

WN911NF-10-2-0104

## **FLOOD RISK AND ASSET MANAGEMENT**

### **Progress Note 3 – Phase 1**

**14.10.2011**

### *Document Information*

<b>Project</b>	Flood Risk and Asset Management
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<b>Project No.</b>	MCR 4699
<b>Progress Note No.</b>	03
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## Report Documentation Page

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# Contents

- 1. Progress statement..... 2
- 2. Financial..... 7

## 1. Progress statement

Following the workshop at HR Wallingford in February 2011, a system flood risk model of the St Paul Minnesota area was set up. The model has been run for a number of different scenarios. The initial results of the modelling have been discussed with USACE corps representatives through a teleconference in early June 2011. Attendees were: David Margo, Dale Munger, Corby Lewis, Neal Schwanz, David Schaaf and Andrew Sander, from USACE and Mike Panzeri, Caroline McGahey and Ben Gouldby from HR Wallingford.

As a result of the teleconference a further series of model results was initiated. Some example outputs from the modelling results are shown in Figures 1-6 below.



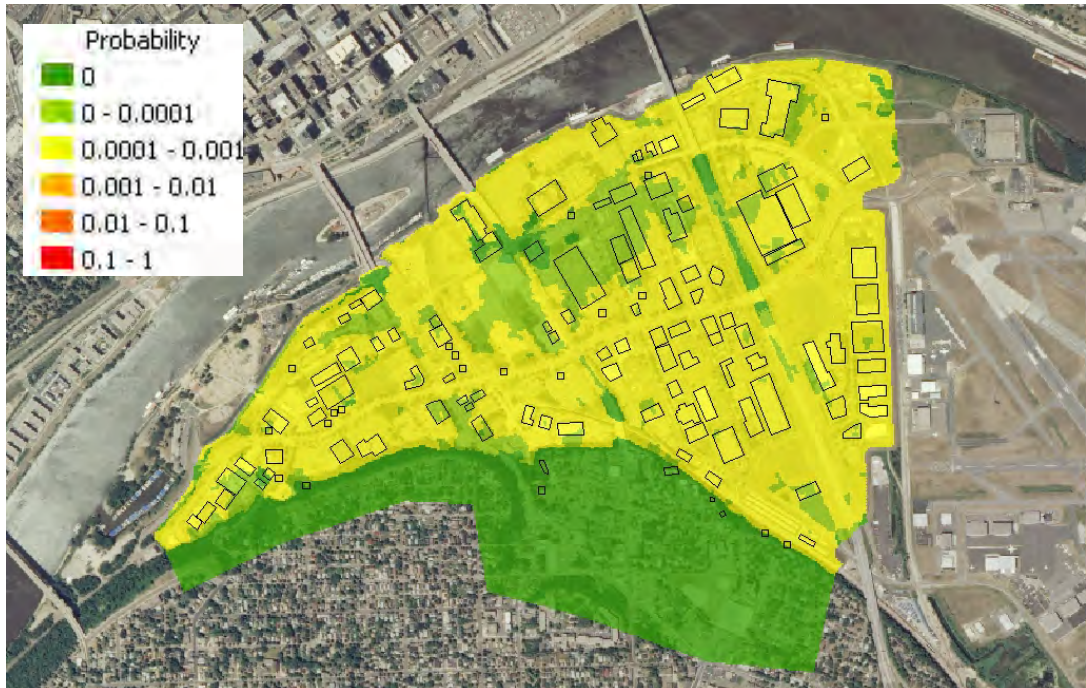
**Figure 1 DTM Ground model of the St Paul, Minnesota Study Area.**



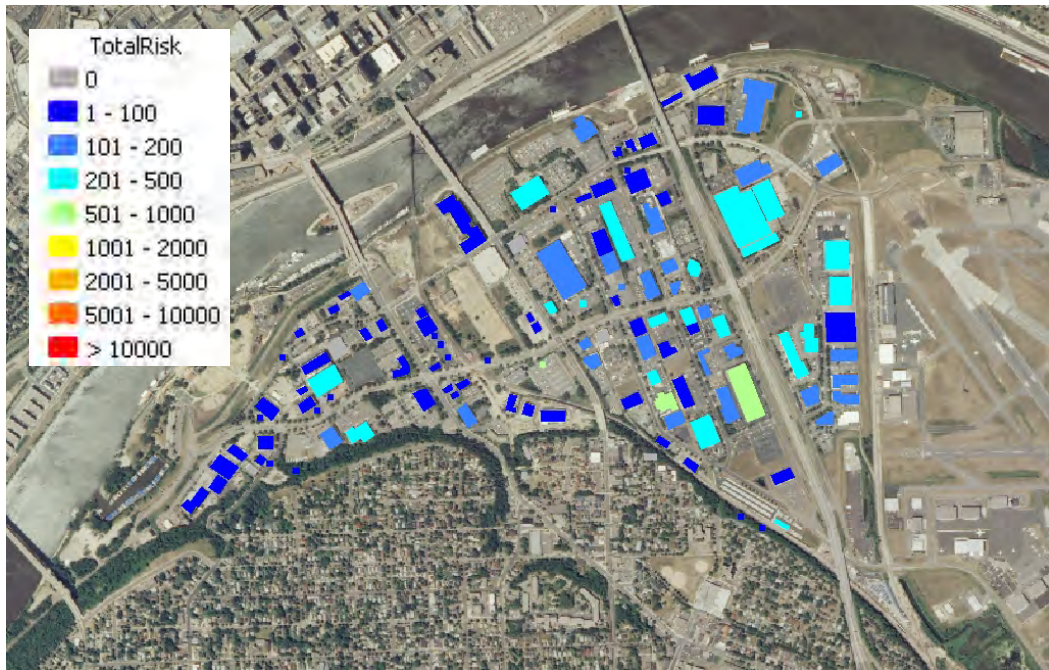
**Figure 2** Computational mesh of the Inundation model for the study area.



**Figure 3 – Spatial location floodplain property.**



**Figure 4 – Spatial distribution of probability of inundation**



**Figure 5 – Spatial distribution of residual floodplain risk (Expected Annual Damages £)**



(a)



(b)

**Figure 6 – Attribution of residual risk to individual asset lengths showing (a) existing situation and (b) crest levels reduced by 3m**

**Table 1 – Summary of results for scenarios**

Ref	Scenario description	Total Risk (Thousand \$)	Total Risk (Thousand £)	Percentage change
1	Existing situation	25.3	15.9	
2	Reduced crest level (-1 m)	59	37	+132
3	Reduced crest level (-2 m)	242	152	+856
4	Reduced crest level (-3 m)	597	374	+2254
5	UK Fragility Curves	26.0	16.3	+2
6	UK Damage Curves	25.1	15.7	-1
7	Resolution - levees	25.5	16.0	+1
8	Resolution - gates	24.4	15.3	-4
9	Resolution - 50m grid	30.1	18.9	+19

This analysis was discussed in detail with members of the USACE at a workshop held in HEC offices in Davis, California in July. The agenda of the workshop is provided in Appendix 1.

As part of the workshop a series of modelling software tools were handed over as well as the model databases for St Paul. The software packages comprised:

- RELIABLE
- HR BREACH
- FRE.

All software were provided under a royalty free license.

The next stage of the project is to provide a draft report. It is understood USACE members of the project team will be in the UK in December 2011 and it is proposed to issue a draft report in time to discuss with members when they visit.

## 2. *Financial*

Contract amount	\$259,337
Invoiced to date	\$194,502
Outstanding	\$129,669



## Appendix 1 Agenda of July workshop held at HEC



HR Wallingford and USACE In Progress Review Meeting:  
 St. Paul Pilot Study  
 Flood risk, levee safety and asset management  
 Hosted by USACE, Tue 26<sup>th</sup> July – Fri 29<sup>th</sup> July 2011

### Programme (Draft)

#### Meeting Objective:

The objectives of the meeting are summarised under three components:

1. Review application of risk assessment models and tools for the St. Paul Pilot Study
2. Demonstration and handoff of the HRW software tools to USACE for the St. Paul Pilot Study
3. Develop and define a work-plan (activities and programme) for completion of the pilot study including identifying opportunities for further collaboration

These activities are to support USACE in the development of their methodology for prioritisation of activities for risk reduction.

The review of risk assessment models will comprise topics that include, but are not limited to:

- Data and inputs
- Methodology and computations
- Outputs and conclusions
- Comparison of methodologies (USACE, HRW, WAT/FRM)

The demonstration and handoff of software tools will include

- Hands on use of the tools by USACE
- Handoff of the software tools and input/output files

The development of the work-plan will seek to agree specifics relating to:

- List of action items required to complete the pilot study
- Further meetings

The programme comprises a series of topics for discussion. Presentations/slides will be provided, it is however, envisaged the session will be informal round the table discussion format to stimulate debate.

**Tuesday, 26<sup>th</sup> July**

- 9.15 Depart Hallmark Inn for HEC Office
- 9.30 Arrival at HEC Office (Shewbridge)  
Overview and Introductions
- 9.35 Overview of Sacramento River Flood Risk Management System (Tibbits)
- 10.30 Overview of RD1000 Levee System (Tibbits)
- 11.30 Q&A
- 12.00 Depart HEC Office for RD1000 Levee System  
Stop for Lunch En Route
- 13.30 Tour of RD1000 Levee System
- 17.00 Finish  
Depart for Hallmark Inn
- Happy Hour at Hallmark Inn  
Dinner (venue tbd)

**Wednesday, 27<sup>th</sup> July**

- 08.30 Data, Model Inputs, and Risk Assessment Framework  
(HRW)
- 09.00 Discussion
- 09.30 Preliminary Model Results  
(HRW)
- 10.00 Discussion
- 10.30 Break
- 10.45 Reliability Modeling  
(HRW)  
Condition Grade Methodology  
Reliable Methodology
- 11.30 Discussion
- 12.30 Lunch
- 13.30 Breach Modeling  
(HRW)  
HR Breach

14.00 Discussion

15.00 Break

15.15 Model Variations and Sensitivities  
(HRW)  
Overtopping Risks and Breach Risks  
Levee Crest Elevation  
Model Resolution  
USACE Fragility and HRW Fragility

16.00 Discussion

17.00 Finish

Happy Hour at Hallmark Inn  
Dinner (venue tbd)

### **Thursday, 28<sup>th</sup> July**

08.30 Software Demonstration  
(HRW)

09.30 USACE Trial Use of Software

12.00 Lunch

13.00 Overview of USACE Risk Assessment for St. Paul  
(Hauck/Schwanz)

15.00 Break

15.15 Comparison of USACE and HRW methods and tools

17.00 Finish  
Depart for Sacramento for tour

18.00 Start tour

19.30 Diner (venue tbd)

### **Friday, 29<sup>th</sup> July**

08.30 HEC Mission and Current Activities  
(Harris)

09.30 HEC WAT/FRM Application for St. Paul  
(Baker)

10.30 Break

- 10.45 Discussion
- 12.00 Lunch
- 13.00 Develop Work Plan
- 15.00 Finish

**List of HRW Attendees**

Gouldby, Ben  
McGahey, Caroline  
Panzeri, Michael

**List of USACE Attendees**

Baker, Penni  
Empson, Bill  
Harris, Jeff  
Hauck, Kari  
Lehman, Will  
Lewis, Corby  
Margo, David  
Needham, Jason  
Patev, Bob  
Roos, Alex  
Sander, Andrew  
Schaaf, David  
Schwanz, Neil  
Shewbridge, Scott  
Terry, Tom