

Appendix A

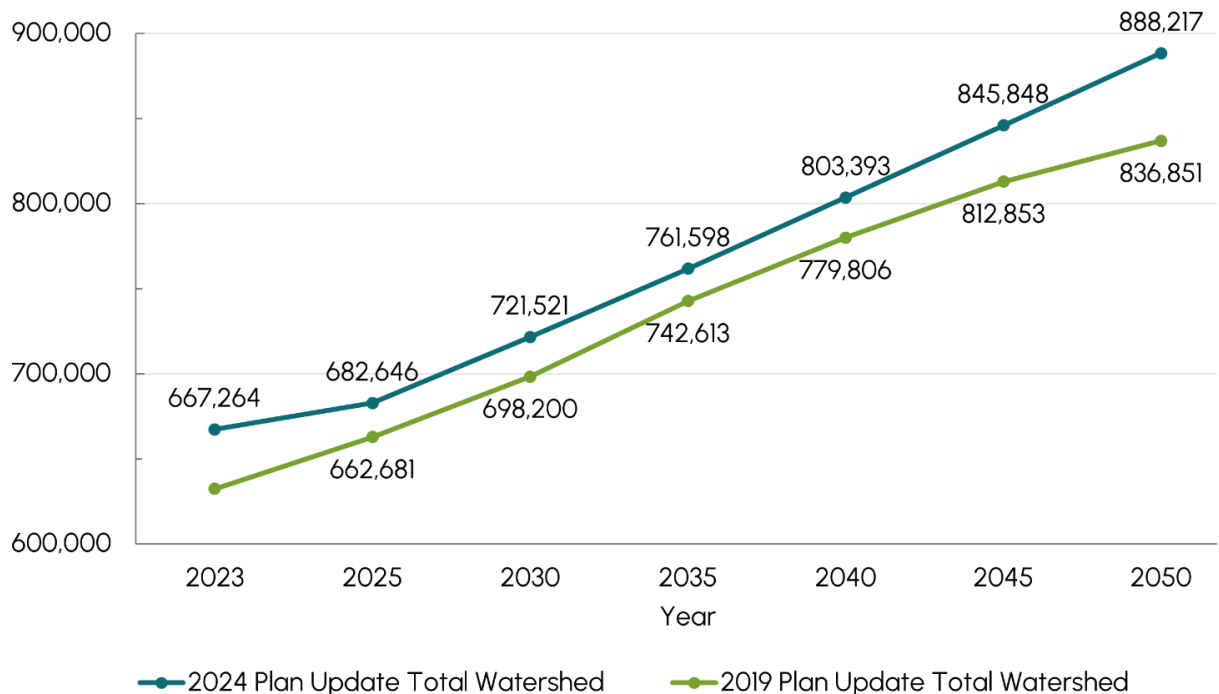
APPENDIX – A

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

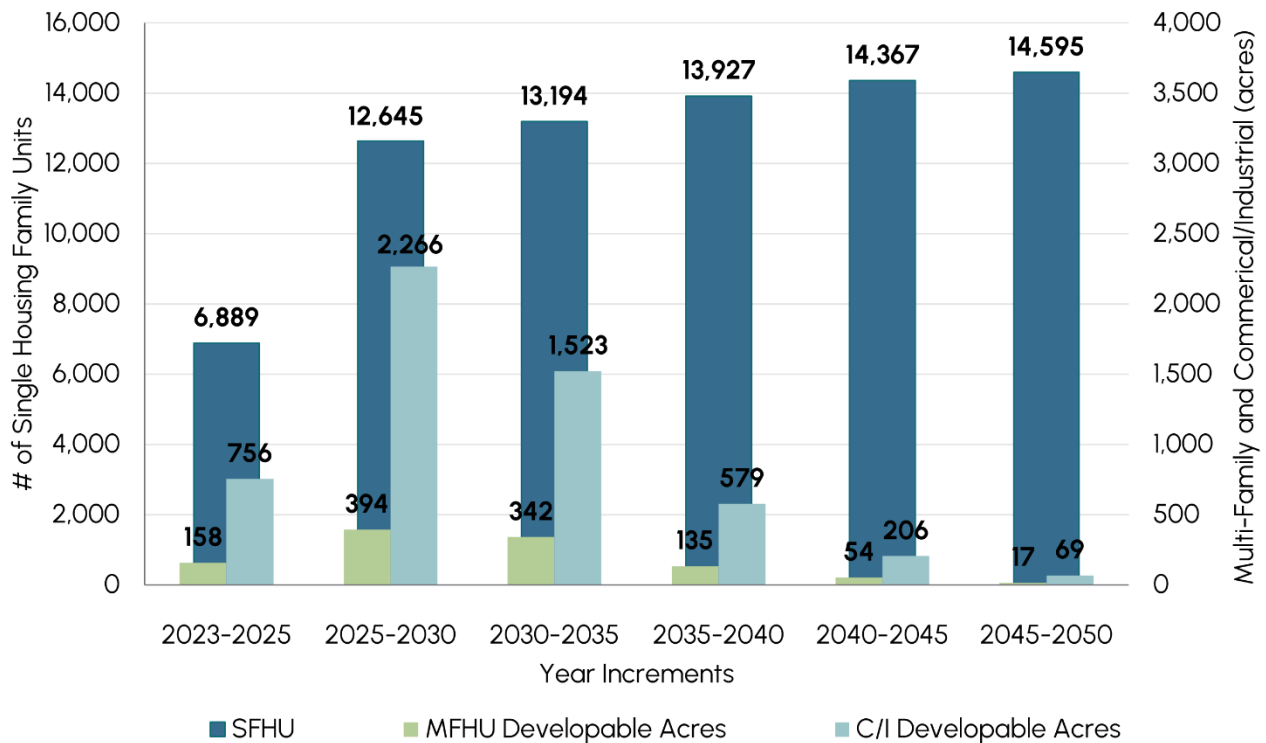


Updated land use maps were developed to help explain the spatial allocations among various types of existing and future development. Land use designations and estimated rates of land consumption for new development are important considerations for the timing and capital costs associated with future regional 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 aeriols 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.

APPENDIX A – FINANCIAL MODEL DEVELOPMENT

2024 Watershed Management Plan Update

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)

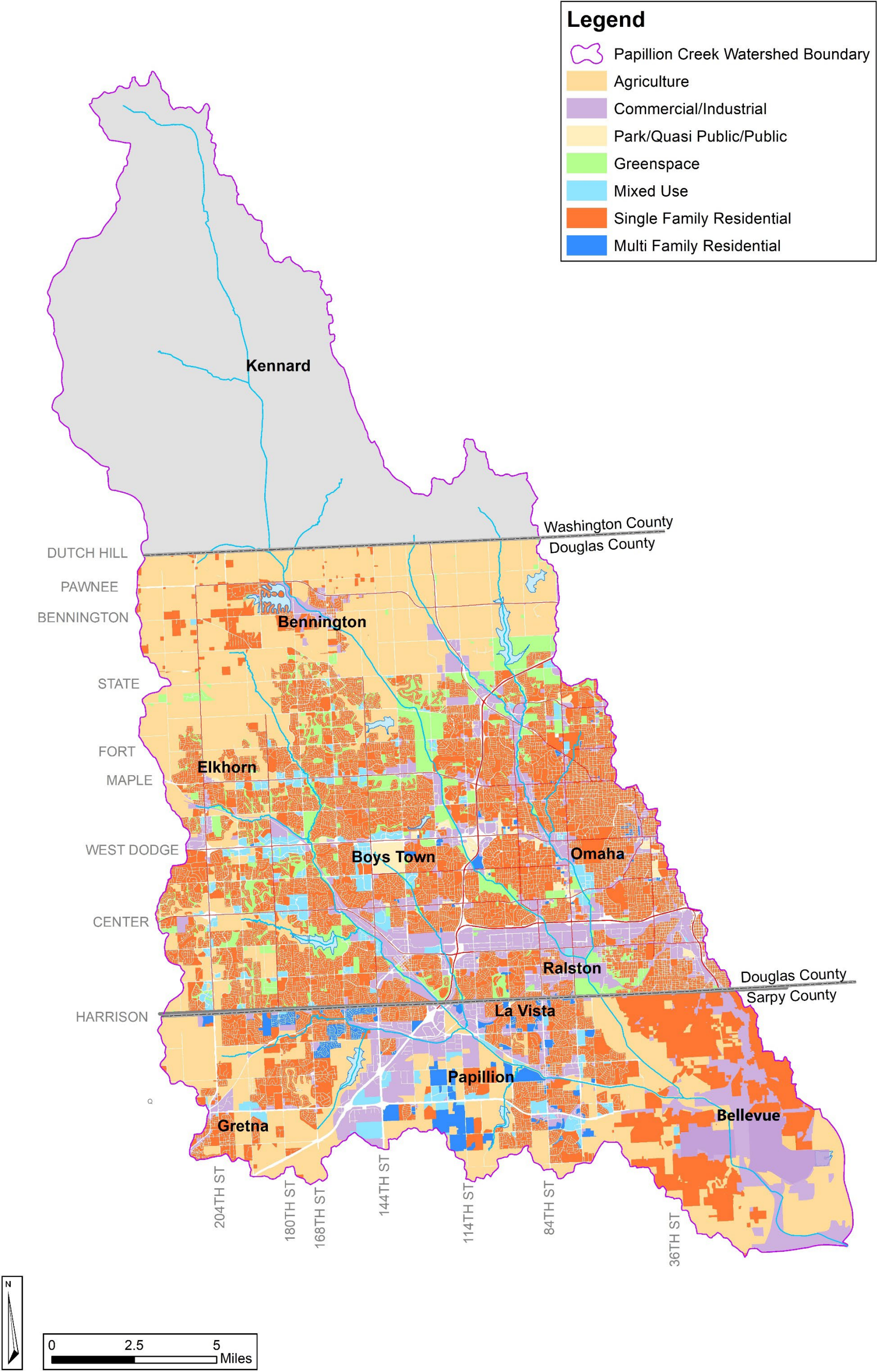
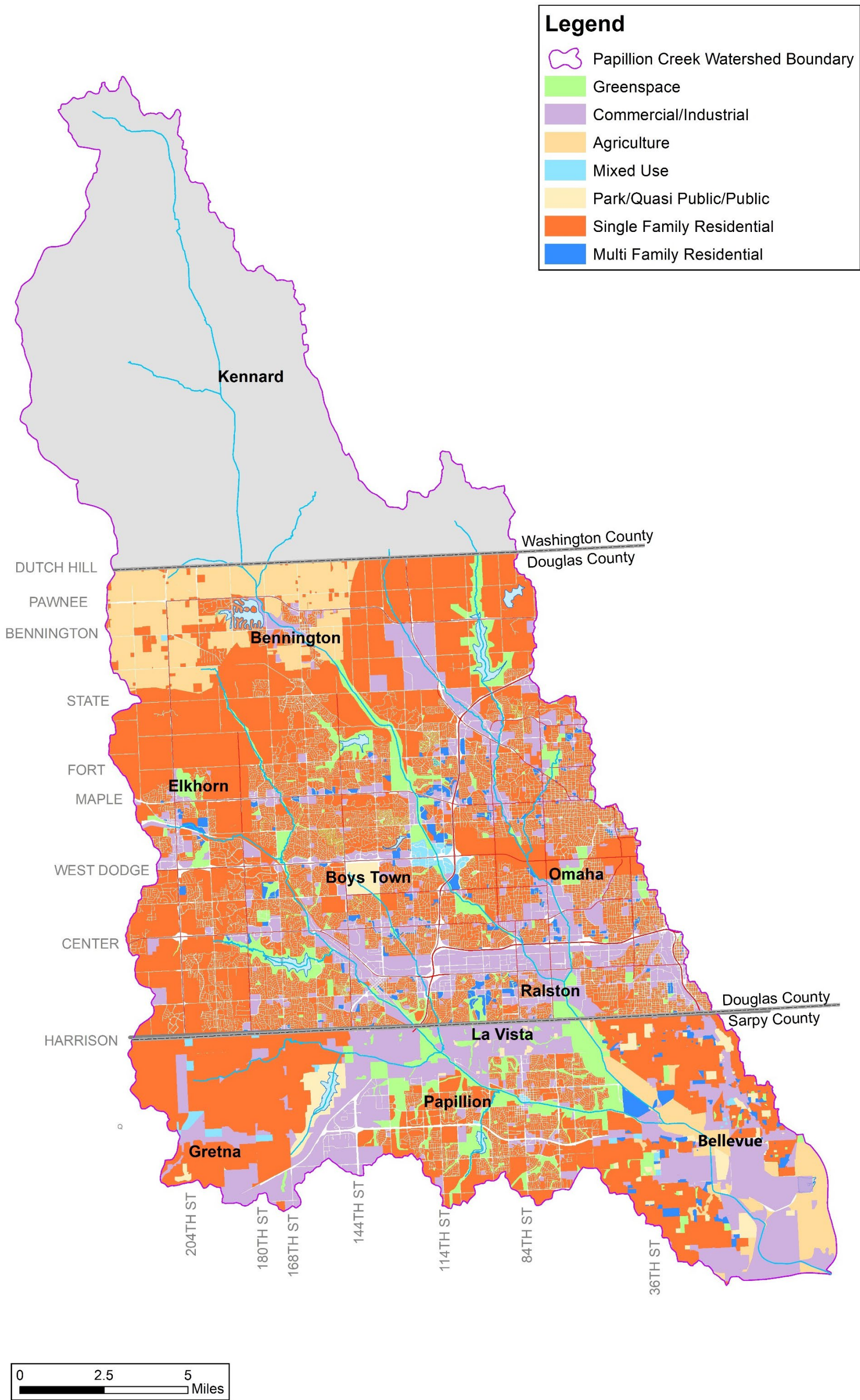


Figure A.4. Future Land Use



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.

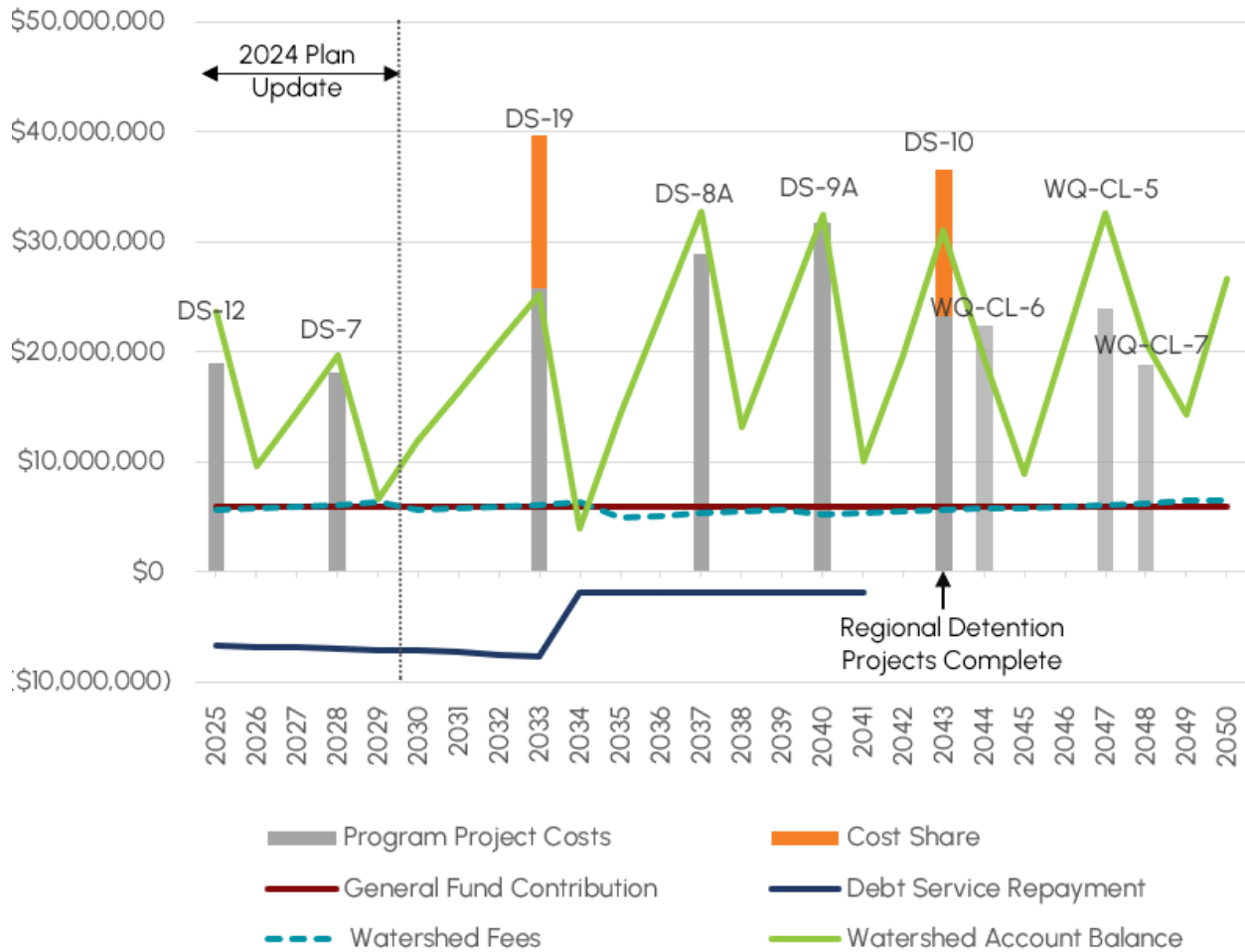
Key model outputs summarized in [Table A.4](#) include:

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

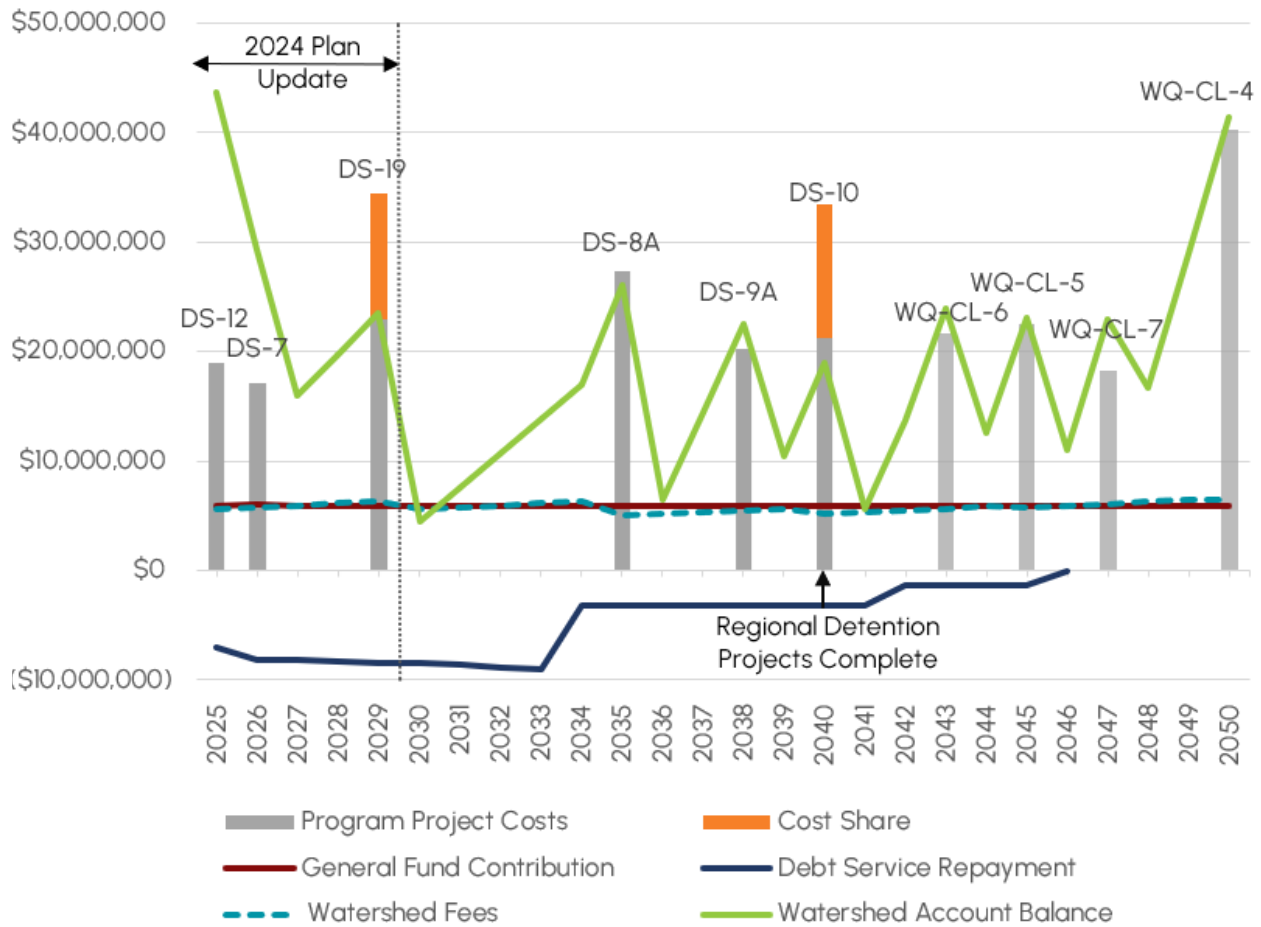
Figure A.5. Scenario 1.0: P-A-Y-G



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).

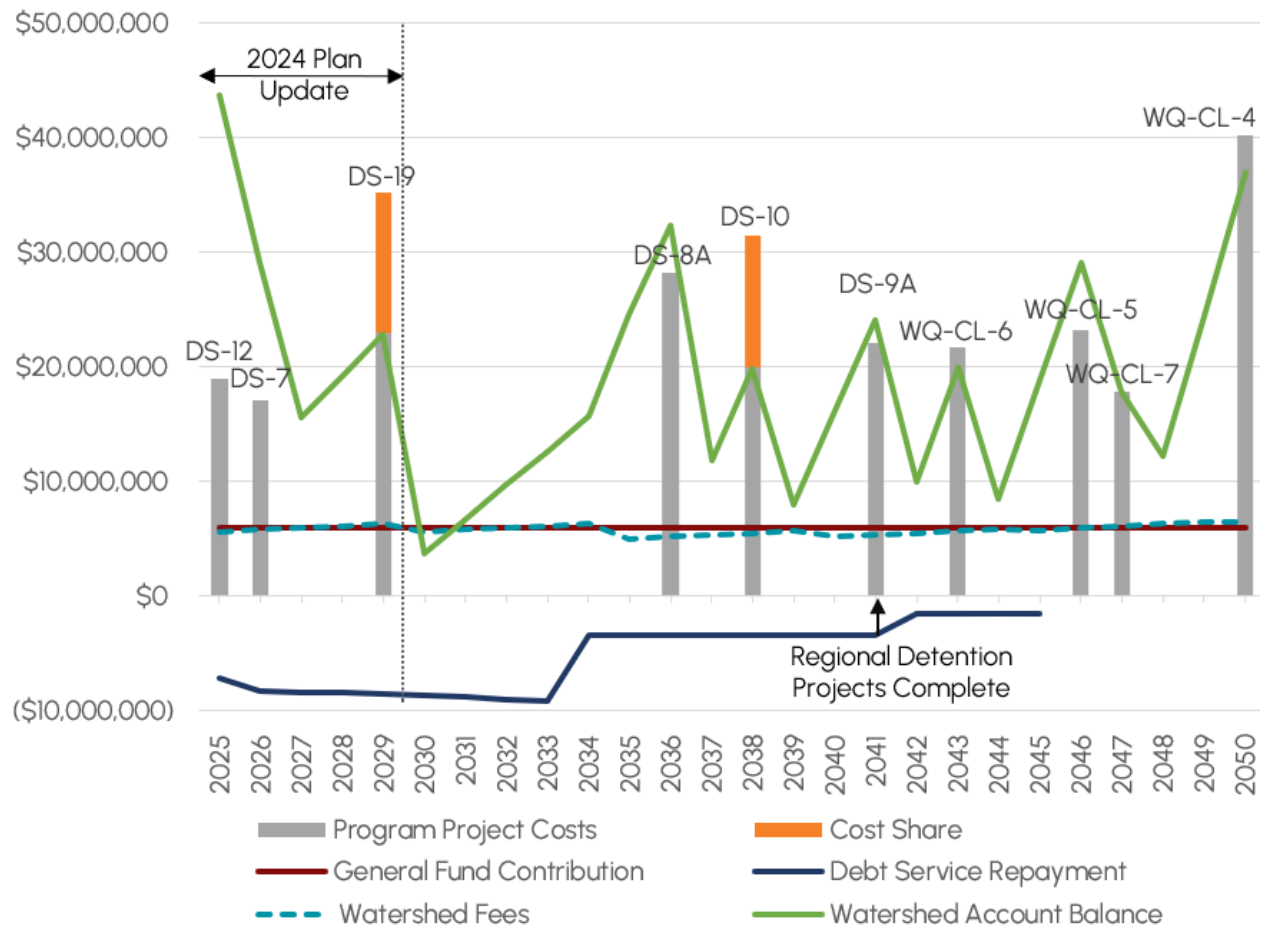
Figure A.6. Scenario 2.1: P-A-Y-G with \$20M Bond (3.0% interest over 20-yrs)



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).

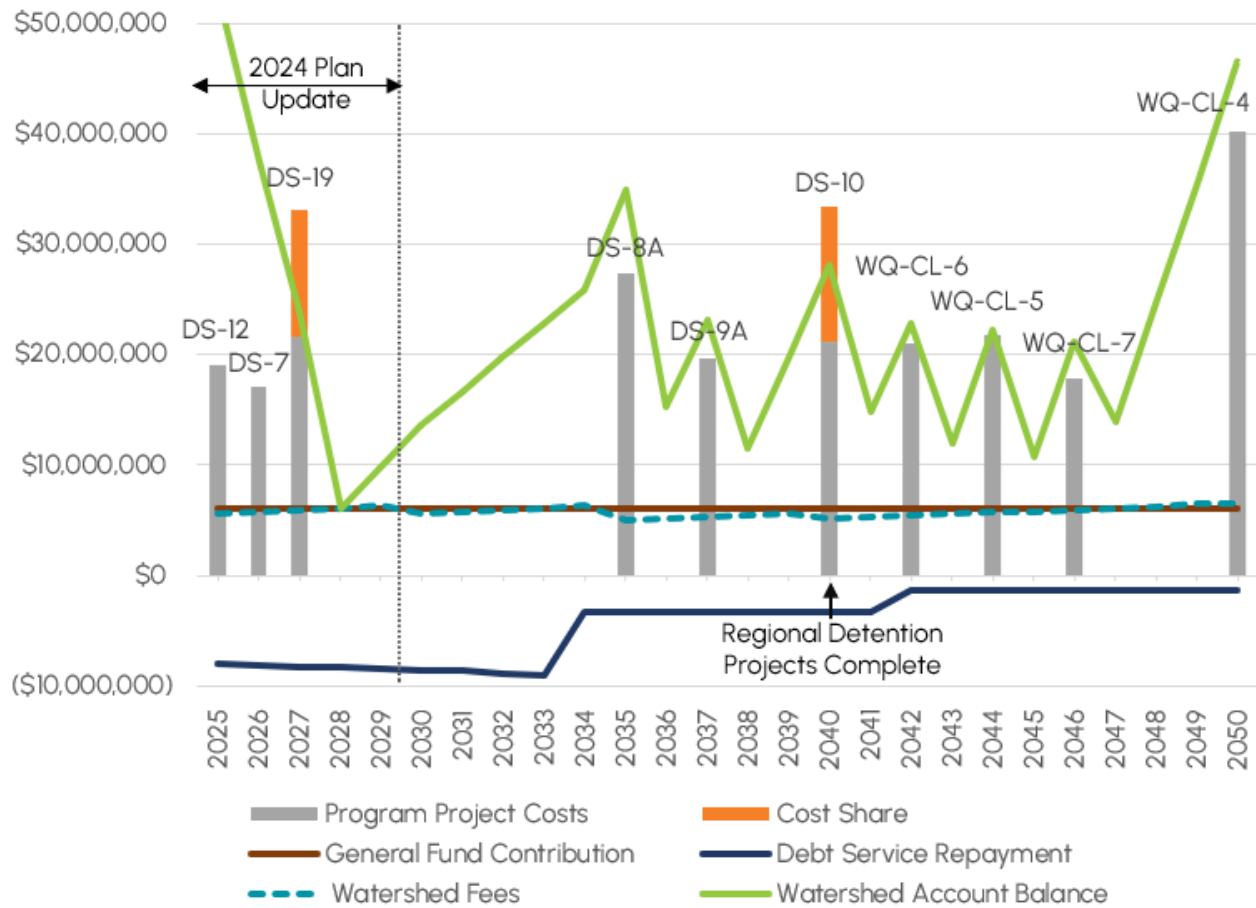
Figure A.7. Scenario 2.2: P-A-Y-G with \$20M Bond (4.5% interest over 20-yr)



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).

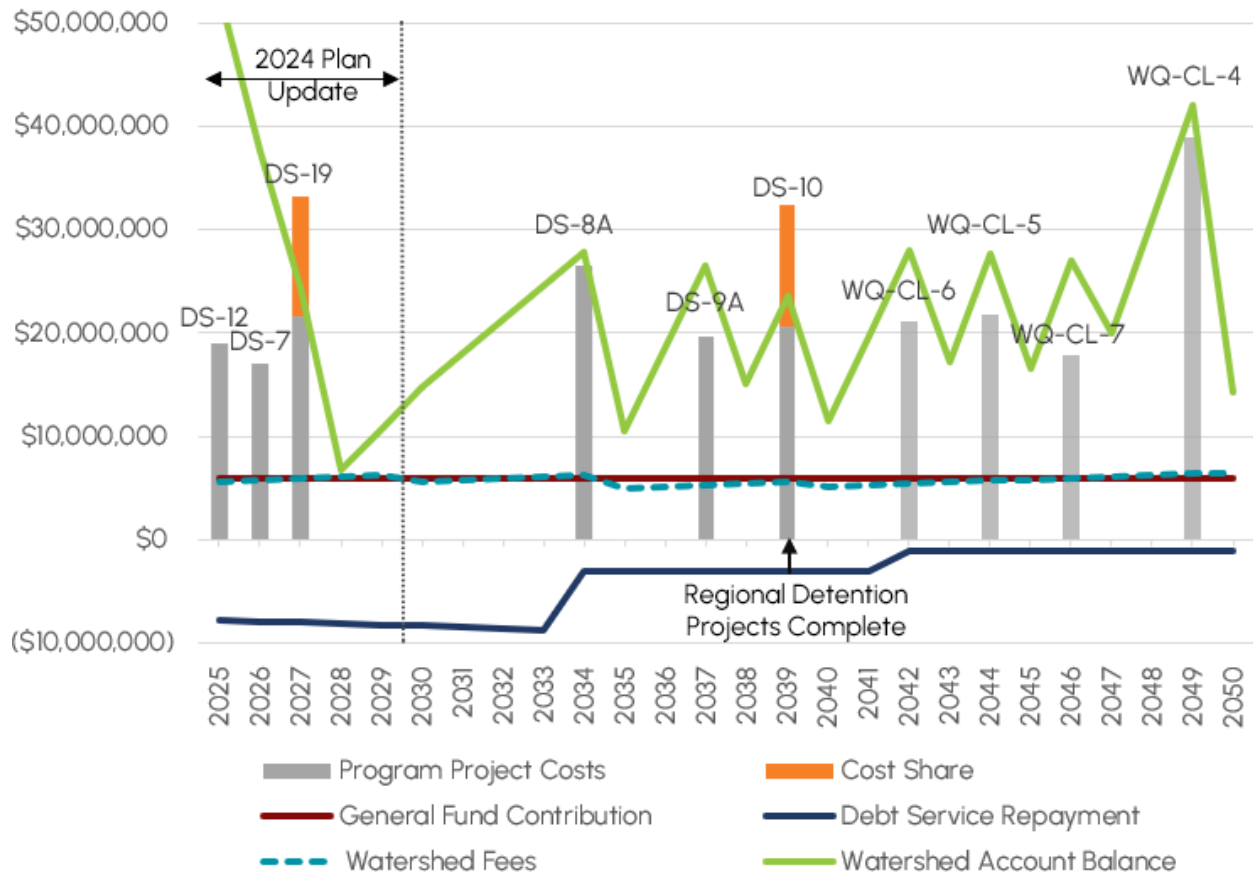
Figure A.8. Scenario 3.1: P-A-Y-G with \$30M WIFIA Loan (3.1% interest over 35-yr)



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).

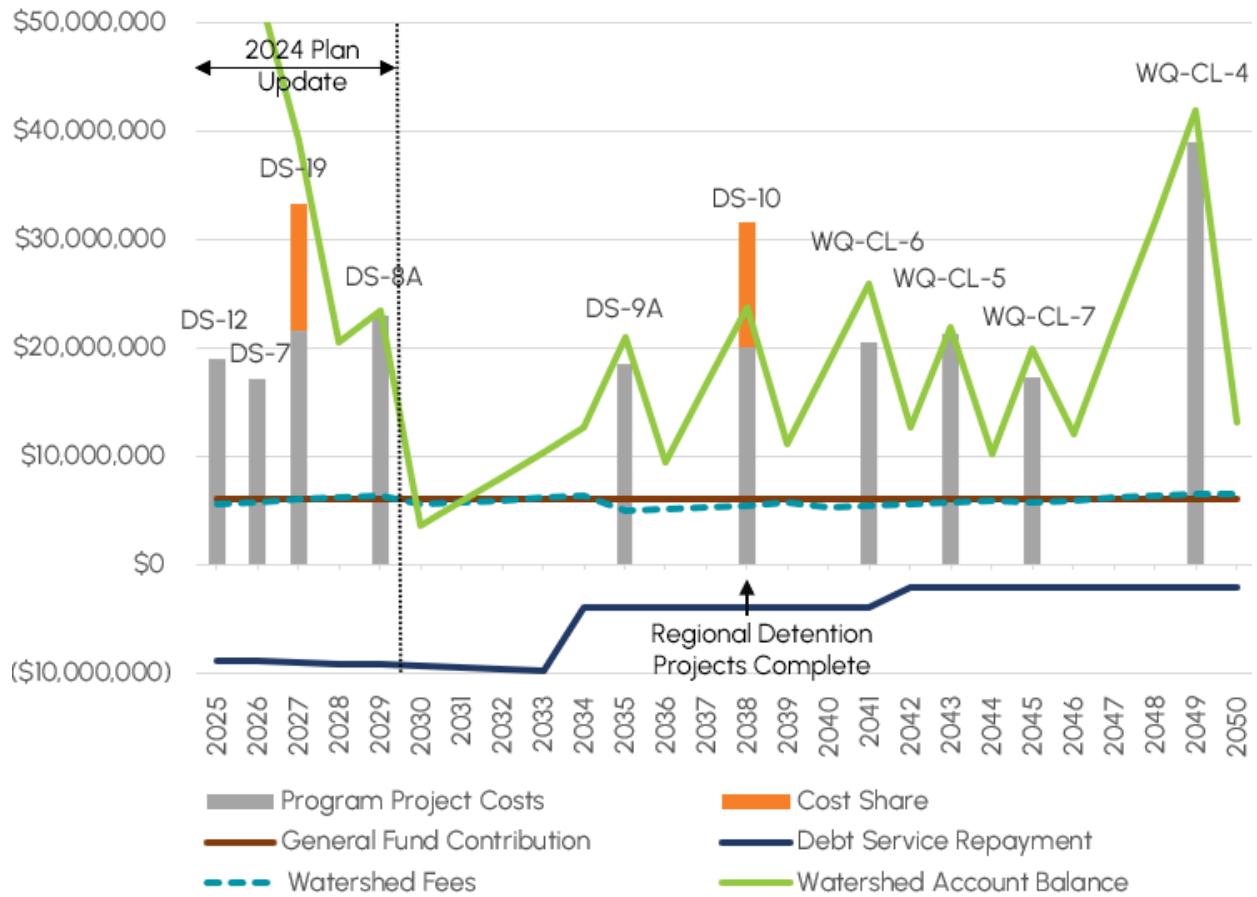
Figure A.9. Scenario 3.2: P-A-Y-G with \$30M WIFIA Loan (2.0% interest over 35-ys)



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).

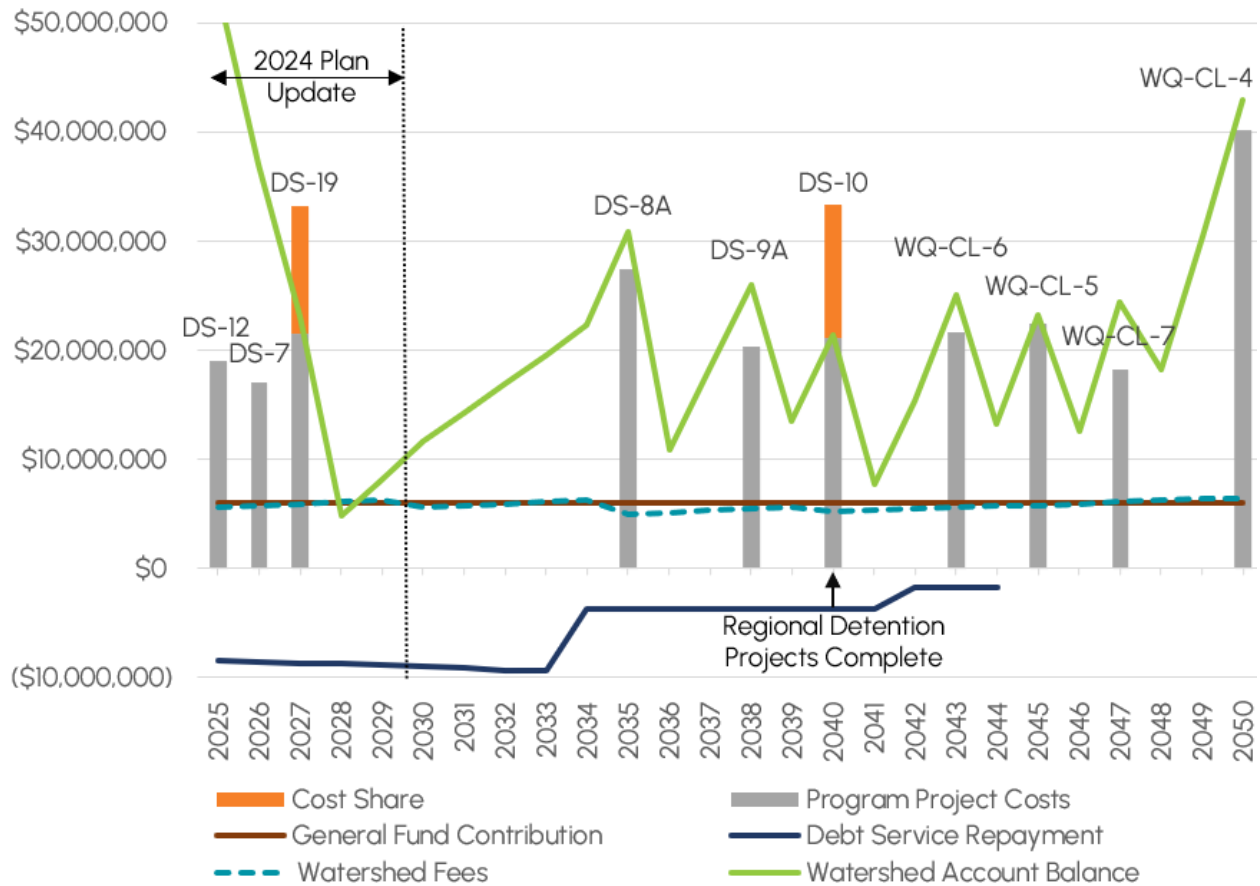
Figure A.10. Scenario 3.3: P-A-Y-G with \$46M WIFIA Loan (3.1% interest over 35-ysr)



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).

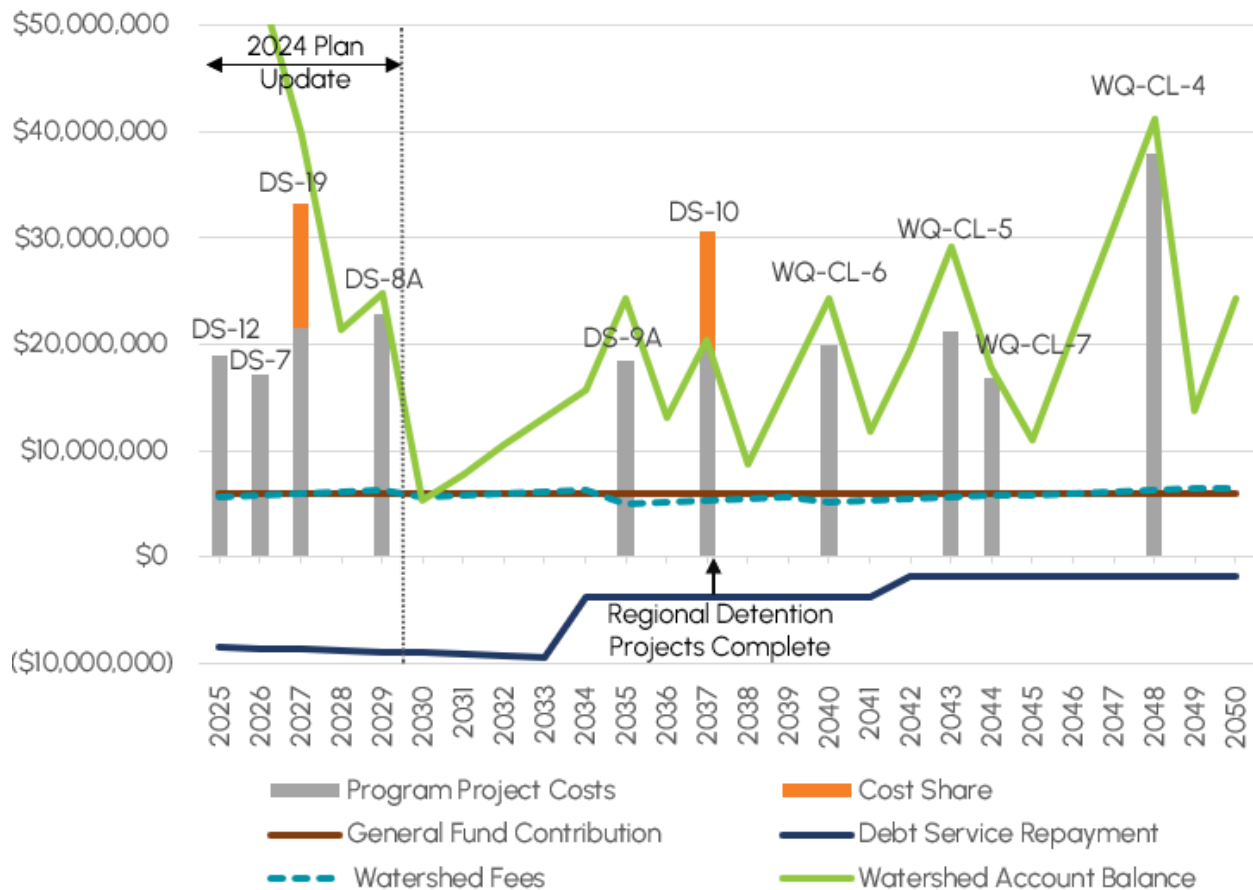
Figure A.II. Scenario 3.4: P-A-Y-G with \$30M WIFIA Loan (2.0% interest over 20-yr)



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).

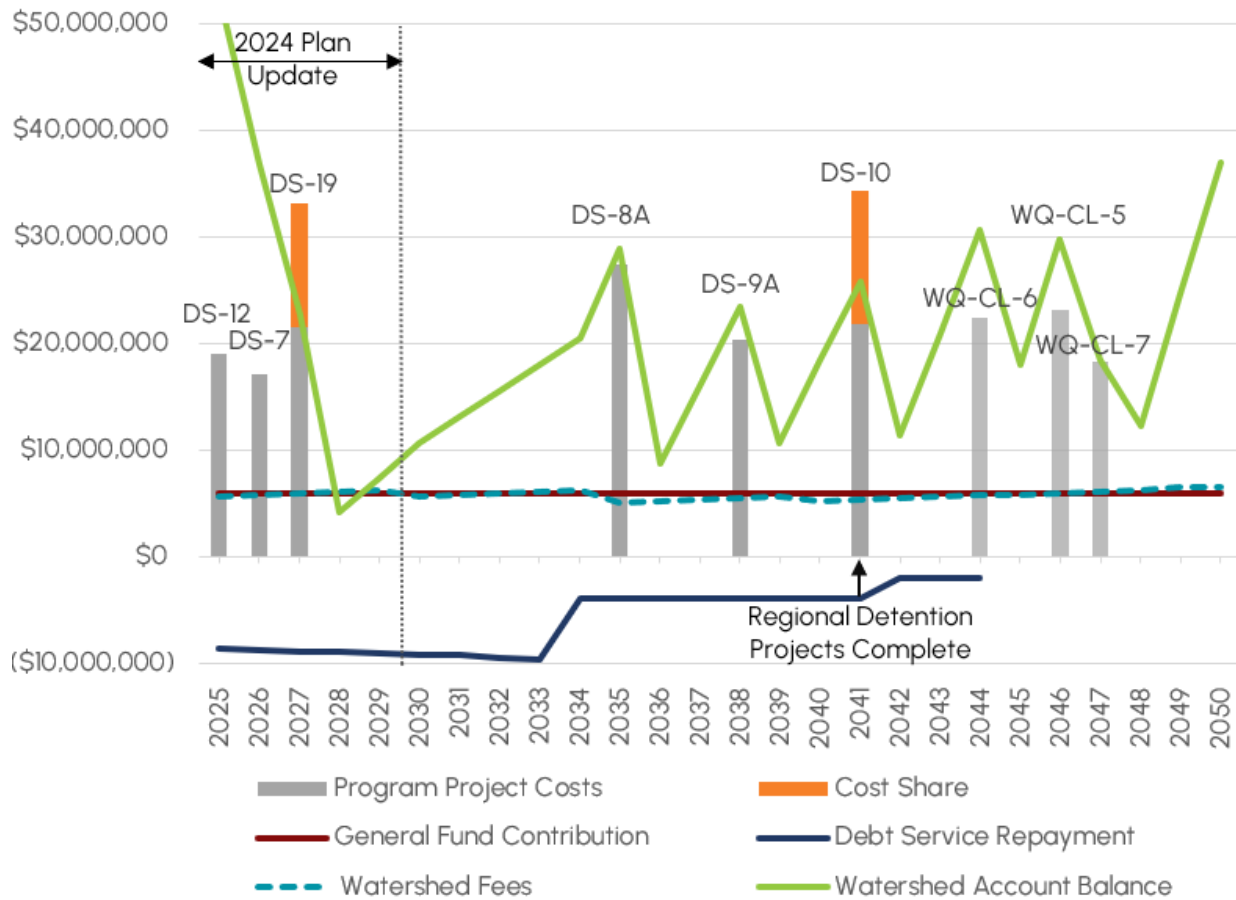
Figure A.12. Scenario 3.5: P-A-Y-G with \$46M WIFIA Loan (2.0% interest over 20-yr)



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