Comprehensive Wastewater Management Plan

Board of Public Works

Town of Dartmouth, MA

December 16, 2010

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CWMP Scope

- Review Prior Planning Efforts
- Assess Current Conditions
- Assess Future Conditions
- Wastewater Needs/Problem Identification
- Development/Evaluation of Alternatives
- Plan Selection
- Recommended Plan
- Public Participation

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Sources of Information

- Town of Dartmouth DPW
- Town of Dartmouth Board of Health
- 2007 Dartmouth Master Plan
- 1988 Town of Dartmouth Facilities Plan
- Dartmouth Water Plan
- MassGIS
- MassDEP
- NPDES Permit
- TR-16
- Previous Reports/Studies
- Federal/State/Local Regulations

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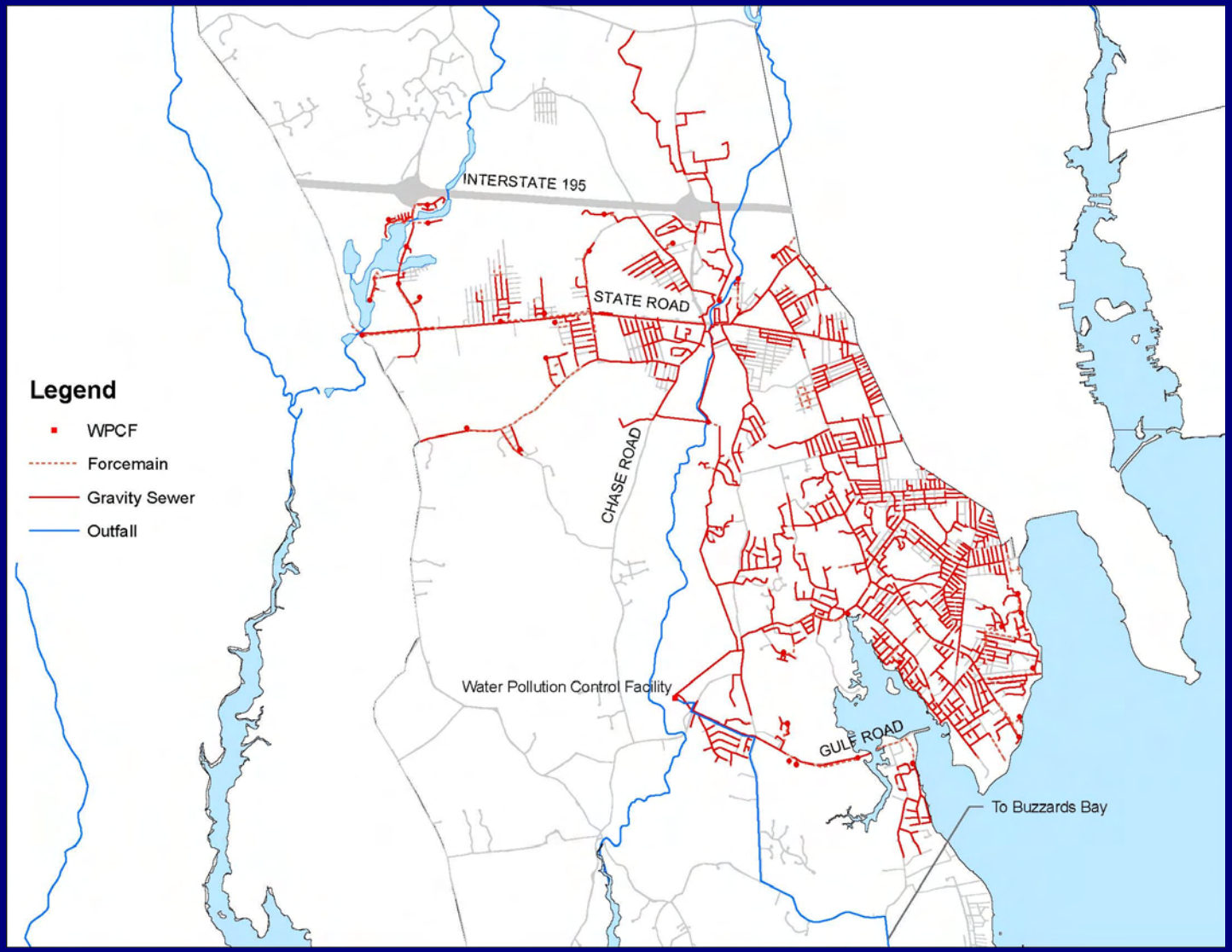
Wastewater Collection System Plan



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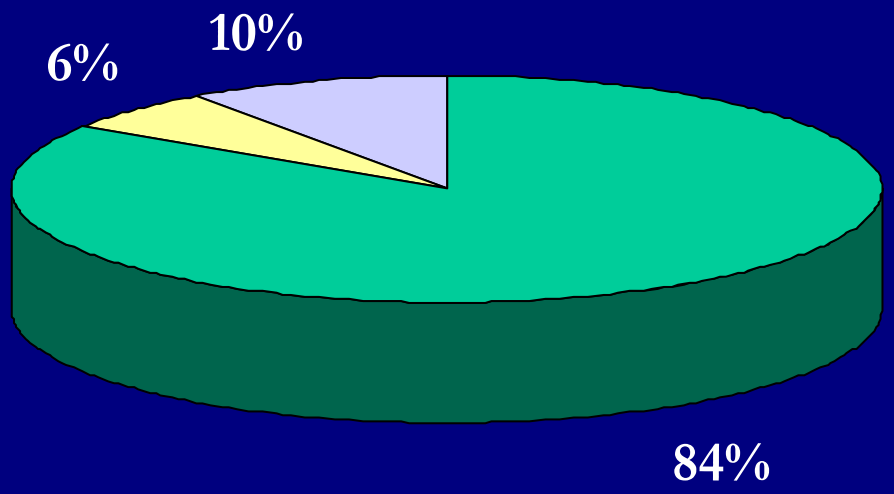
Wastewater Collection System

- Existing System
  - 22 Wastewater Pumping Stations
  - 124 mi Gravity Sewer
  - 3.3 mi Low Pressure Sewer
  - 41 mi Forcemain
  - 6.5 mi 30” Outfall to Buzzards Bay
  - 7,263 Sewer Accounts



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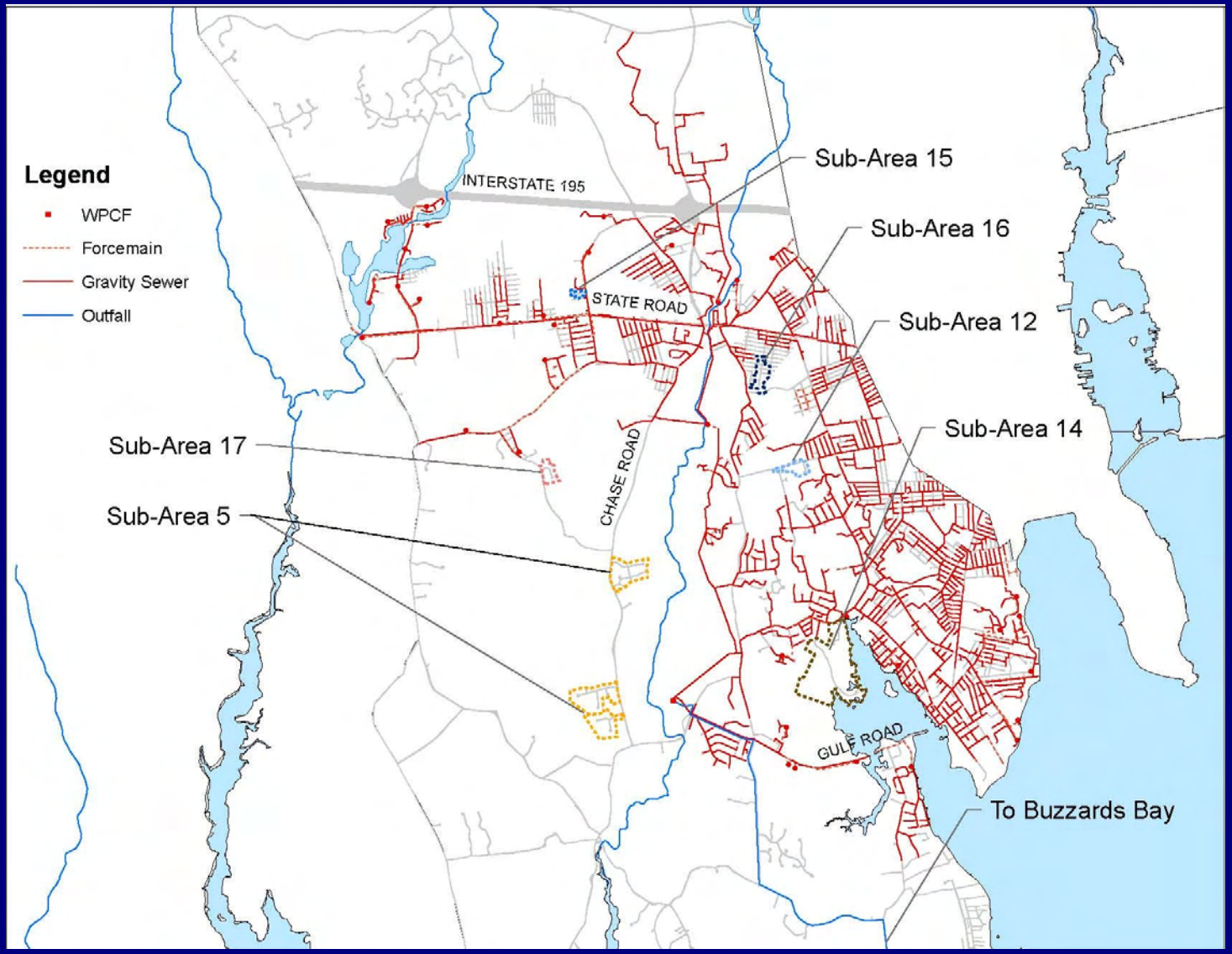
Wastewater Collection System and Needs Area Plan



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Onsite Wastewater Disposal

- Onsite Wastewater Disposal Findings
  - No new areas identified
  - Sub-Area 5: Chase Road Area. Previously identified from 1989 *Facilities Plan*.

Total Parcels	145
Developed Parcels	143
Developable Parcels	1
Average Parcel Size	0.8
Total Acres	117.7
Parcels Requiring Multiple Pumps a Year	7
Septic System Failures	3

  - Recommended for continued use of approved Title V systems

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Wastewater Collection System Needs Areas Identification

- Sub-Area 12: Allen and Plain Streets
- Sub-Area 14: Star of the Sea Drive and Cranberry Lane
- Sub-Area 15: Lasca Street
- Sub-Area 16: Ryder and Cliff Streets
- Sub-Area 17: Lucy Little and Strawberry Lane

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Wastewater Collection System Needs Area Summary

Description	Sub-Area 12	Sub-Area 14	Sub-Area 15	Sub-Area 16	Sub-Area 17
Developed Parcels	19	27	9	25	13
Developable Parcels	4	8	3	1	0
Total Parcels	23	35	12	26	13
Average Parcel Size (acres)	0.6	2.0	0.3	0.7	1.0
Flow Estimate (gpd)	5,200	8,000	2,700	5,900	2,950
Total Acres	13.9	180.2	3.8	18.3	13.6

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Wastewater Collection System Needs Area Summary (cont.)

Needs Area	Alternative Selected	Length (lf)
Sub-Area 12: Allen and Plain Streets	Gravity Sewer	2,000
Sub-Area 14: Star of the Sea Drive and Cranberry Lane	Gravity Sewer LPS	2,000 3,900
Sub-Area 15: Lasca Street	LPS	590
Sub-Area 16: Ryder and Cliff Streets	Gravity Sewer	2,440
Sub-Area 17: Lucy Little and Strawberry Lane	Gravity Sewer/LPS	2,025

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Wastewater Collection System Needs Area Summary (cont.)

Needs Area	Capital Cost
Sub-Area 12: Allen and Plain Streets	$540,000
Sub-Area 14: Star of the Sea Drive and Cranberry Lane	$1,510,000
Sub-Area 15: Lasca Street	$164,000
Sub-Area 16: Ryder and Cliff Streets	$646,000
Sub-Area 17: Lucy Little and Strawberry Lane	$546,000
Total Estimated Capital Cost	$3,406,000

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Existing Condition Survey Results

- Four main stations (North, South, Faunce Corner and Clarence Street Pumping Stations) in need of repair/rehabilitation
- Example deficiencies found
  - Deteriorating structural components
  - Damaged and corroded process and HVAC equipment
  - Old and/or failing pump control systems
  - Corroded conduits and wiring
  - Roof replacements

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Existing Conditions Survey Results

- Four main stations (North, South, Faunce Corner and Clarence Street Pumping Stations)

Pumping Station	Cost	
	Short Term	Intermediate Term
North Main	$422,750	$61,000
South Main	$212,750	$30,000
Faunce Corner Road	$180,000	$110,000
Clarence Street	$124,000	$11,000
Remaining Pumping Stations	$2,000	-
Total	$728,750	$182,000

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Water Pollution Control Facility

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Water Pollution Control Facility

- Original facility built and operated since 1970.
- Upgrades started in 1989 and completed 1992
  - Current Average Daily Flow: 3.07 mgd
  - Permitted Design Flow: 4.2 mgd
  - Max. Daily Design Flow: 8.88 mgd
  - Peak Design Flow 10.33 mgd

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Water Pollution Control Facility

- NPDES Discharge Permit
  - Permit renewed August 19, 2009
  - Permit changes include reduced Fecal Coliform limits
    - Previous average monthly 200 PFU/100mL and 400 PFU/mL Geometric Mean
      - New 14 PFU/mL Geometric Mean and Max. Day 28 PFU/100mL
    - Introduced new Enterococci limits
      - 35 PFU/mL Geometric Mean and Max. Day 276 PFU/100mL

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Current and Projected Wastewater Flows

Year	Present ADF (MGD)	Future ADF yr 2030 (MGD)
2006	3.18	
2007	2.82	
2008	3.13	
2009	3.32	
2010	2.91	
Average	3.07	3.27

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Treatment Issues

- WPCF Existing Conditions Survey
- WPCF Performance Evaluation
- Odor Control
- NPDES Permit Compliance
  - Present
  - Future
- Residuals Management Alternatives

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Existing Condition Survey

- WPCF Inspected
- Systems evaluated:
  - Structural
  - Architectural
  - Mechanical/HVAC
  - Plumbing
  - Electrical/instrumentation

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Existing Condition Survey

- Evaluation was performed based on condition, age, operability, maintenance requirements, code compliance and projected future use
- Corrective measures were evaluated on the following basis:
  - Short term 0-5 years
  - Intermediate term 5-10 years
  - Long term 10-20 years
- Cost estimates were developed for corrective measures

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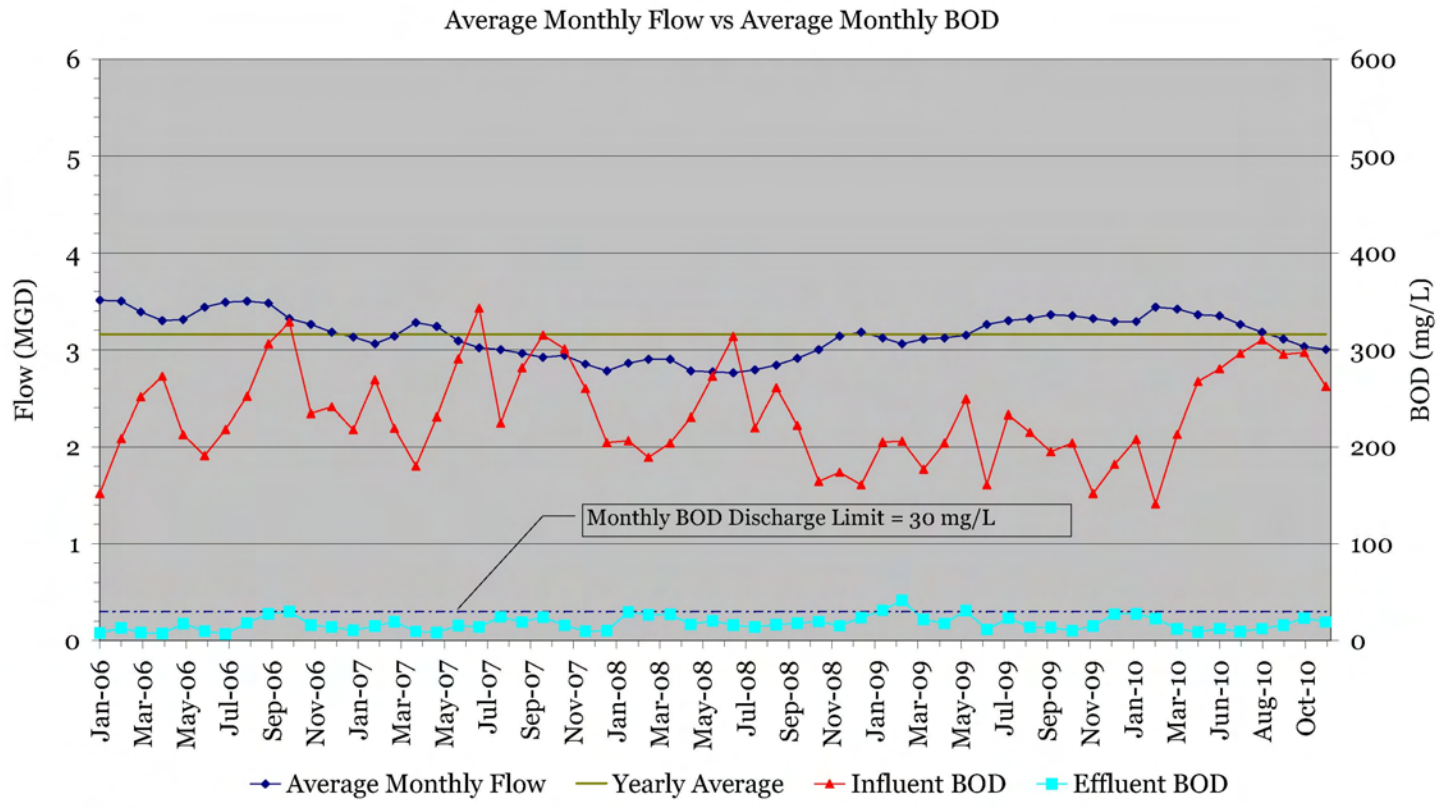
Facility Performance Evaluation



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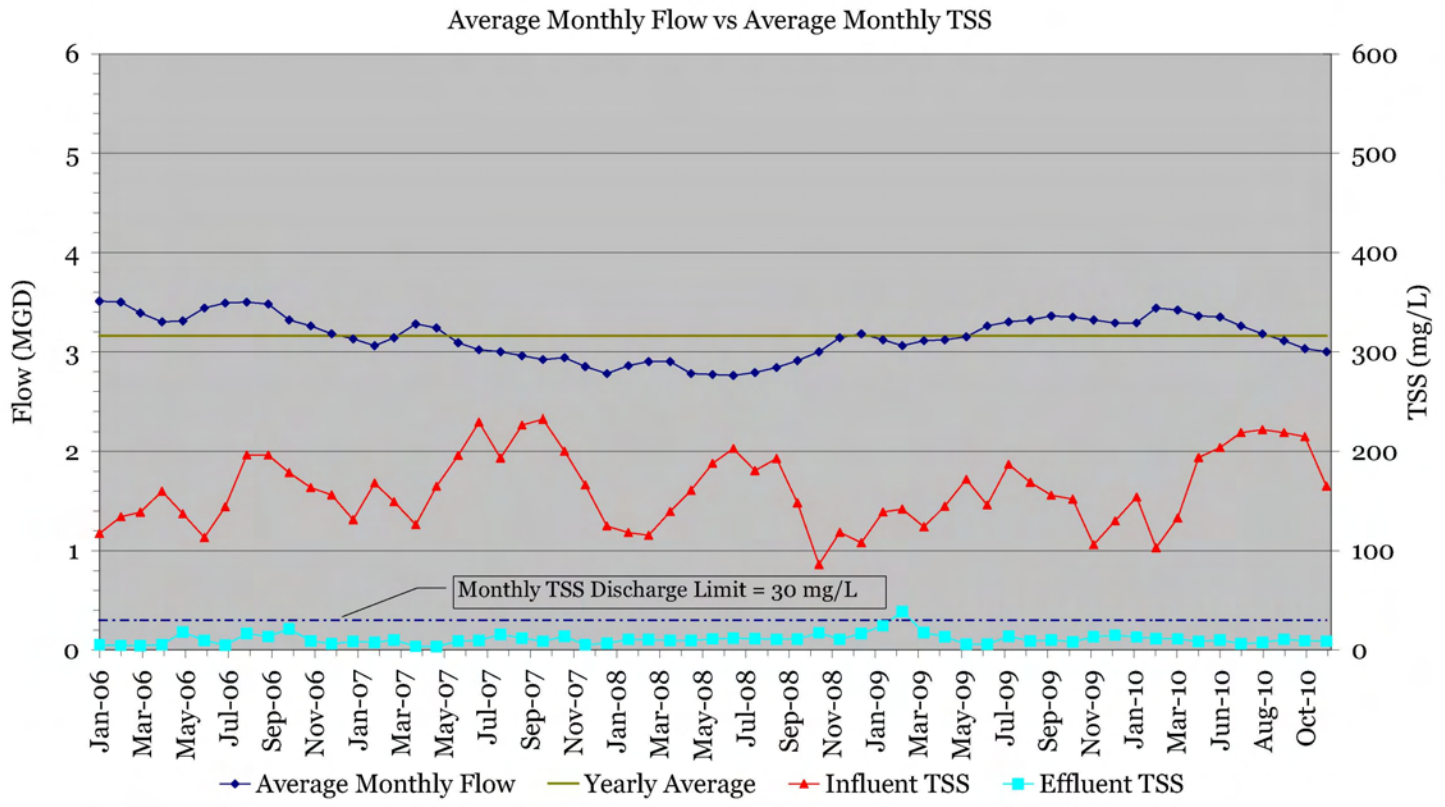
Facility Performance Evaluation



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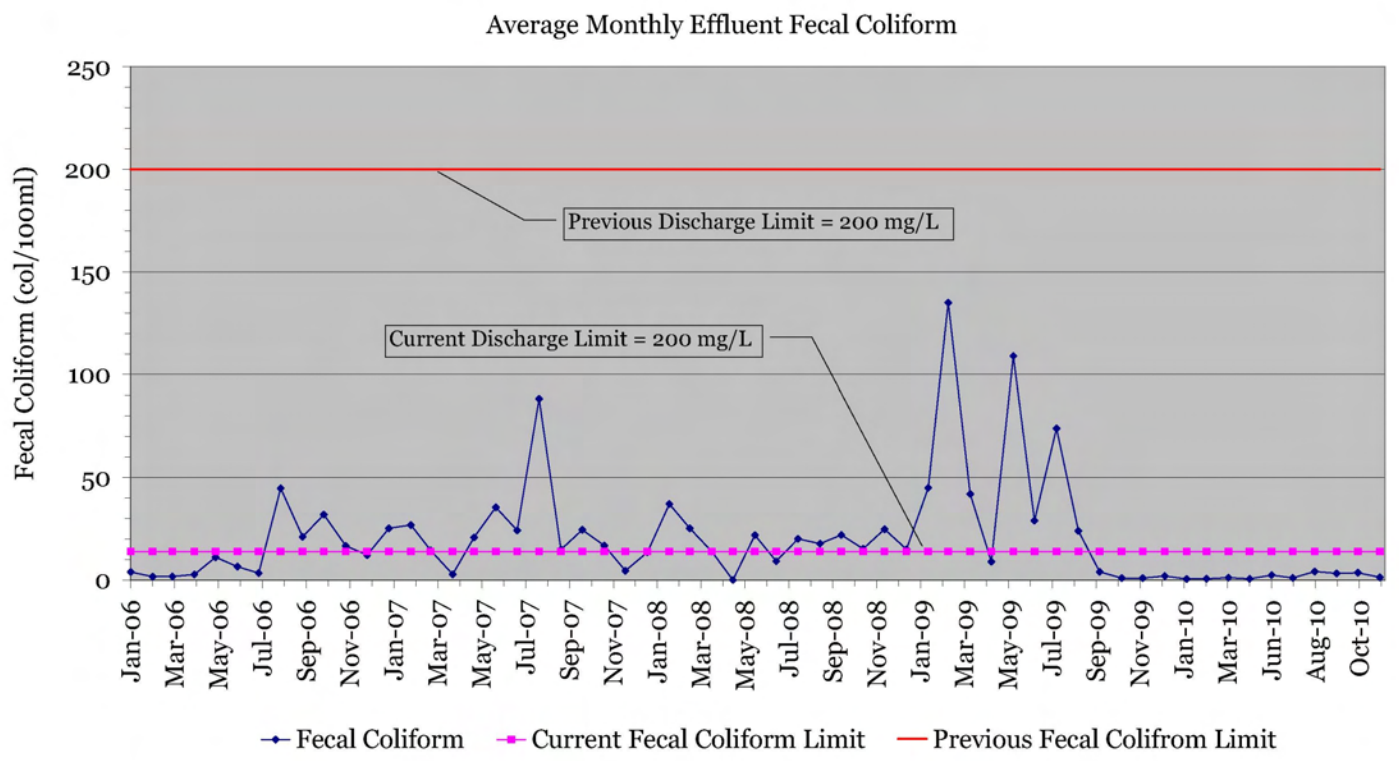
Facility Performance Evaluation



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Facility Performance Summary

- Adequate capacity for hydraulic loads
- Adequate capacity for BOD, TSS loads
- Needs upgrade to consistently comply with fecal coliform density
- Potential future TN concentration discharge limit

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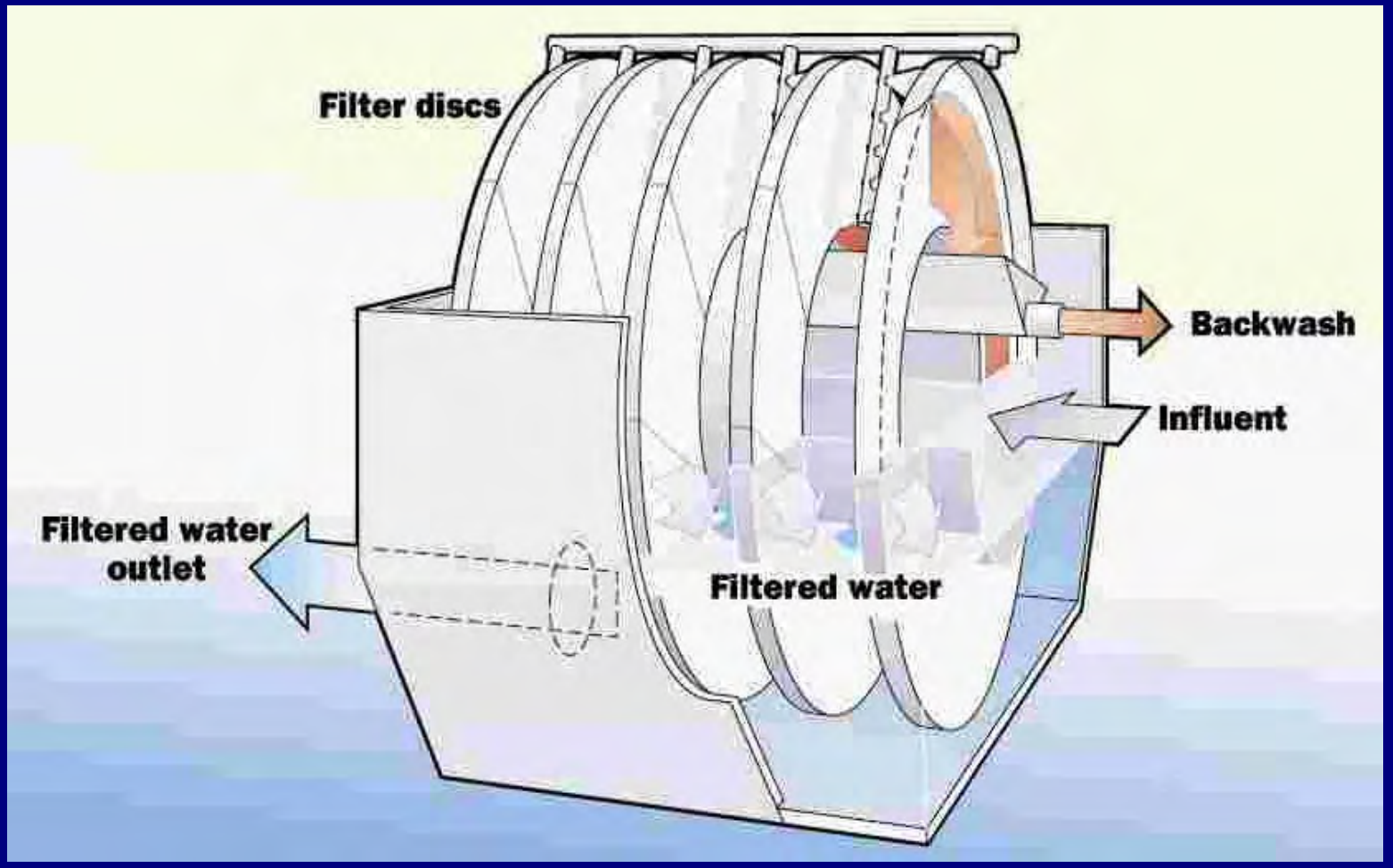
Facility Evaluation Summary
Disk Filtration



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Facility Evaluation Summary
Disk Filtration

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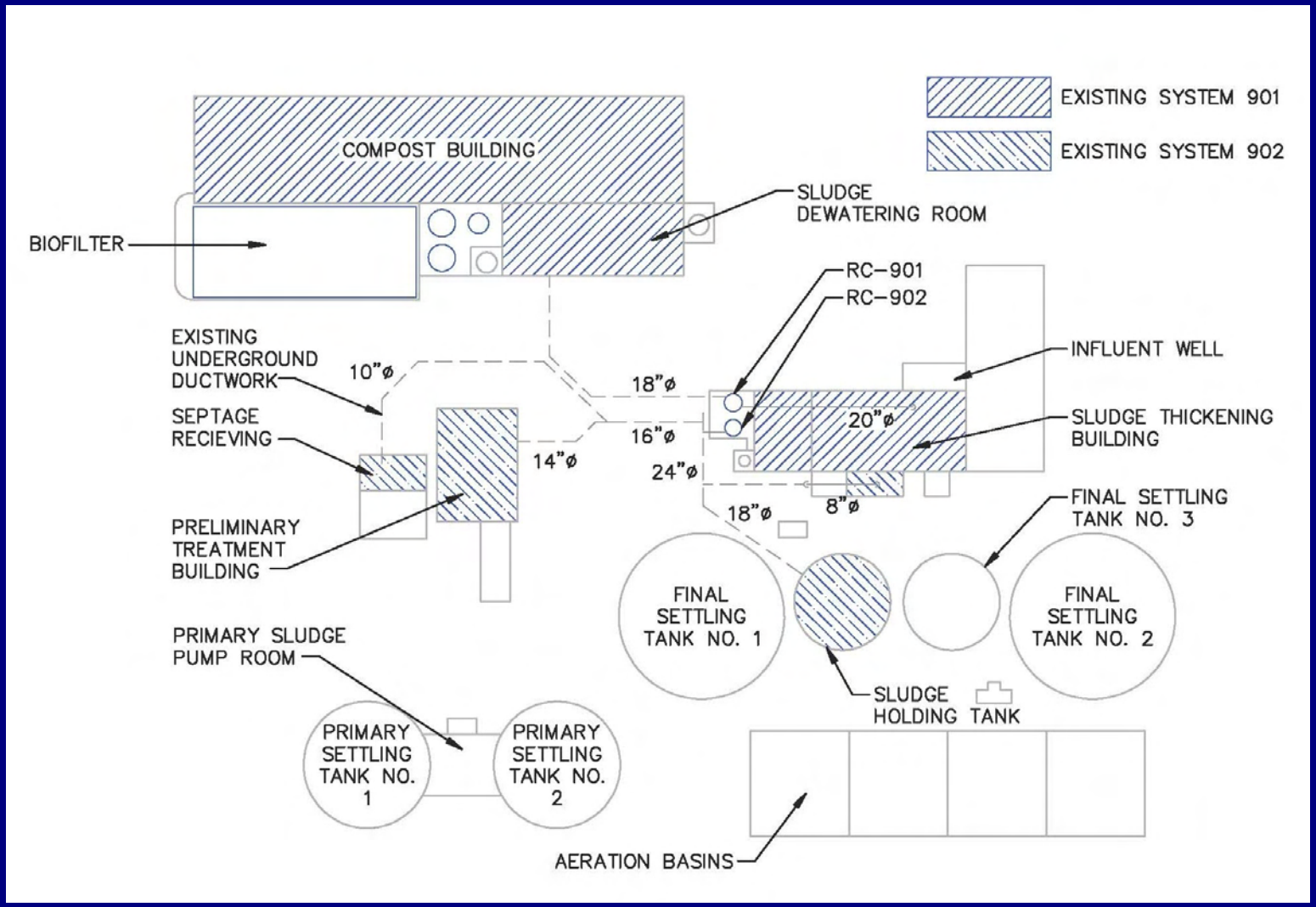
Existing Odor Control Systems



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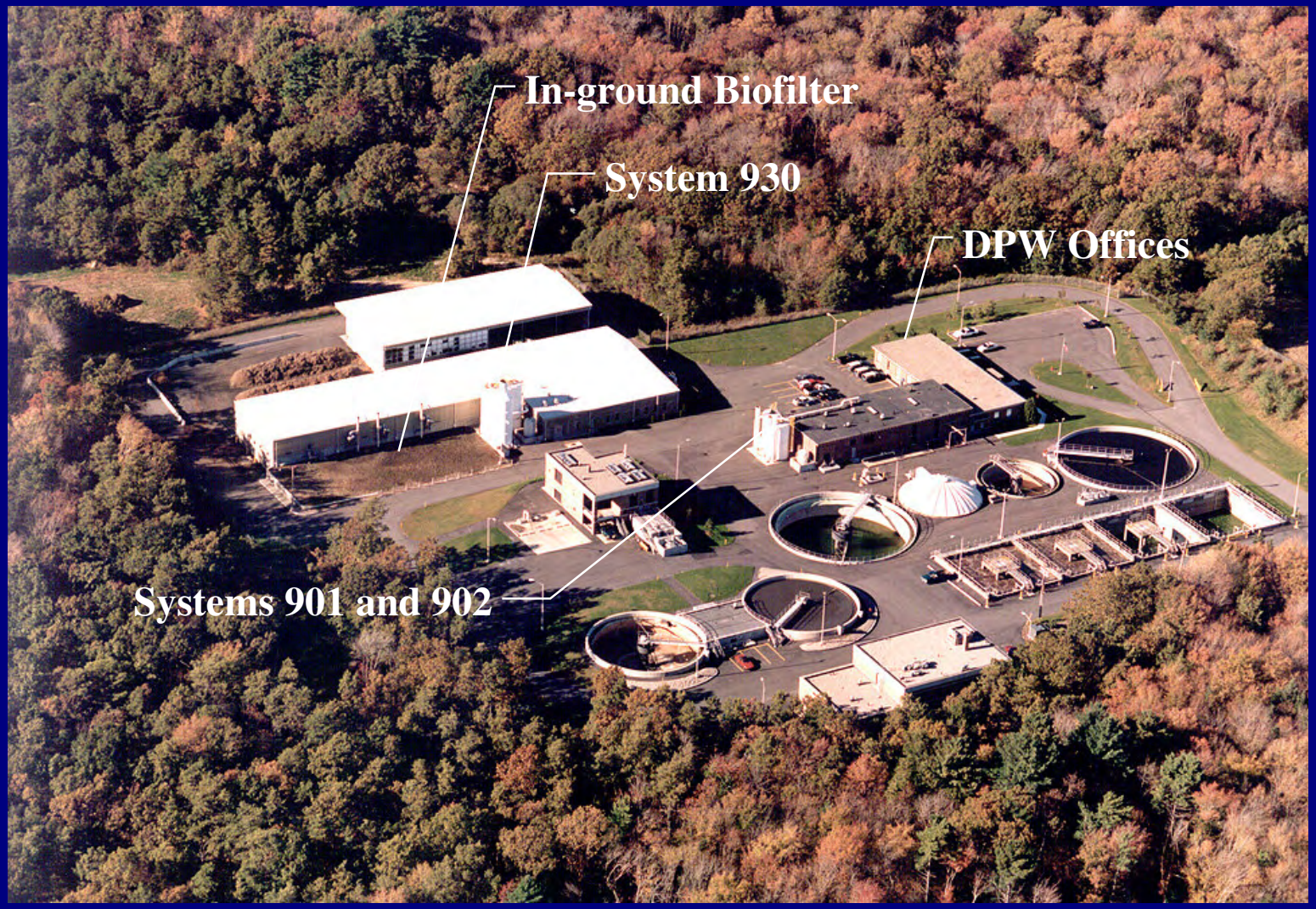
Existing Odor Control Systems



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Proposed Odor Control Systems

- Existing in-ground Biofilter and System 930 are operating satisfactorily. No proposed changes
- Propose covering primary settling tanks
- Combined Odorous air from the following process to be treated:
  - Influent wet well
  - Preliminary Treatment (Headworks)
  - Primary settling tanks
  - Septage receiving facility
  - Thickened WAS storage tanks
  - Residuals thickening room
  - Residuals Dewatering room

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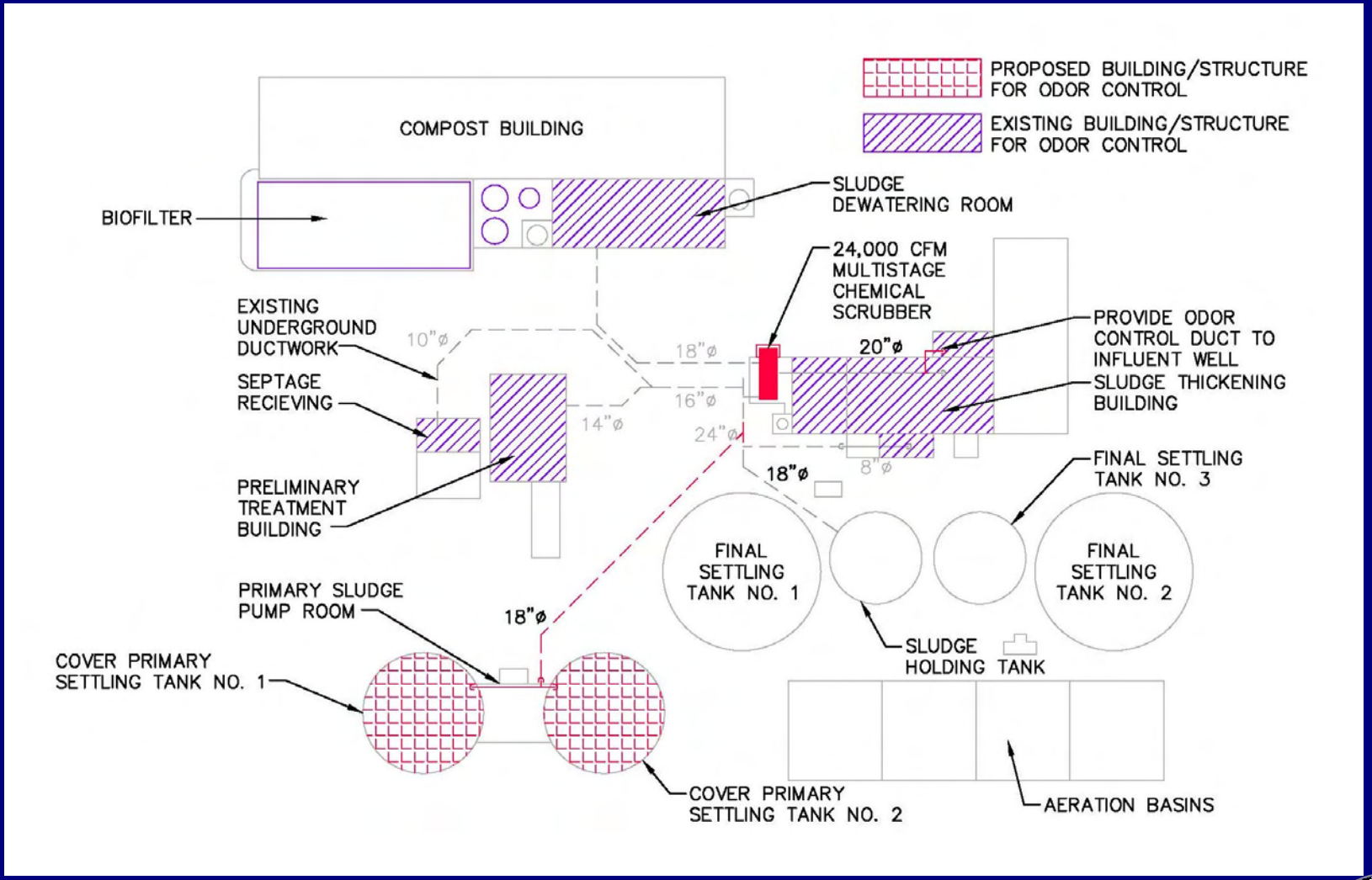
Proposed Odor Control



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Proposed Odor Treatment

- Design air flow rate of 24,000 cfm
- Odor control systems evaluated included the following:
  - Alt. No. 1 - Multistage chemical packed bed scrubber
  - Alt. No. 2 - Single-stage chemical packed bed scrubber
  - Alt. No. 3 - Pre-engineered Biofilter
  - Alt. No. 4 – Carbon adsorption unit

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Odor Control Alternatives Summary Table

Alternative Number	Description	Cost		
		Capital	O&M	Present Worth
1	Multistage chemical packed bed scrubber	$1,945,000	$87,500	$3,036,000
2	Single-stage chemical packed bed scrubber	$1,735,000	$92,000	$2,871,000
3	Pre-engineered biofilter	$1,934,000	$87,000	$3,017,000
4	Carbon adsorption unit	$1,939,000	$86,500	$3,017,000

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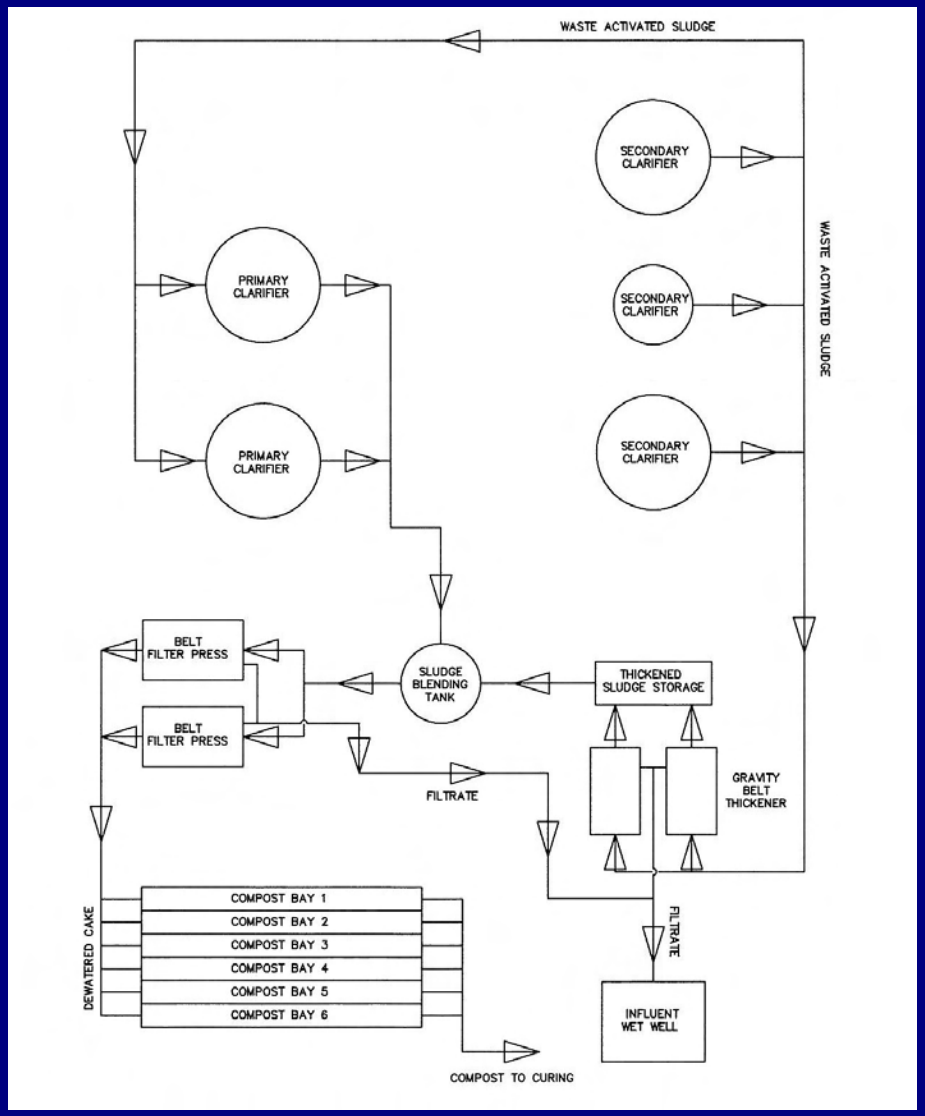
Existing Residuals Management Diagram



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Residuals Management Summary Table

Alternative Number	Description	Cost		
		Capital	O&M	Present Worth
1	Gravity thicken with liquid sludge disposal	$300,000	$753,000	$9,383,000
2	Gravity belt thicken with liquid sludge disposal	$554,000	$568,000	$7,406,000
3	Belt filter press with dewatered sludge disposal	$1,177,000	$698,000	$9,599,000
4	Rotary press with dewatered sludge disposal	$2,116,000	$638,000	$9,820,000
5	Anaerobic digestion with dewatered sludge disposal	$9,932,000	$641,000	$19,797,000
6	Composting with Beneficial Reuse	$2,261,000	$333,000	$6,285,000

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Summary of Estimated Costs for Short Term Improvements

Description	Cost
Existing Conditions Survey Recommendations*	$4,418,000
NPDES Permit Compliance	$2,663,000
Upgrades to Odor Control	$1,945,000
I/I and SSES Program	$450,000
Total	$9,476,000

*Includes 20% Contractors OH&P and 35% Engineering and Contingency. Existing Conditions Survey recommendations include Pumping Station Cost

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