



**TEXASS rPBR 20m<sup>3</sup> WASTEWATER  
TREATMENT SYSTEM**

**c/w PRIMARY BUFFERING & FLOW BALANCING  
TECGNICAL SPECIFICATION**

The Oasis Clearwater TEXASS (**TEX**tile **A**dvanced **S**ewage **S**ystem) wastewater treatment plant, including textile foam-block media in the rPBR (recirculating **P**acked **B**ed **R**eactor) chambers, supplied, installed and maintained by Oasis Clearwater Environmental Systems Limited, P O Box 16-276, Hornby, Christchurch, and/or its authorised agents.

This treatment plant is constructed in a multi-tanked, multi-chambered configuration consisting of the following – to be read in conjunction with system schematic:

## **20m<sup>3</sup> PER DAY SYSTEM**

<b>STAGE</b>	<b>OPERATING CAPACITIES (Litres)</b>
Primary Buffering	15,000
Flow Balancing	30,000 (2 x 15,000)
Primary Influent	30,000 (2 x 15,000)
Primary Filtration	15,000
Recirculation chamber	3,600
Clarification filtration chamber	1,800  - (1 x 7,500)
Discharge chamber	1,800
PBR	15,000 (3 x 5,000)

**TOTAL No. of tanks 10 (6 x 20,000L, 1 x 10,000L, 3 x 7,000L).**

**NOTE: Tank nominal sizes**

**Treatment plant footprint approximately - 18m x 7m**

### **PRIMARY BUFFERING**

Total tank operating capacity is 15,000 litres. All domestic wastewater from the development is pumped or gravity fed to this point. This stage is primarily for the settlement and separation of solids prior to entry in to the flow balancing tanks. Control of flow is via square junctions in and out.

### **FLOW BALANCING**

The Flow Balancing Tanks have a total capacity of 30,000 litres.

Flow balancing is the incorporation of an additional pump chambers to dose wastewater to the treatment system. The amount of the dose can be varied to suit the application. This dosing is especially important where inflows are likely to vary considerably in size and frequency. The treatment plant is dosed at a regular rate throughout the day period providing more consistent wastewater treatment. Furthermore the flow balancing tanks provide the system with up to 24 hour of storage.

### **PRIMARY INFLUENT (Anaerobic and Septic)**

Total tank capacity of 30,000 litres (2 tanks). Primary influent dosed from the flow balancing stage is treated anaerobically and other oxidising bacteria break down suspended solid material. The anaerobic digestion achieves a reduction in biochemical oxygen demand (BOD) of up to 40%. This chamber also receives activated aerated sludge from the re-circulation chamber that stimulates the bacteria and enhances the level of solids digested. It also aids in de-nitrification.

### **PRIMARY FILTRATION (Anaerobic and Septic)**

15,000 litres. The domestic wastewater is able to flow freely through primary tank to the effluent filters mounted on the gravity outlet. The outlet is fitted with four proprietary A300 (1.6mm)

effluent filters to removed larger suspended solids and to reduce flow rate into the stages that follow.

## **RECIRCULATION DISCHARGE TANK**

### **Recirculation**

This stage has an operating capacity of 3,600 litres (plus PBR recirculation capacity adding a further 4,000 litres). It contains the recirculation pump and head works. The treated water from the PBR and aeration chamber is split to allow further passes across the PBR with a proportion split to the discharge pump-out chamber.

Most of the remaining particles of suspended solids settle to the bottom of the chamber allowing largely clean odourless wastewater to pass to the pumping chamber. The suspended solids that sink to the bottom of the chamber are drawn back to the primary influent chamber for further processing.

### **Clarification Filtration Chamber**

This stage (1,800 litres) provides additional filtration of the treated wastewater (400 microns or 0.4mm) prior to passing through to the irrigation pump out chamber.

### **Discharge Pump-out Chamber**

This chamber has a capacity of 1,800 litres. The fully treated wastewater flows into the pumping chamber where it is pumped out at pre-set rates for dose loading onto irrigated gardens, landscaped, or other suitable areas. The pumping chamber of the plant will be set up to dose load the subterranean land application system upon the accumulation of 400 to 600 litres between each dose loading or once daily which ever is the greater frequency.

## **AEROBIC / PACKED BED REACTOR (PBR) TANK (Aeration and Oxygenation)**

This stage has an operating capacity of 15,000 litres and 54m<sup>2</sup> of bio-pore surface area. The semi-treated wastewater is pumped from the recirculation chamber to the PBR chamber through a series of spray nozzles. The oxygen for this chamber is supplied via the nozzles and the trickling filtration process. The PBR chamber contains close cell foam-block media. The media block is a porous mesh in square block form; packed together to produce a large surface area (18,000m<sup>2</sup>). These blocks attract and enhance the bacteria, nitrobacteria and nitrosomonas that replenish free oxygen.

In addition to the ammonium contained in many wastewaters, the foam-block media concentrates other compounds and metals contained in the wastewater during the ion exchange processes. The enhanced aerobic bacterial action results in a high level of aerobic treatment and a reduction in the accumulation of biological sludge. The bottom levels of these tanks contain anoxic wastewater and are connected back to the recirculation chamber. The anoxic environment and the de-nitrifying bacteria it contains, enhances the wastewater de-nitrification process.

## **INTERMITTENT USE AND SURGE LOADINGS**

The Oasis TEXASS wastewater treatment plant is designed to cope with fluctuations that arise from intermittent use and surge loadings.

The bio-pore media and the effluent filters are also installed in the treatment system to assist its ability to cope with intermittent use and surge loadings.

Where there may be extended periods of no use of the plant, in excess of 6 months, re-seeding of bacteria is recommended to assist in the recovery of the system. It should be noted that where the system is used intermittently the effluent quality leaving the system would remain of sufficient quality to allow it to be discharged through an effluent dripline system.

## **EFFLUENT QUALITY**

A properly installed and maintained Oasis TEXASS plant produces effluent for discharge through a covered surface dripper line that meets the standards required in NZS 1547:20xx and those required by the Resource Management Plans of the District Council.

Testing undertaken by the manufacturer shows that these plants are producing effluent well within the BOD5 and SS limits, as outlined in the NZ Standard. Faecal coliforms will be less than 1000cfu/100ml @ 300mm below the point of discharge to land.

It should be noted that when ultraviolet sterilisation is incorporated downstream of the pump out chamber, tests show that the faecal coliform count of the ultraviolet treated effluent falls below 100 faecal coliforms per 100ml of effluent.

Councils are familiar with this Oasis TEXASS treatment system and the quality of the effluent it produces for discharge to land.

## **LAND APPLICATION SYSTEM LOCATION**

The location of the land application system area is to be shown on an appropriate site plan. Site plan to include all relevant site data as it relates to the proposed wastewater treatment system.

## **PROXIMITY OF LAND APPLICATION SYSTEM TO WATER BODIES**

If the land disposal areas are outside the minimum clearance from water bodies stipulated in the Resource Management Plan refer to:

Note 1 in Table 4.2B1 of NZS 1547:20XX in which it is acknowledged that the number of faecal coliforms reduces by an order of magnitude for every 50 millimetres that effluent travels through soils. Thus a path length of 300 to 400 millimetres is sufficient to reduce coliform numbers to insignificant levels in normal soils.

## **MAINTENANCE SCHEDULE**

The Oasis TEXASS wastewater treatment plant will be required to be maintained on an up to four monthly basis or as otherwise required by Councils and/or Wastewater Services. The format of the report to Council will follow the reporting procedures already established between Oasis Clearwater Environmental Systems and the local authorities.

## **CONSTRUCTION MONITORING**

The undersigned or their authorised representative will monitor the installation of the TEXASS wastewater treatment system and the construction of the effluent disposal field.

## **CONCLUSION**

This report confirms that an Oasis TEXASS wastewater treatment plant, when used in conjunction with an appropriately sized land disposal system, will adequately service the on-site wastewater generated as part of the development, while also complying with the provisions of the AS/NZS 1547:2012 On-site Domestic-Wastewater Management standard.