

PLANES DE MITIGACIÓN CONTRA PELIGROS NATURALES

Resiliencia Planificada



JUNTA DE PLANIFICACIÓN

2020

# Municipality of Quebradillas

Natural Hazard Mitigation Plan

Executive Summary

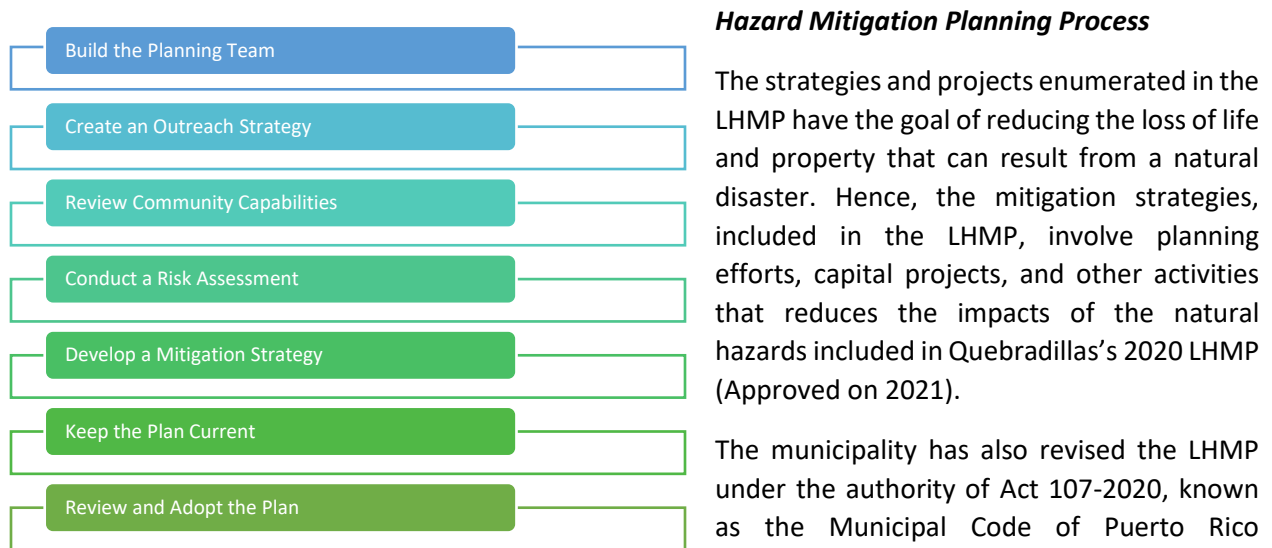


# 1 Introduction

The Municipality of Quebradillas has revised its Local Hazard Mitigation Plan (LHMP)<sup>1</sup> in accordance with the federal Disaster Mitigation Act of 2000 (DMA2K), which was signed into law to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988. One of the requirements that this legislation establishes is that in order for the municipality to receive federal mitigation funds, it must elaborate and adopt a Federal Emergency Management Administration (FEMA) approved LHMP.<sup>2</sup> Also, the DMA2K promotes that the local government, together with the State, work on pre disaster planning and encourages the development of sustainable hazard mitigation activities.

These LHMPs must be revised and updated every five (5) years to remain in compliance with regulations and Federal mitigation grant conditions. This updating requirement offers the municipality an opportunity to reevaluate recommendations, monitor the implementation of mitigation strategies included in the previous Plan, monitor the impact of mitigation actions that have been implemented, and determine if any changes to the Plan need to be incorporated. This Plan complies with said regulations.

Figure 1 Hazard Mitigation Planning Process



Municipalities Act of 1991. Section 1.010 of said Act, *supra* (former section 2.004 of Act 81-1991), states that the municipality can carry out any activity that establish programs or adopt convenient and useful measures to prevent and fight fires, aid the community in cases of emergency or natural disasters, catastrophic accidents of fires and for the civil protection in general.

<sup>1</sup> Please note that the 2020 Revised HMP was written in Spanish as per agreement between the municipality, the Planning Board, the Governor’s Authorized Representative (GAR) and FEMA.

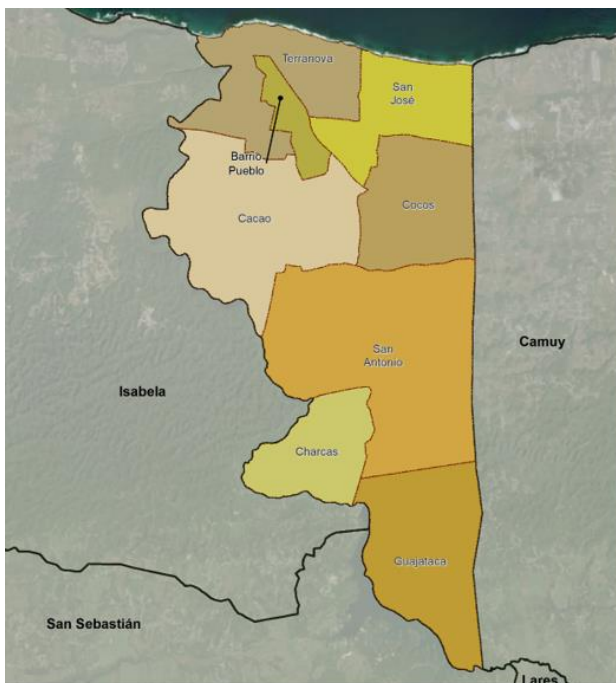
<sup>2</sup> 42 U.S.C 5165; 44 C.F.R. § 201.6.

This Executive Summary will provide an overview on:

- Quebradillas’s population characteristics;
- The public participation and outreach efforts with the community during the LHMP planning process;
- Quebradillas’s risk assessment;
- A review of the mitigation strategies, goals and LHMPs action plan; and
- Plan maintenance, and how to keep the Plan current.

## 2 Quebradillas’ Profile: Main Population Characteristics

Figure 1 Quebradillas and its wards



The Municipality of Quebradillas is located in the Northeastern coast of Puerto Rico. To the East it is adjacent to the Municipality of Camuy, to the North with the Atlantic Ocean, to the West with the Municipality of Isabela, and to the South with the Municipality of San Sebastián.

The Puerto Rico Planning Board, according to the most recent area delimitation, divides the island into eleven areas, grouping the different municipalities by their demographic trends and human settlements, infrastructure endowment, socioeconomic variables, sociodemographic characteristics, internal cohesion, and the resources and development potential of each. The Municipality of Quebradillas belongs to the Functional Area of Arecibo, which is composed of the municipalities of Arecibo, Hatillo, Camuy, Lares, Utuado and Quebradillas.

The municipality has eight (8) official *barríos* or wards: Cacao, Charcas, Cocos, Guajataca, Pueblo, San Antonio, San José and Terranova.

Geographically, the karst topography predominates. The Guajataca River runs from North to South, marking the Western limit of the municipality. The Cibao formation is characterized by being located in mountains of undulating topography. The Aguada limestone contains sinkholes, while the Aymamón limestone is characterized by “mogotes” or conical hills. The Camuy formation is predominantly limestone forming ridges in the topography. More extensive landslide deposits are found in the Guajataca River Valley.

Table 1: Population by age group: 2010 and 2018

| Population                | 2010 Census   | 2018 ACS Estimate | % Rate of Change |
|---------------------------|---------------|-------------------|------------------|
| Younger than 5 years age  | 1,527         | 1,120             | -26.65%          |
| 5 to 19 years of age      | 5,659         | 4,467             | -21.06%          |
| 20 to 64 years of age     | 15,123        | 13,954            | -7.73%           |
| 65 years of age and older | 3,610         | 4,495             | 24.52%           |
| <b>Total</b>              | <b>25,919</b> | <b>24,036</b>     | <b>-7.26%</b>    |

Source: US Census Bureau, Census 2010; American Community Survey 2014-2018 Estimates

showed a 24.52% increase, particularly located at barrio Cacao. Further details, regarding the profile of the municipality, can be found in Chapter 3, Section 3.2 of the updated 2020 LHMP.

According to the 2010 Census, Quebradillas has a population of 25,919. The American Community Survey (ACS) of 2018 estimated that the population of Quebradillas had decreased by 1,883 inhabitants. This represents a reduction of 7.26%. Nonetheless this overall reduction, population of and over 65 years

### 3 Outreach and Public Participation

In order to guide the development of this Plan, Hon. Rafael Surillo Ruíz, Mayor of Quebradillas, appointed the following officials to constitute the Mitigation Planning Committee (henceforth, the Planning Committee). The Planning Committee is comprised by representatives from several departments and citizen involvement with key roles and experience in community planning, public works, and emergency management to serve as key components in the planning process. Please refer to Section 2.5 on the LHMP.

Table 2 Hazard Mitigation Planning Committee

| Name                | Position | Dependency                           | E-mail                            |
|---------------------|----------|--------------------------------------|-----------------------------------|
| Edgar E. Seín Cruz  | Director | Proyect Management Office            | esein@quebradillas.pr.gov         |
| Delvis Irizarry     | Director | Federal Funds and External Resources | dirizarry@quebradillas.pr.gov     |
| Miguel A. Abrams    | Director | Emergency Management Office (OMME)   | mabrams@quebradillas.pr.gov       |
| Edwin A. Cortés     | Director | Citizen Aid Office                   | Not provided.                     |
| Luis Mercado Castro | Director | Finances                             | lmercado@quebradillas.pr.gov      |
| Yamaris Fuentes     | N/A      | Mayor’s Office                       | yfuentes@quebradillas.pr.gov      |
| Ángel M. Abrams     | Director | Public Works                         | obraspublicas@quebradillas.pr.gov |

The Planning Committee activities included: (1) updating the list of the municipality assets and local critical facilities; (2) updating the status of the previous LHMP mitigation strategies; (3) determine possible new mitigation strategies for the 2020 LHMP; (4) development and implementation of public participation and outreach activities and stakeholders at large such as neighboring municipalities, governmental agencies;

(5) announce the municipality’s LHMP efforts to agencies, stakeholders and public feedback for Quebradillas’s 2020 LHMP draft version and incorporate such comments on the Plan.

An initial notice was published on a local newspaper (Metro). Said notice informed the public about the first Public Participation meeting to be held in Quebradillas on March 4, 2020. A second notice was published regarding the publication of the 2020 LHMP draft version for review providing a 25 days period for review, submit comments, and the opportunity to participate in a second community meeting held on July 28, 2020. A draft version of the 2020 LHMP was made available on the Puerto Rico Planning Board’s (PRPB) website (jp.pr.gov).

## 4 Quebradillas’ Risk Assessment

After reviewing the natural hazards identified as priorities on the previous Quebradillas’s 2013 LHMP, the Municipal Emergency Response Plan, the municipality’s disaster history, and other literature related to potential future hazards, the Planning Committee identified the following hazards in the 2020 LHMP; (1) Sea Level Rise, (2) Drought, (3) Earthquakes, (4) Flooding, (5) Landslides, (6) Strong Winds (Tropical Cyclones), (7) Tsunami (8) Coastal Erosion, (9) Storm Surge, (10) Wild Fire. Discussion of these natural hazards are included in the 2020 LHMP’s Chapter 4. In addition, the 2020 LHMP includes a quantitative vulnerability analysis based on the best available data for Quebradillas and Puerto Rico accounting for future development to assess mitigation strategies to prevent repetitive and severe property loss.

This assessment served as a key tool for the Planning Committee and the public to identify and prioritize potential mitigation strategies by focusing attention on areas that present the greatest risk of damages to people, critical facilities, and normal municipality operations. The analysis for earthquake, flood, landslides, and high winds was performed by assessing the potential impacts from each hazard using geographic information system data (GIS).

By ranking each section, the municipality was in position to determine an overall risk classification. It is important to mention that this classification exercise resulted from the municipality’s 2020 LHMP technical risk assessment along with a capability gap analysis and the local community input, which is based on previous natural events experienced by the Planning Committee and the residents and business owners of Quebradillas.

The following table provides a summary of the risk classification for each identified hazard. Part of the process of completing the next appraisal required input from the community as well as from the Committee. Beyond the risk analysis, this table presents the municipality’s prioritization analysis.

*Table 3: Natural Hazard Ranking*

| Natural Hazard                | Risk to people | Risk to facilities | Risk to operations | Classification |
|-------------------------------|----------------|--------------------|--------------------|----------------|
| Climate Change/Sea Level Rise | Low            | Low                | Low                | Low            |
| Drought                       | Moderate       | Low                | Moderate           | Moderate       |
| Earthquake/Liquefaction       | High           | Moderate           | Moderate           | Moderate       |
| Flooding                      | High           | Low                | High               | High           |

| Natural Hazard                 | Risk to people | Risk to facilities | Risk to operations | Classification |
|--------------------------------|----------------|--------------------|--------------------|----------------|
| Landslide                      | Moderate       | Low                | Low                | Moderate       |
| Strong Winds/Tropical Cyclones | High           | High               | High               | High           |
| Tsunami                        | Low            | Low                | Low                | Low            |
| Storm Surge                    | Low            | Low                | Low                | Low            |
| Coastal Erosion                | Low            | Low                | Low                | Low            |
| Wildfire                       | Low            | Low                | Low                | Low            |

Source: Planning Committee 2019-2020

Currently, the potential risks with the highest classification or greater impact identified for the municipality are: (1) flooding and (2) strong winds (high risk), along with (3) drought, (4) earthquake/liquefaction and (5) landslides (moderate risk).

A ranking methodology was adopted to develop the mitigation strategies based on these risks as discussed on Chapter 6 and are divided into the following categories: (1) Prevention, (2) Property Protection, (3) Natural Resources Protection, (4) Structural Projects, (5) Emergency Services, and (6) Education and Public Awareness. The strategy category with most mitigation actions is “Prevention” with a total of 15 mitigation projects. Landslide and flooding are the natural hazards that are most addressed within the mitigation actions.

## 5 Mitigation Strategies, Goals, and Action Plan

The municipal capabilities, along with the risk assessment, serve as a foundation for the design, development and implementation of mitigation strategies. Mitigation strategies, found in Chapter 6, consist of a broad amount of local goals and strategies. The local mitigation actions were gathered from the 2012 LHMP and were incorporated into the current LHMP. This chapter provides information about the assigned implementation mechanisms and target completion dates. The sections in this chapter are designed to make the Plan strategic by identifying long-term goals, and functional, by identifying short term and immediate actions that will guide the daily local decision-making process and project implementation.

Mitigation goals consist of general guidelines that explain what the Municipality of Quebradillas wants to achieve in terms of hazards and mitigation. Thus, the goals included in the 2020 LHMP, offer the Planning Committee and the communities a framework for identifying, prioritizing and implementing actions to reduce the risks associated to natural hazards at Quebradillas.

Mitigation strategies are activities, projects, measures, or processes that Quebradillas will adopt in order to reduce or eliminate risk to people and property from hazards. Consequently, Quebradillas reviewed and revised the criteria adopted in the 2013 LHMP to analyze and prioritize potential mitigation strategies for the municipality. In order to developed the actions, the Planning Committee used the following criteria: (1) the potential of the strategy to reduce expected future damages and/or losses; (2) the capacity of the municipality to implement the action within the 5-year cycle of the Plan; (3) support from the public, agencies, municipal departments, amongst others; and (4) the potential of the action to increase resiliency

of Quebradillas and its residents. Accordingly, the Planning Committee adopted these criteria, the results from the risk assessment, and the feedback from local and neighboring communities to prioritize each mitigation strategy that was contained in this LHMP.

Most of the strategies and projects in the action plan target the continuity of municipality services after a hazard event. The following summarizes some of the strategies intended to mitigate these hazards (Refer to Section 6.5 of the LHMP):

- Purchase of terrain to relocate families to secure areas.
- Inventory of critical facilities that require structural rehabilitation (Repair and attend), as well as habilitate and prepare them for the occurrence of any future risk event (generators, storm shutters, structural rehabilitation).
- Dam repairs.
- Incrementing personnel and designated areas for emergency response (Safe Rooms, OMME).
- Flood prevention & Coastal protection (erosion, sedimentation, amongst others).
- Community training for emergency response and natural hazard awareness.

## 6 Maintenance to Keep the Plan Current

Chapter 7 details the revision and monitoring process in great extent. The formal maintenance process, identified by the Planning Committee, aims to keep the document viable and current, as it is a living document that shall reflect the hazards and realities affecting its community, and how to plan and prepare ahead in the event of a natural disaster. The plan maintenance process provides the procedures for evaluation and review every third quarter of each fiscal year during its 5-year life cycle. Evaluation will include a review of the mitigation action plan implementation, continued public involvement through the Plan's life cycle, as required by federal legislation. As part of the review process, the members of the Planning Committee. In the event of a major natural disaster affecting the island and/or municipality, an emergency meeting must be scheduled, and the Plan should be updated or amended, as necessary, bypassing the 5-year term. The Municipal Administrator will coordinate with other municipal dependencies, as needed, to achieve the goals and objectives stated in this LHMP.

Finally, the municipality will promote continued public participation during the plan maintenance by, including, but not limited to (Refer to Section 7.4.2 and 7.7 of the LHMP):

- Making sure to coordinate meetings between those involved in the Plan maintenance process, which will take place at the beginning of the third quarter of each fiscal year and after each natural disaster occurring in the jurisdiction of Quebradillas.
- Prepare the Work Plan and assign responsibilities for the Evaluation and Plan Update.
- Prepare the Reports of the Plan Progress Analysis, which will be presented and discussed in meetings with the people involved in the Plan maintenance process.
- In coordination with the Mayor's Office, review whether there were changes in the Act, regulatory agency regulations, which affect the Plan in one way or another, as well as budget allocations that may affect the development of projects programmed for communities.
- Ensure that applications for funds for the development of the activities described in the Plan to be made by the municipality are included in the budget of the relevant fiscal year.
- Identify opportunities to access funds.
- Coordinate meetings involving community as detailed in the calendar (Section 7.4.2).
- Establish the program-specific Work Plan, based on the schedule and goals set out in the Plan.

## 7 Plan Approval and Adoption

The Federal Emergency Management Agency (FEMA) completed review of the Municipality of Quebradillas's Hazard Mitigation Plan, based on the standards pursuant to title 44 C.F.R. Section 201 as authorized by the Disaster Mitigation Act of 2000 (DMA2k). The Plan received a satisfactory rating for all required criteria and was approved as approvable pending adoption (APA) on January 27, 2021. Accordingly, the Municipality of Quebradillas, adopted said Plan on March 15, 2021 via Resolution No. 15-E, Series 2020-2021.

Upon receiving the record of adoption from the municipality, FEMA approved Plan by March 30, 2021 and issued an official approval letter to municipality stating the jurisdiction has adopted said Plan thus approved and eligible for FEMA Hazard Mitigation Assistance programs. The approval letter establishes the expiration date 5 years from the date of approval, or until March 29, 2026.