GOVERNMENT OF PUERTO RICO
PUERTO RICO PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

IN RE:	**CASE NO. NEPR-MI-2021-0002**
IN RE: REVIEW OF THE PUERTO RICO ELECTRIC POWER AUTHORITY'S 10-YEAR INFRASTRUCTURE PLAN-DECEMBER 2020	**SUBJECT: Motion Submitting Scope of Work, Request for Confidentiality, and Supporting Memorandum of Law**

MOTION SUBMITTING AMENDED SCOPE OF WORK, REQUEST FOR CONFIDENTIALITY, AND SUPPORTING MEMORANDUM OF LAW

TO THE PUERTO RICO ENERGY BUREAU:

COME NOW LUMA Energy, LLC, and **LUMA Energy ServCo, LLC** (jointly referred to as "LUMA"), through the undersigned legal counsel, respectfully submit the following:

I. Submittal of Amended Scope of Work

1. On March 26, 2021, this Honorable Puerto Rico Energy Bureau ("Energy Bureau") issued a Resolution and Order in the instant proceeding, ordering, in pertinent part, that the Puerto Rico Electric Power Authority ("PREPA") submit to the Energy Bureau the specific transmission and distribution projects ("T&D Projects" or "Projects") to be funded with Federal Emergency Management Agency ("FEMA") funds or any other federal funds at least thirty (30) calendar days prior to submitting these Projects to the Puerto Rico Central Office for Recovery, Reconstruction and Resiliency ("COR3"), FEMA or any other federal agency ("March 26th Order"). It also directed PREPA to continue reporting to the Energy Bureau and FEMA over the next five years on the progress of all ongoing efforts related to the approval of the submitted Projects that have

not yet been approved by the Energy Bureau.[1] The Energy Bureau thereafter determined that this directive should be applied to PREPA and LUMA. *See* Resolution and Order of August 20, 2021.

2. On April 28, 2021, the Puerto Rico Electric Power Authority (PREPA) filed a *Motion in Compliance with the Resolution and Order entered on April 22, 2021* ("April 28th Motion"), whereby it submitted forty-six (46) SOWs for T&D Projects for the Energy Bureau's review and approval prior to submitting them to COR3 and FEMA. Among the SOWs submitted by PREPA was the "Distribution – Vieques Feeders 2501-01, 2501-02, 2501-03 and Culebra Feeders 3801-01, 3801-02" T&D Project. *See* April 28th Motion, pp. 3 and 59.

3. On June 8, 2021, the Energy Bureau issued a Resolution and Order ("June 8th Order") in which it determined that most of the SOWs for T&D projects submitted by PREPA in the April 28th Motion were necessary to improve the system's reliability. Therefore, it approved most of the projects presented in the April 28th Motion, including the "Distribution – Vieques Feeders 2501-01, 2501-02, 2501-03 and Culebra Feeders 3801-01, 3801-02" T&D Project. Furthermore, the Energy Bureau ordered PREPA or LUMA to seek the Energy Bureau's approval immediately should the scope of the approved project change. *See* June 8th Order, p. 3.

4. LUMA has since identified the need to submit an amended "Distribution – Vieques Feeders 2501-01, 2501-02, 2501-03 and Culebra Feeders 3801-01, 3801-02" T&D Project SOW, which has been renamed to "165226-Vieques & Culebra (Feeders)." Pursuant to the above, LUMA hereby submits, as *Exhibit 1* to this Motion, the "165226-Vieques & Culebra (Feeders)" SOW ("Amended SOW"). LUMA respectfully requests that the Energy Bureau replace the previously approved SOW, as detailed in this Motion, and substitute it with the Amended SOW, submitted as

[1] On April 22, 2026, the Energy Bureau issued a Resolution and Order in which it extended the March 26th Order's reporting period for an additional five (5) years. *See* April 22nd Order, p.2. The Energy Bureau stated that all the other provisions of the March 26th Order would remain in full force and effect. *Id*.

Exhibit 1 to this Motion. LUMA also requests that this Energy Bureau approve the Amended SOW submitted with this Motion, to wit, the "165226-Vieques & Culebra (Feeders)" SOW.

II. Request for Confidentiality and Supporting Memorandum of Law

5. LUMA hereby requests that *Exhibit 1* be maintained confidential. LUMA is submitting a redacted version for public disclosure, and an unredacted non-public version under seal of confidentiality.

6. LUMA submits a Memorandum of Law stating the legal basis for which the unredacted version of *Exhibit 1* should be filed under seal of confidentiality. As will be explained below, the unredacted version of the SOW in *Exhibit 1* should be protected from public disclosure as these documents contain confidential information associated with Critical Energy Infrastructure Information ("CEII") as defined in federal regulations, 18 C.F.R. §388.113; 6 U.S.C. §§ 671-674, and per the Energy Bureau's Policy on Management of Confidential Information (the "SOW with CEII"). *See* Energy Bureau's Policy on Management of Confidential Information, CEPR-MI-2016-0009 ("Policy on Management of Confidential Information"), issued on August 31, 2016, as amended by the Resolution dated September 20, 2016.

7. In addition, the Amended SOW includes personal identifying information of individuals who are LUMA staff or contractors protected under Puerto Rico's legal framework on privacy emanating from the Puerto Rico Constitution and should also be protected pursuant to the Energy Bureau's Policy on Management of Confidential Information.

III. Memorandum of Law in Support of Request for Confidentiality

A. Applicable Laws and Regulations to Submit Information Confidentially Before the Energy Bureau

8. The bedrock provision on the management of confidential information filed before this Energy Bureau is Section 6.15 of Act 57-2014, known as the "Puerto Rico Energy

Transformation and Relief Act". It provides, in pertinent part, that: "[i]f any person who is required to submit information to the [Energy Bureau] believes that the information to be submitted has any confidentiality privilege, such person may request the [Energy Bureau] to treat such information as such […]" 22 LPRA §1054n (2024). If the Energy Bureau determines, after appropriate evaluation, that the information should be protected, "it shall grant such protection in a manner that least affects the public interest, transparency, and the rights of the parties involved in the administrative procedure in which the allegedly confidential document is submitted." *Id.* §1054n(a).

9. Access to confidential information shall be provided "only to the lawyers and external consultants involved in the administrative process after the execution of a confidentiality agreement." *Id.* §1054n(b). Finally, Act 57-2014 provides that this Energy Bureau "shall keep the documents submitted for its consideration out of public reach only in exceptional cases. In these cases, the information shall be duly safeguarded and delivered exclusively to the personnel of the [Energy Bureau] who needs to know such information under nondisclosure agreements. However, the [Energy Bureau] shall direct that a non-confidential copy be furnished for public review." Id. §1054n(c).

10. Relatedly, in connection with the duties of electric power service companies, Section 1.10 (i) of Act 17-2019 provides that electric power service companies shall provide the information requested by customers, except for confidential information in accordance with the Puerto Rico Rules of Evidence.

11. Moreover, the Energy Bureau's Policy on Management of Confidential Information details the procedures a party should follow to request that a document or portion thereof be afforded confidential treatment. In essence, the referenced Policy requires identifying confidential

information and filing a memorandum of law explaining the legal basis and support for a request to file information confidentially. *See* CEPR-MI-2016-0009, Section A, as amended by the Resolution of September 20, 2016, CEPR-MI-2016-0009. The memorandum should also include a table identifying the confidential information, a summary of the legal basis for the confidential designation, and an explanation of how each claim or designation conforms to the applicable legal basis for confidentiality. *Id*. at ⁋ 3. The party that seeks confidential treatment of information filed with the Energy Bureau must also file both a "redacted" or "public version" and an "unredacted" or "confidential" version of the document that contains confidential information. *Id*. at ⁋ 6.

12. The Energy Bureau's Policy on Management of Confidential Information states the following with regard to access to CEII:

> Critical Energy Infrastructure Information ("CEII")
>
> The information designated by the [Energy Bureau] as Validated Confidential Information on the grounds of being CEII may be accessed by the parties' authorized representatives only after they have executed and delivered the Nondisclosure Agreement.
>
> Those authorized representatives who have signed the Non-Disclosure Agreement may only review the documents validated as CEII at the [Energy Bureau] or the Producing Party's offices. During the review, the authorized representatives may not copy or disseminate the reviewed information and may bring no recording device to the viewing room.

Id. § D (on Access to Validated Confidential Information).

13. Regulation No. 8543, *Regulation on Adjudicative, Notice of Noncompliance, Rate Review, and Investigation Proceedings*, also includes a provision for filing confidential information in proceedings before this Energy Bureau. To wit, Section 1.15 provides that "a person has the duty to disclose information to the [Energy Bureau] considered to be privileged pursuant to the Rules of Evidence, said person shall identify the allegedly privileged information, request

the [Energy Bureau] the protection of said information, and provide supportive arguments, in writing, for a claim of information of privileged nature. The [Energy Bureau] shall evaluate the petition and, if it understands [that] the material merits protection, proceed according to […] Article 6.15 of Act No. 57-2015, as amended." *See also* Energy Bureau Regulation No. 9137 on *Performance Incentive Mechanisms,* § 1.13 (addressing disclosure before the Energy Bureau of Confidential Information and directing compliance with Resolution CEPR-MI-2016-0009).

B. Discussion in Support of Request for Confidential Treatment

14. The Amended SOW included in *Exhibit 1* contains portions of CEII that, under relevant federal law and regulations, are protected from public disclosure. LUMA stresses that the Amended SOW with CEII warrants confidential treatment to protect critical infrastructure from threats that could undermine the system and negatively affect electric power services to the detriment of the interests of the public, customers, and citizens of Puerto Rico. In several proceedings, this Energy Bureau has considered and granted requests by PREPA to submit CEII under seal of confidentiality.[2] In at least two Data Security and Physical Security proceedings,[3] this Energy Bureau, *motu proprio*, has conducted proceedings confidentially, thereby recognizing the need to protect CEII from public disclosure.

[2] *See, e.g., In re Review of LUMA's System Operation Principles,* NEPR-MI-2021-0001 (Resolution and Order of May 3, 2021); *In re Review of the Puerto Rico Power Authority's System Remediation Plan*, NEPR-MI-2020-0019 (order of April 23, 2021); *In re Review of LUMA's Initial Budgets*, NEPR-MI-2021-0004 (order of April 21, 2021); *In re Implementation of Puerto Rico Electric Power Authority Integrated Resource Plan and Modified Action Plan,* NEPR MI 2020-0012 (Resolution of January 7, 2021, granting partial confidential designation of information submitted by PREPA as CEII); *In re Optimization Proceeding of Minigrid Transmission and Distribution Investments*, NEPR-MI 2020-0016 (where PREPA filed documents under seal of confidentiality invoking, among others, that a filing included confidential information and CEII); *In re Review of the Puerto Rico Electric Power Authority Integrated Resource Plan*, CEPR-AP-2018-0001 (Resolution and Order of July 3, 2019 granting confidential designated and request made by PREPA that included trade secrets and CEII. However, *see* Resolution and Order of February 12, 2021, reversing in part, grant of confidential designation).

[3] *In re Review of the Puerto Rico Electric Power Authority Physical Security Plan,* NEPR-MI-2020-0018.

15. Similarly, the Energy Bureau has granted LUMA's requests for confidential treatment of portions of the FEMA approvals submitted for approval in the present case. Notably, the Energy Bureau has granted LUMA's request for confidential treatment of portions of FEMA Approvals of Projects submitted for consideration and authorization. Furthermore, this Energy Bureau designated portions of submitted FEMA Approvals of Projects as confidential CEII in its Resolution and Order of March 20, 2023; *see* Table 1 on pages 1-2.

16. As mentioned above, the Energy Bureau's Policy on Management of Confidential Information provides for the management of CEII. It directs that the parties' authorized representatives access information validated as CEII only after executing and delivering a Non-Disclosure Agreement.

17. Generally, CEII or critical infrastructure information is exempted from public disclosure because it involves assets and information that pose public security, economic, health, and safety risks. Federal Regulations on CEII, particularly 18 C.F.R. § 388.113(c)(2), states that:

> Critical energy infrastructure information means specific engineering, vulnerability, or detailed design information about proposed or existing critical infrastructure that:
>
> (i) Relates details about the production, generation, transportation, transmission, or distribution of energy;
> (ii) Could be useful to a person in planning an attack on critical infrastructure;
> (iii) Is exempt from mandatory disclosure under the Freedom of Information Act, 5 U.S.C. 552; and
> (iv) Does not simply give the general location of the critical infrastructure.

Id.

18. Additionally, "[c]ritical electric infrastructure means a system or asset of the bulk-power system, whether physical or virtual, the incapacity or destruction of which would negatively affect national security, economic security, public health or safety, or any combination of such

matters. Id. Finally, "[c]ritical infrastructure means existing and proposed systems and assets, whether physical or virtual, the incapacity or destruction of which would negatively affect security, economic security, public health or safety, or any combination of those matters." *Id.*

19. The Critical Infrastructure Information Act of 2002, 6 U.S.C. §§ 671-674 (2020), part of the Homeland Security Act of 2002, protects critical infrastructure information ("CII").[4] CII is defined as "information not customarily in the public domain and related to the security of critical infrastructure or protected systems [...]" 6 U.S.C. § 671 (3).[5]

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[4] Regarding protection of voluntary disclosures of critical infrastructure information, 6 U.S.C. § 673, provides in pertinent part, that CII:

> (A) shall be exempt from disclosure under the Freedom of Information Act;
> (B) shall not be subject to any agency rules or judicial doctrine regarding ex parte communications with a decision-making official;
> (C) shall not, without the written consent of the person or entity submitting such information, be used directly by such agency, any other Federal, State, or local authority, or any third party, in any civil action arising under Federal or State law if such information is submitted in good faith;
> (D) shall not, without the written consent of the person or entity submitting such information, be used or disclosed by any officer or employee of the United States for purposes other than the purposes of this part, except—
> (i) in furtherance of an investigation or the prosecution of a criminal act; or
> (ii) when disclosure of the information would be--
> (I) to either House of Congress, or to the extent of matter within its jurisdiction, any committee or subcommittee thereof, any joint committee thereof or subcommittee of any such joint committee; or
> (II) to the Comptroller General, or any authorized representative of the Comptroller General, in the course of the performance of the duties of the Government Accountability Office
> (E) shall not, be provided to a State or local government or government agency; of information or records;
> (i) be made available pursuant to any State or local law requiring disclosure of information or records;
> (ii)otherwise be disclosed or distributed to any party by said State or local government or government agency without the written consent of the person or entity submitting such information; or
> (iii)be used other than for the purpose of protecting critical Infrastructure or protected systems, or in furtherance of an investigation or the prosecution of a criminal act.
> (F) does not constitute a waiver of any applicable privilege or protection provided under law, such as trade secret protection.

[5] CII includes the following types of information:

> (A)actual, potential, or threatened interference with, attack on, compromise of, or incapacitation of critical infrastructure or protected systems by either physical or computer-based attack or other similar conduct (including the misuse of or unauthorized access to all types of communications and

20. Portions of the Amended SOW included in *Exhibit 1* qualify as CEII because they contain the express coordinates to power transmission and distribution assets (18 C.F.R. § 388.113(iv)). These specific coordinates could potentially be helpful to a person planning an attack on this or other energy infrastructure facilities interconnected with or served by these facilities and equipment. The pages that contain the CEII are identified within the table in Part C of this motion, which summarizes the hallmark requests for confidentiality for the Amended SOW. The information identified as confidential in the table is not common knowledge and is not made publicly available. Therefore, it is respectfully submitted that, on balance, the public interest in protecting CEII weighs in favor of protecting the relevant portions of the Amended SOW with CEII in *Exhibit 1* from disclosure, given the nature and scope of the details included in those portions of the Exhibit.

21. Based on the above, LUMA respectfully submits that portions of the Amended SOW should be designated as CEII. This designation is a reasonable and necessary measure to protect the specific location and other engineering and design information of the energy facilities listed or discussed in *Exhibit 1*. Given the importance of ensuring the safe and efficient operation of the generation assets and the T&D System, LUMA respectfully submits that these materials constitute CEII that should be maintained confidentially to safeguard their integrity and protect them from external threats.

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data transmission systems) that violates Federal, State, or local law, harms interstate commerce of the United States, or threatens public health or safety;
(B)the ability of any critical infrastructure or protected system to resist such interference, compromise, or incapacitation, including any planned or past assessment, projection, or estimate of the vulnerability of critical infrastructure or a protected system, including security testing, risk evaluation thereto, risk management planning, or risk audit; or
(C)any planned or past operational problem or solution regarding critical infrastructure or protected systems, including repair, recovery, construction, insurance, or continuity, to the extent it is related to such interference, compromise, or incapacitation.

22. In addition, portions of the Amended SOW contain the name, signature, and role of two LUMA employees who reviewed the Amended SOW as part of LUMA's internal review and approval of the document. LUMA respectfully requests that information on the names, signatures, and roles of these individuals be maintained confidentially, in light of the fact that these details reveal their employment duties, and that their protection is in the public interest and aligned with Puerto Rico's legal framework on privacy, which protects personal information from disclosure. *See e.g.*, Const. ELA, Art. II, Sections 8 and 10, which protect the right to control personal information and distinctive traits, which applies *ex proprio vigore* and against private parties. *See also, e.g., Vigoreaux v. Quiznos, 173 DPR 254, 262 (2008); Bonilla Medina v. P.N.P., 140 DPR 294, 310-11 (1996); Pueblo v. Torres Albertorio*, 115 DPR 128, 133-34 (1984). *See also* Act 122-2019, Article 4(vi) (which provides, as an exception to the rule on public disclosure, information the disclosure of which could invade the privacy of third parties or affect their fundamental rights). It is respectfully submitted that the redaction of the aforementioned information does not affect the public's or the Energy Bureau's review of the Amended SOW nor interfere with processes before this Energy Bureau. Therefore, on balance, the public interest to protect privacy weighs in favor of protecting the relevant portion of the Amended SOW.

C. Identification of Confidential Information

23. In compliance with the Energy Bureau's Policy on Management of Confidential Information, CEPR-MI-2016-0009, below, find a table summarizing the hallmarks of this request for confidential treatment.

Document	Name	Pages in which Confidential Information is Found, if applicable	Summary of Legal Basis for Confidentiality Protection, if applicable	Date Filed
Exhibit 1	"165226-Vieques & Culebra (Feeders)" Amended SOW	Pages 1, 4	Right to privacy (*see, e.g.*, Const. ELA, Art. II, Sections 8 and 10)	July 1, 2026
	"165226-Vieques & Culebra (Feeders)" Amended SOW	Pages 5, 9, 13, 17, 20, 23, 26, 27, 34-35, 38-40	Critical Energy Infrastructure Information, 18 C.F.R. § 388.113; 6 U.S.C. §§ 671-674.	July 1, 2026

WHEREFORE, LUMA respectfully requests that the Energy Bureau **take notice** of the aforementioned; **approve** the Amended SOW for the T&D Project submitted as *Exhibit 1* to this Motion; and **grant** the request for confidential treatment of *Exhibit 1*.

RESPECTFULLY SUBMITTED.

We hereby certify that we filed this Motion using the electronic filing system of this Energy Bureau. We will send an electronic copy of this Motion to PREPA via Alexis Rivera, alexis.rivera@prepa.pr.gov, and through its counsel of record, Natalia Zayas Godoy, nzayas@gmlex.net, Richard Cruz Franqui, rcruzfranqui@gmlex.net, and Mirelis Valle Cancel, mvalle@gmlex.net, to Genera PR LLC, through its counsel of record, Jorge Fernández-Reboredo,

jfernandez@ecija.com, José J. Díaz Alonso, jdiaz@ecija.com, Ernesto R. Ramos Maldonado, eramos@ecija.com.

In Guaynabo, Puerto Rico, on this 1st day of July 2026.

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Exhibit 1

(public version, confidential version to be filed under seal of confidentiality)

FEMA Project Scope of Work

(Initial)

Project Name:
165226-Vieques & Culebra (Feeders)
Revision: **1**

APPROVALS

The signatures below formally approve the FEMA Project Scope of Work.

Program Brief Management Leadership (PBML)		
Program Brief Owner	**Signature**	**Date**
[redacted]		06/08/2026
Grants Manager		**Date**
[redacted]		06/09/2026

DOCUMENT REVISION HISTORY

This table contains the history of the revisions made to this FEMA Project Scope of Work.

Rev.	Effective Date	Description of Change
0	April 21, 2021	Initial Release
1	June 5, 2026	Change of Scope Based on Issue for Construction Design and Hazard Mitigation Approach

TABLE OF CONTENTS

1.0 OVERVIEW

Project Name:	165226-Vieques & Culebra (Feeders)
Project type:	Restoration to Codes/Standards: Restores the facility(s) to pre-disaster function and to approved
Region:	Vieques & Culebra
Program Brief Owner:	[redacted]
Damage Number:	250081
Damaged Inventory/Asset Category:	Island-Wide Distribution Lines System
FEMA Project Number:	165226

2.0 INTRODUCTION

The purpose of this document is to present a Project Scope of Work (SOW) with Cost Estimates, as well as environmental & Historical (EHP) Preservation and 406 Hazard Mitigation work to be submitted to COR3 and FEMA for projects under DR-4339-PR Public Assistance. COR3 and FEMA will review the completed document to create a version of a specific project worksheet and post-fixed-cost estimates to repair, restore, or replace eligible facilities, including Section 406 hazard mitigation for a specific project.

LUMA Energy provides the Operations and Maintenance of the electric service to the entire island of Puerto Rico. Puerto Rico Electric Power Authority (PREPA) is the agency that owns the facilities, sites, and systems identified in this Scope of Work that are eligible as critical services facilities as defined in the Public Assistance Alternative Procedures (PAAP) (Section 428) and Bipartisan Budget Act (BBA) 2018 guidance documents.

This document will be updated with information developed during the initial design and engineering phase through the construction phase. If preliminary architectural and engineering work has not been completed, the type of work designation is considered initial and is based on currently available information. A Detailed Scope of Work will be submitted for continued advancement of work.

3.0 FACILITIES

3.1 Facilities Description

The facilities listed below are part of the Vieques 2501-01, 2501-02, 2501-03, and Culebra 3801-01, 3801-02 feeder's systems and are a subset of the scope included in the San Juan Region. Feeders Project in the PREPA 10-Year Infrastructure Plan. These interconnected and inter-functional distribution feeders (sites) are part of the electrical distribution system. These feeders are located on the islands of Vieques and Culebra, Puerto Rico. The feeders originate from the Vieques Substation (2501) and Culebra Substation (3801) and serve customers along a route to various locations (end). GPS Coordinates for the start and end point of each electrical feeder backbone (BB) project are noted in the tables below. For the Vieques Feeder 2501-01, the backbone splits into two backbone segments identified as BB-1 (Back Bone-1) and BB-2 (Back Bone-2).

3.2 Facilities List

Vieques 2502 Feeders Coordinates

Feeder Number	GPS Start	GPS End	Construction Date
2501-01 BB-1	[redacted]		More than 20 years
2501-01 BB-2			More than 20 years
2501-02			More than 20 years
2501-03			More than 20 years

Culebra 3801 Feeders Coordinates

Feeder Number	GPS Start	GPS End	Construction Date
3801-01	[redacted]		More than 20 years
3801-02			More than 20 years

Feeder No.	Municipality	Voltage (kV)	Customer Count	Backbone Length (miles)
2501-01 BB1	Vieques	4.16	1,324	6.06
2501-01 BB2	Vieques	4.16	515	2.35
2501-02	Vieques	4.16	1,778	6.40
2501-03	Vieques	4.16	1,376	2.44
3801-01	Culebra	4.16	293	2.10
3801-02	Culebra	4.16	1,215	4.04
		Total	**6,501**	**23.39**

The reconstruction design will cover a total of 23.39 miles of overhead distribution lines on the feeder's backbone (BB) and 0.96 miles of underground for the critical load. Please note that a section of 3801-02 from (P202) to (P218) has been descoped.

4.0 PROJECT SCOPE OF WORK

This project is part of the proposed initiatives that are designed to meet immediate energy needs and provide long-term sustainability in the islands of Vieques and Culebra. Specifically, the Vieques and Culebra feeders that are proposed in this project will connect to the existing Vieques substation (which will be restored and upgraded to meet codes and standards under FEMA project 165225 Vieques 2501 Substation Repairs and New Vieques 2502 Substation) and the existing Culebra Substation (which will be restored and upgraded to meet codes and standards under FEMA Project 165209 Culebra Substation 3801 and New Culebra Substation 3802).

New substations to which the feeders of this DSOW will be connected are also proposed in said projects 165225 and 165209. Moreover, the "Proposed 406 Hazard Mitigation" scope of work section of this DSOW explains how specific hazard mitigation measures of this project integrate with the proposed Vieques and Culebra microgrids (refer to FEMA projects 751655 and 751656) to provide reliability and resiliency. The foregoing will ensure reliable power delivery and contribute to improving redundancy and reliability in the distribution network to the residents of Vieques and Culebra.

This project is part of the proposed initiatives that are designed to meet immediate energy needs and provide long-term sustainability in the islands of Vieques and Culebra. Specifically, the Vieques and Culebra feeders that are proposed in this project will connect to the existing Vieques substation (which will be restored and upgraded to meet codes and standards under FEMA project 165225 Vieques 2501 Substation Repairs and New Vieques 2502 Substation at Project 751655 Vieques Microgrid) and the existing Culebra Substation (which will be restored and upgraded to meet codes and standards under FEMA Project 165209 Culebra Substation 3801 and New Culebra 3802 Substation at Project 751656 Culebra Microgrid). Moreover, the "Proposed 406 Hazard Mitigation" scope of work section of this DSOW explains how specific hazard mitigation measures of this project integrate with the proposed Vieques and Culebra microgrids (refer to FEMA projects 751655 and 751656) to provide reliability and resiliency. The foregoing will ensure reliable power delivery and contribute to improving redundancy and reliability in the distribution network to the residents of Vieques and Culebra. Below includes a breakdown of the scope of work for the **"Proposed 428 Public Assistance Scope of Work"** and the **"Proposed 406 Hazard Mitigation**

Feeder 2501-01 Scope of Work

Pole Replacement 2501-01			
Feeder	**Poles to be removed**	**§ 428 Pole of the Fixed Cost Estimate (FCE)** (Refer below to Proposed Section 406 Hazard Mitigation Scope of Work, Poles and Hardware HM section of this DSOW for description and quantities of poles that are proposed as §406)	**Quantity (Ea.)**
2501-01	35ft. Concrete	Poles to be replaced by electrical utility pole, 45ft round galvanized Steel	3
2501-01	45ft. Steel	Poles to be replaced by electrical utility pole, 45ft round galvanized Steel	1
2501-01	35ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
2501-01	40ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	133

Pole Replacement 2501-01			
Feeder	**Poles to be removed**	**§ 428 Pole of the Fixed Cost Estimate (FCE)** (Refer below to Proposed Section 406 Hazard Mitigation Scope of Work, Poles and Hardware HM section of this DSOW for description and quantities of poles that are proposed as §406)	**Quantity (Ea.)**
2501-01	40ft. Wood	Poles to be replaced by electrical utility pole, 60ft round galvanized Steel	1
2501-01	40ft. Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	12
2501-01	40ft. Concrete	Poles to be replaced by electrical utility pole, 60ft round galvanized Steel	1
2501-01	40ft. Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	52
2501-01	45ft. Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	3
2501-01	45ft. Concrete	Poles to be replaced by electrical utility pole, 60ft round galvanized Steel	1
2501-01	45ft. Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	21
2501-01	45ft. Steel	Poles to be replaced by electrical utility pole, 60ft round galvanized Steel	1
2501-01	50ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	2
2501-01	50ft. Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
		Total	**233**

New Poles		
Feeder	**New Poles to be Added**	**Quantity**
2501-01	Electrical utility pole, steel galvanized, round, tapered shaft, 50' S-8	4
	Total	**4**

Poles to be Removed 2501-01		
Feeder	**Poles to be Removed**	**Quantity**
2501-01 BB-1	30ft Wood	2
2501-01 BB-1	35ft Concrete	3
2501-01 BB-1	35ft Steel	1
2501-01 BB-1	40 ft Wood	1
2501-01 BB-2	30 ft Wood	3
2501-01 BB-2	35 ft Wood	2
2501-01 BB-2	35 ft Steel	1
2501-01 LAT-1	35 ft Steel	1
2501-01 LAT-1	40 ft Concrete	1
	Total	**15**

Poles to Remain 2501-01		
Feeder	**Poles to Remain**	**Quantity**
2501-01	30 ft Steel	1
2501-01	45 ft Concrete	69
	Total	**70**

Steel Galvanized Transformers	Interconnection Voltage	Quantity
37.5 KVA	2.4 kV	3
50 KVA	2.4 kV	11
37.5 KVA	4.16 kV	2
50 KVA	4.16 kV	19
	Total	**35**

Capacitors Banks	Pole Id	Coordinates	Capacity (kVAR)
Capacitor Banks - 3Ø CAPACITY	P003	[redacted]	150
Capacitor Banks - 3Ø CAPACITY	P306		150
		Total	**2**

Reclosers 2501-01			
Pole ID	**Pole FID**	**Description**	**Coordinates**
P312	17025850	Three-Phase Automatic Recloser	[redacted]
		Total Three-Phase Automatic Reclosers	1
P014-09	20018865	Fuse Cutout – 3Ph	[redacted]
P025	20018913	Fuse Cutout – 3Ph	
P030	20019934	Fuse Cutout – 3Ph	
P034	20019971	Fuse Cutout – 3Ph	
P370-01	17027696	Fuse Cutout – 3Ph	
P022	20018910	Fuse Cutout – 2Ph	
P025	20018913	Fuse Cutout – 2Ph	
		Total Fuse Cutout	**7**
		Total	**8**

Concrete Base Description	Diameter (in.)	Length (ft.)	Precast Concrete Foundation Quantity	Cubic Yards
Precast Concrete Base for 50-S8.5	40	14.5	50	168.2

*Precast Concrete Base Volume Formula / 50' or 60'-S8.5 = {[(π*1.66^2*14.5) - (π*1.1^2 *9.8)] / 27} = 3.35CY

Note: FEMA 428 PA FCE considered 20 concrete cubic yards per mile. Feeder 2501-01 includes 8.41 miles x 20 CY per mile = **168.2 CY (428 PA)**. To comply with a design that withstands sustained winds of 160mph caused by hurricane conditions, additional cubic yards are considered as 406 Hazard Mitigation (HM).

Conductor Description 2501-01		
556.5 ACSR Conductor	**652.4 AAAC Conductor**	**1/0 Cu Conductor**
5.30 wire miles (w.miles)	29.08 wire miles (w.miles)	3.96 wire miles (w. miles)
Note: As discussed with FEMA at the 12/16/2025 meeting, conductor 556.5 AAAC is not mechanically and electrically compatible with either 556.5 ACSR nor 652.4 AAAC. As an HM initiative, for feeder segments located more than 1 mile from the seashore, 428 PA will install a 556.5 ACSR conductor. For segments located one mile or less from the seashore line, 428 will install 652.4 AAAC. 406 HM will replace 556.5 ACSR conductors of segments located further than one mile from the seashore line and upgrade them with a 652.4 AAAC conductor (of the same gauge).		

Guy Wires	
Feeder	**1/2'' Guy wires Quantity**
2501-01	53

Fiber Optic* 2501-01	
Fiber Optic Description	**Replacement Quantity**
Armored 96 SMF (Existing 48 SMF to be upgraded with an armored 96 SMF)	5.48 M.L.F.
96 SMF (Existing 48 SMF to be upgraded to 96 SMF)	0.73 M.L.F.
Armored 48 SMF	33.24 M.L.F.
12 SMF	4.26 C.L.F.

*Fiber Optic loop = 51,536 ft (Include 11,660 ft 48 SMF from 406 HM).
SMF = Single Model Fiber; M.L.F = Thousand Linear Feet; C.L.F = Hundred Linear Feet.

Note: As agreed regarding the transmission system, 406 HM will fund the installation of the additional 48-strand fiber optic cable (same size as the existing one) for the full operation of the Vieques and Culebra Microgrids (Reclosers and PMU's). However, the subrecipient, as a recovery solution and using 428 PA funds, will increase the size of the cable from 48 to 96 SMF to gain additional capacity for operational improvements (other technology to support system observability, cameras, etc.).

Feeder 2501-02 Scope of Work

Pole Replacement 2501-02			
Feeder	**Poles to Be Removed**	**§ 428 Pole of the Fixed Cost Estimate (FCE)** (Refer below to Proposed Section 406 Hazard Mitigation Scope of Work, Poles and Hardware HM section of this DSOW for description and quantities of poles that are proposed as §406)	**Quantity (Ea.)**
2501-02	30ft. Wood	Poles to be replaced by electrical utility pole, 40ft round galvanized Steel	2
2501-02	30ft. Concrete	Poles to be replaced by electrical utility pole, 40ft round galvanized Steel	1
2501-02	35ft. Steel	Poles to be replaced by electrical utility pole, 40ft round galvanized Steel	1
2501-02	40ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	26
2501-02	40ft. Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	90
2501-02	40ft. Concrete	Poles to be replaced by electrical utility pole, 55ft round galvanized Steel	4
2501-02	40ft. Concrete	Poles to be replaced by electrical utility pole, 60ft round galvanized Steel	3
2501-02	40ft. Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	4
2501-02	45ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	2
2501-02	45ft. Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	4
2501-02	45ft. Concrete	Poles to be replaced by electrical utility pole, 55ft round galvanized Steel	1
2501-02	45ft. Concrete	Poles to be replaced by electrical utility pole, 60ft round galvanized Steel	5
2501-02	45ft. Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	36
2501-02	50ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
		Total	**180**

New Poles 2501-02		
Feeder	**New Poles to be Added**	**Quantity**
2501-02	Poles to be installed, electrical utility pole, 40ft round galvanized Steel	1
2501-02	Poles to be installed, electrical utility pole, 50ft round galvanized Steel	3
	Total	4

Poles to Remove 2501-02		
Feeder	**Poles to Remove**	**Quantity**
2501-02	30 ft Wood	2
2501-02	30 ft Steel	1
2501-02	40 ft Concrete	1
2501-02	40 ft Steel	1
2501-02	45 ft Wood	2
	Total	7

Poles to Remain 2501-02		
Feeder	**Pole to Remain**	**Quantity**
2501-02	45 ft Concrete	15
	Total	**15**

Steel Galvanized Transformers 2501-02	Interconnection Voltage	Quantity
37.5 kVA	2.4 kV	4
50 kVA	2.4 kV	8
37.5 kVA	4.16 kV	2
50 kVA	4.16 kV	9
	Total	**23**

Reclosers 2501-02			
Pole ID	**Pole FID**	**Description**	**Coordinates**
P474	17026900	Three-Phase Automatic Recloser	[redacted]
		Total Three-Phase Automatic Reclosers	**1**
P434-01	19682183	Fuse Cutout – 3Ph	[redacted]
P468	19681021	Fuse Cutout – 3Ph	
P441-01	1001727924	Fuse Cutout – 2Ph	
		Total Fuse Cutout	**3**
		Total	**4**

Capacitors Banks	Pole Id	Coordinates	Capacity (KVAR)
Capacitor Banks - 3Ø Capacity	P502	[redacted]	150
Total			**1**

Concrete Base Description	Diameter (in.)	Length (ft.)	Precast Concrete Foundation Quantity	Cubic Yards
Precast Concrete Base for 50-S8.5	40	14.5	38	128

*Precast Concrete Base Volume Formula / 50' or 60'-S8.5 = [(π*1.66^2*14.5) - (π*1.1^2 *9.8)] / 27} = 3.35CY

Note: FEMA 428 PA FCE considered 20 concrete cubic yards per mile. Feeder 2501-02 include 20 CY/miles x 6.40 miles = **128 CY (428 PA)**. To comply with a design that withstands sustained winds of 160mph caused by hurricane conditions, additional cubic yards are considered as 406 Hazard Mitigation (HM).

Conductor Description 2501-02		
556 ACSR Conductor	**652.4 AAAC Conductor**	**1/0 Cu Conductor**
5.7 wire miles (w.miles)	21.08 wire miles (w.miles)	2.39 wire miles (w. miles)

Note: As discussed with FEMA on 12/16/2025 meeting, conductor 556.5 AAAC is not mechanically and electrically compatible with neither 556.5 ACSR nor 652.4 AAAC. As a HM initiative, for feeder segments located more than 1 mile from seashore, 428 PA will install a 556.5 ACSR conductor. For segments located one mile or less from the seashore line, 428 will install 652.4 AAAC. 406 HM will replace 556.5 ACSR conductors of segments located further than one mile from the seashore line and upgrade it with a 652.4 AAAC conductor (of the same gauge).

Guy Wires	
Feeder	**1/2" Guy wires Quantity**
2501-02	51

Fiber Optic* 2501-02	
Fiber Optic Description	Replacement Quantity
Armored 144 SMF (Existing underground 48 SMF to be upgraded with a 144 SMF)	0.97 M.L.F.
144 SMF (Existing underground 48 SMF to be upgraded with a 144 SMF)	0.60 M.L.F.
96 SMF (Existing 48 SMF to be upgraded with a 96 SMF)	13.91 M.L.F.
96 SMF (New 48 SMF (406 HM) to be upgraded with a 96 SMF)	24.55 M.L.F.
12 SMF	50.04 C.L.F.

*Fiber Optic loop = 45,034 ft.
SMF = Single Model Fiber; M.L.F = Thousand Linear Feet; C.L.F = Hundred Linear Feet.

Note: As agreed for the transmission system, 406 HM will fund the installation of the additional 48-strand fiber optic cable (same size as the existing one) for the full operation of the Vieques and Culebra Microgrids (Reclosers and PMU's Connections). However, the subrecipient, as a recovery solution and using 428 PA funds, will increase the size of the cable from 48 to 96 SMF and/or 144 SMF to gain additional capacity for operational improvements (other technology to support system observability, cameras, etc.).

Feeder 2501-03 Scope of Work

Pole Replacement 2501-03			
Feeder	**Poles to Be Removed**	**§ 428 Pole of the Fixed Cost Estimate (FCE)** (Refer below to Proposed Section 406 Hazard Mitigation Scope of Work, Poles and Hardware HM section of this DSOW for description of quantities of poles that are proposed as §406)	**Quantity (Ea.)**
2501-03	35ft. Steel	Poles to be replaced by electrical utility pole, 40ft round galvanized Steel	1
2501-03	35ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
2501-03	35ft. Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
2501-03	40ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	17
2501-03	40ft. Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	28
2501-03	40ft. Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	6
2501-03	40ft. Steel	Poles to be replaced by electrical utility pole, 55ft round galvanized Steel	1
2501-03	45ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	7
2501-03	45ft. Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	4
2501-03	45ft. Concrete	Poles to be replaced by electrical utility pole, 60ft round galvanized Steel	1
2501-03	45ft. Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	18
2501-03	45ft. Steel	Poles to be replaced by electrical utility pole, 55ft round galvanized Steel	1
2501-03	50ft. Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
		Total	**87**

New Poles 2501-03		
Feeder	**New Poles to be Added**	**Quantity**
2501-03	Poles to be installed, electrical utility pole, 50ft round galvanized Steel	7
	Total	**7**

Pole to be Removed 2501-03		
Feeder	**Pole to be Removed**	**Quantity**
2501-03	30ft. Wood	3
2501-03	35ft. Steel	1
2501-03	40ft. Steel	1
2501-03	45ft. Steel	4
2501-03	45ft. Concrete	1
2501-03	50ft. Concrete	2
	Total	**12**

Poles to Remain 2501-03		
Feeder	**Pole to Remain**	**Quantity**
2501-03	45ft. Concrete	2
	Total	**2**

Steel Galvanized Transformers 2501-03		Interconnection Voltage	Quantity
50 kVA		2.4 kV	5
37.5 kVA		4.16kV	1
50 kVA		4.16kV	22
75 kVA		4.16kV	1
Total		**29**	

Reclosers 2501-03			
Pole ID	**Pole FID**	**Description**	**Coordinates**
P620	17792194	Three-Phase Automatic Recloser	[redacted]
Total Three Phase Automatic Reclosers			**1**
P637	17794372	Fuse Cutout – 3Ph	[redacted]
P648	19682110	Fuse Cutout – 3Ph	
P635-01	17794041	Fuse Cutout – 2Ph	
Total Fuse Cutout			**3**
Total			**4**

Concrete Base Description 2501-03	Diameter (in.)	Length (ft.)	Precast Concrete Foundation Quantity	Cubic Yards
Precast Concrete Base for 50’ Pole	40	14.5	14	48.8

*Precast Concrete Base Volume Formula / 50’ or 60’-S8.5 = {[(π*1.66^2*14.5) - (π*1.1^2 *9.8)] / 27} = 3.35CY

Note: FEMA 428 PA FCE considered 20 concrete cubic yards per mile. Feeder 2501-03 includes 20 CY/miles x 2.44 miles = **48.8 CY (428 PA)**. To comply with a design that withstands sustained winds of 160mph caused by hurricane conditions, additional cubic yards are considered as 406 Hazard Mitigation (HM).

Conductor Description 2501-03			
556 ACSR Conductor	**652.4 AAAC Conductor**	**652.4 AAAC with cover**	**1/0 Cu Conductor**
-	8.74 wire miles (w.miles)	0.97 wire miles (w.miles)	2.41 wire miles (w.miles)

Guy Wires 2501-03	
Feeder	**1/2" Guy wires Quantity**
2501-03	37

Fiber Optic* 2501-03	
Fiber Optic Description	**Replacement Quantity**
48 SMF	12.93 M.L.F.
12 SMF	21.75 C.L.F.

*Fiber Optic loop = 15,735 ft (Include 630 ft 48 SMF from 406 HM).
SMF = Single Model Fiber; M.L.F = Thousand Linear Feet; C.L.F = Hundred Linear Feet.

Note: As agreed for the transmission system, 406 HM will fund the installation of the additional 48-strand fiber optic cable (same size as the existing one) for the full operation of the Vieques and Culebra Microgrids (Reclosers and PMU's Connections).

Feeder 3801-01 Scope of Work

Pole Replacement 3801-01			
Feeder	**Poles to Be Removed**	**§ 428 Pole of the Fixed Cost Estimate (FCE)** (refer below to Proposed Section 406 Hazard Mitigation Scope of Work, Poles and Hardware HM section of this DSOW for description and quantities of poles that are proposed as §406)	**Quantity (Ea.)**
3801-01	30 ft Wood	Poles to be replaced by electrical utility pole, 40ft round galvanized Steel	3
3801-01	35 ft Steel	Poles to be replaced by electrical utility pole, 40ft round galvanized Steel	1
3801-01	35 ft Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
3801-01	40 ft Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	12
3801-01	40 ft Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	23
3801-01	40 ft Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	5
3801-01	40 ft Concrete	Poles to be replaced by electrical utility pole, 60ft round galvanized Steel	2
3801-01	45 ft Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	11
3801-01	45 ft Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	5
3801-01	45 ft Wood	Poles to be replaced by electrical utility pole, 85ft round galvanized Steel	1
3801-01	45' Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	5
3801-01	70 ft Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
		Total	**70**

New Poles 3801-01		
Feeder	**New Pole to be Added**	**Quantity**
3801-01	Poles to be installed, electrical utility pole, 50ft round galvanized Steel	14
	Total	**14**

Poles to be Removed 3801-01		
Feeder	**Poles to be Removed**	**Quantity**
3801-01	30 ft Wood	1
3801-01	35 ft Steel	1
3801-01	45 ft Concrete	1
	Total	**3**

Poles to Remain 3801-01		
Feeder	**Poles to Remain**	**Quantity**
3801-01	45 ft Concrete	3
3801-01	50 ft Concrete	1
Total		**4**

Steel Galvanized Transformers 3801-01	Interconnection Voltage	Quantity
37.5 kVA	2.4 kV	2
50 kVA	2.4 kV	4
37.5 kVA	4.16 kV	6
50 kVA	4.16 kV	6
Total		**18**

Capacitors Banks	Pole Id	Coordinates	Capacity (kVAR)
Capacitor Banks - 3Ø CAPACITY	P118	[redacted]	150
Total			**1**

Reclosers 3801-01			
Pole ID	**Pole FID**	**Description**	**Coordinates**
P111	17800823	Fuse Cutout – 3 Ph	[redacted]
P139.1	New	Fuse Cutout – 3 Ph	[redacted]
Total Fuse Cutout			**2**

Concrete Base Description 3801-01	Diameter (in.)	Length (ft.)	Precast Concrete Foundation Quantity	Cubic Yards
Precast Concrete Base for 50 ft Pole	40	14.5	12	42

*Precast Concrete Base Volume Formula / 50' or 60'-S8.5 = {[(π*1.66^2*14.5) – (π*1.1^2 *9.8)] / 27} = 3.35CY

Note: FEMA 428 PA FCE considered 20 concrete cubic yards per mile. Feeder 3801-01 includes 20 CY/miles x 2.10 miles = **42 CY (428 PA)**. To comply with a design that withstands sustained winds of 160mph caused by hurricane conditions, additional cubic yards are considered as 406 Hazard Mitigation (HM).

Conductor Description 3801-01
1/0 CU Conductor
9.59 wire miles (w.miles)

Guy Wires 3801-01	
Feeder	**1/2" Guy wires Quantity**
3801-01	38

Fiber Optic* 3801-01	
Fiber Optic Description	**Replacement Quantity**
Armored 48 SMF	0.25 M.L.F.
48 SMF	0.80 M.L.F.
12 SMF	10.20 C.L.F.

*Fiber Optic loop = 14,470 ft (Include 12,400 ft 48 SMF from 406 HM).
SMF = Single Model Fiber; M.L.F = Thousand Linear Feet; C.L.F = Hundred Linear Feet.

Note: As agreed for the transmission system, 406 HM will fund the installation of the additional 48-strand fiber optic cable (same size as the existing one) for the full operation of the Vieques and Culebra Microgrids (Reclosers and PMU's connections).

Feeder 3801-02 Scope of Work

Pole Replacement 3801-02			
Feeder	**Poles to Be Removed**	**§ 428 Pole of the Fixed Cost Estimate (FCE)** (refer below to Proposed Section 406 Hazard Mitigation Scope of Work, Poles and Hardware HM section of this DSOW for description and quantities of poles that are proposed as §406)	**Quantity (Ea.)**
3801-02	30ft Wood	Poles to be replaced by electrical utility pole, 40ft round galvanized Steel	2
3801-02	30ft Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
3801-02	35ft Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	1
3801-02	35ft Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	4
3801-02	40ft Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	97
3801-02	40ft Concrete	Poles to be replaced by electrical utility pole, 55ft round galvanized Steel	1
3801-02	40ft Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	5
3801-02	40ft Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	2
3801-02	45ft Concrete	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	19
3801-02	45ft Steel	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	7

Pole Replacement 3801-02			
Feeder	**Poles to Be Removed**	**§ 428 Pole of the Fixed Cost Estimate (FCE)** (refer below to Proposed Section 406 Hazard Mitigation Scope of Work, Poles and Hardware HM section of this DSOW for description and quantities of poles that are proposed as §406)	**Quantity (Ea.)**
3801-02	45 ft Wood	Poles to be replaced by electrical utility pole, 50ft round galvanized Steel	3
Total			**142**

New Poles 3801-02		
Feeder	**New Poles to be Added**	**Quantity**
3801-02	Poles to be installed, electrical utility pole, 40ft round galvanized Steel	1
3801-02	Poles to be installed, electrical utility pole, 50ft round galvanized Steel	13
Total		**14**

Pole to be Removed 3801-02		
Feeder	**Pole to be Removed**	**Quantity**
3801-02	35 ft Wood	1
3801-02	35 ft Steel	3
Total		**4**

Pole to Remain 3801-02		
Feeder	**Pole to Remain**	**Quantity**
3801-02	40 ft Concrete	1
3801-02	45 ft Concrete	23
3801-02	50 ft Concrete	2
Total		**26**

Steel Galvanized Transformers 3801-02	Interconnection Voltage	Quantity
37.5 kVA	2.4 kV	6
50 kVA	2.4 kV	8
37.5 kVA	4.16 kV	6
50 kVA	4.16 kV	1
Total		**21**

Capacitors Banks 3801-02	Pole Id	Coordinates	Capacity (kVAR)
Capacitor Banks - 3Ø Capacity	P231	[redacted]	150
Total			**1**

Reclosers 3801-02			
Pole ID	**Pole FID**	Description	**Coordinates**
P220	17796397	Three-Phase Automatic Recloser	[redacted]
Total Three-Phase Automatic Reclosers			**1**
P235	17797175	Fuse Cutout – 3Ph	[redacted]
P291	17798234	Fuse Cutout – 3Ph	
P292	17798356	Fuse Cutout – 3Ph	
P313	17798793	Fuse Cutout – 3Ph	
P334	17799049	Fuse Cutout – 3Ph	
Total Fuse Cutout			**5**
Total			**6**

Concrete Base Description 3801-02	Diameter (in.)	Length (ft.)	Precast Concrete Foundation Quantity	Cubic Yards
Precast Concrete Base for 50' Pole	40	14.5	24	80.8

*Precast Concrete Base Volume Formula / 50' or 60'-S8.5 = {[(π*1.66^2*14.5) - (π*1.1^2 *9.8)] / 27} = 3.35CY

Note: FEMA 428 PA FCE considered 20 concrete cubic yards per mile. Feeder 3801-02 include 20 CY/miles x 4.04 miles = **80.8 CY (428 PA)**. To comply with a design that withstands sustained winds of 160mph caused by hurricane conditions, additional cubic yards are considered as 406 Hazard Mitigation (HM).

Conductor Description 3801-02	
652.4 AAAC	**1/0 CU**
7.91 wire miles (w.miles)	12.6 wire miles (w.miles)

Guy Wires 3801-02	
Feeder	**1/2'' Guy wires Quantity**
3801-02	47

Fiber Optic* 3801-02	
Fiber Optic Description	**Replacement Quantity**
Armored 96 SMF	2.95 M.L.F.
96 SMF (Existing 48 SMF to be upgraded with a 96 SMF)	10.94 M.L.F.
96 SMF (New 48 SMF (406 HM) to be upgraded with a 96 SMF)	12.98 M.L.F.
12 SMF	6.44 C.L.F.

*Fiber Optic loop = 27,514 ft.
SMF = Single Model Fiber; M.L.F = Thousand Linear Feet; C.L.F = Hundred Linear Feet.

Note: As agreed for the transmission system, 406 HM will fund the installation of the additional 48-strand fiber optic cable (same size as the existing one) for the full operation of the Vieques and Culebra Microgrids (Reclosers and PMU's connections). However, the subrecipient, as a recovery solution and using 428 PA funds, will increase the size of the cable from 48 to 96 SMF to gain additional capacity for operational improvements (other technology to support system observability, cameras, etc.).

Distribution Line Replacement

- Installation of additional steel poles to comply with structure loading cases along the feeder backbones. For some cases where additional poles are installed, it could be necessary to relocate the adjacent poles to comply with structural loading cases.
- Replacement of existing transformers with new stainless-steel units with their respective capacity.
- Transformers will be replaced with 37.5KVA, 50KVA and 75KVA, which are the current consensus-based code and Standard replacement.
- Replacement of existing conductors by LUMA specification.
- Replacement of existing poles with streetlighting, including a new luminaire.
- Replacement of existing capacitor banks.
- Replacement of all distribution equipment, including disconnect switches, fuse cutout, surge arrester, crossarms, pole insulator, suspension insulators, service drop, secondary lines, tap conductor (first span), etc., in compliance with LUMA Overhead Electrical Distribution System Manual included on the Applicant Event Profile in Grants Portal.
- Installation of communication cables in all backbones. Also, the installation along the backbone of an additional underbuilt communication cable for interconnection with the pole breakers or any other LUMA equipment.
- Retirement and disposal of the existing distribution lines facilities with their related components.
- Soil boring or testing to ensure conditions are suitable for the installation of structures/poles or underground cable systems.
- All the work to be completed will be in the current utility easement or easement to be constituted, due to feeder relocation.

Pole Replacement

- Remove existing poles, including hardware, and install new poles, with hardware, in the same location.
- All pole installations are to be replaced within a 10-foot range; new locations are included in this scope of work. The depths of the poles to be installed are provided.
- Remove the existing foundations and replace them with a new concrete foundation base.
- New guy wire/ anchors are to be installed in compliance with LUMA Overhead Electrical Distribution System Manual included on the Applicant Event Profile in Grants Portal, at the point on the pole closet to the center of the load from the conductors, and within the easement.
- Vegetation clearance will be performed solely to the extent that it allows crews to conduct work and will be limited to a 10 ft radius surrounding the surface of the pole, but not to exceed the width of the easement. This is for the exclusive purpose of gaining access to the pole to conduct repairs. The costs related to vegetation clearance procedures are covered in project FAASt #727691 (Vegetation). The vegetation removal process will be managed in accordance with federal and state regulations.
- This scope of work will not affect water or sewer utility services.

Detail Description for Planned Field Work Scope Notes:

A) Trenching/Underground (Underground Circuit)

- Install new trenching within our existing 10' electrical easement or public domain. The trench's dimensions are described by LUMA, which states the typical trench width is 22 inches and the typical trench depth is 48 inches.

Feeder	Municipality	Purpose	Location Start	Location End	Under Ground Lineal Distance
2501-03	Vieques	New construction required to comply with right of way clearance	[redacted]		1,049 lnft.
3801-02	Culebra	Underground near to the airport approach landing area			1,325 lnft.

For additional information, please refer to Appendix K & L Under Ground Design and Attachment H – Staging Area, Access Rd – Vegetation Management & Ground Distr.

B) Material Disposal

- Polychlorinated biphenyl (PCBs), oil from the transformer and breakers, sealants, and other chemical waste typical of a construction site are considered hazardous waste and will be disposed of by the contractor in approved facilities as per applicable local regulations.
- The type of debris in the process of removal is luminaires, pole arms, photocells, metal scrap, wiring, concrete, steel, and wood poles, etc. The debris will be separated and taken to an approved waste disposal facility in compliance with applicable local regulations.
- Photocells are considered universal waste and will be disposed of by the contractor in authorized facilities in compliance with applicable federal and local laws and regulations. Material amounts will be provided by a certified management contractor performing a site evaluation calculation for asbestos, lead paint, and roof material.
- Material amounts will be provided by a certified management contractor performing a site evaluation calculation for asbestos, lead paint, and roof material as needed.

C) Transformers will be contained and returned to LUMA (Technica de Vieques, [redacted]) (Technica de Culebra [redacted]) in compliance with applicable federal and local regulations. The removal of the transformer will require testing of the existing oil for PCB levels, drain oil, and delivery to the approved waste disposal site.

D) Access Roads

- Poles are near the roads and are site accessible. The construction of access roads is not required for this scope of work

E) Staging Area

- Staging area requirements in Vieques and Culebra islands were considered for both the new equipment to be installed and the equipment that will be retired. Also, an area for the administrative offices, and construction heavy equipment storage is considered as shown in *Appendix H – Staging Area, Access Rd – Vegetation Management & Ground Distr.*

Staging Area	Municipality	Feder	Coordinates	Description	Parcel Number/Owner
1	Vieques	2501-01 2501-02 2501-03	[redacted]	BO PUERTO FERRO, 00765, Vieques, Puerto Rico Proposed Temporary Staging Area: 5,891 m2	457-000-007-10 / ALMACENES MORALES INC.
2	Vieques	2501-01 2501-02 2501-03		BO LUJAN, CARR 997 KM.HM 2.4, PR, Puerto Rico, 00000, Vieques Proposed Temporary Staging: 4,336 m²	462-000-003-02 / Municipio de Vieques
3	Culebra	3801-01 3801-02		BO PLAYA SARDINAS, 00775, Culebra Puerto Rico Proposed Temporary Staging Area: 4,918 m2	476-000-001-16 / CARMEN GEORGINA GONZALEZ MARTINEZ
4	Culebra	3801-01 3801-02		BO LA ROMANA, PR, Puerto Rico, 00000, Culebra Proposed Temporary Staging Area: 5,445 m²	476-000-003-01 / Casellas Márquez Juan

F) Fill, gravel, sand, etc.:

- Fill, Gravel, and Sand materials will be obtained from an approved supplier as referenced in LUMA Vendor Directory List included on the Applicant Event Profile in Grants Portal.

G) List of Equipment to be used:

- Skid Steer, Excavator, Dump trucks, Manlifts, 120-Ton Motor Crane, Boom Trucks 45-ton Crane, Zoom Boom, Air compressor, Truck Digger, Water truck, Pump Truck, Concrete Vibrator, Oil Tanker, Filtering Machine, and Flatbed platform.
- Vegetation will be removed utilizing a machete, chainsaw, electric pruner, telescopic pole pruner, bucket truck, and/or chipper.
- All equipment used will comply with Tier 4 EPA Emission Standard, if available.

H) Water Quality

- The proposed action will result in minor, short-term, and negligible impacts to water quality. Erosion and sedimentation control measures will be installed to protect any water body, as required by applicable state and federal regulations.

I) Erosion Control

- Install any required temporary erosion control and protection measures to mitigate erosion or environmental risk as required by local and federal regulatory agencies prior to construction activities.

J) Cultural Resources

- The proposed action would comply with Section 106 and the requirements of the Project Specific Programmatic Agreement. In the event that unexpected cultural resources are discovered at any time within the project area, work shall cease in the immediate vicinity of such discoveries and notify the agencies.

K) Endangered Species

- The project would comply with Section 7 of the Endangered Species Act.

L) Best Management Practices (BMPs)

- Best Management Practices (BMPs) and notification conditions and reporting requirements will be implemented.

M) Specific List of Permits Required:

- DTOP Endorsements & Municipality Notifications
- Excavation and Demolition Notification in Department of Transportation and Public Works Agency - (DTOP)
- LUMA will provide proof of all permits.

5.0 TYPE OF PROJECT

Choose One (Restoration, Improved, or Alternate) If improved, provide changes in facility size, capacity, dimension, or footprint. If alternate, provide rationale for recommendations.
to its pre-disaster design, function, and capacity per applicable codes and standards.
Restores to Codes and Standards
This work will comply with FEMA (Public Assistance Alternative Procedures (Section 428) Guide for Permanent Work FEMA-4339-DR-PR February 2020)

Note: For this project, final design is complete, and an Issued for Construction (IFC) package is available; therefore, the ToW designation is supported by completed A&E documentation and represents a construction ready scope, subject to revision only if additional information or FEMA/COR3 review findings require modification.

6.0 PRELIMINARY ENGINEERING

Is architectural and engineering (A&E) funding required to help define the intended scope of work?

Yes, architectural and engineering funding required to help define the intended scope of work

7.0 CODES AND STANDARDS

The following will be referenced when applying specific codes, specifications, and standards to the project design:

1. Consensus-based codes, per FEMA (Public Assistance Alternative Procedures (Section 428) Guide for Permanent Work FEMA-4339-DR-PR February 2020).
2. Industry standards per FEMA Recovery Policy FP-104-009-5, Version 2, Implementing Section 20601 of the 2018 Bipartisan Budget Act through the Public Assistance Program.
3. FEMA Recovery Interim Policy FP-104-009-11 Version 2.1, Consensus-Based Codes, Specifications, and Standards for Public Assistance.
4. LUMA's latest Design Criteria Document (DCD), which aggregates the design considerations of most of the consensus-based codes, specifications, and standards listed in FEMA Recovery Interim Policy 104-009-11 Version 2.1 (December 20, 2019).

Codes, Specifications, and Standards

Yes, applicable codes and standards will be identified and incorporated into the plans and specifications.

Industry Standards

Yes: applicable industry standards will be identified and incorporated into the plans and specifications.

8.0 COST ESTIMATE

Cost estimates for this work are prepared in conformance with class 3, accuracy, which is between +/-30% of the final project cost. The estimate includes and is not limited to materials, construction labor and equipment, engineering, management, and contingencies.

Estimated Budget for Architectural & Engineering Design:	$7,300,623.16
Estimated Budget for Procurement & Construction:	$63,747,913.56
Estimated Budget for Equipment and Materials:	$4,347,262.94
Estimated Overall Budget for the Project:	**$73,213,587.24**

9.0 406 HAZARD MITIGATION PROPOSAL

9.1 406 Mitigation Opportunity Scope of Work

It is imperative that LUMA rebuild and harden its interdependent distribution system to FEMA consensus-based codes and standards and harden to more stringent standards included in LUMA's Distribution Design Criteria document, thereby making it more resilient to new hurricane wind loading criteria. The main goal is to reduce the vulnerability and fragility of the interconnected system and improve the resiliency of the power system distribution grid by substantially reducing the potential of future similar damage to the system, thus minimizing the risk of power loss during disaster events.

LUMA has included 406 Hazard Mitigation measures in its preliminary design that meet these new, higher standards described above. These standards include increasing the resiliency of the distribution structures and hardware in higher-risk exposed areas and more robust structures that can withstand higher wind speeds in vulnerable regions on the island.

- PAPPG Version 3 allows for a mitigation design of 2 classes higher than the existing in-place system.
- Replace damaged poles with higher-rated poles as referenced in compliance with Cost-Effective Hazard Mitigation Measures. Design standards have increased from the FEMA Consensus Codes & Standards (145 mph rating) to the new LUMA Standard (160 mph rating).

The following is the distribution of 406 Hazard Mitigation initiatives to be implemented for feeders 2501-01, 2501-02, 2501-03 (Vieques), and 3801-01 / 3801-02 (Culebra).

Poles and Hardware HM

As a hazard mitigation initiative, based on the new C&S poles will be replaced by new 12-sided, electrical utility pole steel galvanized tapered shafts with a wind resistance of 160 mph rating that is stronger than the round steel galvanized established in the Fixed Cost Estimate (FCE). LUMA requests 406 HM funding to cover the increase in cost between the FCE 50' round pole and the stronger 12-sided pole.

Feeder 2501-01			
428 Fixed Cost Estimate Pole Description	**428 PA Quantity**	**406 Hazard Mitigation Pole Description**	**406 HM Quantity**
45ft Round Galvanized Steel	4	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 45ft S-5.7, for distribution	4
50ft Round Galvanized Steel	229	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 50ft S-8.5, for distribution	229
60ft Round Galvanized Steel	4	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 60ft S-10, for distribution	4

Feeder 2501-02			
428 Fixed Cost Estimate Pole Description	**428 PA Quantity**	**406 Hazard Mitigation Pole Description**	**406 HM Quantity**
40ft Round Galvanized Steel	5	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 40ft S-5.7, for distribution	5
50ft Round Galvanized Steel	166	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 50ft S-8.5, for distribution	166

Feeder 2501-02			
428 Fixed Cost Estimate Pole Description	**428 PA Quantity**	**406 Hazard Mitigation Pole Description**	**406 HM Quantity**
55ft Round Galvanized Steel	5	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 55ft S-8.5, for distribution	5
60ft Round Galvanized Steel	8	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 60ft S-8.5, for distribution	5
		Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 60ft S-10, for distribution	3

Feeder 2501-03			
428 Fixed Cost Estimate Pole Description	**428 PA Quantity**	**406 Hazard Mitigation Pole Description**	**406 HM Quantity**
40ft Round Galvanized Steel	1	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 40ft S-5.7, for distribution	1
50ft Round Galvanized Steel	90	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 50ft S-8.5, for distribution	90
55ft Round Galvanized Steel	2	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 55ft S-8.5, for distribution	2
60ft Round Galvanized Steel	1	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 60ft S-8.5, for distribution	1

Feeder 3801-01			
428 Fixed Cost Estimate Pole Description	**428 PA Quantity**	**406 Hazard Mitigation Pole Description**	**406 HM Quantity**
40ft Round Galvanized Steel	4	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 40ft S-5.7, for distribution	4
50ft Round Galvanized Steel	77	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 50ft S-8.5, for distribution	77
60ft Round Galvanized Steel	2	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 60ft S-10, for distribution	2
85ft Round Galvanized Steel	1	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 85ft S-35, for distribution	1

Feeder 3801-02			
428 Fixed Cost Estimate Pole Description	**428 PA Quantity**	**406 Hazard Mitigation Pole Description**	**406 HM Quantity**
40ft Round Galvanized Steel	3	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 40ft S-5.7, for distribution	3
50ft Round Galvanized Steel	152	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 50ft S-8.5, for distribution	152
55ft Round Galvanized Steel	1	Electrical utility pole, steel galvanized, 12-sided, tapered shaft, 55ft S-8.5, for distribution	1

Overall Observability and Resilient Systems:

To accomplish the goal of preventing future similar damage and being able to monitor effectively, the system proposed in this project provides the capacity of detecting problems and communicating them quickly. Reclosers, CFIs, line sensors, and PMUs were not previously installed on Vieques & Culebra, and their addition as mitigation measures will enable the operator to fulfill its responsibility to ensure the continuous operation of the feeder that is essential to the health and safety of people and the economy of the municipality. This equipment is not considered a code or standard in the FCE.

Line sensors feed measurement signals to the PMUs, which in turn estimate synchro phasors and stream them at a high reporting rate to the microgrid controller and/or to a central location. This technology provides real-time situation awareness for network operators, which allows for proactive measures against threats to the grid. Operators can monitor the networks and assets' status and take timely corrective actions to minimize outages. PMU data also expedites system recovery by providing voltage phase angles, which are critical information for generation integration and line reclosing. As an added benefit, after an event, PMU high-resolution data and GPS-synchronized data facilitate event studies and forensic analysis to improve system design and make it even more robust against similar future events.

Distribution PMUs are placed near the beginning of the feeders at the exit of the substation, and at key locations distributed throughout the feeders, as determined by the customer count and demand between PMUs. The PMUs at the substation exits can observe issues beyond the breakers that separate the feeders and continue to observe the demand of the feeder past external tie points in the case of transfer. PMUs would also observe all three phases, instead of only one phase, by SCADA at the feeder's head, adding the ability to notice issues regarding load balance between phases. There are PMUs located near critical facilities such as airports, shelters, fire and police stations, and PRASA facilities to monitor issues that may affect their operation more directly. Other PMUs are placed near switches or fuses that can serve as tie-points with other feeders to ensure the transfers between feeders do not cause problems for either of them. The data obtained from the PMUs and other equipment, such as reclosers in the feeders, will be utilized for state estimation of sections not directly observed and assist in improved fault detection. PMUs and line sensors are being added to this project for mitigation purposes to minimize the risks to people, lifelines such as communications, transportation, water, service interruptions, to plan for the prevention of future damages by events, and to protect the system with its islanding functions, among others. This, in turn, will reduce the reach and duration of outages in the event of a disaster, including to critical facilities that serve the population outside the main Island.

PMUs are planned to be installed at 38kV nodes and throughout 4 kV distribution feeders, and their data will be utilized for system monitoring and control. The 38 kV PMUs with accompanying line sensors will be installed at the Points of Interconnection (POI) between Distribution Energy Resources (DERs) such as Solar Photovoltaic (PV) systems and battery energy storage (BESS); as well as where the Vieques and Culebra microgrids connect and where the Vieques microgrid connects with the submarine cable connecting the Vieques to the main island. The PMU locations are important for monitoring and synchronization of DER assets, while having PMUs at the POIs will support monitoring and coordinating the transition of the microgrids between grid-connected and islanded modes of microgrid operation. During severe incidents that pose a risk to the main island grid, this technology enables proactive microgrid islanding actions to protect the V&C microgrids. Since all PMU measurements are synchronized and time-stamped, it will be possible to get insight into the exact location and timing of events within the V&C microgrids' footprint. It is also important to emphasize that solar PV and BESS DER are Inverter-Based Resources (IBR), so without the PMU-based real-time situational awareness and advanced control software, it would be much more difficult to solve the challenge of reliable integration and monitoring of these IBR-based DERs using only conventional supervisory control and data acquisition (SCADA), and energy management system (EMS) technology.

Real-time PMU data with its related software applications are part of the mitigation efforts that the system operator will implement to: 1) synchronously observe the V&C electric grid, 2) prevent major system

outages and disturbance propagation supported by advanced applications such as voltage instability detection, data-driven event detection and classification, and automatic cascading outage analysis and mitigation, automatic seamless microgrid islanding process support, and 3) accelerate system restoration processes after major events by providing voltage phasor and frequency data, by performing forensic analysis.

Reclosers, CFIs, line sensors, PMUs, and fiber optic links are not redundant but complementary because they all serve their individual purpose alongside each other and work together to enhance the grid situational awareness, controllability, fault location, and restoration, which collectively promote network reliability, efficiency, and resilience.

Recloser HM

Below are two tables: the first lists three-phase automatic reclosers, and the second lists single-phase trip savers. As part of our Hazard Mitigation strategy, newly installed three-phase automatic reclosers will help maintain service to critical loads during environmental disasters and serve as a control mechanism when the Microgrid operates in island mode. Additionally, single-phase fuse cutouts will be upgraded to single-phase trip savers to isolate system faults, preserve power service, and prevent cascading failures across the network. Pole FID's, Pole ID's, locations, and device descriptions are provided below:

Three-Phase Automatic Reclosers

Feeder	Pole ID	Description	Latitude	Longitude	FID
2501-01	P020	Three-Phase Automatic Recloser	[redacted]		20018908
2501-01	P033	Three-Phase Automatic Recloser			20019964
3801-01	P105	Three-Phase Automatic Recloser			17800332
3801-02	P258	Three-Phase Automatic Recloser			17797887
2501-02	P402	Three-Phase Automatic Recloser			1000887110
2501-02	P413	Three-Phase Automatic Recloser			1000887296
2501-02	P422	Three-Phase Automatic Recloser			1000889152
2501-02	P423-01	Three-Phase Automatic Recloser			19679290
2501-02	P527	Three-Phase Automatic Recloser			17026851

Trip-Savers

Existing Equipment	Feeder	Pole ID	Description	Lat	Lon	FID
New Device Location	2501-01	P025	Trip- Savers	[redacted]		20018913
New Device Location	2501-01	P025	Trip- Savers			20018913
New Device Location	2501-01	P034	Trip- Savers			20019971
New Device Location	3801-02	P292	Trip- Savers			17798356
New Device Location	3801-02	P334	Trip- Savers			17799049
New Device Location	2501-03	P637	Trip- Savers			17794372

Trip-Savers						
Existing Equipment	**Feeder**	**Pole ID**	**Description**	**Lat**	**Lon**	**FID**
New Device Location	2501-03	P648	Trip- Savers	[redacted]		19682110
Fuse Cutout Replacement	2501-01	P014-09	Trip- Savers			20018865
Fuse Cutout Replacement	2501-01	P022	Trip- Savers			20018910
Fuse Cutout Replacement	2501-01	P030	Trip- Savers			20019934
Fuse Cutout Replacement	3801-01	P111	Trip- Savers			17800823

Existing Equipment	Feeder	Pole ID	Description	Lat	Lon	FID
Fuse Cutout Replacement	3801-01	P139.1	Trip- Savers	[redacted]		NEW
Fuse Cutout Replacement	3801-02	P235	Trip- Savers			17797200
Fuse Cutout Replacement	3801-02	P291	Trip- Savers			17798234
Fuse Cutout Replacement	3801-02	P313	Trip- Savers			17798793
Fuse Cutout Replacement	2501-01	P370-01	Trip- Savers			17027696
Fuse Cutout Replacement	2501-02	P434-01	Trip- Savers			19682183
Fuse Cutout Replacement	2501-02	P441-01	Trip- Savers			1001727924
Fuse Cutout Replacement	2501-02	P468	Trip- Savers			19681021
Fuse Cutout Replacement	2501-03	P635-01	Trip- Savers			17794041

PMUs / Line Sensors HM

The table below represents the PMU per feeder number, the pole type transformer and the unit quantity that will be installed.

Feeder Number	PMU's	Pole Type 1 kVA Transformer
2501-01	6	6
2501-02	5	5
2501-03	5	5
3801-01	2	2
3801-02	3	3

To enable the operation of PMUs, a 120/240V AC voltage source is required. For proper operation, a 1 kVA stainless-steel distribution transformer will be installed to supply low-voltage power for PMU control systems, including protection, automation, and communication.

Note: PMU quote was provided for FEMA cost evaluation. Transmission Line TL5400 FAASt#165213 scope has been reviewed, and no scope duplicity was identified.

Concrete Bases Foundations HM

As a Hazard Mitigation initiative, a concrete foundation will be added to avoid the cascading effect, having a concrete base on every fifth pole with a double dead-end construction standard. The dimensions for the concrete foundation will vary based on the size and classification of the pole that will be installed (50'/60' S8.5, S10, or S13)

The tables below present a summary of the foundation quantities and dimensions of the Precast Concrete Bases in accordance with the Appendix M, W, X, Y, Z:

Feeder Number	Concrete Base Description	Quantity	Base CY	Total CY
2501-01	*Precast Concrete Base for 50' S8.5, 55' S8.5 & 60' S8.5	198	3.35	681.63
	**Precast Concrete Base for 60' S10	3	6.11	
2501-02	*Precast Concrete Base for 50' S8.5, 55' S8.5 & 60' S8.5	96	3.35	339.93
	**Precast Concrete Base for 60' S10	3	6.11	
2501-03	*Precast Concrete Base for 50' S8.5, 55' S8.5 & 60' S8.5	69	3.35	231.15
3801-01	*Precast Concrete Base for 50' S8.5, 55' S8.5 & 60' S8.5	55	3.35	206.47
	**Precast Concrete Base for 60' S10	2	6.11	
	***Cast-in-Place Concrete Base for 88' S35	1	10	
3801-02	*Precast Concrete Base for 50' S8.5, 55' S8.5 & 60' S8.5	97	3.35	324.95
	Total	**524**	**-**	**1784.13**

Concrete Base Description	Diameter (in.)	Length (ft.)	Volume (CY)	HM Amount of Precast Foundation
*Precast Concrete Base for 50-S8.5, 55-S8.5, and 60-S8.5	40	14.5	1,725.25	515
**Precast Concrete Base for 60'-S10	48	16	48.88	8
*** Cast-in-Place Concrete Base for 88' S35	60	20	10	1

*Precast Concrete Base Volume Formula / 50', 55' or 60'-S8.5 = {[(π*1.66^2*14.5) - (π*1.1^2 *9.8)] / 27} = 3.35CY
**Precast Concrete Base Volume Formula / 60'-S10 = {[(π*2^2*16) - (π*1.1^2 *9.8)] / 27} = 6.11CY
***Cast in Place Concrete Base Volume Formula for 88'-S35 = {[(π*2.5^2*20) - (π*1.6^2 *15.2)] / 27} = 10 CY

As per preliminary design the total amount of concrete bases represents 1,784.13 cubic yards of concrete for the whole project. FEMA FCE considered 20 concrete cubic yards per mile. To comply with a design that withstands sustained winds of 160mph caused by hurricane conditions, additional cubic yards are being considered as HM.

The following table indicates the quantities of cubic yards per mile under 428 PA and 406 HM:

Concrete Base evaluation of quantity of CY/mi (PA vs. HM)				
Total miles	**Project Design CY**	**428 PA (FCE) CY**	**406 HM CY**	**406 HM %**
23.39	**1,784.13**	**23.39 x 20CY = 467.8**	**[(1,784.13 – 467.8(FCE)] = 1,316.33**	**1,316.33/1,784.13 = 73.78%**

Conductor AAAC HM

As a HM measure, LUMA will upgrade the conductor from ACSR to AAAC conductor, outside the coast mile, since it is lighter, more resistant to corrosion, twice as durable as the ACSR, among other benefits. Delta between AAAC and ACSR is considered Hazard Mitigation.

The table below represents the segments that are outside of the 1-mile shoreline.

Conductor 652.4 AAAC Outside mile from the coast		
2501-01	New 652.4 > 1mile from coast	5.3 wire miles
2501-02	New 652.4 > 1mile from coast	5.7 wire miles

Note: As discussed with FEMA at the 12/16/2025 meeting, conductor 556.5 AAAC is not mechanically and electrically compatible with either 556.5 ACSR nor 652.4 AAAC. As an HM initiative, for feeder segments located more than 1 mile from the seashore, 428 PA will install a 556.5 ACSR conductor. For segments located one mile or less from the seashore line, 428 will install 652.4 AAAC. 406 HM will replace 556.5 ACSR conductors of segments located further than one mile from the seashore line and upgrade them with a 652.4 AAAC conductor (of the same gauge).

Transformers Stainless Steel HM

As an HM measure, LUMA will upgrade the transformers from Steel Galvanized material to Stainless Steel type for those transformers that are more than one mile from the coast. Stainless Steel transformers are more resistant to corrosion when compared to the galvanized steel model. Vieques and Culebra are highly corrosive environments due to their size, and overall, the land is close to the seashore.

The table below represents the transformers that are more than 1-mile from the shoreline.

Feeder Number	Pole ID	FID	Latitude	Longitude	Transformer kVA	Distance (Miles)
2501-01	P330	17026503	[redacted]		50 kVA	**1.01**
2501-01	P338	17026598			37.5 kVA	**1.16**
2501-01	P341	17026620			37.5 kVA	**1.14**
2501-01	P350	17026663			37.5 kVA	**1.26**
2501-01	P357	17026702			50 kVA	**1.45**
2501-01	P363	17026734			50 kVA	**1.55**
2501-01	P371	17026818			37.5 kVA	**1.38**
2501-02	P435	19679721			50 kVA	**1.05**
2501-02	P438	19679759			50 kVA	**1.10**
2501-02	P439	19679766			50 kVA	**1.12**
2501-02	P441	19679795			50 kVA	**1.17**
2501-02	P449	19680842			50 kVA	**1.29**
2501-02	P455	19680890			50 kVA	**1.14**
2501-02	P457	19680926			50 kVA	**1.09**

Fiber Optic Cable HM

As an HM measure, LUMA will upgrade the fiber optic loop on the distribution system for V&C in the areas where it did not previously exist to support the reclosers and PMUs (located upstream or downstream). PMUs gather real-time data on voltage, current, and disturbances that inform system operators to act and prevent future physical damage. One way that operators can act using PMU data is through the remote operation of reclosers. The reclosers form an integral part of the Microgrid and must be connected directly to the Microgrid fiber optic loop. The Microgrid controllers will open and close the reclosers to connect and disconnect from the grid and effectively control the loading of the Microgrid under island conditions or special operation mode predicted by the Microgrid controller program algorithms.

The reclosers in this project will be used for protection and will be managed by the Microgrid controller. The reclosers form an integral part of the Microgrid and must be connected directly to the Microgrid communication network. The Microgrid controllers will open and close the reclosers to connect and disconnect segments from the grid and effectively control the loading of the Microgrid under island conditions. This load control will ensure Microgrid stability and the supply of critical loads by shedding non-critical loads. The Microgrid controller will need high-speed and very reliable communication to the reclosers. This is needed to ensure accurate voltage and current measurements at the recloser locations used by the control algorithms, especially in the islanded mode of operation. Wireless communications are too slow and unreliable to support Microgrid control.

This load control will ensure Microgrid stability and the supply of critical loads by shedding non-critical

loads, and will also prevent damage to the generation sources (BESS/Solar/Combustion Generators).

Fiber Optic		
Feeder Number	**Fiber Optic Description**	**New Cable Quantity**
2501-01	New 48 SMF	11.66 M.L.F.
2501-02	New 48 SMF	24.55 M.L.F.
2501-03	New 48 SMF	0.63 M.L.F.
3801-01	New 48 SMF	12.40 M.L.F.
3801-02	New 48 SMF	12.98 M.L.F.

Critical Loads Undergrounding HM

As part of our hazard mitigation analysis, it was concluded that creating a design that included underground segments to feed critical loads had to be implemented. This underground system will prevent power outages caused by hurricane-force winds and windblown debris and will create redundancy for Vieques and Culebra hospitals. Furthermore, this will avoid other risks such as vehicle collisions and fires that directly impact overhead power lines. This decision will provide more resiliency to the system that feeds current critical loads (Vieques Airport and Hospitals) by providing consistent service and reducing the time it will take to restore power to these essential structures in the case of a hurricane affecting the area. Refer to the table shown below for more information:

- Undergrounding to critical loads as shown on the table below, describing the critical loads defined for each feeder. Including the replacement of all facilities on the backbone of each distribution feeder considered in this project: poles and structures (including their foundations), framing and insulators, capacitor banks, pole reclosers, transformers (including lightning arresters and fuse cut-outs), conductors, guy wires, anchoring, grounding assemblies, underground cable, underground cable systems, and fault interrupting equipment (fuses, reclosers, and switches), streetlights, and any other associate components as per Underground Distribution Construction Standards included on the Applicant Event Profile in Grants Portal.
- Undergrounding feeds to critical services, adding distribution automation equipment such as pole reclosers, vacuum switches for service continuity and outage mitigation, additional strengthening, and mitigation beyond codes and standards to above-ground infrastructure in exposed areas.
- The affected route is provided in the underground design drawings.
- Depth 48 inches to the top of the first conduits.
- The only change in depth is in the underground to the Vieques Hospital, which has a segment crossing a culvert with Horizontal Directional Drilling (HDD). The estimated distance for the HDD is 335 Lineal Feet long.

The table below presents underground segments to feed critical loads.

Feeder Number	Critical Load	Services Coordinates	Depth from Finish Grade (in)	Distance from Substation (mi)	Distance from Point of Interconnection
2501-01*	Vieques Airport	[redacted]	48 in	3.07	340 ft
2501-02**	Vieques CDT Hospital		48 in	0.42	2,512 ft
3801-01***	Culebra CDT Hospital		48 in	0.39	1,560 ft
				Total Underground Lines	**4,412 ft (0.83 miles)**

2501-01 Vieques Airport

All overhead infrastructure leading towards the underground transition point feeding the Vieques Airport Load is being upgraded to higher-strength poles, and a minimum wire gauge of 652.4MCM AAAC from P001 (under TL 5400 scope) ([redacted]) to pole P085 ([redacted]) to comply with new LUMA standards. Reliability for the Vieques Airport Critical Load will be obtained from this backbone upgrade and an underground tap (Distance provided on table above 340 ft) from the overhead feeder backbone 2501-01 to its substation.

2501-02 Vieques CDT Hospital

All overhead infrastructure leading towards the underground transition point feeding the Vieques Hospital Critical Load is being upgraded to higher-strength poles, and a minimum wire gauge of 652.4MCM AAAC from P399 ([redacted]) to pole P417 ([redacted]) to comply with new design criteria. Reliability for the Vieques Hospital Critical Load will be obtained from an exclusive underground service from Vieques Substation 2501. The following describes the underground design for the interconnection of the critical load:

- An exclusive underground segment service to the Vieques Hospital Critical Load will be constructed starting at pole P399, up to an existing pull box in the Vieques Hospital facilities, with an approximate distance of 2,362 lineal feet.
- This reconstruction requires two manholes (12ft. x 9ft. x 8ft.), five manholes (10ft. x 7ft x 8ft.), and two 4-way switches. The exclusive underground segment circuit and the riser from pole P417 enter manhole MH-02-07 to a new vacuum switch. From this switch, it goes to the Vieques Hospital existing pull box to interconnect with the new facilities. The cable size for this case will be 4/0 AWG Cu.
- The proposed design includes a New Backup Feeder (2501-03) interconnection underground line tie from the overhead feeder backbone P606 ([redacted]), a new riser will be constructed from the new underground line service to the existing overhead feeder backbone on P606. The approximate distance between P606 and the new manhole MH-02-04 is 150 feet. The cable size for this case will be 750KCMIL-15kV, CU. For existing backup line ties please refer to the facilities description above.

3801-01 Culebra CDT Hospital

All overhead infrastructure leading towards the underground transition point feeding the Culebra CDT Hospital Critical Load is being upgraded to higher-stronger poles, and a minimum wire gauge of 1/0 CU from P101 ([redacted]) to pole P107-R1([redacted]) to comply with new LUMA standards. Reliability for the Culebra CDT Hospital Critical Load will be obtained from an exclusive underground service from Culebra Substation 3801. The following describes the underground design for the interconnection of the critical load:

- An exclusive underground segment service to Culebra CDT Hospital Critical Load will be constructed starting at pole P101, up to a new Manhole MH-01-04 to feed the existing 150KVA trans closure type substation of the Culebra CDT Hospital facilities, the approximate distance is 1,560 Lineal feet.
- This construction requires two manholes (12ft. x 9ft. x 8ft.), four manholes (10ft. x 7ft x 8ft.), one primary load break, a 4-way junction box, and two 4-way switches. The new exclusive underground segment circuit from Culebra Substation 3801 and the new underground segment from the existing manhole MH-03-E, enter the manhole MH-01-04 to a new vacuum switch. The cable size for this case will be 750KCMIL-15kV, CU.
- From this vacuum switch, it goes to the MH-01-05 to interconnect with the existing 150kVA Culebra CDT Hospital trans closure type substation. The cable size for this case will be # 2 AWG Cu.

- The proposed design includes a new underground tie between feeders 3801-01 and 3801-02 with a new 4-way switch. The riser for feeder 3801-01 is located on P101, and for feeder 3801-02 is in P201 approximate distance between the risers and the new manhole MH-01-00 is 180 Lineal Feet. The cable size for this case will be 750KCMIL-15kV, CU. For reference, go to the One-Line Diagram Drawing No. 3801-01-01-DL-UG-600-001, R01, page 11 on Appendix K IFC Culebra 3801 Underground Proposed Design for Hospital.

9.2 406 Mitigation Opportunity Cost Estimate

Estimated Budget for Architectural & Engineering to Design:	$ 1,006,025.84
Estimated Budget for Procurement & Construction:	$10,092,553.89
Estimated Budget for Equipment and Materials:	$ 1,176,186.58
Estimated Overall Budget for the Project:	**$12,274,766.31**

Note: If available, detailed engineering cost estimates will be included as an attachment.

10.0 ENVIRONMENTAL & HISTORIC PRESERVATION REQUIREMENTS

EHP considerations will be identified and evaluated during the preliminary design phase and submitted to FEMA for review. Requirements will be incorporated into the final design and construction documents, which must be approved by FEMA prior to construction activities.

END OF DOCUMENT