

Armidale Dumaresq Council Sewerage Treatment Plant

Located 63 Cafferries Rd 3km on the Waterfall Way



Introduction

- The Sewerage Treatment Plant was first constructed in the late 1930's when the population was only 6,000, in the 1960's the plant was upgraded to handle the growing population with today's population served is about 21,000 and there are 8,000 connections to the sewer.
- The Sewerage Treatment Plant is a conventional Biological trickling Filter Plant and Preliminary screening, Primary, Secondary and Tertiary Biological Treatment.
- There are no chemicals used in the treatment process, tertiary disinfection being by natural oxidation and ultra violet light exposure in the ponds with a minimum 21 days up to 28 days detention period depending on the incoming flows into the STP.
- The maximum treatment capacity of the plant is 300 L/s.
- The plant is licensed by the NSW Environmental Protection Authority to discharge treated effluent into Commissioners Waters, however, with the implementation of load based Licensing under the Protection of the Environment Operations Act, the Reuse Farm can achieve 100% reuse of its bio-solids and 45% of effluent to agriculture land.
- ADC trade up to 600 steers a year to the feedlot market and can produce up to 1200 tonne of Lucerne a year to the local rate payers in Armidale which is all produced on the reuse farm.

Preliminary Treatment

- The sewerage upon arrival at the STP is passed through a series of screens and tanks to remove inorganic solids that cannot be biologically treated.
- These preliminary treatment units, called inlet works include screens, flow measure and grit removal.
- All the screenings of the inorganic solids are bagged and berried at the landfill.



Inlet works at the STP

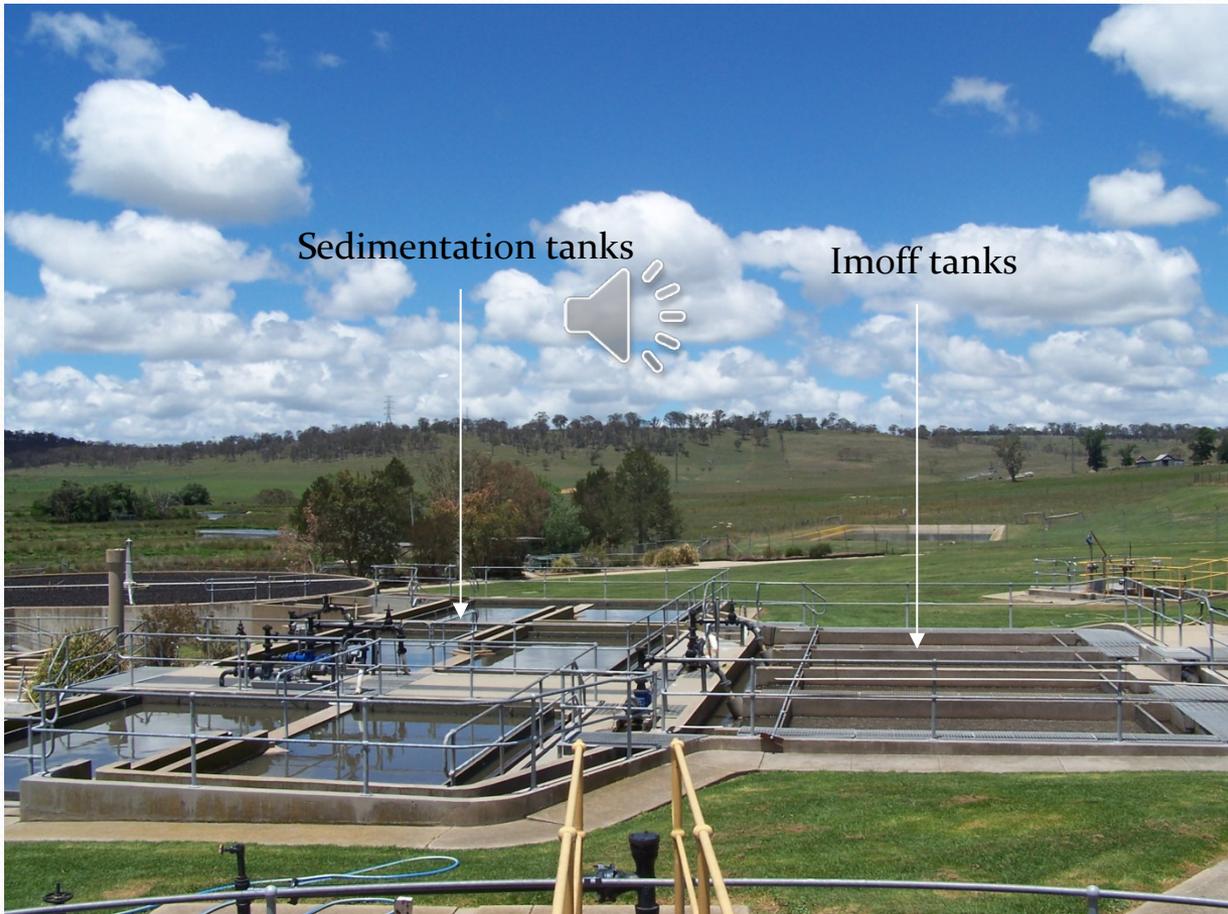


Primary Treatment

- The purpose of the primary treatment units is the separation of floatables and organic settable solids from the wastewater and the treatment and/or disposal of these solids.
- The primary sedimentation tanks remove the settable solids and the floatable solids from the waste water.
- An efficient sedimentation tank remove between 60 and 70% of the suspended solids and reduces the BOD concentration by about 30%.
- All the settable solids (raw sludge) is pumped up in to a primary digester, heated to 36 degrees and constantly mixed, the methane gas that is produced is caught and used to run the boiler that heats the digester, the excess gas is flared off with a waste burner.



Primary Treatment



Primary Treatment



Primary Digester



Secondary Treatment

- The function of secondary treatment is to change the remaining solids onto a form that can be settled and therefore separated from the liquid.
- Armidale STP has 5 Biological Filters (bacteria beds) which have the biological growth attached to a supporting medium (ie. Stones) and the wastewater passed over it, these are called fixed film reactors.
- As the waste water passes over the stones air comes up from the bottom of the filter helping to oxidize the wastewater also the bacteria that lives in the film feeds on the wastewater (food) and turns the non settable solids in to settable solids which in a further process is allowed to pass through another settling tank (humus tank) and allowed to settle out which is called humus sludge the humus sludge is pumped back through the STP process.
- Armidale STP has two secondary digester tanks, secondary digester 1 receives the treated sludge disposed out of the primary digester and in this process it is just constantly mixed (not heated) then passed into secondary digester tank 2 which in this process the sludge is allowed to settle, the water that floats to the top is called supernatant which is pumped back through the STP, the sludge that has settled is pumped in to the sludge lagoons and allowed to settle for at least 1 month before been spread onto the reuse farm.

Biological Trickling Filters



Secondary Digesters 1 & 2



Tertiary Treatment

- Armidale STP has 10ha of maturation ponds, man-made bodies of water designed and constructed to hold the secondary effluent for a period of 21 up to 28 days (depending on incoming flow) in order that natural purification processes will reduce the level of pathogenic organisms.
- The processes that occurs in the maturation ponds are basically aerobic. The level of nutrients in the effluent and the action of sunlight promote the growth of algae and higher life forms. Oxygen is supplied to the ponds by algae and wind action.
- The environment in the tertiary ponds is suitable for survival of many types of microorganisms, including the pathogens. Over a period of time such things as the lack of organics for food and the disinfection action of sunlight causes these micro-organisms to die.
- During the normal operation of effluent ponds the effluent is held for sufficient time to allow 99.9% die-off of bacteria.

Maturation Ponds



Reuse Farm

- Armidale Reuse farm was designed to reduce the load-based licensing fee it pays to the Environmental Protection Authority by irrigating it back onto land for farming of cattle and fodder.
- By growing pasture and fodder crops it is a way of removing the nutrients out of the soil.
- Currently the reuse farm size sits around 400 hectares of which 178 ha are under irrigation allowing reuse usage up to 45% depending on the season.
- The reuse farm consist of 4 centre pivots and 5 traveling walker irrigators.
- 72 ha has been sown down to Lucerne with a life span of 4-5 years which is also harvested 4 times a year producing Hay and silage that is sold to the local community.
- 106 ha are sown down with a mixture of pastures, Rye grass, Fescue and Prairie grass with mixes of clover, chicory and plantain incorporated for the production of beef cattle with breeds predominantly Angus and Black baldly.
- The effluent farm will buy steers in at a average weight 200-300kg and sell when in the weight range of 440-550kg with an average turnover on a steer is 10months.
- ADC trade on average 540 steers a year.
- 100% of the bio-solids from the sludge lagoons is applied to the farm.

Cutting the Lucerne



Baling Lucerne Hay



Spreading of Bio Solids



Steers

