RAFAEL HERNANDEZ AIRPORT
RUNWAY 8-26 RECONSTRUCTION

DRAFT
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

PREPARED FOR:

Federal Aviation Administration
Puerto Rico Ports Authority

August 2024

LIST OF ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
°F	Degrees Fahrenheit
AC	Advisory Circular
ACM	Asbestos-Containing Materials
ACS	American Community Survey
ADG	Aircraft Design Group
AIP	Airport Improvement Program
ALP	Airport Layout Plan
APE	Area of Potential Effect
BMP	Best Management Practice
BQN	Rafael Hernandez Airport
BRL	Building Restriction Line
CAA	Clean Air Act
CFR	Code of Federal Regulations
CH_4	Methane
CO_2e	Carbon Dioxide Equivalent
CRAS	Cultural Resources Assessment Survey
CY	Calendar Year
CZMA	Coastal Zone Management Act
dBA	A-Weighted Decibels
DNL	Day-Night Average Sound Level
DOT	Department of Transportation
DSA	Direct Study Area
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJSCREEN	Environmental Justice Screening and Mapping Tool
EO	Executive Order
EPA	United States Environmental Protection Agency
EQB	Puerto Rico's Environmental Quality Board
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
GA	General Aviation
GHG	Greenhouse Gas
JetA	Jet Fuel
LBP	Lead Based Pain
LDA	Landing Distance Available
LOS	Level of Service
MOA	Memorandum of Agreement
MOS	Modification of Design Standard
MTOW	Maximum Take-off Weight
MOVES	Motor Vehicle Emissions Simulator
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standard
NATA	National Air Toxics Assessment
NAVAID	Navigational Aid
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

NO_x	Oxides of Nitrogen
NPIAS	National Plan of Integrated Airport Systems
NPL	National Priorities List
NRHP	National Register of Historic Places
O_3	Ozone
OPSNET	Operations Network
PAPI	Precision Approach Path Indicators
PM_{10}	Particulate Matter Less Than or Equal to 10 Micrometers in Diameter
$PM_{2.5}$	Particulate Matter Less Than or Equal to 2.5 Micrometers in Diameter
PRCZMP	Puerto Rico Coastal Zone Management Program
PRPA	Puerto Rico Ports Authority
PRPB	Puerto Rico Planning Board
PRSHPO	Puerto Rico State Historic Preservation Office
REIL	Runway End Identification Lights
ROFA	Runway Object Free Area
RPZ	Runway Protection Zone
RSA	Runway Safety Area
SC-GHG	Social Cost of Greenhouse Gases
SO_2	Sulfur Dioxide
SOC	Standard Occupational Classification
SO_x	Oxides of Sulfur
SPCC	Spill Prevention, Control, and Countermeasure
SSA	Socioeconomic Study Area
SWPPP	Stormwater Pollution Prevention Plan
TAF	Terminal Area Forecast
TORA	Takeoff Run Available
U.S.C.	United States Code
US	United States
USCG	United States Coast Guard
USFWS	US Fish and Wildlife Service
VOC	Volatile Organic Compounds

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1.0 INTRODUCTION

1.1 AIRPORT DESCRIPTION AND BACKGROUND

Rafael Hernandez Airport (BQN) is one of nine public airports located within the Commonwealth of Puerto Rico and is located approximately 75 miles west of San Juan and four miles northeast of the City of Aguadilla on the northwestern coast of Puerto Rico. **Figure 1.1-1** depicts the location of BQN.

BQN previously served as the Ramey Air Force Base under the control of the United States (US) Air Force Strategic Air Command until 1974. It was then converted into a civilian airport. The Borinquen Air Station, operated by the US Coast Guard (USCG), as well as the 141st Air Control Squadron Mobile Radar Unit of the Puerto Rico Air National Guard, resides at BQN. In its current commercial service capacity, BQN currently services JetBlue Airways, Spirit Airlines, Frontier Airlines, United Airlines, and Emirates, as well as various air cargo operators including FedEx, Caribe Express, IFL Cargo, and Ameriflight.

The Federal Aviation Administration's (FAA's) National Plan of Integrated Airport Systems (NPIAS) report identifies five-year funding needs for airports eligible to receive Airport Improvement Program (AIP) grants. Each airport is classified based on annual enplanements (departing passengers). The 2023-2027 NPIAS classifies BQN as a primary non-hub airport, defined as having less than 0.05 percent (%) of all commercial passenger enplanements but with more than 10,000 annual enplanements.

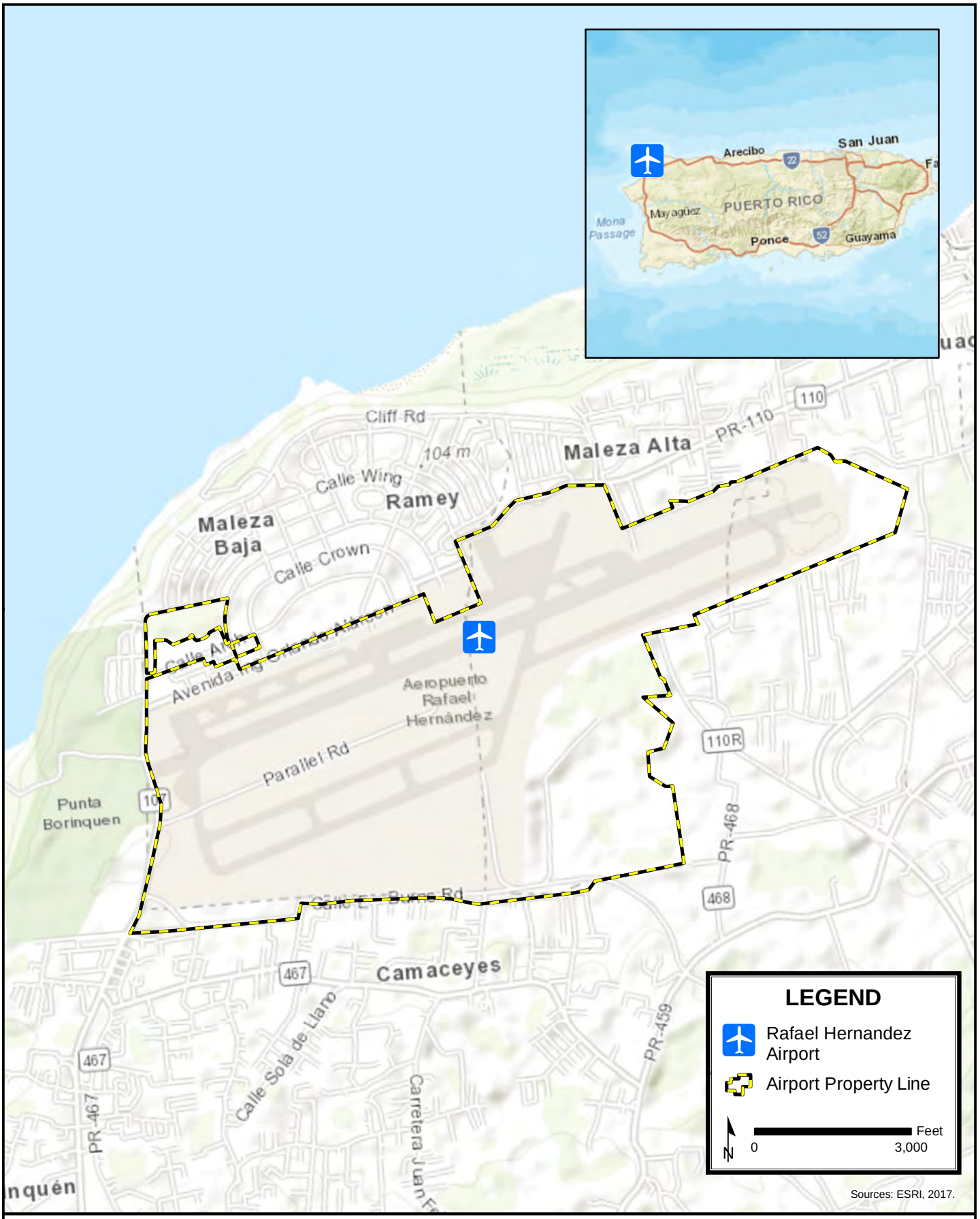
The existing critical aircraft at BQN is currently the Boeing 767-300. The 767-300 was used to determine FAA design and safety standards for Runway 8-26[1], the existing parallel taxiways and cargo apron. The 767-300 has a published approach speed of 130 knots, which places it Aircraft Approach Category C and a wingspan of 156 feet which places it within Aircraft Design Group (ADG) IV.

The future critical aircraft for planning purposes is the Boeing 747-400. Business jet and general aviation (GA) facilities available at BQN accommodate the largest types of business/GA aircraft. The critical aircraft for design purposes is a C-II aircraft (Gulfstream IV).

1.2 EXISTING AIRPORT FACILITIES AT BQN

The BQN Airport Reference Point is located at 18°29'41.50" N Latitude and 67°07'46.00" W Longitude. Primary airside and landslide facilities supporting operations at BQN are described in the following sections. BQN's current Airport Layout Plan (ALP) is included as **Figure 1.1-2**.

1 FAA periodically reviews and updates runway designations and has recently decided to redesignate Runway 8-26 to Runway 9-27. Because runways are designated based on their orientation relative to earth's changing magnetic field, this redesignation more accurately reflects the runway's magnetic declination. This change has been approved on the current Airport Layout Plan for the airport. However, to maintain consistency with the Original 2020 EA and to avoid confusion for the reader, this Supplemental EA maintains the use of Runway 8-26 throughout.



Path: C:\Users\paul.sanford\Desktop\BQN\GIS\mxd\Purpose and Need and Alternatives\180615_Figure 1-1-1 Airport Location_rev0.mxd, Date Saved: 6/15/2018 2:13:01 PM

RAFAEL HERNANDEZ AIRPORT

RUNWAY 8-26 RECONSTRUCTION

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

AIRPORT LOCATION

FIGURE 1.1-1

MODIFICATIONS OF STANDARDS ⚠1

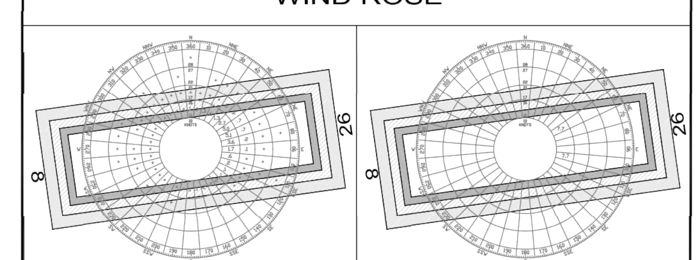
DESCRIPTION	EX. CONDITION	FAA STANDARD	APPROVED	PROPOSED MITIGATION
RUNWAY 8-26 TO TAXIWAY A SEPARATION TO ALLOW B747-8F (ADG VI) OPERATIONS	405'	500'	01/25/2013	NONE

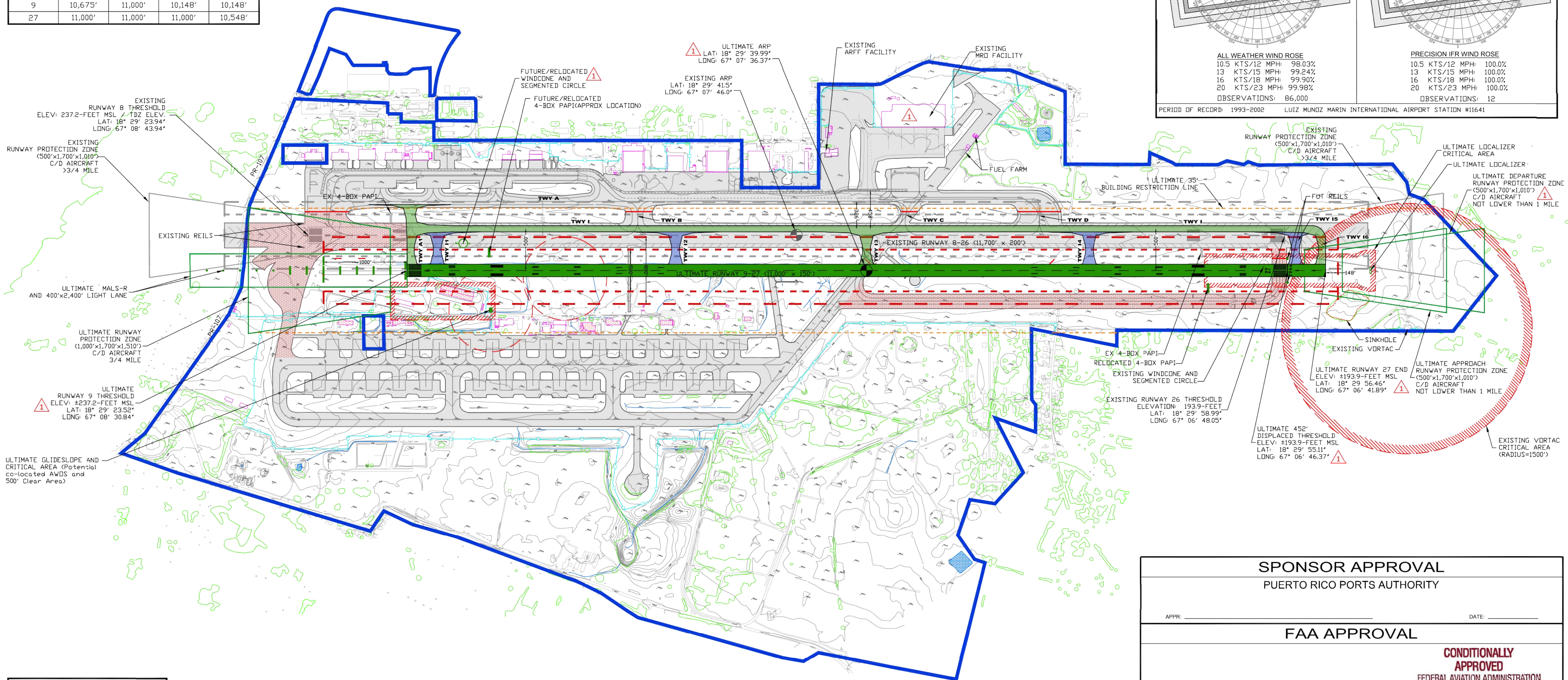
DECLARED DISTANCES ⚠1

ULTIMATE				
RUNWAY	TORA	TODA	ASDA	LDA
9	10,675'	11,000'	10,148'	10,148'
27	11,000'	11,000'	11,000'	10,548'

GRAPHIC SCALE

(IN FEET)
1 inch = 600 ft.





SPONSOR APPROVAL

PUERTO RICO PORTS AUTHORITY

APPR: ____________________ DATE: ____________

FAA APPROVAL

APPR: ____________________

DATE: ____________________

CONDITIONALLY APPROVED
FEDERAL AVIATION ADMINISTRATION
APPROVAL SUBJECT TO COMMENTS IN APPROVAL LETTER
APPROVING OFFICIAL ATLANTA AIRPORTS DISTRICT OFFICE DATE

FAA'S APPROVAL OF THIS AIRPORT LAYOUT PLAN (ALP) REPRESENTS ACCEPTANCE OF THE GENERAL LOCATION OF FUTURE FACILITIES DEPICTED. DURING THE PRELIMINARY DESIGN PHASE, THE AIRPORT OWNER IS REQUIRED TO RESUBMIT FOR APPROVAL THE FINAL LOCATIONS, HEIGHTS, AND EXTERIOR FINISHES OF STRUCTURES. FAA'S CONCERNS ARE OBSTRUCTIONS, IMPACT ON ELECTRONIC AIDS AND ADVERSE EFFECT OF CONTROLLER VIEW OF AIRCRAFT APPROACHES AND GROUND MOVEMENTS WHICH WOULD ADVERSLY AFFECT THE SAFETY, EFFICIENCY OR UTILITY OF THE AIRPORT.

PHASING

PHASE	SYMBOL
I (0-5 YEARS)	(green)
II (6-10 YEARS)	(blue)
III (11-20 YEARS)	(tan)
IV (20+YEARS)	(red)
TO BE DEMOLISHED	(hatched)

LEGEND

DESCRIPTION	EXISTING SYMBOL	FUTURE
RUNWAY SAFETY AREA		
RUNWAY PROTECTION ZONE		
RUNWAY OBJECT FREE AREA		
SPOT ELEVATIONS (ground)	× 170	n/a
AIRPORT REFERENCE POINT		
AIRPORT PROPERTY LINE		SAME
TREE LINE		SAME
5' CONTOURS		SAME
PERIMETER FENCELINE		
HOLD LINES (280' from RW centerline)		SAME
ON AIRPORT BUILDINGS		① hatched by phase
OFF AIRPORT BUILDINGS		SAME
WATER FEATURE		SAME
35' BUILDING RESTRICTION LINE		SAME

ABBREVIATIONS:
- ASR Airport Surveilance Radar
- GS Glide Slope
- LOC Localizer
- NPI Non-Precision Instrument Approach
- OFZ Runway Obstacle Free Zone
- PAPI Precision Approach Path Indicators
- REIL Runway End Identifier Lights
- TBD To Be Determined
- TDZ Touchdown Zone

AIRPORT DATA TABLE

	EXISTING	FUTURE (THROUGH STAGE III)
ESTABLISHED AIRPORT ELEVATION	237.2' MSL	SAME
AIRPORT REFERENCE POINT (ARP)	LAT: 18° 29' 41.50" LON: 67° 07' 46.00"	LAT: 18° 29' 39.99" LON: 67° 07' 36.37" ⚠1
MEAN MAXIMUM TEMP OF HOTTEST MONTH	87.1°F	SAME
NPIAS SERVICE LEVEL	PRIMARY COMMERCIAL	SAME
AIRPORT REFERENCE CODE	D-V	SAME
DESIGN/CRITICAL AIRCRAFT	DC-10-30	B747-400
AIRPORT NAVAIDS/VISUAL AIDS (see also Runway Data Table)	SEGMENTED CIRCLE, BEACON, GPS	SAME + ATCT, ILS, ASR
TAXIWAY LIGHTING/MARKING	MITL/CENTERLINE & EDGE	SAME
MAGNETIC VARIATION AND DATE	12° 3' W (5/25/2005) - NOAA NGDC	

RUNWAY END DATA TABLE

	EXISTING		ULTIMATE	
	RUNWAY 8	RUNWAY 26	RUNWAY 9 ⚠1	RUNWAY 27
LATITUDE / LONGITUDE	18° 29' 23.94" 67° 08' 43.94"	18° 29' 58.99" 67° 06' 48.05"	18° 29' 23.52" 67° 08' 30.84" ⚠1	18° 29 56.46" 67° 06' 41.89"
RUNWAY END ELEVATION	237.2' MSL	193.9' MSL	237.2' MSL	193.9' MSL
DISPLACED THRESHOLDS	NONE	NONE	NONE ⚠1	452'
TDZ ELEVATION	237.2' MSL	210.2' MSL	TBD	TBD
R/W HIGH/LOW POINTS	237.2' / 221' MSL	210.2' / 193.9' MSL	TBD	TBD
T/HOLD SITING SURFACE	NO THRESHOLD SITING SURFACE PENETRATIONS			

NOTES:

1. BASE MAP: 2003 AERIAL PHOTOGRAMETRIC MAPPING/SURVEY.

2. FUTURE RUNWAY END LOCATIONS (i.e. RELOCATION DISTANCES AND COORDINATES) AND ELEVATIONS ARE BASED ON ANALYSIS OF THE 2003 AERIAL PHOTOGRAMETRIC MAPPING/SURVEY AND ARE SUBJECT TO CHANGE PENDING SITE DESIGN AND FIELD VERIFICATION.

RUNWAY DATA TABLE

	EXISTING	ULTIMATE
	RUNWAY 8-26	RUNWAY 9-27 ⚠1
LENGTH AND WIDTH	11,700' x 200'	11,000' x 150'
EFFECTIVE GRADIENT	0.37%	SAME
TRUE BEARING	N072°24'24"E/S252°25'00"W	SAME
PAVEMENT STRENGTH/TYPE	455,000 LBS DBL TANDEM / CONC.& ASPHALT	TBD
RUNWAY SAFETY AREA	500' x 1,000'	SAME
RUNWAY OBJECT FREE AREA	800' x 1,000'	SAME
RUNWAY MARKINGS	NON-PRECISION	PRECISION
RUNWAY LIGHTING	MIRL	HIRL
VISUAL NAVAIDS	RW 8: 4-BOX PAPI, REIL RW 26: 4-BOX PAPI	RW 8: 4-BOX PAPI, REIL, MALSR RW 26: 4-BOX PAPI, REIL
ELECTRONIC NAVAIDS	RW 8: VOR-TAC, GPS RW 26: NONE	RW 8: VOR-TAC, GPS, LOC, GS RW 26: GPS
APPROACH VISIBILITY MINIMUMS	RW 8: NPI, > 1 MILE, 34:1 SLOPE RW 26: VISUAL, 20:1 SLOPE	RW 8: PREC, 3/4 MILE, 50:1 SLOPE RW 26: NPI, 1 MILE, 34:1 SLOPE
OFZ DIMENSIONS	400' x 200'	SAME
OFZ PENETRATIONS	NO OFZ PENETRATIONS	

FINAL DRAWING SET

CAMPBELL AND PARIS ENGINEERS, 4215 LAFAYETTE CENTER DRIVE, SUITE 2, CHANTILLY, VIRGINIA 20151

ENRIQUE RUIZ AND ASSOCIATES, 1226 A. MIRANDA AVENUE, P.O. BOX 1226, SAN JUAN, PUERTO RICO 00936

AUTORIDAD DE LOS PUERTOS — ESTADO LIBRE ASOCIADO DE PUERTO RICO

DESIGNED BY: TSK	DRAWN BY: RC/TSK	CHECKED BY: KSC/GTP	APPROVED BY: GTP/ER
DATE: 2/17/2006	SCALE: AS SHOWN	C&P JOB #: 0201	FILE NAME: sheet2.dwg

NO.	DATE	REVISIONS	BY	APPR.
1	11/21	REVISED TO REFLECT PROPOSED RELOCATION AND RECONSTRUCTION OF RUNWAY 8-26 ALONG WITH ASSOCIATED TAXIWAY IMPROVEMENTS.	ZEN	

RAFAEL HERNANDEZ AIRPORT
AGUADILLA, PUERTO RICO
AIRPORT MASTER PLAN UPDATE
AIRPORT LAYOUT PLAN

FAA AIP NO. 3-72-0020-015-2002

SHEET NO. 2 OF 8

RAFAEL HERNANDEZ AIRPORT
Aguadilla, Puerto Rico
RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

AIRPORT LAYOUT PLAN

FIGURE 1.2-1

D:\Civil 3D Projects\BQN\FIG 1.2-1.dwg 03/20/2024 15:00

1.2.1 AIRSIDE FACILITIES

Airside facilities include the system of runways, taxiways, navigational aids (NAVAIDs), weather aids, and air traffic control facilities that facilitate aircraft operations. Taken together, the following airfield features support current operations at BQN.

1.2.1.1 Runways

Runway 8-26 is 11,700 feet long by 200 feet wide with 50-foot shoulders. The center section of the runway between 2,000 feet and 8,000 feet is comprised of six to eight inches of Portland Cement Concrete, with Asphalt Concrete overlay with thicknesses varying between three and six inches. The runway is serviced primarily by two partial parallel taxiways, Taxiway A and Taxiway M, as well as a traverse diagonal Taxiway C, which ties in with Taxiways E and G providing access to the southwestern apron area.

Runway 8-26 currently is a non-precision instrument approach runway of Aircraft Approach Category C and ADG V. Runway 8-26 and Taxiway A are separated by 405 feet, which meets FAA design standards for taxiway separation per Advisory Circular (AC) 150/5300-13A, Change 1 for ADG V aircraft. The B747-8, an ADG VI aircraft at BQN, operates in contravention of taxiway separation design standards because the required separation is 500 feet compared to 400 feet available. To meet the standard, either the runway, or taxiway, or both would need to be relocated. Therefore, the FAA conditionally approved a Modification of Design Standard (MOS) to allow operations of this aircraft, with conditions on taxiing operations.

1.2.1.2 Taxiways

Runway 8-26 is serviced by two partial parallel taxiways: Taxiway A and Taxiway M. Taxiway A, located north of the runway, is approximately 9,000 feet in length and 75 feet in width with 37.5-foot paved shoulders. Taxiway A provides access to the existing hangars, commercial terminal facility and cargo facilities. Taxiway M, located south of the runway, is 175 feet wide. Other connecting taxiways include Taxiways D, C, E , F, G, H and J.

Taxiway D is an eastward extension of Taxiway A that connects to the runway just east of Taxiway C. Taxiway C is a transverse diagonal taxiway, is closed to aircraft taxiing, and provides access from Runway 8-26 to the south side of the airfield. A portion of Taxiway A is considered to be an apron edge taxilane in front of the commercial and cargo facilities and does not have paved shoulders.

Taxiway F connects the Runway 8 threshold south to Taxiways G and E, which each provide connectivity to the southwest apron areas. Stub connector taxiways across the airfield include Taxiway B providing runway exit access to Taxiway A, and Taxiways H and J which provide north-south connection with Taxiways G and E.

1.2.1.3 Aircraft Parking Aprons

Existing aircraft parking apron space at BQN is divided into a commercial apron, cargo apron, business/GA apron, a government/municipal apron, and an "other/no-use" apron. The commercial apron is

approximately 10,800 square yards and can accommodate up to two B757 type aircraft. The cargo apron is approximately 28,000 square yards and can accommodate multiple large cargo aircraft simultaneously. The apron used by government/municipal agencies is approximately 23,000 square yards and located east of the cargo apron. The business/GA apron is approximately 24,000 square yards and is directly in front of the corporate hangars near the approach end of Runway 8. The "other/no-use" apron is approximately 444,000 square yards and consists of the "Charlie" parking apron on the northeast side of the Airport and 30 parking stubs on the south side of the Airport.

1.2.1.4 Other Facilities

Visual NAVAIDs located at BQN include pavement marking, runway lighting, runway end identification lights (REILs), precision approach path indicators (PAPIs), wind cones, segmented circles, and rotating beacons. Runways 8 and 26 both have four-box PAPIs and supplemental wind cones. Runway 8 also has REILs that can be activated via the common traffic advisory frequency. A segmented circle is co-located at both runway ends with the supplemental wind cones. A rotating green-white-green beacon is also located on the airfield on top of the abandoned air traffic control tower.

1.2.2 LANDSIDE FACILITIES

BQN is accessed from the east via Puerto Rico Highway 2 to Puerto Rico Route 110. Access from Highway 2 to BQN via Route 110 is not direct. Route 110 is a two-lane roadway that loops around the end of Runway 26 to connect to the interior road network of the old Ramey Air Force Base (i.e., Wing Road and Hangar Road) which ultimately leads to a majority of the existing landside facilities at BQN. BQN is accessed from the City of Aguadilla to the south via Puerto Rico Route 107 which then connects with the interior road network of the old Ramey Air Force base. A portion of Route 107 passes through a 1,000-foot paved overrun to Runway 26. Route 107 is a two-lane roadway that, unlike Route 110, provides direct access to the BQN facilities.

Primary landside facilities at BQN include 51 buildings, 17 of which were vacant as of 2005, and a fuel farm. Direct airfield users include users of the passenger terminal facility, air cargo operators, and the Western Aviation Services Corporation which is the Fixed Based Operator at BQN. The Borinquen Air Station is operated by the USCG whose primary roles are search and rescue, secondary law enforcement, aerial support for the Aids to Navigation program and logistic support.

The fuel farm, located in the northeastern portion of the airfield across from the Aircraft Rescue and Fire Fighting facility, has approximately 199,000 gallons of fuel capacity in fourteen tanks that are operated by two tenants. Western Aviation operates five jet fuel (JetA) tanks with capacities of 20,000 gallons each, one Aviation Gasoline tank with a 12,000-gallon capacity, and one diesel tank with an 8,000-gallon capacity. Copeca Jet Center operates five JetA tanks, each with a 15,000-gallon capacity, one 2,000-gallon capacity gasoline tank, and one 2,000-gallon capacity diesel tank.

1.2.3 AVIATION ACTIVITY AT BQN

According to the FAA Operations Network (OPSNET) database, a total of 47,880 aircraft operations were conducted in 2022. Additionally, the FAA's Terminal Area Forecast (TAF) is the official forecast of

aviation activity for US airports and is used for the budgeting and planning needs of the FAA. Currently, the TAF summarizes activity between 1990 and 2050 at BQN. **Table 1.2-1** presents a consolidated summary of the aircraft operational forecasts for years pertinent to this EA.

TABLE 1.1-1 BASELINE AND FORECAST OPERATIONS

Category	Year		
	2022	2029	2034
Air Carrier	6,204	7,810	8,489
Air Taxi/Commuter	1,735	1,743	1,832
GA	29,353	40,708	41,379
Military	10,588	10,302	10,302
Total	**47,880**	**60,563**	**62,002**

Sources: OPSNET 2024 (baseline year); FAA Terminal Area Forecast 2024 (future years).

1.3 DESCRIPTION OF THE PROPOSED PROJECT

The Current Proposed Project and associated airfield improvements, which are the subject of this Supplemental Environmental Assessment (EA), would provide an air carrier runway of sufficient strength and adequate length to accommodate existing and future operations of the existing and projected future aircraft fleet at BQN. Once completed, the runway would comply with all current FAA design and safety standards. The Current Proposed Project would also provide an air carrier runway of sufficient strength and adequate length to accommodate existing and future operations of the existing and projected future aircraft fleet at BQN during rehabilitation and reconstruction activities. Large portions of the existing runway show signs of pavement deterioration and ponding is present along the length of the runway. As a result of this condition, BQN is not in compliance with 14 Code of Federal Regulations (CFR) Section (§) 139.305(a)(6).

Specifically, the Current Proposed Project would construct a new permanent asphalt concrete Runway 8-26 to replace the existing Runway 8-26 (**Figure 1.3-1**). Four new taxiway connections would be installed along the runway's length. The new runway would be 11,000 long by 150 feet wide, situated approximately 420 feet south and approximately 900 feet east of the existing Runway 8-26. This would achieve current FAA design standards and land use compatibility requirements for Runway Protection Zones (RPZ), as directed by FAA AC 150/5300-13A, Change 1, by applying a displaced threshold of 452 feet on Runway 26, and utilizing declared distances. This would reduce usable take-off runway length to 10,600 feet on Runway 8, and further reduce useable landing lengths to 10,548 feet on Runway 26 and 10,148 feet on Runway 8. All RPZ areas would be contained on Airport property. Taxiway M, as well as connecting taxiway pavement off the existing Runway 8 threshold, would need to be demolished. On the south campus, multiple buildings contained within the primary surface and/or approach surface of the new runway would need to be removed.

1.3.1 COMPARISON WITH PREVIOUS EA

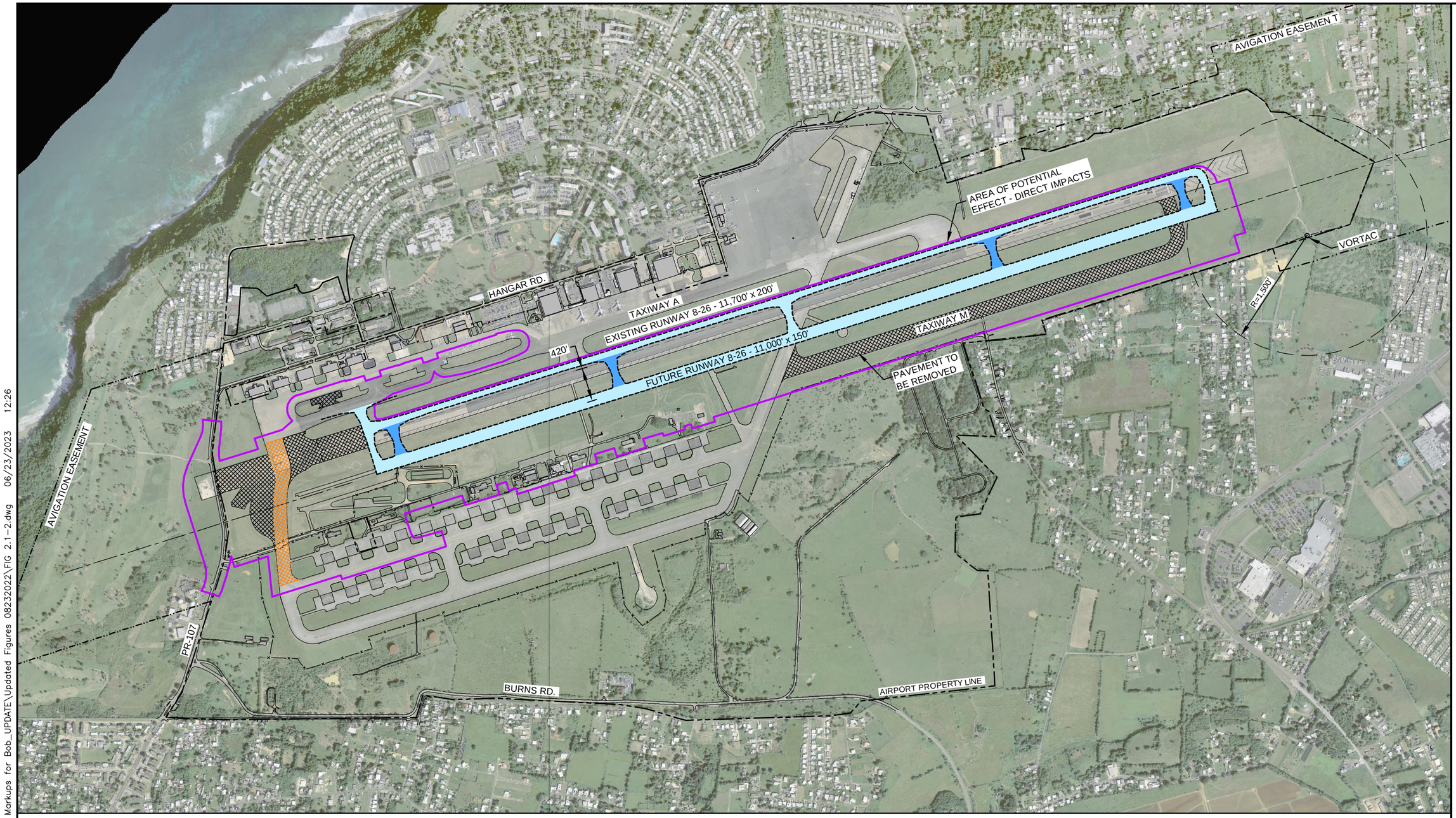
The Original Proposed Project, as proposed in the 2020 EA (Alternative 2B, **Figure 1.3-2**), would shift Runway 8-26 500 feet south and 862 feet east of current alignment. This would achieve current FAA design standards and land use compatibility requirements for RPZs, as directed by FAA AC 150/5300-13A,

Change 1, by applying a displaced threshold of 325 feet on Runway 8, 130 feet on Runway 26, and utilizing declared distances. This would reduce usable take-off runway length to 10,698 feet on Runway 26 and further reduce useable landing length to 10,870 feet on Runway 26, and 10,145 feet on Runway 8. All RPZ areas would be contained on Airport property. The asphalt concrete Runway would measure 11,000 long by 200 feet wide and feature multiple new taxiway connections. Like the Current Proposed Project, Alternative 2B would require demolition of Taxiway M, Runway 8 connecting pavement, and several buildings on the south campus.

Since the 2020 EA, the Puerto Rico Ports Authority (PRPA) has identified the need for a change to the Proposed Project compared to Alternative 2B in the EA. Alternative 2B's runway layout and geometry was driven in part by the need to avoid the Runway Safety Area (RSA) intersecting a suspected sinkhole on the eastern end of the existing Runway 8-26. Since preparation of the 2020 EA, additional geotechnical investigation has determined that the feature in question is not a sinkhole but rather a stable depressional feature. Therefore, there is no longer a need to avoid that feature.

As a result, the preferred alternative is now the Current Proposed Project, which is described in **Section 1.3** and is located approximately 80 feet to the north of Alternative 2B included in the 2020 EA, and approximately 420 feet east (**Figure 1.3-1).** This change is hereinafter referred to the "Current Proposed Project," compared to Alternative 2B, which is hereinafter referred to as the "Original Proposed Project".

Alternative 2B in the EA (i.e., the Original Proposed Project) required the demolition of both historic and contemporary structures to the south of the proposed Runway 8-26 because the buildings were either within the Building Restriction Line (BRL) of the proposed Runway, the Runway Object Free Area (ROFA), or penetrated approach, primary and transitional airspace obstruction surfaces, which made them a hazard to airport operations and navigable airspace with the project. The airspace assessment of Alternative 2B from the 2020 EA is depicted on **Figure 1.3-3**. In comparison, the relationship of the buildings to the imaginary obstruction surfaces and BRL with the Current Proposed Project is shown on **Figure 1.3-4**.



LEGEND

- NEW RUNWAY ALIGNMENT
- FUTURE TAXIWAY CONNECTIONS
- TO BE DEMOLISHED UPON TAXIWAY CONNECTION TO THE SOUTH
- AREA OF POTENTIAL EFFECT DIRECT IMPACTS

N

1000 0 1000

GRAPHIC SCALE IN FEET

RAFAEL HERNANDEZ AIRPORT
Aguadilla, Puerto Rico
RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

CURRENT PROPOSED PROJECT

FIGURE 1.3-1

C:\Civil 3D Projects\BQN\BQN Figure Markups for Bob_UPDATE\Updated Figures 08232022\FIG 2.1-2.dwg 06/23/2023 12:26

RAFAEL HERNANDEZ AIRPORT
Aguadilla, Puerto Rico

RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTLAL ENVIRONMENTAL ASSESSMENT

ORIGINAL PROPOSED PROJECT
(EA ALTERNATIVE 2B)

AVIGATION EASEMENT T
AREA OF POTENTIAL EFFECT - DIRECT IMPACTS
VORTAC
R=1,500'
HANGAR RD.
TAXIWAY A
EXISTING RUNWAY 8-26 - 11,700' x 200'
500'
FUTURE RUNWAY 8-26 - 11,000' x 200'
TAXIWAY M
130' DISPLACED THRESHOLD
PAVEMENT TO BE REMOVED
AVIGATION EASEMENT
862'
325' DISPLACED THRESHOLD
PR-107
BURNS RD.
AIRPORT PROPERTY LINE

LEGEND

- INITIAL PAVEMENT CONSTRUCTION (ALTERNATIVE 2B)
- FUTURE TAXIWAY CONNECTIONS (ONCE JUSTIFIED) (ALTERNATIVE 2B)
- TO BE DEMOLISHED UPON TAXIWAY CONNECTION TO THE SOUTH (ALTERNATIVE 2B)
- AREA OF POTENTIAL EFFECT DIRECT IMPACTS (ALTERNATIVE 2B)

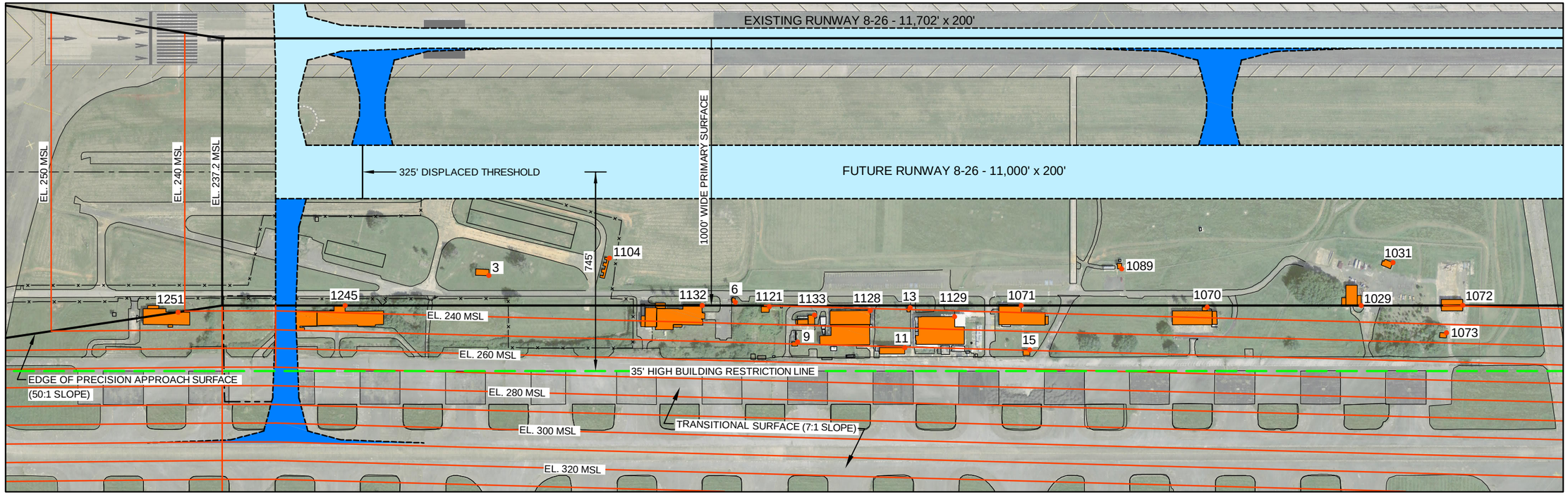
N

1000 0 1000

GRAPHIC SCALE IN FEET

FIGURE
1.3-2

C:\Civil 3D Projects\BQN\BQN Figure Markups for Bob_UPDATE\Updated Figures 08232022\FIG 2.1-1.dwg 06/23/2023 12:26



PLAN VIEW

OBSTRUCTION DATA TABLE

NO.	DESCRIPTION	LATITUDE	LONGITUDE	GROUND ELEVATION FEET (MSL)	BUILDING HEIGHT (FEET)	BUILDING ELEVATION FEET (MSL)	LOWEST AFFECTED FAR PART 77 SURFACE	SURFACE ELEVATION FEET (MSL)	PENETRATION (FEET)
1251	BUILDING	N 18°29'15.74"	W 067°08'35.79"	245	15	260	RUNWAY 8 APPROACH	240.5	19.5
1245	BUILDING	N 18°29'17.84"	W 067°08'29.67"	238	12	250	PRIMARY	236.2	13.8
3	BUILDING	N 18°29'20.52"	W 067°08'24.70"	242	12	254	PRIMARY	234.1	19.9
1104	BUILDING	N 18°29'22.49"	W 067°08'20.43"	240	12	252	PRIMARY	232.3	19.7
1132	BUILDING	N 18°29'21.85"	W 067°08'16.44"	233	25	258	PRIMARY	230.9	27.1
6	BUILDING	N 18°29'22.33"	W 067°08'15.25"	231	15	246	PRIMARY	230.4	15.6
1121	BUILDING	N 18°29'22.56"	W 067°08'13.94"	231	15	246	7:1 TRANSITIONAL	230.5	15.5
1133	BUILDING	N 18°29'22.77"	W 067°08'12.16"	234	20	254	7:1 TRANSITIONAL	234.3	19.7
9	BUILDING	N 18°29'21.63"	W 067°08'12.47"	234	15	249	7:1 TRANSITIONAL	249.0	0.0
1128	BUILDING	N 18°29'23.55"	W 067°08'10.15"	231	30	261	7:1 TRANSITIONAL	231.2	29.8
11	BUILDING	N 18°29'22.63"	W 067°08'08.43"	232	25	257	7:1 TRANSITIONAL	250.4	6.6
13	BUILDING	N 18°29'24.10"	W 067°08'08.71"	232	15	247	7:1 TRANSITIONAL	229.0	18.0
1129	BUILDING	N 18°29'24.29"	W 067°08'06.95"	232	30	262	7:1 TRANSITIONAL	233.1	28.9
15	BUILDING	N 18°29'23.95"	W 067°08'03.78"	231	12	243	7:1 TRANSITIONAL	249.8	-6.8
1071	BUILDING	N 18°29'25.42"	W 067°08'04.61"	231	15	246	PRIMARY	226.2	19.8
1089	BUILDING	N 18°29'27.85"	W 067°08'01.32"	230	25	255	PRIMARY	224.7	30.3
1070	BUILDING	N 18°29'27.46"	W 067°07'57.70"	228	15	243	7:1 TRANSITIONAL	224.3	18.7
1029	BUILDING	N 18°29'29.24"	W 067°07'52.02"	223	30	253	PRIMARY	221.2	31.8
1031	BUILDING	N 18°29'31.11"	W 067°07'51.34"	226	15	241	PRIMARY	220.7	20.3
1072	BUILDING	N 18°29'30.38"	W 067°07'48.25"	225	20	245	PRIMARY	219.7	25.3
1073	BUILDING	N 18°29'29.23"	W 067°07'48.53"	223	12	235	7:1 TRANSITIONAL	234.5	0.5

LEGEND
- INITIAL PAVEMENT CONSTRUCTION
- FUTURE TAXIWAY CONNECTIONS (ONCE JUSTIFIED)
- AFFECTED BUILDINGS
- 240 MSL — 7:1 TRANSITIONAL SURFACE CONTOUR
- BUILDING RESTRICTION LINE
- 1251 — OBSTRUCTION POINT LOCATION

N

400 0 400

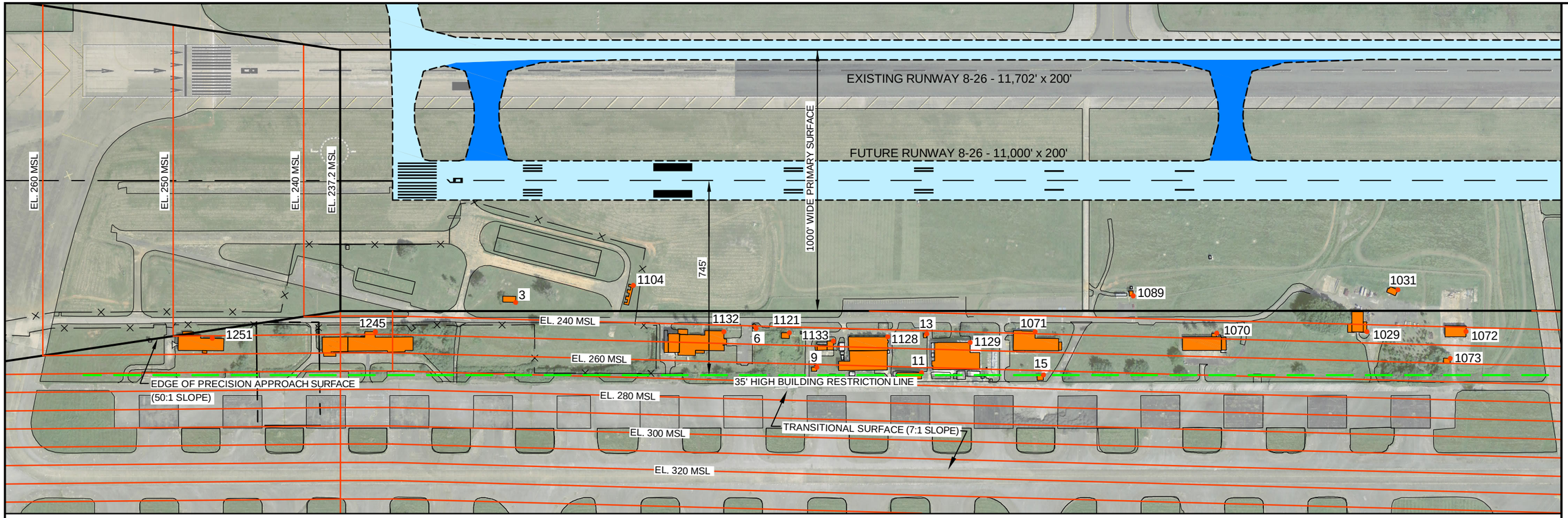
GRAPHIC SCALE IN FEET

RAFAEL HERNANDEZ AIRPORT
Aguadilla, Puerto Rico
RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

ORIGINAL PROPOSED PROJECT
(BUILDINGS WITHIN PROPOSED IMAGINARY SURFACES)

FIGURE 1.3-3

C:\Civil 3D Projects\BQN\BQN Figure Markups for Bob_UPDATE\FIGURE 12.dwg 04/21/2022 15:42



PLAN VIEW

OBSTRUCTION DATA TABLE

NO.	DESCRIPTION	LATITUDE	LONGITUDE	GROUND ELEVATION FEET (MSL)	BUILDING HEIGHT (FEET)	BUILDING ELEVATION FEET (MSL)	LOWEST AFFECTED FAR PART 77 SURFACE	SURFACE ELEVATION FEET (MSL)	PENETRATION (FEET)
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1121	BUILDING	N 18°29'22.56"	W 067°08'13.94"	231	15	246	7:1 TRANSITIONAL	243.1	2.9
1133	BUILDING	N 18°29'22.77"	W 067°08'12.16"	234	20	254	7:1 TRANSITIONAL	247.0	7.0
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1129	BUILDING	N 18°29'24.29"	W 067°08'06.95"	232	30	262	7:1 TRANSITIONAL	245.7	16.3
15	BUILDING	N 18°29'23.95"	W 067°08'03.78"	231	12	243	7:1 TRANSITIONAL	262.4	-19.4
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1073	BUILDING	N 18°29'29.23"	W 067°07'48.53"	223	12	235	7:1 TRANSITIONAL	247.2	-12.2

LEGEND
- INITIAL PAVEMENT CONSTRUCTION
- FUTURE TAXIWAY CONNECTIONS (ONCE JUSTIFIED)
- AFFECTED BUILDINGS
- 240 MSL — 7:1 TRANSITIONAL SURFACE CONTOUR
- BUILDING RESTRICTION LINE
- 1251 — OBSTRUCTION POINT LOCATION

N

400 0 400

GRAPHIC SCALE IN FEET

RAFAEL HERNANDEZ AIRPORT
Aguadilla, Puerto Rico
RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

CURRENT PROPOSED PROJECT
(BUILDINGS WITHIN PROPOSED IMAGINARY SURFACES)

FIGURE 1.3-4

C:\Civil 3D Projects\BQN\BQN Figure Markups for Bob_UPDATE\FIGURE 13.dwg 04/21/2022 15:46

2.0 PURPOSE AND NEED

2.1 AIRPORT SPONSOR'S PURPOSE AND NEED

As stated in the 2020 EA, the purpose of the proposed runway and associated airfield improvements is twofold: 1) provide an air carrier runway of sufficient pavement strength and condition to accommodate existing and future operations at BQN; and 2) maintain adequate runway length for the existing and future aircraft fleet mix using BQN during pavement rehabilitation and reconstruction (see **Section 2.1.1** for details). The need for the Proposed Project is to remedy deteriorating runway pavement conditions and allow for safe continued operation of the airport, provide adequate take-off length for air carrier operations while minimizing the need for payload restrictions, and to adhere fully to FAA regulations on design and safety standards and surrounding land use compatibility. The details of the purpose and need for the Proposed Project are the same as the 2020 EA and remain valid, and are hereby incorporated by reference. Because the aircraft fleet mix at BQN has changed since the 2020 EA, the runway length analysis contained in the 2020 EA has been validated and updated and is discussed in **Section 2.1.1**).

2.1.1 RUNWAY LENGTH ANALYSIS

The 2020 EA presented a runway length analysis which evaluated take-off length requirements for many large commercial aircraft operating at BQN at the time. It concluded that a runway length of 11,000 feet would be sufficient for all passenger and cargo aircraft flying to the continental US to operate at 100% operating load, but that long-range international aircraft take-off operations are restricted to no more than 90% payload capacity.

For this EA, data supplied by current air carriers was evaluated to determine the runway length requirements of the existing large commercial and cargo air carrier aircraft fleet, using the same methodology as the 2020 EA. Like the 2020 EA, appraisal of the carrier data, including origins and destinations, determined that air carrier aircraft typically operate between 70% and 100% of their maximum payload. **Table 2.1-1** presents the updated runway length analysis for take-off operations and affirms the conclusions of the 2020 EA that 11,000 feet of runway length as proposed is still adequate to satisfy the purpose and need of the Proposed Project while avoiding payload restrictions.

TABLE 2.1-1 RUNWAY LENGTH REQUIREMENTS FOR AIR CARRIER FLEET AT BQN

Carrier	Aircraft	Takeoff Length Required, by % MTOW (feet)			
		70%	80%	90%	100%
United Airlines	B737-900	7,450	8,050	9,050	10,500
JetBlue Airways	A320-232	4,300	4,550	4,950	5,250
	EMB190	4,450	4,900	5,350	5,650
	A321-200	4,850	5,150	5,400	5,750
Spirit Airlines	A319-100	4,000	4,000	4,200	4,400
	A320-232	4,100	4,350	4,550	4,700
	A321-231	4,550	4,850	4,950	5,450
	A320 NEO	4,150	4,500	4,700	4,950

Carrier	Aircraft	Takeoff Length Required, by % MTOW (feet)			
		70%	80%	90%	100%
Federal Express	B767-300F	5,900	6,450	7,200	7,800
Frontier Airlines	A320-214	4,000	4,000	5,000	7,100
	A320-250N	4,000	4,300	5,000	6,800
	A321-211	4,000	5,000	6,100	9,500
Emirates	B777-F	5,500	6,200	8,000	10,800

MTOW = Maximum Take-off Weight. Analysis performed assuming sea level elevation and Standard Day Temperature +27 degrees Fahrenheit.
Source: AECOM, 2024

2.2 REQUESTED FEDERAL ACTION

According to FAA *Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, paragraph 201, airport sponsors, not the FAA, own and operate public-use airports in the US and its territories. As a result, airport sponsors are responsible for deciding when and where airport development is needed for building and operating airport facilities. Airport sponsors may seek FAA approvals for changes to their ALP and for Federal Grant funds under the AIP to build airport facilities.

The FAA is responsible for complying with NEPA whenever an Airport Sponsor seeks approval of an ALP or proposed airport projects necessitating an ALP revision; project eligibility for Federal grant-in-aid funds; development of air traffic control and management procedures; and other actions. FAA's decision making process for airport projects must consider the environmental, social, economic, and technical factors of a Proposed Project and those reasonable alternatives that meet the Purpose and Need. The FAA reviewed the Current Proposed Project, and determined that a Supplemental EA could be completed to update the 2020 EA Environmental Decision by disclosing any new or changed potential environmental impacts associated with the Current Proposed Project compared to the 2020 EA, and for the agency to fulfill its obligations under FAA Orders 1050.1F and 5050.4B.

The specific Federal actions being requested through this Supplemental EA are the same as the 2020 EA and include:

- Approval necessary to proceed with the processing of an application for Federal funding for those Proposed Project development items qualifying under the former Airport and Airway Improvement Act of 1982, as amended and re-codified at 49 US Code (U.S.C.) 4701, et seq.
- Unconditional approval[2] of the ALP that depicts the Proposed Project; and
- Modification or cancellation of Terminal Instrument Procedures as necessary for relocated Runway 8-26.

2 The FAA's "unconditional approval" of an ALP, or portions thereof, signals that: 1) the proposed ALP features are safe and efficient, 2) the FAA has completed its environmental review, and 3) the FAA has authorized the Airport Sponsor or Project Proponent to proceed with implementing the Proposed Project (FAA Order 5050.4B, 2006). It does not represent a commitment of Federal financial assistance nor even a determination of project feasibility, eligibility or justification.

2.3 TIMEFRAME OF THE PROPOSED PROJECT

The construction period for the Current Proposed Project would begin sometime in Calendar Year (CY) 2024 and end in CY 2028. Environmental analysis of Proposed Project operational impacts, once the project is fully completed, would be CY 2029, constituting the first full year of operations. For disclosure of potential additional operational impacts due to the Proposed Project, the forecast year 2034 will also be studied in the EA to the extent such study is warranted under the NEPA.

3.0 ALTERNATIVES

3.1 SUMMARY OF PREVIOUS EVALUATION

Chapter 3 of the 2020 EA summarizes the screening process used in the EA to identify, compare, and evaluate a range of alternatives to the Original Proposed Project, inclusive of: an overview of the structure of the alternatives screening process and analysis used in the EA; a description of reasonable alternatives to the Proposed Project, including the No-Action Alternative; a concise statement explaining why some alternatives were eliminated from further evaluation in the EA; and identification of reasonable alternatives retained for further evaluation in the EA. The alternatives analysis presented in the 2020 EA remains valid and applicable to the Current Proposed Project and is hereby incorporated by reference.

3.1.1 ALTERNATIVES CONSIDERED

Alternatives for temporary and permanent runway reconstruction considered in the 2020 EA are summarized on **Table 3.1-1**. A screening process was applied in the 2020 EA to the Alternatives on **Table 3.1-1**, such that not all Alternatives considered in the 2020 EA were retained for detailed analysis. The 2020 EA also considered a No-Action Alternative pursuant to the NEPA. The No-Action Alternative briefly examined the environmental consequences that would result if none of the Proposed Action Alternatives were implemented (i.e., no change from the actions and conditions already present at the Airport). The No-Action Alternative served as a means of comparing the environmental consequences of implementing an Action Alternative to the environmental conditions that would exist if No-Action is taken (i.e., not implementing or constructing the project).

3.1.2 EVALUATION CRITERIA

The 2020 EA alternatives screening process for the reconstruction of Runway 8-26 consisted of the following three levels:

- Level 1 – Purpose and Need
- Level 2 – Operations and Constructability
- Level 3 – Environmental Impacts

The alternatives screening was applied in a stepwise fashion; that is, only alternative(s) meeting the Purpose and Need (i.e., Level 1) were further evaluated in terms of operations and constructability (i.e., Level 2) and, subsequently, potential impact upon key environmental resources (i.e., Level 3).

Alternatives passing all three levels of screening were carried forward for more detailed analysis in the 2020 EA, whereas alternatives not passing these screening levels were eliminated from further consideration. Only Alternative 2B and Alternative 2D passed all three screening levels and were carried forward for more detailed analysis in the 2020 EA. As stated previously, the No-Action Alternative was carried forward in the 2020 EA regardless of the screening process results. The alternatives evaluation

process, screening criteria, and results are presented in detail in the 2020 EA and are hereby incorporated by reference in this Supplemental EA.

TABLE 3.1-1 2020 ENVIRONMENTAL ASSESSMENT ALTERNATIVES SUMMARY

Alternative	Description
1B	Reconstruct Runway 8-26 in place, 243 feet east of current alignment. Demolish airfield buildings and structures to accommodate ROFA of temporary runway. Achieve current FAA design standards and land use compatibility requirements for RPZs, as directed by AC 150/5300-13A, Change 1, by applying a displaced threshold of 915 feet on Runway 26, and utilizing declared distances. Reduce usable runway length to 10,085 feet Takeoff Run Available (TORA) on Runway 26, and 10,950 feet Landing Distance Available (LDA) on Runway 8. All RPZ areas would be contained on Airport property.
1C	Reconstruct Runway 8-26 in place, 478 feet east of current alignment. Demolish airfield buildings and structures to accommodate ROFA of temporary runway. Achieve current FAA design standards and land use compatibility requirements for RPZs, as directed by AC 150/5300-13A, Change 1, by applying a displaced threshold of 400 feet on Runway 8, a displaced threshold of 245 feet on Runway 26, and utilizing declared distances. Reduce usable runway length to 10,600 feet TORA on Runway 26, 10,715 feet TORA on Runway 8. Reduce LDA on Runway 8 to 10,715 feet on Runway on Runway 8 and 10,755 on Runway 26. Realign approximately 2,060 lineal feet of Borinquen Avenue (Route 107) to avoid placement in RPZ.
2B	Reconstruct a new Runway 8-26 500 feet south and 862 feet east of current alignment. Achieve current FAA design standards and land use compatibility requirements for RPZs, as directed by AC 150/5300-13A, Change 1, by applying a displaced threshold of 325 feet on Runway 8, 130 feet on Runway 26, and utilizing declared distances. Reduce usable runway length to 10,698 feet TORA on Runway 26, 10,870 feet LDA on Runway 26, and 10,145 feet LDA on Runway 8. All RPZ areas would be contained on Airport property. RSA and ROFA would partially overlap what was assumed to be a sinkhole at this time of the 2020EA.
2C	Reconstruct a new Runway 8-26 500 feet south and 862 feet east of current alignment. Achieve current FAA design standards and land use compatibility requirements for RPZs, as directed by AC 150/5300-13A, Change 1, by applying a displaced threshold of 325 feet on Runway 8, 130 feet on Runway 26 utilizing declared distances and realigning 2,060 lineal feet of Borinquen Avenue (Route 107). Reduce usable runway length to 10,145 feet LDA on Runway 8 and 10,870 feet LDA on Runway 26. RSA and ROFA would partially overlap what was assumed to be a sinkhole at this time of the 2020 EA.
2D	Reconstruct a new Runway 8-26 500 feet south and 1,187 feet east of current alignment. Achieve current FAA design standards and land use compatibility requirements for RPZs, as directed by AC 150/5300-13A, Change 1, by applying a displaced threshold of 452 feet on Runway 8, and utilizing declared distances. Reduce usable runway length to 10,148 feet LDA on Runway 8, 10,548 feet LDA on Runway 26, and 10,675 TORA on Runway 8. RSA and ROFA would partially overlap what was assumed to be a sinkhole at this time of the 2020 EA.
No-Action	For comparative purposes under NEPA, impacts of each project Alternative described above will be assessed against the option of taking No-Action (i.e., not implementing or constructing the project).

Sources: AECOM, 2017; Rafael Hernandez Airport Runway 8-26 Reconstruction Final Environmental Assessment, September 1, 2020.
Note: Documented sinkhole described for Alternative 2B, Alternative 2C, and Alternative 2D was subsequently determined to be a stable depressional feature.

3.2 ANALYSIS OF CURRENT PROPOSED PROJECT

The Current Proposed Project has been evaluated against the same criteria and factors as the Alternatives presented in the 2020 EA. The results are described in the forthcoming sections and indicate that the Proposed Project meets or exceeds all alternatives evaluation criteria and is carried forward for supplemental environmental analysis in this EA. Also, the No-Action Alternative, despite not meeting the purpose and need for the Proposed Project, is also carried forward for evaluative purposes.

3.2.1 PURPOSE AND NEED

3.2.1.1 Criteria #1 – Pavement Strength and Condition

The Current Proposed Project presented in this EA would accommodate the needed reconstruction and/or rehabilitation of Runway 8-26 pavements. Construction activities necessary for implementing the Proposed Project support a construction phasing approach that would preserve operational capability at BQN during the construction period.

3.2.1.2 Criteria #2 – Adequate Runway Length for Aircraft Fleet

As described in **Section 2.1.1**, re-evaluation and update of the runway length analysis contained in the 2020 EA corroborates the previous findings that 11,000 feet of runway length is adequate for the aircraft fleet operating at BQN and minimizes the need for payload restrictions on operations. However, as described in Chapter 1, the Current Proposed Project applies declared distances and a displaced threshold to keep all RPZs on airport property, meaning that less than the full 11,000 feet may be available depending on the type of operation and the runway end utilized.

Table 2.1-1 indicates that the most demanding aircraft in terms of runway length are the B777F operated by Emirates and the B737-900 operated by United Airlines, which require take-off lengths of 10,800 and 10,500 feet respectively at 100% operating load. Emirates operates their aircraft in a long-range international capacity where as close to 100% payload capacity as possible is needed. United Airlines operates their aircraft in a domestic capacity but destinations are typically to Newark which would be considered a long range flight. In comparison, available take-off run available on Runway 8 is 10,600 feet due to application of displaced thresholds and declared distances. Accordingly, although the Current Proposed Project is adequate for a majority of operations at BQN, operations of the B777F and/or the B737-900 may be situationally payload restricted. For context, in the 2020 EA operators of long range aircraft indicated that a minimum take-off length of 10,500 is desired.

Based on the foregoing analysis, the Current Proposed project continues to meet this purpose and need criterion.

3.2.1.3 Criteria #3 – Compliance with FAA Design and Safety Standards

As previously discussed, full compliance with design and safety standards for RPZs and other safety areas can be achieved for the Current Proposed Project through the application of a displaced threshold and

declared distances to keep all RPZs on airport property. However, as shown on **Figure 1.3-4,** buildings 3, 1104, 1089, and 1031 are located in the primary surface and cannot remain. Seventeen additional buildings are within the BRL. These buildings are also located in the 7:1 transitional surface of the runway and would be considered obstructions to navigable airspace. Also shown on the figure, the majority of these buildings penetrate the 7:1 surface by a significant amount, with the only exceptions being buildings 9, 11, 15 and 1073. Previous airspace analysis has determined that none of these buildings can persist in the transitional surface without compromising the operational capabilities of arriving and departing aircraft. Therefore, the FAA has determined that all buildings shown on **Figure 1.3-4** must be demolished as part of the current Proposed Project in order to achieve compliance with Part 77 regulations.

3.2.2 OPERATIONS AND CONSTRUCTABILITY

Below is a synopsis of the Level 2 Operations and Constructability evaluation for the Current Proposed Project:

- Accessibility and Operational Considerations: The Current Proposed Project meets FAA runway separation requirements, and therefore, provide regular unrestricted use of larger ADG VI aircraft. The existing MOS would no longer be required.
- Land Acquisition Requirements: The Current Proposed Project would not require land acquisition to achieve land use compatibility in RPZs.
- Land Use Compatibility: With a 452 foot displaced threshold and application of declared distances, all RPZs remain on airport property and the Current Proposed Project would not create any land use incompatibility within RPZs and other safety areas. Noise and land use compatibility impacts are further addressed in Chapter 4.
- Potential Interference with Planned Airport Development: The Current Proposed Project would not impede or eliminate the ability of the PRPA to execute long-range development plans for passenger terminal building, terminal aprons and cargo facilities planned in the southwest quadrant of BQN, all of which are immediately adjacent to the Proposed Project. The Current Proposed Project affords major new development on the eastern end of the newly converted parallel taxiway, and allows for future apron expansion with taxilane in the northwest apron areas.

3.2.3 POTENTIAL ENVIRONMENTAL IMPACTS

At a screening level, potential environmental impacts to physical resources on or surrounding BQN were evaluated and are summarized below:

- Biological Resources: During the 2020 EA, FAA coordinated with the US Fish and Wildlife Service (USFWS) regarding land cover conversions which could potentially affect suitable habitat for the federally-endangered Puerto Rican Boa and the federally-threatened Roseate Tern. The Current Proposed Project occurs entirely within the previous limits of disturbance established for the 2020 EA. The USFWS has concurred that there would be no significant impacts to these species. The USFWS has further concluded in a letter dated July 31, 2018 that the Proposed Project

would not result in effects to listed species or designated critical habitat, and therefore further consultation pursuant to Section 7 of the Endangered Species Act is not required.

- Department of Transportation (DOT) Act Section 4(f) Resources: The Current Proposed Project requires the demolition of 21 structures south of the proposed Runway 8-26 reconstruction location to comply with 14 CFR 77.17(a)(5), which prevents the persistence or placement of objects within the surface of a takeoff and/or landing area of an airport, or within any imaginary surface (including, primary, horizontal, conical, approach or transitional surfaces). Sixteen of these structures were constructed as part of the former Ramey Air Force Base (the current site of BQN). Similarly, the existing Runway 8-26 is largely comprised of pavements that were emplaced when BQN was in use as either Borinquen Field (World War II era) or Ramey Air Force Base (Cold War era). Reconfiguring the runway to a taxiway would alter the function of the structure, and rehabilitation/reconstruction of failed sections would remove the original pavements. During National Historic Preservation Act (NHPA) Section 106 consultation for the 2020 EA, the Puerto Rico State Historic Preservation Office (PRSHPO) indicated that BQN, as the former site of Ramey Air Force base is a historic district that is eligible for listing to the National Register of Historic Places (NRHP), and that all structures constructed prior to base closure individually contribute to the historic district. As historically significant structures, the existing runway and 16 of the 21 buildings to be demolished are considered Section 4(f) resources and the Proposed Project would result in their physical use.

- Historic and Archaeological Resources: The closest off-airport historic architectural resource to the Proposed Project and Alternatives is the Fora di Punta Borinquen (Borinquen Lighthouse) approximately 0.6 mile northwest of the existing runway. The resource is eligible for listing to the NRHP. However, no direct impacts to this resource would occur and noise analysis indicates that no indirect noise impacts would occur either. As described above, 16 buildings to be demolished with the Current Proposed Project due to placement, as well as the existing Runway 8-26, are eligible for listing to the NRHP based on their association with the former Ramey Air Force Base. Accordingly, PRSHPO has recommended a finding that the Proposed Project would result in adverse effects to these historic properties. A Memorandum of Agreement (MOA) containing three stipulations was signed by the FAA, PRPA and PRSHPO to resolve adverse effects: an expanded archaeological study, a Permanent Archival Record, and an expanded historical report on the significance of Ramey Air Force Base. Two of those stipulations have already been satisfied and the final is in process as of this EA.

- Wetlands and Water Resources: The Current Proposed Project has the potential to impact a suspected riverine wetland to the south of existing Taxiway M that is documented in the National Wetland Inventory. Environmental evaluation has determined that the subject area is not a wetland, and a conclusion has been obtained from the US Army Corps of Engineers (USACE) in a letter dated on September 18, 2018, which indicates it is not jurisdictional.

4.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED PROJECT

4.1 INTRODUCTION

This chapter provides a description of the relevant baseline human, physical, and natural environment that may be affected by the Current Proposed Project as well as the potential environmental impacts of the Current Proposed Project. The amount of information on each resource is based on the extent of potential impact and is commensurate with the impact's relevance to the Current Proposed Project.

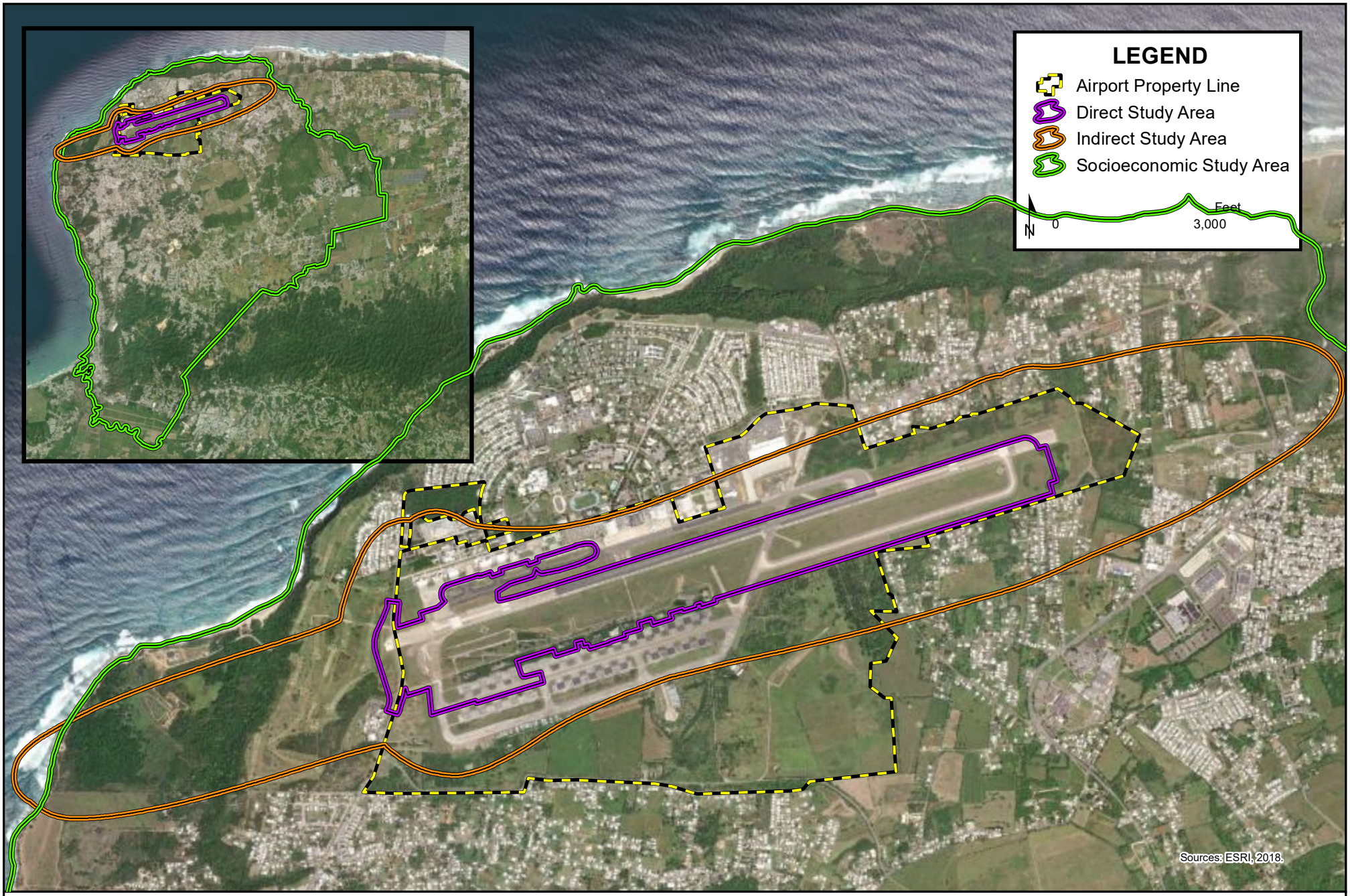
4.1.1 STUDY AREAS

For the 2020 EA, study areas were defined based on the construction footprint of the Original Proposed Project and other factors such as noise exposure and potential socioeconomic impacts. A Direct Study Area (DSA) was delineated within which direct physical impacts of the Original Proposed Project (i.e., construction footprint) were characterized and disclosed. To account for indirect ground disturbance activities that may occur during construction, such as materials and equipment staging, the DSA included a 100-foot buffer. The DSA also coincided with the proposed archaeological resources Area of Potential Effect (APE) for the Original Proposed Project, which was used for the purposes of Section 106 coordination pursuant to the NHPA.

An Indirect Study Area (ISA) was also delineated to assess potential secondary impacts not related to the construction footprint of the Original Proposed Project alternatives, and corresponded to the area within the composite day-night average sound level (DNL) 60 dB of the Original Proposed Project and retained alternatives. The ISA also served as the historic resources APE and was used to identify, disclose, and evaluate potential impacts on eligible historic architectural resources protected by the NHPA, DOT Section 4(f) resources and other potentially incompatible land uses.

Finally, a Socioeconomic Study Area (SSA) was established to broadly characterize conditions of relevance within the Airport vicinity, relating to socioeconomic and environmental justice conditions that would be relevant to evaluation of the Original Proposed Project. The SSA was comprised of the municipality of Aguadilla.

Because the Current Proposed Project falls within the DSA from the 2020 EA, the same DSA is used for this Supplemental EA. Because the noise contours generated for this EA fit within the ISA of the 2020 EA, the same ISA is used for this Supplemental EA. Similarly, the SSA (i.e., the entire Aguadilla municipality) remains broad enough to characterize all potential socioeconomic and environmental justice impacts and therefore no change has been made to the SSA. Refer to **Figure 4.1-1** for a depiction of these study areas.



RAFAEL HERNANDEZ AIRPORT

RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

STUDY AREAS

FIGURE
4.1-1

Path: D:\60579568_BQNEARW826\Environmental\900-Work\920 GIS\Final EA\mxd\Figure 4-1-1 Study Areas_rev1.mxd, Date Saved: 7/9/2020 1:41:49 PM

4.1.2 STUDY YEARS

As stated in **Section 2.3,** the construction period for the Current Proposed Project would begin sometime in CY 2024 and end in CY 2028. Potential environmental impacts to applicable environmental resources (e.g., air quality) during these construction years are identified and disclosed in this chapter. Environmental analysis of Current Proposed Project operational impacts on applicable environmental resources (e.g., noise), once the project is fully completed, would be CY 2029, constituting the first full year of operations. For disclosure of potential additional operational impacts due to the Current Proposed Project, the forecast year 2034 is also included.

4.2 PREVIOUS ANALYSIS INCORPORATED BY REFERENCE

This section identifies environmental resources categories which were either eliminated from detailed evaluation in the 2020 EA, or do not require supplemental analysis in this Supplemental EA due to the previous analysis methods and conclusions from the 2020 EA remaining valid and accurate. For resources not eliminated but not requiring supplemental analysis (**Section 4.2.2** below), the analysis methods and conclusions from the 2020 EA are briefly summarized for disclosure, and the analyses from the 2020 EA in their entirety are otherwise incorporated by reference in this Supplemental EA.

4.2.1 RESOURCES PREVIOUSLY ELIMINATED FROM DETAILED EVALUATION

All of the environmental resource categories listed above were considered for applicability in defining/establishing the affected environment evaluated in the 2020 EA, and for evaluating the potential environmental consequences of the Original Proposed Project. The following resources were determined either not present or not measurably impacted by the Original Proposed Project in the 2020 EA: biological resources, farmlands, visual effects (including light emissions), wetlands, floodplains, Wild and Scenic Rivers. The Current Proposed Project would be located within the Original Proposed Project's DSA and therefore would not measurably affect these resources. Therefore, the dismissal of these resources from detailed analysis in the 2020 EA is applicable to the Current Proposed Project, and is incorporated by reference.

4.2.2 RESOURCES NOT REQUIRING SUPPLEMENTAL ANALYSIS IN THIS EA

4.2.2.1 Coastal Resources

Coastal resources comprise any natural resources or natural environments occurring in coastal waters or adjoining shorelines and are primarily protected by the Coastal Zone Management Act (CZMA), as well as the Coastal Barrier Resources Act, which governs development within the Coastal Barrier Resource System (CBRS). BQN is located within Puerto Rico's designated coastal area and therefore provisions of the Federal CZMA and the federally approved Puerto Rico Coastal Zone Management Program (PRCZMP) apply to activities occurring at BQN. Section 307 of the CZMA requires that projects undertaken by Federal agencies within the coastal zone must demonstrate consistency with the PRCZMP and the enforceable policies contained therein.

The Puerto Rico Planning Board (PRPB)'s Coastal Zone Unit is responsible for implementing the Federal Consistency Certification process in Puerto Rico. On December 21, 2018, PRPB issued a Certification for

the Original Proposed Project. Because the Original Proposed Project is not located in a coral reef ecosystem or a Coastal Barrier Resource System unit and has been certified to be consistent with the PRCZMP, the coastal environment would not be significantly adversely impacted by the Original Proposed Project. The Current Proposed Project would occur within the DSA established for the 2020 EA, and therefore, no additional impacts to coastal resources would result, as compared to the Original Proposed Project. The 2020 EA details the Enforceable Coastal Policies contained in the PRCZMP, the consistency analysis performed, and coastal resource avoidance, minimization, and mitigation measures, which are incorporated by reference in this Supplemental EA. No additional analysis of coastal resource impacts is warranted for the Current Proposed Project.

4.2.2.2 Hazardous Materials, Pollution Prevention, and Solid Waste

To characterize the affected environment in the 2020 EA with respect to current/historical contamination at BQN, and to evaluate potential for hazardous waste and contamination related impacts on the Original Proposed Project, an environmental records search was performed by Environmental Data Resources and queried available environmental records from Federal and state environmental databases. Databases were reviewed for potential environmental records occurring within a one-mile radius of BQN. No sites in the US Environmental Protection Agency's (EPA) Comprehensive Environmental Response, Compensation, and Liability Information System, which contains information on potential hazardous waste sites and remedial activities, and no sites on the EPA's National Priorities List (NPL or "Superfund"), are located within a one-mile radius of BQN. Available historical aerial photographs were also collected and evaluated.

A vast majority of environmental contamination events or compliance issues documented at BQN are historical or otherwise minor in nature. No sites on or around BQN are listed on the NPL of contaminated sites. Overall, the potential for contaminated site involvement during the construction or implementation of the Original Proposed Project is low. The Current Proposed Project would not incur additional impacts compared to the Original Proposed Project.

Demolition and construction activities associated with the Original Proposed Project would result in minor, short-term increases in the volume of hazardous and solid waste generated at BQN. Structures that would be demolished that were built before 1978 could potentially contain asbestos-containing materials (ACM) and lead-based paint (LBP). In February 2018, AECOM Caribe, LLP surveyed the buildings scheduled to be demolished to determine the presence of suspect ACM and LBP. A summary of anticipated demolition solid waste quantities that would be generated by construction of the Original Proposed Project is presented in the 2020 EA, and these quantities would not measurably change for the Current Proposed Project. The Current Proposed Project would not generate a considerable or appreciable amount of hazardous materials or solid waste that would violate applicable regulations or exceed available handling capacity.

The hazardous materials, pollution prevention, and solid waste impacts evaluations, results of the evaluations, and avoidance, minimization, and mitigation measures are detailed in the 2020 EA and incorporated by reference in this Supplemental EA. No additional analysis of hazardous materials, pollution prevention, and solid waste impacts is warranted for the Current Proposed Project.

4.2.2.3 Historic, Architectural, Archaeological, and Cultural Resources

Section 106 of the NHPA of 1966 (16 U.S.C. 470f) requires that Federal agencies take into account the effect of their undertakings on any site that is included on or eligible for inclusion on the NRHP, and implementing regulations published at 36 CFR 800 define the measures to be implemented to attempt to identify and mitigate impacts to such historic properties.

An archaeological and historical literature and background information search pertinent to the project APE was conducted to determine the types, chronology, and locations of previously recorded cultural resources and studies within or near the APE for the 2020 EA. Examination of the PRSHPO cultural resource files indicated that no currently NRHP-listed or archaeological sites are present within the APE or within a one-mile (0.8 km) radius of the APE. The closest recorded sites to the APE are located 2.4 km (1.5 miles) to the west-southwest of the APE. A Cultural Resources Assessment Survey (CRAS), which included architectural and archaeological field investigations, was performed to further identify the potential presence of historic or cultural resources within the APE. Archaeological field investigations identified no positive recoveries of potential archaeologically significant artifacts, including in areas that were previously surveyed by others in support of ongoing identification efforts at BQN. The APE described for the Current Proposed Project is the same as the Original Proposed Project. The literature and background information search and findings, including the CRAS, are detailed in the 2020 EA and are hereby incorporated by reference.

Based on the field surveys and evaluations performed for the CRAS, it was determined that none of the buildings that would be demolished are NRHP-eligible. However, during NHPA Section 106 consultation for the Original Proposed Project, the PRSHPO indicated that BQN, as the former site of Ramey Air Force base is a historic district that is eligible to the NRHP, and that all structures constructed prior to base closure individually contribute to the historic district. 16 of the 21 structures that would be demolished and the existing Runway 8-26 are considered contributing resources to the district's eligibility; therefore, the Proposed Project would adversely affect these resources. In a letter dated June 22, 2020, the Advisory Council on Historic Preservation stated that its involvement in the consultation processes was completed with the notification. Descriptions of these buildings, evaluations of NRHP eligibility, and findings are provided in the 2020 EA CRAS report (**Appendix G** of the 2020 EA), as well as in the 2020 EA, which are incorporated by reference in this Supplemental EA. Impacts to historic, architectural, archaeological, and cultural resources resulting from the Current Proposed Project would be the same as for the Original Proposed Project.

Because the Original and Current Proposed Project would impact the aforementioned contributing resources, the FAA, PRSHPO, and PRPA developed a MOA to resolve these effects (e.g., avoidance/minimization/mitigation steps). The MOA contains nine stipulations pertaining to additional required investigations, additional documentation of historical sites, creation of a permanent archival record for structures to be altered or demolished, post-review discoveries, monitoring and reporting, and management and administration items under the MOA. The additional archaeological and building surveys have been performed, and both the archaeological report and permanent archival record required by the MOA have been accepted by PRSHPO. Work on the MOA stipulation requiring additional historical site documentation is ongoing concurrently with this Supplemental EA. No work that would affect the historic resources will be performed until the MOA is satisfied and approved by all signatories. Avoidance,

minimization, and mitigation measures and the MOA and its stipulations are detailed in the 2020 EA and are incorporated by reference in this Supplemental EA. No additional analysis of impacts to historic, architectural, archaeological, and cultural resources resulting from the Current Proposed Project is warranted.

4.2.2.4 Natural Resources and Energy Supply

An analysis of potable water, wastewater, electricity, telecommunications, and fuel demand and capacity at BQN was performed in the 2020 EA for the Original Proposed Project. Additionally, consumable material quantities required were assessed for construction the Original Proposed Project. The 2020 EA demonstrates that construction, operation, or maintenance of the Original Proposed Project would not cause demands that would exceed available or future (project years) natural resources or energy supplies and would not require consumable natural and energy resources that would be considered in short supply in Puerto Rico.

BQN is located within the Karst Zone Special Planning Area, which requires authorization for construction activities under appropriate conditions, and complying with the required permits, endorsements and franchises required by applicable laws and regulations. A geotechnical study of the Proposed Project area was performed in 2018 to determine stability of soils in the Original Proposed Project area, identify karst features, and identify areas of likely subsoil collapse due to karst features and subsurface dynamics. The study did not find evidence of karst features or karst-related soil instability within the Proposed Project area. The Original Proposed Project would not significantly affect features unique to karst features, and is unlikely to be affected by karst-related soil instability.

The Current Proposed Project would not result in measurably different impacts to natural resources and energy supply, compared to the Original Proposed Project. The Current Proposed Project is located within the DSA of the Original Proposed Project, within which no evidence of karst features or karst-related soil instability has been identified. Details of the natural resources and energy supply analyses and findings, as well as avoidance, minimization, and mitigation measures are provided in the 2020 EA and are hereby incorporated by reference. No additional analysis of potential natural resources and energy supply impacts resulting from the Current Proposed Project is warranted.

4.2.2.5 Surface Transportation

Both the Original Proposed Project and Current Proposed Project would not increase airport capacity and therefore would not result in additional roadway traffic once completed. To determine whether there is a potential for short-term traffic impacts during the construction period, traffic volumes and level of service (LOS) on major road segments and intersections near BQN were considered in the 2020 EA. A traffic study was performed and found that several approaches at nearby intersections would drop below LOS of C (average delays of 20 to 35 seconds, with a stable flow, and acceptable delays) during the PM peak hour during construction of the Original Proposed Project. Construction traffic haul routes recommended in the 2020 EA would help to reduce these temporary impacts by avoiding the affected intersections. The potential temporary impacts to surface traffic during construction would not cause significant impacts to surface transportation. Construction activities and durations are expected to be similar between the Original Proposed Project and Current Proposed Project. The traffic study, findings, and proposed avoidance,

minimization, and mitigation measures detailed in the 2020 EA are incorporated by reference in this Supplemental EA. No additional analysis of potential impacts to surface transportation resulting from the Current Proposed Project is warranted.

4.2.2.6 Water Resources

The 2020 EA describes the surface water and groundwater hydrology of the Aguadilla region, the stormwater collection system at BQN, and the regional water supply and treatment system. An analysis of potential impacts to water quality that could result from the Original Proposed Project was prepared for the 2020 EA in accordance with the principal objectives of the Federal Water Pollution Control Act and subsequent Clean Water Act. A qualitative evaluation of potential water quality impacts from construction and operation of the Proposed Project was performed by reviewing Federal, state, and local regulations and analyzing the current drainage system.

There is potential for construction-related activities (e.g., erosion and sedimentation during rainfall on cleared or disturbed areas, release or spills of construction-related hazardous materials or petroleum substances) to cause exceedances of water quality standards during construction. The use of project-specific best management practices (BMP), implementation of erosion control measures specified in FAA AC 150/5370-10H, acquiring necessary permits, and the implementation of project-specific design criteria to minimize erosion and sedimentation would prevent and/or minimize potential water quality impacts. As a result of these control measures, significant and long-term surface water quality impacts resulting from construction activities associated with the Original and Current Proposed Project would not occur.

Project-specific BMPs and Stormwater Pollution Prevention Plans (SWPPPs) to be designed for the Proposed Project would prevent or minimize the potential release of contaminants into groundwater. Pollutants from stormwater runoff from the proposed runway reconstruction and taxiway would be in low concentrations and would be considered a minimal impact. The existing site-specific Spill Prevention, Control, and Countermeasure (SPCC) plan for the site would need to be revised to reflect changes in configuration in order to minimize the risk of an accidental discharge to surface or groundwater.

No significant impacts to water quality would result from the Proposed Project. The 2020 EA provides details of the water quality impacts analyses and avoidance, minimization, and mitigation measures for the Original Proposed Project, which are hereby incorporated by reference. The Current Proposed Project would not incur measurably different water quality impacts to water resources compared to the Original Proposed Project. No additional analysis of water resources impacts resulting from the Current Proposed Project is warranted.

4.2.2.7 Cumulative Effects

A review of Original Proposed Project records for the BQN area was conducted as part of the cumulative impacts review process in the 2020 EA. A review of Environmental Impact Statement (EIS) documents for the years 2008-2013 was conducted using the Puerto Rico Environmental Quality Board (EQB) website. The review showed that no major projects that would impact the BQN area have been presented during the review period. The possibility of future projects in the immediate vicinity of the DSA was evaluated as part of the cumulative impacts analysis. Any future projects including facilities related to the operation of

the Airport, such as new hangars and aircraft service, would be compatible with the present land use and activities at BQN. A search was performed of currently active, planned, and proposed development projects within Aguadilla Municipality to assess possible cumulative effects and interactions when considered with impacts from the Original Proposed Project. The 2020 PRPA Capital Improvement Program lists two additional planned projects at BQN between 2020 and 2025.

Several of the planned and proposed projects that are not associated with BQN have the potential to incur long-term impacts (e.g., roadway extensions and residential and resort development). However, because the Original Proposed Project would not result in long-term impacts to most environmental resources, it is unlikely that the Original Proposed Project, when considered with other regional projects, would result in significant cumulate effects. The environmental impacts of most projects considered would be minor and limited to the construction phase, as is the case of the Original Proposed Project. None of the projects considered for the cumulative impacts analysis is dependent upon or directly associated with the Original Proposed Project, and therefore are not considered connected actions. Details of the cumulative effects analysis performed for the Original Proposed Project, including a list of projects considered in the analysis, are included in the 2020 EA, and are hereby incorporated by reference.

Some cumulative projects considered in the 2020 EA that would have occurred in the future relative to the Original Proposed Project may occur concurrently with the Current Proposed Project, which is scheduled for construction in CY 2024 through CY 2029. Similarly, projects that would have occurred concurrently with the Original Proposed Project, would now be considered past projects, and recent past projects relative to the Original Proposed Project may no longer be considered close enough in time to be considered for cumulative effects with the Current Proposed Project. Databases consulted to identify cumulative effects projects in the 2020 EA, as well as the EPA's EIS Database for Puerto Rico[3], were reviewed for the Supplemental EA to identify any additional future projects for consideration.

One additional future project at BQN was identified for consideration in this Supplemental EA. The Bipartisan Infrastructure Act of 2022 allocated funds for airport improvements in the United States, including expansion of the passenger terminal and installation of jet bridges at BQN. If implemented, this project would not expand capacity at BQN. A minor additional increase in electricity demand may result, which would not exceed local power supply capacity, and other long-term impacts would be minimal. Short-term environmental impacts would be incurred during construction; however, these impacts would be minimized or mitigated through adherence to required permitting provisions and the use of other environmental controls such as project specific BMPs. The Original Proposed Project is needed to address existing runway pavement deficiencies, and the proposed terminal expansion would not dependent upon or directly associated with the Proposed Project, and therefore are not considered a connected action. Therefore, this project would not cause significant cumulative impacts when considered with the Original Proposed Project and other reasonably foreseeable projects at BQN or in the vicinity of the Airport.

3 Environmental Impact Statement (EIS) Database. https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/search;jsessionid=69DB419B4BD157004B8045D168C15FFB?search=&__fsk=823548583#results. Accessed July 25, 2023.

Since completion of the 2020 EA, the Puerto Rico Department of Transportation and Public Works Puerto Rico Highway and Transportation Authority has updated its Aguadilla Urbanized Area Transportation Improvement Program through 2026. The updated plan includes a variety of transportation infrastructure maintenance programs and projects, a bridge preservation program, and bus shelter installation and replacement. While several new projects are proposed that were not included in the 2020 EA cumulative impacts analysis, these additional projects are similar to those previously considered. None of the proposed transportation projects would have significant long-term operational impacts, and short-term construction impacts would be similar to other projects already considered in the 2020 EA analysis. Short-term construction impacts that may occur concurrently with the Current Proposed Project or in the reasonably foreseeable future would be subject to all permitting requirements and would employ project specific BMPs and other measures to avoid, minimize, or mitigate the generally minor potential environmental impacts.

In 2020, the Federal Emergency Management Agency approved funding for 110 hurricane recovery projects across Puerto Rico, including several in the Aguadilla region. These projects include repairs to roadways and bridges, repairs and upgrades to stormwater management and flood control systems, public building and equipment repairs, repairs to parks and recreational facilities, and debris removal. None of these projects would cause long-term operational impacts. Short-term construction impacts that may occur concurrently with the Current Proposed Project or in the reasonably foreseeable future would be subject to all permitting requirements and would employ project specific BMPs to avoid, minimize, or mitigate the generally minor potential environmental impacts.

The Municipality of Aguadilla has approved funding for several municipal improvement programs that will identify specific projects to implement in the future, possibly during and/or shortly after construction of the Current Proposed Project. Notably, the City Revitalization Program was approved to establish a fund for the municipal government to identify and enable activities aimed at reinvigorating downtown areas, urban centers, and key community corridors. The current funding expires at the end of 2025, although the program may be extended to future years at a later date. Specific projects, while not identified in the plan, are expected to be relatively minor and unlikely to cause significant long-term operational environmental impacts. Short-term construction impacts that may occur concurrently with the Current Proposed Project or in the reasonably foreseeable future would be subject to all permitting requirements and would employ project specific BMPs to avoid, minimize, or mitigate the generally minor potential environmental impacts.

None of the off-airport projects considered for the cumulative impacts analysis would be substantially different from those considered in the 2020 EA, and none would be dependent upon or directly associated with the Current Proposed Project, and therefore are not considered connected actions with the Current Proposed Project. The 2020 EA concluded that no significant cumulative impacts have been identified as a result of this cumulative impacts review. The Current Proposed Project would not cause substantially different impacts compared to the Original Proposed Project. Therefore, no additional cumulative effects analysis is warranted for the Supplemental EA.

4.3 RESOURCES REQUIRING SUPPLEMENTAL ANALYSIS IN THIS EA

FAA has determined that the change between the Original Proposed Project from the 2020 EA and the Current Proposed Project in this Supplemental EA may potentially affect the following resources: air quality; climate; DOT Section 4(f) resources; noise; and socioeconomics, environmental justice and

children's health and safety risk. The following sections describe the affected environment and potential environmental impacts of the Current Proposed Project for each of these environmental resource categories that may occur due to either construction or operation.

4.3.1 AIR QUALITY

This section presents the results of an analysis performed to evaluate the potential air quality impacts of the Current Proposed Project. The Current Proposed Project would have a significant impact on air quality if it would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the USEPA under the Federal Clean Air Act (CAA), for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.[4]

For this Supplemental EA, air quality impact assessment entailed quantifying and disclosing air emissions associated with construction and operation of the Proposed Project. All emissions estimates and quantitative analyses were prepared using current, federally-approved emissions models and tools, such as the USEPA Motor Vehicle Emissions Simulator (MOVES), in a manner consistent with the current FAA guidance. Emissions from the Current Proposed Project and No-Action Alternative were compared. The net difference between the two scenarios is defined as the Project Emissions, which are compared to appropriate thresholds to draw conclusions as to the Current Proposed Project's potential to significantly impact air quality. Detailed emissions estimation methodologies are given within **Appendix A.**

4.3.1.1 Affected Environment

To enforce the CAA, the EPA identifies air pollutants that cause or contribute to the endangerment of human health and/or environmental welfare and establishes air quality "criteria" that guide the establishment of air quality standards to regulate these pollutants (42 U.S.C. §§ 7408 - 7409). To date, EPA has established air quality criteria for six air pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide, ozone (O_3), fine and respirable particulate matter ($PM_{2.5}$ and PM_{10}), and sulfur dioxide (SO_2). NAAQS have been established for these six pollutants to safeguard public health (i.e., primary NAAQS) and environmental welfare (i.e., secondary NAAQS). EPA has delegated authority to enforce the NAAQS in Puerto Rico to the EQB.

EPA and EQB evaluate outdoor air monitoring data on a geographic basis for compliance with the NAAQS. Areas where outdoor air concentrations are within an applicable NAAQS are considered in *attainment* of that NAAQS. If sufficient data are not available to decide, the area is instead deemed *attainment/unclassifiable*. Areas where outdoor air concentrations exceed the NAAQS are designated by EPA as *nonattainment* areas. Lastly, areas that have historically violated the NAAQS, but have since remedied these violations are known as *maintenance* areas. According to the EPA's Green Book listing of nonattainment areas, the municipality of Aguadilla is listed as attainment/unclassifiable for all current NAAQS.[5]

4 FAA Order 1050.1F, Exhibit 4-1

5 EPA. Puerto Rico Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. https://www3.epa.gov/airquality/greenbook/anayo_pr.html. Accessed July 27, 2023.

Air quality impact assessment methodology focuses on satisfying requirements of the CAA and NEPA. For areas designated as nonattainment or maintenance of the NAAQS for criteria air pollutants by the EPA, the General Conformity Regulations (40 CFR §93.153 et seq.) of the CAA require a determination that air emissions from federally obligated actions are accounted for in a State Implementation Plan to control air quality. Because the municipality of Aguadilla is listed as attainment/unclassifiable for all current NAAQS, the General Conformity Regulations do not apply to the Current Proposed Project, and a detailed analysis and Conformity Determination are not required. Nevertheless, annual emissions inventories of construction and operational emissions associated with the Current Proposed Project are provided for disclosure purposes.

The closest air monitoring stations are 19 miles south, 29 miles east, and 48 miles southeast of the Airport, and collectively monitor ambient concentrations of O_3, $PM_{2.5}$, PM_{10}, CO, and Pb. Monitor Site #72-113-0004, located approximately 48 southeast of BQN in Ponce recorded violations of the 1-hour and 8-hour O_3 NAAQS in 2021. However, ongoing monitoring data show no other violations of standards in recent years. CO is generally a localized pollutant (i.e., CO pollution does not generally substantially affect CO concentrations at great distances from the source) with highest concentrations mostly found at congested intersections with significant motor vehicle traffic.[6] Given the distance between BQN and the monitor, the localized nature of CO, and the monitoring site's general compliance with the CO NAAQS, it is unlikely that CO concentrations at this location are affected by CO emissions at BQN. No other violations of the NAAQS for any criteria pollutants have been recorded at the available monitoring sites.

BQN produces emissions of criteria air pollutants and their precursors due to the operation of a variety of mobile and stationary combustion devices at the Airport. Under current conditions, the bulk of these emissions are produced due to aircraft operations. Many larger commercial aircraft utilize Auxiliary Power Units to provide comfort air and power to instrumentation while at the gate, if not using gate infrastructure to do so. Ground support equipment are also used to service arriving and departing aircraft in terms of assisting in aircraft pushback from the gate, refueling, moving baggage and freight, cleaning and restocking aircraft, and other functions. Motor vehicle traffic on airport roadways and the operation of stationary combustion devices also contribute to emissions from BQN operations, but to a nominal degree.

4.3.1.2 Environmental Consequences - Construction

Table 4.3-1 discloses the construction period criteria pollutant emissions computed for the Current Proposed Project. Construction activities and associated pollutant emissions are expected to occur beginning in midyear 2024 and continue through the end of 2028. The Current Proposed Project would result in a temporary increase in emissions related to construction activities such as clearing and grading, material delivery, debris hauling, operation of construction equipment, travel on unpaved surfaces, and construction employee commuting for the duration of the construction period. Under the No-Action Alternative, construction would not occur and no air quality impacts would be incurred.

Because BQN is in an area that is considered attainment/unclassifiable of all NAAQS, there are no applicable significance thresholds (CAA General Conformity *de minimis* thresholds) to which these

6 EPA. Carbon Monoxide. https://www3.epa.gov/region1/airquality/co.html. Accessed July 27, 2023.

emissions increases can be compared. Because construction emissions are temporary in nature and the Current Proposed Project's construction emissions are relatively small, they are not likely to cause pollutant concentrations to exceed one or more of the NAAQS, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations. Therefore, construction of the Current Proposed Project would not cause a significant air quality impact.

TABLE 4.3-1 CONSTRUCTION EMISSIONS INVENTORY FOR CRITERIA POLLUTANTS

Construction	CO (tons)	NO_X (tons)[1]	PM_{10} (tons)	$PM_{2.5}$ (tons)	SO_X (tons)	VOC (tons)[1]	CO_2e (metric tons)
2024	8.13	6.13	5.58	0.90	0.14	11.95	3,846.58
2025	15.21	10.43	20.70	2.66	0.26	23.54	7,579.88
2026	14.47	9.32	20.62	2.58	0.24	23.46	7,553.73
2027	14.11	8.47	20.57	2.53	0.24	23.40	7,553.73
2028	13.77	8.41	20.42	2.52	0.24	23.30	7,524.79

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = oxides of nitorgen; $PM_{2.5}$ = particulate matter equal to or less than 2.5 micrometers in diameter; PM_{10} = particulate matter equal to or less than 10 micrometers in diameter; SO_2 = oxides of sulfur; VOC = volatile organic compounds.

[1] NO_x and VOC are considered precursors to criteria pollutant formation (O_3 and $PM_{2.5}$)

[2] Values may reflect rounding

Source: AECOM, 2024

4.3.1.3 Environmental Consequences - Operations

The Current Proposed Project would not increase airport capacity or result in increased aircraft, motor vehicle, or other airport operations. Therefore, no additional operational emissions would occur compared to the No-Action Alternative. Under the No-Action Alternative, emissions would continue to occur as described in **Section 4.3.1.1**.

4.3.1.4 Avoidance, Minimization, and Mitigation Measures

Mitigation to reduce impacts below the threshold of significance is not required. However, construction-related emissions resulting from the proposed improvements, albeit temporary, can be reduced by employing the following typical emissions reduction measures, in accordance with FAA AC 150/5370-10H, *Standards for Specifying Construction of Airports*:

- Suspension of construction activities during high-wind conditions;
- Creation of dust, odor, and nuisance reporting system;
- Reduction of exposed erodible surface area through appropriate materials and equipment staging procedures;
- Cover of exposed surface areas with pavement or vegetation in an expeditious manner;
- Reduction of equipment idling times;
- Ensure contractor knowledge of appropriate fugitive dust and equipment exhaust controls;
- Soil and stock-pile stabilization via cover or periodic watering;
- Use of low- or zero-emissions equipment;
- Use of covered haul trucks and conveyors during materials transportation;

- Reduction of electrical generator usage wherever possible; and
- Prohibition of open burning for waste disposal.

4.3.1.5 Comparison with Previous EA

As shown on **Table 4.3-2** below, total construction period criteria pollutant emissions from the 2020 EA are similar in magnitude to those computed for this Supplemental EA (see **Section 4.3.2.5** for a comparison of Greenhouse Gases [GHG]). However, the construction period for the Current Proposed Project (CY 2024-2028) spans one additional year than the Original Proposed Project (CY 2020 – 2023), meaning that annual emissions are distributed over a longer time period and therefore lower.

TABLE 4.3-2 CONSTRUCTION EMISSIONS COMPARISON

Pollutant	Year 1		Year 2		Year 3		Year 4		Year 5		Total	
	OPP	CPP	OPP	CPP	OPP	CPP	OPP	CPP	OPP	CPP	OPP	CPP
CO	18.17	8.13	17.13	15.21	16.24	14.47	15.51	14.11	-	13.77	67.05	65.69
NO_x	13.71	6.13	11.75	10.43	10.46	9.32	9.47	8.47	-	8.41	45.39	42.76
PM_{10}	23.62	5.58	23.32	20.70	23.05	20.62	22.98	20.57	-	20.42	92.97	87.89
$PM_{2.5}$	3.13	0.90	3.00	2.66	2.88	2.58	2.81	2.53	-	2.52	11.82	11.19
SO_x	0.32	0.14	0.29	0.26	0.27	0.24	0.25	0.24	-	0.24	1.13	1.12
VOC	26.73	11.95	26.52	23.54	26.33	23.46	26.25	23.40	-	23.30	105.83	105.65

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = oxides of nitorgen; $PM_{2.5}$ = particulate matter equal to or less than 2.5 micrometers in diameter; PM_{10} = particulate matter equal to or less than 10 micrometers in diameter; SO_2 = oxides of sulfur; VOC = volatile organic compounds. OPP = Original Proposed Project; CPP = Current Proposed Project
Source: AECOM, 2020 and 2024

4.3.2 CLIMATE

4.3.2.1 Affected Environment

BQN is located within the subtropical moist forest life zone.[7] The climate of Aguadilla, the nearest municipality with recent climate data, is classified as tropical, with an average temperature of 26.2 degrees Celsius (°C) or 79.2 degrees Fahrenheit (°F). July is the hottest month with an average high temperature of 30.1°C or 86.3°F, while February is the coldest month with an average low temperature of 22.9°C or 73.2°F. Average annual precipitation is approximately 748 millimeters or 29.4 inches. September is typically the wettest month with an average of 111 millimeters or 4 inches of precipitation.[8] In 2019, Puerto Rico passed the Climate Change Mitigation, Adaption, and Resiliency law, which calls for a 50 percent reduction in carbon emissions over five years and a transition to 100 percent renewable energy by 2050. The law also sets a goal of reducing energy consumption island-wide by one percent each year.

7 Ewel, J.S. and J. L. Whitmore. Ecological life zones of Puerto Rico and the US Virgin Islands. USDA – Forest Serv. Res. Paper ITF-18. 72 p. 1973.
8 Climate Data. https://en.climate-data.org/north-america/united-states-of-america/puerto-rico/aguadilla-766543/. Accessed July 28, 2023.

Based on the 2020 EA, operations at BQN generate approximately 10,334 metric tons of Carbon Dioxide equivalent (CO_2e) GHG annually. For context, **Table 4.3-3** provides an estimate of baseline annual GHG emissions at the Puerto Rico and United States national level.

TABLE 4.3-3 PUERTO RICO AND NATIONAL BASELINE ANNUAL GREENHOUSE GAS EMISSIONS (METRIC TONS/YEAR)

Region	CO_2	CH_4	N2O	CO_2e
Puerto Rico	7,928,572.89	871.03	103.75	7,980,454.27
United States	2,064,403,624.24	1,373,133.51	25,402.87	2,109,583,123.28

Source: EPA, 2020. Online 2020 National Emissions Inventory Data Retrieval Tool

4.3.2.2 Environmental Consequences - Construction

Construction of the Current Proposed Project would result in an increase in GHG emissions, when compared to the No-Action Alternative. The Current Proposed Project would result in a temporary increase in emissions related to construction activities such as clearing and grading, material delivery, debris hauling, operation of construction equipment, travel on unpaved surfaces, and construction employee commuting for the duration of the construction period. Refer to **Table 4.3-1** for a summary of GHG emissions that may occur due to the Current Proposed Project. The FAA has not established significance thresholds for aviation GHG emissions, nor have they identified specific factors to consider in making a significance determination for GHG emissions. Consequently, there is currently no quantitative or qualitative basis for comparison for the GHG emissions presented in this document, and therefore, emissions presented in this document are for disclosure purposes only. Based on the analysis conducted for this EA, GHG emissions associated with the Current Proposed Project are minimal and would not exceed any reasonable threshold indicating a significant impact.

Executive Order (EO) 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*, requires an accounting of the full costs of GHG emissions from federal projects, as identified in terms of the social cost of GHGs (SC-GHG) for CO_2, methane (CH_4), and nitrous oxide (N_2O). Additionally, CEQ's January 2023 "National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change" recommends contextualizing GHG emissions using national and state baselines, and determining the SC-GHG from a proposed action where feasible as a means of comparing the GHG impacts of the alternatives. GHG emissions, in absolute terms and as a percentage of Puerto Rico and national baseline emissions, for Current Proposed Action GHG construction emissions, are presented on **Table 4.3-4**. Notably, current emissions models do not produce N_2O emissions rates for all construction sources, so N_2O estimates are omitted from this analysis.

TABLE 4.3-4 CURRENT PROPOSED PROJECT GHG EMISSIONS COMPARED TO REGIONAL AND NATIONAL BASELINES

Construction Year	CO2	CH4	CO2e
Annual Construction Emissions (Metric Tons)			
2024	3,844.13	0.12	3,846.58
2025	7,574.98	0.23	7,579.88
2026	7,548.78	0.24	7,553.73
2027	7,548.78	0.24	7,553.73
2028	7,519.86	0.23	7,524.79

Construction Year	CO2	CH4	CO2e
Percent of Puerto Rico Baseline			
2024	0.048485%	0.013777%	0.048200%
2025	0.095540%	0.026405%	0.094981%
2026	0.095210%	0.027553%	0.094653%
2027	0.095210%	0.027553%	0.094653%
2028	0.094845%	0.026405%	0.094290%
Percent of National Baseline			
2024	0.000186%	0.000009%	0.000182%
2025	0.000367%	0.000017%	0.000359%
2026	0.000366%	0.000017%	0.000358%
2027	0.000366%	0.000017%	0.000358%
2028	0.000364%	0.000017%	0.000357%

Sources: EPA, 2020. Online 2020 National Emissions Inventory Data Retrieval Tool; MOVES4, AECOM, 2024.

The SC-GHG is an estimate of the monetized damages associated with incremental increases in GHG emissions, such as reduced agricultural productivity, human health effects, property damage from increased flood risk, and the value of ecosystem services (Interagency Working Group on Social Cost of Greenhouse Gases, 2021). The *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*, provides the SC-GHG per metric ton of CO_2, CH_4, and N_2O in 2020 US dollars under three different discount rates (5, 3, and 2.5 percent) and in five-year increments (Interagency Working Group on Social Cost of Greenhouse Gases, 2021). A high discount rate (e.g., 5 percent) means that future effects are considered less significant than present effects, whereas a low discount rate (e.g., 2.5 percent) means that future effects are closer to equally significant relative to present effects. The incremental increase in GHG emissions is expected to exact increasing social costs over time; therefore, regardless of the discount rate used to estimate SC-GHG, the social costs per metric ton of GHG emissions will increase incrementally each year. **Table 4.3-4** provides the annual SC-GHG expected to result from construction of the Current Proposed Project in each construction year, using a 3 percent discount rate.

TABLE 4.3-4 CONSTRUCTION SOCIAL COST OF GREENHOUSE GASES, 2020 U.S. DOLLARS, 3 PERCENT DISCOUNT RATE

Year	CO_2	CH_4	Total
Social Cost per Metric Ton Emitted			
2024	$53	$1,520	N/A
2025	$54	$1,580	N/A
2026	$55	$1,640	N/A
2027	$56	$1,700	N/A
2028	$57	$1,760	N/A
Social Cost of Construction Emissions			
2024	$203,738.89	$182.40	$203,921.29
2025	$409,048.92	$363.40	$409,412.32
2026	$415,182.90	$393.60	$415,576.50
2027	$422,731.68	$408.00	$423,139.68
2028	$430,135.99	$404.80	$430,540.79
		Total	**$1,882,590.58**

Sources: Interagency Working Group on Social Cost of Greenhouse Gases, 2021; MOVES4, AECOM, 2024.

Construction related GHG emissions are expected to be lowest in 2024, representing an approximate 0.048200 percent increase over Puerto Rico CO_2e annual baseline emissions and an approximate 0.000182

percent increase over national annual baseline CO_2e emissions. Construction emissions occurring in 2025, 2026, 2027, and 2028 are expected to be similar from year to year, each representing at most an approximate 0.094981 percent increase over Puerto Rico annual baseline CO_2e emissions, and an approximate 0.000359 percent increase over national annual baseline CO_2e emissions.

Although GHG emissions are expected to be similar in each construction from 2025 through 2028, inclusive, the SC-GHG is expected to increase each year, due to the incremental increasing social costs per ton of GHG over time. The total SC-GHG in 2020 U.S. Dollars is expected to be approximately $203,921.39 in 2024, $409,412.32 in 2025, $415,576.50 in 2026, $423,139.68 in 2027, and $430,540.79 in 2028. Construction of the Current Proposed Project is expected to incur a total SC-GHG of $1,882,590.58.

The Current Proposed Project's construction would result in temporary GHG emissions which could affect the extent and rate of climate change in the region. However, implementing the Current Proposed Project would have a beneficial effect on resiliency and adaptation efforts for the Commonwealth of Puerto Rico. Aside from Luis Muñoz Marín International Airport in San Juan, BQN is the only other airport which would adequately support disaster recovery efforts and maintain air cargo/supply flow for the region. The Current Proposed Project would maintain BQN in this capacity by providing an operationally capable runway free of pavement deterioration and flooding deficiencies.

Under the No-Action Alternative, construction would not occur and no GHG impacts would be incurred. However, if the Current Proposed Project was not implemented, existing pavement deterioration and flooding/ponding deficiencies would compound which would impact BQN's operational capability to support disaster recovery operations and cargo flow.

4.3.2.3 Environmental Consequences - Operations

The Current Proposed Project would not increase airport capacity or result in increased aircraft, motor vehicle, or other airport operations. Therefore, no additional operational emissions would occur compared to the No-Action Alternative. Under the No-Action Alternative, emissions would continue to occur as described in **Section 4.3.1.1**.

4.3.2.4 Avoidance, Minimization, and Mitigation Measures

The measures listed in **Section 4.3.1.4** which pertain to fuel combustion (e.g., reduction of idling, use of low emission equipment) also apply here and would serve to reduce and minimize GHG emissions during the construction period for the Current Proposed Project.

4.3.2.5 Comparison with Previous EA

As shown on **Table 4.3-5** below, total construction period GHG emissions from the 2020 EA are similar in magnitude to those computed for this Supplemental EA. However, the construction period for the Current Proposed Project (CY 2024-2028) spans one additional year than the Original Proposed Project (CY 2020 – 2023), meaning that annual emissions are distributed over a longer time period and therefore lower.

TABLE 4.3-5 CONSTRUCTION GHG EMISSIONS COMPARISON

Pollutant	CO_2e (metric tons)	
	OPP	CPP
Year 1	8,601.14	3,846.58
Year 2	8,539.17	7,579.88
Year 3	8,477.11	7,553.73
Year 4	8,446.91	7,553.73
Year 5	--	7,524.79
Total	**34,064.33**	**34,058.71**

CO_2e = carbon dioxide equivalent; OPP = Original Proposed Project; CPP = Current Proposed Project
Source: AECOM, 2020 and 2024

SC-GHG was not estimated in the 2020 EA because the EA preceded EO 13990 and related CEQ guidance. However, based on the similarity of emissions levels between the Current and Original Proposed Projects, as well as the SC-GHG information presented in this Supplemental EA, it is likely that the SC-GHG of the Original Proposed Project is similar in magnitude to the Current Proposed Project.

4.3.3 DEPARTMENT OF TRANSPORTATION SECTION 4(F) RESOURCES

A review was conducted to determine if any resources would have the potential to be directly or indirectly impacted by the Current Proposed Project or the No-Action Alternative with regard to the protective provisions of Section 4(f) of the DOT Act. Section 4(f) of the DOT Act provides that the Secretary of Transportation will not approve any program or project that requires the use of publicly-owned land of a public park, recreation area; or wildlife and waterfowl refuge of national, state, or local significance; or land of an historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless:

- There is no feasible and prudent alternative to use of such land, and
- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

During the NEPA process, the FAA considers whether the action involves more than a minimal physical use of a Section 4(f) resource or constitutes a constructive use based on a determination that the project would substantially impair the Section 4(f) resource. Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished. A significant impact under NEPA would not occur if appropriate mitigation measures avoid or minimize the effects of the use below the threshold of significance. If Section 4(f) property is used, the FAA is responsible for complying with Section 4(f) even if the impacts are less than significant for NEPA purposes.

4.3.3.1 Affected Environment

Resources that meet criteria for DOT Act Section 4(f) protection include publicly owned parks, recreational areas, wildlife and waterfowl refuges, and significant historic sites (properties listed on or eligible for listing

on the NRHP). The term "Section 4(f) resource" in this evaluation refers to any specific site or property meeting DOT Act criteria.

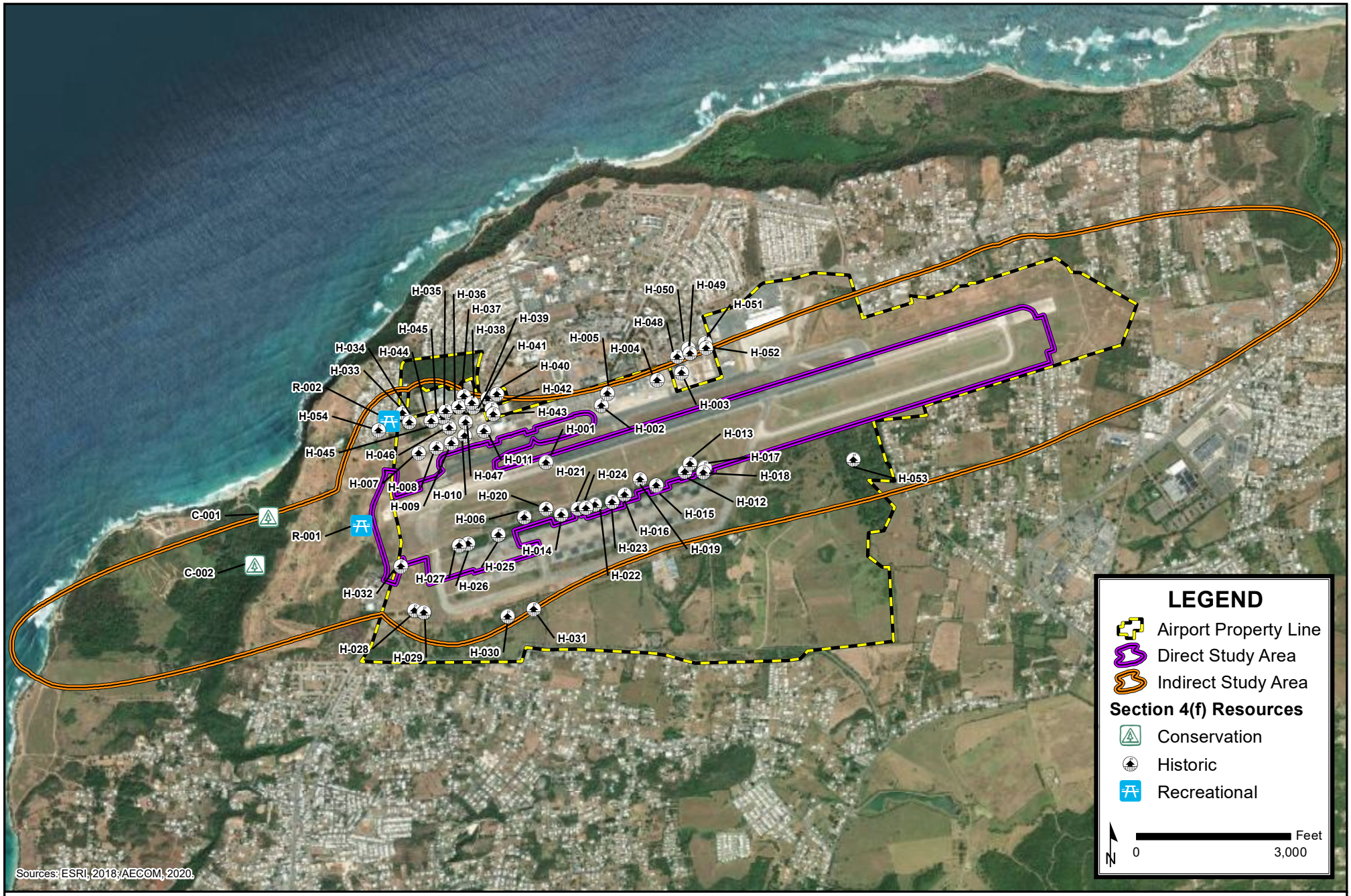
A review of available information from a variety of sources including Aguadilla Municipality and state databases, documented the location of publicly owned parks, recreational areas, wildlife, and waterfowl refuges within the vicinity of BQN. During cultural resources consultations between the FAA and PRSHPO, the PRSHPO indicated that it considers all of BQN, which occupies the site of the former Ramey Air Force Base, to be a historic district eligible for the NRHP, and that all extant structures constructed as part of the former Borinquen Field and Ramey Air Force Base are individually contributing resources. As such, these structures are afforded Section 4(f) protections. **Table 4.3-6a** and **Figure 4.3-1** provide the locations and an overview of Section 4(f) properties identified within the DSA and ISA. A detailed summary and description of Section 4(f) resources are provided in **Appendix K** of the 2020 EA, hereby incorporated by reference.

TABLE 4.3-6A SECTION 4(F) PROPERTIES WITHIN THE ISA

Resource Category	Map ID (Figure 4.3-1)	Name
Historic Resource	H-001	Runway 8-26
	H-002	Building 400 - Control Tower
	H-003	Building 402 - Hangar 2
	H-004	Building 403 - Hangar 3
	H-005	Building 405 -Hangar 5
	H-006	Building 3 - Gazebo
	H-007	Building 571 - Nose Dock Hangar
	H-008	Building 572 - Nose Dock Hangar
	H-009	Building 573 - Nose Dock Hangar
	H-010	Building 574 - Nose Dock Hangar
	H-011	Building 575 - Hangar
	H-012	Building 1029 - Ground Support Equipment Shop
	H-013	Building 1031 - Electric Power Station
	H-014	Building 1132 - Squadron Operations
	H-015	Building 1070 - Aircraft Maintenance Organizational Shop
	H-016	Building 1071 - Squadron Operations
	H-017	Building 1072 - Weapons and Base Systems Shop
	H-018	Building 1073 - Traffic Check House
	H-019	Building 1089 - Weather Observation Tower
	H-020	Building 1104 -Storage and Supply
	H-021	Building 1121 -Electrical Station
	H-022	Building 1128 - Armaments and Avionics Shop
	H-023	Building 1129 - Armaments and Electrical Shop
	H-024	Building 1133 - Captive Water Supply Tank Building
	H-025	Building 1245 - Readiness Crew Facility
	H-026	Building 1251 - Target Intelligence
	H-027	Building 1270 - Storage
	H-028	Building 1203 - Small Arms Magazine
	H-029	Building 1204 - Small Arms Magazine
	H-030	Building 1214 - Fuel Storage Tank
	H-031	Building 1215 - Fuel Storage Tank
	H-032	Building 1230 - Storage
	H-033	Building 501 - Motor Transportation and Repair)
	H-034	Building 502 - Ordnance Repair Shop

Resource Category	Map ID (Figure 4.3-1)	Name
	H-035	Building 503 - Quartermaster Warehouse
	H-036	Building 504 – Bakery
	H-037	Building 505 - Utility Shop
	H-038	Building 506 - Commissary and Quartermaster Warehouse
	H-039	Building 507 - Power Plant
	H-040	Building 508 - Laundry
	H-041	Building 509 - Cold Storage Plant
	H-042	Building 510 - Air Corps Garage
	H-043	Building 511 - Air Corps Garage
	H-044	Building 512 - Quartermaster Warehouse
	H-045	Building 513 - Quartermaster Warehouse
	H-046	Building 524 - Pavement and Grounds
	H-047	Building 543 - Veterinary Office
	H-048	Building 406 - Fire Station
	H-049	Building 407 - Paint, Oil, and Dope House
	H-050	Building 408 - Photographic Laboratory
	H-051	Building 409 - Air Corps Garage
	H-052	Building 410 - Air Corps Garage
Historic Area	H-053	Civilian War Housing
	H-054	Fullana Neighborhood (Partial)
Recreational Area	R-001	Punta Borinquen Golf Course and Club House
	R-002	Aguadilla (Ramey) Skate and Splash Park
Conservation Area	C-001	Conservation Area (Unnamed)
	C-002	Conservation Area (Unnamed)

1 Sources: AECOM, 2024



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RAFAEL HERNANDEZ AIRPORT

RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

DOT SECTION 4(F) RESOURCES

FIGURE
4.3-1

4.3.3.2 Environmental Consequences – Construction

4.3.3.2.1 Physical Use

Physical use of a Section 4(f) property by a project occurs in any of the following circumstances (23 CFR 774.17):

- Land from the Section 4(f) property is permanently incorporated into a transportation facility; or
- There is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose, as determined by the criteria in 23 CFR 774.13(d) (i.e., when all or part of the Section 4(f) property is required for project construction-related activities).

As discussed in Chapter 3, the Current Proposed Project would include reconstruction of Runway 8-26. This would require the demolition and removal of 21 existing structures south of the relocated runway to achieve compliance with 14 CFR 77.17(a)(5), which prevents the persistence or placement of objects within the surface of a takeoff and/or landing area of an airport, or within any imaginary surface (including, primary, horizontal, conical, approach or transitional surfaces). Sixteen of these structures are considered by PRSHPO to be eligible for NRHP inclusion and are therefore Section 4(f) resources, as they were constructed as part of Ramey Air Force Base. Demolition and removal constitutes physical use of these resources.

The Current Proposed Project would also reconfigure the existing Runway 8-26 to serve as a full-length parallel taxiway for the reconstructed runway to the south. This would require relocation of NAVAIDs as well as repairing and reconstructing portions of the existing pavements. Approximately 66% of the existing pavements have not been repaired in over 50 years, and are therefore part of historic pavements installed at the former Ramey Air Force Base . PRSHPO considers the existing Runway 8-26 to be a historic structure eligible for inclusion in the NRHP, and therefore a Section 4(f) resource. As such, the existing runway would experience physical use as a result of the Current Proposed Project.

Table 4.3-6b provides a summary of physical use of Section 4(f) resources that would result from the Current Proposed Project.

TABLE 4.3-6B PHYSICAL USE OF SECTION 4(F) PROPERTIES

Resource Category	Map ID (Figure 4.3-1)	Name	Physical Use Description
Historic Resource	H-001	Runway 8-26	Conversion of runway to parallel taxiway will require removal and replacement of historic pavement materials.
	H-006	Building 3 - Gazebo	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-012	Building 1029 - Ground Support Equipment Shop	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-013	Building 1031 - Electric Power Station	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-014	Building 1132 - Squadron Operations	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).

Resource Category	Map ID (Figure 4.3-1)	Name	Physical Use Description
	H-015	Building 1070 - Aircraft Maintenance Organizational Shop	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-016	Building 1071 - Squadron Operations	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-017	Building 1072 - Weapons and Base Systems Shop	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-018	Building 1073 - Traffic Check House	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-019	Building 1089 - Weather Observation Tower	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-020	Building 1104 -Storage and Supply	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-021	Building 1121 -Electrical Station	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-022	Building 1128 - Armaments and Avionics Shop	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-023	Building 1129 - Armaments and Electrical Shop	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-024	Building 1133 - Captive Water Supply Tank Building	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-025	Building 1245 - Readiness Crew Facility	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).
	H-026	Building 1251 - Target Intelligence	Demolition and removal of historic structure to comply with 14 CFR 77.17(a)(5).

Sources: AECOM, 2024

Under the No-Action Alternative, the existing airfield infrastructure would remain in its current location, no demolition of buildings that are eligible for inclusion in the NRHP would be required, and these Section 4(f) resources would not experience physical use. Because of the failed state of significant portions of existing Runway 8-26, substantial rehabilitation and possible reconstruction of the pavements would eventually be required to comply with FAA standards and regulations, which would result in physical use of this Section 4(f) resource at that time.

4.3.3.2.2 Constructive Use

A "constructive use" of a Section 4(f) property is defined at 23 CFR 774.15(a) as a use which occurs when the transportation project does not incorporate land from the Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Assessing the Current Proposed Project's indirect effects in the following areas is necessary to ascertain whether a constructive use of any Section 4(f) land in the proximity to the Current Proposed Project would occur:

- Air Quality: Construction emissions would occur but would by temporary in nature and would not create a significant or lasting impact on air quality in the area. The region does not currently experience violations of any NAAQS and neither construction nor operation of the Current Proposed Project is expected to cause or contribute to exceedances. It is unlikely that the Current Proposed Project would cause air quality impacts that affect the use of a Section 4(f) resource.

- Light Emissions and Visual Impacts: The lighting modifications associated with the Current Proposed Project are not expected to cause changes in light emissions resulting in substantial annoyance or causing interference with normal activities at Section 4(f) properties. Relocation of runway-associated lighting to the south of its current location would increase light emissions and visual impacts to Section 4(f) resources on the southern side of the DSA and ISA while slightly decreasing these impacts relative to existing conditions for Section 4(f) resources in the northern portion of the DSA and ISA. Section 4(f) resources that would experience an increase in light emissions and visual impacts are structures located on the Airport, and the impacts would not impair the use or value of the Section 4(f) resources.
- Noise: Construction-related noise would temporarily occur during the Current Proposed Project's implementation but could be minimized/managed using BMPs during construction (see **Section 4.3.4.2**). Noise levels Section 4(f) resources would remain consistent with these land use compatibility guidelines. Noise impacts incurred by the Current Proposed Project would not impair the use of any Section 4(f) resource.

Under the No-Action Alternative, Runway 8-26 would not be reconstructed at the proposed location, and the existing Runway 8-26 would not be converted to a taxiway; therefore, the minor, short-term construction related air quality impacts associated with the Action Alternatives would not occur. However, Runway 8-26 would eventually require significant rehabilitation and/or reconstruction to comply with FAA standards, which would result in minor, short-term air quality impacts to Section 4(f) resources.

4.3.3.3 Environmental Consequences - Operations

4.3.3.3.1 Physical Use

No physical use of Section 4(f) resources would occur during the operational phase of both the Current Proposed Project and the No-Action Alternative.

4.3.3.3.2 Constructive Use

The following indirect effects were considered when evaluating whether the Current Proposed Project would cause constructive use of any Section 4(f) resources:

- Air Quality: Operational emissions would not increase at BQN due to the Current Proposed Project Alternative, as compared to the No-Action Alternative. The region does not currently experience violations of any NAAQS and neither construction nor operation of the Current Proposed Project is expected to cause or contribute to exceedances. It is unlikely that the Current Proposed Project would cause air quality impacts that affect the use of a Section 4(f) resource.
- Noise: An analysis of noise impacts to specific Section 4(f) properties was performed using the CY 2034 condition as a worst case (**Table 4.3-6c**). As shown , the Current Proposed Project would cause 17 individual resources to be removed from the DNL 60 dB and above noise contours entirely when compared to the No-Action Alternative. For a majority of the others, the Current Proposed Project would reduce noise exposure levels compared to the No-Action Alternative, with the exceptions being the 20 of the 21 airport buildings to the south of the Proposed Runway that are slated for demolition due to the Current Proposed Project. The Current Proposed Project would add

one resource to the DNL 60 dB and above noise contours compared to the No-Action Alternative. Noise levels at the Civilian War Housing historic resource (Map ID H-053) would increase by 2.68 dB compared to the No-Action Alternative. The predicted sound level at this location would remain compatible with the designated land use and would not substantially impair use of the resource compared to existing conditions. Lastly, Punta Borinquen Golf Course (Map ID R-001) would experience elevated noise levels across its southern portion with the Current Proposed Project, while an area of roughly the same size in the northern portion of the golf course would experience a corresponding decrease in noise levels. The highest noise levels experienced at the golf course (DNL 65 dB) would remain fully compatible with land use compatibility guidelines established at Title 14 CFR Part 150. This Section 4(f) resource would experience no net constructive use. Noise levels affecting all other Section 4(f) resources would remain consistent with these land use compatibility guidelines. Noise impacts incurred by the Current Proposed Project would not impair the use of any Section 4(f) resource.

With the No-Action Alternative, operational emission levels would be expected to continue to increase incrementally over time as a result of expected incremental increases in airport operations. Visual impacts and impacts from light emissions as well as noise impacts from aircraft would generally remain unchanged from the current conditions. No new Section 4(f) properties would experience constructive use.

1 **TABLE 4.3-6C SECTION 4(F) PROPERTIES - 2034 NOISE COMPARISON**

Resource Category	Map ID (Figure 4.3-1)	Name	In No-Action Alternative Contour?	In Proposed Project Contour?	No-Action Noise Level (DNL dB)	Proposed Project Noise Level (DNL dB)	Change (DNL dB)
Historic Resource	H-001	Runway 8-26	X	X	83.64	69.43	-14.21
	H-002	Building 400 - Control Tower	X	X	63.71	60.53	-3.18
	H-003	Building 402 - Hangar 2	X	X	63.42	60.27	-3.15
	H-004	Building 403 - Hangar 3	X		63.23	59.99	-3.24
	H-005	Building 405 -Hangar 5	X		62.44	59.45	-2.99
	H-006	Building 3 - Gazebo	X	X	62.71	72.31	+9.60
	H-007	Building 571 - Nose Dock Hangar	X	X	68.39	60.83	-7.56
	H-008	Building 572 - Nose Dock Hangar	X	X	66.66	62.95	-3.71
	H-009	Building 573 - Nose Dock Hangar	X	X	65.18	62.81	-2.37
	H-010	Building 574 - Nose Dock Hangar	X	X	63.33	61.27	-2.06
	H-011	Building 575 - Hangar	X	X	62.59	61.21	-1.38
	H-012	Building 1029 - Ground Support Equipment Shop	X	X	62.76	65.86	+3.10
	H-013	Building 1031 - Electric Power Station	X	X	63.67	67.48	+3.81
	H-014	Building 1132 - Squadron Operations	X	X	61.12	66.9	+5.78
	H-015	Building 1070 - Aircraft Maintenance Organizational Shop	X	X	61.85	64.99	+3.14
	H-016	Building 1071 - Squadron Operations	X	X	61.56	65.38	+3.82
	H-017	Building 1072 - Weapons and Base Systems Shop	X	X	62.67	65.68	+3.01
	H-018	Building 1073 - Traffic Check House	X	X	62.11	64.84	+2.73
	H-019	Building 1089 - Weather Observation Tower	X	X	63.04	67.44	+4.40
	H-020	Building 1104 -Storage and Supply	X	X	62.85	70.85	+8.00
	H-021	Building 1121 -Electrical Station	X	X	61.38	66.59	+5.21
	H-022	Building 1128 - Armaments and Avionics Shop	X	X	61.31	65.84	+4.53
	H-023	Building 1129 - Armaments and Electrical Shop	X	X	61.05	65.01	+3.96
	H-024	Building 1133 - Captive Water Supply Tank Building	X	X	61.15	65.83	+4.68
	H-025	Building 1245 - Readiness Crew Facility	X	X	62.28	71.6	+9.32
	H-026	Building 1251 - Target Intelligence	X	X	64.25	67.21	+2.96
	H-027	Building 1270 - Storage	X	X	64.78	65.45	+0.67
	H-028	Building 1203 - Small Arms Magazine			55.75	54.66	-1.09
	H-029	Building 1204 - Small Arms Magazine			55.37	54.58	-0.79
	H-030	Building 1214 - Fuel Storage Tank			53.15	55.14	+1.99
	H-031	Building 1215 - Fuel Storage Tank			52.77	55.59	+2.82
	H-032	Building 1230 - Storage	X	X	60.23	60.56	+0.33

Resource Category	Map ID (Figure 4.3-1)	Name	In No-Action Alternative Contour?	In Proposed Project Contour?	No-Action Noise Level (DNL dB)	Proposed Project Noise Level (DNL dB)	Change (DNL dB)
	H-033	Building 501 - Motor Transportation and Repair)	X		61.56	57.74	-3.82
	H-034	Building 502 - Ordnance Repair Shop	X		62.91	58.72	-4.19
	H-035	Building 503 - Quartermaster Warehouse	X		60.06	59.11	-0.95
	H-036	Building 504 – Bakery			59.23	58.27	-0.96
	H-037	Building 505 - Utility Shop			57.98	57.3	-0.68
	H-038	Building 506 - Commissary and Quartermaster Warehouse			58.59	57.82	-0.77
	H-039	Building 507 - Power Plant			58.09	57.39	-0.70
	H-040	Building 508 - Laundry			57.91	57.07	-0.84
	H-041	Building 509 - Cold Storage Plant			59.11	58.26	-0.85
	H-042	Building 510 - Air Corps Garage			59.32	58.46	-0.86
	H-043	Building 511 - Air Corps Garage	X		60.1	59.14	-0.96
	H-044	Building 512 - Quartermaster Warehouse	X	X	62.01	60.22	-1.79
	H-045	Building 513 - Quartermaster Warehouse	X	X	60.94	59.81	-1.13
	H-046	Building 524 - Pavement and Grounds	X		62.28	60.7	-1.58
	H-047	Building 543 - Veterinary Office	X		61.18	59.7	-1.48
	H-048	Building 406 - Fire Station	X		61.36	58.61	-2.75
	H-049	Building 407 - Paint, Oil, and Dope House	X		61.48	58.79	-2.69
	H-050	Building 408 - Photographic Laboratory	X		60.89	58.29	-2.60
	H-051	Building 409 - Air Corps Garage	X		60.84	58.3	-2.54
	H-052	Building 410 - Air Corps Garage	X		61.44	58.8	-2.64
Historic Area	H-053	Civilian War Housing		X	58.16	60.84	+2.68
	H-054	Fullana Neighborhood (Partial)	X		60.36	55.64	-4.72
Recreational Area	R-001	Punta Borinquen Golf Course and Club House	X		67.45	62.56	-4.89
	R-002	Aguadilla (Ramey) Skate and Splash Park	X		60.84	56.58	-4.26
Conservation Area	C-001	Conservation Area (Unnamed)	X		60.29	56.43	-3.86
	C-002	Conservation Area (Unnamed)	X	X	63.17	62.08	-1.09

Sources: AECOM, 2024; AEDT 3f, 2024.

4.3.3.4 Avoidance, Minimization, and Mitigation Measures

In summary, both Runway 8-26 and 16 of the 21 buildings to be demolished as a result of the Current Proposed Project are considered Section 4(f) properties with significant direct, physical use as defined at 23 CFR 774.17. No constructive use impacts have been identified. The direct physical use of these properties is significant because they are each individually considered to be contributing resources to a historic district as determined in consultation with PRSHPO as required by Section 106 of the NHPA. The use is not de minimis in nature because alterations to the affected Section 4(f) properties constitute an adverse effect to historic resources per 36 CFR 800.

The FAA has performed all possible planning to confirm that there are no feasible and prudent avoidance alternatives to impacts on Section 4(f) properties (see **Appendix K** of the 2020 EA). An alternative is not considered feasible if it cannot be built as a matter of sound engineering judgment (23 CFR 774.17). Further, an alternative is not considered prudent if it compromises the project to a degree that it is unreasonable to proceed in light of its purpose and need, results in unacceptable safety or operational problems, causes significant or disproportionate social, economic, or environmental impacts after mitigation, or results in additional costs of extraordinary magnitude.

The alternatives developed for the 2020 EA and considered by FAA (**Section 3.1.1**), among others specifically added within the context of Section 4(f) [**Appendix K** of the 2020 EA), were assessed as to whether they are feasible or prudent. Of the feasible prudent alternatives in the 2020 EA, Alternatives 2B and 2D would not avoid the Section 4(f) resources, and on balance, both of these alternatives present the same level of harm to the Section 4(f) resources in question. Therefore, either Alternative 2B or 2D constituted the "least overall harm" alternative under Section 4(f). Because the Current Proposed Project is substantially similar to Alternative 2B, it can also be considered to constitute a "least overall harm" alternative based on the analysis considered by FAA to date.

4.3.3.5 Comparison with Previous EA

A detailed evaluation of impacts to Section 4(f) resources is provided in **Appendix K** of the 2020 EA, including demonstration that the FAA preformed all possible planning to identify that there were no reasonable and prudent alternatives to avoid the 4(f) resources (see **Section 3.1.1** of this Supplemental EA for a summary of alternatives considered). That analysis is hereby incorporated by reference and the conclusions also apply to the Current Proposed Project. A majority of the physical and constructive use determinations from the Original Proposed Project still apply to the Current Proposed Project based on this supplemental analysis, and further, the Current Proposed Project further reduces noise impacts to many Section 4(f) resources compared to the 2020 EA analysis. The only new impact consideration is increased noise levels at the Civilian War Housing resource (H-053), and as described previously, the increase does not constitute a constructive use of the property.

4.3.4 NOISE AND NOISE-COMPATIBLE LAND USE

4.3.4.1 Affected Environment

The evaluation of the BQN noise environment, and land use compatibility associated with airport noise, was conducted using methodologies developed by the FAA and published in FAA Order 5050.4B, FAA Order 1050.1F, and title 14 CFR Part 150.

For aviation noise analysis, the FAA has determined that the cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of yearly DNL which is used as FAA's primary metric. DNL is a 24-hour time-weighted-average noise metric expressed in A-weighted decibels (dBA) which accounts for the noise levels of all individual aircraft events, the number of times those events occur, and the time of day which they occur. DNL has two time periods: daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.). In order to represent the added intrusiveness of sounds occurring during nighttime hours, DNL penalizes or weights events occurring during the nighttime periods by 10 dBA.

Title 14 CFR Part 150, Appendix A provides Federal compatible land use guidelines for several land uses as a function of DNL values. The ranges of DNL values reflect the statistical variability for the responses of large groups of people to noise. Compatible or non-compatible land use is determined by comparing the predicted or measured DNL values at a site to the values listed at Title 14 CFR Part 150 (**Table 4.3-7**). It should be noted that Title 14 CFR Part 150 land use compatibility guidelines shown in **Table 4.3-7** do not constitute a Federal determination that a specific land use is acceptable or unacceptable under Federal, state, or local laws. The responsibility for determining acceptable land uses rests with the local authorities through its zoning laws and ordinances.

TABLE 4.3-7 LAND USE COMPATIBILITY WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS

	Yearly DNL					
	Below 65 dB	65-70 dB	70-75 dB	75-80 dB	80-85 dB	Over 85 dB
Residential						
Residential (Other than mobile homes & transient lodges)	Y	N[1]	N[1]	N	N	N
Mobile Home Parks	Y	N	N	N	N	N
Transient Lodging	Y	N[1]	N[1]	N[1]	N	N
Public Use						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals, Nursing Homes	Y	25	30	N	N	N
Churches, Auditoriums, Concert Halls	Y	25	30	N	N	N
Governmental Services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
Commercial Use						
Offices, Business & Professional	Y	Y	25	30	N	N
Wholesale & Retail Building Materials, Hardware & Farm Equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail Trade - General	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communications	Y	Y	25	30	N	N

	Yearly DNL					
	Below 65 dB	**65-70 dB**	**70-75 dB**	**75-80 dB**	**80-85 dB**	**Over 85 dB**
Manufacturing & Production						
Manufacturing, General	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and Optical	Y	Y	25	30	N	N
Agriculture (Except Livestock) & Forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock Farming & Breeding	Y	Y[6]	Y[7]	N	N	N
Mining & Fishing, Resource Production & Extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor Sports Arenas, Spectator Sports	Y	Y[5]	Y[5]	N	N	N
Outdoor Music Shells, Amphitheaters	Y	N	N	N	N	N
Nature Exhibits & Zoos	Y	Y	N	N	N	N
Amusement, Parks, Resorts, Camps	Y	Y	Y	N	N	N
Golf Courses, Riding Stables, Water Recreation	Y	Y	25	30	N	N

Source: Title 14 CFR part 150, Appendix A, Table 1, January 1998.
NOTE:
The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties remains with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land use for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.
KEY TO TABLE:
SLUCM Standard Land Use Coding Manual.
Y (Yes) Land Use and related structures are compatible without restrictions.
N (No) Land Use and related structures are not compatible and should be prohibited.
NLR Noise Level Reduction (outdoor to indoor) are to be achieved through incorporation of noise attenuation into the design and construction of structure.
25,30, or 35 Land use and related structures are generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated in design and construction of structure.
[1] Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
[2] Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of the buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
[3] Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of the buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
[4] Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of the buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
[5] Land use compatible provided special sound reinforcement systems are installed.
[6] Residential buildings require an NLR of 25 dB.
[7] Residential buildings require an NLR of 30 dB.
[8] Residential buildings not permitted.
Noncompatible land use denoted in red highlighting.

Figure 4.3-2 shows modeled noise exposure resulting from projected aircraft operations under existing conditions. Overall, the acreage of off-airport land contained within the DNL 65 dB or greater contour is approximately 32 acres and approximately 389 acres of off-airport land are contained within the DNL 60 dB or greater contour. Detailed noise impact analysis methodology is provided in **Appendix B**.

A review of existing and future land use within the DNL 60 dB and DNL 65 dB contours identified for BQN, for existing noise conditions and for each Proposed Action Alternative. As shown on **Figure 4.3-2** and **Table 4.3-8**, land use within the existing DNL 60 dB contour is predominantly classified as Endowment (549 acres of the 835 acre total). Similarly, land use within the existing DNL 65 dB contour is

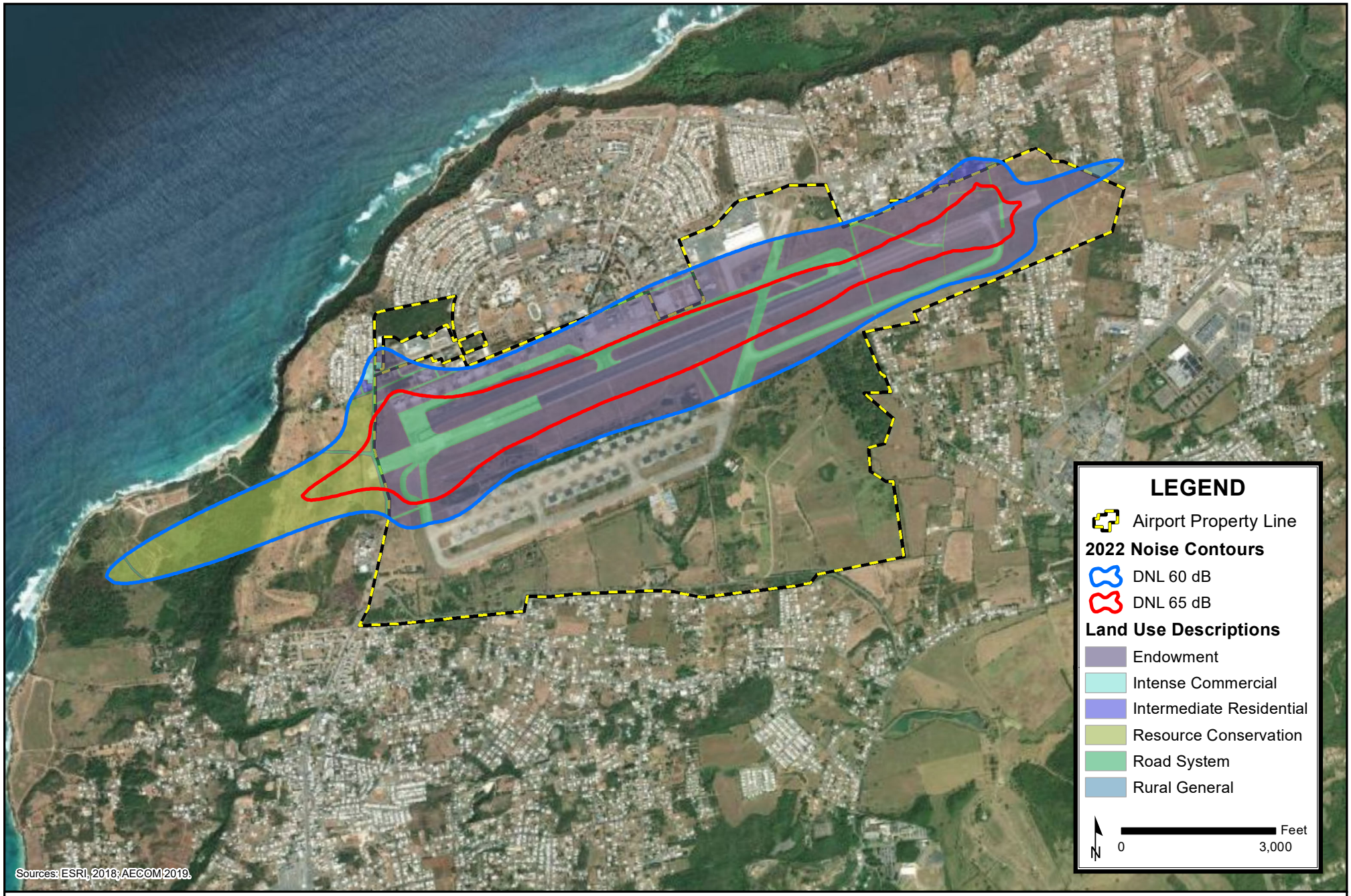
predominantly classified as Endowment (233 acres of the 314 acre total). There is substantial coverage of Resource Conservation and Road System land uses within the DNL 60 dB contour. Within the DNL 65 dBA contour, the only land uses not classified as Endowment are Resource Conservation and Road System. Refer to **Table 4.3-8** for further details on noise compatible land uses within these areas.

TABLE 4.3-8 EXISTING LAND USE NOISE EXPOSURE ESTIMATES

Land Use Type	Land Use Description	Permitted Uses	DNL 60+ dBA (acres)	DNL 65+ dBA (acres)
Endowment (D)	Public or private land associated with endowment, institutional, tourist, commercial, recreational uses, civic, educational, philanthropic, cultural, scientific, educational, religious, or similar as a means of ensuring that they are developed in harmony with the Uses Plan of Land of Puerto Rico.	Municipal business; churches; cemetery; offices; tourist use parking lot; animal hospital; lodging services; commercial (i.e., shops, pharmacy, restaurants); single/multi-family homes; cultural; institutional; museum; renewable energy projects; hospital; outdoor recreational facilities	548.89	232.94
Intense Commercial (CI)	Commercial areas that meet needs of various neighborhoods, residential communities; existing commercial areas of a central nature, including intensive trade and marketing centers	Extensive recreational commercial centers (i.e., retail, lodging services, gas stations, animal hospitals, mortuary, restaurants, theaters, museums, auto shop, hardware stores, light industries)	2.53	0.00
Intermediate Residential (RI)	Residential areas with intermediate population density	Single-family residential; apartments; row house; lodging services; care centers; emerging businesses that do not generate dust, noise, objectionable smells; urban gardens.	7.41	0.00
Resource Conservation (CR)	Areas of special value to be improved or maintained to conserve and protect areas of special interest such as, but not limited to, dunes, beaches, lake margins, flora and fauna refuges, etc.	The following uses as long as they do not conflict with the conservation of the resource or land stabilization: recreational/ecotourism; agricultural; lodging services; residential; archaeological excavations; scientific studies; gift shops; museum	130.95	16.20
Road System (VIAL)	Puerto Rico roadway system	Includes highways; municipal roadways; expressway; forest highways	141.73	65.25
Rural General (RG)	Area with potential for agricultural and agro ecological activities based on soil characteristics; agricultural reserves	Depends on limitation of infrastructure availability and topographic/geological conditions; fishing/mariculture; sowing/cultivation; compost; animal lodging; agroecology; housing for 1 or 2 families; retail, agricultural shops,	3.12	0.00

Land Use Type	Land Use Description	Permitted Uses	DNL 60+ dBA (acres)	DNL 65+ dBA (acres)
		education services; health services; warehouses; recycle center; medical cannabis; agricultural equipment repair shop; renewable energy projects; eco-lodge; animal hospital		
		TOTAL:	**834.63**	**314.39**

Note: Permitted uses and design parameters vary and are reviewed case-by-case by the Board Adjudicative of the OGPe.
Sources: PRPB, *Joint Regulation for Evaluation and Issue of Permits Related to Development, Land Use and Business Operation.* June 7, 2019; AEDT 3f; AECOM 2024.



RAFAEL HERNANDEZ AIRPORT

RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

2022 EXISTING CONDITION NOISE CONTOURS

FIGURE
4.3-2

4.3.4.2 Environmental Consequences - Construction

Construction noise would temporarily increase sound levels in the immediate vicinity of the construction and site preparation activities. Clearing and grading operations are the noisiest, with such equipment generating noise levels as high as 70 to 95 dB within 50 feet of their operation. Dump trucks accessing the site can also generate noise that may be noticeable during morning and nighttime hours. Distance rapidly diminishes noise levels, so area residents would likely experience a modest increase in noise during construction hours. The potential noise impact associated with the operation of machinery on-site would be temporary and can be reduced using construction timing and staging. To further minimize noise impacts, construction equipment would be maintained to meet manufacturers' operating specifications. Contractors will follow all local land development codes and noise ordinances during construction of the Current Proposed Project. Overall, construction noise is expected to have a minor and temporary impact.

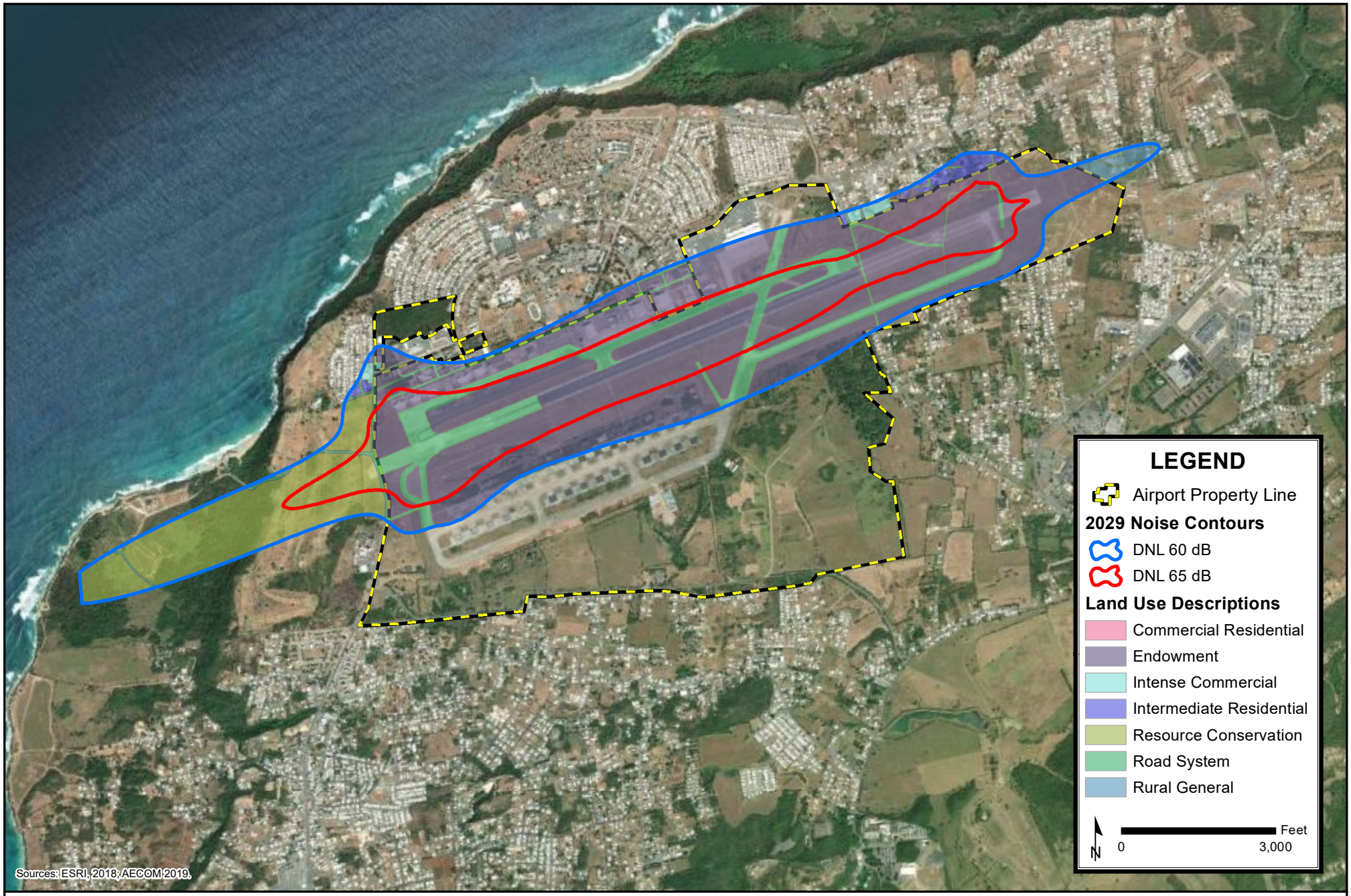
4.3.4.3 Environmental Consequences - Operations

The Current Proposed Project would not generate additional aircraft activity compared to the No-Action Alternative, nor would it change the aircraft fleet mix in use at BQN. Because the Current Proposed Project shifts the location of Runway 8-26 compared to its existing configuration, the location of the aircraft noise contours are different between the Current Proposed Project and the No-Action Alternative.

For the 2029 No-Action Alternative (**Figure 4.3-3 and Table 4.3-9)**, the DNL 65 dB and above noise contour contains 378 acres of land use, comprising Endowment (275 acres), Resource Conservation (22 acres), and Road System (81 acres). The DNL 60 dB and above noise contour contains 980 acres of land use, comprising Commercial Residential (less than one acre), Endowment (628 acres), Intense Commercial (6 acres), Intermediate Residential (15 acres), Resource Conservation (164 acres), Road System (156 acres), and Rural General (11 acres). When comparing the 2029 No-Action noise exposure to the Proposed Project (**Figure 4.3-4 and Table 4.3-9**), the Current Proposed Project changes 36 acres of Resource Conservation/Road System land use to Endowment in DNL 65 dB and above noise contour, and 55 acres of Commercial Residential, Intense Commercial, Intermediate Residential, and Resource Conservation land use to Endowment/Road System/and Rural General land use in the DNL 60 dB and above noise contour. The size of the noise contours due to the Current Proposed Project in 2029 do not affect off-airport residential property and all land uses within these contours would remain compatible. With the exception of the Punta Borinquen Golf Course, no residences or other noise-sensitive structures are located in these off-airport areas. The Punta Borinquen Golf Course is located within the DNL 60 dB noise contour but predicted sound levels in this area remain compatible with 14 CFR Part 150 noise compatibility levels (**Table 4.3-7**).

For the 2034 No-Action Alternative (**Figure 4.3-5 and Table 4.3-10)**, the DNL 65 dB and above noise contour contains 394 acres of land use, comprising Endowment (287 acres), Resource Conservation (24 acres), and Road System (84 acres). The DNL 60 dB and above noise contour contains 1,024 acres of land use, comprising Commercial Residential (less than one acre), Endowment (653 acres), Intense Commercial (8 acres), Intermediate Residential (18 acres), Resource Conservation (171 acres), Road System (159 acres), and Rural General (15 acres). When comparing the 2034 No-Action noise exposure to the Proposed Project (**Figure 4.3-6 and Table 4.3-10**), the Current Proposed Project changes 37 acres of Resource Conservation/Road System land use to Endowment in DNL 65 dB and above noise contour, and 56 acres

of Commercial Residential, Intense Commercial, Intermediate Residential, and Resource Conservation land use to Endowment/Road System/and Rural General land use in the DNL 60 dB and above noise contour. The size of the noise contours due to the Current Proposed Project in 2034 do not affect off-airport residential property and all land uses within these contours would remain compatible. With the exception of the Punta Borinquen Golf Course, no residences or other noise-sensitive structures are located in these off-airport areas. The Punta Borinquen Golf Course is located within the DNL 60 dB noise contour but predicted sound levels in this area remain compatible with 14 CFR Part 150 noise compatibility levels (**Table 4.3-7**).



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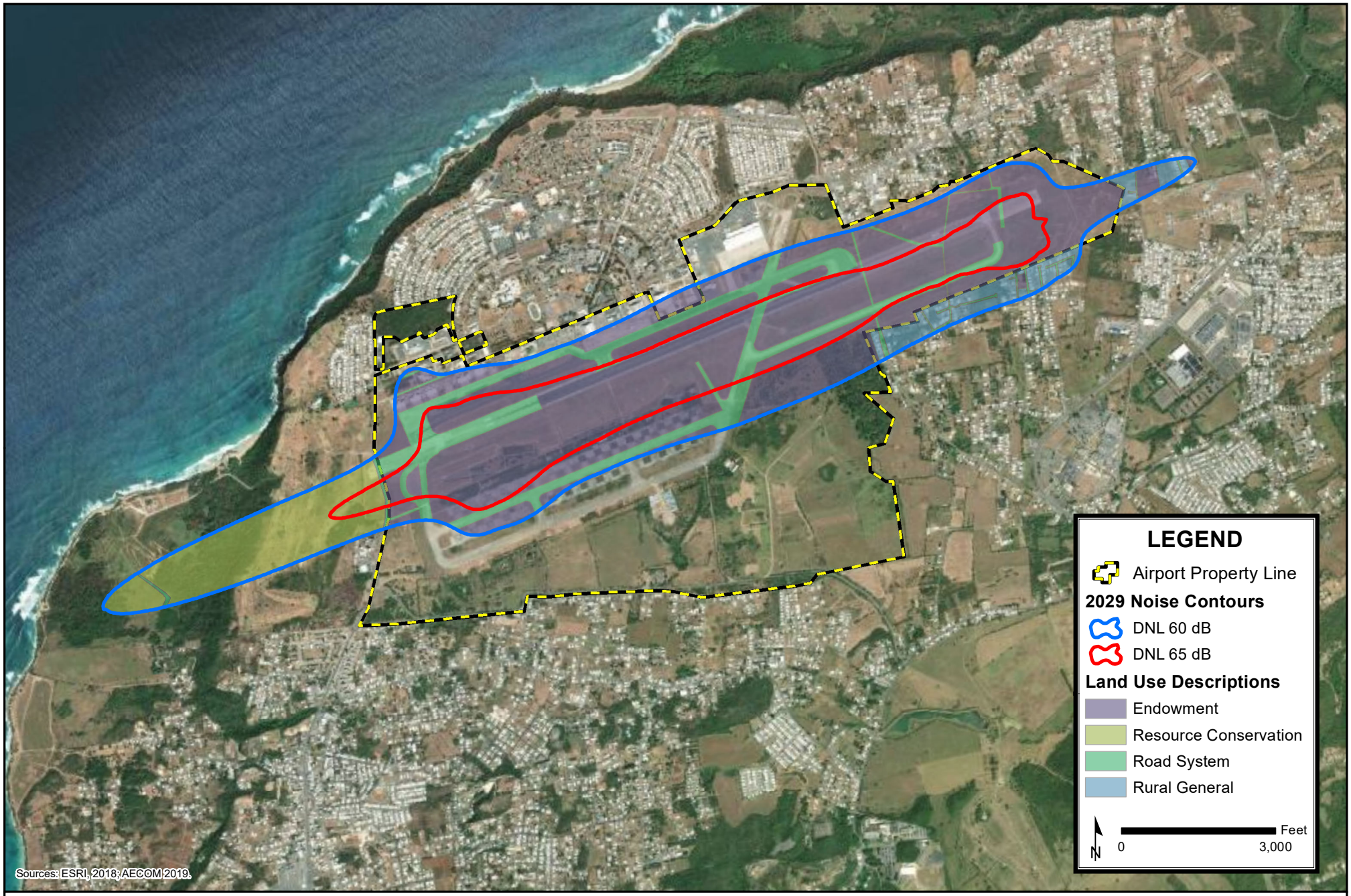
RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

2029 NOISE CONTOURS - NO ACTION ALTERNATIVE

FIGURE 4.3-3

Path: D:\60579568_BQNEARW826\Supplemental EA\Technical\GIS\mxd\20240607_Figure 4.3-2 2029 Noise Contour - No Action_rev0.mxd, Date Saved: 6/10/2024 1:26:15 PM



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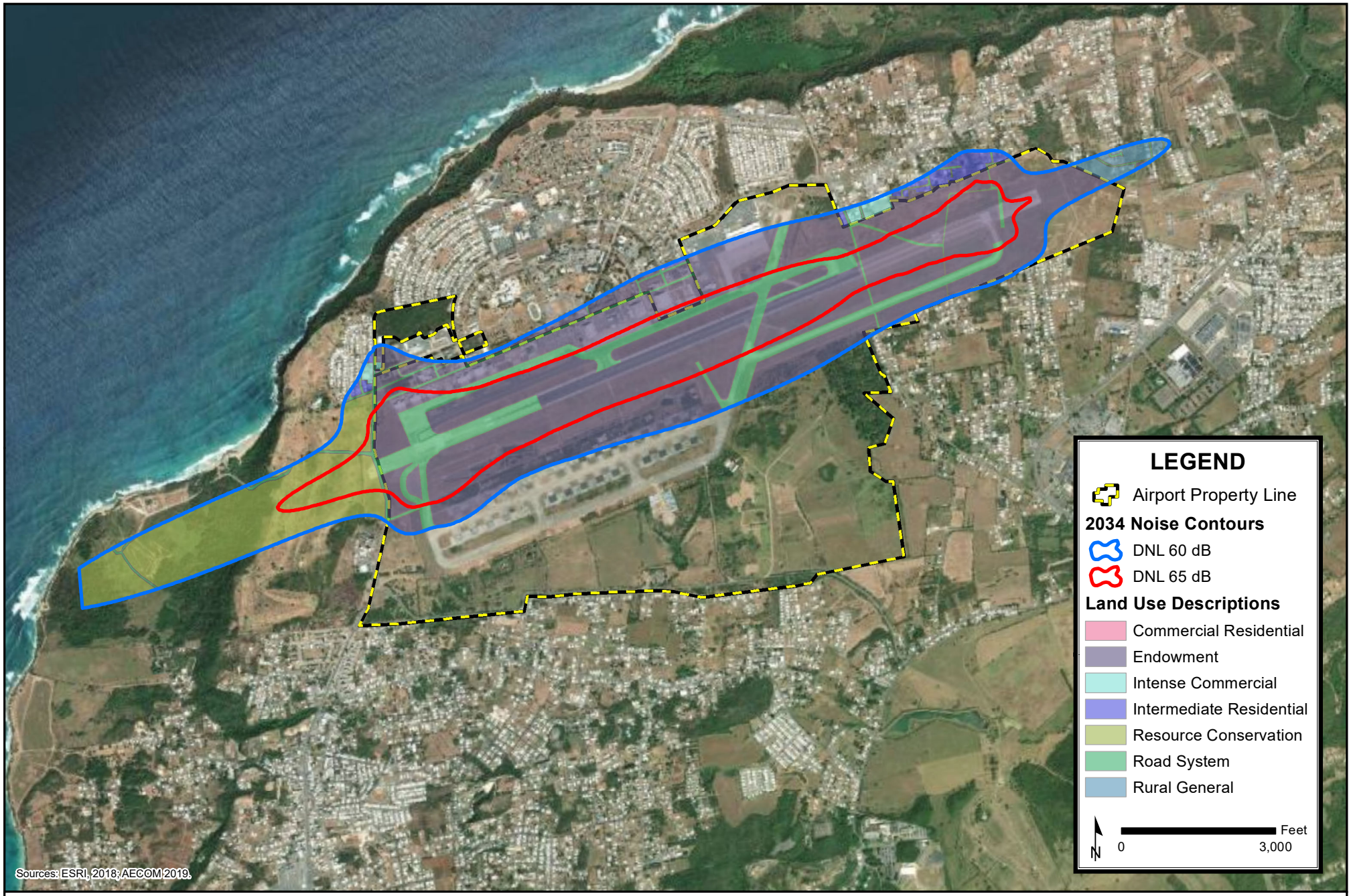
RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

2029 NOISE CONTOURS - PROPOSED PROJECT

FIGURE 4.3-4

Path: D:\60579568_BQNEARW826\Supplemental EA\Technical\GIS\mxd\20240607_Figure 4.3-3 2029 Noise Contour - Proposed Project_rev0.mxd, Date Saved: 6/10/2024 1:27:27 PM



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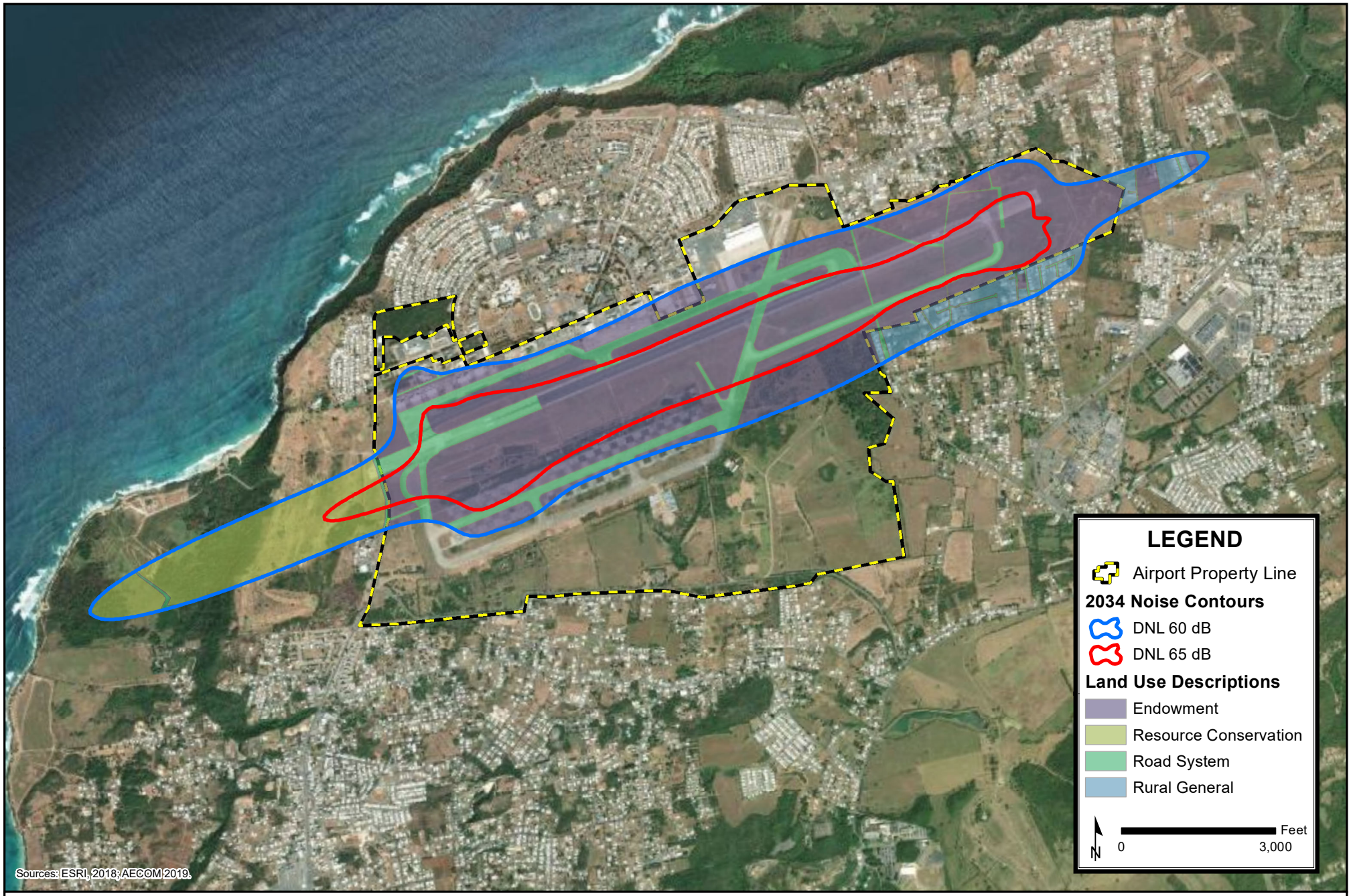
RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

2034 NOISE CONTOURS - NO ACTION ALTERNATIVE

FIGURE 4.3-5

Path: D:\60579568_BQNEARW826\Supplemental EA\Technical\GIS\mxd\20240607_Figure 4.3-4 2034 Noise Contour - No Action_rev0.mxd, Date Saved: 6/10/2024 1:28:33 PM



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RUNWAY 8-26 RECONSTRUCTION
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

2034 NOISE CONTOURS - PROPOSED PROJECT

FIGURE
4.3-6

TABLE 4.3-9 YEAR 2029 NOISE EXPOSURE ESTIMATE

Scenario	Land Use	DNL 65 dB and Above (acres)	DNL 60 dB and Above (acres)
2029 No-Action	Commercial Residential	--	0.02
	Endowment	274.94	627.96
	Intense Commercial	--	6.42
	Intermediate Residential	--	15.01
	Resource Conservation	22.06	163.71
	Road System	81.06	155.90
	Rural General	--	11.21
	Total	**378.06**	**980.23**
Scenario	**Land Use**	**DNL 65 dB and Above (acres)**	**DNL 60 dB and Above (acres)**
2029 Proposed Project	Commercial Residential	--	--
	Endowment	311.41	634.36
	Intense Commercial	--	--
	Intermediate Residential	--	--
	Resource Conservation	8.35	129.83
	Road System	58.3	166.93
	Rural General	--	49.11
	Total	**378.06**	**980.23**
Scenario	**Land Use**	**DNL 65 dB and Above (acres)**	**DNL 60 dB and Above (acres)**
Change	Commercial Residential	--	-0.02
	Endowment	+36.47	+6.4
	Intense Commercial	--	-6.42
	Intermediate Residential	--	-15.01
	Resource Conservation	-13.71	-33.88
	Road System	-22.76	+11.03
	Rural General	--	+37.9
	Total	**0.00**	**0.00**

Sources: Puerto Rico Planning Board, 2023. AEDT 3f, 2024.

TABLE 4.3-10 YEAR 2034 NOISE EXPOSURE ESTIMATE

Scenario	Land Use	DNL 65 dB and Above (acres)	DNL 60 dB and Above (acres)
2034 No-Action	Commercial Residential	--	0.09
	Endowment	286.59	653.48
	Intense Commercial	--	7.53
	Intermediate Residential	--	18.15
	Resource Conservation	23.98	170.94
	Road System	83.87	158.87
	Rural General	--	15.27
	Total	**394.44**	**1,024.33**
Scenario	**Land Use**	**DNL 65 dB and Above (acres)**	**DNL 60 dB and Above (acres)**
2034 Proposed Project	Commercial Residential	--	--
	Endowment	323.12	656.75
	Intense Commercial	--	--
	Intermediate Residential	--	--
	Resource Conservation	9.81	140.52
	Road System	61.51	169.6
	Rural General	--	57.46
	Total	**394.44**	**1,024.33**
Scenario	**Land Use**	**DNL 65 dB and Above (acres)**	**DNL 60 dB and Above (acres)**
Change	Commercial Residential	--	-0.09
	Endowment	36.53	3.27
	Intense Commercial	--	-7.53
	Intermediate Residential	--	-18.15

Scenario	Land Use	DNL 65 dB and Above (acres)	DNL 60 dB and Above (acres)
	Resource Conservation	-14.17	-30.42
	Road System	-22.36	10.73
	Rural General	--	42.19
	Total	**0.00**	**0.00**

Sources: Puerto Rico Planning Board, 2023. AEDT 3f, 2024.

4.3.4.4 Avoidance, Minimization, and Mitigation Measures

An action would have a significant noise impact if it would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level or cause a noise sensitive area to be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase. The Current Proposed Project would not newly expose non-compatible land uses or noise sensitive areas to a 1.5 dB increase in the DNL 65 dB noise contour, and existing land uses within the noise contours would remain compatible. Mitigation measures are not warranted.

4.3.4.5 Comparison with Previous EA

Because the 2020 EA included year 2029 as one of the years of noise analysis, it is possible to compare noise exposure estimates from the Original Proposed Project with the Current Proposed Project in this Supplemental EA. **Table 4.3-11** compares these noise exposure estimates. As shown, the Current Proposed Project's noise contours are smaller than the Original Proposed Project. Specifically, in the DNL 65 dB contour, the Current Proposed Project reduces the amount of Endowment land use by 56 areas, the amount of Resource Conservation land use by 8 acres, the amount of Road System land use by 18 acres, and the amount of Rural General land use by 0.8 acres, for a total of 82 acres reduction in area. In the DNL 60 dB contour, the Current Proposed Project reduces the amount of Developed Rural area by less than one acre, the amount of Endowment land use by 68 acres, the amount of Federal Property by 6 acres, the amount of Intense Commercial land use by less than one acre, the amount of Intermediate Residential land use by three acres, the amount of Resource Conservation land use by 42 acres, the amount or Road System land use by 24 acres, and the amount or Rural General land use by 128 acres, for a reduction in area of 272 acres.

Review of operational data provided for this Supplemental EA versus that utilized in the 2020 EA reveals the following factors contributing to the reduction in noise contour area. **Appendix B** contains additional information on the aircraft fleet mix, operations, and modeling approach for this Supplemental EA.

- Differences in runway end elevations and the amount of displaced thresholds applied on each runway end;
- Removal/retirement of several older generation, louder aircraft from the commercial air carrier fleet mix, including: the Boeing DC-10-10, the Boeing MD-11, the Boeing MD-83, The Boeing 737-700 and -800 series, the Airbus A310-300, and the Fokker F100. Based on operational records provided by the carriers and public flight data information procured from FAA and other sources, these aircraft are no longer in frequent operation currently, nor are they included in the PRPA's forecast of aircraft fleet and activity in the future;
- Reductions in the amount of operations that occur during nighttime hours for several aircraft types compared to the Original EA, based on operational records provided by the carriers and public flight data information procured from FAA and other sources.

As described previously no residential areas are contained in the DNL 65 dB noise contour for the Current Proposed Project, and therefore the previous mitigation measures described in the 2020 EA with respect to property acquisition/easements, purchase assurance, and sales assurance are no longer required.

TABLE 4.3-11 YEAR 2029 NOISE EXPOSURE COMPARISON

Scenario	Land Use	DNL 65 dB and Above (acres)	DNL 60 dB and Above (acres)
2029 Original Proposed Project	Commercial Residential	--	--
	Developed Rural Area	--	0.3
	Endowment	367.1	702.5
	Federal Property	--	5.6
	Intense Commercial	--	0.5
	Intermediate Residential	--	3.4
	Resource Conservation	15.9	171.7
	Road System	76.6	191.0
	Rural General	0.8	176.8
	Total	**460.4**	**1,251.8**
Scenario	**Land Use**	**DNL 65 dB and Above (acres)**	**DNL 60 dB and Above (acres)**
2029 Current Proposed Project	Commercial Residential	--	--
	Developed Rural Area	--	--
	Endowment	311.41	634.36
	Federal Property	--	--
	Intense Commercial	--	--
	Intermediate Residential	--	--
	Resource Conservation	8.35	129.83
	Road System	58.3	166.93
	Rural General	--	49.11
	Total	**378.06**	**980.23**
Scenario	**Land Use**	**DNL 65 dB and Above (acres)**	**DNL 60 dB and Above (acres)**
Change	Commercial Residential	0	0
	Developed Rural Area	0	-0.3
	Endowment	-55.69	-68.14
	Federal Property	0	-5.6
	Intense Commercial	0	-0.5
	Intermediate Residential	0	-3.4
	Resource Conservation	-7.55	-41.87
	Road System	-18.3	-24.07
	Rural General	-0.8	-127.69
	Total	**-82.34**	**-271.57**

Sources: Puerto Rico Planning Board, 2023. AEDT 3f, 2024.

4.3.5 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE AND CHILDREN'S HEALTH AND SAFETY

4.3.5.1 Affected Environment

An SSA was established to support the analysis of social and economic conditions in the area of the Current Proposed Project. The SSA encompasses the municipality of Aguadilla. The SSA serves as the focus of the evaluation of direct, indirect, and secondary and cumulative socioeconomic effects. Refer to **Figure 4.1-1** for a depiction of the SSA.

Information pertaining to the existing social and economic characteristics of the SSA was gathered from data published by the US Census Bureau. Specifically, 2017-2021 American Community Survey (ACS) 5-Year Estimates was used to identify the income/poverty and racial/ethnic characteristics of the population within the SSA and serve as the basis for the assessment of economic activity and employment.

Population

Table 4.3-12 describes the population present within the SSA, Puerto Rico, and the US. In 2021, the population of Puerto Rico was estimated at 3,311,274 residents. The SSA was estimated to contain 55,241 residents. US Census data shows that the population density within the SSA (1,654.1 people per square mile) is considerably higher than that generally seen in the commonwealth (942.0 people per square mile).

Additionally, ACS estimates show that approximately 75 percent of the adult population within the SSA attained a high school diploma (or equivalent) or higher level of education. Approximately 25 percent of the population within the SSA holds a bachelor's or higher degree.[9]

9 US Census Bureau, 2017-2021 ACS, B15003

TABLE 4.3-12 COMMUNITY CHARACTERISTICS

Subject	SSA		Puerto Rico		US	
	Number	%	Number	%	Number	%
Total Population	55,241	100	3,311,274	100	329,725,481	100
Age						
< 5 years	2,007	3.6	122,415	3.7	19,423,121	5.9
5 to 17 years	7,990	14.5	474,862	14.3	54,810,954	16.6
18 to 29 years	8,770	15.9	538,893	16.3	53,193,417	16.1
30 to 39 years	6,323	11.4	388,313	11.7	44,426,904	13.5
40 to 49 years	6,913	12.5	420,954	12.7	41,103,780	12.5
50 to 64 years	10,915	19.8	661,912	20.0	63,878,684	19.4
+65 years	12,323	22.3	703,925	21.3	52,888,621	16.0
Median Age	44.4	N/A	43.1	N/A	38.4	N/A
Race						
White	41,121	74.4	1,693,651	51.1	224,789,109	68.2
Black or African American	1,885	3.4	329,651	10.0	41,393,012	12.6
American Indian and Alaska Native	54	0.1	5,407	0.2	2,722,661	0.8
Asian	38	0.1	6,263	0.2	18,782,924	5.7
Native Hawaiian and Other Pacific Islander	0	0	245	0	615,557	0.2
Some other race	7,527	13.6	714,904	21.6	18,382,796	5.6
Two or more races	4,616	8.4	561,153	16.9	23,039,422	7.0
Ethnicity						
Hispanic	54,210	98.1	3,270,361	98.8	60,806,969	18.4
Households						
Average Household Size	2.55	N/A	2.74	N/A	2.60	N/A

Notes: n/a = not applicable
Source: US Census Bureau, 2017-2021 ACS, B01001, B01002, B02001, B03003, B25010

Age, Race and Ethnicity

The racial, ethnic and age composition of the population present within the SSA, Puerto Rico, and the US is shown in **Table 4.3-12**. Data from the ACS reveals that the White population comprises approximately 74 percent of the SSA's total compared to 51 percent in Puerto Rico and 68 percent in the US. The median age in the SSA is 44.4 years compared to 43.1 years in Puerto Rico and 38.4 years in the US.

Housing Characteristics

Within the SSA, there are approximately 27,336 residential parcels on 23,379 acres of land. Of the residential parcels present, approximately 85 percent support single family homes, almost 15 percent support multi-family homes, and less than one percent support mobile homes and other types of residences (see **Table 4.3-13**).

TABLE 4.3-13 RESIDENTIAL PARCEL TYPES WITHIN THE SSA

Residential Type	Number	% Total
Single-Family Parcels	23,258	85.1
Multi-Family Parcels	4,051	14.8
Mobile Home Parcels	27	0.1
Other Types of Residential Parcels	0	0.0
TOTAL:	27,336	100

Source: US Census Bureau, 2017-2021 ACS, B25024

Economy and Employment

Estimates from the US Bureau of Labor Statistics indicate that there are approximately 50,190 non-farm jobs within Aguadilla-Isabela metropolitan area. **Table 4.3-14** provides a summary of jobs within this area by Standard Occupational Classification (SOC) and employment sector. As shown, the most common industries are based in the Office and Administrative Support (15.1 percent), Sales and Related Occupations (14.9 percent), and Food Preparation and Serving Related Occupations (9.4 percent) sectors. Between 2018 and 2023, the average annual unemployment rate in the Aguadilla-Isabela area fluctuated between 7.7 percent and 14.5 percent. Data for June 2023 indicates a monthly unemployment rate of 8.5 percent.[10]

TABLE 4.3-14 AGUADILLA-ISABELA EMPLOYMENT BY SOC SECTOR

SOC Code	Sector	Estimate	Share
11-0000	Management Occupations	1,960	3.9%
13-0000	Business and Financial Operations Occupations	1,800	3.6%
15-0000	Computer and Mathematical Occupations	960	1.9%
17-0000	Architecture and Engineering Occupations	1,110	2.2%
19-0000	Life, Physical, and Social Science Occupations	300	0.6%
21-0000	Community and Social Service Occupations	520	1.0%
23-0000	Legal Occupations	80	0.2%
25-0000	Education, Training, and Library Occupations	4,090	8.1%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	450	0.9%
29-0000	Healthcare Practitioners and Technical Occupations	2,640	5.3%
31-0000	Healthcare Support Occupations	1,020	2.0%
33-0000	Protective Service Occupations	1,210	2.4%
35-0000	Food Preparation and Serving Related Occupations	4,700	9.4%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	2,090	4.2%
39-0000	Personal Care and Service Occupations	400	0.8%
41-0000	Sales and Related Occupations	7,160	14.3%
43-0000	Office and Administrative Support Occupations	7,570	15.1%
47-0000	Construction and Extraction Occupations	2,090	4.2%
49-0000	Installation, Maintenance, and Repair Occupations	1,790	3.6%
51-0000	Production Occupations	4,690	9.3%
53-0000	Transportation and Material Moving Occupations	3,550	7.1%
00-0000	All Occupations	50,190	100%

Source: US Bureau of Labor Statistics. Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates: Aguadilla-Isabela, PR. May 2023 Data.

10 US Bureau of Labor Statistics. Databases, Tables & Calculators by Subject. Accessed on August 1, 2023 from https://www.bls.gov/data/.

Household Income and Poverty

The 2021 ACS reported the median household income in the municipality of Aguadilla at $16,786. Also, in 2021, the per capita income was estimated at $11,288 in the municipality of Aguadilla. **Table 4.3-15** provides a summary of household income within the SSA. Based on the ACS income estimates, approximately 49.7% of Aguadilla municipality residents fell below the poverty level in 2021.[11]

TABLE 4.3-15 HOUSEHOLD INCOME WITHIN THE SSA

Income Range	Households
Less than $10,000	6,587
$10,000 to $14,999	3,011
$15,000 to $19,999	2,395
$20,000 to $24,999	1,419
$25,000 to $29,999	1,299
$30,000 to $34,999	909
$35,000 to $39,999	796
$40,000 to $44,999	575
$45,000 to $49,999	536
$50,000 to $59,999	1,189
$60,000 to $74,999	1,017
$75,000 to $99,999	913
$100,000 to $124,999	305
$125,000 to $149,999	254
$150,000 to $199,999	108
$200,000 or more	129

Source: US Census Bureau, 2017 - 2021 ACS, B19001

Environmental Justice

EPA's Environmental Justice Screening and Mapping Tool (EJSCREEN) reports environmental and demographic indicators, drawing from the US Census Bureau's ACS, the National Air Toxics Assessment (NATA), information from the Center for Disease Control and other sources. These indicators are used to assess potential environmental justice issues in planning and decision-making processes.

Environmental and demographic indicators from EJSCREEN are summarized on **Table 4.3-16** below. Indicators are expressed in terms of percentiles compared to similar statistics within the Commonwealth of Puerto Rico and within the United States. At this time, the EPA and the EJSCREEN tool do not provide comparisons for Puerto Rico to the rest of the EPA region or the US for all indicators.

11 US Census Bureau, 2013-2017 ACS, B17021, B19013, and B19301.

TABLE 4.3-16 SOCIOECONOMIC INDICATORS (EJSCREEN)

Category	Value	Puerto Rico Average	Percentile in Puerto Rico	USA Average	Percentile in USA
Environmental Indicators					
PM	N/A	N/A	N/A	8.08	N/A
O_3	N/A	N/A	N/A	61.6	N/A
NATA* Diesel PM	0.0211	0.0667	27	0.261	1
NATA* Cancer Risk	20	23	0	28	3
NATA* Respiratory Hazard Index	0.14	0.19	0	0.31	1
Toxic Releases to Air	5,400	4,300	95	4,600	87
Traffic Proximity and Volume	94	180	55	210	55
Lead Paint Indicator	0.15	0.16	65	0.3	42
Superfund Proximity	0.025	0.15	0	0.13	23
Risk Management Plan Proximity	0.45	0.47	70	0.43	74
Hazardous Waste Proximity	0.29	0.76	44	1.9	42
Underground Storage Tanks	0.44	1.7	62	3.9	38
Wastewater Discharge Indicator	.0096	2.3	72	22	82
Demographic Indicators					
Demographic Index (composite of minority and low-income population statistics)	87%	83%	49	35%	98
Supplemental Demographic Index	45%	43%	50	14%	99
People of Color	99%	96%	20	39%	95
Low Income Population	76%	70%	50	31%	96
Unemployment Rate	17%	15%	63	6%	93
Limited English Speaking Households	64%	67%	35	5%	99
Population With Less Than High School Education	24%	21%	60	12%	86
Population Under 5 years of age	4%	4%	61	6%	39
Population over 64 years of age	22%	22%	51	17%	73

Source: EJSCREEN, 2023.
N/A = Not applicable

A low percentile value signifies that the BQN area scores or ranks better or is at lower risk for that indicator compared to the commonwealth population or national population; a high percentile value signifies that the BQN area ranks worse or is at elevated risk compared to commonwealth or national populations.

In terms of reported environmental indicators, nearly all environmental indicators show that the BQN area ranks better or is comparable to reference populations across Puerto Rico for risk of environmental exposure. The only notable exceptions are the indicator for toxic releases to air and the indictor for wastewater discharge, described as the toxicity-weighted concentration per meter distance from discharge. Demographically, EJSCREEN reports that while the level of minority and low-income populations are very high compared to nationwide values, they are relatively low compared to, or comparable to commonwealth trends. The area's population under age five and its elderly population are both comparable to commonwealth trends.

4.3.5.2 Environmental Consequences

Socioeconomic impacts having potential to result from the Current Proposed Project were evaluated based on the thresholds of significance outlined in FAA Order 1050.1F to include:

- Extensive relocation of residents and availability of replacement housing;
- Extensive relocation of community businesses that would create severe economic hardship for the affected communities;
- Disruptions of local traffic patterns that substantially reduce the LOS of the roads serving the Airport and its surrounding communities; and
- A substantial loss in community tax base.

Impacts were determined through the evaluation of the areas affected. Potentially affected land use, residences, commercial buildings, and transportation facilities were identified through GIS analysis.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that Federal agencies include environmental justice as part of their mission by identifying and addressing as appropriate, the potential for disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations, low-income populations, and Native American tribes. *DOT Order 5610.2, Environmental Justice in Minority and Low-Income Populations*, implements EO 12898 and was used by FAA for this analysis. FAA also considered *EO 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All*, which builds upon efforts to advance environmental justice and equity, in preparing the impact analysis presented in this Supplemental EA.

For purposes of this analysis, minority populations and low-income populations were defined as follows:

- A minority is defined as a person of Hispanic or Latino origin of any race; Black or African American; Asian; American Indian or Alaskan Native; and Hawaiian or Pacific Islanders.
- A low-income person is defined as a person living below poverty. The US Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the established threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically but are updated annually to account for inflation.

Environmental justice impacts were evaluated through quantification of populations and households affected by land acquisition and potential noise impacts for the Current Proposed Project to determine if there would be a disproportionately high adverse impact on minority and low-income populations and households. Census data was used to determine the populations and households affected by the Current Proposed Project.

EO 13045, Protection of Children from Environmental Health Risks and Safety Risk, requires Federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children and ensure that its actions address any disproportionate risks. Environmental health risks and safety risks include risks to health or to safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to. This evaluation was based on the Current Proposed Project's potential to result in direct impacts to children in a residential or business setting within the DSA.

According to FAA Order 1050.1F, significant impacts would occur if there were disproportionately high and adverse impacts on low-income and minority populations; disproportionate health and safety risks to children; extensive relocation of residents without sufficient relocation housing available; relocation of businesses that would create severe economic hardship; disruption of traffic patterns affecting the LOS on area roads; and a substantial loss in community tax base.

4.3.5.2.1 Socioeconomics

Construction of the Current Proposed Project would offer additional temporary jobs, which would have further beneficial impacts on the local economy and tax base. No impacts to the regional housing supply are anticipated. Impacts to local traffic patterns would be minimized during construction to the greatest extent practical. As with the Original Proposed Project, potential impacts to the construction phase could be minimized by utilizing haul routes specified in the 2020 EA during AM and PM peak traffic hours. No impacts to public services for the area are anticipated.

Based on the noise analysis conducted for this Supplemental EA, the aircraft operational levels at BQN would remain the same between the Current Proposed Project and the No-Action Alternative, the location of operations would change slightly with the Current Proposed Project. As presented in **Section 4.3.4**, the DNL 65 dB noise contour would remain on airport property and no noise-sensitive land uses would be contained within it. Therefore, adjoining land uses would remain compatible and there is no need to relocate or provide sound mitigation for any residences or businesses.

The No-Action Alternative would forgo potential socioeconomic benefits of creating temporary construction jobs. Otherwise, the No-Action Alternative would have no effect on socioeconomic conditions surrounding BQN.

4.3.5.2.2 Environmental Justice

As previously discussed, the SSA includes the entirety of the municipality of Aguadilla. **Section 4.3.5.1** offers a summary of race, ethnicity, and poverty characteristics for the SSA. As discussed above, the minority and low-income populations of the SSA is relatively low compared to the Commonwealth of Puerto Rico, suggesting a low potential for disproportionate effects on these population segments. The exceptions are air pollution exposure and wastewater discharge according to the EJSCREEN data.

As described in the air quality section (**Section 4.3.1.2**), construction emissions would occur but would be temporary in nature, would not cause or contribute to a violation of any NAAQS, and could be minimized using BMPs. Further, the Current Proposed Project would not change operational emissions levels at BQN compared to the No-Action Alternative (**Section 4.3.1.3**).

As described in the 2020 EA and summarized in **Section 4.2.2.6**, project-specific BMPs and SWPPPs to be designed for the Current Proposed Project would prevent or minimize the potential release of contaminants into groundwater. Pollutants from stormwater runoff from the proposed runway reconstruction and taxiway would be in low concentrations and would be considered a minimal impact. The existing site-specific SPCC plan for the site would need to be revised to reflect changes in configuration in order to minimize the risk of an accidental discharge to surface or groundwater.

Based on the analysis completed, the Current Proposed Project would not result in a disproportionately high and adverse impact on minorities, ethnic groups, Tribal nations, or low-income populations. The No-Action Alternative would have no effect on Environmental Justice populations.

4.3.5.2.3 Children's Health and Safety

The Current Proposed Project would not result in the acquisition or relocation of any schools, child care centers, or other similar facilities. No schools or child care facilities are located in areas that would be affected by significant changes in noise levels. Since there are no schools, daycare centers, or other similar facilities within or adjacent to the DSA and the proposed improvements would be located entirely on the restricted Airport property, the Current Proposed Project is not anticipated to increase environmental health and safety risks or exposures to children in the surrounding community. There would be no disproportionate health and safety risk to children resulting from the Current Proposed Project or the No-Action Alternative

4.3.5.3 Avoidance, Minimization, and Mitigation Measures

As discussed in the preceding sections, applying BMPs during construction could further reduce and minimize impacts to socioeconomic, environmental justice, and children's health and safety. Utilizing haul routes identified in the 2020 EA could minimize traffic impacts to roadway LOS during construction.

4.3.5.4 Comparison with Previous EA

Compared to the Original Proposed Project, impacts to socioeconomics, environmental justice, and children's health and safety are substantially similar in nature. The only major difference is, unlike the Original Proposed Project, the Current Proposed Project does not create significant noise exposure impacts to off-airport land uses and does not require property acquisition or relocation assistance, and the Uniform Act codified at 42 U.S.C. Chapter 61, does not apply.

5.0 PUBLIC INVOLVEMENT

5.1 INTRODUCTION

FAA and PRPA are conducting a public involvement program for Draft EA to ensure information regarding the Current Proposed Project and potential environmental impacts are made available to the general public and public agencies, and that input from interested parties was received and considered in the development of this Supplemental EA. The primary components of the public participation program for this EA include:

- Publication of the Draft EA for public and public agency review,
- Virtual public hearing on the Draft EA, if requested, and
- Public notice of the FAA's decision of whether to issue an extension of the Original EA's Finding of No Significant Impact (FONSI) or to prepare an EIS.

The following summarizes the public involvement and review process.

5.2 DRAFT EA AVAILABILITY FOR REVIEW

The Draft EA has been made available for review by the general public and interested parties. Notification of the Draft EA's availability has been accomplished through legal advertisements in the newspapers *Primera Hora* and *Periódico Visión – Oeste,* as well as the PRPA's website www.prpa.pr.gov, under the section "Avisos." Hard copies of the Draft EA are available for review at the locations listed below:

- Rafael Hernandez Airport
  Main Terminal, Hangar 405, Floor 1
  Aguadilla, Puerto Rico 00603
- Biblioteca Digital Ana M. Javariz,
  Carr. 107 Urb. El Prado
  Aguadilla, Puerto Rico, 00603
- Biblioteca Prof. Enrique A. Laguerre
  University of Puerto Rico – Aguadilla Campus Universidad
  127-129 Crown Road
  Aguadilla, Puerto Rico 00603
- Biblioteca Neris L. Crepo (Aguadilla)
  FWR2+XJ7, Montaña,
  Aguadilla, Puerto Rico 00690

The Draft EA is also available electronically for viewing or download from the PRPA website www.prpa.pr.gov, under the section "Avisos."

5.3 HOW TO COMMENT

Anyone wishing to comment on the information and conclusions in the Draft EA are invited to do so at any time during the advertised public review and comment period. There are two options available to comment:

- Send comments via email to: BQNRunwayEA@prpa.pr.gov.
- Provide written comment to the following address:

Puerto Rico Ports Authority
Attention: Eng. Romel Pedraza
P.O. Box 362829
San Juan, P.R. 00936-2829

5.4 COMMENTS ON THE DRAFT EA

Comments on the Draft EA will be collected and considered during the public comment period. Any substantive public comments received will be included and responded to in the Final EA upon publication.

5.5 FINAL EA

The FAA and the PRPA will consider all comments received from the public during the preparation of the Final EA. The FAA will review the Final EA to determine its adequacy under NEPA, CEQ's regulations implementing NEPA (40 CFR Part 1500), and FAA Orders 1050.1F and 5050.4B. Based on the information and analyses in the Final EA, the FAA will decide whether to either issue a FONSI or prepare an EIS. A Notice of Availability for the FAA's decision document will be published in the newspapers *Primera Hora* and *Periódico Visión – Oeste,* as well as the PRPA's website www.prpa.pr.gov, under the section "Avisos.

Appendix A Air Quality Technical Report

RUNWAY 8-26 RECONSTRUCTION AT RAFAEL HERNANDEZ AIRPORT (BQN)
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

AIR QUALITY TECHNICAL REPORT

PREPARED FOR:

Puerto Rico Ports Authority
and
Federal Aviation Administration

PREPARED BY:

AECOM

May 2024

LIST OF ACRONYMS AND ABBREVIATIONS

AVMT	Annual Vehicle Miles of Travel
BMP	Best Management Practice
BQN	Rafael Hernandez Airport
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
EA	Environmental Assessment
EF	Emission Factor
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse Gas
HP	Horsepower
MOVES	Motor Vehicle Emissions Simulator
mph	miles-per-hour
NO_x	Nitrogen Oxides
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter equal to or less than 2.5 micrometers in diameter
PM_{10}	Particulate Matter equal to or less than 10 micrometers in diameter
SO_2	Sulfur Dioxide
TPY	Tons Per Year
TSP	Total Suspended Particulate
VOC	Volatile Organic Compounds

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1.0 INTRODUCTION

This *Air Quality Technical Report* details the assessment scope, calculation methodology, input data and other technical information used in the analysis of air quality impacts associated with the Supplemental Environmental Assessment (EA) for the proposed Runway 8-26 Reconstruction at Rafael Hernandez Airport (i.e., BQN, or the Airport), hereinafter referred to as the Proposed Project.

1.1. ANALYSIS METHODOLOGY

1.1.1 CONSTRUCTION EMISSIONS

Construction period emission inventories of the following criteria pollutants and their precursors were prepared for the Proposed Project: carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter (PM), and volatile organic compounds (VOC). Greenhouse gas (GHG) emissions, expressed in metric tons of carbon dioxide equivalent (CO_2e) emissions, were also computed. The inventories include annual emissions from the following construction emissions sources: off-road equipment, on-road vehicles, and fugitive sources including asphalt paving and dust generation from site-wide construction activities. Off-road equipment and on-road vehicle emissions were computed using **Equations 1** and **2**, respectively.

Annual hours of off-road equipment operation and on-road annual vehicle miles of travel (AVMT) were derived using an engineering estimate of probable materials quantities and construction costs developed for the Original Proposed Project studied in the Original 2020 EA. The estimates were re-allocated to current construction years and phasing that is planned for the Current Proposed Project studied in this Supplemental EA. Annual construction equipment and vehicle activity is summarized on **Tables 1.1-1a and 1.1-1b.**

Equation 1:

$$\text{Emissions}_{(tpy)} = \sum_{v=i}^{n} EF_v \times HP_v \times \frac{\text{hours}}{\text{day}} \times \frac{\text{days}}{\text{year}} \div 2{,}000 \div 453.59$$

Where:

$\text{Emissions}_{(tpy)}$ = annual emissions (tons per year)

EF_v = emissions rate for equipment v(i)…v(n) (grams per horsepower-hour of operation)

HP_v = rated horsepower for equipment v(i)…v(n)

2,000 = pounds per ton

453.59 = grams per pound

Equation 2:

$$\text{Emissions}_{(\text{tpy})} = \sum_{v=i}^{n} \text{EF}_v \times \frac{\text{miles}}{\text{day}} \times \frac{\text{days}}{\text{year}} \div 2{,}000 \div 453.59$$

Where:

$\text{Emissions}_{(\text{tpy})}$ = annual emissions (tons per year)

EF_v = emissions rate for vehicle v(i)…v(n) (grams per mile)

2,000 = pounds per ton

453.59 = grams per pound

TABLE 1.1-1A ESTIMATED ANNUAL CONSTRUCTION EQUIPMENT ACTIVITY

Off-road Equipment	Fuel	Annual Operating Hours				
		2024	2025	2026	2027	2028
Air Compressor	Gasoline	137.4	271.6	271.6	271.6	270.6
Asphalt Paver	Diesel	69.9	138.2	138.2	138.2	137.7
Bob Cat	Diesel	330.8	654.1	654.1	654.1	651.6
Chain Saw	Gasoline	270.2	534.2	534.2	534.2	532.1
Chipper/Stump Grinder	Diesel	270.2	534.2	534.2	534.2	532.1
Concrete Saws	Gasoline	137.4	271.6	271.6	271.6	270.6
Concrete Truck	Diesel	604.5	1,195.3	1,195.3	1,195.3	1,190.7
Dozer	Diesel	2,163.9	4,278.6	4,278.6	4,278.6	4,262.2
Dump Truck	Diesel	992.9	1,963.1	1,963.1	1,963.1	1,955.6
Dump Truck (12 cy)	Diesel	2,158.6	4,268.2	4,268.2	4,268.2	4,251.8
Excavator	Diesel	1,275.8	2,522.6	2,522.6	2,522.6	2,512.9
Excavator with Bucket	Diesel	165.4	327.1	327.1	327.1	325.8
Flatbed Truck	Diesel	146.7	290.2	290.2	290.2	289.1
Generator Sets	Gasoline	165.4	327.1	327.1	327.1	325.8
Grader	Diesel	44.5	87.9	87.9	87.9	87.6
Hydroseeder	Gasoline	30.7	60.7	60.7	60.7	60.5
Loader	Diesel	183.0	361.8	361.8	361.8	360.4
Off-Road Truck	Diesel	30.7	60.7	60.7	60.7	60.5
Other General Equipment	Diesel	962.8	1,903.8	1,903.8	1,903.8	1,896.5
Pickup Truck	Diesel	4,432.0	8,763.2	8,763.2	8,763.2	8,729.6
Pumps	Gasoline	90.1	178.1	178.1	178.1	177.4
Roller	Diesel	839.3	1,659.4	1,659.4	1,659.4	1,653.1
Rubber Tired Loader	Diesel	137.4	271.6	271.6	271.6	270.6
Scraper	Diesel	387.0	765.2	765.2	765.2	762.3
Skid Steer Loader	Diesel	237.3	469.3	469.3	469.3	467.5
Slip Form Paver	Diesel	137.4	271.6	271.6	271.6	270.6
Surfacing Equipment (Grooving)	Gasoline	226.9	448.6	448.6	448.6	446.8
Tractors/Loader/Backhoe	Diesel	308.9	610.8	610.8	610.8	608.5
Water Truck	Diesel	647.1	1,279.5	1,279.5	1,279.5	1,274.6

Sources: AECOM, 2024.

TABLE 1.1-1B ESTIMATED ANNUAL CONSTRUCTION VEHICLE ACTIVITY

Construction Vehicle	Fuel	Annual Vehicle Miles Traveled				
		2024	2025	2026	2027	2028
Asphalt 18 Wheeler	Diesel	5,387.4	10,652.4	10,652.4	10,652.4	10,611.5
Cement Mixer	Diesel	85,861.0	169,770.6	169,770.6	169,770.6	169,120.2
Dump Truck	Diesel	316,246.8	625,306.2	625,306.2	625,306.2	622,910.4
Dump Truck - Asphalt	Diesel	7,632.1	15,090.7	15,090.7	15,090.7	15,032.9
Dump Truck Subbase Material	Diesel	45,792.5	90,544.3	90,544.3	90,544.3	90,197.4
Passenger Car	Gasoline	849,069.3	1,678,841.5	1,678,841.5	1,678,841.5	1,672,409.2

Sources: AECOM, 2024.

Equipment and vehicle emissions rates were instead generated using the current version of the U.S. Environmental Protection Agency (EPA) Motor Vehicle Emissions Simulator (MOVES). MOVES was invoked at the project-level using input databases specific to Aguadilla Municipio, Puerto Rico. Input databases were adapted from EPA's most recent National Emissions Inventory, which incorporates Aguadilla Municipio-specific information to the extent it was submitted to the EPA by state and local air quality and transportation agencies.

Vehicle age distributions, inspection and maintenance programs (to the extent applied), fuel supply and other data were held constant for future years; that is, projections or adjustments were not applied unless available from locally-developed data. A summer design hour representative of a July weekday in Aguadilla Municipio from 1400 to 1500 was selected for emissions rate modeling based on the worst-case temperature/humidity hourly condition, according to the MOVES 'ZoneMonthHour' input database. Emissions rates for on-road vehicles were generated for five mile-per-hour (mph) increments ranging from 5 to 65 mph. For the purposes of emissions calculations, it was assumed that all on-road vehicles would travel at an average speed of 35 miles per hour. **Tables 1.1-2a** through **1.1-2j** specify the annual off-road equipment and on-road vehicle emissions rates applied in the analysis.

Equation 3 was used to estimate dust emissions from site-wide construction activities, adapted from EPA's AP-42 methodology.[1] EPA studies have concluded that ten percent of the dust emissions in the PM_{10} or less size fractions are $PM_{2.5}$.[2] Therefore, uncontrolled PM_{10} dust emissions were factored by 0.10 to derive the $PM_{2.5}$ component. Further, dust suppression and erosion control Best Management Practices (BMPs) during construction, such as site watering and track-out prevention measures, will ensure that PM impacts from construction activities are minimized. According to EPA, adherence to these BMPs can result in a dust control efficiency of 75 percent, which was applied to the calculation to represent controlled PM emissions.[3]

[1] U.S. Environmental Protection Agency. *Compilation of Air Pollutant Emissions Factors (AP-42). Fifth Edition, Volume I Chapter 13: Miscellaneous Sources*. 1995.
[2] Pace, Thompson G. *Examination of the Multiplier Used to Estimate PM2.5 Fugitive Dust Emissions From PM10.* Presented at the Environmental Protection Agency 14th International Emission Inventory Conference. Las Vegas, NV, 2005
[3] U.S. Environmental Protection Agency. *Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures.* OAQPS, EPA-450/2-92-004. 1992.

Estimation of annual evaporative VOC emissions from asphalt curing is based upon the EPA methods outlined in AP-42[4] as well as the Emissions Inventory Improvement Program.[5] **Equation 4** outlines this method. Because the asphalt characterization is not known, assuming that 35 percent of liquefied asphalt is diluent that can evaporate as VOC, 95 percent of this diluent would evaporate during asphalt curing, and that the density of the diluent is 1.98 pounds per liter of diluent applied.

[4] U.S. Environmental Protection Agency. *Compilation of Air Pollutant Emission Factors (AP-42). Fifth Edition Volume I Chapter 4.5: Asphalt Paving Operations*. 1995.
[5] U.S. Environmental Protection Agency. *Emissions Inventory Improvement Program (EIIP), Volume III: Chapter 17, "Asphalt Paving".* 2001.

TABLE 1.1-2A 2024 OFF-ROAD EQUIPMENT EMISSIONS RATES

Equipment	Fuel Type	Load	Horsepower	2024 Emission Rate (grams per horsepower-hour at operating load)						
				CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Air Compressor	Gasoline	0.56	5.19	207.231	2.158	0.378	0.348	0.007	9.828	1247.329
Asphalt Paver	Diesel	0.59	134.60	0.379	0.911	0.077	0.075	0.003	0.172	536.660
Bob Cat	Diesel	0.21	57.67	4.264	4.652	0.616	0.598	0.004	0.861	694.026
Chain Saw	Gasoline	0.70	3.92	266.028	1.528	9.748	8.968	0.004	73.279	710.948
Chipper/Stump Grinder	Diesel	0.43	84.47	1.670	2.974	0.283	0.274	0.003	0.363	589.667
Concrete Saws	Gasoline	0.78	4.53	266.029	1.528	9.748	8.968	0.004	63.423	710.953
Concrete Truck	Diesel	0.59	419.90	0.195	0.524	0.021	0.020	0.003	0.157	536.680
Dozer	Diesel	0.59	136.10	0.282	0.719	0.050	0.049	0.003	0.165	536.670
Dump Truck	Diesel	0.59	419.90	0.195	0.524	0.021	0.020	0.003	0.157	536.680
Dump Truck (12 cy)	Diesel	0.59	419.90	0.195	0.524	0.021	0.020	0.003	0.157	536.680
Excavator	Diesel	0.59	137.60	0.228	0.558	0.036	0.035	0.003	0.160	536.676
Excavator with Bucket	Diesel	0.59	137.60	0.228	0.558	0.036	0.035	0.003	0.160	536.676
Flatbed Truck	Diesel	0.59	419.90	0.195	0.524	0.021	0.020	0.003	0.157	536.680
Generator Sets	Gasoline	0.68	8.82	273.202	1.675	0.113	0.104	0.006	7.886	1060.731
Grader	Diesel	0.59	231.20	0.196	0.649	0.027	0.026	0.003	0.161	536.674
Hydroseeder	Gasoline	0.60	5.22	203.350	2.019	0.316	0.291	0.007	7.469	1247.841
Loader	Diesel	0.21	87.17	3.935	3.037	0.535	0.519	0.004	0.647	694.778
Off-Road Truck	Diesel	0.59	419.90	0.195	0.524	0.021	0.020	0.003	0.157	536.680
Other General Equipment	Diesel	0.59	442.60	0.955	2.244	0.131	0.127	0.003	0.204	536.542
Pickup Truck	Diesel	0.59	419.90	0.195	0.524	0.021	0.020	0.003	0.157	536.680
Pumps	Gasoline	0.69	4.63	205.309	2.089	0.348	0.320	0.007	10.373	1247.583
Roller	Diesel	0.59	84.76	1.208	1.216	0.140	0.136	0.003	0.187	595.957
Rubber Tired Loader	Diesel	0.59	136.30	0.442	1.042	0.095	0.092	0.003	0.178	536.651
Scraper	Diesel	0.59	422.50	0.525	1.294	0.077	0.075	0.003	0.168	536.659
Skid Steer Loader	Diesel	0.21	57.67	4.264	4.652	0.616	0.598	0.004	0.861	694.026
Slip Form Paver	Diesel	0.59	134.60	0.379	0.911	0.077	0.075	0.003	0.172	536.660
Surfacing Equipment (Grooving)	Gasoline	0.49	8.92	276.425	1.727	0.124	0.114	0.006	6.344	1060.449
Tractors/Loader/Backhoe	Diesel	0.21	87.17	3.935	3.037	0.535	0.519	0.004	0.647	694.778
Water Truck	Diesel	0.59	419.90	0.195	0.524	0.021	0.020	0.003	0.157	536.680

Source: EPA MOVES

1 **TABLE 1.1-2B 2025 OFF-ROAD EQUIPMENT EMISSIONS RATES**

Equipment	Fuel Type	Load	Horsepower	2025 Emission Rate (grams per horsepower-hour at operating load)						
				CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Air Compressor	Gasoline	0.56	5.19	207.231	2.158	0.378	0.348	0.007	9.828	1247.329
Asphalt Paver	Diesel	0.59	134.60	0.290	0.725	0.052	0.051	0.003	0.166	536.669
Bob Cat	Diesel	0.21	57.67	3.961	4.499	0.564	0.547	0.004	0.788	694.232
Chain Saw	Gasoline	0.70	3.92	266.029	1.528	9.748	8.968	0.004	73.280	710.951
Chipper/Stump Grinder	Diesel	0.43	84.47	1.550	2.746	0.258	0.250	0.003	0.339	589.739
Concrete Saws	Gasoline	0.78	4.53	266.029	1.528	9.748	8.968	0.004	63.423	710.951
Concrete Truck	Diesel	0.59	419.90	0.174	0.416	0.017	0.016	0.003	0.157	536.681
Dozer	Diesel	0.59	136.10	0.241	0.578	0.039	0.038	0.003	0.162	536.674
Dump Truck	Diesel	0.59	419.90	0.174	0.416	0.017	0.016	0.003	0.157	536.681
Dump Truck (12 cy)	Diesel	0.59	419.90	0.174	0.416	0.017	0.016	0.003	0.157	536.681
Excavator	Diesel	0.59	137.60	0.198	0.438	0.027	0.026	0.003	0.158	536.678
Excavator with Bucket	Diesel	0.59	137.60	0.198	0.438	0.027	0.026	0.003	0.158	536.678
Flatbed Truck	Diesel	0.59	419.90	0.174	0.416	0.017	0.016	0.003	0.157	536.681
Generator Sets	Gasoline	0.68	8.82	273.068	1.666	0.113	0.104	0.006	7.854	1060.706
Grader	Diesel	0.59	231.20	0.173	0.525	0.022	0.021	0.003	0.159	536.677
Hydroseeder	Gasoline	0.60	5.22	203.351	2.019	0.316	0.291	0.007	7.469	1247.840
Loader	Diesel	0.21	87.17	3.642	2.761	0.485	0.470	0.004	0.589	694.926
Off-Road Truck	Diesel	0.59	419.90	0.174	0.416	0.017	0.016	0.003	0.157	536.681
Other General Equipment	Diesel	0.59	442.60	0.864	2.031	0.119	0.116	0.003	0.197	536.564
Pickup Truck	Diesel	0.59	419.90	0.174	0.416	0.017	0.016	0.003	0.157	536.681
Pumps	Gasoline	0.69	4.63	205.309	2.089	0.348	0.320	0.007	10.373	1247.583
Roller	Diesel	0.59	84.76	0.969	0.989	0.102	0.099	0.003	0.178	595.973
Rubber Tired Loader	Diesel	0.59	136.30	0.354	0.855	0.070	0.068	0.003	0.171	536.661
Scraper	Diesel	0.59	422.50	0.445	1.116	0.064	0.062	0.003	0.165	536.665
Skid Steer Loader	Diesel	0.21	57.67	3.961	4.499	0.564	0.547	0.004	0.788	694.232
Slip Form Paver	Diesel	0.59	134.60	0.290	0.725	0.052	0.051	0.003	0.166	536.669
Surfacing Equipment (Grooving)	Gasoline	0.49	8.92	276.425	1.727	0.124	0.114	0.006	6.344	1060.451
Tractors/Loader/Backhoe	Diesel	0.21	87.17	3.642	2.761	0.485	0.470	0.004	0.589	694.926
Water Truck	Diesel	0.59	419.90	0.174	0.416	0.017	0.016	0.003	0.157	536.681

2 Source: EPA MOVES

TABLE 1.1-2C 2026 OFF-ROAD EQUIPMENT EMISSIONS RATES

Equipment	Fuel Type	Load	Horsepower	2026 Emission Rate (grams per horsepower-hour at operating load)						
				CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Air Compressor	Gasoline	0.56	5.19	207.231	2.158	0.378	0.348	0.007	9.828	1247.329
Asphalt Paver	Diesel	0.59	134.60	0.249	0.594	0.041	0.040	0.003	0.163	536.673
Bob Cat	Diesel	0.21	57.67	3.670	4.353	0.514	0.499	0.004	0.720	694.424
Chain Saw	Gasoline	0.70	3.92	266.029	1.528	9.748	8.968	0.004	73.280	710.952
Chipper/Stump Grinder	Diesel	0.43	84.47	1.447	2.537	0.237	0.230	0.003	0.320	589.795
Concrete Saws	Gasoline	0.78	4.53	266.029	1.528	9.748	8.968	0.004	63.423	710.948
Concrete Truck	Diesel	0.59	419.90	0.159	0.367	0.014	0.013	0.003	0.156	536.680
Dozer	Diesel	0.59	136.10	0.211	0.464	0.031	0.030	0.003	0.159	536.677
Dump Truck	Diesel	0.59	419.90	0.159	0.367	0.014	0.013	0.003	0.156	536.680
Dump Truck (12 cy)	Diesel	0.59	419.90	0.159	0.367	0.014	0.013	0.003	0.156	536.680
Excavator	Diesel	0.59	137.60	0.176	0.382	0.020	0.020	0.003	0.157	536.679
Excavator with Bucket	Diesel	0.59	137.60	0.176	0.382	0.020	0.020	0.003	0.157	536.679
Flatbed Truck	Diesel	0.59	419.90	0.159	0.367	0.014	0.013	0.003	0.156	536.680
Generator Sets	Gasoline	0.68	8.82	273.010	1.662	0.113	0.104	0.006	7.841	1060.693
Grader	Diesel	0.59	231.20	0.155	0.425	0.018	0.018	0.003	0.158	536.679
Hydroseeder	Gasoline	0.60	5.22	203.351	2.019	0.316	0.291	0.007	7.469	1247.839
Loader	Diesel	0.21	87.17	3.360	2.497	0.436	0.423	0.004	0.534	695.064
Off-Road Truck	Diesel	0.59	419.90	0.159	0.367	0.014	0.013	0.003	0.156	536.680
Other General Equipment	Diesel	0.59	442.60	0.780	1.830	0.108	0.105	0.003	0.191	536.582
Pickup Truck	Diesel	0.59	419.90	0.159	0.367	0.014	0.013	0.003	0.156	536.680
Pumps	Gasoline	0.69	4.63	205.310	2.089	0.348	0.320	0.007	10.373	1247.581
Roller	Diesel	0.59	84.76	0.761	0.787	0.068	0.066	0.003	0.171	595.985
Rubber Tired Loader	Diesel	0.59	136.30	0.278	0.689	0.048	0.047	0.003	0.166	536.668
Scraper	Diesel	0.59	422.50	0.372	0.954	0.051	0.049	0.003	0.163	536.670
Skid Steer Loader	Diesel	0.21	57.67	3.670	4.353	0.514	0.499	0.004	0.720	694.424
Slip Form Paver	Diesel	0.59	134.60	0.249	0.594	0.041	0.040	0.003	0.163	536.673
Surfacing Equipment (Grooving)	Gasoline	0.49	8.92	276.424	1.727	0.124	0.114	0.006	6.344	1060.447
Tractors/Loader/Backhoe	Diesel	0.21	87.17	3.360	2.497	0.436	0.423	0.004	0.534	695.064
Water Truck	Diesel	0.59	419.90	0.159	0.367	0.014	0.013	0.003	0.156	536.680

Source: EPA MOVES

1 **TABLE 1.1-2D 2027 OFF-ROAD EQUIPMENT EMISSIONS RATES**

Equipment	Fuel Type	Load	Horsepower	2027 Emission Rate (grams per horsepower-hour at operating load)						
				CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Air Compressor	Gasoline	0.56	5.19	207.231	2.158	0.378	0.348	0.007	9.828	1247.329
Asphalt Paver	Diesel	0.59	134.60	0.221	0.487	0.033	0.032	0.003	0.161	536.673
Bob Cat	Diesel	0.21	57.67	3.407	4.219	0.468	0.454	0.004	0.660	694.424
Chain Saw	Gasoline	0.70	3.92	266.029	1.528	9.748	8.968	0.004	73.280	710.952
Chipper/Stump Grinder	Diesel	0.43	84.47	1.350	2.338	0.217	0.211	0.003	0.302	589.795
Concrete Saws	Gasoline	0.78	4.53	266.029	1.528	9.748	8.968	0.004	63.423	710.948
Concrete Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Dozer	Diesel	0.59	136.10	0.188	0.406	0.024	0.023	0.003	0.158	536.677
Dump Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Dump Truck (12 cy)	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Excavator	Diesel	0.59	137.60	0.161	0.344	0.016	0.015	0.003	0.156	536.679
Excavator with Bucket	Diesel	0.59	137.60	0.161	0.344	0.016	0.015	0.003	0.156	536.679
Flatbed Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Generator Sets	Gasoline	0.68	8.82	272.984	1.660	0.113	0.104	0.006	7.835	1060.693
Grader	Diesel	0.59	231.20	0.141	0.378	0.015	0.015	0.003	0.157	536.679
Hydroseeder	Gasoline	0.60	5.22	203.352	2.019	0.316	0.291	0.007	7.469	1247.839
Loader	Diesel	0.21	87.17	3.090	2.246	0.390	0.378	0.004	0.483	695.064
Off-Road Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Other General Equipment	Diesel	0.59	442.60	0.703	1.643	0.098	0.095	0.003	0.186	536.582
Pickup Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Pumps	Gasoline	0.69	4.63	205.310	2.089	0.348	0.320	0.007	10.373	1247.581
Roller	Diesel	0.59	84.76	0.668	0.643	0.053	0.052	0.003	0.166	595.985
Rubber Tired Loader	Diesel	0.59	136.30	0.243	0.571	0.039	0.038	0.003	0.163	536.668
Scraper	Diesel	0.59	422.50	0.305	0.806	0.039	0.038	0.003	0.161	536.670
Skid Steer Loader	Diesel	0.21	57.67	3.407	4.219	0.468	0.454	0.004	0.660	694.424
Slip Form Paver	Diesel	0.59	134.60	0.221	0.487	0.033	0.032	0.003	0.161	536.673
Surfacing Equipment (Grooving)	Gasoline	0.49	8.92	276.425	1.727	0.124	0.114	0.006	6.344	1060.447
Tractors/Loader/Backhoe	Diesel	0.21	87.17	3.090	2.246	0.390	0.378	0.004	0.483	695.064
Water Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680

2 Source: EPA MOVES

TABLE 1.1-2E 2028 OFF-ROAD EQUIPMENT EMISSIONS RATES

Equipment	Fuel Type	Load	Horsepower	2028 Emission Rate (grams per horsepower-hour at operating load)						
				CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Air Compressor	Gasoline	0.56	5.19	207.231	2.158	0.378	0.348	0.007	9.828	1247.329
Asphalt Paver	Diesel	0.59	134.60	0.221	0.487	0.033	0.032	0.003	0.161	536.673
Bob Cat	Diesel	0.21	57.67	3.407	4.219	0.468	0.454	0.004	0.660	694.424
Chain Saw	Gasoline	0.70	3.92	266.029	1.528	9.748	8.968	0.004	73.280	710.952
Chipper/Stump Grinder	Diesel	0.43	84.47	1.350	2.338	0.217	0.211	0.003	0.302	589.795
Concrete Saws	Gasoline	0.78	4.53	266.029	1.528	9.748	8.968	0.004	63.423	710.948
Concrete Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Dozer	Diesel	0.59	136.10	0.188	0.406	0.024	0.023	0.003	0.158	536.677
Dump Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Dump Truck (12 cy)	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Excavator	Diesel	0.59	137.60	0.161	0.344	0.016	0.015	0.003	0.156	536.679
Excavator with Bucket	Diesel	0.59	137.60	0.161	0.344	0.016	0.015	0.003	0.156	536.679
Flatbed Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Generator Sets	Gasoline	0.68	8.82	272.984	1.660	0.113	0.104	0.006	7.835	1060.693
Grader	Diesel	0.59	231.20	0.141	0.378	0.015	0.015	0.003	0.157	536.679
Hydroseeder	Gasoline	0.60	5.22	203.352	2.019	0.316	0.291	0.007	7.469	1247.839
Loader	Diesel	0.21	87.17	3.090	2.246	0.390	0.378	0.004	0.483	695.064
Off-Road Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Other General Equipment	Diesel	0.59	442.60	0.703	1.643	0.098	0.095	0.003	0.186	536.582
Pickup Truck	Diesel	0.59	419.90	0.150	0.334	0.012	0.012	0.003	0.156	536.680
Pumps	Gasoline	0.69	4.63	205.310	2.089	0.348	0.320	0.007	10.373	1247.581
Roller	Diesel	0.59	84.76	0.668	0.643	0.053	0.052	0.003	0.166	595.985
Rubber Tired Loader	Diesel	0.59	136.30	0.243	0.571	0.039	0.038	0.003	0.163	536.668
Scraper	Diesel	0.59	422.50	0.305	0.806	0.039	0.038	0.003	0.161	536.670
Skid Steer Loader	Diesel	0.21	57.67	3.407	4.219	0.468	0.454	0.004	0.660	694.424
Slip Form Paver	Diesel	0.59	134.60	0.221	0.487	0.033	0.032	0.003	0.161	536.673
Surfacing Equipment (Grooving)	Gasoline	0.49	8.92	276.425	1.727	0.124	0.114	0.006	6.344	1060.447
Tractors/Loader/Backhoe	Diesel	0.21	87.17	3.090	2.246	0.390	0.378	0.004	0.483	695.064
Water Truck	Diesel	0.59	419.90	0.150	2.158	0.012	0.012	0.003	0.156	536.680

Source: EPA MOVES

TABLE 1.1-2F 2024 ON-ROAD VEHICLE EMISSIONS RATES

Vehicle Type	Fuel Type	2024 Emission Rate (grams per vehicle mile traveled)						
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Asphalt 18 Wheeler	Diesel	1.507	3.133	0.234	0.016	0.010	0.460	1181.266
Cement Mixer	Diesel	1.507	3.133	0.234	0.016	0.010	0.460	1181.266
Dump Truck	Diesel	1.507	3.133	0.234	0.016	0.010	0.460	1181.266
Dump Truck - Asphalt	Diesel	1.507	3.133	0.234	0.016	0.010	0.460	1181.266
Dump Truck Subbase Material	Diesel	1.507	3.133	0.234	0.016	0.010	0.460	1181.266
Passenger Car	Gasoline	3.762	0.170	0.004	0.004	0.007	0.140	337.963

Source: EPA MOVES

TABLE 1.1-2G 2025 ON-ROAD VEHICLE EMISSIONS RATES

Vehicle Type	Fuel Type	2025 Emission Rate (grams per vehicle mile traveled)						
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Asphalt 18 Wheeler	Diesel	1.383	2.885	0.210	0.016	0.010	0.417	1174.908
Cement Mixer	Diesel	1.383	2.885	0.210	0.016	0.010	0.417	1174.908
Dump Truck	Diesel	1.383	2.885	0.210	0.016	0.010	0.417	1174.908
Dump Truck - Asphalt	Diesel	1.383	2.885	0.210	0.016	0.010	0.417	1174.908
Dump Truck Subbase Material	Diesel	1.383	2.885	0.210	0.016	0.010	0.417	1174.908
Passenger Car	Gasoline	3.595	0.148	0.004	0.004	0.007	0.131	329.231

Source: EPA MOVES

TABLE 1.1-2H 2026 ON-ROAD VEHICLE EMISSIONS RATES

Vehicle Type	Fuel Type	2026 Emission Rate (grams per vehicle mile traveled)						
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Asphalt 18 Wheeler	Diesel	1.259	2.648	0.188	0.016	0.010	0.372	1168.661
Cement Mixer	Diesel	1.259	2.648	0.188	0.016	0.010	0.372	1168.661
Dump Truck	Diesel	1.259	2.648	0.188	0.016	0.010	0.372	1168.661
Dump Truck - Asphalt	Diesel	1.259	2.648	0.188	0.016	0.010	0.372	1168.661
Dump Truck Subbase Material	Diesel	1.259	2.648	0.188	0.016	0.010	0.372	1168.661
Passenger Car	Gasoline	3.451	0.130	0.004	0.004	0.007	0.123	320.082

Source: EPA MOVES

TABLE 1.1-2I 2027 ON-ROAD VEHICLE EMISSIONS RATES

Vehicle Type	Fuel Type	2027 Emission Rate (grams per vehicle mile traveled)						
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Asphalt 18 Wheeler	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Cement Mixer	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Dump Truck	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Dump Truck - Asphalt	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Dump Truck Subbase Material	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Passenger Car	Gasoline	3.451	0.130	0.004	0.004	0.007	0.123	320.082

Source: EPA MOVES

TABLE 1.1-2J 2028 ON-ROAD VEHICLE EMISSIONS RATES

Vehicle Type	Fuel Type	2028 Emission Rate (grams per vehicle mile traveled)						
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Asphalt 18 Wheeler	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Cement Mixer	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Dump Truck	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Dump Truck - Asphalt	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Dump Truck Subbase Material	Diesel	1.161	2.424	0.168	0.016	0.010	0.337	1162.238
Passenger Car	Gasoline	3.296	0.116	0.004	0.004	0.007	0.116	310.476

Source: EPA MOVES

Equation 3:[**]

$$PM_{10(tpy)} = EF_{TSP} \times \frac{days}{year} \times \frac{acres}{day} \times 0.45 \div 2{,}000$$

Where:

$PM_{10(tpy)}$= annual PM_{10} dust emissions (tons per year)

EF_{TSP}= total suspended particulate (TSP) emissions rate (80 pounds per acre-day)

0.45 = estimated ratio of PM_{10} to TSP

2,000 = pounds per ton

[**]Represents uncontrolled emissions of PM_{10}. Controlled emissions are derived by applying a 75% control factor.

$PM_{2.5} = PM_{10}$ x 0.10

Equation 4:

$$VOC_{(tpy)} = A \times AR \times VD \times EF \times D \div 2{,}000$$

Where:

$VOC_{(tpy)}$= annual VOC paving emissions (tons per year)

A = area of pavement in square meters(m^2)

AR = asphalt application rate (0.679 liter/m^2)

VD = volume fraction of diluent (0.35)

AF = mass fraction of diluent which evaporates as VOC (0.95)

D = solvent density (1.98 pounds/liter)

2,000 = pounds per ton

Appendix B Noise Technical Report

RUNWAY 8-26 RECONSTRUCTION AT RAFAEL HERNANDEZ AIRPORT (BQN)
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

NOISE ANALYSIS
TECHNICAL REPORT

PREPARED FOR:

Puerto Rico Ports Authority
and
Federal Aviation Administration

PREPARED BY:

AECOM

June 2024

LIST OF ACRONYMS AND ABBREVIATIONS

AEDT	Aviation Environmental Design Tool
BQN	Rafael Hernandez Airport
CFR	Code of Federal Regulations
dB	Decibel
dBA	A-Weighted Decibel
DNL	Day-Night Average Sound Level
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FBO	Fixed Base Operator
FICAN	Federal Interagency Committee on Aviation Noise
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
HUD	Department of Housing and Urban Development
Hz	Hertz
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
SEL	Sound Exposure Level
SPL	Sound Pressure Level
TGO	Touch and Go

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1.0 INTRODUCTION

This *Noise Technical Report* details the assessment scope, calculation methodology, input data and other technical information used in the analysis of noise impacts associated with the proposed Reconstruction of Runway 8-26 at Rafael Hernandez Airport (i.e., BQN, or the Airport), hereinafter referred to as the Proposed Project.

1.1. AIRCRAFT NOISE DESCRIPTORS

A variety of noise metrics are used to assess airport noise impacts in different ways. Noise metrics are used to describe individual noise events (such as a single operation of an aircraft taking off overhead) or groups of events (such as the cumulative effect of numerous aircraft operations, the collection of which creates a general noise environment or overall exposure level). Both types of descriptors are helpful in explaining how people tend to respond to a given noise condition. Descriptions of these metrics are provided below.

Decibel, dB – Sound is a complex physical phenomenon consisting of complex minute vibrations traveling through a medium, such as air. These vibrations are sensed by the human ear as sound pressure. Because of the vast range of sound pressure or intensity detectable by the human ear, sound pressure level (SPL) is represented on a logarithmic scale known as decibels (dB). A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet (laboratory-type) listening conditions. A SPL of 120 dB begins to be felt inside the ear as discomfort and pain at approximately 140 dB. Most environmental sounds have SPLs ranging from 30 to 100 dB.

Because dB are logarithmic, they cannot be added or subtracted directly like other (linear) numbers. For example, if two sound sources each produce 100 dB, when they are operated together, they will produce 103 dB, not 200 dB. Four 100 dB sources operating together again double the sound energy, resulting in a total SPL of 106 dB, and so on. In addition, if one source is much louder than another, the two sources operating together will produce the same SPL as if the louder source were operating alone. For example, a 100 dB source plus an 80 dB source produce 100 dB when operating together. The louder source masks the quieter one.

Two useful rules to remember when comparing SPLs are: (1) most people perceive a 6 to 10 dB increase in SPL between two noise events to be about a doubling of loudness, and (2) changes in SPL of less than about 3 dB between two events are not easily detected outside of a laboratory.

A-Weighted Decibel, dBA – Frequency, or pitch, is a basic physical characteristic of sound and is expressed in units of cycles per second or hertz (Hz). The normal frequency range of hearing for most people extends from about 20 to 15,000 Hz. Because the human ear is more sensitive to middle and high frequencies (i.e., 1000 to 4000 Hz), a frequency weighting called “A” weighting is applied to the measurement of sound. The internationally standardized "A" filter approximates the sensitivity of the human ear and helps in assessing the perceived loudness of various sounds. In this document all sound levels are A-weighted sound levels and the adjective "A-weighted" has been omitted.

Figure 1.1-1 charts common indoor and outdoor sound levels. A quiet rural area at nighttime may be 30 A-weighted decibels (dBA) or lower while the operator of a typical gas lawn mower may experience a level of 90 dBA. Similarly, the level in a library may be 30 dBA or lower while the listener at a rock band concert may experience levels near 110 dBA.

Maximum A-Weighted Noise Level, L_{max} – Sound levels vary with time. For example, the sound increases as an aircraft approaches, then falls and blends into the ambient or background as the aircraft recedes into the distance. Because of this variation, it is often convenient to describe a particular noise "event" by its highest or maximum sound level (L_{max}). Note L_{max} describes only one dimension of an event; it provides no information on the cumulative noise exposure generated by a sound source. In fact, two events with identical L_{max} may produce very different total exposures. One may be of very short duration, while the other may be much longer.

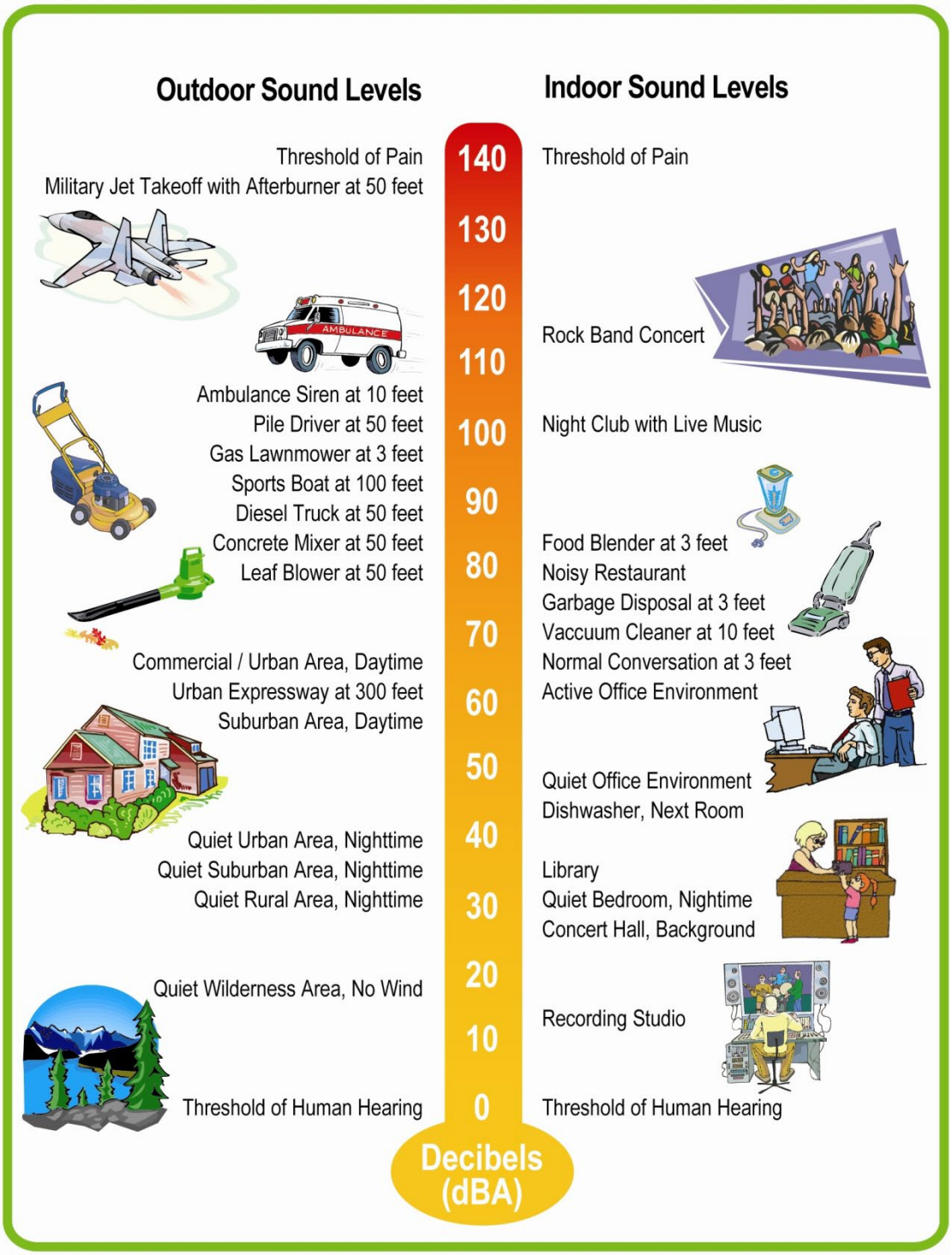
Sound Exposure Level, SEL – The most common measure of noise exposure for a single aircraft flyover is the sound exposure level (SEL). SEL is a summation of the A-weighted sound energy at a particular location over the true duration of a noise event normalized to a fictional duration of one second. The true duration is defined as the amount of time the noise event exceeds background levels. For events lasting more than one second, SEL does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event.

The normalization to the fictional duration of one second enables the comparison of noise events with differing true duration and/or maximum level. Because the SEL is normalized to one second, it will almost always be larger in magnitude than the L_{max} for the event. In fact, for most aircraft events, the SEL is about 7 to 12 dB higher than the L_{max}. Additionally, since it is a cumulative measure, a higher SEL can result from either a louder or longer event, or some combination.

As SEL combines an event's overall sound level along with its duration, SEL provides a comprehensive way to describe noise events for use in modeling and comparing noise environments. Computer noise models, such as the one employed for this document, base their computations on these SELs.

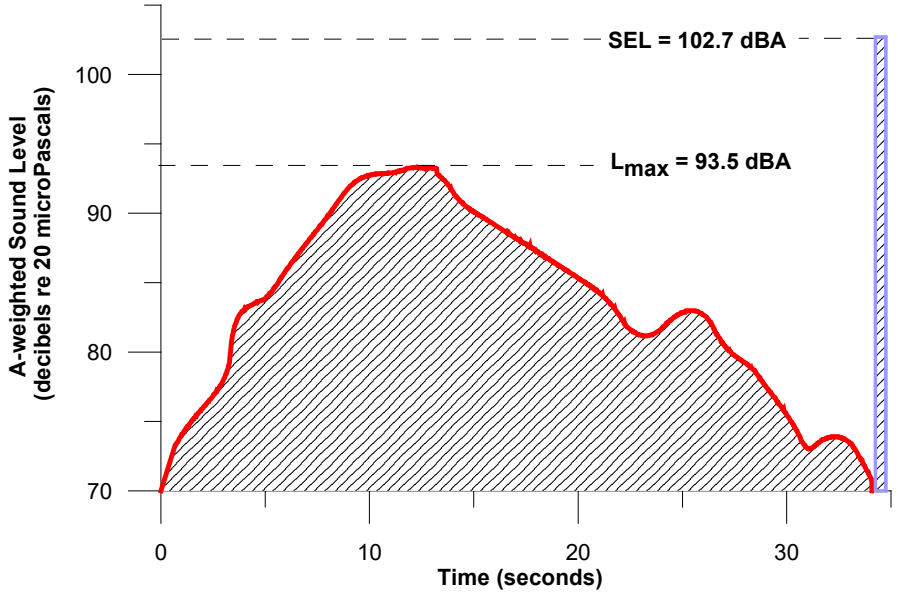
Figure 1.1-2 shows an event's "time history," the variation of sound level with time. For typical sound events experienced by a fixed listener, like a person experiencing an aircraft flying by, the sound level rises as the source (or aircraft) approaches the listener, peaks, and then diminishes as the aircraft flies away from the listener. The area under the time history curve represents the overall sound energy of the noise event. The L_{max} for the event shown in the figure was 93.5 dBA. Compressing the event's total sound energy into one second to compute its SEL yields 102.7 dBA.

FIGURE 1.1-1 COMMON OUTDOOR AND INDOOR SOUND LEVELS



Source: URS Corporation, 2008

FIGURE 1.1-2 COMPARISON OF MAXIMUM SOUND LEVEL (L_{MAX}) AND SOUND EXPOSURE LEVEL (SEL)



Source: URS Corporation, 2007.

Equivalent Sound Level, L_{eq} – Equivalent sound level (L_{eq}) is a measure of the exposure resulting from the accumulation of A-weighted sound levels over a particular period of interest (e.g., an hour, an 8-hour school day, nighttime, or a full 24-hour day). However, because the length of the period can be different depending on the time frame of interest, the applicable period should always be identified or clearly understood when discussing the metric. Such durations are often identified through a subscript, for example $L_{eq(8)}$ or $L_{eq(24)}$.

Conceptually, L_{eq} may be thought of as a constant sound level over the period of interest that contains as much sound energy as the actual time-varying sound level with its normal "peaks" and "dips." In the context of noise from typical aircraft flight events and as noted earlier for SEL, L_{eq} does not represent the sound level heard at any particular time, but rather represents the total sound exposure for the period of interest. Also, it should be noted that the "average" sound level suggested by L_{eq} is not an arithmetic value, but a logarithmic, or "energy-averaged," sound level. Thus, loud events tend to dominate the noise environment described by the L_{eq} metric.

Day-Night Average Sound Level, DNL - Time-averaged sound levels are measurements of sound levels averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period. For the evaluation of community noise effects, and particularly aircraft noise effects, the Day-Night Average Sound Level (DNL). This metric is similar to the L_{eq} except that it compensates for the widely assumed increase in people's sensitivity to noise during nighttime hours. Each aircraft operation occurring between 10:00 p.m. and 7:00 a.m. is treated as if it were 10 operations. Logarithmically, this multiplier is the equivalent of adding 10 dB to the noise level of each nighttime operation. These noise level penalties are intended to correspond to the drop in background noise level which studies have found takes place from daytime to nighttime in a typical community. The nighttime

decrease in ambient sound levels—from both outdoor and indoor sources—is commonly considered to be the principal explanation for people's heightened sensitivity to noises during these periods.

DNL is the primary noise descriptor of this study. DNL is a 24-hour time-weighted-average noise metric expressed in dBA which accounts for the noise levels (in terms of SEL) of all individual aircraft events, the number of times those events occur, and the time of day at which they occur. Values of DNL can be measured with standard monitoring equipment or predicted with computer models. This document utilizes estimates of DNL with a Federal Aviation Administration (FAA)-approved computer-based noise model.

Typical DNL values for a variety of noise environments are shown in **Figure 1.1-3**. DNL values can be approximately 85 dBA outdoors under a flight path within a mile of a major airport and 40 dBA or less outdoors in a rural residential area.

Due to the DNL descriptor's close correlation with the degree of community annoyance from aircraft noise, DNL have been formally adopted by most Federal agencies for measuring and evaluating aircraft noise for land use planning and noise impact assessment. Federal committees such as the Federal Interagency Committee on Urban Noise (FICUN) and the Federal Interagency Committee on Noise (FICON) which include the Environmental Protection Agency (EPA), FAA, Department of Defense, Department of Housing and Urban Development (HUD), and Veterans Administration, found DNL to be the best metric for land use planning. They also found no new cumulative sound descriptors or metrics of sufficient scientific standing to substitute for DNL. Other cumulative metrics could be used only to supplement, not replace DNL. Furthermore, FAA Order 1050.1F for environmental impact studies, requires DNL be used in describing cumulative noise exposure and in identifying aircraft noise/land use compatibility issues (EPA, 1974; FICUN, 1980; FICON, 1992; 14 Code of Federal Regulation [CFR] part 150, 2007; FAA, 2006).

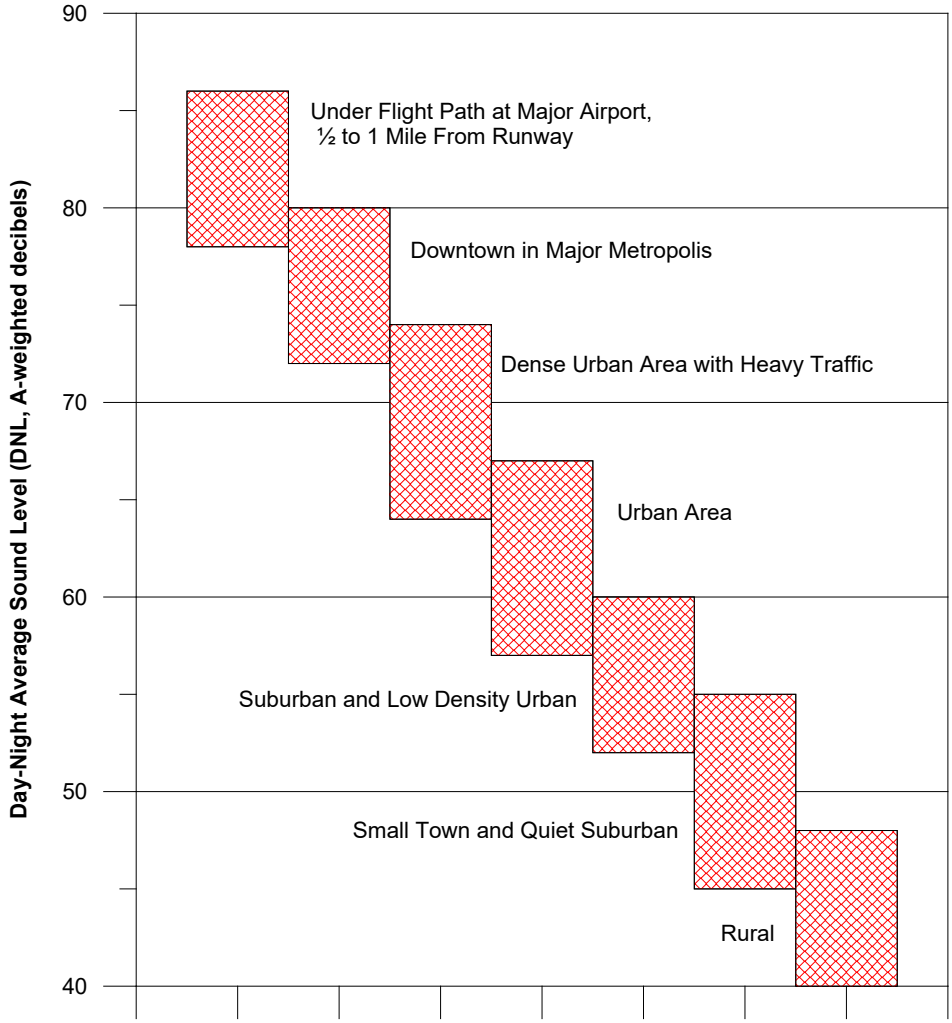
1.2 EFFECTS OF NOISE ON PEOPLE

This section addresses three ways humans can be affected by aircraft noise: annoyance, speech interference and sleep disturbance.

Annoyance – The primary potential effect of aircraft noise on exposed communities is one of annoyance. Noise annoyance is defined by the Environmental Protection Agency as any negative subjective reaction on the part of an individual or group (EPA, 1974). Scientific studies and a large number of social/attitudinal surveys have been conducted to appraise people's annoyance to all types of environmental noise, especially aircraft events. These studies and surveys have found the DNL to be the best measure of this annoyance (EPA, 1974; Schultz, 1978; FICUN, 1980; Fidell, et. al., 1991; FICON, 1992; ANSI, 2003; ANSI, 2007).

The relationship between annoyance and DNL determined by the scientific community and endorsed by many Federal agencies, including the FAA, is shown in **Figure 1.2-1**. For a DNL of 65 dBA, approximately 13 percent of the exposed population would be highly-annoyed. The figure also shows at very low values of DNL, such as 45 dB or less, one percent or less of the exposed population would be highly annoyed. At very high values of DNL, such as 90 dBA, more than 80 percent of the exposed population would be highly annoyed.

FIGURE 1.1-3 TYPICAL RANGE OF OUTDOOR COMMUNITY DAY-NIGHT AVERAGE SOUND LEVELS

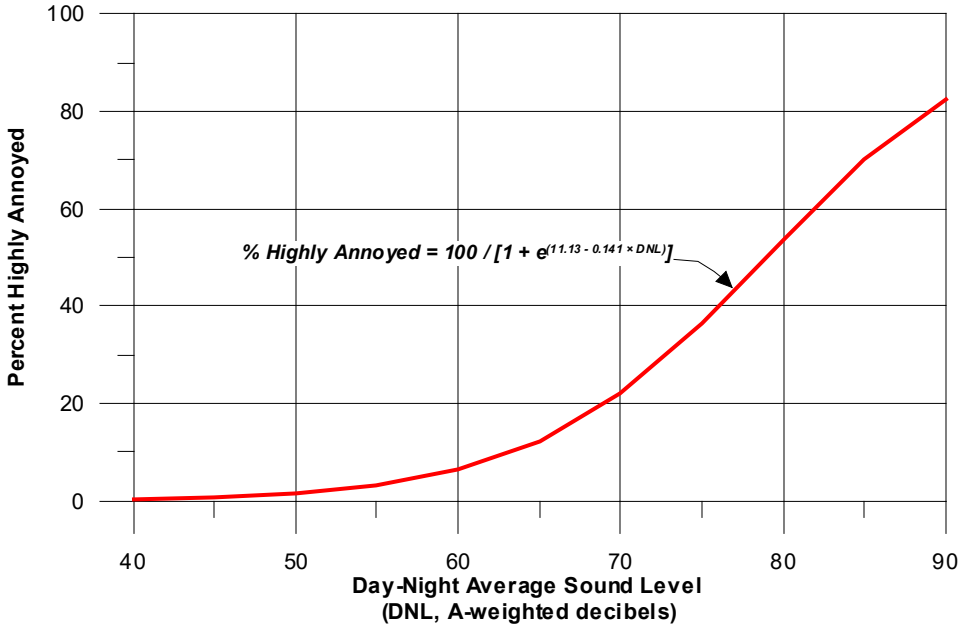


Source: FICON, 1992

It is often suggested that a lower DNL, such as 60 or 55 dB, be adopted as the threshold of community noise annoyance for FAA environmental analysis documents. While there is no technical reason why a lower level cannot be measured or calculated for comparison purposes, a DNL of 65 dB:

- Provides a valid basis for comparing and assessing community noise effects.
- Represents a noise exposure level normally dominated by aircraft noise and not other community or nearby highway noise sources.
- Reflects the FAA's threshold for grant-in-aid funding of airport noise mitigation projects.
- HUD also established a DNL standard of 65 dBA for eligibility for Federally-guaranteed home loans.

FIGURE 1.2-1 RELATIONSHIP BETWEEN ANNOYANCE AND DAY-NIGHT AVERAGE SOUND LEVEL



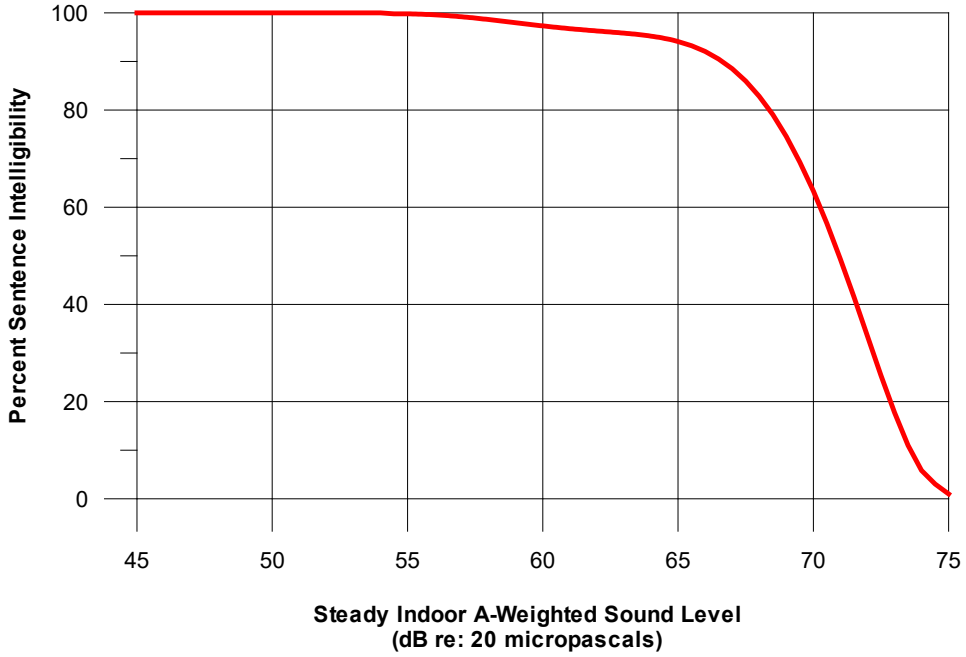
Source: FICON, 1992

Speech Interference – A primary effect of aircraft noise is its tendency to drown out or "mask" speech, making it difficult to carry on a normal conversation. As an aircraft approaches and its sound level increases, speech becomes harder to hear. As the ambient level increases, the talker must raise his/her voice, or the individuals must get closer together to continue talking.

For typical communication distances of three or four feet (one to 1.5 meters), acceptable outdoor conversations can be carried on in a normal voice as long as the ambient noise outdoors is less than about 65 dBA (FICON, 1992). If the noise exceeds this level, intelligibility would be lost unless vocal effort was increased or communication distance was decreased.

Indoor speech interference can be expressed as a percentage of sentence intelligibility between two average adults with normal hearing speaking fluently in relaxed conversation approximately one meter apart in a typical living room or bedroom (EPA, 1974). As shown in **Figure 1.2-2**, the percentage of sentence intelligibility is a non-linear function of the (steady) indoor ambient or background sound level (24-hour energy-average $L_{eq(24)}$). Steady ambient indoor sound levels of up to 45 dBA $L_{eq(24)}$ are expected to allow 100 percent intelligibility of sentences. The curve shows 99 percent sentence intelligibility for $L_{eq(24)}$ at or below 54 dBA and less than 10 percent intelligibility for $L_{eq(24)}$ greater than 73 dBA. In the same document from which **Figure 1.2-2** was taken, the EPA established an indoor criterion of 45 dBA DNL as requisite to protect against speech interference indoors (EPA, 1974).

FIGURE 1.2-2 PERCENT SENTENCE INTELLIGIBILITY FOR INDOOR SPEECH



Source: EPA, 1974

Sleep Disturbance – Sleep may be sensitive to environmental factors, especially noise, because external stimuli are still processed while sleeping, although the sleeper may not be consciously aware of them. There are many factors that influence sleep disturbance, including the differences between noise sources and the context of the living and sleeping environment, and their interactions are complex and variable. Research has not yet provided enough understanding to be able to estimate the population awakened for a specific airport environment or the difference in population awakened for a change in the noise environment (e.g., adding new noise sources or changing the time of day when noise events occur). Existing research has not established a consistent or predictable understanding of these factors and their effects on sleep.

Early research on awakenings from discrete noise events was conducted in laboratory settings. Further research and analysis by FICON established an interim curve to predict the percentage of awakenings from noise events (FICON, 1992). Subsequent field research conducted outside of laboratories by Federal Interagency Committee on Aviation Noise (FICAN) and others showed that considerably less percent of the population is expected to be behaviorally awakened by noise than the laboratory studies indicated (FICAN, 1997; Fidell et. al., 2000). To date, there is no obvious "best choice" research methodology for assessing the relationship between noise events and sleep disturbance. Therefore, it has been difficult to establish one internationally accepted relationship between how much and what type of noise is required to cause sleep disturbance in order to measure or predict the effect of noise on sleep disturbance (Transpiration Research Board, 2008).

1.3 NOISE ANALYSIS

The FAA has required the use of the Aviation Environmental Design Tool (AEDT) since May 29, 2015, for determining the predicted noise impact in the vicinity of airports. Statutory requirements for AEDT use are defined in FAA Order 1050.1F, Environmental Impacts: Policies and Procedures; Order 5050.4B, NEPA Implementing Instructions for Airport Actions; and Title 14 CFR part 150, Airport Noise Compatibility Planning. AEDT Version 3f was the version used for this document.

The AEDT incorporates the number of annual average daily daytime and nighttime flight and run-up operations, flight paths, and flight profiles of the aircraft along with its extensive internal database of aircraft noise and performance information, to calculate the DNL at many points on the ground around an airport. From a grid of points, the AEDT contouring program draws contours of equal DNL to be superimposed onto land use maps. For this document, DNL contours of 55 dBA and above were developed. The land use compatibility analysis was performed using the DNL 65 dB and 60 dB noise contour. DNL contours are a graphical representation of how the noise from the airport's average annual daily aircraft operations is distributed over the surrounding area. The AEDT can calculate sound levels at any specified point so that noise exposure at representative locations around an airport can be obtained.

The results of the AEDT analysis provide a relative measure of noise levels around airfield facilities. When the calculations are made in a consistent manner, the AEDT is most accurate for comparing before and after noise effects resulting from forecast changes or alternative noise control actions. It allows noise levels to be predicted for such Proposed Projects without the actual implementation and noise monitoring of those actions.

Title 14 CFR part 150, Appendix A, provides Federal compatible land use guidelines for several land uses as a function of DNL values. Compatible or non-compatible land use is determined by comparing the predicted or measured DNL values at a site to the established thresholds.

Examples of detailed local acoustical variables include:

- Temperature profiles;
- Wind gradients;
- Humidity effects;
- Ground absorption;
- Individual aircraft directivity patterns; and
- Sound diffraction caused by terrain, buildings, barriers, etc.

1.3.1 EXISTING CONDITION NOISE MODELING

This section describes in detail the sources and derivation of the AEDT input data for the existing conditions including airport layout, weather, flight operations, runway use, flight tracks, track use, and flight profiles.

Airport Layout

Runway 8-26 is 11,700 feet long by 200 feet wide with 50-foot shoulders. The center section of the runway between 2,000 feet and 8,000 feet is comprised of six to eight inches of Portland Cement Concrete, with Asphalt Concrete overlay with thicknesses varying between three and six inches. The runway is serviced primarily by two partial parallel taxiways, Taxiway A and Taxiway M, as well as a traverse diagonal Taxiway C, which ties in with Taxiways E and G providing access to the southwestern apron area.

Flight Operations

As shown in **Table 1.3-1**, AEDT-modeled annual operations for the Existing Conditions totaled 47,880 operations, an average of approximately 131 daily operations. Nighttime operations accounted for approximately ten percent of the total operations at BQN.

Runway Use

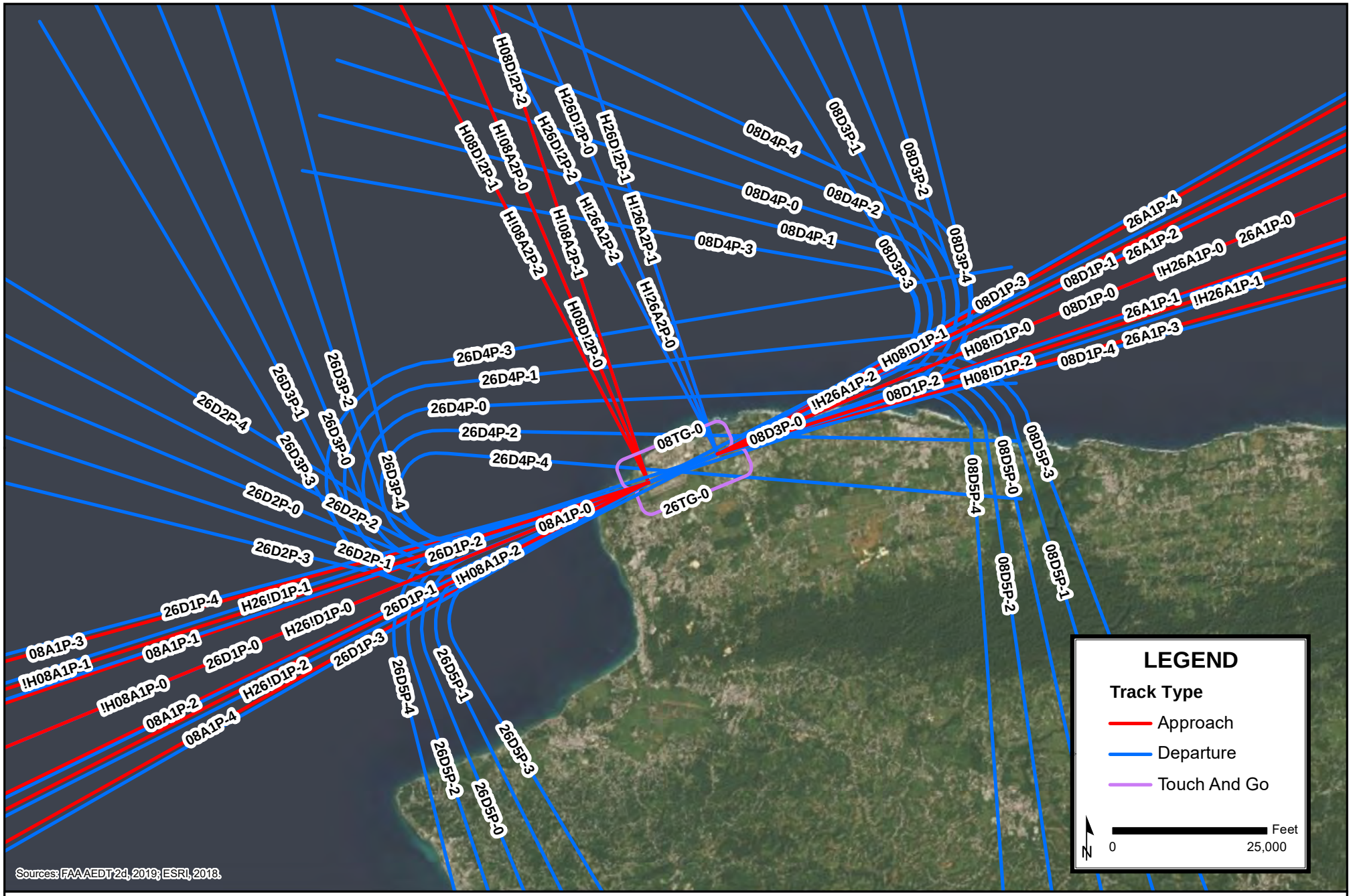
A summary of the modeled annual average daily utilization of BQN's runway is presented in **Table 1.3-2** for arrivals and departures. These data were developed based on review of airport operational records provided by the Airport, air carriers, FAA data feeds, and third party flight databases.

Flight Tracks

Flight tracks are the aircraft's actual path through the air projected vertically onto the ground. Modeled flight tracks for this report consist of published flight tracks in use at BQN. A summary of Existing Conditions flight track utilization is presented in **Table 1.3-3**. Departure, arrival, and touch and go (TGO) flight tracks in use at BQN are depicted on **Figure 1.3-1.**

Flight Profiles

Flight profiles model the vertical paths of aircraft during departure and arrival to determine the altitude, speed, and engine thrust or power of an aircraft at any point along a flight track. AEDT uses this information to calculate noise exposure on the ground. Profiles are unique to each aircraft type and vary with temperature, barometric pressure, headwind, and aircraft weight. Standard AEDT default profiles were used for all aircraft operations.



RAFAEL HERNANDEZ AIRPORT

RUNWAY 8-26 RECONSTRUCTION

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

FLIGHT TRACKS

FIGURE 1.3-1

Path: S:\Projects\P\Puerto Rico 2018\60579568_BQNEARW826\Environmental\900-Work\920 GIS\mxd\191125_Figure X-X-X_Flight Tracks_rev0.mxd, Date Saved: 11/26/2019 10:08:10 AM

1 **TABLE 1.3-1 EXISTING CONDITION AVERAGE ANNUAL DAILY AIRCRAFT OPERATIONS AT BQN**

Aircraft	Engine	2022 Existing Conditions						
		Arrivals		Departures		TGO		Total
		Day	Night	Day	Night	Day	Night	
Airbus A319-100 Series	3IA006	0.540	0.231	0.572	0.191			1.534
Airbus A320-200 Series	1IA003	2.232	0.738	2.216	0.754			5.940
Airbus A321-200 Series	01P10IA025	1.586	0.159	1.566	0.174			3.485
Bell 429	TPE1	0.012	0.003	0.012	0.003			0.030
Bell AH-1W SuperCobra	T70041	10.384	2.929	10.384	2.929			26.627
Boeing 737-400 Series	1CM007	0.002		0.002				0.004
Boeing 737-700 Series	3CM032	0.021	0.004	0.009				0.033
Boeing 737-800 Series	3CM034	0.713	0.130	0.681	0.153			1.677
Boeing 767-200 Series Freighter	1PW026	0.011		0.011				0.021
Boeing 767-300 Series	1PW043	1.732	0.742	0.599	0.200			3.273
Boeing 777-200-LR	01P21GE216	0.580		0.444	0.006			1.030
Bombardier Challenger 600	1TL001	0.069		0.069				0.139
Bombardier Learjet 35A/36A (C-21A)	TFE731	0.221		0.218	0.003			0.441
Britten-Norman BN-2 Islander	250B17	0.121		0.121				0.242
Cessna 172 Skyhawk	TSIO36	3.338	0.278	3.616		0.921		8.154
Cessna 182	IO360	0.877		0.877				1.753
Cessna 206	TIO540	1.811		1.585	0.226			3.622
Cessna 208 Caravan	PT6A14	3.613	0.134	3.580	0.163	0.914	0.042	8.446
Cessna 441 Conquest II	TPE8	0.258		0.249	0.009			0.516
Cessna 500 Citation I	1PW036	0.034		0.034				0.068
Cessna 560 Citation XLS	PW530	0.016		0.016				0.032
Cessna 650 Citation III	1AS002	0.011		0.011				0.023
Cessna 680 Citation Sovereign	03P14PW194	0.009		0.009				0.018
Cessna 750 Citation X	6AL024	0.006		0.006				0.011
CESSNA CITATION 510	PW530	0.026		0.026				0.052
Convair CV-580	501DA2	1.224	0.022	1.212	0.035			2.493
Dassault Falcon 20-D	CF700D	0.020		0.020				0.040
DeHavilland DHC-6-200 Twin Otter	PT6A27	3.176	0.024	3.192	0.008			6.400
DeHavilland DHC-8-100	PW121A	0.002		0.002				0.004
Dornier 328-100 Series	PW119C	0.682	0.003	0.685				1.369
EADS Socata TB-9 Tampico	IO320	1.207		1.151	0.056	0.293	0.014	2.720
Eclipse 500 / PW610F	PW610F	0.004		0.004				0.007
Embraer EMB120 Brasilia	PW118	1.120	0.003	1.120	0.003			2.245
Embraer ERJ145	6AL008	0.009		0.009				0.018
Embraer ERJ190	10GE132	0.003		0.003				0.007

Aircraft	Engine	2022 Existing Conditions						
		Arrivals		Departures		TGO		Total
		Day	Night	Day	Night	Day	Night	
Gulfstream G550	3BR001	0.002		0.002				0.005
Gulfstream IV-SP	1RR019	0.033		0.029	0.004			0.066
Hawker HS748-2B	DART52	0.002		0.002				0.005
Israel IAI-1125 Astra	1AS002	0.008		0.005	0.003			0.016
Lockheed C-130 Hercules	T56A7	0.929	0.262	0.929	0.262			2.382
Mitsubishi MU-300 Diamond	1PW037	0.056	0.003	0.054	0.005			0.118
Piper PA-24 Comanche	TIO540	11.725	1.118	12.254	0.598	3.126	0.152	28.973
Piper PA-28 Cherokee Series	IO320	2.866		2.866				5.733
Piper PA-30 Twin Comanche	IO320	0.363		0.363				0.725
Piper PA-42 Cheyenne Series	PT6A41	0.003		0.003				0.007
Raytheon Beech Baron 58	TIO540	1.027	0.008	1.035		0.080		2.150
Robinson R44 Raven / Lycoming O-540-F1B5	TIO540	0.034	0.010	0.034	0.010			0.086
Saab 340-B	CT79B	0.680	0.128	0.684	0.124			1.616
Shorts 330-200 Series	PT6A4R	3.389	0.022	3.407	0.004			6.822
	Grand Total	**56.788**	**6.950**	**55.975**	**5.923**	**5.334**	**0.208**	**131.178**

TGO = Touch and Go
Day = 7:00 a.m. to 9:59 p.m.; Night = 10:00 p.m. to 6:59 a.m.
Note: Numbers may not add due to rounding.
Source: AECOM, 2024.

1 **TABLE 1.3-2 EXISTING CONDITION RUNWAY UTILIZATION**

Aircraft	Engine	Operation Type	Runway			
			08	26	H08	H26
Airbus A319-100 Series	3IA006	Arrival	95.1%	4.9%	0.0%	0.0%
Airbus A319-100 Series	3IA006	Departure	95.0%	5.0%	0.0%	0.0%
Airbus A320-200 Series	1IA003	Arrival	95.0%	5.0%	0.0%	0.0%
Airbus A320-200 Series	1IA003	Departure	95.0%	5.0%	0.0%	0.0%
Airbus A321-200 Series	01P10IA025	Arrival	95.0%	5.0%	0.0%	0.0%
Airbus A321-200 Series	01P10IA025	Departure	95.2%	4.8%	0.0%	0.0%
Bell 429	TPE1	Arrival	0.0%	0.0%	95.0%	5.0%
Bell 429	TPE1	Departure	0.0%	0.0%	95.0%	5.0%
Bell AH-1W SuperCobra	T70041	Arrival	0.0%	0.0%	93.2%	6.8%
Bell AH-1W SuperCobra	T70041	Departure	0.0%	0.0%	93.2%	6.8%
Boeing 737-400 Series	1CM007	Arrival	95.1%	4.9%	0.0%	0.0%
Boeing 737-400 Series	1CM007	Departure	95.3%	4.7%	0.0%	0.0%
Boeing 737-700 Series	3CM032	Arrival	68.8%	31.2%	0.0%	0.0%
Boeing 737-700 Series	3CM032	Departure	90.5%	9.5%	0.0%	0.0%
Boeing 737-800 Series	3CM034	Arrival	95.0%	5.0%	0.0%	0.0%
Boeing 737-800 Series	3CM034	Departure	95.0%	5.0%	0.0%	0.0%
Boeing 767-200 Series Freighter	1PW026	Arrival	95.0%	5.0%	0.0%	0.0%
Boeing 767-200 Series Freighter	1PW026	Departure	95.1%	4.9%	0.0%	0.0%
Boeing 767-300 Series	1PW043	Arrival	68.8%	31.2%	0.0%	0.0%
Boeing 767-300 Series	1PW043	Departure	0.0%	100.0%	0.0%	0.0%
Boeing 777-200-LR	01P21GE216	Arrival	95.0%	5.0%	0.0%	0.0%
Boeing 777-200-LR	01P21GE216	Departure	98.7%	1.3%	0.0%	0.0%
Bombardier Challenger 600	1TL001	Arrival	95.0%	5.0%	0.0%	0.0%
Bombardier Challenger 600	1TL001	Departure	95.0%	5.0%	0.0%	0.0%
Bombardier Learjet 35A/36A (C-21A)	TFE731	Arrival	95.0%	5.0%	0.0%	0.0%
Bombardier Learjet 35A/36A (C-21A)	TFE731	Departure	95.0%	5.0%	0.0%	0.0%
Britten-Norman BN-2 Islander	250B17	Arrival	95.0%	5.0%	0.0%	0.0%
Britten-Norman BN-2 Islander	250B17	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 172 Skyhawk	TSIO36	Arrival	95.0%	5.0%	0.0%	0.0%
Cessna 172 Skyhawk	TSIO36	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 172 Skyhawk	TSIO36	Touch and Go	90.0%	10.0%	0.0%	0.0%
Cessna 182	IO360	Arrival	95.0%	5.0%	0.0%	0.0%

Aircraft	Engine	Operation Type	Runway			
			08	26	H08	H26
Cessna 182	IO360	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 206	TIO540	Arrival	95.0%	5.0%	0.0%	0.0%
Cessna 206	TIO540	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 208 Caravan	PT6A14	Arrival	95.0%	5.0%	0.0%	0.0%
Cessna 208 Caravan	PT6A14	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 208 Caravan	PT6A14	Touch and Go	90.0%	10.0%	0.0%	0.0%
Cessna 441 Conquest II	TPE8	Arrival	95.0%	5.0%	0.0%	0.0%
Cessna 441 Conquest II	TPE8	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 500 Citation I	1PW036	Arrival	95.0%	5.0%	0.0%	0.0%
Cessna 500 Citation I	1PW036	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 560 Citation XLS	PW530	Arrival	95.0%	5.0%	0.0%	0.0%
Cessna 560 Citation XLS	PW530	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 650 Citation III	1AS002	Arrival	95.0%	5.0%	0.0%	0.0%
Cessna 650 Citation III	1AS002	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 680 Citation Sovereign	03P14PW194	Arrival	95.0%	5.0%	0.0%	0.0%
Cessna 680 Citation Sovereign	03P14PW194	Departure	95.0%	5.0%	0.0%	0.0%
Cessna 750 Citation X	6AL024	Arrival	95.0%	5.0%	0.0%	0.0%
Cessna 750 Citation X	6AL024	Departure	95.1%	4.9%	0.0%	0.0%
CESSNA CITATION 510	PW530	Arrival	95.0%	5.0%	0.0%	0.0%
CESSNA CITATION 510	PW530	Departure	95.0%	5.0%	0.0%	0.0%
Convair CV-580	501DA2	Arrival	95.0%	5.0%	0.0%	0.0%
Convair CV-580	501DA2	Departure	95.0%	5.0%	0.0%	0.0%
Dassault Falcon 20-D	CF700D	Arrival	95.0%	5.0%	0.0%	0.0%
Dassault Falcon 20-D	CF700D	Departure	95.0%	5.0%	0.0%	0.0%
DeHavilland DHC-6-200 Twin Otter	PT6A27	Arrival	95.0%	5.0%	0.0%	0.0%
DeHavilland DHC-6-200 Twin Otter	PT6A27	Departure	95.0%	5.0%	0.0%	0.0%
DeHavilland DHC-8-100	PW121A	Arrival	95.1%	4.9%	0.0%	0.0%
DeHavilland DHC-8-100	PW121A	Departure	95.3%	4.7%	0.0%	0.0%
Dornier 328-100 Series	PW119C	Arrival	95.0%	5.0%	0.0%	0.0%
Dornier 328-100 Series	PW119C	Departure	95.0%	5.0%	0.0%	0.0%
EADS Socata TB-9 Tampico	IO320	Arrival	95.0%	5.0%	0.0%	0.0%
EADS Socata TB-9 Tampico	IO320	Departure	95.0%	5.0%	0.0%	0.0%
EADS Socata TB-9 Tampico	IO320	Touch and Go	90.0%	10.0%	0.0%	0.0%

Aircraft	Engine	Operation Type	Runway			
			08	26	H08	H26
Eclipse 500 / PW610F	PW610F	Arrival	95.0%	5.0%	0.0%	0.0%
Eclipse 500 / PW610F	PW610F	Departure	94.9%	5.1%	0.0%	0.0%
Embraer EMB120 Brasilia	PW118	Arrival	95.0%	5.0%	0.0%	0.0%
Embraer EMB120 Brasilia	PW118	Departure	95.0%	5.0%	0.0%	0.0%
Embraer ERJ145	6AL008	Arrival	95.0%	5.0%	0.0%	0.0%
Embraer ERJ145	6AL008	Departure	95.0%	5.0%	0.0%	0.0%
Embraer ERJ190	10GE132	Arrival	95.0%	5.0%	0.0%	0.0%
Embraer ERJ190	10GE132	Departure	95.1%	4.9%	0.0%	0.0%
Gulfstream G550	3BR001	Arrival	95.0%	5.0%	0.0%	0.0%
Gulfstream G550	3BR001	Departure	94.9%	5.1%	0.0%	0.0%
Gulfstream IV-SP	1RR019	Arrival	95.0%	5.0%	0.0%	0.0%
Gulfstream IV-SP	1RR019	Departure	95.0%	5.0%	0.0%	0.0%
Hawker HS748-2B	DART52	Arrival	95.0%	5.0%	0.0%	0.0%
Hawker HS748-2B	DART52	Departure	94.9%	5.1%	0.0%	0.0%
Israel IAI-1125 Astra	1AS002	Arrival	95.0%	5.0%	0.0%	0.0%
Israel IAI-1125 Astra	1AS002	Departure	95.1%	4.9%	0.0%	0.0%
Lockheed C-130 Hercules	T56A7	Arrival	95.0%	5.0%	0.0%	0.0%
Lockheed C-130 Hercules	T56A7	Departure	95.0%	5.0%	0.0%	0.0%
Mitsubishi MU-300 Diamond	1PW037	Arrival	95.0%	5.0%	0.0%	0.0%
Mitsubishi MU-300 Diamond	1PW037	Departure	95.0%	5.0%	0.0%	0.0%
Piper PA-24 Comanche	TIO540	Arrival	95.0%	5.0%	0.0%	0.0%
Piper PA-24 Comanche	TIO540	Departure	95.0%	5.0%	0.0%	0.0%
Piper PA-24 Comanche	TIO540	Touch and Go	90.0%	10.0%	0.0%	0.0%
Piper PA-28 Cherokee Series	IO320	Arrival	95.0%	5.0%	0.0%	0.0%
Piper PA-28 Cherokee Series	IO320	Departure	95.0%	5.0%	0.0%	0.0%
Piper PA-30 Twin Comanche	IO320	Arrival	95.0%	5.0%	0.0%	0.0%
Piper PA-30 Twin Comanche	IO320	Departure	95.0%	5.0%	0.0%	0.0%
Piper PA-42 Cheyenne Series	PT6A41	Arrival	95.0%	5.0%	0.0%	0.0%
Piper PA-42 Cheyenne Series	PT6A41	Departure	95.1%	4.9%	0.0%	0.0%
Raytheon Beech Baron 58	TIO540	Arrival	95.0%	5.0%	0.0%	0.0%
Raytheon Beech Baron 58	TIO540	Departure	95.0%	5.0%	0.0%	0.0%
Raytheon Beech Baron 58	TIO540	Touch and Go	90.0%	10.0%	0.0%	0.0%
Robinson R44 Raven / Lycoming O-540-F1B5	TIO540	Arrival	0.0%	0.0%	95.0%	5.0%

Aircraft	Engine	Operation Type	Runway			
			08	26	H08	H26
Robinson R44 Raven / Lycoming O-540-F1B5	TIO540	Departure	0.0%	0.0%	95.0%	5.0%
Saab 340-B	CT79B	Arrival	95.0%	5.0%	0.0%	0.0%
Saab 340-B	CT79B	Departure	95.0%	5.0%	0.0%	0.0%
Shorts 330-200 Series	PT6A4R	Arrival	95.0%	5.0%	0.0%	0.0%
Shorts 330-200 Series	PT6A4R	Departure	95.0%	5.0%	0.0%	0.0%

1 Source: AECOM, 2024.

TABLE 1.3-3 EXISTING CONDITION FLIGHT TRACK UTILIZATION

Flight Track	Arrival	Departure	Touch and Go	Total
08D1P	0.0%	15.5%	0.0%	15.5%
08D3P	0.0%	10.1%	0.0%	10.1%
08D4P	0.0%	7.0%	0.0%	7.0%
08D5P	0.0%	2.0%	0.0%	2.0%
08TG	0.0%	0.0%	3.8%	3.8%
26A1P	2.4%	0.0%	0.0%	2.4%
26D1P	0.0%	0.2%	0.0%	0.2%
26D2P	0.0%	0.2%	0.0%	0.2%
26D3P	0.0%	0.5%	0.0%	0.5%
26D4P	0.0%	1.0%	0.0%	1.0%
26D5P	36.0%	0.5%	0.0%	36.4%
26TG	0.0%	0.0%	0.4%	0.4%
H08D1P	0.0%	5.6%	0.0%	5.6%
H26A2P	0.4%	0.0%	0.0%	0.4%
H08D2P	0.0%	3.9%	0.0%	3.9%
H08A2P	3.9%	0.0%	0.0%	3.9%
H26D1P	0.0%	0.3%	0.0%	0.3%
H26D2P	0.0%	0.4%	0.0%	0.4%
H26A1P	0.3%	0.0%	0.0%	0.3%
H08A1P	5.6%	0.0%	0.0%	5.6%
Total	**48.6%**	**47.2%**	**4.2%**	**100.0%**

Source: AECOM, 2024

FAA Part 150 Compatible Land Use Criteria

Title 14 CFR part 150, Appendix A, Table 1 (Title 14 CFR part 150, 2007), provides Federal compatible land use guidelines for several land uses as a function of DNL values. Compatible or non-compatible land use is determined by comparing the predicted or measured values at a site to the values listed in Table 1. This table is provided as **Table 1.3-4**.

TABLE 1.3-4 LAND USE COMPATIBILITY WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS

	Yearly Day-Night Average Sound Level (DNL)					
	Below 65 Decibels	65-70 Decibels	70-75 Decibels	75-80 Decibels	80-85 Decibels	Over 85 Decibels
Residential						
Residential (Other than mobile homes & transient lodges)	Y	N[1]	N[1]	N	N	N
Mobile Home Parks	Y	N	N	N	N	N
Transient Lodging	Y	N[1]	N[1]	N[1]	N	N
Public Use						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals, Nursing Homes	Y	25	30	N	N	N
Churches, Auditoriums, Concert Halls	Y	25	30	N	N	N
Governmental Services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
Commercial Use						
Offices, Business & Professional	Y	Y	25	30	N	N
Wholesale & Retail Building Materials, Hardware & Farm Equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail Trade - General	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N

Communications	Y	Y	25	30	N	N
Manufacturing & Production						
Manufacturing, General	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and Optical	Y	Y	25	30	N	N
Agriculture (Except Livestock) & Forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock Farming & Breeding	Y	Y[6]	Y[7]	N	N	N
Mining & Fishing, Resource Production & Extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor Sports Arenas, Spectator Sports	Y	Y[5]	Y[5]	N	N	N
Outdoor Music Shells, Amphitheaters	Y	N	N	N	N	N
Nature Exhibits & Zoos	Y	Y	N	N	N	N
Amusement, Parks, Resorts, Camps	Y	Y	Y	N	N	N
Golf Courses, Riding Stables, Water Recreation	Y	Y	25	30	N	N

NOTE: The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties remains with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land use for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.
Y (Yes) Land Use and related structures are compatible without restrictions.
N (No) Land Use and related structures are not compatible and should be prohibited.
NLRNoise Level Reduction (outdoor to indoor) are to be achieved through incorporation of noise attenuation into the design and construction of structure.
25, 30, or 35Land use and related structures are generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated in design and construction of structure.
[1] Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
[2] Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of the buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
[3] Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of the buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
[4] Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of the buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
[5] Land use compatibility provided special sound reinforcement systems are installed.
[6] Residential buildings require an NLR of 25 dB.
[7] Residential buildings require an NLR of 30 dB.
[8] Residential buildings not permitted.
incompatible land use
Source: Title 14 CFR part 150, 2007.

1.3.2 FUTURE CONDITIONS NOISE MODELING

The only operational change resulting from the Proposed Project is the spatial reconfiguration of Runway 8-26. The proposed Runway length, displaced thresholds, and runway end coordinates were programmed into AEDT based on the current Airport Layout Plan reflecting the Proposed Project.

Flight Operations

Table 1.3-5 shows the AEDT-modeled average annual daily aircraft operations for the 2029 and 2034 conditions at BQN. There is no difference in aircraft fleet mix or operational levels between the Proposed Project and No-Action Alternative.

Runway Use

Runway utilization remains unchanged from the Existing Condition. See **Table 1.3-2** for details. There is no change between the No-Action Alternative and the Proposed Project conditions.

Flight Tracks

Flight tracks remain unchanged from the Existing Condition. See **Figure 1.3-1** for details. There is no change between the No-Action Alternative and the Proposed Project conditions.

Track Use

Flight track utilization remains unchanged from the Existing Condition. See **Table 1.3-3** for details. There is no change between the No-Action Alternative and the Proposed Project conditions.

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TABLE 1.3-5 2029 AND 2034 AVERAGE ANNUAL DAILY OPERATIONS AT BQN

Aircraft	Engine	2029							2034						
		Arrivals		Departures		TGO		Total	Arrivals		Departures		TGO		Total
		Day	Night	Day	Night	Day	Night		Day	Night	Day	Night	Day	Night	
Airbus A319-100 Series	3IA006	0.679	0.291	0.720	0.240			1.931	0.738	0.316	0.783	0.261			2.099
Airbus A320-200 Series	1IA003	2.810	0.929	2.789	0.950			7.478	3.055	1.010	3.032	1.032			8.128
Airbus A321-200 Series	01P10IA025	1.997	0.200	1.972	0.219			4.387	2.170	0.217	2.143	0.238			4.769
Bell 429	TPE1	0.012	0.003	0.012	0.003			0.030	0.012	0.003	0.012	0.003			0.031
Bell AH-1W SuperCobra	T70041	10.104	2.850	10.104	2.850			25.907	10.104	2.850	10.104	2.850			25.907
Boeing 737-400 Series	1CM007	0.003		0.003				0.005	0.003		0.003				0.006
Boeing 737-700 Series	3CM032	0.027	0.004	0.011				0.042	0.029	0.005	0.012				0.046
Boeing 737-800 Series	3CM034	0.898	0.163	0.857	0.193			2.111	0.976	0.177	0.931	0.210			2.294
Boeing 767-200 Series Freighter	1PW026	0.013		0.013				0.027	0.015		0.015				0.029
Boeing 767-300 Series	1PW043	2.181	0.935	0.754	0.251			4.120	2.370	1.016	0.819	0.273			4.478
Boeing 777-200-LR	01P21GE216	0.731		0.559	0.007			1.297	0.794		0.607	0.008			1.409
Bombardier Challenger 600	1TL001	0.070		0.070				0.140	0.073		0.073				0.146
Bombardier Learjet 35A/36A (C-21A)	TFE731	0.222		0.219	0.003			0.445	0.233		0.230	0.003			0.466
Britten-Norman BN-2 Islander	250B17	0.168		0.168				0.335	0.170		0.170				0.341
Cessna 172 Skyhawk	TSIO36	4.629	0.386	5.014		1.278		11.306	4.706	0.392	5.098		1.299		11.494
Cessna 182	IO360	1.216		1.216				2.431	1.236		1.236				2.472
Cessna 206	TIO540	2.511		2.197	0.314			5.023	2.553		2.234	0.319			5.106
Cessna 208 Caravan	PT6A14	5.010	0.185	4.977	0.226	1.267	0.058	11.724	5.094	0.189	5.059	0.230	1.288	0.059	11.918
Cessna 441 Conquest II	TPE8	0.358		0.345	0.013			0.715	0.364		0.351	0.013			0.727
Cessna 500 Citation I	1PW036	0.034		0.034				0.069	0.036		0.036				0.072
Cessna 560 Citation XLS	PW530	0.016		0.016				0.032	0.017		0.017				0.034
Cessna 650 Citation III	1AS002	0.011		0.011				0.023	0.012		0.012				0.024
Cessna 680 Citation Sovereign	03P14PW194	0.009		0.009				0.018	0.010		0.010				0.019
Cessna 750 Citation X	6AL024	0.006		0.006				0.011	0.006		0.006				0.012
CESSNA CITATION 510	PW530	0.026		0.026				0.053	0.028		0.028				0.055
Convair CV-580	501DA2	1.697	0.031	1.680	0.048			3.457	1.726	0.032	1.708	0.049			3.514
Dassault Falcon 20-D	CF700D	0.027		0.027				0.055	0.028		0.028				0.056
DeHavilland DHC-6-200 Twin Otter	PT6A27	4.405	0.033	4.426	0.012			8.875	4.478	0.033	4.499	0.012			9.022
DeHavilland DHC-8-100	PW121A	0.002		0.002				0.005	0.003		0.002				0.005
Dornier 328-100 Series	PW119C	0.687	0.003	0.690				1.379	0.720	0.003	0.723				1.446
EADS Socata TB-9 Tampico	IO320	1.673		1.596	0.078	0.406	0.020	3.772	1.701		1.622	0.079	0.412	0.020	3.835
Eclipse 500 / PW610F	PW610F	0.005		0.005				0.010	0.005		0.005				0.010
Embraer EMB120 Brasilia	PW118	1.128	0.003	1.128	0.003			2.262	1.182	0.003	1.182	0.003			2.371
Embraer ERJ145	6AL008	0.009		0.009				0.018	0.010		0.010				0.019
Embraer ERJ190	10GE132	0.003		0.003				0.007	0.004		0.004				0.007
Gulfstream G550	3BR001	0.002		0.002				0.005	0.002		0.002				0.005
Gulfstream IV-SP	1RR019	0.033		0.029	0.004			0.066	0.035		0.030	0.004			0.070
Hawker HS748-2B	DART52	0.002		0.002				0.005	0.002		0.002				0.005
Israel IAI-1125 Astra	1AS002	0.008		0.005	0.003			0.016	0.008		0.006	0.003			0.017
Lockheed C-130 Hercules	T56A7	0.904	0.255	0.904	0.255			2.317	0.904	0.255	0.904	0.255			2.317
Mitsubishi MU-300 Diamond	1PW037	0.057	0.003	0.054	0.005			0.119	0.059	0.003	0.057	0.006			0.125
Piper PA-24 Comanche	TIO540	16.248	1.550	16.992	0.829	4.335	0.211	40.165	16.518	1.576	17.274	0.842	4.407	0.215	40.832
Piper PA-28 Cherokee Series	IO320	3.975		3.975				7.949	4.041		4.041				8.081
Piper PA-30 Twin Comanche	IO320	0.503		0.503				1.006	0.511		0.511				1.022
Piper PA-42 Cheyenne Series	PT6A41	0.003		0.003				0.007	0.004		0.004				0.007
Raytheon Beech Baron 58	TIO540	1.424	0.011	1.435		0.111		2.982	1.448	0.011	1.459		0.113		3.031
Robinson R44 Raven / Lycoming O-540-F1B5	TIO540	0.034	0.010	0.034	0.010			0.087	0.036	0.010	0.036	0.010			0.091
Saab 340-B	CT79B	0.943	0.178	0.949	0.172			2.241	0.959	0.181	0.965	0.174			2.278
Shorts 330-200 Series	PT6A4R	4.699	0.031	4.724	0.006			9.460	4.777	0.031	4.802	0.006			9.617

Aircraft	Engine	2029							2034						
		Arrivals		Departures		TGO		Total	Arrivals		Departures		TGO		Total
		Day	Night	Day	Night	Day	Night		Day	Night	Day	Night	Day	Night	
Grand Total		**72.213**	**8.053**	**71.281**	**6.693**	**7.397**	**0.289**	**165.926**	**73.962**	**8.313**	**72.897**	**6.884**	**7.520**	**0.294**	**169.869**

1 TGO = Touch and Go
2 Day = 7:00 a.m. to 9:59 p.m.; Night = 10:00 p.m. to 6:59 a.m.
3 Values reflect rounding
4 Source: AECOM, 2024

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