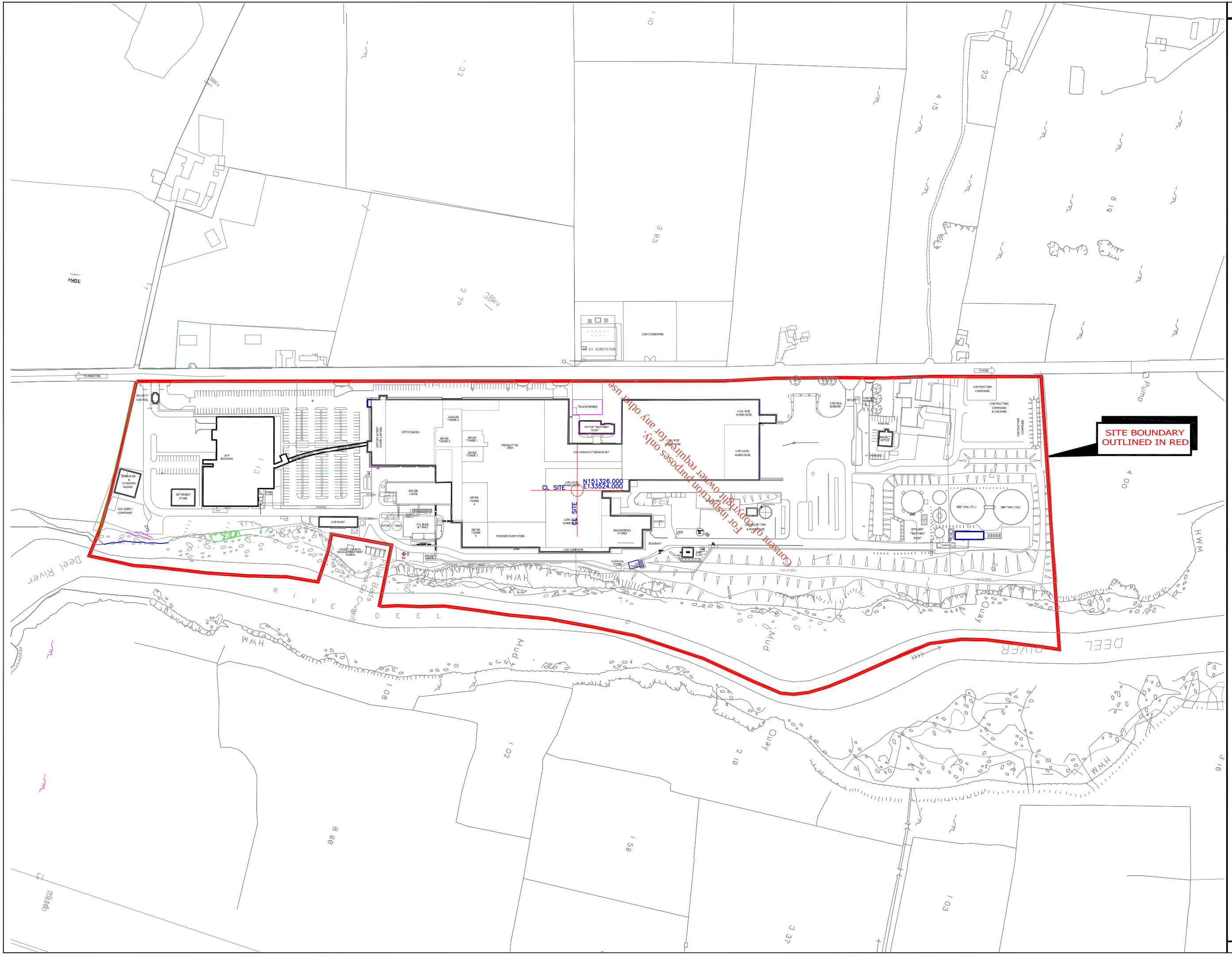

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EXISTING SITE = 43.3 ACRES

REV	ISSUE / DESCRIPTION	
A	INFORMATION	15.05.07

VENDOR

VENDOR DWG NO:	VENDOR PROJECT NO:

CLIENT

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ASKEATON
CO. LIMERICK

DRAWING TITLE

SITE PLAN LAYOUT

PLANT AREA:	DWG NUMBER:
Plant Area	99-SK-30700
PROPOSAL TITLE: SITE DEVELOPMENT PLAN	
PROJECT TITLE: N/A	
PROPOSAL NO: N/A	PROJECT NO: N/A
	DRAWN BY: --
	DRAWN DATE: 15/05/2007

SCALE:	SHEET SIZE:	REVISION:
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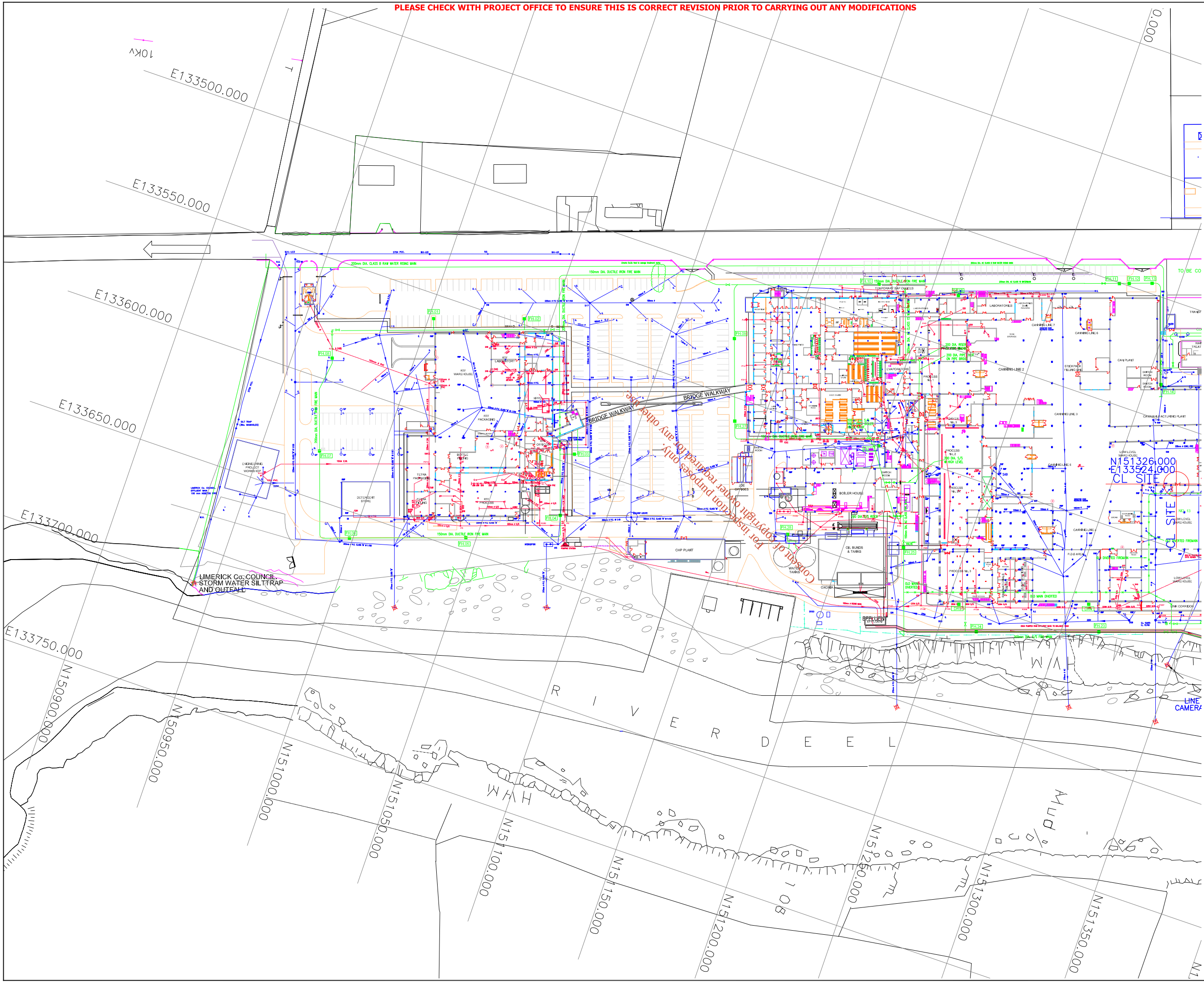
STAGE: Information

PLEASE CHECK WITH PROJECT OFFICE TO ENSURE THIS IS CORRECT REVISION PRIOR TO CARRYING OUT ANY MODIFICATIONS



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LEGEND

- STORM WATER
- WATER/FIRE MAIN
- HYDRANT
- EFFLUENT

REV	ISSUE / DESCRIPTION	DATE
A	ISSUE FOR INFORMATION	28/9/11

VENDOR

VENDOR DWG NO:	VENDOR PROJECT NO:

CLIENT

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DRAWING TITLE

Services Layout
Foul, Storm & Watermain
Sheet 1 Of 2

PLANT AREA: 99 Miscellaneous	DWG NUMBER: 99-CV-31099
PROPOSAL TITLE: .	
PROJECT TITLE: .	
PROPOSAL NO: .	PROJECT NO: .
	DRAWN BY: RF
	DRAWN DATE: 27/09/11

SCALE:	SHEET SIZE:	REVISION:
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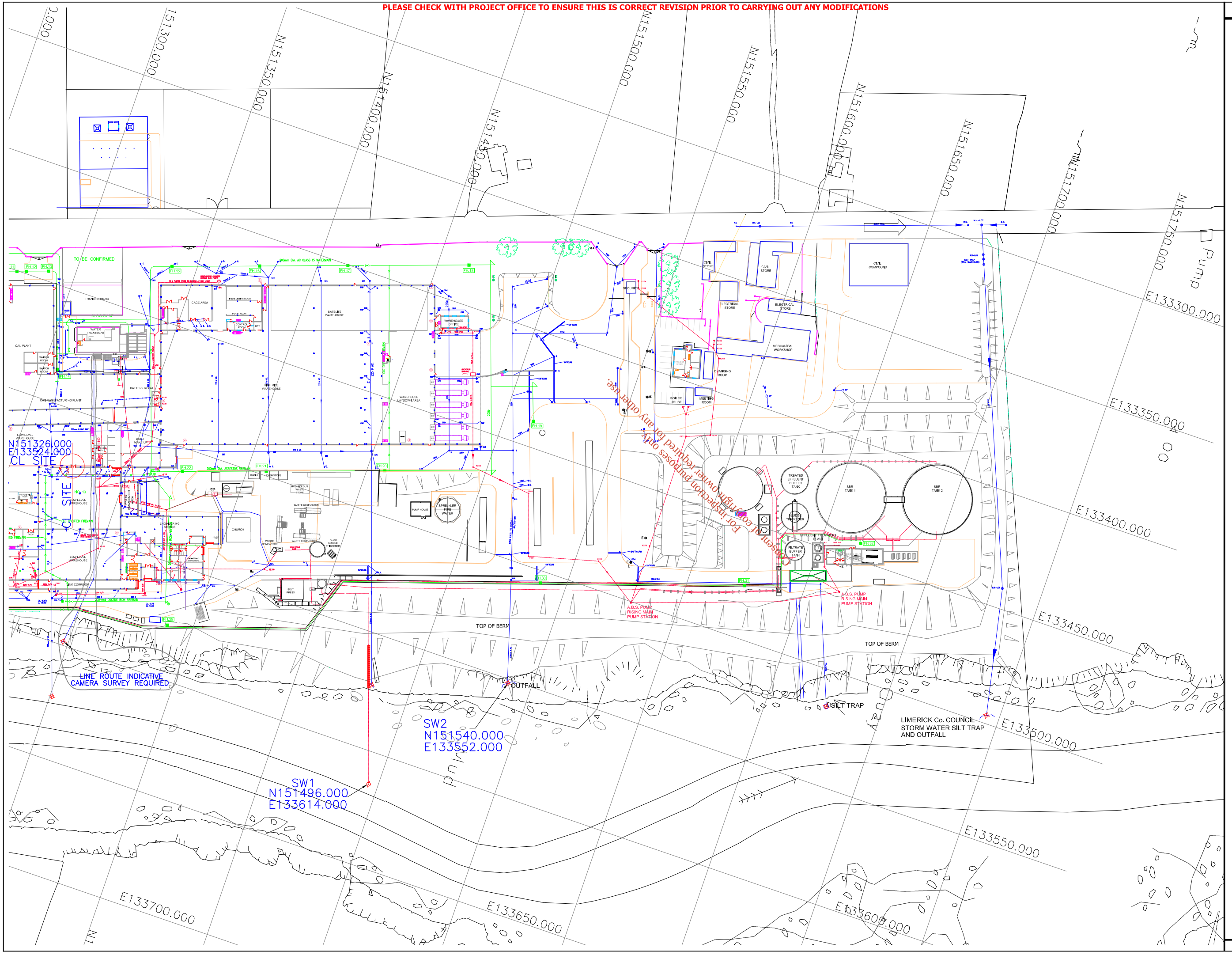
STAGE: PRE-CONSTRUCTION

PLEASE CHECK WITH PROJECT OFFICE TO ENSURE THIS IS CORRECT REVISION PRIOR TO CARRYING OUT ANY MODIFICATIONS



LEGEND.:

LEGEND

- STORM WATER
- WATER/FIRE MAIN
- HYDRANT
- EFFLUENT

REV	ISSUE / DESCRIPTION	DATE
A	ISSUE FOR INFORMATION	28/9/11

VENDOR

VENDOR DWG NO:	VENDOR PROJECT NO:

CLIENT

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DRAWING TITLE

Services Layout
Foul, Storm & Watermain
Sheet 2 Of 2

PLANT AREA: 99 Miscellaneous	DWG NUMBER: 99-CV-31099
PROPOSAL TITLE: .	
PROJECT TITLE: .	
PROPOSAL NO: .	PROJECT NO: .
	DRAWN BY: RF
	DRAWN DATE: 27/09/11

SCALE:	SHEET SIZE:	REVISION:
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STAGE: PRE-CONSTRUCTION

PFIZER NUTRITIONALS IRELAND

WASTEWATER TREATMENT PLANT

Description of Operation

Wyeth

BOWEN WATER TECHNOLOGY

VEOLIA Water

Factory Discharges

- Acids and Caustic wastes
- Oils, Fats and Greases
- Food products containing protein
- Domestic sewage
- Disinfection agents
- Some wastewater from the Water Treatment Plant

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VEOLIA Water

Outline description of the Unit Treatment Stages

- The Raw Wastewater Inlet Collection Sump
- The Balancing Tank
- pH Control
- The Biological Treatment Stage
- Surplus Sludge Removal and Thickening
- Sludge De-watering and Disposal (Currently the Sludge is being composted)
- Wastewater Streams generated within the Treatment Plant
- The Treated Effluent

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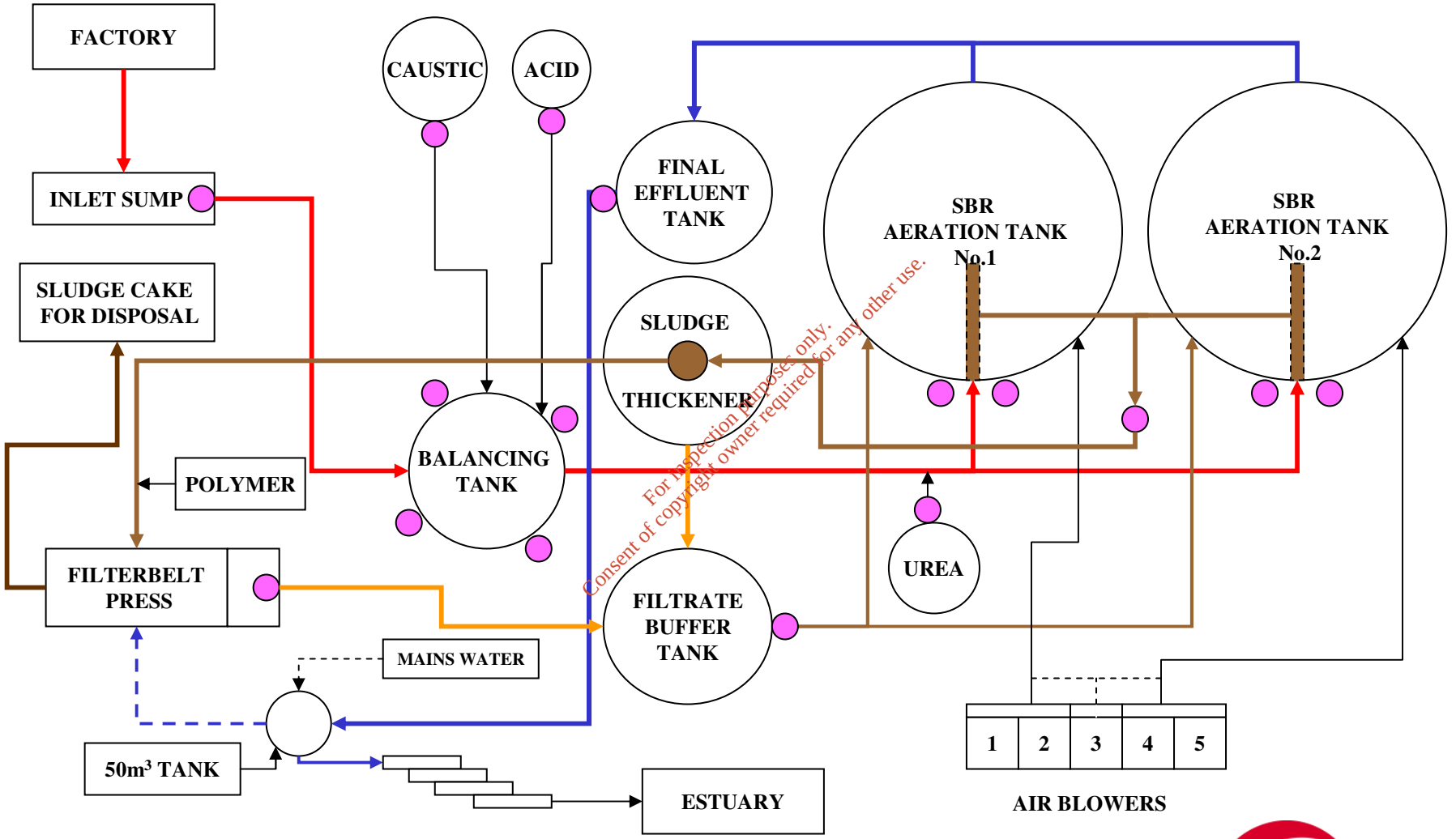
VEOLIA Water

Treatment Plant Schematic



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VEOLIA Water

Raw Wastewater Inlet Collection Sump

- Receives Wastewater discharges from the factory
- Removes Coarse Material using a manual screen
- Removes a part of the floating solidified fats using a fat removal system
- Contains the forward feed pumps which transfer the wastewater to the Balancing Tank
- Imparts a degree of cooling to the incoming wastewater streams which can be > 40ºC
- Emergency Storage Tanks are also present and are used for the collection of evaporator spills

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VEOLIA Water

The Balancing Tank

- To assist in the “smoothing” out of hydraulic loads
- To assist in the “smoothing” out of Organic loads
- To ensure that the liquid contents are fully mixed
- To ensure that the contents do not generate odours
- To ensure that the neutralisation chemicals used for pH correction are fully mixed within the tank contents
- To assist in the cooling of the incoming wastewater
- To provide adequate storage capacity to cater for large quantities of effluent coming from the factory

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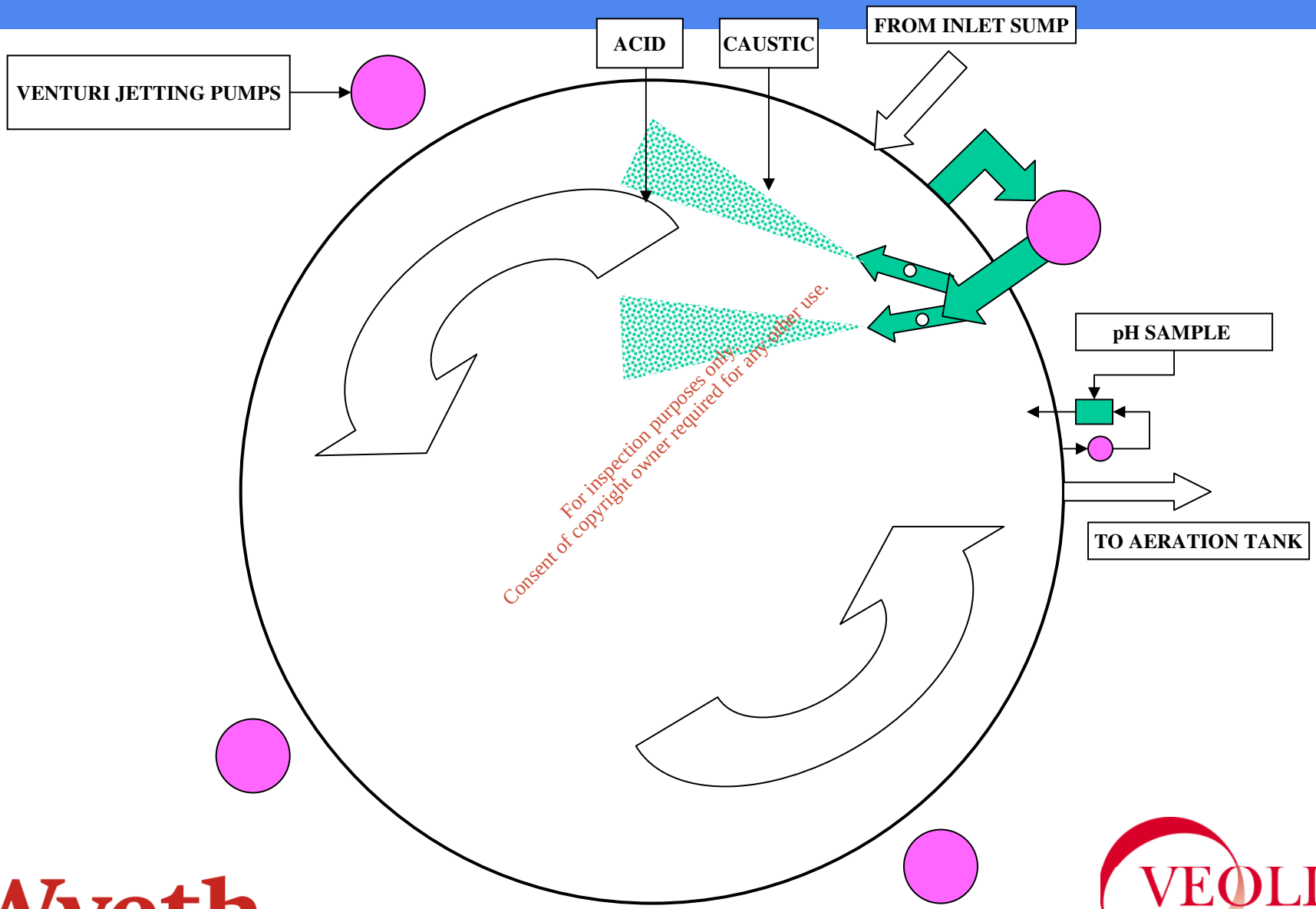
VEOLIA Water

Balancing Tank



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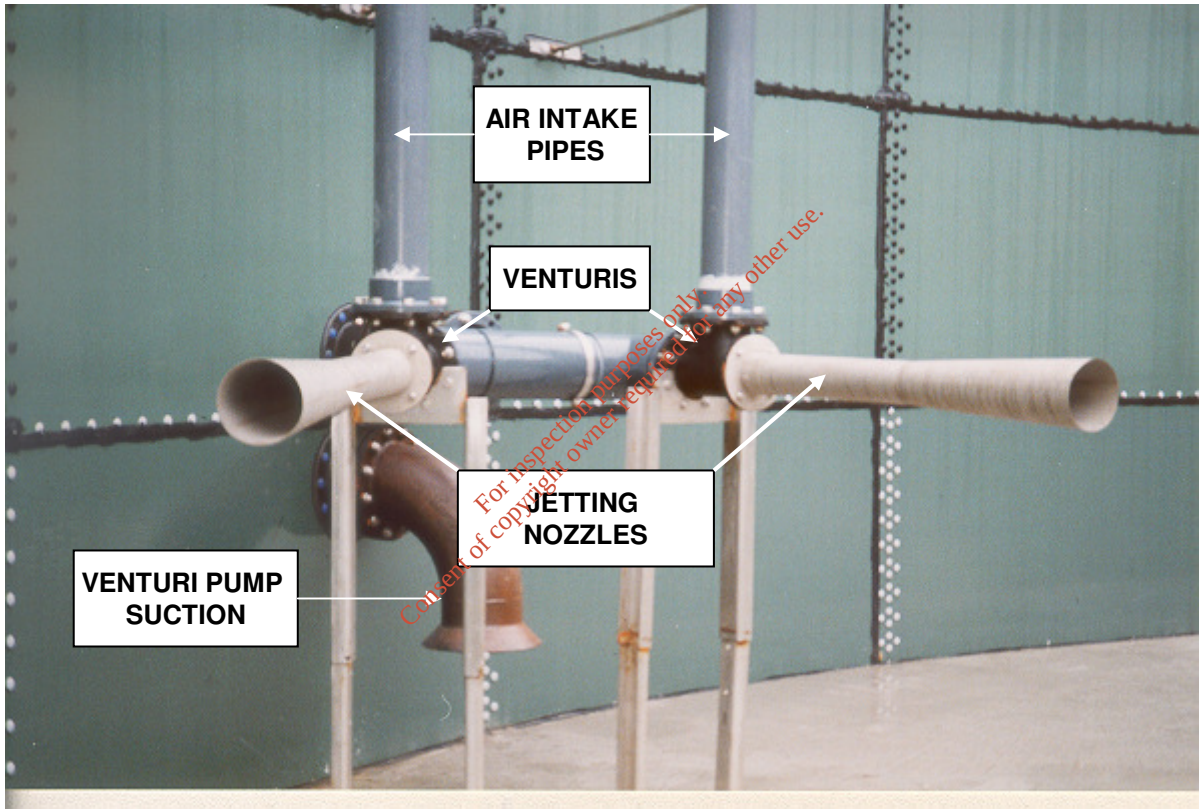
Balancing Tank (cont.)



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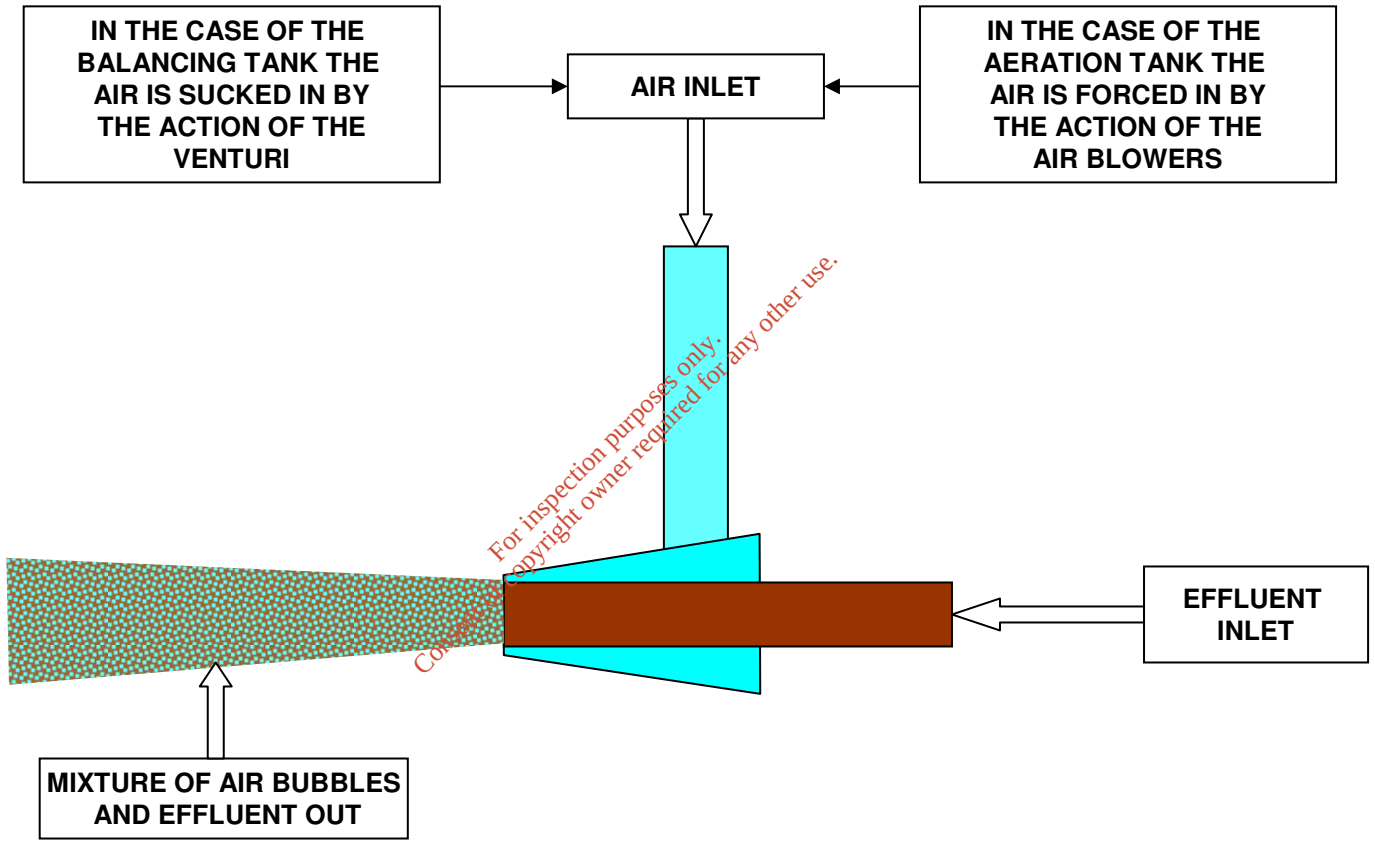
VEOLIA Water

The Principle of the Venturi Mixing System



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VEOLIA Water

pH Control

- The pH of a Wastewater describes the Acidity or Alkalinity. Pure Water has a pH = 7. If the pH is less than 7 we refer to the wastewater as being Acidic; if it is greater than 7 we refer to it as being Alkaline or Caustic

- For most of the time, the Wastewater coming from the factory has a pH greater than 10. However, when Acid is used to clean vessels in the factory (e.g. Nitric Acid), the pH can drop to 4 or even lower

- In order for the Biological process to function correctly, the pH must be within a pre-set band before the wastewater leaves the Balancing Tank. Normally this band is between 6.5 and 7.5. In order to achieve this, it is necessary to control the pH in the Balancing Tank by using either Hydrochloric Acid or Caustic Soda

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VEOLIA Water

The Biological Treatment Stage (introduction)

- The Biological Treatment Stage is one of the most important unit stages in the entire Wastewater Treatment Plant. The simplest way to understand what is occurring is to compare the process with a living creature. A living creature requires food to survive. As it consumes the food, it grows and produces wastes. If the food it eats is toxic, it can die. The creature also requires Oxygen to survive; if it does not get enough oxygen, it will die. If it gets too much Acid or Caustic, it will also die

- In the Wastewater Treatment Biological Stage, we have a mixture of Bacteria growing (referred to as Sludge). For these Bacteria to grow, they need a food source, Oxygen and a suitable pH. They also require supplemental Nutrients such as Nitrogen and Phosphorous. Failure to provide these, could result in their demise or the growth of other species which will not perform as we want them to.

- The optimum conditions for Biological Growth are when the BOD:N:P ratio is 100:5:1. On account of the variations in Raw Wastewater, management of these parameters has to be conducted on a daily basis.

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VEOLIA Water

The Biological Treatment Stage (description)

- The Wastewater Treatment plant biological stage consist of two large Aeration Tanks. The system is referred to as an SBR (Sequencing Batch Reactor). Currently, on account of reduced organic loading from the factory, only one tank is necessary.

- Each of the Aeration Tanks is equipped with an internal, floor mounted Jetting system, externally mounted Re-circulation Pumps and Air Blowers.

- The Re-circulation pump takes effluent from within the tank and re-circulates it through the Jetting system. Air from the Air Blowers transfers air to the Jetting system where it mixes with the re-circulated effluent to form small air bubbles. The latter supplies the Oxygen necessary for the Bacteria to grow. The re-circulation pump ensures that the contents of the tank are fully mixed

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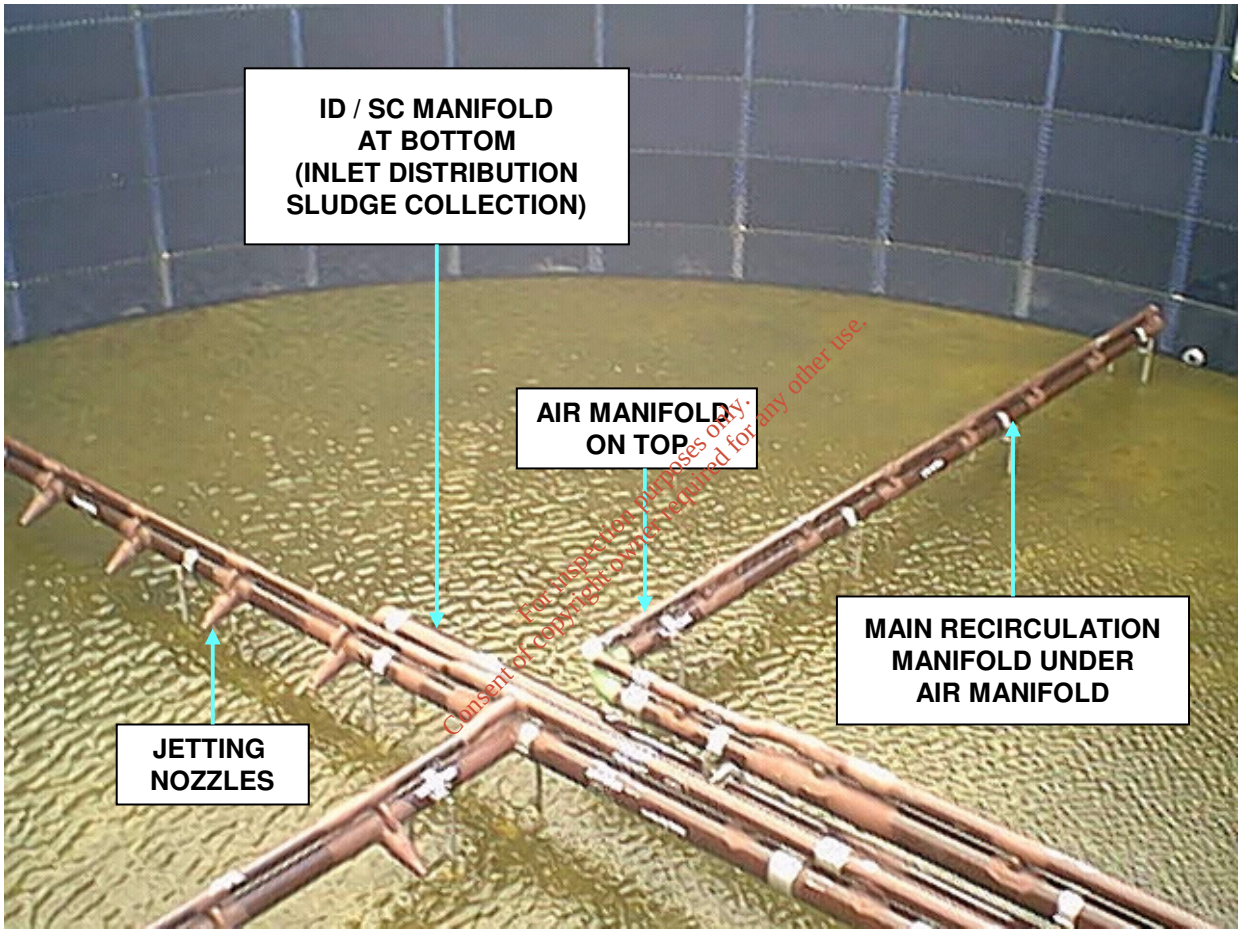
VEOLIA Water

Aeration Tank Manifold



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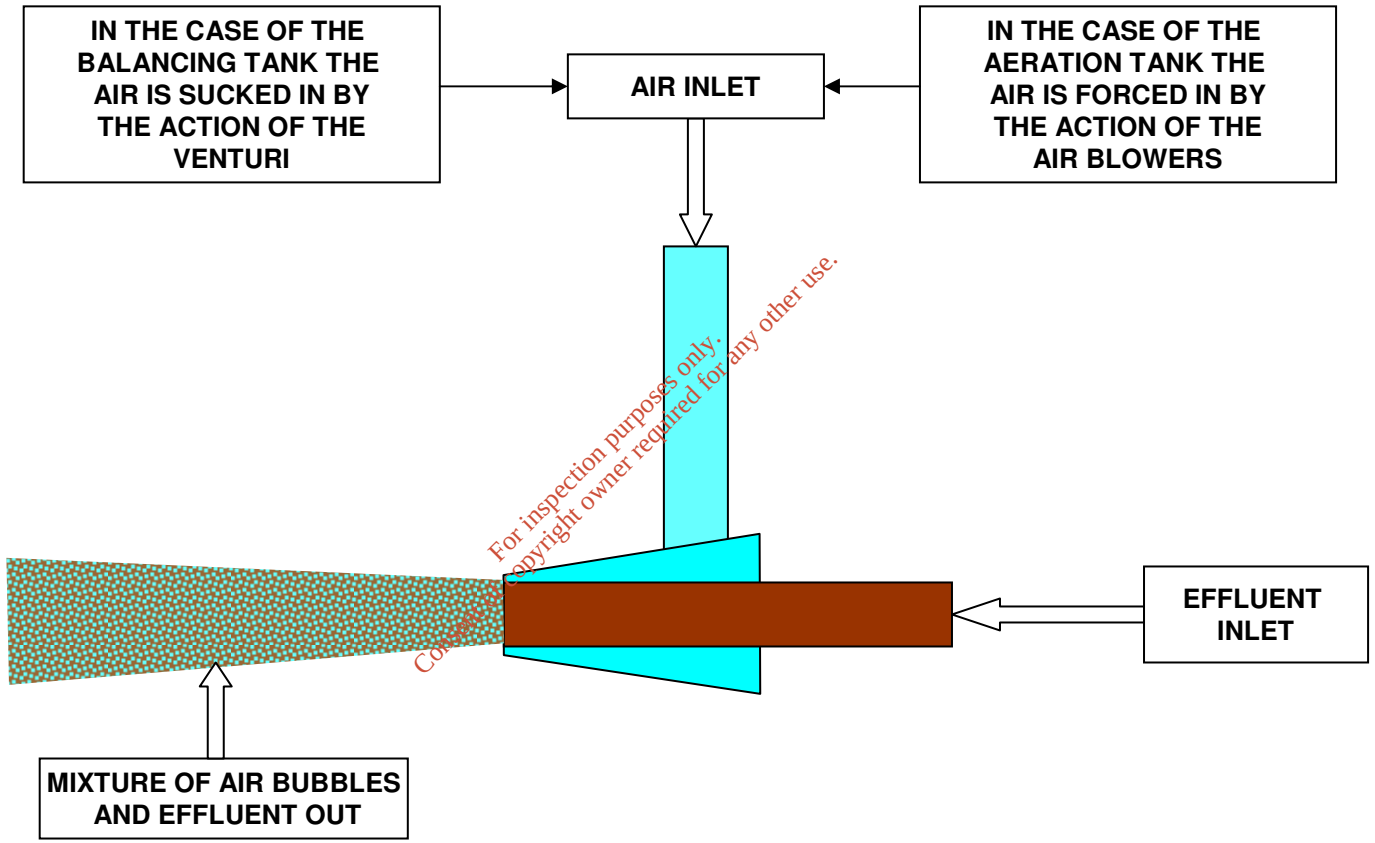
VEOLIA Water

The Principle of the Venturi Mixing System



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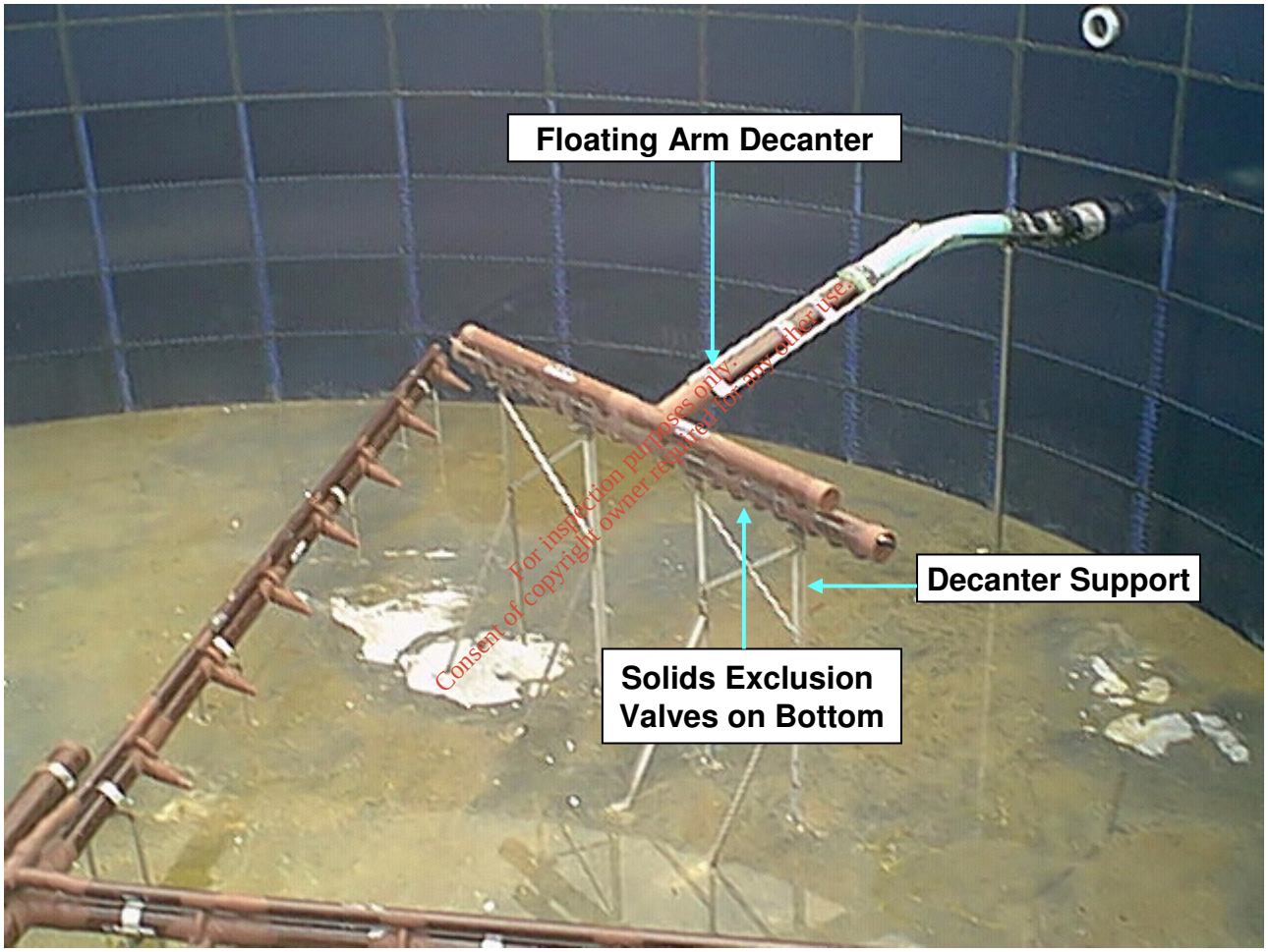
VEOLIA Water

Aeration Tank Decant System



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VEOLIA Water

The Biological Treatment Stage (description cont.)

➜ The Aeration system operates on what is referred to as Cycle times. In a typical 6 hour cycle we have the following stages:-

FILL, REACT, SETTLE, DECANT, DESLUDGE, IDLE

- A 30 min. period where effluent from the Balancing Tank is pumped into the Aeration Tank. During this period, no mixing or aeration occurs. (Unmixed Anoxic Fill mode)
- A 30min. period where effluent from the Balancing Tank is pumped into the Aeration Tank. During this period, mixing occurs but no aeration occurs (Mixed Anoxic Fill mode)
- A 210 min. period where no effluent is pumped into the Aeration Tank but Mixing and Aeration take place (React mode)
- A 50min. period with no Aeration and Mixing (Settle mode)
- A 30min. period where clear effluent at the top of the Aeration Tank is removed (Decant mode)
- A 10 min. idle time where nothing occurs (Idle Mode)

➜ N.B. Cycle times can be altered to suit operating conditions

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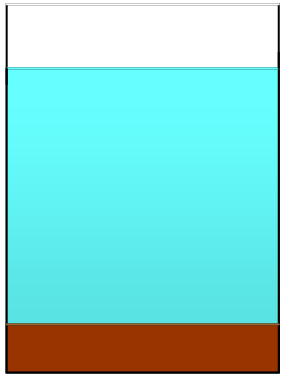
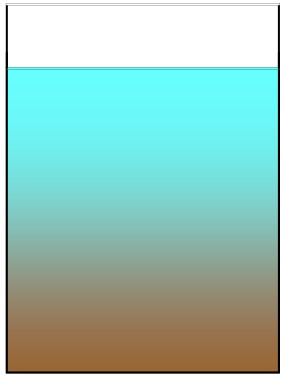
VEOLIA Water

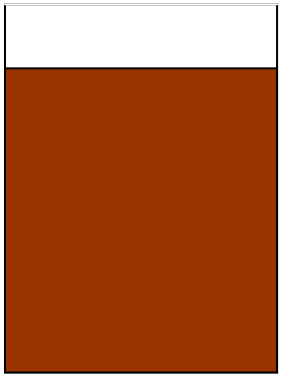
The Aeration Cycle



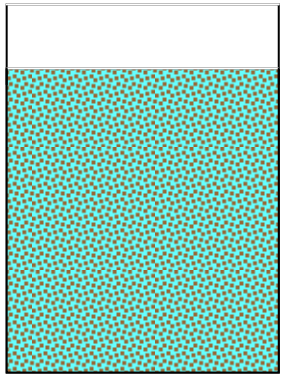
IDLE STAGE
AND DESLUDGE



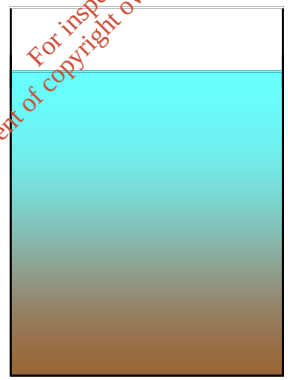
UNMIXED FILL



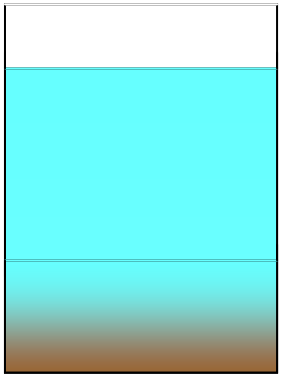
MIXED FILL



REACT STAGE



SETTLE STAGE



DECANT STAGE
AND DESLUDGE

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VEOLIA Water

The Biological Treatment Stage (description cont.)

➜ What is happening during the different stages of the Aeration Cycle?

- Before we start filling the Aeration Tank, we have a Tank that is full of different species of Bacteria (referred to as Mixed Liquor). Each species has to perform a specific function and in order to ensure that this occurs we have to create the correct environment.

- We have also to ensure that the Bacterial population present is capable of reducing the amount of Organic Matter, Nitrogen and Phosphorous that is present in the wastewater in order to meet the E.P.A. discharge standards.

- The following slide explains what is occurring during the different stages.

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VEOLIA Water

The Biological Treatment Stage (description cont)

➜ Unmixed Anoxic Fill mode:

- A species of Bacteria known as De-nitrifiers, break down a form of Nitrogen known as Nitrate. This Nitrate comes from two mains sources - Ammonia formed during the React stage and Nitric Acid used in the factory

➜ Mixed Anoxic Fill mode:

- Continuation of above where Nitrate is converted into Nitrogen gas.

➜ React mode:

- During this mode, two main types of bacteria are in operation - Heterotrophes which break down the Organic matter and Nitrifiers. The latter break down the Protein Nitrogen present in the wastewater into Nitrate Nitrogen which is removed during the Anoxic Fill modes

➜ Decant Mode:

- During this mode, clear effluent is removed from the Aeration Tank

➜ Idle mode:

- A period where nothing occurs.

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VEOLIA Water

The Biological Treatment Stage (description cont.)

➜ In order that the species of bacteria responsible for breaking down the Organic matter can perform, they require readily available nutrients e.g. Phosphorous and Nitrogen.

- In the Askeaton Wastewater Treatment plant, there is an adequate amount of Phosphorous available;
- However, there is not a readily available source of Nitrogen. In order that this latter source can be provided, it is necessary to dose a chemical called Urea.
  - This is introduced in a controlled manner during the Anoxic fill stage.
- In order to reduce the Phosphorous levels in the Final Effluent provision was made for the introduction of another chemical, Ferric Sulphate.
  - However, it has been shown that the existing treatment plant can reduce the Phosphorous to satisfactory levels without the use of this chemical

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VEOLIA Water

Surplus Sludge Removal and Thickening

- The quantity and age of the Bacteria present in the Aeration Tank has to be controlled. These are also very important factors in the control of the overall biological process. The quantity is usually controlled by what is known as the F:M ratio which is simply the ratio of Food to Bacterial mass.
  - The age of the bacterial population, referred to as the Sludge Age, is very important in the correct operation of the Treatment Plant.
  - The quantity of Sludge present in the Aeration tank is referred to as the M.L.S.S. It is normally held at between 3000 and 4000mg./l
- When the bacteria consume a food source, they multiply in numbers. i.e. the amount of Sludge produced, increases. It is therefore necessary to remove this Sludge on a frequent basis.
  - This exercise is conducted by withdrawing sludge from the Aeration Tank during the Idle, Decant or Settle stages and pumping it to a further treatment stage called Sludge Thickening.

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VEOLIA Water

Surplus Sludge Removal and Thickening (cont.)

- Sludge Thickening is a process which receives surplus sludge from the Aeration Tank (referred to a Waste Activated Sludge - W.A.S.) and thickens it from ca. 7000mg./ l (0.7%) to 20,000mg./ l (2%).
- The sludge enters a diffusion drum within the Picket Fence Thickener. The Sludge starts to settle and consolidate at the base where it reaches a concentration of ca. 2%.
- The liquid at the top of the tank overflows weirs and flows by gravity into a further tank which is referred to as the Filtrate Buffer Tank.
- The Thickener is fitted with a central drive unit which is attached to “picket fences” and floor mounted scrapers.
  - The function of the “picket fence” is to ensure that any gasses formed within the sludge are released. Failure to release these gasses could result in sludge floating on the surface.
  - The function of the floor mounted scrapers is to scrape the thickened sludge into a central hopper from where it can be pumped out to the next De-watering stage.

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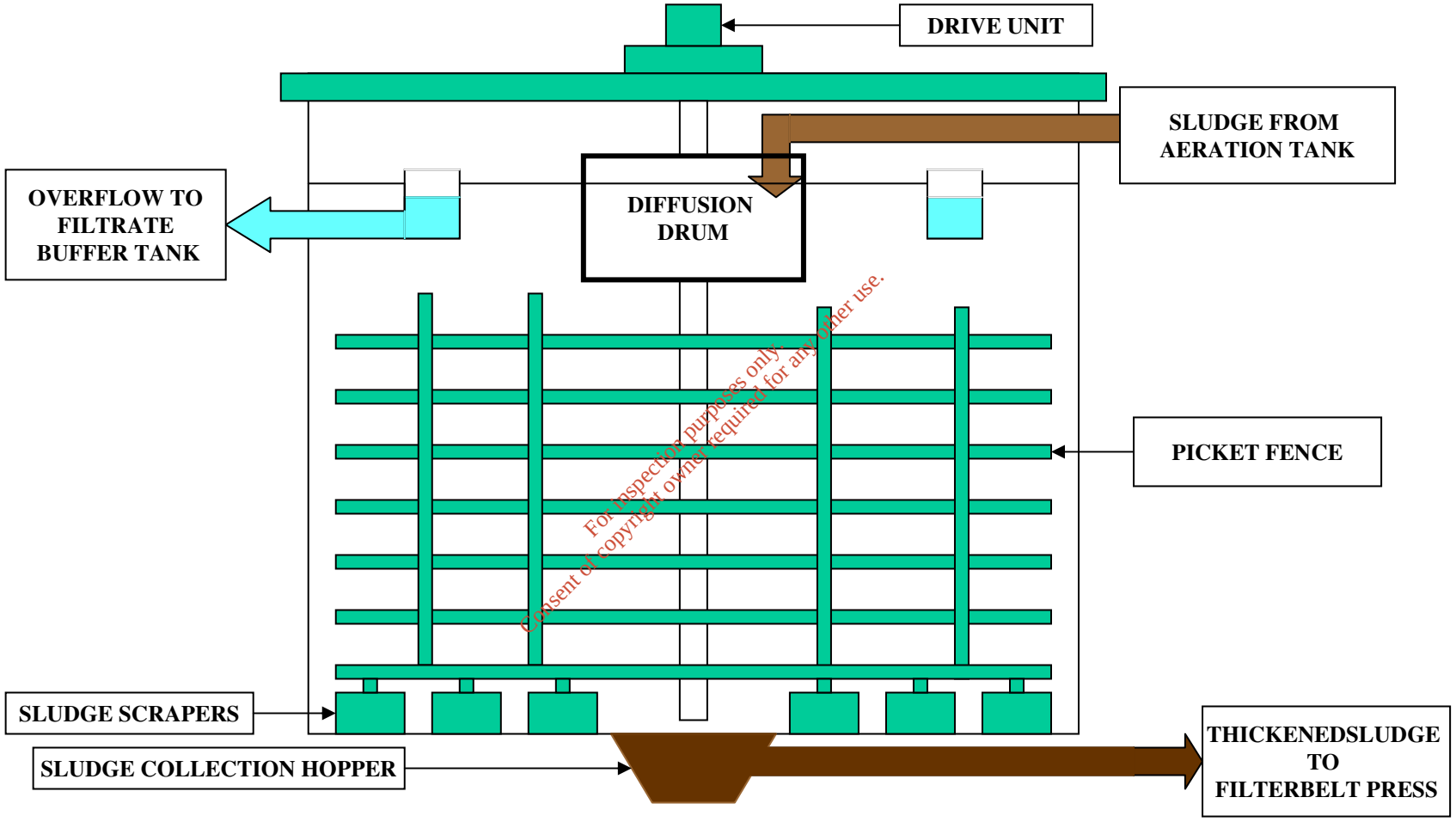
VEOLIA Water

Sludge Thickener Sketch



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VEOLIA Water

Sludge De-Watering

- The main function of the Sludge De-watering stage is to concentrate the Sludge produced in the Thickener to the highest possible concentration.
  - The lower the concentration, the higher the transport costs for disposal.
- In order to de-water the sludge, it is necessary to use another chemical which is called a Polymer (Polyelectrolyte).
  - This chemical assists in joining the sludge particles together making them larger and also making it easier to remove surplus water.
- The De-watering system used at the Askeaton Wastewater Treatment Plant uses a Filterbelt Press.
  - There is an additional Mobile unit also present which is used in the event of large quantities of Sludge being produced.
- The basic steps involved in the De-watering on a Filterbelt press are detailed on the following slide

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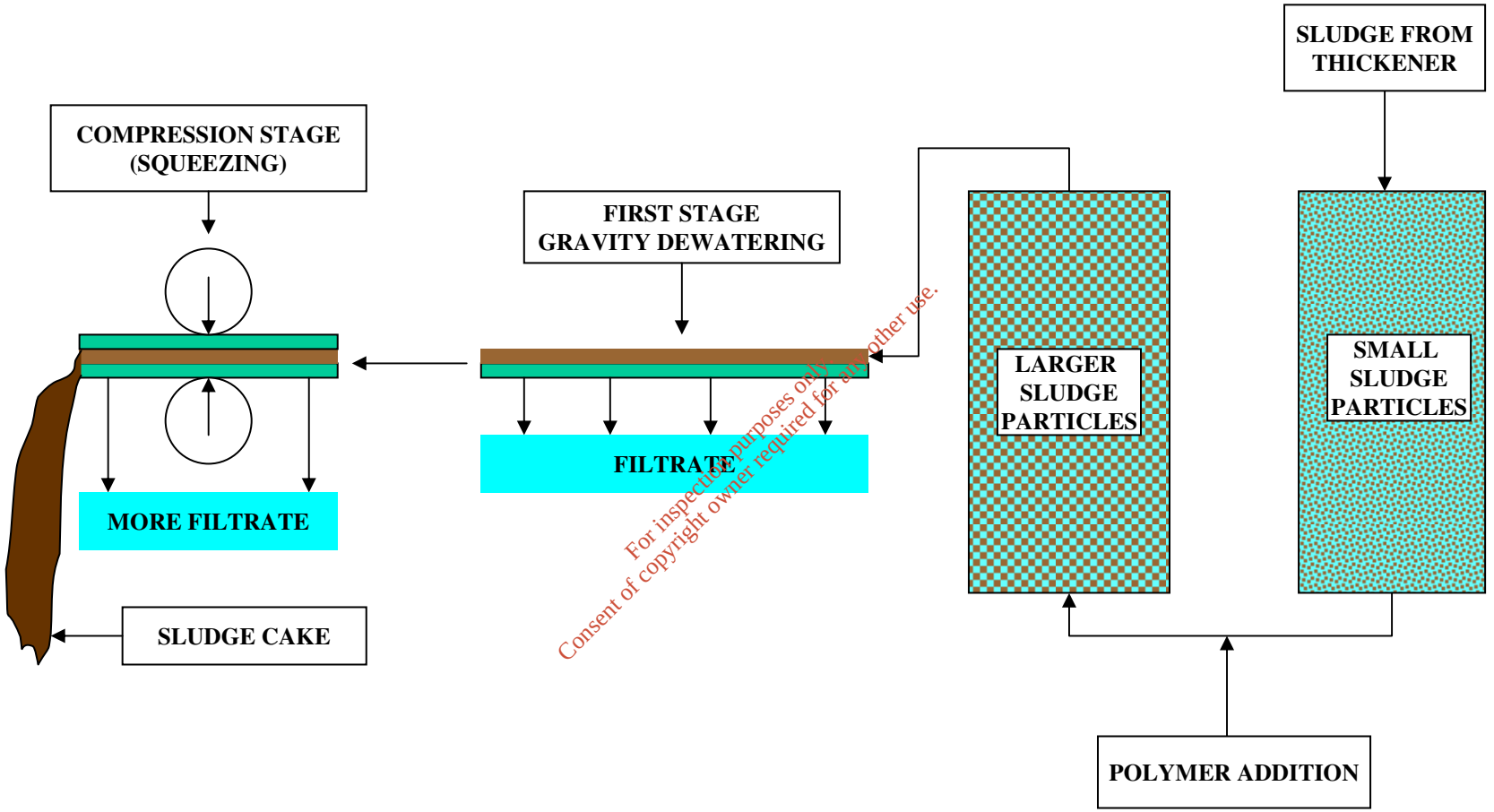
VEOLIA Water

The Stages in Sludge Dewatering



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VEOLIA Water

Sludge De-watering (cont.)

- Transfer of the Thickened Sludge from the Thickener to the Filterbelt Press at a controlled pumping rate.
- Conditioning / mixing of the Sludge with Polymer.
  - The Polymer must be dosed at a controlled rate.
- Transfer of the mixed Sludge to the Gravity De-watering stage of the Filterbelt Press.
  - This ensures that most of the water drains away through the Filter cloth material, before entering the Pressing zone (squeezing).
- During passage through the Pressing zone the sludge is conveyed between two Polyester Filter Cloths which rotate around a series of rollers. As the sludge is squeezed, surplus water is expelled. When the Sludge emerges from the Filter Cloths, it is scraped off and conveyed to a skip for disposal.
- In order to prevent the Filter Cloth material from blinding, a belt spray wash system is kept in continuous operation.
  - All wastewater produced during the pressing operation is collected in a Filtrate Sump and pumped to the Filtrate Buffer Tank

Wyeth

VEOLIA Water

Sludge De-Watering (cont.)

➜ To ensure that optimum performance is obtained from the De-watering process, it is essential that the following points be observed:-

- The concentration of the Sludge in the Thickener should be known
- The Flow rate from the Thickener to the Filterbelt Press should be known
- The Polymer should be made up correctly
- The exact Polymer concentration should be known
- The exact output of the Polymer metering pumps should be known
- The Filterbelt Spray Nozzles should be clean and operating at the correct water pressure

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VEOLIA Water

Sludge De-Watering (cont.)

- Filterbelt Presses are usually designed on two main principles - Hydraulic Throughput and Solids Loading. Examples of operating problems are detailed a follows:

  - If water is pumped onto the belt at too high a rate, it may not be able to filter through the filter cloth fast enough and will result in flooding.
  - If the amount of solids present in the Thickened Sludge is too high and the flow rate is also too high, flooding will also occur.
  - An incorrect Polymer Dose could result in flooding - if it is too low blinding of the belt material with sludge particles could occur; if it is too high, blinding of the belt could also occur due to Polymer blocking the filter cloth spaces.
  - A failure in the belt washwater system or too low a water pressure can also cause flooding

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VEOLIA Water

Sludge De-Watering (cont.)

- Too low a Filterbelt speed rate could also cause flooding
- Over-tensioning of the belt could prevent water from filtering which results in flooding.
- A wet sludge indicates that the operational parameters mentioned in the previous slide have not been optimised. N.B. It is also possible that the nature of the Sludge (Bacteria) has changed. Some sludges are very difficult to de-water. It may be necessary to change the Polymer type.

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VEOLIA Water

Wastewater Streams

- There are two main Wastewater Streams generated within the treatment plant:-
  - Overflow from the Picket Fence Sludge Thickener
  - Filtrate and washdowns from the Filterbelt Press

- Both of these streams are transferred to the Filtrate Buffer Tank. The first one flows by gravity and the second one is pumped.

- Since both of these streams contain Sludge and Organic matter, they must be treated. Treatment is carried out by pumping the Wastewater from the Filtrate Buffer Tank to the Aeration Tank during it's normal fill cycle.

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VEOLIA Water

The Final Treated Effluent

- The Treated Effluent decants from the Aeration Tank during the decant stage of the cycle and enters the Treated Effluent Tank.
- From this tank, the Effluent is pumped to a 50m^3 Break Tank located adjacent to the Sludge De-watering building and then flows by gravity down Cascade steps and into the Estuary.
- The reason for the 50m^3 Break Tank is to provide a water supply for washing the Filterbelt Press.
- The reason for Cascade steps is to impart some aeration (Oxygen) into the Effluent before it enters the Estuary.

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VEOLIA Water

Analysis of Effluent Streams

- In order to understand how the Wastewater Treatment plant is performing, it is essential that certain parameters, throughout the unit treatment stages, are regularly monitored. We must know the nature of the food source for the bacteria growing in the Aeration Tank. It is for this reason that composite samples of the Effluent inside the Balancing Tank are taken and measured on a daily basis.

- Likewise, we need to know how the bacteria are behaving inside the Aeration Tank and also what species are present. It is for this reason that we measure a number of parameters within the Aeration Tank and also view the bacterial population using a Microscope. The latter is a very useful tool in detecting potential problems well in advance of their occurrence therefore permitting an early intervention.

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VEOLIA Water

Analysis of Effluent Streams (cont.)

➜ The main sampling locations and testing conducted are summarised as follows:-

- Balancing Tank –
  - Alkalinity, pH, Soluble and Insoluble C.O.D., S.S., B.O.D., Ammonia Nitrogen, Nitrate Nitrogen, Phosphorous
- Aeration Tank –
  - M.L.S.S.during react stage, Sludge Settleability, Bacterial Population, M.L.S.S. at the end of Settle stage
- Final Effluent (ex Aeration Tank)-
  - This is monitored daily for Ammonia Nitrogen and S.S
- Final Effluent (discharge to the Estuary)-
  - Flow (m^3), Alkalinity, pH, Soluble and Insoluble C.O.D., S.S., B.O.D., Ammonia Nitrogen, Nitrate Nitrogen, Phosphorous

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VEOLIA Water

Analysis of Effluent Streams (cont.)

➜ Periodically, the following analyses are conducted:-

- Balancing Tank - Total Kjeldahl Nitrogen (T.K.N.); this is a measure of the Organic Nitrogen which includes Ammonia Nitrogen but excludes Nitrate Nitrogen
- Picket Fence Thickener- Thickened Sludge concentration
- Filterbelt Press - De-watered Sludge concentration
- Final Effluent - Oils, Fats and Grease (OFG), Toxicity

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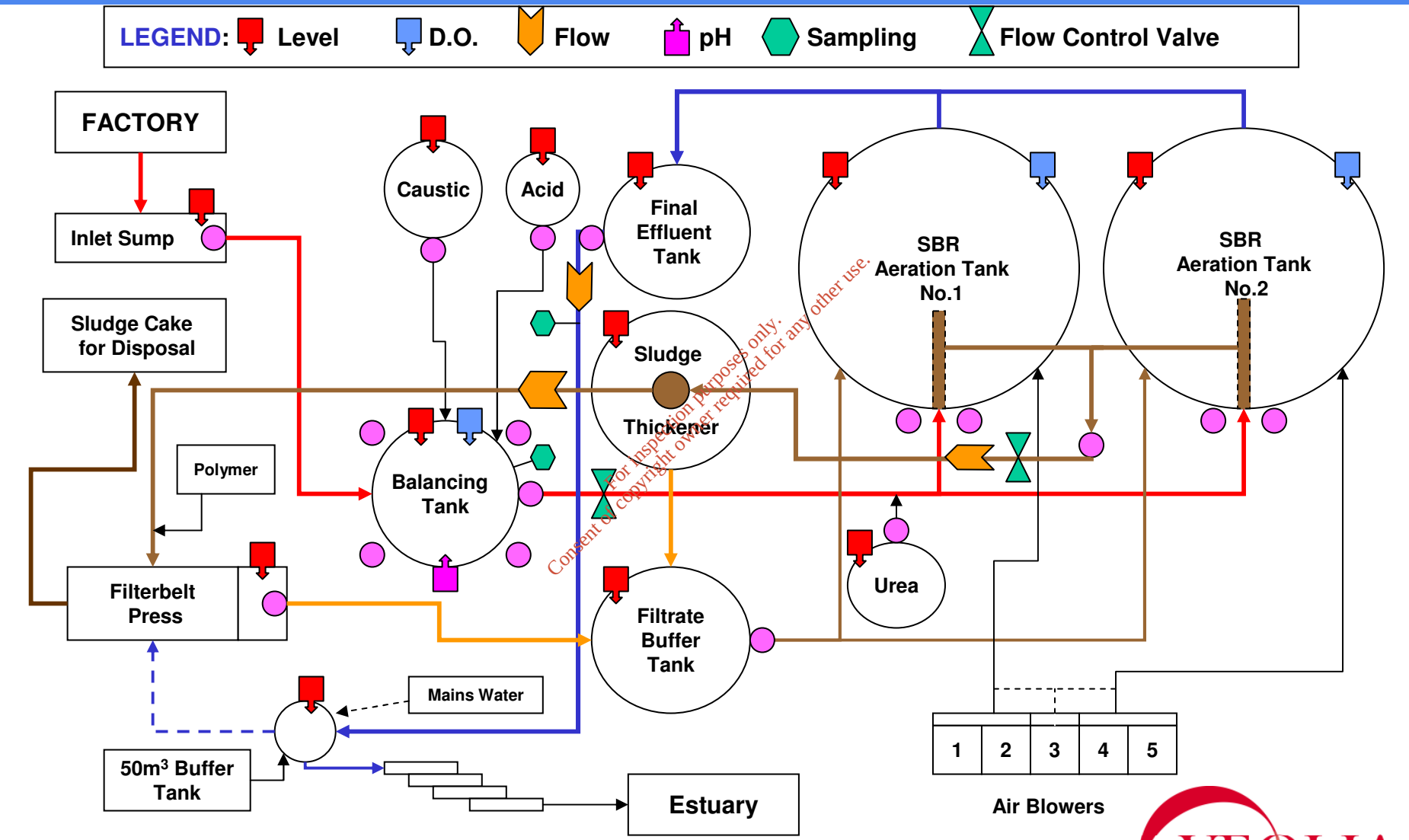
VEOLIA Water

Treatment Plant Schematic – Monitoring & Sampling



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VEOLIA Water

Raw Wastewater Inlet Collection Sump

- Forward Feed Pumps within this Sump transfer the Raw Wastewater to the Balancing Tank. The main Control Item within this Sump is Level. The level in the sump is monitored and controls the operation of the Pumps within two main bands:-

  - Low cut-out level for the pumps
  - Start level

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Balancing Tank

There are numerous Controls and Monitoring points within the Balancing Tank. The Control of the operation is carried out by a PLC (Programmable Logic Controller) which will be referred to later in this presentation. Some of the important ones are detailed as follows:-

- Level Monitoring: The Level of liquid in the tank shows us how full the tank is (expressed as %). The Level is also used to enable the shut-down of the Venturi Aerators in the event that the minimum level is reached. (We do not want the Aerators to operate below a certain level). There is also an emergency High level which when reached, initiates an alarm.

- Control of the Venturi Aerators: Under normal plant conditions, 2 No. diagonally opposite Aerators are operational. These commence operation, once a pre-set start level has been reached (above cut-out level).

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Balancing Tank (cont.)

- During the operation, the Dissolved Oxygen (D.O.) and pH are monitored. If the pH is not within the pre-set limits, additional Aerators are automatically brought into service. This event can also occur when the D.O. level is below a pre-set level. If the D.O. level is too low (< 0.5mg./l) one could generate unpleasant odours. The “key” parameter for being in a position to transfer effluent from the Balancing Tank to the Aeration Tank, is the pH irrespective of the D.O. level. Failure of one or more Aerators initiates an alarm. The control sequence has the facility to bring an additional Aerator on line in the event of a failure of another unit (assuming that all four units are not operational)

- The D.O. is monitored by means of a D.O. Probe which is suspended in the middle of the Balancing Tank. It is important that this probe is kept in a clean state otherwise false readings can occur which could impact on the operation of the Aerators. A low D.O. level also initiates and alarm.

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Balancing Tank (cont.)

- The pH is monitored by means of a pH probe which is located inside a high level Sample Chamber at the top of the Balancing Tank access stairs. This sample chamber is fed by pumps which take their sample from near the base of the tank, close to the point where effluent is transferred to the Aeration Tank. It is essential that this probe be regularly maintained since the pH is one of the most critical parameters in the entire process. If the pH is outside the pre-set limits, an alarm will be initiated and no forward feed will be permitted to go to the Aeration Tank. The pH also controls the Acid and Caustic Metering pumps.

- Composite Sampling: The daily Composite Sample from the Balancing Tank is taken from the same Sample Chamber that is used for the pH monitoring.

- Temperature is also monitored in the Sample Chamber

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Feed from Balancing Tank to Aeration Tank

- When the Aeration Cycle calls for the Fill to be initiated, assuming that the pH is within the pre-set limits (6.5 – 7.5), and the level of liquid in the Balancing Tank is not below the Aerator cut-out level, the Forward Feed Pump starts and at the same time, a Flow Control Valve opens. Flow is monitored by a Flowmeter located downstream of the Flow Control Valve. If flow is sensed, then the Aeration Fill cycle can proceed. If no flow is sensed, an alarm is initiated and the Cycle stops. The function of the Flow Control Valve is to maintain a pre-set, constant flow to the Aeration Tank.

- On the passage of the effluent from the Balancing Tank to the Aeration Tank, Urea is dosed. The Urea is dosed at a fixed feed rate for a fixed period of time. The dose is applied based on so many Litres of Urea Solution per m^3 of Wastewater to be treated. This task is carried out by inputting the Urea pump run time.

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Aeration Tank

- The operation of the entire Aeration Cycle is fully automatic and is controlled by a PLC (details of this will be covered later). The main Monitoring systems used in the Aeration Tank are the following:-
  - D.O. (Dissolved Oxygen):
    - This is one the most critical parameters in the Treatment Plant. The maintenance of the D.O. probe, on a regular basis, is essential to the correct functioning of the Biological process. If a faulty probe is giving an incorrect reading (e.g. it is reading the normal setpoint level ca. 2 – 2.5mg./l when in fact it is very low) this could give rise to a non-compliant Final Effluent. From time to time, when heavy Organic Loads enter the Aeration Tank, it may be necessary to increase the Aeration Cycle duration in order to enable full treatment to take place. A failure to achieve the correct D.O. within the requisite Aeration Cycle period will initiate an alarm.
  - pH:
    - This is used for monitoring purposes only

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Aeration Tank (cont.)

- Level:
  - Similar to the Balancing Tank, Level monitoring is used to indicate the level inside the Aeration Tank. It is expressed in % full. When a very high level is reached, an alarm is initiated.

- M.L.S.S.:
  - Whilst an M.L.S.S. probe is installed it has been shown not to be a reliable system for control purposes– Laboratory testing is therefore the preferred method

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Surplus Sludge Removal and Thickening

- The Treatment Plant is designed to remove Surplus Sludge by either Gravity or Pumped Flow.

- The quantity of Sludge to be removed has to be calculated and is based on the Sludge Age and M.L.S.S. concentration in the Aeration Tank. Normally the sludge is removed by pumping. The Pump Run time is manually set.

- If Gravity Flow is used, the Sludge Flow is monitored by a Flow Meter and the output signal from the Flow Meter Controls a Flow Control Valve to ensure that the correct flow rate is maintained.

- The Sludge Thickener is operated on a Batch Basis. The main monitoring, conducted within the Thickener, is Level. When a High level is reached, an alarm is initiated.

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Surplus Sludge De-Watering

- The Pump which transfers Thickened Sludge from the Thickener to the Filterbelt Press is a vari-speed unit. The output of the Pump is controlled from a control panel within the Sludge De-watering building. Flow is measured by means of a Magnetic Flow Meter.

- The operation of the Filterbelt Press is manual. Polymer make-up is fully automatic. The Polymer Dose rate has to be set manually.

- Filtrate from the Belt Press and floor washings flow by Gravity into the Press Filtrate sump. The main control in this sump is the operation of the Pumps on Level.

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Filtrate Buffer Tank

- The main control within this tank is Level which controls the operation of the Pump, which in turn transfers effluent from this tank to the Aeration Tank. If the level is too low, the pumps will not operate. Assuming that the level is above the minimum cut-out level and the Aeration Cycle starts, effluent will be pumped to the Aeration Tank.

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Treated Effluent and 50m³ Buffer Tank

- The main control within the Treated Effluent tank is Level which controls the operation of the Pump; the latter transfers effluent from this tank to the Estuary via the 50m³ Buffer Tank. The delivery main is fitted with a Magnetic Flow meter and an Automatic, Flow Proportional, Composite Sampler.

- The 50m³ Buffer Tank is designed to provide a water supply for washing the Belt on the Filterbelt Press. The only control associated with this system is Level. In the event that the level in the tank reaches a pre-set Low (i.e. no Final Effluent available) a supply of Mains Water is automatically fed to the Tank

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Control System

The Control System

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Control System Components

- **MCC Panel**
  - Motor Control Centre Panel. Controls switching of plant drives & provides a termination point for plant instrumentation.
- **PLC**
  - Programmable Logic Controller. Has a programmed set of logic instructions which controls the operation of the wastewater plant process.
- **SCADA**
  - Supervisory Control and Data Acquisition. This software, running on the computer, is the operator “window” into the plant process. Allows the operator to visualise the plant and change process setpoints. This computer also saves information necessary to construct trends and provides process alarms.

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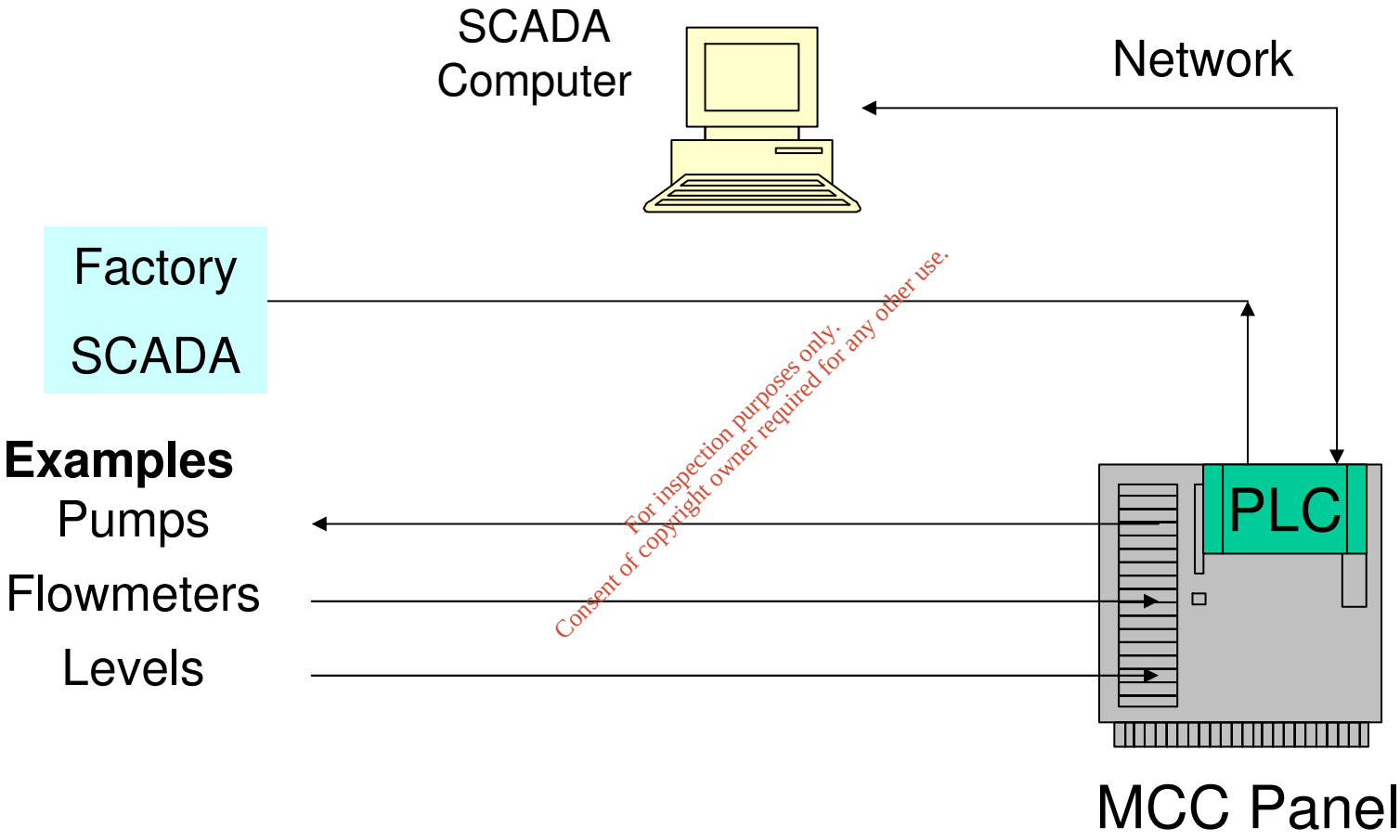
System Schematic



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