

SANITARY EFFLUENT COMPLIANCE

The existing toilet facilities within the Huntstown Complex will continue to be available to site-based staff for the duration of future soil waste recovery activities at the South Quarry. No new or upgraded wastewater treatment facilities are required.

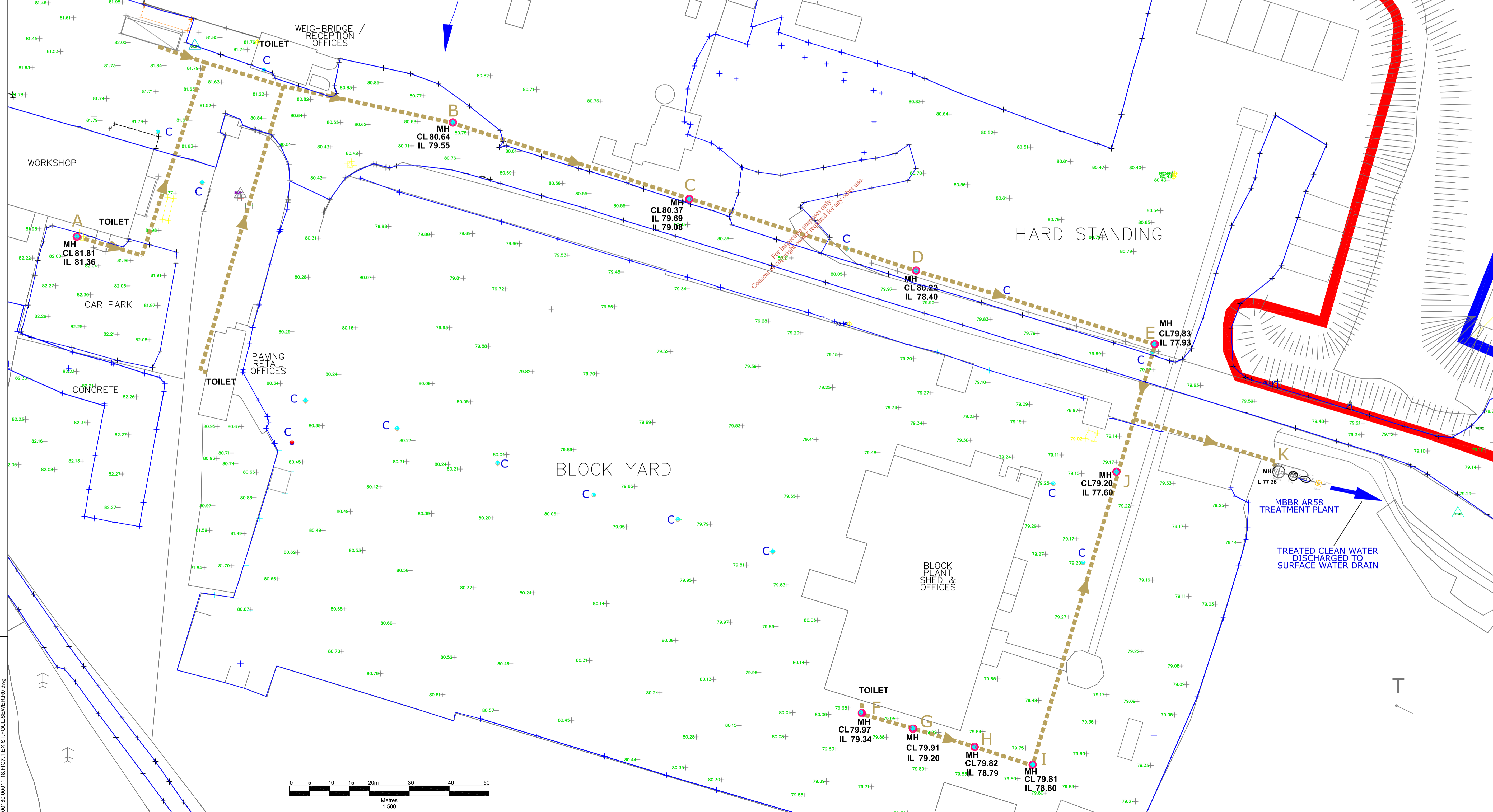
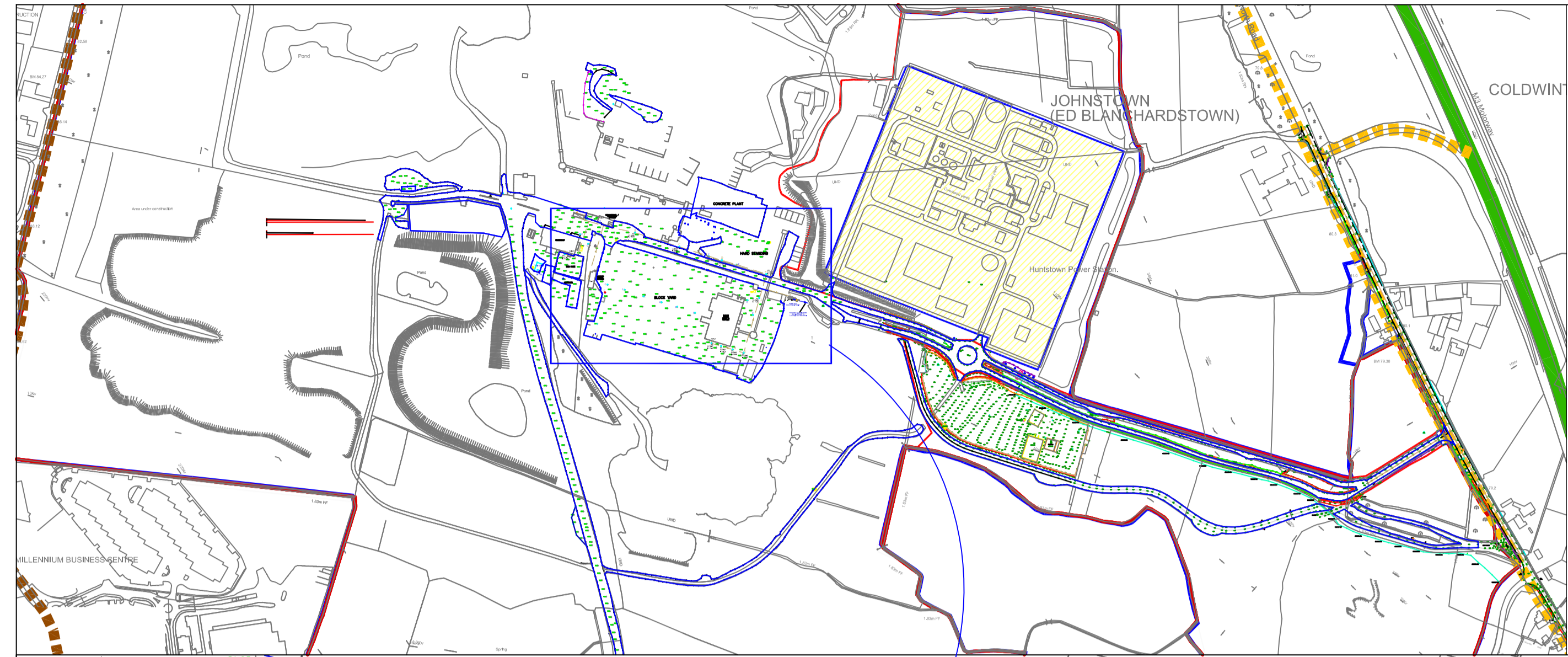
The existing on-site wastewater treatment plant (OSWWTP) at Huntstown services the existing shared toilet facilities at the site. The OSWWTP is a Moving Bed Biological Reactor (MBBR) system which was installed by Anua (Bord Na Mona) in 2001.

Influent wastewater is initially settled in the primary settlement tank, the settled liquor then passes through to the aeration tank where the effective treatment of the media occurs. From the aeration tank, the effluent passes into the clarifier tank where the final stage of settlement occurs. The effluent enters the clarifier tank through a stilling well which slows the velocity and allows any remaining fine solids to settle out; remaining sludge in the clarifier is returned to the primary settlement tank. The treated effluent from the clarifier goes through a final pump chamber from which it is discharged to a drainage ditch.

No percolation area is required for the MBBR OSWWTP. The water treatment system provides a sufficient level of treatment that it can be discharged directly to surface water. The discharge from the Huntstown OSWWTP goes directly to a small ditch, as indicated in the attached figure (Ref. AI-7-1). Proprietary details of the wastewater treatment system are also attached.

A sample was taken by Roadstone of the discharge from the OSWWTP (after the final pump chamber in the MBBR system) in July 2012. The sample was analysed at BHP laboratories and a copy of the results are included under cover of this attachment. The quality of treated water from the MBBR was found to be good and compliant with the treatment standards with respect to TSS and BOD.

Roadstone Wood has an annual maintenance agreement in place with Anua (Bord na Mona) for the OSWWTP.



NOTES

- EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NOS. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A & 3130-B
- ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000712 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

	ROADSTONE WOOD LTD. LANDHOLDING (c. 211 ha)
	HUNTSTOWN POWER STATION (NOT OWNED BY RWL)
	PLANNING APPLICATION AREA (c. 167.5 ha)
	EXISTING FOUL SEWER MANHOLE LOCATIONS
	EXISTING FOUL SEWER ROUTE
	EXISTING COMMUNICATIONS MANHOLE LOCATIONS

FOUL SEWER GRADIENT FALL

A - B = 1 : 0.014 fall (1.4%)
B - C = 1 : 0.008 fall (0.8%)
C - D = 1 : 0.0115 fall (1.15%)
D - E = 1 : 0.008 fall (0.8%)
E - K = 1 : 0.01 fall (1.0%)
F - G = 1 : 0.01 fall (1.0%)
G - H = 1 : 0.025 fall (2.5%)
H - I = 1 : 0.00 level (0.0%)
I - J = 1 : 0.016 fall (1.6%)
J - K = 1 : 0.005 fall (0.5%)

AVERAGE GRADIENT A - K 0.0103 (1.03%)

C.L. - Cover Level
I.L. - Invert Level

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ROADSTONE WOOD LTD.
HUNTSTOWN QUARRY
CONTINUANCE OF USE
PLANNING APPLICATION / E.I.S.
ADDITIONAL INFORMATION
EXISTING FOUL SEWER
DRAINAGE LAYOUT
FIGURE 7-1

Scale 1:500 @ A1 Date NOVEMBER 2012

D:\0180\00011\18 FIG 7.1 EXIST FOUL SEWER RD.dwg

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7th August 2012

Anua Job Reference Number: AR58

RE: Wastewater Treatment Plant installed at CRM Roadstone, Huntstown Quarry, North Road, Finglas, Co. Dublin

Dear Clive,

Following your recent enquiry in relation to the wastewater treatment plant installed at the above site, I wish to confirm the following:

The system currently installed is MBBR system, which can effectively treat effluent based on the following loadings, provided that the plant is properly operated and maintained in accordance with the Operation & Maintenance Manual and that the plant is not over loaded organically or hydraulically.

Treated Effluent Component	Limit
BOD	25 mg/l
TSS	35 mg/l

The above treatment standards can be achieved provided that the following parameters are not exceeded:

Maximum Daily Design Loadings	
Total Organic Loading	2.40 kg BOD/day
Total Hydraulic Loading	7.20 m ³ /day
Maximum Population Equivalent	40 P.E.

We advise that the plant be inspected/serviced at least once a year, to ensure the continued high treatment performance of the treatment plant.

If you require any further information, please do not hesitate to contact us.

Regards,



Brian Mahon
Customer Service Manager,
Anua – Bord na Mona with Nature.

MBBR

Wastewater Treatment for the Commercial Market



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Technology That Serves Customers and the Environment

Anua means 'to renew'. It describes our renewed contract with nature and our renewed focus on the development of innovative environmental solutions. We continue to develop and produce the sustainable technologies that our customers demand. Anua is part of Bord na Móna, a highly successful organisation and Ireland's leading resources company for over 75 years, which has a unique heritage and understanding of the natural environment. Bord na Móna has used its expert insights into natural processes, allied to its excellent in-house research facilities, to develop sustainable solutions across a wide range of environmental challenges – wastewater treatment, odour abatement, land reclamation, power generation, resource recovery and renewable energy. This is both Anua's history and our mission for the future.

Our customers range from homeowners to major commercial, municipal and utility clients, united in seeking cost-effective solutions based on environmentally sound principles. Anua exists to serve both our customers and the natural environment. Across a broad range of sectors in countries around the world, our customers trust us to deliver the best sustainable solutions, backed by superior customer service. That is why we work with our clients throughout every project to achieve the best possible result, one that will build both our reputations.

Anua enjoys the benefit of the support of a highly respected parent company with over 20 years experience in developing sustainable clean air and clean water solutions. As part of this wider organisation, we adhere to their world-class standards and values for both the technology we provide and the service we give our customers.

Complete Solutions

We don't just sell technologies. With our extensive laboratories and Innovation Centres located in Europe and the USA, we understand new challenges, pioneer research and create new processes. We work with you to create the systems you require, ensure correct installation and offer the full services of our nationwide network of support agents and technicians. From pre-planning to installation, service and maintenance, as well as the offer of monitoring and laboratory services, Anua stands by its technology and its customers.

Customised for Customers

Customers need a partner – and products – they can trust. Like nature itself, Anua must be adaptable and responsive to change. That means developing the solutions that best suit each individual project.

For Anua staff, understanding their customers' world is their business. That depth of understanding is matched by the depth of our customer support and focus. We work with clients to design solutions that are technically superior and cost-effective. We're with you every step of the way.



The Environmental Advantages of MBBR

- High quality of effluent treatment
- Substantial further reductions in phosphorous and nitrates available
- Below ground installation for minimal visual impact

The MBBR Advantages for You

- Robust treatment plant with concrete tanks
- Simplicity of design, installation and operation
- Suitable for a broad range of applications
- Minimal civil work required
- Alarm system included as standard
- On-site training provided
- Aeration stage: self-cleaning media
- Small footprint

The MBBR System At Work

If you require a sewage treatment system or need to upgrade your existing septic tank/sewage treatment plant, then Anua's MBBR (Moving Bed Biological Reactor) achieves high quality effluent with a reduced overall footprint.

1. Initial settlement of wastewater and separation of gross solids occurs in the primary settlement tank. Gross solids form a sludge in the bottom of the tank. Lighter social debris forms a crust on the surface. The settled liquor between the sludge and crust passes forward through an outlet filter into the Aeration Zone (MBBR).
2. The Moving Bed Biological Reactor (MBBR) employs submerged media onto which micro-organisms attach. This biomass requires oxygen to flourish, which is supplied by aerating the liquid in the chamber. The biomass on the media provides effective treatment for effluent. The media are kept in motion by the coarse bubble aeration. The air introduced into the tank ensures thorough mixing and turnover of the media within the reactor.

3. The effluent passes forward for the final stage of settlement and enters the final settlement tank through a stilling well. This slows the velocity of the effluent and allows any remaining fine solids to settle.

The base of the tank is coned, allowing final settlement of the effluent to take place with minimal disturbance to any settled particles. The return sludge pump is located at the base of the tank and any remaining fine solids are returned via a sludge return line to the primary settlement tank.

4. The treated effluent emerges from the system through the outlet for disposal.

The MBBR Treatment system utilises a high performance treatment process to achieve a 20:30 standard (mg/l BOD:mg/l TSS).

Diagram Index

1	Inlet	6	Return Sludge Pump
2	Primary Settlement	7	Outlet
3	Effluent Filter	8	Blower
4	Aeration Zone	9	Control Panel
5	Secondary Settlement Zone		



The above illustration is a typical MBBR System installation layout

The MBBR treatment process can be provided for new sewage treatment works or for retrofitting or upgrading existing wastewater treatment plants where a higher treated effluent standard is required.

In addition to the high quality effluent treatment offered by Anua's MBBR system, you can add extra filtration processes to achieve even greater refined levels of effluent treatment.

P-Removal (optional)

As part of Anua's standard P-Removal (removal of phosphorous) system, the following are included:

- Flow proportional dosing (maximises effectiveness of chemical)
- Outdoor bunded kiosk supplied (for health and safety and environmental protection)
- First fill of chemical included

De-Nitrification (optional)

16 hours of storage is designed into the MBBR treatment plant as part of the optional de-nitrification process, ensuring consistent performance and enhanced storage in the event of a power cut or equipment failure.

Tertiary Treatment

You can further enhance the treated effluent quality with a Puraflo tertiary treatment option. Anua's Puraflo system can be added to a MBBR treatment plant as part of a new treatment system or retrofitted to an existing treatment plant where a higher level quality is required for discharge.



Meeting the Highest Standards

Anua is committed to meeting and surpassing the highest quality standards required for each of its products. That's why you will always see national and/or international standards, accreditations for all Anua products.

Free pre-planning and site reports

Free no obligation quotations

Nationwide maintenance call-out service

Expert customer support

The Anua Guarantee

Every MBBR System comes with a 12-month parts and labour warranty, but Anua's commitment to you goes far beyond this.

We have a national network of approved agents and installers, who will provide you with:

Free Pre-Planning and Site Reports

Free No Obligation Quotations

Expert Customer Support

Nationwide Maintenance Call-out Service

For further information, go to www.anua.co.uk or www.anuaenv.ie

Complementary Products for the MBBR System

- Pump Stations
- Nutrient Removal
- Telemetry
- Instrumentation

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Renew	Recover	Re-direct	Recycle	Rarefy	Retain
Wastewater Treatment	Rainwater Harvesting	Pumps	SUDS	Odour Abatement	Holding Tanks

In keeping with company policy of continuing research and development and in order to offer our clients the most advanced products, Anua reserves the right to alter specifications and drawings without prior notice.



Paper made from trees matured in sustainable, well managed forests and is certified to FSC standards

TEST REPORT

Analysing
Testing
Consulting
Calibrating



**Client: Roadstone Wood Ltd
Huntstown Quarry
Finglas
Dublin 11**

**BHP Ref. No.: 105035
Order No.:
Date Received: 18/07/12
Date Completed: 24/07/12
Test Specification: Nil
Item :See below**

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Fax + 353 61 455447
E Mail bhpцем2@bhp.ie

FTAO: Colin Doyle

Test	Client Reference	Units	Results	Standard Reference
Total Suspended Solids	Water Monitoring at Huntstown Effluent Treatment Discharge	mg/l	6	APHA - 2540 -D
pH		-	7.42	APHA-4500-H ⁺ -B
Ammonia (as NH ₃ -N)		mg/l	<0.01	APHA -4500- NH ₃ -D
Temperature		°C	10.5	APHA - 2550 - B
Dissolved Oxygen		% O ₂ sat	89.6	APHA - 4500-O-G
C.O.D		mg/l	11	APHA - 5220 - D
Mineral Oils		mg/l	<0.01	GC-FID
Detergents (as MBAS)		mg/l	0.079	APHA - 5540 - C
Ammonium (as NH ₄ -N)		mg/l	<0.01	APHA -4500- NH ₃ -D
OrthoPhosphate (PO ₄ as P)		mg/l	0.23	APHA - 4500 - P-E
Sulphate (as SO ₄)		mg/l	20.4	APHA - 4110 - B
B.O.D		mg/l	2	APHA - 5210 - B

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Additional information : All methods are from Standard Methods for the Examination of Water and Wastewater 20th Edition.

For and on behalf of BHP laboratories :

**Pat O'Sullivan
Issue Date : 24/07/2012**

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.