Council Bluffs and Pottawattamie County Flood Protection and Prevention Efforts

COMMUNITY FLOOD
OUTREACH FORUM
May 26, 2011

Greg Reeder, P.E.
Public Works Director

LEVEE AND PUMP STATION OVERVIEW
LEVEE AND PUMP STATION MAINTENANCE
LEVEE AND PUMP STATION OPERATION
LEVEE CERTIFICATION
EMERGENCY RESPONSE

Council Bluffs
IOWA'S LEADING EDGE

LEVEE SYSTEM & PUMP STATION OVERVIEW

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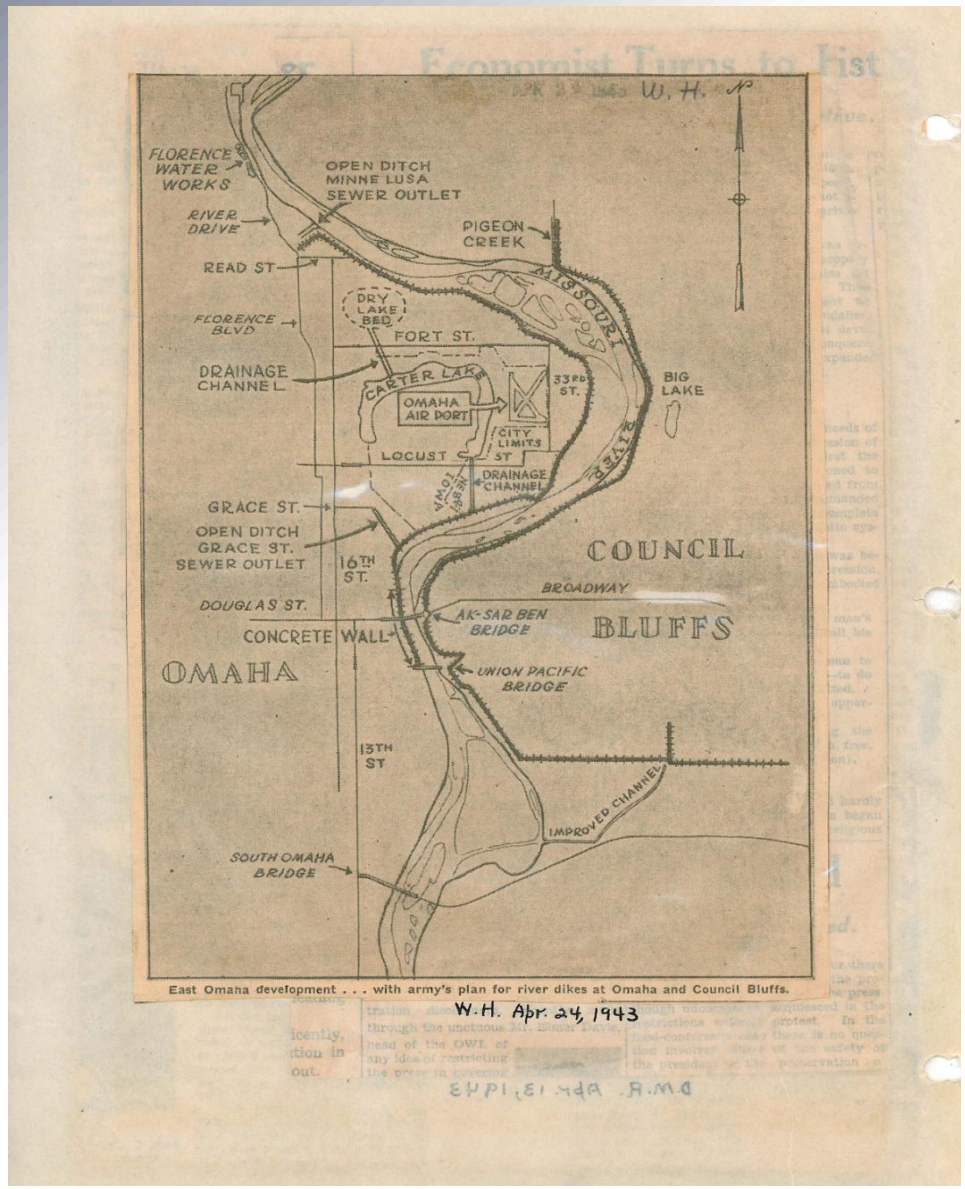
LEVEE HISTORY

- Established by Congressional acts in 1936 & 1944
- USACE Report, 1947
- Built in late 1940's to early 1950's



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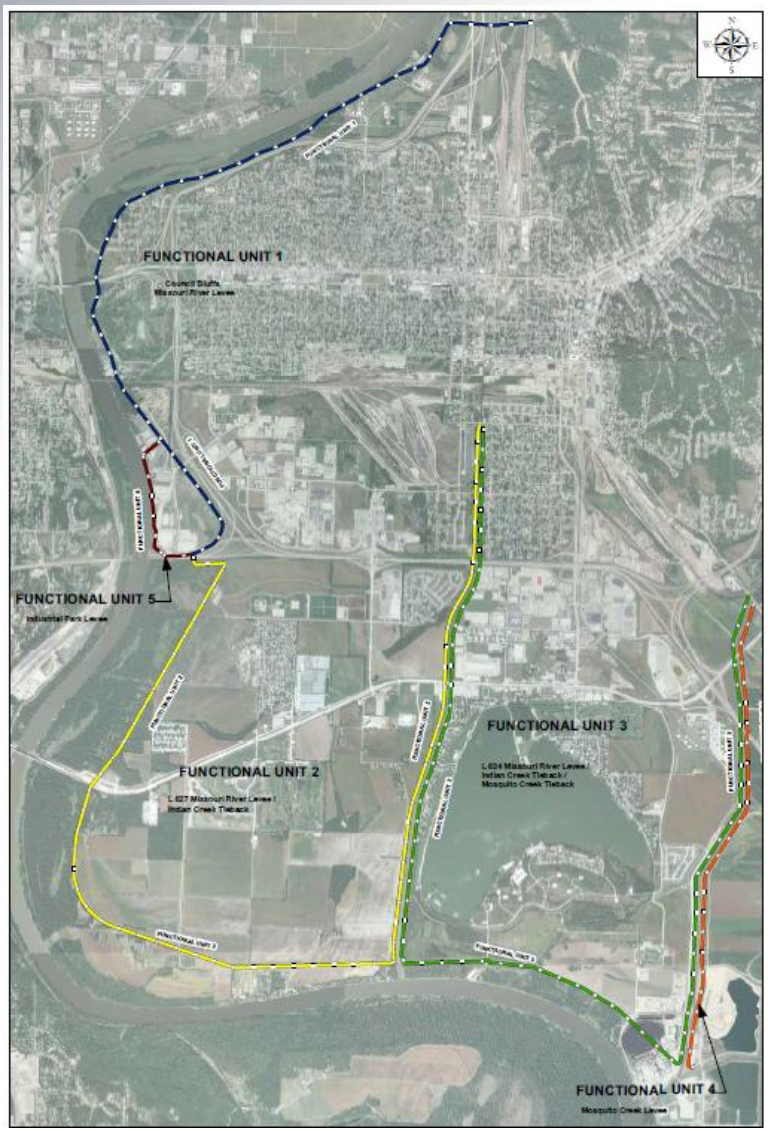
- 28.5 Miles of Levee
  - Missouri River
  - Indian Creek
  - Mosquito Creek
- 16 Storm Water Pump Stations
- 45 Gate Structures
- 173 Relief Wells



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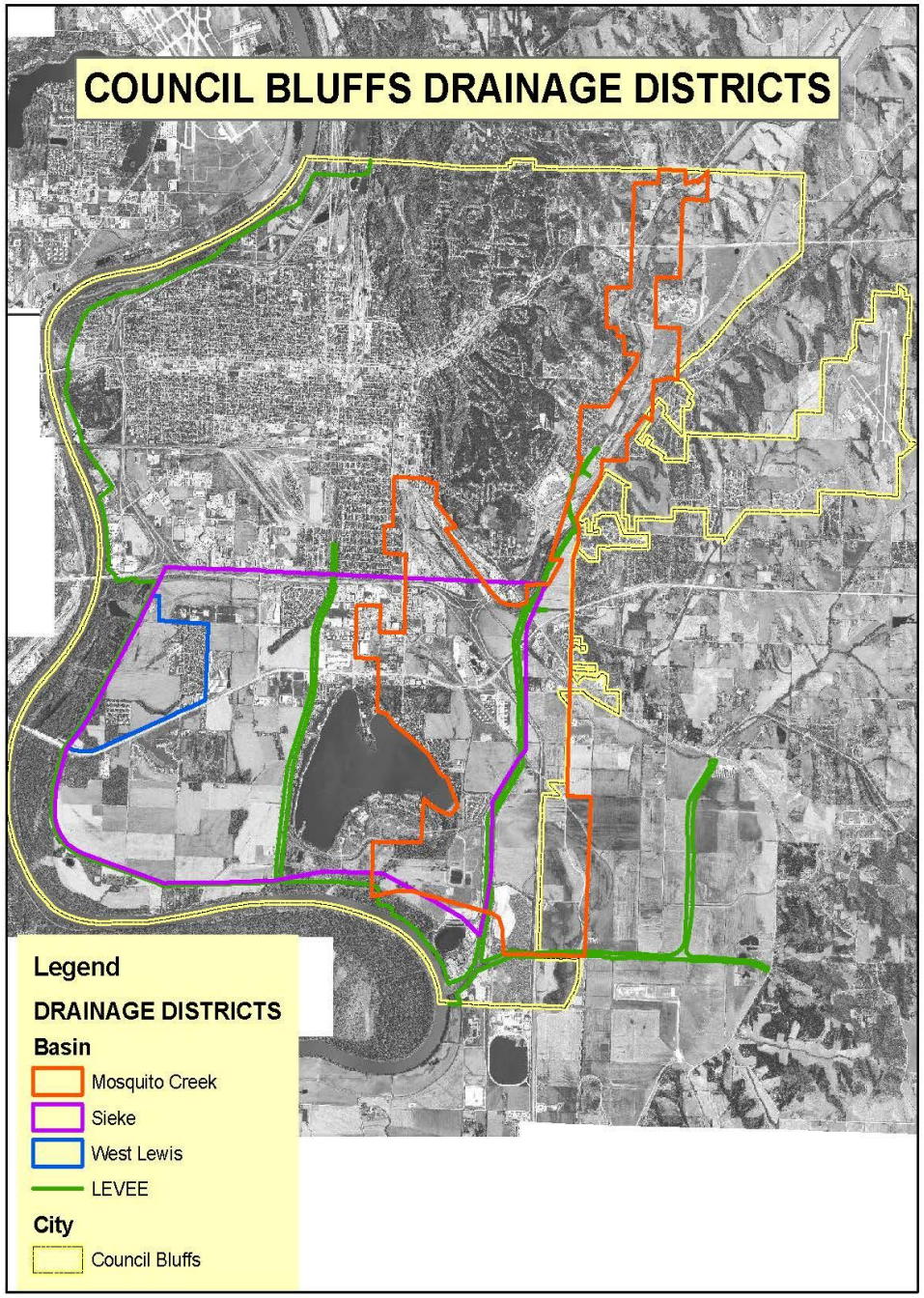

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PART OF FEDERAL LEVEE SYSTEM

- Originally constructed under Congressional Act
- Acceptable standing with USACE

L624 Missouri River Left Bank, Indian Creek Left Bank, and Mosquito Creek Right Bank

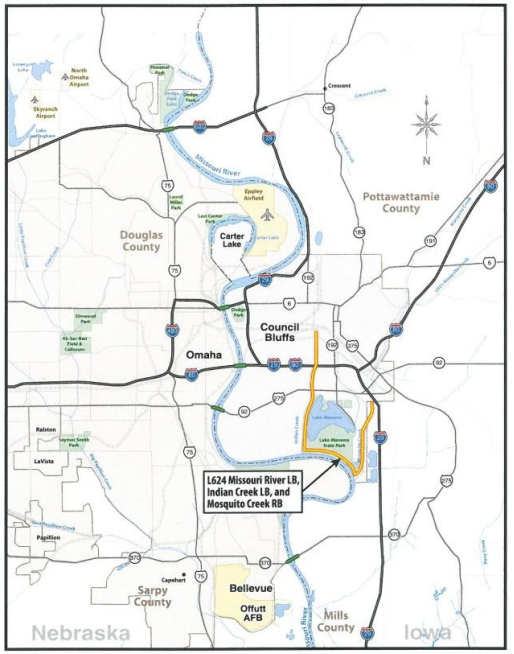
Pottawattamie County, Iowa
City of Council Bluffs, Iowa

Levee Inspection Report
Periodic Levee Inspection No. 1

December 2010

Contract No. Contract No.:
W912DQ-09-D-1005
Task Order No. 1

US Army Corps of Engineers®
Omaha District



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HDR Engineering, Inc.
8404 Indian Hills Drive
Omaha, NE 68114

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LEVEE OPERATIONS & MAINTENANCE

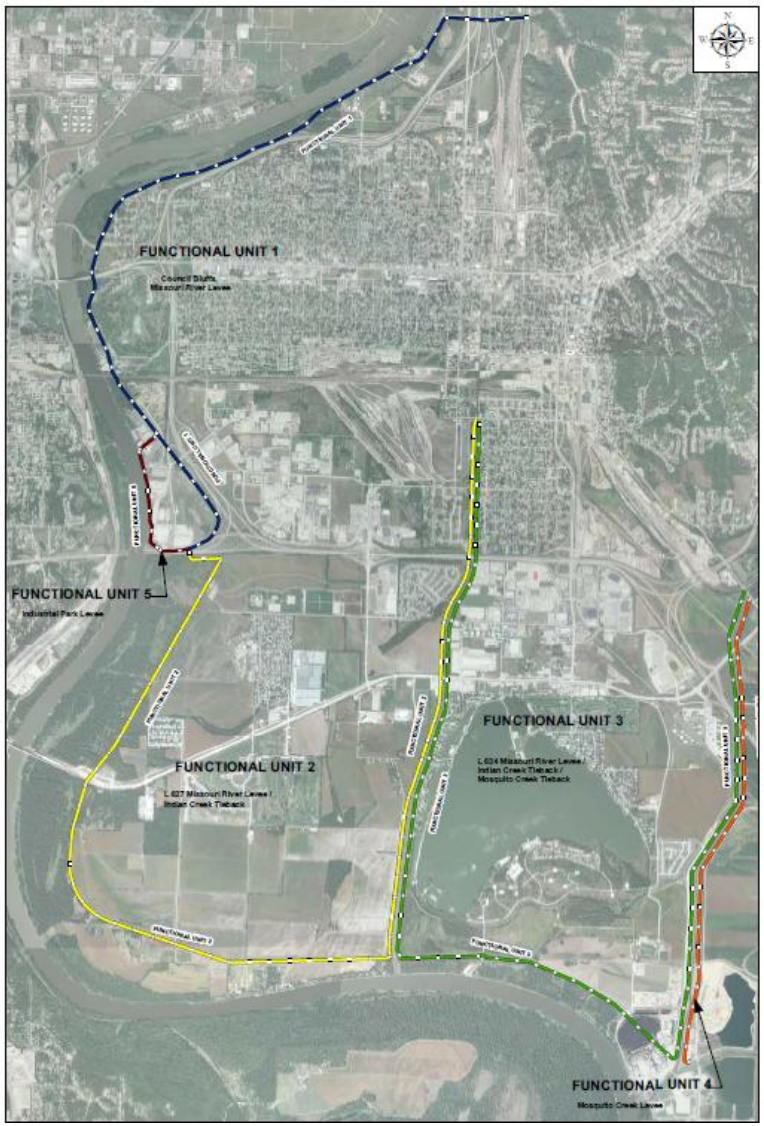
Pat Miller
Public Works Operations Director

The System

Maintenance on the levee banks, gate structures, pump stations and relief wells is performed by Sewer maintenance staff.

Mowing of the levee is outsourced.

Levee maintenance is funded with City general fund levee, Seick, Mosquito and West Lewis drainage funds.



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Levee

The levees serve as flood walls protecting much of the city from the flooding river and creeks. Maintaining the integrity and remedying any adverse conditions of embankments is essential in keeping them fully functional in the case the river floods.

The embankment and toe of the levee must be sound with a growth of grasses to promote stability. It must also be free of obstructions such as trees, shrubs and burling animals.

Trees and shrubs must be removed and not allowed to grow within 15 feet beyond the toe of the levee. Periodic mowing is essential to maintain a good grass growth and is done at intervals necessary to help control weeds and other noxious grasses. Mowing is performed 15 feet beyond the toe of the levee.

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Sluice Gates

The levee has 44-flood Sluice gates.

Sluice gates are large screw gear driven steel gates usually incased in a concrete structure at the end of drainage ditches or storm pipes that run under the levee allowing storm water to flow into the river or creeks during normal river levels and normal operations.

During high river flows, and beginning at approximately 24', crews begin to close gates to prevent water from flowing back into drainage structures.

At this point the storm water is pumped into the river or creeks by storm water pump stations which we will discuss later in the presentation.

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Sluice Gates

These two photos show a typical closed sluice gate. as you can see the river has risen to a point that water will soon begin to back flow through the gate, and pipe or ditch, preventing flow from or causing flow back into the city.

<u>At this point and time the river has risen to 26.7 feet and the gates are closed.</u>

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Sluice Gate Maintenance

Sluice gate are set up on periodic maintenance schedules, where as, during normal operation and average flows the gates are serviced semi -annually.

The maintenance schedules and procedures are monitored through Public Works' asset management work order system.

The work orders are generated automatically with maintenance instructions that include checking the structure, checking the gate for debris, greasing and operating the gate fully closed and back to the open position.

The work and materials are recorded and the schedule resets for the next maintenance period.

During high flows the gates are monitored and maintenance is performed daily for proper operation and cleaning of debris.

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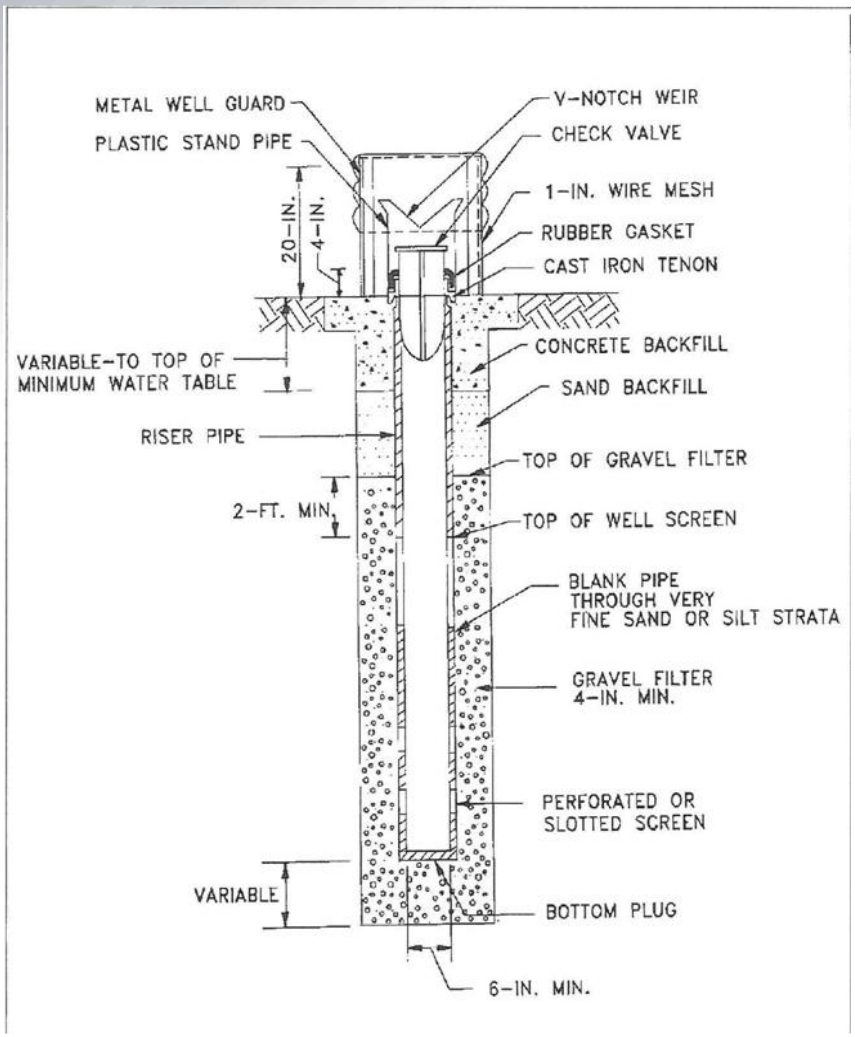
Relief Wells Operation

The levee has 173 relief wells which are used extensively to relieve excess hydrostatic pressures in the previous foundation of the levee.

A simple description of relief well function is, as water rises against the levee and remains against the levee, the water will eventually saturate into the levee structure and in time could weaken the structure.

The relief well is designed to drain down the excessive water by allowing it to seep into the well and then moving it to the surface. When the water reaches the surface it is either allowed to flow into drainage ponds or is drained into a ditch, which flows to a pump station which will pump the water over and back to the river or creek.

The important function of the wells is to relieve the hydrostatic and uplift pressures in the levee.



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Relief Well Maintenance

The Corps of Engineers recommends testing and maintenance every 5-years for each well.

The wells are checked for depth in accordance with OEM manual per well. This is done by a method described as sounding the well. A weight on a string is lowered to the bottom of the well and then measured and compared to required depths in the OEM manual.

If it is found that the well is a bit shallow due to debris and silt, a pumping system is used to clean the well and is then retested.

Once the cleaning and depth of the well is established and meets OEM standards the well is then drawn down and checked for proper underseepage of water back into the well as per OEM requirements.

Relief Well Maintenance

The photo above shows dirt and silt water being cleaned from a well.

The photo above shows a cleaned well being pumped down for inflow underseepage testing.

All the maintenance is recorded in the Public Works asset management work order system and the next PM for the well is set for 5-years in the future to be automatically created by the system.

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Pump Station Operation

The city has some 15 pump stations that vary in size. There are small 4"-6" petroleum (diesel) and electric driven trash pumps stored inside small structures.

Also, larger high capacity stations such as the one shown (River Road Station) with multiple large electric driven 24,000- 47,000 GPM pumps which pump storm water from larger areas.

Some of these stations also run on back-up generators in the case of power outages.

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Pump Station Operation

Example of the River Road pump station running one of three pumps available. During a heavy event there are two more larger capacity pumps that can operate if needed.

Trash Racks such as the one shown to the left are used at many of the stations to remove debris from storm water entering the pump systems such as leaves, bottles, cans and other debris that finds its way into the storm system.

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Pump Station Maintenance

Pump stations are set up on regular preventive maintenance schedules through the Public Works Asset management and work order system.

During the inspections pumps are started, lubricated ,and tested for operation.

Many of the larger stations are setup on a monitoring system (SCADA) which will inform staff if there is a problem with the station and what is malfunctioning.

The picture to the right shows a large pump being removed from a station for repairs with the use of a crane. Most pump stations are designed with roof hatches above the pumps for removal, repair and replacement.

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Closing Remark

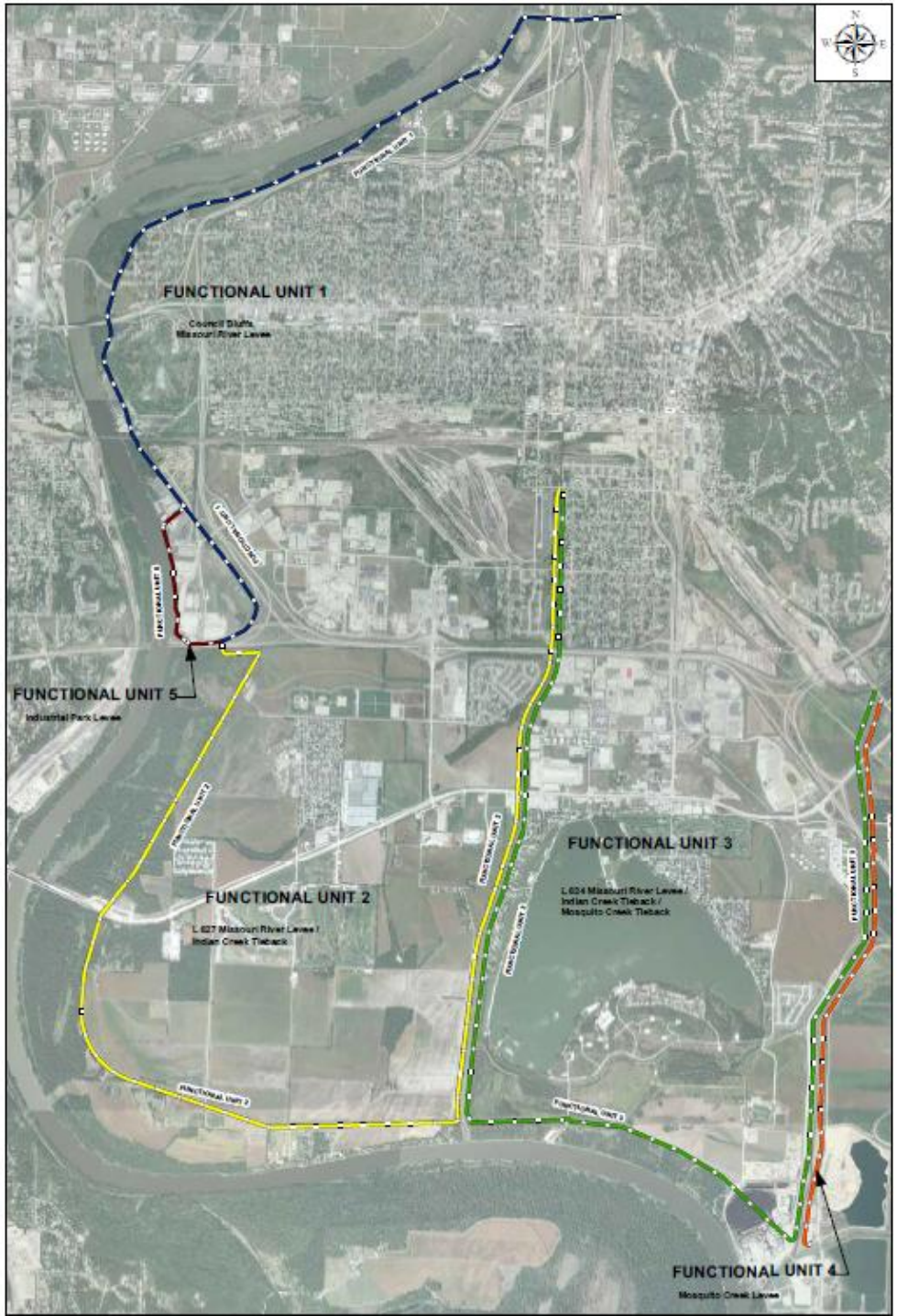
The proper operation and maintenance of our levee system is a challenging and complex responsibility, but is vital to Council Bluffs. When the water rises, it can be quite sobering when one realizes that the river on the other side of the floodwall or levee is actually flowing above the ground level, and that a simple wall or levee is the only thing keeping it from crashing down and filling your streets. This is when all of our maintenance and vigilant preparation pays off.

LEVEE CERTIFICATION

Matt Cox, P.E.
City Engineer

Separate PAL Agreements by Functional Unit

- Missouri River
- Indian Creek
- Mosquito Creek
- Industrial Park



Existing Levee System shown as 100-year Flood Protection on FIRM

FEMA update to DFIRM

City signs PAL Agreements

Levees shown on Preliminary Map as Provisionally Accredited

City has 2 years to provide documentation to FEMA for Levee Certification

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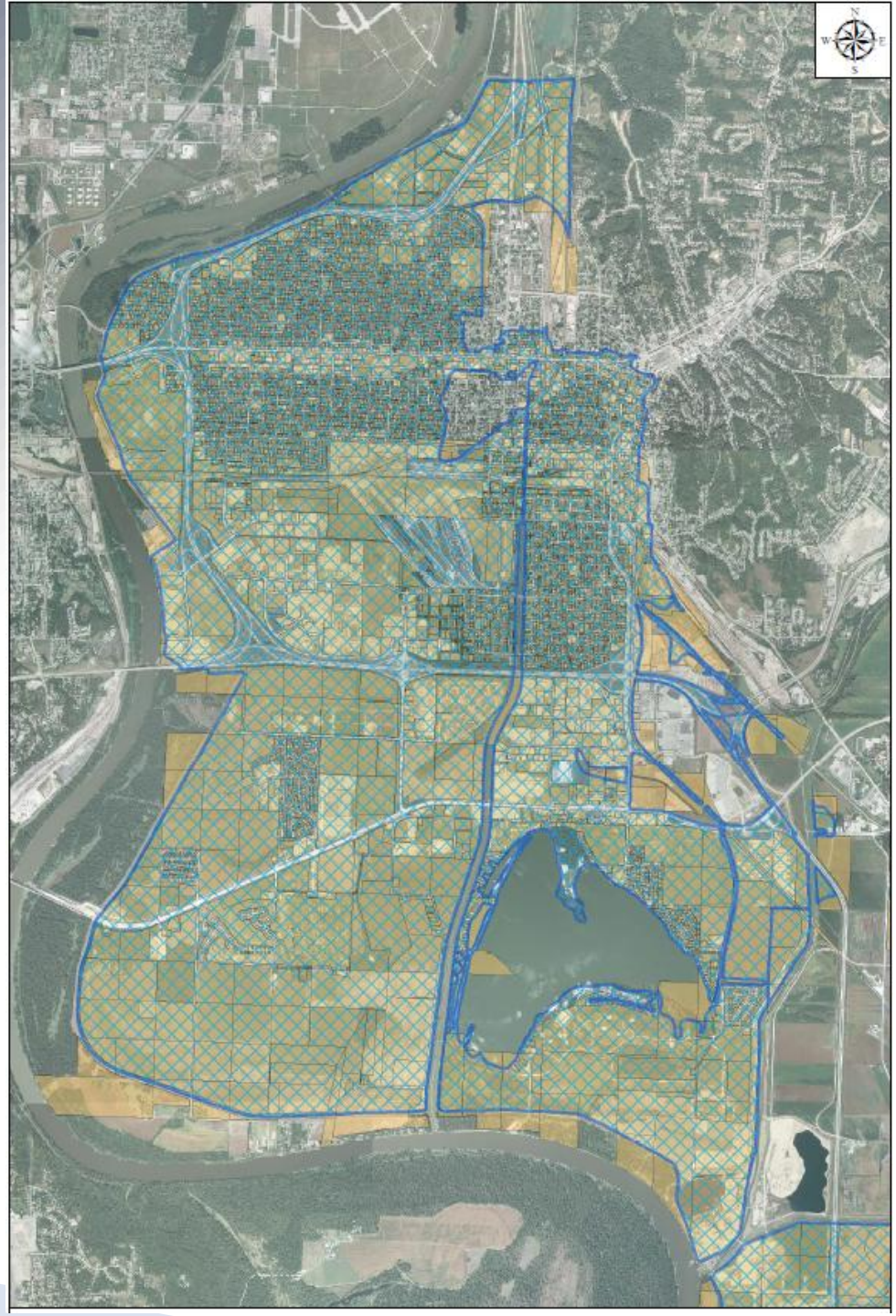
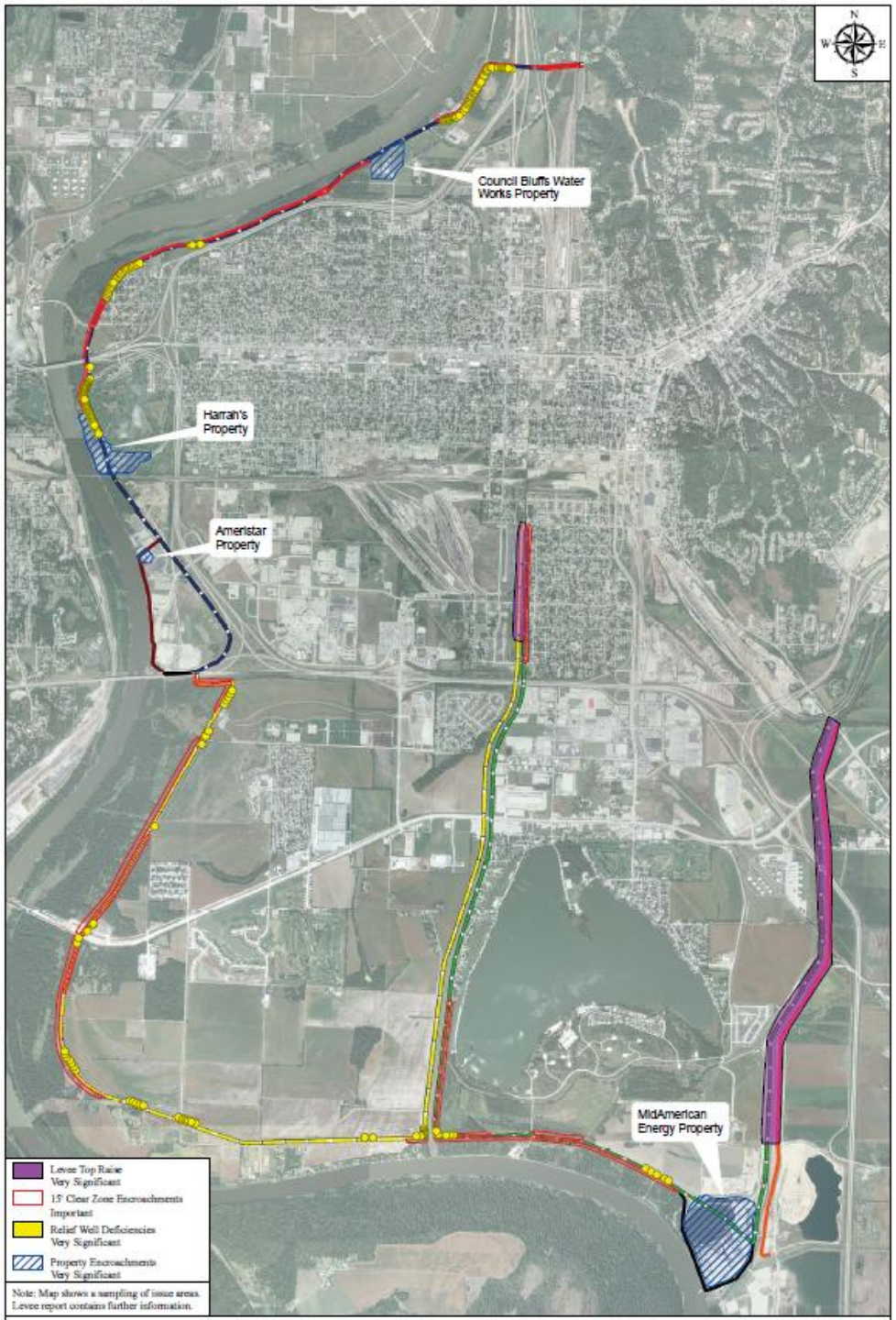
Area of City Protected by Levee System



Existing Levee Concerns

- Levee Height
- Clear Zone Encroachments
- Relief Well Deficiencies
- Property Encroachments



Certification Criteria

- Freeboard, Closures, Embankment Protection, Embankment and Foundation Stability, Settlement, Interior Drainage and O&M

Certification Key Issues

- USACE reviews all “significant” modifications to a Federal levee
- Construction costs for improvements estimated as high as $20 Million
- Does not guarantee against flooding

FLOOD AND SEVERE WEATHER WARNING

Alan Byers
Fire Chief

City of Council Bluffs Flood and Severe Weather Warning

- Emergency Broadcast System
- Severe Weather Warning Sirens
- Media Broadcasts
- Emergency Responder Area Response
- Code Red Warning Notification

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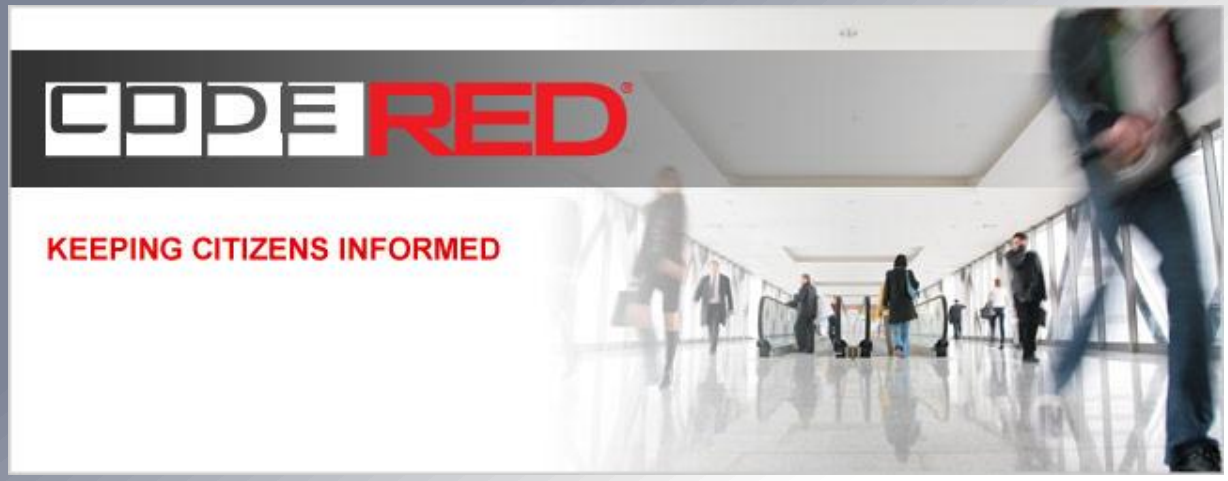
Code Red Emergency Alert System

- Code Red is a product provided by Emergency Communications Network
- Code Red is an emergency alert system provided throughout Pottawattamie County
- Code Red consists of two different warning systems:
  - The basic Emergency Notification System where emergency notification calls can be made to the entire County, selected cities or to specific areas affected by an emergency
  - The “Weather Warning” System which citizens must sign up to be notified when a severe thunderstorm warning, tornado warning or flood warning is issued for the area they reside in



Flood Awareness Uses

- Community notification of flooding potential for area
- Evacuation preparation notice to specific areas of the City and County
- Notification to residents of evacuation routes, shelters, registration sites
- Emergency evacuation notice

Code Red Area Specific Warnings and Notification

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Code Red
Emergency Notification Enrollment

- City Web Site: www.councilbluffs-ia.gov
  or call (712) 328-4646
- County Web Site: www.pottcounty.com
  or call (712) 328-5777

CODERED weather WARNING

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