Evaluating Losses Avoided Through Acquisition Projects

Montevideo, Minnesota

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Acknowledgements

City of Montevideo

Steve Jones, *City Manager*

Minnesota Department of Public Safety – Homeland Security and Emergency Management

Jim Russell, *Hazard Mitigation Administrator*
Jim McClosky, *Mitigation Planner*

FEMA
Timothy Wick, *HM HPA*
Simon Chabel, *Projects and Planning*

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Executive Summary

Central to the mission of the Federal Emergency Management Agency (FEMA) is to reduce losses from future disasters.

The Federal Emergency Management Agency (FEMA) awards mitigation grants to reduce the negative impact of natural hazards on property, people, and the environment. FEMA funds projects based on numerous factors, including a cost-effectiveness analysis of a range of hazard events. Presidential-declared disasters provide considerable funds to States and communities via the Hazard Mitigation Grant Program (HMGP). The HMGP assists States and local communities in implementing long-term hazard mitigation measures. It can be used to fund projects that protect public or private property. Under the HMGP, FEMA may contribute up to 75 percent of project costs. The community must formally agree to provide a local match in the amount of the remaining project costs (at least 25 percent). After significant funds are distributed for mitigation projects, the questions arise: Was the project truly cost effective? How effective was the project during ensuing disasters or hazard events?

The Loss Avoidance Study (LAS) methodology was developed by FEMA to provide a quantitative approach to assess performance of mitigation measures. This report, *Evaluating Losses Avoided through Acquisition Projects*, evaluates the effectiveness of property acquisitions as a mitigation measure. FEMA partnered with the State of Minnesota and the City of Montevideo and used the quantitative approach to complete a loss avoidance study for the acquisition projects.

The LAS methodology includes three major phases. *Phase One* includes data collection which includes the development of the initial project list. Projects were selected based on parameters established for the study. The selected projects were then screened based on the availability of data necessary to complete the study. For this study, the City of Montevideo, MN was selected for their acquisition (with Federal and State assistance) of 48 repetitive-loss properties. The final project list of these properties then proceeded to Phase 2: Data Analysis.

Phase Two includes multiple analyses of the data to determine if there were measurable avoided losses since the projects' completion. National Weather Service data was used to determine historical river crests of Chippewa River since the properties were acquired. To calculate the flood losses avoided due to acquisition projects in the City of Montevideo, it was essential to obtain pre-mitigation data on each structure to be evaluated. This data included:

- Location
- Building Value
- Contents Value

This report contains project descriptive information and the impacts of those projects. Damage estimates were based on *actual* storm events and the potential losses that may have occurred had the mitigation project not taken place. FEMA's HAZUS –MH-MR4 modeling software was used to model a flood event and information from that model was applied to the ten highest historical crests since the acquisitions were completed.

Phase Three involves the Loss Estimation Analysis. This analysis calculated the dollar amount from physical damage and loss of function from pre and post mitigation. Return on Investment (ROI) = Losses Avoided (LA) divided by Property Investment (PI) or acquisition cost x 100. The total losses avoided were estimated at $8,394,030. The total project investment for the project was $1,123,145. As a result, the collective return on investment for the ten flood events was 747 percent.

Using the ten storm events to determine possible damage that *would* have occurred to the properties had they not been acquired, yields significant returns on investments. The ROI will only increase as more flooding events occur, making property acquisition an effective and permanent mitigation tool.

Section I: Introduction

Mitigation is any sustainable activity or project that reduces losses for people, property, or possessions. It is an activity that is practiced by local, state and federal entities and is one of FEMA's primary missions. Working closely with partners at the state and local level, FEMA provides states and communities with substantial funds each year for mitigation activities that reduce or eliminate risk from natural hazards. The State of Minnesota has received millions of dollars in aid for mitigation activities.

Montevideo, Minnesota, has suffered repeated flooding in recent years. The community is situated at the intersection of the Minnesota and Chippewa rivers. .

There are several mitigation measures that can be employed to reduce the devastation of flood events. One in particular renders a permanent solution — acquisition. Property acquisition is one form of hazard mitigation. In a property acquisition project, the community buys private property, acquires its title, and then removes or relocates all structures on the land. By law, the land becomes public property and must forever remain open space. The community can use it to create public parks or wildlife refuges, but it can't sell the property to private individuals or develop it. Property acquisitions work the same way as any other real estate transaction. Property owners who want to sell their property are given fair market value. It is a good opportunity for people who live in or near hazard areas to move to safer ground. The community also benefits by reducing the number of residents in danger during flooding.

1.1 Purpose

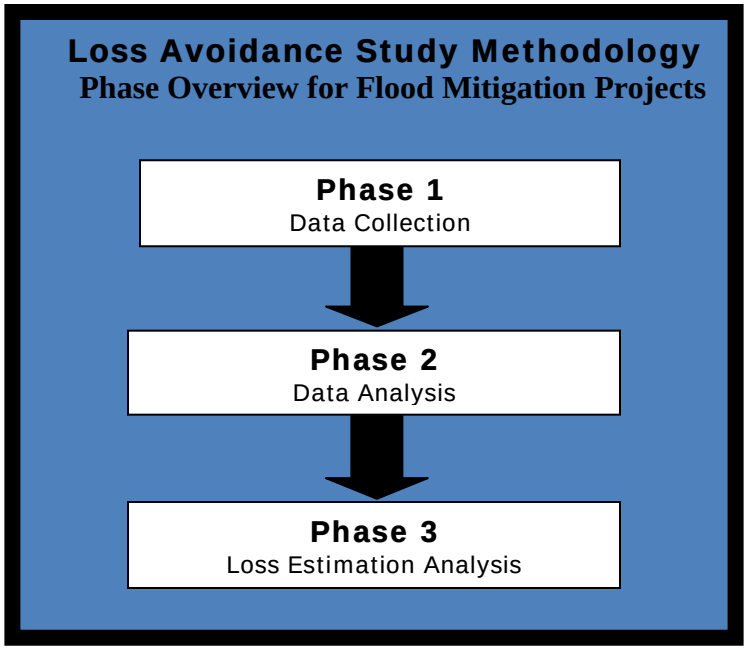
The State of Minnesota has invested millions of dollars to acquire flood-prone properties. How well is this mitigation initiative working? Can losses avoided be quantified as a direct result of implementing acquisition projects? This study seeks to provide the answers.

The scope of this study includes 48 acquisition properties in the City of Montevideo in Chippewa County, and funded through FEMA's Hazard Mitigation Grant Program (HMGP). The study provides comprehensive documentation of "losses avoided" (damages avoided or benefits) utilizing quantitative methods. It also describes a reproducible and verifiable methodology so that results are meaningful and defensible.

1.2 Methodology Overview

This study focused on the performance of acquisition projects and was divided into three phases: **Phase 1**: Data Collection, **Phase 2**: Data Analysis and **Phase 3**: Loss Estimation Analysis.

Figure 1.2.1



Phase 1: Data Collection includes the development of the initial project list. Projects were selected based on parameters established for the study. The selected projects were evaluated based on the availability of data. The final project list then proceeded to Phase 2.

Phase 2: Data Analysis includes multiple analyses to determine if there were measurable avoided losses since the projects' completion. To calculate the flood losses avoided due to acquisition projects in the City of Montevideo, it was essential to obtain pre-mitigation data on each structure to be evaluated. These data include:

- Location
- Building Value
- Contents Value

Phase 3: Loss Estimation Analysis involves analyzing each project for flood damage loss. Loss Estimation Analysis is the final phase of a loss avoidance study. It is conducted to estimate the effectiveness of the mitigation project by calculating the avoided losses. The Loss Estimation Analysis calculates the cost of damage associated with the damage analysis conducted in Phase 2 of the study.

This phase includes two major tasks:

1. Calculating Losses Avoided (LA)

   When calculating losses avoided (LA), the first step is to determine the dollar value estimate of the damage that *would* have occurred had the mitigation project not been executed.

2. Calculating Return On Investment (ROI)

   In determining the Return on Investment (ROI), losses avoided (LA) and project investments (PI) or acquisition costs are used. The formula used to calculate ROI is shown below.

$$\frac{\textbf{\$LA}\ \text{(Loss Avoided)}}{\textbf{\$PI}\ \text{(Project Investment or Acquisition Cost)}} \times 100 = \textbf{ROI}$$

Section 2: Project Selection

2.1 Data Collection (Initial Project Selection)

The first step is to determine the parameters of the study. These parameters may include hazard type, area of interest and project type.

Hazard Type

Projects may be chosen and screened based on hazard type. For this study, flooding is the hazard type.

Area of Interest

Depending on the study, the area of interest could vary from a community, a county, a region of a state, etc. The entity conducting the study should identify and define the area of interest prior to project selection. For this study, the City of Montevideo, Minnesota was chosen for its residential acquisitions.

Project type

Project selection may be based on project type. If flooding under study, the project type may be acquisitions, elevations or other mitigation projects. For this project, property acquisition is the project type.

2.2 Project Screening

The initial list of projects must be evaluated to determine if enough specific data and characteristics are available for the methodology being applied. If the data are not available, the project should be removed from the list.

There are three primary considerations for the project screening process: initial site visits, local preferences, and available information.

Initial Site Visit

A site visit should be done in order to conduct a preliminary assessment of the project and meet the local officials that have worked with the project and have the most knowledge of it. Conducting the detailed data collection for Phase 2 and 3 can also be done at this time. The visit may reveal a lack of data necessary to complete the project or other resources that may be available.

Local Preferences

FEMA works closely with state and local officials. These reports help inform local decision makers about the effectiveness of mitigation efforts they may be considering in their community. When developing these reports, the preferences of state and local officials is paramount as these reports are designed to inform their decision. To maximize their value, the local preferences are highly valued in project selection.

Available Information

Some of the projects selected initially may not have enough information in project files to proceed. FEMA and other contracting agencies have had different long-term data storage requirements since mitigation programs began. Some of the basic information such as the original funding application and financial reports are usually kept in FEMA files. Some of the more detailed information including design drawings and digital data are often not in the same files. Therefore, the person conducting the study may be required to use other resources such as local governments or contracting consultants to retrieve the information. If adequate information cannot be found, the list of possible projects may be reduced.

2.3 Final Project Selection

For this report, a listing of state projects was reviewed and the City of Montevideo was chosen. Montevideo has acquired a number of properties with FEMA mitigation funds over several years. Because the Montevideo area has been subject to repeated flooding, it is an ideal candidate for study. The repeated flooding provides several different events to evaluate the efficacy of mitigation efforts. Next, available information on the damage events since the buyout occurred, i.e. stream data/gauge information, National Climatic Data Center (NCDC) historical data, FEMA disaster declaration information, etc. was collected.

Montevideo was chosen based on the information that was available from local, state and FEMA offices. The final project list then proceeded to Phase 2, Data Analysis.

Section 3: Project Information

This section of the report provides background information on the acquisition project for Montevideo, Minnesota. Information for this section comes from the FEMA project files, the National Weather Service and the Minnesota Department of Public Safety and Emergency Management.

At the intersection of the Chippewa and Minnesota Rivers, the town of Montevideo, Minnesota has seen its share of floods. The city suffered major flooding in 1997 and 2001. With two rivers raging, the community is always at risk. In recent years, the community has been proactive in implementing urban flood control methods.

The community has worked closely with the State of Minnesota and FEMA to develop plans to reduce future flood damages. Central to these plans are the acquisition of properties in flood-prone areas. After Federal Disaster declaration DR-1175 in 1997, community officials developed plans for property acquisition. Since that flood event, the City of Montevideo, working in close partnership with state and federal officials, has acquired numerous flood-prone properties and converted the land into open space.

This study focuses the acquisition of 48 residential properties in the City of Montevideo. All of these properties were classified as Repetitive-Loss Properties (RLP) and FEMA's Hazard Mitigation Grant Program (HMGP) funds were used to purchase them. The majority of the properties were acquired in 1997 and 1998, with the remaining six purchased in 1999, 2000, and 2003. The City of Montevideo and the State of Minnesota have acquired additional properties through other, non-FEMA funding sources. These properties are not being evaluated by this study.

3.1 History

In the spring of 1997, heavy winter snow and ice accumulations and a rapid thaw in the spring resulted in historic flooding in Minnesota. The Minnesota River flooded the western portion of the state, flooding homes and businesses in a number of communities. Significant flooding has recurred almost every year since.

3.2 The Project (Montevideo acquisition)

Historic River Crest Data and Flood Impacts

Since the 1997 flooding, there have been ten significant flooding events in the Montevideo area. These historic crest events are shown in Table 3.2.1. This data is from the USGS stream gauge located southwest of the city center. The expected local flood impacts are shown in Table 3.2.2.

Table 3.2.1 Historical Crests for Chippewa River at Montevideo

Depth:	Date:	Flood Stage:
15.17	Apr. 14, 1998	Minor
11.71	May 18, 1999	Action
22.15	Apr. 14, 2001	Major
11.44	Apr. 11, 2002	Action
12.72	Jun. 25, 2005	Action
15.082	Apr. 08, 2006	Action
15.05	Apr. 05, 2007	Action
12.34	Jun. 26, 2008	Minor
18.27	Mar. 29, 2009	Major
20.68	March 23, 2010	Major

Source: National Weather Service

This report evaluates potential damages to acquired properties for these ten flood events.

Table 3.2.2 Flood Impacts in Montevideo, MN

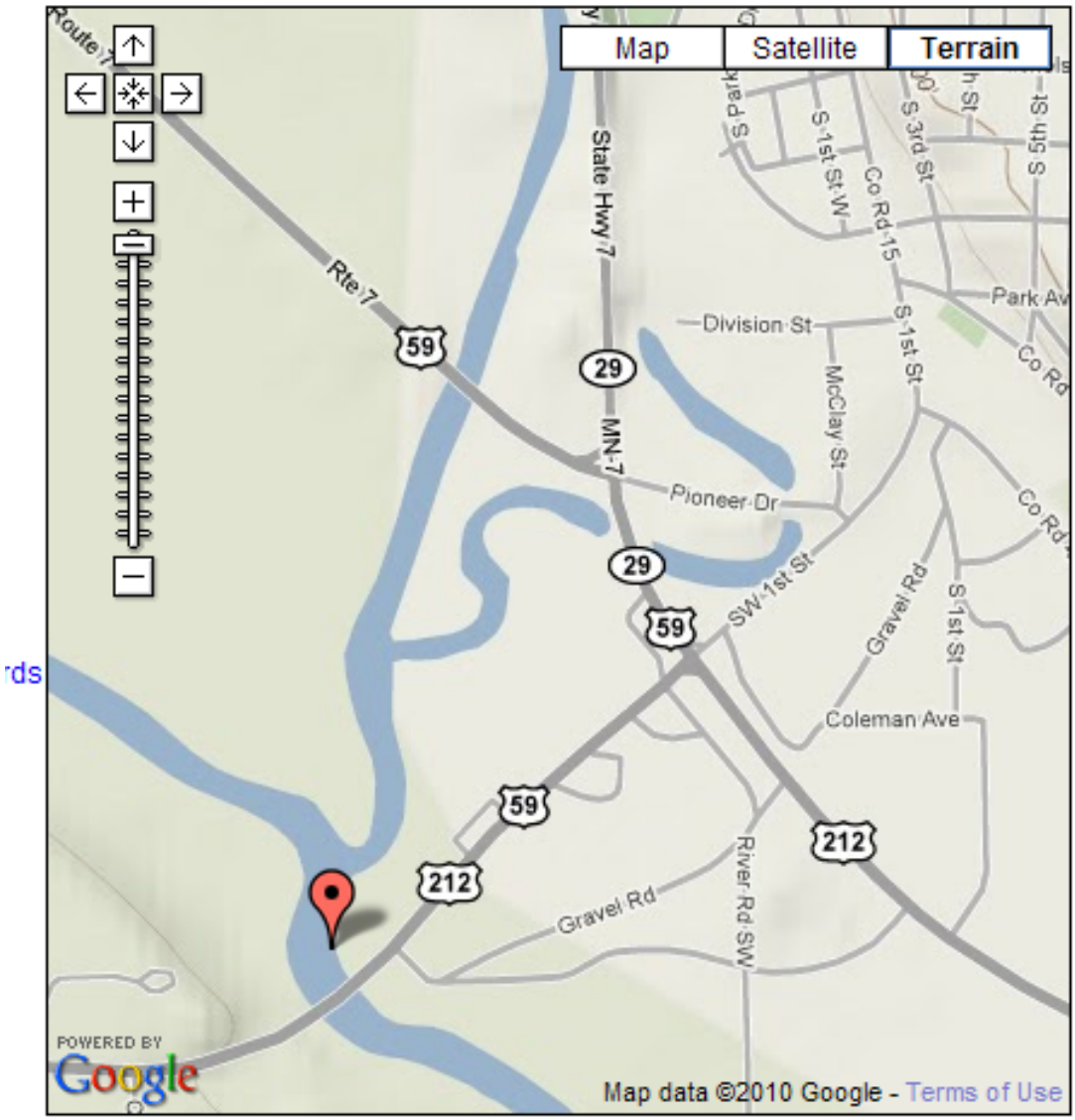
Crest -ft. (flood stages)	Impact:
23.1’	Low bridge steel elevation on the highway 59/212 bridge.
18’	Sanitary sewers begin to be affected at this level.
17.5’	Major flood stage.
17’	Storm sewers may need to be plugged to prevent water from backing up into streets.
16’	Moderate flood stage.
14’	Low lying areas and some roads along the river begin flooding along with some basements of houses along the river.
12’	Action stage.

Source: National Weather Service

Federal disaster aid provided to the state of Minnesota following flooding events includes a portion for disaster mitigation programs. These include programs designed to reduce or eliminate the impact of future events and may include programs such as flood proofing or acquisition.

Mitigation projects are driven by local preferences. FEMA partners with state and local officials to assist with project development and technical details. The City of Montevideo has developed a number of mitigation projects including property acquisition and applied for federal funding. FEMA awarded Montevideo’s acquisition projects and assisted the community with implementation.

Figure 3.2.1 USGS Stream Gauge location



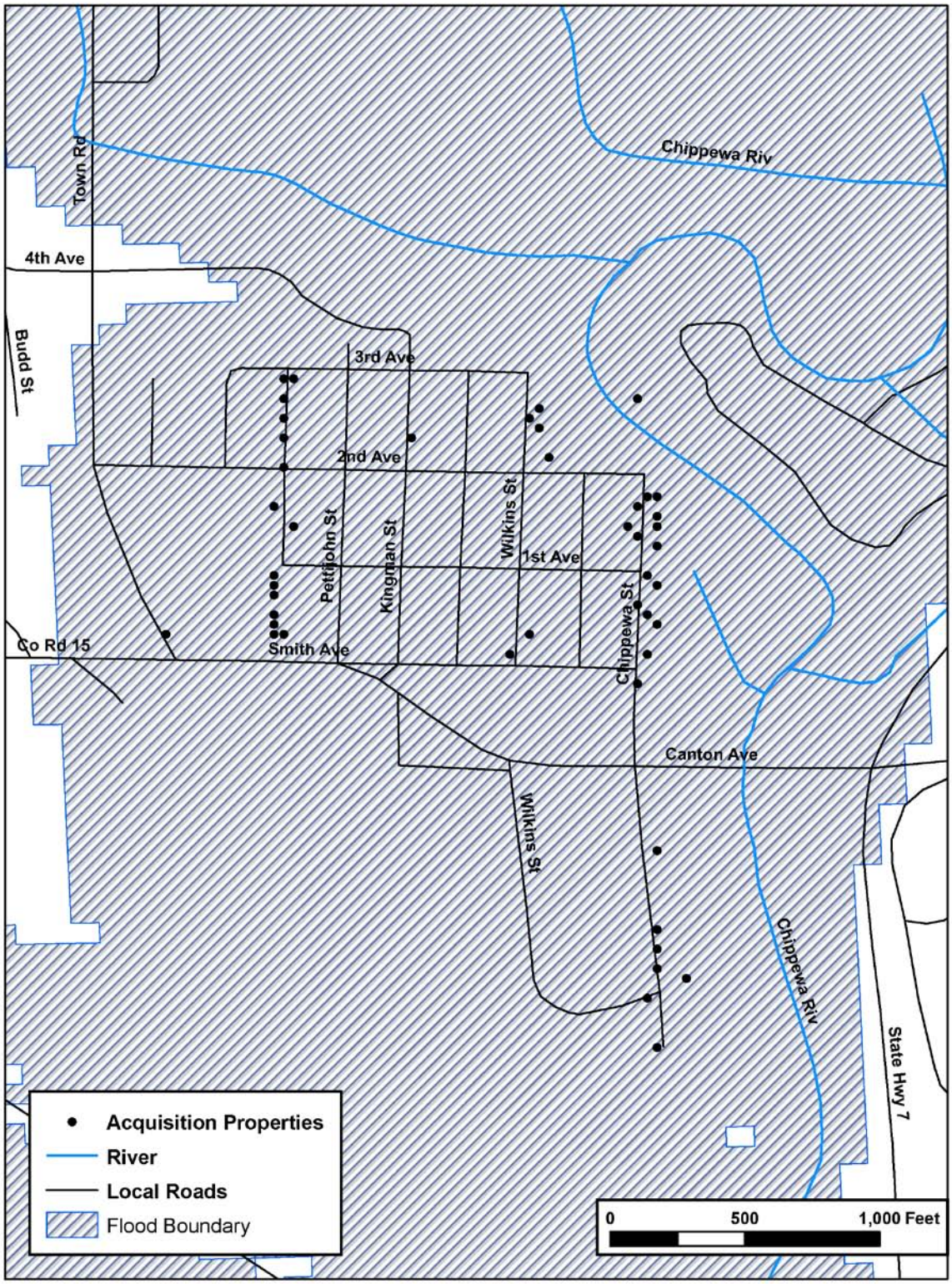
Legend

Gauge Location

Disclaimer

Latitude/Longitude Disclaimer: The gauge location shown in the above map is the approximate location based on the latitude/longitude coordinates provided to the NWS by the gauge owner.

Figure 3.2.2 Acquisition Properties in the Floodplain in Montevideo, MN



HAZUS-MH MR4 modeling was utilized to estimate potential damages to the acquisition properties involved in Montevideo. This methodology offers the most reasonable solution to accomplish loss estimation primarily because data from other sources such as benefit cost analysis (BCA) worksheets was not available. We can determine potential damage percentages to buildings by utilizing the capability of HAZUS to estimate losses based on the property's geographic location in relation to the floodplain and the depth of the flood water. Applying these percentages to the values assigned to the structure and contents provide an estimate of potential losses avoided.

The values represented in Table 3.2.3 will be used to calculate losses avoided for potential flooding events based on the top ten historical crests as detailed in Table 3.2.1. HAZUS modeling was completed for *each* of the ten flood event dates used in this report.

Table 3.2.3 Acquisition Properties: Addresses and Values (Montevideo, MN)

Property Address	Building Value	Content Value	Total Value
210 Chippewa Street	$71,000	$35,500	$106,500
524 Wilkins Street	$34,000	$17,000	$51,000
604 Pettijohn Street	$22,000	$11,000	$33,000
608 Chippewa Street	$25,000	$12,500	$37,500
522 Pettijohn Street	$19,500	$9,750	$29,250
523 Pettijohn Street	$57,000	$28,500	$85,500
623 Chippewa Street	$21,000	$10,500	$31,500
516 Pettijohn Street	$37,500	$18,750	$56,250
315 Chippewa Street	$36,500	$18,250	$54,750
504 Smith Avenue	$21,000	$10,500	$31,500
508 Chippewa Street	$33,000	$16,500	$49,500
515 Chippewa Street	$31,000	$15,500	$46,500
507 Chippewa Street	$25,000	$12,500	$37,500
511 Chippewa Street	$19,500	$9,750	$29,250
605 Chippewa Street	$46,500	$23,250	$69,750
512 Pettijohn Street	$9,000	$4,500	$13,500
701 Pettijohn Street	$33,500	$16,750	$50,250
610 Chippewa Street	$33,000	$16,500	$49,500
501 Pettijohn Street	$22,000	$11,000	$33,000
612 Smith Avenue	$28,000	$14,000	$42,000
227 Chippewa Street	$29,500	$14,750	$44,250
720 Wilkins Street	$37,500	$18,750	$56,250
704 Wilkins Street	$23,500	$11,750	$35,250
611 Pettijohn Street	$35,500	$17,750	$53,250
714 Wilkins Street	$72,000	$36,000	$108,000
612 Wilkins Street	$8,000	$4,000	$12,000
516 Chippewa Street	$26,500	$13,250	$39,750

Table 3.2.3 Acquisition Properties: Addresses and Values (Montevideo, MN)			
Property Address	**Building Value**	**Content Value**	**Total Value**
303 Chippewa Street	$38,000	$19,000	$57,000
520 Pettijohn Street	$13,500	$6,750	$20,250
715 Pettijohn Street	$31,000	$15,500	$46,500
723 Pettijohn Street	$45,000	$22,500	$67,500
617 Chippewa Street	$43,500	$21,750	$65,250
801 3rd Avenue	$84,000	$42,000	$126,000
620 Chippewa Street	$18,000	$9,000	$27,000
615 Chippewa Street	$72,000	$36,000	$108,000
612 Chippewa Street	$68,000	$34,000	$102,000
308 Chippewa Street	$48,500	$24,250	$72,750
322 Chippewa Street	$55,000	$27,500	$82,500
503 Pettijohn Street	$3,000	$1,500	$4,500
704 Pettijohn Street	$48,000	$24,000	$72,000
711 Wilkins Street	$26,000	$13,000	$39,000
519 Chippewa Street	$33,500	$16,750	$50,250
515 Wilkins Street	$37,700	$18,850	$56,550
724 Pettijohn Street	$30,000	$15,000	$45,000
415 Smith Avenue	$18,600	$9,300	$27,900
325 Chippewa Street	$32,500	$16,250	$48,750
623 Pettijohn Street	$12,000	$6,000	$18,000
707 Kingman Street	$23,000	$11,500	$34,500

Source: State of Minnesota and the City of Montevideo

The 48 properties involved in the acquisition project were in the floodway of the Red River. Data necessary for the analysis of the 48 properties was obtained from the State of Minnesota Department of Homeland Security and Emergency Management Agency and the City of Montevideo.

Table 3.2.4 represents the cumulative damage and projected return on investment results for all ten flood events for properties involved in the acquisition project. Additional costs such as displacement and disruption have not been calculated or applied in the analysis.

Table 3.2.4 Mitigation Investment and Loss Estimation *by Event*

Analysis Information			**Estimated Losses Avoided**				
Event Date	Buildings Included in Analysis	Buildings With Potential Losses Avoided	Building Damage	Content Damage	Total Loss Avoided	Project Investment	Projected ROI
April 14, 1998	24	24	$213,083	$136,024	$349,108	$486,244	72%
May 18, 1999	45	44	$443,124	$286,140	$729,264	$1,094,182	67%
April 14, 2001	47	46	$484,181	$312,614	$796,795	$1,109,316	72%
April 11, 2002	47	42	$491,836	$317,556	$809,393	$1,109,316	73%
June 25, 2005	48	47	$540,042	$349,012	$889,055	$1,123,145	79%
April 8, 2006	48	47	$557,463	$360,271	$917,734	$1,123,145	82%
April 5, 2007	48	47	$573,225	$370,457	$943,682	$1,123,145	84%
June 26, 2008	48	47	$607,033	$384,759	$991,791	$1,123,145	88%
March 29, 2009	48	47	$593,236	$383,390	$976,626	$1,123,145	87%
March 23, 2010	48	47	$601,714	$388,869	$990,583	$1,123,145	88%

Source: Minnesota Loss Avoidance Study - 2010

The following tables (Table 3.2.5 thru Table 3.2.14) show loss estimation for each historical crest represented in Table 3.2.1, beginning with the highest historical crest (22.15' on April 14, 2001) to the lowest (11.44'on April 11, 2002). All of the properties had completed the acquisition process and are included for each event. Not every property is assumed to have property damage during each flood event. However, since accurate elevation information was not available for the acquisition properties, HAZUS damage curves for a 100 year modeled event were applied to estimate potential losses. As one would expect, if the river crest were lower, fewer properties would be affected and fewer damages incurred. For the purposes of this report, all properties and events were evaluated using the same damage curves to estimate potential losses. This does represent a shortfall in the analysis as discussed later in the report.

Table 3.2.5 April 14, 2001 Flood Event (River Crest 22.15 ft.)

Street	Building Value	Content Value	HAZUS Building Damage %	HAZUS Contents Damage %	Building Damage Amount	Content Damage Amount	Total Losses Avoided	Project Investment
210 Chippewa Street	$78,343	$39,172	23%	28%	$18,019	$10,968	$28,987	$71,319
524 Wilkins Street	$37,517	$18,758	29%	37%	$10,880	$6,941	$17,820	$34,341
604 Pettijohn Street	$24,275	$12,138	29%	37%	$7,040	$4,491	$11,531	$22,327
608 Chippewa Street	$27,586	$13,793	29%	37%	$8,000	$5,103	$13,103	$18,291
522 Pettijohn Street	$21,517	$10,758	29%	37%	$6,240	$3,981	$10,220	$19,819
523 Pettijohn Street	$61,931	$30,965	30%	38%	$18,579	$11,767	$30,346	$9,296
623 Chippewa Street	$22,817	$11,408	29%	37%	$6,617	$4,221	$10,838	$21,319
516 Pettijohn Street	$40,744	$20,372	30%	38%	$12,223	$7,741	$19,964	$37,808
315 Chippewa Street	$39,657	$19,829	27%	36%	$10,707	$7,138	$17,846	$13,618
504 Smith Avenue	$22,817	$11,408	30%	38%	$6,845	$4,335	$11,180	$1,856
508 Chippewa Street	$35,855	$17,927	29%	37%	$10,398	$6,633	$17,031	$20,800
515 Chippewa Street	$33,682	$16,841	29%	37%	$9,768	$6,231	$15,999	$21,076
507 Chippewa Street	$27,163	$13,581	29%	37%	$7,877	$5,025	$12,902	$12,090
511 Chippewa Street	$21,187	$10,593	29%	37%	$6,144	$3,920	$10,064	$2,853
605 Chippewa Street	$50,522	$25,261	29%	37%	$14,651	$9,347	$23,998	$11,126
512 Pettijohn Street	$9,779	$4,889	30%	38%	$2,934	$1,858	$4,791	$9,314
701 Pettijohn Street	$36,398	$18,199	29%	37%	$10,555	$6,734	$17,289	$9,055
610 Chippewa Street	$35,855	$17,927	29%	37%	$10,398	$6,633	$17,031	$19,295
501 Pettijohn Street	$23,903	$11,952	29%	37%	$6,932	$4,422	$11,354	$2,802
612 Smith Avenue	$30,422	$15,211	29%	37%	$8,822	$5,628	$14,450	$28,261
227 Chippewa Street	$32,052	$16,026	25%	35%	$8,013	$5,609	$13,622	$29,682

Table 3.2.5 April 14, 2001 Flood Event (River Crest 22.15 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
720 Wilkins Street	$40,744	$20,372	28%	36%	$11,408	$7,334	$18,742	$37,779
704 Wilkins Street	$25,533	$12,766	27%	36%	$6,894	$4,596	$11,490	$23,765
611 Pettijohn Street	$38,571	$19,285	30%	37%	$11,571	$7,136	$18,707	$8,352
714 Wilkins Street	$78,228	$39,114	28%	36%	$21,904	$14,081	$35,985	$72,145
612 Wilkins Street	$8,692	$4,346	29%	37%	$2,521	$1,608	$4,129	$8,304
516 Chippewa Street	$28,792	$14,396	29%	37%	$8,350	$5,327	$13,676	$1,768
303 Chippewa Street	$41,287	$20,644	24%	32%	$9,909	$6,606	$16,515	$8,253
520 Pettijohn Street	$14,668	$7,334	30%	38%	$4,400	$2,787	$7,187	$13,733
715 Pettijohn Street	$33,682	$16,841	28%	36%	$9,431	$6,063	$15,494	$31,225
723 Pettijohn Street	$48,893	$24,446	45%	60%	$22,002	$14,668	$36,669	$44,978
617 Chippewa Street	$47,263	$23,631	29%	37%	$13,706	$8,744	$22,450	$18,203
801 3rd Avenue	$91,266	$45,633	26%	35%	$23,729	$15,972	$39,701	$84,372
620 Chippewa Street	$19,557	$9,779	29%	37%	$5,672	$3,618	$9,290	$5,330
615 Chippewa Street	$78,228	$39,114	29%	37%	$22,686	$14,472	$37,158	$66,670
612 Chippewa Street	$73,882	$36,941	29%	37%	$21,426	$13,668	$35,094	$31,825
308 Chippewa Street	$52,695	$26,348	25%	35%	$13,174	$9,222	$22,396	$13,513
322 Chippewa Street	$59,758	$29,879	26%	35%	$15,537	$10,458	$25,995	$12,641
503 Pettijohn Street	$3,260	$1,630	30%	38%	$978	$619	$1,597	$3,319
704 Pettijohn Street	$52,152	$26,076	0%	0%	$0	$0	$0	$48,377
711 Wilkins Street	$28,249	$14,125	28%	36%	$7,910	$5,085	$12,995	$26,351
519 Chippewa Street	$36,398	$18,199	29%	37%	$10,555	$6,734	$17,289	$33,819
515 Wilkins Street	$40,076	$20,038	29%	37%	$11,622	$7,414	$19,036	$38,000
724 Pettijohn Street	$31,891	$15,945	26%	35%	$8,292	$5,581	$13,872	$26,246
415 Smith Avenue	$19,772	$9,886	29%	37%	$5,734	$3,658	$9,392	$18,866
325 Chippewa Street	$34,548	$17,274	28%	36%	$9,674	$6,219	$15,892	$2,800
623 Pettijohn Street	$12,341	$6,171	28%	36%	$3,456	$2,221	$5,677	$12,334

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.6 March 23, 2010 Flood Event (River Crest 20.68 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
210 Chippewa Street	$96,261	$48,130	23%	28%	$22,140	$13,476	$35,616	$71,319
524 Wilkins Street	$46,097	$23,048	29%	37%	$13,368	$8,528	$21,896	$34,341
604 Pettijohn Street	$29,827	$14,914	29%	37%	$8,650	$5,518	$14,168	$22,327
608 Chippewa Street	$33,895	$16,947	29%	37%	$9,829	$6,270	$16,100	$18,291
522 Pettijohn Street	$26,438	$13,219	29%	37%	$7,667	$4,891	$12,558	$19,819
523 Pettijohn Street	$76,094	$38,047	30%	38%	$22,828	$14,458	$37,286	$9,296
623 Chippewa Street	$28,035	$14,017	29%	37%	$8,130	$5,186	$13,317	$21,319
516 Pettijohn Street	$50,062	$25,031	30%	38%	$15,019	$9,512	$24,530	$37,808
315 Chippewa Street	$48,727	$24,364	27%	36%	$13,156	$8,771	$21,927	$13,618
504 Smith Avenue	$28,035	$14,017	30%	38%	$8,410	$5,327	$13,737	$1,856
508 Chippewa Street	$44,055	$22,027	29%	37%	$12,776	$8,150	$20,926	$20,800
515 Chippewa Street	$41,385	$20,692	29%	37%	$12,002	$7,656	$19,658	$21,076
507 Chippewa Street	$33,375	$16,687	29%	37%	$9,679	$6,174	$15,853	$12,090
511 Chippewa Street	$26,032	$13,016	29%	37%	$7,549	$4,816	$12,365	$2,853
605 Chippewa Street	$62,077	$31,038	29%	37%	$18,002	$11,484	$29,487	$11,126
512 Pettijohn Street	$12,015	$6,007	30%	38%	$3,604	$2,283	$5,887	$9,314
701 Pettijohn Street	$44,722	$22,361	29%	37%	$12,969	$8,274	$21,243	$9,055
610 Chippewa Street	$44,055	$22,027	29%	37%	$12,776	$8,150	$20,926	$19,295
501 Pettijohn Street	$29,370	$14,685	29%	37%	$8,517	$5,433	$13,951	$2,802
612 Smith Avenue	$37,380	$18,690	29%	37%	$10,840	$6,915	$17,755	$28,261
227 Chippewa Street	$39,382	$19,691	25%	35%	$9,846	$6,892	$16,737	$29,682
720 Wilkins Street	$50,062	$25,031	28%	36%	$14,017	$9,011	$23,029	$37,779
704 Wilkins Street	$31,372	$15,686	27%	36%	$8,470	$5,647	$14,117	$23,765
611 Pettijohn Street	$47,392	$23,696	30%	37%	$14,218	$8,768	$22,985	$8,352
714 Wilkins Street	$96,119	$48,060	28%	36%	$26,913	$17,301	$44,215	$72,145
612 Wilkins Street	$10,680	$5,340	29%	37%	$3,097	$1,976	$5,073	$8,304
516 Chippewa Street	$35,377	$17,689	29%	37%	$10,259	$6,545	$16,804	$1,768
303 Chippewa Street	$50,730	$25,365	24%	32%	$12,175	$8,117	$20,292	$8,253
520 Pettijohn Street	$18,022	$9,011	30%	38%	$5,407	$3,424	$8,831	$13,733
715 Pettijohn Street	$41,385	$20,692	28%	36%	$11,588	$7,449	$19,037	$31,225
723 Pettijohn Street	$60,074	$30,037	45%	60%	$27,034	$18,022	$45,056	$44,978

Table 3.2.6 March 23, 2010 Flood Event (River Crest 20.68 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
617 Chippewa Street	$58,072	$29,036	29%	37%	$16,841	$10,743	$27,584	$18,203
801 3rd Avenue	$112,139	$56,069	26%	35%	$29,156	$19,624	$48,780	$84,372
620 Chippewa Street	$24,030	$12,015	29%	37%	$6,969	$4,446	$11,414	$5,330
615 Chippewa Street	$96,119	$48,060	29%	37%	$27,875	$17,782	$45,657	$66,670
612 Chippewa Street	$90,779	$45,390	29%	37%	$26,326	$16,794	$43,120	$31,825
308 Chippewa Street	$64,747	$32,373	25%	35%	$16,187	$11,331	$27,517	$13,513
322 Chippewa Street	$73,424	$36,712	26%	35%	$19,090	$12,849	$31,940	$12,641
503 Pettijohn Street	$4,005	$2,002	30%	38%	$1,201	$761	$1,962	$3,319
704 Pettijohn Street	$64,079	$32,040	0%	0%	$0	$0	$0	$48,377
711 Wilkins Street	$34,710	$17,355	28%	36%	$9,719	$6,248	$15,966	$26,351
519 Chippewa Street	$44,722	$22,361	29%	37%	$12,969	$8,274	$21,243	$33,819
515 Wilkins Street	$49,241	$24,621	29%	37%	$14,280	$9,110	$23,390	$38,000
724 Pettijohn Street	$39,184	$19,592	26%	35%	$10,188	$6,857	$17,045	$26,246
415 Smith Avenue	$24,294	$12,147	29%	37%	$7,045	$4,494	$11,540	$18,866
325 Chippewa Street	$42,450	$21,225	28%	36%	$11,886	$7,641	$19,527	$2,800
623 Pettijohn Street	$15,164	$7,582	28%	36%	$4,246	$2,730	$6,975	$12,334
707 Kingman Street	$27,200	$13,600	25%	35%	$6,800	$4,760	$11,560	$13,829

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.7 March 29, 2009 Flood Event (River Crest 18.27 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
210 Chippewa Street	$94,904	$47,452	23%	28%	$21,828	$13,287	$35,115	$71,319
524 Wilkins Street	$45,447	$22,724	29%	37%	$13,180	$8,408	$21,587	$34,341
604 Pettijohn Street	$29,407	$14,703	29%	37%	$8,528	$5,440	$13,968	$22,327
608 Chippewa Street	$33,417	$16,708	29%	37%	$9,691	$6,182	$15,873	$18,291
522 Pettijohn Street	$26,065	$13,033	29%	37%	$7,559	$4,822	$12,381	$19,819
523 Pettijohn Street	$75,022	$37,511	30%	38%	$22,507	$14,254	$36,761	$9,296
623 Chippewa Street	$27,640	$13,820	29%	37%	$8,016	$5,113	$13,129	$21,319
516 Pettijohn Street	$49,357	$24,678	30%	38%	$14,807	$9,378	$24,185	$37,808
315 Chippewa Street	$48,040	$24,020	27%	36%	$12,971	$8,647	$21,618	$13,618
504 Smith Avenue	$27,640	$13,820	30%	38%	$8,292	$5,252	$13,543	$1,856
508 Chippewa Street	$43,434	$21,717	29%	37%	$12,596	$8,035	$20,631	$20,800
515 Chippewa Street	$40,802	$20,401	29%	37%	$11,832	$7,548	$19,381	$21,076
507 Chippewa Street	$32,904	$16,452	29%	37%	$9,542	$6,087	$15,630	$12,090
511 Chippewa Street	$25,665	$12,833	29%	37%	$7,443	$4,748	$12,191	$2,853
605 Chippewa Street	$61,202	$30,601	29%	37%	$17,749	$11,322	$29,071	$11,126
512 Pettijohn Street	$11,846	$5,923	30%	38%	$3,554	$2,251	$5,804	$9,314
701 Pettijohn Street	$44,092	$22,046	29%	37%	$12,787	$8,157	$20,944	$9,055
610 Chippewa Street	$43,434	$21,717	29%	37%	$12,596	$8,035	$20,631	$19,295
501 Pettijohn Street	$28,956	$14,478	29%	37%	$8,397	$5,357	$13,754	$2,802
612 Smith Avenue	$36,853	$18,426	29%	37%	$10,687	$6,818	$17,505	$28,261
227 Chippewa Street	$38,827	$19,414	25%	35%	$9,707	$6,795	$16,502	$29,682
720 Wilkins Street	$49,357	$24,678	28%	36%	$13,820	$8,884	$22,704	$37,779
704 Wilkins Street	$30,930	$15,465	27%	36%	$8,351	$5,567	$13,919	$23,765
611 Pettijohn Street	$46,724	$23,362	30%	37%	$14,017	$8,644	$22,661	$8,352
714 Wilkins Street	$94,765	$47,382	28%	36%	$26,534	$17,058	$43,592	$72,145
612 Wilkins Street	$10,529	$5,265	29%	37%	$3,054	$1,948	$5,001	$8,304
516 Chippewa Street	$34,879	$17,439	29%	37%	$10,115	$6,453	$16,567	$1,768
303 Chippewa Street	$50,015	$25,007	24%	32%	$12,004	$8,002	$20,006	$8,253
520 Pettijohn Street	$17,768	$8,884	30%	38%	$5,331	$3,376	$8,707	$13,733
715 Pettijohn Street	$40,802	$20,401	28%	36%	$11,424	$7,344	$18,769	$31,225
723 Pettijohn Street	$59,228	$29,614	45%	60%	$26,653	$17,768	$44,421	$44,978

Table 3.2.7 March 29, 2009 Flood Event (River Crest 18.27 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
617 Chippewa Street	$57,254	$28,627	29%	37%	$16,604	$10,592	$27,196	$18,203
801 3rd Avenue	$110,559	$55,279	26%	35%	$28,745	$19,348	$48,093	$84,372
620 Chippewa Street	$23,691	$11,846	29%	37%	$6,870	$4,383	$11,253	$5,330
615 Chippewa Street	$94,765	$47,382	29%	37%	$27,482	$17,531	$45,013	$66,670
612 Chippewa Street	$89,500	$44,750	29%	37%	$25,955	$16,558	$42,513	$31,825
308 Chippewa Street	$63,835	$31,917	25%	35%	$15,959	$11,171	$27,130	$13,513
322 Chippewa Street	$72,390	$36,195	26%	35%	$18,821	$12,668	$31,490	$12,641
503 Pettijohn Street	$3,949	$1,974	30%	38%	$1,185	$750	$1,935	$3,319
704 Pettijohn Street	$63,177	$31,588	0%	0%	$0	$0	$0	$48,377
711 Wilkins Street	$34,221	$17,110	28%	36%	$9,582	$6,160	$15,741	$26,351
519 Chippewa Street	$44,092	$22,046	29%	37%	$12,787	$8,157	$20,944	$33,819
515 Wilkins Street	$48,548	$24,274	29%	37%	$14,079	$8,981	$23,060	$38,000
724 Pettijohn Street	$38,632	$19,316	26%	35%	$10,044	$6,761	$16,805	$26,246
415 Smith Avenue	$23,952	$11,976	29%	37%	$6,946	$4,431	$11,377	$18,866
325 Chippewa Street	$41,851	$20,926	28%	36%	$11,718	$7,533	$19,252	$2,800
623 Pettijohn Street	$14,950	$7,475	28%	36%	$4,186	$2,691	$6,877	$12,334
707 Kingman Street	$26,817	$13,409	25%	35%	$6,704	$4,693	$11,397	$13,829

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.8 April 14, 1998 Flood Event (River Crest 15.17 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
210 Chippewa Street	$72,106	$36,053	23%	28%	$16,584	$10,095	$26,679	$71,319
524 Wilkins Street	$34,530	$17,265	29%	37%	$10,014	$6,388	$16,402	$34,341
604 Pettijohn Street	$22,343	$11,171	29%	37%	$6,479	$4,133	$10,613	$22,327
608 Chippewa Street	$25,389	$12,695	29%	37%	$7,363	$4,697	$12,060	$18,291
522 Pettijohn Street	$19,804	$9,902	29%	37%	$5,743	$3,664	$9,407	$19,819
523 Pettijohn Street	$57,000	$28,500	30%	38%	$17,100	$10,830	$27,930	$9,296
623 Chippewa Street	$21,000	$10,500	29%	37%	$6,090	$3,885	$9,975	$21,319
516 Pettijohn Street	$37,500	$18,750	30%	38%	$11,250	$7,125	$18,375	$37,808
315 Chippewa Street	$36,500	$18,250	27%	36%	$9,855	$6,570	$16,425	$13,618
504 Smith Avenue	$21,000	$10,500	30%	38%	$6,300	$3,990	$10,290	$1,856
508 Chippewa Street	$33,000	$16,500	29%	37%	$9,570	$6,105	$15,675	$20,800
515 Chippewa Street	$31,000	$15,500	29%	37%	$8,990	$5,735	$14,725	$21,076
507 Chippewa Street	$25,000	$12,500	29%	37%	$7,250	$4,625	$11,875	$12,090
511 Chippewa Street	$19,500	$9,750	29%	37%	$5,655	$3,608	$9,263	$2,853
605 Chippewa Street	$46,500	$23,250	29%	37%	$13,485	$8,603	$22,088	$11,126
512 Pettijohn Street	$9,000	$4,500	30%	38%	$2,700	$1,710	$4,410	$9,314
701 Pettijohn Street	$33,500	$16,750	29%	37%	$9,715	$6,198	$15,913	$9,055
610 Chippewa Street	$33,000	$16,500	29%	37%	$9,570	$6,105	$15,675	$19,295
501 Pettijohn Street	$22,000	$11,000	29%	37%	$6,380	$4,070	$10,450	$2,802
612 Smith Avenue	$28,000	$14,000	29%	37%	$8,120	$5,180	$13,300	$28,261
227 Chippewa Street	$29,500	$14,750	25%	35%	$7,375	$5,163	$12,538	$29,682
720 Wilkins Street	$37,500	$18,750	28%	36%	$10,500	$6,750	$17,250	$37,779
704 Wilkins Street	$23,500	$11,750	27%	36%	$6,345	$4,230	$10,575	$23,765
611 Pettijohn Street	$35,500	$17,750	30%	37%	$10,650	$6,568	$17,218	$8,352

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.9 April 8, 2006 Flood Event (River Crest 15.082 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
210 Chippewa Street	$89,181	$44,591	23%	28%	$20,512	$12,485	$32,997	$71,319
524 Wilkins Street	$42,707	$21,353	29%	37%	$12,385	$7,901	$20,286	$34,341
604 Pettijohn Street	$27,634	$13,817	29%	37%	$8,014	$5,112	$13,126	$22,327
608 Chippewa Street	$31,402	$15,701	29%	37%	$9,107	$5,809	$14,916	$18,291
522 Pettijohn Street	$24,493	$12,247	29%	37%	$7,103	$4,531	$11,634	$19,819
523 Pettijohn Street	$70,498	$35,249	30%	38%	$21,149	$13,395	$34,544	$9,296
623 Chippewa Street	$25,973	$12,987	29%	37%	$7,532	$4,805	$12,337	$21,319
516 Pettijohn Street	$46,380	$23,190	30%	38%	$13,914	$8,812	$22,726	$37,808
315 Chippewa Street	$45,144	$22,572	27%	36%	$12,189	$8,126	$20,315	$13,618
504 Smith Avenue	$25,973	$12,987	30%	38%	$7,792	$4,935	$12,727	$1,856
508 Chippewa Street	$40,815	$20,407	29%	37%	$11,836	$7,551	$19,387	$20,800
515 Chippewa Street	$38,341	$19,171	29%	37%	$11,119	$7,093	$18,212	$21,076
507 Chippewa Street	$30,920	$15,460	29%	37%	$8,967	$5,720	$14,687	$12,090
511 Chippewa Street	$24,118	$12,059	29%	37%	$6,994	$4,462	$11,456	$2,853
605 Chippewa Street	$57,512	$28,756	29%	37%	$16,678	$10,640	$27,318	$11,126
512 Pettijohn Street	$11,131	$5,566	30%	38%	$3,339	$2,115	$5,454	$9,314
701 Pettijohn Street	$41,433	$20,717	29%	37%	$12,016	$7,665	$19,681	$9,055
610 Chippewa Street	$40,815	$20,407	29%	37%	$11,836	$7,551	$19,387	$19,295
501 Pettijohn Street	$27,210	$13,605	29%	37%	$7,891	$5,034	$12,925	$2,802
612 Smith Avenue	$34,631	$17,315	29%	37%	$10,043	$6,407	$16,450	$28,261
227 Chippewa Street	$36,486	$18,243	25%	35%	$9,121	$6,385	$15,507	$29,682
720 Wilkins Street	$46,380	$23,190	28%	36%	$12,987	$8,348	$21,335	$37,779
704 Wilkins Street	$29,065	$14,533	27%	36%	$7,848	$5,232	$13,079	$23,765
611 Pettijohn Street	$43,907	$21,953	30%	37%	$13,172	$8,123	$21,295	$8,352
714 Wilkins Street	$89,050	$44,525	28%	36%	$24,934	$16,029	$40,963	$72,145
612 Wilkins Street	$9,894	$4,947	29%	37%	$2,869	$1,830	$4,700	$8,304
516 Chippewa Street	$32,775	$16,388	29%	37%	$9,505	$6,063	$15,568	$1,768
303 Chippewa Street	$46,999	$23,499	24%	32%	$11,280	$7,520	$18,800	$8,253
520 Pettijohn Street	$16,697	$8,348	30%	38%	$5,009	$3,172	$8,181	$13,733
715 Pettijohn Street	$38,341	$19,171	28%	36%	$10,736	$6,901	$17,637	$31,225
723 Pettijohn Street	$55,656	$27,828	45%	60%	$25,045	$16,697	$41,742	$44,978

Table 3.2.9 April 8, 2006 Flood Event (River Crest 15.082 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
617 Chippewa Street	$53,801	$26,901	29%	37%	$15,602	$9,953	$25,556	$18,203
801 3rd Avenue	$103,892	$51,946	26%	35%	$27,012	$18,181	$45,193	$84,372
620 Chippewa Street	$22,263	$11,131	29%	37%	$6,456	$4,119	$10,575	$5,330
615 Chippewa Street	$89,050	$44,525	29%	37%	$25,825	$16,474	$42,299	$66,670
612 Chippewa Street	$84,103	$42,052	29%	37%	$24,390	$15,559	$39,949	$31,825
308 Chippewa Street	$59,985	$29,993	25%	35%	$14,996	$10,497	$25,494	$13,513
322 Chippewa Street	$68,025	$34,012	26%	35%	$17,686	$11,904	$29,591	$12,641
503 Pettijohn Street	$3,710	$1,855	30%	38%	$1,113	$705	$1,818	$3,319
704 Pettijohn Street	$59,367	$29,683	0%	0%	$0	$0	$0	$48,377
711 Wilkins Street	$32,157	$16,079	28%	36%	$9,004	$5,788	$14,792	$26,351
519 Chippewa Street	$41,433	$20,717	29%	37%	$12,016	$7,665	$19,681	$33,819
515 Wilkins Street	$45,620	$22,810	29%	37%	$13,230	$8,440	$21,670	$38,000
724 Pettijohn Street	$36,303	$18,151	26%	35%	$9,439	$6,353	$15,792	$26,246
415 Smith Avenue	$22,508	$11,254	29%	37%	$6,527	$4,164	$10,691	$18,866
325 Chippewa Street	$39,328	$19,664	28%	36%	$11,012	$7,079	$18,091	$2,800
623 Pettijohn Street	$14,049	$7,024	28%	36%	$3,934	$2,529	$6,462	$12,334
707 Kingman Street	$25,200	$12,600	25%	35%	$6,300	$4,410	$10,710	$13,829

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.10 April 5, 2007 Flood Event (River Crest 15.05ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
210 Chippewa Street	$91,703	$45,851	23%	28%	$21,092	$12,838	$33,930	$71,319
524 Wilkins Street	$43,914	$21,957	29%	37%	$12,735	$8,124	$20,859	$34,341
604 Pettijohn Street	$28,415	$14,207	29%	37%	$8,240	$5,257	$13,497	$22,327
608 Chippewa Street	$32,290	$16,145	29%	37%	$9,364	$5,974	$15,338	$18,291
522 Pettijohn Street	$25,186	$12,593	29%	37%	$7,304	$4,659	$11,963	$19,819
523 Pettijohn Street	$72,491	$36,246	30%	38%	$21,747	$13,773	$35,521	$9,296
623 Chippewa Street	$26,707	$13,354	29%	37%	$7,745	$4,941	$12,686	$21,319
516 Pettijohn Street	$47,692	$23,846	30%	38%	$14,308	$9,061	$23,369	$37,808
315 Chippewa Street	$46,420	$23,210	27%	36%	$12,533	$8,356	$20,889	$13,618
504 Smith Avenue	$26,707	$13,354	30%	38%	$8,012	$5,074	$13,087	$1,856
508 Chippewa Street	$41,969	$20,984	29%	37%	$12,171	$7,764	$19,935	$20,800
515 Chippewa Street	$39,425	$19,713	29%	37%	$11,433	$7,294	$18,727	$21,076
507 Chippewa Street	$31,794	$15,897	29%	37%	$9,220	$5,882	$15,102	$12,090
511 Chippewa Street	$24,800	$12,400	29%	37%	$7,192	$4,588	$11,780	$2,853
605 Chippewa Street	$59,138	$29,569	29%	37%	$17,150	$10,940	$28,090	$11,126
512 Pettijohn Street	$11,446	$5,723	30%	38%	$3,434	$2,175	$5,609	$9,314
701 Pettijohn Street	$42,605	$21,302	29%	37%	$12,355	$7,882	$20,237	$9,055
610 Chippewa Street	$41,969	$20,984	29%	37%	$12,171	$7,764	$19,935	$19,295
501 Pettijohn Street	$27,979	$13,990	29%	37%	$8,114	$5,176	$13,290	$2,802
612 Smith Avenue	$35,610	$17,805	29%	37%	$10,327	$6,588	$16,915	$28,261
227 Chippewa Street	$37,517	$18,759	25%	35%	$9,379	$6,566	$15,945	$29,682
720 Wilkins Street	$47,692	$23,846	28%	36%	$13,354	$8,585	$21,938	$37,779
704 Wilkins Street	$29,887	$14,943	27%	36%	$8,069	$5,380	$13,449	$23,765
611 Pettijohn Street	$45,148	$22,574	30%	37%	$13,544	$8,352	$21,897	$8,352
714 Wilkins Street	$91,568	$45,784	28%	36%	$25,639	$16,482	$42,121	$72,145
612 Wilkins Street	$10,174	$5,087	29%	37%	$2,951	$1,882	$4,833	$8,304
516 Chippewa Street	$33,702	$16,851	29%	37%	$9,774	$6,235	$16,009	$1,768
303 Chippewa Street	$48,328	$24,164	24%	32%	$11,599	$7,732	$19,331	$8,253
520 Pettijohn Street	$17,169	$8,585	30%	38%	$5,151	$3,262	$8,413	$13,733
715 Pettijohn Street	$39,425	$19,713	28%	36%	$11,039	$7,097	$18,136	$31,225
723 Pettijohn Street	$57,230	$28,615	45%	60%	$25,754	$17,169	$42,923	$44,978

Table 3.2.10 April 5, 2007 Flood Event (River Crest 15.05ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
617 Chippewa Street	$55,322	$27,661	29%	37%	$16,043	$10,235	$26,278	$18,203
801 3rd Avenue	$106,829	$53,415	26%	35%	$27,776	$18,695	$46,471	$84,372
620 Chippewa Street	$22,892	$11,446	29%	37%	$6,639	$4,235	$10,874	$5,330
615 Chippewa Street	$91,568	$45,784	29%	37%	$26,555	$16,940	$43,495	$66,670
612 Chippewa Street	$86,481	$43,240	29%	37%	$25,079	$15,999	$41,078	$31,825
308 Chippewa Street	$61,681	$30,841	25%	35%	$15,420	$10,794	$26,215	$13,513
322 Chippewa Street	$69,948	$34,974	26%	35%	$18,186	$12,241	$30,427	$12,641
503 Pettijohn Street	$3,815	$1,908	30%	38%	$1,145	$725	$1,870	$3,319
704 Pettijohn Street	$61,045	$30,523	0%	0%	$0	$0	$0	$48,377
711 Wilkins Street	$33,066	$16,533	28%	36%	$9,259	$5,952	$15,210	$26,351
519 Chippewa Street	$42,605	$21,302	29%	37%	$12,355	$7,882	$20,237	$33,819
515 Wilkins Street	$46,910	$23,455	29%	37%	$13,604	$8,678	$22,282	$38,000
724 Pettijohn Street	$37,329	$18,664	26%	35%	$9,706	$6,533	$16,238	$26,246
415 Smith Avenue	$23,144	$11,572	29%	37%	$6,712	$4,282	$10,993	$18,866
325 Chippewa Street	$40,440	$20,220	28%	36%	$11,323	$7,279	$18,602	$2,800
623 Pettijohn Street	$14,446	$7,223	28%	36%	$4,045	$2,600	$6,645	$12,334
707 Kingman Street	$25,913	$12,956	25%	35%	$6,478	$4,535	$11,013	$13,829

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.11 June 25, 2005 Flood Event (River Crest 12.72 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
210 Chippewa Street	$86,394	$43,197	23%	28%	$19,871	$12,095	$31,966	$71,319
524 Wilkins Street	$41,372	$20,686	29%	37%	$11,998	$7,654	$19,652	$34,341
604 Pettijohn Street	$26,770	$13,385	29%	37%	$7,763	$4,952	$12,716	$22,327
608 Chippewa Street	$30,421	$15,210	29%	37%	$8,822	$5,628	$14,450	$18,291
522 Pettijohn Street	$23,728	$11,864	29%	37%	$6,881	$4,390	$11,271	$19,819
523 Pettijohn Street	$68,295	$34,148	30%	38%	$20,489	$12,976	$33,465	$9,296
623 Chippewa Street	$25,161	$12,581	29%	37%	$7,297	$4,655	$11,952	$21,319
516 Pettijohn Street	$44,931	$22,465	30%	38%	$13,479	$8,537	$22,016	$37,808
315 Chippewa Street	$43,733	$21,866	27%	36%	$11,808	$7,872	$19,680	$13,618
504 Smith Avenue	$25,161	$12,581	30%	38%	$7,548	$4,781	$12,329	$1,856
508 Chippewa Street	$39,539	$19,770	29%	37%	$11,466	$7,315	$18,781	$20,800
515 Chippewa Street	$37,143	$18,571	29%	37%	$10,771	$6,871	$17,643	$21,076
507 Chippewa Street	$29,954	$14,977	29%	37%	$8,687	$5,541	$14,228	$12,090
511 Chippewa Street	$23,364	$11,682	29%	37%	$6,776	$4,322	$11,098	$2,853
605 Chippewa Street	$55,714	$27,857	29%	37%	$16,157	$10,307	$26,464	$11,126
512 Pettijohn Street	$10,783	$5,392	30%	38%	$3,235	$2,049	$5,284	$9,314
701 Pettijohn Street	$40,138	$20,069	29%	37%	$11,640	$7,426	$19,066	$9,055
610 Chippewa Street	$39,539	$19,770	29%	37%	$11,466	$7,315	$18,781	$19,295
501 Pettijohn Street	$26,360	$13,180	29%	37%	$7,644	$4,877	$12,521	$2,802
612 Smith Avenue	$33,548	$16,774	29%	37%	$9,729	$6,206	$15,936	$28,261
227 Chippewa Street	$35,346	$17,673	25%	35%	$8,836	$6,185	$15,022	$29,682
720 Wilkins Street	$44,931	$22,465	28%	36%	$12,581	$8,088	$20,668	$37,779
704 Wilkins Street	$28,157	$14,078	27%	36%	$7,602	$5,068	$12,671	$23,765
611 Pettijohn Street	$42,535	$21,267	30%	37%	$12,760	$7,869	$20,629	$8,352
714 Wilkins Street	$86,267	$43,134	28%	36%	$24,155	$15,528	$39,683	$72,145
612 Wilkins Street	$9,585	$4,793	29%	37%	$2,780	$1,773	$4,553	$8,304
516 Chippewa Street	$31,751	$15,876	29%	37%	$9,208	$5,874	$15,082	$1,768
303 Chippewa Street	$45,530	$22,765	24%	32%	$10,927	$7,285	$18,212	$8,253
520 Pettijohn Street	$16,175	$8,088	30%	38%	$4,853	$3,073	$7,926	$13,733
715 Pettijohn Street	$37,143	$18,571	28%	36%	$10,400	$6,686	$17,086	$31,225
723 Pettijohn Street	$53,917	$26,959	45%	60%	$24,263	$16,175	$40,438	$44,978

Table 3.2.11 June 25, 2005 Flood Event (River Crest 12.72 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
617 Chippewa Street	$52,120	$26,060	29%	37%	$15,115	$9,642	$24,757	$18,203
801 3rd Avenue	$100,645	$50,323	26%	35%	$26,168	$17,613	$43,781	$84,372
620 Chippewa Street	$21,567	$10,783	29%	37%	$6,254	$3,990	$10,244	$5,330
615 Chippewa Street	$86,267	$43,134	29%	37%	$25,018	$15,959	$40,977	$66,670
612 Chippewa Street	$81,475	$40,737	29%	37%	$23,628	$15,073	$38,701	$31,825
308 Chippewa Street	$58,111	$29,055	25%	35%	$14,528	$10,169	$24,697	$13,513
322 Chippewa Street	$65,899	$32,949	26%	35%	$17,134	$11,532	$28,666	$12,641
503 Pettijohn Street	$3,594	$1,797	30%	38%	$1,078	$683	$1,761	$3,319
704 Pettijohn Street	$57,512	$28,756	0%	0%	$0	$0	$0	$48,377
711 Wilkins Street	$31,152	$15,576	28%	36%	$8,723	$5,607	$14,330	$26,351
519 Chippewa Street	$40,138	$20,069	29%	37%	$11,640	$7,426	$19,066	$33,819
515 Wilkins Street	$44,195	$22,097	29%	37%	$12,816	$8,176	$20,992	$38,000
724 Pettijohn Street	$35,168	$17,584	26%	35%	$9,144	$6,154	$15,298	$26,246
415 Smith Avenue	$21,804	$10,902	29%	37%	$6,323	$4,034	$10,357	$18,866
325 Chippewa Street	$38,099	$19,049	28%	36%	$10,668	$6,858	$17,525	$2,800
623 Pettijohn Street	$13,610	$6,805	28%	36%	$3,811	$2,450	$6,260	$12,334
707 Kingman Street	$24,413	$12,206	25%	35%	$6,103	$4,272	$10,375	$13,829

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.12 June 26, 2008 Flood Event (River Crest 12.34 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
210 Chippewa Street	$95,243	$47,622	23%	28%	$21,906	$13,334	$35,240	$71,319
524 Wilkins Street	$45,609	$22,805	29%	37%	$13,227	$8,438	$21,664	$34,341
604 Pettijohn Street	$29,512	$14,756	29%	37%	$8,558	$5,460	$14,018	$22,327
608 Chippewa Street	$33,536	$16,768	29%	37%	$9,726	$6,204	$15,930	$18,291
522 Pettijohn Street	$26,158	$13,079	29%	37%	$7,586	$4,839	$12,425	$19,819
523 Pettijohn Street	$26,158	$37,645	30%	38%	$7,847	$14,305	$22,153	$9,296
623 Chippewa Street	$75,290	$13,869	29%	37%	$21,834	$5,132	$26,966	$21,319
516 Pettijohn Street	$27,738	$24,766	30%	38%	$8,322	$9,411	$17,733	$37,808
315 Chippewa Street	$49,533	$24,106	27%	36%	$13,374	$8,678	$22,052	$13,618
504 Smith Avenue	$48,212	$13,869	30%	38%	$14,464	$5,270	$19,734	$1,856
508 Chippewa Street	$27,738	$21,794	29%	37%	$8,044	$8,064	$16,108	$20,800
515 Chippewa Street	$43,589	$20,474	29%	37%	$12,641	$7,575	$20,216	$21,076
507 Chippewa Street	$40,947	$16,511	29%	37%	$11,875	$6,109	$17,984	$12,090
511 Chippewa Street	$33,022	$12,879	29%	37%	$9,576	$4,765	$14,341	$2,853
605 Chippewa Street	$25,757	$30,710	29%	37%	$7,470	$11,363	$18,832	$11,126
512 Pettijohn Street	$61,421	$5,944	30%	38%	$18,426	$2,259	$20,685	$9,314
701 Pettijohn Street	$11,888	$22,125	29%	37%	$3,447	$8,186	$11,634	$9,055
610 Chippewa Street	$44,249	$21,794	29%	37%	$12,832	$8,064	$20,896	$19,295
501 Pettijohn Street	$43,589	$14,530	29%	37%	$12,641	$5,376	$18,017	$2,802
612 Smith Avenue	$29,059	$18,492	29%	37%	$8,427	$6,842	$15,269	$28,261
227 Chippewa Street	$36,985	$19,483	25%	35%	$9,246	$6,819	$16,065	$29,682
720 Wilkins Street	$38,966	$24,766	28%	36%	$10,910	$8,916	$19,826	$37,779
704 Wilkins Street	$49,533	$15,520	27%	36%	$13,374	$5,587	$18,961	$23,765
611 Pettijohn Street	$31,041	$23,446	30%	37%	$9,312	$8,675	$17,987	$8,352
714 Wilkins Street	$46,891	$47,552	28%	36%	$13,130	$17,119	$30,248	$72,145
612 Wilkins Street	$95,103	$5,284	29%	37%	$27,580	$1,955	$29,535	$8,304
516 Chippewa Street	$10,567	$17,502	29%	37%	$3,064	$6,476	$9,540	$1,768
303 Chippewa Street	$35,003	$25,097	24%	32%	$8,401	$8,031	$16,432	$8,253
520 Pettijohn Street	$50,193	$8,916	30%	38%	$15,058	$3,388	$18,446	$13,733
715 Pettijohn Street	$17,832	$20,474	28%	36%	$4,993	$7,370	$12,363	$31,225
723 Pettijohn Street	$40,947	$29,720	45%	60%	$18,426	$17,832	$36,258	$44,978

Table 3.2.12 June 26, 2008 Flood Event (River Crest 12.34 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
617 Chippewa Street	$59,439	$28,729	29%	37%	$17,237	$10,630	$27,867	$18,203
801 3rd Avenue	$57,458	$55,477	26%	35%	$14,939	$19,417	$34,356	$84,372
620 Chippewa Street	$110,954	$11,888	29%	37%	$32,177	$4,399	$36,575	$5,330
615 Chippewa Street	$23,776	$47,552	29%	37%	$6,895	$17,594	$24,489	$66,670
612 Chippewa Street	$95,103	$44,910	29%	37%	$27,580	$16,617	$44,197	$31,825
308 Chippewa Street	$89,820	$32,031	25%	35%	$22,455	$11,211	$33,666	$13,513
322 Chippewa Street	$64,063	$36,324	26%	35%	$16,656	$12,713	$29,370	$12,641
503 Pettijohn Street	$72,648	$1,981	30%	38%	$21,794	$753	$22,547	$3,319
704 Pettijohn Street	$3,963	$31,701	0%	0%	$0	$0	$0	$48,377
711 Wilkins Street	$63,402	$17,171	28%	36%	$17,753	$6,182	$23,934	$26,351
519 Chippewa Street	$34,343	$22,125	29%	37%	$9,959	$8,186	$18,146	$33,819
515 Wilkins Street	$48,721	$24,361	29%	37%	$14,129	$9,013	$23,142	$38,000
724 Pettijohn Street	$38,770	$19,385	26%	35%	$10,080	$6,785	$16,865	$26,246
415 Smith Avenue	$24,037	$12,019	29%	37%	$6,971	$4,447	$11,418	$18,866
325 Chippewa Street	$42,001	$21,000	28%	36%	$11,760	$7,560	$19,320	$2,800
623 Pettijohn Street	$15,004	$7,502	28%	36%	$4,201	$2,701	$6,902	$12,334
707 Kingman Street	$26,913	$13,456	25%	35%	$6,728	$4,710	$11,438	$13,829

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.13 May 18, 1999 Flood Event (River Crest 11.71 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
210 Chippewa Street	$73,698	$36,849	23%	28%	$16,951	$10,318	$27,268	$71,319
524 Wilkins Street	$35,292	$17,646	29%	37%	$10,235	$6,529	$16,764	$34,341
604 Pettijohn Street	$22,836	$11,418	29%	37%	$6,622	$4,225	$10,847	$22,327
608 Chippewa Street	$25,950	$12,975	29%	37%	$7,526	$4,801	$12,326	$18,291
522 Pettijohn Street	$20,241	$10,121	29%	37%	$5,870	$3,745	$9,615	$19,819
523 Pettijohn Street	$58,259	$29,129	30%	38%	$17,478	$11,069	$28,547	$9,296
623 Chippewa Street	$21,464	$10,732	29%	37%	$6,225	$3,971	$10,195	$21,319
516 Pettijohn Street	$38,328	$19,164	30%	38%	$11,498	$7,282	$18,781	$37,808
315 Chippewa Street	$37,306	$18,653	27%	36%	$10,073	$6,715	$16,788	$13,618
504 Smith Avenue	$21,464	$10,732	30%	38%	$6,439	$4,078	$10,517	$1,856
508 Chippewa Street	$33,729	$16,864	29%	37%	$9,781	$6,240	$16,021	$20,800
515 Chippewa Street	$31,685	$15,842	29%	37%	$9,189	$5,862	$15,050	$21,076
507 Chippewa Street	$25,552	$12,776	29%	37%	$7,410	$4,727	$12,137	$12,090
511 Chippewa Street	$19,931	$9,965	29%	37%	$5,780	$3,687	$9,467	$2,853
605 Chippewa Street	$47,527	$23,763	29%	37%	$13,783	$8,792	$22,575	$11,126
512 Pettijohn Street	$9,199	$4,599	30%	38%	$2,760	$1,748	$4,507	$9,314
701 Pettijohn Street	$34,240	$17,120	29%	37%	$9,930	$6,334	$16,264	$9,055
610 Chippewa Street	$33,729	$16,864	29%	37%	$9,781	$6,240	$16,021	$19,295
501 Pettijohn Street	$22,486	$11,243	29%	37%	$6,521	$4,160	$10,681	$2,802
612 Smith Avenue	$28,618	$14,309	29%	37%	$8,299	$5,294	$13,594	$28,261
227 Chippewa Street	$30,152	$15,076	25%	35%	$7,538	$5,277	$12,814	$29,682
720 Wilkins Street	$38,328	$19,164	28%	36%	$10,732	$6,899	$17,631	$37,779
704 Wilkins Street	$24,019	$12,010	27%	36%	$6,485	$4,323	$10,809	$23,765
611 Pettijohn Street	$36,284	$18,142	30%	37%	$10,885	$6,713	$17,598	$8,352
714 Wilkins Street	$73,590	$36,795	28%	36%	$20,605	$13,246	$33,851	$72,145
612 Wilkins Street	$8,177	$4,088	29%	37%	$2,371	$1,513	$3,884	$8,304
516 Chippewa Street	$27,085	$13,543	29%	37%	$7,855	$5,011	$12,866	$1,768
303 Chippewa Street	$38,839	$19,420	24%	32%	$9,321	$6,214	$15,536	$8,253
520 Pettijohn Street	$13,798	$6,899	30%	38%	$4,139	$2,622	$6,761	$13,733
715 Pettijohn Street	$31,685	$15,842	28%	36%	$8,872	$5,703	$14,575	$31,225
723 Pettijohn Street	$45,994	$22,997	45%	60%	$20,697	$13,798	$34,495	$44,978

Table 3.2.13 May 18, 1999 Flood Event (River Crest 11.71 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
617 Chippewa Street	$44,461	$22,230	29%	37%	$12,894	$8,225	$21,119	$18,203
801 3rd Avenue	$85,855	$42,928	26%	35%	$22,322	$15,025	$37,347	$84,372
620 Chippewa Street	$18,398	$9,199	29%	37%	$5,335	$3,404	$8,739	$5,330
615 Chippewa Street	$73,590	$36,795	29%	37%	$21,341	$13,614	$34,955	$66,670
612 Chippewa Street	$69,502	$34,751	29%	37%	$20,156	$12,858	$33,013	$31,825
308 Chippewa Street	$49,571	$24,786	25%	35%	$12,393	$8,675	$21,068	$13,513
322 Chippewa Street	$56,215	$28,107	26%	35%	$14,616	$9,838	$24,453	$12,641
503 Pettijohn Street	$3,066	$1,533	30%	38%	$920	$583	$1,502	$3,319
704 Pettijohn Street	$49,060	$24,530	0%	0%	$0	$0	$0	$48,377
711 Wilkins Street	$26,574	$13,287	28%	36%	$7,441	$4,783	$12,224	$26,351
519 Chippewa Street	$34,240	$17,120	29%	37%	$9,930	$6,334	$16,264	$33,819
515 Wilkins Street	$37,700	$18,850	29%	37%	$10,933	$6,975	$17,908	$38,000
724 Pettijohn Street	$30,000	$15,000	26%	35%	$7,800	$5,250	$13,050	$26,246
415 Smith Avenue	$18,600	$9,300	29%	37%	$5,394	$3,441	$8,835	$18,866

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.14 April 11, 2002 Flood Event (River Crest 11.44 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
210 Chippewa Street	$79,582	$39,791	23%	28%	$18,304	$11,141	$29,445	$71,319
524 Wilkins Street	$38,110	$19,055	29%	37%	$11,052	$7,050	$18,102	$34,341
604 Pettijohn Street	$24,659	$12,330	29%	37%	$7,151	$4,562	$11,713	$22,327
608 Chippewa Street	$28,022	$14,011	29%	37%	$8,126	$5,184	$13,310	$18,291
522 Pettijohn Street	$21,857	$10,929	29%	37%	$6,339	$4,044	$10,382	$19,819
523 Pettijohn Street	$62,910	$31,455	30%	38%	$18,873	$11,953	$30,826	$9,296
623 Chippewa Street	$23,177	$11,589	29%	37%	$6,721	$4,288	$11,009	$21,319
516 Pettijohn Street	$41,388	$20,694	30%	38%	$12,416	$7,864	$20,280	$37,808
315 Chippewa Street	$40,284	$20,142	27%	36%	$10,877	$7,251	$18,128	$13,618
504 Smith Avenue	$23,177	$11,589	30%	38%	$6,953	$4,404	$11,357	$1,856
508 Chippewa Street	$36,421	$18,211	29%	37%	$10,562	$6,738	$17,300	$20,800
515 Chippewa Street	$34,214	$17,107	29%	37%	$9,922	$6,330	$16,252	$21,076
507 Chippewa Street	$27,592	$13,796	29%	37%	$8,002	$5,105	$13,106	$12,090
511 Chippewa Street	$21,522	$10,761	29%	37%	$6,241	$3,982	$10,223	$2,853
605 Chippewa Street	$51,321	$25,661	29%	37%	$14,883	$9,494	$24,378	$11,126
512 Pettijohn Street	$9,933	$4,967	30%	38%	$2,980	$1,887	$4,867	$9,314
701 Pettijohn Street	$36,973	$18,487	29%	37%	$10,722	$6,840	$17,562	$9,055
610 Chippewa Street	$36,421	$18,211	29%	37%	$10,562	$6,738	$17,300	$19,295
501 Pettijohn Street	$24,281	$12,140	29%	37%	$7,041	$4,492	$11,533	$2,802
612 Smith Avenue	$30,903	$15,452	29%	37%	$8,962	$5,717	$14,679	$28,261
227 Chippewa Street	$32,559	$16,279	25%	35%	$8,140	$5,698	$13,837	$29,682
720 Wilkins Street	$41,388	$20,694	28%	36%	$11,589	$7,450	$19,038	$37,779
704 Wilkins Street	$25,937	$12,968	27%	36%	$7,003	$4,669	$11,671	$23,765
611 Pettijohn Street	$39,181	$19,590	30%	37%	$11,754	$7,248	$19,003	$8,352
714 Wilkins Street	$79,465	$39,733	28%	36%	$22,250	$14,304	$36,554	$72,145
612 Wilkins Street	$8,829	$4,415	29%	37%	$2,561	$1,633	$4,194	$8,304
516 Chippewa Street	$29,248	$14,624	29%	37%	$8,482	$5,411	$13,893	$1,768
303 Chippewa Street	$41,940	$20,970	24%	32%	$10,066	$6,710	$16,776	$8,253
520 Pettijohn Street	$14,900	$7,450	30%	38%	$4,470	$2,831	$7,301	$13,733
715 Pettijohn Street	$34,214	$17,107	28%	36%	$9,580	$6,159	$15,738	$31,225
723 Pettijohn Street	$49,666	$24,833	45%	60%	$22,350	$14,900	$37,249	$44,978

Table 3.2.14 April 11, 2002 Flood Event (River Crest 11.44 ft.)								
Street	**Building Value**	**Content Value**	**HAZUS Building Damage %**	**HAZUS Contents Damage %**	**Building Damage Amount**	**Content Damage Amount**	**Total Losses Avoided**	**Project Investment**
617 Chippewa Street	$48,010	$24,005	29%	37%	$13,923	$8,882	$22,805	$18,203
801 3rd Avenue	$92,709	$46,355	26%	35%	$24,104	$16,224	$40,329	$84,372
620 Chippewa Street	$19,866	$9,933	29%	37%	$5,761	$3,675	$9,436	$5,330
615 Chippewa Street	$79,465	$39,733	29%	37%	$23,045	$14,701	$37,746	$66,670
612 Chippewa Street	$75,050	$37,525	29%	37%	$21,765	$13,884	$35,649	$31,825
308 Chippewa Street	$53,529	$26,764	25%	35%	$13,382	$9,367	$22,750	$13,513
322 Chippewa Street	$60,702	$30,351	26%	35%	$15,783	$10,623	$26,406	$12,641
503 Pettijohn Street	$3,311	$1,656	30%	38%	$993	$629	$1,622	$3,319
704 Pettijohn Street	$52,977	$26,488	0%	0%	$0	$0	$0	$48,377
711 Wilkins Street	$28,696	$14,348	28%	36%	$8,035	$5,165	$13,200	$26,351
519 Chippewa Street	$36,973	$18,487	29%	37%	$10,722	$6,840	$17,562	$33,819
515 Wilkins Street	$40,710	$20,355	29%	37%	$11,806	$7,531	$19,337	$38,000
724 Pettijohn Street	$32,395	$16,197	26%	35%	$8,423	$5,669	$14,092	$26,246
415 Smith Avenue	$20,085	$10,042	29%	37%	$5,825	$3,716	$9,540	$18,866
325 Chippewa Street	$35,095	$17,547	28%	36%	$9,826	$6,317	$16,143	$2,800
623 Pettijohn Street	$12,537	$6,268	28%	36%	$3,510	$2,257	$5,767	$12,334

Source: FEMA- HAZUS-MH MR4 Modeling
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties.
All values have been adjusted for inflation

Table 3.2.15 represents potential return on investment based on the cumulative results of the damage estimates for each event.

Table 3.2.15 Cumulative Results Through 10 Events			
Street	**Total Losses Avoided**	**Project Investment**	**ROI**
210 Chippewa Street	$317,244	$71,319	445%
524 Wilkins Street	$195,032	$34,341	568%
604 Pettijohn Street	$126,197	$22,327	565%
608 Chippewa Street	$143,406	$18,291	784%
522 Pettijohn Street	$111,857	$19,819	564%
523 Pettijohn Street	$317,378	$9,296	3414%
623 Chippewa Street	$132,403	$21,319	621%
516 Pettijohn Street	$211,960	$37,808	561%
315 Chippewa Street	$195,667	$13,618	1437%
504 Smith Avenue	$128,501	$1,856	6924%
508 Chippewa Street	$181,796	$20,800	874%
515 Chippewa Street	$175,862	$21,076	834%
507 Chippewa Street	$143,505	$12,090	1187%
511 Chippewa Street	$112,248	$2,853	3934%
605 Chippewa Street	$252,301	$11,126	2268%
512 Pettijohn Street	$67,299	$9,314	723%
701 Pettijohn Street	$179,832	$9,055	1986%
610 Chippewa Street	$186,584	$19,295	967%
501 Pettijohn Street	$128,475	$2,802	4585%
612 Smith Avenue	$155,853	$28,261	551%
227 Chippewa Street	$148,589	$29,682	501%
720 Wilkins Street	$202,162	$37,779	535%
704 Wilkins Street	$130,741	$23,765	550%
611 Pettijohn Street	$199,979	$8,352	2394%
714 Wilkins Street	$347,213	$72,145	481%
612 Wilkins Street	$65,902	$8,304	794%
516 Chippewa Street	$130,005	$1,768	7353%
303 Chippewa Street	$161,899	$8,253	1962%
520 Pettijohn Street	$81,753	$13,733	595%
715 Pettijohn Street	$148,834	$31,225	477%
723 Pettijohn Street	$359,252	$44,978	799%
617 Chippewa Street	$225,611	$18,203	1239%
801 3rd Avenue	$384,051	$84,372	455%
620 Chippewa Street	$118,400	$5,330	2221%
615 Chippewa Street	$351,789	$66,670	528%
612 Chippewa Street	$353,313	$31,825	1110%
308 Chippewa Street	$230,931	$13,513	1709%
322 Chippewa Street	$258,336	$12,641	2044%
503 Pettijohn Street	$36,616	$3,319	1103%
704 Pettijohn Street	$0	$48,377	0%
711 Wilkins Street	$138,394	$26,351	525%
519 Chippewa Street	$170,431	$33,819	504%
515 Wilkins Street	$190,817	$38,000	502%

Table 3.2.15 Cumulative Results Through 10 Events			
Street	**Total Losses Avoided**	**Project Investment**	**ROI**
724 Pettijohn Street	$139,057	$26,246	530%
415 Smith Avenue	$94,143	$18,866	499%
325 Chippewa Street	$144,353	$2,800	5155%
623 Pettijohn Street	$51,566	$12,334	418%
707 Kingman Street	$66,494	$13,829	481%
Totals	**$8,394,030**	**$1,123,145**	**747%**

Property Information Source: State of Minnesota; City of Montevideo, MN
HAZUS-MH MR4 Data Source: FEMA HAZUS-MH MR4 100 Year Flood Model for identified properties
All values have been adjusted for inflation

Return on investment was calculated using the following formula:

Return on Investment (ROI)

$$\frac{\$8{,}394{,}030 \quad \$LA \text{ (Loss Avoided)}}{\$1{,}123{,}145 \quad \$PI \text{ (Project Investment)}} \times 100 = 747\% \text{ (ROI)}$$

Data Shortfalls:
For all acquisition projects identifying the correct elevations, (first floor, base flood, and event elevations) is a critical concern. For the Montevideo acquisition project these data were not available in their entirety. While the actual river elevation was established through the use of river gauge data, the first floor elevations were not available. As well, these could not be determined after the fact since the properties were removed after acquisition. Base flood elevations were established using HAZUS modeling and the flood boundaries obtained through the FEMA Map Service Center. It is important to understand however that HAZUS is a modeling tool and results generated in HAZUS are projections using best information available.

Conclusion:
In reviewing the HAZUS data for the ten flood events, the resulting potential for losses avoided is significant. When viewed in the context of ***when*** the next event does happen, there is no question that there will be significant losses avoided as a result of this acquisition project. And, as time goes by, the return on investment will only continue to grow with each future damage event.

It is clear that the most effective mitigation programs are those that remove properties from the flood plain. These projects in the City of Montevideo demonstrate numerous positive outcomes. The affected residents in the community no longer suffer flooding in their homes, and for Chippewa County and the State of Minnesota, acquisition projects prove to be extremely cost effective over the lifetime of the project.

Section 4: Loss Estimation Analysis

The Loss Estimation Analysis is the final phase of a loss avoidance study. This is conducted to estimate the avoided losses based on the effectiveness of the mitigation project during the storm event of interest. The Loss Estimation Analysis is accomplished by calculating the damage (in dollars) associated with the damage analysis reported in Section Two. This section briefly reviews the procedures used in determining the success of the mitigation effort set forth in this study. It includes two major tasks:

(1) Calculating Losses Avoided (LA)
(2) Calculating Return On Investment (ROI)

Calculating Losses Avoided

The losses avoided analysis determines the dollar value estimate of the damage that *may* have occurred had the mitigation project not been executed and the damage that *could* occur after the project was executed. The losses avoided (in dollars) were calculated by subtracting the mitigation completed from the estimated mitigation, absent damages. The end result of the loss calculation was an estimated loss value for the event that actually occurred. The losses were calculated in present-day values.

Calculating Return on Investment

The final task in determining losses avoided is to calculate the ROI. The methodology and results may vary depending upon the number of events being analyzed for each mitigation project and the level of damage sustained during each impacting event.

The Project Investment (PI) represents total project investment for the mitigation projects being evaluated. Project investment captures the resource investment from all parties including state, county and community, and not simply the federal contribution. It does not include work conducted outside of the mitigation projects. The upper portion of the equation (LA) is the total losses avoided. Multiple events are being evaluated for each mitigation project. The LA represents the total losses for all the storm events evaluated. Therefore, the ROI represents the return on investment for the project over ten storm events.

Table 4.1 illustrates the Return on Investment for all of the mitigation acquisition projects over the ten historic flood events.

Table 4.1 Return on Mitigation Investment			
Project:	**Losses Avoided:**	**Project Investment:**	**Return on Investment:**
City of Montevideo acquisitions (48)	**$8,394,030**	**$1,123,145**	**747%**

The cumulative ROI for all of the Montevideo acquisition properties (48) over ten flood stage events is estimated to be 747%. As major flood events occur in the future, the return on investment will continue to increase. The costs to the City of Montevideo for emergency response will continue to decrease as more successful mitigation projects are completed and tested by major flood events.

Section 5: Summary

The City of Montevideo has successfully mitigated 48 properties in the area.

This type of mitigation (acquisition) is necessary or the owners of these properties will continue to be at risk in future flooding events. While property or contents may not always be at risk during future floods, people will be stranded in their properties if they do not evacuate. The community will need to continue emergency services to this area during flood events putting community resources (personnel and property) at risk.

The City of Montevideo, Chippewa County, the State of Minnesota, and the Federal Emergency Management Agency all invested significant time and money to acquire and remove at-risk homes from the floodplain. This study demonstrates the fruits of those efforts.

In less than 15 years since the acquisitions began, Montevideo has suffered ten significant flooding events. These events would have caused more than $8 million in damage to the properties that were removed, a tremendous return on an investment of less than $1.2 million. This return will only continue to increase as Montevideo remains susceptible to future flooding. Fortunately, because of a strong partnership between local, state and federal officials, at least 48 more homes will no longer suffer the devastation of a flood.