EXECUTIVE SUMMARY

1.0 Introduction

The mission of the Federal Emergency Management Agency (FEMA) is to reduce the loss of life and property and protect our institutions from all hazards by leading and supporting the nation in a comprehensive, risk-based emergency management program of mitigation, preparedness, response, and recovery. Beginning September 17, 2017, Hurricane Maria caused significant damages to Puerto Rico ("Commonwealth"). President Donald J. Trump issued a disaster declaration for Hurricane Maria on September 20, 2017 encompassing the entire territory. The declaration authorized federal public assistance to affected communities and certain non-profit organizations per FEMA, and in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974 (42 USC 5172) as amended; the Sandy Recovery Improvement Act (SRIA) of 2013; and the Bipartisan Budget Act of 2018 (Public Law 115-123). The Central Office of Recovery, Reconstruction and Resiliency (COR3) is the Applicant for FEMA grants and multiple agencies may be Subapplicant for specific projects.

This Programmatic Environmental Assessment (PEA) is prepared in accordance with Section 102 of the National Environmental Policy Act (NEPA) of 1969, as amended; and the Regulations for implementation of the NEPA (40 Code of Federal Regulations [CFR] Parts 1500 to 1508). The purpose of this PEA is to consider the potential environmental impacts of potential project alternatives, including a no action alternative, and to determine whether to prepare a Finding of No Significant Impact (FONSI) or an Environmental Impact Statement (EIS). In accordance with above referenced regulations, FEMA Directive 108-1, and FEMA Instruction 108-1-1, FEMA, during the decision-making process, evaluates and considers the environmental consequences of major federal actions it funds or undertakes.

If a proposed project meets the scope, impacts, and mitigation covered in this PEA, then FEMA will only prepare a record of environmental consideration (REC) as required. If the scope of an action triggers additional analysis, FEMA will engage in the appropriate analysis or consultation requirement, prepare a REC, a tiered Environmental Assessment (EA), or Supplemental EA (SEA) under this PEA with the additional information.

This PEA addresses the overall programmatic impacts and requirements of FEMA and the Applicant for applicable roads, culvert, bridge, and landslide projects that the Applicant has submitted to FEMA grant funding. This PEA analyzes the following five alternatives:

- Alternative 1: No Action Alternative;
- Alternative 2: Replacement of Bridges and Culverts;
- Alternative 3: Repair of Landslides;
- Alternative 4: Hazard Mitigation and Repair of Roads, Bridges, Culverts, and Road; and
- Alternative 5: A Combination of Alternatives 2 through 4.

2.0 Purpose and Need

Hurricane Maria's wind, rain, and floodwater damaged various components of the Commonwealth's Roadway transportation system and supporting landscapes. These components include roads, bridges and culverts (Roadway). The purpose of this action is to restore the Commonwealth's Roadway transportation system to its pre-disaster capacity and increase its resiliency for future storm events. Under the Stafford Act, FEMA has authority to provide funding for cost-effective hazard mitigation and resiliency measures for facilities damaged by Hurricane Maria. Additionally, FEMA is authorized to provide funding to eligible grant Applicants and Subapplicants for cost-effective activities that have the purpose of reducing or eliminating risks to life and property from hazards and their effects. FEMA's Public Assistance Alternate Procedures, Sections 404 and 406 Hazard Mitigation under the Stafford Act, and the Bipartisan Budget Act of 2018 each encourage flexibility in recovery.

The Commonwealth-wide dependence on automobiles has led to the development of a complex system of Roadways. In an effort to restore pre-disaster capacity and mitigate impacts from future storm events, federal agencies led by FEMA may provide funds to Puerto Rico for the rehabilitation and upgrade of eligible components of the Commonwealth's Roadway transportation system from as soon as the federal funds are obligated until the allocated federal funds are expended. The need for the action is to re-establish an efficient and resilient Roadway transportation system meeting current codes and standards that will address the impaired movement of resident populations, inefficiencies in the operations of first responders, negative effects of Puerto Rico's current socioeconomic conditions; and the degradation of water quality caused by restrictions in flow beneath bridges and through culverts. A restored roadway system will improve the Commonwealth's mobility and commerce, water quality and land use, tourism, and in-turn, the economic conditions of Puerto Rico. FEMA will monitor the effectiveness of projects satisfied by this PEA through existing transportation and health and safety metrics described herein. For projects that require a SEA, additional information on how a project will address these conditions will be provided in the document and project REC.

3.0 Description of Alternatives

3.1 Alternative 1: No Action Alternative

Under the No Action Alternative, FEMA will not provide grant funding for maintenance, repair, rehabilitation, or replacement of the Commonwealth's Roadway system. Additionally, FEMA will not provide grant funding for the repair of areas affected by landslides. Under the No Action Alternative, the Commonwealth and local authorities are still able to pursue other sources of funding to repair roadway and landslide projects as well as, increase the resiliency of their infrastructure. Due to budgetary constraints within the Commonwealth, FEMA anticipates that much of the work will remain unfunded or deferred indefinitely. Deferred or unfunded transportation and landslide projects will likely impact the efficiency and resiliency of the Commonwealth's Roadway transportation system. In addition, ongoing environmental issues such as erosion and the accumulation of debris in rivers and streams may remain uncorrected. This alternative does not meet the overall purpose and need.

3.2 Alternative 2: Bridge and Culvert Replacement

The activities covered under this class of actions will involve the removal and replacement of existing bridges and culverts. The new structure will remain in the same general traffic corridor as did the pre-disaster bridge or culvert. Alternative 2 actions may occur within an existing right of way (ROW), temporary ROW, or new permanent ROW. Any acquisition of ROW will adhere to federal, state, and local regulations for the acquisition of lands. The Applicant may construct a new bridge on an alignment that is parallel or slightly shifted in relation to the existing structure to reduce risks to flooding, the environment, or local populations. FEMA will review projects that require the acquisition of temporary and permanent ROWs on a case-by-case basis.

Alternative 2 does not include the dredging of sediment beyond pre-disaster depths. The Applicant will be responsible for performing maintenance of traffic (MOT) in accordance with Puerto Rico Department of Transportation and Public Works (DTOP) guidance. If it is necessary to maintain traffic during construction and a reasonable detour is not available, the Applicant may place a temporary bridge next to a similar structure for the purpose of re-routing traffic during the performance of construction activities. The Applicant must remove all temporary structures and comply with all permit requirements with respect to site remediation once the new crossing is open to traffic. This Alternative allows for the infringement of temporary bridges outside the boundaries of an existing ROW.

New structures will meet current PRHTA and FHWA standards, as applicable. Completed projects will not adversely impact the capacity of associated roadways to manage traffic as dictated by PRHTA and FHWA codes and standards. The consequences of completed projects will not result in increases to pre-disaster traffic or speed limits. Under Alternative 2, minor increases in the footprint of a bridge or culvert are permissible if it is due to changes in lane width, shoulder width, live load capacity, and crash-worthy railing.

Specific elements of culvert and bridge design will be the responsibility of the Applicant's engineer and the corresponding regulatory authority. Project activities associated with Alternative 2 may include the following SOWs:

- Alternative 2 includes the removal of post-disaster temporary replacement bridges and culverts. Replacement activities may also include removal of accumulated material from a stream channel for the purpose of restoring pre-disaster or natural channel flow characteristics.

- Alternative 2 includes the removal and replacement of existing bridges. FEMA anticipates the removal of bridges will include the removal of structural piling systems. Construction methodologies may involve the use of pile driving hammers, vibratory hammers, and augers deployed from land, temporary trestles, barges, or boats. The contractor will be responsible for securing any floating work platforms by means appropriate to the location. Associated engineering design services include hydraulic and hydrology (H&H) studies, geotechnical subsurface explorations, life-cycle costs analyses, and other economic and feasibility analyses.

    - Pile sizing and placement will be the responsibility of the Applicant's engineer and the applicable regulatory authority; and

- The Applicant's engineer and the permitting authority will determine the best option for removal and disposal of deteriorating or damaged piles.

- The Applicant may replace existing culverts with larger culverts or with a bridge structure if it is necessary to accommodate the flood capacity of the respective waterway.

- Alternative 2 includes stream or riverbank stabilization projects as part of the replacement of bulkheads or other structural elements. The Applicant's engineer may choose to incorporate soil bioengineering, bioengineered streambank protective devices such as gabion baskets or mattresses and Articulated Concrete Block systems as deemed appropriate.

3.3 Alternative 3: Repair of Landslides

Alternative 3 includes the stabilization of areas impacted by landslides in order to restore the pre-disaster capacity and function of Commonwealth roads and associated facilities. Alternative 3 also includes hazard mitigation measures that will prevent landslides from occurring in the future. For areas that will otherwise be vegetated, the acreage threshold of two acres will apply. For landslide projects that are associated with developed areas such as roads or parking lots, FEMA may consider on a case-by-case basis the application of this PEA's five-acre threshold. Alternative 3 actions may occur within an existing ROW, temporary ROW, or new permanent ROW. Any acquisition of ROW will adhere to federal, state, and local regulations for the acquisition of lands. Project activities associated with Alternative 3 may include the following SOWs:

- Alternative 3 actions include various geotechnical and structural studies of project areas as well as, new engineering design that addresses steep angles on failed slopes.

    - This action includes geotechnical studies and geophysical engineering surveys required for the design of soils stabilization projects. Updated engineering designs may require new configurations to protect transportation structures and comply with current codes and standards; and

    - The installation of short segments of temporary roads and landings may be necessary to complete SOWs. For additional information on specifications and best management practices (BMPs) associated with landslide repair, see PRHTA Landslide Correction Typical Section Sheets (**Appendix B**).

- Landslide stabilization includes a variety of options which can create a buttress that provides lateral support against an existing slide. Alternative 3 activities may include the installation of a buttress fill that involves removing the slide and replacing it with a mechanically stabilized embankment.

    - These activities may include using revetment structures such as soil nailing or rock bolts, gabion walls, retaining walls, rock or earth fill walls, concrete facing and fill, and horizontal piling. The Applicant's engineer will determine whether to remove and completely replace a slide area with engineered fill is necessary.

- Actions associated with soil stabilization include regrading, placement of backfill, and compaction of eroded or displaced fill and soils. The Applicant may choose to rehabilitate

or replace damaged or displaced engineered erosion and sediment control technologies such as geotextile fabric or riprap. Projects may involve upgrades to earthen or engineered stabilization techniques related to mitigation or other code enforcements.

3.4 Alternative 4: Hazard Mitigation and Repair of Bridges, Culverts, and Roadways

Under Alternative 4, SOWs will include hazard mitigation and repair of existing bridges, culverts, and roadways. FEMA anticipates that these SOWs will include hazard mitigation measures. Alternative 4 actions may occur within an existing ROW, temporary ROW, or new permanent ROW. Any acquisition of ROW will adhere to federal, state, and local regulations for the acquisition of lands.

Alternative 4 involves work required to restore the structural and operational integrity of a bridge, culvert, or road. The actions satisfied by Alternative 4 may include SOWs that require minor activities that involve the waterways, roadways, and railroads that an eligible project intersects. Roadway repairs will comply with current American Association of State Highway and Transportation Officials (AASHTO), FHWA, and PRHTA codes and standards.

Under Alternative 4, the SOWs will not adversely impact the compliance of roadways with respect to their applicable traffic management standards (i.e. traffic volume, speed limit, etc.). Alternative 4 does not authorize the dredging of sediment beyond pre-disaster depths. Roadway repair will include eligible mitigation measures in conjunction with the continued use of the road's pre-disaster design and function. Examples of bridge, culvert, and road hazard mitigation and repair projects include the following classes of actions:

- Alternative 4 includes actions that do not require the complete replacement of bridges but rather involve increases in the elevation of decks and span lengths. Such modifications to deck heights or lengths may require reconstructing and raising road approaches;
    - Specific SOWs may include partial or complete deck replacement, modifications to the superstructure, and substructure strengthening or replacement;
- Under Alternative 4, the restoration of hydrology around damaged bridges and culverts may involve the removal of accumulated material from a stream channel, restoration of natural or pre-disaster channel flow, and installation of scour countermeasures;
    - Alternative 4 includes the placement of scour protection to protect abutments, piers, embankments, and wingwalls;
- The enhancement of existing culverts may require the installation of flexible culvert linings, cured-in-place culvert liners, or insertion of a corrugated or steel pipe culvert liners; and
- Under Alternative 4, roadway hazard mitigation and repair activities may include these SOWs:
    - The removal of damaged roadway sections, stabilization of eroding areas, restoration of subgrade soils, and installation of sub-base and base course materials that meet current codes and standards. The Applicant's engineer will be responsible

for determining the appropriate materials for the finishing of roadway surfaces and that their designs meet current codes and standards;

- SOWs included under Alternative 4 may involve the replacement of road associated appurtenances such as erosion and sediment control measures, retaining walls, road and lane dividers, curbs and gutters, sidewalks, pedestrian shelters, planters, landscaping, fencing, stormwater drainage systems, lighting, paint striping, safety reflectors, and signage. The Applicant's engineer will be responsible for ensuring that the replacement of road associated appurtenances meet current codes and standards;

- Road repair work may require the temporary relocation, cutting, and subsequent repair of existing utilities. Repairs to utilities will comply with current codes and standards. The Applicant's engineer will be responsible for ensuring that the management of utilities complies with the owner's requirements for materials and construction specifications;

- Eligible roadway hazard mitigation and repair projects may include the installation of manufactured materials to repair erosion on steep road embankments; and

- Roadway repair may involve minor improvements to adjacent roads that serve as detour routes during construction. Such repairs are permissible provided that the project SOW includes the action.

3.5 Alternative 5: A Combination of Alternatives 2 Through 4

FEMA prefers Alternative 5 as it fulfills the purpose and need of this PEA. Additionally, Alternative 5 allows the Applicant the greatest flexibility in addressing storm related damage and resiliency throughout the Commonwealth's Roadway transportation system. Conceptually, there are many combinations of the above-mentioned alternatives that the Applicant could implement at any given site. This alternative would allow FEMA to use this PEA to satisfy NEPA compliance requirements for projects that need a combination of the classes of actions mentioned in the Action Alternatives.

4.0 Potential Impacts and Resources Evaluated

FEMA evaluated the physical, biological, cultural, and human use setting in which the proposed activities will occur, including restorative actions. This PEA presents a qualitative evaluation of potential impacts to the affected environment. The qualitative evaluation relies upon a scale that describes the intensity and duration of a potential impact. FEMA evaluated the following resources as part of this PEA:

> *Geology, Topography, and Soils, Air Quality, Water Quality, Wetlands, Floodplain, Coastal Resources, Vegetation, Wildlife and Fish, Threatened and Endangered Species, Cultural Resources, Socio-economic and Environmental Justice, Land Use Planning, Noise, Transportation, Public Services & Utilities, Public Health and Safety, and Hazardous Materials*.

Resources eliminated from review within this PEA include: Bald and Golden Eagles, Safe Drinking Water Act, and Fish and Wildlife Coordination Act. These resources were not evaluated through this PEA as they either do not occur within the Commonwealth or are apply to FEMA's NEPA evaluation process for grant funding.

Although FEMA determined that adverse temporary, short-term, and long-term impacts to each evaluated resource may occur from either the No Action or Action Alternatives, all foreseeable impacts are likely to be between the level of negligible and minor. FEMA anticipates that project thresholds and the Conditions and Permits listed herein will be sufficient to prevent adverse impacts from reaching the level of major.

Many potential sites may be within the floodway or 100-year floodplain, and within or near wetlands. FEMA will conduct the 8-Step Decision-Making Process in accordance with Executive Orders 11988 and 11990, as well as 44 CFR Part 9. Many of the actions undertaken as part of this PEA will have a positive effect on floodplains as they will improve the hydraulic flow and protect development from flooding. Mitigation may include raising structures above flood levels, relocating, or otherwise minimizing their effect on floodplain or wetlands. Avoidance and mitigation measures will minimize any adverse impacts to floodplains and wetlands.

If a proposed project is likely to impact Waters of the United States, the Applicant and Subapplicant will be responsible for obtaining all applicable federal, Commonwealth, and local permit approvals. The implementation mitigation measures, and erosion controls will minimize water quality impacts by limiting sediment escapement and retaining turbid waters within project areas.

Proposed actions in the Commonwealth-defined coastal zone are subject to review in accordance with the Coastal Zone Management Act and Puerto Rico Coastal Zone Management Program and Policies. Pursuant to Federal Consistency Regulations at 15 C.F.R. § 930, FEMA and the Puerto Rico Planning Board (PRPB) signed a Federal Consistency Certificate for Category C through G work dated October 3, 2018 (Resolution JP-2018-324). FEMA will submit Federal Coastal Zone Consistency Determinations for scopes of work not included in the resolution to the PRPB for concurrence.

FEMA will review potential scopes of work satisfied by this PEA in accordance with the Clean Air Act. FEMA anticipates that construction emissions will be below threshold levels. The Applicant and Subapplicant will adhere to work hours, adhere to noise ordinances and regulations, as well as the use of best management practices during construction to minimize noise, dust, and potential traffic disruptions. For all applicable projects located in non-attainment and maintenance areas, the Applicant will be responsible for performing a General Conformity applicability analysis.

FEMA Historic Preservation professionals will determine if a project scope of work meets outlined programmatic allowances from the Programmatic Agreement with the Puerto Rico State Historical Preservation Office (SHPO) or requires standard 106 review and consultation. If the scope of work is an applicable allowance, the project will be determined by FEMA to be compliant with Section 106 of NHPA and the review process will be complete. If the proposed scope of work does not fall within the allowances, FEMA will determine the effect and initiate consultation with the SHPO

per the standard Section 106 review process. Additional archaeological surveys of ground disturbing activities may be required depending on consultation with the SHPO.

FEMA does not expect the actions satisfied by this PEA to adversely affect Endangered Species Act (ESA) listed or proposed species or their designated critical habitat (DCH). This PEA does not include any actions that will create a level of impact beyond not likely to adversely affect ESA listed species or have an adverse modification to DCH. Any such action that will cause an impact beyond not likely to adversely affect will require FEMA to perform additional NEPA compliance. The actions satisfied by this PEA may temporarily displace local wildlife and fish during construction; however, landscape and water quality restoration will restore wildlife and fish habitat following completion of transportation projects.

4.1 Cumulative Impacts

FEMA anticipates that the Action Alternatives satisfied by this PEA will not result in major cumulative impacts since FEMA is funding actions that involve the repair, replacement, or rehabilitation of projects that are similar in function, size, and locality to the existing systems. Therefore, most cumulative impacts from the initial installation and temporary restoration of the projects on the human environment have already occurred prior to and after Hurricane Maria. FEMA anticipates that the extended grant approval process for projects covered under this PEA or tiered from the PEA will further minimize cumulative impacts to Commonwealth's environmental and social resources. The process of implementing projects over an extended time period will likely ensure that no one resource is overburdening at any given time by the implementation of federally financed transportation projects.

- For circumstances where multiple transportation projects are under construction within the same watershed and at the same time, a cumulative impact to resources such as vegetation, water quality, and soil could occur. Although adverse, FEMA anticipates that cumulative impacts from the transportation projects satisfied by this PEA will be short-term and less than major. The conservation measures and BMPs presented in the Permits and Conditions below will help minimize cumulative impacts to environmental and socioeconomic resources by maintaining compliance with applicable permit conditions.
- The combined effects of concurrent construction projects could have a short-term less than major cumulative impact on traffic delays and congestion, noise, and social services. The Applicant and Subapplicant will be responsible for coordinating project schedule with their transportation and public utility departments and environmental permitting agencies.

5.0 Permits and Conditions

1. **The Applicant or Subapplicant**: Must comply with all applicable environmental and historic preservation laws. Federal funding is contingent upon acquiring all necessary Federal, State and Local permits. Noncompliance with this requirement may jeopardize the receipt of federal funds.

2. **Utility Clearance**: For all ground disturbing activities, the Applicant is responsible for locating utilities. OSHA mandates that if a utility provider cannot respond to a request to locate underground utility installations or cannot establish the exact location of these installations, the contractor may proceed provided they use detection equipment or other acceptable means to locate utility installations.

3. **Stormwater and Soils**: Under the USEPA NPDES, any project disturbing more than one acre requires a USEPA Construction General Permit under the NPDES Program, and a SWPPP. The permits and plan require BMPs which serve to protect soils and stormwater. Applicant and Subapplicant are required to: manage any piles of soil or debris, minimize steep slope disturbance, preserve native topsoil unless infeasible; and minimize soil compaction and erosion (USEPA 2018).

4. **Erosion and Sediment Control**: For each project the Applicant will implement the BMPs and guidelines recommended in the Puerto Rico Erosion and Sediment Control Handbook for Developing Areas (PREQB-PR & USDA-NRCS). The Applicant will be responsible for obtaining all necessary permits such as an NPDES permit and implementing the associated erosion and sediment control plans (i.e. SWPPP).

5. **Endangered Species Act**: All projects will comply with and implement the ESA conditions found in any FEMA programmatic consultation that applies, or those conditions from a project-specific consultation. Impacts not resolved through consultation, will require individual NEPA compliance.

6. **Work Affecting Water**: For any project that involves WOTUS, the Applicant will be responsible for initiating the permitting process with the USACE. The Applicant is responsible for obtaining appropriate permits prior to the beginning of work, and implementing all requirements of the permits, including pre-construction notification.

7. **Floodplain**: For FEMA funded projects that are within or may affect a floodplain, FEMA will apply the 8-Step Decision-Making Process. FEMA will assess short- and long-term impacts to floodplains and apply applicable avoidance, minimization, and mitigation measures to limit impacts to less than major. FEMA will consider projects in the V-Zone, those with potential major or greater impacts, or those with the potential to increase flood elevations on a case-by-case basis for whether this PEA applies, or to prepare a tiered EA or SEA. Projects must also comply with Commonwealth floodplain and flood risk regulations.

8. **Wetlands**: For FEMA funded projects that are within or may affect a wetland, FEMA will apply the 8-Step Decision-Making Process. FEMA will assess short- and long-term impacts to wetlands and apply applicable avoidance, minimization, and mitigation measures to limit impacts to less than major. Staging areas and access roads must be located outside the jurisdictional boundaries of WOTUS.

9. **Historic Preservation/Archaeological Resources**: FEMA will review all scopes of work for the presence of any historic/archaeological resources on or eligible for the National Register of Historic Places. If there is potential to affect historic/archaeological resources,

the stipulations detailed in the most recent version of the signed FEMA and SHPO Puerto Rico Programmatic Agreement will apply. The Applicant will be responsible for all coordination with the Puerto Rico Institute of Culture (ICP) for compliance with Commonwealth's historic preservation and archaeological requirements.

10. **Discovery of Cultural Resources**: If any cultural materials or human remains are discovered during construction, the contractor must halt work immediately and contact FEMA. FEMA staff meeting the Secretary of the Interior's Professional Qualification Standards (48 FR 22716, Sept. 1983) will evaluate the discovery in coordination with SHPO.

11. **Construction Material and Debris**: The Applicant is responsible for obtaining any permits associated with transportation and handling of construction material and debris. The Applicant will identify, handle, transport, and dispose of hazardous materials and/or toxic waste in accordance with USEPA and PRDNER/PREQB requirements. The Applicant is responsible for determining the presence of asbestos or lead containing materials and obtaining applicable permits before beginning work. The Applicant is responsible for ensuring that all non-recyclable debris generated from restoration and demolition activities must occur at a PRDNER/PREQB permitted landfill.

12. **Clean Air Act**: The Applicant is responsible for complying with all applicable EPA and PRDNER/PREQB requirements for fugitive dust suppression. The Applicant will prepare a General Conformity applicability analysis for applicable projects satisfied by this PEA.

13. **Tree Cutting:** The Applicant is responsible for complying with applicable DRNE/PREQB of Puerto Rico requirements for planting, pruning, and trimming.

14. **Invasive Species**: The Applicant is responsible for restoring disturbed soils with planting native, non-invasive species. Construction equipment should be power washed prior to initial transport to the construction site and prior to changing locations to prevent spread of noxious weeds.