Appendix D: Beneficiary Analysis – Service Category 3

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Final Technical Memorandum

Princeton Flood Risk Reduction Feasibility Study
Small Communities Flood Risk Reduction Program

Financial Feasibility *October 25, 2019*

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1. Purpose

This memorandum has been prepared by Larsen Wurzel & Associates, Inc. (LWA) in support of the Princeton Flood Risk Reduction Feasibility Study under the Department of Water Resources Small Communities Flood Risk Reduction Program. LWA expects that the conclusions presented within this memorandum will be utilized during the alternatives evaluation phase, particularly to help screen the alternatives that would not be financially feasible for the local community. 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 community to generate 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 on-going 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) 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.
4) Screen and rank alternatives based on criteria established by the project team.

The information will be utilized during the alternatives evaluation phase to assess the feasibility of the local community to fund annual O&M and cost share implementation of the preferred alternative.

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 any 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 GIS shape files generated from the hydraulic analyses showing the reduction in flood depths. The extents of these areas were considered the preliminary benefit areas for the alternatives evaluated in the feasibility study. **Figure 1** shows the alternatives and benefit areas considered in this evaluation. All parcels within this benefit area were utilized in the analysis.[1]

Land Use

Land uses for properties within the benefit area were compiled from Colusa 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 Colusa 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 also obtained from the County. For this feasibility level analysis, no effort was made to verify or reconcile the GIS data or County Assessor data.

Structure Type and Size

[1] Where only a portion of a parcel was included in a benefit area, a percentage of the parcel within the benefit area was used to determine the benefit received by the parcel.

The Colusa 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 US 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 a given flood depth. The flood depth for each parcel was provided to LWA to calculate the average flood depth per land use used as part of the hydraulics analysis.

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 wasassigned 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:

$$\begin{bmatrix} Average \\ Damage \\ per\ Acre \end{bmatrix} = \begin{bmatrix} Composite \\ Damage\ Value \\ (Table\ 3) \end{bmatrix} \times \begin{bmatrix} Average \\ SF\ per\ Acre \\ (Table\ 2) \end{bmatrix}$$

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

Three alternatives were evaluated for Colusa. Assessment ranks for each alternative were developed and estimated for potential local revenue. Tables 4 through 7 were developed for each alternative and are labeled by the table number followed by the alternative reference. Assessment Rate

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

$$EBU_{parcel} = \begin{bmatrix} Parcel \\ Acreage \end{bmatrix} \times \begin{bmatrix} Relative \\ Damage\ Factor \\ (Table\ 4) \end{bmatrix}_{\substack{Based\ on \\ Parcel\ Land \\ Use\ Category}}$$

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** (A-C) summarizes these EBU and Assessment rate calculations.

In order to generate an estimated range of maximum revenue, **Table 5** (A-C) summarizes the aggregate assessment amount, the average assessment per parcel, and the average assessment per acre.

4. Financial Feasibility Constraints

Demonstrating Federal Interest

The USACE planning process has a defined approach to determine flood risk reduction benefits. The USACE analysis is based on the value of damageable property and the projected reduction in flood damages once flood risk reduction measures are implemented. Less densely populated areas with agricultural land produce lower benefits than densely populated areas. This makes demonstrating a federal interest in small communities in agricultural areas very difficult.

Securing federal funding for flood risk reduction projects will continue to become more competitive. In the past, funding for authorized projects has relied heavily on prioritizing appropriations based on a project's Benefit to Cost Ratio (BCR). This approach limits federal investments to areas that can achieve a very robust BCR and generally these 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. While the BCR 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.[2] Annual appropriations for construction funding 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

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

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's backlog; authorizations have outpaced appropriations, aging infrastructure requires more significant 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 new 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 DWR's SCFRR Program Guidelines (2016) and support the (2012 and 2017) 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 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 cut local property tax revenue significantly, 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. This proposition

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.

5. Alternative Analysis Screening Constraints

For the purpose of determining the capacity of the local community to generate funds for O&M and capital improvements, the capacity is assumed to be limited by the assessment rate that would be imposed on residential properties. For this study, the limiting factor is assumed to be a maximum annual assessment acceptable to residential property owners of $200 per single family residence. In addition to constraining the maximum parcel assessment rate, a minimum O&M cost of $16,000 per mile of levee for levees and $1,000 for berms protecting the small community was set by the Princeton Feasibility Study team. This cost was based on the need for the levees to be maintained to meet a minimum 100-year level of protection over time. Using theses limitation, a baseline $100,000 assessment for each alternative is show in **Table 5** (A-F). **Table 6** (A-C) and **Table 7** (A-C) provide an estimated range of the maximum revenue that might be generated for each alternative by scaling the $100,000 assessment, while 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** (A-C) constrained the analysis to a $100 annual assessment for single-family residential and **Table 7** (A-C) constrained the analysis based on a $200 annual single-family residential assessment. The results of the assessment evaluation for each alternative are shown in **Table 8** in **Attachment 2 and are summarized in the table below**.

Princeton Small Communities Flood Risk Reduction
Alternatives Cost Summary of Results

Alternative	Total Construction Cost	Assessment Capacity	
		$100 Constraint	$200 Constraint
1	$21,500,000	$15,000	$30,000
2	$88,000,000	$16,000	$32,000
3	$20,400,000	$15,000	$29,000

6. Recommendations for Alternatives Evaluation

Alternative Analysis Screening Process

The final alternatives were screened and ranked based on an overall analysis of the 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 maximum annual land-based assessment was calculated assuming the limitations noted above along with the proportionality requirements of Proposition 218 for the benefited area(s). Second, each alternative's capacity to raise sufficient annual funding to cover long term O&M costs was determined. Finally, the remaining alternatives were ranked based on their ability to raise local capital to protect Princeton with the remaining assessment capacity after required O&M is funded.

The results of the financial feasibility study are shown in **Tables 4-7** (A-C). Alternatives 1-3 were carried forward into the next stage of the analysis and the remaining capacity was determined for these alternatives. Based on the capacity analysis, LWA recommends that the planning level revenue from the local community be $29,000, see **Table 8**. Based on our experience, a $200 annual single-family residential assessment is a reasonable approximation for an acceptable flood property assessment in the central valley of California.

Figure 1

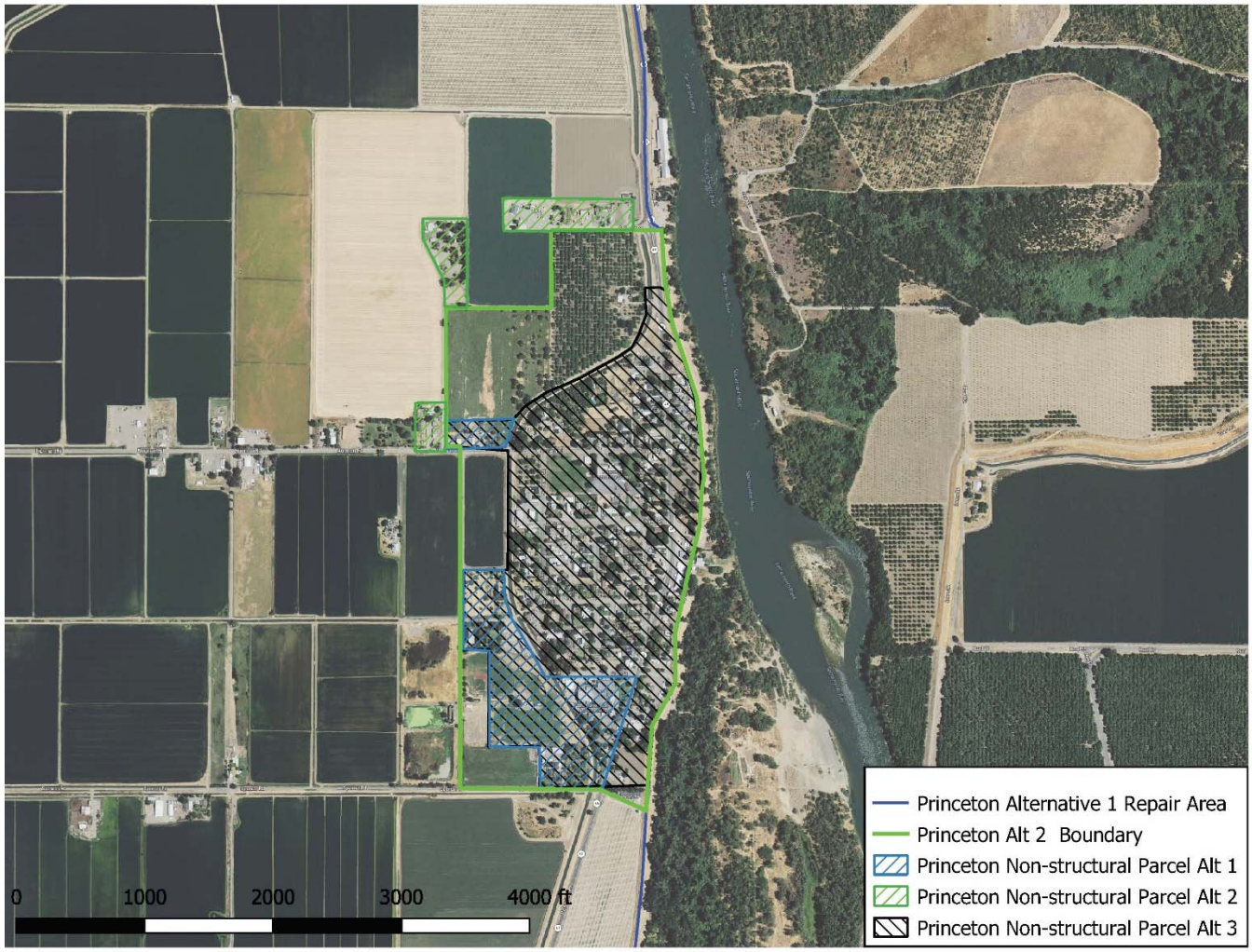
Princeton Alternative 1 Repair Area
Princeton Alt 2 Boundary
Princeton Non-structural Parcel Alt 1
Princeton Non-structural Parcel Alt 2
Princeton Non-structural Parcel Alt 3
0
1000
2000
3000
4000 ft

Table 1
Princeton Small Communities Flood Risk Reduction
Zoning and Land use Code

Use Type	Zoning Code	Land Use Type
A	AGRICULTURAL	Agricultural
A9	AGRICULTURAL	Agricultural
AA	AGRICULTURAL	Agricultural
AD	AGRICULTURAL	Agricultural
AK	AGRICULTURAL	Agricultural
AL	AGRICULTURAL	Agricultural
AO	AGRICULTURAL	Agricultural
AR	AGRICULTURAL	Agricultural
AW	AGRICULTURAL	Agricultural
AV	AGRICULTURAL	Vacant
C	COMMERCIAL	Commercial
C9	COMMERCIAL	Commercial
CA	COMMERCIAL	Commercial
CB	BANK	Commercial
CD	COMMERCIAL	Commercial
CE	RETAIL SALES	Commercial
CF	RESTAURANT	Commercial
CG	RECREATIONAL	Commercial
CH	RESID. HOTEL/MOTEL/RESORTS	Commercial
CI	AUTOMOTIVE USES	Commercial
CJ	AUTOMOTIVE USES	Commercial
CM	MEDICAL/DENTAL/LABS	Commercial
CN	COMMERCIAL	Commercial
CP	AUTOMOTIVE USES	Commercial
CU	COMMERCIAL - MOBILE HOME PARK	Commercial
CV	VACANT	Vacant
CW	COMMERCIAL	Commercial
CX	COMMERCIAL	Commercial
CZ	OFFICE	Commercial
EV	VACANT	Vacant
GV	VACANT	Vacant
I9	INDUSTRIAL	Industrial
IA	INDUSTRIAL	Industrial
IT	INDUSTRIAL	Industrial
IV	VACANT	Vacant
IW	INDUSTRIAL	Industrial
R1	RESID. SINGLE FAMILY	Residential Single
R2	RESID. MULTIPLE FAMILY	Residential Multi
R3	RESID. MULTIPLE FAMILY	Residential Multi
R4	RESID. MULTIPLE FAMILY	Residential Multi

Use Type	Zoning Code	Land Use Type
R5	RESID. MULTIPLE FAMILY	Residential Multi
R6	RESID. MOBILE/MANUFACTURED HOMES	Mobile Home
R7	RESIDENTIAL	Residential Multi
R8	RESIDENTIAL	Residential Multi
R9	RESIDENTIAL	Residential Multi
RU	RESID. MOBILE/MANUFACTURED HOME PARK	Mobile Home
RV	VACANT	Vacant
WD	AGRICULTURAL PRESERVE	Agricultural
WL	AGRICULTURAL PRESERVE	Agricultural
YC	CHURCH	Commercial
YS	SCHOOLS	School
YV	VACANT	Vacant
ZR	AGRICULTURAL	Agricultural

Table 2
Princeton Small Communities Flood Risk Reduction
Structure Size by Land Use

Land Use	Acres with Structures [A]	Structure Size (Sq Ft.) [B]	Avg Structure Size/Acre [C = B/A]
Agricultural	0.00	0	0
Commercial	5.02	27,825	5,543
Industrial	0.00	0	0
School	8.13	31,556	3,881
Residential Multi	8.46	17,464	2,064
Mobile Home	1.87	8,936	4,779
Rural Residential	20.46	10,145	496
Residential Single	31.77	125,338	3,945
Vacant	0.00	0	0
Total	**75.71**	**221,264**	**2,923**

Table 3
Princeton Small Communities Flood Risk Reduction
Damage Per Acre Calculations

Land Use	Structure Replacement Value ($/Sq Ft.)	Contents Damage Ratio	Average Depth (Ft.)	Average Damage Value (per Acre or Sq Ft)		Avg Structure (Sq Ft/Acre)	Relative Damage/ Acre	Relative Damage/acre Normalized
	[A] [1,3]	[B] [2,3]	[C][4]	[D][3]		[E] [5]	[F] = [D] * [E]	[G] = [F] / 300
Agricultural	$300.00	100%	4.90	300.00	acre		1	300
Commercial	$85.56	51%	5.00	71.36	Building SF		5,543	395,520
Industrial	$54.51	31%	0.00	3.85	Building SF		0	0
School	$144.46	38%	5.00	101.70	Building SF		3,881	394,740
Residential Multi	$84.40	50%	4.30	52.53	Building SF		2,064	108,448
Mobile Home	$45.85	50%	3.75	66.94	Building SF		4,779	319,885
Rural Residential	$111.67	50%	4.17	68.37	Building SF		496	33,903
Residential Single	$111.67	50%	4.23	68.94	Building SF		3,945	271,992
Vacant	$100.00	0%	3.94	100.00	acre		1	100

[1] See Table 9: Structure Damage Value

[2] See Table 10: Contents Damage Value

[3] See Table 11 Structure, Contents, and Land Damage Value

[4] Average depth damage for each land use

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

Table 4A **Alternative 1**

Princeton Small Communities Flood Risk Reduction

Effective Benefit Unit Summary Table

Land Use	Acres [A]	Parcels [B]	Relative Damage/acre Normalized [C]	Total EBU [D= A*C]	Avg EBU/Parcel [E = D/B]
Agricultural	1.06	3	1.00	0	0.00
Commercial	3.90	12	1,318.40	5,146	428.87
Industrial	0.00	0.00	0.00	0	0.00
School	8.73	3	1,315.80	11,492	3,830.58
Residential Multi	7.06	9	361.49	2,551	283.48
Mobile Home	1.67	6	1,066.28	1,781	296.91
Rural Residential	7.01	4	113.01	793	198.13
Residential Single	23.60	75	906.64	21,401	285.35
Vacant	14.46	27	0.33	5	0.18
Total	**67.50**	**139**		**43,169**	

Notes:

[A] Acres from Calculated per each Alternative

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

[C] Damage per acre from Table 3

Table 4B **Alternative 2**

Princeton Small Communities Flood Risk Reduction

Effective Benefit Unit Summary Table

Land Use	Acres [A]	Parcels [B]	Relative Damage/acre Normalized [C]	Total EBU [D= A*C]	Avg EBU/Parcel [E = D/B]
Agricultural	69.54	10	1.00	0	0.00
Commercial	4.40	12	1,318.40	5,806	483.82
Industrial	0.00	0.00	0.00	0	0.00
School	8.73	3	1,315.80	11,492	3,830.58
Residential Multi	7.91	10	361.49	2,860	285.99
Mobile Home	2.81	8	1,066.28	2,991	373.93
Rural Residential	20.20	6	113.01	2,283	380.54
Residential Single	26.43	77	906.64	23,967	311.26
Vacant	19.09	32	0.33	6	0.20
Total	**159.13**	**158**		**49,405**	

Notes:

[A] Acres from Calculated per each Alternative

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

[C] Damage per acre from Table 3

Table 4C **Alternative 3**

Princeton Small Communities Flood Risk Reduction

Effective Benefit Unit Summary Table

Land Use	Acres [A]	Parcels [B]	Relative Damage/acre Normalized [C]	Total EBU [D= A*C]	Avg EBU/Parcel [E = D/B]
Agricultural	1.06	3	1.00	0	0.00
Commercial	3.90	12	1,318.40	5,146	428.87
Industrial	0.00	0.00	0.00	0	0.00
School	8.73	3	1,315.80	11,492	3,830.58
Residential Multi	7.06	9	361.49	2,551	283.48
Mobile Home	1.67	6	1,066.28	1,781	296.91
Rural Residential	7.01	4	113.01	793	198.13
Residential Single	25.88	76	906.64	23,468	308.79
Vacant	14.46	27	0.33	5	0.18
Total	**69.78**	**140**		**45,236**	

Notes:

[A] Acres from Calculated per each Alternative

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

[C] Damage per acre from Table 3

Table 5A | **Alternative 1**

Princeton Small Communities Flood Risk Reduction

$100,000 Assessment

Land Use	Total Assessment	Avg Assessment/Parcel	Avg Assessment/Acre
Agricultural	$0.00	$0.00	$0.00
Commercial	$11,921.56	$993.46	$3,054.03
Industrial	$0.00	$0.00	$0.00
School	$26,620.24	$8,873.41	$3,048.01
Residential Multi	$5,910.00	$656.67	$837.39
Mobile Home	$4,126.64	$687.77	$2,470.01
Rural Residential	$1,835.83	$458.96	$261.78
Residential Single	$49,574.57	$660.99	$2,100.21
Vacant	$11.16	$0.41	$0.77
Total	**$100,000.00**		

Table 5B **Alternative 2**

Princeton Small Communities Flood Risk Reduction

$100,000 Assessment

Land Use	Total Assessment	Avg Assessment/Parcel	Avg Assessment/Acre
Agricultural	$0.00	$0.00	$0.00
Commercial	$11,751.37	$979.28	$2,668.54
Industrial	$0.00	$0.00	$0.00
School	$23,260.14	$7,753.38	$2,663.28
Residential Multi	$5,788.74	$578.87	$731.69
Mobile Home	$6,054.97	$756.87	$2,158.24
Rural Residential	$4,621.44	$770.24	$228.74
Residential Single	$48,510.45	$630.01	$1,835.11
Vacant	$12.88	$0.40	$0.67
Total	**$100,000.00**		

Table 5C **Alternative 3**

Princeton Small Communities Flood Risk Reduction

$100,000 Assessment

Land Use	Total Assessment	Avg Assessment/Parcel	Avg Assessment/Acre
Agricultural	$0.00	$0.00	$0.00
Commercial	$11,376.79	$948.07	$2,914.47
Industrial	$0.00	$0.00	$0.00
School	$25,403.79	$8,467.93	$2,908.73
Residential Multi	$5,639.93	$626.66	$799.12
Mobile Home	$3,938.07	$656.35	$2,357.14
Rural Residential	$1,751.93	$437.98	$249.82
Residential Single	$51,878.83	$682.62	$2,004.23
Vacant	$10.65	$0.39	$0.74
Total	**$100,000.00**		

Table 6A | **Alternative 1**

Princeton Small Communities Flood Risk Reduction

Revenue Estimate 1 - $100 Residential Constraint

Land Use	Total Assessment	Avg Assessment/Parcel	Avg Assessment/Acre
Agricultural	$0.00	$0.00	$0.00
Commercial	$1,788.23	$149.02	$458.10
Industrial	$0.00	$0.00	$0.00
School	$3,993.04	$1,331.01	$457.20
Residential Multi	$886.50	$98.50	$125.61
Mobile Home	$619.00	$103.17	$370.50
Rural Residential	$275.37	$77.41	$39.27
Residential Single	$7,436.19	$99.15	$315.03
Vacant	$1.67	$0.06	$0.12
	$15,000.00		

Table 6B | **Alternative 2**

Princeton Small Communities Flood Risk Reduction

Revenue Estimate 1 - $100 Residential Constraint

Land Use	Total Assessment	Avg Assessment/Parcel	Avg Assessment/Acre
Agricultural	$0.00	$0.00	$0.00
Commercial	$1,880.22	$156.68	$426.97
Industrial	$0.00	$0.00	$0.00
School	$3,721.62	$1,240.54	$426.12
Residential Multi	$926.20	$92.62	$117.07
Mobile Home	$968.80	$121.10	$345.32
Rural Residential	$739.43	$77.41	$36.60
Residential Single	$7,761.67	$100.80	$293.62
Vacant	$2.06	$0.06	$0.11
	$16,000.00		

Table 6C | **Alternative 3**

Princeton Small Communities Flood Risk Reduction

Revenue Estimate 1 - $100 Residential Constraint

Land Use	Total Assessment	Avg Assessment/Parcel	Avg Assessment/Acre
Agricultural	$0.00	$0.00	$0.00
Commercial	$1,706.52	$142.21	$437.17
Industrial	$0.00	$0.00	$0.00
School	$3,810.57	$1,270.19	$436.31
Residential Multi	$845.99	$94.00	$119.87
Mobile Home	$590.71	$98.45	$353.57
Rural Residential	$262.79	$77.41	$37.47
Residential Single	$7,781.83	$102.39	$300.63
Vacant	$1.60	$0.06	$0.11
	$15,000.00		

Table 7A | **Alternative 1**

Princeton Small Communities Flood Risk Reduction

Revenue Estimate 2 - $200 Residential Constraint

Land Use	Total Assessment	Avg Assessment/Parcel	Avg Assessment/Acre
Agricultural	$0.00	$0.00	$0.00
Commercial	$3,576.47	$298.04	$916.21
Industrial	$0.00	$0.00	$0.00
School	$7,986.07	$2,662.02	$914.40
Residential Multi	$1,773.00	$197.00	$251.22
Mobile Home	$1,237.99	$206.33	$528.28
Rural Residential	$550.75	$137.69	$78.53
Residential Single	$14,872.37	$198.30	$630.06
Vacant	$3.35	$0.12	$0.23
	$30,000.00		

Table 7B | **Alternative 2**

Princeton Small Communities Flood Risk Reduction

Revenue Estimate 2 - $200 Residential Constraint

Land Use	Total Assessment	Avg Assessment/Parcel	Avg Assessment/Acre
Agricultural	$0.00	$0.00	$0.00
Commercial	$3,760.44	$313.37	$853.93
Industrial	$0.00	$0.00	$0.00
School	$7,443.25	$2,481.08	$852.25
Residential Multi	$1,852.40	$185.24	$234.14
Mobile Home	$1,937.59	$242.20	$528.28
Rural Residential	$1,478.86	$246.48	$73.20
Residential Single	$15,523.35	$201.60	$587.24
Vacant	$4.12	$0.13	$0.22
	$32,000.00		

Table 7C | **Alternative 3**

Princeton Small Communities Flood Risk Reduction

Revenue Estimate 2 - $200 Residential Constraint

Land Use	Total Assessment	Avg Assessment/Parcel	Avg Assessment/Acre
Agricultural	$0.00	$0.00	$0.00
Commercial	$3,299.27	$274.94	$845.20
Industrial	$0.00	$0.00	$0.00
School	$7,367.10	$2,455.70	$843.53
Residential Multi	$1,635.58	$181.73	$231.74
Mobile Home	$1,142.04	$190.34	$528.28
Rural Residential	$508.06	$127.02	$72.45
Residential Single	$15,044.86	$197.96	$581.23
Vacant	$3.09	$0.11	$0.21
	$29,000.00		

Table 8
Princeton Small Communities Flood Risk Reduction
Alternatives Cost Summary of Results

Alternative	Total Construction Cost	Assessment Capacity	
		$100 Constraint	$200 Constraint
1	$21,500,000	$15,000	$30,000
2	$88,000,000	$16,000	$32,000
3	$20,400,000	$15,000	$29,000

Table 9
Princeton Small Communities Flood Risk Reduction
Structure Damage Value

Structure Land Use		Replacement Value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Agricultural	**[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%
Commercial	**[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%
School	**[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%
Industrial	**[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%
Mobile Home	**[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%
Residential Multi	**[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%
Rural Residential	**[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%
Residential Single	**[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%
Vacant		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 10
Princeton Small Communities Flood Risk Reduction
Contents Damage Value

Land Use	Contents Damage Ratio	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Agricultural	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%
Commercial	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%
School	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%
Industrial	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%
Mobile Home	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%
Residential Multi	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%
Rural Residential	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%
Residential Single	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%
Vacant	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 11
Princeton Small Communities Flood Risk Reduction
Structure and Contents Value

Land Use		Replacement Value	Contents Damage Ratio	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Agricultural	**[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
Commercial	**[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
School	**[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
Industrial	**[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
Mobile Home	**[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
Residential Multi	**[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
Rural Residential	**[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
Residential Single	**[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
Vacant		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