

Grand River Water Supply Study

Broken Arrow Municipal Authority

FC

November 7, 2023





AGENDA

- 1 Introduction & Scope of Project
- 2 Water Rights & Demand Projections
- 3 Agency Coordination
- 4 Source Water Comparison
- 5 Raw Water Pipeline Condition Assessment
- 6 Alternatives Evaluation & Recommended Path Forward



1 Introduction & Scope of Project

Historical Overview

BROKEN ARROW Municipal Authority	In the last 100+ years The City of Broken Arrow's population has grown, and the water supply plan has grown and changed with it						
1909 1976 Water Tower/Pump Verdigris Ri Station /Waterline Water Treatr from Ray Harrel Plant Expan	201320142020verConverted Verdigris RiverSupplemental WaterVerdigris River WTPnentWater Treatment Plant toConnection withExpansionsionChloraminationTMUA Completed-30 MGD						
0.5 MGD 10 MGD	Secondary Disinfection 24" Connection System						
1967 Verdigris River Water Plant 4MGD	198220142016PurchaseVerdigris River WTPSecondAgreement withMembraneSupplementalOOWA BecomesUpgrade CompleteWater Connection						
	Effective 20 MGD with I MUA- 30" Connection						

HDR has assisted BAMA on water supply since 2007



Drivers for this Grand River Water Supply Study

- City relies on only one water source
 - Navigable channel (subject to accidents such as spills, etc.)
 - Upstream users (is there enough water in extreme drought?)
 - Periodic algae outbreaks in recent history
 - Potential OWRB curtailment of existing water rights

- Need for increased reliability and resiliency
 - Redundant supply during future drought conditions or water quality events
 - Flexibility for water quality fluctuations







2 Water Rights & Demand Projections





Updated water demand projections and supplies



Agency Coordination





In response to your request

For your information

XXX Additional Information Needed

By: Jason Tutkowski Water Rights Administration Division

Re: City of Broken Arrow, Wagoner County

Stream Water Application #20150008

OKLAHOMA WATER RESOURCES BOARD

OKLAHOMA CITY, OKLAHOMA 73118

3800 NORTH CLASSEN BLVD

DESK PHONE (405) 530-8848

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On February 10, 2015, we received your application for surface water rights and have assigned it application #20150068 along with check #212277 in the amount of \$3,000.00. The application currently requests an additional 17,729 acre-feet per year. Annual water use estimates as described in "City of Broken Arrow, Water Supply Improvements, Plan Development Report, January 24, 2008" appear to project a peak demand of 52.8 million gallons per day (mgd) of need by 2066 (29.8 mgd self-supplied by the City plus 23 mgd of water purchases from the Oklahoma Ordinance Works Authority (OOWA). When converted to units more commonly used in the water rejists application process, the peak need appears to be 59,143.6 acre-feet per year (*l acre-foot = 323,831 gallons*).

The City of Broken Arrow ("City") currently has three active stream water permits that authorize stream water to be used for municipal/public water supply purposes:

- · Permit #19630131: 15,185 acre-feet per year from the Verdigris River,
- · Permit #19780063: 12,042 acre-feet per year from the Verdigris River, and
- · Permit #19790060: 56,000 acre-feet per year from Lake Tenkiller;

which have a combined peak authorization of 83,227 acre-feet per year (or approximately 74.3

mgd). The City also has an active stream water permit #20110036, however it was not included above as it specifically authorizes water to be used for irrigation of a golf course and not municipal/public water supply purposes.

If you would like to continue pursuing application #20150008, you will need to submit information to revise the application and show that the additional 17,729 acre-feet per year requested is an estimated water use customer need that is in addition to (beyond) the existing 83,227 acre-feet of existing municipal/public water supply appropriation. This is a standard requirement for all surface water applicants in the State, where additional water cannot be appropriated in an active water right(s). If you have any questions or concerns regarding the requested revised information for your pending application, please contact me at 405-530-8848 or jason.tutkowski@owrb.ok.gov.

Note: Any incomplete or unresponsive answers may cause a delay in the processing of your application. In addition, 82 O.S. § 105.10(A)(2) and Title 785, Section 20-3-9 of the Oklahoma Administrative Code (OAC) states that if any application is defective as to form, or if the plans submitted appear unfeasible, unsafe, or unlikely to be constructed to completion, the Board must advise the applicant of the correction, amendments, or changes required. Once notified, the applicant has sixty (60) days in which to refile or correct the application as required. If not received by the Board within sixty (60) days of notification, the application as required as an original application received on the date of its refiling or correction. If an applicant does not correct an application or publish notice as instructed by the Board, and no further proceedings are initiated by the applicant for six months or more after last contact with the Board, the application shall be deemed withdrawn. OAC 785:20-3-9(d). The Board shall provide notice to the applicant has been deemed withdrawn.



Jason Tutkowski - Permitting Specialist

EMAILED TO:

Kenneth Schwab, Assistant City Manager – kschwab@brokenarrowok.gov Ethan Edwards, Engineer Manager – EEdwards@brokenarrowok.gov Kristi Shaw, Consultant – Kristi.Shaw@hdrinc.com







Oklahoma Ordnance Works Authority





4 Source Water Comparison







5 Raw Water Pipeline Condition Assessment

Existing 36-inch OOWA Pipeline



Systematic condition assessment was conducted on the pipeline





















Condition assessment conclusions and recommendations



• If decision made to move forward with Grand River supply, recommend internal condition assessment to obtain detailed rehab/replace information for design





6 Alternatives Evaluation & Recommended Path Forward

Alternatives summary

No.	Description	Raw Water Supply (46 mgd Future Demand)
0	Verdigris River Supply Only	46 mgd Verdigris (30 mgd current permits) (16 mgd new permit)
1A	Grand River Supply with OOWA Partnership, Gravity Supply	12.3 mgd Grand 30.0 mgd Verdigris 3.7 mgd TMUA
1B	Grand River Supply with OOWA Partnership, Pumped Supply	25 mgd Grand 21 mgd Verdigris
2	Grand River Supply with GRDA Partnership, Pumped Supply	25 mgd Grand 21 mgd Verdigris

Alt. 0 – Verdigris River Supply Only

- Expand intake pump station on the Verdigris River to 46 mgd
- Construct off-channel reservoir west of WTP site (4,020 ac-ft)
- Expand WTP to 46 mgd (16-mgd expansion)





Alt. 1 – Grand River Supply from OOWA







Cost comparison of alternatives

		00	GRDA		
Item	Alt 0 - Verdigris River Supply Only	Alt 1A – Gravity Supply	Alt 1B – Pumped Supply	Alt 2 – Pumped Supply	
Capital Cost					
Off-channel Reservoir	\$15,256,000	\$12,534,000	\$12,534,000	\$12,534,000	
Intake Pump Station	\$11,882,000	\$0	\$0	\$0	
Transmission Pipelines	\$0	\$42,196,000	\$59,226,000	\$61,492,000	
Transmission Pump Stations & Storage Tanks	\$0	\$1,649,000	\$18,806,000	\$19,041,000	
Water Treatment Plant Expansion	\$48,964,000	\$40,466,000	\$48,964,000	\$48,964,000	
TOTAL COST OF FACILITIES	\$76,102,000	\$96,845,000	\$139,530,000	\$142,031,000	
Contingency / Unforeseen Costs	\$28,857,000	\$33,795,000	\$47,883,000	\$48,645,000	
TOTAL COST OF PROJECT	\$104,959,000	\$130,640,000	\$187,413,000	\$190,676,000	
COST DIFFERENCE FROM ALT 0	\$0	\$25,681,000	\$82,454,000	\$85,717,000	

Recommended phasing for 1A/1B implementation

	Estimated Cos		
Phase 1 (immediate)			
Secure MOU with OOWA on water purchase (25 mgd), purchase rate, and use of infrastructure	\$0.1M		
 Begin land acquisition on OOWA property (if necessary) 	~ ~ · · · · · · · · · · · · · · · · · ·		
Phase 2	\$33M		
Replace Section 1 of existing 36" pipeline	φοσιτι		
Phase 3	\$12M		
Construct facilities to connect with OOWA	ψτΣινι		
 Place system into service to deliver 12.3 mgd to VRWTP by gravity 			
Phase 4	\$13M to \$35M		
 Conduct internal condition assessment of Section 2 of existing 36" pipeline 			
 Rehabilitate/replace portions of Section 2 based on findings 			
Phase 5	\$22M		
 Construct pump station (or rehabilitate existing) at WTP2 	ΨΖΖΙΝΙ		
 Place system into service to pump 25 mgd to VRWTP 			
Phase 6 (goal to be in service by 2035)	\$85M		
 Construct WTP expansion to 46 mgd and presedimentation basin at Site 1A 	φοσινί		
	\$165M to \$188M		

Recommended implementation timeline

ID	Task Name	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1	Phase 1 - MOU with OOWA and Begin Land Acquisition													
2	Phase 2 - Existing 36" Pipeline Section 1 Replacement													
3	Phase 3 - OOWA-COBA Connecting Facilities													
4	12.3 mgd Gravity Delivery from Grand River													
5	Phase 4 - Existing 36" Pipeline Section 2 Rehabilitation													
6	Phase 5 - Pump Station at OOWA WTP 2											(
7	25 mgd Pumped Delivery from Grand River													
8	Phase 6 - VRWTP & Reservoir Expansion													
9	46 mgd Peak Day Demand Capacity													•



Questions?



Staff Recommendation:

Approve and authorize plan to begin process of obtaining a secondary water source as recommended in the Grand River Water Supply Study.