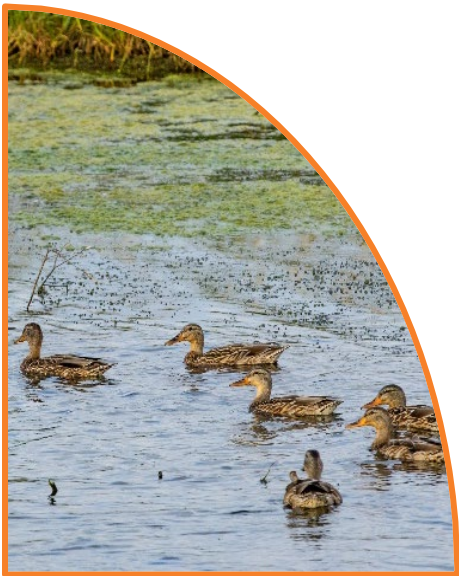


Papillion Creek

Watershed Management Plan

2024 Update



Executive Summary

E.1 Background and Purpose

The Papillion Creek Watershed Partnership (PCWP) was formed in August 2001 to address new development the Papillion Creek Watershed (Watershed) and prioritize stormwater management amongst all jurisdictions in the watershed. PCWP members presently consist of the City of Bellevue, Boys Town, City of Gretna, City of La Vista, City of Omaha, City of Papillion, City of Ralston, Sarpy County, and the Papio-Missouri River Natural Resources District (Papio NRD). In 2009, the Papillion Creek Watershed Management Plan (Plan) was finalized that developed solutions to address water quality and water quantity concerns within the rapidly developing watershed. Structural priority projects (Program Projects) and non-structural policies were among the solutions identified in the Plan, and an implementation plan was developed to outline the first set of action items.

E.2 2024 Review and Update

Every five years, a review of the Plan components and an update of the implementation plan for the next planning period is conducted. This 2024 Watershed Management Plan Update (2024 Update) represents the third iteration of updating the Plan (last update was in 2019) for the fiscal year (FY) planning period FY 2025 to FY 2029. It provides a summary of work completed within the Watershed since the 2019 Update, a review of the policies, and financial forecasting for all remaining structural projects. The financials were evaluated so the PCWP could develop their long-term and near-term funding strategies. This lays the framework for identifying the structural Program Projects that can be funded within the FY 2025 to FY 2029 Implementation Plan. Work completed in the last five years and findings from the 2024 Update include:

Concurrent Study, Planning, and Supplemental Funding Efforts:

General Reevaluation Study: The United States Army Corps of Engineers (USACE) completed a General Reevaluation Study to address flood risks within the Papillion Creek Watershed. Two Program Projects (DS-19 and DS-10) were recommended as projects that the USACE would support.

Watershed and Flood Prevention Operations (WFPO): The Papio NRD developed a Watershed Plan and Environmental Assessment with funding from the Natural Resources Conservation Service (NRCS) WFPO program that addressed water resources concerns in the Papillion Creek Watershed and recommended four streams for grade stabilization, one stream reach for restoration, and one sediment control basin with grade stabilization.

Grant Applications: Supplemental funding was obtained by successful grant awards. These included the Federal Emergency Management Agency's (FEMA) Building Resilient Infrastructure and Communities (BRIC) grant, Nebraska's Water Sustainability Fund (WSF), and the United States Fish and Wildlife Service's (USFWS) Sport Fish Restoration Grant funds by working in coordination with Nebraska Game and Parks (NGPC). In total, approximately \$16.3M of additional funds were obtained to put towards Program Projects.

Watershed Management Plan – Policy Evaluation: The policies were reviewed, and minor edits were made to update terminology and to simplify the policy document. More substantial efforts were put toward an evaluation of the stream setback policy. Based on stream erosion experienced in the Watershed and the risks of damage to public infrastructure and loss of private property, policy modifications were suggested to increase the setback area. Stakeholder outreach efforts were conducted and proposed

2024 Watershed Management Plan Update

policy updates were discussed with local jurisdictions, developers, and the PCWP. No modifications were agreed upon during the 2024 update, but it was agreed that assessments and discussions should continue to determine if modifications should be adopted in the future.

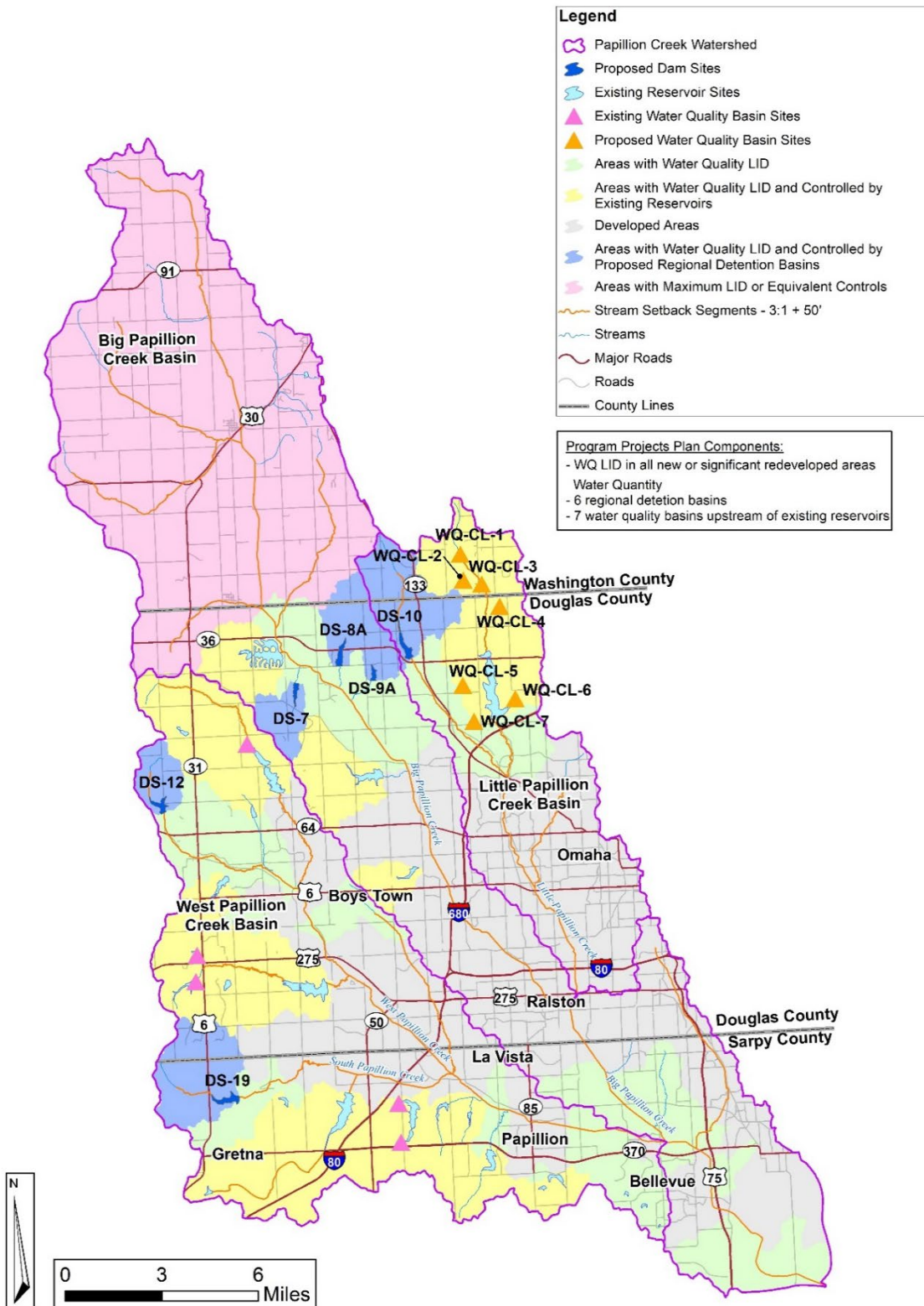
Watershed Management Plan – Status of FY 2019 to FY 2024 Program Projects: Program Projects identified in the 2019 Update were Regional Detention Basins WP-1, WP-2, and WP-4. The Papio NRD serves as the lead agency for project implementation on behalf of the PCWP and orchestrated the final design, land rights purchase, and construction bidding and oversight for all projects. [Table E-1](#) provides updated cost obligations of the FY 2019 to FY 2024 Program Projects and status. The estimated project costs shown in the 2019 Update were updated from 2018 to 2023 dollars for the three structures (\$35.1 million indexed to \$42.3 million). The current capital cost of these structures (\$40.5 million) came in slightly below the estimated cost when updated to 2023 dollars.

Watershed Management Plan – Remaining Program Projects: The 2024 Update summarizes remaining water quality and structural flood reduction projects. [Table E-1](#) shows the list of remaining Program Projects, along with updated estimated capital costs. The project sequencing is in the current order of priority based on development pressure. [Figure E-1](#) shows the locations of the remaining structural projects.

Table E-1. Status of Program Projects

Structure Name	Approx. Location	Drainage Area (acres)	Total Project Capital Cost, 2023 Basis (Millions of \$) ¹	Current Status
2019 Plan Update Program Projects for Years FY 2020 to FY 2024				
WP-1	180th & Fort Streets	865	\$13.0	Anticipated construction completion in winter 2025
WP-2	180th St & Giles Road	705	\$12.2	Anticipated construction completion in spring 2025
WP-4	204th St & Schram Road	670	\$15.3	Anticipated construction completion in fall 2024
Total for FY 2020 to FY 2024			\$40.5	
Remaining Program Projects				
DS-12	216th & Fort Streets	1,660	\$30.4	Preliminary design complete Land rights purchase underway
DS-7	168th St & Bennington Road	1,675	\$27.2	Preliminary design complete Land rights purchase initiated
DS-19	192nd St & Giles Road	2,750	\$37.3	Preliminary design complete Land rights purchase underway USACE final design scheduled for 2025
DS-8A	144th St & Bennington Road	1,850	\$19.2	---
DS-9A	132nd St & Bennington Road	1,280	\$13.0	---
DS-10	120th St & Bennington Road	2,950	\$20.4	USACE preliminary design complete
Regional Detention Subtotal			\$147.5	
WQ-CL 1 through 7	Omaha & Washington Co.	4,470	\$102.1	---
Total Remaining			\$249.6	

Figure E- 1. 2024 Watershed Management Plan Update for Full Build-Out Conditions



2024 Watershed Management Plan Update

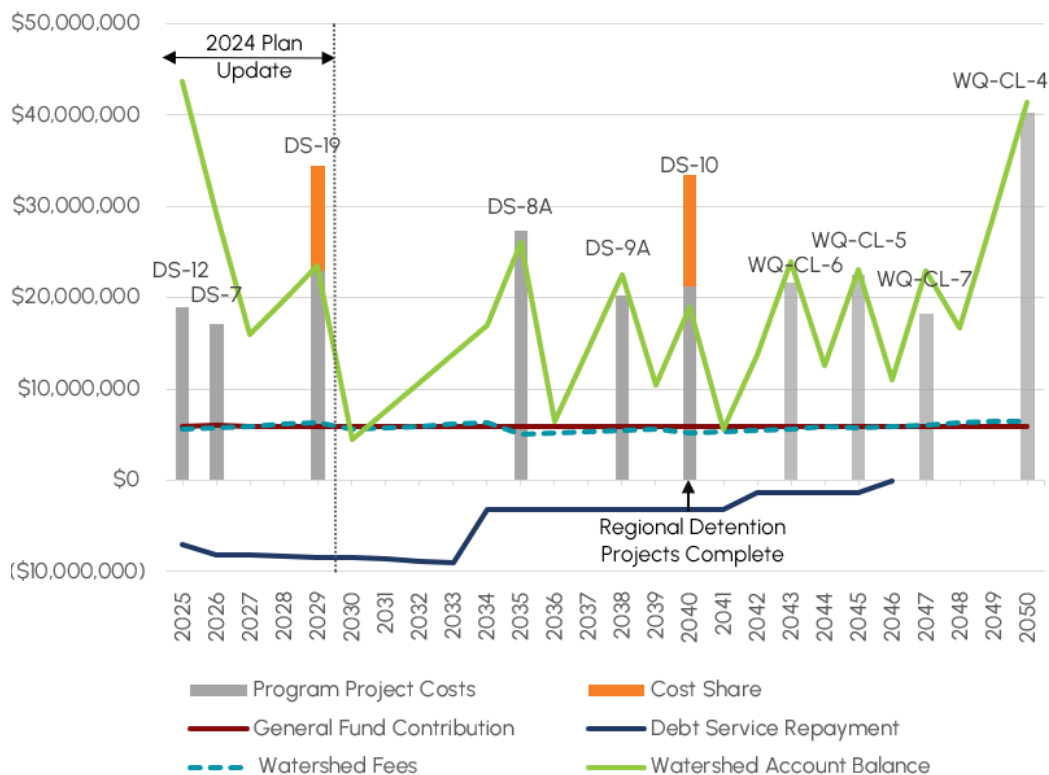
Financial Forecasting: An assessment of the PCWP financials compiled the revenues into the Watershed account (maintained by the Papiio NRD) and expenditures associated with the remaining Program Projects. Financial models were developed to balance the cash flow into and out of the Watershed Account for various funding scenarios. Each modeling scenario identified the number of remaining Program Projects that could likely be completed within the entire planning period ending in FY 2050. These models were used to help identify a reasonable revenue generation strategy to fund the remaining Program Projects.

Updates were required to develop accurate estimates of the revenue sources. Watershed fees to be collected were determined based on updated fee rates and the area of land remaining for development. The Papiio NRD General Fund contribution is a revenue stream included in the model which was estimated to be \$6M annually for the next 5-year planning increment. The Papiio NRD has approximately \$20 million in remaining bonding capacity that was also considered as a potential revenue source along with potential eligible loans.

Project expenditures for Program Projects were updated based on the most current designs and cost estimates. All expenditures included in the cash flow scenarios, which includes capital costs for Program Projects and annual bond repayment obligations.

Several funding scenarios were studied for the 2024 Update. [Figure E-2](#) depicts project funding Scenario 2.1 as a reasonable baseline means for project financing using a pay-as-you-go (P-A-Y-G) approach with bonding. Under this funding strategy, all the remaining six regional detention basin projects and four of the seven remaining water quality basin projects could be implemented within the 2050 planning horizon.

Figure E- 2. Scenario 2.1: P-A-Y-G with \$20M Bond (3.0% interest over 20-yr)



Implementation Plan – FY 2025 to FY 2029: The implementation plan addresses funding needs for the proposed Program Projects as follows:

- Capital costs for Program Projects for the next 5-year planning period
- Financial and administrative needs to implement the proposed Program Projects

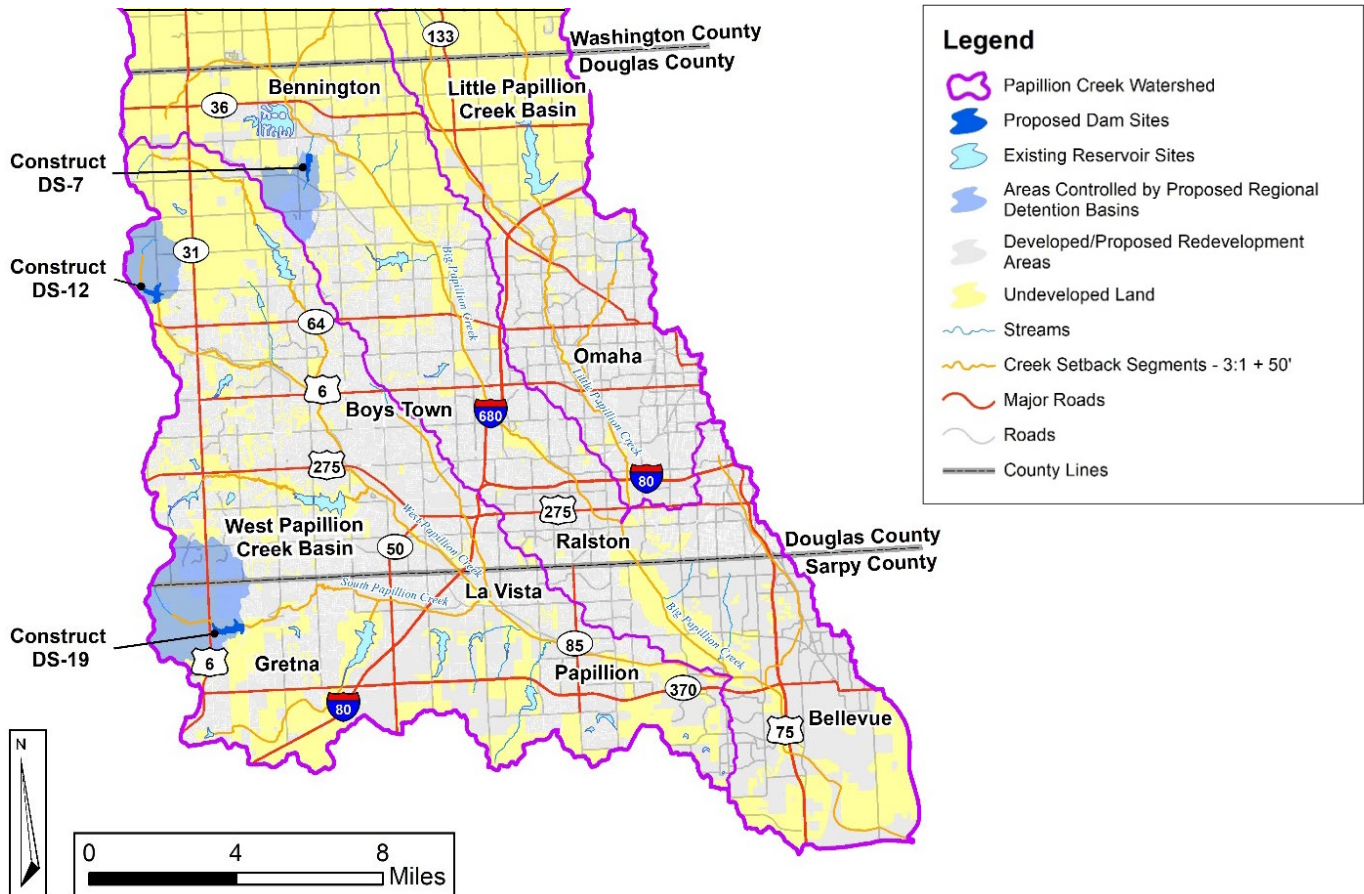
Table E-2 identifies the three structural Program Projects that were selected by the PCWP for the FY 2025 to FY 2029 implementation plan and their projected costs. The USACE will lead the implementation of DS-19 and has design slated to begin in 2025. The PCWP will not have control over this project schedule and cannot guarantee completion within the FY 2025 to FY 2029 implementation period. Additionally, a bond or loan will be required adequately fund the PCWP financial responsibilities for DS-19 within this period.

Table E-2. Implementation Plan - Program Projects for Years FY 2025 to FY 2029

Structure	Approximate Location & Planning Jurisdiction	Drainage Area (acres)	Est. Project Capital Costs, 2023 Basis, \$ Millions
DS-19	192 nd & Giles Road; City of Gretna	2,750	\$37.3
DS-12	216 th & Fort Streets; City of Omaha	1,660	\$30.4
DS-7	168 th & Bennington Road; City of Omaha	1,675	\$27.2
		Total	\$94.9

Figure E-3 represents the implementation plan, depicting the locations for the proposed three Program Projects for the FY 2025 to FY 2029 planning period.

Figure E-3. Papillion Creek Watershed Implementation Plan (FY 2025 to FY 2029)



E.3 Tracking Plan Success

Since the release of the Plan in 2009, the PCWP has dedicated time and resources towards successful implementation of plan components. Policies are being enforced and the PCWP continues to collect watershed fees to support future work. To complete a project, a multi-phase process that consists of design, permitting, land rights determination and purchase, and construction must be complete. The status of the PCWP milestones as of May 2024 is summarized in [Figure E-4](#).

Figure E-4. PWP Milestones

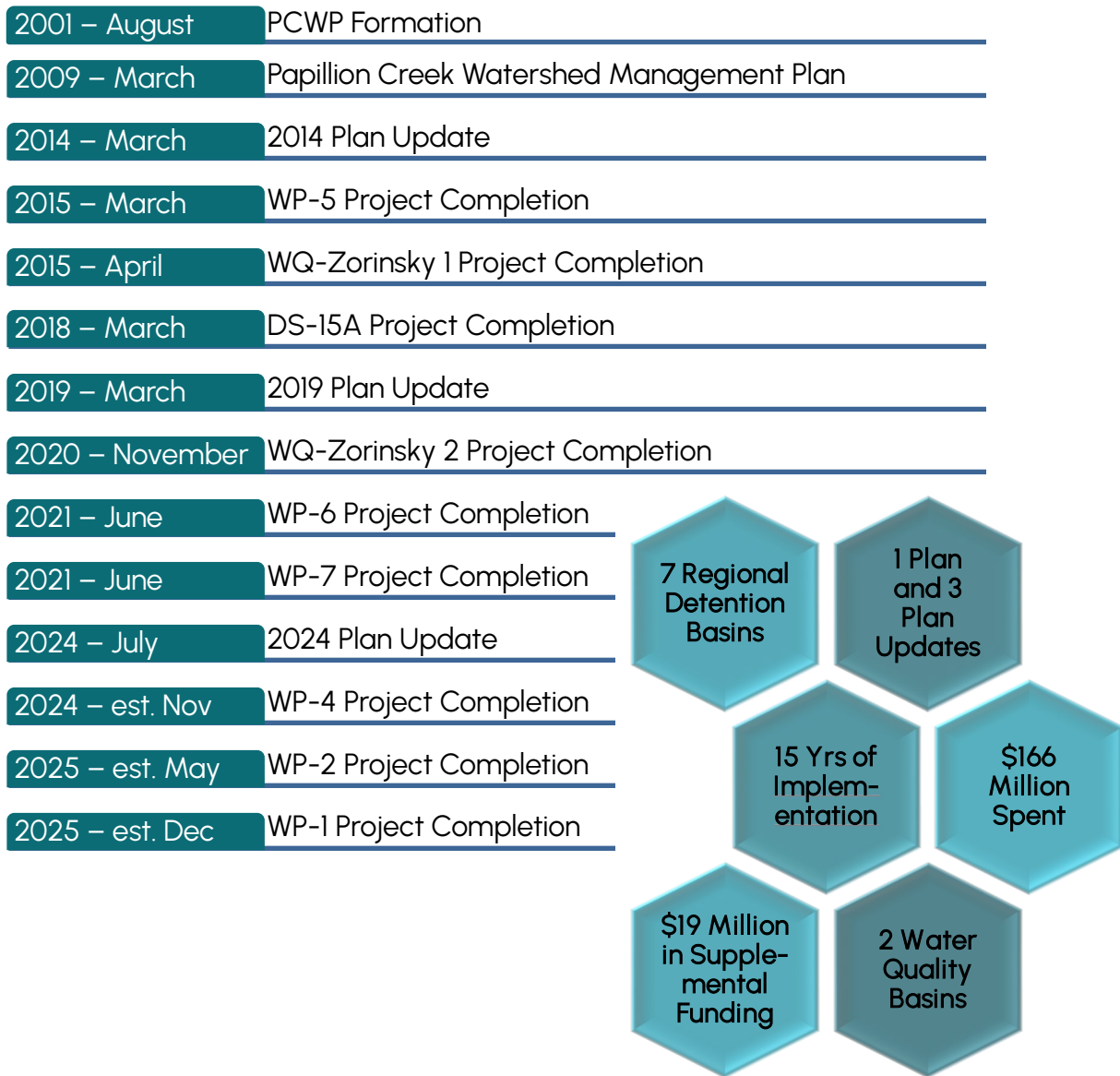


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B	Current Watershed Management Policies
C	Stakeholder Engagement Synthesis
D	Stream Stability Documentation

List of Acronyms and Terms

Term	Description
2019 Update	2019 Papillion Creek Watershed Management Plan Update
2024 Update	2024 Papillion Creek Watershed Management Plan Update
BRIC	Building Resilient Infrastructure and Communities
CWIFP	USACE Corps Water Infrastructure Financing Program
DS	Dam Site
EPA	Environmental Protection Agency
ETJ	Extra-Territorial Jurisdictions
Expenditures	Uses of funds
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
LRIP	Long Range Implementation Plan
Max LID	Maximum Low Impact Development
MF	Multi-Family
NRCS	Natural Resources Conservation Service
NGPC	Nebraska Game and Parks
Papio NRD	Papio-Missouri River Natural Resources District
P-A-Y-G	Pay-As-You-Go
Plan	Papillion Creek Watershed Management Plan
Policies	Basic Administrative Framework
PCWP	Papillion Creek Watershed Partnership
RCPP	Regional Conservation Partnership Program
Revenues	Sources of Funds
SF	Single Family
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
Watershed	Papillion Creek Watershed
Watershed Fees	Watershed Management Fees
WFPO	Watershed and Flood Prevention Operations
WIFIA	Water Infrastructure Finance and Innovation Act
WP	West Papillion
WSF	Water Sustainability Fund
WQMP	Water Quality Management Plan

1 Update Purpose

This Papillion Creek 2024 Watershed Management Plan Update (2024 Update) is intended to provide interim progress on the work completed as part of the Papillion Creek Watershed Management Plan (Plan) completed in 2009. The 2019 Watershed Management Plan Update (2019 Update) identified the priority projects to be implemented within the fiscal year (FY) planning period FY 2020 to FY 2024. Therefore, this 2024 Update includes:

- Update on work that was identified in the 2019 Update completed within the last five (5) years
- Policy review and update efforts
- A review of the Watershed Management Fees (Watershed Fees) framework and rates
- Cost updates for remaining structural projects and the Implementation Plan for the structural Program Projects selected for potential funding and construction for the next planning period. For this 2024 Update, the next Program Project planning period has been established by the PCWP as a 5-year period extending from FY 2025 to FY 2029



Program Project (DS-15A) after completion

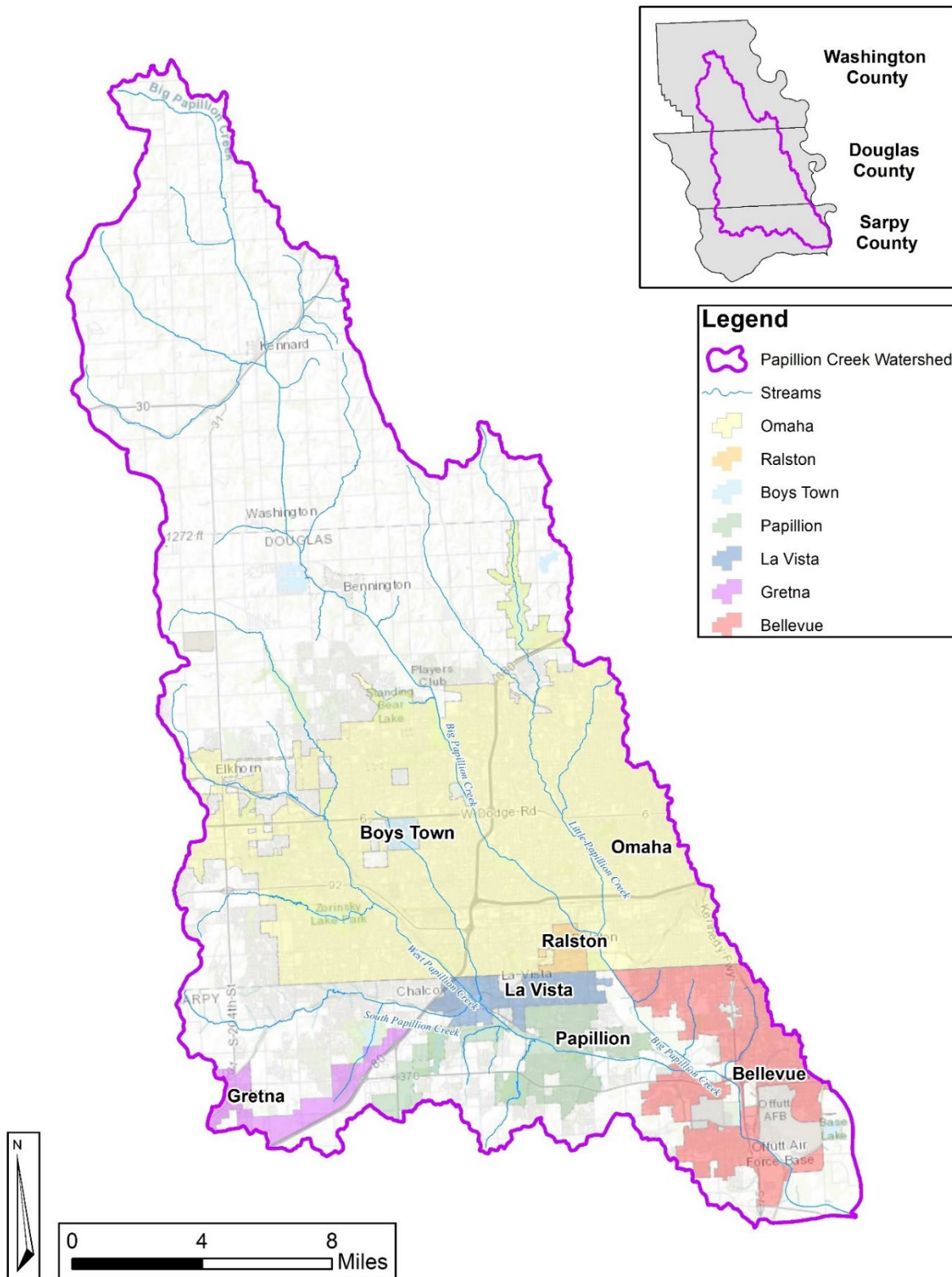
The 2024 Update does not include a description of current water quality impairments as the past updates have. A separate Papio-Missouri River Basin Water Quality Management Plan (WQMP) was developed to meet the Environmental Protection Agency (EPA) requirements of Section 319 of the Clean Water Act for developing nine-element watershed management plans. The Papio-Missouri River Natural Resources District (Papio NRD) and the City of Omaha partnered to complete the WQMP in order to address non-point source pollution and obtain 319 grant funding for eligible practices.

2 Watershed Information

2.1 Description

The Papillion Creek Watershed (Watershed) is depicted in [Figure 1](#) and drains an area of approximately 400 square miles (mi²). Approximately one-half of the Watershed is located within Douglas County, and the other half is divided nearly equally between Washington and Sarpy Counties. Primary streams in the Watershed include Big Papillion, Little Papillion, West Papillion, and Papillion Creeks. Little Papillion Creek drains approximately 60 mi² and flows into the Big Papillion Creek near 66th and Q Streets in Omaha. Big Papillion Creek has a drainage area of approximately 233 mi² and includes the tributary drainage area of Little Papillion Creek. The drainage area of West Papillion Creek is approximately 135 mi². The Big Papillion and West Papillion Creeks form Papillion Creek at their confluence near 36th Street and Gilmore Road in Bellevue. The following jurisdictions located within the Watershed are members of the PCWP: City of Bellevue, Boys Town, City of Gretna, City of La Vista, City of Omaha, City of Papillion, City of Ralston, Sarpy County, and the Papio NRD.

Figure 1. Papillion Creek Watershed



2.2 Concurrent Watershed Study, Planning and Supplemental Funding Efforts

Several concurrent efforts were on-going within the Watershed during the FY 2020 to FY 2024 implementation period. Each is described below.

Stream Degradation Study: In 2019 the Partnership engaged Felsburg, Holt, & Ullevig (FHU) to complete analysis of potential degradation in undeveloped areas of the Watershed. This study identified proposed changes to stream setback policies. This additionally led to a lateral migration potential analysis.

USACE Section 22 Stream Degradation Study: The United States Army Corps of Engineers (USACE) began a study that included a change detection analysis in the Watershed and suggestions for stream repair projects in areas that have experienced extreme degradation.

FEMA Erosion Mapping: As part of updating flood risk maps in the Watershed, FEMA completed analysis of the potential for stream erosion based on the updated hydraulic models. Impervious landcover near streams, and soil types.

General Reevaluation Study: USACE completed a General Reevaluation Study to address flood risks within the Papillion Creek Watershed. Two Program Projects (DS-19 and DS-10) were recommended as projects that the USACE would support.

Watershed and Flood Prevention Operations (WFPO): The Papio NRD developed a Watershed Plan and Environmental Assessment with funding from the Natural Resources Conservation Service (NRCS) WFPO program that addressed water resources concerns in the Papillion Creek Watershed. This study recommended four streams for grade stabilization, one stream reach for restoration, and one sediment control basin with grade stabilization. These structures do not overlap with PWCP Program Projects but will complement the goals of the Plan.

Grant Applications: Supplemental funding was obtained by the Papio NRD on behalf of the PCWP to support Program Projects. These included the Federal Emergency Management Agency's (FEMA) Building Resilient Infrastructure and Communities (BRIC) grant, Nebraska's Water Sustainability Fund (WSF), NRCS's Regional Conservation Partnership Program (RCPP), and the United States Fish and Wildlife Service's (USFWS) Sport Fish Restoration Grant funds by working in coordination with Nebraska Game and Parks (NGPC). In total, approximately \$16.3M of additional funds were obtained to put towards Program Projects. The awards per Program Project for each funding source is summarized in [Table 1](#).

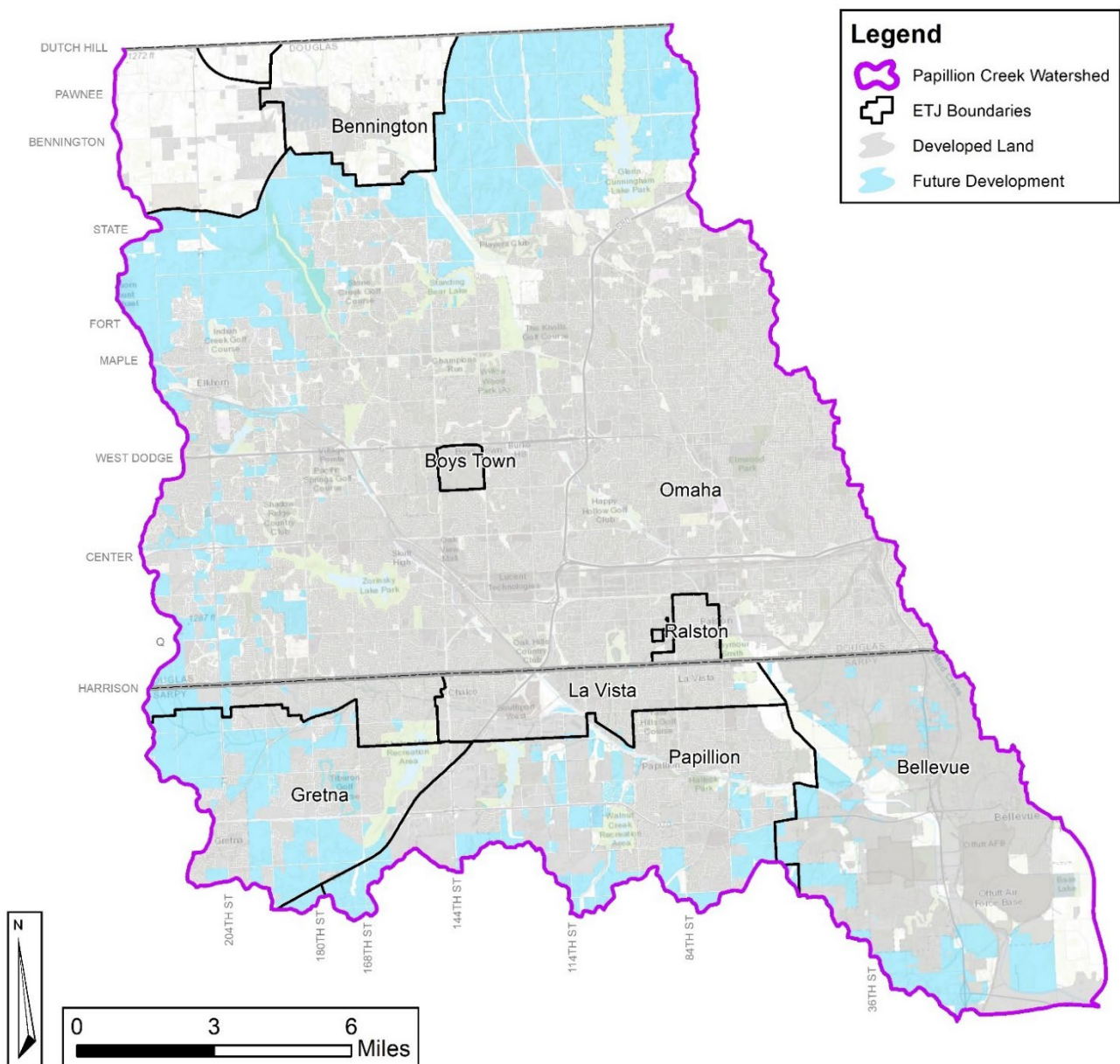
Table 1. Supplemental Funding Summary

Program Project	Grant Sources				
	WSF	FEMA/BRIC	NGPC/FWS	EPA 319	Total
WP-1	\$4,735,048	---	\$500,000	\$200,000	\$5,435,048
WP-2	\$4,171,204	---	\$325,000	---	\$4,496,204
WP-4	\$726,900	\$5,335,650	\$350,000	---	\$6,412,550
Total	\$9,633,152	\$5,335,650	\$1,175,000	\$200,000	\$16,343,802

2.3 Watershed Development

Development is rapidly expanding the urbanized area within the Watershed. [Figure 2](#) depicts developed area (i.e. residential, commercial and industrial land uses) and the land that is slated for future development within the Extra-Territorial Jurisdictions (ETJ) of PCWP member jurisdictions only. Future development is based on a comparison of baseline (2023) and future land use data. [Appendix A](#) summarizes the land use and population changes that were used to estimate Watershed Fees that will be collected as development continues. In the City of Omaha ETJ, development trends are expanding to the west and the northwest. Development to the west of Omaha's ETJ is near completion and the expansion to the north is anticipated to continue. The Cities of Gretna and Papillion are rapidly growing to the west and south; their growth is anticipated to continue within the Watershed boundary and beyond.

Figure 2. Current ETJ and Land Use Map in Douglas & Sarpy Counties



3 Watershed Management Plan

The 2009 Plan integrated water quality and peak flow reduction needs through a series of detailed evaluations of various strategies throughout the Watershed. Final Plan components include the placements of water quality measures within developments; regional detention basin for flood protection; water quality basins upstream of the regional detention basins; and a strategy termed Maximum Low Impact Development (Max LID), which was intended to provide an alternate means of both peak flow reduction and water quality protection in areas outside of the PCWP members' jurisdictions. Plan components are implemented through a series of policies and structural projects.

3.1 Policies

During development of the 2009 Plan, a set of six policies (listed below) were developed that identified requirements for any public or private development in the Watershed must follow. The policies were reviewed, and minor edits were made to update terminology and to simplify the policy document. See [Appendix B](#) for the updated policies.

POLICY GROUPS

- | | |
|---------------------------------|------------------------------------|
| 1. Water Quality Improvements | 4. Erosion and Sediment Control |
| 2. Peak Flow Management | 5. Floodplain Management |
| 3. Stream Corridor Preservation | 6. Stormwater Management Financing |

More substantial efforts were put toward an evaluation of the stream setback definition established in Policy Group #3. Based on stream erosion experienced in the Watershed and the risks of damage to public infrastructure and loss of private property, policy modifications were suggested to increase the setback area. Stakeholder engagement efforts were conducted and are summarized in [Appendix C](#). Modifications to the policy language were discussed and proposed policy updates were presented to the local jurisdictions, developers, and the PCWP. Ultimately, no modifications were agreed upon to include in the 2024 Update, but it was agreed that assessments and discussions should continue to determine if modifications should be adopted in the future.

3.2 Structural Components - Program Projects

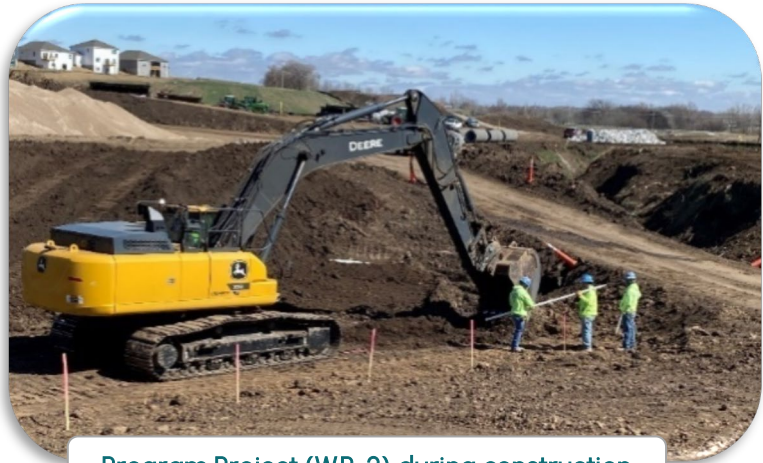
During development of the 2009 Plan, a suite of regional detention basins was screened for relative flood protection performance effectiveness and water quality basins for protection of existing and future reservoirs. In the 2009 Plan, fourteen (14) regional detention basins and seven (7) water quality basins were originally slated as Program Projects. Plan updates in 2014 and 2019 summarize progress of work completed in the first ten (10) years of implementation from FY 2010 to FY 2019.

FY 2020 to FY 2024 Program Projects Status

Program Projects in the 2019 Update implementation plan included WP-1, WP-2, and WP-4. Work required to complete each of these projects consisted of final design and permitting, land rights purchase, and construction. [Table 2](#) summarizes the status of the Program Projects that were progressed during the last five (5) year planning period and include the following:

- In April 2023, construction began on regional detention basin WP-4. Located in the City of Gretna; it is a flood control structure with a 15-acre reservoir contained within 80 acres of public recreation area. A closed loop trail around the lake will provide access to angler access features, along with native grasses and wildlife in the recreation area. Two kayak launches (one ADA accessible) will provide access to the no-wake lake, and three very large breakwater structures will provide angling opportunities into deep water. The fishing pier will allow for wheelchair access for ADA accessibility. The future Schram Road will also serve as the water quality basin embankment. The City of Gretna will take over ownership and maintenance of the recreation area, while the Papio NRD will maintain the dam structure. Construction completion is anticipated in the fall of 2024.

- Construction of regional detention basin WP-2 components was separated into two phases due to development pressure. A sanitary sewer line required for an adjacent neighborhood was designed beneath the water quality basin embankment upstream of WP-2. In 2021, sewer connections were needed, so the water quality basin (and associated sewer line) was bid ahead of schedule and was complete by the spring of 2022. Construction for the remaining



Program Project (WP-2) during construction

- project components began in October 2023. WP-2 is located in the City of Gretna on a tributary to the South Papillion Creek that controls over 700 acres of drainage area and will provide flood reduction benefits on the South, West and Big Papillion Creek branches. It is located at an existing NRCS grade control site, which is a small embankment that will be partially removed to accommodate the new dam structure. A stream mitigation project was developed for the segment downstream of the future dam. This work will stabilize the stream bed from future degradation, restore banks to stable slopes, and reuse cleared trees as habitat and bank stabilization features. The City of Gretna will take over ownership and maintenance of the recreation area, while the Papio NRD will maintain the dam structure. Construction completion is anticipated for the spring of 2025.
- Regional detention basin WP-1 construction will begin in the fall of 2024. WP-1 is located on a tributary to the West Papillion Creek in northwest Omaha. Controlling almost 900 acres of drainage area, this structure will provide flood attenuation through the heart of Omaha and down into the communities of Papillion and Bellevue. The site is predominately surrounded by development and will provide highly sought after local outdoor recreation opportunities. It will be located directly west of Elkhorn North High School, just across from 180th St. A water quality basin on the north end of the recreation area will provide an embankment to trap sediments and serve as a trail crossing to complete a closed loop around the lake. The recreation area will be managed by the City of Omaha upon completion, which is slated for the winter of 2025.
- Due to development pressures, land rights for Program Projects outside the 2019 Plan Update had to be purchased ahead of schedule to ensure the necessary land was obtained by the Papio NRD

and not sold to a developer. The acquisition included land for the DS-7, DS-12 and DS-19 projects.

Remaining Program Projects

There are six (6) regional detention basins and seven (7) water quality basin projects remaining to be constructed. The updated Watershed Management Plan map depicts the status of each Program Project in [Figure 3](#). [Table 3](#) summarizes the estimated capital costs for the remaining regional detention basins and water quality basins. [Appendix A](#) contains additional cost breakdown details.

Table 2. Status of 2019 Implementation Plan for Years FY 2020 to FY 2024

Structure Name	Approx. Location & Planning Jurisdiction	Drainage Area (acres)	Project Funding Sources (Millions of \$)			Current Status
			NRD Fund & Watershed Fees	Other ¹	Total Project Expenditures ²	
2019 Program Projects for Years FY 2020 to FY 2024						
WP-1	180th & Fort Streets	865	\$7.6	\$5.4	\$13.0	Construction Begins Fall 2024 - completion in Winter 2025
WP-2	180th St & Giles Road	705	\$7.7	\$4.5	\$12.2	Under construction - completion in Spring 2025
WP-4	204th St & Schram Road	670	\$8.9	\$6.4	\$15.3	Under construction - completion in Fall 2024
2019 Program Projects Subtotal			\$24.2	\$16.3	\$40.5	---
Land Rights Purchase in FY 2020 to FY 2024						
DS-12	216th & Fort Streets; Omaha	1,660	\$12.5	---	\$12.5	Preliminary design complete Land rights purchase underway
DS- 7	168th Street & Bennington Road; Bennington/Omaha	1,675	\$11.6	---	\$11.6	Preliminary design complete Land rights purchase underway
DS- 19	192nd Street & West Giles Road; Sarpy County	2,750	\$7.7	---	\$7.7	Preliminary design complete Land rights purchase underway USACE final design scheduled for 2025
Land Rights Subtotal			\$31.8	---	\$31.8	---
Total			\$56.0	\$16.3	\$72.3	---

Notes:

WP= West Papillion

DS= Dam Site

[1] Other includes reimbursement for project enhancements by city or county and grant funding.

[2] Includes anticipated costs to complete 2019 Program Projects construction.

Figure 3. 2024 Watershed Management Plan Update for Full Build-Out Conditions

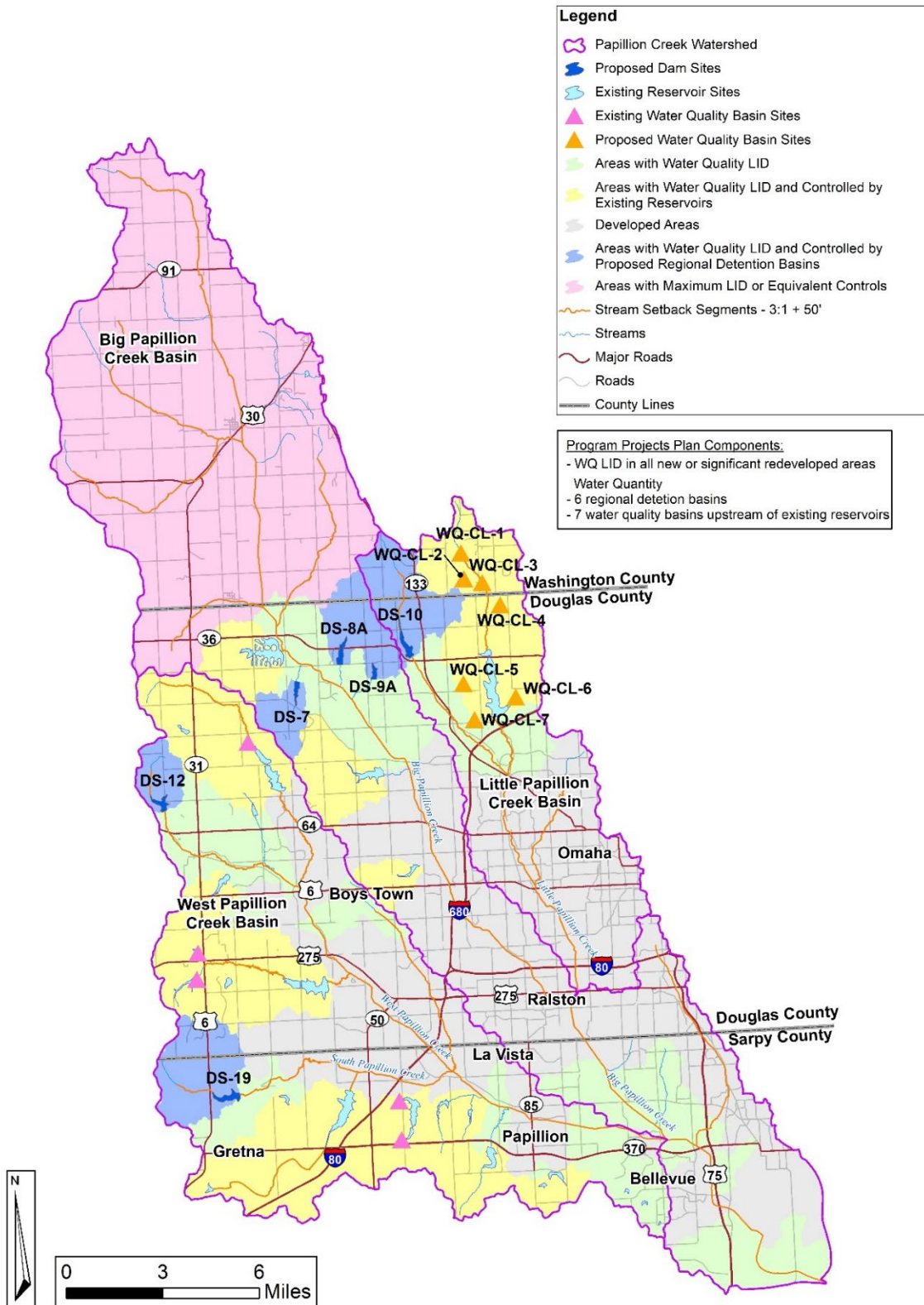


Table 3. Summary of Estimated Capital Costs for Remaining Projects

Structure Name	Stream Reach	Approx. Location/Jurisdiction	Drainage Area (acres)	Est. Normal Pool Area (acres)	Est. Project Costs, 2023 Basis (Millions of \$)		
					Construction Cost ¹	Real Estate Costs	Total Est. Project Capital Cost
DS-19	South Papillion Creek	192nd & Giles Road	2,750	74	\$17.4	\$19.9	\$37.3
DS-12	West Papillion Creek	216th & Fort Streets	1,660	43	\$14.1	\$16.3	\$30.4
DS-7	Trib. to Big Papillion Creek	168th & Bennington Road	1,675	43	\$12.2	\$15.0	\$27.2
DS-8A	Trib. to Big Papillion Creek	144th St & Bennington Road	1,850	75	\$8.8	\$10.4	\$19.2
DS-9A	Trib. to Big Papillion Creek	132nd & Bennington Road	1,280	38	\$6.5	\$6.5	\$13.0
DS-10	Thomas Creek	120th & Bennington Road	2,950	97	\$12.5	\$7.9	\$20.4
Regional Basin Subtotal					\$71.5	\$76.0	\$147.5
WQ-CL-6	Upstr. Cunningham Lake	Omaha	510	---	\$4.9	\$7.1	\$12.0
WQ-CL-5	Upstr. Cunningham Lake	Omaha	470	---	\$4.8	\$6.9	\$11.7
WQ-CL-7	Upstr. Cunningham Lake	Omaha	200	---	\$3.7	\$5.3	\$9.0
WQ-CL-4	Upstr. Cunningham Lake	Omaha & Washington Co.	915	---	\$7.5	\$10.6	\$18.1
WQ-CL-2	Upstr. Cunningham Lake	Washington Co.	845	---	\$7.2	\$10.3	\$17.5
WQ-CL-3	Upstr. Cunningham Lake	Washington Co.	790	---	\$7.0	\$9.9	\$16.9
WQ-CL-1	Upstr. Cunningham Lake	Washington Co.	740	---	\$7.0	\$9.9	\$16.9
Water Quality Basin Subtotal					\$42.1	\$60.0	\$102.1
Total Regional Detention and Water Quality Basins Total					\$113.6	\$136.0	\$249.6

Notes:

DS= Dam Site

WQ-CL=Water Quality-Cunningham Lake

[1] Construction costs include dam construction, utilities/infrastructure relocation/replacement, recreation construction, permitting and engineering.

4 Financial Assessment

The purpose of the financial assessment is to review how projects were funded in past five (5) years and understand the remaining financial requirements for Plan implementation. Each Plan update will assess options to fund the remaining Program Projects based on updated costs and the current economic environment and guide the PCWP in selecting projects to include in the next five (5) year Implementation Plan.

The funding goal for capital projects has been approximately 2/3 from public funding and 1/3 from private funding. This funding goal is commensurate with Policy Group #6: Stormwater Management Financing, included in [Appendix B](#). Public funding is from the Papio NRD and is an allocation of General Funds towards Plan implementation as described in the Papio NRD's Long Range Implementation Plan (LRIP). Private funding is generated by Watershed Fees paid by home builders or developers as described in Section 5.2. All PCWP finances are held in a special Watershed Account that is managed by the Papio NRD. The Papio NRD serves as the administrative agent for the PCWP as a public agency having inter-jurisdictional authority and has the capability for carrying out the construction of structural projects, as authorized by interlocal agreements within the PCWP.

Figures 4 and 5 approximate the revenues and expenditures as of the end of the Papio NRD's Fiscal Year 2023. To date, watershed fees have comprised approximately 14% of the total Program Project expenditures and 12% has come from outside funding sources.

Figure 4. Funding Source

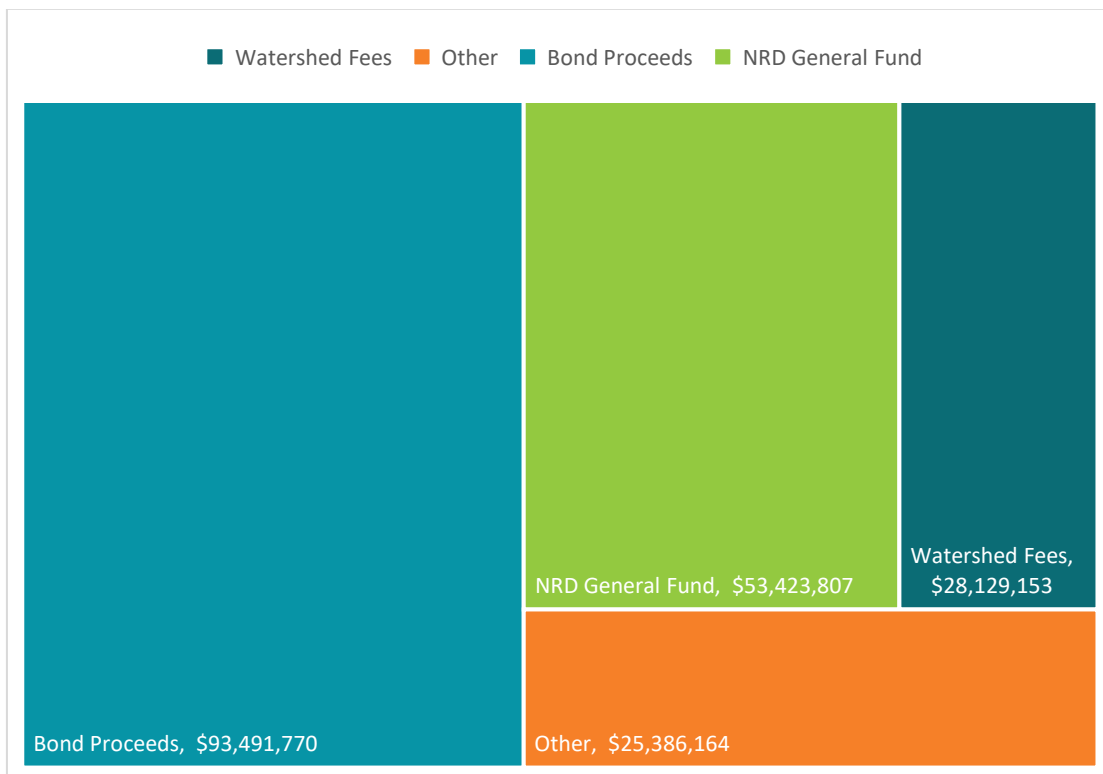
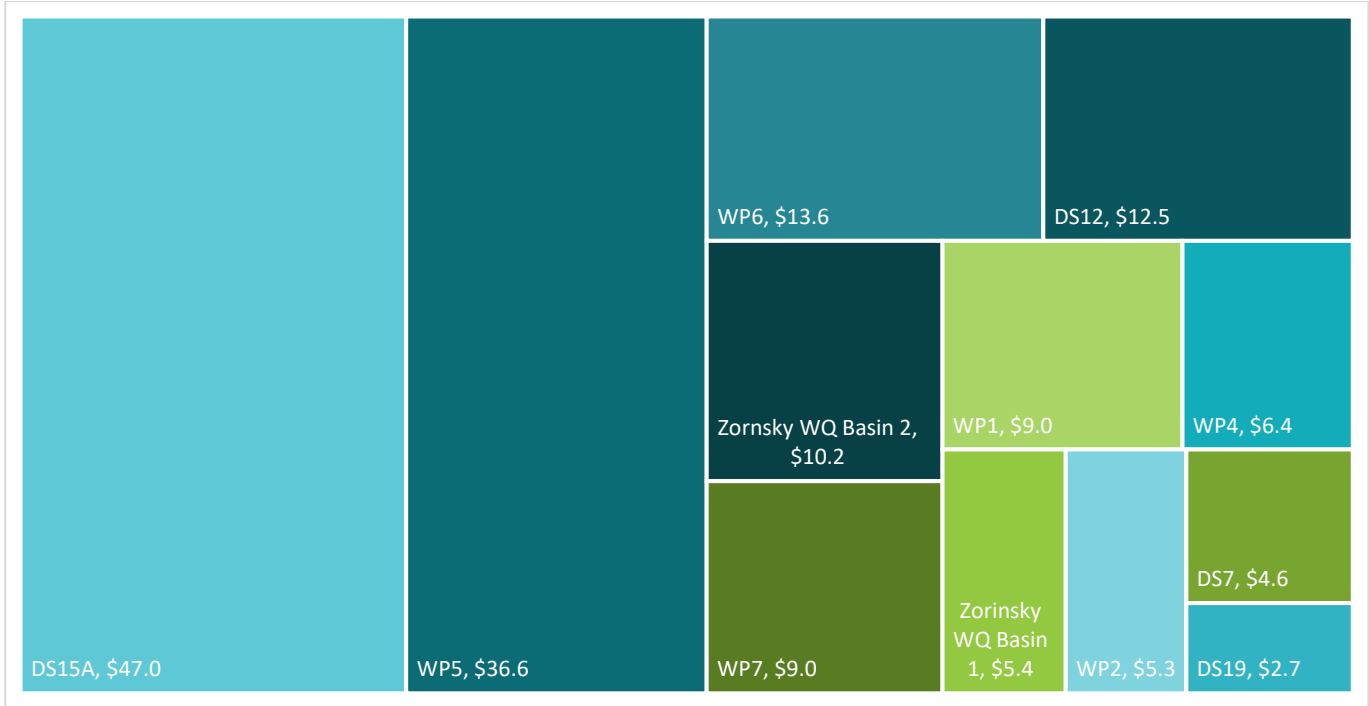


Figure 5. Project Costs to Date (in Millions)



4.1 Previous Program Projects Financial Approach

Program Projects identified for the previous FY 2020 to FY 2024 planning period were constructed with bond proceeds, General Fund allocations, and Watershed Fees as follows:

- The Papio NRD obtained bonding authority from the Nebraska Legislature in 2009. Bonding authority was to sunset in 2019, but in 2019 the Nebraska Legislature authorized a 5-year extension to 2024. Bond repayments are approximately \$7 million per year until three of the four bond repayments expire by 2034. Repayment will be reduced to approximately \$2 million per year until it expires in 2042.
- General Fund contributions: a review of the Watershed Account indicates the contribution from in General Fund from 2020-2024 averaged approximately \$5M per year.
- Watershed Fees: a review of the Watershed Account indicates the annual fees collected by PCWP members from 2020-2024 averaged approximately \$4M per year.

4.2 Remaining Program Projects Financial Assessment

The remaining Program Projects are identified in [Table 3](#) and locations of the proposed structures are located in [Figure 3](#). An assessment was performed to understand the financial requirements for implementing the remaining projects. This includes updates to available revenue source and project expenditures. A cash flow model was created to represent the inflows and outflows of the Watershed Account to predict the resulting balance on an annual time step. Model assumptions and funding mechanisms were applied to the model and several funding scenarios were developed to represent a variety of potential future conditions. The financial assessment of remaining projects is detailed in Sections 4.3 through 4.6.

4.3 Revenue Sources

Funds into the Watershed Account includes reserve balances carried over from the previous year, as well as the following revenue sources:

- General Fund Contribution: public funding from the Papio NRD General Fund collected via property tax mill levy on properties located within the district's boundary.
- Watershed Fees: Watershed Fees are collected by PCWP members through subdivision agreements at the time building permits are secured throughout the year. Watershed fees only apply to new development or significant redevelopment and are collected according to three different fee categories:
 - Single Family (SF) Residential: This classification includes low-density multi-family units up to 4-plexes. Fees are assessed per lot.
 - High-Density Multi-Family (MF) Residential: This classification includes multi-family units beyond 4-plexes. Fees are assessed per gross developable acre.
 - Commercial/Industrial: Fees are assessed per gross developable acre.
- Bond Proceeds: the Papio NRD bonding authority was extended until December 31, 2024, and they maintain the option to issue additional bonds to put towards Program Projects for FY 2025 to FY 2029. The Papio NRD has the remaining authority to issue up to \$20 million in bond proceeds.
- Loans: a new option investigated for FY 2025 to FY 2029 includes a loan through the USACE Corps Water Infrastructure Financing Program (CWIFP) that is authorized by the Water Infrastructure Finance and Innovation Act (WIFIA). Referred to as a WIFIA Loan, it is intended to enable local investment in infrastructure projects that enhance community resilience to flooding, promote economic prosperity, and improve environmental quality. WIFIA Loans are long term, low interest loans available to non-federal governments with projects (or groups of projects) over \$20 million. Current project eligibility is limited to existing infrastructure improvements for dam safety projects; however potential modifications to CWIFP could add new infrastructure projects for consideration. Therefore, the WIFIA Loan was assessed to understand its financial impact should it become an option during the next five (5) year Implementation Plan period.
- Cost Share: past Plan updates did not include potential cost share opportunities that may be obtained in the future, as financial details were undetermined, and no official agreements were in place. With the USACE General Reevaluation Study complete, the financial responsibilities for each agency have been identified and the cost share provided by the USACE for DS-19 and DS-10 can be accounted for in the financial assessment for this 2024 Update.
- Other (grants/donations): supplemental funding similar to the grants obtained during the previous FY 2020 to FY 2024 planning period will be pursued. Financial details are currently unknown and will not be relied upon for Program Project implementation.

4.4 Expenditures

Expenditure include costs for the implementation of projects and payments to debt services as follows:

- Capital costs for implementation of Program Projects include administrative, design and permitting fees, land rights and purchase services, and construction costs. Updated costs are presented in [Table 3](#) and outlined in more detail in [Appendix A](#).

- Debt Service Repayments:
 - Repayments of existing bonds according to bonding summaries prepared by the Papio NRD's bonding company, D. A. Davidson & Company, for bond issuances that are being used to finance the Program Projects.
 - Repayment of any additional bonds or loans obtained to finance Program Projects for the upcoming FY 2025 to FY 2029 period.

The Program Projects were incorporated into cash flow models in preferred sequence as listed in [Table 3](#), beginning with DS-19 and ending with the WQ-CL-1 water quality basin. The project sequence is based on several general factors:

- A need to provide the most performance-effective flood protection as early as possible in the overall program.
- Estimated population and land consumption trends provide the basic guidance for project timing as to when development platting may subsequently encroach on the structures in question. Related factors include: the probable "lead time" that is needed for land appraisals and land acquisition, engineering design time, permitting, and the time it takes to resolve various public utilities, and other infrastructure conflicts.
- Balancing project costs over time is a primary driver for affordability and overall project timing for implementation, deferral, or elimination. There may also be future opportunities for public-private partnerships to help make projects more viable.
- Completing or at least initiating all affordable projects in Douglas and Sarpy Counties prior to platting build-out within respective subbasins is highly desirable from both a cost and performance standpoint. Full platting build-out for the entire Watershed within Douglas County may occur by 2050 or slightly beyond, according to previous land consumption estimates and comments from the Omaha Planning Department. Similarly, full platting build-out within the Sarpy County portion of the Watershed has estimated to occur by 2050 due a recognized trend for a more rapid rate of growth.

4.5 Cash Flow Model Development

A cash flow model was developed to evaluate possible impact of various financing strategies within the PCWP budget on the implementation of the Plan. The cash flow model tracks sources of funds (revenues) and uses of funds (expenditures) over a 25-year planning horizon, beginning in 2025. Based on total revenues and expenditures following their historical trends, the model annually estimates the level of funds available for implementing the projects in their desired sequence. The available funds are assumed to be kept in a reserve or sinking fund until its balance is sufficient to fund the next upcoming project in the Implementation Plan. At the time of implementation, the fund is temporarily depleted, and reserves must again build-up until the subsequent project can be constructed. A similar revenue accrual and expenditure pattern must continue until all of the Program Projects in the Plan are constructed. The model development included:

1. Development of key model assumptions
2. Identification of funding mechanisms.

The Papio NRD provided the following background financial information that was used to update the financial cash-flow model:

- Bonding summaries prepared by the Papio NRD's bonding company, D. A. Davidson & Company, for four outstanding bond issuances that are being used to finance the Program Projects.
- A bond payment schedule that keys into the June 30th end of fiscal years from 2024 through the 2042 retirement of the last bond issued.
- The current design and construction status of the FY 2020 to FY 2024 Program Projects (as presented in [Table 2](#)).
- Papio NRD budget information for FY 2024.
- Watershed Account of revenues and expenditures from FY 2010 through FY 2023.

Key Model Assumptions

The model structure and logic follow straightforward sources and uses of funds analysis. Model assumptions developed for critical inputs include:

1. Watershed Account Balance: the beginning balance for the Watershed Account includes the remaining balance from the past implementation period plus any bond or loan scenario, the value is added to the remaining balance in the first year (FY 2025) of the planning horizon.
2. Regional Growth: it was assumed that population in the Papillion Creek Watershed would increase based on projections derived from the MAPA 2050 Model.
3. Inflation Rate: price levels for the capital costs of the Program Projects are assumed to increase 3 percent per year based on a long-run average of the Consumer Price Index.
4. General Fund Contribution: public funding from the Papio NRD General Fund is based on an assumed allocation to the Watershed Account of \$6 Million per year in line with the Papio NRD's Long Range Implementation Plan (LRIP).
5. Annual Watershed Fee Increases: Watershed Fees are linked to inflation with an assumed long-run average of 3 percent over time based on an average of construction cost indices.
6. Papio NRD Decision to Bond: the Papio NRD has a remaining authority to issue up to approximately \$20 million in bonds. In scenarios where bonding is used, it assumed that all remaining bonding authority will be used in the next planning periods (FY 2025 to FY 2029).
7. Financing Terms for Bonding: it was assumed that bond payments would be the principal amortized over 20 years based on a review of previous bonds issued by the Papio NRD. Interest rates are currently higher than past terms, therefore scenarios were developed for existing rates (4.5%) and rates experienced in the past (3%) that could be attained if market trends continue to decrease.
8. Financing Terms for WIFIA Loan: as a new funding mechanism and no set of previous terms that the Papio NRD has preference towards, a range of loan repayment schedules and interest rates were applied. Modeled scenarios reflect loan payments to be amortized over a range of 20 years to 35 years. The WIFIA Loans are issued at federal prime interest rates. D. A. Davidson & Company provided the current rate at 3.1% and projects that rates could be lower in the future. Modeled scenarios included interest rates at 3.1% and 2.0% to represent a range of potential conditions.
9. Program Project Sequence: the preferred implementation order in which Program Projects were inserted into the cash flow model based on factors described in Section 4.4.

Funding Mechanisms

These inputs were linked to three funding mechanisms: pay-as-you-go (P-A-Y-G), bonding with P-A-Y-G, or a WIFIA Loan with P-A-Y-G. The model development is described in more detail below. The cash flow model considers three (3) funding mechanisms to develop a range of the modeling scenarios described in Section 4.6:

1. P-A-Y-G: the first funding mechanism is a continuance of the strategy developed in the 2009 Plan, whereby implementation continues on a P-A-Y-G basis. Under this mechanism, the projects are implemented utilizing a combination of General Fund revenue allocations from the Papio NRD and Watershed Fees.
2. Bonding with P-A-Y-G: the second funding mechanism adds Papio NRD bonding authority to P-A-Y-G. The Papio NRD has capacity to issue additional bonds with a cap of total annual debt service for all bonds not to exceed 1 percent of the district's total property tax valuation (currently \$20 million remaining in bonding authority). When bonding is used, the Papio NRD would reduce its allocation of General Funds to the Watershed Account to cover the costs of bond issuance (annual debt service). In modeled scenarios, debt service is treated as a project expenditure while the General Fund contribution remains consistent with the LRIP.
3. WIFIA Loan with P-A-Y-G: the third funding mechanism add a WIFIA loan to P-A-Y-G. When a loan is used, the Papio NRD would reduce its allocation of General Funds to the Watershed Account to cover the costs of the loan repayment (annual debt service). In modeled scenarios, debt service is treated as a project expenditure while the General Fund contribution remains consistent with the LRIP.

4.6 Modeled Scenarios and Results

The funding mechanisms were combined with the model assumptions to form financing scenarios described below in [Table 4](#). These financing scenarios represent a range of potential financial pictures for project implementation. Details for Scenarios 1.0, 2.1 3.1, 3.2, and 3.3 are provided for further consideration since they present a variety of options that could be available to the PWCP for implementation depending on the future economic climate. See [Appendix A](#) for additional information on all scenarios evaluated.

Cash flow projections from the model are presented graphically for each funding scenario in [Appendix A](#). Scenarios 1.0, 2.1 3.1, 3.2, and 3.3 are shown in [Figures 6 through 10](#) and key model outputs are summarized in [Table 5](#). The figures include revenue streams and expenditures on projects, and the cumulative Watershed Account balance represents the resulting cash flow from these transactions. Key model outputs that were derived include:

1. Number of Program Projects completed in the next implementation period of FY 2025 to FY 2029.
2. Year in which all regional detention projects will be complete.
3. Cost of all regional detention projects (capital costs vary based on the rate of implementation due to inflation per assumption #2), plus any additional debt service incurred to implement regional detention for a total cost.
4. Number of water quality basins implemented within the planning horizon (by 2050).

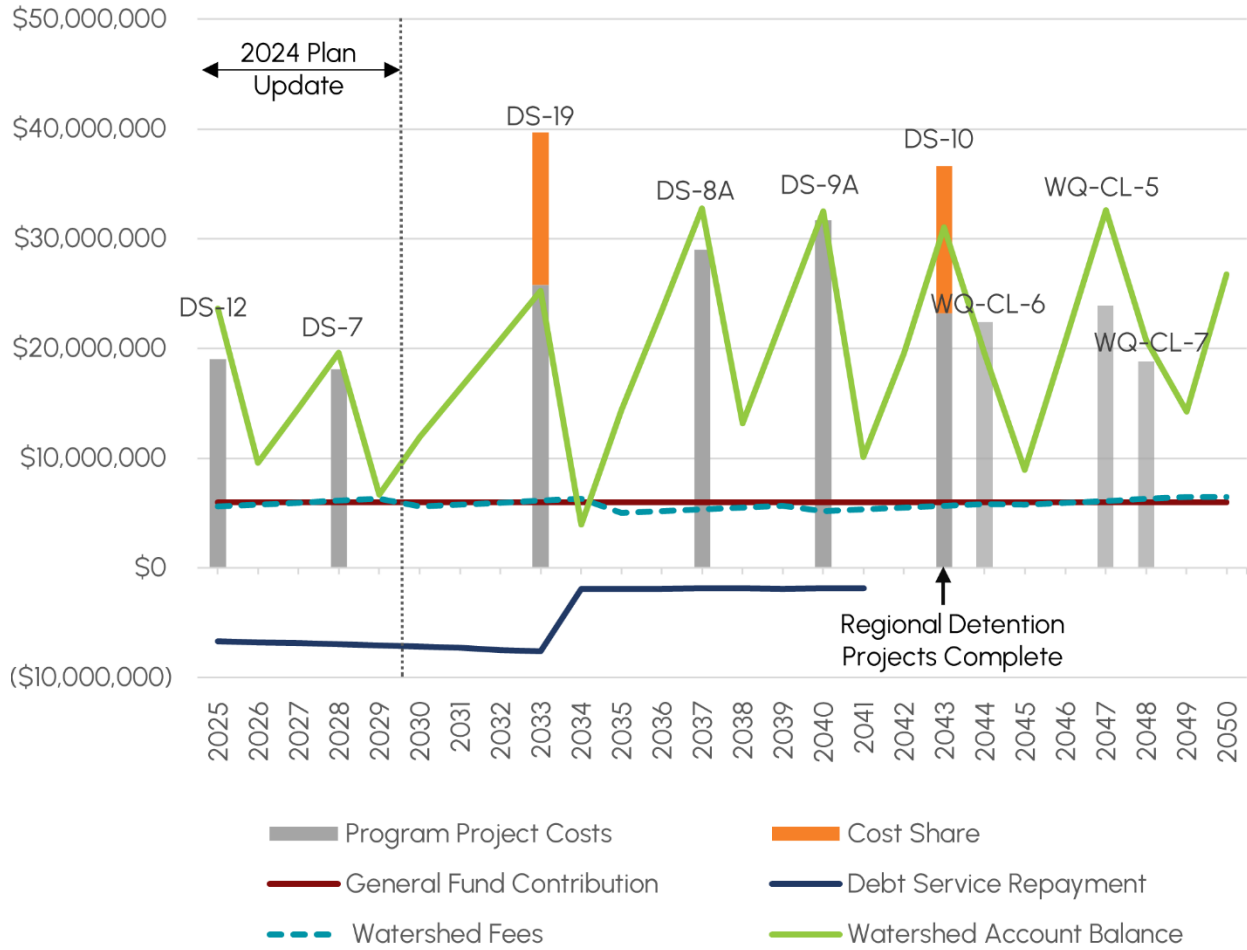
Table 4. Funding Scenarios Evaluated

Scenario	Funding Mechanism	Watershed Fees	Papio NRD Allocation	Financing Terms	
				Interest Rate	Repayment Period
1.0	P-A-Y-G	Current Rates with Inflation	General Fund Contribution	---	---
2.1	P-A-Y-G + Bond	Current Rates with Inflation	General Fund Contribution + \$20M Bond	3.0%	20 Yrs
2.2		Current Rates with Inflation	General Fund Contribution + \$20M Bond	4.5%	20 Yrs
3.1	P-A-Y-G + WIFIA Loan	Current Rates with Inflation	General Fund Contribution + \$30M WIFIA Loan	3.1%	35 Yrs
3.2		Current Rates with Inflation	General Fund Contribution + \$30M WIFIA Loan	2.0%	35 Yrs
3.3		Current Rates with Inflation	General Fund Contribution + \$46M WIFIA Loan	3.1%	35 Yrs
3.4		Current Rates with Inflation	General Fund Contribution + \$30M WIFIA Loan	2.0%	20 Yrs
3.5		Current Rates with Inflation	General Fund Contribution + \$46M WIFIA Loan	2.0%	35 Yrs
3.6		Current Rates with Inflation	General Fund Contribution + \$30M WIFIA Loan	3.1%	20 Yrs

A general description of components included in [Figures 6](#) through [10](#) is summarized below:

- The long-term planning horizon utilized was 25 years (FY 2025 to FY 2050).
- The next Program Projects cycle is highlighted from FY 2025 to FY 2029.
- The red line represents the contribution of annual funds from the PAPIO NRD's General Fund.
- The blue dashed line represents the annual contribution of Watershed Fees.
- The green solid line represents the cumulative funds available in the Watershed Account
- The gray bars represent the estimated cost of the project.
- The navy-blue line represents the existing bond repayment plus any new debt repayment associated with the modeled scenario.
- The orange bars represent planned cost share from the USACE.

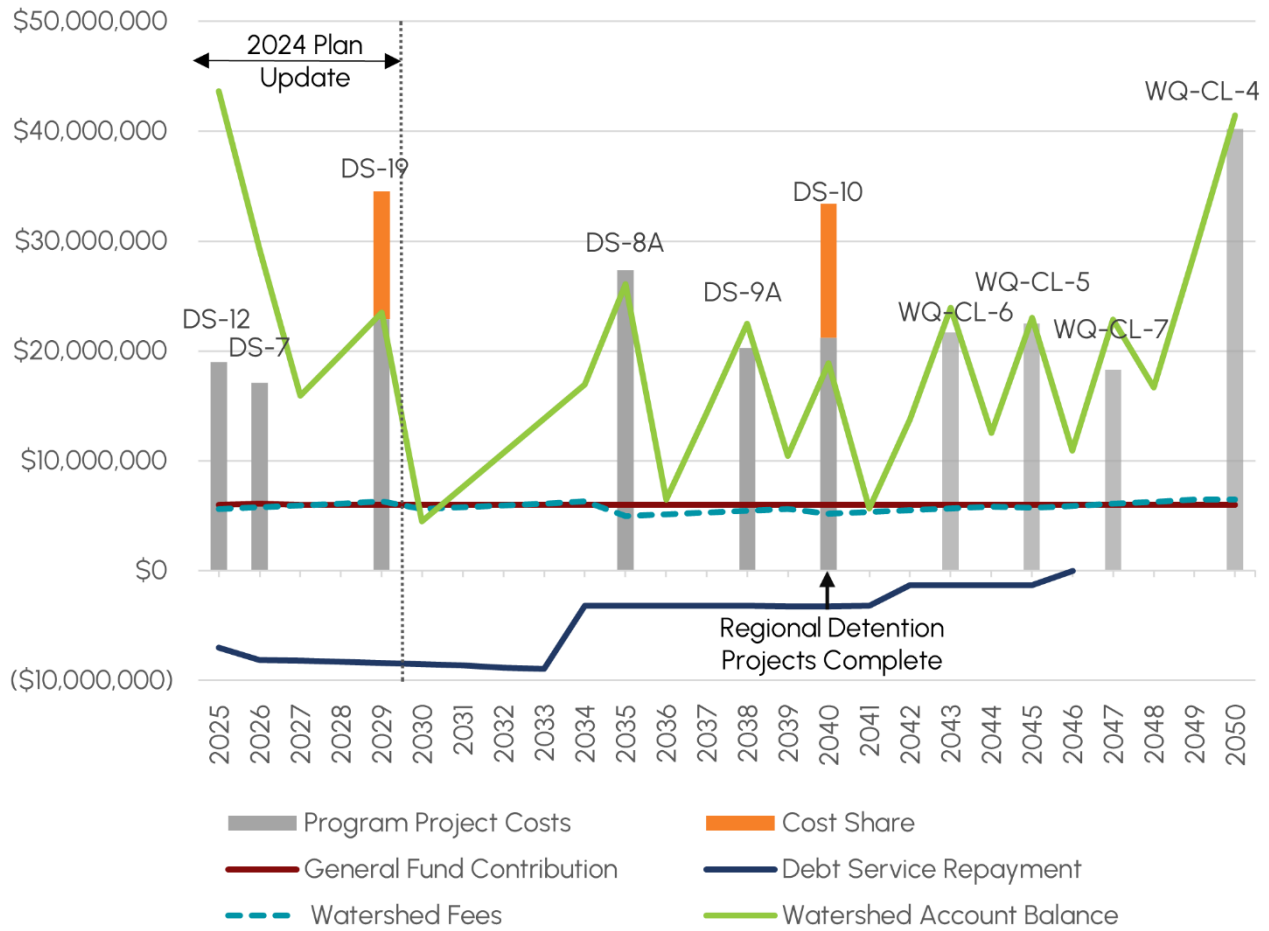
Figure 6. Scenario 1.0: P-A-Y-G



Scenario 1.0 Key Model Outputs:

1. Two (2) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2043.
3. Regional detention project cost of \$146.8 million (with no additional dept service).
4. Three (3) water quality basins can be constructed within the planning horizon (2050).

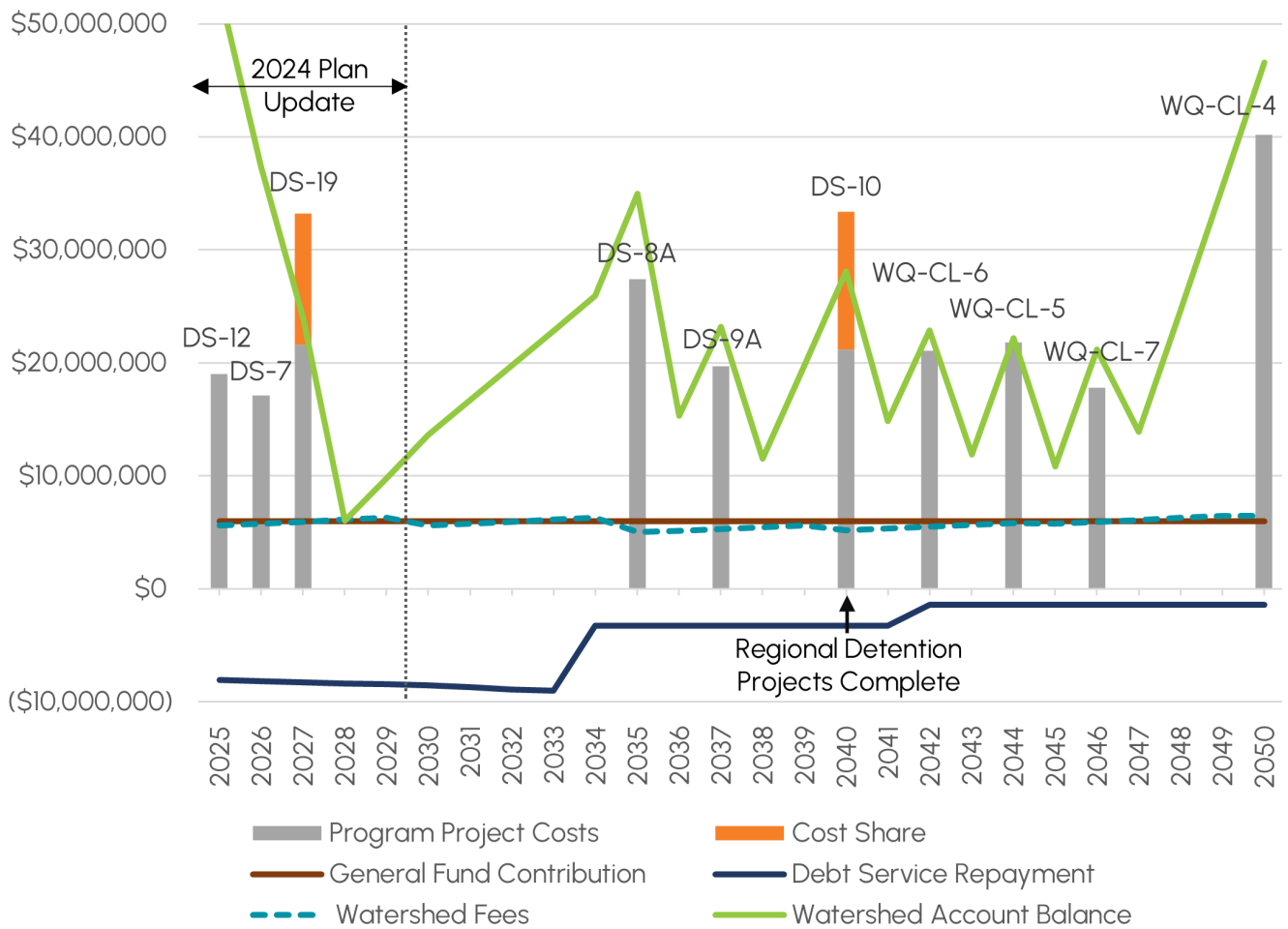
Figure 7. Scenario 2.1: P-A-Y-G with \$20M Bond (3.0% interest over 20-yr)



Scenario 2.1 Key Model Outputs:

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2040.
3. Regional detention project cost of \$127.9 million, plus \$6.9 million in additional dept service for a total regional detention cost of \$134.8 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).

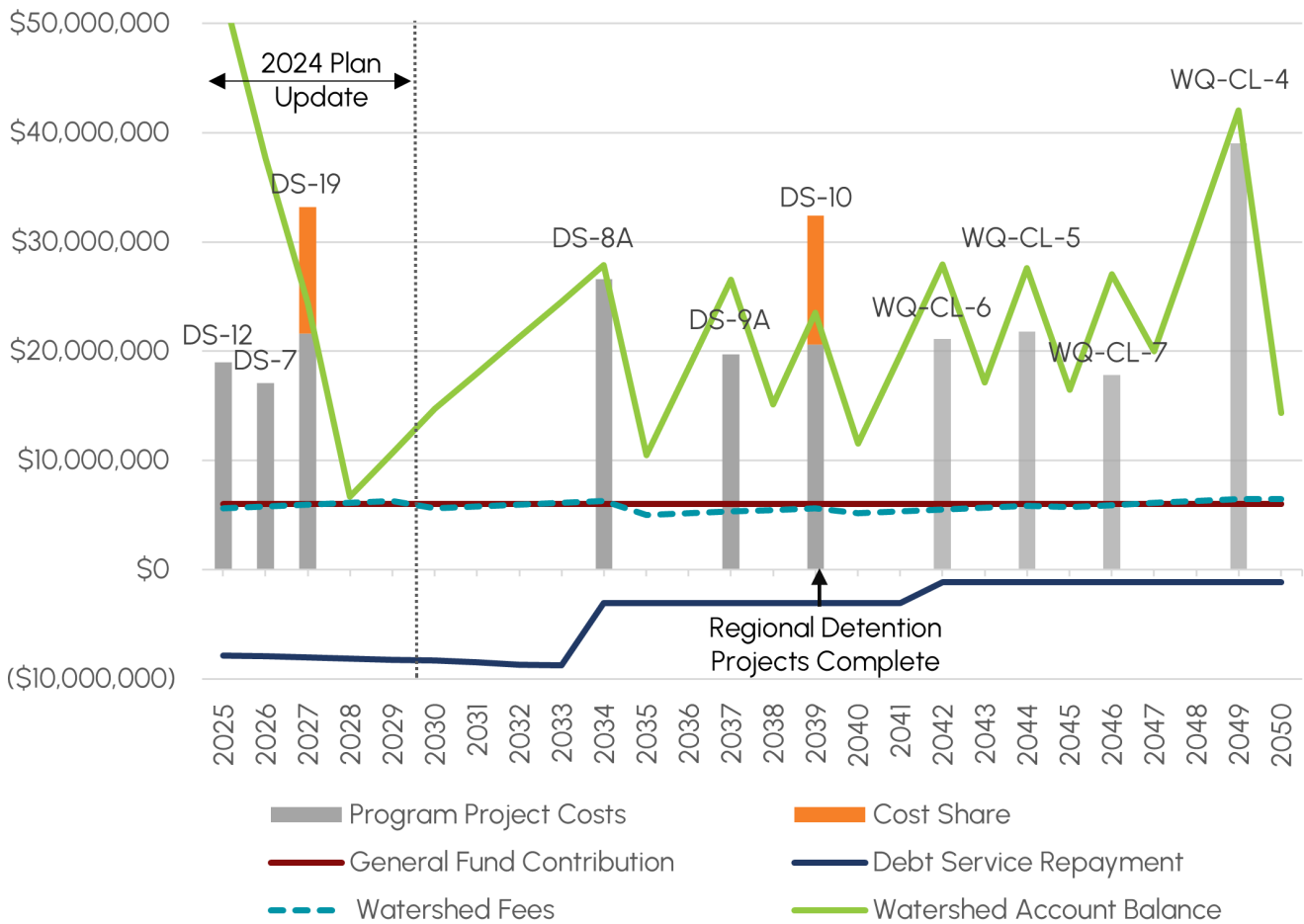
Figure 8. Scenario 3.1: P-A-Y-G with \$30M WIFIA Loan (3.1% interest over 35-yrs)



Scenario 3.1 Key Model Outputs:

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2040.
3. Regional detention project cost of \$126.0 million, plus \$19.2 million in additional dept service for a total regional detention cost of \$145.2 million.
4. Three (3) water quality basins can be constructed within the planning horizon (2050).

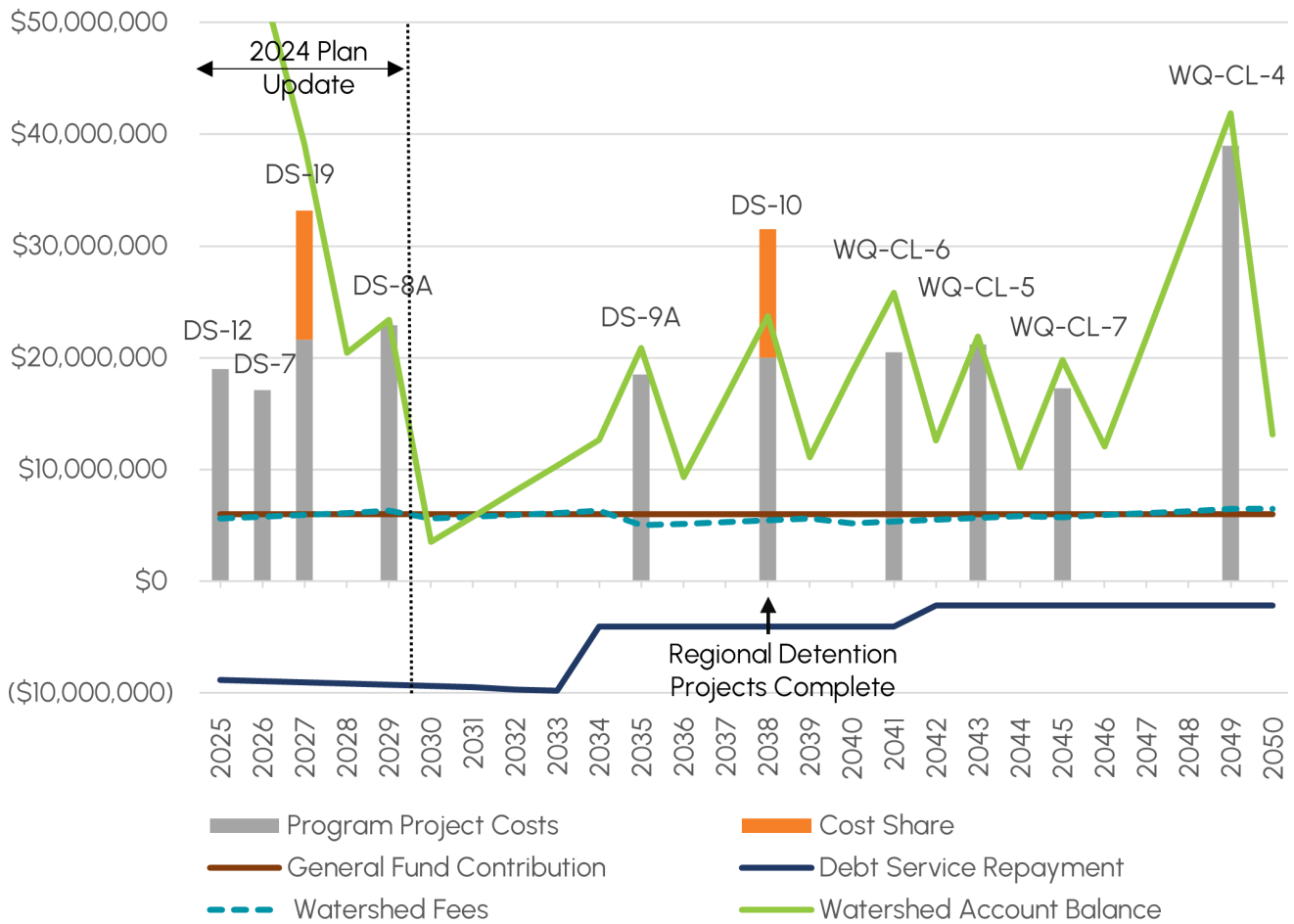
Figure 9. Scenario 3.2: P-A-Y-G with \$30M WIFIA Loan (2.0% interest over 35-yrs)



Scenario 3.2 Key Model Outputs:

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2039.
3. Regional detention project cost of \$124.6 million, plus \$11.7 million in additional dept service for a total regional detention cost of \$136.3 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).

Figure 10. Scenario 3.3: P-A-Y-G with \$46M WIFIA Loan (3.1% interest over 35-yrs)



Scenario 3.3 Key Model Outputs:

1. Four (4) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2038.
3. Regional detention project cost of \$119.1 million, plus \$30.1 million in additional dept service for a total regional detention cost of \$149.2 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).

Table 5 summarizes the results of Scenarios 1.0, 2.1 3.1, 3.2, and 3.3 reported above that reflect financing options for the 25-year planning horizon and projects that could be completed in the next Program Project cycle from FY 2025 to FY 2029. Bonding and loan scenarios allow for immediate funding of projects but imposes a long-term debt service requirement. However, these additional funds upfront will increase the rate of project implementation and reduce future inflation costs that are projected onto capital costs (per assumption 2).

Table 5. Summary of Key Model Outputs

Scenario			# Projects Complete 2025-2029	Year Regional Detention Complete	Regional Detention Costs (\$ in Millions)	Additional Debt Service (\$ in Millions)	Total Regional Detention Cost (\$ in Millions)	# Water Quality Basins*
Method	Interest Rate	Repayment Schedule						
1 - PAYG	---	---	2	2043	\$146.8	\$0.0	\$146.8	3
2.1 - PAYG + \$20M Bond	3.0%	20 Yrs	3	2041	\$127.9	\$6.9	\$134.8	4
3.1 - PAYG + \$30M Loan	3.1%	35 Yrs	3	2040	\$126.0	\$19.2	\$145.2	3
3.2 - PAYG + \$30M Loan	2.0%	35 Yrs	3	2039	\$124.6	\$11.7	\$136.3	4
3.3 - PAYG + \$46M Loan	3.1%	35 Yrs	4	2038	\$119.1	\$30.1	\$149.2	4

5 Implementation Plan

The Implementation Plan in the 2009 Report primarily dealt with the administrative and financial requirements necessary to initiate the Plan. Since the basic administrative framework (policies) are already in place, the Implementation Plan within subsequent updates is primarily intended to provide updated capital cost estimates and recommended Program Projects that can be considered for the next immediate planning period.

5.1 Structural Components: Program Projects

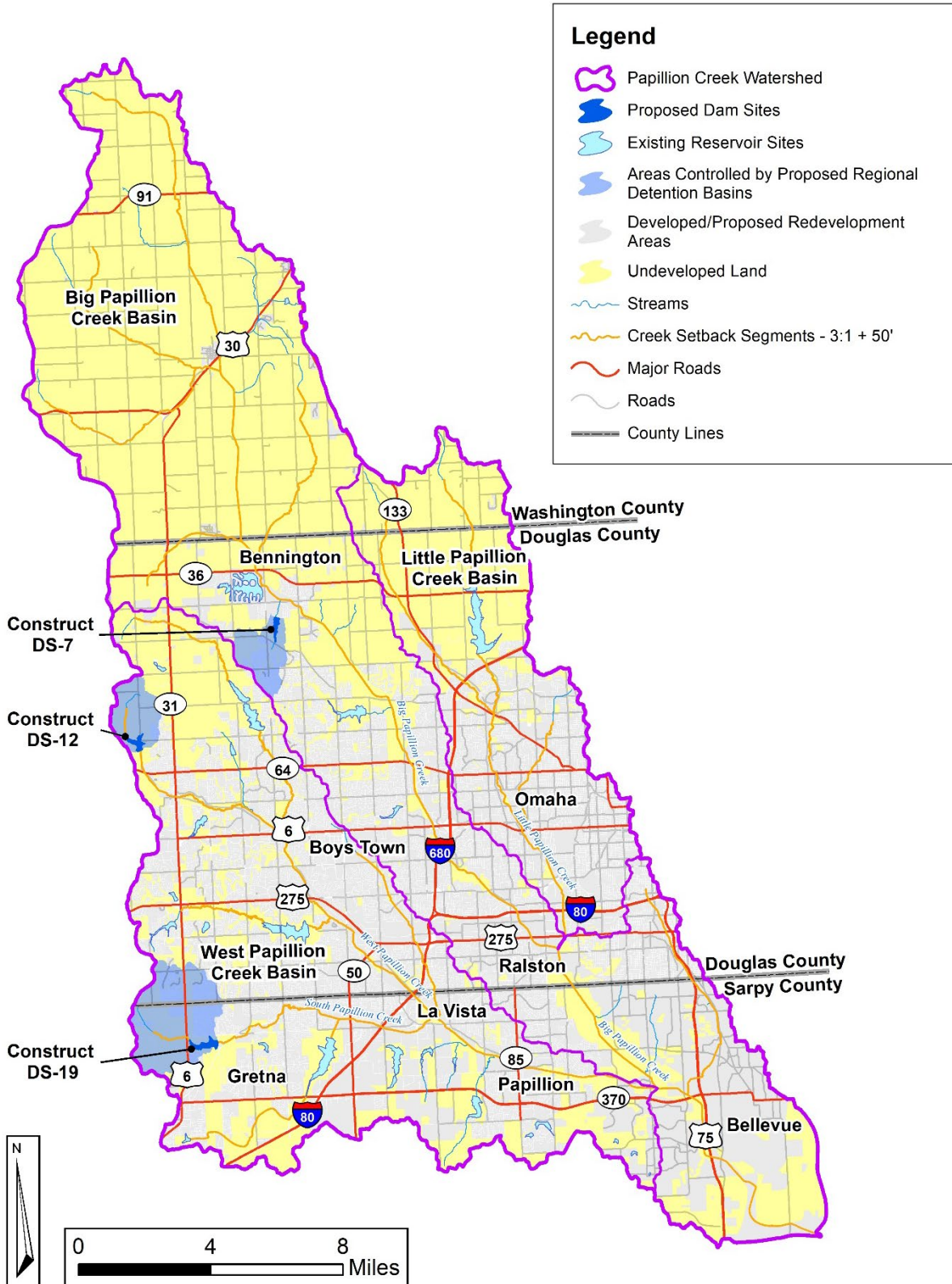
The structural portion of the Implementation Plan update consists of Program Projects whose construction would be initiated in the FY 2025 to FY 2029 planning period. Proposed Program Projects recommended by the PCWP consist of three (3) regional detention basins, as listed in [Table 6](#) and shown on the Implementation Plan Map in [Figure 11](#).

Table 6. Watershed Management Plan Program Projects for FY 2025 to FY 2029

Structure	Approx. Location & Planning Jurisdiction	Drainage Area (acres)	Est. Project Capital Costs, 2018 Basis, \$ Millions
DS-19	192 nd & Giles Road; City of Gretna	2,750	\$37.3
DS-12	216 th & Fort Streets; City of Omaha	1,660	\$30.4
DS-7	168 th and Bennington Road; City of Omaha	1,675	\$27.2
Total			\$94.9

Note:
DS= Dam Site

Figure 11. Papillion Creek Watershed Implementation Plan Map (FY 2025 to FY 2029)



5.2 Project Funding Framework

Project funding considerations every five (5) years need to include a re-examination of financial resources, responsibilities, and constraints that are needed to support the Plan and implementation. The Watershed Fees are reassessed based on total Program costs (updated remaining structural projects plus previous Program Project expenditures), land use/population projections, and a credit for Watershed Fees collected to date. Funding needs will be cost shared with the goal of 2/3 public (tax dollars) and 1/3 private (Watershed Fees) for overall Program Project costs. The Watershed Fee rates increase by an annual inflation factor determined with each plan update. [Table 7](#) below summarizes the adjusted annual Watershed Fee rates with 3 (three) percent inflation per year for the FY 2025 to FY 2029 implementation period.

Table 7. Schedule of Watershed Fees for Years FY 2025 to FY 2029

Fee Category	Current (FY 2024)	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Single Family Residential per housing unit or dwelling unit (also includes low-density multi-family up to 4-plexes)	\$1,027	\$1,058	\$1,090	\$1,122	\$1,156	\$1,191
High-Density Multi-Family Residential (beyond 4-plexes) per gross developable acre	\$4,520	\$4,656	\$4,795	\$4,939	\$5,087	\$5,240
Commercial/Industrial per gross developable acre	\$5,478	\$5,642	\$5,812	\$5,986	\$6,166	\$6,351

The PCWP's intent is to monitor market conditions for favorable interest rates that would justify obtaining an additional \$20M bond by December 2024 to finance Program Projects. Additionally, the PCWP will stay informed on potential revisions to CWIFP that would allow new project eligibility for the WIFIA Loan. Obtaining a bond or WIFIA loan at a favorable rate (approximately 3 percent for bonds and 2 percent for WIFIA Loans as modeled) would increase the rate of Program Project implementation and provide valuable costs savings by minimizing inflation incurred. The total cost of regional detention without additional revenue from bonds or loans (Scenario 1.0) was estimated at \$146.8M and would be reduced by approximately \$10.5M to \$12M (Scenarios 2.1 and 3.2) if a bond or WIFIA Loan was obtained at a favorable interest rate.

5.3 Next Steps

During the FY 2025 to FY 2029 planning period, the Partnership will continue to evaluate issues related to flooding and erosion throughout the watershed. Discussions during the plan update questioned the continued use of watershed fees for flood control projects and whether additional Program Projects could be added that addressed other issues such as stream repair projects. As discussed in Section 4 of this report, watershed fees were intended to cover approximately one-third of the Program Project costs. Fees collected as of the date of analysis comprise approximately 14% of expenditures to complete Program Projects.

Stream Stability Evaluation

Concerns with stream degradation and bank erosion have been identified in developed areas by members of the Partnership and were discussed throughout the 2024 Plan Update process. Stream erosion in developed areas is causing damage to public infrastructure (road crossings, utilities, etc.) as well as loss of private property. The magnitude of this problem and how to address it is not fully understood at this time. During the FY 2025 to FY 2029 implementation period, the Partnership will pursue an assessment that includes the efforts described below. The goal of the assessment would be to provide the Partnership with perspective on the order of magnitude of financial resources that would be required to address stream stability with Program Projects.

1. Identify sites with existing stream stability problems within the watershed
 - a. An inventory of existing problem areas will be created using data provided by each Partner, analysis of available datasets, and minor field work.
2. Identify potential Program Projects
 - a. Based on results of the inventory, the Partnership will determine the magnitude of issues that would qualify for investment from the Partnership. This will also include development of a methodology to prioritize sites so that work is equitable throughout the watershed.
3. Perform a cost analysis
 - a. Approximate total cost range for addressing all potential Partnership Projects

Stream Setback Definition

Effort was made during the 2024 Plan Update to modify the stream setback defined under the Stream Corridor Preservation policy group to reduce the risk of damage from stream erosion and degradation that is experienced within the watershed. No conclusions were reached, and the Partnership continue to evaluate stream setback definition alternatives for a policy update. Prevention of future degradation is a key component to reducing costs to repair and restore streams.

6 References

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US Army Corps of Engineers (USACE) Omaha District Northwest Division. *Papillion Creek and Tributaries Lakes, Nebraska, Final Feasibility Report*, June 2021.

List of Appendices

Appendix	Description
A	Financial Model Development
B	Current Watershed Management Policies
C	Stakeholder Engagement Synthesis
D	Stream Stability Documentation

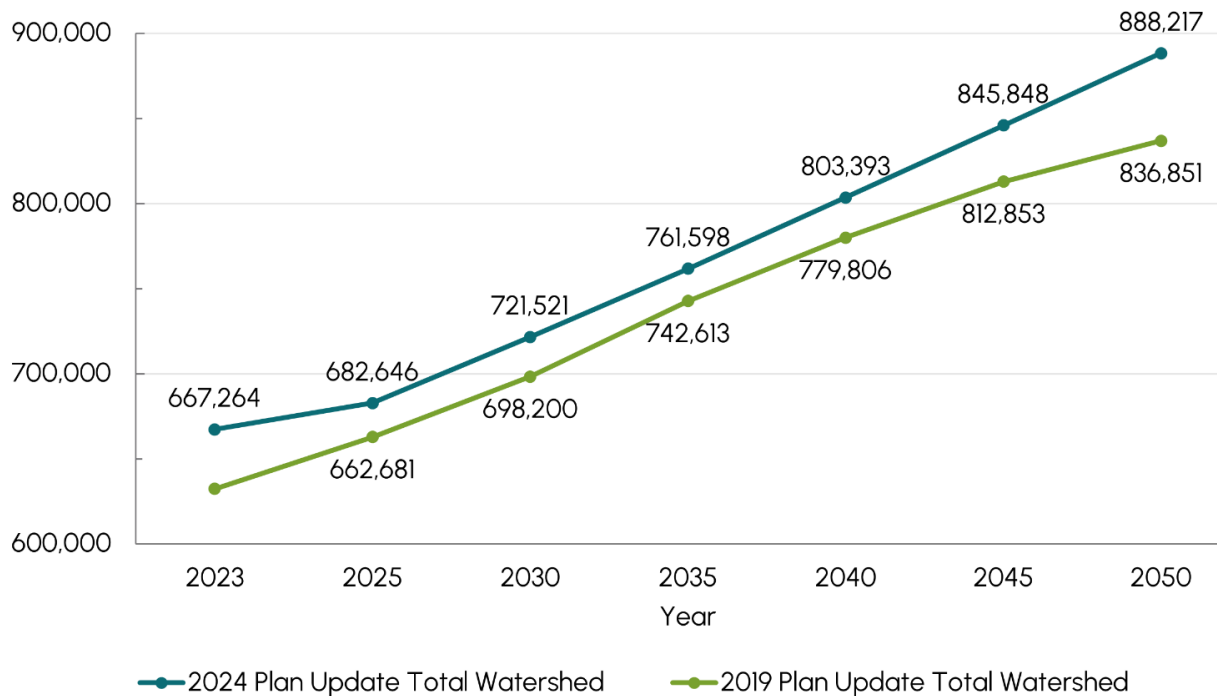
Appendix A

APPENDIX – A Financial Model Development

A.1 Updated Population and Land Use Projections

This portion of Appendix A is intended to provide information concerning the rationale used to derive new population and land use projections used to estimate remaining watershed fees to be collected. Douglas and Sarpy County 2020 census data for census blocks within the watershed were utilized along with Omaha-Council Bluffs Metropolitan Area Planning Agency (MAPA) 5-year incremental growth rate percentages to determine projected population growth. The 2023 population was determined to establish a 'baseline' population to utilize when projecting land use and development alongside 2023 parcel data. Figure A.1 graphically represents the outcome of the census data and MAPA 2050 model projections. Note that the green line and data markers represent the population projections used in the 2019 Report as a comparison to the updated projected populations within the watershed. The populations are numerically listed adjacent to the blue and green markers. Additional data is included in Table A.1 at the end of this section.

Figure A.1 Projected Population within Watershed

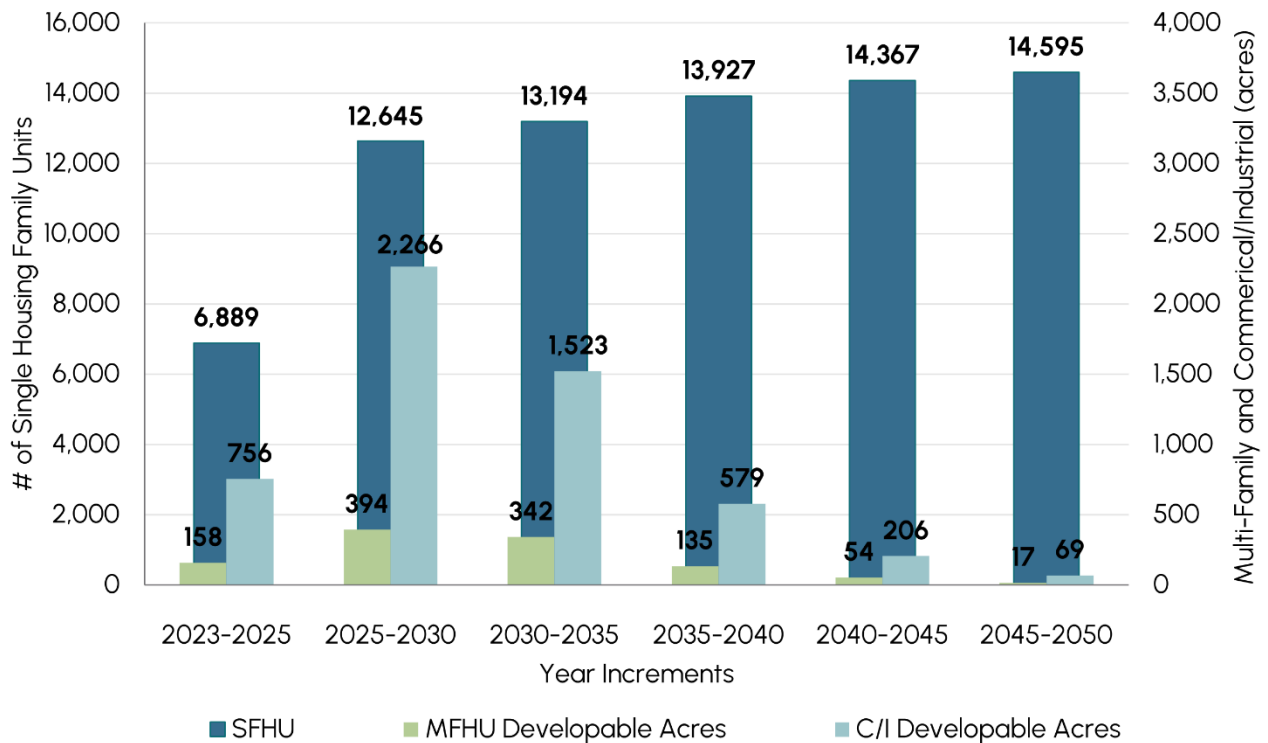


Updated land use maps were developed to help explain the spatial allocations among various types of existing and future development. Land use designations and estimated rates of land consumption for new development are important considerations for the timing and capital costs associated with future regional detention basins and water quality basins. Updated (2023) land use data was obtained from Douglas and Sarpy County GIS on-line web services in June 2023 for

current and future conditions. Land use categories were combined and aggregated with similar categories to create general land use maps. Updated current land use and future (for full development build-out) land use maps were developed utilizing current and future land use zoning data from the counties and 2023 aerial photography. The land use maps are included at the end of this section in [Figures A.3 and A.4](#).

Population projections were utilized alongside land use categories to project watershed fees. The applicable land use categories and resultant land consumption data was consolidated into Single Family Housing Units (SFHUs), Multi-Family Housing Units (MFHUs), and Commercial/Industrial (C/I) Development to be consistent with the watershed fee categories and to provide the basis for estimated watershed fee revenue streams for subsequent cash flow analyses. Development of SFHU, MFHU, and C/I projections are discussed below, [Figure A.2](#) shows projected 5-year increases for each, and [Table A.1](#) provides additional information.

Figure A.2. Projected Watershed Land Consumption



Douglas and Sarpy County 2023 parcel data was analyzed alongside current aeriels to determine 2023 SFHUs. MAPA's 2050 modeling output for projected people per household, 2020 census population data, and MAPA percentage of SFHUs and MFHUs were utilized to forecast SFHU increases in 5-year increments. The 5-year SFHU projections were used to forecast watershed fees. Parcel data indicates that 2023 SFHU were less than MAPA projections for Sarpy County and more than MAPA projections for Douglas County. A summary of assumptions is included below:

- 2023 SFHU totals include improved parcels smaller than 10 acres.
- Acreages over 10 acres are assumed to be developed into SF residential in the future.
- Watershed fees are collected with building permits applications and therefore unimproved parcels that were platted but not built were not included in baseline 2023 SFHU values.
- There was no attempt made to reflect future changes in housing demands in response to economic forecasts.

2050 MAPA model watershed data grids (1.4 acres each) were utilized alongside existing zoning and future land use data for Douglas and Sarpy County to determine protections for MFHUs and C/I in gross developable acres to forecast watershed fees. MAPA model data includes MFHUs for 2015 and 2050 with allocations in 5-year increments, C/I and office population increases allocated in 5-year increments, available developable acres for each grid, and land use types. Land use types were combined and aggregated with similar categories to process the data. Example land use types include Compact Neighborhood, Town Center, Office Park/Flex, Heavy Industrial, Arterial Commercial, etc. MAPA MFHU and C/I employment projections were converted to developable acres and 5-year increment projections were adjusted based on baseline conditions developed from 2023 parcel data and 2020 census data as well as population growth rates for each county. [Figure A.2](#) below shows projected 5-year incremental increases for each and [Table A.1](#) provides additional information.

Table A.1. Population and Land Use Projections

	Census	Baseline	Projections					
	2020	2023	2025	2030	2035	2040	2045	2050
Summary of Papio Watershed Population								
Updated Papio Watershed Population								
Douglas County Portion of Papio Watershed	467,170	480,372	489,174	511,214	533,349	556,053	579,076	602,377
Douglas County Population Percentage Increases			1.83%	4.51%	4.33%	4.26%	4.14%	4.02%
Sarpy County Portion of Papio Watershed	177,021	186,892	193,472	210,307	228,249	247,339	266,772	285,840
Sarpy County Population Percentage Increases			3.52%	8.70%	8.53%	8.36%	7.86%	7.15%
Total Watershed Population		667,264	682,646	721,521	761,598	803,393	845,848	888,217
Total Watershed Percentage Increases			2.31%	5.69%	5.55%	5.49%	5.28%	5.01%
Papio Watershed Single Family Housing Unit Projections								
Single Family Residential in Douglas County								
Douglas County SFHU		146,099	150,555	157,519	164,528	171,729	179,045	186,464
Douglas County SFHU Increases			4,456	6,964	7,009	7,201	7,316	7,419
Single Family Residential in Sarpy County								
Sarpy County SFHU		52,146	54,578	60,260	66,445	73,171	80,222	87,397
Sarpy County SFHU Increases			2,432	5,682	6,185	6,726	7,051	7,176
Single Family Residential in Watershed								
Total Watershed SFHU		198,245	205,134	217,779	230,973	244,900	259,267	273,861
Total Watershed SFHU Increases			6,889	12,645	13,194	13,927	14,367	14,595
Papio Watershed Allocated Increases in Gross Developable Acres								
Multi-Family Residential Gross Developable Acre Increases in Watershed								
Douglas County MFHU Increase			87	363	229	74	50	16
Sarpy County MFHU Increase			71	31	113	62	4	1
Total Watershed MFHU Increase			158	394	342	135	54	17
Commercial/Industrial (C/I) Gross Developable Acre Increases in Watershed								
Douglas County C/I Increase			320	2,109	902	179	191	18
Sarpy County C/I Increase			435	157	621	400	14	51
Total Watershed C/I Increase			756	2,266	1,523	579	206	69

Figure A.3. Current Land Use (2023)

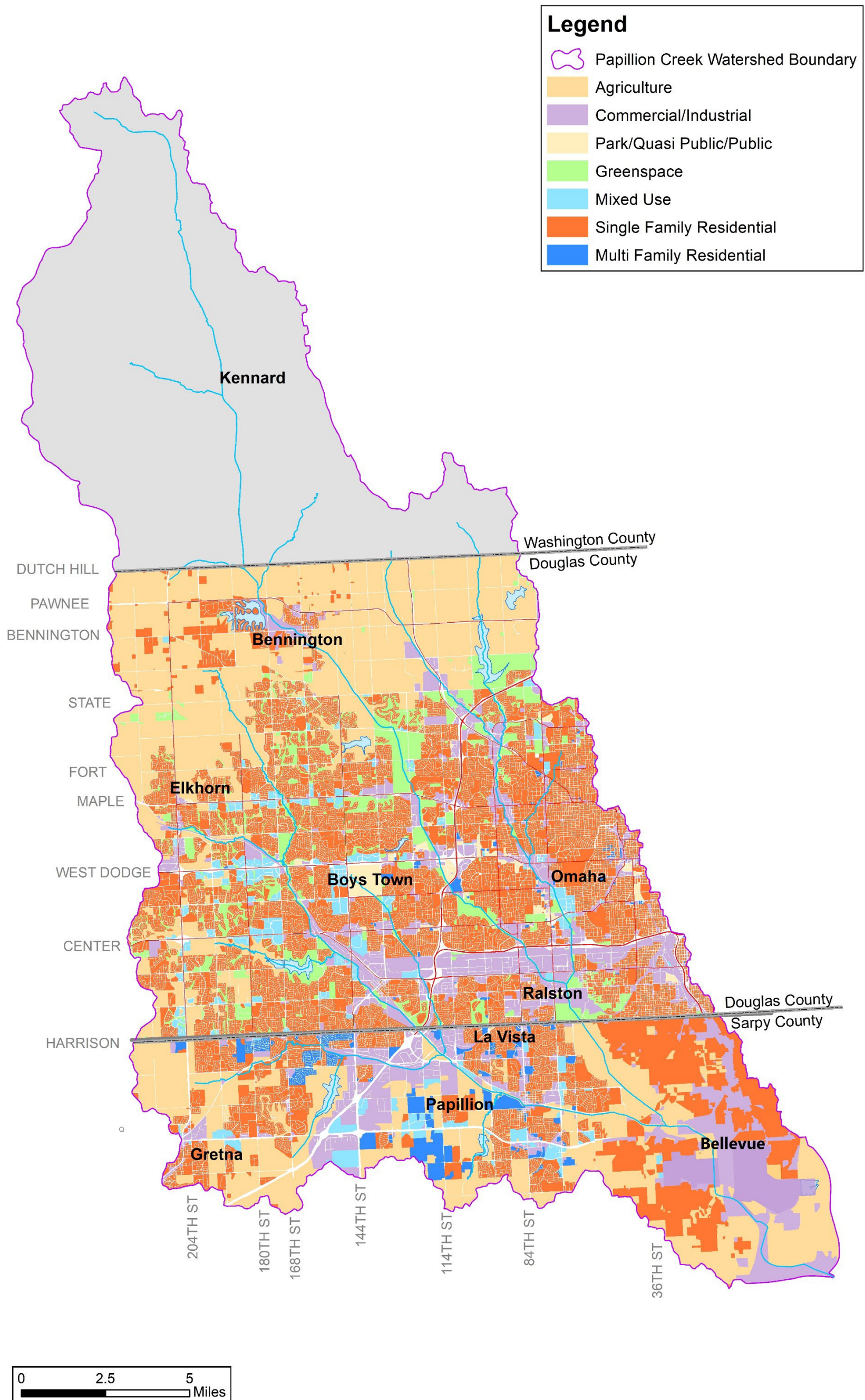
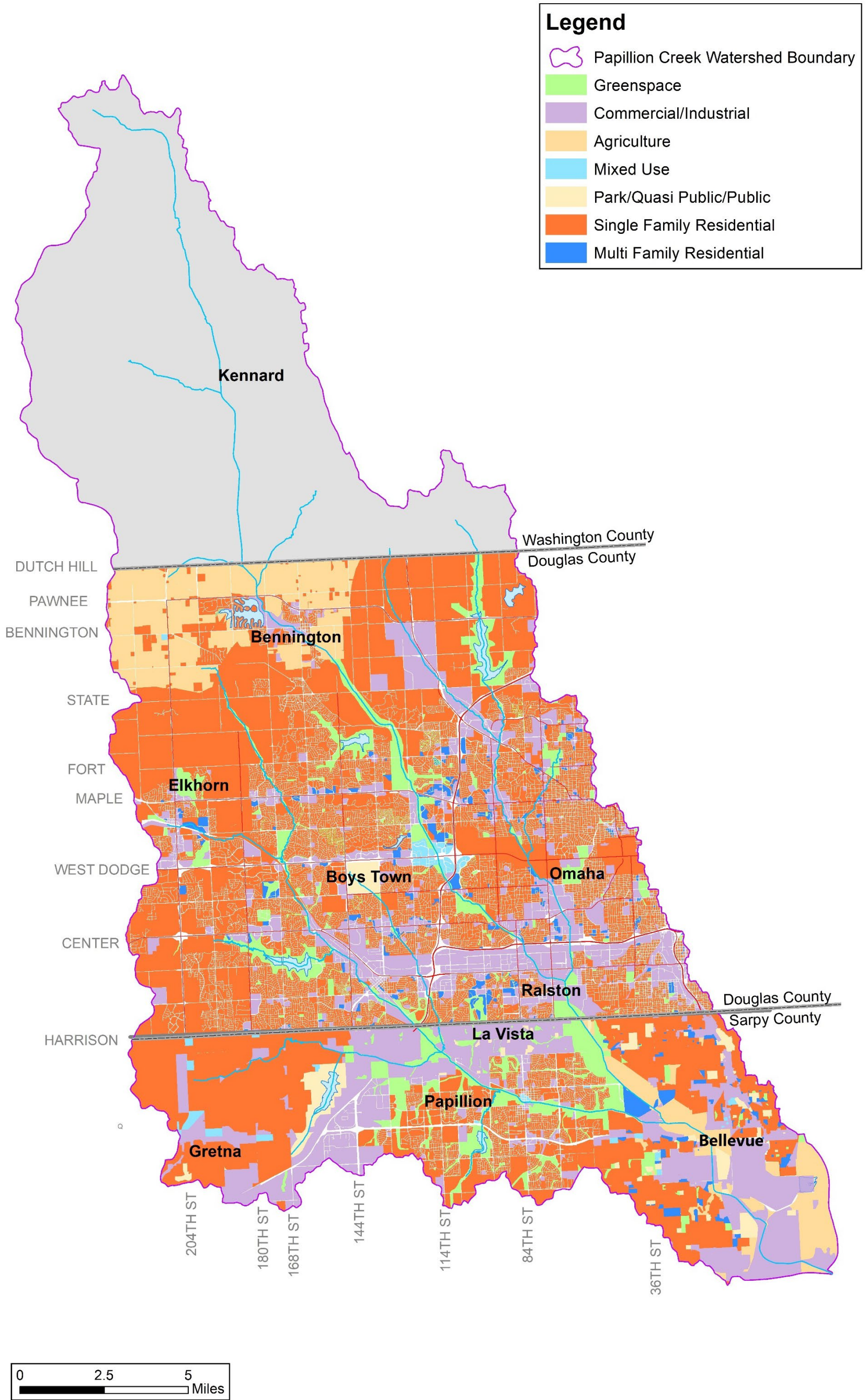


Figure A.4. Future Land Use



A.2 Fee Calculations

Watershed fees are increased each year to account for inflation. For forecasting fees for the long-term horizon planning period (through FY 2050), a 3% increase per year was assumed. Respective fee rates for each land use category were applied to the land consumption values calculated and reported in Figure A.2. Land consumption was distributed evenly per year for each five-year increment to estimate watershed fees on an annual basis, as reported in Table 2. The estimates were utilized in the cash-flow models to assess the financing of the remaining Program Projects.

Table A.2. Remaining Watershed Fee Estimates

Year	Fee Rate			Land Consumption			Annual Watershed Fees
	SF	MF	C/I	SF (units)	MF (ac)	C/I (ac)	
2025	\$1,058	\$4,656	\$5,642	12,645	394	2,266	\$5,599,927
2026	\$1,090	\$4,795	\$5,812				\$5,767,924
2027	\$1,122	\$4,939	\$5,986				\$5,940,962
2028	\$1,156	\$5,087	\$6,166				\$6,119,191
2029	\$1,191	\$5,240	\$6,351				\$6,302,767
2030	\$1,226	\$5,397	\$6,541	13,194	342	1,523	\$5,597,618
2031	\$1,263	\$5,559	\$6,737				\$5,765,546
2032	\$1,301	\$5,726	\$6,939				\$5,938,512
2033	\$1,340	\$5,898	\$7,148				\$6,116,668
2034	\$1,380	\$6,075	\$7,362				\$6,300,168
2035	\$1,422	\$6,257	\$7,583	13,927	135	579	\$5,007,366
2036	\$1,464	\$6,444	\$7,810				\$5,157,587
2037	\$1,508	\$6,638	\$8,045				\$5,312,315
2038	\$1,553	\$6,837	\$8,286				\$5,471,684
2039	\$1,600	\$7,042	\$8,535				\$5,635,835
2040	\$1,648	\$7,253	\$8,791	14,367	54	206	\$5,174,580
2041	\$1,697	\$7,471	\$9,054				\$5,329,817
2042	\$1,748	\$7,695	\$9,326				\$5,489,712
2043	\$1,801	\$7,926	\$9,606				\$5,654,403
2044	\$1,855	\$8,164	\$9,894				\$5,824,035
2045	\$1,911	\$8,409	\$10,191	14,595	17	69	\$5,745,695
2046	\$1,968	\$8,661	\$10,496				\$5,918,065
2047	\$2,027	\$8,921	\$10,811				\$6,095,607
2048	\$2,088	\$9,188	\$11,136				\$6,278,476
2049	\$2,150	\$9,464	\$11,470				\$6,466,830
Total							\$144,011,292

A.3 Program Projects Cost Updates

All capital costs for Program Projects were updated to current (2023) values for the purposes of financial planning and listed in [Table A.3](#). Costs for projects that have progressed since 2019 were updated from the numbers in the 2019 Update. If none, then the 2019 Update values were used and converted to current values using the Construction Cost Index (CCI). Construction costs include cost associated with all project components, including features supplemental to flood control such as the water quality basins, recreation amenities, infrastructure repair/replacement where applicable, as well as design and permitting fees. The current market value for land in the metro-area (approximated at \$65,000 per acre based on recent land transactions associated with Program Projects) was applied to the area to be purchased for each Program Project to obtain an updated real estate cost at the time of this Plan update.

A.4 Financial Cash-Flow Model Scenarios

A range of funding scenarios was evaluated for project implementation as described in Section 4 of the 2024 Update. Provided in [Figures A.5](#) through [A.13](#) are the results of all nine (9) scenarios investigated. A general description of components included in the modeled scenarios figures is summarized below:

- The long-term planning horizon utilized was 25 years (FY 2025 to FY 2050).
- The next Program Projects cycle is highlighted from FY 2025 to FY 2029.
- Contribution of annual funds from the Papio NRD's General Fund.
- Annual contribution of Watershed Fees.
- Cumulative funds available in the Watershed Account
- Estimated cost of the project.
- Existing bond repayment plus any new debt repayment associated with the modeled scenario.
- Planned cost share from the USACE.

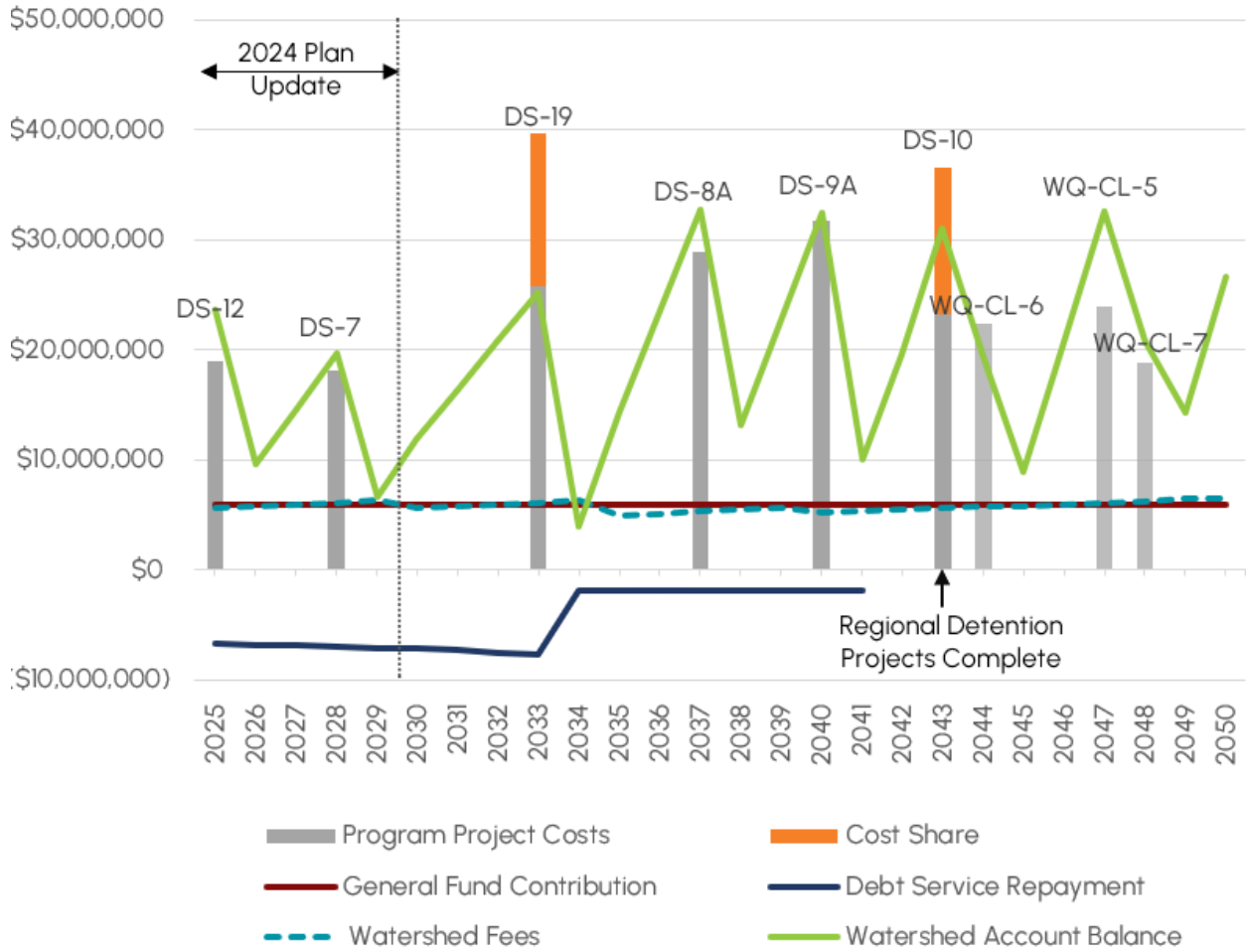
Key model outputs summarized in [Table A.4](#) include:

1. Number of Program Projects completed in the next implementation period of FY 2025 to FY 2029.
2. Year in which all regional detention projects will be complete.
3. Cost of all regional detention projects (capital costs vary based on the rate of implementation due to inflation per assumption #2), plus any additional debt service incurred to implement regional detention for a total cost.
4. Number of water quality basins implemented within the planning horizon (by 2050).

Table A.3. Regional Detention and Water Quality Basin Cost Summary Table

Structure Name	Stream Reach	Approx. Location	Drainage Area (acres)	Est. Normal Pool Area (acres)	Est. Project Costs, 2023 Basis (Millions of \$)		
					Construction Cost	Real Estate Costs	Total Est. Project Capital Cost
DS 12	West Papillion Creek	216th & Fort Streets	1,660	43	\$14.1	\$16.3	\$30.4
DS 7	Trib to Big Papillion Creek	168th St & Bennington Road	1,675	43	\$12.2	\$15.0	\$27.2
DS 19	South Papillion Creek	192nd St & Giles Road	2,750	74	\$17.4	\$19.9	\$37.3
DS 8A	Trib to Big Papillion Creek	144th St & Bennington Road	1,850	75	\$8.8	\$10.4	\$19.2
DS 9A	Trib to Big Papillion Creek	132nd St & Bennington Road	1,280	38	\$6.5	\$6.5	\$13.0
DS 10	Thomas Creek	120th St & Bennington Road	2,950	97	\$12.5	\$7.9	\$20.4
Regional Detention Basin Subtotal					\$71.5	\$76.0	\$147.5
WQ-CL-6	Upstr. Cunningham Lake	Omaha	510	---	\$4.9	\$7.1	\$12.0
WQ-CL-5	Upstr. Cunningham Lake	Omaha	470	---	\$4.8	\$6.9	\$11.7
WQ-CL-7	Upstr. Cunningham Lake	Omaha	200	---	\$3.7	\$5.3	\$9.0
WQ-CL-4	Upstr. Cunningham Lake	Omaha & Washington Co.	915	---	\$7.5	\$10.6	\$18.1
WQ-CL-2	Upstr. Cunningham Lake	Washington Co.	845	---	\$7.2	\$10.3	\$17.5
WQ-CL-3	Upstr. Cunningham Lake	Washington Co.	790	---	\$7.0	\$9.9	\$16.9
WQ-CL-1	Upstr. Cunningham Lake	Washington Co.	740	---	\$7.0	\$9.9	\$16.9
Water Quality Basin Subtotal					\$42.1	\$60.0	\$102.1
Total Regional Detention and Water Quality Basins Total					\$113.6	\$136.0	\$249.6

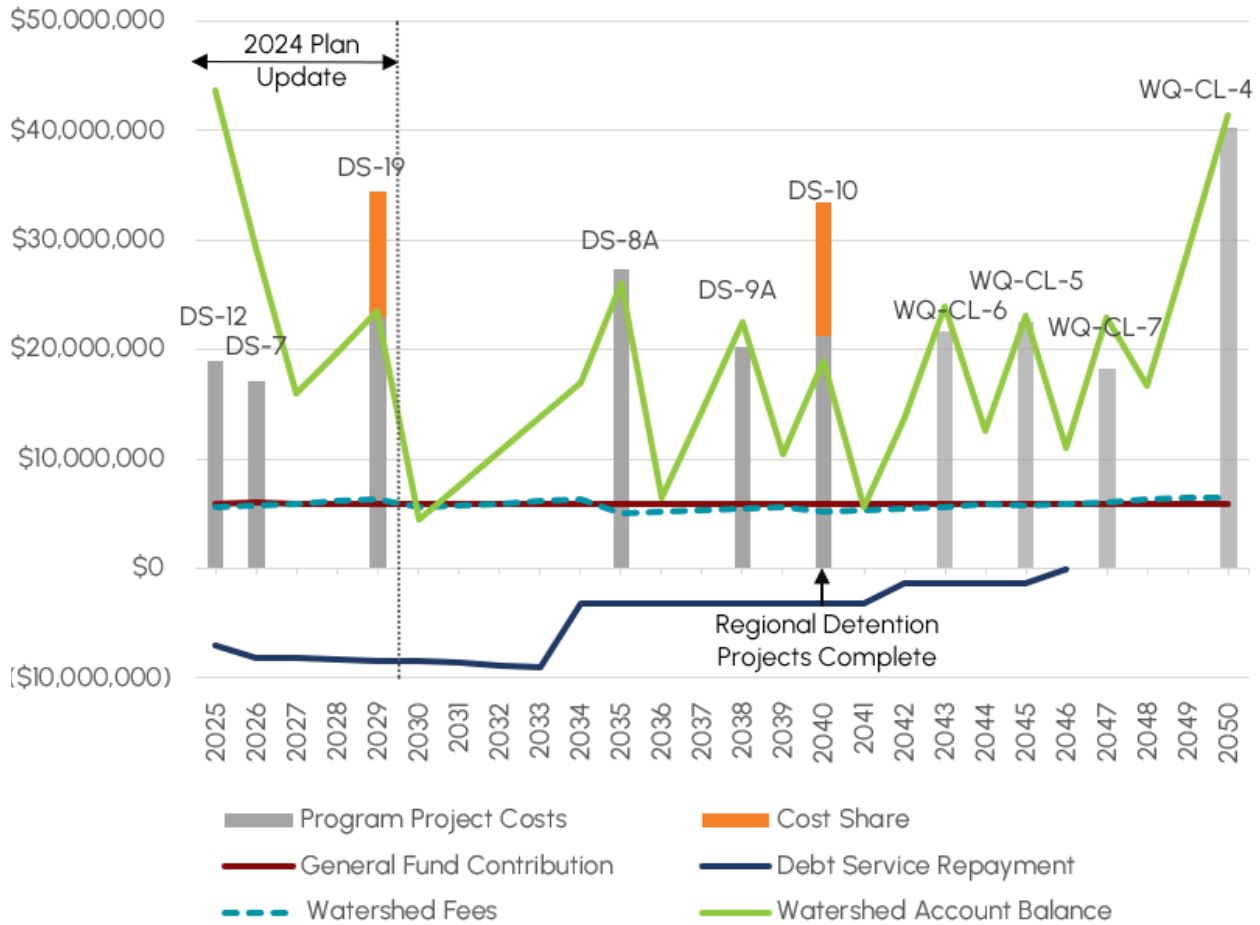
Figure A.5. Scenario 1.0: P-A-Y-G



Scenario 1.0 Key Model Outputs:

1. Two (2) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2043.
3. Regional detention project cost of \$146.8 million (with no additional dept service).
4. Three (3) water quality basins can be constructed within the planning horizon (2050).

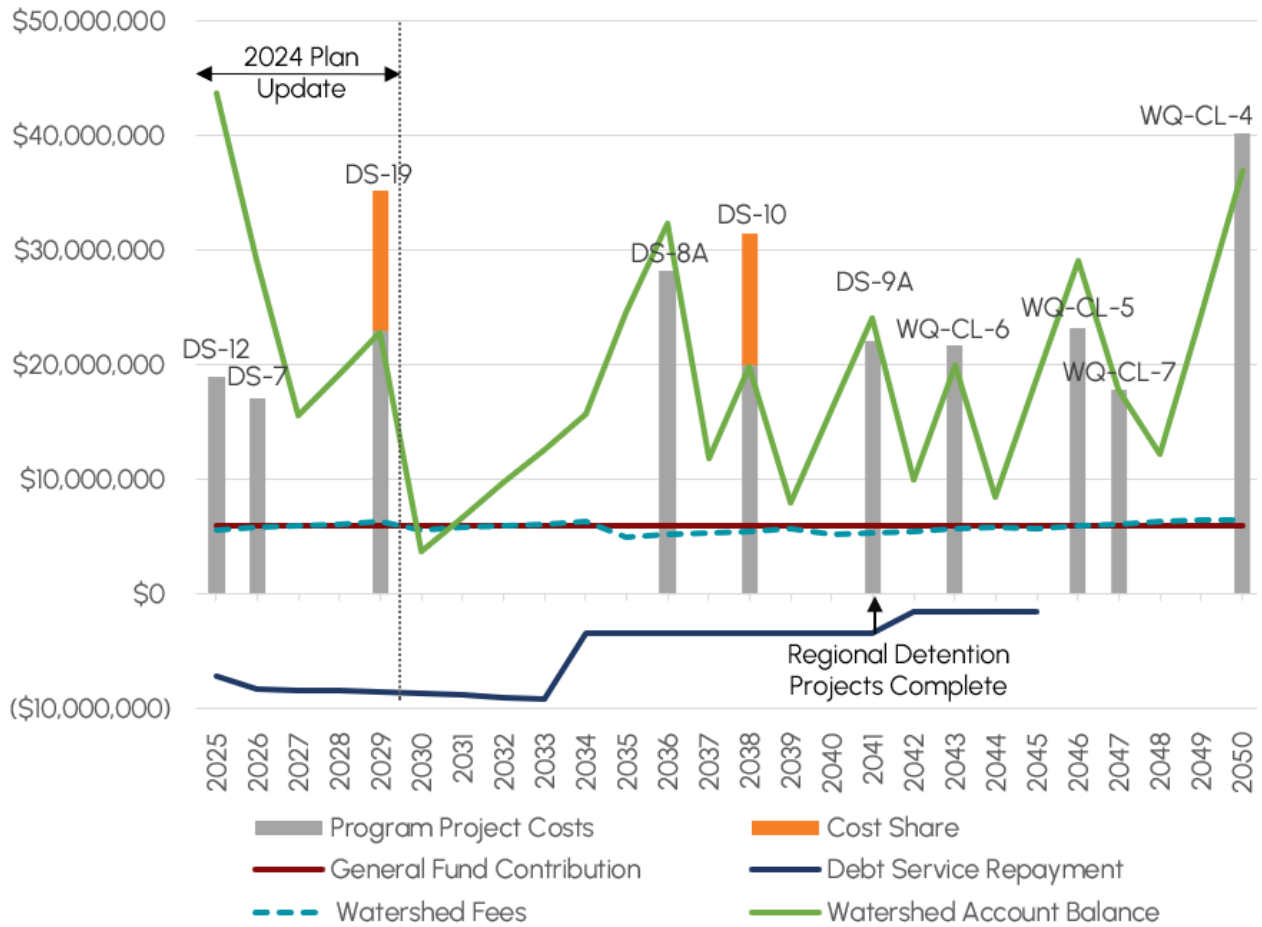
Figure A.6. Scenario 2.1: P-A-Y-G with \$20M Bond (3.0% interest over 20-yr)



Scenario 2.1 Key Model Outputs:

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2040.
3. Regional detention project cost of \$127.9 million, plus \$6.9 million in additional dept service for a total regional detention cost of \$134.8 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).

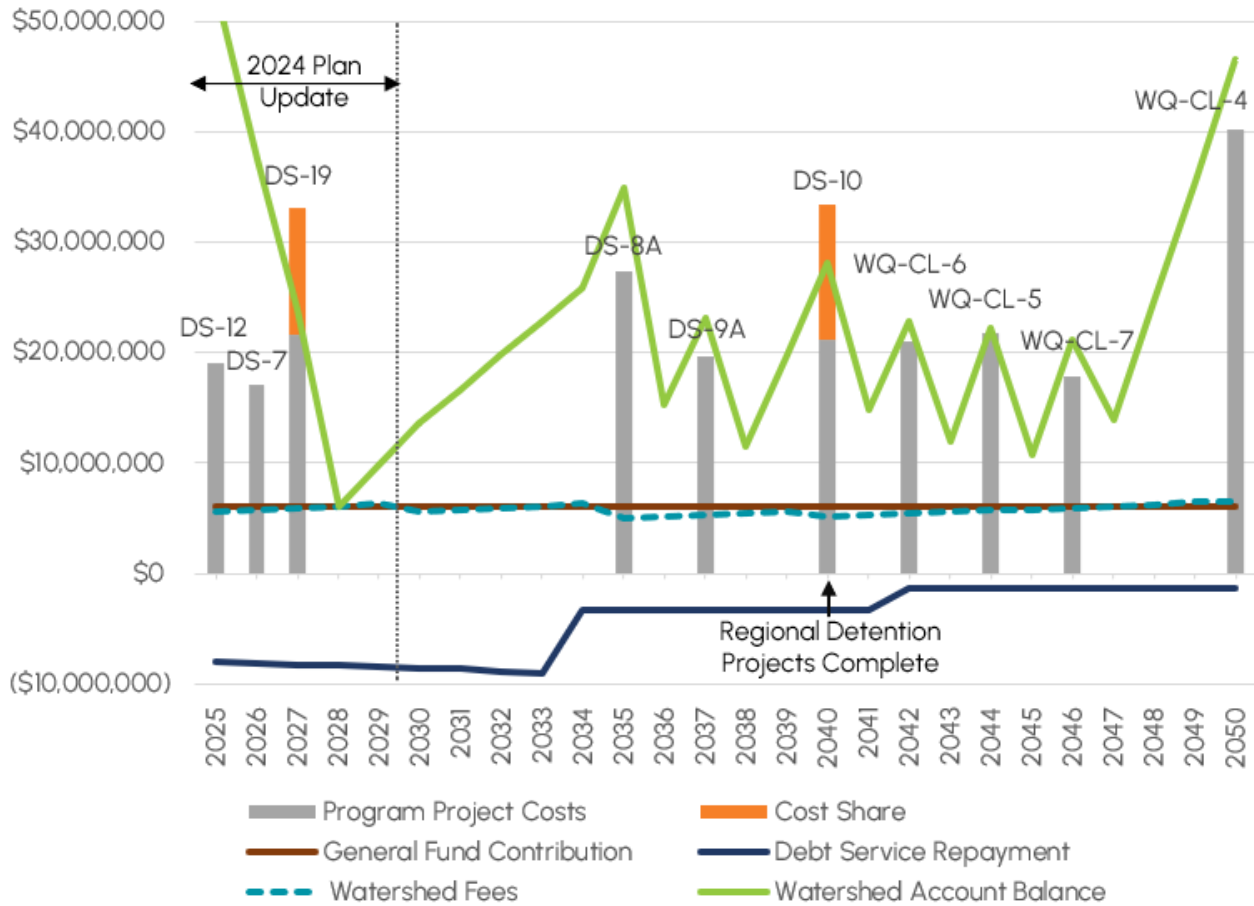
Figure A.7. Scenario 2.2: P-A-Y-G with \$20M Bond (4.5% interest over 20-yr)



Scenario 2.2 Key Model Outputs:

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2041.
3. Regional detention project cost of \$129.3million, plus \$10.3 million in additional dept service for a total regional detention cost of \$139.6 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).

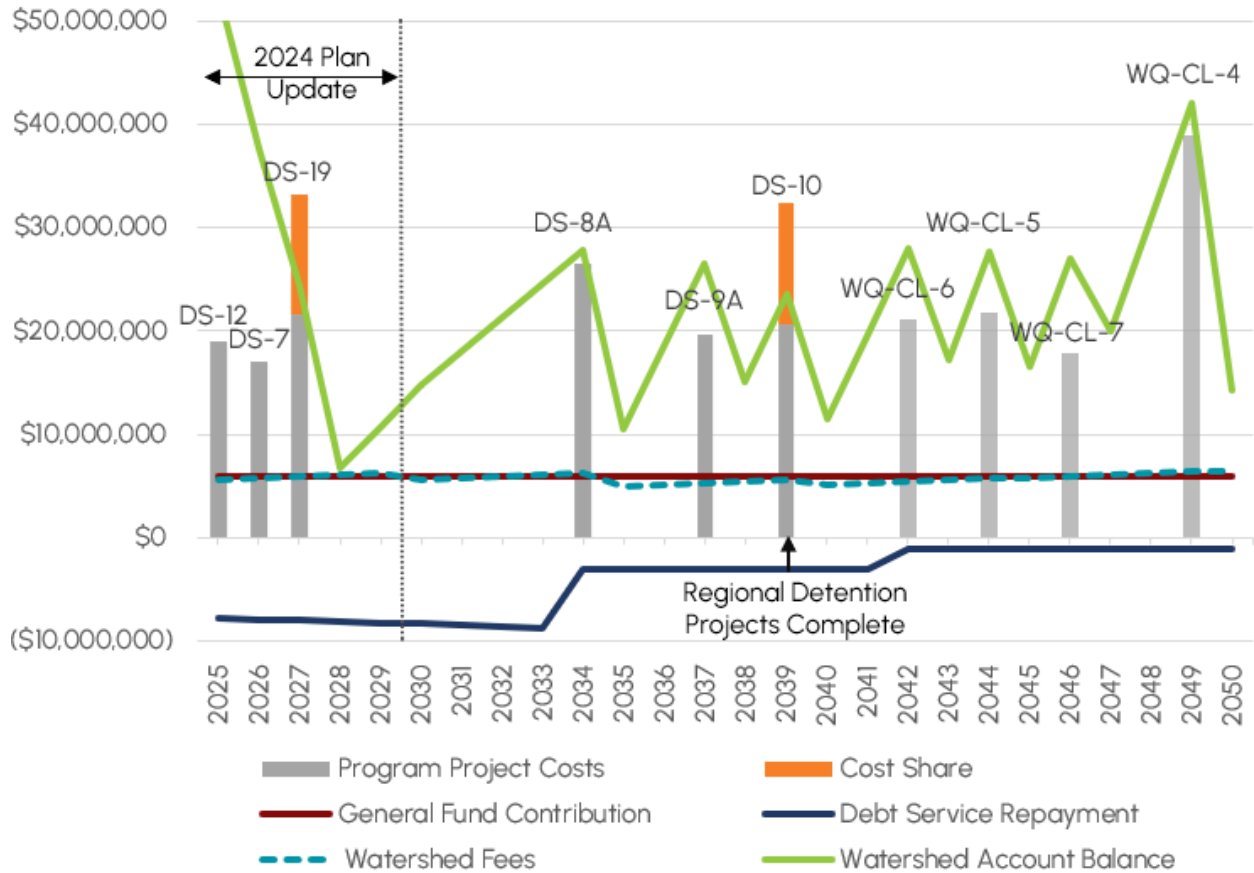
Figure A.8. Scenario 3.1: P-A-Y-G with \$30M WIFIA Loan (3.1% interest over 35-ysr)



Scenario 3.1 Key Model Outputs:

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2040.
3. Regional detention project cost of \$126.0 million, plus \$19.2 million in additional dept service for a total regional detention cost of \$145.2 million.
4. Three (3) water quality basins can be constructed within the planning horizon (2050).

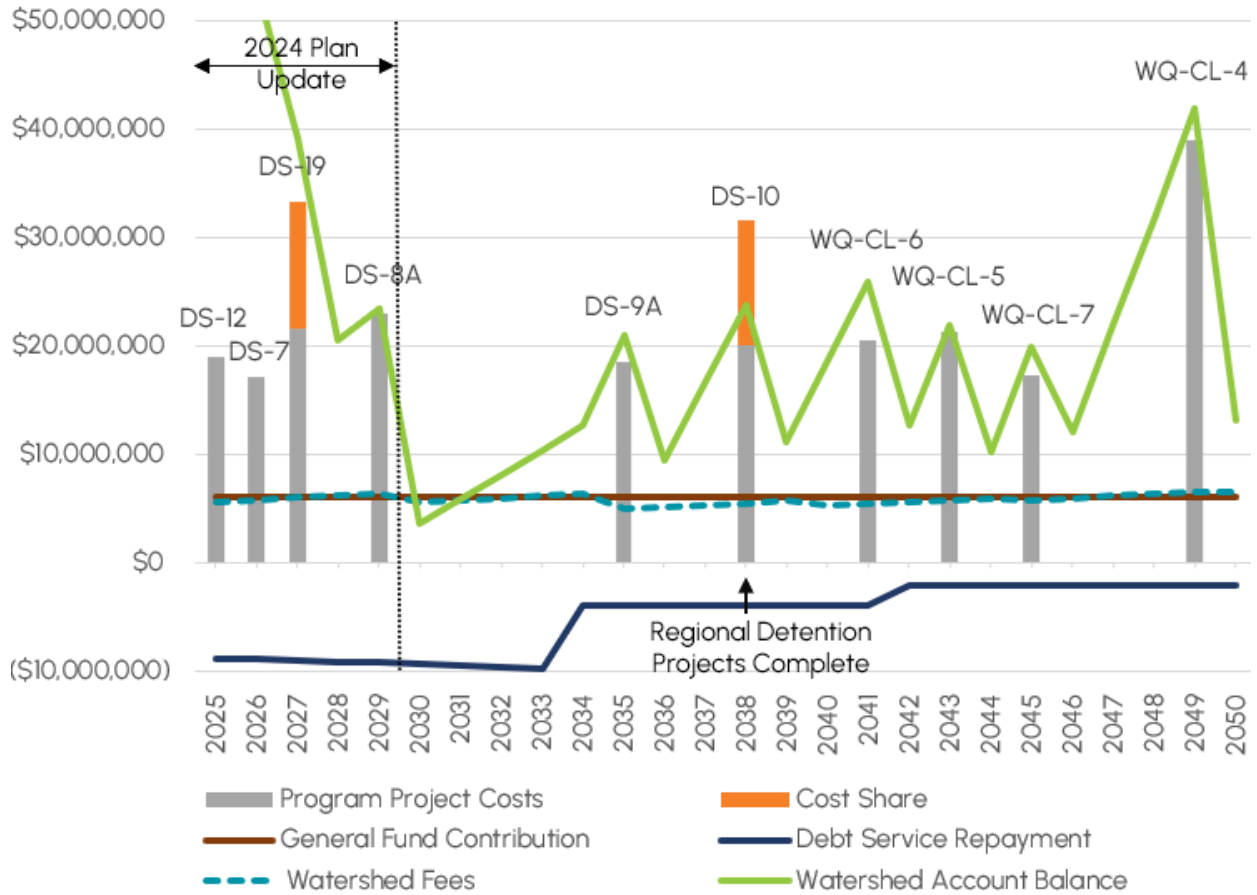
Figure A.9. Scenario 3.2: P-A-Y-G with \$30M WIFIA Loan (2.0% interest over 35-yr)



Scenario 3.2 Key Model Outputs:

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2039.
3. Regional detention project cost of \$124.6 million, plus \$11.7 million in additional dept service for a total regional detention cost of \$136.3 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).

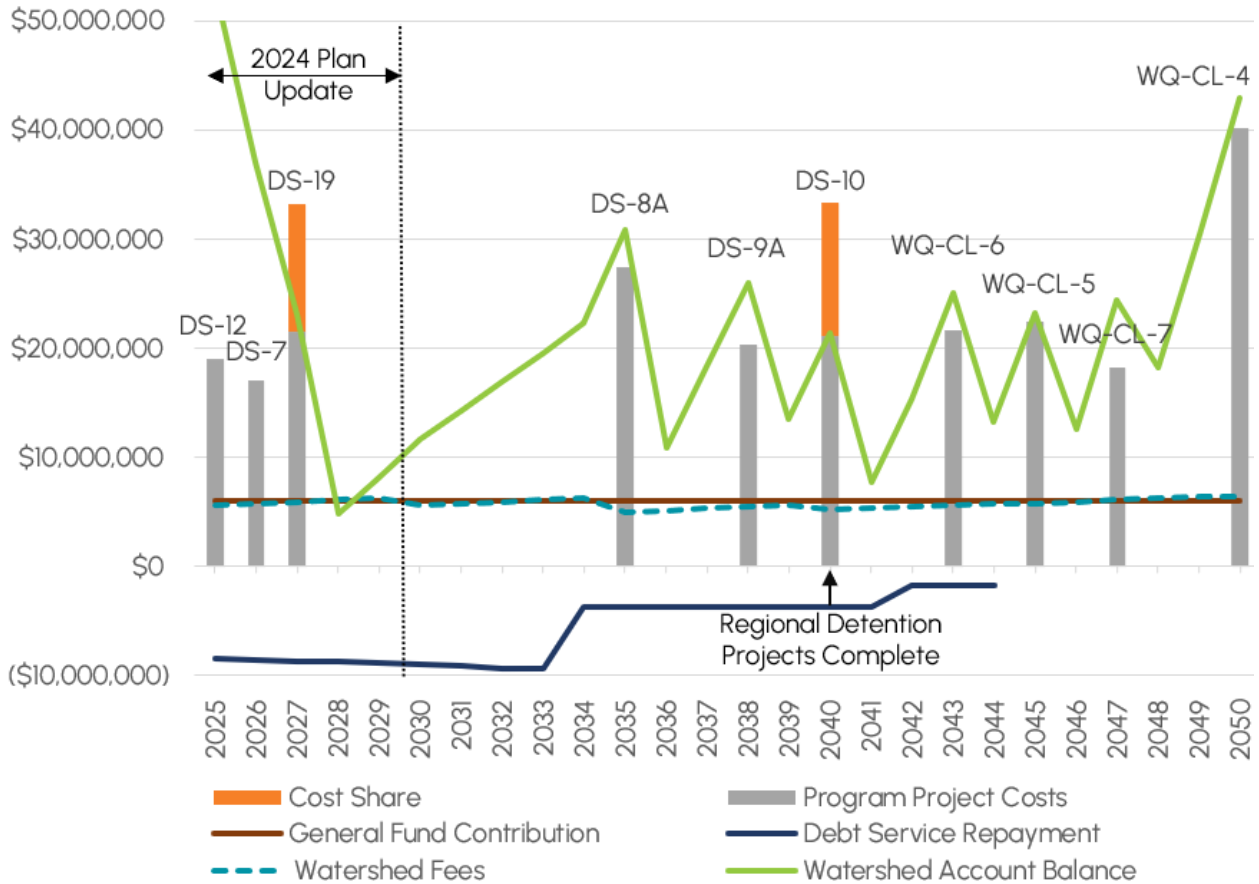
Figure A.10. Scenario 3.3: P-A-Y-G with \$46M WIFIA Loan (3.1% interest over 35-ys)



Scenario 3.3 Key Model Outputs:

1. Four (4) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2038.
3. Regional detention project cost of \$119.1 million, plus \$30.1 million in additional dept service for a total regional detention cost of \$149.2 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).

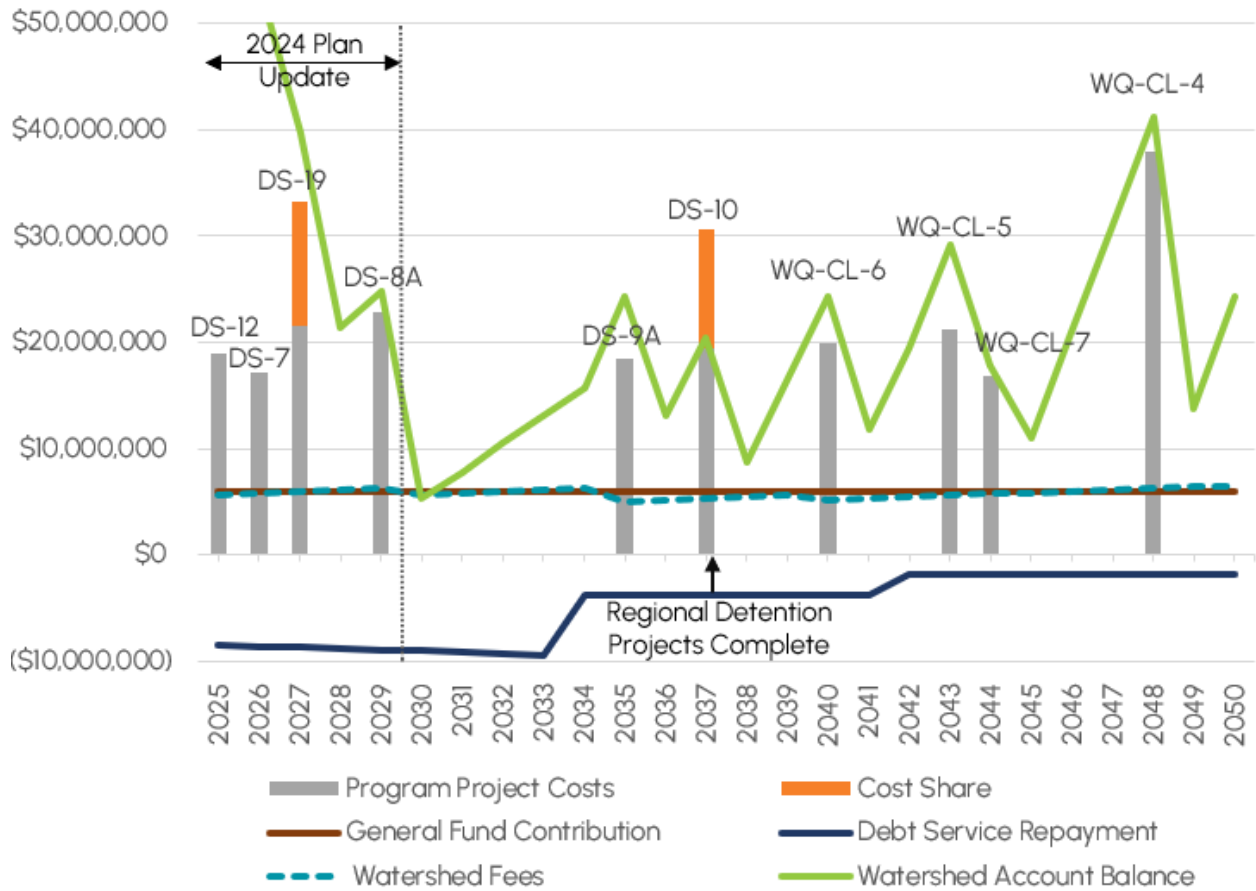
Figure A.II. Scenario 3.4: P-A-Y-G with \$30M WIFIA Loan (2.0% interest over 20-yr)



Scenario 3.4 Key Model Outputs:

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2040.
3. Regional detention project cost of \$126.6 million, plus \$6.5 million in additional dept service for a total regional detention cost of \$133.1 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).

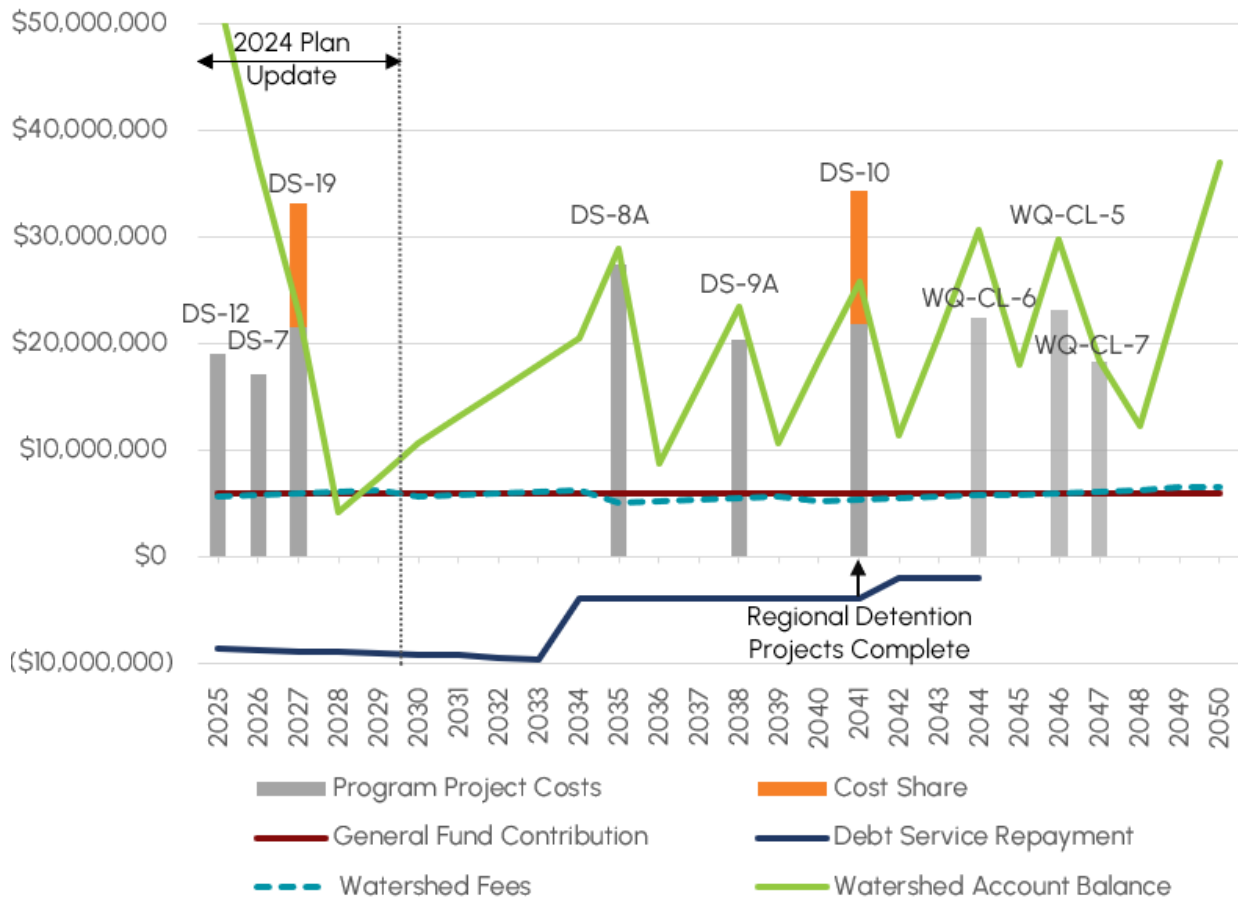
Figure A.12. Scenario 3.5: P-A-Y-G with \$46M WIFIA Loan (2.0% interest over 20-yr)



Scenario 3.5 Key Model Outputs:

1. Four (4) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2037.
3. Regional detention project cost of \$118.5 million, plus \$18.4 million in additional dept service for a total regional detention cost of \$136.9 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).

Figure A.13. Scenario 3.6: P-A-Y-G with \$30M WIFIA Loan (3.1% interest over 20-yr)



Scenario 3.6 Key Model Outputs:

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2041.
3. Regional detention project cost of \$127.2 million, plus \$10.5 million in additional dept service for a total regional detention cost of \$137.7 million.
4. Three (3) water quality basins can be constructed within the planning horizon (2050).

Table A.4. Summary of Modeled Scenarios Results

Scenario			# Program Projects Complete 2025-2029	Year Regional Detention Complete	Regional Detention Costs (\$ in Millions)	Additional Debt Service (\$ in Millions)	Total Regional Detention Cost (\$ in Millions)	# Water Quality Basins*
Method	Interest Rate	Repayment Schedule						
1 - PAYG	---	---	2	2043	\$146.8	\$0.0	\$146.8	3
2.1 - PAYG + \$20M Bond	3.0%	20 Yrs	3	2040	\$127.9	\$6.9	\$134.8	4
2.2 - PAYG + \$20M Bond	4.5%	20 Yrs	3	2041	\$129.3	\$10.3	\$139.6	4
3.1 - PAYG + \$30M Loan	3.1%	35 Yrs	3	2040	\$126.0	\$19.2	\$145.2	4
3.2 - PAYG + \$30M Loan	2.0%	35 Yrs	3	2039	\$124.6	\$11.7	\$136.3	4
3.3 - PAYG + \$46M Loan	3.1%	35 Yrs	4	2038	\$119.1	\$30.1	\$149.2	4
3.4 - PAYG + \$30M Loan	2.0%	20 Yrs	3	2040	\$126.6	\$6.5	\$133.1	4
3.5 - PAYG + \$46M Loan	2.0%	35 Yrs	4	2037	\$118.5	\$18.4	\$136.9	4
3.6 - PAYG + \$30M Loan	3.1%	20 Yrs	3	2041	\$127.2	\$10.5	\$137.7	3

*Implemented by 2050

Appendix B

Exhibit B PAPILLION CREEK WATERSHED STORMWATER MANAGEMENT POLICIES

POLICY GROUP #1: WATER QUALITY IMPROVEMENT

ISSUE: Waters of the Papillion Creek Watershed are impaired.

“ROOT” POLICY: Improve water quality from all contributing sources, including but not limited to, agricultural activities, urban stormwater, and combined sewer overflows, such that waters of the Papillion Creek Watershed and other local watersheds can meet applicable water quality standards and community-based goals, where feasible.

SUB-POLICIES:

- 1) Water Quality LID shall be required on all new developments and significant redevelopments.
- 2) Protect surface and groundwater resources from soil erosion (sheet and rill, wind erosion, gully and stream bank erosion), sedimentation, nutrient and chemical contamination. Buffer strips and riparian corridors should be established along all stream segments.
- 3) Preserve and protect wetland areas to the fullest extent possible to maintain natural hydrology and improve water quality by minimizing the downstream transport of sediment, nutrients, bacteria, etc. borne by surface water runoff. Re-establishment of previously existing wetlands and the creation of new wetlands should be promoted. Any impacted wetlands shall be mitigated at a 3:1 ratio.
- 4) Implement MS4 Stormwater Management Plan.
- 5) Implement Best Management Practices (BMPs), as identified in the Papio-Missouri River Basin Water Quality Management Plan (WQMP), to reduce both urban and rural pollution sources, maintain or restore designated beneficial uses of streams and surface water impoundments, minimize soil loss, and provide sustainable production levels. Water quality basins shall be located in general conformance with an adopted Papillion Creek Watershed Management Plan.

REFERENCE INFORMATION

DEFINITIONS:

- 1) Low-Impact Development (LID). A land development and management approach whereby stormwater runoff is managed using design techniques that promote infiltration, filtration, storage, evaporation, and temporary detention close to its source. Management of such stormwater runoff sources may include open space, rooftops, streetscapes, parking lots, sidewalks, medians, etc.
- 2) Water Quality LID. A level of LID using strategies designed to provide for water quality control of the first ½ inch of stormwater runoff generated from each new development or significant redevelopment and to maintain the peak discharge rates during the 2-year storm event to baseline land use conditions, measured at every drainage (stormwater discharge) outlet from the new development or significant redevelopment.
- 3) Best Management Practice (BMP). “A technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of

Exhibit B

PAPILLION CREEK WATERSHED STORMWATER MANAGEMENT POLICIES

stormwater runoff in the most cost-effective manner.” [Source: U.S. Environmental Protection Agency (EPA)]

4)

5) Municipal Separate Storm Sewer System (MS4). An MS4 is a conveyance or system of conveyances that is:

- owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.,
 - designed or used to collect or convey stormwater (e.g., storm drains, pipes, ditches),
 - not a combined sewer, and
 - not part of a sewage treatment plant, or publicly owned treatment works (POTW).
- [Source: EPA].

The communities located in the urbanized area of Douglas and Sarpy counties, as defined by EPA, are defined as an MS4.

6)

Stormwater Management Plan (SWMP). EPA’s National Pollutant Discharge System (NPDES) requires small, medium, and large communities to obtain NPDES permits and develop stormwater management programs. The communities located within the Papillion Creek Watershed have developed a Stormwater Management Plan (SWMP) that describes stormwater control practices that will be implemented consistent with permit requirements to minimize the discharge of pollutants from the sewer system. MS4s are required to develop, implement, and enforce a stormwater management program. The SWMP focus is to describe how the MS4 will reduce the discharge of pollutants from its sewer system and addresses these program areas:

- Construction Site Runoff Control
- Illicit Discharge Detection and Elimination
- Pollution Prevention/Good Housekeeping
- Post-Construction Runoff Control
- Public Education and Outreach
- Public Involvement/Participation

7)

Water Quality Management Plan (WQMP). Plan based on EPA’s nine key elements (9 Elements) requirements to achieve improvements in water quality. A WQMP for the Papio-Missouri River Basin, which includes the Papillion Creek Watershed, was approved in June 2018 by EPA which lays out a strategy to systematically address water resource deficiencies in the basin and allows for management of individual watersheds or other targeted areas. The focus of the Plan is to address impaired waterbodies and satisfy the EPA requirements to be eligible for Section 319 funding. Implementation will be guided on a watershed scale by a comprehensive strategy to address water and land use deficiencies that contribute to the degradation of surface water resources, groundwater resources, and aquatic and terrestrial habitat. The ultimate goals is to delist impaired waterbodies from the 303(d) list. [Source: 2018 Papio-Missouri River Basin Water Quality Management Plan].

Exhibit B PAPILLION CREEK WATERSHED STORMWATER MANAGEMENT POLICIES

POLICY GROUP #2: PEAK FLOW MANAGEMENT

ISSUE

Urbanization within the Papillion Creek Watershed has and will continue to increase runoff leading to more flooding problems and diminished water quality.

ROOT POLICY

Maintain or reduce stormwater peak discharge during development and after full build-out land use conditions from that which existed under baseline land use conditions.

SUB-POLICY

- 1) Regional stormwater detention facilities and other structural and non-structural BMPs shall be located in general conformance with an adopted Papillion Creek Watershed Management Plan and shall be coordinated with other related master planning efforts for parks, streets, water, sewer, etc.
- 2) Maximum LID shall be required to reduce peak discharge rates on all new developments and significant redevelopments as identified in the Papillion Creek Watershed Management Plan.
- 3) All significant redevelopment shall maintain peak discharge rates during the 2, 10, and 100-year storm event under baseline land use conditions.

REFERENCE INFORMATION

DEFINITIONS

- 1) Low-Impact Development (LID). A land development and management approach whereby stormwater runoff is managed using design techniques that promote infiltration, filtration, storage, evaporation, and temporary detention close to its source. Management of such stormwater runoff sources may include open space, rooftops, streetscapes, parking lots, sidewalks, medians, etc.
- 2) Water Quality LID. A level of LID using strategies designed to provide for water quality control of the first ½ inch of stormwater runoff generated from each new development or significant redevelopment and to maintain the peak discharge rates during the 2-year storm event to baseline land use condition, measured at every drainage (stormwater discharge) outlet from the new development or significant redevelopment.
- 3) Maximum LID. A level of LID using strategies, including water quality LID and on-site detention, designed not to exceed peak discharge rates of more than 0.2 cfs/acre during the 2-year storm event or 0.5 cfs/acre during the 100-year storm event based on the contributing drainage from each site, measured at every drainage (stormwater discharge) outlet from the new development or significant redevelopment.
- 4) Peak Discharge or Peak Flow. The maximum instantaneous surface water discharge rate resulting from a design storm frequency event for a particular hydrologic and hydraulic analysis, as defined in the Omaha Regional Stormwater Design Manual. The measurement of the peak discharge shall be at the lower-most drainage outlet(s) from a new development or significant redevelopment.

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PAPILLION CREEK WATERSHED
STORMWATER MANAGEMENT POLICIES

- 5) Regional Stormwater Detention Facilities. Those facilities generally serving a drainage catchment area of 500 acres or more in size.
- 6) Baseline Land Use Conditions. That which existed for Year 2001 for Big and Little Papillion Creeks and its tributaries (excluding West Papillion Creek) and for Year 2004 for West Papillion Creek and its tributaries.
- 7) Full Build-Out Land Use Conditions. Fully platted developable land use conditions for the combined portions of the Papillion Creek Watershed that lie in Douglas and Sarpy Counties that are assumed to occur by the Year 2050, plus the projected 2050 land uses within the Watershed in Washington County; or as may be redefined through periodic updates to the respective County comprehensive plans.

Exhibit B

PAPILLION CREEK WATERSHED STORMWATER MANAGEMENT POLICIES

POLICY GROUP #3: STREAM CORRIDOR PRESERVATION

ISSUE: Natural areas are diminishing, and there is a need to be proactive and integrate efforts directed toward providing additional landscape and green space areas with enhanced stormwater management through restoration and conservation of stream corridors, wetlands, and other natural vegetation.

“ROOT” POLICY: Utilize landscape preservation, restoration, and conservation techniques to meet the multi-purpose objectives of enhanced aesthetics, quality of life, recreational and educational opportunities, pollutant reduction, and overall stormwater management.

SUB-POLICIES:

- 1) Incorporate stormwater management strategies as a part of landscape preservation, restoration, and conservation efforts where technically feasible.
- 2) Define natural resources for the purpose of preservation, restoration, mitigation, and/or enhancement.
- 3) For new development or significant redevelopment, provide a stream setback of 3:1 plus 50 feet along all streams as identified in the Papillion Creek Watershed Management Plan and a stream setback of 3:1 plus 20 feet for all other streams based upon a current channel survey (within 12 months of preliminary plat submission).
- 4) All landscape preservation features as required in this policy or other policies, including all stormwater and LID strategies, stream setbacks, existing or mitigated wetlands, etc., identified in new or significant redevelopment shall be placed into an outlot or within public right of way or otherwise approved easement.
- 5) These policies are intended to provide a minimum requirement for new development or significant redevelopment. Site conditions may warrant additional setback distance or other stream stabilization measures.
- 6) The Papillion Creek Watershed Partnership is working to update this policy to limit future damages from stream degradation. Policy updates may be completed prior to the expiration of the 2025-2029 interlocal agreement.

REFERENCE INFORMATION

DEFINITIONS

- 1) Stream. Any depression two feet or more below the surrounding land which serves to give direction to a current of water at least nine months of the year and which has a bed and well-defined banks. *[Adapted from Chapter 31 of Nebraska Statutes. May also be referred to as creek or watercourse.]*
- 2) Stream Setback. See Figure 1 below and related definitions in Policy Group #5. A setback area equal to three (3) times the channel depth plus fifty (50) feet (3:1 plus 50 feet) from the edge of the channel bottom on both sides of the channel shall be required for any above or below ground structure exclusive of bank stabilization structures, poles or sign structures adjacent to any stream defined within the watershed drainage plan. Grading, stockpiling, and other construction activities are not allowed within the setback

Exhibit B PAPILLION CREEK WATERSHED STORMWATER MANAGEMENT POLICIES

area and the setback area must be protected with adequate erosion controls or other Best Management Practices, (BMPs). The outer 30 feet adjacent to the stream setback limits may be credited toward meeting the landscaping buffer and pervious coverage requirements.

- 3) A property can be exempt from the stream setback requirement upon a showing by a licensed professional engineer that adequate bank stabilization structures or slope protection will be installed in the construction of said structure, having an estimated useful life equal to that of the structure, which will provide adequate erosion control conditions coupled with adequate lateral support so that no portion of said structure adjacent to the stream will be endangered by erosion or lack of lateral support. In the event that the structure is adjacent to any stream which has been channelized or otherwise improved by any agency of government, then such certificate providing an exception to the stream setback requirement may take the form of a certification as to the adequacy and protection of the improvements installed by such governmental agency. If such exemption is granted, applicable rights-of-way must be provided and a minimum 20-foot corridor adjacent thereto.

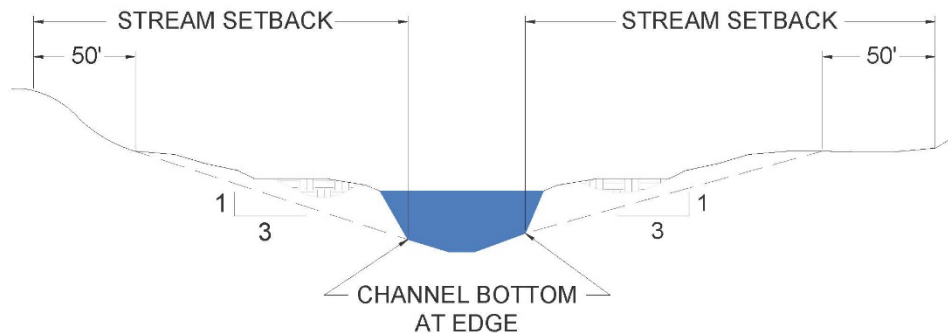


Figure 1 –Stream Setback Schematic

Exhibit B
PAPILLION CREEK WATERSHED
STORMWATER MANAGEMENT POLICIES

**POLICY GROUP #4: EROSION AND SEDIMENT CONTROL
AND OTHER BMPs**

ISSUE: Sound erosion and sediment control design and enforcement practices are needed in order to protect valuable land resources, stream and other drainage corridors, and surface water impoundments and for the parallel purpose of meeting applicable Nebraska Department of Environmental Quality regulatory requirements for construction activities that disturb greater than one acre.

“ROOT” POLICY: Promote uniform erosion and sediment control measures by implementing consistent rules for regulatory compliance pursuant to State and Federal requirements, including the adoption of the Omaha Regional Stormwater Design Manual.

SUB-POLICIES:

- 1) Construction site stormwater management controls shall include both erosion and sediment control measures.
- 2) The design and implementation of post-construction, permanent erosion and sediment controls shall be considered in conjunction with meeting the intent of other Stormwater Management Policies.
- 3) Sediment storage shall be incorporated with all regional detention facilities where technically feasible.

REFERENCE INFORMATION

DEFINITIONS

- 1) Erosion Control. Land and stormwater management practices that minimize soil loss caused by surface water movement.
- 2) Sediment Control. Land and stormwater management practices that minimize the transport and deposition of sediment onto adjacent properties and into receiving streams and surface water impoundments.

Exhibit B

PAPILLION CREEK WATERSHED STORMWATER MANAGEMENT POLICIES

POLICY GROUP #5: FLOODPLAIN MANAGEMENT

ISSUE: Continued and anticipated development within the Papillion Creek Watershed mandates that holistic floodplain management be implemented and maintained in order to protect its citizens, property, and natural resources.

“ROOT” POLICY: Participate in the FEMA National Flood Insurance Program, update FEMA floodplain mapping throughout the Papillion Creek Watershed, and enforce floodplain regulations to full build-out, base flood elevations.

SUB-POLICIES:

- 1) Floodplain management coordination among all jurisdictions within the Papillion Creek Watershed and the Papio-Missouri River Natural Resources District (P-MRNRD) is required.
- 2) Flood Insurance Studies and Flood Insurance Rate Maps throughout the Papillion Creek Watershed shall be updated as new data and methodologies become available. Any further updates will use current and full-build out conditions hydrology.
- 3) Encroachments for new developments or significant redevelopments within floodway fringes shall not cause any increase greater than one (1.00) foot in the height of the full build-out base flood elevation using best available data.
- 4) Filling of the floodway fringe associated with new development within the Papillion Creek System shall be limited to 25% of the floodway fringe in the floodplain development application project area, unless approved mitigation measures are implemented. The remaining 75% of floodway fringe within the project area shall be designated as a floodway overlay zone. For redevelopment, these provisions may be modified or waived in whole or in part by the local jurisdiction.
- 5) The low chord elevation for bridges crossing all watercourses within FEMA designated floodplains shall be a minimum of one (1) foot above the base flood elevation for full-build out conditions hydrology using best available data.
- 6)

REFERENCE INFORMATION

DEFINITIONS (See Figure 1 below and related definitions in Policy Group #3: Landscape Preservation, Restoration, and Conservation).

- 1) Base Flood. The flood having a one percent chance of being equaled or exceeded in magnitude in any given year (commonly called a 100-year flood). *[Adapted from Chapter 31 of Nebraska Statutes]*
- 2) Floodway. The channel of a watercourse and the adjacent land areas that are necessary to be reserved in order to discharge the base flood without cumulatively

Exhibit B

PAPILLION CREEK WATERSHED STORMWATER MANAGEMENT POLICIES

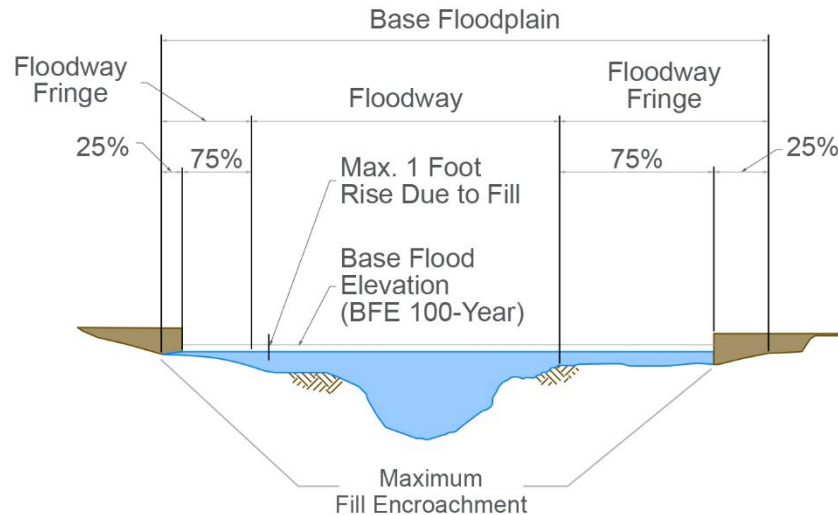


Figure 1 – Floodway Fringe Encroachment Schematic

increasing the water surface elevation more than one foot. *[Adapted from Chapter 31 of Nebraska Statutes]*. The Federal Emergency Management Agency (FEMA) provides further clarification that a floodway is the central portion of a riverine floodplain needed to carry the deeper, faster moving water.

- 3) Floodway Fringe. That portion of the floodplain of the base flood, which is outside of the floodway. *[Adapted from Chapter 31 of Nebraska Statutes]*
- 4) Floodplain. The area adjoining a watercourse, which has been or may be covered by flood waters. *[Adapted from Chapter 31 of Nebraska Statutes]*
- 5) Watercourse. Any depression two feet or more below the surrounding land which serves to give direction to a current of water at least nine months of the year and which has a bed and well-defined banks. *[Adapted from Chapter 31 of Nebraska Statutes]*
- 6) Low Chord Elevation. The bottom-most face elevation of horizontal support girders or similar superstructure that supports a bridge deck.
- 7) Flood Insurance Studies and Flood Insurance Rate Maps. FEMA and the P-MRNRD as a Cooperating Technical Partner update Flood Insurance Studies and Flood Insurance Rate Maps as new data, methodologies, or funding is available. FEMA and P-MRNRD work together to determine if updates are necessary. As part of any new study, FEMA will produce both the Flood Insurance Study and Flood Insurance Rate Maps, as well as Flood Risk Products. These products may include a Flood Risk Map, a Flood Risk Report, and a Flood Risk Database, Changes Since Last FIRM, Areas of Mitigation Interest, Flood Depth and Analysis Grids, and Flood Risk Assessment Data. In addition to these standard datasets, the Flood Risk Database may contain custom datasets based on available information.
- 8) New Development. New development shall be defined as that which is undertaken to any undeveloped parcel that existed at the time of implementation of this policy.

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PAPILLION CREEK WATERSHED STORMWATER MANAGEMENT POLICIES

POLICY GROUP #6: STORMWATER MANAGEMENT FINANCING

ISSUE: Regulatory requirements for stormwater management and implementation of Stormwater Management Policies intended to accommodate new development and significant redevelopment will impose large financial demands for capital and operation and maintenance beyond existing funding resources.

“ROOT” POLICY: Dedicated, sustainable funding mechanisms shall be developed and implemented to meet capital and operation and maintenance obligations needed to implement NPDES Stormwater Management Plans, Stormwater Management Policies, and the Papillion Creek Watershed Management Plan.

SUB-POLICIES:

- 1) All new development and significant redevelopment will be required to fund the planning, implementation, and operation and maintenance of water quality LID.
- 2) A Watershed Management Fee system shall be established to equitably distribute the capital cost of implementing the Papillion Creek Watershed Management Plan among new development or significant redevelopment. Such Watershed Management Fee shall only apply to new development or significant redevelopment within the Papillion Creek Watershed and the initial framework shall consist of the following provisions:
 - a. Collection of fees and public funding shall be earmarked specifically for the construction of projects called for in the Papillion Creek Watershed Management Plan, including Maximum LID costs such as on site detention, regional detention basins, and water quality basins.
 - b. Multiple fee classifications shall be established which fairly and equitably distribute the cost of these projects among all undeveloped areas within the Papillion Creek Watershed.
 - c. Watershed Management Fees (private) are intended to account for approximately one-third (1/3) of required capital funds and shall be paid to the applicable local zoning jurisdiction with building permit applications.
 - d. Watershed Management Fee revenues shall be transferred from the applicable local zoning jurisdiction to a special P-MRNRD construction account via inter-local agreements.
 - e. The P-MRNRD (public) costs are intended to account for approximately two-thirds (2/3) of required capital funds, including the cost of obtaining necessary land rights, except as further provided below; and the P-MRNRD shall be responsible for constructing regional detention structures and water quality basins using pooled accumulated funds.
 - f. The P-MRNRD will seek an extension of its general obligation bonding authority from the Nebraska Legislature to provide necessary construction scheduling flexibility.
 - g. Financing for Papillion Creek Watershed Management Plan projects may require public-private partnership agreements between the P-MRNRD and developers/S&IDs on a case-by-case basis.

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PAPILLION CREEK WATERSHED STORMWATER MANAGEMENT POLICIES

- h. On approximately five (5)-year intervals, the Papillion Creek Watershed Management Plan and Watershed Management Fee framework, rates, and construction priority schedule shall be reviewed with respect to availability of needed funds and rate of development within the Papillion Creek Watershed by the parties involved (local zoning jurisdictions, P-MRNRD, and the development community). Subsequent changes thereto shall be formally approved by the respective local zoning jurisdictions and the P-MRNRD.

The Partnership will continue to work towards establishing a Stormwater Utility Fee System to equitably distribute the costs for ongoing operation and maintenance of all stormwater BMPs and infrastructure among all existing property owners within NPDES MS4 permittees.

REFERENCE INFORMATION

DEFINITIONS

- 1) Stormwater Management Policies. Initial stormwater management policies were approved in 2009. The policies were developed by the Technical Workgroup and Policy Workgroup that were commissioned by the Papillion Creek Watershed Partnership (PCWP) subsequent to the “Green, Clean, and Safe” initiatives developed through the “Watershed by Design” public forums conducted in 2004 and 2005 and subsequently revised by the PCWP in 2009, 2014 and 2019. The following policy groups contain “root” policies and sub-policies for stormwater management that have been developed in addition to the Stormwater Management Financing Policy Group herein:
 - Policy Group #1 – Water Quality Improvement
 - Policy Group #2 – Peak Flow Management
 - Policy Group #3 – Stream Corridor Preservation
 - Policy Group #4 – Erosion and Sediment Control and Other BMPs
 - Policy Group #5 – Floodplain Management
- 2) Stormwater Management Plan (SWMP). A SWMP is a required part of the NPDES MS4 Stormwater Permits issued to the Papillion Creek Watershed Partnership (PCWP) members. Development of Stormwater Management Policies is an integral part of the SWMP, and such policies are to be adopted by respective PCWP partners.
- 3) Comprehensive Development Plans. Existing plans developed by local jurisdictions that serve as the basis for zoning and other land use regulations and ordinances. The Stormwater Management Policies are to be incorporated into the respective Comprehensive Development Plans.
- 4) Policy Implementation. The implementation of the policies will be through the development of ordinances and regulations, in years 3 through 5 of the NPDES permit cycle; that is, by the year 2019. Ordinances and regulations are intended to be consistent for, and adopted by, the respective PCWP members. Such ordinances and regulations shall need to be consistent with the Comprehensive Development Plans of the respective PCWP members.

Exhibit B
PAPILLION CREEK WATERSHED
STORMWATER MANAGEMENT POLICIES

- 5) Low-Impact Development (LID). A land development and management approach whereby stormwater runoff is managed using design techniques that promote infiltration, filtration, storage, evaporation, and temporary detention close to its source. Management of such stormwater runoff sources may include open space, rooftops, streetscapes, parking lots, sidewalks, medians, etc.
- 6) Water Quality LID. A level of LID using strategies designed to provide for water quality control of the first ½ inch of stormwater runoff generated from each new development or significant redevelopment and to maintain the peak discharge rates during the 2-year storm event to baseline land use conditions, measured at every drainage (stormwater discharge) outlet from the new development or significant redevelopment.
- 7) Maximum LID. A level of LID using strategies, including water quality LID and on-site detention, designed not to exceed peak discharge rates of more than 0.2 cfs/acre during the 2-year storm event or 0.5 cfs/acre during the 100-year storm event based on the contributing drainage from each site, measured at every drainage (stormwater discharge) outlet from the new development or significant redevelopment.
- 8) Baseline Land Use Conditions. That which existed for Year 2001 for Big and Little Papillion Creeks and its tributaries (excluding West Papillion Creek) and for Year 2004 for West Papillion Creek and its tributaries. That which existed in 2007 for all areas not within the Papillion Creek Watershed.

Appendix C

C.1 Intent

Every five years, the Partnership reviews the progress on the Plan originally adopted in 2009. Progress towards structural elements of the plan is noted and priorities for the next five years are set. See [Attachment 1](#) for planning progress through the 2019 Plan Update. In August 2023, the Partnership began the 2024 Plan Update process that coincides with the adoption of the interlocal agreement for continuation of the Partnership. This update also included additional stakeholder engagement to pursue potential modifications to the stream setback requirement defined in policy group #3 Stream Corridor Preservation and update local administrations and elected officials on the PWCP purpose and actions carried out as part of the Plan.

Background:

Before this 2024 Plan Update effort, observations of streams in the watershed present severe stream erosion and potential risk of damage to public infrastructure and loss of private property. PCWP members have records of hundreds of known bank failure locations. Problems created by these conditions include undermining culverts and bridge abutments, exposing sewer pipes and other utilities, encroaching bank lines into roadways, private lots and fences falling into streams, sheer cliffs susceptible to bank failure in easily accessible areas, and more. The need for local jurisdiction infrastructure repair projects and submissions for the Papio NRD’s Urban Drainageway Program that assists stream stabilization projects on private lands indicate there are ongoing problems with stream stability. Several studies investigating stream stability concerns in the watershed have also been performed. FEMA and USACE both pursued investigations due to local concerns and the growing number problems caused by stream erosion. The studies include:

- USACE Section 22 Stream Degradation Study: this study provides the PCWP with the opportunity to work closely with the USACE on a technical assessment of degradation issues, trends, and the development of a comprehensive strategy allowing for the prioritization of construction projects that will benefit communities within the watershed.
- FEMA Erosion Mapping: FEMA performed a GIS overlay exercise to map the stream bank erosion potential along major stream segments within the watershed. Factors considered included slope, velocity, soil K-factor, and impervious land cover near the stream buffer.
- Lateral Migration Analysis: PCWP contracted FHU to conduct a lateral migration assessment of streams in the watershed. It was determined that there was an average stream widening of 5-10 feet over a 12-year period in undeveloped watersheds.

FHU was also tasked to investigate stream setback policy alternatives that would reduce the risk of future damage and loss. This effort assessed the pros and cons of various setback policy options considering factors such as ease of implementation, grade control, addressing future degradation, and the impact of buffer width on available developable land. Several policy options were developed and are summarized in [Attachment 2](#) to this appendix. The recommended updated policy that was selected to present to the development community included:

1. **Require 3:1 plus 50 feet setback on all streams (not only main segments as currently identified in the Plan)**
2. **Account future degradation when calculating the setback area or stabilize the streambed with grade controls to reduce degradation (and therefore setback width).**

These policy changes presented to the development community in 2021 and were not well received. Through the stakeholder engagement efforts included with in this 2024 Plan Update, the PCWP sought to identify opportunities for compromise through facilitated conversations with various stakeholder groups. Listening sessions were conducted throughout August and September of 2023 and are summarized in section C.2. After pursuing additional modifications

and discussing compromises as described below, still no updates to the stream setback requirements were agreed upon amongst the development community and members of the PCWP. The PCWP maintains interest in addressing stream stability problems occurring in the watershed and has agreed to continue efforts to investigate policy modifications during the next 5 (five) year implementation period.

C.2 Stakeholder Engagement

Purpose: Establish communication with a variety of stakeholder groups (listed 1-5 below) directly impacted by the existing stream setback policy and learn more about opportunities for or challenges against change. Additionally, the overall engagement effort attempted to reacquaint elected officials and key stakeholders with the PCWP provide a reminder about their essential work for the watershed and its partners.

Format: Virtual Listening Sessions or In-Person Meetings led by third party (RDG Planning & Design) on behalf of the Papillion Creek Watershed Partnership

Outreach Summary (see details on following pages):

1. Architecture & Engineering Consultants

- a. Virtual Listening Session
- b. August 18, 2023
- c. 8 Attendees

2. Surrounding City and County Staff

- a. In-Person Listening Sessions
- b. August 24, 25, 2023
- c. 8 Attendees

3. Developers

- a. Virtual Listening Session
- b. September 5, 2023
- c. 1 Attendee

4. Lawyers who represent Developers

- a. Virtual Listening Session
- b. September 5, 2023
- c. 2 Attendees

5. City of Omaha Staff

- a. In-Person Listening Session
- b. August 24, 2023
- c. 13 Attendees

6. Combined Working Group

- a. In-Person Listening Session
- b. November 15, 2023
- c. 13 Attendees

C.2.1 A&E Consultants Summary

A list of local consulting firms that perform land development design was compiled and email communication was sent to invite participants to a virtual listening session. Consultants are responsible incorporating policy requirements into a land development plat and are familiar with the challenges and impacts of various policy requirements.

Virtual Listening Session Date: 8/18/2023

Table C.1. A&E Consultants List and Communication Log

Position	Organization	Email from Lori	2 nd Email	Response/Attended
Consultant	E&A Consulting Group	Aug. 10	Aug. 14	Kyle Vohl, Caleb Beasley, Anna Grimes, and Jeff LaMontagne
Consultant	Lamp Rynearson	Aug. 10	Aug. 14	Terry Atkins and Joe Flaxbeard
Consultant	TD2	Aug. 10	Aug. 14	Doug Kellner
Consultant	Olsson	Aug. 10	Aug. 14	Phillip Niewohner

What We Learned:

- Will have large tracts of land that will never be developed, not practical, drive up the cost of land.
 - People have issues with the 404-permitting process through the Army Corps of Engineers.
- Conversations were had about what could be allowed in setbacks.
- More density is great, but you still have to be able to sell it.
 - Updating zoning codes could be challenging.
- There are concerns about bank stabilization.
 - Additionally, questions about whether construction costs (stormwater infrastructure) could be reimbursed.
- Cannot rely on Homeowners Associations (HOAs) to handle management and maintenance of the setbacks or stormwater infrastructure.
- Participants questioned whether there could be more flexibility with monitoring.
 - Does it have to be one size fits all approach?

C.2.2 Surrounding City and County Staff Summary

Staff from the cities surrounding Omaha (City of Papillion, City of Gretna, City of LaVista, City of Ralston, and City of Bellevue) and Sarpy County were compiled, and email communication was sent to invite participants to a virtual listening session. City and county staff are responsible for incorporating policies into their local jurisdiction ordinances and enforcement of the policies.

Virtual Listening Session Dates: 8/24/2023 and 8/25/2023

Table C.2. Surrounding City and County Staff List and Communication Log

Position	Organization	Email from Lori	2 nd Email	Response/Attended
City Engineer, City Administrator	City of Gretna	Aug. 10	Aug. 16	Greg Perry Paula Dennison
Planning Director, Planning Coordinator & City Engineer	Sarpy County	Aug. 10	Aug. 16	Don Simon Denny Wilson Kelly Jeck
Community Development Director	City of Ralston	Aug. 10	Aug. 16	Megan Engberg
Deputy Community Development Director & City Engineer	City of La Vista	Aug. 10	Aug. 16	Invited but did not attend
Planning Director	City of Papillion	Aug. 10	Aug. 16	Travis Gibbons
Planning Director	City of Bellevue	Aug. 11	Aug. 16	Tammi Palm

What We Learned:

- It all comes down to cost. Land is already so expensive.
- The lack of affordable housing options is concerning, with no simple answer in the member communities.
 - Affordable housing came up a lot, but so did the ‘missing middle’. Communities aren’t getting the density they would like to see from the development community.
 - People are interested in more variety and smaller lot sizes.
 - “We can’t keep doing \$400,000 homes on big lots.”
- Gretna, specifically, has a lot of room to grow.
- Participants do see neighborhoods that are losing back yards (Bellevue).
- HOAs fail to take care of the issues and the City ends up inheriting them.
- Can we get out in front of Developers?
 - They need education to take some stress off City staff.
- Better park planning is another avenue to consider with the potential for some of these setbacks to be part of a community’s park system.
- Can we incentivize more natural channel restoration?
 - Low-impact Development- at some point, we will need to see as shift in the development community to recognize shifting preferences and what young households can afford.
- Conversation was had about what is allowed in the setbacks.
 - For example, natural/soft trails, landscaping, and drainage easements would be allowed.
 - We’d like to try and keep utilities out of there.
- Small cities’ staff are already at capacity as is.
 - “I don’t have someone right there in house that I can got to with a problem.”
 - Maintaining existing infrastructure is already challenging. Damage or future problems

C.2.4 Lawyers Summary

A list of lawyers who represent developers was compiled and email communication was sent to invite participants to a virtual listening session. Lawyers represent the developers’ best interests and will provide input on the policy requirements placed on developers.

Virtual Listening Session Date: 9/5/2023

Table C.4. Lawyers who Represent Developers List and Communication Log

Position	Organization	Email from Lori	2 nd Email	Response/Attended
Lawyer	FJJB Law	Aug. 10	Aug. 28	Invited but did not attend
Lawyer	Adams & Sullivan	Aug. 10	Aug. 28	Pat Sullivan
Lawyer	Pansing, Hogan, Ernst & Bachman LLP	Aug. 10	Aug. 28	Jim Buser
Lawyer	Baird Holm	Aug. 10	Aug. 28	Invited but did not attend

What We Learned:

- Are there other options?
 - Grade control structures in lieu of additional setback?
- Army Corps requirements are awful.
 - Uncertain
 - Time consuming
 - Expensive
 - EPA overreach
- These requirements would make affordable housing so much more challenging.
- PCSMP Review process needs to be streamlined.
- Would like to see cost analysis of the different options/recommendations.
- Could this be more customized?
 - Checklist of modifications/options

C.2.5 City of Omaha Summary

With City of Omaha having a large list of staff, a separate listening session was created to keep groups smaller and conversations more direct. A list of City of Omaha Staff was compiled, and email communication was sent to invite participants to a virtual listening session. City staff are responsible for incorporating policies into their local jurisdiction ordinances and enforcement of the policies.

Virtual Listening Session Date: 8/24/2023

Table C.5. City of Omaha Staff List and Communication Log

Position	Organization	Email from Lori	Response/Attended
Assistant Director for Environmental Services	City of Omaha	Aug. 10	Jim Theiler
Public Works Assistant Director – Environmental Services	City of Omaha	Aug. 10	Derek Miller
City Planner-Zoning Board Administrator	City of Omaha	Aug. 10	Mike Carter
Public Works-Private Plans Engineer	City of Omaha	Aug. 10	Ryan Haas
Planning Department Assistant Director – Urban Planning	City of Omaha	Aug. 10	Eric Englund
Planning Director	City of Omaha	Aug. 10	Dave Fanslau
Parks Director	City of Omaha	Aug. 10	Matthew Kalcevich

What We Learned:

- There are a lot of creeks out there.
- Challenges- creek setbacks on subdivisions, fees on large lots (watershed management)
- What is allowed in the setbacks?
- The SID isn't maintaining things and erosion happens and sanitary sewers can get exposed.
- How are we supposed to provide affordable housing?
- It's not looking good to get this passed through Council.
- Positive things are happening with the permitting process through the Army Corps.
- Is stabilization cheaper than giving up the extra buffer space?
- Are there any available incentives?
- What happens when an HOA owns the out lot?
 - Ultimately, it ends up in a land bank and the City will take it over with annexation.
- Why 50? Isn't 20 working?
- This is going to cost a lot of money.
- Do some more studies.

- Need clear data to show what works and what doesn't.
- More customized options should be considered.
- How can we incorporate this into park agreements?
 - Allocation of park land

C.2.6 Combined Working Group Summary

After the initial listening sessions, a path forward was not yet clear. A working group session was organized to gather individuals from all the previous categories. The intent of the session was to bring folks together from various professions, cities and backgrounds and collectively brainstorm and consider compromises that would help the plan update move forward. See [Attachment 3](#) for the presentation use for discussions.

The compromise policy proposals brought forward for consideration were as follows:

1. 3:1+50 feet setback. No future degradation considered.
2. Allowance for passive recreation features in outer 30 feet of setback area.
3. Grad control incorporated at stream crossings.

In-Person Meeting Date: 11/15/2023

Attendee List:

- Jim Theiler, City of Omaha
- Kyle Vohl, E&A Consulting Group
- Derek Miller, City of Omaha
- Greg Perry, City of Gretna
- Joe Flaxbeard, Lamp Rynearson
- Derek Goff, City of Papillion
- Katie Swanson, City of Omaha
- Amanda Grint, Papio NRD
- Ian Ghanavati, Papio NRD
- Lori Laster, Papio NRD
- Sara Mechtenberg, Houston Engineering
- Mike Sotak, Houston Engineering
- Molly Hanson, RDG Planning & Design

What We Learned:

- People still have a lot of questions.
 - Should apply to undeveloped land, we've never gone beyond that.
- From the development standpoint, we're still losing developable property.
 - Main concern is with increased setback.
 - Land is still very expensive.
 - We're missing the long-term forever maintenance.
 - They have no long-term consequences.
 - I don't think developers are going to go for it any way you slice it.
- Not a lot of confidence that will pass through City Councils.
 - People are going to have to show up and ask for it.

- Metro Omaha Builders Association (MOBA) will have to be neutral.
- How can we educate elected officials about this?
 - How do we talk about the multiple benefits?
- Can NRD map the relevant land that's still in play?
 - *This was later sent to the group.*
- If point One is a given, then points Two and Three help (compromise recommendations).
 - What if we did a reduction of the rear yard setback?
- Costs for watershed fees.
 - Developers don't pay the watershed fees.
- Follow-up with MOBA.

C.2.7 MOBA Feedback

Metro Omaha Builders Association (MOBA) is an organization that advocates for the needs of the residential construction industry and can provide feedback that is representative of the development community. MOBA was contacted after the working group session to present a compromise in the proposed modifications outline in C.1. They were asked to provide feedback for if only modification #1 was carried forward and #2 was removed. The following response was provided via an email from Mark Westergard, Joint Agency Liaison:

"I presented the proposed creek setback policy to my committee, and it prompted a lot of discussion. After the discussion, the Committee decided that they will not support the 3:1 + 50' at all waterways.

As you know MOBA is an organization whose sole purpose is to support the home building and land development industries. The Committee's objections to the proposed policy were directly related to MOBA's purpose. Several of the reasons for opposition include:

1. An additional 60' swath of undevelopable land along all remaining waterways is a very large amount of land. It is highly doubtful that sellers of land will make any adjustment in price due to the proposed policy, making the net price on useable land much more expensive.
2. The proposed policy does not support affordable housing. If the policy were to become effective the cost of land per dwelling unit will go up considerably.
3. The Committee members generally were of the opinion that the vast majority of creek setback issues have occurred in areas that were developed prior to the current policy of 3:1 + 50' on major streams and 3:1 + 20' on other waterways. For non-major creeks, Committee members were of the opinion that the 3:1 + 20' setback was adequate in providing safe creek separations for residential housing."

C.3 Partnership Update

Purpose: Share PowerPoint slides with staff and council/board members of all jurisdictions in the PCWP that describe where we are at the end of the process and allow time for questions/discussions. Slides are included as [Attachment 4](#) to this appendix.

Format: Virtual Listening Sessions at three predetermined times to accommodate the various schedules of those interest in attending.

Virtual Listening Session Dates: 3/25/2024, 3/27/2024, and 3/28/2024.

1. Monday, March 25, 2024, at 12:00 PM via Zoom

Attendees:

- Molly Hanson, RDG
- Lori Laster, Papio NRD
- Amanda Grint, Papio NRD
- Sara Mechtenberg, Houston Engineering
- Steve Scarpello, Omaha Council
- Beth Garber, Sarpy County

Registered but did not Attend:

- Kathy Bauer
- Colm G. Breathnach
- Aimee Bataillon
- John Krager
- Erica Mullen

Notes/Questions/Comments:

- Douglas County and Bennington choosing not to participate-why?
 - Bennington is small so they haven't been required to have a stormwater permit.
 - Douglas County- the county board had some issues with the structural aspects of the project.
- What population figures do you use to figure the rates?
 - 2020 Census + Sarpy County GIS provided.

2. Wednesday, March 27, 2024, at 4:30 PM via Zoom

Attendees:

- Molly Hanson, RDG
- Lori Laster, Papio NRD
- Mike Sotak, Houston Engineering
- David Fanslau, Papillion City Council
- Pete Festersen, City of Omaha City Council
- Ron Sheehan, City of La Vista
- Caleb Van Weelden, LSarpy County Planning Commission
- Greg Perry, City of Gretna
- Kelly Sell, La Vista City Council
- Rich Casey, City of Bellevue
- Ted Japp, Papio NRD Board

Registered but did not Attend:

- Brinker Harding

Notes/Questions/Comments:

- Glad you're seeing it from the lens of climate action.
- Are those anticipated to be new dam sites or repairs?
 - New: work from 2024-2029
 - Working with landowners and developers
- The new flood maps with the federal government
 - Papio NRD is working on those flood maps.
 - Doesn't impact this work.
- What's the schedule for coming in front of City Councils?
 - Where you'll go first/second?
 - Can be done concurrently.
 - In front of Papio Board of Directors in May
 - No changes in policy was the recommendation going forward.
 - After that, up to each community to determine that schedule.
- Do you anticipate any controversy?
 - Not that we're aware of
- I noticed that Washington County was not represented in this group.
 - Have never been a member.
 - Received a request from them to remove their name from all documentation.
 - Have talked in the past a few times (they are aware/on the mailing list).

3. Thursday, March 28, 2024, at 8:30 AM via Zoom

Attendees:

- Sara Mechtenberg, Houston Engineering
- Lori Laster, Papio NRD
- Tammi Palm, City of Bellevue
- Danny Begley, Omaha City Council
- Dean Miller, City of Omaha
- Kayla Hathcote, Deputy Attorney for Sarpy County
- Scott Bovick, Sarpy County Administration
- Marty Giff, Sarpy County Planning Commission
- John Krager, City of Bellevue Public Works
- Kelly Jeck, Sarpy County Planning Department

Registered but did not Attend:

- Justin Horst
- Douglas Kindig
- Don Preister

Notes/Questions/Comments:

- Any update on DS-19

- None other than USACE design starting in 2025. Likely an 18-month process.
- NRD had started land rights purchase as local sponsor.
- Are DS-7 and 12 federally funded?
 - No

C.4 Papio NRD Board Update

The final presentation to summarize the 2024 Plan Update to the Papio NRD board is included as [Attachment 5](#) to this appendix.

Appendix C
Attachment 1



Papillion Creek Watershed Partnership Watershed Master Plan Progress Update

2009

- Initial Plan Adopted

2014

- First Plan Update

2019

- Second Plan Update



NRD Bonding Authority Approved by
Legislature



Standardization of Grading Permit
Submittal and Review Process



Implementation of New Post Construction
Stormwater Management Plans



Implementation of Creek Setback Policy



Proposed Regional Detention Basins – 2009 Watershed Plan
15 Projects
Total Estimated Cost - \$242.2 Million

Structure	Stream	Location	Estimated Cost (millions)
DS7	Big Papio Tributary	168 th & Bennington Rd	\$12.2
DS8A	Big Papio Tributary	144 th & Bennington Rd	\$14.8
DS9A	Big Papio Tributary	132 nd & Bennington Rd	\$9.5
DS10	Thomas Creek	120 th & Bennington Rd	\$21.4
DS12	West Papio	216 th & Fort St	\$20.3
DS15A	North Branch West Papio	168 th & Fort St	\$47.9
DS19	South Papio	192 nd & Giles Rd	\$21.2
BP1	Big Papio Tributary	216 th & Hwy 36	\$10.8
WP1	West Papio Tributary	180 th & Fort St	\$11.7
WP2	South Papio Tributary	180 th & Giles	\$11.2
WP4	South Papio Tributary	204 th & Schram Rd	\$10.2
WP5	South Papio Tributary	126 th & Cornhusker Rd	\$24.6
WP6	West Papio Tributary	114 th & Cornhusker Rd	\$10.4
WP7	West Papio Tributary	108 th & Cornhusker Rd	\$4.8
WP8	South Papio Tributary	180 th & Harrison St	\$11.2



Proposed Water Quality Basins – 2009 Watershed Plan
12 Projects
Total Estimated Cost - \$133.7 Million

Structure	Reservoir	Location	Estimated Cost (millions)
CL1	Cunningham Lake		\$11.9
CL2	Cunningham Lake		\$12.3
CL3	Cunningham Lake		\$11.9
CL4	Cunningham Lake		\$12.7
CL5	Cunningham Lake		\$8.2
CL6	Cunningham Lake		\$8.5
CL7	Cunningham Lake		\$6.3
WP5-1	WP5 (Prairie Queen)		\$11.9
DS15A-1	DS15A (Flanagan)		\$15.8
DS15A-2	DS15A (Flanagan)		\$15.8
ZB1	Zorinsky Lake		\$9.5
ZB2	Zorinsky Lake		\$8.9

Complete

In
Progress

Future

WP5 & WQ Basin

DS15A & WQ Basin

Zorinsky WQ Basin 1

Zorinsky WQ Basin 2

WP6

WP7

WP4

WP2

WP1

DS12

DS19

DS7

DS10

DS9A

DS8A

7 Cunningham WQ Basins

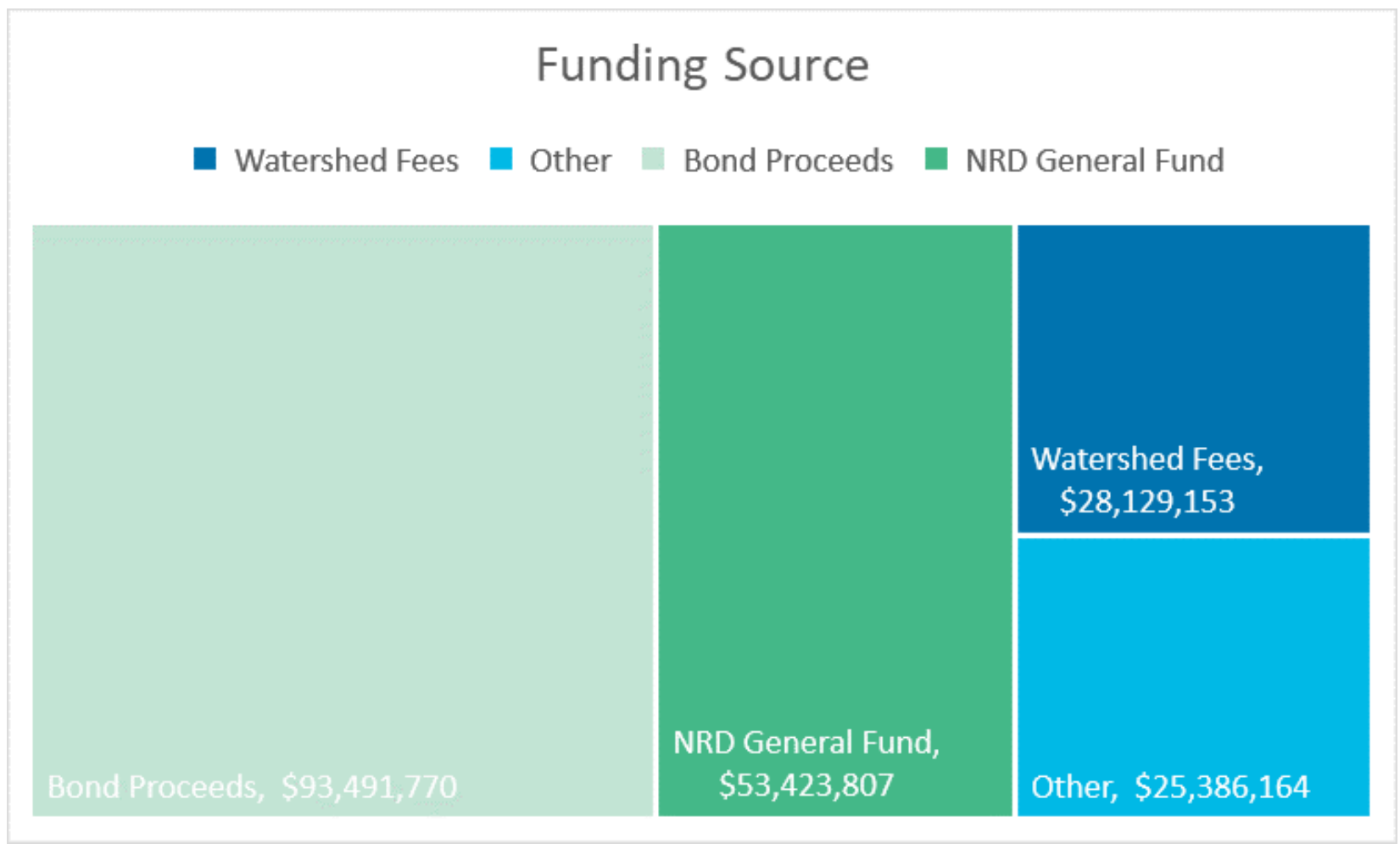


Project Funding

Total to Date

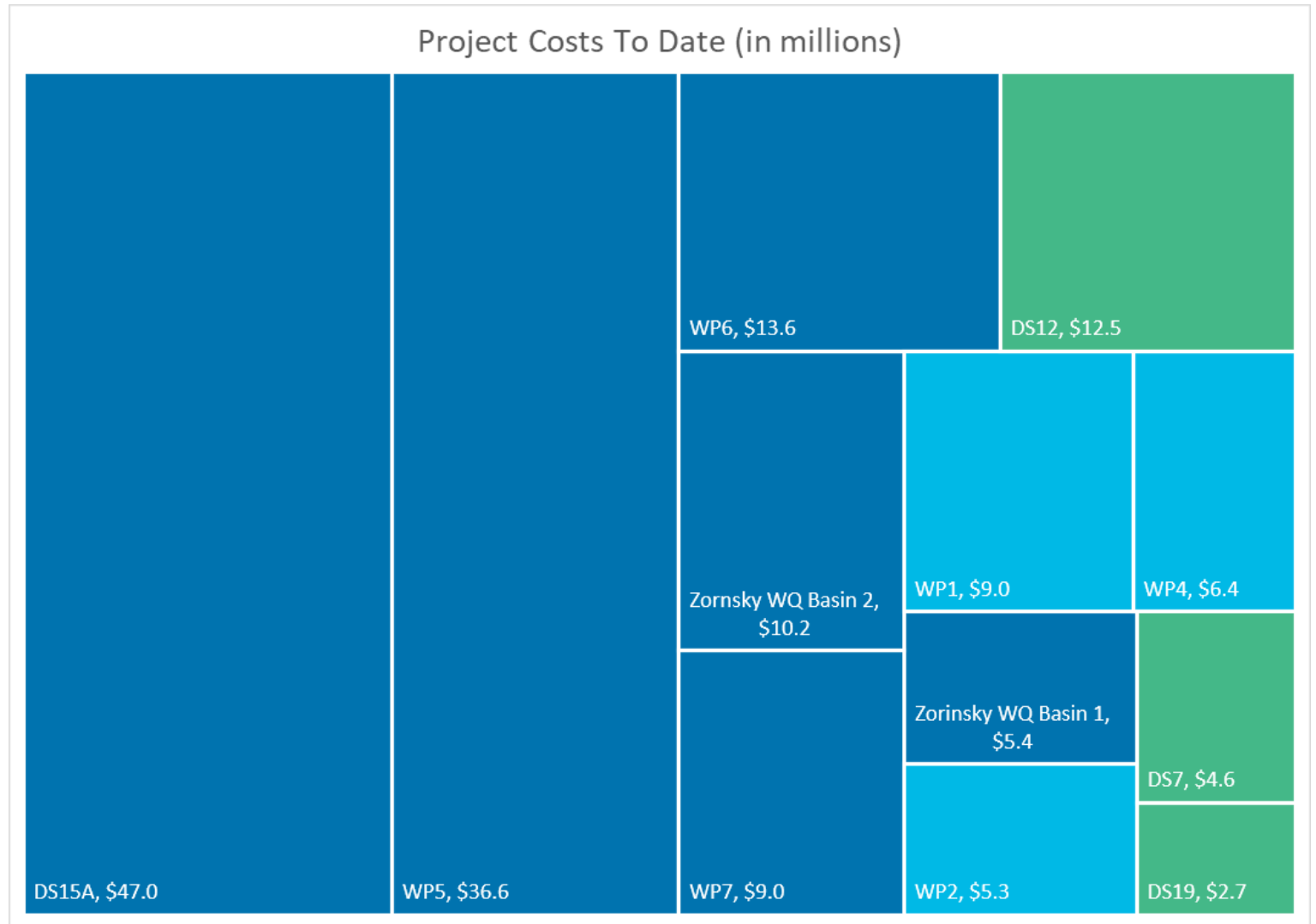
Revenue
\$203.1 million

- Watershed Fees – 14%
- NRD Bonds – 46%
- NRD General Fund – 26%
- Other – 12%





Project Costs To Date (in millions)



Total to Date

Expenditures
\$203.1 million

Completed Projects – \$121.8 M

Projects in Progress - \$20.7 M

Future Projects - \$19.8 M

Bond Payments - \$40.8 M

Remaining Bond Payments

\$98.4 million

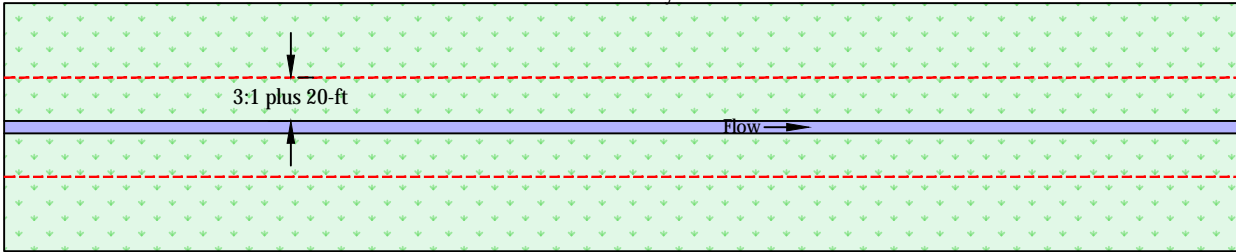
Appendix C
Attachment 2

PCWP Setback Policy Comparison

12/3/2020

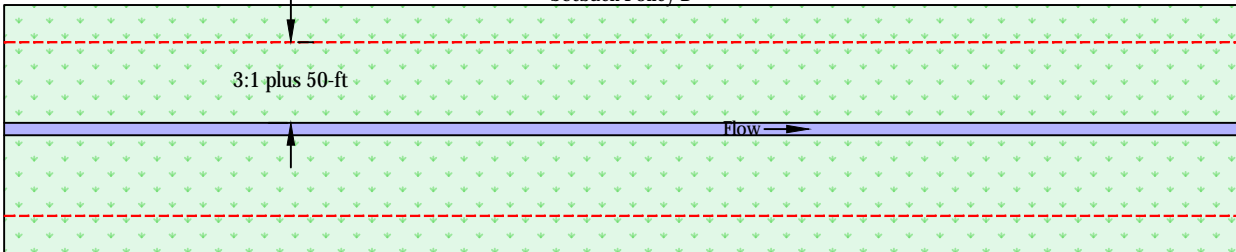
Assuming channel is
10-ft wide, 5-ft deep,
1320-ft long,
@1.5% slope

Setback Policy A



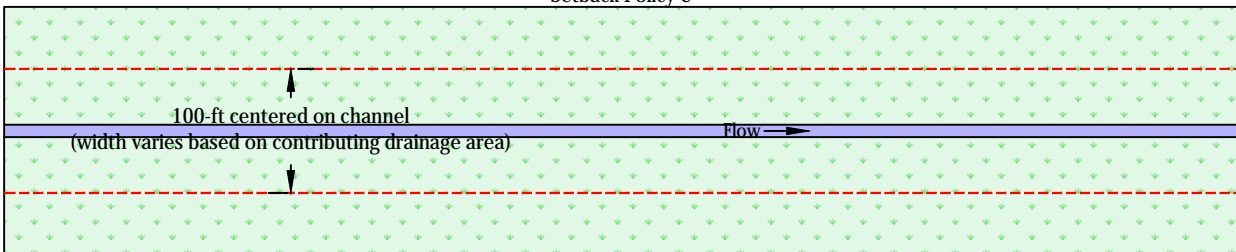
80-ft
Total width

Setback Policy B



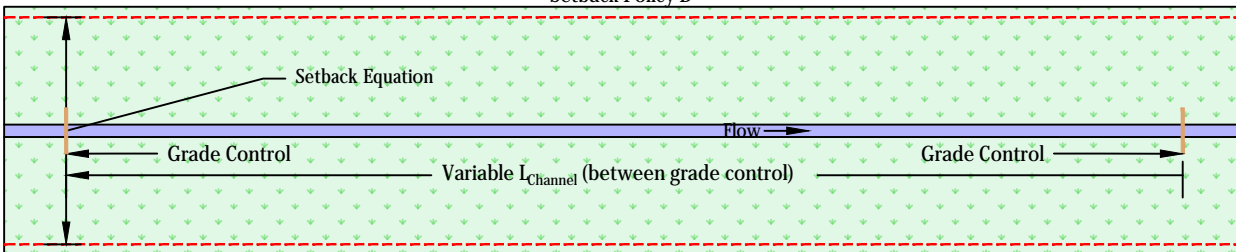
140-ft
Total width
(1.8-ac increase
in setback)

Setback Policy C



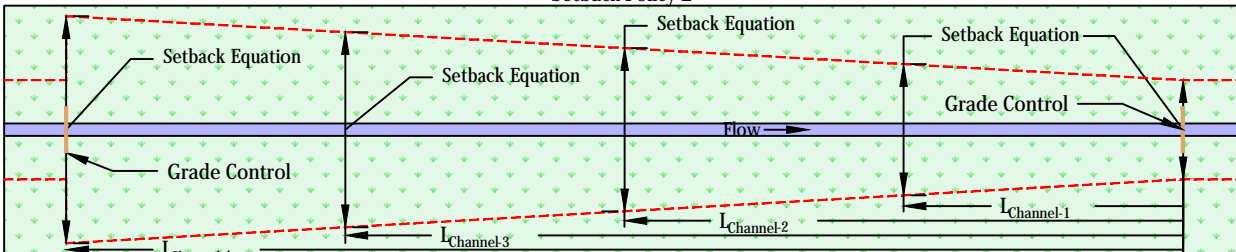
100-ft
Total width
(0.6-ac increase
in setback)

Setback Policy D



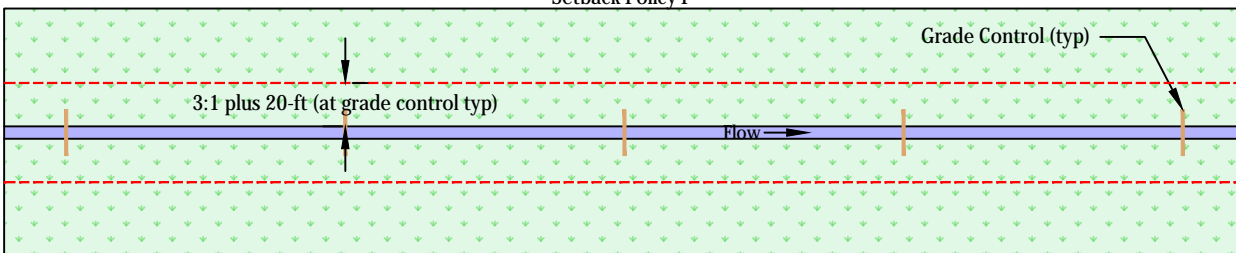
183-ft
Total width
(3.1-ac increase
in setback)

Setback Policy E



80 to 183-ft
Variable width
(1.6-ac increase
in setback)

Setback Policy F



80-ft
Total width
(No increase
in setback)

PCWP Stream Setback Policy Matrix - 12/3/2020

Setback Policy Option		Pros	Cons
	Existing stream setback policy	<ul style="list-style-type: none"> No change to setback policy No increase in setback 	<ul style="list-style-type: none"> Does not address survey timing (old data used) Subjectivity of water surface and watercourse definitions Does not account for grade control Does not adequately address future degradation
A	Existing policy with minor modifications (survey timing, water surface, watercourse definition)	<ul style="list-style-type: none"> Easiest to implement 	<ul style="list-style-type: none"> Does not account for grade control Does not adequately address future degradation
B	Policy A with modifications to buffer width (50-ft buffer all streams)	<ul style="list-style-type: none"> Better fit to address future degradation Easier to implement 	<ul style="list-style-type: none"> Does not account for grade control Does not adequately address future degradation Increased setback compared to existing policy
C	Contributing drainage area defines setback width (i.e. DA<100-ac = 90-ft, 100-ac<DA<200-ac = 100-ft, DA>200ac = equation based setback)	<ul style="list-style-type: none"> Simplified process to determine setback widths Allows for variable setback widths (based on drainage area) Similar to proposed City of Lincoln setback policy 	<ul style="list-style-type: none"> Does not account for grade control Does not adequately address future degradation Increased setback compared to existing policy
D	Grade control at variable intervals with <u>constant</u> setback width determined by equation at upstream end	<ul style="list-style-type: none"> Promotes grade control Adequately addresses future degradation (accounts for varying stream slopes) 	<ul style="list-style-type: none"> Increased setback compared to existing policy Constant buffer width may be overly conservative
E	Grade control at variable intervals with <u>variable</u> setback width determined by equation at 200-ft intervals	<ul style="list-style-type: none"> Promotes grade control Adequately addresses future degradation (accounts for varying stream slopes) Variable buffer width increases developable land 	<ul style="list-style-type: none"> Increased setback compared to existing policy
F	Stream stabilization with geomorphic stream assessment and natural channel design considerations (similar to current exemption)	<ul style="list-style-type: none"> Promotes grade control Variable buffer width increases developable land 	<ul style="list-style-type: none"> Requires additional engineering/regulatory review Additional costs associated with assessment and design/construction

Papillion Creek Watershed Partnership Stream Setback Policy Recommendations
DRAFT - January 7, 2021

SUB-POLICIES

- 1) For new development or significant redevelopment, provide a stream setback on all watercourses the greater of (a) 3:1 plus 50 feet from the future degradation point or (b) top of high bank plus 50 feet as displayed in Figure 1 below. The future degradation depth shall be calculated at 200-ft intervals maximum along the stream with channel length being cumulative from the downstream grade control. Cross sections shall be provided at 200-ft intervals maximum showing existing grades, ordinary high water mark (OHWM), future degradation depth, 3:1 slope projections, and 50-ft setbacks. All measurements of the existing stream shall be determined by current topographic survey.

$$\text{Future Degradation Depth} = L_{\text{Channel}} \times S_{\text{Channel}} - L_{\text{Channel}} * 0.0015$$

Where: L_{Channel} = Channel length – feet (along stream centerline, measured from downstream grade control)

S_{Channel} = Channel slope – foot/foot (average slope of the channel along the channel length as determined by ordinary high water marks)

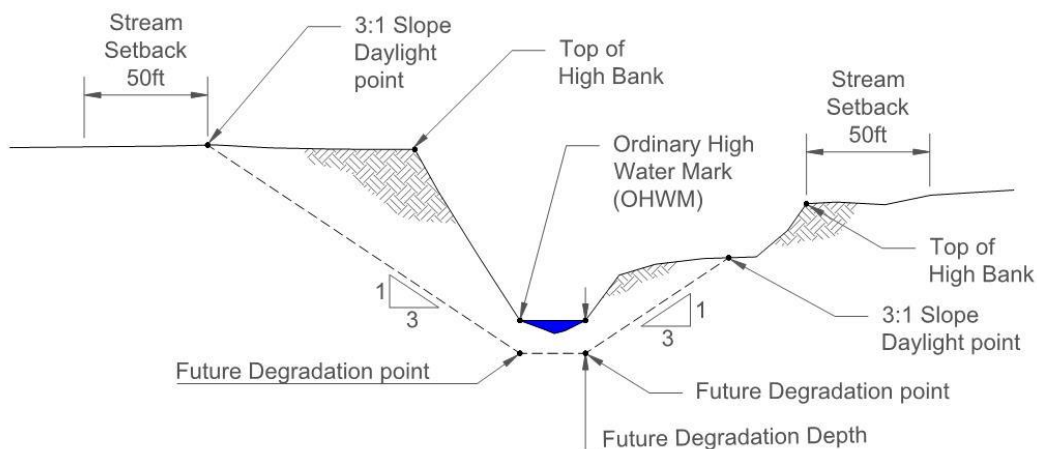


Figure 1 – Creek Setback Schematic

- 2) For streams with a geomorphic stream assessment and stream stabilization design completed by a licensed professional engineer or other natural sciences professional with training and experience in stream stabilization/restoration; or along streams already stabilized or improved by a licensed professional engineer or natural sciences professional with training and experience in stream stabilization/restoration, the stream setback can be modified as shown in Figure 2 below:

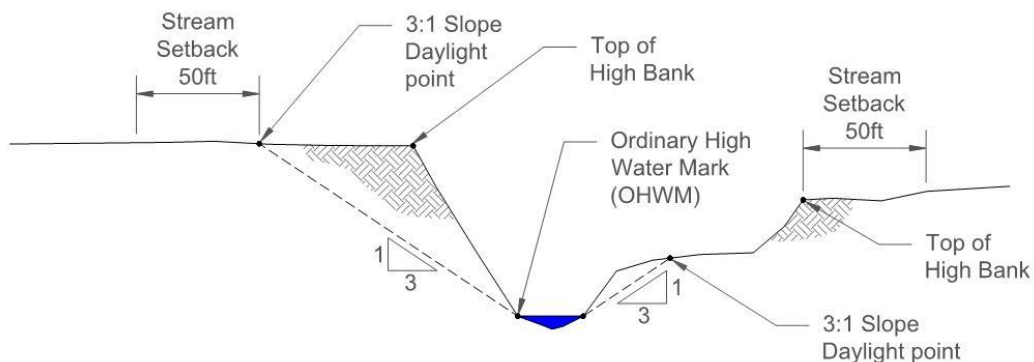


Figure 2 – Creek Setback Schematic with Stream Assessment

The stream stabilization design must demonstrate that future degradation along the entire project stream reach will be addressed and that “natural channel design” and “bioengineering techniques” have been considered as part of that design. In the event that the project stream reach has been channelized or otherwise improved by any agency of government, a certification as to the adequacy and protection of the improvements installed by such governmental agency must be provided. In all cases the stream stabilization design must adhere to all local, state, and federal regulations which may be more stringent.

- 3) Grade control shall be installed at a minimum at the following locations:
 - a. Arterial roadway crossings
 - b. Sanitary sewer crossings and other public utilities less than 10-ft below stream bed (measured from top of pipe to stream bed)

DEFINITIONS

- 1) Stream setback. A stream setback as calculated using the equation(s) above shall be required for any above or below ground structure exclusive of stream/bank stabilization structures, poles or sign structures adjacent to any watercourse. Grading, stockpiling, and other construction activities are not allowed within the setback area and the setback area must be protected with adequate erosion controls or other Best Management Practices (BMPs). The setback area shall be used only for purposes compatible with open space, recreational, or wetland/channel management practices. The outer 30 feet adjacent to the stream setback limits may be credited toward meeting the landscaping buffer and pervious coverage requirements.
- 2) Watercourse. Any depression below the surrounding land which serves to give direction to a current of water from at least 40-acres of contributing drainage area.
- 3) Current Topographic Survey. Topographic survey shall be conducted by a land surveyor licensed in the State of Nebraska and shall be obtained within two years from date of submittal of documentation for approval by the local jurisdiction.
- 4) Ordinary High Water Mark (OHWM). The “ordinary high water mark” observed along the project stream reach as defined by the U.S. Army Corps of Engineers.
- 5) Top of High bank. Location where stream bank slope breaks (inflection point) and flattens to surrounding terrain.
- 6) 3:1 Slope Daylight point. Location where the 3:1 slope projection intersects the existing grade.
- 7) Stream bed. Bottom ground surface of the stream.
- 8) Stream Centerline. The midway point between the ordinary high water marks on each bank.
- 9) Channel slope. Average slope of the channel as determined by ordinary high water marks.
- 10) Channel length. Distance along stream centerline.
- 11) Grade control. Any structure that has been designed to control stream bed degradation to a minimum depth of 10-ft below the designed downstream bed elevation.
- 12) Natural channel design. The application of fluvial geomorphology to create stable channels that do not aggrade or degrade over time and that maximize stream functions given site constraints.
- 13) Bioengineering techniques. The use of living, riparian grasses, trees, and other natural materials to stabilize stream banks.



Working Group

November 15, 2023



Agenda

- Why Are We Here?
- 2021 Proposed Policy
- Comments Received
- Interim Actions
- Policy Proposals
- Group Feedback and Discussion



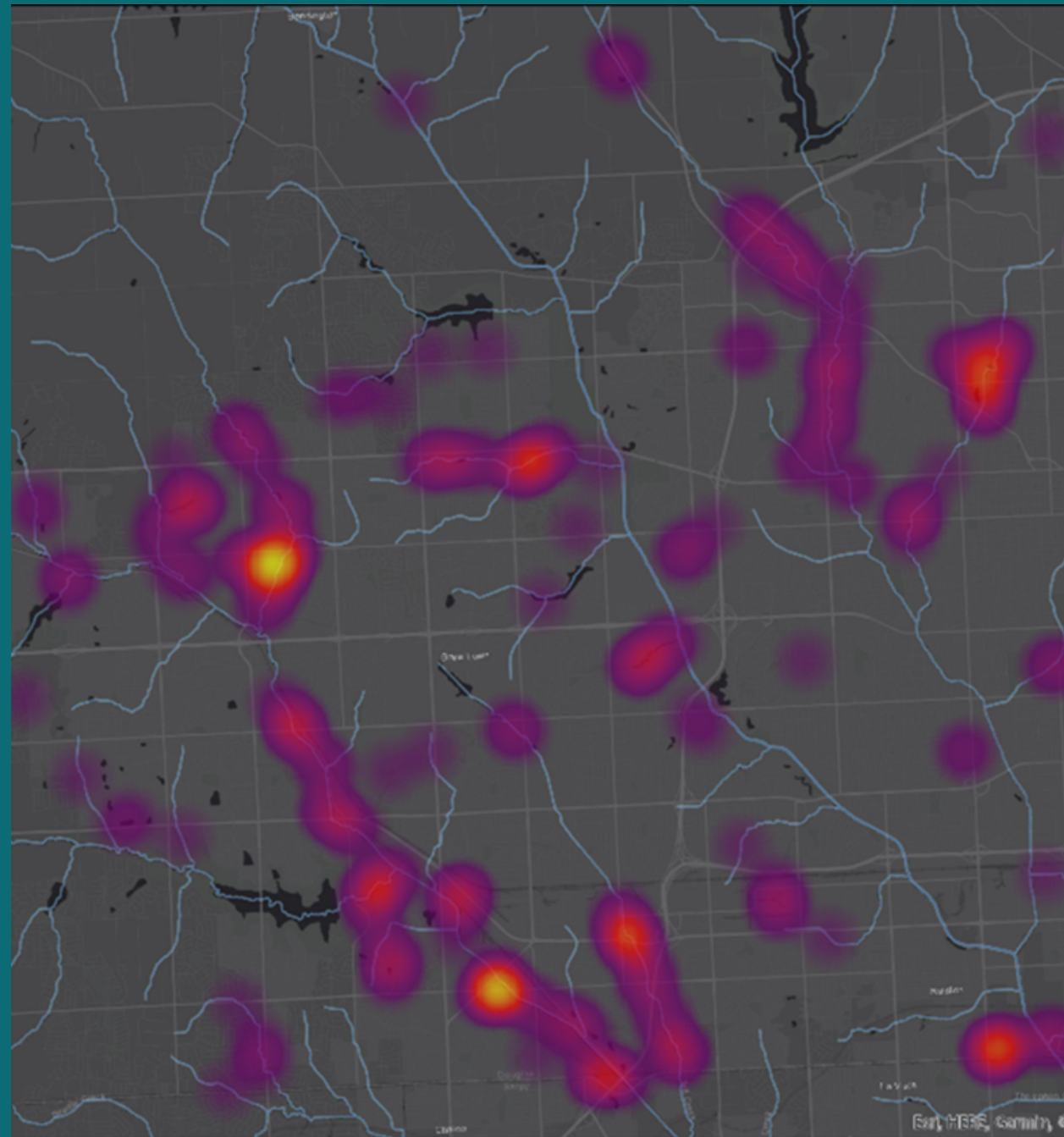


Why Are We Here?





Why Are We Here?



There is a lack of funding to address all the known stream degradation issues.

In many cases the current setback policy is insufficient to protect private property and public infrastructure.

The proposed policy updates based on multiple stream degradation studies were concerning to many stakeholders.

2021 Proposed Policy



- 3:1 + 50 feet based on projected degradation
- Grade Control could be installed to reduce future degradation therefore reducing total setback width



Comments Received

1

Broad
Brush

2

USACE
Permitting
Process

3

Additional
Costs

4

Too
Conservative



1 Additional Analysis

2 USACE Coordination

3 Revisit Policy

Interim Actions



Lateral Migration Analysis

- Change Detection Analysis
- 12 year period
 - 2004, 2010, and 2016 LiDAR
- Largely Undeveloped Watersheds
- Average stream widening of 5-10 feet over a 12-year period in undeveloped watersheds



USACE Coordination

- Discussion with Omaha District Regulatory Office
- Technical Advisory Group
- Permitting templates and guidance for grade control structures.
- **USACE and NDEE reviewed templates and provided input**



Revisit Policy

- PCWP Update Listening Sessions
- Member Jurisdiction Discussions
- Potential Policy Modifications



1

3:1+50 feet setback
No future degradation
consideration

2

Allowance for passive
recreation features in outer
30 feet of setback area

3

Grade Control Incorporated
at stream crossings

Policy Proposals



Discussion

PapioPartnership.org

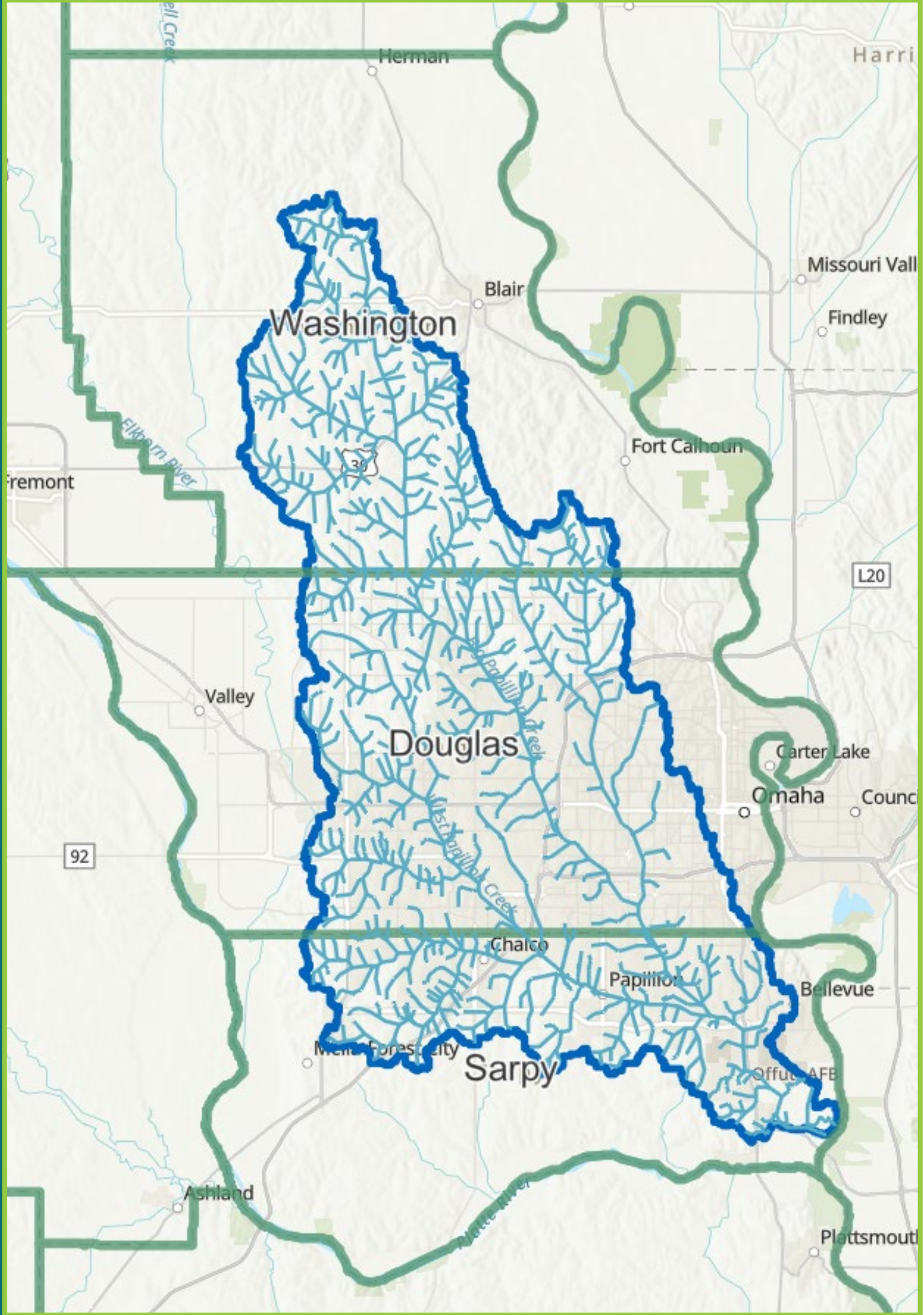
Appendix C
Attachment 4



Partnership Briefing

March 2024

Papillion Creek Watershed



- **402 Square Miles**
- **Three Counties**
 - **Washington**
 - **Douglas**
 - **Sarpy**
- **11 Cities**
- **Approximately 1/3 of Nebraska's Population**

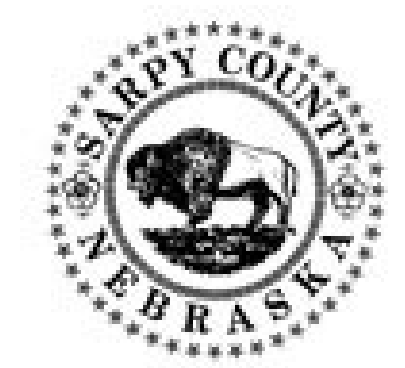


Papillion Creek Watershed Partnership Mission Statement

Our mission is to address issues related to water quality and storm water quantity in the Papillion Creek Watershed by establishing regionally common goals and standards for the development of the watershed through 2040.



PCWP Members



Papio NRD



- **Administering Agent for PCWP**
 - **Hold and disburse funds**
 - **Execute and manage contracts on behalf of PCWP**
 - **Record keeping**
- **Construct Priority Projects of the PCWP**
- **Provide Technical Assistance**
- **Provide Cost Share Programs**





PCWP Management Drivers

- Accommodating Growth in the Watershed
- Regulatory Obligations
- Flooding Potential in Major Tributaries
- Aesthetics and Quality of Life

From July 20, 2006 Public Forum

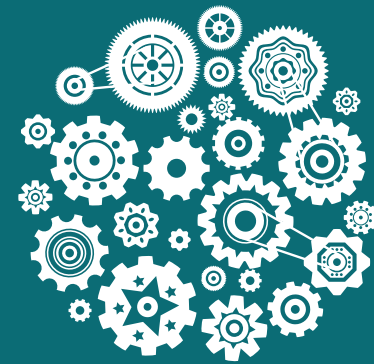
Plan Development Process

2001-2009



3 Workgroups

Technical
Policy
Finance



Technical Analysis

Water Quality
Water Quantity
Alternatives Analysis



Public Outreach

Small Group Presentations
Open Houses
Elected Official Forums



Adopt

Interlocal
Agreement
Municipal
Code

Stormwater Policies

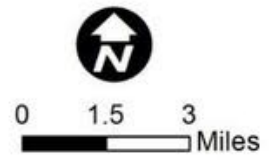


- 1** Water Quality Improvement
- 2** Peak Flow Reduction
- 3** Landscape Preservation, Restoration, and Conservation
- 4** Erosion and Sediment Control and Other Best Management Practices
- 5** Floodplain Management
- 6** Stormwater Management Financing



PCWP Watershed Management Plan

Abbreviations
BP - Big Papillion Creek
CL - Cunningham Lake
DS - Dam Site
LP - Little Papillion Creek
WP - West Papillion Creek
WQ - Water Quality

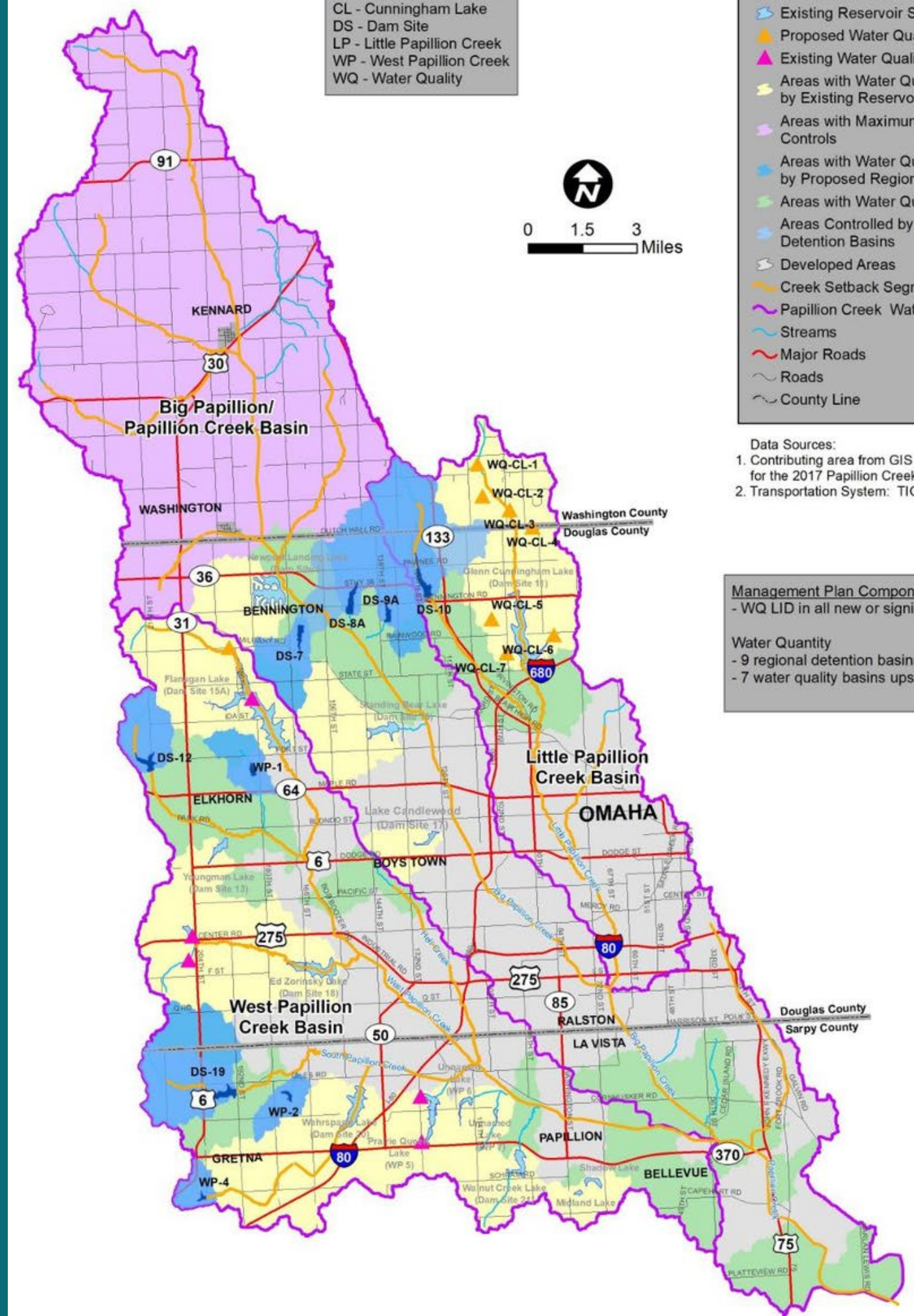


Legend

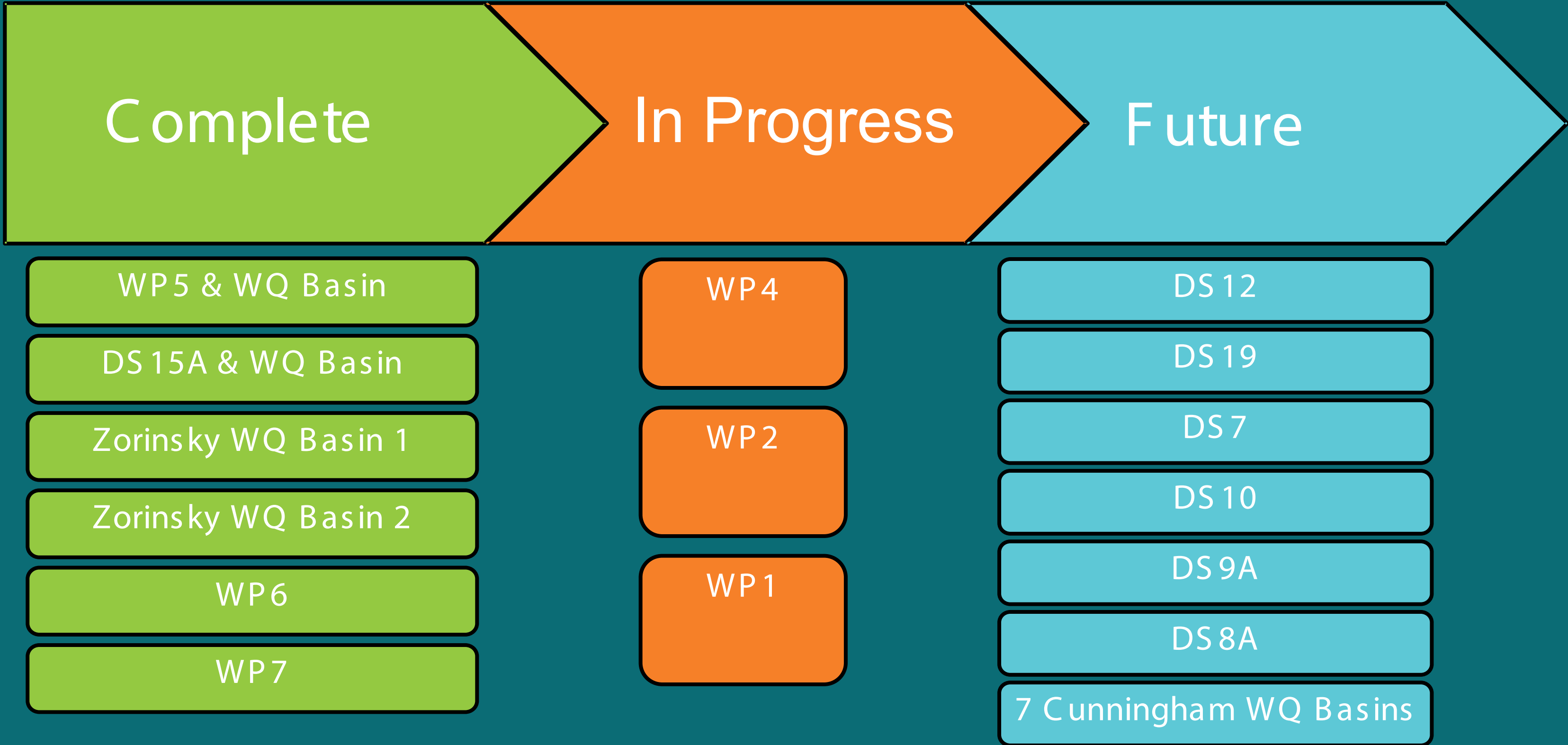
- Proposed Dam Sites
- Existing Reservoir Sites
- Proposed Water Quality Basin Sites
- Existing Water Quality Basin Sites
- Areas with Water Quality LID and Controlled by Existing Reservoirs
- Areas with Maximum LID or Equivalent Controls
- Areas with Water Quality LID and Controlled by Proposed Regional Detention Basins
- Areas with Water Quality LID
- Areas Controlled by Proposed Regional Detention Basins
- Developed Areas
- Creek Setback Segments - 3:1 + 50'
- Papillion Creek Watershed Boundaries
- Streams
- Major Roads
- Roads
- County Line

Data Sources:
1. Contributing area from GIS shapefiles created for the 2017 Papillion Creek Watershed Hydrologic Analysis
2. Transportation System: TIGER, January 2019.

Management Plan Components:
- WQ LID in all new or significant redeveloped areas
Water Quantity
- 9 regional detention basins
- 7 water quality basins upstream of existing reservoirs



Structural Flood Control Projects



Stormwater Management Shared Elements



A. Public Education and Outreach	Lead Partnership Member(s)
Develop Education and Outreach Plan	City of Omaha, PMRNRD
Maintain and Update Outreach Materials	City of Omaha

B. Public Participation and Involvement	Lead Partnership Member(s)
Create Opportunities for Citizen Participation	City of Omaha, PMRNRD

C. Illicit Discharge Detection and Elimination	Lead Partnership Member(s)
Track IDDE complaints	City of Omaha

D. Construction Site Runoff	Lead Partnership Member(s)
Perform Construction Site Inspections	City of Omaha
Maintain Construction Site Reporting Website	City of Omaha
Conduct Workshops on Construction Site Runoff	City of Omaha

E. Post Construction Runoff Control	Lead Partnership Member(s)
Update Omaha Regional Stormwater Design Manual as standards are updated	City of Omaha
Maintain PCSMP Application Reporting, and Project Database Website	City of Omaha

F. Pollution Prevention and Good Housekeeping	Lead Partnership Member(s)
Education and Training	City of Omaha



Budgeting

- Partnership Fund

$$\text{Contribution\%} = \left(0.5 \frac{\text{Population}_{\text{jurisdiction}}}{\text{Population}_{\text{Total}}} + 0.5 \frac{\text{Area}_{\text{jurisdiction}}}{\text{Area}_{\text{Total}}} \right) \times 0.757$$



Current Contributions

Bellevue	9.9%	\$36,400
Boys Town	0.2%	\$750
Gretna	1.6%	\$5,700
LaVista	2.9%	\$10,750
Omaha	50.0%	\$184,400
Papillion	6.3%	\$23,250
Ralston	0.6%	\$2,250
Sarpy County	4.2%	\$15,500
Papio-Missouri River NRD	24.3%	\$90,000
	100.0%	\$369,000



Current Annual Obligations

Omaha Reimbursement	\$275,997
NRD Reimbursement	\$34,400
SEC Seminar Support	\$3,000
Total	\$313,397



Proposed Contributions

Bellevue	9.1%	\$33,700
Boys Town	0.2%	\$600
Gretna	3.6%	\$13,200
LaVista	2.6%	\$9,500
Omaha	51.8%	\$191,000
Papillion	6.0%	\$22,000
Ralston	0.5%	\$2,000
Sarpy County	2.0%	\$7,000
Papio-Missouri River NRD	24.2%	\$90,000
	100.0%	\$369,000

Periodic Updates



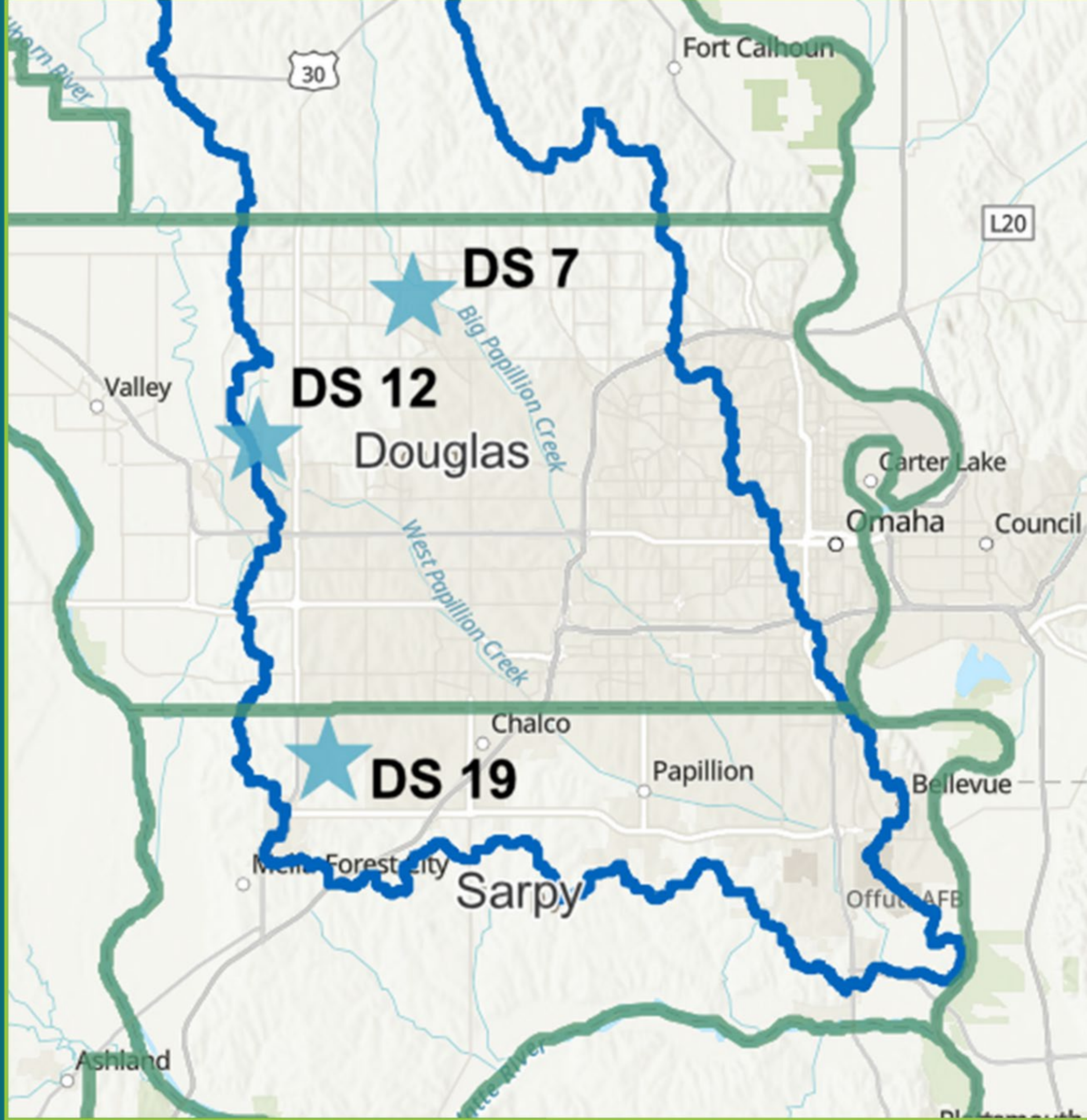
- Update the plan every 5 years
 - Projects Completed
 - Changes to Regulations
- Prioritize Next Structural Projects
- Adjust Policies
- Updates Completed 2014, 2019
- 2024 Update in Progress





2024 Update

- Regional Detention Basins
 - Dam Site 12
 - Dam Site 7
 - Dam Site 19, based on USACE funding
- Policy Updates
 - No major policy updates proposed at this time





The Future

1

Complete Watershed Plan
Update for 2024

Adoption by June 2024

2

Continue work with
developers and other
stakeholders to find a
solution for stream
degradation issues

3

Support efforts to
identify barriers to
creating affordable
housing at a lesser risk
from erosion and
flooding

4

Work towards creation of
green space corridors
through efforts such as
Climate Action Plan, park
plans, and active
transportation plans.

Questions?



PapiroPartnership.org

Appendix C
Attachment 5

2024 Plan Update Summary



1. Purpose
2. Watershed Information
3. Watershed Management Plan
 - Policies
 - Program Projects
4. Financial Assessment
5. 5-Yr Implementation Plan

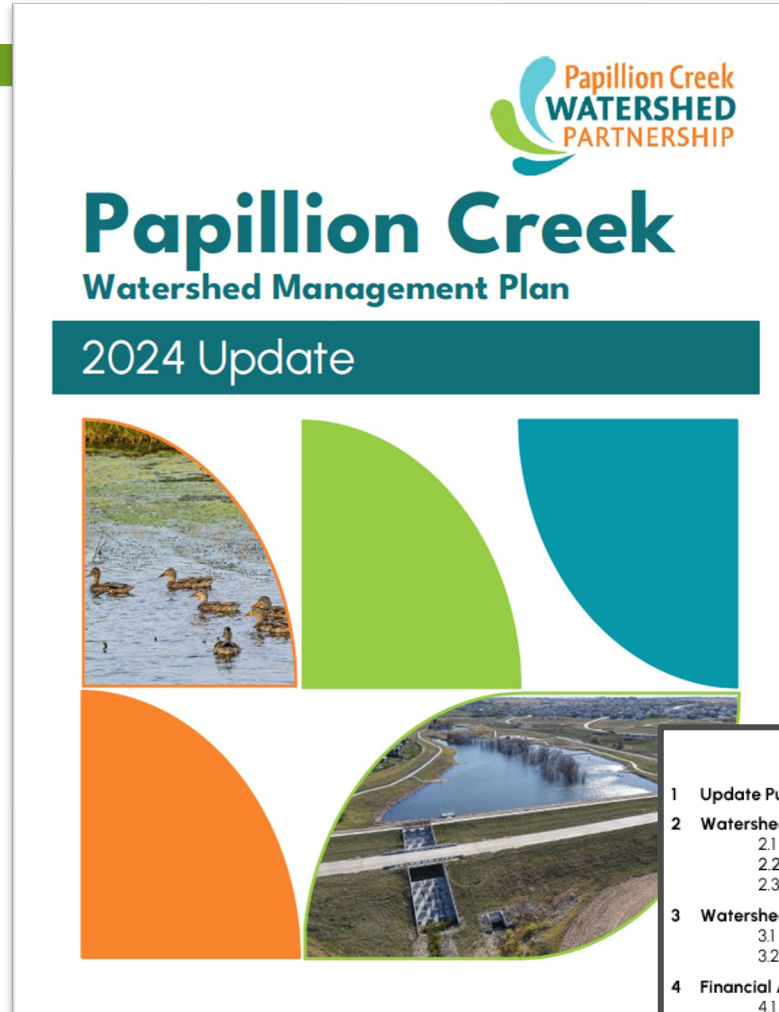


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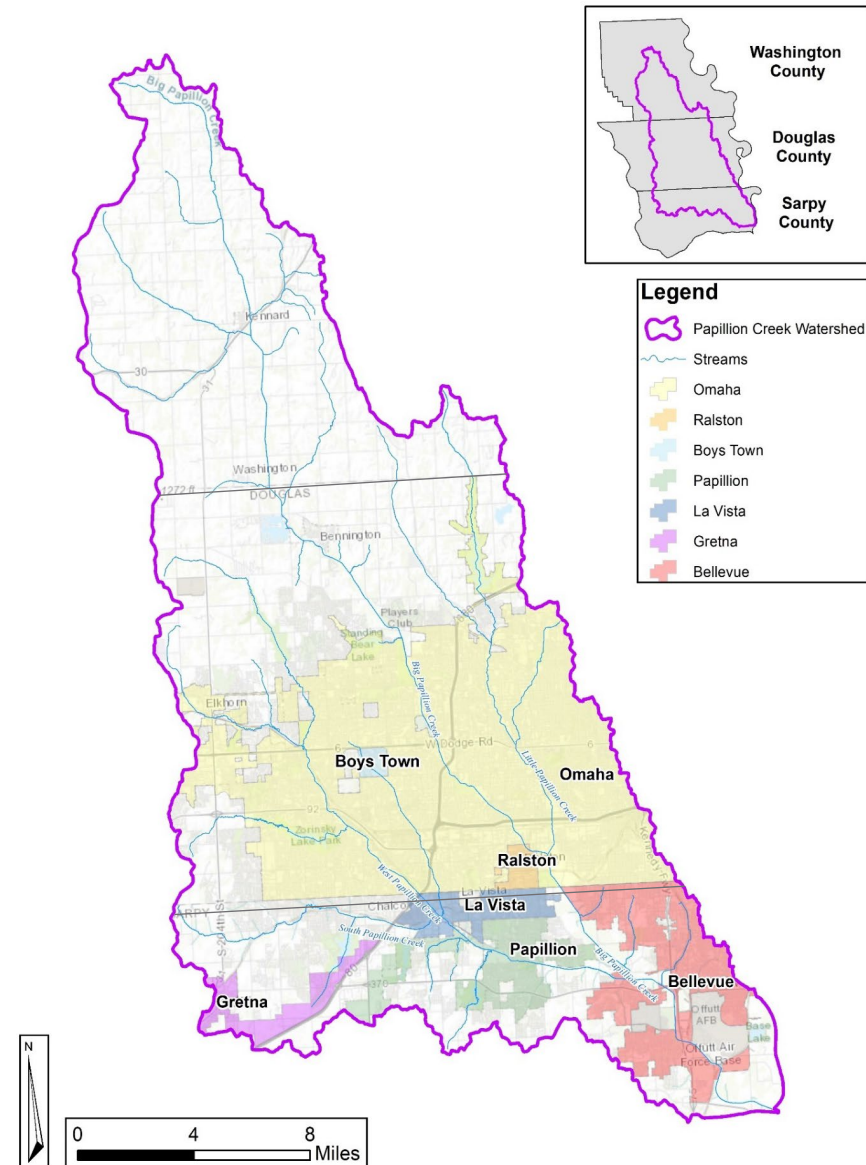
Partnership Website Updates

[Papillion Creek Watershed Partnership \(papiopartnership.org\)](http://papiopartnership.org)

Purpose



- Document progress from last 5-year implementation period (FY 2020 - FY 2024)
- Policy review and update efforts
- Remaining structural Program Projects cost updates
- Watershed Fee rate updates
- Develop next 5-year implementation plan (FY 2025 - FY 2029)
- Update Interlocal Agreements

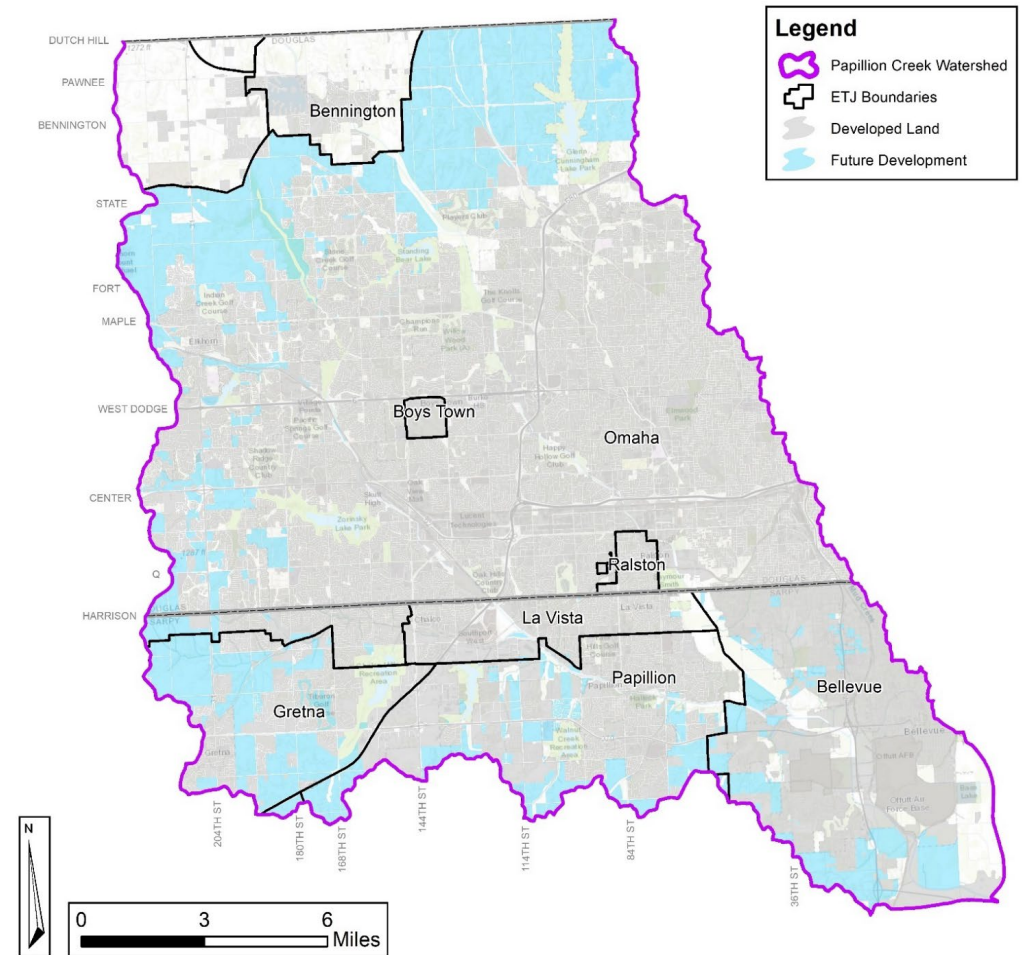


Watershed Information



- Status of development w/in Partnership's ETJs
- Concurrent and related work in Watershed
 - *USACE Reevaluation Study* – plan to address flood risks in Watershed, includes Program Projects DS-19 and DS-10
 - *WFPO Study* – NRCS program to address water resource concerns, includes grade stabilization, stream restoration, and sediment control basin.
 - *Supplemental Funding* – grant applications to support FY 2020- FY 2024 Program Projects - **\$16.3 million total**

Program Project	Grant Sources				
	WSF	FEMA/BRIC	NGPC/FWS	EPA 319	Total
WP-1	\$4,735,048	---	\$500,000	\$200,000	\$5,435,048
WP-2	\$4,171,204	---	\$325,000	---	\$4,496,204
WP-4	\$726,900	\$5,335,650	\$350,000	---	\$6,412,550
Total	\$9,633,152	\$5,335,650	\$1,175,000	\$200,000	\$16,343,802





- Policies

- Reviewed policies, updated terminology, and simplified document

POLICY GROUPS

- | | |
|---------------------------------|------------------------------------|
| 1. Water Quality Improvements | 4. Erosion and Sediment Control |
| 2. Peak Flow Management | 5. Floodplain Management |
| 3. Stream Corridor Preservation | 6. Stormwater Management Financing |

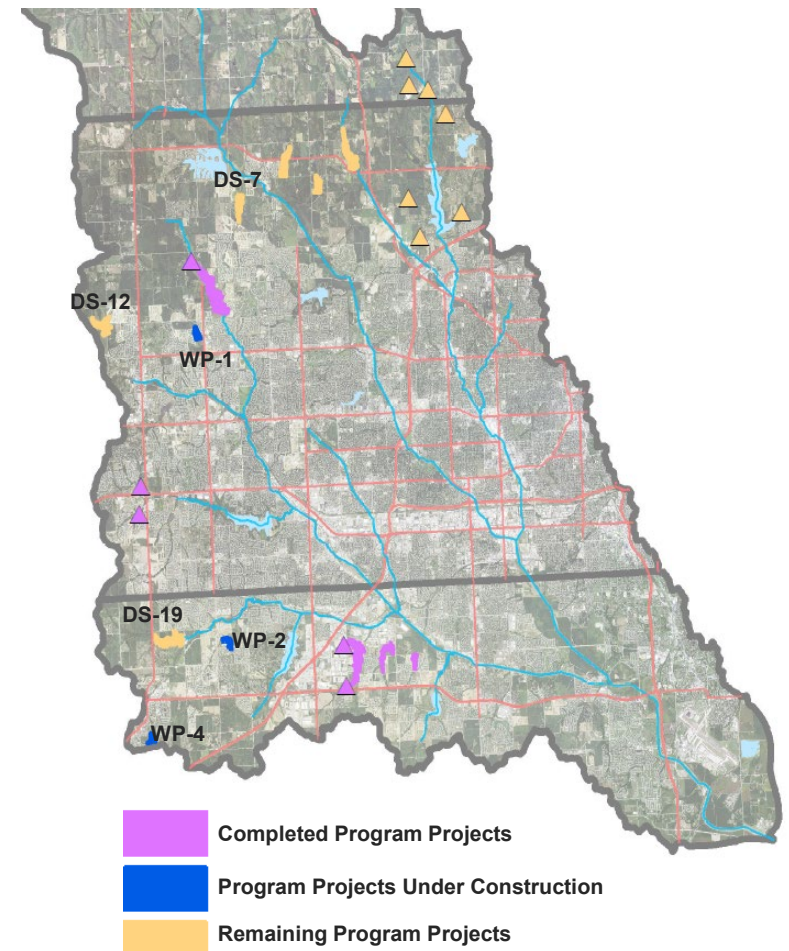
- Revisited stream setback definition and pursued modifications
 - **Proposed compromises to the stream setback policy presented in 2021.**
 - **After stakeholder discussions, there remained opposition to updating the policy so no changes were made.**

Watershed Management Plan



- Structural Components – Program Projects
 - FY 2020 – FY 2024 Status Update

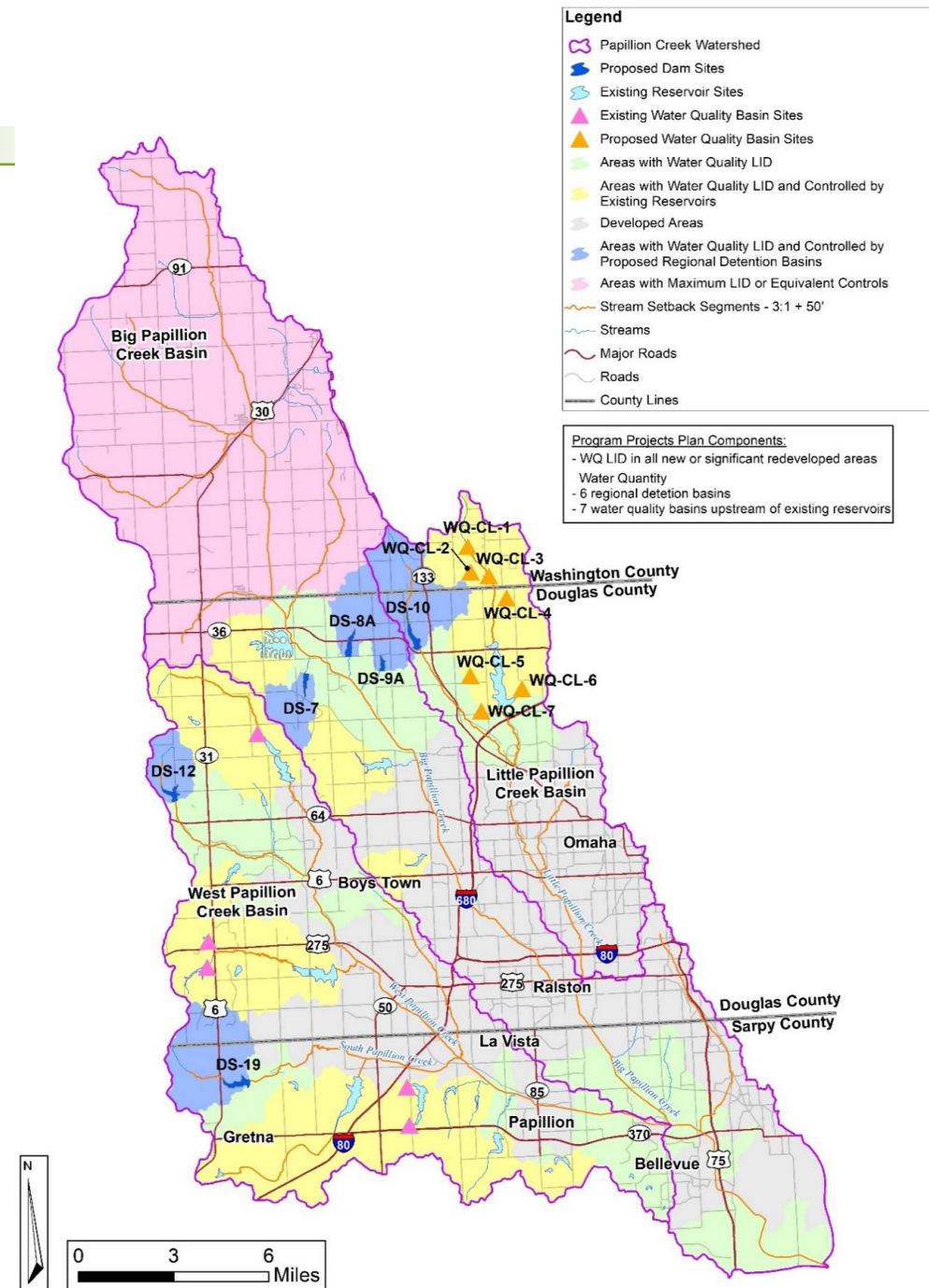
Structure Name	Approx. Location & Planning Jurisdiction	Drainage Area (acres)	Project Funding Sources (Millions of \$)			Current Status
			NRD Fund & Watershed Fees	Other ¹	Total Project Expenditures	
2019 Program Projects for Years FY 2020 to FY 2024						
WP-1	180th & Fort Streets	865	\$4.2	\$8.8	\$13.0	Construction Begins Fall 2024 - completion in Winter 2025
WP-2	180th St & Giles Road	705	\$7.7	\$4.5	\$12.2	Under construction - completion in Spring 2025
WP-4	204th St & Schram Road	670	\$8.9	\$6.4	\$15.3	Under construction - completion in Fall 2024
2019 Program Projects Subtotal			\$20.8	\$19.7	\$40.5	---
Land Rights Purchase in FY 2020 to FY 2024						
DS-12	216th & Fort Streets; Omaha	1,660	\$12.5	---	\$12.5	Preliminary design complete Land rights purchase underway
DS- 7	168th Street & Bennington Road; Bennington/Omaha	1,675	\$11.6	---	\$11.6	Preliminary design complete Land rights purchase underway
DS- 19	192nd Street & West Giles Road; Sarpy County	2,750	\$7.7	---	\$7.7	Preliminary design complete Land rights purchase underway USACE final design scheduled for 2025
Land Rights Subtotal			\$31.8	---	\$31.8	---
Total			\$73.5	\$39.4	\$112.9	---



Watershed Management Plan

- Structural Components – Program Projects
 - Remaining Projects

Structure Name	Approx. Location	Drainage Area (acres)	Total Project Capital Cost, 2023 Basis (Millions of \$) ¹	Current Status
DS-12	216th & Fort Streets	1,660	\$30.4	Preliminary design complete Land rights purchase underway
DS-7	168th St & Bennington Road	1,675	\$27.2	Preliminary design complete Land rights purchase initiated
DS-19	192nd St & Giles Road	2,750	\$37.3	Preliminary design complete Land rights purchase underway USACE final design scheduled for 2025
DS-8A	144th St & Bennington Road	1,850	\$19.2	---
DS-9A	132nd St & Bennington Road	1,280	\$13.0	---
DS-10	120th St & Bennington Road	2,950	\$20.4	USACE preliminary design complete
Regional Detention Subtotal			\$147.5	
WQ-CL 1 through 7	Omaha & Washington Co.	4,470	\$102.1	---
Total Remaining			\$249.6	





- Financial Approach for FY 2020 – FY 2024
 - Watershed Fees
 - Papio NRD General Funds + Awarded Grants
 - Bonding
 - 2019 authorization for a 5-year bonding authority extension
 - Bond funds used for completed Program Projects, expires in 2024

- Financial Assessment for Remaining Program Projects
 - Revenue and expenditure updates
 - Funding Mechanisms
 - Pay-As-You-Go (P-A-Y-G)
 - P-A-Y-G + Additional Bonding
 - P-A-Y-G + WIFIA Loan





- Cash Flow Modeling
 - Funding Scenarios

Scenario	Funding Mechanism	Watershed Fees	Papio NRD Allocation	Financing Terms	
				Interest Rate	Repayment Period
1.0	P-A-Y-G	Current Rates with Inflation	General Fund Contribution	---	---
2.1	P-A-Y-G + Bond	Current Rates with Inflation	General Fund Contribution + \$20M Bond	3.0%	20 Yrs
2.2		Current Rates with Inflation	General Fund Contribution + \$20M Bond	4.5%	20 Yrs
3.1	P-A-Y-G + WIFIA Loan	Current Rates with Inflation	General Fund Contribution + \$30M WIFIA Loan	3.1%	35 Yrs
3.2		Current Rates with Inflation	General Fund Contribution + \$30M WIFIA Loan	2.0%	35 Yrs
3.3		Current Rates with Inflation	General Fund Contribution + \$46M WIFIA Loan	3.1%	35 Yrs
3.4		Current Rates with Inflation	General Fund Contribution + \$30M WIFIA Loan	2.0%	20 Yrs
3.5		Current Rates with Inflation	General Fund Contribution + \$46M WIFIA Loan	2.0%	35 Yrs
3.6		Current Rates with Inflation	General Fund Contribution + \$30M WIFIA Loan	3.1%	20 Yrs

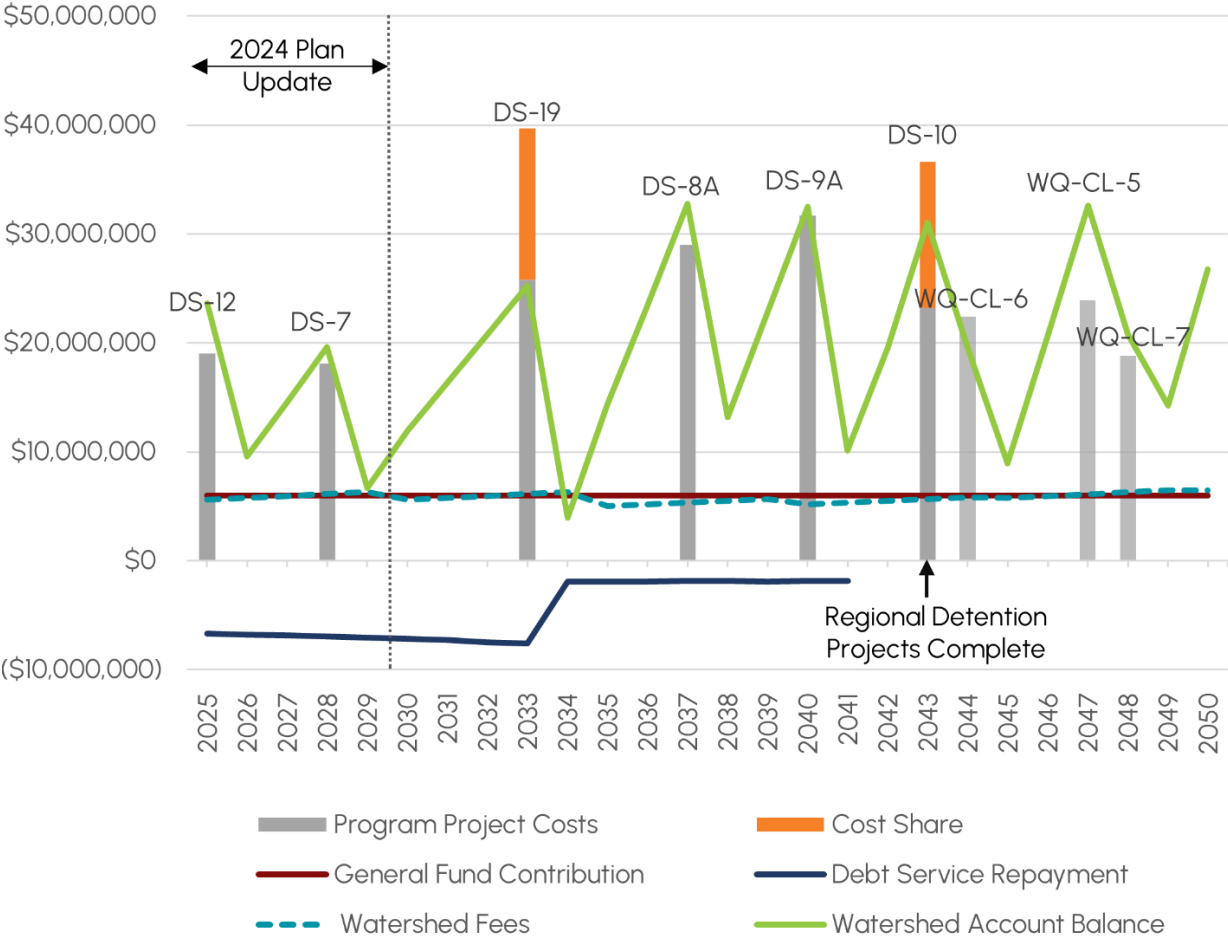


■ Cash Flow Modeling Results

■ Scenario 1. P-A-YG

■ Key Model Outputs

1. Two (2) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2043.
3. Regional detention project cost of \$146.8 million (with no additional dept service).
4. Three (3) water quality basins can be constructed within the planning horizon (2050).



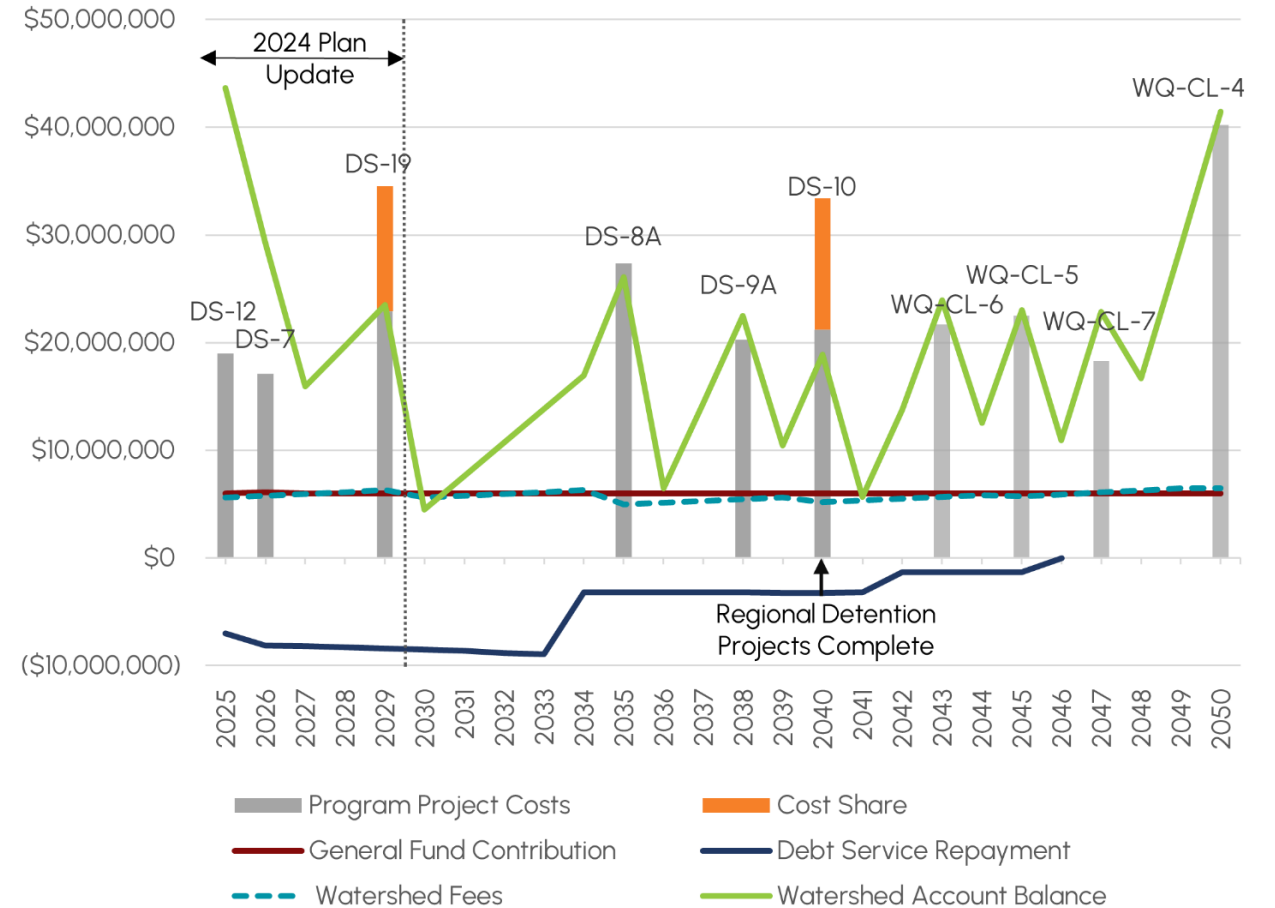


■ Cash Flow Modeling Results

■ Scenario 2.1. P-A-YG + \$20M Bond

■ Key Model Outputs

1. Three (3) projects will be constructed in the next planning period (FY 2025 to FY 2029).
2. All regional detention structures will be complete by 2040.
3. Regional detention project cost of \$127.9 million, plus \$6.9 million in additional dept service for a total regional detention cost of \$134.8 million.
4. Four (4) water quality basins can be constructed within the planning horizon (2050).





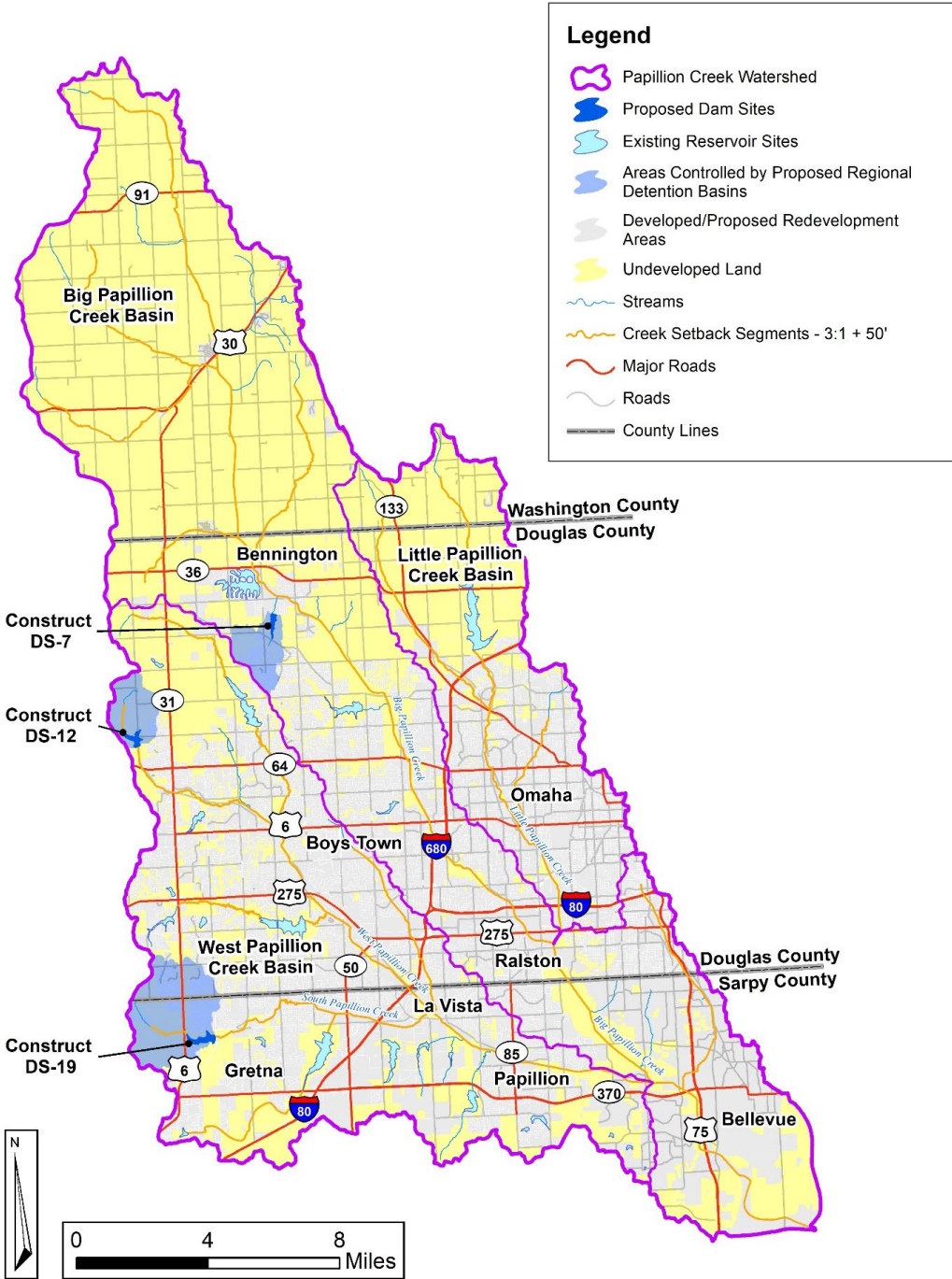
- Cash Flow Modeling Results
 - Summary Key Model Outputs for Range of (5) Scenarios

Scenario			# Projects Complete 2025-2029	Year Regional Detention Complete	Regional Detention Costs (\$ in Millions)	Additional Debt Service (\$ in Millions)	Total Regional Detention Cost (\$ in Millions)	# Water Quality Basins*
Method	Interest Rate	Repayment Schedule						
1 - PAYG	---	---	2	2043	\$146.8	\$0.0	\$146.8	3
2.1 - PAYG + \$20M Bond	3.0%	20 Yrs	3	2041	\$127.9	\$6.9	\$134.8	4
3.1 - PAYG + \$30M Loan	3.1%	35 Yrs	3	2040	\$126.0	\$19.2	\$145.2	3
3.2 - PAYG + \$30M Loan	2.0%	35 Yrs	3	2039	\$124.6	\$11.7	\$136.3	4
3.3 - PAYG + \$46M Loan	3.1%	35 Yrs	4	2038	\$119.1	\$30.1	\$149.2	4

5-Yr Implementation Plan (FY 2025- FY 2029)

Program Projects

Structure	Approx. Location	Drainage Area (acres)	Est. Project Capital Costs, 2018 Basis, \$ Millions
DS-19	192 nd & Giles Road	2,750	\$37.3
DS-12	216 th & Fort Streets	1,660	\$30.4
DS-7	168 th and Bennington Road	1,675	\$27.2
Total			\$94.9





Navigation



Upcoming Events

AUG 22 10:00 am - 11:00 am

August Partnership Meeting

[View Calendar](#)

- Who We Are ▼
- What We Do ▼
- Working in the Watershed ▼
- Resources ▼
- Events
- Contact

Watershed by Design

Our mission is to address issues related to water quality and storm water quantity in the Papillion Creek Watershed by establishing regionally common goals and standards for the development of the watershed through 2040.

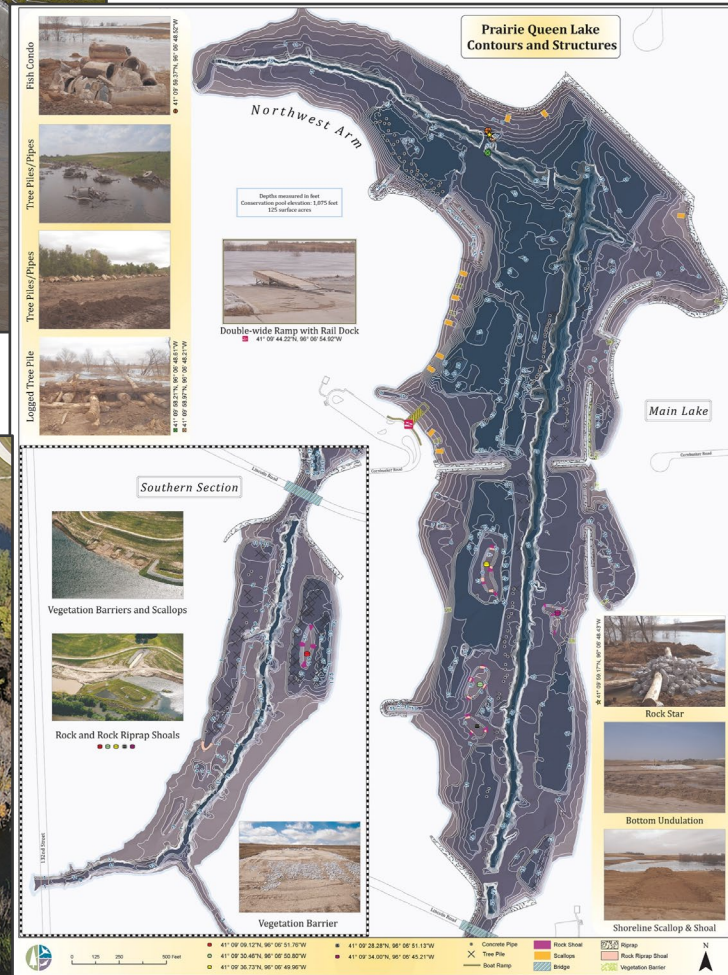
The Papillion Creek Watershed consists of the land area that conveys water to the Missouri River from rain and snowmelt within the basin. The Watershed covers 402 square miles located in Washington, Douglas and Sarpy Counties and flows in a southeasterly direction to the Missouri River. There are three main tributaries that form the Papillion Creek system – Little Papillion Creek, Big Papillion Creek and West Papillion Creek. This watershed approach was adopted by the PCWP so that surface water which flows across numerous jurisdictional boundaries can be managed in a consistent and comprehensive manner.

Website Updates



Project Pages Content

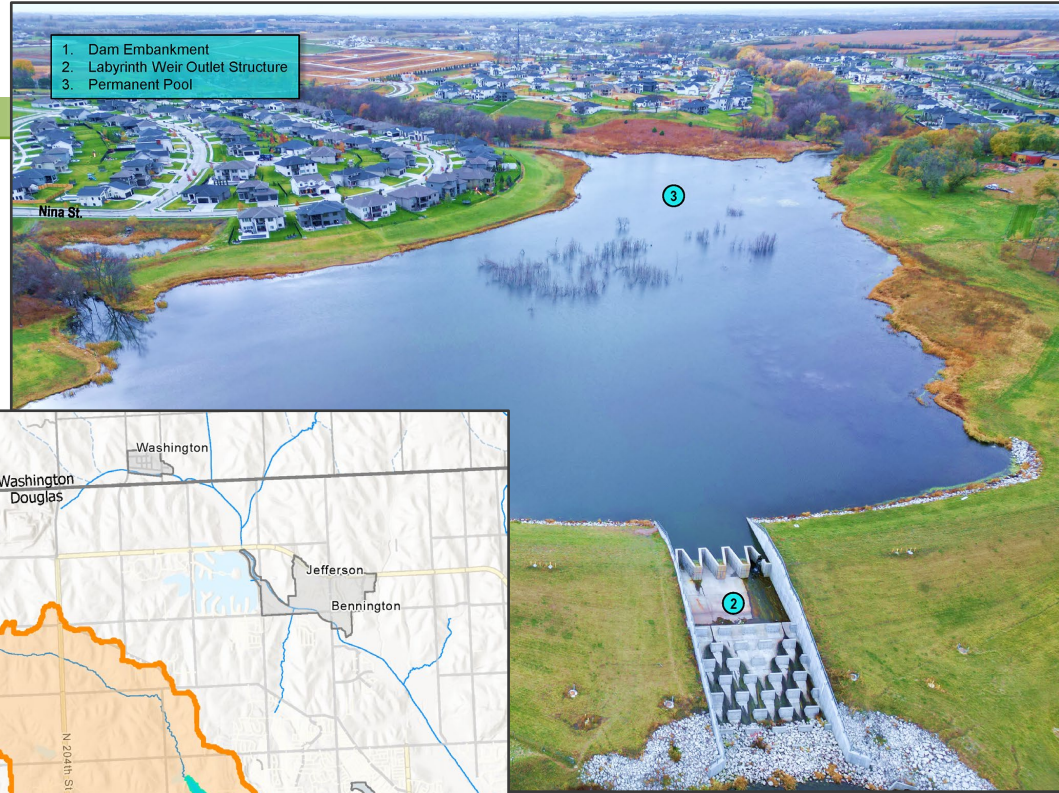
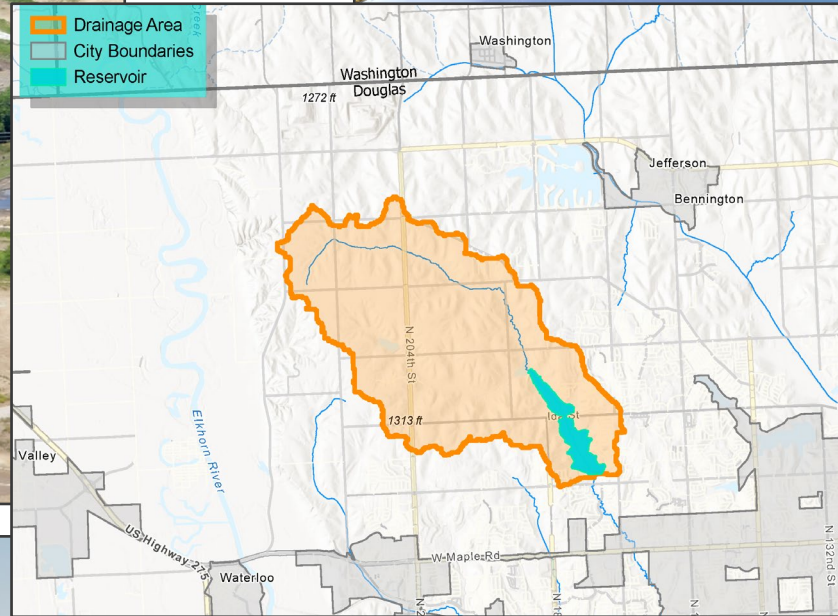
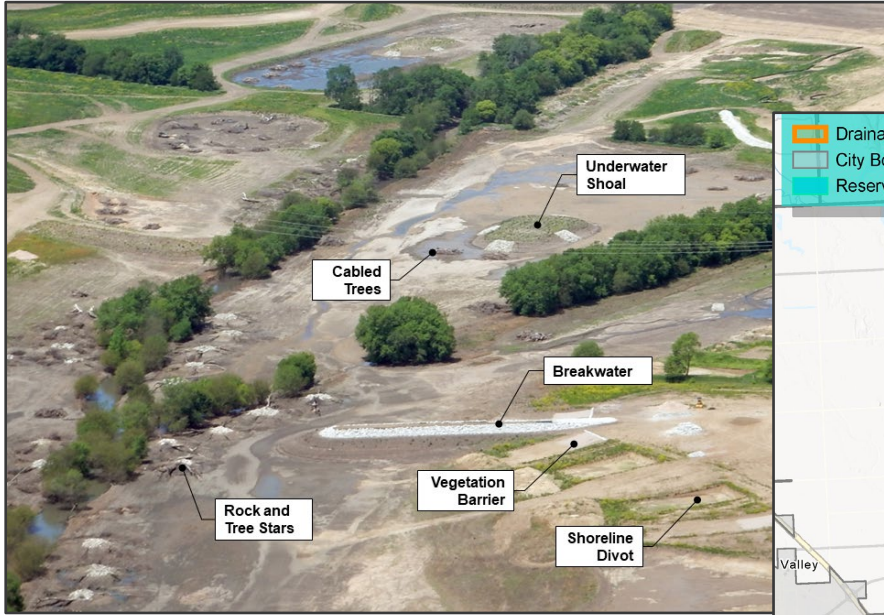
- | | |
|-----------------------------------|------------------------|
| 1. Dam Embankment | 6. Paved Trail |
| 2. Principal Spillway Outlet | 7. Day Use Facility |
| 3. Auxiliary Spillway Channel | 8. Public Boat Ramp |
| 4. Permanent Pool | 9. Water Quality Basin |
| 5. Perpendicular Breakwater (typ) | 10. Pedestrian Bridge |



Website Updates



■ Project Pages Content



Appendix D
