ENVIRONMENTAL ASSESSMENT

CONSTRUCTION OF PR-10
ADJUNTAS TO UTUADO, PUERTO RICO

FEBRUARY 2024

CONSTRUCTION OF PR-10
ADJUNTAS TO UTUADO, PUERTO RICO

ENVIRONMENTAL ASSESSMENT
FOR THE CONSTRUCTION OF A NEW HIGHWAY BETWEEN ADJUNTAS AND UTUADO (7.6 KILOMETERS)

CDBG -MIT FUNDING FROM GRANT #B-18-DP-72-002

Submitted by the
U.S. Department of Transportation Federal Highway Administration
and the
Puerto Rico Department of Housing

03/06/2024	
Date of Approval	For Federal Highway Administration
03/06/2024	
Date of Approval	For Puerto Rico Department of Housing

The following persons may be contacted for comments concerning this document:

Juan Carlos Pérez Bofill, PE, MEng.
Director for Disaster Recovery
CDBG-DR/MIT Program
Puerto Rico Department of Housing
PO Box 21365
San Juan, PR 00928-1365
Mail to: environmentCDBG@vivienda.pr.gov

Luis D. López Rivera, P.E.
Senior Environmental Specialist
Federal Highway Administration
400 W. Washington Street Rm. 4200
Orlando, FL 32801
Mail to: luis.d.lopez@dot.gov

Table of Contents

List of Tables

List of Attachments

Attachment 1: Tabulated Summary of the Reevaluations conducted for PR-10 after approval of the FEIS by FHWA
Attachment 2: Figures
Attachment 3: Copy of a selected section of the most recent Statewide Transportation Improvement Program (STIP)- Amendment #1 for FY 2023-2026 approved by FHWA/FTA including PR-10 Project
Attachment 4: Copy of Recertification Approval of the EQB for the Adjusted Alignment of PR-10
Attachment 5: Copy of Project Drawings illustrating ROW and Location of Bridges
Attachment 6: Copy of HUD Environmental Evaluation Assessment Form
Attachment 7: Copy of the Results Obtained from the NEPAssit Database
Attachment 8: Environmental Site Assessments Phase I and II
Attachment 9: Copy of IPAC Report
Attachment 10: Copy of the Programmatic Biological Opinion (PBO) approved by the USFWS
Attachment 11: Copy of comments and endorsement letters received from consulted federal and local agencies
Attachment 12: Copy of the Flora/Fauna Study conducted by OIKOS 2002
Attachment 13: Copy of the Endangered Bird of Prey Species Reports for Sections II, III and IV (June 2013 and May 2014)
Attachment 14: Copy of the Field Protocols requested by the DNER for the Protection of Endangered Species
Attachment 15: Copy of the 8-Step Decision Making Document
Attachment 16: Copy of the USACE Nationwide Permit for Section II of the Proposed Action
Attachment 17: Copy of the Archaeological Study Requesting Reconsideration to the Need to Perform an Archaeological Phase II at Section II (AC-100069)
Attachment 18: Copy of the Noise Traffic Impact Study performed for Section V (AC-100076)
Attachment 19: Copy of DNL Calculator Result
Attachment 20: Copy of the Forecasting and Traffic Analysis Report for PR-10
Attachment 21: Copy of the EJ Screen: Environmental Justice Screening and Mapping Tool/US Census Database Review Reports
Attachment 22: Geotechnical Studies for Sections II, III, IV and V performed at the request of the DNER
Attachment 23: Copy of the Hydraulic/Hydrologic Studies Performed for Sections II, III, IV and V
Attachment 24: Copy of Letter from DNER with respect to Mitigation Agreements for PR-10 (Hacienda Verde)
Attachment 25: Copy of the Public Comments
Attachment 26: Phase I-A and I-B for sections III to V

Acronyms

ACM	Asbestos Containing Material
ACT	Autoridad de Carreteras y Transportación
ADT	Average Daily Traffic
ASTM	American Society for Testing and Materials
AASHTO	American Association of State Highway and Transportation Officials
BHA	Barret Hale & Alamo
BMP	Best Management Practices
BR	Bridge
BWH	Broad-Winged Hawk
CAA	Clean Air Act
CBIA	Coastal Barrier Improvement Act
CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resources System
CDBG-DR/MIT	Community Development Block Grant-Disaster Recovery / Mitigation
CE	Categorical Exclusion
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CGP	Construction General Permit
CMP	Congestion Management Process
CN	Curve Number
CO	Carbon Monoxide
dBA	Decibels A
DEIS	Draft Environmental Impact Statement
DNER	Department of Natural and Environmental Resources
DNL	Day/Night Noise Level
EIS	Environmental Impact Statement
ESA	Environmental Site Assessment

EJScreen	Environmental Justice Screening and Mapping Tool
EQB	Environmental Quality Board
ESpA	Endangered Species Act
FAHP	Federal-Aid Highway Program
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
GHG	Green House Gases
HEC-HMS	Hydrologic Modeling System
HUD	Department Of Housing and Urban Development
JPA	Joint Permit Application
LBP	Lead Based Paint
Leq	Equivalent Continuous Sound Pressure Level
LOS	Level of Service
MLAA	May Affect, Likely to Adversely Affect
MOT	Maintenance of Traffic
MPO	Metropolitan Planning Organization
MSEM	Master of Science in Engineering Management
MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NLAA	May Affect, Not Likely to Adversely Affect

NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Parks Service
NRCS	Natural Resources Conservation Office
NRI	Nationwide Rivers Inventory
NWSRS	National Wild and Scenic River Systems
OSHA	Occupational Safety and Health Administration
PBO	Programmatic Biological Opinion
PMO	Permits Management Office
PN	Public Notice
PR	Puerto Rico
PRASA	Puerto Rico Aqueduct and Sewer Authority
PRDOH	Puerto Rico Department of Housing
PRDTPW	Puerto Rico Department of Transportation and Public Works
PREPA	Puerto Rico Electric Power Authority
PRHTA	Puerto Rico Highway and Transportation Authority
PRIC	Puerto Rico Institute of Culture
RCRA	Resource Conservation and Recovery Act
RE	Responsible Entity
ROW	Right of Way
RROF	Request for Release of Funds
SIP	Single Incidental Permit
SCS	Soil Conservation Service
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SQG	Small Quantity Generator
SSH	Puerto Rican Sharp-Shinned Hawk

STIP	State Transportation Improvement Plan
SWPPP	Storm Water Pollution Prevention Plan
T	Technical Advisory 6640
TNM	Traffic Noise Model
TPH	Total Petroleum Hydrocarbons
TUB	Traditional Urban Centers
NTSB	National Transportation Safety Board
UIC	Underground Injection Control
URA	Uniform Relocation Act
US	United States
USACE	US Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Services
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

The Puerto Rico Highway and Transportation Authority (PRHTA) is proposing the construction of the remaining sections of PR-10 between the municipalities of Utuado and Adjuntas whose terrestrial connection is being made through state road PR-123. In the context of the Island, the Proposed Action is in the central mountainous region known as Cordillera Central. The Proposed Action would serve to interconnect the northern and southern segments of PR-10 already constructed and in operation. Once completed, PR-10 will span approximately 58.0 kilometers between the Municipalities of Arecibo and Ponce. While most of the roadway has been already built, approximately 7.6 kilometers, divided into four sections for construction purposes, remain to be constructed.

Resulting from its design and construction starting in the late 1880's and completed early in the 1900's, PR-123's exhibits dangerous and substandard operational conditions, a conclusion that was confirmed by various traffic studies as well as a relatively high accident rate. In response to these findings, the PRHTA engaged in the performance of transportation engineering analyses that confirmed the need to improve PR-123 and ultimately identified that its relocation was the recommended alternative resulting from the limitations and constraints of PR-123 corridor. The relocated highway was identified as PR-10, whose construction has progressed as a function of the availability of funds but has not been completed as previously noted. The Proposed Action area remains sparsely developed, with a declining population and low per capita income as per information obtained from the U.S. Census Bureau data for Puerto Rico. Recent Traffic studies (2021) project a low daily traffic volume on PR-123 and estimate that roughly a 60% of the current vehicular traffic using PR-123 would be diverted to the Proposed Action. The new highway aims to enhance safety and should result in a highway that meets modern transportation standards. The Proposed Action typical section consists of an undivided highway with one (1) traffic lane of 3.65 meters in each direction, with an additional climbing lane in the southbound direction toward the Municipality of Adjuntas. An exterior shoulder of 3.0 meters is provided in the northbound lane, while a 1.80 meters shoulder is provided in the southbound lane. As a result of the rugged characteristics of the topography of the area, twenty bridge structures will be constructed as well as drainage improvements in the form of berms, pipe crossings, pipes, catch basins, headwalls, and manholes.

The purpose and need of this project include finishing the construction of a terrestrial link from north to south, aimed at enhancing accessibility and mobility for existing PR-10 users. Its completion will serve to establish a secure and resilient highway infrastructure that mitigates the impact of future natural disasters, in accordance with the latest construction standards outlined in the AASHTO Design and Construction of Highway and Bridges and will provide a safer and modern route for its current and future users. A resilient terrestrial corridor is required as a measure aimed to prioritize mitigation of risk, a key lifeline asset that in the aftermath of a disaster event, and to contribute to the Island's resilience.

The Puerto Rico Department of Housing (PRDOH) plans to contribute $540,069,976.00 from the Community Development Block Grant – Mitigation (CDBG-MIT) under Grant #B-18-DP-72-0002 for the construction of the Proposed Action. These funds stem from the presidentially declared disaster following Hurricane Maria and are designated for transformative infrastructure projects that enhance long-term community resilience to future hazards. Additionally, the State Transportation Improvement Program

(STIP) allocates $2,000,000.00 in federal aid from the Federal Highway Administration (FHWA) funds for the remaining right-of-way (ROW) acquisition related to the Proposed Action.

PRHTA has envisioned the planning and construction of PR-10 as a north-to-south roadway since the late 1960s. The National Environmental Policy Act (NEPA) required the preparation of an Environmental Impact Statement (EIS) at the project's inception, which was finalized on May 27, 1979. Compliance with NEPA https://act.dtop.pr.gov/enlaces-pr-10-utuado-adjuntas/ was documented, and as funds became available, PRHTA initiated the construction of the new roadway in 1995. Since its inception, the FHWA has been the lead federal agency for PR-10, overseeing the EIS and the various Reevaluations that have been conducted until August 2022. Currently, the Proposed Action has received funds under the Federal-Aid Highway Program (FAHP), included in the State Transportation Improvement Program (STIP). However, the primary funding for the proposed action will come from the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant – Mitigation (CDBG-MIT) funds. The PRDOH, as the grantee of CDBG-MIT funds, acts as the Responsible Entity (RE) under 24 CFR § 58.4, assuming responsibility for environmental review, decision-making, and actions as specified in "24 CFR Part 58", following HUD's authority under NEPA and other relevant laws.
Given that CDBG-MIT funds will combine with the allocated Federal-aid funds for the final sections of the PR-10 Project, FHWA and PRDOH are jointly leading the preparation of the Environmental Assessment (EA) to assess the impacts on the human and natural environment. This assessment ensures compliance with FHWA and HUD's requirements under 23 CFR § 771 and 24 CFR § 58, respectively. Coordination with PRHTA, the CDBG-MIT subrecipient, and FAHP recipient will also occur. As joint lead agencies, FHWA and PRDOH will circulate the EA for comments and issue a joint public notice of Finding of No Significant Impact (FONSI), if applicable, adhering to respective agencies' public notice requirements. Should the agencies determine, post-EA completion, that a Supplemental Environmental Impact Statement (Supplemental EIS) or an EIS is necessary, they will take the required actions to ensure compliance with NEPA and relevant federal laws and regulations governing such environmental documents.

Prior to the above-described determination, in June 2023, the PRDOH publicly announced its intention to adopt the FHWA's 1979 Final Environmental Impact Statement (FEIS) and related re-evaluations. However, it was decided to further re-evaluate the FEIS, opening it for public comment. Subsequently, FHWA and PRDOH jointly determined that conducting an EA would be more appropriate to update the analysis of the Proposed Action. The objective was to ascertain if a supplemental Environmental Impact Statement (EIS) was necessary, as outlined in 23 CFR § 771.130, rather than proceeding with the FHWA's FEIS as the Final Draft.

This EA has been prepared in compliance to the NEPA regulations (CFR 1500-1511), FHWA regulations (23 CFR § 771.119), FHWA's Technical Advisory T 6640.8, and HUD regulations (24 CFR Part 58). The FHWA and PRDOH collaborated on this EA to assess the significance of the impacts associated with the final four sections of PR-10. The EA incorporates current laws, regulations, and relevant information to conduct a comprehensive and up-to-date analysis of the potential impacts.

This EA serves as a continuation of the FHWA's FEIS, originally completed in the late 1970s for the entire PR-10 highway project but addressing only the remaining sections of the Proposed Action that constitute the preferred alternative of the FEIS. The purpose is process is to evaluate whether new information or circumstances, including changes in regulations and other federal and local laws relevant to the remaining

Proposed Action, would result in significant environmental impacts not previously considered in the FEIS. The EA aims to determine if a supplemental EIS is required based on the updated analysis.

Three alternatives were assessed for the proposed action. The No Action Alternative and the alternative to enhance the current highway PR-123 were found unsuitable for meeting the transportation infrastructure needs and goals of the region. The third alternative evaluates the construction of a new highway connecting the north and south sections of PR-10 currently in operation. Although the adoption of a mass transit system was initially considered during project planning, it was later dismissed after a thorough study and evaluation. After reviewing the scope of the Proposed Action, the following determinations have been made:

A. Alignment Adjustments

The Proposed Action remains within the same corridor of alternatives analyzed in the FEIS due to its selection as the preferred alternative. However, after its selection as the recommended alternative in early 2000s, and during the performance of design and construction stages, the desirability of making some adjustments in the project alignment were identified in the Adjuntas – Utuado area. The purpose of these adjustments was to minimize environmental impacts and address right-of-way acquisition needs. The adjustments maintained the original highway concept and capacity.

B. Air Quality and Noise

Air quality within the Proposed Action is good, meeting National Ambient Air Quality Standards (NAAQS). Minor air quality impacts are anticipated to occur during the construction stage, necessitating mitigation controls. These have been included in Section 5.3 of the EA, as mitigation measures of the Proposed Action. With respect to noise, a small to moderate increase in noise levels is expected during highway operation, but no significant impacts requiring the adoption of noise abatement measures were identified.

C. Coastal Zone and Coastal Barriers Resources

The Proposed Action is located outside the coastal zone and/or locations with Coastal Barrier resources. Therefore, these types of resources will not be affected by the proposed Action.

D. Hazardous Wastes and Contamination

After conducting a site reconnaissance, it was determined that a Phase I Environmental Site Assessment was required to be performed only a one parcel resulting from the finding of an old heavy trucks repair shop. This environmentally recognized condition resulted in the need to conduct a Phase II Assessment due to the potential presence of contaminants. The results of the Phase II assessment indicate that no significant environmental concerns were detected but did identify the need to perform closure activities of a septic tank found at the property. Closure of the tank and disposal of its contents shall be conducted in compliance with the Department of Natural Resources (DNER) regulations as further described in Section 5.3 of the EA.

E. Explosive and Flammable Hazards

The proposed action does not include development, construction, rehabilitation, or any type of action that will induce an increase in residential densities, or conversion. No installation of aboveground

storage tanks (AST) that may jeopardize the security of the scarce number of residences that are located near the Proposed Action construction sites will occur. Regarding flammable hazards, small quantities of flammable substances (diesel, paints, etc.) may be utilized only during the project construction phase but would be managed as per applicable federal and state regulations. The construction phase will require the use of explosives in some areas within the ROW. The implementation of regulatory health and safety protocols required for the use of explosives will serve to protect from harm nearby properties, humans as well as threatened and/or endangered species (especially during their breeding season) that may be located nearby the Proposed Action corridor. Therefore, due to the location of the proposed action and its surroundings, no impact on human health or the environment is expected.

F. Floodplain Management and Impacts

An 8 Step Process was accomplished, and it concluded that the Proposed Action is the only practical alternative to traverse through floodplain areas within its alignment. The Proposed Action considers only one bridge crossing over the Rio Grande de Arecibo that is located within a FEMA designated A/AE flood zone. The construction of a proposed bridge at that flood prone area within the designated corridor will not significantly impact the floodplain and adjacent wetland. Both resources will be restored, returning them to essentially their previous existing conditions. A Nationwide 14 permit has been granted for the construction of this structure by U.S. Army Corps of Engineers (USACE). The 8-step study provides detailed information on the Nationwide Permit requirements to mitigate impacts during construction on existing resources. These mitigation measures are included in Section 5.3 of the EA.

G. Natural Features

The proposed action will have no significant impact on Unique Natural Features and Water Resources based on consultations with agencies with jurisdiction of this subject as well as consultations with publicly available databases from the DNER and the U.S. Fish and Wildlife Service (USFWS). Mitigations measures during the construction phase of the project to protect the Rio Grande de Arecibo, as described in Section 5.3 of the EA, will be implemented. These measures will be included in the Storm Water Pollution Prevention Plan (SWPPP) that will be prepared for the project to secure coverage of the Construction General Permit (CGP) issued by the U.S. Environmental Protection Agency (EPA).

H. Flora and Fauna

The area is located in the Subtropical Wet Forest life zone (Ewel & Whitmore, 1973) and it is composed by a combination of Sub-montane and lower montane wet evergreen forest/shrub and active/abandoned shade coffee, Sub-montane wet evergreen forest and pastures. Most of the fauna observed in the Proposed Action corridor are common species found in similar locations within the Island. The diversity of the species is higher through the central portion of the alignment. Biological studies through the years, in conjunction with consultations with state and federal agencies have not disclosed the presence of endangered or protected species within the corridor. An agreement was reached with the DNER to develop and implement protective protocols for rare and/or endangered species that may be present nearby the Proposed Action corridor. Said protocols require that qualified biologists shall be present at the Proposed Action site to assess the construction areas

before and during the construction phase of the project. Detailed mitigation measures can be found in Section 5.3 of the EA. The DNER granted PRHTA the exemption from conducting a tree inventory for the proposed action after a review of a proposal that considered the size of the impacted areas and the assessing of their wildlife habitats. Both agencies agreed to transfer 253.32 cuerdas of Hacienda Verde as compensation and mitigation, aligning with compliance requirements outlined in Regulation 25, Law 241 of 1999, and its Regulation Number 6765, addressing wildlife and vegetation management and conservation. The property transfer was officially completed through a deed signed in 2021 and ultimately comprise a total of 369.64 cuerdas considering the size of the property.

I. Endangered Species

Geospatial data identified four federally listed species that might be present along the path of the proposed action which are: the Puerto Rican boa (*Epicrates inornatus*) now known as *Chilabothrus inornatus*, Puerto Rican board-winged hawk (*Buteo platypterus brunnescens*), Puerto Rican parrot (*Amazona vittata*) and Puerto Rican sharp-shinned hawk (*Accipiter striatus venator*). The USFWS reviewed the information submitted by the PRHTA regarding these species and concurred with determination that the proposed action may affect but is not likely to adversely affect the above-mentioned species. Regarding the Puerto Rican boa, no adverse impacts to said species are anticipated. However, consultation with the USFWS concluded with a determination of A May Affect Not Likely to Adversely Affect, if a boa is captured and relocated. Therefore, after a formal consultation, the PRHTA and FHWA accepted the recommendation of the USFWS to comply with sections 6.4 and 6.5 of the Programmatic Biological Opinion (PBO) during the construction activities of the Proposed Action. As one of the environmental commitments developed for the construction of the Proposed Action, the adoption of the required conservation measures and to the adopt the restriction to conduct some construction activities that may affect protected species during the breeding season extending from January to July has been included in Section 5.3 of the EA. These requirements will be included in the contract documents. At a local level, an agreement to implement protection measures in the form of field protocols requiring the presence of an on-site qualified biologist was also included in section 5.3 to comply with the DNER requirements. It is important to indicate that the required protocols for the protection of endangered species were developed and already approved by the DNER. Copy of coordination and protocols approved by the DNER are included in the EA.

J. Wetlands

Impacts on wetlands along the Proposed Action corridor are minimal, and protective measures will be implemented during its construction. A Nationwide 14 USACE permit has been granted for a bridge structure that affects wetlands in a crossing over Rio Grande de Arecibo. Mitigation measures as part of the above mentioned and the 8 Step Process carried out is included in Section 5.3.

K. Farmlands

A review of the database published by the National Resources Conservation Service (NRCS) disclosed the fact that there are no prime or unique farmlands located along the corridor of the Proposed Action. This finding is consistent with the topography of the area and the existing soils within the corridor of the Proposed Action.

L. Aquatic Impacts

The Proposed Action design incorporates measures to minimize adverse impacts to the water quality of the Rio Grande de Arecibo. Specific details pertaining to these measures have been included in section 5.2.1 of the EA.

M. Sole Source Aquifers

The Proposed Action complies with the Sole Source Aquifer requirements enforced by the EPA under provisions of the Safe Water Drinking Act (SWDA). There are no Sole Source Aquifers in Puerto Rico as defined by EPA in the SWDA of 1974.

N. Wild and Scenic Rivers

A review of the database published by the U.S. Forest Service (USFS) regarding the Proposed Action, disclosed the fact that it will not affect rivers designated as Wild and Scenic Rivers by National Parks Service (NPS).

O. Earthquakes

The area of the proposed action did not experience extensive damage in the aftermath of the January 7, 2020, earthquake except for some limited structural damage and the terrestrial highway network for the area did not experience significant damage. The proposed structures will be designed in accordance with stringent design codes that require the construction of earthquake resistant structures and the recommendations of geotechnical studies. Mitigation measures can be found in Section 5.3 of the EA.

P. Historic Properties

No historic properties or structures were identified along the corridor of the Proposed Action. Compliance with Section 106 of the National Historic Preservation Act was secured. As required by Section 106 of the National Historic Preservation Act (NHPA), the State Historic Preservation Office (SHPO) issued a "no historic property affected" determination for the proposed action. At a local level, the Puerto Rico Institute of Culture (PRIC) endorsed the project and required an archaeological monitoring during the construction of Sections III (AC-100071) and IV (AC-100055) due to the proximity of the remains of coffee estates to the proposed action's corridor. This requirement has been included in Section 5.3 of the EA as an Environmental Commitment.

Q. Socioeconomic Impacts and Environmental Justice

The Proposed Action complies with the Requirements of the Environmental Justice Act. There are no environmental conditions identified that would result in a disproportionately high impact adverse effect on low-income and/or minority populations. The Proposed Action will have benefits to the community because of the improved terrestrial connections, and accesses. It will also enhance community well-being by diverting through traffic away from the current PR-123 to PR-10, which includes heavy trucks. A safer and more efficient connection will be established serving as the primary access point for emergency providers and utility agencies in times of crisis.

R. Land Use and Development

The Proposed Action construction is an integral part of all regional land use plans, serving as a vital component of transportation infrastructure for the area. Its implementation will not adversely affect land use developments in the area, since the Planning Board of Puerto Rico (PRPB) and the planning and zoning regulations of Adjuntas and Utuado municipalities have acknowledged and integrated the Proposed Action corridor into their respective planning strategies. Furthermore, the lands adjacent to the Proposed Action corridor have been designated as non-developable. This project entails full access control, prohibiting any direct vehicular access to the existing lands.

S. Construction Impacts

Construction noise impacts, although temporary in nature, would occur longer in time in the mountainous sections of the Proposed Action corridor than in flatter portions of the project. Mitigation measures described in Section 5.3 of the EA will serve to control and minimize negative impacts derived by these activities.

T. Cumulative Impacts

Cumulative impacts of the proposed action are discussed in Section 5.4.2 of the EA. In general terms, the analysis demonstrates that the Proposed Action will not induce cumulative impacts to the area.

U. Mitigation Measures

Mitigation measures and environmental commitments have been adopted by PRDOH to reduce, avoid, or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with applicable regulations. The applicable mitigation measures are described and discussed in Section 5.3 of the EA. These measures must be incorporated into project contracts, development agreements, and other relevant documents. The staff responsible for implementing and monitoring mitigation measures will be clearly identified in the mitigation plan.

V. Landslide and Erosion

Due to the topographic characteristics of the Proposed Action area, it has been acknowledged that the corridor is located within the boundaries of a high landslide prone area. The DNER highlights that, given the project's route through regions prone to landslides, the final roadway design must incorporate the recommendations derived from comprehensive geotechnical and geological investigations. This is essential to minimize risks associated with these natural conditions. Specific measures in hazard areas identified on soil studies will be implemented during the project's design phase. These requirements have been included in Section 5.3 of the EA, as mitigation measures of the Proposed Action.

W. Climate Change and Greenhouse Gases

The Proposed Action will not significantly contribute to greenhouse gases emissions and climate change. Vehicular traffic volume is low and a decrease in Vehicle Miles Traveled (VMT) for both passenger and commercial freight vehicles due to its construction are predicted. This reduction is primarily the result of a shorter distance along the new PR-10 corridor when compared to the existing comparable portion of PR-123. A total annual reduction of 3,503,467 VMT is expected, thus contributing to lower emissions, and helping reduce the factors contributing to climate change.

X. Public Participation

Various public participation processes have been provided as part of the Proposed Action. In doing so, PRDOH intended to receive early comments in their evaluation process to comply with NEPA. Responses to the received comments after the publication of the draft of the Reevaluation published in June 2023 have been included in Attachment 25 of the EA. This EA process includes the provision of an additional thirty (30) day commenting period.

In summary, after reviewing the anticipated level of overall/cumulative impacts resulting from the construction activities and operation of the Proposed Action, and assessing the ability to effectively mitigate them, the agencies have reached a joint finding of no significant impact.

Chapter 1: Introduction, Regulatory Background, And Summary of Conclusions

1.1 Introduction

The Puerto Rico Highway and Transportation Authority (PRHTA) is proposing to finalize the construction of Sections II, III, IV and V of PR-10. This will connect the northern sections of the completed PR-10 to the southern sections of the completed PR-10 and will be referred to as the Proposed Action. For its construction, the Puerto Rico Department of Housing (PRDOH), proposes to provide $540,069,976.00 from the Community Development Block Grant – Mitigation (CDBG-MIT) from Grant #B-18-DP-72-0002. The funds are available resulting from the presidentially declared disaster in the aftermath of Hurricane Maria. These funds are intended to be used for projects that provide transformative infrastructure projects that will provide long-term benefits and strengthen the community's resilience to future hazards. In addition to the CDBG-MIT funds, the STIP has $2,000,000.00 of federal aid (FHWA) funds for the remaining ROW acquisition of the Proposed Action.

The planning and construction of PR-10 as a north to south roadway was envisioned by the Puerto Rico Highway and Transportation Authority (PRHTA) since the late 1960's. At inception, compliance with the National Environmental Policy Act (NEPA) required the preparation of an Environmental Impact Statement (EIS) that was finalized on May 27, 1979, as per letter of June 8, 1979 issued by the Federal Highway Administration (FHWA). Having documented compliance with NEPA (https://act.dtop.pr.gov/enlaces-pr-10-utuado-adjuntas/) and as the necessary funds became available for the proposed action construction, the PRHTA undertook the endeavor of constructing the new roadway since 1995 and which when completed, will stretch 58.0 kilometers between the Municipalities of Arecibo and Ponce. Most of the roadway has already been built but approximately 7.6 kilometers consisting of four sections remains to be constructed for the project completion.

Since its inception, the FHWA has been the lead federal agency for the PR-10 responsible for the preparation and completion of the EIS and various Reevaluations through the years until August2022 (see Attachment 1). Currently, the proposed action has been allocated funds under the Federal-Aid Highway Program (FAHP) which are included in the State Transportation Improvement Program (STIP). However, the primary funding for the proposed action will be from the U.S. Department of Housing and Urban Development (HUD) CDBG-MIT funds. The Puerto Rico Department of Housing (PRDOH) as the grantee of CDBG-MIT funds, is the Responsible Entity (RE) under the authority of 24 CFR 58.4 and assumes the responsibility for environmental review, decision making and action that would otherwise apply to HUD under NEPA and other provisions of the law, as specified in 24 CFR 58.5 Since CDBG-MIT funds will be combined with the currently allocated Federal-aid funds to finance the final sections of the PR-10 Project, FHWA and PRDOH will jointly lead the preparation of the Environmental Assessment (EA) to assess the impacts of these final sections on the human and natural environment. This assessment will ensure compliance with FHWA and HUD's requirements under 23 CFR 771 and 24 CFR 58, respectively. The EA will also be coordinated with the PRHTA, which is the CDBG-MIT subrecipient and the recipient of the FAHP. As the joint lead agencies, FHWA and PRDOH are responsible for approving the EA once it is finalized

and issuing a joint public notice of Finding of No Significant Impact (FONSI), if applicable. The issuance of the Finding will adhere to the respective agencies' public notice requirements. Should the agencies, following the completion of the EA, conclude that a Supplemental Environmental Impact Statement (Supplemental EIS) or an Environmental Impact Statement (EIS) is necessary, they will undertake the necessary actions to ensure compliance with NEPA and the relevant federal laws and regulations governing such environmental documents.

1.2 Regulatory Background

Due to recent actions to provide funding to complete design and right-of-way acquisition and advance the proposed action for construction, this EA has been prepared in accordance with NEPA regulations at CFR 1500-1511, FHWA regulations at 23 CFR 771.119, FHWA's Technical Advisory T 6640.8, and HUD's regulations at 24 CFR part 58. The FHWA and PRDOH prepared this EA to determine the significance of the impacts of proposed action of the final four sections of PR-10. The EA incorporates current applicable laws and regulations and other relevant information and/or changes to the environment to inform a complete and current analysis of impacts. The PRDOH had publicly notified in June 2023 that they would adopt the FHWA's 1979 FEIS and related re-evaluations by further re-evaluating the FEIS. The FEIS was made for public comment. Subsequently, FHWA and PRDOH, agreed that it was appropriate to perform an EA to update the analysis of the proposed action and to determine if a supplemental EIS was necessary as provided in 23 CFR § 771.130 rather than to proceed the FHWA's FEIS as the Final Draft.

The EA is a continuation of the FHWA's FEIS that was completed for the entire PR-10 highway project in late-1970s; it updates the analysis to assess if new information or circumstances, including regulations and other federal and local law relevant concerns for the remaining proposed action would result in significant environmental impacts not evaluated in the FEIS, and thus determine if a supplemental EIS is required.

1.3 Summary of Conclusions

After reviewing the Proposed Action scope, it has been determined that:

- The Proposed Action remains located within the same corridor as the alternatives analyzed for the FEIS since it remains the alternative that was selected as the preferred one. However, as the design and construction of the highway advanced with the assignment of federal funds, project design activities identified the desirability of adjusting some parts of the proposed action alignment within the area of Adjuntas – Utuado to reduce the environmental impacts pertaining to the construction activities on adjacent natural systems and/or ROW acquisition needs. Regarding the highway characteristics, no change in the concept or capacity was considered.

- Land uses along the path of the Proposed Action corridor remain relatively similar to the ones discussed in the original FEIS since the Proposed Action crosses a scattered populated area, with no significant commercial or industrial developments. The Proposed Action does not impact communities along its path, and it should be noted that the ROW acquisition has been already

completed except for some portions of Section IV. The remaining acquisitions will not require the displacement of families, nor businesses nor organizations.

- In general, it can be stated that changes in the vegetation cover of the proposed action corridor have resulted from a change in the Island economy from an agriculturally based one to an industrial/services-oriented economy. Also, it shall be noted that the existing vegetation cover, forested areas along the path of the corridor were damaged in the aftermath of hurricanes Irma and Maria in 2017, and Fiona in 2022. This fact was taken into consideration in the reevaluation of impacts and by concerned agencies before their determination to endorse the proposed action, if measures described in this document are taken during construction of the proposed action.

- Proposed action corridor development is limited to scattered residential uses resulting from the rugged terrain conditions of the area.

- Air quality for the area is good since it is classified as an Attainment area where the National Ambient Air Quality Standards (NAAQS) are met. Only minor impacts on air quality are expected for the area, mostly during the proposed action construction. Mitigation controls are to be developed to further reduce any impacts during the construction phase of the proposed action.

- A small to moderate increase in noise levels are expected during the operation of the new highways but since only a few receptors consisting of various residences, and no other type of noise sensitive locations such as schools, hospitals, daycare centers nor worship centers are located close to the Proposed Action (within 60 meters or more), no impacts requiring the development of noise abatement measures were identified. Predicted noise levels are below the 10 decibels (dBA) increase threshold that defines a substantial increase as per the FHWA Noise Policy and/or the recommended noise exposure level of 65 dBA defined in HUD regulations. The FHWA currently establishes a Noise Abatement Criteria (NAC) of 67 dBA for residential land uses.

- Wetlands impacts along the proposed action corridor are minimal and protective measures for their protection are to be implemented during the construction activities.

- A study for the assessment of forest types cleared for land development in Puerto Rico was conducted by the Colorado State University and the International Institute of Tropical Forestry of the U.S. Department of Agriculture (USDA) Forest Service (GIScience & Remote Sensing, 2007, 44, No. 4, p. 356-382). Said study concluded with some observations among which changes in landscape that have occurred in Puerto Rico between 1950's and 2000 were documented. The study, which was conducted using a time series of digitized land cover maps, concludes with the finding that the economic shift of the Island's economy from an agricultural one to an industrial one the previously intensively cultivated lands have transitioned to hay or intermittently grass cultivation. In some areas that have been left unmanaged, new forested areas have been regenerated. In other areas, such as the one subject of the proposed action, areas cleared for agricultural purposes have reverted to forest. The Proposed Action area is known to have been used in the past for the cultivation of coffee. This information is consistent with the assessment included in the EIS. After hurricane Maria, a study conducted by the Journal of Geophysical Research of January 2020 (Hosannah, N. Ramamurthy, P. Marti, J. Munoz, J., & Gonzalez, J.E. (2021), Impacts of Hurricane Maria on Land and Convection Modification over Puerto Rico)

documented the damage caused by the effects of the winds in the forested areas of Puerto Rico, including the proposed action area.

- During the construction phase of the proposed action, a qualified biologist will be present to monitor the area in accordance with field protocols that were developed and approved by the Puerto Rico Department of Natural and Environmental Resources (DNER). This includes a restriction to perform certain construction activities within the corridor during the peak breeding season (January to July) of the following bird species:

    - Puerto Rican Broad-winged Hawk (Buteo platypterus brunnescens)
    - Puerto Rican Sharp-shinned Hawk (Accipiter striatus venator)
    - Puerto Rican Parrot (Amazona vittata)

- It shall be noted that the biological monitoring conducted for the project for the Puerto Rican Broad-winged Hawk and the Puerto Rican Sharp-shinned Hawk, during the planning phase between 2013 and 2014 (as requested by the USFWS) did not disclose their presence within the proposed action corridor. The performance of these studies required the development of the current environmental conditions to identify spatial factors of the landscape that influence the organism occurrence, habitat use and movement in the landscape. This analysis was performed by using the topographic survey maps developed for the Proposed Action for the development of a Digital Elevation Model for the study area, among other techniques that are described in the report. The findings of this study have been updated with a recent review of the USFWS Information for Planning and Coordination (IPAC) database and formal consultation with the agency that will be discussed in section 5.1.7 of the EA.

- The US Fish and Wildlife Services (USFWS) recommended the adoption of Section 6.4 of the Programmatic Biological Opinion (PBO) and must be acknowledged by PRHTA and FHWA to be exempted from the "take" as defined by the Endangered Species Act (ESpA), and May Affect But Not Likely to Adversely Affect (MANLAA). This PBO became effective in 2022 and applies to the Puerto Rican boa addressing the "take" in the form of capture and relocation while conducting activities with Federal or under the jurisdiction of a Federal agency in Puerto Rico.

- The proposed action considers only one bridge crossing over the Rio Grande de Arecibo that is located within a FEMA designated A/AE flood zone. Please refer to Attachment 2, Figure 16: Flood Zone Map of the Crossing Over Rio Grande de Arecibo. To minimize the impacts on this area, a Hydrologic/Hydraulic (H/H) Study was prepared, and its recommendations incorporated in the design of the bridge. An Eight Step Decision Making Process was prepared on March 20, 2023, and was performed in accordance with 24 CFR 55.20. As a result, mitigation measures will be implemented to avoid and/or minimize impacts on floodplains and riverine wetlands located within the crossing over Rio Grande de Arecibo. Proposed action design incorporates measures to minimize adverse impacts to the water quality of the Rio Grande de Arecibo. More details pertaining to these measures have been included in section 5.2.1 of the EA.

- No historic properties or structures were detected along the path of the proposed action. As required by Section 106 of the National Historic Preservation Act (NHPA), the State Historic Preservation Office (SHPO) issued a "no historic property affected" determination for the proposed action. At a local level, the Puerto Rico Institute of Culture (PRIC) required the PRHTA

to conduct archaeological monitoring during the construction of Sections III (AC-100071) and IV (AC-100055) due to the proximity of the remains of coffee estates to the proposed action corridor.

- Review of available DNER/EPA databases for sites and/or facilities that may have managed hazardous wastes or substances which may present a risk for contamination was conducted. This analysis resulted in the identification of one parcel where the remains of a small repair shop were located within the limits of Section II (AC-100069). Due to the potential to find contaminants in this site, a Phase I Environmental Site Assessment (ESA) in accordance with the American Society for Testing and Materials (ASTM) protocols was performed for this property. This study resulted in a Recognized Environmental Condition (REC) that triggered the need to perform a Phase II investigation with intrusive soil testing. The laboratory test results of samples collected in the remains of a septic tank provided support to the statement that the potential presence of soils impacted with Volatile Organic Compounds (VOCs), Sem-volatile Organic Compounds (SVOCs), Total Petroleum Hydrocarbons (TPH) and Priority Pollutant Metals constituents either did not exceed the comparison criteria or appeared to be associated with natural metal concentrations. Therefore, the chemical constituents of concern should not present an environmental concern for the site. However, the remains of the septic system shall be closed in compliance with the closure requirements of the DNER.

- Proposed action design will incorporate hazard mitigation measures to help to mitigate potential impact to the highway from extreme rain events resulting from hurricanes and the perceived increase in the intensity and duration of rain events caused by the climate change on the Island. Examples of these types of incidents were the landslides caused by hurricanes María and Fiona. Mitigation measures to address potential landslides compromising the structural integrity of side slopes and structures will be incorporated as part of the design requirements of this highway. Therefore, it is the intention of the PRHTA to incorporate what is known as Critical Infrastructure Hazard Mitigation (Critical Infrastructure Resilience - HUD Exchange) for the design of this proposed action. Critical infrastructure refers to the assets, systems, and networks, whether physical or cyber, so vital to the Nation, that their incapacitation or destruction would have a debilitating effect on national security, the economy, public health or safety, and the way of life. Adoption of this strategy will directly reduce the risk of physical damage and service losses to the infrastructure component as well as nearby structures and utilities from one or more hazards addressed by the proposed action. Additionally, these hazard mitigation projects can indirectly reduce risk to other assets and infrastructure from multiple hazards through the interdependent nature of those assets. This interdependency, in turn, mitigates risk from human or natural hazards for persons and critical or secondary infrastructure in the area of impact.

Chapter 2: Proposed Action

2.1 Background Information

PR-10 is part of the Puerto Rico highway system and constitutes the only north-south traffic link that serves the west-central part of the Island, but which currently lacks a section of approximately 7.6 kilometers between the municipalities of Adjuntas and Utuado. Please refer to Attachment 2 (Figure 1-A) for location of PR-10 project from Arecibo to Ponce and Proposed Action from Utuado to Adjuntas. This highway, for practical purposes, constitutes the relocation of PR-123 which is a secondary highway that connects the Municipality of Arecibo to the Municipality of Ponce. The PR-123 roadway dates from the late 19th century and it started as a road to link the coffee-farming mountain of Adjuntas to the southern port of Ponce for the export of coffee. Eventually the road was completed to the smaller northern port city of Arecibo as well, connecting the mountain town of Utuado in its way. The stretch from Ponce to Adjuntas was built under the Spanish government while the remainder of the route to Arecibo was built by the United States and opened on July 1, 1904.

During the 1970's the PRHTA assessed the condition of this state road and concluded that it was inadequate to continue to serve its vital function because of its dated design and construction. This highway was constructed during the early years of the twentieth century as a primary road linking the municipalities of Arecibo, Utuado, Adjuntas and Ponce. As a result of this condition, it was designed to accommodate the needs of the mentioned municipalities for the displacement of people and freight in horse-drawn vehicles. With the advent of combustion engine vehicles, and over the span of many years of use, by the 1950's it was clear that the roadway was no longer adequate to fulfill its intended function. The road was designed for its use in the pre-auto age and cannot accommodate the geometric requirements of higher speed vehicles. The PR-123 was described as a narrow, winding two (2) lane road with inadequate provision of shoulders. The total pavement width ranged from 5.5 to 7.9 meters. Lane widths are substandard and pose a limiting factor on capacity. The Right of ROW is of inadequate width enabling the sitting of structures directly on the edge of the pavement. Side slopes are dangerously steep and hazardous fixed objects (i.e., trees, poles, etc.) are located near the edge of the pavement with no guard rail protection. Once PR-10 is completed, the old PR-123 will remain in use, basically for the residents of the areas it currently serves.

The alignment of the current section of PR-123 between Adjuntas and Utuado, constitutes the most significant limiting factor for the operation of vehicles due to the reduced speed capability of the highway. Designed to minimize earthwork cuts and fills, the existing route conforms very evenly with the existing topography. Although topographic conformance is an important design goal, the maximum operating capacity of motor vehicles is within a range of 15 to 20 miles per hour (mph). Additional operational constraints identified for the operation of PR-123 are:

- Horizontal and vertical alignments are substandard with respect to bridges, delineators, steep-grades, drainage, shoulders, intersections, site distance, side slopes and super-elevation.
- Horizontal radii are extremely short.

- Vertical grades are often too long, and too steep.
- Combined horizontal and vertical alignments are improperly coordinated.

Traffic movement in characteristics of the existing PR-123, limit the capacity and safety of the roadway. Stopping and passing sight distances are inadequate for a primary transportation link. Excessively long and steep upgrades tend to reduce the operating speed of heavy trucks disproportionately to those of cars. An associated lack of adequate sight distance contributes to a situation where unsafe passing conditions occur, or the faster cars are confined to follow slower trucks. At-grade intersections also have substandard sight distances. Many of the intersections mentioned also have sharp angles and no provisions for traffic distribution.

Average capacity analysis of PR-123 was also conducted and provided support that from a standpoint of transportation, the highway was operating at below capacity resulting from its substandard design condition with a determined Level of Service (LOS) assessment of F, with an average operating speed of 30 mph or less as defined by the Highway Capacity Manual (HCM). The LOS of a roadway is a quality measure describing operational conditions within a traffic stream, generally in terms of service measures such as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. The LOS of a facility is described with a letter, varying from A to F. A is assigned to imply the best operating condition of a highway and F the worst. Transportation engineers use the latest version of the HCM or the Transportation Research Board's Circular 212 for the analysis of Congestion Management Process (CMP) roadways. A LOS of C is acceptable for highways like PR-123. A LOS F is considered the worst level that may be assessed for the operation of a highway. This condition was further supported by the fact that a high rate of accidents has been reported on this roadway.

After confirming the hazardous and substandard operating conditions of PR-123, and during late 1960's and early 1970's, the PRHTA retained the services of transportation engineering firms to assess and investigate possible alignments to construct a new and modern highway in the vicinity of the existing PR-123. Primary consideration for the identification of alternate alignment routes took into consideration the displacement of homes, businesses, and farms; required earthwork activities, drainage, and economic impacts. This effort resulted in the identification of three (3) advanced alignments that were included in a Route Location Study and Reconnaissance Report (April 29, 1969).

Once the possible alignments were identified, the PRHTA started the planning and performance of the environmental studies for the construction of the PR-10. Since the funding for the construction of the new roadway was being provided by the FHWA, compliance with the requirements of the NEPA was mandatory. The FEIS for PR-10 was approved by the FHWA on March 30, 1979. The proposed action and selected alternative for PR-10 consisted of the construction of a 58.0 kilometers highway with partial access control starting from PR-22 (De Diego Expressway) at km. 60.2, located toward the south-east part of the town of Arecibo to the existing PR-10 located to the north part of the town of Ponce (in 1974).

As funding for the construction of the highway became available, PRHTA started the construction of PR-10, on a section-by-section basis. Its construction began at the northern and southern sections of the Proposed Action alignment. Due to the protracted construction schedule of this Proposed Action, prior to the initiation of each section or grouped sections of the new highway, a reevaluation to verify the findings of the original FEIS, and to update the findings and environmental commitments was prepared. Maps for the FHWA and the PRHTA illustrating the location of the Proposed Action area in the context of the Island and sections of PR-10 already constructed have been included in Attachment 2 (Figures 1 and 2). The remaining sections of PR-10 whose construction is being addressed by this report are section II (AC-00069), Section III (AC-100071), Section IV (AC-100055) and Section V (AC-100076). These sections were previously reevaluated on August 8, 2022, by the FHWA. See Attachment 2 (Figure 1-A).

Also, it shall be noted that the limitations for the use of the current PR-123 in the aftermath of recent natural disasters, such as hurricane Maria, have exposed the limitations of the current PR-123 operational condition as a safe and reliable evacuation route to provide assistance, and some cases an evacuation route, for the nearby communities.

Existing Conditions and Trends of PR-123 and Vicinity

The Proposed Action area is located within the mountainous center part of the Island, where past agricultural uses were significantly reduced during the middle of the past century. This condition and the rugged topographic characteristics of the terrain have constrained the urbanization trends that occurred in other parts of Puerto Rico which is evidenced by observing the aerial photographs that illustrate the alignment of the Proposed Action included in Attachment 2. Residential uses along the alignment remain scarce as well as commercial and industrial ones. This trend is not anticipated to change any time soon as local planning regulations require that some conditions must be met as required by local land use regulations and most of the terrains of the Municipalities of Adjuntas and Utuado have restrictions for their development.

A review of recent available socio-economic characteristics of the population data for the area obtained from the U.S. Census (see section 5.1.17) depict a population with low per capita income and exhibiting a general trend toward its reduction, a condition that may have been exacerbated by the occurrence of recent hurricanes through the Island. Information obtained from this source also indicates that the existing population along the path of the Proposed Action corridor is basically homogeneous in terms of ethnicity and has a low per capita income (which is common for the center region of the Island). It is important to note that the Proposed Action area shares the trend toward the reduction in population that is also being observed for the rest of the Island. This observation is particularly noticeable in the Municipality of Utuado, where the reduction in population has been estimated at approximately 14.7% between 2010 and 2020. It is important to indicate that the ROW acquisition for the construction of the proposed action has been completed except for Section IV. No relocations of families and/or businesses are required for the remaining acquisitions.

Traffic studies performed in 2021 determined that the daily existing traffic through PR-123 was low and would remain low through 2045, at approximately 4,183 vehicles per day for 2019 and 4,430 in 2025

respectively, when the new highway section was projected to be in operation. For the year 2045 the forecast estimated that 5,254 daily vehicles would travel through existing PR-123. Given the decline in population and employment, total travel demand in the subarea is expected to decline in future years, representing an increase between 1.0 and 1.2%.

In a two-lane highway configuration, as exhibited by PR-123, with one lane for use by traffic in each direction, passing of slower vehicles requires the use of the opposing lane. As volumes of traffic or geometric constraints increase, the ability to pass slow vehicles decreases and platoons of vehicles are formed. As the delays experienced by motorists increases, the LOS worsens to D or F. After the approval of the FEIS, the geometric conditions of existing PR-123 have not changed significantly since the roadway alignment is located within a mountainous region and an its initial design did not consider the traffic of modern vehicles. Based on the geometric conditions of the existing roadway, and collected traffic data, the LOS of current PR-123 has not been improved and remains constrained.

2.3 Proposed Action

The Proposed Action is the construction of the remaining four (4) sections of the PR-10 between the municipalities of Adjuntas and Utuado. A brief description of each section follows:

Section II (AC-100069)

This section of the highway consists of the construction of PR-10 between civil stations 39+78.73 and 55+50.36 with a total length of 1.571 km. It runs southeast alongside the Rio Grande Arecibo in the Guaonico neighborhood in the Municipality of Utuado. The highway's typical section consists of an undivided highway with one (1) traffic lane of 3.65 meters in each direction, with an additional climbing lane in the southbound direction toward Adjuntas. An exterior shoulder of 3.0 meters is provided in the northbound lane, while a 1.80 meters shoulder is provided in the southbound lane.

As part of this section, three (3) concrete bridges (BR-1, BR-1A and BR-1B) will be constructed and whose construction will help minimize the use of fill material, therefore will help to minimize environmental impacts associated with earthwork activities on the adjacent natural systems (such as the Rio Grande de Arecibo). As a result of the rugged characteristics of the topography of the area, drainage improvements in the form of berms, pipe crossings, pipes, catch basins, headwalls, and manholes will need to be incorporated into the highway design. The bridge structures are proposed at the following locations:

- Bridge BR-1 near station 41+01.05 with a span of 149 meters (location coordinates: 18.234, -66.719)
- Bridge BR-1A near station 44+71.00 with a span of 99 meters (location coordinates: 18.231, -66.719)
- Bridge BR-1B near station 50+96.50 with a span of 80 meters (location coordinates: 18.223, -66.718)

Bridge BR-1 crosses over the Rio Grande de Arecibo.

Section III (AC-100071)

This section of PR-10 joins the previous section and runs southeast alongside Rio Grande de Arecibo for 1.839 kilometers. The typical section of the highway consists of an undivided highway with one (1) traffic lane of 3.65 meters wide per direction and an additional climbing lane in the southbound direction to Adjuntas. An exterior shoulder of 3.0 meters will be provided in the northbound section, while a 1.80 meters shoulder is being provided in the southbound lane.

As part of this section, five (5) concrete bridges will be built since the existing site topography requires them. The bridges structures are proposed at the following locations:

- Bridge BR-2 near station 56+25.00 with a span of 140 meters (location coordinates: 18.223, -66.722)
- Bridge BR-3 near station 61+25.00 with a span of 180 meters (location coordinates: 18.223, -66.727)
- Bridge BR-3A near station 66+20.00 with a span of 110 meters (location coordinates: 18.220, -66.729)
- Bridge BR-3B near station 70+10.00 with a span of 190 meters (location coordinates: 18.216, -66.728)
- Bridge BR-3C near station 72+00.00 with a span of 130 meters (location coordinates: 18.215, -66.728)

Section IV (AC-100055)

This section of PR-10 continues its extension toward the Capaez Ward of the Municipality of Adjuntas. It runs for approximately 2.295 kilometers alongside the Rio Grande Arecibo. As with previous sections, the typical section of the highway consists of an undivided highway with one (1) traffic lane of 3.65 meters per direction, with an additional climbing lane southbound toward Adjuntas lane. An exterior paved shoulder of 3.0 meters is provided in the northbound lane, and a 1.80 meters shoulder is also provided in the southbound lane.

The construction of seven (7) concrete bridges is also required for this section of the highway. The bridges structures are proposed at the following locations:

- Bridge BR-4 near station 77+95.00 with a span of 129 meters (location coordinates: 18.212, -66.732)
- Bridge BR-4A near station 79+85.00 with a span of 115 meters (location coordinates: 18.210, -66.733)
- Bridge BR-4B near station 81+45.00 with a span of 50 meters (location coordinates: 18.209, -66.733)
- Bridge BR-5 near station 84+20.00 with a span of 105 meters (location coordinates: 18.207, -66.735)

- Bridge BR-6 near station 86+30.00 with s span of 134 meters (location coordinates: 18.205, -66.734)
- Bridge BR-7 near station 90+20.00 with a span of 160 meters (location coordinates: 18.202, -66.734)
- Bridge BR-8 near station 92+40.00 with a span of 80 meters (location coordinates: 18.200, -66.734)

Section V (AC-100076)

It will have an approximate length of 1.832 kilometers and will interconnect Section IV with the already constructed PR-10 in the Capaez Ward of the Municipality of Adjuntas. As with previous sections, the typical section of the highway consists of an undivided highway with one (1) traffic lane of 3.65 meters per direction, with an additional climbing lane southbound toward Adjuntas lane. An exterior paved shoulder of 3.0 meters is provided in the northbound lane, and a 1.80 meters shoulder is also provided in the southbound lane.

This last section of the highway requires the construction of four (4) concrete bridges. Those bridges structures are proposed at the following locations:

- Bridge BR-9 near station 97+10.76 with a span of 284 meters (location coordinates: 18.196, -66.735)
- Bridge BR-10 near station 103+72.58 with a span of 84 meters (location coordinates: 18.191, -66.738)
- Bridge BR-11 near station 105+85.42 with a span of 154 meters (location coordinates: 18.189, -66.738)
- Bridge BR-12 near station 109+63.89 with a span of 315 meters (location coordinates: 18.185, -66.738)

It is important to indicate that all the sections of PR-10 herein remain located within the preferred alignment of the FEIS that was modified through various re-evaluations. Current bridge's location data is possible since the design has advanced with respect to its previous status. Therefore, the current Proposed Action description incorporates details of the latest designs. An aerial photograph illustrating the alignment of the Proposed Action has been included in Attachment 2 (Figures 3 and 4) providing details about the typical cross sections of the proposed highway.

It is important to indicate, that land uses related with commercial/industrial/residential areas, except those related with agricultural uses across which this highway corridor traverses, have not changed in a significant way after all these years since the rugged topography of the area has severely constrained its potential for development, and the ROW of sections II, III, and V have been already acquired through the years. As a result of this fact, no recent significant types of developments have been constructed along the path of the alignment since the original environmental clearance document was approved. The area can be described as rural with scattered residential structures located close to the existing tertiary roads that have been built in the area, for locals' access. A review of available data indicates that no institutional

uses, such as schools and medical facilities, will be affected by the Proposed Action. Additional information pertaining to conditions of the natural systems located along the path of the Proposed Action and results of more recent studies performed at the request of the DNER/USFWS is included in Chapter 3 of this report.

2.3 Planning Consistency

The proposed action has been included in the FY 2023-2026 Statewide Transportation Improvement Program (STIP) – Amendment #1 approved by the FHWA and the Federal Transit Administration (FTA) on May 12, 2023. The Proposed Action has programmed funds for completion of ROW acquisition of its section IV, which appears in page FHWA-4 of the Amendment #1 Table (see Attachment 3).

Also, it shall be indicated that PR-10 is a part of the freight network of Puerto Rico as per the 2050 Long Range Multimodal Transportation Plan (LRMTP) which defines the state strategies for the enhancement and protection of these highways. Because of this reason, completion of the construction of PR-10 is necessary to comply with this local transportation planning strategy. Since this network provides a key connection between the freight facilities and the distribution centers, one of the adopted strategies is to enhance such accesses. The completion of this Proposed Action serves to fulfill this state transportation goal.

Chapter 3: Purpose and Need for the Project

3.1 Project Purpose

PR-10 corridor connects Arecibo and Ponce providing the 2nd most important North-South route of the Island after PR-52. The existing connection between Utuado and Adjuntas is the PR-123, a 12.0 Km low-capacity winding road corridor. Travel time today from Arecibo to Ponce is approximately 1 hour and 5 minutes but with the construction of the missing section between Utuado and Adjuntas it may be reduced to 45 minutes. This Proposed Action will significantly decrease the overall cost of moving people and goods and travel time, especially during a natural disaster like Hurricanes Maria and Irma. The Proposed Action would also help increase the resilience to disasters and reduce the long-term risk of loss of life, injury, damage and loss of property, and suffering and hardship, by lessening the impact of future disasters.

Numerous transportation studies conducted by the PRHTA through the years dating back to the late 1960's have disclosed the need to improve the north and south terrestrial connection originally served by PR-123, an old highway designed in compliance with requirements predating the advent of combustion propelled vehicles. Therefore, the PR-123 operates under substandard and unsafe conditions that after an extensive engineering analysis and environmental clearance process conducted in the late 1970's, resulted in the proposal to build a safer and efficient roadway that was identified as PR-10. This new highway for practical purposes constitutes the relocation of PR-123. Through the years, sections of PR-10 have been constructed as a function of the availability of funds, with a section of 7.6 kilometers remaining to be constructed and which constitutes the Proposed Action for the purpose of this EA. The remaining

part of the Proposed Action between the Municipalities Adjuntas and Utuado, which for the purposes of construction has been subdivided into four (4) sections, would serve to complete the entire relocation of PR-123 as originally envisioned. Therefore, the Proposed Action purpose is to complete the terrestrial interconnection of the north section of PR-10 in operation between Arecibo and Utuado and the south section of PR-10 in operation between Ponce and Adjuntas. In summary, the construction of the proposed action will serve the following purposes:

- Provide a modern, fast and safe highway to communicate the north and the south of the island.
- Promote the economic development of the region and all of Puerto Rico.
- Connect the industrial and agricultural areas of the central north with the Port of Ponce, PR's second most important domestic port which would be critical in case of disruptions in the operation of the main port of San Juan due to natural disaster.

3.2 Project Need

Once completed, PR-10 would serve to satisfy the following needs:

- Finalizing the establishment of a terrestrial link from north to south, aimed at enhancing accessibility and mobility for existing PR-10 users. This connection will also function as the secondary primary corridor for the north and western regions of the island after considering that PR-52 constitutes the main north to south terrestrial corridor.
- To establish a secure and resilient infrastructure that mitigates the impact of future natural disasters, in accordance with the latest construction standards outlined in the AASHTO Design and Construction of Highway and Bridges.
- Providing a safer and modern route for its current and future users. Statistics obtained from the National Transportation Safety Board (NTSB), indicate that between 2014–2018, a total of 832 accidents occurred in the section of PR-123 subject of this project.
- Construction of a resilient terrestrial corridor required as a measure aimed to prioritize mitigation of risk, a key lifeline asset that in the aftermath of a disaster event, contributes to the Island's resilience. Transportation assets, including points of entry at airports and seaports and connecting road networks, are essential for the movement of people and goods throughout Puerto Rico, before, during, and after a disaster event. The freeways and primary roadways are responsible for the movement of most of the population in Puerto Rico as well as freight daily. The secondary, tertiary, and municipal roadways provide access to neighborhoods, residences, and community assets.
- Pertaining to the above-described Proposed Action need, it is important to note that in the aftermath of Hurricane María in 2017, entrance of food, medical supplies, equipment, that were shipped to the Island through the Port of San Juan (which is the primary port of Puerto Rico) was negatively impacted. Due to this condition, the unloading of critical supplies was negatively

impacted and resulted in a delay in their deployment. The Port of Ponce, which is being developed by the Municipality of Ponce, is directing their efforts to complete the development of what has been designated as Port of Las Americas. This Proposed Action, when completed, will serve to provide a second point of entrance for supplies and assistance needed to respond to future natural disasters as well as to supplement to operation of the Port of San Juan. Therefore, completion of PR-10 will serve to provide a much needed alternative corridor for the distribution of supplies toward the north and northwest part of the Island.

- A completed PR-10 will constitute part of the Island's components of the transportation network that is considered as a critical corridor that serves to connect communities in Puerto Rico to critical ingress/egress routes and necessary supply chain circulation. These corridors are Puerto Ricans' main connections to their work, food, healthcare, community, and the ports. They are the routes by which supplies are moved around the Island, including food, fuel, and medicine. Though many main highways in the primary road system were intact following the recent hurricanes, many internal roads of the secondary and tertiary systems located within the central part of the Island were closed, limiting citizens' access to everything from fresh drinking water to medical assistance.

The absence of the PR-10 highway section between Utuado and Adjuntas became a significant impediment to the swift recovery of the region following the devastating Hurricanes Irma and Maria in September 2017. The lack of an efficient ground communication system delayed emergency and healthcare responses, resulting in loss of life during and in the aftermath of these hurricanes. Numerous landslides along PR-123, coupled with power outages, water scarcity, and a deficient communication network, collectively led to economic losses for the region.

The extensive landslides that obstructed PR-123 during Hurricanes Irma and Maria in September 2017 disrupted the provision of essential services and supplies to the communities in the Municipalities of Utuado and Adjuntas. Residents had to search for alternative routes to access food and medical care in a desperate fight for survival. Vital services such as electricity, clean water, and sustenance were scarce, while rescue teams struggled to reach the disaster-stricken areas. The construction of the PR-10 sections will ensure the continuity of essential services during future natural disasters, enabling first responders, utility companies and supporting organizations to access affected areas swiftly and safely.

When PR-123 becomes unavailable, a detour must be taken using alternate routes PR-135, PR-129 and PR-111 which increases travel time from 23 minutes to 1 hour and 20 minutes. The construction of the PR-10 highway (Utuado – Adjuntas), as a replacement for the PR-123 section will provide assurance that the challenges experienced during and after Hurricanes Irma and Maria, including the scarcity of essential services, will not reach the same magnitude in future natural disasters.

Upon completing the specified enhancements, PRHTA conducted an analysis of the current state of PR-123. The findings indicate that achieving significant improvements to the existing PR-123 without causing substantial impacts on local communities and the environment is not feasible. The exploration of design and construction considerations aimed at enhancing the roadway's geometry to meet contemporary safety standards yielded the following conclusions:

- Achieving the desired improvement in the highway geometry of PR-123 to meet the latest safety standards would require extensive cut and fill operations. However, these activities would have a considerable impact on nearby residents and commercial establishments.

- The implementation of the required enhancements to PR-123 would entail significant displacement of families.

- Construction activities associated with this alternative would adversely affect the mobility of current PR-123 users for a very long period of time.

- The use of existing roadways as temporary detours during construction, as a mitigation measure, is not feasible due to their non-existence or would result in excessively long travel times for current users of this corridor.

Chapter 4: Alternatives

4.1 No Action

The no action alternative considers that the existing PR-10 would not be completed and PR-123 would remain as the only terrestrial connection for vehicular traffic in operation between the municipalities of Adjuntas and Utuado. This would continue the substandard and unsafe operating conditions of PR-123 and would continue to jeopardize the possibility of improving current accessibility and mobility limitations for the users of the existing terrestrial highway corridor. This in turn would result in the following negative impacts:

- Lack of a safe and reliable North – South corridor for the western part of the Island.
- Incomplete terrestrial freight transportation network for the western part of the Island
- Unreliable accessibility for the transportation of materials and first responders in the aftermath of a natural disaster (I.e., hurricane, earthquake, etc.)

4.2 Alternatives

A description of the alternatives that were analyzed to address the Proposed Action need follows.

4.2.1 Alternative 1 – Improvements to existing PR-123 between Adjuntas and Utuado

As described in the background section of this document, the alignment of PR-123 constitutes the most significant limiting factor for the operation of vehicles imposed by the reduced speed capability of the highway. Originally designed to minimize earthwork cuts and fills, the existing route conforms very evenly with the existing topography. Although topographic conformance is an important design goal, the maximum operating capacity of motor vehicles that use this roadway is limited to a range of 15 to 20 miles per hour (mph). Additional operational constraints that were identified for the operation of PR-123 are:

- Horizontal and vertical alignments are substandard with respect to bridges, delineators, steep-grades, drainage, shoulders, intersections, site distance, side slopes and super-elevation.
- Horizontal radii are extremely short.
- Vertical grades are often too long, and too steep.
- Combined horizontal and vertical alignments are improperly coordinated.

The current state of traffic flow on PR-123 is adversely affecting the road's capacity and safety. In particular, insufficient stopping and passing sight distances are creating unsafe conditions for overtaking, leading to instances where vehicles are forced to tail slower trucks. This is a concerning issue for primary transportation routes.

Moreover, the presence of excessively long and steep inclines disproportionately reduce the operating speed of heavy trucks compared to that of cars. In addition, the inadequate sight distance exacerbates the problem, giving rise to unsafe passing situations or compelling faster vehicles to trail slower trucks. The at-grade intersections compound the issue by having below-standard sight distances. Furthermore, many of these intersections feature sharp angles and lack provisions for efficient traffic distribution.

To improve to the maximum extent possible, the existing operational conditions of PR-123 between km. 37.0 (in Adjuntas) and km. 53.0 (in Utuado), the PRHTA developed various improvement projects. These projects were constrained by the limitations imposed by the current ROW and the rugged topography of the area and were required to maintain the integrity of the terrestrial interconnection between Adjuntas and Utuado. A brief description of the activities performed by the PRHTA for this roadway follows:

Improvements

In year 2000, the PRHTA planned a geometric improvement project for PR-123 between Adjuntas and Utuado with an estimated length of 16.0 kms. The following improvements were proposed:

- Where possible, increase the width of the two (2) lanes from 3.35 m. to 3.65 m. This was necessary to provide more space for vehicular traffic flow since the existing widths are lower than the minimum recommended.
- Where possible, provide an emergency paved shoulder.
- Where possible, improve the curve ratio on areas exhibiting extremely close radius.

The Proposed Action goal was to improve the safety of the roadway to its users to the extent possible, considering the physical constraints imposed by the existing geologic, soils, and abrupt topography of the roadway corridor.

A review of PRHTA Construction Department disclosed the fact that projects AC-012315, AC-012316 and AC-012316 were completed between 2002 and 2004 by the PRHTA to improve the traffic conditions of PR-123.

Repairs

In the aftermath of Hurricanes Irma and María (2017), PR-123 (between kms. 37.0 and 53.2) experienced embankment washouts, landslides, damages to traffic signs that required the PRHTA to develop repair projects at the following locations:

Table 1: Summary of Repair Projects of PR-123

Damage ID	Location	Description
PR-123-S-01	Km. 37.4 to 37.8	Landslide due to heavy rain
PR-123-S-02	Km 38.7 to 47.3	Landslide due to heavy rain
PR-123-N-06	km 50.8	Partial road washout
PR-123-N-05	km 50.6	Road washout
PR-123-N-04	km 48.8	Embankment washout
PR-123-N-03	km 48.5	Embankment washout
PR-123-N-02	km 48.4	Partial road washout
PR-123-N-01	km 48.24	Partial road washout
TS-33	km 38.0-48.0	Damage to traffic signs and guardrails.
PR-123-S-03	Km. 42.0, 44.1, 44.3	Partial road collapse

After completion of the described improvements, analysis of the current condition of PR-123 by PRHTA have concluded that significant improvements to current PR-123 are not possible without resulting in significant impacts on the communities and environment. Efforts to define appropriate design and construction considerations that may serve to improve the geometry of this roadway to meet current design standards concluded that:

- Significant cut and fill operations would be required to significantly improve the geometry of the highway up to the latest standards of safety recommended by design codes. These activities would have a significant impact on nearby residents and commercial uses.

- Significant displacement of businesses/families would be required to accommodate the required and improved PR-123.

- Construction activities for this alternative would impose significant temporary negative impacts for the mobility of current users of PR-123.

- Existing roadways that may be used as temporary detours during the construction activity as a mitigation measure are non-existent or would result in excessive travel times for current users of this corridor.

With respect to resilience, this alternative does not serve the need of maintaining a critical access route required in the aftermath of natural disasters such as earthquakes, hurricanes, and landslides for communities served by current PR-123, since it will be blocked for vehicular traffic. The required access

of crews to provide immediate assistance for disrupted infrastructure repairs (i.e., electric lines, potable water, etc.), medical supplies and evacuation routes will not be warranted with this alternative due to the physical, geological and soil conditions of its corridor.

4.2.2 Alternative 2- Construction of a new highway connecting existing sections of PR-10 that was selected as the preferred alternative of the FEIS and its subsequent reevaluations

This alternative considers the construction of a new highway connecting the north and south sections of PR-10 currently in operation. The alternative alignment considered in the EA considers the preferred alignment that was discussed and analyzed in the 1979 FEIS and the subsequent reevaluations. Therefore, it is important to indicate that this alternative remains located within the same corridor of those alternatives analyzed for the FEIS. The current Proposed Action alignment has evolved as a function project design activities that identified the desirability of adjusting some parts of the Proposed Action alignment. The selected alignment has been adjusted as required to reduce the environmental impacts resulting from the construction activities, protection of adjacent natural systems and/or ROW acquisition needs. However, with respect to the highway characteristics, no change in the concept or capacity was considered.

The latest noticeable adjustment of the Proposed Action alignment occurred in 2002 and its scope was presented to the public and government agencies (including the EQB and FHWA) on March 19, 2002, during a public meeting. The adjustment started with a portion of the highway alignment near the Municipality of Utuado, which resulted in a reduction of the volume of earthwork activities required for the construction activities. This adjustment required realigning a portion of the highway toward the east when compared to the revised 2B alignment considered in the FEIS and basically occupies the alignment identified as 2A of the FEIS. Therefore, it is appropriate to indicate that this alignment remains within the corridor of alternatives analyzed in the original EIS document. Environmental benefits of this alignment adjustment are the reduction of the impacts of the earthwork activities which ultimately result in a temporary increase of the sedimentation and turbidity of the Rio Grande de Arecibo water quality. After receiving the comments from agencies and the public, an update of the conditions of the corridor of the Proposed Action was conducted. These included the performance of updated consultations with the DNER, PRIC, SHPO and the USFWS. The updated Proposed Action realignment required to prepare a Reevaluation for the concurrence of the FHWA and a recertification of the FEIS from the EQB (see Attachment 4), both of which were approved. A figure illustrating the mentioned realignment and DEIS alignments with respect to the ones described in the FEIS of the Proposed Action alignment is included in Attachment 2 (Figures 5 and 6 respectively). This alignment has been basically maintained up to present for the continuation of the Proposed Action construction as may be observed from the figure that illustrates the various alignments considered in the analysis as well as the consultations with the required agencies. For the latest presentations, computer generated drawings over imposed on aerial photographs have been used, therefore providing more accurate representation of the alternatives used for the analyses.

This herein described alternative (see Attachment 5) considers the construction of a new highway which is designed incorporating the required horizontal and vertical alignments recommended by the American Association of State Highway and Transportation Officials (AASHTO) standards with a design speed of 50 mph. The 7.6-kilometer section is designed to comply with the requirements of the latest construction codes of AASHTO Design and Construction of Highway and Bridges to provide a resilient facility for future natural events (storms, hurricanes, and earthquakes). The alternative consists of the construction of a new roadway facility including 20 bridges spanning over 20-30 creeks and water bodies along one of the steepest terrains in Puerto Rico. Those bridges will provide free flow to the storm runoff water which is the major causes of erosion and landslides of the highway embankments. It is important to indicate that from a transportation perspective, the logical termini of the alternative are imposed by the ending points from Arecibo to Utuado (north section) and from Ponce to Adjuntas (south section) of PR-10 already constructed and in operation. The alignment of this alternative was assessed in the original FEIS prepared for the Proposed Action and has been adjusted through the years to minimize environmental impacts associated with its construction, particularly those related with the earthwork activities and impacts on flora/fauna species of the area. During this process, federal and local environmental agencies have been providing their expertise and knowledge to maintain the validity of the findings. Therefore, it can be stated that the proposed action corridor has been extensively studied. The alignment crosses mostly vacant rural areas.

The typical section of the highway consists of two 3.65 meters lanes and 1.80-meter shoulder in the uphill sections and one 3.65-meter lane and 3-meter shoulder in the downhill sections. The steep cuts will be reinforced with soil nails system which will protect the roadway against landslides and reduce the volume of cuts resulting in reduced environmental impacts.

This alternative starts at its intersection with PR-10 in the vicinity of the town of Utuado and runs toward the south until reaching Rio Grande de Arecibo, where it turns toward its west side and then running all the way up to the south section of PR-10 that is located toward the northeast side of the town of Adjuntas.

4.2.3 Alternative 3 – Alternative Considered but not Selected for Detailed Study

An additional alternative that was considered as part of the planning of the Proposed Action but was eliminated upon detailed study and evaluation, is the adoption of a mass transit system. A brief description of this alternative follows.

A mass transit alternative is considered a mode of transportation that can move many people at once. It is often used as an alternative to personal vehicles, which can cause traffic congestion and air pollution. Some examples of mass transportation alternatives include:

- Buses: Buses are a common form of mass transportation in many cities. They are relatively inexpensive to operate and can carry many passengers at once. Some cities have dedicated bus lanes to help buses move more quickly through traffic.

- Trains: Trains are another popular form of mass transportation. They can carry many passengers over long distances and are often faster than buses. Some cities have commuter trains that run between the suburbs and the city center.

- Subways: Subways are underground trains that run on tracks. They are often used in large cities where space is limited. Subways can carry many passengers quickly and efficiently.
- Light rail transit (LRT): LRT systems are like subways, but they run above ground on tracks. They are often used in smaller cities or suburbs where a full subway system would not be practical.

- Bus rapid transit (BRT): BRT systems are designed to be faster and more efficient than traditional bus systems. They often have dedicated bus lanes and stations that allow passengers to board quickly.

Each mode of the described mass transit modes has its own advantages and disadvantages, and the best option will depend on the specific needs of the city or region.

Locally, there are various modes of motorized public transportation which are currently in use in Puerto Rico. Among them are the heavy rail (Tren Urbano), local buses, trolleys, públicos, and taxis. Buses and trolleys are typically owned by specific municipalities and thus operate exclusively within their jurisdictions while públicos are privately owned and have an expanded coverage area. In addition to the Tren Urbano rail line, the PR Department of Transportation and Public Works (DTPW) operates the Metropolitan Bus Authority (MBA) fixed bus route system within the San Juan Metropolitan area, and therefore, there are no MBA bus routes serving the Adjuntas and Utuado area. Upon analysis of the rural characteristics of the Proposed Action area and existing infrastructure, it was determined that consideration of a mass transit system is not compatible with the PRHTA purpose and need for the Proposed Action. After analysis of considered alternatives, it was determined that:

- Alternative 1 is not deemed appropriate for the benefit of residents living along the path of the Proposed Action corridor as well as current and future users of PR-10. Operating conditions of PR-123 will continue to deteriorate. This alternative does not provide for improvements in its operation resulting from landslides, therefore the threats to its operation will remain.

- Alternative 3 was analyzed but not considered as feasible for the Proposed Action area since it would not serve as an additional needed access to the Port of Ponce and would not provide access to emergency response vehicles, personnel, etc. to communities during a disaster since they would not be operational. This alternative does not provide adequate protection from the effects of landslides.

- Alternative 2 is considered as the preferred alternative and thus identified as the proposed action to be analyzed in this document for compliance with NEPA. It is important to indicate that the design of this alternative design will incorporate measures to prevent and/or minimize the disruption of the roadway operation resulting from landslides.

Chapter 5: Compliance with FHWA and HUD Environmental Laws and Regulations

The first section of this chapter documents compliance with federal laws and authorities listed in HUD Environmental Review Procedures at 24 CFR Part 58 and applicable FHWA environmental regulations in 23 CFR 7712 for the construction of Sections II, III, IV and V of PR-10 between the municipalities of Adjuntas and Utuado, Puerto Rico. The second portion of this chapter addresses the adequacy of other environmental issues areas considered under NEPA.

5.1 Compliance with 24 CFR §58.5, and §58.6 Laws and 23 CFR 771.119 and other Environmental Laws

All compliance specifics for HUD requirements are shown in **Attachment 6** – HUD Environmental Evaluation Assessment Form.

5.1.1 Airport Hazards 24 CFR § 51, Subpart C and 24 CFR 58.6 (d)

Regulatory Requirements

It is HUD's policy to apply standards to prevent incompatible development around civil airports and military airfields. See 24 CFR 51, Subpart D.

Impacts Associated with the Proposed Action

There are no impacts. The closest Civil Airport (Mercedita, in Ponce) is approximately 25.2 km southeast of the Proposed Action site (outside of the 2,500 feet regulated distance for the Runway Protection Zone). The closest Military Airport is the Joint Civil-Military airport (Luis Muñoz Marin, in Carolina), which is approximately 73.3 km northeast of the Proposed Action site (outside of the 15,000 feet regulated distance for the Accident Potential Zone). A location map illustrating the location of the closest airport with respect to the Proposed Action site has been included in Attachment 2 (Figure 7).

Affected Environment and Regulations Update

This Proposed Action complies with Airport Hazards requirements since neither civil nor military airports are located within the range of the runway protection zone. No mitigation is required.

5.1.2 Coastal Barrier Resources 24 CFR § 58.6 (c) and CFR 771.119

Regulatory Requirements

The Coastal Barrier Resources Act (CBRA) of 1982 designated relatively undeveloped coastal barriers along the Atlantic and Gulf coasts as part of the John H. Chafee Coastal Barrier Resources System (CBRS) and made these areas ineligible for most new Federal expenditures and financial assistance. The Coastal Barrier Improvement Act (CBIA) of 1990 reauthorized the CBRA and expanded the CBRS to include undeveloped coastal barriers along the Florida Keys, Great Lakes, Puerto Rico, and U.S. Virgin Islands.

Impacts Associated with the Proposed Action

The closest Coastal Barrier Resource System Unit is PR-58P, an Otherwise Protected Area, is approximately 21.8 km south of the southern terminus of the Proposed Action site. A map showing the distance between the Proposed Action site and the nearest coastal barrier resource system has been included in **Attachment 2** (**Figure 8)**.

Affected Environment and Regulations Update

The proposed action complies with the Coastal Barrier Resource System requirements.

5.1.3 Flood Insurance 24 CFR § 58.6

Regulatory Requirements

The Flood Disaster Protection Act of 1973 and National Flood Insurance Reform Act of 1994 (42 USC 4012a) requires flood insurance for projects receiving federal assistance and located in an area identified as a Special Food Hazard Area (SFHA) on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRMs). The SFHA is the area where the National Flood Insurance Program's floodplain regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

Impacts Associated with the Proposed Action

The Proposed Action area crosses the 100-year floodplain zone A/AE zone at only one location, the site of the bridge crossing the Rio Grande de Arecibo near the northern terminus of Section II) at approximately Latitude 18.234500 N and Longitude 66.719402 W. The Flood Insurance Rate Map (FIRM) panel applicable to this crossing is 72000C1080H dated 4/19/2005. It shall be noted that roads are not insurable structures under current NFIP coverage provisions. Figures 16 A and B, included in Attachment 2 illustrate the Proposed Action location map and the FIRM.

Affected Environment and Regulations Update

Flood insurance is not required, since NFIP does not provide flood insurance for roads and/or bridges. Therefore, the Proposed Action complies with flood insurance requirements.

5.1.4 Clean Air 24 CFR § 58.5 (g), 23 CFR 771.119 and 40 CFR Parts 51 and 93

Regulatory Requirements

Clean Air Act, Sections 176 (c) and (d), and 40 CFR Parts 6, 51, 9 apply to all federal actions. As such, federal actions, including those affiliated with HUD funding must conform to the State Implementation Plan.

Impacts Associated with the Proposed Action

Operation Impacts

Existing air quality predicted air quality impacts and conformity with the State Implementation Plan (SIP) are discussed in this section. A summary of each one of the mentioned subjects follows:

- **Existing Air Quality**

  Under provisions of the Clean Air Act (CAA), the EPA developed and enforces the National Ambient Air Quality Standards (NAAQS). Those standards have been established for pollutants that are common in outdoor air, considered harmful to public health and the environment, and that are generated from numerous and diverse sources. The statute established two types of national ambient air quality standards: primary standards and secondary standards for six criteria pollutants which are:

  - Carbon Monoxide (CO)
  - Lead (Pb)
  - Particulate Matter (PM)
  - Nitrogen Dioxide (NO_2)
  - Ozone (O_3)
  - Sulfur Dioxide (SO_2)

  For transportation related projects, the pollutant of concern is CO, which is associated with the operation of combustion engine vehicles.

  To obtain information about the current air quality of the Proposed Action area, a review of the current EPA Green Book (Sulfur Dioxide (2010) Designated Area/State Information | Green Book | US EPA) was conducted and disclosed the fact that the air quality of the area meets the NAAQS.

  Based on the most recent information obtained from the EPA, the municipalities of Adjuntas and Utuado are located within an attainment area (see **Attachment 2, Figure 10**), where the concentration of NAAQS air pollutants, including CO, are met. Therefore, the air quality for the proposed action area is good. Current guidelines for assessing air quality impacts by highway projects only require performing air quality modeling only if the Proposed Actions are within a non-attainment area, or there are hot-spots intersections pertaining to highways located within the proposed action area, which does not occur in this air basin. Traffic Studies performed in 2021 for the Proposed Action area indicate that vehicular traffic volumes levels will remain low due to the forecasted decline on population and employment of the region. Because of this decline, emissions from vehicles are also expected to further decline with the projected increase in the use of hybrid and electric cars that is currently being adopted by the population. A meaningful increase of electric vehicles is expected to occur starting in 2035.

  At a local level, a review of the current air quality monitoring data collected by the DNER disclosed the fact that there are no stations located close to the Proposed Action area for CO. The nearest CO monitoring station operated by this agency to collect air quality data (EQB Station #56; Lat: 18.009558, long. -66.627249) is in the San Antonio housing development, at the Municipality of Ponce. It is located at an approximate distance of 22.90 kms. (see

Attachment 2, Figure 11) toward the southeast side of the Proposed Action area. The database reported for 2022 by the DNER/EPA (Air Quality Statistics Report | US EPA) disclosed the fact that measured CO concentrations for the area were 12.2 and 2.2 ppm for the one-hour and eight-hour monitoring periods respectively. The reported concentrations are well below the current applicable NAAQS of 35.0 and 9.0 ppm respectively, and considering the rural characteristics of the area, existing CO concentrations can reasonably be expected to be lower for the air basin of the proposed action area. This statement is supported by the fact that no CO monitoring stations are located within the Proposed Action areas, since their location is a function of the air quality of an air basin. It is important to indicate that even in the San Juan Metropolitan Area of Puerto Rico, where vehicular traffic is considerably higher than the existing and predicted for this area, no air quality issues with high ambient concentrations for CO have been identified.

- **Predicted Air Quality Impacts**

  The current attainment air quality conditions of the air basin for the area and the reduced volume of vehicles allows to reasonably assert that the during the operation of the Proposed Action, ambient concentrations of air pollutants would remain close to current levels. Therefore, no exceedances of the NAAQS are predicted for the Proposed Action area.

- **Conformity with the SIP**

  The CAA of 1970 established the NAAQS and the requirement that each state must prepare a plan for the implementation, maintenance, and enforcement of such standards. In 1972, the Puerto Rico Environmental Quality Board (EQB) prepared and submitted for the review and approval of the EPA, a State Implementation Plan (SIP). Said plan serves as a standard against which governmental performance may be assessed and to satisfy the requirements of the CAA. Through the years, the SIP is a document that is revised to incorporate changes in the regulation and to address specific areas in which the air quality is not in compliance with the NAAQS.

Based on the available information, the Proposed Action is in state conformity with the current SIP which was approved by the EPA in December 2022

Construction Impacts

Temporary impacts on air quality can be expected to occur during the construction stage of the Proposed Action, during the performance of earthworks activities. Those impacts are associated with the generation of temporary airborne dust emissions resulting from the operation of heavy equipment, as well as the clearing and grubbing of the Proposed Action area for construction.

The specific pollutants of concern as well as control measures to minimize such emissions are:

- **Fugitive dust emissions resulting from the earthwork activities**

  These emissions would result from the cut and fill, grading, and fill material transportation between different locations within the Proposed Action. Control measures to minimize these

emissions would be the use of a tank truck with non-potable water and equipped with a water spraying device and cover of dump trucks loading areas with tarps of similar type of material.

- **Combustion gasses generated by heavy equipment and trucks**

  Trucks and heavy equipment to be used during the construction phase of the Proposed Action will be required to maintain their engines in good working conditions to minimize the generation of higher rates of air pollutants.

It is important to indicate that these impacts are temporary in nature, until the construction activities are completed. These impacts are not considered as significant. The selected contractor will be required to secure a "Single Incidental Permit" for the Permits Management Office (PMO) that requires the adoption of the previously mentioned air pollutants control measures which are based on the requirements set forth in DNER's Rule 102, 210, and 425 of the Regulation for the Control of Atmospheric Air Pollution.

Affected Environment and Regulations Update

This proposed action complies with Clean Air Act requirements. However, prior to starting the construction activities, the contractor would be required to secure a Single Construction Permit from the local Puerto Rico Permits Management Office. This permit requires, among other things, mitigation measures such as the implementation of dust control measures consisting of basically of the use of a tank truck that would transit at regular intervals within the internal Proposed Action roads spraying water. This measure is commonly used to minimize fugitive emissions on construction projects requiring earthwork activities and is based on the DNER requirements.

5.1.5 Coastal Zone Management 24 CFR § 58.5 (c) and 23CFR 771.119

Regulatory Requirements

The Coastal Zone Management Act, Sections 307(c), (d) applies to any proposed activity affecting areas covered by an approved coastal zone management plan. The Act requires that projects are consistent with coastal zone programs within each jurisdiction.

Puerto Rico's Coastal Zone Management Program (PRCZMP) was adopted in 1978 under the authority of the U.S. Coastal Zone Management Act of 1972, as amended. The PRCZMP established the basis for the required balance between conservation and the sustainable use of coastal resources. The PRCZMP was also adopted by the Puerto Rico Planning Board (PRPB) as the coastal component of the Island-wide Land Use Plan for Puerto Rico. The Program document was approved by the Governor of Puerto Rico and certified by the National Oceanographic and Atmospheric Administration (NOAA) in September 1978. The Department of Natural and Environmental Resources (DNER) is the lead agency responsible for the overall coordination and implementation of the PRCZMP. The PRCZMP exerts Commonwealth control over the designated coastal zone which covers a geographic area, of a 1,000-meter-wide belt of coastal lands or

additional distances needed to protect key coastal natural systems, the Territorial waters, and submerged lands beneath them extending 9 nautical miles offshore, as well as the Vieques, Culebra, Mona islands, and all keys and islets within the Puerto Rico jurisdiction. Federal actions must be consistent with the coastal zone programs.

Impacts Associated with the Proposed Action

The Proposed Action area is located well outside of the Coastal Zone boundary for Puerto Rico as per the review of the database published by the U.S. Wildlife Service (USFWS). (See **Attachment 2**, **Figure 12)**.

Affected Environment and Regulations Update

This Proposed Action complies with Coastal Zone Act requirements.

5.1.6 Contamination and Toxic Substances 24 CFR § 58.5 (i) (2) and 24 CFR 51

Regulatory Requirements

24 CFR §58.5(i)(2) requires that properties being proposed for use in HUD projects be free of hazardous materials, contamination, toxic gases, and radioactive substances, where a hazard could affect the health and safety of occupants or conflict with the intended utilization of the property.

Impacts Associated with the Proposed Action

To assess the condition of the Proposed Action corridor with respect to the presence/absence of contamination and toxic substances, a review of federal and local agencies databases was conducted on May 10, 2023. Facilities that manage hazardous wastes are regulated under the provisions of 40 CFR Parts 260 through 265 of the Resource Conservation Recovery Act (RCRA). These regulations, among other things, require the owner/operator of such a facility to assess the management of the chemicals substances whose use may result in the generation of wastes that may be characterized as Hazardous Wastes (HW) as per the results of their chemical testing in a certified laboratory. If testing or knowledge of the waste results in the characterization of the wastes as HW, those wastes shall be handled, managed, and disposed of only at approved EPA/DNER facilities. Also, if certain minimum threshold monthly HW generation rates are met, the facility must file for and obtain an EPA RCRA Waste Generator number, which is used as an identifier of the facility for regulatory purposes. The facility ID is then entered into one of various databases maintained by EPA and is required to be used in the manifest document that is prepared by the generator and accompanies the waste until reaching its final disposal site. One of such databases has been designated as NEPAssist. A review of the mentioned database online tool disclosed the fact that there are some EPA regulated sites that manage hazardous wastes within a radius of 3,000 feet from the Proposed Action corridor (see **Attachment 7**). However, none of them were located toward the western side of the Proposed Action corridor. A total of seven (7) sites were identified on the eastern side of the river within 3,000 feet of the Proposed Action alignment. These include:

- **Three (3) NPDES discharge points**
    - Hot Asphalt Paving Company – No violations reported.
    - Wildco Construction – No violations reported.
    - PRASA Adjuntas Wasterwater Treatment Plant (WWTP) – Numerous violations, all resolved administratively and pertain to discharges of the wastewater treatment plant discharges to the Rio Grande de Arecibo.
- **Four (4) hazardous waste management sites**
    - Shell Company SS 0108 – Small Quantity Generator (SQG).
    - PRHTA Unit – No violations reported.
    - PR Public Housing – Villa Valle Verde – No violations reported.
    - PRASA Adjuntas-Garzas Filter Plant – No violations reported.

Based on the results of the investigation, no impacts on the Proposed Action area are reasonably expected since regulated facilities are not located within or adjacent to the ROW. Also, a review of the EPA data indicates that those facilities are located either close to the towns of Adjuntas and Utuado, and/or along the path of PR-123 which is physically separated from the ROW by the Rio Grande de Arecibo. Therefore, migration of pollutants from those sources toward the Proposed Action site is physically impossible since the Rio Grande de Arecibo constitutes a natural barrier to the Proposed Action site and the topographic elevations corridor are significantly higher than the ones of the riverine areas. This topographic condition precludes the mobility of pollutants from lower to higher ground levels. Also, there is a significant physical separation from potential sources of contamination to the Proposed Action boundaries. Migration of contaminants into the site is an unlikely possibility (see Attachment 2, Figure 13).

In addition to the previous observation, during the planning stages of the Proposed Action, the PRHTA consultants performed a walkthrough inspection of the Proposed Action corridor. The inspection disclosed the fact that there was a parcel to be acquired by the agency at which a heavy vehicles mechanical workshop operated for many years. To adequately address this finding, a Phase I and II Environmental Site Assessment (ESA) was prepared for said property, which is located within Section II (see Attachment 8). The results of the intrusive soil sampling activities performed at the site did not result in the finding of detectable concentrations of hazardous materials except for the ones found in the sediment sample from the septic tank that was used in the property. Because of this finding, prior to the initiation of Section II construction, the selected contractor shall secure a closure permit from the DNER, and the septic tank removed along with any contaminated sediment. Since the Proposed Action area remains the same in terms of the lack of potential sources of pollutants given the rural character of the area, the results of the Phase I and II investigations performed in August 2020 area are valid.

Finally, it shall be indicated that solid wastes will be generated during the initial clearing and grubbing operations required to be conducted at the start of the earthwork activities as well as during the construction stage of the Proposed Action. Both types of activities generate wastes that will be required to be disposed of in accordance with the federal and state regulations. Clearing and grubbing wastes consist of the superficial layer of soil and its vegetation cover which has been estimated in approximately 760,000 cubic meters along the path of the Proposed Action corridor considering the removal of the first 0.5 meters layer along the path of 7,600 meters and an average width of 200 meters, but is not generated

at once, but rather as a function of the section of the Proposed Action being constructed. Some of this material is kept in stock piles at designated locations within the Proposed Action is used as top soil for areas at which will be revegetated like in the lateral shoulders of the highway. These areas are required to be protected from the effects of erosion as per the BMP to be included in the SWPPP required to be developed for the Proposed Action. With respect to the wastes to be generated during the performance of the construction activities, they will typically consist of construction debris, discarded materials which may include residues of paints, wood, adhesives, etc. shall be stored in bins and/or covered areas until their final disposal. Management and disposal of wastes resulting from the performance of demolition activities, will be required to be tested for the presence of asbestos containing materials (ACM) and lead based paints (LBP). If testing of samples collected by an accredited DNER/EPA inspector proves positive, wastes are to be disposed only at landfills with approval to receive special types of wastes as required by the DNER Regulation for the Management of Non-Hazardous Solid Wastes. Also, if a waste test is positive for a hazardous characteristic under applicable sections of the Resource Conservation Recovery Act (RCRA), 40 CFR Parts 260-265, and the DNER Regulation for the Control of Hazardous Wastes, the wastes are to be managed and disposed of only at EPA approved facilities. Currently, there are no EPA approved facilities for the final disposal of hazardous wastes which must be shipped to an EPA approved facility in the USA. Non-hazardous solid wastes may be transported and disposed of at DNER/EPA sanitary landfills in Puerto Rico after securing the required PMO permits that require the development of an Operation Plan.

Also, it is important to indicate the goal of the design pertaining to the earthwork activities is to balance the cut and fill operations of a project to minimize to the extent possible the need to transport fill material into the project or the need to transport surplus material to offsite locations, since they increase project costs. Based on currently available information, based on the completed designed of sections II and II, it has been estimated that a surplus of approximately 850,000 cubic meters of fill material will have to be adequately managed or disposed of at approved final disposal facility, mostly related to the activities of section IV and V. However, it shall be clarified that this estimated volume may be reduced during the advanced design stages of mentioned sections. Regardless of the final volume, this material may be suitable for its use as a fill material at other construction projects and thus, will not constitute a waste. Regardless of its destination, the transportation and management of the material shall comply with applicable environmental regulations of the DNER and/or PMO.

Affected Environment and Regulations Update

The approval of closure plan for the septic tank must be secured from the Underground Injection Control (UIC) Program of the DNER prior to the commencement of the construction activities from the identified property. Once approved, the septic tank would be removed along with any contaminated sediment. Also, if during the construction, special or hazardous wastes are generated, they shall be managed and disposed of in compliance with the terms and conditions of a permit issued by the DNER.

5.1.7 Endangered Species 24 CFR §58.5 (e), U.S.C. 1536, Section 7 and 23 CFR 771.119

Regulatory Requirements

Section 7 of the Endangered Species Act (ESpA) applies to any federal action which may affect federally listed endangered or threatened species or result in destruction or modification of critical habitat.

Impacts Associated with the Proposed Action

Figure 14, included in Attachment 2 shows Critical Habitats Location Map for Puerto Rico. Endangered Species Act (ESpA) Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. As part of the Proposed Action planning activities the Information Planning and Consultation (IPAC) database resource developed by the US Fish and Wildlife Services (USFWS) was consulted. The report identified that the following species could be potentially affected, by the proposed Action:

- Puerto Rican Broad-winged Hawk – *Buteo platypterus brunnescens*
- Puerto Rican Parrot – *Amazona vittata*
- Puerto Rican Sharp-shinned Hawk – *Accipiter striatus venator*
- Puerto Rican Boa – *Chilabothrus inornatus* (*Epicrates inornatus*)

Copy of the IPAC report (IPaC: Home (fws.gov)) has been included in **Attachment 9**.

Since compliance with Section 7 of the ESpA is mandatory to secure federal funding and permits, coordination with the US Fish and Wildlife Service (USFWS) has been maintained through the years to address the presence of rare and/o endangered species along the path of the Proposed Action. A chronological summary of the USFWS endorsement letters follows:

- **February 19, 2024**

  This written communication from the USFWS was received on February 19, 2024 in response to a FHWA request for an updated endorsement for the Proposed Action issued on January 18, 2024. The comments are provided under the Endangered Species Act (Act) (87 Stat. 884, as amended; 16 United States Code 1531 et seq.), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The Service indicated that using the IPaC system, FHWA identified four federally listed species within the project area: Puerto Rican boa (*Epicrates inornatus* now known as *Chilabothrus inornatus*), Puerto Rican broad-winged hawk (*Buteo platypterus brunnescens*), Puerto Rican parrot (*Amazona vittata*), and Puerto Rican sharp-shinned hawk (*Accipiter striatus venator*).

  In its response, the Service refers to the previous consultation conducted between FHWA and the Service on May 5, 2023, for this project, the Service concurred with a may affect not likely to adversely affect (NLAA) determination for the Puerto Rican broad-winged hawk, Puerto Rican parrot, Puerto Rican sharp-shinned hawk and Puerto Rican boa.

However, it further indicates the FHWA has changed its previous effects determination for the Puerto Rican boa and has determined that the proposed actions may affect and are likely to adversely affect (MLAA) the Puerto Rican boa. Thus, as part of the project conditions, FHWA will be implementing the terms and conditions established in the U.S. Fish and Wildlife Service's (Service) Amended Programmatic Biological Opinion (PBO) of July 2023, addressing the take of the Puerto Rican boa and the Virgin Islands tree boa in the form of capture and relocation while conducting activities with Federal nexus. We have reviewed the information provided FHWA, and concur with their MLAA determination for the Puerto Rican boa. Based on FHWA's commitment to implement all Terms and Conditions, and Monitoring Requirements described in Sections 6.4 and 6.5 of the PBO, the Service express their belief that the proposed actions will not jeopardize the continued existence of Puerto Rican boa.

As for the Puerto Rican broad-winged hawk, Puerto Rican parrot, Puerto Rican sharp-shinned hawk, FHWA has still determined that the proposed actions may affect, but are not likely to adversely affect these species with the implementation of the previously provided conservation measures. Thus, the Service's concurrence with this determination on May 5, 2023, stills valid.

- **May 5, 2023**

This letter was issued in response to a Public Notice from the Puerto Rico Department of Housing (PRDOH), since the Proposed Action was included as a Strategic Project under the Community Development Block Grant - Mitigation (CDBG-MIT Grant number B–18–DP–72-0002), Infrastructure Mitigation Program to finalize the last 7.6 kilometers of this highway project, the USFWS, by letter dated May 1, 2023, informed that: (1) through the years the Service has been consulted and collaborated with project development as it has been constructed, (2) in 2022, the Service developed a Programmatic Biological Opinion (PBO) for the Puerto Rican boa and the Virgin Islands tree boa addressing the "take" of both species in the form of capture and relocation. The Puerto Rican boa is present throughout the Proposed Action area, and capture and relocation may be needed to remove boas from harm's way during the project activities. Capturing and relocating out of harm's way during construction activity constitutes "take" as defined by ESpA and requires a May Affect Likely to Adversely Affect Determination (MLAA) from PRHTA and FHWA, which trigger a formal consultation. Since there is a PBO in place, the Service would concur with the MLAA determination, and PRHTA and FHWA will be exempted from the "take" determination that would result from the Proposed Action provided that both agencies agree to comply with the Terms and Conditions stated in Section 6.4 of the PBO, (3) The PBO has reporting requirements (section 6.5) regarding the capture and relocation of the boas. These requirements are mandatory and must be complied with.

Copy of the PBO has been included in **Attachment 10**, while copy of the Service letter has been included in **Attachment 11**.

To comply with the USFWS recommendation, both the FHWA and the PRDOH will adopt the PBO. the PRHTA sent an email indicating the acceptance of the MLAA and the applicable PBO terms and conditions, whose copy has been also included in **Attachment 7.**

- **September 1, 2021**

  In response to the PRHTA consultation of August 11, 2021, the USFWS issued a response on September 1, 2021. Their response indicated that: (1) geospatial data identified four federally listed species that might be present along the path of the remaining sections of PR-10 which are the Puerto Rican boa *(Epicrates inornatus)* now known *as Chilabothrus inornatus*, Puerto Rican board-winged hawk (*Buteo platypterus brunnescens*), Puerto Rican parrot (*Amazona vittate*) and Puerto Rican sharp-shinned hawk (*Accipiter striatus venator*), (2) we have reviewed the information provided in your letters and concurred with your determination that the Proposed Action may affect but is not likely to adversely affect the above-mentioned species. No adverse impacts to designated critical habitat are anticipated. However, the service recommends the PRHTA pay special attention to the species during the months of January to July (instead of April to June) in case any breeding activity is observed within or near the proposed construction area. In view of this, we believe that the requirements of Section 7 of the ESpA have been satisfied.

  A copy of this letter has been included in **Attachment 11**.

  The PRHTA will include as an environmental commitment, the adoption of the required conservation measures and to the adopt the restriction of the Proposed Action activities that may affect protected species during the breeding season extending from January to July. These requirements will be included in the contract documents.

  Copy of previous letters of endorsements issued by the USFWS for the proposed action have also been included in **Attachment 11** for reference and evidence of the continuous communications pertaining to the development of this Proposed Action.

  Besides the studies carried out for the F-EIS in 1979, additional biological studies have been conducted for this Proposed Action as part of the re-evaluation process. These include:

  - Flora/Fauna conducted by OIKOS (2002)
  - Presence and Absence of Broad-Winged Hawk (Buteo *platypterus brunnescens*) and Sharp-Shinned Hawk (*Accipiter striatus venator*) and their habitat, along PR-10 proposed alignments for Sections II. III and IV, Utuado-Adjuntas, Puerto Rico, Laredo González, MP, PPL (June 2013)
  - Endangered Species Assessment: Endangered Bird of Prey Species Status AT Highway PR-10 Proposed Alignment for Sections III (AC100071) and IV (AC100055), Utuado - Adjuntas, Puerto Rico. Breeding Season 2014 Final Report, Laredo González, MP, PPL (May 2014)

  Copy of the above-mentioned studies is included in **Attachments 12** and **13** respectively.

  At a local level, close coordination with the Puerto Rico Department of Natural and Environmental Resources (DNER) has been done. This includes:

  - Development of protocols to minimize impacts and adequately manage the potential of finding threatened and/or endangered species that even though were not detected along the path of the Proposed Action alignment may be present in the vicinity of the ROW.

- The specific species are: Chilibotrus inornatus (boa de Puerto Rico), Amazona vitatta (cotorra de Puerto Rico), Accipiter striatus venator (gavilán de Sierra), Buteo platypterus (guaraguaito de bosque), Atlantea tulita (mariposa arlequín), Oplonia spinosa, Cornuvia obovata, Pleodendron macranthum, Solanum ensifolium, Myrcia paganii, and Varronia bellonis.

- The protocols include a restriction indicating that the removal of vegetation or earthwork activities phase of the Proposed Action shall not coincide with the peak breeding season (January to July) of the previously mentioned bird species.

- A qualified biologist capable of conducting monitoring activities and implementing conservation measures for the protection of protected species shall be contracted and be present at the project site, before, during and after the construction of the Proposed Action. The biologist shall be capable of identifying both acoustically and visually individuals, nests, and newborns, leaves, flowers, or fruits of the species identified with the potential to be found within the Proposed Action. If listed threatened and/or endangered species are detected, as soon as practicable, the biologist shall contact, either by telephone or email the following endangered species coordinators from the DNER and the USFWS.

- Coordinate with the DNER and USFWS to agree on the identification of a site for the relocation of an individual that may be identified inside the Proposed Action area.

- All incidents which may result in the death or injury of any of the listed flora and fauna species shall be documented through the preparation of monthly and a final report. The report shall include information about the observed species, place and time of the sighting, number of individuals, type of incident, and type response action. Technical personnel from the DNER/USFWS may assist in the identification of the species through photographs and/or videos. Copies of the reports shall be delivered to the Protected Endangered Species Coordinators of the DNER and the USFWS.

The required protocols for the protection of endangered species were developed for and approved by the DNER. Copy of coordination and protocols worked with the DNER and are included in **Attachment 13**.

Affected Environment and Regulations Update

A May Affect Not Likely to Adversely Affect determination has been made for the boa, if a boa is captured and relocated. Formal consultation with the USFWS will occur in accordance with the PBO.

As previously discussed, the PRHTA/FHWA agreed to implement the requirements set forth in section 6.4 and 6.5 of PBO. This will require species monitoring and reporting to the Service. In addition, and as required by the DNER, approved protocols for the monitoring and protection of the species would be incorporated as part of the Proposed Action contract documents.

5.1.8 Explosive and Flammable Hazards, 24 CFR Part 51C and 23 CFR 771.119

Regulatory Requirements

Under 24 CFR Part 51C, HUD will not approve an application for assistance for a proposed action located less than the acceptable separation distance from a hazard unless appropriate mitigation measures are implemented or are already in place. The requirements of this section establish a threshold for impact resulting from the storage of explosive and flammable hazards if the project considers an increase in the residential density that may be exposed to those hazards. HUD will fund projects located at less than the Acceptable Separation Distance (ASD) from a hazard, if there is no risk to residential properties.

Impacts Associated with the Proposed Action

This citation is primarily intended to apply for protection of residents in buildings that may be constructed in an area that may have explosive and/or flammable hazards. Based on the Proposed Action characteristics, which is the construction of a new roadway, it has been determined that the Proposed Action does not include development, construction, rehabilitation that will increase residential densities, or conversion. Also, the Proposed Action would not result in the permanent installation of aboveground storage tanks (AST) that may jeopardize the security of the scarce number of residences that are located near the Proposed Action construction sites. Regarding flammable hazards, small quantities of flammable substances (diesel, paints, etc.) may be utilized only during the project construction phase but would be managed as per federal and state regulations. This would require storing them in secure and supervised locations by qualified personnel. Once construction is completed, no AST nor flammable hazards would remain in the Proposed Action area.

Based on the results of the geotechnical studies performed so far, the use of explosives will be necessary in some portions of Sections IV and V since outcrops of rocks were found. Construction equipment is not capable of removing them as part of the earthworks stage of the Proposed Action. Due to the location of the Proposed Action and its surroundings, no impact on human health or the environment is expected. The use and management of explosives is highly regulated practice that would only be performed by qualified persons with the necessary safety training as required by the DNER permit conditions which include notification to nearby residents and the use of seismographic equipment to document that vibrations resulting from the use of explosives does not affect nearby structures. The protocols included for the Proposed Action will assure that threatened and/or endangered species will not be impacted, especially during their breeding season.

Affected Environment and Regulations Update

Use of explosives for the construction of the roadway corridor will be controlled so that no adverse impact is caused to human health or the environment. The use of explosives will be necessary to build the new roadway through rock outcrops that were found in some parts of Section IV and V of the Proposed Action. Considering the current Proposed Action corridor conditions, the probability of finding nearby structures is low. On those instances, and since the Proposed Action earthwork related activities exceed the threshold value of 5,000 cubic meters, a Single Incidental Operation Permit must be secured from the

DNER. The permit application would be required to indicate if the use of explosives is needed as part of the Proposed Action construction activities and must include a copy of the geotechnical soil survey report. The contractor will be required among other conditions to monitor the use of explosives using seismographs. The results of the monitoring shall be reported to the agency and would serve to document that no damage was caused to nearby structures and the environment. The use and handling of explosives requires a permit from the Police Department. Personnel in charge of the use of explosives for the Proposed Action will comply with the following state/federal regulations:

- Regulation for the Administration, Application and Supervision of the Puerto Rico Explosive Law (September 11, 1970)
- Applicable requirements of the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA)

The PRHTA Standard Specifications for Road and Bridge Construction (2005) regulates the use of explosives by contractors in a highway construction project. Article 107.12 of the General Provisions section addresses the use of explosives. Other controls are established in Specifications 203-3.01(d)(2) and 203-3.02(f) regarding blasting operations and the use of explosives in the excavation phase of the project.

5.1.9 Farmlands Protection 24 CFR Sec. 58.5(h) and 23 CFR Sec. 777

Regulatory Requirements 24 CFR § 58.5 (h)

NEPA and the Farmland Protection Policy Act (FPPA) and its regulations require federal agencies to coordinate with the Natural Resources Conservation Service (NRCS) if their activities may irreversibly convert farmland (directly or indirectly) to nonagricultural use. For purposes of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance.

The Farmland Protection Policy Act of 1981 applies to any federally assisted action which encourages the conversion of prime, unique, state/locally important farmlands. Compliance requires that the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses be minimized.

Impacts Associated with the Proposed Action

The current Department of Agriculture database (see Attachment 2, Figure 15) provides support to the statement that there are no prime farmlands of importance located along the corridor of the proposed roadway. This includes the current National Resources Conservation Service (NRCS) published maps for farmlands. This finding is consistent with the topography of the area and the existing soils within the corridor of the Proposed Action.

Affected Environment and Regulations Update

The Proposed Action complies with FPPA.

5.1.10 Floodplain Management 24 CFR 58.5(b) and 23 CFR 650A

Executive Order 11988 and 24 CFR Part 55 require that federal projects should avoid direct or indirect support of floodplain development whenever there is a practicable alternative. Executive Order 13960 established a Federal Flood Risk Management Standard to address among other things the consideration of climate change issues and to ensure that infrastructure is resilient to flood risk. An 8-step Decision-Making Process document in compliance with 24 CFR 55.20 was developed and is included in Attachment 15.

Impacts Associated with the Proposed Action

The decision-making process involved eight steps to assess whether viable alternatives exist to avoid crossing the floodplain and wetlands in Rio Grande de Arecibo. The proposed action includes the crossing of a floodplain and a wetland area with a Special Flood Hazard Area (Zone AE) at approximately Latitude 18.234500 N and Longitude 66.719402 W. This crossing will be made by a bridge constructed over the Rio Grande de Arecibo as shown in Attachment 15. The Early Public Notice (PN) advising the federal, state, and local agencies and the general public about an activity in the 100 year-floodplain and Wetlands and the availability of the document for comments was published in El Vocero, a major circulation newspaper on February 10, 2023. A Final Notice of An Activity in a Floodplain and Wetlands was published in El Vocero on March 14, 2023. No comments were received in the first notice and only one comment from a federal agency was received from the second notice. See pages 119-120 and 156-157 of Attachment 15. The analysis conducted for the proposed action, concluded with a determination of no adverse impacts to the floodplain due to their temporary nature and the fact that the impacted area will be restored after the completion of the construction phase of the proposed bridge.

A Nationwide 14 permit (applicable to transportation related projects) for Section II of the Proposed Action (AC-100069) has been granted by the USACE. Said permit, which authorizes activities impacting USACE jurisdictional areas, expires on March 14, 2026. Additional proposed actions sections III, IV and V do not affect floodplain areas.

Step 6, detailed in Attachment 15 on page 12 of the 8-step report, delves into potential alternatives for bypassing the afore-mentioned floodplain and wetland area. The report concludes that, after thorough examination, there are no practical alternatives to siting the Proposed Action in the floodplain and wetlands. This specific location is deemed necessary for constructing the bridge that will link existing PR-10 located north and south of the Proposed Action.

The potential impacts of the Proposed Action are discussed in Step 4 on page 6 of the 8-step report. Despite the BR-1 Section Activity being situated in a floodplain and wetland, the proposed action is designed to comply with conditions and requirements outlined by the USACE in the Nationwide permit granted for the construction of the bridge. This approach aims to minimize the impact on floodplain and wetland values.

The 8-step study provides detailed information on the Nationwide Permit requirements to mitigate impacts during construction on existing environmental resources, including the Floodplain and Wetlands mandated by the Corps of Engineers. These requirements, summarized on page 9 of the study, include:

1. Restoration of the area after completing construction.
2. Compliance with Section 401, General Water Quality Certification.
3. Adequate reporting and Commencement Notification.
4. Ensure authorized work does not alter existing water bodies within the project area.
5. Implement Endangered Species Conservation Measures.
6. Incorporate measures related to Cultural Resources Properties/Historic Properties.
7. Restrictive use of only adequate fill material in the project.

In light of the above discussion, the report concludes that the proposed action is the only practical choice, and the construction of the proposed bridge within the designated corridor will not significantly impact the floodplain and wetland. Both resources will be restored, returning them to essentially their previous existing conditions.

The computer program Hydrologic Modeling System (HEC-HMS) developed by the USACE [2016] was used for hydrologic analysis. Using this program, the Unit Hydrograph method, and the Runoff Curve Number (CN) method, both developed by the Soil Conservation Service (SCS) now National Resources Conservation Service (NRCS), were applied to determine the design hydrograph. This was computed by a process of translating the rainfall excess into a runoff hydrograph known as convolution. Peak discharges corresponding to storms ranging in frequencies from 2, 10, 25, 50 and 100 years were estimated for the existing and proposed conditions. A hydraulic analysis was made to find the hydraulic parameters of the storm watercourses and verify that the increase in water surface elevation due to the construction of the bridges as well as major hydraulic structures will not be more than 0.15 meters. The US Army Corps of Engineer's HEC-RAS computer model was used. The Curve Number (CN) was computed using the NRCS methodology. Soil types and land uses were gotten from NRCS soil maps. With regards to the precipitation used in this H-H study according to the National Hurricane Center Tropical Cyclone Report, the total precipitation between September 19th and 21st, 2017 (Hurricane María) at the rain gauge located in Utuado was 18.18 inches. And during Hurricane Georges between September 21st and 22nd, 1998 the total precipitation over two days was 28.36 inches in Jayuya and 24.62 inches at Lake El Guineo in Villaba. In both cases, the 24-hour precipitation will be less than 20 inches. Compared to the precipitation value adopted in the study (equivalent to 22.4 inches in 24 hours), neither Maria nor Georges produced higher precipitation.

The minimum low chord elevation of the bridges must be 0.60 meters above the 100-year water surface elevation to allow floating solids to pass through avoiding accumulation or clogging. The H-H study concluded that given the configuration of the bridge, their beam and deck are significantly located at a very high altitude in reference to the maximum flood elevation determined by the study and therefore it is not necessary to take additional measures regarding the height of the structure to comply with the free board requirements. The clearance height for bridge provides adequate clearance to allow floating materials to pass through the structure in an extraordinary event.

With regards to the change of flood elevations after the construction of the proposed structure and its impact to adjacent sensitive structures, the H-H study concludes that the proposed structure complies with the existing requirement of an increase of elevation of less than 0.15 meters and residences or resources exist near the Proposed Action area that could be affected by the proposed action. Even if an event having a frequency of a 500-year flood would not have any impact on this site because no structures are located near within the floodplain limits created by an event of this magnitude.

Concerning the alteration in flood elevations following the construction of the proposed bridge and its potential repercussions on nearby vulnerable structures, the H-H study asserts that the planned roadway structure adheres to the current regulatory requirements, having an elevation increase of less than 0.15 meters. Furthermore, there are no residences or other sensitive resources in the Proposed Action vicinity that could be adversely affected by the proposed action. Even in the unlikely occurrence of a 500-year flood event, there would be no impact on the site, as no structures are situated within the floodplain limits created by an event of such magnitude and the flood elevations are lower than the elevation of the proposed bridge.

Affected Environment and Regulations Update

All requirements of the 8-step Decision-Making process and the Nationwide 14 permit must be followed during the construction of the roadway. Copy of the USACE Nationwide 14 permit issued for Section II of the proposed action has been included in **Attachment 16**.

5.1.11 Historic Preservation 24 CFR § 58.5 (a), 23 CFR Sec. 771 and T 6640.8A

Regulatory Requirements

Federal actions are subject to Section 106 of the National Historic Preservation Act, 16 USC §470(f), Section 106; 36 CFR Part 800. Under provisions of this law, all federal agencies consider the effects of their undertakings on historic properties that are included in, or eligible for inclusion in, the National Register of Historic Places prior to the approval of the expenditure of any federal funds or to the issuance of any federal license or federal permit. This process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects, and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

Impacts Associated with the Proposed Action

The Advisory Councils Historic Preservation's four (4) step process to obtain the State Historic Preservation Officer (SHPO) endorsement was followed and a No Effect Determination was granted to this Proposed Action since its initial planning stage. Studies conducted by professionals meeting the Secretary of Interior (SOI) qualifications and consultation with the SHPO resulted in a concurrence of No Effect determination. This determination was reaffirmed by SHPO by means of a letter regarding the proposed action dated January 17, 2024, in which they stated that they continue to support their agency's finding of no historic

properties affected (See Attachment 11). Based on this determination, no further action is needed unless there is a change in the findings, new historic or cultural resources are found, and the proposed action could have an adverse effect on them if mitigation measures are not taken. As part of the documentation provided for their evaluation of the Proposed Action, archaeological studies performed by qualified SOI professional archaeologists were submitted for the review and approval of the agency. These professionals perform the study in accordance with the SHPO guidelines applicable to this type of Proposed Action, which shall include consideration of above and below ground cultural resources, as well as Traditional Urban Centers (TUC).

Review of available information allows to indicate that there are no TUCs in the immediate vicinity of the Proposed Action corridor (see Attachment 2, Figure 17).

Affected Environment and Regulations Update

All archaeological or historical studies conducted for the Proposed Action determined that there are no archeological or historical properties within the corridor of the Proposed Action. Gus Pantel, a qualified SOI professional, conducted a Phase I and Phase I-B study for Section III-V (April 2016) (see Attachment 26). This comprehensive study involved a review of historical and archaeological data in the region where the proposed action is located, along with field studies. The findings indicated no archaeological sites or historic structures within the corridor of Sections III-V.

Similarly, Jacqueline Lopez Melendez, another qualified SOI professional, conducted a Phase I-A study for Section II in September 2012. The study aimed to evaluate the potential existence of archaeological sites and historic structures within the corridor of the proposed action. The conclusion was that no archaeological sites were detected within Section II, but two structures with potential historical importance were identified. The Puerto Rico Institute of Culture (PRIC) endorsed the SOI's recommendations, approving the construction of the proposed action contingent upon a Phase II study on the identified structures.

Subsequently, Virginia Rivera Calderon, a qualified SOI, conducted the Phase II study in September 2022, determining that the identified structures held no historical value (see Attachment 17). PRIC concurred with these findings and granted authorization for the construction of Section II, with the condition that Archaeological Monitoring be implemented during the construction phase. No Memorandum of Understanding was required, and these conditions are outlined in Section 5.3, Mitigation Measures.

At the local level, the PRIC mandated Archaeological Monitoring during the construction of Sections III (AC-100071) and IV (AC-100055) due to the proximity of coffee estate remains in those sections. Although PRIC initially required a Phase II investigation in Section II, a qualified SOI professional demonstrated that the structures were part of an abandoned residential complex. PRIC accepted this evidence, and the study was deemed unnecessary. However, before commencing construction activities, an archaeological monitoring plan must be submitted for advanced review and approval by PRIC for Sections II and IV. No Memorandum of Understanding was required, and these conditions are detailed in Section 5.3, Mitigation Measures.

5.1.12 Compliance with Section 4(f) - 49 U.S.C. 303 and 23 U.S.C. 138

There are no public Parks, recreational areas, waterfowl, and wildlife refuges or listed historic, archeological resources within the corridor of the proposed action. The proposed Action would not impact any public parks, recreational areas or wildlife and waterfowl refuges or other listed historic/archaeological resources. Therefore, there is no need to generate an evaluation document (Programmatic or Individual) for Section 4 (f) resources in accordance with existing regulations and guidelines.

5.1.13 Noise Abatement and Control 24 CFR § 51 B and 23 CFR Sec. 774

Regulatory Requirements

HUD regulations at 24 CFR Part 51 B establish standards for exterior noise levels along with policies for approving HUD-supported or -assisted housing projects in high-noise areas This typically applies to new construction of and rehabilitation residential projects, and do not apply to road construction projects. However, a determination of the impact of the noise from PR-10 on existing structures will be determined. For the assessment of the noise impacts, the procedures established in FHWA's 23 CFR 772, Analysis of Traffic Noise Impacts has been used. Additionally, the HUD noise calculator has been used to determine the noise impacts on existing structures and residences.

Impacts Associated with the Proposed Action

Operation Impacts

Since the Proposed Action passes through rural land, the dominant noise source for the area would be the noise to be generated by the vehicular traffic once the highway is in operation. It was also noted that no major industrial uses, airports, or other major noise generating sources were identified along the path of the Proposed Action.

Resulting from the fact that the recommended alternative alignment passes through less developed lands, a relatively small number of sensitive receptors were identified. Special consideration was provided for the identification of noise sensitive sites such as schools, hospitals, residences, etc. for the noise impact analysis. Results of the noise surveys conducted along the path of the proposed PR-10 indicated that, consistent with the underdeveloped nature of the Proposed Action area, existing noise levels were quite low. Spot checks of existing noise levels conducted in several remote areas disclosed the fact that existing noise levels were below 45 decibels (dBA).

A traffic noise study, using the Traffic Noise Model (TNM) (version 2.5) developed by the FHWA, was performed in September 2012 (see Attachment 18) along the path of the Proposed Action corridor, since the closest noise receiver was in this area. This condition remains unchanged. Said study was conducted considering the fact that the closest noise sensitive residential receptor that was identified along the path of the Proposed Action was located at an approximate distance of 60 meters measured from the edge of the proposed PR-10. The highest noise level measured as part of the study was 50.2 dB (Leq) which

corresponds to the location of the closest receiver to the proposed roadway. Two additional noise measurements conducted along the path of the Proposed Action corridor near residential areas resulted in recorded noise levels of 45.8 and 48.9 dBA (Leq). All the recorded noise levels are considered typical for a residential neighborhood located within a rural area. Once the existing conditions of the area were defined, modeling the most critical receptor in terms of proximity to the proposed PR-10 using TNM, was performed for design year 2032 since the FHWA requires the conduct the analysis in 20 years in future horizon for comparison purposes. The results of modeling predicted a noise level of 58.6 dBA (Leq) for this receiver, which is well below the 67 dBA established by the FHWA Noise Policy in the Development and Operation of Transportation Projects for residential land uses. Due to the results of this analysis, consideration of noise mitigation measures was not required as per the requirements of the Noise Abatement Criteria (NAC) established in the Noise Policy. This consideration of noise abatement is required whenever one of two (2) conditions are identified during the noise impact analysis, which are: prediction of noise levels approaching or exceeding the 67 dBA for a residential area, or the predicted noise levels exceeds a threshold of 10 dBA when compared to existing levels. Since none of the mentioned criteria were met, no noise abatement mitigation is required under the FHWA guidelines. With respect to additional residential areas located within the Proposed Action corridor, a review of the Proposed Action drawings revealed the fact that they are located farther from the roadway than the analyzed receptor. Therefore, and since the noise intensity is inversely correlated with the distance, it is reasonable to conclude that no traffic noise impacts requiring noise abatement measures, would be required for additional receptors located along the path of the Proposed Action, since they would not be negatively impacted in a way that would require to consider noise mitigation measures. Predicted increases in the existing noise environment would be 8.4 dBA or lower based on the results of the most recent study.

With respect to HUD requirements for noise exposure, and although not applicable for a roadway construction project, the HUD Exchange noise calculator (DNL Calculator - HUD Exchange) was used to estimate the Day/Night Noise Level (DNL) for the nearest residential receptor with respect to the proposed highway for comparison purposes only. The results of the calculations resulted in an estimated DNL of 64 dBA, which is below the 65 dBA threshold established by HUD Regulations (see Attachment 19). It is important to indicate that once the Proposed Action construction is completed, there are no additional noise generation activities in the area such as airports. Therefore, the Proposed Action complies with HUD Policies pertaining to noise exposure.

The previously described noise analysis results are consistent with the findings of a report entitled PR-10 Forecasting Demand and Traffic Analysis (included in Attachment 20) that concluded that given the decline in population and employment forecasted for the area, total travel demand in the subarea is predicted to decline in future years. Existing Average Daily Traffic (ADT) on PR-123 in 2019 was approximately 4,183 vehicles per day. Projected ADT for the new highway section for the year 2025 is between 2,800 and 3,808 vehicles and for the year 2045 between 3,556 and 4,633 vehicles, representing an annual increase ranging between 1.0 and 1.2%.

Construction Impacts

Temporarily high noise levels will be produced by the heavy equipment that would be used during the construction stage of the Proposed Action. However, the intensity of noise perceived by the receivers will vary as a function of the distance between the source and the receiver. A reduction of approximately six (6) dBA can be expected with the doubling of the separation between the source and the receiver (Report to the President and Congress on Noise, March 1972, US Government Printing Office, Washington, D.C., page 2-104). Typical noise levels as a function of the type of equipment being used for the Proposed Action construction are summarized in the following table:

Table 2: Typical Noise Levels Associated with Highway Construction Activities as a Function of Distance

Construction Operation	Observation Distance (in meters)				
	30	**60**	**120**	**240**	**480**
Ground clearing	78	72	66	60	54
Excavation	82	76	70	64	58
Foundations	82	70	66	60	54
Erection of structure	73	67	61	55	49
Finishing	78	72	66	60	54

Noise impacts would result with the potential use of pile driving equipment during the construction of new bridges. However, the nature of the terrain requiring the bridges tends to minimize the number of potential nearby receivers.

Construction noise impacts, although temporary in nature, would take longer to complete in the mountainous sections of the Proposed Action corridor than in flatter portions of the Proposed Action. These impacts include the use of explosives during the construction of section IV and V of the Proposed Action. During the construction phases that would require the use of explosives, neighbors of the detonation areas will be notified in advance to make them aware of the high noise levels that would be expected to occur when explosives would be used. However, it shall be noted the potential negative impact to receivers is very low due to the distance of these residential uses in these areas which are also scattered.

Affected Environment and Regulations Update

This Proposed Action complies with the Noise Abatement and Control requirements as demonstrated by the analyses performed using the FHWA and HUD noise Impacts assessment criteria. Both analyses allow to estimate maximum noise levels of L_{eq} of 58.6 dBA (per FHWA methodology) and DNL of 64 dBA (per HUD criteria). These findings indicate that noise abatement measures are not required to be considered as part of the Proposed Action design.

5.1.14 Sole Source Aquifers 24 CFR §58.5(d) and 23 CFR Sec. 777

Regulatory Requirements

The Safe Drinking Water Act of 1974 applies to federally assisted projects which may contaminate an aquifer designated by U.S. Environmental Protection Agency (EPA) as the sole source of drinking water for a community. Further, it prohibits financial assistance of projects which the EPA determines may contaminate a designated sole source aquifer.

Impacts Associated with the Proposed Action

A review of the database published by the EPA, regarding the Proposed Action disclosed the fact that the Proposed Action is not located within a Sole Source Aquifer designated area (https://www.epa.gov/dwssa/map-sole-source-aquifer-locations). Figure 18 illustrates the results of the database review.

Affected Environment and Regulations Update

The Proposed Action complies with the Sole Source Aquifer requirements. There are no Sole Source Aquifers in Puerto Rico as per defined by EPA in the Safe Drinking Water Act of 1974.

5.1.15 Wetlands Protection 24 CFR §58.5(b) and 23 CFR 777

Regulatory Requirements

Executive Order 11990, governing the Protection of Wetlands, is applicable to any federal action involving construction in a wetland. HUD projects are urged to steer clear of any direct or indirect support for new construction in wetlands, opting for practicable alternatives when available. A comprehensive 8-step Decision-Making Process, in line with 24 CFR 55.20, is detailed in **Attachment 15.**

Impacts Associated with the Proposed Action:

A review of the National Wetland Inventory Maps by the USFWS reveals six wetland crossings along the Proposed Action corridor. While all crossings, except the first one over the Rio Grande de Arecibo, traverse small tributaries, design requirements set by PRHTA dictate the use of structures to minimize direct impacts on creeks and streams without disturbing the underlying wetlands. The first crossing, however,

will involve wetland disturbance. Relevant USFWS National Wetlands Inventory Maps are included in Attachment 15.

This wetland-impacting crossing will be facilitated by a bridge over the Rio Grande de Arecibo, as illustrated in Attachment 2, Figure 16. Early Public Notice (PN) was published in El Vocero on February 10, 2023, notifying federal, state, and local agencies, as well as the public, about the activity in the 100-year Floodplain and Wetlands, with the document available for comments. A Final Notice was issued on March 14, 2023, with only one comment received from a federal agency. Pages 119-120 and 156-157 of Attachment 26 provide further details. The analysis concludes that the wetlands' temporary disturbance during construction will not result in adverse impacts, as the affected area will be restored upon completion of the bridge construction.

A Nationwide 14 permit, applicable to transportation-related projects (AC-100069), has been granted by the USACE, valid until March 14, 2026. This type of permit applies to linear transportation projects whose projected impact to non-forested wetlands is equal or less than 0.5 acres.

Alternatives Assessment

Step 6 of the 8-step report, detailed in Attachment 15 on page 12, explores potential alternatives for avoiding the wetlands. The report determines that, upon thorough examination, no practical alternatives exist, necessitating the project's location in the wetlands to construct the bridge connecting existing sections of PR-10 north and south of the proposed action.

Mitigation and Compliance

Step 4 on page 6 of the 8-step report addresses potential impacts, and despite the BR-1 Section Activity being in a wetland, the proposed action aligns with USACE conditions outlined in the Nationwide permit. This strategy aims to minimize impacts on wetland values.

The 8-step study, outlined in Attachment 15, details Nationwide Permit requirements for mitigating construction impacts on environmental resources, including wetlands. The analysis concludes that, aside from the temporary disturbance in the mentioned area, there will be no adverse impacts on wetlands along the remaining Proposed Action corridor.

Affected Environment and Regulations Update

All requirements of the 8-step Decision-Making Process must be adhered to during roadway corridor construction. If after completion of the design phase it is determined that Sections III, IV, and V of the Proposed Action impact USACE jurisdictional areas, JPAs must be submitted and permits secured accordingly, in adherence to both federal and state requirements.

5.1.16 Wild and Scenic Rivers 24 CFR §58.5(f) 23 CFR Sec. 774 and Sec. 777

Regulatory Requirements

The Wild and Scenic Rivers Act (WSRA) established a policy of preserving designated free-flowing rivers for the benefit and enjoyment of present and future generations. Section 7 is one of the most important and powerful parts of the Wild and Scenic Rivers Act. This key provision directs federal agencies to protect the free-flowing condition and other values of designated rivers and congressionally authorized study rivers. Federal actions must assure that they would not affect river designation and are not inconsistent with the management and land use plan for the designated river area of rivers protected under the Wild and Scenic Rivers Act. NWSRS includes rivers designated as Wild and Scenic Rivers, Study Rivers and those listed on the Nationwide Rivers Inventory (NRI).

Impacts Associated with the Proposed Action

A review of the database published by the U.S. Forest Service with respect to the Proposed Action, disclosed the fact that the proposed action will not affect rivers designated as Wild and Scenic Rivers by National Parks Service (NPS). There are only three (3) rivers designated in this list which are Mameyes River, La Mina River and Icacos River. These rivers are located within or close to the Caribbean National Forest, locally known as El Yunque National Forest. This area is located at an approximate distance of 97 kilometers from the Proposed Action corridor. A figure illustrating the results of this database review has been included in Attachment 2, Figure 19.

Affected Environment and Regulations Update

The Proposed Action complies with the WSRA.

5.1.17 Environmental Justice 24 CFR §58.5 (j) and 23 CFR Sec. 771.119 and FHWA Order 6640.23A

Regulatory Requirements

Executive Order 12898 states that federal agencies shall identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

Impacts Associated with the Proposed Action

A review of the PRHTA records for the Proposed Action indicates that the acquisition process and relocations of families and/or businesses have been already completed under provisions of the Uniform Relocation Act (URA), except for various properties' acquisitions on Section IV that are still pending. However, no families nor businesses would be relocated for the construction of the remaining Sections. Also, in order to further characterize the current socio-economic profile of the population within the Proposed Action study area, the EPA environmental justice mapping and screening tool (EJ Screen:

Environmental Justice Screening and Mapping Tool | US EPA), was used to obtain more recent information about this subject. This information was also supplemented with data from 2020 obtained from the US Census (see Attachment 21). The EJ tool data considers the corridor plus a one (1) mile buffer area. The obtained information has been summarized as follows:

- Estimated population: 2,865 persons
- Housing Units: 1,272 units
- Per capita Income: $7,504 which is below the $14,047 reported for Puerto Rico (2020)
- Hispanic Population: 2,861 persons (equivalent to 100% of the population for the study area)
- Population by sex: 47% male (1,339) and 53% female (1,527)
- Population of 0 - 4: 3%
- Population 0 – 17: 19%
- Population of 18+: 81%
- Population of 65 years or more: 18% (506)
- Population educational attainment: 19% has less than 9th grade; 28% has a high school diploma; 17% has a bachelor's degree or more.
- At a municipal level, the following population data was obtained for the Municipalities of Adjuntas and Utuado

Table 3: Population Data (2000-2020)

Population	Adjuntas	Utuado
2000	19,143	35,338
2010	19,483	33,149
2020	18,020	28,287
% Difference (2020 vs. 2000)	- 6.2	-24.9
% Difference (2020 vs. 2010)	-7.5	-14.7

As may be observed from the obtained data, the population of the study area is basically homogeneous in terms of ethnicity and has low per capita income (which is common for the center part of the Island population as per the U.S. Census Data). It is also important to note that the Proposed Action areas share the trend of a reduction in its population that is also being observed for the Island since approximately 2000 as per the U.S. Census data. This observation is particularly noticeable in the Municipality of Utuado, where the reduction in population has been estimated at approximately 14.7% between 2000 and 2020 but can be traced back to 2000. The trend in the reduction of population may have been exacerbated by the negative impacts caused in the aftermath of Hurricanes María and Fiona.

Affected Environment and Regulations Update

A review of available information provides support to the statement that there are no environmental conditions identified that would have disproportionately high impact adverse effect on low-income and/or minority populations. The Proposed Action complies with the Environmental Justice requirements based on a review of the available socioeconomic data obtained from the latest U.S. Census Office (2020) as previously discussed in this report and will have benefits to the community because of the improved connections, access, etc. The proposed action will also enhance community well-being by diverting through traffic away from the current PR-123, which includes heavy trucks. This will establish a safer and more efficient connection, serving as the primary access point for emergency providers and utility agencies in times of crisis. Additionally, the project's construction phase will generate new job opportunities for residents in nearby communities. It will also stimulate the growth of tourism and agricultural businesses, contributing to additional employment opportunities and economic development, without an increase in traffic volumes.

Regarding the public participation and notification for the Proposed Action, it shall be noted that the following activities were performed:

- Publication of Information about the Proposed Action in the agency's social/network media and web site (December 2021). Please refer to the following link for referenced information: [https://act.dtop.pr.gov/wp-content/uploads/2023/06/Presentacion-junio-2023.pdf]

- Development of a pre-recorded virtual presentation of the Proposed Action that was uploaded to the Puerto Rico Department of Transportation and Public Works/Puerto Rico Highway and Transportation Authority (PRDTPW/PRHTA) web site and YouTube (November 2021). Please refer to the following link for referenced information: [https://act.dtop.pr.gov/act-proyecto-extension-puerto-rico/]

- State Transportation Improvement Program (STIP) is a staged four-year capital improvement program that lists all projects expected to be funded with federal (FHWA and FTA) participation. The STIP is developed in coordination with the Metropolitan Planning Organization (MPO) includes a public participation period of 45 calendar days for public review and comments, before it gets approved by FHWA and FTA. The following bullets list public participation periods which included the Construction of the PR-10 Proposed Action from Adjuntas to Utuado:

    - **STIP 2019-2022, Approved by MPO, FHWA and FTA –August 2022**
      Projects: AC-100071,100069, 100076, 100055 for CDBG – MIT only

    - **STIP 2019-2022, Approved by MPO, FHWA and FTA –August 2022**
      Projects: AC-100071,100069, 100076, 100055 for CDBG – MIT only

    - **STIP 2023-2026, Approved by MPO, FHWA and FTA –November 2022**
      Projects: AC-100071,100069, 100076, 100055 for CDBG –MIT only

5.2 Environmental Assessment Factors

The completed HUD Environmental Review Form for this Proposed Action is included in **Attachment 6** for reference. It includes impact ratings, as well as A/B compliance or mitigation requirements for the 58.5 and 58.6 resource areas.

5.2.1 Land Development

Conformance with Plans / Compatible Land Use and Zoning / Scale and Urban Design

The Puerto Rico Planning Board approved the Municipal Zoning Plan (Plan de Ordenamiento Territorial) for the whole island in 2015. The Municipality of Adjuntas approved its Municipal Zoning Plan (Plan de Ordenamiento Territorial) for the Municipality in 2011 and the Municipality of Utuado approved its plan on May 8, 2023. The construction of the Proposed Action is included in all these plans as an essential transportation infrastructure element for the region.

The Proposed Action will have no impact on land developments for the area since the PR Planning Board and the Municipalities of Adjuntas and Utuado planning and zoning regulations have recognized and incorporated the corridor of the proposed action within their respective planning strategies and has classified the lands adjacent to it as non-developable. The Proposed Action is a full access control project and no direct vehicular access to the existing lands will be allowed.

The Land Use Plans of the Municipalities of Utuado and Adjuntas have classified the properties adjacent to the Proposed Action corridor as specially protected lands and do not allow any type of new development on them. Both Municipalities local planning regulations allow future developments in three nearby wards adjacent to the urban center, which are located west, north, and southeast. Page 115 of the Plan shows the land uses of the Municipality of Utuado. It is worth noting that the Plan is marked as a Draft, but it was approved by the Municipality on May 9, 2023, and it was approved and signed by the governor of Puerto Rico in December 2023. Therefore, the Plan has transitioned into a legally binding planning instrument.

In the Municipality of Adjuntas the lands are classified as non-developable land, but the classification is less strict for development than the one adopted by the Municipality of Utuado. Its land use plan allows for development west and south of its urban center and in some lands located north and northwest of the town. The Proposed Action is a full access control project and no direct access to the existing lands will be allowed. However, it is important to indicate the Proposed Action is included in the state transportation plan and there will be no encroachment on the protected lands. The Proposed Action will not increase the residential density of the area. The construction will take place within a corridor that has no impact on existing land uses, traversing through areas classified as non-developable land. Links for each municipality's land use information are:

https://jp.pr.gov/wp-content/uploads/2023/01/POT_Utuado-Fase-2-01.11.2023.pdf

https://jp.pr.gov/wp-content/uploads/2021/11/Adjuntas-PT-Programa-2011.pdf

Based on the review of the available information, the Proposed Action conforms with local land use and zoning plans developed for the area. Compliance with scale and urban design is not applicable to this Proposed Action since this is a highway construction project.

Assessment of this subject under the provisions of HUD regulations allows to assign an impact code of 2 (no impact anticipated) for the proposed action. There is little or no growth or land use change in the Proposed Action area. As mitigation measures, permits are required to be obtained or renewed prior to initiation of construction.

Soil Suitability/Erosion/Drainage/Storm Water Runoff

The Proposed Action's design requires the execution of soil geotechnical studies. These studies aim to assess the soil's properties to determine its capacity to withstand the loads imposed by the construction of structures and vehicles during the operation of the roadway. The findings from these studies will be relayed to the structural engineers, who will integrate these recommendations into the final design. This step ensures that the soil's suitability for the Proposed Action is adequately addressed.

The requirement to conduct these studies was explicitly specified by the DNER in their feedback on the project. This requirement stems from a review of geological data provided by the US Geological Survey for the area (USGS Open File Report 2020-1022, authored by K. S. Hughes and W. H. Schultz). The DNER highlights that, given the project's route through regions prone to landslides, the final roadway design must incorporate the recommendations derived from comprehensive geotechnical and geological investigations. This is essential to minimize risks associated with these natural conditions.

Concerning the geological conditions of the area, the DNER (please refer to the attached copy of the letter dated September 30, 2021 and October 25, 2021, and other relevant documents, along with the geotechnical studies for all Proposed Action sections in Attachment 22) has identified specific hazards and established mandatory requirements to address these issues during the Proposed Action design phase. It is imperative to adhere to these detailed recommendations. The recommendations are as follows:

- Adopt the recommendations of the geotechnical/geological studies aimed to be incorporated in the design of the roadway and structures.
- Notify the agency and others with jurisdiction, if superficial/underground bodies are found during the investigation or construction activities.

Recommendations for the design of the bridges that resulted from the evaluation of the already submitted H/H studies for the DNER review and approval are also mandatory.

Given the challenging terrain in the central to southern sections of the Proposed Action alignment, it's crucial to address how the Proposed Action will manage sedimentation and turbidity during the construction phase. Proper control of sediment transport to nearby bodies of water necessitates a multistage approach, which can be summarized as follows:

Planning Stage

In the planning stage, an initial assessment is conducted by reviewing publicly available information, such as:

- The Web Soil Map published by the Natural Resources Conservation Service (NRCS) (see Attachment 2, Figure 20)
- Topographic Quadrangle Maps published by the U.S. Geological Survey.

These sources provide fundamental data for understanding soil erodibility characteristics, site topography, and general site drainage patterns. This information helps identify areas of concern specific to the Proposed Action.

Design Phase

During the Proposed Action design phase, site-specific data is generated, including:

- Geotechnical Soil Reports: These reports offer detailed information about the soil properties at the project location, obtained from soil borings. They are used by structural and civil engineers to inform the project's design.

- Hydraulic/Hydraulics (H/H) Studies: These reports analyze stormwater flow through the project site based on engineering standards and specialized software. Government agencies typically require approval of these reports. In Puerto Rico, the Department of Natural and Environmental Resources (DNER) must approve H/H reports. These reports provide recommendations for designing a storm sewer system capable of handling the anticipated stormwater volume from the project.

Information gathered from these reports guides the civil engineer in designing the roadway and its storm sewer system. It is important to note that the storm sewer system's design must adhere to the Puerto Rico Planning Board Regulation for the Design, Criteria for the Operation, and Maintenance of Storm Sewer Systems (Regulation #40 as of April 19, 2023). This regulation represents an update from the previous version dating back to 1975, incorporating lessons learned from recent natural disasters and the impacts of climate change in Puerto Rico. Additionally, the Proposed Action's design must align with the PRHTA and FHWA Design Standards.

Given the challenging terrain in the central to southern sections of the Proposed Action alignment, it's crucial to address how the Proposed Action will manage sedimentation and turbidity during the construction phase. Proper control of sediment transport to nearby bodies of water necessitates a multistage approach, which can be summarized as follows:

Construction Phase

Before commencing construction, the Proposed Action owner or contractor is mandated to create a Storm Water Pollution Prevention Plan (SWPPP). This requirement arises because the earthwork activities for

the project exceed the one-acre threshold specified in 40 CFR Part 122 for construction projects. Developing the SWPPP involves a qualified individual performing the following tasks:

Site Assessment and Planning

During the site assessment phase of SWPPP preparation, the following considerations are essential.

- Understanding how stormwater currently flows from the site and identifying points of discharge or areas.
- Identifying slopes and their lengths, as these topographic features significantly impact erosion.
- Recognizing soil types, especially highly erodible soils, and their infiltration capacity.
- Identifying natural features such as trees, streams, wetlands, slopes, and other elements requiring protection.

As part of this task, a brief description of construction activities is provided, including project type, location, estimated start and end dates, activity sequence and timing, project size, estimated total excavation and grading areas, percentages of impervious areas before and after construction, and runoff coefficients.

Selection of Erosion and Sediment Control Best Management Practices (BMPs)

The EPA defines erosion and sediment controls as essential measures used during construction to prevent sediment from leaving the site (erosion control) and to capture any sediment moved by stormwater before it exits the site (sediment control). Erosion controls play a vital role in a sound SWPPP and serve as the primary defense against stormwater pollution. Sediment controls provide a secondary line of defense when erosion controls are correctly designed and installed. The specific Best Management Practices (BMPs) described in the SWPPP should reflect the unique site conditions.

Erosion control measures include:

- Reducing the disturbance of areas and protecting natural features and soil on the site.
- Phasing construction activities to control stormwater movement throughout the project.
- Managing stormwater that flows onto and through the project site.
- Stabilizing soils promptly.
- Safeguarding slopes.

Sediment control measures encompass:

- Protecting storm drain inlets.
- Establishing perimeter controls.
- Retaining sediments on-site and controlling dewatering practices. This involves using temporary sediment traps or sediment basins based on the project site's size to contain sediments, preventing them from reaching nearby surface water bodies. This measure effectively removes suspended solids from stormwater, reducing water turbidity.
- Establishing stabilized construction exits for the project.
- Inspecting and maintaining controls regularly.

Selection of Good Housekeeping BMPs

Construction projects, like the one discussed in this report, generate significant waste that, if not managed correctly, can contaminate stormwater runoff. Therefore, the SWPPP should incorporate good housekeeping practices to prevent stormwater contamination from material and waste management on the project site. The EPA identifies six key areas that should be considered in the SWPPP.

- Implementing effective waste management practices.
- Establishing appropriate building material staging areas.
- Designating paint and concrete washout areas.
- Establishing proper equipment and vehicle fueling and maintenance practices.
- Controlling equipment and vehicle washing and allowable non-stormwater discharges.
- Developing a spill prevention and response plan.

Developing Inspection, Maintenance, and Housekeeping BMPs

The effectiveness of erosion and sediment control BMPs, as well as good housekeeping and pollution prevention measures, hinges on the consistent and ongoing implementation of an inspection and maintenance schedule. Key considerations for SWPPP preparation include:

- Determining inspection frequency, as required by regulations and before/after expected rainfall events.
- Generating complete inspection reports and filing system.

Operational Phase

Before beginning construction activities, the contractor must meet two specific conditions:

- Obtain coverage under the 2022 Construction General Permit (CGP) issued by the EPA. This involves submitting a Notice of Intent (NOI) to the EPA at least fourteen (14) days before starting construction activities. The NOI submission requires a prepared SWPPP duly signed by responsible parties.
- Secure a Single Incidental Permit (SIP) from the Puerto Rico Permits Management Office (PMO). The SIP includes a Plan for the Control of Erosion and Sedimentation for the Proposed Action, similar but not identical to the SWPPP.

Before commencing actual construction activities at the site, both plans require the installation of necessary BMPs. This involves appointing a qualified person or engineer responsible for implementing the plans, conducting periodic inspections, and preparing required reports.

Typical BMPs used for highway construction projects involving earthwork activities include, but are not limited to:

- Constructing stabilized entrance and exit points for trucks.
- Installing silt fences at the lower portions of the project perimeter to retain sediments within the project premises.
- Promptly stabilizing exposed slopes, using methods such as hydroseeding and geotextile membranes.
- Creating ditches at the top of slopes to divert stormwater away from exposed soil areas.
- Constructing the storm sewer system promptly to manage stormwater runoff effectively.

- Implementing erosion protection measures at the discharge points of the storm sewer system, such as riprap.
- Installing silt fences around soil stockpiles.
- Constructing stormwater sediment traps and sedimentation basins as required for the project.
- Replanting vegetation on already completed exposed areas.
- Conducting regular BMP inspections and preparing reports, typically every seven days or after rain events exceeding 0.25 inches, as permitted by the 2022 EPA Construction General Permit (section 4.2 of the permit).

Regarding drainage, the Proposed Action design aims to maintain existing drainage patterns in the area. The design of the storm sewer system for the new roadway must adhere to the latest requirements of the PRPB, DNER, EPA and FHWA. The existing watersheds traversed by the Proposed Action are outlined in the Hydrologic-Hydraulic studies in Attachment 23. The Proposed Action area's drainage patterns remain largely consistent with those discussed in the FEIS, and adjustments made during the design stage to reduce earth movement have resulted in more bridge structures, further minimizing the impact on existing drainage patterns of the Proposed Action.

The proposed action will preserve natural drainage patterns and existing watercourses to the greatest extent possible while minimizing their disturbance during highway construction. Culverts are designed to allow water to flow beneath the road when it crosses natural watercourses. The size and design of culverts are chosen to maintain natural flow patterns and aquatic habitat, while preventing erosion and flooding. Roadside ditches are designed to collect and channel stormwater runoff, ensuring their size and slope are adequate to prevent erosion.

The proposed action is anticipated to lead to a rise in stormwater runoff volume reaching nearby surface water bodies. This increase is attributed primarily to the expansion of impervious areas, particularly the paved section of the proposed new roadway. However, the storm sewer system design for the Proposed Action involves analyzing before-and-after conditions through a Hydrologic-Hydraulic (H/H) study, discussed in section 5.1.10 of this report. The results of this study, combined with the applicability of the Regulation for the Design, Operation, and Maintenance of Storm Sewer Systems (Regulation #40 of April 19, 2023) from the Puerto Rico Planning Board, will be taken into account during the design phase of the proposed action.

The updated regulations now incorporate requirements to address recent storm impacts and climate change conditions, allowing for the inclusion of appropriate mitigation measures to minimize adverse impacts as part of the Proposed Action construction.

Assessment of Landslide Hazard Risks

The municipalities of Utuado and Adjuntas are in the central mountainous region of Puerto Rico, an area that is characterized by steep terrain, heavy rainfall, and the presence of weathered volcanic and sedimentary rocks, which can contribute to landslide occurrences.

The geology and topography of Puerto Rico has always made Puerto Rico susceptible to landslides. A recent hazard risk assessment report for Puerto Rico indicated the following:

- Landslides induced by heavy rain were one of the top three hazards impacting the island, second only to flooding and hurricane-force winds.
- For the two municipalities in which the PR-10 extension locates, Utuado and Adjuntas, landslide is the second highest hazard risk behind hurricane wind.
- The municipalities of Utuado and Adjuntas have very high to extreme susceptibility to landslides.
- PR-123 has an extreme susceptibility to landslides along most of the PR-10 extension.

A review of the PRHTA Geotechnical Engineering Office (GEO) database geotechnical reports revealed the following:

- Based on a review of more than 100 site locations along PR-10 and PR-123, there were at least 20 definite reports and 5 probable reports of documented landslide incidents, with 19 incidents along PR-10 and 6 incidents along PR-123. Most of these landslide reports are supported field observations and detailed subsurface exploration data including site photographs and measurements of slide areas, soil boring samples, rock cores, and inclinometer readings.

- Of these 25 geotechnical reports, there were four definite reports and two probable reports of documented landslide incidents within the 7.6-Km Utuado-Adjuntas extension of PR-10.

This data is considered in the design and construction phase of the Proposed Action. It is essential to reduce water runoff speed in steep terrain and adequately manage increased water flow to reduce or avoid landslide in this type of terrain.

The proposed completion of PR-10 between Utuado and Adjuntas provides a more stable north-south route that can reduce traffic delays from landslide damage along PR-123. Additionally, the Proposed Action would provide improved access to utility rights-of-way that can help facilitate post-disaster repairs to damaged electrical transmission lines.

The required steep cuts will be reinforced with a soil nails system which will protect the roadway against landslides and reduce the volume of cuts resulting in reduced environmental impacts. Twenty (20) bridges will be built to maintain free flow conditions to the rainfall water and avoid the washing-out of the embankments of the new road during heavy rainfall events.

Measures for the Proposed Action protection against landslides are as follows:

1. Site Evaluation and Planning: A thorough site evaluation through the planning process is being done and will continue during the design process, to assess the geological conditions, including slope stability, soil types, and drainage patterns. Areas prone to landslides will be identified to avoid construction of the road in high-risk zones, if possible.

2. Slope Stabilization Techniques: Slope stabilization measures will be taken as part of the design phase and construction phase. They will include techniques such as terracing, retaining walls, rock bolts, soil nails, and slope reinforcement with geosynthetic materials. The specific methods used will depend on the site conditions and engineering recommendations.

3. Drainage Systems: An effective drainage system will be designed and constructed to manage surface water runoff and prevent the accumulation of water on or near slopes. Adequate culverts, ditches, and channels will be installed to divert water away from the slopes and road surface. Proper drainage will aid in maintaining the stability of the slopes by reducing soil saturation and erosion.
4. Vegetation and Erosion Control: During the construction phase PRHTA has stated that it will implement measures to preserve or restore vegetation along slopes and in areas adjacent to the roadway. Planting trees, shrubs, and grass helps stabilize the soil, control erosion, and absorb excess water. PRHTA has also stated that it will incorporate erosion control techniques such as erosion control blankets, matting, or geotextiles to prevent soil erosion and promote vegetation establishment.

5. Retaining Structures: PRHTA has stated that it will design and construct retaining walls or embankments where necessary to support or stabilize slopes. Retaining structures will provide additional stability to steep or problematic areas along the roadway, reducing the risk of slope failure.

6. Regular Maintenance and Monitoring: PRHTA has stated that as part of the roadway operation that it will establish a regular maintenance program to inspect and address potential issues promptly. Regular monitoring of slope stability, drainage systems, and vegetation health is essential to identify any signs of instability or erosion. Implement early warning systems, such as slope sensors or rainfall monitoring, to detect changes that may indicate an increased landslide risk.

7. Qualified geotechnical, highway, and civil engineers, as well as other relevant professionals such as environmental professionals, will team up to ensure the design, construction, and maintenance of the roadway follow best practices and meet safety standards. Their expertise will help in conducting detailed geological surveys, analyzing slope stability, and recommending appropriate mitigation measures that will be considered in the design and construction phase of the Proposed Action.

Upon reviewing available information, it has been determined that an impact code 3 (slight adverse impact) is adequate for the Proposed Action. This determination is supported by the compromise to provide adequate mitigation measures described in this section as well as in section 5.3.

Hazards and Nuisances including Site Safety and Noise

The Proposed Action will have a minor adverse impact on Hazards and Nuisances for Noise. A Noise Study was performed, and results indicated that the existing noise levels do not exceed an Leq of 50.2 dB, which is considered “Quiet.” This would be less than the HUD action level DNL of 65 dB. Projection of future noise levels for the closest residential areas using applicable the FHWA and HUD noise impact criteria resulted in predicted noise levels below the threshold levels that are required to consider noise abatement mitigation measures (Leq = 67 dBA and DNL of 65 dBA respectively).

There will be noise associated with construction, including the blasting of some rocky areas. However, that noise is associated with road construction and will cease upon completion of the Proposed Action.

Additionally, safety measures must be taken during times of blasting activities to prevent injury to workers and other non-workers that may be in the area.

The use of explosives in the construction of a rural highway project is a highly regulated and controlled process that requires careful planning, preparation, and execution to ensure the safety of everyone involved. Environmental restrictions that will be implemented in during the construction phase of the proposed action to control the use of explosives include the following:

- To control the noise level, maximum noise levels will be established as well as limiting and restricting the times when explosives can be used.
- To control the air quality impact of explosives, dust and smoke control measures will be implemented, such as using water to suppress dust.
- Sediment control measures to prevent soil erosion and runoff and to contain any spills that may occur during the handling or storage of explosives will be implemented.
- To manage waste, waste management practices will be implemented, such as recycling or reusing materials where possible, and disposing of waste in accordance with local regulations.
- To protect wildlife, buffer zones will be established around sensitive areas, and construction activities will be scheduled to avoid critical periods of wildlife activity, such as nesting and breeding seasons.

The occurrence of landslides along the path of the Proposed Action corridor has been considered to pose a potential safety hazard during the construction and operation of the new roadway. As a result of the extreme rain events experienced in Puerto Rico in the aftermath of Hurricanes Irma and María, many landslides were documented on highways located mostly within the mountainous central portion of the Island. The Adjuntas and Utuado regions were not exempted from these incidents which were studies by the U.S. Geological Survey (USGS). This agency issued a map (see Attachment 2, Figure 21) depicting the potential for landslides for Puerto Rico on an area basis (landslide per square kilometer) in 2017. A review of report indicates that the Proposed Action area landslide density is estimated less than 25 landslides per square kilometer (landslide map Puerto Rico | U.S. Geological Survey (usgs.gov).

To adequately address this potential risk, the Proposed Action design incorporates the results of geotechnical studies as well as H/H studies. The geotechnical studies are required to analyze the geological conditions of the existing formations and type of soils found along the path of the Proposed Action corridor while the H/H studies analyze the current natural drainage patterns of the area to define adequate design measures aimed to minimize the potential damages resulting from the occurrence of landslides. The design is required by regulations and updated design practices, to consider the potential impacts of extreme weather events and experiences learned from the construction of section of PR-10 currently in operation. A detailed discussion of this subject has been incorporated in the previous section of the report entitled Assessment of Landslide Hazard Risks. This measure warrants that an adequate phasing of the construction activities will be developed as part of the recommendations of project

designer and would also incorporate BMPs designed to minimize the effects of erosion on the new formed slopes which may lead to unwanted landslides.

With respect to the potential risk of structural failures resulting from an earthquake, like the recent one that occurred on January 18, 2021, it is important to indicate that Puerto Rico is known to be in an active seismic zone. As a result of this condition, current Design and Building codes require to design seismic resistant structures to prevent catastrophic events to the extent possible. Therefore, the design of the Proposed Action incorporates seismic resistant measures which are based on the results and recommendations of the geotechnical and soil studies conducted for the Proposed Action. It should be noted that based on available information, no structures failure attributable to the referenced seismic event were reported for the Adjuntas and Utuado area. As matter of fact, no damage to sections PR-10 structures already in operation was reported.

Upon reviewing available information, it has been determined that an impact code 3 (slight adverse impact) is adequate for the Proposed Action. This determination is supported by the compromise to provide adequate mitigation measures described in this section as well as in section 5.3.

Energy Consumption

The Proposed Action will have no impact on Energy Consumption. The new roadway will require no energy consumption for its operation. However, portable sources of electricity consisting of emergency generators would be used during the construction phase of the Proposed Action. Current Proposed Action drawings do not include the installation of light poles since this is a Rural Roadway. Also, due to the presence of endangered/rare species near the Proposed Action corridor, the installation of lighting poles is not recommended. Installation of lighting fixtures in a rural area like the one being considered for this project may constitute a source of what is known as lighting pollution, which may cause disruption of the behavior of reptiles, mammals, and insects among others. Therefore, from a perspective of wildlife protection, the installation of lighting pole is not recommended for this proposed action. Upon reviewing available information, it has been determined that an impact code 2 (no impact) is adequate for the Proposed Action. This determination is supported by the characteristics of the Proposed Action.

5.2.2 Socioeconomic Conditions

Employment and Income Patterns

The Proposed Action is expected to have a positive impact on employment and income patterns in the area. During the construction phase, the Proposed Action will generate new job opportunities for residents and those in nearby municipalities. We estimated the number of new jobs that would be created during construction using an employment multiplier developed by the Puerto Rico Planning Board for construction projects. This estimation indicates that over 4,528 direct and indirect employment opportunities would result from the construction phase of the Proposed Action.

Once the Proposed Action is operational, it is not anticipated to bring significant changes to local employment opportunities or income patterns.
Although the Proposed Action does not directly provide access to businesses, the Land Use Plans of the Municipalities of Utuado and Adjuntas1 suggest that it will contribute to attracting tourists to the existing cultural, culinary, and scenic attractions within both municipalities. Additionally, it will facilitate the transportation of agricultural products from the region to external markets, enhancing cargo movement and service provision. These economic activities are expected to create new job opportunities.

However, according to current US Census data, the region is projected to experience a population decline, with both municipalities losing nearly 15% of their respective populations by 2045. Employment growth rates are also expected to decrease by almost 10% by 2045. Several factors contribute to this decrease:

- A significant decline in birth rates.
- A decrease in manufacturing employment due to changes in federal taxation policies, international competition, and increased automation leading to reduced employment.
- An increase in the rate of out-migration to other parts of the United States.
- The disruption of economic activity caused by Hurricane María and other events such as earthquakes and COVID epidemic.
- A long-standing fiscal imbalance, culminating in the appointment of a federal oversight board in 2017.

These factors collectively contribute to the projected population decline and slower employment growth in the region.

Aside from the construction, the Proposed Action would not employ additional personnel or affect income patterns. Therefore, there is no impact associated with this Proposed Action and an impact code of 2 (no impact anticipated) has been assessed for the Proposed Action.

Demographic Character Changes and Displacement
The Proposed Action is not expected to have significant impacts on demographic character changes and displacement. The acquisition of the Right of Way (ROW) necessary for the construction of the proposed action has already been completed, except for Section IV. The Right of Way acquisition plans developed by the Puerto Rico Highway and Transportation Authority (PRHTA) indicate that the remaining acquisition procedures will only involve vacant structures and properties, with no further relocation required.

It is important to note that the remaining acquisition process will adhere to the guidelines of the Uniform Relocation Act (URA) as mandated. As a result, the demographic character of the area has not been significantly altered, and most of the individuals who were relocated have been resettled in nearby areas within Adjuntas and Utuado.

[1] Adjuntas Land Use Plan(2011) at pages 67, 161 and 178 and Utuado Land Use Plan(2023) at page 146 and 147.

All acquisitions have been completed except for the ones pertaining to section IV in accordance with the URA. Based on available PRHTA records, acquisition affects only lots and structures. No family/business relocations are required. Therefore, applicable URA for relocations does not apply to the remaining section. In general, the demographic character change in the area has not been altered as a majority of the individuals relocated to nearby areas in Utuado and Adjuntas. Therefore, there is little impact associated with this Proposed Action and an impact code of 2 (no impact anticipated) has been determined appropriate for this subject.

5.2.3 Community Facilities and Services

Educational and Cultural Facilities

In the vicinity of the Proposed Action, there are no educational or cultural facilities. The closest such facilities are located in the towns of Utuado and Adjuntas, situated to the north and south of the Proposed Action boundaries. Based on the land use plans developed by these municipalities, there will be no direct or indirect impact on educational or cultural facilities due to the Proposed Action.

Due to the above-mentioned facts, an environmental impact code of 2 (no impact anticipated) has been assigned for the Proposed Action. While the Proposed Action is not expected to negatively impact these facilities, it will enhance residents' accessibility to the existing educational and cultural facilities in the area. An increase in tourism activities is also expected with the improved access to the region.

Commercial Facilities

The Proposed Action is expected to have a positive impact on commercial facilities. This is due to the improved terrestrial connection between the northern and southern parts of the island, which will facilitate the transportation of raw materials and finished goods in a safer and more efficient manner. The completion of the Proposed Action corridor may stimulate the growth of private commercial ventures and provide quicker travel routes that benefit commercial facilities.

After considering the available information, it has been determined that an environmental impact code of 1 (slight beneficial impact) is adequate for the Proposed Action.

Health Care and Social Services

The Proposed Action is anticipated to have a positive impact on health care and social services. The improved roadway will enhance access to hospitals, emergency facilities, clinics, and physician services. This improved accessibility will result from a safer and more modern route, increasing the availability of these services in the municipalities of Arecibo, Ponce, Utuado, and Adjuntas.

An environmental impact code of 2 (no impact anticipated) is adequate for this category of assessment.

Solid Waste Disposal / Recycling

The finished roadway will impact solid waste disposal and recycling. During the construction phase, a significant amount of construction debris is expected to be generated. To address this, a comprehensive operation plan must be developed by the selected contractor, covering the generation, handling, and disposal of construction waste. This plan must be approved by the Department of Natural and Environmental Resources (DNER) and should identify the permitted sanitary landfills that will receive the waste. Transportation of waste to these destinations must be carried out by DNER-approved transporters and accompanied by the required manifest for waste management, as per the Regulation for the Control of Non-Hazardous Solid Wastes.

A split 2 (no impact anticipated)/ 3 (minor impact anticipated) has been determined appropriate for this category of assessment. This rating is based upon the disparity between the finished roadway and the roadway construction. The finished roadway will not be associated with solid waste generation and will have no impact on these services. However, during construction, a significant amount of construction debris is anticipated to be generated. Because of this reason, mitigation will be required to address this condition and will consist of the preparation of an Operation Plan which must be prepared for the revision and approval of the DNER. These mitigation measures have been included in section 5.3.

Wastewater/ Sanitary Sewers

As the proposed action pertains to the construction of a new roadway and does not include offices or dwelling units, it is not expected to have significant impact on wastewater/sanitary sewers. However, during construction activities, minor impacts are expected, resulting from the generation of small amounts of wastewater by construction employees. To address this, portable toilets will be installed on-site and emptied by a licensed contractor who will transport the waste to an EPA/DNER permitted wastewater treatment plant facility. The contractor is required to develop a plan for handling and disposing of wastewater during the construction stage, subject to DNER approval.

As with the previous subject, a split rating of 2 (no impact anticipated)/ 3 (minor impact anticipated) has been determined to be appropriate for this category of assessment. The finished roadway will not be associated with wastewater generation and will have no impact on these services. However, during the construction, some wastewater will be generated. Therefore, mitigation will be required. Mitigation will consist in the preparation of a plan to be developed by the contractor and submitted for the review and approval of the DNER.

Water Supply

The Proposed Action will have no impact on water supply systems in terms of consumption. It will require only limited amounts of water for dust control, which may be sourced from non-potable sources. Water supply for construction purposes will be delivered using tank trucks, and no connections to existing Puerto Rico Aqueduct and Sewer Authority owned potable water utilities will be made when the Proposed Action is open for highway users. Thus, the water supply capacity for existing communities near the Proposed Action will remain unaffected. The Adjuntas Lake, located in proximity to the Proposed Action, is no longer

used as a source of potable water due to sedimentation effects. The protection of the water quality of this reservoir will be ensured by rigorous implementation of Best Management Practices (BMPs) during construction to minimize negative impacts from erosion and sedimentation resulting from earthwork activities. Implementation of the required erosion and sedimentation controls should minimize the adverse effects on this water source and other sections of the Rio Grande de Arecibo.

There are no water supply issues associated with the construction or operation of the roadway. Therefore, there is no impact associated with this subject for the Proposed Action and an environmental assessment factor of 2 (no impact anticipated) has being assessed.

Police, Fire, and Emergency Medical Services

The Proposed Action corridor is situated between the towns of Adjuntas (to the south) and Utuado (to the north). While the Proposed Action does not create a new terrestrial interconnection route between these towns, it will have a positive impact on Police, Fire, and Emergency Medical Services. The Proposed Action will provide a safer and faster route for responding to emergencies in the southern parts of Utuado and northern parts of Adjuntas. After the Proposed Action completion, PR-10 will also facilitate the coordination of resources for responding to natural disasters and emergencies requiring joint efforts between the municipalities. The Proposed Action will enhance accessibility for these services, especially for the local population of nearby rural municipalities like Lares.

The completion of PR-10 will provide an easier means of access for these services, and therefore, there is a potential for a minor benefit associated with this Proposed Action. Because of this reason an environmental assessment code of 1 (minor beneficial impact) has been assessed for this Proposed Action.

Parks, Open Spaces, and Recreation

There are no Parks, Open Spaces and recreation facilities within the corridor of the proposed action. The proposed action is not expected to have a direct negative impact on parks, open spaces, and recreation areas. A review of the National Park Service database and Google Maps aerial photographs identified specific resources such as Cancha Pellejas and the Guarionex Recreational Complex, none of which will be impacted by the proposed action because they are located far away from the footprint of the corridor. (see Attachment 2, Figure 22). The completion of PR-10 will provide safer and faster terrestrial access to these locations, resulting in a positive impact.

Since no parks, open spaces and/or recreation areas will be significantly impacted by the Proposed Action an environmental assessment code of 2 (no impact anticipated code) has been assessed for the Proposed Action.

Transportation and Accessibility

The Proposed Action's construction will significantly reduce travel times for both passenger and freight vehicles that currently rely on PR-123 between Adjuntas and Utuado. Based on traffic analysis and demand modeling of approximately 5000 vehicles per day on a 7.6-kilometer roadway, it is estimated that

the Proposed Action will save on average 11.96 minutes per vehicle for "on-peak" drivers and 10.76 minutes for "off-peak" drivers. These time savings translate into a reduction in Vehicle Hours Traveled (VHT) of 1,305,946 hours in the first year, with a total savings of 19,127,181 hours over the analysis period.

Additionally, the Proposed Action will lead to a substantial decrease in Vehicle Miles Traveled (VMT) for passenger and commercial freight vehicles, reducing total VMT by 3,503,467 annually through the analysis period. This reduction will result in cost savings, emissions reductions, and improved safety.

The completion of the Proposed Action will enhance accessibility between the north and south regions of the island, improving transportation routes for essential supplies and services. It will benefit residents by providing a safer and more efficient highway, leading to an improved quality of travel and facilitating the response to natural disasters. The Proposed Action will offer significant advantages for users, especially those commuting between Adjuntas and Utuado. In summary, the Proposed Action will have wide-reaching positive effects on both the south and north regions of the Island.

As previously mentioned, a traffic study conducted in 2021 for the Proposed Action forecasts that once the Proposed Action is operational, approximately 60% of the vehicular traffic will shift to the new roadway, while the remaining 40% will continue to use the existing PR-123. The primary goal of the Proposed Action is to enhance connectivity across the entire island by finalizing one of the limited transportation projects that spans from the northern to the southern regions. Completing this highway is one of the three critical road projects recognized by the PRHTA to ensure a robust transportation system for future emergencies.

The findings of the previously mentioned traffic study are applicable to all users of the proposed highway, with a particular focus on the current commuters between the municipalities of Adjuntas and Utuado. In essence, this Proposed Action will enhance access to medical services, facilitate goods and services movement, provide better access to parks, and enable a quicker response for residents in the event of natural disasters. The most significant benefit for future users of this Proposed Action will be a safer and more efficient highway, ultimately resulting in an improved overall travel experience.

Considering the enhancement of the accessibility and mobility of current users of PR-123 that will provide the Proposed Action, it has been determined that an environmental assessment code of 1 (minor beneficial impact) is appropriate for this Proposed Action.

5.2.4 Natural Features

Unique Natural Features, Water Resources

There are no unique natural features within the corridor that could be affected by the proposed action. The proposed action will have no significant impact on Unique Natural Features and Water Resources. The latest letter from DNER dated September 30, 2021, indicates (see Attachment 11) no impact from the proposed action to the water resources or other natural resources within surrounding areas. Attachment 23 includes the Hydraulic/Hydrologic (H/H) studies performed for the construction of the bridges of the

four (4) sections as well as the DNER endorsements for each one of the sections. In general, the agency provided the following recommendations throughout their responses for comments:

- For the construction of bridge BR-1 of Section II (AC-100069), the DNER establishes the need to secure a Nationwide Permit #14 from the USACE (already obtained).
- If a superficial or underground body of water is found, either perennial or intermittent, it shall be immediately notified to the DNER and/or other agencies with jurisdiction.

The construction and use of a highway, introduces three general potential water quality hazards:

- An increase in the volume of runoff due to additional paved areas.
- Temporary ground water contamination resulting from waste disposal or the use of contaminated fill material.
- A change in the quality of runoff water due to increased erosion during and after construction as well as additional pollution inherent to highway traffic.

It is rather difficult to predict the increase of water quality pollutants quantitatively resulting from the construction and operation of a new highway facility. However, it shall be indicated that currently, the operation of PR-123 already contributes to the generation of pollutants associated with the traffic flow in the area. After construction of the Proposed Action, it is reasonable to expect that the generation of pollutants resulting from the operation of the existing roadway would be transferred to the new highway while a reduction of the potential for the generation in the current PR-123 would occur. The following is a list of pollution sources affecting the quality of highway runoff:

Source	**Pollutant**
Vehicles	Lubricants, hydraulic flues, coolants, tire dust, dirt carried on undercarriages, fuel residue, particulate exhaust emissions, brake and clutch lining materials.
Street Surface Material	Asphalt and its decomposition products, aggregates and crack fillers.
Runoff from Adjacent Areas	Silt, leaves, grass clippings, soil stabilizers and growth control compounds.
Litter	Diverse items
Spills	Oil, gasoline, bulk goods, and other items
Sediments	Unprotected soil exposed during highway and bridge construction

It is anticipated that the contribution of the first five items towards the degradation of water quality will be so minor that extensive evaluation of the probable impact is not warranted. Normal operations of the facility will not generate large quantities of the above items to adversely impact water quality. However, the potential impacts of soil erosion require the adoption of temporary and permanent exposed soil protection measures discussed in other sections of this report. These measures would also help to address the generation, reduction and control of sedimentation and turbidity that, if not adequately controlled may affect the quality of the receiving bodies of water. The design of the proposed highway will include measures to avoid and/or minimize erosion, sedimentation, turbidity, and water pollution. These include the replacement of vegetation on exposed areas as soon as practicable, especially on slopes, construction of diversion swales at the top of newly formed slopes to minimize the entrance of run-on water to the Proposed Action site. Also, to reduce the contamination of stormwater runoff during the operation of the highway the following BMP have been incorporated in the design:

- A strip of vegetation has been provided between the roadway and the lateral swales that convey the stormwater runoff toward the discharge points;
- The discharge of the stormwater runoff associated with the operation of the bridges has been designed to occur either before or after the bridge and has been provided with oil/water separators to retain to the extent possible small leaks that may occur. This measure may also help to collect coarse sediments that may have reached this device.

A potential hazard exists along one kilometer of roadway which approaches the Lago Adjuntas. The lake is no longer operating as a source of potable water due to the cumulative effects of sedimentation in the lake. However, if a spill of toxic chemicals occurs on the road, the runoff would flow directly into the lake thereby contaminating the body of water. Therefore, erosion control measures must be complete and effective to avoid further impacts. The potential hazard of dangerous spills will be minimal because a new road designed at high safety standards will greatly reduce the possibility of accidents. It shall be also noted that existing PR-123 operating conditions present higher risks for the occurrence of spills that may affect the water quality of the Adjuntas Lake due to its geometrical limitations. The Proposed Action would improve this condition.

Consultation with the DNER indicates that no impact on the surrounding areas is expected based on the hydrologic surveys performed for the four sections. Therefore, an environmental assessment code of 3 (minor adverse impact) was assessed for this category. This will require adopting mitigations measures during the construction phase of the Proposed Action to protect the Rio Grande de Arecibo. These measures will be included in the SWPPP that will be prepared for the Proposed Action to secure coverage of the Construction General Permit (CGP) issued by the EPA.

Vegetation, Wildlife

A description of the existing vegetation (trees, shrubs, and herbs) along the path of the proposed action was included in the FEIS. An updated Flora and Fauna Study including a description of the vegetation for the present Proposed Action was prepared in 2002 and covered an area of approximately 50 – 60% of the total corridor of the Proposed Action. On more recent dates, extensive defoliation of the Proposed Action

area vegetation and habitat destruction occurred in the aftermath of hurricanes Irma and Maria in 2017. Nevertheless, subsequent site visits over these years and discussions with organizations knowledgeable in this field have revealed a gradual recovery in the local flora. A brief summary of the wildlife and vegetation description observed within the corridor of the Proposed Action, obtained from both the 2002 study and the survey for the detection of the presence/absence of the Broad-winged Hawk (Buteo platypterus brunnesceens) reports of 2013-14 included in Attachments 11 and 12 indicate that:

- "The area is located in the Subtropical Wet Forest life zone (Ewel & Whitmore, 1973) and it is composed by a combination of Sub-montane and lower montane wet evergreen forest/shrub and active/abandoned shade coffee, Sub-montane wet evergreen forest and pastures (Gould & et. al., 2008; Miller & Lugo, 2009)."

- "The diversity of the species is higher through the central portion of the alignment."

- "Understory is irregularly developed, frequently absent or undeveloped, possible due to clearing for coffee cultivation and Musa plantations and washing of deposited seed by runoff water on very thin litter mattress and very steep slopes. When present, it was composed by saplings of canopy species, remains of Coffea (arabiga and robusta) plantations, Cyathea arborea and Casearia guianensis."

Additional information about the existing vegetation along the path of the Proposed Action corridor can be obtained from page 9 of the field protocols to be implemented at the request of DNER and approved in September 30, 2021 for sections II, II and IV and in October 25, 2021 for section V. Copy of the protocols have been included in Attachment 14) which indicates that:

- "The area shows a matrix of young to moderate mature secondary forest with a mosaic of manmade features (roads, houses, power lines, etc.), Mussa and Coffea, both active and abandoned, plantations, bamboo groves, openings (pastures, shrub land, bare soil areas, etc.) and areas occupied by more mature, denser, and taller tracks of secondary forest. Residential dwellings are sparsely distributed, more common in Sections II, III and V. No active human dwellings were found in Section IV. However, several abandoned human dwellings, electric poles, shacks, and ornamental plants, indicates that this section supported a greater degree of human activities in the past. Aerial images taken in 1930's shows drastic deforestation and clearing implemented during those years in significant portions the proposed alignment. Some forest fragments which were spared may now have evolved to more mature secondary forest tracks.

- "Some forested areas are dominated by Cecropia peltata, Guarea guidonias, Zanthoxylum martinicense, Cordia sulcata, Inga laurina and Inga vera. This cover type contains tall (DBH >20", height>50') emergent trees of Ochroma pyramidale, Castilla elastica, Trichillia pallida, Guarea guidonias, Roystonea borinquena and Zanthoxylum martinicense. Around houses and roads was common the presence of fruit tree species like Mangifera indica, Mammea americana, Psidium guajava and Persea americana."

- "Understory is irregularly developed, frequently absent or undeveloped, possible due to clearing for coffee cultivation and Musa plantations and washing of deposited seed by runoff water on

very thin litter mattress and very steep slopes. When present, it was composed by saplings of canopy species, remains of Coffea (arabiga and robusta) plantations, Cyathea arborea and Casearia guianensis."

Further review of recent publicly available databases and reports providing information about the existing vegetation along the Proposed Action corridor was conducted and the results are summarized below. With respect to the studies, it is important to indicate that most of them have been conducted using remote sensing technology that allows the observation of the before and after condition of the vegetation. The information has been used by local and federal agencies to develop geospatial maps that may be accessed by the agencies and the public as a planning tool.

- A report titled "A Comprehensive Inventory of Protected Areas and Other Land Conservation Mechanism in Puerto Rico" was published by the International Institute of Tropical Dasonomy of the USDA Forest Service in August 20192. The report was prepared with the cooperation of the USFWS, DNER, PRPB, Caribbean Landscape Conservation Cooperative, Para la Naturaleza, Alma de Bahia, and Bahia Beach Resort & Golf Club. Geospatial inventories of protected areas and information pertaining to additional conservation mechanisms that were established to protect natural resources are useful in evaluating conservation effectiveness and supporting conservation planning at broader scale that can serve for long term objectives. It also indicates that the lack of a single inventory and common terminology among stakeholders in Puerto Rico was identified as a major limitation in planning and monitoring conservations effectiveness across the Island. To overcome the described conservation limitations, the report delineates a multiagency/organization effort aimed to facilitate communication between managers and stakeholders of protected areas toward an integrated system for the conservation of natural and cultural resources in Puerto Rico. As part of this endeavor, an inventory of protected public and private lands was developed and a map illustrating their location included in the report. Said figure incorporates the proposed action area (see Attachment 2, Figure 23). A review of the illustration discloses the fact that no critical or conservation designated area has been identified within the proposed action corridor which validates the results of previous studies. It's important to note that this document constitutes one of the most recent efforts designed by the entities to publicly disclose the location of areas which merit conservation measures based on the known data.

- Recent information about the condition of the vegetation along the path of the Proposed Action in the aftermath of Hurricane María was obtained to supplement available information about thus subject. To that end, specific information was obtained from the report entitled Impacts of Hurricane María on Land and Convection Modification over Puerto Rico which provides the result of the analysis which was conducted using LANDSAT-8 image mosaics to quantify the hurricane land modifications (2020). It is important to indicate the study was performed to assess the condition of the entire Island, which includes the Proposed Action area. The result of the analysis indicates that:

[2] Castro-Prieto, Jessica; Gould, William A.; Ortiz-Maldonado, Coralys; Soto-Bayó, Sandra; Llerandi-Román, Ivan, Gaztambide-Arandes, Soledad; Quiñones, Maya; Cañón, Marcela; Jacobs, Kasey R. 2019. A Comprehensive Inventory of Protected Areas and other Land Conservation Mechanisms in Puerto Rico. Gen. Tech. Report IITF-GTR-50. San Juan, PR: U.S. Department of Agriculture Forest Service, International Institute of Tropical Forestry.161 p.

- The before and after analysis of the Normalized Difference Vegetation Index (NDVI) indicated a decrease value across the Island after Hurricane María, particularly over El Yunque, along the north coast, and at the center of the Island.

- Based on the imagery analysis, it was estimated that before Hurricane María, approximately 53% of land cover was forest, with forests located along the south-central coast, largely virgin evergreen forests within El Yunque at the eastern side of the Island, dry/moist serpentine forest in the northwest and mostly moist forests in the central to eastern areas.

- Most of the forest cover island-wide apart from the south was severely impacted, with satellite imagery indicating a decrease from 53% to 11%. The northwest exhibits the most forest damage followed by the central region and El Yunque. The grass cover increased from 15.45 % to 26.30%.

.

The study concluded that Puerto Rico suffered significant damage to its land cover (excluding the south coast) and that approximately 80 % of the forest cover was affected.

- The PRPB has an online search engine known as Puerto Rico Interactive Map (http://gis.jp.pr.gov/mipr). Through this portal, a series of georeferenced maps is available for the public including ecological and flora/fauna resources. After consulting this reference, it was found that no protected forest nor endangered/rare habitats of plants were identified along the path of the proposed action corridor. Figures 24 A, 24B and 24 C illustrating the results are included in Attachment 2 for reference and validate findings other sources of information results.

Finally, it is important to indicate that continuous coordination with the DNER and USFWS has been maintained through the course of the years as evidenced by the record, to update the survey for the presence of protected flora species that may have been added to the list of rare/endangered species that would have trigger the need to comply with applicable requirements of Section 7 of the ESpA.

Wildlife

Regarding wildlife, studies conducted in 2002 for the flora/fauna, and 2013-14 for the Broad-winged Hawk (*Buteo platypterus brunnesceens*) disclosed the following findings:

- "Most of the animals observed in the study area are common species found in similar locations within the Island."
- "The diversity of the species is higher through the central portion of the alignment."
- "Since most of the study area has been used for coffee crops in the past, the abundance of animal species is low when compared to nearby forests such as Guilarte and Toro Negro Forests. The greater diversity and abundance of species was found at the central part because slopes in the mountains are higher thus limiting their use for agricultural purposes. Also, it was noted that greater biodiversity was observed at locations close to the river, especially nearby Adjuntas Lake."
- "Although not observed during the six (6) months of observations for the study, it is understood that some areas along the corridor near the Rio Grande Arecibo are suitable to constitute a habitat of the Epicrates inornatus, Puerto Rican boa.
- "The Broad-winged Hawk (Buteo platypterus brunnesceens) was not observed within the corridor of the Proposed Action."

To update previous findings about the wildlife resources identified through previous studies along the path of the proposed action corridor, a review of georeferenced sources of information for wildlife in Puerto Rico was conducted. The investigation resulted in the identification of the report entitled Puerto Rico State Wildlife Action Plan: Ten Year Review, (PRCWCS: ELEMENT 2 & 4). The report was developed by the DNER and the USFWS with the objective of assessing the progress of a comprehensive strategy for the conservation of Puerto Rico's wildlife resources and documented the progress made to accomplish among others, the following activities:

- Identify and address the conservation needs of Puerto Rico's fish and wildlife.
- Prioritize efforts for species with great conservation needs.
- Allow the DNER to work with partnerships to conserve, enhance and protect Puerto Rico's diverse, but not necessarily rare or at risk, fish and wildlife species.

The previously referenced report acknowledged that new species were identified and included in the plan and new and completed databases resulting from the terrestrial and aquatic gap analysis projects added. The plan also recognized that climate change is considered as a new stressor and threat for wildlife species and habitats and updated previous wildlife data such as:

- Updated Land Cover Map of Puerto Rico (see Figure **25A** in **Attachment 2**)
- Puerto Rico Land Stewardship Map (see **Figure 25B** in **Attachment 2**). The land stewardship is an interagency collaborative effort to update and existing, but not complete land stewardship layer of Puerto Rico. The figure identifies a total of 21 public land managers.
- Distribution of Critical Elements in the Natural Heritage Program (see **Figure 25C** in **Attachment 2**)

After reviewing the information obtained from this report, the presence of critical wildlife resources was not identified along the path of the proposed action corridor. Also, it shall be noted that the recommendations for the protection of the Puerto Rican boa (Epicrates inornatus) were addressed in section 5.1.7 Endangered Species through the acceptance of the PBO recommeded by the USFWS.

The new roadway construction entails the removal of vegetation and trees within the right of way, resulting in an impact on forested areas. After the construction is finished, there is a plan to revegetate exposed areas using methods such as hydroseeding, avoiding the use of impervious materials. While this commitment of resources is unavoidable, it is deemed necessary for the successful completion of the PR-10 construction. Following this, an agreement was established to acquire Hacienda Verde farm, encompassing 253.23 cuerdas (245.88 acres). As part of the agreement, 117 cuerdas (113.61 acres) of Hacienda Verde were designated for transfer to DNRE as compensation for the impacted trees and habitat loss, while the remaining area would serve as a mitigation bank for future projects.

In the context of the proposed action, PRHTA sought an exemption from conducting a tree inventory and suggested using the remnant lands of Hacienda Verde as compensation and mitigation for tree and habitat loss. On August 1, 2011, DNRE granted PRHTA the exemption from conducting a tree inventory for the proposed action. Both agencies agreed to transfer 253.32 cuerdas of Hacienda Verde as compensation

and mitigation, aligning with compliance requirements outlined in Regulation 25, Law 241 of 1999, and its Regulation Number 6765, addressing wildlife and vegetation management and conservation. The property transfer was officially completed through a deed signed in 2021. (**See Attachment 24**)

The agreement stipulates that PRHTA must contract a biologist for assessing the areas before commencing construction activities to identify the presence of state and federally protected, threatened, and/or endangered species. If such species are identified, individuals will be relocated to designated areas following approved protocols. Given these conditions, an environmental assessment code of 3 (indicating minor adverse impact) has been assigned to this category.

Concerning wildlife, the construction of the new highway may cause disruption along its path. However, the affected wildlife is expected to relocate to nearby areas. Consequently, there is no anticipated adverse impact, as the wildlife is expected to adapt to the new conditions, similar to what has been observed in sections of the already constructed PR-10. To obtain an updated endorsement of the DNER for the Proposed Action, the PRHTA sent a written request on January 9, 2024. In response to this request, the DNER issued a response on February 9, 2024 validating its previous endorsements for the project. Copy of this letter has been included in **Attachment 11**.

Other Factors

Climate Change and Hurricanes

"Climate change" refers to the gradual, long-term alterations in climate measures, encompassing factors like rainfall, temperature, and wind patterns.

To gain a comprehensive understanding of the broader implications of constructing rural highways on climate change, it is essential to adopt a holistic viewpoint. This entails evaluating various factors, such as the density of existing road networks in the region, traffic volume, travel speed, traffic patterns, induced travel effects, and the implementation of environmental mitigation measures.

Studies suggest that this region may experience a decline in economic activity, a reduction in population, and a decrease in job creation. Traffic studies also anticipate a modest annual traffic increase of approximately 1 to 1.2% over the next two decades, while land use and transportation plans for this region do not include any future major highway projects.

The proposed highway construction will fulfill the originally planned route, potentially boosting economic development by enhancing access to markets, services, and employment opportunities that are presently more accessible. This, in turn, could reduce the dependence on high-carbon emission economic activities within the agriculture sector or manufacturing in favor of lower-emission service and knowledge-based industries.

It is important to note that there are no activities associated with the construction and operation of PR-10 that would have a significant impact on climate change.

The proposed action offers several positive outcomes in this context. It enhances transportation efficiency by improving connectivity and reducing travel time. This improvement is expected to lead to optimized fuel consumption and a reduction in vehicle emissions per unit of distance traveled, potentially resulting in lower greenhouse gas (GHG) emissions. In the first year of benefits, it's estimated that the Proposed Action will reduce the total Vehicle Hours Traveled (VHT) by 1,305,946 hours, with a total time savings of 19,127,181 hours over the analysis period.

Furthermore, the Proposed Action will lead to a decrease in Vehicle Miles Traveled (VMT) for both passenger and commercial freight vehicles. This reduction is primarily due to the shorter distance along the new PR-10 connector compared to the existing comparable portion of PR-123. This difference will result in an annual reduction of 3,503,467 total VMT throughout the analysis period. This reduction in VMT will contribute to lower emissions, thus helping mitigate the negative impacts of climate change.

To address environmental concerns, the Proposed Action includes various mitigation measures. These measures focus on protecting and restoring natural habitats, implementing green infrastructure practices, and promoting sustainable construction techniques. By mitigating the environmental impact of construction and either preserving or enhancing ecosystem services, these measures can actively support climate change adaptation and mitigation efforts. The overarching goal is to safeguard the road infrastructure from climate change impacts and prevent any increase in vulnerability in the surrounding area due to these impacts.

To safeguard the Proposed Action from potential adverse impacts of climate change, measures are being integrated into both its design and construction phases to the extent feasible. The PRHTA aims to address climate change effects in multiple ways to reinforce the primary goal of enhancing user accessibility and mobility. These efforts will focus on:

- Protecting the road infrastructure from the effects of climate change.
- Ensuring that the road infrastructure does not exacerbate the vulnerability of the surrounding area to climate change impacts.

Climate change can significantly affect rural highway construction in mountainous regions, presenting unique challenges that must be considered during planning, design, and maintenance. Specific impacts include:

- Increased landslides and rockfalls due to more intense rainfall events and changing precipitation patterns.
- Higher temperatures and extreme heat affect worker safety and pavement materials.
- Changes in hydrology and drainage, leading to increased runoff and flash floods.
- Spread of invasive species and pests affecting slope stability and vegetation health.

To adapt to these climate change impacts and ensure highway construction resilience in mountainous areas, the following strategies will be employed:

- Thorough site assessments and consideration of future climate projections during the design phase.
- Use of climate-resilient and durable construction materials.
- Implementation of slope stabilization and hazard mitigation measures.
- Construction of culverts and bridges to handle increased water flow during intense rainfall.
- Integration of eco-friendly construction practices to minimize environmental impacts.
- Measures to prevent riverbank erosion, such as riprap or vegetation stabilization.
- Consideration of flood risk assessments and adequate drainage systems.
- Design and placement of bridges to accommodate potential changes in river flow and water levels.
- Implementation of erosion and sediment control measures during construction to maintain water quality.
- Efforts to minimize disturbances to aquatic habitats during construction.
- Consideration of potential bridge scour due to altered river flow patterns.
- Regular maintenance of bridges to prevent structural damage and ensure stability.

These measures and strategies will enhance the Proposed Action resilience to climate change impacts while promoting the safety and sustainability of the highway infrastructure.

Considering the scope of the proposed action, it is understood that there are no activities associated with construction and operation of PR-10 that would significantly contribute to climate change. Therefore, an environmental assessment code of 2 (no impact anticipated) has been assigned to this category.

Hurricanes in Puerto Rico

Puerto Rico is located in a region prone to tropical storms and hurricanes within the Caribbean. As a result, the local population and agencies are well-prepared to create plans aimed at aiding the deployment of emergency response teams and equipment during the hurricane season. The hurricane season, as established by the National Weather Service (NWS), runs from June 1st to November 30th for Puerto Rico and the U.S. Virgin Islands. The most recent hurricanes to affect the island were Hurricanes Irma (on September 6, 2017), María (on September 20, 2017) and Fiona (on September 18, 2022).

In light of these frequent hurricane events and recent studies conducted by government entities like the NWS, researchers have been investigating the potential connection between climate change and the frequency and intensity of hurricanes. Scientists are particularly concerned about how the higher temperatures of sea waters might be influencing hurricane intensity. Recognizing the existence of climate change in the scientific community, the National Oceanic and Atmospheric Administration (NOAA) has initiated studies to establish a link between hurricane frequency and intensity in the Caribbean. One such study, (Global Warming and Hurricanes – Geophysical Fluid Dynamics Laboratory (noaa.gov)), concludes:

"In summary, our model projections and analyses do not support the idea that greenhouse gas-induced warming will significantly increase the number of tropical storms or hurricanes in the Atlantic. There is evidence of increased hurricane rapid intensification, but this may be due to internal climate variability rather than anthropogenic forcing. While some studies suggest anthropogenic influences on hurricane

precipitation in Texas and Puerto Rico, more research is needed for definitive conclusions. The cause of a slowing of tropical cyclone propagation speeds over the continental U.S. since 1900 remains uncertain.

Regarding future changes, several climate modeling studies project that climate warming will lead to higher rainfall rates and increased hurricane intensity in the Atlantic in the coming century. Coastal inundation levels related to tropical cyclones are also expected to rise with projected sea level increases. Additionally, there is uncertainty about the frequency of Atlantic tropical storms and very intense hurricanes in a warming climate."

Based on the available information, including recent anecdotal data, it is clear that hurricanes are becoming more intense in terms of wind speed and precipitation rates. This has a noticeable impact on the stability of structures and the management of stormwater in the infrastructure and water bodies. To adapt to these new conditions, the Proposed Action design incorporates measures to construct resilient structures, handle increased stormwater, and safeguard bridge structures and exposed slopes to prevent landslides. These measures are discussed in more detail in other sections of this document, see in Section 5.2.1, Soil Suitability/Erosion.

Finally, information obtained from NOAA, provide support to the statement that the municipalities of Adjuntas and Utuado have experienced significant accumulated rainfall, approximately 18 inches after Hurricane María and between 14 to 18 inches after Hurricane Fiona. Both hurricanes exhibited extreme intensity, leading to the defoliation of the area's vegetation, particularly in forested areas, and causing landslides that disrupted traffic on PR-123 and many secondary municipal roads. The damage from both hurricanes resulted in disruptions in road operation, along with power outages and water supply disruptions. The Proposed Action aims to provide a safer route for faster government agency responses, reducing the hardships faced by the local population. The Proposed Action design will incorporate the most up-to-date construction codes.

Earthquakes

In general, and as per information published by the USGS, it is a fact that Puerto Rico lies in a tectonically active region where earthquakes have occurred for centuries. However, the Island has not experienced an earthquake of the level of the one that occurred on January 7, 2020, since 1918, the recent quakes, their aftershocks, and resulting damage took the population by surprise. It caused widespread damage and power outages, more extensively in the southern part of the Island. The earthquake was caused by the oblique faulting of the Caribbean and the North American plates. The municipalities of Guánica, Guayanilla, Peñuelas and Ponce experienced extensive damage to their structures.

The Proposed Action area did not experience extensive damage except for some limited structural damage and the terrestrial highway network for the area did not experience significant damage. No environmental impacts within the corridor of the proposed action were identified during these events.

Since the proposed structures are being design in accordance with stringent design codes that require the construction of earthquake resistant structure and the recommendations of the geotechnical studies, it is

understood that the Proposed Action shall be capable to withstand future earthquakes to the extent that current knowledge allows.

5.2.5 Greenhouse Gases

The emission of Greenhouse Gases (GHGs), which are known contributors to climate change, is a worldwide concern. While natural climate variations have occurred throughout Earth's history, the current consensus is that the planet's climate is changing at an accelerated rate. This trend is not anticipated to reverse in the foreseeable future, and scientific evidence suggests that human activities are playing a significant role in this acceleration. The most prominent anthropogenic GHG is Carbon Dioxide (CO2), responsible for most of the human-induced warming. While CO2 naturally occurs in the carbon cycle, human activities, such as burning fossil fuels, have significantly increased atmospheric CO2 levels. Other noteworthy GHGs related to transportation include methane (CH4) and nitrous oxide (N2O).

Under NEPA regulations, an in-depth environmental analysis should focus on issues that hold significance and relevance for decision-making. A review of the Proposed Action scope and local conditions reveals that:

- The Proposed Action has a limited geographic footprint.
- Land uses in the Proposed Action corridor are governed by established Land Use Plans.
- The area is predominantly rural with scattered residential developments.
- No substantial industrial activities are planned or exist in the region

Current vehicular traffic between Adjuntas and Utuado predominantly uses PR-123, which runs close to the Proposed Action alignment. Recent traffic studies indicate that after the Proposed Action's completion, the expected increase of traffic volumes on PR-123 and the new PR-10 section will be minimal. Consequently, the construction of the Proposed Action is not anticipated to result in significant changes in GHG emissions within the local air basin. GHG sources, rural transportation projects are likely to have relatively small potential GHG impacts.

Nevertheless, it is essential to recognize that the proposed action brings several favorable outcomes in this context. The majority of GHG emissions from transportation come from carbon dioxide (CO2) released during the combustion of petroleum-based products in internal combustion engines. The most significant sources of transportation-related GHG emissions include passenger cars, medium and heavy-duty trucks, and light-duty trucks, including SUVs, pickup trucks, and minivans. These sources account for over half of the emissions from the transportation sector. In 2020, the average fuel economy for cars and light trucks was 22.9 miles per gallon, with each gallon of gasoline burned emitting 8.89 × 10-3 metric tons of CO2.3 The average passenger vehicle emits about 400 grams of CO2 per mile.4

[3] https://fueleconomy.gov
[4] https://epa.gov/energy/greenhouse-gas-equivalencies-calculator

The proposed action enhances transportation efficiency by improving connectivity and reducing travel time. This improvement is expected to lead to optimized fuel consumption and a reduction in vehicle emissions per unit of distance traveled, potentially resulting in lower GHG emissions. In the first year of benefits, it's estimated that the Proposed Action will reduce the total Vehicle Hours Traveled (VHT) by 1,305,946 hours, with a total time savings of 19,127,181 hours over the analysis period. Additionally, it will lead to a decrease in Vehicle Miles Traveled (VMT) for both passenger and commercial freight vehicles. This reduction is primarily due to the shorter distance along the new PR-10 connector compared to the existing comparable portion of PR-123. This difference will result in an annual reduction of 3,503,467 total VMT throughout the analysis period, contributing to lower emissions and helping mitigate the negative impacts of climate change.

5.3 Control Monitoring, Mitigation and Environmental Commitments

Mitigation measures and environmental commitments have been adopted by PRDOH to reduce, avoid, or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with applicable regulations. These measures must be incorporated into project contracts, development agreements, and other relevant documents. The staff responsible for implementing and monitoring mitigation measures will be clearly identified in the mitigation plan. The following table provides a summary of the mitigation measures required for this project.

Table 4: Summary of Mitigation Measures

Law, Authority, or Factor	Mitigation Measure
Contamination and Toxic Substances- 24 CFR Part 58.2 (i)(2), 23 CFR Sec. 771.119 and 42 U.S.C. Chapter 82	Obtain permit from DNER/PMO for the closure of the septic tank found, including the disposal of contaminated debris at approved DNER/EPA facilities. If demolition debris is generated during the construction activities, testing for the presence of ACM and LBP will be conducted on the wastes prior to disposal in compliance with the DNER/EPA regulations. Testing ACM/LBP will be performed only by accredited inspectors and management and disposal of the waste at approved facilities after securing the necessary DNER permits. Waste containing paints, and/or other types of organic solvents will be tested as per RCRA regulations and disposed of only at approved DNER/EPA facilities. Responsible Entity: Contractor
Endangered Species Act of 1973, Section 7: 50 CFR Part 402, 16 U.S.C.	Implementation of Sections 6.4 and 6.5 of the PBO (**Attachment 10**) required to be adopted by the USFWS. These sections pertain to the management of Puerto Rican boas that may be found during the

1536, Section 7 and 23 CFR Sec. 771.119	clearing and grubbing and construction activities stages of the project. Vegetation clearing and earthwork activities shall be performed outside the breeding season of the four endangered species described in Section 5.1.7 (January to July) during the project construction phase. Responsible Entity: Contractor, PRHTA, FHWA
Explosive and Flammable Hazards – 24 CFR Part 51, Subpart C and 23 CFR Sec. 771.119	Use of explosives for the construction of the Proposed Action will be controlled so that no adverse impact is identified to human health or the environment. The contractor shall secure DNER a permit for the use of explosives and manage them accordingly to permit requirements and PRHTA construction specifications. Blasting of rocks outcrops shall not be performed during the breeding season of the four endangered species described in Section 5.1.7 during the breeding season (January through July) as required by USFWS/DNER. Also, the PMO/DNER Single Incidental permit that must be secured prior to start project construction, requires to notify the residents in advance of the use of explosives and to document that vibrations resulting from the blasting operations does not result in damages to nearby structures, if present. This may require the use of seismographic equipment. Responsible Entity: Contractor
Floodplain Management Executive Order 11988, Section 2(a): 24 CFR Part 55 and 23 CFR Sec. 650A	All requirements of the 8-Step Decision-Making Process and the conditions of the Nationwide 14 USACE permit as described in Sections 5.1.10 and 5.1.15 and **Attachments 15**, and 16 must be followed during the construction of the Proposed Action. Responsible Entity: PRHTA, PRDOH
Wetlands Protection Executive Order 11990, Sections 2, and 6 and 23 CFR Sec. 777	All requirements of the 8-Step Decision-Making Process as well as in the Nationwide Permit SAJ-2021-01875 (NW-AMG) issued by the USCE for section II must be complied with during the construction of the Proposed Action. Responsible Entity: Contractor, PRHTA, PRDOH

Soil Suitability/Slope/Erosion/Drainage/ Storm Water Runoff	PRHTA will meet requirements from DNER regarding geological hazards as per the recommendations of the geotechnical studies. Also, as a mitigation measure, the selected contractor will be required to prepare and submit for approval the following permits: 1. Construction General Permit (CGP) from the EPA which requires to develop a SWPPP and obtain coverage of the permit by filing a Notice of Intent (NOI). This requires implementing BMPs and performing regular inspections of the project construction site. Inspection reports are also required to be prepared and kept on files for review by EPA officials, if required. The development of the SWPPP requires the design of site specific BMPs such as: • Stabilized project entrance/exits. • Trucks tire washing area at entrance/exits. • Installation of perimeter erosion control along the project construction areas (silt feces, haystacks, etc.) • Phased construction activities. • Control for stormwater flowing onto and through the project. • Project potentially erodible material exposed by excavation and borrow/fill operations will be minimized. • Cut and fill side slopes will be treated as excavation takes place by loaming, seeding, and mulching side slopes, thereby dissipating water energy and protecting otherwise unprotected soil. • Sedimentation basins will be constructed to remove sediment from runoff during the construction before the water reaches surface bodies of water. • Special treatment such as stone blankets, terraces, pipes berms, dams, and slope basins are recommended for problem areas where significant erosion potential may exist (i.e., near Lago Adjuntas) • Crushed stone at culvert inlets and outlets, ditches and other sloped channels is recommended to minimize erosion by acting as a water flow energy dissipator. • Portable toilets must be provided during construction and disposed of at a DRNE/EPA approved facility. • The effects of increased runoff should be minimized through design to maintain the hydrologic balance of the water-shed area.

	2. At a local level, contractors shall prepare and submit a Plan for the Control of Erosion and Sedimentation to the DNER/PMO which is part of the SIP required for the construction of projects. Said plans shall provide comprehensive BMPs to protect the Rio Grande de Arecibo and in particular the Adjuntas Lake from the negative impacts resulting from the effects of erosion and sedimentation. The DNER required the adoption of the following measures: • Performance of geotechnical/geological studies aimed to obtain specific recommendations for the design of the roadway and structures • Notify the agency and others with jurisdiction, if superficial/underground bodies are found during the investigation or construction activities • Recommendations for the design of the bridges that resulted from the evaluation of the H/H studies submitted for their review and approval. Adoptions of the design recommendations are mandatory. The contractor would be required to monitor water quality for parameters such as turbidity to ensure that BMPs are functioning adequately. For the protection of the project from the effects landslides, the following mitigation measures are required to be implemented: 1. Site Evaluation and Planning: A thorough site evaluation through the planning process is being done and will continue during the design process, to assess the geological conditions, including slope stability, soil types, and drainage patterns. Areas prone to landslides will be identified to avoid construction of the road in high-risk zones, if possible. 2. Slope Stabilization Techniques: Slope stabilization measures will be taken as part of the design phase and construction phase, to enhance the stability of slopes along the roadway. They will include techniques such as terracing, retaining walls, rock bolts, soil nails, and slope reinforcement with geosynthetic materials. The specific methods used will depend on the site conditions and engineering recommendations.

	3. Drainage Systems: An effective drainage system will be designed and constructed to manage surface water runoff and prevent the accumulation of water on or near slopes. Adequate culverts, ditches, and channels will be installed to divert water away from the slopes and road surface. Proper drainage will aid in maintaining the stability of the slopes by reducing soil saturation and erosion. 4. Vegetation and Erosion Control: During the construction phase PRHTA has stated that it will Implement measures to preserve or restore vegetation along slopes and in areas adjacent to the roadway. Planting trees, shrubs, and grass helps stabilize the soil, control erosion, and absorb excess water. PRHTA has also stated that it will incorporate erosion control techniques such as erosion control blankets, matting, or geotextiles to prevent soil erosion and promote vegetation establishment in newly formed slopes as well as other non-paved areas as soon as practicable 5. Retaining Structures: PRHTA has stated that it will design and construct retaining walls or embankments where necessary to support or stabilize slopes. Retaining structures will provide additional stability to steep or problematic areas along the roadway, reducing the risk of slope failure. 6. Regular Maintenance and Monitoring: PRHTA has stated that as part of the roadway operation that it will establish a regular maintenance program to inspect and address potential issues promptly. Regular monitoring of slope stability, drainage systems, and vegetation health is essential to identify any signs of instability or erosion. Implement early warning systems, such as slope sensors or rainfall monitoring, to detect changes that may indicate an increased landslide risk. 7. Qualified geotechnical, highway, and civil engineers, as well as other relevant professionals such as environmental professionals, will team up to ensure the design, construction, and maintenance of the roadway follow best practices and meet safety standards. Their expertise will help in conducting detailed geological surveys, analyzing slope stability, and recommending appropriate mitigation measures that will be considered in the design and construction phase of the project. Mitigation measures aimed to minimize the carryover of pollutants to nearby surface bodies of water during the operation of the Proposed Action have been identified for its adoption as part of the roadway design. They are:

	1. A strip of vegetation has been provided between the roadway and the lateral swales that convey the stormwater runoff toward the discharge points; 2. The discharge of the stormwater runoff associated with the operation of the bridges have been designed to occur either before or after the structure and has been provided with oil/water separators to retain to the extent possible small leaks that may occur. This measure may also help to collect coarse sediments that may have reached this device. Fuels and oils stored on the Proposed Action site shall comply with 40 CFR Part 112, if applicable. This regulation requires the development of a Spill Prevention Control and Countermeasures (SPCC) Plan. The applicability of this regulation is triggered whenever the total aggregate storage of oil, within the context of the regulation, exceeds 1,320 gallons. Aboveground storage of oils, including drums of 55 gallons, shall incorporate secondary containment measures and the performance of regular inspections, among other requirements. Responsible Entity: Contractor, PRHTA, PRDOH
Hazards and Nuisances, including Site Safety and Noise	The following noise pollution control measures will be incorporated during construction activities: 1. Equipment must be fitted with noise suppressing devices and adequately maintained and repaired to minimize noise impact. 2. Construction activities should be limited to the daylight hours. 3. Access to construction sites shall be located on more isolated routes to minimize the noise impact on residential areas, schools, etc. 4. Pile driving activities should be conducted during hours in which the serenity of the surrounding neighborhoods is less disturbed. 5. Additionally, a plan for blasting activities to prevent injuries and information to residents must be developed as part of the construction phase of the Proposed Action. For controlling air pollution during construction, the following measures must be complied with: 1. Emissions from the construction equipment to be used during construction shall be minimized and controlled by close supervision of the maintenance and repair schedule of the contractor.

	2. To the extent possible, modern equipment will be required to be fitted with EPA mandated emission control equipment, as applicable. 3. Burning of trees and shrubbery for clearing purposes and/or the burning of trash within the construction site is not permitted. 4. Dust emissions from earthwork related operations shall be controlled by adequate means such as sprinkling of water using tank trucks. 5. Loading truck areas shall be covered with tarpaulins to prevent dust emission while transporting their loads. Responsible Entity: Contractor
Solid Waste Disposal/ Recycling	Initial earthwork activities will require to conduct a clearing and grubbing operations that will result in the generation of a combination of superficial soil and vegetation, shrubs, trees, etc. The upper cover of soil will be stored in stockpiles for its use as top soil once the grading/construction activities are completed. Areas designated for the storage of this material, shall be provided with BMPs such as the use of silt fence around the perimeter of the area to minimize the effect of erosion and other as required by the CES Plan and SWPPP that shall be prepared for the project. Construction solid wastes to be generated by the construction activities will be stored in covered waste bins and/or sheds as determined in the SWPPP. With respect to material that will be transported to either a final waste disposal facility or to a construction project requiring such material, the following measures will apply: 1- Transport will be conducted using only permitted DNER transporters and the cargo area shall be provided with tarpaulins to minimize the emission of dust while in transit. 2- Surplus material could be transported only to projects with valid construction permits issued by PMO, with approved CES Plans and SWPPP, as applicable. 3- Management of the material shall be planned and coordinated as a function of the project development and coordinated between sections construction schedules.

	At a local level, an Operation Plan must be developed to address the generation of solid waste handling and disposal for the construction of the Proposed Action. This plan must be approved by the DNER/PMO and shall comply with applicable regulations for the management and disposal of such waste using qualified personnel. Consideration of the adoption of waste recycling practices such as the shredding of vegetative material that may be used to produce mulching for erosion control at the proposed action site shall be included in the plan as well as other ones deemed appropriate. Compliance with 40 CFR Part 122 of EPA regulations also require the owner/contractor to develop a SWPPP which also incorporates specific BMPs for the adequate management of solid wastes to be generated by the construction activity. Responsible Entity: Contractor/PRHTA/ PRDOH
Wastewater/Sanitary Sewers	Portable toilets will be provided for employee use during construction activities. The contractor shall be responsible for providing regular disposal of the wastewaters at approved sewage treatment facilities and transportation performed only by DNER approved transporters. A written plan must be developed to address the generation of wastewater handling and disposal during the construction of the Proposed Action. The plan must be approved by the DNER/PMO. Responsible Entity: Contractor
Vegetation, Wildlife	Perform monitoring of the areas prior to construction to detect and manage any species in accordance with DNER approved protocols. This activity shall be performed by a qualified resident biologist. Responsible Entity: Contractor, PRHTA, PRDOH
Historic	An archaeological monitoring shall be performed during the construction phase of Sections III and IV of the projects as required by the PRIC. As per the agency request, an archaeological monitoring plan must be submitted for advance review and approval. Responsible Entity: PRHTA, PRDOH

Other	Measures for Adapting Project Design and Operation to Climate Change and Hurricane Impacts 1. Through site assessments and considerations of future climate change projections during the design phase. 2. Use of climate-resilient and durable construction materials. 3. Implementation of slope stabilization and hazard mitigation measures. 4. Construction of culverts and bridges to handle increased water flow during intense rainfall. 5. Integration of eco-friendly construction practices to minimize construction impacts. 6. Adopt measures to prevent riverbank erosion, such as riprap or vegetation stabilization. 7. Consideration of flood risk assessments and provide adequate drainage systems. 8. Design and placement of bridges to accommodate potential changes in river flow and water levels. 9. Implementation of erosion and sediment control measures during construction to maintain water quality. 10. Incorporate efforts to minimize disturbances to aquatic habitats during construction. 11. Consideration of potential bridge scour due to altered river flow patterns. 12. Regular maintenance of bridges to prevent structural damage and ensure their stability. 13. Proposed Action Design must incorporate the Critical Infrastructure Hazard Mitigation recommendations developed by HUD. During construction All permits required for construction activity shall be reviewed and updated, if needed. • Single Incidental Permit from the PMO • Construction General Permit from the EPA • Permit to use explosives from the DNER

	• COE permit for sections II, IV and V, if required Hydrology Commitments The following commitments apply to the hydrologic component of the project: • Two percent minimum cross slopes are to be provided in the roadways so that effective drainage will be accomplished across the surface of the pavement and down the side sloes of the embankment. • Where existing terrain slopes toward the embankment or where protection of adjacent properties is required, interceptor ditches will be provided to interrupt and channel the overload flows to proper discharge locations. • At high fill and deep cut areas, special erosion controlling methods will be introduced to secure stable side slope conditions and to prevent sliding. • Where a depressed median is designed, drainage will be performed by median inlets spaced approximately 100 meters on centers and connected to reinforced concrete pipes that will discharge into lateral interceptor ditches. • In flood plains, large equalizing drainpipes will be placed across the highway to control the extent of these floods and to minimize any higher flood levels that would otherwise result from damming this area by the proposed highway. • Drainage will not be combined with sewage and will not be carried across natural drainage divide unless such modification is already in existence. • Bridge openings will be designed to accommodate coincident with a flood of 100-year frequency. Responsible Entity: Contractor, PRHTA, PRDOH Relocations and/or Displacements Remaining acquisitions of the remaining properties located in section IV of the proposed action ROW will not require the displacement of families or business as indicated in section 1.3 of the EA. As applicable, those acquisitions will be conducted in compliance with the requirements of the URA.

5.4 Cumulative Impacts

The assessment of cumulative impacts is required by the Council of Environmental Quality (CEQ) NEPA regulations. Cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (state or federal) or person undertakes such actions (40 CFR 1508.7). The study area for this analysis is defined as the corridor of the PR-10 defined as the Proposed Action and that corresponds to the Project as presented in the EIS/Reevaluations and its immediate surroundings. Therefore, the existing and future conditions of this area are the subject of this analysis.

To identify and assess the potential for cumulative impacts of a proposed action, there is a requirement focusing on the nature of the Proposed Action, the organization and composition (i.e., ecological structure, connectivity, and land use) of the affected environment, and those actions that have already contributed to the existing environment, and those that could in the foreseeable future. To provide relevance to the assessment, it is important to identify the specific resources that may be significantly affected over time.

As discussed in section 5.2.1 Land Development, current local zoning maps restrict the development of the properties along the path of the proposed action corridor while adopting the construction of PR-10 in those maps. Therefore, it is reasonable to conclude the Proposed Action would not induce the development of nearby properties.

5.4.1 Past, Present, and Reasonably Foreseeable Future Actions in the Study Area

The study area for this cumulative impact analysis is defined by the corridor of the original Proposed Action and its vicinity as evaluated in the 1979 FEIS. The area is mostly rural with agricultural uses. Residential uses are scattered within the area. Existing sections of PR-10 from Arecibo to Utuado (from the north) and from Ponce to Adjuntas (from the south), and PR-123 between Adjuntas and Utuado constitute the previous terrestrial transportation projects that have contributed to shape the characteristics of the area, as well as the natural environment conditions. Aside from the proposed completion of PR-10, no new highway construction or other types of transportation related projects have been identified for the foreseeable future in the study area.

Under the No Action alternative transportation system, land use, economic conditions, communities, air quality, noise and vibration, water resources, ecosystems, geology, and soils, would remain unchanged. Vehicular traffic would continue to use existing PR-123 with its substandard and unsafe operating conditions. Delays caused by the transit of trucks would continue to be experienced by PR-123 users and the rest of the PR-10 users between Arecibo and Ponce. During emergencies access could be affected, and aid could be unnecessarily delayed. Response to establish essential utility services could be halted or delayed.

5.4.2 Cumulative Impacts

5.4.2.1 Air/Noise Quality

Small increases in air pollutants and noise levels resulting from the operation of vehicular traffic are expected. However, since most of the traffic using PR-123 will be diverted to the new PR-10, the net change would be minimal. Also, since no new additional highway construction projects are anticipated in the foreseeable future, no cumulative increase on the air pollutants and noise levels are anticipated to occur within the study area.

5.4.2.2 Social/Economic Resources

The Proposed Action construction would help to foster a more efficient transportation of people and finished goods between the north and south parts of the western part of the Island. This improvement in turn may help to enhance the operating conditions of businesses within the area, which shall be reflected in improved employment opportunities for residents of the area and beyond.

5.4.2.3 Land Use

The land use of the Proposed Action has been estimated using an average right of way of 100 meters along the path of the estimated length of 7,600 meters. This implies that an estimate of approximately 187 acres (equivalent to 192.5 “cuerdas”) would be required to be taken by the Proposed Action for the operation of the highway (excluding the remnants of the acquired properties which will remain in their existing condition or revegetated after the Proposed Action construction). Although none of these lands have been identified as prime farmland, they would not be available for agricultural or residential use. Land use patterns within the study area have remained unchanged, as evidenced by a review of aerial photographs. Since no additional projects have been identified for the study area, no cumulative impacts can be reasonably expected to occur.

5.4.2.4 Additional Transportation Projects for the Study Area

The State Transportation Improvement Program (STIP) does not include the construction of new highways in the Proposed Action area. As a result, there is no expectation of long-term adverse cumulative impacts on the highway system due to increased vehicular traffic in the study area. Nevertheless, the PRHTA is currently working on a series of projects aimed at repairing the damage caused by Hurricane María and Fiona in PR-10. As part of their environmental compliance, an assessment of these projects' potential impact on the Proposed Action will be conducted to evaluate their effects on the accessibility and mobility of PR-10 users. The table shown in the following page provides a summary of these projects along with their respective locations.

Table 5: Summary of PR-10 Hurricane Maria and Fiona Repair Projects

AC Code	AC Number Construction	Roadway	Municipality
808544	826579	PR-10, km. 41.6	Utuado
808544	826579	PR-10, km. 41.9	Utuado
808544	827579	PR-10, km. 46.7	Utuado
808544	827579	PR-10, km. 47.5	Utuado
808544	865579	PR-10, km. 52.3	Utuado
818544	865579	PR-10, km. 30.3 – 30.4	Adjuntas
808544	828579	PR-10, km. 44.7, 44.9, 45, 45.1	Utuado

The existing PR-10 south to north section between Ponce and Adjuntas ends at kilometer 30.6 while the north to south section between Arecibo and Utuado ends at kilometer 38.2. This implies that, except for the project located at kms. 30.3 through 30.4, none of them are located within the corridor of Proposed Action since this is a new section of PR-10. A review of the Categorical Exclusions (CE) prepared for the listed projects indicates that throughout construction, the PR-10 sections would remain open, but a temporary half section closure may be necessary. Advance notice of the closure for its users and the development of a Maintenance of Traffic (MOT) would be implemented. Those projects include the installation of temporary traffic control devices, installation of temporary traffic signs, temporary concrete barriers, etc. Travel through this project during its reconstruction phase will continue and the operation of the roadway will be temporarily limited, but not permanently disrupted affected. A review of the CE prepared for the repairs of km. 30.3 – 30.4 of PR-10 in the Municipality of Adjuntas (ER-HWY-12, ER-9999 (327), AC-818544) indicates that similar traffic management measures would be implemented during the construction activities of this project. In summary, based on the review of the available information, the planned repairs for the existing PR-10 would incorporate measures to minimize the disruption of current users of PR-10.

5.4.2.5 Surface Water Resources

The Proposed Action would cross over the Rio Grande de Arecibo and some small creeks. To minimize the impact on these systems the construction of approximately twenty (20) bridges has been incorporated in the Proposed Action design. This practice reduces the disruption of the existing corridor topography which would result in an increase of the sedimentation and turbidity of the existing surface bodies of water and maintains the natural drainage patterns of the area. Therefore, only minimal impacts on these resources are expected after considering the implementation of the herein described BMPs. Since no additional projects are expected to be constructed within the study area, no cumulative impacts of surface bodies

of water are expected. Monitoring of the water quality of this water body will be performed before, during and after construction of the Proposed Action, similar to what PRHTA has done when constructing other sections of this highway.

5.4.2.6 Wetlands

Most wetlands within the study area are located adjacent to the Rio Grande de Arecibo and its tributaries. This is the result of the physiography of the area and is limited in extent. Additional isolated wetland systems have been identified after a review of the USFWS National Wetland Inventory Maps mostly related to drainage features and small creeks. The Proposed Action will have an impact of approximately less than one (1) acre on wetlands since the use of bridges to minimize their disruption has been integrated into the Proposed Action design. As an example of this statement, wetland impacts associated with the construction of the bridge over Rio Grande de Arecibo (BR-1) has been estimated at approximately 0.35 acres for Section II (AC-100069). Given the fact that no additional transportation related projects of other types of commercial/industrial/residential developments have been proposed for construction in the foreseeable future, no more cumulative impacts on wetland systems can be reasonably expected.

Chapter 6: Public Participation

A Public Participation Process during February to March 2023 was carried out regarding the 8-Step Process for Floodplains and Wetlands to obtain comments from concerned agencies and the public. A second participation process ended on June 24 on an Environmental Re-evaluation of the FEIS and subsequent Re-evaluations approved by FHWA for the construction of PR-10 between Arecibo and Ponce with the intention to adopt this document. In doing so, PRDOH intended to receive early comments in their evaluation process for the adoption of said document.

There were approximately 166 comments. A response to the comments is included as **Attachment 25**. As explained in Section 1.1 PRDOH later decided that the appropriate course of action in complying with NEPA, FHWA and HUD environmental Regulations, to prepare this EA to assess changes and new environmental impacts not previously covered. Within this EA process there will be an additional thirty (30) days commenting period to respond.

Chapter 7: Coordination and List of Preparers

7.1 Coordination Agencies

Puerto Rico Highway and Transportation Authority
Eng. Luis E. Rodríguez Rosa - Programming and Special Studies Area

Puerto Rico Department of Housing
Mr. Angel G. López Guzmán, MSEM – Deputy Director, Permits & Environmental Compliance/CDBG-DR/MIT Program
Juan C Pérez-Bofill, P.E. - Disaster Recovery Director CDBG-DR/MIT

Federal Highway Administration
Luis D. López Rivera, P.E. – Senior Environmental Specialist

7.2 Preparers

PRHTA Environmental Consultant
David Moreno Vázquez, P.E. – Senior Environmental Consultant

Barret Hale and Alamo (BHA)
César Collazo, P.E. – Lead Engineer

DC Engineering Group, PSC
Jorge Rivera Jiménez, JD, P.E. – Senior Environmental Consultant
Daianyk Córdova Marrero, MSCE, P.E. – Environmental Coordinator

ATTACHMENTS