

North Dakota Water & Pollution Control Conference

MBBR and IFAS Technologies: An Introduction

Presentation Overview

- **History**
- **Definitions**
- **Design Concepts**
- **Operational Considerations**
- **Closing Comments**
- **Questions**



History

History of MBBR

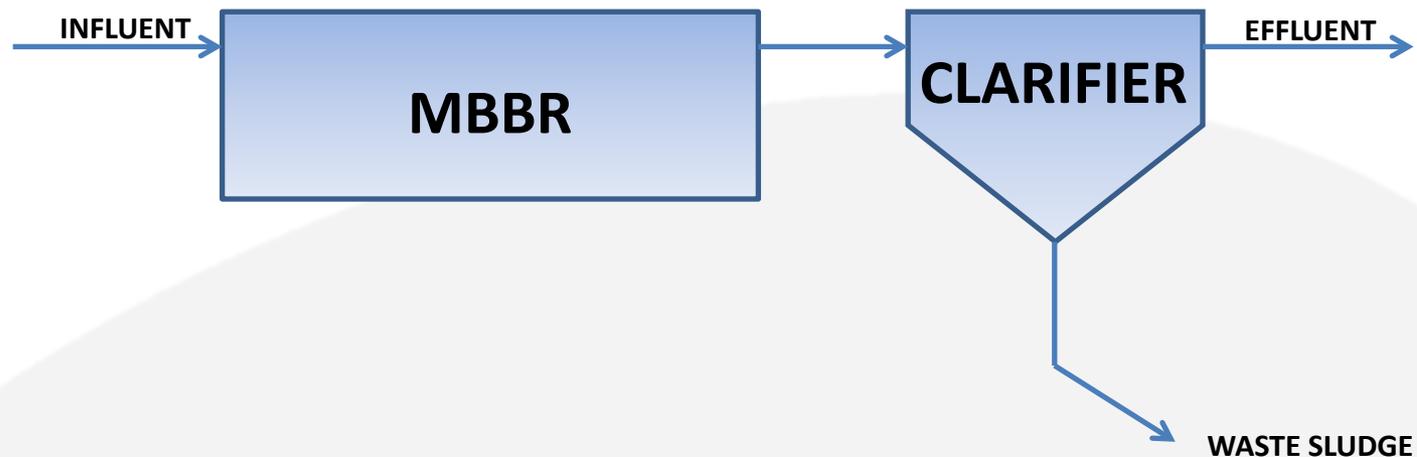
- **New Technology (1990s)**
- **Developed In Norway**
 - Maximize Treatment Volume
 - Free-moving Plastic Media
 - Aeration Basin
- **500 Installations Worldwide**
- **First North America – Moorhead, MN (2003)**



Definitions

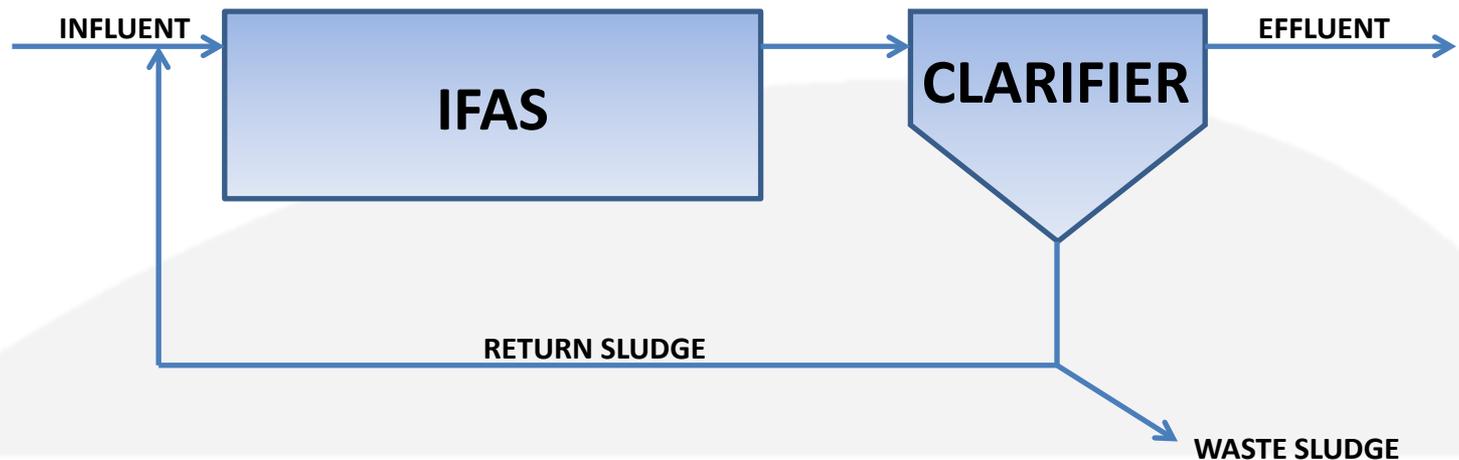
MBBR

- **Moving Bed Biofilm Reactor**
 - Biological Fixed Film Process
 - Floating, Free-Moving Biomass Carrier Media
 - Media Retained in Aerated/Mixed Reactor



IFAS

- **Integrated Fixed Film Activated Sludge**
 - Hybrid Process: Fixed Film + Suspended Growth
 - Media (Biofilm) and Activated Sludge (MLSS)
 - Increased Biomass (Treatment) in Same Reactor Volume



Design Concepts

Moving Bed Media



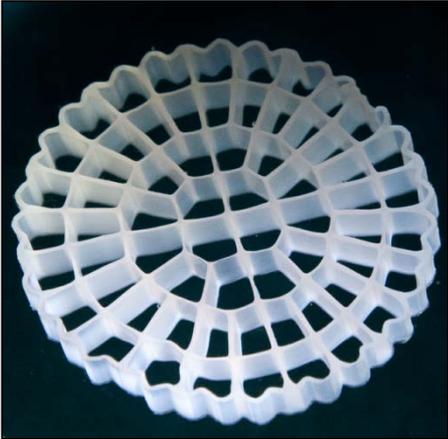
Headworks BIO



Entex



Siemens



AnoxKaldnes

Aeration & Mixing

- Coarse Bubble



- Low Speed Mixers



Media Retention

- **Cylindrical Sieves**



- **Flat Plate Wall Screens**



Operational Considerations

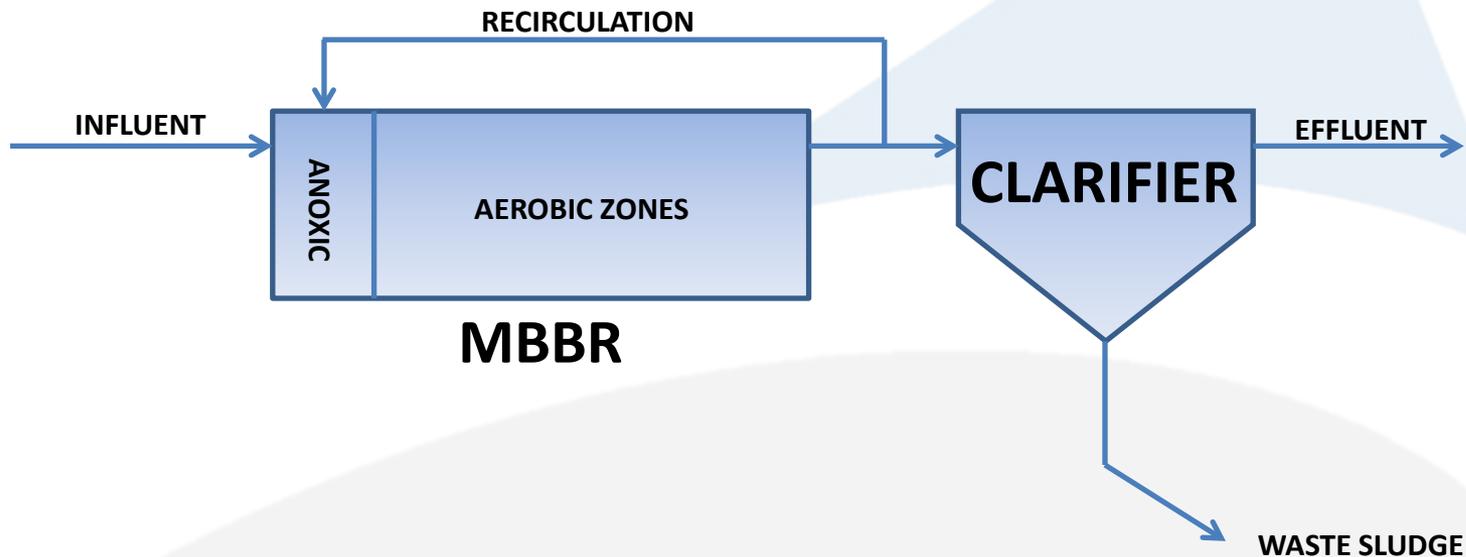
Operational Considerations

- **Polishing for Nutrient Removal**
 - Tertiary Nitrification/ Denitrification
- **Maximize Existing Site**
 - Convert Ponds to MBBR



Operational Considerations

- **MBBR for Nitrification/Denitrification**



Operational Considerations

- **Upgrade Existing Facilities**

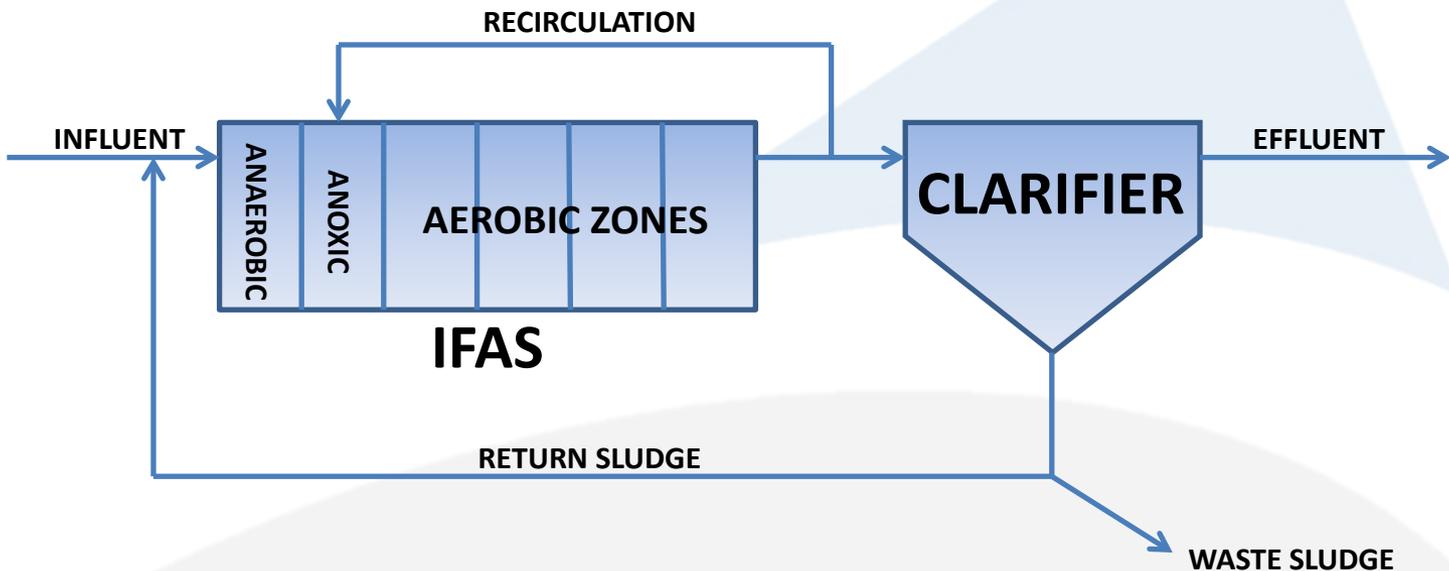
- Convert AS to IFAS
- Addition of Media for Increased Capacity

- **Biological Nutrient Removal**

- IFAS Incorporates Nitrification/Denitrification and Biological Phosphorus Removal

Operational Considerations

- IFAS for Biological Nutrient Removal



Closing Comments

Closing Comments

■ Advantages of MBBR/IFAS Systems

- Ideal for Retrofits
- Increase Capacity w/out Increased Load to Clarifiers
- Site Constraints
- BNR
- Cold Weather
- Flexibility



Closing Comments

- **Advantages of MBBR/IFAS Systems Cont...**
 - Resistant to Washouts
 - Resistant to Slug Loads
 - Biomass Responds to Loading Fluctuations



Closing Comments

- **Disadvantages of MBBR/IFAS Systems**
 - Energy Consumption
 - Coarse Bubble
 - Higher DO
 - Influent Screening
 - 1/2" to 1/4" PCs
 - 1/8" No PCs
 - Tank Downtime
 - Media Procurement
 - Scum, Foam



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