Levee Analysis and Mapping Plan
Ellenville Flood Damage Reduction Project

Village of Ellenville, New York

April 2018

FEMA

RiskMAP
Increasing Resilience Together

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Acronyms

BFE	Base Flood Elevation
CERC	Community Engagement and Risk Communication
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
LLPT	Local Levee Partnership Team
LOMR	Letter of Map Revision
NAVD 88	North American Vertical Datum of 1988
NFIP	National Flood Insurance Program
NGVD 29	National Geodetic Vertical Datum of 1929
NYSDEC	New York State Department of Environmental Conservation
SFHA	Special Flood Hazard Area
STARR II	Strategic Alliance for Risk Reduction
USACE	U.S. Army Corps of Engineers

Definitions

The terms below have been used in this document. Additional terms are provided in FEMA's *Analysis and Mapping Procedures for Non-Accredited Levee Systems* (July 2013) in the Glossary of Levee Terms. This document is available from the FEMA Library at https://www.fema.gov/media-library-data/20130726-1922-25045-4455/20130703_approachdocument_508.pdf.

Base Flood Elevation (BFE) – The elevation of a flood having a 1-percent chance of being equaled or exceeded in any given year.

Levee Analysis and Mapping Procedures* – Levee Analysis and Mapping Procedures include Sound Reach, Freeboard Deficient, Overtopping Analysis, Structural-Based Inundation, and Natural Valley. Details on these approaches can be found in FEMA's *Analysis and Mapping Procedures for Non-Accredited Levee Systems* (July 2013).

Leveed Area* – A spatial feature in the NLD defined by the lands from which flood water is excluded by the levee system.

Levee Reach – Any continuous section of a levee system to which a single analysis and mapping procedure may be applied.

Levee System – A flood hazard-reduction system that consists of a levee, or levees, and associated structures, such as closures, pumps and drainage devices, which are constructed and operated in accordance with sound engineering practices**.**

Local Levee Partnership Team (LLPT) – A work group that can be facilitated by FEMA when a non-accredited levee system in a community or project area will be analyzed and the areas landward of the levee system will be mapped. The primary function of this group is to share information/data and identify options based on stakeholder roles and knowledge.

Non-Accredited Levee System – A levee system that does not meet the requirements spelled out in the National Flood Insurance Program (NFIP) regulations at Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations (44CFR§65.10), *Mapping of Areas Protected by Levee Systems*, and is not shown on a FIRM as reducing the flood hazards posed by a 1-percent-annual-chance or greater flood.

Zone A – An area inundated by 1-percent-annual-chance flooding, for which no BFEs have been determined.

Zone D – Area of undetermined but possible flood hazard.

*All definitions on this page except for these are from FEMA's Analysis and Mapping Procedures for Non-Accredited Levee Systems (July 2013).

0 Executive Summary

In 1974, the U.S. Army Corps of Engineers (USACE) constructed the Ellenville Flood Damage Reduction Project (Ellenville FDRP), comprised of multiple levee systems, bridge and channel improvements, and drainage appurtenances, to reduce flood risk within the Village of Ellenville. The Federal Emergency Management Agency's (FEMA's) Flood Insurance Study (FIS) report and Flood Insurance Rate Map (FIRM) for Ulster County, New York depict the levee systems within the Ellenville FDRP as non-accredited.

FEMA's guidance was revised in 2013 to incorporate a new Levee Analysis and Mapping Procedure which provides a suite of flexible procedures to perform flood hazard analysis and mapping (see Section 1 of this report). The Village of Ellenville (Village) and neighboring Town of Wawarsing (Town) have a levee discovery project where the Ellenville FDRP, located in the Village but also potentially impacting a small area of the Town, is being studied using the Levee Analysis and Mapping Procedures (see Section 2). This study will help identify potential options the Village may have to show the levee as providing reduced flood hazard on the FIRM.

In May of 2017, FEMA Region II partnered with stakeholders in the Village and the Town to form a collaborative Local Levee Partnership Team (LLPT) and worked to determine potential Levee Analysis and Mapping Procedures for the Ellenville FDRP (see Sections 3 and 4 respectively). The process involved the collection and group evaluation of available data, creation and evaluation of an initial data analysis (see Section 5), and detailed discussions on mapping needs.

The information gained through the extensive coordination of the LLPT and the initial data analysis performed, supports the development of this document — a plan outlining potential reach analysis procedures. This document informs the potential paths forward for the Village (see Section 6). The Village is currently considering the benefits and costs of the Freeboard Deficient Procedure and accreditation to depict the flood hazard for leveed areas of the Ellenville Levee. The effective FIRM dated November 16, 2016 depicts leveed areas of the non-accredited Ellenville Levee System. Should the Village elect to revise the FIRM in the future through the Freeboard Deficient Procedure or accreditation, the Village may pursue a Letter of Map Revision (LOMR) instead of waiting for the FEMA Regional Office to incorporate updates into future mapping studies.

1 Introduction

Under FEMA's prior levee approach, a levee system that did not meet the National Flood Insurance Program (NFIP) requirements outlined in Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations (44CFR§65.10) was analyzed and mapped as if it provided no protection during a base (1-percent-annual-chance) flood. This was known as the "without levee" approach.

Some stakeholders expressed concern about the "without levee" approach. Members of both the U.S. House of Representatives and the U.S. Senate echoed this concern and asked FEMA to consider discontinuing the "without levee" approach. Accordingly, FEMA drew on current modeling techniques to refine the identification of flood hazard reduction that non-accredited levee systems provide. This process recognizes the uncertainty associated with hazard identification of leveed areas.

FEMA, its Production and Technical Services contractor Strategic Alliance for Risk Reduction (STARR II) and Community Engagement and Risk Communication contractor (CERC) initiated the Levee Analysis and Mapping Procedures process for the levee systems of the Ellenville FDRP within the Village and Town. Recent technological advances in data collection methods and hydrologic and hydraulic modeling were leveraged as part of this process. FEMA's Levee Analysis and Mapping Procedures for non-accredited levees is a more refined approach to mapping flood hazards in leveed areas.

The Levee Analysis and Mapping Procedures process also:

- Leverages local knowledge and data, with proactive stakeholder engagement in LLPTs;
- Aligns available resources for engineering analyses and mapping commensurate with the level of risk in leveed areas; and
- Considers the unique characteristics of each levee system from an engineering perspective.

The levee systems of the Ellenville FDRP are non-accredited. At the request of the community, FEMA is using the Levee Analysis and Mapping Procedures process to evaluate potential flood hazard mapping options in leveed areas. This will inform the Village's decision on how they would like to depict the levee-related flood hazards in the Village in the future.

This report is the result of the collaboration between FEMA, the Village of Ellenville, Town of Wawarsing, Ulster County, New York State Department of Environmental Conservation (NYSDEC), USACE, and other local stakeholders. This report documents the evaluation of data, initial data analysis, as well as the community's preferred Levee Analysis and Mapping Procedure.

2 Levee System Description

2.1 Flood Protection Measures in the Village of Ellenville

The Ellenville FDRP is a USACE designed and constructed flood control project made up of three levee systems; Fantine Kill Left Bank Levee, Beer Kill Left Bank/Fantine Kill Right Bank Levee, and the Beer Kill Right Bank Levee as shown in Figure 1.

Figure 1: Ellenville FDRP Levee System Alignments

The levee systems include earthen levee and concrete flood wall sections, associated drainage appurtenances, and channel relocation. Bridge improvements were also part of the project but were constructed by local stakeholders. The approximate locations of the earthen embankments and concrete floodwalls are shown in Figure 2.

Figure 2: Levee Embankments and Floodwalls

The project construction was completed in 1974 and is now owned, operated, and maintained by the NYSDEC. The Ellenville FDRP does not have any pump stations for interior drainage; however, interior drainage facilities include gated gravity-drained conduits, swales, and a ponding area.

2.2 Community NFIP and FIRM History

Tables 1 and 2 summarize the communities' NFIP and FIRM history.

Table 1. Summary of Communities in Project Area

County	Community	Participating in the NFIP?	Estimated Number of Potentially Impacted Structures in Leveed Area[1]
Ulster County	Village of Ellenville	Yes	9
Ulster County	Town of Wawarsing	Yes	1 industrial facility

[1] Levee protected area from 1-percent-annual-chance flood hazard from November 16, 2016 FIRM.

Table 2. Community Map History

Community Name	Initial Identification	Flood Hazard Boundary Map Revision Date(s)	FIRM Effective Date	FIRM Revision Date(s)
Village of Ellenville	May 24, 1974	June 18, 1976	July 5, 1983	November 18, 2016
Town of Wawarsing	September 13, 1974	June 10, 1977	September 15, 1983	November 18, 2016

A countywide FIS report was issued for Ulster County, New York on November 18, 2016. According to the FIS report, "This flood-control project is not mapped as providing protection against the 1-percent-annual-chance flood." No certified documentation is available to show the Ellenville FDRP meets the minimum requirements of 44CFR§65.10 of the NFIP Regulations.

The effective FIRM for Ulster County dated November 18, 2016, Figure 3, depicts the flood risk in leveed areas of the Ellenville FDRP as Zone A SFHA.

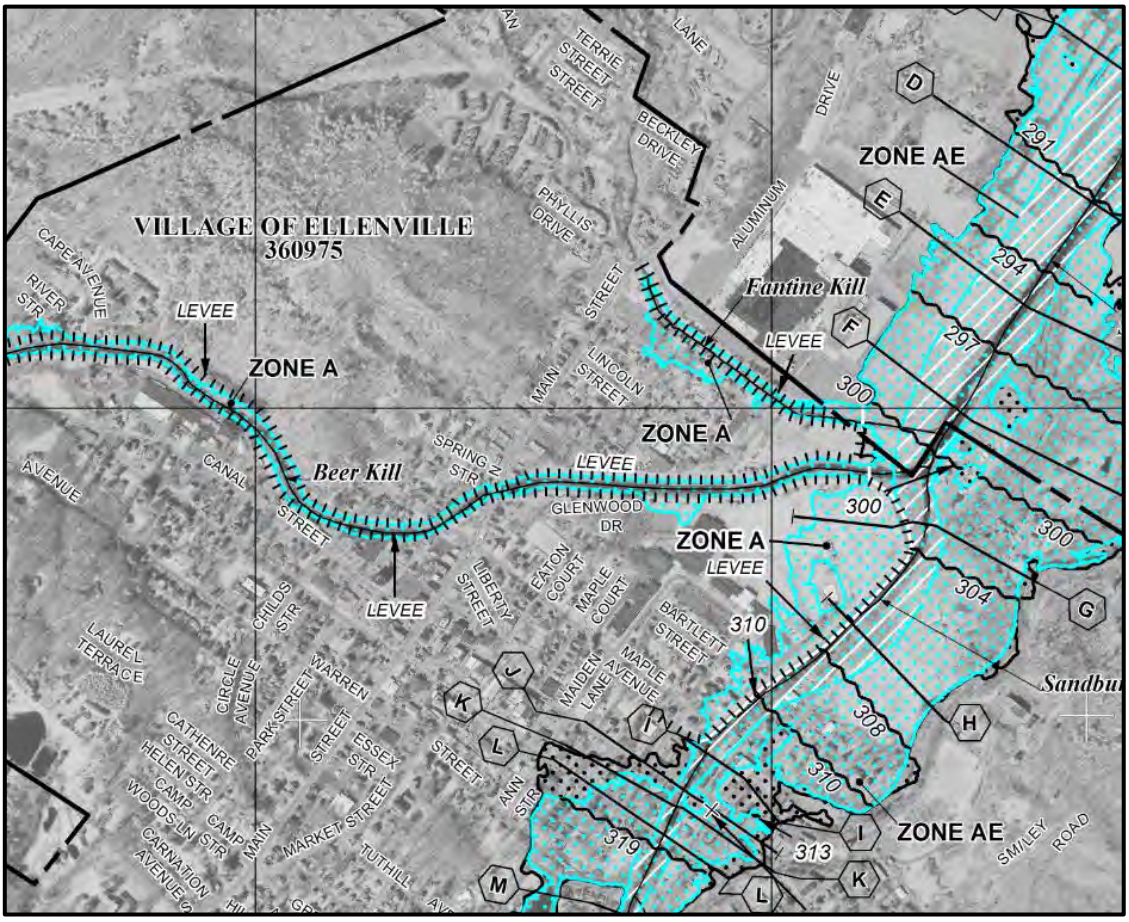

Figure 3: Approximate Study Area from

Ulster County, NY FIRM No. 36111C0685F, Revised November 18, 2016

3 Local Levee Partnership Team

The LLPT was formed to provide FEMA with data and input, including feedback on the procedures to be used for analyzing and mapping the levee systems, based on local levee conditions. The stakeholders who participated in the LLPT for this project are listed in Table 3.

Table 3. LLPT Participants

LLPT Member	Contact Information
Joseph Stoeckeler	Village of Ellenville jstoeckeler@villageofellenville.com
Brian Schug	Village of Ellenville bschug@villageofellenville.com
Leonard Distel	Town of Wawarsing wawsupervisor@hvc.rr.com
Burt Samuelson	Ulster County bsam@co.ulster.ny.us
Kathy Fallon	Office of Congressman John Faso 845-514-2322; Kathy.fallon@mail.house.gov
Don Fletcher	Barton and Loguidice dfletcher@bartonandloguidice.com

LLPT Member	Contact Information
Mark Lukasik	Tectonic Engineering mlukasik@tectonicengineering.com
Richard Geike	GM2 Associates
Charles Bazydlo	Law Office of Charles T. Bazydlo, P.C. 845-361-3668; cbazydlo@hvc.rr.com
Bill Nechamen*	NYSDEC *Since this meeting, Bill Nechamen has retired. Alan Fuchs will assume his roles.
Brad Wenskoski	NYSDEC 518-402-8082; brad.wenskoski@dec.ny.gov
Alan Fuchs**	NYSDEC 518-402-8185; alan.fuchs@dec.ny.gov **Took over for Bill Nechamen when Bill retired.
Arvind Goswami	NYSDEC 518-402-8186; Arvind.goswami@dec.ny.gov
Anna Servidone	NYSDEC 518-402-8147; Anna.servidone@dec.ny.gov
John Harrington	NYSDEC 845-256-3055; John.harrington@dec.ny.gov
Lynn Meeker	NYSDEC Lynn.meeker@dec.ny.gov
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Ali Bachowski***	USACE ***Since meeting left NY District USACE, Encer Schaefer now covering
Brittney Hyde	USACE Brittney.R.Hyde@usace.army.mil
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Thomas Song	CERC, FEMA Outreach Consultant 914-343-6696; thomas.song@mbakerintl.com

4 Stakeholder Engagement

4.1 LLPT Meeting 1

A FEMA-led project team under the leadership of Shudipto Rahman, engaged the Ellenville FDRP stakeholders at the LLPT Meeting 1 held at the Ellenville Government Building on June 7, 2017. The overall intent of the meeting was to gain local insight on the status and data available for the Ellenville FDRP, introduce the Levee Analysis and

Mapping Procedures concepts with respect to the levee systems, and begin to establish the stakeholders who would like to participate in the LLPT.

An overview of the methods available to depict flood risks of leveed areas under current Levee Analysis and Mapping Procedures guidance was also discussed during the meeting along with a timeline for the levee project. Additional details regarding the LLPT 1 meeting are provided in Appendix A.

4.2 LLPT Meeting 2

On September 12, 2017, the LLPT Meeting 2 was held to review the Initial Data Analysis and discuss outcomes from the data collection process for the levee systems. During the meeting, the FEMA project team discussed the draft results of the Initial Data Analysis for the Natural Valley Procedure, Structural-Based Inundation Procedure, and the Freeboard Deficient Procedure. The Overtopping Deficient Procedure was determined to be not applicable. Additional details regarding the LLPT 2 meeting are provided in Appendix B.

A touchpoint call was hosted with the LLPT on December 4, 2017 to provide updates to the group since the LLPT 2 meeting and preview the draft Levee Analysis and Mapping Plan. Notes from this meeting are also provided in Appendix B.

Subsequent to this call, the Village provided FEMA with two USGS Scientific Investigations Reports regarding groundwater to consider in support of the levee analysis. The Village expressed concern about the findings contained in the reports and how groundwater may be contributing to flooding in their community. The USGS documents, listed below and provided in Appendix G, include discussion on groundwater sampling, hydrologic assessment, and potential impacts with respect to tunnel shutdowns within the watershed.

- *Preliminary Assessment of Water Chemistry Related to Groundwater Flooding in Wawarsing, New York, Scientific Investigations Report 2009-11; and*
- *Preliminary Analysis of the Hydrologic Effects of Temporary Shutdowns of the Rondout-West Branch Water Tunnel on the Groundwater-Flow System in Wawarsing, New York, scientific Investigations Report 2012-5015*.

While groundwater flow may be impacted by the leaky Rondout-West Branch Water Tunnel or may influence basement seepage, the flow is typically a small fraction of surface flooding. For example, the tunnel leak was estimated by the Village to be 19 million gallons/day which equates to approximately 30 cfs; however, the 1-percent-annual-chance flow for Beer Kill is approximately 6,000 cfs, and approximately 15,000 cfs for Sandburg Creek. Furthermore, it is rare to have access to detailed data on groundwater conditions that can be used to characterize surface flooding behavior. Although groundwater impacts do not directly correlate with the levee analyses, the Village's concern is noted and discussions on this topic may continue outside of this levee project.

4.1 LLPT Meeting 3

A LLPT Meeting 3 was held on February 26, 2018 to present the overall findings of the Levee Analysis and Mapping Plan to the Village Board and the LLPT prior it being finalized. Notes from this meeting are provided in Appendix C.

5 Initial Data Analysis

FEMA project team members from STARR II developed an Initial Data Analysis, which is an approximate analysis using available data to approximate the floodplain boundary for each relevant Levee Analysis and Mapping Procedures approach initially determined. This informed the discussions in LLPT Meeting 2 (See Appendix B for LLPT 2 Meeting Notes) and the touchpoint call prior to LLPT Meeting 3. Details of the reach analysis and application of reach analysis procedures are provided below.

5.1 Reach Analysis

For the purposes of the Levee Analysis and Mapping Procedure hydraulic analyses, the three Ellenville FDRP levee systems (see Figure 2) were separated into reaches based on the adjacent stream and modeled separately. For example, the Beer Kill Right Bank Levee System was modeled as a reach along Sandburg Creek and a reach along Beer Kill.

The top of levee profile from the USACE National Levee Database was compared to the 44 CFR§65.10 minimum freeboard requirements for each levee system reach. The profile comparisons are included in Appendix D.

The results of the profile comparisons indicate that the left descending reach along Sandburg Creek could be considered a Sound Reach (see Section 5.5) as it is estimated to meet minimum freeboard requirements. The majority of the left and right descending reaches along Beer Kill are also estimated to be at or above the elevation of the 1-percent-annual-chance flood resulting from the approximate study of Beer Kill, except near the North Main Street crossing. While these reaches may be able to be considered Sound Reaches if the entire levee crest meets minimum freeboard requirements, for the purpose of this analysis, the reaches were also conservatively considered Freeboard Deficient.

Along Fantine Kill, the top of levee elevations for the left descending and right descending reaches are estimated to be at or above the elevation of the 1-percent-annual-chance flood (except for potentially near the upstream end of the right descending reach; however, they do not meet minimum freeboard requirements and are considered Freeboard Deficient.

5.2 Natural Valley Procedure

The Natural Valley Procedure is completed for all levee systems to identify the potential leveed area associated with the 1-percent-annual-chance flood. This is completed through hydraulic modeling of a levee system as though it is not reducing flood risk and allowing flow to be conveyed on both the riverside and landside of the levee system while the levee

itself remains. For the levee reaches along Beer Kill, the traditional HEC-RAS 5.0.3 hydraulic analysis (1-Dimensional, steady flow) was enhanced to a 2-Dimensional, unsteady flow analysis to better capture the overland flow potential away from the channel.

5.3 Structural-Based Inundation Procedure

The Structural-Based Inundation Procedure incorporates a hypothetical breach analysis to evaluate the flood risk within the leveed area and was completed for all levee systems. The analysis was completed using HEC-RAS 5.0.3 (2-Dimensional, unsteady flow) at 3 hypothetical breach locations (typically upstream, central, and downstream) along each levee reach. For example, the Beer Kill Right Bank levee system was breached at 3 locations along the left descending reach of Sandburg Creek and at 3 locations along the right descending reach of Beer Kill. The resulting inundation area is a composite of the breach results for levee reaches. The breach locations were developed for modeling purposes only and do not indicate historic or future breach development at these locations.

5.4 Freeboard Deficient Procedure

The Freeboard Deficient Procedure can be applied if the 1-percent-annual-chance flood does not overtop the levee crest and levee crest does not meet the freeboard standards in 44 CFR§65.10. For Freeboard Deficient levee systems, the leveed area (as determined using the Natural Valley Procedure) is depicted as Zone D. The Zone D designation is a possible, but undetermined, flood hazard where property owners are not subjected to mandatory federal flood insurance purchase rules in situations where a mortgage is held on an insurable structure secured by federally-regulated loans. Zone D also gives communities discretion in the measures adopted for flood damage reduction under their floodplain management ordinance.

5.5 Sound Reach Procedure

A Sound Reach can be described as a reach of a levee system that meets minimum freeboard requirements in accordance with the standards in 44 CFR§65.10 and has been designed, constructed, and maintained to withstand the flood hazards posed by a 1-percent-annual-chance flood. A levee system comprised only of Sound Reaches would be considered an accredited levee system as each reach would meet all of the standards in 44 CFR§65.10.

Table 4 summarizes the potential application of the analysis procedure for each levee system broken down by reach.

Table 4. Ellenville FDRP Potential Analysis Procedures

Ellenville FDRP Levee System	Reach	Potential Application of Analysis Procedures				
		Natural Valley	Structural-Based Inundation	Overtopping	Freeboard Deficient	Sound Reach
Fantine Kill Left Bank	Fantine Kill Left Descending	✓	✓	✗	✓	✗
Beer Kill Left Bank/Fantine Kill Right Bank	Beer Kill Left Descending	✓	✓	✗	✓	✗[1]
	Fantine Kill Right Descending	✓	✓	✗	✓	✗
Beer Kill Right Bank	Sandburg Creek Left Descending	✓	✓	✗	✗	✓
	Beer Kill Right Descending	✓	✓	✗	✓	✗[1]

5.6 Review of Initial Data Analyses

It should be noted that the findings of the Initial Data Analysis are non-regulatory and are intended to inform the path forward for identification of flood risk associated with the levee system. The findings may be used for emergency planning purposes; however, they are subject to change and due process, and should not be used outside of this levee stakeholder group for any regulatory activities. The flood risk due to interior drainage in the leveed area is also not depicted and would need to be evaluated in the future prior to updating the FIRM.

The findings of the Natural Valley and Structural Based Inundation Procedures are shown by stream in Appendix H for ease of viewing. However, it should be noted that the impacts to the total leveed area of each levee system should be considered when evaluating the potential mapping options moving forward. Summary results from the Initial Data Analysis are included in Table 5 and shown in Figures 4 through 7.

[1] The Beer Kill Left Descending and Beer Kill Right Descending reaches may be considered Sound Reaches if the levee crest is found to be at or above minimum freeboard standards of 44CFR§65.10.

Table 5. Results from the Initial Data Analysis

Ellenville FDRP Levee System	Reach	Approximate Length of Levee Segment (ft)	Flooding Source(s)	Approximate # Structures Impacted	Comments: Natural Valley Procedure[2] (Figure 4)	Comments: Structural-Based Inundation Procedure[3] (Figure 5)	Comments: Freeboard Deficient Procedure[4] (Figure 6)	Comments: Sound Reach (Figure 7)
Fantine Kill Left Bank	Fantine Kill Left Descending	1,300	Fantine Kill	Natural Valley – 1 Structural-Based Inundation - 1	• Natural Valley inundation area more conservative than effective FIRM; however, overbank flooding not previously identified.	• More conservative results than Natural Valley Procedure. May be utilized for emergency planning.	• The Freeboard Deficient Procedure applies for the levee system if the top of levee is at or above the 1-percent-annual-chance flood, but the levee crest does not meet minimum freeboard requirements.	• Not applicable, levee does not meet minimum freeboard requirements.
Beer Kill Left Bank/ Fantine Kill Right Bank	Beer Kill Left Descending	3,800	Beer Kill	Natural Valley - 8 Structural-Based Inundation - 11	• Natural Valley inundation area adjacent to Fantine Kill similar to effective FIRM; however, Beer Kill Left Descending Natural Valley could inundate shared leveed area.	• More conservative results than Natural Valley Procedure. May be utilized for emergency planning.	• The Freeboard Deficient Procedure could apply for the levee system if the top of levee is at or above the 1-percent-annual-chance flood, but the levee crest does not meet minimum freeboard requirements.	• The Beer Kill Left Descending reach could be considered a Sound Reach[5] if levee crest meets minimum freeboard requirements. • Fantine Kill Right Descending – Not applicable but could be considered Freeboard Deficient.
	Fantine Kill Right Descending	1,650	Fantine Kill	Natural Valley – 2 Structural-Based Inundation -1				
Beer Kill Right Bank	Sandburg Creek Left Descending	2,500	Sandburg Creek	Natural Valley -1 Structural-Based Inundation - 4	• Natural Valley inundation area adjacent to Sandburg Creek similar to effective FIRM; however, Beer Kill Right Descending Natural Valley could inundate shared leveed area.	• More conservative results than Natural Valley Procedure. May be utilized for emergency planning.	• Freeboard is met along Sandburg Creek (Sound Reach); however, the Beer Kill Right Descending reach levee crest was approx. at or above the BFE except at N. Main Street. • The Freeboard Deficient Procedure could apply for the Beer Kill Right Descending reach if the top of levee is at or above the 1-percent-annual-chance flood.	• The Beer Kill Right Descending reach could be considered a Sound Reach[5] if levee crest meets minimum freeboard requirements. • If both levee reaches are Sound Reaches, the levee system could be considered accredited.
	Beer Kill Right Descending	6,900	Beer Kill	Natural Valley - 33 Structural-Based Inundation - 115				

[2] Depicts levee system as not reducing flood risk. No additional data required to support future analysis or mapping.
[3] Hypothetical levee breach analysis. No additional data required to support future analysis or mapping.
[4] Freeboard requirement (44 CFR§65.10(b)(1)) is not met, but the top of levee is above the 1-percent-annual-chance flood. Certified data compliant with 44§CFR 65.10 and Freeboard Deficient procedures required to support future analysis or mapping.
[5] All minimum requirements of 44 CFR§65.10 are met, including freeboard. Certified data compliant with 44 CFR§65.10 required to support future analysis or mapping.

Figures 4 and 5 show the approximate inundation areas for the 1-percent-annual-chance flood for all three Ellenville FDRP levee systems for the estimated Natural Valley and Structural-Based Inundation Procedures.

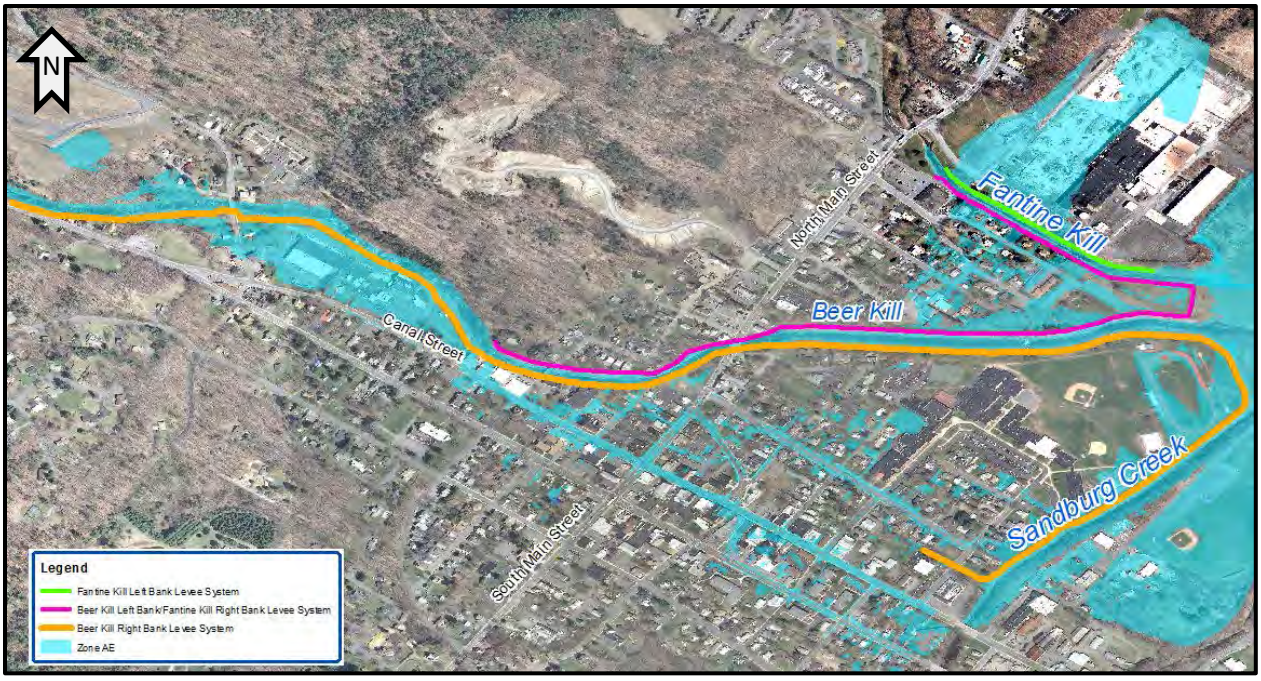

Figure 4: Natural Valley Procedure – All Levees

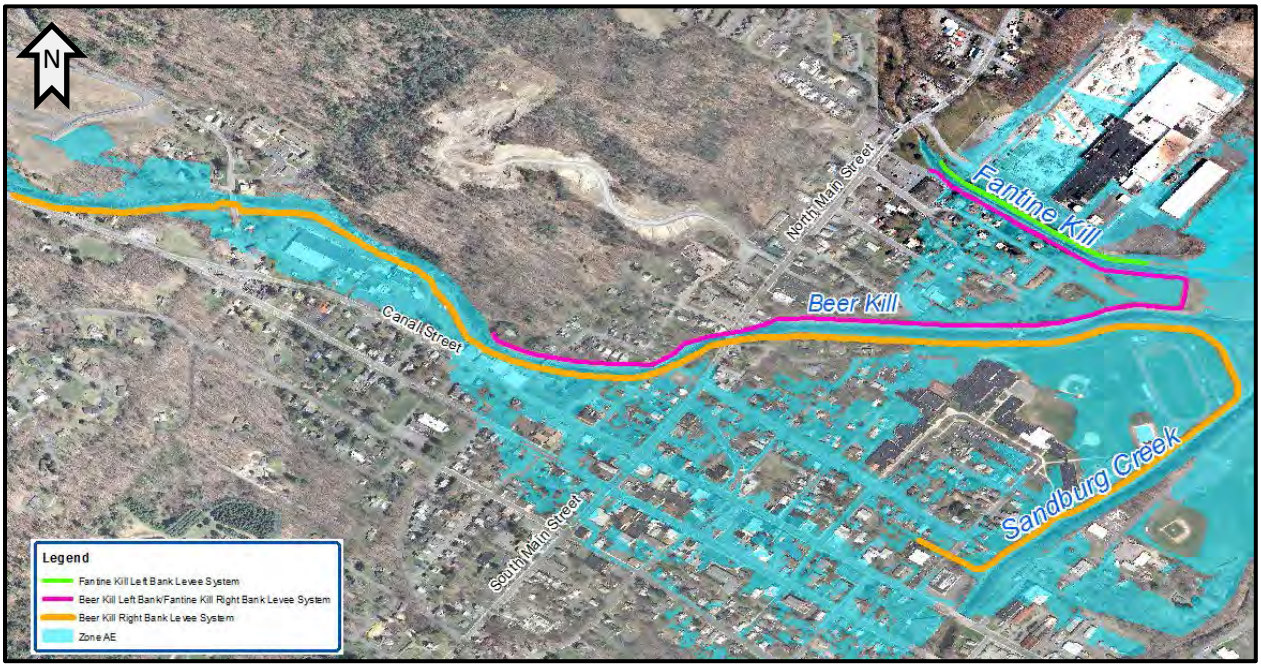

Figure 5: Structural-Based Inundation Procedure – All Levees

Figure 6 shows the approximate 1-percent-annual-chance flood inundation areas for the Fantine Kill and Beer Kill Left Bank/Fantine Kill Right Bank levee systems for the Freeboard Deficient Procedure. The approximate inundation area for the Beer Kill Right Bank levee system reflects the Freeboard Deficient Procedure for the Beer Kill Right Bank reach and the Sound Reach Procedure for the Sandburg Creek reach.

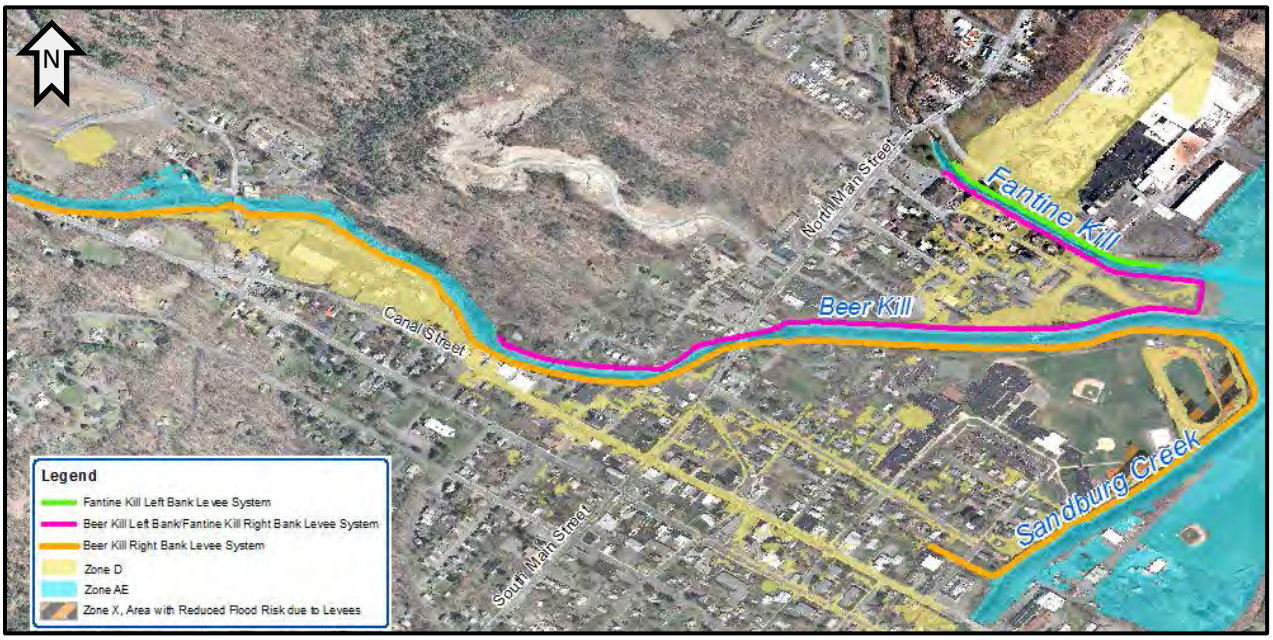

Figure 6: Freeboard Deficient Procedure – Ellenville FDRP

Figure 7 shows the approximate inundation areas for the 1-percent-annual-chance flood for the Beer Kill Left Bank/Fantine Kill Right Bank levee system and for the Beer Kill levee system under the Sound Reach Procedure. It should be noted that the inundation area for the Fantine Kill Right Bank reach of the Beer Kill Left Bank/Fantine Kill Right Bank levee system and the Fantine Kill Left Bank levee system are shown as Natural Valley since these levee crests are below the minimum freeboard requirements.

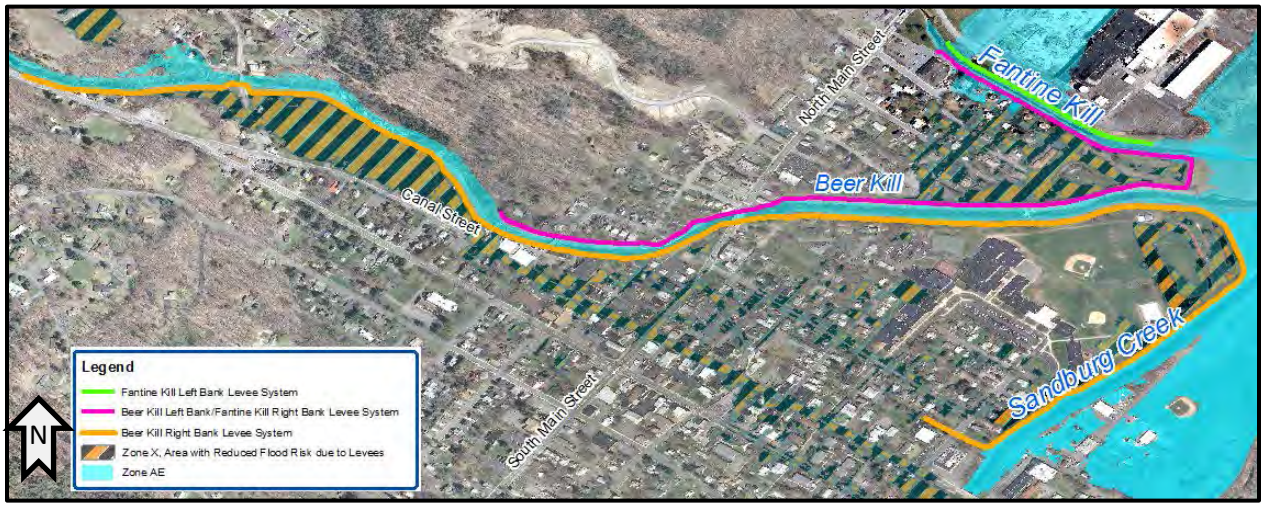

Figure 7: Sound Reach Procedure – Beer Kill Right Bank Levee, Beer Kill Left Bank Levee Reach of Beer Kill Left Bank Levee/Fantine Kill Right Bank Levee

6 Path Forward

6.1 Levee Analysis and Mapping Procedures

The Ellenville FDRP included in this study is shown as non-accredited on the effective FIRM. No certified documentation is available to show the Ellenville FDRP meets the minimum requirements of 44CFR§65.10 of the NFIP Regulations. At the request of the Village of Ellenville, FEMA engaged the community through the Levee Analysis and Mapping Procedures process to help identify potential options to evaluate the flood risk for the leveed areas of the Ellenville FDRP. The Village is currently considering Freeboard Deficient Procedure and accreditation to depict the flood hazard for leveed areas of the Ellenville Levee; however, they are currently weighing the costs and benefits prior to moving forward.

Should the community be able to provide certified data in support of all minimum requirements of 44 CFR§65.10 for a levee system, the levee system could be shown as accredited with the flood risk of the leveed area shown as shaded Zone X.

Should the community be able to provide 44 CFR§65.10 compliant data for a levee system, for all but freeboard criteria (Freeboard Deficient Procedure), and the top of levee elevation is certified to be at or above the 1-percent-annual-chance flood, the flood risk of the leveed area could be shown as Zone D.

If the community does not provide 44 CFR§65.10 compliant data, the effective FIRM dated November 17, 2016 will not be changed until warranted by future mapping updates.

Due to the recent flood risk mapping for the levee system becoming effective November 18, 2016, FEMA does not anticipate updating the flood risk maps in the near future;

however, 44 CFR§65.10 compliant levee data in support select levee analysis and mapping procedures may be submitted at any time through the LOMR process to update the FIRM. It is recommended that the community coordinate with FEMA Region II in advance of any submittal to keep the Region apprised of the status of the levee systems. FEMA's Levee Accreditation Checklist has been included in Appendix F for reference.

7 References

FEMA: Non-Accredited Levee Analysis and Mapping Guidance, September 2013

USACE, National Levee Database (GeoDatabase Version 3.0 dated 07-28-2015), 2015.

Appendix A
Stakeholder Engagement - LLPT Meeting 1 Information

Appendix B
Stakeholder Engagement - LLPT Meeting 2 Information

Appendix C
Stakeholder Engagement - LLPT Meeting 3 Information

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Freeboard Profile Comparison

Appendix E
Site Photographs

Appendix F
Levee Accreditation Checklist

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Collected Data

Appendix H
Initial Data Analysis