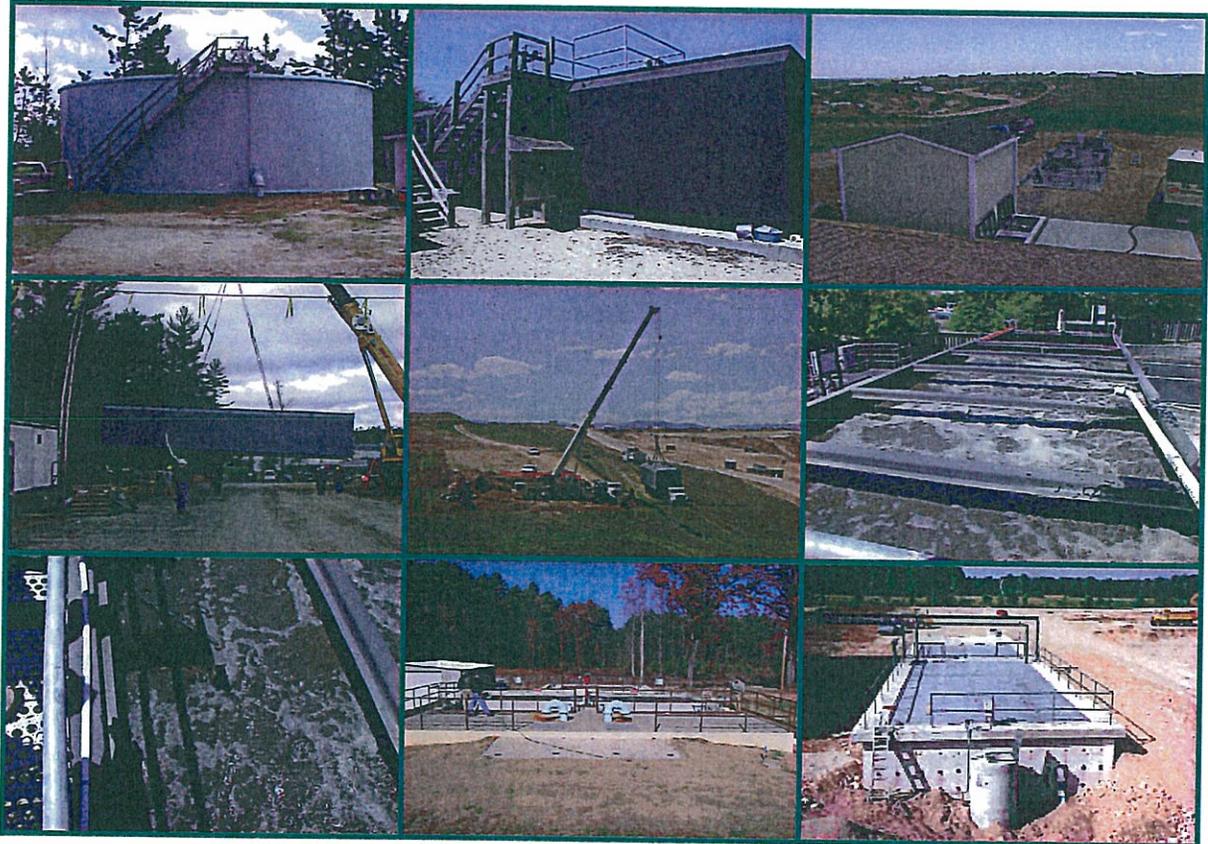


Appendix P

FLUIDYNE CORPORATION



THE EXPERIENCED LEADER IN SEQUENCING BATCH REACTOR TECHNOLOGY



ISAM™

SEQUENCING BATCH REACTOR PROCESS



THE EXPERIENCED LEADER IN SEQUENCING BATCH REACTOR TECHNOLOGY

TRUST FLUIDYNE'S EXPERIENCE

The Fluidyne ISAM™ Sequencing Batch Reactor (SBR) system incorporates the latest technology and two decades of experience in providing the most reliable system with the highest effluent quality. Fluidyne SBR systems have operated around the World and won numerous awards including the 1997 USEPA Grand Award for the best operated and maintained WWTP in the Nation in the Large, Non-Discharging (water reclamation) category for the Bartow, Florida plant. Fluidyne SBRs consistently provide better than 10/10/5/1 (BOD5/TSS/N/TP) effluent quality. The Bartow plant has consistently produced better than 3/3/3/1 effluent quality.

A TOTALLY NEW CONCEPT IN SBR DESIGN

The Fluidyne ISAM™ Sequencing Batch Reactor system is a single train SBR system which incorporates a constant level anaerobic selector chamber, followed by a surge/anoxic/mix (SAM™) tank, and one or more SBR basins.

In operation, all influent flow enters the anaerobic basin where influent solids are allowed to settle much like a primary clarifier. Elimination of primary solids in the anaerobic basin allows for much smaller SBR basins at equivalent SRT than conventional SBRs. The anaerobic selector also creates soluble carbon as a food source for biological nutrient removal through anaerobic conversion of settleable BOD to soluble BOD.

The influent then flows to the SAM™ surge basin, or influent equalization basin. The surge basin provides flow and nutrient equalization to optimize treatment at the full range of flows and loadings.

Several unique features of the Fluidyne ISAM™ SBR include odor control and scum skimming. Mixed liquor is maintained in the SAM™ tank to immediately react with incoming flow from the anaerobic chamber to suppress odors and initiate and accelerate carbon and nitrogen reactions. Mixed liquor is recycled from the top of the SBR tank effectively removing scum by use of proprietary flow and scum control system. In addition, nitrates are recycled to the SAM™ tank for effective and rapid denitrification. Denitrification reactions are accelerated in the presence of the unreacted carbon from the raw sewage entering the SAM™ tank. Aeration and energy requirements are reduced as nitrates are fully reduced to nitrogen gas in the SAM™ tank.

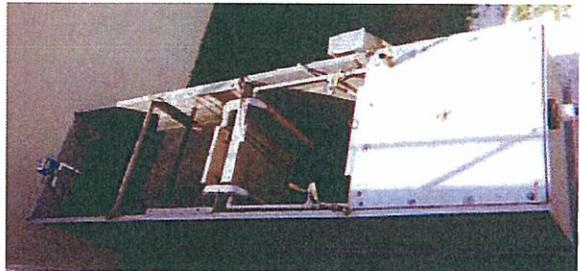
FLUIDYNE PREPACKAGED SBRs

The Fluidyne prepackaged ISAM™ SBR is available for average influent flows from 1,000 GPD to 50,000 GPD. Each unit is shipped complete; prewired and prepiped.



100% ON-LINE STANDBY EQUIPMENT

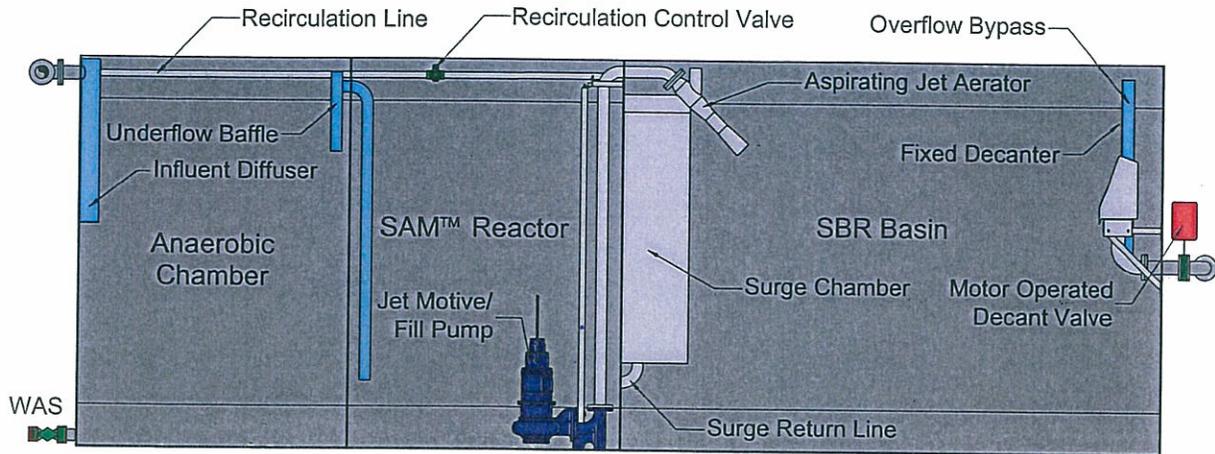
Fluidyne's prepackaged ISAM™ SBRs are furnished with spare mixing/fill pump and aerator assembly installed for 100% redundancy.



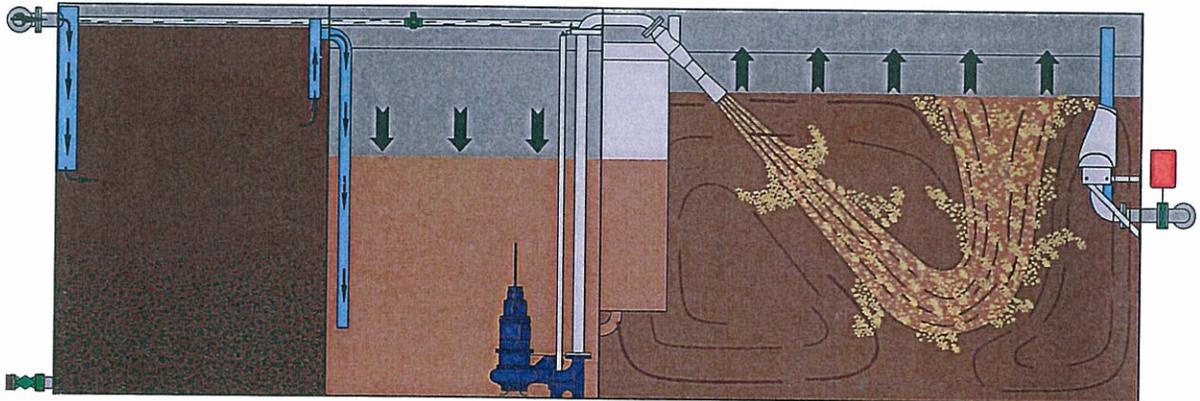
REDUCES WASTE SLUDGE BY 75%

The Fluidyne ISAM™ Sequencing Batch Reactor incorporates an anaerobic selector chamber with the SAM™ SBR. The anaerobic selector not only provides consistent phosphorous removal by subjecting the recirculated biomass to anaerobic conditions, forcing the release of phosphorous, but also creates soluble carbon as a food source for phosphorous removal through anaerobic conversion of settleable BOD to soluble BOD. Additionally, anaerobic sludge digestion occurs in the anaerobic selector chamber, reducing waste solids production by up to 75% for the entire secondary process.

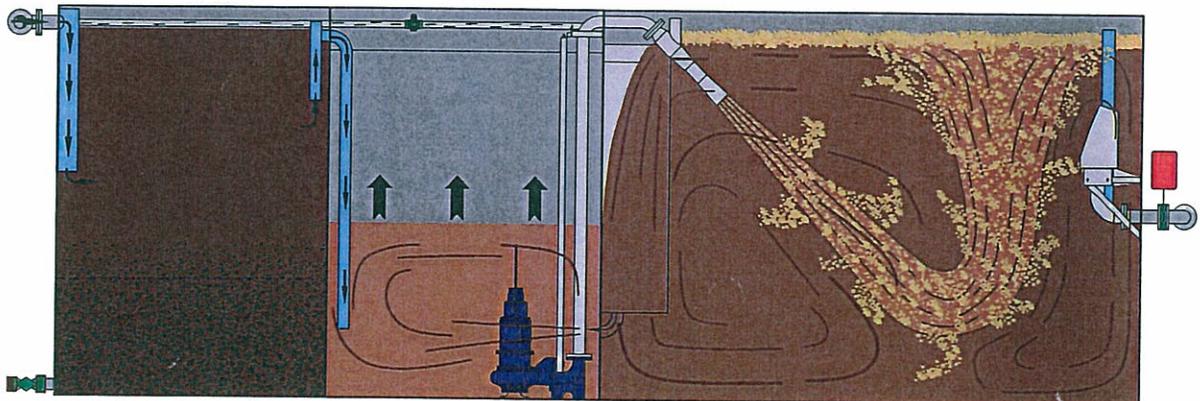
THE EXPERIENCED LEADER IN SEQUENCING BATCH REACTOR TECHNOLOGY



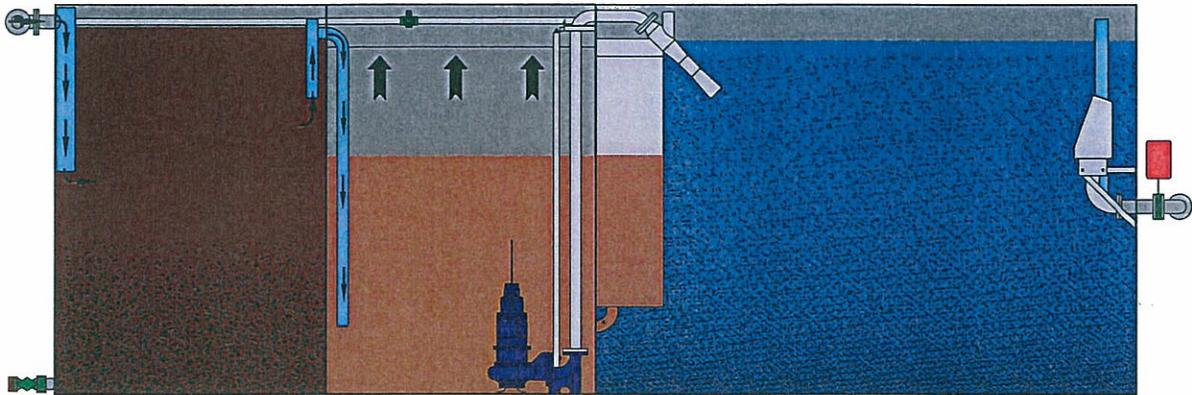
System Components: Influent continuously enters the anaerobic chamber where solids settle. Settleable BOD is converted to soluble BOD. The influent then flows to the SAM™ reactor. Mixed liquor is maintained in the SAM™ reactor to react with incoming raw wastewater to suppress odors, and initiate and accelerate carbon and nitrogen reduction.



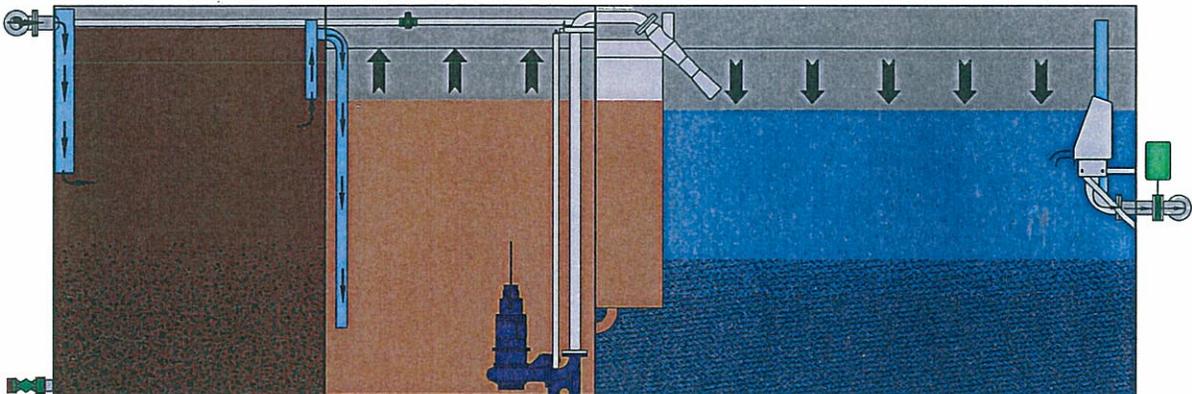
Fill Phase: When the level in the SAM™ reactor reaches a predetermined “control level,” the motive liquid pump is started. The SBR basin is filled and mixed. A variable percentage of the pumped flow is returned to the anaerobic chamber where solids settle. The recycle flow is varied to maintain the desired MLSS concentration in the in the SBR basin. Solids in the anaerobic chamber are digested.



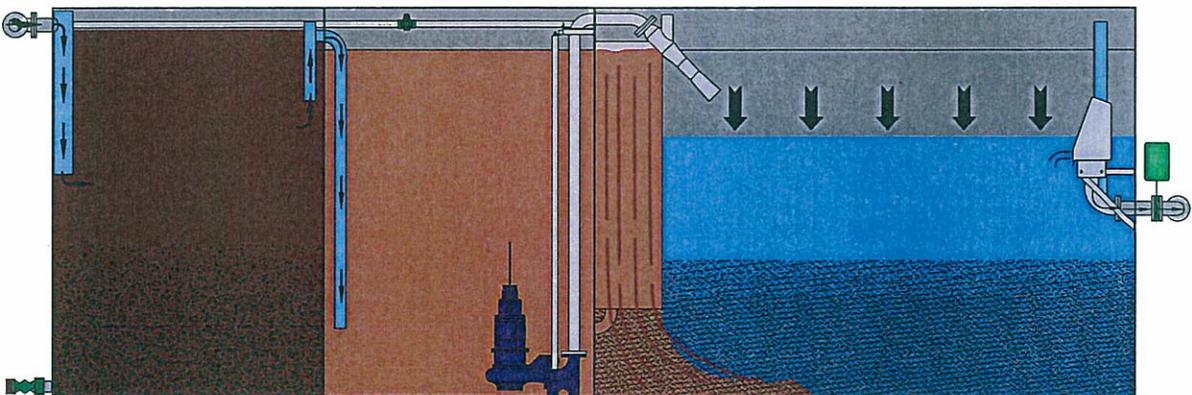
Interact Phase: When the level in the SBR reaches TWL, mixed liquor overflows the surge chamber weir and is returned to the SAM™ reactor through the surge return line to mix and react with the raw influent. Aeration is cycled on and off to provide the required oxygen. Scum is also removed from the SBR basin.



Settle Phase: When the level in the SAM™ reactor again reaches “control level,” aeration is discontinued, and the SBR basin settles under perfect quiescent conditions.



Decant Phase: When the settle timer value is reached, the decant valve is opened, and treated effluent is withdrawn from the upper portion of the SBR basin by means of a fixed solids excluding decanter.



Filled Decant Phase: If, during peak hourly flows, the SAM™ reactor reaches TWL before the decant phase ends, influent flows in a reverse direction through the surge return line and overflows the surge chamber secondary weir, and is diffused into the settled sludge at very low velocity as the decant phase continues.

THE EXPERIENCED LEADER IN SEQUENCING BATCH REACTOR TECHNOLOGY

CUSTOM ENGINEERED ISAM™ SYSTEMS

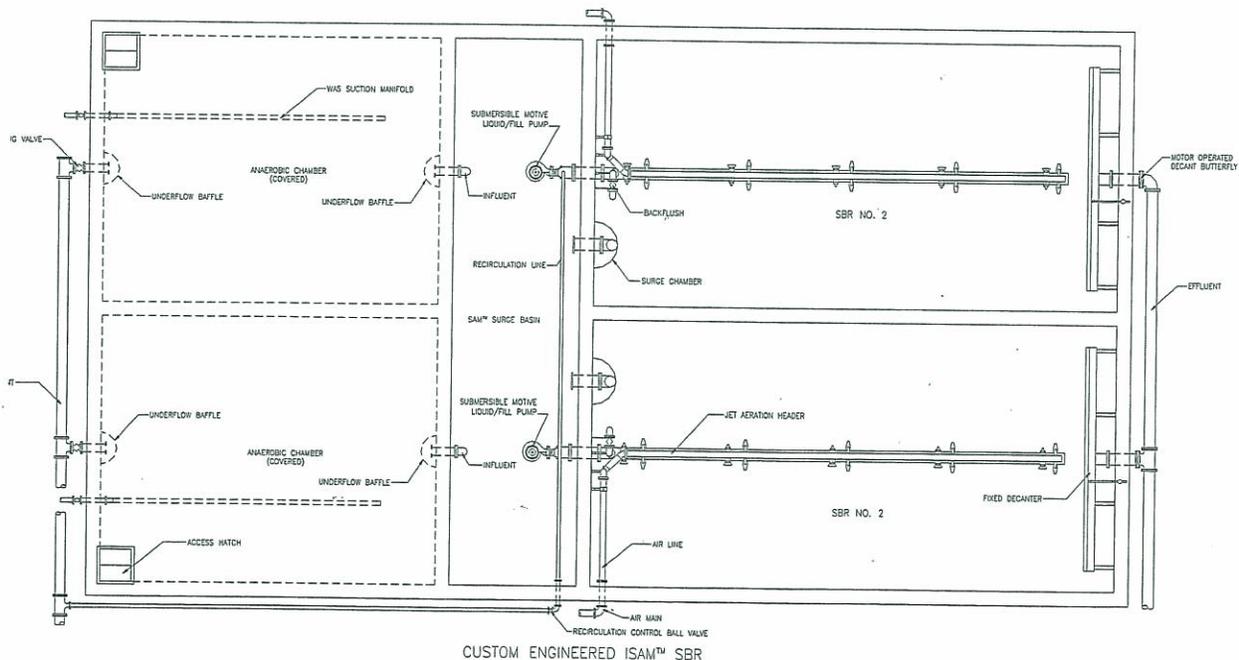
The majority of ISAM? systems currently operating are packaged systems for daily flows of less than 100,000 GPD. However, the process offers the same advantages for larger facilities. The first advantage is that the ISAM? requires smaller SBR basins than a conventional SBR, at identical loadings. This is due to the fact that 65% of the influent solids are removed in the anaerobic chamber, and are therefore not considered in calculation of the SRT. An ISAM? designed for an average daily flow of 1.0 MGD, and an SRT of 20 days will have an SBR basin capacity of 0.67 MG, and an HRT of 16 hours. A conventional SBR designed for a 20 day SRT would have a capacity of 1.24 MG, and an HRT of 30 hours. The 1.0 MGD ISAM? SBR design also includes the SAM? reactor having a capacity of 0.14 MG. Since the SAM? reactor contains mixed liquor, the actual working SRT for the ISAM? process is 25 days, and the total volume is only 66% of that of the conventional SBR.

The ISAM? design also includes two anaerobic influent conditioning chambers having a total capacity of 0.50 MG. Therefore, the total volume of the entire ISAM? SBR process is 1.31 MG, and no additional digesters are required. Aerobic digesters for a conventional 1.0 MGD SBR would have a capacity of 0.30 MG if designed for a 30 day sludge age. This

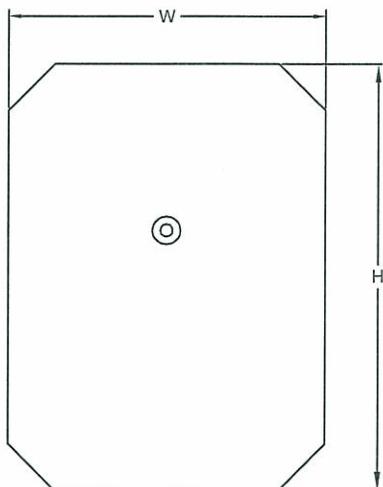
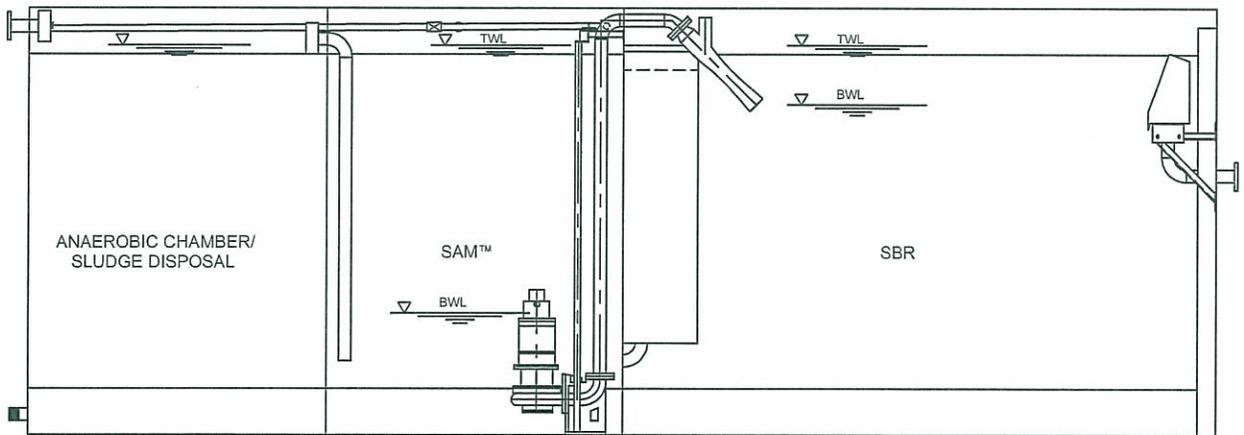
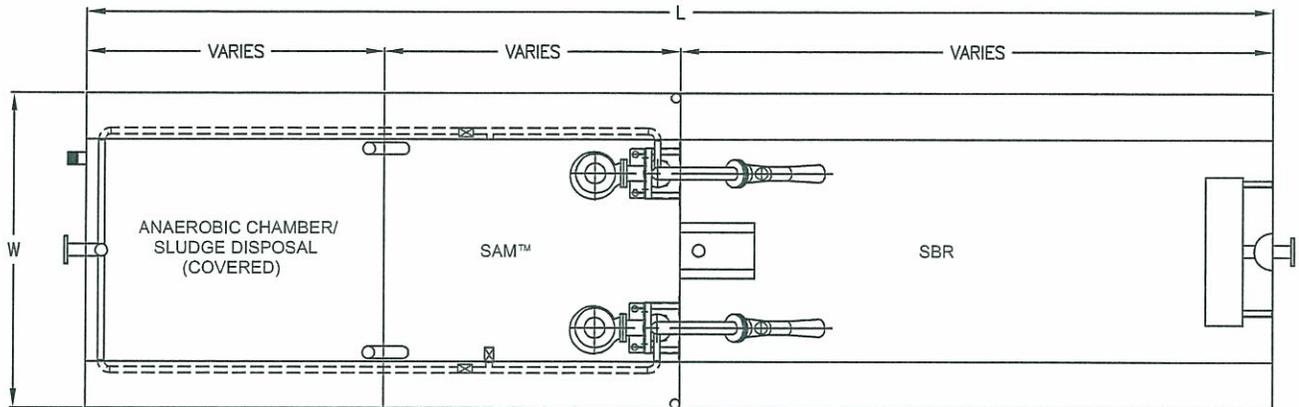
means that the total volume for a 1.0 MGD conventional SBR plus aerobic digesters would be 1.54 MG. The total volume for the ISAM? process is 1.31 MG.



The total power consumption for a 1.0 MGD conventional SBR plus aerobic digestion would be approximately 1,680 KWH/day. The total power consumption for a 1.0 MGD ISAM? SBR is approximately 845 KWH/day; 50% less than a conventional SBR.



PREPACKAGED ISAM™ SEQUENCING BATCH REACTOR SYSTEMS



MODEL	W	L	H	HP*
ISAM™ 05	6.5	16	9.5	5
ISAM™ 10	8.5	24	9.5	5
ISAM™ 15	8.5	24	11.5	5
ISAM™ 20	8.5	32	11.5	5
ISAM™ 25	8.5	40	11.5	7.5
ISAM™ 30	11.9	32	11.5	7.5
ISAM™ 40	11.9	45	11.5	10
ISAM™ 50	11.9	56	11.5	10

* EACH PUMP (ONE IS STANDBY)



THE EXPERIENCED LEADER IN SEQUENCING BATCH REACTOR TECHNOLOGY

The Fluidyne ISAM™ SBR system provides the following benefits,

1. Ability to handle highly variable flows and loading associated with the small flow plants. The ISAM™ is more flexible than continuous flow plants. Regardless of flows or loading, aeration and mixing can automatically be adjusted to optimize power and prohibit filamentous growth.
2. At high flows, solids cannot wash out as with extended aeration plants as the ISAM™ system has quiescent settle and decant.
3. ISAM™ facilities are easily expandable by adding a new tank. The additional tank does not require major changes in controls; only a new tank and associated equipment.
4. ISAM™ provides a small footprint with no digesters, secondary clarifiers, RAS piping and pumping.
5. ISAM™ produces the highest quality effluent. Typical Fluidyne ISAM™ facilities are achieving less than 10 mg/l BOD and TSS, less than 1 mg/l NH₃-N, less than 5 mg/l total N, and less than 2 mg/l phosphorous.
6. Easy to operate and maintain as mechanical equipment is minimized with no chasing of sludge associated with extended aeration plants.
7. Use of self-aspirating jet aerators eliminate blowers and blower accessories.
8. Built in sludge reduction system using the Anaerobic Conditioner/Trash Trap significantly reduces sludge handling and hauling costs.
9. 100% stand-by aerator is included with the system to allow continuous operation with one unit out of service.
10. Built in flow equalization is provided in the ISAM™ reactor to handle peak hours.
11. Automatic scum skimming prior to effluent discharge provides highest quality effluent.
12. Exceptional after sales service by Fluidyne technicians. Fluidyne employees have been granted over 40 patents in wastewater and water treatment technology and equipment.
13. Reduced operation and maintenance costs as power usage is controlled through the Fluidyne control panel.
14. Installed cost is lower as the system comes with the in-basin equipment pre-installed
15. The Anaerobic Conditioner/Trash Trap is covered and raw wastewater reacts immediately with mixed liquor in an aerated environment, there are no odor concerns.

Fluidyne Corporation
2816 West First Street
Cedar Falls, Iowa 50613
Phone: (319) 266-9967
Fax: (319) 277-6034
E-Mail: www.FluidyneCorp.com

Fluidyne Florida
2202 Gold Oak Lane
Sarasota, FL 34232
Phone: (941) 342-8915
Fax: (941) 342-9765
E-mail: ptiflorida@aol.com

Fluidyne Canada
2348 Lucerne Rd, Suite 110
Town of Mount Royal, Quebec
H3R2J8, Canada
Phone: (514) 739-5363
Fax: (514) 739-5420
E-mail: fluidyne@attcanada.net