UMBRELLA ENVIRONMENTAL

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Environmental Risk Assessment

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D1	23/01/2023	AIL	AIL	Drafted for substantial variation application pack, Client review.
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V2	31/10/2023	AIL	AIL	Amendments due to EA request.

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1 INTRODUCTION

This Environmental Risk Assessment (ERA) accompanies the application for variation to an bespoke waste permit to modernise in accordance with legislation from a waste permit to an installation permit and to add an additional waste code. Site is located at 54 Caswell Road Brackmills Industrial Estate Northampton NN4 7PW.

In approx. 2012 Installation Emissions Directives (IED) was issued and those applicable bespoke waste permits that fell within the remit as defined by the IED regulations had a transition period to apply and vary their operations to be complaint. Unfortunately permit EPR/AP3398LQ was not varied to an IED permit in 2012 and now needs to be varied under a substantial variation application rather than a normal variation as described in the pre application advice received in section 01 of this application pack/

MISWA Chemicals Limited was established in 1979 and has operated in around Northamptonshire creating and exporting products worldwide. An bespoke environmental permit was applied for and issued 0n 28th April 2009 however to date the site has not operated this permit fully.

The existing permit enables the operation of;

'The main features of the facility are as follows. Glycol and water are recovered from waste glycol streams using filtration, settlement, flocculation, and distillation. The recovered glycol and water are then used as raw materials in other downstream processes.

Figure 1 Aerial Image

(Showing location of site)

1.1 Scope

This risk assessment is based on the source-pathway-receptor approach. All potential sources of pollution associated with the acceptance, treatment and storage of permitted inert and non-hazardous waste activities have been assessed against the principle receptor types identified within the site's vicinity.

The requirement for risk management measures is then dependent on a viable pathway being present between the source and the receptor. Where such a pathway exists, management measures are required to reduce risk.

1.2 Aims

This assessment aims to consider potential environmental hazards associated with the activity, to identify sensitive receptors which these may impact, and determine the influence management practice has on reducing risk.

2 SITE SETTING

2.1 Location

The National Grid Reference (NGR) is SP 77565 58276, Eastings and Northings 477565 , 258276 and What Three Words saving.abode.cove.

Site is accessed by the A 45 and Caswell Road, Site is located south west of Northampton Town center.

2.2 Humans and Property

The permitted area is approx. 3778 m^2. The site is surrounded by an industrial area north, east, south and west to the south west of Northampton town centre. The closets commercial premises are adjacent with the closets residential properties located on Pagnell Road 600 m west south west.

2.3 European Designated Receptors

	DESIGNATED SITES (European)		
1	Upper Nene Valley Gravel Pits - SSSI, RAMSAR, SPA	1486 m	NE
2	Northampton AQMA No. 5	1981 m	WSW
3	Roade Cutting - SSSI	5865 m	SSW
4	Salcey Forest - SSSI	6484 m	SSE
5	Yardley Chase - SSSI	6542 m	ESE
6	Bilsworth Rectory Farm Quarry - SSSI	7767 m	SW
7	Upper Nene Valley Gravel Pits - SSSI, RAMSAR	9091 m	ENE

See sensitive receptors 10 km plan 012.1_09_005.

2.4 Designated Receptors

Receptors with no European status but In the future could be recognised but still have impact to the permitting process.

	NON DESIGNATED SITES (but of impact to permitting)		
1	BAP - Deciduous Woodland within and surrounding Hardingstone Pocket Park	244 m	SSW
2	BAP - Deciduous Woodland south of Gowerton Road	809 m	S
3	BAP - Deciduous Woodland adjacent to Hardingstone Dyke & River Nene	947 m	N
4	Barnes Meadow - Local Nature Reserve	947 m	NNW
5	BAP - Deciduous Woodland forming Delapre Wood and within Delapre Golf Centre	1032 m	W
6	BAP - Deciduous Woodland surrounding Delapre Abbey	1133 m	NW
7	BAP - Coastal & Wetland Marshes within Upper Nene Valley Gravel Pits	1452 m	NE
8	BAP - Deciduous Woodland within Brackmills Country Park	1496 m	ESE
9	BAP - Deciduous Woodland within the University of Northampton	1542 m	N

2.5 Geology

Table 1 Geology

Artificial Ground/Made Ground	None
Superficial and Drift Geology	No superficial aquifer designation.
Bedrock and Solid Geology	Unproductive These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

2.6 Hydrogeology

Groundwater vulnerability-Low

Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, No Superficial Aquifer.

2.7 Hydrology

No surface water features within 500 m of the site. Closets feature is Hardingstone Dyke 921 m north, north west of the site.

2.8 Flood Risk

No flood risk from rivers, sea or surface water flooding.

2.9 Air Quality

Not in an Air Quality Management Zone (AQMA).

2.10 Nature of Risk Assessment

This document provides a broad and general assessment of the risk factors considered to be of significance for the site, and an evaluation of the impact from the principle risk factors to receptors within the site vicinity.

3 METHODOLOGY

3.1 Hazard Identification

Hazards have been identified in 103.2 Types of Waste Activity Hazards below. Risk assessments have been carried out for these hazards and are shown in Table 8 Odour, Table 9 Noise and Vibration, Table 10 Fugitive Emissions and Table 11 Accidents.

3.2 Types of Waste Activity Hazards

Hazard		Sources	Risk	Further Assessment
Odour	• Odour from storage • Odour from processing • Odour from Transfer	1. Waste delivery 2. Storage 3. Treatment Process 4. Material dispatch	• Non Conforming wastes	• Table 8 Odour
Noise and Vibration	• Engine Noise (idling) • Noise from vehicle and plant movement. • Noise form reverse warnings • Noise form waste processing • Vibration from plant and vehicle movements	1. Waste delivery 2. Storage 3. Treatment Process 4. Material dispatch	• Processing and storage occurs inside a building.	• Table 9 Noise and Vibration
Fugitive Emissions	• Dust from waste processing • Dust from Stored Waste • Litter form waste storage and/or treatment • Litter from vehicle movements • Pest form waste storage	1. Waste delivery 2. Storage area run-off pre and post treatment 3. Treatment Process 4. Material dispatch 5. Fire Water	• Dust and particulate matter liberated from external areas only during dry conditions. • Loss of material during unloading, treatment and dispatch of waste. • Liquid waste containment failure	• Table 10 Fugitive Emissions

	• Runoff from site operations			
Accidents	• Leak from onsite oil storage • Transfer of substances • Plant of Equipment Failure • Fire in waste materials • Flooding • Vandalism	1. Waste delivery 2. Storage 3. Treatment Process 4. Material dispatch 5. Fire Water 6. Flood risk from Rivers, Sea or surface water. 7. Unauthorised access	• Loss of waste from vehicles • Spillages from processing equipment and vehicles transferring waste in to and out of site. • Damage to processing equipment and site infrastructure by vandals. • Uncontrolled emissions of fire water and smoke.	• Table 11 Accidents
Sensitive Areas	• Damage to protected ecosystems	1. Waste delivery 2. Storage 3. Treatment Process 4. Material dispatch 5. Fire Water	• Sensitive receptors located around site impacted by normal operating activities and those during an incident.	• Table 8 Odour • Table 9 Noise and Vibration • Table 10 Fugitive Emissions • Table 11 Accidents

If a hazard has been identified that may have an environmental impact these have been identified had have been provided mitigation in Section 4 of this document.

3.3 Identify Receptors

Receptors are those sites/activities that are at risk form the hazards that a waste activity may have impact on and are defined as below:

- Protected sites and species
- Anywhere used to grow food or to farm animals or fish
- Drain and sewer systems
- Factories and other businesses
- Fields and allotments used to grow food
- Footpaths
- Groundwater, groundwater source protection zone
- Homes, or groups of homes (such as villages or housing developments
- Playing fields and playgrounds
- Private drinking water supplies
- Regionally important geological
- Schools, hospitals and other public buildings
- Water, for example ponds, streams, rivers, lakes or the sea –
- Conservation and habitats protected areas and areas of scientific interest

The receptors most likely to be impacted by the waste sites activities are listed below in Table 2 Key Receptors

Table 2 Key Receptors

TYPE OF RECEPTOR	ID #	DESCRIPTION	DISTANCE FROM BOUNDARY (M) APPROX	DIRECTION
		SITE		
HUMANS AND PROPERTY		Site Workers	On site	-
		Site Visitors	On site	-
		COMMERCIAL		
	1	Multiple Distribution Centres between Caswell Road & Salthouse Road	0 m	E
	2	Industrial Unit off Caswell Road	13 m	W
	3	Multiple Distribution Centres east of Rhosili Road	49 m	N
	4	Multiple Distribution Centres south of Caswell Road	73 m	SE
	5	Brackmills Trade Park	142 m	WSW
	6	Multiple Offices off Gowerton Road	192 m	SSW
	7	Multiple Offices off Pavillion Drive	225 m	W
	8	Multiple Distribution Centres west of Rhosili Road	356 m	NW
	9	Multiple Distribution Centres west of Burryport Road	439 m	NNE
	10	Multiple Distribution Centres north of Salthouse Road	475 m	NE
	11	Multiple Distribution Centres south of Liliput Road	682 m	NE
	12	Distribution Centre south of Gowerton Road	725 m	SSE
	13	Distribution Centre north of Liliput Road	807 m	NE
	14	Marriott Hotel off Nene Valley Way	810 m	NW
	15	Multiple Distribution Centres east of Salthouse Road	879 m	ENE
	16	Multiple Distribution Centres south east of Salthouse Road	931 m	ESE
	17	Multiple Commercial Units off Queensbridge	1113 m	NNE
	18	Multiple Distribution Centres east of Thomas Dachser Way	1138 m	NE
	19	Distribution Centre and Commercial Development Land off Thomas Dachser Way	1220 m	ENE
	20	Holiday Inn & multiple commercial units off Waterside Way	1295 m	NNE
	21	Multiple Office Buildings north of Bedford Road	1313 m	NNE
	22	Brownfield Development Land off Ransome Road	1629 m	NW
	23	Dobbies Garden Centre & Waitrose (supermarket) off Newport Pagnell Road	1773 m	WSW
	24	Multiple Car Showrooms off Bedford Road	1817 m	NNW
	25	Premier Inn (hotel) & office buildings off Newport Pagnell Road	1868 m	WSW
	26	Multiple Commercial Units off Ransome Road	1873 m	NW
		PUBLIC USE		
	1	Hardingstone Primary School	1242 m	SW

TYPE OF RECEPTOR	ID #	DESCRIPTION	DISTANCE FROM BOUNDARY (M) APPROX	DIRECTION
	2	Northampton High School for Girls	1398 m	SW
	3	Great Houghton School	1566 m	ENE
	4	University of Northampton north of the River Nene	1584 m	NNW
	5	University of Northampton south of River Nene	1615 m	NW
	6	Preston Hedges Primary School	1632 m	SSW
	7	Caroline Chisolm School	1923 m	SSW
	8	Wooton Primary School	1942 m	SW
		RESIDENTIAL		
	1	Residents of Hardingstone north of Newport Pagnell Road	600 m	WSW
	2	Residents of Hardingstone south of Newport Pagnell Road	1217 m	SW
	3	Residents of Great Houghton	1695 m	ENE
		PUBLIC RIGHTS OF WAY (PROW)		
	-	Footpath from Sketty Close to Brackmills Wood & Brackmills Country Park	549 m	E
	-	Footpaths within Northampton Bike Park	839 m	WSW
	-	Footpath at Delaware Lake	1037 m	NNW
	-	Footpath between Nene Valley Way & University of Northampton	1067 m	WNW
	-	Footpath from Bedford Road to Northampton Washlands	1270 m	NNE
	-	Footpath between Cherry Orchard & London Road via Delapre Wood	1408 m	WSW
	-	Footpath from Great Houghton to Brackmills Wood	1470 m	ENE
	-	Footpath from High Street (Great Houghton) to Bedford Road	1539 m	ENE
		ROADS & RAILWAYS		
	-	Caswell Road	10 m	S
	-	A45 Nene Valley Way	698 m	NW
	-	B526 Newport Pagnell Road	1189 m	SW
	-	A428 Bedford Road	1340 m	NE
	-	A4501 Cliftonville Road	1790 m	NNW
	-	A5095 Park Avenue South	1826 m	NNE
		RECREATIONAL		
	1	Hardingstone Pocket Park	275 m	SW
	2	Northampton Bike Park	411 m	WSW
	3	Delapre Golf Complex	836 m	WSW
	4	Northampton Casuals Rugby Football Club & Northampton Rowing Club	1063 m	N
	5	Brackmills Country Park	1110 m	ENE

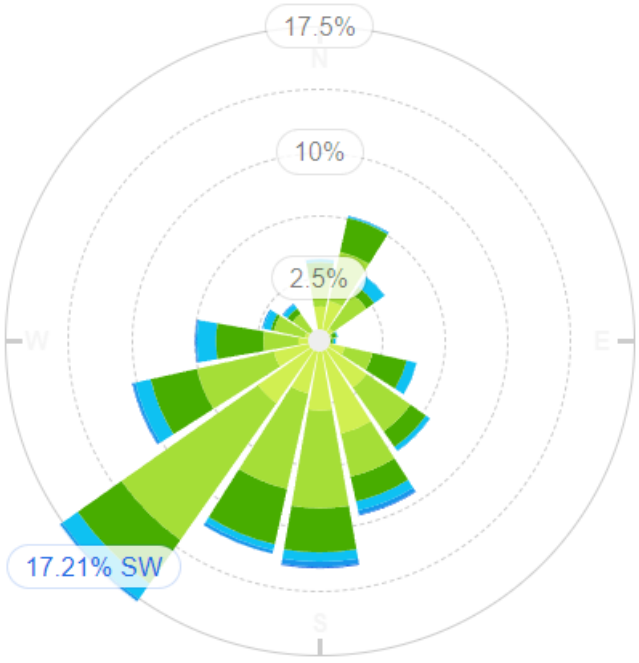
TYPE OF RECEPTOR	ID #	DESCRIPTION	DISTANCE FROM BOUNDARY (M) APPROX	DIRECTION
	6	Becks Meadow Nature Reserve	1315 m	NNW
	7	Cherry Orchard	1362 m	WSW
	8	Midsummer Meadow Recreation Ground	1547 m	NNW
	9	Wooton Community Sports Centre	1692 m	SSW
	10	Northampton Old Scouts Rugby Football Club	1885 m	NNE
		AGRICULTURAL		
	1	Packets of Arable Land east of Hardingstone	672 m	SW
	2	Packets of Arable Land north of 'The Grn' (road)	963 m	SE
	3	Packets of Arable Land south of 'The Grn' (road)	1298 m	SSE
	4	Packets of arable land north of Great Houghton	1538 m	NE
	5	Packets of Arable Land south and west of Great Houghton	1577 m	E
	6	Packets of Arable Land south of Hardingstone	1629 m	SSW
		ATMOSPHERE		
	2	Northampton AQMA No. 5	1981 m	WSW
WATER		**SURFACE WATER**		
	-	Hardingstone Dyke	921 m	NNW
	-	Delapre Lake	960 m	NW
		Multiple courses of the River Nene	984 m	NNW
	-	Pond in Brackmills Wood	1161 m	ENE
	-	Multiple streams within Delapre Estate	1536 m	WNW
	-	Multiple lakes forming Northampton Washlands	1577 m	NNE
		GROUNDWATER		
	-	No bedrock aquifer or superficial layer identified below the site		
ENVIRONMENTALLY SENSITIVE		**DESIGNATED SITES (European)**		
	1	Upper Nene Valley Gravel Pits - SSSI, RAMSAR, SPA	1486 m	NE
	2	Northampton AQMA No. 5	1981 m	WSW
	3	Roade Cutting - SSSI	5865 m	SSW
	4	Salcey Forest - SSSI	6484 m	SSE
	5	Yardley Chase - SSSI	6542 m	ESE
	6	Bilsworth Rectory Farm Quarry - SSSI	7767 m	SW
	7	Upper Nene Valley Gravel Pits - SSSI, RAMSAR	9091 m	ENE
		NON DESIGNATED SITES (but of impact to permitting)		
	1	BAP - Deciduous Woodland within and surrounding Hardingstone Pocket Park	244 m	SSW
	2	BAP - Deciduous Woodland south of Gowerton Road	809 m	S

TYPE OF RECEPTOR	ID #	DESCRIPTION	DISTANCE FROM BOUNDARY (M) APPROX	DIRECTION
	3	BAP - Deciduous Woodland adjacent to Hardingstone Dyke & River Nene	947 m	N
	4	Barnes Meadow - Local Nature Reserve	947 m	NNW
	5	BAP - Deciduous Woodland forming Delapre Wood and within Delapre Golf Centre	1032 m	W
	6	BAP - Deciduous Woodland surrounding Delapre Abbey	1133 m	NW
	7	BAP - Coastal & Wetland Marshes within Upper Nene Valley Gravel Pits	1452 m	NE
	8	BAP - Deciduous Woodland within Brackmills Country Park	1496 m	ESE
	9	BAP - Deciduous Woodland within the University of Northampton	1542 m	N
HERITAGE LOATIONS		**LISTED BUILDINGS AND PARKS**		
	1	c.25 No. Grade II Listed Buildings in Hardingstone	774 m	WSW
	2	Battle of Northampton 1460 Area	805 m	WNW
	3	Farm House at Home Farm (Grade II Listed)	883 m	NW
	4	North Building (Grade II Listed)	1505 m	SW
	5	Multiple Grade II Listed Features at Delapre Abbey	1676 m	WNW
	6	14 No. Grade II Listed Buildings in Great Houghton	1753 m	ENE
	7	Former Midlands Railway Locomotive Shed (Grade II Listed)	1911 m	NW

3.4 Wind Rose

Wind rose shows the prevailing wind direction for the waste site. The data is taken from the weather station based in centre of Northampton 3 km north of the site.

Figure 2 Wind Rose



(https://www.willyweather.co.uk/)

3.5 Pathways

Table 3 Potential Pathways

Hazard	Potential Receptors	Pathway
Odour	Humans/Property/ Sensitive Areas (Designated)	Atmosphere
Noise and Vibration		Atmosphere, Physical
Fugitive Emissions	Ground Water/Humans/Property/ Sensitive Areas (Designated)	Atmosphere, Physical
Fire, Spills and Contaminated surface water.		Atmosphere, Physical, Infiltration via the ground
Vermin, Birds, Insects	Humans/Property/ Sensitive Areas (Designated)	Atmosphere, Physical

3.6 Risk

Environmental Risk is the probability of an receptor being exposed to an environmental hazard and the impact of such exposure. The Primary risk is assessed with no mitigation in place such as managerial procedures and physical engineering.

To assess risk the probability and the consequence of exposure have to be assessed see below tables.

Table 4 Probability of Exposure

Probability of exposure
HIGH – exposure is probable: direct exposure likely with no / few barriers between hazard, source and receptor.
MEDIUM – exposure is fairly probable: feasible exposure possible, barriers to exposure less controllable.
LOW – exposure is unlikely: several barriers exist between hazards source and receptors to mitigate against exposure.
VERY LOW – exposure is very unlikely; effective, multiple barriers in place to mitigate against exposure.

Table 5 Consequence of Exposure

Consequences of Exposure
HIGH – the consequences are severe: sufficient evidence that short or long term exposure may result in serious damage.
MEDIUM – consequences are significant; sufficient evidence that exposure to hazard may result in damage that is not severe in nature and reversible once exposure ceases (e.g. irritant).
LOW – consequences are minor; damage not apparent though reversible adverse changes may occur.
VERY LOW – consequences are negligible; no evidence of adverse changes following exposure.

Application of the probability and consequences of an hazard gives a risk rating as shown by the matrix below in

Table 6 Risk Matrix

		Consequences			
		Very Low	Low	Medium	High
Likelihood	High	Low	Medium	High	High
	Medium	Low	Medium	Medium	High
	Low	Low	Low	Medium	Medium
	Very Low	Very Low	Low	Low	Low

3.7 Management of Risk

For all the hazards identified in section 3.2 above, managerial procedures and hard infrastructure engineering have been developed in accordance with relevant guidance documents[1][2][3][4]

Residual risk will remain and these are detailed in the activity risk tables.

Table 7 Activity Risks

Reference	Process

[1] https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit#odour-management-plan
[2] Sector Guidance Note S5.06: Recovery and disposal of hazardous and non-hazardous waste
[3] H3 Noise Assessment and Control (Part 2)

AR1	Waste receipt
AR2	Waste storage pending treatment or recovery/disposal
AR3	Waste treatment processes
AR4	Material dispatch for recovery/disposal

Table 8 Odour

Odour							
Identifying the harm and what could be harmed			**Assessing the risk**			**Managing the risk**	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
AR1 **Reception** (delivery of waste to the site) Vehicle Movements (waste delivery, movement of waste within the site and transfer of waste out of site) **AR2** **Storage (Secure Storage)** **AR3** **Treatment processes** (Treatment consisting only of, separation and	**Humans & Property** **Protected Nature Conservation Sites** **Atmosphere** *Inhalation of particles.* *Deposition of dust/particles on property and land.*	**Air**	**LOW**	**MEDIUM**	**MEDIUM**	• All vehicles delivering and collecting materials to/from the site are covered and or sealed tankers. • Daily maintenance and inspection of storage areas. • All vehicles, plant and machinery would be operated and maintained in accordance with manufacturer's specifications. • All plant based on the site would be equipped with upward facing exhausts. • Vehicle speeds are restricted to a maximum of 10 mph.	**LOW**

blending. **AR4** **Material Dispatch** (Recovery/disposal)						• 012.1_05_003 EMS provides managerial procedures to prevent odour.	

Table 9 Noise and Vibration

Noise and Vibration							
Identifying the harm and what could be harmed			**Assessing the risk**			**Managing the risk**	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
AR1 **Reception** (delivery of waste to the site) **Vehicle Movements** (waste delivery, movement of waste within the site and transfer of waste out of site) **AR2**	**Noise sensitive locations**[5] **Protected Nature Conservation Sites** .	**Air,** **Land**	**HIGH**	**MEDIUM**	**HIGH**	• Machinery is inspected and maintained regularly in line with manufacturer's recommendations. • Daytime operations only. • Industrial location (higher back ground levels) • See Noise Impact Assessment in appendix 1 which shows no adverse impact or requirement for an Noise and Vibration Management Plan	**LOW**

[5] **Notes:** Noise–sensitive location defined in H3 *Horizontal Guidance for Noise Part 2 – Noise Assessment and Control* published by the Environment Agency as - *'Any dwelling, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity, which for its proper enjoyment requires the absence of noise at nuisance levels'*. Part 1 of H3 suggests that '*commercial premises may be* [noise sensitive], *depending upon the activities undertaken there'*.

Storage (Secure Storage) **AR3** **Treatment processes** (Treatment consisting only of, separation and blending. **AR4** **Material Dispatch** (Recovery/disposal)						• 012.1_05_003EMS provides managerial procedures to prevent noise and vibration	

Table 10 Fugitive Emissions

Litter and Debris							
Identifying the harm and what could be harmed			**Assessing the risk**			**Managing the risk**	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
AR1 **Reception** (delivery of waste to the site) **Vehicle Movements** (waste delivery, movement of waste within the site and transfer of waste out of site) **AR2** **Storage** (Secure Storage) **AR3** **Treatment processes** (Treatment consisting	**Humans & Property** **Protected Nature Conservation Sites** *Litter Nuisance*	**Air;** **windblown, physical transport and deposition**	**LOW**	**LOW**	**LOW**	• All vehicles delivering and collecting materials to/from the site are covered and or sealed tankers. • One singular waste type accepted. • Type of waste is unlikely to produce litter. • Daily housekeeping of site surfaces to remove litter and debris and prevent spread. • Daily maintenance and inspection of storage areas. • Training provided to all relevant staff to collect loose litter and debris on a see it pick it up basis. • All waste activities occur inside see site plan 012.1_09_002.	**VERY LOW**

Litter and Debris							
Identifying the harm and what could be harmed			**Assessing the risk**			**Managing the risk**	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
only of, separation and blending. **AR4** **Material Dispatch (Recovery/disposal)**						• 012.1_05_003 EMS provides managerial procedures to prevent litter and debris	

Water							
Identifying the harm and what could be harmed			**Assessing the risk**			**Managing the risk**	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
AR1 **Reception** (delivery of waste to the site) **Vehicle Movements** (waste delivery, movement of waste within the site and transfer of waste out of site) **AR2** **Storage** (Secure Storage) **AR3** **Treatment processes** (Treatment consisting only of, separation and	**Protected Nature Conservation Sites** **Surface Water** **Groundwater** *Contamination*	**Land, water, runoff**	**LOW**	**LOW**	**LOW**	• All waste transfers are overseen by a competent person. • Daily site inspections and good housekeeping procedures in place – recorded in site diary. • Spill kits on site and employees are trained in their use and disposal. • Fuel/oil storage is in accordance with the Oil Storage Regulations and provided with secondary containment. • No waste stored within 10 m of a water course • No waste stored within 50 m of any spring or borehole • All waste stored internally undercover or within a	**VERY LOW**

Water							
Identifying the harm and what could be harmed			**Assessing the risk**			**Managing the risk**	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
blending. **AR4** **Material Dispatch (Recovery/disposal)**						designated tank farm under pressure. • Separate drainage system for roof water. • Waste stored on impermeable site surface within a building. • 012.1_05_003 EMS provides managerial procedures to prevent ingress of rain water.	

Mud and Debris							
Identifying the harm and what could be harmed			**Assessing the risk**			**Managing the risk**	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
AR1 **Reception** (delivery of waste to the site) **Vehicle Movements** (waste delivery, movement of waste within the site and transfer of waste out of site) **AR4** **Material Dispatch (Recovery/disposal)**	**Humans & Property** *Amenity impact*	**Direct deposition**	**LOW**	**MEDIUM**	**MEDIUM**	• Daily inspections by site staff and records kept. • Road sweeping as required. • Transport vehicles inspected when leaving site and cleaned as required. • Waste is not known to originate from locations that are muddy. • Waste is inherently non muddy. • 012.1_05_003 EMS provides managerial procedures to prevent mud and debris escaping.	**VERY LOW**

Pest, Vermin, Scavengers							
Identifying the harm and what could be harmed			**Assessing the risk**			**Managing the risk**	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
N/A - Given types of wastes accepted at site unlikely to give rise to significant pest issues.	**Humans & Property** **Protected Nature Conservation Sites**	**Air; Ground depending on vector**	**LOW**	**MEDIUM**	**LOW**	• Daily site inspections and good housekeeping procedures in place. • Permitted wastes unlikely to attract scavenging animals • Waste stored in a building or pressurised tank farm • 012.1_05_003 EMS provides managerial procedures to prevent pest and vermin.	**VERY LOW**

Table 11 Accidents

Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
TRANSFERRING SUBSTANCES							
AR1 **Reception** (delivery of waste to the site) **Vehicle Movements** (waste delivery, movement of waste within the site and transfer of waste out of site) **AR2** **Storage** (Secure Storage) **AR3** **Treatment processes** (Treatment consisting	**Humans & Property** **Protected Nature Conservation Sites** **Surface Water** **Groundwater** **Atmosphere** *Adverse impact*	**Land, air, water**	**LOW**	**LOW**	**MEDIUM**	• All vehicles delivering and collecting materials to/from the site are covered and or contain waste in IBC containers. • All waste that arrives is either containerised or in tankers • All waste transfers are overseen by a competent person. • Fuel/oil storage is in accordance with the Oil Storage Regulations and provided with secondary containment. All stored within secured perimeter. • Limited vehicle movements on site and 10 mph speed limit	**LOW**

Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
only of, separation and blending. **AR4** **Material Dispatch (Recovery/disposal)**						• Spill kits on site and employees are trained in their use and disposal. • Deposit of waste occurs within a designated area. • 012.1_05_003 EMS provides managerial procedures to prevent accidents	

Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
PLANT OR EQUIPMENT FAILURE							
AR1 **Reception**	**Humans & Property** **Protected Nature**	**Land, air, water**	**LOW**	**LOW**	**MEDIUM**	• Limited vehicle movements within site reduces risk of accident.	**LOW**

Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
(delivery of waste to the site) **Vehicle Movements** (waste delivery, movement of waste within the site and transfer of waste out of site) **AR2** **Storage** (Secure Storage) **AR3** **Treatment processes** (Treatment consisting only of, separation and blending. **AR4**	**Conservation Sites** **Surface Water** **Groundwater** **Atmosphere** *Adverse impact*					• Critical spares held on site • Planned maintenance program limits failure of key process components. • Daily inspections of plant, equipment and site infrastructure • 012.1_05_003 EMS provides managerial procedures to prevent plant or equipment failure.	

Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
Material Dispatch (Recovery/disposal)							

Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
FLOODING							
Surface water flooding. No risk from coastal and river waters. **AR1** **Reception** (delivery of waste to the site)	***Site*** ***Humans and Property***	**Land and water**	**MEDIUM**	**MEDIUM**	**MEDIUM**	• Visual Checks of drainage system on site and externally on highways road. • Maintenance of site drainage system. • Notification to Highways when road drains are blocked	**LOW**

Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
Vehicle Movements (waste delivery, movement of waste within the site and transfer of waste out of site) **AR2** **Storage** (Secure Storage) **AR3** **Treatment processes** (Treatment consisting only of, separation and blending. **AR4** **Material Dispatch (Recovery/disposal)**							

Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
VANDALISM							
Entire Process	**Humans & Property** **Protected Nature Conservation Sites** **Surface Water** **Groundwater** **Atmosphere** *Adverse impact*	**Land, air, water**	**LOW**	**MEDIUM**	**MEDIUM**	• Site is secured by fencing and gated. • CCTV • Waste stored internally pre processing and then in tank farm post processing see site plan MD22024 - BERP Project Site Drawing - Dated 14-12-2022 • 012.1_05_003 EMS provides managerial procedures to prevent vandalism.	**LOW**

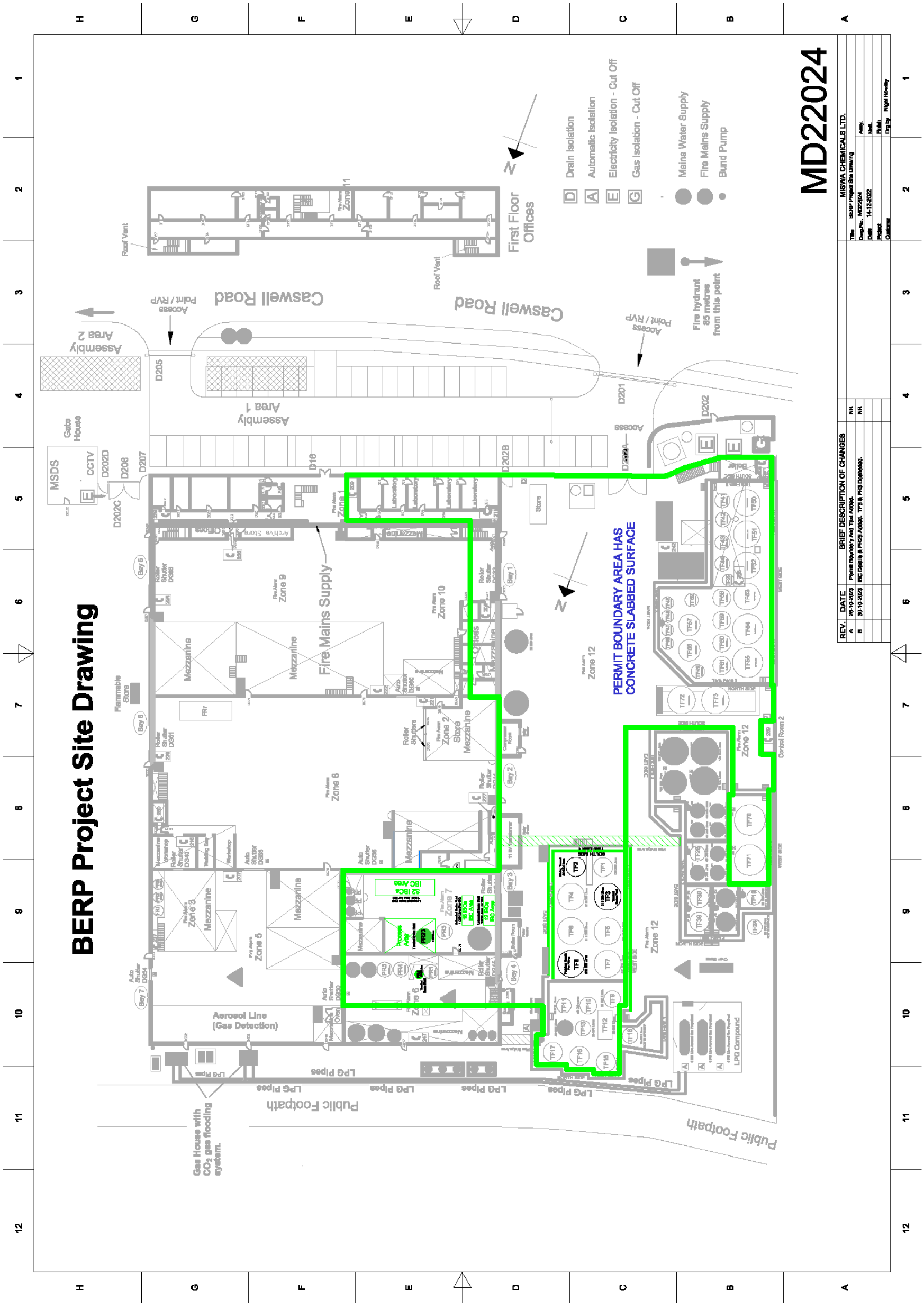
Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
FIRE							
AR1 **Reception** (delivery of waste to the site) **Vehicle Movements** (waste delivery, movement of waste within the site and transfer of waste out of site) **AR2** **Storage** (Secure Storage) **AR3** **Treatment processes** (Treatment consisting only of sorting, separation,	**Humans & Property** **Protected Nature Conservation Sites** **Atmosphere** *Loss of life and property, loss of habitat, destruction and loss of amenity*	**Spread through physical contact; fanned by winds**	**LOW**	**HIGH**	**MEDIUM**	• Liquid waste has LOW combustibility. • Incoming waste is source segregated. • CCTV. • Potential ignition sources will be removed from waste storage areas. • The operational section of the site is a no smoking area. All areas are subject to daily housekeeping. • 012.1_05_003 EMS provides managerial procedures to prevent fire.	**LOW**

Identifying the harm and what could be harmed			Assessing the risk			Managing the risk	
Hazard	**Receptor**	**Pathway**	**Probability of exposure**	**Consequence**	**Overall risk**	**Risk Management**	**Residual risk**
Potential to cause harm?	*What's the risk? What do I wish to protect?*	*Route of hazard to the receptor?*	*Likelihood of this contact?*	*Harm that can be caused?*	*Remaining Risk*	*Measures to reduce the risk?*	*Residual risk after the application of managerial procedures?*
screening, crushing and blending of waste for recovery as a soil, soil substitute or aggregate). **AR4** **Material Dispatch (Recovery/disposal)**							

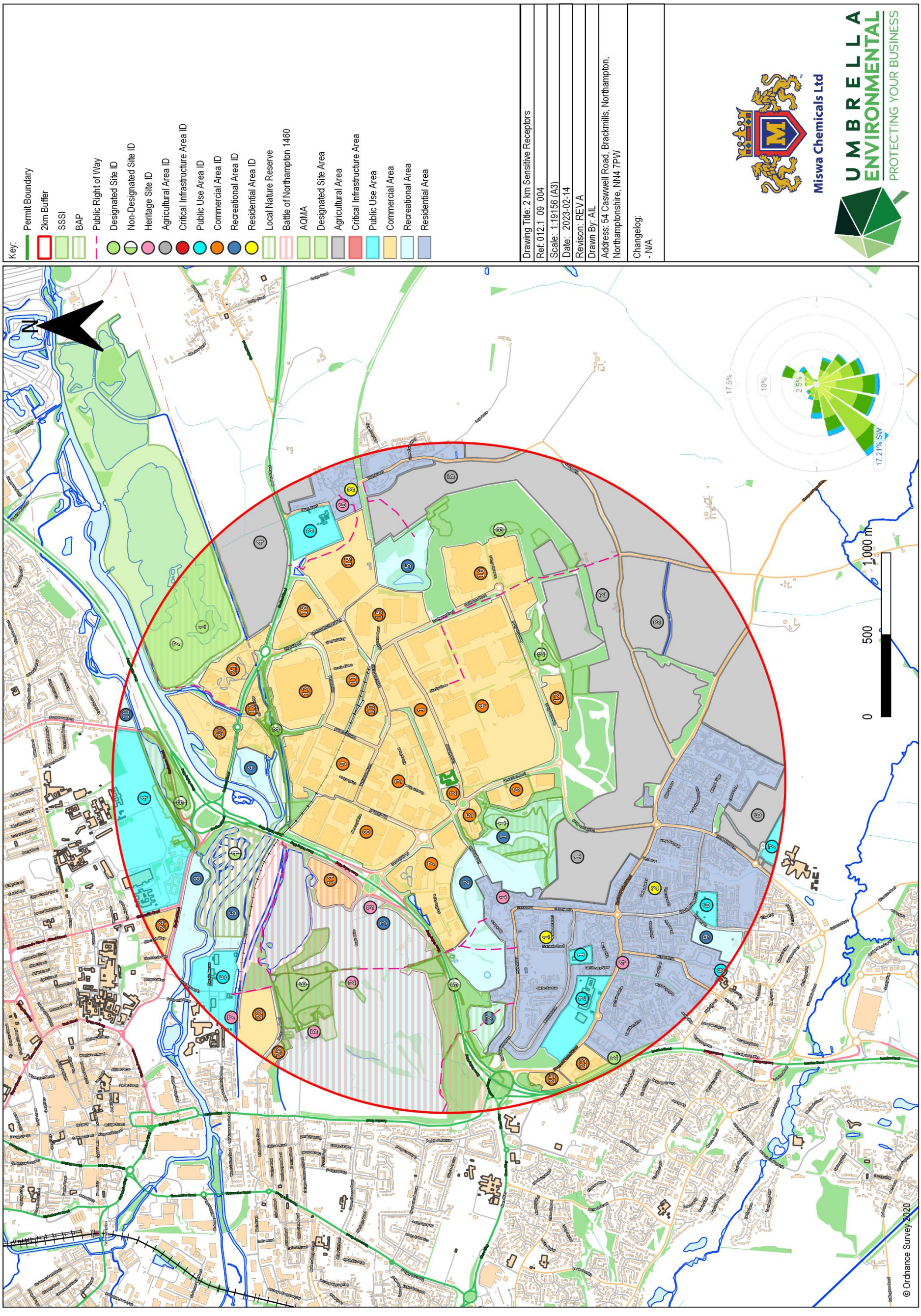
4 DRAWINGS

Drawing 1 Permit Boundary 012.1_09_001

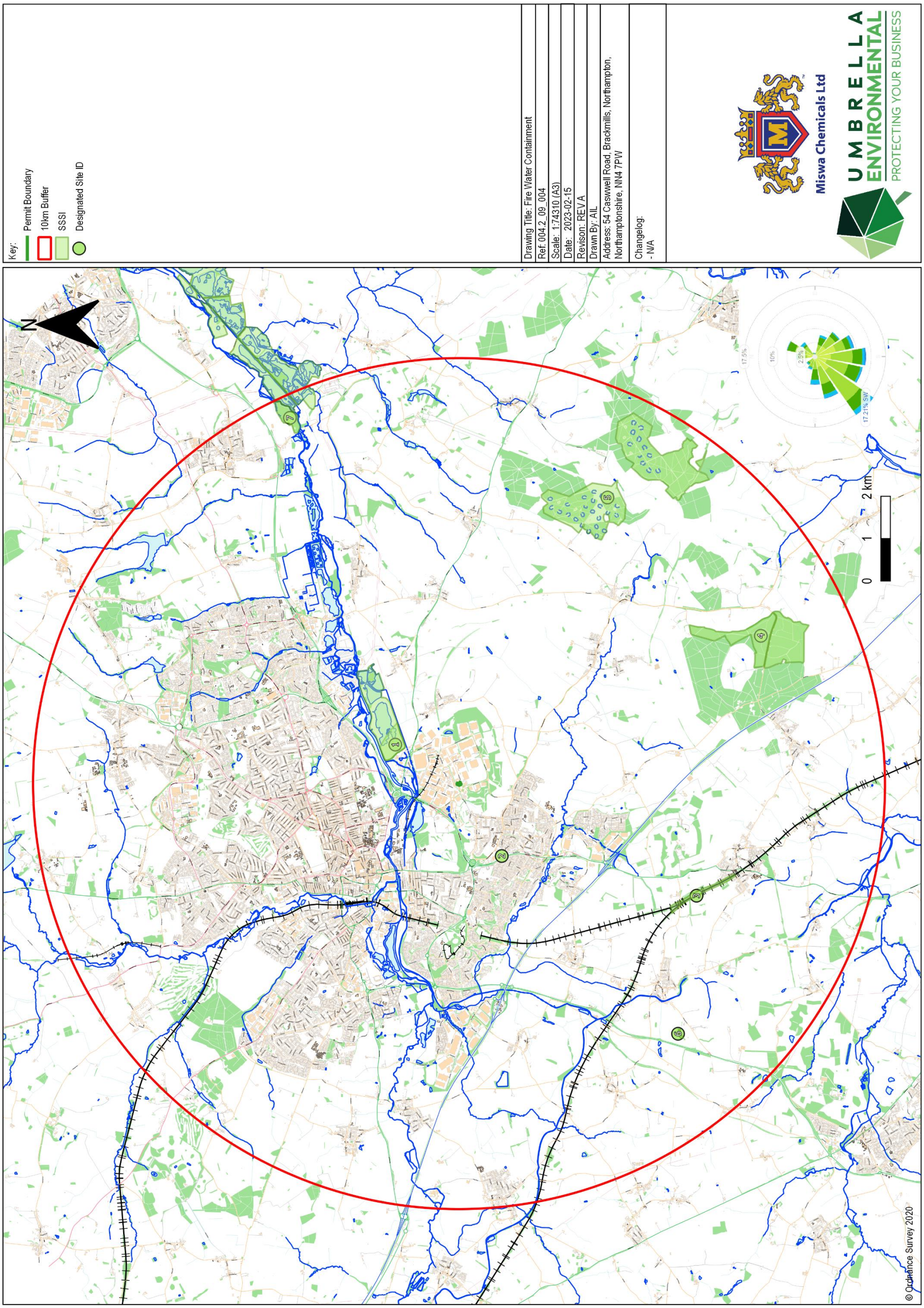
Drawing 2 Site Plan MD22024 - BERP Project Site Drawing - Dated 14-12-2022



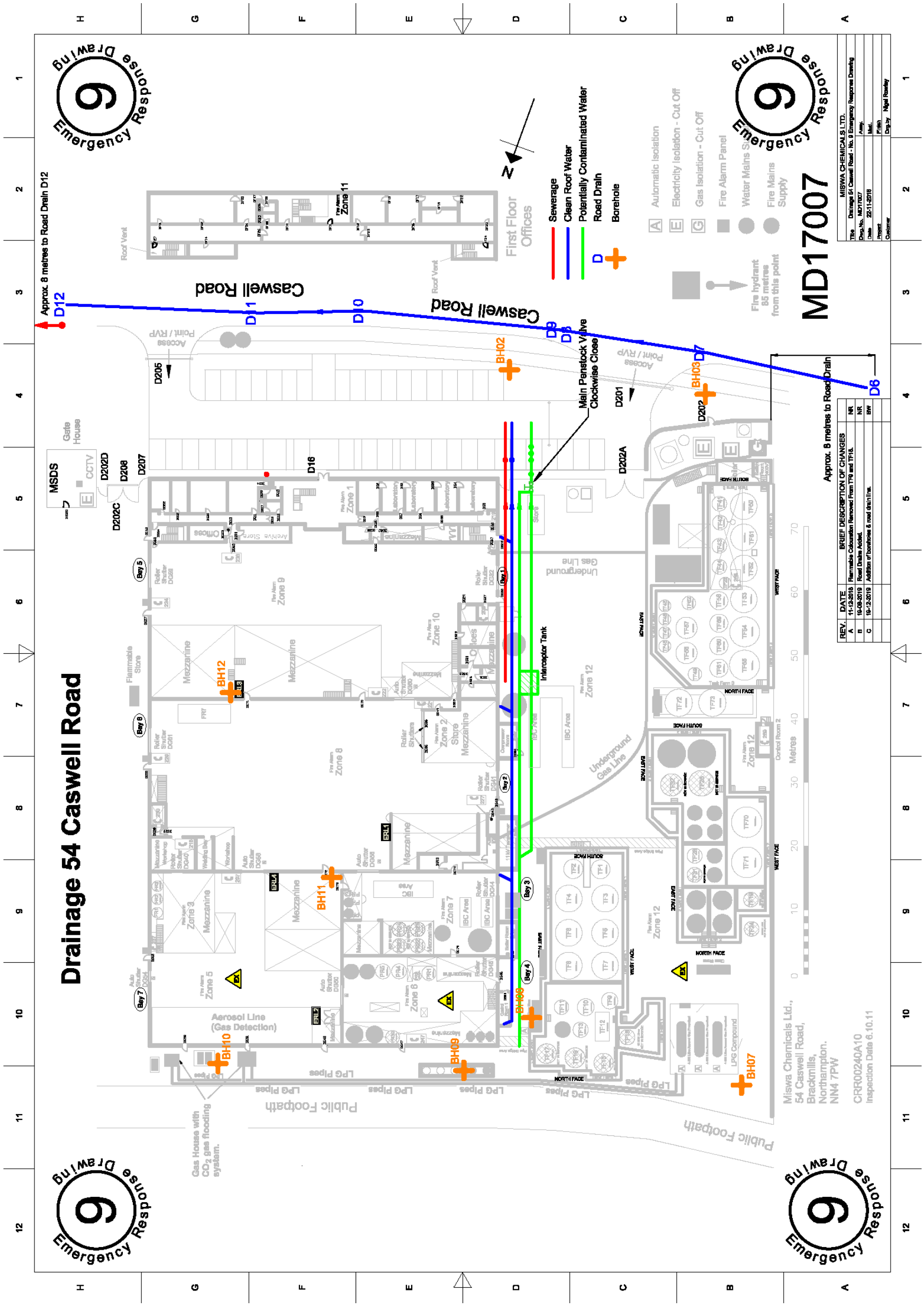
Drawing 3 Sensitive Receptors 2 km Plan 012.1_09_004



Drawing 4 Sensitive Receptors 10 km Plan 012.1_09_005



Drawing 5 Drainage Plan MD17007



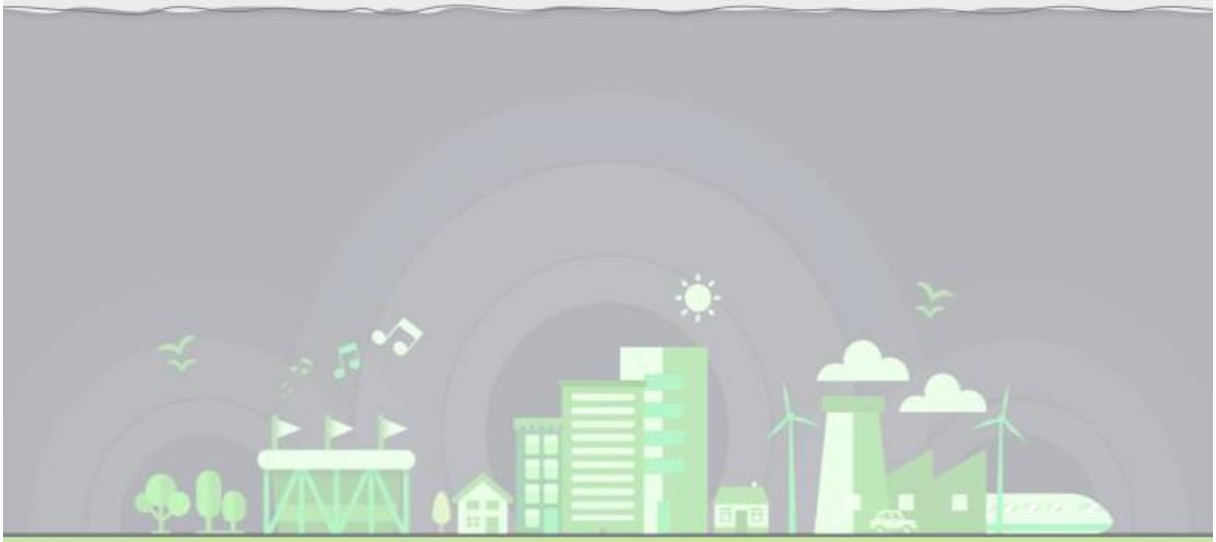
5 APPENDICES

Appendix 1 8757UE - Noise Impact Assessment - NOVA Acoustics Ltd

NOVA ACOUSTICS

Noise Impact Assessment for the Extension of Permitted Industrial Operations

Client Name:	Miswa Chemicals Ltd
Site Address:	54 Caswell Road, Brackmills Industrial Estate, NN4 7PW
Date:	15/12/2022



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Date	15/12/2022
Project Number	8757UE
Version Reference	001

Disclaimer

The opinions and interpretations presented in this report represent our best technical interpretation of the data made available to us. However, due to uncertainty inherent in the estimation of all parameters, we cannot, and do not guarantee the accuracy or correctness of any interpretation and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, cost, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. If additional information becomes available which may affect our comments, conclusions or recommendations, the author reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly. Except for the provision of professional services on a fee basis, NOVA Acoustics Ltd does not have a commercial arrangement with any person or company involved in the interests that are the subject of this report. NOVA Acoustics Ltd cannot accept any liability for the correctness, applicability or validity for the information they have provided, or indeed for any consequential costs or losses in this regard. Our efforts have been made on a "best endeavours" basis and no responsibility or liability is warranted or accepted by NOVA Acoustics Ltd.

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Tables

Figures

Executive Summary

An environmental noise survey and noise impact assessment have been undertaken at Miswa Chemicals Ltd, 54 Caswell Road, Brackmills Industrial Estate, NN4 7PW to assess the noise emissions from the proposed extension of operations. The measured background sound levels have allowed for a BS4142:2014 noise impact assessment to be carried out. A summary of the assessment results can be seen below.

BS4142:2014 Noise Assessment of Proposed Operations:

The BS4142:2014 noise impact assessment has indicated that 'Low Impact, dependant on context' is expected at the most affected residential NSR, which equates to 'No Observed Effect Level' ('NOEL') when assessed in accordance with the NPSE and NPPF. Furthermore, the specific sound level from the proposed operations is significantly below the existing ambient sound level which indicates that the proposed operations will not constructively add to the existing ambient sound climate. The rating penalties applied to the specific sound level are deemed 'robust' as the specific sound level is significantly below the prevailing background sound level, and that the residual acoustic environment would have to drop significantly in level for the specific sound level emissions from the proposed operations to be audible. Furthermore, the specific sound level emissions from the proposed operations are similar in nature to that of the residual acoustic climate which already includes a great number of HGV movements and deliveries and similar external fixed plant associated with the tank farm.

Whilst the scope of BS4142:2014+A1:2019 states it is only appropriate for residential NSRs, consideration has been given to the nearby offices. The external rating sound level of 29 dBA is below the BS8233:2014 internal ambient noise level criteria of 35 dBA for an executive office.

It should be recognised that an expanded uncertainty to 95% confidence was calculated at 4 dB and that the results of the assessments are likely to be an overestimate due to the 'worst-case' conditions assumed within the modelling software (in accordance with ISO 9613-2).

The findings of this report will require written approval from the Local Authority prior to work commencing.

1. Introduction

Overview

NOVA Acoustics Ltd has been commissioned to prepare a noise assessment for the proposed extension to permitted industrial operations ('the Proposed Development') at Miswa Chemicals Ltd, 54 Caswell Road, Brackmills Industrial Estate, NN4 7PW ('the Site'). The report details the existing background and ambient sound climate at the nearest Noise Sensitive Receptors, as well as the noise emissions associated with the proposed operations and recommend mitigation measures where necessary.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

Scope & Objectives

The scope of the noise assessment can be summarised as follows:

- Baseline sound monitoring survey to evaluate the prevailing background sound levels at the nearest Noise Sensitive Receptor ('NSR') to Site;
- Sound monitoring at the site to measure specific noise emissions from any proposed noise generating equipment deemed to be a cause for concern.
- Detailed sound modelling, acoustic calculation and analysis in accordance with: ISO 9613-2 – 'Attenuation of sound propagation outdoors prediction methodology', to predict the sound levels at the NSRs;
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Policy Framework (2021), Noise Policy Statement for England (2010), British Standard BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound' and IEMA 'Guidelines on Noise Impact Assessments'. Further information on the legislation can be found in Appendix B.

Legislation & Guidance

Environmental Permitting (England and Wales) Regulations 2016 (as amended)

The regulations require that operators of permitted installations conduct their activities to prevent, or where that is not possible, to reduce to a minimum, pollution arising from their operations. The legislation requires that all pollutants (including noise and vibration) meet the standards required and demonstrate 'Best Available Techniques' ('BAT').

Assessment of the impacts of noise from a proposed installation requires an assessment to predict the significance of the potential impacts.

Additional guidance and reference to national standards for the monitoring and evaluation of noise are accepted as an appropriate metric for assessing the significance of impacts. The relevant guidance is detailed below.

Horizontal Guidance for Noise Part 2 – Noise Assessment and Control (H3)

Agency Guidance note H3 provides advice on assessing the potential impact of noise from permitted installations. The guidance notes that:

> *"Regulation of noise under IPPC will bring together several legislative regimes with different scope but similar purpose and, in the case of A1 installations, will require a co-ordinated approach between the Regulator and both the Planning functions and the Environmental Health or Environmental Protection Teams of local authorities. At an early stage, lead planning and environmental health/protection officers should be identified to ensure an effective liaison and consultation process."*

It is therefore appropriate to reference guidance used by planning authorities in determining planning applications and, where possible, align compliance requirements to avoid confusion or conflict between similarly required regulatory outcomes.

H3 endorses the use of the following specific guidance and standards for the assessment of noise from permitted installations:

- National Planning Policy Framework 2021 (NPPF)
- Planning Practice Guidance (ProPG)
- British Standard 4142:2014+A1:2019 – 'Methods for rating industrial noise affecting mixed residential and industrial areas'
- British Standard 5228:2009+A1:2014 – 'Noise and vibration control on construction and open sites'
- British Standard 7445:2003 – 'Description and measurement of environmental noise'
- World Health Organisation Guidelines for Community Noise: 1999.

It is expected that controls on noise emissions put in place under the environmental permit requirements should be consistent with those required under other regulatory regimes. It is therefore also appropriate to consider planning policy when setting appropriate noise controls.

It is normal for permitted installations to demonstrate compliance by preparing a 'Noise Management Plan' ('NMP'). The NMP addresses physical, operational and management controls exercised by the operator of the installation to comply with 'Best Available Techniques' ('BAT').

Context & Background

Miswa Chemicals Ltd have conducted their current permitted activities for over 10 years, which include the processing of waste chemicals and subsequent manufacture of chemicals. The proposal is for the extension of site operations to include the processing and storage of waste brake fluid. The following is proposed:

- Once a month, a HGV will deliver up to 20 No. IBC tanks containing waste brake fluid between 07:00 to 14:00 hours on Monday to Friday.
- All waste brake fluid processing will occur between 07:00 to 16:30 hours, Monday to Friday.
- Forklifts then transport the waste brake fluid off the HGV to a storage area within a repurposed section of the existing building (zone 6).

- The waste brake fluid is then pumped from the IBC tanks into an adjacent PR23 tank via a new 'Double Diaphragm' ('DD') pump which also powers to bag filters and carbon cartridge filters.
- The contents within the PR23 tank are then pumped through pipework into an existing storage tank farm in zone 7 (PR2).
- The contents are then pumped from the storage tanks within zone 7 into a larger existing and repurposed storage tank (TF3) outside in zone 12.

The primary noise sources are that of:

- HGV movements and loading.
- Forklifts transporting the IBC tanks around site.
- The new double diaphragm pump within the building of zone 6.
- The pump used to transport the waste brake fluid from zone 6 into the storage tanks in zone 7.
- The external pump located at the base of storage tank TF3 used to pump the waste brake fluid into it.

The permit extension is indicated by the dashed green outline in the figure below.

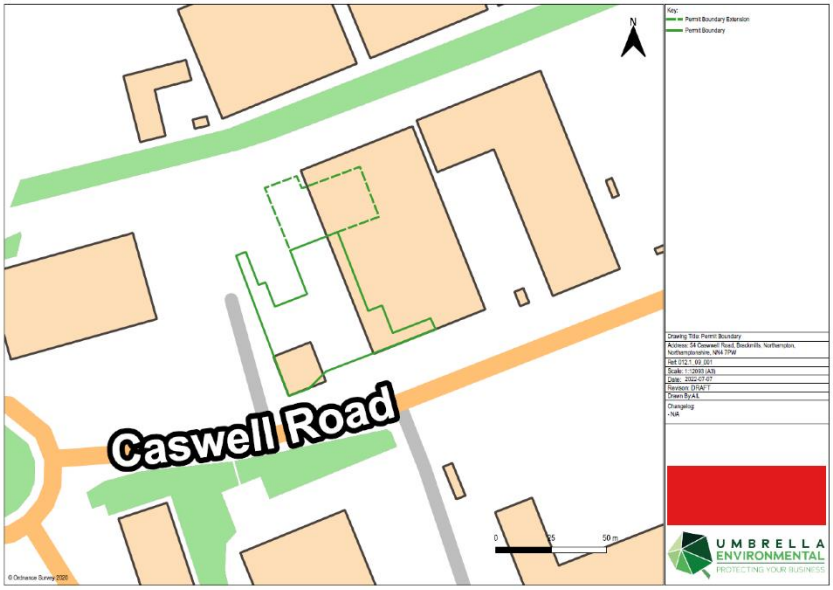


Figure 1.0 – Permit Boundary Extension

2. Environmental Noise Survey

Measurement Methodology

To characterise the sound profile of the area and establish background sound levels at the closest 'Noise Sensitive Receptors' ('NSR's), an environmental sound survey was carried out from 05/12/22 to 06/12/22. For the sound monitoring, a sound level meter was attached to lamppost within the vicinity of the closest NSR (MP1 / NSR 1) with the microphone positioned approximately 4m above the ground, and at least 3.5m from any other large reflective surface. The sound level meters were installed at this height in order to avoid interference by the general public. The monitoring locations are shown in Figure 1.0 below.

Figure 2.0 – Indicative Site Layout

Surrounding Areas & Subjective Impression

The area surrounding the site consists primarily of commercial/industrial premises with the closest residential properties approximately 620m to the west of the site along Llex Close. Due to this dwelling's proximity to the site, it is considered to be the closest residential 'Noise Sensitive Receptor' ('NSR1'). An office block forms the second NSR (NSR2) and is located on Oxwich Close approximately 36m from the northern site boundary.

The acoustic environment at MP1 (NSR1) was deemed to be moderate to high in level during the day operational period, and the noise profile was dominated by road traffic noise emissions from the surrounding road networks, particularly the A46, which facilitate heavy levels of traffic flow, particularly during early morning and afternoon rush hours. Whilst the acoustic environment that immediately surrounds the Proposed Development Site and NSR2 is heavily influenced by industrial and commercial noise emissions including; HGV movements, continuous and audible humming from fixed plant noise and transient events of impact noise, the acoustic environment at MP1 (NSR1) which was shielded by the dwellings themselves did not include such noise emissions.

Environmental Noise Survey Results

Background Sound Levels – Excluding Existing Operations

The figures below outline the measured background sound levels that have been used as the baseline for the subsequent NIA. It should be noted that the background sound level analysis presented in the figures below is indicative of the operational hours (07:00 to 17:00) for the entire measurement period between 05/12/2022 to 06/12/2022.

A summary of results for the entire measurement period can be found in Appendix C.

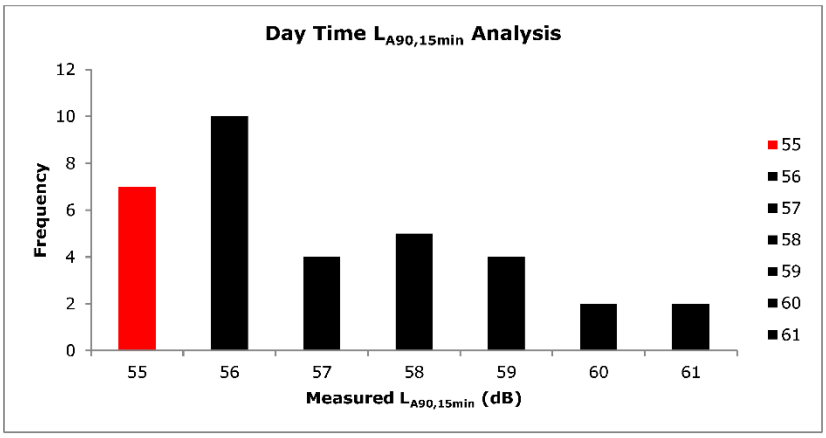


Figure 3.0 – Day Time $L_{A90,15min}$ Background Sound Level Analysis

As can be seen in the figure above, the modal $L_{A90,15min}$ value is 56 dB during the day time operational period, however, the $L_{A90,15min}$ value of 55 dB occurred 7 times and is considered to be the 'lowest typical' background sound level that presents a 'robust' scenario, and has been used as the baseline for the subsequent assessment.

3. BS4142:2014 Noise Impact Assessment of Proposed Operations

The following section of the report analyses the impact of the noise emissions generated by the proposed site operations.

Specific Sound Levels of Plant & Operations

The following section of the report outlines the specific sound levels at the most affected NSRs. All onsite measurements taken during the attended site survey were conducted with the sound level meter microphone approximately 1.5m above the ground. Where possible the noise source of interest was dominant at the measurement positions, and instances where not, residual sound measurements have been conducted to obtain specific sound levels.

HGV Movements & IBC Tank Unloading:

The following table presents the measured sound levels of the following:

- A single HGV stationary at the site entrance,
- A single HGV entering the site,
- A 'forklift' ('FL') unloading 10 IBC tanks,
- A single HGV manoeuvring and leaving the site.

The table also shows the time corrected sound power levels for each process considering the following:

- A single HGV moving into the site and within the yard during the BS4142 reference day time period of 1-hour.
- A single HGV remains stationary at the site entrance for no more than 3-minutes during the day time 1-hour period.
- A forklift takes 15-minutes to unload 20 IBC tanks during the day time 1-hour period.

Time Corrected Sound Power Levels of HGV Movements & IBC Tank Unloading									
Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
HGV Stationary at Gate (L_{eq} – 3m)	71	69	71	75	75	71	69	66	79
Time Corrected L_W of Stationary HGV	76	74	76	80	80	76	74	71	84*
FL Unloading IBC Tanks (L_{eq} – 5m)	66	63	63	65	68	67	59	53	72
Time Corrected L_W of FL Unloading IBC Tanks	82	79	79	81	84	83	75	69	88*
HGV Manoeuvring & Pulling Away (L_{eq} – 5m)	59	60	60	62	65	67	61	53	71

Time Corrected L_W of HGV Manoeuvring & Pulling Away	70	71	71	73	76	78	72	64	89*
Cumulative L_W of IBC Unloading & HGV Manoeuvring & Exiting	82	80	80	82	85	84	77	70	89*

Table 1.0 – Sound Power Levels of HGV Movements & FL IBC Unloading

**Global A-weighted noise level calculated from octave band L_{eq} noise levels considering the A-weighting scale correction.*

Internal Noise Breakout of Proposed Buildings:

The following table outlines the measured internal ambient noise levels of zone 6 and zone 7 which are to house the new DD pumps. Measurements were taken at various distances from the noise generating source (DD pumps) within zone 7, however, the measured noise levels are indicative of those in both zones. The noise levels measured at 1m have been used in the subsequent calculations to present a 'worst-case' scenario.

Measured Internal Noise Levels of Zone 6 & Zone 7									
Description	**1/1 Octave Frequency Band (Hz, L_{eq} dB)**								**Overall (dBA)**
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
DD Pump at 1m in Zone 7	69	61	64	68	71	72	71	68	78

Table 2.0 – Measured Internal Noise Levels Noise Generating Rooms

During the site visit, the following constructions and building elements were noted, and the following assumptions have been made within the calculations:

- The lower section of the façades (approximately 2m in height) is constructed from a minimum of 100mm concrete blockwork, which is assumed to provide sufficient sound reduction and has not been considered in the noise breakout calculations.
- The upper section of façades and the roofing of the building are constructed from Kingspan KS1000RW panels. Manufacturers data sheets can be found in Appendix E.

The table below presents the sound reduction provided by each building fabric element.

Sound Reduction of Building Fabric Elements									
Description	**1/1 Octave Frequency Band (Hz, SRI dB)**								**Overall (R_W)**
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
KS1000RW Panels	20	18	20	24	20	29	39	47	25

Table 3.0 – Sound Reduction of Building Fabric Elements

The predicted noise breakout from the structures is calculated considering the following criteria:

- The noise emissions breaking out of the buildings have been calculated considering the internal noise levels as shown in Table 2.0 and the sound reduction provided by building fabric elements (SRI) presented in Table 3.0.
- All pedestrian doors will remain closed for the duration of any noisy internal operations.
- In accordance with BS 12354-4, a -6 dB correction to account for the change in reverberant internal to non-reverberant external conditions has been applied.
- To form a robust scenario, no on-time correction has been applied as the noise emissions from the internal operations are considered to be continuous over the BS4142:2014 reference time period of 1-hour during the day.

The table below shows the calculated external noise levels at 1m from the façades, roof, and louvres of the buildings.

Calculated External Noise Levels at 1m from Building Fabric Elements									
Description	**1/1 Octave Frequency Band (Hz, L_{eq} dB)**								**Overall (dBA)***
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
Zone 6 & 7 – Façades & Roof	43	37	38	38	45	37	26	15	46

Table 4.0 – Calculated External Noise Levels Building Fabric Elements

**Global A-weighted noise level calculated from octave band L_{eq} noise levels considering the A-weighting scale correction.*

External Fixed Plant – Tank TF3 Stirring Motor & Filling Pump:

Situated within the existing tank farm is tank TF3 which is to be repurposed for the storage of the processed brake fluid. Located at the base of TF3 is a stirring motor and filling pump (located next to one another), which can be operational for up to 1-hour during the day time operational period. Measurements at various distances from the stirring motor and filling pump of tank TF2 were conducted as a simulation of the process that tank TF3 will do. Both the motor and pump were identical to that of TF3. The following table outlines the calculated sound power levels of the motor and pump for tank TF3.

Calculated Sound Power Levels of Tank TF3 Motor & Pump									
Description	**1/1 Octave Frequency Band (Hz, dB)**								**Overall (dBA)**
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
Pumping Fluid into Tank TF3 (L_{eq} – 1m)	66	66	64	67	59	55	51	46	66
Pumping Fluid into Tank TF3 (L_{eq} – 3m)	66	68	63	59	53	46	42	37	60
L_W of Pumping Fluid in Tank TF3	81	83	78	74	68	61	57	52	75*

Table 5.0 – Calculated Sound Power Levels of Tank TF3 Motor & Pump

**Global A-weighted noise level calculated from octave band L_{eq} noise levels considering the A-weighting scale correction.*

Noise Modelling

The specific sound levels at the NSRs have been calculated using SoundPlan 8.2, which undertakes its calculations in accordance with the guidance provided in ISO 9613-2.

The following assumptions have been made within the calculation software:

- To accurately model the land surrounding the development the topographical data has been taken from the EA's 'National LIDAR Programme' on the DEFRA Data Services Platform.
- For the purpose of the assessment, the ground between the source and receiver is considered to be a mixture of acoustically 'soft' and 'hard' surfaces.
- Where source data was provided with octave band data it was used to facilitate noise modelling in accordance with ISO 9613-2. Where only A-Weighted noise levels were provided, the overall A-Weighted levels were used, with the calculations utilising the attenuation terms at 500Hz. ISO 9613 assumes a 'downwind' model.
- The sound map grid height has been set to 1.5m, however, the noise levels used in the assessment will be taken form the most exposed point on each NSR façade.
- All buildings and any intervening objects have been modelled according to measurements taken on-site, those provided by the LIDAR data and technical drawings provided by Miswa Chemicals Ltd.
- The Proposed Development has been modelled according to on-site inspections.
- One scenario has been modelled:
    - Day time operations between 07:00 and 16:30 hours when a single HGV deliveries 20 IBC tanks and the fluid is processed simultaneously. This presents a robust scenario as the two processes would rarely occur simultaneously.
- No on-time corrections have been applied to any operation that is equal to or exceeds 75% of the reference time periods.
- Point source emitters with the sound power levels presented in Section 4.0 have been used to represent the HGV stationary at the site entrance and both the stirring motors and filling pump of tank TF3.
- An area source emitter with the cumulative sound power levels presented in Table 3.0 and modelled at 1m above the ground (approximate engine height), has been used to represent the HGV manoeuvring and the forklift loading the IBC tanks.
- Any building fabric elements are assumed to behave as area noise sources which is calculated within the SoundPlan software considering the formula: $L_W = L_{P1m} + 10*Log(S)$, where S is the surface area of the building element.

The sound maps showing the specific sound level emissions from the proposed permit variation can be seen in the figures below.

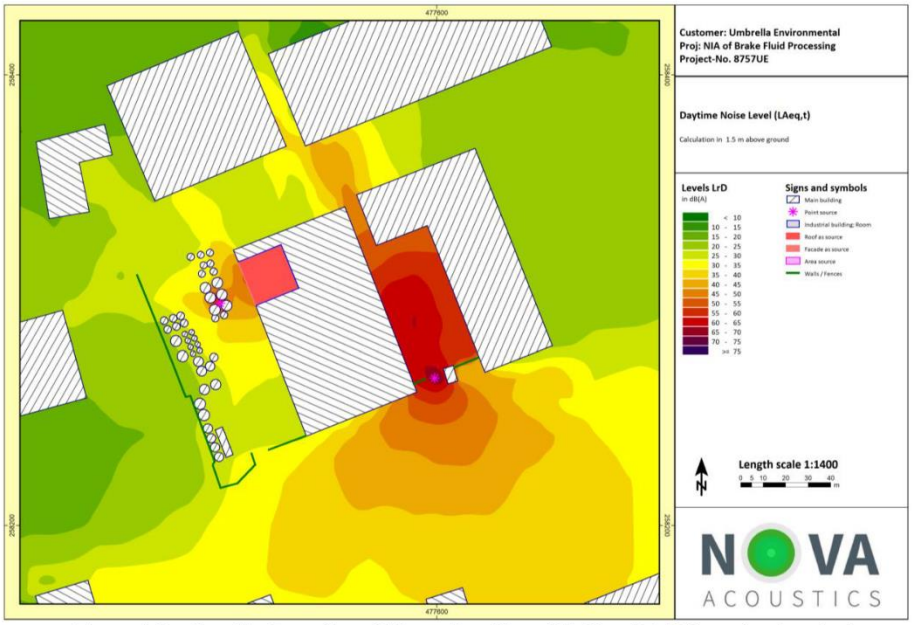


Figure 4.0 – Specific Sound Level Map – Day Time (07:00 – 17:00 hours) – Detailed

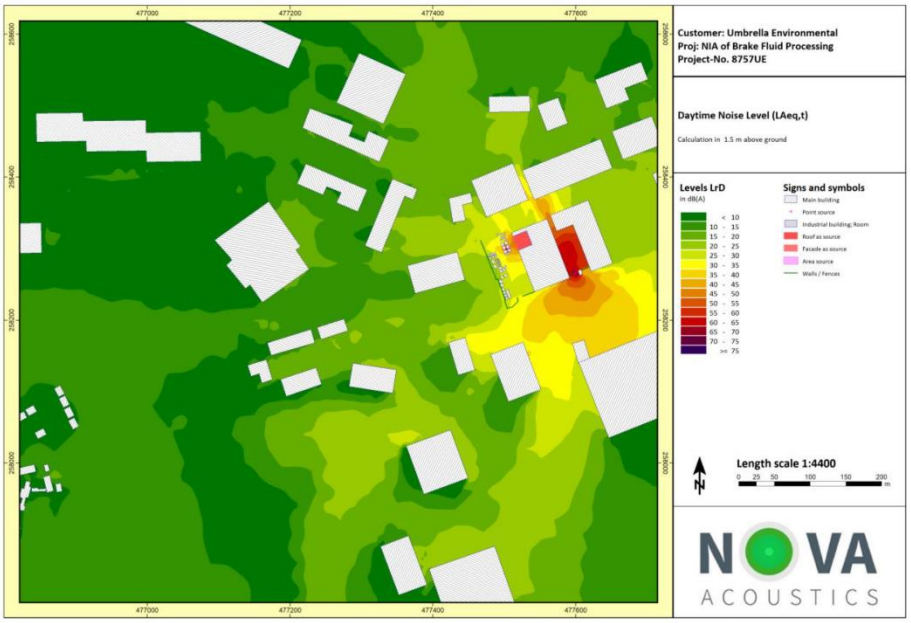


Figure 5.0 – Specific Sound Level Map – Day Time (07:00 – 17:00 hours) – All Areas

A summary of the specific sound levels at the most affected NSRs, based on the sound maps shown in Figures 4.0 and 5.0 can be seen in the table below.

NSR	Day Time Specific Sound Level (dBA)
1 – FF & GF Façades	14
1 – Garden	16
2 - Offices	26

Table 6.0 – Specific Sound Levels at the NSRs

BS4142:2014 Rating Penalty Assessment

No rating level has been applied. Given the very low specific noise level there will be no tonal, intermittent, or impulsive character to the sound at the NSR. It is highly likely the specific sound will be inaudible against the ambient sound level at the NSR.

BS4142:2014 Assessment

The following table outlines the BS4142:2014 assessment for the most affected NSR.

BS4142:2014 Assessment – Day Time (07:00 – 23:00 hours)			
NSR	**Results**	**Value (dBA)**	**Notes**
1	Rating Sound Level	16	
	Background Sound Level	55	As shown in Figure 3.0.
	Excess of Rating Level Over Background Sound Level	-39	The assessment indicates 'Low Impact, Dependant on Context' in accordance with BS4142:2014.

Table 7.0 – BS4142:2014 Noise Assessment

Discussion

The assessment above indicates that at the most affected residential NSR, the rating sound level is predicted to be 39 dB below the prevailing background sound level during the daytime operational period. This is a strong indication of 'Low Impact, dependant on context' in accordance with BS4142:2014 and 'No Observed Effect Level' ('NOEL') when assessed in accordance with the NPPF and NPSE. Furthermore, the specific sound level from the proposed operations is significantly below the existing ambient sound level at the NSR which indicates that the proposed operations will not constructively add to the existing ambient sound climate.

Whilst the scope of BS4142:2014+A1:2019 states it is only appropriate for residential NSRs, consideration has been given the nearby offices. The external rating sound level of 26 dBA is below the BS8233:2014 internal ambient noise level criteria of 35 dBA for an executive office.

4. Limitations and Uncertainty

The impact assessment has been prepared in accordance with source data measured during the site visit. The measurement distances were measured accurately, and the worst-case highest sound levels measured where directivity was at its greatest have been used. The measurements were undertaken at distances where noise emissions from operations were dominant where planar source behaviour was present and also where they were propagating in point source fashion. This allowed for the accurate calculation of sound power levels in accordance with BS5228:2009. The calculations using SoundPlan 8.2 conform to ISO 9613 that has an uncertainty reported as ±3.0 dB. ISO9613 assumes a downwind model output that will tend overestimate actual noise propagation form source to receptor locations. The calculated levels are therefore based on worst-case scenarios.

The 'uncertainty budget' has been derived using the methodology outlined in 'Uncertainties in Noise Measurement' procedure by Kerry and Craven (Craven, N.J., Kerry, G. 2007. '*Uncertainties in Noise Measurement'. University of Salford).* This document requires an uncertainty budget to be calculated based on the following approach:

- Define the half value (for example, 3 for ±3.0 dB) of each source of uncertainty,
- Apply a correction for the standard uncertainty for a rectangular distribution (x / √3) for each source of uncertainty,
- Add together the values found in 2 for all uncertainties,
- Take the square foot to find the combined uncertainty,
- Multiply by 2 to calculate the expanded uncertainty to 95% confidence.

It advises that measuring under downwind conditions usually produces worst-case conditions at a distance of several hundred meters, therefore the ±3.0 dB uncertainty advised in ISO 9613-2 has been used due to the receptors being within 300m of the sources under assessment.

The following table outlines the total expanded uncertainty:

Measurement Uncertainty			
Description	**Accuracy**	**Variance**	**Comments**
Instrumentation Accuracy	±0.1 dB	0.1/√3 = **0.1 dB**	Minimised by use of calibrated traceable instrument.
Use of Wind Shield	±0.2 dB	0.2/√3 = **0.1 dB**	Prevents local wind effects, all meters collecting data used wind shields.
Measurement Distance from Source	±0.5m (worst-case 50cm error of 5m)	20*Log (4.5/5) = -0.9 20*Log (5.5/5) = +0.8 Difference = 1.7 dB 1.7/√3 = **1.0 dB**	
Background Sound Level	±1.5 dB	1.5/√3 = **0.9 dB**	Background sound level uncertainty may exist.

Measurement Uncertainty	Total Variance = **2.1 dB**	Total Uncertainty: √2.1 = **1.4 dB**	
Modelling Uncertainty			
Description	**Accuracy**	**Variance**	**Comments**
Measurement of Sources to Receptors	±3m (closest receptor 78m)	20*Log(75/78) = -0.3 20*Log)(81/78) = +0.3 Difference = 0.6 dB 0.6/√3 = **0.3 dB**	Minimised by use of model based on accuracy of maps.
Ground Absorption	Ground absorption effects are not calculated as barrier effects are prominent.		
Air Absorption	Temp range considered to be -5◦C to +20◦C	Results for 9◦C = 0.003639 dB/m Results for -5◦C = 0.006381 dB/m Results for 20◦C = 0.004978 dB/m Variance = 0.002704 dB/m Over 78m this is 0.2 dB 0.2/√3 = **0.1 dB**	Assumed 101.3 kPa, variable temp (worst absorption temp for air), 70% relative humidity, no precipitation.
Modelling Uncertainty	±3.0 dB	3/√3 = **1.7 dB**	Stated model uncertainty due to Para. 9 of ISO 9613, Table 5.
Modelling Uncertainty	Total Variance = **2.1 dB**	Total Uncertainty: √2.1 = **1.4 dB**	
Combined Uncertainty	Total Variance = 4.2 **dB**	Total Uncertainty = √4.2 = 2.0 dB Expanded to 95% confidence = 2.0 * 2 = **4.0 dB**	

Table 8.0 – Expanded Uncertainty of Measurement and Modelling

The table above shows an expanded uncertainty of up to 4.0 dB. Given the worst-case conditions the noise modelling software accounts for, it is likely that the results presented in this report are an overestimate of the actual level of impact.

5. Noise Management Plan

This noise management plan outlines the methods by which the site operator will systematically assess and minimise the potential impacts of noise generated by the site. The noise management plan is a working document with the specific aim to ensure that:

- Noise impact is considered as part of routine inspections.
- Noise is primarily controlled at source by good operational practices, including physical and management control measures.
- All appropriate measures are taken to prevent or, where that is not reasonably practical, to reduce noise emissions from the site.

The noise management plan addresses the impact of noise and the control measures employed to mitigate the risk. These are supported through monitoring procedures to identify elevated levels and review complaints should they arise. The complaints management procedure is also addressed, which includes the management responsibilities.

Hours of Operation

- Noise from on-site operations will occur between 07:00 to 17:00 hours.

Equipment Maintenance

All failed/broken plant and equipment will be replaced with equivalents that produce equal or lower levels of noise. This will be verified with manufacturers technical datasheets or on-site noise measurements.

All plant and machinery will be regularly and properly maintained in accordance with the preventative maintenance schedule of which the appropriate staff will be trained in.

Operator Monitoring Plan

Monitoring of noise emissions from the site will be undertaken both subjectively and objectively.

Continuous Subjective Noise Monitoring

- All operational staff will, as part of their induction, be made aware of their roles and responsibility. It is the responsibility of all staff to be aware of noise on site and to report any potential noise issues to the sites Operations Manager at the earliest opportunity.
- All staff will have refresher training on noise issues, prevention and management at six-monthly intervals.
- If members of staff report any instances of elevated noise, this should be investigated immediately. In the event that increased noise levels are verified, the source of the noise should be taken out of commission and must be fixed/corrected prior to the equipment being put back into commission.
- A visual inspection of all equipment should be made before use to ensure that there are no obvious faults or malfunctions that could lead to elevated noise levels. It will be ensured that all noise mitigation measures (silencers, etc.) are installed as per manufacturer's guidance.

Objective Noise Monitoring

- A class 2 sound level meter will be purchased to measure sound levels on site. This will take place during typical operations when the site is in use and associated plant vehicles are operating as normal.

Monthly Measurements

Noise levels will be measured at monthly intervals at the site perimeter in the location shown below.

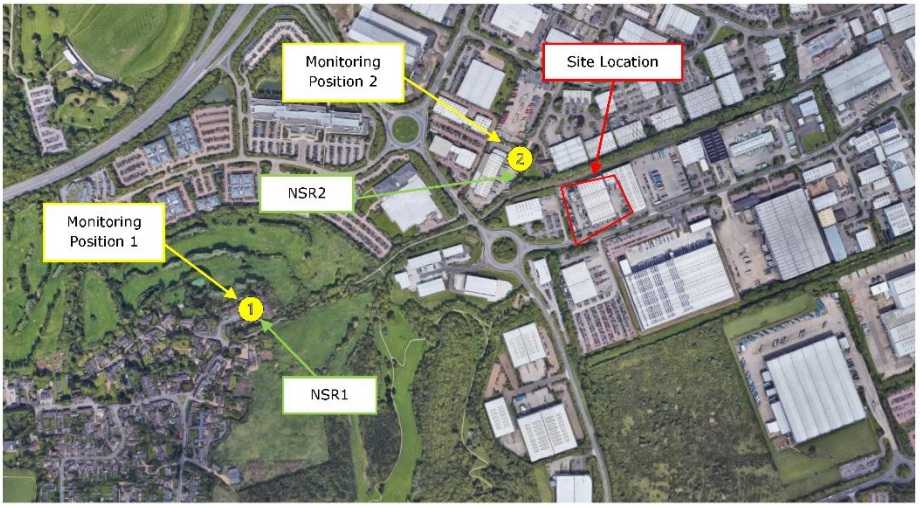


Figure 6.0 – NMP Monitoring Location

- $L_{Aeq,1hour}$ (A-weighted noise levels averaged over a 1-hour assessment period) and L_{Amax} noise levels will be recorded. Measurements taken on site will be compared with previous measurements. If $L_{Aeq,1hour}$ noise levels increase by more than 3 dB from the previous month then the cause of the increase shall be investigated.
- When the source of the elevated noise levels is discovered, remedial work shall be undertaken to reduce noise emissions to 'normal' levels. If complex remedial work is required, the offending equipment will be taken out of commission until repair work is completed. This will be logged in an IMS (Issue Management System).

Plant Operator Noise Control Measures Summary

- Reversing alarms will be white noise.
- Vehicles will adhere to the 10-mph speed limit on site.
- Engines will be switched off when not in use. Vehicles will not be left idling.
- No shaking of vehicle bodies will take place whilst raised.
- Vehicle horns to be used as a Health and Safety measure only.
- Vehicle movements will be spread evenly throughout the day where practicable.

- All mitigation measures specified within this report will be implemented prior to the first operation of the proposed permit variation and retained thereafter.

Management Control Measures

- Users of on-site plant and equipment complete a daily defect log at the beginning of the working day if they observe that their vehicle is not working to its optimum. An on-site mechanic actions the defect log on the same working day and machines are not used until this action has been completed.
- Tool-box talks are provided by site management on a regular basis to site operatives. These talks include all aspects of the management plans for this site.
- Plant maintenance schedules using the manufacturer's recommendations where vehicles are serviced after 500 hours of operation.
- Pre-use checks are completed prior to using plant and equipment daily.
- Defects are reported and actions are taken to rectify the problem or remove the offending item from service until such time as the issue is resolved.
- All plant and equipment are visually inspected by the operator at the end of the working day.
- Throughout the day operators are vigilant in checking vulnerable areas like exhausts and engine bays.
- Specialist contractors are used to perform maintenance outside the scope and expertise of the site management and operatives.
- All documentation relating to plant and equipment maintenance is retained in the site office for inspection.

Noise Complaint Investigation

An issue management system (IMS) will be implemented and completed by the site manager, this will include a site diary, plus forms and records of complaints. Further to this, a complaints procedure will be implemented; this procedure will allow for all complaints, feedback and requests made by third parties regarding the site's operational activities, health and safety performance or quality of service/product.

A phone number for the head office can be obtained online in order to allow for any member of the public to lodge a complaint without entering the operational site. The operations manager will be specifically assigned to deal with complaints.

All complaints received from third parties including statutory authorities, statutory consultees, members of the general public and representatives of the company will be forwarded to the operations manager to action as below within 2 hours (where feasible). The complaint will be logged in the incident database within 72 hours.

The operations manager will ensure that:

- The complaint is investigated to identify the cause, if necessary, this may involve direct communication with the complainant.

- The noise source will be measured using a class 2 sound level meter and compared with monthly objective monitoring records.
- In the event of elevated noise being detected, the presence of 'abnormal' onsite activity is assessed and if necessary, action is taken immediately to prevent a reoccurrence of the same problem. These actions must be documented.
- The complainant will be contacted and given information on the investigations conducted and actions taken as appropriate.
- All complaints are reported to regional directors and discussed at site meetings.
- Details of other complaints are sent to the other company personnel as appropriate.

If the investigation indicates that the complaint has not been justified this will be clearly recorded on the incident report. All complaints will be logged.

Reporting Measures

In the event of elevated levels of noise being identified, the event will be reported into an issue management system (IMS) by a member of operational staff. Upon notification of an environmental incident, the site manager will complete an incident reporting form. The completed form is then distributed throughout the company for review at operational, management and health and safety meetings.

All performance failures will be categorised for input into the IMS as follows:

- Minor event: quick fix possible, locally resolved.
- Medium event: brief disruption to service, management intervention required.
- Major event: significant disruption to service.

Each non-conformance category must have a given deadline for rectification. The deadline for each category is:

- Minor Event: within 24 hours
- Medium Event: within 6 hours
- Major Event: within 1 hour

The IMS will record any actions taken to rectify the issue, ensure that any necessary actions or review are recorded onto the IMS and ensure that the person reporting the incident is notified. The site manager will investigate the performance failure within a reasonable time frame (ideally 2 hours). Once the issue has been resolved, the corrective action will be entered onto the system and the issue will be closed.

Appendix A – Acoustic Terminology

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20μPa (20x10-6 Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L90 can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L10 can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided. The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source. A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the

time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}.

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound. To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS4142:2014 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1hour}$ dB and $L_{A90,15mins}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125ms

Appendix B – Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

B.1 – National Planning Policy Framework (2021)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2021. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 174e, it states:

Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

Paragraph 185 states:

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) *Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
b) *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
c) *Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 185 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life;*
- *Where possible, contribute to the improvement of health and quality of life.*

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that "significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development".

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. This can be related to the third aim above, which seeks: "where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – British Standard BS 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound

Overview

BS4142:2014 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142:2014 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142:2014 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142:2014 states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

a) subjective method;
b) objective method for tonality;
c) reference method."

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142:2014, which states:

"Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources."

BS4142:2014 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

a) Tonality

A rating penalty of +2 dB is applicable for a tone which is "just perceptible", +4 dB where a tone is "clearly perceptible", and +6 dB where a tone is "highly perceptible".

b) Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is "just perceptible", +6 dB where it is "clearly perceptible", and +9 dB where it is "highly perceptible".

c) Other Sound Characteristics

BS4142:2014 states that where "the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinct against the residual acoustic environment, a penalty of +3 dB can be applied."

d) Intermittency

BS4142:2014 states that when the "specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time … if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied."

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night time period for sleep purposes.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

Assessment of Impact

BS4142:2014 states: "The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- "Typically, the greater this difference, the greater the magnitude of the impact."
- "A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."
- "A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."
- "The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a negligible impact, depending on the context."

Interpreting the guidance given in BS4142:2014, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

- A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level;
- A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level;
- The lower the rating sound level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating sound level does not exceed the background sound level, this is an indication of the specific sound source having a negligible impact and would therefore classified as a No Observed Adverse Effect Level.

During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

Appendix C – Environmental Survey

C.1 – Tabulated Summary Noise Data

Measurement Position MP1 – Full Period				
Measurement Time Period ('t')	**$L_{Aeq,t}$ (dB)**	**$L_{Amax,t}$ (dB)**	**$L_{A90,t}$ (dB)**	**$L_{A10,t}$ (dB)**
Day 1: 05/12/22 – 12:00 – 23:00	56.0	87.0	54.0	58.0
Night 1: 05/12/22 – 23:00 – 07:00	52.0	75.0	48.0	57.0
Day 2: 06/12/22 – 07:00 – 10:30	60.0	81.0	59.0	61.0
MP1 – L_{A90} Analysis – Full Period				
Measurement Period ('t')	**$L_{A90,t}$ (dB)**	**SMR $L_{A90,t}$ (dB)**	**Min. $L_{A90,t}$ (dB)**	**Max. $L_{A90,t}$ (dB)**
Day 1: 05/12/22 – 12:00 – 23:00	54.0	56.0	49.0	57.0
Night 1: 05/12/22 – 23:00 – 07:00	48.0	43.0	43.0	58.0
Day 2: 06/12/22 – 07:00 – 10:30	59.0	58.0	57.0	61.0

Table 9.0 – MP1 Sound Survey Summary Results – Full Period

Figure 7.0 – MP1 Noise Survey Time History

C.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
CESVA SC420 Class 1 Sound Level Meter	T244478	≤0.1
CESVA CB006 Class 1 Calibrator	901625	
CESVA SC420 Class 1 Sound Level Meter	T250681	≤0.1
CESVA CB006 Class 1 Calibrator	902442	

Table 10.0 – Measurement Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.1 dB. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

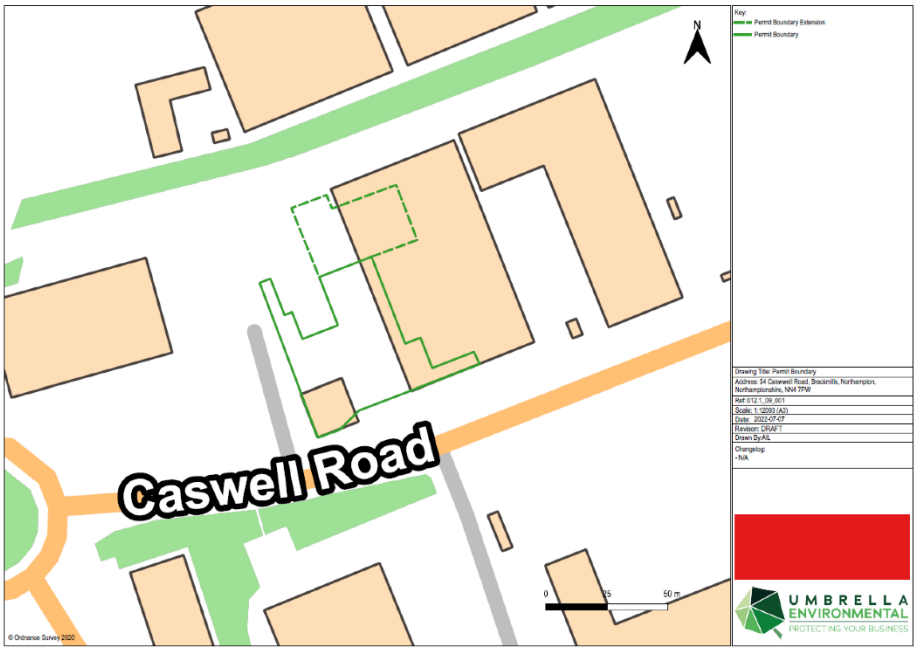
C.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Martins Lane (Approx. 1.3km SWW of Site)				
Time Period	**Air Temp (°C)**	**Rainfall (mm/h)**	**Prevailing Wind Direction**	**Wind Speed (m/s)**
05/12/22 – 00:00 – 23:59	2.4 – 5.7	0.0 – 0.8	ENE	0.0 – 3.1
06/12/22 – 00:00 – 23:59	0.6 – 3.9	0.0	W	0.0 – 3.9

Table 11.0 – Weather Summary

Appendix D – Site Plans and Drawings



Appendix E – Manufacturers' Datasheets

QuadCore™ RW Trapezoidal Roof Panel

Insulation Core
KS1000 RW insulated roof panels are manufactured with an HCFC, CFC and HFC free QuadCore insulation core.

Fire
Reaction to Fire

- Classified B-s1,d0 according to the European Reaction to Fire classification system (Euroclasses) BS EN 13501–1:2007+A1:2009 when tested on the internal liner. Please contact Technical Services for information relating to the external face
- B_{ROOF} (t4) to BS EN 13501-5:2016

Insurer Approvals

- LPS 1181 Part 1: Issue 1, series of fire growth tests for LPCB approval and is certified to LPS 1181 Grade EXT-B
- FM 4471 Class 1 panel roofs*
- FM 4880 Class 1 fire rating of building panels or interior finish materials, unlimited height
- FM 4882 Class 1 interior wall panels in smoke sensitive occupancies (pharmaceutical manufacturing & storage areas, and food preparation & storage areas or similar occupancies)

*1.5m maximum span only. Please contact Technical Services for more information.

FM APPROVED

LPCB

LPS 1181 : Issue 1.2
Cert. No. 260F & 186F

Environmental
Kingspan Insulated Panels produced in the UK are certified to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) 'Very Good'. Kingspan Insulated Panels directly contribute to BREEAM/LEED credits.

Air Leakage
An air leakage rate of $3m^3/hr/m^2$ at 50Pa or less can be achieved when using Kingspan insulated roof and wall panels.

Acoustic
Sound Reduction Index (SRI)

Hz*	63	125	250	500	1K	2K	4K	8K
SRI (dB)	20	18	20	24	20	29	39	47

* Frequency

The KS1000 RW insulated roof panel has a single figure weighted sound reduction Rw = 25dB.

Biological
Kingspan panels are normally immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are not considered deleterious

Materials
Substrate

- Kingspan XL Forté, Kingspan Spectrum, Kingspan AQUA*safe*, Kingspan AQUA*safe55* and Kingspan CLEAN*safe*: Metallic protected steel to BS EN 10346:2015.thickness 0.5mm.
  CLEAN*safe 15*: Metallic protected steel to BS EN10346:2015.thickness 0.4mm
- Stainless Steel: Austenitic Grade 316 stainless steel to BS EN 10088: Part 2: 2014, thickness 0.4mm.
- Aluminium: Please contact Kingspan envirocare Technical Services.

Coatings - External Weather Sheet

- Kingspan XL Forté: Consists of a multi-layer organic coating, embossed with a traditional leather-grain finish.
- Kingspan Spectrum: Consists of a coated semi-gloss finish with slight granular effect.

Coatings - Internal Liner Sheet

- Kingspan CLEAN*safe 15*: The coating has been developed for use as the internal lining of insulated panels. Standard colour is "bright white" with an easily cleaned surface.
- Kingspan AQUA*safe*: The coating has been developed for use as the internal lining of insulated panels to suit high humidity internal environments.
- Kingspan AQUA*safe 55*: The coating has been developed for use as the internal lining of insulated panels to swimming pool internal environments.
- Kingspan CLEAN*safe 120*: The coating has been developed for use as the internal lining of insulated panels where a high level of cleanliness and hygiene is required, and the panels are to be cleaned down on a regular basis.
- Stainless Steel: The stainless steel liner has been developed for use as the internal lining of insulated panels in buildings with a very aggressive/corrosive internal environment.

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