

City of Hillsboro Water Treatment Plant Replacement Alternatives

Informational Meeting

June 5, 2008 - 7:00 pm



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Outline

- **Description of Existing Facilities**
- **Deficiencies of Existing Facilities**
- **Past Studies**
- **Alternatives**
- **Water Quality Comparison**
- **Project Cost Comparison**
- **Advantages of the Alternatives**
- **Questions**



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Existing Water Supply Facilities

- Wells (3 @ 475/250/400 gpm)
- Water Treatment Plant (WTP) (400 gpm in 1966)
- Clearwell (Storage) (20k + 500 k)
- High Service Pumps (2 @ 350 gpm)
- Transmission Lines (6" + 10")



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Well Deficiencies

- Well Spacing
- Age



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WTP Deficiencies

- Quality Issues
- Quantity Issues
- Physical Issues



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Quality Issues

- Does not remove
 - Manganese
 - Sulfates
 - Total Dissolved Solids (TDS)
- Limited Arsenic Removal
- No Hardness Reduction



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Quantity Issues

- **1999 Report**
 - **Recommended Capacity = 500 gpm**
 - **Actual Capacity = 400 gpm**



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Physical Issues (Age/Condition)

- **Aged Plant (40 yrs)**
- **Backwash Disposal Issue**
- **Inadequate Backwash Rate**
- **Out Dated Filter Design**
- **Inadequate Chemical Storage & Feed Areas**
- **Lack of Clearwell Volume**
- **Lack of Turn Over in the Clearwell**
- **Lack of High Service Pumping Capacity**



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Transmission Deficiencies

- Capacity
- Age



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Past Studies

- 1999 Facility Plan Report
- 2002 Traill Preliminary Engineering Report – Hillsboro, Mayville, Traill
- 2007 Regional Feasibility Study Report
- 2008 Addendum to the Regional Feasibility Study
- 2008 Updated Cost Estimate for Hillsboro WTP Replacement
- 2008 Plant Tours



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WTP Replacement Alternatives **Begin Considered**

- **Iron/Manganese Removal WTP – Hillsboro Independent**
- **Membrane WTP - Hillsboro Independent**
- **Membrane WTP – Regional System**



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Iron/Manganese Removal WTP – Hillsboro Independent

- **1 or 2 Additional Wells**
- **New 500 – 600 gpm WTP**
- **Remove Only Iron & Manganese**
- **Additional Clearwell Storage**
- **New Larger High Service Pumps**
- **New 12” Transmission Line**



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Membrane WTP – Hillsboro Independent

- 1 or 2 New Wells
- New 500 – 600 gpm WTP
- Remove/Reduce Iron, Manganese, Sulfates, TDS, Arsenic
- Reduce Hardness
- Additional Clearwell Storage
- New Larger High Service Pumps
- New 12" Transmission Line



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Membrane WTP – Regional System

- New Wells and Transmission - Traill
- New 1,000 gpm WTP
 - 600 gpm - Hillsboro
 - 400 gpm - Traill
- Remove/Reduce Iron, Manganese, Sulfates, TDS, Arsenic
- Reduce Hardness
- Additional Clearwell Storage
- New Larger High Service Pumps
- New 12" Transmission Line



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Membrane WTP Regional System Alternative

3 Entities

Hillsboro

Mayville

Trail Rural Water District

3 Phases of Construction

Governed by a Joint Powers Agreement

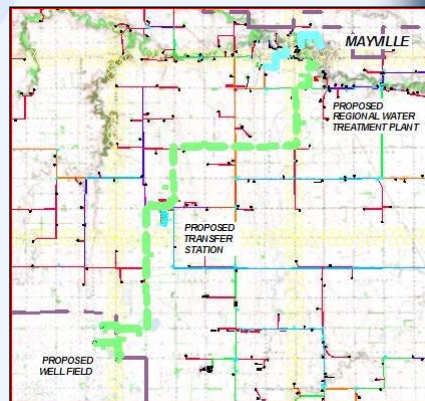


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Project Components

Phase 1

- Wellfield Development
- Raw Water Transfer Facility
- Raw Water Transmission to TRWD and Mayville
- TRWD Distribution Improvements (Portland Area)

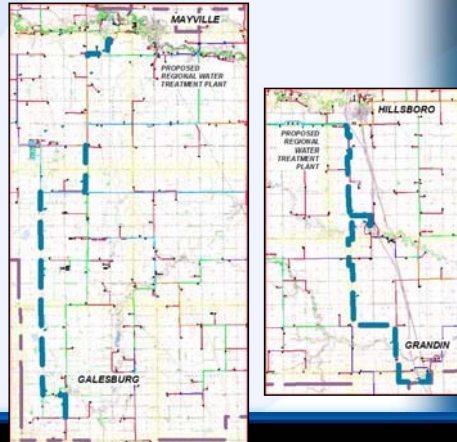


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Project Components

Phase 2

- TRWD Distribution Improvements
 - Galesburg Area
 - Grandin Area

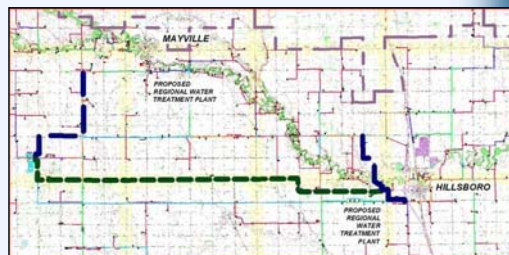


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Project Components

Phase 3

- Additional Wellfield Development
- Raw Water Transmission to Hillsboro
- Mayville WTP Improvements
- TRWD & Hillsboro Joint WTP
- TRWD Additional Distribution Improvements



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Water Quality Comparison

Constituent	Max. Level mg/l	Hillsboro Existing mg/l (gr/gal)	Fe/Mn Removal WTP Hillsboro Independent mg/l (gr/gal)	Membrane* WTP Hillsboro Independent mg/l (gr/gal)	Membrane* WTP Regional System mg/l (gr/gal)
Sodium	20	114	114	30 - 40	2 - 5
Sulfate	250	354	354	75 - 85	50 - 60
Iron**	0.3	0.02	0	0	0
Manganese**	0.05	0.23	0	0	0
Arsenic***	10	7	7	2 - 3	3 - 5
TDS	500	938	938	240 - 260	100 - 120
Hardness	< 50	546 (31.7)	546 (31.7)	50 - 86 (3 - 5)	50 - 86 (3 - 5)

* Single Array Units; Assume 80% Water Recovery; Assume 15% By-pass Flow
 **Iron and Manganese must be removed prior to RO Treatment due to fouling potential
 ***Arsenic concentrations provided in µg/l



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Project Cost Comparison

Description	Fe/Mn Removal WTP Hillsboro Independent	Membrane WTP Hillsboro Independent	Membrane WTP Regional System
TOTAL PROJECT COST	\$2,685,067	\$6,803,162	\$8,023,008
PROJECT COSTS NON-ELIGIBLE FOR MR&I GRANT	\$2,685,067	\$6,803,162	\$0
TOTAL MR&I GRANT ¹	\$0	\$0	\$5,616,106
TOTAL LOAN REQUIRED	\$2,685,067	\$6,803,162	\$2,406,902
ANNUAL DEBT SERVICE EXPENSE: (DWSRF 20 Year Term at 3.0%)	\$180,479	\$457,279	\$161,782
RESERVE EXPENSE: (20% of Debt Service Expense)	\$36,096	\$91,456	\$32,356
TOTAL ANNUAL DEBT SERVICE & RESERVE:	\$216,574	\$548,735	\$194,138
PROJECT RELATED USER COSTS			
MONTHLY USER COST - PROJECT	\$25.07	\$63.51	\$22.47
INCREASED MONTHLY O&M USER COST - PROJECT	\$0	\$5.63	\$5.63
TOTAL INCREASED MONTHLY PROJECT RELATED COSTS	\$25.07	\$69.14	\$28.09
EXISTING USER COSTS			
AVERAGE MONTHLY USER COST - EXISTING	\$16.00	\$16.00	\$16.00
TOTAL PROJECTED MONTHLY USER COST	\$41.07	\$85.14	\$44.09



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Advantages of Fe/Mn Removal WTP Hillsboro Independent

- Removal of Iron & Manganese
- Least Costly Alternative



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Advantages of Membrane WTP Hillsboro Independent

- Removal of Iron and Manganese
- Less Sodium
- Better Tasting (Sulfates, TDS, and Hardness)
- Does Not Have a Laxative Effect (Sulfates)
- Reduced Salt Usage (home softening)
- Potentially Eliminate Home Softening
- Better Arsenic Removal
- Better Capability For Handling Future Regulations
- Most Expensive Alternative



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Advantages of Membrane WTP Regional System

- Removal of Iron and Manganese
- Less Sodium
- Better Tasting (Sulfates, TDS, and Hardness)
- Does Not Have a Laxative Effect (Sulfates)
- Reduced Salt Usage (Home Softening)
- Potentially Eliminate Home Softening
- Better Arsenic Removal
- Better Capability For Handling Future Regulations
- Future Tie Into Red River Valley Water Supply Project
- Free Up Existing Well Capacity For Industry
- Potentially Lower Operation and Maintenance Costs
- Second Least Costly Alternative



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QUESTIONS?



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