

Cedar Lake Study Committee Update

Infrastructure Committee Meeting

March 15, 2016

Study Committee Makeup

- Friends of Cedar Lake: Dale Todd, Felicia Wyrick
- Alliant Energy: Mary Meisterling, Jenna Wischmeyer
- Linn County: Linda Langston, Ben Rogers
- City of Cedar Rapids Steve Hershner, Ralph Russell

Meetings started: Spring 2015

Friends of Cedar Lake activities:

- Working for several years
- Lots accomplished including:
 - Inventory of physical features around the lake
 - Research on sampling and testing of water and sediment (majority is late 90's and before)
 - Investigation of potential grant funding
 - Numerous communications with DNR, EPA and USGS
 - Held numerous public meeting
 - Prepared Master Plan for development of Cedar Lake (Confluence)
 - Potential uses include fishing, public lawn, picnic area, walking & bike trails, canoeing and kayaking, lowland prairie, wetland prairie, boardwalk over water, sand shoreland & boat launch, overlook, public art, playground, urban dog park, murals on underpass, illuminated pedestrian bridge, vegetated floating islands, sediment removal, ADA accessibility, etc.
 - Estimated development cost: \$8.8 million
 - Preliminary negotiations with USGS for cost sharing in sampling and testing.
 - Other activities

Alliant activities, interests and responsibilities:

- Very cooperative and interested in working with City:
- Identifying environmental liabilities that they may have caused
 - Completed Phase I Environmental Assessment at their expense and shared with CLSC.
- Finishing demo of plant (foundations remain)
- Reached agreement with City to leave foundations in and permit open to observe for few years.
- Interested in ultimately divesting ownership in the property

Linn County activities and interests:

- Very involved in all meetings and activities to date:

- Interested in acquiring the property if the City of CR does not move forward on acquisition.
- Potential source of funds for development.

City of Cedar Rapids interests and activities:

- Facilitated CLSC meetings.
- Organized and managed the public input process (Jennifer Pratt, Bill Michael)
 - Potential identified uses include many of the same uses identified in the Friends of Cedar Lake Master Plan as well as a few others.
- Numerous conversations with IDNR, EPA and USGS.
- Prepared a Phase II Environmental Assessment (Brownfield) Grant Application
 - Submitted late in December 2015
 - Awards will be announced in April 2016
 - If successful, CR will be grant recipient and administrator.
 - If successful, will do RFP in summer 2016 for consultant to perform Phase II.
 - If successful, funds will be available to start work in October 2016
 - Completion of Phase II – TBD
- Community Development Department is taking lead on all activities on behalf of City staff.
- Parks Department (Sven) providing input on all activities including potential future development around Cedar Lake.

Concerns:

- Identifying potential environmental liabilities of property before acquisition by City.
- Identifying potential environmental liabilities on adjacent property.
- Silt and sediment load from Kenwood storm sewer.
- Extent of sedimentation and makeup of sediment.
- Direct connection to the Cedar River

Future activities:

- Council resolution identifying intent regarding leading development of Cedar Lake. (March 22 or April 12)
- Continued involvement by Community Development Department going forward.
- Completion of Storm Sewer Master Plan
- Authorization and preparation of a Kenwood drainage basin Watershed Plan.
- Locate other funding in the event we are not successful on the Brownfield grant
- Negotiate cost sharing sampling and testing with USGS (work that would not be eligible for payment under Brownfield grant.)
- Remediation of environmental liabilities, if any. (Alliant and others)
- Negotiation of acquisition of Cedar Lake with Alliant.



To: City Council Infrastructure Committee
From: Bruce Jacobs
Subject: Update – Aquifer modeling project with USGS
Date: March 15, 2016

Background:

The Cedar Rapids Utilities Department – Water Division and the USGS have begun work on a third-generation Cedar River alluvial aquifer model with a completion date set for September 2017. The model will provide the City of Cedar Rapids with the ability to plan for changes in aquifer capacity while meeting future municipal water supply needs. The model is building on knowledge gained from surface-water and groundwater data collected during the previous two decades, and in the wake of the 2012 drought, and is being augmented with new data and analysis aimed at better understanding the effects on flow between the Cedar River and the underlying alluvial and carbonate aquifers in response to drought and increased stress from high-capacity pumping.

This investigation will help the City better develop and implement strategies to mitigate the effects of prolonged drought on ground-water availability.

Project Description:

Program tasks include developing a refined conceptual model building on knowledge gained through previous investigations, model calibration using the latest version of MODFLOW, and submission of the model to regional specialists for review and approval. The model will then be used to 1) quantify the interaction between the Cedar River, the alluvial aquifer, and the underlying bedrock aquifer during normal conditions and periods of prolonged drought; 2) quantify pumping capacities under normal conditions and periods of prolonged drought; 3) evaluate water availability for future development scenarios; and 4) provide water managers with environmental indicators for implementing drought-stage contingencies.

Update:

The update will consist of a PowerPoint presentation describing progress to date, and plans for an aerial geo-magnetic survey of the aquifer system that supplies water for Cedar Rapids.

Requested time on agenda: 10 min



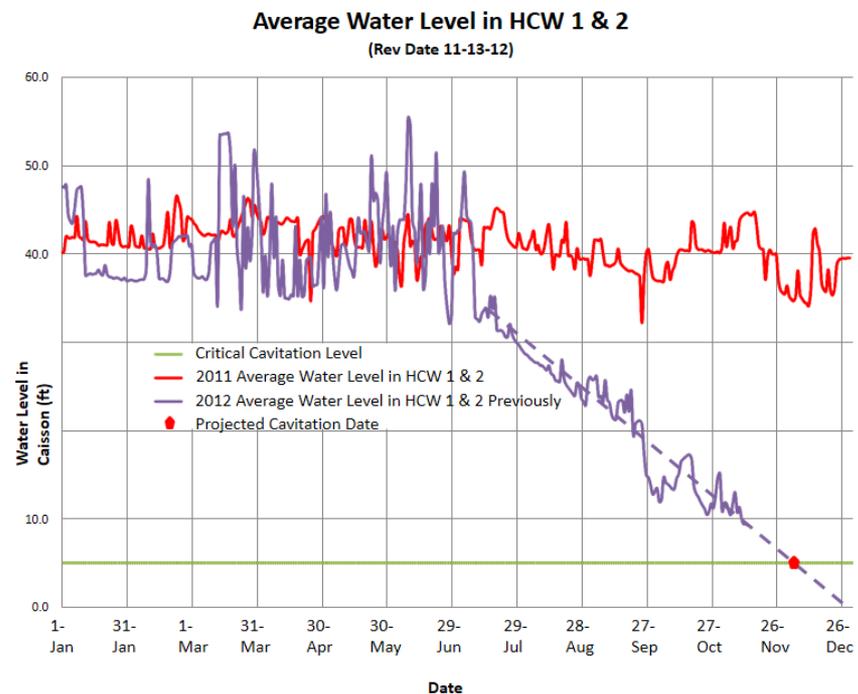
Using Airborne Electromagnetic Surveys to Characterize the Cedar River Alluvial Aquifer

Prepared for Bruce Jacobs, Utilities Engineering Manager, City of Cedar Rapids

Prepared by U.S. Geological Survey Iowa Water Science Center and South Dakota Water Science Center

Cedar Rapids Alluvial Aquifer Model

- The low flows in the Cedar River and high demand on the alluvial aquifer during 2012, caused a drawdown in water levels that could not be simulated by the groundwater model.
- USGS Iowa Water Science Center was charged with building a new model that could simulate stresses and drawdowns the aquifer experiences during extreme drought/demand.



New assumptions to be considered:

- River connectivity to the aquifer (Stream bed seepage rate changes due to siltation)
- Alluvial aquifer connectivity to bedrock aquifer (changes in gaining and losing conditions)
- Subsurface recharge sources (Tributary inflows and buried valleys)
- Wetland and oxbow lake connectivity to the alluvial aquifer



Cedar Rapids, IA

42°00'29.04" N 91°42'33.61" W elev 791 ft eye alt 31343 ft

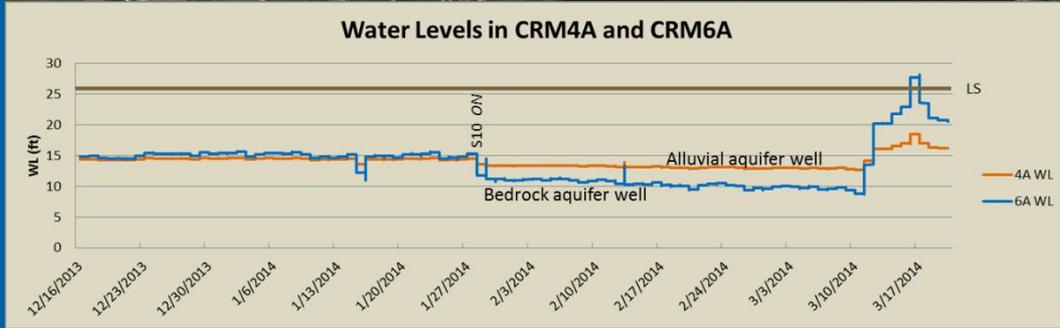
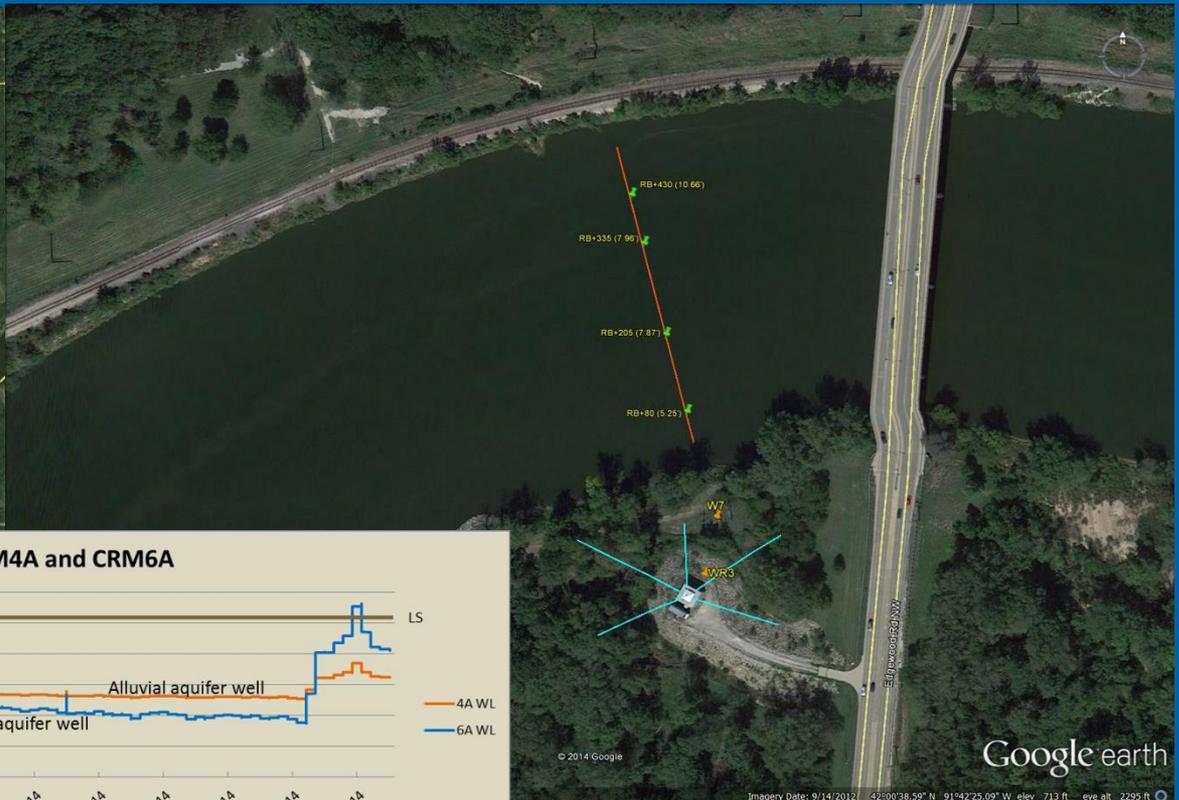
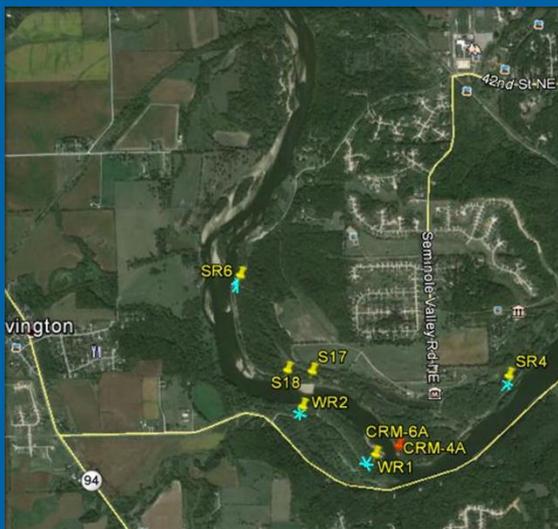
© 2016 Google

6862 ft

1990

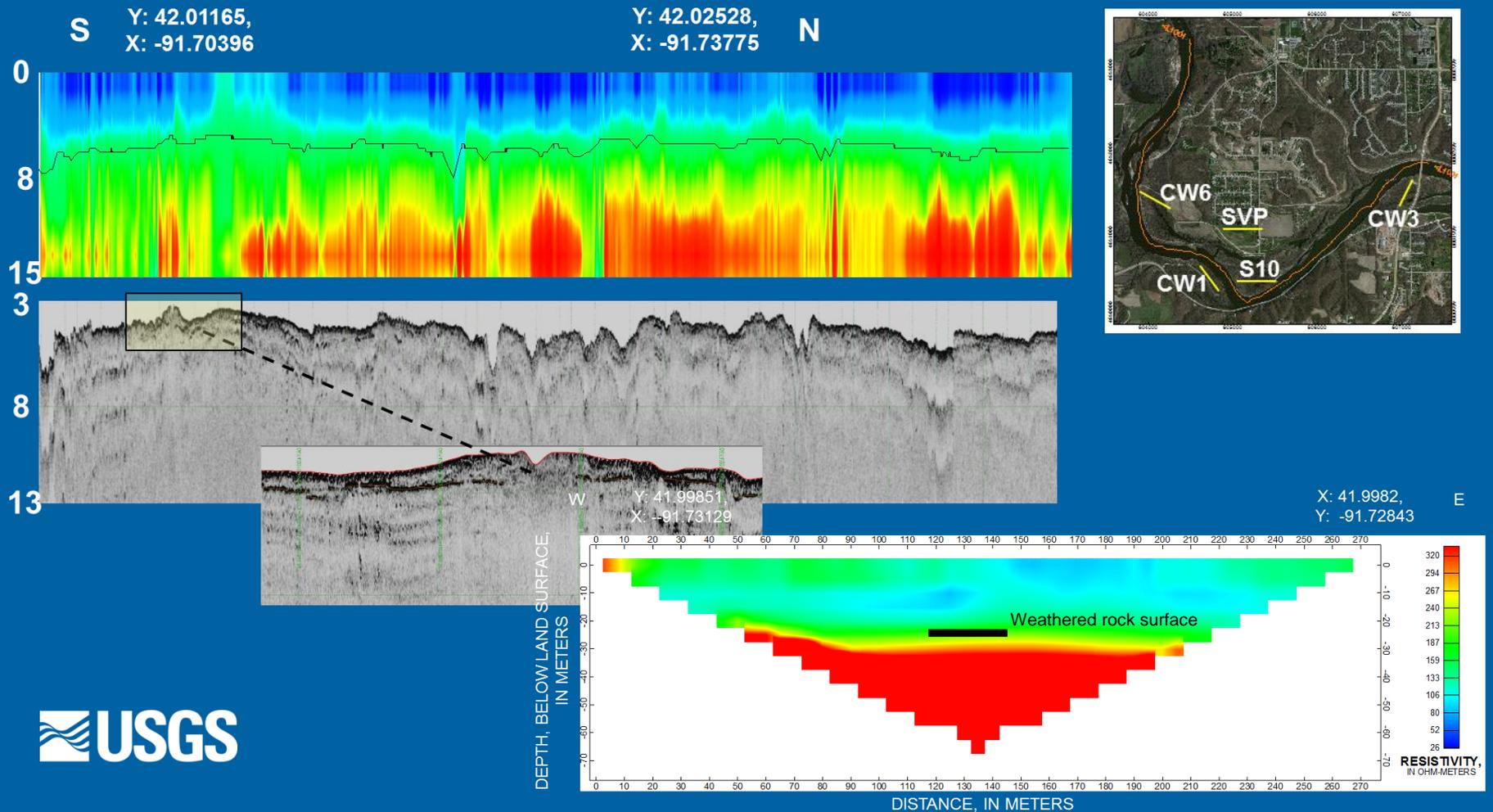
Data Gathered for new model

- Bed seepage study (2013) river-aquifer connectivity
- Analysis of monitoring well data



Data Gathered for new model

- Ground-based and Water Borne Geophysical surveys (2015) Aquifer thickness and characteristics, bedrock connectivity



Local Case Study – Airborne Electromagnetic Survey (AEM), Sioux Falls, SD

■ Problem

- City of Sioux Falls needed to move highly productive wells to new locations
- Need to find a sustainable resource to replace older wells and growing population
- Basin wide groundwater model to assist in management of resources



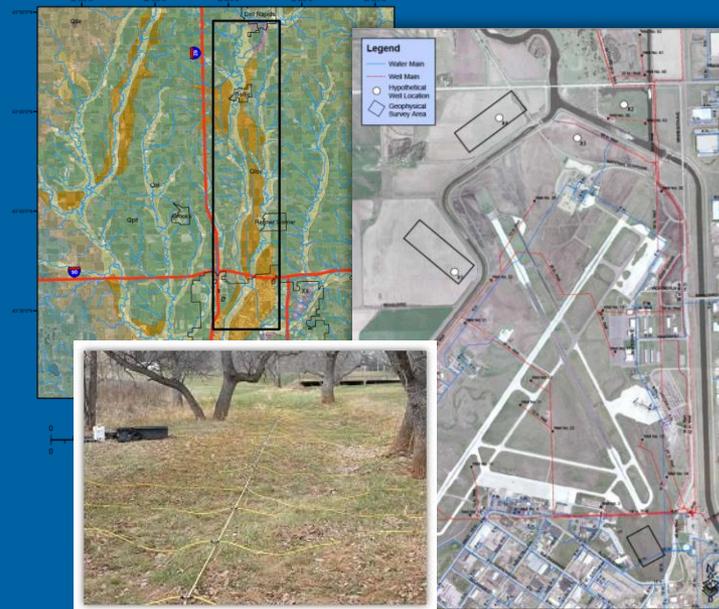
Local Case Study – Sioux Falls, SD

■ Problem

- City of Sioux Falls needed to move highly productive wells to new locations
- Need to find a sustainable resource to replace older wells and growing population
- Basin wide groundwater model to assist in management of resources

■ USGS assists Sioux Falls

- Ground-based geophysical surveys – local aquifer characterization
- Well log inventory and interpretation
- Groundwater model development



Local Case Study – Sioux Falls, SD

■ Problem

- City of Sioux Falls needed to move highly productive wells to new locations
- Need to find a sustainable resource to replace older wells and growing population
- Basin wide groundwater model to assist in management of resources

■ USGS assists Sioux Falls

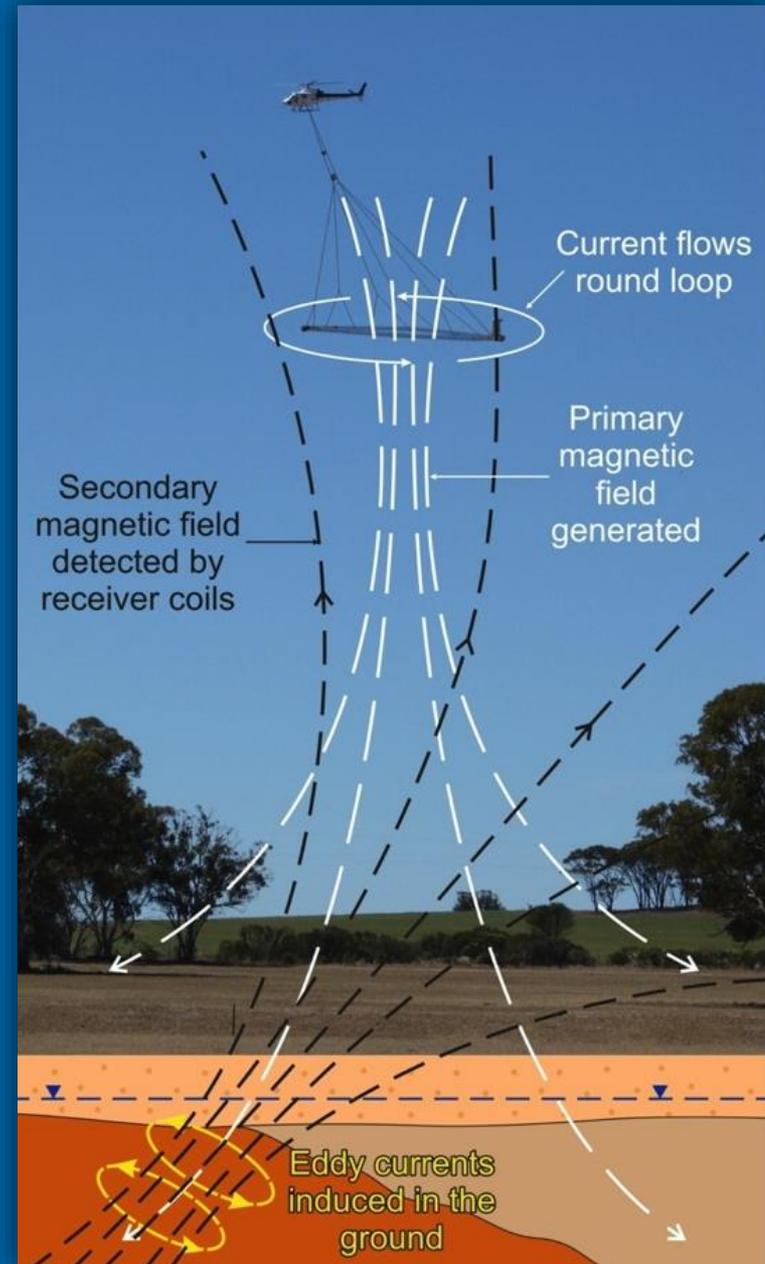
- Ground-based geophysical surveys – local aquifer characterization
- Well log inventory and interpretation
- Groundwater model development

■ USGS challenges

- Privately owned land
- Time and labor intensive ground-based surveys
- Optimal characterization of aquifer and highly productive zones may be overlooked

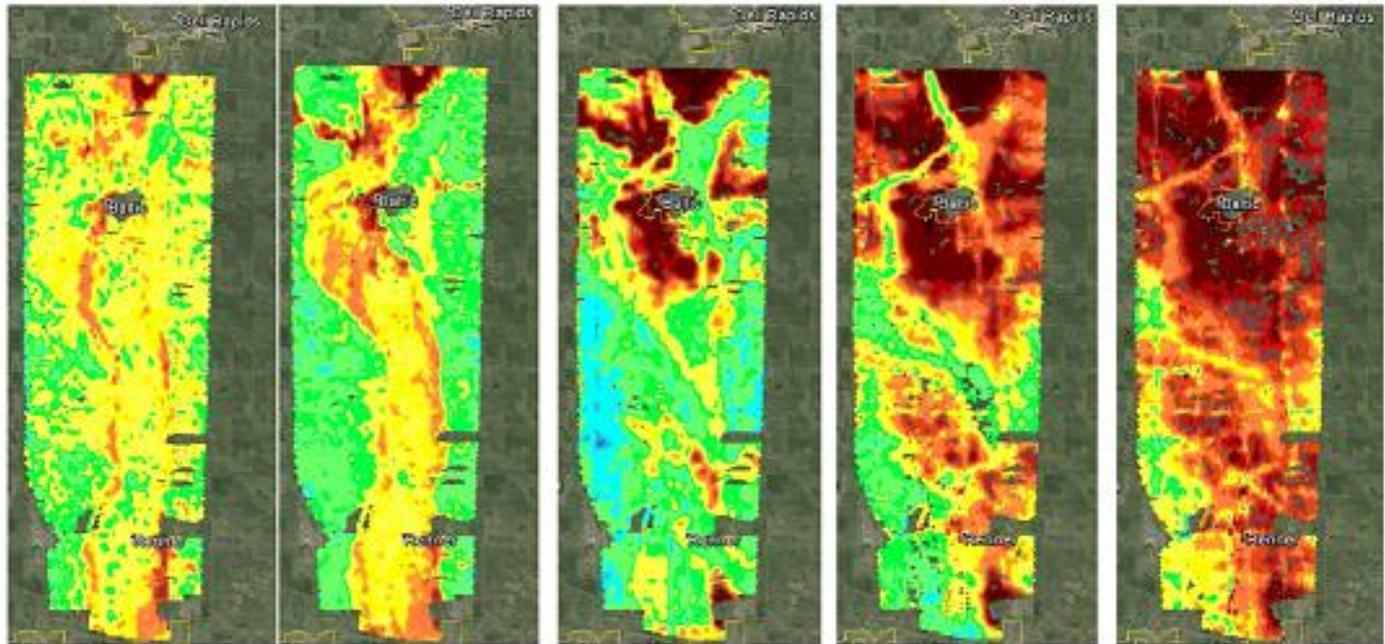
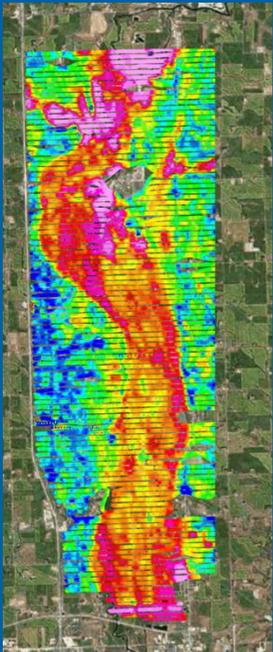
How AEM Works

- Time-domain EM
 - Single (or dual) transmitting and receiving coil
- Frequency-domain EM
 - Dual coils - both continuously transmitting and receiving at multiple frequencies



AEM Survey Results

Preliminary inversion model resistivities at different depths below ground surface



3 m

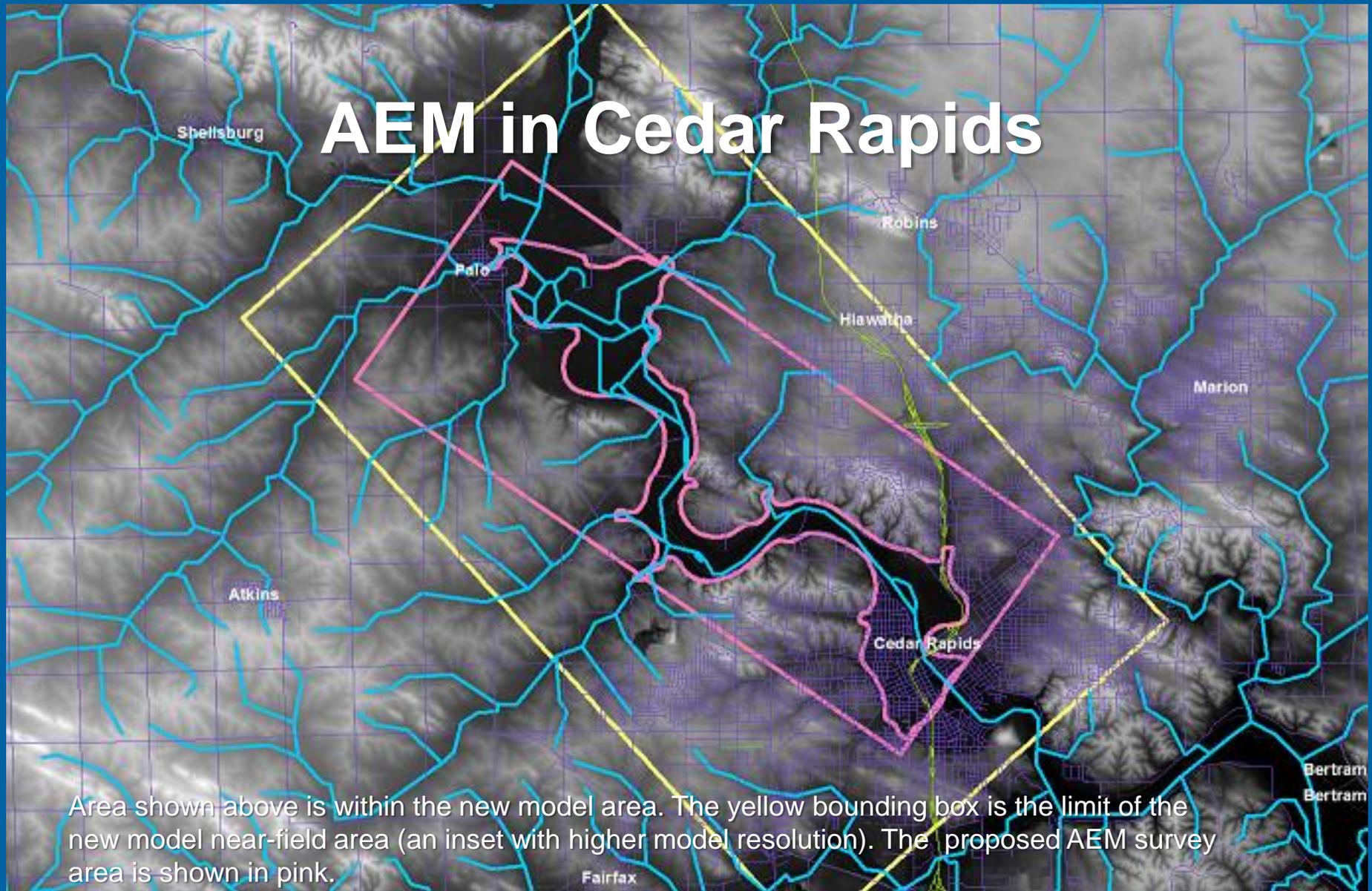
5 m

16 m

30 m

42 m

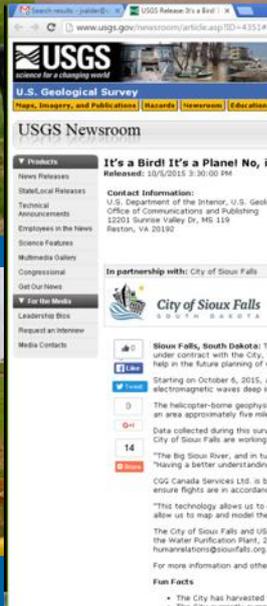
AEM in Cedar Rapids



Area shown above is within the new model area. The yellow bounding box is the limit of the new model near-field area (an inset with higher model resolution). The proposed AEM survey area is shown in pink.

Once Funding is Approved: Outreach is Initiated

Other pre-flight needs



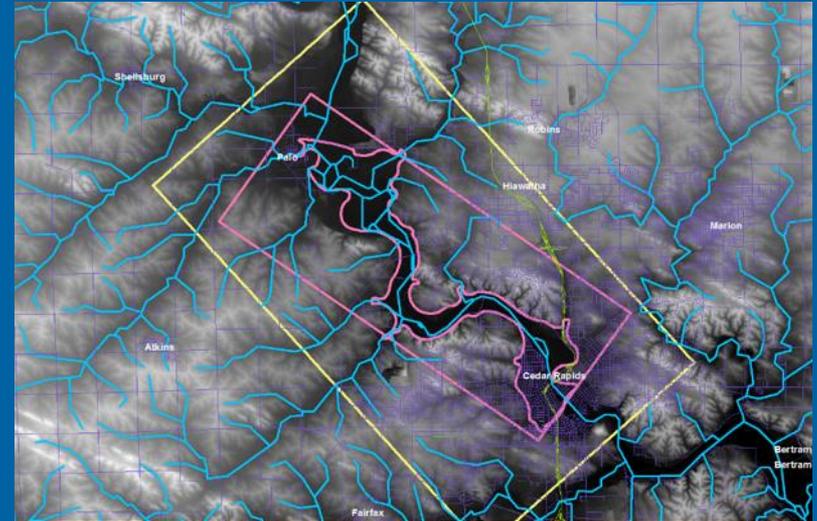
- Presented to County and City officials in areas in the flight path
- Sent two letters to landowners, one farther in advance and one with more specific dates
- Hosted a public meeting on site at the water plant
- Hosted a news conference
- Placed message boards on highly traveled roads
- Posted to Facebook and Twitter during the flight
- Notified all surrounding smaller communities and city commissions that may get questions from their citizens
- Notified the state, county, city, law enforcement for work near the interstate systems and city/county
- Notified the South Dakota Department of Transportation for work near the interstate systems
- Contractor coordinated with Federal Aviation Authority
- Had a special segment on City Scene discussing the project, special city cable channel



Cedar Rapids – next steps, 3 Phases

Planning

- Define science questions & budget **(draft completed)**
- Rough plans of survey area **(draft completed)**
 - How many sq. km. / line-km?
 - What are the geologic targets (depth, resolution, spatial scale)
 - Avoid possible sources of noise (power lines, pipelines, etc.)
 - Avoid possible livestock disturbances (poultry farms)
- Develop RFP with survey specs, quality requirements, deliverables, etc.
- Technical review of proposed bids...
Contract award



Cedar Rapids – next steps

Data Collection

- Survey
 - Pre-survey logistics
 - Local PR
 - On-site geophysicist for initial data QC & oversight of operations
- Final data delivery

Analysis

- Detailed data QC
 - Calibration, removal of cultural noise, etc.
- Geophysical inversion
- Model integration
- Target new survey areas based on uncertainty





To: City Council Infrastructure Committee
From: Michael Duffy
Subject: Update – Street Maintenance Projects
Date: March 3, 2016

Background:

Monthly street maintenance information intended to provide the status of work being performed by City crews.

Projects Description:

Clean up efforts

- Street sweeping began on February 22nd. Initial efforts are on the Downtown area, NewBO, Med Q and arterial Streets. Sweeping is being done on 1st and 3rd Shift.
- A two person crew per quad is being utilized to pick up large debris items within City Row in an effort to clean up CR after the winter season.
- Sod damage – Repairs to sod damage from snow removal is underway. Due to warmer temperatures during a number of the snow events there is more repairs needed than normal.

Snow removal

- We have taken delivery of 70% of the required 80% of our contract salt quantities. We will complete deliveries in March.
- Crews continue to do frost runs on bridges as needed prior to the morning commute on 3rd shift
- Contracts and material needs for 2017 winter is being evaluated.

Asphalt point repairs

- Crews are repairing damage from freeze thaw and failed asphalt daily. Early March, 14 tons per day on average placed by 3 patching crews. As conditions require those efforts will be increase.

Concrete

- Work has begun on driveway, curb and sidewalk repairs. These are small projects and used as training opportunities for staff who will work with the concrete crew in 2016.

Sandbags

- Have 6500 sandbags on hand. Sandbagger has been serviced and is ready should the need arise. Inventory of materials completed.

Update:

Any updates to this information will be provided at meeting.