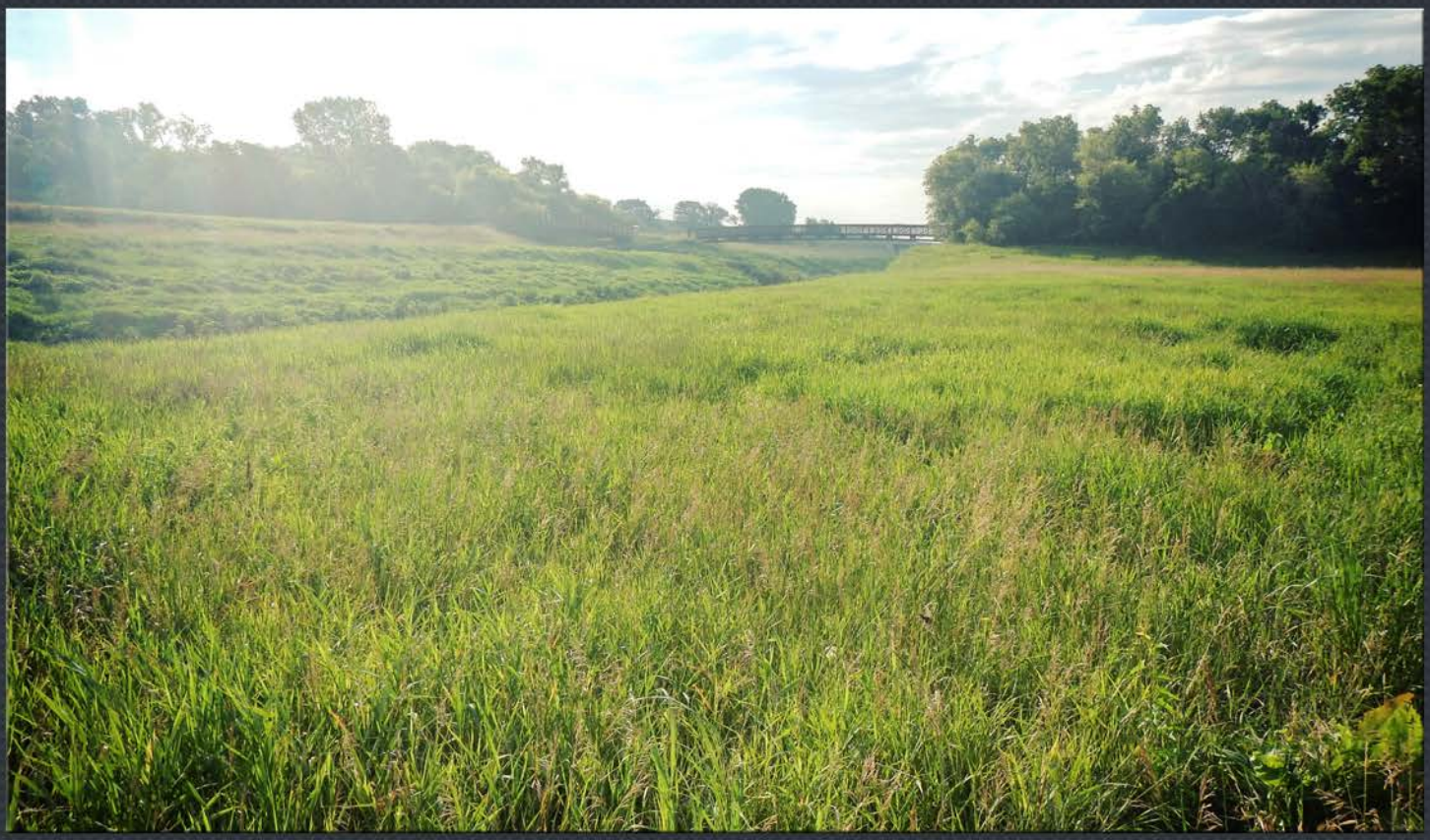

# Water Sustainability Fund Application
# West Branch Papillion Creek Regional Detention Structures 5, 6 and 7 (WP-5, 6 & 7)
# December 30, 2015

Enclosed in this document, in its entirety, is an application for the Nebraska Natural Resources Commission's (NRC) Water Sustainability Fund that has been divided into four categories.

The **Cover Letter** introduces the project and states the Applicant's intent.

The **Application** follows the format in the Application Form provided by the NRC answering all questions and requests for information in Sections A, B, C and D. The responses and information provided are intended to address the information requested as directly as possible.

The Application references the **Supplemental Information Attachment (SIA)** where supporting documentation and additional information is contained. The SIA provides additional data and references to support the responses offered in the Application. The information in the SIA is provided in the same order and is numbered the same manner as in the Application. Note that not all sections of the Application will have information included in the SIA.

At the end of the SIA is a **Bibliography** for all external reports, design guidance or other material referenced in the Application. This Bibliography provides the reviewer with additional references relevant to the Application. The combined size of these references prohibits the inclusion of the references within the SIA PDF. Digital copies of the references have been included as part of this submittal. The information provided in the Bibliography is alphabetical, but each entry is cross referenced back to the Application/SIA section to which it pertains and is referenced.

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT
8901 S. 154th Street
Omaha, NE 68138-3621
402-444-6222
www.papionrd.org

December 30, 2015

Mr. Jeff Fassett, P.E.

Director, Nebraska Department of Natural Resources

**via Electronic Submission**

Re: West Branch Papillion Creek Regional Detention Structures 5, 6 and 7 (WP-5, 6 & 7)

Application for Water Sustainability Fund Grant

Director Fassett and member of Natural Resources Commission:

In accordance with the rules, regulations and guidelines for Nebraska's new Water Sustainability Fund Grant Program, please accept this grant application on behalf of the Papio-Missouri River Natural Resources District (P-MRNRD) for the above-referenced project.

This project is somewhat unique in that it includes all three dams that were designed to maximize flood control as a system. The unique part is that one of the three dams is already constructed. As you are aware, the NRC has not been accepting applications for NRDF grant applications for several years. In that time, development pressure has forced the NRD to construct Site WP-5, or the ability to complete the project would be lost, or as a minimum, costs would increase significantly.

Through this application, and more so in the supporting materials, the benefits of the three dams working as a system are detailed. As is often the case in flood control projects, the value of the system is greater than the sum of the individual components. For that reason, this project is looked at as a system of three dams. The costs and benefits of this system are assessed together, but funding assistance is only requested for the remaining two sites. We believe that these forgone costs provides a great value to the start of the Water Sustainability Fund and therefore all Nebraskans.

In addition to the application form posted on the NDNR website, which has been copied verbatim into this grant application, there is also an attachment referenced as the Supplemental Information Attachment (SIA) to this application. Contained within the SIA is a bibliography of technical documents related to the project that contain additional information that can be reviewed if desired. These technical documents have been uploaded with the application. The goal of this application structure was to first provide reviewers with the information required to

directly answer the questions in the official application form at a concise level, second to provide additional maps, charts and supporting documents to address the required information in the SIA, and then finally to provide the overall documents that any information provided originates from. We trust that this allows you to quickly review the information you desire and gather additional data as each individual reviewer sees fit.

"Water Sustainability" is defined in Nebraska Title 264 as *when water use is sustainable when current use promotes healthy watersheds, improves water quality, and protects the ability of future generations to meet their needs.*

Recognizably, sustainability has varied meanings across the State, in Eastern Nebraska, watershed health is related to reducing the threat of flood damage first and foremost. Nearly every watershed plan in this region addresses flood control first. And as argued above, finding any project that would better protect the ability of future generations to meet their needs would be difficult, given the protection this project provides to such vital infrastructure and Nebraska's economy.

We thank you for your acceptance of this application and stand ready to provide any clarification on any information provided during your review.

Sincerely,

John Winkler (signed)

General Manager, P-MRNRD

# Application

## Section A
## ADMINISTRATIVE

# NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

## Section A.

## ADMINISTRATIVE

PROJECT NAME: West Branch Papillion Creek Regional Detention Structures 5, 6 and 7 (WP-5, 6 & 7)

### PRIMARY CONTACT INFORMATION

Entity Name: Papio-Missouri River Natural Resources District (P-MRNRD)

Contact Name: John Winkler, General Manager

Address: 8901 S. 154th Street, Omaha, NE 68138

Phone: 402.444.6222

Email: jwinkler@papionrd.org

Partners / Co-sponsors, if any: City of Papillion, Sarpy County, Nebraska Game and Parks Commission

1. Dollar amounts requested: (Grant, Loan, or Combination)

   Grant amount requested. $ 8,996,910 (see SIA Table A-1.1 for breakdown)

   Loan amount requested. $ N/A

   If Loan, how many years repayment period?

   If Loan, supply a complete year-by-year repayment schedule.

2. Permits Needed - Attach copy for each obtained (N/A = not applicable)

   All necessary permits were obtained prior to the construction of WP-5 and included in the SIA.

WP-6 and WP-7 are currently in the final design and permitting phase and all efforts to obtain the required permits for these sites is in progress. Any coordination required for Threatened and Endangered Species and Cultural Resources is performed under the US Army Corps of Engineers (USACE) 404 permitting process. Specific permits were not obtained for those items since they are included in the 404 process.

| | | | |
|---|---|---|---|
| Nebraska Game & Parks Commission (G&P) consultation on Threatened and Endangered Species and their Habitat | N/A☐ | Obtained: YES☒ | NO☐ |
| Surface Water Right | N/A☐ | Obtained: YES☒ | NO☐ |
| USACE (e.g., 404 Permit) | N/A☐ | Obtained: YES☒ | NO☐ |
| Cultural Resources Evaluation | N/A☐ | Obtained: YES☒ | NO☐ |
| Other (provide explanation below) | N/A☐ | Obtained: YES☒ | NO☐ |

Other permits not listed above that were obtained for WP-5 and will be obtained WP-6 & 7 include Approval of Plans for Dams from the Nebraska Department of Natural Resources (NDNR), a National Pollution Discharge Elimination System (NPDES) Permit from the Nebraska Department of Environmental Quality (NDEQ), and a grading permit as required by the Papillion Creek Watershed Partnership (PCWP) and obtained through the City of Papillion.

3. Are you applying for funding for a combined sewer over-flow project?

YES☐ NO☒

If yes, do you have a Long Term Control Plan that is currently approved by the Nebraska Department of Environmental Quality?

YES☐ NO☐

If yes attach a copy to your application.

If yes what is the population served by your project?

If yes provide a demonstration of need.

If yes and you were approved for funding in the most recent funding cycle, then resubmit the above information updated annually but you need not complete the remainder of the application.

4. If you are or are representing an NRD, do you have an Integrated Management Plan in place, or have you initiated one?

N/A☐ YES☒ NO☐

5. Has this application previously been submitted for funding assistance from the Water Sustainability Fund and not been funded?

YES☐ NO☒

If yes, have any changes been made to the application in comparison to the previously submitted application?

If yes, describe the changes that have been made since the last application. Click here to enter text.

No, I certify the application is a true and exact copy of the previously submitted and scored application. (Signature required)

6. Complete the following if your project has or will commence prior to next July 1st.

Development pressure has forced the P-MRNRD to continue progress on the PCWP's *Papillion Creek Watershed Management Plan (*hereafter referred to as the *PCWM Plan)* (HDR 2009); specifically these three structures due to immediate development pressure. Construction of Site WP-5 was completed in 2014 and the P-MRNRD is not requesting assistance or reimbursement for those costs already incurred. Final design and permitting are currently underway for WP-6 and WP-7 and like all WP-5 costs incurred to date, the P-MRNRD is not requesting reimbursement for those costs. The remaining engineering, planning, legal work and construction of these sites makes up the grant amount being requested, the majority of which will not be completed prior to the submission of this application.

As of the date of submittal of this application, what is the Total Net Local Share of Expenses incurred for which you are asking cost share assistance from this fund?

The only costs incurred that are included in the cost share request are a portion of the Engineering, Planning and Permitting costs reported in the cost breakdown in Section A-1 of the SIA. This value is reported as $122,032 for each WP-6 and WP-7, totaling $244,064. Invoices and canceled checks for these expenses are reported in the *P-MRNRD Invoices and Canceled Checks Summary* (P-MRNRD 2015a).

Attach all substantiating documentation such as invoices, cancelled checks etc. along with an itemized statement for these expenses.

Estimate the Total Net Local Share of Expenses and a description of each you will incur between the date of submittal of this application and next July 1st for which you are asking cost share assistance from this fund.

The details of the cost breakdown, including the estimated costs requested above are shown in the SIA under Section A-1. Cancelled checks and invoices for all expenditures being requested to date are included in the Bibliography material being provided to NDNR (Kent Zimmerman) outside of this document.

# Application

# Section B
# DNR DIRECTOR'S FINDINGS

## Section B.

## DNR DIRECTOR'S FINDINGS

Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?

YES☒ NO☐

1(a). If yes (structural), submit a feasibility report (to comply with Title 261, CH 2) including engineering and technical data and the following information:

This project will include the structural components (dams) at sites WP-5, 6 & 7. Site WP-5 has already been constructed, and a preliminary analysis on the feasibility of site WP-6&7 was completed for the P-MRNRD in October 2015. The results are reported in the *Dam Sites WP-6 & 7 Technical Memorandum* (hereafter referred to as the *WP-6 & 7 TM*) (FYRA 2015a). A complete bibliography of any documents referenced in the Application or SIA is included in the in SIA Bibliography and digital copies have been included as part of the submittal.

A discussion of the plan of development (004.01 A);

Sites WP-5, 6 & 7 were identified in the PCWP's Plan to provide regional detention of storm water during flood events and water quality improvements in the watershed. The Plan was developed to address a long history of flooding within the watershed, which extends from the upper reaches in Washington County, across Douglas County, and ending in Sarpy County at the confluence with the Missouri River. The Plan includes 14 storm water detention basins and associated water quality basins, as well as an implementation prioritization based on flood risk reduction and pressure of impending development.

The West Papillion Creek Watershed, where sites WP-5, 6 & 7 are located, is the most rapidly developing watershed in the metropolitan area and in Nebraska, and these sites were selected at the time the Plan was developed to maximize flood control, given what open ground remains in the area. These three sites were at the top of the list of a re-prioritization study recently conducted by the P-MRNRD. WP-5 lies within the recently annexed limits of the City of Papillion. WP-6 & 7 lie within the extraterritorial jurisdiction (ETJ) of Papillion.

A description of all field investigations made to substantiate the feasibility report (004.01 B);

As stated above, the construction of WP-5 is complete. On-site investigations at WP-6 & 7 were conducted by the owner and FYRA

Engineering to collect visual observations and gain an understanding of the proposed dam locations. An on-site meeting with NDNR Dam Safety personnel was held to discuss all safety-related aspects of the dam design, including auxiliary spillway design related to the existing and proposed adjacent roadways, and project hydrology.

A preliminary site survey was performed to collect locations of any visible utility markers and drainage structures in the vicinity. During final design, this will be supplemented with a more detailed topographic and legal boundaries surveys.

A wetland delineation and stream assessment was completed in August 2015 to identify the location of jurisdictional water bodies located on the project sites. This information will be used to determine project impacts and develop design alternatives and/or modifications to reduce potential impacts. Stream assessments were also completed for each site to document current and future channel conditions potentially impacted by the project. The findings from the assessments are documented in the following reports:

- *Wetland Delineation Report – WP-6 Detention Basin, Sarpy County, NE* (FHU 2015a)
- *Wetland Delineation Report – WP-7 Detention Basin, Sarpy County, NE* (FHU 2015b)
- *Stream Assessment for WP-6 Detention Basin, Sarpy County, NE* (FHU 2015c)
- *Stream Assessment for WP-7 Detention Basin, Sarpy County, NE* (FHU 2015d)

Sub-surface geotechnical investigations are required for sites WP-6 & 7. A geophysical investigation consisting of five Cone Penetrometer Tests (CPTs) along each dam centerline was conducted in November of 2015. These soundings were used to refine the proposed soil boring sub-surface investigation scheduled for early 2016. The results of the CPTs and the proposed layout of the soil boring investigation are included in the SIA in Figures B-1(a).1, B-1(a).2, B-1(a).3, and B-1(a).4.

Maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C);

A location map has been inserted into the SIA as Figure B-1(a).5. There are numerous maps, charts, tables, etc. that help to define the project, show design intent and label site features. They are included throughout this application, in the SIA, and within the documents listed in the Bibliography.

A description of any necessary water and land rights and pertinent water supply and water quality information, if appropriate (004.01 D);

As per State statute, a Permit to Impound Water application will be submitted to NDNR upon completion of the final design of the WP-6&7 sites. Said water right is to permanently store water in the dam's reservoir. Water rights in the Papillion Creek Watershed are typically uncontended and very few senior water rights exist downstream of the proposed dams. This permit for WP-5 is complete and was included in Section A-2 of the SIA**.**

Land Rights will be required for the construction, operation and maintenance of these sites. The P-MRNRD intends to obtain the land rights fee-title and does not anticipate any resistance, as the sites have been identified in the master planning efforts by the City and are included in the development plan. The local planning jurisdiction (City of Papillion) supports the implementation of these sites.

A discussion of each component of the final plan including, when applicable (004.01 E);

Required geologic investigation (004.01 E 1);

Data collected in the sub-surface investigation described above will be analyzed and used to perform a complete geotechnical analysis required for the dam design. A series of models will be developed to assess settlement/stability and determine the specific embankment/foundation design requirements, design the downstream seepage berm, identify viable borrow site locations, and to develop a construction instrumentation and monitoring plan.

Required hydrologic data (004.01 E 2);

A hydrologic analysis of the contributing area to sites WP-6 and WP-7 was completed during the development of the *WP-6 & 7 TM* (FYRA 2015a). Table 1 below summarizes the design storms that were modeled and are used to hydraulically size the sites in accordance with NDNR dam design criteria.

**Table 1. Design Storm Information**

| Design Storm | Duration | Frequency | Rainfall (in) | Source |
|---|---|---|---|---|
| (PSH) | 24 hours | 0.2% (500-year) | 9.82 | NOAA Atlas 14 |
| (PSH) | 10 days | 0.2% (500-year) | 13.6 | TP-49 |
| (SDH) | To be modeled upon collection of geotechnical information | | | |
| (FBH) | 6 hour | PMF | 20.34 | NE Statewide PMF Study |
| (FBH) | 24 hour | PMF | 23.82 | NE Statewide PMF Study |

Future land use was applied to the hydrologic models (assumed fully developed conditions) in order to produce the most conservative results.

Design criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3).

As reported in the table above, different precipitation models were used for the design storms. For the hydraulic analysis during preliminary design, the most conservative result from the different precipitation models was applied to set the auxiliary spillway and top of dam elevations. This will be revisited during final design and final hydrology will be set in coordination with NDNR Dam Safety. The dam design will adhere, as a minimum, to the requirements in the NRCS TR-60 Earth Dam and Reservoirs guidance.

The permanent pool elevations were selected as a function of a reservoir sustainability analysis and are described in detail in the Preliminary Design Study. Sites WP-6 & 7 have relatively small pool area/storage capacities (compared to other Papillion Creek sites), and a significant emphasis was placed to select a pool elevation that would not compromise the water quality and sustainability of the reservoir.

Water quality basins are proposed on the upstream end of the reservoir to capture and store nutrients and sediments delivered to the sites. Efforts were made to size the basins to trap the anticipated heavy sediment load transported during the development of the watersheds.

1(b). If no (non-structural), submit data necessary to establish technical feasibility including, but not limited to the following (004.02):

A discussion of the plan of development (004.02 A);

A description of field or research investigations utilized to substantiate the project conception (004.02 B);

A description of the necessary water and/or land rights, if applicable (004.02 C);

A discussion of the anticipated effects, if any, of the project upon the development and/or operation of existing or envisioned structural measures including a brief description of any such measure (004.02 D).

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative.

Flood reduction in the Papillion Creek watershed has been studied extensively through efforts undertaken by the PCWP. The *PCWM Plan* (HDR 2009) developed an integrated approach to address peak flow reduction using a combination of Low Impact Development (LID) and regional detention structures in the watershed. Even with incorporating LID techniques in the watershed, it was concluded that the regional detention structures are still required to reduce flood flows and prevent associated damage. Multiple structure locations and combinations were analyzed for their flood reduction and water quality potential, yielding these three sites as the most favorable in this watershed.

This project will provide flood control benefits specifically on the West Branch of the Papillion Creek. As a result of watershed development currently, this levee system no longer contains the 100-yr flood and required freeboard in accordance with FEMA criteria. The P-MRNRD performed two studies, the *West Papillion Creek Levee Restoration – Summary of Previous Analyses* (HDR 2006) and the *West Papillion Creek Levee Restoration Evaluation* (HDR 2008), to assess flood control measures to restore the required levee freeboard. Like the PCWM Plan, these studies also studied various alternatives to reduce flooding in the watershed and the net result of both plans is that these sites are vital to providing flood control in the overall watershed and this sub-watershed. Site locations within the watershed were not studied. These sites represent the maximum drainage area that can be controlled in the watershed, given the current development and infrastructure in the area. A detailed description of the alternatives studies are in the studies referenced in the SIA Bibliography.

3. Document all sources and report all costs and benefit data using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies shall be fifty (50) years or with prior approval of the Director, up to one hundred (100) years [T261 CH 2 (005)].

- Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01).
- Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe any intangible or secondary benefits separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, such that the economic feasibility of the project can be approved by the Director and the Commission (005.02).
- All benefit and cost data shall be presented in a table form to indicate the annual cash flow for the life of the proposal, not to exceed 100 years (005.03).
- In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, the economic feasibility of such proposal shall be demonstrated by such method as the Director and the Commission deem appropriate (005.04).

## Costs

A summary of all initial capital costs related to the project area presented in the tables below, and a more detailed breakdown of the land purchase and construction costs are provided in the SIA. They include all of the items listed in the top bullet above. Detailed cost estimates for construction items and land rights are included in the SIA Tables B-3.1 through B-3.8.

**Table 2. Professional Services Cost Breakdown**

| Service | WP-5 | WP-6 | WP-7 | Total |
|---|---|---|---|---|
| Engineering, Planning and Permitting | $3,100,000 | $1,141,782 | $1,141,782 | $5,383,564 |
| Legal | $50,000 | $50,000 | $50,000 | $150,000 |
| Total | $3,150,000 | $1,191,782 | $1,191,782 | **$5,533,564** |

**Table 3. Land Purchase Summary**

| | WP-5 | WP-6 | WP-7 | Total |
|---|---|---|---|---|
| Fee Title Acquisition | $18,200,000 | $5,170,000 | $2,210,000 | **$25,580,000** |

**Table 4. Construction Cost Estimate Summary**

| Item | WP-5 | WP-6 | WP-7 | Total |
|---|---|---|---|---|
| Dam | $15,228,273 | $873,934 | $2,131,958 | |
| Water Quality Basin | | $42,000 | $18,984 | |
| Recreation | | $1,973,616 | $1,374,300 | |
| Total | $15,228,273 | $2,889,550 | $3,525,242 | **$21,643,065** |

## Benefits

The costs are weighted against the primary tangible benefits as described in the *Title 264 – Rules Governing the Administration of the Water Sustainability Fund* (NDNR 2015a). For this project, those benefits include flood reduction benefits, recreation benefits, infrastructure savings, and land improvement values. A detailed discussion of the quantified benefits and the computation tables are located in SIA Tables B-3.9 through B-3.20 with supporting images shown in Figures B-3.3 through B-3.5. Additional computations at the parcel level are included in *FYRA WSF Detailed Computations for Land and Structure Damages* (FYRA 2015b). The costs and benefits have been assessed over a 100-year lifetime as shown in the cash flow stream below.

## Table 5. Cash Flow Stream

| Project Year(s) | Calendar Year(s) | Cash Flow Categories | Costs | Benefits | Details |
|---|---|---|---|---|---|
| 0 | 2015 | | | | |
| | | Engineering, Planning, Permitting | $3,344,064 | | All WP-5 Costs, Preliminary Design, Geotechnical Exploration, Title Searches, Appraisals for WP-6,7 |
| | | Legal Services | $50,000 | | WP-5 Land Rights Assistance |
| | | Land Rights | $18,200,000 | | WP-5 |
| | | Capital Improvement Costs | $15,228,273 | | WP-5 |
| | | **Total Costs:** | **$36,822,337** | | |
| | | Flood Damage Reduction Benefits | | | |
| | | Recreation Benefits | | | |
| | | **Total Benefits:** | | **$0** | |
| 1 | 2016 | | | | |
| | | Engineering, Planning, Permitting | $1,639,500 | | Final Design and Permitting |
| | | Legal Services | $80,000 | | WP-6,7 Land Rights Assistance |
| | | Land Rights | $6,066,371 | | WP-6, WP-7 |
| | | Capital Improvement Costs | $3,525,242 | | WP-7 |
| | | OMR&R | $114,212 | | WP-5 Dam/Rec @ 0.75% |
| | | **Total Costs:** | **$11,425,325** | | |
| | | Flood Damage Reduction Benefits | | $357,588 | WP-5 |
| | | Recreation Benefits | | $199,306 | WP-5 Benefits begin |
| | | **Total Benefits:** | | **$556,894** | |
| 2 | 2017 | | | | |
| | | Engineering, Planning, Permitting | $400,000 | | |
| | | Legal Services | $20,000 | | WP-6 Land Rights Assistance |
| | | Land Rights | $1,313,629 | | WP-6 Completion |
| | | Capital Improvement Costs | $2,889,550 | | WP-6 |
| | | OMR&R | $140,651 | | WP-5,7 @ 0.75% |
| | | **Total Costs:** | **$4,763,830** | | |
| | | Flood Damage Reduction Benefits | | $407,995 | WP-5,7 |
| | | Recreation Benefits | | $270,171 | WP-5, WP-7 Benefits begin |
| | | **Total Benefits:** | | **$678,166** | |
| 3-99 | 2018-2114 | | | | |
| | | OMR&R | $162,323 | | |
| | | **Total Costs:** | **$162,323** | | |
| | | Land Value Benefits | | $7,399,410 | DS WP-5, US/DS WP-6,7 |
| | | Infrastructure Savings Benefits | | $7,406,016 | West Papillion levee and bridge construction |
| | | Flood Damage Reduction Benefits | | $544,461 | WP-5,6,7 |
| | | Recreation Benefits | | $400,626 | WP-5, WP-7, WP-6 Benefits begin |
| | | **Total Benefits:** | | **$15,750,513** | |

Benefit:Cost

The benefit:cost ratio computed from the total annual costs and benefits reported above for the project is 1.58 for the 100-year project life.

## Table 6. Benefit to Cost Calculation Table

| Benefit Category | Calculated Benefit | # of Occurances Over Lifetime | Lifetime Benefits | Cost Category | Calculated Costs | # of Occurances Over Lifetime | Total Costs |
|---|---|---|---|---|---|---|---|
| Land Value Improvements | | | | Engineering, Planning, Permitting | $5,383,564 | 1 | $5,383,564 |
| WP-5, 6, 7 | $7,399,410 | 1 | $7,399,410 | Legal Services | $150,000 | 1 | $150,000 |
| Infrastructure Savings | $7,406,016 | 1 | $7,406,016 | | | | |
| Flood Damage Reduction | | | | Land Rights | $25,580,000 | 1 | $25,580,000 |
| WP-5 | $357,588 | 100 | $35,758,800 | Capital Improvement Costs | $21,643,065 | 1 | $21,643,065 |
| WP-7 | $50,407 | 99 | $4,990,293 | OMR&R | | | |
| WP-6 | $136,465 | 98 | $13,373,570 | WP-5 | $114,212 | 100 | $11,421,200 |
| Recreation | | | | WP-7 | $26,439 | 99 | $2,617,461 |
| WP-5 | $199,306 | 100 | $19,930,600 | WP-6 | $21,672 | 98 | $2,123,819 |
| WP-7 | $70,865 | 99 | $7,015,635 | | | | |
| WP-6 | $130,455 | 98 | $12,784,590 | | | | |
| **Total Benefits:** | | | **$108,658,914** | **Total Costs:** | | | **$68,919,109** |

**Benefit:Cost Ratio = 1.58:1**

The period of analysis shown for this project is 100 years. Three primary factors were considered regarding project life of the project and therefore, its ability to provide project benefits:

1. The reservoir volume was designed to trap incoming sediments as efficiently as possible. This means maximizing the pool volume, given the land rights available at the site. Additionally, water quality basins are designed at the sites to provide additional trapping capability at the headwaters of the reservoirs. A lengthy discussion of the reservoir's sustainability is contained in the *WP-6 & 7 TM* (FYRA 2015a), but in summary, the reservoir is anticipated to last in excess of 200 years, given the sediment loading anticipated for the site.
2. The materials used in the dam design are of the highest quality. The principal spillway is a lined steel cylinder concrete pressure pipe. All other non-native materials are reinforced concrete designed to convey a probable maximum flood (PMF), and therefore have extremely conservative design requirements. Dams designed 100 years ago were not designed anywhere near this level of conservatism are still around today and functioning as intended.
3. NDNR Dam Safety Requirements require that dams be designed to high hazard potential criteria within metropolitan areas. This requires that the dam safely passes a PMF event and that all engineering design of the embankment uses factors of safety in the design that are highly conservative. Very few engineered projects anywhere use such a conservative design. This, and the closely monitored maintenance inspections conducted through the life of the project required by State law, contributes to the above factors in ensuring that this project will function as intended into the future for years to come.

Collectively, the three justifications explained above detail why, if any project would last for 100 years, these projects are built to last like very few others would.

In addition to these tangible benefits, there are multiple intangible ways in which the project enhances water and environmental sustainability. These intangible benefits cannot be expressed in monetary terms, but collectively help promote healthy watersheds and protects the ability of future generations to meet their needs. Many intangible benefits are directly related to our quality of life as a society. Although difficult or impossible to measure, they are fundamental to human well-being, making them invaluable in many regards. Creating opportunities to interact with the natural world in sustainable ways near population bases elevates the quality of life of the region. This project will result in the establishment and protection of much needed natural areas for future generations and will create opportunities for natural world discovery, wildlife viewing, hiking, enjoyment of scenic beauty, picnicking, family unit enhancement, environmental education and environmental appreciation. In addition, these intangible benefits include our responsibility to create and preserve valuable habitat to ensure the enjoyment of wildlife and the natural world for generations to come.

4. Provide evidence that sufficient funds are available to complete the proposal.

The P-MRNRD has planned for and budgeted the cost of the design and majority of the land rights acquisition for these sites in their current (FY16) budget, as report in their *P-MRNRD FY 2016 Tax Levy and Adoption Budget Memorandum* (P-MRNRD 2015b). They have a proven record of planning their budgets on an annual basis to account for the costs required for their upcoming projects. The P-MRNRD has recently increased their tax levy, and will be seeking a public vote in 2016 to double the bonding authority for the P-MRNRD solely for the implementation of the remainder of the *PCWM Plan* (HDR 2009). These bonds may be used as needed to pay costs of design and construction for the planned flood control and water quality structures planned throughout the district.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).

The P-MRNRD includes maintenance costs in their annual budget every year for the maintenance of the dams that they operate. The budgeted amount is reviewed in detail every year by assessing annual maintenance costs and any special project needs. A budget statement from the NRD on funds available for this project. For fiscal year 2017 and beyond, the operating budget levy will be adjusted to increase funding available if the proposed bonding instrument is not approved in the May, 2016 vote.

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.

N/A

7. Describe how the plan of development minimizes impacts on the natural environment.

Numerous design alternatives were screened in the *PCWM Plan* (HDR 2009), but were refined in the Section 404 permitting process to avoid and minimize environmental impacts. The permitting process is underway and ongoing and the impacts are considered relatively small. Stream assessments of waterways within the project area was also conducted according to the methodologies and procedures outlined in the U.S. Army Corps of Engineers Nebraska Stream Condition Assessment Procedure (NeSCAP). The procedure involved the review of available published resources combined with field assessments to evaluate the physical and biological attributes of a stream reach. The studies found that stream channel reaches degrade moving downstream as they become deeply

incised, disconnected from the floodplain, heavily eroded streambanks and appear to be frequently disturbed (FHU 2015c,d).

The same assessment methodology was applied to future (post project) conditions to determine stream health and function impacts related to the project. This analysis found that the project will increase stream function within the project area. Specifically, there will be an overall increase in habitat stability, improvements to riparian buffer communities and decreases in erosion will increase aquatic functions. The reservoirs will create both deep and shallow open water habitat, inundated wetlands, and emergent wetland/mesic tallgrass prairie transition zones. Tree and shrub dominated areas may also develop with the buffer zone by natural colonization, or promoted with plantings in designated areas.

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds.

The P-MRNRD is a regional government agency that focuses on protecting ground and surface water, reducing flood threats, slowing the effect of soil erosion, creating and enhancing wildlife habitat and more. These flood control sites directly align with the types of projects they have a history of successful implementation, operation and maintenance. Land Rights will be acquired so that the project will not take place on private property, and all permits will be acquired to ensure all legal facets of the project have been covered.

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state.

In the NDNR's *Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process* (hereafter referred to as the *Annual Report)* (NDNR 2015b), the Statewide activities describe Water Sustainability Fund goals. This project fits multiple goals stated under:

*d.) Contribute to multiple water supply management goals including flood control, reducing threats to property damage, agricultural uses, municipal and industrial uses, recreational benefits, wildlife habitat, conservation and preservation of water resources*

The benefits of this project and how it achieves these goals are described in detail below:

Flood Control

The primary purpose of these dam sites is flood control and water quality improvements as identified in the *PCWM Plan* (HDR 2009). The reservoirs will attenuate flood flows through a 48" diameter principal spillway pipe, storing flood flows in the reservoir. They are designed to maximize flood reduction benefits in a rapidly developing watershed. The dams will provide significant flood reduction within the sub-watershed and contribute to a reduction in the West Branch Papillion Creek channel necessary to avoid costly levee modifications and bridge raises to bring the West Branch levees into FEMA compliance. Maps detailing the effects of the flood reduction benefits and tables quantifying the overall flood reduction are included in the SIA in Figures B-3.3, B-3.5, and C-4.1 through C-4.3.

Recreation

The proposed project components provide numerous recreational, wildlife habitat, water resource conservation and preservation benefits (FYRA 2015a). Reservoirs create multiple recreational opportunities near Nebraska's largest population base including fishing, boating, canoeing, wildlife viewing, hiking and picnicking. While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-6 to provide like uses the public is accustomed to with a P-MRNRD installation. Primary programmed uses for WP-6 focus upon hiking/bicycling trail use, picnicking, shoreline fishing, and boat ramp water access. The following is a summary of proposed day use facilities for WP-6:

- Concrete boat ramp with adjacent floating dock for motorboat as well as non-motorized watercraft water access. Motorboat usage shall be restricted to no-wake speeds.
- One day use picnic shelter with associated table and grill provisions.

- Waterless toilet facility with single male and female stalls.
- 1.5 mile concrete multi-use trail – single loop circumnavigating reservoir.
- Ten stabilized shore fishing extensions into the lake (9 aggregate paved and 1 ADA compliant surface). Fishing extensions allowing shore anglers to gain better access to deeper waters.
- Aggregate parking access to un-programmed natural space for foot hiking, birding, and passive recreation south of Cornhusker Road.
- Paved parking lot with 20 boat trailer parking stalls.
- Open park space for sledding and exploration

While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-7 to provide like uses the public is accustomed to with a P-MRNRD installation. It is valuable to note a unique difference in WP-7 to the other locally approximate recreation areas. Due to the size of the permanent pool being smaller than its local counterpart reservoirs, WP-7 may be specifically attractive to a different slice of the public.

As 'universally accessible' recreational provisions are gaining awareness of their necessity, there is an opportunity through a shorter trail loop and additional detail to shelters, restrooms, and water access to serve the 'differently-abled' in the community. Design solutions should consider needs of not only the disabled or elderly, but also young families or temporally impaired individuals seeking a small scale manageable area to recreate.

In additional to dry-land uses, the WP-7 permanent pool provides opportunity to designate motor-less watercraft use only without compromising the other 4 local reservoir provisions for motorboat users. While a relatively minor distinction, an exclusive paddle-only water body becomes unique to specific user groups. The following is a summary of proposed day use facilities for WP-7:

- Paved access to stabilized shoreline landing/launch area.
- One universally accessible floating kayak and canoe launch.
- One day use picnic shelter with associated table and grill provisions – fully accessible.
- Waterless accessible toilet facility with single male and female stalls.
- ¾ mile concrete multi-use trail – single loop circumnavigating reservoir.
- ¼ mile primitive grass or gravel trail.

- Seven stabilized shore fishing extensions into the lake (5 aggregate paved and 2 ADA compliant surface). Fishing extensions allowing shore anglers to gain better access to deeper waters.
- Concrete parking area.
- Open park space for sledding and exploration

Water Quality

The water quality and aquatic habitat benefits from this project are substantial. Water quality basins upstream of the reservoirs can have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

Wildlife Habitat

The reservoirs themselves will create diverse deep and shallow water habitats for a variety of aquatic organisms and birds. The reservoirs also impact water quality in a positive way by further reducing sediment, nutrient and bacteria transport downstream. In addition, downstream habitat is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion and sediment deposition. Altering the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended

sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

10. Are land rights necessary to complete your project?

YES☒ NO☐

If yes, provide a complete listing of all lands involved in the project.

Site WP-6 will encompass an estimated 105.3 acres and Site WP-7 will encompass an estimate 45.7 acres. See Section B-3 of the SIA for maps associated with tables below. The P-MRNRD does not currently own this ground, but have already begun communication with the land owners regarding the land acquisition process. All landowners are aware of the projects and at this time, are anticipated to be willing sellers to this project and the planned developments surrounding the project.

**Table 7. WP-6 Land Rights**

| Tract Number | Parcel ID | Total Project Area (acres) |
|---|---|---|
| 1 | 010385347 | 76.1 |
| 2 | 010522298 | 25.7 |
| 3 | 011592009 | 0.9 |
| 4 | 011592008 | 0.7 |
| | Total Purchase | 103.4 |
| | Within Existing ROW | 1.9 |
| | Total Project Area | 105.3 |

**Table 8. WP-7 Land Rights**

| Tract Number | Parcel ID | Total Project Area (acres) |
|---|---|---|
| 1 | 010462740 | 0.5 |
| 2 | 010462775 | 1.0 |
| 3 | 010522662 | 0.7 |
| 4 | 010522670 | 30.4 |
| 5 | 011039329 | 11.3 |
| 6 | 011596960 | 0.1 |
| 7 | 011596993 | 0.2 |
| | Total Purchase | 44.2 |
| | Within Existing ROW | 1.5 |
| | Total Project Area | 45.7 |

If yes, attach proof of ownership for each easements, rights-of-way and fee title currently held.

N/A

If yes, provide assurance that you can hold or can acquire title to all lands not currently held.

The P-MRNRD is currently undergoing negotiations with multiple land owners for acquisition. All land owners are anticipating the sale and to date have not indicated unwillingness to sell. The P-MRNRD has the power of eminent domain that could be applied if necessary.

11. Identify how you possess all necessary authority to undertake or participate in the project.

This project falls directly in line with the roles and responsibilities of the P-MRNRD. The P-MRNRD will obtain all necessary permits and land rights to complete the project to obtain the authority needed to perform work on their own property.

12. Identify the probable environmental and ecological consequences that may result as the result of the project.

The water quality and aquatic habitat benefits from this project are substantial. Water quality basins upstream of the reservoirs can have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

The reservoirs themselves will create diverse deep and shallow water habitats for a variety of aquatic organisms and birds. The reservoirs also impact water quality in a positive way by further reducing sediment, nutrient and bacteria transport downstream. In addition, downstream habitat is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion and sediment deposition. Altering the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

Numerous design alternatives were screened in the *PCWM Plan* (HDR 2009), but were refined in the Section 404 permitting process to avoid and minimize environmental impacts. The permitting process is well underway and ongoing. Although the impacts are considered relatively small, the

project will require Section 404 permits and will result in some unavoidable impacts that are documented in FYRA (2015a). A summary of these impacts include:

- Construction of the WP-6 dam and spillway would require fill in an estimated 0.02 acres of PEMA/PEMC wetlands and 500 linear ft of channel. An estimated 0.7 acres of PEMA/PEMC wetlands and 5,300 linear feet of channel would be inundated within the permanent pool.
- Construction of the WP-7 dam and spillway would require fill in an estimated 0.01 acres of PEMA/PEMC wetlands and 500 linear ft of channel. An estimated 0.05 acres of PEMA/PEMC wetlands and 2,200 linear feet of channel would be inundated within the permanent pool.
- In total, the project would impact an estimated 0.03 acres of PEMA/PEMC wetlands and 1,000 linear feet of perennial stream channel for earth fill for the dam and spillway at both sites. An estimated total of 0.75 acres of PEMA/PEMC wetlands and 7,500 linear feet of perennial stream channel inundated below the normal pool elevation at both sites.

However, the project overall will significantly improve stream health and function. Specifically, there will be an overall increase in habitat stability, improvements to riparian buffer communities and decreases in erosion will increase aquatic functions. Tree and shrub dominated areas may also develop with the buffer zone by natural colonization, or promoted with plantings in designated areas.

# Application

## Section C
## NRC SCORING

## Section C.

## NRC SCORING

In the NRC's scoring process, points will be given to each project in ranking the projects, with the total number of points determining the final project ranking list.

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0, 2, 4, or 6 for items 1 through 8; and 0, 1, 2, or 3 for items 9 through 15. Two additional points will be awarded to projects which address issues determined by the NRC to be the result of a federal mandate.

**Notes:**

- The responses to one criterion ***will not*** be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.

- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted in parenthesis. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.

- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

1. Remediates or mitigates threats to drinking water;

    - Describe the specific threats to drinking water the project will address.
    - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
    - Provide a history of issues and tried solutions.
    - Provide detail regarding long range impacts if issues are not resolved.

N/A

2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;

   - Identify the specific plan that is being referenced including date, who issued it and whether it is an IMP or GW management plan.
   - Provide the history of work completed to achieve the goals of this plan.
   - List which goals and objectives of the management plan the project provides benefits for and how the project provides those benefits.

N/A

3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

   List the following information that is applicable:

   - The location, area and amount of recharge;
   - The location, area and amount that aquifer depletion will be reduced;
   - The reach, amount and timing of increased streamflow. Describe how the project will meet these objectives and what the source of the water is;
   - Provide a detailed listing of cross basin benefits, if any.

N/A

4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;

   - List the goals the project provides benefits.
   - Describe how the project will provide these benefits
   - Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

Flood Control

The primary purpose of these dam sites is flood control and water quality improvements as identified in the *PCWM Plan* (HDR 2009). The reservoirs will attenuate flood flows through a 48" diameter principal spillway pipe, storing flood flows in the reservoir. They are designed to maximize flood reduction benefits in a rapidly developing watershed. The dams will provide significant flood reduction within the sub-watershed and contribute to a reduction in the West Branch Papillion Creek channel necessary to avoid costly levee modifications and bridge raises to bring the West Branch levees into FEMA compliance. Maps detailing the effects of the flood reduction benefits and tables quantifying the overall flood reduction are included in SIA Figures B-3.3, B-3.5, C-4.1 and through C-4.3.

Recreation

The proposed project components provide numerous recreational, wildlife habitat, water resource conservation and preservation benefits (FYRA 2015a). Reservoirs create multiple recreational opportunities near Nebraska's largest population base including fishing, boating, canoeing, wildlife viewing, hiking and picnicking. While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-6 to provide like uses the public is accustomed to with a P-MRNRD installation. Primary programmed uses for WP-6 focus upon hiking/bicycling trail use, picnicking, shoreline fishing, and boat ramp water access. The following is a summary of proposed day use facilities for WP-6:

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- Ten stabilized shore fishing extensions into the lake (9 aggregate paved and 1 ADA compliant surface). Fishing extensions allowing shore anglers to gain better access to deeper waters.
- Aggregate parking access to un-programmed natural space for foot hiking, birding, and passive recreation south of Cornhusker Road.
- Paved parking lot with 20 boat trailer parking stalls.
- Open park space for sledding and exploration

While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-7 to provide like uses the public is accustomed to with a P-MRNRD installation. It is valuable to note a unique difference in WP-7 to the other locally approximate recreation areas. Due to the size of the permanent pool being smaller than its local counterpart reservoirs, WP-7 may be specifically attractive to a different slice of the public.

As 'universally accessible' recreational provisions are gaining awareness of their necessity, there is an opportunity through a shorter trail loop and additional detail to shelters, restrooms, and water access to serve the 'differently-abled' in the community. Design solutions should consider needs of not only the disabled or elderly, but also young families or temporally impaired individuals seeking a small scale manageable area to recreate.

In additional to dry-land uses, the WP-7 permanent pool provides opportunity to designate motor-less watercraft use only without compromising the other 4 local reservoir provisions for motorboat users. While a relatively minor distinction, an

exclusive paddle-only water body becomes unique to specific user groups. The following is a summary of proposed day use facilities for WP-7:

- Paved access to stabilized shoreline landing/launch area.
- One universally accessible floating kayak and canoe launch.
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- Waterless accessible toilet facility with single male and female stalls.
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Water Quality

The water quality and aquatic habitat benefits from this project are substantial. Water quality basins upstream of the reservoirs can have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

Wildlife Habitat

The reservoirs themselves will create diverse deep and shallow water habitats for a variety of aquatic organisms and birds. The reservoirs also impact water quality in a positive way by further reducing sediment, nutrient and bacteria transport

downstream. In addition, downstream habitat is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion and sediment deposition. Altering the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;

- Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
- Describe the beneficial uses that will be reduced, if any.
- Describe how the project provides a beneficial impact to the state's residents.

In highly urbanized areas, flood control remains the top focus of Nebraskans within the urban area. This project addresses that need directly as part of a well-developed plan. While providing flood control benefits, this project offers secondary beneficial uses to Nebraskans including recreation, habitat improvement, water quality improvements and opportunities for education regarding all of the above.

There will be few reduced beneficial uses. Impacts to existing resources are detailed throughout the environmental permitting process and mitigation measures are planned to more than offset the impacts.

This project provides a beneficial impact by reducing the threat of flooding and enhancing the opportunity for Nebraskans to enjoy the water resources of the State in a highly urbanized area.

6. Is cost-effective;

- List the estimated construction costs, O/M costs, land and water acquisition costs, alternative options, value of benefits gained.
- Compare these costs to other methods of achieving the same benefits.
- List the costs of the project.
- Describe how it is a cost effective project or alternative.

A cost summary table detailing all of the costs for the proposed project is provided in a summary table in SIA Section A-1. All detailed costs are shown in the SIA

Section B-3 along with the benefits, cash flow stream and economic comparison. The comparison shows the cost effectiveness of the plan with an overall B:C ratio of 1.47:1

Sites WP-5, 6 & 7 were identified in the *PCWM Plan* (HDR 2009) to provide regional detention of storm water during flood events and water quality improvements in the watershed. This was developed to address a long history of flooding within the watershed, which extends from the upper reaches in Washington County, across Douglas County, and ending in Sarpy County at the confluence with the Missouri River. The *PCWM Plan* (HDR 2009) includes 14 storm water detention basins and associated water quality basins, as well as an implementation prioritization based on flood risk reduction and pressure of impending development. The report provides detailed information on the alternatives studies and their costs.

Flood reduction in the Papillion Creek watershed has been studied extensively through efforts undertaken by the PCWP. The *PCWM Plan* (HDR 2009) developed an integrated approach to address peak flow reduction using a combination of Low Impact Development (LID) and regional detention structures in the watershed. Even with incorporating LID techniques in the watershed, it was concluded that the regional detention structures are still required to reduce flood flows and prevent associated damage.

This project will provide flood control benefits specifically on the West Branch of the Papillion Creek. As a result of watershed development currently, this levee system no longer contains the 100-yr flood and required freeboard in accordance with FEMA criteria. The P-MRNRD performed two studies, the *West Papillion Creek Levee Restoration – Summary of Previous Analyses* (HDR 2006) and the *West Papillion Creek Levee Restoration Evaluation* (HDR 2008), to assess flood control measures to restore the required levee freeboard. Like the PCWM Plan, these studies also studied various alternatives to reduce flooding in the watershed and the net result of both plans is that these sites are vital to providing flood control in the overall watershed and this sub-watershed. Site locations within the watershed were not studied. These sites represent the maximum drainage area that can be controlled in the watershed, given the current development and infrastructure in the area. A detailed description of the alternatives studies are in the studies which are in the SIA Bibliography.

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;

   - Identify the interstate compact, decree, state contract or agreement or federal law.
   - Describe how the project will help the state meet its obligations under compacts, decrees, state contracts or agreements or federal law.
   - Describe current deficiencies and document how the project will reduce deficiencies.

Section 303(d) of the EPA's Clean Water Act is required to maintain the integrity of the Nation's waters, and requires states to establish a list of impaired that do not meet water quality standards. Once on the 303(d) of impaired waters, it is required that a Total Maximum Daily Load (TMDL) report is developed to set goals and pollutant load reductions required for the water body to meet water quality standards.

The entire Papillion Creek system, which includes the Little Papillion Creek, Cole Creek, Big Papillion Creek, West Papillion Creek tributaries, is on the 303(d) list of impaired waters for E.coli and the *TMDL for the Papillion Creek Watershed Report* (hereafter referred to as the *TMDL Report*) (NDEQ 2009) was developed. The water quality benefits improvements from these projects will help contribute to reductions in the E.coli load, specifically to the West Papillion Creek immediately downstream of the sites. This is achieved by increasing the surface area exposed to sunlight and extending the detention time of the water, allow for additional bacteria die off prior to discharging through the dam spillway system and transported downstream to the Papillion Creek system.

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the United States such that their incapacitation would have a debilitating effect on public security or public health and safety;

- Identify the property that the project is intended to reduce threats to.
- Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.
- Identify the potential value of cost savings resulting from completion of the project.
- Describe the benefits for public security, public health and safety.

This project reduces (nearly eliminates) the threat to the lands between the dams and the West Branch Papillion Creek. That land is shown in the SIA Section B-3 and includes the existing facilities labeled on the figure that will be protected by this project, in addition to future development for projects to come (some already in the planning stage). The project contributes much needed flood reduction within the West Branch and downstream Papillion Creek system and the transportation corridors, utilities and other infrastructure that runs along or through the Papillion Creek system.

Flood reduction benefits are shown in aerial and tabular formats in the SIA Section B-3. Flood damage reductions are computed in the economic analysis, so the reduction in threats to critical infrastructure including roadways, etc. are detailed there. The project also provides a significant flood reduction threat to utilities along the Papillion Creek system, although quantifying that threat is technically difficult to impossible. The elimination of the threat is the benefit provided to Nebraskans.

9. Improves water quality;

- Describe what quality issue(s) is/are to be improved.
- Describe and quantify how the project improves water quality, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- Describe other possible solutions to remedy this issue.
- Describe the history of the water quality issue including previous attempts to remedy the problem and the results obtained.

The water quality improvements from this project are substantial. Water quality basins upstream of the reservoirs and the reservoirs themselves will have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function (FYRA 2015a). The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

In addition, downstream water quality is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion, sediment deposition and pollutant loading. Altering the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

10. Has utilized all available funding resources of the local jurisdiction to support the program, project, or activity;

- Identify the local jurisdiction that supports the project.
- List current property tax levy, valuations, or other sources of revenue for the sponsoring entity.
- List other funding sources for the project.

The City of Papillion has been an avid supporter of this project and participated in numerous costs for WP-5. They have been an active participant in the planning process of WP-6 & 7 to date and stand prepared to discuss financial participation during the final design process. That support is shown in the letters of support in Section D-3 of the SIA.

All anticipated funding sources for the project are shown in the cost summary in the SIA Table A-1.1. The P-MRNRD currently taxes at a levy rate of $0.030449 per $100 of valuation to obtain a property tax income of nearly $22 million. Because the P-MRNRD is not in a fully or over-appropriated basin, any remaining tax levy up to a $0.045 levy rate will be required to pay the local share of the costs for this project and others that are currently being planned or designed. Because the P-MRNRD taxing authority will be completely utilized without being able to implement the projects vital to the P-MRNRD's mission, there has been new legislation introduced to generate additional tax dollars through the ability to finance capital improvement projects with a new bonding authority.

11. Has a local jurisdiction with plans in place that support sustainable water use;

- List the local jurisdiction and identify specific plans being referenced that are in place to support sustainable water use.
- Provide the history of work completed to achieve the goals of these plans.
- List which goals and objectives this project will provide benefits for and how this project supports or contributes to those plans.
- Describe and quantify how the project supports sustainable water use, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- List all stakeholders involved in project.
- Identify who benefits from this project.

N/A

12. Addresses a statewide problem or issue;

- List the issues or problems addressed by the project and why they should be considered statewide.

- Describe how the project will address each issue and/or problem.
- Describe the total number of people and/or total number of acres that would receive benefits.
- Identify the benefit, to the state, this project would provide.

Flooding is the number one threat to Nebraskans in highly urbanized area. The real threat of flooding in the Papillion Creek Watershed is well documented in the *PCWM Plan* (HDR 2009). This project will address that issue by providing flood control in the West Branch of Papillion Creek and downstream throughout the system. The total number of acres, structures, etc. protected is identified in Section B-3 of the SIA. The benefits have also been quantified and are detailed in Section B-3 of the SIA.

13. Contributes to the state's ability to leverage state dollars with local or federal government partners or other partners to maximize the use of its resources;

- List other funding sources or other partners, and the amount each will contribute, in a funding matrix.
- Describe how each source of funding is made available if the project is funded.
- Provide a copy or evidence of each commitment, for each separate source, of match dollars and funding partners.
- Describe how you will proceed if other funding sources do not come through.

N/A

14. Contributes to watershed health and function;

- Describe how the project will contribute to watershed health and function in detail and list all of the watersheds affected.

A stream assessment of waterways within the project area was conducted according to the methodologies and procedures outlined in the U.S. Army Corps of Engineers Nebraska Stream Condition Assessment Procedure (NeSCAP). The procedure involved the review of available published resources combined with field assessments to evaluate the physical and biological attributes of a stream reach. The study found that stream channel reaches degrade moving downstream as they become deeply incised, disconnected from the floodplain, heavily eroded streambanks and appear to be frequently disturbed (FHU 2015c,d).

The same assessment methodology was applied to future (post project) conditions to determine stream health and function impacts related to the project. This analysis found that the project will increase stream function within the project area. Specifically, there will be an overall increase in habitat stability, improvements to riparian buffer communities and decreases in erosion will increase aquatic functions. The reservoirs will create both deep and shallow open water habitat,

inundated wetlands, and emergent wetland/mesic tallgrass prairie transition zones. Tree and shrub dominated areas may also develop with the buffer zone by natural colonization, or promoted with plantings in designated areas.

15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- Identify the date of the Annual Report utilized.
- List any and all objectives of the Annual Report intended to be met by the project
- Explain how the project meets each objective.

The *Annual Report* (NDNR 2015b), lists the following objectives as related to the Water Sustainability Fund;

*Water Sustainability Fund*

The Legislature created the new Water Sustainability Fund in LB906 (2014) and defined governance and appropriation in LB1098 and LB1098A. In July 2014, $21 million was transferred to the fund. In 2015, LB657 re-appropriated the unexpended cash balance of about $21 million and appropriated $8 million for both the 2016 and 2017 fiscal years. LB661 provided and stated the intent that $11 million be transferred to the fund for a minimum of 10 years. The goals of the Water Sustainability Fund are to:

*a) Provide financial assistance to programs, projects, or activities that increase aquifer recharge, reduce aquifer depletion, and increase streamflow;*
*b) Remediate or mitigate threats to drinking water;*
*c) Promote the goals and objectives of approved integrated management plans or ground water management plans;*
*d) Contribute to multiple water supply management goals including flood control, reducing threats to property damage, agricultural uses, municipal and industrial uses, recreational benefits, wildlife habitat, conservation, and preservation of water resources;*
*e) Assist municipalities with the cost of constructing, upgrading, developing, and replacing sewer infrastructure facilities as part of a combined sewer overflow project;*
*f) Provide increased water productivity and enhance water quality;*
*g) Use the most cost effective solutions available; and*
*h) Comply with interstate compacts, decrees, other state contracts and agreements and federal law.*

The objectives of goals d) and f) are met as follows;

The primary purpose of these dam sites is flood control and water quality improvements as identified in the *PCWM Plan* (HDR 2009). The reservoirs will attenuate flood flows through a 48" diameter principal spillway pipe, storing flood flows in the reservoir. They are designed to maximize flood reduction benefits in a rapidly developing watershed. The dams will provide significant flood reduction within the sub-watershed and contribute to a reduction in the West Branch Papillion

Creek channel necessary to avoid costly levee modifications and bridge raises to bring the West Branch levees into FEMA compliance. Maps detailing the effects of the flood reduction benefits and tables quantifying the overall flood reduction are included in the SIA Figures B-3.3, B-3.5, and C-4.1 through C-4.3.

Recreation

The proposed project components provide numerous recreational, wildlife habitat, water resource conservation and preservation benefits (FYRA 2015a). Reservoirs create multiple recreational opportunities near Nebraska's largest population base including fishing, boating, canoeing, wildlife viewing, hiking and picnicking. While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-6 to provide like uses the public is accustomed to with a P-MRNRD installation. Primary programmed uses for WP-6 focus upon hiking/bicycling trail use, picnicking, shoreline fishing, and boat ramp water access. The following is a summary of proposed day use facilities for WP-6:

- Concrete boat ramp with adjacent floating dock for motorboat as well as non-motorized watercraft water access. Motorboat usage shall be restricted to no-wake speeds.
- One day use picnic shelter with associated table and grill provisions.
- Waterless toilet facility with single male and female stalls.
- 1.5 mile concrete multi-use trail – single loop circumnavigating reservoir.
- Ten stabilized shore fishing extensions into the lake (9 aggregate paved and 1 ADA compliant surface). Fishing extensions allowing shore anglers to gain better access to deeper waters.
- Aggregate parking access to un-programmed natural space for foot hiking, birding, and passive recreation south of Cornhusker Road.
- Paved parking lot with 20 boat trailer parking stalls.
- Open park space for sledding and exploration

While all existing flood control reservoir day use facilities provide a diversity of public use amenities, it is appropriate for WP-7 to provide like uses the public is accustomed to with a P-MRNRD installation. It is valuable to note a unique difference in WP-7 to the other locally approximate recreation areas. Due to the size of the permanent pool being smaller than its local counterpart reservoirs, WP-7 may be specifically attractive to a different slice of the public.

As 'universally accessible' recreational provisions are gaining awareness of their necessity, there is an opportunity through a shorter trail loop and additional detail to shelters, restrooms, and water access to serve the 'differently-abled' in the community. Design solutions should consider needs of not only the disabled or elderly, but also young families or temporally impaired individuals seeking a small scale manageable area to recreate.

In additional to dry-land uses, the WP-7 permanent pool provides opportunity to designate motor-less watercraft use only without compromising the other 4 local reservoir provisions for motorboat users. While a relatively minor distinction, an exclusive paddle-only water body becomes unique to specific user groups. The following is a summary of proposed day use facilities for WP-7:

- Paved access to stabilized shoreline landing/launch area.
- One universally accessible floating kayak and canoe launch.
- One day use picnic shelter with associated table and grill provisions – fully accessible.
- Waterless accessible toilet facility with single male and female stalls.
- ¾ mile concrete multi-use trail – single loop circumnavigating reservoir.
- ¼ mile primitive grass or gravel trail.
- Seven stabilized shore fishing extensions into the lake (5 aggregate paved and 2 ADA compliant surface). Fishing extensions allowing shore anglers to gain better access to deeper waters.
- Concrete parking area.
- Open park space for sledding and exploration

Water Quality

The water quality and aquatic habitat benefits from this project are substantial. Water quality basins upstream of the reservoirs can have a major impact on reservoir sustainability. The primary function of a water quality basin is to trap sediment upstream of the reservoir and prevent transport of this material into the main body. This concentrates the material into a smaller, more manageable location and prevents reduction of the water volume in the reservoir, which is beneficial to maintaining water quality and planned lake depths. Pollutant load reductions can be expected, specifically those such as phosphorus with the affinity to adhere to sediment particles that will settle out. When designed correctly, water quality basins can also reduce the dissolved pollutant loads through biological uptake of wetland vegetation. A water quality basin can also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. Any increase in surface area provided by the water quality basin provides more ultraviolet light exposure that kills bacteria.

A few additions are incorporated into the basin design to improve the basin's function. The configuration of the riser structure will increase the drawdown time for smaller events that often have the greatest impact on water quality (generally the first 0.5 inches of runoff). In summary, additional earthwork grading that increases storage capacity, the creation of wetlands and increasing the surface area will collectively improve the basin's performance.

Wildlife Habitat

The reservoirs themselves will create diverse deep and shallow water habitats for a variety of aquatic organisms and birds. The reservoirs also impact water quality in a positive way by further reducing sediment, nutrient and bacteria transport downstream. In addition, downstream habitat is improved and protected. As the watershed develops, land is covered with impervious surfaces such as roads, parking lots, roofs, driveways and sidewalks that prevent rainfall from infiltrating into the ground. The reservoirs cause a decrease in stormwater runoff flow rate, volume and velocity, which decreases erosion and sediment deposition. Altering the magnitude, frequency and duration of stormwater runoff and sediment loads to streams reduces impacts to water quality and loss of aquatic life and habitat through a variety of geomorphic mechanisms. These mechanisms include less changes in channel bed material, decreased suspended sediment loads, gains of riparian habitat due to decreases in streambank erosion and decreases in the variability of flow and sediment transport characteristics relative to aquatic life cycles.

Additionally, goal g) is met with a detailed analysis of the cost-effectiveness of this project as detailed in the PCWP Plan and throughout this Application.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate which furthers the goals of the WSF, then:

- Describe the federal mandate.
- Provide documentary evidence of the federal mandate.
- Describe how the project meets the requirements of the federal mandate.
- Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.

N/A

# Application

## Section D
## PROJECT DESCRIPTION

## Section D.

## PROJECT DESCRIPTION

1. Overview

In 1,000 characters *or less*, provide a brief description of your project including the nature and purpose of the project and objectives of the project.

The P-MRNRD is proposing construction of a series of three regional detention basins within the West Papillion Creek watershed that were identified in the *PCWM Plan* (HDR 2009). The report identified the best remaining options available for providing flood control and lake and stream water quality benefits within the 402 square-mile watershed. The plan was developed to address a long history of flooding within the watershed, which extends from the upper reaches in Washington County, across Douglas County, and ending in Sarpy County at the confluence with the Missouri River. The plan includes 14 storm water detention basins and associated water quality basins, as well as a prioritization based on flood risk reduction.

The WP-5, 6 & 7 will provide regional detention in the West Papillion Creek sub-watershed, located in Sarpy County, NE on the tributaries shown on the location map in Section B-1(a) of the SIA. This is one of the most rapidly developing watersheds in the metropolitan area and these sites were selected to maximize flood control, given what open ground remains in the area. These sites were at the top of the list of the NRD's re-prioritization study recently conducted.

The primary purpose of the proposed dam structures is flood control, and several ecologic and recreation benefits are realized with the implementation of the reservoirs. The earthen dams will have primary spillway outlet pipes that control the permanent pool elevation in the reservoirs. The auxiliary spillway is set at the modeled 500-yr storm elevation, which will provide flood storage and reduced discharge for all events up to the 500-yr storm. Collectively, the sites will control 5,055 acres of drainage area and provide 2,386 acre-ft of flood storage. A breakdown of the site data is located in the table below.

**Table 9. Site Data**

| Dam Site | Drainage acres | Permanent Pool (acre) | Flood Storage (AF) | 500-Yr Peak Discharge Reduction (%) |
|---|---|---|---|---|
| WP-5 | 3,320 | 125 | 1,625 | 97% |
| WP-6 | 1,267 | 34 | 594 | 95% |
| WP-7 | 468 | 13 | 167 | 93% |
| Total | 5,055 | 172 | 2,386 | --- |

According to the Papillion Creek HMS model created for FEMA floodplain remapping, the sites collectively reduce the 100-yr peak flood discharge on the West Papillion Creek by 9-13%, which reduces the elevation raise required to meet FEMA requirements on average by 0.6 ft.

The ecological benefits include large improvement to water. Not only are there planned water quality basins upstream of each site to protect the reservoir, but the reservoir also protects and improves the water quality discharged downstream into the West Papillion Creek. The water quality basins will trap sediment and prevent accumulation in the main reservoir. Of the sediment that reaches the reservoir, the majority will settle in the large reservoir and will not be transported downstream. This is plays a large role in the reduction of E.coli transported to the West Papillion Creek, since E. coli is attached to sediment particles. The reservoirs and water quality basins will also extend the time it takes for water to transfer into the lake, providing additional die off time for bacteria. The increase in water surface area provided by the project also provides more ultraviolet light exposure that kills bacteria. Collectively the project should provide substantial reductions in E. coli, for which the West Papillion Creek is currently listed as impaired, and will be highly beneficial in helping meet the goals listed in the *TMDL Report* (NDEQ 2009). Additionally, nutrient load reductions will be achieved through settling from increased detention time, as well as biological update from the increased wetland area created by these sites.

Aquatic and wildlife habitat improvements will all be experienced as part of this projected. The stream assessment found that the stream channel reaches at WP-6 & 7 are degraded, are becoming deeply incised and are disconnected from the floodplain. They have heavily eroded streambanks and appear to be frequently disturbed. Future conditions provided by the dams will create grade stability and prevent continued erosion. The reservoirs create both deep and shallow water habitats and improvements to the riparian and buffer zones.

Recreation will also be improved with the activities associated with the reservoir, as well as park features that are included in the recreation plan. The open water provides fishing, boating and kayaking opportunities. Additionally trails and angler access features, as well as boat ramps and picnic facilities increase the recreation opportunities in the urban area.

2. Project Tasks and Timeline

Identify what activities will be conducted by the project. For multiyear projects please list what activities are to be completed each year.

The tasks for each site have been broken down into the following:

<u>Professional Services</u>
Includes all of the data collection, testing, modeling/analysis, design, engineering, coordination and permitting of the dam and all associated features. Each site has

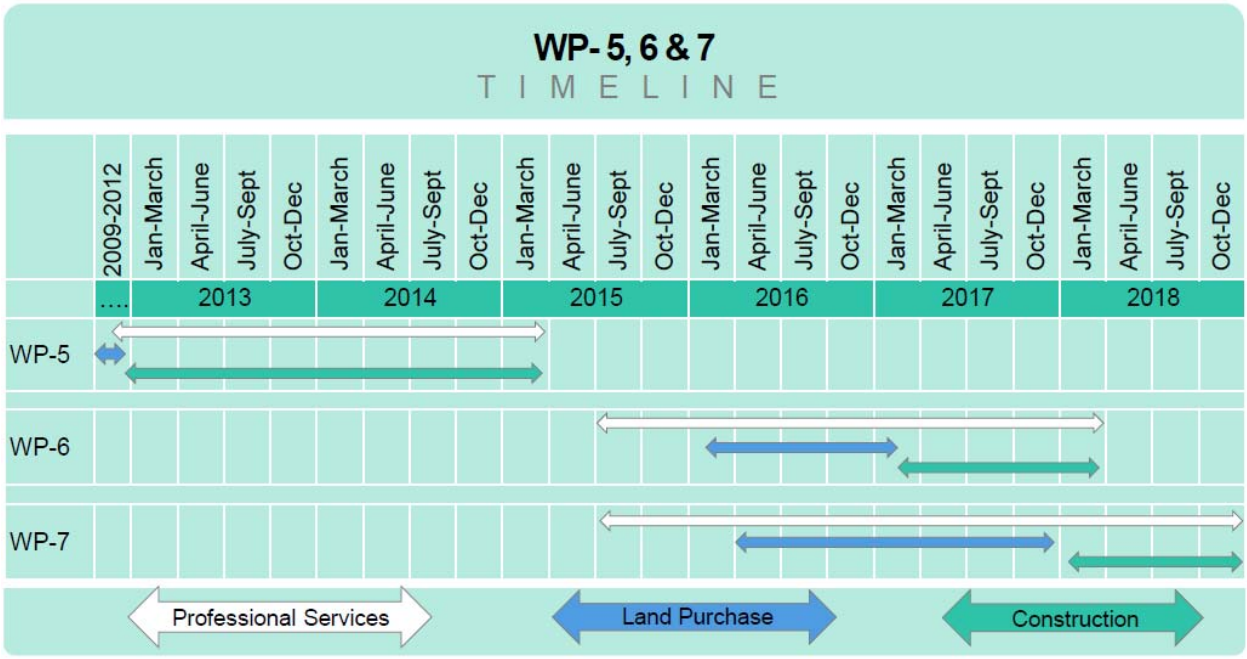
roadway design/considerations, recreational facilities and water quality basins included as part of the project. Also included are professional and legal services required to facilitate land purchase and to perform construction observation.

Land Purchase
Includes performing appraisals and negotiations with land owners, and obtaining the property required for the project.

Construction
Includes construction of the dam and all associated features.

Below is the timeline associated with these tasks.

**Figure 1. Project Timeline**




3. Partnerships

Identify the roles and responsibilities of agencies and groups involved in the proposed project regardless of whether each is an additional funding source. List any other sources of funding that have been approached for project support and that have officially turned you down. Attach the rejection letter.

PCWP
This partnership has been involved from the beginning in identifying these project sites as a need to reduce flood control. They have maintained their involvement with monthly meeting updates and monitoring to track the progress of projects in the watershed. No funds will be contributed directly from PCWP.

Nebraska Game and Parks Commission (NGPC)

The NGPC regularly attends coordination meetings to provide input and help make decisions regarding the project design, specifically related to the recreational opportunities at each site. The NGPC is a funding source, as it uses its ability to apply for Federal Sport Fish Restoration Program grant funding and contribute obtained funds toward the projects.

City of Papillion (City)
The sites are located either within the City boundary or within the ETJ that is intended for annexation. The City regularly attends coordination meetings to provide input and help make decisions regarding the design of each site. See the SIA for letters of support. They are specifically involved in decisions that impact roadways and future development. The City will manage the recreational facilities located at the sites. The City is a funding partner and will be cost-sharing in portions of the project determined during design.

Sarpy County (County)
The County regularly attends coordination meetings to provide input and help make decisions regarding the design of each site. Since they currently maintain the roadways around sites WP-6 and WP-7 and the majority of the watershed drainage is currently located outside of the City boundary in the County. The County is not a funding partner.

4. Other Sources of Funding

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources are not obtained.

A complete summary of the capital costs detailed out for the project during the economic analysis is provided in the following table. Federal and state grants will be applied for, and cost sharing from local project partners will go towards this project, which is summarized in the table in Section A-1 of the SIA.

**Table 10. Capital Cost Summary Table**

| | WP-5 | WP-6 | WP-7 | Total |
|---|---|---|---|---|
| Professional Services | $3,150,000 | $1,191,782 | $1,191,782 | $5,533,564 |
| Land Purchase | $18,200,000 | $5,170,000 | $2,210,000 | $25,580,000 |
| Construction | $15,228,273 | $2,889,550 | $3,525,242 | $21,643,065 |
| Total | $3,150,000 | $9,251,332 | $6,927,024 | **$52,756,629** |

NGPC
The NGPC can apply obtained grant funds through the U.S. Fish and Wildlife Services' SportFish Restoration Fund towards the construction costs of the fisheries portion of the recreational facilities at the sites. The NGPC obtained

$500,000 for WP-5 and will apply for approximately $436,230 for site WP-6 and $247,275 for WP-7, totaling an estimated $1,183,505 towards the project.

City of Papillion
The City will be responsible for cost-sharing on portions of the project where they would have been spending funds for roadway and infrastructure improvements that are now covered in the scope of the project. This is primarily the drainage structure improvements to the roadways that are incorporated as part of the dam or water quality basin. A fair cost-share value will be determined through engineer's estimates throughout the project, but were preliminarily estimated around $500,000.

Nebraska Environmental Trust (NET) Fund
An NET grant application will be completed during the Professional Services phase of the project to assist in the construction costs of the dams. It is anticipated that a request of approximately $200,000 total for both WP-6 and WP-7 will be made.

EPA Section 319 Grant Program
A 319 grant application through the Nebraska Department of Environmental Quality will be completed during the Professional Services phase of the project to assist in the costs associated with the construction of the water quality basins and with any additional improvements and/or public education efforts in the watersheds. It is anticipated that a request of approximately $300,000 will be made.

5. Support/Opposition

Discuss both support and opposition to the project, including the group or interest each represents.

The Papillion-LaVista School District has an immense interest in these projects with the proximity to their schools and the learning opportunities that are associated with the projects. Students have been invited and have attended several coordination meetings to observe and learn the processes that go into this project. They have interest in working with the P-MRNRD and consultant team on developing program for water quality monitoring and watershed management.

Local recreators have tremendous interest in the three new reservoirs in the area. Trails and parks get abundant use within the urban areas, and these site create new opportunities and closer proximity to those features. Both WP-6&7 have more primitive nature trails and or parking to expose the public to diverse atmospheres. These site also create new water access for boaters and anglers; site WP-7 presents a different approach, as there will be no motor boats allowed and a different fish stocking approach than the traditional reservoirs. Without motorboats, this will be ideal for kayakers and shore anglers.

No local or direct opposition has been noted. There remains opposition groups to the implementation of regional detention basins throughout the watershed, but none with any direct connection to these project sites.

# Supplemental Information Attachment

## Section A
## ADMINISTRATIVE



PAPIO MISSOURI RIVER NATURAL RESOURCES DISTRICT

FYRA ENGINEERING

## SECTION A

### A-1 Project Cost and Funding Breakdown

**Table A-1.1 – Project Cost and Funding Breakdown**

| | Total Costs | FEDERAL | | STATE | Remaining Costs | Costs Prior to 12/31/15 | Costs Between 12/31/15 and 7/1/16 | Total Prior Costs | WSF Grant Request | Total Local Cost Share | LOCAL COST SHARE BREAKDOWN | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | USFWS SRF | NDEQ Section 319 | NET | | | | | | | City of Papillion | Sarpy County | NRD Cost Share |
| WP5 | | | | | | | | | | | | | |
| Engineering, Planning and Permitting | $3,100,000 | | | | $3,100,000 | $3,100,000 | | $3,100,000 | $0 | $3,100,000 | | | $3,100,000 |
| Legal Services | $50,000 | | | | $50,000 | $50,000 | | $50,000 | $0 | $50,000 | | | $50,000 |
| Land Rights | $18,200,000 | | | | $18,200,000 | $18,200,000 | | $18,200,000 | $0 | $18,200,000 | | | $18,200,000 |
| Capital Improvement Costs | | | | | | | | | | | | | |
| Dam and Spillway | $15,228,273 | $500,000 | | | $14,728,273 | $14,728,273 | | $14,728,273 | $0 | $14,728,273 | $272,268 | $272,268 | $14,183,737 |
| Fishery Enhancements | | | | | | | | | | | | | |
| Water Quality Basins/Improvements | | | | | | | | | | | | | |
| Recreation Facilities | | | | | | | | | | | | | |
| WP6 | | | | | | | | | | | | | |
| Engineering, Planning and Permitting | $1,141,782 | | | | $1,141,782 | $122,032 | $899,500 | $1,021,532 | $685,069 | $456,713 | | | $456,713 |
| Legal Services | $50,000 | | | | $50,000 | | | | $30,000 | $20,000 | | | $20,000 |
| Land Rights | $5,170,000 | | | | $5,170,000 | | $3,856,351 | $3,856,351 | $3,102,000 | $2,068,000 | | | $2,068,000 |
| Capital Improvement Costs | | | | | | | | | | | | | |
| Dam and Spillway | $873,934 | | | | $873,934 | | | | $524,360 | $349,574 | $250,000 | $75,000 | $174,574 |
| Fishery Enhancements | $581,640 | $436,230 | | | $145,410 | | | | $87,246 | $58,164 | | | $58,164 |
| Water Quality Basins/Improvements | $42,000 | | $25,200 | | $16,800 | | | | $10,080 | $6,720 | | | $6,720 |
| Recreation Facilities | $1,391,976 | | $124,800 | $100,000 | $1,167,176 | | | | $700,306 | $466,870 | | | $466,870 |
| WP7 | | | | | | | | | | | | | |
| Engineering, Planning and Permitting | $1,141,782 | | | | $1,141,782 | $122,032 | $699,500 | $821,532 | $685,069 | $456,713 | | | $456,713 |
| Legal Services | $50,000 | | | | $50,000 | | | | $30,000 | $20,000 | | | $20,000 |
| Land Rights | $2,210,000 | | | | $2,210,000 | | $2,210,000 | $2,210,000 | $1,326,000 | $884,000 | | | $884,000 |
| Capital Improvement Costs | | | | | | | | | | | | | |
| Dam and Spillway | $2,131,958 | | | | $2,131,958 | | | | $1,279,175 | $852,783 | $250,000 | $75,000 | $677,783 |
| Fishery Enhancements | $329,700 | $247,275 | | | $82,425 | | | | $49,455 | $32,970 | | | $32,970 |
| Water Quality Basins/Improvements | $18,984 | | $11,390 | | $7,594 | | | | $4,556 | $3,037 | | | $3,037 |
| Recreation Facilities | $1,044,600 | | $138,610 | $100,000 | $805,990 | | | | $483,594 | $322,396 | | | $322,396 |
| Totals | | $1,183,505 | $300,000 | $200,000 | $51,073,124 | $36,322,337 | $7,665,351 | $7,909,415 | $8,996,910 | $42,076,213 | $772,268 | $422,268 | $41,726,213 |

## A-2 Permits

Copies of the permits obtained for WP-5 are inserted below. The same permits will be obtained for sites WP-6 and WP-7.

**USACE 404 Permit (pg 1 of 6)**

**DEPARTMENT OF THE ARMY PERMIT**

Permittee: **Papio Missouri River Natural Resources District (WP-5)**

Permit No.: **2009-00799-WEH**

Issuing Office: **WEHRSPANN REGULATORY OFFICE, OMAHA DISTRICT, U.S. CORPS OF ENGINEERS**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

The proposed project consists of constructing the West Papillion Detention Basin No. 5 (WP-5). The WP-5 structure would be an earthen embankment approximately 1,225 feet in length, 40 feet above the valley floor and 64 feet above the channel bottom. This would require 2,280 cubic yards of clean fill dirt. Two water quality basins are proposed to be constructed west of 132nd street for water quality benefits to WP-5 as well as a culvert extension for 132nd street and a utility line crossing. This project would result in the loss of 0.65 acres of PEMA/C linear riverine wetlands and 1,817 linear feet of perennial stream channel (937 linear feet for the structure, stilling basin, riprap scour hole, 265 for the north water quality basin, 310 from the south water quality basin, 210 for the culvert extension east of 132nd street, 95 for utility line crossing). The drainage area of WP-5 is approximately 5.2 square miles and the principal spillway pool area would be 134 acres at elevation 1,075 feet. This project would inundate 13,250 linear feet of perennial stream channel.

Attachments:
1/ Project Plans
2/ Water Quality Certification
3/ BMP's
4/ Final Mitigation Plan

Project Location:
The project is located in SW ¼ of Section 19, Township 14 North, Range 12 East, Sarpy County, Nebraska.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **August 31, 2015**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area. ENG Form 1721,

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

1

**Approval of Plans for Dams (pg 1 of 3)**

STATE OF NEBRASKA

DEPARTMENT OF NATURAL RESOURCES

APPROVAL OF APPLICATION A-18813

AND PLAN NUMBER 17953

WATER DIVISION 2-F

BACKGROUND

1. On September 22, 2011, John Winkler, General Manager, Papio-Missouri River Natural Resources District filed in the Department of Natural Resources (Department) application A-18813 for a permit to impound water, application for approval of plans for dams, specifications and plan P-17953.

2. The plan is for a proposed dam subject to the *Safety of Dams and Reservoirs Act*.

3. John Engle, P.E., HDR, 8404 Indian Hills Drive, Omaha, Nebraska 68114-4049, prepared the drawings and specifications.

4. Papio-Missouri River Natural Resources District, 8901 South 154th Street, Omaha, Nebraska 68138, holds easements for the reservoir and dam.

5. The drawings and specifications were examined by a Registered Professional Engineer of the Department and were found to be consistent with current standards.

ORDER

IT IS HEREBY ORDERED Application A-18813, the Application for Approval of Plans for Dams and plan P-17953 are APPROVED subject to the following limitations and conditions:

1. The source of water is a tributary to South Papillion Creek.

2. The priority date is September 22, 2011.

3. The amount of water that may be diverted shall not exceed 1,700 acre-feet per year to be stored in WP-5 Regional Detention Structure. WP-5 Regional Detention Dam will be located in the NE¼SW¼ of Section 19, Township 14 North, Range 12 East of the 6th P.M. in Sarpy County.

4. *Neb. Rev. Stat.* § 46-241(5) states in part, "The owner or possessor of a reservoir or intentional underground water storage facility does not have the right to store water in such reservoir or facility during the time that such water is required in ditches for direct irrigation or for any reservoir or facility holding a senior right. Every person who owns, controls or operates a reservoir or intentional underground water storage facility, except political subdivisions of this state, shall be required to pass ... a portion of the measured inflows to furnish water for livestock ... ."

A-18813 Appplanaprv PMR NRD
sw - 08072012 - 11024 - ord

Page 1 of 3

**Permit to Impound Water**

STATE OF NEBRASKA

**Dave Heineman**
*Governor*

**DEPARTMENT OF NATURAL RESOURCES**
**Brian P. Dunnigan, P.E.**
*Director*

# APPROVAL TO OPERATE

IN REPLY TO:
NE05082

July 30, 2014

John Winkler, Manager
Papio-Missouri River NRD
8901 South 154th Street
Omaha, NE 68138-3621

Dear Mr. Winkler:

We are in receipt of the construction certification for the Prairie Queen Main Dam in Sarpy County and this letter is the official acceptance of the project by the Nebraska Department of Natural Resources and the approval to operate the dam.

All the conditions and limitations specified in the Department's Plan of Dam Approval dated August 7, 2012, remain in effect. You must comply with all relevant statutes. This includes, but is not limited to, the following:

- Notify the Department of any change in ownership or address;
- Receive approval prior to taking any action that changes the storage capacity of this reservoir, the specifications, plan P-17953;
- Operate and maintain the structure in accordance with *Neb. Rev. Stat.* § 46-241 and the Safety of Dams and Reservoirs Act, §§ 46-1601 to 46-1670; and
- Assume liability for all damages due to leakage, overflow or structural failure of the dam.

Retain this letter with the important documents relating to this project.

Sincerely,

Tim Gokie, P.E.
Chief of Dam Safety

cc: John Engel, P.E., HDR Engineering, Inc.

DS 07302014-5082-cer

301 Centennial Mall South, 4th Floor • P.O. Box 94676 • Lincoln, Nebraska 68509-4676 • Phone (402) 471-2363 • Telefax (402) 471-2900

NPDES Permit

STATE OF NEBRASKA

**Dave Heineman**
*Governor*

April 25, 2012

**DEPARTMENT OF ENVIRONMENTAL QUALITY**
**Michael J. Linder**
*Director*
Suite 400, The Atrium
1200 'N' Street
P.O. Box 98922
Lincoln, Nebraska 68509-8922
Phone (402) 471-2186
FAX (402) 471-2909
website: www.deq.state.ne.us

Mr. John Winkler
Papio Missouri River Natural Resources District
8901 South 154th Street
Omaha, NE 68138

RE: **Issuance of storm water discharge authorization for the P-MRNRD WP-5 Reservoir and Associated Improvements construction project located at 126th and Cornhusker Road, in Sarpy County, NE (NPDES Authorization Number NER113070)**

Dear Mr. Winkler:

This is to acknowledge receipt of the CSW-NOI form on April 24, 2012 for the project referenced above. This project has authorization to discharge storm water under the terms and conditions of NPDES General Permit NER110000.

When final stabilization (Part III.M of the permit) has been completed, submit a written notice of the termination for the project as required in Part V of the permit. The enclosed CSW-NOT form is to be used for this purpose.

This project falls within the zoning jurisdiction of the City of Omaha. A grading permit from the City may be required in addition to the storm water discharge authorization provided by the NPDES permit.

Questions concerning the City of Omaha's grading permit requirement should be referred to Geoffrey P. Goodwin at (402) 444-5105.

If you have any questions concerning this NPDES storm water discharge authorization, please contact our office at (402)471-4239.

Sincerely,

Wendy Wulf
Water Quality Division

Enclosures: CSW-NOT form

copy w encl:

Mr. Troy Meyer, P.E.
HDR Engineering, Inc.
8404 Indian Hills Drive
Omaha, NE 68114

**Grading Permit**

Invoice is proof of application and permit number listed (12-0463) indicates permit obtained

City of Papillion
122 East Third St
Papillion, NE 68046

Phone: 402-597-2072
Fax: 402-597-2074

## Paid Invoice Summary

Page 1 of 1

| DATE | 10/3/2012 |
|---|---|

ACCOUNT:

Papio-Missouri River NRD
8901 S 154th St
Omaha NE 68138

Phone: 402 496 2498

| PERMIT NUMBER | 12-0463 |
|---|---|

12701 Cornhusker Rd
Papillion, NE 68046

| Date | Reference Number | Invoice Number | FeeCat | Description | Status | Amount |
|---|---|---|---|---|---|---|
| 3/28/2012 | 12-0463 | 00501 | 1-3181 | Grading Permit Fee | Paid | (-) 1000.00 |

| Date | InvoiceNum | Status | Payment | Amount |
|---|---|---|---|---|
| 3/28/2012 | 00501 | Original Due | | 1000.00 |
| 3/28/2012 | 00501 | Paid | Check 79295 | (-) 1000.00 |

**Total Paid** 1,000.00

## A-6 Itemized List of Invoices

**Figure A-6.1 – Itemized List of Invoices**

| Client | Check | Invoice | Date | Amount |
|---|---|---|---|---|
| P-MRNRD | 88529 | 001-077 | 11/30/2015 | $ 21,790.00 |
| P-MRNRD | 88353 | 001-072 | 11/2/2015 | $47,082.52 |
| P-MRNRD | 88148 | 001-069 | 9/28/2015 | $44,943.57 |
| P-MRNRD | 87989 | 001-066 | 8/31/2015 | $32,318.75 |
| P-MRNRD | 87803 | 001-062 | 8/3/2015 | $35,316.20 |
| P-MRNRD | 87600 | 001-060 | 6/22/2015 | $62,612.77 |
| **Total** | | | | **$244,064** |

# Supplemental Information Attachment

# Section B
# DNR DIRECTOR'S FINDINGS



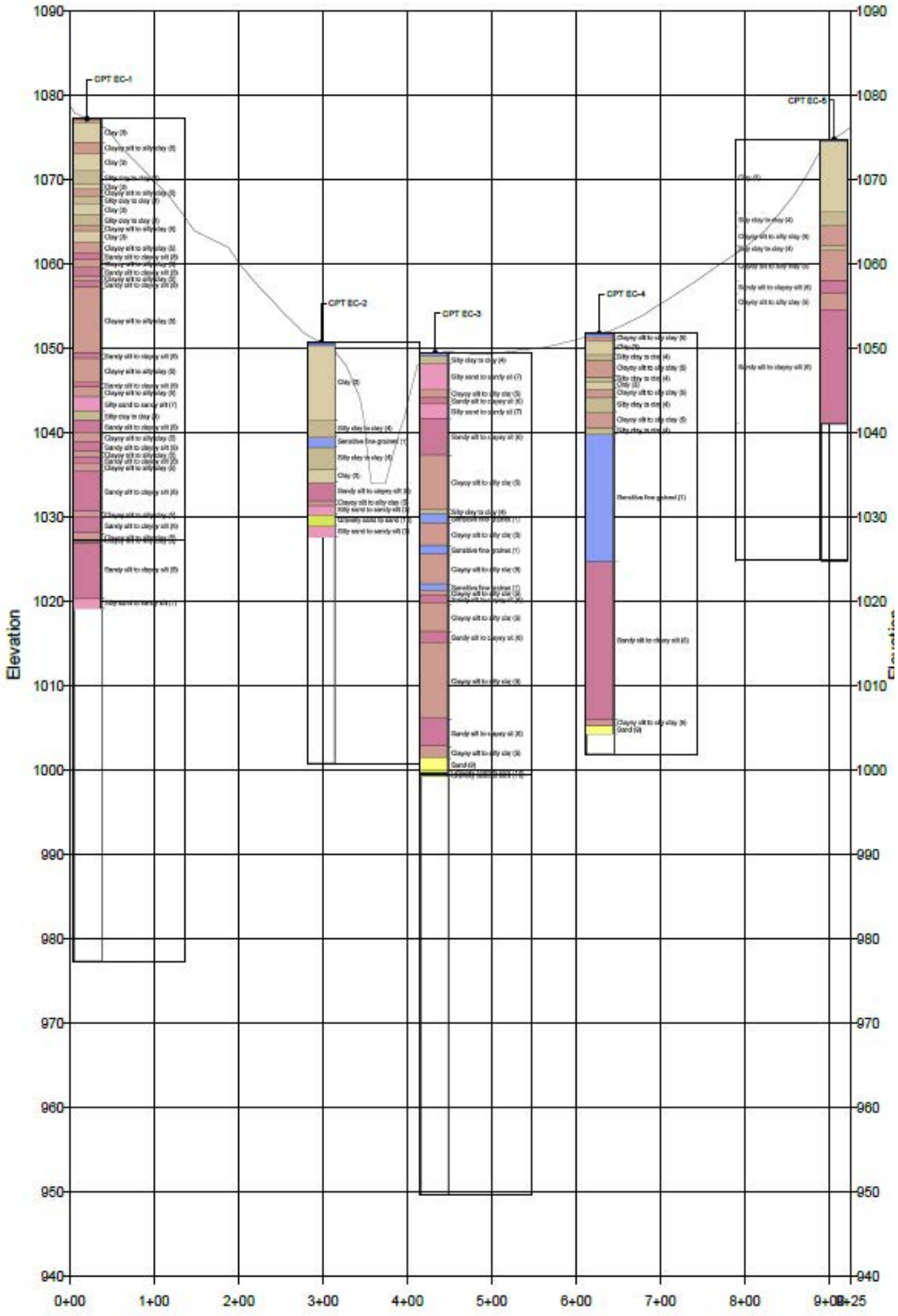
PAPIO MISSOURI RIVER NATURAL RESOURCES DISTRICT

FYRA ENGINEERING

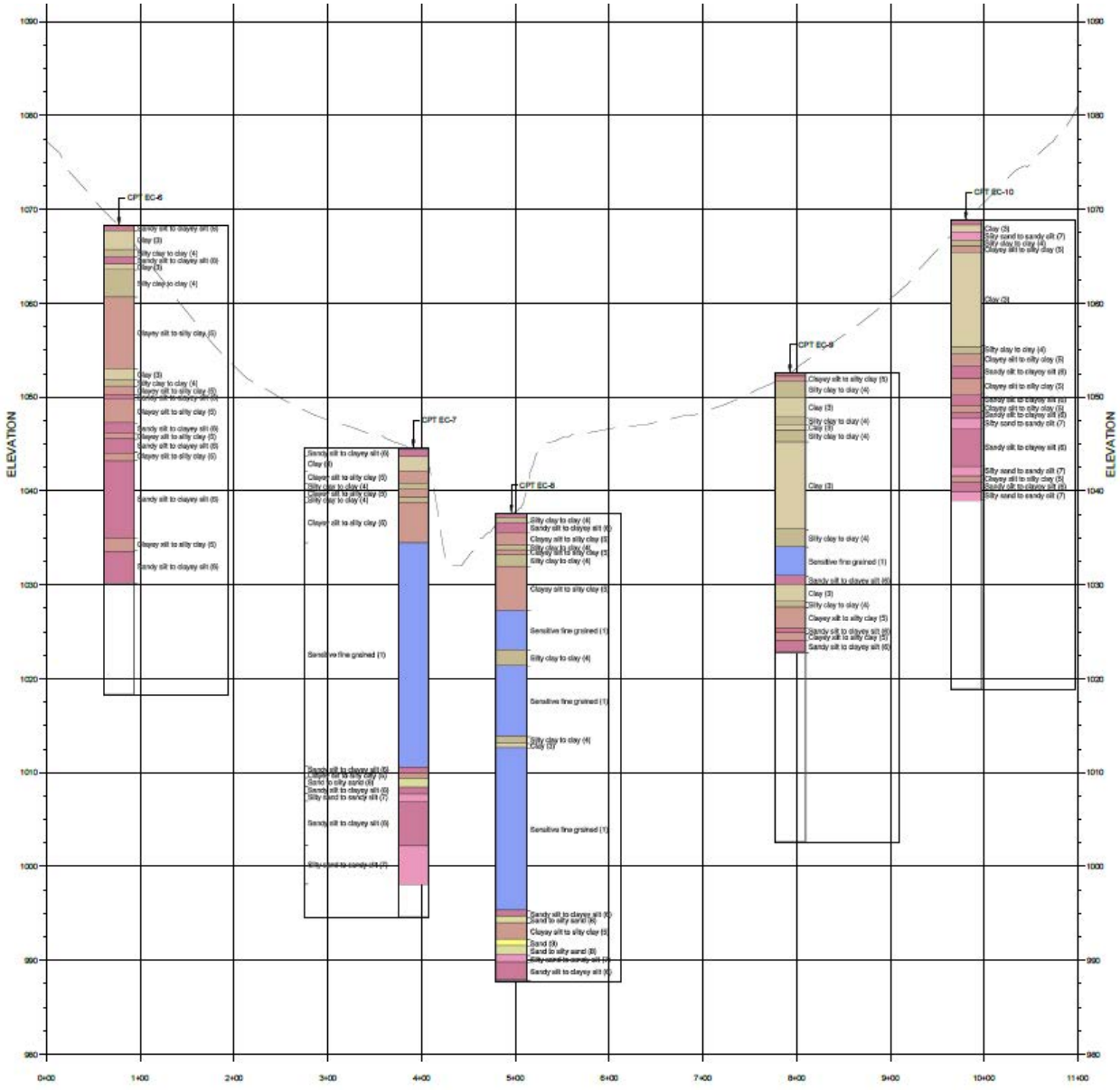
## SECTION B

### B-1(a) Field Investigations

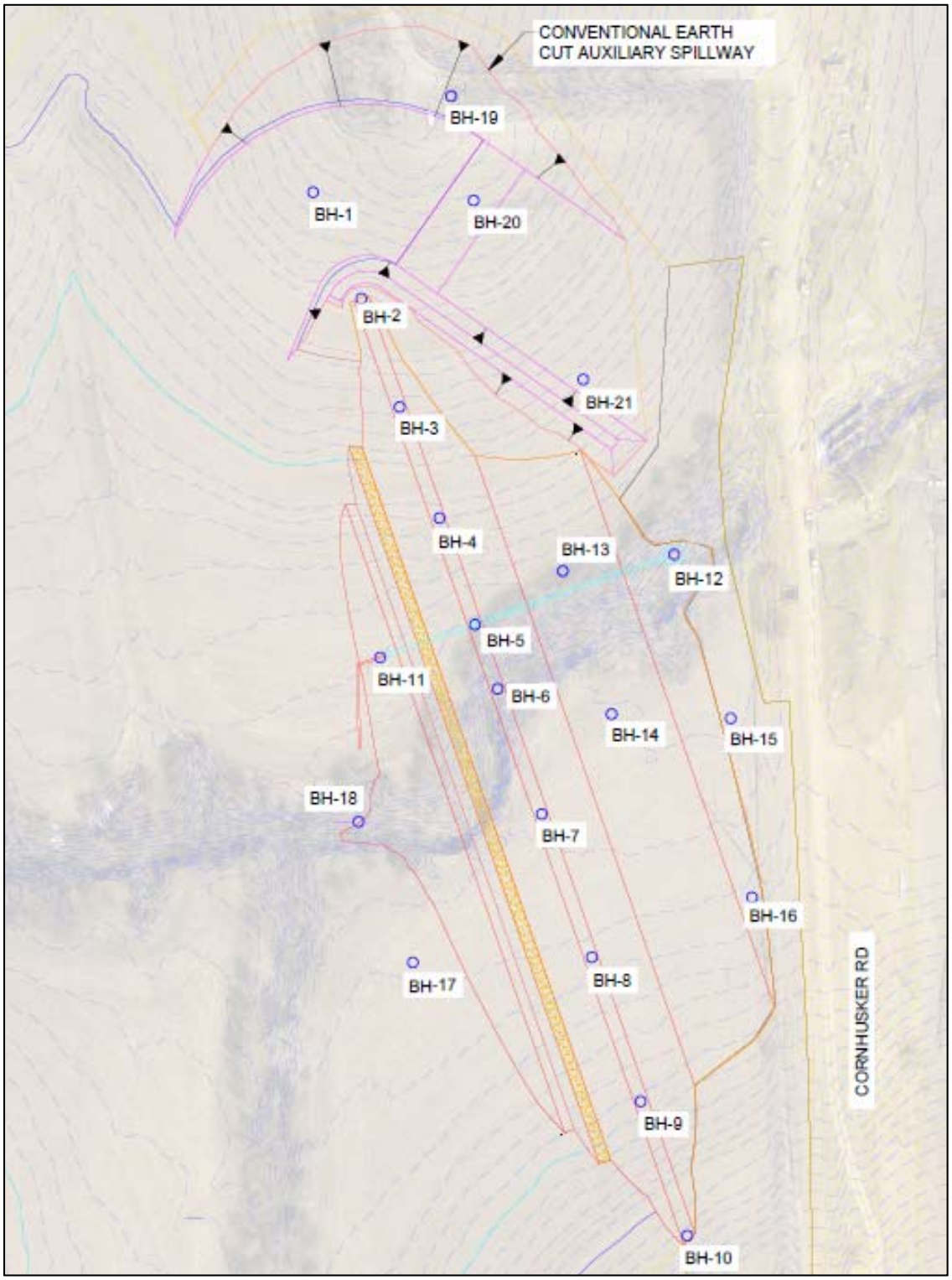
**Figure B-1(a).1 - WP-6 Cone Penetrometer Test Results**



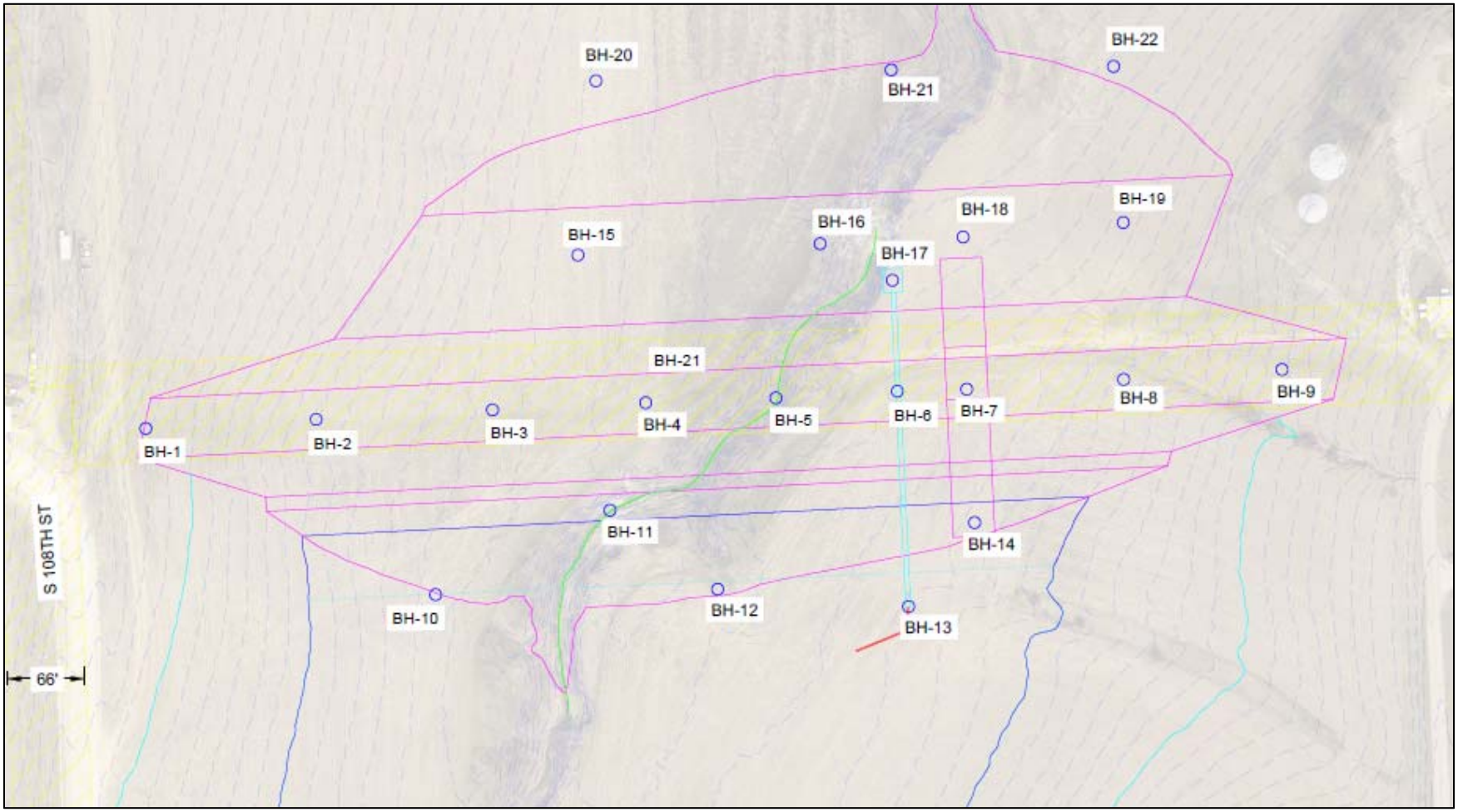
## Figure B-1(a).2 - WP-7 Cone Penetrometer Test Results



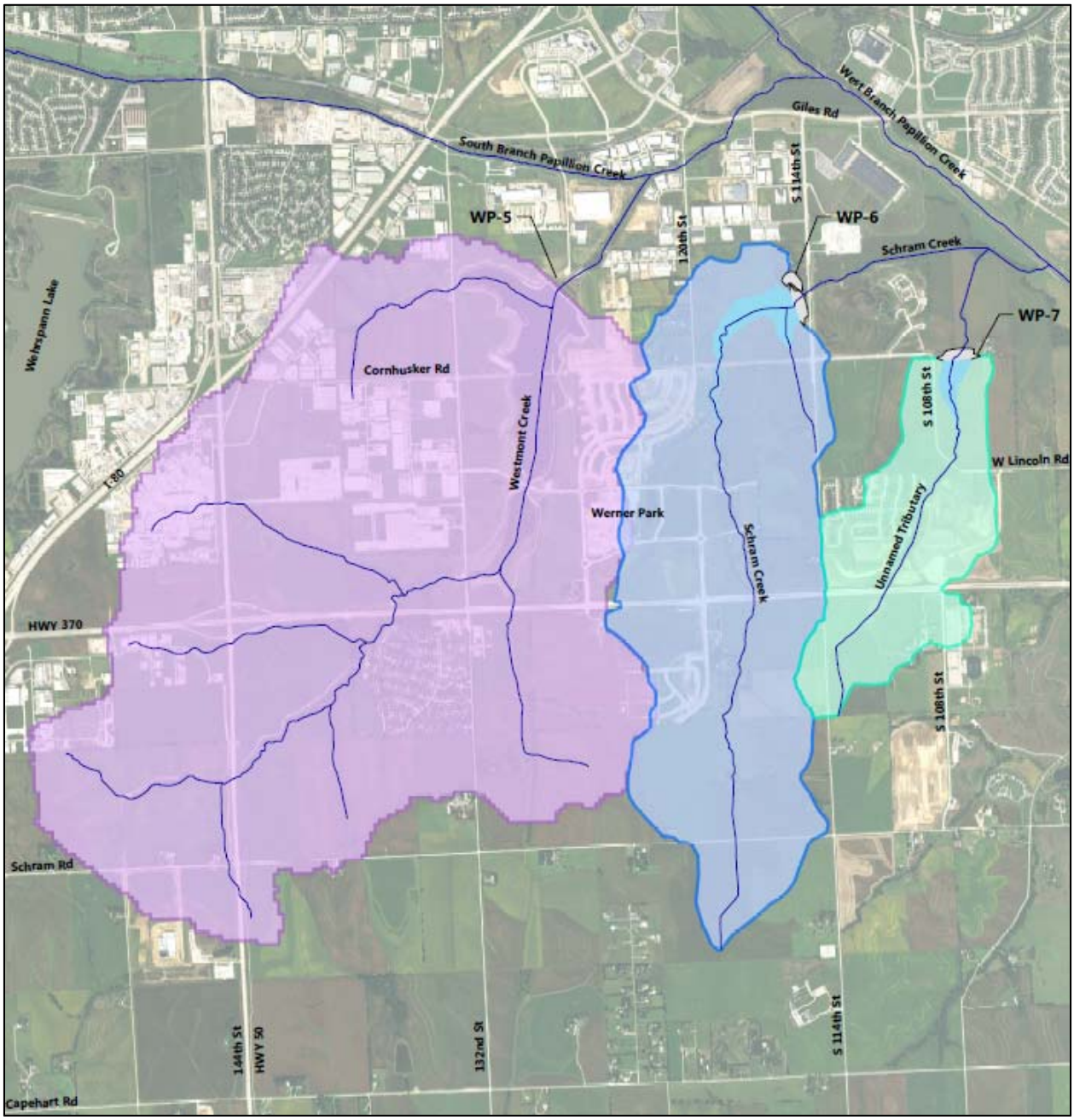
## Figure B-1(a).3 - WP-6 Proposed Soil Boring Locations



## Figure B-1(a).4 - WP-7 Proposed Soil Boring Locations



## Figure B-1(a).5 - Project Location Map



## B-3 Economic Feasibility

### Land Purchase

Since WP-5 is complete, the actual costs for land acquisition are presented in the summary table in the application. A more detailed breakdown of the anticipated land requirements for WP-6 & 7 have been provided as justification for costs used in this analysis. Tables and corresponding figures are presented below.

**Table B-3.1 – WP-6 Land Purchase Breakdown**

| Item | Area* | Unit | Unit Cost | Cost |
|---|---|---|---|---|
| Dam and Spillway | 7.6 | AC | $50,000 | $380,000 |
| Permanent Pool | 34.1 | AC | $50,000 | $1,705,000 |
| 500-Year Pool | 38.3 | AC | $50,000 | $1,915,000 |
| Top of Dam | 18.4 | AC | $50,000 | $920,000 |
| Additional Purchase (estimated) | 5.0 | AC | $50,000 | $250,000 |
| **TOTAL** | **103.4** | | | **$5,170,000** |

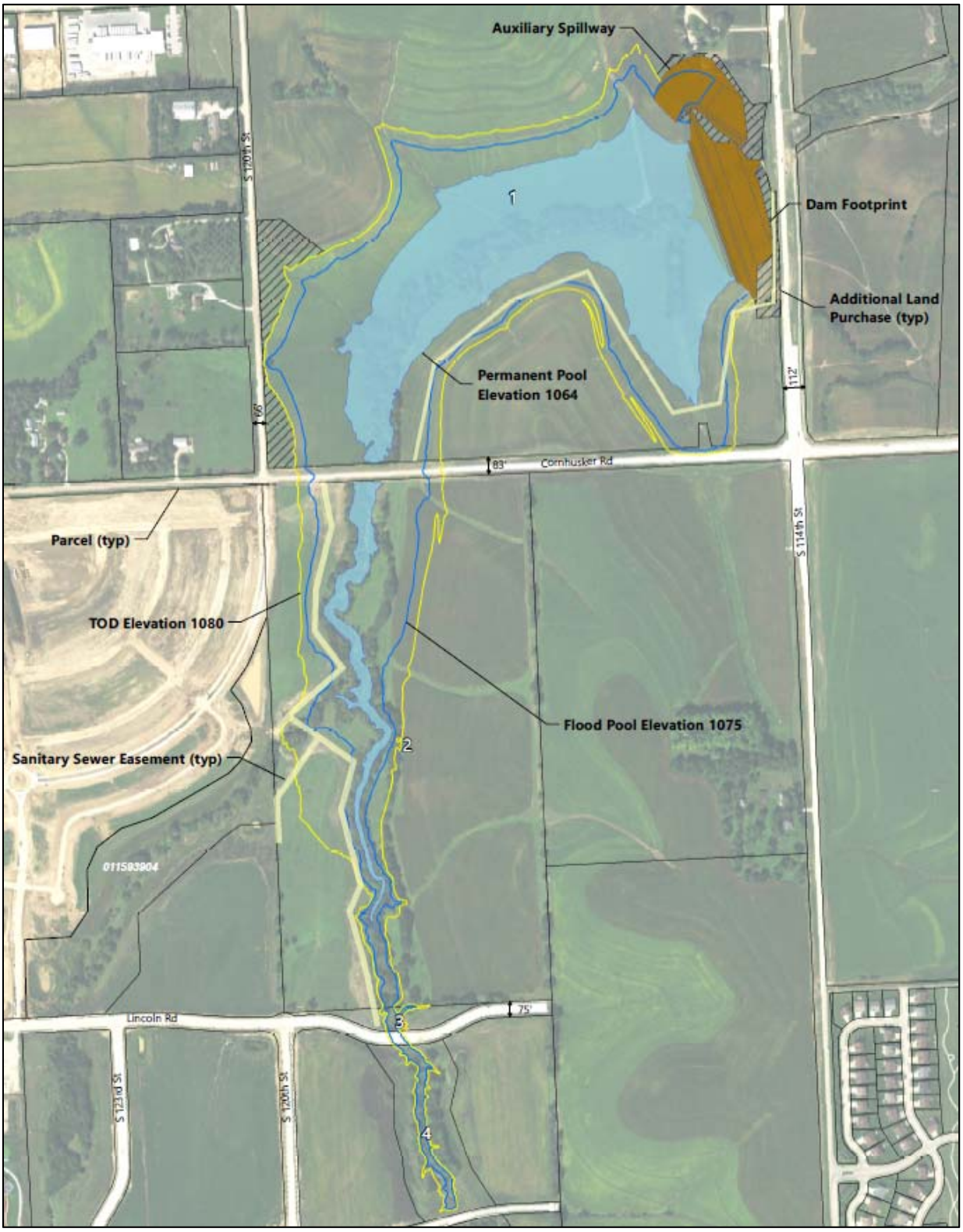
**area within existing ROW not included*

**Table B-3.2 – WP-7 Land Purchase Breakdown**

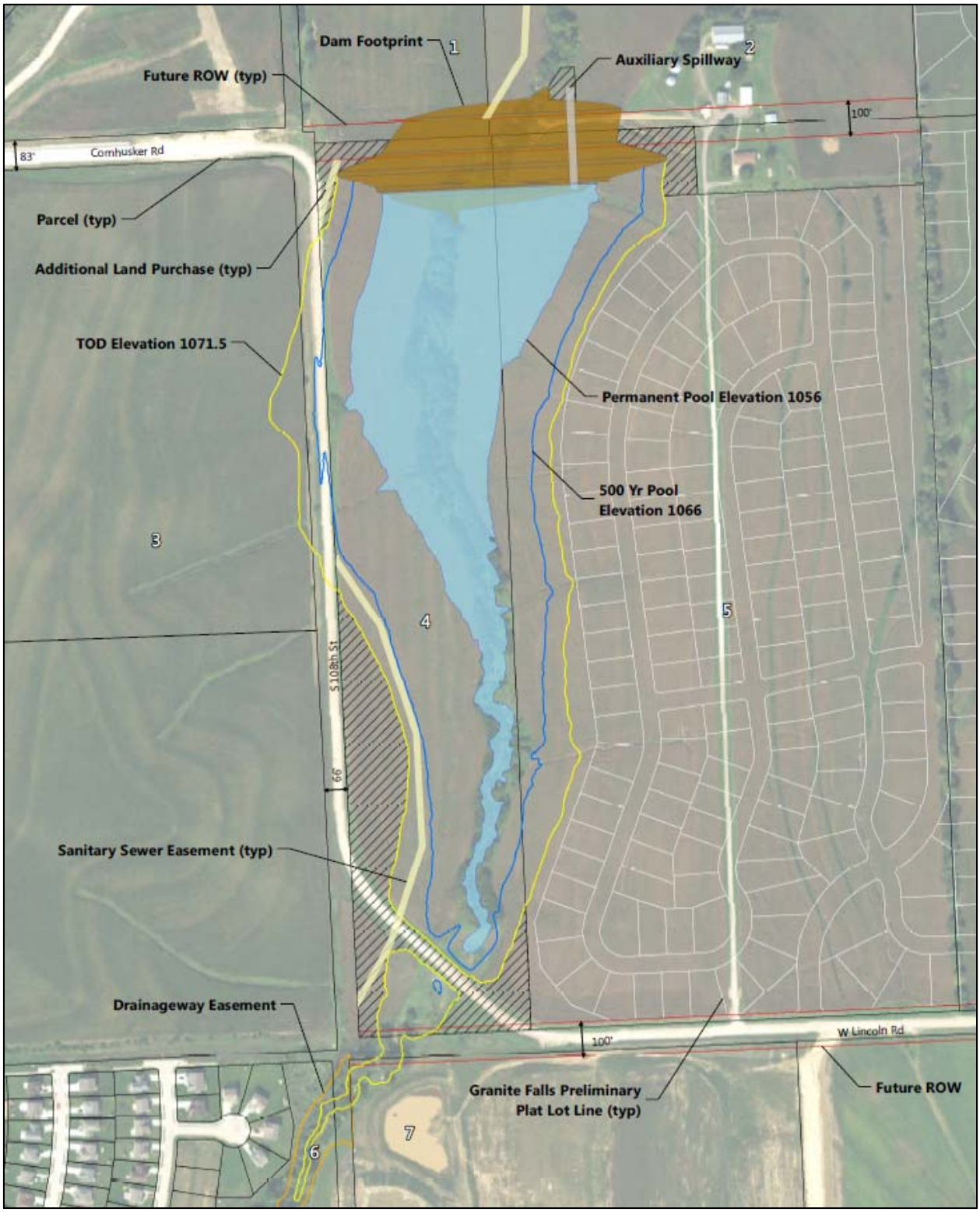
| Item | Area* | Unit | Unit Cost | Cost |
|---|---|---|---|---|
| Dam and Spillway | 4.2 | AC | $50,000 | $210,000 |
| Permanent Pool | 12.7 | AC | $50,000 | $635,000 |
| 500-Year Pool | 13.5 | AC | $50,000 | $675,000 |
| Top of Dam | 8.0 | AC | $50,000 | $400,000 |
| Additional Purchase (estimated) | 5.8 | AC | $50,000 | $290,000 |
| **TOTAL** | **44.2** | | | **$2,210,000** |

**area within future ROW and drainage easement included in anticipated purchase cost; existing ROW not included*

## Figure B-3.1 – WP-6 Land Rights Map



## Figure B-3.2 – WP-7 Land Rights Map



**Construction**

All capital costs reported for WP-5 in the summary table located in the application are actual costs. A more detailed breakdown of the engineer's estimates for the construction of the dam, water quality basin and recreation facilities at WP-6 & 7 have been provided as justification for costs used in this analysis.

**Table B-3.3 – WP-6 Dam Cost Estimate**

| Item | Quantity | Unit | Unit Cost | Cost |
|---|---|---|---|---|
| Mobilization/General | 1 | LS | $66,208 | $66,208 |
| Dam Embankment | 133,800 | CY | $2.50 | $334,325 |
| Principal Spillway Pipe | 280 | FT | $550.00 | $154,000 |
| Drawdown Pipe and Valve | 110 | FT | $250.00 | $27,500 |
| Common Excavation | 12,220 | CY | $2.00 | $24,431 |
| Aggregate Fill | 310 | TN | $30.00 | $9,240 |
| Rock Riprap | 885 | TN | $60.00 | $52,959 |
| Seeding | 13.0 | AC | $1,800.00 | $23,615 |
| Structural Concrete | 75 | CY | $500.00 | $36,000 |
| Non-Structural Concrete | 55 | CY | $550.00 | $28,600 |
| | | | Subtotal | $728,279 |
| | | | 20% Contingency | $145,656 |
| | | | **TOTAL** | **$873,934** |

**Table B-3.4 – WP-6 Water Quality Basin Cost Estimate**

| Item | Quantity | Unit | Unit Cost | Cost |
|---|---|---|---|---|
| Remove Existing 10' Dia. RCP | 1 | LS | $3,000.00 | $3,000 |
| Outlet Works | 1 | LS | $35,000.00 | $35,000 |
| | | | Subtotal | $35,000 |
| | | | 20% Contingency | $7,000 |
| | | | TOTAL | **$42,000** |

**Table B-3.5 – WP-6 Recreation Facilities Cost Estimate**

| | Quantity | Unit | Unit Price ($) | Cost ($) |
|---|---|---|---|---|
| Multi-Use Concrete Trail | | | | |
| **Site Preparation** | | | | |
| Sediment and Erosion Control Measures | 1 | LS | $9,500.00 | $9,500 |
| Field Staking and Surveying | 1 | LS | $11,000.00 | $11,000 |

| | | | | |
|---|---|---|---|---|
| **Site Improvements** | | | | |
| 8' wide x 5" Concrete Trail with earthwork | 10,000 | LF | $48.00 | $480,000 |
| 10’ wide aggregate trail | 670 | LF | $30.00 | $20,100 |
| Stormwater Culverts/Mitigation Measures | 4 | EA | $2,500.00 | $10,000 |
| Slope Retaining and Soil Stabilization Measures | 1 | LS | $12,000.00 | $12,000 |
| Signage | 1 | LS | $2,500.00 | $2,500 |
| 120th Street Entry Drive, Parking and Boat Ramp | | | | |
| **Site Preparation** | | | | |
| Sediment and Erosion Control Measures | 1 | LS | $8,000.00 | $8,000 |
| Field Staking and Surveying | 1 | LS | $4,500.00 | $4,500 |
| **Site Improvements** | | | | |
| 7" Concrete Drive and Parking | 5,050 | SY | $48.00 | $242,400 |
| Boat Ramp and Dock Construction | 1 | EA | $40,000.00 | $40,000 |
| Vehicle Access Control and Soil Stabilization Measures | 1 | LS | $6,500.00 | $6,500 |
| Site Lighting | 1 | LS | $25,000.00 | $25,000 |
| Entry Gate and Signage | 1 | LS | $5,500.00 | $5,500 |
| Public Amenity Facilities | | | | |
| **Site Preparation** | | | | |
| Sediment and Erosion Control Measures | 1 | LS | $8,000.00 | $8,000 |
| Field Staking and Surveying | 1 | LS | $4,500.00 | $4,500 |
| **Site Improvements** | | | | |
| (1) 16 x 24 Picnic Shelter with pad, tables, and grills | 1 | LS | $20,000.00 | $20,000 |
| Vault Toilet 2-Stall Unit (Romtec) | 1 | EA | $50,000.00 | $50,000 |
| 5" Pedestrian Concrete Walks | 4500 | SF | $4.00 | $18,000 |
| Signage | 1 | LS | $1,000.00 | $1,00 |
| Stormwater Management BMPs | 1 | LS | $8,000.00 | $8,000 |
| Fisheries | | | | |
| (9) Aggregate and Sheet Pile Shore Fishing Landings | 9 | EA | $15,000.00 | $135,000 |
| (1) ADA Concrete and Sheet Pile Shore Fishing Landings | 1 | EA | $18,000.00 | $18,000 |
| Shoreline Protection | 1200 | FT | $21.00 | $25,200 |
| Offshore Breakwater/Trail | 500 | FT | $185.00 | $92,500 |

| | | | | |
|---|---|---|---|---|
| Breakwater Jetty | 4 | EA | $6,000.00 | $24,000 |
| Vegetation Barriers | 10 | EA | $1,500.00 | $15,000 |
| Underwater Shoals | 10 | EA | $1,500.00 | $15,000 |
| Shoreline Scallops | 5 | EA | $5,000.00 | $25,000 |
| In-lake "Rock Star" Habitat | 25 | EA | $2,800.00 | $70,000 |
| Shoreline Access Bumpouts | 10 | EA | $5,000.00 | $50,000 |
| Cove Enhancement Excavation | 3000 | CY | $5.00 | $15,000 |
| Cornhusker Road Natural Area Parking | | | | |
| **Site Preparation** | | | | |
| Sediment and Erosion Control Measures | 1 | LS | $4,500.00 | $4,500 |
| Field Staking and Surveying | 1 | LS | $1,500.00 | $1,500 |
| **Site Improvements** | | | | |
| 6" Aggregate Paving | 860 | SY | $18.00 | $15,480 |
| Entry Gate | 1 | LS | $2,400.00 | $2,400 |
| Site Lighting | 1 | LS | $4,000.00 | $4,000 |
| Signage | 1 | LS | $1,200.00 | $1,200 |
| Site Vegetation Restoration | | | | |
| **Turf and Grasses** | | | | |
| Fescue turfgrass / Hydromulch (day use area) | 3 | Acre | $1,500.00 | $4,500 |
| Overland Rural NRD Mix / Crimp Straw | 60 | Acre | $1,800.00 | $108,000 |
| Stream mitigation - channel stabilization plantings | 1.5 | Acre | $1,800.00 | $2,700 |
| Stream mitigation - vegetated buffer plantings | 6 | Acre | $1,800.00 | $10,800 |
| **Trees** | | | | |
| 2" Caliper Trees (day use/fish bump outs | 50 | EA | $350.00 | $17,500 |
| Mulch | 20 | CY | $45.00 | $900 |
| | **SUBTOTAL** | | | $1,644,680 |
| | **20% Contingency** | | | $328,936 |
| | **TOTAL** | | | **$1,973,616** |

### Table B-3.6 – WP-7 Dam Cost Estimate

| Item | Quantity | Unit | Unit Cost | Cost |
|---|---|---|---|---|
| Mobilization/General | 1 | LS | $121,512 | $121,512 |
| Dam Embankment | 123,000 | CY | $2.50 | $307,500 |
| Fuse Plug Fill- Clay | 280 | CY | $4.00 | $1,120 |
| Fuse Plug Fill- Sand | 140 | TN | $30.00 | $4,200 |
| Principal Spillway Pipe | 250 | FT | $550.00 | $137,500 |
| Drawdown Pipe and Valve | 70 | FT | $250.00 | $17,500 |
| Common Excavation | 1,200 | CY | $2.00 | $2,400 |
| Aggregate Fill | 230 | TN | $30.00 | $6,900 |
| Rock Riprap | 900 | TN | $60.00 | $54,000 |
| Seeding | 5 | AC | $1,800.00 | $9,000 |
| Bridge | 1 | LS | $350,000 | $350,000 |
| Structural Concrete | 1,265 | CY | $500.00 | $632,500 |
| Non-Structural Concrete | 370 | CY | $250.00 | $92,500 |
| | | | Subtotal | $1,776,632 |
| | | | 20% Contingency | $355,326 |
| | | | **TOTAL** | **$2,131,958** |

### Table B-3.7 – WP-7 Water Quality Basin Cost Estimate

| Item | Quantity | Unit | Unit Cost | Cost |
|---|---|---|---|---|
| Fill | 3,808 | CY | $2.50 | $9,520 |
| Outlet Works | 1 | LS | $6,300.00 | $6,300 |
| | | | Subtotal | $15,820 |
| | | | 20% Contingency | $3,164 |
| | | | TOTAL | **$18,984** |

## Table B-3.8 – WP-7 Recreation Facilities Cost Estimate

| | Quantity | Unit | Unit Price ($) | Cost ($) |
|---|---|---|---|---|
| Multi-Use Concrete Trail | | | | |
| **Site Preparation** | | | | |
| Sediment and Erosion Control Measures | 1 | LS | $7,500.00 | $7,500 |
| Field Staking and Surveying | 1 | LS | $8,500.00 | $8,500 |
| **Site Improvements** | | | | |
| 8' wide x 5" Concrete Trail with earthwork | 4,900 | LF | $48.00 | $235,200 |
| 10' wide aggregate trail | 460 | LF | $30.00 | $13,800 |
| Mowed grass trail | 1,850 | LF | - | - |
| Stormwater Culverts/Mitigation Measures | 2 | EA | $2,500.00 | $5,000 |
| Weir Bridge Crossing | 1 | LS | $75,000.00 | $75,000 |
| Slope Retaining and Soil Stabilization Measures | 1 | LS | $9,500.00 | $9,500 |
| Signage | 1 | LS | $1,000.00 | $1,000 |
| Lincoln Street Entry Drive and Parking | | | | |
| **Site Preparation** | | | | |
| Sediment and Erosion Control Measures | 1 | LS | $4,500.00 | $4,500 |
| Field Staking and Surveying | 1 | LS | $2,500.00 | $2,500 |
| **Site Improvements** | | | | |
| 7" Concrete Drive and Parking | 5000 | SY | $48.00 | $240,000 |
| Vehicle Access Control and Soil Stabilization Measures | 1 | LS | $6,500.00 | $6,500 |
| Site Lighting | 1 | LS | $25,000.00 | $25,000 |
| Stormwater Management BMPs | 1 | LS | $8,000.00 | $8,000.00 |
| Entry Gate and Signage | 1 | LS | $5,500.00 | $5,500 |
| Water Access Amenities | | | | |
| **Site Preparation** | | | | |
| Sediment and Erosion Control Measures | 1 | LS | $1,500.00 | $1,500 |
| Field Staking and Surveying | 1 | LS | $900.00 | $900 |
| **Site Improvements** | | | | |
| NRD and G&P Access Ramp (Fleximat and Planks) | 1 | LS | $18,000.00 | $18,000 |
| Stabilized Beach Landing (Fleximat and Aggregate shore launch) | 2500 | SF | $6.00 | $15,000 |
| Floating Universal Access Transfer and Launch | 1 | LS | $28,000.00 | $28,000 |
| Signage | 1 | LS | $1,200.00 | $1,200 |

| | | | | |
|---|---|---|---|---|
| Public Amenity Facilities | | | | |
| **Site Preparation** | | | | |
| Sediment and Erosion Control Measures | 1 | LS | $1,500.00 | $1,500 |
| Field Staking and Surveying | 1 | LS | $1,500.00 | $1,500 |
| **Site Improvements** | | | | |
| (1) 16x24 Picnic Shelter with pad, tables, and grills | 1 | LS | $20,000.00 | $20,000 |
| Vault Toilet 2-Stall Unit (Romtec) | 1 | EA | $50,000.00 | $50,000 |
| 5" Pedestrian Concrete Walks | 1800 | SF | $4.00 | $7,200 |
| Signage | 1 | LS | $1,000.00 | $1,000 |
| Fisheries | | | | |
| (5) Aggregate and Sheet Pile Shore Fishing Landings | 5 | EA | $15,000.00 | $75,000 |
| (2) ADA Concrete and Sheet Pile Shore Fishing Landings | 2 | EA | $18,000.00 | $36,000 |
| Offshore Breakwater/Trail | 350 | FT | $185.00 | $64,750 |
| Breakwater Jetty | 1 | EA | $6,000.00 | $6,000 |
| Vegetation Barriers | 6 | EA | $1,500.00 | $9,000 |
| Underwater Shoals | 4 | EA | $1,500.00 | $6,000 |
| Shoreline Scallops | 4 | EA | $5,000.00 | $20,000 |
| In-lake "Rock Star" Habitat | 10 | EA | $2,800.00 | $28,000 |
| Shoreline Access Bumpouts | 6 | EA | $5,000.00 | $30,000 |
| Site Vegetation Restoration | | | | |
| **Turf and Grasses** | | | | |
| Fescue turfgrass / Hydromulch (day use area) | 2 | Acre | $1,500.00 | $3,000 |
| Overland Rural NRD Mix / Crimp Straw | 25 | Acre | $1,800.00 | $45,000 |
| Stream mitigation - channel stabilization plantings | 1 | Acre | $1,800.00 | $1,800 |
| Stream mitigation - vegetated buffer plantings | 5 | Acre | $1,800.00 | $9,000 |
| **Trees** | | | | |
| 2" Caliper Trees (day use and fish bump outs) | 50 | EA | $350.00 | $17,500 |
| Mulch | 20 | CY | $45.00 | $900 |
| | **SUBTOTAL** | | | $1,145,250 |
| | **20% Contingency** | | | $229,050 |
| | **TOTAL** | | | **$1,374,300** |

**Benefits**

Flood Damage Reduction Calculations

To assess the flood damage reductions due to the construction of WP 5, 6 and 7, the net impact on hydrology and hydraulics was required. Utilizing the effective FEMA DFIRM model, modifications were made to the hydrologic model (HEC-HMS V2.2.2) to reflect the presence of the three detention structures. Once the modifications were made to the HEC-HMS model, three recurrence events (50-, 100-, and 500-yr) were simulated for each of eight storm sizes ranging from 40- to 200-mi$^2$.

For each location along the West Branch Papillion Creek specified as a flow change location within the HEC-RAS Model, a corresponding storm size is denoted in the DFIRM model documentation. When reconstructing the HEC-RAS steady-state flow file, care was taken to select only the pertinent peak discharge corresponding to the correct storm size. The resulting steady-state flow file was then entered into the HEC-RAS model and ran to simulate the impact of WP 5, 6 and 7.

Because of FEMA requirements at the time of this model's construction, four geometric scenarios exist to correctly assess the uncertified levee's hydraulics (channel only, left levee failure, right levee failure, and both levee failure). When assessing the impacts to channel hydraulics, the "channel only" geometry plan was utilized. When assessing the left floodplain hydraulics, the higher of either "left levee failure" or "both levee failure" was selected. When assessing the right floodplain hydraulics, the higher of either "right levee failure" or "both levee failure" was selected.

To visualize the reduction in channel water surface elevations (WSEs), three graphs have been created to simulate the events. The graphs contain two lines dictating the actual WSE and a bar graph signifying the absolute difference between the two routings (without and with project). As indicated on the graphs, for a 100-year event, average WSE reductions are on the order of 0.67 feet.

To visualize the reduction in floodplain elevations, a single map was created for the 100-year event. The map was created by projecting both 100-year modeling results onto the most current 2013 LIDAR data. The net difference in inundation depth was then calculated for both floodplains between the with- and without-project conditions. Floodplain depth reductions reached a maximum of 1.35-feet in several locations throughout the map.

Utilizing the inundation mapping, expected damages in the floodplain were calculated for the with- and without-project conditions. The most current 2015 Sarpy County parcel data was selected as well as the most current aerials to locate structures. Two types of damages were computed in this manner: agricultural/land damages and structure damages.

For agricultural damages, the flood duration was assumed short-lived and occurring during the spring to summer months. Based on average corn prices of $5.11/bushel (NRC Information) and yields approaching 200 bushels/acre (conversations with local farmers), a 20% loss of crops would amass damages of nearly $200/acre.

For structural damages, the parcel classification and structure type was utilized to select a stage-damage curve from HEC-FDA's catalog. Four general residential curves were selected from the USACE RES-1 Chicago library: One-Story No Basement, One Story with Basement, Two Story with Basement, and Split Level No Basement. However, due to incomplete data regarding basements, a conservative simplification was made to utilize only the Split Level No Basement stage-damage curve. This curve provides a lower than average damage for the same stage thereby slightly underestimating the flood damages for each event. We feel this simplification will provide suitable results for this level of study.

The resulting flood damages for the with- and without-project conditions as well as the net reduction are detailed in the tables below. The following figures depicts the downstream flood inundation depths and detailed listings of individual structures and agricultural parcels realizing benefits is provided in the *Detailed Computations for Land and Structure Damages* (FYRA 2015b). All hydrologic, hydraulic and economic models are available from FYRA Engineering upon request.

Flood Insurance

Due to the presence of Zone A delineated floodplains, floodplain insurance is required whenever a home mortgage is written. With the recent modifications to the NFIP program through the Biggert-Watters Act, floodplain insurance costs have increased. Based on discussions with local insurance agents as well as the P-MRNRD, it is estimated that floodplain insurance ranges from $4,000-6,000 per year for residential homes in this vicinity that would be classified as high-risk. Moderate to low risk residences would pay less than $500/year, however, only high-risk structures were included in this analysis. A valid estimate of commercial and industrial floodplain insurance was not acquired for this study for high-risk areas; however, based on moderate risk rates from the NFIP (https://www.floodsmart.gov/floodsmart/pages/commercial_coverage/policy_rates.jsp), it is expected that high-risk, non-residential properties may reach $10,000/year. For the purpose of this study, an average value of $5,000/year was utilized for both residential and commercial/industrial properties.

**Table B-3.9 – Flood Damages for West Branch Papillion Creek without Project**

| | 50-Year | 100-Year | 500-Year |
|---|---|---|---|
| Total Structures Impacted | 130 | 159 | 220 |
| Total Land Inundated (acres) | 1388 | 1501 | 1774 |
| Potential Structure Damages | $2,034,254 | $2,652,369 | $5,005,030 |
| Potential Content Damages | $813,702 | $1,060,948 | $2,002,012 |
| Agricultural Damages | $37,953 | $42,601 | $50,772 |
| Comm/Res Land Damages | $30,583 | $32,919 | $40,391 |
| Stream Damages | $203,425 | $265,237 | $500,503 |
| Floodplain Insurance | | $795,000 | |

### Table B-3.10 – Flood Damages for West Branch Papillion Creek with Project

| | 50-Year | 100-Year | 500-Year |
|---|---|---|---|
| Total Structures Impacted | 40 | 53 | 88 |
| Total Land Inundated (acres) | 1294 | 1396 | 1652 |
| Potential Structure Damages | $1,639,787 | $2,139,601 | $3,426,542 |
| Potential Content Damages | $655,915 | $855,840 | $1,370,617 |
| Agricultural Damages | $35,554 | $38,107 | $46,323 |
| Comm/Res Land Damages | $28,635 | $30,935 | $37,638 |
| Stream Damages | $163,979 | $213,960 | $342,654 |
| Floodplain Insurance | | $270,000 | |

### Table B-3.11 – Net Flood Benefits

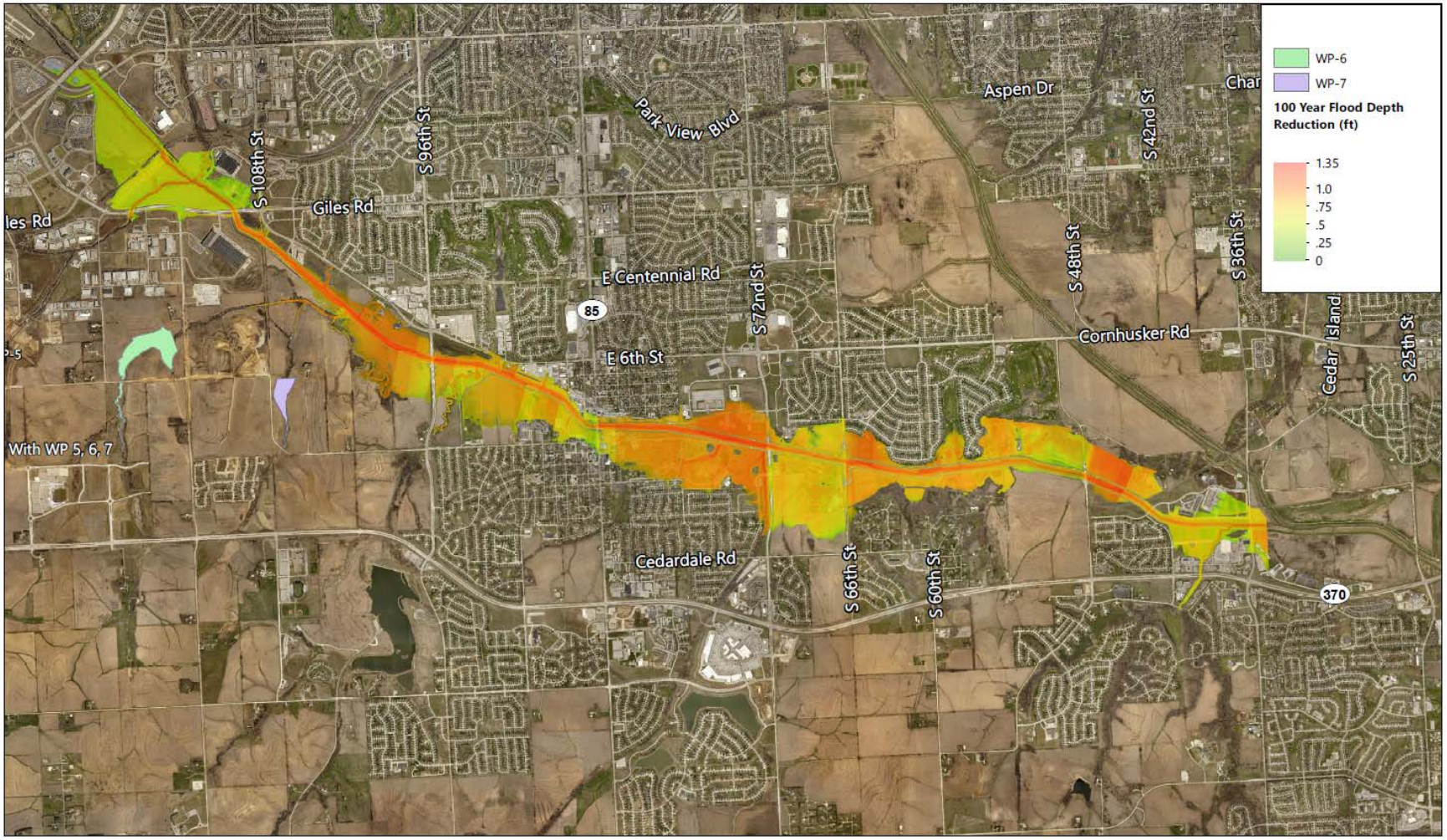
| | 50-Year | 100-Year | 500-Year |
|---|---|---|---|
| Total Structures Impacted | 89 | 105 | 131 |
| Total Land Inundated (acres) | 94 | 106 | 122 |
| Potential Structure Damages | $394,468 | $512,769 | $1,578,488 |
| Potential Content Damages | $157,787 | $205,107 | $631,395 |
| Agricultural Damages | $2,399 | $4,494 | $4,449 |
| Comm/Res Land Damages | $1,949 | $1,984 | $2,753 |
| Stream Damages | $39,447 | $51,277 | $157,849 |
| Floodplain Insurance | | $525,000 | |

### Table B-3.12 – Flood Benefit Annualization Summary

| **Event** | **2.00%** | **1.00%** | **0.20%** |
|---|---|---|---|
| **Total Damage Reduction** | **$596,049** | **$775,630** | **$2,374,934** |
| **Annualization** | | **$6,858** | **$12,602** |
| **Total Reduction in Annualized Flood Damages** | | | **$544,461** |

| | **Acres** | **% of Total** | **Damages** |
|---|---|---|---|
| **Attributable to WP-5** | **3,320** | **66%** | **$357,588** |
| **Attributable to WP-6** | **1,267** | **25%** | **$136,465** |
| **Attributable to WP-7** | **468** | **9%** | **$50,407** |

## Figure B-3.3 – 100-Year Flood Depth Reduction



Recreation Benefits

Recreation benefits were calculated in accordance with Nebraska Resources Development Fund Guidelines. A recreation day value of $8.33 was used in accordance with information provided by NRD for the WSF grant application. Many studies and other methodologies exist that suggest that this value is low, but since an overall positive benefit:cost comparison was achieved, additional effort was not expended to develop a justification for a higher number. Given the urban location and value of the land, the opportunity costs alone of the area would suggest the $8.33 value is very low.

The Nebraska Game and Parks Commission, in their commitment of resources and funding to this project, along with their most recent State Comprehensive Outdoor Recreation Plan (SCORP - http://outdoornebraska.ne.gov/parks/programs/scorp/ ) has identified Omaha as a major recreation area deficit. This is driven by the high population density and the demand generated by the population of course, but also lends credibility to the argument that the value of the recreation should be higher.

Planned recreation facilities are shown in the *WP-6 & 7 TM* (FYRA 2015a). A detailed breakdown of the benefit calculations are provided below.

**Table B-3.13 – WP-5 Project Recreation Benefits**

| Recreational Activity | Units | Supply | Recreation Days | Value Per Rec Day | Recreation Benefits |
|---|---|---|---|---|---|
| Hiking | Miles | 4.4 | 5720.0 | $8.33 | $47,648 |
| Fishing | Acres | 125 | 2109.4 | $8.33 | $17,571 |
| Canoeing | Acres | 125 | 1615.4 | $8.33 | $13,456 |
| Bicycling | Miles | 4.4 | 5720.0 | $8.33 | $47,648 |
| Picnicking | Tables | 8 | 906.7 | $8.33 | $7,553 |
| Ice Fishing | Acres | 125 | 1054.7 | $8.33 | $8,786 |
| Soccer Field | Field | 2 | 520.0 | $8.33 | $4,332 |
| Sledding | Area | 1 | 5357.1 | $8.33 | $44,625 |
| Playground | Area | 1 | 923.1 | $8.33 | $7,689 |
| **Total** | | | | | **$199,306** |

**Table B-3.14 – WP-6 Project Recreation Benefits**

| Recreational Activity | Units | Supply | Recreation Days | Value Per Rec Day | Recreation Benefits |
|---|---|---|---|---|---|
| Hiking | Miles | 2.1 | 2730.0 | $8.33 | $22,741 |
| Fishing | Acres | 31.4 | 529.9 | $8.33 | $4,414 |
| Canoeing | Acres | 31.4 | 405.8 | $8.33 | $3,380 |
| Bicycling | Miles | 2.1 | 2730.0 | $8.33 | $22,741 |
| Picnicking | Tables | 16 | 1813.3 | $8.33 | $15,105 |

| | | | | | |
|---|---|---|---|---|---|
| Ice Fishing | Acres | 31.4 | 264.9 | $8.33 | $2,207 |
| Sledding | Area | 1 | 5357.1 | $8.33 | $44,625 |
| Playground | Area | 1 | 923.1 | $8.33 | $7,689 |
| Beach | Area | 1 | 906.7 | $8.33 | $7,553 |
| **Total** | | | | | **$130,455** |

**Table B-3.15 – WP-7 Project Recreation Benefits**

| Recreational Activity | Units | Supply | Recreation Days | Value Per Rec Day | Recreation Benefits |
|---|---|---|---|---|---|
| Hiking | Miles | 0.8 | 1040.0 | $8.33 | $8,663 |
| Fishing | Acres | 10.2 | 172.1 | $8.33 | $1,434 |
| Canoeing | Acres | 10.2 | 131.8 | $8.33 | $1,098 |
| Bicycling | Miles | 0.8 | 1040.0 | $8.33 | $8,663 |
| Picnicking | Tables | 6 | 680.0 | $8.33 | $5,664 |
| Ice Fishing | Acres | 10.2 | 86.1 | $8.33 | $717 |
| Sledding | Area | 1 | 5357.1 | $8.33 | $44,625 |
| **Total** | | | | | **$70,865** |

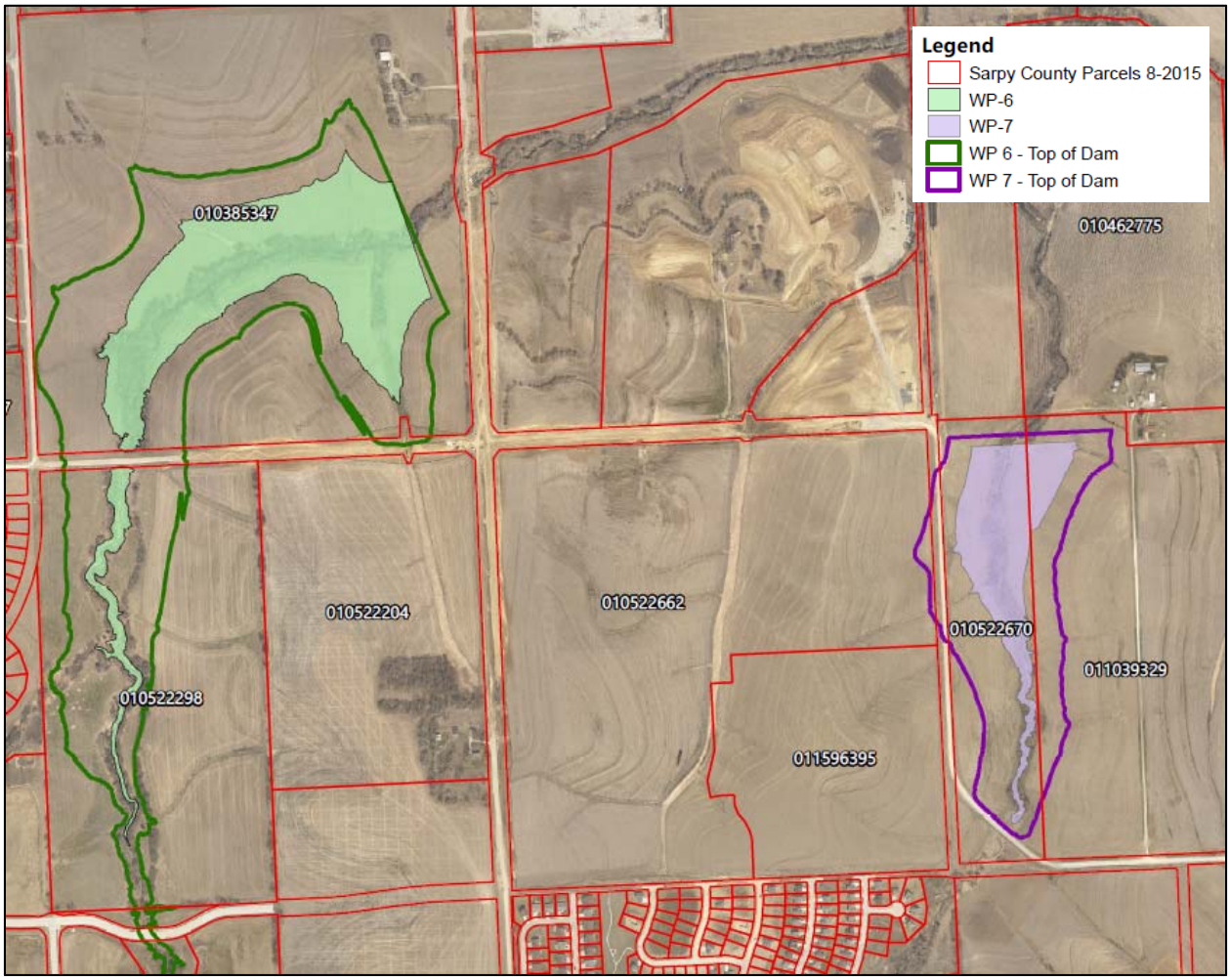
Land Improvement Values

*Upstream* - The added value of land adjacent to the lake property, increasing the value of the land from a "developable" value to a "lakefront developable" value. The value of the improved land is approximated at $45,000 (approximate average of all upland WP-5 tracts as shown in the table below) minus $32,670 (parcels 11539003-11539005) which represents the difference of the appraised value of a lake lot with the assessed value of a developed lot. A value of $12,000 was included in the table detailing these benefits below. These tracts surround the top of dam elevation limits WP-6 and WP-7 only, as delineated in the figure below. The state of development around site WP-5 was in various stages and therefore, was more complicated and therefore, left out of the benefit calculation.

**Table B-3.16 – WP-5 Acquired Land Cost Summary**

| Tract No. | Owner Name | Number of Acres Counter Offer | Counter Offer Total | Counter Offer Per Acre | Acquisition Date |
|---|---|---|---|---|---|
| 1 | H.E Rohwer's Grandchildrens Trust | 20.53 | $876,340 | $42,667 | Dec-09 |
| 2 | Glen J. Hansen | 64.91 | $1,817,600 | $28,000 | Aug-09 |
| 4 | Consolidated Land Company | 78.09 | $3,279,780 | $42,000 | Jan-10 |
| 5 | Papio Valley Land Company | 66 | $2,772,000 | $42,000 | Dec-09 |
| 6 | Vandeventer Farms LP | 156.4 | $5,943,200 | $38,000 | Apr-09 |
| 7 | LEN Properties LLC | 18.56 | $882,720 | $47,571 | Oct-09 |
| 8 | Harold H. Eurich Trust of 1999, et.al. | 61.76 | $2,574,160 | $41,680 | Oct-09 |
| 11 | DDF Enterprises LLC | 3.29 | $82,250 | $25,000 | May-10 |
| | | 469.54 | $18,228,050 | | |
| | | **Total Estimated Compensation** | **$18,228,050** | | |
| | | **Average Compensation per Acre Acquired** | **$38,821** | | |

**Figure B-3.4 – WP-6 and WP-7 Upstream Tracts**

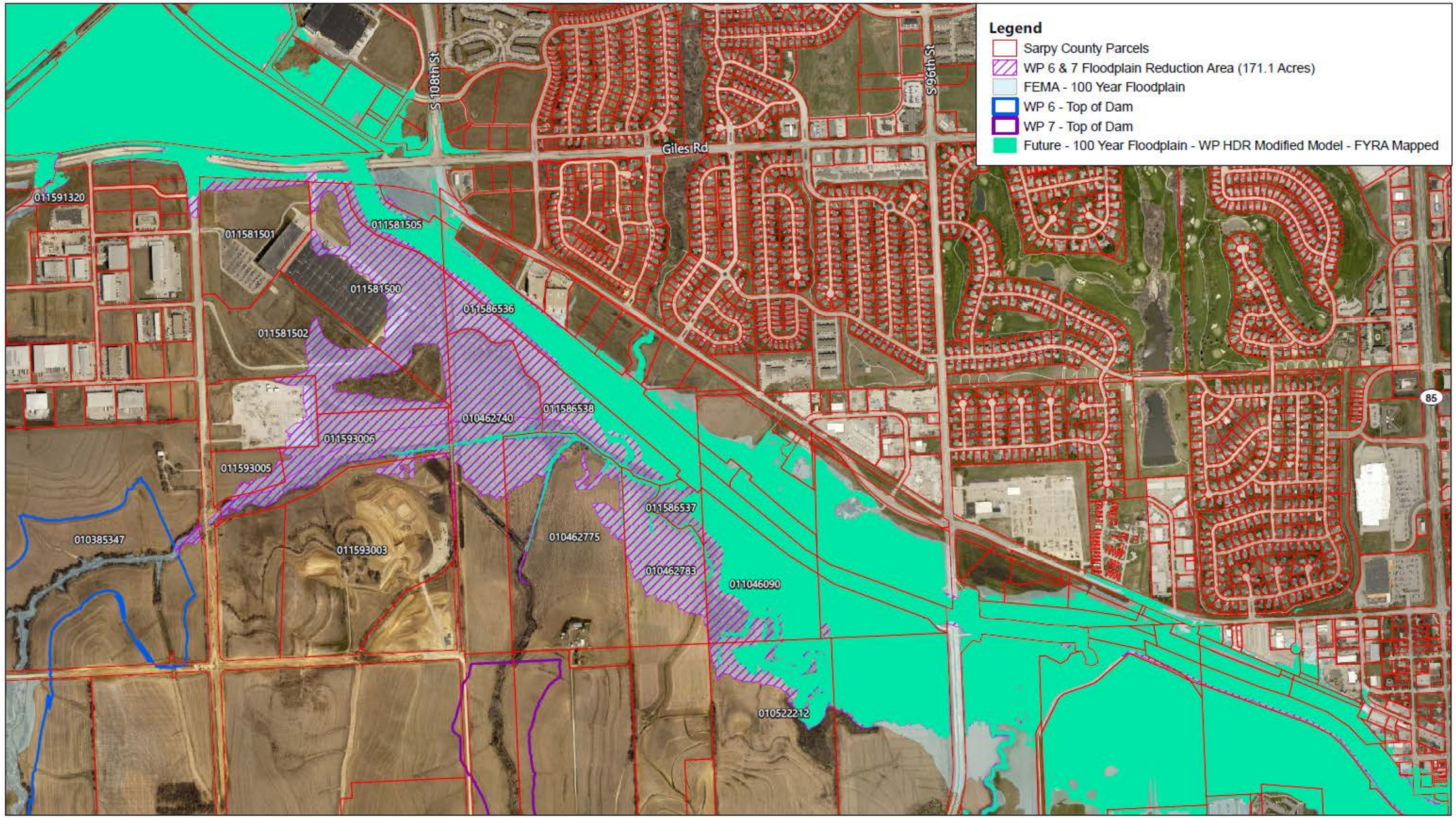



*Downstream* – The removal of land from the floodplain, increasing the value of the land from a "floodplain" value to a "developable" value. Downstream of WP-6, the value of the land improves from $1,000 (parcel 11593006) to $32,670 (parcels 11539003-11539005). To be conservative, an improved value of only $15,000 per acre of land improved downstream of the dams is used in the Land Improvement Values table below. Along with the table calculating the values, a map showing both the parcel locations and the with- and with-out 100-year floodplain location is provided.

**Table B-3.17 – Land Improvement Values**

| Dam | Parcel ID | Pre-Project | | | Acres Purchased | Acres Remaining | Without Project Inundated | With Project Inundated | Inundated Acres Removed | Improved Value per Acre | Land Improvement Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Acreage | Land Value | Value/Acre | | | | | | | |
| WP-5 Upstream | Not included in analysis | | | | | | | | | | |
| WP-5 Downstream | | | | | | | | | | | |
| | 11581502 | 45.64 | $1,492,366 | $32,699 | | | 13.0 | 0.0 | 13.0 | Negligible Impact | |
| | 11591320 | 4.41 | $996,158 | $225,886 | | | 0.8 | 0.6 | 0.2 | | |
| WP-6 - Upstream | | | | | | | | | | | |
| | 10385347 | 152.7 | $736,453 | $4,823 | 76.2 | 76.5 | | | | $12,000 | $918,000 |
| | 10522298 | 78.89 | $267,749 | $3,394 | 25.7 | 53.19 | | | | $12,000 | $638,280 |
| | 10522204 | 56.8 | $366,612 | $6,454 | 0 | 56.8 | | | | $12,000 | $681,600 |
| | 11077697 | 10.5 | $135,900 | $12,943 | 0 | 10.5 | | | | $12,000 | $126,000 |
| | 11246405 | 4.87 | $96,490 | $19,813 | 0 | 4.87 | | | | $12,000 | $58,440 |
| | 11246391 | 4.87 | $96,490 | $19,813 | 0 | 4.87 | | | | $12,000 | $58,440 |
| | 11332107 | 8.85 | $47,370 | $5,353 | 0 | 8.85 | | | | $12,000 | $106,200 |
| | 11077328 | 9.74 | $115,700 | $11,879 | 0 | 9.74 | | | | $12,000 | $116,880 |
| WP-6 - Downstream | | | | | | | | | | | |
| | 11593004 | 25.1 | $820,017 | $32,670 | 0 | | 0.0 | 0.0 | 0.0 | Negligible Impact | |
| | 11539005 | 8.11 | $264,954 | $32,670 | 0 | | 1.7 | 0.0 | 1.7 | | |
| | 11539003 | 68.73 | $2,245,409 | $32,670 | 0 | | 1.4 | 0.0 | 1.4 | | |
| | 11593006 | 26.78 | $26,780 | $1,000 | 0 | | 22.6 | 0.4 | 22.2 | $15,000 | $332,700 |
| WP-7 - Upstream | | | | | | | | | | | |
| | 10522662 | 114.43 | $601,882 | $5,260 | 0.7 | 113.73 | | | | $12,000 | $1,364,760 |
| | 11596395 | 38.75 | $200,714 | $5,180 | 0 | 38.75 | | | | $12,000 | $465,000 |
| | 10522670 | 30.61 | $137,114 | $4,479 | 30.4 | 0.21 | | | | $12,000 | $2,520 |
| | 11039329 | 72.27 | $372,202 | $5,150 | 11.3 | 60.97 | | | | $12,000 | $731,640 |
| | 10522409 | 40.75 | $208,793 | $5,124 | 0 | 40.75 | | | | $12,000 | $489,000 |
| WP-7 - Downstream | | | | | | | | | | | |
| | 10462740 | 50.46 | $258,790 | $5,129 | | | 28.08 | 0.8 | 27.28 | $15,000 | $409,200 |
| | 10462775 | 64.6 | $311,423 | $4,821 | | | 11.586688 | 2.256688 | 9.33 | $15,000 | $139,950 |
| | 10462783 | 28.9 | $148,349 | $5,133 | | | 19.0809 | 1.3509 | 17.73 | $15,000 | $265,950 |
| | 11046090 | 32.35 | $133,958 | $4,141 | | | 32.35 | 23.999499 | 8.41 | $15,000 | $126,150 |
| | 10522212 | 79.01 | $372,521 | $4,715 | | | 17.169588 | 11.759588 | 5.41 | $15,000 | $81,150 |
| | 11586538 | 25.45 | $106,720 | $4,193 | | | 25.45 | 6.328977 | 19.17 | $15,000 | $287,550 |
| **Total** | | | | | | | | | | | **$7,399,410** |

**Figure B-3.5 – Inundated Acres Removed Map**



Bridge and Levee Infrastructure Savings

With a project life of 100-years, the area bridges that are impacted by project hydrology and hydraulics will need to be replaced at some point. To account for this one-time benefit, the estimated cost savings to re-construct the bridge was computed. The net reduction in WSE was used to estimate the reduction in bridge length (on the order of 2-5 feet in most cases), as well as the reduction in approach raises that would need to be done. An average cost of $200/ft$^2$ was used in estimating the cost differential. Eight bridges are impacted by the improved hydraulics, with seven of those structures showing a decrease in construction costs due to the reduced WSEs. The cost savings are shown below.

**Table B-3.18 – West Papillion Creek Bridge Construction Cost Savings with Project**

| Bridge Location | Bridge Low Chord Elev. | Bridge Width (ft) | U/S Face HEC RAS Section | 100-YR WSEs | | Net Improvement (ft) | Cost Savings of Bridge Raise[1] |
|---|---|---|---|---|---|---|---|
| | | | | Existing | Post-Project | | |
| Giles Road | 1030.17 | 100 | 37386.82 | 1032.95 | 1032.72 | 0.23 | $487,600 |
| 96th Street | 1022.50 | 84 | 29072.00 | 1021.31 | 1020.32 | 0.99 | $1,762,992 |
| 84th Street | 1012.45 | 66 | 23035.37 | 1014.83 | 1014.24 | 0.59 | $830,192 |
| 72nd Street | 1008.83 | 80 | 17388.29 | 1011.33 | 1011.01 | 0.32 | $542,720 |
| 66th Street | 999.29 | 33 | 14921.29 | 1008.30 | 1007.48 | 0.82 | $573,672 |
| 48th Street | 999.11 | 54 | 6962.48 | 1000.70 | 1000.53 | 0.17 | $194,616 |
| Raynor Prkwy[2] | 998.33 | 61 | 4586.00 | 996.15 | 995.49 | 0.66 | |
| 36th Street | 986.01 | 43 | 1137.49 | 992.91 | 992.52 | 0.39 | $355,524 |
| **Total** | | | | | | | **$4,747,316** |

Per P-MRNRD Requirements, bridge replacements must provide 1-foot of clearance above low-chord to 100-yr WSE in channel.

1) Cost estimated at $200/sqft with 100ft of resurfacing required per 1-foot of WSE change plus required bridge length increase.

2) Raynor Parkway bridge low-chord is already above 100-yr WSE plus 1-foot.

Immediately downstream of WP 5, 6 and 7 are the West Branch Levees. Currently those levees are not shown as certified on the DFIRM mapping and subsequently floodplain inundates surrounding land and structures. The *West Papillion Creek Levee Restoration Evaluation* (HDR 2008) investigate raising the freeboard deficient levees as well as area bridges to allow the levees to be certified, thus removing the surrounding land from the floodplain. As part of this economic study, the possible cost reductions to this future project were considered. Utilizing channel routings (representing intact levees), the net WSE decrease from the construction of WP 5, 6 and 7 were used to compute the reduction in both earthen levee fill and land rights requirements to reach freeboard requirements. The cost savings are shown below.

**Table B-3.19 – West Papillion Creek Levee Construction Cost Savings with Project**

| Item | Quantity | Unit | Cost |
|---|---|---|---|
| Levee Fill Material | 309,700 | $yd^3$ | $2,477,600 |
| Land Acquisition | 3.62 | acres | $181,100 |
| **Total** | | | **$2,658,700** |

The table below summarize the numbers calculated above that were applied to the benefit:costs calculation presented in the application.

**Table B-3.20 – Benefits Summary Table**

| Project Item | Occurrence | WP-5 | WP-6 | WP-7 |
|---|---|---|---|---|
| Flood Reduction | Annual | $357,588 | $136,465 | $50,407 |
| Recreation | Annual | $199,306 | $130,455 | $70,865 |
| Land Value | One-Time | $7,399,410 | | |
| Infrastructure | One-Time | $7,406,016 | | |

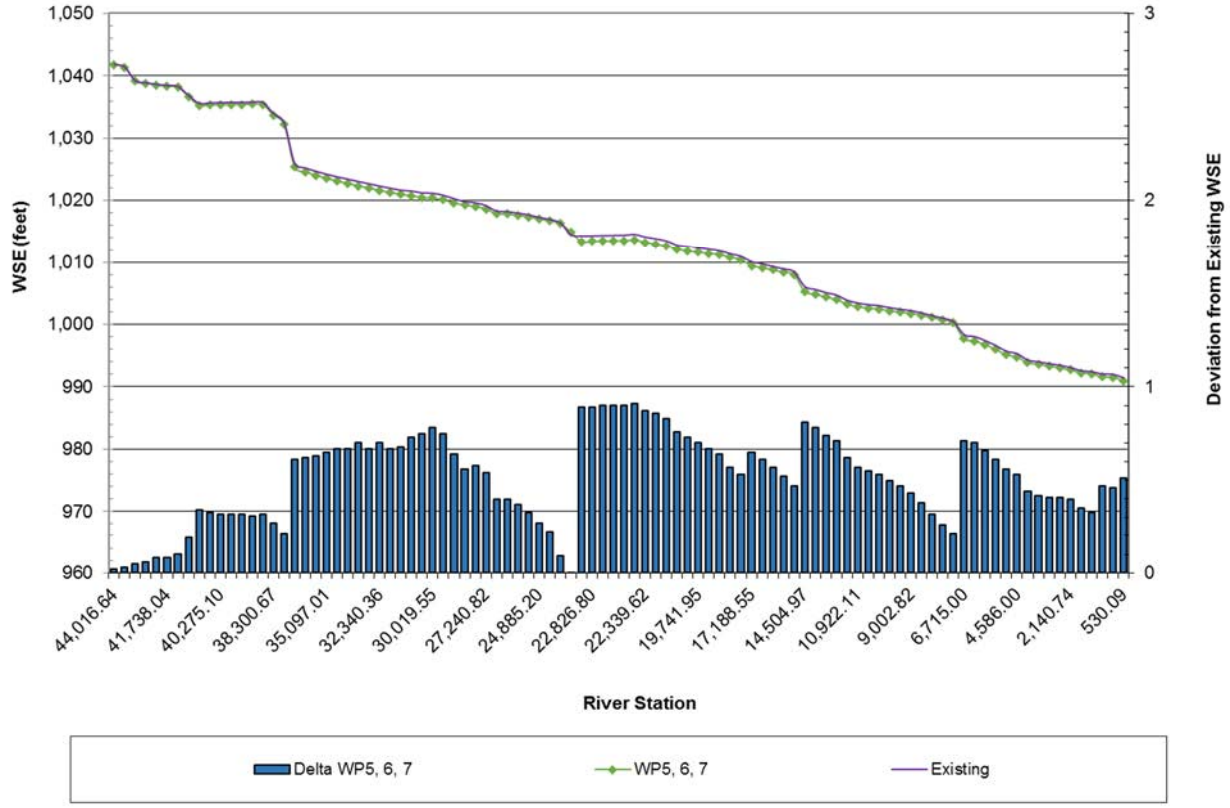
# Supplemental Information Attachment

## Section C
## NRC SCORING

# SECTION C

## C-4 Flood Control

**Figure C-4.1 – West Papillion Creek 50-Year WSE Comparison**



## Figure C-4.2 – West Papillion Creek 100-Year WSE Comparison

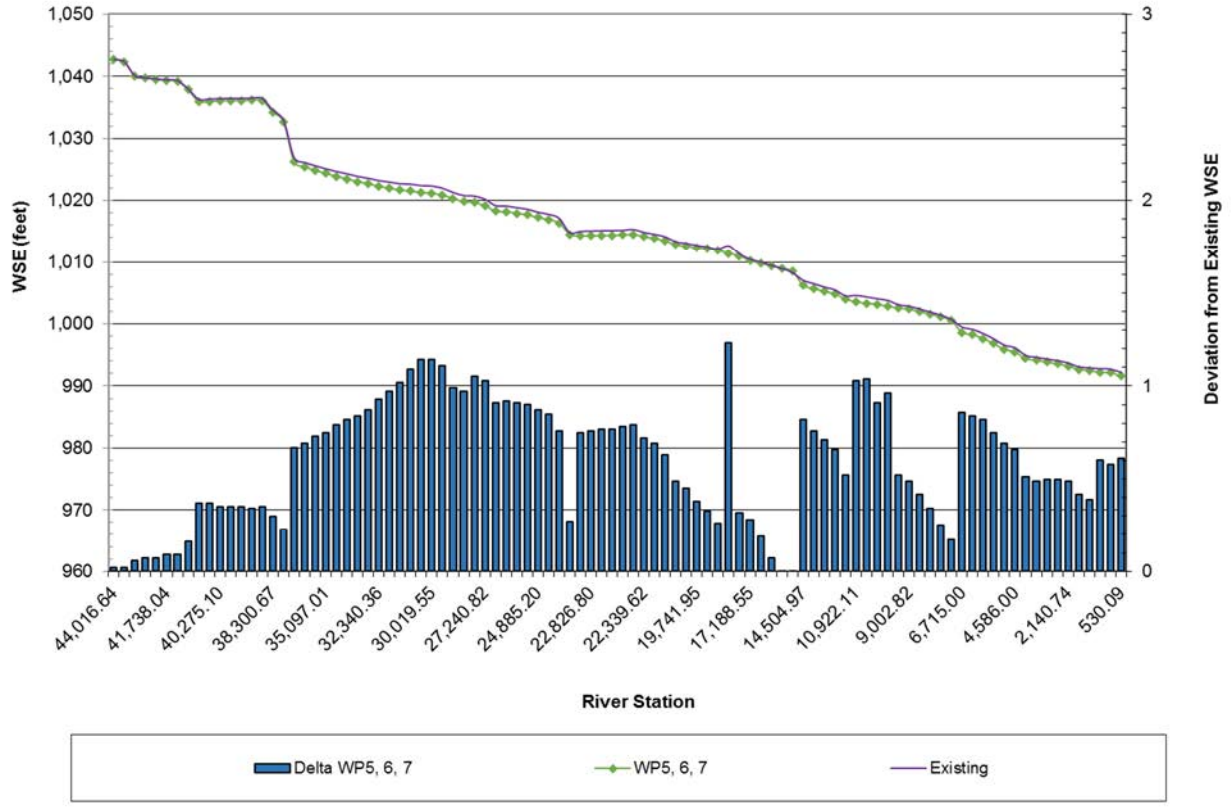
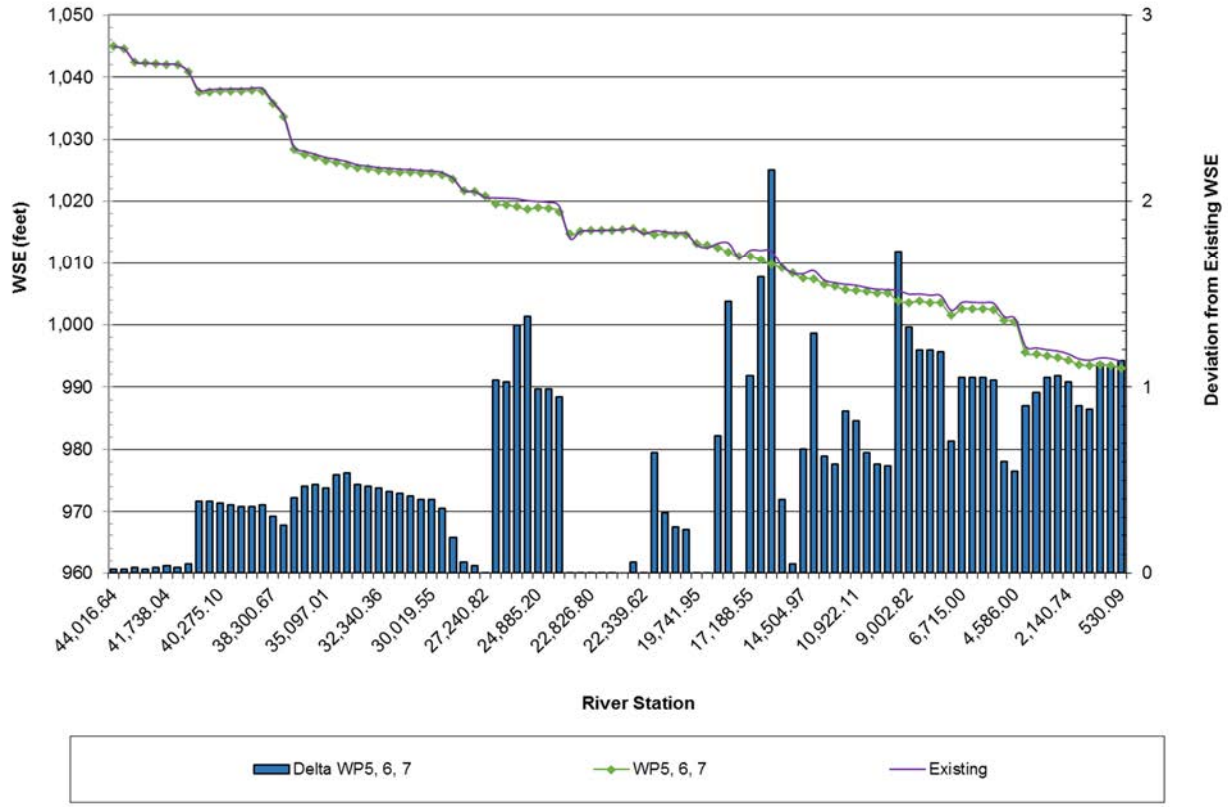


**Figure C-4.3 – West Papillion Creek 500-Year WSE Comparison**



# Supplemental Information Attachment

# Section D
# PROJECT DESCRIPTION


FYRA
ENGINEERING

SIA
Section D

Bibliography

## SECTION D

## D-3

### City of Papillion Letter of Support for WP-5

CITY OF PAPILLION
James E. Blinn, Mayor

122 East Third Street
Papillion, Nebraska 68046
Phone 402-827-1111
Fax 402-339-0670

January 6, 2009

Mr. John Winkler
Papio-Missouri River NRD
8901 South 154th Street
Omaha, NE 68138

**RE: WP-RB5 Design Scope of Work**

Dear John,

The City of Papillion recognizes the value of WP-RB5 for stormwater management, addressing both quality and quantity, along the West Papillion Creek corridor and we support the Papio-Missouri River NRD's decision to move forward with design. We understand that a land use planning component is required for the design of WP-RB5 and we look forward to participating in that process.

Because the design of WP-RB5 is intrinsically linked with the future construction of WP-RB6 and WP-RB7, it is our belief that the land use planning for these three reservoirs should happen simultaneously. The City of Papillion is willing to assist financially with the land use planning component to an amount up to $19,990 for the geographic area bounded by Giles Road, 96th Street, Schram Road, and 132nd Street, which is the study area defined in the proposed scope of work.

Again, we look forward to working with the Papio-Missouri River NRD on this important project.

With warm regards,

James E. Blinn
Mayor

CC: Papio-Missouri River NRD Board

**City of Papillion Letter of Support for WP-6 & 7**

CITY OF PAPILLION
David P. Black, Mayor

122 East Third Street
Papillion, Nebraska 68046
Phone 402-827-1111
Fax 402-339-0670

November 5, 2015

John Winkler
Papio-Missouri River NRD
8901 South 154th Street
Omaha, NE 68138

**RE: WP6 & WP7 Letter of Support**

Dear John,

The City of Papillion recognizes the value of WP-6 and WP-7 for stormwater management, addressing both quality and quantity, along the West Papillion Creek corridor. We support the Papio-Missouri River NRD's decision to move forward with land acquisition for these projects. Furthermore, I would encourage you to move as quickly as possible with acquisition. The City of Papillion is currently processing multiple development applications in close proximity to both reservoir sites. As development occurs, the price of adjacent land tends to increase – and in some cases that increase is substantial. I know you share my belief that we, as public officials, have an obligation to be good stewards of public resources. Acquisition of these sites prior to further increases in land prices would be the best way to fulfill our obligations.

As always, we look forward to working with the Papio-Missouri River NRD on these important projects.

Sincerely,
CITY OF PAPILLION

David P. Black
Mayor

CC: Papio-Missouri River NRD Board

# BIBLIOGRAPHY

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