

TABLE OF CONTENTS

THE CLEAN SOLUTION™	2
CONVENTIONAL SUBSURFACE DISPOSAL SYSTEM vs THE CLEAN SOLUTION	4
FUNCTION OF A SEPTIC TANK	5
FUNCTION OF A LEACH FIELD.....	5
FUNCTION OF <i>THE CLEAN SOLUTION</i> system	6
WHEN TO USE <i>THE CLEAN SOLUTION</i>	8
SYSTEM SCHEMATIC ANAEROBIC vs AEROBIC	8
ADVANTAGES OF USING THE CLEAN SOLUTION	10
Environmentally Friendly	10
User Friendly	10
Low Maintenance	11
Technical and Installation Support.....	11
Community Developments	11
Restaurants	12
INDEPENDENT TEST RESULTS	12
THEORY of THE CLEAN SOLUTION	14
WHY USE THE CLEAN SOLUTION SYSTEM	16
DESIGN CRITERIA	18
THE CLEAN SOLUTION MODELS FOR SINGLE FAMILY HOMES	18
FULL TIME RESIDENTIAL MODELS.....	19
SEASONAL RESIDENTIAL MODELS.....	20
COMMERCIAL MODELS	20
DISPERSAL AREA SIZING.....	21
PUMP STATION DESIGN RECOMMENDATIONS.....	22
DUPLEX PUMP STATIONS.....	23
RESPONSIBILITIES	23
The Owner.....	23
The Licensed Designer.....	23
Wastewater Alternatives, Inc.	23
The Installer.....	23
MAINTENANCE and OPERATION FOR SINGLE FAMILY RESIDENTIAL	23
Full Time Residential Use (Single Family Home)	23
Seasonal Residential Use (Single Family Home use less than 6 months per year)	23
THE CLEAN SOLUTION WARRANTY	23
PERFORMANCE SPECIFICATIONS	23
RIGHTS TO DATA AND ACCESS TO THE SYSTEM	23
TRADE SECRETS	23
DIGITAL FILES	23
FREQUENTLY ASKED QUESTIONS ABOUT THE CLEAN SOLUTION SYSTEMS	23
APPENDIX - SYSTEM SCHEMATICS	23



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

THE CLEAN SOLUTION™

Alternative Wastewater Treatment System

Wastewater Alternatives Inc., (WAI) would like to Thank You for your interest in THE CLEAN SOLUTION™ alternative wastewater treatment system.

There is now an affordable, ecologically sound alternative wastewater treatment system available to replace the conventional leach field currently required with septic systems. Developed in Jaffrey, N.H. by Wastewater Alternatives Inc., *THE CLEAN SOLUTION* accomplishes the biological functions of a leach field in a subterranean tank the size of a septic tank. The discharge is a treated, odorless liquid, which is cleaner than typical treated municipal sewage. *THE CLEAN SOLUTION* system is widely used in New Hampshire, Maine, Massachusetts and Vermont. Systems range in capacity from serving a single-family home to large community systems and commercial applications.

Wastewater Alternatives Inc., was founded in 1992 by Harold Davis who saw the need to have a subsurface disposal system that could treat household wastewater in an environmentally friendly manner and be cost effective. *THE CLEAN SOLUTION* system was first tested in 1992 with the first system installed in Rindge, New Hampshire in 1995. From 1992, to when the first *CLEAN SOLUTION* was installed, it has evolved into an environmentally friendly, cost effective, low maintenance alternative subsurface disposal system. When WAI began in 1992, WAI had one basic principle it would follow, “**customer satisfaction**”. WAI continues to follow that principle and has added new members to its team over the years to maintain the same level of service to its clients that has been WAI’s hallmark since 1992. WAI installs over 100 systems each year in New Hampshire. *THE CLEAN SOLUTION* system is also approved for use in Vermont, Maine and Massachusetts.

The following pages provide you information pertaining to *THE CLEAN SOLUTION* system. This information is provided to give you a clear understanding of the system, as well as your respective responsibilities as a Home Owner, Designer, or Installer. The following information will be updated as necessary to address technological advances or regulatory updates pertaining to the system approval process. To ensure that you have the most current information please contact WAI at 1-866-900-2415.

There are four critical steps that need to be followed when using *THE CLEAN SOLUTION* system.

1. The owner must hire a Designer licensed in the State of New Hampshire. *THE CLEAN SOLUTION* system must be designed, installed and operated as described in the Innovative/Alternative System approval granted by NH Department of Environmental Services – Subsurface Bureau.
2. Prior to making an application for state or local approval a copy of the design plan(s) and supporting documentation must be submitted to WAI for review and approval. This is required to ensure the homeowner(s) has been provided with the required documentation outlining the Sales and Maintenance of the system.
3. In conjunction with a Licensed Installer, WAI requires that a WAI technician install the components of *THE CLEAN SOLUTION* system.
4. The owner of a property where *THE CLEAN SOLUTION* system has been installed shall have a valid maintenance contract with WAI or an approved vendor. The minimum length of any contract shall be for a period of two years.



CONVENTIONAL SUBSURFACE DISPOSAL SYSTEM vs *THE CLEAN SOLUTION*

In a subsurface disposal system there are basically two processes that break down and treat wastewater. The first process is Anaerobic (without oxygen) in the septic tank and the second process is Aerobic (with oxygen), which often occurs in the leach field of a conventional subsurface disposal system.

FUNCTION OF A SEPTIC TANK

The first component of the subsurface disposal system is the septic tank. The septic tank inlet receives black and gray water from the structure (i.e. house) and allows solids to settle out, and retain floatable matter. The septic tank is the anaerobic component of a conventional subsurface disposal system; allowing the biological process of breaking down solids into dissolved solids - a necessary step for final aerobic treatment. The septic tank then outlets effluent that has gone through the anaerobic process to a leach field.

FUNCTION OF A LEACH FIELD

Since an anaerobic septic tank provides only partial treatment, further aerobic activity is required for complete treatment. The leach field is the component of the subsurface disposal system that provides this aerobic treatment. There are three major types of leach fields currently being used; Pipe and Stone systems, Chamber Systems, and Fabric Based Systems. All three types require airflow through the system to begin the aerobic treatment process. Air is introduced into the leach field either by airflow through the soil or by adding vents. Aerobic treatment creates a biomat /clogging layer (sludge) within the leach field. The biomat is a biological growth which filters out solid particles and dissolved pollutants not processed within the septic tank. As the biomat forms a clogging layer forms on the soil interface between the stone and the sand blanket. On fabric based systems the clogging layer forms on the fabric as well as the soil interface between the fabric material and soil surface. The development of biomat /clogging layer is a function of the organic loading as well as the loading rate (gallons per day). High strength effluent from restaurants is typically 5 to 10 times stronger than residential effluent and will result in the biomat / clogging layer forming at a faster rate. As the biomat / clogging layer becomes thicker the infiltration rate of the system decreases. As the infiltration rate decreases over time the leach field becomes overloaded (flooded). Once flooded, the leach field converts from aerobic treatment to anaerobic treatment. At this point the leach field no longer is able to effectively treat the wastewater, which results in polluting groundwater and nearby surface water. Onsite septic systems are a major concern for property owners in sensitive environmental areas.

FUNCTION OF *THE CLEAN SOLUTION* system

When using *THE CLEAN SOLUTION* system a septic tank is utilized and performs the same function as a septic tank in a conventional subsurface disposal system. *THE CLEAN SOLUTION* system differs from a conventional septic system in that the aerobic treatment process occurs within the BioCon™ chamber, instead of in a leach field.

In the BioCon chamber, air is introduced into the effluent stream. The air (oxygen) and effluent stream (food) then prompts the growth of a biofilm (bacteria) on the media stored in the BioCon™ chamber. The biofilm breaks down the wastewater reducing BOD5 and TSS levels, as well as nitrogen and phosphorus. The biofilm in the BioCon chamber is equivalent to the biomat in the leach field, creating



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

sludge as a byproduct of the treatment process. The treated effluent from the BioCon chamber then flows into a settling chamber. The settling chamber allows excess sludge to settle out of the effluent.

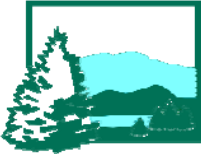
From the settling chamber clear treated effluent is dispersed into the ground through a dispersal field. The advantage of *THE CLEAN SOLUTION* system is the "Biomat" has been trapped in the settling chamber and is pumped out when the septic tank is serviced. *THE CLEAN SOLUTION* system has provided the aerobic treatment, allowing clear treated effluent to be dispersed into the ground in a much smaller area called a "dispersal field". Because of *THE CLEAN SOLUTION* treatment process the dispersal field does not suffer the same clogging fate of a conventional leach field. The size of the dispersal field varies from State to State and is typically set by a State's Environmental Department.

With a conventional soil based septic system, homeowners are not typically aware of problems lurking in the leach field below the lawn. Owners only become aware that the leach field has reached its effective life span when the sewer line backs-up into the house or the lawn becomes too "soggy" to mow. Remote leach fields go years in failure without anyone noticing the problem. Long before the "soggy" areas are noticed or the sewer backs up into the house, untreated wastewater has entered the groundwater and nearby surface water. When the homeowner reaches the "soggy" lawn point the system needs to be replaced which is very costly and disruptive. Often times the replacement of the leach field results in a major impact to the property's existing landscaping.

When *THE CLEAN SOLUTION* system is utilized, the system is typically inspected when the septic tank is serviced. The technician inspecting the system is trained in its proper operation and determines if the system is functioning properly. If a problem is encountered, it can often be corrected during the inspection process and long before the "soggy lawn" symptom occurs.

WHEN TO USE *THE CLEAN SOLUTION*

THE CLEAN SOLUTION system is well suited for use in any septic system application where the installation of a standard leach field would be expensive or difficult – whether it's a single-family house, multi unit development or a commercial development. Examples include homes on bodies of water, high water tables, ledge, small lots, housing developments, condo units, restaurants, shopping centers and office complexes. *The CLEAN SOLUTION* unit is an affordable, completely in-ground system that is ideal for all new installations or failed system replacements.



WASTEWATER ALTERNATIVES INC.
developing innovative solutions with sustainable results

SYSTEM SCHEMATIC ANAEROBIC vs AEROBIC



ADVANTAGES OF USING *THE CLEAN SOLUTION*

Environmentally Friendly

- *THE CLEAN SOLUTION* system, a tank that is installed in line after the septic tank, provides the same aerobic treatment that a leach field is designed to. As a result a smaller field is required to disperse the clean, odorless water into the ground.
- *THE CLEAN SOLUTION* system helps prevent ground water pollution and protects our natural streams, lakes and wetlands.
- Requires less fill.
- Adaptable for sensitive sites.
- Tests show more environmentally safer than other conventional system.
- Recharges groundwater with a higher level of treatment than conventional systems.

User Friendly

- Simple - the only mechanical device used by *THE CLEAN SOLUTION* system is the air compressor.
- Garbage disposer and dishwasher compatible.
- Accommodates vacations, low flows and peak loads.
- Landscape friendly - tanks in ground, no unsightly candy canes, vents or large raised covers above ground.
- Low operating cost.
- Does not require a pump for gravity systems.
- Reduces costly repairs in the future.

Low Maintenance

- In most applications, simple maintenance is required approximately every 2 to 3 years depending upon system loading rates. Maintenance consists of pumping the septic tank and settling tank.
- There are no mechanical or electrical components within the BioCon treatment chamber.
- **Does not require remote operating via phone modem to maintain treatment.**

Technical and Installation Support

- WAI provides one on one support throughout the design, installation and startup process.
- WAI staff has experience in designing all types of subsurface disposal systems.
- WAI has on staff Licensed Designers, Installers, Certified Septic System Evaluators and Wetland Scientist.
- WAI staff has been involved in onsite wastewater disposal system designs since 1986.
- WAI can provide you value engineering services on projects for cost comparisons.
- WAI is trained in wastewater sampling and can provide sampling services.

Community Developments

- Grouping homes together to utilize larger *Clean Solution* systems, in conjunction with the smaller dispersal field, can substantially reduce cost. The larger systems also permit better land use and can result in maximizing the number of units allowed on a piece of land.

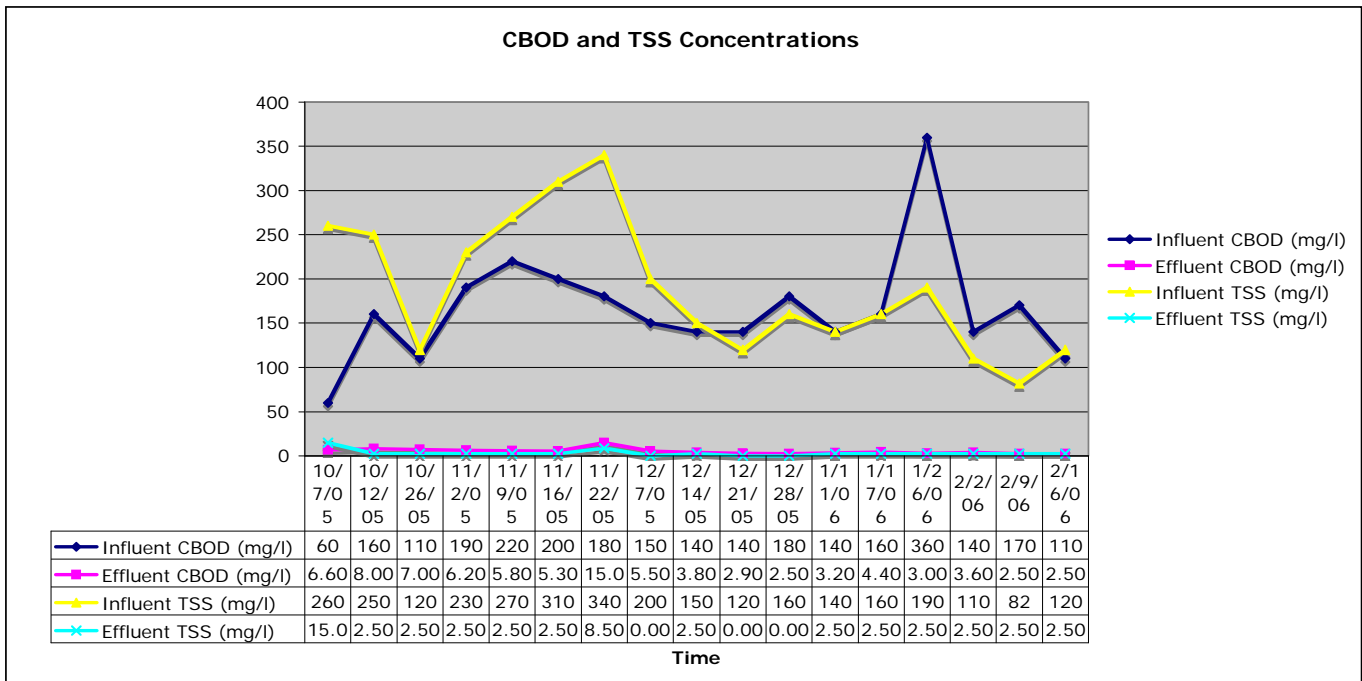
Restaurants

- *THE CLEAN SOLUTION* system can be used to treat high strength wastewater.
- Improves efficiency of the subsurface disposal system dispersal field.
- Reduces costly repairs in the future.



INDEPENDENT TEST RESULTS

In addition to the creativity that *THE CLEAN SOLUTION* gives designers to fit systems into a natural setting while reducing impact to natural buffers, *THE CLEAN SOLUTION* reduces BOD and TSS below 30 mg/l, and in most residential project the results are in the single digits. *THE CLEAN SOLUTION* system is being tested at the Massachusetts Alternative Septic Testing Center located at Otis Air National Guard Base on Cape Cod. A measured 550 gal/day from the base facilities are metered into the system each day. Test results average 5.2 mg/l BOD, 3.1 mg/l TSS, levels far superior to municipal plants, typically operating at 30 mg/l for both BOD and TSS.



It is important to note the difference between the influent and effluent CBOD, which is a measure of the strength of the wastewater. The influent test BOD is very typical of that from the septic tank in a residential dwelling.

High strength wastewater from a restaurant typically has BOD and TSS levels four to ten times or more higher than residential wastewater. In wastewater sampling completed by WAI, we have seen wastewater strength as high as 4900 mg/l for BOD, 4000 mg/l for TSS and FOG (Fats-oil-grease) at 930 mg/l. Conventional leach field sizing is based on residential strength wastewater. The organic loading on a conventional soil or fabric based leach field from high strength wastewater increases the rate that the Biomat forms resulting in early failures. *THE CLEAN SOLUTION* system reduces high strength wastewater down to levels typical of treated residential wastewater.



THEORY of *THE CLEAN SOLUTION*

Conventional small to mid-size sewage systems normally use a septic tank followed by a leach field to first provide anaerobic (without air) and then aerobic (with air) treatment of the effluent. Septic tanks work well for capturing and digesting the solids, which are anaerobically fermented over a long period of time, dissolving the solids into the liquid waste. However, a septic tank is not designed to treat the contaminants that dissolve in the liquids. These are treated aerobically in the leach field. Municipal systems, which handle very large volumes of wastewater use different equipment to accomplish the same biological functions: primary sedimentation tanks remove solids, and a subsequent aerobic system treats the contaminants dissolved in the liquids. Settled solids are removed from municipal primary and secondary facilities for further treatment.

All aerobic treatment systems, whether a conventional leach field, municipal treatment plant, or *THE CLEAN SOLUTION*, depend on bacteria to purify the effluent from a solids settling system. In order for bacteria to reproduce they require energy (food) and air. By using the contaminants in the effluent as food and atmospheric air the bacteria metabolize the dissolved solids to carbon dioxide, water and sludge (colonies of bacteria). The aerobic bacteria also convert ammonia compounds to nitrates.

A large number of bacteria need to come in contact with the food source in order to purify an effluent. Treatment systems utilize different methods to provide the necessary bacteria population. A municipal system mechanically stirs up the bacteria in the secondary treatment process so that they will contact their food and not settle out of the effluent. In a leach field, the sludge (biomat) that forms at the ground interface is a large colony of bacteria through which the dissolved solid stream flows. In *THE CLEAN SOLUTION* the bacteria collect in a thin film on the plastic media in WAI'S proprietary BioCon biological contactor, the effluent is circulating over the plastic media several times.

THE CLEAN SOLUTION uses the same biological process as a municipal secondary treatment plant utilizing the activated sludge process. Solids are settled out and air is added for bacteria respiration in the BioCon. This allows the bacteria to convert the carbonaceous dissolved solids to carbon dioxide, water and sludge. In addition the urea and ammonia converts to nitrates and sludge. The sludge created is settled for periodic removal from the system, and a clean, odorless effluent is discharged to the dispersal field.

The major difference between a conventional septic system and *THE CLEAN SOLUTION* is where the bacteria (sludge) collect. In a conventional system, the sludge forms in the bottom of the leach field and restricts the effluent flow enough so that the bacteria has time to act. This flow rate through the sludge determines the required field size. In *THE CLEAN SOLUTION* system the sludge is formed in the BioCon chamber resulting in treated, clear effluent discharging to the dispersal field. This field can be greatly reduced in size because there is no further treatment to reduce BOD and TSS.



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

WHY USE *THE CLEAN SOLUTION* SYSTEM

COST EFFECTIVE - REDUCED FIELD SIZE

- With the increased cost of materials and the difficulty of obtaining quality septic sand and washed stone, designers, installers and developers are seeing *THE CLEAN SOLUTION* system as the best alternative. With a dispersal area over 90% smaller than a conventional field, money is saved on land clearing, grubbing, transporting fill material, and labor to construct a leach field that meets NHDES square foot requirements. These savings offset the cost of *THE CLEAN SOLUTION* system, often reducing the overall cost of the septic system to the homeowner.

USE ANY FIELD DESIGN

- *THE CLEAN SOLUTION* dispersal field can be constructed using any of the approved field technologies, both proprietary and conventional pipe and stone.

ENVIRONMENTALLY FRIENDLY

- Local and State Land Use Boards are becoming more aware and concerned with the impacts that developments have on our natural resources, including groundwater and sensitive areas. *THE CLEAN SOLUTION* system produces an effluent quality well above what is considered the acceptable standard, while reducing the overall landscape impacts.
- With a dispersal field up to 90% smaller than a conventional field, designers, engineers, and site evaluators have increased options for a design that fits into the natural settings of each lot. The reduced size allows the designer to keep trees, rocks and other natural features undisturbed.

DEVELOPMENTS

- In a cluster development, *THE CLEAN SOLUTION* can reduce the overall project cost by connecting multiple homes to one system. To maximize the cost efficiency, the engineer must weigh the costs of the additional infrastructure required for effluent collection with the savings from using a larger *CLEAN SOLUTION* system to determine the appropriate size of each clustered system.
- *THE CLEAN SOLUTION* is also very effective in new developments where land costs are high. Minimizing the area needed for the leach field may result in the creation of additional building sites.

THE CLEAN SOLUTION system is the best alternative when proposing a new development where land costs are high and minimizing the area needed for leach fields may result in additional building sites. It is equally effective in environmentally sensitive areas such as wetlands and water bodies. *THE CLEAN SOLUTION* will help to offset rising field and land costs. The entire WAI staff has experience in all phases of development from conceptual layout through permitting and construction. Please call and have one of our staff members work with you to see how your client can benefit from using *THE CLEAN SOLUTION* system.



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

DESIGN CRITERIA

A Designer who is licensed by the State of New Hampshire shall prepare a site design and design the dispersal field. *THE CLEAN SOLUTION* system is sized by WAI staff based on design flow provided by the licensed designer. The design must be completed using WAI specifications and NHDES Env-Wq 1000 SUBDIVISION AND INDIVIDUAL SEWAGE DISPOSAL SYSTEM DESIGN RULES– Effective February 9, 2008 or most current.

THE CLEAN SOLUTION MODELS FOR SINGLE FAMILY HOMES

Model Designations:

ST = Model with septic tank compartment

Rx = Residential model with maximum number of bedrooms

Sx = Seasonal model with maximum number of bedrooms

P.x = Model with pump. Model to be designated as **P.4** for a 4/10 horsepower model, or **P.5** for a 5/10 horsepower model.

Example: 250ST-R4-P.4 = *CLEAN SOLUTION* system with septic tank compartment Residential model for 4-bedrooms, and 4/10 horsepower pump chamber.

FULL TIME RESIDENTIAL MODELS

2 to 4-Bedroom Single Family Models (require separate septic tank):

250-Rx 1,000 gal (500/500)

250-Rx-P.x 1,000 gal (500/500)

2 to 4-Bedroom Single Family Plastic Tank Models (require separate septic tank):

250-Rx (2)- 500/500 gal

250-Rx-P.x (2)- 500/500 gal

3-Bedroom Single Family Models with Septic Tank Compartment:

250ST-R3 1,750 gal (1,050/300/400)

250ST-R3-P.x 2,100 gal (1,250/350/500)

4-Bedroom Single Family Models with Septic Tank Compartment:

250ST-R4 2,100 gal (1,250/350/500)

250ST-R4-P.x 2,100 gal (1,250/350/500)

6-Bedroom Single Family Models (require separate septic tank):

600-R6 1,000 gal (500/500)

600-R6-P.x 1,000 gal (500/500) & 500 gal Pump Tank

6-Bedroom Single Family Plastic Tank Models (require separate septic tank):

600-R6 (2)- 500/500 gal

600-R6-P.x (3)- 500/500/500 gal

6-Bedroom Single Family Models with Septic Tank Compartment:

250ST-R6 2,550 gal (1,500/450/600)

250ST-R6-P.x 2,550 gal (1,500/450/600)



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

SEASONAL RESIDENTIAL MODELS

The seasonal models can be used when the cottage will be winterized in the fall and reopened in the spring.

2-Bedroom Single Family Seasonal Models with Septic Tank Compartment:

250ST-S2	1,750 gal (1,050/300/400)
250ST-S2-P.x	1,750 gal (1,050/300/400)

2 to 4-Bedroom Single Family Seasonal Models (require separate septic tank):

250-S4	1,000 gal (500/500)
250-S4-P.x	1,000 gal (500/500)

All models listed above utilize standard duty tanks. Please call WAI for specifications using heavy duty or H-20 loaded tanks.

COMMERCIAL MODELS

WAI offers a full range of commercial and multi-family models that are designed to meet the projects needs. Call WAI to see how *THE CLEAN SOLUTION* system can help your clients eliminate the leach field and design a smaller dispersal field saving space reducing project cost. WAI provides ACAD drawings for all commercial and multi-family models.

DISPERSAL AREA SIZING

For single-family homes (full time or seasonal) with three-bedrooms or less the minimum dispersal field area required is 75 sq.ft.

For single-family homes (full time or seasonal) with four-bedrooms the minimum dispersal field area required is 100 sq.ft.

For single-family homes (full time or seasonal) with six-bedrooms the minimum dispersal field area required is 150 sq.ft

The above minimum sizes can be used on soils with percolation rates ranging from 2 to 45 min/in. For soils with a percolation rate slower than 45 min/in please contact WAI to discuss sizing requirements.

WAI requires the minimum dispersal field footprint be within the five-foot fill extension. Any of the leach field products approved by NHDES – Subsurface Bureau may be used with *THE CLEAN SOLUTION* system. However, additional reductions to the minimum dispersal field area required by WAI are not permitted when using proprietary leach field products. WAI recommends that the designer look at storage capacity of proprietary leach field products when a pump system is being used or when heavy water use is anticipated.

WAI recommends that a dispersal field be designed with a length to width ratio of 4 to 1 be used whenever possible. This will increase the linear loading rate and result in a more efficient dispersal field.



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

The designer of the dispersal field shall follow the design requirements established by NHDES Env-Wq 1000 SUBDIVISION AND INDIVIDUAL SEWAGE DISPOSAL SYSTEM DESIGN RULES.

WAI allows the designer to make the final decision on the type of product to be used in the dispersal field. There are many products on the market that can be incorporated into the design of the dispersal field that work well with *THE CLEAN SOLUTION* system. Whenever it is cost efficient WAI recommends that a conventional pipe and stone leach field be considered.

Contact WAI for dispersal field sizing requirements for all commercial or multi-family projects.

PUMP STATION DESIGN RECOMMENDATIONS

When raw sewage needs to be pumped, by either a solids handling or grinder type pump, the subsurface disposal system design must be completed using WAI specifications and NHDES Env-Wq 1000 SUBDIVISION AND INDIVIDUAL SEWAGE DISPOSAL SYSTEM DESIGN RULES– Effective February 9, 2008 or most current.

When pumping effluent to *THE CLEAN SOLUTION* system for treatment using an effluent pump a settling/energy dispersing tank must be installed in front of *THE CLEAN SOLUTION* system to prevent short circuiting the treatment process. Because *THE CLEAN SOLUTION* system cannot be vented back through the house stack a secondary vent will need to be shown on the design plans. Contact WAI to discuss pumping requirements.

The forcemain inlet into the tank shall be directed down into the tank.

When pumping to a dispersal field that utilizes a distribution box (d-box), the d-box shall have either a baffle that is an integral part of the d-box or the discharge line should be fitted with a tee.

A second option to pumping directly into the d-box is to pump into a pipe segment that has been install to allow gravity flow into the d-box.

If a pump is required to lift effluent to a dispersal field the designer is to provide WAI with the following pumping information;

- Flow rate – gallons per minute (gpm)
- TDH (total dynamic head)
- Diameter of discharge line
- Volume of dose. WAI recommends small frequent dosing be used on all systems.

WAI only provides simplex pumps for single-family homes with a pump horsepower of 0.5hp or less.



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

DUPLEX PUMP STATIONS

Designer is responsible for designing all duplex pump stations and pump stations that serve more than one single family home.

On large commercial systems, (i.e. multi-family, office complexes or restaurants) WAI recommends that the following components be added into pump station design

- Run time meter for each pump
- Pump dose counter for each pump
- Inlet baffle be used in the pump station and the bottom of the baffle be extended down to the same level as the pump off float.

Feel free to call WAI at anytime to discuss pump station requirements.



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

RESPONSIBILITIES

The responsibilities for a *CLEAN SOLUTION* installation rest in the partnership between the owner, designer, installer, and WAI. Below is an outline of responsibilities.

The Owner

1. Retains a Licensed Designer by the State of New Hampshire to prepare a plan.
2. Reviews plans prepared by Licensed Designer.
3. Reads the conditions outlined in the WAI's *Sales and Maintenance Agreement*.
4. Obtains all necessary permits and approvals required at both the State and Local level.
5. Executes a sales agreement with WAI at least 3 weeks prior to installation.
6. Executes an Inspection / Maintenance Agreement with WAI.
7. Hires a contractor to install the septic tank(s), pump chamber and complete all earthwork.
8. Owner and WAI Technician determine location of compressor.
9. Hires a licensed electrician to provide an electrical outlet near the compressor capable of 1 amp, 120 volts. If a sump pump is specified, provides an electrical service panel with a 20 amp, 120-volt circuit. Circuit must be capable of running pump and high water alarm. Owner must provide electrician for all required electrical work. (WAI can provide electrical services at an additional cost – New Hampshire systems only)
10. Retain Licensed Installer to complete construction as approved by NHDES – Subsurface Bureau.

The Licensed Designer

1. Provide owner with a copy of WAI's *Sales and Maintenance Agreement*.
2. Explain to the owner the difference between *THE CLEAN SOLUTION* system and a conventional wastewater disposal system.
3. Complete all fieldwork required by NHDES – Subsurface Bureau
4. Prepare design plans.
5. Contact WAI to discuss system design parameters.
6. Review final design plan with owner for owner sign-off.
7. Provide WAI with a copy of the design plan(s) and supporting documentation for final review and WAI files.
8. If a pump is required for single-family residence, designer to provide WAI with pump operating parameters. (gpm, TDH, diameter of discharge line and volume of dose)
9. Submit final design for local approval if applicable and to NHDES – Subsurface Bureau.
10. Provides plans "Approved for Construction" by NHDES – Subsurface Bureau to homeowner and homeowner's licensed installer.



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

Wastewater Alternatives, Inc.

1. Review system design parameters with Designer.
2. Prepare standard *Sales and Maintenance* agreement for Owner with system design schematic.
3. Provide Contractor with Purchase Order for tanks provided by WAI outlined in Sales agreement as part of contract price.
4. Coordinate project schedule with Contractor for installation.
5. WAI Technician to install the following components onsite;
 - a. BioCon Media
 - b. Air transfer system
 - c. Setup Air Compressor
 - d. Internal BioCon plumbing
 - e. Setup effluent pump (optional)
 - f. Setup effluent pump controls and alarms (optional)
6. Installation checklist with swing ties to access stacks.
 - a. Copy of report to Owner
7. Once the system has been installed and approved for use, WAI to review system, operation and maintenance schedule with Owner.

The Installer

1. Contracts with owner for all work outside of WAI's responsibilities.
2. Contacts WAI at least 3 weeks prior to installation to discuss installation schedules.
3. Provides all subsurface system components and materials outside of WAI's responsibilities. See Sales Agreement and system schematics.
4. Excavates for the septic tank and all WAI tanks to design elevations as shown on approved for construction plans.
5. Calls WAI tank supplier with Purchase Order Number to arrange delivery and setting of the WAI tank(s).
6. Constructs the dispersal field in accordance with the approved design.
7. Installs all piping to and from all tanks.
8. Installs the piping from *THE CLEAN SOLUTION* system or pump chamber to dispersal field.
- 9. Seals all pipe penetrations and knockouts with a watertight non-shrink mortar.**
10. Digs necessary trenches for the electrical conduits and airlines.
- 11. Brings risers to grade. Contractor ensures that all sections of risers are watertight.**
12. Completes all leakage tests if required by designer.
13. Backfill system components, loam, seed and mulch disturbed areas as required by approved design plans.
14. Calls the regional NHDES – Subsurface Bureau inspector and local inspector when applicable.
15. Obtains NHDES Operations Approval for system and provides it to homeowner.

The above list of responsibilities is a general outline. Additional responsibilities may be required based on specific site conditions or type of use. WAI is not responsible for work completed by licensed designer or licensed installer. It is the owners(s) responsibility to contract directly with designer and installer.



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

MAINTENANCE and OPERATION FOR SINGLE FAMILY RESIDENTIAL

The following maintenance is required. It is the owner's responsibility to see that this maintenance is performed. The owner must maintain a Maintenance Agreement with Wastewater Alternatives, Inc. or approved vendor.

Full Time Residential Use (Single Family Home)

1. Inspections every 2 years by WAI Technician, or by a company or individual that has been certified by WAI to perform inspections.
2. Use a local pumper to pump out the septic and settling/pump tanks every 2 to 3 years. More or less frequent pumping may be required depending on system use and number of occupants. WAI and the pumper can determine the required frequency. Owner must retain records of pumping.
3. Compressor must run continuously. It should be checked for operation at least once a month.
4. BioCon chamber may require pumping between 6 and 8 years. WAI Technician will determine if pumping is necessary during inspection.
5. Compressor Air Filter to be clean or replaced yearly.

Seasonal Residential Use (Single Family Home use less than 6 months per year)

1. Inspections every 3 years by WAI Technician, or by a company or individual that has been certified by WAI to perform inspections.
2. Use a local pumper to pump out the septic and settling/pump tanks every 3 years. More or less frequent pumping may be required depending on system use and number of occupants. WAI or the pumper can determine the required frequency. Owner must retain records of pumping.
3. Compressor may be disconnected during the off-season.
4. BioCon chamber may require pumping between 8 and 10 years. WAI Technician will determine if pumping is necessary during inspection.
5. Compressor Air Filter to be clean or replaced yearly

WAI is available for Item 1 listed above for both Full Time and Seasonal Residence. The service will include a detailed inspection of the system, replacement of any failed items and a check of the compressor. Tank pumping is not included in the price and must be arranged by the owner just prior to the scheduled maintenance appointment. Materials replaced not covered by warranty will be billed at direct cost.

Contact WAI for Maintenance, Operational and Warranty requirements for all commercial projects.



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

THE CLEAN SOLUTION WARRANTY FOR RESIDENTIAL SINGLE FAMILY SYSTEM

For a period of 10 years, WAI will warranty the components within the BioCon™ chamber and repair any malfunction, including parts and labor, at no cost to you. This does not cover pumping the system to make necessary repairs.

WAI will extend the compressor manufacturer's warranty from two to four years. This covers compressors that have been maintained and used under normal operating conditions. WAI will provide replacement air compressors at cost-plus shipping for compressors not covered under warranty. Labor to replace compressor(s) will be billed out at WAI standard hourly rates.

For systems that require the use of a sump/effluent pump to discharge into a dispersal field, the pump chamber components (i.e. pump, floats, alarms) warranty is limited to the pump / floats / alarm manufacturer's terms and conditions. Labor to replace a sump/effluent pump and components will be billed out at WAI standard hourly rates.

WAI will warrantee a dispersal field that utilizes concrete or plastic chambers or conventional pipe and stone dispersal fields designed and constructed to NH Department of Environmental services and WAI requirements for a period of 5 years. This warrantee does not cover system failures caused water fixture leaks, water overuse, groundwater leaks or flooding. This warrantee is for materials only to replace the dispersal field in-kind and does not cover the cost of landscaping, pumping, relocation or labor.

Warranty on all other types of dispersal fields (i.e. fabric style leaching components) is limited to manufacturer's warranty and not covered by WAI or WAI warranties.

Owner(s) responsibility during this period is to perform the required maintenance and have a maintenance agreement with WAI or an approved vendor in effect at all times. Failure to perform the required maintenance, have a maintenance agreement, and maintain records of pumping or to notify WAI of any problems will void this warranty. This warranty also does not cover damage caused by improper use, poor construction or design practices, high groundwater, flooding or acts of God.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY OR OTHERWISE, APPLICABLE TO THE SEWAGE TREATMENT SYSTEM SHALL BE LIMITED IN DURATION TO ONE YEAR.

WASTEWATER ALTERNATIVES INC., SHALL NOT BE LIABLE FOR ANY DIRECT OR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. NOR, SHALL WASTEWATER ALTERNATIVE'S LIABILITY UNDER THIS WARRANTY EXCEED THE PRICE PAID BY THE BUYER to WASTEWATER ALTERNATIVES INC.



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

PERFORMANCE SPECIFICATIONS

The system is warranted to discharge clean, odor free water to the dispersal field, equivalent or better than that obtained from a municipal system with secondary treatment (30ppm BOD₅, 30ppm SS).

RIGHTS TO DATA AND ACCESS TO THE SYSTEM

WAI reserves the right of reasonable access to collect data, modify, maintain and repair *THE CLEAN SOLUTION* and its subsystems. WAI will retain all data collected and the rights to it.

TRADE SECRETS

THE CLEAN SOLUTION is the result of the expenditure of a great deal of effort and money. The design of the components and operational cycle are the intellectual property of WAI and may not be revealed without written permission.

DIGITAL FILES

WAI can provide digital files for all system components and required system notes. Call WAI with your system questions and a CD of standards.

FREQUENTLY ASKED QUESTIONS ABOUT THE *CLEAN SOLUTION* SYSTEMS

Does the system need a real leach field?

The dispersal field is constructed the same as a conventional field, the only difference is the size. Since *The Clean Solution* BioCon and settling chambers perform the same biological functions as a leach field there is no need to have a large leach field to provide aerobic treatment.

Can I use other proprietary devices in place of a pipe and stone field?

Yes. Any approved stone replacement system is acceptable, however, there are some that would not prove cost effective, but are still compatible with *The Clean Solution* system.

How do you size chambers or tubes?

The tubes are sized based on the field print conversion using the total footprint of the field and then judging how many tubes or chambers would be used for that space.

How do you vent the field of *The Clean Solution*?

When you use *The Clean Solution* system is vented through the roof vent, therefore a field vent is unnecessary. When using the system on an application without a roof vent a vent must be installed at or near the tank. (i.e. a trailer park or campground must be vented at the tank)

Are there any additives in the system?

No, the only thing that *The Clean Solution* system needs to run is air, which comes from the small



WASTEWATER ALTERNATIVES INC.

developing innovative solutions with sustainable results

mechanical air compressor.

FREQUENTLY ASKED QUESTIONS CONT.

Where does the air compressor go?

The air compressor can go anywhere above the snow line, but the most ideal place for it is in a garage or basement.

How much noise does the air compressor make?

The air compressor makes less noise than a refrigerator.

How much electricity does the air compressor require to run?

The air compressor requires approximately 80 watts and 1 amp, which can be thought of as the power required for a typical light bulb.

How often do I need to maintain the system?

The system maintenance is done at the same time the septic tank is pumped.

What does the system inspection consist of?

A WAI trained technician or vendor inspects the media, effluent quality, dissolved O₂ levels, settling chamber performs a compression test on the air transfer system and replaces the air filter.

What if I need to order replacement parts?

WAI can be contacted for replacement parts. We will also handle any maintenance or repairs.

Is the system exempt from certain setback rules or to ground water tables?

The Clean Solution system has received variances to NHDES Subsurface Bureau regulations on replacement systems.

Do I need an effluent pump?

An effluent pump is only needed if the dispersal field is higher than the outlet of the tank.

**Please contact WAI to discuss your upcoming projects
or
To setup an in-house training**



APPENDIX - SYSTEM SCHEMATICS

