



Center for the Inland Bays Scientific & Technical Advisory Committee Meeting

Wandendale Regional
Wastewater Treatment and
Disposal Facility

February 18, 2011



Regulated Wastewater Utility

- ✓ Design
- ✓ Build
- ✓ Own
- ✓ Operate
- ✓ Maintain

Governmental Agency Oversight

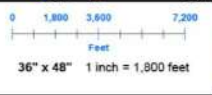
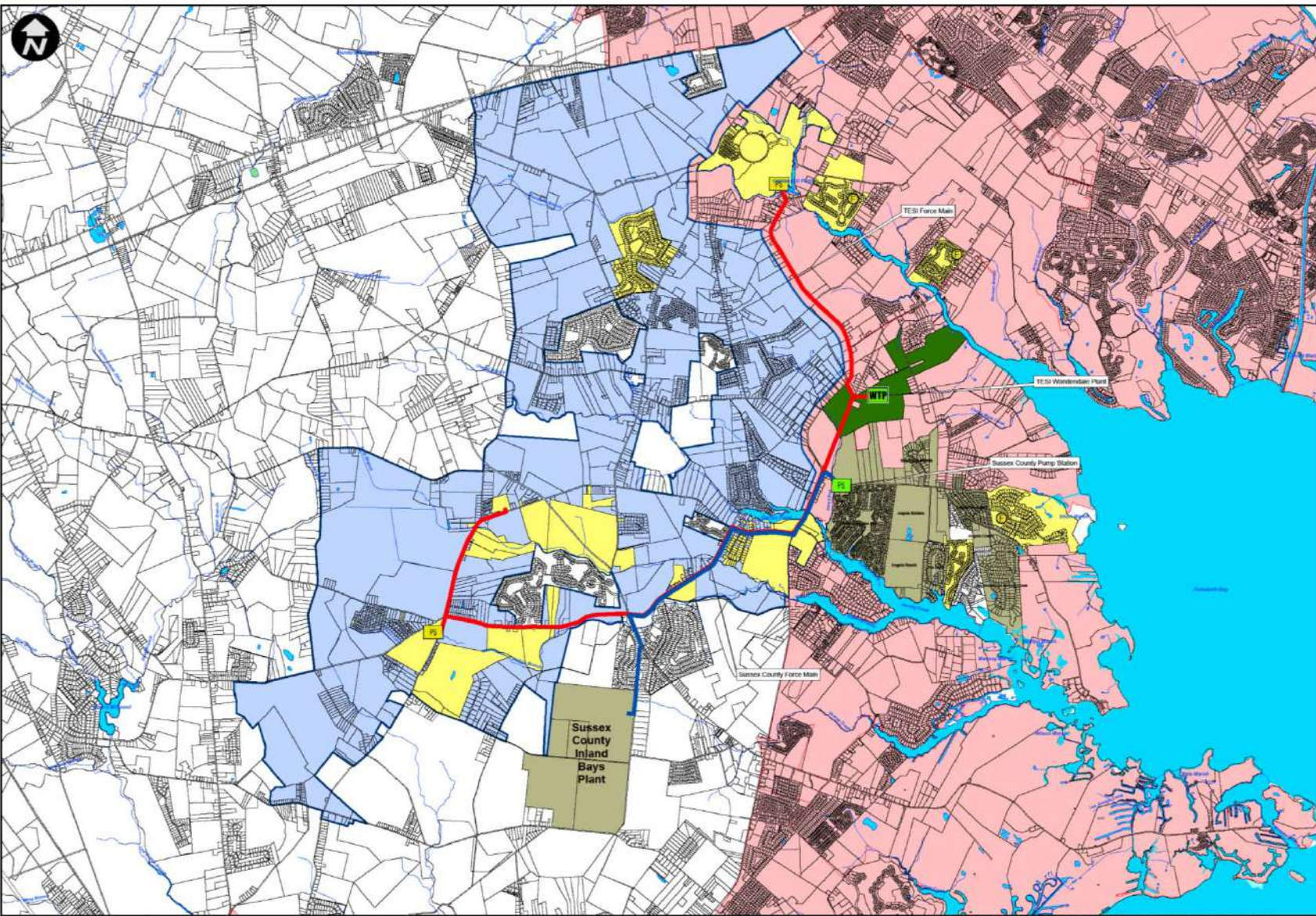
- PSC oversee us for:
 - Tariff
 - Franchise
 - Service

- DNREC – for environmental aspects
 - Coastal Zone permit
 - Construction permit
 - Operating permit

- Sussex County
 - Conditional use approval

Project Scope:

- Design, Build, Own, Operate a regional wastewater treatment and disposal facility that would do several things:
 - Serve proposed developments (essentially eliminating the need to build individual septics or multiple smaller community systems)
 - Provide the opportunity to eliminate existing septics



Legend	
■ Sussex County Sewer Planning Areas	■ TESI Wandalde Planning Area
■ Sussex County Inland Bays Plant	■ TESI Wastewater Service Areas
■ County Angola Neck Service Area	

TIDEWATER WASTEWATER PLANNING MAPS
WANDALDE
 REGIONAL WASTEWATER TREATMENT
 AND DISPOSAL FACILITY
 SUSSEX COUNTY, DELAWARE

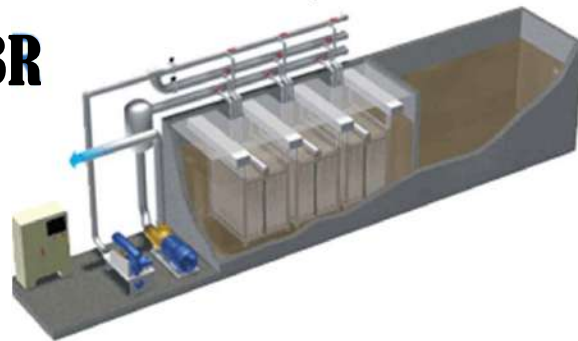
DATE:	09.01.2009
REVISION:	R5
MAP NO.:	10-207-08-107



Type of Treatment

- Membrane Bio-reactor treatment facility.
 - Produces high quality effluent that is clear and odorless.
 - Provides enhanced nutrient removal with discharges of:
 - Total Nitrogen of 5 mg/l (in accordance with PCS)
 - Total phosphorus will be 0.5 mg/l
 - Followed by Ultra Violet disinfection

MBR



Nearby MBR's

- Cecil County, MD
- Baltimore County, MD
- Hart's Landing, Lewes, DE
- Marsh Property
- Bayfront, Lewes, DE
- Glen Riddle Development – Ocean City, MD.





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AESTHETIC LANDSCAPE

ATTACHMENT
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Facility Rendering



Hart's Landing Wastewater
Facility



Type of Disposal

RIBS

- Shallow basins (18-24" deep) that accept the treated water
- 15.4 acres area approved for RIBs
- Six (6) basins
- Dose one basin per day, then let it rest for five days and rotate the basins.



Bay Front RIBS Facility

Spray Irrigation

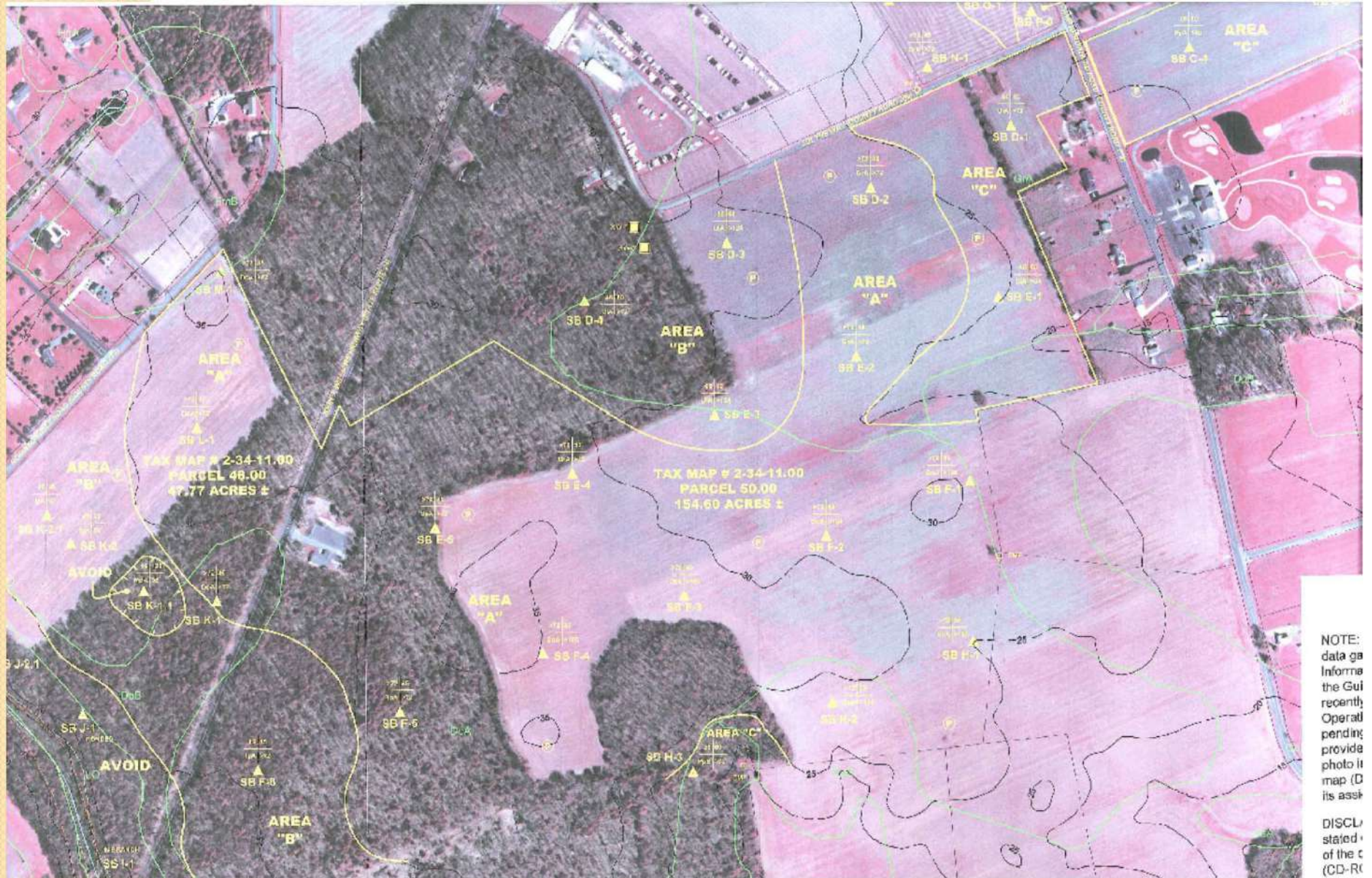
- Berm landscaping
- Cropland
- Similar to the County's Wolf Neck, Piney Neck and Inland Bays
- Future lined storage pond
- 150 acres of spray land





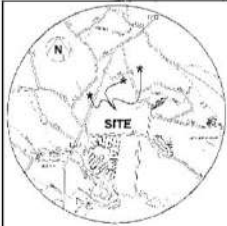
Extensive Soils Work Has Been Done

- Soils reconnaissance and report
- Detailed Soils investigation report for the RIB area
 - Depth to Ground water is 19-22ft. in RIB area
 - Double Ring Infiltrometer testing has been done in RIB area to test the permeability and the results are favorable.



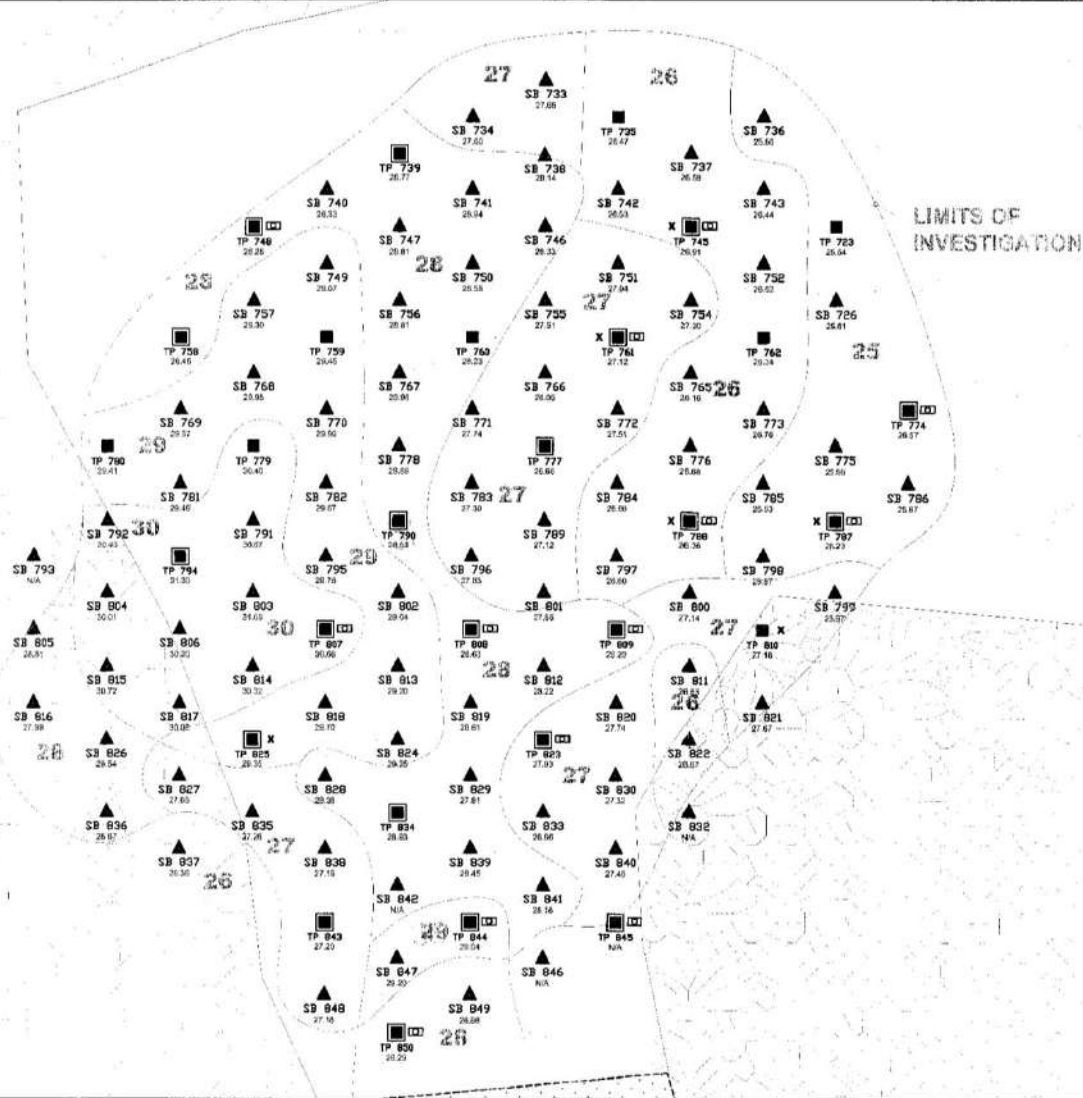
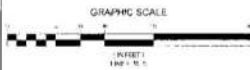
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SITE MAPPING LEGEND

- Adjacent Property Lines
- Recent Property Lines
- Watercourse Ditch
- Dike/water SWAMP Line
- Wetlands Intersectory Line
- Soil Map Unit Boundaries (Recent Soil Survey update by NRCS)
- ▲ Logged Soil Boring
- Logged Test Pit
- Logged Test Pit & Infiltration Test
- X Particle Size Location
- Photograph Location



REVISIONS

NO.	DATE	DESCRIPTION

**SOIL INVESTIGATIVE REPORT FOR
RAPID INFILTRATION BASINS - AREA A
DETAIL PLAN**

LANDS OF WAKENDALE FARMS, INC.
SUSSEX COUNTY, DELAWARE

TERRA FIRMA CONSULTING, INC.
Post Office Box 938
Ocean View, DE 19970
Phone: (302) 539-4501
Fax: (302) 538-1315
tfc@terrafirmac consulting.com



PROJECT NO: 1077-11-2008
APPROVED BY: [Signature]
DATE: 11/15/08
JOB # 1077-11-2008
SCALE: AS SHOWN
DRAWN BY: [Signature]
CHECKED BY: [Signature]
DATE: 11/15/08

Extensive Hydro-geological Work Completed

- Continuous wet season monitoring
- Deep borings
- A hydro-geological ground water model
 - Long Travel Times
 - Significant depth to groundwater
 - No adverse affects to wells or water bodies
- Significant depth to groundwater

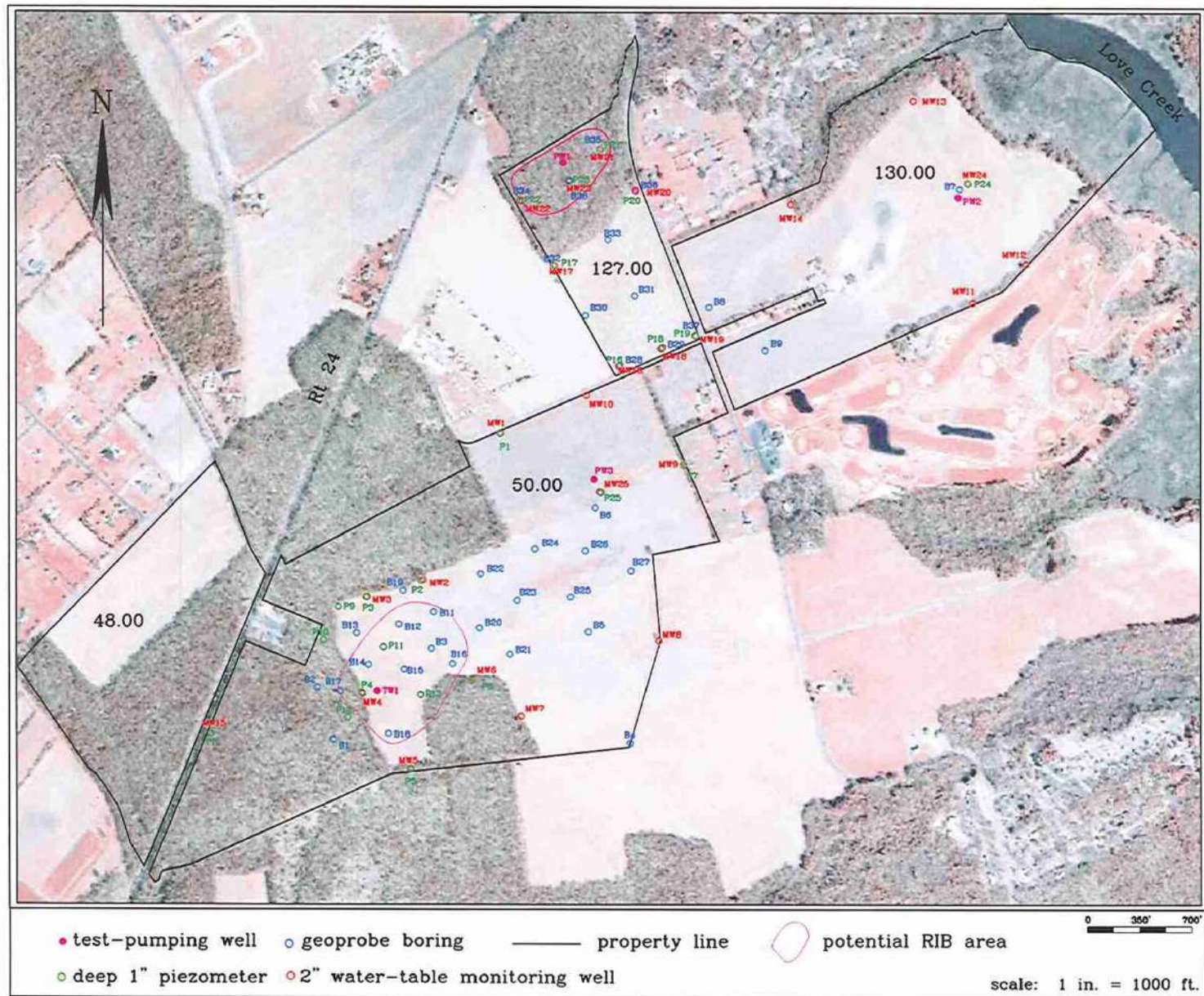


Figure 2: Test Boring and Well Locations

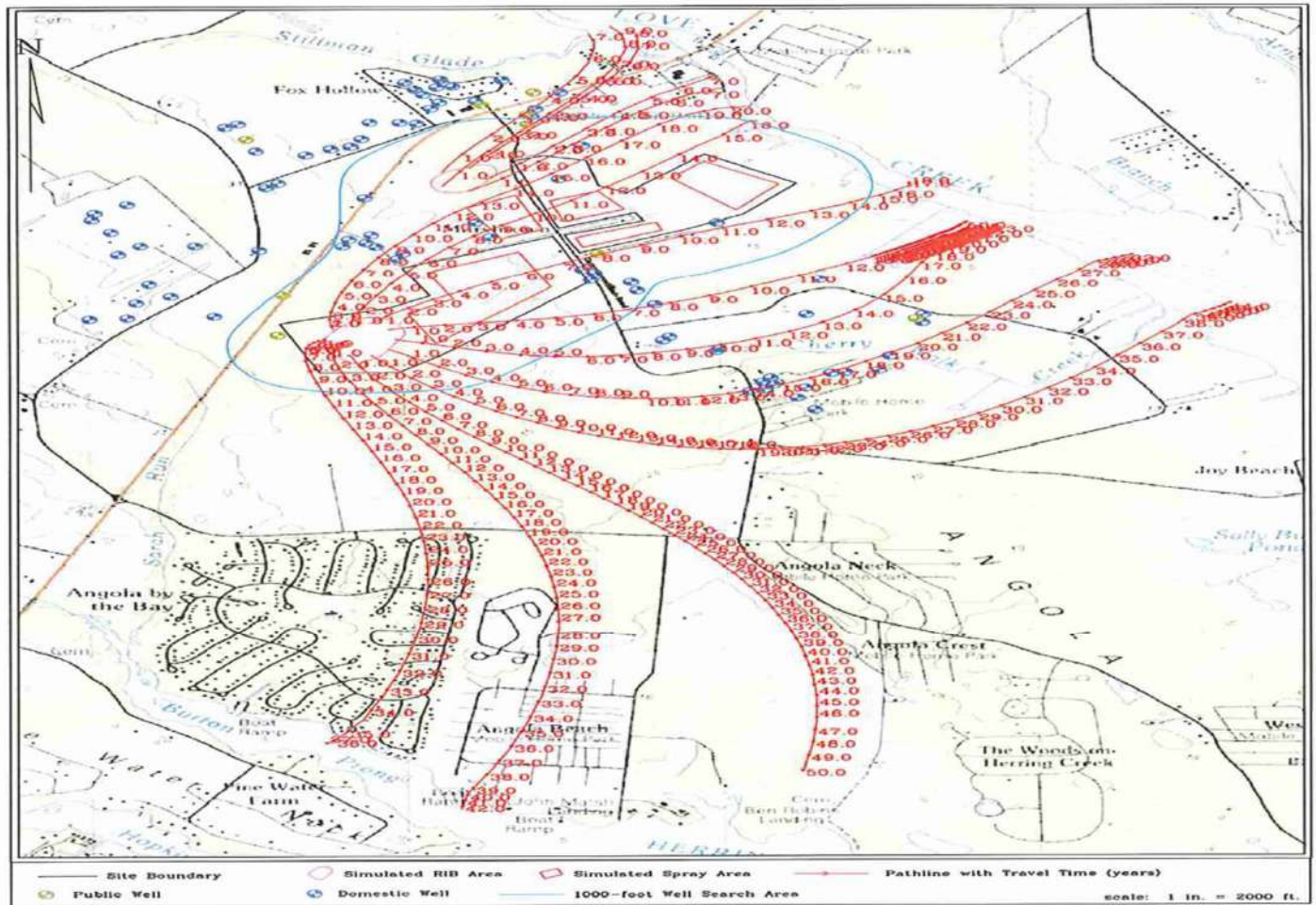


Figure 21: Calculated Flow Paths and Travel Times

Phased Construction and Operation of the Facility

- Ultimate Design Capacity is for 1.45 MGD.
- The phases will be for 150,000 gpd each; the last increment will be for 100,000 gpd.
- Pump and haul for the first 15-20,000.
- At 15 - 20,000 gpd, place plant into operation.
- At 145,000 gpd (10% of overall permit), we'll start to spray on landscaping on berms of RIBs as needed.
- At 300,000 gpd we'll start to spray on field closest to RIBs using co-mingled water drawn out of a well downgradient of the RIBs, because the discharge itself will not be enough.
- At 600,000 gpd we'll build first lagoon and start spraying near RIBs; will use well as needed.
- We'll continue with RIB disposal during the phases as well, when crops do not need the water.
- Treatment systems will be in designed and constructed in parallel.

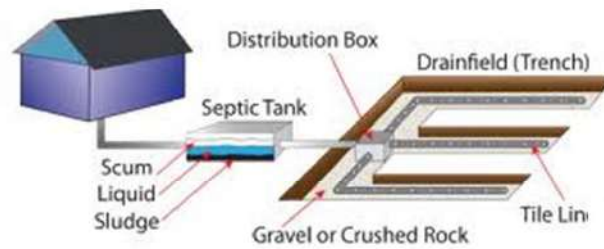
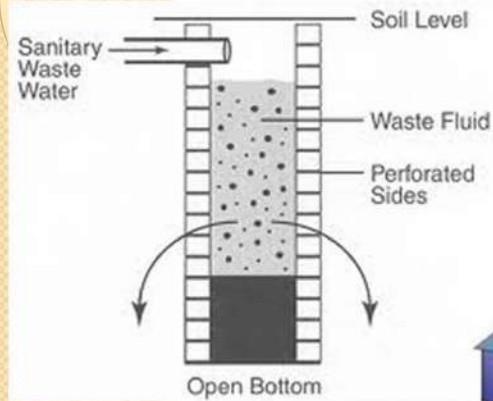
Approvals for Project

- Sussex County Conditional Use Approval.
- Coastal Zone permit approval.
- Detailed Soils Investigation report approval.
- Received Ground Water Impact Assessment approval.
- The Construction permit was submitted to DNREC on December 20, 2010.

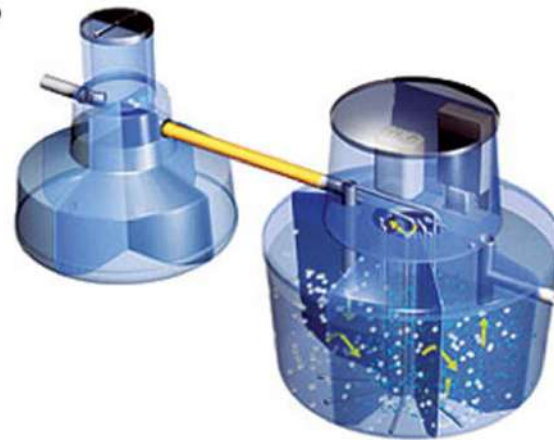
Summary

- ✓ Design, Build, own, operate a state of the art wastewater treatment and disposal facility.
- ✓ Reduce nutrients (meet PCS requirements)
- ✓ Recharge groundwater
- ✓ No adverse effects on wells or water bodies
- ✓ Preserves open space, farmland and forest land.
- ✓ Serve new developments eliminating need for multiple community systems or individual septics.
- ✓ Opportunity to serve existing individual septics

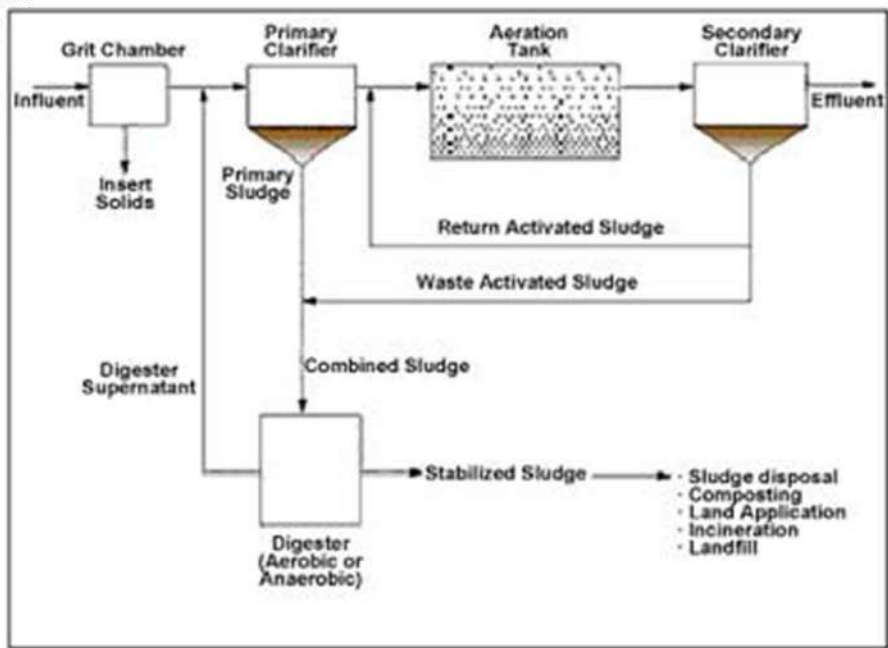
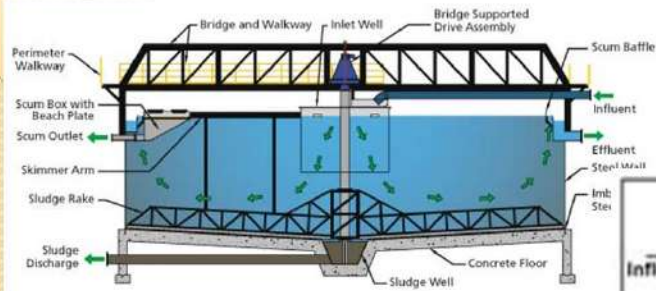
Treatment & Disposal Evolution



Schematic of a Drainfield



Treatment & Disposal Evolution



Treatment & Disposal Evolution



Spray Irrigation of Domestic Wastewater was Banned in Delaware in the 1970's

Spray Irrigation of Domestic Wastewater was Back in Action in the mid-80's Using Lagoon Treatment Technology for BOD Reduction and Crops for Nutrient Removal

Disposal Evolution



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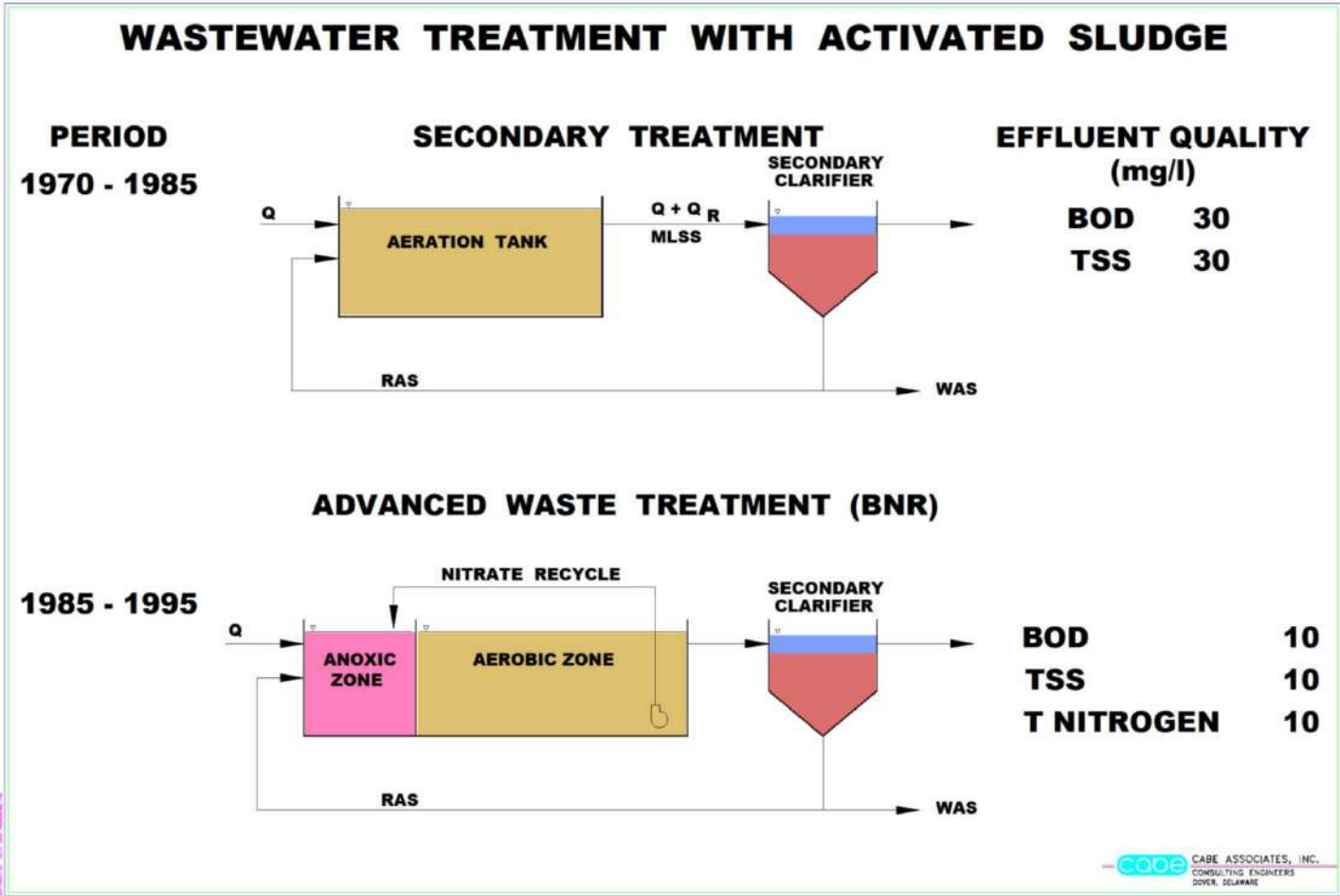


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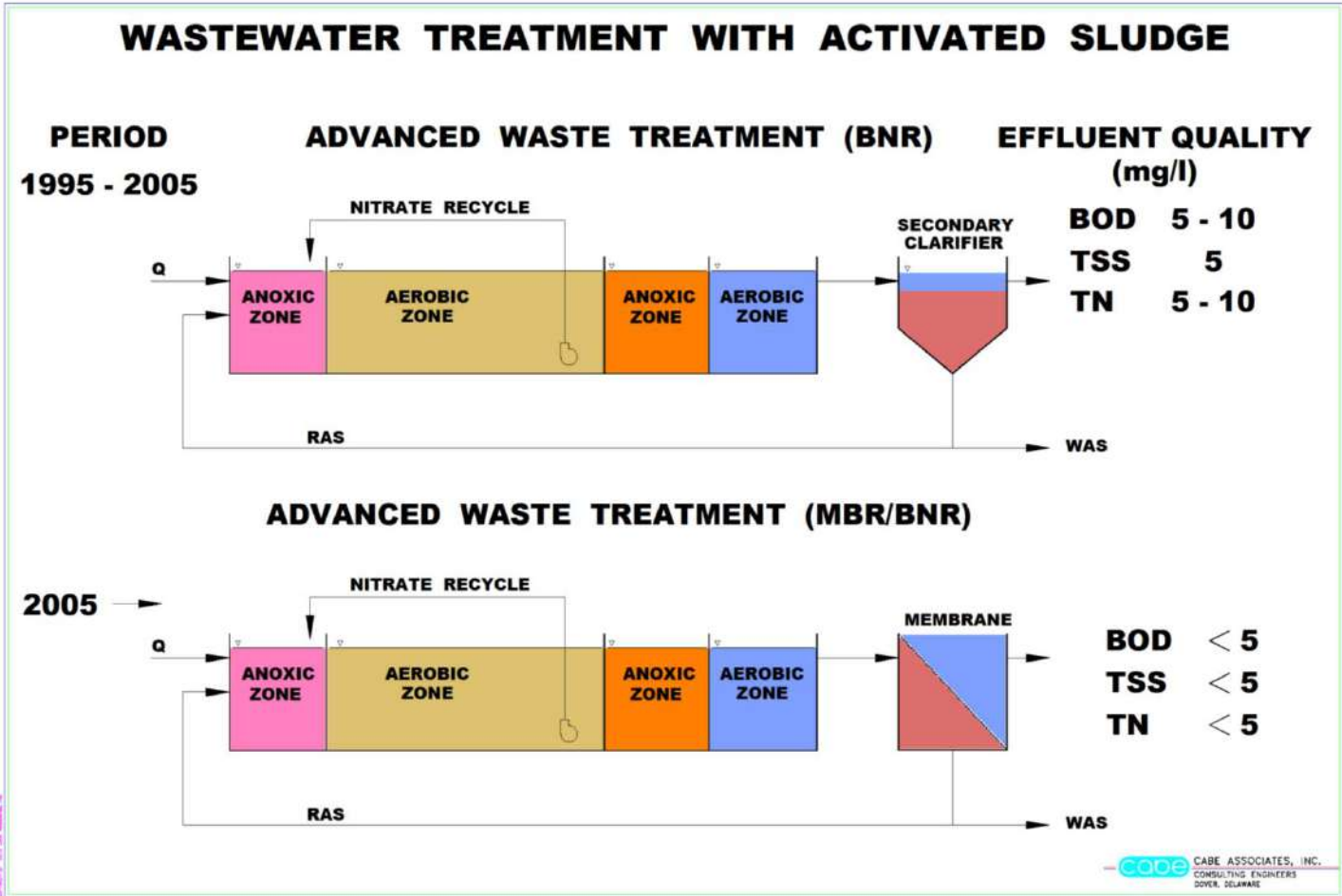


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Treatment Evolution

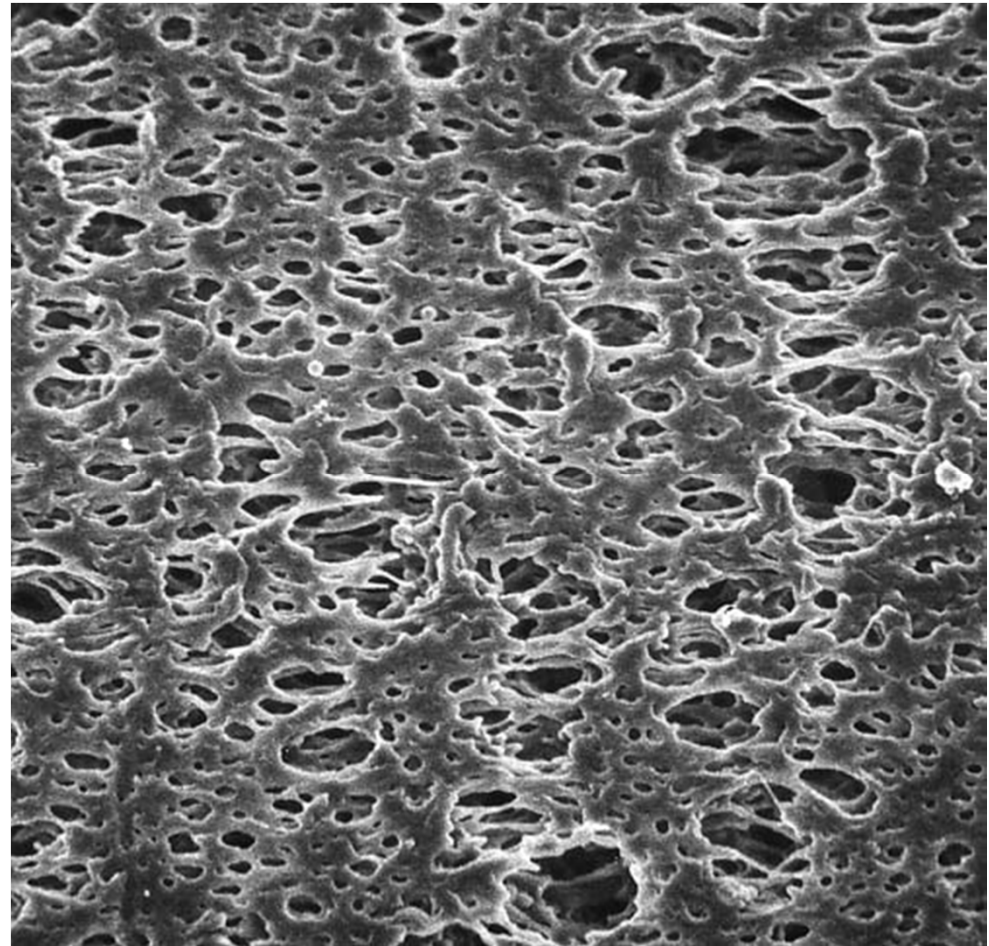


Treatment Evolution

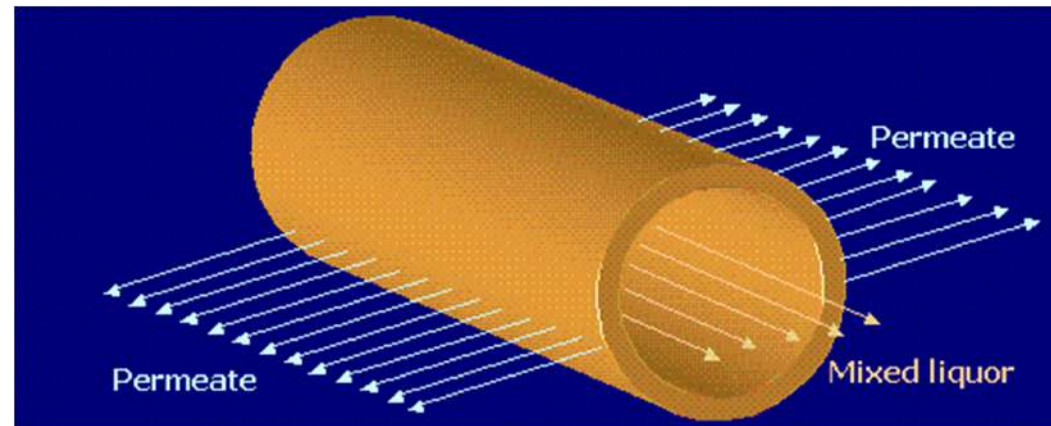
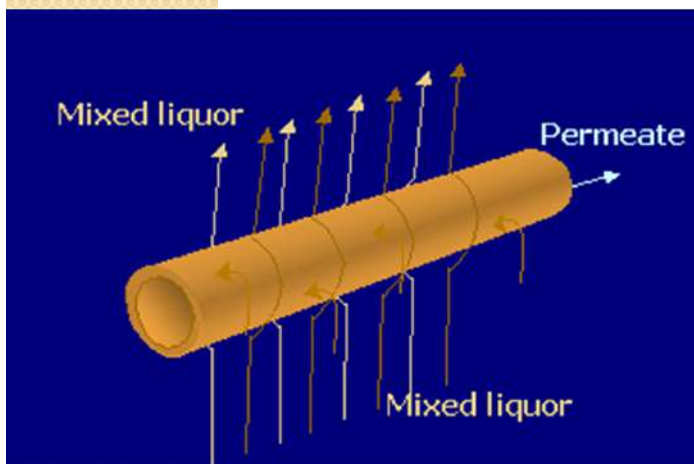
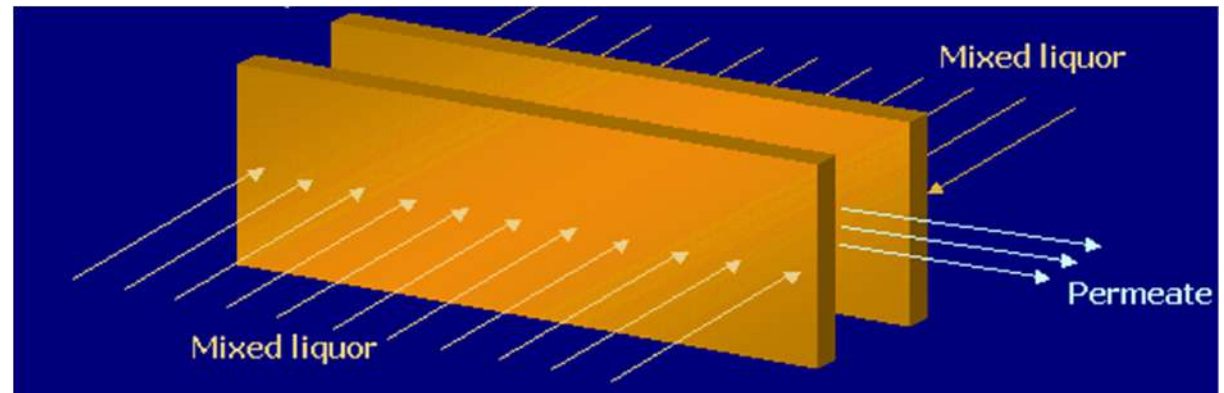
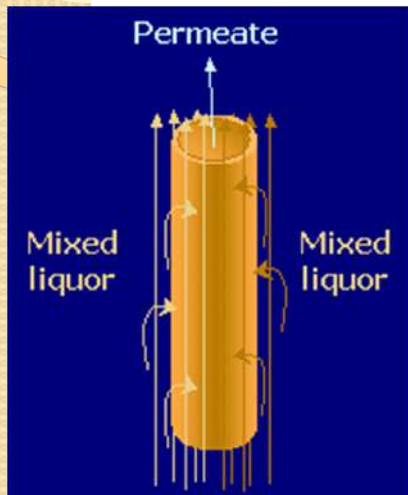


Membrane Overview

- Semi-Permeable Membrane
- Pores



Treatment Evolution

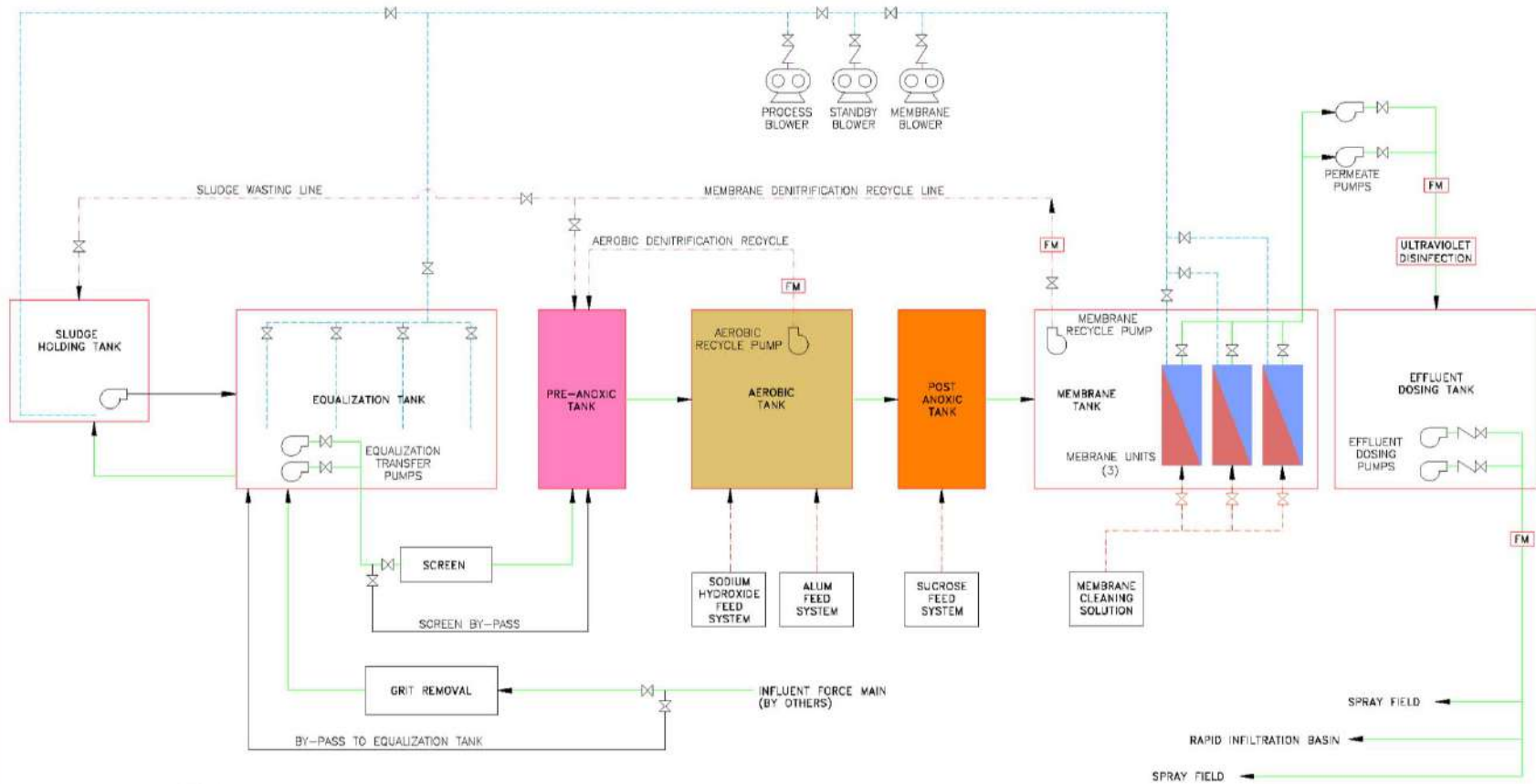




Treatment & Disposal Evolution

- Technology has finally caught up.
- Regulatory requirements can all be met
- Crops no longer necessary to provide nutrient reduction function

WANDENDALE REGIONAL WASTEWATER TREATMENT AND DISPOSAL FACILITY PROCESS FLOW DIAGRAM



- LEGEND**
- PRIMARY WASTEWATER FLOW
 - SECONDARY WASTEWATER FLOW
 - - - RECYCLE
 - - - CHEMICAL FEED
 - AIR LINE