APPENDIX 9

APPENDIX 9-1

Project 1: City of Lompoc, Lompoc Valley Leak Detection and Repair Project

This project does not require an appendix to this attachment.

APPENDIX 9-2

Project 2: City of Santa Maria, Untreated Water Landscape Irrigation Project

This project does not require an appendix to this attachment.

APPENDIX 9-3

Project 3: City of Santa Maria, LeakWatch Project

This project does not require an appendix to this attachment.

APPENDIX 9-4

Project 4: City of Goleta,
San Jose Creek Capacity Improvement and Fish Passage Project

- Army Corps of Engineers Santa Maria Levee Analysis
- Flood Damage Calculations
- Infrastructure Damage Calculations
- Income and Revenue Loss Calculations

US Army Corps of Engineers

Flood Damage Analysis
Santa Maria Levee Project

Prepared By:
USACE Los Angeles District, Economics Section

Purpose

This Economic Analysis will present the methods and results of a flood damage analysis conducted for the Santa Maria Levee Project. The analysis is intended to determine whether there is a Federal interest in making emergency improvements to portions of the Santa Maria Levee that would be expected to reduce the risk of levee failure, thus reducing the risk of economic damages from flooding in the surrounding area.

Methodology & Delimitation

The principal guidance of the analysis comes from the U. S. Army Corps of Engineer's (USACE) "*Planning Guidance Notebook*", ER 1105-2-100, with specific guidance from Appendix D – Economic and Social Considerations. Guidance on the use of emergency resources comes from ER 500-1-1, *Emergency Employment of Army and Other Resources*. Benefits and costs are expressed in average annual terms at 2007 price levels using the fiscal year 2007 federal discount rate of 4.875%. Importantly, for purposes of this Economic Analysis, the period of analysis is limited to five years because that is the length of time that roughly corresponds with the expected effective life of the emergency measures. However, the effectiveness of the emergency measures in preventing a levee breach in this location could, in reality, last much longer than this. While the actual effective life of the emergency measures (assuming no other actions are taken) is uncertain, it is expected that the effective life is much more likely to be greater than five years than it is to be less than five years. Since project benefits are positively correlated with project life, this project life assumption means that overall benefits are likely greater (or much greater) than shown here. Also, the Corps is currently pursuing options for making improvements to the levees that will address existing deficiencies that are resulting in a level of protection that is less than the authorized level. However, beyond the emergency measures, it is uncertain what type of longer-term improvements will be made and when they will be implemented. It is hoped that such long-term improvements can be completed prior to the end of the useful life of the advanced protective measures recommended in this report.

Given the urgency associated with this analysis and potential repair work, and given the limited funding and time available for this analysis, it was necessary to simplify the analysis in numerous ways. First, the damage estimate was limited to structures and their contents. In a flooding analysis for highly developed, urbanized floodplains such as this, damage to structures and contents is expected to constitute the vast majority of economic damages from flooding. Second, as opposed to collecting a detailed, updated floodplain property inventory, the analysis relied on aerial photography, real estate records, and conversations with local officials. As described in more detail below, this information was combined with local construction cost data in order to value the total property at risk in the floodplain. Third, event-based damages were calculated for three events, using adjusted overflow depth data from a prior USACE report from 1980[1]. Given that significant urbanization and development has occurred in the floodplain since 1980, it is assumed for purposes of this analysis that the average flood depths for a given frequency have increased by 25%[2]. Damages to structures were calculated using structure and content depth-damage curves developed by either the Institute for Water Resources or FEMA. Expected Annual Damages (EAD) were calculated in a Microsoft Excel spreadsheet given the estimated damages per event and the corresponding probability of flooding.

[1] *Supplement to Design Memorandum No. 1 for Santa Maria Valley Levees and Channel Improvements*, USACE Los Angeles District, March 1980.
[2] Source: USACE Hydrology and Hydraulics Branch

The Study Area and the Current Flooding Threat

The Santa Maria River Levee is located 160 miles north of Los Angeles in Santa Barbara County, CA. The City of Santa Maria has approximately 85,000 residents, 28,000 housing units, and over 1,500 business establishments. Since 1980, the population has more than doubled – from 32,000 to 84,000 residents.

Figure 1 below shows the approximate floodplain[3]. The floodplain is approximately 2,600 acres in size (4 square miles). This floodplain encompasses approximately one-fifth of the City of Santa Maria, but approximately one-third of the developed land in the city. According to USACE engineers, the floodplain outlined in Figure 1 is the most likely area of inundation in the event of a levee breach. Under the existing conditions, it is expected that the non-damaging frequency event is the ten-year storm, which is a storm that has a 10% probability of occurring in any given year. According to USACE Engineers, it is reasonable to assume that, while the depths differ, the extent of the floodplain is roughly equivalent for the 100-, 50-, and 25-year frequency events.

Figure 8: Extent of Floodplain (Approx.)

[3] Approximates the Breach No. 3 floodplain boundary delineated in the 1980 design memorandum

Floodplain Inventory

In order to estimate the economic impact of potential future flood damages to the residences and businesses in the study area's floodplain, it is necessary to estimate the total value of these structures and their contents. As a result of funding and time constraints, no detailed structure inventory was completed. Instead, this estimate was made by using a combination of previous USACE studies, aerial photography, real estate records, and telephone interviews with local officials. This information was combined with data from the Marshall & Swift (M&S) valuation service, which provides the relevant cost components that serve as the basis for the value calculations, to arrive at a rough approximation for the value of property in the floodplain.

As stated above, the floodplain encompasses approximately one-third of the developed land in the city. Compared to the overall land use in the City of Santa Maria, the land use in the floodplain is to a greater extent comprised of residential use, and less of industrial and manufacturing use. For purposes of this analysis, however, it is assumed that the land use pattern in the floodplain is consistent with the land use in the broader city. Using one-third as an approximation of the proportion of the city's structures that are contained in the floodplain, it is possible to make a rough estimate the number of the various types of structures at risk in the floodplain. The results of this inventory are shown below.

Table 1: Structure Inventory - Units in Floodplain

Structure Type	Total Units in City^	Number of Units in 100-Year Floodplain
SFR	19,000	6,333
MFR	7,000	2,333
MH	1,700	567
Office	440	147
Retail	347	116
Other Commercial	470	157
Manuf./Ind.	80	27
Restaurant	165	55
Churches*	NA	6
Schools*	NA	6
*Estimated directly from aerial photography.		
^Source: U.S. Census Bureau. Commercial - includes retail and wholesale trade; Offices - includes professional services and healthcare facilities; Manufacturing & Industrial - those classified as manufacturing by the U.S. Census Bureau.		

The value of the structures was calculated by multiplying the square footage of the structure by an estimate of the per square foot value of the structure, which depends on the structure use type (residential, commercial, etc.). The per square foot values were taken from Marshall & Swift, which are based on the following factors: the type of structure, the quality of the construction, the condition of the structures, a locality multiplier (Santa Barbara County in this case), and a cost multiplier (western region). The aerial photographs in Figure 2 below are examples of the type of residential and commercial structures that are found in the floodplain.

Figure 9: Example of Residential and Commercial Structures in the Floodplain
Source: www.local.live.com

Given the funding and time restrictions of this analysis, it was necessary to make several assumptions regarding the characteristics of the property in the floodplain. For the single-family residential structure valuation, an examination of aerial photographs and real estate records indicates that it is reasonable to assume for purposes of this analysis that the average single-family residence is 1,700 square feet. For USACE economic analyses, the appropriate structure value to use is the depreciated replacement value. Date of construction, which is used here as a partial indication of structure condition was estimated from real estate data collected via an internet site specializing in real estate information[4]. According to this source, most of the residences in the floodplain were constructed between thirty and fifty years ago. As such, it is assumed for this analysis that, according to the M&S classification system for Class D (wood fame) structures, the structures are of "average" construction quality and in "average" condition. Given this, a per square foot construction cost of $63 is assumed, which incorporates a regional adjustment and depreciation percentage. Combining this value with the average square footage of the structures and multiplying this value by the total number of structures in the floodplain gives a rough estimate of the total structure value of single-family residences in the 100-yr floodplain. The same methodology was followed to estimate the total structure value of multi-family residences, mobile homes, and commercial structures.

Another important component of this preliminary evaluation is an estimation of the content value of those structures in the floodplain. For the purpose of this assessment, it is assumed that the content to structure value of the all residential structures is one-half. That is, the total value of the contents is assumed to be half of the depreciated replacement value of the structure. Value ratios for other structure types were assumed based on USACE guidance documents and previous empirical studies. Table 2 below shows the per-square-foot and content to structure ratio values used for each of the structure types included in the analysis.

[4] www.zillow.com

Table 2: Structure & Content Value Assumptions

Structure Type	$/SF, Including Depreciation*	Square Footage Per Unit	Content to Structure Value Ratio
SFR	63	1,700	0.5
MFR	55	800	0.5
MH	37	800	0.5
Office	79	2,500	0.8
Retail	58	2,500	1.4
Other Commercial	58	2,500	1.4
Manuf./Ind.	37	5,000	1.7
Restaurant	91	2,500	0.4
Churches	55	5,000	0.3
Schools	103	40,000	0.3

*Depreciated Replacement Cost - In accordance with Marshall & Swift

Table 3 below shows the estimated values of the depreciated replacement cost of the structures and contents in the 100-year floodplain.

Table 3: Depreciated Structure & Content Value, 100-Year Floodplain

Structure Type	Units in 100-Year Floodplain	Total Depreciated Structure Value*	Total Depreciated Content Value	Total Structure and Content Value
SFR	6,333	$683,401	$341,700	$1,025,101
MFR	2,333	$102,522	$51,261	$153,782
MH	567	$16,926	$8,463	$25,390
Office	147	$29,084	$23,267	$52,350
Retail	116	$16,860	$23,604	$40,465
Other Commercial	157	$22,834	$31,968	$54,802
Manuf./Ind.	27	$4,970	$8,450	$13,420
Restaurant	55	$12,548	$5,019	$17,567
Churches	6	$1,658	$497	$2,156
Schools	6	$24,774	$8,175	$32,949
TOTAL	9,746	915,577	502,405	1,417,981

*In accordance with Marshall & Swift, Depreciation Index. All dollars in thousands.

Without-Project Damage to Property from Flooding

Damage to property from flooding is of course to a large extent a function of the depth of flooding. For this analysis, because of funding, time, and informational constraints, the flood depths at each structure type were derived from a previous USACE report, *Supplement to Design Memorandum No. 1, for Santa Maria Valley Levees and Channel Improvements,* from March of 1980. The depths associated with the 1980 report's Breach No. 3 were utilized here because, according to USACE engineers, that is currently the location at greatest risk of levee failure. USACE Hydrology and Hydraulics (H&H) division have

stated that, given the urbanization and growth in the floodplain since 1980, it is reasonable to assume that the flood depths in the floodplain as a result of a levee breach in this area would be twenty-five percent greater as compared to the 1980 data. Also, the 1980 report does not include an estimate of 25-year flood depths. USACE H&H states that it is reasonable to assume that the 25-year depth is two-thirds of the 50-year depth. The adjusted internal structure depth data is shown in the table below[5]. Depth-damage curves are not available for as many structure categories as is shown in the structure valuation tables. As a result, the ten structure categories shown above were condensed into six broader categories as shown in the table below.

Table 4: Internal Structure Flood Depths by Type & Frequency

Structure Type	100-Year	50-Year	25-Year
	Depth (ft)	Depth	Depth
SFR	1.13	0.63	0.41
MFR	1.75	1.00	0.66
MH	0.00	0.00	0.00
Commercial	2.38	1.63	1.07
Manuf./Ind.	5.63	4.25	2.81
Public	2.00	1.13	0.74
Source: *Santa Maria Valley Levees and Channel Improvements*, USACE Los Angeles, 1980. See document text for an explanation of adjustments and assumptions.			

Tables 5 and 6 below show the estimate of percent damage to structures and structure contents in the floodplain for three storm events. It should be noted that Table 6 shows the damage to contents of residential structures as a percentage of the total depreciated content value, and not as a percentage of structure value, which is sometimes the convention in USACE flood damage analyses.

Table 5: Percent Damage to Structures by Type and Frequency

Structure Type	100-Year		50-Year		25-Year	
	Depth (ft)	% Damage	Depth	% Damage	Depth	% Damage
SFR	1.13	24.2	0.63	19.3	0.41	17.4
MFR	1.75	12.7	1.00	9.9	0.66	8.4
MH	0.00	0	0.00	0	0.00	0
Commercial	2.38	26.2	1.63	21.3	1.07	17.2
Manuf./Ind.	5.63	41.3	4.25	30	2.81	27.1
Public	2.00	24.7	1.13	17.2	0.74	13.5
Source: Damage Percent from FEMA and USACE Economic Guidance Memorandum 03-01						

[5] This is the calculated as the difference between total flood depth at the structure and the first floor elevation of the structure. Taken from the 1980 report.

Table 6: Percent Damage to Contents by Structure Type and Frequency

Structure Type	100-Year		50-Year		25-Year	
	Depth (ft)	% Damage	Depth	% Damage	Depth	% Damage
SFR	1.13	27.5	0.63	22.4	0.41	20.4
MFR	1.75	16.1	1.00	9.8	0.66	9
MH	0.00	0	0.00	0	0.00	0
Commercial	2.38	26	1.63	21.3	1.07	18.2
Manuf./Ind.	5.63	76.5	4.25	61.3	2.81	42.6
Public	2.00	23.7	1.13	18.2	0.74	15.5
Source: Damage Percent from FEMA and USACE Economic Guidance Memorandum 03-01						

Table 7 below shows the estimated structure and content damages by frequency event. The total structure and content damages from a levee breach in this area associated with the 100-year event are estimated to be just under $341 million.

Table 7: Structure & Content Damages by Event

Structure Type	100-Year		
	Structure Damage	Content Damage	Total
SFR	$165,383	$93,968	$259,351
MFR	$13,020	$8,253	$21,273
MH	$0	$0	$0
Commercial	$21,307	$21,803	$43,110
Manuf./Ind.	$2,053	$6,464	$8,517
Public	$6,529	$2,055	$8,584
TOTAL	$208,292	$132,543	$340,835
Structure Type	**50-Year**		
SFR	$131,896	$76,541	$208,437
MFR	$10,150	$5,024	$15,173
MH	$0	$0	$0
Commercial	$17,322	$17,862	$35,184
Manuf./Ind.	$1,491	$5,180	$6,671
Public	$4,546	$6,389	$10,935
TOTAL	$165,406	$110,995	$276,401
Structure Type	**25-Year**		
SFR	$118,912	$69,707	$188,619
MFR	$8,612	$4,613	$13,225
MH	$0	$0	$0
Commercial	$13,988	$15,262	$29,250
Manuf./Ind.	$1,347	$3,600	$4,947
Public	$3,568	$1,344	$4,913
TOTAL	$146,427	$94,526	$240,953
All dollars in thousands.			

Figure 3 below graphically depicts the without-project damages to structures and contents by frequency event. The total without-project expected annual damages (EAD), which is the sum of the area below the damage curve in the figure below, is $18.2 million.

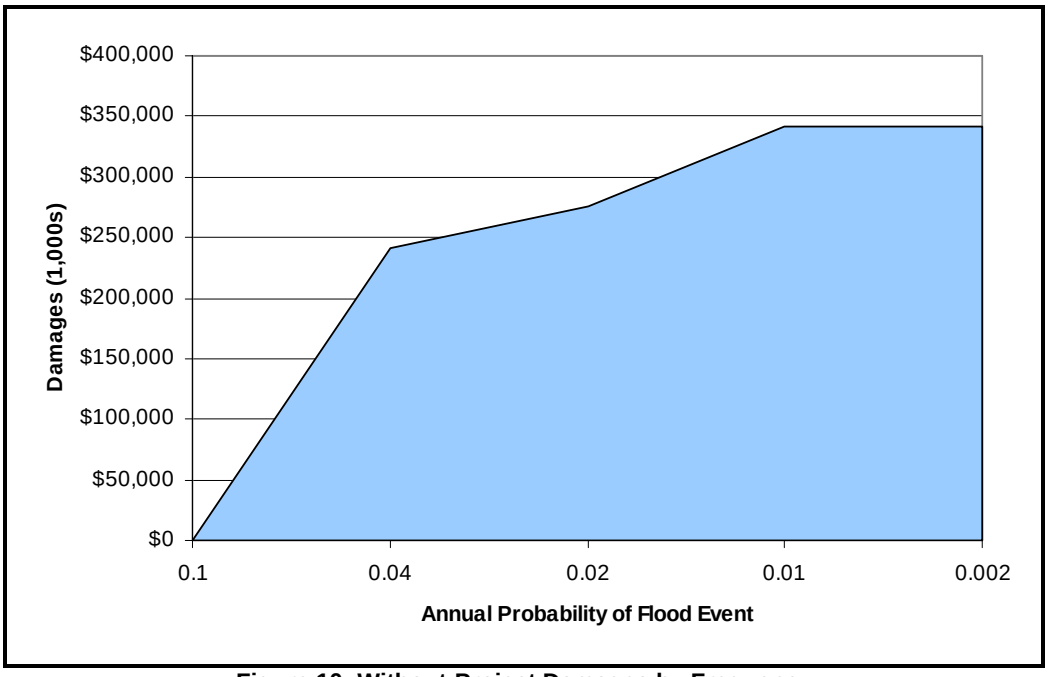

Figure 10: Without-Project Damages by Frequency

Damages Not Estimated

As stated previously, damage to structures and their contents is expected to constitute the vast majority of total economic damages from flooding as a result of a levee breach in this area. For this reason, and because they are two damage categories that are most readily quantifiable, the damage estimate was limited to these two categories. There are numerous other damage categories that were not included in the analysis however. These include both physical and non-physical costs, for which in many cases there are few commonly accepted generalized functions similar to what exists for structure and content damages. These other categories include structure dewatering and cleanup costs, temporary relocation costs incurred on residents, vehicle damage, emergency costs associated with the flooding, traffic delay and detour costs, and non-recoverable income losses to businesses (such as the destruction of perishable items such as food).

With-Project Damage to Property from Flooding

The proposed plan includes stockpiling sufficient quantities of rock suitable for flood fighting and protecting a 1,000' foot long section of the levee, extending an existing pilot channel to redirect low flows from critical areas where flow impingement is an ongoing problem, and developing a detailed flood fighting plan to address mobilization and execution of flood fighting. It is estimated that the implementation of these measures will reduce the probability of a levee breach in the study area, and that over the course of the project's life the measures would enable the levee to withstand a storm corresponding to a range of between a 25-year and 50-year magnitude,

which are storms that have a four percent and two percent chance of occurring in any one year, respectively.

Figures 4 and 5 below show the frequency-damage curves for a 25-year and 50-year level of protection, respectively. The EAD associated with each of these protection levels is $8.6 million and $4.3 million, respectively. This EAD can be considered the residual damages associated with the implementation of the emergency measures, depending on the actual level of protection provided by the project.

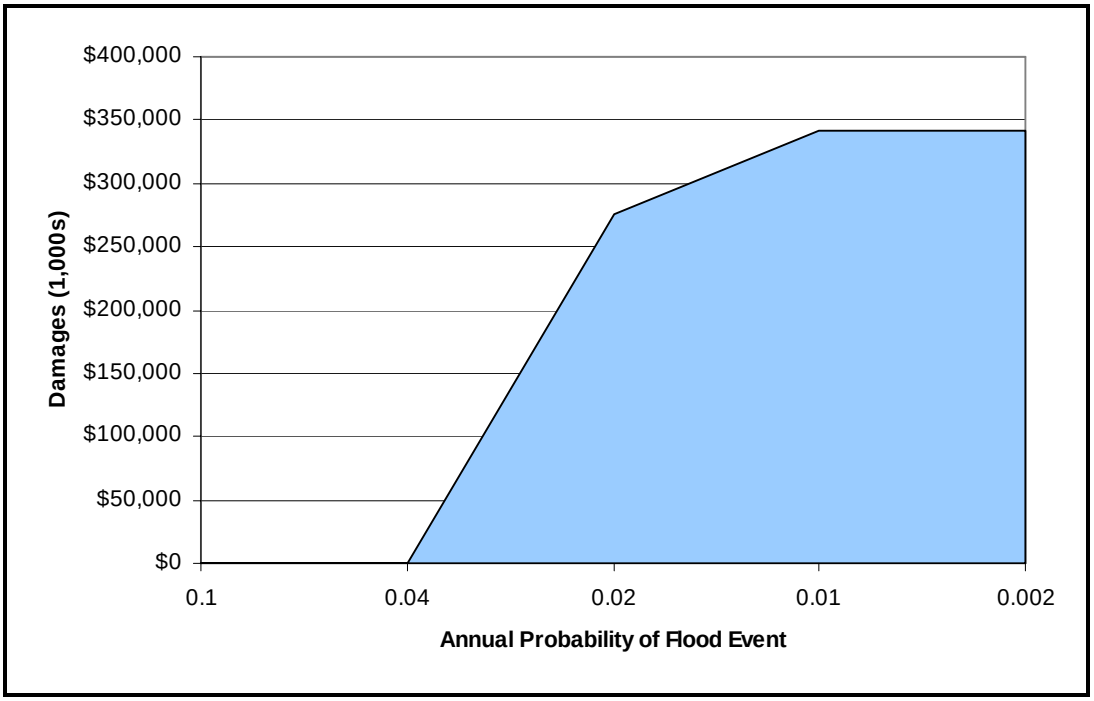

Figure 11: With-Project Damages, 25-Year Protection Level

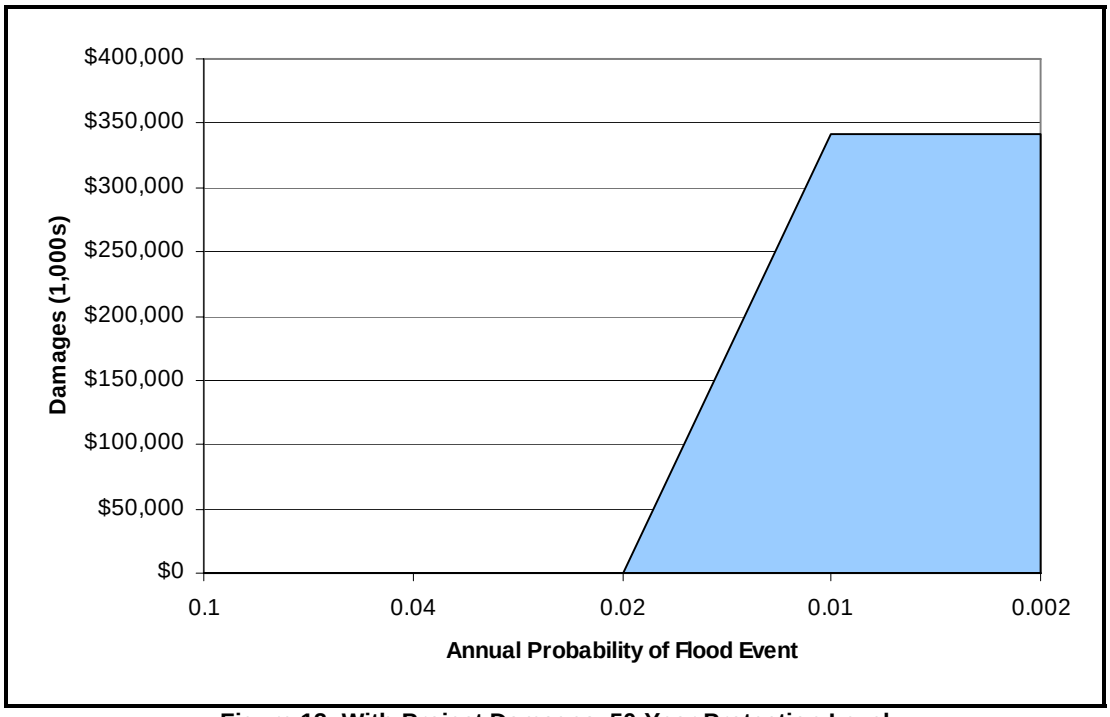

Figure 12: With-Project Damages, 50-Year Protection Level

Averaging the damage reduction that is associated with these two protection levels, the reduction in EAD totals just over $11.7 million. The table below shows the difference in damages between the without- and with-project conditions, and shows the reduced and residual EAD associated with the project. As the table shows, the project is expected to provide benefits at the 25- and 50-year event frequency, but is assumed to provide no benefits for events larger than the 50-year event. Again, because the project is expected to be effective for frequency events between the 25- and 50-year, the final with-project damage reduction incorporates the average of the damage reduction between these two protection levels.

Table 8: With-Project Damages & Damages Reduced

Frequency Event	Without-Project Damages	With-Project Damages			With-Project Damage Reduction
		25-Year Protection	50-Year Protection	Average of 25- and 50-Year	
0.1	$0	$0	$0	$0	$0
0.04	$241,000	$0	$0	$0	$241,000
0.02	$276,000	$276,000	$0	$138,000	$138,000
0.01	$341,000	$341,000	$341,000	$341,000	$0
0.005	$341,000	$341,000	$341,000	$341,000	$0
EAD	$18,213	$8,573	$4,433	$6,503	$11,710

All damages in thousands.

Net Benefits of the Emergency Measures

As stated previously, it is estimated that the completion of these features will reduce the probability of a levee breach in the study area, and that over the effective life of the project the non-damaging storm event will be increased to a level between the 25 and 50-year event. As explained previously, the emergency measures are assumed to have an effective life of five years, and are expected to cost $730,000 to implement. Using a five-year period of analysis and an interest rate of 4.875%, the annualized cost of the project is $168,000. The annual benefits are $11.7 million, which results in annual net benefits of over $11.5 million and a benefit to cost ratio of 70. According to this analysis, there is strong economic justification for implementation of the emergency measures to reduce the risk of flood damages in the project area.

Table 9: Net Benefits and B/C

Average Annual Benefits	Annualized Cost	Annual Net Benefits	B/C
$11,710,000	$168,029	$11,541,971	70

Table 1: Structure Inventory - Units in Floodplain

Structure Type	Number of Units in 100-Year Floodplain
SFR	500
MFR	1,050
MH	0
Office	145
Retail	55
Other Commercial	86
Manuf./Ind.	55
Restaurant	11
Churches	2
Schools	1

* Estimated from Land Use Designations, aerial photographs and institutional knowledge of the area.

Table 2: Structure & Content Value Assumptions

Structure Type	$/SF, Including Depreciation*	Square Footage Per Unit	Content to Structure Value Ratio *
SFR	$66	1,200	0.50
MFR	$57	600	0.50
MH	$38	700	0.50
Office	$82	600	0.80
Retail	$60	3,300	1.40
Other Commercial	$60	11,044	1.40
Manuf./Ind.	$38	23,600	1.70
Restaurant	$95	2,650	0.40
Churches	$57	750	0.30
Schools	$107	11,000	0.30

* Depreciated Replacement Cost - In accordance with Marshall & Swift as per "Flood Damage Analysis - Santa Maria Levee Project," USACE in 2009 dollars

Table 3: Depreciated Structgure & Content Value, 100-Year Floodplain

Structure Type	Units in 100-Year Floodplain	Total Depreciated Structure	Total Depreciated Content Value	Total Structure and Content Value
SFR	500	39,312,000	19,656,000	58,968,000
MFR	1,050	36,036,000	18,018,000	54,054,000
MH	0	0	0	0
Office	145	7,147,920	5,718,336	12,866,256
Retail	55	10,948,080	15,327,312	26,275,392
Other Commercial	86	57,290,971	80,207,359	137,498,330
Manuf./Ind.	55	49,947,040	84,909,968	134,857,008
Restaurant	11	2,758,756	1,103,502	3,862,258
Churches	2	85,800	25,740	111,540
Schools	1	1,178,320	353,496	1,531,816

* Depreciated Replacement Cost - In accordance with Marshall & Swift as per "Flood Damage Analysis - Santa Maria Levee Project," USACE

Table 4: Internal Structure Flood Depths by Type & Frequency

Structure Type	100-Year	50-Year	25-Year
	Depth (ft)	Depth	Depth
SFR	2.75	1.75	1.17
MFR	2.75	1.75	1.17
MH	2.00	1.00	0.67
Commercial	3.00	2.00	1.33
Manuf./Ind.	3.00	2.00	1.33
Public	3.00	2.00	1.33

Source: USACE Los Angeles, "Economic Guidance Memorandum 01-03, Generic Depth-Damage Relationships" December 2000.

Table 5: Percent Damage to Structures by Type and Frequency

Structure Type	100-Year		50-Year		25-Year	
	Depth (ft)	% Damage	Depth (ft)	% Damage	Depth (ft)	% Damage
SFR	2.75	40.00%	1.75	32.00%	1.17	23.00%
MFR	2.75	24.00%	1.75	19.00%	1.17	16.00%
MH	2.00	32.00%	1.00	15.00%	0.67	12.00%
Commercial	3.00	40.10%	2.00	32.10%	1.33	17.00%
Manuf./Ind.	3.00	40.10%	2.00	32.10%	1.33	17.00%
Public	3.00	40.10%	2.00	32.10%	1.33	17.00%
Source: Damage Percent from FEMA and USACE Economic Guidance Memorandum 03-01.						

Table 6: Percent Damage to Contents by Structure Type and Frequency

Structure Type	100-Year		50-Year		25-Year	
	Depth (ft)	% Damage	Depth (ft)	% Damage	Depth (ft)	% Damage
SFR	2.75	21%	1.75	17.10%	1.17	13.50%
MFR	2.75	17%	1.75	12.00%	1.17	10.10%
MH	2.00	18%	1.00	14.00%	0.67	11.00%
Commercial	3.00	22%	2.00	17.90%	1.33	15.00%
Manuf./Ind.	3.00	22%	2.00	17.90%	1.33	15.00%
Public	3.00	22%	2.00	17.90%	1.33	15.00%
Source: Damage Percent from FEMA and USACE Economic Guidance Memorandum 03-01						

Table 7: Structure & Content Damanges by Event

Structure Type	100-Year		
	Structure Damage	Content Damage	Total
SFR	$15,724,800	$4,127,760	$19,852,560
MFR	$8,648,640	$3,063,060	$11,711,700
MH	$0	$0	$0
Commercial	$2,866,316	$1,258,034	$4,124,350
Manuf./Ind.	$4,390,180	$3,372,009	$7,762,189
Public	$22,973,679	$17,645,619	$40,619,298
TOTAL	$54,603,615	$29,466,482	$84,070,097
Structure Type	**50-Year**		
SFR	$12,579,840	$3,361,176	$15,941,016
MFR	$6,846,840	$2,162,160	$9,009,000
MH	$0	$0	$0
Commercial	$2,294,482	$1,023,582	$3,318,064
Manuf./Ind.	$3,514,334	$2,743,589	$6,257,923
Public	$18,390,402	$14,357,117	$32,747,519
TOTAL	$43,625,898	$23,647,624	$67,273,522
Structure Type	**25-Year**		
SFR	$9,041,760	$2,653,560	$11,695,320
MFR	$5,765,760	$1,819,818	$7,585,578
MH	$0	$0	$0
Commercial	$1,215,146	$857,750	$2,072,897
Manuf./Ind.	$1,861,174	$2,299,097	$4,160,270
Public	$9,739,465	$12,031,104	$21,770,569
TOTAL	$27,623,305	$19,661,329	$47,284,634

The Daily Lane Rental Rate per Mile for Hollister Avenue is $70,000
Per Caltrans Methods

For a 25 - 100 year event, Hollister can be impassable for up to 7 days
This analysis assumes 4 days
This does not include the two way left turn lane

Storm Event	**Lanes Flooded**	**Miles**	**Lane-Miles**	**$ Value**
100 year	4	0.5	2	$140,000
50 year	4	0.5	2	$140,000
25 year	4	0.5	2	$140,000
TOTAL PER DAY				**$420,000**
4 days				**$1,680,000**

Kellogg Avenue and Other Two Lane Roads Impacted $12.6 million per month

Daily Rate	$86,667
4 Days	$346,668
Total Daily Lane Rental	**$506,667**
Total 4 Day Lane Rental	**$2,026,668**

Caltrans' Highway design Manual states that a roadway should not have
more than one tenth of a cubic foot per second crossing a roadway for safe operation.
All of these storms would exceed that.

Assumptions for the rental rate:

Distance between R217 & Fairview: ½ mile
Rental Rate/month per 10' of store front: $4,000
Rental Rate/Lane/month/mile: $2.1 M
3 parallel Roads with 2 lanes each: 3*2*2.1 = $12.6M /month/mile

Accelerated Roadway Depreciation Due to Flooding and Clean-up
Hollister Avenue

Construction Cost to Install New Structural Section	$5,800,000			
Length of Roadway	.57 miles			
Number of Lanes	5			
Cost per Lane Mile	2,035,088			
Normal depreciation percent per annum	1%			
Damage from one flooding event (25 year and up)	20% Damage	to	Complete	**AVG**
Range	**$1,160,000**	to	**$5,800,000**	**$3,480,000**
Other two lane roads in flood area	2.25 miles			
Lane miles	4.5			
Cost to replace - Range	**$1,831,579**	to	**$9,157,895**	**$5,494,737**
Hollister plus all two lane roads - Range	**$2,991,579**	to	**$14,957,895**	**$8,974,737**

Assumptions:
Construction Cost to Install New Structural Section
does not include construction management,
project management, drainage structures or design.

Property

Entire RDA

Assessed Value	PPI 25%	TOTAL
$ 1,036,465,879	$ 259,116,470	**$ 1,295,582,349**

Sales

(From HDL Companies--City's Sales Tax Consultant. Information is for taxable sales on Hollister between Fairview & Kellogg, & Kellogg South of the 101 to Terminus, for FY 2009-10. Added additional 25% to capture non-taxable sales.)

Taxable Sales FY 2009-10	Non-Taxable Sales 25%	TOTAL	Daily	Net Income 20%
$ 102,552,200	$ 25,638,050	$ 128,190,250	$ 351,206	**$ 70,241**

Residents

(Income data from 2009 FFIEC Census Report - Summary Census Income Information)

2009 Est.Median Family Income	Housing Units
$ 54,000	1805

Property

Impacted Area by SJ Creek Flooding

33% of Total RDA

AV	PPI 25%	TOTAL
$ 342,033,740	$ 85,508,435	**$ 427,542,175**

Sales

(IBID regarding table to the left based on information from HDL Companies--City's Sales Tax Consultant. Same base numbers multiplied by % of Total RDA to get an estimate for the Impacted Area)

Taxable Sales FY 2009-10	Non-Taxable Sales 25%	TOTAL	Daily	Net Income 20%
$ 33,842,226	$ 8,460,557	$ 42,302,783	$ 115,898	**$ 24,180**

Residents

2009 Est.Median Family Income	Housing Units	Yearly Income for Area	**Daily Income for Area**
$ 54,000	596	$ 32,165,100	**$ 89,124**

APPENDIX 9-5

Project 5: Central Coast Water Authority,
Water Supply Reliability and Infrastructure Improvement Project

This project does not require an appendix to this attachment.

APPENDIX 9-6

Project 6: Goleta Sanitary District, Wastewater Treatment Plant Upgrade

This project does not require an appendix to this attachment.

APPENDIX 9-7

Project 7: City of Guadalupe, Recycled Water Feasibility Study

This project does not require an appendix to this attachment.