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Fire-Water Risk Assessment

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Fire-Water Risk Assessment

KMK Recycling, Moate Road, Meeniska, Kilbeggan, Co. Westmeath

Document Control Sheet

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Contents

1 Introduction

1.1 Background

KMK Metals Recycling Ltd. operates a high-quality waste electrical and electronic equipment (WEEE) recycling facility at Moate Road, Kilbeggan, Co. Westmeath. The facility operates under Industrial Emissions (IE) Licence **P1076-01**. The main activities carried out at the facility are the treatment of metallic and WEEE waste for efficient recovery and preparation for reuse.

1.2 IE Licence Conditions

Under Industrial Emissions (IE) Licence P1076-01, *KMK Metals Recycling Ltd.* is authorised to accept up to 50,000 tonnes of hazardous and non-hazardous waste, including waste electrical and electronic equipment (WEEE) under specified licence conditions aimed at ensuring maximum protection to the environment from site activities.

Of relevance to this report is **Condition 3.12** which states that:

3.12 Fire-water Retention

3.12.1 The licensee shall carry out a risk assessment to determine if the activity should have a fire-water retention facility. The licensee shall submit a report to the Agency for approval on the findings and recommendations of the assessment within six months of the date of grant of this licence.

3.12.2 In the event that a significant risk exists for the release of contaminated fire-water, the licensee shall, based on the findings of the risk assessment, prepare and implement, with the approval of the Agency, a suitable risk management programme. The risk management programme shall be fully implemented within three months of date of notification by the Agency.

3.12.3 In the event of a fire or a spillage to storm water, the site storm water shall be diverted for collection.

3.12.4 The licensee shall examine, based upon the findings of the risk assessment in Condition 3.12.1 of this licence, as part of the response programme in Condition 3.12.2 of this licence the need to provide automatic diversion of storm water for collection.

3.10.5 The licensee shall have regard to any guidelines issued by the Agency with regard to firewater retention.

1.3 Updated EPA Guidelines

In 2019, following a period of public consultation and input from the Fire Services, the Environmental Protection Agency (EPA) published a document titled “Guidance Note to Industry on Fire Water Retention Facilities”. This guidance replaces the EPA Guidance Note

"Draft Guidance Note to Industry on the Requirements for Fire-Water Retention Facilities", which was originally published in 1995.

In practical terms, the provision of thousands of cubic meters of fire water retention can lead to exorbitant capital costs and compact facilities can have inadequate space in which to install the required capacity. The recently published guidelines include the following revised criteria to aid sites in the implementation of more practical solutions:

- Emphasis on the significance of a fire event rather than the likelihood – The updated guidelines require an assessment of **significance** of a fire event vs the environmental **hazard potential**.
- Substance Storage thresholds based on **hazard statements** rather than **risk phrases**.
- Firewater capacity calculated based on:
  - Contribution of individual sections of the site (on condition there is adequate separation between 'high risk' areas from 'low risk' areas.
  - Change in rainfall contribution from a 1 in 20-year rainfall event to a 1 in 10-year rainfall event.
- Bunds can no longer be used to provide firewater retention storage unless directly involved with the fire event.

1.4 Objectives

This purpose of this Firewater Risk Assessment is to:

- Review and update the existing FWRA in accordance with the updated EPA Guidance.
- Calculate the volume of firewater retention required at the site.
- Evaluate the suitability of the existing drainage capacity at the site for firewater retention.
- Provide recommendations of suitable options to ensure adequate firewater retention storage is present on-site at all times

2 Methodology

The methodology applied for this Firewater Risk Assessment has been developed by ORS in accordance with "Environmental Protection Agency Guidance on Retention Requirements for Firewater Run-off" (2019). **Figure 2.1** outlines the steps followed in a typical FWRA.

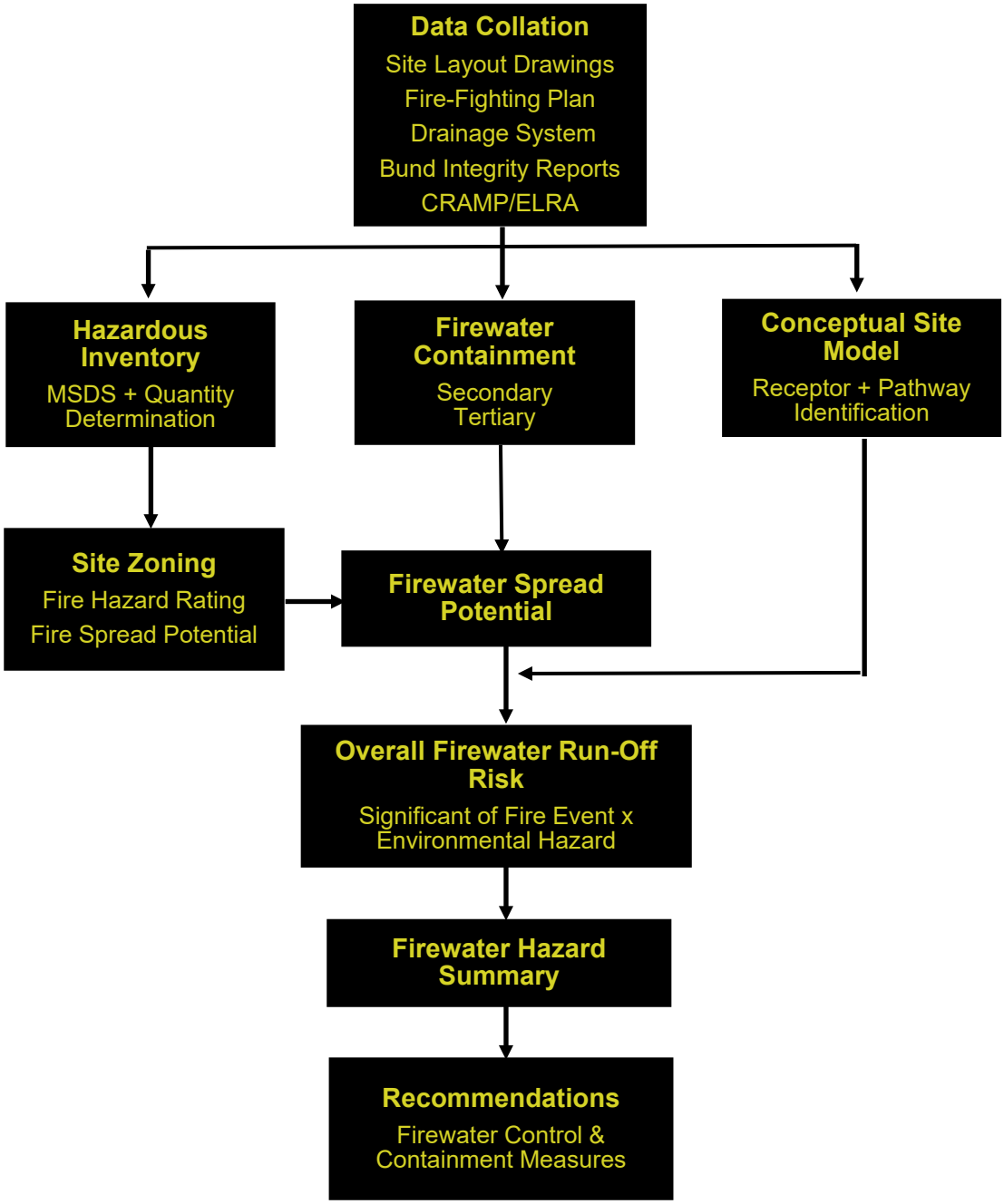


Figure 2.1: Steps in a Firewater Risk Assessment (EPA, 2019)

2.1 Data Collation

A comprehensive desk-top review was carried out by ORS in order to develop the initial Conceptual Site Model.

The following documents were provided by *KMK Metals Recycling Ltd*.to ORS for review, in order to provide a site overview, summarised in **section 3**.

- Environmental Liabilities Risk Assessment (ELRA)
- Closure, Restoration and Aftercare Management Plan (CRAMP)
- Material Safety Data Sheets (MSDS) for substances stored on-site
- Fire Certs for buildings located on-site
- Emergency Response Procedure
- Site Layout Drawing
- Site Drainage Schematic
- Bund Register

The following publicly available sources were consulted in order to describe the environmental setting and identify potential sensitive receptors in the vicinity of the site. **Section 4** outlines the findings of this assessment.

- EPA/GSI Online Mapping
- Flood Mapping
- MyPlan
- Historical Maps (OSI Geo Hive 6'' Cassini etc.)

2.2 Site Zoning

Facilities can be separated into different assessment zones based on a minimum of:

- Two-hour fire walls
- 15m separation distance between zones

If the separation of parts of a site into individual assessment zones cannot be justified with adequate supporting documentation, then they must be assessed together.

The methods of fire spread include direct flame impingement, flow of flammable liquid, and radiation.

Site separation cannot be used in the assessment if **explosion** is a risk on-site.

2.3 Firewater Risk Assessment

The potential **risk (R)** of firewater run-off to the environment is assessed based on the **significance (S)** of a fire event that could generate substantial quantities of firewater, and a potential **environmental hazard (H)**, due to the generation of firewater run-off.

2.3.1 Significance of Fire Event (S)

The significance of a fire event will depend on the fire load, the detection system in place and mitigation measures in place. A summary of the fire safety features specific to the site is provided in **section 5** including a description of:

- Quantities and Types of Flammable and Combustible Materials
- Fire Detection In Place
- Sprinkler/Deluge Systems
- Preventative Measures

The significance of a fire event is then evaluated based on this data and an '**S**' rating is assigned as summarised in **Table 2.1**.

Table 2.1: Evaluation of the significance of a fire event

Significance (S)	Description
S1	Low Significance
S2	Medium Significance
S3	High Significance

2.3.2 Environmental Hazard Potential (H)

The Environmental Hazard Potential is influenced by the specific properties and quantities of hazardous substances stored on site.

Table 2.2: Evaluation of the hazard potential

Hazard Statement	Hazard Details	Storage Threshold (Tonnes)
H400 H410	Very toxic to aquatic life Very toxic to aquatic life with long lasting effects	1
H401 H411	Toxic to aquatic life Toxic to aquatic life with long lasting effects	10
H402 H412	Harmful to aquatic life Harmful to aquatic life with long lasting effects	100
H413	May Cause Long Lasting Harmful Effects to Aquatic Life	1000

An inventory of substances stored on site was compiled. Material Safety Data Sheets (MSDS) for each substance were provided by KMK Metals and analysed to quantify substances which bear the 'Hazardous to the Aquatic Environment' Hazard Statement.

Any applicable substances stored in quantities above the thresholds listed in **Table 2.2** are assigned a '**H**' rating of H1 as outlined in **Table 2.3**.

Table 2.3: Evaluation of the hazard potential

Hazard Potential (H)	Description
H0	No Hazard Potential Present
H1	Hazard Potential Present

2.3.3 Firewater Runoff Risk (R)

The overall firewater runoff risk is calculated as a function of Significance '**S**' and Hazard Potential '**H**' as shown in **Table 2.4**.

Table 2.4: Evaluation of the Firewater Runoff Risk

Firewater Runoff Risk		
	H0	**H1**
S1	**R0**	**R1**
S2	**R0**	**R1**
S3	**R1**	**R1**

R0 – No dedicated firewater retention required

R1 – Firewater run-off must be retained within the operational site

2.4 Firewater Retention Capacity Calculation

The appropriate volume of Firewater Retention capacity required at any given site is dependent on the following factors:

- Potential harm of the contaminated fire-fighting water to the environment.
- Primary capacity of the vessel in which harmful material is stored.
- Potential amount of rainfall during the emergency event.
- Firefighting and cooling water.
- Fire-fighting foam.

Two retention capacity calculation methodologies are set out in the EPA guidance document assuming the separation of the site into distinct zones is feasible. A third calculation methodology is outlined is site separation is proven infeasible. The applicability of each method is dependent on the characteristics of the area being evaluated, and the availability of accurate data about the area, and the associated fire protection measures.

A fire event arising from the worst-case scenario as defined by the most recent site ELRA is modelled to calculate the retention requirements for the site.

2.4.1 Method 1: Warehouse Retention

This method provides an opportunity for a reduction in firewater retention volume required for the site, if fire protection measures, such as sprinklers, are provided to control and limit the fire area.

This method should only be used by facilities that can provide evidence that the design of the installation meets an appropriate design standard, and for which up-to-date maintenance records are available.

Documentation verifying that systems are designed, inspected, and maintained to an appropriate standard should be available on site at all times, and upon request by the EPA.

2.4.2 Method 2: Tank Farm/Process Plant Retention

Tank farms and process plants usually store flammable materials, and therefore should be designed in accordance with recognised standards and guidelines.

The loss of 100% capacity of tanks in the tank farm or process plant in a fire situation may need to be considered, based on the level of fire protection measures in place. Where automatic fire-fighting systems are in place, which are designed and installed to an appropriate standard, only the volume of the largest vessel needs to be included in the firewater volume calculation.

In the absence of automatic fire-fighting systems, the inventory of all tanks or process equipment must be included in the calculation.

2.4.3 Method 3: General Retention

Some facilities may incorporate areas that are used for processing, warehouse type storage, and chemical storage in a tank farm. If appropriate, it may be possible to utilise the previous methods (Methods 1 & 2) on a case by case basis, combining them as required.

If site areas do not fall within the scope of the other methods described, or if there is insufficient information and/or expertise to use those methods, then the calculation of firewater retention required must be determined based on a more conservative general approach.

General Assumptions for this method include;

- Loss of all process/product material stored in the area:
- The volume of product may need to be calculated using an appropriate measurement of density. Density information is usually available on the MSDS of any substance.
- Six Hour Fire Fighting Scenario; This is the conservative time-period, and must be used unless otherwise agreed with the local Fire Authority;
- If deemed appropriate, based on the fire load and set-up of the site, the local Fire Authority can advise a shorter firefighting scenario period but not less than 90 minutes. Evidence of consultation with the local Fire Authority must be provided with all

submissions;
- Consideration needs to be given to the expansion rates of any foam that will be used. The MSDSs and specification sheets for any foam concentrate should be checked for the relevant information;
- Rainwater Contribution;

The Fire Water Risk Assessment (FWRA) carried out for the site is described in **section 6**.

2.5 Retention Formula

The following formula is utilised in all three methods described above to calculate the total Firewater Run-off Retention at a given site.

$$V_R = V_P + W_E + R_W - E$$

Where,

V_R = Firewater Retention Required

V_P = Full volume of Product Loss

W_E = Extinguishing Medium (Water/Foam) (including Fire Brigade resources)

R_W = Rainwater Contribution

E = Retention Volume Directly Available (i.e. capacity at area on fire only)

2.6 Firewater Retention Design

Firewater retention can be provided by means of the site's drainage system and other suitable infrastructure, which is not exclusively foreseen for firewater retention (e.g. storm water attenuation ponds / tanks in waste-water treatment plants*).

All elements of the site infrastructure to be used for firewater retention (including shut-off valves) must be regularly inspected and tested, to ensure functionality and impermeability.

The retention facilities must remain impermeable for the duration of the incident up to the removal of the firewater run-off. The documented available retention capacity in the existing site infrastructure must be monitored and maintained.

Automatic shut-off valves, which engage as soon as the fire alarm is activated must be maintained and tested. Diversion of firewater to retention facilities must be automatic on activation of the site fire alarm. On-site bunds cannot be used to provide firewater retention unless the content of a bund is directly involved in the fire event.

The existing site drainage system is assessed as a means of providing adequate retention capacity. Additional scenarios including the installation of automatic shut-off valves to isolate parts of the drainage system along with dedicated retention infrastructure are also considered.

3 Site Overview

3.1 Site Location

The site is located towards the eastern fringes of Kilbeggan Town, along the R446 ca. 500m west of the town centre. The site occupies an area of *ca.* 1.7Ha and is bounded by pastures to the north and west and shares a boundary with a light industrial facility to the east. The R446 Moate Road runs adjacent to the southern site boundary. The EPA Licenced Boundary of the site is outlined in red in **Figure 3.1**.

Figure 3.1: Site Location (Google Earth)

3.2 Site Layout

The facility originally consisted of a single warehouse structure, the eastern most unit on the site. In 2006 an additional warehouse was erected to form a conjoined warehouse structure with a total footprint area of ca. 3,868m^2. With the exception of a row of trees along the western site boundary, the entire site is covered by hardstanding. A carpark is located to the south of site.

The natural fall of the site is from south-west to north-east. The storm network is fitted with a 400m^3 capacity attenuation tank located to the west of the site and follows the site gradient towards the north east. A petrol interceptor was installed in the north-eastern corner of the site, prior to outfall into the drainage network of the greater industrial estate. The eastern and northern boundary consist of a bund wall designed to capture any potentially contaminated run-off generated by the site.

KMK Metals was granted a licence by the EPA on the 12th November 2020. This licence authorised the intensification of use at the site from 10,000 tonnes of WEEE and metal waste per annum to 50,000 tonnes of WEEE and metal waste per annum. In order to facilitate the licensee's ability to process the extra material the installation of additional infrastructure was scheduled.

At the time of inspection, the majority of additional works was complete. A summary of the status of each installation is included in **Table 3.1**, below.

Table 3.1: Summary of works scheduled under Planning Application: 176372 (Westmeath CoCo)

Infrastructure	Status
Second external air handling unit	Complete
New canopy roof (2,715m2) covering to existing open yard to west side of the existing building with open sides to front (south) and rear (north) and part-open side to west	Not completed
Weighbridge Station building (35m) to western side of the existing building with 2 No. Weighbridges.	Not Complete
MV Substation Building (14m) to eastern side of and adjoining the existing building	Not Complete
New vehicular and pedestrian entrance to site from R446, including modifications to existing boundary fence and new gates and rearrangement of existing vehicle parking on the site	Not Complete
Proposed new signage including 4.0m high totem sign adjacent to main road and new plinth signage at new entrance	Not Complete
Two 10,000L overground rainwater harvesting tanks to rear of site	Complete
Proposed minor modifications to existing underground services and all associated underground and overground site works	Complete

3.3 Site Activities

The main activity at the KMK Metals facility Kilbeggan is the sustainable treatment of metallic and WEEE waste for efficient recovery and reuse of valuable secondary raw materials.

The main elements of the KMK Kilbeggan facility are illustrated in **Figure 3.2** and comprise of the following processes:

- Flat Panel Display (FPD) Unit Treatment
- Metallic-Type Fines Treatment
- Large Household Appliances (LHA) Treatment

- Handling & Storage of Fridges, Freezers and WEEE Fractions
- Preparation for Re-Use Activity
- Storage of WEEE Fractions

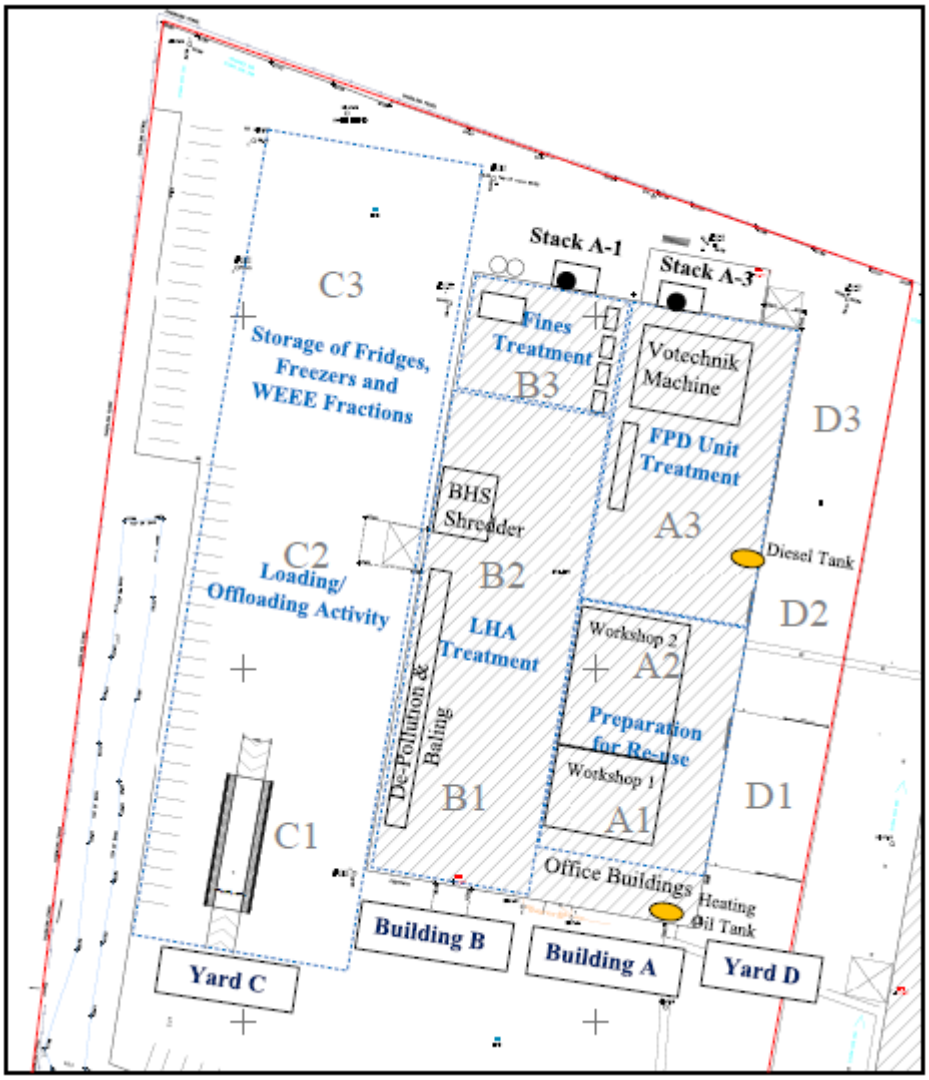


Figure 3.2: Site Layout

3.3.1 Flat Panel Display Unit Treatment

FPD units (comprising of televisions and monitors) are delivered to building A where they first undergo a manual dismantling activity. This entails putting the FPD unit onto a dismantling table, removing any external plugs and cables and the plastic stand. The plastic stand is sent to KMK Tullamore for recycling. FPD monitors are carefully repackaged for export for further recovery. LED FPD units that have been dismantled are transferred to the BHS shredder on-site. The resultant metal shred is transferred to KMK Tullamore for further recovery.

LCD TV units are placed onto the infeed conveyer of the Votecknik Trumaster-ALR machine. This machine is a fully automated, high through-put technology that can process sixty LCD TV units per hour. All processing is carried out at one central location at a rate of one LCD TV unit every sixty seconds. An extraction and carbon filtration system extracts air from within the machine via stack A-3, which is located at the back of the site. Air extracted passes through a particulate filter and 24 carbon filters to remove potential particulates and mercury vapour prior to discharge.

All fractions resulting from the process are sent to Yard C for suitable storage prior to transport.

All waste streams arising from the FPD process sent for recycling include:

- LCD panel and diffusers sheets
- CCFL tubes
- LCD carcass
- Circuit boards
- Transformers
- Speakers
- Plastic
- Cable
- Steel (light iron)
- Plastic/metal mixes from the shredding process of the carcasses

3.3.2 Fines Treatment

A fines treatment process is located in Building B, which comprises of feed hoppers, air table and a screen. This screen accepts waste fractions and separates them into smaller, uniform fractions, suitable for recycling on the air table. The air table uses a technology that separates heavy (concentrated metal) and light (concentrated plastic) materials. The output materials generated from the process consists of metals, plastics, sand/grit and filter dust. Extracted air from this process is directed to a dust extractor located externally at the back of the site, with emission point A-1. This dust extraction has a bag filter system and minimal emissions to atmosphere. A differential pressure gauge indicates when bags are torn or loose and the system will receive ongoing maintenance.

3.3.3 Large Household Appliances (LHA) Treatment

Large Household Appliances are delivered to building B and manually dismantled to remove the plug, cable, pump, motors, transformer, capacitors. The sorted components are stored inside Area B1 while debris is removed to the waste-to-energy skips, outside.

After removal of these fractions, the LHA carcass is to be sent to the Baler. The resultant bales are stored prior to export as steel for recycling.

3.3.4 Storage of Fridges, Freezers and WEEE Fractions

Fridges and freezers require the application of advanced processes for effective treatment (i.e. refrigerant gas containment/extraction and specialist technology). The processing of these appliances at the Kilbeggan facility is limited to their intake at Yard C, inspection, decontamination and sending off-site to a dedicated and fully authorised treatment facility.

WEEE fractions resulting from all other processes on-site are also transferred to Yard C. WEEE fractions are appropriately packaged, weighed, and labelled in accordance with all relevant transport regulations and loaded for outward transport to an authorised treatment facility by an approved haulier.

3.3.5 Preparation for Reuse

This activity does not currently take place at the facility and will involve the assessment and processing of IT equipment and FPD units in accordance with “Requirements for the preparing for re-use of WEEE’ Standard (EN 50614:2020)”.

3.4 Fuels & Raw Materials

There are no raw materials purchased by the operator to assist in processing other than Kerosene used for the heating of office spaces and Diesel for forklifts and the baler unit on site. A small amount of product is also required for water softening for the boiler water feed and absorbent material is purchased for spills.

Electricity is used to power other plant and equipment on site and for lighting. Water use is for domestic use only (canteen, sinks/taps and toilets). Water is not used in the production process.

There are several small to medium sized stockpiles of flat-packed cardboard boxes and wooden pallets.

3.5 Plant and Machinery

Plant and machinery is in constant use during operations at the facility. Plant and machinery consists of:

- 1 no. Steel Baler for LHA Carcasses (Eurobaler)
- 4 no. forklifts
- 1 no. JCB Teleporter
- 1 no. road sweeper
- BHS Shredder for treated FPD items (Steel only)
- ALR machine
- Cardboard Compactors
- Feed Hoppers
- Air Compressor
- Dust Extractors

- Air Table Separator
- Water Table Separator

3.6 Building Occupants

There are approximately 20 people on-site during any given day of operation consisting of site operatives, administrative staff and managerial staff. There is currently no regular site occupant with a disability.

Visitors unfamiliar to the site are either accompanied by site personnel at all times or are inducted and carry out their scheduled works under a permit-to-work system. It is unlikely that more than 30 persons will occupy the site at any one time.

The site is designed to optimise sightlines between various process areas and is under 24-hour surveillance via CCTV. Incidences of lone working are rare occurrences with all workstations in clear view of adjacent workstations.

3.7 Site Drainage

The site drainage plan is depicted in schematic form in **Appendix B**. There are 2 no. branch surface water lines running in a SW-NE direction, tying in with a main surface water line which runs from W-E, parallel to the northern boundary of the site.

The line running between MH-S1 to MH-S2 to MH-S3 to MH-S4 is located towards the west of the site between the weighbridge and Building B. This surface water line is a 225Ø pipe constructed of PVC. The pipe widens between MH-S3 to MH-S4 to 300mmØ. There are several gullies feeding this line. The total capacity of this branch is *ca*. 5.1m^3.

There are 2 no. silt traps located along this branch, one between MH-S2 to MH-S3; and one between MH-S3 to MH-S4. These are 2,000mm^2.

There is an additional surface water line between MH-S3.2 to MH-S3 which runs parallel to the line between M1-S1 to MH-S4. This line is located immediately adjacent to the western wall of Building B. The total capacity of this branch is *ca*. 7.25m^3.

There are 2 no. additional lines which tie-in to MH-S4 extra to the lines mentioned above. Line MH-S4.1 to MH-S4 consists of a 300mmØ line emerging from a 395m^3 underground attenuation tank. Flow in this line is controlled by a hydrobrake, installed prior to the entry point into MH-S4. There is also an additional 225mmØ line which merges into MH-S4 from the x2 Above-Ground Rain-Water Harvesting tanks, located to the North of Building B.

The line between MH-S6.2 to MH-S6 is located to the east of Building A, between the warehouse and the site boundary to the east. This surface water line is a 225mmØ pipe constructed of PVC. There are several gully lines feeding into between MH-S6.2 and MH-S6.

MH-S4 to MH-S6 and subsequently to the site outfall consists of a 300mmØ line running W-E. There is a 2,000mm^2 silt trap installed between MH-S6 and the petrol interceptor. The total capacity of this branch is *ca*. 7.95m^3.

The surface water network terminates at the petrol Interceptor located in the northeast corner of the site, between MH-S6 and the site outfall to the east. The interceptor consists of x2 no. underground concrete tanks located side-by-side and is fitted with an oil alarm linked by underground cable to the site offices to alert staff of high oil/silt levels. The interceptor has a capacity of ca. 20m^3 between the two tanks.

The total capacity of all the sub-surface storm water network is calculated at **441m^3**.

3.8 Bund Capacity

The site drainage plan depicted in **Appendix B** also outlines the position of an in-situ bund wall, constructed from reinforced concrete along the northern and eastern site boundaries of the site.

The yard surface in this area (north and east of the site) consists of 225mm thick concrete. The bund wall consists of 300mm thick concrete. This bund has been designed to capture any excess run-off in the event of the surface water system becoming over-whelmed or if outfall from the site is prevented.

A conservative[1] estimate of the capacity of this bunded yard is **163m^3**, based on the following dimensions:

(1) East Yard – 13m (Width of yard) x 75m (Length of yard) x 0.53m (Height of bund wall)
(2) North Yard – 7.5m (Width of yard) x 15m (Length of yard) x 0.53m (Height of bund wall)

3.9 Current Firewater Retention Capacity

Based on the descriptions of site drainage infrastructure outlined in sections 3.7 and 3.8 it is assumed that in the event of a fire at the facility, the resultant run-off would be contained within the site's sub-surface storm network and the bunded yard towards the north east of the site. The total capacity available for firewater retention is **604m^3**.

[1] Bunded wall extends further than 75m in both directions and the yard is much wider in both directions. It is assumed that run-off will pool in the north-east corner of the site pending removal and that southward migration of the liquid will be limited by the position of the gullies feeding into the surface water network, hence widths for both yards was halved.

4 Environmental Setting

4.1 Hydrology and Topography

According to EPA maps the site forms a catchment with The Brosna River as illustrated in **Figure 4.1**. The natural landscape falls from northwest to southeast, towards the River Brosna however, the site has been elevated above the natural ground level by the importation of made ground at the site. This has created an artificial fall, with the site sloping from southwest to northeast.

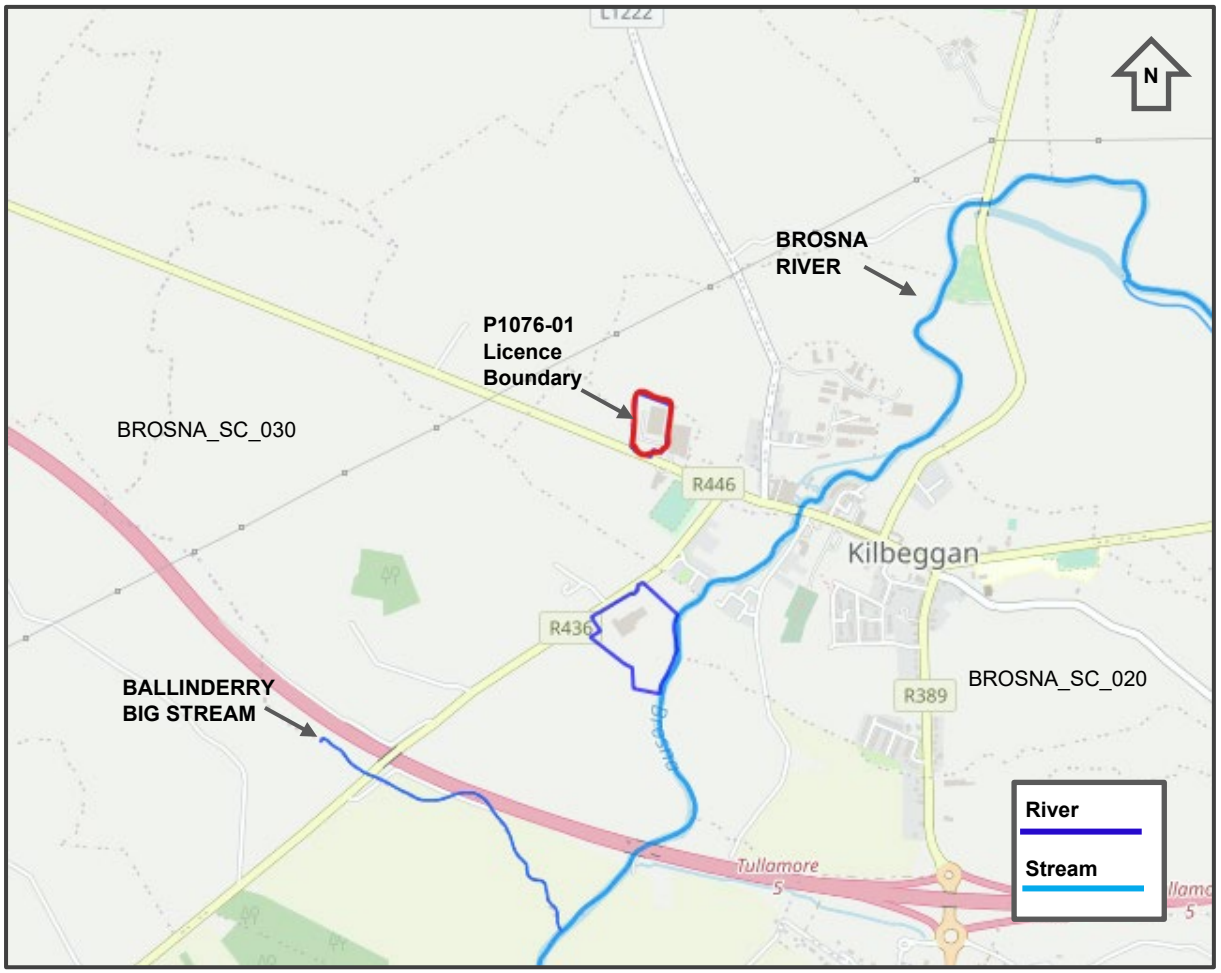


Figure 4.1 – Hydrological Setting of KMK Metals Recycling Ltd. Kilbeggan (EPA)

The River Brosna is the principle hydrological feature within the vicinity of the site and runs ca. 420m southeast of the site in a northeast to southwest direction in relation to the site. The Ballinderry Stream, a tributary of the Brosna River runs northwest to southeast ca. 1.2km southwest of the site.

The Brosna River has been determined 'Not At Risk' under the Water Framework Directive and has a 2013-2018 WFD status of 'Good'.

4.2 Geology and Hydrogeology

This section is taken directly from the EIAR Chapter completed for the site in 2017 by *IE Consulting Ltd*.

According to the Geological Survey of Ireland records the geology at the site is mapped as Waulsortian Limestone, which consists of massive unbedded lime-mudstone. There is a contact with the Allenwood Limestone Formation indicated approximately 500 m to the east. There is a southwest-northeast trending fault mapped approximately 1.5 km north of the site. There is no known rock outcrops and no karst features mapped near the site.

During borehole drilling at the site, Limestone was encountered at depths of between 10.8 and 14.3 mbgl. In the northwest of the site, there was 1.5 m of weathered rock before competent rock was encountered. Along the eastern boundary of the site, the limestone was weathered from 14.3 mbgl to the end of the hole, at 24 mbgl. and competent rock was not encountered in this hole. In the southeast of the site, weathered limestone extended from 14.2 to 22.5 mbgl, where competent Limestone was finally encountered. There was significant clay infill in the weathered Limestone in the east and southeast of the site.

The soil and subsoil at the site is mapped by the GSI as Made Ground. Based on the subsoil of the surrounding area, it is inferred that the Made Ground is underlain by Till derived chiefly from Limestone.

During window sampling, water was encountered at shallow depths (0.12 – 1.8 mbgl). During borehole drilling, minor water strikes were encountered in the overburden in GW2 and GW3 in the east and southeast of the site. In all three wells, the main water strikes occurred in the weathered bedrock. Two weeks after well installation, when dipped, the water level in the wells was very shallow (0.82 – 1.48 mbgl). As the wells were screened in the bedrock, this would suggest that the aquifer is confined or at least semi-confined. Based on groundwater levels and survey levels obtained on 23rd October 2017, it would appear that water is flowing in a south-easterly direction, towards the River Brosna (Figure 8). There appears to be perched groundwater in the shallow subsurface at the site. Layers of gravelly soil were found which contain water starting at depths of between 3.8 – 5.0 mbgl.

The site is mapped by the GSI as **High** Vulnerability which suggests a thickness of overburden of 3.0 to 5.0 metres above bedrock or the water table. But during borehole drilling, bedrock was encountered at between 10.8 and 14.2 mbgl. This would indicate that the site is **Low** Vulnerability

4.3 Designated Areas

There are no designated areas (SPAs, SACs or NHAs) within a 5kms radius of the site according to the National Parks and Wildlife Services protected sites maps.

4.4 Rainfall

The maximum volume of rainfall to be included is based on the 1 in 10 year 24-hour rainfall event.

Data for a 1 in 10 year, 24-hour rainfall event in the Midlands area (Mullingar Meteorological Station) was available from Met Éireann with a value of 52.9mm returned (see **Appendix A**).

5 Fire Safety Management

The fire suppression on site is supplied through a combination of early detection warning systems, fire extinguishers and an automated deluge system for the boiler. The Fire Risk Assessment carried out at the facility determined that the overall fire risk was low primarily due to good housekeeping; good source separation of ignition, fuel & oxygen sources; and the non-combustible nature of the material processed at the facility.

5.1 Fire Detection & Warning Systems

General fire detection and warning measures maintained throughout the site are as follows:

- Manual 'Break-Glass' call points located at every exit.
- Smoke detectors located in in all indoor areas.
- Fire Protection system is adequately scaled for the size of the facility.
- Fire alarm system audible throughout entire facility.
- Emergency lighting is of a sufficient lux (demonstrated during inspection).
- Third Party Security Company provides constant surveillance outside operation hours.

All lights & alarms are checked weekly and serviced quarterly

5.2 Fire Prevention

Measures to limit the spread of potential fires were observed as follows:

- Certain activities such as the ALR Machine (Area A3) or the BHS (Area B2) included self-contained compartmentalization.
- There is sufficient distances maintained and/or separation between separate process areas indoors.
- Storage bays constructed of concrete fire-wall located in the Fines Treatment Area (Area B3). All fines stockpiles below level of storage bay wall.
- Segregation of different waste streams in external areas is facilitated by skips located to the west of Yard C, or a combination of skip bags or steel-rooved containers in Yard D. Each waste stream is less than 4m in height and less than 20m in length and separated by a minimum clearance of 6 metres.
- Penetrations for services are firestopped

All storage infrastructure is in good condition.

5.3 Ignition Sources

There is good separation distances maintained throughout the site between different processing areas, relative to one another. Taking the fire triangle into consideration, the proximity of sources of ignition, fuel and oxygen to each other throughout the site are summarised in **Table 5.1**.

Table 5.1: Material Separation of sources of ignition, fuel and oxygen

Building Area	Infrastructure / Activity	Potential Sources			Adequate Distance Maintained?	Fire Triangle Rating
		Ignition	Fuel	Oxygen		
A1	Offices, Data Security Workshop, Electricity Switchboard, Canteen, Kerosene Tank for office heating & boiler	Electrical switch board, Toaster/ Microwave	Kerosene (Stored in self-bunded tank)	Ambient Levels	Yes	3/3 while all three components are present in this area, there is adequate separation distances
A2	Preparation for Reuse Workshop	None	None	Ambient Levels	N/A	1/3
A3	FPD Unit Treatment & ALR Machine	Sawing / Grinding action in ALR Machine	Diesel Tank (High Flash Point & Cardboard Stockpile	Heightened Levels due to dust extraction	Yes – Cardboard stockpile <3.5m high, <2m wide <2m long Adequate distance maintained	3/3 Adequate distances maintained between ignition, fuel & oxygen sources. Risk further mitigated by self-contained nature of ALR machine
A3	Pre-treatment Benches	Frictional heat from plant movement	None	Ambient	Yes	2/3 Risk further mitigated by the high flash point of diesel.
B1	Eurobaler Unit	Plant Exhaust	Diesel	Ambient	Yes	3/3
B2	BHS Shredder (shred light metals)	Frictional heat or equipment malfunction	None	Ambient	Yes	2/3
B3	Fines Treatment Area, Feed hoppers, Screen, Air Table, Water Separation Table	Frictional heat from plant movement	None	Heightened Levels due to dust extraction, Air table & compressor	Yes	2/3 – Risk mitigated by the adequate separation distances between sources.
Yard C	Storage of Fridges, Freezers & WEEE Fractions	Frictional heat from plant movement	None	Ambient	Yes	2/3
Yard D	Wooden Pallets, Battery Boxes (Temporary Storage)	Frictional heat from plant movement	Wooden Pallets / Batteries / Plastic Fines	Ambient	Yes	3/3 - Risk mitigated by the temporary storage nature of the batteries and separation distances >6m from other sources.

5.3.1 Emergency Response Procedure

An incident requiring the use of fire water is normally considered an emergency situation that may pose immediate and extreme danger to people, property or process. Due to the fact most emergencies are sudden, severe and unexpected, it is extremely important to be properly prepared.

Proper preparation helps ensure safety and therefore a written emergency response plan is the best preparation tool for handling emergencies. The aim of the plan is to put in place a set of preventative and corrective procedures, so that in the case of an emergency situation, response is automatic and everyone is aware of their own role.

An Emergency Response Plan (ERP) is present on site and outlines *KMK Metals Recycling Ltd* strategy following an Emergency occurring onsite. Section 3 of the ERP outlines standard operating procedures for fire. A full copy of the outlines *KMK Metals Recycling Ltd.* Emergency Response Plan is available on-site for inspection.

5.4 Fire Containment

No evidence was provided for the presence of 2-hour walls for any of the buildings on-site hence all walls are assumed to be built with materials below this standard.

6 Site Zoning

6.1 Background

Prior to commencing the firewater risk assessment, the agency guidance document recommends that the site should be divided into distinct assessment zones based on distance and/or fire containment properties.

It cannot automatically be assumed that a fire will remain in only one zone of the site, therefore robust reasoning with supporting documentation for discounting fire spread to other areas must be provided.

The methods of fire spread to be considered include direct flame impingement, flow of flammable liquid, and radiation.

Site separation cannot be used in the assessment if **explosion** is a risk onsite.

6.2 Site Characteristics

The justification process for site separation is detailed in **section 2.2**. The *KMK Metals Recycling Ltd.* consists of a single conjoined warehouse structure with a total footprint area of ca. 3,868m^2.

6.3 Zoning Determination

Given the nature and scale of the site, site zoning is not technically feasible at this facility, hence the Firewater Risk Assessment (FWRA) must assess the site as a single entity.

7 Firewater Risk Assessment

7.1 Procedure

The requirement for dedicated firewater retention is principally dependent on the quantities of substances stored on site which pose a risk to aquatic receptors. Substances with highly flammable properties are also considered.

A comprehensive review of Material Safety Data Sheets (MSDS) for each substance stored in bulk at the site was carried out. Substances which were assigned the following hazard statements were included in the risk assessment.

- 'Hazardous to the Aquatic Environment' (H400, H401, H402, H410, H411, H412, H413)
- 'Flammable' (H220, H221, H224, H225, H226, H227, H228)

Following the collation and analysis of MSDS's for each substance stored on site, the data was input into the FWRA Tool, developed by the EPA.

Based on the conclusions of **section 6**, site separation is not technically feasible and the risk assessment must consider the site as a single entity.

7.2 Input data

The data compiled from the MSDS from each substance is listed in **Table 7.1**. Quantities of substances stored on site were generally provided in litres. For the purposes of risk assessment calculations, volumes were converted to tonnes using mater density data as per MSDS. Each substance which exceeded the storage thresholds for 'Hazardous to the Aquatic Environment' 'H' Statements according to the table below was incorporated into the risk assessment calculations.

There are no substances stored on site in quantities above the storage thresholds for retention requirements as prescribed by the EPA Guidance Document. Petroleum products (fuels & oils) stored in bulk at the site possess chemical properties present a flammability risk and pose the greatest risk to the aquatic environment.

Table 7.1: Hazard Statements for substances stored in bulk on-site

Substance	Volume		Hazard Statement	Storage Quantity Threshold	Exceedance of Quantity Threshold?
	Litres	Tonnes			
Diesel	2,500L	2.215	**H226:** Flammable liquid and vapour **H411:** Toxic to aquatic life with long lasting effects	10t	No
Kerosene	2,200L	1.8	**H226:** Flammable liquid and vapour **H411:** Toxic to aquatic life with long lasting effects	10t	No
Hydro-Soft Tablets	-	0.3	No Applicable Hazard Classes	N/A	No
Safe-O-Absorbent	-	0.08	No Applicable Hazard Classes	N/A	No

7.3 Chemical Properties

7.3.1 Gas-Oil (Diesel)

Gas-oil for the plant and fixed installations is stored in a double skinned, above ground storage tank in area A3. Gas oil is a flammable liquid albeit with a high flash point meaning ignition is extremely unlikely at ambient temperatures. It is also a material which can cause significant pollution to aquatic environments. The tanks are double walled tanks equipped with leak detection alarms.

7.3.2 Heating Oil

Ingestion of heating oil, otherwise known as Kerosene is harmful and can be fatal, posing a significant risk to aquatic life. Kerosene is located in an above-ground storage tank above the office space in area A1 and is used exclusively for heating office spaces.

8 Firewater Retention Calculations

8.1 Worst Case Scenario

The most plausible worst-case scenario identified consists of the occurrence of a significant fire in either of the main processing areas (A3 or B3), detailed in **Figure 3.2** and subsequent spread into other areas of the site. This could trigger the combustion of the cardboard stockpiles and fuel loss from the diesel and kerosene tanks.

There are no single substances or combination of substances with applicable hazard statements stored on-site in quantities above the storage thresholds outlined in the EPA Guidance documents.

Careful consideration must also be made for the contribution of the products of combustion and for each fire tender's foam, which in itself has the potential to be hazardous to aquatic environments.

8.2 Input Data

The data required to complete the Firewater Retention equation below is detailed in **Table 8.1**.

$$V_R = V_P + W_E + R_W - E$$

Where,

V_R = Firewater Retention Required

V_P = Full volume of Product Loss – Sourced from the site ELRA

W_E = Extinguishing Medium (Water/Foam) – Primarily sourced from consultation with Westmeath County Council Chief Fire Officer

R_W = Rainwater Contribution – Sourced from Met Eireann (see **Appendix A**)

E = Retention Volume Directly Available (i.e. capacity at area on fire only) Sourced from the bund register.

8.3 Rationale

It is assumed that both the kerosene and diesel tanks were full at the time of the fire and released the full amount of their contents. An additional cubed meter of product loss was included to account for lubricating oils and waste oils stored throughout the site in minor quantities.

Given the nature and scale at this industrial unit, it is anticipated that two fire tenders would arrive at the site. Each fire tender is a Class B unit capable of carrying 1,800L of water and four 10L drums of compressed aerated foam. A water tanker carrying 9,600L would also be

brought onsite by the fire services. It is estimated that it would take a total of 1.5 hours until the fire is extinguished.

With the contribution of a 1 in 10-year 24-hour rainfall (52.9mm) event multiplied by the total area of the site (14,720m^2); the worst-case scenario rainfall event coinciding with the fire would yield a run-off volume of 778.68m^3.

Table 8.1: Firewater Retention Capacities required for various pollutant sources within the facility

Parameters		Substances of Concern		Total
		Plant Fuel	Heating Oil	
Volume of Product Loss (V_P)				
Volume of Product Lost (m^3) (V_P)		2.215	1.8	**5**
Fire Brigade Resources (W_E)				
No. of fire tenders		2		
Fire tender capacity (m^3)	**Water**	1.8		
	Foam	0.04		
Foam Expansion Rate		1:5		
Water tanker Capacity		-		
Fire Tender Flow Rate (l/min)		1,500		
Duration of Fire (Hours)		1.5		
Total (m^3) (W_E)		202.31		**202.31**
Rainwater Contribution (R_W)				
Common Drainage Area (m^2)		14,720		
1 in 10-year 24-hour rainfall event		0.0529		
Total (m^3) (R_W)		**778.68**		**778.68**
Secondary Retention (E)				
Bund Capacity (m^3) (E)		N/A		**0**
Total Firewater Retention Required (VR)				
Total Retention Required (m^3) (V_R)				**941**

8.4 Firewater Retention Volume

Based on the worst-case scenario fire event, the required volume for firewater retention at the site is **941m^3**.

9 Firewater Retention - Provision

9.1 Background

The key requirement which must be satisfied for retention infrastructure is that all systems are automatically activated in the event of a fire alarm being triggered. Reliance on manual intervention to deploy retention is not acceptable.

All retention ponds/tanks, etc., shall be maintained empty, or at least to a point where the required retention capacity is available.

All infrastructure dedicated for firewater retention must be structurally sound and must be integrity tested every three years.

Once the above conditions are satisfied there are several options which may be utilised to meet retention requirements:

(1) Dedicated Firewater Retention Ponds.
(2) Lagoons or Storm Water Ponds.
(3) Tanks
(4) Bunding – May only be utilised for localised fires.
(5) Drainage System
(6) Automated Systems – Such as the self-contained retention capacity included in the SRF building.

9.2 Stormwater System Capacity

The required volume for firewater retention at the site is **941m^3**. As concluded in **section 3.9** conservative estimates of the site's sub-surface storm network (**441m^3**) and the bunded yard (**163m^3**) towards the north east of the site, reveal that the total capacity available for firewater retention is **604m^3**.

Despite the shortfall in capacity, the EPA Fire Risk Assessment Tool confirmed that dedicated retention is **not** required at the site.

10 Conclusions and Recommendations

10.1 Key Findings

There are no single substances or combination of substances stored on site in quantities above the storage thresholds for retention requirements as prescribed by the EPA Guidance Document.

The EPA FWRA Calculation tool assigned a rating of "**R0 – No Risk**" to the site hence it was determined that no dedicated firewater retention is required.

Petroleum products (fuels & oils) stored in bulk at the site possess chemical properties present a flammability risk and pose the greatest risk to the aquatic environment posed by this site.

Careful consideration must also be made for the contribution of the products of combustion and for each fire tender's foam, which in itself has the potential to be hazardous to aquatic environments.

Fire-water retention requirements for the site were calculated in consideration of these factors in order to assess the baseline retention requirement, were the site obligated to provide firewater retention. This exercise revealed that the retention requirement was **941m^3**.

10.2 Conclusion

According to the EPA Fire Water Risk Assessment Tool dedicated retention is **not** required at this site.

10.3 Recommendations

According to the rating assigned to the site of "**R0 – No Risk**", by the EPA FWRA tool, the licence holder is under no obligation to provide fire-water retention at the site.

In the event that there are any significant changes to the types of wastes accepted at the site, or if there any significant changes to the inventory of chemicals stored on-site, it is recommended that an additional Firewater Retention Risk Assessment is carried out to determine the requirement for retention.

Appendix A – Met Eireann Rainfall Data

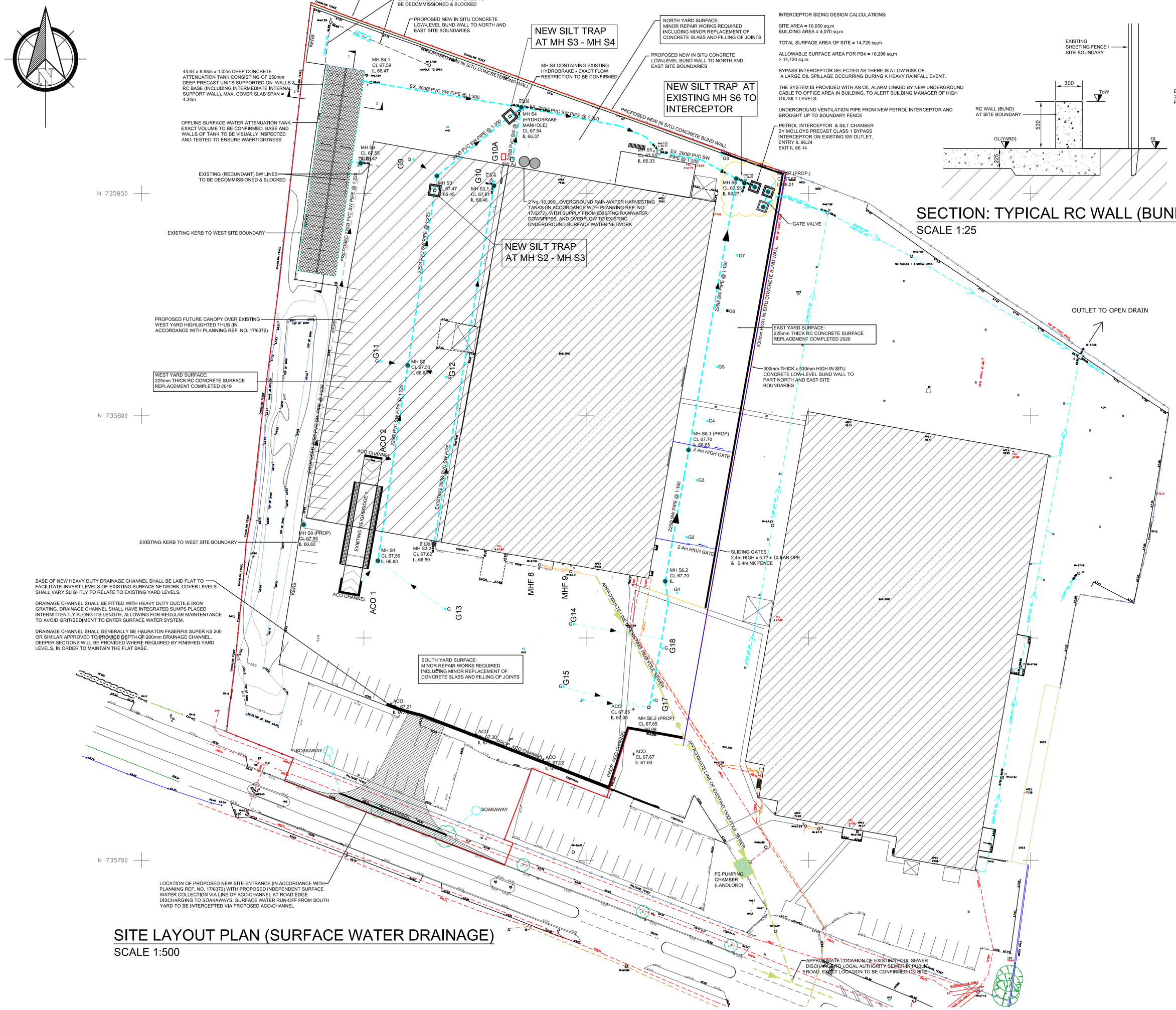
Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 257077, Northing: 242840,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.5,	3.5,	3.9,	4.7,	5.2,	5.5,	6.8,	8.1,	9.0,	10.3,	11.4,	12.2,	13.5,	14.5,	15.3,	N/A ,
10 mins	3.5,	4.8,	5.5,	6.5,	7.2,	7.7,	9.4,	11.3,	12.6,	14.3,	15.8,	17.0,	18.8,	20.2,	21.3,	N/A ,
15 mins	4.1,	5.7,	6.5,	7.7,	8.5,	9.1,	11.1,	13.3,	14.8,	16.8,	18.6,	20.0,	22.1,	23.8,	25.1,	N/A ,
30 mins	5.5,	7.4,	8.4,	9.9,	10.9,	11.6,	14.1,	16.8,	18.5,	21.0,	23.1,	24.7,	27.2,	29.2,	30.7,	N/A ,
1 hours	7.2,	9.6,	10.9,	12.7,	13.9,	14.9,	17.8,	21.1,	23.2,	26.1,	28.6,	30.6,	33.5,	35.8,	37.6,	N/A ,
2 hours	9.5,	12.6,	14.1,	16.4,	17.9,	19.0,	22.6,	26.5,	29.1,	32.5,	35.5,	37.8,	41.3,	43.9,	46.1,	N/A ,
3 hours	11.2,	14.7,	16.4,	19.0,	20.7,	21.9,	26.0,	30.3,	33.1,	37.0,	40.3,	42.8,	46.6,	49.5,	51.9,	N/A ,
4 hours	12.6,	16.4,	18.3,	21.1,	22.9,	24.3,	28.7,	33.4,	36.4,	40.5,	44.1,	46.7,	50.8,	53.9,	56.4,	N/A ,
6 hours	14.8,	19.1,	21.3,	24.4,	26.5,	28.0,	32.9,	38.2,	41.5,	46.0,	50.0,	52.9,	57.4,	60.8,	63.5,	N/A ,
9 hours	17.5,	22.3,	24.8,	28.3,	30.6,	32.4,	37.8,	43.7,	47.3,	52.4,	56.7,	59.9,	64.8,	68.5,	71.5,	N/A ,
12 hours	19.6,	24.9,	27.6,	31.5,	34.0,	35.8,	41.7,	48.0,	52.0,	57.3,	62.0,	65.4,	70.6,	74.6,	77.8,	N/A ,
18 hours	23.1,	29.1,	32.2,	36.5,	39.3,	41.4,	47.9,	54.9,	59.3,	65.2,	70.3,	74.1,	79.8,	84.1,	87.6,	N/A ,
24 hours	25.9,	32.5,	35.8,	40.5,	43.5,	45.8,	52.9,	60.4,	65.1,	71.4,	76.8,	80.9,	87.0,	91.6,	95.3,	107.7,
2 days	31.2,	38.5,	42.1,	47.2,	50.4,	52.9,	60.4,	68.2,	73.1,	79.7,	85.2,	89.4,	95.6,	100.2,	103.9,	116.5,
3 days	35.9,	43.9,	47.8,	53.2,	56.7,	59.3,	67.3,	75.6,	80.7,	87.6,	93.4,	97.8,	104.2,	109.0,	112.9,	125.8,
4 days	40.2,	48.8,	53.0,	58.8,	62.5,	65.3,	73.7,	82.5,	87.9,	95.1,	101.1,	105.7,	112.4,	117.4,	121.4,	134.7,
6 days	48.2,	57.9,	62.5,	69.0,	73.1,	76.2,	85.5,	95.1,	101.0,	108.8,	115.4,	120.3,	127.5,	132.8,	137.1,	151.4,
8 days	55.5,	66.2,	71.3,	78.4,	82.9,	86.2,	96.3,	106.7,	113.0,	121.4,	128.5,	133.7,	141.4,	147.1,	151.7,	166.8,
10 days	62.5,	74.1,	79.6,	87.3,	92.1,	95.7,	106.5,	117.6,	124.4,	133.3,	140.8,	146.3,	154.4,	160.5,	165.3,	181.2,
12 days	69.2,	81.6,	87.6,	95.8,	100.9,	104.7,	116.2,	128.0,	135.1,	144.6,	152.5,	158.3,	166.9,	173.2,	178.3,	195.0,
16 days	82.0,	96.1,	102.7,	111.9,	117.6,	121.9,	134.7,	147.7,	155.6,	166.0,	174.6,	181.0,	190.4,	197.3,	202.8,	220.9,
20 days	94.3,	109.9,	117.2,	127.3,	133.6,	138.2,	152.2,	166.4,	175.0,	186.2,	195.6,	202.5,	212.5,	220.0,	225.9,	245.4,
25 days	109.2,	126.6,	134.7,	145.8,	152.8,	157.9,	173.3,	188.8,	198.1,	210.4,	220.6,	228.0,	239.0,	247.0,	253.5,	274.5,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

Appendix B – Site Layout

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS TO MCCE



SITE LAYOUT PLAN (SURFACE WATER DRAINAGE)
SCALE 1:500

INTERCEPTOR SIZING DESIGN CALCULATIONS:

SITE AREA = 10,650 sq.m
BUILDING AREA = 4,070 sq.m

TOTAL SURFACE AREA OF SITE = 14,720 sq.m

ALLOWABLE SURFACE AREA FOR PS4 = 16,296 sq.m
> 14,720 sq.m

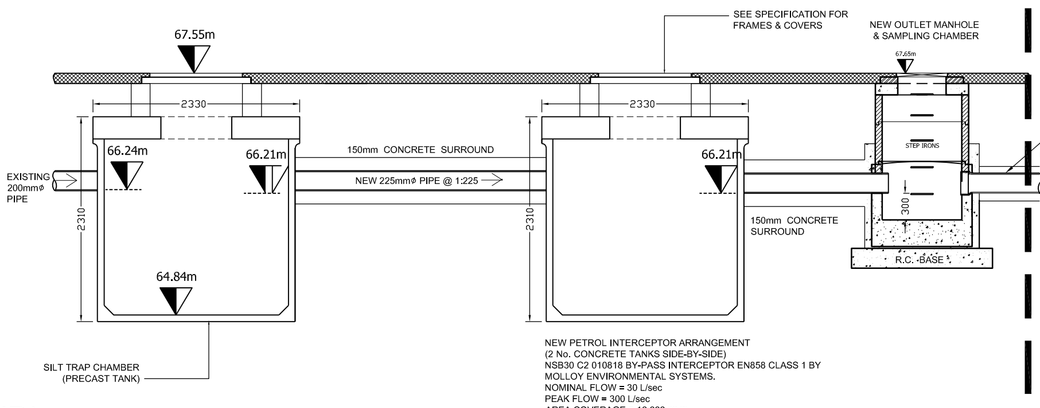
BYPASS INTERCEPTOR SELECTED AS THERE IS A LOW RISK OF A LARGE OIL SPILLAGE OCCURRING DURING A HEAVY RAINFALL EVENT.

THE SYSTEM IS PROVIDED WITH AN OIL ALARM LINKED BY NEW UNDERGROUND CABLE TO OFFICE AREA IN BUILDING, TO ALERT BUILDING MANAGER OF HIGH OIL/SLT LEVELS.

UNDERGROUND VENTILATION PIPE FROM NEW PETROL INTERCEPTOR AND BROUGHT UP TO BOUNDARY FENCE

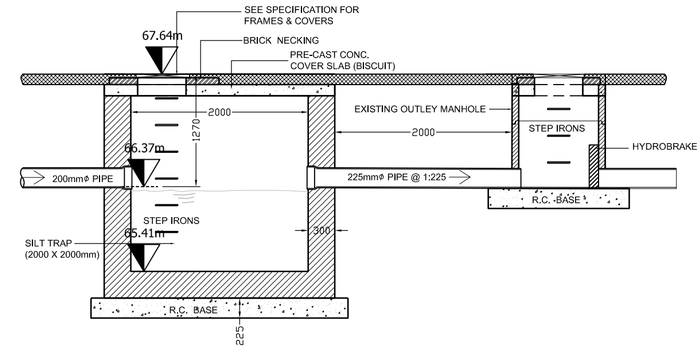
PETROL INTERCEPTOR & SILT CHAMBER BY MOLLOYS PRECAST CLASS 1 BYPASS INTERCEPTOR ON EXISTING SW OUTLET.
ENTRY IL 66.24
EXIT IL 66.14

SECTION: TYPICAL RC WALL (BUND)
SCALE 1:25



NEW PETROL INTERCEPTOR ARRANGEMENT
(2 No. CONCRETE TANKS SIDE-BY-SIDE)
NSB30 C2 010818 BY-PASS INTERCEPTOR EN858 CLASS 1 BY MOLLOY ENVIRONMENTAL SYSTEMS.
NOMINAL FLOW = 30 L/sec
PEAK FLOW = 300 L/sec
AREA COVERAGE = 16,666 sq.m
MAX. SILT CAPACITY = 5,750 L
MAX EMERGENCY OIL RETENTION = 1,000 L

SECTION THROUGH (TYPICAL) NEW SILT TRAP AT OIL INTERCEPTOR
SCALE 1:50



SECTION THROUGH (TYPICAL) NEW SILT TRAP MHS3 - MHS4
SCALE 1:50

COVER LEVEL	67.59	67.64
INVERT LEVEL	66.47	66.37
NOTES	EXISTING 300Ø PIPE - JOINTS TO BE REPAIRED REMOTELY	

COVER LEVEL	67.65	67.70	67.
INVERT LEVEL	66.99	66.65	66.
NOTES	EXISTING 225Ø PIPE TO BE COMPLETELY RE-LAID FOR FULL LENGTH	EXISTING 225Ø PIPE TO BE COMPLETELY RE-LAID FOR FULL LENGTH	

SURFACE WATER LONGITUDINAL SECTIONS & SCHEDULE OF REPAIR/REPLACEMENT PROPOSALS
SCALE 1:500 HORIZONTALLY, 1:250 VERTICALLY

NOTES:

EXACT FINISHED LEVELS TO BE CONFIRMED ON SITE. ALL LEVELS RELATE TO MALIN HEAD ORDNANCE DATUM.

ALL SURFACE WATER PIPES WITH LESS THAN 1200MM COVER IN ROADS/YARDS AND 600MM ELSEWHERE TO BE SURROUNDED IN MINIMUM 150MM THICK CONCRETE (35N/20)

ALL MANHOLE COVERS TO BE LOADING CLASS D400 AND TO BE LOCKABLE.

ALL SURFACE WATER PIPES FROM ROAD GULLIES TO MAIN SEWER TO BE 150MM DIA. P.V.C.

ALL GULLY GRATINGS TO BE LOADING CLASS C250 IN ACCORDANCE WITH EN124 AND TO BE LOCKABLE.

ALL SEWER PIPES UP TO AND INCLUDING 225MM DIA. TO BE u.P.V.C.

Rev.	Date	Amendment	By

Issued For:
INFORMATION PURPOSES

Project:
KMK RECYCLING LTD.
EXISTING UNIT AT
ATHLONE ROAD, KILBEGGAN

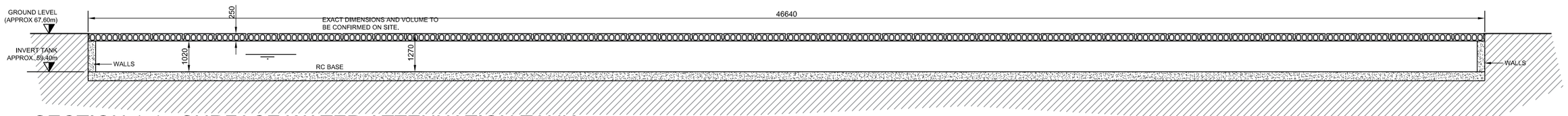
Drawing Title:
PROPOSED SITE SERVICES LAYOUT PLAN

Client:
KMK METALS RECYCLING LTD.
CAPINCUR INDUSTRIAL ESTATE
TULLAMORE, CO. OFFALY

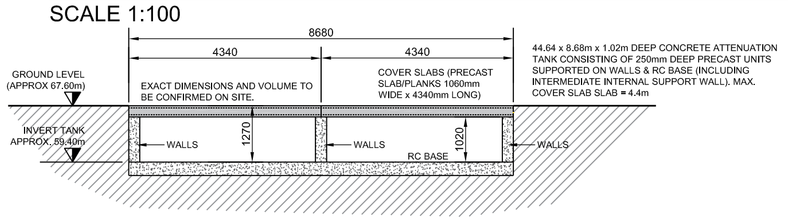
MALACHI CULLEN
CONSULTING ENGINEERS LTD
Old Bridge House, Strand Street, Athlone, Co. Westmeath
T: 090 6420364 F: 090 6449034 E: info@mcullen.ie W: www.mcullen.ie

SCALE @ A1 =	1:500
DATE:	MAY 2018
DRAWN:	PK
CHECKED:	JD

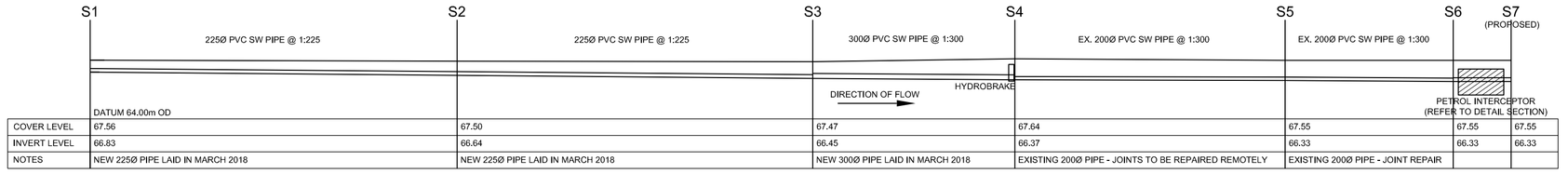
Drawing Number: 15-097-C06
Rev. 04



SECTION 1-1 : SURFACE WATER ATTENUATION TANK
SCALE 1:100



SECTION 2-2 : SURFACE WATER ATTENUATION TANK
SCALE 1:100



COVER LEVEL	67.56	67.50	67.47	67.64	67.55	67.55	67.55
INVERT LEVEL	66.83	66.64	66.45	66.37	66.33	66.33	66.33
NOTES	NEW 225Ø PIPE LAID IN MARCH 2018	NEW 225Ø PIPE LAID IN MARCH 2018	NEW 300Ø PIPE LAID IN MARCH 2018	EXISTING 200Ø PIPE - JOINTS TO BE REPAIRED REMOTELY	EXISTING 200Ø PIPE - JOINT REPAIR		

SURFACE WATER LONGITUDINAL SECTIONS & SCHEDULE OF REPAIR/REPLACEMENT PROPOSALS
SCALE 1:500 HORIZONTALLY, 1:250 VERTICALLY

Appendix C – EPA FWRA Tool

FIRE WATER RETENTION RISK ASSESSMENT

Organisation Name	**KMK Metals**	
Licence Number	**P1076-01**	
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This Fire Water Retention Risk Assessment Spreadsheet is to be used in conjunction with the EPA Guidance on Retention Requirements for Firewater Run-off The purpose of this workbook is to determine, at a conservative level, whether firewater retention is required for the facility, and if so the required retention capacity.

SHEET DESCRIPTION	INSTRUCTIONS	COMMENT
Significance of Fire Event	Please enter the fire protection measures that are available in each area of the site and the quantity of flammable and combustible material storage within these areas.	Input Required
Hazard Potential	Please enter the quantities of hazardous substances stored within each "assessment area" of the site. If the site is a licensed waste disposal facility please select "Hazardous" or "Non-Hazardous", or "N/A" if this does not apply.	Input Required
Fire Water Run-Off Risk	This tab will outline the Overall Fire Water Run-Off Risk of each area based on the Significance of a Fire event and the Hazard Potential in each "assessment area". The conclusion as to whether or not the site requires fire water retention is stated here.	Risk Assessment Result
Method 1: Warehouse Retention Calculation	A calculation of the fire water retention required for a warehouse area storage is outlined here. The method is based on the Swiss Federation Firewater Retention Practical Guide.	Input Required
Method 2: Tank Farm / Process Plant Retention Calculation	For other areas, e.g. tank farm, process room, etc. a detailed assessment should be carried out to determine firewater retention volume required. This involves acquiring information on expected fire duration, sprinkler flow rates, etc. See Section 4.3 of the Guidance Report.	Input of Calculation and Support Data
Method 3: General Retention Calculation	A generic calculation can also be used based on first principles of fire water retention. This is a conservative approach to retention volume calculation.	Input Required

Significance of Fire Event

Sample Assessment Area

Number	Fire Protection Measures in this Area	Response			
	1. Fire Prevention Measures				
1.1	Fire Detection and Alarm Systems (FDAS). IS 3218:2013	Yes	0		
1.2	Automatic Fire Protection	Yes	0		
	2. Materials Stored	**Tonnes**		**Substance Name(s)**	
	H224 (extremely flammable)	0			Tonnes
	H225 (highly flammable)	0			Tonnes
	H226 (flammable)[1]	4		Diesel, Kersosene	Tonnes
2.1	**Flammable Liquids Storage**	4	0.5		**Tonnes**
	H220 (extremely flammable)	0			Tonnes
	H221 (flammable)	0			Tonnes
2.2	**Flammable Gas Storage**	0	0		**Tonnes**
	H228 (flammable)	0			Tonnes
2.3	**Flammable Solids Storage**	0	0		**Tonnes**
	H227 Combustible Liquids	0			Tonnes
	Waste	0			Tonnes
	Packaging (including pallets)	0			Tonnes
	Plastic (if not in packaging above)	0			Tonnes
	Oils/fuels (not classified as flammable)	0			Tonnes
	Process materials (not classified as flammable)	0			Tonnes
	Any other combustible material	0			Tonnes
2.4	**Combustible Materials Storage**	0	0		**Tonnes**
	Percent of S1 Storage	80%	N/A		
	Percent of S2 Storage	8%	N/A		
	Percent of S3 Storage	8%	N/A		
			0		
			2. Max		**0.0**
		Fire Significance			**S1 - Low Significance**

Likelihood	Description
S 1	Low Significance
S 2	Medium Significance
S 3	High Significance

Scoring Details			
Flammable Material Threshold (see Information Tab for Threshold details)	**Fire Protection**		**Significance**
None	N/A		S 1
Lower	FDAS		S 1
Lower	None		S 2
Middle	FDAS Sprinklers		S 1
Middle	FDAS		S 2
Middle	None		S 3
Upper	Any		S 3

Note 1 H226 Flammable Liquids have a large flash point range. Higher flash point flammables (e.g. Diesel - Flash Point 55-56°C) can be considered as combustible for the purpose of this exercise if the material under normal environmental or workplace operational conditions will always be handled at temperatures at least 15ºC below their flashpoint and in consequence will not produce a flammable atmosphere. See *HSG140 - Safe Use and Handling of Flammable Liquids*, UK HSE 2015, for more information. Ambient external temperature in Ireland does not generally exceed 30ºC.
See Appendix A of Guidance Report for more information.

Hazard Potential

Sample Assessment Area

Number	Material Stored in this Area	Response	Hazard Category
	1. Hazardous Material Storage on Site[3]		
1.1	H400/H410 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.2	H401/411 Environmentally Hazardous Material (GHS Classification) (tonnes)	4	
1.3	H402/412 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.4	H413 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
	Total H400 Equivalent Material	**0.4**	**H0**
	Note on WGK Classification: Use either H statement or WGK classification of a material. Start with H statement if available, if not available use WGK classification instead. DO NOT ENTER THE SAME MATERIAL UNDER BOTH CLASSIFICATIONS See Appendix A of the Guidance Document for further instruction		
1.5	WGK3 Water Hazardous Material (German Classification) (tonnes)	0	
1.6	WGK2 Water Hazardous Material (German Classification) (tonnes)	0	
1.7	WGK1 Water Hazardous Material (German Classification - See information tab) (tonnes)	0	
	Total WGK3 Equivalent Material	**0**	**H0**
66	Laboratories which contain Genetically Modified Micro-Organisms (GMOs) According to Directive 2009/41/EC (Groups 3 & 4) See Appendix A of the Guidance Document for further instruction.	No	H0
1.90	Licensed Hazardous Waste Facility	No	H0
			0

Hazard Potential	Description
H0	No Hazard Potential
H1	Hazard Potential

Scoring Details	
Hazard Potential	**Quantity of Material / Type of Facility**
H0 *No hazard potential*	<1t WGK 3 or Equivalent[1] <1t Toxic (H400/H410 Harmful to Aquatic Life) **or** Equivalent[2]
H1 *Hazard potential*	>1t WGK 3 or Equivalent[1] <1t (H400/H410 Harmful to Aquatic Life) **or** Equivalent[2] Laboratories Which Contain Genetically Modified Micro-Organisms (GMOs) According To Directive 2009/41/EC (Groups 3 & 4) Licenced Waste Storage Facility

Note 1: Hazardous to the Aquatic Environment Equivalent Calculation: 100t H412/H413 = 10t H411 = 1t H400/410

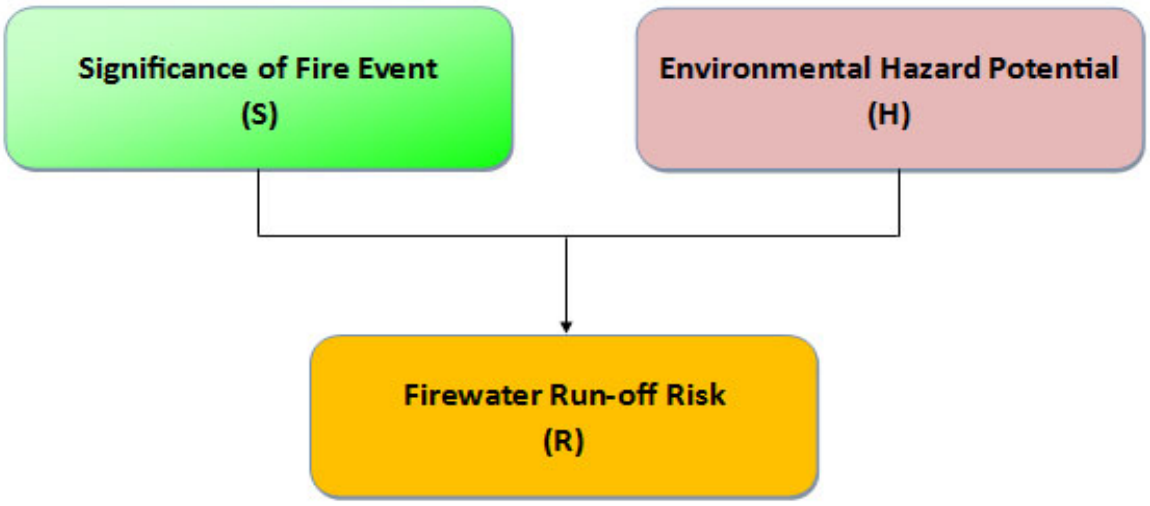
Note 2: WGK Equivalent Calculation: 100t WGK1 = 10t WGK2 = 1t WGK3

Note 3: Fire-fighting foam to be used in this area should be included if relevant hazard classifications apply

Overall Fire Water Run-Off Risk

Office of Environmental Enforcement

Sample Assessment Area



Sheet Reference	Score
Signficance of Fire Event	S1 - Low Significance
Hazard Potential	H0 - No Hazard Potential

	H0	H1
S1	R0	R1
S2	R0	R1
S3	R1	R1

	Score
Fire Water Run-Off Risk	R0 - No Risk

Risk	Minimum Firewater Retention Measures Required
R0 No Risk	No dedicated firewater retention required.
R1 Risk of Environmental Contamination	Firewater run-off must be retained within the operational site. The retention can be provided by means of the site's drainage system and other suitable infrastructure which is not exclusively foreseen for firewater retention (e.g. storm water ponds / tanks in waste water treatment plants). All elements of the site infrastructure to be used for firewater retention (including shutoff valves) must be regularly inspected to ensure functionality and impermeability. The retention facility must remain impermeable for the duration of the incident up to the removal of the firewater run-off The documented available retention capacity in the existing site infrastructure must be monitored and maintained. Automatic shut-off valves must be maintained and tested. Diversion of firewater to retention facilities must be automatic on activation of the site fire alarm. Onsite bunds cannot be used to provide firewater retention unless the content of a bund is directly involved in the fire event.

Conclusion	
Fire Water Retention Required on Site?	No

Fire Water Retention Calculation

General Method - Any Area

Number	Calculation Steps	Response	Comment
1.1	Max Flow of Local Hydrants (l/min)	1500	Input Required
1.2	Fire Duration (Hours) This should be set at 6 hours unless the local fire authority has advised that a reduced time is acceptable. Note: Minimum duration is 1.5 hours	1.5	Input Required
1.3	Max FW volume from hydrants during Fire Event m^3	135	
1.4	Total Fire Water/Foam to be provided by Local Fire Brigade (m^3)	22	Input Required
1.5	Total Fire Water/Foam Stored on Site (m^3)	0	Input Required
1.6	Volume of Product Loss (m^3) See Section 4.5 of the Guidance Document for further information	5	Input Required
1.7	Area of Site which shares common drainage with Assessment Area (m^2)	14720	Input Required
1.8	1 in 10 year 24hour rainfall event for local area (m)	0.0529	Input Required
1.9	Rain Water (m^3)	779	
	Fire Water Retention Required (m^3)	**941**	