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May 2007
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Mecklenburg County
Health Department

Basil G. Deltas, M.D., M.P.H.
Health Director

August 3, 1989

Steven Berkowitz
Community Environmental Health Services Branch
P. O. Box 2091
Raleigh, NC 27602-2091

Dear Mr. Berkowitz:

Subject: Southerland Associates,Inc.
Proposed Waste Disposal System

Enclosed please find the following for your review in approving this Cromaglass Wastewater Treatment System:

1. Site Plan
2. Improvement Permit Application
3. Soil Evaluation Report
4. Proposed Waste Disposal System
5. Cut Sheet for Cromaglass System
6. Cut Sheet for Baltimore Aircoil Water Filter
7. Letter from Southerland Associates,Inc. of July 27, 1989

Your prompt attention to this matter would be greatly appreciated. If you should need further information, please do not hesitate to give me a call.

Very truly yours,

Jim Ericson, R.S., Supervisor
On Premises Waste Disposal & Water Supply

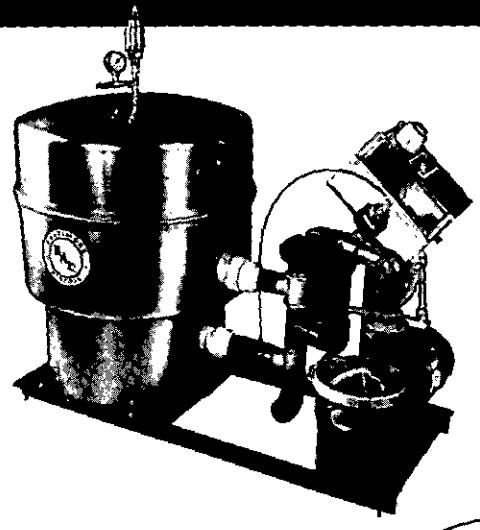
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Enclosure

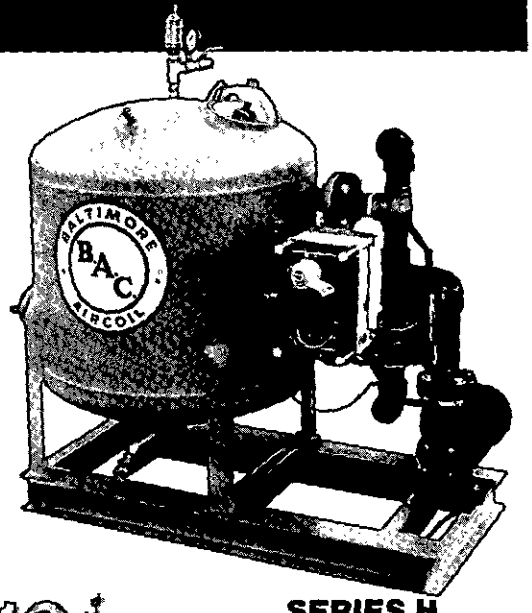
Environmental Health Division
1200 Blythe Boulevard • Charlotte, North Carolina 28203 • (704) 376-4603

Baltimore Aircoil

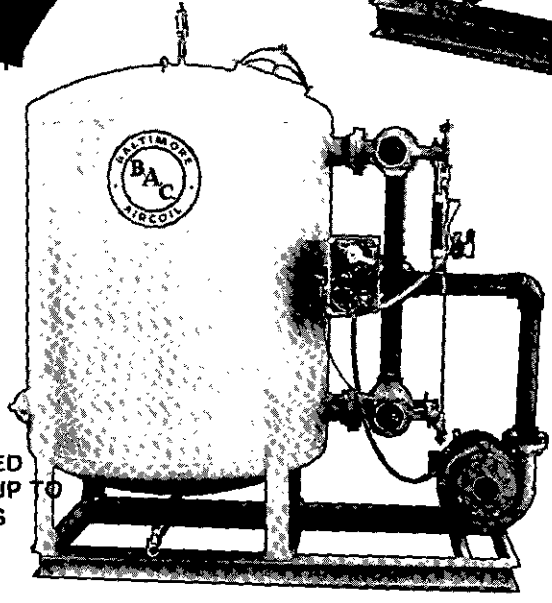
INDUSTRIAL WATER FILTERS



SERIES S
FOR NON-PRESSURIZED
SYSTEM VOLUMES UP TO
5880 GALLONS



SERIES H
FOR PRESSURIZED
SYSTEM VOLUMES UP TO
11,520 GALLONS



SERIES B
FOR PRESSURIZED
SYSTEM VOLUMES UP TO
60,360 GALLONS

For use with cooling towers, industrial fluid coolers and evaporative condensers

INDUSTRIAL

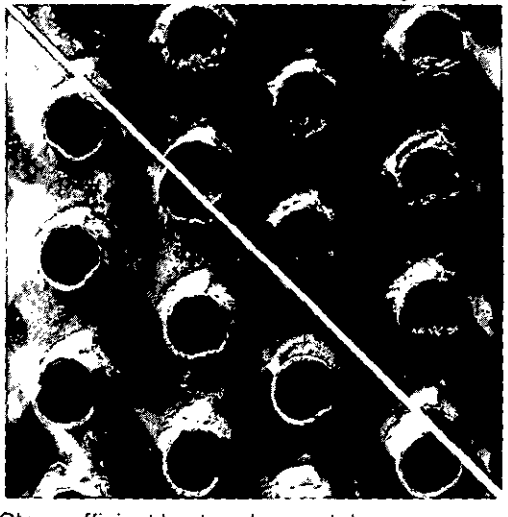
SAND MEDIA FILTRATION DESIGNED SPECIFICALLY TO CLEAN COOLING SYSTEM WATER

■ FILTERED WATER = A CLEAN SYSTEM

The IWF Industrial Water Filter is an effective tool for improving the efficiency of air conditioning, refrigeration and industrial water cooled systems by removing unwanted dirt, dust, and other suspended solids.

Suspended solids in a cooling system can originate from many sources and are circulated through the system where they can foul heat exchangers, piping and other system components. This results in an inefficient system with increased operating costs.

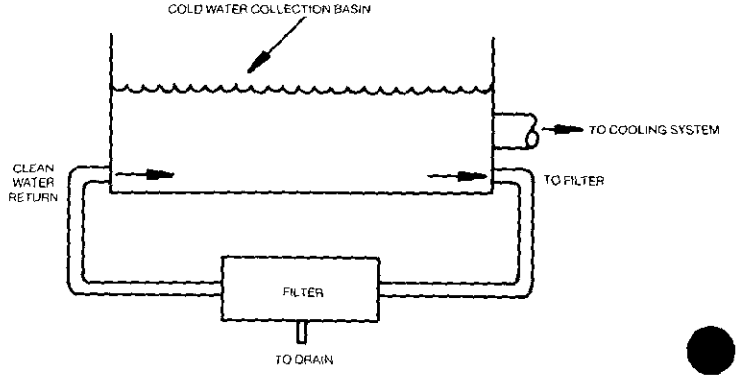
Dirty, inefficient heat exchanger tubes.



Clean, efficient heat exchanger tubes.

■ SYSTEM OPERATION

A side stream flow from the water cooling system is cleaned continuously by the IWF Filter. The side stream IWF Filter is selected to clean the entire system volume at least once an hour. Periodically the suspended solids are automatically backwashed to drain.



© 1987 Baltimore Aircoil Company

•WATER FILTERS

...AND INCREASE THE EFFICIENCY OF WATER COOLED SYSTEMS

□ SAVES ENERGY

Solid particles that collect on heat exchange surfaces form an insulating layer. This increases the fouling factor and decreases the heat transfer capacity. As heat transfer surfaces become less efficient, the energy required to meet design capacity increases. For example, an increase in the standard design fouling factor of .0005, to a .0015 fouling factor can increase chiller energy consumption by as much as 11%.

A build up of solid particles on system components can also increase pipe friction and dynamic head losses, thereby reducing water flow. Increasing the flow to the original design value may require increased pump horsepower. Filtration effectively reduces the buildup of suspended solids, maintains the system efficiency, and helps minimize energy costs.

□ REDUCES MAINTENANCE

The accumulation of suspended solids on piping, heat exchange surfaces, and evaporative cooling equipment necessitates periodic shutdowns for cleaning. Through continuous filtration, suspended solid accumulations are reduced and the frequency of labor intensive shutdowns for cleaning are minimized. Less time will be spent cleaning the tower pan and condenser tubes. In some cases maintenance labor on water cooled equipment can be reduced as much as 50%.

□ ENHANCES WATER TREATMENT PROGRAM

Research has shown that a reduction in the level of suspended solids in cooling water can reduce scaling tendency and biological growth. Hence, the overall efficiency of any water treatment program can be enhanced by effective filtration of these suspended solids.

In addition, by reducing the amount of times the system is shut down, drained and flushed, additional water and chemical cost savings may also be realized.

Consult with a competent water treatment supplier for specific recommendations.

□ EXTENDS EQUIPMENT LIFE

Abrasive solids circulating through the system increase wear on seals, pump parts and other system components. In addition, the methods required to clean fouled passages can in themselves damage and reduce the life of valuable equipment. By eliminating harmful particles, equipment life can be extended.

□ MINIMIZES DOWNTIME

Despite regular maintenance procedures, extensive fouling of equipment is still a possibility and can lead to costly unscheduled downtime. Correction usually requires specialized service personnel and equipment. Filtration minimizes downtime by removing damaging materials from the system.

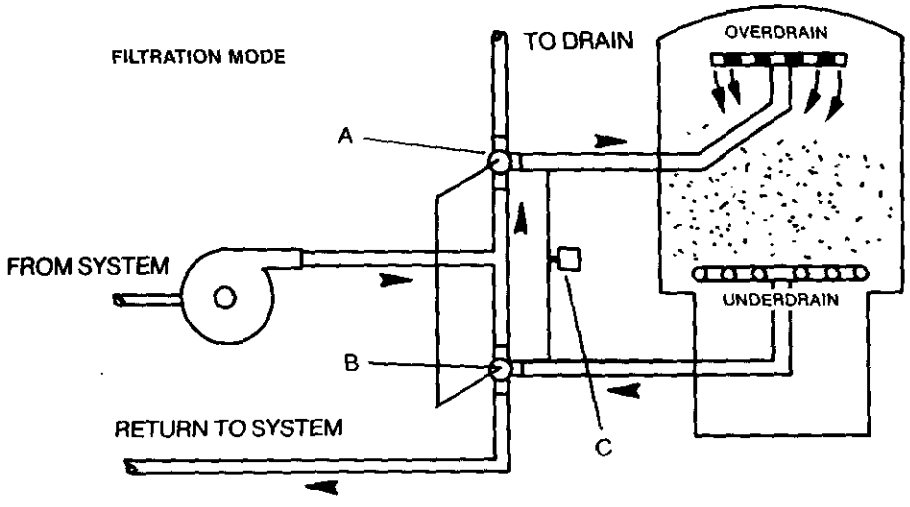
PRINCIPLE OF OPERATION (AUTOMATIC)

The IWF Filter is furnished as standard with an automatic backwash system to clean the media when the differential pressure across the tank increases to a preset point. The automatic backwash system includes: a differential pressure switch, valve actuator, and NEMA 4X (corrosion resistant) control panel containing a service disconnect switch with thermal overload and short-circuit protection, motor contactor, fused step-down transformer, solid-state backwash timer, and manual push-button for backwash override.

As an option, IWF Filters may also be ordered without automatic controls for manual operation of the backwash cycle.

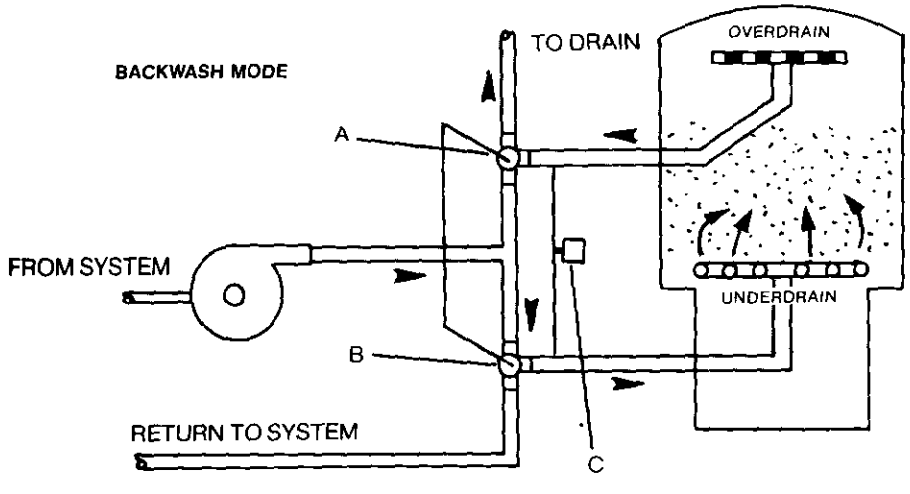
FILTRATION MODE

Water from the cooling system is pumped through the valving at A (in the direction indicated) and into the overdrain assembly at the top of the filter tank. The water is distributed over the sand media where suspended solids are trapped between, and on the surface of, sand particles. The filtered water drains from the tank through the valving at B (in the direction indicated) and returns to the cooling system.



BACKWASH MODE

When differential pressure switch C senses a predetermined pressure differential across the filter tank, the valving at A and B is automatically repositioned. Water from the cooling system is pumped through the valving at B (in the direction indicated) and into the underdrain assembly at the bottom of the filter tank. The sand media is fluidized and trapped solids are released. The dirty water drains from the filter tank through the overdrain assembly, passes through the valving at A (in the direction indicated) and is flushed to the drain.



FILTER SELECTION

The IWF Industrial Water Filter is available in three different configurations, the Series S, the Series H, and the Series B.

The Series S Industrial Water Filter is designed for use in non-pressurized, open loop, low static head applications. Typically it is piped to, and located near the sump of the evaporative cooling equipment.

The Series H Industrial Water Filter is available in 50 psi, 100 psi, or 150 psi ASME Code construction and is suitable for use in high pressure, closed loop, or high static head applications. A typical location for this type of filter may be in the mechanical equipment room, several stories below the evaporative cooling equipment.

The Series B Industrial Water Filter is a heavy-duty industrial filter, available in sizes suitable for very large systems. Like the Series H, it is available in 50 psi, 100 psi, or 150 psi ASME Code construction for high pressure, closed loop, or high static head applications.

SELECTION PROCEDURE

I. Determine System Volume

A) Estimate the gallons of water in the cooling tower pan. _____ (contact your local B.A.C. Representative for assistance)

B) Estimate the gallons of water in the piping using Table 1. _____

C) Estimate the gallons of water in heat exchangers, condensers, and other components of the system using manufacturer's information. _____

D) Add the gallons of water obtained in A, B, and C. The result is the system volume. _____

TABLE 1

PIPE CAPACITIES*			
Nominal Pipe Size	Gallons Per Linear Foot	Nominal Pipe Size	Gallons Per Linear Foot
4	.662	14	7.040
6	1.503	16	9.193
8	2.603	18	11.636
10	4.101	20	14.461
12	5.822	24	20.916

*Based on Schedule 40 Pipe

II. Select IWF Industrial Water Filter

The selection chart below lists common system turnover rates. The standard system turnover rate is 24-time a day.

The higher rate (30-times a day) should be used for a high contaminate area such as near smokestacks, dust, blowing sand, or for initial system clean-up.

To use the chart, begin by selecting the filter configuration desired; Series S, Series H, or Series B.

Enter from the top at the column headed by the desired system turnover rate. Read down the column until reaching a figure equal to or greater than the system volume. Proceed horizontally to the left to find the model number of the recommended unit. Note: Multiple units should be used on systems with multiple cold water sumps. Multiple units can also be used on a single cold water sump. For turnover rates not listed below, use the following equation to determine the correct filter flow rate.

$$\text{Filter Flow Rate} = \frac{\text{System Volume (gallons)} \times \text{Turnover Rate Times (a day)}}{1440}$$

For example, a turnover rate of 8 times a day may be used on a closed loop application.

Read down the IWF flow rate column in the selection chart until reaching a flow rate equal to or greater than the filter flow rate calculated. Proceed horizontally to the left to find the model number of the recommended unit.

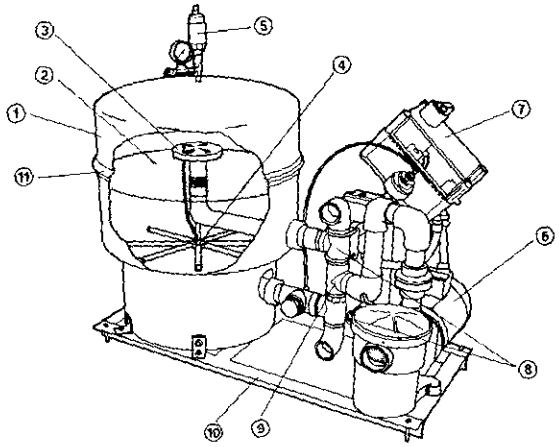
For assistance in determining the proper turnover rate, please consult your local B.A.C. Sales Representative.

SELECTION CHART

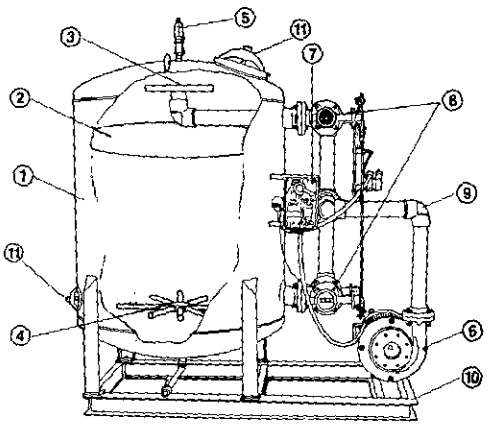
	Model No.	IWF Flow Rate	System Volumes for Common System Turnover Rates: 24 Times Per Day (Standard)	30 Times Per Day (High Contaminate)
SERIES S	IWF-120S	16	960	770
	IWF-180S	35	2100	1680
	IWF-240S	63	3780	3020
	IWF-300S	98	5880	4700
SERIES H	IWF-180H	35	2100	1680
	IWF-240H	63	3780	3020
	IWF-300H	98	5880	4700
	IWF-360H	142	8520	6820
	IWF-420H	192	11520	9220

	Model No.	IWF Flow Rate	System Volumes for Common System Turnover Rates: 24 Times Per Day (Standard)	30 Times Per Day (High Contaminate)
SERIES B	IWF-180B	35	2100	1680
	IWF-240B	63	3780	3020
	IWF-300B	98	5880	4700
	IWF-360B	142	8520	6820
	IWF-420B	192	11520	9220
	IWF-480B	252	15120	12100
	IWF-540B	318	19080	15260
	IWF-600B	392	23520	18820
	IWF-660B	475	28500	22800
	IWF-720B	566	33960	27170
	IWF-780B	663	39780	31820
	IWF-840B	770	46200	36960
	IWF-900B	883	52980	42380
	IWF-960B	1006	60360	48290

CONSTRUCTION DETAILS

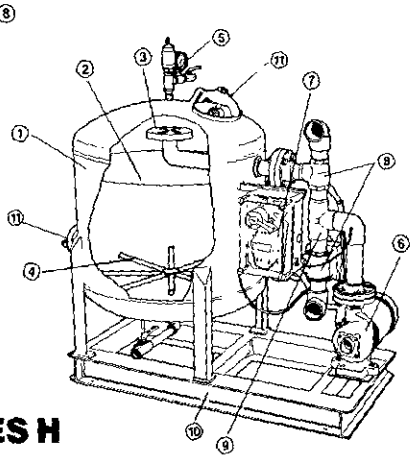


SERIES S



SERIES B

Shown with optional interconnecting piping and I-Beam base



SERIES H

1. FILTER TANK

The Series S filter tank is constructed of type 304 stainless steel. The Series H and Series B filter tanks are carbon steel construction; rated at 50, 100, or 150 psi operating pressure (the 150 psi tank is manufactured of ASME Codes); and are fusion-bonded epoxy-lined on the interior, and fusion-bonded polyester coated on the exterior.

2. FILTRATION MEDIA

Silica sand particles (or optional garnet) of specific size and shape provide efficient removal of solids during filtration and quick release of the trapped solids during backwash.

3. OVERDRAIN ASSEMBLY

The overdrain assembly provides a balanced hydraulic flow for optional water distribution through the media.

4. UNDERDRAIN ASSEMBLY

The PVC underdrain assembly is designed to prevent sand media passage in the filtration mode and to ensure complete fluidizing of the media during backwash.

5. PRESSURE GAUGE/AIR RELIEF ASSEMBLY

The assembly at the top of the tank includes a pressure gauge, an automatic air relief valve, and a petcock for manual air relief.

6. WATER PUMP

The pump is a bronze, close-coupled, centrifugal type with a mechanical seal and bronze impeller. It utilizes a TEFC motor with a 1.15 service factor. The Series S filter pump is equipped with an integral basket strainer so that the unit may be piped directly into the evaporative cooling equipment sump.

7. CONTROL PANEL

The NEMA 4X (corrosion resistant) panel includes: a service disconnect switch with thermal overload and short circuit protection, motor contactor, fused step-down transformer, solid-state backwash timer, differential pressure switch, and push-button for manual backwash override. (Optional features include: backwash counter, 7-day programmable timer and auxiliary contacts for remote operation.)

8. VALVES

The Series S and Series H filters utilize two three-way, two-position, bronze ball valves with mechanical linkage and motorized electric actuators for reliable automatic operation in both the filtration and backwash modes. The Series B filter utilizes four positive sealing butterfly valves with mechanical linkage and a pneumatic (80 psi) actuator (optional electric linear actuator). Backwash is initiated by a preset pressure differential switch.

9. INTERCONNECTING PIPING

The Series S and Series H filters are provided with factory-installed interconnecting PVC piping as standard. Filter inlet, clean water return, and waste water outlet connections are provided. Interconnecting piping is an available option on the Series B.

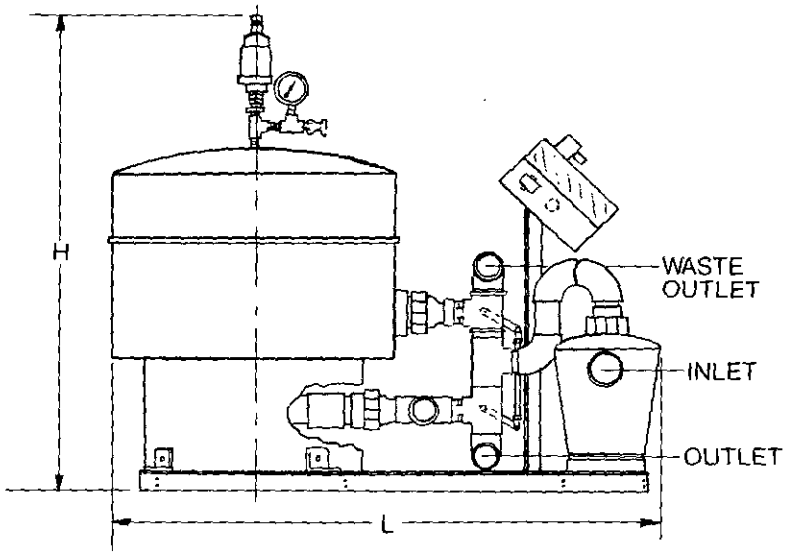
10. BASE

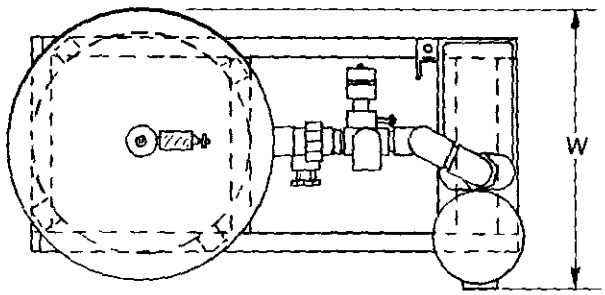
The Series S filter is mounted on an anodized, welded aluminum frame base. The Series H filter (and the Series B filter when provided with the optional interconnecting piping) is mounted on a heavy gauge, hot-dip galvanized steel I-beam base, with a fusion-bonded polyester coating.

11. ACCESS

Access to the interior of the Series S filter tank is conveniently obtained by separating the top from the bottom. A positive O-ring seal protects against leakage. The Series H and Series B filters are equipped with an access port on the top of the tank, and two hand-holes on the side of the tank located for easy access to the media and internal components.

IWF SERIES S ENGINEERING DATA





Model No.	Approx. Weights (lbs.)* Oper.	Shpg. (incl. crate)	Pump HP	Dimensions (in.) L	W	H
IWF-120S	215	295	1	36½	22½	36
IWF-180S	350	360	1	41	21¾	43
IWF-240S	605	445	2	46⅜	27	41¼
IWF-300S	1200	900	2	53⅛	30	48½

*Automatic units, including 10 Micron media for Model IWF-300S, ships on separate pallet (Approx. weight 400 lbs.).

Do not use for construction. Refer to factory certified dimensions. This brochure includes data current at the time of publication which should be reconfirmed at the time of purchase.

ENGINEERING SPECIFICATIONS FOR IWF SERIES S INDUSTRIAL WATER FILTERS

INDUSTRIAL WATER FILTER

Furnish and install, as shown on the plans, _____ factory assembled filtration system(s) mounted on an anodized aluminum base. The system shall include a filter tank with filter media, recirculating pump with removable pre-strainer, PVC piping, (2) three-way directional valves and automatic control for activating filtration and backwash modes.

CAPACITY

The filter(s) shall remove 90% by volume of the suspended particles larger than 10 microns (5 microns optional) from _____ gpm of water circulated through it. The filter shall recirculate the entire system volume of _____ gallons _____ times a day.

FILTER TANK

The tank shall be constructed of 304 stainless steel and a pressure gauge and air relief assembly shall be mounted on top. The internal underdrain assembly shall be constructed with removable laterals. The tank shall be two-part construction to obtain access to the internal components. A positive O-ring with stainless steel clamps shall be provided to seal the access.

VALVES

Two (2) three-way, two position, brass ball valves with mechanical linkage shall be provided.

FILTER MEDIA

The filter media shall be spherical silica sand particles for removal of solids 10 microns and larger. (OPTIONAL: The filter media shall be screened garnet for removal of solids 5 microns and larger.)

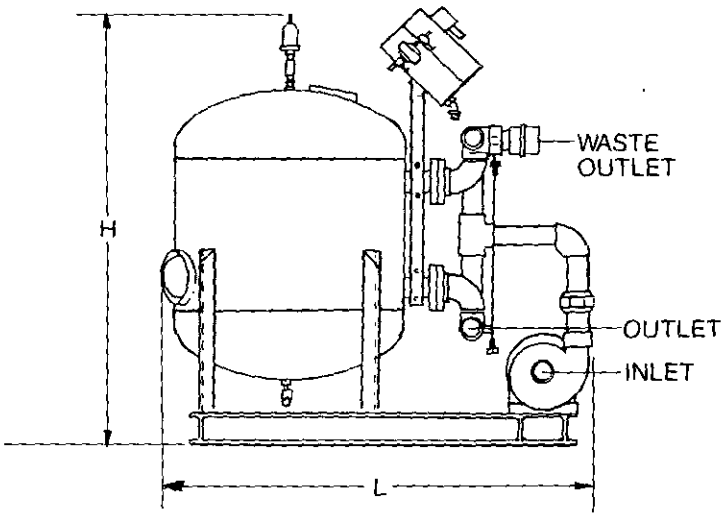
WATER RECIRCULATING PUMP

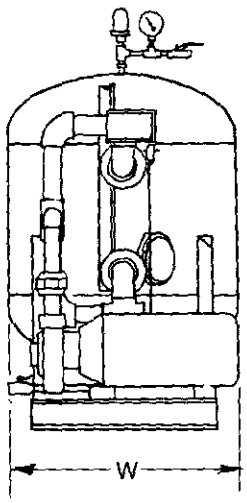
A close coupled, bronze centrifugal pump equipped with mechanical seal and bronze open face impeller and basket-type pre-strainer shall be provided. Pre-strainers shall have a removal core and a see-through lid. _____ HP, TEFC pump motor(s) shall be furnished for operation on _____ volt, _____ hz, _____ phase electrical service.

AUTOMATIC OPERATION

The filter shall be furnished with a pre-piped and pre-wired automatic backwash system to clean the media when the differential pressure across the tank increases to a preset point. The automatic backwash system shall include: a pressure switch, valve actuator, and NEMA 4X (corrosion resistant) control panel containing a service disconnect switch with thermal overload and short-circuit protection, motor contactor, fused step-down transformer, solid-state backwash timer, and a push-button for manual backwash override.

IWF SERIES H ENGINEERING DATA





Model No.	Approx. Weights (lbs.)*		Pump HP	Dimensions (in.)		
	Oper.	Shpg. (incl. crate)		L	W	H
IWF-180H	880	770	1	44	19	46
IWF-240H	1340	1100	2	50	24	48
IWF-300H	1940	1600	2	59	30	50
IWF-360H	2960	2460	3	67	36	52
IWF-420H	3960	3260	5	74	42	54

*Automatic, skid mounted units, 50 psi construction, including 10 Micron media.

Do not use for construction. Refer to factory certified dimensions. This brochure includes data current at the time of publication which should be reconfirmed at the time of purchase.

ENGINEERING SPECIFICATIONS FOR IWF SERIES H INDUSTRIAL WATER FILTERS

INDUSTRIAL WATER FILTER

Furnish and install, as shown on the plans, _____ factory assembled filtration system(s) mounted on a heavy gauge I-beam base. The system shall include a filter tank with filter media, recirculating pump, PVC piping, (2) three-way directional valves and automatic control for activating filtration and backwash modes.

CAPACITY

The filter(s) shall remove 90% by volume of the suspended particles larger than 10 microns (5 microns optional) from _____ gpm of water circulated through it. The filter shall recirculate the entire system volume of _____ gallons _____ times a day.

FILTER TANK

The tank shall be constructed of carbon steel and shall be suitable for a working pressure of 50 psi (100 psi or 150 psi pressure rating and/or ASME code label available as an option). The tank shall be fusion-bonded epoxy-lined on the interior, fusion-bonded polyester coating on the exterior, and supported by structural steel angles which allow access to the tank underside. Inlet and outlet connections shall be flanged, schedule 40 steel pipe located in the tank side. The internal underdrain assembly shall be constructed with removable laterals. Each unit shall be equipped with a manhole located on top of the unit, and two (2) hand holes for cleanout on the tank side. A pressure gauge and air relief assembly shall also be provided on the top of the tank.

VALVES

Two (2) three-way, two position, brass ball valves with mechanical linkage shall be provided.

FILTER MEDIA

The filter media shall be spherical silica sand particles for removal of solids 10 microns and larger. (OPTIONAL: The filter media shall be screened garnet for removal of solids 5 microns and larger.)

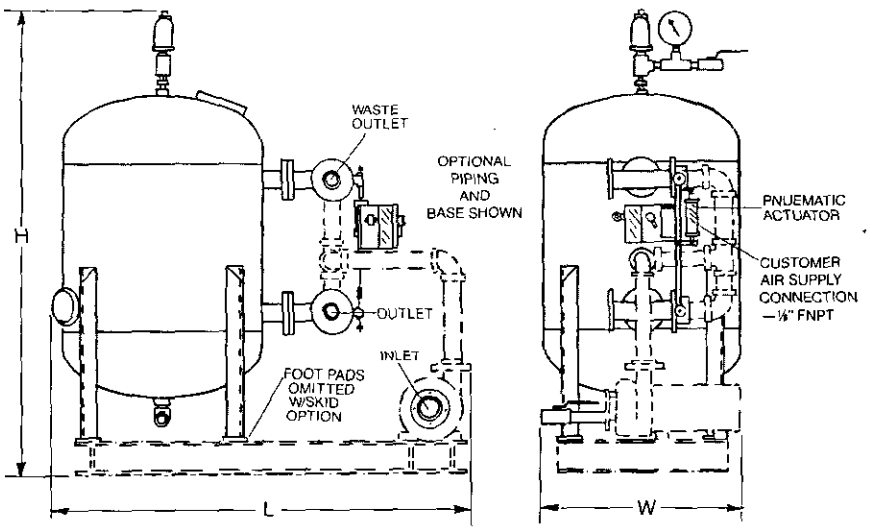
WATER RECIRCULATING PUMP

A close coupled, cast iron bronze-fitted centrifugal pump equipped with mechanical seal and bronze open face impeller shall be provided. _____ HP, TEFC pump motor(s) shall be furnished for operation on _____ volt, _____ hz, _____ phase electrical service.

AUTOMATIC OPERATION

The filter shall be furnished with a pre-piped and pre-wired automatic backwash system to clean the media when the differential pressure acros the tank increases to a preset point. The automatic backwash system shall include: a pressure switch, valve actuator, and NEMA 4X (corrosion resistant) control panel containing a service disconnect switch with thermal overload and short circuit protection, motor contactor, fused step-down transformer, solid-state backwash timer, and a push-button for manual backwash override.

IWF SERIES B ENGINEERING DATA



Model No.	Approx. Weights (lbs.)* Oper.	Shpg. (incl. crate)	Pump HP	Dimensions (in.) L	W	H
IWF-180B	1,300	1,100	1	45¼	15	65½
IWF-240B	2,100	1,240	2	51 3/16	24	67¾
IWF-300B	3,000	1,750	3	58 3/16	30	69¾
IWF-360B	4,400	2,650	3	67¾	36	71⅜
IWF-420B	6,600	4,390	5	74 11/16	42	86⅛
IWF-480B	8,600	5,770	5	80 3/16	48	88⅜
IWF-540B	11,000	7,350	5	90¾	54	90⅞
IWF-600B	13,400	8,900	7.5	96½	60	93
IWF-660B	16,800	11,390	10	107½	66	96¼
IWF-720B	20,200	13,680	10	112⅞	72	99⅜
IWF-780B	23,800	16,070	15	118¾	78	101⅜
IWF-840B	28,100	19,070	15	124¼	84	105¾
IWF-900B	32,300	21,750	15	130¼	90	108⅛
IWF-960B	39,600	26,830	20	143½	96	114

*Automatic, skid mounted units, 50 psi construction, including 10 Micron media.

Do not use for construction. Refer to factory certified dimensions. This brochure includes data current at the time of publication which should be reconfirmed at the time of purchase.

ENGINEERING SPECIFICATIONS FOR IWF SERIES B INDUSTRIAL WATER FILTERS

INDUSTRIAL WATER FILTER
Furnish and install, as shown on the plans, _____ factory assembled filtration system(s). The system shall include a filter tank with filter media, recirculating pump, four butterfly valves with a mechanical linkage and automatic controls for activating the filtration and backwash modes.

CAPACITY
The filter(s) shall remove 90% by volume of the suspended particles larger than 10 microns (5 microns optional) from _____ gpm of water circulated through it. The filter shall recirculate the entire system volume of _____ gallons _____ times a day.

FILTER TANK
The tank shall be constructed of carbon steel and shall be suitable for a working pressure of 50 psi (100 psi or 150 psi pressure rating and/or ASME code label available as an option). The tank shall be fusion-bonded epoxy-lined on the interior, fusion-bonded polyester coated on the exterior, and supported by structural steel angles which allow access to the tank underside. Inlet and outlet connections shall be flanged schedule 40 steel pipe located in the tank side. The internal underdrain assembly shall be constructed with removable laterals. Each unit shall be equipped with a manhole located on top of the unit, and two (2) hand holes for cleanout on the tank side. A pressure gauge and air relief assembly shall also be provided on the top of the tank.

VALVES
Four positive sealing lug-style butterfly valves with mechanical linkage shall be provided.

FILTER MEDIA
Filter support media shall be crushed uniformly graded gravel. The filter media shall be spherical silica sand particles for removal of solids 10 microns and larger. (OPTIONAL: The filter media shall be screened garnet for removal of solids 5 microns and larger.)

WATER RECIRCULATING PUMP
A close coupled, cast iron bronze-fitted centrifugal pump equipped with mechanical seal and bronze open face impeller shall be provided. _____ HP, TEFC pump motor(s) shall be furnished for operation on _____ volt, _____ hz, _____ phase electrical service.

AUTOMATIC OPERATION
The filter shall be furnished with an automatic backwash system to clean the media when the differential pressure across the tank increases to a preset point. The automatic backwash system shall include: a pressure switch, pneumatic valve actuator and solenoid, and NEMA 4X (corrosion resistant) control panel containing a service disconnect switch with thermal overload and short circuit protection, a motor contactor, a fused step-down transformer, a solid-state backwash timer, and a push-button for manual backwash override.

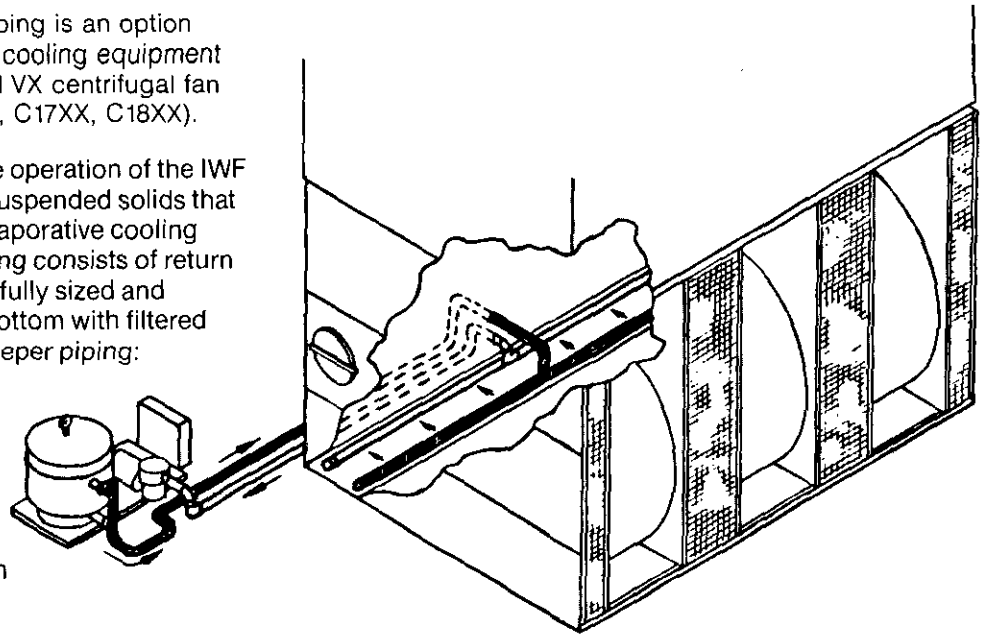
INTERCONNECTING PIPING AND I-BEAM BASE (OPTIONAL)
The filter shall be provided with factory-installed, PVC interconnecting piping with inlet, clean water return, and waste water outlet connections. The complete filter assembly shall be mounted on a heavy gauge, hot-dipped galvanized steel I-beam base with a fusion-bonded polyester coating.

SUMP SWEEPER PIPING

Factory installed sump sweeper piping is an option available on all B.A.C. evaporative cooling equipment except for the smaller Series V and VX centrifugal fan models (VXT 10-185, F17XX, F18XX, C17XX, C18XX).

Sump sweeper piping enhances the operation of the IWF filter by minimizing the amount of suspended solids that may settle out in the low velocity evaporative cooling equipment sump. The sweeper piping consists of return and pick-up pipes with orifices carefully sized and oriented for "sweeping" the sump bottom with filtered water. In this manner, the sump sweeper piping:

1. keeps the water turbulent to minimize settling, and
2. sweeps the suspended solids towards the filter pick-up piping.

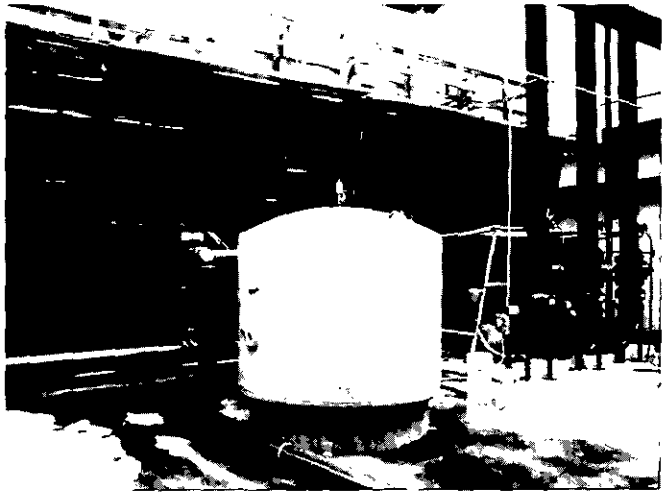


Consult your local B.A.C. Representative for more information on sump sweeper piping for your system.

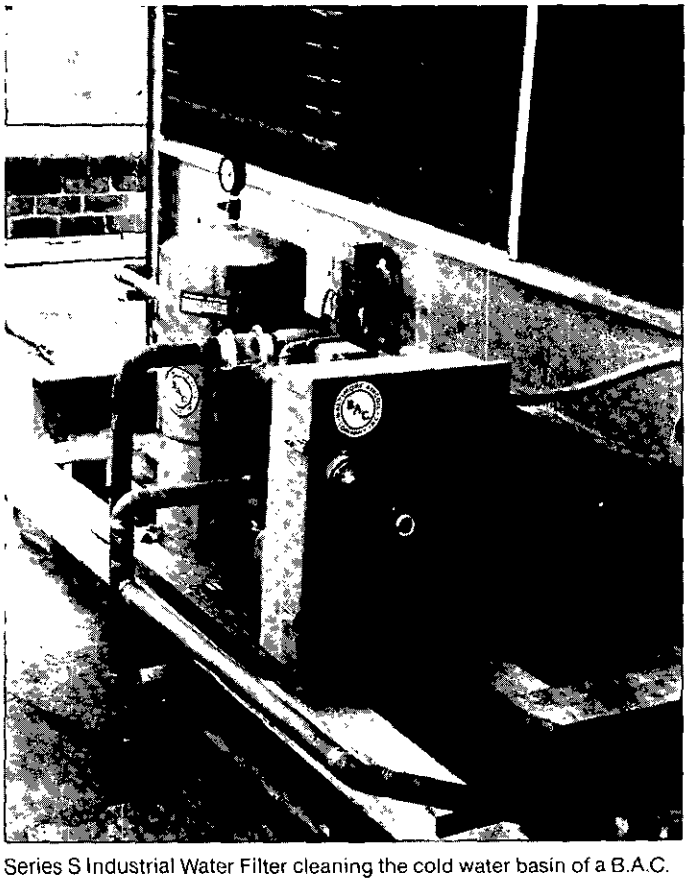
EASE OF INSTALLATION

Baltimore Aircoil Industrial Water Filters are completely engineered, factory-assembled units which are easily installed on both new and existing cooling systems. The automatic backwash system is prewired at the factory, and only requires a power connection to the control box.

After the units are set in place, only power and piping connections are required. (Interconnecting piping and filter base are optional on Series B filters.)



Series B Industrial Water Filter filtering the cold water sump of a large field erected cooling tower.



Series S Industrial Water Filter cleaning the cold water basin of a B.A.C. Ejector Cooling Tower.

APPLICATIONS

The IWF Filter is a pre-engineered system designed specifically for use with cooling towers, industrial fluid coolers, evaporative condensers, and heat exchangers. Satisfactory performance is dependent on correct selection and proper attention to overall system design and installation. Some of the major design considerations are discussed below. For more detailed recommendations, consult your B.A.C. Representative.

WATER TREATMENT

Filtration is an effective way of reducing the level of suspended solids in a system but is only one component of a water treatment program. Dissolved solids originally present in water remain after evaporation and cannot be eliminated by filtration. The concentration of these dissolved solids increases rapidly and can cause scale and corrosion. In addition, airborne impurities and biological contaminants, including Legionella, may be introduced into the recirculation water system through the evaporative cooling equipment being filtered.

To control all potential contaminants, a water treatment program must be employed. In many cases, a simple bleed-off in the system may be adequate for control of scale and corrosion. The filter backwash can be used to constitute a portion of the bleed. However, biological contamination can be controlled only through the use of biocides and such treatment should be initiated at system start-up and continued regularly thereafter.

For specific recommendations on water treatment, contact a competent water treatment supplier. Also, refer to the evaporative cooling equipment operating and maintenance instructions for equipment cleaning procedures.

PIPING AND LOCATION

SERIES S — Piping should be sized in accordance with good piping practice. The Series S Industrial Water Filter must be installed no more than 10 feet above or below the operating level of the evaporative cooling equipment sump. When the Industrial Water Filter is positioned above the operating water level, a swing check valve is required and must be installed between the cooling equipment and the filter pump suction to prevent the filter pump from losing prime. Shut-off valves should be installed on the filter inlet and discharge lines to permit servicing the filter without draining the sump. Series S Industrial Water Filters should not be installed on a closed loop system such as a chilled water circuit or on any pressurized system such as a condenser water circuit; rather they should be installed only on open sumps. Series S Industrial Water Filters are not designed for pressurized systems.

SERIES H AND SERIES B — Piping should be sized in accordance with good piping practice. Shut-off valves should be installed on the filter inlet and discharge lines to permit servicing of the filter without draining the system. When the Series H or Series B Industrial Water Filter is installed on an evaporative cooling equipment sump above the operating water level, a swing check valve is required and must be installed between the cooling equipment and the filter pump suction to prevent the filter pump from losing prime. The Series H or Series B Industrial Water Filter can be installed on a closed loop system such as a chilled water circuit or on a pressurized system such as a condenser water circuit. The standard maximum filter working pressure is 50 psi. Higher pressure ratings and/or ASME code label are available for pressurized systems. When the Series H or Series B Industrial Water Filter is installed on a closed loop system or any pressurized system, it may be installed less pump with the filter inlet on the discharge side of the system pump and the filter discharge on the suction side of the system pump. The filter requires a minimum of 50 feet of head to operate in this manner.

FREEZE PROTECTION

Filters that will be exposed to below-freezing ambient temperatures require protection to prevent freezing. Installation of the filter in a heated indoor space is the best means of avoiding water freezing in a filter. Where indoor installation is impractical because of filter location or space limitations, supplementary heat must be supplied through the use of electrical heater tape and insulation.

The unit should be drained when it is to be shut down for any period of time. In addition, piping between evaporative cooling equipment and the filter, drain pipes and other exposed piping that does not drain at shutdown should be taped with electrical heater tape and insulated.

Filtration devices are not adequate protection against fouling when chiller and condenser water circuits are mixed. B.A.C. does not recommend or endorse mixing chiller and condenser water circuits.

This brochure includes data current at the time of publication which should be reconfirmed at the time of purchase.

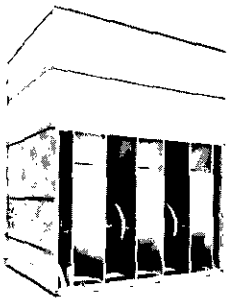
Warranties: Please refer to the Limitation of Warranties applicable to and in effect at the time of the purchase of these products.

Adequate precautions, appropriate for the installation and location of these products, should be taken to safeguard the equipment and the premises from damage and the public from possible injury.

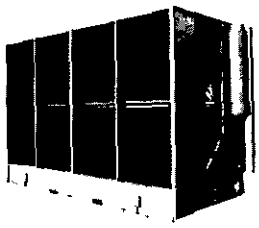
For a discussion of Safety Precautions to be followed when operating or maintaining this equipment, please refer to the equipment's Operating & Maintenance Instructions.

INDUSTRIAL WATER FILTERS

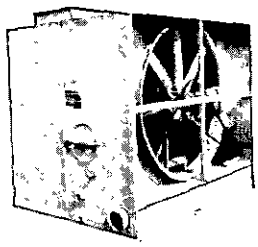
Industrial Water Filters are available for use with a complete line of Baltimore Aircoil Co. Cooling Towers, Industrial Fluid Coolers, Evaporative Condensers, and Heat Exchangers.



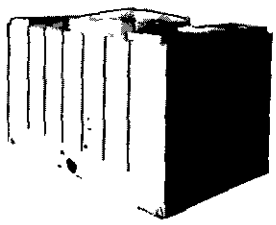
SERIES V
COOLING TOWERS



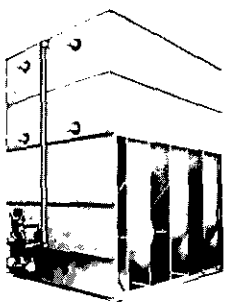
EJECTOR
COOLING TOWERS



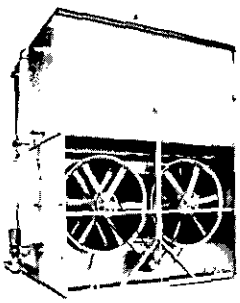
FXT
COOLING TOWERS



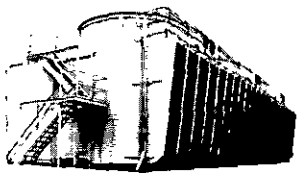
SERIES 3000
COOLING TOWERS



SERIES V
INDUSTRIAL
FLUID COOLERS



SERIES V
EVAPORATIVE
CONDENSERS



BAC-PRITCHARD
FIELD ERECTED
COOLING TOWERS,
FLUID COOLERS
AND EVAPORATIVE
CONDENSERS



HIGH-*k*®
HEAT EXCHANGER
AND PLATE FRAME
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BAC-PRITCHARD, P.O. Box 510, Merced, California 95341

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JDL 5M 4/88

COMMUNITY WASTEWATER TREATMENT SYSTEMS



12,000 GPD system — serving 30 luxury homes.

Cromaglass™ **BATCH-TREAT PROCESS**

CROMAGLASS BATCH PROCESS

All Cromaglass treatment systems operate on identical principles: turbulent aeration of incoming sewage and batch treatment of the bio-mass in separate aeration and quiescent settling tanks. The discharged effluent is a completely odorless liquid, almost clear in color and with a reduction of suspended solids and B.O.D. over 95%. Even higher efficiencies can be obtained if required. Normal per-batch cycling is 180 minutes, and optimum quality standards are maintained even at peak intake levels because of batch-transfer and batch-reserve functions.

COST EFFECTIVE SMALL COMMUNITY SYSTEMS

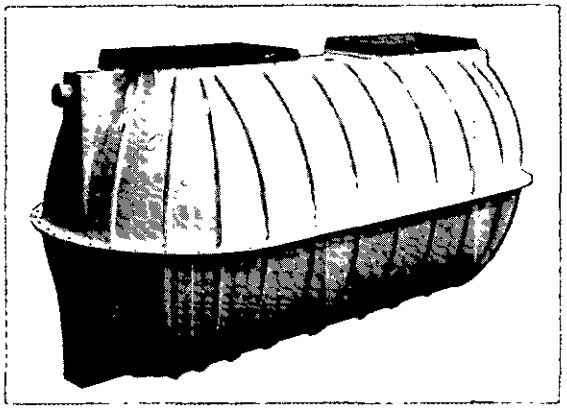
Builders and developers of communities situated outside of municipal type sewerage systems have found use of Cromaglass controlled batch treat units to offer optimum cost effectiveness combined with modern efficient processing acceptable to regulatory agencies. These modular concept designs have been less costly and more environmentally sound than septic tank type installations.

PROVEN QUALITY

Assurance of treatment quality has been accomplished through independent laboratory research and testing supported by sampling from systems under actual use conditions. National standards such as established under Federal EPA and the National Sanitation Foundation have been surpassed even with stress type usage. Effluent quality with over 96% reduction of wastewater pollutants has enabled Cromaglass to be designed for use where other sewerage methods have not been acceptable — or where effluent recycling is preferable in vegetation irrigation and as a toilet flushing medium.

ADEQUATE OVERLOAD RESERVE

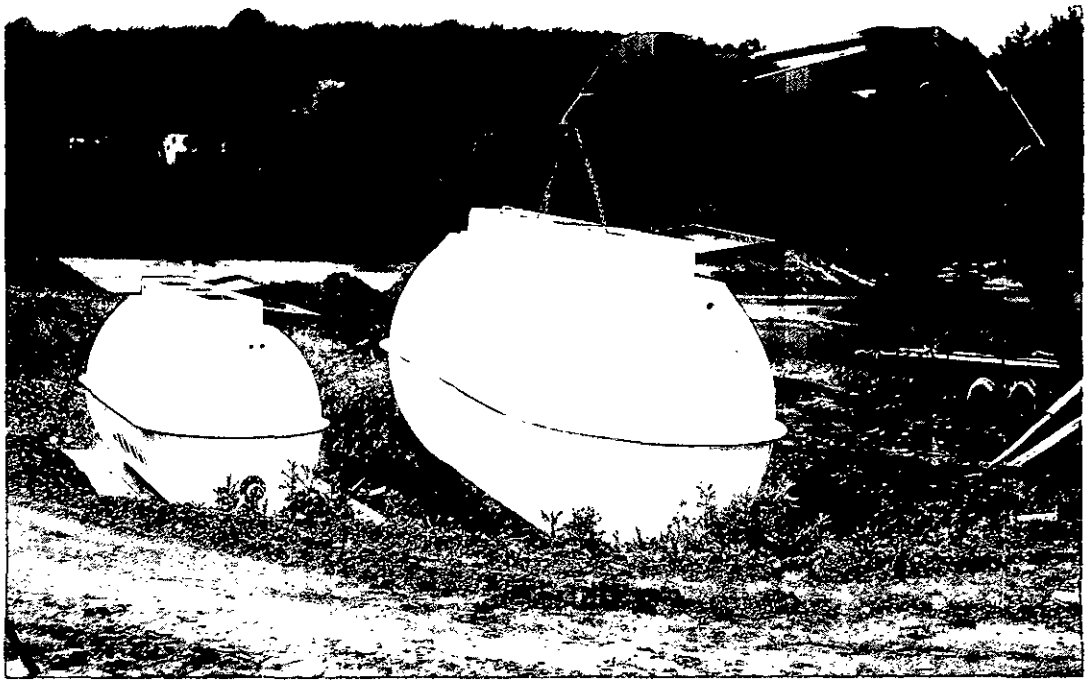
Batch processing has been assessed as being capable of high treatment even under a wide range of flows found in growing communities and extreme organic loadings of commercial, school, or industrial/institutional use. This feature is built into the system to cover temporary emergencies.



NOISE AND ODOR FREE

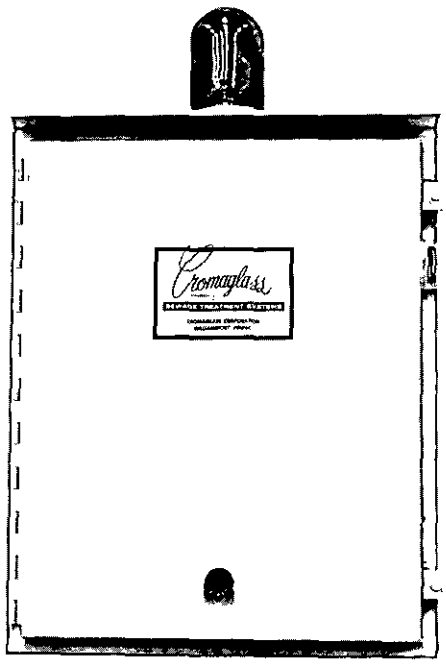
Strong fiberglass tanks with locked maintenance hatchways enable Cromaglass Systems to be installed with no odors or noises associated with other types of open sewage treatment plants. Attractive tank modules can be installed below or above ground as closely as desired to buildings being served. This then saves cost of large collector lines and pump stations normally associated with other types of sewerage systems.

Pumping components integrated with Cromaglass Systems allow design engineers to automatically transport treated effluent to a most desirable near or distant location — whether surface (streams, rivers, or ocean); subsurface (natural soils, raised beds, etc.); or recycling. Cromaglass Systems have been used in many situations considered undesirable with subsurface discharges from septic tanks or "flow through" treatment plants.



Model CA 100

Lightweight fiberglass modules being offloaded by backhoe to excavation and concrete pad.



AUTOMATIC CONTROL PACKAGE ENABLES FULL-TIME MONITORING

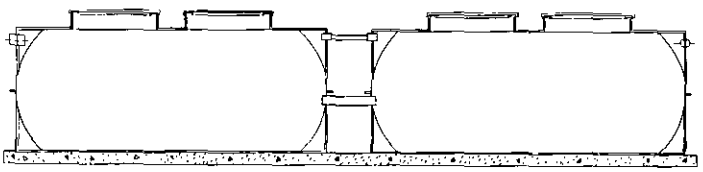
All Cromaglass Treatment Systems utilize preprogrammed control devices for efficient batch processing, and require no regular supervision while operating. Pumping, cycling, alarm systems and switchgear are programmed from a single center within the system and powered by single phase 115 or 230 AC voltage. The only maintenance required is a periodic maintenance check by your serviceman. Accessory monitoring devices are available to automatically alert the operator in remote facilities if a malfunction should occur. These trained accredited operators quickly and effectively make necessary adjustments thereby assuring property owners, regulatory bodies, and the entire community of a pollution-free environment.

CORROSION-PROOF CONSTRUCTION

Depending on the size of the Cromaglass system you install, tank construction is either fiberglass or poured concrete. Covers and locking hatches on all models are constructed entirely of fiberglass to reserve heat and prevent tampering. Interchangeable submersible pumps are employed in all systems. Tanks and electrical systems can be installed either above or below ground, and no sheds, fences or buildings are necessary.

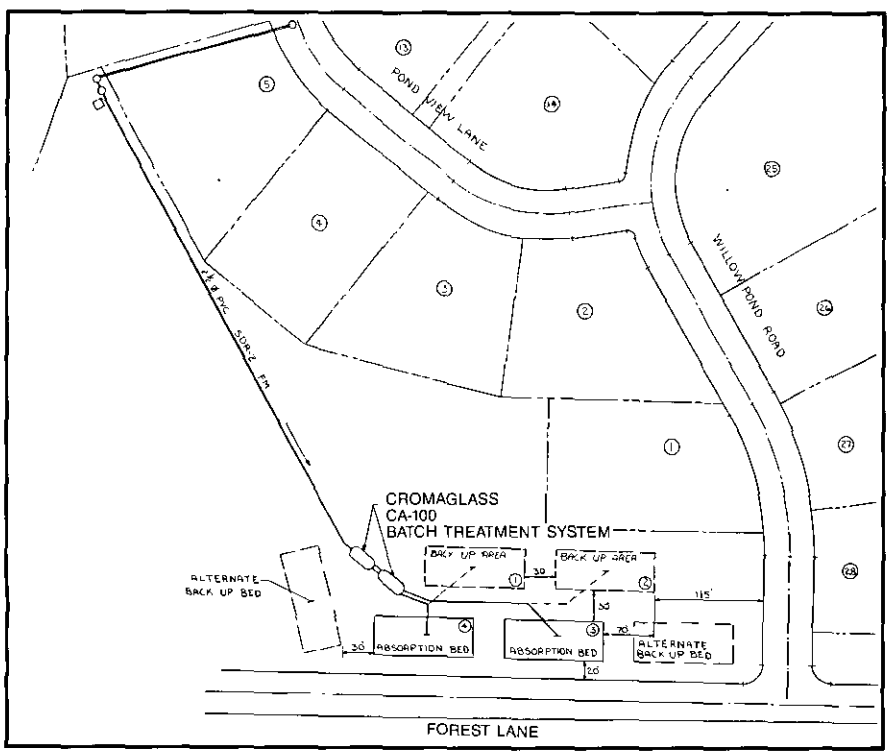
TYPICAL APPLICATIONS OF BATCH-TREATMENT SYSTEMS:

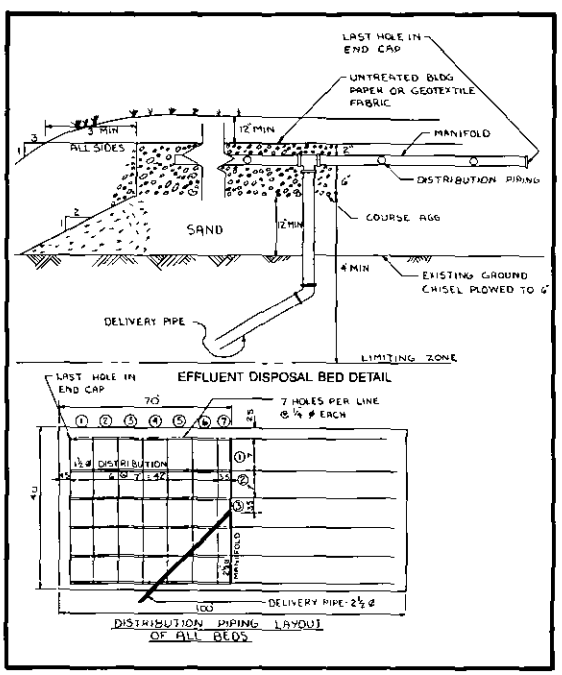
Apartment Houses — Forestry Service — Subdivisions — Ships — Industrial Plants — Mobile Home Parks — Motels — Offshore Drilling Platforms —Private Hospitals — Recreational Areas — Residences — Restaurants — Schools — Resort Areas.



BY-PASS NOT POSSIBLE

Cromaglass systems are designed to make by-pass and intertank contamination impossible. No bio-mass can transfer *from one tank to another except through* the programmed pumping system, and all sludge that *collects in secondary tanks is automatically returned* to the main tank for further aeration and breakdown. *This results in extremely low sludge deposits.* Most residual sludge that collects is made up of biological ash and *insoluble particles that have come into the* system.





Typical design — 30-home subdivision served by Cromaglass modular treatment systems.

SPECIFICATIONS

POWER:
115V/230V Single Phase.
Refer to power consumption chart for KWH and amperes.
230V/460V - 3 phase available at increased cost.

CONTROL PANEL:
Nema 1 enclosure standard equipment.
(Nema 3R, 4, 7, and 12 available)

ALARM:
Red Light mounted on panel plus Audible alarm.

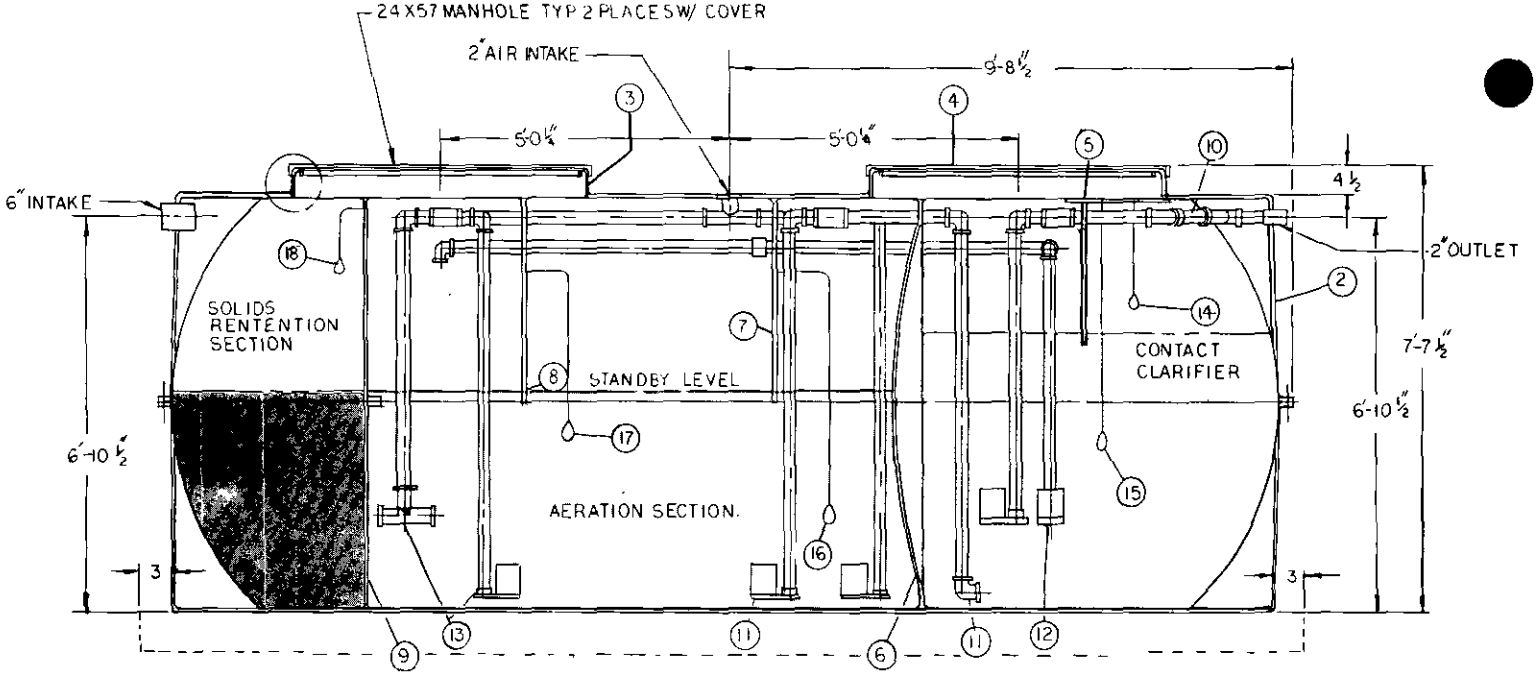
CONSTRUCTION MATERIALS:
Tank—Fiberglass Reinforced Plastic.
Comminution Chamber—Fiberglass and non-corrosive screen.
Piping and Fittings—Schedule No. 40 - PVC - NSF Approved.
Metal Fittings—Stainless Steel.

Pumps	Total Head in Feet					Amperage	
Model	5	10	15	20	25	Max. Run Amps.	Locked Rotor Amps.
	Capacity in Gals. Per Min.						
1/3 H.P. Discharge	41	36	26	8		10	15.6
1/3 H.P. WP0311E	100	85	62	36	3	9.4	32.2
1/2 H.P. WP0511S	160	133	90	50	20	11	34.9

SHIPPING WEIGHT AND DIMENSIONS

Model #	Dimensions Length	Width	Height	Shipping Weight	24 Hour Rated Capacity.	Discharge Volume	Discharges per day
CA5	7'11"	5' 7"	5' 7"	450#	500 gal.	85 gals.	6
CA15	11' 3"	5' 7"	5' 7"	570#	1,500 gal.	260 gals.	6
CA25	14'10"	6'10"	6'10"	1,075#	2,500 gal.	420 gals.	6
CA30	14'10"	6'10"	6'10"	1,275#	3,000 gal.	400 gals.	8
CA50	19' 5"	7' 4"	7' 3"	1,905#	5,000 gal.	625 gals.	8
CA60	19' 5"	7' 4"	7' 3"	1,905#	6,000 gal.	750 gals.	8
CA100	38'10"	7' 4"	7' 3"	3,600#	10,000 gal.	1,250 gals.	8
CA120	38'10"	7' 4"	7' 3"	3,600#	12,000 gal.	1,500 gals.	8

PROCESS DESCRIPTION



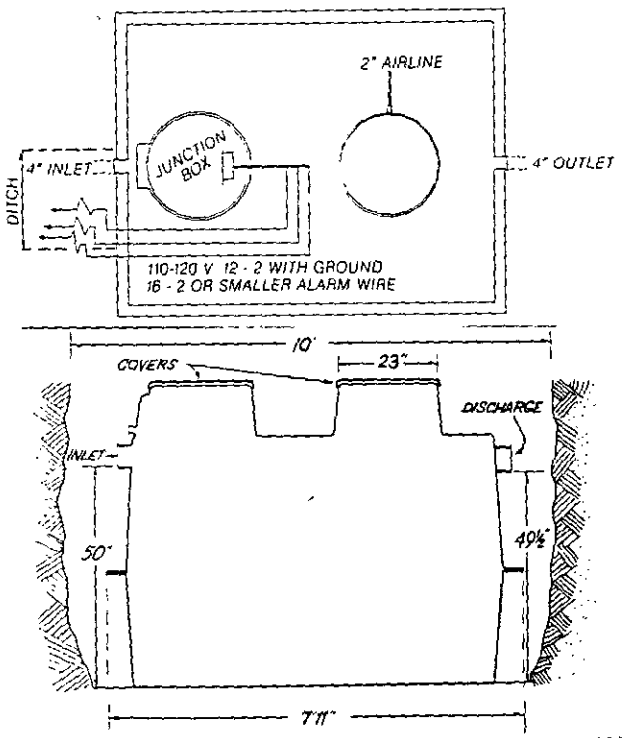
① Aerobic Wastewater Treatment Plant Model CA-50	⑩ Discharge Pump System
② Tank Model CA-50	⑪ Transfer Pump System
③ Manhole	⑫ Sludge Return Pump System
④ Cover	⑬ Aeration Pump P1 & P2
⑤ Baffle	⑭ Float - Sludge Return F1
⑥ Concave Baffle	⑮ Float - Discharge F1
⑦ Half Baffle	⑯ Float - Discharge Shut Off
⑧ Baffle	⑰ Float - Aeration P-2
⑨ Baffle	⑱ Float - High Water Alarm

CROMAGLASS Corporation
Williamsport, Pennsylvania 17701 • Telephone (717) 326-3396

CROMAGLASS MODEL C-5 WASTEWATER TREATMENT SYSTEM
MANDATORY INSTALLATION INSTRUCTIONS

LOCATION

1. Installation of unit shall be in such location as will allow adequate access for service and where adequate tile field performance is possible. Distances from any building, lot line, or water supply shall be those required by local health regulations.
2. Avoid placement in locations subject to flooding. In areas of known high water tables, tanks must be secured as required by local health regulations.
3. Tanks shall have access lids at grade level for easy inspection and servicing. Where the top of the tank is below grade level, use a standard twenty-four (24) inch diameter Cromaglass standpipe, or equal, from the top of the tank to grade level.



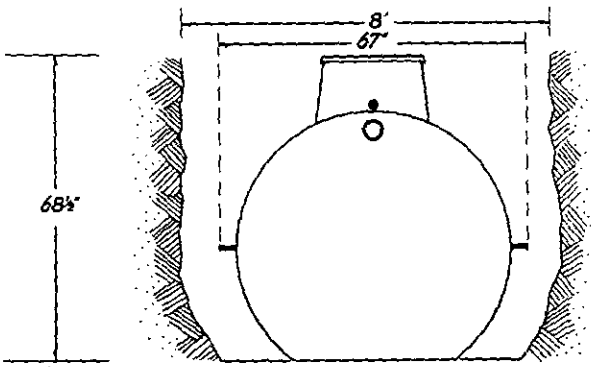
EXCAVATION

1. FOR TANK
   a. The hole for the tank shall be of sufficient size to allow proper placement of the tank and facilitate backfilling. (Approximately eight (8) feet wide, ten (10) feet long and fifty (50) inches deep from the bottom of the inlet pipe to leveled, impacted earth.) (See Diagram.)

   If a concrete slab base is used, add the thickness of the slab to the hole depth. Unlike conventional tanks, a natural hole is dug, smaller at the bottom than the top.
2. FOR SEWER PIPE
   a. The inlet and outlet sewer pipe ditch shall be of sufficient depth to accommodate the sewer pipe.

Unlike conventional tanks, a natural hole is dug, smaller at the bottom than at the top.

After inserting tank in excavation, fill one-half full of water before completing fill-in.



Form 1-2

WARRANTY

Cromaglass warrants all Cromaglass Products to be free from defects in material and workmanship for a period of one year from date of installation if installed and operated per Cromaglass Installation, Operation and Service Specifications. This warranty is limited to resupplying or repairing at Cromaglass' plant any defective Cromaglass Products which have been returned to Cromaglass and which are, in fact, defective Cromaglass Products. Cromaglass shall have no responsibility for any other repairs or consequential damages, and THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Cromaglass makes no warranty in respect to electric motors, controls, switches, and other electrical trade accessories which are warranted by their respective manufacturers.

MAIL THIS CARD

GUARANTEE REGISTER CARD

Guarantee is Void unless this Card is returned
Within 10 days of date of Installation

PLEASE PRINT PLAINLY

Owner's Name _____

Date of Installation _____

Street _____ City _____

State _____ Zip _____

Dealer's Name _____

Model No. _____ Serial No. _____

PLACEMENT AND BACKFILL

1. SEWER PIPE AND AIRLINE

   a. The sewer pipe from the building to the tank, and from the tank to the sub-surface seepage area (or point of discharge) shall have a minimum diameter of four (4) inches and a slope of one-quarter inch fall per one foot of length. The sewer pipe from the building must be vented.

   b. Location of sewage drainage lines shall follow local regulations.

   c. Sewer lines shall be flood-proof and leak-proof.

   d. Lay one piece 2" I.D. non-collapsible plastic airline in building sewer trench of sufficient length from utility area to the tank — (utility area location should be in warm part of building). Close ends to keep line clean until connected.

   e. Lay two underground electric service wires (mainline 110-120V, 12-2 with ground and 16-2 or smaller alarm wire) of sufficient length from inside location to tank.

   f. Backfill and tamp carefully to prevent displacement of pipe, collapse of airline and insure leak-proof joints.

2. TANK

   a. Use lifting hooks to place tank on leveled, impacted earth bottom of hole or on a concrete slab if necessary.

   b. Line up tank inlet pipe with building sewer pipe and tank outlet pipe with discharge pipe. Utilize the correct pipe adapter required to fit cast iron, steel, terra-cotta, concrete or plastic sewer pipe, as required.

   c. Connect airline to tank air inlet and secure with a stainless steel hose clamp as furnished.

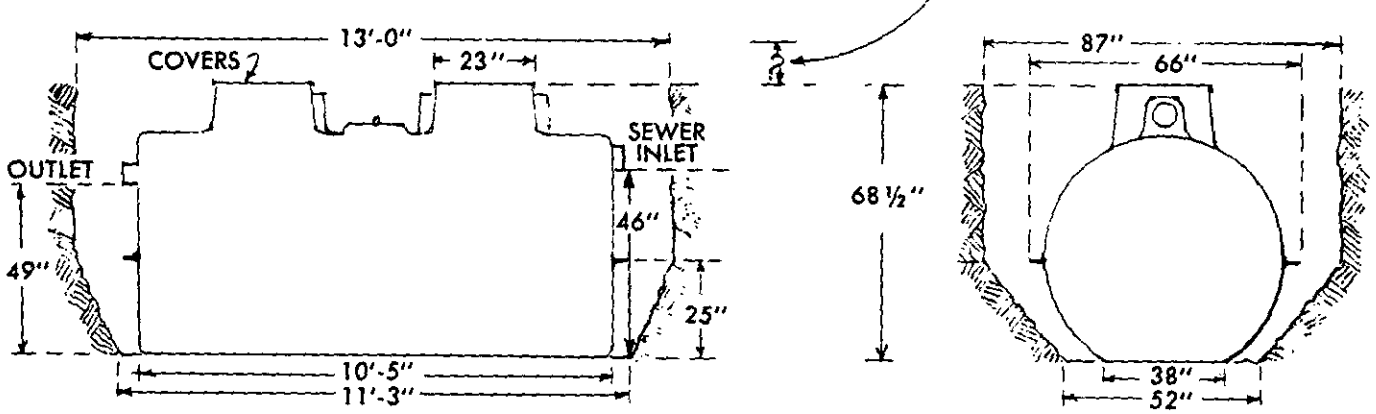
   d. When required, cut Cromaglass standpipe to predetermined length which will allow the top of the standpipe to extend at least two inches above the grade level. Seal with a good grade of caulking compound.

   e. Allow sufficient time for caulking compound to set, partially fill tank with water to hold tank in place. Check all connections and install lids.

   f. Carefully backfill around the tank being sure no large stones strike the tank. Use water to "puddle" backfill around the bottom of the tank instead of mechanical tampers which could dislocate the tank.

MODEL CA-1500-5

SEWER FLOW LINE BELOW SURFACE OF GROUND WILL DETERMINE COMPLETE DEPTH OF THE EXCAVATION. STAND PIPES MAY BE REQUIRED.



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P. O. Box 3215
Williamsport, Pa. 17701

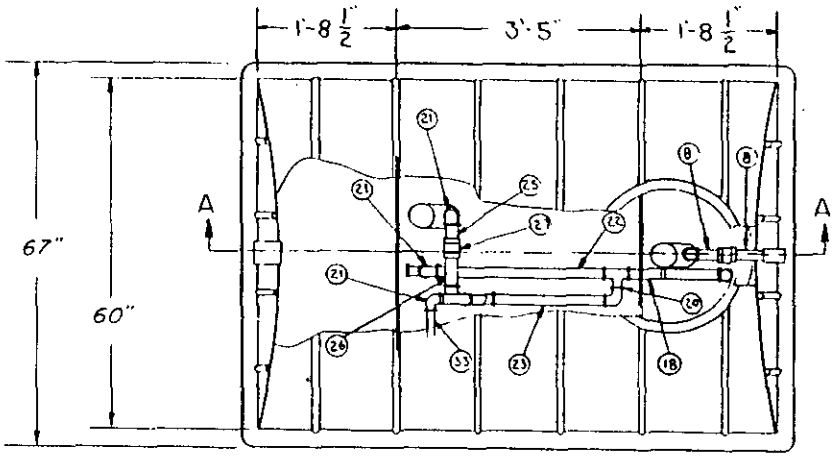
Cromaglass™ CORPORATION

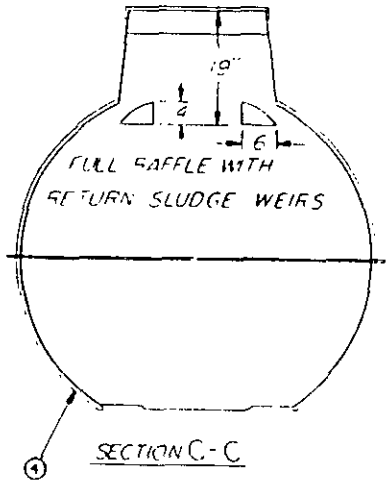
P. O. BOX 3215
WILLIAMSPORT, PA. 17701

PHONE 717 326-3396

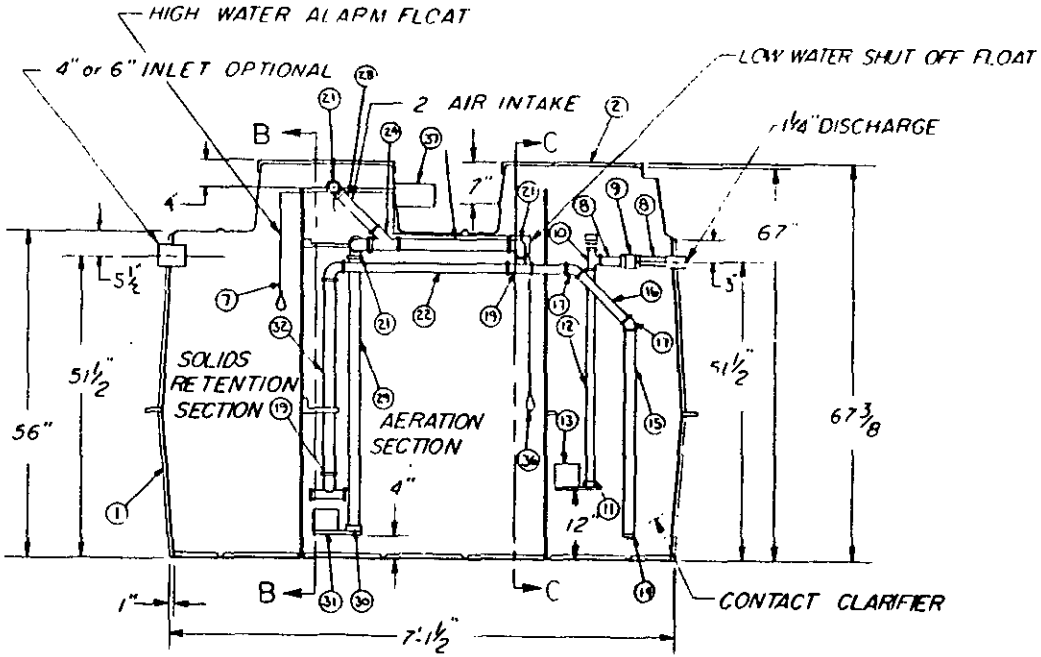
ATTENTION: Registration Dept.

#5764A

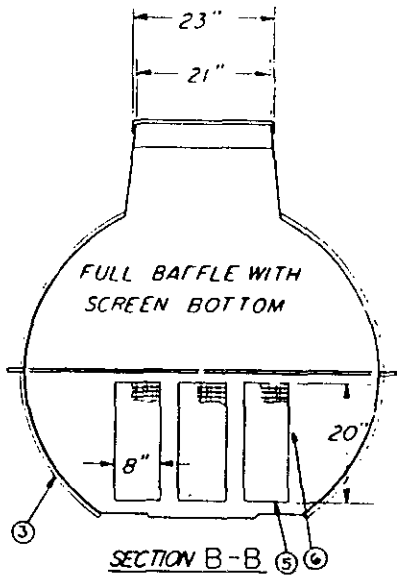




SECTION C - C

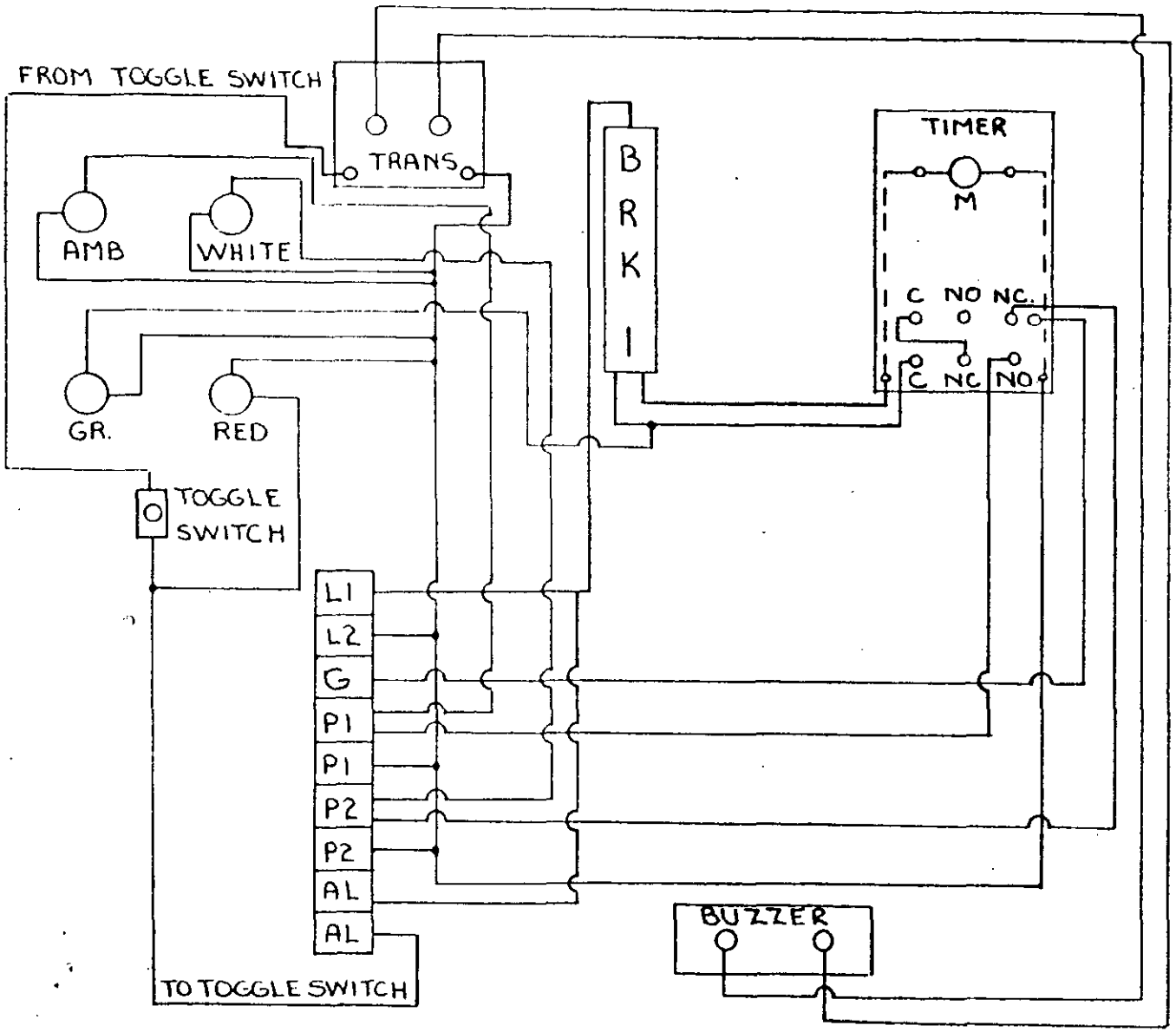


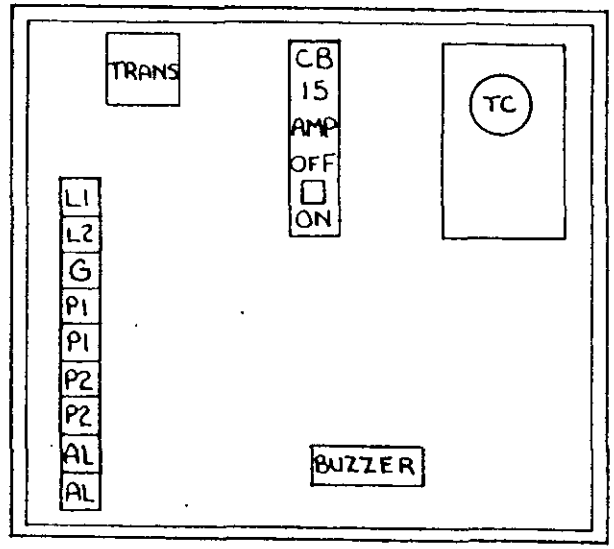
SECTION A - A



SECTION B - B

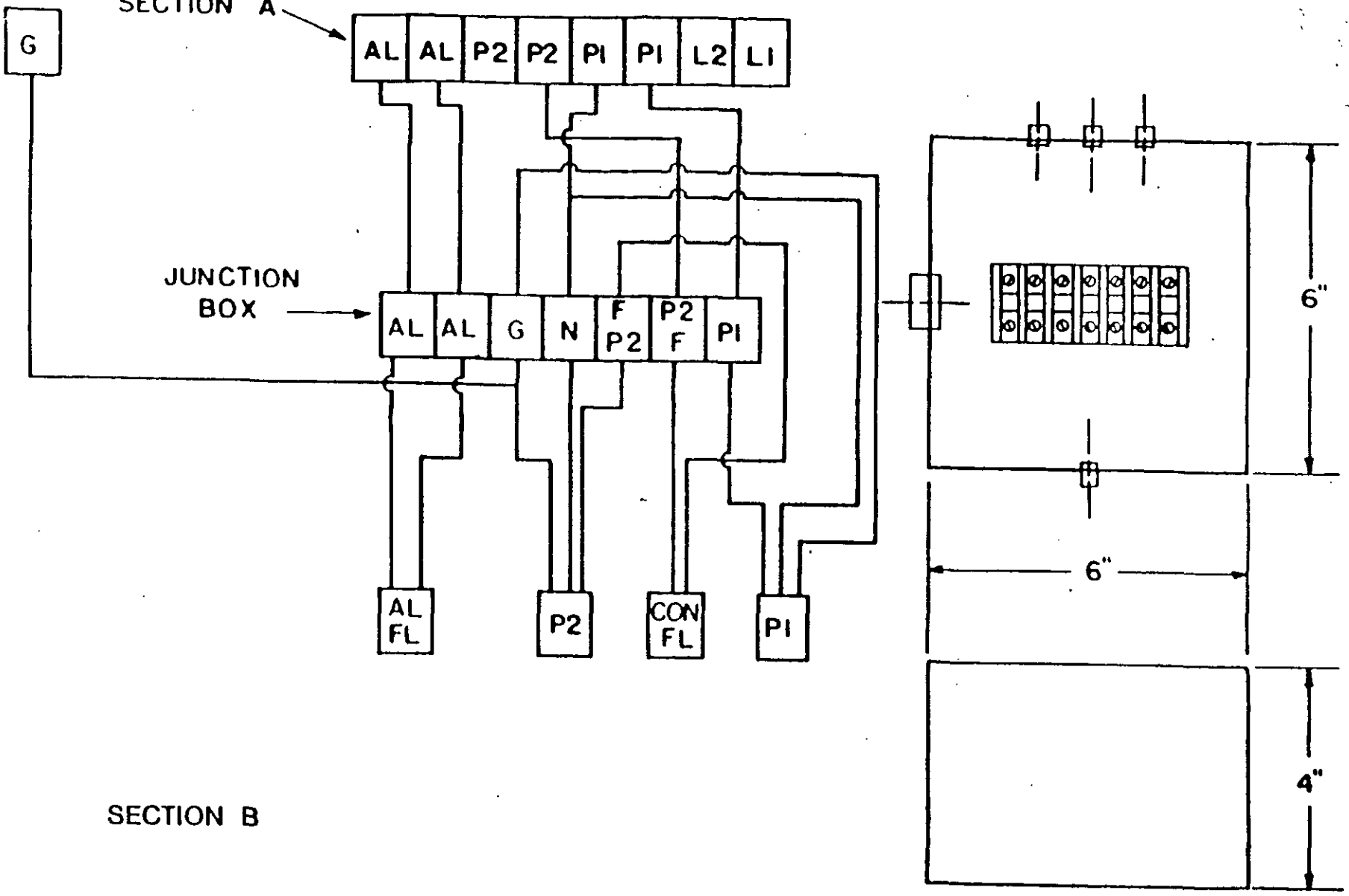
CROMAGLASS CORP. WILLIAMSPORT, PENNA.	DRWN BY: N. KIESSLING	DATE: 3/10/82
	APPRV'D: C.L.B.	SCALE: 3/4"=1'
TITLE: WASTEWATER TREATMENT PLANT CA-5		DRWNG NO.





P-1 PUMP- MAIN AERATION
P-2 PUMP- DISCHARGE
AL ALARM
G GROUND

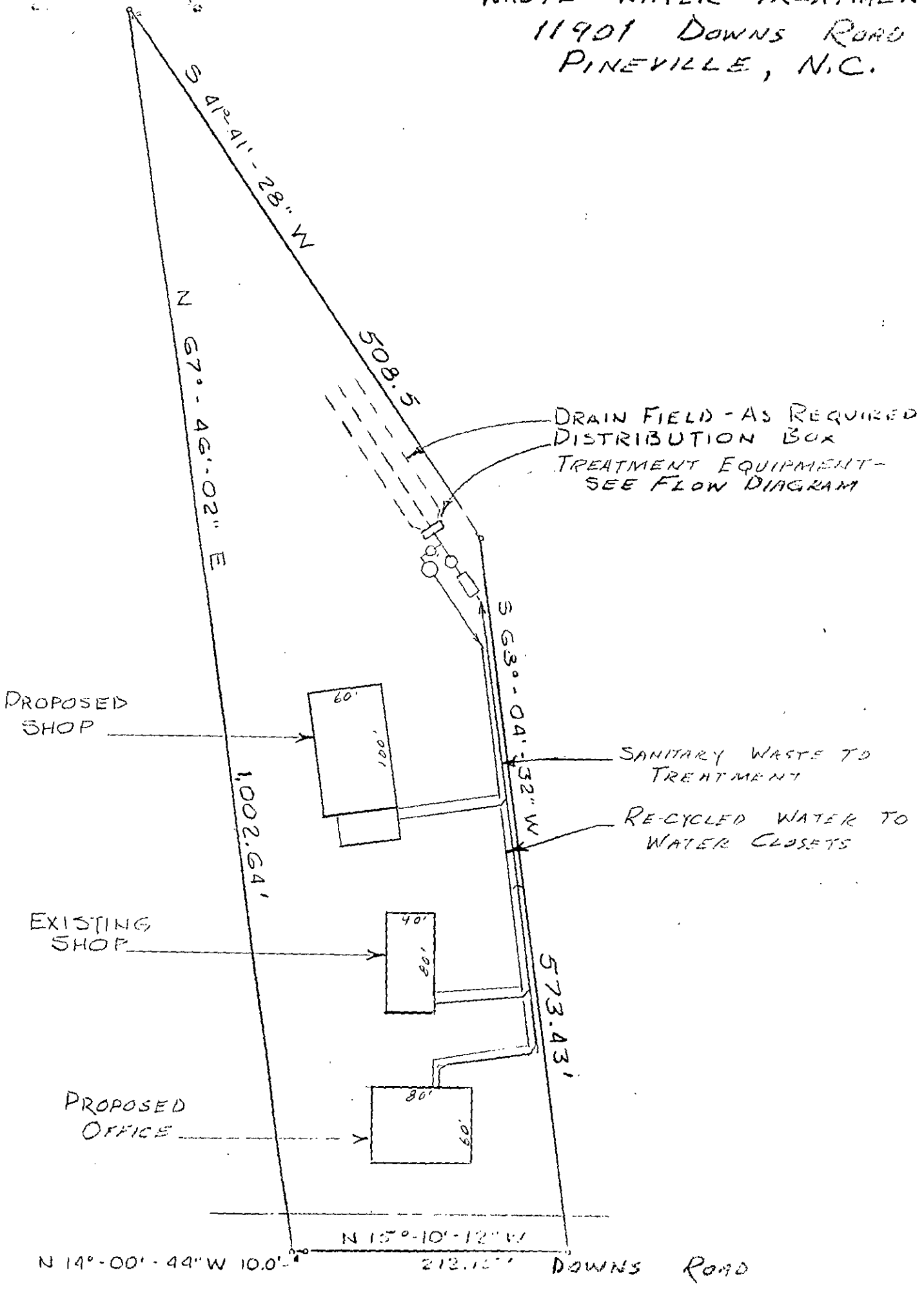
CROMAGLASS CORP. WILLIAMSPORT PA.	DRWN BY: R.S.S.	DATE: 6-4-86
	APPV'D BY:	SCALE: NTS.
TITLE: WIRING DIAGRAM CA-5: CA-15		DRWNG NO: CA-5-15-101



CROMAGLASS CORP. WILLIAMSPORT, PENNA.	TITLE: WIRING DIAGRAM & JUNCTION BOX FOR WASTE WATER TREATMENT PLANTS CA-5 CA-15	DATE: 6/86 DRAWN BY APPRV'D BY	DRWG. NO. 101-A

5764A

WASTE WATER TREATMENT
11901 DOWNS ROAD
PINEVILLE, N.C.

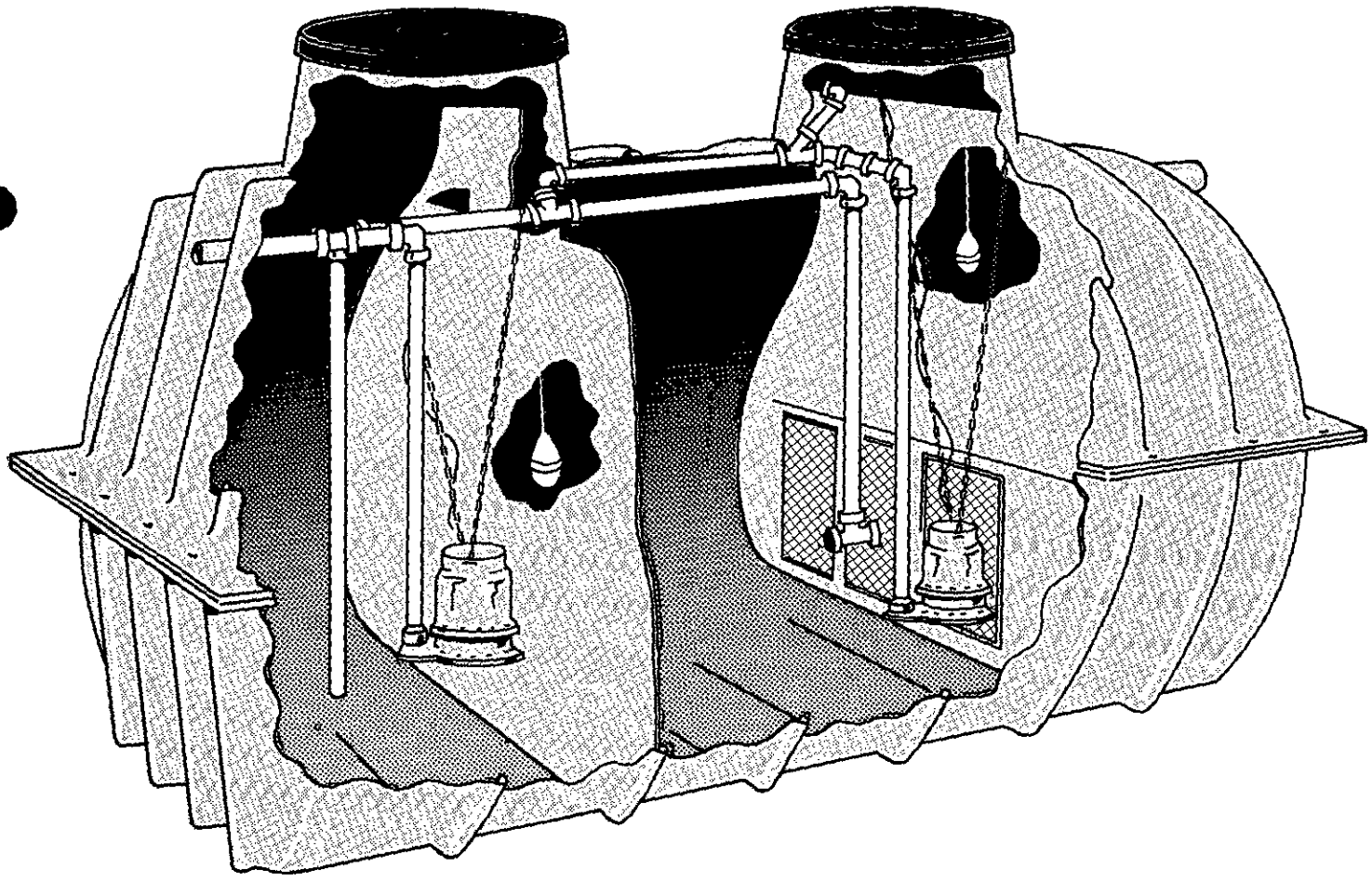


#5764A

Cromaglass™

CONTROLLED BATCH

WASTEWATER TREATMENT SYSTEM



CROMAGLASS Corporation

Williamsport, Pennsylvania 17701 • Telephone (717) 326-3396

Why a Cromaglass™ Batch-treat system *is best* —

All Cromaglass treatment systems operate on identical principles: turbulent aeration of incoming sewage and batch treatment of the bio-mass in separate aeration and quiescent settling tanks. The discharged effluent is a completely odorless liquid, almost clear in color and with a reduction of suspended solids and B.O.D over 85%. Even higher efficiencies can be obtained if required. Normal per-batch cycling is 180 minutes, and optimum quality standards are maintained even at peak intake levels because of batch-transfer and batch-reserve functions.

ADEQUATE OVERLOAD RESERVE

Cromaglass systems will safely handle temporary peaks when the plant is subject to overloads, and there is only a slight reduction in effluent quality under these conditions. This feature is built into the system to cover temporary emergencies only.

HIGHER OPERATING TEMPERATURES

Cromaglass systems are designed to retain heat, and are specially insulated for this reason. Higher temperatures increase enzyme and biological activity, reducing the cycling time required between tanks. The heat generated by the submersible pumps is fully utilized to increase operating temperatures even further. Cromaglass systems operate efficiently at sub-zero temperatures, and models are available for permafrost installations.

NOISE AND ODOR FREE

Bio-mass breakdown is accomplished underwater in totally enclosed tanks and there is absolutely no odor when hatches are closed. The processed effluent that is discharged from the system is also odorless. When a system is operating it is inaudible, and can be installed very close to the building it is serving.

COMPLETELY AUTOMATIC, MINIMAL MAINTENANCE

All Cromaglass systems are completely automatic and require no regular supervision while operating. Pumping, cycling, alarm systems and switchgear are programmed from a single center within the system and powered by single phase 115 or 230 AC voltage. The only maintenance required is a periodic maintenance check by your serviceman.

BY-PASS NOT POSSIBLE

Cromaglass systems are designed to make by-pass and intertank contamination impossible. No bio-mass can transfer from one tank to another except through the programmed pumping system, and all sludge that collects in secondary tanks is automatically returned to the main tank for further aeration and breakdown. This results in extremely low sludge deposits. Most residual sludge that collects is made up of biological ash and insoluble particles that have come into the system.

CORROSION-PROOF CONSTRUCTION

Depending on the size of the Cromaglass system you install, tank construction is either fiberglass or poured concrete. Covers and locking hatches on all models are constructed entirely of fiberglass to reserve heat and prevent tampering. Interchangeable submersible pumps are employed in all systems. All tanks and electrical systems can be installed either above or below ground, and no sheds, fences or buildings are necessary.

REDUCED DRAINAGE FIELD SIZE

Because of the clarity, odorless quality and high treatment standards of the effluent from Cromaglass systems, the drainage field can be up to two-thirds smaller than the size required for conventional systems. This reduced field area leaves more room on the property for other buildings, roads or landscaping. The number of field failures due to inadequate wastewater treatment are legion, and can never occur with a properly maintained Cromaglass system. Clogging of tiles from the effluent of a Cromaglass batch-treat system is impossible.

TYPICAL APPLICATIONS OF BATCH-TREATMENT SYSTEMS:

Apartment House — Forestry Service — Generating Stations — Ships — Industrial Plants — Mobile Home Parks — Motels — Offshore Drilling Platforms — Private Hospitals — Recreational Areas — Residences — Restaurants — Schools — Resort Areas.

SPECIFICATIONS

POWER:
115V/230V Single Phase.
Refer to power consumption chart for KWH and amperes.
230V/460V - 3 phase available at increased cost.

CONTROL PANEL:
Nema 1 enclosure standard equipment.
(Nema 3R, 4, 7, and 12 available)

ALARM:
Red Light mounted on panel plus Audible alarm.

CONSTRUCTION MATERIALS:
Tank—Fiberglass Reinforced Plastic.
Comminution Chamber—Fiberglass and non-corrosive screen.
Piping and Fittings—Schedule No. 40 - PVC - NSF Approved.
Metal Fittings—Stainless Steel.

Pumps	Total Head in Feet					Amperage	
Model	5	10	15	20	25	Max. Run Amps.	Locked Rotor Amps.
	Capacity in Gals. Per Min.						
⅓ H.P. Discharge	41	36	26	8		10	15.6
½ H.P. WP0311E	100	85	62	36	3	9.4	32.2
½ H.P. WP0511S	160	133	90	50	20	11	34.9

SHIPPING WEIGHT AND DIMENSIONS

Model #	Dimensions Length	Width	Height	Shipping Weight	24 Hour Rated Capacity.	Discharge Volume	Discharges per day
CA5	7'11"	5' 7"	5' 7"	450#	500 gal.	85 gals.	6
CA15	11' 3"	5' 7"	5' 7"	570#	1,500 gal.	260 gals.	6
CA25	14'10"	6'10"	6'10"	1,075#	2,500 gal.	420 gals.	6
CA30	14'10"	6'10"	6'10"	1,275#	3,000 gal.	400 gals.	8
CA50	19' 5"	7' 4"	7' 3"	1,905#	5,000 gal.	625 gals.	8
CA60	19' 5"	7' 4"	7' 3"	1,905#	6,000 gal.	750 gals.	8
CA100	38'10"	7' 4"	7' 3"	3,600#	10,000 gal.	1,250 gals.	8
CA120	38'10"	7' 4"	7' 3"	3,600#	12,000 gal.	1,500 gals.	8

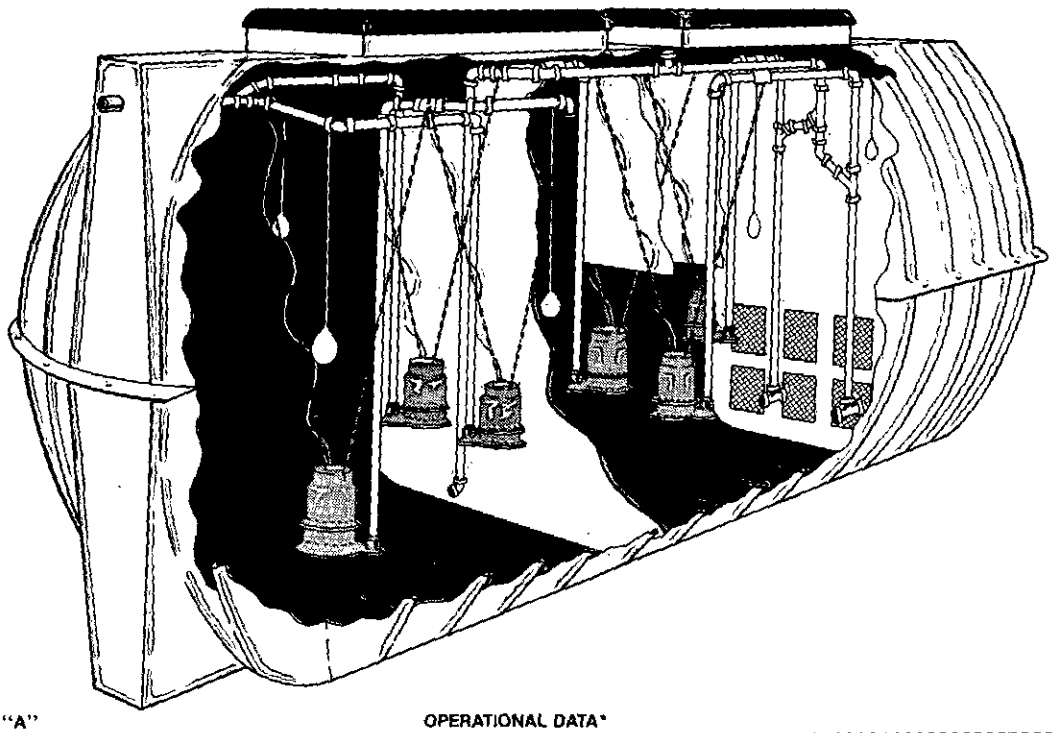
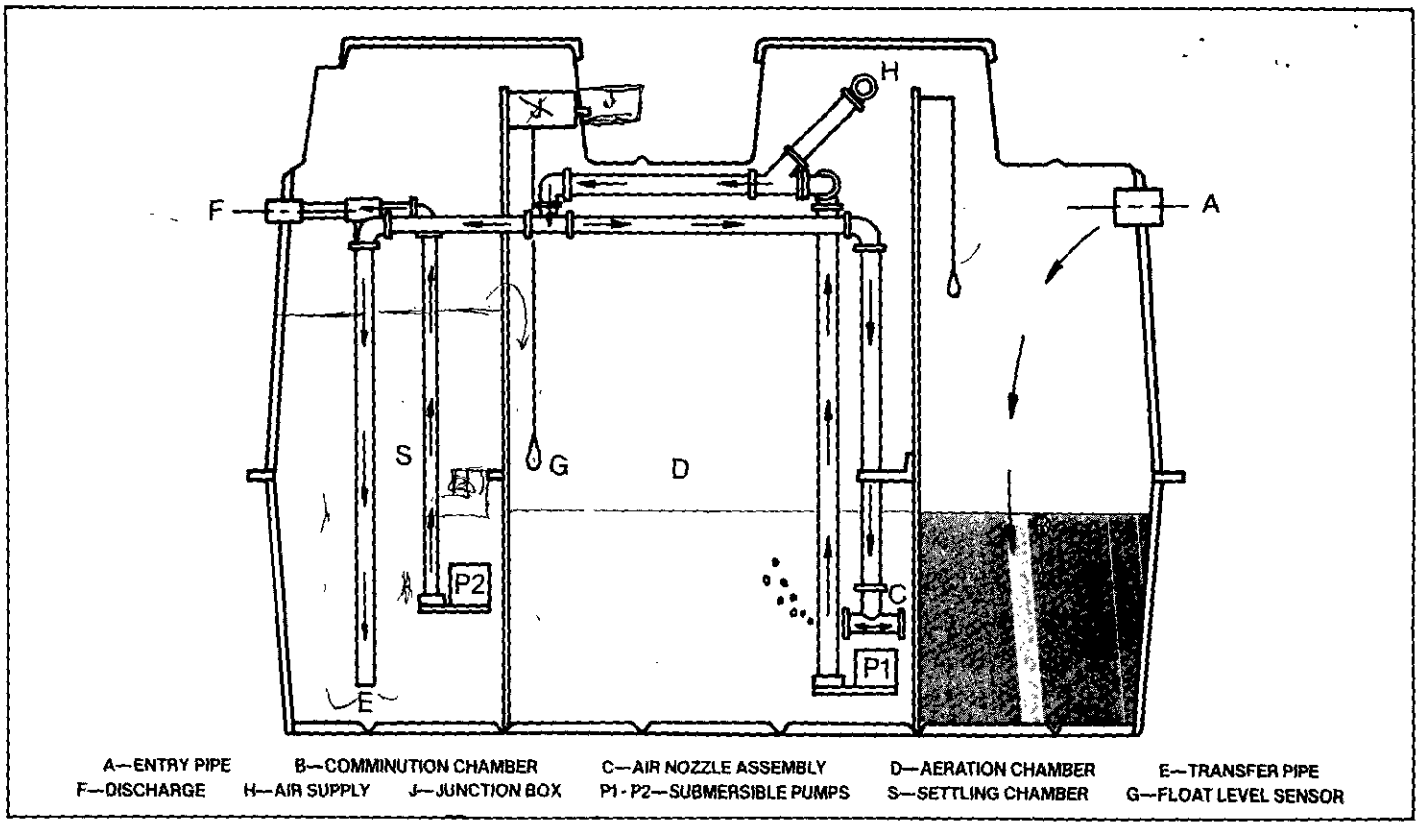


Table "A" **OPERATIONAL DATA***

Power Consumption/Per 24 Hrs.			Removal Efficiency	Sludge Recycle	B.O.D.		Aeration Detention Time	Reserve Surge Volume
Plant Model	Daily Treated Capacity Gals.	KWH			Influent	Effluent		
			%	%	mg/l	mg/L	(hours)	
CA5	500	5.78	85-96	98-100	80-300	10-30	14	In excess of 250 Gals./Day
CA15	1500	9.17						
CA25	2500	14.85					Average	
CA30	3000	32						
CA50	5000	32						
CA60	6000	32						
CA100	10000	52						
CA120	12000	52						

*Based on NSF Certified Data



PROCESS DESCRIPTION

Sewage from source flows through entry pipe (A) to comminution chamber (B) Aeration pump (P1) is programmed — drawing mixed liquor through bottom and out through air nozzle venturi assembly (C) Air supply is pulled into tank through pipe (H) Discharge from nozzle is directed toward screen and ensuing turbulence causes material in chamber to abraid and come apart after which mixed solution passes into main aeration chamber (D)

Transfer pipe (E) directs approximately 25% of (P1) pump flow to settling chamber (S) All power to pumps (P1) and (P2) comes from junction box (J) Remotely located control panel contains a level control switch which activates an alarm circuit within home if water level rises too high in tank (i.e. electrical or pump failure or overloading).

Pump (P2) discharges treated - settled effluent at programmed level.

Float level sensor (G) prevents (P2) pump from discharging too much water from settling chamber during periods of low flow and thereby retains necessary biological mix in aeration section for best treatment.

Discharge is via PVC fitting (F)

Important facts about ordering & installing a system

A professional engineer should be consulted as soon as you have decided to install a system. He will provide all the information you'll need during preliminary planning stages, then handle liaison between your contractor and Cromaglass Corporation as the job proceeds. His services are also invaluable in obtaining permits or authorizations that may be required from regulatory departments or agencies. Detailed installation drawings are supplied to you and your engineer when your order is placed. For preliminary planning and estimating beforehand, this checklist provides a helpful guide:

☐ Each Cromaglass system requires specific shipping and handling techniques. Our offices can advise you on best methods, and how to handle and place the plant once it is on site.

☐ Installed systems must be accessible, and installed under conditions suitable for operation and service. Buildings or fences are not normally required, but if plant is to operate under low temperature extremes, certain protection options may have to be supplied.

☐ For costing of excavation, slabs, hold-downs, backfilling, etc., please see plant dimension tables on installation drawing.

☐ Future enlargement of system capacity should be considered if expansion is likely, and the location now being selected should allow for temporary overload conditions.

☐ Adequate single phase electrical power must be available, with proper panels, fuses and safety switch. Electric equipment, wiring and pipes must be in accordance with local codes and ordinances. No changes in the system can be made without written approval of Cromaglass Corporation.

SOUTHERLAND ASSOCIATES, INC.
Engineers - Constructors

611 Fortune Street
Charlotte, N. C. 28205
TELEPHONE 704-375-6627
704-375-8604

July 27, 1989

Mr. James R. Ericson, R.S.
Sanitation Supervisor
Mecklenburg County Health Department
1200 Blythe Boulevard
Charlotte, NC 28203

Re: Permit Application - Sanitary Waste Treatment System
11901 Downs Road
Pineville, NC

Dear Mr. Ericson:

We appreciate your taking time to meet with us on Wednesday afternoon. As mentioned in that meeting, we forward the following additional information:

Sampling

A manual sampling station (not shown on our flow sheet) will be provided downstream of the filter. Samples will be taken daily during initial operation until sufficient data has been developed to allow extending the sampling internal.

Effluent Quality

The system effluent will meet established standards for drinking water with respect to: B.O.D., suspended solids, nitrogen removal, turbidity, and coliform count. Chlorination and filtration will be modified, as required, to achieve this result. Specifically,

a. Chlorine dosage will be adjusted to provide free residual chlorine, not less than 0.1 mg/liter, and

b. Filtration will be at a maximum rate of one gallon per minute in a Baltimore Air Coil Model IWF-120S, stainless steel, canister type, sand filter having a cross sectional area of 113 square inches, through not less than 16 inches of filtering medium, having the following specification: The top layer shall be 8"-12" of filter anthracite conforming to AWWA Specification B100. Effective particle size shall be 1.2 mm with a uniformity coefficient of 1.4 or less.

RECEIVED
MECKLENBURG COUNTY
HEALTH DEPT.

JUL 31 19

ENVIRONMENTAL HEALTH
DIVISION

Specific gravity shall be approximately 1.65. The anthracite medium shall be supported on a 6"-10" layer of selected filter sand conforming to AWWA Specification B100 and having the following characteristics:

Specific gravity: 2.60, or more
Effective particle size: 0.55 - 0.65 mm.
Uniformity coefficient: 1.60, or less.

The sand will be supported on a gravel bed conforming to AWWA Specification B100, from which it will be separated by a layer of suitable geotextile fabric.

Maintenance

Monitoring, sampling, and maintenance of the system will be accomplished by regular full-time employees of Southerland Associates, Inc., except:

a. Sample analysis of more than routine scope will be done by a commercial testing laboratory, and

b. Sludge and grit removal, as required, (we estimate annually) will be done by a commercial sewage service firm.

We hope that this information, along with that supplied earlier, will enable your department to approve the proposed system. Please do not hesitate to call upon us if additional information is required.

Sincerely,

SOUTHERLAND ASSOCIATES, INC.

Geo. W. McCormick

George W. McCormick, P.E.

ssg

5764A

Client SOUTHERLAND ASSOCIATES
11901 DOWNS RD.

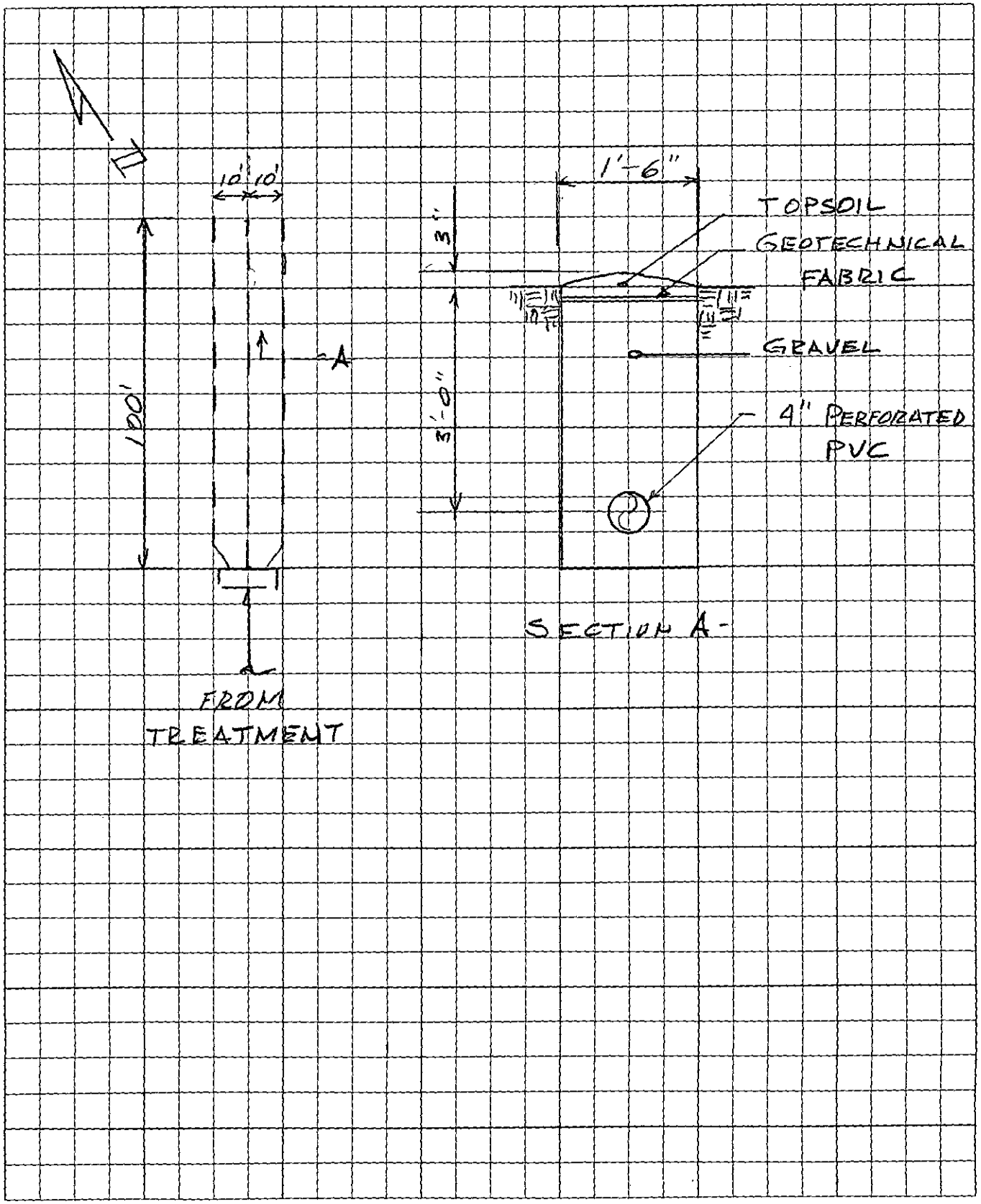
Subject SANITARY DRAIN FIELD

Project No. _____ Sheet 1 of 1

SOUTHERLAND ASSOCIATES, INC.
Engineers & Constructors
611 Fortune Street
Charlotte, N. C. 28205

By G.W.McC. Date 7-11-89

Revision _____ Date _____



APPLICATION FOR AN IMPROVEMENT PERMIT

HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION
1200 BLYTHE BOULEVARD
CHARLOTTE, NC 28203
PHONE (704) 376-4603

Mecklenburg County services are available without regard to ethnic origin, sex, or disability.

(OFFICE USE ONLY)

FILE: 5764A

TC: 205-061-20

SERIAL: № 18636

☐ L ☐ CRT

JOB LOCATION

① ADDRESS: 11901 (STREET NO.) Downs Road (STREET) ② FILE: _____

③ JURISDICTION: _____ ④ TAX PARCEL NO.: 205-061-20

⑤ SUBDIVISION: _____ ⑥ LOT: _____ ⑦ BLOCK: _____

OWNER

⑧ NAME: W. H. Southerland, Jr. & O. L. Southerland (FIRST) (MIDDLE) (LAST)

⑨ MAILING ADDRESS: 611 Fortune Street

⑩ CITY: Charlotte, ⑪ STATE: NC ⑫ ZIP: 28205

⑬ PHONE: (WORK) _____ ⑭ (HOME) _____

REQUEST

This request is for a(n):

⑮ ☒ New permit ⑰ ☐ Authorization for mobile home exchange

⑯ ☐ Repair or alteration permit ⑱ ☐ Other (specify) _____

DESIGN CRITERIA

System will serve:

⑲ ☐ Residence ⑳ ☐ Mobile home ㉑ ☒ Business or place of public assembly

㉒ Number of bedrooms? _____ ㉕ Type? Office

㉓ Maximum occupancy? _____ ㉖ Maximum number of employees? 40

㉔ Basement? ☐ yes ☐ no ㉗ Maximum number of seats? 10

WATER SUPPLY

㉘ Water supply from (present or proposed):

A ☐ Individual well

B ☒ Municipal system

C ☐ Community well

D ☐ Community system

㉙ The undersigned, owner of the property described above as the "JOB LOCATION" has read the foregoing application, acknowledges that the contents of same are true, and authorizes agents of the MECKLENBURG COUNTY HEALTH DEPARTMENT to enter on the property for the purpose of processing this request.

Signed: W H Southerland Jr

Date: 7-7-89

IMPROVEMENT PERMIT

The undersigned, an authorized agent of the MECKLENBURG COUNTY HEALTH DEPARTMENT, certifies that the Department has approved the Request for the Job Location contained in this document. This approval is granted in accordance with the provisions of Laws And Rules For Sanitary Sewage Collection, Treatment And Disposal in effect at the time of issuance of the permit and is subject to the following provisions:

... No work shall be conducted on the septic tank system until an Installation, Construction, Alteration and/or Repair permit is issued by this Department.

... This permit is not transferable, and shall become null and void 36 months from the date of issuance.

_____ / _____
Environmentalist Date

_____ / _____
Director or Authorized Section Head Date

*This permit must be signed by the Director of Mecklenburg County Health Department or an authorized section head in order to be valid.

MECKLENBURG COUNTY HEALTH DEPARTMENT

ENVIRONMENTAL HEALTH DIVISION

CHARGE SLIP

DATE: 7/11/89

NAME/COMPANY: W. H Southerland, Jr

Sanitation _____

Vector Control _____

OPWD ✓

SERVICE: Imp - Modified
#5764A

MECKLENBURG COUNTY
HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION
PAID
JUL 11 1989

FEE: 100

Cash
#100.00

Completed By

Collected By

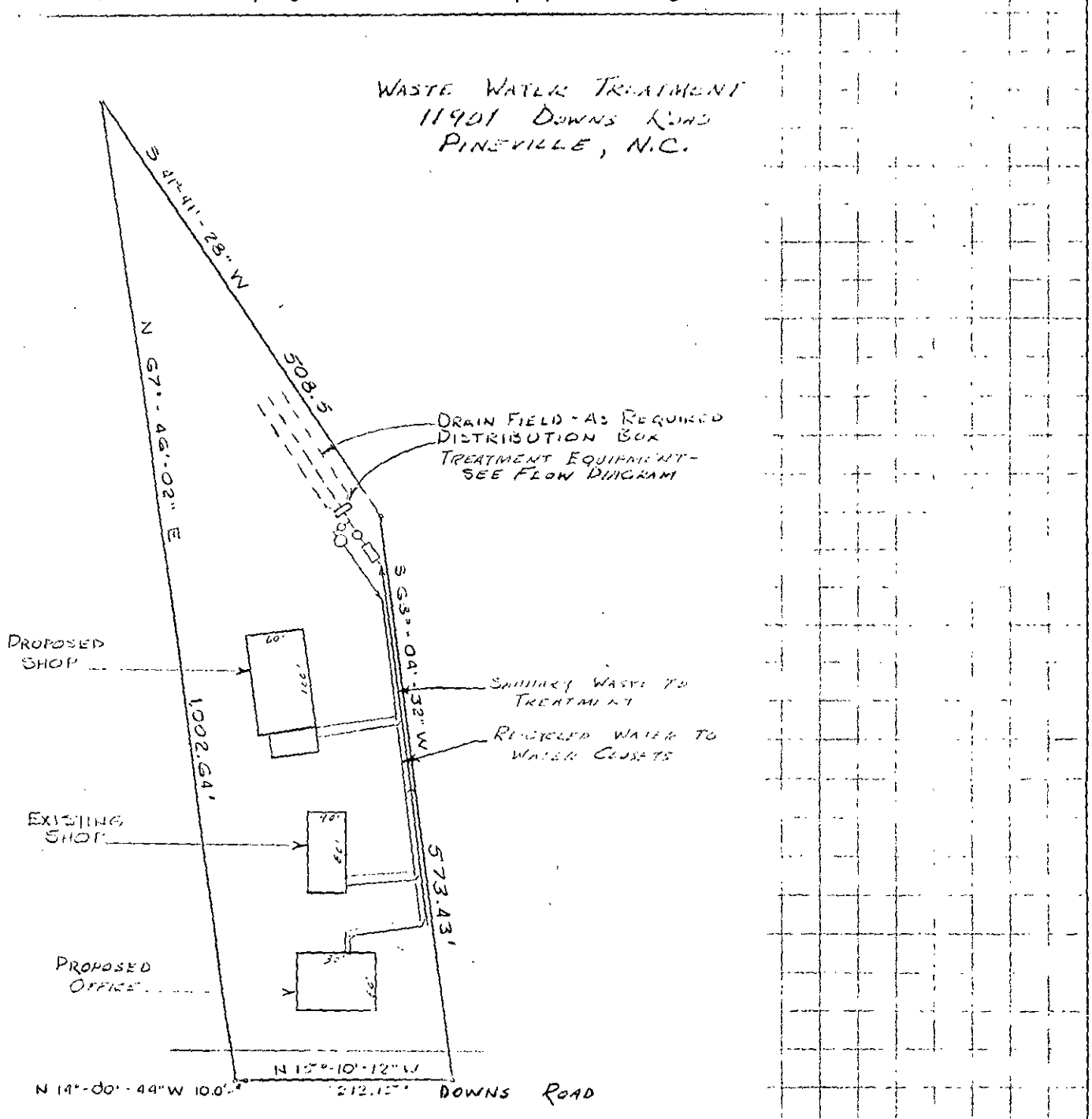
PROPOSED PLOT PLAN

HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION
1200 BLYTHE BOULEVARD
CHARLOTTE, NC 28203
PHONE (704) 376-4603

FILE: 5764A

TC: 205-061-20

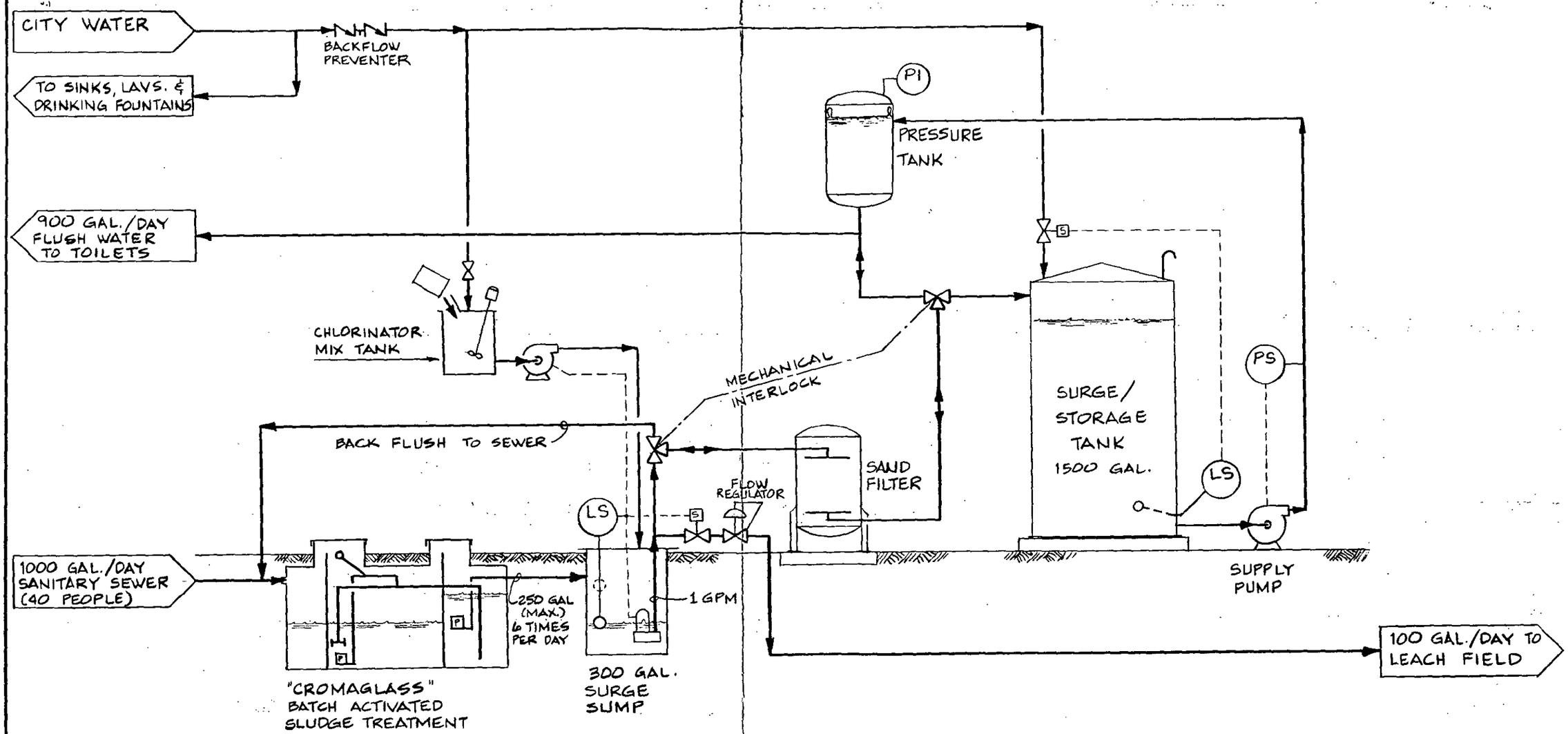
Draw in and name all roads adjoining the property. Draw in and accurately dimension the lot concerned. Accurately indicate property boundaries, proposed and/or existing structures and driveways, underground utilities, and wells and springs within 100 feet of the proposed building or drainfield.



Signed: Geo. W. McCormick, P.E.

Date: July 11, 1989

#5764A



REV No.	DATE	RECORD OF ALTERATIONS	BY	EC APP'D	WHS APP'D
0	7/10/89	ISSUE FOR APPROVAL	DH	EC	WHS

DR BY	DEH	7/10/89
CH BY		
APPD		
APPD		
APPD		
APPD		
DATE STARTED	7/10/89	
DATE FINISHED		

SOUTHERLAND ASSOCIATES, INC.
CONSULTING AND DESIGN ENGINEERS
CHARLOTTE, N.C.

PROPOSED WASTE DISPOSAL
SOUTHERLAND ASSOC. OFFICE BUILDING

SCALE	CONTRACT NO.	JOB NO.	DRAWING NO.	REV No.
NONE				0

MR. ERICSON

CITY WATER

BACKFLOW PREVENTER

TO SINKS, LAVS. & DRINKING FOUNTAINS

900 GAL./DAY FLUSH WATER TO TOILETS

1000 GAL/DAY SANITARY SEWER (90 PEOPLE)

AIR CONDITIONING RETURN

AIR CONDITIONING SUPPLY

CHLORINATOR MIX TANK

TIMER

BACK FLUSH TO SEWER

MECHANICAL INTERLOCK

PI

PRESSURE TANK

S

LS

PS

SURGE/ STORAGE TANK 1500 GAL.

SAND FILTER

LS

SUPPLY PUMP

LS

250 GAL (MAX.) 6 TIMES PER DAY

1 GPM

300 GAL. SURGE SUMP

"CROMAGLASS" ACTIVATED SLUDGE BATCH TREATMENT

LSH LSL

S

S

CIRCULATING PUMP

100 GAL./DAY (MAX.) TO DRAIN FIELD

REV No.	DATE	RECORD OF ALTERATIONS	BY	APD	APD
2	7/11/89	REV. CONTROLS	GM		
1	7/12/89	ADD AIR COND'S.	GM		
0	7/10/89	ISSUE FOR APPROVAL	DH	EC	WHS

DR BY	DEH	7/10/89
CH BY		
APPD		
APPD		
APPD		
APPD		
DATE STARTED	7/10/89	
DATE FINISHED		
SCALE	NONE	

SOUTHERLAND ASSOCIATES, INC.
CONSULTING AND DESIGN ENGINEERS
CHARLOTTE, N.C.

PROPOSED WASTE DISPOSAL
SOUTHERLAND ASSOC. OFFICE BUILDING

CONTRACT NO.	JOB NO.	DRAWING NO.	REV No.
			2

DUNCAN-PARNELL, INC., CHARLOTTE 287 704-372-7766

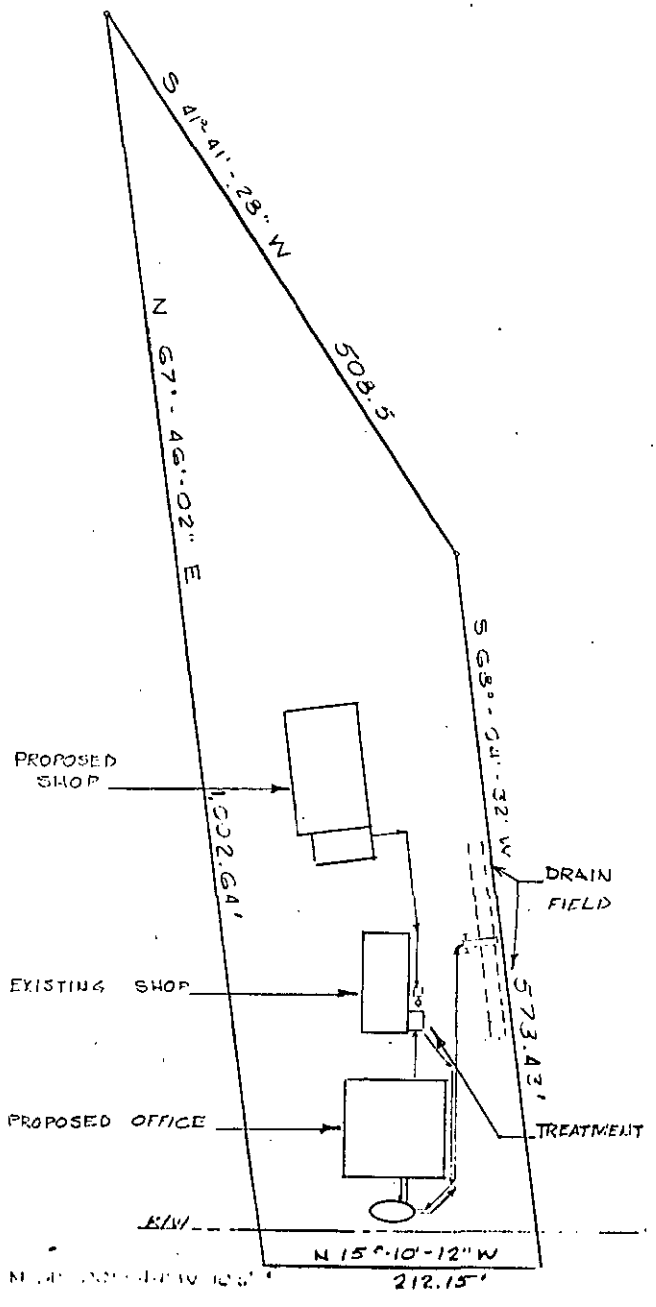
PROPOSED PLOT PLAN

HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION
1200 BLYTHE BOULEVARD
CHARLOTTE, NC 28203
PHONE (704) 376-4603

FILE: _____

TC: _____

Draw in and name all roads adjoining the property. Draw in and accurately dimension the lot concerned. Accurately indicate property boundaries, proposed and/or existing structures and driveways, underground utilities, and wells and springs within 100 feet of the proposed building or drainfield.



Signed: _____

Date: _____

APPLICATION FOR SOIL INVESTIGATION

HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION
1200 BLYTHE BOULEVARD
CHARLOTTE, NC 28203
PHONE (704) 376-4603

(OFFICE USE ONLY)

FILE: 5764A

TC: 205-061-20

☐ PC ☐ REPT

pd 30

JOB LOCATION

① ADDRESS: 11901 Downs Road

② SUBDIVISION: - ③ LOT: - ④ BLOCK: -

⑤ PARCEL REFERENCE: BOOK NO.: 205 PAGE NO.: 061 PARCEL NO.: 20

⑥ DEED REFERENCE: BOOK NO.: 205 PAGE NO.: 06

OWNER

⑦ NAME: William H. Southerland, Jr. and Omara L. Southerland
(FIRST) (MIDDLE) (LAST)

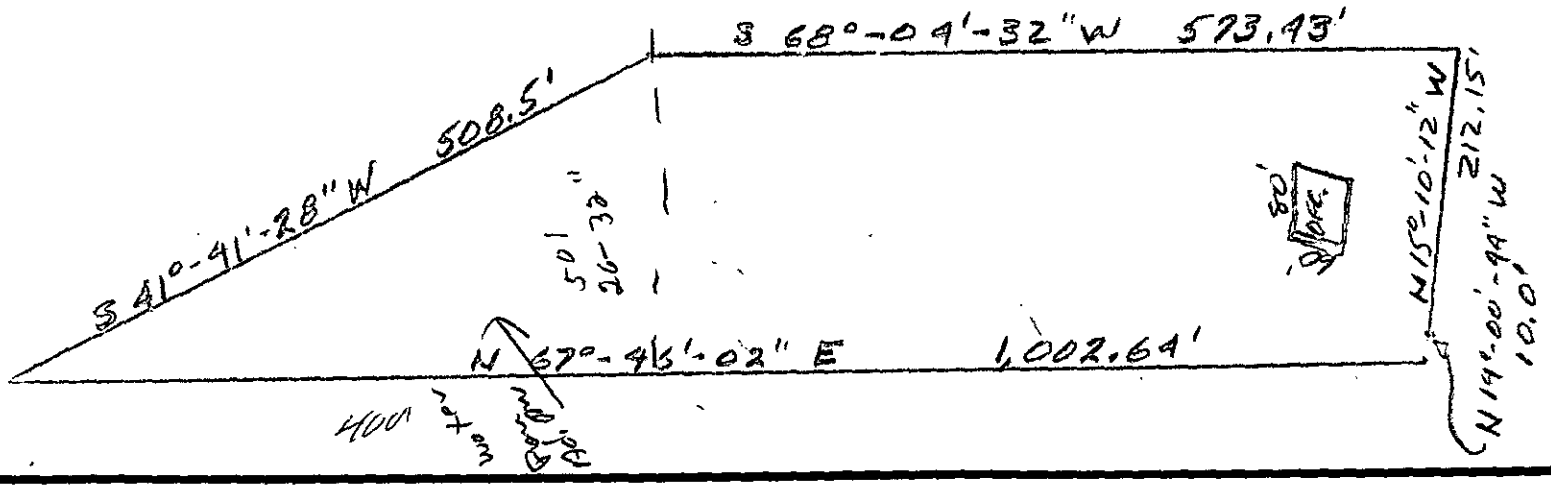
⑧ MAILING ADDRESS: 611 Fortune Street

⑨ CITY: Charlotte ⑩ STATE: NC ⑪ ZIP: 28205

⑫ PHONE: (WORK) 704/375-6627 (HOME) -

call first

⑬ Accurately diagram and dimension lot.



⑭ The undersigned, owner of the property described above as the "JOB LOCATION" has read the foregoing application, acknowledges that the contents of same are true, and authorizes agents of the MECKLENBURG COUNTY HEALTH DEPARTMENT to enter onto the property for the purpose of processing this request.

Signed: W H Southerland Jr

Date: May 23, 1989

Mecklenburg County services are available without regard to ethnic origin, sex, or disability.

WHITE - HEALTH DEPARTMENT'S COPY • CANARY - ENVIRONMENTALIST'S COPY • PINK - OWNER'S COPY

SOUTHERLAND ASSOCIATES, INC.
CONSULTING & DESIGN ENGINEERS

GEO. W. McCORMICK, P.E.
CIVIL ENGINEER

611 FORTUNE STREET
CHARLOTTE, N. C. 28205
TEL. 704-375-6627

Mecklenburg County
Health Department

Basil G. Delta, M.D., M.P.H.
Health Director

June 9th, 1989

William H. Southerland, Jr.
611 Fortune Street
Charlotte, NC 28205

RE: Property located at 11901 Downs Road
FILE: 5764A
PARCEL: 20506120

Dear Sir:

At your request, a field investigation was conducted on the property designated above for the purpose of determining site suitability for the installation of a ground absorption sewage disposal system. The results of this investigation showed the property to be classified UNSUITABLE for the installation of such a system. A copy of the Site Evaluation Report (Serial Number 16176) is enclosed.

State regulations provide that sites originally classified unsuitable may be utilized for the installation of alternate or modified sewage disposal systems provided the requirements of 10 NCAC 10A .1948 (c) are met. A reprint of this section is enclosed for your information.

Should you desire to file for permission to install an alternate or modified sewage treatment system on the property, please submit an Application For An Improvement Permit with an ACCURATELY dimensioned plot plan detailing the location of current and/or proposed buildings, wells and sewage disposal systems to this office. They will be reviewed, and if it is determined that the proposed system may reasonably be expected to function satisfactorily, an Improvement Permit will be issued by the Department upon completion by you, of a formal request for lot reclassification.

If I may be of any assistance, please feel free to call.

Very truly yours,

Jim Ericson, R.S., Supervisor
On Premises Waste Disposal & Water Supply

Enclosure (2)

MECKLENBURG COUNTY ENVIRONMENTAL HEALTH
SITE EVALUATION REPORT
SERIAL NUMBER 16176

File: 5764A Action 2

Parcel: 20506120 ☐ PC

Location: 11901 Downs Road

Subdivision:

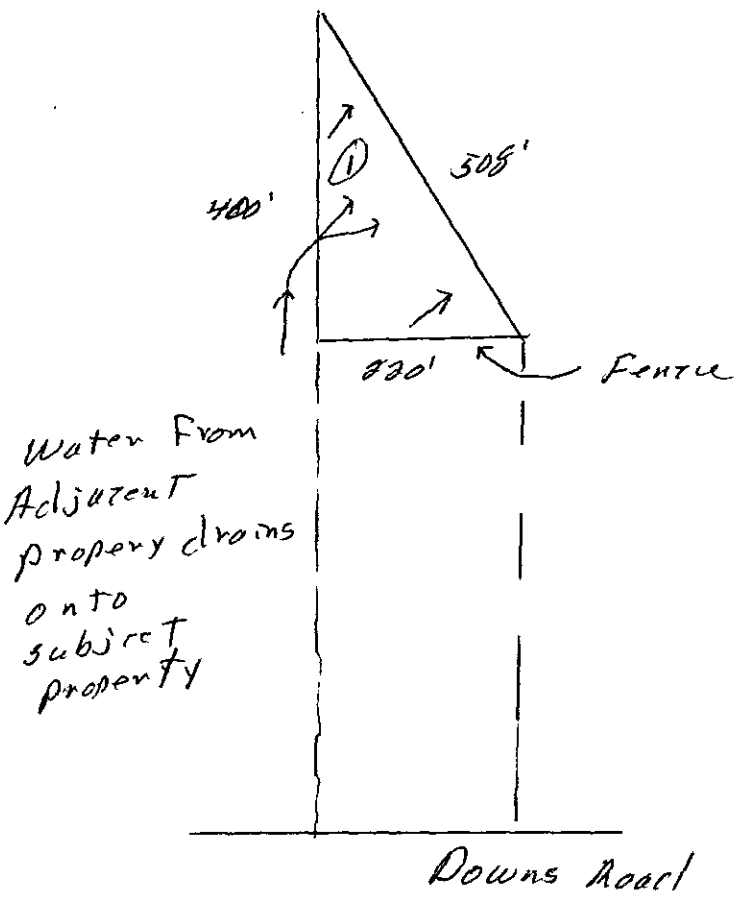
Lot: Block: Acres: Appx 1 .9

Owner: William H. Southerland, Jr.
Address: 611 Fortune Street
Charlotte, NC 28205

Comments: _____

Described by: William A. Marlin

Date: 6-9-89



***** EVALUATION KEY *****

S = Suitable U = Unsuitable
PS = Provisionally Suitable
The "Area Classification" below indicates the suitability of areas in the diagram.

FACTORS	AREA 1	AREA 2	AREA 3	AREA 4	AREA 5	AREA 6
Topography	(S) PS U 2-8%	S PS U	S PS U	S PS U	S PS U	S PS U
Texture	S PS (U) 2-1C loy	S PS U	S PS U	S PS U	S PS U	S PS U
Structure	S (PS) U Blocky	S PS U	S PS U	S PS U	S PS U	S PS U
Drainage	S (PS) U 7-36" To water	S PS U	S PS U	S PS U	S PS U	S PS U
Depth	S PS (U) 26-32"	S PS U	S PS U	S PS U	S PS U	S PS U
Restrictive Horizons	S (PS) U >36"	S PS U	S PS U	S PS U	S PS U	S PS U
Available Space	S (PS) U	S PS U	S PS U	S PS U	S PS U	S PS U
Other (specify)	S PS U	S PS U	S PS U	S PS U	S PS U	S PS U
Soil Group/Series	IVB Mec Klenburg Lilo					
Area Classification	S PS (U)	S PS U	S PS U	S PS U	S PS U	S PS U

APPLICATION FOR SOIL INVESTIGATION

HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION
1200 BLYTHE BOULEVARD
CHARLOTTE, NC 28203
PHONE (704) 376-4603

(OFFICE USE ONLY)

FILE: 5764A

TC: 205-061-20

☑ PC ☐ REPT

JOB LOCATION

① ADDRESS: 11901 Downs Road

② SUBDIVISION: - ③ LOT: - ④ BLOCK: -

⑤ PARCEL REFERENCE: BOOK NO.: 205 PAGE NO.: 061 PARCEL NO.: 20

⑥ DEED REFERENCE: BOOK NO.: 205 PAGE NO.: 06

OWNER

⑦ NAME: William H. Southerland, Jr. and Omara L. Southerland
(FIRST) (MIDDLE) (LAST)

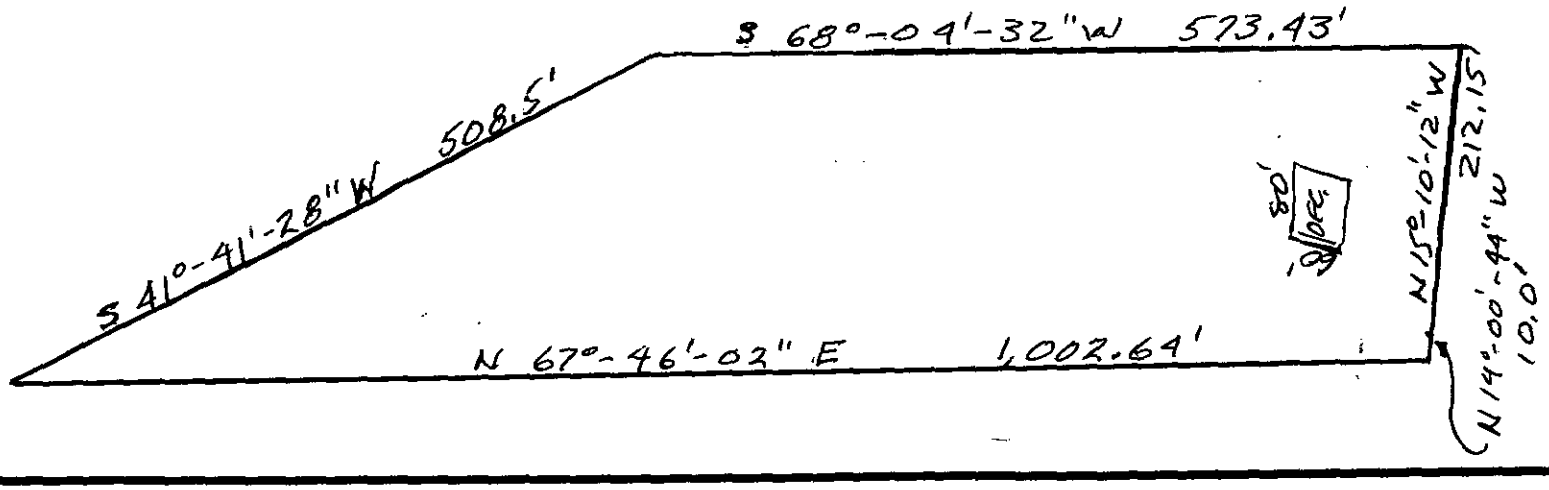
⑧ MAILING ADDRESS: 611 Fortune Street

⑨ CITY: Charlotte ⑩ STATE: NC ⑪ ZIP: 28205

⑫ PHONE: (WORK) 704/375-6627 (HOME) -

⑬ Accurately diagram and dimension lot.

~~(PLEASE SEE ATTACHED SITE PLAN)~~



⑭ The undersigned, owner of the property described above as the "JOB LOCATION" has read the foregoing application, acknowledges that the contents of same are true, and authorizes agents of the MECKLENBURG COUNTY HEALTH DEPARTMENT to enter onto the property for the purpose of processing this request.

Signed: W H Southerland Jr.

Mecklenburg County services are available without regard to ethnic origin, sex, or disability.

Date: May 23, 1989

WHITE - HEALTH DEPARTMENT'S COPY • CANARY - ENVIRONMENTALIST'S COPY • PINK - OWNER'S COPY

MECKLENBURG COUNTY HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION

CHARGE SLIP

Date 5/23/89

Name/Company William H. Southerland

Sanitation _____

Vector Control _____

O.P.W.D. ✓

Service: Soil test 1 ac
#57644

MECKLENBURG COUNTY
HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION
PAID
MAY 23 1989

C&A
#30.00

Fee: $ 30 -

Completed by

Collected by