



NAWT

National Association of **Wastewater** Technicians

AFTER LIFE – WASTEWATER TREATMENT

KIM SEIPP, NAWT

INTRODUCTIONS

- NAWT –
 - NATIONAL ASSOCIATION OF WASTEWATER TECHNICIANS
- KIM SEIPP
 - HIGH PLAINS SANITATION SERVICE – OWNER
 - NAWT – EDUCATIONAL COORDINATOR
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The material being presented does not reflect the opinions of NOWRA

Introduction – Life Cycle & Principles of OWTS

Beginning of the Life Cycle – Design Principles

Beginning & Early Life – Installation Principles

Mid-Life – Operations & Maintenance Principles

Mid-Life – Inspection Principles

All during the Life Cycle – Safety Principles

After Life – Decommissioning Principles

Summary – Where we are, where we care and where we go from here

After Life – Waste Treatment Principles

NAWT TRACK PLAN FOR TODAY

Introduction to Wastewater
Treatment Options & Ideas

What are the Options for Disposal?

Creating a Disposal Plant

Business Considerations

**NAWT –
AFTER LIFE
WASTEWATER
TREATMENT
OPTIONS**

Introduction to Wastewater
Treatment Options & Ideas

What are the Options for Wastewater Treatment?
What is the Best Option?

Creating a Wastewater Treatment Plant

Business Considerations

**NAWT –
AFTER LIFE
WASTEWATER
TREATMENT
OPTIONS**

The background image shows an industrial facility, likely a wastewater treatment plant, with various pipes, concrete structures, and a large white tank. The entire image is overlaid with a semi-transparent blue filter. The text is centered over the image.

SEPTAGE MANAGEMENT

WHAT HAPPENS WITH THE RESIDUAL WASTE FROM AN OWTS

Introduction to Wastewater
Treatment Options & Ideas

What are the Options for Disposal?

Creating a Treatment Plant

Business Considerations

**NAWT –
AFTER LIFE
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The background image shows a wastewater treatment plant with various pipes, concrete structures, and a large white tank. The entire image is overlaid with a semi-transparent blue filter. The text is centered in the middle of the image.

PUBLICLY OWNED TREATMENT WORKS (POTWS)

HEAD OF PLANT

PUBLICLY OWNED TREATMENT WORKS (POTWS)

- SEPTAGE RECEIVING AREA





LAND APPLICATION



DEDICATED FACILITY TECHNOLOGIES



Introduction to Wastewater
Treatment Options & Ideas

What are the Options
Available?

Creating
a Disposal Plant

Business Considerations

**NAWT –
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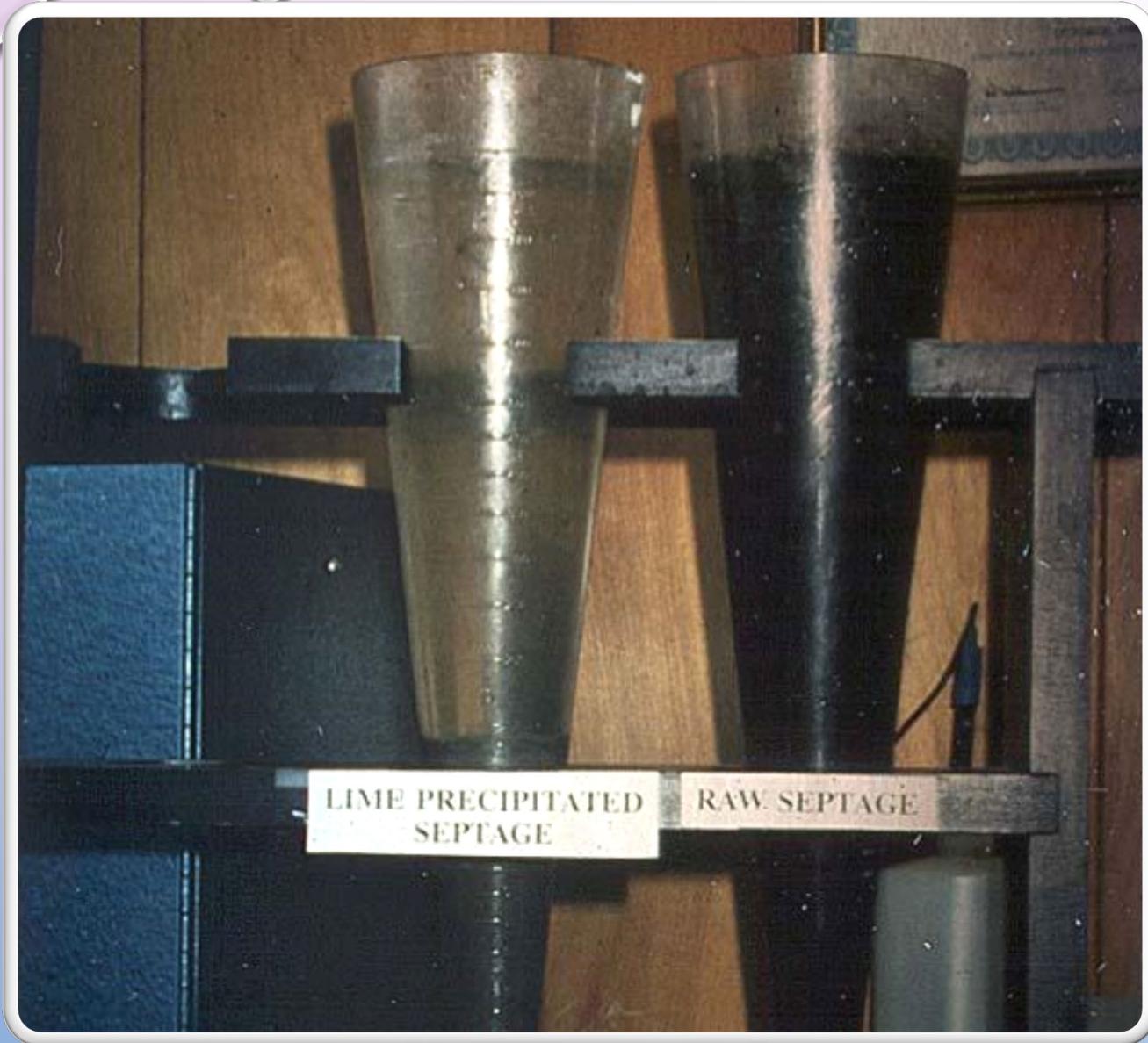
PRIVATELY OWNED DEDICATED FACILITY

DEDICATED FACILITY TECHNOLOGIES

Thickening

Dewatering Equipment

- Belt Press
- Rotary Drum Vacuum Filter
- Recessed Cavity Plate & Frame
- Container Filter
- Centrifuge
- Others



DEDICATED FACILITY TECHNOLOGIES

- THICKENING
 - ADD LIME AND/OR
 - ADD POLYMER

DEDICATED FACILITY TECHNOLOGIES

- THICKENING
- ADD LIME AND/OR
- ADD POLYMER
- GRAVITY BELT



DEDICATED FACILITY TECHNOLOGIES

- THICKENING
 - ADD LIME AND/OR
 - ADD POLYMER
 - GRAVITY BELT
 - DRUM THICKENER



Introduction to Wastewater
Treatment Options & Ideas

What are the Optimal
Treatment Options?

Creating a
Treatment Plant

Business Considerations

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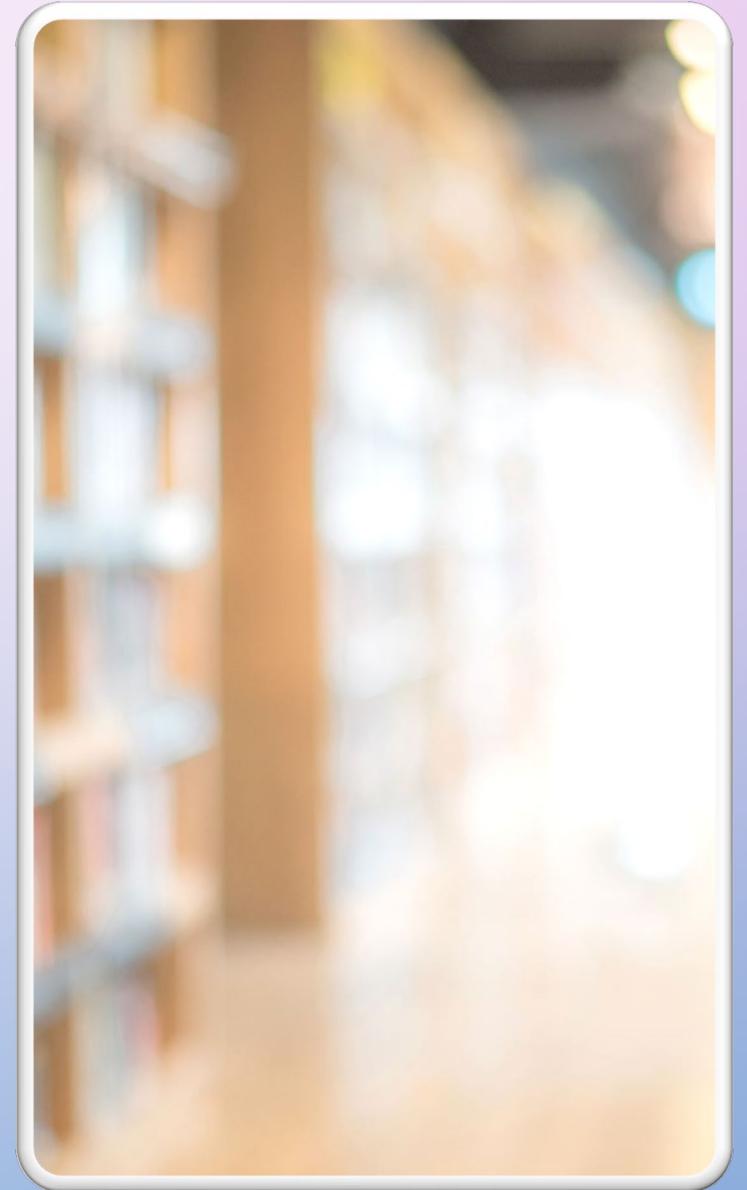
Business Considerations

OVERVIEW

- Publicly Owned Treatment Works (POTWs)
- Land Application
- Dedicated Septage Facilities
- Economic Elements
- Business Plan – Decision by \$

PUBLICLY OWNED TREATMENT WORKS (POTWS)

- ECONOMIC ELEMENTS
 - DISPOSAL FEE
 - PER GALLON
 - PER LOAD
 - HONOR SYSTEM
 - TRUCK TIME
 - DISTANCE
 - TIME
 - 24/7 FACILITY
 - NEED HOLDING TANK



PUBLICLY OWNED TREATMENT WORKS (POTWS)

- ECONOMIC ELEMENTS
 - DISPOSAL FEE
 - PER LOAD 5 CENTS/GAL -3000 GAL \$150.00
 - TRUCK TIME
 - TIME ADDITIONAL 1 HOUR @80.00/HR \$ 80.00
 - 24/7 FACILITY – YES
 - TOTAL COST FOR 3,000 GALLONS \$230.00
 - PER 1,000 GALLONS $\$230/3=$ \$ 76.67
 - PER GALLON $\$230/3,000 =$ \$ 0.07667



LAND APPLICATION



LAND APPLICATION

- ECONOMIC ELEMENTS

- LAND COST

- EQUIPMENT

- SCREENING

- TANKAGE W/MIXING

- LIME STORAGE

- SPREADING EQUIPMENT

- LIME

- TRUCKING

- VOLUME TO BE DISPOSED

- RECORDKEEPING

S

LAND APPLICATION

- ECONOMIC ELEMENTS
 - VOLUME TO BE DISPOSED - 500,000 GAL/YR
 - LAND COST - NONE
 - EQUIPMENT - \$50,000 10 YR
 - SCREENING
 - TANKAGE W/MIXING
 - LIME STORAGE
 - SPREADING EQUIPMENT
 - LIME - 25# PER 1,000 GAL @\$150.00/TON
 - TRUCKING - 1 HR TURNAROUND - @ \$ 80.00
 - RECORDKEEPING



Disposal Costs Based on 20,000 Gallons Per Day

PARAMETER	COST	PER	Cost Per Year
EQUIPMENT	\$50,000	10 Years	\$ 5,000
LIME	\$150 per Ton	25 # per 1,000 5200 x 25 lbs = 130,000 lbs	\$ 9,750
TRUCKING	\$80.00/hr	1 hr per 4,000 gal 5,200,000/4,000=1300 trips	\$ 104,000
TOTAL COST			\$ 118,750
COST PER 1,000			\$ 22.84
COST PER GAL			2.284 Cents

LAND APPLICATION

PRIVATELY OWNED DEDICATED FACILITY



DEDICATED FACILITY TECHNOLOGIES

- ECONOMIC ELEMENTS
 - PLANNING/ENGINEERING
 - PERMITTING
 - FUNDING
 - CAPITAL REIMBURSEMENT FEE
 - EQUIPMENT SELECTION
 - OPERATIONAL COSTS



DEDICATED FACILITY TECHNOLOGIES

- UNIT PROCESSES
 - SCREENING/GRIT REMOVAL
 - EQUALIZATION TANKAGE
 - DEWATERING
 - POLYMER ADDITION
 - SLUDGE
 - FURTHER TREATMENT
 - FILTRATE
 - FURTHER TREATMENT
- ODOR CONTROL



DEDICATED FACILITY TECHNOLOGIES

- CAPITAL REIMBURSEMENT FEE
 - DEFINED IN SEWER USE ORDINANCE
 - USUALLY ____ DOLLARS PER ____ GALLONS PER DAY (EDU-EQUIVALENT DWELLING UNIT)

EXAMPLE:

- \$ 3,500 PER EDU
- 228 GALLONS PER DAY (GPD) IS AN EDU
- SAY 20,000 GPD OR $20,000/228 = 87.72$ EDUS
- $87.72 \text{ EDUS} \times \$ 3,500 \text{ PER EDU} = \$ 307,020$

Note: Costs May Vary Considerably by location

DEDICATED FACILITY TECHNOLOGIES

■ ECONOMICS OF CONSTRUCTION

■ LAND & BUILDING	\$	400,000
■ SCREEN/GRIT REMOVAL		50,000
■ DEWATERING EQUIPMENT		100,000
■ TANKAGE		50,000
■ ODOR CONTROL		25,000
■ ENGINEERING & PERMITS		30,000
■ PLUMBING & ELECTRICAL		<u>40,000</u>
		\$ 695,000

DISCLAIMER: COSTS MAY VARY CONSIDERABLY

■ ECONOMIC ELEMENTS

■ COST TO CONSTRUCT	\$ 695,000
■ CAPITAL REIMBURSEMENT FEE	<u>307,020</u>
	\$ 1,002,020

ASSUME 20-YEAR PAYBACK @ 6.5% INTEREST

12 PAYMENTS PER YEAR = \$ 89,650

DEDICATED
FACILITY
TECHNOLOGIES

■ ECONOMICS OF ANNUAL COSTS FOR 20,000 GPD

■ PAYBACK OF CAPITAL COSTS	\$ 89,650
■ SEWER DISCHARGE FEES @ \$.005	26,000
■ SLUDGE DISPOSAL @ \$ 35.00/TON	75,900
■ UTILITIES	8,000
■ CHEMICALS (POLYMER/LIME)	9,750
■ PERMIT & ANALYSIS	3,000
■ REPAIR & MAINTENANCE	5,000
■ WAGES & BENEFITS	40,000
■ INSURANCE	5,000
■ COST OF PROPERTY	<u>10,000</u>
5,200,000 GAL PER YEAR AT 5.2 CENTS/GALLON	272,300

DEDICATED
FACILITY
TECHNOLOGIES

DEDICATED FACILITY TECHNOLOGIES

■ ECONOMICS OF CONSTRUCTION

■ LAND & BUILDING	\$	400,000	
■ SCREEN/GRIT REMOVAL		50,000	10,000
■ DEWATERING EQUIPMENT		100,000	150,000
■ TANKAGE		50,000	
■ ODOR CONTROL		25,000	
■ ENGINEERING & PERMITS		30,000	
■ PLUMBING & ELECTRICAL		<u>40,000</u>	
		\$ 695,000	\$ 705,000

DISCLAIMER: COSTS MAY VARY CONSIDERABLY

DEDICATED FACILITY TECHNOLOGIES

■ ECONOMICS OF ANNUAL COSTS FOR 20,000 GPD

■ PAYBACK OF CAPITAL COSTS	\$ 89,650	90,550
■ SEWER DISCHARGE FEES @ \$.005	26,000	
■ SLUDGE DISPOSAL @ \$ 35.00/TON	75,900	40,000
■ UTILITIES 8,000		
■ CHEMICALS (POLYMER/LIME)	9,750	8,000
■ PERMIT & ANALYSIS	3,000	
■ REPAIR & MAINTENANCE	5,000	
■ WAGES & BENEFITS	40,000	
■ INSURANCE	5,000	
■ COST OF PROPERTY	<u>10,000</u>	
5,200,000 GAL PER YEAR AT 5.2 CENTS/GALLON	\$ 272,300	235,550

4.53/cents/gallons

DEDICATED FACILITY TECHNOLOGIES

THINK! ... WHAT ARE
YOUR RESOURCES?

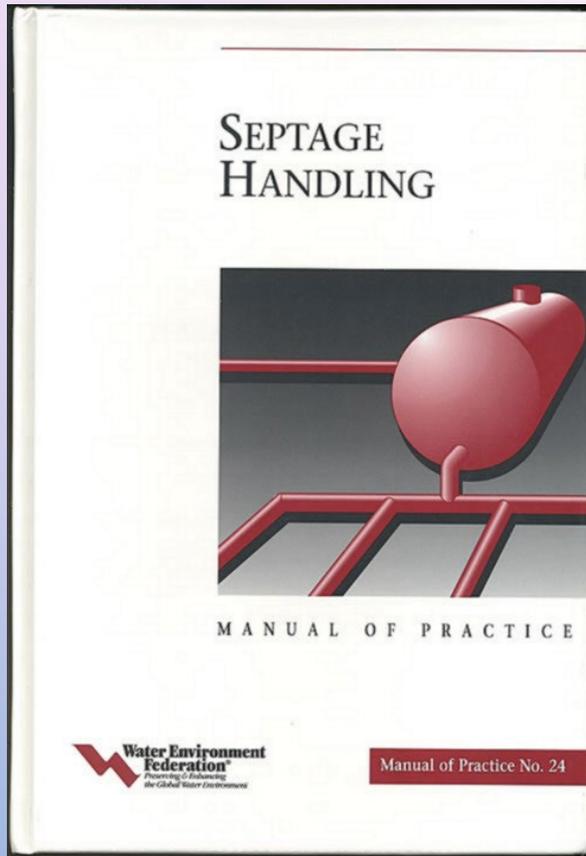
	Solids			Liquid	
Lime Stabilization	Land Apply				
Thickening	Land Apply		POTW	POTW	Land Apply
Dewatering	Land Apply	Composting Heat Drying etc	Landfill	POTW	Land Apply

Disposal Costs Based on 20,000
Gallons Per Day

POTW	7.667	cents/gallon
Land Application	2.284	cents/gallon
Dedicated Facility	5.24	cents/gallon

SUMMARY

MORE INFO?



Water Environment Federation
Septage Handling

Manual of Practice No. 24

1-703-684-2400

www.wef.org/applications/publications/

DISPOSAL OPTIONS – CHOOSING THE BEST METHOD



JUST DO IT