CITY OF DIXON
Fargo Creek Study Progress Meeting

Veenstra & Kimm, Inc.
February 16, 2017
Introductions

Liandro Arellano Jr.
• Mayor

Cole O’Donnell
• City Manager

Terry Weter
• Public Works Director
Introductions

Veenstra & Kimm, Inc.

Jason McKenzie, P.E.
  • Project Engineer

Tom Kirkeeng, P.E.
  • Hydraulic Engineer
Project Understanding

Veenstra & Kimm, Inc.

Fargo Creek
Main Channel

Fargo Creek
West Branch
Project Understanding

Veenstra & Kimm, Inc.

- Long history of problems
- Urban setting downstream; rural setting upstream
- Existing infrastructure issues
  - Roads
  - Culverts
  - House flooding
- Recent flooding
Project Understanding

- Rock River watershed
- Fargo Creek subbasins
  - East Basin has detention
    - Less problems
  - West Basin
    - Downstream urban
    - Upstream rural
Project Scope

- Review GIS/FIS/previous hydrology and hydraulics work
- Public Involvement Meetings
- Survey Channels/Structures
- Infrastructure condition assessment
- Determine flows, sewer/channel capacities
- Determine flood inundation mapping
- Evaluate alternative and potential impacts
- Determine costs for alternatives
- Evaluate alternatives and costs for grant opportunities
Project Scope

- Comprehensive watershed/subbasin evaluation
  - Flow reduction
    - Wetlands
    - Impervious pavements
    - Bio-swale
    - Rain garden inlet/tree box inlets
  - Storm peak reduction
    - Regional detention
    - Detention locations
  - Flow conveyance
    - Larger pipes/channels
    - Pump stations
  - Funding/financing
DIXON, ILLINOIS
FARGO CREEK FLOOD CONTROL STUDY SCHEDULE

Kickoff Meeting with City
Kickoff Public Meeting
Infrastructure Assessment/Survey
Hydraulics and Hydrology Modeling
Storm Runoff Reduction Concepts/Preliminary Costs
Green Infrastructure Integrations/Preliminary Costs
City Staff Meeting/Public Meeting (Initial Concepts)
Cost Estimating Selected Alternatives
Draft Report & Grant Support
City Staff Meeting/City Council Meeting (Recommendations)
Final Report

Late October 2016
Mid November 2016
Late December 2016
Late January 2017
Mid February 2017
Mid February 2017
Mid February 2017
Early March 2017
Early March 2017
End March 2017
End March 2017
Culvert Location Map
<table>
<thead>
<tr>
<th>ID</th>
<th>Culvert Type</th>
<th>Location细节</th>
<th>Shape</th>
<th>Size</th>
<th>Material</th>
<th>Length</th>
<th>Inlet Type</th>
<th>Outlet Type</th>
<th>V/NS Rating</th>
<th>Condition Notes</th>
<th>Recommendations</th>
<th>Improvement Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>M-1</td>
<td>Divisions &amp; Eastern at Existing Detention Basin</td>
<td>Circular</td>
<td>Diameter: 90”</td>
<td>RC</td>
<td>150’</td>
<td>RC Flared Headwall</td>
<td>RC Flared Headwall</td>
<td>3</td>
<td>Excellent Condition; Some small cracks and minor surface rust.</td>
<td>Reinspect in 2-3 years</td>
<td>$0.00</td>
</tr>
<tr>
<td>3</td>
<td>M-2</td>
<td>Divisions &amp; Eastern Tee Intersection</td>
<td>Rectangular Box</td>
<td>Width: 9’9” Height: 4’9”</td>
<td>RC</td>
<td>100’</td>
<td>RC Flared Headwall</td>
<td>RC Flared Headwall</td>
<td>5</td>
<td>Excellent Condition; Minimal amount of oil (approximately 6%).</td>
<td>Reinspect in 2-3 years</td>
<td>$0.00</td>
</tr>
<tr>
<td>4</td>
<td>M-3</td>
<td>Henderson Avenue - Culvert Under Drive at Address 1124 (Possibly a Private Culvert)</td>
<td>Circular</td>
<td>Diameter: 60”</td>
<td>CMP</td>
<td>20’</td>
<td>CMP</td>
<td>CMP</td>
<td>2</td>
<td>Poor Condition. Skinwall is deformed and bulging. There is some rust on inside of pipe.</td>
<td>Reinspect in 1 year; Replacement in Approximately 3 years in 2020 with 5’ x 10’ RC Box</td>
<td>$75,000.00</td>
</tr>
<tr>
<td>5</td>
<td>M-4</td>
<td>Henderson Avenue - Culvert Under Henderson Avenue near Address 1124</td>
<td>Circular Oval</td>
<td>Width: 57” Height: 60”</td>
<td>CMP</td>
<td>25’</td>
<td>Limestone Headwall</td>
<td>RC Headwall</td>
<td>3</td>
<td>Fair Condition. Inlet headwall has some loose limestone. Outlet has a little herringbone. Unable to see interior due to ice. A little surface rust.</td>
<td>Reinspect in 2 years; Replacement in Approximately 5 years with 5’ x 10’ RC Box</td>
<td>$124,000.00</td>
</tr>
<tr>
<td>6</td>
<td>M-5</td>
<td>1300-1309 Fargo Avenue</td>
<td>Rectangular Box Double</td>
<td>Width: 70” Height: 40” (Each Box)</td>
<td>RC</td>
<td>40’</td>
<td>RC Headwall</td>
<td>RC Headwall</td>
<td>4</td>
<td>Structurally in Good Condition. The north box inlet is approximately 25% silted in and the north box outlet is approximately 50% silted in.</td>
<td>Clearing/removal of silt and debris at north box inlet &amp; outlet in the spring. Reinspect in 2 years</td>
<td>$4,600.00</td>
</tr>
<tr>
<td>7</td>
<td>M-6</td>
<td>617 N. Pine Avenue - Driveway Culvert</td>
<td>Rectangular Box</td>
<td>Width: 35’ Height: 50’</td>
<td>RC</td>
<td>10’</td>
<td>RC Flared Headwall</td>
<td>Limestone Flared Headwall</td>
<td>1</td>
<td>Structurally in Very Poor Condition. Wood deck is failing, beams rusted out and failing, undermining and erosion of outlet headwall on northside. Outlet and superstructure are in very poor condition - Grade 1. Substructure is in fair condition - Grade 3.</td>
<td>Immediate replacement with new RC box 10’ x 6’ x 3’</td>
<td>$37,000.00</td>
</tr>
</tbody>
</table>
| 8  | M-7                           | Walnut and Spruce Intersection | Rectangular Box Double | Width: 8’ Height: 57’5” (Each Box) | RC | 140’ | RC Flared Headwall | RC Flared Headwall | 4 | Good Condition. Outlet has some delamination and cracks. West box has 50% delamination. Inlet and outlet needs excavation. | Patching for delamination and cracking at outlet in 1 year; Excavation at inlet/outlet and debris removal from west box in 1 year. | $8,600.00
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Cedar &amp; Chestnut Avenue</td>
<td>CIRCULAR / SPRING</td>
<td>DIAMETER: 84&quot; (7&quot;</td>
<td>RC</td>
<td>28&quot;</td>
<td>LIMESTONE FLARED</td>
<td>LIMESTONE HEADWALL</td>
<td>2</td>
<td>Poor-to-Fair Condition. Culvert shows concrete spalling. Inlet needs some excavation. 15&quot; pipe into box has bottom of pipe rusted out. Guardrail at street above is rusted out. Inlet and outlet have CMI pipe, center section of culvert is RC.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Poplar Street - Benner Grocery</td>
<td>SPRING ARCH / BOX</td>
<td>VARIOUS (MAJORITY</td>
<td>RC</td>
<td>599</td>
<td>FLARED RC &amp; GABION BASKET HEADWALL</td>
<td>RC BOX HEADWALL</td>
<td>4</td>
<td>Overall, in Good Condition. Inlet and outlet are spring arch pipe, but a majority of the culvert is a RC. There is a smaller section of the culvert with block sidewalls. Overall observations showed some spider cracking, hairline cracks, some spalling on older spring arch concrete pipe.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>E. 7th Street &amp; Ottawa Avenue -</td>
<td>RECTANGULAR BOX</td>
<td>WIDTH: 13'11&quot;</td>
<td>RC</td>
<td>338</td>
<td>LIMESTONE STRAIGHT WALLS</td>
<td>RC STRAIGHT WALLS</td>
<td>4</td>
<td>Overall, in Good Condition. Sediment piles were seen throughout culvert due to the number of bends. Observed some cross-section cracking.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>E. 6th Street</td>
<td>SPRING ARCH</td>
<td>WIDTH: 8'5&quot;</td>
<td>RC</td>
<td>507</td>
<td>RC FLARED HEADWALL</td>
<td>RC STRAIGHT WALLS</td>
<td>3</td>
<td>Poor Condition. There is an accumulation of concrete spalling throughout the culvert. Some small cracks in RC headwall.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>S. Olazza Ave &amp; E. 5th Street</td>
<td>RECTANGULAR BOX</td>
<td>WIDTH: 10&quot;</td>
<td>RC</td>
<td>502</td>
<td>RC WALL &amp; LIMESTONE CHANNEL WALLS</td>
<td>RC HEADWALL &amp; RC CHANNEL WALL</td>
<td>1/4</td>
<td>From inlet at 0' to 114&quot; into culvert, Grade 1 was given due to being in Very Poor Condition. Large amounts of exposed rebar, some sagging of the ceiling, major concrete spalling and delamination, multiple fractures/cracking. From 114&quot; to 502' at the outlet, the structure is in Good Condition and was given Grade 5.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Hennepin Avenue - Between W. 5th</td>
<td>RECTANGULAR BOX</td>
<td>WIDTH: 10'0&quot;</td>
<td>RC</td>
<td>92</td>
<td>RC FLARED HEADWALL</td>
<td>RC HEADWALL &amp; LIMESTONE WALL</td>
<td>5</td>
<td>Excellent Condition. Note that there is a gradual dimension change from inlet to outlet of the rectangular box. Inlet was measured 8'6&quot; and outlet measured 10' x 4'.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Hennepin Avenue - Between W. 5th</td>
<td>RECTANGULAR BOX</td>
<td>VARIIES (HEIGHT</td>
<td>RC</td>
<td>331</td>
<td>RC BOX W/ RIPRAP REVETMENT</td>
<td>RC FLARED WIREWAYS</td>
<td>1/3</td>
<td>From inlet at 0' to 356'. Grade 1 was given for Very Poor Condition. In this stretch of culvert, there were many longitudinal cracks, reinforcement visible and rusted through, 0' to 4' of spalling/delamination on ceiling, rebar sagging. From 356' to 351' at the outlet, the structure is in Fair Condition and was given Grade 5. Many cracks and some exposed rebar/spalling still occurred in this section of culvert.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Highland Avenue - Between 4th and 3rd Street</td>
<td>RECTANGULAR BOX</td>
<td>VARIOUS (MAJORITY OF BOX IS 15 WIDE X 18 TALL)</td>
<td>RC</td>
<td>3,372</td>
<td>RC BOX W/ GABION BASKETS ON THE RIGHT</td>
<td>RC FLARED WIREWAYS</td>
<td>4/2</td>
<td>Overall, the structure was given grade 6 Good Condition. From 650' to the outlet at 1825', the structure was given grade 2 Poor Condition. The poor condition for this stretch was due to large amounts of spalling/missing concrete and exposed rebar in the floor of the structure. Being the final outlet for Farge Creek, this culvert likely sees high flows during rain events and the concrete floor has started to deteriorate and erode. This culvert also showed cracking (mild, moderate and major) at numerous construction joints.</td>
<td></td>
</tr>
</tbody>
</table>

**REPLACE GUARDRAIL ASAP. MAINTENANCE ON 15" PIPE. RECOMMEND EXCAVATION AT THE INLET THIS SPRING. REPLACE IN APPROXIMATELY 3 YEARS WITH RC BOX 7"."**

**REPLACE 35" OF SPRING MARCH UNDER CRAWFORD IN APPROXIMATELY 3.5 YEARS WITH RC BOX 8"X7". R EINSPECT IN 1-2 YEARS.**

**REPLACE IN APPROXIMATELY 3 YEARS. R EINSPECT IN 1-2 YEAR.**

**REPLACE IN THE APPROXIMATELY 1-2 YEARS THE FIRST 114". R EINSPECT IN 1 YEAR.**

**REPLACE IN THE NEXT 5 YEARS THE SECTION 0' TO 156'. REPLACE IN THE NEXT 5 YEARS THE SECTION 156' TO 351'. R EINSPECT IN 1 YEAR.**

**REPLACE IN THE NEXT APPROXIMATELY 2 YEARS THE SECTION 0' TO 156'. REPLACE IN THE NEXT 5 YEARS THE SECTION 156' TO 351'. R EINSPECT IN 1 YEAR.**

**REPLACE IN THE NEXT 5 YEARS THE SECTION 156' TO 351'. R EINSPECT IN 1 YEAR.**

**REPLACE IN THE NEXT 5 YEARS THE SECTION 156' TO 351'. R EINSPECT IN 1 YEAR.**

**REPLACE GUARDRAIL ASAP. MAINTENANCE ON 15" PIPE. RECOMMEND EXCAVATION AT THE INLET THIS SPRING. REPLACE IN APPROXIMATELY 3 YEARS WITH RC BOX 7"."**

**REPLACE IN THE NEXT APPROXIMATELY 2 YEARS THE SECTION 0' TO 156'. REPLACE IN THE NEXT 5 YEARS THE SECTION 156' TO 351'. R EINSPECT IN 1 YEAR.**
## Culvert Inspection Summary - West Branch

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>W-1</td>
<td>Under Railroad Approximately 330' Southwest of the End of Monroe Avenue</td>
<td>ARCH</td>
<td>SPAN: 82'</td>
<td>RISE: 1'</td>
<td>CMP</td>
<td>11'</td>
<td>LIMESTONE HEADWALL</td>
<td>LIMESTONE HEADWALL</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>W-2</td>
<td>9th Street &amp; Monroe Avenue - Backyard of Property on the Corner (Address 532 W. 9th Street)</td>
<td>SPRING ARCH</td>
<td>WIDTH: 8'6&quot;</td>
<td>HEIGHT: 12'</td>
<td>RC</td>
<td>30'</td>
<td>RC BOX &amp; RC WALLS</td>
<td>RC BOX</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>W-3</td>
<td>9th Street &amp; Monroe Avenue - Culvert Under Monroe Just South of Intersection</td>
<td>SPRING ARCH</td>
<td>DIAMETER: 86&quot;</td>
<td>RISE: 1'</td>
<td>BC</td>
<td>6'</td>
<td>LIMESTONE FLARED HEADWALL</td>
<td>RC HEADWALL</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>W-4</td>
<td>9th Street &amp; Monroe Avenue Intersection</td>
<td>RECTANGULAR BOX</td>
<td>WIDTH: 32'6&quot;</td>
<td>HEIGHT: 7'7&quot;</td>
<td>RC</td>
<td>75'</td>
<td>RC WINGWALLS</td>
<td>RC WINGWALLS</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>W-5</td>
<td>532 Monroe Avenue Between 5th and 6th Street</td>
<td>CIRCULAR</td>
<td>DIAMETER: 94&quot;</td>
<td>CMP</td>
<td>48'</td>
<td>RC HEADWALL &amp; LIMESTONE BLOCKS</td>
<td>CMP</td>
<td>3</td>
<td>Fair Condition. Inlet headwall has fraying, gaps, and large void between headwall and pipe. CMP shows some minor surface rust on sidewalls and rust in the flumes. There are small holes (1&quot;) throughout culvert. Concrete and branches partially blocking inlet, erosion off of road at outlet.</td>
</tr>
<tr>
<td>6</td>
<td>W-6</td>
<td>5th Street &amp; Madison Avenue Intersection</td>
<td>ARCH</td>
<td>SPAN: 231'</td>
<td>RISE: 1'</td>
<td>CMP</td>
<td>105'</td>
<td>CMPdez &amp; RC HEADWALL</td>
<td>CMPdez &amp; RC HEADWALL</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>W-7</td>
<td>4th Street Near Highland Avenue</td>
<td>RECTANGULAR BOX</td>
<td>WIDTH: 32'6&quot;</td>
<td>HEIGHT: 6'</td>
<td>RC</td>
<td>4'5&quot;</td>
<td>RC WINGWALLS &amp; LIMESTONE BLOCK WALLS</td>
<td>RC WINGWALLS &amp; LIMESTONE BLOCK WALLS</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>W-8</td>
<td>Highland Avenue - Connects to L300 ft. Long Culvert to River</td>
<td>BOX</td>
<td>WIDTH: 6'6&quot;</td>
<td>HEIGHT: 6'7&quot;</td>
<td>RC</td>
<td>52'7&quot;</td>
<td>RC HEADWALL WITH ARMOR BASKETS RIGHTSIDE</td>
<td>RC JUNCTION POINT</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>W-9</td>
<td>Highland Avenue - Connects to L300 ft. Long Culvert to River</td>
<td>RECTANGULAR BOX</td>
<td>WIDTH: 8'3&quot;</td>
<td>HEIGHT: 6'7&quot;</td>
<td>RC</td>
<td>56'</td>
<td>RC BOX WITH SIDEWALLS</td>
<td>RC JUNCTION POINT</td>
<td>5</td>
</tr>
</tbody>
</table>

**Definitions:**
- **A:** Section Number
- **B:** Culvert Identification
- **C:** Culvert Type
- **D:** Span
- **E:** Rise
- **F:** Material
- **G:** Length
- **H:** Height
- **I:** Condition
- **J:** Replacement Date
- **M:** Cost

**VC Ratings:**
- **A:** AIR
- **C:** CORRUGATED METAL PIPE
- **D:** DUCTILE IRON PIPE
- **F:** FLARED END SECTION
- **R:** REINFORCED CONCRETE
- **V:** REINFORCED-CONCRETE PIPE

**VE Ratings:**
- S: EXCELLENT
- 4: GOOD
- 3: FAIR
- 2: POOR
- 1: VERY POOR
Culvert Rating Map

EXISTING CULVERT LOCATIONS
RATING CONDITION
FARGO CREEK
CITY OF DIXON, ILLINOIS

CULVERT RATING SYSTEM
5 (EXCELLENT)
4 (GOOD)
3 (FAIR)
2 (POOR)
1 (VERY POOR)
Project Opportunities –
Regional Detention Facility

Veenstra & Kimm, Inc.
Project Opportunities – Underground Detention Facility

Veenstra & Kimm, Inc.
Project Opportunities – Upsize Box Culverts

Veenstra & Kimm, Inc.
Project Opportunities - Green Infrastructure

Veenstra & Kimm, Inc.

LEGEND
- Permeable Paver Parking Lots
- Green Alley
- Green Streets (Rain Garden and Bioswale Inlet Boxes, Permeable Pavers Parking Areas)

LOWLAND GREEN INFRASTRUCTURE OPPORTUNITIES
CITY OF DIXON, ILLINOIS
Project Opportunities - Green Infrastructure

Permeable Pavers
Project Opportunities - Green Infrastructure

Veenstra & Kimm, Inc.

Bio-swales and Rain Garden Inlet Boxes
Project Opportunities - Green Infrastructure

Green/Permeable Alleys
Green Street Plan View
Project Opportunities - Green Infrastructure

Bio-swales and Rain Garden Detail
Project Opportunities - Green Infrastructure

Veenstra & Kimm, Inc.

Green Street Typical Section
Lee County LiDAR/Basins
Drainage Basins

Veenstra & Kimm, Inc.
Alternatives Investigated

Veenstra & Kimm, Inc.
100-YR Flood FEMA Map vs Base

Veenstra & Kimm, Inc.
100-YR Flood_Alt 1 vs Base

Veenstra & Kimm, Inc.
Alternative 2

Veenstra & Kimm, Inc.
100-YR Flood_Alt 2 vs Base

Veenstra & Kimm, Inc.

FLOOD STUDY
100 YEAR INUNDATION - ALT 2 vs. BASE
FARGO CREEK
CITY OF DIXON, ILLINOIS
Alternative 3
100-YR Flood_Alt 3 vs Base

Veenstra & Kimm, Inc.
100-YR Flood_Alt 9 vs Base

Veenstra & Kimm, Inc.
100-YR Flood _Alt 10 vs Base

Veenstra & Kimm, Inc.

Box Culvert Improvement
100-YR Flood_Alts 3, 9, 10 vs Base

Veenstra & Kimm, Inc.
# Gross Cost Estimates of Alternatives

**Veenstra & Kimm, Inc.**

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Detention Pond 1,600’ downstream of Bloody Gulch Road</td>
<td>$489,280</td>
</tr>
<tr>
<td>2</td>
<td>Detention Pond Upstream of Bloody Gulch Road</td>
<td>$817,440</td>
</tr>
<tr>
<td>3</td>
<td>Detention Pond upstream of the C&amp;NW Railroad</td>
<td>$850,010</td>
</tr>
<tr>
<td>3 REC</td>
<td>Detention Pond upstream of the C&amp;NW Railroad as Recreation Facility and StormWater Facility</td>
<td>$2,775,010</td>
</tr>
<tr>
<td>4</td>
<td>Off Channel Storage Monroe Ave between 5th &amp; 6th St</td>
<td>Eliminated Alternative</td>
</tr>
<tr>
<td>5</td>
<td>Off Channel Storage under Grocery Store Parking Lot</td>
<td>Eliminated Alternative</td>
</tr>
<tr>
<td>6</td>
<td>Off Channel Storage underneath Jailhouse Parking Lot</td>
<td>Eliminated Alternative</td>
</tr>
<tr>
<td>7</td>
<td>Off Channel storage Underneath Haymarket Square</td>
<td>Eliminated Alternative</td>
</tr>
<tr>
<td>8</td>
<td>New 8’ X 11’ Culvert Riverfront to 4th Street about 1400’ feet</td>
<td>Eliminated Alternative</td>
</tr>
<tr>
<td>9</td>
<td>New 8’ X 10’ Culvert Monroe between 5th and 6th Street</td>
<td>$288,000</td>
</tr>
<tr>
<td>10</td>
<td>New 8’ X 10’ Culvert Monroe between 5th and 6th Street</td>
<td>$553,000</td>
</tr>
</tbody>
</table>
• Which alternatives did you like and Why?

• Were there any alternatives that you thought of that was not covered?
Questions?

Thank you!!!