

**BROOME COUNTY
ONLINE
SEPTIC SYSTEM
INSTALLER TRAINING**

TABLE OF CONTENTS

- INTRODUCTION
- WASTEWATER & DISEASE
- GENERAL OVERVIEW OF SEPTIC SYSTEMS
- SEPARATION DISTANCES
- CONSTRUCTION PROCESS
- APPLICATION
- UNNECESSARY INSPECTIONS
- DIG SAFELY NY
- SITE EVALUATION (SOIL CUT)
- SEPTIC TANK & SYSTEM DESIGN & SIZE
- COMMON PROBLEMS
- AERATION UNITS
- INSPECTION FORM

INTRODUCTION

- **PURPOSE:** TO DEVELOP AN EXISTING INDIVIDUAL RESIDENTIAL SEPTIC SYSTEM THAT CORRESPONDS TO THE ENGINEERING SPECIFICATIONS AND DESIGN STANDARDS SET FORTH BY THE NEW YORK STATE DEPARTMENT OF HEALTH & BROOME COUNTY HEALTH DEPARTMENT.
- PURSUANT TO THE AUTHORITY OF THE COMMISSIONER OF HEALTH BY SECTION 201 (1)(I) OF THE PUBLIC HEALTH LAW, APPENDIX 75-A WASTEWATER TREATMENT STANDARDS - INDIVIDUAL HOUSEHOLD SYSTEMS, AND CHAPTER 11 OF TITLE 10 (HEALTH) OF THE OFFICIAL COMPILATION OF CODES, RULES & REGULATIONS OF THE STATE OF NEW YORK.
- DEPARTMENT OF HEALTH'S ADMINISTRATIVE RULE'S & REGULATIONS
design standard (10NYCRR APPENDIX 75-A)

WASTEWATER & DISEASE

by Mike Dill, Wastewater Trainer (NYS Rural Water)

When you are asked about the cost of treatment and why is it so expensive, your reply could be some historical notes:

- 1700 BC Ahead of his time by a few thousand years, King Minos of Crete had running water in his bathrooms in the palace at Knossos. Although there is no evidence of plumbing and sewage systems at several ancient sites, including ancient Rome, their use did not become widespread until modern times.

WASTEWATER & DISEASE (cont.)

- 1817 A major epidemic of cholera hit Calcutta, India after a national festival. The numbers are not very accurate, however it was estimated that there were at least 10,000 fatalities. The epidemic then spread to other countries and to the US and Canada by 1832. The governor of NY quarantined the Canadian border in a vain effort to stop the epidemic. When cholera reached NY city, people were so frightened they either fled or stayed inside, leaving the city streets deserted.
- 1854 A London, England physician, Dr. John Snow, demonstrated that cholera deaths in an area of the city could all be traced to a common well that was contaminated, within the area of the city, with sewage.

WASTEWATER & DISEASE (cont.)

- 1859 The British Parliament was suspended during the summer because of the stench coming from the Thames river. According to one account, the river began to “seethe and ferment under the burning sun.”
- 1892 The comma-shaped bacteria that causes cholera was identified by German scientist Robert Koch. His discovery proved the relationship between contaminated water and the disease.
- 1939 60 people died in an outbreak of typhoid fever at Manteno State Hospital in Illinois. The cause was traced to a sewer line passing too close to the hospital’s water supply.

WASTEWATER & DISEASE (cont.)

- 1940 A valve was accidentally opened causing polluted water from the Genesee river to be pumped into the Rochester, NY water supply. Approximately 35,000 cases of gastroenteritis and 6 cases of typhoid fever were reported.
- 1955 Water containing a large amount of sewage was blamed for overwhelming a water treatment plant and causing an epidemic of hepatitis in Delhi, India. An estimated 1 million people were infected.
- 1958 The Androscoggin river in Western Maine catches fire from chemicals discharged from a paper mill treatment facility.

WASTEWATER & DISEASE (cont.)

- 1993 An outbreak of cryptosporidiosis in Milwaukee claimed 104 lives and infected more than 400,000 people.

This is the short list. Many will be quick to say this was caused by sewage; however this was NOT caused by properly TREATED sewage. So when the question arises, why so much... the answer is, we can't afford not to. Remember that sooner or later, someone's discharge becomes someone else's intake.

Diseases caused by pathogens in Sewage

- Cholera
- Hepatitis A
- Giardiasis
- Typhoid Fever
- Viral Diarrhea
- Poliomyelitis
- Amoebic Dysentery
- Fascioliasis
- Ascariasis

SEPTIC SYSTEM GENERAL INFORMATION w/ O & M

- ◆ Garbage disposal units substantially increase the accumulation of solids in the septic tank as well as suspended materials leaving the tank. Their disadvantages outweigh their convenience and they are not recommended.
- ◆ All roof, cellar or footing drains must be excluded from the system and must drain away from the system.
- ◆ Backwash from water softeners will not affect the operation of your septic tank but may decrease the life of the rest of the system.
- ◆ Roots from trees in the immediate area of the system may clog the pipes.
- ◆ Do not locate structures such as swimming pools, additions or other buildings over any part of the system.
- ◆ Do not allow vehicles or heavy equipment in the vicinity of the system.
- ◆ Avoid excessive water use. Check toilet tank valves and repair other leaky fixtures. Install appliances and fixtures that use less water. These measures will prolong the life of your system.
- ◆ If surface water is running onto or eroding your system, divert it.

If your treatment system is failing or you are developing a new lot, you need a permit to repair or install a system. For more information, contact the Broome County Health Department.

**Division of Environmental Health
Robert W. Denz, P.E., Director**

**Broome County Health Department
225 Front Street
Binghamton, NY 13905
(607) 778-2887**

*Barbara Fiala, County Executive
Claudia A. Edwards, MS, Public Health Director*

**SEPTIC
SYSTEMS**

**OPERATION
AND
MAINTENANCE**

GENERAL INFORMATION

w/ O & M – Cont.

Whenever possible, sewage should be collected in community sewers connected to a central treatment plant. However, most rural and suburban areas rely on individual on-site sewage treatment systems for the disposal of household wastewater. A properly designed and constructed household sewage treatment system will serve a home satisfactorily only if it is carefully operated and maintained.

System components

A typical household system consists of a house sewer, septic tank, distribution box, and a treatment system. The type of treatment system is determined by the characteristics of the soil in which it is to be constructed. It's size is proportional to the number of bedrooms in the dwelling it is to serve. A sketch or plan of the as-built system (including the septic tank access holes, and distribution box) should be kept by the homeowner for future inspection and maintenance.

Definitions

Effluent - Liquid discharge

House Sewer - The pipe connecting the house to the septic tank.

Septic Tank - A large watertight chamber with baffles in front of the inlet and outlet pipes. When sewage enters the septic tank, the heavy solids settle to the bottom as sludge. Grease and other materials lighter than water float to the top as scum which is trapped between the baffles. The effluent from the tank, although significantly improved, still contains dissolved and suspended materials which may include disease bacteria and needs further treatment.

Aerobic Unit - A watertight chamber similar to a septic tank but which injects air into the sewage by means of a motor.

This promotes the growth of aerobic bacteria which are more efficient at decomposing the organic material in the sewage. An aerobic plant may be used as the primary unit instead of a septic tank, but the problem of effluent disposal still remains. It must be discharged in an appropriate treatment system.

Distribution Box - A water tight container with an inlet and several outlets which evenly divides flow from the septic tank. This prevents overloading of any one part of the treatment system.

Treatment Systems

Absorption Field - A system of trenches, each containing a perforated pipe bedded in washed stone. Each pipe receives septic tank effluent from the distribution box, which passes through the perforations and seeps into the surrounding soil.

Seepage Pit - A deep excavation containing a covered open jointed block or perforated pre-cast concrete cylinder. Septic tank effluent is drained into the pit and seeps into the surrounding soil. Being deeper than an absorption field, a seepage pit is more likely to contaminate groundwater.

Raised Bed - A mound of permeable fill placed above the ground surface into which an absorption field is installed. The raised bed depends on the topsoil underlying it to disperse the wastewater once it has filtered through the bed material.

Sand Filter - The septic tank effluent is spread across the surface of a bed of sand through a network of perforated distribution pipes. Collector pipes beneath the filter receive treated effluent after it has passed through the sand. This effluent is then discharged through a soil absorption system. A sand filter is utilized where soil is so impervious that disposal of wastewater in the ground is impractical.

OPERATION AND MAINTENANCE

- ◆ The contents of the septic tank should be pumped every two or three years. If not, the sludge and scum will be carried into the treatment system causing it to clog and fail prematurely. Pumping your septic tank is less expensive than replacing your entire system. Pumped-out tanks contain toxic gases and must not be entered by the homeowner.
- ◆ Adding a second septic tank to your system will increase storage capacity, decrease pump-out frequency and significantly reduce solids carry-over prolonging the life of your system.
- ◆ The addition of a filter or gas deflection device to the outlet of the septic tank will also reduce solids carry-over and prolong the life of your system.
- ◆ Normal amounts of detergents, bleach, cleansers, etc. will not affect your system. Excessive quantities can be harmful.
- ◆ Do not dispose of cigarette butts, diapers, condoms, feminine hygiene products, plastics, grease, chemicals, or other non-biodegradable trash in your system.
- ◆ Septic tank additives are not recommended. They are unnecessary and may even cause the sludge and scum to discharge to the treatment system causing it to clog and fail prematurely.

Separation Distances

**TABLE 2
REQUIRED SEPARATION DISTANCES FROM WASTEWATER SYSTEM COMPONENTS**

System Components	Well (f) or Suction Line	To Stream, Lake Watercourse (b), or Wetland	Dwelling	Property Line	Drainage Ditch (b), (g)
		25'			
House Sewer (watertight joints)	25' if cast iron or PVC with O-ring joints, 50' otherwise	25'	3'	10'	—
Septic tank	50'	50'	10'	10'	10'
Effluent line to distribution box	50'	50'	10'	10'	10'
Distribution box	100'	100'	20'	10'	20'
Absorption field	100' (a)	100'	20'	10'	20'
Seepage pit	150' (a)	100'	20'	10'	20'
Dry well (roof and sootings)	50'	25'	20'	10'	10'
Raised or Mound System (c)	100' (a)	100'	20'	10'	20'
Intermittent Sand Filter (c)	100' (a)	100'	20'	10'	20'
Evapotranspiration-absorption system (c)	150' (a)	50'	20'	10'	20'
Composter	50'	50'	20'	10'	10'
Sanitary Privy Pit	100'	50'	20'	10'	20'
Privy, Watertight Vault	50'	50'	20'	10'	10'

NOTES:

(a) When sewage treatment systems are located in coarse gravel or upgrade and in the general path of drainage to a well, the closest part of the treatment system shall be at least 200 feet away from the well.

(b) Mean high water mark.

(c) For all systems involving the placement of fill material, separation distances are measured from the toe of slope of the fill.

(d) Any water service line under pressure (i.e., public water supply main, household service line, well to household service line) located within ten feet of any absorption field, seepage pit or sanitary privy shall be installed inside a larger diameter water main to protect the potable water supply.

(e) Any water service line under pressure (i.e., public water supply main, household service line, well to household service line) crossing a sewer shall be installed with one full length of water main centered above the sewer so both water connecting joints are as far as possible from the sewer. Section 8.6 of the GLUMRB Recommended Standards for Water Works, shall be followed for separation of water mains, sanitary sewers and storm sewers.

(f) The minimum separation distance between a septic tank and a community type public water supply well should be 100 feet. Distribution boxes and absorption facilities (e.g., absorption trenches/beds, seepage pits, raised systems, mound systems, etc.) should be located at least 200 feet from community type public water supply wells.

(g) Recommended separation distances.

CONSTRUCTION PROCESS

- Application completed and fee paid (\$190)
- Site evaluation by BCHD (contractor needed) except when installing an aerator which needs no site evaluation
- Specifications sent to homeowner
- Contractor begins construction
- Inspections by BCHD (up to 2 required)
- Contractor completes construction
- Approval issued by BCHD

Application

SPECIFICATIONS					
Office Use Only	Inspector	Date	Checked by	Recorded	File #
	APPROVED				
	Inspector	Date	Checked by	Recorded	Installer
	NOT APPROVED				
	Inspector	Date	Checked by	Recorded	Engineer

APPLICATION FOR SEWAGE DISPOSAL CONSTRUCTION PERMIT
 BROOME COUNTY HEALTH DEPARTMENT - 225 FRONT STREET, BINGHAMTON, N.Y. 13905 (607) 778-2867

* Applicant _____ * Phone (home) _____ (work) _____

* Mailing Address _____

* Owner _____ * Phone (home) _____ (work) _____

* Mailing Address _____

* Lot Size _____ * Name of Subdivision _____

* Property location (in detail) _____

_____ * Tax Map No. _____ * Town _____

* Type of Building _____ * Existing or New _____ * Age _____
 (house, mobile home, etc.)

* Total No. _____
 Of Bedrooms _____ Occupants _____ Garbage Disposal (yes or no) _____

* Water Supply: Existing or proposed _____ drilled well _____ spring _____ * Depth _____
 * Type: dug well _____ public _____ * Casting depth _____

* SIGNATURE _____ * DATE _____

APPLICANT - DO NOT WRITE BELOW THIS LINE AND PLEASE READ INSTRUCTIONS CAREFULLY

Date of Test _____ By _____ Date of Cut _____ By _____
 Soil perc test : _____ Soil Characteristics (note GW or BR) _____

Hole no.	Depth feet	Minutes to drop each		
		1" inch	2" inch	3" inch

	1
	2
	3
	4
	5
	6
	7
	8

Application rate: _____ Gal/Day/Sq.Ft.
 Design Time: _____ Min/Inch

Approved For: Fits _____ Lines _____ Mound _____ Sand Filter _____ Other _____
 Ground Surface Slope _____ % VALID FROM _____ TO _____
 Knowledge app. _____

An oversight on the part of a septic system installer that results in a re-inspection is termed unnecessary. Items which will result in an unnecessary re-inspection include but are not limited to those listed below.

- The installer does not appear for a previously scheduled site evaluation
- The installer does not call the BCHD when he will not be ready for a previously scheduled inspection
- The installer fails to meet any one of the various separation distance requirements
- Varying the system as specified without prior approval from the BCHD

Unnecessary inspections (con't.)

- The installer fails to provide chlorine tablets in sand filter chlorinators
- The installer fails to provide sufficient sand depth in a sand filter
- The installer fails to provide water for leveling the distribution box
- The installer fails to provide hay or geotextile covering when required
- The installer fails to place stone where required or fails to provide sufficient stone
- The installer fails to provide end caps where required

DIG SAFELY NY

- If you plan to dig or do any type of excavation work, NYS law requires that you call Dig Safely NY prior to doing so.

WAIT THE REQUIRED TIME

- You need to provide two full working days notice prior to starting your work, not counting the day of your call, weekends or holidays. This provides time for the utilities to locate your proposed dig site.

CONFIRM UTILITY RESPONSE

- Dig Safely NY will notify all member utilities of the pending excavation so that they can come out and mark the location of their underground lines. Before digging on your stated commencement date, confirm that all utilities have responded to you indicating that they have marked your property or they have no facilities present.

RESPECT THE MARKS

- Before you begin your excavation, walk through the site to familiarize yourself with the markings and the location of the buried facilities.

DIG WITH CARE

- It is important excavators take a proactive approach to safety not only for themselves but for the public by initiating the One Call process and adhering to the five steps of a safe excavation.

SITE EVALUATION (SOIL CUT)

- ALL DESIGNED SYSTEMS WITHIN BROOME COUNTY REQUIRE A SOIL CUT EXCEPT ONE
- EXCEPTION: AERATION SYSTEM
- OBJECTIVE: TO DETERMINE SOIL CHARACTERISTICS, HIGH GROUNDWATER DEPTH, ROCK DEPTH & PERFORM FIELD INVESTIGATION FOR ONSITE SEPTIC SYSTEMS

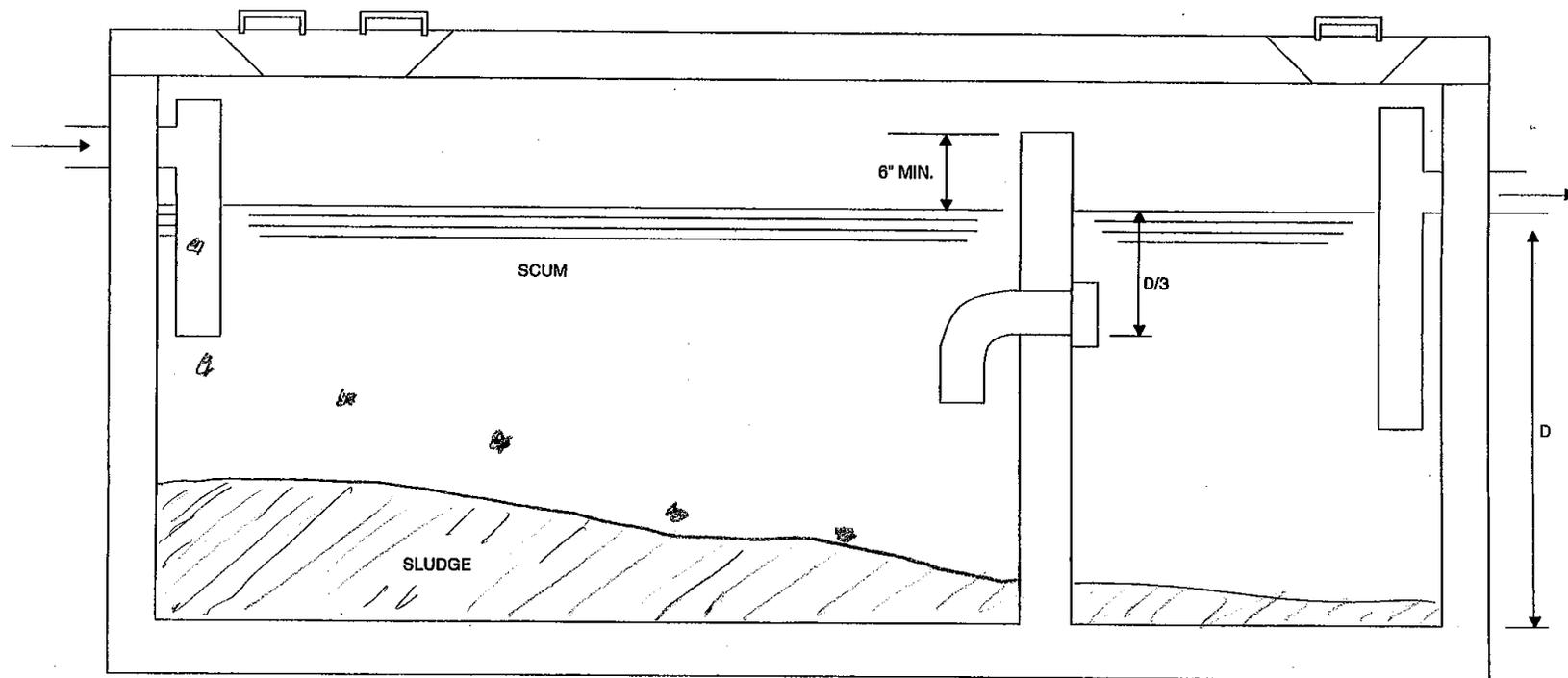
SEPTIC TANK SIZES

Number of Bedrooms	Minimum Tank Capacity (gals)	Minimum Liquid Surface Area (SF)
1, 2 or 3	1,000	27
4	1,250	34
5	1,500	40
6	1,750	47

NOTE: Tank size requirements for more than six bedrooms shall be calculated by adding 250 gallons and 7 square feet of surface area for each additional bedroom. A garbage grinder or hot tub/spa should be considered equivalent to an additional bedroom for determining tank size.

Dual Compartment Concrete Septic Tank

- Properly Operating

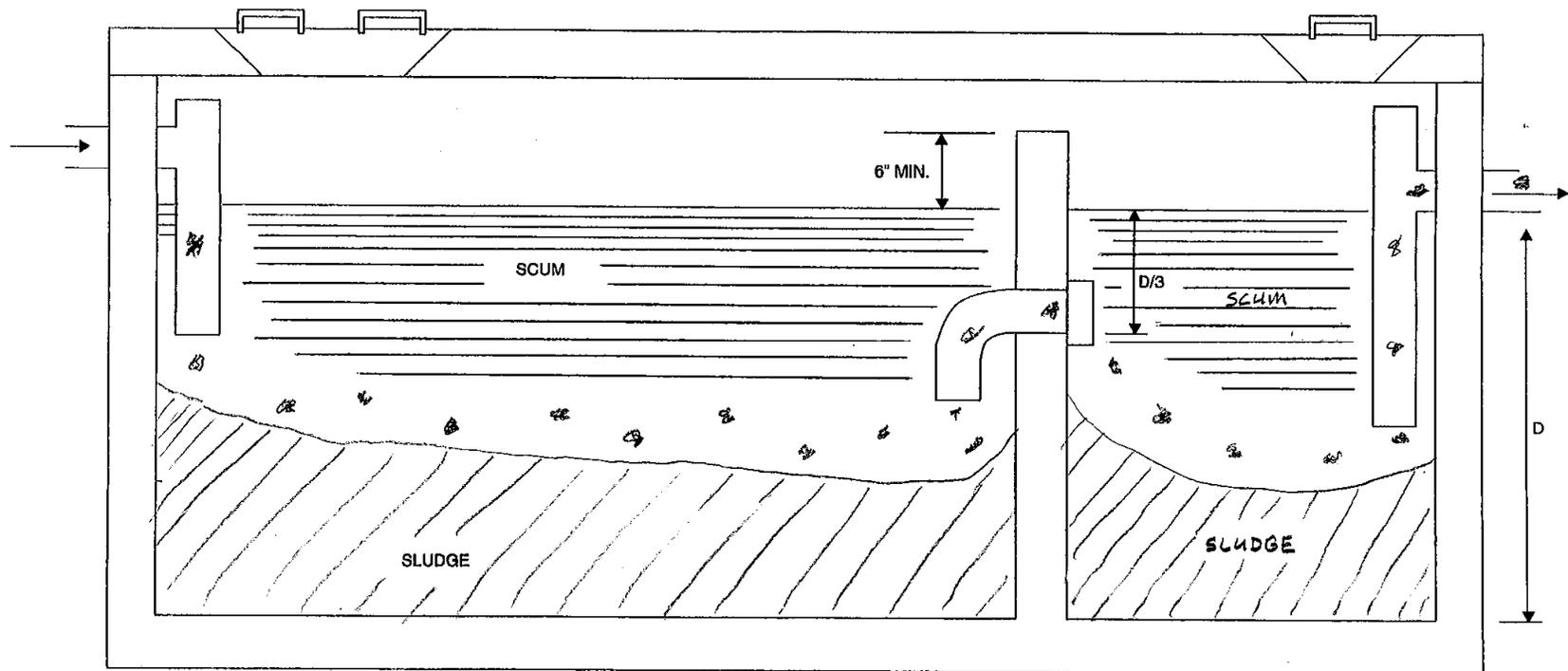


NOTES:

1. COMPARTMENTS SHALL BE CONNECTED BY A FOUR INCH VERTICAL SLOT AT LEAST 18" IN WIDTH, A SIX INCH ELBOW, TWO 4-INCH ELBOWS, OR FOUR 4-INCH DIAMETER HOLES LOCATED AS SHOWN.

Dual Compartment Concrete Septic Tank

- Needs Pumping

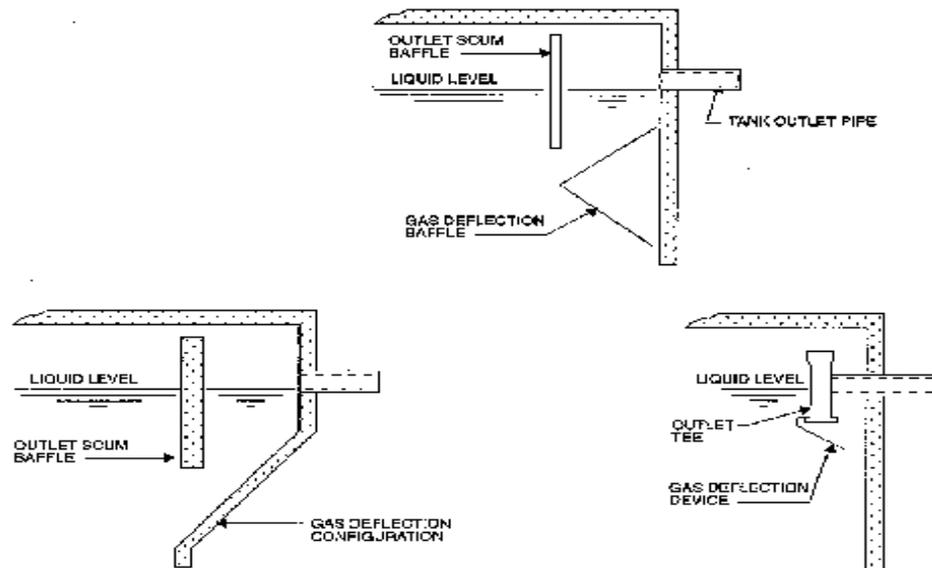


NOTES:

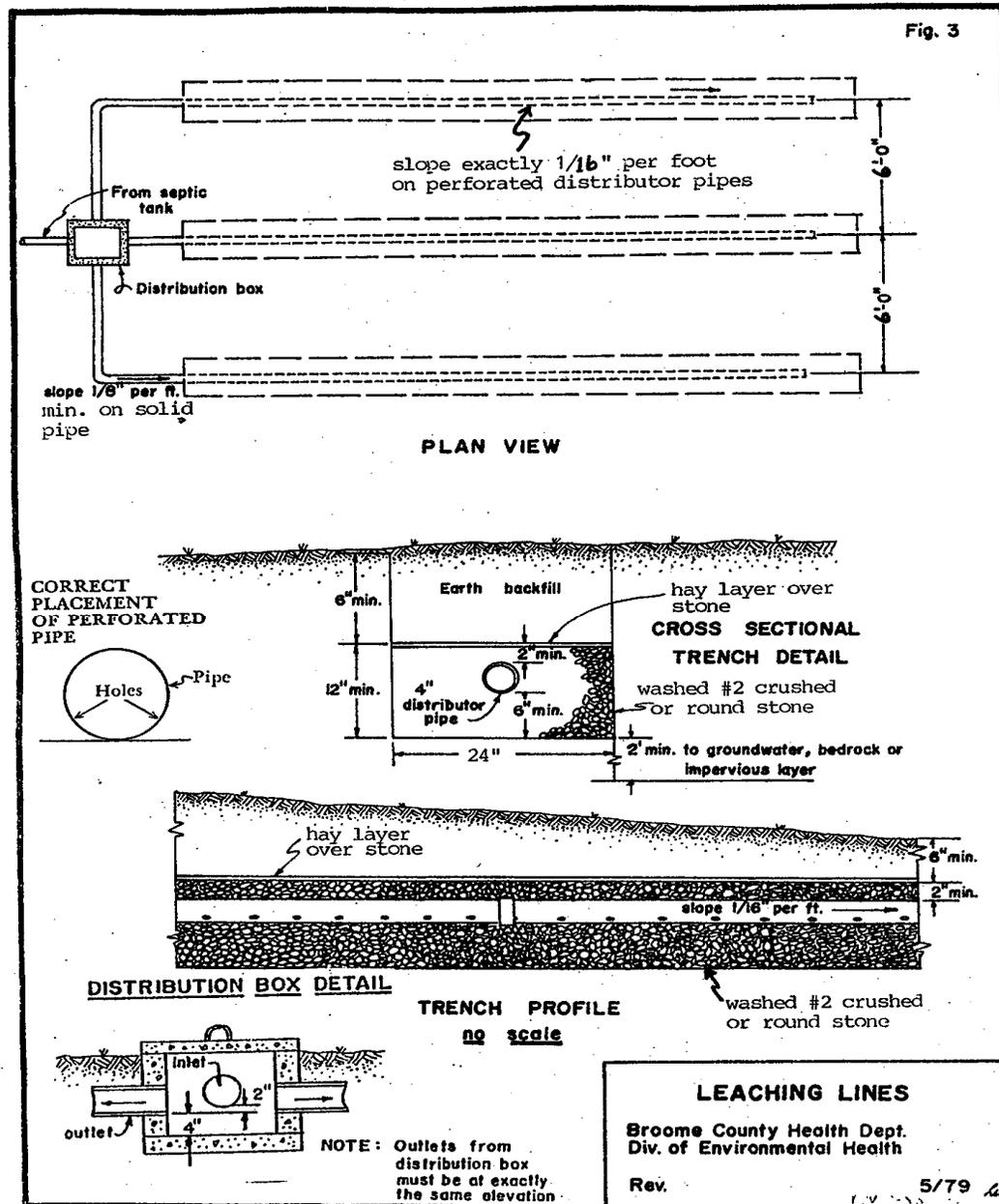
1. COMPARTMENTS SHALL BE CONNECTED BY A FOUR INCH VERTICAL SLOT AT LEAST 18" IN WIDTH, A SIX INCH ELBOW, TWO 4-INCH ELBOWS, OR FOUR 4-INCH DIAMETER HOLES LOCATED AS SHOWN.

Typical Septic Tank Outlet Structure

Figure 6
Typical Septic Tank Outlet Structures to
Minimize Suspended Solids in Effluent



Leach Lines



Absorption Bed

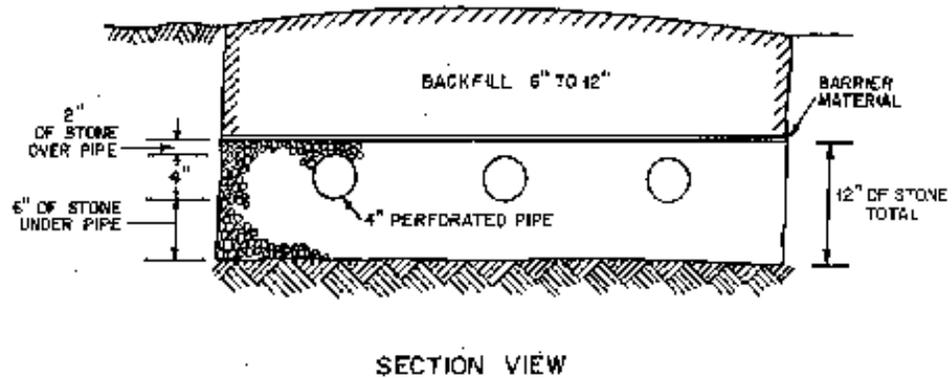
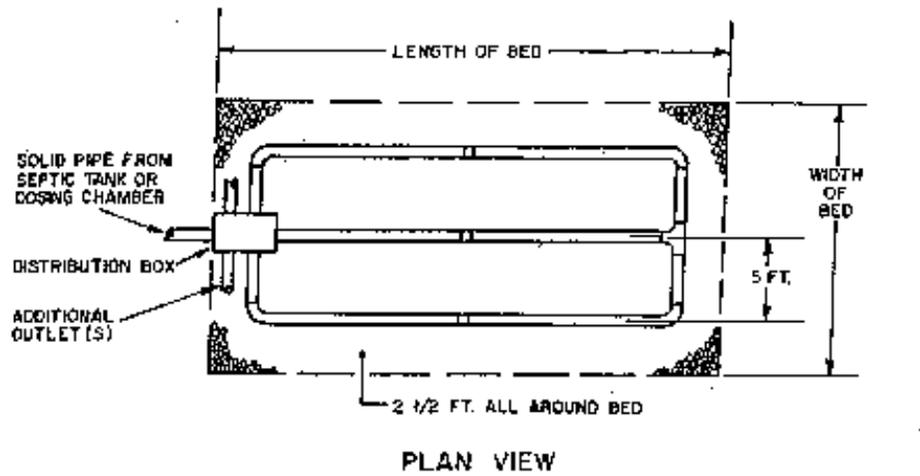
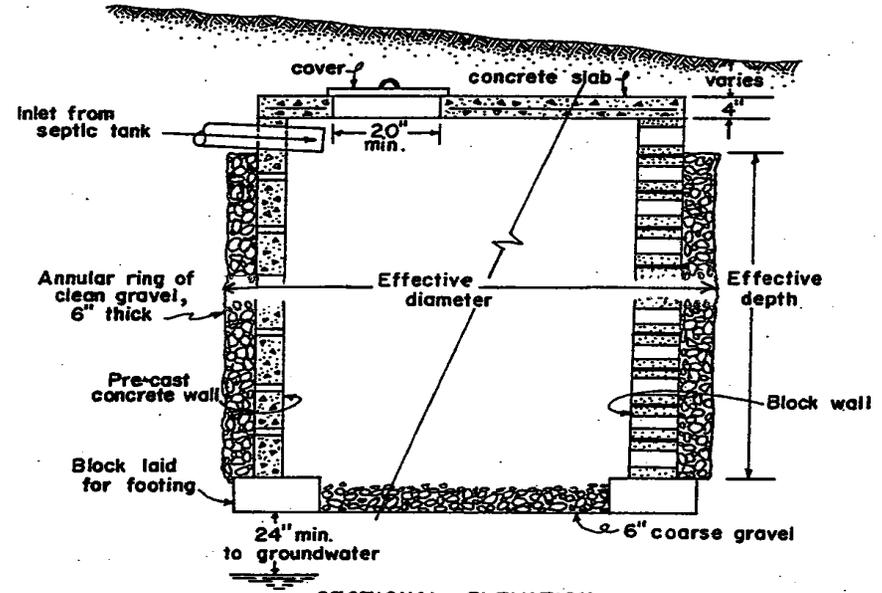
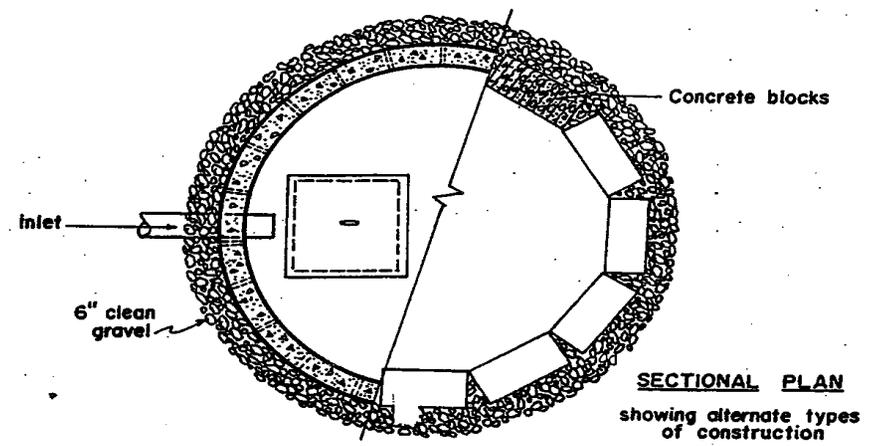


FIGURE 8. CONVENTIONAL ABSORPTION BED

Leach Pit

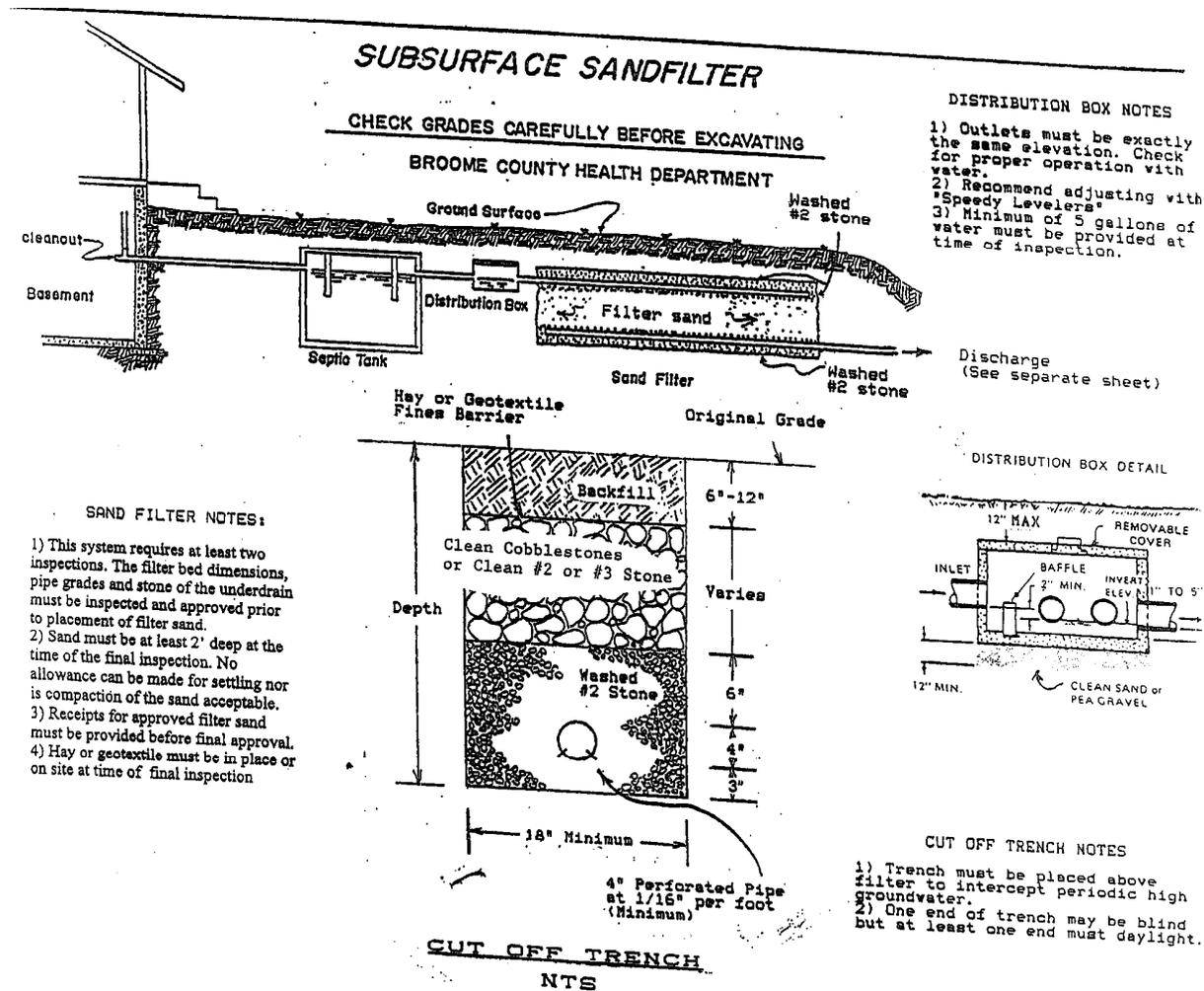
Fig: 2



SECTIONAL ELEVATION

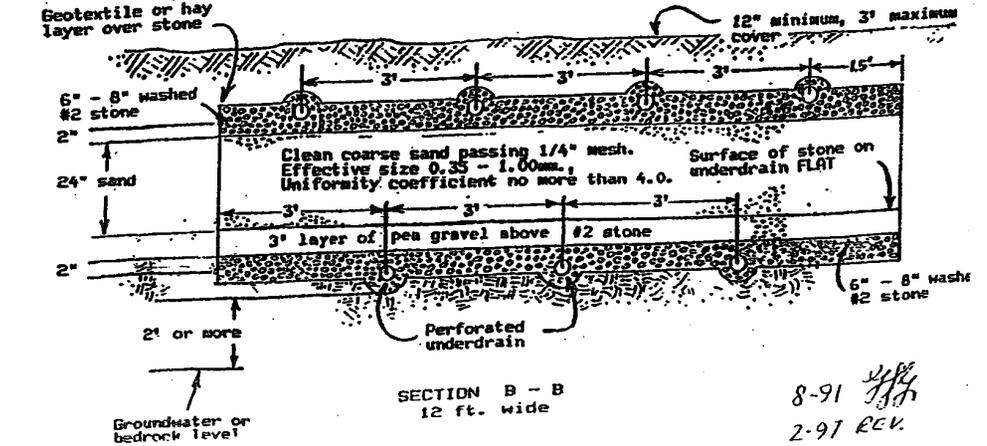
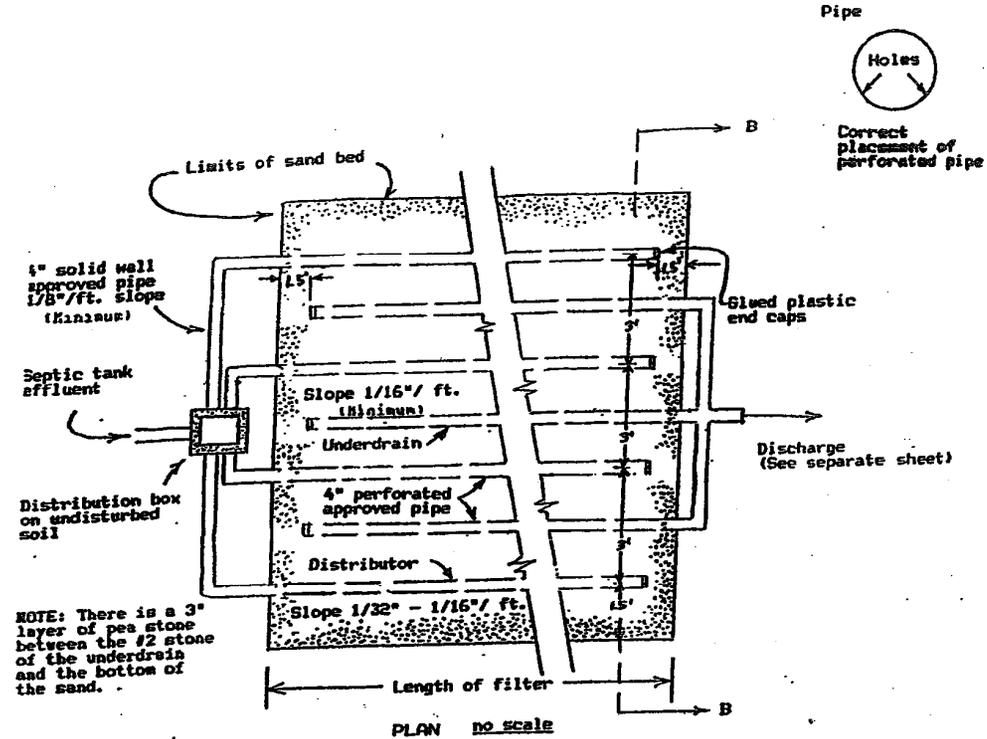
LEACHING PIT
 Broome County Health Dept.
 Div. of Environmental Health
 Rev. 5/79

Subsurface Sand Filter w/ Cutoff Trench

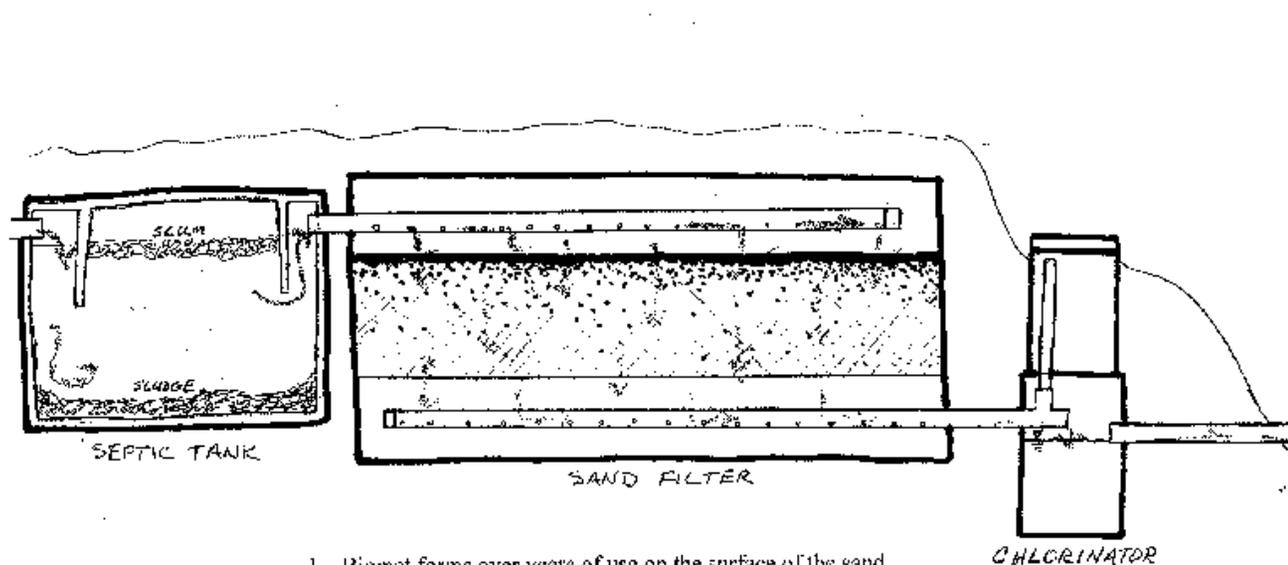


Sand Filter Top View & Cross Section View

SAND FILTER BROOME COUNTY HEALTH DEPT.



Sand Filter Operation

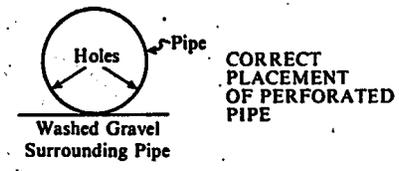
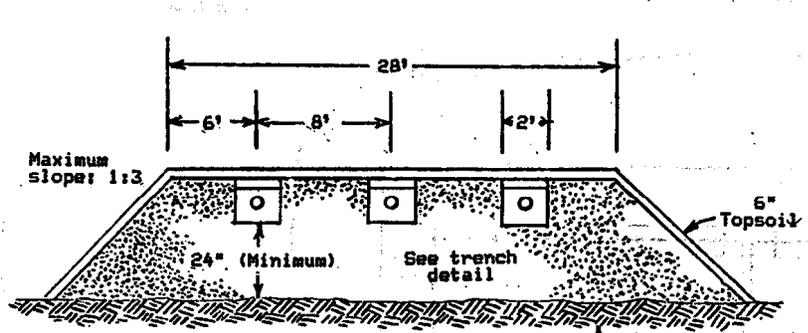


- 1 – Biomats forms over years of use on the surface of the sand
- 2 – Sand also traps suspended particles which escape the septic tank
- 3 – Sand becomes impermeable
- 4 – Untreated effluent pools, breaks out onto the ground or backs up into house

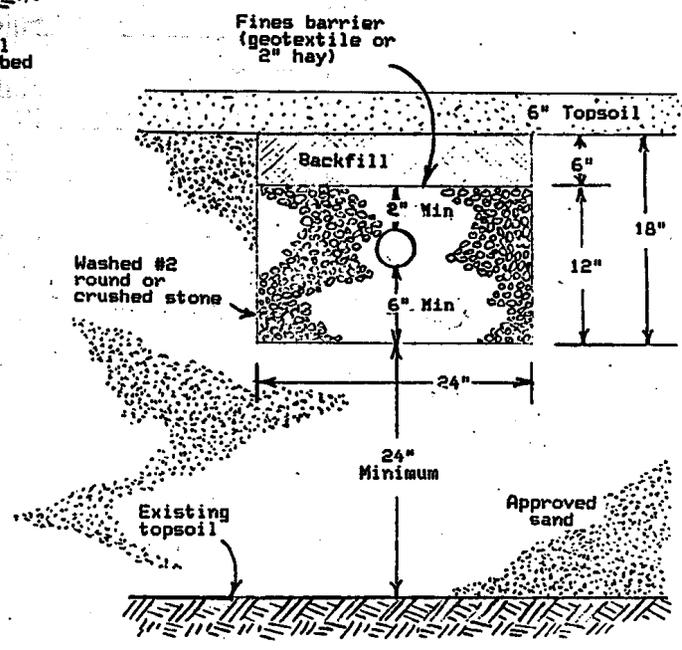
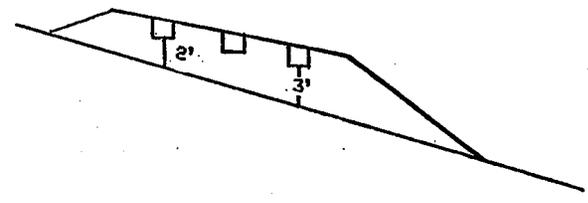
The average time that a homeowner lets elapse before applying to the Health Department to replace a sand filter is 12 years. The more careful the homeowner is with what is allowed to go into the septic system, the longer the system will last. Regular pumping of the septic tank will also help prolong the life of the system.

Raised Bed System

BROOME COUNTY HEALTH DEPARTMENT
RAISED BED SYSTEM

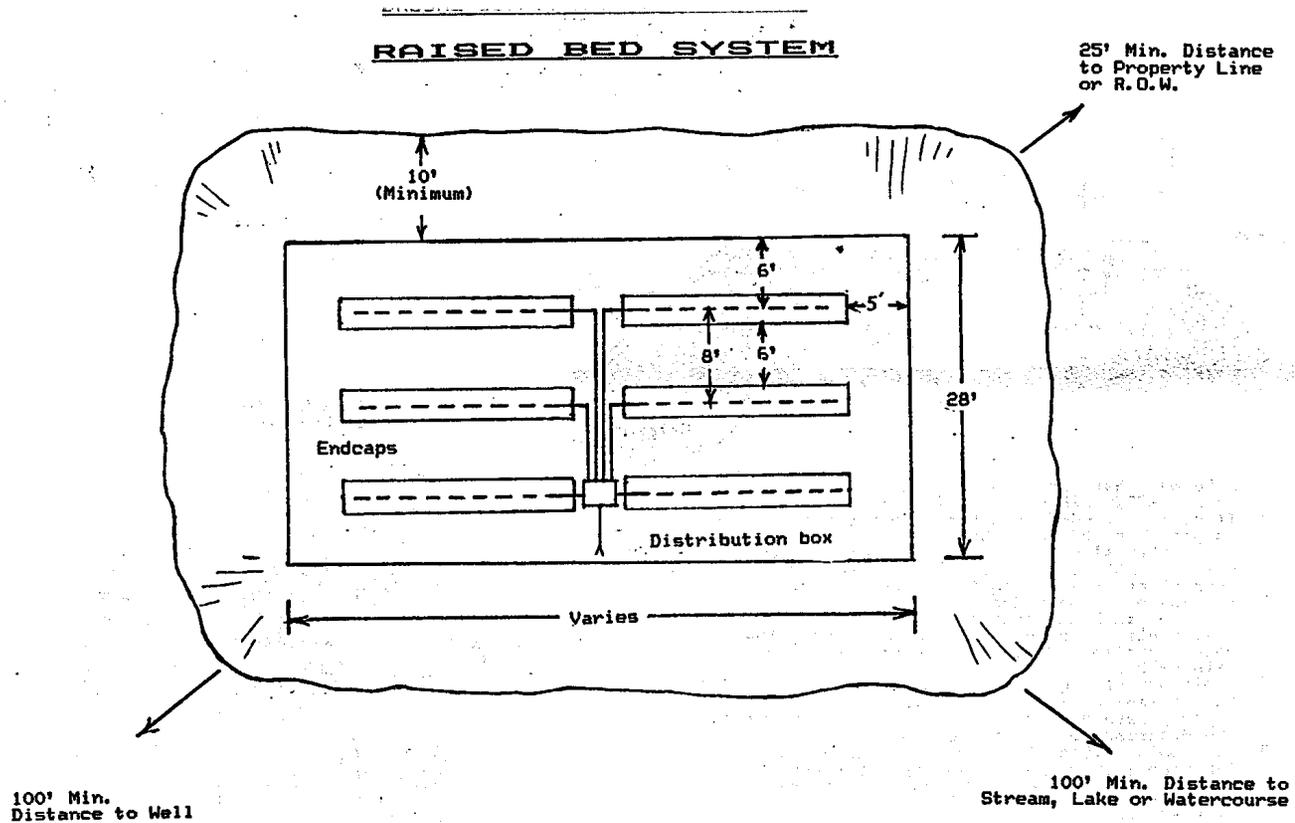


1. Site must have at least 12" of native topsoil. DO NOT STRIP OFF EXISTING TOPSOIL.
2. If site is wooded, cut trees as close to ground as possible. DO NOT PULL STUMPS.
3. Fill material shall be from an approved source. Call 778-2887 for current list of sources.
4. Compaction or settling is not necessary.
5. Maximum slope on sides of fill shall be 1 vertical to 3 horizontal.
6. Distribution box outlets must be exactly the same elevation. Check for proper operation with water.
7. A minimum of 5 gallons of water must be provided at the time of inspection.
8. "Speedy levelers" are recommended for adjusting the distribution box outlets.
9. On sloping sites, the depth of fill shall increase from 2' below the uppermost trench to 3' below the lowermost trench (See Below). The downslope taper will then be 20' to comply with #5 above.



8-91 *clp*

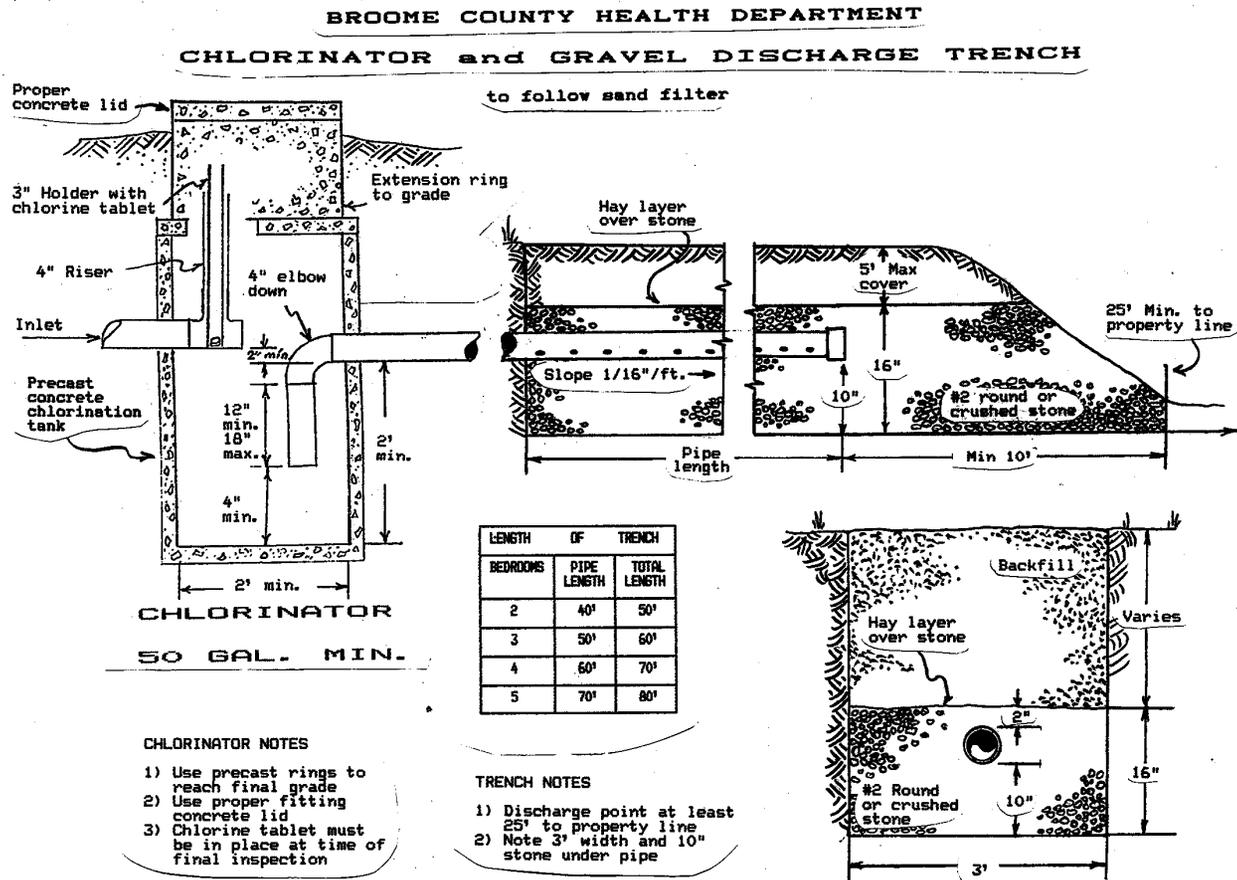
Raised Bed System Top View



PLAN VIEW
(NTS)

8-91

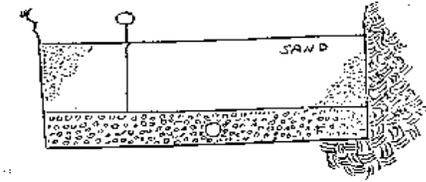
Chlorinator & Gravel Discharge Trench



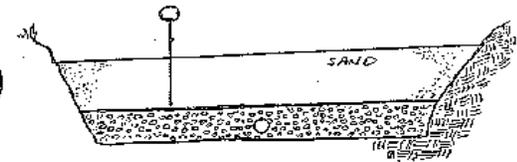
Do's & Don'ts

- Top two photos shows vertical edge to filter
- Bottom photos show that the distributor lines and underdrains must not protrude into the 24" of sand

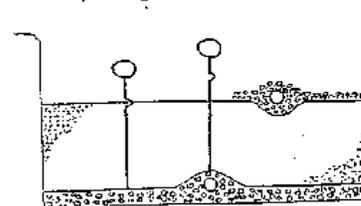
YES



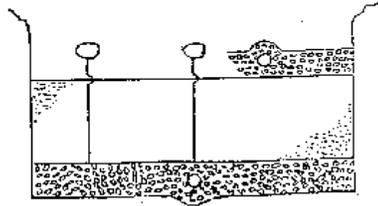
NO



NO



YES



- Sand Filter with ground water inside. This shows the need for a cut off trench. The depth of the trench will be lower than the bottom of the filter.



- Improper discharge trench, unsupported with no end cap.



- Incorrect End cap. Must be glued.



- Corrections made with proper end cap, straw for barrier and covering.



- Improper installation of discharge trench. It is mounded and will fail to the ground surface.



- Discharge trench is incorrectly placed on top of the crushed stone.



- Properly covered discharge trench



Aeration Authorization

#28
BROOME COUNTY HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH SERVICES
225 FRONT STREET
BINGHAMTON, NY 13905
607-778-2887

To: Broome County Health Department

I _____ request the installation of a NSF

Class 1 aeration unit at my property _____

In the Town of _____. I understand that this system requires continuous
electricity and that a maintenance contract with a factory authorized service
center must be kept in effect for the life of the unit.

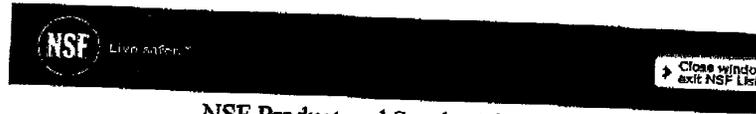
signed _____

date _____ 200

The following aeration units are considered class I and are allowed in Broome County

- Jet
- Norweco
- Multi flow

NSF/ANSI STANDARD 40 Residential Wastewater Treatment Systems



NSF Product and Service Listings

These Listings were Last Updated on Wednesday, June 07, 2006 at 4:15 AM Eastern Time. Please contact NSF International to confirm the status of any Listing, report errors, or make suggestions.

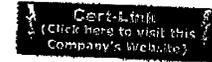
Warning: NSF is concerned about fraudulent downloading and manipulation of website text. If you have received this listing in hard copy, always confirm this certification/listing information by going directly to <http://www.nsf.org/Certified/Wastewater/Listings.asp?Standard=040&Company=34030> for the latest most accurate information.

NSF/ANSI STANDARD 40 Residential Wastewater Treatment Systems

NORWECO, INC.

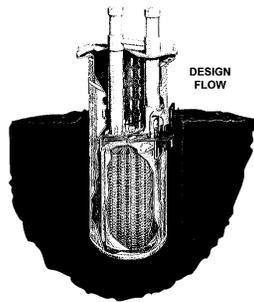
FIRELANDS INDUSTRIAL PARK
220 REPUBLIC STREET
NORWALK, OH 44857-1196
419-668-4471

Facility : NORWALK, OH.



Model Number	Rated Capacity Gallons/Day	Classification
Singlair 950-600GPD System	600	Class I
Singlair 950-750GPD System	750	Class I
Singlair 950-1000GPD System	1000	Class I
Singlair 950-1250GPD System	1250	Class I
Singlair 950-1500GPD System	1500	Class I
Singlair 960-500GPD System[1]	500	Class I
Singlair 960-500GPD System	600	Class I
Singlair 960-750GPD System	750	Class I
Singlair 960-750GPD System	800	Class I
Singlair 960-1000GPD System	1000	Class I
Singlair 960-1250GPD System	1250	Class I
Singlair 960-1500GPD System	1500	Class I
Singlair 960OP-500GPD System	500	Class I
[2] Singlair 960OP-500GPD System	600	Class I

AR System Design and Alarm

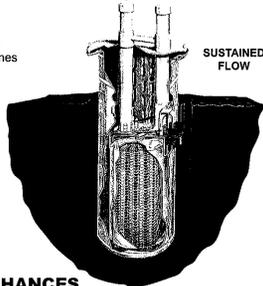


ELIMINATES THE NEED FOR SAND, GRAVEL OR SYNTHETIC FILTERS AND PROVIDES TROUBLE-FREE PERFORMANCE...

Modern families with working parents and hectic schedules promote concentrated periods of water usage in short periods of time. In today's home, excessive hydraulic flows are common and often cause problems with septic tanks, sand filters or any treatment system without flow equalization. The non-mechanical flow equalizing design of the Bio-Kinetic system insures that all incoming wastewater is properly treated prior to discharge. Clarified liquids enter the Bio-Kinetic system through the filter media and are held in the baffled perimeter settling zone. Liquids exit the perimeter settling zone through the flow equalization ports. These ports control the flow through all upstream and downstream processes and regulate the amount of liquid that can enter the Bio-Kinetic system. When incoming flow exceeds the hydraulic discharge rate of the equalization ports, it is retained upstream of the Bio-Kinetic system within the first three treatment stages.

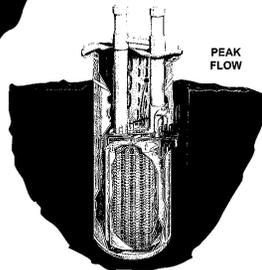
FEATURES

- Three positive filtration zones
- Eight independent settling zones
- Adjustable outlet weir
- Leveling lugs with level
- Adjustable flow deck
- Design flow equalization
- Sustained flow equalization
- Peak flow equalization
- Design flow filter
- Peak flow filter
- Lock-down lugs
- Optional chlorination
- Optional dechlorination



CONSTANT FLOW EQUALIZATION ENHANCES OVERALL SYSTEM PERFORMANCE...

If the incoming wastewater flow increases beyond the discharge rate of the design flow equalization ports, the liquid level will automatically rise to a pair of sustained flow equalization ports. With four flow equalization ports in use, the rate of flow will not exceed the design flow discharge rate. After complete equalization, optional disinfection may be added before all flow follows the multi-directional path to the system outlet. Even during periods of extreme hydraulic or organic overload, effluent quality is maintained. The Bio-Kinetic system has been designed with peak flow filter media and peak flow equalization ports held safely in reserve, well above the sustained flow liquid level. Norveco's Bio-Kinetic system combines up-to-the-minute technology with state-of-the-art design to provide today's answer for the protection of tomorrow's environment.



ADVANTAGES

- Assures complete treatment
- No additional tankage
- Automatic operation
- Patented design
- No moving parts
- Serviceable from grade
- Minimizes chlorine usage
- No electrical requirements
- Eliminates operational upsets
- State-of-the-art technology
- Corrosion resistant material
- Fully warranted

THE STATE-OF-THE-ART ALTERNATIVE TO THE TROUBLESOME SEPTIC TANK...

The Singular plant quietly, efficiently and automatically treats all incoming wastewater in just twenty-four hours. Incorporating the most up-to-date technology, the system reduces all domestic wastewater to a clear, odorless liquid. The Singular plant employs the extended aeration process, similar to the treatment method used by most municipal wastewater treatment facilities. This process involves a natural, biological breakdown of the organic matter in the wastewater. Once complete treatment has been accomplished, a stabilized effluent is safely returned to the environment. The Singular system is a trouble-free answer to wastewater disposal. It contributes to property value and insures a safe, sanitary home environment.

FLOW EQUALIZED THROUGH ALL TREATMENT STAGES...

Flow equalization guarantees adequate retention in each treatment stage. Wastewater enters the system and is equalized within the pretreatment chamber, while anaerobic bacteria and gravity precondition the waste before it flows into the aeration chamber. In the aeration chamber, aerobic bacteria convert the waste into stable substances. Flow equalization maximizes this biological oxidation and insures twenty-four hour retention. Following aeration, the liquids flow into the clarification chamber where flow equalization enhances the settling of biologically active substances. As the fine particles settle, they are returned to the aeration chamber by the Bio-Static sludge return. Only clarified liquids enter the final treatment stage, the Bio-Kinetic system. This revolutionary device incorporates filtration, settling, non-mechanical flow equalization, optional disinfection, adjustable outlet weir and optional dechlorination. Throughout all treatment stages, flow equalization assures process efficiency and effluent quality.

RIVALS THE PERFORMANCE OF THE MOST ADVANCED WASTEWATER TREATMENT EQUIPMENT IN THE WORLD...

The Singular plant is the only onsite wastewater treatment system performance certified and fully listed by NSF International and the Canadian Standards Association. The Singular system complies with U.S. EPA guidelines and meets all requirements of NSF Standard 40. The entire system is listed by CSA for safety, reliability and quality. These certifications insure that the Singular system will reliably protect you, your family and the environment.

CONTROL CENTER WITH TIME CLOCK AUTOMATICALLY REDUCES OPERATING COSTS...



Every Singular aerator is supplied with a prewired electrical control center for fully automatic operation. The control center is contained in a gasketed, lockable, corrosion resistant enclosure for safety and protection of components and wiring. Each control center is equipped with a resettable circuit breaker, on/off/automatic selector switch, red warning light, adjustable time clock and audible alarm. The time clock is factory preset for normal operating conditions, but can be adjusted by your factory-trained Norveco distributor if necessary. The Singular system has been performance certified with the aerator operating only 30 minutes per hour. Intermittent operation results in direct savings in electrical costs and longer aerator life. The distributor's name, address and telephone number are prominently displayed on the control center cover. All system controls and necessary owner information are conveniently located at your fingertips.

OPTIONAL BIO-SANITIZER® DISINFECTING TABLETS



Specifically formulated for use in the Singular system, Bio-Sanitizer tablets provide efficient and reliable disinfection when chlorination is desirable. Manufactured from pure calcium hypochlorite, Bio-Sanitizer tablets dissolve slowly and evenly, providing effective, economical bacteria killing power. Each tablet contains a minimum of 70% available chlorine and can be used to provide positive disinfection when required. Packaged in easily handled and resealable containers, Bio-Sanitizer tablets are available from your local distributor in 4 lb., 25 lb. and 45 lb. polyethylene pails or 100 lb. polyethylene drums.

TODAY'S ANSWER FOR THE PROTECTION OF TOMORROW'S ENVIRONMENT

AERATION UNIT

THE STATE-OF-THE-ART ALTERNATIVE TO THE TROUBLESOME SEPTIC TANK...

The Singulair plant quietly, efficiently and automatically treats all incoming wastewater in just twenty-four hours. Incorporating the most up-to-date technology, the system reduces all domestic wastewater to a clear, odorless liquid. The Singulair plant employs the extended aeration process, similar to the treatment method used by most municipal wastewater treatment facilities. This process involves a natural, biological breakdown of the organic matter in the wastewater. Once complete treatment has been accomplished, a stabilized effluent is safely returned to the environment. The Singulair system is a trouble-free answer to wastewater disposal. It contributes to property value and insures a safe, sanitary home environment.

FLOW EQUALIZED THROUGH ALL TREATMENT STAGES...

Flow equalization guarantees adequate retention in each treatment stage. Wastewater enters the system and is equalized within the pretreatment chamber, while anaerobic bacteria and gravity precondition the waste before it flows into the aeration chamber. In the aeration chamber, aerobic bacteria convert the waste into stable substances. Flow equalization maximizes this biological oxidation and insures twenty-four hour retention. Following aeration, the liquids flow into the clarification chamber where flow equalization enhances the settling of biologically active substances. As the fine particles settle, they are returned to the aeration chamber by the Bio-Static sludge return. Only clarified liquids enter the final treatment stage, the Bio-Kinetic system. This revolutionary device incorporates filtration, settling, non-mechanical flow equalization, optional disinfection, adjustable outlet weir and optional dechlorination. Throughout all treatment stages, flow equalization assures process efficiency and effluent quality.



OPTIONAL BIO-SANITIZER® DISINFECTING TABLETS

Specifically formulated for use in the Singulair system, Bio-Sanitizer tablets provide efficient and reliable disinfection when chlorination is desirable. Manufactured from pure calcium hypochlorite, Bio-Sanitizer tablets dissolve slowly and evenly, providing effective, economical bacteria killing power. Each tablet contains a minimum of 70% available chlorine and can be used to provide positive disinfection when required. Packaged in easily handled and resealable containers, Bio-Sanitizer tablets are available from your local distributor in 4 lb., 25 lb. and 45 lb. polyethylene pails or 100 lb. polyethylene drums.

RIVALS THE PERFORMANCE OF THE MOST ADVANCED WASTEWATER TREATMENT EQUIPMENT IN THE WORLD...

The Singulair plant is the only onsite wastewater treatment system performance certified and fully listed by NSF International and the Canadian Standards Association. The Singulair system complies with U.S. EPA guidelines and meets all requirements of NSF Standard 40. The entire system is listed by CSA for safety, reliability and quality. These certifications insure that the Singulair system will reliably protect you, your family and the environment.

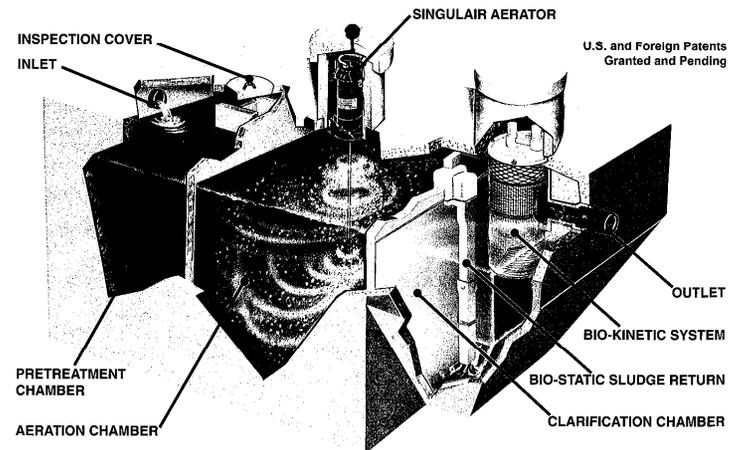
CONTROL CENTER WITH TIME CLOCK AUTOMATICALLY REDUCES OPERATING COSTS...



Every Singulair aerator is supplied with a prewired electrical control center for fully automatic operation. The control center is contained in a gasketed, lockable, corrosion resistant enclosure for safety and protection of components and wiring. Each control center is equipped with a resettable circuit breaker, on/off/automatic selector switch, red warning light, adjustable time clock and audible alarm. The time clock is factory preset for normal operating conditions, but can be adjusted by your factory-trained Norweco distributor if necessary. The Singulair system has been performance certified with the aerator operating only 30 minutes per hour. Intermittent operation results in direct savings in electrical costs and longer aerator life. The distributor's name, address and telephone number are prominently displayed on the control center cover. All system controls and necessary owner information are conveniently located at your fingertips.

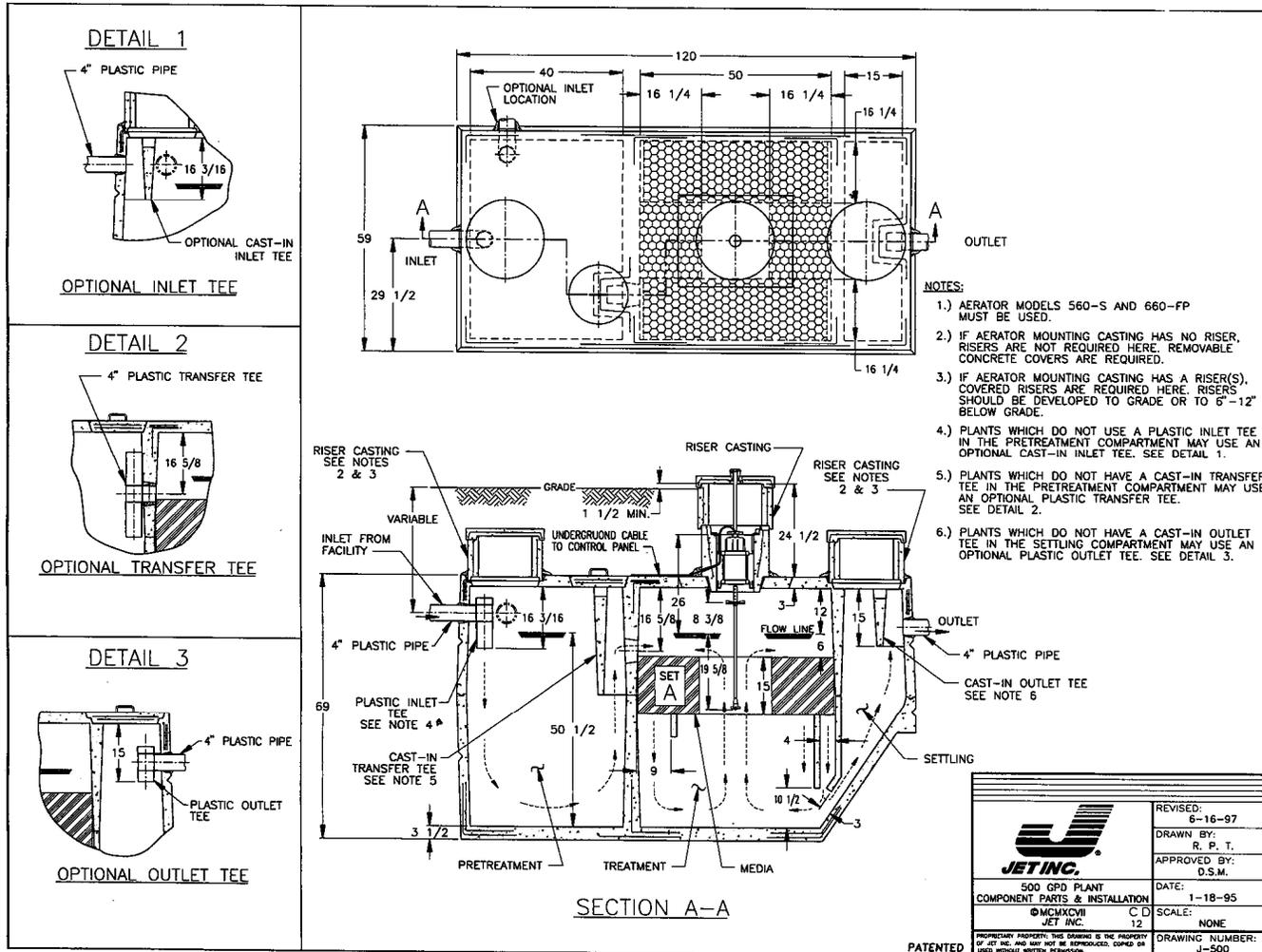
A UNIQUE NEW DESIGN THAT EXCEEDS GOVERNING CRITERIA AND ASSURES YEARS OF RELIABLE TREATMENT AND TROUBLE-FREE OPERATION...

- 50% less energy required—the Singulair aerator operates only 30 minutes per hour, providing substantial savings over continuous-run systems.
- NSF and CSA listed to internationally recognized performance standards—certified testing insures quality, reliability, safety and long life.
- Frequent tank pumping eliminated—48 hour retention in the Singulair system reduces pumping frequency compared to smaller capacity systems.
- Low operating cost—the Singulair aerator is the only electrical component. The fractional horsepower aerator motor requires less electrical energy than most major appliances.
- Low installation cost—the Singulair plant may be installed to treat all domestic wastewater at a cost comparable to that of a septic system.
- Increases property value—insures a safe, sanitary home environment. Eliminates the unsightly and unsanitary conditions associated with troublesome septic tanks.
- Durable, reliable components installed safely below grade—no exposed power cords, compressors, filters or air lines accessible to children or pets.
- Precast concrete pretreatment chamber included—eliminates the need to purchase a separate tank.
- State-of-the-art design—incorporating the revolutionary Bio-Kinetic system, all flow through the Singulair plant is uniformly distributed throughout all four treatment stages.
- Fully warranted components—backed by the longest warranty and exchange program in the industry.
- Equalizes hydraulic surges—at the Standard 40 design loading pattern, all flow is equalized an average of 44%.
- Consistent treatment—variations in flow from guests, parties or vacations do not affect performance.
- Local distribution and service—all Singulair systems are installed and serviced by licensed, factory-trained Norweco distributors. Their company name and address are displayed on the control center cover.



Norweco®, Singulair®, Modulair®, Travalair®, Microsonic®, Lift Rail®, Bio-Kinetic®, Bio-Sanitizer®, Bio-Neutralizer®, Bio-Static®, Bio-Dynamic®, Bio-Fan®, Grass Buster® and "BIUSTED"™ are registered trademarks of Norweco Wastewater Equipment Company, Incorporated.

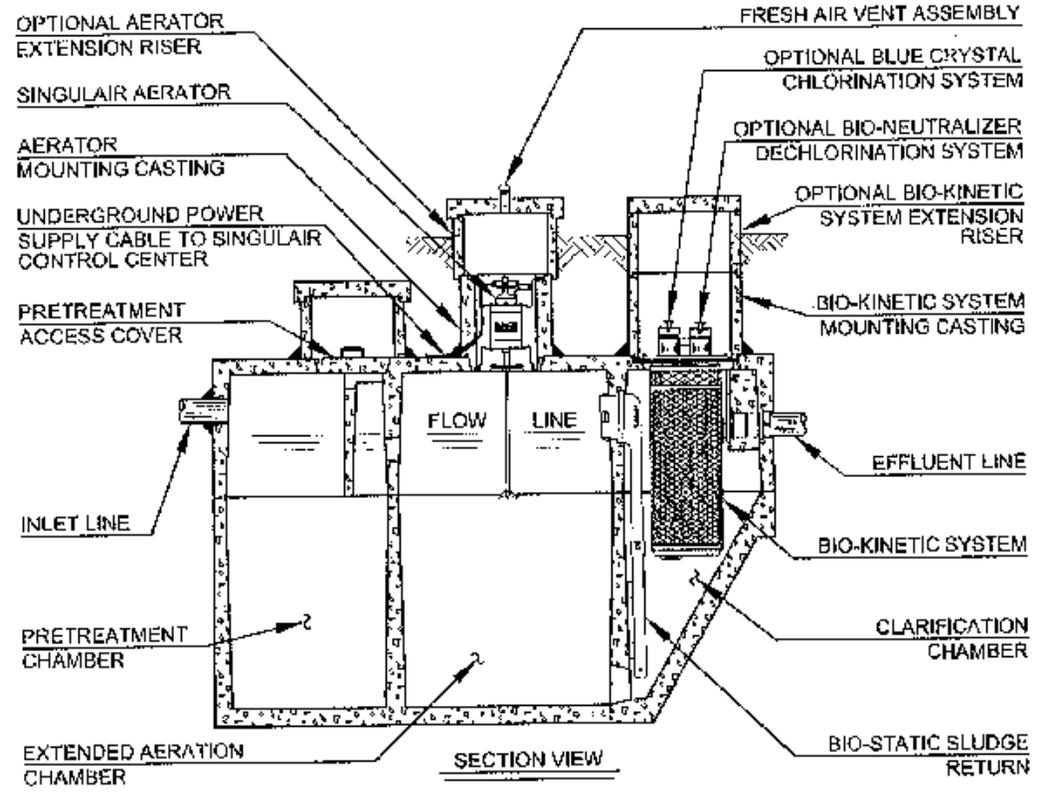
JET AERATION UNIT



 JET INC. 500 GPD PLANT COMPONENT PARTS & INSTALLATION ©MCMXCVII JET INC.	REVISED: 6-16-97
	DRAWN BY: R. P. T.
	APPROVED BY: D.S.M.
	DATE: 1-18-95
SCALE: NONE	DRAWING NUMBER: J-500

PATENTED PROPRIETARY PROPERTY: THIS DRAWING IS THE PROPERTY OF JET INC. AND MAY NOT BE REPRODUCED, COPIED OR USED WITHOUT WRITTEN PERMISSION.

NORWECO AERATION UNIT



- Multi-Flo Aeration Unit

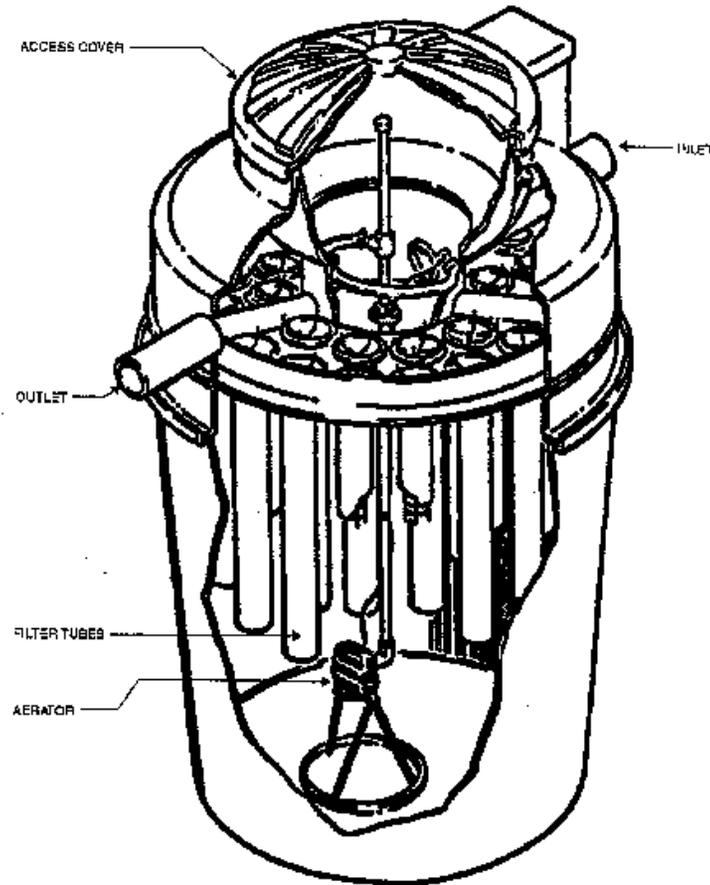
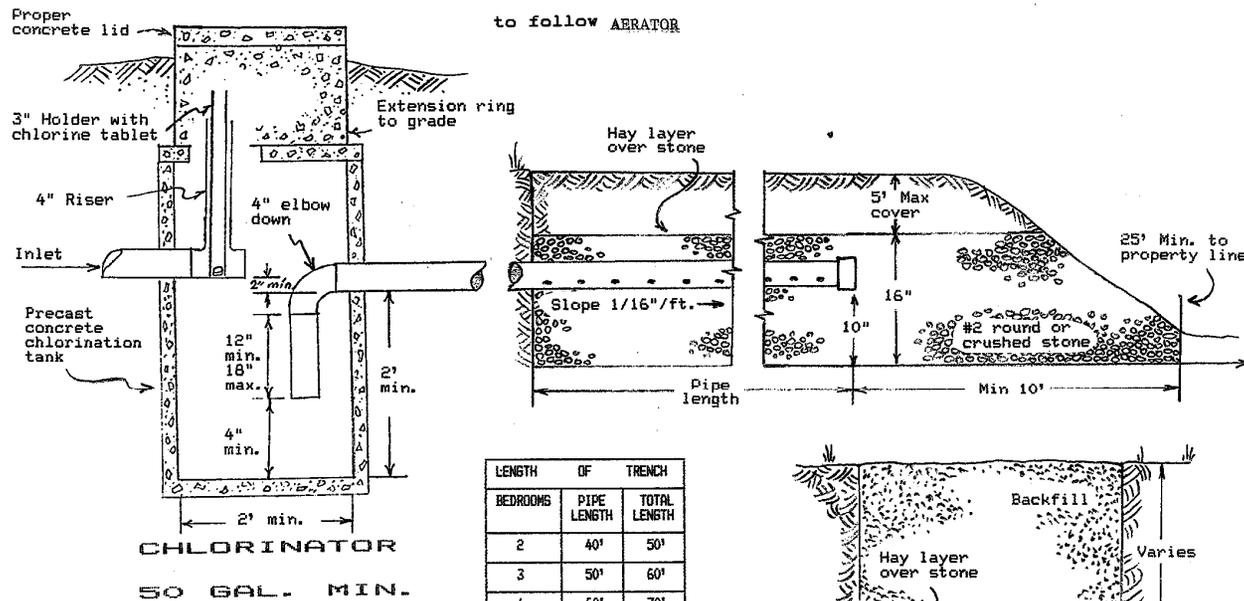


Figure 8A
Aerobic Unit
Page 70

Aeration Discharge Trench

BROOME COUNTY HEALTH DEPARTMENT
CHLORINATOR and GRAVEL DISCHARGE TRENCH



CHLORINATOR NOTES

- 1) Use precast rings to reach final grade
- 2) Use proper fitting concrete lid
- 3) Chlorine tablet must be in place at time of final inspection

TRENCH NOTES

- 1) Discharge point at least 25' to property line
- 2) Note 3' width and 10" stone under pipe

Field Sewage Inspection Form



BROOME COUNTY HEALTH DEPARTMENT
 225 FRONT ST., BINGHAMTON, NY 13905
 PHONE (607) 778-2887

CERTIFICATE OF INSPECTION

FILE# _____

An inspection of the septic system being constructed at _____ Town _____

and owned by _____ has been completed. The status of this inspection and the items checked are described below.

CONSTRUCTION INSPECTION CHECKLIST

ITEM INSPECTED	YES	NO	ITEM INSPECTED	YES	NO
HOUSE SEWER			WATERCOURSE SEPARATION		
SEPTIC TANK (SIZE AND TYPE)			WELL SEPARATION		
SEPTIC TANK BAFFLES			PROPERTY LINE/ R.O.W. SEPARATION		
LINE TO DISTRIBUTION BOX			DEPTH TO BEDROCK OR GROUNDWATER		
DISTRIBUTION BOX WATER TIGHT			MOUND/FILL SYSTEM SIZE		
DISTRIBUTION BOX LEVEL			MOUND/FILL SYSTEM MATERIAL		
DISTRIBUTION BOX STABLE			MOUND/FILL SYSTEM RECEIPTS		
UNDERDRAIN SIZE			TOPSOIL AND SEED		
UNDERDRAIN DEPTH			TRENCH LENGTH		
UNDERDRAIN PIPE GRADES			TRENCH WIDTH AND DEPTH		
UNDERDRAIN ENDCAPS			TRENCH PIPE GRADES		
#2 STONE			TRENCH ENDCAPS		
#1 STONE			AERATION TANK CONSTRUCTION		
SAND DEPTH			AERATION MOTOR		
SAND RECEIPTS			AERATION MAINTENANCE CONTRACT		
DISTRIBUTOR GRADES			PUMP AND ALARM		
DISTRIBUTOR STONE DEPTH			DRY WELL CONSTRUCTION		
DISTRIBUTOR ENDCAPS			HAY OR GEOTEXTILE		
CHLORINATOR - CONSTRUCTION					
CHLORINATOR - TABLET					

_____ The system seems to be installed satisfactorily and may be covered; a Certificate of Approval will be issued.

_____ The system seems to be installed satisfactorily and may be covered; a Certificate of Approval is being withheld until the item(s) listed below are inspected.

_____ The bottom inspection of the sand filter was satisfactory; construction may proceed. A final inspection is required before covering.

_____ The system is not passed or could not be inspected for the following reasons:

_____ This inspection is for the system components as described in the Health Department specification. Construction incidental to the installation (i.e. electrical connections, internal plumbing) are not subject to Health Department Approval.

A CERTIFICATE OF APPROVAL WILL NOT BE ISSUED UNTIL THE UNSATISFACTORY ISSUES ARE RESOLVED.

DATE _____

CONTRACTOR _____

TIME _____

INSPECTOR _____

IF YOU HAVE ANY QUESTIONS
BEFORE YOU BEGIN OR
DURING CONSTRUCTION,
PLEASE CALL US AT 778-2887
AND ASK TO SPEAK WITH
SOMEONE IN THE SEWAGE
PROGRAM. DON'T MAKE THE
MISTAKE OF CHANGING THE
DESIGN TO FIT THE SITE.
THAT MAY COST YOU MONEY.