



24 August 2021

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Capital Project Funding Request Wellhead 4 Treatment

BUILDING A WORLD OF DIFFERENCE®



Agenda

- Water Supply
- Growth in Dayton
- Water Quality
- Treatment Options
- Lifecycle Costs
- Wellhead 4 Treatment
- Questions/Discussion

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Water Supply



Dayton's Current Water System

- Water Sources Well Water + Bulk Purchase
- Well Water
 - Well #1 Old Village
 - Well #2 NE Dayton
 - Well #3 Old Village (Backup)
 - Well #4 NE Dayton (Under construction)

Purchase Water from Maple Grove & Champlin

Groundwater Chemistry



- Dissolved Minerals
 - Hardness & Alkalinity
 - Calcium/Magnesium
 - Dissolved Metals
 - Iron/Manganese
 - Other Minerals Sodium, Sulfate, Chloride, Fluoride, etc.
- Nitrogen Source Ammonia, Nitrite, Nitrate

Photo Source: USGS "Groundwater General Interest" Publication

Primary Standards vs Secondary Standards

- Primary Standard
 - Inorganic Chemicals Nitrate, Nitrite, Lead, Copper, etc.
 - Organic Chemicals Benzene, etc.
 - Microorganisms Crypto, Giardia, Viruses
 - Radionuclides
 - Disinfectants/Disinfection By Product

MUST TREAT

- Secondary Standards
 - Color
 - Red (Iron Fe)
 - Black (Manganese Mn)
 - Odors Rotten Egg/Swimming Pool
 - Hardness
 - Taste

SHOULD TREAT

Growth in Dayton



Population



Water Usage (gallons)



Water Quality



Iron & Manganese



Well #2 Data

Water Quality Data

	Target (Secondary Standard)	Well #1 (Old Village)	Well #2 (NE System)	Well #3 (Old Village)	Well #4 (NE System)
Iron (µg/L)	300	1092	988	1123	1420
Manganese (µg/L)	50*	348	104	233	60

*MDH Health Guidance indicates that for those less than 1 year a safe level of manganese is <100 μ g/L. For others, it is <300 μ g/L

Complaints – Color & Odor





supply - the difference is night and day"

off color this one was obscene."

Treatment Options





Treatment Options

- Oxidize Iron with Chlorine
- Filter out with media filter
 - Potentially use Greensand for Manganese removal

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- Options
 - In-Home
 - Wellhead
 - Centralized

Treatment Options

- In-Home
 - Installed in each household
- Wellhead Treatment
 - Smaller treatment plants designed to treat up to 2 wells.
 - Packaged pressure filters
- Centralized Treatment
 - Large 10 MGD treatment facility to treat all water for the NE.
 - Concrete gravity filters







Lifecycle Cost Comparison



Wellhead Treatment

<u>Costs</u>

• City

- \$4,000,000/facility
- \$750,000 every 25 years
- \$450/MG

• Homeowners

 Increase each household's bimonthly bill by \$42, or 50%, for the next 10 years



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20 Year Wellhead Treatment Cost

20-year Comparison



50-year Comparison



Wellhead 4 Treatment



Wellhead Treatment



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