

## Attachment H6: Hydrogeology

Chapter 11 of the EIS discusses the hydrogeology of the site, potential impacts and mitigation measures.

Included in this attachment is the EPA site characterisation form and design details of the proposed proprietary treatment system for the treatment of domestic wastewater.

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# SITE CHARACTERISATION FORM (2004)

To avoid any accidental damage, a trial hole assessment or percolation tests should not be undertaken in areas, which are at or adjacent to significant sites (e.g. NHAs, SACs, SPAs, and/or Archaeological etc.), without prior advice from Duchas, the Heritage Service or other relevant bodies.

## 1.0 GENERAL DETAILS (From planning application)

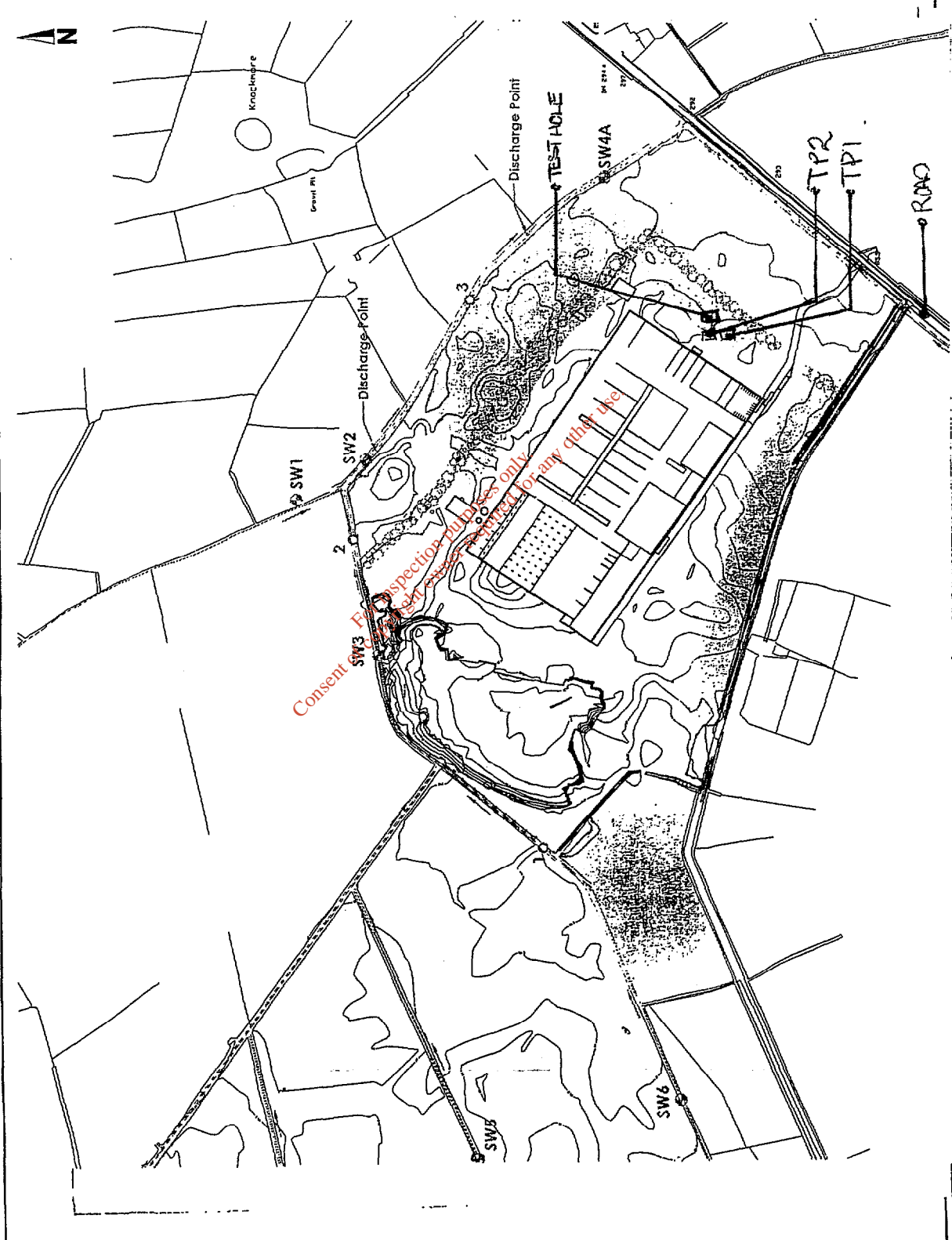
NAME & ADDRESS OF APPLICANT:		THORNTONS RECYCLING, KILLEN ROAD,			
THORNTONS RECYCLING		DUBLIN 10			
SITE LOCATION AND TOWNLAND:		KILBRIOR / FENNISCOFFEY, CO. WESTMEATH			
TELEPHONE NO:		FAX NO:		E-MAIL:	
MAXIMUM NO. OF RESIDENTS:	10-15 (MON-FRI: 9-5)	NO. OF DOUBLE BEDROOMS:	N/A	NO. OF SINGLE BEDROOMS:	N/A
PROPOSED WATER SUPPLY: (tick as appropriate)	mains N/A	private well/borehole <input checked="" type="checkbox"/>	group well/borehole N/A		

## 2.0 DESK STUDY

Soil type	Gley	Other (specify)	AQUIFER CATEGORY	Regionally Important	Locally Important	Poor
	OTHER	SOIL & PEAT COMPLEXES		NA	L1/Lg	NA
Is there a Groundwater Protection Scheme (Y/N):	NO	Groundwater Protection Response: R1/R2 <sup>1</sup> , R2 <sup>2</sup> , R2 <sup>3</sup> , R2 <sup>4</sup> , R3 <sup>1</sup> , R3 <sup>2</sup>			R2 <sup>1</sup>	
Presence of significant sites (archaeological, natural & historical):	NO					
Past experience in the area:	NONE					
<b>Comments:</b> (Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, and/or any potential site restrictions).						
<ul style="list-style-type: none"> <li>THE SURFACE PEAT LAYER IS NOT RELEVANT TO THE DEVELOPMENT — A THIN SURFACE LAYER.</li> <li>L1 CLASSIFICATION = BEDROCK AQUIFER. Lg = (ASSUMED) LOCALLY IMPORTANT GRAVEL AQUIFER</li> <li>THE P-TEST &amp; WATER TREATMENT WILL OCCUR IN A SATURATED GRAVEL LAYER (AQUIFER) ABOVE CONFINING TILL LAYER. EXTREME VULNERABILITY RELATES TO THE GRAVEL AQUIFER, NOT THE BEDROCK AQUIFER.</li> </ul>						

Sketch of site showing measurement to Trial Hole location and Percolation Test Hole locations, wells and direction of groundwater flow (if known), proposed house (incl. distances from boundaries) adjacent houses, watercourses, significant sites and other relevant features. North point should always be included.

[A copy of the site layout drawing should be used if available]



### 3.0 ON-SITE ASSESSMENT

#### 3.1 Visual Assessment

LANDSCAPE POSITION:		SLOPE:	STEEP (>1:5)	SHALLOW (1:5-1:20)	RELATIVELY FLAT (<1:20)
<b>SURFACE FEATURES</b>					
HOUSES:	> 500 M AWAY				
SITE BOUNDARIES:	> 3 M AWAY				
ROADS:	> 4 M AWAY				
EXISTING LAND USE:	TILLAGE (BARLEY LAST SEASON); FALLOW (THIS SEASON)				
OUTCROPS (ROCK AND/OR SUBSOIL):	NONE VISIBLE				
SURFACE WATER/PONDING:	NONE				
LAKES:	NONE				
BEACHES/SHELLFISH AREAS/WETLANDS:	NONE				
KARST FEATURES:	NONE				
WATERCOURSE/STREAM:	DITCHES / STREAM PRESENT - H <sub>2</sub> O LEVEL 2 M BELOW GROUND (FIELD) LEVEL				
DRAINAGE DITCHES*:	ABOVE				
WELLS*:	NONE				
SPRINGS*:	NONE				
TYPE OF VEGETATION:	TILLAGE; FALLOW GRASSLAND WITH SOME THISTLE; TREES & HEDGEROW AT BOUNDARY				
GROUND CONDITION:	DRY				
<b>COMMENTS:</b> (Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, the suitability of the site to treat the wastewater and the location of the proposed system within the site).					
* note water level					

### 3.2 Trial Hole

The Trial Hole should be a minimum of 2.1 m deep

Depth of trial hole (m):	2.2 m	Date and time of excavation:	21/06/24	Date and time of examination:	23/06/24
Depth from ground surface to bedrock (m) (if present):	NOT DETERMINED				
Depth from ground surface to water table (m) (if present):	1.9 m				
	Soil/Subsoil Texture & Classification**	Soil Structure	Density/ Compactness	Colour ***	Preferential flowpaths
0.1 m	SOFT FINE PEAT	STRUCTURELESS SUBANGULAR- PARTICLES		BROWN	
0.2 m					
0.3 m	SANDY / CLAY			LIGHT GREY	
0.4 m					
0.5 m					
0.6 m					
0.7 m	SANDY GRAVEL TILL	OCCASIONAL ROUNDED PEBBLES, SHARP-ANGULAR PARTICLES. BLOCKY	MEDIUM	DARK BLUE / GREY.	NO FLOW PATHS. H2O INGRESS FROM BASE TO A LEVEL OF 1.9 m bgl (1.9 m BELOW GROUND LEVEL)
0.8 m					
0.9 m					
1.0 m					
1.1 m					
1.2 m					
1.3 m					
1.4 m					
1.5 m					
1.6 m					
1.7 m	DENSE SANDY GRAVEL WITH LARGE ROUNDED COBBLES PRESENT. STRUCTURELESS WITH SHARP-ANGULAR PARTICLES				
1.8 m					
1.9 m					
2.0 m					
2.1 m					
2.2 m					
2.3 m					
2.4 m					
2.5 m					
<b>Other information (where relevant)</b>					
Depth of water ingress:	1.9 m bgl	Rock type (if present):	LIMESTONE GRAVEL (TILL)	Plasticity and dilatancy results:	N/A
Likely T value:					
<b>EVALUATION:</b>					

\*\* See Table 5 for examples

\*\*\* All signs of mottling should be recorded

**3.3 (a) Percolation ("T") Test for Deep Subsoils and/or Water Table**  
 (i.e. where subsoil and/or water table is  $\geq 2$  m from the ground surface)

Percolation Test Hole				1	2		
Depth from ground surface to top of hole (mm) (A)				900	800		
Depth from ground surface to base of hole (mm) (B)				1300	1300		
Depth of hole (mm) [B- A]				400	400		
Dimensions of hole [length x breadth (mm)]				300 x 300	300 x 300		
Each hole must be pre-soaked twice before the test is carried out (from 10.00 am to 5.00 pm and from 5.00 pm to next morning)							
Date of test				23/06/04	23/06/04		
Date pre-soaking started				21/06/04	21/06/04		
Time filled to 400 mm							
Time water level at 300 mm							
Percolation Test Hole No.	1			2			
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	$\Delta t$ (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	$\Delta t$ (min)	
1			11:0			9:0	
2			16:0			11:0	
3			18:0			18:0	
Average $\Delta t$			15.3	Average $\Delta t$			11.3
Average $\Delta t/4 =$ [Hole No.1] <u>3.8</u> ( $t_1$ )				Average $\Delta t/4 =$ [Hole No.2] <u>2.8</u> ( $t_2$ )			
T value* = $(t_1 + t_2)/2 =$ <u>3.3</u> (min/25 mm)							
Result of Test : T = <u>3.3</u>							
COMMENTS: T = 3.3 $\Rightarrow \geq 1; \leq 50$ $\therefore$ <u>PASS</u>							

\* If get two very different T test results and where one of these values falls then a third test should be carried out to determine the representivity of each of the results.

#### 4.0 CONCLUSION of SITE CHARACTERISATION:

(Integrate the information from the desk study and on-site assessment (i.e. visual assessment, trial hole and percolation tests) above and conclude the type of system(s) that is (are) appropriate. This information is also used to choose the optimum final disposal route of the treated wastewater).

**Suitable for** (delete as appropriate)\*\*\*\*:

(a) septic tank and soil percolation system polishing and polishing unit

(b) septic tank and intermittent filter system and unit; or septic tank and constructed wetlands

(c) mechanical aeration system and polishing unit

\*\*\*\*note: more than one option may be suitable for a site and this should be recorded

and

**SUITABLE / UNSUITABLE** (delete as appropriate) for discharge to **surface water**<sup>1</sup>

**SUITABLE / UNSUITABLE** (delete as appropriate) for discharge to **groundwater**

#### 5.0 RECOMMENDATION:

Propose to install: PURAFLO PEAT FILTER SYSTEM FROM BORO NA MÓNA  
and discharge to surface water/groundwater (delete as appropriate)

Conditions (if any) e.g. special works, invert level of trench etc.

ALTHOUGH THE PERCOLATION TESTS INDICATE THAT THE SITE IS SUITABLE FOR (a) ABOVE; SEPTIC TANK & PERCOLATION SYSTEM A SITE SPECIFIC SYSTEM WAS OBTAINED FROM BORO NA MÓNA ON THE REQUEST OF THORNTON'S RECYCLING.

Signed: [Signature]

Address: ENVIROS CONSULTING SERVICES

Qualifications/Experience: M.Sc.; BA (mod)

Date of Report: 25/06/04

Phone: 01 8131025

Fax: 01 8904221

e-mail: declan@enviros.com

<sup>1</sup> A discharge of sewage effluent to "waters" (definition includes any or any part of any river, stream, lake, canal, reservoir, aquifer, pond, watercourse or other inland waters, whether natural or artificial) will require a licence under the Water Pollution Acts 1977-90

# BORD NA MÓNA

BORD NA MÓNA ENVIRONMENTAL LIMITED

Mr Declan Duff  
Enviros Consulting Ltd  
Unit 4  
The Plaza  
Swords  
Co Dublin

29<sup>th</sup> July 2004

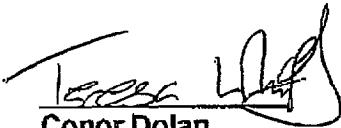
Re: Quotation No 33266

Dear Customer

Thank you for your enquiry regarding the Puraflo Peat Filter System from Bord na Móna.  
Enclosed please find the following.

1. Site specific report
2. Puraflo Peat Filter System Quotation, Terms & Conditions
3. Puraflo Single House Service Agreement

Yours sincerely



**Conor Dolan**  
**MANAGER**  
**Domestic Wastewater Treatment**

MAIN STREET, NEWBRIDGE, CO. KILDARE, IRELAND.  
TELEPHONE: (045) 431201. INT: +353-45-431201. FAX: (045) 432312. INT: +353-45-432312.

REGISTERED OFFICE: MAIN STREET, NEWBRIDGE, CO. KILDARE.  
REGISTERED IN IRELAND NUMBER: 303313



29<sup>th</sup> July 2004

**Re; Proposed 2 modular Puraflo wastewater treatment system at Enniscoffey, Co Westmeath for Thornton's Recycling Depot.**

Based on the site information you supplied, I would make the following recommendations:

With regard to the proposed extension to the premises, and as per details given to us by Enviro Consulting Ltd, it is estimated that the expected usage of the facilities is approximately 15 people during normal working hours. Basing this on the EPA recommendations, it is further estimated that the development will generate a total hydraulic loading of 0.450m<sup>3</sup>/day. As a safety measure I recommend we install a two modular Puraflo to cater for same. The maximum recommendation in section 3.2 of our Irish Agreement certificate 99\0060 is a hydraulic loading of 240lt/m<sup>2</sup>/d. The additional surface area can act as a safety net in periods of greater hydraulic loading. Given the intermittent usage from the proposed development, peat filtration is ideal in these circumstances.

From the site details given it is noted that the watertable was recorded at a 1.9 metre depth below ground level. The soil profile consisted of 300mm of peat with 100mm of sandy/clay with a sandy gravel till below this level. T tests conducted on site yielded a T value of 3.3 mins/25mm. It is therefore recommended that a 2 modular Puraflo treatment system be installed on site. The existing subsoil is sufficient to act as a polishing filter. The polishing filter will be above ground level. Criteria for polishing filters given in section 4.11.1 of the EPA's wastewater treatment manual "Treatment systems for single houses" is a application rate of 20 l/m<sup>2</sup>. The polishing filter material will need to be free draining unsaturated subsoil with a minimum depth of 600mm. The dimensions of the polishing filter will be 10m x 6m x 600mm deep, with at least 250mm above ground level. Underlain the polishing filter will be 48 linear metres of percolation drains.

The applicant should engage in extensive planting regime, which will absorb any residue containments onsite. The percolation drains would be directed towards this planting regime.

The level of treatment is attained prior to the effluent weeping into the prepared area is as stated in the table below:

PARAMETER	INFIDENT	EFFLUENT	% REDUCTION
B.O.D. (mg/l)	296	Less than 15	96 +
T.S.S. (mg/l)	195	Less than 15	95 +
NH <sub>3</sub> -N (mg/l)	47	Less than 5	90 +
Tot. Coliforms*	2.8 x 10 <sup>6</sup>	3.3 x 10 <sup>2</sup>	99.9 +
<i>E. coli</i> **	1.1 x 10 <sup>6</sup>	1.8 x 10 <sup>2</sup>	99.9 +
Pathogenic Bacteria**	Present	Absent	-

\* CFU's per 100ml

\*\* Including *Salmonella*, *Staphylococcus* and *Shigella* species, *Pseudomonas aeruginosa* and Sulphide reducing *Clostridia*.

**This significantly reduces the risk to public health and the environment.**

As per EPA, GSI and D.E.L.G recommendations, the site itself is noted as being within the "high aquifer vulnerability section". The appropriate response to this level of vulnerability requires the following :

" Acceptable subject to normal good practices .Where domestic water supplies are located nearby , particular attention should be given to the depth of subsoil over bedrock such that the minimum depth requires ( EPA 2000) are met and that the likelihood of microbial pollution is minimized"

Cont.

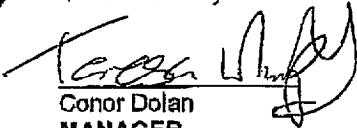
Research studies from Ireland and USA where up to 99.9% reduction of faecal coliforms are consistently achieved, prove that Puraflo ensures that almost total elimination from treated wastewater of faecal coliforms and pathogenic organisms. As a result, the Puraflo is now recognised by most Local Authorities as the only system meeting strict requirements for the removal of pathogenic organisms for use in areas where the groundwater is at risk.

I have also enclosed a copy of our System Inspection Agreement which will ensure that a 15 BOD/15 SS standard is maintained from the treatment system. In accordance with the Groundwater Protection recommendations, Bord na Mona can offer the client a long-term maintenance contract (10 years) if required.

I am satisfied that the treatment and disposal method being utilised will work satisfactorily on this site.

If you require any additional information or clarification on the attached please do not hesitate to contact me.

Yours sincerely



Conor Dolan  
MANAGER

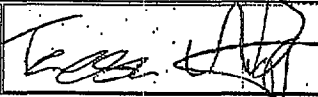
Domestic Wastewater Treatment Systems

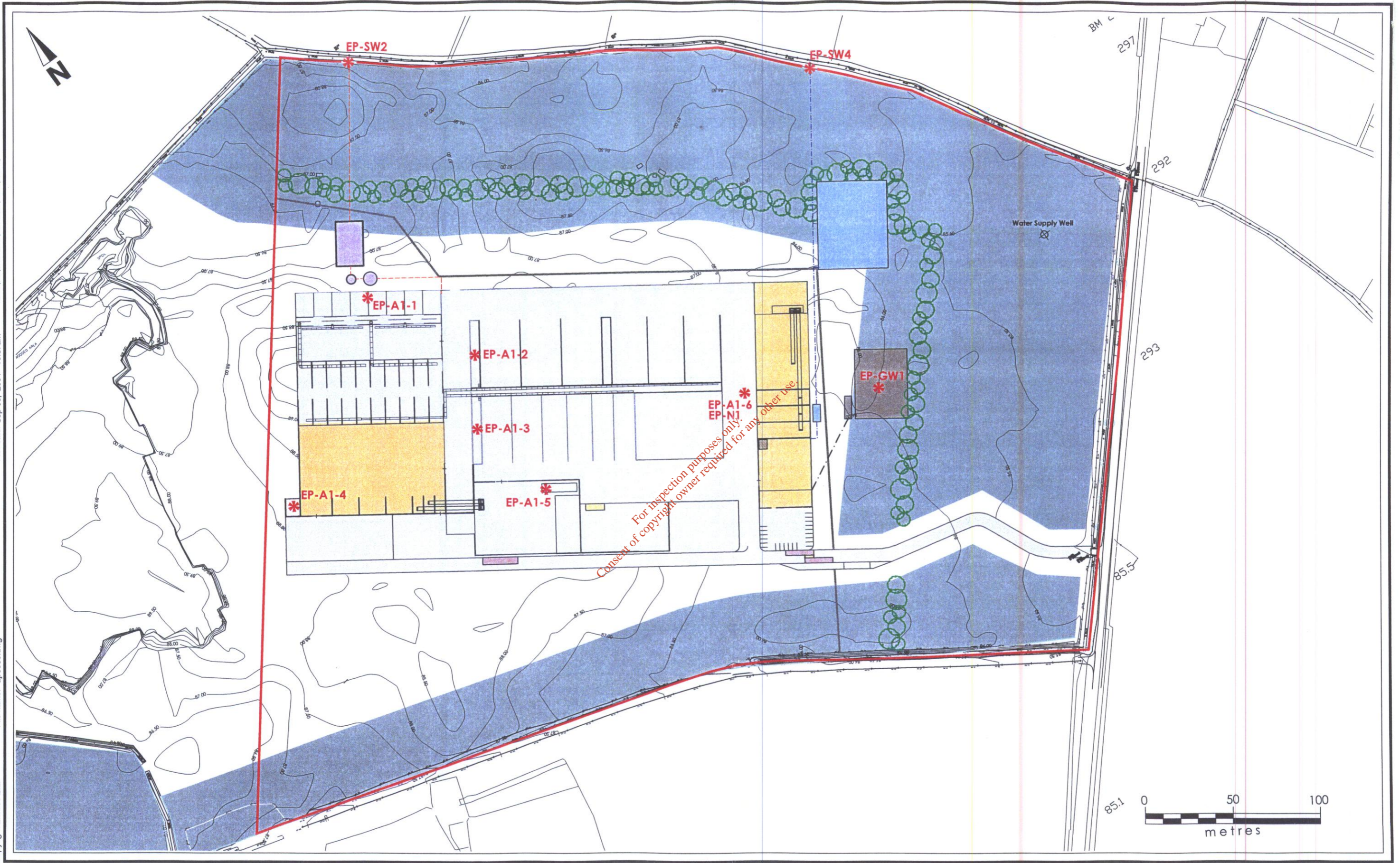
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# BORD NA MÓNA

BORD NA MÓNA ENVIRONMENTAL LIMITED

## PURAFLO PEAT FILTER SYSTEM QUOTATION

DATE	29 <sup>th</sup> July 2004	QUOTE NO.	33266
SITE OWNER SITE ADDRESS PHONE	Thorntons Recycling Depot Enniscoffey Co Westmeath	REFERENCE	Dejan Duff Enviros Consulting Ltd, Unit 4
SCOPE OF SUPPLY	<p><i>Bord na Mona Environmental Ltd will deliver to site, install and commission the Puraflo Peat Filter System consisting of:</i>                  2 Puraflo Modules, Concrete Pumping Chamber, Electrical Control Panel, 40mm PE Pipe, 110mm uPVC Sewer, Pipe from Septic Tank onwards</p> <p><i>Provision of the following is the responsibility of the customer:</i>                  Septic Tank – SR6 Compliant (with T pieces, down legs and baffle wall), JCB and Driver, Electrical cable from house to control panel at septic tank, Electrician to complete electrical connection, a quantity of 1" – 2" clean broken stone (depending on percolation requirements); All site re-instatements.</p>		
EXTRAS (if any)			
PRICE	<p>€ 3,947.14 + vat @ 13.5% = € 4,480</p> <ul style="list-style-type: none"> <li>• 30% Order Deposit to be paid when order is placed = € 1,344</li> <li>• Balance to be paid on day of installation = € 3,136</li> <li>• Additional charges may be incurred by the customer for any delays that result in the installer having to make subsequent visits to the site to complete the installation. Please see Conditions of Sale for full details.</li> </ul> <p><b>FINAL PRICE OF SYSTEM IS SUBJECT TO SITE VISIT</b></p>		
<p>When returning your signed quotation to Bord na Mona Environmental Ltd, please ensure the following items are included:</p> <ul style="list-style-type: none"> <li>• Copy of your Site Map and Planning Conditions as approved by the County Council</li> <li>• Soil T / P Value (percolation test results)</li> <li>• Order Deposit Cheque</li> </ul> <p>Please return the signed quotation along with the items listed above to:                  Puraflo Co-ordinator, Bord na Mona Environmental Ltd, Newbridge, Co. Kildare</p> <p>Tel: 1850 361136 / 045 431201, Fax: 045 432312, E-Mail: <a href="mailto:ed.info@bnm.ie">ed.info@bnm.ie</a>, Website: <a href="http://www.bnm.ie">www.bnm.ie</a></p>			
TO BE COMPLETED BY INVOICEE <small>(Please use block capitals)</small>	NAME:	ADDRESS:	COMPANY: (if applicable)
		PHONE:	TITLE: (if applicable)
SIGNED (Customer)		DATE	
SIGNED (For Bord na Mona Environmental Ltd)		DATE	
<p>I have read, understand and accept the above quotation &amp; General Conditions of Sale attached. This form when signed by both parties constitutes a binding contract. Please retain a copy showing both signatures for your reference.</p>			



**Thorntons** recycling  
**ATTACHMENT H**  
 EMISSION POINTS

KEY:  
 \* Emission Points