Brighton COLORADO

Water Treatment Plant Expansion & Denitrification Phase I Design Services

Presenting: Michael Woodruff, Director of Infrastructure
Project Manager: Matt Amidei, Project Engineer

Strategic Plan

Supportive and Sustainable Infrastructure

Financially Responsible

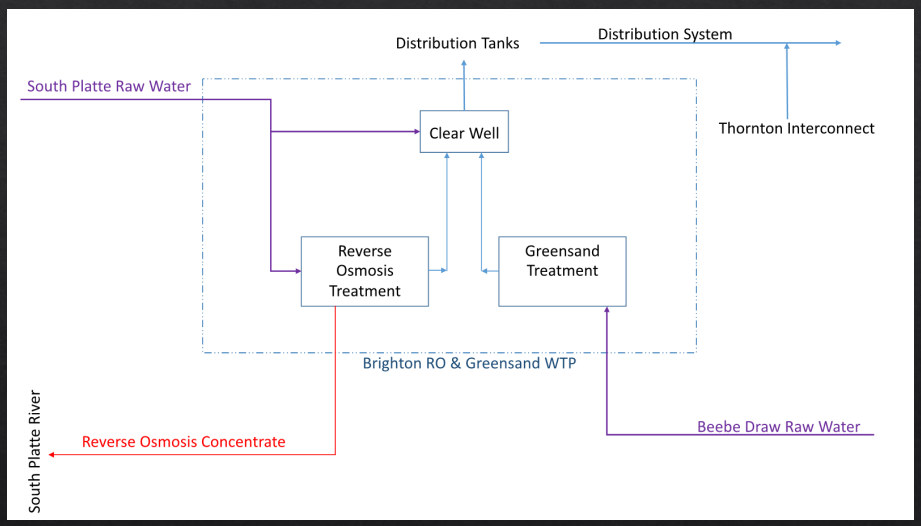
Safe, Active, and Engaged Community

Recognizable and Well-Planned Community

Introduction

- Project Background
- Project Details
- Proposal Process and Results
- Final Recommendation

Project Background

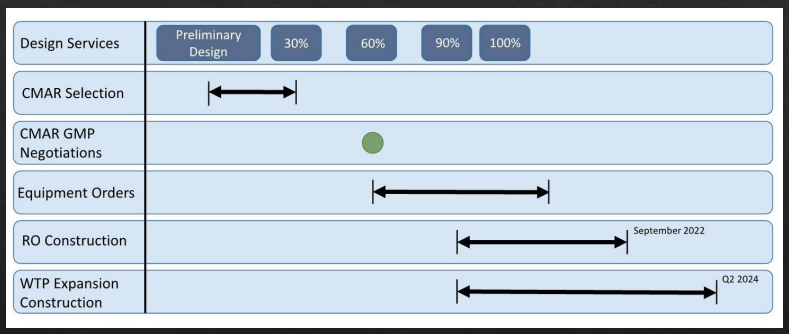


Project Background

- Reverse Osmosis (RO) Denitrification
  - New CDPHE discharge limits for RO waste stream (Total Inorganic Nitrogen, Selenium & Sulfates)
  - Must be compliant by September 30, 2022 (Potential of significant fines)
- Greensand WTP Expansion
  - Current production capacity – 11.7 MGD
  - Rated production capacity - 13.3 MGD
  - Current max day demand – 11.68 MGD (July 26, 2019)

Project Details – Overall Project Schedule

- Design engineer will be retained from conceptual planning through final construction completion (Phase I, II & III)
- Retain CMAR for construction services around 30% design
- GMP will be established with CMAR at 60% design allowing for long lead time equipment purchases
- Owners representative can be contracted at any time for design review



Project Details – Design Scope of Services

- Phase I Scope of Services
  - Pilot Testing
  - Water Quality & Process Evaluation
  - CDPHE Permitting
  - Conceptual Design
  - Condition Assessment
  - Hydraulic Evaluation
  - CMAR Solicitation
- Phase II Scope of Services (At later date)
  - Final set of construction documents
  - All permits and required easements
  - Engineers opinion of probable cost
  - Final set of specifications
- Phase III Scope of Services (At later date)
  - Construction oversight and inspections services
  - Final acceptance testing
  - As-builts
  - Start-up and commissioning

Project Details – CMAR

- What is Construction Management-at-Risk (CMAR)?
  - Collaborative delivery process between Design-Build and Design-Bid-Build
- Owner first selects and retains the design firm
- Design firm moves forward with intent of City hiring CMAR around 30% design
- CMAR is involved with design going forward and provides constructability review and cost estimates
- CMAR assembles guaranteed maximum price (GMP) at 60% design
- Allows pre-purchasing of critical long lead time equipment

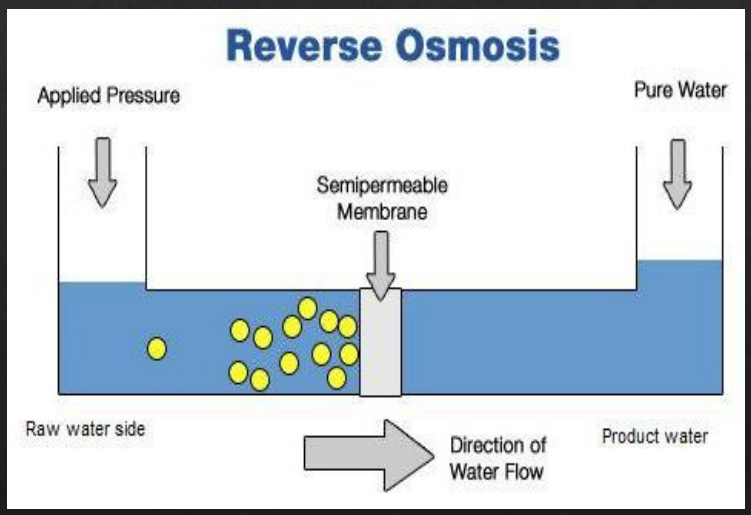
Project Details

- Advantages of CMAR delivery
  - CMAR is part of design team collaboration early in process
  - Assists with value engineering, cost estimating and constructability review
  - Opportunity to overlap phases of design and construction
  - Early cost certainty in design
  - CMAR is allowed to self-perform portions of work
  - City controls both design and CMAR contracts
  - If GMP is not within budget City can release CMAR and formally bid construction or negotiate costs
  - "Open Book" process
- CMAR has been successfully used by other municipalities in Colorado

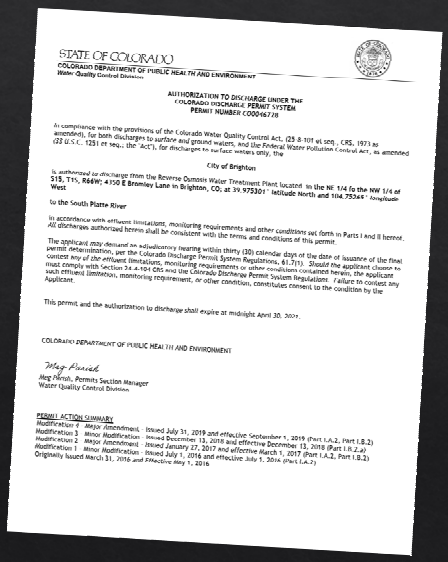
Project Details

- Staff will be returning to Council with additional contracts over the next couple years
  - Phase II & III of design
  - CMAR construction services
  - Purchase of long lead time equipment
  - CMAR GMP
  - Owners representative
  - Ancillary services
- Due to scheduling constraints and CDPHE deadlines of Project, timing of contract approval is critical in preventing delays and associated costs

Project Details – RO Process



Project Details



STATE OF COLORADO
COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
Water Quality Control Division

AUTHORIZATION TO DISCHARGE UNDER THE COLORADO DISCHARGE PERMIT SYSTEM
PERMIT NUMBER CO0046778

In compliance with the provisions of the Colorado Water Quality Control Act, (25 8-101 et seq., CRS, 1973 as amended), for both discharges to surface and ground waters, and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., the "Act"), for discharges to surface waters only, the

City of Brighton

is authorized to discharge from the Reverse Osmosis Water Treatment Plant located in the NE 1/4 of the NW 1/4 of S15, T1S, R66W; 4150 E Bromley Lane in Brighton, CO, at 39.975301° latitude North and 104.75345° longitude West

to the South Platte River

In accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I and II hereof. All discharges authorized herein shall be consistent with the terms and conditions of this permit.

The applicant may demand an adjudicatory hearing within thirty (30) calendar days of the date of issuance of the final permit determination, per the Colorado Discharge Permit System Regulations, 61.7(1). Should the applicant choose to contest any of the effluent limitations, monitoring requirements or other conditions contained herein, the applicant must comply with Section 24.4-104 CRS and the Colorado Discharge Permit System Regulations. Failure to contest any such effluent limitation, monitoring requirement, or other condition, constitutes consent to the condition by the Applicant.

This permit and the authorization to discharge shall expire at midnight April 30, 2021.

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Meg Parish

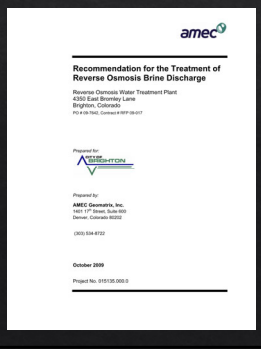
Meg Parish, Permits Section Manager
Water Quality Control Division

PERMIT ACTION SUMMARY
Modification 4 Major Amendment - Issued July 31, 2019 and effective September 1, 2019 (Part I.A.2, Part I.B.2)
Modification 3 Minor Modification - Issued December 13, 2018 and effective December 13, 2018 (Part I.B.2.a)
Modification 2 Major Amendment - Issued January 27, 2017 and effective March 1, 2017 (Part I.A.2, Part I.B.2)
Modification 1 Minor Modification - Issued July 1, 2016 and effective July 1, 2016 (Part I.A.2)
Originally issued March 31, 2016 and effective May 1, 2016

- December 2007 CDPHE issued revised effluent limits to existing concentrate discharge permit
- Original compliance date of September 2013
- Brighton has been granted multiple extension since 2007
- Current permit issued July 31, 2019 has compliance date for Total Inorganic Nitrogen, Selenium & Sulfates of September 30, 2022
- If compliance schedule is not met CDPHE may impose significant fines

Project Details

- City has completed multiple alternative analysis reports since 2007
- The City successfully piloted a FBR in 2014 but construction didn't move forward due to operational challenges
- Biological denitrification was, and still is, determined to be the optimal treatment option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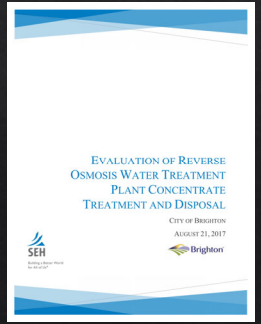
Recommendation for the Treatment of Reverse Osmosis Brine Discharge

Reverse Osmosis Water Treatment Plant
4200 East Bromley Lane
Brighton, Colorado

October 2009


Evaluation of Reverse Osmosis Water Treatment Plant Concentrate Treatment and Disposal

City of Brighton

August 21, 2017

Brighton


PROPOSAL | MAY 2, 2018

RO CONCENTRATE RESOLUTION

City of Brighton | RFQ #18-030

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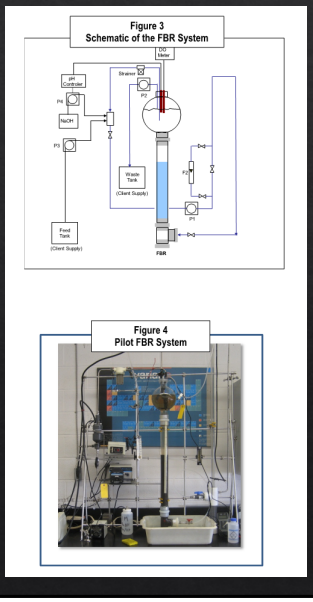

Project Details – Greensand Expansion

- City currently meets water demands with three sources
  - RO permeate with raw water blending
  - Greensand filtrate
  - Thornton interconnect
- Current max day demand (11.67 MDG) is very close to rated production capacity (13.3 MGD)
- Actual production capacity is closer to 11.7 MGD due to operational constraints

Table 4 - Growth & Demand Projection

Year		SFE	Maximum Day Demand (MGD)	Population
0	2016	14,900	11.4	37,900
5	2021	16,500	12.8	41,100
10	2026	18,200	14.4	44,700
15	2031	20,000	16.0	48,500
20	2036	22,100	17.9	52,900
25	2041	24,400	20.0	57,600
30	2046	27,000	22.3	62,900
35	2051	29,800	24.8	68,700
40	2056	32,900	27.6	75,100
45	2061	36,300	30.7	82,200
50	2066	40,100	34.1	90,000
53	2069	43,000	36.7	95,000

Project Details

- Expanding RO not a realistic option
  - Concentrate/permitting issues
  - Fewer locations for new South Platte wells
- Future surface water plant not currently an option
  - Need more water rights
  - More storage
  - Large infrastructure requirements
  - Projected cost of $100+ Million
- Greensand is the optimal plant to expand
  - City owns land for new wells
  - Doesn't have permitting issues
  - Lower treatment costs

Project Details

- Greensand plant is fed from the Beebe Draw Well Field
- City owns 40 acres and has 3 active wells and one that needs to be equip for operation
- City currently pumps approximately 1,100 acre-feet (308 MG) annually for treatment
- Report completed by HRS in 2019 estimates a max annual yield of 5,600 acre-feet (1,568 MG) with the addition of appropriate wells

Project Details – Phase I Scope of Services

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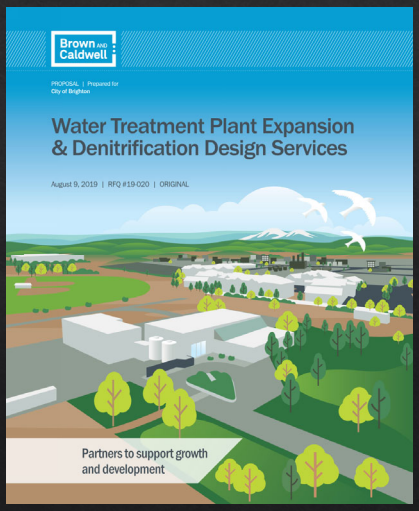

Proposal Process and Results

- Request for Qualifications (RFQ) in April 2019
  - 3 Firms Submitted. The City selected 2 firms to shortlist for the Request for Proposal (RFP) process
    - Burns & McDonnell
    - Brown & Caldwell
- Formal RFP Process
  - RFP was sent to the two shortlisted firms
  - Both firms submitted proposals
- Selection Process
  - Brown & Caldwell was selected because of their system knowledge and innovative approach
  - The fee for Phase I design services is $683,532.00

Final Recommendation

Staff believes that accepting the design proposal from Brown & Caldwell for design services for the Water Treatment Plant Expansion & Denitrification Phase I Design Services would accomplish the following:

- Provide a long term, reliable solution to address current issues at the RO Treatment Plant and ensure continuation of RO treatment and distribution to customers
- Meet all regulatory deadlines and avoid potential CDPHE fines
- Provide reliable drinking water service to existing and future City of Brighton residence and businesses as well as providing environmental stewardship by continuing to meet our permit requirements

Questions?