

**ATTACHMENT D**

**Financial Feasibility – Technical  
Memorandum**

## *Technical Memorandum*

# Nicolaus & Rio Oso Flood Risk Reduction Feasibility Study

## Small Communities Flood Risk Reduction Program

*Financial Feasibility*

*April 24, 2020*

**Prepared by:** Elisabet Abdissa

**Reviewed by:** Sean Myers, David Lee, & Derek Larsen, P.E., CFM

---

### **1. Purpose**

This memorandum has been prepared by Larsen Wurzel & Associates, Inc. (LWA) in support of the Nicolaus and Rio Oso Flood Risk Reduction Feasibility Studies under the Department of Water Resources Small Communities Flood Risk Reduction (SCFRR) Program. LWA expects that the conclusions presented within this memorandum will be utilized during the alternatives evaluation phase, particularly to help screen the alternatives not financially feasible for the local communities. LWA prepared a separate funding sources memorandum that provides a summary of available State and federal funding sources to advance flood risk reduction projects.

This memorandum and the funding sources memorandum were used to develop a conceptual financial plan for implementation of the preferred alternative. The conceptual finance plan and funding sources memorandum are presented separately as part of a final Feasibility Study Report.

### *Organization*

This memorandum is divided into six sections. This section provides the purpose of the memorandum; Sections 2 and 3 outline the approach and methodology used to analyze the financial feasibility of the proposed alternatives; Section 4 describes the constraints facing flood risk reduction projects; Section 5 outlines the alternative analysis screening constraints in determining the capacity of the local communities to generate new assessment revenue for Operations and Maintenance (O&M) and capital improvement projects; and Section 6 provides recommendations for the alternatives evaluated.

**Attachment 1** Provides a summary of the local funding methods used by local agencies in California to fund flood risk reduction improvements and services. The table describes the general uses of the funding source and the attributes and applicability of the mechanism for flood control and management projects. In addition to these sources, many local agencies supplement funding for flood risk reduction through enterprise revenues related to storm water management and general fund revenues (primarily property tax revenue).

**Attachment 2** Provides the series of tables referenced throughout this memorandum.

## 2. Approach

Multiple local funding mechanisms are available to fund flood risk reduction efforts as shown in Attachment 1. Flood risk reduction projects provide a special benefit to property owners and are most commonly funded by property-based assessment districts. Therefore, the primary approach for analyzing financial feasibility starts with the assumption that the local funding required for a flood risk reduction project will be raised through a property-based special benefit assessment. As a result, the requirements associated with imposing a benefit assessment would apply. These requirements, primarily those associated with Proposition 218, are discussed further below.

The next assumption is that the local beneficiaries would be solely responsible for long-term ongoing O&M of any improvements. Therefore, locally generated annual assessment revenue would first be utilized to pay for the ongoing O&M of the project. Any remaining annual revenue would then be allocated toward the local share of the capital cost either on a pay-go basis or to service debt.

LWA's analysis starts by determining the proportionality of assessment revenue between land uses and applying the following approaches to gauge feasibility:

- 1) Estimate the assessment rates required to generate, on an aggregate basis, \$100,000 of annual revenue and review the resulting rates to determine whether any land use assessment rate exceeds a level that could preclude approval of the assessment;
- 2) Establish the O&M funding requirements based on project team input and determine whether there is sufficient revenue to fund adequate levee maintenance;
- 3) Establish criteria based on an assumed maximum single-family residence assessment rate (\$200) developed by the project team; and
- 4) Estimate the amount of annual revenue that could be generated from benefiting properties given the special benefit proportionality requirements of Proposition 218 and an assumed feasible single-family residence assessment rate developed by the project team.

The methodologies utilized to determine the project beneficiaries and the relative benefits received are documented in section 3 and are based upon the assumption that a Proposition 218 Assessment will fund the local cost share of the project.

The small communities of Nicolaus and Rio Oso are within the same hydraulic basin and remediation of levees near each community impacts the entire basin. All of the levee improvements are required to achieve the planned flood risk reduction goals. A breach in the levees in the Nicolaus plan would inundate Rio Oso, and a breach in the levees in the Rio Oso plan would inundate Nicolaus. Therefore, a combined cost for the preferred alternative was prepared for both communities. Through geotechnical evaluation, an alternative alignment with multiple alternative remediations was identified for both the Nicolaus and Rio Oso Project. For the purpose of this analysis, the minimum and maximum repair costs associated with each remediation alternative was considered in determining the recommended approach.

### 3. Methodology

Special benefit assessments for flood control projects have historically utilized the following parcel attributes to apportion benefit:

- Land use;
- Parcel size;
- Parcel improvements;
  - Permanent Crop Type; and/or
  - Structure type and size; and
- Relative Damage.

Proposition 218 requires first; that parcels only be assessed for the special benefits received by the service, meaning that all general benefits provided by the service and available to the public at large be excluded from the assessment, and second; that a property only be assessed for its proportionate share of the special benefits received. Given this, once the special benefits received by all parcels have been quantified, each individual parcel would be assessed based on its proportionate share of the total special benefits.

#### *Benefit Area*

LWA was provided composite flood depths from the hydraulic analyses showing the post project reduction in flood depths. The extents of these areas were considered the preliminary benefit areas for the alternatives evaluated in the feasibility study.

The project team identified nine areas within the Nicolaus & Rio Oso area that require remediation to maintain 100-year flood protection. As shown in **Figure 1** and **Figure 2**, breach occurrences along **19 miles** of levee on the Feather River and **6.8 miles** of levee on the Bear River levees would result in flood in the communities of Nicolaus & Rio Oso. As stated in the MBK's *Small Communities Flood Risk Reduction Program – Hydraulic Analysis for the Communities of Rio Oso and Nicolaus* memorandum, In the event of breach scenarios along either the Feather or Bear river, both communities will face potential flood risk.

#### *Land Use*

Land uses for properties within the benefit area were compiled from Sutter County Assessor's data obtained from ParcelQuest. Each land use code was evaluated and assigned to a generalized Land Use Category (e.g.: Agricultural, Single-Family Residential, Commercial, etc.) to identify the category for use in apportioning special benefit. A table presenting the County's use type code and the associated land use category is displayed in **Table 1** of **Attachment 2**.

#### *Parcel Size*

The Sutter County Assessor's data obtained from ParcelQuest included the acreage of each parcel. This data was reviewed for completeness. Where data was missing, the parcel size was estimated using parcel GIS data obtained

from Wood Rogers. For this feasibility level analysis, no effort was made to verify or reconcile the GIS data or County Assessor data.

### *Structure Type and Size*

The Sutter County Assessor's data obtained from ParcelQuest also included structure size data. Structures on a parcel were assumed to be consistent with the Land Use Category assigned to the property for the purposes of this analysis. For example, all structures on a parcel with a Commercial land use category designation by the County Assessment were analyzed as Commercial structures. Agricultural and vacant land uses assume no structural damage. **Table 2** provides a summary of the total acreage of parcels with structures, total structure size, and the average structure size per acre for each land use category within the benefit area.

### *Relative Damage Rate*

The special benefits received from flood control projects are assumed to be proportional to the amount of flood damage avoided by implementing the projects and/or performing O&M services. For the purpose of this analysis, a simplified approach has been used to quantify the flood damages avoided for each Land Use Category.

Composite structure depth-damage values were prepared for each Land Use Category based on the U.S. Army Corps of Engineers (USACE) guidance. The composite structure damage values consider the structure replacement value, the contents-to-structure ratio and the percentage of damage to the structure and contents at an average flood depth. The flood depth for each parcel was provided to LWA to calculate the average flood depth per land use.

Agricultural land was assigned a crop damage value of \$300/acre based on data provided in the 2010 Central Valley Flood Protection Plan.

Vacant land was assigned a damage value of \$100/acre to reflect minor damage to infrastructure and/or damage from site erosion.

**Table 3** provides the structure replacement value, the contents-to-structure ratios and the composite damage values for each Land Use Category, excluding agricultural and vacant land uses across a range of flood depths.

The average damage per acre for each Land use Category was calculated using the following formula:

$$\left[ \begin{array}{c} \text{Average} \\ \text{Damage} \\ \text{per Acre} \end{array} \right] = \left[ \begin{array}{c} \text{Composite} \\ \text{Damage Value} \\ \text{(Table 3)} \end{array} \right] \times \left[ \begin{array}{c} \text{Average} \\ \text{SF per Acre} \\ \text{(Table 2)} \end{array} \right]$$

A Relative Damage Factor was calculated by normalizing the average damage per acre to the Agricultural Land Use (i.e., Agricultural = 1.0). The normalization does not change the proportionality and maintains compliance with Proposition 218.

## Alternatives

An alternative alignment with multiple alternative remediations was identified for the Project. The minimum and maximum construction cost for the remediation alternatives will be utilized to determine the local funding capacity for the Project capital costs in Section 5. The Nicolaus and Rio Oso project teams provided the total project costs to LWA and also determined that the existing local assessment generates revenue that covers the cost of O&M activities and provides remaining capital that will be allocated toward the total assessment capacity to be used to advance the preferred alternative.

## Assessment Rate

The special benefit for each parcel was determined by calculating the amount of Equivalent Benefit Units (EBU) using the following formula:

$$EBU_{parcel} = \left[ \frac{Parcel}{Acreage} \right] \times \left[ \frac{Relative}{Damage Factor} \right]_{\substack{\text{Based on} \\ \text{Parcel Land} \\ \text{Use Category}}} \text{ (Table 4)}$$

The Assessment Rate is equal to the amount of revenue required divided by the sum of EBUs from all benefitting parcels.

The assessment for a particular parcel is equal to the quantity of EBUs for that parcel multiplied by the resulting Assessment Rate per EBU. **Table 4** summarizes these EBU and Assessment rate calculations.

In order to generate an estimated range of maximum revenue, **Table 5** summarizes the aggregate assessment amount, the average assessment per parcel, and the average assessment per acre, required to generate \$100,000 in annual assessment revenue

## 4. Financial Feasibility Constraints

### *Demonstrating Federal Interest*

The USACE planning process has a defined approach to determine flood risk reduction project benefits. The USACE analysis is based on the value of damageable property and the projected reduction in flood damages once flood risk reduction projects are implemented. Less densely populated rural areas like agricultural areas produce lower benefits than densely populated urban areas. This approach makes demonstrating Federal interest in rural or small communities that are primarily agricultural very difficult.

Securing Federal funding for flood risk reduction projects will continue to be highly competitive. In the past, funding for authorized projects has relied heavily on prioritizing appropriations based on a project's Benefit to Cost Ratio (BCR). The approach limits Federal investments to areas that can achieve a very robust BCR and generally funded projects are in urban areas where significant flood damage reduction benefits exist. In FY 2019 budget requests, the current administration sought to limit funding to ongoing flood risk reduction projects with

a BCR greater than 2.5 to 1.<sup>1</sup> While the BCRs for projects vary each year, the competition for limited Federal funding also increases as authorizations continue to outpace appropriations.

### *Limited Availability of Federal Funding*

The USACE has historically been a major financial contributor in the development of flood risk reduction infrastructure in California. It is estimated the USACE has a backlog of authorized projects higher than \$96 billion nationally.<sup>2</sup> Annual appropriations for construction funding nationally in FY 2018 and FY 2019 were \$2.1 billion and \$2.2 billion respectively, or just over 2% of the total backlog of authorized projects. However, some of the backlogged appropriations are related to projects that are unlikely to be constructed, as throughout the nation they are not competitive when compared against other projects.

There are multiple factors contributing to the growth of the USACE backlog; authorizations have outpaced appropriations, aging infrastructure requires more substantial financial investments, and construction related costs continue to escalate.

### *Availability of State Funds*

Following the passage of the Water Resources Development Act of 1986, non-Federal interests were required to share more of the financial and management burdens. These requirements, coupled with more stringent environmental regulations, resulted in further reduction in the Federal share of spending for flood and water management projects. With the reduction in Federal authorizations and the more stringent conditions on State and local financing of flood management projects, the State turned to general obligation (GO) bonds.

In 2006, the State passed water management bond propositions 84 and 1E. The Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) authorized \$4.09 billion in general obligation bonds to rebuild and repair California's most vulnerable flood control structures to protect homes and prevent loss of life from flood-related disasters, including levee failures, flash floods, and mudslides and to protect California's drinking water supply system by rebuilding delta levees that are vulnerable to earthquakes and storms. Proposition 84 enhanced these efforts with an additional \$800 million for flood projects. Proposition 1 was passed on November 4, 2014 and included \$395 million for flood projects. Proposition 68 was passed on June 5, 2018 and included another \$550 million for flood projects.

Proposition 1E funds have been allocated to conduct Feasibility Study investigations that are consistent with the DWR Small Community Flood Risk Reduction (SCFRR) Program Guidelines (2016) and support the (2012 and 2017)

---

<sup>1</sup> <https://fas.org/sgp/crs/natsec/IF10864.pdf>

<sup>2</sup> Carter, N. (2018). *Army Corps of Engineers Annual and Supplemental Appropriations: Issues for Congress*. Congressional Research Service.

Central Valley Flood Protection Plan goals of promoting flood risk management actions to reduce flood risk to people and property protected by State Plan of Flood Control facilities. The study objectives include assessing a community's existing flood hazards, evaluating structural, non-structural and multi-benefit projects, and making recommendations to implement a flood risk protection project that integrates other resources' needs, as much as is feasible.

### *Limited Local Funding Sources/Proposition 218 Assessments*

Funding local infrastructure and services, including flood and water management projects, became more difficult when voters in California passed Proposition 13 in 1978, Proposition 62 in 1986, and Proposition 218 in 1996. Proposition 13 limited ad valorem taxes on California properties. The proposition limited the amount of tax that could be collected based on the assessed value of private property, including real estate, to 1 percent of the assessed value of the property. Proposition 13 also decreased the assessed value of the properties to 1975 values (negating three years of increased value), and limited increases of assessed value to a maximum of 2 percent per year. Property that is sold or declines in value after an initial purchase may be reassessed. The enactment of Proposition 13 significantly reduced local property tax revenue, causing cities and counties to raise user fees and other local taxes. In response, voters approved Proposition 62, the Voter Approval of Taxes Act, in 1986. Proposition 62 required that new general taxes be approved by two-thirds of the local agency's governing body and a majority of voters, and new special taxes be approved by a two-thirds majority of voters. This led local agencies and communities to use assessments and property-related fees (among other fees) to pay for government services. Proposition 218 was passed by voters in 1996 and added requirements and limits on local governments' ability to impose or increase assessments and fees.

Proposition 26, which was passed in 2010, redefined many existing fees as taxes. The impacts of institutional and legal constraints associated with raising local funding for flood infrastructure and services is described in greater detail in a 2014 Public Policy Institute of California's report ("Paying for Water in California," 2014). Constraints from Proposition 218 and 13 have been thoroughly documented by the State and also highlighted as a major challenge in DWR's January 2005 White Paper, "Responding to California's Flood Crisis."

### *Tax Rate and Infrastructure Burden Considerations*

In order to consider an area's ability to generate new revenue through special taxes and assessments, the uses of taxing capacity for all infrastructure and services should be considered. The California Debt and Investment Advisory Commission (CDIAC) promulgates guidelines with respect to land secured financing, including the use of assessments and Mello-Roos Special Taxes. CDIAC's Mello-Roos Guidelines (1991) suggest that jurisdictions should integrate Mello-Roos financing into the land use regulatory framework. Local governments can create a process for coordinating the use of land secured financing through the provision of this form of integration. The main concern is that in the absence of coordinated planning, property owners/taxpayers could find themselves vulnerable to onerous overlapping property tax burdens imposed by a multitude of local governments that may provide services to the same group of properties. Further, the services funded by these burdens may not reflect property owners' collective priorities for services and infrastructure. This issue is analogous to the current ongoing



efforts associated with planning for the future of flood management infrastructure, to the extent that there are a multitude of planning efforts, all developing concurrent funding and financing strategies. These efforts should be coordinated to ensure that there is sufficient funding capacity available from the identified beneficiaries and the funding is dedicated toward the beneficiaries’ collective highest priorities.

Overlapping property tax burdens imposed by a multitude of local governments that may provide services to the same group of properties. Further, the services funded by these burdens may not reflect property owners’ collective priorities for services and infrastructure. This issue is analogous to the current ongoing efforts associated with planning for the future of flood management infrastructure, to the extent that there are a multitude of planning efforts, all developing concurrent funding and financing strategies. These efforts should be coordinated to ensure that there is sufficient funding capacity available from the identified beneficiaries and the funding is dedicated toward the beneficiaries’ highest collective priorities.

### 5. Alternative Analysis Screening Constraints

For the purpose of determining the capacity of the local communities to generate new assessment revenue for capital improvements, the capacity is assumed to be limited by the assessment rate that would be imposed on residential properties. A baseline \$100,000 assessment for each alternative is show in **Table 5**. The baseline assessment was prepared to provide context and allow the County to scale assessment rates for each additional \$100,000 in revenue needed. For example, if an additional \$100,000 in assessment revenue was needed, the assessment rates would increase by 100%. **Table 6** and **Table 7** provide an estimated range of the maximum revenue that might be generated for each alternative by constraining the maximum assessment for single-family residential. The \$100,000 assessment was used determine the impacts on different land use rates when scaling the capacity up or down. **Table 6** constrained the analysis to a \$100 annual assessment for single-family residential and **Table 7** constrained the analysis based on a \$200 annual single-family residential assessment. The results of the assessment evaluation are shown in **Table 8** in **Attachment 2** and are summarized in the table below.

**Nicolaus & Rio Oso Small Communities Flood Risk Reduction  
 Alternatives Cost Summary of Results**

Alternative	Total Construction Cost	New Assessment Capacity	
		\$100 Constraint	\$200 Constraint
<b>Preferred</b>	\$465,678,200	\$44,000	\$88,000
<b>Min</b>	\$464,531,000	\$44,000	\$88,000
<b>Max</b>	\$590,832,190	\$44,000	\$88,000

## 6. Recommendations for Alternatives Evaluation

### Alternatives Analysis Screening Process

The capital costs of the remediation alternatives were compared to the two community's ability to generate local matching funds as a percent of the total project cost. The ability to pay analysis was a three-step screening process. First, a new maximum annual land-based assessment was calculated assuming the limitations noted above along with the proportionality requirements of Proposition 218 for the benefited area. Second, based on the calculated assessment revenue, it was determined that \$88,000 in new assessment revenue would be allocated toward the local share of the capital costs either on a pay-go basis or to service debt. Finally, the project team determined that the existing local assessment generates a total annual revenue of \$953,000, of which \$470,000 will cover required O&M<sup>3</sup> costs. Sixty-five percent (65%) of the remaining existing assessment revenue or \$313,950, in addition to \$88,000 in new assessment capacity, was allocated toward the capital assessment capacity of \$401,950. This represents the total amount of local assessment capacity available to advance the preferred alternative.

The preferred, minimum, and maximum alternatives would raise between \$5.62 million to \$7.16 million on varying debt financing interest rates between 3% to 5%. A range of local capital amount was developed and compared to the estimated alternative cost to determine the percent of local matching funds available for the range of remediation alternatives. The alternatives are ranked based on the percent of the project that could be paid with local capital. The results of the potential debt financing for the range of alternatives are shown in **Table 9** in **Attachment 2** and are summarized in the table below.

---

<sup>3</sup> Revenue and costs based on RD1001 2018 Fiscal Year.

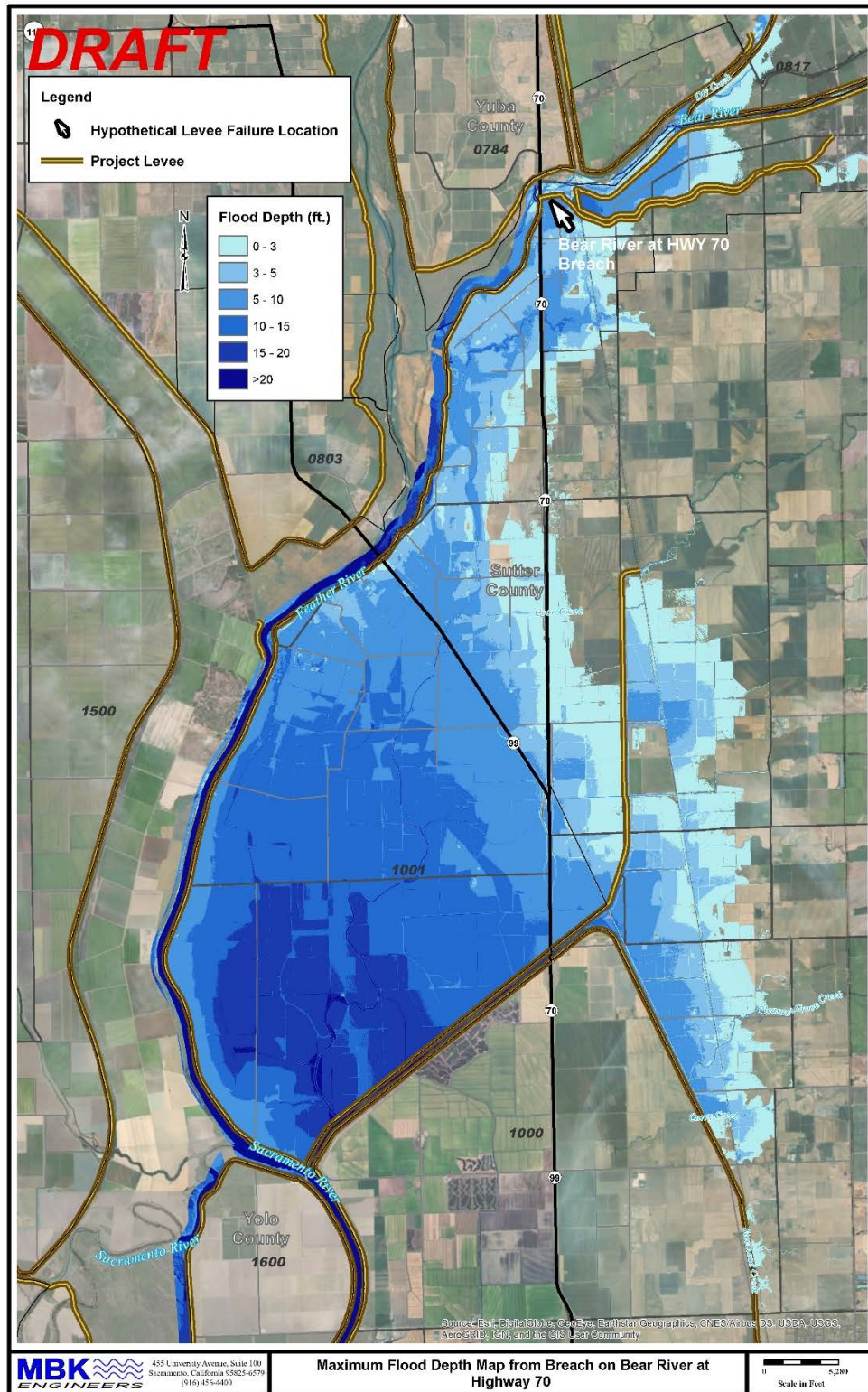
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction  
 Local Funding Analysis**

Alt.	Capital	Low	High	Project	Local		Non-Local		Fund
	Assessment Capacity \$	Int. Rate Millions \$ [1,2,4]	Int. Rate Millions \$ [1,3,4]	Cost Millions \$	High %	Low %	High %	Low %	Capacity Ranking
<b>Preferred</b>	\$401,950	\$7.16	\$5.62	\$465.68	1.54%	1.21%	98.8%	98.5%	2
<b>Min</b>	\$401,950	\$7.16	\$5.62	\$464.53	1.54%	1.21%	98.8%	98.5%	1
<b>Max</b>	\$401,950	\$7.16	\$5.62	\$590.83	1.21%	0.95%	99.0%	98.8%	3

**Notes:**

- [1] Assumes 1.1 Debt Coverage Ratio
- [2] Low interest rate for debt issuance assumed to be 3%
- [3] High interest rate for debt issuance assumed to be 5%
- [4] Term for bond repayment assumed to be 30 years.

Figure 1







# Attachment 1

## Summary of Local Funding Mechanisms



Item	Funding Attribute						Pro/Con		
	Use	Voter Approval	Benefit Test	Bonds Allowed	Funding Period	Entity	Pro	Con	Note
<b>Enterprise Revenues</b>									
Utility User Fees	O&M/ Capital Improvements	50% of Property Assessed	Yes	Yes	Long-Term	Varies	Would be broad based applying to all parcels. Depending upon service provided, could be exempt from Prop 218 balloting process. (Solely flood control would not apply.)	Might require enabling legislation for the specific district. Prop 218 would apply.	
<b>Sales Tax Measure</b>	O&M/ Capital Improvements as Approved	2/3 of Electorate	No	Yes	As Authorized	Cities or Counties	Flexible if approved.	Difficult to approve and limited to amount over Statewide sales tax rate.	
<b>Assessment Districts [1]</b>									
Various Water Code Sections	O&M/ Capital Improvements	50% of Property Assessed	Yes	No	Long-Term	Reclamation & Levee Districts	Simple Majority Approval, Ongoing Funding Source	Applicability of Prop 218 - Must Show Benefit	Used to fund maintenance or capital works. Through other authority, can be used to finance improvements.
Benefit Assessment District Act of 1982	O&M/ Capital Improvements	50% of Property Assessed	Yes	No	Long-Term	Flexible	Simple Majority Approval, Ongoing Funding Source	Must Show Benefit Improvements/Services must be within the Boundary	Could provide some reimbursement of Advance Funding. Bonds must be issued under separate authority.
Municipal Improvement District Act	Capital Improvements	50% of Property Assessed	Yes	Yes	Long-Term	Flexible	Simple Majority Approval, Ongoing Funding Source	Must Show Benefit Improvements/Services must be within the Boundary	Could provide some reimbursement of Advance Funding
<b>Community Facilities Districts [1]</b>	O&M/ Capital Improvements	2/3 of Electorate	No	Yes	Long-Term	Flexible	Benefit not Needed, Flexible in Forming District, Improvements located anywhere	2/3 Approval Difficult to Obtain	Voting requirements change depending upon presence of registered voters (no more than 12) within boundary.
<b>Development Impact Fees</b>	Capital Improvements	NA	Yes	NA	Long-Term	County & City (Land Use Agencies)	Implemented by Agency Action in Short Time Period	-Must Show Benefit -Development Feasibility Issues -Only works if area of flood control Benefit is slated for Development	Could provide some reimbursement of Advance Funding
<b>Advance Funding [2]</b>	Planning & Capital Improvements	NA	NA	NA	Short-Term	N/A	Can cover upfront planning/operations costs	Limited/Uncertain Availability	Could be subject to reimbursement from various sources over time.
<b>Tax Increment Financing (Enhanced Infrastructure Financing District)</b>	Capital Improvements	No - to form and Allocate Revenues, Yes - for any Bonded Debt Issuance (55%)	No (but allocation of TI could be structured to ensure proportion ality to benefit)	Yes - With Voter Approval (55%). Maximum 45 Year term.	Long Term	New EIFD Public Financing Authority	Could generate significant revenues in areas planned for development especially when improvements have a regional benefit to several local taxing entities over the long term.	Not a new source of funding, would allocate future general fund property taxes from an existing entity that would otherwise be used to provide general governmental services. Given this, a detailed Fiscal Impact Analysis is needed to ensure that there is no significant impact to providing municipal services to the developing area. Fiscal mitigation measures may need to be put in place to demonstrate viability.	All Participating entities would need to agree to allocate funds to the EIFD. Schools cannot participate. An Infrastructure Financing District "Plan" that describes everything needs to be prepared. The new EIFD implements the plan. The boundary of the EIFD cannot cover any area of a former RDA unless a finding of completion is certified by the DOF.

Sources: California Flood Future's Report - Attachment I, Finance Strategies, California Government Code and LWA.

[1] Can be implemented by cities, counties, special independent districts, and JPA's with these types of members.

[2] Advance Funding is defined as General Fund, developer, and/or other local public or private funding which could be subject to reimbursement from long term funding sources.

# Attachment 2

## Referenced Tables

1. Zoning and Land use Code.....	Table 1
2. Structure Size by Land Use.....	Table 2
3. Damage Per Acre Calculations.....	Table 3
4. Equivalent Benefit Unit Summary Table.....	Table 4
5. \$100,000 Assessment.....	Table 5
6. Revenue Estimate - \$100 SFR.....	Table 6
7. Revenue Estimate - \$200 SFR.....	Table 7
8. Alternatives Cost Summary of Results.....	Table 8
9. Local Funding Analysis.....	Table 9
10. Structure Damage Value.....	Table 10
11. Contents Damage Value.....	Table 11
12. Structure and Contents Value.....	Table 12

**Table 1**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Zoning and Land use Code**

Use Type	Description	County Use Type	FeasibilityLand Use Type
10	Lodge building/club house or school building	Institutional	Commercial
11	Privately owned schools	Institutional	Commercial
20	Funeral homes or mortuary	Institutional	Commercial
30	Churches and temples	Institutional	Commercial
40	Cemetery or mausoleum	Institutional	Vacant
50	Government taxable	Institutional	Commercial
60	Government non-taxable	Institutional	Commercial
70	Manufactured home lots with licensed mobile homes	Residential	Residential Single
80	Vacant R-2	Vacant Land	Vacant
90	Vacant R-3 and R-4	Vacant Land	Vacant
100	Vacant R-1	Vacant Land	Vacant
120	One residence	Single Family Residences	Residential Single
130	Two (2) single family residences	Single Family Residences	Residential Single
131	Three (3) single family residences	Single Family Residences	Residential Single
132	Four (4) single family residences	Single Family Residences	Residential Single
133	Five (5) or greater single family residences	Single Family Residences	Residential Single
140	Duplex unit	Duplexes	Residential Single
150	Triplex or duplex and single unit mix	Duplexes	Residential Multi
160	Fourplex or two duplex units or mix	Duplexes	Residential Multi
170	Apartment or MFR over 4 units	Duplexes	Residential Multi
180	Single family residence - Half-plexes	Apartments	Residential Multi
190	Single family residence - Condominium	Apartments	Residential Multi
200	Open land over 15 acres - no SFR	Agricultural	Agricultural
201	Open land over 15 acres w/one (1) SFR	Agricultural	Agricultural
202	Open land over 15 acres w/two (2) SFR	Agricultural	Agricultural
203	Open land over 15 acres w/three (3) SFR	Agricultural	Agricultural
204	Open land over 15 acres w/four (4) SFR	Agricultural	Agricultural
205	Open land over 15 acres w/five (5) SFR & greater	Agricultural	Agricultural
220	Home site or small ranch under 15 acres - no SFR	Agricultural	Agricultural
221	Home site or small ranch under 15 acres w/one (1) SFR	Agricultural	Agricultural
222	Home site or small ranch under 15 acres w/two (2) SFR	Agricultural	Agricultural
223	Home site or small ranch under 15 acres w/three (3) SFR	Agricultural	Agricultural
224	Home site or small ranch under 15 acres w/four (4) SFR	Agricultural	Agricultural
225	Home site or small ranch under 15 acres w/five (5) SFR & great	Agricultural	Agricultural
230	Orchard over 15 acres - no SFR	Agricultural	Agricultural
231	Orchard over 15 acres w/one (1) SFR	Agricultural	Agricultural
232	Orchard over 15 acres w/two (2) SFR	Agricultural	Agricultural
233	Orchard over 15 acres w/three (3) SFR	Agricultural	Agricultural
234	Orchard over 15 acres w/four (4) SFR	Agricultural	Agricultural
235	Orchard over 15 acres w/five (5) SFR & greater	Agricultural	Agricultural
240	Ag business - vacant land or orchard - no SFR	Agricultural	Agricultural



**Table 1**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Zoning and Land use Code**

Use Type	Description	County Use Type	FeasibilityLand Use Type
241	Ag business - orchard w/one (1) SFR	Agricultural	Agricultural
242	Ag business - orchard w/two (2) SFR	Agricultural	Agricultural
243	Ag business - orchard w/three (3) SFR	Agricultural	Agricultural
244	Ag business - orchard w/four (4) SFR	Agricultural	Agricultural
245	Ag business - orchard w/five (5) SFR & greater	Agricultural	Agricultural
260	Dry farming or grazing land	Agricultural	Agricultural
280	Duck clubs	Agricultural	Agricultural
290	Horse stables	Commercial	Agricultural
310	Improved commercial - Store type	Commercial	Commercial
311	Improved commercial - service type	Commercial	Commercial
320	Improved commercial - shopping center	Commercial	Commercial
321	Restaurant/bars	Commercial	Commercial
322	Fast food restaurant	Commercial	Commercial
329	Medical building	Commercial	Commercial
330	Office building	Commercial	Commercial
331	Mixed use	Commercial	Commercial
332	Mini-storage building	Commercial	Commercial
333	Mini-mart-gas	Commercial	Commercial
334	Small grocery store	Commercial	Commercial
335	Misc. and special use	Commercial	Commercial
340	Auto services	Commercial	Commercial
350	Motels	Commercial	Commercial
360	Mobile home parks	Commercial	Mobile Home
370	Rest homes/skilled nursing	Commercial	Commercial
375	Rice dryers	Commercial	Commercial
377	Dairy	Commercial	Commercial
380	Marinas	Commercial	Commercial
400	Vacant industrial land	Industrial	Vacant
410	Improved industrial land	Industrial	Industrial
415	Steel buildings	Industrial	Industrial
420	Airport, crop dusting	Industrial	Industrial
430	Mines and quarries	Industrial	Industrial
600	Recreational	Industrial	Industrial
610	Water companies	Industrial	Industrial
620	Private roads	Industrial	Vacant
700	Gas wells	Industrial	Vacant
MH0	Manufactured Homes	Residential	Mobile Home

Source: Parcelquest

**Table 2**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Structure Size by Land Use**

<b>Land Use</b>	<b>Acres with Structures [A]</b>	<b>Structure Size (Sq Ft.) [B]</b>	<b>Avg Structure (Sq Ft/Acre) [C = B/A]</b>
<b>Agricultural [1]</b>	0.00	0	0.00
<b>Commercial</b>	174.54	39,668	227.27
<b>Industrial</b>	158.38	20,033	126.49
<b>School</b>	51.73	45,814	885.64
<b>Residential Multi</b>	6.33	5,420	856.24
<b>Mobile Home</b>	16.79	20,397	1,214.83
<b>Rural Residential</b>	534.15	276,739	518.09
<b>Residential Single</b>	257.42	302,878	1,176.60
<b>Vacant [1]</b>	0.00	0	0.00
<b>Total</b>	<b>1,199.34</b>	<b>710,949</b>	<b>592.79</b>

[1] No structural damage assumed.

**Table 3**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Damage Per Acre Calculations**

Land Use	Structure Replacement Value (\$/Sq Ft.) [A] [1,3]	Contents Damage Ratio [B] [2,3]	Average Depth (Ft.) [C][4]	Average Damage Value (per Acre or Sq Ft) [D][3]	Avg Structure (Sq Ft/Acre) [E] [5]	Relative Damage/Acre [F] = [D] * [E]	Relative Damage/acre Normalized [G] = [F] / 300
<b>Agricultural</b>	\$300.00	100%	3.14	300.00 acre	1	300	1
<b>Commercial</b>	\$85.56	51%	3.00	86.24 Building SF	227	19,600	65
<b>Industrial</b>	\$54.51	31%	4.33	35.37 Building SF	126	4,473	15
<b>School</b>	\$144.46	38%	3.00	98.52 Building SF	886	87,254	291
<b>Residential Multi</b>	\$84.40	50%	3.25	59.90 Building SF	856	51,291	171
<b>Mobile Home</b>	\$45.85	50%	2.83	66.94 Building SF	1,215	81,322	271
<b>Rural Residential</b>	\$111.67	50%	3.25	86.75 Building SF	518	44,944	150
<b>Residential Single</b>	\$111.67	50%	3.11	88.93 Building SF	1,177	104,637	349
<b>Vacant</b>	\$100.00	0%	3.13	100.00 acre	1	100	0.33

[1] See Table 10: Structure Damage Value

[2] See Table 11: Contents Damage Value

[3] See Table 12 Structure, Contents, and Land Damage Value

[4] Average depth damage for each land use

[5] See Table 2: Structure Size by Land Use

**Table 4**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Equivalent Benefit Unit Summary Table**

Land Use	Acres	Parcels	Relative	Total EBU	Avg EBU/Parcel
			Damage/acre Normalized		
	[A]	[B]	[C]	[D= A*C]	[E = D/B]
<b>Agricultural</b>	26,980.31	378.00	1.00	26,980.31	71.38
<b>Commercial</b>	197.62	28.00	65.33	12,910.87	461.10
<b>Industrial</b>	160.23	5.00	14.91	2,389.22	477.84
<b>School</b>	56.40	4.00	290.85	16,403.84	4,100.96
<b>Residential Multi</b>	6.33	2.00	170.97	1,082.25	541.12
<b>Mobile Home</b>	41.62	10.00	271.07	11,282.07	1,128.21
<b>Rural Residential</b>	337.22	88.00	149.81	50,519.60	574.09
<b>Residential Single</b>	157.81	137.00	348.79	55,042.26	401.77
<b>Vacant</b>	62.22	48.00	0.33	20.74	0.43
<b>Total</b>	<b>27,999.76</b>	<b>700.00</b>		<b>176,631.15</b>	

Notes:

[A] Acres from Calculated per each Alternative

[B] Based on modeling of assessor data in benefit zone. Calculated per each Alternative.

[C] Relative damage per acre from Table 2

**Table 5**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**\$100,000 Assessment**

<b>Land Use</b>	<b>Total Assessment</b>	<b>Avg. Assessment/Parcel</b>	<b>Avg. Assessment/Acre</b>
<b>Agricultural</b>	\$15,274.94	\$40.41	\$0.57
<b>Commercial</b>	\$7,309.51	\$261.05	\$36.99
<b>Industrial</b>	\$1,352.66	\$270.53	\$8.44
<b>School</b>	\$9,287.06	\$2,321.77	\$164.66
<b>Residential Multi</b>	\$612.72	\$306.36	\$96.80
<b>Mobile Home</b>	\$6,387.36	\$638.74	\$153.47
<b>Rural Residential</b>	\$28,601.75	\$325.02	\$84.82
<b>Residential Single</b>	\$31,162.26	\$227.46	\$197.47
<b>Vacant</b>	\$11.74	\$0.24	\$0.19
<b>Total</b>	<b>\$100,000.00</b>		

**Table 6**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Revenue Estimate - \$100 Residential Constraint**

<b>Land Use</b>	<b>Total Assessment</b>	<b>Avg. Assessment/Parcel</b>	<b>Avg. Assessment/Acre</b>
Agricultural	\$6,720.98	\$17.78	\$0.25
Commercial	\$3,216.18	\$114.86	\$16.27
Industrial	\$595.17	\$119.03	\$3.71
School	\$4,086.31	\$1,021.58	\$72.45
Residential Multi	\$269.59	\$134.80	\$42.59
Mobile Home	\$2,810.44	\$281.04	\$67.53
Rural Residential	\$12,584.77	\$143.01	\$37.32
Residential Single	\$13,711.39	\$100.08	\$86.89
Vacant	\$5.17	\$0.11	\$0.08
<b>Total</b>	<b>\$44,000.00</b>		

**Table 7**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Revenue Estimate - \$200 Residential Constraint**

<b>Land Use</b>	<b>Total Assessment</b>	<b>Avg. Assessment/Parcel</b>	<b>Avg. Assessment/Acre</b>
<b>Agricultural</b>	\$13,441.95	\$35.56	\$0.50
<b>Commercial</b>	\$6,432.37	\$229.73	\$490.92
<b>Industrial</b>	\$1,190.34	\$238.07	\$7.43
<b>School</b>	\$8,172.61	\$2,043.15	\$144.90
<b>Residential Multi</b>	\$539.19	\$269.59	\$85.18
<b>Mobile Home</b>	\$5,620.88	\$562.09	\$135.05
<b>Rural Residential</b>	\$25,169.54	\$286.02	\$74.64
<b>Residential Single</b>	\$27,422.79	\$200.17	\$173.77
<b>Vacant</b>	\$10.33	\$0.22	\$0.17
<b>Total</b>	<b>\$88,000.00</b>		

**Table 8**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Alternatives Cost Summary of Results**

Alternative	Total Construction Cost	New Assessment Capacity	
		\$100 Constraint	\$200 Constraint
<b>Preferred</b>	\$465,678,200	\$44,000	\$88,000
<b>Min</b>	\$464,531,000	\$44,000	\$88,000
<b>Max</b>	\$590,832,190	\$44,000	\$88,000

[1] O&M Assessment Revenue Provided by project Team.

[2] Annual O&M costs provided by Project Team.



**Table 9**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Local Funding Analysis**

Alt.	Capital Assessment Capacity \$	Low	High	Project Cost Millions \$	Local		Non-Local		Fund Capacity Ranking
		Int. Rate Millions \$ [1,2,4]	Int. Rate Millions \$ [1,3,4]		High %	Low %	High %	Low %	
<b>Preferred</b>	\$401,950	\$7.16	\$5.62	\$465.68	1.54%	1.21%	98.8%	98.5%	2
<b>Min</b>	\$401,950	\$7.16	\$5.62	\$464.53	1.54%	1.21%	98.8%	98.5%	1
<b>Max</b>	\$401,950	\$7.16	\$5.62	\$590.83	1.21%	0.95%	99.0%	98.8%	3

**Notes:**

- [1] Assumes 1.1 Debt Coverage Ratio
- [2] Low interest rate for debt issuance assumed to be 3%
- [3] High interest rate for debt issuance assumed to be 5%
- [4] Term for bond repayment assumed to be 30 years.

**Table 10**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Structure Damage Value**

Structure Land Use	Replacement Value	Replacement Value																
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
<b>Agricultural</b>	[1]	300	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>Commercial</b>	[2]	85.56	7.00%	21.70%	30.20%	31.20%	32.40%	32.40%	39.80%	42.80%	51.70%	53.10%	54.10%	61.80%	64.80%	64.80%	65.50%	86.10%
<b>School</b>	[3]	144.46	7.00%	21.70%	30.20%	31.20%	32.40%	32.40%	39.80%	42.80%	51.70%	53.10%	54.10%	61.80%	64.80%	64.80%	65.50%	86.10%
<b>Industrial</b>	[4]	54.51	7.00%	21.70%	30.20%	31.20%	32.40%	32.40%	39.80%	42.80%	51.70%	53.10%	54.10%	61.80%	64.80%	64.80%	65.50%	86.10%
<b>Mobile Home</b>	[5]	45.85	9.90%	44.70%	45.70%	96.50%	96.50%	96.50%	96.50%	96.50%	96.50%	96.50%	96.50%	96.50%	96.50%	96.50%	96.50%	96.50%
<b>Residential Multi</b>	[6]	84.4	13.40%	23.30%	32.10%	40.10%	47.10%	53.20%	58.60%	63.20%	67.20%	70.50%	73.20%	75.40%	77.20%	78.50%	79.50%	80.20%
<b>Rural Residential</b>	[7]	111.67	13.40%	23.30%	32.10%	40.10%	47.10%	53.20%	58.60%	63.20%	67.20%	70.50%	73.20%	75.40%	77.20%	78.50%	79.50%	80.20%
<b>Residential Single</b>	[8]	111.67	13.40%	23.30%	32.10%	40.10%	47.10%	53.20%	58.60%	63.20%	67.20%	70.50%	73.20%	75.40%	77.20%	78.50%	79.50%	80.20%
<b>Vacant</b>		100	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Reference Table C-1 2012 CVFPP HEC-FDA Structure and Damage Functions - CVFPP Attachment 8F Flood Damage Analysis

[1] Assumed Crop damage per acre

[2] Source: Table B-9 - Good Status for Commercial Retail

[3] Source: Table B-29 Good Status for Public and Private Schools

[4] Source: Table B-21 - Good Status for Industrial Light

[5] Source: Table B-25 - Good Status for Mobile Home

[6] Source: Table B-26 - Good Status Construction Class and Quality for Multi-Family Residential

[7] Source: Table B-33 - Good Status for Single Family Residential

[8] Source: Table B-33 - Good Status for Single Family Residential

**Table 11**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Contents Damage Value**

Land Use	Contents Damage Ratio	Contents															
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Agricultural</b>	100%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Commercial</b>	51%	0.00%	79.80%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>School</b>	38%	0.00%	87.80%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>Industrial</b>	31%	0.20%	87.60%	96.40%	99.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>Mobile Home</b>	50%	0.00%	85.00%	95.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%
<b>Residential Multi</b>	50%	8.10%	13.30%	17.90%	22.00%	25.70%	28.80%	31.50%	33.80%	35.70%	37.20%	38.40%	39.20%	39.70%	40.00%	40.00%	40.00%
<b>Rural Residential</b>	50%	8.10%	13.30%	17.90%	22.00%	25.70%	28.80%	31.50%	33.80%	35.70%	37.20%	38.40%	39.20%	39.70%	40.00%	40.00%	40.00%
<b>Residential Single</b>	50%	8.10%	13.30%	17.90%	22.00%	25.70%	28.80%	31.50%	33.80%	35.70%	37.20%	38.40%	39.20%	39.70%	40.00%	40.00%	40.00%
<b>Vacant</b>	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Reference Table C-1 2012 CVFPP HEC-FDA Structure and Damage Functions - CVFPP Attachment 8F Flood Damage Analysis

Reference Table 3-10 Contents to Structure Ratio - 2012 CVFPP Attachment 8F Flood Damage Analysis

**Table 12**  
**Nicolaus & Rio Oso Small Communities Flood Risk Reduction**  
**Structure, Contents, and Land Damage Value**

Land Use	Replacement Value	Contents Damage Ratio	Contents																
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
<b>Agricultural</b>	[1]	300	100%	0.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
<b>Commercial</b>	[2]	85.56	51%	5.99	53.39	69.47	70.33	71.36	71.36	77.69	80.26	87.87	89.07	89.92	96.51	99.08	99.08	99.68	117.30
<b>School</b>	[3]	144.46	38%	10.11	79.55	98.52	99.97	101.70	101.70	112.39	116.72	129.58	131.60	133.05	144.17	148.50	148.50	149.52	179.27
<b>Industrial</b>	[4]	54.51	31%	3.85	26.63	32.75	33.74	34.56	34.56	38.59	40.23	45.08	45.84	46.39	50.59	52.22	52.22	52.60	63.83
<b>Mobile Home</b>	[5]	45.85	50%	4.54	39.98	42.73	66.94	66.94	66.94	66.94	66.94	66.94	66.94	66.94	66.94	66.94	66.94	66.94	66.94
<b>Residential Multi</b>	[6]	84.4	50%	14.73	25.28	34.65	43.13	50.60	57.05	62.75	67.60	71.78	75.20	77.99	80.18	81.91	83.13	83.98	84.57
<b>Rural Residential</b>	[7]	111.67	50%	19.49	33.45	45.84	57.06	66.95	75.49	83.03	89.45	94.98	99.50	103.18	106.09	108.38	109.99	111.11	111.89
<b>Residential Single</b>	[8]	111.67	50%	19.49	33.45	45.84	57.06	66.95	75.49	83.03	89.45	94.98	99.50	103.18	106.09	108.38	109.99	111.11	111.89
<b>Vacant</b>		100	100%	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Reference Table 6 Reclamation District 2140 - Hamilton City Levee O&M Assessment

[1] Assumed Crop damage per acre

[2] Source: Table B-9 - Good Status for Commercial Retail

[3] Source: Table B-29 Good Status for Public and Private Schools

[4] Source: Table B-21 - Good Status for Industrial Light

[5] Source: Table B-25 - Good Status for Mobile Home

[6] Source: Table B-26 - Good Status Construction Class and Quality for Multi-Family Residential

[7] Source: Table B-33 - Good Status for Single Family Residential

[8] Source: Table B-33 - Good Status for Single Family Residential