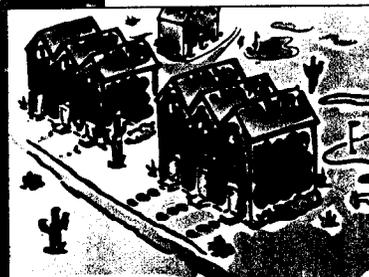


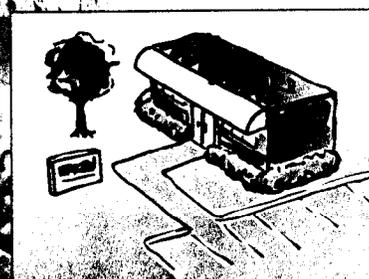
**FAST** wastewater  
treatment  
systems



**Single Family Dwellings**



**Clustered Subdivisions**



**High Strength Commercial**



**Failed System Renovation**



**BIO-SAVE, INC**

*Will & Sydney Palmer*

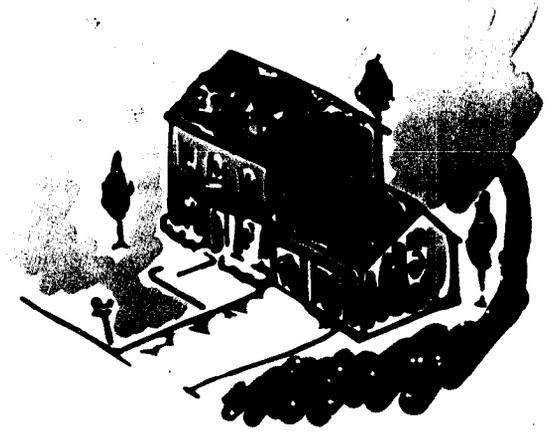
P.O. Box 50672  
Laughlin, NU 89028

Toll Free 877-664-0019  
Fax (602) 548-1076  
Email [wpalmer@netwrx.net](mailto:wpalmer@netwrx.net)

**BIO-SAVE, INC.**  
Toll Free 877-664-0019  
Fax 602-548-1076  
email [biosave@netwrx.net](mailto:biosave@netwrx.net)

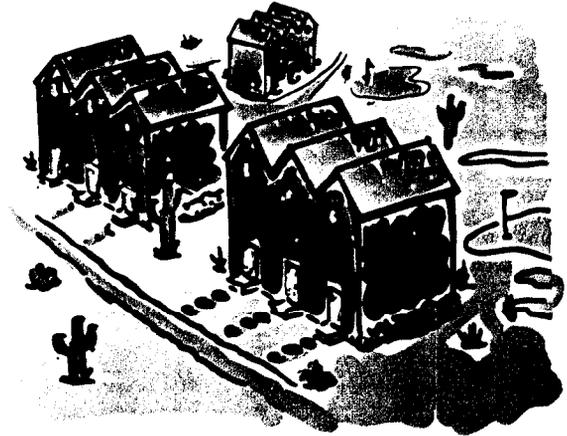
## Single Family Dwellings

- Environmentally safe treatment allows full use of property by homeowners, children and pets
- Proven high performance levels could mean reductions in lot size, separation distances and other limiting factors
- Possible innovative re-use of precious water resources for irrigation
- Advanced wastewater treatment system ready for next generation requirements



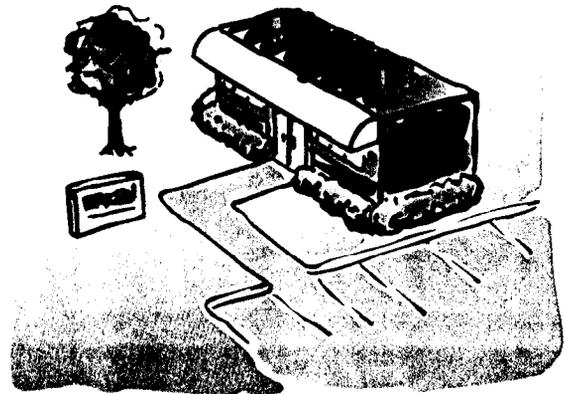
## Clustered Subdivisions

- FAST may make previously unbuildable land useful and profitable
- Modular design of FAST system allows project planners maximum flexibility
- Builders and developers are able to purchase and install only when and where needed, saving large capital expenditures of a costly centralized system



## High Strength Commercial

- Restaurants and other difficult high strength waste applications are effortlessly treated with FAST's robust aerobic process
- Clubhouses, schools, trailer parks, office buildings and other commercial properties are natural fits for a FAST wastewater treatment system
- With FAST's reliable process engineering design, operation is simple and virtually maintenance free

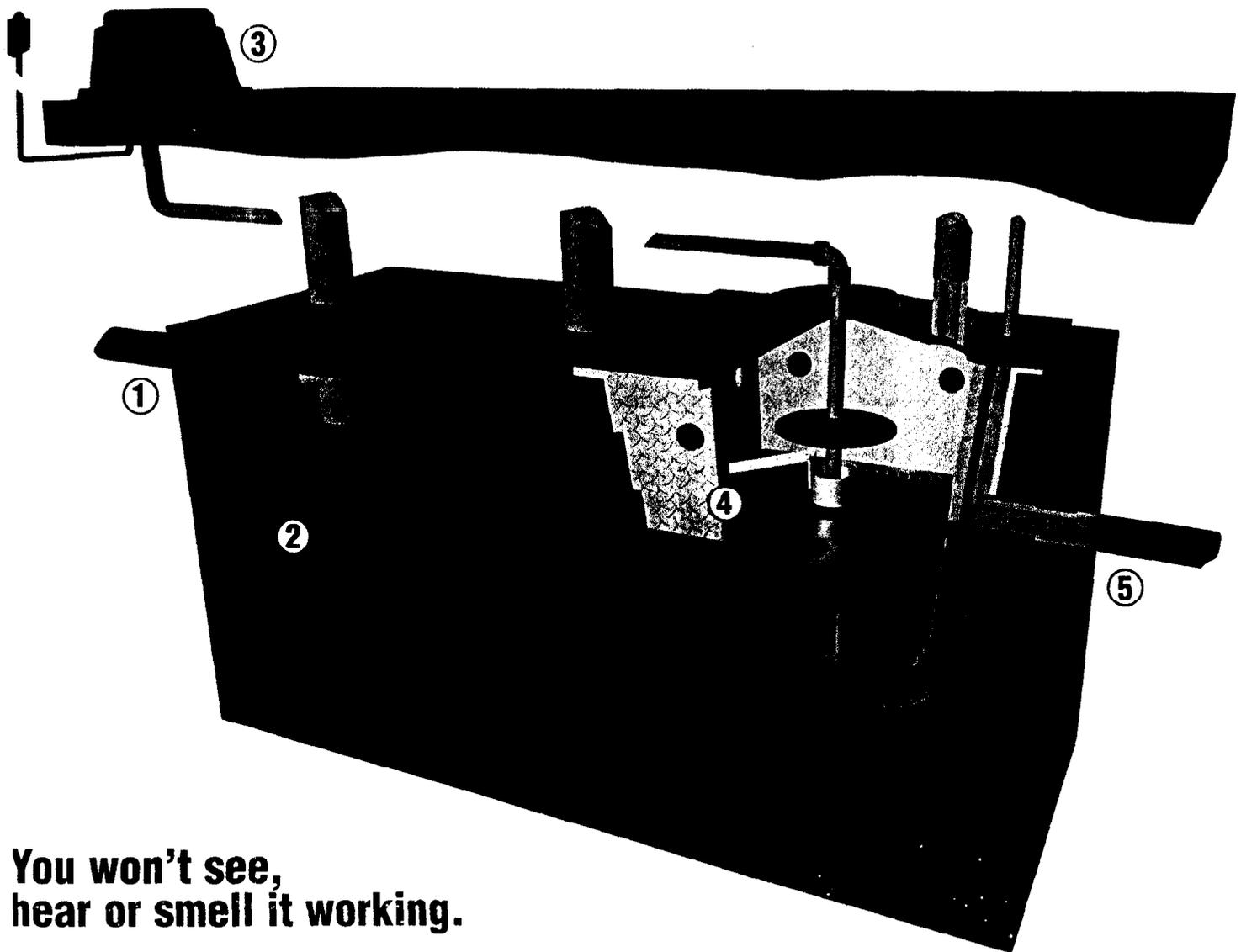


## Failed System Renovation

- Failing septic systems can easily be retrofitted and upgraded with the simple, affordable design of FAST
- Small communities now have a practical, proven alternative to cost prohibitive centralized sewer systems
- Modernizing the wastewater treatment system with FAST increases value and usefulness of the property



# Introducing **FAST.** Wastewater Treatment Systems



**You won't see,  
hear or smell it working.**

- ① FAST® wastewater treatment systems process all the wastewater from single family homes, clusters of homes, small communities or even the high strength wastes from restaurants or commercial facilities.
- ② Natural separation and settling processes occur in the first compartment of the underground tank.
- ③ Remote blower (the system's only moving part) delivers large volumes of air into the heart of the system, creating vigorous water movement. FAST is oxygen-rich and self-cleaning.
- ④ Proven, reliable FAST treatment module provides the perfect environment for "friendly bacteria" to grow and multiply. FAST consistently processes and removes more than 95% of common impurities. Special patented technology allows exceptional Total Nitrogen reductions (including nitrates) of more than 70%.
- ⑤ Clear, odorless treated water is ready for standard or innovative dispersal.



8271 Melrose Drive • Lenexa, KS 66214 • Phone: 913-492-0707 • Fax: 913-492-0808  
e-mail: onsite@biomicrobics.com • www.biomicrobics.com • 800-753-FAST(3278)

## The History of FAST®

In the early 1970s, the U.S. Coast Guard had a problem. Ships cruising in coastal waters were dumping wastewater overboard, causing excessive pollution. The Coast Guard decided to call in Smith & Loveless, Inc., a leader in the wastewater industry since 1946.

Smith & Loveless collaborated with a major ship builder and the University of Kansas in Lawrence, Kansas to come up with a solution. There were three criteria for the product to be designed: 1) It had to be fairly small in size; 2) It had to have low maintenance requirements, since the ships' mechanics who would be maintaining the system had to be available for the much more critically necessary ships' engines at any given time; and 3) It had to effectively treat wastewater with varying hydraulic flows.

After much research and testing, the marine form of FAST (Fixed Activated Sludge Treatment) was born. It utilized a fixed film media combined with activated sludge treatment technology so that bacteria clinging to the media would digest wastewater, producing a remarkably clear effluent that was a major improvement over the raw wastewater that had previously been going overboard. In fact, the system worked so well that Smith & Loveless engineers saw possibilities for many additional uses for the technology. As a result, there is now an entire family of FAST® products including:

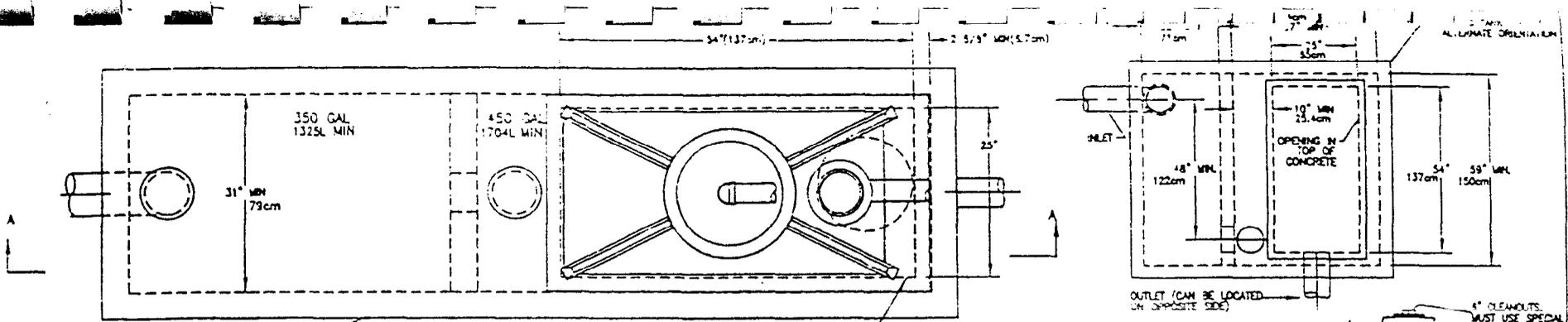
**Marine FAST®**—Used on many well-known cruise ship lines and in other places, Marine FAST is certified by the U.S. Coast Guard, the Canadian Great Lakes (the strictest marine standard in the world) and the U.K. based International Maritime Organization (I.M.O.) Marine FAST has been and remains the virtually undisputed worldwide leader in marine wastewater treatment systems.

**Modular FAST®**—Larger FAST systems are designed for use in municipal and industrial wastewater treatment. The modular configuration allows multiple modules to work together to produce just the right size system for the application. Another advantage of Modular FAST is that each segment is of a moderate size, allowing pieces to be placed through small openings such as ships' doorways before assembly into the final system.

**Mobile FAST®**—Sometimes called Container FAST, this system fits inside a standard shipping container for transport via truck, rail or ship to remote locations. A popular application for Mobile FAST is resorts, where the system can be moved from season to season depending on where there are the most people in summer or winter months.

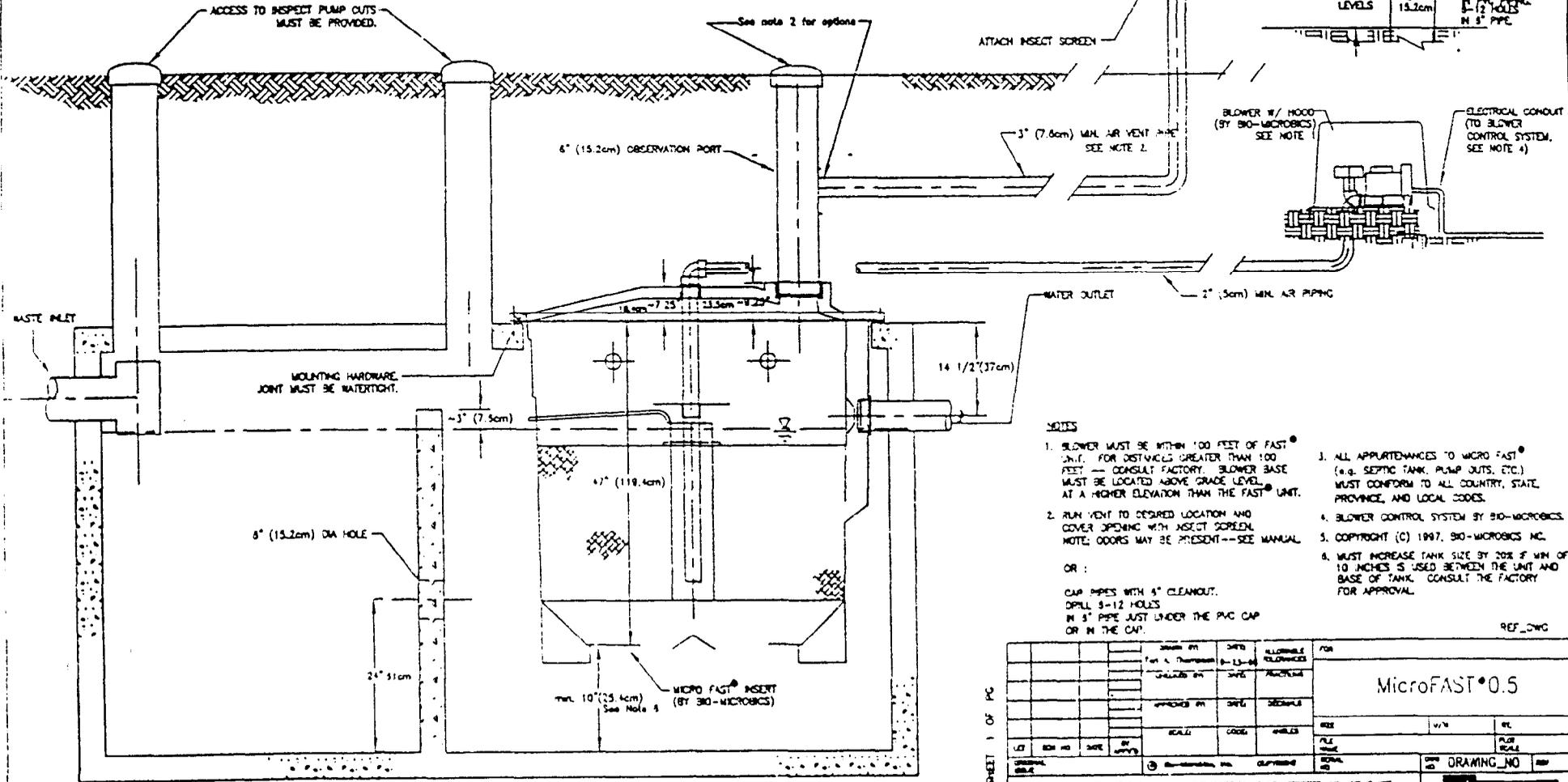
**Single Home FAST®**—Introduced to the market only in the past few years, Single Home FAST was actually developed in the 1970s, before onsite wastewater treatment became such a major concern for environmental protection. Utilizing the same tried-and-true technology as the other FAST systems, Single Home FAST treats wastewater in a fiberglass or concrete septic tank to provide highly treated effluent that won't clog lateral fields or pollute groundwater supplies. Tested and certified by NSF International, FAST provides BOD and TSS levels of 10 mg/L for up to twelve people. It can also reduce Total Nitrogen levels, including nitrates, to 10 mg/L for up to ten people or approximately 1,000 gallons per day. Single Home FAST is marketed by Bio-Microbics, an affiliate of Smith & Loveless.

**Micro FAST®**—The newest member of the FAST family, Micro FAST works like Single Home FAST in a smaller size designed to treat wastewater produced by six to eight people or approximately 600 gallons per day. It produces the same excellent results on a smaller scale and provides an economical method of wastewater treatment where standard septic systems are inadequate. Micro FAST provides a popular alternative to sand filters and mound systems with minimal maintenance requirements.



CONCRETE SEPTIC TANK  
SEE NOTE 1.

OPENING IN TOP  
OF CONCRETE



ACCESS TO INSPECT PUMP OUTS  
MUST BE PROVIDED.

See note 2 for options

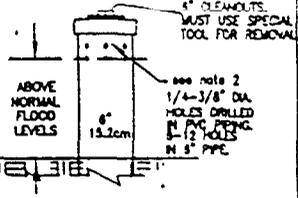
ATTACH INSECT SCREEN

BLOWER W/ HOOD  
(BY BIO-MICROBICS)  
SEE NOTE

ELECTRICAL CONDUIT  
(TO BLOWER  
CONTROL SYSTEM,  
SEE NOTE 4)

6" (15.2cm) OBSERVATION PORT

3" (7.6cm) MIN. AIR VENT PIPE  
SEE NOTE 2.



MOUNTING HARDWARE  
JOINT MUST BE WATERTIGHT.

14 1/2" (37cm)

WATER OUTLET 2" (5cm) MIN. AIR PIPING

6" (15.2cm) DIA HOLE

24" (61cm)

MIN. 10" (25.4cm)  
SEE NOTE 5  
MICRO FAST® INSERT  
(BY BIO-MICROBICS)

NOTES

1. BLOWER MUST BE WITHIN 100 FEET OF FAST UNIT. FOR DISTANCES GREATER THAN 100 FEET - CONSULT FACTORY. BLOWER BASE MUST BE LOCATED ABOVE GRADE LEVEL AT A HIGHER ELEVATION THAN THE FAST UNIT.
  2. RUN VENT TO DESIRED LOCATION AND COVER OPENING WITH INSECT SCREEN. NOTE: DOORS MAY BE PRESENT--SEE MANUAL.
  3. ALL APPLIANCES TO MICRO FAST (e.g. SEPTIC TANK, PUMP OUTS, ETC.) MUST CONFORM TO ALL COUNTRY, STATE, PROVINCE, AND LOCAL CODES.
  4. BLOWER CONTROL SYSTEM BY BIO-MICROBICS.
  5. COPYRIGHT (C) 1997, BIO-MICROBICS INC.
  6. MUST INCREASE TANK SIZE BY 20% IF MIN OF 10 INCHES IS USED BETWEEN THE UNIT AND BASE OF TANK. CONSULT THE FACTORY FOR APPROVAL.
- OR:
- CAP PIPES WITH 4" CLEANOUT.  
DRILL 8-12 HOLES  
IN 3" PIPE JUST UNDER THE PVC CAP  
OR IN THE CAP.

REF\_OWG

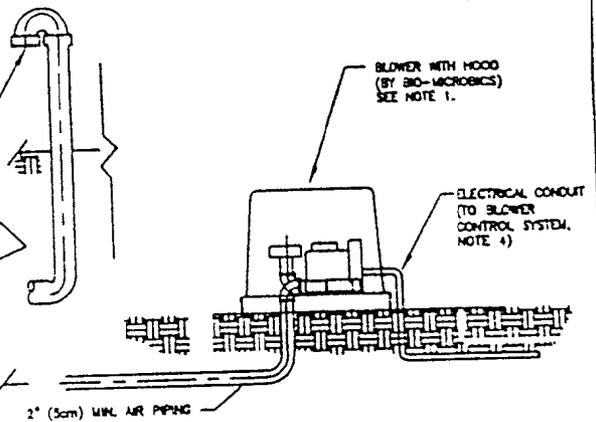
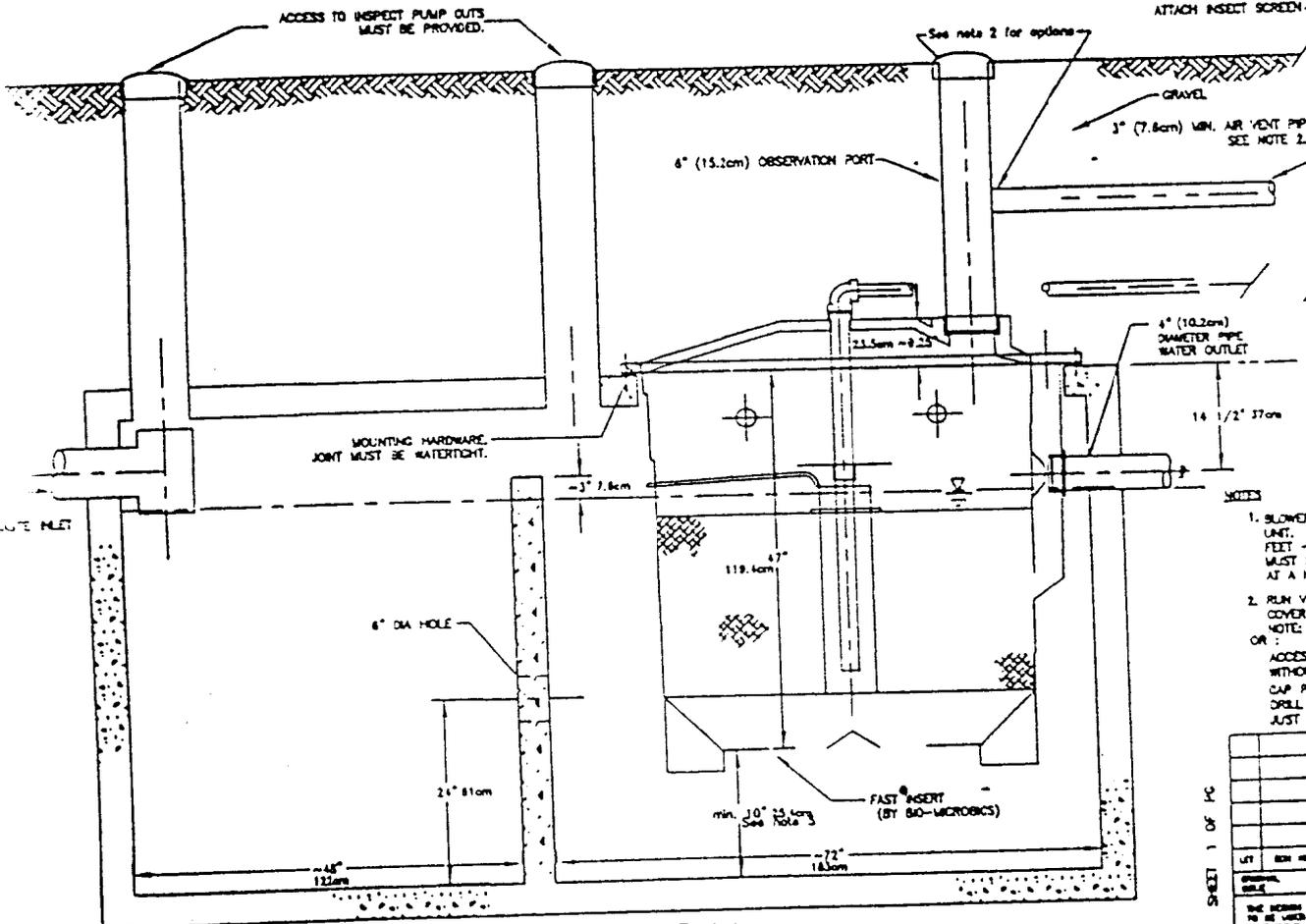
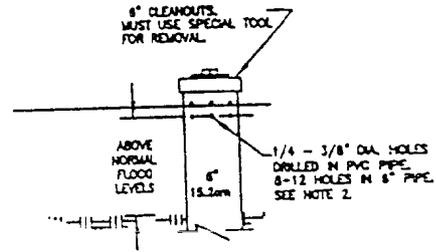
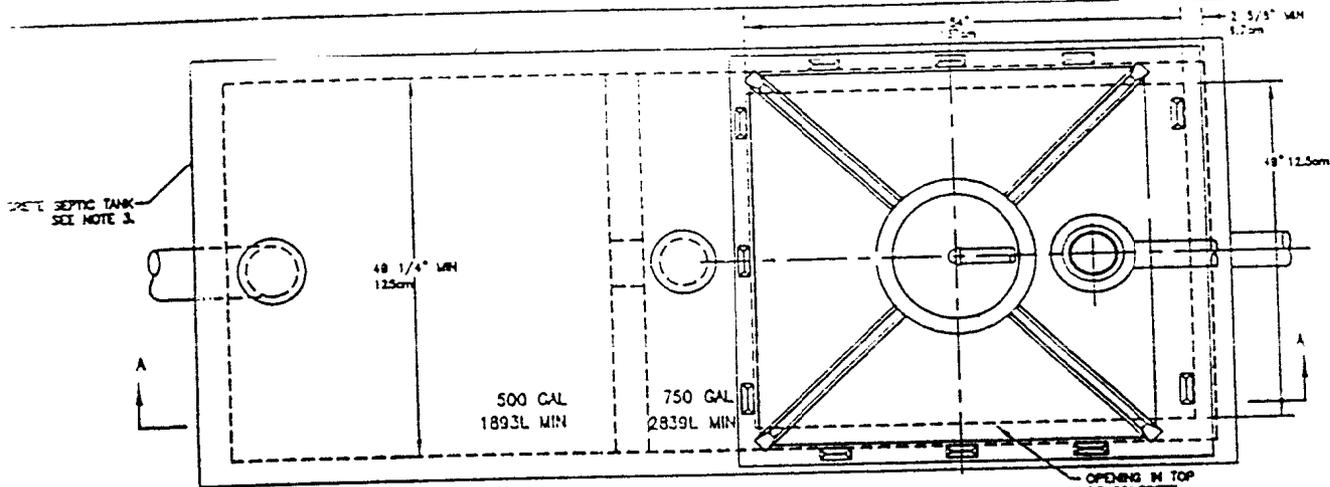
SHEET 1 OF PG

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MicroFAST® 0.5

DRAWING NO. 050

VIEW A-A



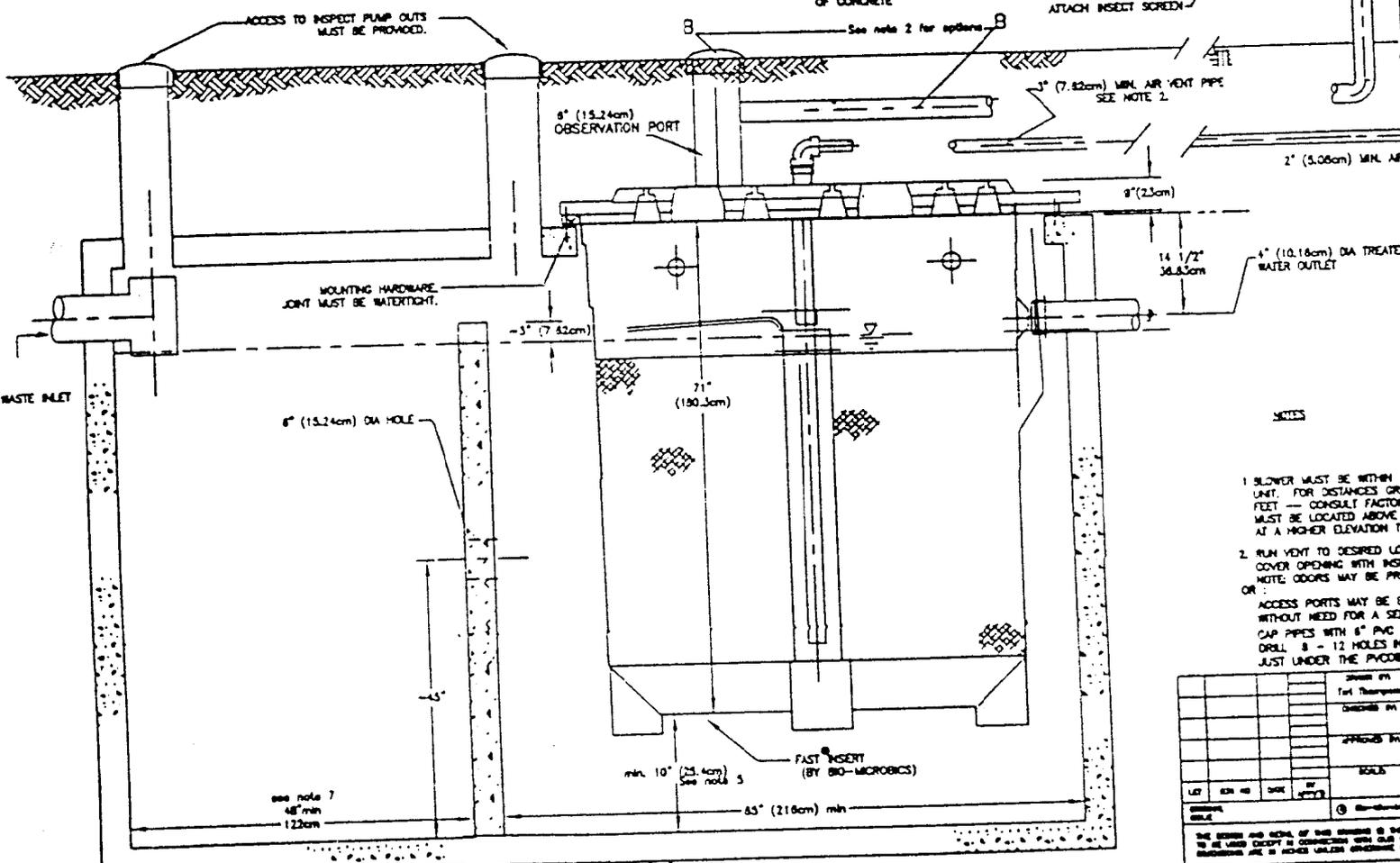
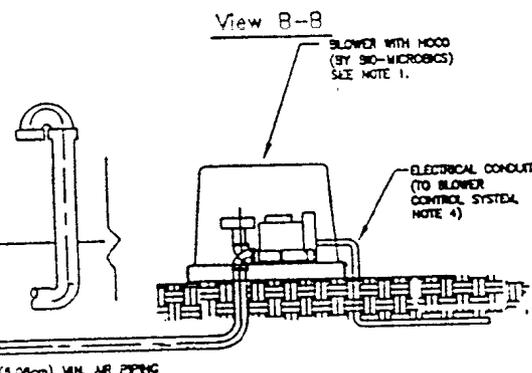
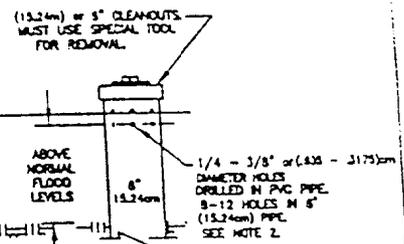
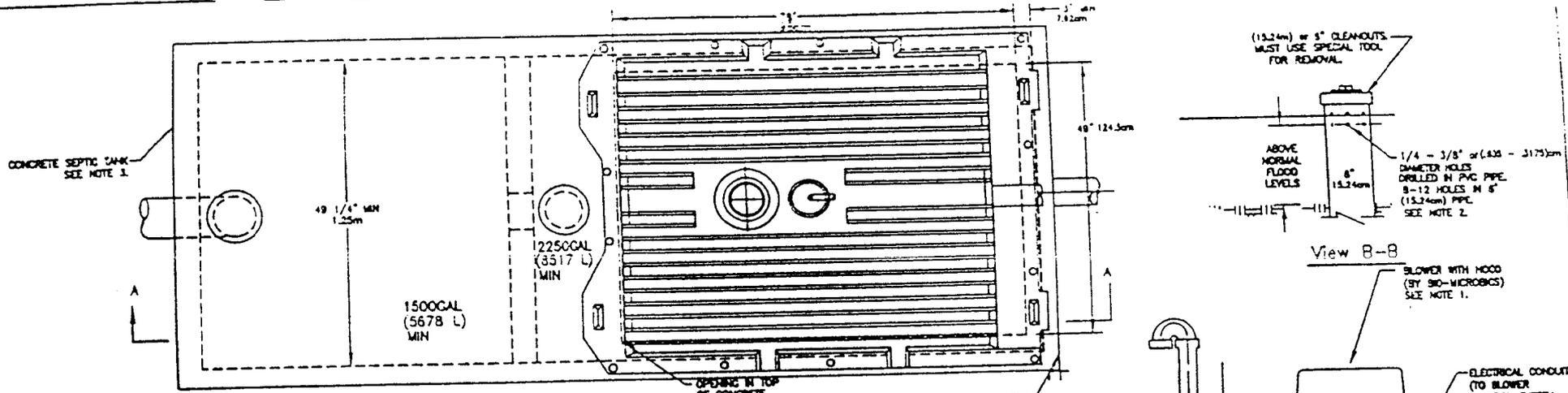
1. BLOWER MUST BE WITHIN 100 FEET OF FAST UNIT. FOR DISTANCES GREATER THAN 100 FEET — CONSULT FACTORY. BLOWER BASE MUST BE LOCATED ABOVE GRADE LEVEL AT A HIGHER ELEVATION THAN THE FAST UNIT.
  2. RUN VENT TO DECIDED LOCATION AND COVER OPENING WITH INSECT SCREEN. NOTE: ODORS MAY BE PRESENT—SEE MANUAL OR: ACCESS PORTS MAY BE BROUGHT ABOVE GRADE WITHOUT NEED FOR A SEPARATE VENT PIPE. CAP PIPES WITH 6\"/>
1. ALL APPURTENANCES TO FAST (A.S. SEPTIC TANK, PUMP OUTS, ETC.) MUST CONFORM TO ALL COUNTRY, STATE, PROVINCE, AND LOCAL CODES.
  4. BLOWER CONTROL SYSTEM, BY BIO-MICROBICS.
  3. MUST INCREASE TANK SIZE BY 20% IF MIN OF 10 INCHES IS USED BETWEEN THE UNIT AND BASE OF TANK. CONSULT THE FACTORY FOR APPROVAL.
  6. COPYRIGHT (C) 1997, BIO-MICROBICS INC. 157\_DWD

SHEET 1 OF 10		DESIGNER		DATE		APPROVAL		FOR	
TESTED BY		DATE		APPROVED BY		DATE		MicroFAST 0.9	
SCALE		DATE		SCALE		DATE		FILE NO.	
DRAWING NO.		DATE		SCALE		DATE		DRAWING NO.	

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VIEW A-A





1. BLOWER MUST BE WITHIN 100 FEET OF FAST UNIT. FOR DISTANCES GREATER THAN 100 FEET - CONSULT FACTORY. BLOWER BASE MUST BE LOCATED ABOVE GRADE LEVEL AT A HIGHER ELEVATION THAN THE FAST UNIT.
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- 6. COPYRIGHT (C) 1997, BIO-MICROBICS INC.
- 7. THE PRIMARY COMPARTMENT MAY BE A SEPARATE TANK.

Model		Serial		Date		By		Checked		Approved	
MicroFAST 3.0											
BIO-MICROBICS INC. - 10000 W. 10TH AVE. - DENVER, CO 80202											

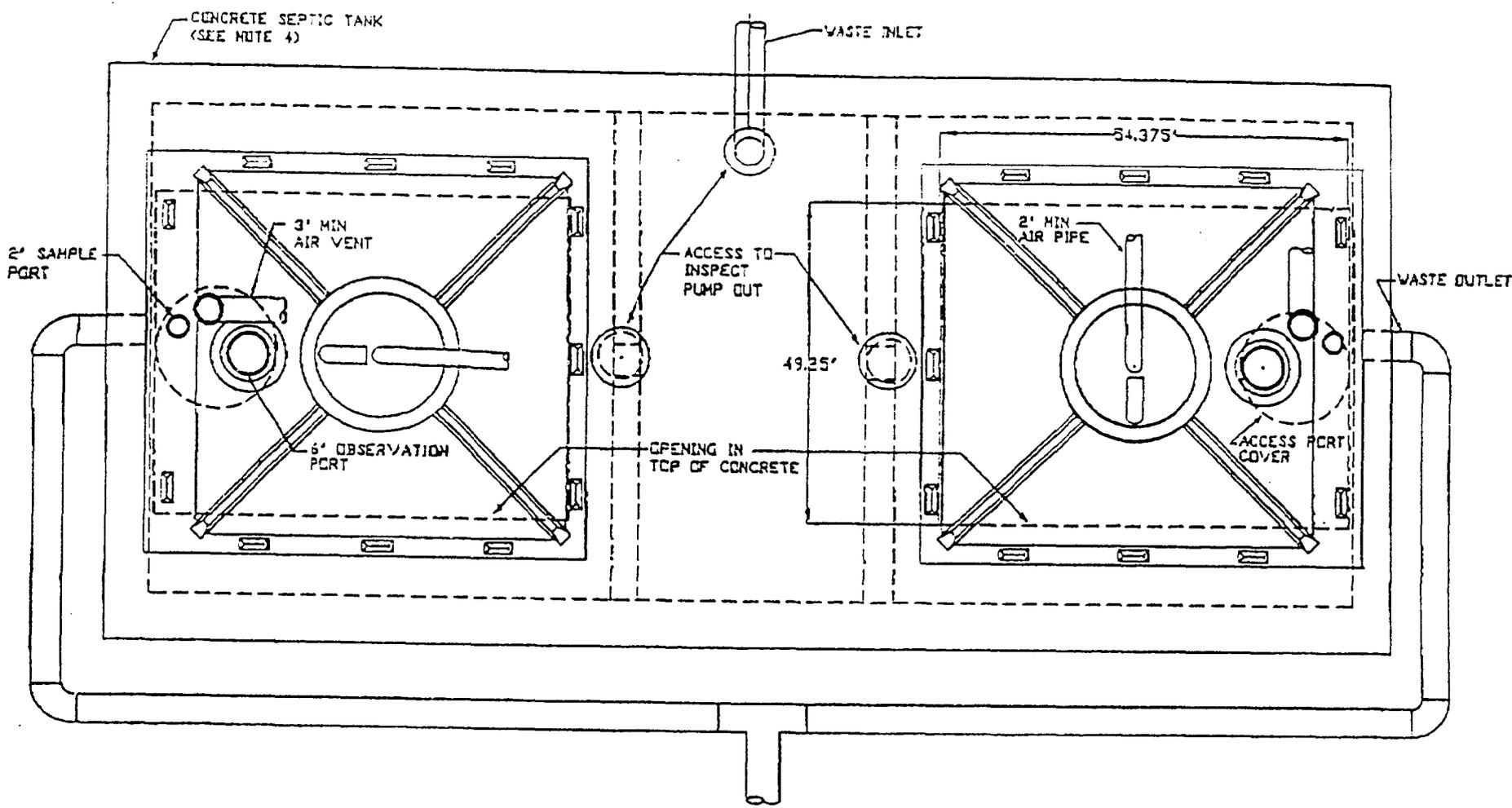
VIEW A-A





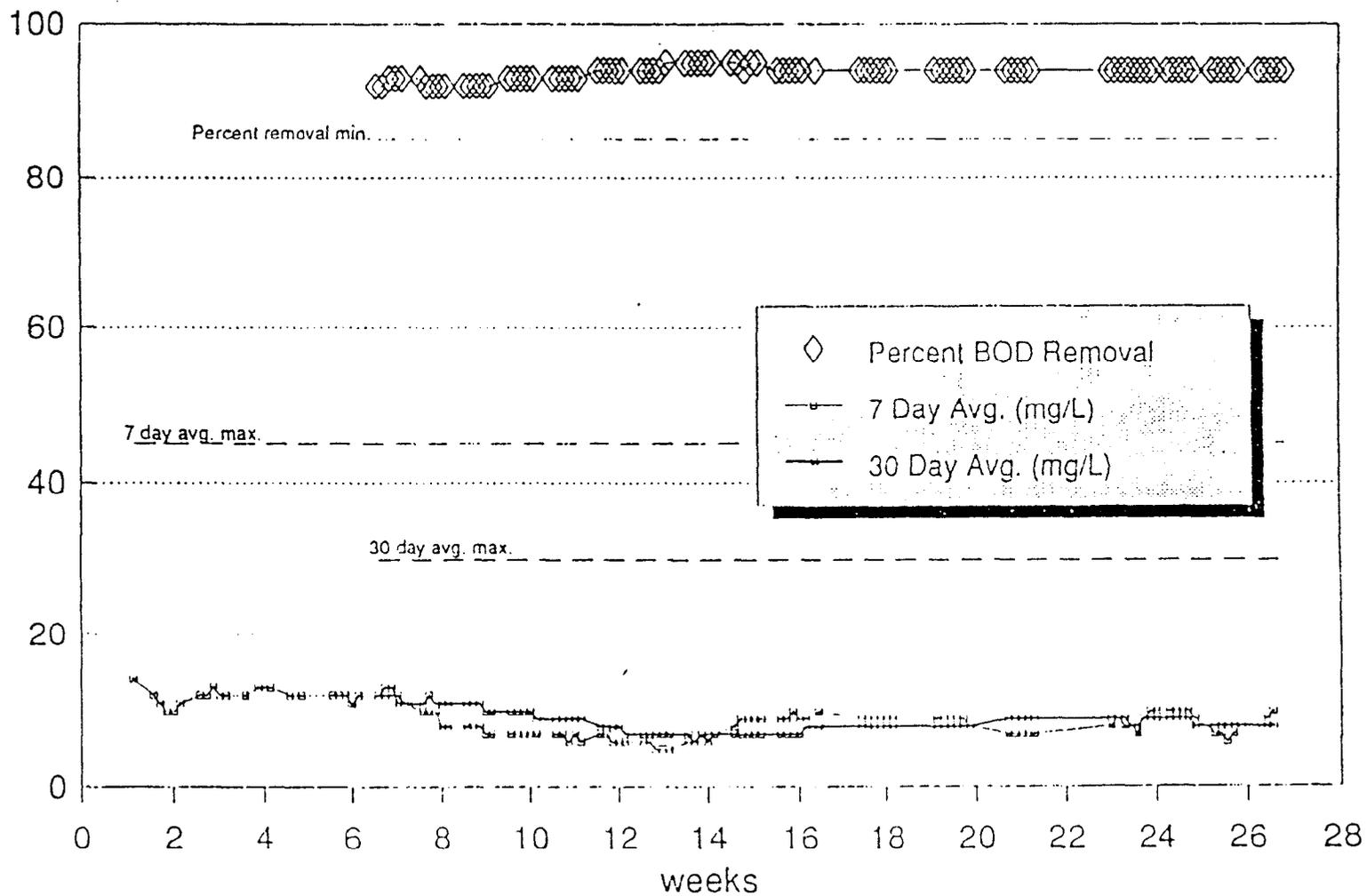


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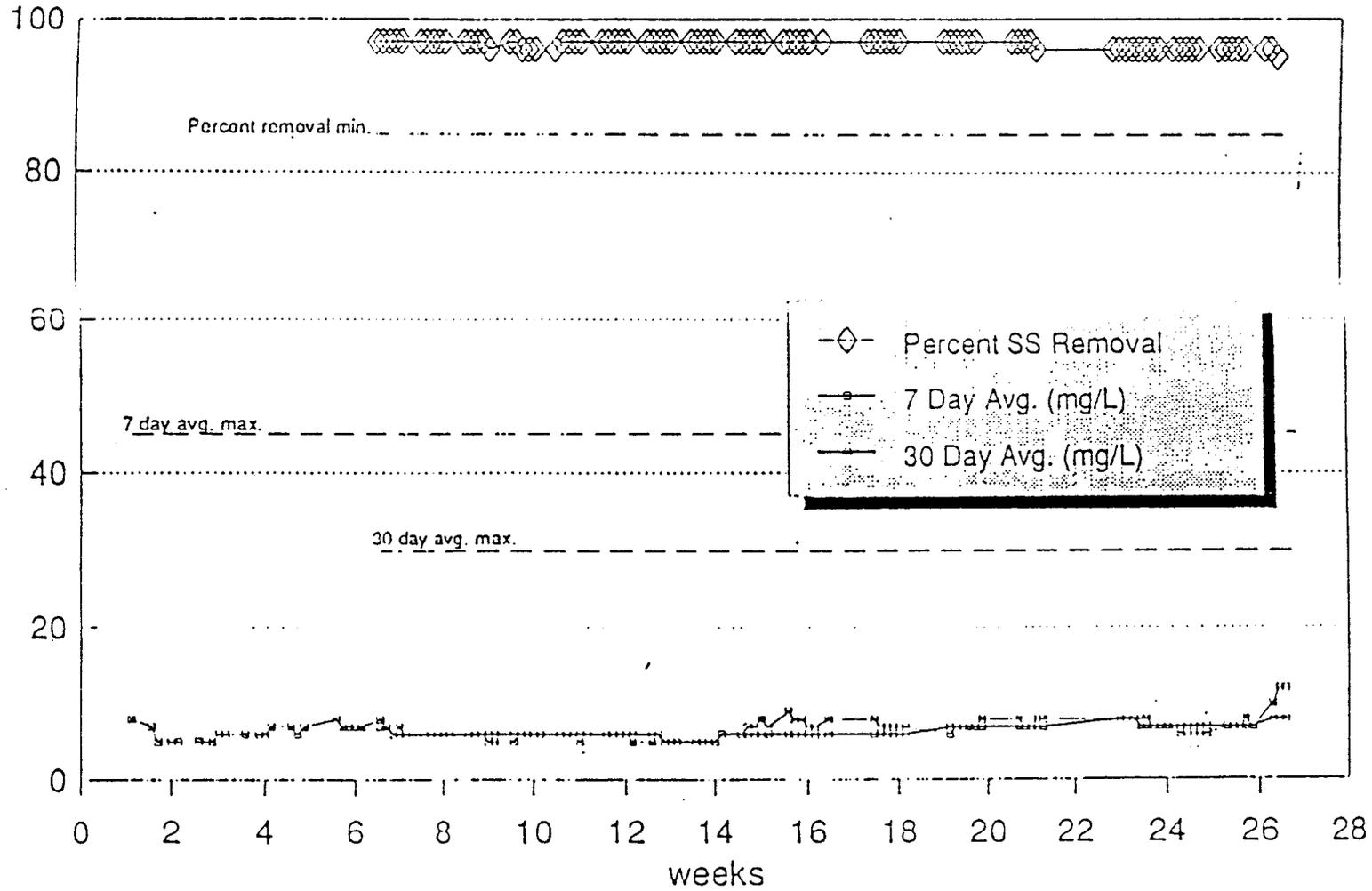
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© International, Inc. USA					2000
THE PUMP AND SYSTEM ARE THE PROPERTY OF INTERNATIONAL, INC. AND ARE TO BE USED ONLY IN CONNECTION WITH THE VENT, TUBES AND INVERTED SIGHT GLASS. NO OTHER PARTS OR ACCESSORIES ARE TO BE USED.					DUPLEX FAST <sup>®</sup> SYSTEM 2,000 GPD FASTPUMP-TOP \$2,000.000

Figure 2. Effluent BOD Averages and Percent BOD Removal.



7

Figure 4. Effluent Suspended Solids  
Averages and Percent SS Removal



5



## EXECUTIVE SUMMARY

Testing of the Bio-Microbics, Inc. (formerly Scienco/FAST<sup>®</sup>) Single Home FAST Treatment Plant Model 23-001-750 was conducted under the provisions of NSF Standard 40 for Individual Aerobic Wastewater Treatment Plants (July 1990). NSF Standard 40 was developed by the NSF Joint Committee on Wastewater Technology.

The performance evaluation was conducted at the NSF Wastewater Technology Test Facility in Chelsea, Michigan, using wastewater diverted from the Chelsea municipal wastewater collection system. The evaluation consisted of six months of testing, during which a seven week stress test was conducted. The evaluation consisted of three weeks of dosing without sampling to allow for plant start-up, sixteen weeks of dosing at design flow, seven weeks of stress test and five weeks of dosing at design flow. Sampling started in the fall and continued through the winter and into spring, covering a full range of operating temperatures.

Standard 40, in Section II. (3) of Appendix A, provides for exclusion of up to ten percent of the effluent sample days, not to exceed one during stress testing, in completing the pass/fail determination. No sample days were excluded in this evaluation. Over the course of the evaluation, the average effluent BOD<sub>5</sub> was 9mg/L, ranging between <5 and 24 mg/L, and the average effluent suspended solids was 7mg/L, ranging between <5 and 27mg/L. The pH ranged from 7.5 to 8.2.

The Single Home FAST Treatment Plant Model 23-011-750 produced an effluent that successfully met the performance requirements established by NSF Standard 40 for Class I effluent:

The maximum arithmetic mean of seven consecutive sample days was 14mg/L for BOD<sub>5</sub> and 12mg/L for suspended solids, both well below the allowed maximum of 45mg/L. The maximum arithmetic mean of 30 consecutive sample days was 12mg/L for BOD<sub>5</sub> and 8mg/L for suspended solids, both well below the allowed maximum of 30mg/L. Removal rates ranged from 92 to 95 percent for BOD<sub>5</sub> and 95 to 97 percent for suspended solids, consistently above the requirement of 85 percent.

The effluent pH during the entire evaluation ranged between 7.5 and 8.2, within the required range of 6.0 to 9.0. The plant also met the requirements for noise levels (less than 60 dbA at a distance of 20 feet) and color, threshold odor, oily film and foam.

Prepared 3/23/96