Introduction

As part of the Upper Salt Creek DWP development, inundation mapping was produced based on hydrologic and hydraulic modeling. Tables 1 and 2 include a comparison of the inundation mapping created for this DWP to the effective FEMA floodplain mapping, revised August 19, 2008 as part of the FEMA Map Modernization program. Only detailed study Zone AE and limited detail study Zone A special flood hazard areas (SFHA) are included in the comparison. Caution should be exercised when evaluating the numbers in both tables, as some differences in inundation area may result from differences in the extent of detailed hydraulic modeling.

In some locations, discrepancies exist between this DWP inundation area maps and the FEMA floodplain maps, which may be attributed to differences in hydrologic and hydraulic modeling, as described in more detail in the following paragraphs.

Hydrologic Modeling Methodology

Hydrologic modeling methodologies utilized for the District's DWP are fundamentally different than those performed for DFIRM mapping, thus estimated peak flow rates may be significantly different. DFIRM hydrology was primarily based on regression equations and older hydrologic models (HEC-1, TR-20, etc.) while this DWP utilized a current hydrologic model (HEC-HMS). Consequently, different approaches to channel and reservoir routing may have been taken, which may result in magnitude and timing differences.

Parameters of each hydrologic model may be quite different. This DWP computed NRCS Curve Numbers based on the latest CMAP land use maps and NRCS soil maps. Contrarily, hydrologic methods, utilized by the DFIRM mapping, likely referenced older land use and soil data. Additionally, different methodologies may have been used to calculate subbasin times of concentration.

This DWP utilized current ISWS Bulletin 70 rainfall data while previous hydrologic studies used for DFIRM mapping may have used older Technical Paper-40 rainfall data. Bulletin 70 rainfall data generally yields higher rainfall depths than Technical Paper-40. For example, Technical Paper-40 specifies a 100-year, 24-hour duration rainfall depth of approximately 6.0 inches while Bulletin 70 specifies a corresponding rainfall depth of approximately 7.60 inches. Additionally, this DWP utilizes depth-area adjustments, which may not have been utilized in the DFIRM mapping.

Subbasin delineation is likely different between this DWP and the DFIRM mapping, as this DWP utilized the latest Cook County LiDAR data for topographic information to support subbasin delineation.

Differences in hydrologic modeling approaches may yield different flow rates, which will likely yield different flood surface profiles in the hydraulic model results.

Hydraulic Modeling Methodology

Hydraulic modeling methodologies utilized for this DWP are fundamentally different than those performed for DFIRM mapping, thus their associated flood surface profiles may be significantly different. Steady-state hydraulic modeling was generally performed in support of DFIRM mapping. This DWP utilized dynamic unsteady flow simulation. The difference in approaches between steady and unsteady hydraulic modeling may contribute to discrepancies between flood surface profiles.

Channel cross sections in the hydraulic models differ between this DWP and previous modeling. Cross sections developed under this DWP were generally obtained from field surveys. In a few cases, recent hydraulic models were available and modified under this DWP. If recent hydraulic models were used, several cross sections were verified with field surveying. Hydraulic models produced in support of DFIRM mapping may have used different cross section data, which may reflect outdated channel geometries. Likewise, bridge section geometries may also vary from previous modeling. Differences in model cross sections may contribute to discrepancies between flood surface profiles.

Hydraulic model calibration may also contribute to discrepancies in flood surface profiles between this DWP and DFIRM mapping. This DWP was calibrated to recent storm events that have occurred since the development of DFIRM modeling. The calibration may contribute to discrepancies between flood surface profiles.

DWP and FEMA Floodplain Area Comparison

Table 1 below lists for comparison the floodplain area within each subwatershed as determined by the Upper Salt Creek DWP and the DFIRM mapping (for both FEMA Zone AE, and FEMA Zone A).

TABLE 1
Comparison of DWP Inundation Area and FEMA Floodplain by Subwatershed

Subwatershed	DWP Floodplain Area (acres)	FEMA Zone AE Area (acres)	FEMA Zone A Area (acres)
Mainstem	1941	697	1312
West Branch	386	359	47
Arlington Heights Branch	445	391	185
Totals	2772	1447	1544

Table 2 below lists for comparison the floodplain area within each community within the Upper Salt Creek watershed as determined by the Upper Salt Creek DWP and the DFIRM mapping (for both FEMA Zone AE, and FEMA Zone A).

TABLE 2

Comparison of DWP Inundation Area and FEMA Floodplain by Community

Community	DWP Floodplain Area (acres)	FEMA Zone AE Area (acres)	FEMA Zone A Area (acres)
Village of Schaumburg	312	302	56
Village of Palatine	493	451	2
FPDCC	1211	44	1357
Village of Hoffman Estates	33	10	70
Village of Elk Grove Village	221	180	0
City of Rolling Meadows	173	209	1
Village of Inverness	103	82	51
Palatine Township*	135	133	4
Village of Arlington Heights	4	4	0
Schaumburg Township*	82	27	2
Elk Grove Township*	5	5	1
Village of Barrington	0	0	0
Wheeling Township*	0	0	0
Village of Itasca	0	0	0
Village of Deer Park	0	0	0
Village of Wood Dale	0	>1	0
Total	2772	1447	1544

* Communities with no DWP inundation area mapping were omitted from the table, although some did have FEMA Zone A area. Contributing FEMA Zone A areas were included in the total.