

# **MSBR CYCLE DESCRIPTION**

## **TYPICAL**

A brief description of each of the four treatment cells in the Aqua Modified SBR follows for this project. Following this description, a narrative is provided detailing the operations and status of each cell as it relates to accomplishing effluent objectives.

### **Cells #1 and #4**

These cells will alternate as final clarifiers in the system. Effluent will be continuously discharged from cell #1 or cell #4. In preparation for one of these cells becoming a clarifier, it will go through specific steps based upon achieving effluent objectives as well as to prepare it to become the final clarifier.

### **Cells #2**

Cell 2 will always be completely mixed absent of aeration. This cell will continuously receive all of the influent flow and the return sludge (RAS) flow from cell # 1 or # 4. Cell # 2 operates as an anoxic cell.

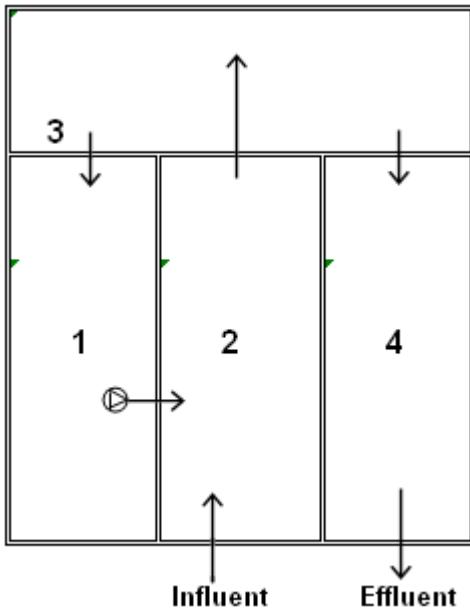
### **Cell #3**

This cell is the main aeration cell and will be continuously aerated. It will handle the oxygen demand emanating from cell #2. Cell #3 will be primarily responsible for a majority of the BOD5 removal and nitrification in the aerobic conditions present in this cell.

With a background now on the general function of each cell, specific details with respect to cell status and process function will be outlined. The following outline is based on a half cycle. The next repetitive half cycle is essentially identical to that which will be described except for the fact that cell #1 and cell #4 will exchange modes of operation. That is, cell #1 will act as the final clarifier, while cell #4 will go through steps designed to assist in achieving effluent objectives and to prepare it once again to become a final clarifier.

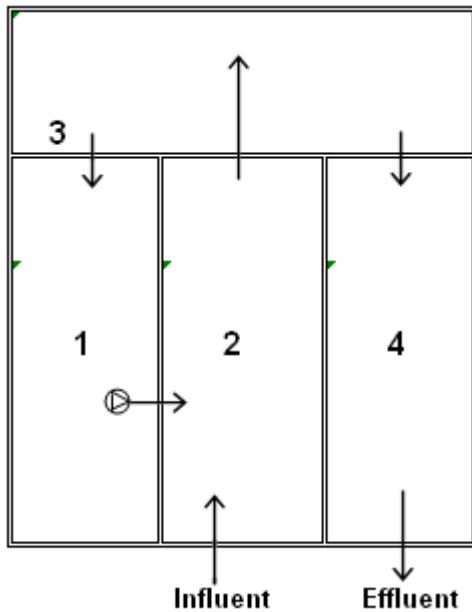
## Cell Status

### Phase I



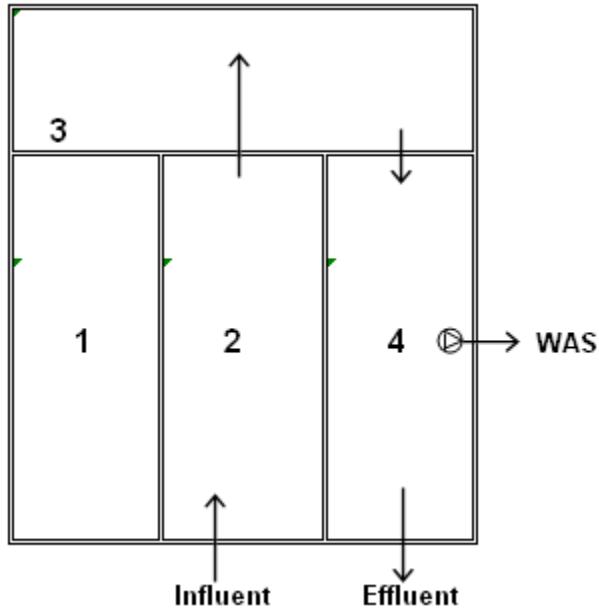
In this phase, cell #1 is transformed from being the final clarifier to now being a more proactive part of the process designed for nutrient removal. The accumulated solids that had deposited in this cell from the previous cycle are brought up to complete mix conditions by activating the AquaDDM mixers. At this time no aeration is provided for cell #1. In this condition cell #1 is now concurrently receiving recycled flow from cell #3 while recycling solids to cell #2. Cell #2 receives all of the influent flow and remains completely mixed absent of aeration. Cell #3 remains completely aerobic and cell #4 is acting as the final clarifier.

## Phase II



Influent flow will continue to enter cell #2. Cells # 2 remains completely mixed absent of aeration. Solids will continue to be transferred from cell #1, which is now aerated, to cell #2. Cell #3 remains aerobic and cell #4 continues as the final clarifier. Mixed liquor is recycled from cell #1 to cell #2.

### Phase III



Influent flow will continue to enter cell #2 and remains completely mixed absent of aeration. Cell #3 remains aerobic and cell #4 continues as the final clarifier. Waste activated sludge will now be withdrawn from cell #4. Cell #1 operates in an isolated condition by the absence of sludge recirculation and now enters a pre-settle phase where all aeration and mixing are terminated. The solids are allowed to settle under quiescent conditions before cell #1 is converted to the final clarifier in the next phase. The pre-settling phase will ensure that when effluent is drawn off at the beginning of the next phase, it will be free of solids and capable of meeting effluent objectives.