

Cave Bay Community Services

**Water Facility Plan
Public Meeting**

October 2023

Introduction



Who am I?

- Brent Deyo, PE
- Zach Thompson, PE
 - CBCS's engineer since 2011, developed the CBCS Wastewater Facility Plan and implemented changes.

Who is Ardurra?

- Formerly T-O Engineers
- Full-service engineering firm
- 1300 employees

Outline

- Background
- ~~Water demand analysis~~
- Water system issues/solutions
- Alternatives review
- Funding
- Moving forward

*Note IDEQ = Idaho Department of Environmental Quality, regulatory agency for water and wastewater systems.
IDAPA = Idaho Administrative Code, IDEQ Rules*

Background

- **What is a Facility Plan?**
- Comprehensive analysis of the system
- Identify deficiencies and recommend improvements
- Required by IDEQ for improvements and funding
- 20-year planning document
- Initiated due to recurring water main breaks (notably 2019)
- T-O facilitated \$200,000 from IDEQ in grant funding to repair the main
- 50% Grant for WFP from IDEQ



Background



CBCS Compliance with IDEQ Regulations

- In 2018, IDEQ completed a Sanitary Survey of the CBCS Water System.
- Several areas of system are not in compliance with current IDEQ rules.
- System becoming aged leading to consistent waterline breaks.

Background



Water Facility Plan Progress

- May 2022 - Facility Plan Update Meeting
- November 2022 – Submitted Draft Facility Plan to IDEQ
- March 2023 – Received Comments from IDEQ
- July 2023 – Resubmitted Draft Facility Plan to IDEQ
- August 2023 – Received approval of Draft Facility Plan

Background



What Next

- Finalize Facility Plan
 - October 25th - Public Meeting
 - **November 11th - Board Votes on Selected Alternative**
 - Final Facility Plan Submitted to DEQ
 - Allows CBCS to complete improvements and obtain funding



- LEGEND:**
- PRESSURE REDUCING VALVE
 - GROUNDWATER WELL
 - TANK SITE
 - HYDRANT
 - ELEVATION CONTOURS (USGS 20-FT)
 - APPROXIMATE CBCS SERVICE BOUNDARY

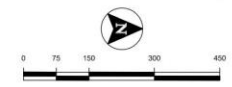
TANK SITE
TANK 1 - 20,000 GAL.
TANK 2 - 20,000 GAL.
TANK 3 - 50,000 GAL.

WELL SITE
EVALUATED BY
NORTHWEST
GROUNDWATER
CONSULTANTS

179 connections and 220 total lots

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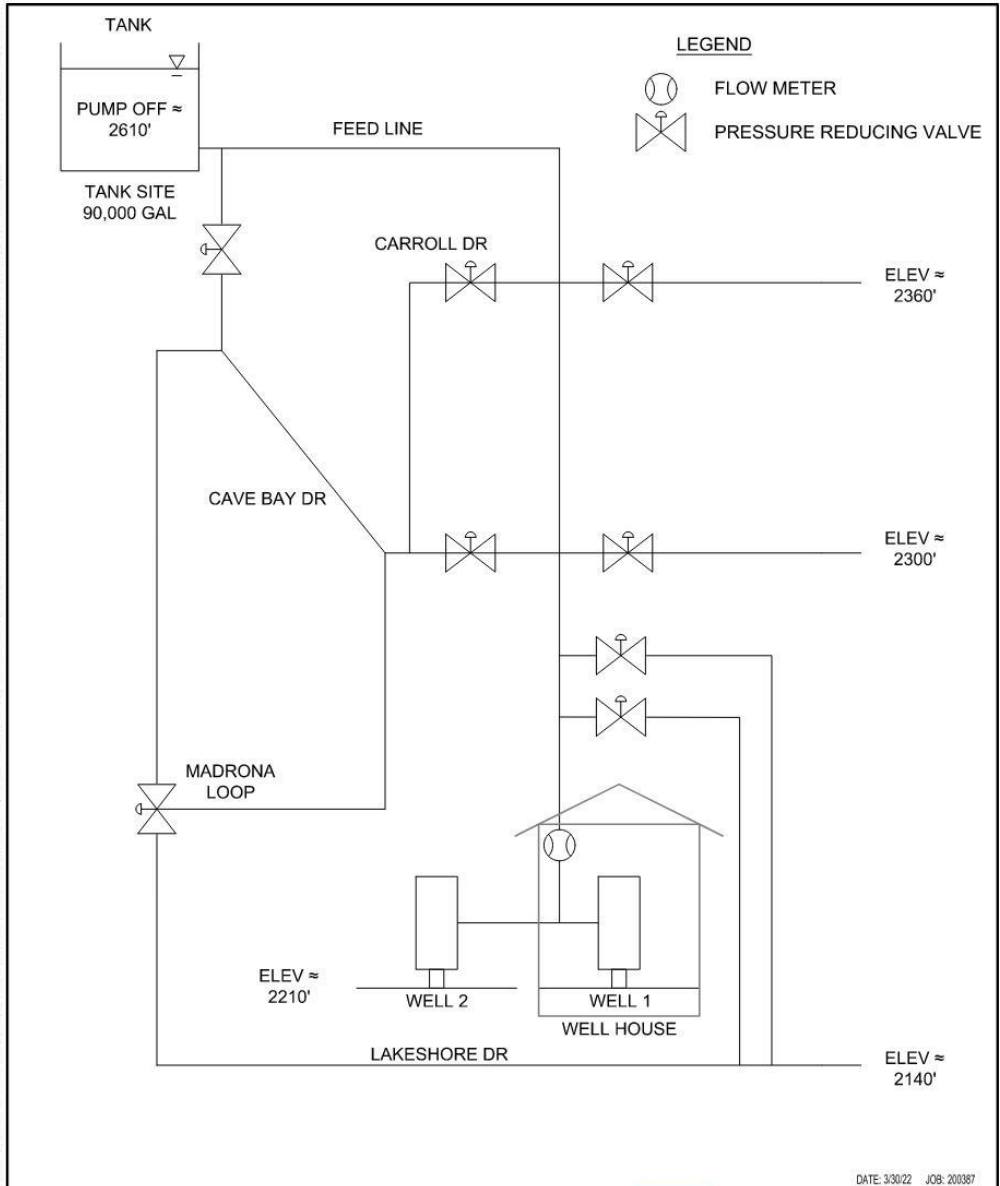
CAVE BAY COMMUNITY SERVICES
WATER SYSTEM MAP
WATER FACILITY PLAN 2022



2471 S. TITANIUM PLACE
 MERIDIAN, IDAHO 83642
 208-323-2288 | WWW.T-O-ENGINEERS.COM

300 9100 28 2022

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CAVE BAY COMMUNITY SERVICES
 WATER SYSTEM SCHEMATIC
 WATER FACILITY PLAN 2022

TO T-O ENGINEERS
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 208-762-3644 | WWW.TO-ENGINEERS.COM

DATE: 3/30/22 JOB: 200387



Water System Characteristics	
# of Storage Tanks	2 – 20,000 gal, 1 – 50,000 gal
# of Wells	2
# of PRVs	8 main line PRVs
# of Blowoffs	10
Water Mains	22,000 lineal feet (PVC & galvanized, 1" to 6" pipe)



Water System Issues/Solutions - Notes



- System broken down into three categories
 - Source
 - Storage
 - Distribution Piping
- Solutions = Alternatives (IDEQ Language)
- All alternatives include a 'No Action' option (number 0)
- Alternatives for each category combined into alternative packages
- Advantageous to select expansive alternative
 - 20-year plan
 - Simplifies permitting process
- Selected alternative can be phased
- Fire flow is not a requirement by IDEQ

Water System Issues/Solutions - Source



Water Source Issues	Water Source Solutions	
	Source Alternative 1 (S1)	Source Alternative 2 (S2)
Wells cannot meet minimum IDEQ required capacity	New well and increase existing well capacity	New Surface Water Treatment and Intake System
No Redundancy		
Backup power	Backup generator	
Wellhouse electrical & control does not meet current codes	Upgrade all electrical & control at existing wellhouse	
Wellhouse building undersized to meet minimum setbacks	Expand the existing wellhouse	
COST	\$0.93 Million	\$3.14 Million

Water System Issues/Solutions - Distribution

Hydraulic Model Results

- Fire flow cannot be met at any of the existing blowoffs.
 - 82-421 gpm available
 - 1000 gpm required
- Lakeshore Drive undersized leading to pressures beyond IDEQ requirements.
- Highest 3 lots on High Drive cannot be served by gravity alone.



Water System Issues/Solutions - Distribution

Distribution System Issues	Distribution Solutions		
	Distribution Alternative 1 (D1)	Distribution Alternative 2 (D2)	Distribution Alternative 3 (D3)
PRVs are aging and difficult to maintain	Replace all PRVs except those at wellhouse		
Water mains do not meet IDEQ minimum diameters – 6” if serving hydrant, 3” if not serving hydrant. Inadequate pressures during peak usage	Upsize all mains to minimum 3” pipe	Upsize most mains to a minimum 6” pipes (3” on dead ends)	
Existing hydrants cannot provide adequate fire flow.			
Lack of access to hydrants.	Not Addressed	Add hydrants throughout system	
No service meters	Not Addressed		New service meters throughout system
COST	\$5.54 Million	\$6.24 Million	\$6.80 Million

Water System Issues/Solutions - Storage

- Fire Suppression Storage cannot be met with existing tanks
- Source improvements needed for tanks to meet buildout demands

SYSTEM STORAGE REQUIREMENTS (GALLONS)			
	Existing	Build-Out	
		No Improvements	Source Improvements
Effective Storage Available		83,086	
Required Storage without Fire Suppression	84,596	105,329	81,629
Fire Suppression Storage	60,000	60,000	60,000
Required Storage with Fire Suppression	144,596	165,329	141,629

Assumptions: Residences will remain less than 3,600 square-feet and all others will have personal supplemental fire suppression systems.

Water System Issues/Solutions - Storage



Storage System Issues	Storage Solutions	
	Storage Alternative 1 (T1)	Storage Alternative 2 (T2)
Cannot supply fire suppression storage	60,000-gallon Standpipe	
Water age could be exceptionally long particularly in the off-season	Not Addressed	Mixers for each Tank
COST	\$0.52 Million	\$0.59 Million

Alternatives Review - Cost Estimates and Packages



Alternative	Capital Cost
S1 – New Well, Wellhouse, Rehab of Existing Wellhouse	\$0.93 M
S2 – Surface Intake and Treatment	\$3.14 M
T0 – No Storage Improvements	\$0.00 M
T1 – New Standpipe	\$0.52 M
T2 – New Standpipe and Mixers	\$0.59 M
D1 – Upsize Mains, No Fire Flow	\$5.54 M
D2 – Upsize Mains, Fire Flow	\$6.24 M
D2 – Upsize Mains, Fire Flow, Add Service Meters	\$6.80 M
Alternative Packages	
AP1 – S1, T0, D1 – Upsize to 3” mains, no fire flow	\$6.47 M
AP2 – S1, T1, D2 – Fire flow and increased storage	\$7.68 M

Each alternative package addresses all aspects of water system and brings system into compliance with current IDEQ rules.

Alternatives Review - Cost Estimates and Packages

	AP1	AP2	Example Phase
Cost of Selected Alternative	\$6,472,014	\$7,683,009	\$2,000,000
Awarded Grant Funds	\$0	\$0	\$0
Project Loan Repayment	\$6,472,014	\$7,683,009	\$2,000,000
Assumed Interest Rate	3.5%	3.5%	3.5%
Assumed Loan Term (years)	30	30	30
Project Loan Repayment	\$10,556,761	\$12,532,063	\$3,262,280
Annual Loan Repayment	\$351,892	\$417,735	\$108,743
ERUs	179	179	179
Monthly Debt per ERU	\$163.82	\$194.48	\$50.63

Funding Source

- **IDEQ Drinking Water Loan**
- **USDA-RD Grant/Loan**
 - Provides below-market rate interest loans (1.75% - 3.50%)
 - Principal forgiveness/grant offered to qualifying projects
 - Loan term ranges from 20-30 years
 - Loans of up to 100% of project costs may be awarded for project design and/or construction

Note: DEQ funds cannot be used for projects that are greater than 50% fire flow.

What Next?

November 11th 2023: Final Alternative Selected

Winter 2023/2024: Final Facilities Plan Submitted and Approved

Winter 2023/2024: Funding Applications Due

Summer 2024/TBD: Funding Offered

TBD: Design and Construction



Thank you!

Questions?

Brent Deyo

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Water System Issues/Solutions - Distribution



Distribution Alternative	Notable Results
Distribution Alt. D1	<ul style="list-style-type: none">• Provides domestic flows for ADD, MDD, and PHD at buildout• All connections have modeled pressures between 40 to 80 psi• Minimal fire flow impact
Distribution Alt. D2	<ul style="list-style-type: none">• Same as D1• All hydrants capable of producing 1,000 gpm
Distribution Alt. D3	<ul style="list-style-type: none">• Same as D2• Add service meters

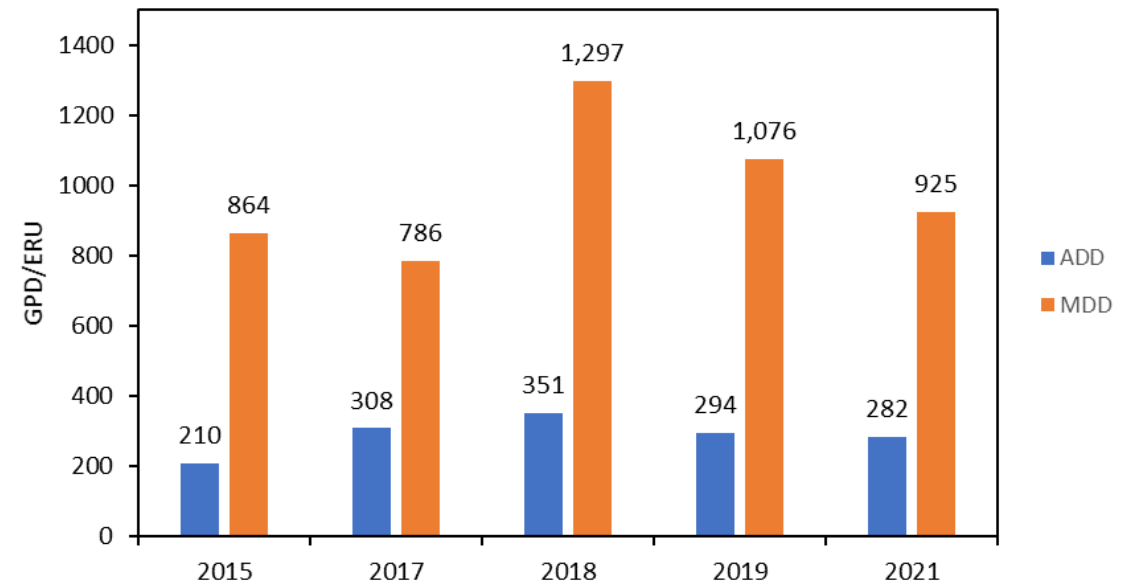
Water Demand - Existing

Assumptions

- ERU=Equivalent Residential Unit ~ Average Household (connections, 179)
- Based on well flow meter data to extract average day demand (ADD) and maximum day demand (MDD) usage from 2015 and 2021.
- PHD based on WA DOH Water System Design Manual equations utilizing MDD and ERUs
- 2018 Data Utilized, 175 ERUs total

Existing System Design Demands (2018 Data)

	gpm	gpd	gpd/ERU
ADD	43	61,455	351
MDD	158	227,054	1,297
PHD	401	577,337	3,299



Water Demand – Future Projections



20-Year and Build-Out Demand Assumptions

- Growth based on increase in connections from 2015 (165) to 2021 (179) (2.3 ERUs/year)
- Buildout based on when all vacant lots are connected to water system (220 ERUs total)
- Full buildout would occur in 2039 – within 20-years

System Demands			
		<i>2018 (175 ERUs)</i>	<i>Design/Buildout (220 ERUs)</i>
Units	gpd/ERU	gpm	gpm
ADD	351	43	54
MDD	1,297	158	198
PHD	3,299	401	504