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Pajaro Regional Flood Management Agency

Supplemental Operations and Maintenance Assessment

PUBLIC DRAFT ENGINEER'S REPORT

Prepared for: Pajaro Regional Flood Management Agency

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Section 1. Introduction

Background

The Pajaro Regional Flood Management Agency (PRFMA) is a joint powers authority formed in July 2021 to plan, finance and manage projects and programs to reduce flood risk to the City of Watsonville, the Town of Pajaro, and surrounding agricultural areas. PRFMA's members include the Counties of Monterey and Santa Cruz, the City of Watsonville, the Monterey County Water Resources Agency, and the Santa Cruz County Flood Control and Water Conservation District.

PRFMA member agencies are currently responsible for operating and maintaining approximately 28 miles of levees along the Pajaro River, Salsipuedes Creek and Corralitos Creek, maintaining vegetation within these channels, and operating and maintaining internal drainage facilities to collect and remove rain and storm waters. The US Army Corps of Engineers, in partnership with Monterey County Water Resources Agency and the Santa Cruz County Flood Control and Water Conservation District – Zone 7, is advancing the Pajaro River Flood Risk Management Project (PRFRMP) to provide up to a 100-year flood protection for the communities and surrounding agricultural areas by improving portions of the existing levees and constructing new levees and other associated improvements. With the passage of CA Senate Bill 496, the State of California is authorized to provide 100 percent of the non-federal matching funds for PRFRMP, alleviating the local communities from the burden of raising capital funds to construct the project. However, in order to secure federal and state funds, local agencies must contractually provide assurances that the project improvements will be properly maintained. These assurances require the local maintaining agencies to generate sufficient revenue to adequately fund the operation, maintenance, repair, replacement, and rehabilitation (collectively referred herein as "O&M Services") of the flood protection system to strict regulations and standards.

Existing Assessments for O&M Services

As described below, there are currently two revenue mechanisms to fund O&M Services for the Pajaro River flood protection system.

Monterey County Water Resources Agency, Zone 1 and Zone 1A

Monterey County Water Resources Agency (MCWRA) currently levies assessments on properties within Zone 1 and Zone 1A to fund flood control maintenance activities on the Pajaro levee and in the Pajaro River channel.

The boundaries of Zone 1 and assessments to be levied therein was established in 1980 by Ordinance 2626 of the Monterey County Flood Control and Water Conservation District, which was ratified by the voters of Zone 1 on November 4, 1980. Zone 1 encompasses approximately 3,200 acres within the 100-year floodplain of the Pajaro River. Properties within Zone 1 were found to contribute to the need for the Pajaro Levee and receive significant benefits from flood protection. The rates and methodology of assessments in Zone 1 were modified in 1996 by Ordinance 3878 without change to its boundary.

The boundary of Zone 1A and assessments to be levied therein were established in 1996 by Ordinance 3881. Zone 1A represents properties within the Pajaro River Drainage Basin located outside of 100-yr floodplain (effectively the boundary of Zone 1) that drain directly behind the Pajaro River levee, within the jurisdiction of MCWRA.

In 1999, a supplementary assessment was imposed on Zone 1 and Zone 1A to fund flood control maintenance activities and silt removal projects within the Pajaro River channel. In addition to these maintenance activities, revenue was authorized to repay loans from the Monterey County General Fund necessary for immediate flood-damaged levee repairs in 1995 and 1998.

Santa Cruz County Flood Control and Water Conservation District, Zone 7 and Zone 7A

Santa Cruz County Flood Control and Water Conservation District established the boundaries of Zone 7 in 1991 to include all of the lands lying within the Pajaro Storm Drain Maintenance District (PSDMD), including those lands within the City of Watsonville. An assessment was levied with the primary purpose to finance the local match of the US Army Corps of Engineers' project, fund the construction of other minor capital improvements, and provide supplementary funds for maintenance performed by PSDMD and the City of Watsonville.

The Santa Cruz County Flood Control and Water Conservation District established Zone 7A in 2004 to include all the lands lying within Zone 7 but excluding parcels within the boundaries of the City of Watsonville. Zone 7A collects impervious surface impact fees associated with new development to augment existing funding sources for the local match share of the PRFRMP (called the Pajaro River Levee Reconstruction Project in Zone 7A formation documents) and to finance and provide administrative, maintenance and engineering drainage services for other projects as identified in the Zone's Engineer's Report.

Future O&M Responsibility

As the non-federal sponsor for the PRFRMP, PRFMA will provide the O&M assurances to the US Army Corps of Engineers and will assume responsibility of providing O&M Services for the Pajaro River flood system. As described further in **Section 3**, the member agencies will be dedicating revenue from existing sources to the PRFMA. However, the existing revenue sources are not sufficient to fund the expected cost of O&M Services. Therefore, the PRFMA is proposing to levy a new assessment under the Benefit Assessment Act of 1982 to adequately fund the required operation and maintenance activities. This proposed Supplemental O&M Assessment (Proposed Assessment), if approved by property owners, would provide the additional funding needed to perform the O&M Services on behalf of the member agencies.

Purpose of Engineer's Report

This Engineer's Report describes, in detail, the methodology for levying an assessment upon parcels that receive special benefit from the O&M Services performed by the PRFMA on behalf of its member agencies. As further described within this report, the assessment is intended to provide the PRFMA with sufficient funding to perform the annual operations and maintenance of the levee system, as well as establish a reserve to support routine repairs, rehabilitation, and replacement of infrastructure.

Report Organization

This report is divided into six sections:

Section 1 Introduction, provides the background and purpose of this Engineer's Report.

Section 2 Authority and Process, outlines the authorization and process for imposing the proposed special assessment.

Section 3 Proposed Services and Funding Plan, describes the funding plan for levee operation and maintenance services.

Section 4 Assessment Methodology, details the methodology for levying an assessment that is proportional to the special benefits received by each parcel being assessed. All tables and equations referenced in the report are included in this section.

Section 5 Assessment Administration, describes how the assessment would be administered on an annual basis.

Section 6 Conclusion, provides the special benefit findings and certification by the Assessment Engineer. All figures referenced in the report are included after this section.

Section 2. Authority and Process

The Supplemental O&M Assessment would be imposed by the PRFMA pursuant to the Benefit Assessment Act of 1982 (1982 Act) codified in California Government Code §§54703 – 54719. Under Government Code §54710(a), the PRFMA is authorized to levy an assessment to finance the maintenance and operation costs for levees and drainage services. Furthermore under §54710.5, the assessment may include the cost of installation and improvement of the facilities providing the levee and drainage services. As further detailed in **Section 3**, the proposed assessment will finance the annual cost of levee operations and maintenance, as well as create a reserve for routine repairs, rehabilitation, and replacement of the levee facilities.

Under Government Code §54711, the assessment must meet the following requirements:

1. The amount of the assessment imposed on any parcel must be related to the benefit received by the parcel;
2. The aggregate amount of the assessment cannot exceed the annual cost of providing the service; and
3. The revenue derived from the assessment must only be used for the services identified as the basis for assessment.

In addition, all special benefit assessments must also comply with article XIIID of the State Constitution, adopted by voters under Proposition 218, and the Proposition 218 Omnibus Implementation Act (Government Code §53750 et seq.). These requirements outline the process for imposing the Assessment, including the requirement that this Engineer's Report documents the special benefits conferred by the service provided, the process for imposing the Assessment, and property owner approval through a balloting process.

This Engineer's Report has been prepared to:

1. Contain the information required pursuant to Government Code §54716(a), including:
    a. a description of the services proposed to be financed through the revenue derived from the Assessment;
    b. a description of each lot or parcel of property to be subject to the Assessment;
    c. the amount of the Proposed Assessment for each lot or parcel;
    d. the basis of the Assessment; and,
    e. the schedule of the Assessment;
2. Determine the special benefits received from the services provided by the PRFMA to benefiting properties; and,
3. Assign a method of apportioning the Assessment to benefiting parcels.

Following submittal of this report to the PRFMA Board of Directors (Board) for preliminary approval, the Board may, by resolution, call for an assessment ballot proceeding and public hearing on the establishment of the Proposed Assessment.

If the Board approves such a resolution, the secretary of the Board will initiate the notice, protest, and hearing procedure required by Government Code §54716, Government Code section 53753, and article XIIID. A notice and assessment ballot will be mailed to all benefiting property owners within the PRFMA boundaries. Such notice would include a description of the services to be funded by the Proposed Assessment, the Proposed Assessment amount for each parcel owned, the duration of the Assessment, an explanation of the method of voting on the Assessment, and the name and telephone number of the person designated by the Board to answer inquiries regarding the protest hearing. Each notice would also specify the date, time, and place of the public hearing and a summary of the ballot return procedures. Finally, each notice would include a ballot upon which the property owner can mark his or her approval or disapproval of the Proposed Assessment, as well as affix his or her signature, and a postage prepaid envelope in which to return the ballot.

Property owners will have at least 45 days to return the assessment ballots. On the last day of the balloting period, the public hearing will be held for the purpose of receiving public testimony regarding the Proposed Assessment. At the public hearing, property owners will have the opportunity to address the Board about the Proposed Assessment. Ballots must be submitted prior to the close of the public hearing. Property owners may also revise previously submitted ballots prior to the close of the public hearing.

If the votes received in favor of the Proposed Assessment outweigh the votes received opposing the Proposed Assessment (weighted by the proportional financial obligation of the property for which the ballots are submitted), the Board may continue with the process of imposing the Proposed Assessment and its future levy. If the assessments are so confirmed and approved by the Board, the Assessment roll would be submitted in future years to the Santa Cruz County and Monterey County Auditor Controller for inclusion on the secured property tax rolls, or the PRFMA may directly bill the property owner for the Assessment pursuant to Government Code §54718. As outlined in Government Code §53739, the Board may levy the Assessment in future years without conducting a new ballot proceeding so long as the Assessment is within the stated inflation-adjusted Assessment Rate authorized by the original balloting proceeding.

Section 3. Proposed Services and Funding Plan

Services Funded by the Assessment

The services to be funded by the Proposed Assessment include levee operation and maintenance services that are required to ensure that the design level of flood protection is maintained over time. The specific O&M activities may include, but are not limited to, levee inspections and evaluations, debris cleanup, mowing and spraying for weed control, rodent control, levee patrols during warning and flood stages, resurfacing of levee roads when required to keep them passable for patrolling and maintenance purposes, replacing erosion protection materials as needed, in-channel vegetation management, repair of the embankment to ensure levee integrity, and general operations & administration of the agency. In addition to the on-going performance of these services, the Proposed Assessment will also provide adequate reserves to support capital projects to provide emergency response and preparedness services, routine repair, rehabilitation, and replacement of facilities in order to ensure an adequate level of service over the duration of the Proposed Assessment. Collectively, these services are herein referred to as "O&M Services."

It is anticipated that assessment revenues may increase due to development within boundaries of the PRFMA. The resulting additional incremental revenue may be used for repayment of capital funding, including the issuance of bonds or other debt based on the additional revenue stream.

Annual Budget for Services Provided by the PRFMA

The PRFMA has prepared an annual budget to determine the cost for operations, maintenance, repair, replacement, and rehabilitation of the flood risk reduction system (e.g., levees and channels) and agreed upon internal drainage features (e.g., pump stations and culverts). The estimated annual cost to provide these services is approximately $3.8 million. The budget reflects the current expectation of costs based partially on historical expenses and partially on anticipated changes as a result of the completion of the PRFRMP.

Member agencies intend to commit approximately $2.6 million (primarily from the existing assessment revenues identified in **Section 1**) to fund a significant portion of the annual costs. Therefore, this Proposed Assessment is intended to fund the remaining $1.2 million needed for O&M Services associated with the flood risk reduction system. Prior to, or shortly after, approval and adoption of this Proposed Assessment, the PRFMA will execute cost share agreements to secure the funding commitments with the member agencies.

It should be noted that this budget was developed for the purpose of determining the annual revenue required for this proposed assessment. Future annual budgets approved by the PRFMA Board may vary from year to year according to actual anticipated expenses and revenues. **Table 1** on the next page provides a summary of the estimated Agency budget for fiscal year 2022-2023.

Table 1: Proposed PRFMA Budget for FY 2022/2023

Budget Item		Amount
REVENUE:		
Member Agency Contributions		
Santa Cruz County (Zone 7)	$	2,138,400
Monterey County (Zone 1/1A)	$	443,700
City of Watsonville	$	49,900
Subtotal Member Agency Contributions	*$*	*2,632,000*
Proposed Assessment	$	1,200,000
Total Revenue	**$**	**3,832,000**
EXPENSES:		
General Operations and Administration		
Personnel	$	822,200
Administrative Contract Services	$	581,700
County/City Services	$	265,700
Services and Supplies:	$	103,400
Subtotal General Operations and Administration	*$*	*1,773,000*
Operations, Maintenance, Repair, Replacement & Rehabilitation (OMRR&R):		
Levee Slope/Bench Mowing	$	227,500
Levee Compaction	$	252,900
Rodent Control	$	167,300
Flap Gate/Culvert Maintenance	$	113,000
Culvert CCTV Inspection/Flushing	$	40,700
Brush Removal	$	56,600
Levee Top & Access Road Maintenance	$	173,600
Pump Station O&M	$	58,500
Misc. O&M	$	210,700
In-channel Vegetation Maintenance	$	339,400
Capacity Analysis (surveying and H/H)	$	113,200
Permitting, Biological Monitoring, Mitigation	$	113,200
Emergency Monitoring/Gaging and Response	$	79,200
Reserve, Repair, Replacement, Rehabilitation	$	113,200
Subtotal OMRR&R	*$*	*2,059,000*
Total Expenses	**$**	**3,832,000**

Section 4. Assessment Methodology

General Discussion

Requirements of Proposition 218

To levy an assessment for a property related service for operations and maintenance, Proposition 218 requires the local agency to:

- Separate the general benefits from the special benefits conferred on a parcel;
- Identify the parcels that have special benefits conferred on them by the service;
- Calculate the proportionate special benefit for each parcel in relation to the entirety of the O&M expenses being funded; and
- Ensure the assessment does not exceed the reasonable cost of the proportionate special benefit conferred on each parcel.

The following methodology has been developed in accordance with these requirements.

Special Benefit vs. General Benefit

Proposition 218 requires any local agency proposing to increase or impose a special assessment to "separate the general benefits from the special benefits conferred on a parcel." (Cal. Const. art. XIIID §4). The rationale for separating special and general benefits is to ensure that property owners are not charged a special benefit assessment in order to pay for general benefits provided to the general public or to property outside the assessment district. Thus, a local agency performing a service that provides both special and general benefits may levy an assessment to pay for the special benefits but must acquire separate funding to pay for the general benefits.[1]

A special benefit is a particular and distinct benefit over and above the general benefits conferred on real property located within the agency's boundary or to the public at large. The total cost of the services must be apportioned among the properties being assessed based on the proportionate special benefit the properties will receive. Moreover, the governmental agency must demonstrate through a balloting process that the ballots submitted in opposition to the assessment do not exceed the ballots submitted in favor of the assessment, weighted according to the proportional special benefit and financial obligation of the affected properties.

In this instance, the O&M Services performed by the PRFMA provide both a general benefit to the public at large and a special benefit to specific properties located within the agency's boundaries. With regard to the special benefit, only those properties within the PRFMA's boundaries that are protected by the Pajaro River flood protection system receive a special benefit from the O&M Services provided by the PRFMA. This system protects properties from damages that would result from inundation due to uncontrolled flooding that would otherwise occur if the O&M Services were not provided. The special benefit provided to each parcel varies based on the parcel use, the area and average depth of flooding on the parcel, improvements (i.e., structures) on the parcel, and the relative flood risk based on its location within the flood protection system.

[1] *Silicon Valley Taxpayers' Assn., Inc. v. Santa Clara County Open Space Authority*, 44 Cal. 4th 431, 450; 2008

As noted above, special benefits are those "particular and distinct over and above general benefits conferred on real property located in the district or to the public at large." (Cal. Const. art. XIIID §2(i)). By contrast, general benefits provided to the public at large are discussed in terms of provision of general public services such as police and fire protection, and recreational opportunities that are available to people regardless of the location of their property. (See, e.g., Cal. Const. art. XIIID §6(2)(b)(5); Silicon Valley Taxpayers, 44 Cal. 4th 431. 450–456). The following considerations were evaluated to distinguish the general benefits provided by the O&M Services.

Public Property

The O&M Services will protect certain public properties (e.g., government buildings, schools, and parks). While the use of these public properties is a general benefit, the public properties themselves are protected by the Pajaro River flood protection system and receive a special benefit from the O&M Services in the same manner as private property. All public properties have been included in the determination of special benefit, as described in more detail under the Assessment Apportionment Methodology below. Therefore, there is no general benefit for public properties to be funded by the Proposed Assessment because the public properties will be assessed based on the special benefit received.

Local Streets and Collectors

The O&M Services will protect certain local streets and collectors. These roads are primarily used to access properties, as opposed to thoroughfares discussed separately below. The boundary of the Proposed Assessment has been narrowly drawn to include only those properties receiving special benefit from O&M Services. Therefore, the benefit from O&M Services to local streets and collectors is captured by assessing the properties they serve – as these roads have no value but in providing access to property, and protecting these roads is a means to provide special benefit to properties.

Thoroughfares

The O&M Services will also protect certain thoroughfares within the boundary of the Proposed Assessment. These roads are distinct from local streets and collectors in that these roads serve as primary transit routes within, through and across the community. These roads are used by the public at large regardless of residency, destination, or purpose. Therefore, the protection of these thoroughfares provides a general benefit that must be separated from the special benefit conferred on property by the Proposed Assessment and cannot be funded by the Proposed Assessment. Further discussion supporting the quantification and separation of this general benefit from the special benefit is provided below.

Proposed Assessment Boundary and Benefit Zones

All parcels within the PRFMA's boundaries receiving special benefit from the operation and maintenance of the Pajaro River flood protection system are within the benefit area of the Proposed Assessment. **Figure 1** provides a map of the Proposed Assessment Boundary, including the boundaries of Benefit Zones described in more detail below.

Hydraulic Analysis

In order to identify properties that receive special benefit from the O&M Services and develop a methodology to apportion the Proposed Assessment based on the special benefit received, R&F Engineering, Inc. (R&F) prepared a hydraulic analysis to determine the extent of flooding that would occur as a result of levee failures if the O&M Services were not provided. This hydraulic analysis utilized the hydraulic computation models developed by R&F for the purpose of determining special benefit from the O&M Services, as described below. The approach and results of the hydraulic analysis are documented in a technical memorandum prepared by R&F (*Pajaro River Flood Risk Management Project: Assessment District Hydraulic Analysis – DRAFT,* March 9, 2022) and summarized below.

With adequate O&M, the levees are assumed to be capable of withstanding a maximum flow event with water up to the top of the levee without failing. Therefore, the first step of the hydraulic analysis was to determine maximum flow that could be contained without overtopping the levee system (the "overtopping event"). The overtopping event varies within the Pajaro River flood protection system due to differences in levee height of each reach of the system. The system was divided into groups of contiguous levee reaches that provided similar level of flood protection. For example, once improvements are complete, the levees that are included in the PRFRMP will all be designed to a uniform flow event and will be able to pass the same overtopping event. Other levees in the system that are not part of the PRFRMP are able to pass a different sized overtopping event based on the existing levee heights. The overtopping event for each group of levee reaches was identified and became the basis for evaluating the extent of flooding that would occur as a result of levee failure if O&M Services were not provided.

Without adequate O&M, the levees are assumed to fail under the maximum flow event which results in flooding properties as water spills out of the channel through the failed levee section and spreads out onto the adjacent land. Multiple levee failure scenarios were performed to determine the extent of flooding associated with each levee reach. For each scenario, the levee failure was simulated by individually removing sections of levee within each reach from the hydraulic model and simulating the floodplain inundation that would occur under the overtopping event to determine the extent and depth of flooding on the adjacent land.

Benefit Zones

The Pajaro River flood protection system provides different levels of flood protection to properties depending on where a property is located, as indicated by the need to establish the overtopping event for each group of levee reaches. As a result, the flood damages associated with each levee failure scenario are not comparable when the scenarios are based on different overtopping events. Therefore, the following Benefit Zones were delineated (as shown in **Figure 1**) to identify areas that are inundated by the same set of levee failure scenarios. The zones were labeled with a county designation and numbered sequentially from downstream to upstream. The estimated recurrence interval of the overtopping event and a composite floodplain was developed for each Benefit Zone to establish the maximum extent and depth of flooding from the associated levee failure scenarios.

Benefit Zone SC1: This zone includes properties protected by 3.60 miles of levee on the right bank of the Pajaro River west of Highway 1. The recurrence interval of the overtopping event was estimated to be 10 years.

Benefit Zones SC2 and SC3: These zones include properties protected by 5.88 miles of levee on the right bank of the Pajaro River upstream of Hwy 1, the right bank of Salsipuedes Creek and the right bank of Corralitos Creek. The recurrence interval of the overtopping event was estimated to be 300 years. Zone SC2 is inundated from all levee failure scenarios on the right bank. Zone SC2 also extends west of Highway 1 to include the area flooded from flow down West Beach Street through the road embankment opening of the Highway 1 overpass. Zone SC3 is only inundated by levee failure scenarios associated with 1.90 miles of levee on the right bank of Corralitos Creek and the first leveed reach on the right bank of Salsipuedes Creek downstream of Highway 152.

Benefit Zone SC4:	This zone includes properties protected by 2.21 miles of levees on the left bank of Corralitos Creek and the first reach of Salsipuedes Creek downstream of Highway 152 on the left bank. The recurrence interval of the overtopping event was estimated to be 25 years.
Benefit Zone MC1:	This zone includes properties protected by 2.84 miles of levee on the left bank of the Pajaro River west of Highway 1. The recurrence interval of the overtopping event was estimated to be 10 years.
Benefit Zone MC2:	This zone includes properties protected by 5.01 miles of levees on the left bank of Pajaro River from Highway 1 upstream to the PRFRMP Tie-back Levee, as well as the PRFRMP Tie-back Levee. The recurrence interval for the overtopping event was estimated to be 300 years.
Benefit Zone MC3:	This zone includes properties protected by 1.94 miles of levee on the left bank of the Pajaro River, upstream (east) of the PRFRMP Tie-back Levee. The recurrence interval of overtopping event was estimated to be 15 years.
Benefit Zones F1 and F2:	These zones include properties protected by 5.04 miles levees on the left bank of Salsipuedes Creek and the right bank of the Pajaro River. The recurrence interval of the overtopping event was estimated to be 15 years. Zone F1 is inundated by all levee failure scenarios along these reaches. Zone F2 is only inundated by the levee failure scenario for the 1.8-mile upper reach of levee on the right bank of the Pajaro River.

Assessment Apportionment Methodology

Overview

The methodology for apportioning the annual assessment is based on calculating the number of equivalent benefit units for each parcel according to the special benefit received from the O&M Services provided by the PRFMA. The benefit conveyed to a parcel is based on avoided flood damages to the parcel as a result of uncontrolled flooding from a levee failure that would otherwise occur if the O&M Services were not provided.

The assessment is apportioned across parcels based on the following equation:

$$\underset{(EBU)}{Special\ Benefit} = \left[\begin{pmatrix} Avoided \\ Land\ and\ Crop \\ Damages \end{pmatrix} + \begin{pmatrix} Avoided \\ Structure \\ Damages \end{pmatrix}\right] \times \begin{pmatrix} Relative \\ Flood\ Risk \\ Factor \end{pmatrix}$$

The Equivalent Benefit Unit (EBU) methodology utilizes the following property characteristics and factors to determine the special benefit received by each parcel:

1. The Benefit Zone based the location within the flood protection system
2. The Land Use Category representing the type and use of property
3. The parcel size (acreage)
4. The extent (acreage) and average flood depth (feet)
5. The size (square footage) of any structure's building footprint
6. The Land and Crop Damage Rate based on the Land Use Category
7. The Structure Damage Rate per square foot based on the Land Use Category and average depth of flooding
8. The Relative Flood Risk assigned to each Benefit Zone based on:
    - The length of levee protecting the Benefit Zone, and
    - The recurrence interval of the overtopping for the levees protecting the Benefit Zone

Property Characteristics

Benefit Zones

The level of protection provided by the levee system varies depending on where a particular parcel is located. As discussed in above, Benefit Zones were established to delineate areas where all parcels have the same relative flood risk based on the maximum flow event before levee overtopping and the length of levee protecting the zone.

Land Use Categories

Multiple land use codes are used by the Santa Cruz County and Monterey County Assessors to categorize the properties within the PRFMA boundary. Each land use code was evaluated and assigned to a generalized Land Use Category (e.g.: agricultural, residential, commercial, industrial, etc.) for the purpose of identifying the characteristics of all parcels within each category for use in apportioning special benefit. A random sample of parcels for each County land use code was analyzed by reviewing satellite imagery to ensure that it had been assigned to the appropriate Land Use Category. Additional land use categories were added to classify parcels that were vacant, open space, or otherwise dissimilar from the generalized land use categories. The Land Use Categories are generally described as follows:

Agricultural properties were inspected using historic satellite imagery to confirm evidence of prior crop production.

Single-Family Residential properties are characterized by three or fewer single-family dwelling structures on a parcel. This Land Use Category includes properties with duplex and triplex buildings as they generally have the same characteristics as a single-family residence.

Multi-Family Residential is characterized as four or more dwelling units on a parcel. This Land Use Category includes apartments, condominiums, and townhouses.

Mobile Home Park is assigned exclusively to properties designed specifically for a mobile home complex.

Commercial is characterized by properties with retail, business office or public service buildings. This Land Use Category includes hotels, shopping centers, restaurants, offices, hospitals, certain school properties, etc.

Industrial is characterized by manufacturing and processing facilities. This Land Use Category includes warehousing, manufacturing, processing, distributors, and public utilities.

Vacant is characterized by properties that do not have a benefitting structure. This Land Use Category includes residential, commercial, and industrial parcels that have not been prepared for construction. This category also includes open space parcels which are developed as intended, such as parks, sports fields, bike paths, common areas, etc.

Floodway parcels are those that are normally inundated or configured to intentionally be inundated during high flood events. These parcels do not receive a special benefit from the Assessment. An example of this would be community lake or detention basin.

A **Blended** Land Use Category was used as necessary to properly apportion the benefit received by larger parcels over which multiple land uses were apparent. The Blended Land Use Category was typically used for schools and churches; however, it was applied on any parcel with a significant variety of land uses.

Table 2 summarizes the catalog of Land Use Categories with the total number of and acreage of benefiting parcels associated with each category.

Parcel Size

For properties in the County of Santa Cruz, all parcel acreage data was obtained from the Zone 7 FY 2021/2022 Assessment Roll. For properties in the County of Monterey, parcel acreage data was obtained from the Zone 1/1A FY 2021/2022 Assessment Roll and supplemented as necessary with Monterey County Assessor's data acquired through ParcelQuest.

Flooded Acres and Average Flood Depth

The hydraulic analysis applied to delineate the Benefit Zones was utilized to determine the extent of flooding, or flooded acres, and the average flood depth for each parcel within the boundary of the assessment district.

The hydraulic analysis is assumed to have some level of uncertainty in the reporting of the average flood depths due to the accuracy of the ground elevation data. To eliminate this uncertainty, the average flood depths were rounded down to the nearest foot prior to the calculation of avoided damages. The average flood depth was only calculated for only the flooded acreage and was used to determine structure damages which vary based on the depth of flooding.

The following threshold was applied to the flooded acres to determine when to calculate damages for parcels located along the edge of the floodplain:

- If less than 10% of the property is flooded, land and crop damages are not calculated. This condition typically exists where the delineated street flooding partially encroaches along the front of the parcel and damages are expected to be de minimis.
- If less than 10% of the property is flooded, structure damages are not calculated. This condition is typical of properties along the fringe with flooding in the front of the property, but the structure footprint does not encroach into the floodplain.

Structure Footprint

The assessment methodology utilizes the size of the structure footprint (square-footage) in conjunction with the building size identified in the County Assessor's data to apportion the special benefit associated with avoided structure damages. The structure footprint was utilized in the assessment methodology for the following reasons:

1) The number of stories recorded in the assessor's data is inconsistent both within and across each county. Relying on the assessor's data could result in numerous errors.
2) Structure damage based on the total livable area for multi-story residential buildings does not significantly deviate from the structure damage based on the comparable footprint of a single-story building until the depth of flooding is greater than 9 feet. After reviewing the floodplain depth data, only nine residential structures had a flood depth of 10 feet or greater. All nine residential structures were verified to be single story.
3) The building size identified in the County Assessor's data for commercial and industrial properties was found to be inconsistent with the size of the buildings observed in aerial images. Utilizing the building footprint provides a more reliable and consistently applied record of building size.

The structure footprint, as delineated and measured from aerial photographs may not exactly match the physical footprint of the building. However, the methodology and procedures to delineate the structure footprint were consistently applied to all properties. Therefore, any error in the size of the building footprint is assumed to be consistent across all properties. To account for this error and be equitable across all properties, the measured structure footprint data from the shapefiles was rounded down to the nearest 100 square-feet prior to calculating structure damages.

Secondary structures (e.g., detached garages or gazebos) and observable attached features (e.g., carports or patio awnings) were not included in the Structure Footprint because the damages and associated benefit are de minimis in comparison to the primary structure.

For properties in Santa Cruz County, structure footprints within each parcel were obtained from the "Building Footprints" shapefile located in the County of Santa Cruz's Geographic Information Services portal. The structure footprint shapefile was reviewed for accuracy within each parcel.

For properties in Monterey County, building footprint data did not exist. Therefore, each parcel within the benefit area in Monterey County was inspected using satellite imagery to determine the existence of structures. The building footprint of these structures were delineated and recorded in a GIS shapefile. The measured values of the delineated building footprints were then taken from the shapefile to replicate the methodology used for determining structure footprint sizes for properties in Santa Cruz County.

The delineated building footprints were overlaid on the floodplains utilized for each Benefit Zone. For parcels along the edge of the floodplain that are partially flooded, the delineated building footprints were inspected to determine whether the structure footprint was within or outside boundary of the floodplain. For those structures located outside the floodplain, the structure footprint was set to zero to ensure that damages would not be calculated for these structures.

For residential land use categories (SFR, MFR and Rural Residential), the building footprint may include areas under the roof structure that should not be assessed (for example, a roofline extension that creates a covered patio that cannot be distinguished from the primary building footprint). Therefore, for these residential land use categories, if the building footprint is greater than the building size from the assessor's data, the assessor's data will be used to determine structure damages.

Table 2 also summarizes total structure footprint for each Land Use Category.

Equivalent Benefit Unit Calculation

Equivalent Benefit Units (EBU) are the measure of special benefit received by properties from the PRFMA's O&M Services. Avoided flood damages to land, crop, and structures were based on the flooded acres and average flood depth from the hydraulic analysis.

The EBU for each property is calculated using the following equation:

$$\begin{matrix}Equivalent\\ Benefit\ Unit\\ (EBU)\end{matrix} = \left[\left(\begin{matrix}Avoided\\ Land\ and\ Crop\\ Damages\end{matrix}\right) + \left(\begin{matrix}Avoided\\ Structure\\ Damages\end{matrix}\right)\right] \times \left(\begin{matrix}Relative\\ Flood\ Risk\\ Factor\end{matrix}\right)$$

Where:

$$\begin{matrix}Avoided\\ Land\ and\ Crop\\ Damages\end{matrix} = \left(\begin{matrix}Flooded\\ Acreage\end{matrix}\right) \times \left(\begin{matrix}Land\ and\ Crop\\ Damage\ Rate\end{matrix}\right)$$

$$\begin{matrix}Avoided\\ Structure\\ Damages\end{matrix} = \left(\begin{matrix}Structure\\ Footprint\end{matrix}\right) \times \left(\begin{matrix}Replacement\\ Value\end{matrix}\right) \times \left(\begin{matrix}Structure\\ Damage\ Rate\end{matrix}\right)$$

$$\begin{matrix}Relative\\ Flood\ Risk\\ Factor\end{matrix} = \left(\begin{matrix}Flood\\ Frequency\\ Factor\end{matrix}\right) \times \left(\begin{matrix}Length\ of\\ Levee\\ Factor\end{matrix}\right)$$

And:

$$\begin{matrix}Flood\\ Frequency\\ Factor\end{matrix} = \frac{\mathrm{LOG}(Flood\ Frequency\ for\ the\ \ Benefit\ Zone)}{\mathrm{LOG}\ (Highest\ Flood\ Frequency\ for\ all\ Benefit\ Zones)}$$

$$\begin{matrix}Length\ of\\ Levee\\ Factor\end{matrix} = \frac{Length\ of\ Levee\ Protecting\ the\ Benefit\ Zone}{Longest\ Length\ of\ Levee\ Protecting\ all\ Benefit\ Zones}$$

Land and Crop Damage Rate

To determine the Land Damage Rate per acre, each Land Use Category was assigned a Relative Land Value based on data included in Appendix J of the Final General Reevaluation Report prepared for the Pajaro River Flood Risk Management Study. These values do not represent the assessed value or market value, rather a fair representation of general land value relationships between land use classifications. Although these general land values were determined in 2019, any changes in value would be relatively the same between each Land Use Category. The Land Damage Rate is intended to represent flood damages to bare land, horizontal infrastructure (e.g., drainage facilities) and improvements (e.g., landscaping) that are typical of each Land Use Category. The Land Damage Rate was established to be 10% of the Relative Land Value. This figure was based on reasonable engineering judgement and is believed to be a conservative estimate of actual expected damages.

For agricultural properties, the Crop Damage Rate was based on the information included in Agricultural Flood Risk in the Pajaro River Flood Risk Management General Reevaluation Report, Appendix J, Attachment 1. The economic analysis calculated the monthly probability-weighted Direct Production Investment (DPI) loss for various types of crops by multiplying the operating costs incurred each month (exclusive of overhead costs) by the probability of flooding in the same month. The USACE determined the monthly probability of flooding by examining peak annual flow records for the Pajaro River for the 56-year period ending in 2017 and determining the occurrence of the peak annual flow for each month. The annual weighted DPI loss was calculated as the sum of the monthly probability-weighted DPI loss values. The annual weighted DPI loss figures presented in the analysis represents the damage per acre for each crop type. The Assessment Engineer determined that the annual assessment upon agricultural properties should not vary from year to year due to changes in crop rotations or fallowing. Instead, the Crop Damage Rate should represent a fair estimation of crop damages expected over a longer time frame, so as not to be construed as financially penalizing or rewarding the grower's choice of crop to grow in a particular year. After evaluating the range of DPI loss per acre of all crop types, the Assessment Engineer determined that the average DPI loss of $1,973 per acre for head lettuce, leaf lettuce and cauliflower/broccoli represented a fair baseline value for setting the Crop Damage Rate at $2,000 per acre. The Assessment Engineer recognized that the analysis reported higher DPI loss for the variety of berry crops, but also recognized that berry crops have a higher market value to justify the higher DPI for growers. Therefore, setting the Crop Damage Rate at $2,000 per acre is consistent with not financially penalizing or rewarding a grower's choice of crop.

Table 3 summarizes the calculation of the Land and Crop Damage Rate per acre for each Land Use Category.

Structure Replacement Value and Damage Rate

The following information was obtained from the Pajaro River Flood Risk Management General Reevaluation Report, Appendix J:

1. Structure Replacement Values per square-foot by structure type
2. Content-to-Structure Ratios by structure type
3. Structure and Content Depth-Damage Functions by structure type

For each Land Use Category, a representative structure type was selected to determine the Structure Replacement Value. To simplify the EBU calculation, the separate structure depth-damage function and contents depth-damage function were combined by using the content-to-structure ratio to develop a single composite depth-damage function for each Land Use Category.

Table 4 summarizes the replacement value, contents ratio and composite depth-damage function for each Land Use Category. As a reminder the content-to-structure ratio has been incorporated into the composite depth-damage function and is only shown for reference purposes.

The "depth" value applied in the composite depth-damage functions is the flood depth measured above the finish floor elevation, as opposed to the parcel's average flood depth from the hydraulic analysis, which is measured above the existing ground elevation. **Table 5** summarizes the assumed foundation elevation above adjacent ground for each land use category which was subtracted from the average flood depth to determine the depth of flooding above the finish floor.

Table 6 summarizes the total damages to Land, Crops and Structures for each Land Use Category.

Relative Flood Risk Factor

The calculations for Land and Crop Damages and for Structure Damages above are calculated based on the hydraulic analysis used to establish Benefit Zones, as described above. However, the magnitude of these damages is not comparable across all Benefit Zones without factoring in the relative flood risk between Benefit Zones. The Relative Flood Risk Factor was developed to normalize the flood risk between Benefit Zones based on the total length of levee protecting each Benefit Zone, and the recurrence interval of the overtopping event used to calculate flood damages for each Benefit Zone. The Flood Risk Factor is calculated as the product of the Length of Levee Factor and the Flood Frequency Factor, as described below.

Length of Levee Factor represents the relative exposure to flooding based on how many miles of levee protect the Benefit Zone, as identified above in the Benefit Zone descriptions. The Length of Levee Factor is calculated by dividing the miles of levee protecting the Benefit Zone by the longest length of levee protecting any Benefit Zone.

For example, Benefit Zone SC2 has the longest levee length (5.88 miles) and therefore has a Length of Levee Factor of 1. Whereas, Benefit Zone F2 has the shortest levee length (1.80 miles) and therefore has a Length of Levee Factor of 0.306 (=1.80 ÷ 5.88).

Flood Frequency Factor represents the relative frequency (the inverse of the recurrence interval) of the overtopping event occurring for each Benefit Zone. Benefit Zones for which the O&M Services protect against an overtopping event with a lower recurrence interval are at risk of overtopping more often and receive less benefit than Benefit Zones for which the O&M Services protect against an overtopping event with a higher recurrence interval. The Flood Frequency Factor is based on the logarithmic distribution of flood flow events cataloged by recurrence interval, as prescribed in Bulletin 17C, Guidelines for Determining Flood Flow Frequency (US Geological Survey, Version 1.1, May 2019). Therefore, the Flood Frequency Factor for each Benefit Zone is calculated by dividing the logarithm of the recurrence interval of the maximum flow event by the logarithm of the highest recurrence interval for all benefit zones.

For example, the highest recurrence interval of the overtopping events is 300 years, and is associated with Benefit Zones SC2, SC3 and MC2. Therefore, these Benefit Zones have a Flood Frequency Factor of 1. The lowest recurrence interval of the overtopping events is 10 years, associated with Benefit Zones SC1 and MC1 which have a Flood Frequency Factor of 0.404 (=LOG [10] ÷ LOG [300]).

Table 7 summarizes the factors used to determine the Relative Flood Risk Factor for each Benefit Zones.

Summary of Special Benefit

Table 8 provides a summary of the total damages, relative flood risk factors, and total EBU calculated for each Benefit Zone. The total quantity of EBU from all parcels is 329,643,687 which is used to determine the Assessment Rate, described below.

General Benefit Calculation

Thoroughfare Damages

As described above, the O&M Services provide a general benefit to the public at large by protecting thoroughfares within the boundary of the Proposed Assessment from flood damages. The amount of EBU for the general benefit associated with each thoroughfare was quantified by multiplying the cost to repair the flood damages by the Relative Risk Factor for Benefit Zone in which the thoroughfare is located. The Santa Cruz County Roads Division indicated that the average cost to repair flood damages for an entire reach of thoroughfare is approximately $5.00 per square-foot.

Table 9 lists the reaches of thoroughfares protected against flood damages by the O&M Services (grouped by Benefit Zone); identifies the cross-street limits, reach length, and typical road width; and calculates the area of pavement and flood damages.

Table 10 summarizes the total flood damages to thoroughfare for each Benefit Zone, the associated Flood Risk Factor, and the calculated EBU.

Table 11 presents a summary of the general benefit from protecting thoroughfares and the special benefit from protecting properties, using EBU as basis for comparison.

- The general benefit from protecting all thoroughfares was calculated to be 7.7% of the total benefit (general benefit and special benefit) provided by the O&M Services, which equates to $296,914 of the PRFMA budget.
- The amount of general benefit provided in Santa Cruz County was calculated to be 5.5% of the total benefit, which equates to $210,942 of the PRFMA budget.
- The amount of general benefit provided in Monterey County was calculated to be 2.2% of the total benefit, which equates to $85,972 of the PRFMA budget.

Federal Properties

Federally owned properties, such as the United States Post Office in Watsonville, receive a benefit from the O&M Services and are included in the apportionment of special benefit. The proposed assessment for the post office property would be $6,492.86. However, federal law prohibits local agencies from collecting the assessment due from the federal government. The lost revenue cannot be reapportioned to assessed property owners. Therefore, the O&M Services provide a general benefit by protecting the post office against flood damages, and the lost assessment revenue must be funded by other revenue sources.

Evaluation of Funding Sources for General Benefit

The total revenue required to fund the general benefit is $303,406.86 (protecting thoroughfares: $296,914; plus the Watsonville Post Office: $6,492.86).

There are two revenue sources available to fund the general benefit:

1. Monterey County contributions in excess of Zone 1/1A Assessment Revenue:
   Current assessment revenue from Zone 1/1A that would be available for contribution to PRMA was reported to be approximately $250,000. In order to meet the total contribution committed in **Table 1**, Monterey County has pledged an additional $193,700 from other non-assessment revenue, which is sufficient to fund the general benefit occurring in Monterey County.

2. Santa Cruz County Zone 7 Revenue:
   These revenues are proceeds of a pre-Proposition 218 assessment, exempt from the measure under Article XIII D, Section 5 of the California Constitution. Accordingly, these revenues may be used consistently with the purposes for which they were originally levied. Those purposes included "the replacement, upgrading and maintenance of drainage and flood control facilities including, but not limited to, open and closed drainage conduits, channels, levees, drainage structures, pumps and other appurtenances within the zone," and therefore are properly used to fund the general benefit provided by the O&M Services of the PRFMA.

   This additional revenue is sufficient to fund the general benefit occurring within Santa Cruz County.

Proposed Assessment Rate

With existing revenue sources in place to fund the general benefit, there are no changes required to agency budget presented in **Table 1**, and the Proposed Assessment will fund the remaining $1.2 million needed to adequately fund the O&M Services.

The proposed assessment rate per EBU is equal to the required annual revenue (from **Table 1**) divided by the total EBU (from **Table 8**):

$$Proposed\ Asssessment\ Rate = \frac{\$1.2\ million}{329{,}643{,}687\ EBU} = \$0.00364\ per\ EBU$$

Special Benefit Assessment Calculation

To determine the proposed assessment for an individual parcel, the amount of Equivalent Benefit Units (EBU) for the parcel is calculated based on the methodology described above and multiplied by the proposed assessment rate per EBU. All factors to calculate the Parcel EBU can be found in the tables provided below.

The proposed assessment for an individual parcel can be expressed by the following equation:

$$[\boldsymbol{Parcel\ Assessment}] = [Parcel\ EBU] \times [Assessment\ Rate\ per\ EBU]$$

The Assessment Rate required to collect the required annual revenue is ***$0.00364*** per EBU. In order to recover the annual cost associate with administering the assessment, a minimum assessment of $15 per parcel will be applied to any parcel with a calculated assessment less than $15.

Assessment Calculation Steps

Using the proposed parcel assessment equations, the individual parcel characteristics and the assessment factors described above, the assessment for a particular parcel is calculated by applying the following steps.

Step 1 – Determine the Land Use Category, Benefit Zone, Parcel Size and Building Size, Flooded Acres and Average Flood Depth, and Structure Footprint

Step 2 – Using **Table 3**, determine the Land & Crop Damage Rate per Acre

Step 3 – Using **Table 4,** determine the Structure Replacement Value

Step 4 – Using **Table 4** and **Table 5**, determine the Structure Damage Rate based on Average Flood Depth

Step 5 – Using **Table 7**, determine the Relative Flood Risk Factor based on the Benefit Zone

Step 6 – If the flooded acres is greater than 10% of the parcel size, calculate Land and Crop Damages

Step 7 – If the flooded acres is greater than 10% of the parcel size, calculate Structure Damages

- For residential land use categories, use the smaller of the Building Size or Structure Footprint

Step 7 – Calculate the **Parcel EBU** using the total calculated damages and the Relative Flood Risk Factor

Step 8 – Calculate the **Parcel Assessment** by multiplying the Parcel EBU times the assessment rate

Step 9 – Round the calculated assessment down to the closest multiple of $0.02 as required by the Santa Cruz and Monterey County Assessor's office for submission of the assessment roll for collection on the County Property Tax Bills.

The Proposed Assessment will be the greater of the rounded calculated assessment from Step 9, or the minimum assessment of $15.00.

Assessment Tables

Table 2: Catalog of Land Use Categories

Land Use Category	Total Number of Parcels	Total Parcel Acreage	Total Flooded Acreage	Total Structure Square Footage [1],[2]
Agriculture	289	7,308	6,441	187,300
Blended	17	140	120	363,000
Commercial	225	228	179	1,670,700
Industrial	138	352	311	4,212,000
Multi-Family Residential	285	97	93	889,787
Mobile Home Parks	5	5	4	65,000
Rural Residential	17	102	51	20,415
Single-Family Residential	1,747	292	251	1,968,474
Vacant	280	404	318	102,300
Totals	**3,003**	**8,927**	**7,770**	**9,478,976**

Source: Larsen Wurzel & Associates: PRFMA Assessment Model v2.xlsx

[1] Determined by measuring building footprints for Agriculture, Commercial, Industrial and Mobile Home Park, and Vacant Land Uses

[2] Determined using Santa Cruz and Monterey County Assessor's data as available for Multi-Family Residential, Single-Family Residential, and Rural Residential Land Uses

Table 3: Land and Crop Damage Rate per Acre

Land Use Category	Percent Land Damage	Relative Land Value per Acre	Land Damage per Acre	Crop Damage Per Acre	Land & Crop Damage per Acre
	A	*B*	*C = A * B*	*D*	*E = C + D*
Agriculture	10%	$25,000	$2,500	$2,000	$4,500
Commercial	10%	$70,000	$7,000	$0	$7,000
Industrial	10%	$70,000	$7,000	$0	$7,000
Multi-Family Residential	10%	$70,000	$7,000	$0	$7,000
Mobile Home Parks	10%	$50,000	$5,000	$0	$5,000
Rural Residential	10%	$25,000	$2,500	$0	$2,500
Single-Family Residential	10%	$50,000	$5,000	$0	$5,000
Vacant	10%	$10,000	$1,000	$0	$1,000

Source: Larsen Wurzel & Associates: PRFMA Assessment Model v2.xlsx

Table 4: Content and Structure Replacement Value and Depth Damage

Land Use	Structure Replacement Value	Contents to Structure Ratio	Percent Damage							
Depth			0	1	2	3	4	5	6	7
Agricultural	$111.67	50.0%	0.0%	30.0%	39.9%	49.1%	58.1%	66.1%	73.0%	79.0%
Commercial	$85.56	51.0%	0.0%	23.0%	31.2%	40.9%	46.0%	59.9%	72.4%	86.6%
Industrial	$54.51	31.0%	0.0%	17.5%	26.1%	34.0%	39.6%	48.6%	57.6%	63.2%
Mobile Home	$45.85	50.0%	0.0%	67.5%	92.5%	110.0%	123.0%	128.5%	133.0%	134.5%
Multi-Family Residential	$84.40	50.0%	0.0%	30.0%	39.9%	49.1%	58.1%	66.1%	73.0%	79.0%
Vacant	$0.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Single-Family Residential	$111.67	50.0%	0.0%	30.0%	39.9%	49.1%	58.1%	66.1%	73.0%	79.0%
Rural Residential	$111.67	50.0%	0.0%	30.0%	39.9%	49.1%	58.1%	66.1%	73.0%	79.0%
Floodway	$0.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Land Use	Structure Replacement Value	Contents to Structure Ratio	Percent Damage							
Depth			8	9	10	11	12	13	14	15
Agricultural	$111.67	50.0%	84.1%	88.4%	91.8%	94.6%	96.4%	97.7%	98.7%	99.4%
Commercial	$85.56	51.0%	105.3%	113.4%	113.4%	113.4%	113.4%	113.4%	113.4%	113.4%
Industrial	$54.51	31.0%	77.3%	84.3%	85.4%	85.7%	85.7%	85.7%	85.7%	85.7%
Mobile Home	$45.85	50.0%	135.0%	145.0%	150.0%	150.0%	150.0%	150.0%	150.0%	150.0%
Multi-Family Residential	$84.40	50.0%	84.1%	88.4%	91.8%	94.6%	96.4%	97.7%	98.7%	99.4%
Vacant	$0.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Single-Family Residential	$111.67	50.0%	84.1%	88.4%	91.8%	94.6%	96.4%	97.7%	98.7%	99.4%
Rural Residential	$111.67	50.0%	84.1%	88.4%	91.8%	94.6%	96.4%	97.7%	98.7%	99.4%
Floodway	$0.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Sources: USACE General Reevaluation Report, Appendix J and Larsen Wurzel & Associates, PRFMA Assessment Model v2.xlsx

Table 5: Assumed Foundation Elevation

Land Use Category	Foundation Elevation (Ft)
Agricultural	0
Commercial	0
Industrial	0
Mobile Home Parks	0
Multi-Family Residential	1
Rural Residential	1
Single-Family Residential	1
Vacant	0

Source: Larsen Wurzel & Associates, PRFMA Assessment Model v2.xlsx

Table 6: Total Damages by Land Use

Land Use Category	Land Damages	Crop Damages	Structure Damages	Total Damages
	A	*B*	*C*	*D = A + B + C*
Agriculture	16,104,035	12,883,228	11,454,461	40,441,723
Blended	275,457	65,048	12,416,497	12,757,002
Commercial	1,262,364	0	67,733,232	68,995,596
Industrial	2,182,837	0	97,708,592	99,891,429
Multi-Family Residential	660,381	0	37,565,008	38,225,389
Mobile Home Parks	22,016	0	3,868,617	3,890,633
Rural Residential	128,549	0	1,180,961	1,309,510
Single-Family Residential	1,292,397	0	93,702,488	94,994,885
Vacant	318,802	0	0	318,802
Totals	**22,246,837**	**12,948,275**	**325,629,855**	**360,824,968**

Source: Larsen Wurzel & Associates, PRFMA Assessment Model v2.xlsx

Table 7: Relative Flood Risk Factor

Zone	Recurrence Interval	Flood Frequency Factor	Length of Levee Protecting Benefit Zone	Length of Levee Factor	Relative Flood Risk Factor
	A	*B = LOG(A)/LOG(300)*	*C*	*D = C/MAX[C]*	*E = B * D*
SC1	10	0.404	3.60	0.612	0.25
SC2	300	1.000	5.88	1.000	1.00
SC3	300	1.000	1.90	0.323	0.32
SC4	25	0.564	2.21	0.376	0.21
MC1	10	0.404	2.84	0.483	0.20
MC2	300	1.000	5.01	0.852	0.85
MC3	15	0.475	1.94	0.330	0.16
F1	15	0.475	5.04	0.857	0.41
F2	15	0.475	1.80	0.306	0.15

Source: Larsen Wurzel & Associates, PRFMA Assessment Model v2.xlsx

Table 8: Summary of Special Benefit by Zone

Zone	Total Damages	Relative Flood Risk Factor [2]	Total Special Benefit	Percent of Benefit
	A =Table 6 Column D	*B = Table 7 Column E*	*C = A * B*	*D*
SC1	8,552,613	0.25	2,138,153	0.65%
SC2	253,405,885	1.00	253,405,885	76.87%
SC3	2,010,317	0.32	643,301	0.20%
SC4	1,916,952	0.21	402,560	0.12%
MC1	3,659,069	0.20	731,814	0.22%
MC2	80,948,815	0.85	68,806,493	20.87%
MC3	1,800,632	0.16	288,101	0.09%
F1	7,491,453	0.41	3,071,496	0.93%
F2	1,039,233	0.15	155,885	0.05%
Totals	**360,824,968**		**329,643,687**	**100%**

Source: Larsen Wurzel & Associates, PRFMA Assessment Model v2.xlsx

Table 9: Summary of Thoroughfares in the Benefit Area

Thoroughfare	From	To	Length (Feet)	Typical Width (Feet)	Pavement Area (SQ-FT)	Thoroughfare Damages
			A	B	C = A x B	D = C *($5.00/SF)
Benefit Zone SC1						
West Beach Rd	Watsonville City Lim	Pajaro Dunes	6,933	28	194,124	$970,620.00
San Andreas Rd	Dairy Rd	West Beach Rd	3,410	31	105,710	$528,550.00
Benefit Zone SC2						
West Beach Rd	Watsonville City Lim	State Hwy 1	19,610	30	588,300	$2,941,500.00
State Hwy 1	Pajaro River	Watsonville Slough	7,000	92	644,000	$3,220,000.00
West Beach St	State Hwy 1	Main St	7,270	42	305,340	$1,526,700.00
East Beach St	Main St	Hushbeck Av	4,570	40	182,800	$914,000.00
State Hwy 129 (W. Riverside Dr)	State Hwy 1	Union St	7,410	80	592,800	$2,964,000.00
State Hwy 129 (Riverside Dr)	Union St	Salsipuedes Creek	2,720	52	141,440	$707,200.00
Bridge St	State Hwy 129 (Riverside Dr)	Beck St	1,000	40	40,000	$200,000.00
Bridge St	Beck St	Joyce Dr	4,060	60	243,600	$1,218,000.00
Ohlone Parkway	West Beach Dr	Seaview Ranch	1,160	50	58,000	$290,000.00
Walker St	Watsonville Slough	Pajaro River	5,140	38	195,320	$976,600.00
Rodriguez St	West Lake Av	State Hwy 129 (Riverside Dr)	2,220	60	133,200	$666,000.00
State Hwy 152 (Main St)	State Hwy 152 (East Lake Av)	West Beach St	2,200	60	132,000	$660,000.00
Main St	West Beach St	Pajaro River	700	60	42,000	$210,000.00
Union St	State Hwy 152 (East Lake Av)	State Hwy 129 (Riverside Dr)	1,520	36	54,720	$273,600.00
State Hwy 152 (Lincoln St)	State Hwy 152 (East Lake Av)	State Hwy 152(East Beach St)	670	40	26,800	$134,000.00
Lincoln St	State Hwy 152(East Beach St)	State Hwy 129 (Riverside Dr)	1,500	44	66,000	$330,000.00
Hushbeck Av	State Hwy 152 (East Lake Av)	Bridge St	1,870	40	74,800	$374,000.00
Benefit Zone SC3						
State Hwy 152 (East Lake Av)	Wagner Av	Corralitos Creek	3,100	54	167,400	$837,000.00
Benefit Zone SC4						
Holohan Rd - 2605	Grimmer Rd	Hwy 152	3,770	30	113,100	$565,500.00
College Rd - 2610	Lakeview Rd	Hwy 152	3,593	34	122,162	$610,810.00
Benefit Zone MC1						
Trafton Road	Highway 1	Buff Road	13,240	24	317,760	$1,588,800.00
Benefit Zone MC2						
Trafton Road	Highway 1	Salinas Road	8,760	24	210,240	$1,051,200.00
Porter Drive	Pajaro River	Salinas Road	1,560	60	93,600	$468,000.00
San Juan Road	Porter Drive	Tie-Back Levee alignment	13,500	32	432,000	$2,160,000.00
Salinas Road	Porter Drive	Hall Road	8,570	80	685,600	$3,428,000.00
Hall Road	Salinas Road	Elkhorn Road	4,000	40	160,000	$800,000.00
Lewis Road	Salinas Road	Hutchings Court	8,850	26	230,100	$1,150,500.00
Benefit Zone F1						
Riverside Road	Salsipuedes Creek	Coward Creek	10,460	40	418,400	$2,092,000.00
Lakeview	Riverside Road	College Road	5,950	26	154,700	$773,500.00

Source: Larsen Wurzel & Associates, PRFMA Assessment Model v2.xlsx

Table 10: Summary of General Benefit for Thoroughfares by Benefit Zone

Benefit Zone	Total Thoroughfare Damages	Flood Risk Factor	EBU
	A = Table 9 Column D	*B = Table 7 Column E*	*C = A * B*
Santa Cruz County			
SC1	$1,499,170	0.25	374,793
SC2	$17,605,600	1	17,605,600
SC3	$837,000	0.32	267,840
SC4	$1,176,310	0.21	247,025
F1	$2,865,500	0.41	1,174,855
F2	$0	0.15	0
Subtotal Santa Cruz County			*19,670,113*
Monterey County			
MC1	$1,588,800	0.2	317,760
MC2	$9,057,700	0.85	7,699,045
MC3	$0	0.16	0
Subtotal Monterey County			*8,016,805*

Source: Larsen Wurzel & Associates, PRFMA Assessment Model v2.xlsx

Table 11: General Benefit Determination and Budget Allocation

Description	Santa Cruz County		Monterey County		Total Benefit Area	
Benefit Determination						
General EBU	19,670,113	5.5%	8,016,805	2.2%	27,686,918	7.7%
Special EBU	259,817,280	72.7%	69,826,408	19.5%	329,643,687	92.3%
Subtotal EBU	*279,487,392*		*77,843,213*		*357,330,605*	*100.0%*
PRFMA Budget Allocation by Benefit						
General Benefit	$ 210,942		$ 85,972		$ 296,913	
Special Benefit	$ 2,786,271		$ 748,816		$ 3,535,087	
Subtotals	***$ 2,997,212***		***$ 834,788***		***$ 3,832,000***	

Source: Larsen Wurzel & Associates, PRFMA Assessment Model v2.xlsx

Example Assessment Calculations

The following examples illustrate the application of the assessment equation to determine the annual assessment for several hypothetical properties.

Example 1

Consider a 0.12-acre single-family residential property, 100% inundated, with an 1,100 square foot single-family structure footprint. The following table provides the assessment calculation factors and steps for the same property in two different Benefit Zones, with two different Average Flood Depths.

	SC2 – Depth 1 Foot	SC2 – Depth 4 Feet	MC2 – Depth 1 Foot	MC2 – Depth
Land Use Category	Single-Family Residential			
Benefit Zone	SC2	SC2	MC2	MC2
Flood Depth	2 Feet	5 Feet	2 Feet	5 Feet
Foundation Elevation (From **Table 5**)	1 Foot	1 Foot	1 Foot	1 Foot
Land & Crop Damage Rate (From **Table 3**)	$5,000 per acre			
Structure Replacement Value (From **Table 4**)	$111.67 per square foot			
Flood Depth Above Finish Floor	1 Foot	4 Feet	1 Foot	4 Feet
Structure Damage Rate (From **Table 4**)	30.0%	58.1%	30.0%	58.1%
Relative Flood Risk Factor (From **Table 6)**	1.00	1.00	0.85	0.85
$\boldsymbol{EBU} = [([0.12] \times [5{,}000]) + ([1{,}100] \times [111.67] \times [Structure\ Damage\ Rate])] \times [Relative\ Flood\ Risk\ Factor]$				
Parcel EBU	37,451.10	71,968.30	31,833.44	61,173.05
$[\boldsymbol{Calculated\ Assessment}] = [Parcel\ EBU] * [\$0.00364]$				
Calculated Assessment	$136.32	$261.96	$115.87	$222.67
Proposed Assessment	$136.32	$261.96	$115.86	$222.66

Example 2

Assume a 5-acre commercial property with a 4,000 square-foot building in the Town of Pajaro is 100% flooded with an average flood depth of 4 ft.

Land Use Category: Commercial

Benefit Zone: MC2

EBU Calculation:

From **Table 3**, the Land and Crop Damage Rate is $7,000 per acre

From **Table 4**, the Structure Replacement Value is $85.56

From Table 5, the Foundation Elevation is 0 ft → the Flood Depth above the Finish Floor is 4 ft

From **Table 4**, Structure Damage Rate is 46%

From **Table 6**, the Relative Flood Risk Factor for MC2 is 0.85

$$\boldsymbol{EBU} = [([5.00\ ] \times [7{,}000]) + ([4{,}000] \times [85.56] \times [46\%])] \times 0.85\ = 163{,}565.84$$

Flooded Acres — Table 3 — Structure Footprint — Table 4 — Table 4 — Table 6

Assessment Calculation:

$$[Calculated\ Assessment] = [163{,}565.84] \times [\$0.00364] = \$595.38$$

$$[\boldsymbol{Proposed\ Assessment}] = \$\mathbf{595.38}$$

Example 3

Assume a 20-acre agricultural parcel located in the "Fish head" is 60% flooded. No structures are within the benefit area. The average flood depth is 3 feet.

Land Use Category: Agriculture

Benefit Zone: F1

EBU Calculation:

From **Table 3**, the Land and Crop Damage Rate is $4,500 per acre

From **Table 6**, the Relative Flood Risk Factor for Benefit Zone F1 is 0.41

$$\boldsymbol{EBU} = [([20.00\ \times 60\%] \times [4{,}500]) + \ (Zero\ Structure\ Damage)]\ \times\ 0.41\ = 22{,}140.00$$

Property Size — % Flooded — Table 3 — Table 6

Assessment Calculation:

$$[Calculated\ Assessment] = [22{,}140.00] \times [\$0.00364] = \$80.59$$

$$[\boldsymbol{Proposed\ Assessment}] = \$\mathbf{80.58}$$

Summary of Assessments

Appendix A provides a detailed listing by Assessor's parcel number of the maximum assessments that will be voted on by the property owners for the proposed Assessment.

Special Considerations

Large Properties with Multiple Land Uses

For large parcels over which multiple land uses were apparent, the factors used to calculate the total property benefit units are weighted by the proportional acreage of each land use.

Public Parcels

Consistent with the requirements of Proposition 218, all publicly owned parcels must be assessed proportionately to the special benefit received from the O&M Services provided by the PRMFA. Therefore, public parcels are treated the same as privately owned parcels for assessment calculation purposes. To calculate assessments for these parcels, a Land Use Category was assigned to each public parcel based on its current use. However, public parcels that are utilized to provide the O&M Services, such as levees, ponds, and ditches, are excluded from this assessment.

Assessment Exclusions

All parcels within the PRFMA receiving a special benefit from O&M Services are within the boundary of the proposed assessment. Parcels that are utilized to provide the O&M Services do not receive a benefit from the PRFMA Services and are excluded from this assessment.

Minimum Assessment Amount

The minimum assessment will be $15 to defray the PRFMA's annual cost of administering the assessment. All annual assessments calculated to be less than this minimum will be raised to the $15.

Updating the Assessment Roll

Recalculating individual parcel assessments on an annual basis accommodates changes within benefit area over time. These changes can result from development activity or lot splits. Placement of a structure on an undeveloped parcel or other changes will trigger a recalculation of the assessment due if there is a change in Land Use Category of the underlying property or a change in the structure(s) on the property.

It is recognized that when compiling data for the thousands of parcels that constitute the proposed assessment, the data used to derive individual parcel characteristics may not be accurate and may not precisely fit the intent of the Agency thus leading to errors and/or circumstances that result in inaccurate assessment calculations. Where such circumstances are discovered, either by the persons administering the assessment or by the owners of the properties affected, the Executive Director of the PRFMA (or his or her designee) shall review such circumstances and determine if corrections or adjustments are appropriate. Any such corrections or adjustments are to be consistent with the concept, intent, and parameters of the methodology for the proposed assessment as set forth within this Engineer's Report. Unless such proposed changes are appealed to the PRFMA Board of Directors, they will be incorporated into the Assessment roll.

Section 5. Assessment Administration

Implementation

Schedule for Collection

If property owners approve the proposed assessment, the PRFMA intends to commence collection of the assessment in FY 2022/23 and continue every year thereafter. Beginning in FY 2022/23, the PRFMA Board of Directors will establish the Assessment Rate each year which will not exceed the maximum approved by property owners plus an annual escalation as described below. The proposed assessment will remain in effect until terminated by the PRFMA Board of Directors.

Annual Escalation

In order to ensure that the PRFMA is able to provide the needed services over time, it may be important to increase the Assessment Rate (as defined in the ***Assessment Methodology*** section) subject to the rising costs of labor and materials over time. Therefore, beginning in FY 2023/24, the maximum authorized Assessment Rate will be subject to an annual inflationary escalator pursuant to Government Code §53739(b) based on the annual change in the Consumer Price Index February to February CPI-W for West – Size Class B/C, all Items, with Base Period December 1996 = 100, published by the U.S. Department of Labor, Bureau of Labor Statistics, subject to a minimum of 0 percent and a maximum of 4 percent in any given year. The PRFMA Board may elect to levy the Assessment up to the maximum authorized Assessment Rate in any given year, based on an annual budget analysis.

Appeals of Assessments Levied to Property

Appeals Process

Any property owner who believes his or her property should be reclassified, and the individual assessment adjusted may file a written appeal with the Executive Director of the PRFMA or his or her designee. Any such appeal is limited to correction of an assessment during the then-current fiscal year and for future years.

All appeals must include a statement of reasons why the property should be reclassified and may include supporting evidence. On the filing of any such appeal, the Executive Director, or his or her designee, will promptly review the appeal and any information provided by the property owner and may investigate and assemble additional evidence necessary to evaluate the appeal. If the Executive Director finds that the individual assessment should be modified, the appropriate changes will be made to the Assessment roll. If any such changes are approved after the Assessment roll has been filed with the County for collection, the Executive Director is authorized to refund the property owner the amount of any approved reduction to the individual assessment for the then current fiscal year. If an appeal is filed, and a subsequent adjustment is resulting in a refund, refunds for any prior year's assessments paid before the appeal was filed will not be made.

If a landowner disputes the decision of the Executive Director, a secondary appeal may be made to the PRFMA Board of Directors, which will consider the matter at a regularly scheduled Board meeting. Any decision made by the Board of Directors shall be final.

Impact of Appeals During Formation Period

The data being used by the Assessment Engineer to generate the Assessment Rate defined in the **Assessment Methodology** section comes from the Santa Cruz County and Monterey County Assessor. While the data from the County Assessor is assumed to be accurate, its primary purpose is for use by the County Assessor and is subject to the Assessor's standards for accuracy and frequency of update. Because this data is not maintained by the Assessor in a form designed to support this special benefit assessment effort, the Assessment Engineer has worked to refine the data to properly reflect the conditions present in the physical benefit area.

However, throughout the formation period, data errors and discrepancies with the data may surface and require modification of the assessment calculation for various parcels. Changes in the data for a particular parcel without a corresponding change in the Assessment Rate established by this report will, by definition, change the total amount of assessment levied and collected for that particular parcel. For example, if the data assumes the existence of a house and that house has since burned down and has not been reconstructed, once the database is corrected the rates will generate a smaller total assessment. On the other hand, if the data assumes an empty lot where a house has since been constructed, once the database is corrected the rates will generate a larger total assessment. Due to the database being constantly refined (either through internal review or an external appeal process), it is infeasible to fine-tune the rates between the Preliminary Engineer's Report and the Final Engineer's Report. In addition, because changes to the database will either increase or decrease the total amount assessed, it is presumed that these amounts will roughly offset each other. Therefore, although minor changes to the database will continue to be made during the formation period, the Assessment Rate proposed in this Report will not be fine-tuned, even though that will result in a total assessment revenue which may be slightly less than or slightly more than the amount determined for the development of this report.

Future Land Use Changes

It is anticipated that changes in land use will occur in the Agency over time. To accommodate for these changes, individual property characteristics will be reviewed and updated as needed on an annual basis for determining the individual property assessments for the following fiscal year. The annual assessment would increase or decrease depending on the change in land use and/or changes to improvements on the property.

Example: Land Use Change Resulting in an Increased Assessment

Assume a 0.25-acre warehouse property with a 5,000 square-foot building in Watsonville in SC2 is converted to a 5,000 square-foot condominium complex. Assume this entire parcel is flooded with an average depth of 5 feet. The following changes would be made to the assessment roll that would be effective the following year:

Land Use:	The Land Use Category would change from Industrial to Multi-Family Residential.
Land & Crop Damage:	The Land and Crop Damage Rate would remain $7,000 per acre.
Structure Replacement Value:	The Structure Replacement Value would increase from $54.51 to $84.40 per square foot
Structure Damage Rate:	The Structure Damage Rate would increase from 48.6% to 58.1% to reflect the land use change.
Benefit Zone:	The Benefit Zone and Relative Flood Risk Factor would not change.

The assessment for the warehouse property, at the current assessment rate, would be $488.52. The resulting assessment following the land use change to condominiums would be $898.82.

Section 6. Conclusion

It is concluded that the proposed assessments do not exceed the reasonable cost of the proportional special benefit conferred on each property assessed.

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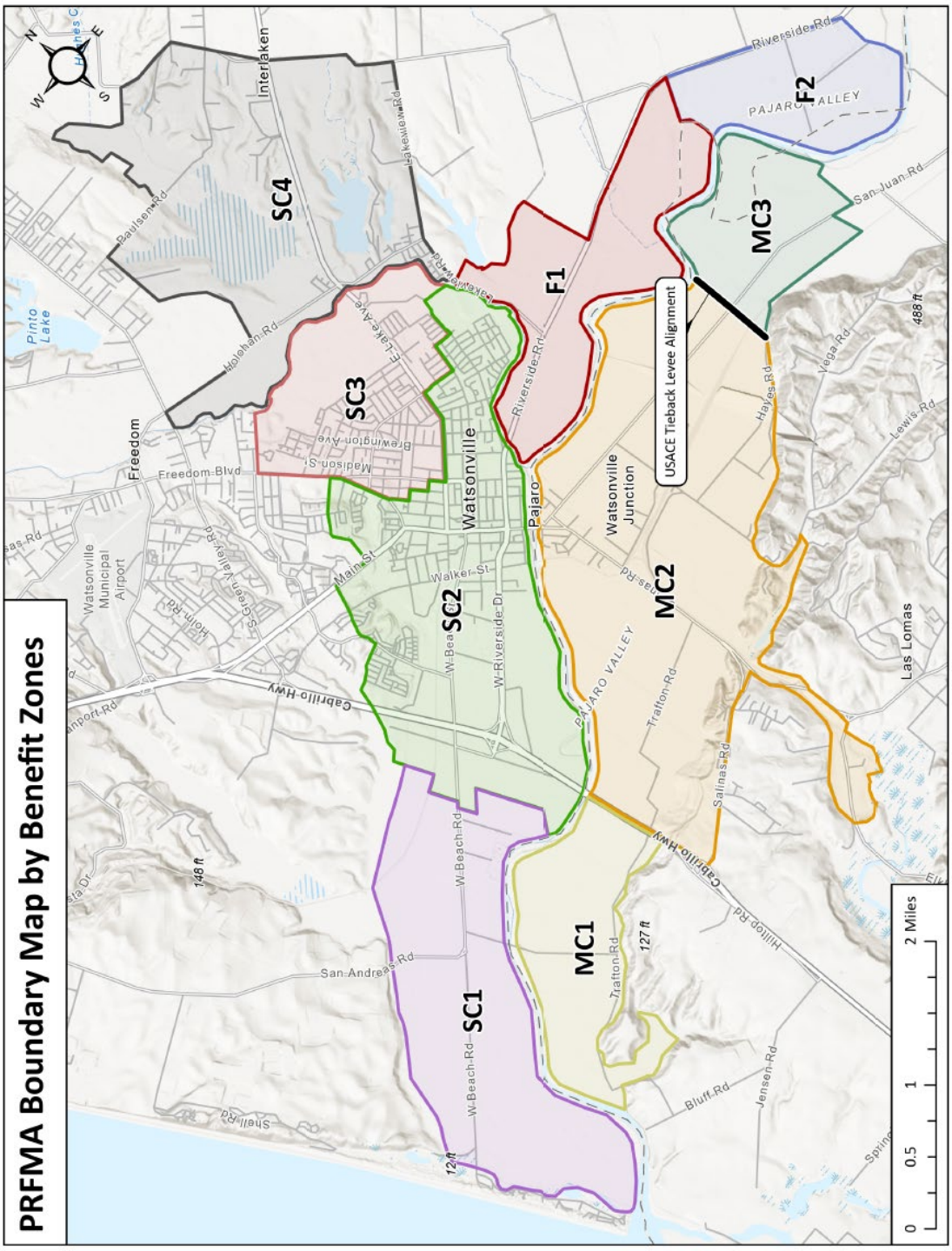
Scott L. Brown, P.E.

Figure 1: PRFMA Boundary Map with Benefit Zones



Appendix A: Proposed PRFMA Assessment Roll

Provided under separate cover.