

CHERRY CREEK BASIN WATER QUALITY
AUTHORITY

***2023 CAPITAL IMPROVEMENT PROGRAM
SUPPORTING DATA***

TAC Draft – October 6, 2022

TAC Recommendation – November 3, 2022

Board Review Version – October 20, 2022

Board Final Version – November 17, 2022

2023 CAPITAL IMPROVEMENT PROGRAM

This document presents the details of the 2023 Capital Improvement Program as included in the Authority’s Budget adopted by the Board and includes the following information:

Table 1 – Summary of Potential Pollutant Reduction Facilities, Revision for 2023 CIP.

This table lists all the PRF projects that have been considered for implementation by the Authority since 2000 and shows their current status. The “green” font represents projects in progress and the “blue” font represents completed projects.

Prior to 2010, Cherry Creek Reservoir was under a total maximum annual load (TMAL) limitation for phosphorus. Since PRFs originally focused on reduction of phosphorus loads discharged into the reservoir, the table was developed to provide a brief summary of the design basis, projected loads and treatment, and estimated PRF costs and costs per pound of phosphorus immobilized. Currently there is no TMAL; instead the control strategy identified in Regulation No. 72 is to minimize nutrient (phosphorus and nitrogen) concentrations. Therefore, PRFs are still evaluated, in part, on their costs per pound for consistency between all potential PRFs (see also Stream Reclamation Unit Costs below). Additional information on how PRFs are evaluated, particularly stream reclamation type projects, is presented in the Authority’s report dated June 17, 2011 titled *Stream Reclamation Water Quality Benefit Evaluation Interim Status Report*.

The Cottonwood Creek Cattail Harvesting Pilot Project (CCB-13.3.1 A and B) included phosphorus reduction/removed (59-60 pounds per year) from the system based on 2020 Cattail Harvesting Pilot Project Memo for a unit cost \$1,000-1,017 per pound of phosphorus removed. In 2021, CCB-13.3.3.1 A removed 69 pounds of phosphorus at unit cost of \$1,200 per pound of phosphorus.

Table 2 – Summary of Recommended Pollutant Reduction Facilities 2023 – 2032 Budget Projections

This table lists the PRFs that are in the current, 10-year CIP projection with more detail provided for the projects in the current budget year. Since the Authority partners with other governmental agencies to design and construct some of the PRFs, the Authority’s portion of total project costs is also shown. The column labeled “obligated funds” represents the total amount approved by the Authority for the project prior to the budget year, since most projects take several years from concept through construction. Funds are considered “obligated” once the Board approves funding at a regular Board meeting. The highlights of the projects included in the 2023 Budget are described below.

CCBWQA’s funding on the East Shade Shelter Shoreline Stabilization Phase III (CCB-17.5) is 100% as it is a PRF in CCSP.

CCBWQA’s funding on Cherry Creek Stream Reclamation – Reaches 3 and 4 (CCB-5.14C) is 25% as it is a partner project.

CCBWQA’s funding of Cherry Creek – Reservoir to Lake View Drive Alternatives Analysis (CCB-5.16A) is 100%.

CCBWQA's funding on Cherry Creek Stream Reclamation at Dransfeldt Extension (CCB-5.17.1B) is at 7% (not the typical 25% partner project) as the project was advanced from 2024 and 2025 to 2022 and 2023 to meet the schedule for the requesting entity.

CCBWQA's funding on McMurdo Gulch Reclamation (CCB-7.4) is 25% as it is a partner project.

CCBWQA's funding on Lone Tree Creek in CCSP (CCB-21.3, Done in conjunction with Centennial Trail Project) is at 25% (not the typical 100% for projects within CCSP) of the stream reclamation portion of the larger trail project. The trail portion advanced the stream reclamation portion ahead of its water quality priority, limiting the funds available for the project. The \$112k shown is not currently in the budget for 2023 and would have to come out of contingency if done in 2023; \$95k was included in CCBWQA's 2022 Budget. If CCB-21.3 doesn't move forward, then the Lone Tree Creek in CCSP (CCB-21.3a, CCBWQA Only) was included in 2032 and is 100% CCBWQA funded. The schedule, cost, and priority will be reevaluated based on the Planning effort scheduled for Lone Tree Creek in 2023.

CCBWQA's funding on Happy Canyon Creek County Line to Cherry Creek (CCB-22.1) is at 25% as it is a partner project.

CCBWQA's funding on Dove Creek (CCB-22.1 and CCBW-23.1) is 25% as it is a partner project.

CCBWQA's funding on Piney Creek Reach 1 to 2 (CCB-6.5) is at 22% (not the typical 25% partner project) as that was the funding level requested by the requesting entity.

CCBWQA's funding on PRF Preservation, Acquisition, Lease of Land or Water is budgeted for \$100k and CCBWQA's percentage is not known as no project and costs have been identified yet for 2023.

2023 Operations and Maintenance Budget Detail

These tables provide further 2023 budget detail for operations and maintenance activities proposed for the constructed PRF's including the Reservoir Mixing System (i.e.: compressor and aeration system maintenance).

2023 Stream Reclamation Unit Costs

These figures show the stream reclamation unit costs. Figure 1 is for PRFs within CCSP that are fully CCBWQA funded and Figure 2 for projects outside of CCSP that are shared funding.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AB	
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																											
2	TABLE 1 - SUMMARY OF POTENTIAL POLLUTANT REDUCTION FACILITIES																											
3	REVISIONS FOR 2023 CIP																											
4	Date: November 11, 2022 Color Code: Blue: Project Completed Green: Planned for design/construction during 5-year period Red: See 2021 CIP Notes for changes to this Spreadsheet																											
5																												
6																												
7																												
8																												
9																												
10																												
11	Proj. Designation	Project Title	Status	Description	Design Basis				Projected Loads			Projected Treatment		Cost Estimate (1000S)								Unit Cost (\$/pound)		Note				
PRF Type					Quantity	Unit	Rate	Volume	Rate	Total	Source	Removal	lbs Removed	Capital	Land Acquisition	Water Augment ⁸	Capital Replace ⁹	O&M	Annual Cost @ 4%	CCBWQA Share (%)	CCBWQA Share (\$)	w/o cost sharing	w/cost sharing					
12	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)				
14	CCR-1	Reservoir Destratification (mixing)	Officially start-up April 2008	Use inlake mixing to minimize algae blooms, therefore chlorophyll a	369	sq mi	n/a	n/a	n/a		n/a		n/a		810	lbs/season	\$ 968				28	\$ 80	100%	\$968	\$ 99	\$ 99		
15	CCB-1	CCSP Wetlands	Prelim design prepared in 2003 (Ref 1, 8)	Restore 60 Acres of wetlands in multiple phases	369	sq mi	3.5 cfs avg daily flow	1415 af/210 days	0.35	mg/l	1050	lbs/yr	Base flow		600	lbs/season	\$ 1,928	\$ -	\$ -	\$ -	19	\$ 123	100%	\$1,928	\$ 204	\$ 204	18	
16	CCB-5.1	Cherry Creek Sediment Pond at Arapahoe Road (see CCB-5.14)	Project eliminated and area combined into Phase III of CCB-5.14	Design and construct sediment pond	369	sq mi		3600 cy sed/yr	14.6	mg/l	92	lbs/yr	base flow		85	lbs/year	\$ 2,355	\$ 50	\$ -	\$ -	\$ 90	\$ 219	18%	\$424	\$ 2,575	\$ 463	1, 19	
17	CCB-5.2	Arapahoe/Douglas County Line Stream Stabilization	Project completed w/o Authority participation	Local stream stabilization (L = 2700 ft)	0.51	mi			100	lbs/mi	51	lbs/yr	Storm Flow	90%	46	lbs/year	\$ 1,062	\$ -	\$ -	\$ -	1	\$ 58	0%	\$0	\$ 1,258	\$ -		
18	CCB-5.3	Cottonwood Bridge Stream Stabilization	Project completed by Parker w/o Authority participation	Local stream stabilization (L = 2700 ft)	0.51	mi			100	lbs/mi	51	lbs/yr	Storm Flow	90%	46	lbs/year	\$ 436	\$ -	\$ -	\$ -	2	\$ 25	0%	\$0	\$ 551	\$ -		
19	CCB-5.4	Cherry Creek Stream Stabilization at Main Street (Parker)	Conceptual design by UDFCD	Local stream stabilization (L = 4000 ft)	0.76	mi			100	lbs/mi	76	lbs/yr	Storm Flow	90%	68	lbs/year	\$ 1,776	\$ -	\$ -	\$ -	1	\$ 96	11%	\$200	\$ 1,410	\$ 159	2, 3	
20	CCB-5.5	Stroh Road Stream Stabilization	Project completed by Parker w/o Authority participation	Stream stabilization (L = 5000 ft)	0.95	mi			100	lbs/mi	95	lbs/yr	Storm Flow	90%	85	lbs/year	\$ 218	\$ -	\$ -	\$ -	1	\$ 13	0%	\$0	\$ 149	\$ -		
21	CCB-5.6	Cherry Creek Stream Stabilization at Lincoln Avenue (Parker)	Conceptual design by UDFCD	Local stream stabilization (L = 2350 ft)	0.45	mi			100	lbs/mi	45	lbs/yr	Storm Flow	90%	40	lbs/year	\$ 1,447	\$ -	\$ -	\$ -	1	\$ 79	21%	\$304	\$ 1,960	\$ 412	2, 3	
22	CCB-5.7	Cherry Creek Stream Stabilization at Eco-Park (SEMSWA)	IGA w/SEMSWA for design in 2010 and construction in 2011/2012	Local stream stabilization (L = 6850 ft)	1.30	mi			100	lbs/mi	130	lbs/yr	Storm Flow	90%	117	lbs/year	\$ 4,756	\$ -	\$ -	\$ -	\$ 1	\$ 256	24%	\$1,155	\$ 2,191	\$ 532	2, 3	
23	CCB-5.8	Cherry Creek Stream Reclamation U/S Arapahoe Rd (Aurora) (see CCB-5.14)	Now Phase 5 of CCB-5.14	Local stream stabilization (L = 2200 ft)	0.42	mi			100	lbs/mi	42	lbs/yr	Storm Flow	90%	38	lbs/year	\$ -	\$ -	\$ -	\$ -	1	\$ 1	35%	\$0	\$ 27	\$ 9	2, 3	
24	CCB-5.9.1	Cherry Creek Stream Stabilization at 12-Mile Park (CCSP) - Phase I	Design completed in 2011 for Phase I.	Local stream stabilization (L = 500 ft)	0.09	mi			100	lbs/mi	9	lbs/yr	Storm Flow	90%	9	lbs/year	\$ 296	\$ -	\$ -	\$ -	\$ 1	\$ 17	100%	\$296	\$ 1,979	\$ 1,979	2, 20	
25	CCB-5.9.2	Cherry Creek Stream Stabilization at 12-Mile Park (CCSP) - Phase II	Design completed in 2013 for Phase II.	Local stream stabilization (L = 2500 ft)	0.47	mi			100	lbs/mi	47	lbs/yr	Storm Flow	90%	43	lbs/year	\$ 1,429	\$ -	\$ -	\$ -	\$ 1	\$ 78	100%	\$1,429	\$ 1,820	\$ 1,820	2, 20	
26	CCB-5.10	Cherry Creek Stream Stabilization at PJCOS (Vermillion Creek, PJMD.)	Design completed by PJMD. Authority is funding partner in design	Local stream stabilization (L = 5100 ft)	0.97	mi			100	lbs/mi	97	lbs/yr	Storm Flow	90%	87	lbs/year	\$ 3,017	\$ -	\$ -	\$ -	\$ 2	\$ 164	21%	\$643	\$ 1,882	\$ 401	2, 3	
27	CCB-5.11	Cherry Creek Stream Stabilization at Norton Farms (Parker)	Conceptual design by UDFCD identified priority 3	Local stream stabilization (L = 2200 ft)	0.42	mi			100	lbs/mi	42	lbs/yr	Storm Flow	90%	38	lbs/year	\$ 900	\$ -	\$ -	\$ -	1	\$ 49	28%	\$252	\$ 1,313	\$ 368	2, 3	
28	CCB-5.12	Cherry Creek Stream Stabilization at Pine Lane	Project completed by Parker w/o Authority participation	Local stream stabilization (L = 1500 ft)	0.28	mi			100	lbs/mi	28	lbs/yr	Storm Flow	90%	26	lbs/year	\$ 500	\$ -	\$ -	\$ -	1	\$ 28		\$0	\$ 1,087	\$ -		
29	CCB-5.13	Cherry Creek Stream Stabilization at Shop Creek Trail	Preliminary design completed in 2010 (Ref 12).	Local Stream Stabilization (L = 2000 ft)	0.38	mi			100	lbs/mi	38	lbs/yr	Storm Flow	90%	34	lbs/year	\$ 603	\$ -	\$ -	\$ -	6	\$ 38	100%	\$603	\$ 1,125	\$ 1,125	2, 3	
30	CCB-5.14	Cherry Creek Stream Reclamation - CCSP to Eco Park (Ph II to V)	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 11000 ft)	2.08	mi			100	lbs/mi	208	lbs/yr	Storm Flow	90%	188	lbs/year	\$ 10,200	\$ -	\$ -	\$ -	\$ 1	\$ 547	25%	\$2,499	\$ 2,920	\$ 715	2, 3	

CHERRY CREEK BASIN WATER QUALITY AUTHORITY
TABLE 1 - SUMMARY OF POTENTIAL POLLUTANT REDUCTION FACILITIES
REVISIONS FOR 2023 CIP

Date: November 11, 2022
Color Code: Blue: Project Completed
Green: Planned for design/construction during 5-year period
Red: See 2021 CIP Notes for changes to this Spreadsheet

Proj. Designation	Project Title	Status	Description	Design Basis				Projected Loads			Projected Treatment		Cost Estimate (1000S)							Unit Cost (\$/pound)		Note				
				PRF Type	Quantity	Unit	Rate	Volume	Rate	Total	Source	Removal	lbs Removed	Capital	Land Acquisition	Water Augment ⁸	Capital Replace ⁹	O&M	Annual Cost @ 4%	CCBWQA Share (%)	CCBWQA Share (\$)		w/o cost sharing	w/cost sharing		
CCB-5.14A	Cherry Creek Stream Reclamation - Eco Park to Soccer Fields	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 2700 ft)	0.51	mi			100	lbs/mi	51	lbs/yr	Storm Flow	90%	46	lbs/year	\$ 1,850	\$ -	\$ -	\$ -	\$ 1	\$ 100	35%	\$650	\$ 2,181	\$ 766	2, 3
CCB-5.14B	Cherry Creek Stream Reclamation - Valley Country Club	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 2000 ft.=1400 ft on Cherry Creek and 600 ft. on Tributary)	0.38	mi			100	lbs/mi	38	lbs/yr	Storm Flow	90%	34	lbs/year	\$ 2,284	\$ -	\$ -	\$ -	\$ 1	\$ 123	21%	\$484	\$ 3,607	\$ 764	2, 3
CCB-5.14C	Cherry Creek Stream Reclamation - Valley Country Club to Soccer Fields (Reaches 3 and 4)	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 5167 ft on Cherry Creek)	0.98	mi			100	lbs/mi	98	lbs/yr	Storm Flow	90%	88	lbs/year	\$ 5,287	\$ -	\$ -	\$ -	\$ 1	\$ 284	25%	\$1,322	\$ 3,223	\$ 806	2, 3
CCB-5.14D	Cherry Creek Stream Reclamation - Remaining Sections (not included in Reaches 3 and 4) from Valley Country Club to Soccer Fields	Projects with UDFCD, SEMSWA, and Aurora. Phases started in 2010.	Local stream stabilization (L = 3688 ft on Cherry Creek)	0.70	mi			100	lbs/mi	70	lbs/yr	Storm Flow	90%	63	lbs/year	\$ 2,980	\$ -	\$ -	\$ -	\$ 1	\$ 161	25%	\$745	\$ 2,556	\$ 639	2, 3
CCB-5.15	Cherry Creek Stream Reclamation at Country Meadows (Hess Rd)	Project by Town of Parker and Douglas County	Local stream stabilization (L = 7700 ft)	1.46	mi			100	lbs/mi	146	lbs/yr	Storm Flow	90%	131	lbs/year	\$ 2,170	\$ -	\$ -	\$ -	\$ 2	\$ 118	24%	\$520	\$ 901	\$ 216	
CCB-5.16	Cherry Creek Stream Reclamation - 12 Mile Phase III	Project w/in CCSP identified as Reach 1 in Project CCB-5.14 work.	Local stream stabilization (L = 30 ft.)	0.01	mi			100	lbs/mi	1	lbs/yr	Storm Flow	90%	1	lbs/year	\$ 300	\$ -	\$ -	\$ -	\$ 3	\$ 19	100%	\$300	\$ 37,299	\$ 37,299	2, 20
CCB-5.16A	Cherry Creek Stream Reclamation - Reservoir to Lake View Drive (Reach 1 in Muller's 2022 Stream Assessment Report)	Project w/in CCSP	Local stream stabilization (L = 6365 ft.)	1.21	mi			100	lbs/mi	120.5	lbs/yr	Storm Flow	90%	108	lbs/year	\$ 6,842	\$ -	\$ -	\$ -	\$ 68	\$ 435	100%	\$6,842	\$ 4,009	\$ 4,009	2, 20
CCB-5.16B	Cherry Creek Stream Reclamation - Lake View Drive to North Side of DOLA (Reach 2 in Muller's 2022 Stream Assessment Report)	Project w/in CCSP	Local stream stabilization (L = 5220 ft.)	0.99	mi			100	lbs/mi	98.9	lbs/yr	Storm Flow	90%	89	lbs/year	\$ 5,612	\$ -	\$ -	\$ -	\$ 56	\$ 357	100%	\$5,612	\$ 4,010	\$ 4,010	2, 20
CCB-5.16C	Cherry Creek Stream Reclamation - North Side of DOLA to CCSP Boundaries (Reaches 3 and 4 in Muller's 2022 Stream Assessment Report)	Project w/in CCSP	Local stream stabilization (Cherry Creek Reach 3 L = 7353 ft, Piney Creek Reach 4 L = 2000 ft)	1.77	mi			100	lbs/mi	177.1	lbs/yr	Storm Flow	90%	159	lbs/year	\$ 10,054	\$ -	\$ -	\$ -	\$ 101	\$ 639	100%	\$10,054	\$ 4,009	\$ 4,009	2, 20
CCB-5.17.1A	Cherry Creek Stream Reclamation at KOA	Preliminary design completed 2019, Extension Requested by UDFCD and Parker in 2019	Local stream stabilization (L = 1400 ft original, L = 2000 ft with 600 ft extension)	0.38	mi			100	lbs/mi	38	lbs/yr	Storm Flow	90%	34	lbs/year	\$ 2,035	\$ -	\$ -	\$ -	\$ 20	\$ 129	20%	\$375	\$ 3,795	\$ 776	2, 3
CCB-5.17.1B	Cherry Creek Stream Reclamation at Dransfeldt	Design in 2021, Construction in 2023	Local stream stabilization (L = 2400 ft original)	0.45	mi			100	lbs/mi	45	lbs/yr	Storm Flow	90%	41	lbs/year	\$ 6,010	\$ -	\$ -	\$ -	\$ 60	\$ 382	7%	\$400	\$ 9,340	\$ 622	2, 3
CCB-5.17.2	Cherry Creek Stream Reclamation U/S Scott Road	Project requested by Douglas County and UDFCD in 2019	Local stream stabilization (L = 4300 ft)	0.81	mi			100	lbs/mi	81	lbs/yr	Storm Flow	90%	73	lbs/year	\$ 5,237	\$ -	\$ -	\$ -	\$ 52	\$ 333	17%	\$900	\$ 4,543	\$ 781	2, 3
CCB-6.1	Piney Creek Stream Stabilization - Project 1	Authority funded \$118,000 Arapahoe County in 2002.	Restore 5200 lf upstream of Parker Road	22.90	sq mi	n/a	n/a	100	lbs/mi	100	lbs/yr	Storm Flow	90%	90	lbs/year	\$ 997	\$ -	\$ -	\$ -	at	#VALUE!	13%	\$130	#VALUE!	#VALUE!	2, 3
CCB-6.2	Piney Creek Stream Stabilization - Project 2 U/S Buckley Rd	Project completed w/o Authority participation	Reclaim 1700 lf upstream of Buckley Road	0.32	mi			100	lbs/mi	32	lbs/mi	Storm Flow	90%	29	lbs/year	\$ 998	\$ -	\$ -	\$ -	\$ 1	\$ 54	12%	\$120	\$ 1,880	\$ 226	2, 3
CCB-6.3	Piney Creek Stream Sediment Removal - Saddle Rock Golf Course	Request from Aurora in 2011	Sediment removal to restore channel capacity (L = unk)	unk				unk		unk	unk	Sediment	100%	5346	unk	\$ 383	\$ -	\$ -	\$ -	\$ 10	\$ 30	25%	\$96	\$ 6	\$ 1	
CCB-6.4	Piney Creek Stream Reclamation - Reaches 6 & 7	Request from UDFCD in 2014	Local stream stabilization (L = 6,000 ft)	1.14	mi			unk		365	lbs/yr	Storm Flow	90%	329	lbs/year	\$ 11,000	\$ -	\$ -	\$ -	\$ 2	\$ 591	25%	\$2,750	\$ 1,800	\$ 450	12

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AB	
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																											
2	TABLE 1 - SUMMARY OF POTENTIAL POLLUTANT REDUCTION FACILITIES																											
3	REVISIONS FOR 2023 CIP																											
4	<p>Date: November 11, 2022</p> <p>Color Code: Blue: Project Completed Green: Planned for design/construction during 5-year period Red: See 2021 CIP Notes for changes to this Spreadsheet</p>																											
5																												
6																												
7																												
8																												
9																												
10																												
11	Proj. Designation	Project Title	Status	Description	Design Basis				Projected Loads			Projected Treatment		Cost Estimate (1000S)								Unit Cost (\$/pound)		Note				
PRF Type					Quantity	Unit	Rate	Volume	Rate	Total	Source	Removal	lbs Removed	Capital	Land Acquisition	Water Augment ⁸	Capital Replace ⁹	O&M	Annual Cost @ 4%	CCBWQA Share (%)	CCBWQA Share (\$)	w/o cost sharing	w/cost sharing					
12																												
47	CCB-6.5	Piney Creek Reach 1 to 2 (SEMSWA)	Requested in 2020	2900 lf of stream reclamation	0.55	mi				100	lbs/mi	55	lbs/mi	Storm Flow	90%	49	lbs/year	\$ 2,350	\$ -	\$ -	\$ -	\$ 2	\$ 128	22%	\$515	\$ 2,588	\$ 567	2,3
48	CCB-6.6	Piney Creek Tower to Orchard (SEMSWA)	Requested in 2020	3800 lf of stream reclamation	0.72	mi				100	lbs/mi	72	lbs/mi	Storm Flow	90%	65	lbs/year	\$ 3,000	\$ -	\$ -	\$ -	\$ 2	\$ 163	23%	\$700	\$ 2,512	\$ 586	2,3
49	CCB-7.1	McMurdo Gulch Reclamation (Castle Rock)	Project completed in 2011	Stream Reclamation (L = 15,000 lf)	2.84	mi				100	lbs/mi	284	lbs/yr	Storm Flow	90%	256	lbs/year	\$ 1,470	\$ -	\$ -	\$ -	28	\$ 107	43%	\$630	\$ 419	\$ 180	
50	CCB-7.2	McMurdo Gulch Reclamation (Castle Rock) 19/20 Project	Design in 2019, Construction in 2020	Stream Reclamation (L = 2,000 lf)	0.38	mi				100	lbs/mi	38	lbs/yr	Storm Flow	90%	34	lbs/year	\$ 1,677	\$ -	\$ -	\$ -	17	\$ 107	25%	\$420	\$ 3,127	\$ 783	2,3
51	CCB-7.3	McMurdo Gulch Reclamation (Castle Rock) 20/21/22 Project	Design in 2020, Construction 2021	Stream Reclamation (L = 3,700 lf)	0.70	mi				100	lbs/mi	70	lbs/yr	Storm Flow	90%	63	lbs/year	\$ 2,460	\$ -	\$ -	\$ -	25	\$ 156	25%	\$615	\$ 2,480	\$ 620	2,3
52	CCB-7.4	McMurdo Gulch Reclamation (Castle Rock) 22/23/24 Project	Design in 2022, Construction 2023 and 2024	Stream Reclamation (L = 6,550 lf)	1.24	mi				100	lbs/mi	124	lbs/yr	Storm Flow	90%	112	lbs/year	\$ 3,298	\$ -	\$ -	\$ -	33	\$ 210	25%	\$825	\$ 1,878	\$ 470	2,3
53	CCB-8	Limestone Filter Enhancement	Specific project not identified	Construct limestone filter bed downstream of retention pond	1.0	sq mi	n/a	10.7 af/year/sq mile		427	lbs/sq mi	427	lbs/yr	Base and storm flow	20%	85	lbs/year/mi ²	\$ 943	\$ -	\$ 595	\$ -	1	\$ 83	43%	\$405	\$ 977	\$ 420	
54	CCB-11	Advanced Water Treatment Plant	Conceptual design prepared	Construct 2 MGD AWT plant on Cottonwood Creek to treat Cherry Creek and Cottonwood Creek flows (0.21-mg/ influent, 0.03 mg/l disch)	3	cfs	2-MGD	2260	0.21	mg/l	1272	lbs/yr	Base flow and groundwater	90%	1145	lbs/year	\$ 4,593	unknown	unknown	\$ -	69		100%	\$4,593	\$ -	\$ -	11	
55	CCB-12	Bowtie Property PRF	Purchase completed 2003	Stabilize confluence (Ph I) and construct sediment pond (Ph 2)	22	sq mi	2-year flood	300 af	500	mg/l/ton	85	lbs/yr	base flow and minor flood	70% pond 65% wetlands	235	lbs/year	\$ 826	\$ 300	\$ 63	\$ 1.8	6	\$ 70	100%	\$826	\$ 299	\$ 299		
56	CCB-12.1	Bowtie Phase I	No action to date	Constructed Wetlands u/s Bowtie Property in Cherry Creek (0.20-disch)	369	sq mi	0.5 cfs avg daily flow	210 af/210 days	0.35	mg/l	86	lbs/yr	Base flow	assumed effluent conc	86	lbs/season	\$ 235	\$ 200	\$ 80	\$ -	7	\$ 35	100%	\$235	\$ 404	\$ 404		
57	CCB-13.1	Cottonwood/Peoria Wetlands Pond	Completed 2003. Restorative maintenance required in 2009	Joint funded project with UDFCD, GWV, Arapahoe County	8.30	sq mi							base and flood flows	measured	363	lbs/year	\$ 1,636	\$ -	\$ -	\$ -	5	\$ 93	12%	\$196	\$ 255	\$ 31	2	
58	CCB-13.2	Cottonwood Stream Reclamation in CCSP	Phase I completed in 2004. Phase II completed June 2008 (Ref 2)	11,600 lf of stream reclamation from Peoria to Perimeter Rd. Pond	2.20	mi				100	lbs/mi	220	lbs/yr	base and flood flows	see separate calcs	730	lbs/year	\$ 2,200	\$ -	\$ -	\$ -	55	\$ 173	100%	\$2,200	\$ 237	\$ 237	2
59	CCB-13.3	Cottonwood Creek Stream Stabilization at Easter Avenue	Authority contributed \$338,000 for construction in 2010.	2,600 lf of stream reclamation from Easter Ave to Briarwood Ave	0.49	mi				100	lbs/mi	49	lbs/yr	Storm Flow	90%	44	lbs/year	\$ 1,350	\$ -	\$ -	\$ -	1	\$ 73	25%	\$338	\$ 1,655	\$ 414	2
60	CCB-13.3.1A	Cottonwood Creek Cattail Harvesting from Reservoir to Peoria Street-	Pilot Project - Odd Years Harvest Left Bank	1.7 Acres of Cattail Harvesting	2.90	mi					lbs/mi	30	lbs/yr	Storm Flow	100%	59	lbs/year	\$ 60					100%	\$60	\$ 1,017	\$ 1,017	4	
61	CCB-13.3.1B	Cottonwood Creek Cattail Harvesting from Reservoir to Peoria Street-	Pilot Project - Even Years Harvest Right Bank	2.0 Acres of Cattail Harvesting	2.90	mi					lbs/mi	237	lbs/yr	Storm Flow	100%	60	lbs/year	\$ 60					100%	\$60	\$ 1,000	\$ 1,000	4	
62	CCB-13.4	Peoria Trib B/Airport East and West Pond (Outfall C-1)	Cottonwood Creek Master Planned Improvements. Ponds combined into one.	Combined existing detention ponds and provided EURV	0.35	sq mi				400	lbs/sq mi	140	lbs/yr	Base and storm flow	40%	56	lbs/yr	\$ 523	\$ -	\$ -	\$ -	-	\$ 28	25%	\$131	\$ 500	\$ 125	
63	CCB-13.5.1	Cottonwood Creek at Briarwood (SEMSWA)	Requested in 2019	700 lf of stream reclamation	0.13	mi				100	lbs/mi	13	lbs/yr	Storm Flow	90%	12	lbs/year	\$ 850	\$ -	\$ -	\$ -	9	\$ 54	16%	\$140	\$ 4,529	\$ 746	
64	CCB-13.5.2	Cottonwood Creek D/S Easter Avenue	Requested in 2019	800 lf of stream reclamation	0.15	mi				100	lbs/mi	15	lbs/yr	Storm Flow	90%	14	lbs/year	\$ 800	\$ -	\$ -	\$ -	8	\$ 51	20%	\$160	\$ 3,730	\$ 746	
65	CCB-13.5.3	Cottonwood Creek Tributary - Shooting Area Tributary (CCSP)	Requested in 2020	600 lf of stream reclamation	0.11	mi				100	lbs/mi	11	lbs/yr	Storm Flow	90%	10	lbs/year	\$ 300	\$ -	\$ -	\$ -	3	\$ 19	25%	\$75	\$ 1,865	\$ 466	2,3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AB		
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																												
2	TABLE 1 - SUMMARY OF POTENTIAL POLLUTANT REDUCTION FACILITIES																												
3	REVISIONS FOR 2023 CIP																												
4	<p style="text-align: center;">Date: November 11, 2022</p> <p style="text-align: center;">Color Code: Blue: Project Completed Green: Planned for design/construction during 5-year period Red: See 2021 CIP Notes for changes to this Spreadsheet</p>																												
5																													
6																													
7																													
8																													
9																													
10																													
11	Proj. Designation	Project Title	Status	Description	Design Basis				Projected Loads				Projected Treatment			Cost Estimate (1000S)							Unit Cost (\$/pound)		Note				
PRF Type					Quantity	Unit	Rate	Volume	Rate	Total	Source	Removal	lbs Removed	Capital	Land Acquisition	Water Augment ⁸	Capital Replace ⁹	O&M	Annual Cost @ 4%	CCBWQA Share (%)	CCBWQA Share (\$)	w/o cost sharing	w/cost sharing						
12	CCB-13.5.4	Cottonwood Creek and Tributary C (IWSD)	Requested in 2020	2080 lf of stream reclamation	0.39	mi			100	lbs/mi	39	lbs/yr	Storm Flow	90%	35	lbs/year	\$ 1,664	\$ -	\$ -	\$ -	17	\$ 106	25%	\$416	\$ 2,984	\$ 746	2, 3		
66	CCB-13.5.5	Windmill Creek Pond W-9 Retrofit (SEMSWA)				sq mi		3600	cy sed/yr		mg/l	lbs/yr	base flow			lbs/year	\$ 150	\$ 50	\$ -	\$ -	\$ 90	\$ 101	25%	\$38	#DIV/0!	#DIV/0!	5		
67	CCB-14	Bellevue Wetlands	Co-funding opportunity with USACE on indefinite hold	Retrofit existing develop. w/wet detention pond	235	Ac SF Resid			400	lbs/sq mi	145	lbs/yr	Base and storm flow	50%	73	lbs/year	\$ 210	\$ -	\$ -	\$ -	\$ 2	\$ 13	100%	\$210	\$ 183	\$ 183	2		
68	CCB-15	Surface Water Reuse at Cherry Creek Vista	Supplemental water not available. Project on indefinite hold.	Use water from Cottonwood Creek to irrigate 10-acres			2.92	af/ac-yr	29.2	af/yr	0.20	mg/l	15.9	lbs/yr	base flow	80%	13	lbs/year	\$ 50	\$ -	\$ -	\$ -	\$ -	\$ 3	100%	\$50	\$ 211	\$ 211	
69	CCB-16	Stream Corridor Preservation	No projects identified	Partner with others to purchase property or conservation easements along Cherry Creek													\$ 100					\$ 5	100%	\$100			1		
70	CCB-17.2	Reservoir Shoreline Stabilization Mountain Loop Trail	Scheduled for construction beginning in 2012	CCSP Recreation sites: Mountain, Lake and Cottonwood Creek Loops											54	lbs/yr	\$ 1,131	\$ -	\$ -	\$ -	\$ 5	\$ 66	100%	\$1,131	\$ 1,215	\$ 1,215	1, 16		
71	CCB-17.2.1	Mountain and Lake Loop - 2021 Shoreline Maintenance	Identified during 2020 annual PRF observation	45 lf of bank stabilization	45	lf	0.1	cy/yr/ft	0.14	lbs/lf	6.3	lbs/yr	bank erosion	80%	5.04	lbs/yr	\$ 24	\$ -	\$ -	\$ -	\$ 2	\$ 3	100%	\$24	\$ 652	\$ 652	1, 16		
72	CCB-17.3	West Boat Ramp Parking Lot WQ Improvements	Final design completed in 2012	Provide water quality treatment of parking lot runoff.	3.43	ac prkg lot					3	lbs/yr	parking lot	70%	2.1	lbs/yr	\$ 330	\$ -	\$ -	\$ -	\$ 1	\$ 19	100%	\$330	\$ 8,903	\$ 8,903	1		
73	CCB-17.4	East Boat Ramp Shoreline Stabilization Phase II	Identified during 2012 annual PRF inspection	100 lf of bank stabilization	105	lf	0.1	cy/yr/ft	0.14	lbs/lf	14.7	lbs/yr	bank erosion	80%	11.8	lbs/yr	\$ 63	\$ -	\$ -	\$ -	\$ 2	\$ 5	100%	\$63	\$ 457	\$ 457	1, 16		
74	CCB-17.4.1	East Boat Ramp Shoreline Stabilization Phase III	Identified during 2012 annual PRF inspection	400 lf of bank stabilization	400	lf	0.1	cy/yr/ft	0.14	lbs/lf	56.0	lbs/yr	bank erosion	80%	44.8	lbs/yr	\$ 350	\$ -	\$ -	\$ -	\$ 2	\$ 21	100%	\$350	\$ 463	\$ 463	1, 16		
75	CCB-17.5	East Shade Shelter Shoreline Stabilization Phase II	Identified during 2012 annual PRF inspection	20 lf of bank stabilization	20	lf	0.1	cy/yr/ft	0.14	lbs/lf	2.8	lbs/yr	bank erosion	80%	2.2	lbs/yr	\$ 18	\$ -	\$ -	\$ -	\$ -	\$ 1	100%	\$18	\$ 431	\$ 431	1, 16		
76	CCB-17.5.1	East Shade Shelter Shoreline Stabilization Phase III	Identified during 2012 annual PRF inspection	400 lf of bank stabilization	400	lf	0.1	cy/yr/ft	0.14	lbs/lf	56.0	lbs/yr	bank erosion	80%	44.8	lbs/yr	\$ 906	\$ -	\$ -	\$ -	\$ -	\$ 49	100%	\$906	\$ 1,083	\$ 1,083	1, 16		
77	CCB-17.6	West Shade Shelter Shoreline Stabilization PRF ¹⁴	Identified initially in 2006. UCD Student Project w/WPR in 2013	1,400 lf of bank stabilization	1400	lf	0.1	cy/yr/ft	0.14	lbs/lf	196.0	lbs/yr	bank erosion	80%	179	lbs/yr	\$ 704	\$ -	\$ -	\$ -	\$ 1,000	\$ 51	65%	\$458	\$ 285	\$ 185	21		
78	CCB-17.7	Tower Loop Shoreline Stabilization Phase II	Identified during 2014 annual PRF inspection	700 lf of bank stabilization	700	lf	0.1	cy/yr/ft	0.14	lbs/lf	98.0	lbs/yr	bank erosion	80%	78.4	lbs/yr	\$ 1,056	\$ -	\$ -	\$ -	\$ -	\$ 57	100%	\$1,056	\$ 722	\$ 722	1, 16		
79	CCB-17.8	Dixon Grove Shoreline Stabilization Phase II	Identified during 2019 annual PRF inspection	200 lf of bank stabilization	200	lf	0.1	cy/yr/ft	0.14	lbs/lf	28.0	lbs/yr	bank erosion	80%	22.4	lbs/yr	\$ 235	\$ -	\$ -	\$ -	\$ -	\$ 13	100%	\$235	\$ 562	\$ 562	1, 16		
80	CCB-18	OWTS Sewer Service	No action to date	Provide Sewer Service for OWTS Areas									To Be Determined										100%				1		
81	CCB-19	Non-point Pollutant Management	No action to date	Assist agricultural contributors to water quality impact									To Be Determined				\$ 100	\$ -	\$ -	\$ -	\$ -	\$ 5	100%	\$100			1		
82	CCB-20.1	Detention Pond Retrofit Program - McMurdo Gulch	Phase 1 - McMurdo Gulch	Modify existing ponds to meet current standards for WQ	1	Each			0.40	lbs/Trib Acre	0.4	lbs/yr	Residential		9	lbs/pond/yr	\$ 60	\$ -	\$ -	\$ -	\$ 0	\$ 4	100%	\$60	\$ 396	\$ 396	1, 17		
83	CCB-21.1	Lone Tree Creek in CCSP downstream of Pond (CCBWQA Only)	Identified in 2014. Request from Arapahoe County Open Space.	500 lf of stream reclamation from CCSP Boundary to Cottonwood Creek	0.09	mi			100	lbs/mi	9	lbs/yr	Storm Flow	90%	9	lbs/yr	\$ 340	\$ -	\$ -	\$ -	\$ 2	\$ 20	100%	\$340	\$ 2,372.03	\$ 2,372	2, 3		
84	CCB-21.2	Lone Tree Creek Pond L-3 Retrofit (SEMSWA)				sq mi		3600	cy sed/yr		mg/l	lbs/yr	base flow			lbs/year	\$ 2,355	\$ 50	\$ -	\$ -	\$ 90	\$ 219	#DIV/0!	\$18	#DIV/0!	#DIV/0!	5		
85	CCB-21.3	Lone Tree Creek in CCSP upstream of Pond (Centennial Trail Portion)	Request from Centennial for Participation in Stream Reclamation portion of Trail Project.	710 lf of stream reclamation between CCSP Boundary and Windmill Creek Loop Trail	0.13	mi			100	lbs/mi	13	lbs/yr	Storm Flow	90%	12	lbs/yr	\$ 448	\$ -	\$ -	\$ -	\$ 2	\$ 26	25%	\$112	\$ 2,148.56	\$ 537	2, 3		
86	CCB-22	Happy Canyon Creek	MDP Priority Project	6,600 lf of stream reclamation upstream of I-25	1.25	mi			100	lbs/mi	125	lbs/yr	Storm Flow	90%	113	lbs/yr	\$ 7,702	\$ -	\$ -	\$ -	\$ 2	\$ 415	25%	\$1,926	\$ 3,685.78	\$ 921	2, 3		
87	CCB-22.1	Happy Canyon Creek at Jordan Road (SEMSWA)	Requested in 2020	2,500 lf of stream reclamation, project extended another 2000 feet in 2022	0.85	mi			100	lbs/mi	85	lbs/yr	Storm Flow	90%	77	lbs/year	\$ 2,731	\$ -	\$ -	\$ -	27	\$ 174	25%	\$683	\$ 2,264	\$ 566	2, 3		
88																													

CHERRY CREEK BASIN WATER QUALITY AUTHORITY
TABLE 1 - SUMMARY OF POTENTIAL POLLUTANT REDUCTION FACILITIES
REVISIONS FOR 2023 CIP

Date: **November 11, 2022**
Color Code: Blue: Project Completed
Green: Planned for design/construction during 5-year period
Red: See 2021 CIP Notes for changes to this Spreadsheet

Proj. Designation	Project Title	Status	Description	Design Basis				Projected Loads			Projected Treatment		Cost Estimate (1000\$)							Unit Cost (\$/pound)		Note				
				PRF Type	Quantity	Unit	Rate	Volume	Rate	Total	Source	Removal	lbs Removed	Capital	Land Acquisition	Water Augment ⁸	Capital Replace ⁹	O&M	Annual Cost @ 4%	CCBWQA Share (%)	CCBWQA Share (\$)		w/o cost sharing	w/cost sharing		
CCB-22.2	Happy Canyon Creek Upstream of I-25 (MHFD)	Requested in 2020	3000 lf of stream reclamation	0.57	mi			100	lbs/mi	57	lbs/yr	Storm Flow	90%	51	lbs/year	\$ 5,441	\$ -	\$ -	\$ -	54	\$ 346	9%	\$500	\$ 6,765	\$ 622	2,3
CCB-23.1	Dove Creek U/S Pond D-1 to Chambers Rd (SEMSWA)	Requested in 2020	1300 lf of stream reclamation	0.25	mi			100	lbs/mi	25	lbs/yr	Storm Flow	90%	22	lbs/year	\$ 650	\$ -	\$ -	\$ -	7	\$ 41	25%	\$163	\$ 1,865	\$ 466	2,3
CCB-23.2	Dove Creek Otero to Chambers Rd. (SEMSWA)	Requested in 2020	1400 lf of stream reclamation	0.27	mi			100	lbs/mi	27	lbs/yr	Storm Flow	90%	24	lbs/year	\$ 700	\$ -	\$ -	\$ -	7	\$ 45	25%	\$175	\$ 1,865	\$ 466	2,3

92 BASIS FOR ANALYSIS:
93 (A) Unit cost of phosphorus removal based on annualized cost of completed project over 35 years at 4% interest rate. CRF = 0.053577
94 (B) All projects identified provide for additional phosphorus immobilization beyond minimum requirements, unless noted otherwise.
95
96
97
98 2023 CIP NOTES:
99 1. Assumed that augmentation for consumptive use not required
100 2. Augmentation for naturally established wetlands not required (assumption)
101 3. Phosphorus Estimated based on Interim Stream Reclamation Paper
102 4. See 2020 Cattail Harvesting Pilot Project Memo. Phosphorus estimated based on SEMSWA 2020 Data.
103 5. Pond updates to bring up to current standards and to facilitate maintenance. No phosphorus calculation provided, since ponds already exist.
104 6
105 7
106 8. Water costs at \$ 6,500 per acre foot
107 9. Present worth of capital replacement
108 11. Land acquisition and water augmentation not defined. CWSD\ACWWA JWPP project influenced scope of project.
109 12. Total Phosphorus loading derived from laboratory sediment samples & Stantec Geomorphic Study BANCS analysis.
110 15. Estimate based on costs for similar work along East Shoreline dating back to 1996
111 16. Benefit approximated based on other shoreline projects and estimates
112 17. Loads and performance based on calculations for 3 McMurdo Gulch ponds.
113 18. SEO opined that ET must be augmented. Also, recent Reservoir fluctuations may render project infeasible. Placed on indefinite hold.
114 19. Approach was shifted to focus on stream reclamation (CCB-5.14) and reduction of sediment and nutrient sources from erosion.
115 20. Joint project with CCSP. Integrate design with Dog Park uses and improvements.
116 Estimate based on similar stream stabilization projects
117 21. Phosphorus: Shoreline 177 lbs/yr + Parking Lot 2 lbs/yr =179 lbs/yr
118
119
120

REFERENCES
1. Muller Eng 2003. *Feasibility Evaluation for Cherry Creek State Park Wetlands Project*
2. Muller Eng 2003. *Feasibility Evaluation for Cottonwood Creek Stream Stabilization Project*
3. AMEC 2005. *Draft Feasibility Report Cherry Creek Reservoir Destratification*
4. AMEC 2006. *Recommendations for Prepurchase of Jamor Equipment for Cherry Creek Reservoir Destratification Project.*
5. Tetra Tech August 2006. *Phosphorus Estimates in Cherry Creek and Cost for Removal via Sediment Trap.*
6. WERF 2000. *Phosphorus Credit Trading in the Cherry Creek Basin: An Innovative Approach to Achieving Water Quality Benefits.*
7. Ruzzo, WP September 5, 2003. *Cherry Creek Corridor Master Plan-Estimate of Phosphorus Reduction from Stream Reclamation*
8. Ruzzo, W. P. September 21, 2006. *Cottonwood Creek Reclamation - Water Rights Augmentation Requirements.*
9. TetraTech December 2006. *Design of Cherry Creek Sediment Basin and Stream Stabilization.*
10. Brown and Caldwell Feb 2007. *Shop Creek Wetlands Pollutant Reduction Facility Wetland Assessment*
11. PBSJ October 2006. *Draft McMurdo Gulch Major Drainageway Master Plan*
12. Brown and Caldwell 2010. *Cherry Creek Stream Reclamation at Shop Creek Trail.*
13. CCBWQA TAC June 16, 2011. *Stream Reclamation Water Quality Benefit Evaluation Interim Status Report*
14. Ruzzo Memo, September 4, 2013, *West Shade Shelter Shoreline Stabilization PRF - Water Quality Analysis.*

	A	B	C	D	E	F	G	H	O	P	Q	R	W	AB	AD	AE	AF	AG	AH	AI	AJ	AK
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																					
2	TABLE 2 - SUMMARY OF RECOMMENDED POLLUTANT REDUCTION FACILITIES																					
3	2023 - 2032 BUDGET PROJECTIONS (1000\$)																					
9																						
10		November 11, 2022	Current Project Budget				Prior Year Obligated Funds³	Proposed 2023 Budget				Proposed 2024 Budget	Proposed 2025 Budget	Proposed 2026 Budget	Proposed 2027 Budget	Proposed 2028 Budget	Proposed 2029 Budget	Proposed 2030 Budget	Proposed 2031 Budget	Proposed 2032 Budget	2023-2032 Total	
11	Project No.	Project Title	Capital¹	Total	O&M	Authority Portion	Authority Portion		Design	Capital	Water	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
12	Budget Category - General																					
14	Budget Category - Reservoir Projects																					
17	CCR-2	Reservoir Destratification System - Distribution Preliminary Design - Includes evaluation of Optimization of Distribution with WWE Expansion Alternative	\$ 2,140	\$ 2,140		\$ 2,140	100%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 270	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 935	\$ 935	\$ -	\$ 2,140
18	CCR-3	Reservoir Nutrient Mitigation Alternatives Study	\$ 100	\$ 100		\$ 100	100%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100
19	CCB-17.5	East Shade Shelter Shoreline Stabilization Phase III	\$ 906	\$ 906		\$ 855	100%	\$ 51	\$ 59	\$ 600	\$ -	\$ 659	\$ 196	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 855
20	CCB-17.6	West Shade Shelter Shoreline Stabilization PRF	\$ 704	\$ 704		\$ 704	100%	\$ 154	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 550	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 550
21	CCB-17.7	Tower Loop Shoreline Stabilization Phase II	\$ 1,056	\$ 1,056		\$ 1,056	100%	\$ 90	\$ -	\$ -	\$ -	\$ -	\$ 966	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 966
22	Budget Category - Stream Reclamation Projects																					
23	CCB-5.4	Cherry Creek Stream Reclamation at Main Street (Parker)	\$ 1,776	\$ 1,776		\$ 200	11%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 200	\$ -	\$ -	\$ -	\$ -	\$ 200
24	CCB-5.6	Cherry Creek Stream Stabilization at Lincoln Avenue (Parker)	\$ 1,447	\$ 1,447		\$ 304	21%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 304	\$ -	\$ -	\$ -	\$ 304
28	CCB-5.14C	Cherry Creek Stream Reclamation - Reach 3	\$ 2,567	\$ 2,567		\$ 640	25%	\$ -	\$ 130	\$ -	\$ -	\$ 130	\$ 510	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 640
29	CCB-5.14C	Cherry Creek Stream Reclamation - Reach 4	\$ 2,720	\$ 2,720		\$ 680	25%	\$ 25	\$ -	\$ 475	\$ -	\$ 475	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 475
30	CCB-5.16A	Cherry Creek - Reservoir to Lake View Drive Alternatives Analysis	\$ 200	\$ 200		\$ 200	100%	\$ -	\$ 200	\$ -	\$ -	\$ 200	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 200
34	CCB-5.17.1B	Cherry Creek Stream Reclamation - at Dranfheldt Extension (Parker)	\$ 6,010	\$ 6,010		\$ 400	7%	\$ 60	\$ -	\$ 170	\$ -	\$ 170	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 170
36	CCB-7.4	McMurdo Gulch Reclamation (Castle Rock)	\$ 4,308	\$ 4,308		\$ 1,078	25%	\$ -	\$ -	\$ 907	\$ -	\$ 907	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 907
37	CCB-13.5.3	Cottonwood Creek Tributary - Shooting Area Tributary (CCSP)	\$ 300	\$ 300		\$ 75	25%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75	\$ -	\$ -	\$ -	\$ -	\$ 75
38	CCB-13.5.4	Cottonwood Creek and Tributary C (IWSD)	\$ 1,664	\$ 1,664		\$ 416	25%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 416	\$ -	\$ -	\$ -	\$ 416
39	CCB-21.1	Lone Tree Creek in CCSP downstream of Pond (CCBWQA Only)	\$ 340	\$ 340		\$ 340	100%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100	\$ 400	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 500
40	CCB-21.3	Lone Tree Creek in CCSP upstream of Pond (Done in conjunction with Centennial Trail Project)	\$ 448	\$ 448		\$ 112	25%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
41	CCB-21.3a	Lone Tree Creek in CCSP upstream of Pond (CCBWQA Only)	\$ 448	\$ 448		\$ 448	100%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 448	\$ 448
42	CCB-22.1	Happy Canyon Creek County Line to Cherry Creek (SEMSWA)	\$ 1,520	\$ 1,520		\$ 381	25%	\$ 25	\$ -	\$ 88	\$ -	\$ 88	\$ 50	\$ 75	\$ 75	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 288
44	CCB-23.1	Dove Creek U/S Pond D-1 to Chambers Rd (SEMSWA)	\$ 650	\$ 650		\$ 163	25%	\$ -	\$ -	\$ 63	\$ -	\$ 63	\$ 75	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 138
45	CCB-23.2	Dove Creek Otero to Chambers Rd. (SEMSWA)	\$ 700	\$ 700		\$ 175	25%	\$ 25	\$ -	\$ 75	\$ -	\$ 75	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75
46	CCB-6.5	Piney Creek Reach 1 to 2 (SEMSWA)	\$ 2,350	\$ 2,350		\$ 515	22%	\$ -	\$ 63	\$ -	\$ -	\$ 63	\$ 39	\$ 25	\$ 75	\$ 150	\$ 125	\$ -	\$ -	\$ -	\$ -	\$ 477

	A	B	C	D	E	F	G	H	O	P	Q	R	W	AB	AD	AE	AF	AG	AH	AI	AJ	AK
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																					
2	TABLE 2 - SUMMARY OF RECOMMENDED POLLUTANT REDUCTION FACILITIES																					
3	2023 - 2032 BUDGET PROJECTIONS (1000\$)																					
9																						
10		November 11, 2022	Current Project Budget				Prior Year Obligated Funds³	Proposed 2023 Budget				Proposed 2024 Budget	Proposed 2025 Budget	Proposed 2026 Budget	Proposed 2027 Budget	Proposed 2028 Budget	Proposed 2029 Budget	Proposed 2030 Budget	Proposed 2031 Budget	Proposed 2032 Budget	2023-2032 Total	
11	Project No.	Project Title	Capital¹	Total	O&M	Authority Portion	Authority Portion		Design	Capital	Water	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
47	CCB-6.6	Piney Creek Tower to Orchard (SEMSWA)	\$ 3,000	\$ 3,000		\$ 710	24%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75	\$ 150	\$ 235	\$ 250	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 710
48	CCB-5.16A,B,C	Cherry and Piney Creeks in CCSP	\$ 22,500	\$ 22,500			0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 450	\$ 1,400	\$ 1,000	\$ 1,355	\$ 1,900	\$ 2,000	\$ 920	\$ 960	\$ 1,500	\$ 11,485
49	CCB-5.14D	Cherry Creek Stream Reclamation - Remaining Sections (not included in Reaches 3 and 4) from Valley Country Club to Soccer Fields	\$ 2,980	\$ 2,980		\$ 745	25%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100	\$ 100	\$ 545	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 745
50	Budget Category - PRF Water Quality/Wetland Ponds																					
51	Budget Category - PRF Preservation, Acquisition, Lease																					
52	CCB-16	PRF Preservation, Acquisition, Lease of Land or Water	\$ 500	\$ 500		\$ -	0%	\$ -		\$ 100	\$ -	\$ 100	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 550
53		SUB-TOTALS										\$ 2,930	\$ 2,881	\$ 2,200	\$ 2,085	\$ 2,350	\$ 2,350	\$ 2,354	\$ 2,321	\$ 1,945	\$ 1,998	\$ 23,414

	A	B	C	D	E	F	G	H	O	P	Q	R	W	AB	AD	AE	AF	AG	AH	AI	AJ	AK
1	CHERRY CREEK BASIN WATER QUALITY AUTHORITY																					
2	TABLE 2 - SUMMARY OF RECOMMENDED POLLUTANT REDUCTION FACILITIES																					
3	2023 - 2032 BUDGET PROJECTIONS (1000\$)																					
9																						
10		November 11, 2022	Current Project Budget				Prior Year Obligated Funds³	Proposed 2023 Budget				Proposed 2024 Budget	Proposed 2025 Budget	Proposed 2026 Budget	Proposed 2027 Budget	Proposed 2028 Budget	Proposed 2029 Budget	Proposed 2030 Budget	Proposed 2031 Budget	Proposed 2032 Budget	2023-2032 Total	
11	Project No.	Project Title	Capital¹	Total	O&M	Authority Portion	Authority Portion	Design	Capital	Water	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	
54	OPERATIONS AND MAINTENANCE																					
56	Routine Category																					
57	OM-7	Reservoir Destratification	\$ 350	\$ 350		\$ 350	100%		\$ 35		\$ 35	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 395
58	OM-14.1	PRF Weed Control	\$ 100	\$ 100		\$ 100	100%		\$ 10		\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 10	\$ 100
59	OM-14.2	PRF Reseeding at CCSP	\$ 50	\$ 50		\$ 27	100%		\$ 5		\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 50
60	OM-14.3	PRF Mowing	\$ 50	\$ 50		\$ 45	100%		\$ 5		\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 50
61		SUB-TOTAL	\$ 550	\$ 550		\$ 522			\$ 55		\$ 55	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 595
62	Operations Category																					
63	O - 1	RDS Utilities	\$ 650	\$ 650		\$ 650	100%		\$ 65		\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 65	\$ 650
64	O - 2	RDS Service Plan	\$ 155	\$ 155		\$ 155	100%		\$ 12		\$ 12	\$ 13	\$ 14	\$ 15	\$ 16	\$ 17	\$ 18	\$ 19	\$ 20	\$ 20	\$ 20	\$ 164
65	O - 3	PRF Emergency Repairs	\$ -	\$ -		\$ -	#DIV/0!		\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
66	O - 4	Meteorological Station	\$ 36	\$ 36		\$ 36	100%		\$ 3		\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 3	\$ 30
67		SUB-TOTAL	\$ 841	\$ 841		\$ 841			\$ 80		\$ 80	\$ 81	\$ 82	\$ 83	\$ 84	\$ 85	\$ 86	\$ 87	\$ 88	\$ 88	\$ 88	\$ 844
68	Restorative Category																					
69	OM -	Tree/Shrub Planting	\$ 18	\$ 18		\$ 18	100%		\$ -		\$ -	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 2	\$ 18
70	OM -	Fence Repair	\$ 72	\$ 72		\$ 72	100%		\$ -		\$ -	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 8	\$ 72
71	OM -	Shoreline / Bank Restoration																				\$ -
72		Average Annual Cost							\$ -		\$ -	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 195	\$ 1,755
73		Shop Creek Concrete Repairs	\$ 10	\$ 10		\$ 10			\$ 10		\$ 10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10
74		Mountain/Lake Loop Shoreline	\$ 24	\$ 24		\$ 24	100%		\$ 30		\$ 30	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 30
75	OM -	Wetland Harvesting	\$ 900	\$ 900		\$ 900	100%		\$ 90		\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90	\$ 900
76		SUB-TOTAL	\$ 1,024	\$ 1,024		\$ 1,024			\$ 130		\$ 130	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 2,785
77	Rehabilitation Category																					
78	OM -						#DIV/0!															
79		SUB-TOTAL	\$ -	\$ -		\$ -			\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
81		SUB-TOTAL O&M	\$ 2,415						\$ 265		\$ 265	\$ 436	\$ 437	\$ 438	\$ 439	\$ 440	\$ 441	\$ 442	\$ 443	\$ 443	\$ 443	\$ 4,540
82		GRAND TOTAL									\$ 3,195	\$ 3,317	\$ 2,637	\$ 2,523	\$ 2,789	\$ 2,790	\$ 2,795	\$ 2,763	\$ 2,388	\$ 2,441	\$ 30,006	

Cherry Creek Basin Water Quality Authority
Summary of Operation & Maintenance (O&M) Costs
 Prepared / Updated: November 4, 2022

Project	Quantity			CCSP Work	CCBWQA Purchases Seed with CCSP Installation	CCBWQA Work				Comments	Total Cost	
	Each	Hours	Acres	Herbicide Application ¹	Tractor Reseeding (Seed Cost Only) ²	Weed Control ¹	Tree Planting ³	Shrub Planting ³	Misc.			Restorative / Rehabilitation work ⁴
Shop Creek	1					\$ 3,000					Herbicide treatment of vegetation growing on faces of drops at 100% CCBWQA, since it isn't weed control related.	\$ 13,000
	1									\$ 10,000	Project carryover from 2022 to 2023, Concrete Repair at Crests of 3 drop structures.	
Cottonwood Wetlands	1									\$ 3,600	PRF Routine, Decompaction and revegetation of access along embankment. Cleaning of outlet grate.	\$ 3,600
Mountain/Lake Loop Shoreline	1									\$ 30,000	Project carryover from 2022 to 2023, Restore shoreline area.	\$ 30,000
East Boat Ramp	1					\$ 3,000					Weed Control for noxious weeds at 100% CCBWQA, since within 5 years of PRF construction.	\$ 3,000
Cherry Creek 12-mile Phase III	1					\$ 4,000					Weed Control for noxious weeds at 100% CCBWQA, since within 5 years of PRF construction.	\$ 4,000

Subtotal \$ - \$ - \$ 10,000 \$ - \$ - \$ - \$ 43,600

Totals
 CCSP = \$ -
 CCBWQA = \$ 53,600
 Combined = \$ 53,600

Note 1. CCBWQA performs weed control (mechanical until native grasses mature, then herbicide) for first 5 years after PRF construction; afterwards 50/50 split between CCBWQA and CCSP.
 Note 2. Reseeding Rate = \$800/acre. CCBWQA purchases seed CCSP installs it with their tractor and the seed attachment purchased by CCBWQA.
 Note 3. Tree Replacement = \$1,000/ea. Shrub Replacement = \$50/ea.. CCBWQA Participation @ 100%.
 Note 4. PRF Function Repair/Maintenance. Project Specific Estimate. CCBWQA Participation @ 100%.

Figure 1 - Stream Reclamation inside of CCSP

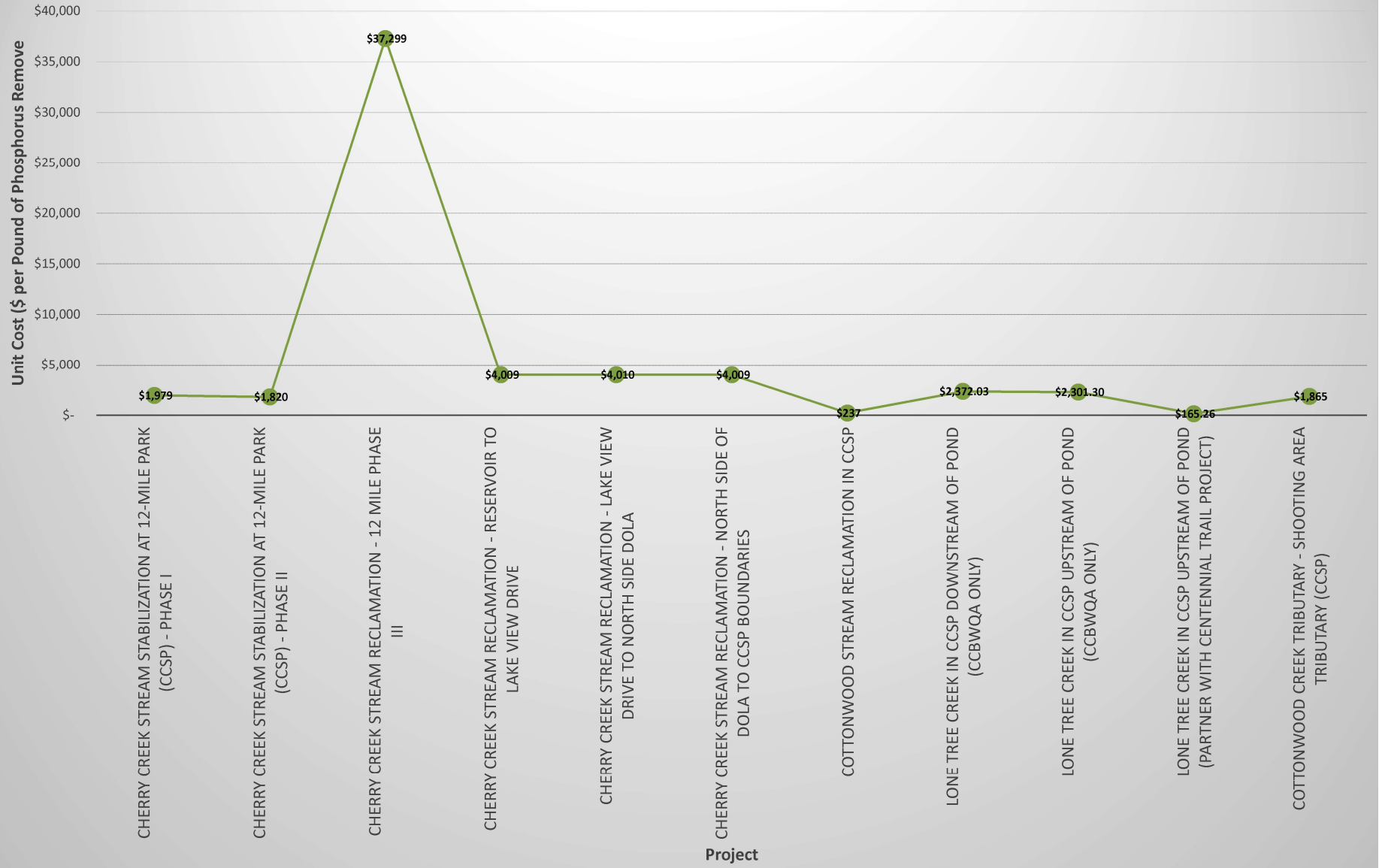


Figure 2 - Stream Reclamation outside of CCSP

