

Appendix J

FEMA Benefit-Cost Analysis

FEMA

Benefit-Cost Analysis of Hazard Mitigation Projects

LIMITED DATA MODULE

Version 5.2.3
May 2, 2006

Report of Benefit-Cost Analysis

Project Address City, State, Zip County	Evaluation to Reduce Salt I Lincoln, NE
Applicant Contact Person	
Analysis Date Analyst	09/09/2008 CDM
Scenario Run ID File Save As Name	Preferred Alternative Cost-Benefit Ratio
Disaster Number DSR Number	

FEMA Disclaimer:

The results produced by this analysis are neither conclusive evidence that the proposed project is cost-effective, nor a guarantee that a project is eligible for any government grant for whatever purpose.

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PROJECT INFORMATION

Disaster Number		Project	Evaluation to Reduce Salt Creek BFEs
DSR Number		Address	
DSR Category		City, State, Zip	Lincoln, NE
DSR Subject		County	Lancaster County
Inspection Date		Applicant	
Application Date		Contact Person	
Analysis Date	09/09/2008	Scenario Run ID	Preferred Alternative
Analyst	CDM	File Save As Name	Cost-Benefit Ratio

PROJECT DATA

Off-line stormwater detention along Middle and Oak Creek to reduce BFEs along Salt Creek. Proposed Alternative is to build multiple cell stormwater detention at three sites. Total number of basins for this alternative is 7 basins.

Project Useful Life (Years)	50
Base Year of Costs	2008
Historic Preservation Issues (Yes or No)?	No
Environmental Issues (Yes or No)?	No

Economic Factors:	Discount Rate (%)	4.88	Present Value Coefficient	18.61
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Net Mitigation Project Cost:	\$38,600,000
Notes:	

Additional Annual Maintenance Cost (\$/year) for Mitigation Project	\$30,000
Present Value of Additional Annual Maintenance Cost (\$)	\$558,428
TOTAL MITIGATION PROJECT COST	\$39,158,428

TYPE OF FACILITY (for Loss of Function)	ROADS/BRIDGES
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FACILITY DESCRIPTION	
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Loss of Function for Roads/Bridges	
Estimated Number of One-Way Traffic Trips Per day	0
Estimated Delay (Detour) Time Per One Way Trip (hours)	0.00
Total Economic Loss Per Hour of Delay: Ordinary, commercial, and emergency traffic	\$0.00

Economic Loss Per Day of Loss of Function of Bridge or Road	\$0
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FLOOD HISTORY

Estimated Frequency of Declared Flood Event (Years)	
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Data Sources and Documentation

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DAMAGES BEFORE MITIGATION

Flood Frequency Events (Years)	Scenario Flood Damages			Loss of Function Time and Dollars		TOTAL Damages and Losses
	A	B	C	Days	Losses	
1					\$0	\$0
2					\$0	\$0
5					\$0	\$0
10	\$26,400,000				\$0	\$26,400,000
25					\$0	\$26,400,000
50	\$140,000,000				\$0	\$140,000,000
100	\$240,591,696				\$0	\$240,591,696
250					\$0	\$240,591,696
500					\$0	\$240,591,696
Total Annualized Damages						\$7,184,134

Data Sources and Documentation

DAMAGES AFTER MITIGATION

Flood Frequency Events (Years)	Scenario Flood Damages			Loss of Function Time and Dollars		TOTAL Damages and Losses
	A	B	C	Days	Losses	
1					\$0	\$0
2					\$0	\$0
5					\$0	\$0
10	\$21,300,000				\$0	\$21,300,000
25					\$0	\$21,300,000
50	\$124,000,000				\$0	\$124,000,000
100	\$216,000,000				\$0	\$216,000,000
250					\$0	\$216,000,000
500					\$0	\$216,000,000
Total Annualized Damages						\$6,252,818

Data Sources and Documentation

SUMMARY OF BENEFITS AND COSTS

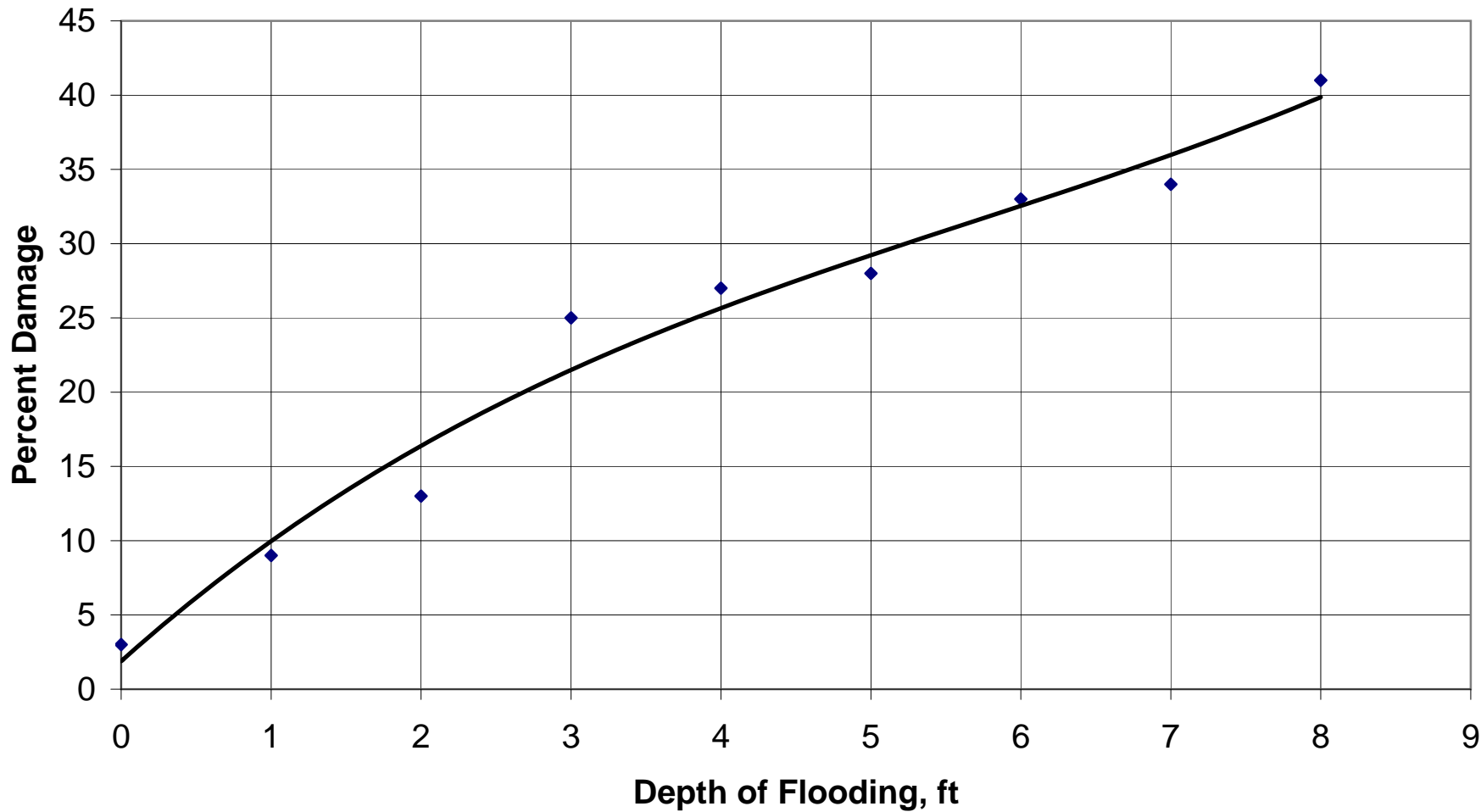
	Expected Annual	Present Value
Expected Annual Damages Before Mitigation	\$7,184,134	\$133,727,263
Expected Annual Damages After Mitigation	\$6,252,818	\$116,391,515
Expected Avoided Damages After Mitigation (BENEFITS)	\$931,316	\$17,335,747
PROJECT COSTS	\$39,158,428	
PROJECT BENEFITS	\$17,335,747	
BENEFITS MINUS COSTS	(\$21,822,680)	
BENEFIT-COST RATIO	0.44	

Data Sources and Documentation

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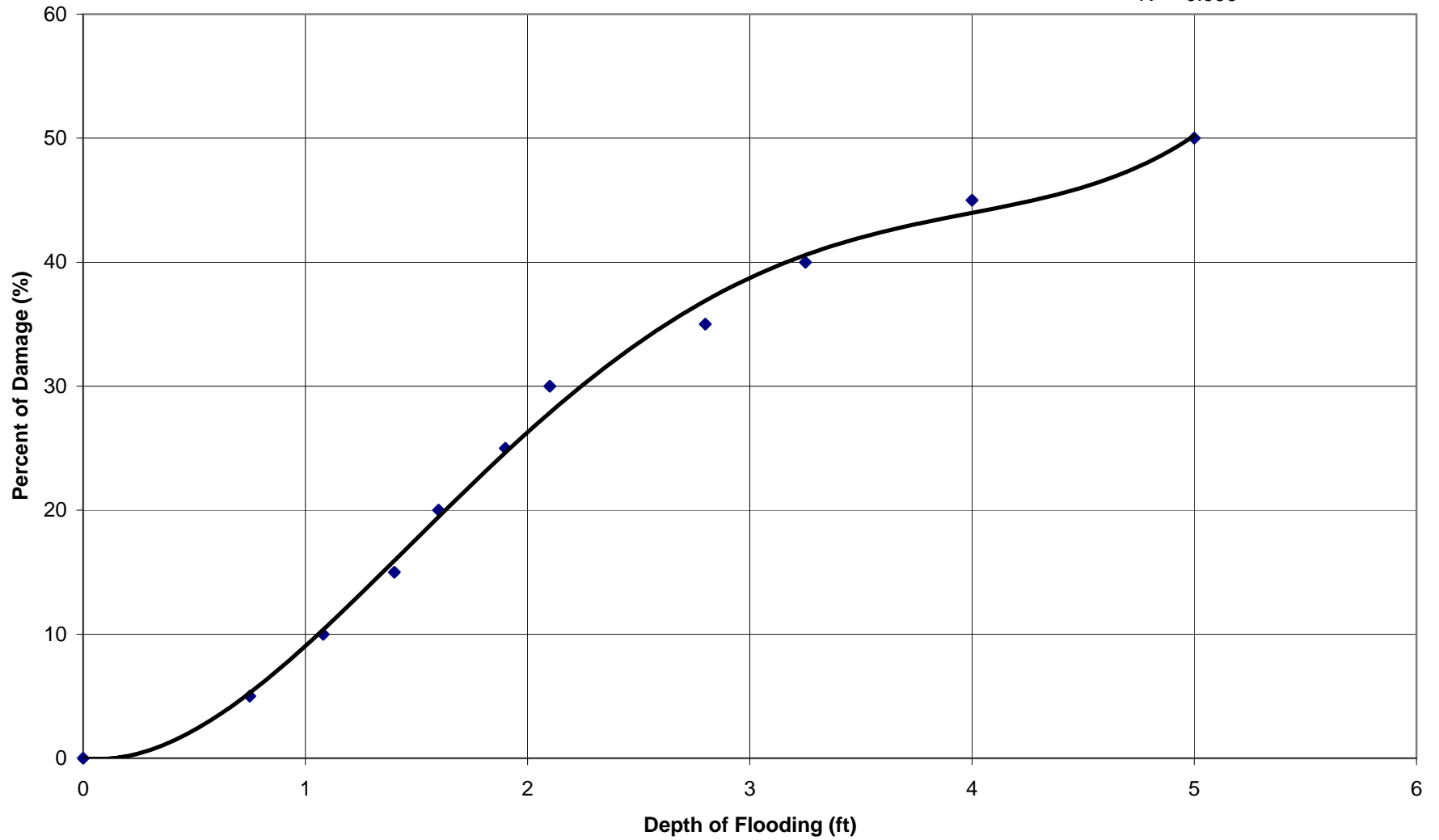
Buildings Contents Damage

$$y = 0.0589x^3 - 1.0058x^2 + 9.0226x + 1.8889$$
$$R^2 = 0.973$$

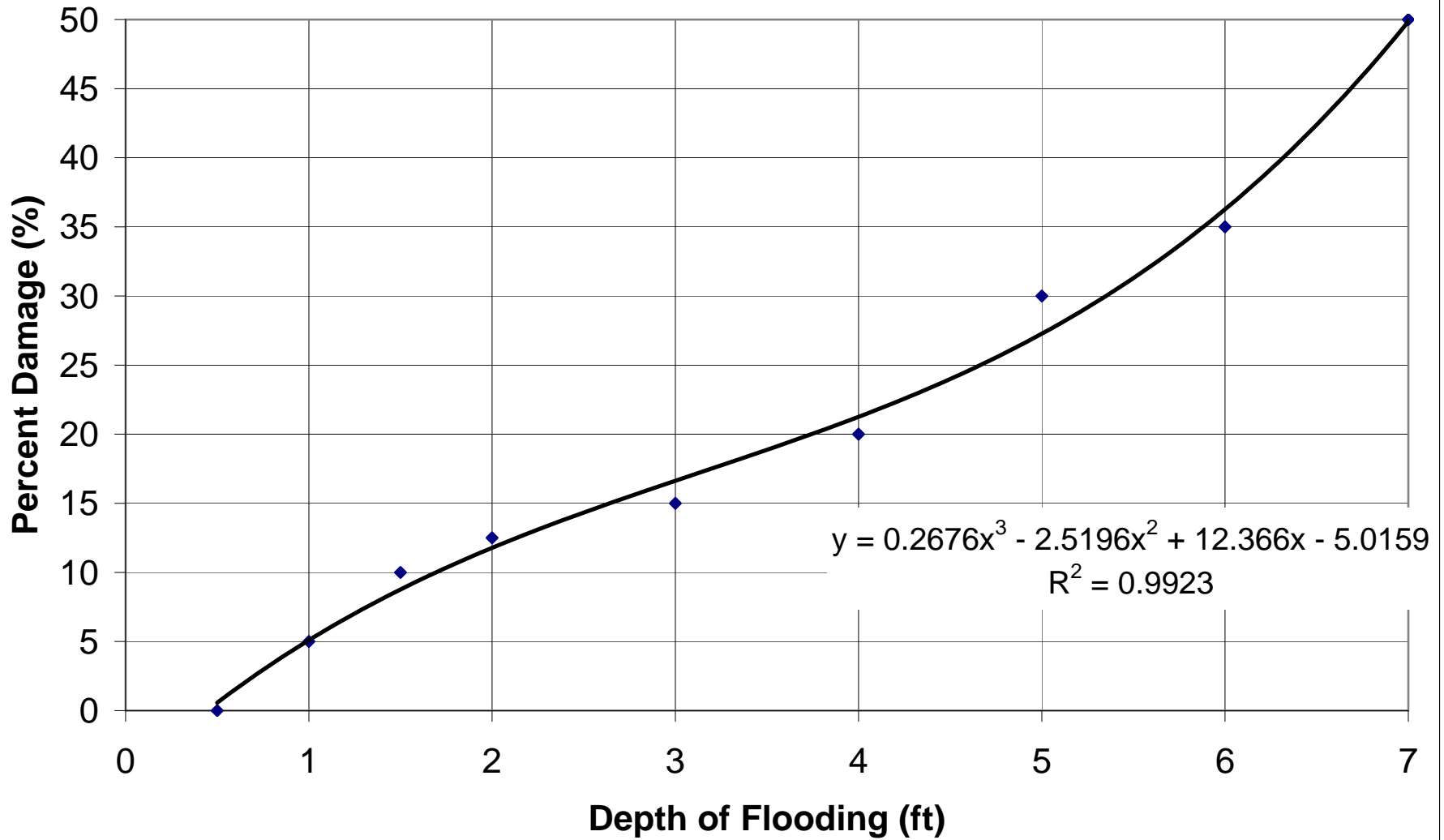


Building Flooding Damage Curve

$$y = 0.4408x^4 - 4.8086x^3 + 15.436x^2 - 2.0212x$$
$$R^2 = 0.996$$



Street Flood Damage Curve



Damages Cost Estimates

Salt Creek Existing Conditions		Salt Creek Preferred Alternative	
10-Year Event		10-Year Event	
<i>No. of Properties with Damaged Buildings:</i>	140	<i>No. of Properties with Damaged Buildings:</i>	76
<i>Length of Street (mi):</i>	5.1	<i>Length of Street (mi):</i>	4.2
Building Damage:	\$19,000,000	Building Damage:	\$16,000,000
Contents Damage:	\$7,000,000	Contents Damage:	\$5,000,000
Street Damage:	\$400,000	Street Damage:	\$300,000
Total Damages:	\$26,400,000	Total Damages:	\$21,300,000
50-yr Event		50-yr Event	
<i>No. of Properties with Damaged Buildings:</i>	1386	<i>No. of Properties with Damaged Buildings:</i>	1335
<i>Length of Street (mi):</i>	36.1	<i>Length of Street (mi):</i>	35.0
No. of Buildings:		No. of Buildings:	1267
Building Damage:	\$94,000,000	Building Damage:	\$88,000,000
Contents Damage:	\$39,000,000	Contents Damage:	\$33,000,000
Street Damage:	\$4,000,000	Street Damage:	\$3,000,000
Total Damages:	\$137,000,000	Total Damages:	\$124,000,000
100-yr Event		100-yr Event	
<i>No. of Properties with Damaged Buildings:</i>	1770	<i>No. of Properties with Damaged Buildings:</i>	1740
<i>Length of Street (mi):</i>	50.8	<i>Length of Street (mi):</i>	49.5
Building Damage:	\$166,000,000	Building Damage:	\$149,000,000
Contents Damage:	\$64,000,000	Contents Damage:	\$60,000,000
Street Damage:	\$7,000,000	Street Damage:	\$7,000,000
Total Damages:	\$237,000,000	Total Damages:	\$216,000,000
Lincoln Airport Damages (HWS Report)		Lincoln Airport Damages (HWS Report)	
With No Levees	\$3,591,696	Levees meet FEMA	\$0