

**ROLL CALL ORDER FOR MEETING OF  
July 23, 2018**

**Buol, Del Toro, Jones, Larson, Resnick, Rios, Shaw**



**CITY OF DUBUQUE, IOWA  
CITY COUNCIL MEETING  
Historic Federal Building  
350 W. 6th Street  
July 23, 2018**

**Council meetings are video streamed live and archived at [www.cityofdubuque.org/media](http://www.cityofdubuque.org/media) and on Dubuque's CityChannel on the Mediacom cable system at cable channel 8 and digital 117.2**

**SPECIAL SESSION**

**6:00 PM**

**WORK SESSION**

**1. Levee/Floodwall Breach Study**

City staff and an HDR representative will conduct a work session / presentation on the Levee/Floodwall Breach Study.

**ADJOURNMENT**

The agenda with supporting documents may be accessed at [www.cityofdubuque.org](http://www.cityofdubuque.org) or at the City Clerk's Office, 50 W. 13th Street, during regular business hours.

This notice is given pursuant to Chapter 21, Code of Iowa, and applicable local regulations of the City of Dubuque, Iowa and/or governmental body holding the meeting.

Any visual or hearing impaired persons needing special assistance or persons with special accessibility needs should contact the City Clerk's Office at (563) 589-4100 or TTY/TTD (563) 690-6678.

## City of Dubuque

## Work Session - Bottom # 1.

---

---

**ITEM TITLE:**

Levee/Floodwall Breach Study

**SUMMARY:**

City staff and an HDR representative will conduct a work session / presentation on the Levee/Floodwall Breach Study.

**SUGGESTED DISPOSITION:**

**ATTACHMENTS:**

**Description**

Levee/Floodwall Breach Study-MVM Memo  
Staff Memo  
Presentation Outline

**Type**

City Manager Memo  
Staff Memo  
Supporting Documentation

**TO:** The Honorable Mayor and City Council Members  
**FROM:** Michael C. Van Milligen, City Manager  
**SUBJECT:** Levee/Floodwall Breach Study  
City Council Work Session  
**DATE:** July 19, 2018

City Engineer Gus Psihoyos is transmitting information for the Levee/Floodwall Breach Study Work Session. City staff and a representative from HDR will make a presentation.

  
\_\_\_\_\_  
Michael C. Van Milligen

MCVM:jh  
Attachment

cc: Crenna Brumwell, City Attorney  
Teri Goodmann, Assistant City Manager  
Cori Burbach, Assistant City Manager  
Gus Psihoyos, City Engineer

**TO:** Michael C. Van Milligen, City Manager

**FROM:** Gus Psihoyos, City Engineer  
John Klostermann, Public Works Director

**DATE:** July 19, 2018

**SUBJECT:** Levee/Floodwall Breach Study, City Council Work Session

### **INTRODUCTION**

The purpose of this memorandum is to outline the information to be presented at the City Council Work Session scheduled for July 23, 2018.

### **BACKGROUND**

The John C. Culver Floodwall system was designed to protect the City of Dubuque from Mississippi River floods. It was authorized by the federal Flood Control Act of 1962. Construction began in 1968 and was completed in 1973.

Dubuque's "Floodwall Protection System" consists of earthen levees (22,500 ft.) and concrete floodwalls (7,120 ft.) stretching from the upstream Lock & Dam 11 to the downstream end of the city near Maus Park. It provides protection against a Mississippi River flood up to river stage 28.3. Since the turn of the 20<sup>th</sup> century, the highest recorded flood stage is 26.81. The Flood Control System includes gravity outlets for discharge into the river at low stages and pumping stations and ponding areas for use when the Mississippi River is high.

Funded and built by the U.S. Army Corps of Engineers (USACE) and operated and maintained by the City of Dubuque, the Floodwall Protection System protects thousands of properties and thousands of people from Mississippi River flooding. According to the USACE, the Flood Protection System "has prevented an estimated \$103,955,700 in flood damages as of 2009."<sup>1</sup>

In exchange for the USACE agreeing to fund and construct the Flood Protection System, the City of Dubuque agreed to maintain and operate the floodwall system after completion in accordance with regulations prescribed by the USACE.

The USACE conducts two types of inspections to help ensure the Flood Protection System is adequately operated and maintained: periodic inspections and annual inspections. In both cases, the inspections usually conform to the following process:

- Joint inspection of the Flood Protection System by USACE and City staff;
- USACE provides a report to the City with inspection findings and recommendations;
- Independent inspection and corrective actions are undertaken by the City; and
- City submits a report to USACE outlining actions taken or planned to correct defects noted in the USACE inspection report.

---

<sup>1</sup> U.S. Army Corps of Engineers - Rock Island District, "Engineering Technical Review Report Existing Flood Risk Management Levee System – Dubuque, Iowa," (2010).

Based on the inspection, the USACE rates the levee system as Acceptable, Minimally Acceptable, or Unacceptable.

A Periodic Inspection occurs every five years when the USACE activity is funded. Usually performed by a third party, the Periodic Inspection is more comprehensive than the Annual Inspection. The last Periodic Inspection was conducted in 2010 and its findings issued in March of 2011. The USACE rated the levee system as Minimally Acceptable. According to the USACE, there were some system elements inspected and rated as Minimally Acceptable and some as Unacceptable. Moreover, through engineering determinations, they concluded that the Unacceptable items would not prevent the system from performing as intended during a flood event.<sup>2</sup> The City subsequently addressed the issues within the corrective action period. Based on the 2017 USACE annual inspection, the Flood Protection System was determined to be “Acceptable,” the highest rating given.

Recognizing the fact that levees do fail, the City set aside funding in FY2014 for the Floodwall Breach Analysis. The stated purpose of the study was to “identify actions that could be taken in the event of a floodwall failure to reduce the flood and limit property damage.” After reaching out to the USACE, the City’s primary partner when it comes to the Flood Protection System, the City was informed that the USACE had been involved with a similar effort for the City of Muscatine and another was planned for the City of Cedar Falls. And in August of 2014, the USACE was able to secure federal funding to prepare a levee breach analysis for the City of Dubuque.

## **DISCUSSION**

The levee breach study was not initiated because of any known imminent risk of failure to the levee system that protects Dubuque, but instead as an effort to improve emergency planning and communication of the potential risks associated with the levee.

The USACE created a sophisticated computer model that can predict the depth of inundation, time to inundation, and inundation paths at critical locations for hypothetical levee breach scenarios. The main goal of the USACE’s work was to further advance their new computer software tool [HEC-RAS 5.0]. But the work also helped to further their mission to ensure that the public understands the risks of “living behind a levee.” The USACE levee breach analysis serves as a starting point for additional more detailed analysis of evacuation routes, potential flood hardening, and overall resiliency planning and design.

The City hired HDR, Inc (HDR), an engineering consultant, to advance the 2-D modeling. While the USACE model helps to reinforce the idea that there are risks associated with “living behind a levee,” the work of HDR provided for a model that can be used by the City to identify what might be done before, during, and after a levee breach to mitigate the threat to human safety/health and property.

City staff and a representative from HDR will present more detailed information and lead the discussion. An outline of the presentation is attached.

## **REQUESTED ACTION**

No action is required. This memo is for informational purposes only.

---

<sup>2</sup> Out-Brief Meeting, Periodic Inspection: Dubuque System, HNTB-Gerwick River Solutions, (2010)

Prepared by Deron Muehring  
Attach.

Cc: Teri Goodmann, Assistant City Manager  
Laura Carstens, Planning Services Manager  
Kyle Kritz, Associate Planner  
Randy Gehl, Public Information Officer  
Deron Muehring, Civil Engineer

Outline  
Presentation to City Council on July 23, 2018  
Levee Breach Study

1. History of DBQ floodwall system
2. City Operation
3. USACE Oversight
4. USACE Modeling
  - a. 2-D
  - b. Five breach locations for one river stage (28.3), a 1,000-year event
5. Des Moines Levee Breach (2008)
6. HDR Modeling
  - a. HDR efforts compared to USACE
    - i. Additional breach locations
    - ii. Multiple river stages
    - iii. Refined break-lines
    - iv. Incorporated buildings & streets
    - v. Statistically reduced infinite number of breach scenarios to most likely scenarios
  - b. Researched flood barrier products
  - c. Model output
    - i. Video of model running for a particular scenario based on breach location and river stage
    - ii. Ultimate depth at various locations
    - iii. Travel time information
      1. Time to 1-foot at location - why important
      2. Time to ultimate depth at location (flood proof, future renovations to consider)
7. How the model output can be utilized
  - a. Private facility use
    - i. Pre-breach, floodproof doors/windows
    - ii. Site Renovations, rebuild facilities to take the information into account and avoid future flooding
    - iii. Know how high to place sandbags
    - iv. Know how much time they would have to evacuate (18 inches of water can float a car)
  - b. City use
    - i. Pre-breach
      1. Floodproof doors/windows
      2. Site Renovations
    - ii. During breach
      1. Utilization of interior flood barriers to limit the spread of floodwaters
      2. Provide info on availability of streets for evacuation purposes. (citizens driving out of the area)
      3. Provide info on the available time to evacuate a specific facility

## 8. Introduce Documents

- a. Levee Breach Analysis Modeling Report (description of the study)
- b. Levee Breach Flood Mitigation Tools (Appendix C)

- i. Overview

- ii. Example

1. Where can the City erect HESCO barriers?

- Where will time allow barriers to be erected?
- How long will it take to build: reference table showing time required and material required
- How long before floodwaters reach area: Reference figure showing time to 0.1 feet and figure showing time to 1 foot of water

2. What streets can be used for evacuation routes and for how long.

3. Time available to evacuate a facility by vehicle versus boat

## 9. Next Steps