

**COMMISSIONING OF WOODFORD ISLAND  
SEWERAGE TREATMENT PLANT – OPERATIONAL  
AND PROCESS ISSUES**



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# COMMISSIONING OF WOODFORD ISLAND SEWERAGE TREATMENT PLANT – OPERATIONAL AND PROCESS ISSUES

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## **ABSTRACT**

Clarence Valley Council as part of a large sewerage infrastructure program has constructed a new Sewerage Treatment Plant located on Woodford Island approximately 5km from the township of Maclean on the North Coast of NSW.

The STP was just one construction package along with transfer systems and pressure sewer packages. The STP construction was delayed due to flooding in the Clarence Valley in May 2009; however the transfer packages were not delayed to the same extent. Due to some contractual issues and community expectations flow was accepted at the treatment plant before construction and commissioning was completed. This paper outlines the operational issues arising from this situation along with establishing a biological process.

## **KEY WORDS**

Sewage Treatment, Process establishment

## **1.0 INTRODUCTION**

To enable Clarence Valley Council to meet its environmental obligations in regard to sewerage treatment and disposal a decision was made to close down three existing Sewerage Treatment Plants (STP) and construct a new STP capable of producing an effluent that would meet recycled water requirements.

The new 8000 EP STP was constructed on Woodford Island adjacent to the local golf course to enable maximum reuse of the recycled water. Woodford Island is the largest inland island in the southern hemisphere and has a large amount of sugar cane cultivation, this was another reason for the STP location as some of the cane land may utilise the recycled water in the future.

Along with the STP construction contract other construction packages were underway; these comprised of a pressure sewer project in the small village of Lawrence a previously unsewered area, 2 Horizontal Directional Drilling (HDD) river crossings and five new pump stations and rising mains. All together there were four different construction companies involved all with there own issues and expectations.

Delays in construction of the Woodford Island STP were experienced due to a number of factors including a major flood event in the Clarence River. However the transfer construction packages were not delayed to the same extent. This meant that Clarence Valley Council along with our project managers at NSW Public Works had to either ask the construction contractors to alter their program or allow sewage to be pumped to the uncompleted STP.

Due to the potential delay claims from the construction contractors the decision was made to not interrupt the progress of the pressure sewer and transfer contracts. The impact of this decision was that the Woodford Island STP would not be completed before the transfer packages.

## 2.0 DISCUSSION

The contractor for the STP was advised that sewage would be sent to the plant and stored in the completed structures until the STP was finished and commissioned. This caused some angst with the on-site construction staff due to odour and OH&S issues. Figure 1 shows the layout of the Woodford Island STP, and Table 1 lists the status of the various structures at the STP when the transfer packages were completed

**Table1:** *Woodford Island STP structures at completion of transfer packages*

Structure	Number	Volume	Status
Inlet balance tank	1	0.25 ML	Completed
Storm Buffer tank	1	1.1 ML	Completed
Inlet works	1		Completed
IDEA tanks	2	3.6 ML	Completed
Reuse storage	1		Incomplete
Tertiary filters	2		Incomplete
River storage	1		Incomplete
Discharge pump station	1		Incomplete
UV System	1		Incomplete
Alum Dosing	2		Incomplete
Sodium Hydroxide dosing	1		Incomplete
Sodium Hypochlorite dosing	1		Incomplete
Sludge Lagoons	3	6.3 ML	Completed

Total Storage volume = 11.25 ML

Average Daily Flow at this stage = 200 KL

Number of days storage = 56

The flow to the STP was introduced in stages as the transfer construction was completed.

Pumping Station	Average daily flow in KL
Lawrence SPS 21	80
Harwill SPS 11	17
Maclean SPS 8	103

### 2.1 The Challenge

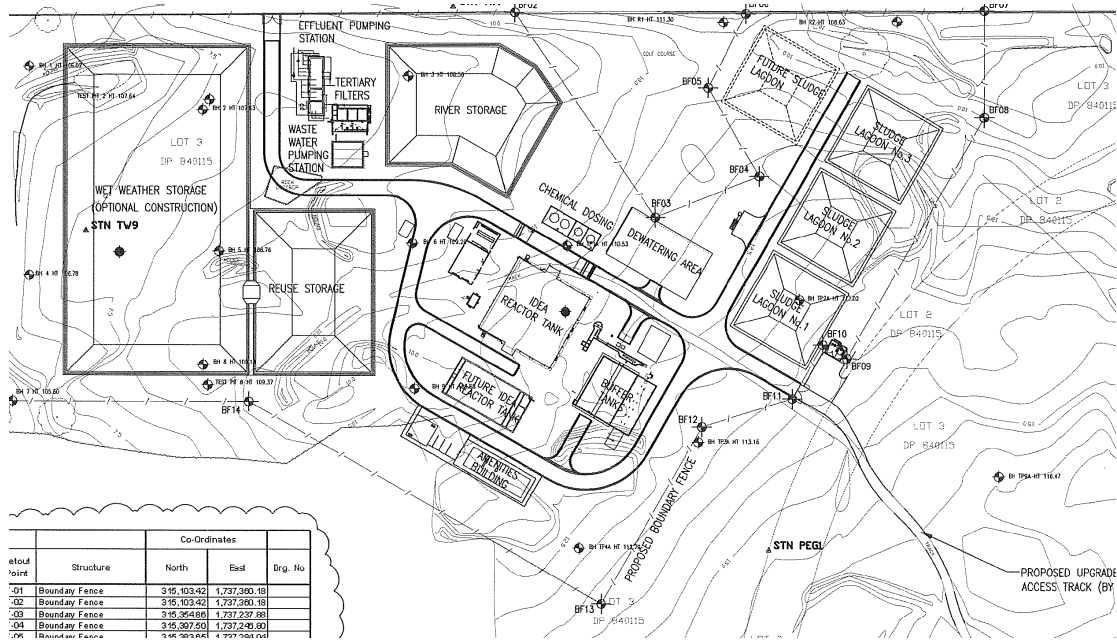
Now that influent was being pumped to the STP the operator had another plant to attend to along with the other 3 existing plants and adding to the operational issues the new plant was a construction site that was far from complete. As the STP was not complete effluent could not flow over the decant weir and to the tertiary section of the plant.

### 2.2 The Plan

Sewage would be allowed to flow in through the balance tank and inlet works and stored in the Intermittently Decanted Extended Aeration Tanks (IDEAT). Once enough height in the tank has been achieved then the mixers and diffused air would be turned on. While this was happening Mixed Liquor Suspended Solids (MLSS) was being transported by tanker truck from the Yamba STP, approximately 30 km away.

Initially only one IDEAT was filled and a biological process established, the thought being that once we had one tank established then we could transfer MLSS and also establish the biological process in the second tank.

If the level in the IDEAT increased to near Top Water Level (TWL) then the Waste Activated Sludge pumps (WAS) would be turned on and MLSS sent to the sludge lagoons.



**Figure 1:** Woodford Island STP layout

### 2.3 The Problem

Once the MLSS had been transported from Yamba and a biological process established in tank No1 of the IDEAT’s the operator noticed air escaping from several of the diffusers during the settle and decant cycles. This required the tank to be emptied so the diffusers could be accessed and the retaining clip tightened, this took a couple of days. The MLSS was transferred to No2 IDEAT and provided with air and mixing.

Now once the second tank was filled the same problem arose with the retaining rings on the diffused air membranes, so it was back to IDEAT No1 with the MLSS all this time the amount of flow to the plant was steadily increasing and the sludge lagoons were filling.

Tank No 2 problem was fixed and there was no other option but then to allow flow into this tank. At this point a leak was detected in the end weir decant gate and the supplier advised that it would need to be removed and replaced. All of the MLSS was pumped into the storm buffer tank, it took 4 days to pump out and replace the decant weir. At this point it was decided to “seed” IDEAT No 1 with the MLSS from tank No2 while at the same time mixing the stored biomass in the wet weather storage with the incoming flow. IDEAT No1 did not recover, it did not matter how much “fresh” MLSS was introduced from tank No2 and also MLSS trucked in from the Yamba plant a biological process could not be established.



**Figure 2:** *Intermittently Decanted Extended Aeration Tanks*

## 2.4 The Dilemma

So now we have all structures full, a contractor under pressure to complete the remaining works, an operator that just wants to have one plant to operate not four! We have transfer packages complete and needing to be tested with potable water for 2 weeks and nowhere to put the test water and about 1 ML of dead biomass.

## 2.5 The Solution

IDEAT No 1 had to be emptied and at this stage the contractor had finished the re-use storage pond. IDEAT No 2 was performing and had an established biological process and at this stage the plant was not fully loaded. The stored influent in one of the sludge lagoons was pumped to the inlet works and along with the inflow was directed to IDEAT No 2 and as the re-use pond was completed this tank could operate on its normal cycle and decant.

The MLSS from IDEAT No1 was then pumped to the empty sludge lagoon. MLSS from IDEAT No 2 was transferred to IDEAT No 1 along with MLSS trucked from the Yamba STP and this enabled the establishment of a stable biological process.

## 3.0 CONCLUSION

While we did eventually achieve the desired outcome of establishing a biological process and retaining all of the influent to the STP it required an extensive amount of man hours and management. In hindsight from a purely operational point of view the STP should have been completed and commissioned before any flow was allowed to the plant. The decision to proceed before construction of the plant was complete was not taken lightly and the STP Operator was an involved at all stages of the process.