DRAIN IMPACT & ASSIMILATIVE REPORT BASED ON A PROPOSED WASTE WATER TREATMENT SYSTEM (WWTS)

FOR

KMK METALS RECYCLING LTD.

AT

CAPPINCUR INDUSTRIAL ESTATE,

TULLAMORE, CO OFFALY

20th July 2012

Report prepared by;

ENVIROCO Management Ltd.
Bow House,
O'Moore Street
Tullamore
Tel : (057 93) 52200
Fax : (057 93) 52342
Website : www.enviroco.ie

KMK proposes to submit a planning application and EIS to Offaly County Council for their facility at Cappincur Industrial Estate, Tullamore, Co Offaly.

As part of this application and to address condition 4 of a previous grant of planning permission ref: 10/101 with states: *'The proposed new soil polishing filter shall be installed in accordance with the recommendations of the 2009 EPA Code of Practice 'Wastewater Treatment and Disposal Systems Serving Single Houses (P.E ,10)'. Setback distances shall be adhered to as far as reasonably practicable'* KMK has now appraised the situation fully. The three options available can be summarised as follows;

1) Purchase additional land space adjoining the existing percolation area, remove the existing percolation area and install a new area subject to the *2009 EPA Code of Practice.* This option was not viable to KMK due to land unavailability from the land owner and prohibitive costs.
2) Connect to the proposed foul sewer network once it is installed by Offaly County Council. This option was discounted due to a delay for several years for the foul sewer line to become available to users of Cappincur Industrial Estate.
3) The option to contain the domestic effluent in a holding tank for off-site removal to the County Council Wastewater Treatment plant was considered. However, this practise was discounted as unsustainable due to prohibitive costs and time incurred for liquid transport and associated treatment fees by the Council Plant over a number of years.
4) A final option was to upgrade the existing WWTS on-site taking into consideration best available technologies as alternatives to the standard percolation methods. After approaching two providers of WWTS, a full appraisal of the system proposed by Molly Precast was strongly considered as an appropriate method of treatment of effluent and associated wastes. This is considered the best option and is discussed further below.

The full details of the proposed WWTS are included in **Appendix 1** and will involve the following key improvements;

- The existing tank will be modified for use as a primary holding chamber for domestic effluent storage and settlement.
- A new tank will be installed to be used as a buffering and reaction tank called a Sequencing Batch Reactor (SBR) including dosing for ortho-phosphate and total nitrogen removal. This secondary treatment process designed to reduce BOD, COD, solids and ammonia over an 8 hour batch cycle and prepare the effluent for sand filter treatment.
- The sand filter is a biological treatment process designed to further reduce the parameter loadings and ensure the final discharged effluent is acceptable for surface water.

This report is an investigation of the assimilative capacity of the receiving water (land drains) based on field work flow measurements and water quality of the same drain as determined from grab samples taken; up-stream and down stream of the proposed KMK discharge point associated with a newly proposed Waste Water Treatment System (WWTS).

The proposal also includes a full assessment of the new WWTS to be provided by Molloy Precast, Tullamore and its associated treated effluent discharge quality and volumes. It is proposed to discharge treated effluent from the up-graded WWTS to the land drain.

The land drain flow rate was measured on 20th June 2012 at three transects across the drain and are tabulated below:

Table 1.0 – Flow rate field work June 2012

Transect	**Average Cross Sectional Area (m^2)**	**Average Velocity (m/s)**	**Average Flow (m^3/s)**
A	0.19	0.013	**0.0025**
B	0.14	0.019	**0.0027**
C	0.16	0.018	**0.0028**
Average			**0.0026**

This assessment is to judge what the likely potential loading will be on the local land drain and the capacity for this drain to assimilate the chemical and biological components of the discharge. The following equation is utilised to calculate the current loading of the land drain from existing influents to the water body.

Existing loadings (kg) = flow x conc. of each parameter measured (mg/l) / 1000
The proposed treated effluent discharge point flow as determined from water metering installed at the KMK site is: 1,790litres/day or 0.000021m^3/s.

To calculate the existing chemical/biological parameter loadings the following equation is used:
Existing loadings (kg) = flow x conc. of each parameter measured (mg/l) / 1000

Water quality analysis was carried out on water samples taken at;

- Upstream of the proposed discharge point
- Down stream of the proposed discharge point

Please see map (Fig 1) attached for reference to sample locations and general drainage network of area.

Cappincur Drainage

Fig 1 Showing sampling locations for KMK Metals site at Cappincur and the general drainage network to the Tullamore River.

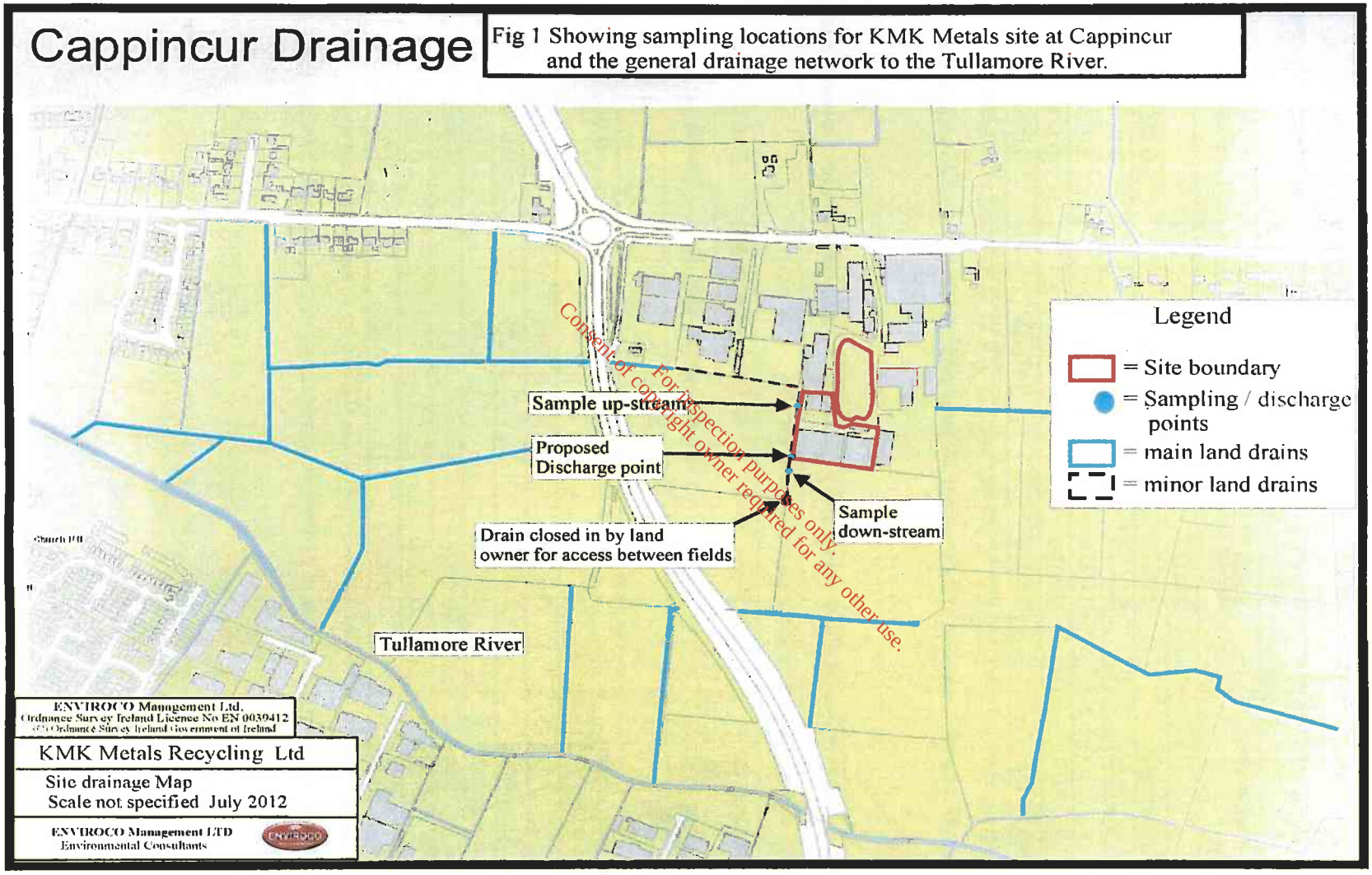


Table 1.1 shows the baseline parameter loadings for the land drain- Upstream (US) of the proposed discharge outlets (E Drain)

Parameter	River Flow (m^3/s)	US Concentration measured (mg/l)	Estimated loadings* (kg)
Total Suspended Solids	0.0026	70	0.00018
pH	0.0026	6.95	-
Total Ammonia	0.0026	0.28	0.0000007
Orthophosphate	0.0026	0.13	0.0000003
BOD	0.0026	14	0.000036
COD	0.0026	48	0.000125
Nitrate (NO3)	0.0026	1.33	0.0000034

*Figures based the calculated flow rate of the drain: 0.0026 m^3/s and using water quality analysis data taken upstream of the proposed discharge point. See **Appendix 2** for analysis results

Table 1.2 shows the baseline parameter loadings for the land drain- Downstream (DS) of the proposed discharge outlets (E Drain)

Parameter	River Flow (m^3/s)	DS Concentration measured (mg/l)	Estimated loadings* (kg)
Total Suspended Solids	0.0026	100	0.00026
pH	0.0026	6.98	-
Total Ammonia	0.0026	0.16	0.0000004
Orthophosphate	0.0026	0.14	0.0000003
BOD	0.0026	11	0.0000286
COD	0.0026	49	0.0001274
Nitrate (NO3)	0.0026	0.25	0.00000065

*Figures based the calculated flow rate of the drain: 0.0026 m^3/s and using water quality analysis data taken downstream of the proposed discharge point. See **Appendix 2** for analysis results

Table 1.3 shows the variation between upstream and downstream, including discharge values.

Parameter	Units	US	DS	US-DS
Total Suspended Solids	mg/l	70	100	**+30.0**
pH	pH units	6.95	6.98	**+0.03**
Total Ammonia	mg/l	0.28	0.16	**-0.12**
Orthophosphate	mg/l	0.13	0.14	**+0.01**
BOD	mg/l	14	11	**-3.0**
COD	mg/l	48	49	**+1.0**
Nitrate (NO3)	mg/l	1.33	0.25	**-1.08**

Positive results indicate an increase in the sample parameter from up-stream to downstream
Negative results indicate a decrease in the sample parameter from the up-stream to the downstream

The estimated parameter loadings from the upgraded wastewater treatment plant including after sand filtration is shown in table 1.4.

Table 1.4 – Potential loading impacts to the land drain

Parameter	Units	Proposed maximum parameters as discharged after sand filter (mg/l)[note1]	Dry Weather Flow Rate[note2] m^3/s	Loading Kg
pH	Units	7	0.00002	-
BOD	mg/l	5	0.00002	0.00000014
COD	mg/l	35	0.00002	0.0000007
Total solids	mg/l	4	0.00002	0.00000008
Phosphorous	mg/l	1	0.00002	0.00000002
Ammonia	mg/l	1	0.00002	0.00000002
Nitrates	mg/l	8	0.00002	0.00000016

Note1 = values taken from table on page 4 of Molloy Precast report in Appendix 2

Note2 = it should be noted that the final discharge to land drain will also include rainwater run-off from the building roof and rainwater soakage from the open area of the sand filter (during wet weather only). This rainwater will increase the volume of discharge but will also dilute the overall discharged loading. Average rainfall contribution is therefore estimated as:

1.2m (annual rainfall) x [95m^2 (sand filter area) + 1,016m^2 (D-Hanger building area)] /365 = 3.65m^3/day

It is therefore necessary to show the comparison between the existing loadings on the land drain and the proposed loadings from the upgraded WWTS discharge point from KMK (represented in Table 1.5 below).

Table 1.5 – Potential loading impacts to the land drain

Parameter	Existing loadings (kg) downstream of discharge point	Proposed Loading from final discharge kg*	% increase in drain loading from discharge point
pH (units)	-	-	-
BOD (mg/l)	0.0000286	0.00000014	0.49
COD (mg/l)	0.0001274	0.0000007	0.55
Total solids (mg/l)	0.00026	0.00000008	0.31
Phosphorous (mg/l)	0.0000003	0.00000002	6.6
Ammonia (mg/l)	0.0000004	0.00000002	5
Nitrates (mg/l)	0.00000065	0.00000016	24.6

* Figures based on 1,790 l/day being discharged from KMK WWTS process to the land drain over a typical day (10 hour working period) and using proposed effluent quality analysis data taken from Molloy Precast (the proposed WWTS provider). The proposed flow from KMK is $0.000021 m^3/s$. See Appendix 2 for laboratory analysis results.

Similarly, when we take a 'Mass Balance' approach, the following is used:

This formula is used to calculate the concentration of a parameter in the receiving water i.e. land drain downstream of the discharge. This downstream concentration may then be compared directly with the water quality standard (EQS) to determine whether the discharge will cause an exceedance of the EQS value.

Mass balance Equation:

$$T = \frac{FC + fc}{F + f}$$

where:

- F is the river flow upstream of the discharge (usually 95%ile flow m^3/sec);
- C is the concentration of pollutant in the river upstream of the discharge (mean concentration in mg/l);
- f is the flow of the discharge (m^3/sec);
- c is the maximum concentration of pollutant in the discharge (mg/l);
- T is the concentration of pollutant downstream of the discharge.

Suspended solids is thus investigated and quantified in terms of its potential increase down stream as follows:

Suspended solids:

$$T = \frac{0.182 + 0.00008}{0.0026 + 0.00002}$$

= 69.5

Ammonia is thus investigated and quantified in terms of its potential increase down stream as follows:

Ammonia :

$$T = \frac{0.00073 + 0.00002}{0.0026 + 0.00002}$$

= 0.286

Discussion:

From the above results in tables 1.1, 1.2, 1.3, 1.4 and 1.5 and from the Mass Balance Equation calculations, we can see that there is a negligible reduction in the water quality of the land drain downstream of the proposed discharge point from KMK Metal's WWTS.

For example: the expected ammonia increase will only be 5% of the existing levels on the drain, the phosphorous levels will be increased by 6% and nitrates by 24%.
It is also important to consider that the receiving land drain flows through agricultural and industrial land prior to entering the Tullamore River. The entry point to the river is estimated at various points depending on land drain water levels.
Further reasons for the projected low impact to the Tullamore river from KMK are as follows;

- The discharge from the WWTS will be controlled and treated. The following treatment of discharge is carried out;
  - All domestic and associated effluent from the proposed up-graded WWTS is effectively treated by a primary, secondary and final biological process prior to entry to the land drain. This treatment process is described on page 2 previously and technical details are fully represented in the Molly Precast Environmental Solutions document in Appendix 1.
  - There will be a sampling chamber installed on the final outfall from the sand filter unit for sampling of treated effluent quality prior to linking with the roof water discharge pipe from D-Hanger building. This sampling point will provide monitoring of the discharge prior to dilution with rainwater during wet weather. The true dilution effect of the effluent discharge can be determined by sampling of the discharge pipe at the land drain during wet weather for comparison purposes.
  - There are no chemicals or other substances entering the WWTS and therefore precluded from entering the land drain.

- The receiving land drain flows through a myriad of other land drains prior to entry to the Tullamore River (refer to Fig 1 previously). This network of land drains will assist greatly in assimilation of the organic and other parameters prior to entry to the river. For example, vegetation growing in the land drains can utilise nutrients in water such as nitrogen and phosphorous. In addition, dilution effects of rainfall can also reduce the concentration of contaminants.

APPENDIX 1

MOLLOY PRECAST Environmental Solutions
Proposed Waste Water Treatment Plant improvements

MOLLOY PRECAST
Environmental Solutions

Colerain, Clara Road, Tullamore, Co. Offaly.
Tel: 05793 26000 Fax: 05793 26060
Email: info@molloyprecast.com Web: www.molloyprecast.com

KMK Metals, Cappincar, Tullamore, Co. Offaly

Proposed Waste Water Treatment plant improvements

Contents

Atached drawings:
Site plan
Proposed system
Proposed sand filter

Attached by others: Final Site Layout Drawings

C.O. Niall Nally, Enviroco Management Services
Bow House, O'Moore Street, Tullamore, Co. Offaly
Phone: 087 1221422
Email: nnally@enviroco.ie

Date: 17-07-2012

MOLLOY
Precast Products Ltd.
Coleraine, Clara Road
Tullamore, Co. Offaly
T: 057-93-26000
F: 057-93-26060
E: info@molloyprecast.com
W:www.molloyprecast.com

Date: 17th July 2012

Re: Site Specific information for WWT system and sand filter for KMK Metals, Cappincar, Tullamore

Site relevant parameters:

The site at KMK metals is small and very restricted, only a limited portion of land will be available for percolation. It is proposed to install Primary, Secondary and Tertiary treatment unit discharging to surface water.

The design criteria will be:

1. To achieve the level of treatment that is suitable for surface water discharge.
2. To have a system that is as automatic and as simple as possible to run.
3. To have a system that will have reasonable ongoing running costs.
4. To have a system that will require low external maintenance costs.
5. Regular in-house monitoring should be quick and simple.

Estimated daily flow into the existing wastewater treatment plant is 1790 litres.

Calculated PE (Hydraulic Load@ 150l/person): 12 PE
Calculated Organic Load: 1.44kg Equiv. 24PE

On review of effluent quality results from Oldcastle (lab ref 217988), and with comparison of COD tests carried out in house, they seem to be somewhat accurate. The effluent from the existing system is very strong and further treatment will be required for dosing onto a sand filter.

Some items of concern include:

- High phosphorus content, this will require ferric chloride dosing, the combination of a secondary treatment unit and sand filter will not bring phosphorus levels down to desirable levels.

- Limited Carbon, we feel that the levels of Carbon in this system are not high enough to deal with the nutrient levels. For proper removal carbon dosing will be required.

Proposed treatment system

Aswaflow A1 10 - 20PE using *WISSMANN ELEKTRONIK GMBH* patented *SBR* ***Clear Rex*** ® technology, certified tested to EN 12566-3, MFPA 4-50PE Cert No.B31.12.081.01.

The primary, buffer and treatment tanks are installed underground and will not give rise to any noise nuisance or any unpleasant odours once the system is correctly vented and maintained.

Proposed secondary treatment system components

The proposed *Aswaflow Wastewater Treatment System* is a SBR (Sequencing Batch Reactor) mechanical aeration system designed to cater for 10 to 20PE *(population equivalent)*.
The system will be programmed to specifically suit the calculated loads..

The following set-up will be applied:

- Installation of a 7000 litre tank divided into two equal compartments after the existing biocycle unit. The existing tank will operate as a basic primary tank for solid settlement. The first chamber of the new tank will act as a buffer, capable of buffering a day's influent. The second chamber will act as the reaction chamber.
- Installation of a SBR unit operating on a 12 hour cycle modified to include both ferric chloride and carbon dosing .
- Installation of a 2500 litre pump station to feed the previously designed sand filter. (Pumps sized specifically for the designed pipework layout)
- After commissioning, a check and testing is carried out at three months or by agreement.
- A local care taker will be trained and instructed in the operation and checks of the system, for efficient operation.
- Electrical requirements are: an independently 16A 220v supply.
- Kiosk with control panel installed with **audible and visual alarms**.
- **Yearly electrical power consumption will be < 1500 kWh for this site.**
- All tanks are installed under ground with low noise operation.
- No unacceptable odors will be present when the correct ventilation is installed.
- Recommended servicing periods, four times per year.
- Recommended minimum de-sludging frequency is once per year, or as the service engineer directs.
- During light load periods the system will revert to economy mode and holiday mode to reduce energy consumption to the minimum.

Tests and approvals of the SBR system

- *National Technical Approval, Germany* **Z-55.3-165 4-50PE** Approval was based on independent testing done by the University Weimar, MFPA Weimar. Threshold tested values to **DIN En 12566-3. Cert number MFPA 4-50PE** cert No.B31.12.081.01.

BOD_5: 11mg/l
COD: 62mg/l
Settable solids: 28 mg/l
NH_4-N: 5 mg/l
P : <1.8 mg/l *(with Ferric Chloride dosing)*

A correctly constructed polishing filter or sand or soil can be expected to achieve final effluent results as follows. (See Tertiary treatment below)

Characteristics In mg/l	Prior to Treatment	Treated (SBR) 8 hour cycle	After Polishing Filter (or sand)
Ph	7.5	7 – 7.5	7
$B.O.D_5$	<300	< 11	< 5
C.O.D.	>400	< 62	< 35
Total Solids	>200	< 28	< 4
Phosphorous	<10	<2 (with chemical dosing)	<1
Ammonia (NH_4-N)	>60	< 5	<1
Nitrates NO_3-N		<10	<8
Nitrites NO_2-N		<1	<1

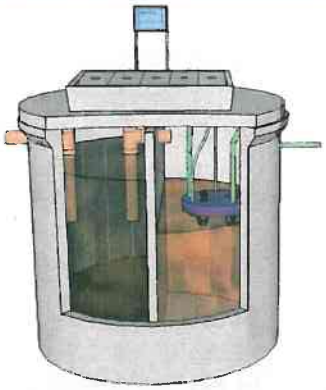
EPA manual *Waste Water Treatment – Single houses – Small Communities. The achievement of these results is not guaranteed as the treatment achieved will depend on the soil and site conditions and good system operational and maintenance practice.*

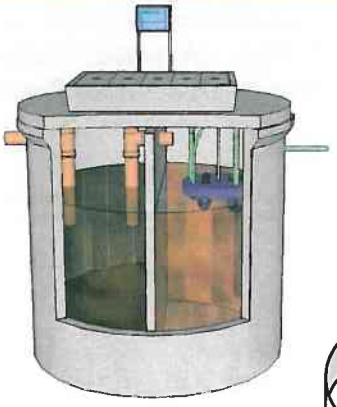
How does a Sequential Batch Reactor system work

AswaFlow uses Sequence Batch Reactor technology to treat wastewater to the minimum standards set out by the EPA. An SBR system treats wastewater in a cycle of three phases namely **FILL**, **REACT**, **SETTLE** and **DISCHARGE**. The AswaFlow system repeats this cycle three times each day. The sewage treatment system is separated into three tanks, namely: Primary, Buffer and Treatment. Raw sewage enters the Primary Tank where it is stored; this in turn overflows into the Buffer Tank, where it is intermittently pumped into the Treatment Tank. The Primary Tank allows solids to settle under quiescent conditions. The purpose of the Buffer Tank is to collect and store wastewater while the Treatment tank is in a cycle. The Treatment tank treats the wastewater prior to discharge into the percolation system. The illustrations below are for a two chamber domestic system, however, the process is identical to the operation of the Buffer Tank and Treatment Tank of the commercial system.

Fill

Sewage is transferred from the first chamber into the second chamber via a siphon pipe primed by the sludge pump. An equal amount of wastewater is transferred every time. If the required amount is not available within the first chamber the next phase (React) will not commence until the quantity of wastewater is available.



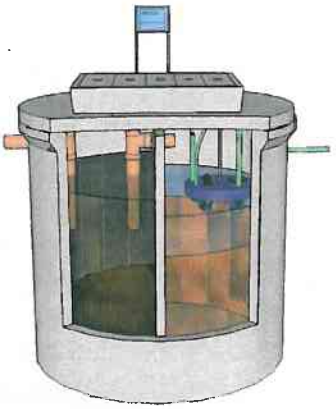


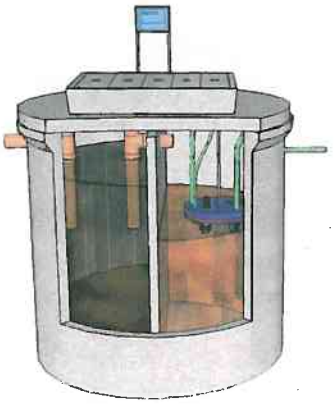
React

The AswaFlow system uses bacteria already in the chamber to degrade the impurities within sewage. This is achieved by agitating the contents of the tank to mix the sewage with the existing contents of the chamber together. Oxygen is added using an aerator to allow the bacteria to thrive and efficiently remove the sewage's impurities. To prevent excessive amounts of sludge building up in the second chamber a small portion of sludge is intermittently pumped back to the first chamber using the sludge pump.

Settle

The React Phase finishes after a set period of time, all equipment is then switched off allowing the sludge and bacteria within the tank to settle out. This produces a clarified volume of water on the top of the chamber.





Discharge

This phase removes the clarified volume of water. The clarified effluent is pumped to the percolation system using the clear water pump. The volume of water discharged is equal to the volume added in the fill phase and is controled by a float switch.

Site Specific Adjustments of SBR

The Aswaflow system is unique in that the cycle can be successfully adjusted to run a 6 hour, an 8 hour, a 12 hour or a 24 hour cycle. The system proposed for this development can buffer 100% of the days calculated output of waste water at the beginning of a cycle.

MOLLOY PRECAST LTD. fully guarantees the *Aswaflow Wastewater Treatment System* as suitable for the development in question. The system must be installed according to the manufacturer's specific instructions and commissioned by trained personnel. To ensure the efficient treatment and disposal of the domestic wastewater, we recommend the following:

- **NO RAINWATER, SURFACE WATER** etc., should be discharged to the treatment system.
- Only domestic wastewater, which includes all effluent from the kitchen, toilets, bathroom, showers, appliances, should be discharged to the treatment system.

- **N.B. Urinals and any other automatically flushing apparatus should be economy type and only operate during the occupied time. (A water meter should be fitted to the main supply for regular checking to determine there is no unnecessary waste.)**

Type of Tertiary Treatment - Intermittent Sand Filter

Intermittent sand filters use unsaturated aerobic conditions to effectively treat wastewater. Sand filters consist of a number of beds of graded sand 700-900mm deep in total underlain by a 200mm thick gravel layer to prevent outwash or piping of the sand as per fig.8.5 p31 of EPA CoP 2009. Sand filters can have good phosphorus removal attributes however this is entirely dependent on the sands mineralogy and phosphorus removal is finite. The sand filter should be constructed in the following way as per section 8, EPA CoP, 2009.

- The sand filter for this project should be **95 m^2** in size.
- The recommended dosing rate is 40 lit per m^2 per day.
- This filter is best finished on top with gravel for better Oxygen uptake, monitoring and maintenance. (A minimum of soil cover for, grass growth, can be used effectively.)
- Wastewater should be distributed evenly throughout the sand filter using a pressured pipe network.
- The sand filter should be vented appropriately
- The sand filter should be sealed on the sides to prevent side flows.
- Construct the Sand Filter as per the attached drawing.

- **Discharge is collected and diverted away from site.**
- **Place the 4" perforated ventilation pipes in place with the non perforated vertical vent shafts supported as required as per the supplied construction drawings.**
- Place the side sealing impermeable membrane in place.
- Since the side sealing impermeable membrane must extend to the full height of the sand filter fold the excess back over the clay while the bottom layers of the sand filter are being assembled with the vent pipes also being positioned at this time.
- Continue building the clay bank to enclose the sand filter in stages insuring that the sealing side sealing membrane is kept in place.
- Place the sand filter media in layers, exactly as shown in the drawing, the fine filter sand must be correctly graded and **certified for the Cu D_{60}/D_{10} <4** requirement as per EPA recommendations. (To insure that the Sand Filter reaches its design life of >25 years the Cu should be <2)
- Place the pressurized distribution pipes in place as per the drawing with holes pointing downwards and pipes sloped away from the manifold at a gradient of about 1:200
- Cover the distribution pipes with a little more stone and a membrane to prevent weed growth.
- The pipe system should drain down after dosing to insure **frost protection.**
- A degree of skill and experience is required to construct a Sand Filter successfully. The attached generic drawing should be studied for guidance only, consult Molloy Precast for specific details.
- Ensure that the contractor is familiar with Sand Filter construction and has a level of skill and experience required to construct the filter correctly.

Servicing

Servicing is carried out by Molloy Precast Products Ltd. trained personnel.
It is recommended that this system is serviced four times a year and monitored by a caretaker weekly.

Please contact me should you require any additional information.

Yours sincerely,

Shane Fox B.Eng MIEI

Civil Engineer
Molloy Precast Products Ltd

MOLLOY Precast Products Ltd.
Coleraine, Clara Road
Tullamore, Co. Offaly
T: 057-93-26000
F: 057-93-26060
E: info@molloyprecast.com
W:www.molloyprecast.com

Site ID:tba.

Maintenance Contract Agreement:
Aswaflow Wastewater Treatment System For 10-20 PE

For: **Management**

At:. **KMK Metals, Cappincur, Tullamore, Co. Offaly**

Contact phone numbers: Tel:..... Fax: .....

MOLLOY PRECAST LTD. undertakes to service the system as follows:

- Visual inspection and servicing off all components of the Aswaflow system and a complete check of the Pumping Station pumps and the Sand Filter condition.
- Efficiency testing of the system on the following core parameters:
  - Sludge level in the primary settlement tank (to determine de-sludging frequency)
  - Sequential batch reactor(SBR) sludge volume check (Settled Sludge Volume – SSV_{30})
  - System test run through the control panel and check alarm log
  - Adjustment of system settings on the control panel where necessary
  - Issue a maintenance report of tests when completed

Service charge: €350 inc. VAT payable in advance, for each service call.

Payable in advance. Renewable yearly. Call out charges are at our standard rates plus parts and mileage. Equipment under warranty is dependent on Molloy Precast Ltd. servicing the system as advised. As a minimum the system should be serviced annually. (This service contract applies only to the treatment system and does not extent to the pipe work outside of the tank area. Toilet and pipe blockages or percolation areas are not covered.)

First Service Call due after : TBA
Second Service call due after : ... .
Third Service call due after : ... .

Optional Laboratory testing of effluent on request.
It is advisable to avoid excessive use of detergents and household cleaning agents and to use the phosphate free alternative products.
Disclaimer: Molloy Precast Ltd. cannot take responsibility for the effluent quality as the treatment achieved will depend on household input, good system operation and maintenance. Molloy Precast Ltd cannot take responsibility for equipment damage owing to flooding/unfavourable site conditions.

Signed: ---------- **Signed:** ----------
(for - MOLLOY PRECAST LTD. Ltd.) *(for Customer/Client)*

Position: Civil Engineer
Date: 17th July 2012 **Date:** ----------

MOLLOY
Precast Products Ltd.
Coleraine, Clara Road
Tullamore, Co. Offaly
T: 057-93-26000
F: 057-93-26060
E: info@molloyprecast.com
W:www.molloyprecast.com

(Prices Valid 2011 – VAT @ 13.5% - See terms & conditions)

Maintenance Contract Terms & Conditions

- **Molloy Precast Products Ltd.** trained service personnel will conduct the servicing of the designated Sewage Treatment System in a safe and efficient manner in accordance with Molloy Precast Products Ltd. Safety Statement.
- The site Occupier / Owner will insure that the site is accessible and safe.
- This contract does not bind Molloy Precast Products Ltd. to effluent quality, however every effort will be made to advise the occupier and to make any adjustments to the plant that will ensure the best possible effluent quality.

1. The occupier should insure that all manholes pertaining to the sewage treatment system are accessible.
2. Access to the control panel is also required. (If access to the control panel is not available at the time of a service call, the service will proceed without that component of the service.)
3. Access to a water tap is needed to clean components during servicing.
4. It is advisable that children and pets are not present in the vicinity of the sewage treatment tanks during servicing. (Open manholes present a significant risk of injury or drowning in the deep tanks.)

- The Service visit includes the items and visits that are paid for and indicated on the maintenance contract only.
- Replacement, broken or unserviceable parts will be charged for at cost.
- Breakdowns, alarms, etc. requiring **call out**, are subject to the charges below.
- Note: This maintenance contract only covers the treatment system. It does not extend to any fowl sewer pipe work or blockages or house fittings external to the treatment system. It does not cover any problems relating to percolation or soak-aways.
- A call out request, that occurs close to a due service call date, may be combined with the service by mutual agreement.

Failure to have the system serviced, on an annual basis, will invalidate any current warranty after the first 12 months of operation.

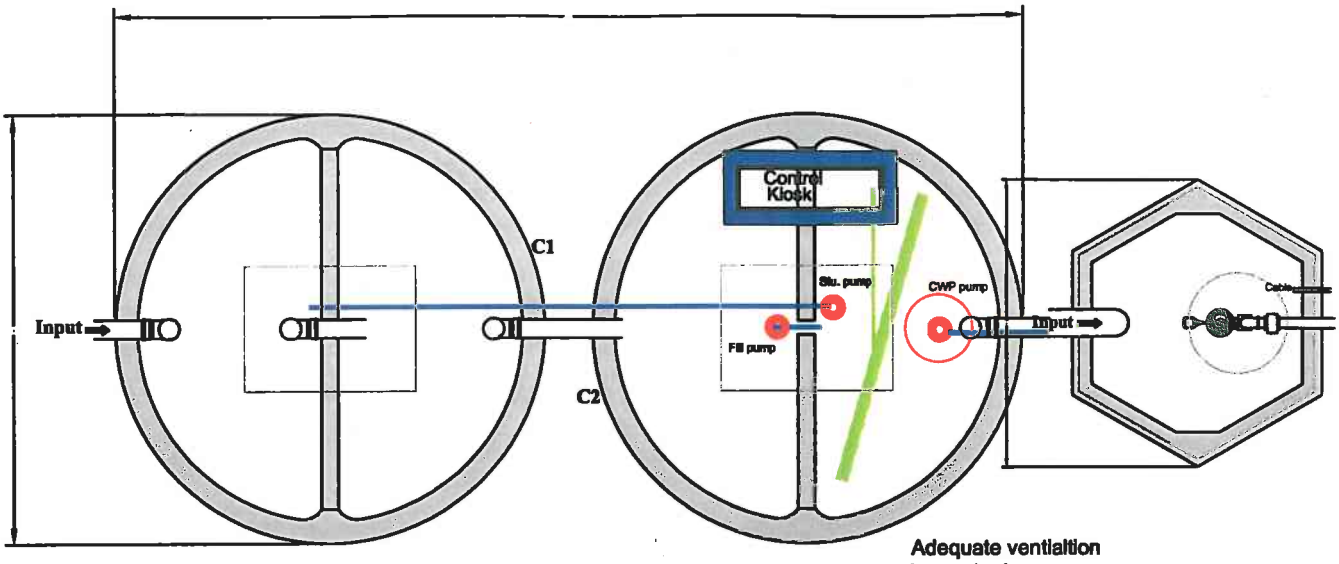
Call out costs are: €100 per visit plus mileage @ €1.20 per mile from Tullamore and €40 per hour for every hour after the first hour, all plus VAT at 13.5%.

Access and mutually acceptable times must be arranged beforehand. No access at the time of an arranged call will incur the full callout charge.

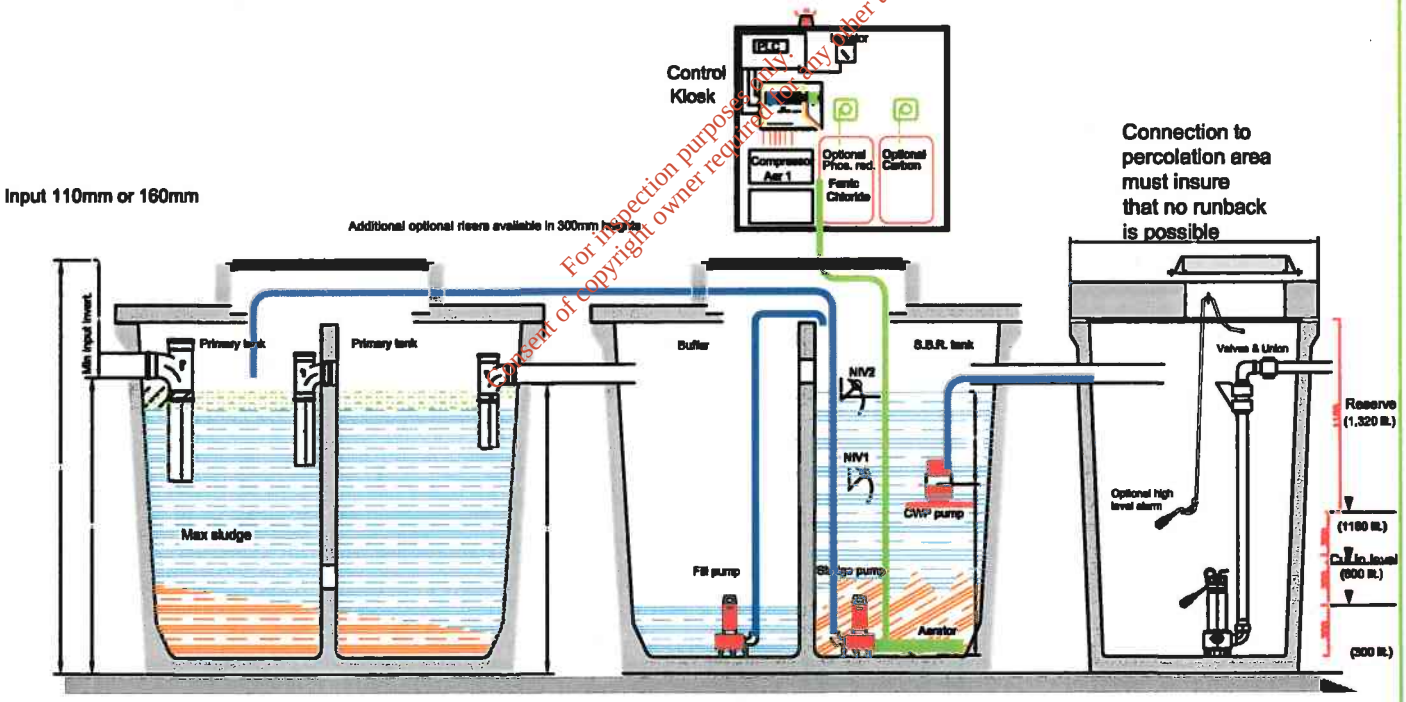
Please mark the services required on the signed document and return to Molloy Precast with payment & VAT for the required services. The counter-signed document will be returned with a receipt.

(Prices Valid 2011– VAT @ 13.5%)

4-20 PE Wastewater Treatment System - 2S+ Tanks (14,000 L) with 2500 litre pump station



Adequate ventialtion is required.



Primary & Sludge **Buffer** **SBR Reactor** **Pump Station**

A good firm, rock free, level base is required.
Where ground is unsuitable, a C30 concrete base may be required.

Clara Road, Tullamore, Co. Offaly, Ireland
Tel: 057 9326000 info@molloyprecast.com
Fax: 057 9326060 www.molloyprecast.com

Note: Observe all safety regulations in regard to excavation and lifting requirements. Never leave opening uncovered or unattended at any time.
Note: Specify any specific requirements prior to ordering. All civil works by customer.
Note: Do not scale from this drawing. Only for illustration purposes.

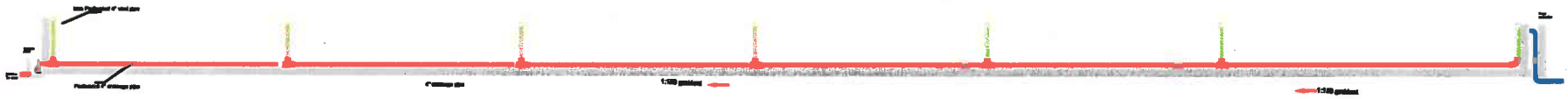
Tank Type: 2S+H+
Tank Size: 5440mm x 2570mm (Overall)
Height: 2480mm (Each)
Volume: 14000 litres (7000 litres Each)
Weight: 7100 kg (Each)
(Tank Dim: ± 20mm. Weight: ± 30Kg.)

Title: Aswaflow Treatment System - 2S+
Population Equivilant: 4-20 PE
Date: June 2012
Drg. No.: WWT-2S+H+-20PE-00
Drawn By: SF

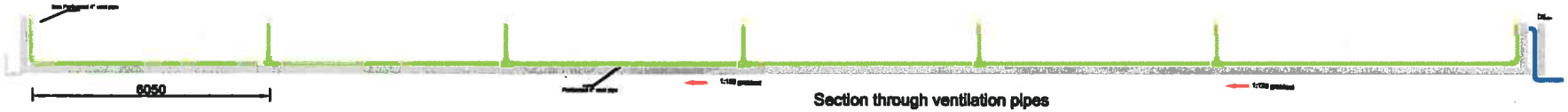
Suggested layout and design for a tank enclosed 95m sq. open top intermittent tertiary treatment sand filter.

EPA CoP 2009 part 8.2 page 29 - 10.1.2 page 44 - Table 10.2 page 45 - EPA CoP Clarifications 2/2012

KMK Metals Tullamore



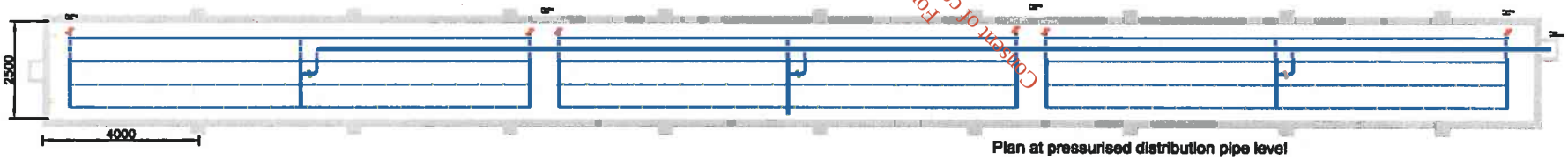
Section through drain pipe



Section through ventilation pipes

Suggested layering and volumes for this design.

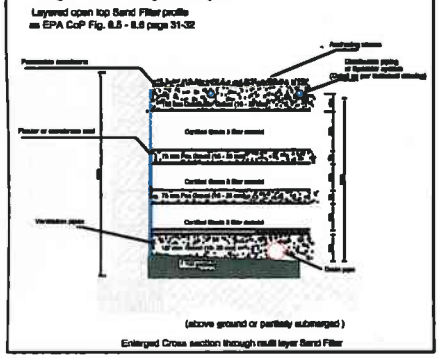
Plan at drain and vent level



Plan at pressurised distribution pipe level

Enlarged section through sand layers.

Layered open top Sand Filter profile as EPA CoP Fig. 8.5 - 8.6 page 31-32



(above ground or partially submerged)

Enlarged Cross section through multi layer Sand Filter

Section through tank

Section through tank at pillars

Section at sample point

Section at rising main frost protection area

Molloy Precast Products Ltd
Coleraine, Clara Road,
Tullamore, Co.Offaly.
Tel: 05793 28000
Fax:05793 28080
E-mail: info@molloyprecast.com
Web: www.molloyprecast.com

Local Authority and EPA 2009 CoP Table 6.1 p64 details should be complied with at planning and installation stage.

Minimum separation distances in metres

	Water Course	Well	Lake	Boundary	Road	House
Tanks:	10	10	60	3	4	7
Percolation	10	30	60	3	4	10

Hydraulic design criteria for three zone single supply.

As per EPA CoP clarifications 08 2012
As per US EPA/625/R-006 manual - Chapter 4.27

Rising main supply pipe min. 75mm
Manifold distribution pipe 50mm
All laterals 32mm

240 of 5mm holes spaced .8m x .8m x .8m
System drain down for frost protection
Contact Molloy's for details.

Minimum supply pump size :- .... l/m @ 7m head. Contact Molloy's for details.
60m 75mmØ rising main flow friction at 420 l/m = 4.34m
30m 75mmØ rising main flow friction at 420 l/m = 1.63m
Liquid velocity in 75mm rising main 1.66 m/s
Liquid velocity in 50mmØ manifold 1.29 m/s
Liquid velocity at the beginning of each 32mm lateral pipe .4 m/s
Design head for each hole 300mm

Cross sections of sand filter

View of sand filter

APPENDIX 2

LABORATORY ANALYSIS DATA

TEST REPORT

Analysing
Testing
Consulting
Calibrating

BHP

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Client: Enviroco Management Ltd
Bow House
O'Moore St
Tullamore
Co.Offaly

FTAO: Kenneth Goodwin

BHP Ref. No.: 104541
Order No:
Date Received: 21/06/12
Date Completed: 04/07/12
Test Specification: Nil
Item : See below

Date Sampled: 20/06/12

TEST	Client Reference	Units	Results	Method
Total Suspended Solids	LD US	mg/l	70	APHA - 2540 -D
pH		-	6.95	APHA - 4500 - H^+ - B
Total Ammonium (as N)		mg/l	0.28	APHA-4500-NH_3-D
OrthoPhosphate (as PO_4)		mg/l	0.13	APHA - 4500 - P-E
BOD		mg/l	14	APHA - 5210 - B
COD		mg/l	48	APHA - 5220 - D
Nitrate (as NO3)		mg/l	1.33	APHA - 4110 - B
Total Suspended Solids	LD DS	mg/l	100	APHA - 2540 -D
pH		-	6.98	APHA - 4500 - H^+ - B
Total Ammonium (as N)		mg/l	0.16	APHA-4500-NH_3-D
OrthoPhosphate (as PO_4)		mg/l	0.14	APHA - 4500 - P-E
BOD		mg/l	11	APHA - 5210 - B
COD		mg/l	49	APHA - 5220 - D
Nitrate (as NO3)		mg/l	0.25	APHA - 4110 - B

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

Authorised by:

Pat O' Sullivan
Chemical and Environmental Monitoring Laboratory
Environmental Site Manager

Date of Issue: 04th July 2012