

SWIF SUMMARY

The City of Pierce, NE (City) is the local sponsor for the Pierce – North Branch Elkhorn Right Bank (RB) levee system.

The periodic inspection of the right bank levee system conducted in October 2010 resulted in the levee system being rated as unacceptable. Due to the unacceptable rating, the levee system received an “inactive” designation by the United States Army Corps of Engineers. Following the inactive designation, the City submitted to the Corps of Engineers on August 27, 2012 a Letter of Intent (LOI) to develop a System Wide Improvement Framework (SWIF). The LOI was approved by the Corps of Engineers on December 17, 2012 and eligibility for the Rehabilitation Program was restored for two years while a SWIF was to be developed. The City was granted an additional one year eligibility extension in 2014 as a result of the release of the Interim Policy for Determining Eligibility Status of Flood Risk Management Projects for the Rehabilitation Program extending the SWIF development period through December 17, 2015. This SWIF plan is intended to fulfill the Corps of Engineers SWIF policy requirements, outlining the schedule and approach to complete system wide improvements to meet eligibility requirements for the Corps of Engineers Rehabilitation Program.

With the assistance of JEO Consulting Group, Inc., the final SWIF was submitted to the Corps of Engineers on April 15, 2016.

The purpose of the SWIF is:

To define the overall plan for carrying out system wide improvements and correction of unacceptable deficiencies, including defining what levee system is involved;

Identify deficiencies and envisioned system wide improvements, and how those improvements optimize flood risk reduction;

To assist the levee sponsor in attaining compliance with USACE standards;

To identify collaborating agencies and stakeholders and their role in the SWIF process;

To identify specific regional considerations, if any;

To develop interim risk reduction measures that will be implemented, including alternate inspection standards during SWIF implementation;

To develop an overall integrated schedule and milestones for tracking SWIF implementation progress;

To provide documentation that FEMA has been notified of the SWIF plan; and

To provide a mechanism for the sponsor to maintain eligibility for federal rehabilitation assistance under PL 84-99 while they are developing and implementing a SWIF.

The expected date for completion of the rectification work included in this SWIF plan is December 2020.

SWIF PLAN

This SWIF plan includes proposed unacceptable rated deficiency resolution projects prioritized by risk. The intent of this plan is to optimize flood risk reduction while balancing limits in place due to funding, permitting, and other constraints.

PROPOSED DEFICIENCY RESOLUTION PROJECTS

This SWIF plan focuses on resolution of unacceptable rated deficiency items. This section provides brief remarks toward each specific unacceptable rated deficiency item and describes proposed deficiency resolution projects. Some of the deficiencies are more complex to correct and will involve interagency collaboration, detailed investigation, engineering evaluation and design, permitting, and construction contracts. Proposed improvements or alterations that entail a scope of work beyond levee maintenance will follow policy guidance pursuant to 33 USC 408 (Section 408) by submitting plans and specifications to the United States Corps of Engineers for review prior to construction.

Unwanted Vegetation Growth, Vegetation & Obstructions

Unwanted vegetation growth was observed along the RB levee system embankment and received unacceptable ratings. Unwanted vegetation growth on the levee embankment includes trees greater than two inches in diameter, woody vegetation and tree stumps on the slope of the levee.

Vegetation and obstructions were observed at locations of interior drainage infrastructure belonging to the RB levee system and received unacceptable ratings. Additionally, vegetation was observed along the flood damage reduction channel bank associated with the RB levee system and received an unacceptable rating. These vegetation and obstruction observations include trees, debris, and sediment blocking inlets and outlets of interior drainage infrastructure.

Project A:

Unwanted vegetation growth will be removed from the levee embankment. Removal techniques will include hand cutting. Large tree removals will include removal of the associated root ball structure. Any voids resulting from removal of unwanted vegetation will be filled with appropriate levee fill material and the area reseeded to establish sod cover.

Vegetation and obstructions will be removed from the identified inlet and outlet areas belonging to interior drainage infrastructure. Vegetation will also be removed from the identified location along the flood damage reduction channel. Vegetation removal techniques will include hand cutting. Removal of sediment and debris deposits will include disposal of materials at suitable locations outside of the floodway.

Encroachments

Encroachments were observed along the RB levee system and received unacceptable ratings. These unacceptable encroachments include a planted corn crop and residential lots within the levee right-of-way, and a utility pole on the crown of the levee.

Project B

The City will notify the landowner responsible for farming within the landward levee slope and levee 15-foot clear zone that such actions are prohibited and have resulted in the levee system receiving an unacceptable rating from the USACE. The City has established levee right-of-way and is working to ensure that the landowner does not farm within the levee 15-foot clear zone. Any existing corn or other crop will be removed from the levee right-of-way and the area will be seeded to establish sod cover.

Project C

The City has retained JEO Consulting Group, Inc. (JEO) to assist with design and permitting to realign the levee and tie the levee into high ground. Upon completion of construction, the new alignment will resolve the identified residential encroachment on the levee embankment. Additionally, the new alignment will eliminate the issue of existing utility power poles located in the levee crown.

The latest version of the design plans and specifications for the realignment and tie-in improvement project were submitted to the USACE for Section 408 review on 4 June 2015. The USACE provided Section 408 review comments on 21 August 2015. The City is currently working to acquire the necessary real estate for the project. This portion of the work is anticipated to be completed by May 2016 and the City anticipates proceeding toward construction in the fall of 2016.

Depressions and Rutting

Depressions were observed on the levee crest at the upstream and downstream high ground tie-in locations of the RB levee system and received unacceptable ratings. Depressions observed include a section of levee 6 inches lower than its adjacent reaches and a location where the levee crest does not tie into high ground.

Project C *(continued)*

This depression is the result of grading work associated with residential construction at the original high ground levee tie-in location. As mentioned previously, the City is currently working with JEO to realign the levee and adequately tie the levee into high ground.

The latest version of the design plans and specifications for the realignment and tie-in improvement project were submitted to the USACE for Section 408 review on 4 June 2015. The USACE provided Section 408 review comments on 21 August 2015. The City is currently working to acquire the necessary real estate for the project. This portion of the work is anticipated to be completed by May 2016 and the City anticipates proceeding toward construction in the fall of 2016.

Project D

According to the Elkhorn River Basin Flood Protection Project Operation and Maintenance (O&M) manual project plates dated July 1983, this depression was a feature of the original levee design in order to accommodate the Chicago Northwestern Railway that once passed through this location of the levee. This railroad no longer exists and track infrastructure has since been removed. The City will fill the depression and restore the levee crest to the height of the adjacent reaches.

Riprap Revetments and Bank Protection

The 2014 CEI noted that there was no evidence of riprap along the left bank of Willow Creek along the RB levee system. Dense vegetation was also observed. As a result, this area received an unacceptable rating.

Project E

The City will verify whether riprap has been displaced or if over time the existing riprap has been covered by sediment deposits. If the City locates evidence of riprap in place, images and other verification information will be submitted to the USACE for documentation. If determined that riprap has, in fact, been displaced, the City will work with an engineer to determine best course of action to address riprap displacement.

The City will remove the dense vegetation identified as part of unwanted vegetation removals to be completed through Project A.

Erosion

Erosion was observed along the banks of the flood damage reduction channels associated with the RB levee system and received unacceptable ratings. This 2014 CEI noted significant bank caving and nearly vertical slopes.

A review of aerial imagery dating back to 1993 of the Elkhorn North Branch flood damage reduction channel does not appear to produce evidence of significant right channel bank migration due to erosion. Further, the distance of the right channel bank to the RB levee toe is at least 90 feet or greater; leaving a significant buffer between the channel and the levee. The identified erosion does not appear to pose a significant threat to the integrity of the levee.

Aerial imagery dating back to 1993 of the Willow Creek flood damage reduction channel does not appear to produce evidence of significant Willow Creek left channel bank migration due to erosion. The identified erosion does not appear to pose a significant threat to the integrity of the levee.

Project F

The City will develop a Channel Erosion Plan to be included in the Emergency Preparedness Plan (EPP). The Channel Erosion Plan will include:

- A Monitoring Plan to evaluate any future channel erosion toward the RB levee embankment. The Monitoring Plan will detail how channel erosion will be monitored and will identify who will be responsible. The Monitoring Plan will include action triggers based on the distance of the erosion from the levee section. Actions might include increased monitoring based on assessed risk (proximity of erosion to levee section), survey of the current conditions to compare back to the as-built plans, placement of riprap on channel erosion, or construction of a piggy back levee to increase the levee footprint.
- Channel maintenance guidance such as the removal of unwanted vegetation.
- Emergency locations of stockpiles of riprap and cohesive material.
- Highly recommended that cross sections be taken of the current conditions to compare back to as-builts to see if channel has moved or if any sedimentation has occurred and the actually channel section is now buried under sediment.

Closure Structures

Deterioration and corrosion was identified at the closure structure post anchor assemblies associated with the RB levee system and received unacceptable ratings. The 2014 CEI noted that the Highway 13 panel closure assemblies are corroded, buried, or not openable.

In May 2014, the City conducted a trial closure of the closure structure. Images from this installation are provided in Appendix D of this SWIF plan. The associated post anchor assemblies were successfully opened for installation. Additionally, the City has worked with the Nebraska Department of Roads (NDOR) to prevent asphalt placement over post anchor assemblies.

Project G:

The City will paint exposed metal post anchor assembly surfaces for protection from corrosion and maintain the assemblies clear from asphalt and soil.

Foundation of Concrete Structures

Undermining of the headwall of a concrete structure was identified and received an unacceptable rating. The 2014 CEI noted that the headwall is being undermined and is tilting.

Project H:

The City will repair undermining of the headwall structure.

PROJECT COST ESTIMATES

Table 11: SWIF Project Cost Estimates

Project	Recommendation	Cost Estimate
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Project A	Remove unwanted vegetation and sediment/debris obstructions	Internal City Staff Resources
Project B	Stop farming activity within 15-foot levee clear zone	Internal City Staff Resources
Project C	Re-align levee and tie levee into high ground	\$55,000
Project D	Fill in depression to restore levee section to height of adjacent reaches	\$30,000
Project E	Verify displacement of riprap or if covered by sediment deposits	\$5,000
Project F	Develop a Channel Erosion Plan	Part of EPP Development
Project G	Paint exposed metal post anchor assembly surfaces	Internal City Staff Resources
Project H	Repair undermining of concrete headwall structure	\$10,000

Project Subtotal = \$100,000

Emergency Preparedness Plan = \$30,000

SWIF Plan Total= \$130,000

FUNDING

The City of Pierce has secured funds within its general fund operating budget over the next 5 years to pay for the identified resolution projects. Additionally, the City is budgeting City staff resources (maintenance personnel hours) in order to complete all work in which the City's internal operation and maintenance staff are capable.

INTERAGENCY COLLABORATION MEETING

As part of an overall interagency collaboration effort, the City facilitated an interagency collaboration meeting on 9 September 2015. Agency contacts included on the agency master list were invited to the meeting. The purpose of the meeting was for the City to introduce stakeholders to the SWIF project, its scope, and the anticipated schedule as well as to dialogue with stakeholders to facilitate common understanding of flood risk and convey possible risk reduction measures. A PowerPoint presentation was used to guide the meeting and a SWIF project fact sheet was also provided to attendees. Incorporated into the presentation was a presentation on SWIF and the PL 84-99 Rehabilitation Program by a USACE-Omaha District Levee Safety representative.

PROGRESS TOWARD CORRECTING DEFICIENCIES

Since the completion of the 2010 PI, the City has made progress toward completing necessary corrective actions and resolving rated item deficiencies. Corrective actions include:

- Removing encroaching trees from the levee embankment and obstructing tree branches from the channel
- Removing encroachments from the levee right-of-way
- Removing debris from drainage channels
- Performing maintenance on interior drainage structures
- Providing documentation of interior drainage structure inspections
- Trial closure of the Highway 13 panel closure structure
- Design of the levee re-alignment and tie-in improvement
- Painting of exposed metal post anchor panel closure assembly surfaces

The results of the two Continuing Eligibility Inspections (CEIs) conducted in 2013 and 2014 have reflected corrective actions completed with several items once rated as unacceptable being updated to acceptable or minimally acceptable. Additionally, according to the 2014 CEI, due to an engineering reassessment, the rating of several encroachments changed from unacceptable to minimally acceptable.

Table 12: Pierce - Elkhorn North Branch RB Levee System SWIF Plan Projects

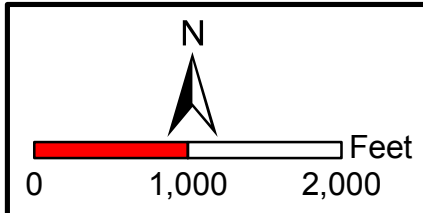
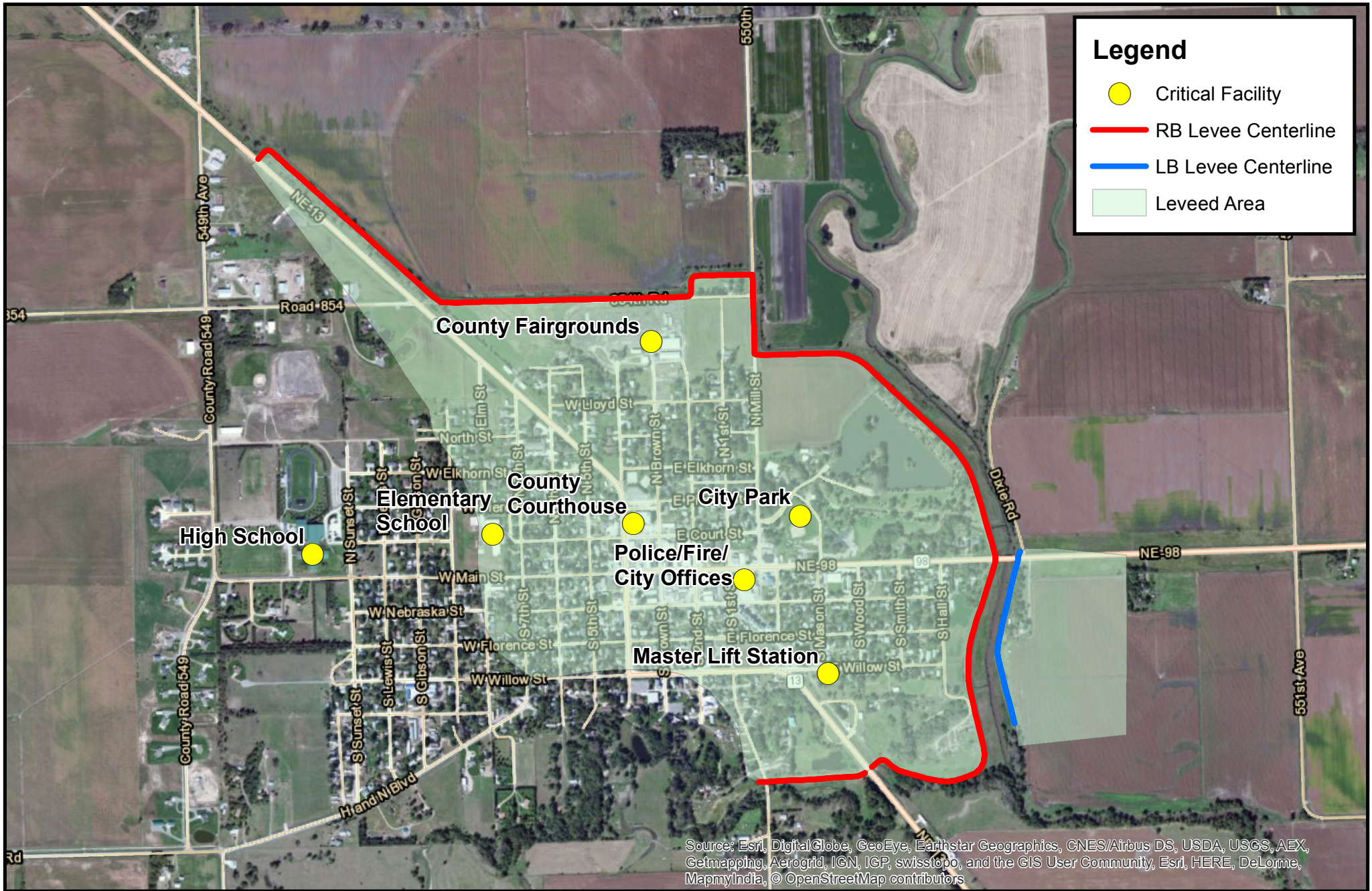
U-Rated Item Addressed (2014 ID No.)	Location	Type	Risk Ranking (High, Medium, Low)	Project	Recommendation	Interagency Collaboration	Milestone Task	Estimated Task Accomplishment	Actual Task Accomplishment	Cost Estimate
PNER-2014_a_0024	Sta. 33+25	Unwanted Vegetation	Low	Project A	Remove unwanted vegetation and sediment/debris obstructions	USACE (Reassessment)	Complete Vegetation Removal	December 2020		Internal City Staff Resources
PNER-2014_a_0033	Sta. 60+00	Unwanted Vegetation	Low				Complete Vegetation Removal			
PNER-2014_a_0037	Sta. 62+25 to Sta. 74+50	Unwanted Vegetation	Low				Complete Vegetation Removal			
PNER-2014_a_0053	Sta. 85+75	Unwanted Vegetation	Low				Complete Vegetation Removal			
PNER-2014_a_0070	Sta. 105+25 to Sta. 114+00	Unwanted Vegetation	Low				Complete Vegetation Removal			
PNER-2014_a_0077	Sta. 115+75	Unwanted Vegetation	Low				Complete Vegetation Removal			
PNER-2014_a_0101	Sta. 125+50	Unwanted Vegetation	Low				Complete Vegetation Removal			
PNER-2014_a_0048	Sta. 80+80R	Vegetation & Obstruction	Low				Complete Vegetation & Obstruction Removal			
PNER-2014_a_0089	Sta. 116+70R	Obstruction	Low				Complete Obstruction Removal			
PNER-2014_a_0107	Sta. 127+46R	Obstruction	Low				Complete Obstruction Removal			
PNER-2014_a_0102	Sta. 0+30WC to Sta. 1+75WC	Vegetation	Low	Complete Vegetation Removal						
PNER-2014_a_0029	Sta. 50+00 to Sta. 54+50	Encroachment	High	Project B	Stop farming activity within 15-foot levee clear zone	USACE (Reassessment)	Farming Activity Stopped	December 2016		Internal City Staff Resources
PNER-2014_a_0111	Sta. 129+25	Encroachment	High	Project C	Re-align levee and tie levee into high ground	USACE (Section 408), City Utilities	Begin Design and Section 408 Permit	Underway		\$55,000
PNER-2014_a_0113	Sta. 129+50 to Sta. 131+29	Encroachment	High				Real Estate Acquisition	November 2016		
PNER-2014_a_0112	Sta. 129+50	Depression	Medium				Begin Construction	June 2017		
							Complete Construction	December 2017		
PNER-2014_a_0003	Sta. -13+25	Depression	Medium	Project D	Fill in depression to restore levee section to height of adjacent reaches	USACE (Section 408)	Begin Design and Section 408 Permit	June 2018		\$30,000
							Begin Construction	September 2018		
							Complete Construction	December 2018		
PNER-2014_a_0072	Sta. 108+50 to Sta. 114+00	Riprap Revetment & Bank Protection	High	Project E	Verify displacement of riprap or if covered by sediment deposits	USACE (Reassessment)	Verify Presence of Riprap	September 2017		\$5,000
PNER-2014_a_0035	Sta. 58+50C to Sta. 60+00C	Riprap Revetment & Bank Protection	Medium				Complete Memo of Findings	December 2017		
PNER-2014_a_0115	North Branch - Willow Creek Confluence	Riprap Revetment & Bank Protection	Medium				Develop Repair Plan if Necessary (Per Findings)	February 2018		
PNER-2014_a_0034	Sta. 56+00C to Sta. 106+70C	Erosion	Low	Project F	Develop a Channel Erosion Plan		Completion of EPP	December 2017		Part of EPP Development
PNER-2014_a_0100	Sta. 2+50WC to Sta. 3+25WC	Erosion	Low							
PNER-2014_a_0090	Sta. 117+25.46	Closure Structure	High	Project G	Paint exposed metal post anchor assembly surfaces	USACE (Reassessment)	Complete Painting	August 2016	August 2016	Internal City Staff Resources
PNER-2014_a_0091	Sta. 117+25.46	Closure Structure	High							
PNER-2014_a_002	Sta. -14+15R	Foundation of Concrete Structure	High	Project H	Repair undermining of concrete headwall structure	USACE (Reassessment)	Begin Design of Repair	July 2018		\$10,000
							Begin Construction	November 2018		
							Complete Construction	December 2018		

Project Subtotal = \$100,000

Add Levee Content to City Website
Emergency Preparedness Plan (EPP)

Add Content	August 2016
Complete Plan	December 2017

EPP Subtotal = \$30,000
SWIF Plan Total = \$130,000



Critical Facilities Map
Pierce-North Branch Elkhorn RB Levee System SWIF Plan
 Pierce, Nebraska

