

## Description of the five technologies Light Environmental utilizes:

### **A<sup>2</sup>/O Conventional Activated Sludge Process**

The A<sup>2</sup>/O process was developed to provide biological nitrogen and phosphorus removal in addition to BOD and TSS removal. The fermentation basin provides anaerobic pre-conditioning of the wastewater to create certain microorganisms that essentially result in higher phosphorus removal. After the fermentation basin the anoxic basin provides an excellent environment for denitrification due to the extremely low levels of D.O. The wastewater then goes through a process called aeration which provides COD removal and nitrification. The wastewater is then sent to the clarifiers for which provide solids separation. If necessary you may place a sand filter and UV Unit at the end of this treatment to meet regulatory effluent requirements. The A<sup>2</sup>/O process is simple and reliable and it usually provides excellent BOD, TSS, Phosphorus and Ammonia removal.

### **Bio Mass Technology**

The Bio Mass wastewater treatment system uses innovative technology based on Bio-Filtration utilizing biomass carriers. The wastewater is delivered to the treatment plant where it will flow through a grit removal unit and an automatic bar screen. The wastewater then flows through the two chambers of the balance tank and is aerated by fine bubble diffusion. From the balance tank the wastewater flows through the biological aeration filter chamber which contains the hollow plastic media (Bio Mass Carriers) that ensure a very high level of sewage purification at great speeds. A central air lift aerator provides for an oxygen rich environment. The processed wastewater then flows to the clarifier tank for final settlement and polishing before being filtered and sent through a UV Unit for disinfection. The Bio Mass system generates very little sludge for disposal over conventional activated sludge plants, and has a very small footprint

### **Sequential Batch Reactors (SBR)**

The activated sludge sequencing batch reactor (SBR) process performs the same treatment steps as a conventional activated sludge process. They both accomplish aeration, sedimentation, and clarification but an SBR does not utilize continuous flow. The SBR process of activated sludge treatment is accomplished in a single tank, through sequencing stages. This eliminates additional tanks and the need to waste and/or return sludge. The processes which the wastewater will undergo in sequencing order are: fill, react (aeration), settle, decant (removal of the clarified effluent), and idle. The complete cycle most usually occurs two to six times a day in each SBR tank.

### **Plate Membrane Bioreactor (MBR)**

A Plate Membrane Bioreactor (MBR) is a combination of an activated sludge process characterized by a suspended growth of biomass, with a plate membrane filtration system

designed to separate extremely fine particles. Membrane technology has been successfully used for over 50 years in the purification of water.

Effluent from an MBR is suitable for direct reuse or to meet strict discharge limits. They are significantly smaller than traditional wastewater treatment plants and are designed to allow for simple incremental growth or large structural expansion. MBR technology provides for separation of the clean permeate directly inside the activated sludge as opposed to phase separation as seen in a traditional clarifier. This allows the sludge to become more concentrated and to be wasted and much higher levels. This substantially reduces the amount of water which needs to be processed. The effluent passes through a membrane barrier. This positive barrier insures the highest quality effluent. Plate membranes do not require the extensive and continuous cleaning procedures and equipment required by hollow fiber membranes. Air separation equipment, dip tanks, and secondary screening are not required therefore plate membrane systems require fewer components. MBR systems use multiple recycle zones. This provides for a superior level of process control not found in other traditional MBR systems. MBR systems are designed to operate efficiently in activated sludge from 5,000 MLSS to over 20,000 MLSS. Traditional MBR systems focus on operating in a much narrower range.

### **Archaea Bio-Dredging**

Archaea is the name given to a Kingdom of organisms. There are many species of organisms within this Kingdom. Archaea is one of the oldest life forms on Earth, and is estimated to be 35% or more of the Earth's biomass. Each species functions optimally at varying levels of pH and temperature, and are specific as to what purpose they serve. There are three general types of Archaea: thermophiles that are found in geysers, hot springs, and thermal vents, halophiles that live in high salt conditions, and methanogens that live in glaciers, rumen, peat, and other areas of degradation and regeneration.

As waste (nitrogen, ammonia, BOD, TSS and or pathogens) enters a lagoon, tank, or basin from an industrial or agricultural operation, bacteria break it down to acids, alcohols, ammonia and insoluble sludge. These breakdown products poison bacteria and slow/stop them. The sludge, alcohols, acids, ammonia, hydrogen sulfide, etc. produced by bacteria are the end products remaining in the lagoon unless, tank or basin. The unique microbes found within the Kingdom Archaea breakdown the sludge and other poisonous materials to water, carbon dioxide, methane, and nitrogen gas. Pathogens are reduced and water-holding capacity is increased. The end products are not toxic, and waste breakdown proceeds to completion.

# LightEnvironmental

Worldwide experts in wastewater treatment

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**When it comes to wastewater,  
our solutions are clear.™**



Light Environmental is a full service solution provider for state-of-the-art wastewater treatment and water recycling systems. We specialize in the design, construction, and operation of various wastewater treatment and water recycling systems. Each system is customized to the client's specific requirements and regulatory specifications with an emphasis on capital and operational costs.

Our comprehensive solutions provide for the design of wastewater treatment and water recycling systems from the ini-

tial excavation and headworks through the effluent discharge. Depending upon specific requirements, various treatment processes may include Ultra-violet (UV), aerobic digesters, anaerobic digesters, covers, bar screens, lagoon equipment, aeration devices, and specific proprietary systems. Light Environmental has the expertise to assist the client during the approval and permitting process with regulatory agencies.

Light Environmental solutions may include extended aeration plants, oxidation ditch systems, and conventional ac-

tivated sludge treatment. Recently developed technologies exclusively marketed by Light Environmental allow the rapid production of potable water from wastewater without reverse osmosis. The five different technologies we utilize are:

- *A<sup>2</sup>/O Conventional Activated Sludge Process*
- *Biomass Technology*
- *Sequential Batch Reactors (SBR)*
- *Plate Membrane Bioreactor (MBR)*
- *Archaea Bio-Dredging*

Light Environmental is focused on environmental concerns and utilizes a minimal physical plant footprint coupled with the most advanced and comprehensive technology in the marketplace today.

Do not let water evaporate from our future. Light Environmental can help you turn your wastewater into a valuable resource with water reclamation and reuse strategies.

Contact us today for a complete analysis of your water and wastewater requirements at [info@lightenvironmental.com](mailto:info@lightenvironmental.com).

