

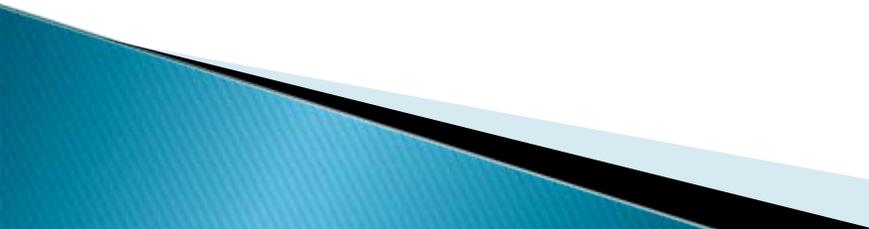
Using Asset Management Techniques in the Development of a Capital Program – A Case Study

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SRF Advisory Committee

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EVERGREEN–FARMINGTON SEWAGE DISPOSAL SYSTEM

- ▶ Collection system for 15 communities.
 - ▶ The system totals approximately 158 miles of sewer (8" to 8'-0")
 - ▶ 10 Lift Stations (1 cfs to 60 cfs).
 - ▶ System built in phases; first phase in the early 1960s.
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EFSDS RESERVE STUDY

Evergreen-Farmington SDS Recommended Reserve Calculation Summary		
(1) O&M reserve component is 35% of annual O&M.	Annual O&M FY 2006 \$31,334,175	\$10,966,961
(2) Planned capital asset replacement reserve component is 1% of total system value.	Total System Value 2007 \$197,497,972	\$1,974,980
(3) Emergency capital asset replacement reserve component is 5% of total system value.	Total System Value 2007 \$197,497,972	\$9,874,899
(4) Rate stabilization reserve component is 10% of annual O&M.	Annual O&M FY 2006 \$31,334,175	\$3,133,417
Total Recommended Reserve		\$25,950,257
Evergreen-Farmington SDS Existing Reserve Summary (12/31/2007)		
(1) Designated for Major Maintenance and Repair		\$5,000,000
(2) Designated for Repairs and Replacement		\$1,502,400
(3) Designated for System Operating Improvements		\$7,870,298
(4) Undesignated		\$5,579,766
Total Actual Reserve		\$19,952,464

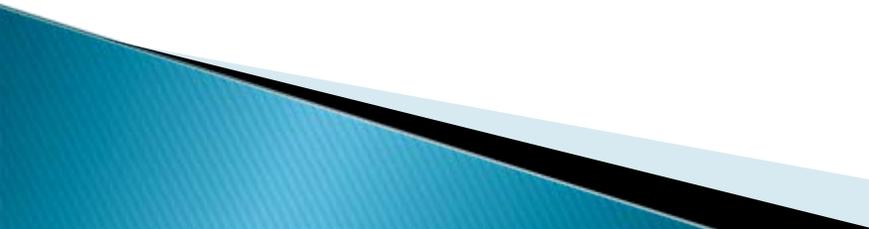
Next Steps:

Establish clearly defined and consistent reserve accounts across all sewage and water facilities

1) Emergency Repair and Replacement Reserve

- Unexpected event due to system failure or catastrophic event
- ~50% of FY operating and maintenance budget (less DWSD expense)
- Repair must be greater than \$20k
- Not considered normal operating expense
- Could be considered capital depending on the amount
- Not part of a planned project or program

2) Planned Capital Improvement Reserve

- Requires development and prioritization of a capital plan for each Fiscal Year
 - ~3% of original construction cost
 - Must meet capitalization threshold of \$20,000 or greater
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Next Steps:

3) Maintenance Reserve

- Used to minimize fluctuations of expenses not accounted for in the FY budget
- Expenses incurred on intervals greater than one year
 - e.g. sewer cleaning
- ~1.5% of operations and maintenance budget

4) Undesignated Reserve

- Offset costs associated with overflow events (Rates, labor, chemicals, etc.)
- ~20% of Operating Revenue

EFSDS Pump Station Evaluation

The Oakland County Water Resources Commissioner (OCWRC) undertook a project to develop a Capital Improvement Program (CIP) for ten pumping facilities in the Evergreen-Farmington Sewage Disposal System (EFSDS).

- Serve as the basis for EFSDS facilities
- Be a model for future evaluation of systems throughout the County.

Study Methodology



Business Risk Evaluation

The **CRITICALITY** of each **FACILITY** was evaluated using six criteria:

- ▶ Process – Is the facility “mission critical?” Would loss of the facility make it impossible to accomplish the mission (5) or would it have little or no impact (1)?
- ▶ Financial Impact – Would major damage/loss of the facility require borrowing and possible rate increases to pay for repair/replacement (5) or could the expense be absorbed in the normal budget (1)?
- ▶ Safety – Would loss of the facility pose danger to people sufficient enough to risk loss of life (5) or is there no immediate threat (1)?
- ▶ Environmental Impact – Would environmental impacts from loss of the facility lead to enforcement action (5) or would there be little or no impact (1)?
- ▶ Disruption to the Community – Would loss of the facility lead to major disruption in the community (flooding, etc.) (5) or would the community hardly notice (1)?
- ▶ Required Response Time – Would the nature of the facility require staff response to an incident within one-half hour (5) or could response be delayed for greater than eight hours (1)?

Business Risk Evaluation

The **CONDITION** of each **FACILITY** was evaluated using four criteria:

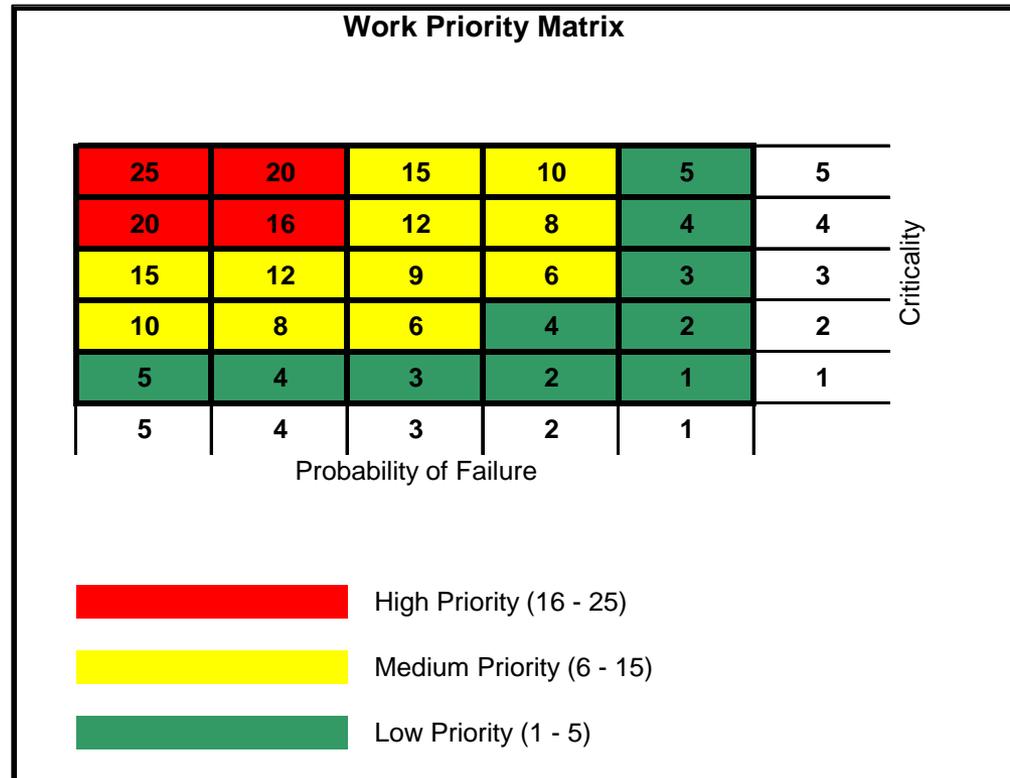
- ▶ Physical condition based on visual inspection – Visual inspection by maintenance practitioners can yield an overall condition assessment that is almost as reliable as predictive maintenance, especially when combined with other factors.
- ▶ Performance (ability to meet current needs) – Equipment that does not have sufficient capacity to meet current needs is likely to fail either because it is approaching its useful life or because it is over-stressed.
- ▶ O&M Protocols (Completeness of manuals, records and SOPs) – Experience shows that organizations that are copious with regard to maintenance records are applying a sufficient level of maintenance as to maximize useful life.
- ▶ Reliability (Unplanned maintenance as a percent of total maintenance) – If a piece of equipment is being repaired frequently, it is likely approaching failure

Business Risk Evaluation

ASSET RANKING

- ▶ The Business Risk Score for any given asset is derived by multiplying the condition score by the criticality score.

Business Risk Evaluation



Facility Ranking Results

Project: Evergreen Farmington Sewage Disposal System Asset Management			Date:	May 15, 2009	
#	Equipment Description	Asset ID	Criticality (C) (see back-up sheets) 1 = very low 5 = very high	Probability of Failure (P) (see back-up sheets) 1 = very low 5 = very high	Business Risk (BRE=PxCxR) 1 = very low 25 = very high
4	Walnut #3	PI 4	2.7	2.8	7.3
1	8 mile	PI 1	5.0	1.3	6.3
3	Walnut #2	PI 3	3.2	1.8	5.5
10	I-696	PI 10	2.8	1.8	5.0
7	Biddestone	PI 7	2.8	1.5	4.3
6	Drake	PI 6	2.8	1.3	3.5
5	Thornbrook	PI 5	2.3	1.5	3.5
8	Amy	PI 8	2.7	1.3	3.3
2	Walnut #1	PI 2	3.2	1.0	3.2
9	Morris Lake	PI 9	2.5	1.0	2.5

Business Risk Evaluation

RANKING OF EQUIPMENT

- ▶ The team identified all the components of each facility and ranked them for criticality and condition.
 - ▶ The **CRITICALITY** of a **PIECE OF EQUIPMENT** was weighed using the same criteria as was used for each facility.
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Business Risk Evaluation

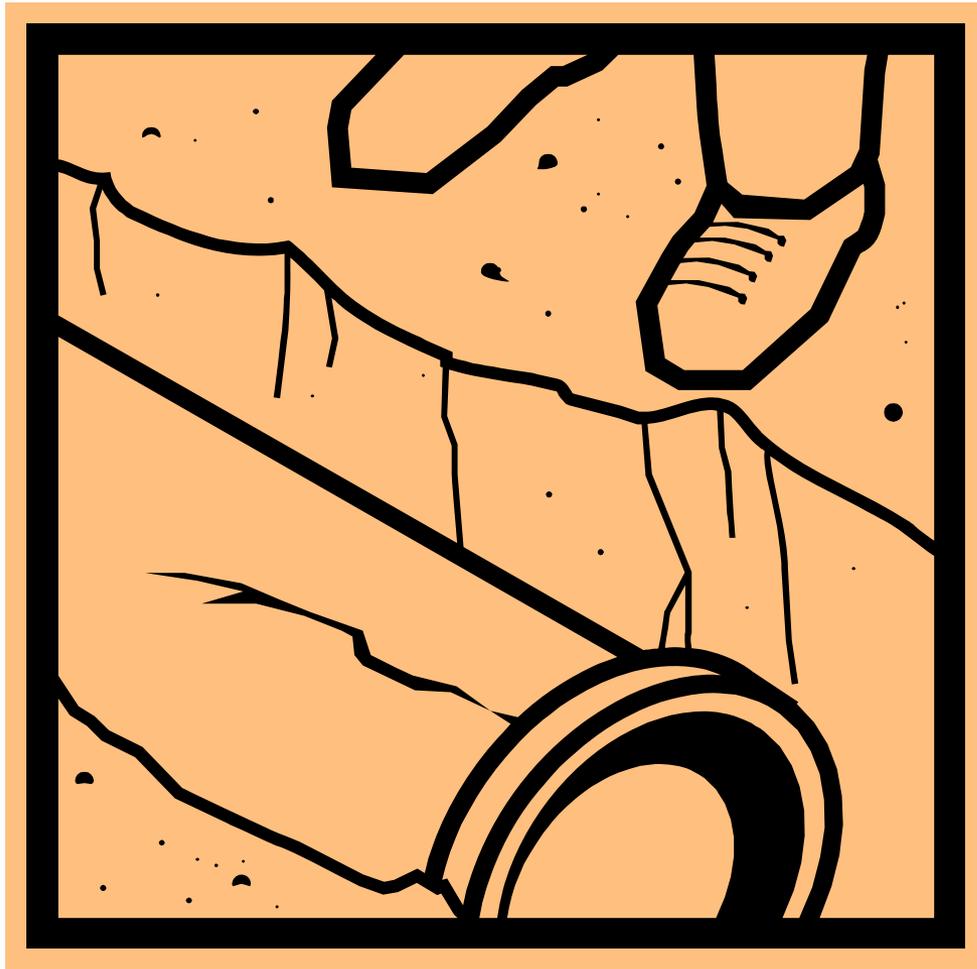
The **CONDITION** of each **PIECE OF EQUIPMENT** was evaluated using four criteria:

- ▶ Physical condition based on visual inspection – Visual inspection by maintenance practitioners can yield an overall condition assessment that is almost as reliable as predictive maintenance, especially when combined with other factors.
- ▶ Age factor – The team attempted to evaluate condition based on useful life. This was further divided into sub-categories based on whether the equipment was frequently operated major equipment, frequently operated minor equipment, rebuilt or reconditioned equipment, or infrequently operated.
- ▶ O&M Protocols (Completeness of manuals, records and SOPs) – Experience shows that organizations that are copious with regard to maintenance records are applying a sufficient level of maintenance as to maximize useful life.
- ▶ Repair history – A refinement on Reliability. Equipment that is frequently repaired is often deemed unreliable and becomes a candidate for replacement.
- ▶ Current Operational Status – Is the piece of equipment out of service and not repairable (5) or is it operating with no discernable problems (1)?

Business Risk Evaluation

Equipment Name:	Process Pump #1									
Asset ID	PI 1									
Date:	March 19, 2009									
Classify the equipment based on the following criteria					1					
Frequently Operated Major =					1					
Frequently Operated Minor =					2					
Frequently Operated rebuilt/reconditioned =					3					
Infrequently operated =					4					
Weighting Factor										
	↓									
		5 Very High		4 High		3 Moderate		2 Low		1 Very Low
Physical Condition (Based on visual inspection)	1	Very Poor (Condition Grade 5)		Poor (Condition Grade 4)		Fair (Condition Grade 3)		Good (Condition Grade 2)		Very Good (Condition Grade 1) x
Age Factor	1	Greater than 80% of useful life		Age between 60% and 80% of useful life		Age between 40% and 60% of useful life		Age between 20% and 40% of useful life		Age less than 20% of useful life x
O&M Protocols	1	None		Written/online, but not complete, not current or location unknown		Written/online, but not complete, not current or not easily accessible		Complete, written/online, current, but not easily accessible		Complete, written/online, current, and easily accessible x
Repair history	1	Very Poor (Repaired more than 15 times in the last 10 years)		Poor (Repaired 10 to 15 times in the last 10 years)		Moderate (Repaired 5 to 10 times in the last 10 years)		Good (Repaired 1 to 5 times in the last 10 years)		Very Good (Not repaired in the last 10 years) x
Current Operational Status	1	Not operational and not repairable		Operational but needs to be rebuilt or upgraded		Operational but needs some restoration		Operational with minimal problems		No operational problems x
Probability of Failure (P)					1.0	Very Low				

Works Equally Well With Pipe



Pipeline Assessment and Certification Program





3 Stages of Collapse

- ▶ STAGE 1 – An initial defect enables deterioration process to commence
- ▶ STAGE 2 – Deterioration process continues in and/or behind the sewer wall
- ▶ STAGE 3 – Collapse occurs due to weakened wall
- ▶ **Key to long pipe life is to prevent the creation of initial defects and minimize effects of deterioration factors**

Typical Structural Performance Grades

Grade 5 Major Defects that should be reviewed and prioritized for repair or reassessment

Grade 4 Significant Defects that will likely change over time and should be monitored

Grade 3 Moderate Defects but little change in condition expected

Grade 2 Minor Defects

Grade 1 Excellent structural condition

Equipment Ranking Results – Overall

Project: EFSDS Asset Management - Pumping Facilities			SUMMARY OF ALL ASSETS					Date: June 16, 2009		
#	Equipment Description	Location	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (Percent)	Redundancy Score (R) (Reduces (C)) 50% Red. by 50% 100% Red. by 90% 200% Red. by 98%	Criticality (C) (see back-up sheets) 1 = very low 6 = very high	Probability of Failure (P) (see back-up sheets) 1 = very low 6 = very high	Business Risk (BRE=PxCxR) 1 = very low 25 = very high
18	Safety (Wet Well)	Bulding ID: 8 Mile	1	1	0	0%	1.00	6.00	6.00	26.00
8	Pump Control Panel	Bulding ID: Biddestone	1	1	0	0%	1.00	6.00	6.00	26.00
8	Pump Control Panel	Bulding ID: I-696	1	1	0	0%	1.00	6.00	6.00	26.00
18	Safety (Lock out/Tag out)	Bulding ID: I-696	1	1	0	0%	1.00	6.00	6.00	26.00
8	Pump Control Panel	Bulding ID: Walnut #3	1	1	0	0%	1.00	6.00	6.00	26.00
7	Switchgear (Transfer Switch)	Bulding ID: 8 Mile	1	1	0	0%	1.00	6.00	3.11	18.66
18	Safety (Lock out/Tag out)	Bulding ID: Walnut #3	1	1	0	0%	1.00	6.00	3.00	16.00
14	Process Control (includes I&C)	Bulding ID: Drake	1	1	0	0%	1.00	2.83	6.00	14.17
14	Process Control (includes I&C)	Bulding ID: Thornbrook	1	1	0	0%	1.00	2.83	6.00	14.17
6	Generator	Bulding ID: Thornbrook	1	1	0	0%	1.00	2.67	6.00	13.33
8	Motor Control Center	Bulding ID: Drake	1	1	0	0%	1.00	2.60	6.00	12.60
8	Motor Control Center	Bulding ID: Walnut #2	1	1	0	0%	1.00	2.60	6.00	12.60
8	Motor Control Center	Bulding ID: Thornbrook	1	1	0	0%	1.00	2.33	6.00	11.67
1	Process Pump #1	Bulding ID: Walnut #3	1	1	0	0%	1.00	2.33	6.00	11.67
2	Process Pump #2	Bulding ID: Walnut #3	1	1	0	0%	1.00	2.33	6.00	11.67
14	Process Control (includes I&C and individual pump controllers)	Bulding ID: Amy	1	1	0	0%	1.00	2.00	6.00	10.00
11	Bar Screens	Bulding ID: 8 Mile	1	1	0	0%	1.00	2.17	3.60	7.80
10	Metering	Bulding ID: 8 Mile	1	1	0	0%	1.00	1.60	6.00	7.60
18	Safety (Move Control Panel to Grade)	Bulding ID: Biddestone	1	1	0	0%	1.00	6.00	1.40	7.00
15	Process Piping and Valves	Bulding ID: 8 Mile	1	1	0	0%	1.00	2.67	2.40	6.40
15	Process Piping and Valves	Bulding ID: Walnut #3	1	1	0	0%	1.00	2.83	2.00	5.67
15	Process Piping and Valves	Bulding ID: Morris Lake	1	1	0	0%	1.00	2.60	2.00	5.00
18	Safety	Bulding ID: Walnut #1	1	1	0	0%	1.00	6.00	1.00	6.00
15	Process Piping and Valves	Bulding ID: Thornbrook	1	1	0	0%	1.00	2.17	2.20	4.77
7	Disconnects and ATS	Bulding ID: Walnut #2	1	1	0	0%	1.00	3.33	1.40	4.67

Equipment Ranking Results – By Facility

			Date: March 19, 2009		
#	Equipment Description	Asset ID	Criticality (C) (see back-up sheets) 1 = very low 5 = very high	Probability of Failure (P) (see back-up sheets) 1 = very low 5 = very high	Business Risk (BRE=PxCxR) 1 = very low 25 = very high
Sta 4	Walnut #3	PI 4	2.67	2.75	7.33
8	Pump Control Panel	PI 8	5.00	5.00	25.00
18	Safety (Lock out/Tag out)	PI 18	5.00	3.00	15.00
1	Process Pump #1	PI 1	2.33	5.00	11.67
2	Process Pump #2	PI 2	2.33	5.00	11.67
15	Process Piping and Valves	PI 15	2.83	2.00	5.67
6	Generator	PI 6	2.67	1.00	2.67
7	Main disconnect and ATS	PI 7	2.50	1.00	2.50
13	Structural	PI 13	1.00	1.00	1.00

BRE Recommendations

Project	Location	Cost	Year 1	Year 2	Year 3	Year 4
Correct safety items in the wet well, including stair nosings, handrail, etc.	8 Mile	\$60,000	x			
Relocate controls from dry well to above grade at Biddestone	Biddestone	\$30,000	x			
Relocate controls from dry well to above grade at I-696	I-696	\$30,000	x			
Correct lack of lockout/tagout on electrical equipment at I-696	I-696	In above	x			
Relocate controls from dry well to above grade at Walnut Lake No. 3	Walnut #3	\$30,000	x			
Replace switch gear and ATS	8 Mile	\$100,000	x			
Correct Safety Lockout/tagout	Walnut #3	In above	x			
Process Control Panel	Drake	\$120,000	x			
Process Control Panel	Thornbrook	\$120,000	x			

EFSDS Pump Evaluation

EFSDS Pump Station CIP						
Site	Description	Amount (\$1,000)				
		FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
8 Mile	Upgrade Switchgear ATS	\$ 10				
8 Mile	Address Wet Well Safety Issues (stair nosings, hadnrail, piping)	\$ 50				
8 Mile	Metering Improvements	\$ 50				
Biddestone	Replace Process and Motor Controls	\$ 30				
I-696	Replace Process & Motor Controls; Address Lock-out / Tag-out	\$ 30				
Walnut # 3	Replace Process & Motor Controls; Address Lock-out / Tag-out	\$ 30				
Drake	Replace Process and Motor Controls		\$ 120			
Thornbrook	Replace Process and Motor Controls		\$ 60	\$ 60		
Thornbrook	Replace Generator			\$ 110		
Walnut # 2	Replace Motor Controls Only				\$ 90	
Amy	Replace Process Controls (I&C Only)				\$ 46	
Walnut # 3	Rebuild Pumps 1 and 2					\$ 40
Walnut # 2	Replace Knife Gate Valves and Heat Exchangers					\$ 24
8 Mile	Replace Bar Screen					\$ 65
8 Mile	Sandblast and Paint Pipe and Valves					\$ 12
	Total	\$ 200	\$ 180	\$ 170	\$ 136	\$ 141

WLN WWTP BRE

WLN WWTP Recommended Improvements from 2010 Master Plan			
Project #	Reserve Description	Project Description	Estimated Cost (2009 Dollars)
1	CIP	Security Camera Installation at Gate	\$10,000
2	CIP	Motion Sensor Installation	\$10,000
3	CIP	Provide secondary surge arrestors for each of the four (4) major Motor Control Centers (MCC-A, B, C and D)	\$20,000
4	CIP	Entrance Gate Replacement	\$30,000
5	CIP	Add DO monitoring/control for aeration	\$50,000
6	CIP	Construct an onsite vector disposal drying bed	\$50,000
7	CIP	PEW Tank Repairs	\$76,000
8	CIP	South Tank Painting	\$150,000
9	CIP	Replace Main Control System	\$120,000 - \$210,000
10	Major Maint	Repair gutter spill aprons on north side of Sludge Drying Bed. Seal joints + some minor work on curb transition.	\$3,000
11	Major Maint	Replace uneven sidewalk flags between influent pump station and filter building	\$5,000
12	Major Maint	Replace uneven/broken sidewalks at treatment Tank #1	\$5,000
13	Major Maint	Replace uneven/broken sidewalks at Treatment Tank #2	\$5,000
14	Major Maint	Replace seal water piping & pressure gauges for influent pumps	\$8,000
15	Major Maint	Replace uneven/broken sidewalks at Treatment Tank #3	\$8,000
16	Major Maint	Repair concrete deck around bar screen	\$10,000
17	Major Maint	Repair leaks in wall/floor causing water on floor in tunnel of filter	\$10,000
18	Major Maint	Repair other leak in concrete wall in tunnel of filter building	\$10,000
19	Major Maint	Repair non-OSHA steps and transitions on interior decking and address other decking issues such as loose plates or wide gaps on East Treatment Tank steps/platforms	\$10,000
20	Major Maint	Replace uneven sidewalk near flow Splitting Structure	\$10,000

WLN Lift Station BRE

WLN SDS Lift Station Recommended Improvements from 2010 Master Plan			
Project #	Reserve Description	Project Description	Estimated Cost (2009 Dollars)
1	CIP	Austin Drive Station - replace single phase pumps w/ three	\$7,500
2	CIP	Decker Road - replace Main Control Panel and Switchgear	\$35,000
3	CIP	Delta Station - replace Main Control Panel and Switchgear at Delta Station	\$35,000
4	CIP	Ladd Road - Replace Main Control Panel and Switchgear	\$35,000
5	CIP	South Commerce - Replace Main Control Panel and	\$35,000
6	CIP	Chateau Novi - replace Main Control Panel and Switchgear	\$42,000
7	CIP	Austin Drive - Replace Main Control Panel and Switchgear (including VFDs for phase conversion)	\$55,000
8	Major Maint	Austin Drive - correct pavement heaving	\$2,500
9	Major Maint	Delta Station -correct pavement heaving near top slab at Delta Station	\$2,500
10	Major Maint	Perform cathodic protection survey at 6 stations	\$9,000
11	Major Maint	Austin Drive - blast and repaint can/piping	\$15,000
12	Major Maint	Chateau Novi - blast and repaint can/piping	\$15,000
13	Major Maint	Decker Road - Blast and repaint can/piping	\$15,000
14	Major Maint	Add cathodic protection systems if recommended by study (\$7,500/station)	\$0 - \$45,000

WLN WWTP CIP

WLN WWTP Short Term Improvement Plan (FY 2010 - FY 2014)									
Project #	Reserve Description	Project Description	Comments	Estimated Cost (2009 Dollars)	FY 2010 (\$1,000)	FY 2011 (\$1,000)	FY 2012 (\$1,000)	FY 2013 (\$1,000)	FY 2014 (\$1,000)
3,9,30,33	CIP	Electric and Control Improvements	Improvements include: electric system automatic switching upgrades, replacement of corroded conduits, secondary surge protection for major MCCs and replacement of main control system. Further evaluation needed for development of a detailed	\$300,000	\$125	\$175			
6	CIP	Construct an onsite vector disposal drying bed / abandon sand beds	CVT survey needed to determine feasibility, by evaluating if user fees can offset construction, operations and maintenance costs of this project.	\$50,000			\$50		
7	CIP	PEW Tank Repairs	Bid with South Tank Painting project below.	\$76,000			\$76		
8	CIP	South Tank Painting	Bid with PEW Tank Repair project above.	\$150,000				\$150	
5	CIP	Add DO monitoring/control for aeration		\$50,000					\$50
1,2,4	CIP	Security Improvements	Includes new security camera, new motion sensor and entrance gate replacement. Additional scope to be determined by review of COT WWTP security	\$50,000					\$50
Total CIP				\$676,000	\$125	\$175	\$126	\$150	\$100
n/a	Major Maint	Repair Grit Classifier		\$15,000	\$15				
27	Major Maint	Replace leaky roof and warped decking of administration building, pump station building and blower building.		\$30,000	\$30				
20	Major Maint	Replace uneven sidewalk and steps near flow Splitting		\$10,000	\$10				
16	Major Maint	Repair concrete deck around bar screen		\$10,000	\$10				
n/a	Major Maint	Structural evaluation of influent pump station		\$10,000	\$10				
12,13,15	Major Maint	Concrete sidewalk replacement	Coordinate with lift station concrete repairs, FY 2010 concrete repairs and other FY 2011 concrete repairs.	\$18,000		\$18			
10	Major Maint	Repair gutter spill aprons on north side of Sludge Drying Bed. Seal joints + some minor work on curb transition.	Coordinate with lift station concrete repairs, FY 2010 concrete repairs and other FY 2011 concrete repairs.	\$3,000		\$3			
11	Major Maint	Replace uneven sidewalk flags between influent pump station and filter building	Coordinate with lift station concrete repairs, FY 2010 concrete repairs and other FY 2011 concrete repairs.	\$5,000		\$5			

WLN WWTP CIP (continued)

17	Major Maint	Repair leaks in wall/floor causing water on floor in tunnel of filter building		\$10,000		\$10				
18	Major Maint	Repair other leak in concrete wall in tunnel of filter building		\$10,000		\$10				
21	Major Maint	Repair/Replace asphalt paving problems around the Filter and Blower Buildings		\$10,000		\$10				
19	Major Maint	Repair non-OSHA steps and transitions on interior decking and address other decking issues such as loose plates or wide gaps on East Treatment Tank steps/platforms		\$10,000			\$10			
23	Major Maint	Correct HVAC so that it provides positive draft in lower level of influent pump station		\$20,000			\$20			
24	Major Maint	Coat walls in influent pump station wet well to stop surface deterioration		\$20,000				\$20		
26	Major Maint	Inject efflorescent cracks (400-500 LF) on wall with flexible material on West Treatment Tank		\$20,000				\$20		
22	Major Maint	Relocate water lines that run above electrical panels in influent pump station		\$15,000					\$15	
25	Major Maint	Relocate water pipes that run over electrical panels in filter building		\$20,000					\$20	
Total Major Maint				\$236,000		\$75	\$56	\$30	\$40	\$35
WLN WWTP Capacity Recommendations										
Project #	Reserve Description	Project Description	Comments	Estimated Cost (2009 Dollars)						
81	CIP	Replace Tertiary Filters for increased treatment capacity (Contingent Improvement)		\$750,000						
82	CIP	Upsize piping between grit chamber and secondary treatment units to increase hydraulic capacity (Contingent Improvement)		\$750,000						
n/a	CIP	New Equalization Tank Evaluation		n/a						

WLN Lift Station CIP

WLN SDS Lift Station Short Term Improvement Plan (FY 2010 - FY 2014)

Project #	Reserve Description	Project Description	Comments	Estimated Cost (2009 Dollars)	FY 2010 (\$1,000)	FY 2011 (\$1,000)	FY 2012 (\$1,000)	FY 2013 (\$1,000)	FY 2014 (\$1,000)
1,7,18	CIP	Austin Drive - Replace Main Control Panel, Level Control and Switchgear (including VFDs for phase conversion); replace single phase pumps w/ 3 phase	The need to relocate the control panel above grade has been reviewed and is not recommended. Estimate adjusted accordingly.	\$55,000	\$40	\$15			
6,18	CIP	Chateau Novi - Replace Main Control Panel, Level Control and Switchgear	The need to relocate the control panel above grade has been reviewed and is not recommended. Estimate adjusted accordingly.	\$42,000		\$42			
2,18	CIP	Decker Road - Replace Main Control Panel, Level Control and Switchgear	The need to relocate the control panel above grade has been reviewed and is not recommended. Estimate adjusted accordingly.	\$35,000			\$35		
3,18	CIP	Delta Station - Replace Main Control Panel, Level Control and Switchgear at Delta Station	The need to relocate the control panel above grade has been reviewed and is not recommended. Estimate adjusted accordingly.	\$35,000				\$35	
4,18	CIP	Ladd Road - Replace Main Control Panel, Level Control and Switchgear	The need to relocate the control panel above grade has been reviewed and is not recommended. Estimate adjusted accordingly.	\$35,000					\$35
5,18	CIP	South Commerce - Replace Main Control Panel, Level Control and Switchgear	The need to relocate the control panel above grade has been reviewed and is not recommended. Estimate adjusted accordingly.	\$35,000					\$35
Total CIP				\$237,000	\$40	\$57	\$35	\$35	\$70
8	Major Maint	Austin Drive - correct pavement heaving	Coordinate with WWTP concrete repairs and other FY 2011 concrete repairs.	\$2,000		\$2			
9	Major Maint	Delta Station -correct pavement heaving near top slab at Delta Station	Coordinate with WWTP concrete repairs and other FY 2011 concrete repairs.	\$2,000		\$2			
19	Major Maint	Decker Road - Repair/Replace wetwell top slab	Coordinate with WWTP concrete repairs and other FY 2011 concrete repairs.	\$3,000		\$3			
Total Major Maint				\$7,000	\$0	\$7	\$0	\$0	\$0

Advantages of this Approach

- ▶ Simple
 - ▶ Systematic
 - ▶ Easily Explained
- 

Equipment Ranking Results – Overall

Project: EFSDS Asset Management - Pumping Facilities			SUMMARY OF ALL ASSETS					Date: June 16, 2009		
#	Equipment Description	Location	Average number of units in service	Total Number of units	Redundancy (Number)	Redundancy (Percent)	Redundancy Score (R) (Reduces (C)) 50% Red. by 50% 100% Red. by 90% 200% Red. by 98%	Criticality (C) (see back-up sheets) 1 = very low 6 = very high	Probability of Failure (P) (see back-up sheets) 1 = very low 6 = very high	Business Risk (BRE=PxCxR) 1 = very low 25 = very high
18	Safety (Wet Well)	Bulding ID: 8 Mile	1	1	0	0%	1.00	6.00	6.00	26.00
8	Pump Control Panel	Bulding ID: Biddestone	1	1	0	0%	1.00	6.00	6.00	26.00
8	Pump Control Panel	Bulding ID: I-696	1	1	0	0%	1.00	6.00	6.00	26.00
18	Safety (Lock out/Tag out)	Bulding ID: I-696	1	1	0	0%	1.00	6.00	6.00	26.00
8	Pump Control Panel	Bulding ID: Walnut #3	1	1	0	0%	1.00	6.00	6.00	26.00
7	Switchgear (Transfer Switch)	Bulding ID: 8 Mile	1	1	0	0%	1.00	6.00	3.11	18.66
18	Safety (Lock out/Tag out)	Bulding ID: Walnut #3	1	1	0	0%	1.00	6.00	3.00	16.00
14	Process Control (includes I&C)	Bulding ID: Drake	1	1	0	0%	1.00	2.83	6.00	14.17
14	Process Control (includes I&C)	Bulding ID: Thornbrook	1	1	0	0%	1.00	2.83	6.00	14.17
6	Generator	Bulding ID: Thornbrook	1	1	0	0%	1.00	2.67	6.00	13.33
8	Motor Control Center	Bulding ID: Drake	1	1	0	0%	1.00	2.60	6.00	12.60
8	Motor Control Center	Bulding ID: Walnut #2	1	1	0	0%	1.00	2.60	6.00	12.60
8	Motor Control Center	Bulding ID: Thornbrook	1	1	0	0%	1.00	2.33	6.00	11.67
1	Process Pump #1	Bulding ID: Walnut #3	1	1	0	0%	1.00	2.33	6.00	11.67
2	Process Pump #2	Bulding ID: Walnut #3	1	1	0	0%	1.00	2.33	6.00	11.67
14	Process Control (includes I&C and individual pump controllers)	Bulding ID: Amy	1	1	0	0%	1.00	2.00	6.00	10.00
11	Bar Screens	Bulding ID: 8 Mile	1	1	0	0%	1.00	2.17	3.60	7.80
10	Metering	Bulding ID: 8 Mile	1	1	0	0%	1.00	1.60	6.00	7.60
18	Safety (Move Control Panel to Grade)	Bulding ID: Biddestone	1	1	0	0%	1.00	6.00	1.40	7.00
15	Process Piping and Valves	Bulding ID: 8 Mile	1	1	0	0%	1.00	2.67	2.40	6.40
15	Process Piping and Valves	Bulding ID: Walnut #3	1	1	0	0%	1.00	2.83	2.00	5.67
15	Process Piping and Valves	Bulding ID: Morris Lake	1	1	0	0%	1.00	2.60	2.00	5.00
18	Safety	Bulding ID: Walnut #1	1	1	0	0%	1.00	6.00	1.00	6.00
15	Process Piping and Valves	Bulding ID: Thornbrook	1	1	0	0%	1.00	2.17	2.20	4.77
7	Disconnects and ATS	Bulding ID: Walnut #2	1	1	0	0%	1.00	3.33	1.40	4.67

Equipment Ranking Results – By Facility

			Date: March 19, 2009		
#	Equipment Description	Asset ID	Criticality (C) (see back-up sheets) 1 = very low 5 = very high	Probability of Failure (P) (see back-up sheets) 1 = very low 5 = very high	Business Risk (BRE=PxCxR) 1 = very low 25 = very high
Sta 4	Walnut #3	PI 4	2.67	2.75	7.33
8	Pump Control Panel	PI 8	5.00	5.00	25.00
18	Safety (Lock out/Tag out)	PI 18	5.00	3.00	15.00
1	Process Pump #1	PI 1	2.33	5.00	11.67
2	Process Pump #2	PI 2	2.33	5.00	11.67
15	Process Piping and Valves	PI 15	2.83	2.00	5.67
6	Generator	PI 6	2.67	1.00	2.67
7	Main disconnect and ATS	PI 7	2.50	1.00	2.50
13	Structural	PI 13	1.00	1.00	1.00

Questions ?

