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community, provide habitat structure for benthic invertebrates and small fish feeding on the attached growth, and provide a spawning substrate for the fish.

The Inflow Channel distributes flow to each of the Biofilters and achieves saturation oxygen levels in the water. It is one meter deep and has a rock-lined bottom. It was designed to distribute the water flow to the bio cells evenly along its length on both sides. The Head Pool and Inflow Channel together increases the residence time of bacteria in the water to facilitate maximum exposure to the dissolved oxygen. To eliminate nitrogenous oxygen sag, which is due to the high respiration of the biological community, an aeration system is located in the supply channel and in each of the two pools to provide oxygen saturation levels in the water sufficient to be lethal to coliform bacteria.

The BioCell includes 134 units which function as the structural base for biofilm and periphyton growth and are responsible for the bulk of nutrient assimilation within the system. The cells consist of the following components:

The BioCell Head Pools (BHP) provide the major habitat for the assimilation of nutrients by the attached microbial and plant community. This function is enabled by the addition of APDS units, distributed through the BHP and including 371 m² of growth surface for biofilm and periphyton. The rocky substrate provides a good habitat for a benthic community. However, the addition of APDS will increase the size of this habitat by up to two orders of magnitude due to the tremendous surface area added to the system.

Fish will graze on the periphyton and prevent the nutrients from merely being released back into the water after these relatively short-lived organisms die. The fish will either swim downstream, or become a food source for humans or various animal species. The depth of the retention pools is one meter, which allows 150 mm of space for potential sedimentation to occur and still permit the APSS units to function properly. An APSS unit can remove 1–2.8 grams of nitrogen per day depending on the specific conditions of the system. The number of units required is determined by calculating daily and seasonal fluctuations of effluent and ambient temperature.

The Central Marsh Channels (CMC) provide additional aquatic habitat and a major interface between the terrestrial system and the aquatic system. Birds such as herons, kingfishers, and waterfowl may utilize this habitat while feeding on small fish, plants, and invertebrates. These birds provide not only a nutrient removal function but also add value for public use.

The Riffle Zone is the final compartment of the bioremediation facility providing turbulence, oxygenation, and small organism habitat. The water is shallow enough to discourage downstream movement by the largest fish, but shallow enough to allow small fish passage.