

Town of Fromberg, Montana Wastewater System PER

Public Hearing
April 7, 2014



Preliminary Engineering Report (PER)

1. Evaluation of Existing System

- Compile Inventory and Assess Condition
- Evaluate Performance
- Identify Deficiencies

2. Alternative Development

- Determine All Possible Solutions During Alternative Screening
- Retain Viable Alternatives for Detailed Analysis

3. Selection of Preferred Alternative

4. Funding and Implementation Plan

Why?

- **July 18, 2008:** Violation Letter Following Compliance Inspection for Failure to Operate and Maintain System per Design Specifications
- **May 18, 2009:** DEQ Issued Notice of Violation and Administrative Compliance Order (Order)
- **January 13, 2012:** Order Changed to Administrative Order on Consent (Consent Order)
 - Waives Fines for Previous Violations
 - Compliance Plan and Schedule Negotiated with Town
 - Requires PER to Be Prepared

Consent Order Schedule

Major Milestone	Completion Date
Submit Preliminary Engineering Report	May 2, 2014
Submit Final Design of Upgrades to DEQ for Review	April 30, 2016
Completion of Construction of Upgrades	November 30, 2017
Achieve Compliance with Permit	May 31, 2018

Existing Wastewater System

Collection System

- Original Construction in 1961
- No Major Improvements Since
- Bridge Street
- Inflow and Infiltration (I&I)
 - Some Indications of Slow Inflow
 - Manholes Buried Over a Foot Deep and Located in Areas of Standing Water

Lift Station

- Original Pump House Replaced in 1990
- Wet Well with Two Submersible Pumps
 - Replaced in 2011 and 2013
 - Designed to Pump 300 gpm Against 20 Feet of TDH
 - Lift Station Calibration = 130 gpm and 145 gpm Average
 - Inappropriate Pumps?
- Controls Short Out & Outdated
- Emergency Generator Failed & Not Replaced

Treatment & Disposal

- Three-Cell, Facultative Lagoon
 - Cell 1 Constructed 1961
 - Cells 2 & 3 Added in 1990
- Designed to Discharge to Clarks Fork of the Yellowstone
 - Discharged One Time (\approx 4 Weeks June/July 2013) in Last 10 Years
 - Consent Order Cited Excessive Leakage & Required Leak Test

Leak Test

- Measured Inflow, Outflow, Precipitation, and Evaporation Over Three Week Periods
- Calculated Leakage
 - Cell 1 > 180"/year
 - Cell 2 > 18"/year
 - Cell 3 > 12"/year
- DEQ Allows 6"/year



General Permit – Interim Effluent Limits

Parameter	Units	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
5-Day Biological Oxygen Demand (BOD ₅)	mg/L	30	45	-
	lbs/day	16	24	-
	% removal	85	NA	-
Total Suspended Solids (TSS)	mg/L	30	45	-
	lbs/day	16	24	-
	% removal	85	NA	-
Total Residual Chlorine (TRC)	mg/L	0.011	-	0.019
pH	s.u.	6.0 - 9.0 (instantaneous)		

General Permit – Final Effluent Limits (Effective January 1, 2017)

Parameter	Units	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
5-Day Biological Oxygen Demand (BOD ₅)	mg/L	30	45	-
	lbs/day	16	24	-
	% removal	85	NA	-
Total Suspended Solids (TSS)	mg/L	30	45	-
	lbs/day	16	24	-
	% removal	85	NA	-
<i>E. coli</i> bacteria - summer ¹	cfu/100 mL	126	252	-
<i>E. coli</i> bacteria - winter ²	cfu/100 mL	630	1,260	-
Total Residual Chlorine (TRC)	mg/L	0.011	-	0.019
pH	s.u.	6.0 - 9.0 (instantaneous)		

¹ April 1 through October 31

² November 1 through March 31

MPDES Permit Analysis

- Expect in Future Permits:
 - Ammonia Limit of ≈ 20 mg/L
 - Nondegradation Load Limits for Total Nitrogen (TN) and Total Phosphorous (TP)
- Also Potential for:
 - TN Wasteload Allocation from Total Maximum Daily Limit (TMDL)
 - Copper Limit

Alternative Analysis

Collection System Alternatives

- C-1: No Action
- C-2: Video Inspection & Replacement Plan
 - Cleaning & TV Inspection of Entire System
 - Prioritize Any Damaged Sections & Develop Long-Term Capital Improvement Plan
- C-3: Replace Known Areas
 - Cleaning & TV Inspection of Entire System
 - Replace/Rehab Approximately 4 to 5 Blocks
 - Long-Term Plan for Remaining Sections

Collection System Cost Estimates

Alternative	Capital Cost (2016 dollars)	Increase to Annual O&M	20 year Life Cycle Cost
C-1: No Action	\$0	\$0	\$0
C-2: TV Inspection & Rehab Plan	\$59,000	\$(300)	\$53,961
C-3: Replace Known Areas	\$538,000	\$(682)	\$526,546

Lift Station Alternatives

- LS-1: Rehabilitate Existing Lift Station
 - More Appropriate Pumps
 - Trash Rack
 - New Controls & Backup Generator
 - Reuses Existing Wet Well

- LS-2: Replace Existing Station
 - Same as LS-1 but New Structure

Lift Station Cost Estimates

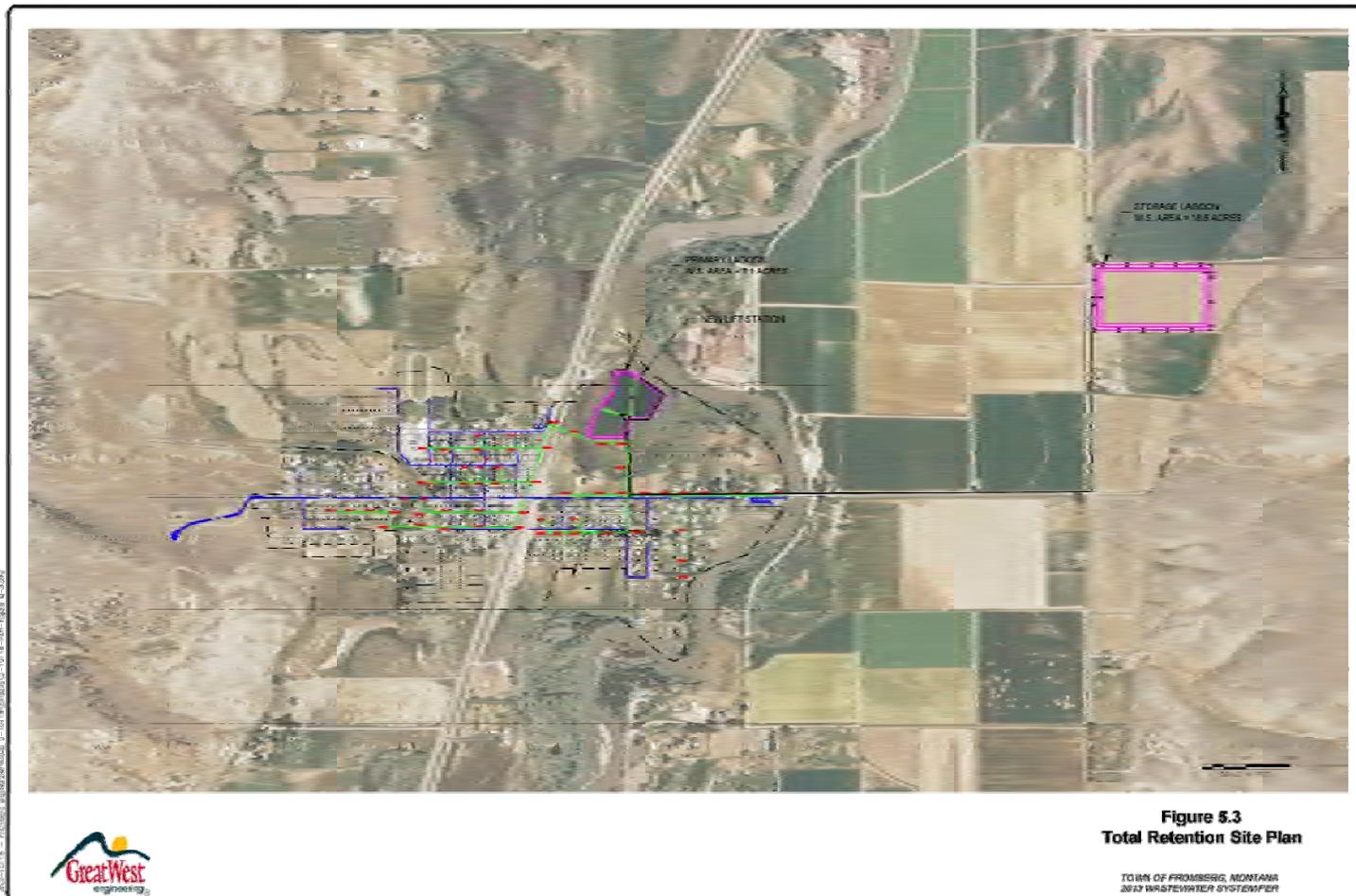
Alternative	Capital Cost (2016 dollars)	Increase to Annual O&M	20 year Life Cycle Cost
LS-1: Rehab Existing Lift Station	\$382,000	\$4,600	\$458,000
LS-2: Replace Existing Lift Station	\$431,000	\$4,600	\$507,000

Treatment and Disposal Alternatives

- **T-1:** Total Retention Lagoons
- **T-2a:** Facultative Lagoons & Land Application
- **T-2b:** Facultative Lagoons with UV & Land Application
- **T-3a:** Aerated Lagoons & Land Application
- **T-3b:** Aerated Lagoons with UV & Land Application
- **T-4:** Facultative Lagoons with SAGR & Continued Discharge
- **T-5:** Aerated Lagoons with SAGR & Continued Discharge
- **T-6:** Aerated Lagoons with LEMNA & Continued Discharge
- **T-7:** Aerated Lagoons with Poo Gloo & Continued Discharge

Treatment Alternative T-1

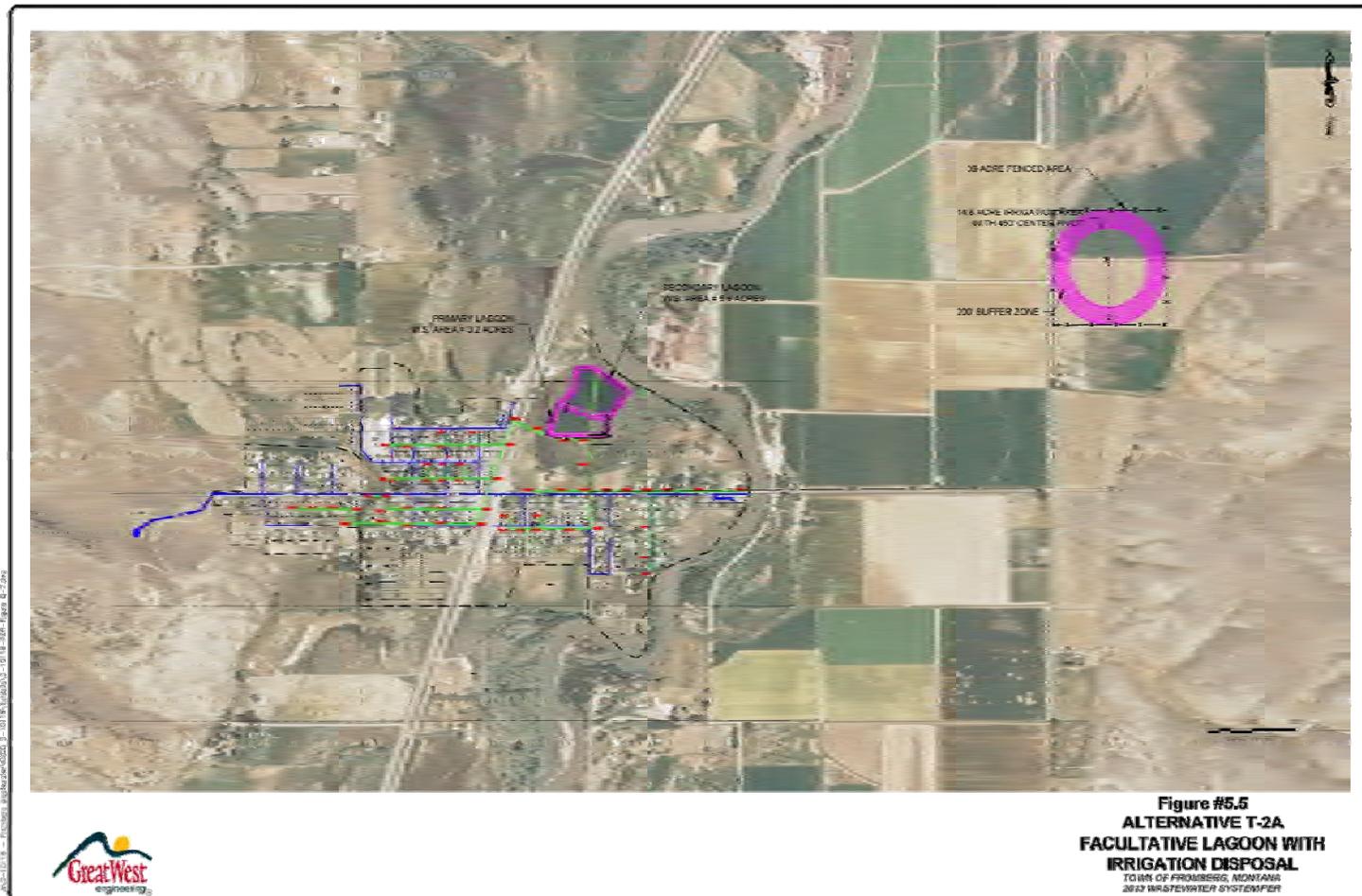
Total Retention



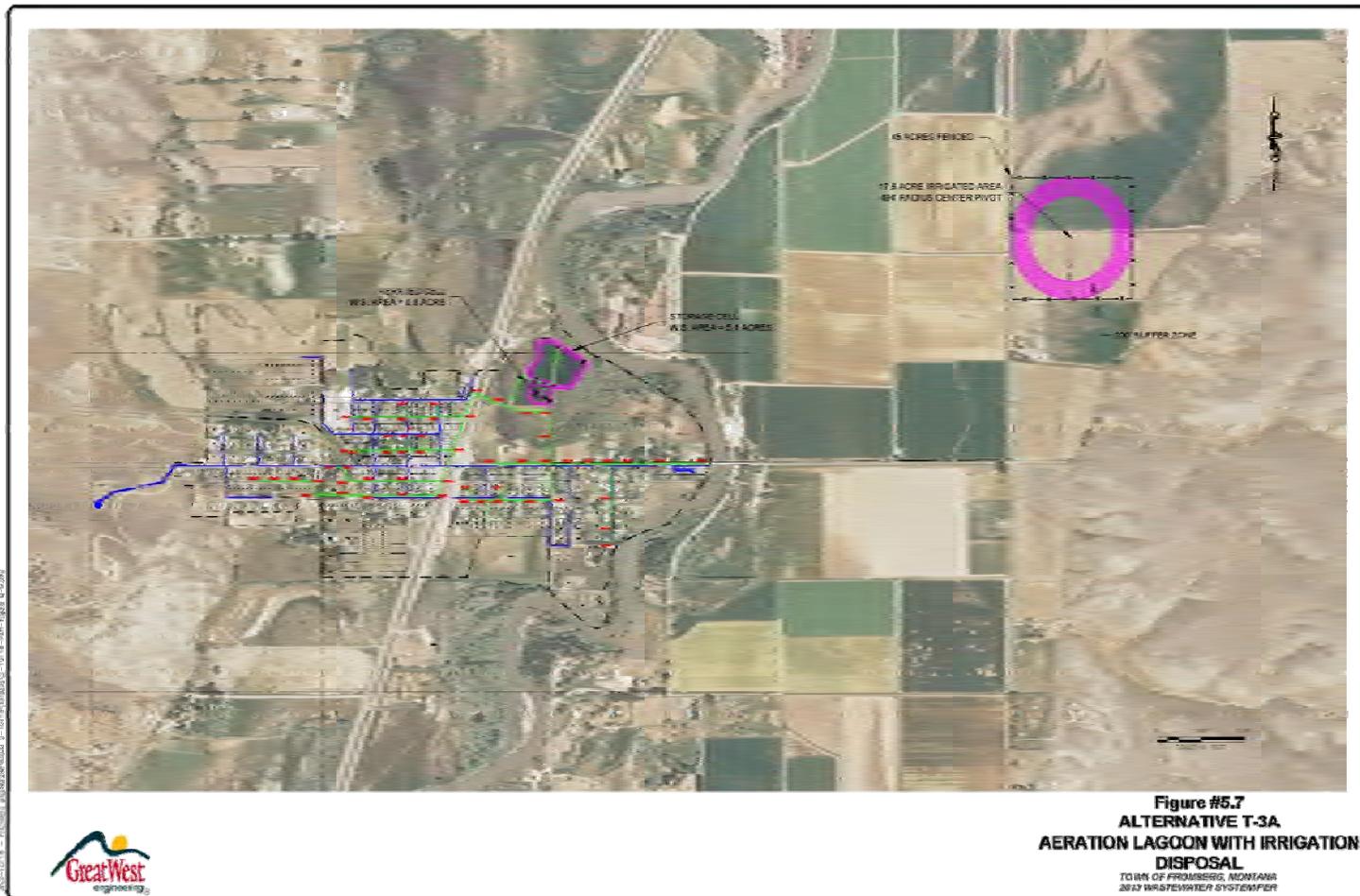
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Treatment Alternative T-2a Facultative & Irrigation



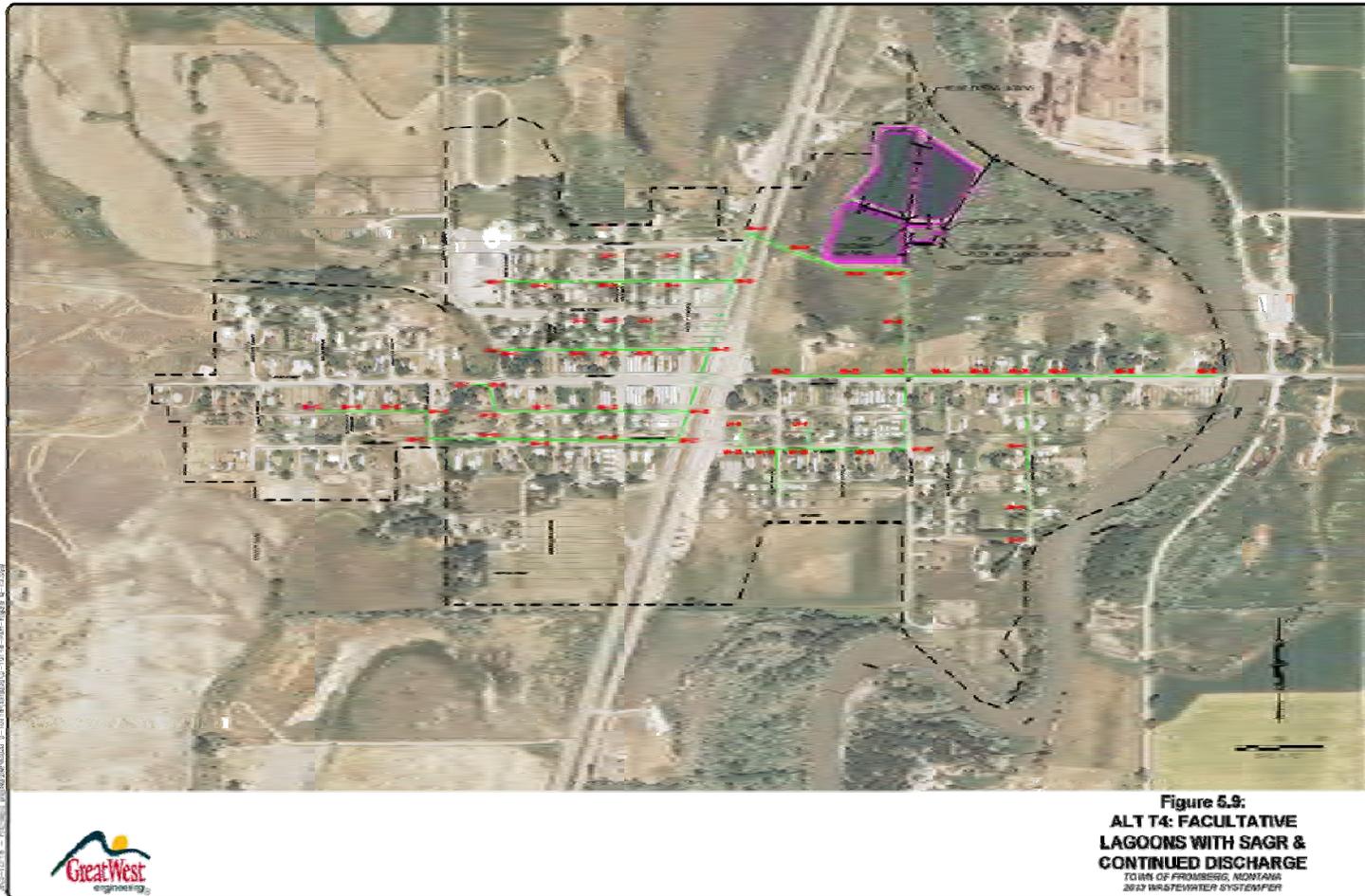
Treatment Alternative T-3a Aerated & Irrigation



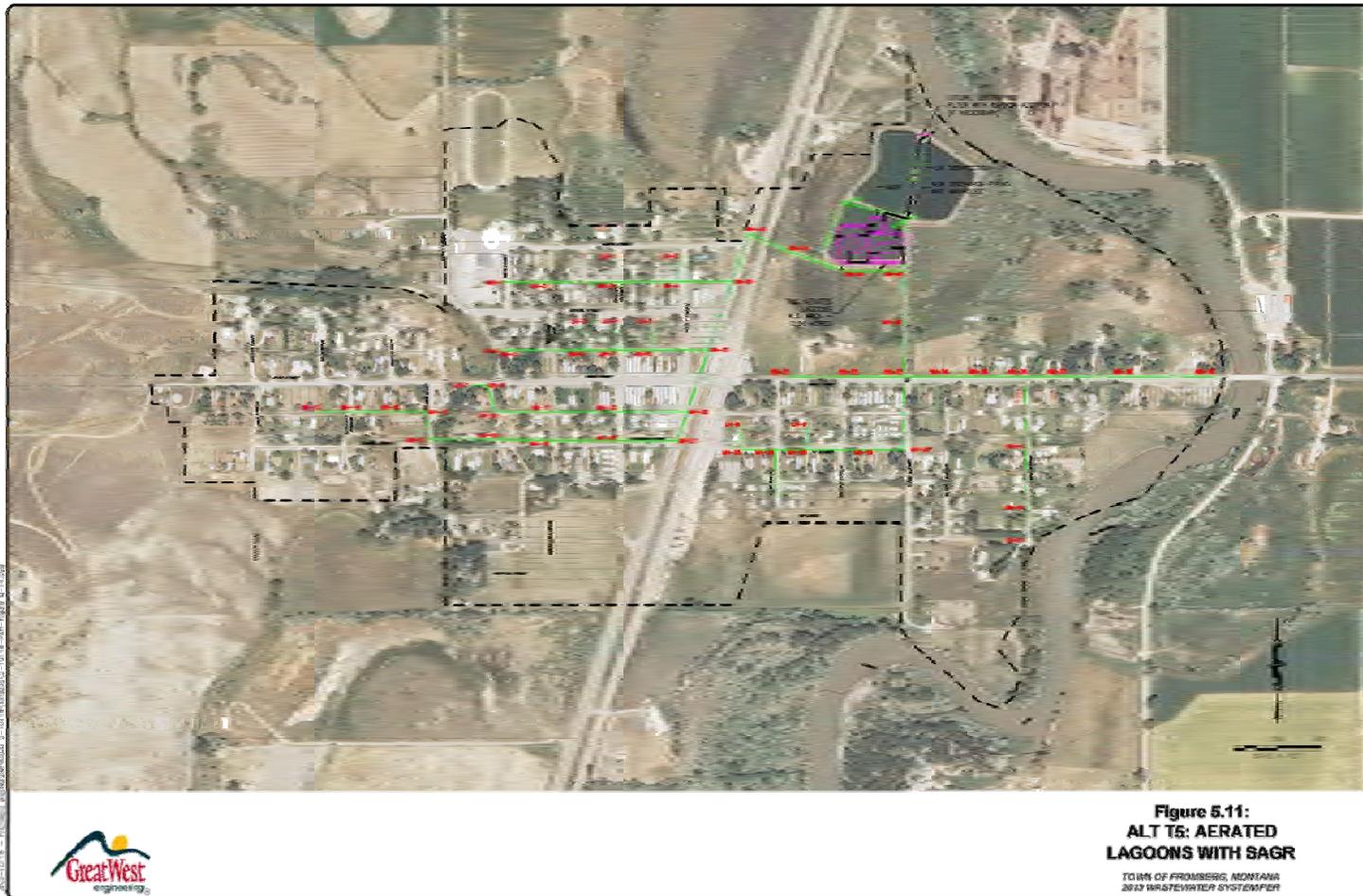
01/11/12 11:11 AM C:\Users\jgibson\Documents\2012 WWS System Plan\2012 WWS System Plan.dwg



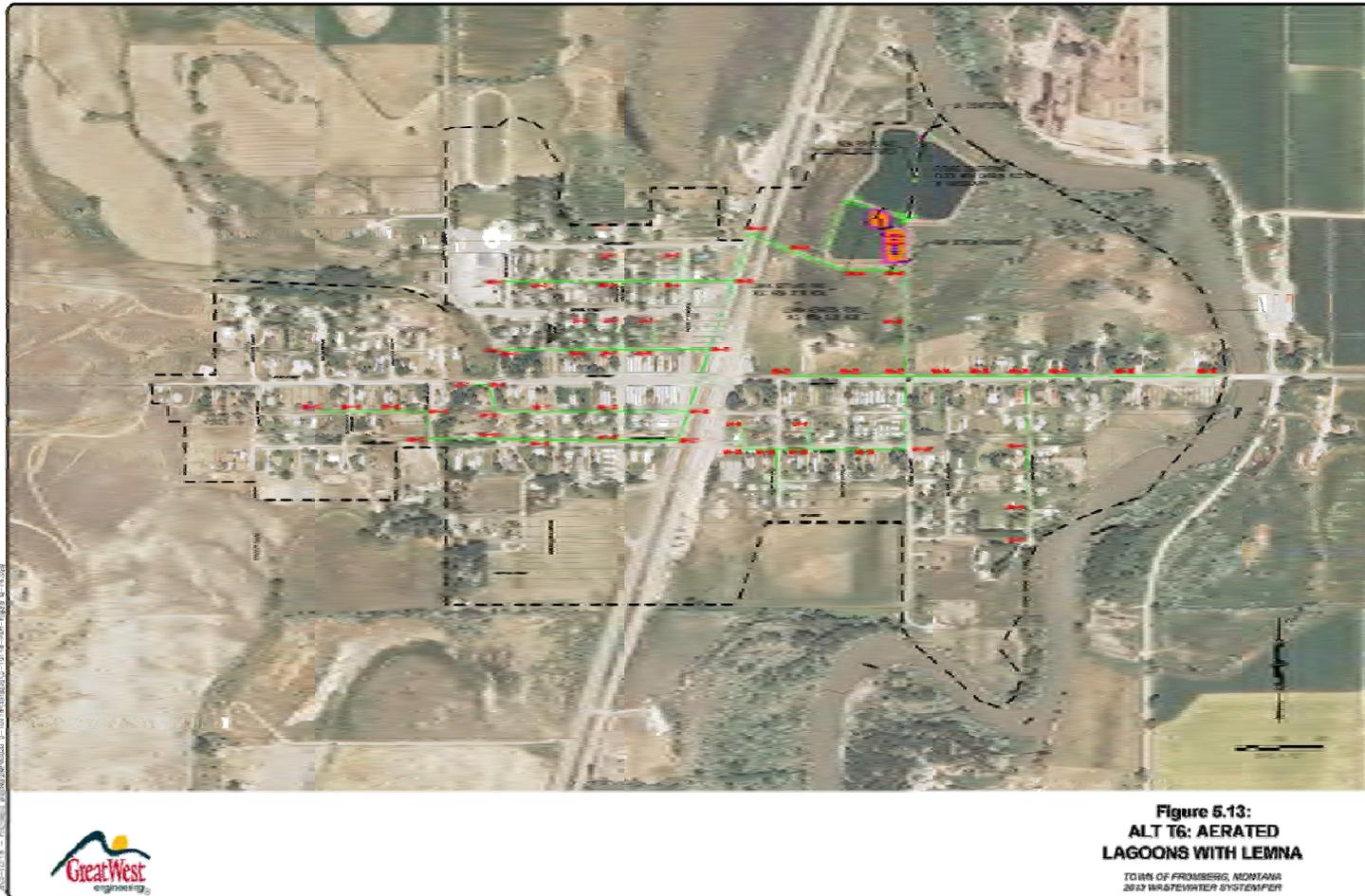
Treatment Alternative T-4 Facultative with SAGR & Discharge



Treatment Alternative T-5 Aerated with SAGR & Discharge



Treatment Alternative T-6 Aerated with LEMNA & Discharge



Treatment and Disposal Cost Estimates

Alternative	Capital Cost (2016 dollars)	Increase to Annual O&M	20 year Life Cycle Cost
T-1: Total Retention	\$6,827,000	\$5,400	\$6,916,000
T-2a: Facultative & Irrigation	\$3,386,000	\$(1,000)	\$3,371,000
T-2b: Facultative w/ UV & Irrigation	\$3,630,000	\$8,500	\$3,772,000
T-3a: Aerated & Irrigation	\$3,873,000	\$53,400	\$4,769,000
T-3b: Aerated with UV & Irrigation	\$4,109,000	\$51,700	\$4,977,000
T-4: Facultative w/ SAGR & Discharge	\$3,912,000	\$31,000	\$4,432,000
T-5: Aerated w/ SAGR & Discharge	\$2,760,000	\$40,600	\$3,441,000
T-6: Aerated w/ LEMNA & Discharge	\$2,775,000	\$112,800	\$4,668,000

Risk Assessment

- No Discharge
 - Low to No Risk
- Land Application
 - Low to Moderate Risk
 - Increased Monitoring & Enforcement of Treatment to Secondary Standards in Future
- Continued Discharge
 - Moderate to High Risk
 - Total Nitrogen Limit = Addition of Denitrifying Filter with Carbon Addition
 - Copper Limit = Corrosion Control on Water System (Best Case) to Ion Exchange on Effluent (Worst Case)

Decision Matrix

Alt.	Life Cycle Costs		Operation and Maintenance		Permitting		Social Impacts		Environmental Impacts		Sustainability Considerations		Public Health and Safety		Land Acquisition		TOTAL
	Weight:	10	Weight:	7	Weight:	4	Weight:	7	Weight:	5	Weight:	4	Weight:	10	Weight:	5	
	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	
Collection System																	
C-1	10.0	100	1	7	6	24	8	56	2	10	5	20	2	20	5	25	262
C-2	4.5	45	6	42	8	32	5	35	5	25	5	20	5	50	5	25	274
C-3	0.0	0	8	56	5	20	2	14	8	40	5	20	7	70	5	25	245
Lift Station Alternatives																	
LS-1	5.5	55	8	56	5	20	6	42	5	25	6	24	8	80	9	45	347
LS-2	4.5	45	8	56	5	20	5	35	5	25	6	24	8	80	9	45	330
Treatment System																	
T-1	2.4	24	8	56	8	32	3	21	4	20	7	28	5	50	3	15	246
T-2a	7.6	76	7	49	5	20	7	49	6	30	5	20	5	50	1	5	299
T-2b	6.7	67	6	42	5	20	6	42	6	30	4	16	8	80	3	15	312
T-3a	5.1	51	5	35	5	20	5	35	6	30	4	16	5	50	1	5	242
T-3b	4.8	48	4	28	5	20	5	35	6	30	3	12	8	80	3	15	268
T-4	5.6	56	4	28	2	8	5	35	5	25	3	12	8	80	4	20	264
T-5	7.4	74	3	21	2	8	7	49	5	25	3	12	8	80	7	35	304
T-6	5.2	52	3	21	3	12	5	35	5	25	2	8	8	80	7	35	268

It is important to note that the above scoring and weighting are subjective. Alternatives that score overall within 10 pts of each other may essentially hold the same degree of preference.

Funding Strategy and Implementation Plan

Potential Funding Sources



- **Treasure State Endowment Program (TSEP)**
 - Various Grant Amounts Available Depending on Rates vs. Target Rates
 - \$500,000 if Rates At or Exceed Target Rate
 - \$625,000 if Rates > 125% of Target Rate
 - \$750,000 if Rates > 150% of Target Rate
 - 50-50 Match Required
 - Cannot Exceed 50% of Project Costs
- **DNRC Renewable Resource Grant and Loan Program (RRGL)**
 - Up to \$125,000 for Public Facility Grants
 - Conserve, Manage, Develop, or Protect Renewable Resources
- **Community Development Block Grant (CDBG)**
 - Up to \$450,000 for Public Facility Grants
 - > 50% Low to Moderate Income (LMI)
 - User Rate Must Meet or Exceed Target Rate
- **Rural Development Grant (RD)**
 - Grant Eligibility Determined by Median Household Income (MHI)
 - Up to 75% of Project Costs grant eligible if MHI < \$38,206
 - Up to 45% of Project Costs grant eligible if \$38,206 < MHI < \$47,757
 - Remainder Low Interest Loan
 - Alleviate Health or Sanitation Concerns in Communities with Population Less Than 10,000



Funding Scenarios

ITEM	Alt. T-1: Total Retention	Alt. T-2b: Facultative w/ UV & Irrigation	Alt. T-5: Aerated w/ SAGR & Discharge
Collection Alternative - TV Inspection	\$ 59,000	\$ 59,000	\$ 59,000
Lift Station Alternative - Rehab Existing Station	\$ 382,000	\$ 382,000	\$ 382,000
Treatment Alternative	\$ 6,827,000	\$ 3,630,000	\$ 2,760,000
DEQ Approval & Interim Loan Costs	\$ 7,500	\$ 7,500	\$ 7,500
Rounded Total	\$ 7,276,000	\$ 4,079,000	\$ 3,209,000
TSEP Grant	\$ 750,000	\$ 750,000	\$ 750,000
DNRC Grant	\$ 125,000	\$ 125,000	\$ 125,000
CDBG Grant	\$ 450,000	\$ 450,000	\$ 450,000
Town Reserves	\$ 5,000	\$ 5,000	\$ 5,000
RD Grant (Assumed 45%)	\$ 2,675,700	\$ 1,237,050	\$ 845,550
RD Loan (Assumed 55%)	\$ 3,270,300	\$ 1,511,950	\$ 1,033,450
Total Project Funds	\$ 7,276,000	\$ 4,079,000	\$ 3,209,000
Total Loan Amount	\$ 3,270,300	\$ 1,511,950	\$ 1,033,450
Annual Loan Payment @ 2.5% Interest	\$ 130,276	\$ 60,230	\$ 41,169
Annual Loan Coverage	\$ 13,028	\$ 6,023	\$ 4,117
TOTAL ANNUAL DEBT SERVICE	\$143,304	\$66,253	\$45,286
User Capital Cost/Month	\$46.47	\$21.48	\$14.68
Current Annual O&M	\$ 41,525	\$ 41,525	\$ 41,525
Short Lived Assests	\$ 3,000	\$ 3,000	\$ 3,000
Additional O&M Due To Project	\$ 9,700	\$ 12,800	\$ 44,900
TOTAL ANNUAL O&M COSTS	\$54,225	\$57,325	\$89,425
User O&M Cost/Month	\$17.58	\$18.59	\$29.00
Estimated User Cost/Month/EDU After Project	\$ 64.05	\$ 40.07	\$ 43.68
Existing Average User Cost/Month/EDU	\$ 31.00	\$ 31.00	\$ 31.00
ESTIMATED COST INCREASE/MONTH/EDU	\$33.05	\$9.07	\$12.68
Existing Other System Cost/Month	\$ 50.10	\$ 50.10	\$ 50.10
Total Proposed Water & Sewer Cost/Month	\$ 114.15	\$ 90.17	\$ 93.78
Combined Systems Target Rate	\$ 58.91	\$ 58.91	\$ 58.91
PERCENT OF COMBINED TARGET RATE	193.8%	153.1%	159.2%

Potential Timeline

- Grant Applications
 - TSEP May 2, 2014
 - DNRC May 15, 2014
 - RD Open Application
 - CDBG (if eligible) March 2014
- Draft Rankings Fall 2014
- Award May 2015
- Complete Design February 2016
- Start Construction June 2016

Questions and/or Comments?

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