

The Aero-Fac® WwTP at Errol, Dundee

An effective, low-cost, wastewater
treatment option which minimises
impact on receiving waters



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MWH/LAS Partnership



Started in 1996 with MWH International
MWH always on look out for proven technologies to assist Water Utilities in meeting mandates and saving costs
Sludge regulation changes in the UK suggested LAS technology as very beneficial to Utilities
MWH have carried out two due diligence trips to the USA to confirm capabilities of technology, one with Yorkshire Water Cemented with agreement in UK in 99
Errol is first project in partnership
12 others currently at feasibility stage

Today, as part of MWH's global vision of



MWH and LAS combine proven skills with proven technology to provide design, build and operation of LAS Wastewater Treatment Plants.

Today s Presentation

Description of the Errol Aero-Fac WwTP

Introduction to the process used and how it deals with wide flow swings without storm tanks and shock loads from tourism or industry

Examples of how we could reduce impact on receiving waters

Errol, Scotland

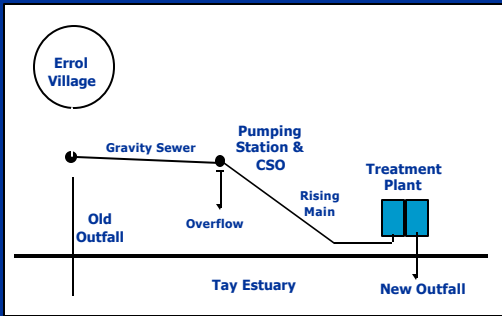


Scottish Water (NoSWA)

Montgomery Watson Harza

LAS International

The Errol Scheme



Errol Design Specs

Service Population Equivalent

- | | |
|-------------|-------|
| a. Initial: | 1,210 |
| b. Design: | 1,995 |
-

Flow

- | | Design |
|----------------------------|--------|
| a. Dry Weather Flow: | 8 l/s |
| b. Average Flow: | 10 l/s |
| c. Peak Flow to Treatment: | 70 l/s |
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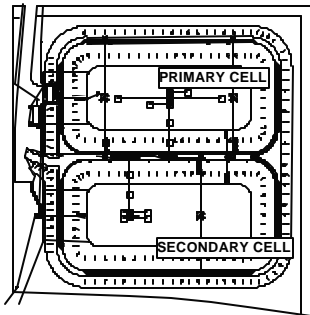
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- | | |
|-------------------------|------------|
| a. BOD: 60 g/capita/day | 120 kg/day |
| b. TSS: 75 g/capita/day | 150 kg/day |
-

Discharge Requirement

- | | |
|---------|--|
| a. BOD: | <25 mg/l (Nitrification suppressed for 5 days @ 20C) |
|---------|--|
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General Arrangement



2 treatment cells in rock and earth embankments

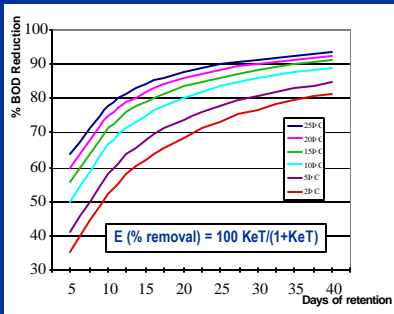
Lined with PE liner

Drainage and gas vent system under liner

Submerged inlet and outlets

Screening & sampling chambers

Precise rates of reduction
**BOD reduction is
time & temperature dependent**



Basics of Lagoon Design

Primary cell contents must maintain critical biological layers

Aggressive aeration should not be used to prevent scouring etc

Sufficient retention time required to establish biology and accomplish reductions

Non aerated: >45 days

Aerated: 15-25 days

All cells must stay aerobic

Anaerobic and Anoxic cells create unpleasant odour and require sludge removal

Basics of Lagoon Design

To keep lagoons aerobic without the addition of supplemental aeration the surface BOD load must not exceed natural re-aeration rates

Lagoon/WSP: <65
kg/ha/day

Natural re-aeration must match surface loading and is supplied via surface absorption and algal photosynthesis.

With Supplemental aeration

Accelerated lagoons: <120
kg/ha/day

Aerated lagoons: <1,500
kg/ha/day

US Loading Rates

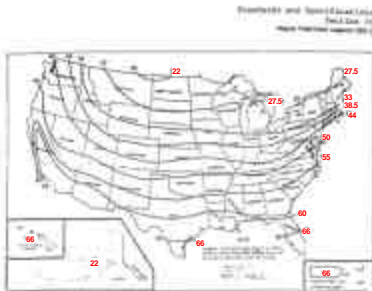
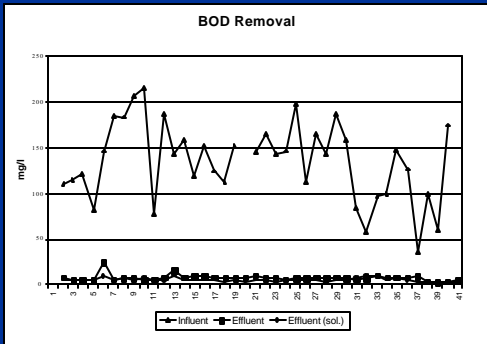
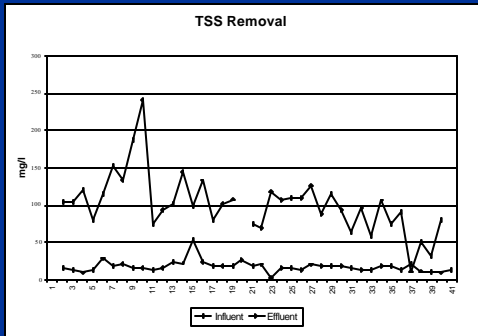


Figure 1. US Loading Rates (contour lines) and their distribution

Errol BOD Removal performance



Errol TSS Removal performance

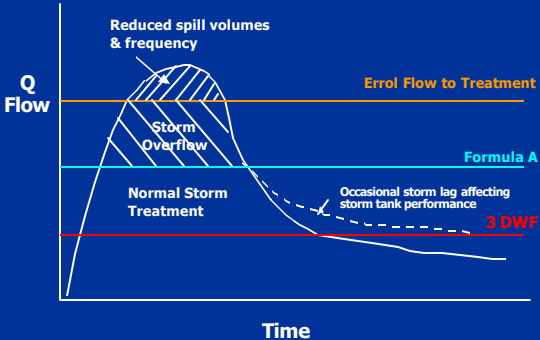


Errol COD Removal performance

COD Removal

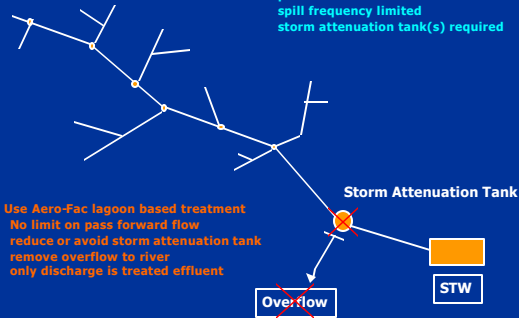


How can we reduce impact on receiving waters ?



How can we reduce impact on receiving waters ?

Combined Sewer System
pass forward flow to treatment limited
spill frequency limited
storm attenuation tank(s) required



Use Aero-Fac lagoon based treatment
No limit on pass forward flow
reduce or avoid storm attenuation tank
remove overflow to river
only discharge is treated effluent

Summary

Described the Errol Aero-Fac WwTP
Introduced the process used and how it deals with wide flow swings without storm tanks and shock loads
Proposed ways in which we could reduce impact on receiving waters

