

Winnebago County Hydrologic and Hydraulic Analysis, Proposed Scope of Work

Illinois State Water Survey, Coordinated Hazard Assessment Program

1/5/2012

Winnebago County Hydrologic and Hydraulic Analysis, Proposed Scope of Work

Contents

Introduction	2
Scope of Work.....	3
South Ditch/Howard Creek.....	3
Spring Creek	3
Fuller Creek	4
Unnamed Tributary to Willow Creek	4
Unnamed Tributary to McDonald Creek.....	5
Rock Fork South Drainage Ditch	5
North Kent Creek	6
Issues to be addressed with Winnebago DFIRM mapping	6
Keith Creek downstream of Alpine Dam and South Branch Keith Creek	6
Streams that were considered, but are not included in the Scope of Work	7
North Kinnikinnick Creek	7
McDonald Creek.....	7
Unnamed Tributary to Leanna Creek.....	7
Welworth/Wentworth Area	7
Keith Creek upstream of Alpine Dam.....	7

Winnebago County Hydrologic and Hydraulic Analysis, Proposed Scope of Work

Introduction

This proposed scope of the hydrologic and hydraulic study was prepared by the Illinois State Water Survey, Coordinated Hazard Assessment and Mapping Program, CTP, and was submitted to FEMA Region 5 as required by MAS ISWS 10-06, Upper Rock River Watershed (HUC 0709005), and Winnebago County. Performance of the hydrologic and hydraulic studies described herein will meet the goals and conditions of MAS ISWS10-06.

The Illinois State Water Survey received funding from FEMA to complete a hydrologic and hydraulic analysis of tributaries to the Rock River within the Lower Rock River HUC-8 watershed in Winnebago County, Illinois as part of a RiskMAP project (MAS ISWS10-06). The scope of work for this effort is to be determined giving consideration to comments received from the Winnebago communities during the Discovery meeting which was held in Rockford on January 25, 2011. A summary of the Discovery meeting and the comments received are presented as a separate document. The proposed scope of work was completed after a second meeting at which the candidate projects were presented to gather input and feedback as to where a hydrologic and hydraulic analysis would provide the most benefit. This second meeting was held on September 27, 2011 in Rockford. Attendees are listed in Table 1.

The following scope of work was developed to identify projects that would result in more accurate hydrologic and hydraulic data that the community can use to assess and mitigate risk. Updated hydrologic and hydraulic analysis is needed for streams that were identified based on FEMA's CNMS database criteria, input from the community, and review by the state. Projects included in this scope of work are based on the anticipated benefit a new analysis would provide, with consideration given to the availability of data and funding to complete the analysis.

A summary of the streams under consideration for the final scope of work is provided below, and maps of the streams using orthoimagery for the basemap are provided at the end of this summary. Additional information on stream reaches that were considered for study, but are not included in the current scope of work is also summarized herein.

The ISWS is working with the USACE Rock Island District, which has been tasked to survey and model the Rock River main stem in Winnebago County and to survey the tributaries for modeling to be performed by the ISWS. There are a number of bridges crossing these urban tributaries, and the extent of the updated modeling supported by the new survey is based upon the assumption that as-built bridge plans will be available for approximately 20% of these structures.

The Kishwaukee River and Pecatonica River watersheds are not under consideration for this scope of work, as they are not located in the Lower Rock River HUC-8 watershed. The Pecatonica River is being studied under a different funding contract.

Winnebago County Hydrologic and Hydraulic Analysis, Proposed Scope of Work

Scope of Work

All of the proposed studies will result in new discharge values, and water surface profiles for the 10-, 4-, 2-, 1-, and 0.2% annual-chance events with a floodway for the 1% annual-chance event based on the State of Illinois criteria will be incorporated in the Winnebago County DFIRM mapping and database. The full Risk MAP project will include Risk Map products: Changes Since Last Map and Flood Depth Grids for the 1% annual-chance event, which are funded under separate MAS.

South Ditch/Howard Creek

- South Ditch, also known in the community as Howard Creek, is 0.7 miles long in a very urbanized area with a Zone AE floodplain with a floodway in the effective FIS and FIRM. The stream's Zone AE floodplain has an unverified stream status in the CNMS database based on the following secondary elements: the use of rural regression equations in an urban area, new regression equations are available, there are repetitive loss properties outside of the floodplain, and there is new topography available. The community reported a study was completed by Hanson to confirm the impact of mitigation efforts. Improving the hydrology and hydraulic data available in the FIS along South Ditch was noted to be a priority for the community of Loves Park at the Discovery meeting.
- The proposed study for this stream would include an HEC-HMS analysis of the watershed to replace the effective discharge values based on regression equations. Surveying and a steady state HEC-RAS model would be completed for the entire length of the current effective floodplain reach, which has an upstream limit of Forest Hills Road. The Hanson Drainage study will be reviewed and surveying data will be utilized as appropriate as will the effective study and available bridge plans.
- Communities within the South Ditch proposed study area include Loves Park and the City of Rockford.

Spring Creek

- Spring Creek has an effective Zone AE floodplain with a floodway from the confluence to 4.7 miles upstream at which point there is an effective Zone A floodplain for an additional 3.6 miles. The stream's Zone AE floodplain has an unverified stream status in the CNMS database based on the following secondary elements: the use of rural regression equations in an urban area, new regression equations are available, there are repetitive loss properties outside of the floodplain, and there is new topography available. The Zone AE effective study was completed in 1976. There are several structures not included in the effective model. The Zone A study was completed with the 2006 Map Modernization; however, this study did not include structures or channel surveying. Multiple comments were received at the Discovery Meeting concerning Spring Creek. Many of the comments were specific to the Zone A reach where development is occurring. Further research indicated the discharge values would increase 15% based on the new regression equations, and there are more than 15 new structures in the floodplain.
- The proposed study for this stream would include an HEC-HMS analysis of the watershed to replace the effective discharge values based on regression equations. Surveying and a steady state HEC-RAS model would be completed on the full effective floodplain reach. The Winnebago-

Winnebago County Hydrologic and Hydraulic Analysis, Proposed Scope of Work

Boone County boundary would remain the limit of study. Multiple discovery comments indicate some support data for a floodplain study are available and these will be reviewed and utilized as will the effective study and available bridge plans.

- Communities within the Spring Creek proposed study area include the City of Rockford and Winnebago County.

Fuller Creek

- Fuller Creek, an unnamed tributary to Rock River on the effective FIRM maps, has an effective Zone A floodplain from the confluence for 3.2 miles upstream. Brian Eber (then Floodplain Manager for City of Rockford) reported a new sanitary trunk would be installed in 2011 and new development is expected to occur.
- Given the current largely rural land use in this watershed, the proposed study for this stream would include a 2004 regression equation analysis to determine discharge values. Surveying and a steady state HEC-RAS model would be completed on the full effective floodplain reach. Bridge data from the state and county would be utilized when available.
- The community within the Fuller Creek proposed study area in Winnebago County is the City of Rockford.

Unnamed Tributary to Willow Creek

- The unnamed Tributary to Willow Creek has an effective Zone A floodplain. Comments from the Discovery meeting indicate there is potential development in this area, and multiple minor hydrologic and hydraulic studies have been completed for development purposes. The effective Zone A is based on a hydraulic model completed as part of the 2006 map modernization project.
- At the scope of work meeting, the communities indicated they strongly felt this stream was a priority for analysis.
- An HEC-HMS model would be completed for the hydrologic analysis, with attention to the new retention ponds in the area. Available data will be utilized when possible.
- A Zone AE steady state HEC-RAS hydraulic model is proposed from the confluence with Willow Creek to Forest Hills Road. A large IDOT project on highway 173, which runs parallel to the stream, is underway and will impact the floodplain. Where the project has been completed, a new analysis would be beneficial, but where future construction is planned, analysis of the existing floodplain would be inefficient. Therefore, the IDOT 173 construction project will define the extent of the scope of work for this analysis. Phase 1 includes construction downstream of Forest Hills that will be complete in the fall of 2011 and as-built plans will be requested for incorporation with this analysis. Phase 2 of the highway 173 construction, upstream of Forest Hills, will not be completed before the conclusion of this project. Therefore, the hydraulic analysis upstream of Forest Hills will be completed without surveying and will be mapped as a Zone A floodplain. The community has indicated it will plan to submit a LOMR for this reach once the construction is complete. The proposed analysis will be scheduled in the spring when the IDOT Phase 1 as-built plans for 173 are expected to be available.

Winnebago County Hydrologic and Hydraulic Analysis, Proposed Scope of Work

- Communities within the Unnamed Tributary to Willow Creek in Winnebago County proposed study area include Loves Park and Machesney Park.

Unnamed Tributary to McDonald Creek

- The Unnamed Tributary to McDonald Creek has an effective Zone A floodplain from its confluence with McDonald Creek for 3.2 miles upstream to the Winnebago-Boone County boundary. Discussions with Machesney Park staff indicated there is potential development in this area and the community would benefit from base flood elevation determination.
- Given the largely rural land use in this watershed, the proposed study for this stream would include a 2004 regression equation analysis to determine discharge values. Surveying and a steady state HEC-RAS model would be completed on the full effective floodplain reach. The Winnebago-Boone County boundary would remain the limit of study. Bridge data from the state and county would be utilized when available.
- The community within the Unnamed Tributary to McDonald Creek proposed study area in Winnebago County is Machesney Park.

Rock Fork South Drainage Ditch

- The effective Rock Fork South Drainage Ditch floodplain is a Zone A based on a study completed in 2004. A review of Rock Fork South Drainage Ditch was completed based on comments concerning recent stream channelization. A Special Problems Report was written during the Map Modernization project suggesting a Zone AE would be more appropriate for this channelized stream. Following conversations with the City of Rockford indicated that there are multiple hydrologic studies for this reach that are contradictory. The city would like to have a good understanding of the hydrology for this stream. The city is in the process of buying out homes along this stream and tearing them down to put in detention pond facilities. A hydrologic analysis would be the priority for this stream, but a hydraulic analysis would also be useful to the city. The concrete channel has areas in need of repair and an H&H study would aid in making decisions about the repair work.
- The county is very interested in flooding issues in the Walworth/Wentworth area tributary to this drainage ditch. This area is not included in the hydraulic and hydrologic analysis, but efforts will be made to review these issues and communicate with the consultant retained by Winnebago County about the possibility of incorporating a LOMR.
- The proposed study for this stream would include an HEC-HMS analysis of the watershed. A review of the available contradicting hydrologic analyses would be completed. A steady state HEC-RAS model will be completed on the full effective floodplain reach. The effective study and available bridge plans will be reviewed and utilized as appropriate.
- The community within the Rock Fork South Drainage Ditch proposed study area in Winnebago County is the City of Rockford.

Winnebago County Hydrologic and Hydraulic Analysis, Proposed Scope of Work

North Kent Creek

- The North Kent Creek FIS and FIRM data seem to have a discrepancy based on the timing of the effective study with the annexation of a portion of the reach into the City of Rockford. There is an effective profile for the full stream reach in the effective FIS. However, the effective maps show a Zone A floodplain between two Zone AE floodplains along this reach. The effective FIS does not document the source of the study data for North Kent Creek. Review of available materials available indicates the study was completed in 1976 and was likely completed in concurrence with the dam and diversion construction. A 2001 PMR for the Winnebago County FIS included a revised study of the diversion and South Kent Creek. The impact of this study on North Kent Creek downstream of the diversion is unknown.
- An in-depth engineering review of the effective and available data will be completed to determine the appropriate analysis to resolve the mapping discrepancy for this scope of work. The engineering analysis and mapping within the isolated Zone A floodplain upstream of Central Avenue will be updated with input from the impacted communities.
- The community within the North Kent Creek proposed study area in Winnebago County is the City of Rockford.

Issues to be addressed with Winnebago DFIRM mapping

Keith Creek downstream of Alpine Dam and South Branch Keith Creek

The USACE completed an existing condition model of Keith Creek in 2008 that is anticipated to be available for incorporation into the DFIRM. The USACE hydraulic study limits are from the confluence to just downstream of Alpine dam on Keith Creek as well as a portion of the South Branch of Keith Creek. In the City of Rockford, the hydraulic conditions have changed since the 2008 study. It is anticipated that an update to the hydraulic model will be completed by the city's contractor or the USACE by fall 2012 to enable this study to be leveraged and incorporated into the Winnebago DFIRMs.

The Keith Creek revised floodplain is included in the scope of work as mapping incorporation of leveraged data. Incorporation of an updated Keith Creek floodplain into the Winnebago County FIRMs will be based on the timely receipt of an approved hydrologic and hydrologic analysis. No hydrologic or hydraulic analysis will be completed by the ISWS.

Winnebago County Hydrologic and Hydraulic Analysis, Proposed Scope of Work

Streams that were considered, but are not included in the Scope of Work

North Kinnikinnick Creek This stream was thought to be considered unverified under the CNMS database criteria until further review determined one of the repetitive loss properties outside of the floodplain is actually in the Rock River watershed. This stream is not unverified per CNMS. No request for new analysis was received during the Discovery meeting process.

McDonald Creek The Zone A reach of McDonald Creek was considered for a study to provide base flood elevations. Further discussions with the Village of Roscoe indicated this area is not likely to be developed due to the large park along this reach.

Unnamed Tributary to Leanna Creek There is a short reach of Unnamed Tributary to Leanna Creek through a subdivision where there is no effective floodplain. Upstream of this reach there is an effective Zone A, and downstream is the effective Zone AE from the Rock River confluence. Communication with Winnebago County indicates the community would benefit from eliminating the gap in this floodplain and having base flood elevations.

This stream was included in the proposed scope of work but removed for the final scope of work. Upon further consideration the communities determined that a study on this stream was not necessary.

Welworth/Wentworth Area This area was reviewed based on comments from the Proposed Scope of Work meeting. Hey and Associates has been contracted by Winnebago County to do a water quality study funded by the Illinois Environmental Protection Agency in this area. The county would like to consider adding the results of this study to the floodplain as part of the mapping project in Winnebago County. This area will be addressed as part of the Rock Fork South Drainage Ditch if an existing conditions analysis is made available. As the lack of visible channel on the aerial photo indicates the flooding may not be riverine flow, and because a study is already in progress, no further hydrologic or hydraulic work is proposed.

Keith Creek upstream of Alpine Dam The USACE has completed a study on the existing conditions of Keith Creek in 2008 that will be incorporated into the DFIRM. The entire watershed was included in the hydrologic analysis. The USACE hydraulic study limits are from the confluence to just downstream of Alpine dam on Keith Creek as well as a portion of the South Branch of Keith Creek. Through the incorporation of the USACE study, the stream will no longer be considered invalid by CNMS. However, the new hydrology indicates the flows have increased approximately 80% upstream of the dam compared to the effective FIS. The stream reach upstream of Alpine Dam is Zone AE and Zone A floodplain. The effective Zone AE study has been effective since November 1980.

This stream was included in the proposed scope of work but removed from the final scope of work at the request of the city. The City of Rockford is considering changes to Alpine Dam that would impact the upstream floodplain, and the city determined analysis of this stream was not a priority at this time.

Winnebago County Hydrologic and Hydraulic Analysis, Proposed Scope of Work

Table 1. September 27, 2011 Meeting Attendees

<i>Community</i>	<i>Name</i>	<i>Title</i>	<i>E-mail</i>	<i>Phone</i>
Winnebago County	Joe Vanderwerff	County Engineer	jvanderwerff@co.winnebago.il.us	815-319-4000
Winnebago County	Don Krizan	Highway Engineer	dkrizan@wincoil.us	815-319-4000
Winnebago County	Wayne Vlk	Highway Engineer	wvlk@wincoil.us	815-319-4000
Winnebago County	Prafull Soni	Engineer	psoni@wincoil.us	815-319-4000
Loves Park	Steve Thompson	FPM	SteveThompson@loves-park.il.us	815-654-5029
Machesney Park	Chris Dopkins	City Engineer	cdopkins@mcmgrp.net	815-636-9590
Machesney Park	Trish Diduch	FPA	patriciad@machesneypark.org	815-877-5432
Rockford	Dean Kurth	Building and Zoning	dean.kurth@rockfordil.gov	815-987-5570
Rockford	Tim Hanson	Director of Public Works	timothy.hanson@rockfordil.gov	815-985-4635
Rockford	Marcy Leach	City Engineer	marcy.leach@rockfordil.gov	815-987-5570
Rockford	Mark Lattner, PE	Water Engineer	mark.lattner@rockfordil.gov	815-987-5637
Rockford	Brad Holcomb	Stormwater	Brad.holcomb@rockfordil.gov	815-967-7061
Rockford	Kelly Nokes	Asst. Ops. Mgr. - Engineering	Kelly.nokes@rockfordil.gov	815-967-6915
IDOT	Bill McWethy	Highway Engineer	william.mcwethy@illinois.gov	815-284-5360
IDOT	Rich Guise	Highway Engineer	rich.guise@illinois.gov	815-284-5361
IDNR	Rick Gosch	OWR	Rick.gosch@illinois.gov	217-782-4732