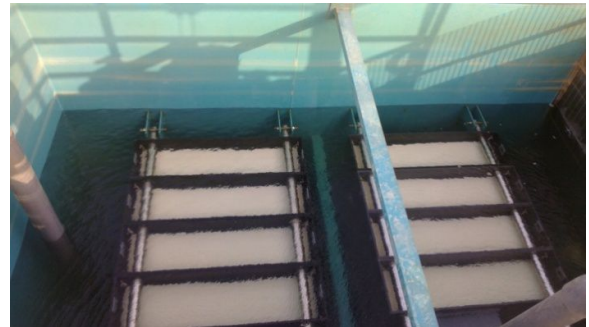


***Containerized Package Sewage Treatment Plant  
(Biotrane MBR 250) based on MBR Technology  
250 m<sup>3</sup>/day for Strabag Oman LLC, Duqm, Oman***



**Equalization Tank of STP**



**Top View of MBR Tank**



**Side View of STP**



**Side View showing all STP Units**



**Influent and TSE Samples of STP**

## *Project Name*

The Containerized Package Sewage Treatment Plant (STP) of 250 m<sup>3</sup>/day based on MBR Technology is located at the Project Site of Strabag and caters to the wastewater treatment requirements of the Workers Camp.

## *Client*

Strabag Oman LLC, Duqm, Oman

## *Project Joint Venture*

Celar Water Equipment Co., LLC, Sharjah, UAE  
EarthCAD Environment FZ-LLC, RAK, UAE

## *Membrane Filtration Units*

Microdyn-Nadir, Germany

## *Scope of Services*

### **Scope of Work under this project includes:**

- Design, Engineering, Fabrication & Commissioning of Package Sewage Treatment Plant of 250 m<sup>3</sup>/day capacity based on MBBR Technology including all Electrical & Mechanical Works.
- Operation and Maintenance of STP including Supply of Consumables and Chemicals for 1 year.

## *MBR Treatment Technology*

The MBR process is a high rate suspended growth activated sludge process system that utilizes microporous membranes for solid/liquid separation in lieu of secondary clarifiers. The typical arrangement of MBR System includes a tank with Anoxic zone, Aeration zone and internal mixed liquor recycle pumps. The Membranes are submerged in the Mixed Liquor inside the Membrane Filtration Tank of the Bioreactor. **Flatsheet Type Ultrafiltration Membrane Units with Mechanical Cleaning Process (MCP)** from Microdyn-Nadir, Germany have been used in the STP. The MBR plant delivers very high quality permeate which is pumped out by permeate pump for effluent reuse.

## *Design Basis*

The Package MBR STP has been designed taking into consideration the wastewater flow (**250 m<sup>3</sup>/day**) and characteristics as given below.

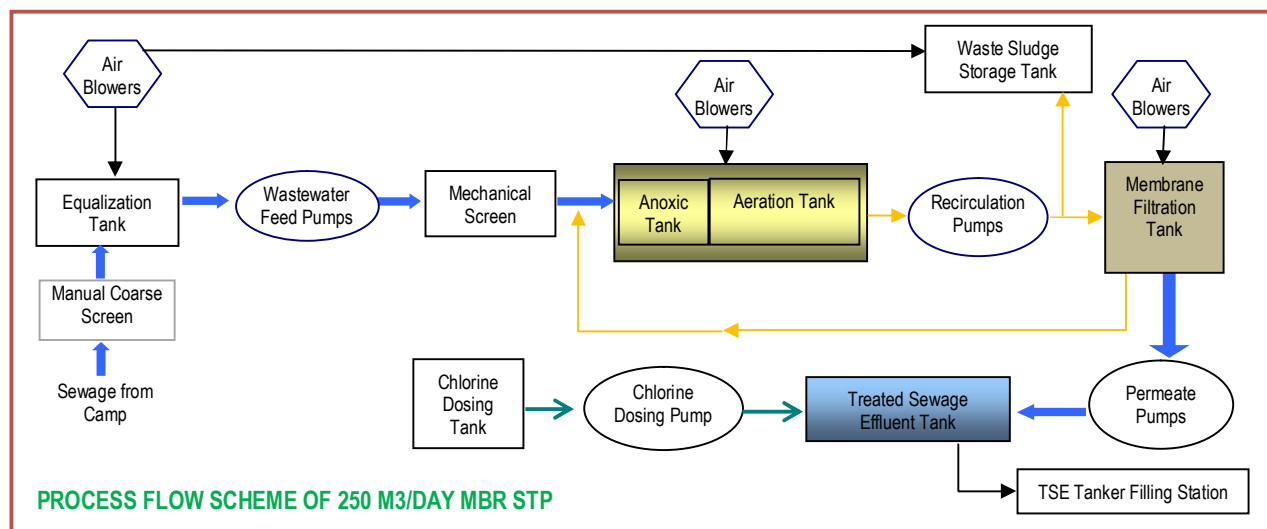
### **Inlet Wastewater Characteristics**

Parameters	Designed (Maximum)
BOD	250 mg/L
COD (Total)	600 mg/L
TSS	250 mg/L
pH	6.5-8
Ammonical Nitrogen	40 mg/l

## *Design and Process Flow Scheme*

The Design and Process Flow Scheme of the 250 m<sup>3</sup> per day MBR STP is as follows:

- Manual Coarse Bar Screen before Equalization Tank
- Equalization Tank for Homogenization of flow
- Air Blowers for Sewage Collection Tank & Sludge Tank with all accessories including air distribution system
- Submersible Sewage Feed Pumps
- Mechanical Fine Screen, 1-2 mm
- Separate Anoxic and Aeration Compartments. The tanks are made of 6 mm thick Mild Steel plates and externally and internally Epoxy painted.
- Fine Bubble Diffusers and Air Grid in Aeration Tank
- Air Blowers for Aeration Tanks with all accessories including air distribution system in GI
- MBR Tank with Membrane Filtration Modules (2 x BC400) and related accessories
- Air Blowers for MBR Tank with all accessories including air distribution system
- Permeate Pumps and Accessories
- Chlorine Dosing System for disinfection
- Sludge Recirculation Pumps
- Waste Sludge Storage Tank
- Treated Sewage Effluent (TSE) Storage Tanks
- Electrical control panel with PLC automation, SCADA System and VFD for Permeate Pumps for operation and control of equipments
- Civil Works for RCC Platforms for Placement of Equipments and Tanks



## STP Performance and Treatment Efficiencies

The Plant was commissioned on **16<sup>th</sup> July 2012** and the performance data is given below;

Present Flow to STP: 200 m3/day

### Results of Lab Analysis (24 July 2012)

Parameters	Inlet of STP (mg/l)	Outlet of STP (mg/l)
pH at 25 <sup>o</sup> Temp.	6.4	6.7
Total Suspended Solids (TSS)	442	<5
Biochemical Oxygen Demand	510	5
Chemical Oxygen Demand	1119	13
Nitrogen Ammonia	31	0.04
Oil and Grease	17	<5
Fecal Coliform CFU/100 mL	>1.0x10 <sup>3</sup>	2 CFU/100 mL

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STATUS

DESCRIPTION	Values	Unit	RESET
Permeate Flow	7.97	m3/hr	
Dissolved Oxygen	3.99	mg	
Trans Membrane Pressure	-12.7	mBar	
Flow Totalizer	121.33	m3	
Daily Flow	66.97	m3	Daily Flow Reset Time 0 0 0 hr min sec
DESCRIPTION	RUN HOUR	DESCRIPTION	RUN HOUR
Sewage Feed Pump - P01A	14	Air Blower - AB01A	18
Sewage Feed Pump - P01B	2	Air Blower - AB01B	0
Recirculation Pump-P02A	16	Air blower - AB02A	17
Recirculation Pump-P02B	0	Air Blower - AB02B	0
Permeate Pump - P03A	13	Air Blower - AB03A	0
Permeate Pump - P03B	0	Air Blower - AB03B	1
NaOH Dosing Pump - DP01	0	Anoxic Tk Mixer - DM01	18
Chlorine Dosing Pump-DP02	0	Screen - SC01	15

SCADA System of STP



Top View of STP showing Blowers, Aeration Tanks, Control Panel & Operations Room



MBR Tank and TSE Tanks of STP