



**Cherry Creek Basin Water Quality Authority  
Technical Advisory Committee Meeting Agenda  
Thursday, January 5, 2023, 9:00 a.m.**

**In-Person: SEMSWA  
7437 S. Fairplay St.  
Centennial, CO 80112**

**Virtual: Zoom<sup>1</sup>  
<https://zoom.us/j/3039689098> Passcode: CCBWQA  
Phone (669)900-6833 Mtg ID 3039689098# Passcode: 542117**

**TAC Meeting Documents can be found online at the link below.**

**<https://drive.google.com/drive/folders/12BoEhmFbnnMCxivnpjY2l7T5TzP8Azlq?usp=sharing>**

1. Call to Order/Opening Remarks (Erickson) (9:00)
2. Approve Meeting Minutes from December 1, 2022 (enclosed)
3. Highlights from December 15, 2022 Board Meeting (Clary)
4. Action Items (9:10)(25 minutes)
  - a. 2022 RDS Operations Report (Borchardt, enclosed)
  - b. Dove Creek Stream Reclamation IGA Amendment (Borchardt, enclosed)
  - c. CR72 Informational Hearing Letter (DiToro, enclosed)
5. Discussion Items (9:35) (25 minutes)
  - a. Workshops for 2023 (Borchardt/Clary)
    - i. Cherry Creek in CCSP Muller Report and BMP Effectiveness Workshop - March 16, 2023  
8:30-11:30 am
    - ii. Watershed Plan Process - September 21, 2023  
8:30-11:30 am
  - b. Lake Nutrients RMH (DiToro/Clary)\*
  - c. Land Use Referral Contacts (Clary)\*
6. Presentations (10:00)
  - a. WY 2022 Monitoring Report (Stewart) (40 minutes)
  - b. Water Quality Standards 101 (DiToro) (10 minutes)
7. Updates (10:50)
  - a. Cherry Creek Stewardship Partners (Davenhill)
  - b. TAC Members
  - c. TAC Subcommittees
  - d. Contractors
    - i. [Water Quality Update](#) (Stewart)
    - ii. Pollution Abatement Projects (Borchardt/Goncalves)
      - a. CIP Status Report
      - b. Maintenance and Operations Status Report
    - iii. Regulatory (DiToro)
    - iv. LUR Summary
  - e. Manager
  - f. Other
8. Upcoming Events
9. Adjournment (11:00)

**[CCBWQA Workplan](#)**

<sup>1</sup> If you are unable to participate on the CCBWQA's Zoom platform, please email [val.endyk@ccbwwa.org](mailto:val.endyk@ccbwwa.org)



**Cherry Creek Basin Water Quality Authority  
Minutes of the Technical Advisory Committee  
Thursday, December 1, 2022, 9:00 a.m.**

**TAC Members Present**

Alex Mestdagh, Town of Parker  
Ann Woods, City of Greenwood Village (zoom)  
Ashley Byerley, SEMSWA  
Casey Davenhill, Board Appointee, Cherry Creek Stewardship Partners  
David Van Dellen, Town of Castle Rock (zoom)  
Jacob James, TAC Chairman, City of Lone Tree  
Jason Trujillo, Board Appointee, Cherry Creek State Park (zoom)  
Jim Watt, Board Appointee, Mile High Flood District  
Joseph Marencik, City of Castle Pines  
Jon Erickson, TAC Vice Chairman, Board Appointee, Colorado Parks and Wildlife  
Joshua Giovannetti, CDOT - Alternate (zoom)  
Lisa Knerr, Arapahoe County  
Rick Goncalves, Board Appointee  
Ryan Adrian, Douglas County (zoom)  
Sherry Scaggiari, City of Aurora (zoom)  
Wanda DeVargas, Board Appointee, E-470 (zoom)

**Board Members Present**

Bill Ruzzo, Governor's Appointee (zoom)  
Roger Hudson, City of Castle Pines (zoom)  
Steve Sundberg, City of Aurora (zoom)  
Tom Downing, Governor's Appointee (zoom)

**Others Present**

Alan Leak, RESPEC (zoom)  
Erin Stewart, LRE Water (zoom)  
James Linden, SEMSWA (zoom)  
Jane Clary, Wright Water Engineers, CCBWQA Technical Manager  
Jessica DiToro, LRE Water  
Richard Borchardt, R2R Engineers  
Val Endyk, CCBWQA

**1. Call to Order**

Jacob James called the meeting to order at 9:01 am.

**2. Meeting Minutes from November 3, 2022**

Casey Davenhill provided some clarification to the minutes under 6b. Minutes have been amended to remove "High-water turf varieties"

Alex Mestdagh moved to approve the November 3, 2022 minutes as amended. Seconded by Joseph Marencik. The motion carried.

### 3. Discussion and Action Items

#### a. 2023 TAC Chair and Vice Chair Positions

Jacob James moved to appoint Jon Erikson as Chair of the CCBWQA Technical Advisory Committee in 2023 and Lisa Knerr as Vice Chair of the CCBWQA Technical Advisory Committee in 2023. Seconded by Joseph Marencik. The motion carried.

#### b. Land Use Referral Process

Jane Clary provided background information that the CCBWQA Board approved eliminating routine technical reviews of land development type activities from local governments for compliance with Control Reg 72. Eliminating the Authority's routine Land Use Reviews was discussed at a TAC meeting during which time the TAC supported this change but had questions regarding local governments' need for the Authority's "approval" as part of their MS4 permits and how the change would be implemented. The TAC formed a subcommittee to review changes in the procedure and recommend approval of the procedure. Jane explained how the changes will be implemented beginning in 2023 as detailed in her [memo](#).

Eliminating Land Use Reviews is expected to reduce the Authority's expenses by over \$30,000 per year. Jane noted that in cases where the local government would like additional review or consultation with the Authority, the Authority's Technical Manager will be available to discuss questions or arrange an independent review if needed. Effective date would be as soon as possible but will defer to the Board.

Discussion included:

- Ashley Byerly provided feedback that they appreciated the group working with the MS4s to come up with the revisions.
- Jacob James expressed gratitude to Rich Borchardt for all his work over the previous years and the thought and effort that went into this work
- CDOT may need the formal technical review more often.
- Conservation Districts - Douglas County Conservation District had a project referred to them involving horse stables. Not typical, so they weren't sure how to move forward. What would the TAC recommend for that kind of a situation/guidance? Douglas County is the land use agency and would be the place to start.
- Local government reviews will still require compliance with Reg. 72.
- Minor edits to memorandum to move second bullet over so it reads as part of the response.
- CCBWQA will send a letter to land use review agencies that may have been using the CCBWQA LUR process to update them of the change. Ashley Byerly will provide a list of contacts to notify and information will also be added to the website.
- Memo was revised to be addressed to the Board from the TAC.

Alex Mestdagh moved to recommend that the Board update its policy on the land use referral process as described in this [Action Memo](#) from the TAC with minor editorial revisions along with a proposed letter to the agencies notifying them of the change. Seconded by Ashley Byerley. The motion carried.

#### c. Cherry Creek from Reservoir to Park Boundary

Rich Borchardt provided the TAC with background information explaining that CCBWQA sole-sourced the [Stream and Water Quality Assessment](#) and [Baseline Channel Monitoring Reports](#) to Muller Engineering in 2020 and 2021, respectively. Muller presented their initial findings to CCBWQA at the July 15, 2021 Board meeting, which was followed by a field trip that included a stop on Cherry Creek near the Aurora water lines to observe existing conditions. Muller has now completed the two reports (linked above). Muller's scope of work includes two workshops (up to 4 hours each) to help CCBWQA digest the information in the reports, get input and direction from the TAC and Board and help CCBWQA determine its next steps. The workshop could inform some upcoming projects (Alternatives Analysis on Cherry Creek from Reservoir to Lake View Drive and Piney Creek Reaches 1 and 2) in CCBWQA's Capital Improvement Project plan.

Rich provided further explanation in a [summary report](#) and noted several pictures, maps, and tables.

Rich recommends a workshop to give direction to next steps.

Discussion included:

- TAC recommends integrating various studies to date, not just this report.
- This report highlights significant channel degradation that has been going on for a while. Aurora should be part of this workshop since their water lines are in the affected reach.
- Muller reports combined with modeling reports help provide direction to future projects. Ultimate goal is to identify what works and doesn't work to move towards compliance with Reservoir water quality standards.
- Baseline channel monitoring report will be used to help identify next steps that CCBWQA may take to reduce channel degradation and associated phosphorus loading. This will be discussed in more detail at the workshop.
- Phosphorus mass listed in the report assumed that this was mobilized phosphorus that eventually reaches Cherry Creek Reservoir in Reach 1, however the other two reaches upstream may be partially retained in the valley floor alluvial fan in Reach 2 with likely only a portion of the current phosphorus load being transported to the reservoir.
- An integrated viewpoint and supportive data are important in planning. LRE is working on developing more integrated GIS so that projects and studies can be viewed in a more integrated manner.
- It is important for sediment data collected to be saved in the repository so the information can be tracked over time.

Casey Davenhill moved to accept the Stream and Water Quality Assessment and Baseline Channel Monitoring Reports prepared by Muller Engineering and recommend to the Board that a workshop be scheduled to seek input and direction from the TAC and Board to determine CCBWQA's next steps on Cherry Creek and Piney Creek within CCSP. Seconded by Rick Goncalves. The motion carried.

#### **d. Lone Tree Creek and Windmill Master Plan Park Boundary to Reservoir**

Jane Clary explained that WWE is currently performing drainage master plan work for the Mile High Flood District and SEMSWA for the Southwest Tributaries of Cherry Creek, which include the Cottonwood, Lone Tree, Windmill, and Dove Creek watersheds, but the analysis ends at the Park Boundary. See <https://www.cherrycreekswttribs.com/> for project information. CCBWQA has a current opportunity to extend this project to the Reservoir as a companion project to the work being completed by WWE for SEMSA/MHFD. WWE's Andrew Earles would serve as the project manager for both projects. The [scope of work](#) included in the TAC packet provides more information about the project approach and its relation to the upstream master planning effort for these tributaries.

WWE's proposed budget is \$40,000 and has been included in the 2023 CCBWQA budget. The optional task for additional meetings of \$4,000 is available in contingency funds in the 2023 budget, if needed.

Discussion included:

- General TAC support provided.
- The plan Planning - Data - Action
- CPW will collaborate with CCBWQA and WWE as a key project stakeholder. Structural issues at the Lone Tree Creek pond need to be addressed. Water rights may be an issue affecting options for this pond.
- Ashley Byerly would like this to be a part of the larger Master Plan, with SEMSWA and MHFD actively involved in planning. Pending approval from MHFD and SEMSWA, this study could potentially be integrated into the SEMSWA-MHFD upstream master plan.
- MHFD planning traditionally stops at the park boundary. The Corps of Engineers manages the Cherry Creek Reservoir dam and flood control operations.
- Stakeholder engagement is part of the scope of work.
- The Executive Committee supports the project.

Jason Trujillo moved to recommend that the Board authorize preparation of an agreement to engage Wright Water Engineers (WWE) to extend an on-going master drainage plan effort for Lone Tree Creek, Windmill Creek and Cottonwood Creek from the Cherry Creek State Park Boundary to the Reservoir in accordance with WWE's

proposed scope of work provided to the TAC on November 28, 2022. Seconded by Rick Goncalves. The motion carried.

**e. Lakes Nutrient Criteria and Recommendation to Delegate Authority to Board Subcommittee**

Jessica DiToro explained that as directed by the Board and TAC, Jane Clary coordinated with Blake Beyea (Water Quality Control Division [WQCD] Standards Unit Manager) to briefly discuss the CCBWQA’s request for a delayed effective date to allow time for development of site-specific standards for Cherry Creek Reservoir. Based on this discussion, the WQCD agreed to provide some additional informal feedback to CCBWQA on the draft RPHS, with initial discussion suggesting that more specificity regarding the site-specific standards approach could be beneficial to CCBWQA’s Responsive Prehearing Statement (RPHS). If additional feedback from WQCD and related discussions identify minor changes that could result in WQCD supporting the Authority’s position, Staff would like the ability to make such changes if the timing does not align with upcoming TAC and Board meetings. To address this potential timing constraint, Staff requests that the TAC recommend that a Board subcommittee be created with the delegated authority to make decisions during time-constrained hearing deadlines and/or make minor edits to hearing documents for the Lake Nutrients Criteria RMH that are substantively consistent with prior direction provided by the Board and TAC.

Discussion included:

- Feedback from the WQCD has generally been positive about the development of site-specific standards; however, the Division has not indicated that they will support the CCBWQA’s position of a delayed effective date for site-specific standards development.
- If the CCBWQA accepts the table value standards as proposed by the WQCD and then works to develop site-specific standards, will that simplify this process?
  - General consensus is no.
  - The CCBWQA statutory language regarding using funds on what could be perceived as a relaxation of water quality standards could make the site-specific standards process more difficult if TVSS already apply.
  - The work has already been done to draft the RPHS requesting a delayed effective date.
- TAC supports “staying the course” and continuing with our current position to request the delayed effective date and agrees that the TVSS are not appropriate for Cherry Creek Reservoir.
- WQCD and the WQCC are often aligned in rulemaking hearings, but not always. For this reason, even if the WQCD staff choose not to support CCBWQA’s request, the WQCC could draw different conclusions. The WQCC has adopted delayed effective dates in the past for other parameters/segments, so it is not unprecedented.
- TAC is not opposed to a Board subcommittee related to regulatory decision making; however, this is ultimately a Board decision rather than a TAC decision.
- Approximately 130 people attended the Lakes Nutrients Criteria Town Hall yesterday. Multiple entities expressed concern about the methodologies/models/data used by the WQCD to develop the criteria and the potential impacts that could result from the implementation of the proposed standards. To date, CCBWQA has focused on the standards in the context of Cherry Creek Reservoir only, rather than broader concerns related to the standards development methodology.

Jon Erickson moved that the TAC recommends that the CCBWQA Board continue with the delayed effective date request for the Lake Nutrients Criteria RMH. Seconded by Alex Mestdagh. The motion carried.

**4. Discussion Items**

**a. Workshops for 2023**

- Cherry Creek/ Piney Creek workshop is proposed to be 4 hours with ½ hour lunch. Jane/Rich also propose reserving some time for input on the BMP Effectiveness study.
- It would be ideal to complete the workshop after the February Board meeting.
- Scheduling considerations
  - Arapahoe County will be appointing a new commissioner who will be a new Board member.

- MHFD has board meetings beginning at 12:30-1 pm on the 3rd Thursday, which poses a conflict.
- Feb 2 TAC meeting may be a good time.
- Quarterly or Spring and Fall workshops may be helpful to continue progress on various CCBWQA projects.

**b. TAC Subcommittees**

Rich suggested consideration of reforming the watershed subcommittee to cover topics of the watershed model, updating of the watershed plan, upcoming and missing master planning efforts, and studies.

Rick suggested a subcommittee focused on tying the watershed and reservoir models together. (Note: The framework to link the models has already been developed; however, the recent watershed model scenarios completed by RESPEC have not yet been run through the reservoir model developed by Hydros.)

As part of a watershed plan subcommittee, it may be worth looking at the components of several types of watershed planning documents such as EPA’s 9 Element Watershed Plan and Stream Management Plan approach completed under the Colorado Water Plan related to integrated stream management. Casey volunteered to provide a summary of what they look for in a watershed plan.

**5. Presentations**

none

**6. Updates**

**a. Cherry Creek Stewardship Partners (Davenhill)**

- The CCSP will lead a Winter Solstice Tour as part of the quarterly census of wildlife activity at the Cherry Creek Valley Ecological Park on December 17th from 9:30 am-11:00 am. Meet at the Cherry Creek Valley Ecological Park. 7500 S Jasper Ct, Centennial. Details can be found on the [website](#).
- CCSP Audubon Christmas Bird Count on January 1st at 8:30 am. Details can be found [here](#). Register [here](#)
- Hawk Walk will be on January 28th from 9:00 am-12:00 pm. We will meet at Cherry Creek High School and carpool to the Cottonwood Creek Trailhead. Details can be found on the [website](#).
- Considering August 23rd or 24th, 2023 for Cherry Creek Watershed Conference.

**b. TAC Members**

Ashley Byerley provided an update that the Nonstandard MS4 Stormwater Permit (COR70000) Mod 2 permit renewal (incorporates Reg 72.7 changes) has been released.

**c. TAC Subcommittees**

**d. Contractors**

**i. [Water Quality Update](#) (Stewart)**

Erin provided an update that she is actively working on WY2022 Monitoring Report and will provide a presentation at the January meeting.

**ii. [Pollution Abatement Projects](#) (Borchardt)**

**a. [LUR Monthly Summary](#)**

**b. [CIP, Maintenance, and Operations Status Report](#)**

**c. [2022 Annual PRF/PAP Observation and Maintenance Report](#) (updated based on TAC’s comments in November)**

**iii. [Regulatory](#) (DiToro)**

**e. [Manager](#)**

Transition with R2R scope changes for 2023

**f. [Other](#)**

**7. [Upcoming Events](#)**

**8. [Adjournment](#)**

Jacob James adjourned the meeting at 11:16 am.



## ACTION ITEM MEMORANDUM

To: CCBWQA Technical Advisory Committee (TAC)  
From: Richard Borchardt, Pollution Abatement Project Manager  
Date: January 5, 2023  
Subject: 2022 Reservoir Destratification System (RDS): Operations & Maintenance Annual Report

**Request:** The TAC accepts the 2022 RDS Operations & Maintenance Report.

**Project:** The 2022 Report highlights the year of Operations & Maintenance for the RDS. The 2022 Report notes the following.

- Since the coolers were cleaned on June 14, 2022 and the compressor had a temperature warning and shutdown on September 2, 2022, it is recommended to have Ingersoll Rand (IR) clean compressor coolers at a frequency of about every 2 months during the operating season to minimize the chances of another high temperature shutdown like what happened from September 2-7, 2022. This cleaning can be requested by contacting IR's Technician Supervisor, currently Daniel Ortiz at DOrtiz@irco.com or his mobile phone 303.598.7069.
- Since there was a delay in knowing that the compressor wasn't running (CCBWQA had to wait until the after the holiday weekend to be contacted by IR of a potential issue), it is recommended that CCBWQA evaluate options to improve communication with IR and consider other options to monitor RDS operations to minimize the length of future lengths shutdowns.
  - IR was contacted to start this evaluation, and they are beta testing providing their Remote Monitoring System (RMS) to their customers. The RMS provides e-mail and notifications and an online platform to IR to inform their maintenance of the compressor. The RMS beta test would be included in CCBWQA's PackageCare so there wouldn't be any additional cost; a request to add CCBWQA has been made to IR's Account Manager, currently Jeff Handley at Jeff.Handley@irco.com or his mobile phone 303.345.4407. If CCBWQA notices an issue through the RMS or site visit, then a call can be placed to 1-800-223-1911 option 1 to IR for maintenance on the compressor. The standard work hours are Monday through Friday 7:30 am to 4:00 pm (Mountain Standard Time); if maintenance is needed outside of those hours, it gives instructions for a 24-hour call service that will reach out to the on-call technician. Maintenance during standard work hours is covered under CCBWQA's PackageCare plan, but after-hours work is not covered and is charged at an hourly rate with a 4-hour minimum.
  - If the RMS doesn't meet the information and communication needs of CCBWQA, CCBWQA can look at possibly reviving the previous notification system (SCADA and Mission Control software used with the old compressor) or a new one that provides a call out to a list (consultant staff and manager) and remote monitoring/control option. This option would likely need further evaluation to determine the scope of work and identification of costs.

- Since there was an 8.8% increase in energy consumption from 2021 to 2022, it is recommended to continue monitoring the annual energy consumption and look for any trends that may point to developing issues or concerns.

**Budget:** The 2023 budget includes \$65,000 for Utilities, \$11,000 for Service Plan (PackageCare), and \$47,700 for Maintenance of the RDS.

**Reports:** Included in the TAC Packet.

**Motion:** **I move to accept the 2022 RDS Operations & Maintenance Report.**



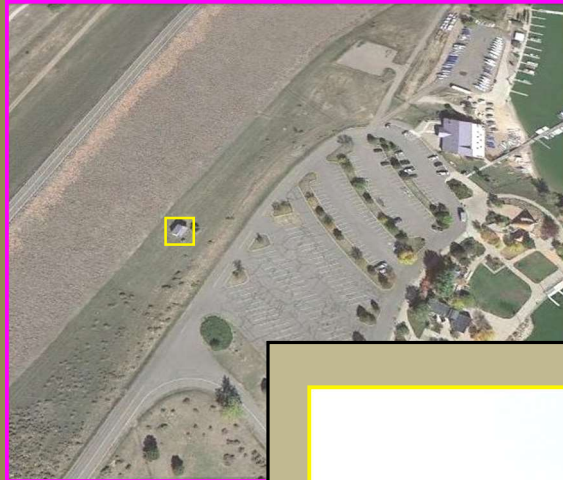
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**CHERRY CREEK RESERVOIR  
DESTRATIFICATION SYSTEM**

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**OPERATION AND MAINTENANCE  
ANNUAL REPORT  
2022 - DRAFT**

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**Submitted To:**

**Cherry Creek Basin Water Quality Authority**



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**Prepared By:**



5975 S. Quebec Street, Suite 225 | Centennial, CO 80111 | 303.488.7571 | 303.868.5767 cell | [r2rengineers.com](http://r2rengineers.com)

Richard "Rich" Borchardt

# CHERRY CREEK BASIN WATER QUALITY AUTHORITY RESERVOIR DESTRATIFICATION SYSTEM OPERATION AND MAINTENANCE ANNUAL REPORT 2022

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## **INTRODUCTION:**

R2R Engineers is retained under the “Pollution Abatement Project Manager (PAPM)” agreement to operate and coordinate maintenance of the compressor and aeration system commonly referred to as the Cherry Creek Reservoir Destratification System (RDS). The RDS began operation in April 2008.

## **2022 RDS SEASON SUMMARY:**

At their January 20, 2022 meeting, the CCBWQA Board of Directors (Board) adopted a restated amended Policy for the Operation of the RDS (Policy) by resolution 2022-1-2 included in **Appendix A** which:

- adopted the new operation season of about mid-April through about the end of September, and
- optimizes the water quality benefit of a reduced the summer chlorophyll-a average (historically reduced by 0.8 to 4.7 ug/l from 2008-2013<sup>1</sup>).

In accordance with this Policy, R2R Engineers started the RDS on April 15, 2022 and shut it down on October 6, 2022.

## **2022 OPERATION DETAILS/REPAIRS/ MAINTENANCE:**

The RDS test start and visual leak check was done on April 4, 2022 from 2:18 to 3:12 pm for 54 minutes with the pressure reducing valve set to a distribution system pressure of 40 psi. Ingersoll Rand replaced the top pressure regulating valve and performed their pre-season start inspection of the compressor on April 4, 2022. Prior to RDS test, leak check, and compressor inspection, an email was sent to CCBWQA representatives, Cherry Creek State Park representatives, and the Marina operator. The manholes were opened and the gage pressures for each of the 5 zones were observed (**Photo 1**). A visual observation was made from the shoreline



<sup>1</sup> Cherry Creek Reservoir Model Documentation - Section 5.2.1; April 2017, Hydros Consulting Inc.



with no leaks apparent; the surface of the reservoir included some waves that were visually masking some of the bubble plumes from the aerators (**Photo 2**).

The 2022 RDS Operations Log in **Appendix B** summarizes the operations and maintenance recorded during the 2022 season. Some of the key highlights are included below.

- The RDS was started for the season on April 15, 2022 at 8:56 am with the pressure reducing valve set to a distribution system pressure of 40 psi.
- The distribution system pressure was stepped up to 50 psi on April 25, 2022 at 2:55 pm.
- The distribution system pressure was stepped up to 55 psi on May 6, 2022 10:29 am.
- On May 10 at 9:55 am, the RDS was shut down at request of Colorado Parks and Wildlife to aid in the search and recovery efforts in the reservoir.
- On May 14, 2022 at 2:32 pm, the RDS was restarted.
- On June 6, 2022, Colorado Parks and Wildlife reported a potential leak in the reservoir.
- On June 7, 2022, LRE Water followed up on the leak report and observed a diffuser head that was creating a larger than normal bubble plume (**Photo 3**) and the other heads in the zone beyond the leak were still working so all zones were left operational.
- On June 14, 2022, Ingersoll Rand performed preventative maintenance which included cleaning of coolers.
- On June 21, 2022, B&RW replaced a blown regulator (**Photo 4**) in head 402 repairing the leak.
- On August 17, 2022, the louvers in both doors to the RDS Building were observed and found free from clogging and debris (**Photo 5**).
- On August 22-23, 2022, B&RW began annual maintenance of the in-lake distribution system.
- On September 6, 2022, Ingersoll Rand informed CCBWQA that they received a message stating temperatures were elevated and that there was a potential ventilation issue. R2R Engineers went out to the site and observed:
  - the louvers in both doors to the RDS Building and found no clogging, and
  - the compressor was shut down and had a warning of High Bearing Oil Temperature on September 2, 2022 at 16:03:46 (**Photo 6**).

Ingersoll Rand was informed of findings and they scheduled a technician for September 7, 2022.

- Ingersoll Rand performed preventative maintenance on September 7, 2022, which included cleaning of coolers, and the compressor was placed back into service.
- On September 14, 2022, the Marina reported a visible leak in the Reservoir.
- On September 15, 2022, LRE Water confirmed leak with large bubble plume and no heads beyond leak were running, they shut down Zone 1 so that remaining zones could still operate.

- On September 20, 2022, B&RW initiated repairs and found the line separated with a large gap between ends. B&RW tried unsuccessfully to pull lines closer together. B&RW capped the end of line so the first few heads in Zone 1 could operate until a larger repair could be made.
- On September 27, 2022, B&RW finished the repair of Zone 1 by disassembling the disconnected section, moving it back into place, and reassembling, thus reconnecting it. Zone 1 was fully returned to service.
- On October 4-5, 2022, B&RW finished annual maintenance of the in-lake distribution system.
- The RDS was shut down for the season on October 6, 2022 at 2:14 pm.



Photo 3



Photo 4

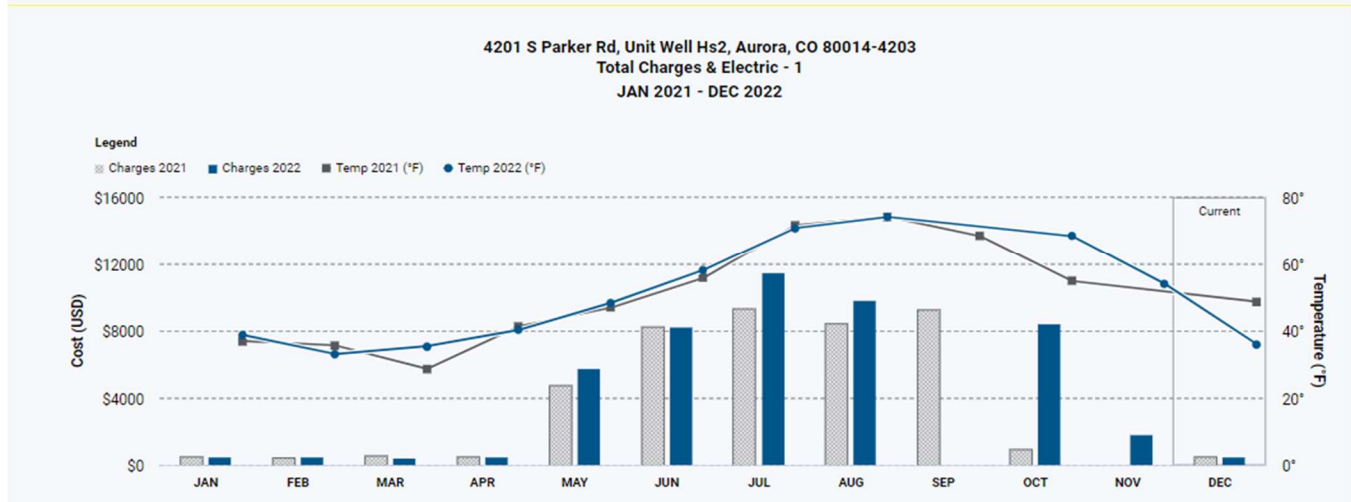
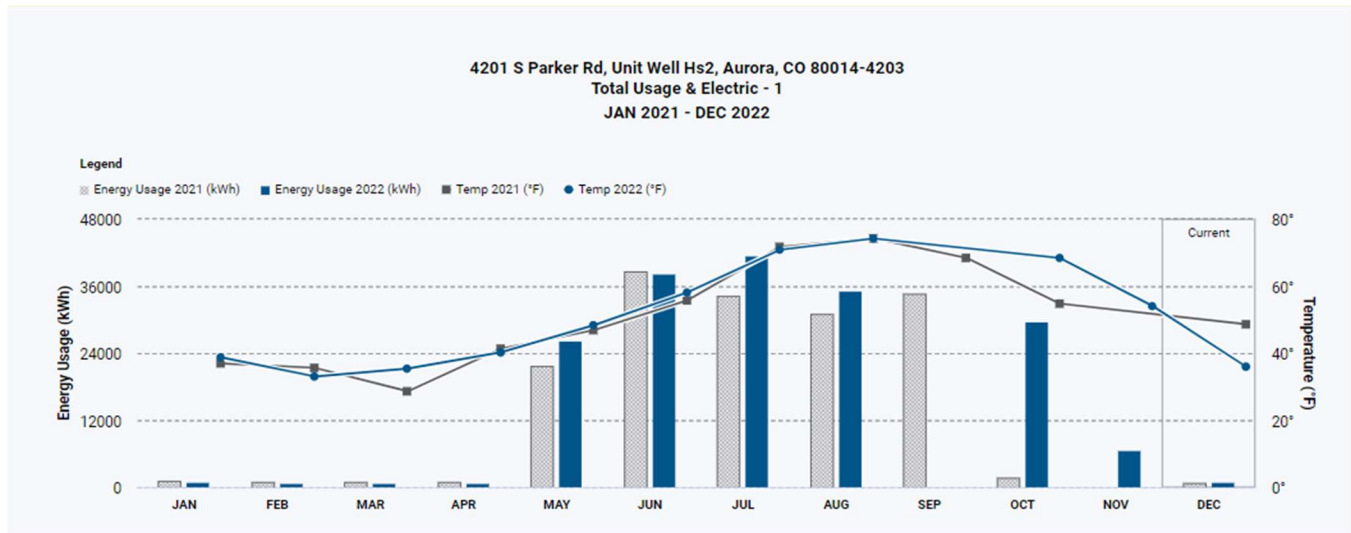


Photo 5



Photo 6

**2022 ELECTRICAL USAGE AND CHARGES:**



Xcel Energy changed its reporting this year<sup>2</sup> and now provides two graphs and corresponding monthly data for the 2022 electrical usage and charges (see graphs above and corresponding monthly data in **Appendix C**). These graphs show the previous year for comparison as well. Note that there is information missing for November 2021 and September 2022, which is likely a result of the meter not being read. The charges are actual dollars billed and have not been adjusted for inflation. When the corresponding data is summarized, the total electrical usage for 2022 was 181720 kWh at a cost of \$48,088.50 compared with 2021 that used 166880 kWh at a cost of \$43,623.15. The energy use of the RDS increased in 2022, while the 2022 season was longer (comparing stop dates of 10/6/22 versus 10/1/22) there were other shut down periods in 2022 (for 4 days May 10-14, 2022 and 5 days September 2-7, 2022) that would offset the longer season operation of 5 days. There isn't a readily apparent reason for this 8.8% increase, and it may be a result of different weather patterns and reservoir conditions (i.e., depth and temperature of water). It is recommended that the energy use be monitored going forward to determine whether there are any developing performance issues with the RDS.

<sup>2</sup> Xcel CCBWQA Account Data, Public Service Company of Colorado, 2022

## **RECOMMENDATIONS:**

The following recommendations are provided for consideration to improve system operation.

- Since the coolers were cleaned on June 14, 2022 and the compressor had a temperature warning and shutdown on September 2, 2022, it is recommended to have Ingersoll Rand (IR) clean compressor coolers at a frequency of about every 2 months during the operating season to minimize the chances of another high temperature shutdown like what happened from September 2-7, 2022. This cleaning can be requested by contacting IR's Technician Supervisor, currently Daniel Ortiz at [DOrtiz@irco.com](mailto:DOrtiz@irco.com) or his mobile phone 303.598.7069.
- Since there was a delay in knowing that the compressor wasn't running (CCBWQA had to wait until the after the holiday weekend to be contacted by IR of a potential issue), it is recommended that CCBWQA evaluate options to improve communication with IR and consider other options to monitor RDS operations to minimize the length of future lengths shutdowns.
  - IR was contacted to start this evaluation, and they are beta testing providing their Remote Monitoring System (RMS) to their customers. The RMS provides e-mail and notifications and an online platform to IR to inform their maintenance of the compressor. The RMS beta test would be included in CCBWQA's PackageCare so there wouldn't be any additional cost; a request to add CCBWQA has been made to IR's Account Manager, currently Jeff Handley at [Jeff.Handley@irco.com](mailto:Jeff.Handley@irco.com) or his mobile phone 303.345.4407. If CCBWQA notices an issue through the RMS or site visit, then a call can be placed to 1-800-223-1911 option 1 to IR for maintenance on the compressor. The standard work hours are Monday through Friday 7:30 am to 4:00 pm (Mountain Standard Time); if maintenance is needed outside of those hours, it gives instructions for a 24-hour call service that will reach out to the on-call technician. Maintenance during standard work hours is covered under CCBWQA's PackageCare plan, but after-hours work is not covered and is charged at an hourly rate with a 4-hour minimum.
  - If the RMS doesn't meet the information and communication needs of CCBWQA, CCBWQA can look at possibly reviving the previous notification system (SCADA and Mission Control software used with the old compressor) or a new one that provides a call out to a list (consultant staff and manager) and remote monitoring/control option. This option would likely need further evaluation to determine the scope of work and identification of costs.
- Since there was an 8.8% increase in energy consumption from 2021 to 2022, it is recommended to continue monitoring the annual energy consumption and look for any trends that may point to developing issues or concerns.

## **RDS POLICY and HISTORY**

For the 2009-2013 operating seasons, the Cherry Creek Basin Water Quality Authority (CCBWQA) annually reviewed the prior year's Reservoir De-stratification System operating policies and procedures in light of reservoir data collected from system operations to determine the system start-up date.

In 2014, data collected during the time period of 2008 through 2013 was further analyzed. The data identified that the de-stratification system provided two primary benefits. One is the reduction in the dominance of blue-green algae as part of the whole algal assemblage, and the second is the reduction in the periods when the reservoir is thermally stratified during the summer.<sup>3</sup>

The data further suggested that operating the aeration system in early spring did not significantly affect blue-green algae (i.e. cyanobacteria) growth, since the primary cyanobacteria growth period is from June through September when water temperatures are warmer.<sup>4</sup> Additionally, the aeration system supports de-stratification of the reservoir, thereby reducing the tendency for the reservoir to "turn over," bringing up anoxic water and higher concentrations of nutrients from the reservoir floor. The data from 2008 through 2013 suggested that the reservoir begins to stratify in late-April to mid-May.

<sup>3</sup> CCBWQA January 28, 2013. *Compressor Design Basis - Daily Operation*, William P. Ruzzo, P.E., Craig Wolf, GEI.

<sup>4</sup> GEI, Consultants, Inc. January 2014. *Cherry Creek Reservoir 2013 Water Year Aquatic Biological Nutrient Monitoring Study and Cottonwood Creek Pollutant Reduction Facilities Monitoring*.

After review of the data, it was concluded that operation of the destratification system, beginning in 2014, shall be modified as follows:

- a. System start-up shall occur between the dates of May 1<sup>st</sup> and May 10<sup>th</sup>.
- b. System shutdown shall occur between the dates of November 1<sup>st</sup> and November 15<sup>th</sup>.

Additionally, operation of the destratification system shall be limited to those times when ice is not present on the reservoir, except under specific scenarios. This information resulted in "Operation Policy Regarding Ice" policy adopted by the CCBWQA's Board on February 20, 2014 and the "Destratification System Compressor Start-up Procedure" approved by the CCBWQA's Technical Advisory Committee on April 3, 2014 (mentioned here for historical purposes since it has subsequently been updated when the RDS Operations Policy was adopted via resolution 2022-1-2 at the January 20, 2022 Board meeting, see **Appendix A**).

Prior to the start of the 2014 operation of the destratification season, the question surfaced regarding whether the system should be started to allow for reservoir data to be collected with the destratification system in non-operational mode. This would provide additional water quality data to be collected for the in-progress reservoir modeling effort that was underway. The CCBWQA's Technical Advisory Committee took this question under advisement and recommended to the CCBWQA's Board that the system not operate during the 2014 season. The CCBWQA's Board approved this change in the Destratification Operating Policy such that the system did not operate for the entire 2014 aeration season.

Then in 2015 and again in 2016, the CCBWQA's Technical Advisory Committee (TAC) took the question of whether the destratification system should operate under advisement and in each year recommended to the CCBWQA's Board that the system not operate during the 2015 and 2016 aeration seasons in order to collect additional water quality data with the system turned off. The CCBWQA's Board approved the TAC's recommendation each year.

During each of the three years that the destratification system didn't operate, one or more cyanobacteria blooms were observed within the reservoir. Prior to the start of the 2017 aeration season, the CCBWQA's Technical Advisory Committee (TAC) again took the question of whether the destratification system should operate in 2017. Since the reservoir modeling was complete, TAC recommended the destratification system operate from the first of May through the July 4<sup>th</sup> weekend to determine if this abbreviated aeration season would prevent a cyanobacteria bloom. The CCBWQA's Board approved TAC's recommendation and the destratification system was started on May 1, 2017. Following the system shutdown on July 1, 2017, the aeration system was operated (exercised) periodically to maintain it in a "ready state".

Again in 2018, TAC reviewed and recommended the same operational procedure for the destratification system, which was approved by the CCBWQA's Board.

In 2019, the TAC and Board approved a similar operation season to 2017 and 2018, with the following modifications:

1. Test runs and startup begin in April to assess and prepare for system operations; and
2. If the system is inoperative for longer than 1 day, a restart procedure be established; and
3. Automated controls be evaluated at a cost of less than \$7,500.

A restart procedure of contacting a group<sup>5</sup> to review available water quality monitoring data and length of operation to establish a restart protocol.

In 2020, the compressor was replaced in July, see compressor replacement summary in **Appendix D**. The RDS was operated from May 1 through November 16, 2020 to capture the full water quality benefits from the RDS. The compressor operated even through the hottest months of July and August. There were several algae blooms. One of the worst was a blue-green algae bloom from July 9 to July 14, 2020 resulting in the Marina and Swim Beaches being closed to water contact and warning signs posted. It was recommended

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<sup>5</sup> Cherry Creek State Park Manager (Jason Trujillo), Colorado Parks and Wildlife Water Quality Coordinator (Mindi May), Solitude Lake Management Regional Manager (Erin Stewart) and the CCBWQA's Pollution Abatement Project Manager (Rich Borchardt)



that the RDS operation season and policy be updated to include additional data that has been gathered since 2014 (when previous RDS Operations Policy) and the ability of new compressor to operate for a longer season.<sup>6</sup>

In 2021, it was noted in the 2021 RDS Operations and Maintenance Annual Report<sup>7</sup> to add observation and cleaning, if needed, of louvers in the building doors.

In 2022, the CCBWQA Board of Directors (Board) adopted a restated amended Policy for the Operation of the RDS (Policy) by resolution 2022-1-2 included in **Appendix A** which:

- adopted the new operation season of about mid-April through about the end of September; and
- optimizes the water quality benefit of a reduced the summer chlorophyll-a average (historically reduced by 0.8 to 4.7 ug/l from 2008-2013<sup>8</sup>).

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<sup>6</sup> CCBWQA 2020 RDS Operations and Maintenance Annual Report, R2R Engineers.

<sup>7</sup> CCBWQA 2021 RDS Operations and Maintenance Annual Report, R2R Engineers

<sup>8</sup> Cherry Creek Reservoir Model Documentation - Section 5.2.1; April 2017, Hydros Consulting Inc.

**APPENDIX A – Resolution 2022-1-2 RDS Operations Season and Policy**

**CHERRY CREEK BASIN WATER QUALITY AUTHORITY**

**RESOLUTION 2022-1-2**

**ARAPAHOE AND DOUGLAS COUNTIES, COLORADO**

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**A RESOLUTION ADOPTING A RESTATED AND AMENDED POLICY FOR THE OPERATION OF THE CHERRY CREEK RESERVOIR DESTRATIFICATION SYSTEM**

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**WHEREAS**, the Cherry Creek Basin Water Quality Authority (“Authority”) is authorized by the provisions of Section 25-8.5-110(1)(a), C.R.S., to adopt policies to facilitate the governance and management of the affairs of the Authority and for the execution of the powers vested in the Authority, and for carrying out the provisions of Article 8.5 of Title 25 of the Colorado Revised Statutes; and

**WHEREAS**, the Authority is statutorily charged with protecting, preserving, and enhancing the water quality of Cherry Creek, the Cherry Creek Reservoir and related Watershed; and

**WHEREAS**, the Authority has installed and currently operates an aeration system in the Reservoir (“Destratification System”) for the purpose of mixing the water column to reduce the occurrence of thermal stratification; and

**WHEREAS**, on February 20, 2014, the Authority adopted a Destratification System Operating Policy (“Policy”) which the Authority desires to restate and amend; and

**WHEREAS**, the Authority’s Technical Advisory Committee has reviewed the proposed Restated and Amended Destratification System Operating Policy and recommends the Board adopt the same.

**NOW THEREFORE, BE IT RESOLVED BY** the Board of Directors of the Cherry Creek Basin Water Quality Authority, Arapahoe and Douglas Counties, Colorado that:

**Section 1. Adoption of Restated and Amended Policy.** The Restated and Amended Destratification System Operating Policy attached hereto as **Exhibit A** is hereby adopted.

**Section 2. Prior Policies Superseded.** The Restated and Amended Policy supersedes all policies previously adopted by the Board that pertain to the operation of the Destratification System including, but not limited to, the Policy adopted on February 20, 2014.

**Section 3. No Assumed Duty.** The Authority is afforded certain immunities, defenses, and protections from and against tort liability under the Colorado Governmental Immunity Act, Section 24-10-101, *et. seq.*, C.R.S., which the Authority, by the adoption of this Policy, does not waive in whole or in part. The adoption of this Policy and its subsequent implementation shall not give rise to a duty of care on the part of the Authority where none otherwise existed, nor shall the enforcement of or failure to enforce the Policy or any provision contained therein give rise to a duty of care when none otherwise existed.

**Section 4. Severability.** Should any one or more sections or provisions of this Resolution be judicially declared invalid or unenforceable, such determination shall not affect, impair, or invalidate the remaining provisions of this Resolution, the intention being that the various sections and provisions hereof are severable.

**Section 5. Repeal.** Any and all resolutions, or part thereof, in conflict or inconsistent herewith, or to the extent of such conflict or inconsistency are hereby repealed; provided, however, that the repeal of any such resolution or part thereof shall not revive any other resolution or part thereof heretofore repealed or superseded.

**Section 6. Effective Date.** The provisions of this Resolution memorialize the actions taken by the Board at its December 16, 2021, regular meeting and accordingly, shall take effect as of said date.

**ADOPTED** on the 16<sup>th</sup> day of December 2021 and **EXECUTED** this 20<sup>th</sup> day of January, 2022.

**CHERRY CREEK BASIN WATER  
QUALITY AUTHORITY**

By: **Joshua Rivero**  
\_\_\_\_\_  
Joshua Rivero, Chair

**Attest:**

**John A McCarty**  
\_\_\_\_\_  
John A. McCarty, Secretary/Treasurer

## **EXHIBIT A**

### **CHERRY CREEK BASIN WATER QUALITY AUTHORITY**

#### **CHERRY CREEK RESERVOIR RESTATED AND AMENDED DESTRATIFICATION SYSTEM OPERATING POLICY**

July 19, 2021

(TAC reviewed September 2, 2021; Board reviewed January 20, 2022)

#### **Recommended Operating Season and Start-up Criteria:**

In 2020, the Cherry Creek Basin Water Quality Authority (CCBWQA) replaced the compressor to improve the operation of the Reservoir Destratification System (RDS) and to allow for operation from March 1 through November 30. In July 2020; the compressor was replaced, and operation was tested through November 16, 2020.<sup>1</sup> With the new compressor, it appears that the RDS has the capability of operating from ice off through ice on the reservoir.

In 2021, CCBWQA wanted to optimize the water quality benefits of the RDS. CCBWQA reviewed the water quality data from the water quality sampling and thermistor set in the reservoir to evaluate the optimal operating season. For the period of 2016 – 2020<sup>2</sup>:

- the earliest start of thermal stratification was April 20, 2020 (without RDS Operating); and,
- the latest finish of thermal stratification was October 17, 2020 (RDS was operating) or September 27, 2018 (without RDS Operating).

Considering this information, CCBWQA's Technical Advisory Committee at its September 2, 2021, meeting proposed amending the RDS Operations Policy to include, among other things that the RDS should be operated:

- from about mid-April through at least the end of September; and
- before startup, CCBWQA's System Operator will need to visually verify that ice should be off the reservoir<sup>3</sup> and the temperature in the building 38 degrees Fahrenheit; and,
- CCBWQA's System Operator shall then log the detail of the start-up and shut-down procedure in the Cherry Creek Reservoir Destratification Facilities Operation and Maintenance Annual Report.

#### **Start-up Procedure:**

CCBWQA's System Operator should perform a leak check after ice off and ahead of Operating Season start date. CCBWQA's System Operator will perform test by:

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<sup>1</sup> Cherry Creek Reservoir Destratification System – 2020 Operation and Maintenance Annual Report, R2R Engineers.

<sup>2</sup> E-mails from Solitude Lake Management on March 25, 2021, and April 14, 2021.

<sup>3</sup> Destratification System - Operation Policy Regarding Ice; adopted by the CCBWQA Board on February 20, 2014

1. Notifying Cherry Creek State Park Staff (manager and operations manager), Marina Operator, and Ingersoll Rand's client manager for CCBWQA of leak test and season start date.
2. At distribution manholes, check that valves are configured to send air to all zones.
3. Set Pressure Reducing Valve to 40 psi.
4. Review Compressor discharge pressure is set to a range between 100-110 psi.
5. Start compressor following instructions in compressor manual.
6. Monitor gages on Pressure Reducing Valve and Compressor. Compressor delivers 100-110 psi and Pressure Reducing Valve regulates it to 40 psi going to distribution system.
7. Shutdown compressor if compressor delivers more than 110 psi or output on Pressure Reduction Valve exceeds 40 psi.
8. Check pressure gages at distribution manholes.
9. Visually look for leaks by driving dam road and using binoculars from dam and shoreline or by boat.
10. After test, shut-down RDS and report any leaks.
11. Record leak test date and time.

**For season start-up, CCBWQA's System Operator:**

1. Follow instructions 2-8 from leak test.
2. Step up of pressure in 2 phases (50 and 55 psi) at least 4 hours apart,
  - a. Check Pressure Reducing Valve output doesn't exceed phase pressure.
  - b. Check pressure gages at distribution manholes.
3. Record start-up date and time.

**Shut-down Procedure:**

1. Notifying Cherry Creek State Park Staff (manager and operations manager), Marina Operator, and Ingersoll Rand's client manager for CCBWQA of season end date.
2. Turn off Compressor.
3. Monitor gages on Pressure Reducing Valve and Compressor. Pressures should drop.
4. Record shut-down date and time.

**CHERRY CREEK BASIN WATER QUALITY AUTHORITY**  
**CHERRY CREEK RESERVOIR DESTRATIFICATION SYSTEM**  
**OPERATIONS POLICY**

July 19, 2021 (TAC reviewed September 2, 2021; Board reviewed  
January 20, 2022)

**Recommended Operating Season and Start-up Criteria:**

In 2020, the Cherry Creek Basin Water Quality Authority (CCBWQA) replaced the compressor to improve the operation of the Reservoir Destratification System (RDS) and to allow for operation from March 1 through November 30. In July 2020; the compressor was replaced, and operation was tested through November 16, 2020.<sup>1</sup> With the new compressor, it appears that the RDS has the capability of operating from ice off through ice on the reservoir.

In 2021, CCBWQA wanted to optimize the water quality benefits of the RDS. CCBWQA reviewed the water quality data from the water quality sampling and thermistor set in the reservoir to evaluate the optimal operating season. For the period of 2016 – 2020<sup>2</sup>:

- the earliest start of thermal stratification was April 20, 2020 (without RDS Operating); and,
- the latest finish of thermal stratification was October 17,2020 (RDS was operating) or September 27, 2018 (without RDS Operating).

Considering this information, CCBWQA’s Technical Advisory Committee at their September 2, 2021 accepted the update the RDS Operations Policy and the RDS should be operated:

- from about mid-April through at least the end of September; and
- before startup, CCBWQA’s System Operator will need to visually verify that ice should be off the reservoir<sup>3</sup> and the temperature in the building 38 degrees Fahrenheit; and,
- CCBWQA’s System Operator shall then log the detail of the start-up and shut-down procedure in the Cherry Creek Reservoir Destratification Facilities Operation and Maintenance Annual Report.

**Start-up Procedure:**

CCBWQA’s System Operator should perform a leak check after ice off and ahead of Operating Season start date. CCBWQA’s System Operator will perform test by:

1. Notifying Cherry Creek State Park Staff (manager and operations manager), Marina Operator, and Ingersoll Rand’s client manager for CCBWQA of leak test and season start date.
2. At distribution manholes, check that valves are configured to send air to all zones.
3. Set Pressure Reducing Valve to 40 psi.
4. Review Compressor discharge pressure is set to a range between 100-110 psi.
5. Start compressor following instructions in compressor manual.
6. Monitor gages on Pressure Reducing Valve and Compressor. Compressor delivers 100-110 psi and Pressure Reducing Valve regulates it to 40 psi going to distribution system.
7. Shutdown compressor if compressor delivers more than 110 psi or output on Pressure Reduction Valve exceeds 40 psi.
8. Check pressure gages at distribution manholes.
9. Visually look for leaks by driving dam road and using binoculars from dam and shoreline or by boat.
10. After test, shut-down RDS and report any leaks.
11. Record leak test date and time.

For season start-up, CCBWQA’s System Operator:

1. Follow instructions 2-8 from leak test.

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<sup>1</sup> Cherry Creek Reservoir Destratification System – 2020 Operation and Maintenance Annual Report, R2R Engineers.

<sup>2</sup> E-mails from Solitude Lake Management on March 25, 2021 and April 14, 2021.

<sup>3</sup> Destratification System - Operation Policy Regarding Ice; adopted by the CCBWQA Board on February 20, 2014

2. Step up of pressure in 2 phases (50 and 55 psi) at least 4 hours apart,
  - a. Check Pressure Reducing Valve output doesn't exceed phase pressure.
  - b. Check pressure gages at distribution manholes.
3. Record start-up date and time.

**Shut-down Procedure:**

1. Notifying Cherry Creek State Park Staff (manager and operations manager), Marina Operator, and Ingersoll Rand's client manager for CCBWQA of season end date.
2. Turn off Compressor.
3. Monitor gages on Pressure Reducing Valve and Compressor. Pressures should drop.
4. Record shut-down date and time.

**Signature:** 

**Email:** jrivero@parkeronline.org

**Signature:**   
John A. McCarty (Jan 30, 2022 16:21 MST)

**Email:** johnmccarty1972@gmail.com



## **APPENDIX B - 2022 RDS OPERATIONS LOG**

Cherry Creek Basin Water Quality Authority  
 2022 Reservoir Destratification System (RDS) Operational Log  
 December 23, 2022

Date	Day	Time		Runtime Minutes	System Pressure psi	Comments
		Start	Shutdown			
4/4/2022	Monday					Ingersoll Rand replaced top pressure regulating valve and performed pre-season start inspection
4/4/2022	Monday	2:18 PM	3:12 PM	54	40	No leaks or problems observed
4/15/22	Friday	8:56 AM			40	Season Start
4/25/22	Monday	2:55 PM			50	Stepped up system pressure to 50 psi
5/6/22	Friday	10:29 AM			55	Stepped up system pressure to 55 psi
5/10/22	Tuesday		9:55 AM		55	RDS was shutdown at request of CPW for search and recovery
5/14/22	Saturday	2:32 PM			55	Notified by CPW that RDS could be started
6/6/22	Monday				55	CPW reported possible leak
6/7/22	Tuesday				55	LRE Water confirmed leak and provided coordinates. Other heads still working.
6/14/22	Tuesday				55	Ingersoll Rand performed preventative maintenance which included cleaning of coolers
6/21/22	Tuesday				55	B&RW replaced blown regulator in head 402
8/17/22	Wednesday				55	Observed louvers in both doors were clear
8/22/22	Monday				55	B&RW performed in lake maintenance
8/23/22	Tuesday				55	B&RW performed in lake maintenance
9/2/22	Friday		4:03 PM		55	High Bearing Oil Temperature
9/6/22	Tuesday				55	Ingersoll Rand received message stating temperatures were elevated and that there was a potential ventilation issue. Observed louvers in both doors were clear, noted Compressor Warning of High Bearing Oil Temperature on 9/2/22 at 16:03:46. Informed Ingersoll Rand which scheduled a technician for 9/7/22.
9/7/22	Wednesday				55	Ingersoll Rand performed preventative maintenance which included cleaning of coolers
9/14/22	Wednesday				55	Marina reported possible leak
9/15/22	Thursday				55	LRE Water confirmed leak with large bubble plume and no heads beyond leak were running, they shut down Zone 1 so that remaining zones could still operate
9/20/22	Tuesday				55	B&RW initiated repairs found line separated with large gap between ends. Tried unsuccessfully to pull lines closer together. Capped end of line so the first few heads in Zone 1 could operate until larger repair could be made
9/20/22	Tuesday				55	B&RW initiated repairs and found the line separated with large gap. B&RW tried unsuccessfully to pull lines closer together. B&RW capped the end of line so first few heads in Zone 1 could operate until a larger repair could be made
9/27/22	Tuesday				55	B&RW repaired the gap by disassembling the disconnected section, moving it back into place, and reassembling thus reconnecting it.
10/4/22	Tuesday				55	B&RW performed in lake maintenance
10/5/22	Wednesday				55	B&RW performed in lake maintenance
10/6/22	Thursday		2:14 PM			Season stop

RDS all zones operating with leak in a single head with other heads in zone beyond leak still operating  
 RDS operating with one zone shutdown as leak took numerous heads out of service; other zones still operating  
 RDS completely shut down

## **APPENDIX C – XCEL ENERGY INFORMATION**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total
Energy Usage 2021 (kWh)	1080	920	1000	920	21720	38640	34240	31000	34760	1760		840	166880
Energy Usage 2022 (kWh)	880	800	760	800	26200	38240	41600	35160		29760	6640	880	181720
Temp 2021 (°F)	36.97059	35.63793	28.63333	41.36207	46.90323	55.77419	71.78571	74.31035	68.46667	54.81035		48.65152	
Temp 2022 (°F)	38.76471	33.06667	35.39655	40.25806	48.39655	58.13334	70.9138	74.25		68.46774	54.06452	36	

Missing Informaiton likely due to meter not being read

Increase in Energy Usage (2022 kWh/2021 kWh)= 1.088926174

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total
Charges 2021	498.99	471.01	572.57	533.73	4759.94	8285.34	9341.35	8468.24	9249.96	952.58		489.44	43623.15
Charges 2022	497.28	481.62	473.83	486.83	5802.56	8276.05	11497.55	9826.91		8420.9	1820.2	504.77	48088.5
Temp 2021 (°F)	36.97059	35.63793	28.63333	41.36207	46.90323	55.77419	71.78571	74.31035	68.46667	54.81035		48.65152	
Temp 2022 (°F)	38.76471	33.06667	35.39655	40.25806	48.39655	58.13334	70.9138	74.25		68.46774	54.06452	36	

Missing Informaiton likely due to meter not being read

## **APPENDIX D - COMPRESSOR REPLACEMENT SUMMARY**

**DATE:** January 12, 2021

**TO:** Chuck Reid, CCBWQA Manager

**CC:** Jacob James, CCBWQA TAC Chairman

**FROM:** Richard Borchardt, PE & CFM

**SUBJECT:** Reservoir Destratification System – 2020 Compressor Replacement Project Summary



**Background and Purpose:**

In April 2008, the Cherry Creek Basin Water Quality Authority (CCBWQA) placed the Reservoir Destratification System (RDS) in service. Shortly after startup the air compressor began shutting down through internal overheating protection. **Figure 1** shows the location of the RDS Compressor Building where the compressor is located.

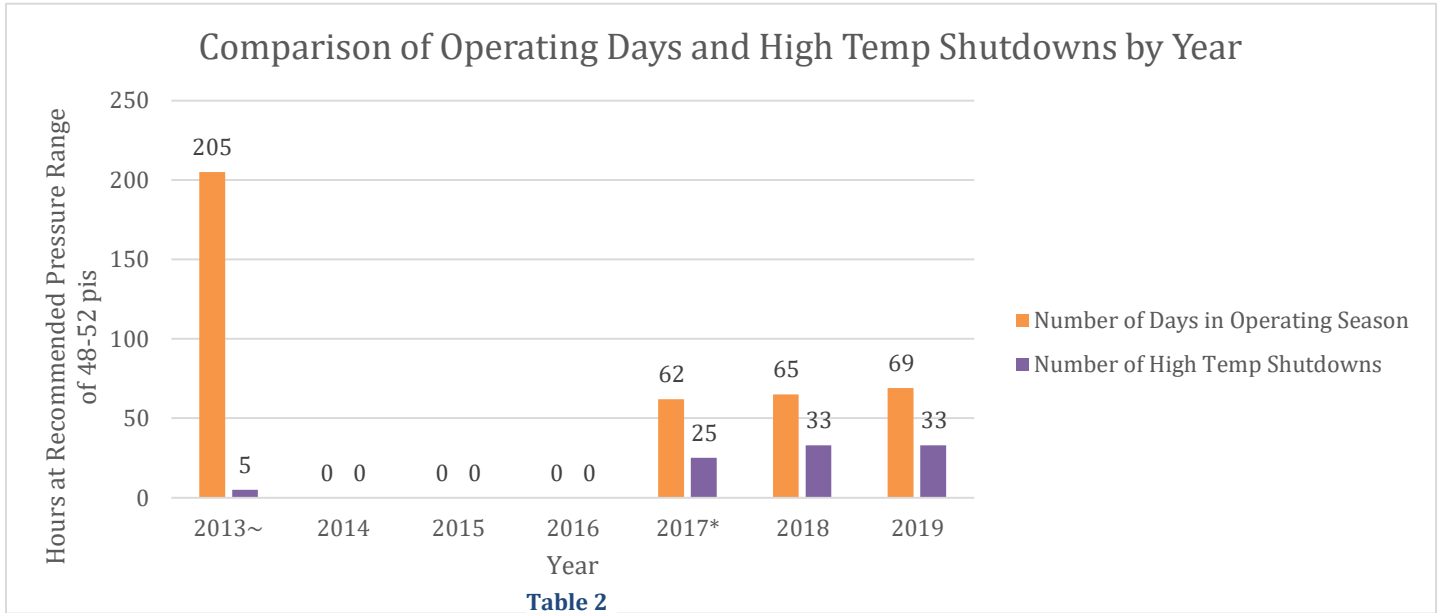
In September 2013, Eaton Energy Solutions (EES) prepared a report evaluating the RDS and providing options to improve operation of the RDS<sup>1</sup>. EES provided several options and ultimately concluded that the compressor needed to be replaced to obtain full operation (24 hours a day, 7 days a week, through the operating season of

March 1 to November 30) at the appropriate volume of air 287 cubic feet per minute (cfm) at a pressure of 58 pounds per square inch (psi) on-site. Between 2013 and 2019, certain of EES’s recommendations were implemented: replacing the above ground piping and upgrading controls to minimize manual restarts.

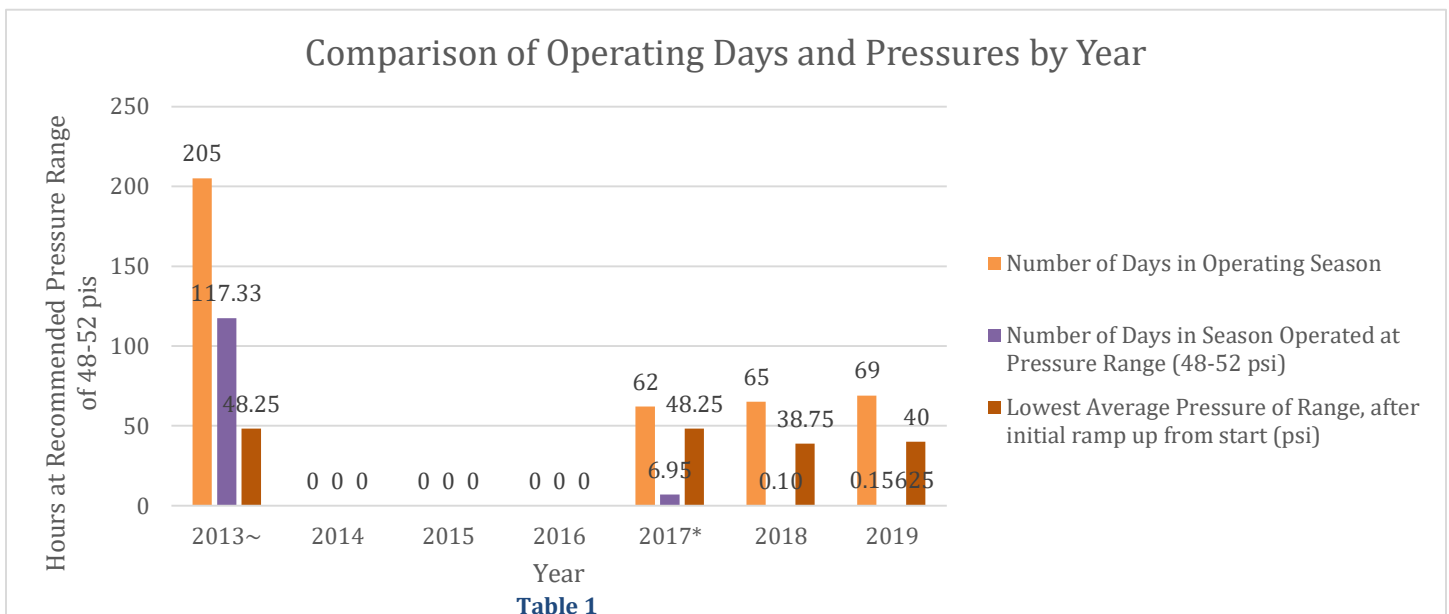
<sup>1</sup> Destratification System Evaluation for Cherry Creek Reservoir in Cherry Creek State Park, Co. Eaton Energy Solutions, Inc. September 27, 2013

**Existing Conditions:**

After the 2019 operating season, R2R Engineers prepared comparison of operating metrics from 2013 through 2019 (RDS was not operated in 2014 and 2015). These comparisons showed the continual decline operation time and pressure of the RDS. **Table 1** compares the number of days that the RDS was operated and the



corresponding number of high temperature shutdowns that occurred during that period. **Table 2** compares the number of days that the RDS was operated, with the number of days that it was operated at the best achievable pressure range (48-52 psi) with aging compressor, and the lowest average pressure range (pressure that was used to keep compressor running as much as possible). There is an apparent trend from 2018- 2019



of an increased number of high temperature shutdowns (33) with lower than ideal operating pressures (average of pressure ranges of 38.75 in 2018 and 40 in 2019).



## Reservoir Destratification System – 2020 Compressor Replacement

January 12, 2021

Page | 3 of 3

### R2R Engineers Memorandum

#### **Procurement and Installation:**

In 2020, CCBWQA replaced the compressor through a design-build procurement process. The selected bidder, Ingersoll Rand, installed a 100 Horsepower motor compressor capable of delivering 317 cfm at 100 psi on-site (exceeds performance specification), and a variable speed drive. CCBWQA added a receiver tank in the bid alternate to lower the pressure changes and extend the life of the compressor. Pressure regulators were included to allow CCBWQA to adjust pressure to the 58 psi.

**Photo 2** shows the old compressor being removed, and **Photo 3** shows the new compressor installed. <sup>2</sup>



Photo 2

#### **Water Quality Benefits:**

The RDS' water quality benefits include:

- Reduction of approximately 810 pounds of Phosphorus per year<sup>3</sup>
- Disrupting blue-green algae life cycles as part of the whole algal assemblage, and
- Decreasing periods when the reservoir is thermally stratified during the summer<sup>4</sup>.

The decline in operating time and pressure (over time) has likely impacted these benefits. The compressor replacement restores the original operation parameters and associated water quality benefits.

#### **Summary:**

**Water Quality Benefit of reduction of ≈ 810 pounds of Phosphorus per season**

**Total Project Cost = \$314,241<sup>5</sup>**

**Authority's Share = \$314,241**

**Engineer/Contractor: Ingersoll Rand**



Photo 3

<sup>2</sup> Full Installation and Inspection Report by RG and Associates available from CCBWQA Manager.

<sup>3</sup> CCBWQA 2020 Capital Improvement Program Supporting Data, Board Adopted Version November 21, 2019.

<sup>4</sup> CCBWQA January 28, 2013. Compressor Design Basis - Daily Operation, William P. Ruzzo, P.E., Craig Wolf, GEI.

<sup>5</sup> Includes 10-year maintenance plan.



**ACTION ITEM MEMORANDUM**

**To:** CCBWQA Technical Advisory Committee (TAC)  
**From:** Richard Borchardt, Pollution Abatement Project Manager  
 Jane Clary, Technical Manager  
**Date:** January 5, 2023  
**Subject:** Dove Creek Stream Reclamation Improvements from Otero Avenue to Pond D1 – IGA

**Request:** TAC approves the draft Intergovernmental Agreement (IGA) with SEMSWA for the first phase of construction of the Dove Creek Stream Reclamation.

**Project/Issue:** The design is nearing completion on Dove Creek from Otero Avenue to Pond D1 located upstream of Broncos Parkway in the City of Centennial. RESPEC is the design engineer. The Project sponsors are CCBWQA and the Southeast Metro Stormwater Authority (SEMSWA) which is the project lead. Dove Creek is a tributary to Cherry Creek. The proposed stream improvements benefit the water quality in Cherry Creek and the Cherry Creek Reservoir by reducing bed and bank erosion and immobilizing Phosphorus in the adjacent soils. It is estimated that this 0.51 mile long-project will immobilize 46 pounds of phosphorus annually. The first phase of construction between Otero Avenue and Chambers Road is scheduled for early 2023 and the IGA Amendment brings in 2023 funding of \$1,700,000 (\$138,000 CCBWQA and \$1,562,000 SEMSWA) for the construction of the first phase and contingency. The project is currently estimated at \$2,100,000 in the IGA; the table below provides a breakdown of funding by sponsors and shows CCBWQA’s participation is 11.3% which is less than the 25% limit historically used on partner projects. Future IGA Amendment(s) is anticipated to bring in construction funding for the second phase of construction. Construction of the second phase between Chambers Road to Pond D-1 just upstream of Broncos Parkway is anticipated in 2024.



Funding Source	2021	2022		2023		
	Engineering Design	Additional Annual Funding	Cumulative Project Funding	Project Sponsor %	Additional Annual Funding	Cumulative Project Funding
SEMSWA	\$100,000	\$200,000	\$300,000	88.7%	\$1,562,000	\$1,862,000
CCBWQA	\$25,000	\$75,000	\$100,000	11.3%	\$138,000	\$238,000
Total	\$125,000	\$275,000	\$400,000	100.0%	\$1,700,000	\$2,100,000

**Budget:** The Project is within CCBWQA’s 2023 Budget of \$138,000.

**Motion:** I move to recommend that the Board approve an Intergovernmental Agreement (IGA Amendment) with SEMSWA for the first phase of construction of the Dove Creek Stream Reclamation.



**Photo of Dove Creek downstream of Chambers Road (Courtesy of Molly Trujillo)**



**Photo of Dove Creek upstream of Chambers Road (Courtesy of Molly Trujillo)**

**INTERGOVERNMENTAL AGREEMENT FOR FUNDING  
THE CONSTRUCTION OF DOVE CREEK STREAM  
RECLAMATION IMPROVEMENTS – PHASE 1**

**THIS INTERGOVERNMENTAL AGREEMENT FOR FUNDING THE CONSTRUCTION OF DOVE CREEK STREAM RECLAMATION IMPROVEMENTS – PHASE 1** (“Agreement”) is made and entered into this \_\_\_\_ day of \_\_\_\_\_, 2023 by and between the **CHERRY CREEK BASIN WATER QUALITY AUTHORITY**, a quasi-municipal corporation and political subdivision of the State of Colorado (“Authority”) and **SOUTHEAST METRO STORMWATER AUTHORITY**, a quasi-municipal corporation and political subdivision of the State of Colorado (“SEMSWA”), individually a “Party” and collectively the “Parties”.

**RECITALS**

**WHEREAS**, Authority entered into that certain Intergovernmental Agreement for Funding the Design of Dove Creek Stream Reclamation Improvements dated May 28, 2021 as amended by a First Amendment dated April 21, 2022 (“Design Funding Agreement”), pursuant to which SEMSWA contributed \$300,000 and the Authority contributed \$100,000 to the design of the Project as hereinafter defined; and

**WHEREAS**, Dove Creek is tributary to Cherry Creek and pursuant to the Design Funding Agreement, the Parties agree to cooperate in funding the design and construction of that portion of Dove Creek that extends south from East Otero Avenue to Dove Creek Pond D1 (“Project”); and

**WHEREAS**, design of the Project is nearing completion and the Parties desire to cooperate in funding the construction of Phase 1 of the Project, which is located between Otero Avenue on the south and Chambers Road on the North and which is estimated to cost \$2,100,000, including design costs of \$400,000 (“Phase 1”); and

**WHEREAS**, based upon the Project’s water quality features and the benefits to be derived from the Project, including Phase 1, the Authority budgeted \$138,000 for construction of Phase 1 the Project in the Authority’s 2023 Capital Improvement Project Budget; and

**WHEREAS**, the Design Funding Agreement contemplated that the Parties would fund the construction of the Project and budget the appropriate funds therefore in future years; and

**WHEREAS**, the Authority has ranked the Project, including Phase 1, high in priority based upon the criteria established by the Authority’s Technical Advisory Committee for water pollution abatement projects as confirmed by the Authority’s Stream Reclamation, Water Quality and Benefit Evaluation – Interim Stream Report, dated June 16, 2011; and

**WHEREAS**, the water quality features of the Project affect both the design and construction costs for the Project, including Phase 1; and

**WHEREAS**, the Parties desire to cooperate in funding the construction of the Project, including Phase 1, and for that purpose, desire to enter into this Agreement as hereinafter set forth.

**NOW, THEREFORE**, in consideration of the covenants and mutual agreements herein contained, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. **Purpose.** The purpose of this Agreement is to provide for the Parties to jointly fund the construction of Phase 1, and establish dates regarding the construction of Phase 1, as well as their expectations regarding the funding and construction of the balance of the Project.

2. **Construction of Phase 1**

2.1 **Construction.** Subject to paragraph 2.2 below, with input from the Authority, Phase I will be constructed by a contractor recommended and selected by SEMSWA and Authority. Except as provided in this Agreement, all matters relating to the construction of Phase I, including the Water Quality Component thereof, shall be at the discretion of SEMSWA. SEMSWA shall use its best efforts to award a contract for the construction of Phase I no later than March 31, 2023 and to cause Phase I, including the Water Quality Component thereof, to be constructed and accepted, for ownership and maintenance purposes, by either the Mile High Flood District or SEMSWA, as applicable on or before December 31, 2024.

2.2 **Construction Costs.** Before SEMSWA awards construction of Phase I, SEMSWA shall submit to the Authority a summary of construction costs received for Phase I, together with SEMSWA's recommendation to award a contract for the construction of Phase I. The Authority shall have the right to review the construction costs and will notify SEMSWA of any objections to SEMSWA's recommendation within five (5) days of receipt of the construction costs and SEMSWA's recommendation. SEMSWA will consider any objections raised by the Authority, but SEMSWA may award a contract to any construction contractor as to which the Authority has objected and not withdrawn that objection only after consultation with and consideration of the objections of the Authority. SEMSWA will require that the construction contractor ("Contractor") provide a performance and payment bond for Phase I, in the full amount of the construction contract price and to name the Authority as an additional obligee on said performance and payment bond.

If the construction costs for any reason are not acceptable to either SEMSWA or the Authority, and SEMSWA does not award a contract for construction of Phase I, the funds

paid by the Authority to SEMSWA, under paragraph 3.1 below, shall be returned to the Authority as soon as reasonably practical and this Agreement shall be considered null and void.

2.3 Construction in Accordance with Approved Plans. SEMSWA shall cause Phase I to be constructed in accordance with the construction plans as approved by Mile High Flood District, if applicable, SEMSWA, and the Authority.

2.4 Reports. SEMSWA shall provide to the Authority periodic updates and written reports concerning construction of Phase I. Unless otherwise agreed, said periodic reports shall be provided to the Authority no less frequently than monthly.

2.5 Meetings. At any time and in particular, following receipt of any periodic report, the Authority shall have the right to request a meeting with SEMSWA to review any Authority concerns or obtain any additional information that SEMSWA has concerning Phase I. If the Authority has concerns, SEMSWA agrees that it will address those concerns as soon as practical, but in no event later than twenty (20) days from the date such concerns are raised by the Authority and delivered in writing to SEMSWA. In the event that the Authority's concerns are not addressed to the Authority's satisfaction, the Authority shall have a right to appeal to the SEMSWA's engineer who shall render a decision within ten (10) days from the date of the appeal. The decision of the SEMSWA's engineer shall be final.

2.6 Change Orders. In addition to the provisions set forth in paragraph 4 below, in the event there is a proposed change order for Phase I regarding a stream reclamation and water quality enhancement component of Phase I, the Authority must approve the proposed change order, if as a result of the change order the Authority would be obligated to contribute funds for Phase I in excess of the \$138,000 agreed upon herein.

If the Authority's representative agrees that the change order is appropriate, the Authority's Board of Directors will be asked to approve, but shall be under no obligation to approve, an amendment to this Agreement increasing the Authority's contribution for Phase I. The Authority shall have no obligation to contribute funds to Phase I excess of the \$138,000 authorized herein unless an appropriate written amendment to this Agreement is executed by the Parties hereto.

**3. Parties Contributions**

<b>Party</b>	<b>Design Cost</b>	<b>Construction Cost</b>	<b>% Share of Construction Cost</b>	<b>% Share of Total Cost</b>
SEMSWA	\$300,000	\$1,562,000	91.88%	88.67%
Authority	\$100,000	\$138,000	8.12%	11.33%
<b>Total:</b>	<b>\$400,000</b>	<b>\$1,700,000</b>	<b>100%</b>	<b>100%</b>

3.1 Payment of Authority Funds. From funds appropriated by the

Authority for calendar year 2023, the Authority shall contribute \$138,000 ("Authority's Funds") for construction of Phase I. The Authority's Funds shall be paid to SEMSWA within thirty (30) days after this Agreement is executed by both Parties and upon receipt of an invoice from SEMSWA to the Authority for said amount. The Authority's Funds shall be used exclusively for Phase I, and only in accordance with the terms and provisions of this Agreement.

#### 4. **Use of Funds and Disbursements**

4.1 **Use of Funds.** Unless otherwise agreed to in writing by the Authority, the Authority's Funds shall be used solely for the stream reclamation and water quality enhancement component of Phase I.

4.2 **Disbursement of Authority Funds.** The Authority requires and SEMSWA agrees that it shall provide the Authority with a copy of each pay application for Phase I so that the Authority can review each pay application. It is agreed that the Authority's Funds will be disbursed gradually over the construction of Phase I and not used entirely at the outset of Phase I.

4.3 **Percentage of Pay Application.** The contract awarded by SEMSWA is for the construction of stream reclamation improvements that are entirely water quality related. The Authority's portion of each pay application shall not exceed 8.12% of the pay application and the Authority's maximum contribution of \$138,000.

4.3.1 **Approval of Pay Applications.** A copy of each application for payment submitted by the Contractor with respect to Phase I shall be provided to the Authority's representative, who shall have five (5) business days to review and approve the same. Failure of the Authority's representative to object to any pay application within said five (5) day period shall be deemed approval of the pay application. Once a pay application has been approved it shall be funded, in part, from the Authority's Funds in accordance with the provisions of paragraph 4.3 above.

If the Authority's representative objects to all or any portion of a pay application, the Authority and SEMSWA shall immediately meet to discuss the same and resolve the issue. The Authority shall have the right to provide all input it deems relevant to any pay application and the Authority's objections shall be given due consideration by SEMSWA. If the Authority is not satisfied or still objects to a pay application after SEMSWA has made a determination, SEMSWA shall have the right to proceed with the pay application.

4.4 **Monthly Accounting.** SEMSWA shall provide a monthly accounting to the Authority, showing the amount and for what purposes the Authority's Funds were spent on Phase I. The accounting to be furnished to the Authority hereunder shall describe, in as much detail as the Authority reasonably requires, how SEMSWA spent the Authority's Funds. Upon completion of the Water Quality Component of the Project, SEMSWA shall

also provide the Authority with a final accounting of the Project's expenditures, which shall include, in detail, all the costs and expenses incurred by SEMSWA in connection with the construction of Phase I.

5. **Ownership and Maintenance of Phase I.**

5.1 Phase I Site. SEMSWA agrees that it shall construct Phase I on real property that SEMSWA has obtained easements for and has the ability to access Phase I for maintenance purposes.

5.2 Ownership and Maintenance of Phase I. Upon completion and acceptance of Phase I by SEMSWA, SEMSWA shall own, operate and maintain the same or shall make arrangements for Phase I to be owned, operated, and maintained by Mile High Flood District or another appropriate governmental entity, as determined by SEMSWA.

5.3 Access of Authority to Phase I. At such time as construction of Phase I is initiated, SEMSWA agrees that the Authority shall have a right of access to Phase I for observation of construction activities and any subsequent general operation and maintenance, to the extent that the Authority deems such access advisable.

6. **Construction of Phase II**

5.1 Construction of Phase II. The remaining portion of the Project referred to herein as "Phase II" is anticipated to occur in 2024. At such time as the construction plans are finalized and contingent upon the availability of funds, the Parties anticipate amending this Agreement to provide for their joint cooperation with respect to the funding of Phase II.

7. **Miscellaneous.**

7.1 Governing Law. The Parties agree this Agreement shall be governed by and construed in accordance with the laws of the State of Colorado.

7.2 Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the Parties and their successors, assigns, and legal representatives.

7.3 ThirdPartyBeneficiary. It is specifically agreed between the Parties executing this Agreement that it is not intended by any of the provisions of any part of this Agreement to create a thirdparty beneficiary hereunder, or to authorize anyone not a party to this Agreement to maintain any claim under this Agreement. The duties, obligations and responsibilities of the Parties to this Agreement with respect to third parties shall remain as imposed by law.



7.4 Entire Agreement; Amendments. This Agreement, including its exhibits, contains the entire understanding of the Parties with respect to this subject matter. This Agreement supersedes all prior agreements and understandings between the Parties with respect to its subject matter. This Agreement may be amended only by a written instrument duly executed by the Parties or their respective successors or assigns.

7.5 Notice and Communications. Any notice pursuant to the terms and conditions of this Agreement shall be in writing and delivered personally, or sent by certified mail, return receipt requested, or sent by a recognized overnight mail or courier services, with delivery receipt requested, to the following addresses (or to such other address as may from time to time be specified in writing by the Parties):

If to Authority: Richard Borchardt, Capital Projects Manager  
Cherry Creek Basin Water Quality Authority  
P.O. Box 3166  
Centennial, CO 80161

with a copy to: Timothy J. Flynn, Esq.  
Collins Cole Flynn Winn & Ulmer, PLLC  
165 South Union Boulevard, Suite 785  
Lakewood, CO 80228

If to SEMSWA: Dan Olsen, Executive Director  
Southeast Metro Storm Water Authority  
7437 South Fairplay Street  
Centennial, CO 80112

with a copy to: Edward J. Krisor, Esq.  
3900 South Wadsworth Boulevard, Suite 320  
Lakewood, CO 80235

Notices shall be effective when received by the party to whom addressed.

7.6 Binding Representative. In regard to all project documents and communications, including but not limited to, change orders, pay applications and construction contract amendments, the Authority designates Richard Borchardt, or his designee as its representative with power to bind the Authority subject to the limitations set forth in Paragraph 3; provided, however, the Authority's representative shall have no Authority to amend this Agreement.

7.7 Default/Remedies. In the event of a breach or default of this Agreement

by any Party, the non-defaulting party shall be entitled to exercise all remedies available at law or in equity, specifically including suits for specific performance and/or monetary damages. In the event of any litigation, arbitration or other proceeding to enforce the terms, covenants or conditions hereof, the prevailing party in such litigation, arbitration or other proceeding shall be entitled to obtain as part of its judgment or award its costs and reasonable attorneys' fees. The authorization by SEMSWA of a payment to the construction contractor that has been objected to by the Authority, shall constitute a breach of this Agreement if SEMSWA's approval was unreasonable under the circumstances.

7.8 Force Majeure. Wherever there is provided in this Agreement a time limitation for performance by the Parties for any obligations related to the construction of Phase I, the time provided for shall be extended for as long as and to the extent that the delay is due to an act of God, strikes, labor disputes, inability to obtain labor or materials or reasonable substitutes, fire or other casualty and other causes beyond the control of the Parties.

7.9 Counterpart Execution. This Agreement may be executed in counterparts, each of which shall be deemed an original, and all of which together shall constitute one and the same instrument.

7.10 Governmental Immunity. Nothing herein shall be construed as a waiver of the rights and privileges of Authority or SEMSWA pursuant to the Colorado Governmental Immunity Act, §§ 24-10-101, et seq., C.R.S., as amended from time to time.

**IN WITNESS WHEREOF**, the Parties have executed this Agreement as of the day and year first above written.

SOUTHEAST METRO STORM WATER  
AUTHORITY

By: \_\_\_\_\_  
\_\_\_\_\_, Executive Director

Attest:

\_\_\_\_\_  
\_\_\_\_\_, Secretary

CHERRY CREEK BASIN WATER QUALITY  
AUTHORITY

By: \_\_\_\_\_  
Josh Rivero, Chair

Attest:

\_\_\_\_\_  
John McCarty, Secretary

DRAFT



## ACTION ITEM MEMORANDUM

To: CCBWQA TAC  
From: Jessica DiToro, PE, LRE Water  
Date: December 27, 2022  
Subject: Control Regulation 72 Information Hearing

**Request:** That the CCBWQA TAC recommend that the CCBWQA Board of Directors approve the attached letter to the Water Quality Control Commission (WQCC).

**Issue:** In April 2023, the WQCC will hold an Informational Hearing for CR 72. At this hearing, the WQCC will hear from stakeholders regarding issues that they would like to see as part of the scope for the formal RMH that is tentatively set to occur in the latter half of 2023.

In May 2021, the WQCC held the Triennial Review Informational Hearing (TRIH) for CR72. The CCBWQA, along with a number of other stakeholders, submitted letters to the WQCC recommending items to be included in the formal scope for the future RMH. At the May 2021 TRIH, the WQCC determined that a limited-scope RMH would be set in 2022 to address changes that were needed for the stormwater section of CR72, section 72.7. An additional informational hearing to determine whether any additional items should be included in the scope was approved by the WQCC, at the CCBWQA's request. The timing for this additional informational hearing was set to occur sometime after the limited-scope Section 72.7 RMH in April of 2022.

CCBWQA Staff has engaged both the TAC and Board on this specific CR 72 regulatory item on a monthly basis since April of 2022 until September of 2022. On September 15, 2022 the CCBWQA Board moved as follows: *"Without precluding further discussion with the WQCC, I move that, at this time, CCBWQA not propose changes to CR 72, but that CCBWQA seek party status if a RMH is scheduled."* This motion passed.

Per the next steps identified in the September 9, 2022 Action Item Memo (AIM) to the Board on this topic, CCBWQA Staff has drafted a letter to the WQCC for the April 2023 CR 72 Informational Hearing stating that the CCBWQA does not intend to be a proponent for the 2023 RMH and will not be bringing any issues forward for inclusion in the CR 72 RMH scope. This letter is attached to this AIM for your review.

**Budget:** Participation in this RMH effort is covered under the current CCBWQA contractors' budgets for fiscal year 2023.

**Recommendation:** The CCBWQA TAC recommends that the CCBWQA Board of Directors prepare a letter, a draft which is attached, to the Water Quality Control Commission stating that CCBWQA does not believe that there are any issues to bring forward at this time for a formal Control Regulation 72 Rulemaking Hearing in 2023 or 2024, and if a Rulemaking Hearing is scheduled that the CCBWQA will not be the proponent of said RMH. However, if changes are proposed by others, CCBWQA will request party status for the CR 72 RMH.

**Next Steps:** Staff will bring forward the recommended letter to the CCBWQA Board at its January 19, 2023 meeting for review and a motion to submit the letter to the WQCC for the April 2023 Informational Hearing.

January XX, 2023  
Jojo La, Interim Administrator  
Water Quality Control Commission  
4300 Cherry Creek Drive South  
Denver, CO 80246

Re: Cherry Creek Reservoir Control Regulation 72 (CR 72) Water Quality Control Commission (WQCC)  
Routine Review Informational Hearing April 10, 2023

Dear Ms. La,

Cherry Creek Basin Water Quality Authority (CCBWQA) is looking forward to participating in the Cherry Creek Reservoir Control Regulation 72 (CR 72) Water Quality Control Commission (WQCC) Routine Review Informational Hearing scheduled for April 10, 2023.

In May 2021, the WQCC held a Triennial Review Informational Hearing (TRIH) for CR 72. At this TRIH, the WQCC set a limited-scope Rulemaking Hearing (RMH) for CR 72 to bring the stormwater section (72.7) of the control regulation in line with the Water Quality Control Division's (WQCD) municipal separate storm sewer (MS4) permits. In April 2022, this limited-scope RMH resulted in extensive changes to Section 72.7 and associated definitions in Section 72.2. This hearing addressed many issues that the CCBWQA had identified in previous communication with the Commission Administrator.

The CCBWQA Board of Directors has determined that it will not propose changes to CR 72 in the forthcoming CR 72 Informational Hearing; however, if changes are proposed by others, CCBWQA will request party status for the CR 72 RMH.

Respectfully,

Joshua Rivero  
Chairman of the Board of Directors

**CHERRY CREEK BASIN WATER QUALITY AUTHORITY**  
**2022 Capital Project, Maintenance, and Planning Status Report**  
December 30, 2022

**RESERVOIR PROJECTS**

1. Reservoir Destratification System (RDS)– Distribution System Concepts (CCR-2)
  - a. Description: The RDS in-lake distribution system consists of several lines and 116 membrane disc diffusers that create the bubble plumes to help mix the reservoir and improve water quality. The RDS reduces the chlorophyll a in the reservoir. The RDS was originally installed in 2008. The in-lake distribution which has been requiring increased maintenance in 2019-2021, which is indicating that replacement may be needed within the 10-year CIP window. In January 2020, Wright Water Engineers (WWE) evaluated in-lake treatment in the Reservoir included an expansion of existing destratification system. This project evaluates the replacement and/or upgrade of the distribution system and informs cost and timing of the work.
  - b. Status: Project is waiting on watershed model runs, at which time it will be brought back to TAC and Board for further discussion, input, and direction (3/31/22).
2. Reservoir Nutrient Mitigation Alternatives Study (CCR-3)
  - a. Description: Nutrients in the Reservoir fuel the chlorophyll a level. In January 2020, Wright Water Engineers (WWE) evaluated in-lake treatment in the Reservoir. In 2021, Solitude Lake Management performed a sediment sampling and testing in the Reservoir. This study combines this recent work with CCBWQA's ongoing water quality sampling in the reservoir and the reservoir model, to inform options to reduce nutrients in the reservoir and refine their viability.
  - b. Status: *Alternatives study has been moved to 2024 pending feasibility and modeling results.*
3. East Shade Shelters Phase III and Tower Loop Phase II Shoreline Stabilization (CCB-17.5 and CCB-17.7)
  - a. Description: These projects were identified in 2014 through the annual inspection. The Tower Loop Phase II connects to the Phase I project and extends shoreline protection 570 feet to the southeast towards Dixon Grove. The East Shade Shelters Phase III starts on the north end of the Shade Structure and goes 400-feet to the south.
  - b. Status: Consultant selection is scheduled for the 1st quarter. A consultant selection committee will be set in February (1/29/21). At the February TAC meeting Jason Trujillo, Jon Erickson, Lanae Raymond, Bill Ruzzo were interested in serving on the consultant selection committee (2/11/21). This selection committee was discussed at the 3/18/21 Board Meeting, and no further members were added. The Request for Proposals (RFP) has been posted on BidNet and Proposals are due 04/21/21 (3/25/21). The pre-proposal meeting was held on 4/7/21. 5 proposals were received on 4/28/21; the selection committee is reviewing them. Interviews were held and a selection is being brought to the May Board meeting (5/14/21). Board authorized negotiations with RESPEC (5/27/21). Agreement has been executed with RESPEC (10/15/21). Field Survey of project areas and topographic mapping is underway (12/30/21). A design kickoff meeting was held on 4/22/22. A design sprint workshop was held on 7/12/22 which included a site visit and evaluation of alternatives. RESPEC is developing a recommended alternative (9/8/22). RESPEC provided updated project costs for budgeting (10/13/22). The 30% submittal was received on 11/16/22 and is under review.

**STREAM RECLAMATION PROJECTS**

1. Cherry Creek Monitoring Station CC-10, Flow Measuring Improvements (CCB-5.13)
  - a. Description: This project was identified in 2019 as part of the exploration of the downcut area and through the flow analysis with during the reservoir and watershed modeling effort. It installs equipment upstream of the perimeter road that would be used to measure the flow

- that splits off to the west and bypasses the CC-10 and provide a new rating curve at CC-10 to improve measurements of high flow at this location.
- b. Status: RESPEC provided scope of work and fee for the engineering and survey work needed, and it was approved by the Board at their April 2020 meeting. Survey is scheduled for 5/29/20. Survey is complete. Updated rating curves are scheduled to be delivered by late September. Received update from RESPEC that information is under Quality Assurance and Quality Check review and will be submitted soon (10/8/20). RESPEC's draft memo was received on 12/4/20 and comments have been returned. A meeting was held with Erin, Chuck, Chris, and Rich on 12/16/20 to discuss measuring station improvements and scheduling. A tour with Jason Trujillo was held on 2/12/21, no fire damage was noted on CC-10. A stage gage will be added upstream of Lake View Drive to allow for flow measurement of flows that bypass CC-10 and go directly to Cherry Creek reservoir (3/12/21). Work order has been prepared to Hydrologik for stage measurement at Lake View Drive (4/13/21). Hydrologik has installed the stage measurement at Lake View Drive and RESPEC has submitted the Final Draft of the Rating Curve and it is currently under review (8/13/21). Comments on report have been provided to RESPEC (11/11/21). Additional analysis on rating curve for CC10 was done to determine effects of reservoir level (3/31/22). RESPEC prepared a detailed rating curve for Lake View Drive which will facilitate flow comparison between CC10 and Lake View Drive (5/13/22).
2. Cherry Creek Stream Reclamation at Arapahoe Road aka Reaches 3 and 4 (CCB-5.14C)
    - a. Description: This project continues the work on Cherry Creek by CCBWQA, MHFD, and local partners. It ties into the previous stream reclamation projects of Cherry Creek Eco Park to Soccer Fields (CCB-5.14A) and Cherry Creek at Valley Country Club (CCB-5.14B). The 5,167 Linear Feet of stream reclamation reduces bed and bank erosion immobilizing approximately 88 pounds of phosphorus annually. The project is anticipated to be funded over several years and likely be broken into phases.
    - b. Status: In 2021, and IGA was executed between CCBWQA, MHFD, City of Aurora, and SEMSWA to begin this work. IGA Amendment that brings in 2022 funding is under review (5/13/22). Board authorized IGA Amendment for 2022 funding on 7/21/22 (8/12/22). IGA Amendment has been revised to show Aurora's lower participation; CCBWQA's participation was lowered accordingly to meet 25% partner project level; revised IGA Amendment received TAC recommendation and is being taken to Board for their consideration in October (10/13/22). Board authorized the IGA Amendment for 2022 funding at their 10/22/22 meeting.
  3. Cherry Creek Stream Reclamation at 12-Mile Park – Phase 3 (CCB 5.16A)
    - a. Description: The design contract with CH2M Hill was executed on November 27, 2018. Notice to proceed included only those services defined as Phase 1 in CH2M Hill's scope of services. As part of the approved Action Item Memo to the Board, staff recommended that a design review committee consisting of the Capital Projects Manager and up to three TAC members be established. The not-to-exceed fee totals \$104,991.88; with the Part 1 services not-to-exceed fee of \$45,078.88, and the Part 2 services not-to-exceed fee of \$59,913.00. The design review committee is David Van Dellen, Jacob James, Casey Davenhill, Bahman Hatami/Jon Erickson, and Richard Borchardt. CH2M Hill is now Jacobs.
    - b. Status: Jacobs is starting data collection for topographic survey and wetland mapping. Survey is scheduled to start 2/28/19 and is coordinated with Colorado State Parks. Survey has been completed and wetland mapping is underway. Jacobs has prepared updated schedule to account for weather delays on surveying and wetland mapping. The design kickoff meeting was held on 5/15/19. Jacobs is preparing concepts and costs for 4 alternatives. A field visit and progress meeting are scheduled for 8/8/19. Jacobs presented alternatives and costs to the design review committee on 8/8/19. Jacobs and the design review committee are preparing a presentation on alternatives and costs for the TAC (9/5/19 and 10/3/19) and Board (10/17/19). Received authorization from Board at 10/17/19 meeting to move project forward in 2 phases; Jacobs is working on scope of work adjustments needed for this approach. Final design of phase 3A (protects existing work done in phases 1

and 2) and permit level design of Phase 3B (adaptive approach downstream of breach area) are underway. A progress meeting was held on 1/30/20; design on Phase 3A is about 30% complete. The initial site visit with the Army Corps of Engineers has been cancelled due to stay at home orders, approach has changed to supplying them a draft of the materials and addressing questions and comments. Progress meeting and site visit to look at Phase 3B was held on 6/1/20. Scope of work and fee for adaptive management and preliminary design of Phase 3B is under review by committee. A joint Cherry Creek Committees meeting is scheduled for 10/5/20 to discuss optimization between the Cherry Creek 12-mile Phase 3B project and the Cherry Creek Reservoir to Park Boundary study. Phase 3A was submitted to the US Army Corps of Engineers for their 408 review on 11/4/20. Construction BMPs plan and report were reviewed and approved by Arapahoe County on behalf of Cherry Creek State Park on 12/22/20. Jacobs submitted draft Scope of Work (draft SOW) for the optimization for Phase 3B (north of breach repair) for adaptive management approach; the joint committee meeting is schedule for 2/3/21 to review SOW. A meeting is scheduled with USACOE's new contact Bobbi Jo Trout for CCBWQA on 2/1/21 where a status update on the 408 review will be requested. The Joint Cherry Creek Committees recommended holding off on Jacobs draft SOW, as the scope and scale of adaptive management may evolve with Muller's Study of the area between Reservoir and the Park Boundary; Bobbi is checking on status of 408 review (2/11/21). A site visit with Bobbi and Jason was held on 4/26/21 to help facilitate the USACOE's 408 review. A site visit with the Cherry Creek subcommittee was held on 6/24/21, plan modifications associated with additional erosion from spring 2021 runoff and Muller's study work on Cherry Creek are being evaluated by the Cherry Creek subcommittee. A coordination meeting was held on 7/12/21 with Jacobs and Muller to discuss updating the location cutoff wall and layout (based on the erosion from the 2021 Spring runoff and the Muller's geomorphic and 2D modeling effort); Jacobs is preparing exhibits for subcommittee's discussion and consideration (7/29/21). The subcommittee met on 8/12/21 and provided Jacobs direction on cutoff wall location and plan revisions. Revised plans and engineer's opinion of probable construction cost has been sent to project committee (11/11/21). Board is considering the release of the project to Bid (12/9/21). Board authorized project for bidding with the base bid and add alternate at their December 2021 meeting. We received confirmation that plan revisions made are still in conformance with 408 approval; are waiting for response regarding revisions and the 404 permit; received approval on GESC plans and report (12/30/21). CCBWQA received concurrence on conformance with existing 404 permit and project is out for bid (1/13/22). The project is out to bid and the pre-bid meeting was held on 1/28/22. CCBWQA received 10 bids on 2/4/22; the low bidder is 53 Corporation. Notice of Award has been issued to 53 Corporation (3/10/22). Construction Agreement has been executed (3/31/22). The pre-construction meeting was held on 4/6/22 with construction scheduled to start on 4/25/22. Construction is underway (5/13/22). Construction is nearing completions with the final walk-through was held on 6/14/22. Project is substantially complete and is waiting for seeding and planting window to complete willow staking and touch up seeding (7/15/22). Jacobs is scheduled to do a site visit on 9/9/22 to evaluate post-storm condition and recommend repairs needed because of the 8/15/22 storm. Repairs are minor and are being scheduled with 53 Corporation (10/13/22). Visited site with 53 Corporation on 11/2/22.

4. Cherry Creek Stream Reclamation – Upstream of Scott Road (CCB-5.17)
  - a. Description: Design and construction of stream reclamation is in partnership with Douglas County and MHFD. It improves 4,100 feet of Cherry Creek and is located upstream of Scott Road.
  - b. Status: IGA was approved by the Board at their April 2020 meeting. Muller had been selected as consultant, and design scope of work is being prepared. Kickoff meeting was held on 12/11/20; a follow-up field visit will be scheduled for early 2021. Site visit was held on 1/29/21. Conceptual design is complete, negotiations are underway to contract for 60% design (4/8/21). Muller is working on alternatives (4/30/21). Muller is working on preliminary design and an IGA Amendment to bring in additional 2021 funding from Douglas County is being brought to the Board in October (10/15/21); IGA Amendment has been executed



(11/11/21). Muller is preparing 60% Design Submittal (1/28/22). Muller submitted 60% Design on 2/2/22; comments have been provided on 60% Design Submittal (3/10/22). IGA Amendment bringing in 2022 funding is scheduled for TAC and Board consideration in June (5/27/22). IGA Amendment was authorized at the June 16<sup>th</sup> Board Meeting (6/30/22).

5. Cherry Creek Stream Reclamation at Dransfeldt (CCB-5.17.1B)
  - a. Description: Design and construction of stream reclamation is in partnership with Town of Parker and MHFD. It improves 2,400 feet of Cherry Creek near the future location of Dransfeldt bridge which is just downstream of the Cherry Creek at KOA project.
  - b. Status: Initial scoping has begun, and a partners meeting was held on 1/30/21. IGA is scheduled for CCBWQA's May TAC and Board meetings (4/30/21). IGA was approved by all parties and has been executed (6/25/21). Muller Engineering has submitted their Draft Scope of Work for Design Services, and the project sponsors have reviewed it (7/8/21). Design kickoff meeting was held on 10/14/21. Alternatives are being evaluated (12/9/21). Pre-submittal meeting for the 404 permit is being scheduled (12/30/21). CLOMR is being prepared for project (3/10/22) and was submitted to FEMA on 3/31/22. CEI was selected for as project partner to provide contractor input during the design (5/27/22). CLOMR is under review by FEMA (8/12/22).
  
6. McMurdo Gulch 2020/2021/2022 Stream Reclamation (CCB-7.2)
  - a. Description: The design and construction of stream reclamation is in partnership with Castle Rock. Castle Rock is the lead agency. This phase continues the work from the previous project and the improves the next set of high priority areas about 2,500 feet. The Authority's water quality component share for design and construction is estimated to be \$360,000 (\$60,000 for design in 2020, and \$300,000 for construction in 2021). The total project cost is estimated at \$1,440,000.
  - b. Status: 2020 Funding was approved at June Board Meeting and capital budget restructure will be drafted for future consideration. 60% level progress meeting is scheduled for 10/5/20. Review comments on 60% submittal were provided on 10/6/20. 90% design submittal is scheduled by end of March (3/12/21). 90% design submittal is being reviewed (4/8/21). CCBWQA submitted comments on 90% design on 4/13/21. The 90% design review and progress meeting was held on 7/22/21, and the construction funding for project is being considered by the TAC at their August meetings (7/29/21). The IGA is currently be drafted and will be brought to the Board at their September meeting (8/13/21). The project is being bid by Castle Rock with the bid opening scheduled for 11/12/21. Tezak Construction was the apparent low bidder (12/9/21). The pre-construction meeting was held on 1/3/22. Construction is underway (2/11/22). A construction meeting was held on 3/8/22, with sites 1-3 have the general construction completing and are waiting for a revegetation window and site 4 has started work on riffle structure. Seeding and revegetation are underway during spring planting window (5/13/22). Visited site on 11/22/22, construction appears complete and vegetation establishment has begun.
  
7. Lone Tree Creek in Cherry Creek State Park (CCB-21.1)
  - a. Description: This project includes a trail connection to Cherry Creek State Park and includes 570 linear feet of stream reclamation on Lone Tree Creek from the State Park Boundary to the Windmill Creek Loop Trail. The City of Centennial is the project lead. CCBWQA participation is for the stream reclamation only.
  - b. Status: 95% submittal is under review (5/13/22); review comments have been returned (5/27/22). Project funding was brought to TAC at their 7/7/22 meeting, during drafting of IGA it was discovered that future maintenance of stream reclamation should be considered, project will be brought back to TAC at an upcoming meeting for maintenance discussion and recommendation (8/12/22). A stakeholder meeting was held on 9/29/22 to discuss maintenance. A stakeholder meeting was held on 11/2/22 to discuss findings from CCBWQA's site visit and findings included in Wright Water Engineers report. The Board supports CCBWQA's partnering with Centennial at their 11/17/22 meeting.

8. Happy Canyon Creek – County Line to Confluence with Cherry Creek (CCB-22.1)
  - a. Description: The design and construction are in partnership with Southeast Metro Stormwater Authority and MHFD and includes 2,500 feet of stream reclamation. The Authority's water quality component share for design and construction is estimated to be \$325,000. The total project cost is estimated at \$1,300,000.
  - b. Status: IGA is scheduled for June TAC and Board meetings (5/27/21). IGA has been approved and executed by all parties (7/29/21). Jacobs has been selected as design consultant and project scoping is underway; limits have been extended upstream to the County Line and sediment capture area and transport will be included with the project (10/15/21). Jacobs has submitted their scope of work and fee for design which is under review by project sponsors (11/11/21). Project sponsors have completed a review of Jacobs' fee and scope of work and the agreement is being routed for signatures (1/28/22). IGA Amendment to bring in 2022 funding is in process (3/10/22). A project kickoff meeting was held on 3/28/2022. A site visit was performed on 4/12/22 to document existing conditions and identify sediment source/transport/deposition areas. Project Team is preparing a sampling plan for bank and bed materials to determine phosphorous content (5/13/22). The project team met on 5/24/22 to discuss project goals and Jacobs is progressing through the study. Jacobs and ERC are working on sediment transport analysis and model (6/30/22). The results from the sediment transport model were presented at the 8/23/22 progress meeting and an upstream sediment capture area just south of the JWPP was included in the alternatives analysis (8/26/22). The alternative analysis report is expected to be completed before the end of 2022 (10/13/22). Lab results from stream soil samples were sent to Jacobs so that they include phosphorus reduction in the alternatives analysis report; a groundwater investigation is needed to inform sediment capture facility and stream reclamation alternatives, scoping and negotiations are in progress (11/11/22).
9. Happy Canyon Creek - Upstream of I-25 (CCB-22.2)
  - a. Description: The design and construction are in partnership with Douglas County, City of Lone Tree, and MHFD and includes 2,500 feet of stream reclamation. The Authority's water quality component share for design and construction is estimated to be \$500,000. The total project cost is estimated at \$2,000,000.
  - b. Status: Douglas County, City of Lone Tree, and MHFD have initially funded and selected Muller Engineering as the design engineer. Design has started and a progress meeting was held on 1/27/21. Design is progressing (2/11/21). Muller has submitted 60% Design Deliverables (5/27/21). IGA for 2021 Funding is being brought to Board in September (9/9/21). 2021 IGA Amendment has been executed (11/11/21). Coordination with CDOT and easement acquisitions are on-going (1/13/22). Board authorized 2022 funding and IGA Amendment at their June 16<sup>th</sup> meeting (6/30/22). The project received environmental clearance from CDOT (8/12/22). The 90% design submittal is scheduled for delivery by end of September (8/26/22). The 90% design submittal is being reviewed (10/13/22). Comments were provided on 90% submittal (11/11/22). Muller completed the 100% design submittal on 11/22/22.
10. Dove Creek - Otero to Chambers Rd. (CCB-23.1)
  - a. Description: The design and construction are in partnership with Southeast Metro Stormwater Authority (SEMSWA) and with Mile High Flood District (MHFD) being a key stakeholder; it includes 1,300 feet of stream reclamation. The Authority's water quality component share for design and construction is estimated to be \$175,000. The total project cost is estimated at \$700,000.
  - b. Status: SEMSWA is drafting the Intergovernmental Agreement to bring in the 2021 funding for the project (3/12/21). RESPEC is the design consultant; two conceptual design alternatives have been prepared and reviewed during meeting on 3/15/21. IGA is scheduled for CCBWQA's May TAC and Board meetings (4/30/21). IGA has been approved and executed by all parties (7/29/21). 30% Design Review Meeting was held on 8/23/21. A Progress meeting is scheduled for 2/26/22 with 60% Plan submittal expected to follow (1/28/22). The 60% Design was submitted on 2/16/2022, comments were provided, and a

design review meeting was held on 2/23/2022. IGA Amendment to bring in 2022 funding is in process (3/10/22). Construction costs were prepared by CEI based on 60% submittal (5/13/22). A design progress meeting was held 6/14/22 and 90% design submittal is being prepared (6/30/22). 90% design submittal is expected by the end of July (7/15/22). The 90% design submittal was reviewed, and comments were submitted on 8/22/22. *Construction is anticipated in 2023 (10/13/22)*. A progress meeting was held on 11/8/22, project will likely be done in 2 phases, IGA Amendment will be needed early in 2023 so that construction can start ahead of storm season. *Dove Creek IGA for construction of Phase 1 is scheduled for TAC and Board in January 2023, construction is expected to start shortly afterwards (12/30/22)*.

11. Piney Creek from Fraser Street to Confluence with Cherry Creek aka Reaches 1 and 2 (CCB-21.1)
  - a. Description: This project includes 2900 liner feet of stream reclamation on Piney Creek. The project partners are SEMSWA and CCBWQA.
  - b. Status: Project coordination meeting was held with SEMSWA on 6/29/22. IGA drafted and is being reviewed by SEMSWA (8/12/22). IGA was approved by CCBWQA at the 9/15/22 Board meeting.

## MAINTENANCE

1. Reservoir Destratification Operations (OM-7)
  - a. Description: Includes 2022 Annual Operations and Maintenance of the Reservoir Destratification System (RDS).
  - b. Status: Ingersoll Rand replaced the top pressure regulating valve on 4/4/22; the pre-season check was done simultaneously, and no leaks were observed. The RDS was started for the season on 4/15/22. At the request of Colorado Parks and Wildlife (CPW) to aid in search and recovery efforts the RDS was turned off on 5/10/22 and it will be started back up when notified by CPW that it is appropriate. The RDS was restarted on 5/14/22. Ingersoll Rand performed compressor maintenance on 6/14/22 and B&RW repaired a leaky diffuser head on 6/22/22. Annual maintenance on the in-lake distribution system started on 8/22/22 and 8/23/22 with the remaining maintenance scheduled for the end of September. Compressor shut down with a high temperature warning on 9/2/22; the Ingersoll Rand technician responded on 9/7/22, cleaned out coolers, and restarted compressor. A leak in the reservoir distribution was observed on 9/15/22, the affected zone 1 was turned off until repairs can be made, repairs were completed on 9/27/22 and zone 1 was turned back on then. Annual maintenance continued the week of 10/3/22 and when it was completed the system was turned off for the season on 10/6/22.
2. PRF Weed Control (OM 14.1)
  - a. Description: Includes 2022 weed control from 2021 Annual Observation of Pollution Reduction Facilities (PRFs).
  - b. Status: No weed control was performed in 2022.
3. PRF Reseeding at CCSP (OM 14.2)
  - a. Description: Includes 2022 routine restoration of PRF vegetation at Cherry Creek State Park (CCSP) from 2021 Annual Observation of Pollution Reduction Facilities (PRFs).
  - b. Status: No seeding was performed in 2022.
4. Mountain and Lake Loop Shoreline Stabilization Phase II (OM 4.6)
  - a. Description: This project was identified in through the 2020 annual inspection and design and permitting started in 2021. It adds about 40 feet of shoreline protection where it has eroded leaving a 1-2 foot tall vertical bank.
  - b. Status: Construction Plans have been prepared and the GESC was submitted to Arapahoe County for review (1/13/22). Plans are being reviewed by US Army Corps of Engineers for 408 clearance (5/13/22).
5. East Boat Ramp Shoreline Stabilization Phase II (OM 4.6)

- a. Description: This project was identified in through the 2012 annual inspection and design and permitting started in 2019. It connects to the Phase I project and extends shoreline protection 100 feet to the north towards the East Shade Shelters.
  - b. Status: Field work has been completed on the East Boat Ramp Shoreline Stabilization and design is underway. Permitting Meeting was held on 9/16/19. ERO has been contracted to for 404 permitting assistance. Preliminary Design was completed on the East Boat Ramp in December 2019; permitting and final design has begun. Design is about 80% complete. Site meeting with Colorado Parks and Wildlife was held on 3/25/20. ERO has prepared 404 permit application on 4/30/20. 404 permit application has been submitted. East Boat Ramp Plans were submitted on 8/26/20 to USACOE and Cherry Creek State Park staff for their review and approval. USACOE's 408 approval was received and final bid documents are being prepared (1/29/21). Contract Documents are being updated for Bidnet (5/27/21). GESC is being prepared (11/11/21). GESC was submitted to Arapahoe County for review (1/13/22). Project is out for bid (5/13/22). The pre-bid meeting was held on 5/25/22. The bid opening was on 6/8/22 with 53 Corporation being the low bidder. The Board authorized the award to 53 Corporation and the construction funding at their June 16<sup>th</sup> meeting (6/30/22). 53 Corporation started construction on 8/22/23. Project is nearing completion and final walk-through was held on 10/4/22. Construction is complete (11/11/22).
6. 2021 Wetland Harvesting Pilot Project (OM WHPP)
- a. Description: Includes 2021 Wetland Harvesting on Cottonwood Creek (Western Bank) to remove Phosphorus and Nitrogen. Harvesting cuts the above ground biomass, collects and hauls off cuttings effectively removing the Phosphorus and Nitrogen trapped in the cuttings. The preserved below ground biomass will regenerate and regrow, creating a sustainable harvesting program that retains the natural and beneficial functions of the wetlands.
  - b. Status: The Board authorized Wetland Harvesting Pilot Project at their March 2021 meeting (8/13/21). The Pilot Project started on 10/11/21, a site visit was made on 10/13/21, and is scheduled to be completed by 10/31/21. Field work has been completed (11/11/21). Lab data is being compiled (12/9/21). LRE Water is preparing a google earth and GIS boundaries of 2021 harvest limits (12/30/21). Lab data on vegetation samples was received and nutrient removal information from 2021 harvesting is being developed (1/28/22). The 2021 update and data were presented to TAC at their 4/7/22 meeting. Presentation of 2021 Update is scheduled for the May Board meeting (5/13/22). An update on the regrowth of the 2021 Harvest Area will be provided at the 8/18/22 Board Meeting and 9/1/22 TAC Meeting.
7. 2022 Wetland Harvesting Pilot Project (OM WHPP)
- a. Description: Includes 2022 Wetland Harvesting on Cottonwood Creek (Eastern Bank) to remove Phosphorus and Nitrogen. Harvesting cuts the above ground biomass, collects and hauls off cuttings effectively removing the Phosphorus and Nitrogen trapped in the cuttings. The preserved below ground biomass will regenerate and regrow, creating a sustainable harvesting program that retains the natural and beneficial functions of the wetlands.
  - c. Status: Action for 2022 is scheduled for the May Board meeting (5/13/22). The Board authorized the wetland harvesting work for 2022 (5/27/22). L&M is preparing proposal for 2022 wetland harvesting (8/12/22). The 2022 wetland harvesting is scheduled from 9/12/22 to 9/23/22 (8/26/22). The 2022 wetland harvesting has been completed; lab results of samples, area measurement, and final weights of harvesting are in progress (10/13/22). *The Pilot Project Summary with 2022 Data is being prepared (12/30/22).*

## PLANNING

- 1. Cherry Creek Master Plan Cherry Creek State Park Boundary upstream to the Mile High Flood District Boundary (PAPM-0)
  - a. Description: The Mile High Flood District (MHFD), Southeast Metro Stormwater Authority, Town of Parker, Douglas County, and CCBWQA are preparing a Major Drainageway Planning Study for Cherry Creek upstream of Cherry Creek Reservoir. The Plan identifies

- potential Pollution Abatement Projects (PAPs). Potential PAPs are stream reclamation (immobilizes phosphorus in soil).
- b. Status: Muller Engineering has been selected as the consultant for the project and their scope of work and fee and currently under review by the project sponsors. Field visits by the consulting team started on 10/8/20 and were completed on 11/6/20. Progress meeting was held on 12/14/20, which included overview of field visits. At the 2/8/21 progress meeting, a water quality parametric was discussed, and could be mapped and used to identify deficiencies along Cherry Creek. Muller is scheduled to present at TAC at the 5/6/21 TAC meeting, and the 2021 Water Quality Planning Scope of Work and Fee will be considered at CCBWQA's May TAC and Board meetings (4/30/21). Muller provided update and 2021 Water Quality Planning work was authorized (5/27/21). A progress meeting was held on 10/11/21. Muller has added a water quality parametric to the overall stream assessment exhibit and is working with RESPEC to include information from watershed model (12/30/21). A draft storyboard of the work was presented at the progress meeting on 4/11/22. Water Quality text for StoryMap/WebPlan submittal is scheduled for mid-August (7/15/22). Received water quality submittal on 8/26/22 and it is being reviewed (9/8/22). Muller is incorporating final comments and presented story map at the 9/23/22 Cherry Creek Stewardship Conference. Study has been completed (11/28/22).
2. Cherry Creek Tributaries Major Drainageway Planning (PAPM-1)
    - a. Description: The Mile High Flood District (MHFD), City of Aurora, Southeast Metro Stormwater Authority, and Douglas County are preparing a Major Drainageway Planning Study for Cherry Creek Tributaries upstream of Cherry Creek Reservoir and Dewberry / J3 is the consultant. The tributaries included are Little Raven Creek, Suhaka Creek, Joplin Tributary, Grove Ranch, Valley Club Acres, North Arapahoe Tributary, South Arapahoe Tributary, Chenango Tributary, Tagawa Tributary, Kragelund Tributary, and 17-mile Tributary. This project identifies potential Pollution Abatement Projects (PAPs) within the Cherry Creek Tribs MDP and the areas of those tributaries in CCSP. Potential PAPs are stream reclamation (immobilizes phosphorus in soil) and water quality treatment within detention basins (settlement of sediments and attached phosphorus).
    - b. Status: Board authorized CCBWQA to enter into Agreement with Dewberry at their 2/20/20 meeting, and CCBWQA contracted with Dewberry. Dewberry conducted field work 4/28-4/30/20. Dewberry will continue CCBWQA's work in conjunction with hydrology and alternatives in MHFD master plan. Dewberry has submitted the Alternatives Memo which is being reviewed (10/15/21). Comments have been provided on Alternatives Memo (12/9/21). Dewberry is working on the grading of the proposed water quality ponds (6/10/22). Study progress meetings were held for 17-mile Tributary on 8/15/22 and Kragelund Tributary on 8/22/22. A study progress meeting was held for Chenango Tributary on 9/2/22. *The draft alternatives analysis was submitted on 10/26/22 and is under review; comments were submitted on 12/12/22.*
  3. Cherry Creek Stream Planning and Approach Study Reservoir to 12-Mile Park (BAPM-1)
    - a. Description: Several issues and concerns exist on Cherry Creek between the reservoir and 12 -mile Park: the continued head cut erosion and fallen and dying trees, CCBWQA's CC-10 monitoring station's declining accuracy and reliability of flow measurements, Bank and bed erosion along Cherry Creek from Perimeter Road to downstream, and the change in flow path downstream of the Cherry Creek 12-mile Park Phase 2 project (Breach Area). This study will help determine the water quality implications of these issues, CCBWQA's approach and role in the area, and stake-holders and possible partners.
    - b. Status: Interim committee is being set up to negotiate with Muller and determine scope of work, fee, and deliverables for TAC and Board consideration. Interim committee consists of Bill Ruzzo, John McCarty, Jon Erickson, Jason Trujillo, Rich Borchardt, and Chuck Reid. The scoping meeting is scheduled for 3/30/20. Muller conducted field assessment work on 4/28/20. Drone video is pending permit approval by USACOE. Muller has submitted draft base scope of work and optional additional services, which are being reviewed and considered by interim committee at their next meeting on 5/4/20. The next scoping meeting

with interim committee and Muller is scheduled for 5/15/20; with a final draft of scope and fee being prepared for consideration shortly afterwards. Muller's scope of work and fee were distributed to TAC and Board authorized design services at their April 2020 meeting. Muller's revised scope and fee is being reviewed by committee. The study committee of John McCarty, Bill Ruzzo, Jacob James, Lanae Raymond, David VanDellen, and Jon Erickson has been formed to assist with decisions and direction during study. The kickoff meeting was held on 8/11/20. A joint Cherry Creek Committees meeting is scheduled for 10/5/20 to discuss optimization between the Cherry Creek 12-mile Phase 3B project and the Cherry Creek Reservoir to Park Boundary study. Muller is preparing draft scope of work for the optimization approach (11/12/20). Muller has submitted the draft scope of work and fee for the optimization approach on 12/9/20. Muller revised draft Scope of Work (draft SOW) for the optimization to include sub-consultant work; the joint committee meeting is schedule for 2/3/21 to review draft SOW. The Joint Cherry Creek Committees and TAC have reviewed the draft SOW, and the final version is being included for Board consideration at their February Board Meeting (2/11/21). The Board approved Muller's Optimization work at their February Board Meeting (2/26/21). Muller plans to provide an update at July TAC meeting (4/30/21). Muller provided a draft submittal of historical site information and the survey efforts on 5/24/21. Muller will provide an update at the July TAC and Board Meetings (6/25/21). Please submit any comments on Draft report to Rich by 8/20/21 (7/29/21). Muller's additional scope of work for workshops and partnering efforts are scheduled was authorized by the Board in September (10/15/21); amendment to Muller's contract has been executed (11/11/21). It is anticipated that the workshop will be held in 2022 (12/30/21). Muller submitted the water quality assessment report on 4/9/22 which is currently being reviewed by the Pollution Abatement Project Manager. Comments on water quality study and monitoring have been sent to Muller (5/27/22). Muller is revising study to include comments (7/15/22). Muller has submitted revised channel monitoring report on 9/8/22. Muller has submitted the revised stream assessment report on 10/10/22. Muller revised reports and resubmitted them on 11/21/22; reports will be taken to TAC and Board in December with a proposed workshop for consideration. *The TAC and Board accepted the Muller reports and a workshop has been scheduled for March 16, 2023 (12/30/22).*

Cherry Creek Basin Water Quality Authority							
Land Use Referral Summary							
Prepared:	December 21, 2022						
December has yielded 15 reviews to date down from 26 in November. 9 were commercial, 4 were residential, and 2 were parks and open space land use submittals.							
Dec-22							
Referral Agency	Proposed Development	Type of Land Use	Date Received	Review Deadline	Approx. Dev. Size (acres)	Review Date	Comments
Town of Parker	Tanterra F12	residential	12/2/2022	1/5/2022	28.4	12/15/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the use of water quality pond for post construction BMPs. However the final report for design of these features (by Muller) should be provided for review. Final design shall show the water quality pond will treat the WQCV as required for tier 3 developments. 3. No exceptions taken with the proposed construction BMPs (CBMP plan in the CD Plan Set). Phasing requirements for construction disturbance should be considered for the overall Tanterra Filing 1B development to ensure requirements per CR72 Section 72.7-2.(b)(5)(i)(A.) are being met.
Town of Parker	Tanterra F13	residential	12/2/2022	1/5/2022	26.9	12/15/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the use of water quality pond for post construction BMPs. However the final report for design of these features (by Muller) for Filing 1 B should be provided for review. Final design shall show the water quality pond will treat the WQCV as required for tier 3 developments. 3. No exceptions taken with the proposed construction BMPs (CBMP plan in the CD Plan Set). Phasing requirements for construction disturbance should be considered for the overall Tanterra Filing 1B development to ensure requirements per CR72 Section 72.7-2.(b)(5)(i)(A.) are being met.
Arapahoe County	Dove Valley Business Park Master,	commercial	12/2/2022	12/19/2022	42.7	12/16/2022	1. This project is located in the Cherry Creek Basin and subject to the requirements in the Control Regulation 72. The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. Information about post construction and construction BMPs was not provided in this submittal. These should be provided to meet the requirements of CR72.
Douglas County	Rugers Ranch Subdivision	residential	12/5/2022	1/3/2022	26.0	12/16/2022	1. This project is located in the Cherry Creek Basin and subject to the requirements in the Control Regulation 72. The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. Information about post construction and construction BMPs was not provided in this submittal. These should be provided to meet the requirements of CR72.
SEMSWA	The Garage Den at Dove Valley CDOC	commercial	12/6/2022	12/27/2022	7.4	12/19/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction and construction BMPs. 3. No further referrals to the authority on this project are necessary.
Douglas County	Piney Lake Trails Final Plat	other - parks and open space	12/7/2022	1/4/2022	335.1	12/19/2022	1.A portion of the project is located in the Cherry Creek Basin and subject to the requirements in the Control Regulation 72. The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction BMPs. 3.Construction BMPs were not provided in this submittal, but should be incorporated for development to meet CR72 construction BMP requirements for a Tier 3 development. Phasing requirements for construction disturbance should be shown on the GESC plans to ensure disturbance limit requirements per CR72 Section 72.7-2.(b)(5)(i)(A.) are being met.
Town of Parker	Stroh Crossing F1 L7 B10 Daycare	commercial	12/8/2022	1/5/2022	1.5	12/19/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction and construction BMPs. 3. No further referrals to the authority on this project are necessary.
Town of Parker	Vantage Point F1 AMD 2 Replat	residential	12/8/2022	1/10/2022	8.1	12/19/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed subdivision 3. No exceptions taken with the proposed post construction BMPs submitted (SP22-131) for the Grocery pad site. Post construction BMPs will need to be provided for the future retail sites. 4. Construction BMPs were not provided, they should be provided during construction to meet the requirements of CR72.
Town of Parker	Compark Village F4 Tract E - Flex Office	commercial	12/13/2022	1/13/2022	4.0	12/20/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction and construction BMPs. 3. No further referrals to the authority on this project are necessary.
City of Aurora	Prairie Point Golf Course F1	commercial	12/15/2022	12/29/2022	275.0	12/20/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. As noted in the drainage report, a variance was requested to bypass structural water quality for the rear portion of the lots backing Antelope creek. Tier 3 post construction BMPs are still required for these areas; please provide more detail of the acceptable post construction BMPs for the areas and provide supporting calculations. Utilization of existing landscape for runoff reduction BMPs is acceptable provided runoff reduction meets design criteria outlined in the USCDM Vol.3, however more information and supporting calculations needs to be provided. (Also commented on in Master Drainage Report for Kings Point North East RSN #1595659) 3. This site includes development in the stream preservation areas which requires additional post construction BMPs per the CR72. See Section 72.7 (2)(c)(8)(i) of the CR72 for more information regarding the requirements. Please explain what additional BMPs are being provided to meet these requirements.
Town of Parker	Vantage Point F1 AMD 2 L2 - Grocery Store	commercial	12/15/2022	1/17/2022	6.4	12/20/2022	1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction and construction BMPs. 3. No further referrals to the authority on this project are necessary.
SEMSWA	Dove Creek Otero to Chambers Rd	other - parks and open space	12/16/2022	12/29/2022	8.8	12/20/2022	Previously Reviewed 2047,2231,2302 1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs). 2. No exceptions taken with the proposed post construction and construction BMPs.

SEMSWA	Take 5 Oil Change SITE	commercial	12/19/2022	1/3/2022	0.9	12/21/2022	<p>Previously Reviewed 2285 &amp; 2395</p> <p>1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs).</p> <p>2.No exceptions taken with the proposed post construction BMPs</p> <p>3. Construction BMP plan was not included in the submittal for review. Construction BMPs should be implemented to meet the requirements of the permittee.</p>
SEMSWA	RJHS Athletics SITE PLAT	commercial	12/19/2022	1/10/2022	18.0	12/21/2022	<p>Previously Reviewed 2466</p> <p>1.This project is in the Cherry Creek Basin and therefore must follow requirements in the Cherry Creek Basin Water Quality Authority's Control Regulation 72. Control Regulation 72 requires both construction and post-construction Best Management Practices (BMPs). Based on the disturbance area and additional impervious area added, this project would classify as a Tier 3 development and shall provide BMPs meeting the requirements for this designation.</p> <p>2. No exceptions taken with the full spectrum detention and/or raingarden for a proposed post construction BMP.</p> <p>3. However, Basins OS1, OS2, OS3 and OS4 still include the addition of new/added impervious area. Per control regulation 72, new/added impervious area should be treated in a post construction BMP meeting Tier 3 requirements, or the project needs to meet the criteria (and request) an automatic or authorized exclusion to the post construction BMP requirements (See section 72.7-2. (c)(4)).It doesn't appear a specific exclusion has been requested meeting CR72 criteria.</p> <p>4. No exceptions taken with the proposed construction BMPs.</p>
Town of Parker	Parker Auto Plaza F2 AMD 3 L1A B4 - McDonald Audi Service	commercial	12/20/2022	1/20/2022	5.7	12/21/2022	<p>1.The Authority's Control Regulation 72 requires construction and post-construction Best Management Practices (BMPs).</p> <p>2. No exceptions taken with the proposed post construction and construction BMPs.</p> <p>3. No further referrals to the authority on this project are necessary.</p>