West Offaly Power

Phased Transition to Biomass

Surface Water Drainage Design

Prepared by

Bord na Móna

Civil Engineering Office

DOCUMENT CONTROL SHEET

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1. Introduction

As part of the planning application for the proposed phased transition to biomass at West Offaly Power Station, it is proposed to provide two concrete slabs for the temporary storage of biomass such as woodchip. One of the proposed concrete slabs is located adjacent to the eastern entrance to the station referred to as Biomass Storage Slab B. The other slab is located immediately south of the existing Intermediate Peat Storage building and is referred to as Biomass Storage Slab A. As these storage slabs will be open to the elements, surface water runoff will be generated and this report sets out the proposals for collecting and discharging this surface water runoff.

2. Biomass Storage Slab A

This storage slab is accessed from the existing roundabout located at the eastern entrance to the West Offaly Power station. This is the entrance currently used for all peat deliveries by road and it is proposed to continue to use this entrance for all peat and biomass road deliveries under this planning application. The proposed slab is located to the south of the existing intermediate peat storage building. The area where the slab is to be located is currently a gravel hardstanding area.

The proposed storage area will be a reinforced concrete slab with an overall area of 3,924 square metres which includes turning areas and the entrance area. It is proposed to construct a pellet silo and a pellet intake building on the western boundary of the slab.

3. Biomass Storage Slab B

This storage slab is accessed from the existing roundabout located at the eastern entrance to the West Offaly Power station. The proposed slab is located north-west of an existing building currently used for storage of materials. The area where the slab is to be located is currently a gravel hardstanding area with some vegetation and small trees in the southern area of the site.

The proposed storage area will be a reinforced concrete slab with an overall area of 6,330 square metres which includes turning areas and the entrance area.

4. General Drainage Proposals

The biomass material to be stockpiled on the concrete slabs will consist of chipped pulp wood, imported woodchip and possibly other sustainable biomass materials such as sustainable and certified palm kernel shells. There will be no runoff or leachate from the biomass material deposited on the concrete slab other than that from rainfall that may fall on the slab and the biomass stockpile. It is envisaged that some of this rainfall will be absorbed by the biomass however in the run-off calculation this has not been taken into account. All surface water runoff from the biomass storage slabs shall discharge into the existing surface water drainage network for the power station, following primary treatment and attenuation. Surface water discharges from the power station will be subject to an Industrial Emissions

licence from the Environmental Protection Agency and regular monitoring of these discharges will be carried out to ensure compliance with this licence.

Due to the elevation of Slab B it will be necessary to pump the runoff from the slab via a rising main to an existing manhole within the station, which is located adjacent to the existing Lab and Office. Prior to being pumped, the surface water shall be attenuated and shall have discharged through silt traps, a settlement tank and an oil interceptor to reduce suspended solids and BOD levels. No pumping station is required for Slab A.

Details of the drainage layout plan are included in Appendix A. The pipe network has been designed using the Modified Rational Method. The design criteria for the pipe network is based on the provision of self-cleansing velocities between 0.75m/s and 3m/s and no surcharge in manholes for a storm event of 1 in 5 year return period.

Slab A has been designed so that surface water flows towards the centre of the slab into two concrete channels. The channels will be approximately 0.50 m deep and will discharge into an ACO drain situated along the eastern boundary of the slab. It is proposed that the ACO drain will be 0.30 m wide and 0.39 m deep. The ACO drain will then route flows through the primary treatment and attenuation systems. To prevent standing water on the concrete slab, a high point is provided along the centre of the slab and along the perimeter walls with a minimum crossfall of 1.5% to the concrete channel. A minimum longitudinal fall in an easterly direction along the channel of 1.0% will be provided. Regular cleaning of the channel shall be carried out to remove any biomass material that may have entered the channel.

Due to the existing elevations at the Slab B site the proposed pumping station will be located at the south west corner of the slab. The slab is designed with a 350mm wide x 250mm deep channel along all slab edges other than at the entrance road area where a normal 125mm kerb will be provided. A reinforced concrete upstand of 225mm is provided to the channel to ensure all run off is retained as shown in Figure 1 below. To prevent standing water on the concrete slab, a high point is provided along the centre of the slab with a minimum crossfall of 1.5% to the edge channel. A longitudinal fall of minimum 1% is provided in the drainage channel.

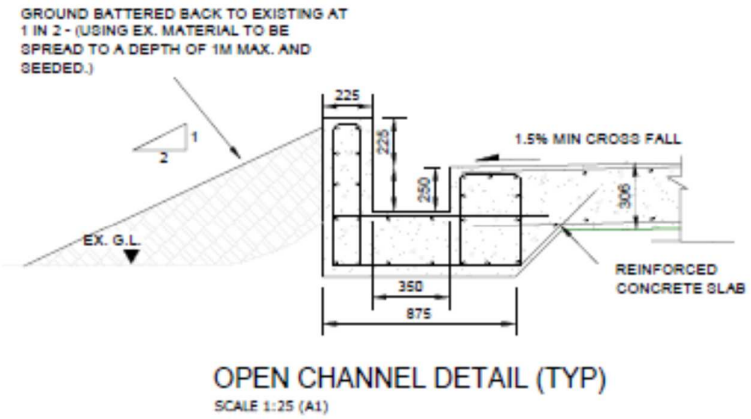

Figure 1: Typical Detail of edge drainage Channel – Slab B

The edge channels shall discharge into silt traps with internal dimensions of 2000mm x 1500mm to ensure settlement of sediment. Regular cleaning of the channel and silt traps shall be carried out to remove any biomass material that may have entered the channel.

Runoff on both slabs will then be diverted into a large settlement tank with internal dimensions of circa 8000mm x 2000mm. The settlement tank shall have baffle walls and screens to remove any floating sediment and a silt retention capacity of 15 cubic metres. Typical details of the proposed silt trap and settlement tank are included in the planning drawings.

Following on from the settlement tank, the surface water runoff shall discharge into a Full Retention Oil Interceptor Class 1 which is designed to achieve a concentration of less than 5mg/l of oil under standard test conditions. These interceptors are sized based on the area of the biomass slabs and Klargestor NSFA 080 for Slab A and Klargestor NSFA 125 for Slab B, or similar approved, are proposed. The interceptor will also provide additional silt storage capacity and in the case of the Klargestor NSFA 080 silt storage capacity of 8 cubic metres is provided while the NSFA 125 provides 12.5 cubic metres. Details of the oil interceptors are included in Appendix B as typical examples of the size and type of oil interceptor that will be required.

5. Surface Water Attenuation

All surface water from the biomass slabs shall be attenuated to limit the discharge from the slabs to greenfield run-off rate of 6.495 litres/sec/hectare. This can be achieved through the use of a flow control device or similar means to limit the flow discharging from the slab to greenfield rates. A flow control device such as a Hydro-brake or similar approved consists of a self –activating vortex flow control device that can be installed in the manhole upstream of the pumping station. This device will be sized

to restrict flow into the existing surface water network for Slab A and the pumping station for Slab B to the greenfield flow rates that would be generated from the slab areas. An overflow pipe shall be provided from this manhole into a storage area, or attenuation area, to accommodate storage of surface water in excess of green field flow during storm events. This stored volume will be slowly discharged over a period of time after the storm event. Alternatively, for Slab B, rather than using a flow control device, the proposed pump controls can be used to limit the discharge to green field run-off flows. The method used to limit the flow can be determined at detailed design stage.

The attenuation areas have been sized to accommodate the surface water that would be generated on the slabs during a 30 year return period storm event. Additional storage has also been provided on the slab itself and in the edge channel and this volume combined with the attenuation storage volume, will provide adequate storage capacity for a 1 in 100 year return period storm event. The design calculations, including the rainfall matrix, used to size the attenuation storage requirement are attached in Appendix C. An additional allowance of 10% is added to the rainfall matrix to take account of future climate change. These calculations are based on the Greater Dublin Strategic Drainage Study, Regional Drainage Policies – Volume 2. This appendix also includes a sketch showing the area of Slab B that is used as attenuation for 30 to 100 year return period storm events.

Details of a typical attenuation storage system, Tubosider, is attached in Appendix D.

6. Surface Water Quality

The biomass supply to the power station will be on a just in time or JIT basis and generally lorries will deposit their biomass load directly into the lorry tipplers where it will be transported by conveyor into the existing Intermediate Peat Storage building and subsequently into the boiler. The biomass slabs will be used for short term storage of biomass only, to ensure adequate fuel for holiday periods, to accommodate unscheduled loads, to provide a buffer supply in the event of a weather forecast that may prevent road deliveries or to allow lorries to unload in the event of a problem with the tippler. It is envisaged that biomass material will be retained on the slabs for a short period of time with the deliveries operated on a first-in, first-out basis and the material will be removed within days rather than weeks. The proposed biomass material shall be organic in nature with a moisture content in the range of 20% to 65% and will be in dry form when deposited on the slabs. As the material will be stored for a short time there will be very minimal, if any, decomposition or degradation of the stockpiled material.

In dry weather there will be no runoff generated on the biomass slabs, however during rainfall events, surface water will be generated from rainfall on the slabs and the biomass stockpile. The biomass will be stockpiled in such a manner so as to ensure rainwater will run off the side of the stockpiles rather than pond on the top of the stockpile. The cross fall of the concrete slabs will also reduce standing water on the slabs. It is inevitable that some rain will penetrate the stockpile however, and while some of this will be absorbed by the biomass material, the runoff may accumulate some suspended solids and organic material. The primary settlement measures outlined above combined with restricted flow and

surface water attenuation as well as dilution with the surface water run-off from other paved areas in the power station will ensure that the runoff from the slabs will not impact on the surface water emission limits at the station. These emission limits will be determined and monitored by the Industrial Emissions licence for the power station from the Environmental Protection Agency.

7. Conclusion

All surface water discharges from the site will be subject to an EPA licencing regime. It is envisaged that any potential impacts from the additional surface water runoff due to the proposed biomass slabs will be mitigated by the provision of primary treatment and attenuation as described in this report.

Appendix A

Biomass Storage Slabs
Drawings of Proposed Drainage Network

NOTES:

1. THIS DRAWING IS FOR PLANNING APPLICATION PURPOSES ONLY.

2. DRAWING NOT TO BE SCALED. FIGURED DIMENSIONS ONLY TO BE USED.

3. ALL LEVELS TO MALIN HEAD METRES ABOVE DATUM

NOTE:
PLANS AND LAYOUT DRAWINGS SHOW PRINCIPLE FEATURES AND STRUCTURES OF THE SITE. AS WITH ALL INDUSTRIAL SITES, ON-GOING OPERATIONS AND MAINTENANCE OCCASIONALLY NECESSITATE THE TEMPORARY USE OF MODULAR UNITS SUCH AS PORTACABINS FOR WELFARE FACILITIES, STORAGE ETC. THEIR USE IS TYPICALLY SHORT-TERM, RELATED TO PARTICULAR ACTIVITIES AND DOES NOT CHANGE THE NATURE OR INTENSITY OF ACTIVITIES ON THE SITE.

LEGEND

PLANNING APPLICATION BOUNDARY:

EXISTING GROUND LEVEL (MOD): + 44.50

PROPOSED GROUND LEVEL (MOD): + 44.50

EXISTING SURFACE WATER PIPE AND MANHOLE:

PROPOSED SURFACE WATER PIPE AND MANHOLE:

PROPOSED SILT TRAP

PROPOSED GULLY G

PROPOSED SURFACE WATER ATTENUATION SYSTEM:

EXISTING WATER MAIN

PROPOSED WATER MAIN

PROPOSED FIRE HYDRANT HY

PROPOSED FIRE CABINET FC

PROPOSED RISING MAIN

EXISTING SERVICES TO BE REMOVED

KEY PLAN:

OSI MAP NO: OY013-10

REV	DATE	REVISION DESCRIPTION	ESBI DRN	ESBI VER	ESBI APP	BnM DRN	BnM VER	BnM APP
0	18.10.18	ISSUED FOR PLANNING		H.O'K	PK	DK	PN	BH

PURPOSE OF ISSUE - PRELIMINARY UNLESS INDICATED

CLIENT APPROVAL ☐ PLANNING ☒ TENDER ☐ CONSTRUCTION ☐ AS-BUILT ☐

CLIENT: ESB

PROJECT: WEST OFFALY POWER TRANSITION TO BIOMASS

ENGINEER DESIGN: ESB INTERNATIONAL — One Dublin Airport Central, Dublin Airport, Cloghran, Co. Dublin. Tel: 353 1 703 8000 Email: marketing@esbi.ie Web: www.esbinternational.ie. ESB International is a trading name of ESBI Engineering & Facility Management Ltd. Registered Office: as above. Registered in Ireland No. 155249

ENGINEER DESIGN: BORD NA MÓNA Naturally Driven — Engineering Department, Leabeg, Tullamore, Co. Offaly Tel: 057 9345900

CONTRACT: WOP - TRANSITION TO BIOMASS

DRAWING TITLE: BIOMASS STORAGE SLAB B
PROPOSED DRAINAGE LAYOUT PLAN

PRODUCTION UNIT: CIVIL & ENVIRONMENTAL ENGINEERING

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DRAWN	VERIFIED	APPROVED	APPROVAL DATE
DK	HO'K	PK	18.10.18

CLIENT REF	NO. OF SHTS	SIZE	SCALE
	1	A1	1:500

DRAWING NUMBER: QS-000206-01-D460-035

REV: 0

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PROPOSED SILT TRAP
PROPOSED GULLY: G
PROPOSED SURFACE WATER ATTENUATION SYSTEM:
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PROPOSED WATER MAIN
PROPOSED FIRE HYDRANT: HY
PROPOSED FIRE CABINET: FC
PROPOSED RISING MAIN
EXISTING SERVICES TO BE REMOVED

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REFERENCE: OSI MAP NO: OY013-10

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ENGINEER DESIGN: BORD NA MÓNA Naturally Driven
Engineering Department,
Leabeg, Tullamore, Co. Offaly Tel: 057 9345900

CONTRACT: WOP - TRANSITION TO BIOMASS

DRAWING TITLE: BIOMASS STORAGE SLAB A
PROPOSED DRAINAGE LAYOUT PLAN

PRODUCTION UNIT: CIVIL & ENVIRONMENTAL ENGINEERING

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GR	RMcG	DC	18.10.18

CLIENT REF	NO. OF SHTS	SIZE	SCALE
	1	A1	1:500

DRAWING NUMBER: QS-000206-01-D460-037
REV: 0

Appendix B

Biomass Storage Slabs
Typical Oil Interceptor Details

SEPARATORS

A RANGE OF FUEL/OIL SEPARATORS
FOR PEACE OF MIND

Kingspan

Klargester

60 YEARS OF
Expertise &
1955–2015 Innovation

Separators

A RANGE OF FUEL/OIL SEPARATORS FOR PEACE OF MIND

Surface water drains normally discharge to a watercourse or indirectly into underground waters (groundwater) via a soakaway. Contamination of surface water by oil, chemicals or suspended solids can cause these discharges to have a serious impact on the receiving water.

The Environment Regulators, Environment Agency, England and Wales, SEPA, Scottish Environmental Protection Agency in Scotland and Department of Environment & Heritage in Northern Ireland, have published guidance on surface water disposal, which offers a range of means of dealing with pollution both at source and at the point of discharge from site (so called 'end of pipe' treatment). These techniques are known as 'Sustainable Drainage Systems' (SuDS).

Where run-off is draining from relatively low risk areas such as car-parks and non-operational areas, a source control approach, such as permeable surfaces or infiltration trenches, may offer a suitable means of treatment, removing the need for a separator.

Oil separators are installed on surface water drainage systems to protect receiving waters from pollution by oil, which may be present due to minor leaks from vehicles and plant, from accidental spillage.

Effluent from industrial processes and vehicle washing should normally be discharged to the foul sewer (subject to the approval of the sewerage undertaker) for further treatment at a municipal treatment works.

SEPARATOR STANDARDS AND TYPES

A British (and European) standard (EN 858-1 and 858-2) for the design and use of prefabricated oil separators has been adopted. New prefabricated separators should comply with the standard.

SEPARATOR CLASSES

The standard refers to two 'classes' of separator, based on performance under standard test conditions.

CLASS I

Designed to achieve a concentration of less than 5mg/l of oil under standard test conditions, should be used when the separator is required to remove very small oil droplets.

CLASS II

Designed to achieve a concentration of less than 100mg/l oil under standard test conditions and are suitable for dealing with discharges where a lower quality requirement applies (for example where the effluent passes to foul sewer).

Both classes can be produced as full retention separators. The oil concentration limits of 5 mg/l and 100 mg/l are only applicable under standard test conditions. It should not be expected that separators will comply with these limits when operating under field conditions.

FULL RETENTION SEPARATORS

Full retention separators treat the full flow that can be delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65mm/hr.

On large sites, some short term flooding may be an acceptable means of limiting the flow rate and hence the size of full retention systems.

BYPASS SEPARATORS

Bypass separators fully treat all flows generated by rainfall rates of up to 6.5mm/hr. This covers over 99% of all rainfall events. Flows above this rate are allowed to bypass the separator. These separators are used when it is considered an acceptable risk not to provide full treatment for high flows, for example where the risk of a large spillage and heavy rainfall occurring at the same time is small.

FORECOURT SEPARATORS

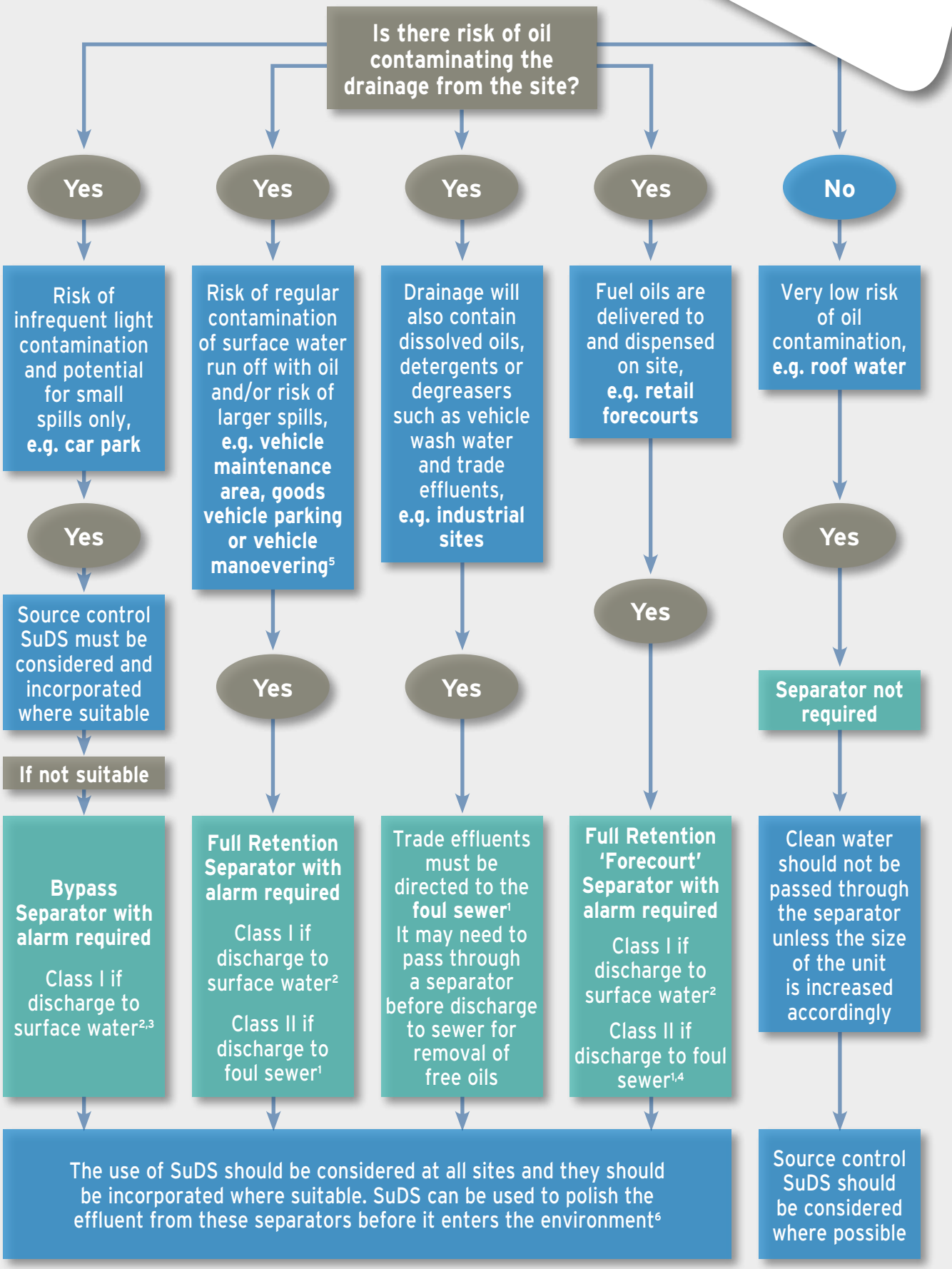
Forecourt separators are full retention separators specified to retain on site the maximum spillage likely to occur on a petrol filling station. They are required for both safety and environmental reasons and will treat spillages occurring during vehicle refuelling and road tanker delivery. The size of the separator is increased in order to retain the possible loss of the contents of one compartment of a road tanker, which may be up to 7,600 litres.

SELECTING THE RIGHT SEPARATOR

The chart on the following page gives guidance to aid selection of the appropriate type of fuel/oil separator for use in surface water drainage systems which discharge into rivers and soakaways.

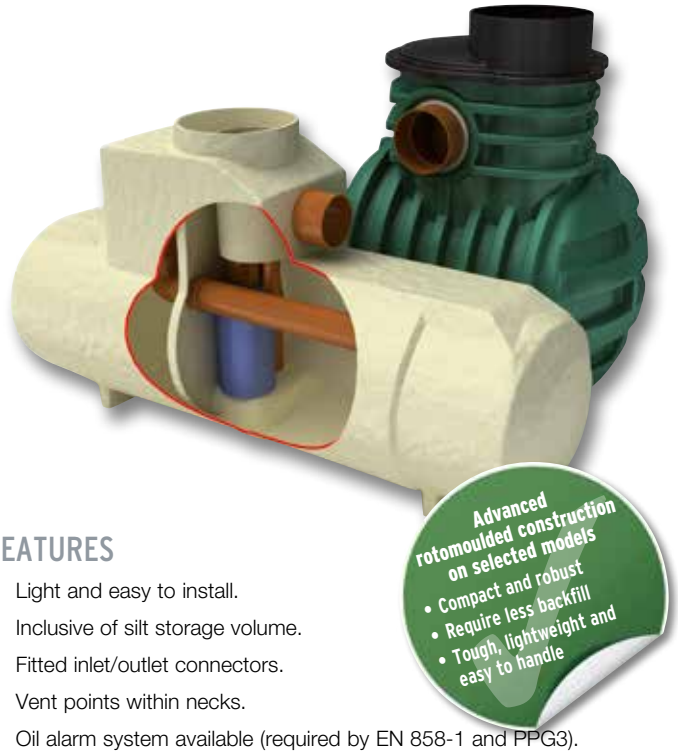
For further detailed information, please consult the Environment Agency Pollution Prevention Guideline 03 (PPG 3) 'Use and design of oil separators in surface water drainage systems' available from their website.

Kingspan Klargester has a specialist team who provide technical assistance in selecting the appropriate separator for your application.



1 You must seek prior permission from your local sewer provider before you decide which separator to install and before you make any discharge.
2 You must seek prior permission from the relevant environmental body before you decide which separator to install.
3 In this case, if it is considered that there is a low risk of pollution a source control SuDS scheme may be appropriate.
4 In certain circumstances, the sewer provider may require a Class 1 separator for discharges to sewer to prevent explosive atmospheres from being generated.
5 Drainage from higher risk areas such as vehicle maintenance yards and goods vehicle parking areas should be connected to foul sewer in preference to surface water.
6 In certain circumstances, a separator may be one of the devices used in the SuDS scheme. Ask us for advice.

Bypass NSB RANGE



APPLICATION

Bypass separators are used when it is considered an acceptable risk not to provide full treatment, for very high flows, and are used, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small, e.g.

- Surface car parks.
- Roadways.
- Lightly contaminated commercial areas.

PERFORMANCE

Klargester were one of the first UK manufacturers to have separators tested to EN 858-1. Klargester have now added the NSB bypass range to their portfolio of certified and tested models. The NSB number denotes the maximum flow at which the separator treats liquids. The British Standards Institute (BSI) tested the required range of Kingspan Klargester Bypass separators and certified their performance in relation to their flow and process performance assessing the effluent qualities to the requirements of EN 858-1. Klargester bypass separator designs follow the parameters determined during the testing of the required range of bypass separators.

Each bypass separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Oil storage volume.
- Silt storage capacity.
- Coalescer.

The unit is designed to treat 10% of peak flow. The calculated drainage areas served by each separator are indicated according to the formula given by PPG3 NSB = 0.0018A(m2). Flows generated by higher rainfall rates will pass through part of the separator and bypass the main separation chamber.

Class I separators are designed to achieve a concentration of 5mg/litre of oil under standard test conditions.

FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Oil alarm system available (required by EN 858-1 and PPG3).
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size bypass separator, the following information is needed:-

- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the flow is not pumped.
- The drain invert inlet depth.
- Pipework type, size and orientation.

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	PEAK FLOW RATE (l/s)	DRAINAGE AREA (m²)	STORAGE CAPACITY (litres) SILT	OIL	UNIT LENGTH (mm)	UNIT DIA. (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	STANDARD FALL ACROSS (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA.
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP004	4.5	45	2500	450	60	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5841	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

Rotomoulded chamber construction GRP chamber construction * Some units have more than one access shaft – diameter of largest shown.

Full Retention NSF RANGE

APPLICATION

Full retention separators are used in high risk spillage areas such as:

- Fuel distribution depots.
- Vehicle workshops.
- Scrap Yards

PERFORMANCE

Kingspan Klargester were the first UK manufacturer to have the required range (3-30 l/sec) certified to EN 858-1 in the UK. The NSF number denotes the flow at which the separator operates.

The British Standards Institute (BSI) have witnessed the performance tests of the required range of separators and have certified their performance, in relation to their flow and process performance to ensure that they met the effluent quality requirements of EN 858-1. Larger separator designs have been determined using the formulas extrapolated from the test range.

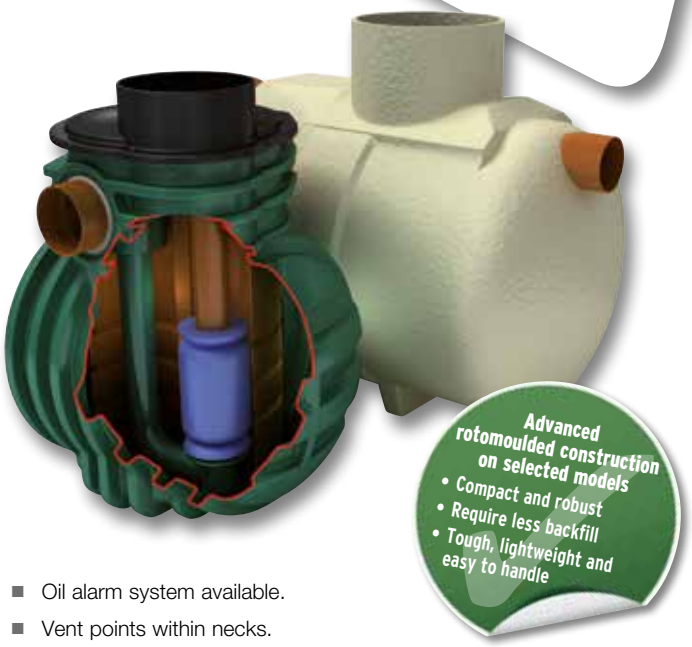
Each full retention separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Silt storage capacity.
- Automatic closure device.
- Oil storage volume.
- Coalescer (Class I units only).

Klargester full retention separators treat the whole of the specified flow.

FEATURES

- Light and easy to install.
- Class I and Class II designs.
- 3-30 l/sec range independently tested and performance sampled, certified by the BSI.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.



- Oil alarm system available.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size full retention separator, the following information is needed:-

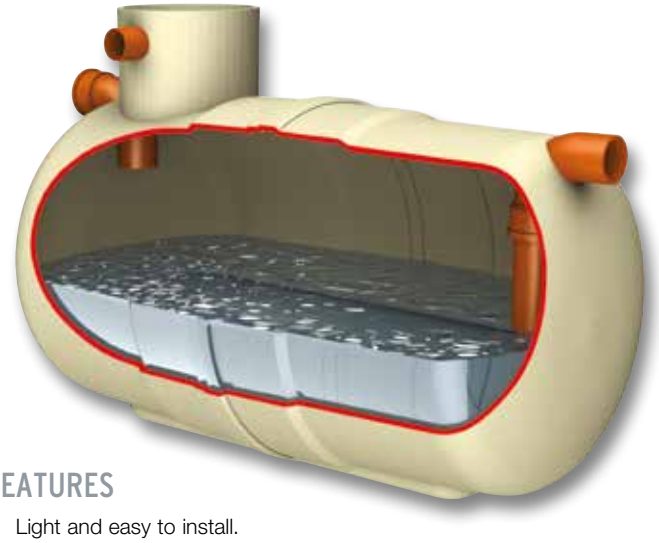
- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the influent is not pumped.
- The required discharge standard. This will decide whether a Class I or Class II unit is required.
- The drain invert inlet depth.
- Pipework type, size and orientation.

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	DRAINAGE AREA (m^2) PPG-3 (0.018)	STORAGE CAPACITY (litres) SILT	OIL	UNIT LENGTH (mm)	UNIT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	MIN. INLET INLET (mm)	STANDARD PIPEWORK DIA. (mm)
NSFP003	3	170	300	30	1700	1350	1420	1345	500	160
NSFP006	6	335	600	60	1700	1350	1420	1345	500	160
NSFA010	10	555	1000	100	2610	1225	1050	1000	500	200
NSFA015	15	835	1500	150	3910	1225	1050	1000	500	200
NSFA020	20	1115	2000	200	3200	2010	1810	1760	1000	315
NSFA030	30	1670	3000	300	3915	2010	1810	1760	1000	315
NSFA040	40	2225	4000	400	4640	2010	1810	1760	1000	315
NSFA050	50	2780	5000	500	5425	2010	1810	1760	1000	315
NSFA065	65	3610	6500	650	6850	2010	1810	1760	1000	315
NSFA080	80	4445	8000	800	5744	2820	2500	2450	1000	300
NSFA100	100	5560	10000	1000	6200	2820	2500	2450	1000	400
NSFA125	125	6945	12500	1250	7365	2820	2500	2450	1000	450
NSFA150	150	8335	15000	1500	8675	2820	2550	2450	1000	525
NSFA175	175	9725	17500	1750	9975	2820	2550	2450	1000	525
NSFA200	200	11110	20000	2000	11280	2820	2550	2450	1000	600

Rotomoulded chamber construction GRP chamber construction

Washdown & Silt



APPLICATION

This unit can be used in areas such as car wash and other cleaning facilities that discharge directly into a foul drain, which feeds to a municipal treatment facility.

If emulsifiers are present the discharge must not be allowed to enter an NS Class I or Class II unit.

- Car wash.
- Tool hire depots.
- Truck cleansing.
- Construction compounds cleansing points.

PERFORMANCE

Such wash down facilities must not be allowed to discharge directly into surface water but must be directed to a foul connection leading to a municipal treatment works as they utilise emulsifiers, soaps and detergents, which can dissolve and disperse the oils.

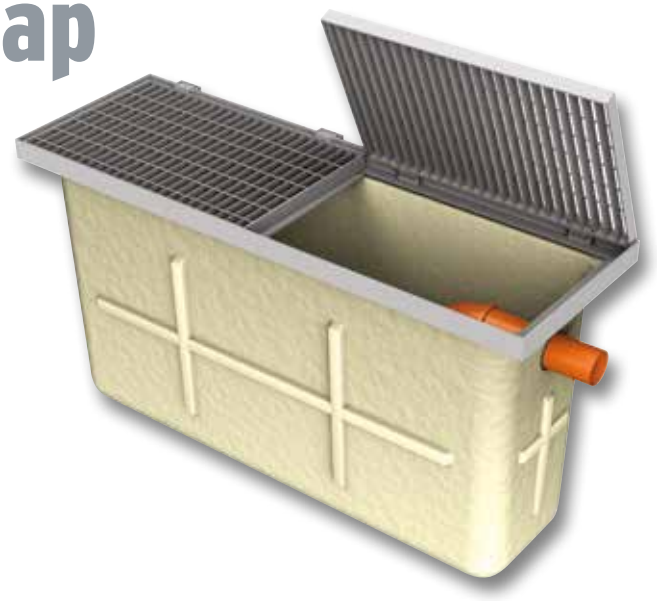
FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.

SIZES AND SPECIFICATIONS

REF.	TOTAL CAPACITY (litres)	MAX. REC. SILT	MAX. FLOW RATE (l/s)	LENGTH (mm)	DIAMETER (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT (mm)	STANDARD FALL ACROSS UNIT (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA. (mm)	APPROX EMPTY (kg)
W1/010	1000	500	3	1123	1225	460	1150	1100	50	500	160	60
W1/020	2000	1000	5	2074	1225	460	1150	1100	50	500	160	120
W1/030	3000	1500	8	2952	1225	460	1150	1100	50	500	160	150
W1/040	4000	2000	11	3898	1225	460	1150	1100	50	500	160	180
W1/060	6000	3000	16	4530	1440	600	1360	1310	50	500	160	320
W1/080	8000	4000	22	3200	2020	600	2005	1955	50	500	160	585
W1/100	10000	5000	27	3915	2020	600	2005	1955	50	500	160	680
W1/120	12000	6000	33	4640	2020	600	2005	1955	50	500	160	770
W1/150	15000	7500	41	5435	2075	600	1940	1890	50	500	160	965
W1/190	19000	9500	52	6865	2075	600	1940	1890	50	500	160	1200

Car Wash Silt Trap



APPLICATION

Car Wash silt trap is designed for use before a separator in car wash applications to ensure effective silt removal.

FEATURES

- FACTA Class B covers.
- Light and easy to install.
- Maintenance from ground level.

Forecourt

APPLICATION

The forecourt separator is designed for installation in petrol filling station forecourts and similar applications. The function of the separator is to intercept hydrocarbon pollutants such as petroleum and oil and prevent their entry to the drainage system, thus protecting the environment against hydrocarbon contaminated surface water run-off and gross spillage.

PERFORMANCE

Operation ensures that the flow cannot exit the unit without first passing through the coalescer assembly.

In normal operation, the forecourt separator has sufficient capacity to provide storage for separated pollutants within the main chamber, but is also able to contain up to 7,600 litres of pollutant arising from the spillage of a fuel delivery tanker compartment on the petrol forecourt. The separator has been designed to ensure that oil cannot exit the separator in the event of a major spillage, subsequently the separator should be emptied immediately.

FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- Class I and Class II design.
- Oil storage volume.
- Coalescer (Class I unit only).
- Automatic closure device.
- Oil alarm system available.

INSTALLATION

The unit should be installed on a suitable concrete base slab and surrounded with concrete or pea gravel backfill. See sales drawing for installation.

If the separator is to be installed within a trafficked area, then a suitable cover slab must be designed to ensure that loads are not transmitted to the unit.

The separator should be installed and vented in accordance with Health and Safety Guidance Note HS(G)41 for filling stations, subject to Local Authority requirements.

SIZES AND SPECIFICATIONS

ENVIROCEPTOR CLASS	TOTAL CAP. (litres)	DRAINAGE AREA (m^2)	MAX. FLOW RATE (l/s)	LENGTH (mm)	DIAMETER (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT (mm)	STD. FALL ACROSS UNIT (mm)	MIN. INLET INVERT (mm)	STD. PIPEWORK (mm)	EMPTY WEIGHT (kg)
I	10000	555	10	3963	1920	600	2110	2060	50	400	160	500
II	10000	555	10	3963	1920	600	2110	2060	50	400	160	500
I	10000	1110	20	3963	1920	600	2110	2060	50	400	200	500
II	10000	1110	20	3963	1920	600	2110	2060	50	400	200	500

Alarm Systems

British European Standard EN 858-1 and Environment Agency Pollution Prevention Guideline PPG3 requires that all separators are to be fitted with an oil level alarm system and that it should be installed and calibrated by a suitably qualified technician so that it will respond to an alarm condition when the separator requires emptying.

- Easily fitted to existing tanks.
- Excellent operational range.
- Visual and audible alarm.
- Additional telemetry option.

PROFESSIONAL INSTALLERS

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Issue No. 21: September 2015

Appendix C

Biomass Storage Slabs
Surface Water Attenuation Calculations

BORD NA MÓNA Naturally Driven	CALCULATION SHEET	Ref No.	PG-WOP-04-DD-01
Project	WOP Biomass - Biomass Storage Slab B	Sheet No.	1 of 4
		Designer.	D.K.
Element	Greenfield Runoff and Attenuation Calc.	Date	26/01/2018

Designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS)

Runoff Estimation

Q_{bar} = $0.00108*(AREA)^{0.89}*(SAAR)^{1.17}*(SOIL)^{2.17}$

SAAR = 902 Taken from Met Eireann 1981 - 2010 records

SOIL = 4 Soil type 4 Taken from the winter rain acceptance potential map

take 0.47

AREA $1km^2 = 100$ ha

$1 ha = 10,000m^2$

*Note: Q_{bar} formula only suitable for sites greater than / equal to 50 hectares

Total Site Area	0.632	Hectares	→ Hardstanding Area	0.632	Hectares
Take	50	Hectares	Roof Area	0.000	Hectares
	0.50	km^2	Landscaped Areas	0.000	Hectares
*Qbar	0.325	(m^3/s)			

Surface Water Storage

Refer to sample calculation attached

** Note min allowable runoff per site is 2 l/s/ha

*** Note Storage is the volume required to attenuate the surface water in excess of green field runoff.

Area Reference	Area	Calc. Allowable Runoff	Calc. Allowable Runoff	Calc. Allowable Runoff	**Actual Allowable runoff	Actual Allowable runoff
	(ha)	(m^3/s)	(l/s)	(l/s/ha)	(l/s/ha)	(l/s)
Development	0.63	0.00410	4.105	6.495	6.495	4.105

T	Multiplier	Flow
1	0.85	3.489
2	0.92	3.776
10	1.67	6.855
20	1.96	8.046
30	2.10	8.620
50	2.33	9.564
100	2.60	10.673

	Flow	Storage	Cumlative Storage
1 Yr Throttle	3.489	63	63
30 - 1Yr Throttle	5.131	123	185
100 - 30 Yr Throttle	2.052	66	252

****Note Multiplier taken from GDSDS Appendix C

Storage Required 252 m^3

BORD NA MÓNA Naturally Driven	CALCULATION SHEET	Ref No.	PG-WOP-04-DD-01
Project	WOP Biomass Storage Slab B	Sheet No.	2 of 4
		Designer.	D.K
Element	Greenfield Runoff and Attenuation Calc.	Date	26/01/2018

SURFACE WATER STORAGE : PIPE/TANK

Storm Return Period =	1	Years		
Total Site Area =	0.632	Hectares (ha)		
Existing Open Space =	0.632	ha		
Proposed Impermeable Area				
Roof Area =	0.00	ha	.....@	100%
Hard Standing /Road Area =	0.63	ha	.....@	80%
Vegetation =	0.00	ha	.....@	30%
Allowable Outflow =	3.49	Litres/sec/ha		

Rainfall Data Obtained from Met Eireann

1 hectare = 10,000m^2

Duration (min)	Rainfall (mm)	Climate Change 10%	Intensity (mm/hr)	Rainfall (m^3/ha)	Proposed Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Req'd (m^3)
1								
2			0.00	0	0	0	0	0
5			0.00	0	0	0	1	-1
10			0.00	0	0	0	1	-1
15	**7**	**7.15**	28.60	72	36	36	2	34
30	**8**	**9.02**	18.04	90	46	46	4	42
60	**11**	**11.55**	11.55	116	58	58	8	50
120	**13**	**14.63**	7.32	146	74	74	16	58
240	**17**	**18.70**	4.68	187	95	95	32	63
360	**20**	**21.45**	3.58	215	108	108	48	61
720	**25**	**27.28**	2.27	273	138	138	95	43
1440	**32**	**34.65**	1.44	347	175	175	191	-15
2880	**39**	**42.79**	0.89	428	216	216	381	-165

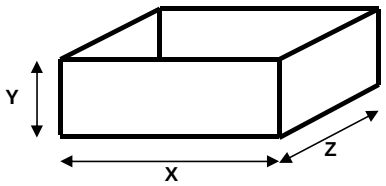
Minimum value of storage required = **63** **m^3** Including for 10% climate change

Oversized Pipe Requirements

Pipe dia. (mm)	Length (m)
600	222
900	99
1050	73
1200	56
1500	36

Tank Requirements

Width	**10.0**	**m**
Depth	**1.0**	**m**
Length	**6**	**m**



BORD NA MÓNA Naturally Driven	CALCULATION SHEET	Ref No.	PG-WOP-04-DD-01
Project	WOP Biomass Storage Slab B	Sheet No.	3 of 4
		Designer.	D.K
Element	Greenfield Runoff and Attenuation Calc.	Date	26/01/2018

SURFACE WATER STORAGE : PIPE/TANK

Storm Return Period =	30	Years		
Total Site Area =	0.632	Hectares (ha)		
Existing Open Space =	0.632	ha		
Proposed Impermeable Area				
Roof Area =	0.00	ha	.....@	100%
Hard Standing /Road Area =	0.63	ha	.....@	80%
Vegitation =	0.00	ha	.....@	30%
Allowable Outflow =	3.78	Litres/sec/ha		

Rainfall Data Obtained from Met Eireann

1 hectare = 10,000m^2

Duration (min)	Rainfall (mm)	Climate Change 10%	Intensity (mm/hr)	Rainfall (m^3/ha)	Proposed Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Req'd (m^3)
1								
2			0.00	0	0	0	0	0
5			0.00	0	0	0	1	-1
10			0.00	0	0	0	1	-1
15	**21**	**22.66**	90.64	227	115	115	2	112
30	**24**	**26.51**	53.02	265	134	134	4	130
60	**28**	**31.13**	31.13	311	157	157	9	149
120	**33**	**36.52**	18.26	365	185	185	17	167
240	**39**	**42.79**	10.70	428	216	216	34	182
360	**43**	**46.86**	7.81	469	237	237	52	185
720	**50**	**55.00**	4.58	550	278	278	103	175
1440	**59**	**64.46**	2.69	645	326	326	206	120
2880	**68**	**74.25**	1.55	743	375	375	412	-37

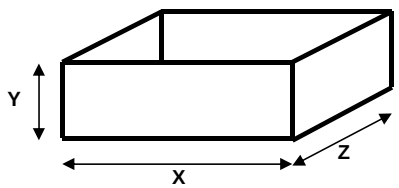
Minimum value of storage required = **185** m^3 Including for 10% climate change

Oversized Pipe Requirements

Pipe dia. (mm)	Length (m)
600	656
900	291
1050	214
1200	164
1500	105

Tank Requirements

Width	**10.0**	**m**
Depth	**1.0**	**m**
Length	**19**	**m**



BORD NA MÓNA Naturally Driven	CALCULATION SHEET	Ref No.	PG-WOP-04-DD-01
Project	WOP Biomass Storage Slab B	Sheet No.	4 of 4
		Designer.	D.K
Element	Greenfield Runoff and Attenuation Calc.	Date	26/01/2018

SURFACE WATER STORAGE : PIPE/TANK

Storm Return Period =	100	Years		
Total Site Area =	0.632	Hectares (ha)		
Existing Open Space =	0.632	ha		
Proposed Impermeable Area				
Roof Area =	0.00	ha	.....@	100%
Hard Standing /Road Area =	0.63	ha	.....@	80%
Vegitation =	0.00	ha	.....@	30%
Allowable Outflow =	3.78	Litres/sec/ha		

Rainfall Data Obtained from Met Eireann

1 hectare = 10,000m^2

Duration (min)	Rainfall (mm)	Climate Change 10%	Intensity (mm/hr)	Rainfall (m^3/ha)	Proposed Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Req'd (m^3)
1								
2			0.00	0	0	0	0	0
5			0.00	0	0	0	1	-1
10			0.00	0	0	0	1	-1
15	**30**	**32.56**	130.24	326	165	165	2	162
30	**34**	**37.18**	74.36	372	188	188	4	184
60	**39**	**42.46**	42.46	425	215	215	9	206
120	**44**	**48.51**	24.26	485	245	245	17	228
240	**50**	**55.44**	13.86	554	280	280	34	246
360	**55**	**59.95**	9.99	600	303	303	52	252
720	**62**	**68.53**	5.71	685	346	346	103	243
1440	**71**	**78.32**	3.26	783	396	396	206	190
2880	**80**	**88.22**	1.84	882	446	446	412	34

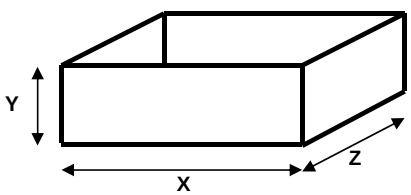
Minimum value of storage required = **252** **m^3** Including for 10% climate change

Oversized Pipe Requirements

Pipe dia. (mm)	Length (m)
600	890
900	395
1050	291
1200	222
1500	142

Tank Requirements

Width	**10.0**	**m**
Depth	**1.0**	**m**
Length	**25**	**m**



Blackwater Return Period Rainfall Matrix - Received from Met Eireann							
	Return Periods (years)						
Duration	**0.5**	**1**	**2**	**10**	**20**	**30**	**100**
15 min	4.4	6.5	7.6	14.6	18.2	20.6	29.6
30 min	5.8	8.2	9.6	17.5	21.5	24.1	33.8
60 min	7.6	10.5	12	21	25.4	28.3	38.6
120 min	9.9	13.3	15.1	25.3	30.1	33.2	44.1
240 min	12.9	17	19	30.3	35.5	38.9	50.4
360 min	15.1	19.5	21.8	33.8	39.2	42.6	54.5
12 hrs	19.7	24.8	27.3	40.5	46.3	50	62.3
24 hrs	25.7	31.5	34.4	48.7	54.8	58.6	71.2
48 hrs	32.4	38.9	42	57.2	63.6	67.5	80.2
96 hrs	43.4	50.9	54.4	71.4	78.3	82.5	96

BORD NA MÓNA Naturally Driven	CALCULATION SHEET	Ref No.	PG-WOP-04-DD-02
Project	WOP Biomass - Biomass Storage Slab A	Sheet No.	1 of 4
		Designer.	R.M.G
Element	Greenfield Runoff and Attenuation Calc.	Date	16/05/2018

Designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS)

Runoff Estimation

Q_{bar} = $0.00108*(AREA)^{0.89}*(SAAR)^{1.17}*(SOIL)^{2.17}$

SAAR = 902 Taken from Met Eireann 1981 - 2010 records

SOIL = 4 Soil type 4 Taken from the winter rain acceptance potential map

take 0.47

AREA $1km^2 = 100$ ha

$1 ha = 10,000m^2$

*Note: Q_{bar} formula only suitable for sites greater than / equal to 50 hectares

Total Site Area	0.425	Hectares	→	Hardstanding Area	0.425	Hectares
Take	50	Hectares		Roof Area	0.000	Hectares
	0.50	km^2		Landscaped Areas	0.000	Hectares
*Qbar	0.325	(m^3/s)				

Surface Water Storage

Refer to sample calculation attached

** Note min allowable runoff per site is 2 l/s/ha

*** Note Storage is the volume required to attenuate the surface water in excess of green field runoff.

Area Reference	Area	Calc. Allowable Runoff	Calc. Allowable Runoff	Calc. Allowable Runoff	**Actual Allowable runoff	Actual Allowable runoff
	(ha)	(m^3/s)	(l/s)	(l/s/ha)	(l/s/ha)	(l/s)
Development	0.43	0.00276	2.760	6.495	6.495	2.760

T	Multiplier	Flow
1	0.85	2.346
2	0.92	2.540
10	1.67	4.610
20	1.96	5.410
30	2.10	5.797
50	2.33	6.432
100	2.60	7.177

	Flow	Storage	Cumlative Storage
1 Yr Throttle	2.346	51	51
30 - 1Yr Throttle	3.450	89	140
100 - 30 Yr Throttle	1.380	46	186

****Note Multiplier taken from GDSDS Appendix C

Storage Required 186 m^3

BORD NA MÓNA Naturally Driven	CALCULATION SHEET	Ref No.	PG-WOP-04-DD-02
Project	WOP Biomass Storage Slab B	Sheet No.	2 of 4
		Designer.	R.M.G
Element	Greenfield Runoff and Attenuation Calc.	Date	16/05/2018

SURFACE WATER STORAGE : PIPE/TANK

Storm Return Period =	1	Years		
Total Site Area =	0.425	Hectares (ha)		
Existing Open Space =	0.425	ha		
Proposed Impermeable Area				
Roof Area =	0.00	ha	.....@	100%
Hard Standing /Road Area =	0.43	ha	.....@	80%
Vegetation =	0.00	ha	.....@	30%
Allowable Outflow =	2.35	Litres/sec/ha		

Rainfall Data Obtained from Met Eireann

1 hectare = 10,000m^2

Duration (min)	Rainfall (mm)	Climate Change 10%	Intensity (mm/hr)	Rainfall (m^3/ha)	Proposed Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Req'd (m^3)
1								
2			0.00	0	0	0	0	0
5			0.00	0	0	0	0	0
10			0.00	0	0	0	1	-1
15	**7**	**7.15**	28.60	72	24	24	1	23
30	**8**	**9.02**	18.04	90	31	31	2	29
60	**11**	**11.55**	11.55	116	39	39	4	36
120	**13**	**14.63**	7.32	146	50	50	7	43
240	**17**	**18.70**	4.68	187	64	64	14	49
360	**20**	**21.45**	3.58	215	73	73	22	51
720	**25**	**27.28**	2.27	273	93	93	43	50
1440	**32**	**34.65**	1.44	347	118	118	86	32
2880	**39**	**42.79**	0.89	428	145	145	172	-27

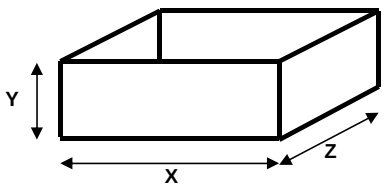
Minimum value of storage required = **51** m^3 Including for 10% climate change

Oversized Pipe Requirements

Pipe dia. (mm)	Length (m)
600	182
900	81
1050	59
1200	45
1500	29

Tank Requirements

Width	**10.0**	**m**
Depth	**1.0**	**m**
Length	**5**	**m**



BORD NA MÓNA Naturally Driven	CALCULATION SHEET	Ref No.	PG-WOP-04-DD-02
Project	WOP Biomass Storage Slab B	Sheet No.	3 of 4
		Designer.	R.M.G
Element	Greenfield Runoff and Attenuation Calc.	Date	16/05/2018

SURFACE WATER STORAGE : PIPE/TANK

Storm Return Period =	30	Years		
Total Site Area =	0.425	Hectares (ha)		
Existing Open Space =	0.425	ha		
Proposed Impermeable Area				
Roof Area =	0.00	ha	.....@	100%
Hard Standing /Road Area =	0.43	ha	.....@	80%
Vegitation =	0.00	ha	.....@	30%
Allowable Outflow =	2.54	Litres/sec/ha		

Rainfall Data Obtained from Met Eireann

1 hectare = 10,000m^2

Duration (min)	Rainfall (mm)	Climate Change 10%	Intensity (mm/hr)	Rainfall (m^3/ha)	Proposed Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Req'd (m^3)
1								
2			0.00	0	0	0	0	0
5			0.00	0	0	0	0	0
10			0.00	0	0	0	1	-1
15	**21**	**22.66**	90.64	227	77	77	1	76
30	**24**	**26.51**	53.02	265	90	90	2	88
60	**28**	**31.13**	31.13	311	106	106	4	102
120	**33**	**36.52**	18.26	365	124	124	8	116
240	**39**	**42.79**	10.70	428	145	145	16	130
360	**43**	**46.86**	7.81	469	159	159	23	136
720	**50**	**55.00**	4.58	550	187	187	47	140
1440	**59**	**64.46**	2.69	645	219	219	93	126
2880	**68**	**74.25**	1.55	743	252	252	187	66

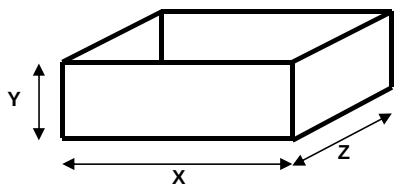
Minimum value of storage required = **140** m^3 Including for 10% climate change

Oversized Pipe Requirements

Pipe dia. (mm)	Length (m)
600	496
900	221
1050	162
1200	124
1500	79

Tank Requirements

Width	**10.0**	**m**
Depth	**1.0**	**m**
Length	**14**	**m**



BORD NA MÓNA Naturally Driven	CALCULATION SHEET	Ref No.	PG-WOP-04-DD-02
Project	WOP Biomass Storage Slab B	Sheet No.	4 of 4
		Designer.	R.M.G
Element	Greenfield Runoff and Attenuation Calc.	Date	16/05/2018

SURFACE WATER STORAGE : PIPE/TANK

Storm Return Period =	100	Years		
Total Site Area =	0.425	Hectares (ha)		
Existing Open Space =	0.425	ha		
Proposed Impermeable Area				
Roof Area =	0.00	ha	.....@	100%
Hard Standing /Road Area =	0.43	ha	.....@	80%
Vegitation =	0.00	ha	.....@	30%
Allowable Outflow =	2.54	Litres/sec/ha		

Rainfall Data Obtained from Met Eireann

1 hectare = 10,000m^2

Duration (min)	Rainfall (mm)	Climate Change 10%	Intensity (mm/hr)	Rainfall (m^3/ha)	Proposed Runoff (m^3)	Total Runoff (m^3)	Allowable Outflow (m^3)	Storage Req'd (m^3)
1								
2			0.00	0	0	0	0	0
5			0.00	0	0	0	0	0
10			0.00	0	0	0	1	-1
15	**30**	**32.56**	130.24	326	111	111	1	110
30	**34**	**37.18**	74.36	372	126	126	2	124
60	**39**	**42.46**	42.46	425	144	144	4	140
120	**44**	**48.51**	24.26	485	165	165	8	157
240	**50**	**55.44**	13.86	554	188	188	16	173
360	**55**	**59.95**	9.99	600	204	204	23	181
720	**62**	**68.53**	5.71	685	233	233	47	186
1440	**71**	**78.32**	3.26	783	266	266	93	173
2880	**80**	**88.22**	1.84	882	300	300	187	113

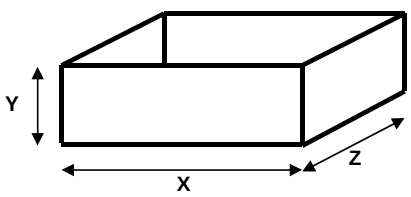
Minimum value of storage required = **186** **m^3** Including for 10% climate change

Oversized Pipe Requirements

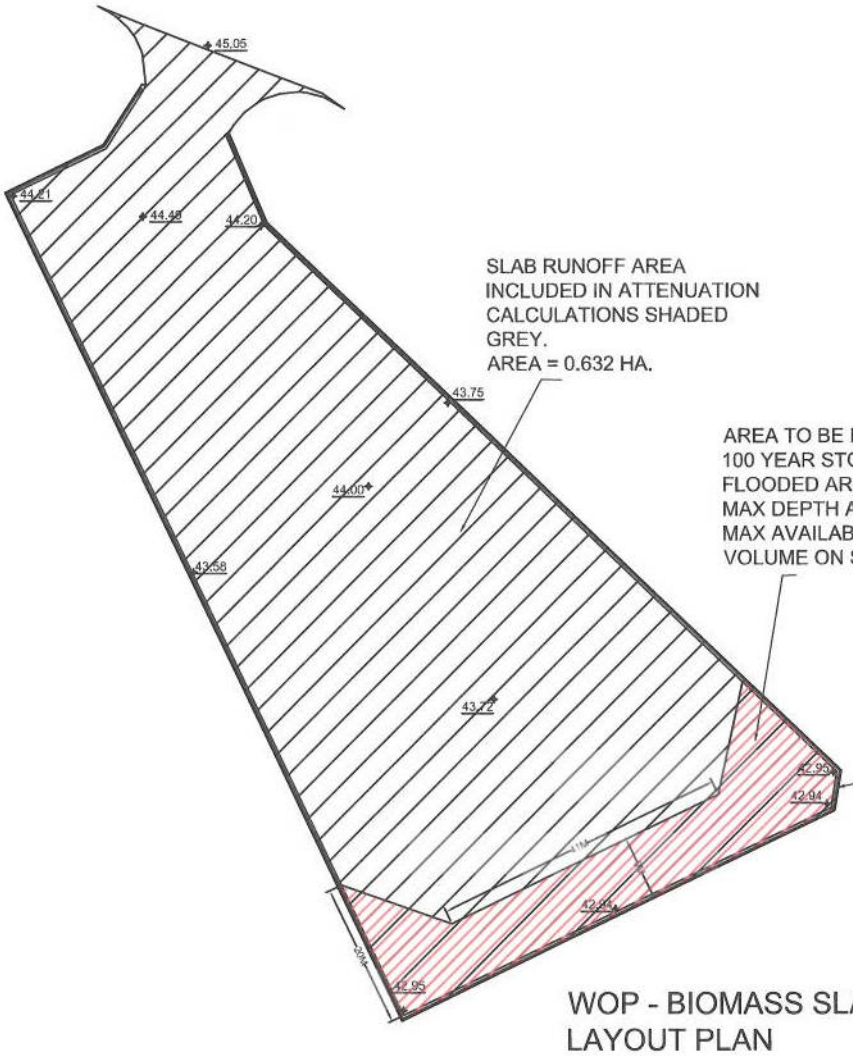
Pipe dia. (mm)	Length (m)
600	659
900	293
1050	215
1200	165
1500	105

Tank Requirements

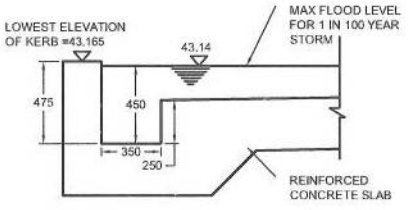
Width	**10.0**	**m**
Depth	**1.0**	**m**
Length	**19**	**m**



Blackwater Return Period Rainfall Matrix - Received from Met Eireann							
	Return Periods (years)						
Duration	**0.5**	**1**	**2**	**10**	**20**	**30**	**100**
15 min	4.4	6.5	7.6	14.6	18.2	20.6	29.6
30 min	5.8	8.2	9.6	17.5	21.5	24.1	33.8
60 min	7.6	10.5	12	21	25.4	28.3	38.6
120 min	9.9	13.3	15.1	25.3	30.1	33.2	44.1
240 min	12.9	17	19	30.3	35.5	38.9	50.4
360 min	15.1	19.5	21.8	33.8	39.2	42.6	54.5
12 hrs	19.7	24.8	27.3	40.5	46.3	50	62.3
24 hrs	25.7	31.5	34.4	48.7	54.8	58.6	71.2
48 hrs	32.4	38.9	42	57.2	63.6	67.5	80.2
96 hrs	43.4	50.9	54.4	71.4	78.3	82.5	96



WOP - BIOMASS SLAB B
LAYOUT PLAN



OPEN CHANNEL DETAIL (TYP)

WOP BIOMASS STORAGE SLAB B
DRAINAGE RUNOFF AREAS

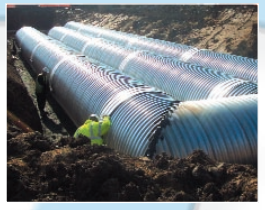
BORD NA MÓNA
Naturally Driven

Appendix D

Biomass Storage Slabs
Typical Attenuation Storage Details - Tubosider

STORMWATER ATTENUATION TANKS

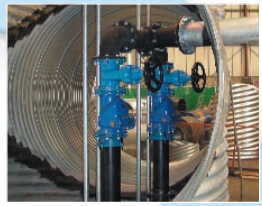
TUBOSIDER
GRUPPO RUSCALLA
UNITED KINGDOM LTD



INSTALLATION OF MULTI-LEG TANK

H125 PIPE COUPLING BAND

DESPATCH OF TRENCHCOATED TANK



PUMPS FITTED INTO TANK

INTRODUCTION

TUBOSIDER Stormwater Attenuation Tanks are fabricated from Helibore pipe which is a fully BBA Certified product.

TUBOSIDER tanks offer the most cost effective and flexible underground storage solution on the market.

TUBOSIDER have supplied, on average, over 100 tanks per year since 1987.

FEATUES & BENEFITS

- Concrete chambers or cellular type systems are limited by size and shape whereas **TUBOSIDER** fabricated tanks can be fabricated to an infinite variety of layouts using pipes from 0.3m diameter to 3.6m.
- **TUBOSIDER** tanks are accessible for routine inspection. This is now a fundamental requirement with many authorities and is impossible using “cellular” or “crate” systems.
- Load bearing strength. Designed structurally to Highways Agency Standard BD12, **TUBOSIDER** tanks will carry full motorway live loads if required.
- Fully pre-fabricated. Tanks include access shafts, ladders, inlet and outlet connections, all factory fabricated. There is no concrete work or fabrication work on-site. Tanks are assembled from components using standard gasketed joints. The fastest system there is to install.
- **TUBOSIDER** can supply and factory fit Flow Regulators to restrict discharge to the specified rate. This eliminates the need for expensive regulator chambers, which are required with “crate” type systems.
- **TUBOSIDER** gasketed joints are fully tested and WRc approved to “Sewers for Adoption” standards of watertightness.

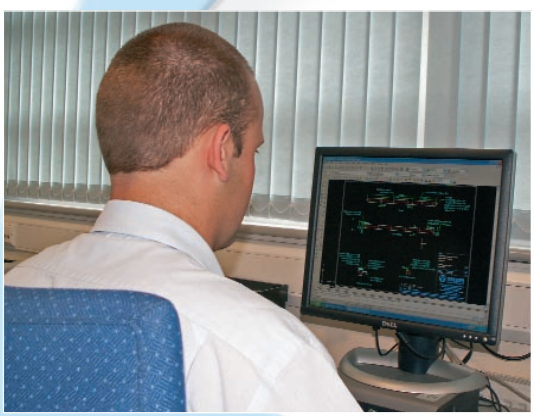
DESIGN

TUBOSIDER can assist at every stage of your attenuation project. Working from a capacity calculated by others we can develop a tank layout to fit the particular location or, given:-

- Return Period
- Permissible Discharge Rate
- Site Dimensions

We will provide free;

- Outline design and drawing
- Flow regulation requirement
- Installation instructions
- Cost estimate



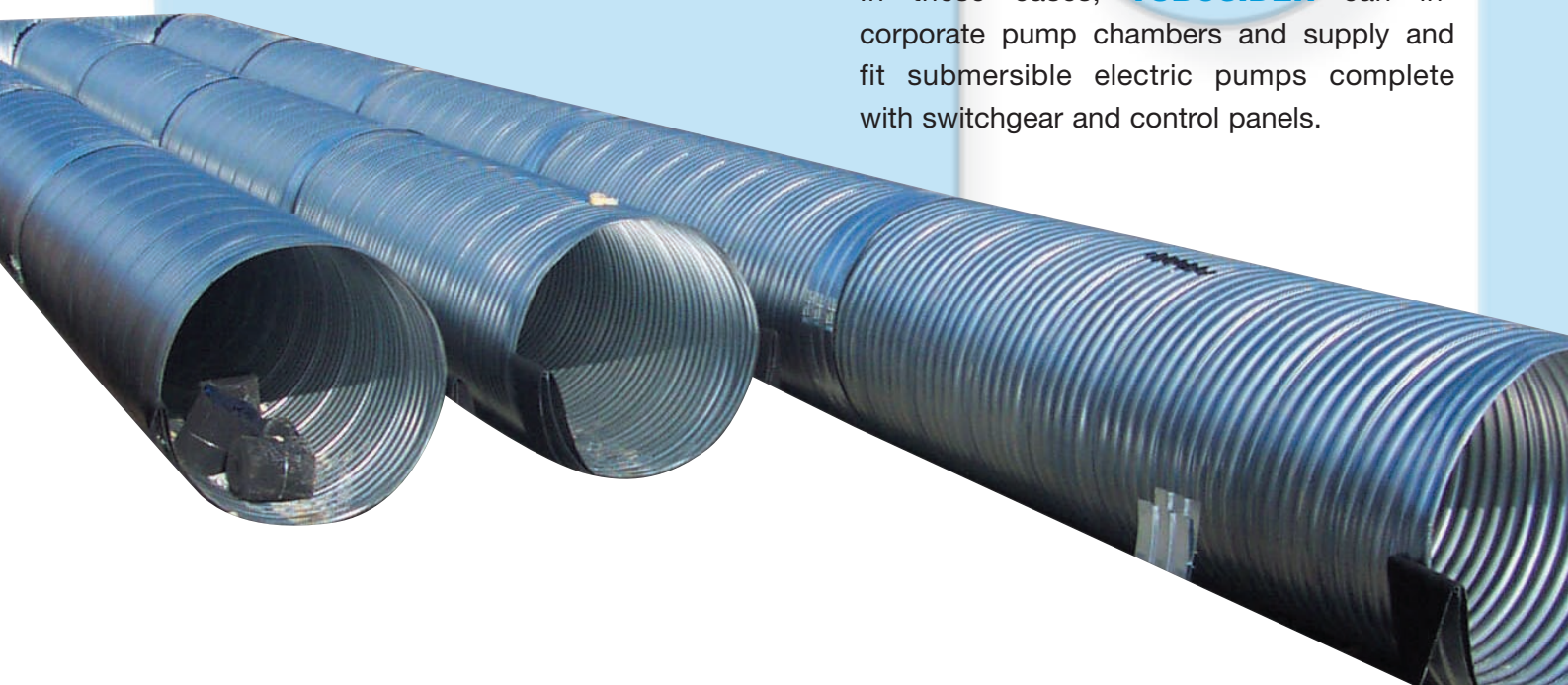
DURABILITY

All pipe is manufactured from high quality pre-galvanised coil to BS EN 10143 with 305gms/m^2 zinc coating on each surface. This is normally adequate to provide a design life of 50 - 60 years in non-aggressive environments.

PUMPED SYSTEMS

For aggressive environments or combined sewer applications, Trenchcoat Polymer secondary coating is utilised giving a BBA Certified add on life of 50 years in an aggressive environment.

Increasingly, storage volumes cannot be achieved with conventional gravity systems. In these cases, **TUBOSIDER** can in-corporate pump chambers and supply and fit submersible electric pumps complete with switchgear and control panels.



INSTALLATION OF STORMWATER ATTENUATION TANK

TUBOSIDER
GRUPPO RUSCALLA
UNITED KINGDOM LTD

Tubosider United Kingdom Ltd
10 Sutton Fold Industrial Estate, Off Lancots Lane, Sutton, St Helens, WA9 3EX

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Website: www.tubosider.co.uk