



IP 0001/13

WASTE MANAGEMENT FACILITY AT DDE ATTARD LTD, LUQA

VOLUME 2: IPPC APPLICATION



Version 3: March 2019



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Quality Assurance

Waste Management Facility at DDE Attard Ltd, Luqa Volume 2: IPPC Application Version 3 March 2019

Report for: **DDE Attard Ltd**

Revision Schedule

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01	Oct. 2018	Draft consolidated IPPC application	Rachel Decelis Senior Consultant	Rachel Xuereb Director	Adrian Mallia Managing Director
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CONTENTS

1. Introduction	1
Background to the Scheme	1
Structure of the IPPC application	1
2. The Scheme	5
B1.2 Non-Technical Summary	5
B1.4 Site Maps and Reports	13
Pollutant Linkages	39
Site Investigation	41
3. Techniques	63
Introduction	63
B2.1 Environmental Management System	63
Terms of Reference	63
B2.2 Activities	68
B2.2.1 Proposed Activities	68
B2.2.2 Measures to Reduce Waste and Emissions	93
B2.2.3 Flow Diagrams	94
B2.2.4 BAT Assessment	115
B2.2.5 Alternatives Considered	115
B2.3 Raw Materials	116
B2.5 Maintenance	117
B2.6 Energy	119
B2.7 Water	120
B2.8 Risk Assessment	125
Terms of Reference	125
Assessment Methodology	125
Risk Assessment	127
Conclusion	148
Fire and Explosion Prevention and Response Plan	149
Spill Prevention and Response Plan	169
B2.9 Training	171
B2.10 Cessation	174
4. Emissions	177
B3.1 Waste	177
Incoming Waste	177
Outgoing Waste	185
B3.3 Emissions to Sewer	193
B3.5 Rainwater	197
B3.6 Emissions to Air	200

B3.7	Odour Emissions.....	201
B3.9	Noise	203
	Introduction.....	203
	Noise Survey	211
	Noise Impact Assessment	219
	Conclusion	220
B3.10	Monitoring.....	221
	Emissions Monitoring	221
	Compost Testing.....	222
5.	Impact on the Environment	223
B4.1	Environmental Effects	223
B4.2	Effects on Other Sites.....	224

FIGURES

Figure 1.1:	Location of the Scheme.....	3
Figure 2.1:	Site location.....	7
Figure 2.2:	Proposed Scheme layout.....	9
Figure 2.3:	Site location.....	15
Figure 2.4:	Site photo, circa 1955.....	17
Figure 2.5:	Site photo, circa 1955.....	17
Figure 2.6:	Aerial photo, 1957.....	19
Figure 2.7:	Aerial photo, 1988.....	20
Figure 2.8:	Surrounding land uses.....	21
Figure 2.9:	Civic amenity site.....	23
Figure 2.10:	Agricultural land.....	23
Figure 2.11:	Geology.....	25
Figure 2.12:	Hydrology.....	29
Figure 2.13:	Installation of membrane underlay	32
Figure 2.14:	Installation of reinforced concrete surface.....	33
Figure 2.15:	Proposed Scheme layout	35
Figure 2.16:	Surface water management	37
Figure 2.17:	Oily stain near diesel tank	40
Figure 2.18:	Oily stains on site	40
Figure 2.19:	Sampling locations	43
Figure 2.20:	Drill rig used for sampling	46
Figure 3.1:	DDE Attard Ltd organisational chart.....	63
Figure 3.2:	PDCA cycle.....	67
Figure 3.3:	Site layout.....	71

Figure 3.4: Depollution system	74
Figure 3.5: Draining of engine oil.....	74
Figure 3.6: Shredder	78
Figure 3.7: Sorting system	78
Figure 3.8: Shredder loading.....	79
Figure 3.9: Shredded engine blocks ²⁵	79
Figure 3.10: Sorting system, including magnetic drum.....	80
Figure 3.11: Press	81
Figure 3.12: Baler.....	82
Figure 3.13: Baled tyres.....	82
Figure 3.14: Shredder loading.....	83
Figure 3.15: Shredded wood ²⁶	84
Figure 3.16: Diesel tank bunding.....	85
Figure 3.17: Composter shed.....	89
Figure 3.18: Composter specifications	91
Figure 3.19: ELV depollution and dismantling (stage 1)	97
Figure 3.20: ELV depollution and dismantling (stage 2)	99
Figure 3.21: ELV depollution and dismantling (stage 3 & 4)	101
Figure 3.22: Baling of tyres.....	103
Figure 3.23: Processing of washing machines.....	105
Figure 3.24: Processing of cookers	106
Figure 3.25: Processing of water meters	107
Figure 3.26: Metal processing.....	108
Figure 3.27: Metal shredding detail.....	109
Figure 3.28: Wire stripping	110
Figure 3.29: Wood processing	110
Figure 3.30: Temporary storage of containerised waste.....	111
Figure 3.31: Composting.....	113
Figure 3.32: Underground reservoirs	123
Figure 3.33: Geology.....	139
Figure 3.34: Hydrology.....	141
Figure 3.35: Surrounding land uses	143
Figure 3.36: Scheme layout	153
Figure 3.37: Assembly point.....	163
Figure 3.38: Location of fire-fighting equipment.....	165
Figure 3.39: Ring main connections to firefighting reservoir.....	167
Figure 4.1: Scheme layout.....	183
Figure 4.2: Site layout plan showing connection to sewer.....	195
Figure 4.3: Installation of membrane underlay.....	198
Figure 4.4: Installation of reinforced concrete surface	198

Figure 4.5: Rainwater management and firefighting reservoir.....	199
Figure 4.6: Location of the Scheme site.....	205
Figure 4.7: Surrounding Land Uses.....	209
Figure 4.8: Location of Noise Monitoring Points and Noise Sensitive Receptors	213
Figure 5.1: Surrounding land uses.....	227

TABLES

Table 2.1: Pollution pathway identification for Scheme site activities.....	39
Table 2.2: Analytes for land monitoring.....	41
Table 2.3: Sampling points.....	45
Table 2.4: Sample logs.....	47
Table 2.5: Methods for analysis of land samples	53
Table 2.6: C12-C35 hydrocarbons concentration (mg/kg).....	55
Table 2.7: C5-C12 hydrocarbons concentration (µg/kg).....	55
Table 2.8: BTEX concentration (µg/kg).....	55
Table 2.9: Metals concentration (mg/kg)	56
Table 2.10: PAHs concentration (mg/kg).....	56
Table 2.11: PCBs concentration (µg/kg)	57
Table 2.12: MTBE concentration (µg/kg).....	58
Table 2.13: Asbestos identification and quantification.....	58
Table 2.14: Cyanide concentration (mg/kg)	59
Table 2.15: Dioxins and furans concentration (ng/kg).....	59
Table 2.16: Chlorinated aliphatic hydrocarbons concentration (µg/kg)	60
Table 2.17: Halogenated aliphatic hydrocarbons concentration (µg/kg)	61
Table 3.1: Environmental management programme (first year after IPPC permit issue)	65
Table 3.2: Raw materials.....	116
Table 3.3: Machinery on site.....	117
Table 3.4: Inspection and maintenance programme.....	118
Table 3.5: Maintenance records template	119
Table 3.6: Energy consumption	119
Table 3.7: Energy consuming equipment	120
Table 3.8: Criteria for assessing environmental consequences	127
Table 3.9: Measure of likelihood.....	127
Table 3.10: Risk matrix	127
Table 3.11: Pollution pathway identification and mitigation measures.....	129
Table 3.12: Risk levels (current mitigation).....	144

Table 3.13: Risk levels with additional mitigation	146
Table 3.14: Environmental training programme.....	172
Table 3.15: Training records template	173
Table 4.1: Incoming waste.....	179
Table 4.2: DDE Attard Ltd registered waste carriers	181
Table 4.3: Outgoing waste	187
Table 4.5: Combustion plant on site.....	200
Table 4.6: Location of Noise Monitoring Points	215
Table 4.7: Sound Level Surveys.....	216
Table 4.8: Recorded Sound Level at the Noise Sensitive Receptors	217
Table 4.9: Recorded Sound Levels at the Perimeter of the Scheme site	217

ANNEXES

Annex 1: Method Statement for Site Investigation

Annex 2: Environmental Policy

Annex 3: Depollution equipment

Annex 4: Refrigerant recovery system

Annex 5: BAT Assessment

Annex 6: Safety Data Sheets

Annex 7: Sewer Discharge Permit Application

Annex 8: Air Monitoring Report

Annex 9: Sound Level Meter Calibration Certificates

I. INTRODUCTION

- I.1. This Integrated Pollution Prevention and Control (IPPC) application was commissioned by Mr Disma Attard on behalf of DDE Attard Ltd, to support its application for the continued operation and upgrading of an existing waste management installation at DDE Attard Ltd in Luqa.
- I.2. Hereafter in the IPPC application, the installation is referred to as 'the Scheme'. DDE Attard Ltd is referred to as 'the Applicant'.
- I.3. The IPPC application was first submitted to the then-Malta Environment and Planning Authority (MEPA), now the Environment and Resources Authority (ERA) in March 2016. Following reviews by ERA and other consultees, several clarifications and updates were made to the IPPC application. The original IPPC application has therefore been updated to ensure consistency with these later submissions.

BACKGROUND TO THE SCHEME

- I.4. The Scheme site, located at Scrap Lane, Luqa (**Figure I.1**) has been in use as a scrapyards for over 50 years. The Applicant is proposing to reorganise the site to improve current operations by accommodating a new shed to bring certain activities under cover and to better organise the site. A new activity consisting of composting of food waste is also proposed. Treatment of waste vehicles using standard machinery and storage of sealed containerised waste are also proposed.
- I.5. The site boundary is also being amended to take up small areas surrounding the current site; the total site area remains approximately the same as existing.

STRUCTURE OF THE IPPC APPLICATION

- I.6. The IPPC application is composed of three volumes:
 - **Volume 1** comprises the IPPC application forms A and B;
 - **Volume 2** (the current volume) consists of the IPPC application document; and
 - **Volume 3** consists of the Applicant's response to the feedback from ERA and other consultees on the IPPC application.

Figure I.1: Location of the Scheme



ERDF 156 data, (2013), Developing National Environmental Monitoring Infrastructure and Capacity, Malta Environment & Planning Authority

INDICATIVE ONLY - Not to be used for direct interpretation

Location of site

Legend

- New proposed site boundary
- Site boundary (PA 5538/07)

DEE Attard Ltd Luqa scrapyard - IPPC



Map by: Adi Associates Environmental Consultants Ltd

Client: DEE Attard Ltd	Ref: DEE004
File ref: IPPC\DDE Attard-Luqa\Maps\	Date: 9 / 2018

2. THE SCHEME

BI.2 NON-TECHNICAL SUMMARY

2.1. MEPA's ToR were:

Please provide a non-technical summary of the proposed installation activities.

2.2. This IPPC Application is being submitted for the operation of a waste management facility operated by DDE Attard Ltd at Sqaq il-Fdal tal-Ħadid, Ħal Luqa, as shown in **Figure 2.1**. The facility is hereafter, in this Application, referred to as 'the Scheme'.

2.3. The Scheme site has been in use as a scrapyards for over 50 years. The operator is proposing to reorganise the site as shown in **Figure 2.2**, to improve current operations by accommodating a new shed to bring certain activities under cover and to better organise the site. A new activity consisting of composting of food waste is also proposed. Treatment of waste vehicles using standard machinery and storage of sealed containerised waste are also proposed.

2.4. The site boundary is also being amended slightly, but the total site area remains approximately the same as existing.

2.5. The proposed activities at the Scheme will consist of:

- Treatment of waste vehicles to remove hazardous components using specialised equipment, followed by dismantling;
- Dismantling of washing machines, cookers and water meters;
- Processing of metals, including shredding and pressing;
- Baling of tyres and bumpers;
- Stripping of cable wires;
- Wood processing (including shredding);
- Storage of various materials and waste associated with the above activities, including vehicle parts, tyres, scrap metal, wood, plastic, oils and fuel;
- Temporary storage of containerised waste: to consist only of waste in sealed containers, received at the site for onward shipment without any on-site processing;
- Composting of food waste: this is a pilot project processing around 100 tonnes of food waste each year; and
- Maintenance of on-site machinery.

Figure 2.1: Site location



ERDF 136 data, (2013), Developing National Environmental Monitoring Infrastructure and Capacity, Malta Environment & Planning Authority

INDICATIVE ONLY - Not to be used for direct interpretation

Location of site

Legend

- New proposed site boundary
- Site boundary (PA 5538/07)

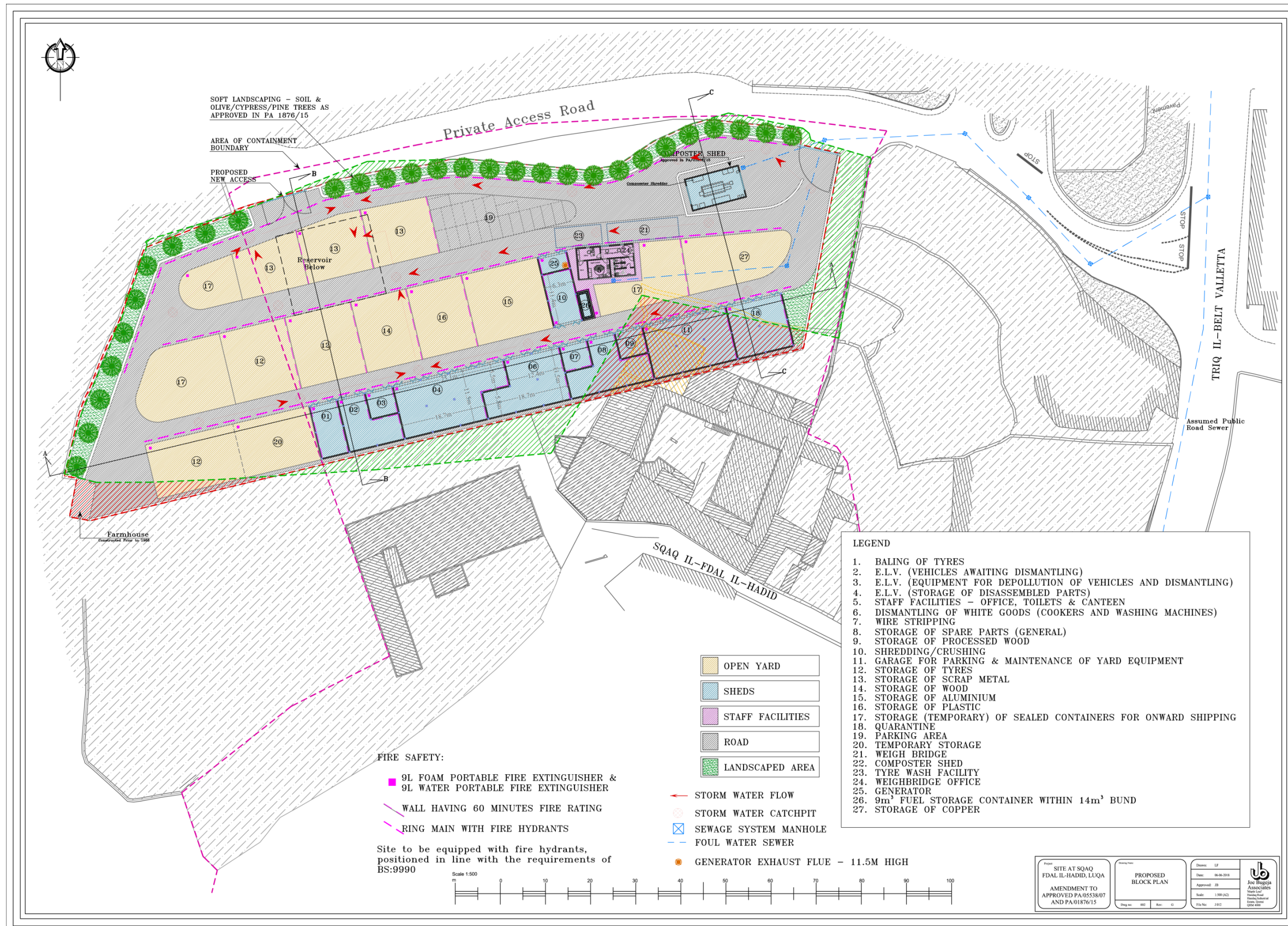
DEE Attard Ltd Luqa scrapyard - IPPC



Map by: Adi Associates Environmental Consultants Ltd

Client: DEE Attard Ltd	Ref: DEE004
File ref: IPPC\DDE Atard-Luqa\Maps\	Date: 9 / 2018

Figure 2.2: Proposed Scheme layout



- 2.6. All processing of hazardous waste will be carried out in the covered shed. A designated quarantine area will also be included for temporary controlled storage of unpermitted waste that may inadvertently enter the site.
- 2.7. The processed waste will then be sent to a permitted facility, either locally or abroad. Over 80% of the incoming waste will be reused, recycled or recovered, rather than disposed of. Further details regarding the Scheme's proposed activities are included in section B2.2 and B3.1 of this Application.
- 2.8. There are also plans for management of rainwater. A hardstanding surface will be installed throughout the site. Rainwater will be channelled through gutters towards an oil treatment system before being collected in an underground reservoir. It is intended that the treated water will be used for irrigation and washing within the site as far as practicable. This system also ensures that the risk of contamination of land or groundwater is minimised.
- 2.9. Emissions to air from the Scheme will mainly arise from machinery on site (such as the press, shredder and tyre baler) and heavy vehicles, shredded material from the shredder and dust tracked out by heavy vehicles. However, the Scheme includes mitigation measures to reduce these emissions, including regular maintenance of equipment, wetting of metals during shredding, and installation of site surfacing.
- 2.10. Odour emissions will be minimised by ensuring that certain odorous waste (particularly animal tissue waste, body parts and organs and mixed municipal waste) are not accepted. Odours from composting will be mitigated using a biofilter.
- 2.11. Some noise emissions will be generated by the Scheme; however, they are not expected to have a significant impact on the noise climate at the nearest residences, which are located around 220 m away from the Scheme.
- 2.12. The Scheme will include measures to reduce the risk of fire, and firefighting equipment will also be installed, as required by the Fire and Explosion Prevention and Response Plan prepared for the Scheme.

BI.4 SITE MAPS AND REPORTS

2.13. MEPA's ToR regarding site maps and reports were:

Please provide:

BI.4.1: *A site report, providing a history of the site (including current and past uses) and describing the condition of the site of that part of the installation in respect of which you are applying for a permit, and, in particular, identifying any substance in, on or under the land which may constitute a pollution risk. A baseline report assessing the state of the groundwater and land may also be required by the Authority.*

BI.4.2: *A suitable map (or maps) showing the location of the site of the installation, and the area of the site covered by the site report and which an IPPC permit is being applied for. The outline of the site should be clearly marked in colour, and the surroundings of the site should be included in the map.*

BI.4.3: *Suitable block plans, properly labelled, showing the location and nature of the various activities being proposed on that site.*

Description of the Site and the Surroundings

Location

2.14. The Scheme site covers an area of approximately 9,100 m² and is located at Sqaq il-Fdal tal-Ħadid, Ħal Luqa, as shown in **Figure 2.3**. **Figure 2.3** also shows that there are plans for a slight variation from the site boundary defined in PA 05538/07; a Planning Application (PA 04172/16) has been submitted to revise the site boundary, however, the total site area will remain approximately the same.

History

- 2.15. The history of the Scheme site and its surroundings has been obtained through a review of available documentation and interviews with the site's operator.
- 2.16. The 1909 survey sheet for the area shows the Scheme site as agricultural land bounded by rubble walls. Most of the surroundings were either agricultural or unused, with two small areas north and east of the site being used as quarries. The two buildings just south of the Scheme site were already in existence, and to the west (on the site of the current St Vincent de Paul Residence) was a lepers' asylum.
- 2.17. The Scheme site has been in use as a scrapyards for over 50 years. In 1952 a permit was issued for a naval storage yard for the site, which extended further south of the current site boundary.
- 2.18. At the time, the site was used only for the storage and processing of scrap metal (including vehicles and machinery) and wood. This is corroborated by site photos from circa 1955 (**Figure 2.4** and **Figure 2.5**); an aerial photo of the site from 1957

shows what appear to be scrap heaps throughout the site (**Figure 2.6**). End-of-life vehicles would be crushed in the open using a grab excavator (without prior de-pollution), then baled using a hydraulic press.

- 2.19. The 1957 aerial photo also suggests that most of the immediate surroundings were agricultural at the time, with a disturbed area north of the Scheme site. In fact, this area was used as a rubbish dump from the 1930s to the 1970s¹, and the nature of the waste dumped on the site is not known.
- 2.20. In December 1984, the applicant was issued with a Police Licence to “deal in old metal” and for “marine stores” (Police Licence E/4/57). An aerial photo from 1988 (**Figure 2.7**) shows what appear to be scrap heaps and machinery / containers throughout the site. This aerial photo also shows the extent of disturbed ground in the area of the rubbish dump north of the Scheme site to have increased over that in 1957.
- 2.21. Additionally, both the 1957 and 1988 aerial photos show that the Scheme site at the time extended southwards beyond the current and proposed site boundaries. This additional area is now owned and operated by third parties.
- 2.22. According to the operator, past operations at the Scheme site have mainly consisted of storage and processing of scrap metal, vehicles and white goods such as fridges.
- 2.23. Asbestos has, in the past, been temporarily stored on site in containers prior to export.
- 2.24. Burning of plastic / rubber motor cables also used to be carried out in the past to obtain copper. This practice has been discontinued. No burning of other materials (including tyres) has been carried out on site.
- 2.25. The operator has stated that any transformers received used to be emptied from oils before being transported to the site. Additionally, no air conditioning units or refrigerants have ever been accepted, as the site is not equipped to process such materials.
- 2.26. Storage of diesel fuel and oils for use on the operator’s vehicles and machinery has also been carried out. There are no records of significant oil or fuel spillages on site.

¹ MEPA (2007) *Luqa Park Development Brief*. www.mepa.org.mt/LpDocumentDetails?syskey=621.

Figure 2.3: Site location



Figure 2.4: Site photo, circa 1955



Figure 2.5: Site photo, circa 1955



Figure 2.6: Aerial photo, 1957



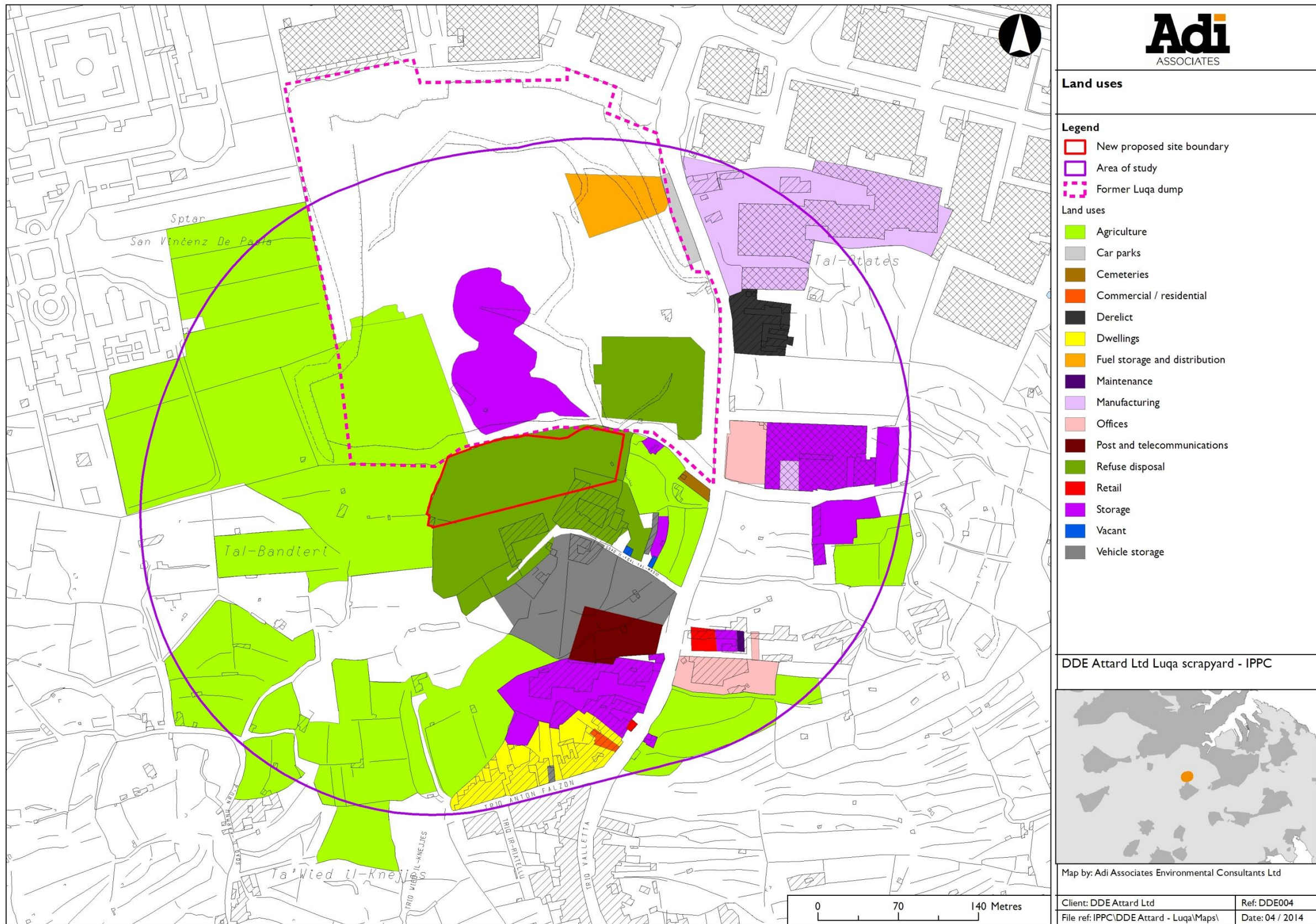
Figure 2.7: Aerial photo, 1988



Surrounding Land Uses

- 2.27. A land use survey was carried out on 2nd October 2014. The surrounding land uses are shown in **Figure 2.8**.
- 2.28. The land uses immediately surrounding the Scheme site are industrial and agricultural (**Figure 2.9** and **Figure 2.10**). The areas immediately adjoining the Scheme site are occupied primarily by small to medium enterprises, including another waste management facility next door and a civic amenity site operated by Wasteserv Malta Ltd next to the Scheme site entrance.

Figure 2.8: Surrounding land uses



INDICATIVE ONLY - Not to be used for direct interpretation

Land uses

Legend

- New proposed site boundary
- Area of study
- Former Luqa dump

Land uses

- Agriculture
- Car parks
- Cemeteries
- Commercial / residential
- Derelict
- Dwellings
- Fuel storage and distribution
- Maintenance
- Manufacturing
- Offices
- Post and telecommunications
- Refuse disposal
- Retail
- Storage
- Vacant
- Vehicle storage

DDE Attard Ltd Luqa scrapyards - IPPC



Map by: Adi Associates Environmental Consultants Ltd

Client: DDE Attard Ltd	Ref: DDE004
File ref: IPPC\DDE Attard - Luqa\Maps\	Date: 04 / 2014

Figure 2.9: Civic amenity site



Figure 2.10: Agricultural land



- 2.29. Various industrial uses now occupy the site of the former Luqa dump (**Figure 2.8**). While this dump has been considered to be a contaminated site,² recent testing for TOC, hydrocarbons, metals and pesticides at this site³ revealed that arsenic levels exceeded Dutch target values only slightly; these target values indicate the level at which there is a sustainable soil quality. The remaining metals were not found at concentrations exceeding the target values; hydrocarbons (C<12 and C12-40) as well as pesticides were below the detection limit (10 mg/kg and 0.01 mg/kg respectively).

Geo-environment

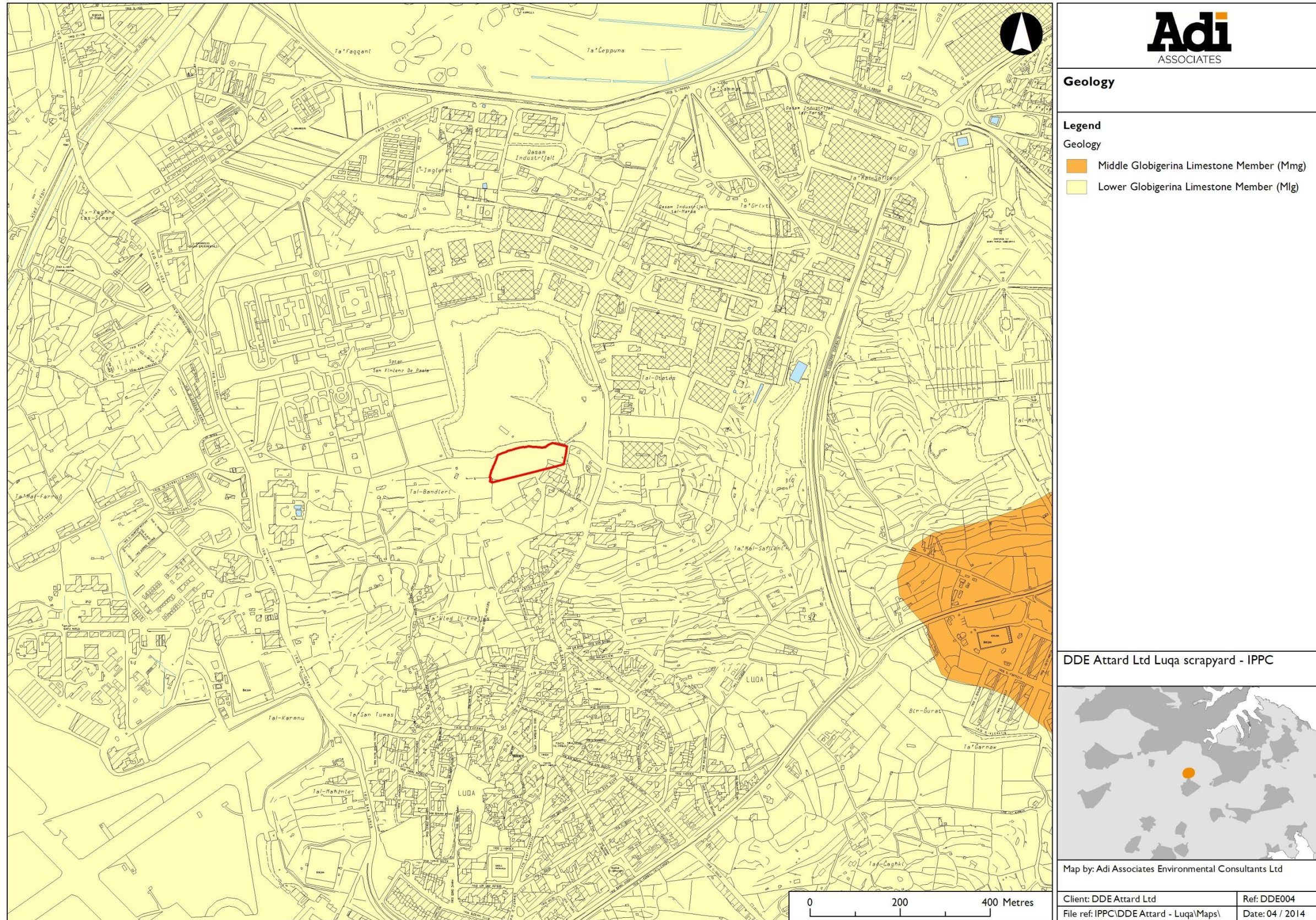
Geology

- 2.30. The geology of the site and its immediate surroundings are as shown in **Figure 2.11**. At the Scheme site, the exposed rock formation is Lower Globigerina Limestone. This is a relatively weak limestone consisting of the shells of marine micro-organisms that were once deposited at the bottom of a deep sea, and subsequently compacted and cemented together with time. These processes have resulted in a fine-textured rock, which is however easily worked due to it being poorly cemented in comparison with other limestones.
- 2.31. While at present there are no arrangements for surface collection and water management, the site generally appears to slope downwards from south to north; however some areas on site retain rainwater, and the southwestern boundary slopes southwards.
- 2.32. As mentioned, only part of the ground surface of the site as it currently exists is concreted; the remainder is untreated and unsurfaced.

² Malta Resources Authority (2004) *Malta Main Mean Sea Level Groundwater Body* <http://mra.org.mt/wp-content/uploads/2012/08/MT001.pdf>.

³ Terracore (2013) *Service Tender for a Soil Baseline Survey Project: ERDF I 56: Final Report* www.mepa.org.mt/EIACMS/documents/activity/Activity_5-130315_Final_report.pdf.

Figure 2.11: Geology



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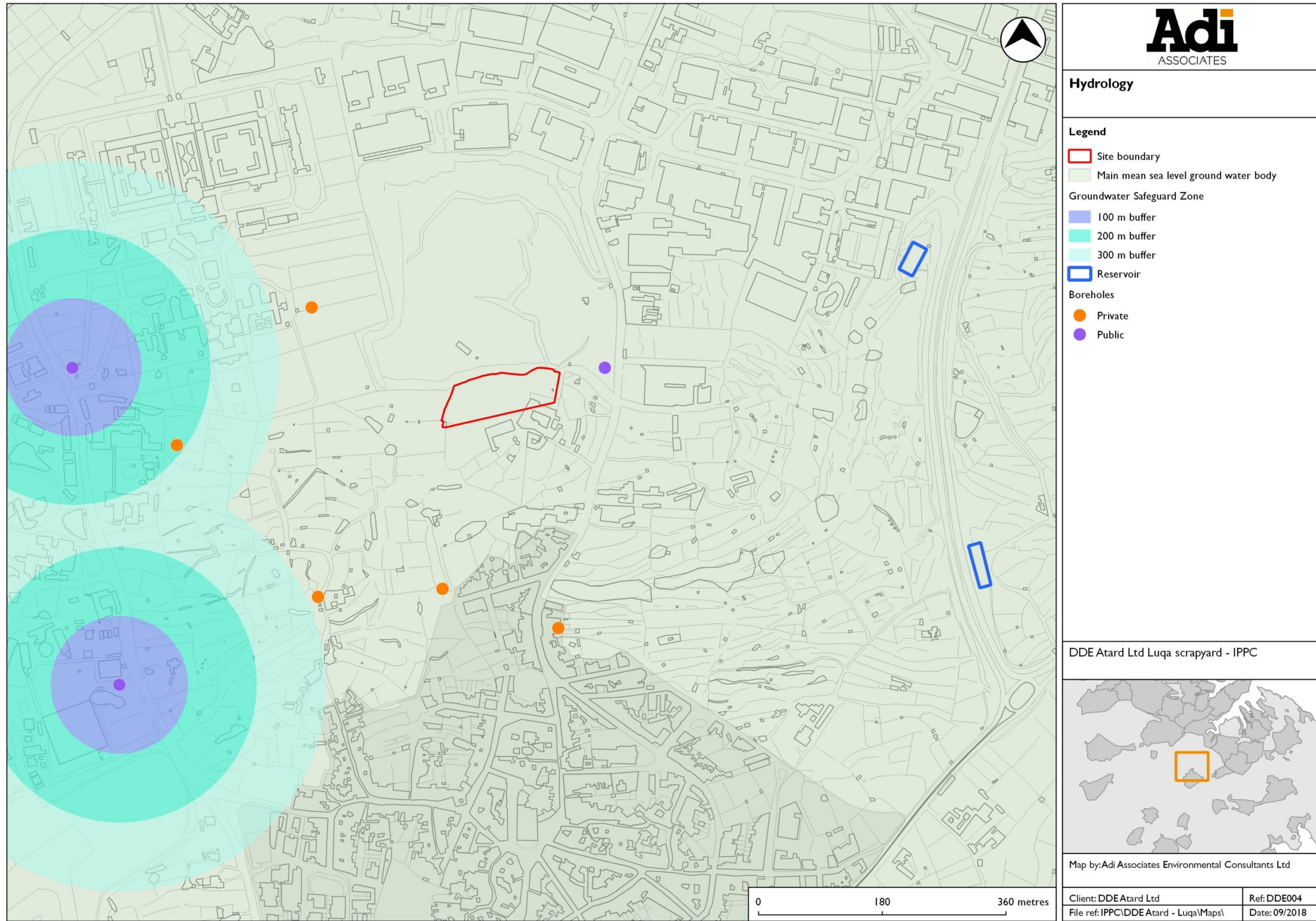
Hydrology

- 2.33. The main hydrological feature within the site is the mean sea level aquifer (**Figure 2.12**), since the site is located in the Malta Main Mean Sea Level Groundwater Body (MT001). This aquifer covers an area of 217 km². The maximum length is 21 km whilst the maximum width is 13 km. The mean groundwater thickness is 67.5 m. The groundwater at the Scheme site is found at a depth of around 56 to 60 m below the land surface, since the site is located from around 58 to 62 m above sea level, and the groundwater in the area can be assumed to be 1 to 2 m above mean sea level.⁴
- 2.34. The site is located outside the Drinking Water Safeguard Zone. Drinking Water Safeguard Zones were designated by creating a buffer of 300 m around public abstraction groundwater points.
- 2.35. There are five private groundwater boreholes located at distances ranging from around 235 m to 390 m away from the site, and two Water Services Corporation groundwater boreholes located over 500 m from the site (**Figure 2.12**). WSC regularly monitor their boreholes for conductivity, chlorides and nitrates.⁵

⁴ Sapiano, M (Water Policy Unit within the Ministry for Energy and Health). Personal communication (email), 9th October 2014.

⁵ Micallef Sultana, M (MRA). Personal communication (email), 7th October 2014.

Figure 2.12: Hydrology



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Current Operations at the Scheme Site

- 2.36. On 28th October 2010, the former MEPA issued the operator with a Waste Management Permit, “*To operate a Facility for Metal recovery and storage prior to export*”. This permit was varied and renewed several times.
- 2.37. The Scheme site was regulated by an Environmental Permit (WM 0009/06/G varied on 12th March 2014) at the time this site report was prepared (in 2014). The permit authorised the following activities:
- Temporary storage and dismantling of washing machines, cookers and water meters;
 - Storage and processing of scrap metal;
 - Sorting, storage and baling of tyres; and
 - Storage and processing of wood.
- 2.38. It is noted that the current environmental permit (WM 0009/06/K issued on 14th March 2016) also authorises the operation of a composter; however, the composter is not relevant to land / groundwater contamination as it only processes non-hazardous food waste.
- 2.39. A site survey was carried out by Adi Associates’ personnel on 28th August 2014 and 2nd October 2014 to obtain further information regarding the current site activities and carry out a preliminary visual investigation of the current state of the site.
- 2.40. Storage and stockpiling of vehicle and white good parts, including scrap metal, are carried out throughout the site. There are no delineated areas for different types of waste, although some organisation of wastes by type into stockpiles was noted. It is understood that the size and location of stockpiles changes according to the types and quantities of wastes accepted and according to how quickly they can be processed.
- 2.41. ELVs are only accepted if they have previously been dismantled to remove hazardous components. Tyres are processed by being cut using shears and then baled using an electric baler.
- 2.42. A diesel fuel tank is located approximately midway through the site, and its location has apparently remained approximately constant over the years. The tank is housed in a container that acts as a bund, and diesel is used to refuel the operator’s vehicles and machinery. The dispenser is not bunded. The operator also uses a diesel bowser to transport diesel to vehicles off-site.
- 2.43. Various unbunded fresh oil drums were noted around the site; these are used for the operator’s vehicles and machinery.
- 2.44. A site office is also present just outside the southeastern boundary.

- 2.45. Much of the ground surface is currently still untreated and unsurfaced. However, a full development permit for upgrading of the site was issued on 14th April 2014 (PA 05538/07), and included the installation of a hardstanding surface and surface water management. Following the issue of this permit, the western side of the site has been surfaced, and there are plans to surface the remaining site area.
- 2.46. Surfacing includes an underlying impermeable membrane (**Figure 2.13**) and a reinforced concrete layer (**Figure 2.14**) to ensure impermeability.

Figure 2.13: Installation of membrane underlay



Figure 2.14: Installation of reinforced concrete surface



Proposed Reorganisation of the Scheme Site

- 2.47. The operator is also proposing to reorganise the Scheme site as shown in **Figure 2.15**, to improve current operations by accommodating a new shed to bring certain activities under cover and to better organise the site. A new activity consisting of composting of food waste is also proposed. De-pollution of ELV using standard machinery and storage of sealed containerised waste are also proposed.
- 2.48. During the discussions leading up to the formulation of the IPPC Application and following agreement on land ownership with a neighbouring site, the site boundary is being amended to take up small areas surrounding the current site and to provide access by the third-party operator to his site; the total site area remains approximately the same. The change in the site boundary also requires demolition of part of a building located southeast of the current site. A full development permit application to cover these changes has been submitted (PA 4172/16).
- 2.49. The proposed activities will therefore be limited to:
- ELV depollution using dedicated equipment, followed by dismantling;
 - Dismantling of Waste Electrical and Electronic Equipment (WEEE): this activity will be limited to washing machines, cookers and water meters;
 - Processing of metals (including of dismantled WEEE and ELV metal components),

including shredding and pressing;

- Baling of tyres and bumpers;
- Wire stripping;
- Wood processing (including shredding);
- Storage of various materials / waste associated with the above activities, including vehicle parts, tyres, scrap metal, wood, plastic, oils and fuel;
- Temporary storage of containerised waste: To consist of solid / liquid waste (including hazardous waste such as asbestos) in sealed containers, received at the site for onward shipment without any on-site processing;
- Composting of food waste: This is an EU-funded pilot project processing around 100 t/a of waste; and
- Maintenance of on-site machinery.

2.50. All processing of hazardous waste will be carried out in the covered shed. A designated quarantine area will also be included for temporary controlled storage of unpermitted waste that may inadvertently enter the site.

2.51. There are also plans for management of surface water (**Figure 2.16**). Surface water will be channelled through gutters to an underground reservoir fitted with oil-water interceptors to clean the water before collection. It is intended that the clean water will be used for irrigation and washing within the site as far as practicable. The only overflow of surface water from the site will be clean water from this reservoir.

Figure 2.15: Proposed Scheme layout

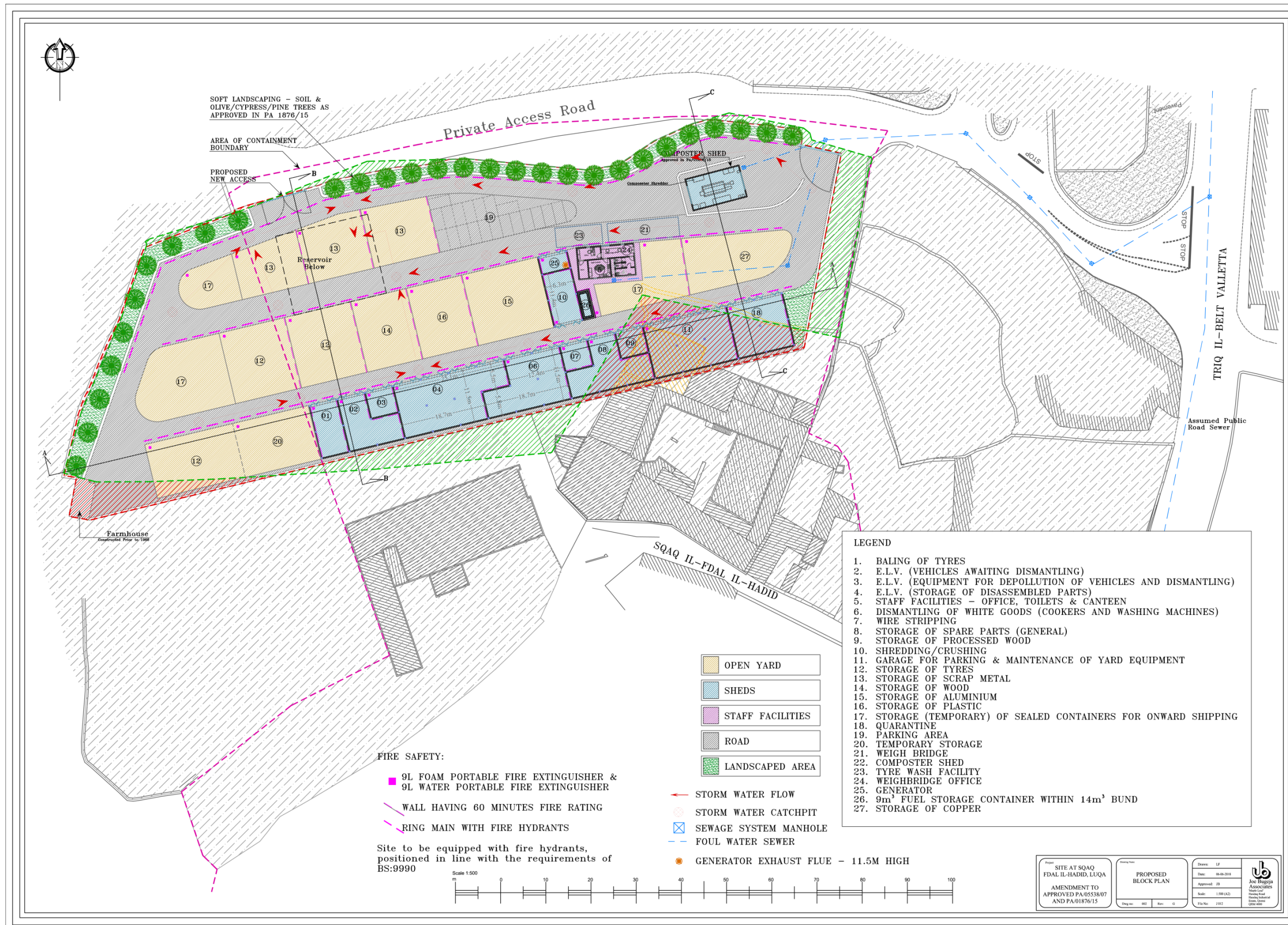
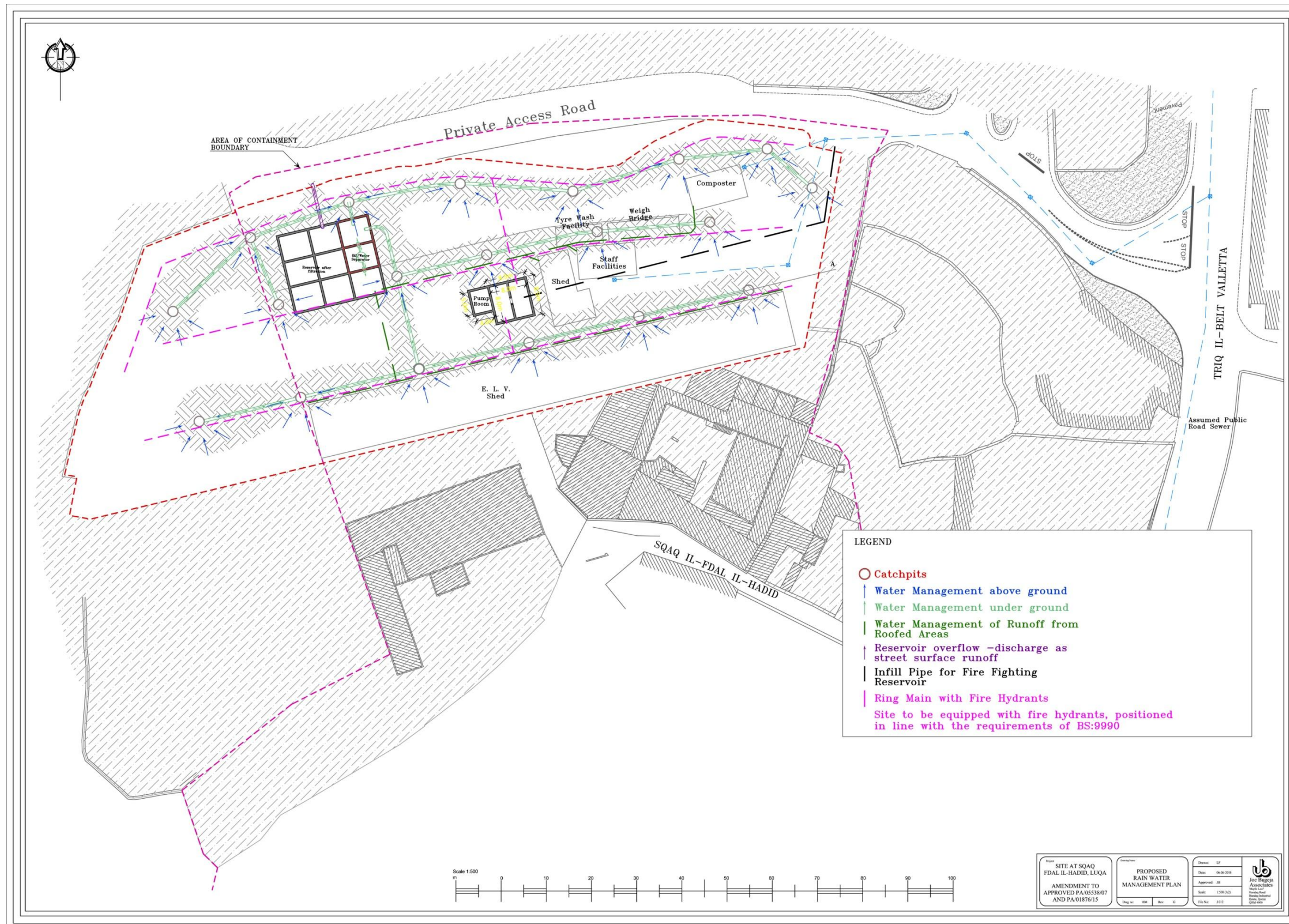


Figure 2.16: Surface water management



Pollutant Linkages

- 2.52. **Table 2.1** identifies the principal source-pathway-receptor linkages for land and groundwater contamination from the Scheme site. Environmental risk occurs when there is a means by which a hazard can result in a deleterious impact on the surrounding environment, i.e. receptors. The presence of a hazard alone does not constitute a risk. A risk is only present if there is a pathway which links the source (hazard) to the receptor. This is known as the source-pathway-receptor linkage.⁶
- 2.53. If any of the three elements are absent then there is no complete linkage and thus no unacceptable risk to the environment.

Table 2.1: Pollution pathway identification for Scheme site activities

Source	Pathway	Receptor	Mitigation Measures		
			Historic	Current	Planned
Drips and spills of liquid hazardous substances / waste during processing and storage of wastes (mainly scrap machinery) and storage and dispensing of diesel fuel	Direct contamination; Permeable land strata above water table; Rainwater runoff.	Land Groundwater	None.	Hardstanding has been installed in part of the site.	Impervious hardstanding; Surface water management, including oil-water interceptor.
Release of asbestos fibres (if accidentally broken)	Direct contamination; Permeable land strata above water table; Rainwater runoff.	Land Groundwater	No breaking of asbestos on site.	Activity discontinued.	Storage in sealed containers; Impervious hardstanding.
Crushing of vehicles using grabbers	Air dispersal; Direct contamination; Rainwater runoff (particularly for soluble components).	Land Groundwater	None.	Only dismantled car chassis are accepted at the site.	Impervious hardstanding; Surface water management, including oil-water interceptor; Vehicles to be dismantled under cover using standard ELV processing machinery; shed planned for mobile crusher.
Burning of cables	Air dispersal;	Land	Attention	Activity	Activity not

⁶ Defra (2002) *Groundwater Protection Code: Petrol Stations and other Fuel Dispensing Facilities involving Underground Storage Tanks*
<http://archive.defra.gov.uk/environment/quality/water/waterquality/ground/documents/groundwater-petrol.pdf>.

Source	Pathway	Receptor	Mitigation Measures		
			Historic	Current	Planned
	Rainwater runoff.	Groundwater	paid to wind speed to limit dispersal.	discontinued.	planned.

- 2.54. Considering the nature of the site and the current and historic activities, the principal source of hazardous substances would have been mainly small leaks of fuel, oils and other liquids during processing and storage of waste machinery such as end-of-life vehicles, as well as during storage and dispensing of diesel fuel. This would have released chemical components found in fuels, coolants, lubricants and batteries. In fact there are oily stains in several areas around the site, including near the diesel tank (**Figure 2.17** and **Figure 2.18**).
- 2.55. Asbestos could also have been released if stored material was accidentally broken during transport or storage.
- 2.56. Another source of contamination would be components released during crushing of vehicles, such as particles containing metal and asbestos (which was historically used in brake linings). In this case, the land could be contaminated directly, or indirectly through air dispersal, whereas components (especially soluble ones) could also migrate to the groundwater via rainwater runoff.
- 2.57. Burning of motor cables would also have released pollutants from the combustion of plastic / rubber surrounding the cables, including dioxins and furans, although this activity has been discontinued and is no longer planned.

Figure 2.17: Oily stain near diesel tank



Figure 2.18: Oily stains on site



- 2.58. Since most of the site is currently untreated and unsurfaced (with the exception of the recently installed hardstanding), a source-pathway-receptor linkage still exists at present for spillages of hazardous liquids. However, as mentioned in **Table 2.1**, the planned future mitigation measures related to site surfacing and water management should lower the environmental risk considerably. Additionally, certain practices

have been discontinued and thus no longer present a risk to land / groundwater.

- 2.59. While both land and groundwater have been identified as receptors, there is no perched aquifer beneath the site, and the mean sea level aquifer is located around 56 to 60 m below the site. This reduces the risk of significant contamination of the aquifer considerably, provided there are no direct routes to groundwater (such as fissures).
- 2.60. Considering that the areas surrounding the site have been used for industrial and waste management activities, in many cases with limited environmental controls in place, pollutant linkages might also exist from external activities to the Scheme site. Therefore if contamination is found on site, it will be difficult to establish whether this has arisen from the operator's activities or from other activities occurring in the surroundings, including the former Luqa rubbish dump and the adjacent waste management activity.

Site Investigation

- 2.61. A Method Statement for site investigation was submitted to the former MEPA on 23rd October 2014. It was accepted, after revisions, on 27th January 2015. The Method Statement is included in **Annex I**.
- 2.62. Since contaminants need to first permeate through the land strata to reach the groundwater, a phased monitoring strategy was agreed to with the former MEPA, starting with land monitoring up to a depth of 2 m. If the results indicate that contamination has reached the deeper samples, groundwater monitoring would also be considered, in consultation with MEPA and MRA, and preferably making use of the existing boreholes identified previously.
- 2.63. The analytes included in this monitoring programme are presented in **Table 2.2**, together with a rationale for their inclusion.

Table 2.2: Analytes for land monitoring

Analyte	Rationale for inclusion
C12-C35 hydrocarbons (total)	Main constituents of fuels, coolants and lubricants.
C5-C12 hydrocarbons (total)	Main constituents of fuels, coolants and lubricants.
BTEX (benzene, toluene, ethylbenzene, xylene)	Fuel additives.
Metals (As, Cd, Cr VI, Cr (total), Cu, Hg, Ni, Pb, Se, Zn)	Certain metals are / used to be components of fuels, lubricating oils and batteries. ⁷
PAHs ⁸	Components of fuel, lubricating oil. ⁹

⁷ Pulles, T., van der Gon, H. D., Appelman, W., & Verheul, M (2012) Emission factors for heavy metals from diesel and petrol used in European vehicles. *Atmospheric Environment*, 61, 641-651. doi: 10.1016/j.atmosenv.2012.07.022.

⁸ 16 US EPA PAHs, as follows: acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, dibenzo(ah)anthracene, fluoranthene, fluorene, indeno(123-cd)pyrene, naphthalene, phenanthrene, pyrene.

Analyte	Rationale for inclusion
PCBs ¹⁰	Used in transformer cooling oils (traces may have been present even if transformers were received empty).
MTBE	Formerly used as an anti-knocking agent, to improve the octane rating of petrol.
Asbestos	Historically used in brake linings, asbestos has been stored on site and is proposed to be stored in future (in sealed containers).
Cyanide (total)	Component of lubricating oil. ¹¹
Dioxins and furans ¹²	By-product of burning cables (practice discontinued).
Chlorinated aliphatic hydrocarbons ¹³	Used as solvents, cleaners, and degreasing agents and included on request from the former MEPA (no evidence of their use on site). ¹⁴
Halogenated aliphatic hydrocarbons ¹⁵	Used as solvents, degreasing agents, pesticides and chemical intermediates and included on request from the former MEPA (no evidence of their use on site). ¹⁶

Sampling

- 2.64. Sampling was carried out on 14th April 2015. Weather conditions were sunny during sampling.
- 2.65. Samples were taken from the sampling points shown in **Figure 2.19**; five sampling points were selected to ensure adequate site representation and capture potential current and future contamination, as described in **Table 2.3**.

⁹ Perrone, M G, et al. (2014) Exhaust emissions of polycyclic aromatic hydrocarbons, n-alkanes and phenols from vehicles coming within different European classes. *Atmospheric Environment*, 82, 391–400. doi: 10.1016/j.atmosenv.2013.10.040.

¹⁰ EC7 congeners: BZ#28, BZ#52, BZ#101, BZ#118, BZ#138, BZ#153, BZ#180, total tri-hepta.

¹¹ Elnasharty, I. Y., Kassem, A. K., Sabsabi, M., & Harith, M. A. (2011) Diagnosis of lubricating oil by evaluating cyanide and carbon molecular emission lines in laser induced breakdown spectra. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 66(8), 588-593. doi: 10.1016/j.sab.2011.06.001.

¹² 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-Heptachlorodibenzofuran, 1,2,3,4,7,8,9-Heptachlorodibenzofuran, 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-Hexachlorodibenzofuran, 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-Hexachlorodibenzofuran, 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-Hexachlorodibenzofuran, 1,2,3,7,8-Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-Pentachlorodibenzofuran, 2,3,4,6,7,8-Hexachlorodibenzofuran, 2,3,4,7,8-Pentachlorodibenzofuran, 2,3,7,8-Tetrachlorodibenzo-p-dioxin, 2,3,7,8-Tetrachlorodibenzofuran, Octachlorodibenzo-p-dioxin, Octachlorodibenzofuran.

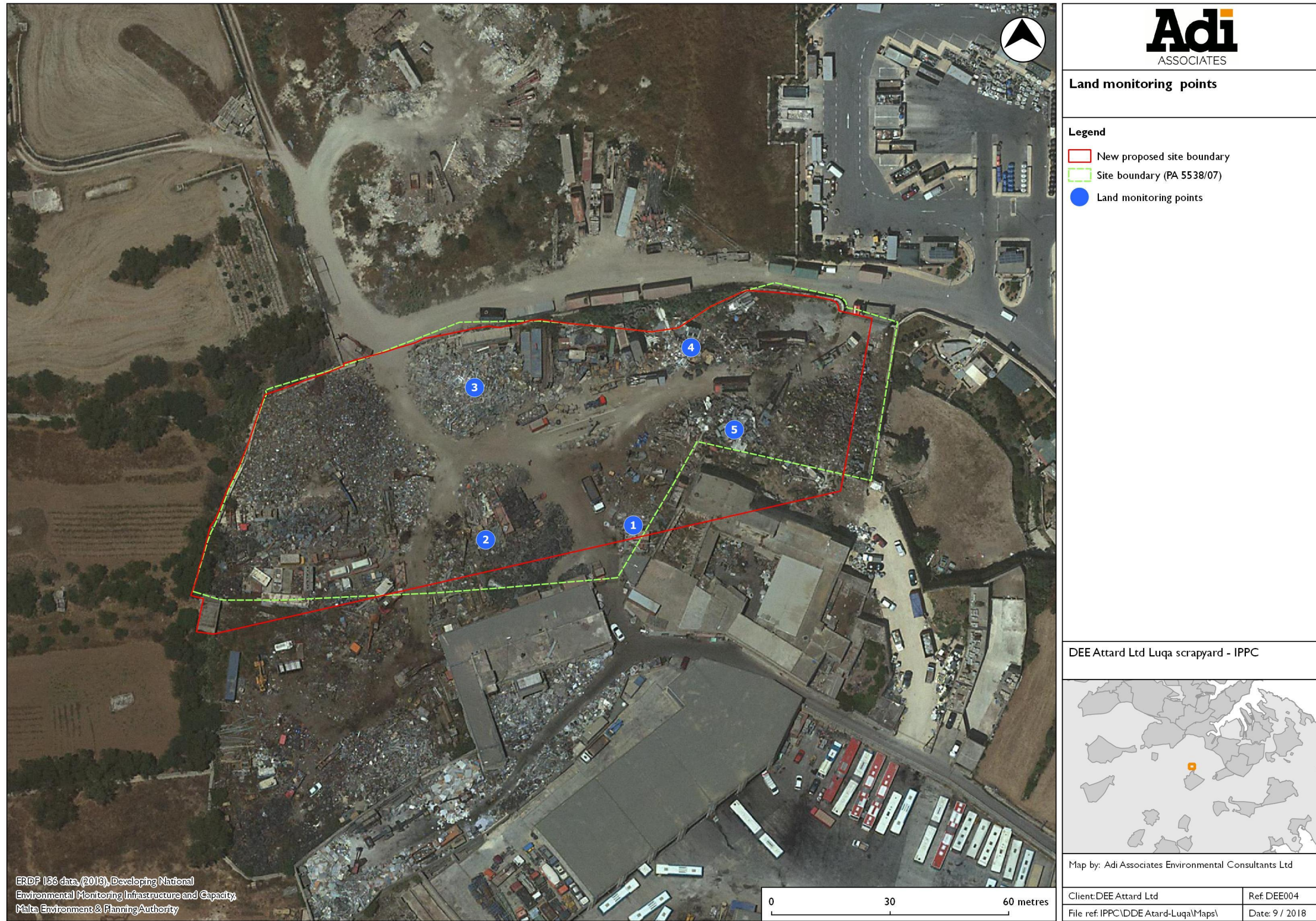
¹³ Chloromethane, dichloromethane, trichloromethane, vinyl chloride monomer, 1,2-dichloroethane, 1,1-dichloroethylene, trichloroethylene, tetrachloroethylene.

¹⁴ Ellis, D. E., Lutz, E. J., Odom, J. M., Buchanan, R. J., Bartlett, C. L., Lee, M. D., Harkness, M. R., & DeWeerd, K. A. (2000). Bioaugmentation for accelerated in situ anaerobic bioremediation. *Environmental Science & Technology*, 34(11), 2254-2260. doi: 10.1021/es990638e.

¹⁵ Bromoform, 1,2-dibromoethane, dibromochloromethane, bromochloromethane.

¹⁶ Janssen, D. B., Scheper, A., Dijkhuizen, L., & Witholt, B. (1985). Degradation of halogenated aliphatic compounds by *Xanthobacter autotrophicus* GJ10. *Applied and Environmental Microbiology*, 49(3), 673-677.

Figure 2.19: Sampling locations



ERDF 156 data, (2013), Developing National Environmental Monitoring Infrastructure and Capacity, Malta Environment & Planning Authority

INDICATIVE ONLY - Not to be used for direct interpretation

Table 2.3: Sampling points





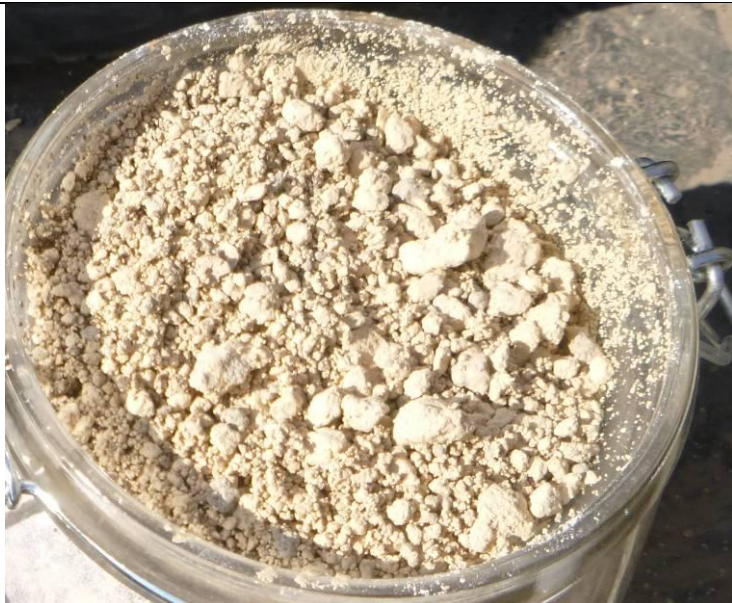

Point No.	Coordinates (WGS84)	Rationale
1	35°51'56.53"N, 14°29'19.49"E	Area just outside the fuel tank container. This location also corresponds to the proposed garage for parking and maintenance of yard equipment.
2	35°51'56.25"N, 14°29'17.87"E	Currently used for storage of scrap.
3	35°51'57.82"N, 14°29'17.87"E	Currently used for storage of scrap.
4	35°51'58.21"N, 14°29'20.09"E	Currently used for storage of scrap.
5	35°51'57.32"N, 14°29'20.93"E	Currently used for storage of scrap. This location also corresponds to the proposed location for the quarantine area.


- 2.66. Samples were taken at three depths to determine whether there has been any vertical distribution of pollutants. The first sample was taken from the surface, the second at 1 m depth, and the third at 2 m depth.
- 2.67. Land investigations were conducted in accordance with BS 4019: 1993: *Rotary core drilling equipment*, and BS 5930: 1999: *Code of practice for geological site investigations*. Sampling was supervised by a chemist.
- 2.68. The sampling point was cleared and the sample drilled using a Beretta drill rig fitted with an auger to drill through soil and rock (**Figure 2.20**). This technique removes the material from the base of the borehole towards the top, and does not require the use of circulation fluids.
- 2.69. After each sample, the drill rig was moved to a wash-down area and cleaned using a power wash. Voids were backfilled using the remaining part of the core not sent for analysis.
- 2.70. Samples were stored in glass jars, and a small portion of each sample was placed in a 40 mL septum-capped vial filled to the top immediately upon sampling and chilled. This vial was used by the lab for testing of volatile substances.
- 2.71. All samples were photographed, labelled, and logged before being sent to the laboratory. Additionally, a record was kept of any visual or olfactory evidence of contamination. This record is presented in **Table 2.4**.




Figure 2.20: Drill rig used for sampling



Table 2.4: Sample logs

Sampling point		Depth		
		Surface	1 m	2 m
1	Unique ID	DDE-1-0-Gen	DDE-1-1-Gen	DDE-1-2-Gen
	Photograph			
	Observations	No odour.	Rock was found at around 90 cm below the surface. Sample had a damp earth odour.	Damp earth odour.
2	Unique ID	DDE-2-0-Gen	DDE-2-1-Gen	DDE-2-2-Gen
	Photograph			
	Observations	Odororous.	Rock was found at around 80 cm below the surface. Sample had a damp earth odour.	Damp earth odour. Sample taken from slightly to the west of the surface and 1 m samples (sampling had to be restarted due to a broken auger part).

3	Unique ID Photograph	<p>DDE-3-0-Gen</p> 	<p>DDE-3-1-Gen</p> 	<p>DDE-3-2-Gen</p> 
	Observations	Sample appears stained, odorous.	Mix of earth and land, appears stained. Rock was found at around 1 m below the surface.	Rock appears stained.
4	Unique ID Photograph	<p>DDE-4-0-Gen</p> 	<p>DDE-4-1-Gen</p> 	<p>DDE-4-2-Gen</p> 
	Observations	Odorous.	Mix of earth and land, earth appears stained. Rock was found at around 1 m below the surface.	No odour or stains evident.

5	Unique ID Photograph	DDE-5-0-Gen	DDE-5-1-Gen	DDE-5-2-Gen
				
	Observations	No odour.	Mix of rock and earth, no odour. Rock was found at around 1 m below the surface.	Earthy smell.

Analysis

- 2.72. Samples were delivered for analysis at a UK laboratory accredited to ISO 17025 as well as for certain specific tests as indicated in **Table 2.5**. A copy of the laboratory's certification was provided to the former MEPA.
- 2.73. Delivery took place by courier and the samples were received by the laboratory on 15th April 2015. The vials were kept chilled during transport.
- 2.74. **Table 2.5** presents the methodology used for analysis and associated limits of detection. The laboratory uses in-house methods for analysis based on international reference standards.

Table 2.5: Methods for analysis of land samples

Analyte	Analytical methodology	Reference standard ¹⁷	Limit of detection	Test-specific accreditation
C12-C35 hydrocarbons (total)	GC-FID	EPA Method 8015B, Revision 2; TNRCC Method 1006	1 mg/kg	No
C5-C12 hydrocarbons (total)	GC-MS	EPA Method 8260, Revision B	10 µg/kg	No
BTEX (benzene, toluene, ethylbenzene, xylene)	GC-MS	EPA Method 8260, Revision B	1 µg/kg	Yes (soil)
Metals (As, Cd, Cr VI, Cr (total), Cu, Hg, Ni, Pb, Se, Zn)	ICP-MS	EPA Method 6020	0.1 mg / kg	No
PAHs	GC-MS	EPA Method 8270, Revision C	0.01 mg/kg	Yes (soil)
PCBs	GC-MS	EPA Method 8082; EPA Method 1668	0.05 µg/kg	Yes (soil)
MTBE	GC-MS	EPA Method 8260, Revision B	1 µg/kg	Yes (soil)
Asbestos	Polarised light microscopy	HSG248	Presence / absence; if asbestos is detected the quantification test has a LoD of 0.001%	Yes (soil)

¹⁷ The laboratory uses a documented in-house method based on the analytical methodology identified in the table. The in-house method refers to the international standards referred to in this table.

Analyte	Analytical methodology	Reference standard ¹⁷	Limit of detection	Test-specific accreditation
Cyanide (total)	Colorimetry	DOE Methods for the Examination of Waters and Associated Materials, published by HMSO (1988) (equivalent to EPA 9014)	0.5 mg/kg	Yes (soil, down to 1 mg/kg)
PCDD/PCDF	GC-MS	EPA Method 1613	0.5 ng/kg TEQ	Yes (soil)
Chlorinated aliphatic hydrocarbons	GC-MS	EPA Method 8260	5 µg/kg, except vinyl chloride and dichloromethane (10 µg/kg)	Yes (soil), except dichloromethane
Halogenated aliphatic hydrocarbons	GC-MS	EPA Method 8260	5 µg/kg	Yes (soil), except dibromo-chloromethane

2.75. Each core sample was analysed for all the analytes in **Table 2.5**, with the exception of dioxins and furans, which were analysed in the surface and 2 m samples.

2.76. Following analysis, the samples were appropriately disposed of by the laboratory in accordance with regulations.

2.77. The laboratory maintains several QA/QC procedures, including:

- Multi-point calibration with authentic standards (with defined minimum performance characteristics);
- Analysis of control samples within each analytical batch, such as independent standards, matrix spikes or reference materials;
- Analysis of reagent / method blanks within each analytical batch;
- Ongoing quality assurance through the use of control charts in conjunction with warning and action limits for the QC sample data; and
- Participation in external proficiency testing and inter-laboratory schemes.

Results

2.78. The results are presented in **Table 2.6** to **Table 2.17**.

2.79. Results are given as dry weight for metals (**Table 2.9**), and on the sample as received for the other parameters.

Table 2.6: C12-C35 hydrocarbons concentration (mg/kg)

Depth	Sampling point reference				
	1	2	3	4	5
Surface	490	5,300	1,200	3,500	2,800
1 m	44	580	1,100	520	590
2 m	2	<1	200	350	73

Table 2.7: C5-C12 hydrocarbons concentration (µg/kg)

Depth	Sampling point reference				
	1	2	3	4	5
Surface	<20 ⁽¹⁸⁾	<50 ⁽¹⁸⁾	<20 ⁽¹⁹⁾	<10	<20 ⁽¹⁹⁾
1 m	<20 ⁽¹⁸⁾	<10	<10	<20	<10
2 m	<10	<10	<10	<10	<10

Table 2.8: BTEX concentration (µg/kg)

Parameter	Depth	Sampling point reference				
		1	2	3	4	5
Benzene	Surface	<2 ⁽¹⁸⁾	<5 ⁽¹⁸⁾	<2 ⁽¹⁹⁾	<1	<2 ⁽¹⁹⁾
	1 m	<2 ⁽¹⁸⁾	<1	<1	<2 ⁽¹⁹⁾	<1
	2 m	<1	<1	<1	<1	<1
Toluene	Surface	<2 ⁽¹⁸⁾	<5 ⁽¹⁸⁾	<2 ⁽¹⁹⁾	<1	<2 ⁽¹⁹⁾
	1 m	<2 ⁽¹⁸⁾	<1	<1	<2 ⁽¹⁹⁾	<1
	2 m	<1	<1	<1	<1	<1
Ethylbenzene	Surface	<2 ⁽¹⁸⁾	<5 ⁽¹⁸⁾	<2 ⁽¹⁹⁾	<1	<2 ⁽¹⁹⁾
	1 m	<2 ⁽¹⁸⁾	<1	<1	<2 ⁽¹⁹⁾	<1
	2 m	<1	<1	<1	<1	<1
Ortho-xylene	Surface	<2 ⁽¹⁸⁾	<5 ⁽¹⁸⁾	<2 ⁽¹⁹⁾	<1	<2 ⁽¹⁹⁾
	1 m	<2 ⁽¹⁸⁾	<1	<1	<2 ⁽¹⁹⁾	<1
	2 m	<1	<1	<1	<1	<1
Meta/para-xylene	Surface	<2 ⁽¹⁸⁾	<5 ⁽¹⁸⁾	<2 ⁽¹⁹⁾	<1	<2 ⁽¹⁹⁾
	1 m	<2 ⁽¹⁸⁾	<1	<1	<2 ⁽¹⁹⁾	<1
	2 m	<1	<1	<1	<1	<1

¹⁸ The limit of detection was determined by a sample aliquot used for analysis.

¹⁹ The limit of detection was raised due to low internal standard recovery.

Table 2.9: Metals concentration (mg/kg)

Parameter	Depth	Sampling point reference				
		1	2	3	4	5
Arsenic	Surface	43	79	36	74	39
	1 m	28	32	64	83	36
	2 m	35	29	34	33	29
Cadmium	Surface	6.1	16.0	2.3	29.0	6.6
	1 m	1.1	1.9	14.0	17.0	3.3
	2 m	0.9	0.7	2.0	3.0	0.8
Chromium (total)	Surface	91	230	49	550	110
	1 m	35	41	120	270	95
	2 m	34	24	33	62	35
Chromium (hexavalent)	Surface	<0.1	<0.1	<0.1	<0.1	<0.1
	1 m	<0.1	<0.1	<0.1	<0.1	<0.1
	2 m	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	Surface	550	1,100	150	2,300	310
	1 m	40	81	400	1,300	180
	2 m	26	27	67	240	23
Lead	Surface	5,400	18,000	1,100	5,700	2,300
	1 m	240	1,100	5,600	7,200	1,500
	2 m	97	260	750	850	120
Mercury	Surface	4.6	96.0	1.1	12.0	6.7
	1 m	0.2	5.9	2.3	4.8	2.1
	2 m	<0.1	1.2	0.2	1.0	0.1
Nickel	Surface	96	250	61	370	110
	1 m	48	46	150	280	83
	2 m	49	35	52	69	53
Selenium	Surface	11.0	5.2	3.4	4.3	3.4
	1 m	6.2	3.2	5.2	6.0	3.7
	2 m	5.1	3.4	2.2	2.9	2.7
Zinc	Surface	3,000	4,900	1,200	5,800	2,500
	1 m	180	400	6,400	6,700	1,500
	2 m	92	110	780	840	160

Table 2.10: PAHs concentration (mg/kg)

Parameter	Depth	Sampling point reference				
		1	2	3	4	5
Acenaphthene	Surface	0.01	0.33	0.01	0.03	0.02
	1 m	<0.01	<0.01	0.01	0.02	0.02
	2 m	<0.01	<0.01	<0.01	0.01	<0.01
Acenaphthylene	Surface	0.01	0.23	0.01	0.03	0.04
	1 m	<0.01	<0.01	0.05	0.01	0.01
	2 m	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	Surface	0.01	0.88	0.01	0.06	0.05
	1 m	0.01	0.01	0.05	0.04	0.04
	2 m	<0.01	<0.01	0.01	0.01	<0.01
Benzo(a)anthracene	Surface	0.04	6.1	0.09	0.19	0.27
	1 m	0.01	0.03	0.39	0.14	0.16
	2 m	0.01	0.01	0.04	0.02	0.01
Benzo(a)pyrene	Surface	0.04	2.3	0.1	0.24	0.34
	1 m	0.01	0.02	0.55	0.18	0.16

Parameter	Depth	Sampling point reference				
		1	2	3	4	5
Benzo(b)fluoranthene	2 m	<0.01	0.01	0.05	0.01	0.01
	Surface	0.06	2.4	0.13	0.32	0.35
	1 m	0.01	0.03	0.69	0.24	0.21
Benzo(ghi)perylene	2 m	<0.01	<0.01	0.07	0.02	0.01
	Surface	0.06	1.2	0.09	0.26	0.28
	1 m	0.01	0.03	0.46	0.17	0.14
Benzo(k)fluoranthene	2 m	<0.01	0.01	0.04	0.01	0.01
	Surface	0.04	1.3	0.1	0.24	0.36
	1 m	0.01	0.01	0.51	0.2	0.14
Chrysene	2 m	<0.01	<0.01	0.04	0.02	0.01
	Surface	0.06	12	0.13	0.31	0.39
	1 m	0.01	0.09	0.61	0.22	0.2
Dibenzo(ah)anthracene	2 m	0.01	0.02	0.06	0.02	0.01
	Surface	0.02	0.42	0.03	0.09	0.1
	1 m	<0.01	0.01	0.17	0.06	0.05
Fluoranthene	2 m	<0.01	<0.01	0.02	0.01	<0.01
	Surface	0.07	10	0.13	0.39	0.47
	1 m	0.02	0.05	0.7	0.35	0.33
Fluorene	2 m	0.01	0.01	0.06	0.05	0.01
	Surface	<0.01	0.33	0.01	0.03	0.02
	1 m	<0.01	0.01	0.01	0.02	0.02
Indeno(123-cd)pyrene	2 m	<0.01	<0.01	<0.01	0.01	<0.01
	Surface	0.05	0.77	0.08	0.21	0.22
	1 m	0.01	0.02	0.41	0.16	0.11
Naphthalene	2 m	<0.01	0.01	0.04	0.01	0.01
	Surface	0.01	0.53	0.04	0.09	0.08
	1 m	<0.01	0.01	0.06	0.05	0.02
Phenanthrene	2 m	0.02	0.01	0.01	0.03	<0.01
	Surface	0.03	3	0.08	0.28	0.29
	1 m	0.02	0.04	0.29	0.24	0.22
Pyrene	2 m	0.01	0.02	0.03	0.04	0.01
	Surface	0.22	24	0.14	0.41	0.46
	1 m	0.02	0.14	0.72	0.32	0.29
Total PAH	2 m	0.01	0.03	0.07	0.06	0.01
	Surface	0.73	66	1.2	3.2	3.7
	1 m	0.14	0.5	5.7	2.4	2.1

Table 2.11: PCBs concentration (µg/kg)

Congener	Depth	Sampling point reference				
		1	2	3	4	5
BZ#28	Surface	0.19	11	23	7	0.39
	1 m	<0.50 ⁽²⁰⁾	0.13	30	0.7	0.55
	2 m	<0.50 ⁽²⁰⁾	<0.50 ⁽²⁰⁾	2	0.16	0.33

²⁰ The limit of detection was raised due to matrix interference, as co-eluting interferences were detected in several samples.

Congener	Depth	Sampling point reference				
		1	2	3	4	5
BZ#52	Surface	1	60	30	64	1.4
	1 m	<0.50 ⁽²⁰⁾	1	940	3.9	2.8
	2 m	<0.50 ⁽²⁰⁾	<0.50 ⁽²⁰⁾	54	0.63	0.28
BZ#101	Surface	2	81	25	42	2.3
	1 m	<0.50 ⁽²⁰⁾	1.8	1,500	10	5.2
	2 m	<0.50 ⁽²⁰⁾	<0.50 ⁽²⁰⁾	83	1.3	1.1
BZ#118	Surface	0.89	65	17	25	1.1
	1 m	<0.50 ⁽²⁰⁾	1.4	1,500	5.2	3.4
	2 m	<0.50 ⁽²⁰⁾	<0.50 ⁽²⁰⁾	79	0.61	0.44
BZ#138	Surface	2.9	76	18	37	4.4
	1 m	<0.50 ⁽²⁰⁾	2.1	1,100	15	9.4
	2 m	<0.50 ⁽²⁰⁾	<0.50 ⁽²⁰⁾	54	2.6	2.0
BZ#153	Surface	2.6	53	15	34	4.3
	1 m	<0.50 ⁽²⁰⁾	1.4	720	12	8.8
	2 m	<0.50 ⁽²⁰⁾	<0.50 ⁽²⁰⁾	37	1.9	2.0
BZ#180	Surface	2.6	30	8.1	22	3.1
	1 m	<0.50 ⁽²⁰⁾	1.1	140	8.6	6.5
	2 m	<0.50 ⁽²⁰⁾	<0.50 ⁽²⁰⁾	7.8	1.3	1.6
Total tri-hepta²¹	Surface	40	1,400	620	830	53
	1 m	<5.0 ⁽²⁰⁾	32	18,000	180	130
	2 m	<2.0 ⁽²⁰⁾	<2.0 ⁽²⁰⁾	970	25	22

Table 2.12: MTBE concentration (µg/kg)

Depth	Sampling point reference				
	1	2	3	4	5
Surface	<2 ⁽¹⁸⁾	<5 ⁽¹⁸⁾	<2 ⁽¹⁹⁾	<1	<2 ⁽¹⁹⁾
1 m	<2 ⁽¹⁸⁾	<1	<1	<2 ⁽¹⁹⁾	<1
2 m	<1	<1	<1	<1	<1

Table 2.13: Asbestos identification and quantification

Depth	Sampling point reference				
	1	2	3	4	5
Surface	n.d. ⁽²²⁾	n.d.	n.d.	n.d.	n.d.
1 m	n.d.	n.d.	n.d.	n.d.	n.d.
2 m	n.d.	n.d.	Chrysotile fibres detected, <0.001%	n.d.	n.d.

²¹ Total of all trichloro- and heptachloro-PCB congeners, including congeners other than those analysed individually.

²² n.d.: Not detected.

Table 2.14: Cyanide concentration (mg/kg)

Depth	Sampling point reference				
	1	2	3	4	5
Surface	<0.5	1.4	<0.5	1.9	0.8
1 m	<0.5	<0.5	1	1.3	<0.5
2 m	<0.5	<0.5	<0.5	<0.5	<0.5

Table 2.15: Dioxins and furans concentration (ng/kg)

Parameter	Depth	Sampling point reference				
		1	2	3	4	5
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	Surface	42	310	71	660	110
	2 m	0.89	5	21	63	6
1,2,3,4,6,7,8-Heptachlorodibenzofuran	Surface	27	380	31	160	55
	2 m	0.79	3	8.1	33	3.9
1,2,3,4,7,8,9-Heptachlorodibenzofuran	Surface	2.4	24	2.9	14	4.6
	2 m	<0.11	0.2	1.1	3.6	<0.11
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	Surface	0.82	10	1.5	4.2	1.6
	2 m	<0.057	0.12	0.27	0.47	0.2
1,2,3,4,7,8-Hexachlorodibenzofuran	Surface	5.9	63	5.2	29	11
	2 m	0.18	0.47	5.9	4	0.84
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	Surface	2.5	31	4.7	20	6.2
	2 m	0.11	0.29	1.1	1.7	0.5
1,2,3,6,7,8-Hexachlorodibenzofuran	Surface	4.9	47	5.3	21	7.2
	2 m	0.15	0.39	2	2.6	0.52
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	Surface	2.3	21	3	13	4.2
	2 m	0.11	0.22	0.8	1.1	0.39
1,2,3,7,8,9-Hexachlorodibenzofuran	Surface	0.97	16	1.9	6.4	2.5
	2 m	<0.068	0.14	1.5	0.75	0.2
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	Surface	0.91	7.9	1.4	4.1	1.7
	2 m	<0.053	0.099	0.31	0.33	0.14
1,2,3,7,8-Pentachlorodibenzofuran	Surface	3.9	23	3.1	13	5
	2 m	0.13	0.2	2.1	1.1	0.29
2,3,4,6,7,8-Hexachlorodibenzofuran	Surface	7.3	95	7.8	30	11
	2 m	0.22	0.74	2.2	2.8	0.82
2,3,4,7,8-Pentachlorodibenzofuran	Surface	7.1	52	7.9	23	8.2
	2 m	0.2	0.36	3.4	1.6	0.64
2,3,7,8-Tetrachlorodibenzo-p-dioxin	Surface	0.29	2	<0.45	1.1	0.53
	2 m	<0.057	<0.055	<0.094	0.12	<0.060
2,3,7,8-Tetrachlorodibenzofuran	Surface	7.6	38	8.9	23	9.4
	2 m	0.26	0.39	7.9	1.5	0.62
Octachlorodibenzo-p-dioxin	Surface	280	1,800	540	6,400	1,000
	2 m	5.9	42	160	600	39
Octachlorodibenzofuran	Surface	16	200	25	160	66
	2 m	0.48	1.8	5.8	44	2.7
PCDD/F WHO2005 TEQ	Surface	7.5	66	8.9	37	12

Parameter	Depth	Sampling point reference				
		1	2	3	4	5
Lower Bound ²³	2 m	0.19	0.58	3.9	3.6	0.86
PCDD/F WHO2005 TEQ	Surface	7.5	66	9.4	37	12
Upper Bound ²⁴	2 m	0.31	0.64	4	3.6	0.92
Dioxins and Furans ITEQ,	Surface	8.7	74	10	45	14
Lower Bound	2 m	0.23	0.64	4.6	4.3	0.95
Dioxins and Furans ITEQ,	Surface	8.7	74	11	45	14
Upper Bound	2 m	0.33	0.70	4.7	4.3	1.0

Table 2.16: Chlorinated aliphatic hydrocarbons concentration (µg/kg)

Parameter	Depth	Sampling point reference				
		1	2	3	4	5
Chloromethane	Surface	<10 ⁽¹⁸⁾	<25 ⁽¹⁸⁾	<10 ⁽¹⁹⁾	<5	<10 ⁽¹⁹⁾
	1m	<10 ⁽¹⁸⁾	<5	<5	<10 ⁽¹⁹⁾	<5
	2 m	<5	<5	<5	<5	<5
Dichloromethane	Surface	<100 ⁽¹⁸⁾	<250 ⁽¹⁸⁾	<100 ⁽¹⁹⁾	<50	<100 ⁽¹⁹⁾
	1m	<100 ⁽¹⁸⁾	<50	<50	<100 ⁽¹⁹⁾	<50
	2 m	<50	<50	<50	<50	<50
Trichloromethane	Surface	<10 ⁽¹⁸⁾	<25 ⁽¹⁸⁾	<10 ⁽¹⁹⁾	<5	<10 ⁽¹⁹⁾
	1m	<10 ⁽¹⁸⁾	<5	<5	<10 ⁽¹⁹⁾	<5
	2 m	<5	<5	<5	<5	<5
Vinyl chloride	Surface	<20 ⁽¹⁸⁾	<50 ⁽¹⁸⁾	<20 ⁽¹⁹⁾	<10	<20 ⁽¹⁹⁾
	1m	<20 ⁽¹⁸⁾	<10	<10	<20 ⁽¹⁹⁾	<10
	2 m	<10	<10	<10	<10	<10
1,2-dichloroethane	Surface	<10 ⁽¹⁸⁾	<25 ⁽¹⁸⁾	<10 ⁽¹⁹⁾	<5	<10 ⁽¹⁹⁾
	1m	<10 ⁽¹⁸⁾	<5	<5	<10 ⁽¹⁹⁾	<5
	2 m	<5	<5	<5	<5	<5
1,1-dichloroethylene	Surface	<10 ⁽¹⁸⁾	<25 ⁽¹⁸⁾	<10 ⁽¹⁹⁾	<5	<10 ⁽¹⁹⁾
	1m	<10 ⁽¹⁸⁾	<5	<5	<10 ⁽¹⁹⁾	<5
	2 m	<5	<5	<5	<5	<5
Trichloroethylene	Surface	<10 ⁽¹⁸⁾	<25 ⁽¹⁸⁾	<10 ⁽¹⁹⁾	<5	<10 ⁽¹⁹⁾
	1m	<10 ⁽¹⁸⁾	<5	<5	<10 ⁽¹⁹⁾	<5
	2 m	<5	<5	<5	<5	<5
Tetrachloroethylene	Surface	12	<25 ⁽¹⁸⁾	<10 ⁽¹⁹⁾	<5	<10 ⁽¹⁹⁾
	1m	<10 ⁽¹⁸⁾	<5	<5	<10 ⁽¹⁹⁾	<5
	2 m	<5	<5	<5	<5	<5

²³ Total amount of PCDD/F detected, assuming that any value below the detection limit is 0 (i.e. the best-case scenario).

²⁴ Total amount of PCDD/F detected, assuming that any value below the detection limit is equivalent to the detection limit (i.e. the worst-case scenario). The upper bound is equal to the lower bound when all congeners are reported above the limit of detection.

Table 2.17: Halogenated aliphatic hydrocarbons concentration (µg/kg)

Parameter	Depth	Sampling point reference				
		1	2	3	4	5
Bromoform	Surface	<10 ⁽¹⁸⁾	<25 ⁽¹⁸⁾	<10	<5	<10
	1 m	<10 ⁽¹⁸⁾	<5	<5	<10	<5
	2 m	<5	<5	<5	<5	<5
1,2-dibromoethane	Surface	<10 ⁽¹⁸⁾	<25 ⁽¹⁸⁾	<10	<5	<10
	1 m	<10 ⁽¹⁸⁾	<5	<5	<10	<5
	2 m	<5	<5	<5	<5	<5
Dibromochloromethane	Surface	<10 ⁽¹⁸⁾	<25 ⁽¹⁸⁾	<10	<5	<10
	1 m	<10 ⁽¹⁸⁾	<5	<5	<10	<5
	2 m	<5	<5	<5	<5	<5
Bromochloromethane	Surface	<10 ⁽¹⁸⁾	<25 ⁽¹⁸⁾	<10	<5	<10
	1 m	<10 ⁽¹⁸⁾	<5	<5	<10	<5
	2 m	<5	<5	<5	<5	<5

Assessment of Results

- 2.80. The surface samples and two of the samples taken at 1 m depth (point 3 and 4) appear to be the most heavily contaminated. Pollutants found at significant concentrations in these samples include various metals, C12-C35 hydrocarbons, dioxins and furans and PCBs, with the concentration varying depending on the sample being examined.
- 2.81. PAHs and cyanide were detected in less significant quantities, whereas asbestos was only detected in one sample and at a very low concentration (point 3, at 2 m depth).
- 2.82. There appears to be minimal contamination by C5-C12 hydrocarbons, BTEX and MTBE in all samples. This is reasonable considering the high volatility of these compounds. The concentration of chlorinated / halogenated aliphatic hydrocarbons on site is not significant, which is consistent with their being no evidence of use of these substances on site.
- 2.83. In general, there is a clear and sharply negative concentration gradient from the surface to the 2 m samples. The only exception is point 3, where the 1 m sample appears to be more contaminated than the corresponding surface sample. This could be due to the fact that the 1 m sample was a mix of soil and rock (rather than exclusively rock), which could have facilitated transfer of pollutants downward. However, even at this point the 2 m sample is significantly less contaminated than the 1 m sample.
- 2.84. Considering that the groundwater at the Scheme site is found at a depth of around 56 to 60 m below the land surface, the substantial attenuation in contaminant concentrations observed from 0 to 2 m is expected to continue up to this depth provided there are no direct routes to groundwater (such as fissures), thus significantly reducing the risk of groundwater contamination.
- 2.85. The mitigation measures planned for the Scheme will also help ensure that future spills / leaks do not contaminate land and groundwater.

3. TECHNIQUES

INTRODUCTION

- 3.1. This Chapter describes the operational techniques proposed at the Scheme. The techniques described in this Application include the proposed upgrades and reorganisation of the Scheme, which are required for the Scheme to meet the requirements of the Industrial Emissions (IPPC) Regulations.

B2.1 ENVIRONMENTAL MANAGEMENT SYSTEM

Terms of Reference

- 3.2. The requirements for an Environmental Management System were described in MEPA’s application form; these are reproduced below:

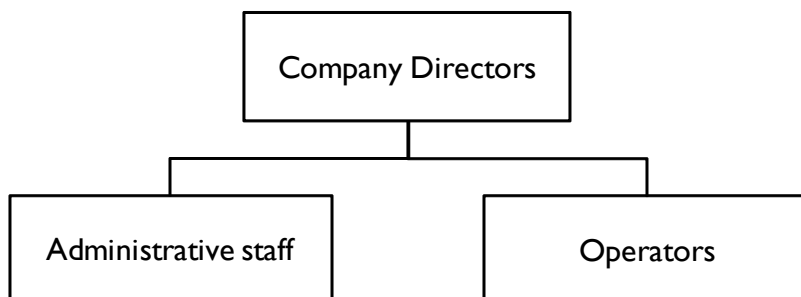
Provide details of your proposed management techniques and environmental management system (EMS). An EMS can take the form of a standardised system (e.g. EN ISO 14001:1996; EMAS) or a non-standardised (“customised”) system, provided that is properly designed and implemented.

- 3.3. Additionally, the BREF for Waste Treatments Industries includes recommendations regarding the establishment of an EMS.

Management and Reporting Structure

- 3.4. **Figure 3.1** shows the organisational chart for DDE Attard Ltd. The company is owned by four Directors. Disma Attard is the Managing Director and is responsible for oversight of operation and the company’s strategic direction. Daniel Attard is the Technically Competent Person (TCP) for the Scheme and is responsible for day-to-day supervision and environmental matters. Information regarding Daniel Attard’s qualifications, experience and contact details is included in section B8 of this IPPC Application.

Figure 3.1: DDE Attard Ltd organisational chart



- 3.5. Administrative staff are responsible for record-keeping and administrative aspects.
- 3.6. Operators take care of waste processing activities, including operating machinery and

vehicles, maintenance, and so on.

- 3.7. Both administrative staff and operators report directly to the Managing Director.

Environmental Policy

- 3.8. The Scheme's Environmental Policy is included in **Annex 2**.

Environmental Management Programme

- 3.9. An environmental management programme (EMP) for the first year of operation after the issue of the IPPC permit has been prepared (**Table 3.1**). This programme follows from a review of all operations and processes, and takes into account the objectives identified in DDE Attard Ltd's environmental policy.
- 3.10. The achievement of each of the targets set out in the EMP will be documented. At the start of each year, the TCP will review DDE Attard Ltd's achievement of the targets set in the previous year's EMP. New targets will be set for the forthcoming year as appropriate, and if necessary, the environmental policy will also be updated. This process also ensures that the company's aim for continual improvement is met.

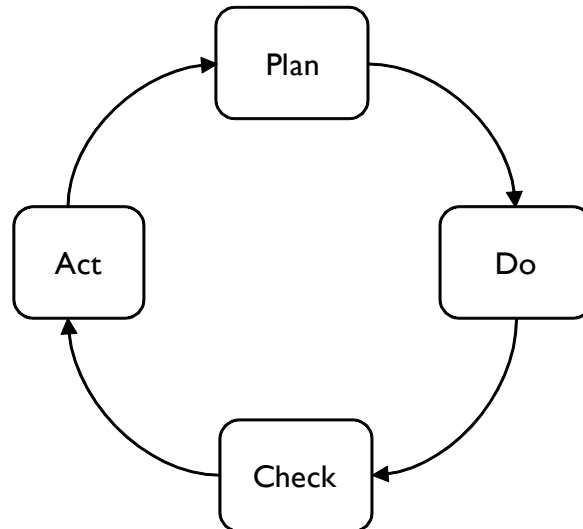
Table 3.1: Environmental management programme (first year after IPPC permit issue)

Objective	Target	Target date	Responsible person	Environmental performance indicator
To upgrade the installation to minimise the risk of land and groundwater contamination	Installation of impermeable hardstanding throughout the site	As per phasing plan (Volume 3 of the IPPC application)	Managing Director	Impermeable hardstanding installed.
	Installation of an underground reservoir with a pre-treatment system to collect surface water	As per phasing plan (Volume 3 of the IPPC application)	Managing Director	Underground reservoir and pre-treatment system installed.
To minimise the facility's impact on air quality in the surroundings	Minimising dust emissions from the site through the installation of site surfacing	As per phasing plan Volume 3 of the IPPC application)	Managing Director	Impermeable hardstanding installed.
To maximise the proportion of waste prepared for reuse and sent for recovery	At least 75% of the waste processed on site will be prepared for reuse, recycling or recovery	Within 12 months of permit issue	TCP	Waste reuse, recycling and recovery data.
To manage DDE Attard Ltd's consumption of natural resources	Reduce the consumption of mains water by at least 25% over the previous year, by using water from the new underground reservoir to clean the site and vehicles, and for landscaping	Within 12 months of new hardstanding and reservoir installation	TCP	Consumption of mains water.
Train all staff on the environmental aspects relevant to their duties	Deliver environmental training to all staff.	Within 6 months of permit issue	TCP	Staff training records.

Control of Operation

- 3.11. The strategy for controlling operations on site is based on the Plan-Do-Check-Act (PDCA) approach (**Figure 3.2**).

Figure 3.2: PDCA cycle



- 3.12. The following activities are included in the planning stage:
- Defining the operating procedures for each of the proposed activities: Procedures are defined in section B2.2 of this Application;
 - Setting environmental targets for the forthcoming year: these are included in the EMP presented in **Table 3.1**;
 - Staff training: A training programme is included in section B2.9 of this Application, and an objective to train staff is included in the EMP;
 - Maintenance: A maintenance programme is included in section B2.5 of this Application; and
 - Emergency preparedness and response: A risk assessment and emergency response plans are include in section B2.8 of this Application.
- 3.13. These procedures will be implemented as planned, under the supervision of the Technically Competent Person (TCP) for the site.
- 3.14. Checking of environmental performance will be carried out through monitoring, measurement and record-keeping, as follows:
- A monitoring programme is included in section B3.10 of this Application (**Chapter 4**). Any additional monitoring arising from the IPPC permit will also be implemented;

- Keeping records of the company's performance using the environmental performance indicators included as part of the EMP;
 - Keeping staff training and equipment maintenance records;
 - Supervision of site activities by the TCP; and
 - Analysis of inspection reports issued by ERA's environment officers following a site visit.
- 3.15. In the event of a nonconformity with a permit condition, legal requirement, or if the targets set in the EMP are not achieved, the TCP will:
- Investigate the cause of the nonconformity;
 - Identify what corrective action needs to be undertaken to mitigate the environmental damage caused, if any; and
 - Set out what action needs to be taken to prevent a recurrence of the incident, and communicate this to the relevant staff. Such action may include retraining of staff, updating operational procedures, setting of new environmental targets, and updating the maintenance programme.
- 3.16. Additionally, the EMP will be reviewed annually to ensure continual environmental improvement.

B2.2 ACTIVITIES

B2.2.1 Proposed Activities

- 3.17. MEPA's ToR included a requirement to "*describe the proposed installation activities.*"
- 3.18. The proposed activities at the Scheme will consist of:
- ELV depollution using dedicated equipment, followed by dismantling;
 - Dismantling of Waste Electrical and Electronic Equipment (WEEE): this activity will be limited to washing machines, cookers and water meters;
 - Processing of metals (including of dismantled WEEE and ELV metal components), including shredding and pressing;
 - Baling of tyres and bumpers;
 - Wire stripping;
 - Wood processing (including shredding);
 - Storage of various materials / waste associated with the above activities, including

vehicle parts, tyres, scrap metal, wood, plastic, oils and fuel;

- Temporary storage of containerised waste: to consist of only solid / liquid waste (including hazardous waste such as asbestos) in sealed containers, received at the site for onward shipment without any on-site processing;
- Composting of food waste: this is an EU-funded pilot project processing around 100 t/a of food waste; and
- Maintenance of on-site machinery.

3.19. Each activity is described in more detail in the following subsections.

ELV Depollution and Dismantling

3.20. This activity will be carried out in area 3 (**Figure 3.3**), unless mentioned otherwise below for specific steps in the process. The depollution / dismantling process is carried out in four sequential stages:

- Stage 1: Preliminary activities;
- Stage 2: Removal of fluids and hazardous items;
- Stage 3: Removal of airbags; and
- Stage 4: Dismantling of components from the depolluted ELV.

3.21. All ELVs will be processed as described in this document, and no resale of second-hand parts is currently foreseen (although this option may be considered in the future in order to improve overall reuse and recovery rates). Additionally, end-of-life refrigerated trucks will not be accepted on site.

Stage 1: Preliminary Activities

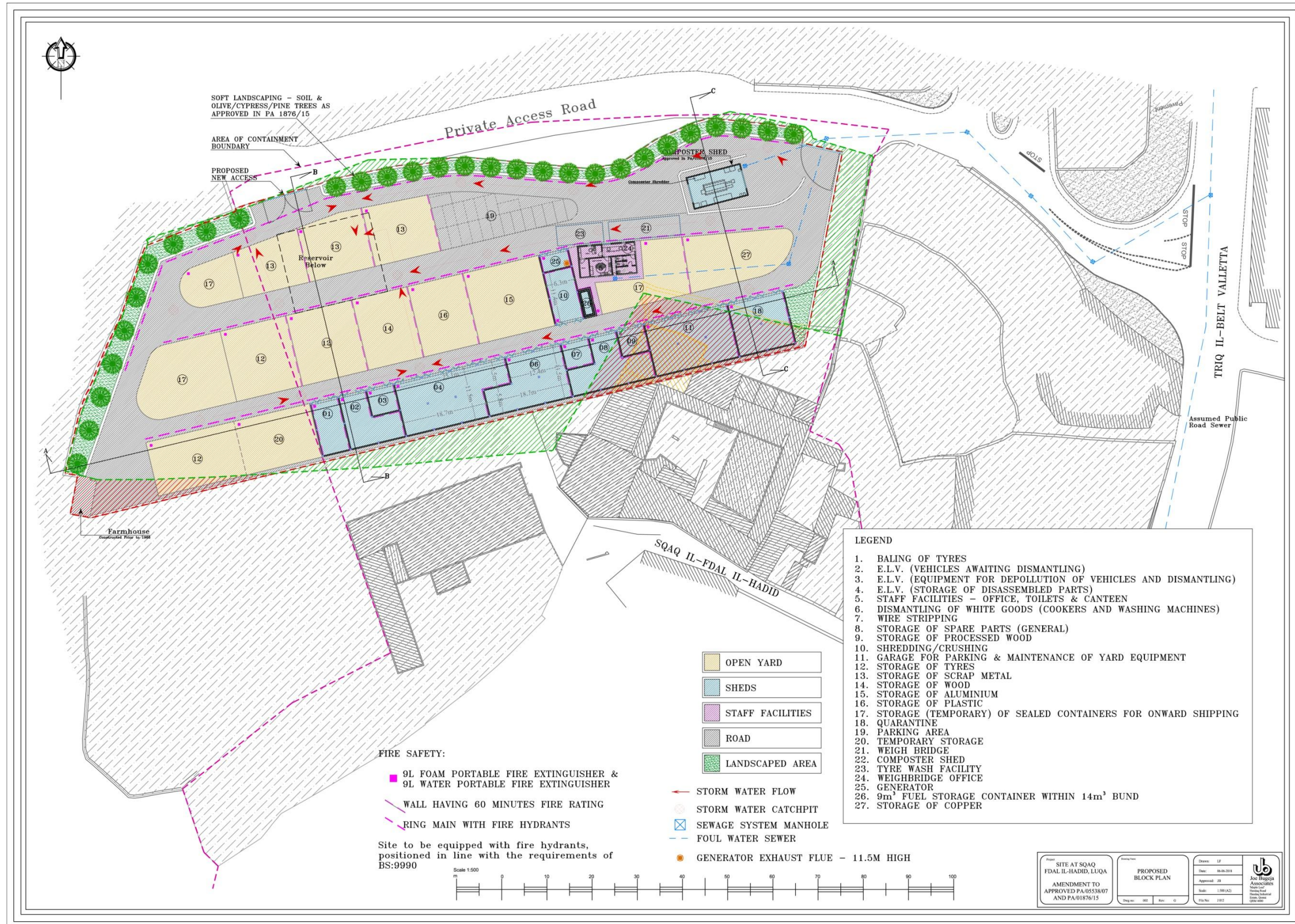
3.22. Preliminary activities are conducted before the ELV is placed on a support frame.

3.23. If the vehicle is LPG-powered, where practicable the engine is switched on outdoors (in area 20) for some time until the fuel in the tank is combusted.

3.24. The ELV is then inspected to determine whether it has airbags. The number of airbags in an ELV can range from 1 (in the steering wheel) to 10 or more. However, airbags may have already been deployed if the vehicle has been classified as an ELV as result of damage sustained during an accident.

3.25. If a visual inspection identifies that the ELV contains one or more airbags that have not been deployed, airbags will need to be removed from the ELV (in stage 3 of the process). In preparation for this step, the side windows will be lowered, then the battery will be removed using standard tools. For safety reasons, removal of airbags will only be carried out in stage 3 and after at least 30 minutes have passed from the battery being removed from the ELV. LPG vehicles will be checked for any gas leaks using gas detection equipment prior to removing the battery.

Figure 3.3: Site layout



- 3.26. If the vehicle is LPG-powered, the LPG tank also needs to be removed. This is done by turning off the isolating valve, cutting through the connecting pipes and the retaining clamps / straps, and removing the tank. LPG vehicles will only be disassembled by mechanics authorised by the Regulator for Energy and Water Services (REWS) as competent installers for autogas-driven vehicles. Removal of the LPG tank will also be carried out in an outdoor area on site to minimise the risk of build up of LPG gas.
- 3.27. The fuel (for petrol / diesel vehicles) and oil filler caps will then be removed or opened. This allows fuel and oil drainage to occur more easily during depollution in stage 2.
- 3.28. The heater controls are then adjusted to the position that would normally provide the maximum amount of heat. This ensures that coolant in the heater unit is able to be drained.
- 3.29. Electric or hybrid vehicles also have a high-voltage electrical system and battery pack. In such vehicles, after turning off the engine and carrying out the above activities (including removing the conventional 12 V car battery), the high-voltage electrical system will be isolated by removing the service plug or turning off the isolation switch. This high-voltage system loses its power after 10 minutes from disconnection. The battery cable terminals are then disconnected from the high-voltage battery and insulated using electrical insulation tape, and the battery pack is removed according to the manufacturer's instructions.

Stage 2: Removal of Fluids and Hazardous Items

- 3.30. The vehicle is then placed onto a raised support frame using a forklift, to allow access to the underside of the vehicle.
- 3.31. Depollution of ELVs will be carried out inside the shed using mobile equipment specifically designed for this purpose (**Figure 3.4**). This ensures a high level of depollution (removal of over 98% of the fluids in the ELV) in a relatively short time (20 to 30 minutes per ELV). The depollution equipment also includes built-in containers to collect the fluids removed from the ELV, and includes underlying containment. **Annex 3** includes further technical information on the depollution system.
- 3.32. Engine oil is drained by removing the drain plug at the bottom of the sump and collecting the oil by gravity (**Figure 3.5**). The oil is allowed to drain for at least 20 minutes, or until no further draining of oil is visible.
- 3.33. The oil filter is then removed using a spanner, and taking care not to puncture the filter.

Figure 3.4: Depollution system



Figure 3.5: Draining of engine oil



3.34. Transmission oil is contained in manual gearboxes, automatic gearboxes (including

the torque converter, when separate) and in the rear axle differential unit of rear wheel drive vehicles (such as small commercial vans and some larger cars). To remove the oil, if a drain plug is present, the plug will be removed and the oil drained by gravity. Otherwise, a suitably sized hole is drilled at the bottom – the depollution equipment used will include a suitable drill and will also provide suction to assist in draining. The oil will be allowed to drain for at least 10 minutes or until no further draining is visible.

- 3.35. Coolant (antifreeze) will be removed by making a hole in the bottom hose connected to the radiator and sucking the liquid out into a container. The coolant will be allowed to drain for at least 10 minutes until further drainage is no longer visible.
- 3.36. Hydraulic oils are then removed, including brake fluid, clutch fluid and power steering oil. Clutch fluid is typically only found in older cars, since most modern cars have cable clutches that do not require hydraulic clutch fluid. The depollution equipment will use suction to extract these fluids, including from the brake fluid reservoir, the brake pipes and cylinders (via the bleed nipples), the hydraulic clutch reservoir and pipes, and the power steering oil reservoir and connecting hose (the hose will need to be punctured). Fluids will be drained for at least 10 minutes, until no visible fluid is left in the reservoirs and until no further drainage is observed when the suction pipe is disconnected.
- 3.37. Screen washing fluid will be removed by sucking fluid from the reservoir using the depollution equipment. The pipe placed in the reservoir will be long enough to reach the bottom of the reservoir. If the ELV has a separate container to service the rear window, this will also be drained.
- 3.38. In petrol and diesel vehicles, fuel will be removed by suction via the fuel inlet to avoid release of vapour. If the fuel tank is damaged, it will be drilled at its lowest point using a pneumatically powered drill, and the fuel collected by gravity. The depollution equipment also includes an earthed tubular frame structure to minimise risk of sparks / explosion.
- 3.39. Fluid in the shock absorbers will be drained from both the inner and outer cylinder. For sealed suspension systems, an adapter will be fitted to the filling / draining valve; the fluids will then be drained by gravity over 20-25 minutes.
- 3.40. Any opened drain plugs will be resealed at this stage, or plastic stoppers used to reseal any drilled holes.
- 3.41. The presence of one or more catalyst units will be identified through visual inspection of the exhaust system. Catalysts will be removed by cutting the exhaust pipe in front of and behind the catalyst unit.
- 3.42. The vehicle will be checked for the presence of an air conditioning unit. If this is present, the type of refrigerant (R12 or R134a) will also be verified. The refrigerant will be removed using specialist equipment provided as part of the depollution system, into one of two dedicated disposable collection cylinders. The equipment

will be attached to the air conditioning filler valve, and the refrigerant will be removed over 10-12 minutes. **Annex 4** provides details of the refrigerant recovery system.

- 3.43. A visual inspection of the vehicle will then be carried out to identify whether the ELV contains notices that indicate that certain remaining parts contain hazardous materials, such as brake pad linings containing asbestos and switches containing mercury. If any are identified, they will be removed and stored in designated labelled containers for off-site disposal.
- 3.44. The material removed during this stage is considered to be hazardous and will be stored in designated and labelled containers connected to the depollution system or in a bunded area within the shed prior to removal for off-site recovery / disposal.

Stage 3: Removal of Air Bags

- 3.45. The vehicle will then be lowered from the support frame to ground level.
- 3.46. Any undeployed air bags will then be removed, without deployment. As mentioned, air bags will only be removed after at least 30 minutes have passed from the time the battery is removed, to avoid the air bag detonating as a result of the presence of a residual charge.

Stage 4: Dismantling of Components

- 3.47. At this stage the depolluted ELV is classified as non-hazardous waste.
- 3.48. The following components will then be dismantled manually:
- Bumpers;
 - Tyres; and
 - Electronics.
- 3.49. Bumpers will be baled before being sent off-site. Tyres will be sheared when necessary, and baled after removal.
- 3.50. The remaining ELV frame is then passed through a shredding and sorting machine that separates the ferrous metals from the rest of the materials; the latter is sorted manually by site operators to remove non-ferrous metals (copper wiring and aluminium) from the rest of the shredder residues.
- 3.51. Further measures are also planned to improve reuse, recycling and recovery rates for end-of-life vehicles; these are described in **Volume 3**.

WEEE Dismantling

- 3.52. WEEE treatment will be limited to cookers (including ovens), washing machines and water meters, and dismantling will be carried out manually by removing individual components, as described below. This activity will be carried out in area 6 (**Figure 3.3**).

- 3.53. The remaining components of dismantled WEEE items are then shredded / pressed on site (in area 10 shown in **Figure 3.3**), while other components segregated during dismantling are stored in designated areas and referred to licensed facilities for further processing.

Washing Machines

- 3.54. The appliance will be opened from the service hatches. Wiring and printed circuit boards will be dismantled manually and stored separately.
- 3.55. The concrete block will be removed.
- 3.56. The remaining metal and plastic carcass will be shredded.

Cookers

- 3.57. Only traditional cookers / ovens will be accepted on site; these are primarily composed of metal components, with minimal glass and electronic parts. No modern electronic cookers or glass hobs are accepted.
- 3.58. If any electronic components are present, these will be dismantled manually and stored separately.
- 3.59. The remaining metal frame and metallic components are processed further on site (shredded / pressed).

Water Meters

- 3.60. Only old meters will be accepted – these are composed primarily of metal and do not need to be dismantled. Meters will be shredded or pressed.

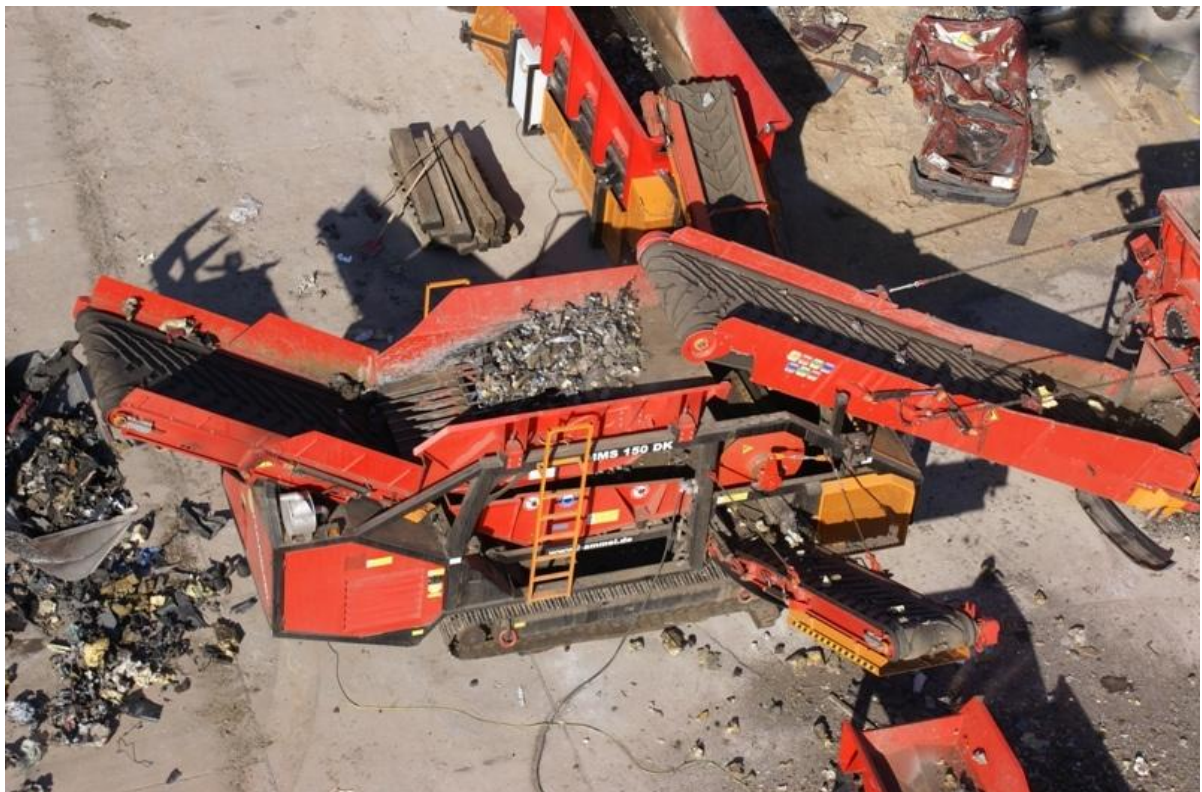
Metal Processing

- 3.61. All metal waste, whether arising from ELV / WEEE treatment or received from outside sources will be processed as follows.
- 3.62. The various metal types will be segregated using grab excavators. Segregation is done on the basis of source, size and where necessary, material (ferrous / non-ferrous).
- 3.63. Large items such as cranes and flue stacks are first sheared (using one of two shears on site) to make them easier to transport on site and also easier to process. Where necessary the metal is instead cut to size using a cutting torch.
- 3.64. Metal items are then either shredded or crushed using a metal press. The preference is to use the shredder when available; however, when the shredder is unavailable due to maintenance / repair or because it is already being used, the press will be used instead. Shredding and pressing will be carried out in area 10 (**Figure 3.3**).
- 3.65. Shredding is carried out using a mobile shredder of the type shown in **Figure 3.6**, equipped with a sorting system of the type shown in **Figure 3.7**.

Figure 3.6: Shredder



Figure 3.7: Sorting system



- 3.66. Metal is first loaded into the shredder container (**Figure 3.8**) using a grab excavator.
- 3.67. The shredder draws the material in using intertwining metal shafts, which also shred the material. This process produces metal fragments of up to 300 mm length, such as

in the example shown in **Figure 3.9**.

Figure 3.8: Shredder loading²⁵



Figure 3.9: Shredded engine blocks²⁵



- 3.68. The shredded metal then passes onto a sorting system (**Figure 3.7** and **Figure 3.10**) via a conveyor belt. A mesh prevents material larger than 150 mm from entering the system; material captured by the mesh is later collected using a grab excavator and passed again through the shredder.

²⁵ Hammel (2014) VB 950 DK - RED GIANT - Motorblöcke www.hammel.de/de/Aktuelles/Mediathek.html.

- 3.69. Another conveyor belt then leads the shredded material towards a rotating magnetic drum (**Figure 3.10**). Ferromagnetic material is picked up by this drum and collected separately. Other material which is not captured by the drum passes onto a separate conveyor belt; this is then sorted manually by site operators.

Figure 3.10: Sorting system, including magnetic drum



- 3.70. The shredder is equipped with a two-stage water sprinkling system to abate dust emissions. Metal is wetted first when it is loaded into the shredder, and again on the conveyor belt that receives the output of the shredder. Water is currently supplied by two above-ground water tanks located close to the shredder; when the underground reservoir is installed it will be used to supply this water. Wetting is not expected to generate significant quantities of excess water; however, any excess water that escapes from the shredder will be collected by the site's oil-water separator.
- 3.71. Crushing of metal, on the other hand, is carried out using a metal press (**Figure 3.11**). Metal is loaded onto the press using a grab excavator, and the press exerts a force of 420 tonnes on the metal to reduce its volume.

Figure 3.11: Press



3.72. The processed scrap metal is then exported to authorised facilities.

Baling of Tyres and Bumpers

3.73. This activity will be carried out in area I (**Figure 3.3**).

3.74. The tyre is removed from the wheel rim; the wheel rim is shredded or crushed using the metal press.

3.75. Where necessary, tyres are then sheared using one of the two shears. This is done to either prevent re-use of the tyre, or in the case of large tyres, to ensure that the tyre is able to fit inside the baler.

3.76. A baler similar to the one shown in **Figure 3.12** is used for baling of tyres and bumpers. The machine is loaded by the operator and once the door is closed, the baler exerts a pressing force of up to 80 tonnes onto the contents. This reduces the volume considerably – in the case of tyres, by 60% to 80%.

Figure 3.12: Baler



3.77. The contents are then bound by the machine and can then be removed to a designated storage area (area 12 in **Figure 3.3**). **Figure 3.13** shows tyres after they have been baled.

Figure 3.13: Baled tyres



Wire Stripping

- 3.78. Wire stripping is carried out using an electrical cable stripper, in area 7 (**Figure 3.3**).
- 3.79. The cables are fed manually into the machine, which separates the outer plastic casing from the inner copper wire.

Wood Processing

- 3.80. Wood processing is carried out using the same shredder used for metals (without use of the sorting facility), since the shredder is designed to be able to cater for a range of wastes. The shredder will be located in area 10 (**Figure 3.3**).
- 3.81. Wood is loaded into the shredder container using a grab excavator (**Figure 3.14**). The wood is processed by the shredder and released via a conveyor into a pile. The output material will have a length of up to 300 – 350 mm (**Figure 3.15**), and the wood will only be shredded once.

Figure 3.14: Shredder loading²⁶



²⁶ Hammel (2014) VB 950 DK - RED GIANT - Bahnschwellen www.hammel.de/de/Aktuelles/Mediathek.html.

Figure 3.15: Shredded wood²⁶



Storage

- 3.82. The above processes include various inputs and outputs, and some temporary storage on site of each waste type will be needed prior to processing or removal to an authorised facility.
- 3.83. The site includes designated areas for the main waste types, as shown in **Figure 3.3**.
- 3.84. The diesel tank is also located inside a container that acts as a bund (**Figure 3.16**).

Figure 3.16: Diesel tank bunding



- 3.85. All other hazardous substances and wastes will be stored in designated areas inside the covered shed, with temporary containment provided for liquid hazardous substances / waste. The ELV depollution machinery also comes with its own containers to ensure appropriate segregated storage of the various waste types.

Storage of Containerised Waste

- 3.86. This storage will consist of intermediate temporary storage of shipping containers prior to export. It is estimated that around two containers will be accepted each month.
- 3.87. All waste types will be accepted, except for the following items (to avoid hazards and odour issues):
- Animal tissue waste;

- Waste explosives;
 - Body parts and organs; and
 - Mixed municipal waste.
- 3.88. Containers will either originate from licensed waste facilities / brokers or from the site of generation, and will be loaded at the waste management facility or site of generation before delivery to the Scheme site. While on site, they will be stored in a designated area (area 17, and potentially area 20 in **Figure 3.3**).
- 3.89. Containers will remain sealed while on site, and will typically be stored for not more than a few days / weeks.

Composting

- 3.90. Composting of food waste will be carried out using an aerobic in-vessel process that uses extremophilic bacteria. This pilot plant will have a capacity of 270 kg / day (up to around 100 tonnes annually). The composter will be housed in a dedicated shed (area 22 in **Figure 3.3**).
- 3.91. Incoming waste will consist of source-separated food waste (primarily from schools) and tree prunings. Waste will be collected and transported to the Scheme in 120 L wheelie bins, and will not be compacted so as to minimise the generation of leachate. An agreement will be in place with the waste generators for delivery of the waste according to an established schedule. Waste will only be accepted if it can start to be processed within 48 hours.
- 3.92. The food waste received at the Scheme will consist of vegetable and fruit remains, bread / pastries, eggshells, teabags, paper napkins, etc. Meat and fish derivatives will be excluded from the accepted waste streams, to minimise the potential for odours and attraction of rodents. However, the inclusion of cooked animal by-products is typically important to ensure that the compost has a good nitrogen content, and this issue may need to be revisited and discussed with ERA once the results of the first analysis are available.
- 3.93. An educational campaign will also be run at the waste generator sites to increase awareness regarding which wastes can be placed in the bin designated for composting, and wheelie bins designated for food waste will also be appropriately labelled.
- 3.94. Waste loading into the composter will be carried out by trained Scheme operators. These operators will carry out visual inspections of the waste before it is tipped into the composter. Any waste identified as not suitable for composting will be removed manually prior to tipping – it is envisaged that this will mainly consist of recyclable plastic, although if other material is found this will also be segregated and disposed of or recycled appropriately. After the visual inspection, the waste will be loaded into the composter using a bin lifter attached to the composter; 270 kg of waste will be loaded daily (around three to four bins daily).

- 3.95. Extremophilic bacteria are added, as well as a nutritional plant-based liquid (Advetec 6000, used by the bacteria as a growing medium). Shredded tree prunings are also added to regulate the water content to about 60%; if insufficient quantities are available, woodchips or paper and cardboard can be used instead. Shredding will be carried out on site in a separate mobile shredder; specifications for this shredder are included in Volume 3.
- 3.96. The composter also contains a 12 mm waste shredder at the input stage, to ensure that the food components inputted have sufficient surface area for bacterial action.
- 3.97. The digestion process is thermophilic and aerobic. Digestion occurs in a closed stainless steel vessel having three main chambers, and the material is moved along the chambers automatically. The first chamber is the in-feed module, the second chamber is the intermediate digestion chamber, and the third chamber is the outfeed module, to which a discharge screw is fixed, releasing the compost product. A 25 mm grid is fitted between the second and the third chambers, while a 20 mm grid is fitted between the third chamber and the final discharge point; this ensures that the output material contains particles of the required dimensions.
- 3.98. Each chamber is fitted with paddles fixed to a horizontal axle that rotate every 3-8 minutes to oxygenate the microbes, whilst ensuring even heat distribution. The paddles are only activated when the composter lid is closed, both as a safety measure and to minimise odour emissions when the vessel is open.
- 3.99. The composter maintains a constant temperature of around 65 °C as the composting process generates heat. This thermophilic process hygienises the compost by eliminating any pathogens, parasites and seeds.
- 3.100. The processing time is five days; the material will be retained in the composter for five days, during which time it passes through three chambers before leaving the composter. The process is a continuous one, with waste being fed into the system daily (except on Sundays) and output also being produced daily.
- 3.101. The process is controlled through an electronic control system. Various parameters (e.g. oxygen content, moisture content) are controlled automatically; however, operators can also carry out manual intervention if necessary.
- 3.102. After composting, the compost is matured in the compost maturing area (**Figure 3.17**); a maturation period of two to four weeks is required to ensure stabilisation of the compost. The compost produced will be a dry powder having a fine texture, dark in colour with a rich earthy smell.
- 3.103. The matured compost will be packaged and can be used as a concentrated soil improver. Due to its high concentration of nutrients, only a small amount is needed when it is mixed with soil (ratio of around 1:20).
- 3.104. The digestion vessel is equipped with a biofilter to capture odorous emissions.
- 3.105. The composter will be in continuous operation; however, waste will only be

accepted during the Scheme's normal operating hours.

- 3.106. The composter is not expected to generate wastewater, because water content inside the vessel is monitored and regulated. If the water content is high, shredded tree prunings / paper / cardboard are introduced into the vessel to reduce the water content. However, should any leachate be produced by condensation, the equipment has a built-in container in which it can be stored. The condensate would be discharged to sewer.
- 3.107. Wheelie bins will not be washed at the Scheme site, but will be returned as soon as possible to the waste generator sites.

Figure 3.17: Composter shed

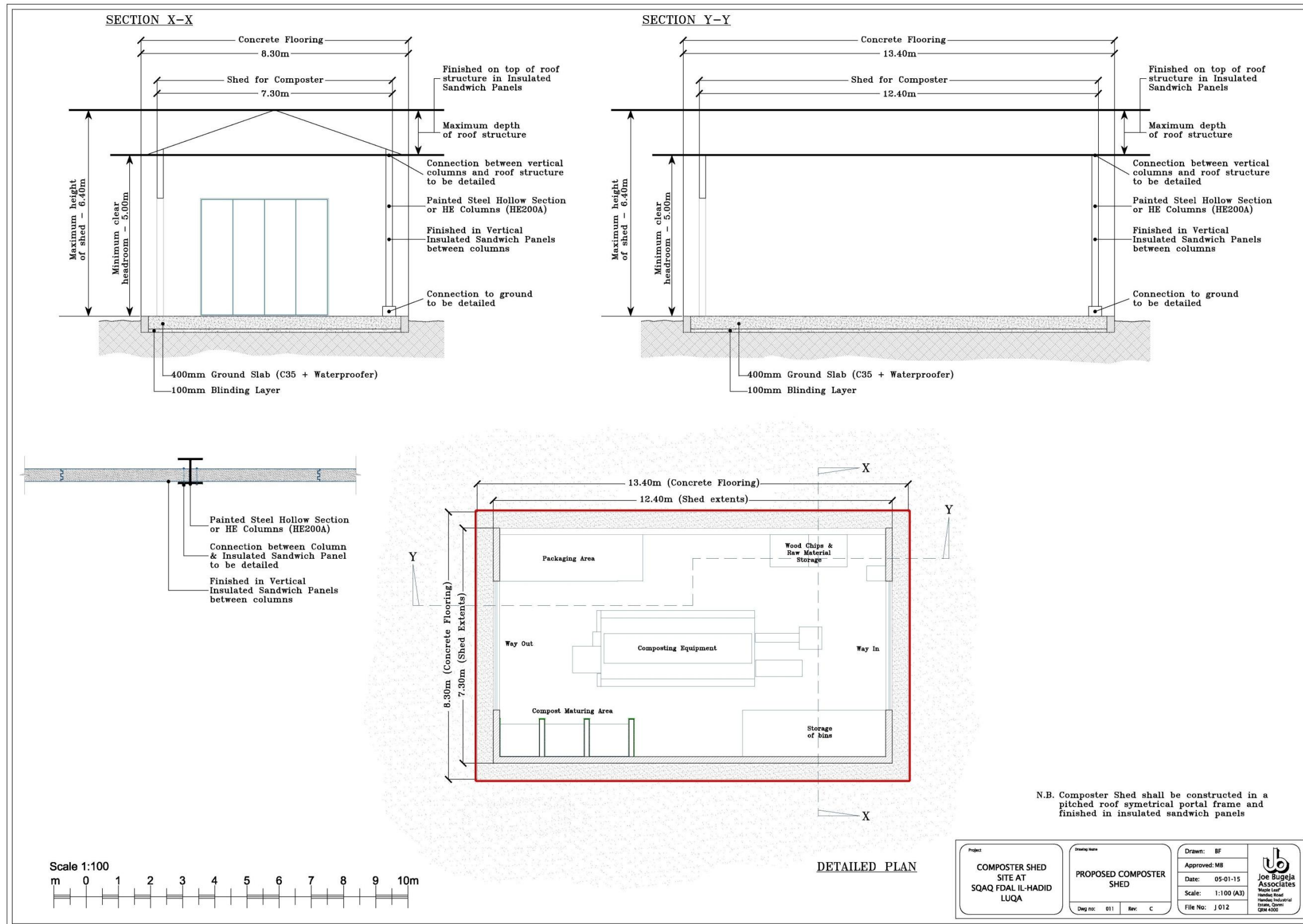
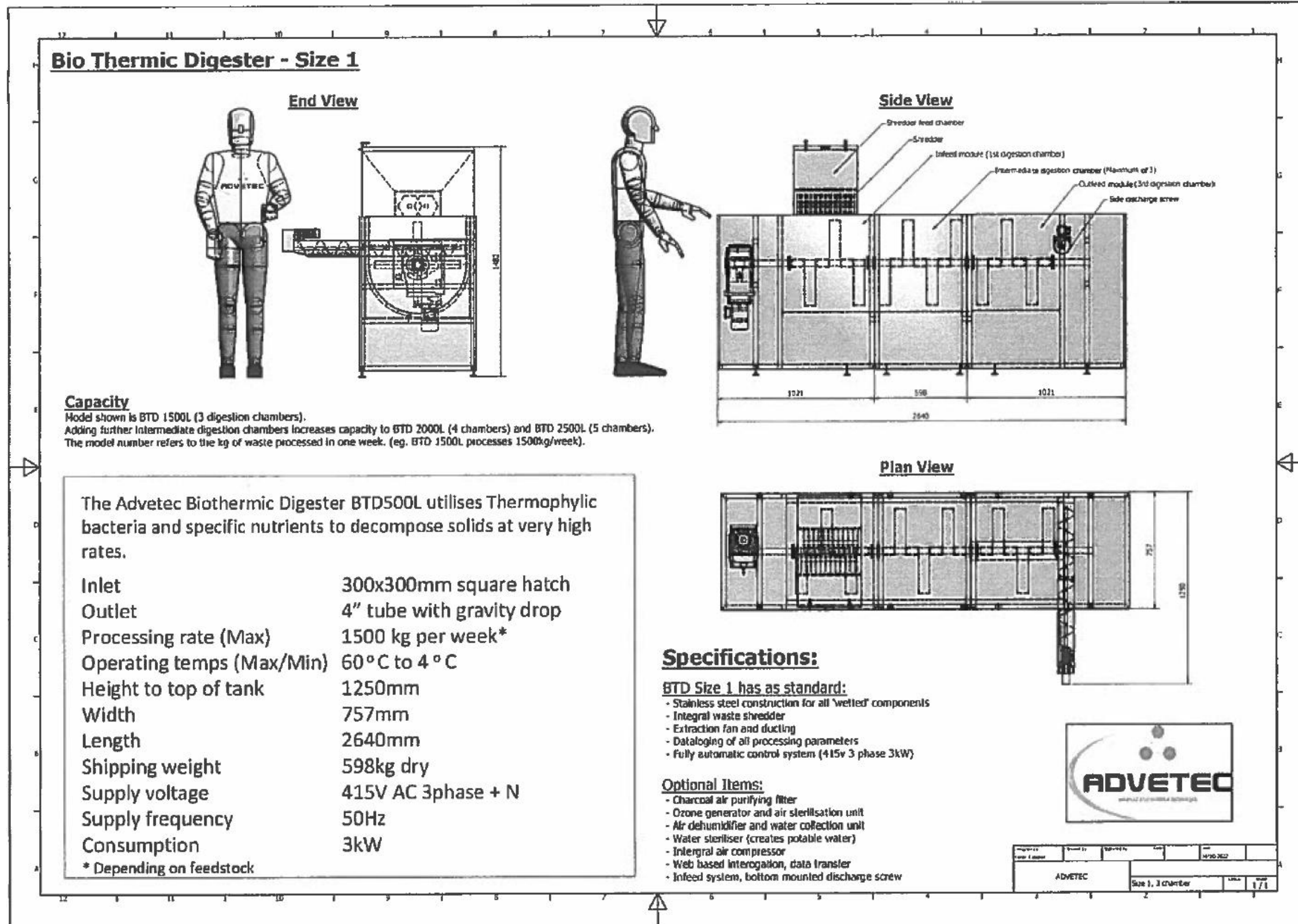


Figure 3.18: Composter specifications



Maintenance

- 3.108. A maintenance programme is included in section B2.5 of this Application.
- 3.109. Additional maintenance and repair of on-site vehicles and machinery will be carried out as needed by operators to ensure the equipment is working as needed. This may include activities such as replacement of damaged / worn-out parts, leak repair, and so on.
- 3.110. Maintenance will be carried out in the shed in area 11, as shown in **Figure 3.3**. Temporary containment will be provided for liquid hazardous substances and waste.

Generator

- 3.111. An emergency electricity generator will also be installed for use in case of mains supply failure. This will provide emergency lighting and small power for the offices, staff facilities, lighting within the shed and to operate light equipment, such as power tools. The generator will be of the self-contained type, housed in an acoustic weather-proof enclosure in area 25.
- 3.112. The generator will run on diesel. The diesel day tank will be housed in the skid supporting the generator set, and will have a capacity not exceeding 220 L. The tank will be bunded, with the bund being capable of retaining at least 110% of the day tank volume.
- 3.113. The exhaust flue will terminate at 3 m above the level of any roof within a 25 m radius.
- 3.114. An engineer's report on the generator is included in Volume 3.

B2.2.2 Measures to Reduce Waste and Emissions

- 3.115. MEPA's Application Form included a requirement to:

Describe the proposed techniques and measures to prevent and reduce waste and emissions of substances and heat (including during periods of start-up or shut-down, momentary stoppage, leak or malfunction).

- 3.116. The Scheme is designed to maximise the reuse, recycling and recovery of waste materials, including ELVs, WEEE, metals and food. As described in section B3.1, over 80% of the incoming waste is planned to be reused, recycled or recovered, and appropriate pre-treatment (such as ELV depollution) will be applied on site when possible. Procedures will also be in place for quarantining unauthorised waste.
- 3.117. An impermeable hardstanding surface will be installed over the entire site, and the ground will be laid to fall towards a silt trap and oil-water interceptors before being received in an underground reservoir. This ensures that emissions from any spills are contained and do not contaminate the underlying bedrock / aquifer or disperse beyond the site. Spill kits will also be available for use by staff. Further details are included in the Spill Prevention and Response Plan in section B2.8 and in section B3.5

on rainwater management.

- 3.118. The Scheme site will also include designated areas for the main site activities, including a covered shed for activities involving the processing of hazardous waste. Designated storage areas for the main waste types have been defined, and bunding will be provided for hazardous substances and waste, as described in sections B2.2.1 and B2.3.
- 3.119. The Scheme will also have a Fire and Explosion Prevention and Response Plan in place (section B2.8 of this Application). Amongst others, this Plan includes measures to minimise the risk of fire, such as earthed vehicle depollution equipment, and a fire-fighting system to reduce the spread of a fire. Staff will also receive training on emergency prevention and response.
- 3.120. As described in section B3.6 of this Application, air emissions will be minimised through regular maintenance of equipment, wetting of metals during shredding and single shredding of wood (to minimise the generation of very fine particles), and installation of site surfacing. Start-up and shut-down of combustion plant are not expected to cause a significant impact on surrounding receptors.
- 3.121. As mentioned in section B3.7, to reduce the risk of significant odours from the temporary storage of containerised waste, animal tissue waste, body parts and organs and mixed municipal waste will not be accepted at the Scheme. Additionally, containers will remain sealed while on site, and will typically be stored for not more than a few days / weeks to minimise risks of odours.
- 3.122. Odours from the composter (which is a small-scale pilot plant) will be mitigated through a biofilter on the composter vessel and deactivation of the aeration paddles during waste loading. Additionally, waste will only be accepted on site if treatment can commence within 48 hours, food will not be compacted prior to delivery, and meat and fish will not be accepted without prior agreement with ERA.
- 3.123. An inspection and preventive maintenance programme has also been prepared to reduce the risk of breakdown and unforeseen emissions; this is included in section B2.5 of this Application. Corrective maintenance will also be carried out as needed to reduce the risk of abnormal emissions.
- 3.124. Training is also planned, as mentioned in section B2.9, to ensure that staff are aware of their responsibilities and the procedures they need to follow to protect the environment.

B2.2.3 Flow Diagrams

- 3.125. The IPPC Application form includes a requirement to “*submit a flow diagram summarising the proposed installation activities.*” In section B3.11 there is also a requirement to “*by means of a mass flow diagram, summarise the emissions and waste described in sections B3.1, B3.2, B3.3, B3.4, B3.6, and B3.8 of this application.*”
- 3.126. Mass flow diagrams summarising the proposed installation activities and estimated

annual quantities are presented in **Figure 3.19** to **Figure 3.31**. Considering that the Scheme is a waste management facility, it is considered appropriate to present only flows of waste and raw materials in these flow diagrams. The only relevant emissions routinely generated by the Scheme are emissions to air from shredding and combustion; these emissions are described in Section B3.6 of the Application.

- 3.127. **Figure 3.19** to **Figure 3.21** show the four stages in the ELV depollution and dismantling process (annual estimates are used); this flow diagram corresponds to the description in section B2.2.1 above, nevertheless further measures to improve recovery and reuse rates will be implemented as described in **Volume 3**, and an updated flow diagram is also included in that Volume. Baling of tyres and bumpers from this process are included in **Figure 3.19** and **Figure 3.21** respectively. Baling of tyres received separately and not generated from the ELV depollution process is included in **Figure 3.22**.
- 3.128. The WEEE dismantling processes are shown in **Figure 3.23** to **Figure 3.25**.
- 3.129. Metal processing is summarised in **Figure 3.26**, while **Figure 3.27** shows the metal shredding and sorting process in more detail. The mass flows in **Figure 3.26** do not include metals processed as part of the ELV and WEEE treatment processes, to avoid double-counting.
- 3.130. The wire stripping process is presented in **Figure 3.28**, and **Figure 3.29** shows the wood processing activity.
- 3.131. As mentioned, the above processes include inputs and outputs, and some temporary storage on site of each waste type will take place prior to processing or removal to an authorised facility.
- 3.132. The temporary storage of containerised waste is shown in **Figure 3.30**.
- 3.133. **Figure 3.31** shows the composting process.

Figure 3.19: ELV depollution and dismantling (stage 1)

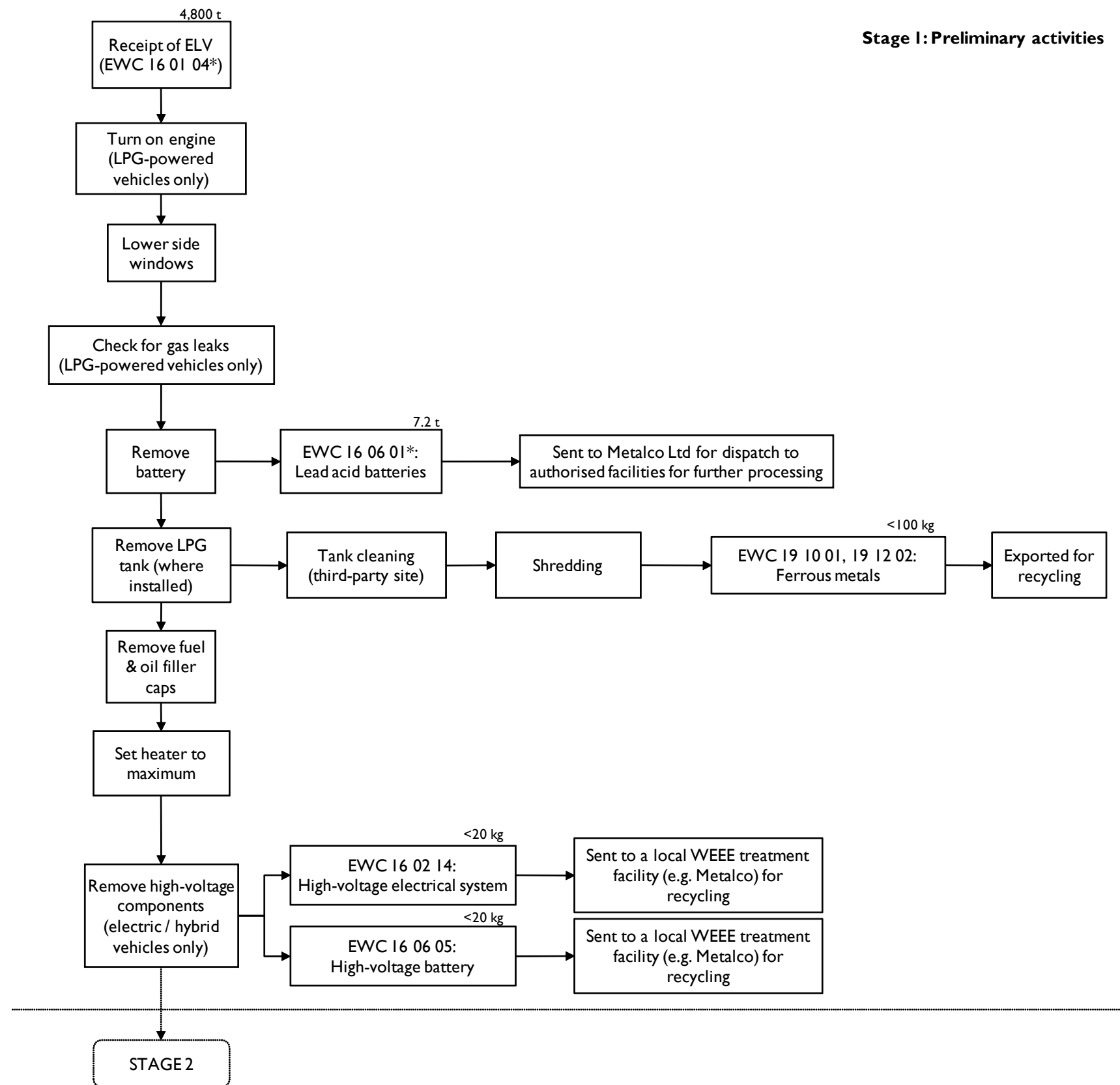


Figure 3.20: ELV depollution and dismantling (stage 2)

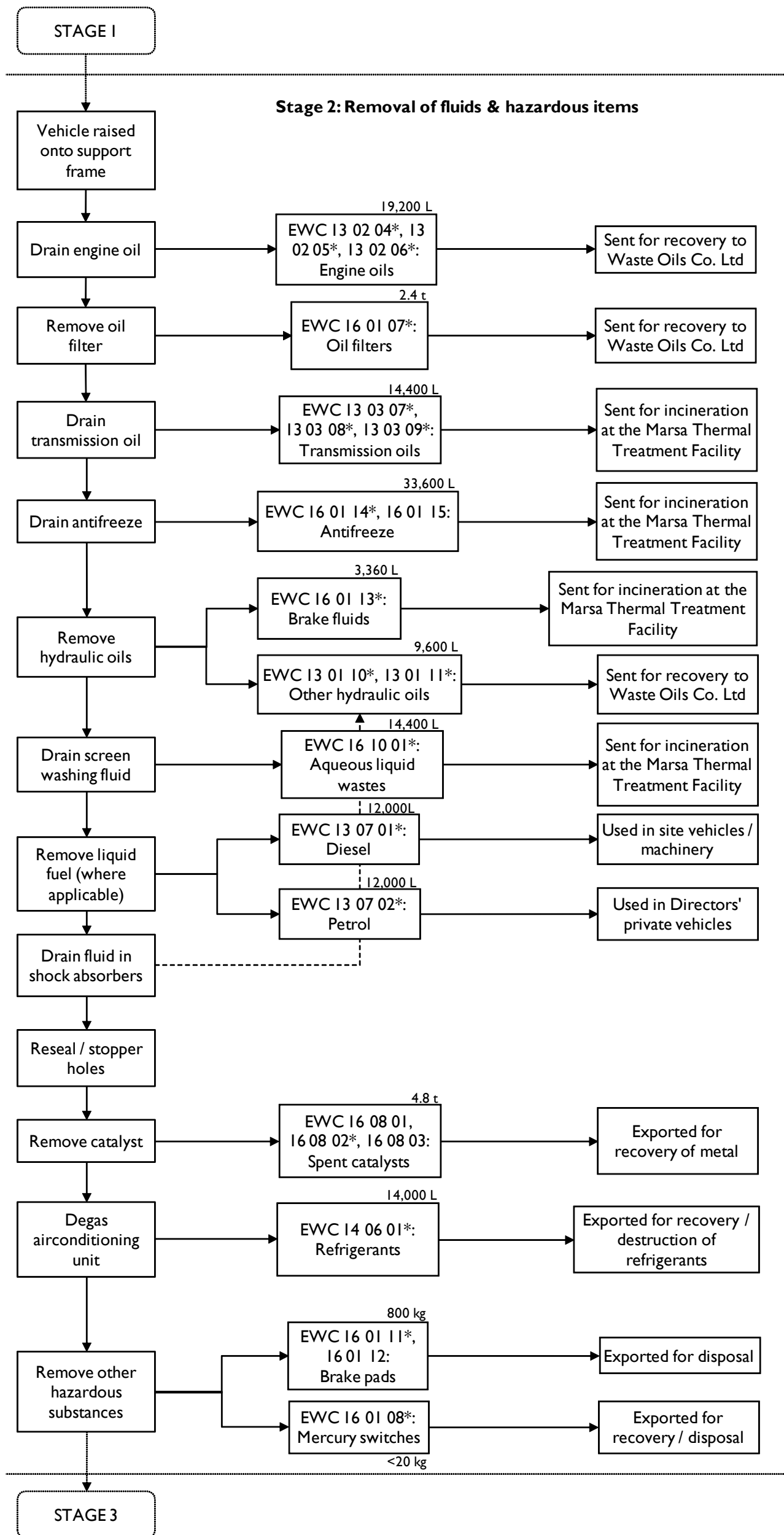
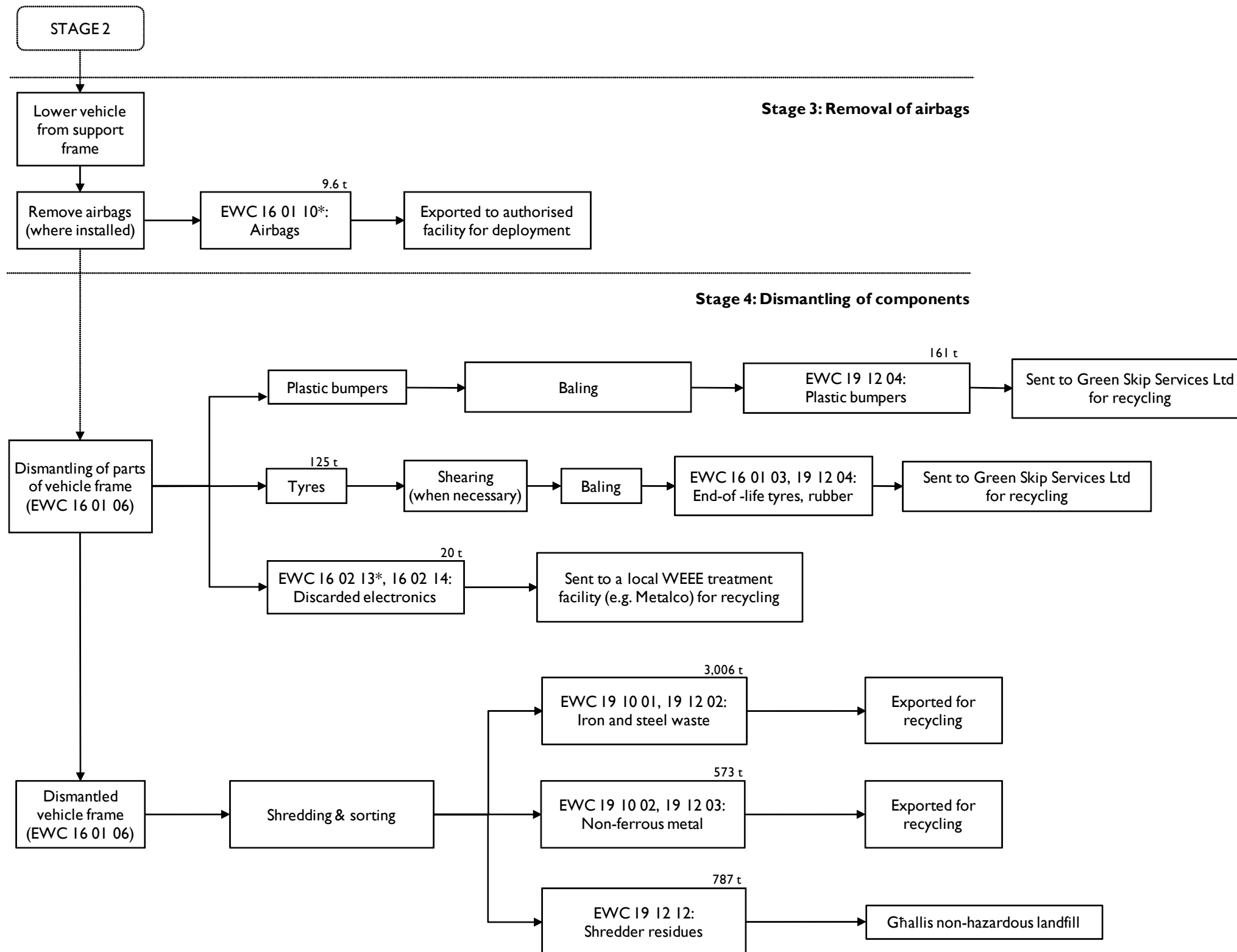


Figure 3.21: ELV depollution and dismantling (stage 3 & 4)



Stage 4 will be improved to improve reuse / recycling / recovery rates, as described in **Volume 3**, which also includes an updated flow diagram.

Figure 3.22: Baling of tyres

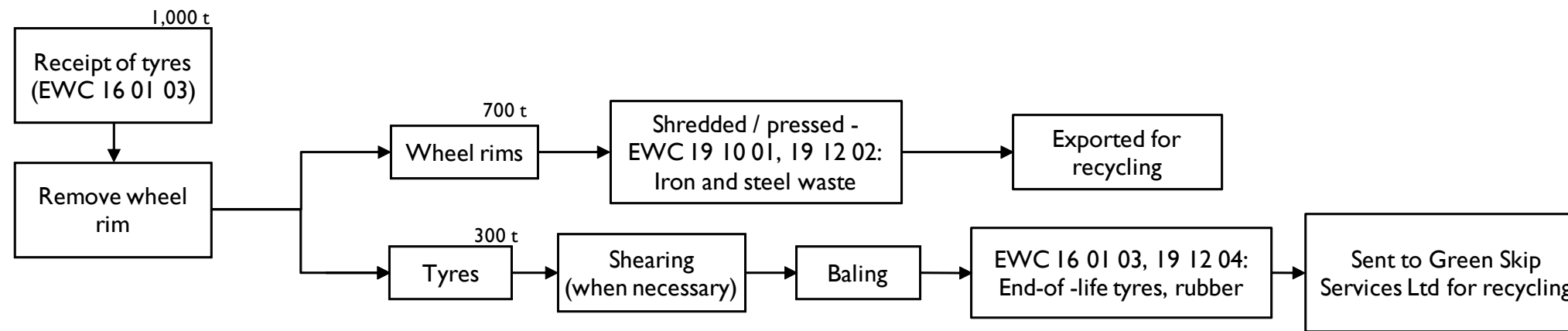


Figure 3.23: Processing of washing machines

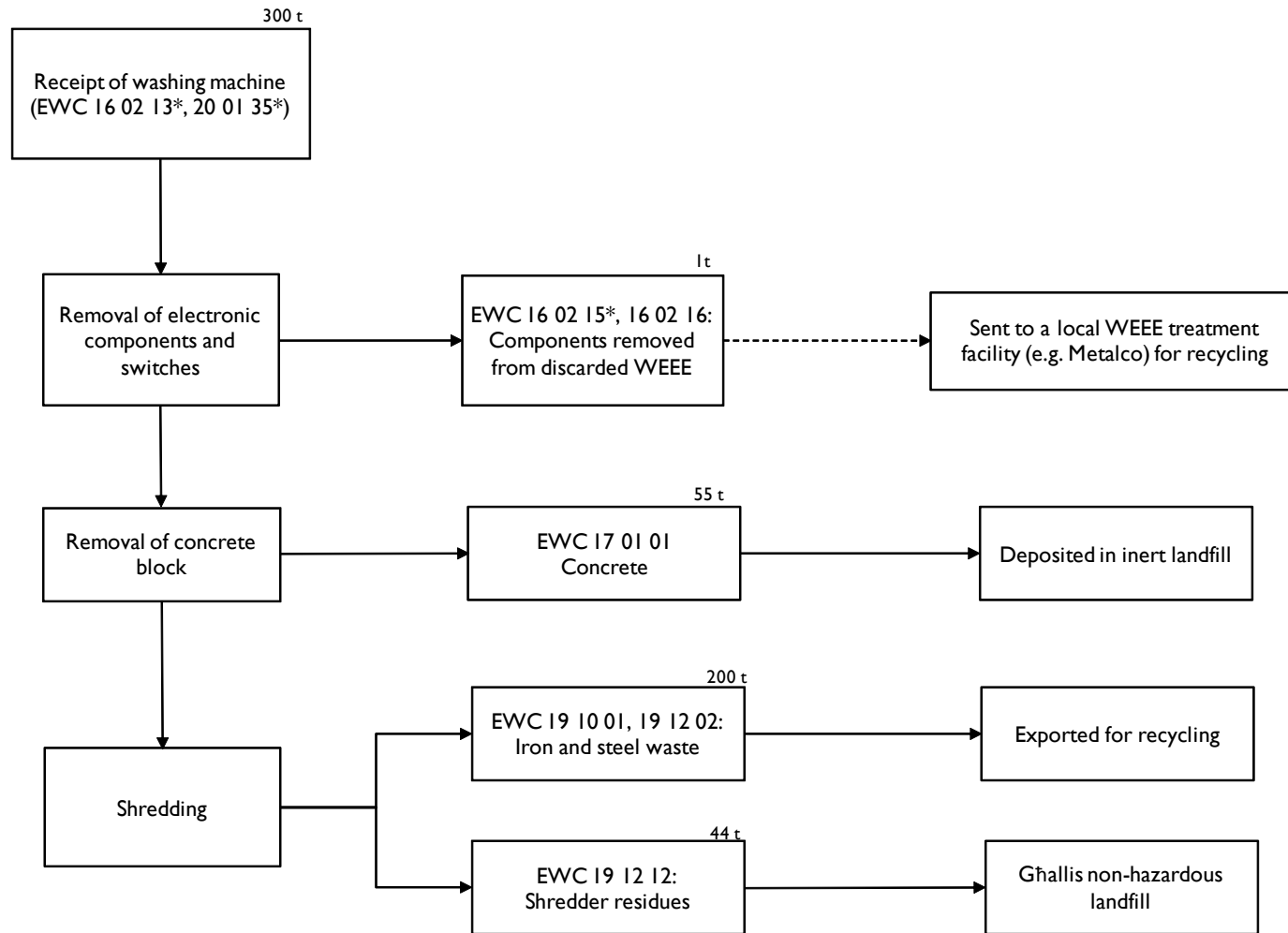


Figure 3.24: Processing of cookers

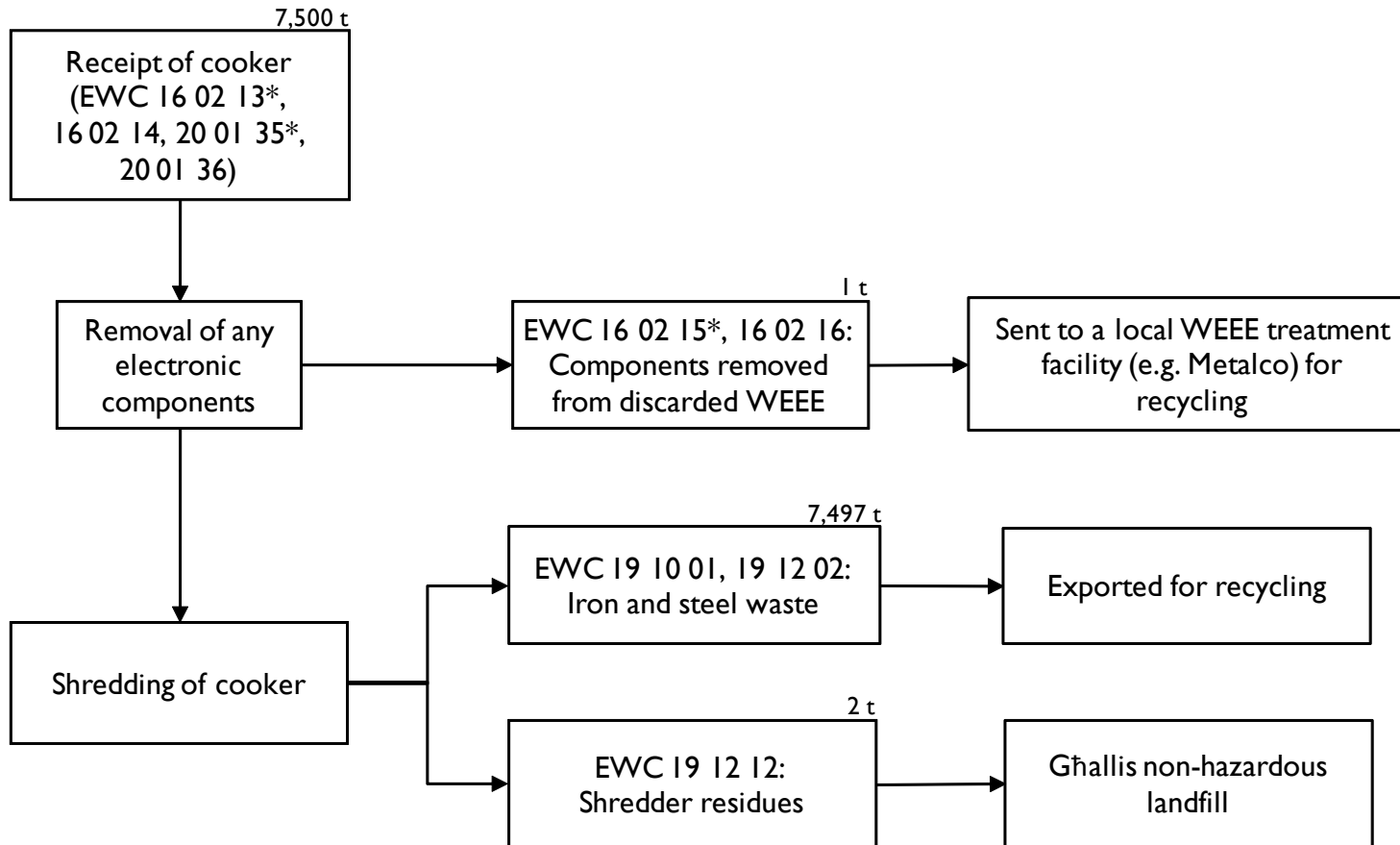


Figure 3.25: Processing of water meters

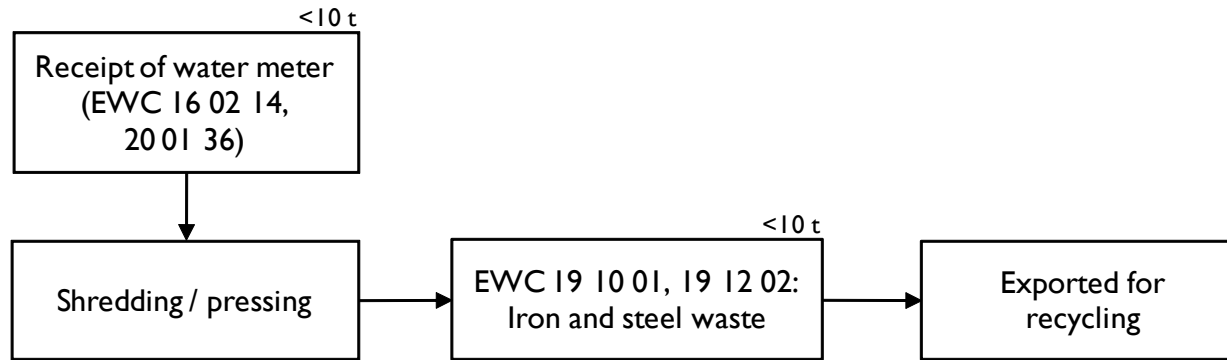


Figure 3.26: Metal processing

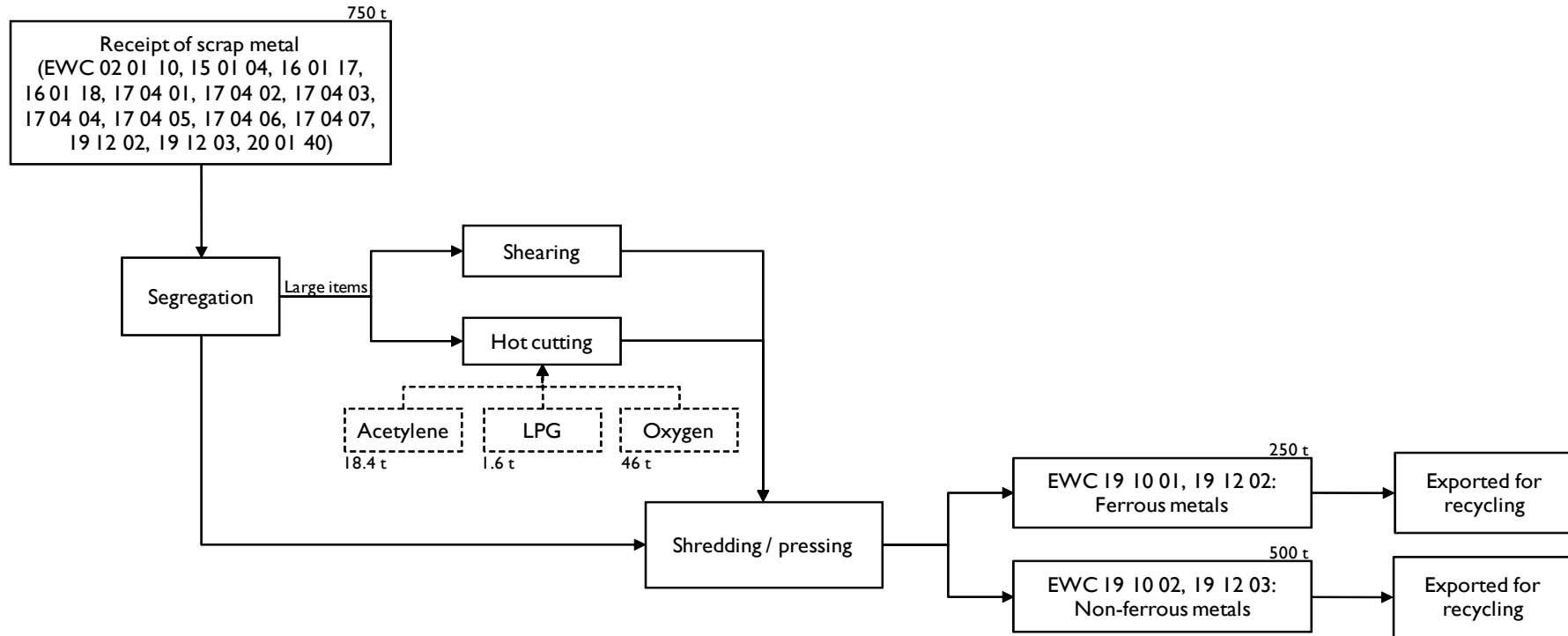


Figure 3.27: Metal shredding detail

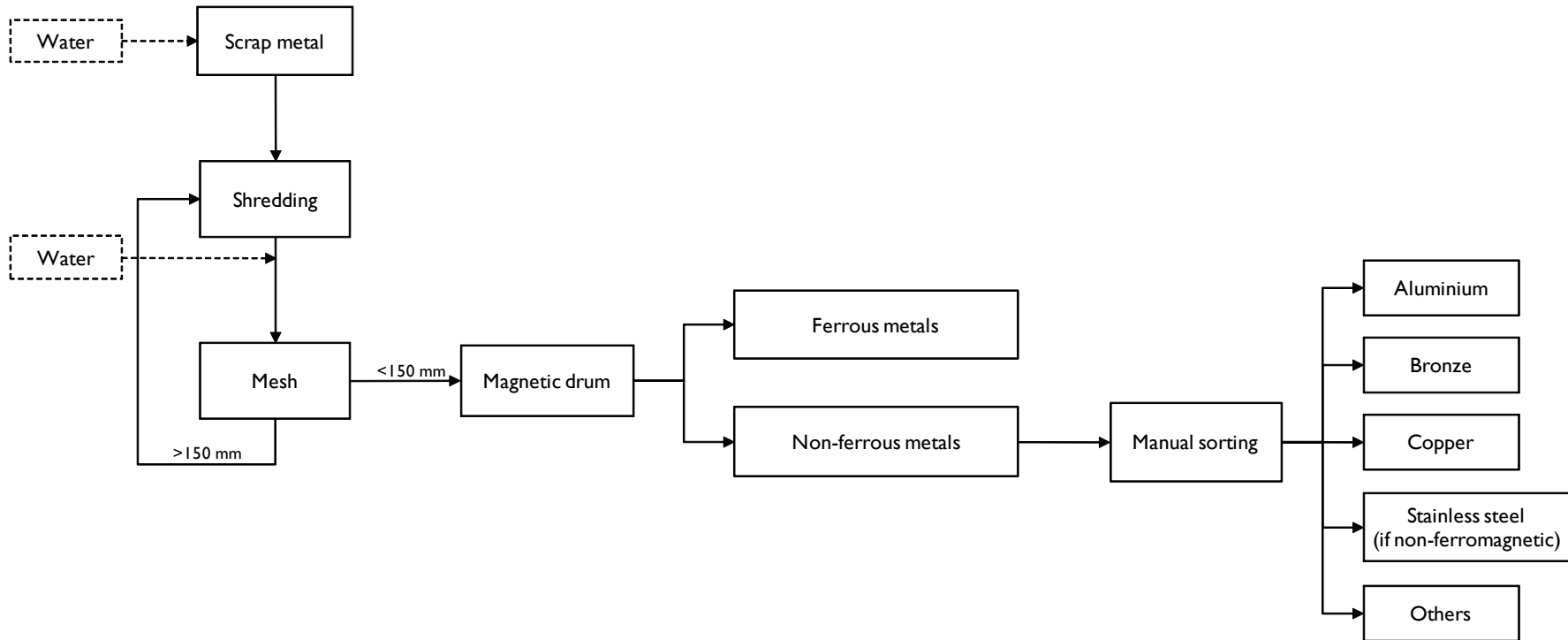


Figure 3.28: Wire stripping

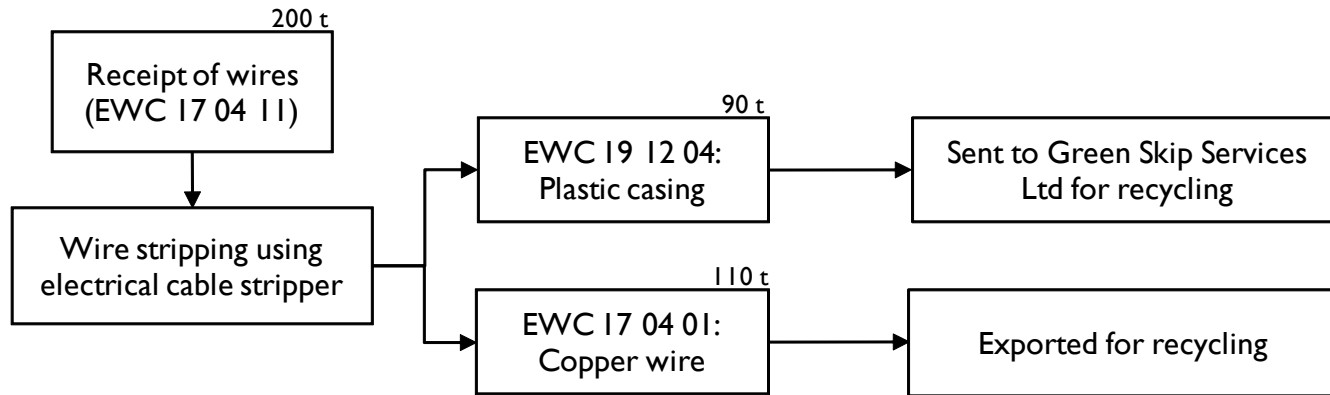


Figure 3.29: Wood processing

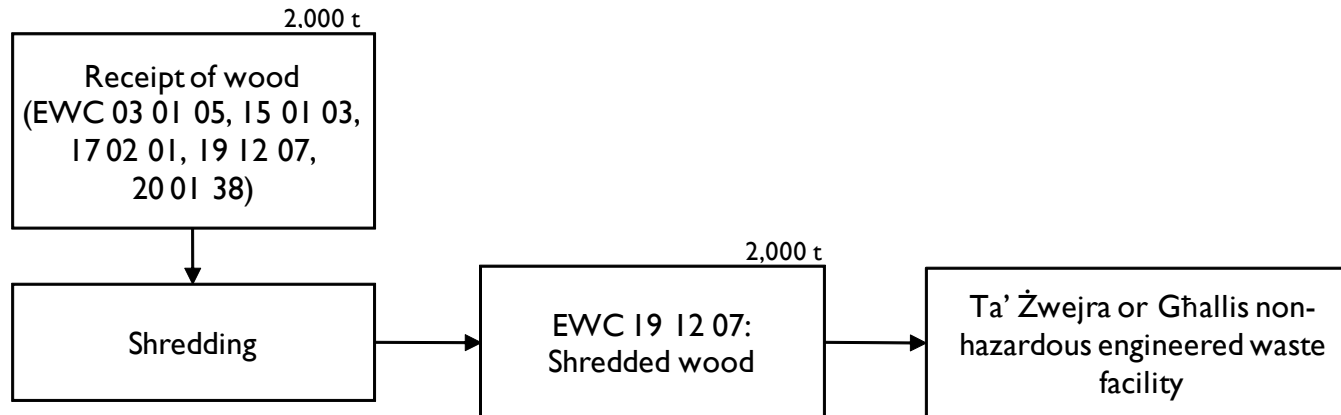


Figure 3.30: Temporary storage of containerised waste

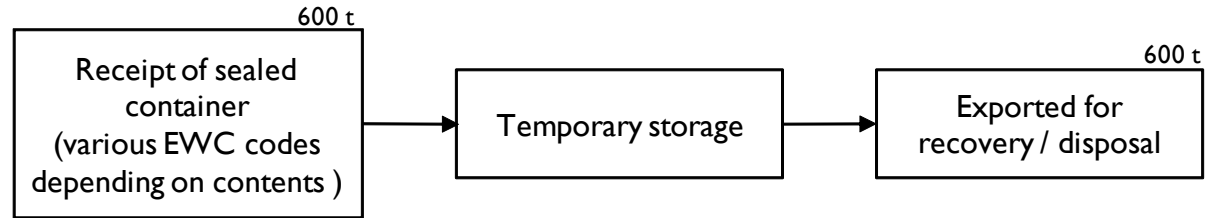
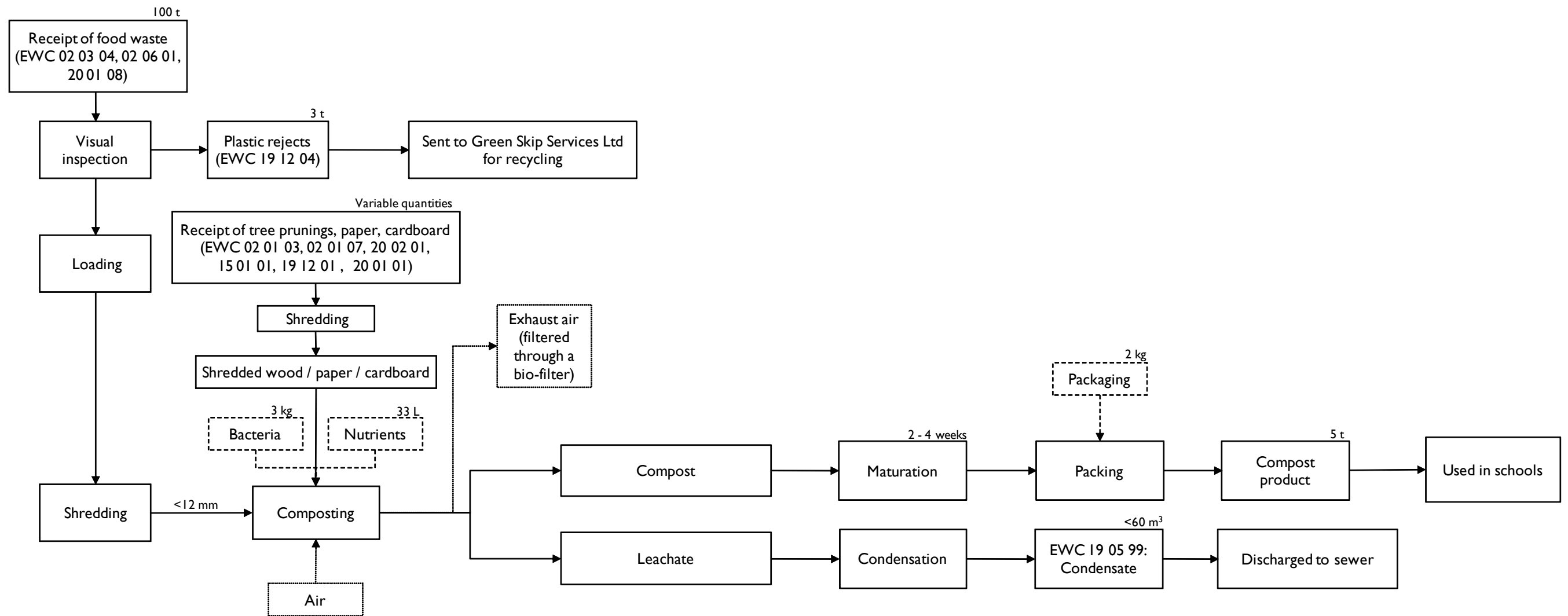


Figure 3.31: Composting



B2.2.4 BAT Assessment

3.134. The ToR issued by the former MEPA included a requirement to:

Include a comparison of the proposed activities with relevant BAT conclusions published by the European Commission, where these have been published.

3.135. As guided by the former MEPA, a comparison of the Scheme against the BREF for Waste Treatments Industries (published in August 2006) is included in **Annex 5**.

B2.2.5 Alternatives Considered

3.136. The former MEPA's Application Form required the following:

Include an outline of the main alternatives considered to the proposed technology, techniques and measures.

3.137. The principal alternative to the proposed techniques would be to maintain the Scheme's current operational activities.

3.138. The techniques currently in use are not considered to be BAT, especially since most of the ground surface is not impervious, there are no infrastructural arrangements for surface water and spill management, and there are no designated areas for storage of different materials (including bunded areas for hazardous substances and waste).

3.139. These limitations have also constrained the operator's activities on site. For instance, the operator is currently constrained to accept ELVs only if they have previously been dismantled to remove hazardous components, and the permit does not authorise the temporary storage of sealed hazardous waste containers.

3.140. An alternative site layout was also proposed as part of PA 05538/07; however, this layout only allowed for the treatment of plastics, textiles and scrap metal.

3.141. The equipment and techniques proposed are standard for the industry, and will allow for the achievement of at least 80% reuse / recycling / recovery rate, as described in section B3.1 of this Application.

3.142. The main alternative considered over the shredder for processing metal would be a metal press. However, the installation of a shredder allows for flexibility in operations and for further reduction of the volume of metal over the reduction achieved by a press. Additionally, the press is not suitable for processing wood.

3.143. The main alternative to installing ELV depollution equipment would be to remove the hazardous components manually. However, this is not the preferred option since processing of ELVs would take longer. Additionally, manual removal would not be as safe for the operators and the environment as using earthed equipment with integrated containers and bunding.

- 3.144. With regard to the composter, an open windrow system was initially considered; however, this option was discarded due to the potential for generation of significant odours.
- 3.145. Several improvements and adjustments to the layout and proposed operations were also made in the course of this IPPC application process following discussions with ERA, as documented in Volume 3.

B2.3 RAW MATERIALS

- 3.146. The ToR provided by the former MEPA in the IPPC application form in respect of raw materials were:

Identify the raw and auxiliary materials, and any other substances that you propose to use, including fuels.

Give details of quantities proposed to be used annually and submit respective MSDS sheets.

Identify the storage location of these materials on a site layout plan and give details on:

- *Maximum storage capacity;*
- *Containment measures (including bunding capacity, where applicable);*
- *Protective measures (including security).*

- 3.147. The raw materials in use at the Scheme are identified in **Table 3.2**. Safety Data Sheets are included in **Annex 6**.

Table 3.2: Raw materials

Activity	Raw material	Annual consumption	Maximum quantity stored	Storage location and containment
Refuelling of site vehicles, machinery and generator	Diesel EN 590 (≤0.001% sulphur)	140,000 L	8,000 L (8 m ³)	Area 11, in covered shed in a dedicated locked and bunded container having a capacity of 9.3 m ³ , i.e. around 115% of the contents of the tank. Drip trays used during dispensing of vehicles and filling of tank. Generator day tank in area 25 (self-

Activity	Raw material	Annual consumption	Maximum quantity stored	Storage location and containment
				contained).
Hot cutting of metal during processing, vehicle / equipment maintenance and repair	Acetylene	18,400 kg	80 kg	Lockable cage / cabinet inside shed (area 11), secured vertically. Additional protective measures are included in the Fire and Explosion Prevention and Response Plan (section B2.8).
	LPG	1,600 kg	60 kg	
	Oxygen	46,000 kg	720 kg	
Metal shredding	Water	500 m ³	800 m ³	Underground reservoir
Composting	Nutrients (Advetec 6000)	33 L	5 L	Designated area in composter shed (area 22); impermeable flooring
	Extremophilic bacteria	3 kg	500 g	
	Tree prunings / paper / cardboard	Dependent on the water content of the incoming waste	800 kg	
	Packaging material	2kg	1 kg	
Vehicle / equipment maintenance and repair	Engine oil	4,800 L	1,000 L	Area 11 in covered shed; stored on drip trays.
	Transmission oil	1,200 L	400 L	

3.148. In addition to the containment measures identified in **Table 3.2**, the entire site will be constructed on an impermeable hardstanding surface with all areas laid to fall towards an underground reservoir. The reservoir will be fitted with a silt trap and oil-water interceptors to prevent any oily contaminants from reaching the reservoir.

B2.5 MAINTENANCE

3.149. The ToR regarding maintenance in the IPPC application form are as follows:

Provide a proposed maintenance programme for the installation, and a template for keeping records of maintenance.

3.150. **Table 3.3** identifies the Scheme's machinery; a number of forklifts and trucks also operate on site.

Table 3.3: Machinery on site

Type of machinery	Brand	Quantity
Grab excavators	Hitachi	4
Shredder	Hammel	1
Hydraulic press	Lefort	1
Shear	Kobelco	1
Small shear	Deltax	1

Type of machinery	Brand	Quantity
Cable stripper	Deltax	1
Tyre baler	LSM	1
ELV depollution system	STH Anlagenbau	1
Composter	Advetec	1
Generator	n/a	1

3.151. An inspection and maintenance programme is presented in **Table 3.4**; this includes the site's machinery, vehicles, infrastructure and temporary storage containers.

Table 3.4: Inspection and maintenance programme

Equipment	Inspection and maintenance schedule
Hydraulic press	Annual service, maintenance / repair as required, annual inspection and certification by warranted mechanical engineer
Grab excavators	Annual service, maintenance / repair as required, annual inspection and certification by warranted mechanical engineer
Shredder	Annual service, maintenance / repair as required, annual inspection and certification by warranted mechanical engineer
Shear	Annual service, maintenance / repair as required, annual inspection and certification by warranted mechanical engineer
Small shear	Annual service, maintenance / repair as required, annual inspection and certification by warranted mechanical engineer
Cable stripper	Annual service, maintenance / repair as required, annual inspection and certification by warranted mechanical engineer
Tyre baler	Annual service, maintenance / repair as required, annual inspection and certification by warranted mechanical engineer
ELV depollution system	Annual service, annual inspection and certification by warranted mechanical engineer
Composter	A maintenance manual is provided with the equipment. The equipment requires the following maintenance: <ul style="list-style-type: none"> • Daily 30-minute inspection; • Monthly air filter cleaning (more frequent if indicated by warning lamp); • Monthly checking and cleaning of compressor air intake; • Quarterly draining of gearbox and greasing of bearings; and • Periodic emptying of drain valve.
Generator	Annual service, annual inspection and certification by warranted mechanical engineer
Forklifts	Annual service, maintenance / repair as required, annual inspection and certification by warranted mechanical engineer as per the Work Equipment (Minimum Safety and Health Requirements) Regulations, 2016 (S.L.424.35), VRT testing according to licence requirements
Trucks	Annual service, maintenance / repair as required, VRT testing according to licence requirements
Site surfacing (hardstanding)	Annual inspection, with repair where necessary
Surface water management system	Weekly inspection of gutters; Monthly inspection of silt trap / interceptor; Inspection after a major spill; Removal of contents as necessary
Fire detection and fighting system	Annual servicing of smoke / fire detectors and fire extinguishers

Equipment	Inspection and maintenance schedule
Containers / drums containing liquid hazardous substances / waste and core storage areas	Weekly inspection; repair / repackaging if necessary

- 3.152. Repairs will be carried out on malfunctioning equipment / vehicles as soon as possible after a problem is identified.
- 3.153. Preventive and corrective maintenance records will be kept using the template in **Table 3.5**. Records will also be kept of the engineer's annual inspection report and certificates.

Table 3.5: Maintenance records template

Equipment / vehicle details					
Type		Brand		Identifier	(e.g. number plate, engine number)
Maintenance record					
Date	Type of maintenance	Description of work	Problems identified	Next maintenance due date	Employee signature
	(preventive / corrective)				

B2.6 ENERGY

- 3.154. The ToR provided by the former MEPA in the Application form in respect of energy were:

B2.6.1: Provide a breakdown of the proposed annual energy consumption, highlighting the main energy-consuming equipment, and generation by source and end-use (including information on energy generated on site, if applicable).

B2.6.2: Describe the proposed basic measures for improvement of energy efficiency.

- 3.155. At the Scheme site, energy is obtained from electricity and diesel fuel. The estimated annual consumption is shown in **Table 3.6**.

Table 3.6: Energy consumption

Energy source	Estimated annual consumption
Electricity from mains power supply	35,000 kWh
Diesel fuel	140,000 L

- 3.156. Electricity is used for lighting and to operate the cable stripper, the tyre baler, the ELV depollution system and the composter as shown in **Table 3.7**. Diesel is used to

power the combustion plant shown in **Table 3.7** as well as forklifts and trucks.

Table 3.7: Energy consuming equipment

Type of machinery	Brand	Quantity	Frequency of use	Stationary / mobile	Power source
Grab excavators	Hitachi	4	5 h weekly (each)	Mobile	Diesel
Shredder	Hammel	1	30 h weekly	Mobile	Diesel
Hydraulic press	Lefort	1	20 h weekly	Stationary	Diesel
Shear	Kobelco	1	24 h weekly	Mobile	Diesel
Small shear	Deltax	1	4 h weekly	Mobile	Diesel
Generator	n/a	1	<100 h annually	Stationary	Diesel
Cable stripper	Deltax	1	4 h weekly	Mobile	Electricity
Tyre baler	LSM	1	24 h weekly	Stationary	Electricity
ELV depollution system	STH Anlagenbau	1	Depending on the quantity of incoming vehicles, up to 48 hours weekly	Mobile	Electricity
Composter	Advetec	1	Continuous	Mobile	Electricity

- 3.157. Information on energy consumption by type of equipment is not generally kept; however consumption is heavily dependent on the frequency of use of the equipment, which varies depending on the demand.
- 3.158. Additionally, with a consumption of 3 kWh daily, the proposed composter is very energy efficient compared to other composting systems.
- 3.159. To minimise energy consumption, the entire vehicle fleet has been upgraded to more fuel efficient Euro VI models. Additionally, any fuel leaks noted are immediately repaired.

B2.7 WATER

- 3.160. MEPA's ToR regarding water were:

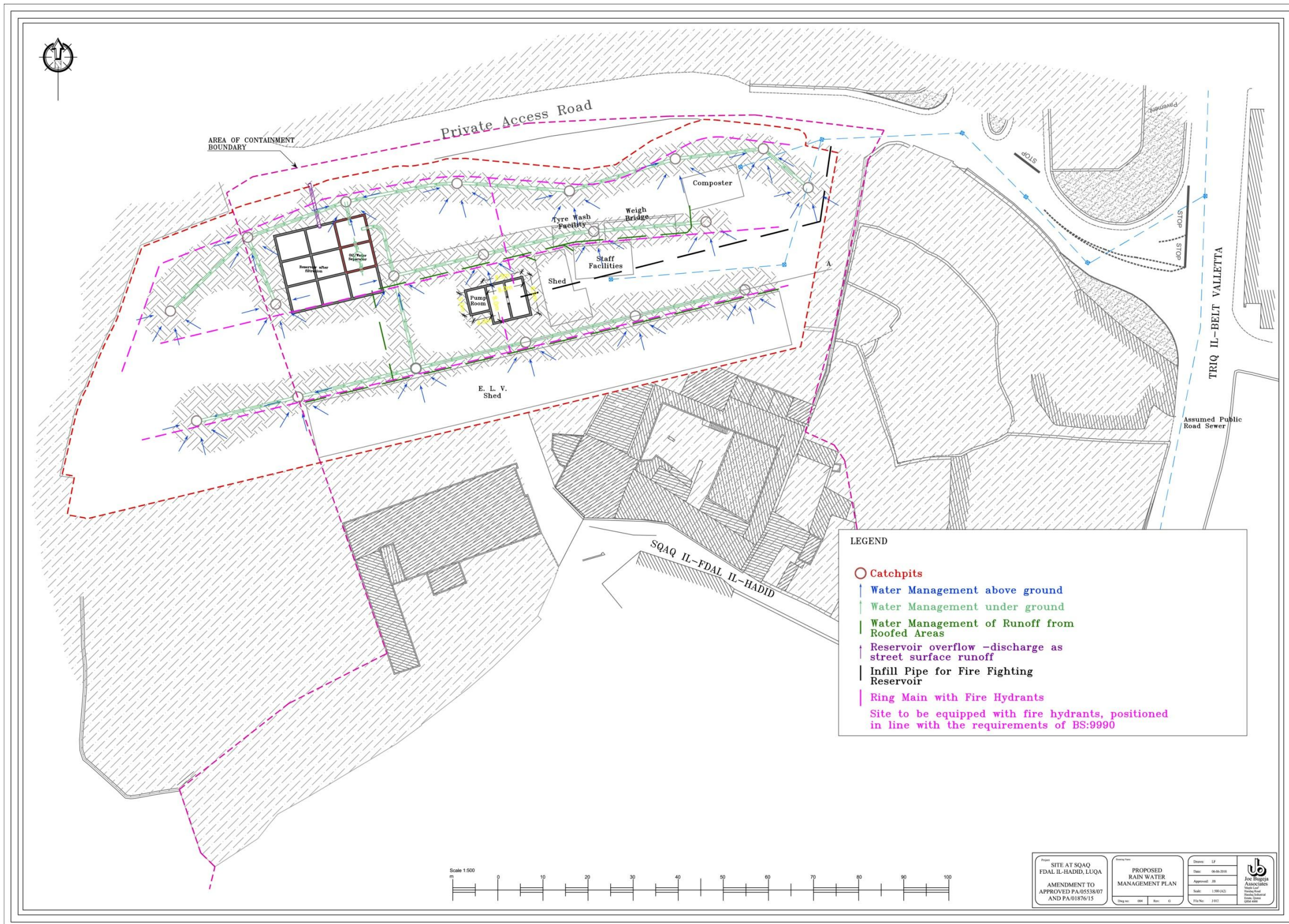
Provide a breakdown of the proposed annual water consumption by source and end-use.

- 3.161. Water is currently obtained only from the mains water supply, with an annual consumption of around 1,200 m³. It is used for cleaning the site, cleaning of trucks, wetting of metals during shredding, landscaping, and showers / toilet facilities for employees.
- 3.162. The planned upgrade includes the excavation of an underground 800 m³ reservoir (**Figure 3.32**) for the collection of surface water, which will be treated in a silt-trap and oil-water interceptors before collection as described in **Chapter 4**.
- 3.163. Water from this reservoir will be used to clean the site and vehicles, to wet metals during shredding, and for landscaping. This will also help reduce the consumption of

mains water.

- 3.164. A separate 175 m³ water reservoir will be constructed close to the site entrance. This will be filled up by bowser and the contents reserved for fire-fighting.

Figure 3.32: Underground reservoirs



B2.8 RISK ASSESSMENT

Terms of Reference

3.165. The ToR provided by the former MEPA in the IPPC application form in respect of risk assessment were:

Describe the documented system proposed to be used to identify, assess and minimise the environmental risks and hazards of accidents and their consequences.

Include:

(a) emergency plans in case of fire and other emergencies (e.g. explosions);

(b) plans for actions to be taken in case of failure of abatement equipment;

(c) plans for actions to be taken in case of other environmentally relevant incidents (e.g. spillages, gas leakage).

Provide certification from a competent company or engineer that the relevant fire safety procedures and equipment are in place.

Certification and fire plans shall include the presence of emergency firefighting water supplies for use by the Civil Protection Department.

Assessment Methodology

Scheme Description

3.166. As mentioned, the Scheme will consist of the following activities:

- ELV depollution using dedicated equipment, followed by dismantling;
- Dismantling of WEEE (limited to washing machines, cookers and water meters);
- Processing of metals, including shredding and pressing;
- Baling of tyres and bumpers;
- Wire stripping;
- Wood processing (including shredding);
- Storage of various materials / waste associated with the above activities, including vehicle parts, tyres, scrap metal, wood, plastic, oils and fuel;
- Temporary storage of containerised waste: to consist of only solid / liquid waste (including hazardous waste) in sealed containers, received at the site for onward shipment without any on-site processing;

- Composting of food waste: A pilot project processing around 100 t/a of waste; and
- Maintenance of on-site machinery.

Objectives

3.167. This section will therefore present an environmental risk assessment for the operation of the Scheme by:

- Describing and evaluating the risks to the environment associated with the Scheme's operation, including risks arising due to the nature of the materials being handled and stored, risk associated with the machinery and vehicles used, and risk associated with the activities on site; and
- Describing the measures which will be undertaken to mitigate such risks, and evaluating the residual risk levels.

3.168. The following emergency prevention and response plans are also included:

- Fire and explosion prevention and response plan;
- Spill prevention and response plan.

Risk Assessment Methodology

Source-Pathway-Receptor Linkage

3.169. An environmental risk occurs when there is a means by which a hazard can result in a deleterious impact on the surrounding environment, i.e. receptors. The presence of a hazard alone does not constitute a risk. A risk is only present if there is a pathway which links the source (hazard) to the receptor. This is known as the source-pathway-receptor linkage.²⁷

3.170. Environmental risk assessment is the process by which source-pathway-receptor linkages are identified and evaluated. If any of the three elements are absent then there is no complete linkage and thus no unacceptable risk.

Risk Assessment Criteria

3.171. If a source-pathway-receptor linkage is found, the magnitude of a risk is a function of the consequences of pollution and the likelihood that such pollution will occur.

3.172. The risk criteria being applied to this assessment are based on a matrix consistent with ISO 31010: *Risk management: Risk assessment techniques*.

²⁷ Defra (2002) *Groundwater Protection Code: Petrol Stations and other Fuel Dispensing Facilities involving Underground Storage Tanks*
<http://archive.defra.gov.uk/environment/quality/water/waterquality/ground/documents/groundwater-petrol.pdf>.

3.173. **Table 3.8** presents criteria for assessing environmental consequences, whereas **Table 3.9** presents criteria for assessing the likelihood of the event occurring.

Table 3.8: Criteria for assessing environmental consequences

Severity level	Effects on natural environment
1: Insignificant	Limited damage to minimal area of low significance.
2: Minor	Minor effects on biological or physical environment. Minor short/medium-term damage to small area of limited significance.
3: Moderate	Moderate effects on biological or physical environment (e.g. air, water) but not affecting ecosystem function. Moderate short/medium-term widespread impacts (e.g. significant spills).
4: Major	Serious environmental effects with some impairment of ecosystem function. Relatively widespread medium-long term impacts.
5: Catastrophic	Very serious environmental effects with impairment of ecosystem function. Long term, widespread effects on significant environment (e.g. national park).

Table 3.9: Measure of likelihood

Level	Descriptor	Description	Guideline frequency
A	Almost certain	Consequence is expected to occur in most circumstances	Occurs more than once per month
B	Likely	Consequence will probably occur in most circumstances	Occurs once every 1 month - 1 year
C	Occasional	Consequence should occur at some time	Occurs once every 1 year - 10 years
D	Unlikely	Consequence could occur at some time	Occurs once every 10 years - 100 years
E	Rare	Consequence may only occur in exceptional circumstances	Occurs less than once every 100 years

3.174. The overall risk level is then determined by combining the two factors, using the matrix in **Table 3.10**.

Table 3.10: Risk matrix

Likelihood	Environmental consequence					No pollutant linkage
	1: Insignificant	2: Minor	3: Moderate	4: Major	5: Catastrophic	
A: Almost Certain	Low	Moderate	Extreme	Extreme	Extreme	None
B: Likely	Low	Moderate	High	Extreme	Extreme	
C: Occasional	Very low	Moderate	High	High	Extreme	
D: Unlikely	Very low	Low	Moderate	High	High	
E: Rare	Very low	Low	Moderate	Moderate	High	

Risk Assessment

Overview

3.175. The Scheme's operations will include storage and processing of hazardous substances and waste, and use of machinery, which, without mitigation, could create a risk to the

environment through underground, surface and airborne pollution.

- 3.176. **Table 3.11** summarises potential sources of pollution and the respective pathway to the relevant receptors. The major accident scenario of fire / explosion has also been considered.
- 3.177. **Table 3.11** also includes the mitigation measures that will be adopted to mitigate such risks, distinguishing between fixed structural elements incorporated into the upgraded plant design, and procedural mitigation measures. The Table also distinguishes between the measures already in place (current mitigation), and other measures that will be implemented as part of the planned upgrading of the site and the proposed Environmental Management Programme. It is to be noted that all the current mitigation measures will be retained in the upgraded scenario.

Table 3.11: Pollution pathway identification and mitigation measures

Source	Pathway	Receptor	Mitigation measures		
			Current mitigation	Additional proposed mitigation	
				Structural measures	Procedural measures
Spill from 8 m ³ diesel tank during filling or dispensing	Direct contamination Permeable strata above water table Rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> Impermeable hardstanding; Gutters leading to silt trap and oil-water separators. 	<ul style="list-style-type: none"> Spill Prevention and Response Plan; Spill trays used during dispensing of fuel to machinery / vehicles; Spill kits; Staff training on spill prevention and response; Inspection and maintenance programme covers gutters, silt trap and oil-water separators.
Spill from 8 m ³ diesel tank during storage (catastrophic failure of tank)	Direct contamination Permeable strata above water table Rainwater runoff (These pathways only exist if the containment system fails)	Land Groundwater	<ul style="list-style-type: none"> Diesel tank integrated in a container that acts as a bund. 	<ul style="list-style-type: none"> Impermeable hardstanding; Gutters leading to silt trap and oil-water separators. 	<ul style="list-style-type: none"> Spill Prevention and Response Plan; Spill kits; Staff training on spill prevention and response; Inspection and maintenance programme covers gutters, silt trap and oil-water separators.
Diesel spill from generator day tank	Direct contamination Permeable strata above water table Rainwater runoff (These pathways	Land Groundwater	<ul style="list-style-type: none"> Not applicable – this activity is not currently authorised. 	<ul style="list-style-type: none"> Integrated bund; Impermeable hardstanding; Gutters leading to silt trap and oil-water separators; Small scale storage (≤220 L). 	<ul style="list-style-type: none"> Infrequent filling (due to limited usage); Spill Prevention and Response Plan; Spill kits; Staff training on spill prevention and response;

Source	Pathway	Receptor	Mitigation measures		
			Current mitigation	Additional proposed mitigation	
				Structural measures	Procedural measures
	only exist if the containment system fails)				<ul style="list-style-type: none"> Inspection and maintenance programme covers gutters, silt trap and oil-water separators.
Spill from temporary storage of containerised waste	Direct contamination Permeable strata above water table Rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> Not applicable – this activity is not currently authorised. 	<ul style="list-style-type: none"> Impermeable hardstanding; Gutters leading to silt trap and oil-water separators. 	<ul style="list-style-type: none"> Spill Prevention and Response Plan; Containers remain sealed during storage on site; Spill kits; Staff training on spill prevention and response.
Spills of other liquid hazardous substances / waste (e.g. during storage, transfer, handling, ELV depollution, leaks from vehicles / machinery, maintenance)	Direct contamination Permeable strata above water table Rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> Impermeable hardstanding (part of site). 	<ul style="list-style-type: none"> Impermeable hardstanding (entire site); Gutters leading to silt trap and oil-water separators; ELV depollution equipment equipped with containers for hazardous materials and banded. 	<ul style="list-style-type: none"> Spill Prevention and Response Plan; Hazardous waste stored in shed under cover; Containment for liquid hazardous waste (spill trays, prefabricated bunds, and similar systems); Spill kits; Staff training on operational procedures and spill prevention and response.
Air emissions from combustion, shredding, navigation and dust trackout by heavy vehicles	Air dispersion (prevailing wind direction)	Air sensitive receptors	<ul style="list-style-type: none"> Low-sulphur diesel used for combustion; Cleaning of premises and vehicles; Regular 	<ul style="list-style-type: none"> Wetting of metals during shredding; Wood shredded once; Installation of hardstanding surface. 	<ul style="list-style-type: none"> Defined maintenance programme for equipment and vehicles; Regular cleaning of premises; Wheel wash used by trucks before exiting the facility.

Source	Pathway	Receptor	Mitigation measures		
			Current mitigation	Additional proposed mitigation	
				Structural measures	Procedural measures
			maintenance of equipment and vehicles.		
Odour emissions from composter	Air dispersion (prevailing wind direction)	Air sensitive receptors	<ul style="list-style-type: none"> • Not applicable. 	<ul style="list-style-type: none"> • Biofilter; • Paddles stop automatically during waste loading; • Small-scale plant. 	<ul style="list-style-type: none"> • Operator training; • Filter maintenance; • Waste only accepted if it can be treated within 48 hours; • Waste will not be compacted prior to receipt; • Meat and fish will not be accepted.
Fire / explosion	Air dispersion (prevailing wind direction)	Air sensitive receptors	<ul style="list-style-type: none"> • Fire extinguishers (all stored in one area, not spread around the site). 	<p><u>General:</u></p> <ul style="list-style-type: none"> • Dedicated 175 m³ underground water reservoir; • Ring main, fire pump, fire hydrants and hoses in accordance with the Fire and Explosion Prevention and Response Plan; • Smoke / fire detection units in buildings and shed, connected to an alarm system; • Scheme designed to ensure sufficient space for access by CPD vehicles; • Wind direction indicator. <p><u>ELV depollution:</u></p>	<p><u>General:</u></p> <ul style="list-style-type: none"> • Fire and Explosion Prevention and Response Plan; • Fire extinguishers installed throughout the site in accordance with the Fire and Explosion Prevention and Response Plan; • Staff training on operational procedures and fire / explosion prevention and response, including fire drills, and maintenance of signed training logs; • Limiting the amount of tyres stored to 50 tonnes; other measures for storage included in the Fire and Explosion Prevention and Response Plan;

Source	Pathway	Receptor	Mitigation measures	
			Current mitigation	Additional proposed mitigation
				Structural measures
Fire / explosion (continued)				<ul style="list-style-type: none"> • Earthed depollution equipment. <p><u>LPG vehicles:</u></p> <ul style="list-style-type: none"> • No maintenance pit that could cause accumulation of vapours. <ul style="list-style-type: none"> • Safety signage, e.g. no smoking or naked lights, emergency response numbers; • Designated area outside the site for smoking; • Hot work procedure; • Storage of acetylene and LPG cylinders in accordance with the Fire and Explosion Prevention and Response Plan; • Operations on site prohibited in severe weather (in accordance with Fire and Explosion Prevention and Response Plan); • Weekly inspection of core storage areas and containers; • Firefighting water reservoir kept full; • Night security guard. <p><u>ELV depollution:</u> Adherence to the ELV Depollution and Dismantling procedure (section B2.2.1 of the IPPC application), including:</p> <ul style="list-style-type: none"> • Vehicles checked for fluid leaks upon acceptance; • Removal of battery before depollution of fuel tank; • Fuel from the ELV tank normally removed by suction.

Source	Pathway	Receptor	Mitigation measures	
			Current mitigation	Additional proposed mitigation
				Structural measures
Fire / explosion (continued)				<ul style="list-style-type: none"> • Storage of fuels and oils in dedicated containers; • At least 30 minutes allowed from battery removal to removal of airbag from ELV. <p><u>LPG vehicles:</u> Adherence to the ELV Depollution and Dismantling procedure (section B2.2.1 of the IPPC application), including:</p> <ul style="list-style-type: none"> • Only staff certified as competent installers for autogas driven vehicles will dismantle such vehicles; • LPG tank emptied by running the vehicle and not vented; • Vehicle checked for gas leaks; battery not disconnected without this process, especially if the battery is located close to the LPG tank; • Vehicle stored in an open area outdoors until the LPG tank is removed; • Ensure LPG tank is removed and cleaned before shredding. <p><u>Electric / hybrid vehicles:</u> Adherence to the ELV Depollution and Dismantling procedure (section B2.2.1 of the</p>

Source	Pathway	Receptor	Mitigation measures		
			Current mitigation	Additional proposed mitigation	
				Structural measures	Procedural measures
					IPPC application), including: <ul style="list-style-type: none"> • Isolating the high-voltage electrical system and removing the high-voltage battery before depollution; • Storing the high-voltage battery under cover, not exposed to high temperatures.
Used firefighting water (generated in case of a fire)	Direct contamination Permeable strata above water table	Land Groundwater	<ul style="list-style-type: none"> • None. 	<ul style="list-style-type: none"> • Impermeable hardstanding; Gutters leading to 800 m³ underground reservoir. 	<ul style="list-style-type: none"> • Inspection and maintenance programme includes gutters.

Identification of Potential Releases

- 3.178. Releases could occur from accidental spillages of the hazardous substances / waste stored and handled on site, including diesel from the diesel tank and the generator day tank, containerised liquid waste and waste generated from the ELV depollution, as well as leaks from vehicles / equipment and drips from maintenance activities. The nature of the substances released would be mostly hydrocarbon-based (e.g. oils and fuels), although some other non-hydrocarbon based hazardous waste will also be stored on site as part of normal activities (such as lead-acid batteries and possibly certain containerised waste). In an accident involving a spill, releases would typically be of a small-scale, however, catastrophic failure of the diesel tank or an entire shipping container could, without mitigation, result in a much larger release – the diesel tank has a capacity of 8,000 L, while shipping containers typically have a capacity of over 20 tonnes.
- 3.179. Emissions to air will also occur from diesel-operated combustion plant and trucks, releasing combustion by-products including NO_x, SO₂ and dust. The shredder also generates emissions of fine particulates from the material being shredded – dust emissions could also travel further when wood is shredded, since it is lighter than metal. Some dust is also generated when heavy vehicles drive around the site (especially since the site is currently unsurfaced) and may be tracked out with the vehicle when it leaves the site. Additionally, without mitigation the composter may also be a source of odour emissions.
- 3.180. There is also a risk of fire / explosion, for example during hot working, when damaged liquid fuel tanks are drilled, during the processing of LPG-powered vehicles, shredding of LPG tanks and during the removal of airbags (since airbags are pyrotechnic devices and can detonate during removal if the correct procedures are not followed). The storage of flammable substances, including wood, fuels, oils, tyres and ELV upholstery, also presents a fire risk.
- 3.181. Used firefighting water will also be generated in the event of a fire, and this may become contaminated with hazardous substances / waste being stored on site.

Identification of Migration Pathways

- 3.182. In the event of a release from the 8 m³ diesel tank due to rupture of the tank, the spill will be contained in the integrated bund; a source-pathway-receptor linkage is therefore only present in the current scenario if this bund also fails. With additional mitigation, even if the bund fails, the spill would fall on an impermeable surface, be collected in a gutter and then captured by an oil-water separator.
- 3.183. However, if a spill occurs during filling or dispensing (either in the pipework or at the dispensing point), in the current scenario, the spill could contaminate land directly and potentially also reach the groundwater through the permeable rock strata underlying the site or via rainwater runoff (although some attenuation is expected due to the depth of rock above the groundwater). With additional mitigation, the spill would fall on an impermeable surface, be collected in a gutter and then captured by an oil-water separator.

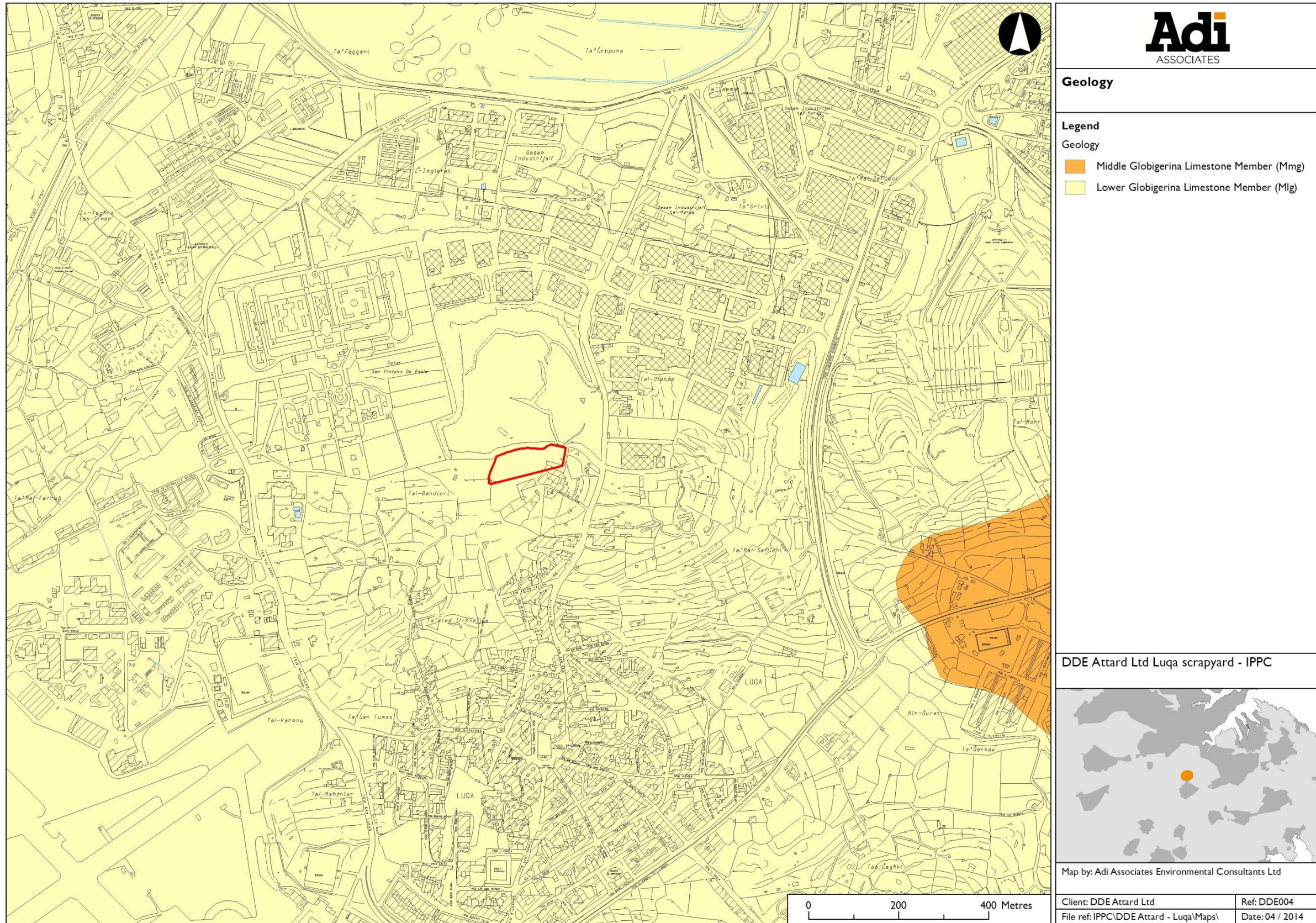
- 3.184. A diesel spill from the generator day tank would be contained in the tank's bund; if this fails the spill would fall on an impermeable surface, be collected in a gutter and then captured by an oil-water separator.
- 3.185. If there is a spill of containerised waste, hazardous liquid could escape from the joints in the shipping container or, if the container itself is damaged, from the damaged area. In the unmitigated scenario, the spill could contaminate the bedrock and could eventually also reach the groundwater through the permeable rock strata underlying the site or via rainwater runoff (although as mentioned, the bedrock would help attenuate the spill). With mitigation, the spill would fall on an impermeable surface, be collected in a gutter and, in the case of oily substances, be captured in the oil-water separator. Spills of aqueous-based waste would not be collected by the separator, but would be collected in the underground reservoir, which would need to be emptied and the contents disposed of appropriately.
- 3.186. In the current scenario, a migration pathway still exists in case of a spill of other liquid hazardous substances / waste, even if the spill occurs on the part of the site having impermeable hardstanding. In this case, the spill could travel to unsurfaced areas and contaminate land, and potentially also reach groundwater through the permeable rock strata or via rainwater runoff (although the proportion of flow to underground strata would be significantly reduced). Land contamination would also occur directly if the spill occurs in an unsurfaced area. With additional mitigation, in outdoor areas (where any spills that occur would mainly be of oily substances) the spill would fall on the impermeable surface, be collected in a gutter and then captured in the oil-water separator. Within the shed, hazardous liquid spills would be collected in dedicated containment; if this containment fails, the spill would travel to an outdoor impermeable area and still be collected by oil-water separator (or in the reservoir in case of an aqueous spill).
- 3.187. In the scenario with additional mitigation, all of the above spills can also be collected by trained site operators using spill kits. Two sets of spill kits will be available on site. The first set, a sawdust spill kit, will be stored next to the diesel tank and is intended to service any spills arising from diesel tank and leaks from vehicles, equipment and maintenance. The second set will be stored in the shed and will service any spills in the shed (including spills from the ELV depollution facility and any other hazardous waste) and spills from containerised waste. This spill kit will consist of a commercial set that includes absorbent pads and booms.
- 3.188. The pathway for air and odour emissions and the spread of a fire / explosion would be air dispersion, particularly in the prevailing wind direction. However, mitigation measures are planned to reduce air and odour emissions and to reduce the risk of fire / explosion, as summarised in **Table 3.11**.
- 3.189. In the event of a fire, in the current scenario used firefighting water can contaminate the land directly, and potentially contaminate the groundwater by travelling through the permeable land strata. In the upgraded site, a 175 m³ underground reservoir will provide firefighting water. Firefighting water demand over a period of one hour at a rate of 3,000 L/min is estimated at 180,000 L (180 m³). The used firefighting water

will all be collected in a separate 800 m³ underground reservoir.

Identification of Potential Receptors

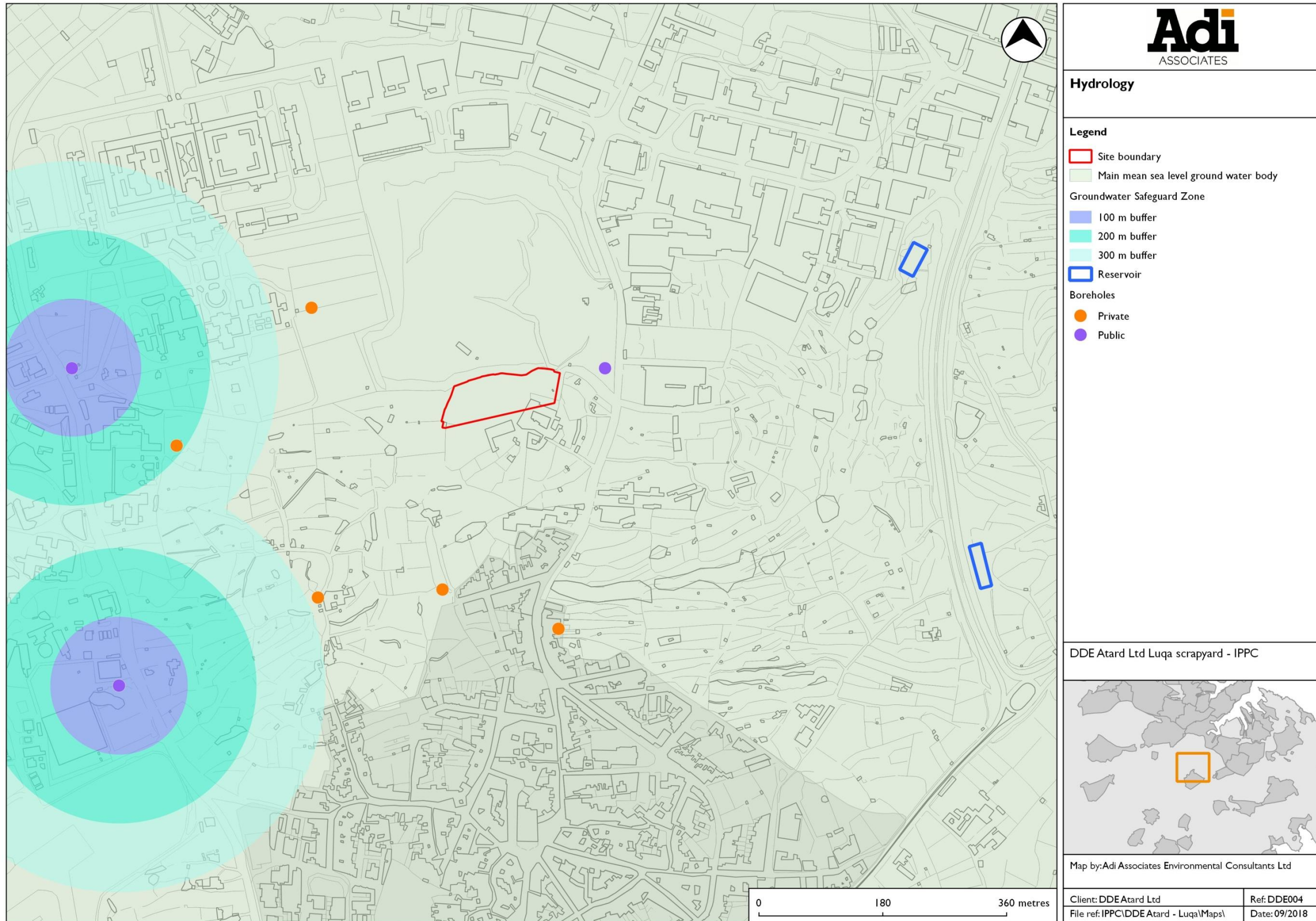
- 3.190. In the event of a spill or leak, in the current scenario the main receptor is the underlying land. The geology of the site and its immediate surroundings are as shown in **Figure 3.33**. At the Scheme site, the exposed rock formation is Lower Globigerina Limestone.
- 3.191. Contaminants could also eventually reach the groundwater in the unmitigated scenario. The mean sea level aquifer is the principal hydrogeological feature in the area (**Figure 3.34**), and the groundwater at the Scheme site is found at a depth of around 56 to 60 m below the land surface. The site is located outside the Groundwater Safeguard Zone; however, there are seven groundwater boreholes located within 600 m of the site. However, in the event of a spill, some attenuation of contaminants is expected even in the unmitigated scenario, considering that there is a considerable depth of rock before the material is able to reach the groundwater.
- 3.192. In the mitigated scenario, the pathway to the above land and groundwater receptors will be removed, thus reducing the environmental risk considerably.
- 3.193. The closest receptors sensitive to emissions to air and odours from the Scheme are the residences located approximately 220 m south of the Scheme site.
- 3.194. The receptors sensitive to the spread of a fire include the various users identified in **Figure 3.35**. The land uses immediately surrounding the Scheme site are industrial and agricultural, and include a former landfill immediately to the north of the site. The landfill is particularly susceptible to fire, and a fire from the Scheme could be significantly exacerbated if it reaches the former landfill. Additionally, the Scheme site is located around 158 m south of an LPG storage, filling and distribution facility (EasyGas (Malta) Ltd); this facility is a COMAH (control of major accident hazards) site and the Scheme site is located in the outer COMAH zone of the facility.
- 3.195. In the event of a fire, in the current scenario the relevant receptors for used firefighting water are the land and, to a lesser extent due to attenuation, the groundwater. With mitigation, the pathway to receptors is removed since used firefighting water will be collected in an underground reservoir, thus reducing the environmental risk.
- 3.196. There are no protected areas (e.g. Natura 2000 sites) in the immediate vicinity of the site that could act as receptors.

Figure 3.33: Geology



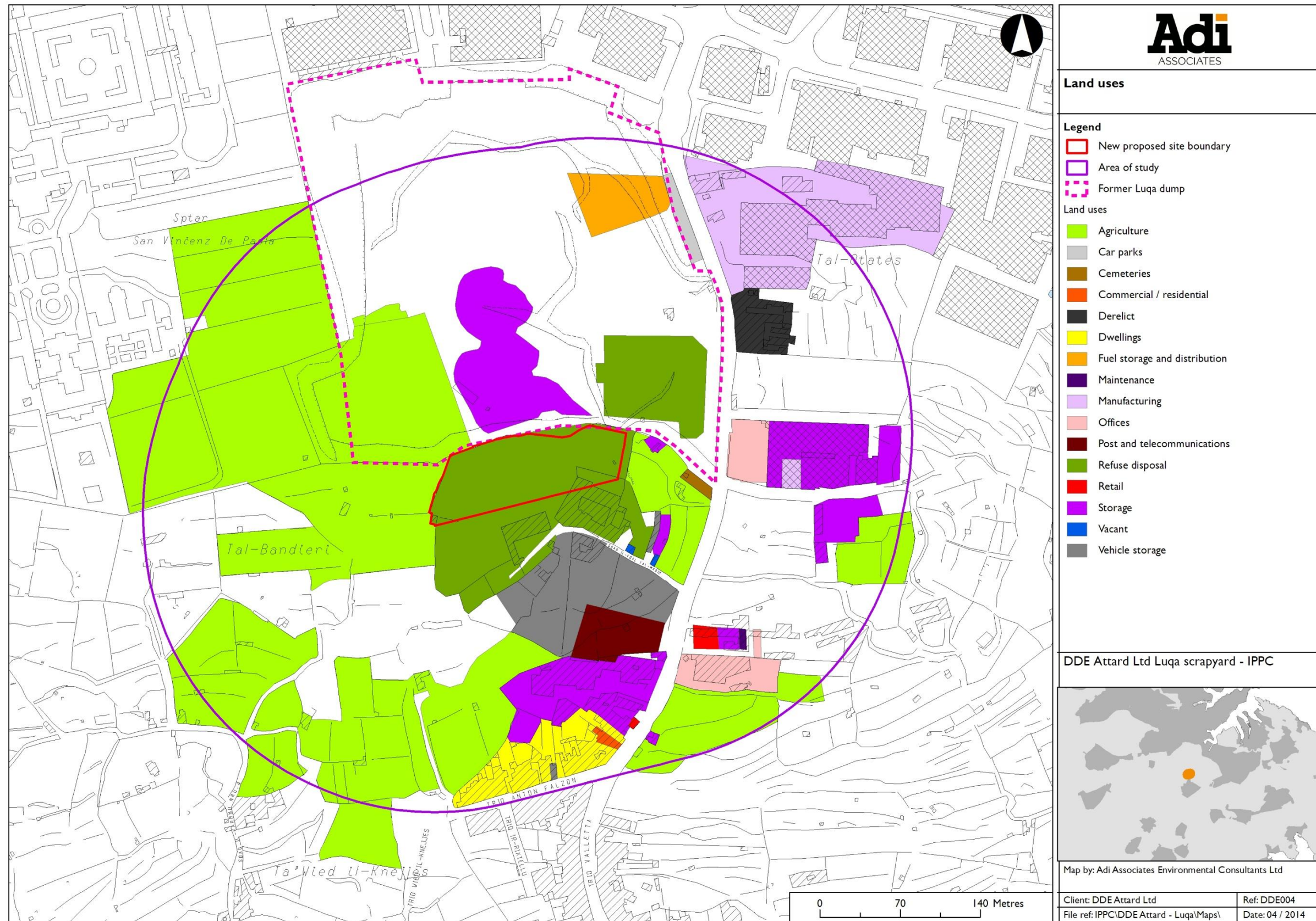
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Figure 3.34: Hydrology



INDICATIVE ONLY - Not to be used for direct interpretation

Figure 3.35: Surrounding land uses



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Risk Evaluation

- 3.197. The various risks to the environment will be assessed using the evaluation criteria described earlier.
- 3.198. The risks, associated with both the current scenario and the scenario with the additional proposed mitigation, are evaluated. It should be noted that the Scheme proposes to include all the mitigation measures described.

Current Mitigation

- 3.199. **Table 3.12** presents risk levels for each source in the current mitigation scenario, but considers the full range of activities proposed in this Application, including new activities.

Table 3.12: Risk levels (current mitigation)

Source	Environmental consequence	Likelihood of consequence	Resultant risk level
Spill from diesel tank during filling or dispensing	Minor	Likely	Moderate
Spill from diesel tank during storage (catastrophic failure of tank)	Major	Rare	Moderate
Diesel spill from generator day tank	Minor	Unlikely	Low
Spill from temporary storage of containerised waste	Moderate	Occasional	Moderate
Spills / leaks of other liquid hazardous substances / waste	Minor	Almost certain	Moderate
Air emissions from combustion, shredding and dust trackout by heavy vehicles	Minor	Almost certain	Moderate
Odour emissions from composter	Insignificant	Almost certain	Low
Fire / explosion (during operating hours)	Major	Likely	Extreme
Fire / explosion (outside operating hours)	Major	Unlikely	High
Used firefighting water	Minor	Likely	Moderate

- 3.200. A spill of diesel during filling of the tank or dispensing of vehicles, for example due to failure of the pipework or drips from the dispenser has been classified as having minor environmental consequences. This is since the operation is carried out manually, and so a spill would be detected immediately before a large quantity of fuel is released. The frequency has been classified as likely since drips are expected to

occur frequently in such circumstances.

- 3.201. The environmental consequences of a spill of the entire diesel tank contents (8,000 L) could be major; however, such consequences would require failure of both the diesel tank and its bund, therefore this scenario has been classified as rare.
- 3.202. A spill from the generator diesel day tank would only result in environmental effects if it is released outside the bund; given the small quantity stored the effect would be minor. The frequency is considered to be unlikely, since the day tank will be filled infrequently.
- 3.203. The environmental consequence of a spill from containerised waste has been classified as moderate, since while most spills would be small, it could be some time before they are detected, and there is always the possibility of a large-scale spill from catastrophic failure of the container. The likelihood is however, occasional.
- 3.204. Other spills and leaks would typically be small-scale and having a minor effect on the environment; however, minor spills almost always occur in such sites, for example drips from machinery.
- 3.205. Emissions to air are routinely expected from normal operations; however, considering the expected quantities of emissions and the distance from the residential receptors (220 m away from the Scheme) the environmental consequences are expected to be minor.
- 3.206. Odour emissions from the composter have been classified as insignificant even without mitigation, due to the small scale of the plant and because the nearest sensitive receptors are 220 m away from the Scheme boundary.
- 3.207. Two fire / explosion scenarios are being assessed – the first during operational hours and the second outside operational hours (including night-time and Sundays).
- 3.208. In the current mitigation scenario, the likelihood of a fire / explosion during operation is likely, due to the ignition sources on site (particularly hot working) and the flammable substances stored. The environmental consequences can be serious, particularly if the fire spreads to nearby sites such as the former landfill, and have therefore been classified as major. It is to be noted that the Scheme currently has minimal mitigation measures in place to prevent the occurrence and spread of a fire.
- 3.209. Outside operating hours, the likelihood of a fire / explosion is reduced to unlikely because the main ignition sources are removed; the residual risk arises mainly from severe weather conditions (such as extreme heat or a lightning strike). The environmental consequences of a fire, if it occurs, could still be major, especially because the site is not normally staffed outside operating hours, and it may be some time before the fire is discovered and tackled.
- 3.210. Used firefighting water will be generated in case of a fire, and the likelihood has therefore also been classified as likely (same as the fire / explosion risk in the operational scenario). The environmental impacts of used firefighting water are,

however, minor, since used firefighting water would mainly consist of water with the possibility of some contamination with hazardous substances.

With Proposed Additional Mitigation

3.211. **Table 3.13** presents risk levels for each source in the scenario with the additional planned mitigation measures.

Table 3.13: Risk levels with additional mitigation

Source	Environmental consequence	Likelihood of consequence	Resultant risk level
Spill from diesel tank during filling or dispensing	Insignificant	Occasional	Very low
Spill from diesel tank during storage (catastrophic failure of tank)	Minor	Rare	Low
Diesel spill from generator day tank	Insignificant	Unlikely	Very low
Spill from temporary storage of containerised waste	Insignificant	Occasional	Very low
Spills / leaks of other liquid hazardous substances / waste	Insignificant	Likely	Low
Air emissions from combustion, shredding and dust trackout by heavy vehicles	Insignificant	Almost certain	Low
Odour emissions from composter	Insignificant	Likely	Low
Fire / explosion (during operating hours)	Minor	Unlikely	Low
Fire / explosion (outside operating hours)	Moderate	Unlikely	Moderate
Used firefighting water	Insignificant	Unlikely	Very low

3.212. In the mitigated scenario, a diesel spill from the diesel tank or the generator day tank would fall on an impermeable surface and be captured by the oil-water separator, thus removing the pathway to the receptor. The environmental impact is therefore insignificant. Staff training on spill prevention should also reduce the likelihood of a spill from the diesel tank to occasional; the possibility of a spill from the generator day tank remains unlikely.

3.213. The environmental consequences of a spill of the entire diesel tank contents would be reduced significantly in the scenario with additional mitigation, since even if the spill escapes the bund, it would be collected in the oil-water separator, thus removing the pathway to the receptor. Adverse environmental consequences would only arise

if there is a failure of the tank, the bund, as well as the oil-water separator – a scenario that has been classified as rare – and even if this occurs staff training on spill control and the impermeable hardstanding on site would limit the contamination of land and groundwater to minor.

- 3.214. Similarly, the proposed mitigation measures, including impermeable hardstanding, and an oil-water separator leading to a reservoir will remove the source-pathway-receptor linkage in the case of a spill from temporary storage of containerised waste, although the likelihood would remain occasional.
- 3.215. Spills of other hazardous substances or waste would also have insignificant environmental consequences. Additionally, staff training on operational procedures and spill prevention, as well as the integrated equipment used for ELV depollution should help reduce the likelihood of such spills to likely.
- 3.216. The installation of a hardstanding surface, wetting of metals during shredding, single-stage shredding of wood, and regular maintenance of equipment and vehicles should reduce the environmental impact from air emissions to insignificant; the consequences would remain almost certain as some minimal air emissions are expected from normal operations.
- 3.217. Odour emissions from the composter would be further reduced with mitigation; therefore their impact remains insignificant, while their frequency is classified as likely (rather than almost certain) in the mitigated scenario.
- 3.218. The mitigated scenario also reduces the likelihood of a significant fire / explosion during operation to unlikely. A Fire and Explosion Prevention Plan will be in place, together with a firefighting system that includes an underground reservoir, ring main, fire hydrants and fire extinguishers throughout the site. Smoke / fire detection units will also be installed in the buildings, and these will be connected to an alarm system. Staff will also be trained on operational procedures, for example with regard to hot working, ensuring batteries are removed before depollution of the fuel tank (thus preventing a possible electrical discharge igniting the fuel), waiting for at least 30 minutes from removal of the battery before removing the airbags (to ensure the residual charge that might cause airbag detonation is lost), and removing the high-voltage electrical system and battery before depolluting electric / hybrid vehicles. Additionally, LPG vehicles will only be disassembled by trained staff following defined procedures to minimise the risk of a fire / explosion, and LPG tanks will only be shredded after having been certified to be LPG-free. The ELV depollution equipment also includes an earthed connection to minimise the risks of sparks and explosion. Fuel will also be removed by suction to avoid the release of fuel vapours (except where this is not possible due to a damaged tank). There will also be a limit on the quantity of tyres that can be kept on site. Prompt attention to a fire by trained site operators would also ensure that the fire is controlled and does not spread within and beyond the site, thus reducing the severity level to minor.
- 3.219. Outside operating hours, the likelihood of a fire / explosion will be the same as the unmitigated scenario (i.e. unlikely). However, the environmental consequences could

be moderate in the mitigated scenario, because the fire is likely to be detected sooner (by the night security guard, and the smoke / fire detection units in the buildings and shed), and therefore tackled faster. Improved site management should also help to reduce the spread of the fire.

- 3.220. The likelihood of generation of used firefighting water is therefore also classified as unlikely. Considering that used firefighting water will be collected by the underground reservoir, the environmental consequences are insignificant, since there is no pathway to receptors.

Conclusion

- 3.221. As a result of the mitigation measures, all environmental risks have been reduced from moderate to extreme to very low to moderate.
- 3.222. It will be important for the mitigation measures to be implemented, monitored and maintained to ensure their continued effectiveness and to keep risk levels as low as possible.

Fire and Explosion Prevention and Response Plan

- 3.223. This Plan describes the fire / explosion safety procedures that will be implemented at the Scheme, including the equipment to be installed. Once the Plan is fully implemented, the Scheme will engage a competent person to certify that the relevant fire safety procedures and equipment are in place.
- 3.224. This Plan will also be made available to employees, who will also be trained on fire emergency preparedness and response as described in section B2.9 of the IPPC application.
- 3.225. A fire safety report is also provided in Volume 3 of the IPPC application.

Fire and Explosion Risks

- 3.226. The Scheme includes storage of various flammable materials, such as fuel, tyres and wood, and sources of sparks (such as during hot working of metal), that could start a fire or cause an explosion.
- 3.227. In this situation, the presence of a large quantity of flammable material would also facilitate the spread of a fire.

Fire and Explosion Precautions

ELV Processing

- 3.228. Several precautions will be followed during ELV depollution and dismantling, to reduce the risk of fire / explosion. These are described below.
- 3.229. The following general precautions are applicable, in accordance with the ELV Depollution and Dismantling procedure (section B2.2.1 of the IPPC application):
- Training will be given to the employees working on vehicle depollution and dismantling;
 - Vehicles arriving at the site will be checked for any fluid leaks, including fuel;
 - The battery will be removed first;
 - Depollution will be carried out using a dedicated vehicle depollution system. Fire safety signage such as “No Smoking or Naked Lights” will be put up at this work station, and the correct fire extinguishing medium will be stored in the vicinity;
 - The vehicle will be earthed during depollution reduce further the risk of sparks or explosion;
 - Fuel will be removed by suction (except when the tank is damaged), to reduce the release of vapour;
 - Fuels and hazardous oils collected during depollution will be stored separately in labelled containers integrated within the depollution equipment; and

- Airbags will only be removed after 30 minutes have passed from battery removal.

3.230. The depollution of LPG vehicles is subject to the following additional precautions:

- Only employees certified as competent in such operations will be allowed to work on LPG vehicles;
- LPG tanks will be emptied by running the vehicle. LPG will not be vented directly to the atmosphere;
- The vehicle will be checked for any gas leaks with proper detection equipment prior to removing the battery;
- The vehicle will be stored in a separate area in the open, away from other vehicles until the LPG tank is removed. This avoids the accumulation of vapours that might occur if the LPG tank is removed in an enclosed area; and
- The empty LPG tank must be sent for cleaning before being shredded.

3.231. The following precautions are applicable to the processing of end-of-life hybrid vehicles:

- The high-voltage system must be isolated and the high-voltage battery removed before depollution commences; and
- High-voltage batteries should be stored separately and under cover, and should not be exposed to high temperatures, thus reducing the risk of fire/explosion.

3.232. It is important for core storage areas to be checked regularly to ensure that fluids are not leaking, which may cause a fire hazard.

3.233. The area where the containers will be held will be appropriately labelled and the appropriate fire signage such as “No smoking or naked lights” will be put up.

Storage

3.234. Tyres will be stored in a designated area (area 12 in **Figure 3.36**) and will not be allowed to exceed 50 tonnes at any time.

3.235. Diesel will be stored inside a dedicated and bunded 8,000 L tank. Fire fighting equipment will be stationed near this container and appropriate safety and fire preventive signage will be put up.

3.236. Batteries will be stored in plastic leak-proof containers in the covered shed, away from flammable liquids or gases.

3.237. Cylinders containing acetylene or LPG used for hot cutting will be stored vertically, using cylinder stands or other methods to secure them. Cylinder carriages / trolleys will be used to transport gas cylinders around the site.

3.238. These cylinders will be stored in a lockable cage / cabinet inside the shed (area 11 in

Figure 3.36), in order to ensure safety and reduce abuse. This storage facility will be constructed in a way that ensures that no water can accumulate at the bottom and possibly cause corrosion.

3.239. Acetylene and LPG cylinders will:

- Be kept away from direct sunlight and from other objects that could fall on them;
- Have the appropriate gas pressure regulators that have passed inspection;
- Be segregated according to their contents, and according to whether they are full or empty;
- Be stored with their valve cover, if so equipped;
- Be properly marked and labelled. A Safety Data Sheet will be available for every gas and gas mixture; and
- Moved in a controlled manner, secured to avoid accidents or damage.

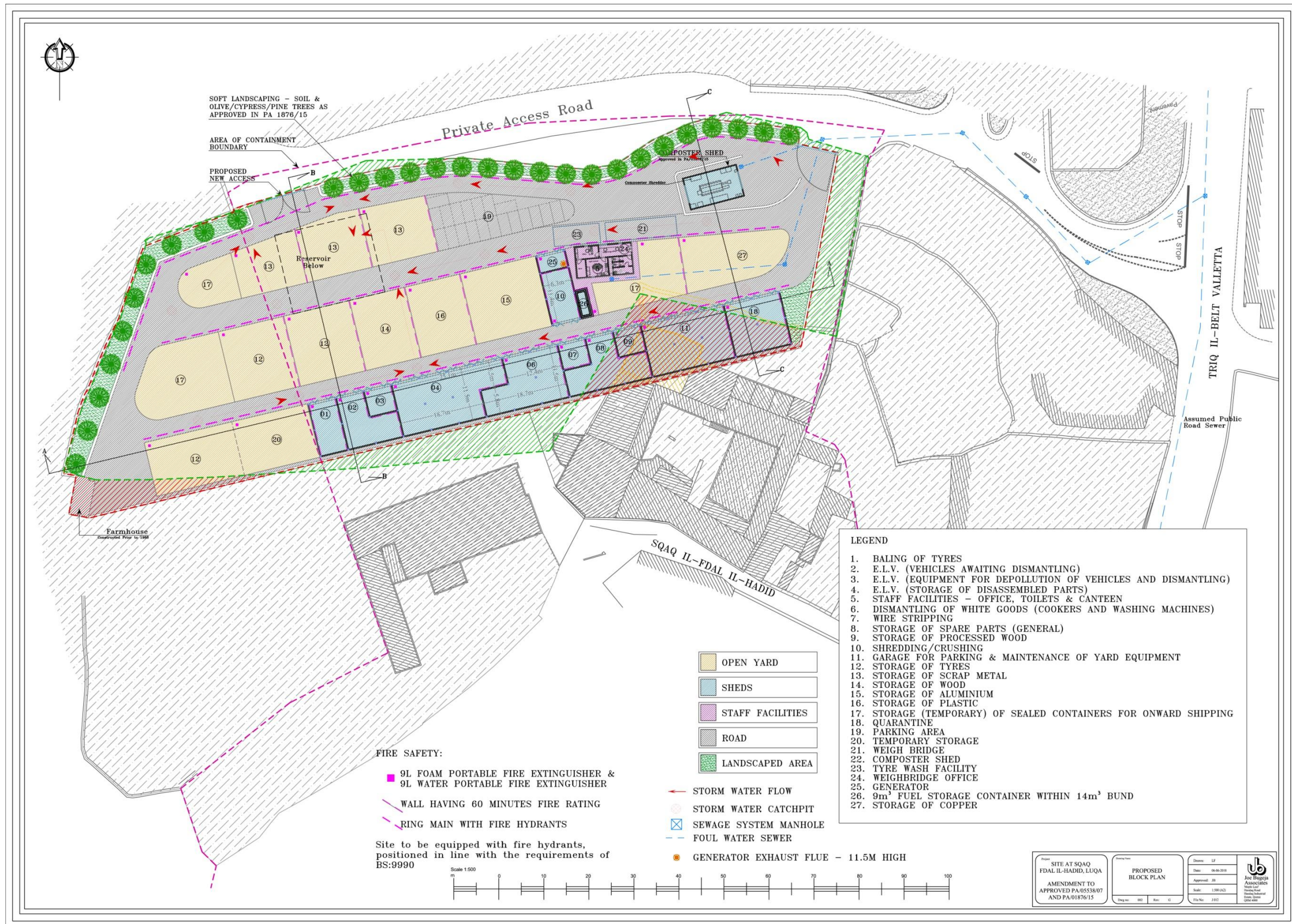
3.240. Cylinders should not be stored:

- Inside buildings;
- Near easily ignited materials such as wood, paper, oil and grease;
- Near ignition sources; or
- Near an emergency exit area.

Hot Work

3.241. A Standard Operating Procedure (SOP) will be established for hot working. Employees doing hot works will be required to follow this SOP, and to have a fire watch equipped with the correct fire extinguishing medium to assist them whilst carrying out such work.

Figure 3.36: Scheme layout



Severe Weather

- 3.242. Electrical (lightning) storms can cause a fire hazard at the Scheme site due to the presence of flammable materials on site. Severe wind storms can also damage electrical structures, in addition to being a safety hazard.
- 3.243. The Technically Competent Person (TCP) will monitor weather information (including warnings issued by the Meteorological Office), especially during wet periods, where thunderstorms or severe winds might hit the island. The Meteorological Office (tel: 5230 2021) will be contacted to check for predicted severe weather.
- 3.244. In such severe cases, the management will inform those on site through the alarm / notification system and will also prohibit any operation in the yard until the weather conditions improve or are declared safe to work in. Employees will be directed to a safe area away from metal heaps and flammable equipment until the TCP gives the all clear. The TCP will also assess whether any structure has been damaged by the storm, and ensure that appropriate actions are taken.

Signage

- 3.245. Due to the fire load that will exist within the Scheme site, the entire site will be designated as a non-smoking zone. The company will designate and label smoking zones outside the premises and inform all staff of such locations.
- 3.246. Safety signs will be located around the site, including no smoking / naked flames notices, and signs marking the location of fire hydrants and the fire extinguisher stations. Signs will also identify the type of fire that each fire extinguisher can be used for.
- 3.247. The telephone numbers of key site personnel and emergency services will be also placed at easily accessible locations on site to ensure a speedy response in case of an emergency.

Training

- 3.248. Emergency response training will be part of the Scheme's ongoing training programme and will include:
- The location of the fire fighting equipment;
 - Employee roles and responsibilities;
 - Known threats and hazards;
 - Raising the alarm, notification and communications procedures;
 - Emergency response procedure;
 - Location of assembly point;

- Location of emergency exits or shelters; and
 - Emergency shutdown procedure.
- 3.249. Specialised training will also be given to employees assigned specialised duties under this Plan, such as on coordinating the evacuation procedure, fire fighting and first aid.
- 3.250. Training will be given when:
- This Plan is initially developed;
 - When a new employee is recruited;
 - Whenever an employee is assigned a new task;
 - Whenever an employee's responsibilities or designated actions under the Plan change;
 - Whenever new equipment, material, or processes are introduced into the workplace;
 - Whenever the layout of the site is changed; and
 - Whenever this Plan is updated.
- 3.251. The TCP will also organise regular safety meetings with employees and carry out regular demonstration of general safety with employees, to ensure that employees are aware of what actions to take during emergencies.
- 3.252. Fire drills will be held at least once every six months as per Legal Notice 44 of 2002. Drills will provide essential feedback on the effectiveness of the Emergency Response Plan training and highlight areas where further training is required.
- 3.253. Records of fire drills will be maintained as part of the Health and Safety documentation, and will include the following information:
- Identity of the person conducting the drill;
 - Date and time of the drill;
 - Notification method used;
 - Number of staff members participating;
 - Number of occupants evacuated;
 - Any special conditions simulated;
 - Any problems encountered;
 - Weather conditions when occupants were evacuated; and

- Time required to accomplish the complete evacuation.

3.254. Once the Scheme is fully operational as proposed, the Civil Protection Department will be invited to carry out familiarisation visits and carry out fire drills with employees (including those having special duties under this Plan).

Responsibilities

3.255. The TCP or his representative will have overall responsibility for this Plan. His role is to:

- Develop and maintain written standard operating procedures for regular and silent hours;
- Review and update this Plan as necessary;
- Take security measures to protect the employees and the site;
- Integrate this Plan with any existing emergency plan covering the site or work area;
- Inform employees of the location of the emergency exits and evacuation routes;
- Conduct fire drills and judge the effectiveness of the Plan;
- Organise training for employees in emergency response;
- Ensure that the fire fighting equipment or any other safety equipment is maintained, that records are kept, that fire extinguishers are stored appropriately, and that water levels in the reservoir are checked weekly; and
- Ensure that the Scheme site meets Health and Safety Regulations.

3.256. During an emergency situation, the TCP (or another manager if the TCP is unavailable) is responsible to:

- Notify emergency service providers in the event of an emergency affecting the facility;
- Decide whether the emergency requires evacuation of the site, whether full or partial;
- Ensure that evacuation has commenced when initiated;
- Direct the shutdown of any machines;
- Supervise all efforts to control the fire and prevent its spread to other nearby areas, with the assistance of the emergency personnel; and
- If the emergency involves the release of a toxic agent, take the necessary safety precautions.

3.257. One employee will be designated and trained as the evacuation coordinator, with another employee having the role of substitute coordinator. They will be responsible for:

- Providing guidance and instructions during an emergency on site;
- Directing and assisting all employees and visitors during an evacuation, to ensure evacuation is carried out in a safe and orderly manner;
- Knowing the area well in order to avoid potential hazards during evacuation;
- Being aware of any employees who need extra assistance;
- Teaching and implementing the buddy system, to facilitate the identification of any employees who have not evacuated the site;
- Picking up the Log Book on the way out during evacuation;
- Carrying out a roll call at the assembly point and ensuring that all employees and visitors are accounted for;
- Issuing instructions to those at the assembly point;
- Informing first responders / emergency services whether all employees and visitors are accounted for, and of any known hazards at the site; and
- Assisting the emergency responders if asked to.

3.258. One or more employees will be trained as fire marshals. Their role is to extinguish small and controllable fires, if safe to do so, while waiting for the emergency services to arrive.

3.259. One or more employees will be trained as a first aider.

Fire and Explosion Response Procedure

3.260. In the event of a fire / explosion, the following procedure must be followed, as appropriate depending on the nature and extent of the fire / explosion:

- Raise the alarm;
- Evacuate;
- Notify the emergency services; and
- Extinguish the fire.

Raising the Alarm

3.261. The person discovering the fire / explosion must immediately:

- Alert nearby workers / visitors; and

- Notify their supervisor and management, via radios or verbally.
- 3.262. Management will decide whether to evacuate the site, activate the fire alarm, and call the emergency services, depending on the location and size of the fire.
- 3.263. Management will also determine whether the entire site or part of it should be evacuated, or whether it will be safer for the employees to remain indoors or in a safe pre-defined location.
- 3.264. The buildings and shed on site also will be equipped with smoke / fire detection units, which will be connected to an alarm system. Activation of the alarm will initiate the evacuation procedure.
- 3.265. The alarm can also be activated manually through one of a number of manual call points to be located around the site.
- 3.266. If an evacuation is initiated, management will also inform neighbouring companies of the emergency, so that they will also activate their internal emergency response plan if need be.
- 3.267. Key management personnel and important telephone numbers will be kept at the main office in order to facilitate and speed up the response. These include the site telephone number, and contact numbers for the following staff members:
- Yard supervisor;
 - Fire marshal;
 - First aider/s;
 - Evacuation coordinator;
 - Health and Safety officer; and
 - TCP contact number after office hours.
- 3.268. The site telephone number as well as the after-hours TCP contact number will also be fixed to a notice at the main gate.

Evacuation

- 3.269. The Scheme site will have two entry / exit gates, either of which can be used during an emergency evacuation. The site will also be equipped with a wind direction indicator such as a wind sock, to help the evacuation coordinator identify which emergency exit should be used.
- 3.270. The following signage will be installed to facilitate the safe evacuation of employees and visitors:
- Signs marking the evacuation route; and

- A sign marking the assembly point (shown in **Figure 3.37**) outside the premises.

3.271. When the alarm is sounded, all employees should follow these steps:

- Stop working and make all equipment or machinery they are working with safe, if possible. Critical equipment is to be shut down when possible;
- Proceed, in an orderly manner, to the nearest or available fire exit leading to the assembly point;
- Employees and site management should assist each other and ensure that all visitors or fellow workers follow them to the evacuation area;
- Before leaving their work station, employees should ensure that other workers working near them are aware of the situation;
- Before leaving their work station employees should also ensure that the area is checked and that no person is left in enclosed or confined spaces that could entrap them; and
- Once at the assembly point, employees are to wait for a roll call and further instructions from the designated evacuation coordinator.

3.272. The evacuation coordinator will carry out a roll call immediately once evacuation is complete, so as not to delay the rescue of any missing persons who might be trapped in the premises.

3.273. If any person is injured or contaminated, the Scheme's internal rescue and first aid operating procedure will be followed.

3.274. Only trained and designated fire marshals are to remain on site to tackle the fire. This is only applicable if the fire is perceived as small and controllable, and the fire marshal is not putting his / her life at risk to extinguish it. The fire marshal will attempt to extinguish the fire only if:

- The fire is small and is not spreading to other areas;
- Escaping the area is possible by backing up to the nearest exit; and
- The fire fighting system is in working condition.

3.275. If the fire is too large, the fire marshal will not attempt to extinguish it, but will evacuate the site.

Notifying Emergency Services

3.276. Emergency services will be contacted by the TCP (or one of the other managers if the TCP is unavailable). The person making the call will:

- Give clear details about the situation, including the address, the nature and location of the fire;

- Report on any casualties or persons that need to be rescued; and
- Provide details on known hazards at the Scheme, such as flammable materials.

3.277. The relevant emergency telephone numbers for use in case of a fire / explosion are:

- Emergency services: 112
- Civil Protection Department: 2393 0000
- General hospital: 2545 0000 / 2545 4030 / 2545 4184
- ERA: 2292 3500
- Police headquarters: 2122 4001 / 9

3.278. For ease of reference, these emergency telephone numbers will be placed at call points, notice boards or in other locations where deemed necessary.

3.279. Emergency services will be notified even if the emergency can be contained by the Scheme's trained personnel.

Fire Fighting

3.280. When emergency respondents arrive at the site, the evacuation coordinator will inform them of any known hazards at the site, such as the location of flammable liquids, metals, fuel, oil and pressurised gas cylinders. The evacuation coordinator will also inform respondents of any missing or injured persons.

3.281. The Scheme site will be equipped with a number of portable fire extinguishers (water and foam) placed in stations at various locations around the site, depending on the type of fire load, and indicated by proper signage (**Figure 3.38**).

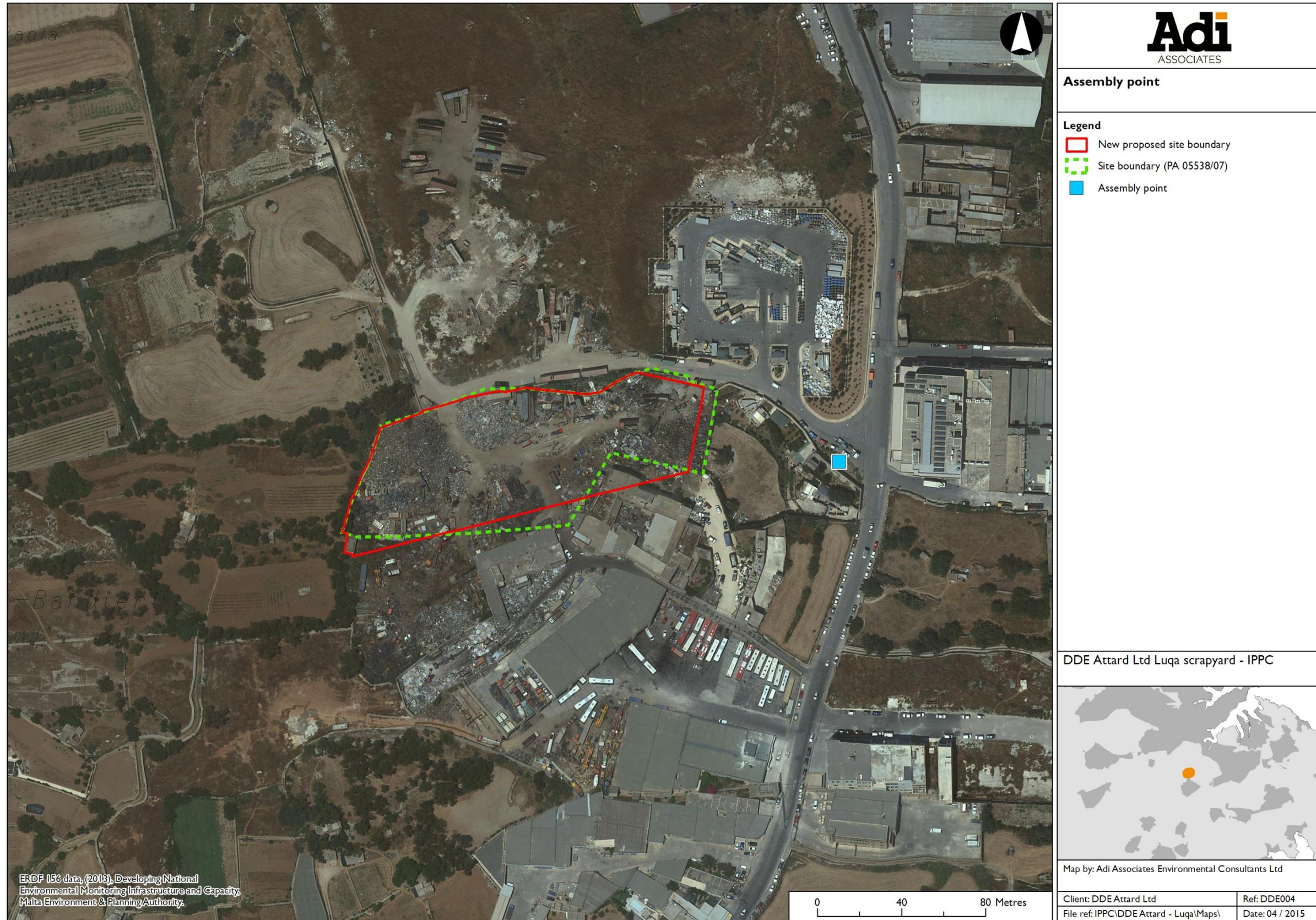
3.282. A dedicated firefighting reservoir with a capacity for 175 m³ of water will be constructed. A fire pump will be connected to this reservoir, located away from any fire hazards and feeding into a ring main (**Figure 3.39**) that will be constructed around the site. The ring main will have strategically located double headed fire hydrant outlets conforming to CPD connections. The fire pump will be capable of delivering 3,000 L per minute at a pressure of 8 bar.

3.283. The reservoir will hold not less than 175,000 L of water for use by the CPD. It will be filled by bowser and kept full for emergency purposes.

3.284. All roads inside the DDE Attard premises will be wide enough for CPD vehicles to navigate and operate from.

3.285. The site's wind direction indicator will also help respondents identify the best direction from which to tackle a fire.

Figure 3.37: Assembly point



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Figure 3.38: Location of fire-fighting equipment

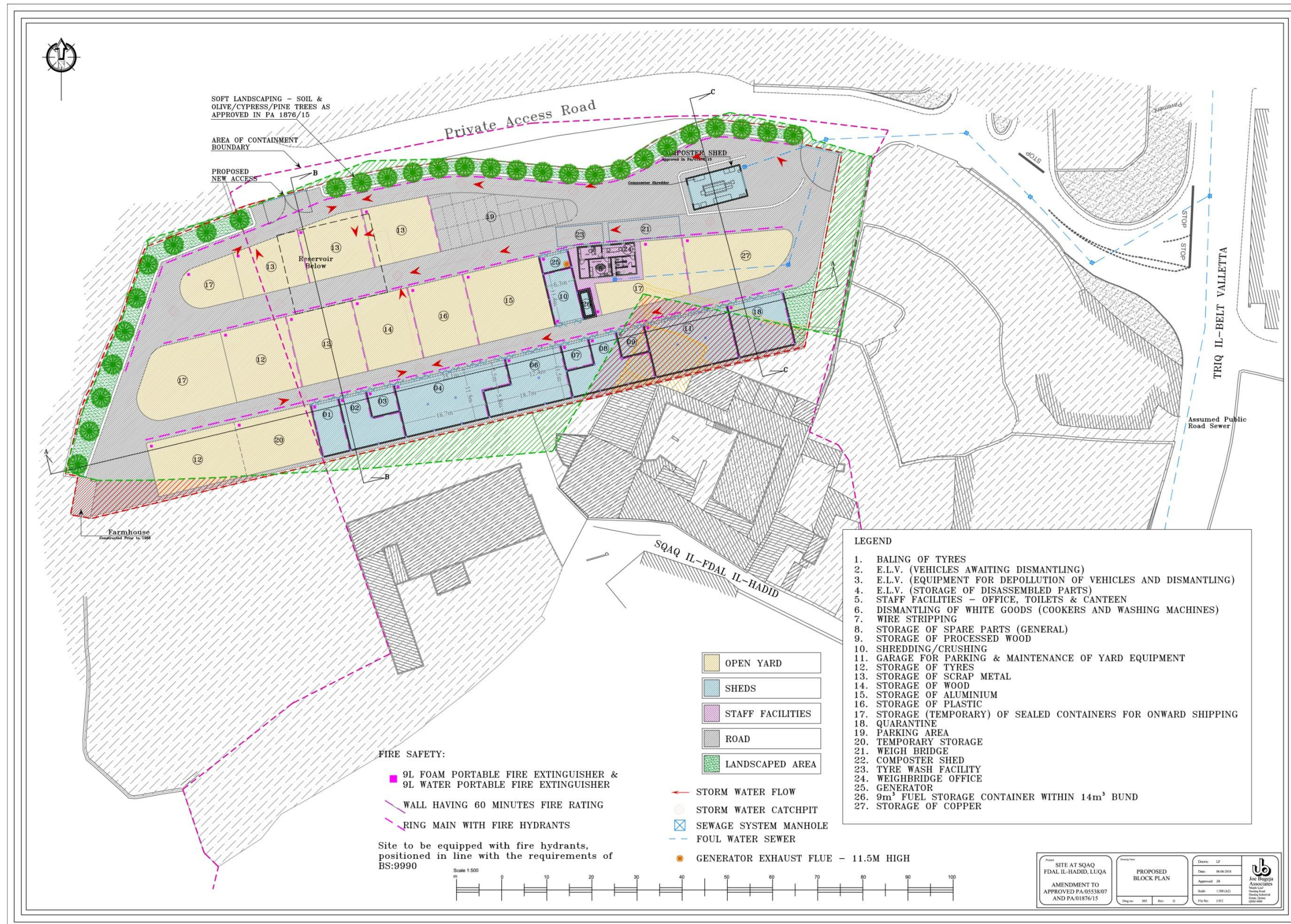
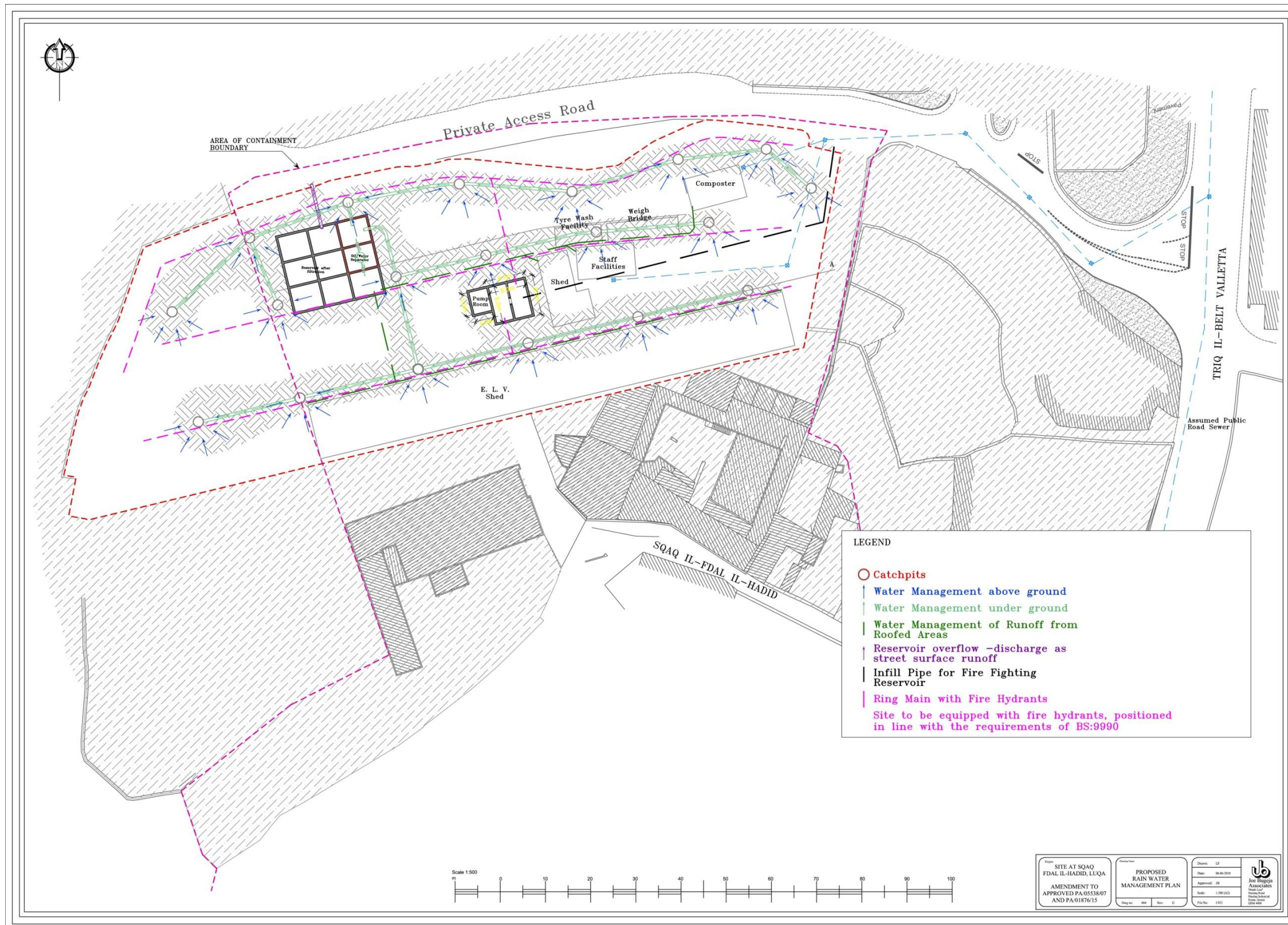


Figure 3.39: Ring main connections to firefighting reservoir



(The ring main and its connections to the firefighting reservoir are shown in pink in the above drawing).

Incident Follow-Up

- 3.286. After an incident, the TCP will be responsible for identifying the cause of the incident, taking actions to prevent a recurrence, and reviewing and updating this Plan as deemed necessary.
- 3.287. ERA will be informed of any updates to this Plan, and of any significant fire / explosions that occur on site.
- 3.288. Equipment used (e.g. fire extinguishers) is to be serviced as soon as possible after the incident.
- 3.289. In the event of a major fire, the TCP is also responsible for ensuring that the clean-up and restoration process are to the satisfaction of ERA and that they are sufficient to ensure that the health and safety of the employees is not jeopardised.

Spill Prevention and Response Plan

Spill Risks

- 3.290. Various liquid hazardous substances and wastes are stored and used at DDE Attard Ltd. Examples include:
- Diesel stored in the diesel tank and the generator day tank;
 - Containerised liquid waste; and
 - Waste generated from vehicle depollution, such as oils, coolants, and batteries containing acid.
- 3.291. Spillages may arise from accidental damage / wear and tear of a container or pipework, tipping over of a container, or due to poor operational practices (such as careless dispensing of fuel, or storage of hazardous materials outside designated areas). Leaks may also arise from the equipment and vehicles used on site.
- 3.292. If hazardous materials / waste are spilled, without proper safeguards they can contaminate the land and groundwater in the surroundings.

Spill Precautions

- 3.293. The site at DDE Attard Ltd is being upgraded with the installation of an impermeable surface, a system of gutters in the outside areas, and oil-water interceptors to collect oily spills; an engineer's report on the interceptors is included in Volume 3. Any water-based spills are collected in the reservoir.
- 3.294. Additionally, the diesel tank and the generator day tank include integrated containment, and the depollution equipment includes containers built into the system to collect the fluids removed from the ELV, and includes underlying containment.
- 3.295. The following procedural precautions should also be followed to minimise the risk of a spill:

- Store all other liquid hazardous substances and waste indoors (in a contained area or using temporary containment), in labelled and closed containers;
- Use drip trays when dispensing fuel or filling up the diesel tank;
- Inspect containers / drums containing liquid hazardous substances / waste according to the maintenance schedule, and repair / repackage as necessary;
- Inspect the site surfacing according to the maintenance programme and carry out repairs as required; and
- Inspect the gutters, silt trap and interceptor according to the maintenance programme and clean up as necessary.

3.296. Any minor drips, for example from vehicles, are to be seen to quickly before they increase.

3.297. Staff will also receive training on spill prevention and response to minimise the likelihood of a spill, and the environmental consequences of a spill if it occurs.

Spill Kits

3.298. Two sets of spill kits are available on site:

- A sawdust spill kit is stored next to the diesel tank and is intended to service any spills arising from diesel tank and leaks from vehicles, equipment and maintenance; and
- A commercial spill kit that includes absorbent pads and booms is stored in the shed and is aimed at servicing any spills in the shed (including spills from the ELV depollution facility, and spills of hazardous wastes) and spills from containerised waste.

Spill Response Procedure

3.299. In the event of a spill being detected, the following procedure must be followed. This is based on the 3C programme, i.e.:

- Control the spill;
- Contain the spill; and
- Clean up the spill.

Control the Spill

3.300. Attempt to identify the nature (e.g. fuel, coolant) and source of the spill (e.g. a damaged drum, a container that has tipped over).

3.301. If you can identify the source of the spill and can control the flow of the material being spilled, do so quickly (e.g. put a drip tray beneath the container). The aim of this step is to stop any further release of the substance.

Contain the Spill

- 3.302. The aim of this step is to avoid the further spread of spilled material.
- 3.303. For spills of diesel, or leaks from vehicles and equipment, the sawdust spill kit is to be used. First place the sawdust around the spill and then place sawdust on top of the spill, allowing it to absorb the spill material.
- 3.304. For spills in the shed and from containerised waste, absorbent pads and booms are to be used. Use the socks to contain the spill, by placing one or more socks around the spill as necessary. Then place the absorbent pads on top of the spill to absorb it.

Clean up the Spill

- 3.305. Collect and place the used sawdust / absorbent pads in a heavy-duty plastic disposal bag, and close the bag. Ensure no visible residue is left on the ground.
- 3.306. Once you are certain the source is no longer leaking, collect and place the used socks into a separate plastic disposal bag, and close the bag.

After the Spill

- 3.307. The used absorbent pads / sawdust are to be considered hazardous waste (EWC 15 02 02*) and disposed of at a facility licensed to receive such waste (such as the Marsa Thermal Treatment Facility or Waste Oils Co. Ltd). The consignment note procedure for transfer of hazardous waste is to be followed.
- 3.308. If the socks are heavily contaminated they are also to be disposed of as hazardous waste.
- 3.309. Any use of spill kit contents is to be reported to the office administrator, who will make arrangements for purchasing material to replenish the spill kit as necessary, in consultation with the Managing Director.
- 3.310. The oil-water separators are to be inspected following any large oily spill that reaches the separator, to establish whether they need to be emptied. The underground reservoir will be emptied following any large water-based spill that reaches the reservoir.
- 3.311. All spills will be recorded in the site diary. Significant spills will also be reported to ERA.

B2.9 TRAINING

- 3.312. The ToR regarding training in the IPPC application form are as follows:

Please submit a proposal for a training programme and a proposed template for keeping training records. Please submit the name of the technically competent person on site who will be responsible for such training.

- 3.313. A training needs analysis will be carried out to identify the type of training needed by personnel whose jobs may have an impact on the environment. An outline

environmental training programme is included in **Table 3.14**.

Table 3.14: Environmental training programme

Topic	Trainees	Training method
Environmental Management System	All employees	Interactive presentation
Relevant aspects of the environmental / IPPC permit	All employees	Interactive presentation
Differences between hazardous and non-hazardous substances and waste	All employees	Interactive presentation
Fire emergency preparedness and response	All employees	Interactive presentation and practical demonstration on operating fire extinguishers
Use of the quarantine area	All employees	Interactive presentation
Documentation and record-keeping; checking of permit-related documents (e.g. registration for waste carriers)	Administrative staff	Interactive presentation
Spill prevention and response, including dispensing of fuel, storage of hazardous items, use of spill kits	Operators	Practical demonstration
Operation and maintenance of the composter	Operators	Practical training provided by the equipment manufacturer during testing and commissioning; Operation and maintenance manual provided by the manufacturer

3.314. The above training programme is designed to ensure that every employee is aware of:

- The Environmental Policy and Environmental Management Programme;
- The environmental benefits resulting from conforming with the Environmental Policy, EMS requirements, and site procedures;
- Their responsibilities with regard to compliance with the EMS and the relevant aspects of the environmental / IPPC permit;
- The procedures that apply to their work, including potential environmental impacts from site activities;
- The action to be taken in case of an emergency, including an environmental incident; and
- The potential consequences of environmental damage caused by nonconformity.

3.315. Training will be delivered to existing employees following the issue of the IPPC permit as part of the targets set in the Environmental Management Programme. New employees will receive training within two weeks of starting their employment with DDE Attard Ltd.

3.316. Training will be delivered by an external service provider. The Civil Protection

Department will also be invited to carry out fire drills with employees.

3.317. This training will be documented. A template for keeping training records is included in **Table 3.15**.

3.318. Formal training will be supplemented by informal training to operators as needed regarding the practical aspects of operation (such as operating machinery), since site operators are typically skilled labourers with few academic qualifications. Such practical training will be given by the Managing Director or a delegate. Employees will also be supervised as appropriate until management is confident that the employee has the relevant skills to work without supervision.

3.319. Retraining will occur in the event of a nonconformity identified by the Managing Director or by ERA’s environmental inspectors. Additionally, all staff will receive refresher training annually on the environmental topics that are relevant to their work.

Table 3.15: Training records template

Topic			
Trainer name			
Date	Employee name	Employee signature	Trainer signature

3.320. Employees carrying out certain specialised tasks will also receive additional training, as follows; copies of certificates will be kept with the employee training records:

- Staff involved in disassembling LPG vehicles will undertake a training course given by a Regulator for Energy and Water Services (REWS)-approved institution on autogas installation, and will apply for REWS authorisation to be recognised as competent installers for autogas driven vehicles;
- If required, operators carrying out degassing of airconditioning units containing F-gases will follow a local training course that meets the requirements of EU Regulation 517/2014.

B2.10 CESSATION

3.321. The former MEPA's ToR in respect of cessation were:

Submit an outline decommissioning plan describing the draft proposed measures upon definitive cessation of activities, to avoid any pollution risk and return the site of the installation to a satisfactory state (including relevant measures for the design and construction of the installation).

This plan shall include:

- *A qualitative assessment of the potential for contamination of land and groundwater pollution which might arise from the historical and current processes carried out at the installation.*
- *A draft waste management strategy including:*
 - *The identification and characterisation of sources, types of wastes (including equipment, tanks, fuels and by-products);*
 - *Criteria for segregation of wastes;*
 - *Proposed treatment, conditioning, transport, storage and disposal/recovery methods;*
 - *Potential reuse/recycling of such wastes.*

3.322. The potential for land and groundwater contamination from historical and current activities has been presented in section B1.4 of this Application, which includes a baseline report assessing the state of the land on site that has also been submitted. The baseline report also concludes that the risk to groundwater from historical and current activities is significantly reduced, considering that substantial attenuation in contaminant concentrations is observed from 0 to 2 m and that the groundwater at the Scheme site is found at a depth of around 56 to 60 m below the land surface.

3.323. A risk assessment is also presented in section B2.8 of this Application. The risk assessment concludes that, with the proposed mitigation measures, the risks to land and groundwater are low and very low. As mentioned, this risk level is contingent on mitigation systems, including impermeable surfacing, site containment and oil-water interceptors, being implemented, inspected and maintained to ensure their continued effectiveness.

3.324. The following activities will be carried out upon cessation of activities:

- Preparation of a Waste Management Plan; and
- Land monitoring and, if relevant, groundwater monitoring.

- 3.325. The Waste Management Plan will identify the types and approximate quantities of wastes on site at the decommissioning stage. These are likely to include the various wastes accepted and generated by the Scheme (described in section B2.2.1, B2.2.3 and B3.1), machinery and vehicles (described in section B2.6) and raw materials (as described in section B2.3).
- 3.326. Since the Scheme is a waste management facility, existing site procedures will be used to process any remaining wastes on site and deliver them to authorised facilities via licensed waste carriers – waste will be delivered for recovery as far as possible.
- 3.327. The state of machinery and vehicles used on site will be assessed. Depending on their condition, they will either be either sold as second-hand equipment, or else depolluted, dismantled and the metal shredded / pressed to be sold as scrap metal.
- 3.328. Any unused fuel will be returned to the supplier. Other raw materials will either be returned to the supplier or disposed of / recycled at an appropriate licensed facility.
- 3.329. The silt trap and oil-water interceptor will also be cleaned out and the sludge delivered to an authorised facility.
- 3.330. After the site has been cleared, monitoring of land will take place using a method consistent with the baseline monitoring, to ensure comparability of the results. A Method Statement will be submitted to ERA for consideration before the start of monitoring works. The monitoring strategy will also take into account any environmentally relevant incidents that may have occurred since the baseline monitoring was carried out. The results will then be assessed against the baseline data, to determine whether the Scheme caused significant pollution. If this is the case, the operator will take any practicable measures to return the site to the state identified in the baseline report, in consultation with ERA. Groundwater monitoring may also be required, depending on the results of the land monitoring.

4. EMISSIONS

B3.1 WASTE

4.1. The former MEPA's ToR regarding waste were:

B3.1.1: *Characterise (using the European Waste Catalogue code, in accordance with LN 184 of 2011 as amended) and quantify each waste stream from the installation. (For installations carrying out waste management activities (activities listed in "Section 5: Waste management" of Annex I of the Industrial Emissions Directive), please use this section to document both incoming and outgoing waste.)*

B3.1.2: *Describe the proposed measures for waste management, storage and handling. Indicate the storage location of wastes on a site layout plan and give details on:*

- *Maximum storage capacity;*
- *Containment measures (including bunding capacity, where applicable);*
- *Protective measures (including security).*

B3.1.3: *Describe how each waste stream is, in order of priority and in accordance with Directive 2008/98/EC, prepared for re use, recycled, recovered or disposed of. If you propose any disposal, explain why recovery is technically and economically impossible and describe the measures planned to avoid or reduce any impact on the environment.*

Give details on authorised disposal/recovery facilities proposed to be used for each waste. If any on-site recovery of waste is proposed, provide details.

For each waste, give details on off-site transportation, including registered waste carriers/brokers to be used.

4.2. Since the Scheme is a waste management facility, both incoming and outgoing waste will be described in this section.

Incoming Waste

4.3. **Table 4.1** identifies the incoming waste and the treatment applied on site. Further details regarding how the various waste types will be treated are included in section B2.2.1 of the Application.

Table 4.1: Incoming waste

Description	EWC code	H-code	Estimated annual quantity	Treatment on site
<i>ELVs and their components:</i>				
End-of-life vehicles	16 01 04*	H5	4,800 t	Depolluted and dismantled; vehicle frame is shredded, tyres and bumpers are baled.
Tyres	16 01 03	-	1,000 t	Dismantled, sheared, baled; wheel rim shredded / pressed
<i>WEEE:</i>				
Washing machines	16 02 13* 20 01 35*	H5	300 t	Electronics and concrete block removed, remaining carcass shredded
Cookers	16 02 13* 16 02 14 20 01 35* 20 01 36	H5	7,500 t	Electronics removed, remaining carcass shredded
Water meters	16 02 14 20 01 36	-	<10 t	Shredding / pressing
<i>Metals:</i>				
Scrap metal	02 01 10 15 01 04 16 01 17 16 01 18 17 04 01 17 04 02 17 04 03 17 04 04 17 04 05 17 04 06 17 04 07 19 12 02 19 12 03 20 01 40	-	750 t	Shearing, shredding / pressing

Description	EWC code	H-code	Estimated annual quantity	Treatment on site
<i>Cable wires:</i>				
Cables (non-hazardous)	17 04 11	-	200 t	Stripped using an electrical cable stripper
<i>Wood:</i>				
Wood	03 01 05 15 01 03 17 02 01 19 12 07 20 01 38	-	2,000 t	Shredded
<i>Containerised waste:</i>				
Various waste types depending on the contract	All EWC codes except the following: <ul style="list-style-type: none"> • 02 01 02, 02 02 02: Animal-tissue waste • 16 04 01*, 16 04 02*, 16 04 03*: Waste explosives • 18 01 02: Body parts and organs including blood bags and blood preserves • 20 03 01: Mixed municipal waste 	Depending on waste type	600 t	None. Temporary storage in sealed containers prior to export.
<i>Composting:</i>				
Food waste	02 03 04 02 06 01 20 02 01	-	100 t	Composting
Tree prunings, paper, cardboard	02 01 03 02 01 07 20 02 01 15 01 01 19 12 01 20 01 01	-	Variable	Shredded and used in composting

Waste Acceptance Procedures

- 4.4. Waste will be delivered to the site using waste carriers registered for that type of waste. The operator already has a number of vehicles authorised to transport waste, including those listed in **Table 4.2**; however, waste may also be received from other facilities / brokers using their own registered waste carriers.

Table 4.2: DDE Attard Ltd registered waste carriers²⁸

Registration number	Vehicle number plate	Waste class	Waste description
GBR/00554/08	BAD 617	A4	Separated waste (including non-hazardous packaging waste)
GBR/01334/11	DDE 003	A4	
GBR/01344/11	EAE 627	A4	
GBR/01339/11	KBD 876	A4	
GBR/01330/11	DDE 003	A5	Other class A (non-hazardous) waste
GBR/01332/11	EAE 627	A5	
GBR/01333/11	KBD 876	A5	
GBR/01338/11	KBD 876	D1	Liquid waste
GBR/01337/11	KBD 876	D2	WEEE, including white goods
GBR/00329/08	BAD 617	D3	Other hazardous waste
GBR/01331/11	KBD 876	D3	

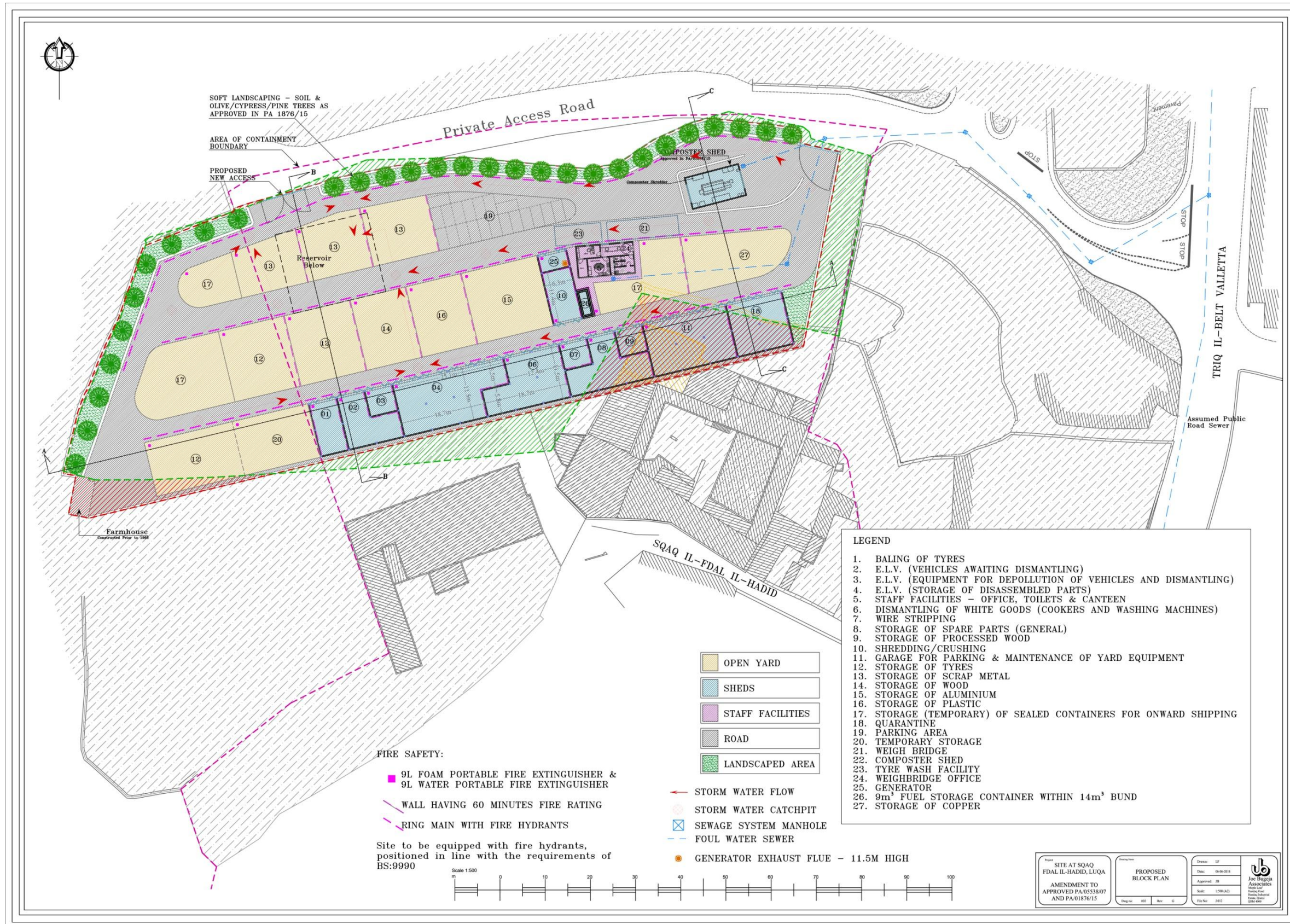
- 4.5. All hazardous waste transferred to and from the site will be accompanied by a valid hazardous waste consignment permit issued by ERA. Each consignment under the consignment permit will also be accompanied by a consignment note.
- 4.6. Relevant permits will be inspected at the weighbridge reception facility, and trucks will be weighed upon entry and exit at the weighbridge (area 21 in **Figure 4.1**) to ensure accurate records are kept.
- 4.7. In the event of any waste appearing not to fall within the list of authorised waste after the truck has been unloaded, such waste will be placed in the quarantine area and removed from the site to an authorised facility as soon as practicable. The quarantine area (area 18 in **Figure 4.1**) will be in the covered shed; liquid hazardous wastes will be bunded.

Waste Storage

- 4.8. Incoming waste will be stored in designated areas, as shown in **Figure 4.1**. Designated areas have also been identified for the waste generated after processing.

²⁸ Data is correct as at 6th November 2014 and is subject to change from time to time.

Figure 4.1: Scheme layout



- 4.9. The entire site will include an impermeable hardstanding and containment (including oil-water interceptors). However, as an additional precaution and to help protect waste from the elements, ELVs awaiting dismantling, hazardous liquids and components from ELVs, WEEE (including hazardous dismantled WEEE) and wires will be stored in the covered shed. Waste from maintenance of on-site machinery and sludge from the separator will also be stored in the shed prior to removal. Provision will also be made for temporary containment of liquid hazardous materials / waste (e.g. drip trays and similar). Shipping containers awaiting export (and which may contain hazardous waste) will remain sealed while on site.
- 4.10. The maximum quantities of each wastes stored will not exceed the site's capacity, and wastes will be removed as frequently as necessary to ensure the quantities on site remain within the site's capacity. Additionally, the quantity of tyres stored at any time will not exceed 50 tonnes to reduce fire risk. Food waste will also only be accepted if treatment can start within 48 hours.

Outgoing Waste

- 4.11. **Table 4.3** lists the various waste streams arising from the processing of incoming waste, maintenance of vehicles, mitigation measures and administration facilities. The receiving facility has been identified where this information is available, although other alternative licensed facilities may be used as the need arises. Different licensed facilities are used when a waste stream is exported, depending on the receiving facility's availability and commercial considerations.
- 4.12. As shown in **Table 4.3**, over 80% of the incoming waste is reused, recycled or recovered. Disposal is only used when it is the only practicable option.
- 4.13. All hazardous waste transferred from the site will accompanied by a valid hazardous waste consignment permit issued by ERA. Each consignment under the consignment permit will also be accompanied by a consignment note.
- 4.14. Exports of waste will be in accordance with Regulation (EC) 1013/2006 on shipments of waste. In general, shipments of non-hazardous waste will follow the Annex VII procedure, and hazardous waste shipments will be covered by a transfrontier shipment permit from ERA.
- 4.15. Waste will also be removed from site using waste carriers registered for that type of waste, or collected by authorised waste brokers.
- 4.16. The quantity of each type of waste removed from site will be measured using the site's weighbridge and recorded.

Table 4.3: Outgoing waste

Description	EWC code	H-code	Estimated annual quantity	Destination	Fate
<i>ELV depollution and dismantling:²⁹</i>					
Lead acid batteries	16 06 01*	H5, H8, H14	7.2 t	Metalco Ltd	Recovery
Metal from LPG tanks	19 10 01 19 12 02	-	<100 kg	Exported	Recycling
Iron and steel waste (including from tyres received separately)	19 10 01 19 12 02	-	3,706 t	Exported	Recycling
Non-ferrous metals	19 10 02 19 12 03	-	573 t	Exported	Recycling
Tyres (including tyres received separately)	16 01 03 19 12 04	-	425 t	Green Skip Services Ltd	Recycling
High-voltage electrical system	16 02 14	-	<20 kg	Local WEEE treatment facility (e.g. Metalco)	Recycling
High-voltage battery	16 06 05	-	<20 kg	Local WEEE treatment facility (e.g. Metalco)	Recycling
Engine oils	13 02 04* 13 02 05* 13 02 06*	H5/6, H7, H14	19,200 L	Waste Oils Co. Ltd	Recovery
Oil filters	16 01 07*	H5, H14	2.4 t	Waste Oils Co. Ltd	Recovery
Transmission oils	13 03 07* 13 03 08* 13 03 09*	H5/6, H7, H14	14,400 L	Marsa Thermal Treatment Facility	Disposal (incineration)
Antifreeze	16 01 14* 16 01 15	H5/6, H14 -	33,600 L	Marsa Thermal Treatment Facility	Disposal (incineration)
Brake fluids	16 01 13*	H5/6, H14	3,360 L	Marsa Thermal Treatment Facility	Disposal (incineration)

²⁹ A description of how recovery / reuse rates will be improved for end-of-life vehicles, including updated figures, is included in **Volume 3**.

Description	EWC code	H-code	Estimated annual quantity	Destination	Fate
Other hydraulic oils	13 01 10* 13 01 11*	H5/6, H14	9,600 L	Waste Oils Co. Ltd	Recovery
Screen washing fluid	16 10 01*	H5/6, H14	14,400 L	Marsa Thermal Treatment Facility	Disposal (incineration)
Diesel	13 07 01*	H3, H5/6, H7, H14	12,000 L	Site vehicles / machinery	Reuse
Petrol	13 07 02*	H3, H5/6, H7, H14	12,000 L	Directors' private vehicles	Reuse
Catalyst units	16 08 01 16 08 02* 16 08 03	H5, H14	4.8 t	Exported	Metal recovery
Refrigerants	14 06 01*	H3, H5, H14	14,000 L	Exported	Recovery / destruction of refrigerants
Brake pads	16 01 11* 16 01 12	H5, H7 -	800 kg	Exported	Disposal
Mercury switches	16 01 08*	H6, H14	<20 kg	Exported	Recovery / disposal
Airbags	16 01 10*	H1	9.6 t	Exported	Deployment (disposal)
Plastic bumpers	19 12 04	-	100 t	Green Skip Services Ltd	Recycling
Shredder residues	19 12 12	-	787 t	Ghallis non-hazardous landfill	Disposal
Discarded electronics	16 02 13* 16 02 14	H5, H14 -	20 t	Local WEEE treatment facility (e.g. Metalco)	Recycling
<i>WEEE treatment:</i>					
Iron and steel waste	19 10 01 19 12 02	-	7,707 t	Exported	Recycling
Electronic parts	16 02 15* 16 02 16	H5, H14 -	2 t	Local WEEE treatment facility (e.g. Metalco)	Recycling
Concrete	17 01 01	-	55 t	Inert landfill	Recovery (backfilling)
Shredder residues	19 12 12	-	46	Ghallis non-hazardous landfill	Disposal
<i>Metal processing</i>					

Description	EWC code	H-code	Estimated annual quantity	Destination	Fate
Ferrous metals (shredded / pressed)	19 10 01 19 12 02	-	250 t	Exported	Recycling
Non-ferrous metals (shredded / pressed)	19 10 02 19 12 03	-	500 t	Exported	Recycling
<i>Wire stripping:</i>					
Plastic casing	19 12 04	-	90 t	Green Skip Services Ltd	Recycling
Copper wire	17 04 01	-	110 t	Exported	Recycling
<i>Wood processing:</i>					
Shredded wood	19 12 07	-	2,000 t	Ta' Żwejra or Għallis non-hazardous engineered waste facility	Disposal
<i>Containerised waste:</i>					
Various waste types depending on the contract	All EWC codes except the following: • 02 01 02, 02 02 02: Animal-tissue waste • 16 04 01*, 16 04 02*, 16 04 03*: Waste explosives • 18 01 02: Body parts and organs including blood bags and blood preserves • 20 03 01: Mixed municipal waste	Depending on waste type	600 t	Licensed facility appropriate to the waste type.	Recovery / disposal depending on waste type and receiving facility
<i>Composting:</i>					
Rejects	19 12 05	-	3 t	Green Skip Services Ltd	Recycling
Condensate	19 05 99	-	<60 m ³	Discharged to sewer	Disposal
<i>Waste from maintenance of on-site machinery:</i>					
Absorbent pads	15 02 02*	H3, H5, H7, H14	100 kg	Waste Oils Co. Ltd	Recovery
Vehicle components	As per the above list of ELV components	As above	<10 t	As above	As above

Description	EWC code	H-code	Estimated annual quantity	Destination	Fate
<i>Waste from separator:</i>					
Sludge from oil-water separator	13 05 07*	H3, H5/6, H7, H14	<100 L	Waste Oils Co. Ltd	Recovery
<i>Office waste:</i>					
Mixed municipal waste	20 03 01	-	2 t	Għallis non-hazardous landfill	Disposal
Paper	20 01 01	-	600 kg	Sant' Antnin Waste Treatment Plant	Recycling
Plastic	20 01 39	-	300 kg	Sant' Antnin Waste Treatment Plant	Recycling

4.17. Waste is considered to have reached end-of-waste status if a number of criteria are met. Legal Notice 184 of 2011 states that:

6. (1) Waste shall cease to be waste within the meaning of regulation 4 when it has undergone a recovery, including recycling, operation and complies with the following conditions:

(a) the substance or object is commonly used for specific purposes;

(b) a market or demand exists for such a substance or object;

(c) the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products;

(d) the use of the substance or object will not lead to overall adverse environmental or human health impacts; and

(e) the substance or object shall be accompanied by a declaration as set out in Schedule 10.

4.18. With regard to compost, the Applicant has applied with ERA to consider compost as having reached end-of-waste status under Schedule 10 of Legal Notice 184 of 2011; a copy of the application is included in Volume 3.

B3.3 EMISSIONS TO SEWER

4.19. The former MEPA's ToR regarding emissions to sewer were:

B3.3.1: *Does the installation have (or is proposing to have) a sewer connection? Please submit a block plan of the site, showing the proposed layout of sewer connections and any other drains (colour-coded), as well as the proposed discharge point(s).*

B3.3.2: *Does the installation have (or is proposing to have) a cesspit? Please provide certification by an independent, warranted engineer showing that the cesspit is in line with the requirements of Schedule I Activity 43 of LN 106 of 2007 (as may be amended).*

B3.3.3: *Does the installation have a Sewer Discharge Permit? Please submit a copy of the permit, or of the submitted application if the permit has not yet been issued.*

B3.3.4: *Could the installation involve the release of any Schedule A or Schedule B substance into the sewers? If yes, explain how the requirements of LN 139 of 2002 have been addressed.*

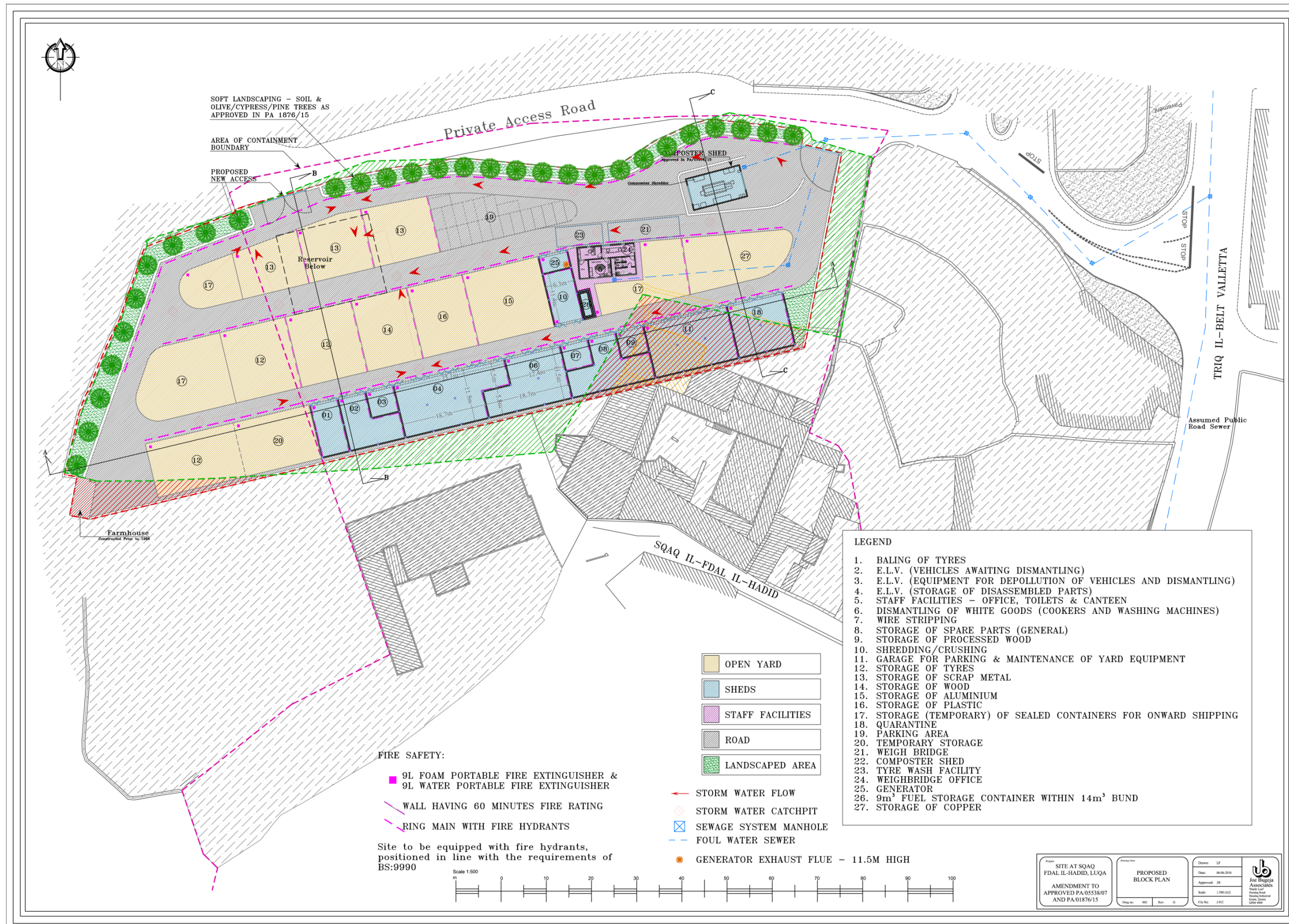
4.20. The Scheme is not currently connected to the sewerage network, but a direct connection is planned (as shown in **Figure 4.2**). This connection will be used to discharge sanitary waste from staff facilities (area 5) and condensate from the composter (if any is generated). No cesspits are planned on site.

4.21. The only potential source of process wastewater is the composter. Since this is non-hazardous effluent generated from the composting of food waste, no release of any Schedule A or Schedule B substances is foreseen. It is also anticipated that the limits in Schedule C of the Sewer Discharge Control Regulations, S.L. 545.08, will be met, although the effluent will be tested to verify this as required by the Water Services Corporation (WSC).

4.22. A sewer discharge permit application has been submitted to the WSC (a copy is included in **Annex 7**).

4.23. Rainwater will be managed as described in section B3.5; provision will also be made for a firefighting reservoir as described in that section.

Figure 4.2: Site layout plan showing connection to sewer



B3.5 RAINWATER

4.24. MEPA's ToR regarding rainwater management were:

Describe how rainwater is handled on site. Attach a site drainage map indicating rainwater capture and harvesting/discharge.

- 4.25. The Scheme includes an underground 800 m³ reservoir for collection of rainwater.
- 4.26. Rainwater reaching the internal roads and open storage areas (and which might be contaminated) will be collected through surface gutters, and treated in a silt-trap and oil-water interceptors before being received in this reservoir. Two interceptors will be installed, each covering approximately half of the site catchment area; these will be placed side-by-side in the same location. An engineer's report on the interceptors is included in Volume 3.
- 4.27. Clean rainwater from roofed areas will be received in the underground reservoir without pre-treatment.
- 4.28.** **Figure 4.5** shows the planned rainwater management for the site.
- 4.29. It is intended that the clean water will be used for irrigation and washing within the site as far as practicable. The only overflow of surface water from the site will be treated water from this reservoir.
- 4.30. As mentioned, a hardstanding surface is also being installed throughout the entire site. This includes an underlying impermeable membrane (**Figure 4.3**); and reinforced concrete layer (**Figure 4.4**) to ensure impermeability.
- 4.31. Additionally, a second 175 m³ reservoir is planned (**Figure 4.5**), for firefighting purposes. It will be filled by bowser and will not receive rainwater.

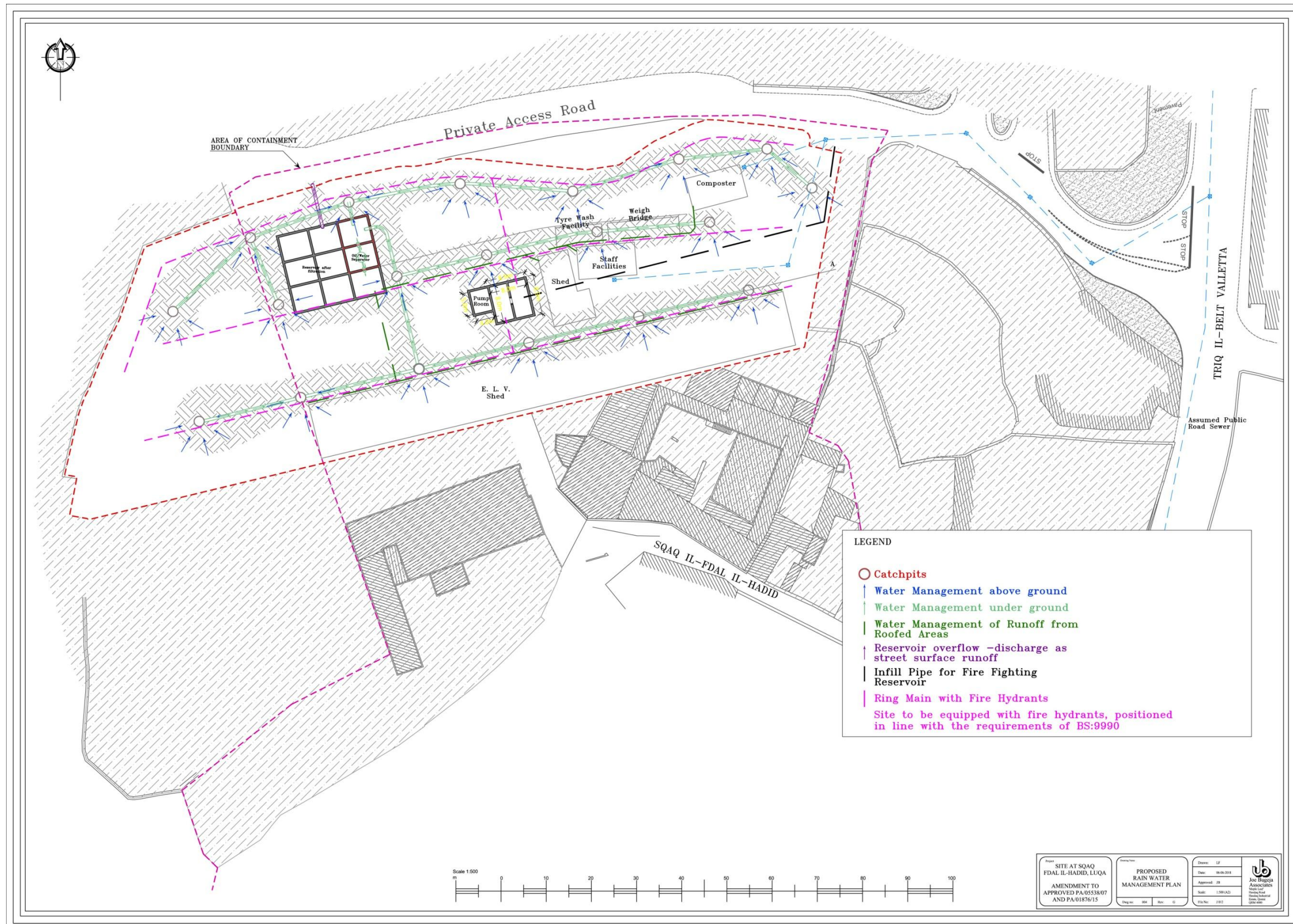
Figure 4.3: Installation of membrane underlay



Figure 4.4: Installation of reinforced concrete surface



Figure 4.5: Rainwater management and firefighting reservoir



B3.6 EMISSIONS TO AIR

- 4.32. The requirements prescribed by the IPPC Application form in respect of air emissions are:

Identify if there may be emissions of substances to air.

If any are identified, submit details of each emission point, the nature and the proposed quantities of substances emitted from each point and treatment/abatement measures. A block plan of the site showing each emission point should be submitted.

For each boiler/generator, submit the following details: rated thermal input, energy output, date of manufacture, stack height, fuel type and annual fuel consumption.

- 4.33. The Scheme will include a number of combustion plant operating on diesel (**Table 4.5**), most of which are mobile vehicle-type machinery. Some emissions of combustion by-products (including NO_x, SO₂ and dust) are expected; however, emissions will be minimised through the use of low-sulphur fuel (≤0.001% sulphur EN 590 diesel) and regular maintenance of equipment. Additionally, most of the equipment will be not in continuous use during working hours.

Table 4.5: Combustion plant on site

Type of machinery	Brand	Quantity	Frequency of use	Stationary / mobile	Location (Figure 4.1)
Grab excavators	Hitachi	4	5 h weekly (each)	Mobile	As required
Shredder	Hammel	1	30 h weekly	Mobile	Area 10
Hydraulic press	Lefort	1	20 h weekly	Stationary	Area 10
Shear	Kobelco	1	24 h weekly	Mobile	Area 10
Small shear	Deltax	1	4 h weekly	Mobile	Area 10
Cable stripper	Deltax	1	4 h weekly	Mobile	Area 7
Tyre baler	LSM	1	24 h weekly	Stationary	Area 1
Standby generator	n/a	1	<100 h annually	Stationary	Area 25

- 4.34. Some emissions of fine particulates are also expected from the output of the shredder conveyor, especially when wood is shredded, since wood is lighter than metal. However, for wood the shredder will be used as a primary shredder and the wood will not be finely shredded (the expected length of shredded material is up to 300 – 350 mm). Additionally, metals will be wetted during shredding, and this reduces dust emissions considerably.
- 4.35. The relevant emissions to air from the composter are odour-related. Odour emissions, including abatement measures, are described in section B3.7.
- 4.36. A number of trucks and forklifts also operate on site; however, exhaust emissions are not expected to be significant. As mentioned, the vehicle fleet has been upgraded to

Euro VI models.

- 4.37. Currently dust is also generated when vehicles navigate the site and tracked out with vehicles when they leave the site, since most of the ground is not surfaced. However, the situation is expected to improve considerably through the installation of hardstanding throughout the site.
- 4.38. No boilers are proposed. A standby generator is proposed in area 25; this will not exceed 100 kVA and will run on diesel. The generator will only be used in case of mains supply failure and will have an exhaust flue 11.5 m high (i.e. terminating at 3 m above the level of any roof within a 25 m radius). Any further details required by ERA on the generator will be provided once the model is selected.
- 4.39. An air monitoring report was also commissioned by the Applicant in 2014; this is presented in **Annex 8**.

B3.7 ODOUR EMISSIONS

- 4.40. MEPA's requirements regarding odour emissions were:

Identify if there may be emissions of odour.

If any are identified, submit details of the main sources of odour, and the proposed techniques and measures for control of odour.

- 4.41. Some odour emissions may be generated during the temporary storage of containerised waste. However, to reduce the risk of significant odours, the following waste types will not be accepted at the Scheme:
- Animal tissue waste;
 - Body parts and organs; and
 - Mixed municipal waste.
- 4.42. Additionally, containers will remain sealed while on site, and will typically be stored for not more than a few days / weeks to minimise risks of odours.
- 4.43. The composting of food waste may also be a source of odours. Odours will however be mitigated through the installation of a biofilter. The composter paddles will also stop operating during waste loading and whenever the inspection hatch is opened; this reduces agitation of the contents and escape of odours.
- 4.44. Food waste will only be accepted on site if treatment can commence within 48 hours; a delivery schedule will be agreed in advance with food waste suppliers. Food will not be compacted prior to receipt on site, to minimise the production of odorous leachate. As mentioned in section B2.2.1, meat and fish will not be accepted without prior agreement with ERA.
- 4.45. During maturation of the compost, minimal odour emissions are expected, since the

compost would have been heat-treated as a result of the composting process.

- 4.46. These arrangements are considered sufficient to avoid odour nuisance, considering the very small scale of the composting plant and the large distance from sensitive receptors.

B3.9 NOISE

Introduction

- 4.47. This section describes the results of the noise survey undertaken in 2014 at DDE Attard Ltd in Luqa (see **Figure 4.6**) to determine the noise climate at the closest sensitive receptors in the vicinity of the Scheme site during the day time (when the Scheme was in operation). The Scheme does not operate at night. The Report also describes the assessment of the noise impact on the sensitive receptors, informed by the noise survey.

Terms of Reference

- 4.48. The requirements for the noise assessment were described in the former MEPA's application form; these are reproduced below:

Describe:

B3.9.1: *The main sources of noise and vibration (including infrequent sources) of the proposed installation;*

B3.9.2: *The proposed techniques and measures for control of noise;*

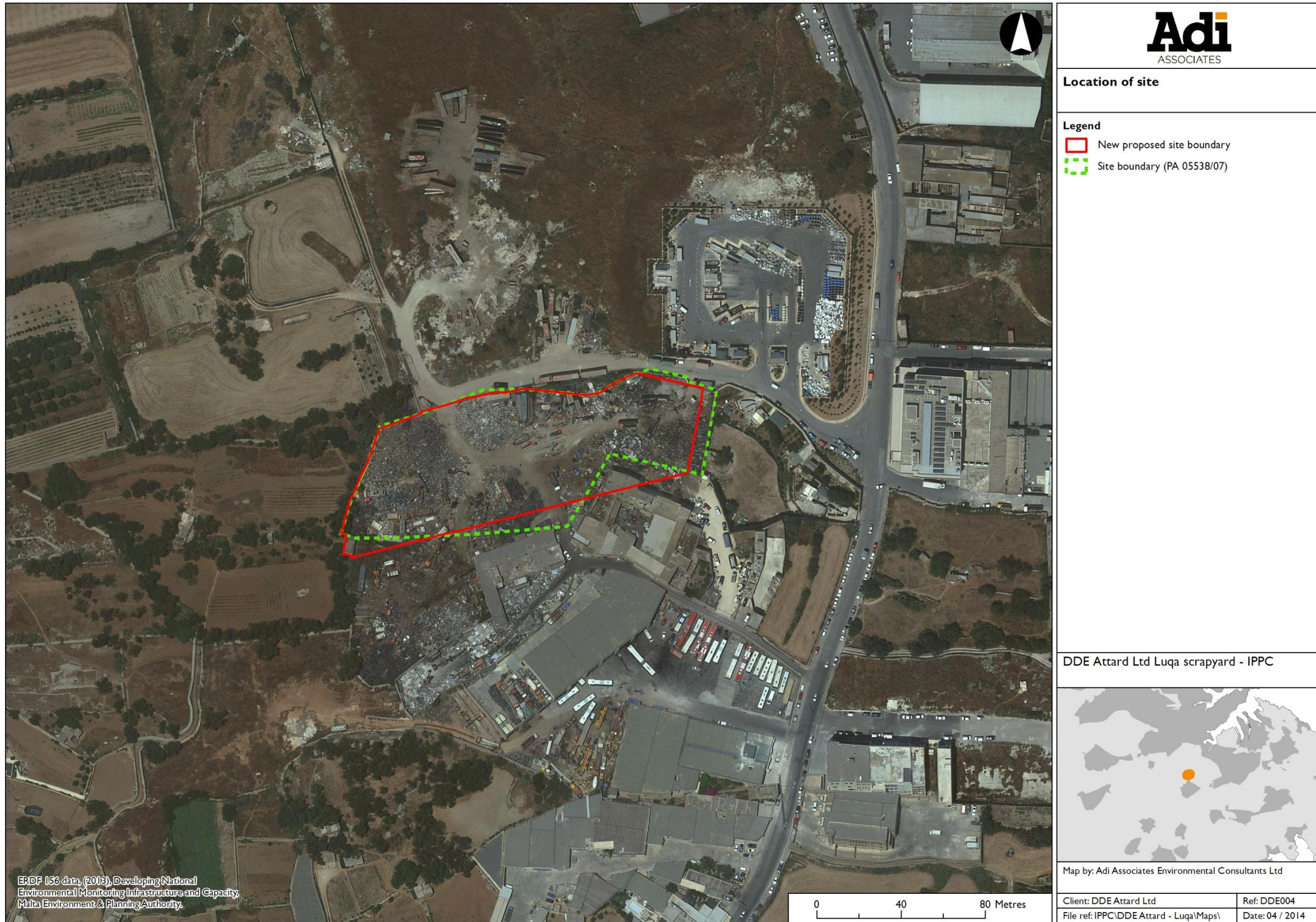
B3.9.3: *The nearest noise sensitive locations and distance away from the site (a site map shall also be submitted for this purpose); and*

B3.9.4: *Relevant environmental noise measurement surveys which have been undertaken (monitoring shall be according to the latest revisions of ISO 1996 and the rating of industrial noise affecting residential areas shall be according to BS 4142; monitoring shall be carried out exclusively using type 1 sound level meter).*

Description of the Scheme

- 4.49. The first stage of the noise study involved an examination of the Scheme operations and identification of the noise generating activities and predominant noise sources.
- 4.50. The Scheme currently comprises the following activities:
- Storage and dismantling of WEEE; this activity is restricted to white goods only (washing machines, cookers and water meters);
 - Storage and processing of scrap metal;
 - Sorting, storage and baling of tyres;
 - Storage and processing of wood; and
 - General maintenance of plant / machinery; and
 - HGV transport of materials to / from and within the site.

Figure 4.6: Location of the Scheme site



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4.51. The current predominant noise sources are:

- Hydraulic press (1 in number);
- Grab excavators (4);
- Shear (1);
- Small shear (1);
- Cable stripper (1);
- Tyre baler (1); and
- HGV traffic.

4.52. Notably, the above machinery is not in continual operation throughout the day; machinery is used intermittently, as the need arises.

4.53. It is proposed to add to the plant on site, in the form of a shredder for the processing of metal and wood, an ELV de-pollution machine and a composter (which will include a small mobile shredder for tree prunings).

4.54. The Scheme operates seven days a week. Operating hours from Monday to Friday are 0700 to 1600, and the Scheme is in fairly constant operation throughout this time. On Saturdays and Sundays, the Scheme operates from 0700 to 1200, servicing drop-ins, and operations on site are much reduced in comparison to weekdays.

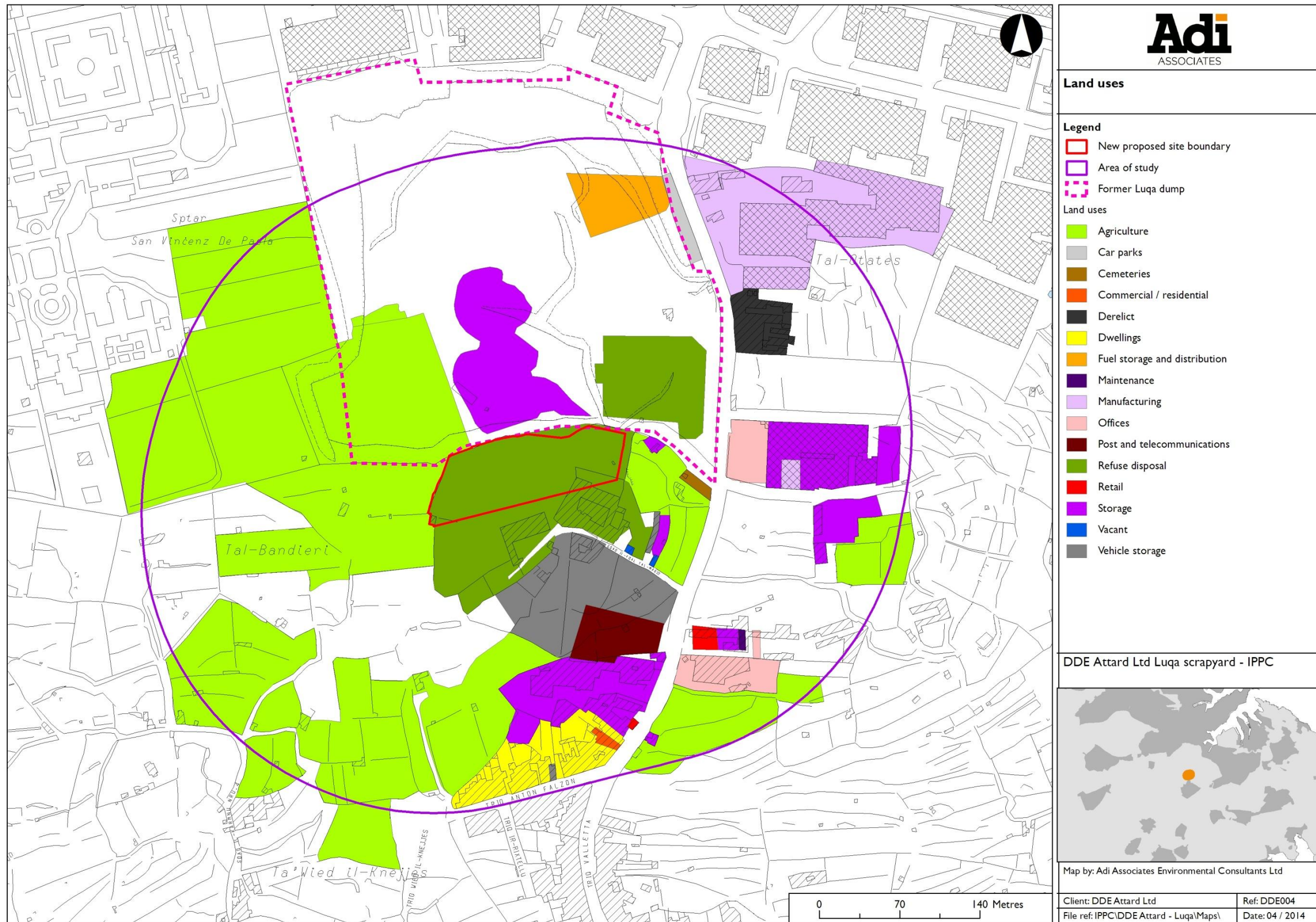
Description of the Area in the Vicinity of the Scheme Site

4.55. The Scheme site is located on the edge of the settlement of Luqa. A detailed land use survey of the area surrounding the Scheme site was conducted on the 2nd October 2014. A land use map of the area is illustrated in **Figure 4.7**.

4.56. The land uses immediately surrounding the Scheme site are primarily industrial, and the area (including the Scheme site) has been in long-term industrial use. The large area to the north of the Scheme site was the site of the former Luqa dump; it has now been developed for a range of industrial and storage uses. The whole of the area, including the Scheme site, is identified as a candidate 'Area of Containment' in Planning Policy Guidance document *Way Forward: Areas of Containment, October 2012*.

4.57. The land immediately adjoining the Scheme site is occupied primarily by small to medium-scale industrial enterprises. These include another waste management facility, Metalco (adjoining the Scheme site on its southern perimeter) and a civic amenity site, operated by Wasteserv Malta Ltd (opposite the site entrance, to the north).

Figure 4.7: Surrounding Land Uses



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- 4.58. The nearest residential area is located approximately 220 m to the south of the Scheme site, along Triq Anton Falzon. The area between the Triq Anton Falzon and the Scheme site is occupied by industrial and storage uses; the second waste management facility (Metalco, referred to above) is located between the residential properties and the Scheme.

Noise Survey

Standards and Guidance

- 4.59. At the time of the survey, there was no specific guidance in Malta on noise in the context of IPPC³⁰. In situations where standards are not available, MEPA generally makes reference to equivalent guidance from the UK and ISO standards. In respect of this study therefore, it was considered appropriate to refer to the British Standard BS 4142: 2007³¹ and to the UK Government's Planning Policy Guidance Notes which clarify the applicability of these Standards to land use planning issues (PPG 24: Planning and Noise³²). Reference was also made to ISO 1996³³, in accordance with Annex II of the Environmental Noise Directive (2002/49/EC).

Noise Sensitive Receptors and Noise Monitoring Locations

- 4.60. One group of Noise Sensitive Receptors (NSRs) was identified; these were identified as being the closest sensitive receptors to the Scheme site. These sensitive receptors comprise the private residential properties on the northern side of Triq Anton Falzon, located approximately 220 m from the southwestern corner of the Scheme site, at its closest point.
- 4.61. One Noise Monitoring Point (NMP) was identified to measure the noise climate at the NSRs. Where it was not possible to gain access to the rear of the residential properties (since the land to the rear was in private ownership), this NMP was selected so as to be representative of the noise climate at the rear, and so as to minimise the influence of road traffic noise from along Triq il-Belt Valletta, as well as having regard to the guidelines on measurement practice outlined in BS 4142: 2007.
- 4.62. An additional NMP was identified in the vicinity of the perimeter of the Scheme site. Again, where it was difficult to gain access to the area immediately south of the Scheme site (area in private ownership) and which is in any case occupied by another noise-generating activity, the NMP was identified on the northern perimeter of the

³⁰ Malta transposed the Environmental Noise Directive (Directive 2002/49/EC) into national legislation through Legal Notice 426 of 2007. The Regulations designate MEPA as the competent authority for the generation of strategic noise maps, the publication of information on environmental noise, and the drawing up of action plans.

³¹ BS 4142:1997, *Method for rating industrial noise affecting mixed residential and industrial areas*, British Standards Institution

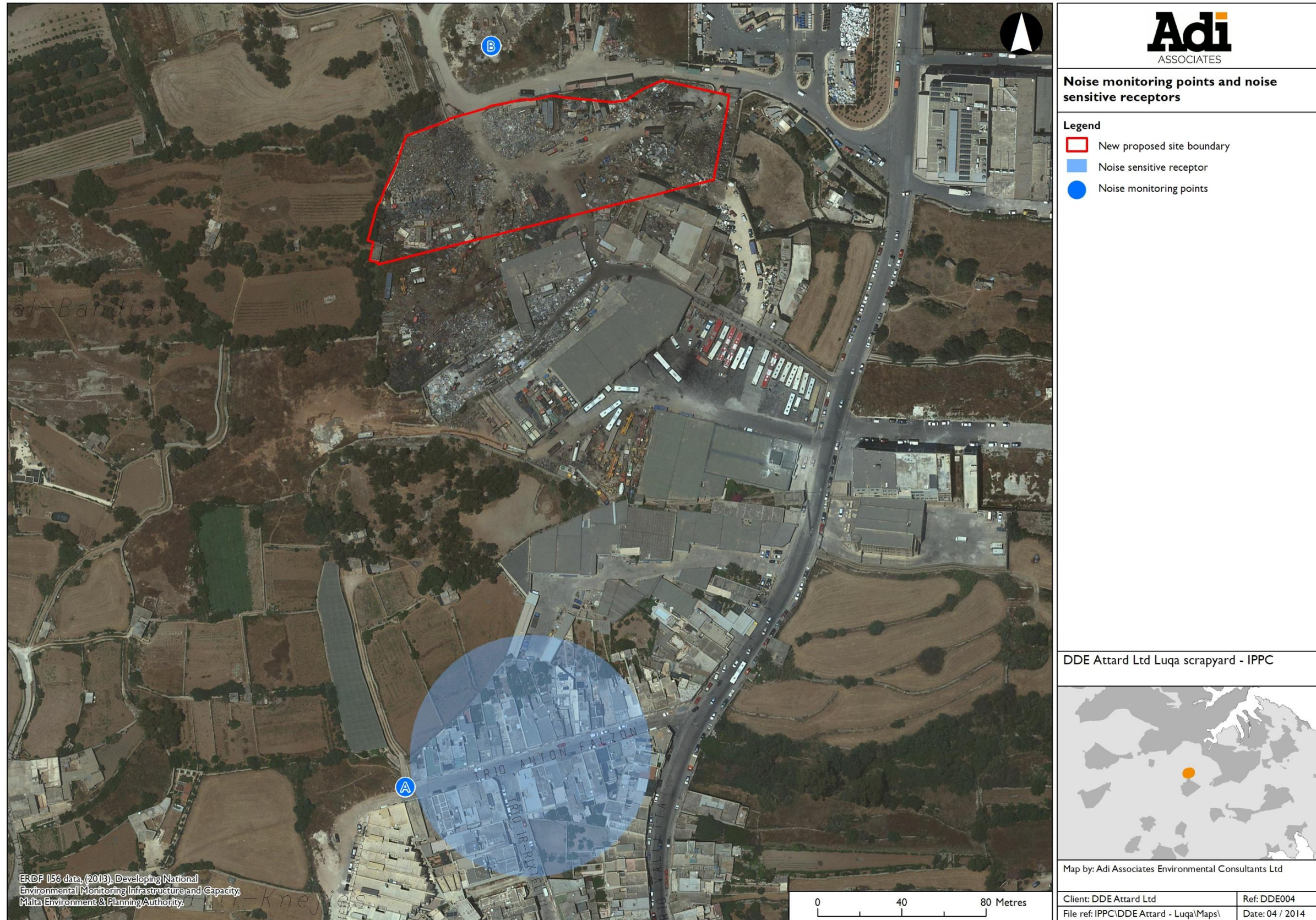
³² Department of Communities and Local Government (UK), Planning Policy Guidance PPG 24, *Planning and Noise*, September 1994.

³³ ISO 1996, *Acoustics - Description, measurement and assessment of environmental noise*, International Organisation for Standardization.

Scheme site. It was selected in view of the slightly elevated location, which offered an uninterrupted line of sight to the Scheme.

- 4.63. **Figure 4.8** illustrates the location of both NMPs relevant to the survey, as well as the location of the NSRs. Details of the precise location of the NMPs are provided in **Table 4.6**.

Figure 4.8: Location of Noise Monitoring Points and Noise Sensitive Receptors



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Table 4.6: Location of Noise Monitoring Points

NMP	Location	Eastings	Northings
A	Private residential properties, Triq Anton Falzon	453751.43	3968899.80
B	Scheme boundary (northern perimeter)	453792.27	3969252.14

Sound Level Survey Protocols

- 4.64. The sound level surveys were undertaken in accordance with BS 4142:1997; paragraphs 5.1 to 5.5 of the Standard give guidelines on measurement practice.
- 4.65. In accordance with the Standard, and in order to minimize the influence of reflection, the measurement taken at the NSRs (NMP A) was taken at a distance of 3.5 m from the façade of the nearest building. The measurement taken at NMP B was also in the free-field, taken at a distance of 26 m from the boundary wall of the Scheme site (the nearest reflecting surface). In the case of both NMPs, the sound level meter was mounted on the tripod at a height of 1.26 m above ground level. Details of the measurement position (distance from reflecting surface and height above ground level) were recorded.
- 4.66. An effective windshield was used to minimize the effects of turbulence at the microphone. The weather conditions prevailing during the measurement were also recorded. In accordance with BS4142:1997, the wind speed was less than 5 m/s (Force 2).

Sound Level Equipment

- 4.67. A Class I Norsonic 140 Noise Nuisance Recorder, calibrated according to BS 4142:1997, was used to take the measurements. Calibration certificates are provided in **Annex 9**.

Sound Level Indices

- 4.68. The sound level surveys measured and recorded the following sound level indices:
 - $L_{Aeq(T)}$ (the equivalent continuous noise level, or energy average, recorded over the time period of interest);
 - L_{AFmax} (the maximum noise level recorded over the time period of interest);
 - L_{AF10} (the noise level exceeded for 10% of the time period of interest); and
 - L_{AF90} (the noise level exceeded for 90% of the time period of interest).
- 4.69. During the survey, observations were recorded by the noise assessors and attempts were made to identify the source of any significant impulsive or tonal noise. In addition, efforts were made to identify and describe acoustic events and phenomena attributable to sources other than the Scheme.

Sound Level Measurements

- 4.70. One sound level survey (day time) was undertaken in order to establish the noise climate at the NSRs (NMP A). An additional sound level survey (day time) was undertaken close to the northern perimeter of the Scheme site (NMP B).
- 4.71. In accordance with the Standard, both day time surveys were conducted over a one hour sampling time. The surveys were undertaken in the period between 0700 and 1600, having regard to the weekday operating times of the Scheme.
- 4.72. Specifically, the sound level surveys were conducted as described in **Table 4.7**.

Table 4.7: Sound Level Surveys

NMP	Date	Time
<i>Day time surveys</i>		
A	Friday 10 th October 2014	07:50 - 08:50
B	Friday 10 th October 2014	09:23 - 10:23

- 4.73. The measured sound levels recorded at the NSRs are shown in **Table 4.8**. The measured sound levels recorded at the perimeter of the Scheme site are shown in **Table 4.9**.

Table 4.8: Recorded Sound Level at the Noise Sensitive Receptors

NMP	L_{Aeq}	L_{AFmax}	L_{A10}	L_{A90}	Scheme Noise Sources	Other Predominant Noise Sources	Climatic Conditions
<i>Day time sound levels</i>							
A	49	68	49	37	No noise audible from the Scheme	<ul style="list-style-type: none"> Road traffic (occasional and significant) Aircraft traffic - low-flying small craft (occasional and significant) and larger air craft (less frequent and significant on one occasion) Construction noise (excavator), from the northeast (intermittent / frequent but not significant) Chatter from nearby residential properties (intermittent and not significant) Birds chirping (constant but not significant) 	Wind Direction: S Wind Speed: 1.7 km/h Air Temperature: 20 °C Relative Humidity: 78% Precipitation: 0 mm

Table 4.9: Recorded Sound Levels at the Perimeter of the Scheme site

NMP	L_{Aeq}	L_{AFmax}	L_{AF10}	L_{AF90}	Scheme Noise Sources	Other Predominant Noise Sources	Climatic Conditions
<i>Day time sound levels</i>							
B	59	79	61	51	<ul style="list-style-type: none"> Grab excavator – engine noise / banging and clanking of metal against metal (regular and significant) HGV traffic through the site entrance (regular and significant) 	<ul style="list-style-type: none"> Vehicle and / or plant revving, from the adjoining waste management facility to the south of the Scheme site (fairly continuous and fairly significant) Construction noise (excavator), from the southeast (intermittent but frequent, but not significant) Aircraft traffic (infrequent and not significant) 	Wind Direction: S Wind Speed: 1.7 km/h Air Temperature: 25 °C Relative Humidity: 65% Precipitation: 0 mm

Noise Impact Assessment

- 4.74. The noise survey reveals the day time ambient noise level recorded at the NSRs (NMP A) to be relatively low (L_{Aeq} of 49 dB(A), with L_{AFmax} of 68 dB(A) and L_{AF90} of 37 dB(A)). The recorded L_{Aeq} (49 dB(A)) is well within the World Health Organisation day time outdoor guideline value of L_{Aeq} 55 dB(A)³⁴.
- 4.75. The observations of the assessors at NMP A (see **Table 4.8** above) were that the predominant noises audible during the survey at NMP A arose from other noise-generating activities in the area, primarily road traffic. The assessors' observations were that the L_{AFmax} level recorded (69 dB(A)) was influenced by occurrences of road traffic. Importantly, the assessors observed that there was no audible noise arising from the Scheme during the survey at NMP A (at the sensitive receptors).
- 4.76. The observations of the assessors at NMP B (on the site perimeter) were that the noise level recorded at this monitoring point (L_{Aeq} of 59 dB(A), with L_{AFmax} of 79 dB(A) and L_{AF90} of 51 dB(A)) arose primarily from the operating activity of the Scheme (see **Table 4.9** above). The predominant noise source was the grab excavator, which was operating immediately south of the monitoring point, in the western portion of the Scheme site. The noise from HGV traffic moving into and out of the site was also a significant contributor to the overall noise level recorded.
- 4.77. The assessors also observed noise arising from sources other than the Scheme at NMP B. The most significant of these was the loud revving from either a vehicle or plant (it wasn't possible to discern the precise source), but the noise was clearly arising from the waste management facility adjoining the Scheme site. Notably, this facility is located between the Scheme site and the NSRs.
- 4.78. The observations of the assessors, supported by the recorded ambient noise level at NMP A, clearly suggest that the noise climate at the NSRs is acceptably low, and is not unduly influenced by the Scheme. The noise level recorded at NMP B (close to the Scheme site boundary) would support this suggestion. Assuming the noise level recorded at NMP B to be reasonably representative of the noise output from the Scheme at a distance of 20 m south of the southern perimeter of the site (in the direction of the NSRs), and attenuating for the distance to the NSRs (approximately 200 m further away), it is calculated that the noise output of the Scheme at the NSRs would be in the range of 39 dB. Importantly, this assumes no additional attenuation due to intervening buildings or other barriers / screens, or any attenuation that would be expected by reason of the significant soft ground cover in the intervening space (a large area to the north of the NSRs in the direction of the Scheme site is agricultural land).

³⁴ Berglund B, Lindvall T, and Schwela D, (Eds) *Guidelines for Community Noise*, World Health Organisation, London March 1999, Published 2nd March 2000.

Conclusion

- 4.79. The noise survey was undertaken with the objective of determining the noise climate at the closest sensitive receptors to the Scheme site during the day time, when the Scheme is in operation. The results of the survey point to there being no discernible impact from the Scheme on the ambient noise levels at the identified NSRs (NMP A). The assessors observed there to be no audible noise from the Scheme during the survey at NMP A, and the data recorded identifies that the ambient noise levels were relatively low; the recorded L_{Aeq} level is well within the WHO day time outdoor guideline value.
- 4.80. Finally, it is proposed to add to the plant on the Scheme site. As mentioned, a shredder, composter (including a shredder for tree prunings) and ELV de-pollution machine will be installed. The composter and ELV de-pollution machine will have a limited noise output, and both will be located inside a shed (which helps attenuate noise further); the shredders will generate noise (although this may be to varying degrees given that the site's main shredder is expected to be larger than the tree pruning shredder). Given the existing noise output from the Scheme as a whole (as measured at NMP B), the distance to the NSRs, and the noise output of other noise generating activities in the area, it is unlikely that the addition of the shredders will have any significant impact on the noise climate at the sensitive receptors.

B3.10 MONITORING

4.81. MEPA's ToR regarding monitoring were prescribed in the IPPC application form:

Describe the proposed measures for monitoring emissions including any environmental monitoring. The following must be specified:

B3.10.1: *The location of each proposed monitoring point (plotted on a suitably-labelled block plan of the site);*

B3.10.2: *The substances (in each environmental medium) which are proposed to be monitored;*

B3.10.3: *The frequency with which monitoring is proposed to take place;*

B3.10.4: *The proposed measurement methodology, which should be a standard methodology, such as EN or ISO standard, or equivalent;*

B3.10.5: *The proposed procedure for evaluation of the results.*

Emissions Monitoring

4.82. The emissions identified in this Chapter are:

- Discharges to sewer;
- Emissions to air;
- Odour emissions; and
- Noise emissions.

4.83. Discharges to sewer may arise if condensate is generated by the composter; this will be tested as required by the WSC.

4.84. With regard to air emissions, an air monitoring report was commissioned by the Applicant in 2014, and is presented in **Annex 8**. Air emissions are described in section B3.6 of the Application. Additionally, the risk assessment (included in section B2.8 of this Application) concludes that, with mitigation, the environmental impacts of air emissions from the Scheme are expected to be insignificant. However, an air monitoring programme will be implemented following the issue of the IPPC permit, as required by ERA. This will include:

- Monitoring of emissions to air from the composter (as described in Volume 3); and
- Ambient air monitoring during specific operations such as shredding (it is understood that ERA will provide Terms of Reference in the IPPC permit).

- 4.85. Odour emissions may arise from the storage of containerised waste and the composting of food waste. However, as mentioned in section B3.7, odour emissions are not expected to have a significant impact on nearby sensitive receptors. Nevertheless, if ERA receives complaints regarding odours from the Scheme, an odour monitoring programme based on sniff testing can be prepared and implemented.
- 4.86. The noise survey and assessment (section B3.9 of the Application) concludes that there is currently no discernible impact from the Scheme on ambient noise levels at the noise-sensitive receptors. Even with the addition of the shredders, considering the distance to the noise sensitive receptors and the existing noise generated from the Scheme and other surrounding activities, it is unlikely that the Scheme as proposed will have any significant impact on the noise climate at the sensitive receptors. However, as requested by ERA, the noise study will be updated following the issue of the IPPC permit to include the new equipment. Monitoring will be carried out in accordance with a Method Statement to be submitted to ERA for approval.
- 4.87. Additionally, the risk assessment submitted in section B2.8 of this Application concludes that the risk of land and groundwater contamination from spills will be low and very low, considering the planned mitigation. The baseline report also concludes that the risk to groundwater from historical and current activities is significantly reduced, considering that substantial attenuation in contaminant concentrations is observed from 0 to 2 m and that the groundwater at the Scheme site is found at a depth of around 56 to 60 m below the land surface.
- 4.88. The Industrial Emissions (IPPC) Regulations allow a risk-based approach to be adopted for land and groundwater monitoring. Considering the low risk levels identified in the risk assessment, it is considered that further land monitoring during operation is not necessary and may even increase risk levels, since the impermeable underlying membrane would be ruptured if a land core is taken. Provided that the proposed mitigation measures are implemented and maintained, it is recommended that land monitoring is next carried out at the decommissioning stage. A Method Statement will be agreed to with ERA before the commencement of such monitoring. Groundwater monitoring may also be required, depending on the results of the land monitoring.
- 4.89. Testing of any condensate generated through the composting process will also be carried out as required by WSC.

Compost Testing

- 4.90. Compost testing will be carried out as described in Volume 3 of the IPPC application.

5. IMPACT ON THE ENVIRONMENT

B4.1 ENVIRONMENTAL EFFECTS

5.1. The ToR provided by the former MEPA in the IPPC application form were:

Provide an assessment of the potential significant environmental effects (including transboundary effects) of the foreseeable emissions.

5.2. As described in this Application, the potential emissions arising from the Scheme are:

- Discharges to sewer;
- Emissions to air;
- Odour emissions;
- Noise emissions; and
- Emissions to land and groundwater (from unmitigated spills).

5.3. Discharges to sewer are described in section B3.3 of this Application, where the only process wastewater that may be generated is condensate from the composting of non-hazardous food waste. This effluent will be tested before being discharged to sewer; no significant environmental effects are anticipated from this type of effluent.

5.4. Emissions to air during operation are described in section B3.6 of this Application, and are also assessed in the Risk Assessment prepared for the Scheme (section B2.8). Air emissions are expected from stationary and mobile combustion plant, but will be minimised through the use of low-sulphur fuel and regular maintenance of equipment. Emissions from the shredder will be minimised by wetting of metals during shredding and single-stage shredding of wood. Generation of dust from navigation of vehicles around the site will also be mitigated by the hardstanding to be installed throughout the site. Therefore the environmental impacts of air emissions from the Scheme are expected to be insignificant.

5.5. Odour emissions are not expected to cause a significant environmental impact. Emissions from the temporary storage of containerised waste will be minimised by limiting the acceptance of odorous materials, as described in section B3.7, limiting the storage duration, and keeping containers sealed while on site. Odours from composting will be mitigated through the installation of a biofilter, deactivation of the aeration paddles during waste loading, and by the small scale of the operation. Additionally, waste will only be accepted on site if treatment can commence within 48 hours, food will not be compacted prior to delivery, and meat and fish will not be accepted without prior agreement with ERA. The heat treatment occurring naturally during composting also reduces the risk of odour emissions during maturation of the compost.

5.6. Noise emissions are assessed in section B3.9 of this Application. The survey and

assessment carried out for the Scheme conclude that there is currently no discernible impact from the Scheme on ambient noise levels at the noise-sensitive receptors. Even with the addition of the shredder, considering the distance to the noise sensitive receptors and the existing noise generated from the Scheme and other surrounding activities, it is unlikely that the Scheme as proposed will have any significant impact on the noise climate at the sensitive receptors.

- 5.7. With regard to emissions to land and groundwater, the Risk Assessment prepared for the Scheme (section B2.8 of this Application) concludes that, with mitigation, the risk of contamination of land or groundwater from spills is very low to low. This assessment takes into account the planned installation of an impermeable hardstanding surface, with the site being laid to fall towards oil-water separators leading to an underground reservoir. This removes several source-pathway-receptor linkages under normal operation, and hence reduces the risk to the environment considerably.

B4.2 EFFECTS ON OTHER SITES

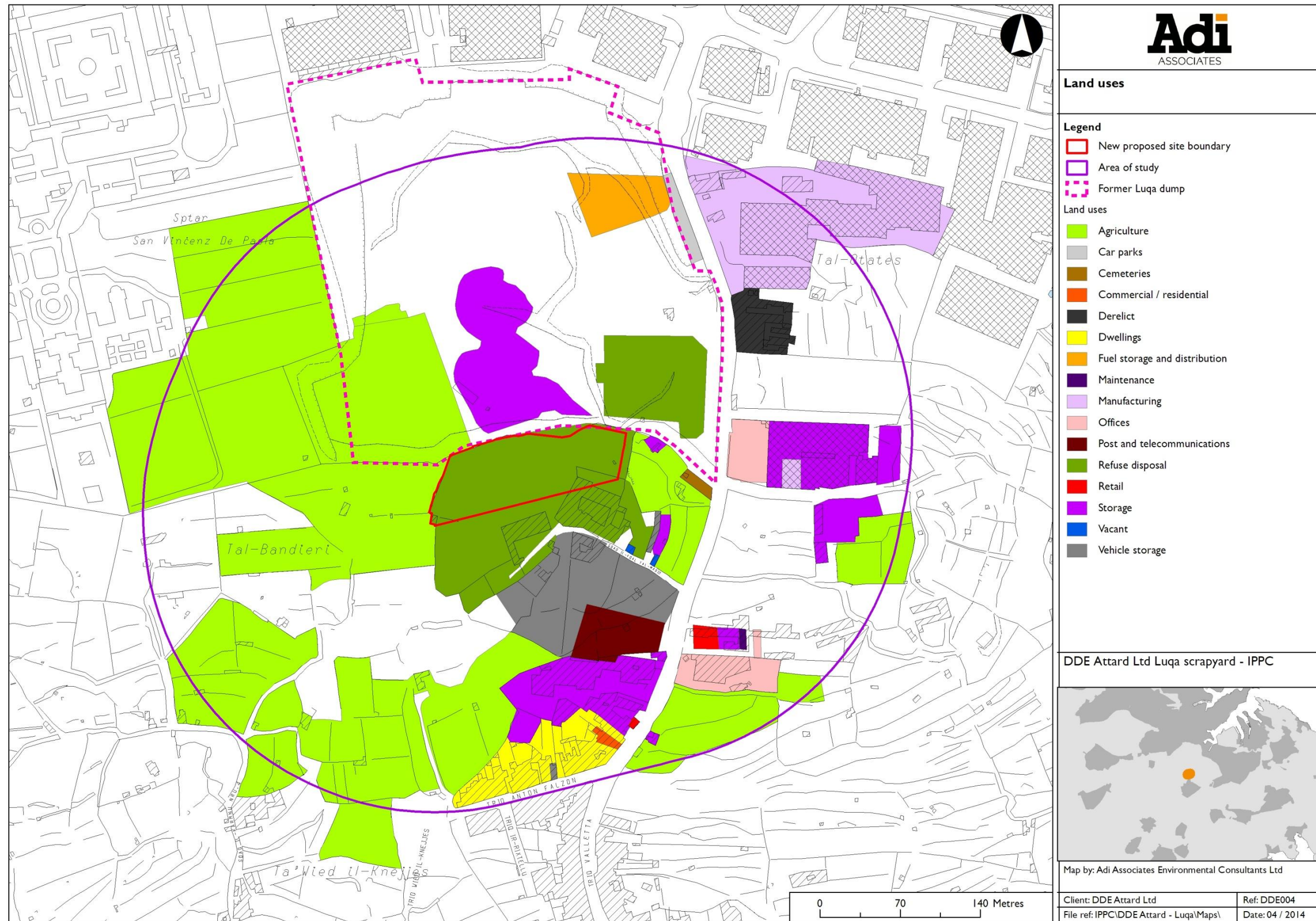
- 5.8. MEPA's ToR required:

Provide an assessment of whether the installation is likely to have a significant effect on another site in Malta and, if it is, provide an assessment of the implications of the installation for that site.

- 5.9. **Figure 5.1** shows the land uses surrounding the Scheme site. The uses immediately surrounding the Scheme site are industrial and agricultural.
- 5.10. The areas immediately adjoining the Scheme site are occupied primarily by small to medium enterprises, including another waste management facility next door (Metalco) and a civic amenity site operated by Wasteserv Malta Ltd next to the Scheme site entrance.
- 5.11. As stated in section B3.6 of this Application, emissions to air from the Scheme will mainly arise from combustion plant, the shredder and dust trackout by heavy vehicles. However, the Scheme includes mitigation measures to reduce these emissions, including regular maintenance of equipment, wetting of metals during shredding, single-stage shredding of wood, and installation of site surfacing. As a result, the impact on nearby sites is not expected to be significant.
- 5.12. Considering the proposed odour abatement measures and the nature of other sites in the vicinity, it is not expected that odour emissions will have a significant effect on nearby sites.
- 5.13. With regard to noise, the majority of sites adjoining the Scheme are industrial, and some nearby sites also generate noise (as described in section B3.9 of this Application, which also identified adjoining sites as generating noise). It is therefore considered that the Scheme is compatible with the surrounding industrial activities and will not generate a significant noise impact on the nearby industrial sites.

- 5.14. The Risk Assessment prepared for the Scheme (section B2.8), however, identified a risk of fire / explosion, which could also spread to other nearby sites. Considering that the Scheme site is located close to a former landfill and in the outer COMAH zone of another facility (Easygas), without mitigation the environmental impact of a fire could be major.
- 5.15. However, the Scheme will include a number of mitigation measures to minimise both the likelihood and severity of a fire / explosion.
- 5.16. A Fire and Explosion Prevention Plan will be in place (section B2.8 of this Application). As described in this Plan, various operational procedures will be in place to minimise fire / explosion risk, and staff will be trained on these procedures. The ELV depollution equipment also includes an earthed connection to minimise the risks of sparks and explosion.
- 5.17. A firefighting system that includes an underground reservoir, ring main, fire hydrants and fire extinguishers throughout the site will also be installed. Smoke / fire detection units will also be installed in the buildings and shed, and will be connected to an alarm system. There will also be a limit on the quantity of tyres that can be kept on site, to minimise the spread of a fire if it occurs.
- 5.18. These measures reduce the likelihood of a significant fire / explosion to unlikely. Additionally, during operational hours, prompt attention to a fire by trained site operators would ensure that the fire is controlled and does not spread within and beyond the site, therefore also reducing the severity of a fire to minor.
- 5.19. Outside operating hours, the smoke / fire detection units and presence of a security guard will increase the likelihood of quicker detection of the fire, and improved site management will also help reduce the spread of a fire. A 24-hour contact number for the TCP will also be available at the gate, thus improving communication and response if a fire occurs after hours. This reduces the environmental consequences of a fire to moderate in the mitigated scenario.

Figure 5.1: Surrounding land uses



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Annex I: Method Statement for Site Investigation



IP 0001/13

BASELINE MONITORING AT DDE ATTARD LTD

METHOD STATEMENT



Version 4: January 2015



Report Reference:

Adi Associates Environmental Consultants Ltd, 2014. Baseline Monitoring at DDE Attard Ltd. Method Statement for IP 0001/13. San Gwann, January 2015; vi + 28 pp.

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Quality Assurance

Baseline Monitoring at DDE Attard Ltd Method Statement January 2015

Report for: **DDE Attard Ltd**

Revision Schedule

Rev	Date	Details	Written by:	Checked by:	Approved by:
01	October 2014	Submission to Client	Rachel Decelis Consultant	Rachel Xuereb Director	Rachel Xuereb Director
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CONTENTS

Introduction.....	1
Terms of Reference.....	1
Description of the Site and the Surroundings	3
Location.....	3
History.....	3
Surrounding Land Uses.....	8
Geo-environment.....	10
Current Operations at the Scheme Site.....	14
Proposed Reorganisation of the Scheme Site.....	16
Pollutant Linkages.....	20
Monitoring Methodology.....	22
Monitoring Strategy	22
Sampling Points.....	24
Sampling Methods	24
Analysis.....	26
Laboratory Quality Assurance and Quality Control (QA / QC).....	27
Assessment of Results.....	28

FIGURES

Figure 1: Site location.....	4
Figure 2: Site photo, circa 1955	5
Figure 3: Site photo, circa 1955	5
Figure 4: Aerial photo, 1957	6
Figure 5: Aerial photo, 1988.....	7
Figure 6: Civic amenity site.....	8
Figure 7: Agricultural land	8
Figure 8: Surrounding land uses	9
Figure 9: Geology	12
Figure 10: Hydrology.....	13
Figure 11: Installation of membrane underlay.....	15
Figure 12: Installation of reinforced concrete surface.....	16
Figure 13: Proposed site layout	18
Figure 14: Surface water management	19
Figure 15: Oily stain near diesel tank	21
Figure 16: Oily stains on site	21
Figure 17: Sampling locations.....	25

TABLES

Table 1: Pollution pathway identification for Scheme site activities.....	20
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Table 2: Analytes for land monitoring.....	23
Table 3: Sampling points	24
Table 4: Methods for analysis of land samples.....	26

METHOD STATEMENT

INTRODUCTION

1. This method statement outlines the proposed methodology for baseline monitoring at the waste management facility operated by DDE Attard Ltd, hereinafter referred to as the 'Scheme', as required by MEPA as part of the IPPC application for the site (IP 0001/13).

TERMS OF REFERENCE

2. The Terms of Reference (ToR) provided by MEPA as part of the IPPC application are:

BI.4.1: Please provide a site report, providing a history of the site (including current and past uses) and describing the condition of the site of that part of the installation in respect of which you are applying for a permit, and, in particular, identifying any substance in, on or under the land which may constitute a pollution risk. A baseline report assessing the state of the groundwater and land may also be required by the Authority.

3. The requirements in the Industrial Emissions (Integrated Pollution Prevention and Control) Regulations (Legal Notice 10 of 2013) are also relevant to this baseline assessment:

Regulation 5 (1): An application for a permit shall include a description of the following:

(d) the conditions of the site of the installation;

(e) where applicable, a baseline report in accordance with regulation 16(2);

Regulation 16 (2): Where the activity involves the use, production or release of relevant hazardous substances and having regard to the possibility of soil and groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation or before a permit for an installation is updated for the first time after 7 January 2013.

The baseline report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for under sub-regulation (3).

The baseline report shall contain at least the following information:

(a) information on the present use and, where available, on past uses of

the site;

(b) where available, existing information on soil and groundwater measurements that reflect the state at the time the report is drawn up or, alternatively, new soil and groundwater measurements having regard to the possibility of soil and groundwater contamination by those hazardous substances to be used, produced or released by the installation concerned.

Where information produced pursuant to other national or European Union law fulfils the requirements of this sub-regulation, that information may be included in, or attached to, the submitted baseline report.

In the preparation of the baseline report, the operator shall take into account any guidance published by the European Commission on the content of the baseline report.

(3) (a) Upon definitive cessation of the activities, the operator shall assess the state of soil and groundwater contamination by relevant hazardous substances used, produced or released by the installation. Where the installation has caused significant pollution of soil or groundwater by relevant hazardous substances compared to the state established in the baseline report referred to in sub-regulation (2), the operator shall take the necessary measures to address that pollution so as to return the site to that state. For that purpose, the technical feasibility of such measures may be taken into account.

(b) Without prejudice to paragraph (a), upon definitive cessation of the activities, and where the contamination of soil and groundwater at the site poses a significant risk to human health or the environment as a result of the permitted activities carried out by the operator before the permit for the installation is updated for the first time after 7 January 2013 and taking into account the conditions of the site of the installation established in accordance with regulation 5(1)(d), the operator shall take the necessary actions aimed at the removal, control, containment or reduction of relevant hazardous substances, so that the site, taking into account its current or approved future use, ceases to pose such a risk.

4. As suggested by these regulations, the principal aim of the baseline report is to establish reference levels against which site contamination may be assessed upon decommissioning.
5. The European Commission has also published guidance on preparing baseline reports (Communication 2014/C 136/03).

DESCRIPTION OF THE SITE AND THE SURROUNDINGS

Location

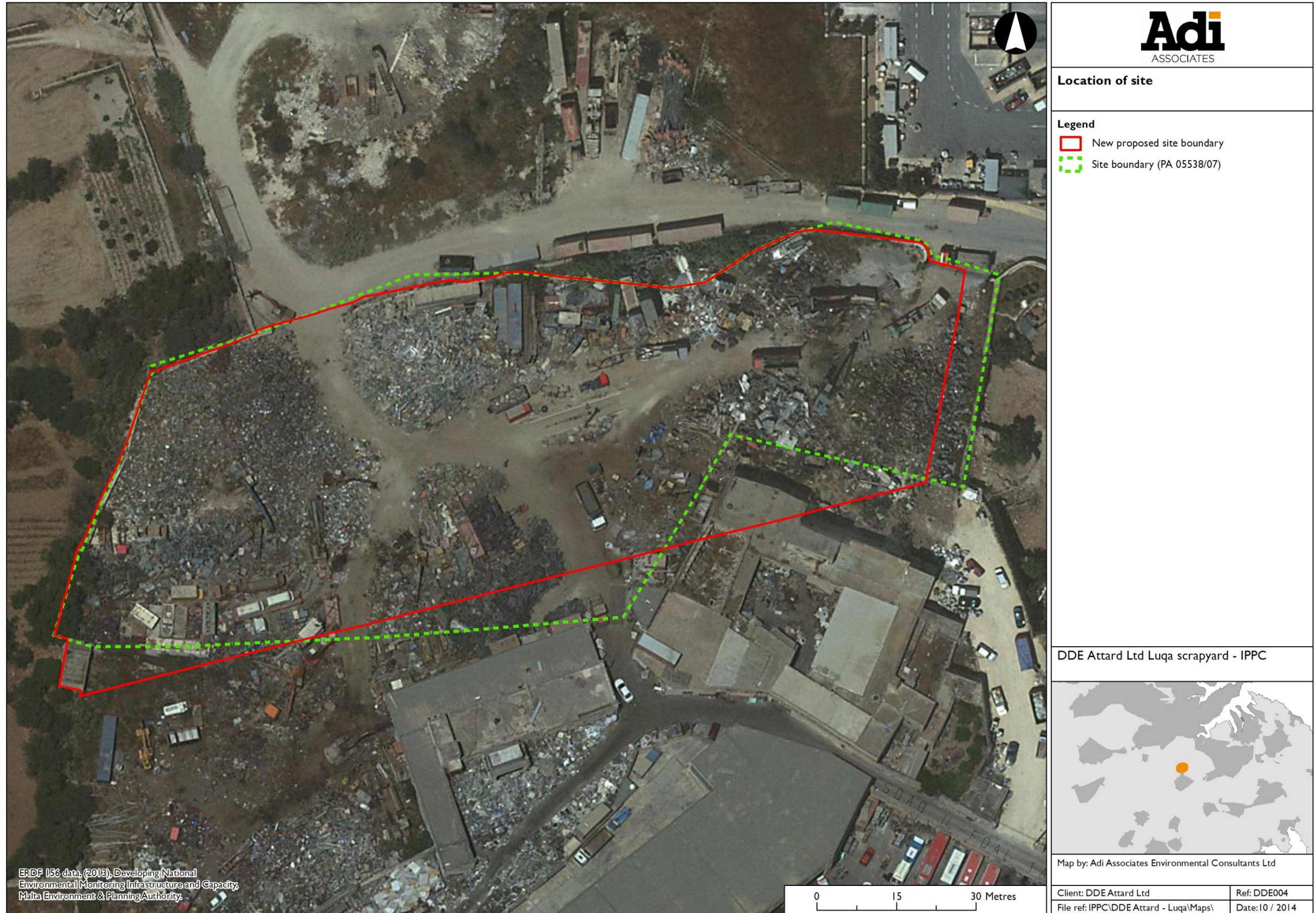
6. The Scheme site covers an area of approximately 8,990m² and is located at Sqaq il-Fdal tal-Ħadid, Ħal Luqa, as shown in **Figure 1**. **Figure 1** also shows that there are plans for a slight variation from the site boundary defined in PA 05538/07; however the total site area will remain the same.

History

7. The history of the Scheme site and its surroundings has been obtained through a review of available documentation and interviews with the site's operator.
8. The 1909 survey sheet for the area shows the Scheme site as agricultural land bounded by rubble walls. Most of the surroundings were either agricultural or unused, with two small areas north and east of the site being used as quarries. The two buildings just south of the Scheme site were already in existence, and to the west (on the site of the current St Vincent de Paul Residence) was a lepers' asylum.
9. The Scheme site has been in use as a scrapyards for over 50 years. In 1952 a permit was issued for a naval storage yard for the site, which extended further south of the current site boundary.
10. At the time, the site was used only for the storage and processing of scrap metal (including vehicles and machinery) and wood. This is corroborated by site photos from circa 1955 (**Figure 2** and **Figure 3**); an aerial photo of the site from 1957 shows what appear to be scrap heaps throughout the site (**Figure 4**). End-of-life vehicles would be crushed in the open using a grab excavator (without prior de-pollution), then baled using a hydraulic press.
11. The 1957 aerial photo also suggests that most of the immediate surroundings were agricultural at the time, with a disturbed area north of the Scheme site. In fact, this area was used as a rubbish dump from the 1930s to the 1970s¹, and the nature of the waste dumped on the site is not known.
12. In December 1984, the applicant was issued with a Police Licence to "deal in old metal" and for "marine stores" (Police Licence E/4/57). An aerial photo from 1988 (**Figure 5**) shows what appear to be scrap heaps and machinery / containers throughout the site. This aerial photo also shows the extent of disturbed ground in the area of the rubbish dump north of the Scheme site to have increased over that in 1957.
13. Additionally, both the 1957 and 1988 aerial photos show that the Scheme site at the time extended southwards beyond the current and proposed site boundaries. This additional area is now owned and operated by third parties.

¹ MEPA (2007) *Luqa Park Development Brief*. www.mepa.org.mt/LpDocumentDetails?syskey=621.

Figure 1: Site location



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Figure 2: Site photo, circa 1955



Figure 3: Site photo, circa 1955



Figure 4: Aerial photo, 1957



Figure 5: Aerial photo, 1988



14. According to the operator, past operations at the Scheme site have mainly consisted of storage and processing of scrap metal, vehicles and white goods such as fridges.
15. Asbestos has in the past been temporarily stored on site in containers prior to export.
16. Burning of plastic / rubber motor cables also used to be carried out in the past to obtain copper. This practice has been discontinued. No burning of other materials (including tyres) has been carried out on site.
17. The operator has stated that any transformers received used to be emptied from oils before being transported to the site. Additionally, no airconditioners or refrigerants have ever been accepted, as the site is not equipped to process such materials.
18. Storage of diesel fuel and oils for use on the operator's vehicles and machinery has also been carried out. There are no records of significant oil or fuel spillages on site.

Surrounding Land Uses

19. A land use survey was carried out on 2nd October 2014. The surrounding land uses are shown in **Figure 8**.
20. The land uses immediately surrounding the Scheme site are industrial and agricultural (**Figure 6** and **Figure 7**). The areas immediately adjoining the Scheme site are occupied primarily by small to medium enterprises, including another waste management facility next door and a civic amenity site operated by Wasteserv Malta Ltd next to the Scheme site entrance.

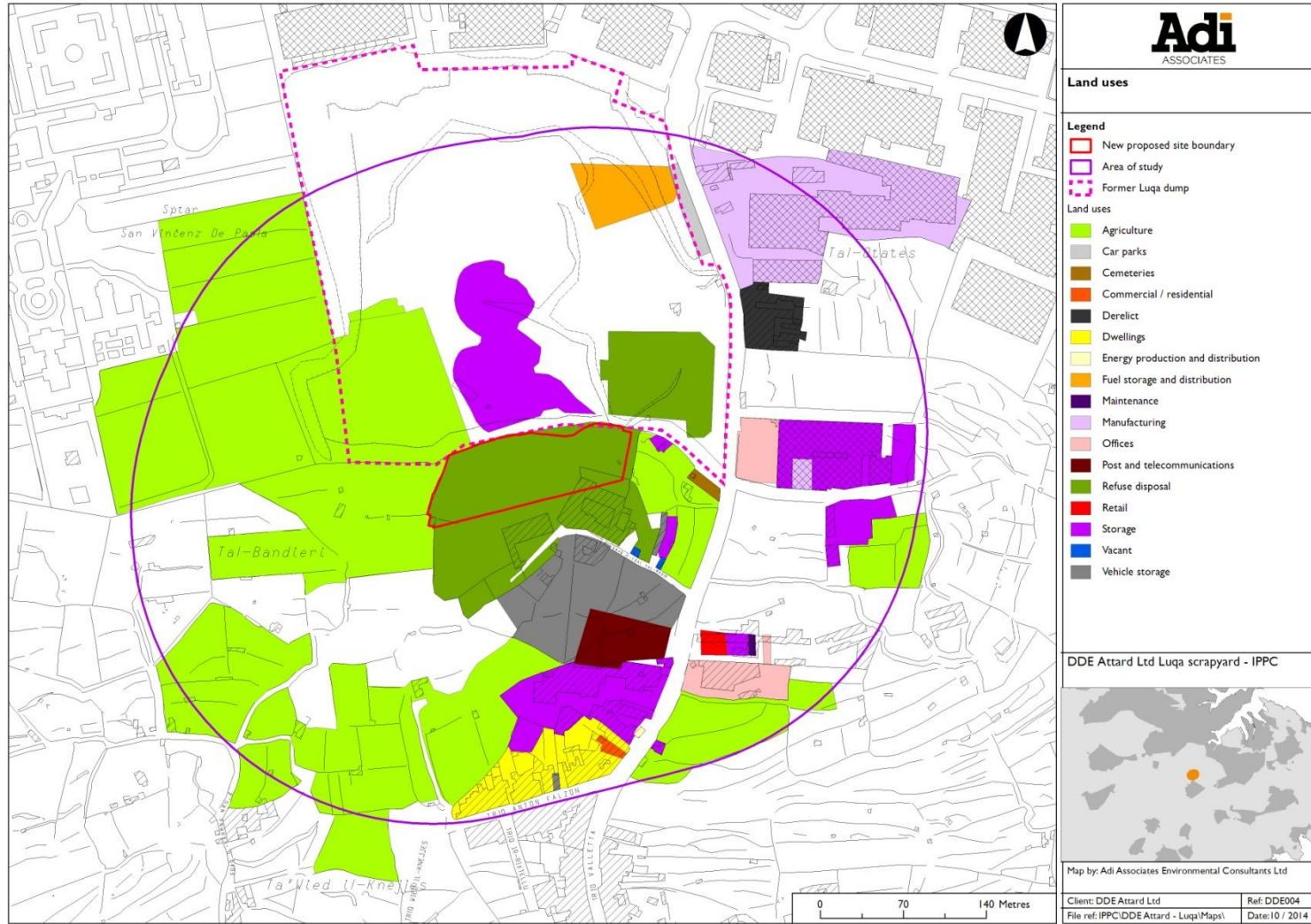
Figure 6: Civic amenity site



Figure 7: Agricultural land



Figure 8: Surrounding land uses



21. Various industrial uses now occupy the site of the former Luqa dump (**Figure 8**). While this dump has been considered to be a contaminated site,² recent testing for TOC, hydrocarbons, metals and pesticides at this site³ revealed that arsenic levels exceeded Dutch target values only slightly; these target values are indicate the level at which there is a sustainable soil quality. The remaining metals were not found at concentrations exceeding the target values, and hydrocarbons (C<12 and C12-40) as well as pesticides were below the detection limit of 10 mg/kg and 0.01 mg/kg respectively.

Geo-environment

Geology

22. The geology of the site and its immediate surroundings are as shown in **Figure 9**. At the Scheme site, the exposed rock formation is Lower Globigerina Limestone. This is a relatively weak limestone consisting of the shells of marine micro-organisms that were once deposited at the bottom of a deep sea, and subsequently compacted and cemented together with time. These processes have resulted in a fine-textured rock, which is however easily worked due to it being poorly cemented in comparison with other limestones.
23. While at present there are no arrangements for surface collection and water management, the site generally appears to slope downwards from south to north; however some areas on site retain rainwater, and the southwestern boundary slopes southwards.
24. As mentioned, only part of the ground surface of the site as it currently exists is concreted; the remainder is untreated and unsurfaced.

Hydrology

25. The main hydrological feature within the site is the mean sea level aquifer (**Figure 10**), since the site is located in the Malta Main Mean Sea Level Groundwater Body (MT001). This aquifer covers an area of 217 km². The maximum length is 21 km whilst the maximum width is 13 km. The mean groundwater thickness is 67.5 m. The groundwater at the Scheme site is found at a depth of around 56 to 60 m below the land surface, since the site is located from around 58 to 62 m above sea level, and the groundwater in the area can be assumed to be 1 to 2 m above mean sea level.⁴
26. The site is located in a Drinking Water Protection Zone and a Drinking Water Safeguard Zone. The Malta Main Mean Sea Level Groundwater Body (MT001) is designated as a Drinking Water Protection Zone. Drinking Water Protection Zones

² Malta Resources Authority (2004) *Malta Main Mean Sea Level Groundwater Body*
<http://mra.org.mt/wp-content/uploads/2012/08/MT001.pdf>.

³ Terracore (2013) *Service Tender for a Soil Baseline Survey Project: ERDF I56: Final Report*
www.mepa.org.mt/EIACMS/documents/activity/Activity_5-130315_Final_report.pdf.

⁴ Sapiano, M (Water Policy Unit within the Ministry for Energy and Health). Personal communication (email), 9th October 2014.

correspond to those groundwater bodies that are used for abstraction of water. The Drinking Water Safeguard Zones are areas with a focus on pollution prevention measures. Drinking Water Safeguard Zones were designated by creating a buffer of 300 m around public abstraction groundwater points.

27. There are five private groundwater boreholes located at distances ranging from around 235 m to 390 m away from the site, and two Water Services Corporation groundwater boreholes located over 500 m from the site (**Figure 10**). WSC regularly monitor their boreholes for conductivity, chlorides and nitrates.⁵

⁵ Micallef Sultana, M (MRA). Personal communication (email), 7th October 2014.

Figure 9: Geology

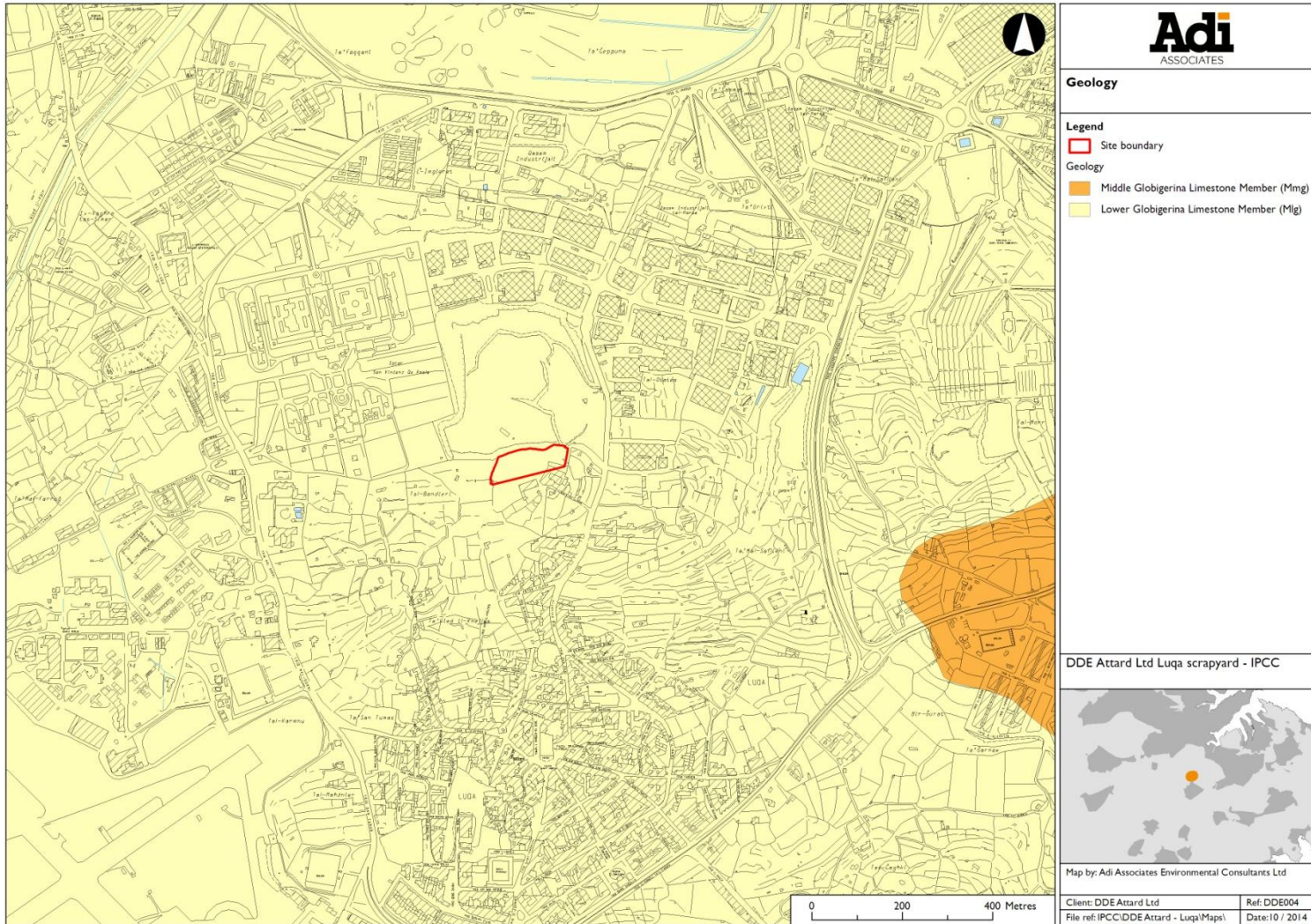
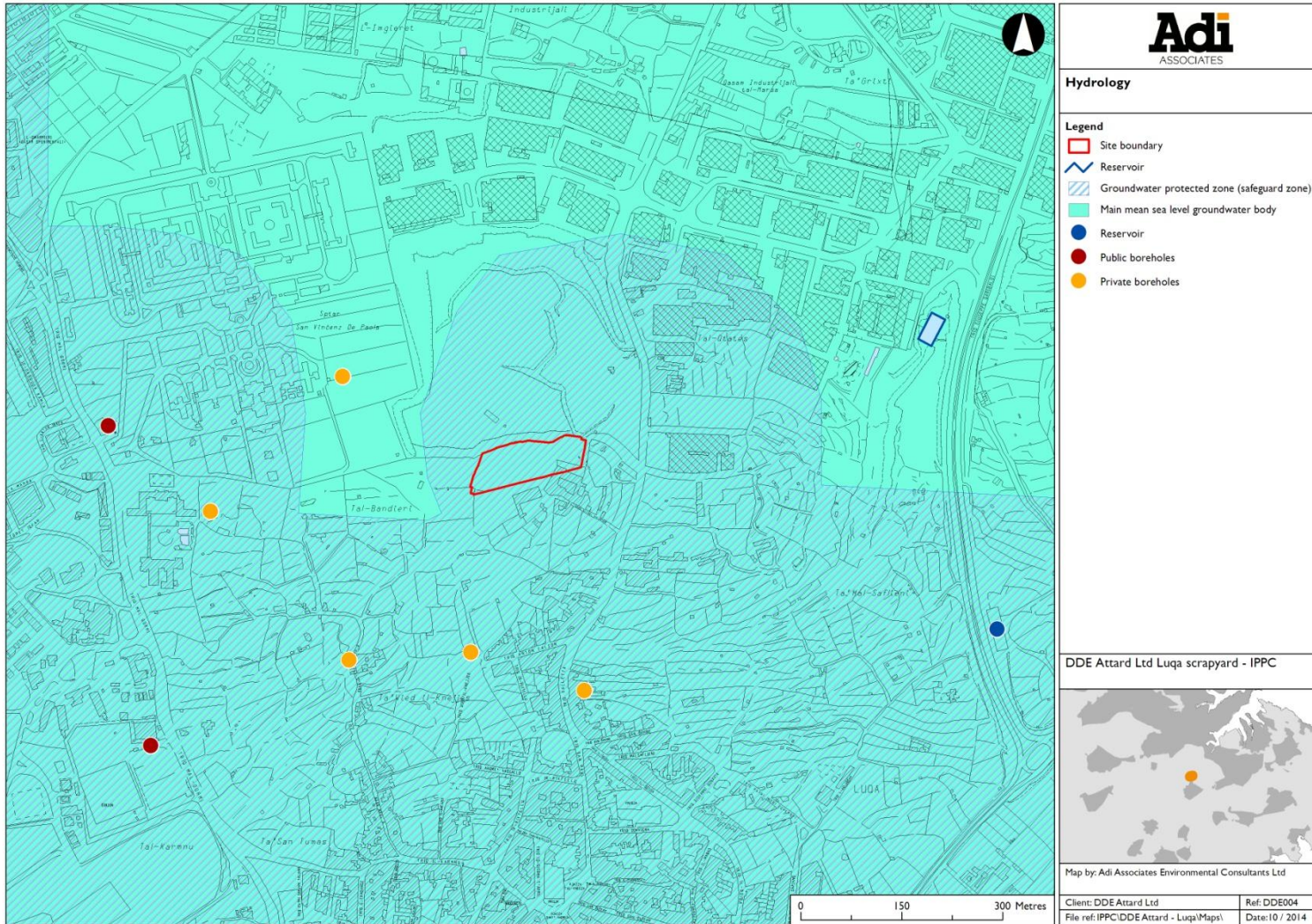


Figure 10: Hydrology



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Current Operations at the Scheme Site

28. On 28th October 2010, MEPA issued the operator with a Waste Management Permit, “*To operate a Facility for Metal recovery and storage prior to export*”. This permit was varied and renewed on 18th December 2012, with the new Environmental Permit (WM 0009/06/D) licensing the applicant “*to carry out waste management activities related to storage and processing of specified non-hazardous waste*”.
29. The Scheme site is currently regulated by an Environmental Permit (WM 0009/06/G varied on 12th March 2014). The permit authorises the following activities:
 - Temporary storage and dismantling of washing machines, cookers and water meters;
 - Storage and processing of scrap metal;
 - Sorting, storage and baling of tyres; and
 - Storage and processing of wood.
30. A site survey was carried out by Adi personnel on 28th August 2014 and 2nd October 2014 to obtain further information regarding the current site activities and carry out a preliminary visual investigation of the current state of the site.
31. Storage and stockpiling of vehicle and white good parts, including scrap metal, are carried out throughout the site. There are no delineated areas for different types of waste, although some organisation of wastes by type into stockpiles was noted. It is understood that the size and location of stockpiles changes according to the types and quantities of wastes accepted and according to how quickly they can be processed.
32. ELVs are nowadays only accepted if they have previously been dismantled to remove hazardous components. Tyres are processed by being cut using shears and then baled using an electric baler.
33. A diesel fuel tank is located approximately midway through the site, and its location has apparently remained approximately constant over the years. The tank is housed in a container that acts as a bund, and diesel is used to refuel the operator’s vehicles and machinery. The dispenser is not bunded. The operator also uses a diesel bowser to transport diesel to vehicles off-site.
34. Various unbunded fresh oil drums were noted around the site; these are used for the operator’s vehicles and machinery.
35. A site office is also present just outside the southeastern boundary.
36. Much of the ground surface is currently still untreated and unsurfaced. However, a full development permit for upgrading of the site was issued on 14th April 2014 (PA 05538/07), and included the installation of a hardstanding surface and surface water management. Following the issue of this permit, the western side of the site has been

surfaced, and there are plans to surface the remaining site area as soon as possible after core samples are taken.

37. Surfacing is being carried out using three layers to ensure impermeability:

- Concrete base layer;
- Impermeable membrane (**Figure 11**); and
- Reinforced concrete layer on top (**Figure 12**).

Figure 11: Installation of membrane underlay



Figure 12: Installation of reinforced concrete surface



Proposed Reorganisation of the Scheme Site

38. The operator is also proposing to reorganise the Scheme site as shown in **Figure 13**, to improve current operations by accommodating a new shed to bring certain activities under cover and to better organise the site. A new activity consisting of composting of garden waste is also proposed. De-pollution of ELV using standard machinery and storage of sealed containerised waste are also proposed.
39. During the discussions leading up to the formulation of the IPPC Application and following agreement on land ownership with a neighbouring site, the site boundary is being amended to take up small areas surrounding the current site; the total site area remains the same. The change in the site boundary also requires demolition of part of a building located southeast of the current site. A full development permit application to cover these changes has been submitted (TRK 158323).
40. The proposed activities will therefore be limited to:
 - ELV depollution using dedicated equipment, followed by dismantling;
 - Dismantling of Waste Electrical and Electronic Equipment (WEEE): This activity will be limited to white goods such as washing machines and cookers, as well as water meters;

- Metal processing (including shredding / crushing);
 - Baling of tyres and bumpers;
 - Wire stripping;
 - Wood processing (including shredding / crushing);
 - Storage of various materials associated with the above activities, including vehicle parts, scrap metal, wood and plastic;
 - Temporary storage of containerised waste: To consist of solid / liquid waste (including hazardous waste such as asbestos) in sealed containers, received at the site for onward shipment without any on-site processing;
 - Composting of food waste: this is an EU-funded pilot project processing around 100 t/a of waste; and
 - Maintenance of on-site machinery.
41. All processing of hazardous waste will be carried out in the covered shed. A designated quarantine area will also be included for temporary controlled storage of unpermitted waste that may inadvertently enter the site.
42. There are also plans for management of surface water (**Figure 14**). Surface water will be channelled through gutters to an underground reservoir fitted with an oil-water interceptor to clean the water before collection. It is intended that the clean water will be used for irrigation and washing within the site as far as practicable. The only overflow of surface water from the site will be clean water from this reservoir.

Figure 13: Proposed site layout

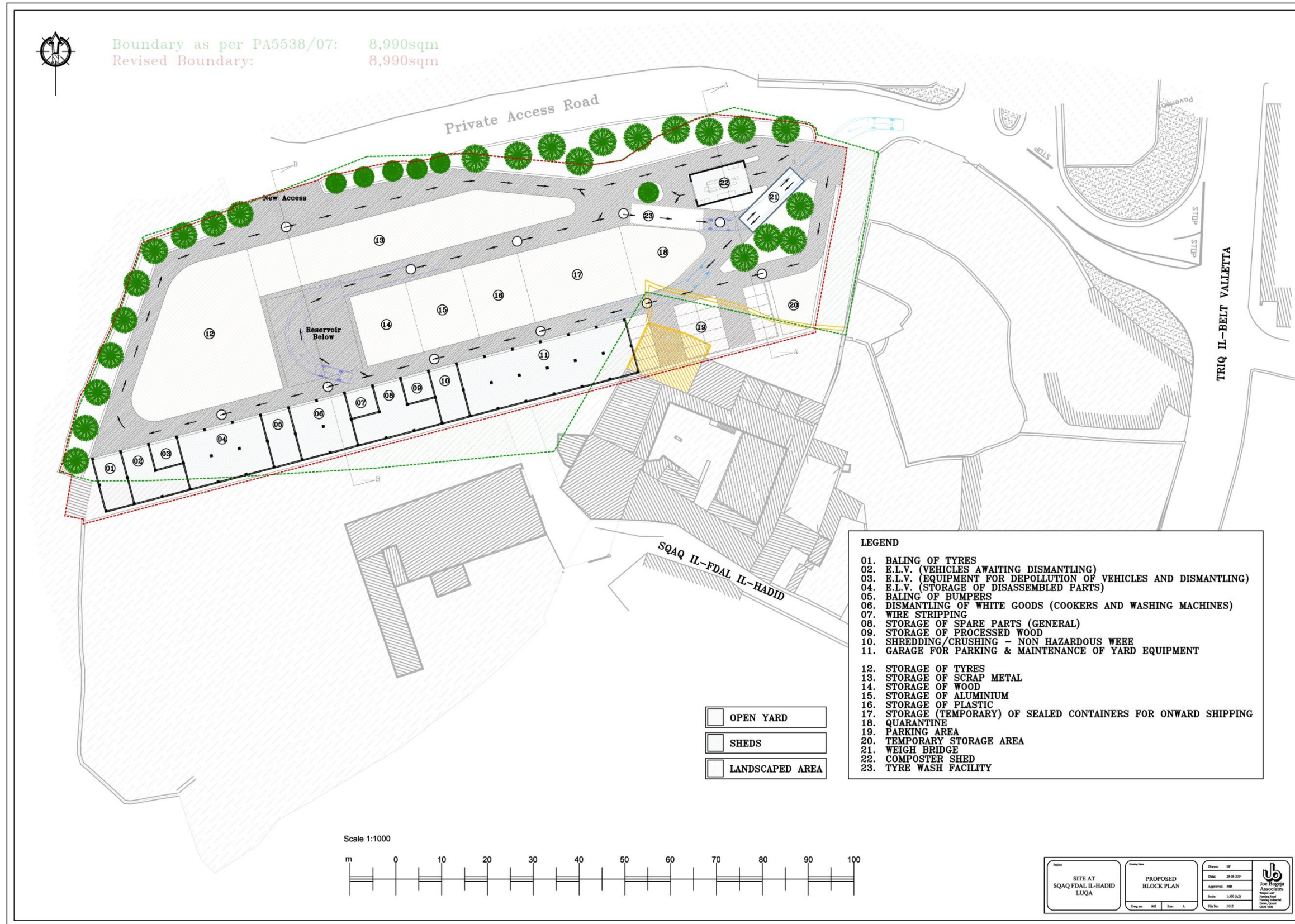
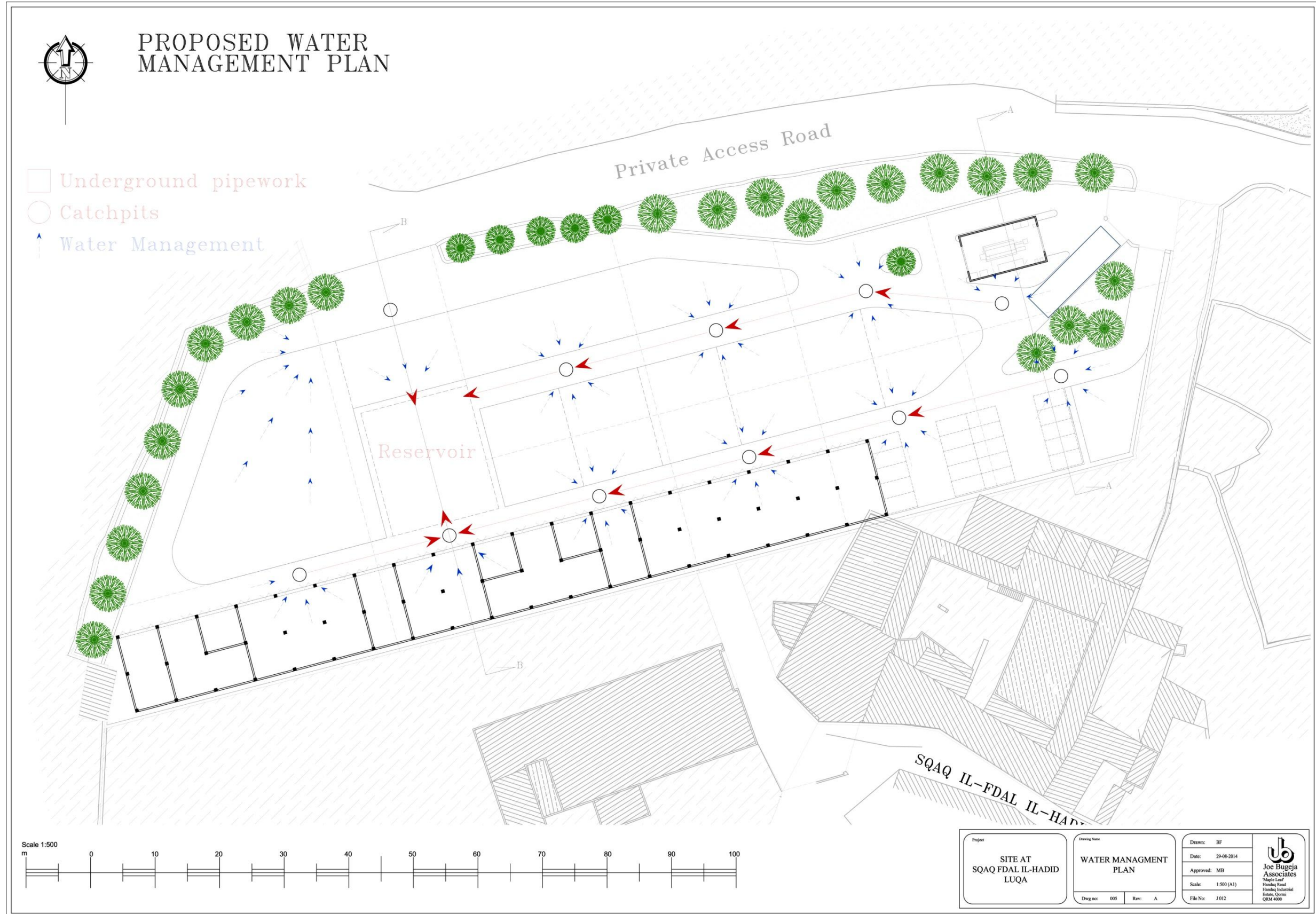


Figure 14: Surface water management



POLLUTANT LINKAGES

43. **Table I** identifies the principal source-pathway-receptor linkages for land and groundwater contamination from the Scheme site. Environmental risk occurs when there is a means by which a hazard can result in a deleterious impact on the surrounding environment, i.e. receptors. The presence of a hazard alone does not constitute a risk. A risk is only present if there is a pathway which links the source (hazard) to the receptor. This is known as the source-pathway-receptor linkage.⁶
44. If any of the three elements are absent then there is no complete linkage and thus no unacceptable risk to the environment.

Table I: Pollution pathway identification for Scheme site activities

Source	Pathway	Receptor	Mitigation Measures		
			Historic	Current	Planned
Drips and spills of liquid hazardous substances / waste during processing and storage of wastes (mainly scrap machinery) and storage and dispensing of diesel fuel	Direct contamination; Permeable land strata above water table; Rainwater runoff.	Land Groundwater	None.	Hardstanding has been installed in part of the site.	Impervious hardstanding; Surface water management, including oil-water interceptor.
Release of asbestos fibres (if accidentally broken)	Direct contamination; Permeable land strata above water table; Rainwater runoff.	Land Groundwater	No breaking of asbestos on site.	Activity discontinued.	Storage in sealed containers; Impervious hardstanding.
Crushing of vehicles using grabbers	Air dispersal; Direct contamination; Rainwater runoff (particularly for soluble components).	Land Groundwater	None.	Only dismantled car chassis are accepted at the site.	Impervious hardstanding; Surface water management, including oil-water interceptor; Vehicles to be dismantled under cover using standard ELV processing machinery; shed planned for mobile

⁶ Defra (2002) *Groundwater Protection Code: Petrol Stations and other Fuel Dispensing Facilities involving Underground Storage Tanks*
<http://archive.defra.gov.uk/environment/quality/water/waterquality/ground/documents/groundwater-petrol.pdf>.

Source	Pathway	Receptor	Mitigation Measures		
			Historic	Current	Planned
					crusher.
Burning of cables	Air dispersal; Rainwater runoff.	Land Groundwater	Attention paid to wind speed to limit dispersal.	Activity discontinued.	Activity not planned.

45. Considering the nature of the site and the current and historic activities, the principal source of hazardous substances would have been mainly small leaks of fuel, oils and other liquids during processing and storage of waste machinery such as end-of-life vehicles, as well as during storage and dispensing of diesel fuel. This would have released chemical components found in fuels, coolants, lubricants and batteries. In fact there are oily stains in several areas around the site, including near the diesel tank (**Figure 15** and **Figure 16**).
46. Asbestos could also have been released if stored material was accidentally broken during transport or storage.
47. Another source of contamination would be components released during crushing of vehicles, such as particles containing metal and asbestos (which was historically used in brake linings). In this case, the land could be contaminated directly, or indirectly through air dispersal, whereas components (especially soluble ones) could also migrate to the groundwater via rainwater runoff.
48. Burning of motor cables would also have released pollutants from the combustion of plastic / rubber surrounding the cables, including dioxins and furans, although this activity has been discontinued and is no longer planned.

Figure 15: Oily stain near diesel tank



Figure 16: Oily stains on site



49. Since most of the site is currently untreated and unsurfaced (with the exception of the recently installed hardstanding), a source-pathway-receptor linkage still exists at

present for spillages of hazardous liquids. However, as mentioned in **Table I**, the planned future mitigation measures related to site surfacing and water management should lower the environmental risk considerably. Additionally, certain practices have been discontinued and thus no longer present a risk to land / groundwater.

50. While both land and groundwater have been identified as receptors, there is no perched aquifer beneath the site, and the mean sea level aquifer is located around 56 to 60 m below the site. This reduces the risk of significant contamination of the aquifer considerably.
51. Considering that the areas surrounding the site have been used for industrial and waste management activities, in many cases with limited environmental controls in place, pollutant linkages might also exist from external activities to the Scheme site. Therefore if contamination is found on site, it will be difficult to establish whether this has arisen from the operator's activities or from other activities occurring in the surroundings, including the former Luqa rubbish dump and the adjacent waste management activity.

MONITORING METHODOLOGY

Monitoring Strategy

52. Considering that contaminants will need to first permeate through the land strata to reach the groundwater, a phased approach is proposed.
53. Initially land monitoring will be carried out from cores on site up to a depth of 2 m. If it results that contamination has reached the deeper samples, groundwater monitoring would also be considered, in consultation with MEPA and MRA, and preferably making use of the existing boreholes identified previously.

Sampling Strategy

54. A targeted sampling strategy is proposed, focusing on the areas within the site most likely to be contaminated, namely the fuel tank storage area, and the various areas on site where waste is currently stored. Internal roads are considered to have a lower risk of contamination than storage areas, and therefore will not be sampled.
55. Sampling will also avoid the western area of the site where impervious hardstanding has recently been installed, to avoid damaging the underlying membrane.
56. Sampling will also take into account the planned location of activities involving storage or maintenance of hazardous substances and waste.

Analytical Programme

57. **Table 2** presents a proposed list of analytes and a rationale for their inclusion.

Table 2: Analytes for land monitoring

Analyte	Rationale for inclusion
C12-C35 hydrocarbons (total)	Main constituents of fuels, coolants and lubricants.
C5-C12 hydrocarbons (total)	Main constituents of fuels, coolants and lubricants.
BTEX (benzene, toluene, ethylbenzene, xylene)	Fuel additives.
Metals (As, Cd, Cr VI, Cr (total), Cu, Hg, Ni, Pb, Se, Zn)	Certain metals are / used to be components of fuels, lubricating oils and batteries. ⁷
PAHs ⁸	Components of fuel, lubricating oil. ⁹
PCBs ¹⁰	Used in transformer cooling oils (traces may have been present even if transformers were received empty).
MTBE	Formerly used as an anti-knocking agent, to improve the octane rating of petrol.
Asbestos	Historically used in brake linings, asbestos has been stored on site and is proposed to be stored in future (in sealed containers).
Cyanide (total)	Component of lubricating oil. ¹¹
Dioxins and furans ¹²	By-product of burning cables (practice discontinued).
Chlorinated aliphatic hydrocarbons ¹³	Used as solvents, cleaners, and degreasing agents and included on request from MEPA (no evidence of their use on site). ¹⁴
Halogenated aliphatic hydrocarbons ¹⁵	Used as solvents, degreasing agents, pesticides and chemical intermediates and included on request from MEPA (no evidence of their use on site). ¹⁶

⁷ Pulles, T., van der Gon, H. D., Appelman, W., & Verheul, M (2012) Emission factors for heavy metals from diesel and petrol used in European vehicles. *Atmospheric Environment*, 61, 641-651. doi: 10.1016/j.atmosenv.2012.07.022.

⁸ 16 US EPA PAHs, as follows: acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, dibenzo(ah)anthracene, fluoranthene, fluorene, indeno(123-cd)pyrene, naphthalene, phenanthrene, pyrene.

⁹ Perrone, M G, et al. (2014) Exhaust emissions of polycyclic aromatic hydrocarbons, n-alkanes and phenols from vehicles coming within different European classes. *Atmospheric Environment*, 82, 391-400. doi: 10.1016/j.atmosenv.2013.10.040.

¹⁰ EC7 congeners: BZ#101, BZ#118, BZ#138, BZ#153, BZ#180, BZ#28, BZ#52, total tri-hepta.

¹¹ Elnasharty, I. Y., Kassem, A. K., Sabsabi, M., & Harith, M. A. (2011) Diagnosis of lubricating oil by evaluating cyanide and carbon molecular emission lines in laser induced breakdown spectra. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 66(8), 588-593. doi: 10.1016/j.sab.2011.06.001.

¹² 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-Heptachlorodibenzofuran, 1,2,3,4,7,8,9-Heptachlorodibenzofuran, 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-Hexachlorodibenzofuran, 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-Hexachlorodibenzofuran, 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-Hexachlorodibenzofuran, 1,2,3,7,8-Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-Pentachlorodibenzofuran, 2,3,4,6,7,8-Hexachlorodibenzofuran, 2,3,4,7,8-Pentachlorodibenzofuran, 2,3,7,8-Tetrachlorodibenzo-p-dioxin, 2,3,7,8-Tetrachlorodibenzofuran, Octachlorodibenzo-p-dioxin, Octachlorodibenzofuran.

¹³ Chloromethane, dichloromethane, trichloromethane, vinyl chloride monomer, 1,2-dichloroethane, 1,1-dichloroethylene, trichloroethylene, tetrachloroethylene.

¹⁴ Ellis, D. E., Lutz, E. J., Odom, J. M., Buchanan, R. J., Bartlett, C. L., Lee, M. D., Harkness, M. R., & DeWeerd, K. A. (2000). Bioaugmentation for accelerated in situ anaerobic bioremediation. *Environmental Science & Technology*, 34(11), 2254-2260. doi: 10.1021/es990638e.

¹⁵ Bromoform, 1,2-dibromoethane, dibromochloromethane, bromochloromethane.

¹⁶ Janssen, D. B., Scheper, A., Dijkhuizen, L., & Witholt, B. (1985). Degradation of halogenated aliphatic compounds by *Xanthobacter autotrophicus* GJ10. *Applied and Environmental Microbiology*, 49(3), 673-677.

58. Since fluoride is a component of refrigerants and such materials have not been processed on site, this analyte is not being included. Additionally, international guidance¹⁷ does not predicate the analysis of fluoride from open yards.

Sampling Points

59. The proposed sampling points are shown in **Figure 17**. In accordance with MEPA guidance on previous projects, five sampling points have been selected to ensure adequate site representation and capture potential current and future contamination, as described in **Table 3**.

Table 3: Sampling points

Point No.	Coordinates (WGS84)	Rationale
1	35°51'56.53"N, 14°29'19.49"E	Area just outside the fuel tank container. This location also corresponds to the proposed garage for parking and maintenance of yard equipment.
2	35°51'56.25"N, 14°29'17.87"E	Currently used for storage of scrap.
3	35°51'57.82"N, 14°29'17.87"E	Currently used for storage of scrap.
4	35°51'58.21"N, 14°29'20.09"E	Currently used for storage of scrap.
5	35°51'57.32"N, 14°29'20.93"E	Currently used for storage of scrap. This location also corresponds to the proposed location for the quarantine area.

60. In accordance with international guidance,^{17,18} samples will be taken at three depths to determine whether there has been any vertical distribution of pollutants. The first sample will be taken from the surface, the second at 1 m depth, and the third at 2 metres depth. Each core will be around 15 cm in length.

Sampling Methods

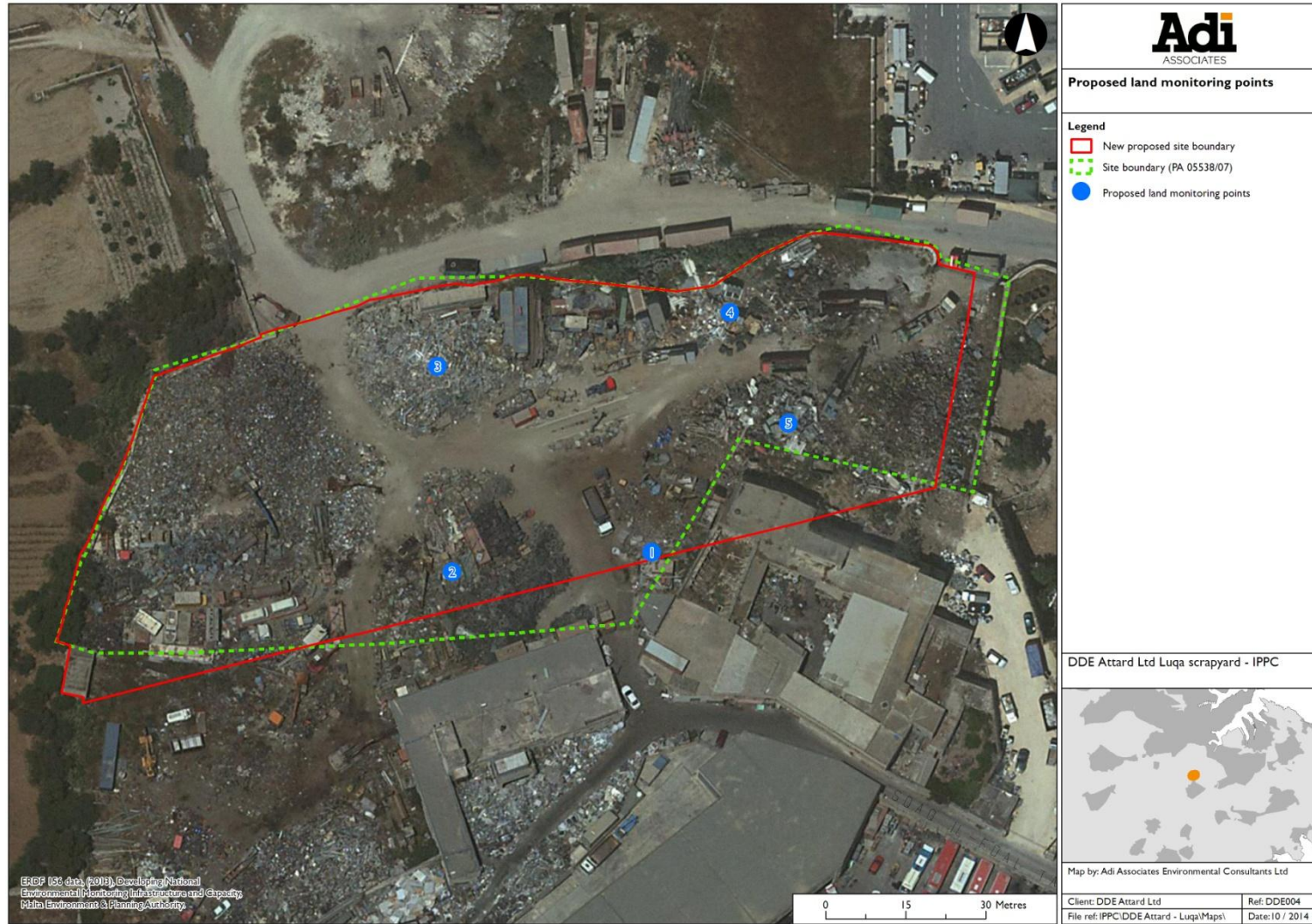
61. Land investigations will be conducted in accordance with BS 4019: 1993: *Rotary core drilling equipment*, and BS 5930: 1999: *Code of practice for geological site investigations*. Sampling will be supervised by a chemist.
62. The sampling point will be cleared and the core sample drilled using a Beretta T44 drill rig. A rotary solid stem auger will be used for drilling through soil and rock. This technique removes the material from the base of the borehole towards the top, and does not require the use of circulation fluids.

¹⁷ Environmental Protection Department (2011) *Practice Guide for Investigation and Remediation of Contaminated Land*

www.epd.gov.hk/epd/english/environmentinhk/waste/guide_ref/files/pg_conland_eng_2011.pdf.

¹⁸ Ministry for the Environment (2011) *Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils* www.mfe.govt.nz/publications/hazardous/contaminated-land-mgmt-guidelines-no5/guideline-5.pdf.

Figure 17: Sampling locations



INDICATIVE ONLY - Not to be used for direct interpretation

63. After each sample, the drill rig will be moved to a wash-down area and steam cleaned. Voids will be backfilled using the remaining part of the core not sent for analysis and inert screed.
64. Surface soil samples will be stored in glass jars whereas rock core samples will be placed in specially manufactured wooden trays. A small portion of each sample will also be placed in a 40 mL septum-capped vial filled to the top immediately upon sampling. The vial will be used by the lab for testing of volatile substances.
65. All samples will be photographed, labelled, and logged before being sent to the laboratory. Additionally, a record will be kept of any visual or olfactory evidence of contamination (e.g. stains, hydrocarbon odours).

Analysis

66. Samples will be delivered for analysis at a UK laboratory accredited to ISO 17025 as well as for certain specific tests as indicated in **Table 4**. A copy of the laboratory's certification will be provided to MEPA.
67. Delivery will take place by courier within a maximum of 24 hours of sampling. The vials will be kept chilled during transport.
68. **Table 4** presents the proposed methodology for analysis and associated limits of detection. The laboratory uses in-house methods for analysis based on international reference standards.

Table 4: Methods for analysis of land samples

Analyte	Analytical methodology	Reference standard ¹⁹	Limit of detection	Test-specific accreditation
C12-C35 hydrocarbons (total)	GC-FID	EPA Method 8015B, Revision 2; TNRCC Method 1006	1 mg/kg	No
C5-C12 hydrocarbons (total)	GC-MS	EPA Method 8260, Revision B	10 µg/kg	No
BTEX (benzene, toluene, ethylbenzene, xylene)	GC-MS	EPA Method 8260, Revision B	1 µg/kg	Yes (soil)
Metals (As, Cd, Cr VI, Cr (total), Cu, Hg, Ni, Pb, Se, Zn)	ICP-MS	EPA Method 6020	0.1 mg / kg	No
PAHs	GC-MS	EPA Method 8270, Revision C	0.01 mg/kg	Yes (soil)

¹⁹ The laboratory uses a documented in-house method based on the analytical methodology identified in the table. The in-house method refers to the international standards referred to in this table.

Analyte	Analytical methodology	Reference standard ¹⁹	Limit of detection	Test-specific accreditation
PCBs	GC-MS	EPA Method 8082; EPA Method 1668	0.05 µg/kg	Yes (soil)
MTBE	GC-MS	EPA Method 8260, Revision B	1 µg/kg	Yes (soil)
Asbestos	Polarised light microscopy	HSG248	Presence / absence; if asbestos is detected the quantification test has a LoD of 0.001%	Yes (soil)
Cyanide (total)	Colorimetry	DOE Methods for the Examination of Waters and Associated Materials, published by HMSO (1988) (equivalent to EPA 9014)	0.5 mg/kg	Yes (soil, down to 1 mg/kg)
PCDD/PCDF	GC-MS	EPA Method 1613	0.5 ng/kg TEQ	Yes (soil)
Chlorinated aliphatic hydrocarbons	GC-MS	EPA Method 8260	5 µg/kg, except vinyl chloride and dichloromethane (10 µg/kg)	Yes (soil), except dichloromethane
Halogenated aliphatic hydrocarbons	GC-MS	EPA Method 8260	5 µg/kg	Yes (soil), except dibromo-chloromethane

69. Each core sample will be analysed for all the analytes in **Table 4**, with the exception of dioxins and furans, which will be analysed in the surface and 2 m samples.
70. Following analysis, the samples will be appropriately disposed of by the laboratory in accordance with regulations.

Laboratory Quality Assurance and Quality Control (QA / QC)

71. The laboratory maintains several QA/QC procedures, including:
- Multi-point calibration with authentic standards (with defined minimum performance characteristics);
 - Analysis of control samples within each analytical batch, such as independent standards, matrix spikes or reference materials;
 - Analysis of reagent / method blanks within each analytical batch;
 - Ongoing quality assurance through the use of control charts in conjunction

with warning and action limits for the QC sample data; and

- Participation in external proficiency testing and inter-laboratory schemes.

ASSESSMENT OF RESULTS

72. The data will be reviewed to establish the concentration gradient of each pollutant in different areas and at different depths.
73. This assessment will also help determine whether the aquifer is at risk of contamination and therefore whether groundwater monitoring is required. If the results show that the samples at 2 m below the surface are significantly contaminated, a method statement for groundwater monitoring will be prepared, in consultation with MEPA and MRA. The method statement would preferably making use of existing boreholes where available, and the analytical programme would focus on those pollutants that have been shown to be at significantly elevated concentrations below the surface.

Annex 2: Environmental Policy

DDE Attard Ltd acknowledges its role in ensuring sustainable waste management in a manner that least impacts the environment. The company is committed to reducing the negative effects of its operations and to maximising the beneficial impacts by incorporating environmental considerations into its waste management operations.

DDE Attard Ltd will:

- Comply with all environmental legislation, including the requirements of the company's environmental permit/s;
- Continually improve its waste management operations;
- Maximise the proportion of waste prepared for reuse and sent for recovery; and
- Manage its consumption of natural resources, including electricity, water and fuel.

In order to achieve these aims, the company will:

- Upgrade the installation to minimise the risk of land and groundwater contamination;
- Minimise the facility's impact on air quality in the surroundings;
- Train all staff on the environmental aspects relevant to their duties; and
- Use environmental performance indicators to measure its environmental performance.

This policy applies to all DDE Attard Ltd's activities and services at 3, Scrap Lane, Valletta Road, Luqa, and will be communicated to all employees.



Disma Attard

Managing Director

Annex 3: Depollution equipment

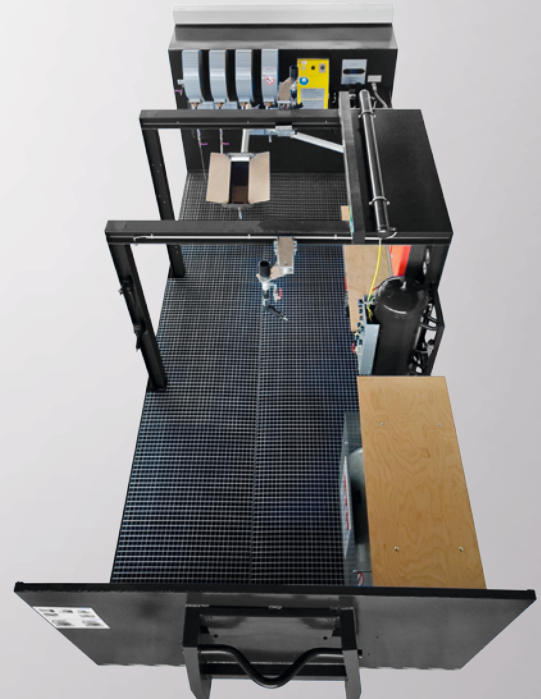
The Innovation in car depollution

STH

ANLAGENBAU

Mobile/stationary car depollution system

Car Depollution System
Mobile, STH – 003/E/12/B14
with integrated dump tanks



support frame for motor vehicles, load 3 t

STH-Huber Anlagenbau GmbH

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www.cardepollution.com
kontakt@sth-anlagenbau.de

The Innovation in car depollution



mobile/stationary car depollution system

Technical data STH 003 E/12/B14 :

Basic Features

The car depollution system STH-003/E/12/B is designed for vehicles with a size of 5000 x 1900 x 1900 mm (L x W x H) and a maximum permissible load of 3 tons.

According to a study conducted by Germany, the amounts of media used in a single car are as follows:

Medium 1: gasoline 20.0 l	Medium 6: coolant 7.0 l
Medium 2: diesel fuel 20.0 l	Medium 7: shock absorber oil 1.0 l
Medium 3: brake fluid 0.7 l	Medium 8: screen wash 3.0 l
Medium 4: motor oil 4.0 l	Medium 9: power steering fluid 1.0 l
Medium 5: gear box oil 3.0 l	Medium 10: refrigerant 3.0 l

The depollution time of a car was established on the basis of the offered compressed air procedure with a setup time of approximately 15 min. On the basis of 8 hours running time daily, the system is capable of depolluting about 32 cars per day. The depollution technology has been developed by STH-Huber Anlagenbau GmbH, Germany. All types use the same depollution technology.

The size of the carrier structure is 6300 x 2430 x 2400 mm (L x W x H). The depollution technology is integrated in the carrier and ready for use. Each type comes with the required tools. All depollution loops are fully connected and the depollution system is supplied ready for use.

The tanks meet the statutory regulations relating to the storage of water polluting liquids in the respective ratings and come fitted with venting and overflow fuses. The compressed air is supplied by a compressor (minimum capacity of 350 l/min.) The build-up of pressure is controlled by a compressed air chamber. There are free capacities for additional compressed air tools. The power supply is 220-230V and complies with the guidelines of the Association of German Electrical Engineers and is used to operate the various overflow systems.

The carrier consists of a customer-earthed tubular frame structure with an integrated grate-covered receiver pan in the floor that is sized to section of the German Law on Water Resources Management (Wasserhaushaltsgesetz). The receiver pan has a capacity of 995 litres. For better protection and ease of maintenance, the double diaphragm pumps are installed in the tank area. The tank area is fitted completely with metal panels.

The operator side is open and has an aluminium roll-up gate which can be closed for weather protection (solar radiation) and protection against unauthorized use. The support frame is made out of 120 mm-HEB broad flanged beams (designed to DIN 1025).

Advantages of a Mobile Motor Vehicle Draining Facility STH – 003/E/12/B14

1. mobility, road permit, overall size of 6300 x 2430 x 2400 mm
2. integrated tanks on the tool carrier for all media: petrol, diesel, used oil, coolant, screen wash, brakefluid
3. The dump tanks come fitted with venting, limiting value transmitters and overflow fuses
4. filtering and re-use of media petrol and diesel by means of processing for refilling in-house vehicles (by means of fuel pistols)
5. receiver pan with a capacity of 995 l (in accordance with section of the German Law on Water Resources Management)
6. support frame for motor vehicles, load 3 tons
7. flow rate – 8 hours approx. 32 vehicles
8. building licenses
9. pneumatic diaphragm pumping technology (high performance, low wear)
10. All technical devices, drilling und suction units as well as tools are included in the purchase price.



Conditions for the Installation of the Facility:

- a) building license
- b) safety distances to other constructions
- c) electric power supply by builder by means of a EURO plug 230 V
- d) earthing of the facility by builder
- e) surrounding field navigable by fork lift truck
- f) compressor, carrying capacity of minimum 350 l/min.



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Annex 4: Refrigerant recovery system

CPS® REFRIGERANT RECOVERY SYSTEM

MODEL
CR400E
SERIES



**TO BE OPERATED
BY QUALIFIED
PERSONNEL ONLY!**

TABLE OF CONTENTS

INTRODUCTION	2
SPECIFICATIONS	3
GENERAL SAFETY INSTRUCTIONS	3
DIRECT LIQUID OR VAPOR RECOVERY	4
LIQUID PUSH-PULL RECOVERY	4
ROUTINE MAINTENANCE	5

OPERATION MANUAL

INTRODUCTION

Thank you for purchasing the CPS CR400E series unit. CPS is dedicated to give you the fastest and most reliable equipment to meet all your commercial refrigerant recovery requirements.

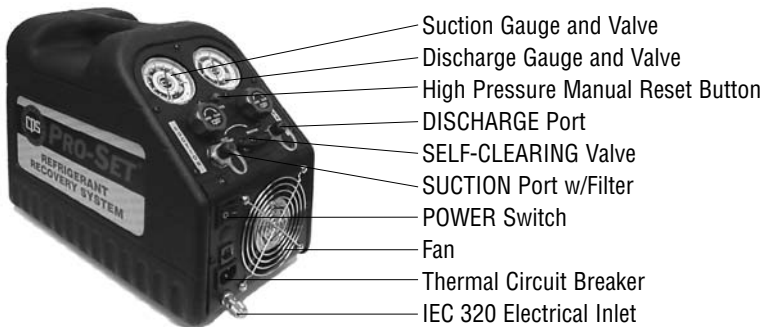
The CR400E is designed for servicing commercial and residential refrigeration systems. Simply follow the quick start guide and turn it on. No need to watch for liquid refrigerant, this unit automatically handles it. Once the recovery is complete, simply turn the center valve to the SELF-CLEARING position. Now the unit is ready for the next type of refrigerant.

The CPS CR400E series utilizes a 1/6 hp (0.35kW) compressor, nonrestrictive diaphragm manifold valves, and a liquid regulating valve to make it the first truly direct liquid or vapor refrigerant recovery unit.

The following are additional features:

- “On the Run” SELF-CLEARING valve. No need to turn off the unit when switching from recovery to self-clearing.
- On board SUCTION and DISCHARGE gauges.
- 0 to 55 bar (800-psig) discharge gauge to handle R-410A.
- Small physical size.
- Weighs only 12.6 kg (29 lbs.)
- Integrated easy to use carrying handle.
- High Pressure manual reset button set at 38 bar.
- Easy and secure filter accesses. No dangling filters to be damaged.
- Replaceable or cleanable filter cartridge.
- Heavy-duty powder coated aluminum chassis surrounded by a tough High-Density Polyethylene case.
- Maintenance free Oil-less compressor

To help you get a good start, please continue to carefully read the balance of this manual. This manual contains important information on the proper procedures for operating this equipment. Please pay close attention to the safety information, WARNING and CAUTIONS provided throughout this manual. Always remember “SAFETY FIRST”.



CR400E SPECIFICATIONS

Compressor Type	1/6 HP Reciprocating Compressor
Dimensions	20cm (8") wide x 37cm (14.5") long x 30.5cm (12") high
Weight	12.6 kg (29 lbs.)
Operating Range	0°C (32°F) to 49°C (120°F)
Power Source	220/240 VAC 50 Hz 1Ph
Power Consumption	350 W
Suction Pressure Gauge	-1 to 35 bar
Discharge Pressure Gauge	0 to 55 bar
Filtration	Cleanable 100-mesh screen integrated into Suction Port
Shut-off Valves	Suction piston type and Discharge diaphragm type manifold valves
Construction	Heavy gauge aluminum chassis w/High Density Polyethylene Case
Overload Protection	6A thermal circuit breaker
High Pressure Shut-off	38 bar 550 psig
Refrigerants	R-12, R-134a, R-401C, R-500, R-401A, R-409A, R-401B, R-407D, R-22, R-502, R-407C, R-402B, R408A, R-509, R-407A, R-404A, R-402A, R-507, R-407B, R-410A
	Flow Rate
Direct Vapor	Up to 16 kg/h (36 lbs/hr)
Direct Liquid	Up to 22 kg/h (49 lbs/hr)
Push-Pull Liquid	Up to 175 kg/h (384 lbs/hr)

GENERAL SAFETY INSTRUCTIONS

**ONLY QUALIFIED SERVICE PERSONNEL SHOULD OPERATE THIS UNIT.
MOST STATES, COUNTRIES, PROVINCES, ETC...MAY REQUIRE THE USER TO BE
LICENSED. PLEASE CHECK WITH YOUR GOVERNMENT AGENCY.**

DANGER - the recovery tank contains liquid refrigerant. Overfilling of the recovery tank may cause a violent explosion resulting in severe injury or even death. As a minimum use a scale to continuously monitor the recovery tank weight.

DANGER - Avoid breathing refrigerant vapors and lubricant vapor or mist. Breathing high concentration levels may cause heart arrhythmia, loss of consciousness, or even cause suffocation.

DANGER - ELECTRICAL SHOCK HAZARD - Always disconnect power source when servicing this equipment.

DANGER - EXPLOSION RISK. Do not recover flammable refrigerants.

CAUTION - all hoses may contain liquid refrigerant under pressure. Contact with refrigerant may cause frostbite or other related injuries. Wear proper personal protective equipment such as safety goggles and gloves. When disconnecting any hose, please use extreme caution.

CAUTION - avoid breathing refrigerant vapors and/or lubricant mist. Exposure may irritate eyes, nose, throat, and skin. Please read the manufacturers Material Safety Data Sheet for further safety information on refrigerants and lubricants.

CAUTION - to reduce the risk of fire, avoid the use of extension cords thinner than NO.14 awg. (1,5mm²) to prevent the overheating of this cord please keep length to a minimum.

CAUTION - do not use this equipment in the vicinity of spilled or open containers of gasoline or other flammable substances. Make certain that all safety devices are functioning properly before operating the equipment.

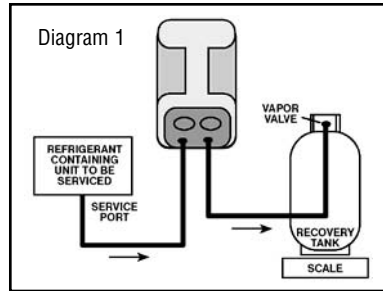
This equipment is intended for use of one refrigerant at a time until the SELF-CLEARING feature is used. Mixing of different refrigerants will cause your recovered supply of refrigerant to become contaminated. NOTE: It is very expensive to destroy mixed or damaged refrigerants.

DIRECT VAPOR OR LIQUID RECOVERY OPERATION

1. Connect the unit as shown in Diagram 1.

Note: The recovery tank must be rated for 38 bar.

2. Open the vapor valve on the Recovery Tank.
3. Open DISCHARGE valve on CR400E.
4. Rotate the center valve to the “RECOVERY” position.
5. Push the Main Power Switch “ON”.
Note: If the unit fails to start, open the suction valve and rotate the center valve to the “SELF-CLEARING” position for 5-10 seconds. Then rotate back to the “RECOVERY” position. Reset circuit breaker. Push the START switch.



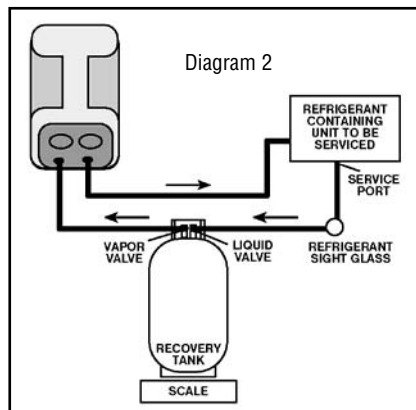
6. Once unit has started, open the SUCTION valve on the CR400E to start the refrigerant flow.
7. Monitor the suction gauge until it falls below the required vacuum level. Close the SUCTION valve.
8. Rotate the center valve to the SELF-CLEARING position. Again monitor suction gauge. Once the gauge reads a vacuum, turn unit off.
RECOVERY AND SELF-CLEARING ARE COMPLETE.

PUSH-PULL LIQUID RECOVERY OPERATION

1. Connect the unit as shown in Diagram 2.

Note: The recovery tank must be rated for 38 bar.

2. Open both valves on the Recovery Tank.
3. Open DISCHARGE valve on CR400E.
4. Rotate the center valve to the “SELF-CLEARING” position.
5. Push the Main Power Switch “ON”.
Note: If the unit fails to start, open the suction valve and rotate the center valve to the “SELF-CLEARING” position for 5-10 seconds. Then rotate back to the “RECOVERY” position. Reset circuit breaker. Push the START switch.



6. Once unit has started, open the SUCTION valve on the CR400E to start the refrigerant flow.
7. Monitor the optional inline sight glass for liquid refrigerant movement.
8. Once liquid refrigerant is no longer present, close SUCTION valve. When the SUCTION gauge falls into vacuum, proceed to Direct Vapor Recovery Operation.

ROUTINE MAINTENANCE

FILTER MAINTENANCE - the CR400E is equipped with a 100 mesh screen filter. This filter should be checked periodically. A partially clogged filter will slow down the recovery rate of this unit.

Replace the filter cartridge as follows:

1. Use a 7/8" socket or boxed end wrench to loosen the suction port as shown in Figure 1.
2. Once loose, remove the suction port- filter cartridge assembly is shown in Figure 2.
3. Either clean the current cartridge or replace with new cartridge.
4. Inspect O-ring. Re-lubricate with compressor oil or equivalent.
5. Place filter back into suction port fitting.
6. Hand tighten this assembly back onto the CR400E.
7. Use a 7/8" socket or boxed end wrench to tighten 1/8 of a turn. Do not over tighten, damage to the O-ring may occur.
8. Check the connection for leaks.

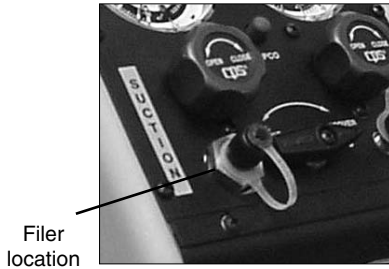


Figure 1



Figure 2

Compressor Oil Maintenance - the CR400E utilizes a hermetically sealed oil filled reciprocating compressor. It will be necessary to completely change the compressor oil periodically.

Change oil as follows:

1. The unit should have no pressure in it. If pressure exists, run Recovery until suction gauge reads a slight vacuum.
2. Remove the brass cap on the Oil Drain hose located in the lower left-hand corner of the unit.
3. Lift the unit as shown below in Figure 3. Hold until all the oil has drained out.
4. Inject 8 ounces (240 ml) of SW22 oil back into compressor.



Figure 3



Figure 4

5. Check oil level by tilting the back of the unit up 1.5" (4 cm) as shown in Figure 4. With the Oil Drain cap removed, oil should slowly drip out of the unit's oil drain port. Add oil if necessary.

WARRANTY & REPAIR POLICY

CPS® Products, INC. guarantees that all products are free of manufacturing and material defects for one year. If the equipment should fail during the guarantee period it will be repaired or replaced (at our option) at no charge. This guarantee does not apply to equipment that have been altered, misused, or returned solely in need of field service maintenance. This repair policy does not include equipment that is determined to be beyond economical repair. All products being returned for warranty repair must be accompanied by an original bill of sale and customer contact information



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#73-021 RevB ENG.

Annex 5: BAT Assessment

COMPARISON OF THE PROCESSES AT THE SCHEME WITH THE BREF FOR WASTE TREATMENTS INDUSTRIES (PUBLISHED AUGUST 2006)

Part I: Generic BAT

Ref.	Aspect of BAT	BAT	Status at the Scheme
I.	Environmental management system (EMS)	<p>BAT is to implement and adhere to an Environmental Management System (EMS) that incorporates, as appropriate to individual circumstances, the following features: (see Chapter 4.1.2.8 of BREF)</p> <ul style="list-style-type: none"> • definition of an environmental policy for the installation by top management (commitment of the top management is regarded as a precondition for a successful application of other features of the EMS) • planning and establishing the necessary procedures • implementation of the procedures, paying particular attention to <ul style="list-style-type: none"> - structure and responsibility - training, awareness and competence - communication - employee involvement - documentation - efficient process control - maintenance programme - emergency preparedness and response - safeguarding compliance with environmental legislation. • checking performance and taking corrective action, paying particular attention to <ul style="list-style-type: none"> - monitoring and measurement (see also the Reference document on General Principles of Monitoring) - corrective and preventive action - maintenance of records - independent (where practicable) internal auditing in order to determine whether or not the environmental management system conforms to planned arrangements and has been properly implemented and 	The Scheme's EMS documentation has been submitted as part of the IPPC application (section B2.1).

Ref.	Aspect of BAT	BAT	Status at the Scheme
		<p style="text-align: center;">maintained.</p> <ul style="list-style-type: none"> • review by top management. 	
2.		<p>Three further features, which can complement the above stepwise, are considered as supporting measures. However, their absence is generally not inconsistent with BAT. These three additional steps are:</p> <ul style="list-style-type: none"> • having the management system and audit procedure examined and validated by an accredited certification body or an external EMS verifier • preparation and publication (and possibly external validation) of a regular environmental statement describing all the significant environmental aspects of the installation, allowing for year-by-year comparison against environmental objectives and targets as well as with sector benchmarks as appropriate • implementation and adherence to an internationally accepted voluntary system such as EMAS and EN ISO 14001:1996. This voluntary step could give higher credibility to the EMS. In particular EMAS, which embodies all the above-mentioned features, gives higher credibility. However, non-standardised systems can in principle be equally effective provided that they are properly designed and implemented. 	<p>The EMS has been prepared by external consultants, in consultation with the operator.</p> <p>Following the issue of the IPPC permit, an Environmental Management Programme (EMP) report (for the previous year) and proposal (for the following year) will be submitted annually to ERA as part of the Annual Environmental Report. ERA normally publishes these reports on its website.</p>
3.		<p>Specifically for this industry sector, it is also important to consider the following potential features of the EMS:</p> <ul style="list-style-type: none"> • giving consideration to the environmental impact from the eventual decommissioning of the unit at the stage of designing a new plant 	<p>The EMP includes upgrades to the plant such as the installation of a hardstanding surface and surface water management. These reduce the risk of land and groundwater contamination and therefore facilitate the eventual decommissioning. Please refer to sections B2.1 and B2.2.1 of the application.</p> <p>An outline decommissioning plan is also included in the application – please refer to section B2.10.</p>

Ref.	Aspect of BAT	BAT	Status at the Scheme
4.		<ul style="list-style-type: none"> giving consideration to the development of cleaner technologies 	<p>Please refer to point 3.</p> <p>Additionally, the site upgrades include the use of ELV depollution equipment, storage of hazardous liquid waste in a covered shed, and designation of a formal quarantine area.</p>
5.		<ul style="list-style-type: none"> where practicable, sectoral benchmarking on a regular basis, including energy efficiency and energy conservation activities, choice of input materials, emissions to air, discharges to water, consumption of water and generation of waste 	<p>Internal benchmarking against the Scheme's previous year's environmental performance is planned as part of the EMP and the annual reporting to ERA.</p>
6.	Activities carried out	<p>Ensure the provision of full details of the activities carried out on-site. A good detail of that is contained in the following documentation (see Section 4.1.2.7 and related to the previous aspect (preparation and publication).</p> <ul style="list-style-type: none"> descriptions of the waste treatment methods and procedures in place in the installation 	<p>Please refer to sections B2.2.1 and B3.1.1 of the IPPC application.</p>
7.		<ul style="list-style-type: none"> diagrams of the main plant items where they have some environmental relevance, together with process flow diagrams (schematics) 	<p>A diagram for the composter is included in section B2.2.1 of the IPPC application; equipment diagrams for other plant are not environmentally relevant. For process flow diagrams, please refer to section B2.2.3 of the IPPC application.</p>
8.		<ul style="list-style-type: none"> details of the chemical reactions and their reaction kinetics/energy balance 	<p>Not applicable. No chemical reactions are planned at the Scheme.</p>
9.		<ul style="list-style-type: none"> details on the control system philosophy and how the control system incorporates the environmental monitoring information 	<p>Please refer to the details provided on control of operations as part of the</p>

Ref.	Aspect of BAT	BAT	Status at the Scheme
			EMS (section B2.1 of the IPPC application), and for the composter, as part of B2.2.1 of the IPPC application.
10.		<ul style="list-style-type: none"> details on how protection is provided during abnormal operating conditions such as momentary stoppages, start-ups, and shutdowns 	<p>Please refer to section B2.2.2 of the IPPC application.</p> <p>Start-up and shut-down of diesel-operated machinery would only result in slightly elevated emissions for a very limited time, and these are minimised through maintenance.</p>
11.		<ul style="list-style-type: none"> an instruction manual 	Please refer to section B2.9 of the IPPC application.
12.		<ul style="list-style-type: none"> an operational diary (related to the next aspect) 	<p>A site diary will be kept that includes records of the following:</p> <ul style="list-style-type: none"> Quantities of waste accepted on site; Quantities of waste removed from site for disposal / recovery; Quantities of waste refused entry; Quantities of waste sent to the quarantine area and the associated waste carrier; Incidents on site and remedial action taken; Names of visitors; and Any other notable incidents.
13.		<ul style="list-style-type: none"> an annual survey of the activities carried out and the waste treated. The annual 	Records of incoming and outgoing

Ref.	Aspect of BAT	BAT	Status at the Scheme
		survey should also contain a quarterly balance sheet of the waste and residue streams, including the auxiliary materials used for each site (related to the EMS aspect).	wastes are already kept, and monthly records are currently reported to ERA on an annual basis as part of the AER. Record-keeping and reporting will follow the requirements of the IPPC permit.
14.	Housekeeping procedure	Have a good housekeeping procedure in place, which will also cover the maintenance procedure, and an adequate training programme, covering the preventive actions that workers need to take on health and safety issues and environmental risks (see Sections 4.1.1.4, 4.1.1.5, 4.1.2.5, 4.1.2.10, 4.1.4.8 and 4.1.4.3).	A maintenance programme is included in section B2.5 and a training programme is included in section B2.9 of the IPPC application. Regular cleaning of the site is already implemented, and housekeeping will improve once the site is fully surfaced.
15.		4.1.1.4: Sampling	<p>Considering the nature of the waste, a visual check of the waste upon unloading will be sufficient to determine whether the waste received matches the waste types that the facility will be authorised to receive; no sampling or laboratory analysis is necessary.</p> <p>However, to minimise environmental risks, sealed containers containing hazardous waste will not be opened on site. They will only be opened at the final receiving facility.</p>
16.		4.1.1.5: Reception facilities, including quarantine, sampling / analysis	A quarantine area is planned. In the event of any waste appearing not to fall within the list of authorised waste after the truck has been unloaded,

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17.		<p>4.1.2.5: Management techniques, including operational control, provision and maintenance of suitable infrastructure, effluent, qualifications of personnel, peripheral structures (e.g. property boundaries, signs designating the location of parking places and storage facilities, lighting, scales, a workshop)</p> <p>4.1.2.10: Qualified personnel</p>	<p>such waste will be placed in the quarantine area and removed from the site to an authorised facility as soon as practicable, typically within a few days.</p> <p>The Scheme is managed by Disma Attard, whereas Daniel Attard provides the technically competent management and day-to-day supervision for the site. Please refer to sections B2.1 and B8 of the IPPC application. Operational control is provided through training and supervision of personnel; please refer to section B2.9 of the IPPC application.</p> <p>Infrastructure such as hardstanding and surface water management will be installed and maintained to minimise risks to land and groundwater. Please refer to section B2.5 of the IPPC application for a maintenance programme.</p> <p>Peripheral structures will be installed as shown in the site layout plan (please refer to section B2.2.1 of the application).</p>

Ref.	Aspect of BAT	BAT	Status at the Scheme
18.		4.1.4.8: Transfer from containers	<p>There will be no mixing of incompatible waste.</p> <p>The only environmentally relevant transfer to / from containers is the filling up of the diesel tank (and generator day tank) and diesel dispensing. Measures will be in place to prevent and control spills, as described in the Spill Prevention and Response Plan (section B2.8 of the Application).</p>
19.		4.1.4.3: Maintenance of storage	<p>The site's hardstanding will be included in the inspection and maintenance programme. Please refer to section B2.5 of the IPPC application.</p>
20.	Relationship with waste producer / holder	Try to have a close relationship with the waste producer/holder in order that the customers sites implement measures to produce the required quality of waste necessary for the waste treatment process to be carried out (see Section 4.1.2.9).	<p>The Scheme has good relationships with waste suppliers to help ensure the good quality of the incoming waste.</p> <p>With regard to the composting plant, a close relationship will be maintained with the waste generators to ensure only the correct waste is received.</p> <p>Other waste is typically received following a competitive bidding process. Except for waste in containers (which is not opened on site), waste is inspected upon receipt</p>

Ref.	Aspect of BAT	BAT	Status at the Scheme
			to ensure it is as described. Waste may be refused if unacceptable.
21.	Staff	Have sufficient staff available and on duty with the requisite qualifications at all times. All personnel should undergo specific job training and further education (see Section 4.1.2.10. This is also related to the Housekeeping procedure aspect).	Please refer to section B2.9 of the IPPC application.
22.	Waste IN Knowledge	Have a concrete knowledge of the waste IN. Such knowledge needs to take into account the waste OUT, the treatment to be carried out, the type of waste, the procedure under consideration (see next aspects) and the risk (related to waste OUT and the treatment) (see Section 4.1.1.1). Guidance on some of these issues is provided in Sections 4.2.3, 4.3.2.2 and 4.4.1.2.	Only very specific waste types are accepted for processing, where a visual check will easily confirm whether the waste is as expected. WEEE and ELV are also under direct observation by site operatives throughout the process.
23.	Waste IN Pre-acceptance procedure	<p>Implement a pre-acceptance procedure containing at least the following items (see Section 4.1.1.2):</p> <ul style="list-style-type: none"> • tests for the incoming waste with respect to the planned treatment • making sure that all necessary information is received on the nature of the process(es) producing the waste, including the variability of the process. The personnel having to deal with the pre-acceptance procedure need to be able due to his profession and/or experience to deal with all necessary questions relevant for the treatment of the wastes in the WT facility • a system for providing and analysing a representative sample(s) of the waste from the production process producing such waste from the current holder. • a system for carefully verifying, if not dealing directly with the waste producer, the information received at the pre-acceptance stage, including the contact details for the waste producer and an appropriate description of the waste regarding its composition and hazardousness • making sure that the waste code according to the European Waste List (EWL) is provided • identifying the appropriate treatment for each waste to be received at the 	<p>Please refer to points 15 and 16 above.</p> <p>It is to be noted that the Scheme will only accept a limited and defined set of wastes for processing, and the treatment method for each type of waste is well-defined. The correctness of the EWC code will also be verified upon receipt of the waste.</p>

Ref.	Aspect of BAT	BAT	Status at the Scheme
		installation (see Section 4.1.2.1) by identifying a suitable treatment method for each new waste enquiry and having a clear methodology in place to assess the treatment of waste, that considers the physico-chemical properties of the individual waste and the specifications for the treated waste.	
24.	Waste IN Acceptance procedure	<p>Implement an acceptance procedure containing at least the following items (see Section 4.1.1.3):</p> <ul style="list-style-type: none"> • a clear and specified system allowing the operator to accept wastes at the receiving plant only if a defined treatment method and disposal/recovery route for the output of the treatment is determined (see pre-acceptance in the previous aspect). Regarding the planning for the acceptance, it needs to be guaranteed that the necessary storage (see Section 4.1.4.1), treatment capacity and dispatch conditions (e.g. acceptance criteria of the output by the other installation) are also respected • measures in place to fully document and deal with acceptable wastes arriving at the site, such as a pre-booking system, to ensure e.g. that sufficient capacity is available • clear and unambiguous criteria for the rejection of wastes and the reporting of all non conformances • visually inspect the waste IN to check compliance with the description received during the pre-acceptance procedure. <i>For some liquid and hazardous waste, this BAT is not applicable</i> (see Section 4.1.1.3). 	Please refer to point 23. A delivery schedule will also be agreed to with food waste suppliers.
25.		<ul style="list-style-type: none"> • a system for identifying the maximum capacity limit of waste that can be stored at the facility 	The storage capacity is defined by the dimensions of the various designated areas on site, and will not be exceeded. Additionally, the maximum quantity of tyres stored on site at any time will not exceed 50 tonnes to reduce fire risk. Moreover, food waste will only be accepted on site if it can start to be treated within 48 hours.

Ref.	Aspect of BAT	BAT	Status at the Scheme
26.	Waste IN Sampling procedures	<p>Implement different sampling procedures for all different incoming waste vessels delivered in bulk and/or containers. These sample procedures may contain the following items (see Section 4.1.1.4):</p> <ul style="list-style-type: none"> • sampling procedures based on a risk approach. Some elements to consider are the type of waste (e.g. <i>hazardous</i> or non-hazardous) and the knowledge of the customer (e.g. waste producer) • check on the relevant physico-chemical parameters. The relevant parameters are related to the knowledge of the waste needed in each case • registration of all waste materials • have different sampling procedures for bulk (liquid and solids), large and small containers and laboratory smalls. The number of samples taken should increase with the number of containers. In extreme situations, small containers must all be checked against the accompanying paperwork. The procedure should contain a system for recording the number of samples and degree of consolidation • details of the sampling of wastes in drums within designated storage, e.g. the time-scale after receipt • sample prior to acceptance • maintenance of a record at the installation of the sampling regime for each load, together with a record of the justification for the selection of each option • a system for determining and recording: <ul style="list-style-type: none"> - a suitable location for the sampling points - the capacity of the vessel sampled (for samples from drums, an additional parameter would be the total number of drums) - the number of samples and degree of consolidation - the operating conditions at the time of sampling • a system to ensure that the waste samples are analysed (see Section 4.1.1.5) • in the case of cold ambient temperatures, a temporary storage may be needed in order to allow sampling after defrosting. This may affect the applicability of some of the above items in this BAT (see Section 4.1.1.5). 	Please refer to point 15.
27.	Waste IN	Have a reception facility covering at least the following issues (see Section 4.1.1.5):	Please refer to points 15 and 16.

Ref.	Aspect of BAT	BAT	Status at the Scheme
	Reception facility	<ul style="list-style-type: none"> • have a laboratory to analyse all the samples at the speed required by BAT. Typically this requires having a robust quality assurance system, quality control methods and maintaining suitable records for storing the analyses results. <i>Particularly for hazardous wastes, this often means that the laboratory needs to be on-site</i> • have a dedicated quarantine waste storage area as well as written procedures to manage non-accepted waste. If the inspection or analysis indicates that the wastes fail to meet the acceptance criteria (including, e.g. damaged, corroded or unlabelled drums) then the wastes can be temporarily stored there safely. Such storage and procedures should be designed and managed to promote the rapid management (typically a matter of days or less) to find a solution for that waste • have a clear procedure dealing with wastes where inspection and/or analysis prove that they do not fulfil the acceptance criteria of the plant or do not fit with the waste description received during the pre-acceptance procedure. The procedure should include all measures as required by the permit or national/international legislation to inform competent authorities, to safely store the delivery for any transition period or to reject the waste and send it back to the waste producer or to any other authorised destination • move waste to the storage area only after acceptance of the waste • mark the inspection, unloading and sampling areas on a site plan • a system to ensure that the installation personnel who are involved in the sampling, checking and analysis procedures are suitably qualified and adequately trained, and that the training is updated on a regular basis • the application of a waste tracking system unique identifier (label/code) to each container at this stage. The identifier will contain at least the date of arrival on-site and the waste code. 	
28.		<ul style="list-style-type: none"> • have a sealed drainage system 	A sealed drainage system will be in place, including treatment before acceptance of potentially contaminated surface water in the reservoir. Please

Ref.	Aspect of BAT	BAT	Status at the Scheme
29.	Waste OUT Analysing	Analyse the waste OUT according to the relevant parameters important for the receiving facility (e.g. landfill, incinerator) (see Section 4.1.1.1).	refer to sections B2.8 (“Overview”) and B3.5 of the IPPC application. The outgoing waste types are very well-defined and laboratory analysis is not generally necessary to establish the correct receiving facility. Please refer to section B3.1 of the application. However, testing of compost will be carried out. Please refer to section B3.10 of the IPPC application.
30.	Management systems Traceability	<p>Have a system in place to guarantee the traceability of waste treatment. Different procedures may be needed to take into account the physico-chemical properties of the waste (e.g. liquid, solid), type of WT process (e.g. continuous, batch) as well as the changes that may occur to the physico-chemical properties of the wastes when the WT is carried out. A good traceability system contains the following items (see Section 4.1.2.3):</p> <ul style="list-style-type: none"> • documenting the treatments by flow charts and mass balances (see Section 4.1.2.4) • carrying out data traceability through several operational steps (e.g pre-acceptance/acceptance/ storage/treatment/dispatch). Records can be made and kept up-to-date on an ongoing basis to reflect deliveries, on-site treatment and dispatches. Records are typically held for a minimum of six months after the waste has been dispatched • recording and referencing the information on waste characteristics and the source of the waste stream, so that it is available at all times. A reference number needs to be given to the waste and needs to be obtainable at any time in the process to enable the • operator to identify where a specific waste is in the installation, the length of time it has been there and the proposed or actual treatment route • having a computer database/series of databases, which are regularly backed up. The 	Mass flow diagrams have been prepared – please refer to section B2.2.3 of the IPPC application. Records of incoming and outgoing waste are also kept. An inventory of the wastes in storage at the end of each year is also kept and reported to ERA.

Ref.	Aspect of BAT	BAT	Status at the Scheme
		<p>tracking system operates as a waste inventory/stock control system and includes: date of arrival on-site, waste producer details, details on all previous holders, an unique identifier, pre-acceptance and acceptance analysis results, package type and size, intended treatment/ disposal route, an accurate record of the nature and quantity of wastes held on-site including all hazards details on where the waste is physically located in relation to a site plan, at which point in the designated disposal route the waste is currently positioned</p> <ul style="list-style-type: none"> only moving drums and other mobile containers between different locations (or loaded for removal off site) under instructions from the appropriate manager, ensuring that the waste tracking system is amended to record these changes (see Section 4.1.4.8). 	
31.	<p>Management systems Mixing and blending rules</p>	<p>Have and apply mixing/blending rules oriented to restrict the types of wastes that can be mixed/blended together in order to avoid increasing pollution emission of down-stream waste treatments. These rules need to consider the type of waste (e.g. <i>hazardous</i>, non-hazardous), waste treatment to be applied as well as the following steps that will be carried out to the waste OUT (see Section 4.1.5).</p>	<p>Not applicable. Wastes will be processed according to well-defined procedures for each type of waste. Only wastes of the same type will be processed / stored together.</p>
32.	<p>Management systems Segregation and compatibility procedure</p>	<p>Have a segregation and compatibility procedure in place (see Section 4.1.5), including:</p> <ul style="list-style-type: none"> keeping records of the testing, including any reaction giving rise to safety parameters (increase in temperature, generation of gases or raising of pressure); a record of the operating parameters (viscosity change and separation or precipitation of solids) and any other relevant parameters, such as generation of odours (see Sections 4.1.4.13 and 4.1.4.14) packing containers of chemicals into separate drums based on their hazard classification. Chemicals which are incompatible (e.g. oxidisers and flammable liquids should not be stored in the same drum (see Section 4.1.4.6). 	<p>Not applicable. Only wastes of the same type will be processed / stored together.</p>
33.	<p>Management systems Efficiency</p>	<p>Have an approach for improving waste treatment efficiency. This typically includes the finding of suitable indicators to report WT efficiency and a monitoring programme (see Section 4.1.2.4).</p>	<p>Reuse, recycling, recovery and disposal records are kept. Targets on the proportion of waste prepared for</p>

Ref.	Aspect of BAT	BAT	Status at the Scheme
			reuse and sent for recovery are included in the EMS – please refer to section B2.1 of the IPPC application.
34.	Management systems Accident Management Plan	Produce a structured accident management plan (see Section 4.1.7).	A risk assessment and emergency preparedness and response plans are included in section B2.8 of the IPPC application.
35.	Management systems Incident diary	Have and properly using an incident diary (see Section 4.1.7).	Please refer to point 12 above.
36.	Management systems Noise and vibration management plan	Have a noise and vibration management plan in place as part of the EMS (see Section 4.1.8). For some WT installations, noise and vibration may not be an environmental problem.	The noise assessment carried out concludes that there is no discernible impact from the Scheme on the ambient noise levels at the identified noise-sensitive receptors, and that the addition of the shredder is unlikely to have any significant impact on the noise climate at the sensitive receptors. Please refer to section B3.9 of the IPPC application.
37.	Management systems Decommissioning	Consider any future decommissioning at the design stage. For existing installations and where decommissioning problems are identified, put a programme to minimise these problems in place (see Section 4.1.9).	Please refer to point 3 above. An outline decommissioning plan has also been prepared – please refer to section B2.10 of the IPPC application.
38.	Utilities and raw material management Raw material consumption and generation	Provide a breakdown of the energy consumption and generation (including exporting) by the type of source (i.e. electricity, gas, liquid conventional fuels, solid conventional fuels and waste) (see Section 4.1.3.1). This involves: <ul style="list-style-type: none"> • reporting the energy consumption information in terms of delivered energy • reporting the energy exported from the installation • providing energy flow information (for example, diagrams or energy balances) 	Please refer to section B2.6 of the IPPC application.

Ref.	Aspect of BAT	BAT	Status at the Scheme
		showing how the energy is used throughout the process.	
39.	Utilities and raw material management Energy efficiency	Continuously increase the energy efficiency of the installation, by (see Section 4.1.3.4): <ul style="list-style-type: none"> • developing an energy efficiency plan • defining and calculating the specific energy consumption of the activity (or activities), setting key performance indicators on an annual basis (e.g. MWh/tonne of waste processed). • using techniques that reduce energy consumption and thereby reduce both direct (heat and emissions from on-site generation) and indirect (emissions from a remote power station) emissions 	Please refer to section B2.6 of the IPPC application.
40.	Utilities and raw material management Internal benchmarking	Carry out an internal benchmarking (e.g. on an annual basis) of raw materials consumption. Some applicability limitations have been identified and these are mentioned in Section 4.1.3.5.	The raw materials used have been identified in section B2.3 of the IPPC application. Internal benchmarking will be included as part of the environmental management programme (prepared annually as part of the EMS).
41.	Utilities and raw material management Waste as a raw material	Explore the options for the use of waste as a raw material for the treatment of other wastes (see Section 4.1.3.5). If waste is used to treat other wastes, then to have a system in place to guarantee that the waste supply is available. If this cannot be guaranteed, a secondary treatment or other raw materials should be in place in order to avoid any unnecessary waiting treatment time (see Section 4.1.2.2).	Not applicable. None of the waste outputs are usable for the treatment of other wastes – most are solids that can however, be reused / recovered / recycled.
42.	Storage and handling Storage	Apply the following techniques related to storage (see Section 4.1.4.1): <ul style="list-style-type: none"> • locating storage areas: <ul style="list-style-type: none"> - away from watercourses and sensitive perimeters, and - in such a way so as to eliminate or minimise the double handling of wastes within the installation 	Waste will only be stored in designated areas, and the entire site will have impermeable hardstanding and a surface water management system installed.
43.		<ul style="list-style-type: none"> • ensuring that the storage area drainage infrastructure can contain all possible contaminated run-off and that drainage from incompatible wastes cannot come 	Potentially contaminated runoff will be treated and collected. No

Ref.	Aspect of BAT	BAT	Status at the Scheme
		into contact with each other	incompatible waste drainage is foreseen.
44.		<ul style="list-style-type: none"> using a dedicated area/store which is equipped with all necessary measures related to the specific risk of the wastes for sorting and repackaging laboratory smalls or similar waste. These wastes are sorted according to their hazard classification, with due consideration for any potential incompatibility problems and then repackaged. After that, they are removed to the appropriate storage area 	Not applicable. No sorting and repackaging of laboratory smalls is planned.
45.		<ul style="list-style-type: none"> handling odorous materials in fully enclosed or suitably abated vessels and storing them in enclosed buildings connected to abatement 	Abatement measures related to odour emissions from the composter are described in section B3.7 of the IPPC application. Amongst others, the composter is closed and linked to a biofilter.
46.		<ul style="list-style-type: none"> ensuring that all connections between the vessels are capable of being closed via valves. Overflow pipes need to be directed to a contained drainage system (i.e. the relevant bunded area or another vessel) 	Not applicable. No overflow valves between vessels are foreseen.
47.		<ul style="list-style-type: none"> having measures available to prevent the building up of sludges higher than a certain level and the emergence of foams that may affect such measures in liquid tanks, e.g. by regularly controlling the tanks, sucking out the sludges for appropriate further treatment and using anti-foaming agents 	Input of waste into the composter will be closely monitored.
48.		<ul style="list-style-type: none"> equipping tanks and vessels with suitable abatement systems when volatile emissions may be generated, together with level meters and alarms. These systems need to be sufficiently robust (able to work if sludge and foam is present) and regularly maintained 	Please refer to point 45.
49.		<ul style="list-style-type: none"> storing organic waste liquid with a low flashpoint under a nitrogen atmosphere to 	Not applicable. Organic liquid waste

Ref.	Aspect of BAT	BAT	Status at the Scheme
		keep it inertised. Each storage tank is put in a waterproof retention area. Gas effluents are collected and treated.	will not be treated on site, and may only be received in sealed containers.
50.	Storage and handling Bundling	Separately bund the liquid decanting and storage areas using bunds which are impermeable and resistant to the stored materials (see Section 4.1.4.4).	Not applicable. No decanting is planned.
51.	Storage and handling Tank and process pipework	Apply the following techniques concerning tank and process pipework labelling (see Section 4.1.4.12): <ul style="list-style-type: none"> clearly labelling all vessels with regard to their contents and capacity, and applying an unique identifier. Tanks need to have an appropriately labelled system depending on their use and contents ensuring that the label differentiates between waste water and process water, combustible liquid and combustible vapour and the direction of flow (i.e. in or outflow) 	The only process tank on site will be the composter tank, which will labelled.
52.		<ul style="list-style-type: none"> keeping records for all tanks, detailing the unique identifier; capacity; its construction, including materials; maintenance schedules and inspection results; fittings; and the waste types which may be stored/treated in the vessel, including flashpoint limits. 	Records will be kept for the composter tank, including as part of the maintenance programme. Flash point is not relevant to this plant, which will only receive food waste (not flammable).
53.	Storage and handling Accumulation	Take measures to avoid problems that may be generated from the storage/accumulation of waste. This may conflict with BAT on “Utilities and raw material management: Waste as a raw material” when waste is used as a reactant (see Section 4.1.4.10).	Please refer to point 25 above.
54.	Storage and handling Handling	Apply the following techniques when handling waste (see Section 4.1.4.6): <ul style="list-style-type: none"> having systems and procedures in place to ensure that wastes are transferred to the appropriate storage safely having in place a management system for the loading and unloading of waste in the installation, which also takes into consideration any risks that these activities may incur. Some options for this include ticketing systems, supervision by site staff, keys 	Designated areas and routes have been defined for transfer and segregated storage of various waste types, as described in section B2.2.1 of the Application.

Ref.	Aspect of BAT	BAT	Status at the Scheme
		or colour-coded points/hoses or fittings of a specific size	
55.		<ul style="list-style-type: none"> ensuring that a qualified person attends the waste holder site to check the laboratory smalls, the old original waste, waste from an unclear origin or undefined waste (especially if drummed), to classify the substances accordingly and to package into specific containers. In some cases, the individual packages may need to be protected from mechanical damage in the drum with fillers adapted to the packaged waste properties 	Not applicable. No such waste will be accepted at the Scheme, except in sealed containers.
56.		<ul style="list-style-type: none"> ensuring that damaged hoses, valves and connections are not used 	This practice will be ensured during operation.
57.		<ul style="list-style-type: none"> collecting the exhaust gas from vessels and tanks when handling liquid waste unloading solids and sludge in closed areas which are fitted with extractive vent systems linked to abatement equipment when the handled waste can potentially generate emission to air (e.g. odours, dust, VOCs) (see Section 4.1.4.7) 	Please refer to point 45.
58.		<ul style="list-style-type: none"> using a system to ensure the bulking of different batches only takes place with compatibility testing (see Section 4.1.4.7 and 4.1.5). 	Not applicable. Please refer to point 31 above.
59.	Storage and handling Bulking and mixing	Ensure that the bulking/mixing to or from packaged waste only takes place under instruction and supervision and is carried out by trained personnel. For certain types of wastes, such a bulking/mixing needs to be carried out under local exhaust ventilation (see Section 4.1.4.8).	Not applicable. Please refer to point 31 above.
60.	Storage and handling Chemical incompatibilities	Ensure that chemical incompatibilities guide the segregation required during storage (see Section 4.1.4.13 and 4.1.4.14).	Not applicable. Please refer to point 31 above.
61.	Storage and handling Containerised	<p>Apply the following techniques when containerised wastes are handled (see Section 4.1.4.2):</p> <ul style="list-style-type: none"> storing of containerised wastes under cover. This can also be applied to any container that is held in storage pending sampling and emptying. Some exceptions 	Sealed containers will be stored in a designated area in the open yard, in accordance with accepted practice.

Ref.	Aspect of BAT	BAT	Status at the Scheme
	wastes	<p>on the applicability of this technique related to containers or waste not affected by ambient conditions (e.g. sunlight, temperature, water) have been identified (see Section 4.1.4.2). Covered areas need to have adequate provision for ventilation</p> <ul style="list-style-type: none"> maintaining the availability and access to storage areas for containers holding substances that are known to be sensitive to heat, light and water, under cover and protected from heat and direct sunlight. 	<p>However, storage will be temporary (will typically not more than a few days / weeks.) The outside area also leads to a silt-trap and oil-water interceptors.</p> <p>Other hazardous waste will be stored under cover in the shed.</p>
62.	Extractive vent systems	<p>Perform crushing, shredding and sieving operations in areas fitted with extractive vent systems linked to abatement equipment (see Section 4.1.6.1) when handling materials that can generate emission to air (e.g. odours, dust, VOCs).</p>	<p>It is typical for metal shredders to be operated outdoors. However, for wood the shredder will be used as a primary shredder and the material will not be finely shredded (the expected length of shredded material is up to 300 – 350 mm). Additionally, metals will be wetted during shredding, and this reduces dust emissions considerably.</p> <p>The composter will also shred food waste; however, this system is enclosed and linked to a biocarbon filter. Shredding of tree prunings / paper / cardboard is also not expected to cause significant emissions to air.</p>
63.	Full encapsulation / Inert atmosphere	<p>Perform crushing/shredding operations (see Sections 4.1.6.1 and 4.6) under full encapsulation and under an inert atmosphere for drums/containers containing flammable or highly volatile substances. This will avoid ignition. The inert atmosphere is to be abated.</p>	<p>Not applicable. No crushing / shredding of containers containing flammable / volatile substances is planned. Empty LPG tanks will be certified as clean before being shredded.</p>
64.	Washing processes	<p>Perform washing processes considering (see Section 4.1.6.2):</p> <ul style="list-style-type: none"> identifying the washed components that may be present in the items to be washed 	<p>Please refer to point 28.</p>

Ref.	Aspect of BAT	BAT	Status at the Scheme
		<p>(e.g. solvents)</p> <ul style="list-style-type: none"> transferring washings to appropriate storage and then treating them in the same way as the waste from which they were derived using treated waste water from the WT plant for washing instead of fresh water. The resultant waste water can then be treated in the WWTP or re-used in the installation. 	<p>Additionally, wheelie bins used for food waste will not be washed on site.</p>
65.	Air emission treatments	<p>Restrict the use of open topped tanks, vessels and pits by:</p> <ul style="list-style-type: none"> not allowing direct venting or discharges to air by linking all the vents to suitable abatement systems when storing materials that can generate emissions to the air (e.g. odours, dust, VOCs) (see Section 4.1.4.5) keeping the waste or raw materials under cover or in waterproof packaging (see Section 4.1.4.5) connecting the head space above the settlement tanks (e.g. where oil treatment is a pre-treatment process within a chemical treatment plant) to the overall site exhaust and scrubber units (see Section 4.1.4.1). 	<p>No open topped tanks, vessels or pits are foreseen.</p>
66.		<p>The use of an enclosed system with extraction, or under depression, to a suitable abatement plant. This technique is especially relevant to processes which involve the transfer of volatile liquids, including during tanker charging/discharging (see Section 4.6.1).</p>	<p>This aspect of BAT is only relevant to the composter. Abatement measures are described in section B3.7 of the IPPC application, and include a biofilter.</p>
67.		<p>Apply a suitably sized extraction system which can cover the holding tanks, pre-treatment areas, storage tanks, mixing/reaction tanks and the filter press areas, or to have in place a separate system to treat the vent gases from specific tanks (for example, activated carbon filters from tanks holding waste contaminated with solvents) (see Section 4.6.1).</p>	<p>Please refer to point 66.</p>
68.		<p>Correctly operate and maintain the abatement equipment, including the handling and treatment/disposal of spent scrubber media (see Section 4.6.11).</p>	<p>Operations will be carried out by trained operators; a training programme is included in section B2.9 of the IPPC application. A</p>

Ref.	Aspect of BAT	BAT	Status at the Scheme								
69.		Have a scrubber system in place for the major inorganic gaseous releases from those unit operations which have a point discharge for process emissions. Install a secondary scrubber unit to certain pre-treatment systems if the discharge is incompatible or too concentrated for the main scrubbers (see Section 4.6.11).	maintenance programme is included in section B2.5 of the IPPC application. Please refer to point 66.								
70.		<p>Have leak detection and repair procedures in place in installations</p> <ul style="list-style-type: none"> • handling a large number of piping components and storage and • compounds that may leak easily and create an environmental problem (e.g. fugitive emissions, soil contamination) (see Section 4.6.2). <p>This may be seen as an element of the EMS.</p>	An inspection and maintenance programme is included in section B2.5 of the IPPC application.								
71.	Air emission levels	<p>Reduce air emission to the following levels</p> <table border="1"> <thead> <tr> <th>Air parameter</th> <th>Emission levels associated to the use of BAT (mg/Nm³)</th> </tr> </thead> <tbody> <tr> <td>VOC</td> <td>7 – 20¹</td> </tr> <tr> <td>PM</td> <td>5 – 20</td> </tr> <tr> <td colspan="2">¹ For low VOC loads, the higher end of the range can be extended to 50</td> </tr> </tbody> </table> <p>by using a suitable combination of preventive and/or abatement techniques (see Section 4.6). The techniques mentioned above in the BAT ‘Air emission treatments’ section also contribute to achieve these values.</p>	Air parameter	Emission levels associated to the use of BAT (mg/Nm ³)	VOC	7 – 20 ¹	PM	5 – 20	¹ For low VOC loads, the higher end of the range can be extended to 50		As described in sections B3.6 and B3.7 of the IPPC application, emissions to air will arise from combustion, shredding, and composting (the latter with regard to odour). Emission levels are not currently available; however, sections B3.6 and B3.7 describe mitigation measures to ensure the impact on the surroundings is not significant. Monitoring will also be carried out as required by ERA.
Air parameter	Emission levels associated to the use of BAT (mg/Nm ³)										
VOC	7 – 20 ¹										
PM	5 – 20										
¹ For low VOC loads, the higher end of the range can be extended to 50											
72.	Waste water management	<p>Reduce the water use and the contamination of water by (see Sections 4.1.3.6 and 4.7.1):</p> <ul style="list-style-type: none"> • applying site waterproofing and storage retention methods 	<p>The entire site will be impermeable, and potentially contaminated rainwater reaching the site surface will be collected through surface gutters, and treated in a silt-trap and oil-water interceptors before being received in an underground 800 m³ reservoir.</p> <p>Processing of hazardous substances /</p>								

Ref.	Aspect of BAT	BAT	Status at the Scheme
73.		<ul style="list-style-type: none"> carrying out regular checks of the tanks and pits especially when they are underground 	<p>waste will take place in a covered shed; composting will also take place in a covered shed – this reduces the risk of rainwater contamination.</p> <p>There are no underground wastewater tanks and pits. All potentially contaminated water will be treated before being received in the main reservoir, thus this reservoir will only contain clean water. The firefighting water reservoir will also only contain clean water delivered by bower.</p> <p>Impermeability testing will be carried out as required by ERA in the IPPC permit.</p>
74.		<ul style="list-style-type: none"> applying separated water drainage according to the pollution load (roof water, road water, process water) 	<p>Rainwater reaching the internal roads and open storage areas (and which might be contaminated) will be collected through surface gutters, and treated in a silt-trap and oil-water interceptors before being received in this reservoir.</p> <p>Clean rainwater from roofed areas will be received in the underground reservoir without pre-treatment.</p> <p>Any process wastewater generated by the composting process will be collected separately.</p>

Ref.	Aspect of BAT	BAT	Status at the Scheme
75.		<ul style="list-style-type: none"> applying a security collection basin 	An underground reservoir is planned for the collection of clean and treated rainwater. Please refer to section B3.5 of the IPPC application.
76.		<ul style="list-style-type: none"> segregating process water from rainwater (see Section 4.7.2). 	Process wastewater will only be generated in the composting process (if any), and will be collected separately.
77.		<ul style="list-style-type: none"> performing regular water audits, with the aim of reducing water consumption and preventing water contamination 	Mains water usage records are kept, and a target for reduction of mains water consumption is included as part of the EMS (please refer to section B2.1 of the IPPC application).
78.		Have procedures in place to ensure that the effluent specification is suitable for the on-site effluent treatment system or discharge (see Section 4.7.1).	As described in section B2.2.1 of the IPPC application, the composter is not expected to generate wastewater, because water content inside the vessel is monitored and regulated. If the water content is high, shredded tree prunings / paper / cardboard are introduced into the vessel to reduce the water content. However, should any leachate be produced by condensation, the equipment has a built-in container in which it can be stored; the condensate will be discharged to sewer (and tested as required by the WSC).
79.		Avoid the effluent by-passing the treatment plant systems (see Section 4.7.1).	Not applicable. No wastewater treatment plant is planned on site.

Ref.	Aspect of BAT	BAT	Status at the Scheme
80.		Have in place and operate an enclosure system whereby rainwater falling on the processing areas is collected along with tanker washings, occasional spillages, drum washings, etc. and returned to the processing plant or collected in a combined interceptor (see Section 4.7.1).	Please refer to point 72.
81.		Segregate the water collecting systems for potentially more contaminated waters from less contaminated water (see Section 4.7.2).	Please refer to point 76.
82.		Have a full concrete base in the whole treatment area that falls to internal site drainage systems which lead to storage tanks or to interceptors that can collect rainwater and any spillage. Interceptors with an overflow to sewer usually need automatic monitoring systems, such as pH checks, which can shut down the overflow (see Section 4.1.3.6).	Please refer to point 72. There will not be any overflows to sewer. The only overflow of surface water from the site will be treated water from the main reservoir; the overflow will be to the road.
83.	Rainwater collecting	Collect the rainwater in a special basin for checking, treatment if contaminated and further use (see Section 4.7.1).	Please refer to points 72 and 74.
84.	Re-use	Maximise the re-use of treated waste waters and use of rainwater in the installation (see Section 4.7.1).	Rainwater will be used for irrigation and washing within the site as far as practicable.
85.	Daily checks	Conduct daily checks on the effluent management system and to maintain a log of all checks carried out, by having a system for monitoring the effluent discharge and sludge quality in place (see Section 4.7.1).	Daily inspections are planned for the composter. Please refer to section B2.5 of the IPPC application.
86.		Firstly identify waste waters that may contain hazardous compounds (e.g. adsorbable organically bound halogens (AOX); cyanides; sulphides; aromatic compounds; benzene or hydrocarbons (dissolved, emulsified or undissolved); and metals, such as mercury, cadmium, lead, copper, nickel, chromium, arsenic and zinc) (see Section 4.7.2). Secondly, segregate the previously identified waste water streams on-site and thirdly, specifically treat waste water on-site or off-site.	Not applicable. Please refer to point 78.

Ref.	Aspect of BAT	BAT	Status at the Scheme																		
87.		Ultimately after the application of “the water use and the contamination of water reduction”, select and carry out the appropriate treatment technique for each type of waste water (see Section 4.7.1).	Please refer to point 78.																		
88.		Implement measures to increase the reliability with which the required control and abatement performance can be carried out (for example, optimising the precipitation of metals) (see Section 4.7.1).	Not applicable. No on-site treatment of wastewater is proposed.																		
89.		Identify the main chemical constituents of the treated effluent (including the make-up of the COD) and to then make an informed assessment of the fate of these chemicals in the environment (see Section 4.7.1 and their applicability restrictions identified).	Not applicable. No on-site treatment of wastewater is proposed.																		
90.		Only discharge the waste water from its storage after the conclusion of all the treatment measures and a subsequent final inspection (see Section 4.7.1).	Please refer to point 78.																		
91.	Water emission levels	<p>Achieve the following water emission values before discharge:</p> <table border="1"> <thead> <tr> <th>Water parameter</th> <th>Emission values associated with the use of BAT (ppm)</th> </tr> </thead> <tbody> <tr> <td>COD</td> <td>20 – 120</td> </tr> <tr> <td>BOD</td> <td>2 – 20</td> </tr> <tr> <td>Heavy metals (Cr, Cu, Ni, Pb, Zn)</td> <td>0.1 – 1</td> </tr> <tr> <td>Highly toxic heavy metals:</td> <td></td> </tr> <tr> <td>As</td> <td><0.1</td> </tr> <tr> <td>Hg</td> <td>0.01 – 0.05</td> </tr> <tr> <td>Cd</td> <td><0.1 – 0.2</td> </tr> <tr> <td>Cr(VI)</td> <td><0.1 – 0.4</td> </tr> </tbody> </table> <p>by applying a suitable combination of techniques mentioned in Sections 4.4.2.3 and 4.7. The techniques mentioned above in this section on ‘waste water management’ (also contribute to reach these values.</p>	Water parameter	Emission values associated with the use of BAT (ppm)	COD	20 – 120	BOD	2 – 20	Heavy metals (Cr, Cu, Ni, Pb, Zn)	0.1 – 1	Highly toxic heavy metals:		As	<0.1	Hg	0.01 – 0.05	Cd	<0.1 – 0.2	Cr(VI)	<0.1 – 0.4	Please refer to point 78. Expected emission values in the compost condensate are not currently known, but will be tested as required by WSC. It is to be noted, however, that the input waste for composting is food waste, and therefore not hazardous.
Water parameter	Emission values associated with the use of BAT (ppm)																				
COD	20 – 120																				
BOD	2 – 20																				
Heavy metals (Cr, Cu, Ni, Pb, Zn)	0.1 – 1																				
Highly toxic heavy metals:																					
As	<0.1																				
Hg	0.01 – 0.05																				
Cd	<0.1 – 0.2																				
Cr(VI)	<0.1 – 0.4																				
92.	Management of the process generated residues	<p>BAT is to have a residue management plan (see Section 4.8.1) as part of the EMS including:</p> <ul style="list-style-type: none"> • basic housekeeping techniques • internal benchmarking techniques (see Section 4.1.2.8). 	The EMS includes a target to maximise the proportion of waste reused / recovered. As mentioned in section B3.1 of the IPPC application, over 80% of the incoming waste is reused, recycled or recovered. Disposal is only used when it is the only																		

Ref.	Aspect of BAT	BAT	Status at the Scheme
			practicable option.
			Wastewater from washing of floors will be treated in the silt-trap / interceptors and the clean water received in the reservoir for reuse (washwater from the composter area will, however, be collected separately).
93.		<p>Maximise the use of re-usable packaging (drums, containers, IBCs, palettes, etc.) (see Section 4.8.1).</p> <p>Re-use drums when they are in a good working state. In other cases, they are to be sent for appropriate treatment (see Section 4.8.1).</p>	Minimal packaging waste is foreseen; however, as described in sections B2.2.1 and B3.1, most waste will be prepared for recycling on site.
94.		Keep a monitoring inventory of the waste on-site by using records of the amount of wastes received on-site and records of the wastes processed (see Section 4.8.3).	Please refer to point 30.
95.		Re-use the waste from one activity/treatment possibly as a feedstock for another (see Section 4.1.2.6).	Please refer to point 41.
96.	Soil contamination	<p>BAT is to provide and then maintain the surfaces of operational areas, including applying measures to prevent or quickly clear away leaks and spillages, and ensuring that maintenance of drainage systems and other subsurface structures is carried out (see Section 4.8.2).</p> <p>Utilise impermeable base and internal site drainage (see Section 4.1.4.6, 4.7.1 and 4.8.2).</p>	Please refer to point 72. The maintenance programme also includes inspection and maintenance of the site's hardstanding and surface water management system – please refer to section B2.5 of the IPPC application.
97.		Reduce the installation site and minimise the use of underground vessels and pipework (see Section 4.8.2).	The size of the site has been reduced from the original, and takes into consideration the space required for optimal operations. Only clean rainwater will be stored underground; this is accepted practice in Malta and minimises land uptake.

Part 2: BAT for specific types of waste treatments

Ref.	Aspect of BAT	BAT	Status at the Scheme
98.	Biological treatments	<p>BAT is to use the following techniques for storage and handling in biological systems (see Section 4.2.2):</p> <ul style="list-style-type: none"> for less odour-intensive wastes, use automated and rapid action doors (opening times of the doors being kept to a minimum) in combination with an appropriate exhaust air collection device resulting in an under pressure in the hall for highly odour-intensive wastes, use closed feed bunkers constructed with a vehicle sluice house and equip the bunker area with an exhaust air collection device. 	Techniques for odour abatement from the composter system are described in section B3.7 of the Application.
99.		Adjust the admissible waste types and separation processes according to the type of process carried out and the abatement technique applicable (e.g. depending on the content of non-biodegradable components) (see Section 4.2.3).	The composter (including the associated abatement) has been designed to cater for the range of food wastes described in section B2.2.1 of the Application. An educational campaign will also be run at the waste generating sites to increase awareness regarding which wastes can be placed in the bin. Visual inspections will also be carried out by Scheme operators prior to tipping of the waste into the composter.
100.		<p>Use the following techniques when applying anaerobic digestion (see Sections 4.2.4 and 4.2.5):</p> <ul style="list-style-type: none"> application of a close integration between the process with the water management a recycling of the maximum amount of waste water to the reactor. See some operational issues that may appear when applying this technique in Section 4.2.4 operate the system under thermophilic digestion conditions. For certain types of wastes, thermophilic conditions cannot to be reached (see Section 4.2.4) measure TOC, COD, N, P and Cl levels in the inlet and outlet flows. When a better control of the process is required, or a better quality of the waste OUT, more parameters are necessary for measuring and controlling 	Not applicable. Digestion will be aerobic.

Ref.	Aspect of BAT	BAT	Status at the Scheme
		<ul style="list-style-type: none"> maximise the production of biogas. This technique needs to consider the effect on the digestate and biogas quality. 	
I01.		<p>Reduce the air emissions of the exhaust gas when using biogas as a fuel by restricting the emissions of dust, NO_x, SO_x, CO, H₂S and VOC by using an appropriate combination of the following techniques (see Section 4.2.6):</p> <ul style="list-style-type: none"> scrubbing the biogas with iron salts using de-NO_x techniques such as SCR using a thermal oxidation unit using activated carbon filtration. 	Not applicable. Biogas will not be used as a fuel.
I02.		<p>Improve the mechanical biological treatments (MBT) by (see Sections 4.2.2, 4.2.3, 4.2.8, 4.2.10, 4.6.23):</p>	While the composter does not include a mechanical sorting element, some of these techniques are applicable to the composter plant:
I03.		<ul style="list-style-type: none"> using fully enclosed bioreactors 	The composter is fully enclosed and stops operation when opened.
I04.		<ul style="list-style-type: none"> avoiding anaerobic conditions during aerobic treatment by controlling the digestion and the air supply (by using a stabilised air circuit) and by adapting the aeration to the actual biodegradation activity 	O ₂ content will be measured and controlled automatically.
I05.		<ul style="list-style-type: none"> using water efficiently 	Water will be used only as needed; water content during digestion is monitored and regulated.
I06.		<ul style="list-style-type: none"> thermally insulating the ceiling of the biological degradation hall in aerobic processes 	The purpose of this technique is to minimise the generation of condensate. However, the composter is not expected to generate wastewater, because water content inside the vessel is monitored and regulated.

Ref.	Aspect of BAT	BAT	Status at the Scheme
107.		<ul style="list-style-type: none"> minimising the exhaust gas production to levels of 2500 to 8000 Nm³ per tonne. Levels below 2500 Nm³ per tonne have not been reported. 	This data is not available. However, as the plant is a pilot plant minimal total exhaust gases are expected. Moreover, exhaust gases will be treated.
108.		<ul style="list-style-type: none"> guaranteeing a uniform feed 	Agreements will be signed with waste suppliers to ensure the regular availability of source-separated food waste.
109.		<ul style="list-style-type: none"> recycling process waters or muddy residues within the aerobic treatment process to completely avoid water emissions. If waste water is generated, then this should be treated to reach the water emissions values mentioned previously 	The composter is not expected to generate wastewater, because water content inside the vessel is monitored and regulated. If the water content is high, shredded tree prunings / paper / cardboard are introduced into the vessel to reduce the water content. However, should any leachate be produced by condensation, the equipment has a built-in container in which it can be stored. This will be discharged to sewer, and monitored as required by the WSC.
110.		<ul style="list-style-type: none"> continuously learning of the connection between the controlled variables of biological degradation and the measured (gaseous) emissions 	Emissions to air will be monitored as required by ERA.
111.		<ul style="list-style-type: none"> reducing emissions of nitrogen compounds by optimising the C:N ratio 	Nitrogen content is expected to be low, since the composter will not accept meat and fish derivatives unless agreed to with ERA.
112.	Emission levels for mechanical biological treatments	Reduce the emissions from mechanical biological treatments to the following levels (see Section 4.2.12):	Not applicable. The composter does not include a mechanical sorting element. However, odour emissions will be minimised as described in section B3.7 and

Ref.	Aspect of BAT	BAT	Status at the Scheme						
		<table border="1"> <thead> <tr> <th>Parameter</th> <th>Treated exhaust gas</th> </tr> </thead> <tbody> <tr> <td>Odour (ouE/m³)</td> <td><500 – 6000</td> </tr> <tr> <td>NH₃ (mg/Nm³)</td> <td><1 – 20</td> </tr> </tbody> </table> <p>For VOC and PM, see the generic BAT 41 The TWG recognised that N₂O (see Section 4.6.10) and Hg also needed to be added to this table, however not enough data were provided to validate values on these issues.</p>	Parameter	Treated exhaust gas	Odour (ouE/m ³)	<500 – 6000	NH ₃ (mg/Nm ³)	<1 – 20	ammonia emissions will be minimal since the composter will not accept meat and fish derivatives.
Parameter	Treated exhaust gas								
Odour (ouE/m ³)	<500 – 6000								
NH ₃ (mg/Nm ³)	<1 – 20								
		<p>by using an appropriate combination of the following techniques (see Section 4.6):</p> <ul style="list-style-type: none"> maintaining good housekeeping (related to BAT number 3) regenerative thermal oxidiser dust removal. 							
113.		Reduce the emissions to water to the levels mentioned in “the water emissions values”. In addition, restrict the emissions to water of total nitrogen, ammonia, nitrate and nitrite as well (see Section 4.7.7 and the concluding remarks Chapter 7).	Not applicable. The composter does not include a mechanical sorting element.						
114.	Physico-chemical treatments	BAT is to apply the following techniques in physico-chemical reactors (see Section 4.3.1.2):	Not applicable. No physico-chemical treatment is proposed.						
115.		<ul style="list-style-type: none"> clearly defining the objectives and the expected reaction chemistry for each treatment process assessing each new set of reactions and proposed mixes of wastes and reagents in a laboratory-scale test prior to waste treatment 	Not applicable.						
116.		<ul style="list-style-type: none"> specifically designing and operating the reactor vessel so that it is fit for its intended purpose 	Not applicable.						
117.		<ul style="list-style-type: none"> enclosing all treatment/reaction vessels and ensuring that they are vented to the air via an appropriate scrubbing and abatement system 	Not applicable.						
118.		<ul style="list-style-type: none"> monitoring the reaction to ensure that it is under control and proceeding towards the anticipated result 	Not applicable.						
119.		<ul style="list-style-type: none"> preventing the mixing of wastes or other streams that contain metals and complexing agents at the same time (see Section 4.3.1.3). 	Not applicable.						
120.		In addition to the generic parameters identified previously for waste water, additional	Not applicable.						

Ref.	Aspect of BAT	BAT	Status at the Scheme
		parameters need to be identified for the physico-chemical treatment of waste waters. Some reference is given on this issue in the concluding remark Chapter 7.	
I21.		<p>Apply the following techniques for the neutralisation process (see Section 4.3.1.3)</p> <ul style="list-style-type: none"> ensuring that the customary measurement methods are used separately storing the neutralised waste water performing a final inspection of the neutralised waste water after a sufficient storage time has elapsed. 	Not applicable.
I22.		<p>Apply the following techniques to aid precipitation of the metals in treatment processes (see Section 4.3.1.4):</p> <ul style="list-style-type: none"> adjusting the pH to the point of minimum solubility where the metals will precipitate avoiding the input of complexing agents, chromates and cyanides avoiding organic materials that may interfere with precipitation from entering the process allowing the resulting treated waste to clarify by decantation when possible, and/or by the addition of other dewatering equipment using sulphidic precipitation if complex agents are present. This technique may increase the sulphide concentration in the treated waste water. 	Not applicable.
I23.		<p>Apply the following techniques to break-up emulsions (see Section 4.3.1.5):</p> <ul style="list-style-type: none"> testing for the presence of cyanides in the emulsions to be treated. If cyanides are present, the emulsions need a special pre-treatment first setting up simulated laboratory tests. 	Not applicable.
I24.		<p>Apply the following techniques to oxidation/reduction (see Section 4.3.1.6):</p> <ul style="list-style-type: none"> abating the air emissions generated during the oxidation/reduction having safety measures and gas detectors in place (e.g. suitable for detecting HCN, H₂S, NO_x). 	Not applicable.

Ref.	Aspect of BAT	BAT	Status at the Scheme
I25.		Apply the following techniques to waste waters containing cyanides (see Section 4.3.1.7): <ul style="list-style-type: none"> • destroying the cyanides by oxidation • adding caustic soda in excess to prevent a decrease in pH • avoiding the mixing of cyanide wastes with acidic compounds • monitoring the progress of the reaction using electropotentials. 	Not applicable.
I26.		Apply the following techniques to waste waters containing chromium (VI) compounds (see Section 4.3.1.8): <ul style="list-style-type: none"> • avoiding the mixing of Cr(VI) wastes with other wastes • reducing Cr(VI) to Cr(III) • precipitating the trivalent metal. 	Not applicable.
I27.		Apply the following techniques to waste waters containing nitrites (see Section 4.3.1.9): <ul style="list-style-type: none"> • avoiding mixing nitrite wastes with other wastes • checking and avoiding nitrous fumes during the oxidation/acidification treatment of nitrites. 	Not applicable.
I28.		Apply the following techniques to waste waters containing ammonia (see Section 4.3.1.11): <ul style="list-style-type: none"> • using a dual column air stripping system with an acidic scrubber for waste with ammonia solutions up to 20 w/w-% • recovering the ammonia in the scrubbers and returning it to the process prior to the settlement stage • removing the ammonia removed in the gas phase by scrubbing the waste with sulphuric acid to produce ammonium sulphate • extending any air sampling for ammonia in exhaust stacks or filter press areas to cover the VOCs in filtration and dewatering (see Section 4.3.1.12). 	Not applicable.
I29.		Link the air space above filtration and dewatering processes to the main abatement system of the plant (see Section 4.3.1.12).	Not applicable.
I30.		Add flocculation agents to the sludge and waste water to be treated, to accelerate the	Not applicable.

Ref.	Aspect of BAT	BAT	Status at the Scheme
		sedimentation process and to facilitate the further separation of solids (see Section 4.3.1.16 for some applicability restrictions identified). To avoid use of flocculation agents, evaporation is better in those cases where it is economically viable (see Section 4.7.6.1).	
131.		Apply rapid cleaning and steam- or high pressure water jet cleaning of the filter apertures of the sieving processes (see Section 4.3.1.17).	Not applicable.
132.	Physico-chemical treatment of solid wastes	<p>BAT is to promote the insolubilisation of amphoteric metals, and to reduce the leaching of toxic soluble salts by a suitable combination of water washing, evaporation, recrystallisation and acid extraction (see Section 4.3.2.1, 4.3.2.8, 4.3.2.9) when immobilisation is used to treat solid waste containing hazardous compounds for land filling.</p> <p>Test the leachability of inorganic compounds, by using the standardised CEN leaching procedures and by applying the appropriate testing level: basic characterisation, compliance testing or on-site verification (see Section 4.3.2.2).</p> <p>Restrict the acceptance of wastes to be treated by solidification/immobilisation treatment to those not containing high levels of VOCs, odorous components, solid cyanides, oxidising agents, chelating agents, high TOC wastes and gas cylinders (see Section 4.3.2.3).</p> <p>Apply control and enclosure techniques for loading/unloading and enclosed conveyor systems (see Section 4.3.2.3).</p> <p>Have an abatement system(s) in place to handle the flow of air, as well as the peak loadings associated with charging and unloading (see Section 4.3.2.3).</p> <p>Use at least a solidification, vitrification, melting or fusion process before landfilling solid waste according to techniques in Sections from 4.3.2.4 to 4.3.2.7.</p>	Not applicable. No physico-chemical treatment is proposed.
133.	Re-refining of waste oils	<p>BAT is to operate a careful control of the incoming materials supported by analytical equipment (viscometry, infrared, chromatography and mass spectrometry as appropriate), laboratories and resources (see Section 4.1.1.1).</p> <p>Check at least for chlorinated solvents and PCBs (see Sections 4.1.1.1 and 4.4.1.2).</p>	Not applicable. No re-refining of waste oils on site is proposed.

Ref.	Aspect of BAT	BAT	Status at the Scheme								
		<p>Use condensation as a treatment for the gas phase of the flash distillation unit (see Section 4.6.8).</p> <p>Have vapour return lines for loading and unloading vehicles, routing all vents to a thermal oxidiser/incinerator or an activated carbon adsorption installation (see Sections 4.1.4.6, 4.6.7 and 4.6.14).</p> <p>Direct vent streams to a thermal oxidiser with waste gas treatment if chlorinated species are present in the vent stream. If high levels of chlorinated species are present then condensation followed by caustic scrubbing and an activated carbon guard bed is the preferred treatment path (see Section 4.6).</p> <p>Utilise a thermal oxidation at 850 °C with a two seconds residence time for the vacuum distillation vent of vacuum generators or for the air from process heaters (see Section 4.6).</p> <p>Use a highly efficient vacuum system (see Section 4.4.1.1).</p> <p>Use the residues from vacuum distillation or thin film evaporators as asphalt products (see Section 4.4.1.15).</p> <p>Use a re-refining process of waste oil which can achieve a yield higher than 65 % on a dry basis (see Sections from 4.4.1.1 to 4.4.1.12).</p>									
134.	Emission levels for re-refining of waste oils	<p>Achieve the following values in the discharged waste water from the re-refining unit (see Section 4.4.1.14):</p> <table border="1"> <thead> <tr> <th>Waste water parameter</th> <th>Concentration (ppm)</th> </tr> </thead> <tbody> <tr> <td>Hydrocarbons</td> <td><0.01 – 5</td> </tr> <tr> <td>Phenols</td> <td>0.15 – 0.45</td> </tr> <tr> <td colspan="2">For other water parameters, refer to BAT number 56 in the Generic BAT section</td> </tr> </tbody> </table> <p>by using a suitable combination of process-integrated techniques and/or primary, secondary, biological and finishing treatments (see Sections 4.4.1.14 and 4.7).</p>	Waste water parameter	Concentration (ppm)	Hydrocarbons	<0.01 – 5	Phenols	0.15 – 0.45	For other water parameters, refer to BAT number 56 in the Generic BAT section		Not applicable. No re-refining of waste oils on site is proposed.
Waste water parameter	Concentration (ppm)										
Hydrocarbons	<0.01 – 5										
Phenols	0.15 – 0.45										
For other water parameters, refer to BAT number 56 in the Generic BAT section											

Ref.	Aspect of BAT	BAT	Status at the Scheme
135.	Treatment of waste solvent	<p>BAT is to operate a careful control of the incoming materials as supported by analytical equipment, laboratories and resources (see Section 4.1.1.1).</p> <p>Evaporate the residue from the distillation columns and to recuperate the solvents (see Section 4.4.2.4).</p>	Not applicable. No treatment of waste solvent is proposed.
136.	Regeneration of waste catalyst	<p>BAT is to use bag filters to abate particulates from the fumes generated during the regeneration process (see Sections 4.4.3 and 4.6.5).</p> <p>Use a SO_x abatement system (see Section 4.4.3.3).</p>	Not applicable. No regeneration of waste catalyst is proposed.
137.	Regeneration of waste activated carbon	<p>BAT is to have an effective quality control procedure in place to ensure that the operator can differentiate between the carbon used for potable water or food grade carbon and the rest of spent carbons (the so-called 'industrial carbons') (see Section 4.4.4.2).</p> <p>Require a written undertaking from customers indicating what the activated carbon has been used for (see Section 4.1.2.3).</p> <p>Utilise an indirect fired kiln for industrial carbons –it may be argued that this could equally be applied to potable water carbons. However, limits on capacity and corrosion may deem that only multiple hearth or direct fired rotary kilns may be used (see Section 4.4.4.1).</p> <p>Utilise an afterburner with a minimum of 1100 °C, two seconds residence time and 6 % excess oxygen for the regeneration of industrial carbons where refractory halogenated or other thermally resistant substances are likely to be present. In other cases, less stringent thermal conditions are sufficient (see Section 4.4.4.2).</p> <p>Utilise an afterburner with a minimum heating temperature of 850 °C, two seconds residence time and 6 % excess oxygen for potable water and food grade active carbons (see Section 4.4.4.2).</p> <p>Apply a flue-gas treatment train consisting of quench and/or venturi and aqueous scrubbing sections, followed by an induced draft fan (see Section 4.4.4.2).</p> <p>Utilise a caustic or soda ash scrubbing solutions to neutralise acid gases for industrial carbon</p>	Not applicable. No regeneration of waste activated carbon is proposed.

Ref.	Aspect of BAT	BAT	Status at the Scheme
		plants (see Section 4.4.4.2). Have a WWTP containing an appropriate combination of flocculation, settlement, filtration and pH adjustment for the treatment of potable water carbons. For effluents of industrial carbons, applying additional treatments (e.g. metal hydroxide precipitation, sulphide precipitation) are also considered BAT (see Section 4.4.4.3).	
138.	Preparation of waste to be used as fuel	BAT is to try to have a close relationship with the waste fuel user in order that a proper transfer of the knowledge of the waste fuel composition is carried out (see Section 4.5.1).	The only types of wastes intended for use as fuel are petrol / diesel from ELVs (used by the Directors in their vehicles). Since the source of the fuel is known, and the chemical composition of the fuel is not altered by processing on site, these fuels can be used safely. In the case of petrol / diesel, the fuel used has similar characteristics to that sold in licensed fuel dispensers.
139.		Have a quality assurance system to guarantee the characteristics of the waste fuel produced (see Section 4.5.1).	The production of fuel is governed by the procedures described in the IPPC Application (section B2.2.1) and uses very simple processes, as described in point 138 above.
140.		Manufacture different type of waste fuels according to the type of user (e.g. cement kilns, different power plants), to the type of furnace (e.g. grate firing, blow feeding) and to the type of waste used to manufacture the waste (e.g. hazardous waste, municipal solid waste) (see Section 4.5.2).	Please refer to point 138.
141.		<i>When producing waste fuel from hazardous waste, use activated carbon treatment for low contaminated water and thermal treatment for highly polluted water (see Sections 4.5.6 and 4.7). In this context, thermal treatment relates to any thermal treatment in Section 4.7.6 or incineration which is not covered in this document.</i>	No wastewater is generated from fuel production. Precautions related to the flammability of

Ref.	Aspect of BAT	BAT	Status at the Scheme
		<i>When producing waste fuel from hazardous waste, ensure correct follow-up of the rules concerning electrostatic and flammability hazards for safety reasons (see Sections 4.1.2.7 and 4.1.7).</i>	petrol / diesel are covered by the Fire and Explosion Prevention and Response Plan (refer to section B2.8 of the IPPC Application).
I42.	Preparation of solid waste fuels from non-hazardous waste	BAT is to visually inspect the incoming waste to sort out the bulky metallic or non-metallic parts. The purpose is to protect the plant against mechanical destruction (see Section 4.1.1.3 and this is also related to BAT 8.e).	Not applicable. No solid waste fuels will be prepared from non-hazardous waste.
I43.		Use magnetic ferrous and non-ferrous metal separators. The purpose is to protect the pelletisers as well as fulfill the requirements of the final users (see Sections 4.5.3.3 and 4.5.3.4).	Not applicable; refer to point I42.
I44.		Make use of the NIR technique for the sorting out of plastics. The purpose is the reduction of organic chlorine and some metals which are part of the plastics (see Section 4.5.3.10).	Not applicable; refer to point I42.
I45.		Use a combination of shredder systems and pelletisers suitable for the preparation of the specified size waste fuel (see Sections 4.5.3.1 and 4.5.3.12).	Not applicable; refer to point I42.
I46.		<i>For some installations preparing solid waste fuels from source-separated waste streams, the use of some or all of the above-mentioned techniques may not be necessary to comply with BAT (see Section 4.5.3.1).</i>	Not applicable; refer to point I42.
I47.	Preparation of solid waste fuels from hazardous waste	Consider emissions and flammability hazards in case a drying or heating operation is required (see Sections 4.1.2.7 and 4.5.4.1)	Not applicable. Preparation of solid waste fuels from hazardous waste is not proposed.
I48.		Consider carrying out the mixing and blending operations in closed areas with appropriate atmosphere control systems (see Sections 4.1.4.5, 4.5.4.1 and 4.6)	Not applicable.
I49.		Use bags filters for the abatement of particulates (see Section 4.6.26)	Not applicable.
I50.	Preparation of liquid waste fuels from	Use heat-exchange units external to the vessel if heating of the liquid fuel is required (Section 4.5.4.1)	Not applicable. Preparation of liquid waste fuels from hazardous waste is not proposed.

Ref.	Aspect of BAT	BAT	Status at the Scheme
151.	hazardous waste	Adapt the suspended solid content to ensure the homogeneity of the liquid fuel (see Section 4.5.4.1).	Not applicable.

Annex 6: Safety Data Sheets



FALZON

Group of Companies

SAN LUCIAN OIL COMPANY LIMITED

42, Spencer Hill, Marsa MRS1955, Malta

Tel: (+356) 21 446077 (+356) 21 491026 Fax: (+356) 21 446508

E-mail: info@falzongroup.com

Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

GASOIL

Product Use: Gasoil 10 ppm

Product Number(s): 32782

Synonyms: Diesel

Company Identification

San Lucian Oil Company Limited

Qajjenza Road

Birzebbuga BBG 1283

Malta

+356 21 654 654

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	EC NUMBER/ CAS NUMBER	SYMBOL / RISK PHRASES	AMOUNT
Fuels, Diesel; Gasoil – unspecified	269-822-7/ 68334-30-5	Xn/Carc. Cat. 3/R40, Xn/R65, R66, N/R51/53	100 %weight

The full text of all R-phrases is shown in Section 16.

SECTION 3 HAZARDS IDENTIFICATION

CLASSIFICATION: Carc. Cat. 3; R40 | Xn; R65 | R66 | N; R51/53 |

IMMEDIATE HEALTH EFFECTS

Eye: Not expected to cause prolonged or significant eye irritation.

Skin: Skin contact may cause drying or defatting of the skin. Symptoms may include pain, itching, discoloration, swelling, and blistering.

Ingestion: Because of its low viscosity, this material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death.

Inhalation: Not expected to be harmful if inhaled.

DELAYED OR OTHER HEALTH EFFECTS: Prolonged or repeated exposure to this material may cause cancer.

ENVIRONMENTAL EFFECTS: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SECTION 4 FIRST AID MEASURES

Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.

Skin: Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

Ingestion: If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.

Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

SECTION 5 FIRE FIGHTING MEASURES

See Section 7 for proper handling and storage.

FLAMMABLE PROPERTIES:

Flashpoint: (Pensky-Martens Closed Cup) 61.5 °C (143 °F) Minimum

Autoignition: 350 °C (662 °F)

Flammability (Explosive) Limits (% by volume in air): Lower: 1 Upper: 6

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:

Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.

Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

Reporting: Report spills to local authorities as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Specific Use: Gasoil

Precautionary Measures: Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe vapor or fumes. Do not breathe mist. Wash thoroughly after handling.

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.

Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances. Refer to appropriate CEN standards.

ENGINEERING CONTROLS:

Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT

Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

Skin Protection: Wear protective clothing to prevent skin contact. Selection of protective clothing may include gloves, apron, boots, and complete facial protection depending on operations conducted. Suggested materials for protective gloves include: Chlorinated Polyethylene (or Chlorosulfonated Polyethylene), Nitrile Rubber, Polyurethane, Viton.

Respiratory Protection: If exposure to harmful levels of airborne material may occur when working with this material, wear an approved respirator that provides protection, such as: No respiratory protection is normally required. Air-Purifying Respirator for Organic Vapors.

Occupational Exposure Limits:

Component	Country/ Agency	TWA	STEL	Ceiling	Notation
Fuels, Diesel; Gasoil - unspecified	--	--	1000 mg/m ³	--	--

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Amber

Physical State: Liquid

Odor: Petroleum odor

pH: Not Applicable

Vapor Pressure: 0.04 kPa (Approximate) @ 40 °C (104 °F)

Vapor Density (Air = 1): >1

Boiling Point: 160°C (320°F) - 400°C (752°F)

Solubility: Insoluble

Freezing Point: Not Applicable
Density: 810 - 890 kg/m³ @ 15°C (59°F)
Viscosity: 1.5mm²/s @ 40°C (104°F) Minimum

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Conditions to Avoid: Avoid contact with heat, sparks, fire and oxidizing agents

Incompatibility With Other Materials: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS

Eye Irritation: The Draize eye irritation mean score in rabbits for a 24-hour exposure was: <10/110.

Skin Irritation: For a 24-hour exposure, the Primary Irritation Score (PIS) in rabbits is: >5 / 8.0.

Skin Sensitization: This material did not cause skin sensitization reactions in a Buehler guinea pig test.

Acute Dermal Toxicity: LD50: >5ml/kg (rabbit).

Acute Oral Toxicity: LD50: >5 ml/kg (rat)

Acute Inhalation Toxicity: 4 hour(s) LC50: >5mg/kg (rat).

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

This material is expected to be toxic to aquatic organisms.

48 hour(s) Water Accomodated Fraction: 20-210 mg/l (Daphnia magna)

72 hour(s) Water Accomodated Fraction: 2.6-25 mg/l (Raphidocellus subcapitata)

96 hour(s) Water Accomodated Fraction: 21-210 mg/l (Salmo gairdneri)

MOBILITY

No data available.

PERSISTENCE AND DEGRADABILITY

May cause long-term adverse effects in the aquatic environment. The product has not been tested. The statement has been derived from products of a similar structure and composition.

POTENTIAL TO BIOACCUMULATE

Bioconcentration Factor: No data available.

Octanol/Water Partition Coefficient: No Data Available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by international, country, or local laws and

regulations. In accordance with European Waste Catalogue (E.W.C.) the codification is the following: 13 07 01

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult appropriate Dangerous Goods Regulations for additional description requirements (e.g., technical name) and mode-specific or quantity specific shipping requirements.

ADR/RID Shipping Description: UN1202 GAS OIL, 3, III, ADR CODE F1 , Hazard ID No.30

ICAO/IATA Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER ICAO

IMO/IMDG Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER THE IMDG CODE

SECTION 15 REGULATORY INFORMATION

REGULATORY LISTS SEARCHED:

01=EU. Directive 76/769/EEC: Restrictions on the marketing and use of certain dangerous substances.

02=EU Directive 90/394/EEC: Carcinogens at work.

03=EU Directive 92/85/EEC: Pregnant or breastfeeding workers.

04=EU Directive 96/82/EC (Seveso II): Article 9.

05=EU Directive 96/82/EC (Seveso II): Articles 6 and 7.

06=EU Directive 98/24/EC: Chemical agents at work.

The following components of this material are found on the regulatory lists indicated.

Fuels, diesel; Gasoil - unspecified 03, 06

CHEMICAL INVENTORIES:

All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), EINECS (European Union), IECSC (China), KECI (Korea), PICCS (Philippines), TSCA (United States).

CLASSIFICATION - LABELING:

Under the criteria of the directive EEC/67/548 (dangerous substances) and EEC/1999/45 (dangerous preparations):

- contains: Fuels, diesel; Gasoil – unspecified

Symbols: Xn - Harmful

N - Dangerous for the environment

R40; Limited evidence of a carcinogenic effect.

R65; Harmful: may cause lung damage if swallowed.

R66; Repeated exposure may cause skin dryness or cracking.

R51/53; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S36/37; Wear suitable protective clothing and gloves.

S61; Avoid release to the environment. Refer to special instructions/safety data sheets.

S62; if swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

SECTION 16 OTHER INFORMATION

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data

Sheet: 5,9,13

Revision Date: MARCH 06, 2007

Full text of R-phrases:

R40; Limited evidence of a carcinogenic effect.

R51/53; Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R65; Harmful: may cause lung damage if swallowed.

R66; Repeated exposure may cause skin dryness or cracking.

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
CAS - Chemical Abstract Service Number	

Prepared according to the criteria of the directive 2001/58/EC

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.



ACETYLENE

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	ACETYLENE
Product Code(s)	G-2
UN-Number	UN1001
Recommended Use	Compressed gas.
Synonyms	Ethyne,Acetylen,Ethine, Disolved Acetylene
Supplier Address*	<p>Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC 575 Mountain Ave. Murray Hill, NJ 07974 Phone: 908-464-8100 www.lindeus.com</p> <p>Linde Gas Puerto Rico, Inc. Las Palmas Village Road No. 869, Street No. 7 Catano, Puerto Rico 00962 Phone: 787-641-7445 www.pr.lindegas.com</p> <p>Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecanda.com</p>
	* May include subsidiaries or affiliate companies/divisions.
	For additional product information contact your local customer service.
Chemical Emergency Phone Number	Chemtrec: 1-800-424-9300 for US/ 703-527-3887 outside US

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview

Unstable. Sensitive to heat or shock. May become explosive.

Flammable gas

Simple asphyxiant

May cause skin and eye irritation

May cause central nervous system depression

Contents under pressure

Keep at temperatures below 52°C / 125°F

Appearance Colorless.

Physical State Compressed gas.

Odor Slight garlic

OSHA Regulatory Status This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Principle Routes of Exposure Inhalation. Eye contact. Skin contact.

Acute Toxicity

Inhalation Simple asphyxiant. May cause suffocation by displacing the oxygen in the air. Exposure to oxygen-deficient atmosphere (<19.5%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination.

Eyes May cause slight irritation.

Skin May cause skin irritation and/or dermatitis.

Skin Absorption Hazard No known hazard in contact with skin.

Ingestion Not an expected route of exposure.

Chronic Effects None known.

Aggravated Medical Conditions Central nervous system. Respiratory disorders. Skin disorders.

Environmental Hazard See Section 12 for additional Ecological Information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Volume %	Chemical Formula
Acetylene	74-86-2	95	C ₂ H ₂
Acetone	67-64-1	5	C ₃ H ₆ O

4. FIRST AID MEASURES

General Advice Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye Contact None normally required. Consult a physician if direct contact with pressurized material occurs. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek immediate medical attention/advice.

Skin Contact Contaminated clothing presents a fire hazard and should be removed immediately. Wash off immediately with soap and plenty of water. Get medical attention if irritation persists.

Inhalation PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF INHALATION OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious inhalation victims should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and, as necessary, given artificial resuscitation and supplemental oxygen. Treatment should be symptomatic and supportive.

Ingestion None under normal use. Get medical attention if symptoms occur.

Notes to Physician Treat symptomatically.

Protection of First-aiders Remove all sources of ignition.

5. FIRE-FIGHTING MEASURES

Flammable Properties Flammable.

Suitable Extinguishing Media Dry chemical. Water spray. DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.

Hazardous Combustion Products Carbon monoxide. Carbon dioxide (CO₂).

Explosion Data

Sensitivity to Mechanical Impact Self-decomposition or self ignition may be triggered by heat, chemical reaction, friction or impact.

Sensitivity to Static Discharge Yes.

Specific Hazards Arising from the Chemical GASEOUS ACETYLENE IS SPONTANEOUSLY COMBUSTIBLE IN AIR AT PRESSURES ABOVE 15 PSI (270 kPa). Pure acetylene is shock sensitive. It requires a very low ignition energy so that fires which have been extinguished without stopping the flow of gas can easily re-ignite with possible explosive force.

Fires involving acetylene occur occasionally at fusible metal pressure relief plugs at the tops and bottoms of cylinders, commonly due to hot metal or slag dropped on the fusible plugs. When the fusible plug releases a large volume of acetylene creating a "roaring" sound. The flame may extend a foot or two away from the cylinder until the pressure is reduced. In most cases, the other end of the cylinder may develop a coating of frost.

If the flame is large, burning from a fusible plug, DO NOT try to put it out unless the cylinder is outdoors or in a very well ventilated area free from sources of ignition. Usually it is very difficult to extinguish large fires because the escaping acetylene may be re-ignited by adjacent ignition sources, thereby possibly creating confined space explosion. Keep containers cool with water spray.

Continue to cool fire exposed cylinders until flames are extinguished. Cylinders may rupture under extreme heat. Damaged cylinders should be handled only by specialists.

Protective Equipment and Precautions for Firefighters

Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn.

If possible, stop the flow of gas. Do not extinguish the fire until supply is shut off as otherwise an explosive-ignition may occur. If the fire is extinguished and the flow of gas continues, GET AWAY!

Vapors may form explosive mixtures with air. Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. All equipment used when handling the product must be grounded. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Monitor oxygen level. Never enter a confined space or other area where the concentration is greater than 10% of the UEL (0.23%).

Environmental Precautions Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Prevent spreading of vapors through sewers, ventilation systems and confined areas.

Methods for Containment	Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location. DO NOT ATTEMPT TO REMOVE CYLINDERS THAT HAVE BEEN EXPOSED TO HEAT. When the cylinder is removed, it may be hosed down with water to keep it cool. Open valve slowly to let the acetylene escape. Tag the cylinder with "WARNING-Leaking Flammable Gas". Close valve when empty. Contact the appropriate emergency phone number in Section 1 or call your closest Linde location.
Methods for Cleaning Up	Return cylinder to Linde or an authorized distributor.

7. HANDLING AND STORAGE

Handling	<p>Ground and bond all lines and equipment associated with product system. All equipment should be non-sparking and explosion proof. Never use copper piping for acetylene service. Only steel or wrought iron pipe should be used. Open cylinder valve minimum amount required (no more than 1-1.5 turns) to deliver acceptable flow to enable the cylinder to be closed quickly in an emergency situation. Acetylene is shipped in a cylinder packed with a porous mass material, and a liquid solvent, commonly acetone. Acetylene is dissolved in the acetone solution and dispersed throughout the porous medium. When the valve of a charged acetylene cylinder is opened, the acetylene comes out of the solution and passes out in the gaseous form. IT IS CRUCIAL THAT FUSE PLUGS IN THE TOPS AND BOTTOMS OF ALL ACETYLENE CYLINDERS BE THOROUGHLY INSPECTED WHENEVER HANDLED. REMOVE AND QUARANTINE IN SAFE LOCATION ANY DEFECTIVE CYLINDER. "NO SMOKING" signs should be posted in storage and use areas.</p> <p>Use only in ventilated areas. Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use backflow preventive device in piping.</p> <p>Use an adjustable strap wrench to remove over-tight or rusted caps. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing leak to occur. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.</p> <p>Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.</p> <p>For additional information, consult the Compressed Gas Association's pamphlets P-1, G-1, G-1.1, AV-9, G-1.2, G-1.3, G-1.5, G-1.6, G-1.7, C-13, SB-4, NFPA #51, and OSHA 1910 Subpart H & Q.</p>
Storage	<p>Unless oxygen and acetylene are separated, there should be a non-combustible partition of at least 5 ft. high with a fire-resistance rating of one-half hour between cylinders. In the U.S. cylinders stored inside a building near user locations must be limited to total capacity of 2500 ft³ of gas, exclusive of in-use or attached for use cylinders. If rough handling or other occurrences should cause any fusible plug to leak, move the cylinder to an open space well away from an possible source of a sign on the cylinder warning of "Leaking Flammable Gas". Do not store cylinders on their side. This makes the acetylene less stable and less safe, and increases the likelihood of solvent loss resulting in decomposition.</p> <p>Outside or detached storage is preferred. Protect from physical damage. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.</p>

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Acetylene 74-86-2			Ceiling: 2500 ppm Ceiling: 2662 mg/m ³
Acetone 67-64-1	STEL: 750 ppm TWA: 500 ppm	TWA: 1000 ppm TWA: 2400 mg/m ³ (vacated) TWA: 750 ppm (vacated) TWA: 1800 mg/m ³ (vacated) STEL: 2400 mg/m ³ The acetone STEL does not apply to the cellulose acetate fiber industry. It is in effect for all other sectors (vacated) STEL: 1000 ppm	IDLH: 2500 ppm 10% LEL TWA: 250 ppm TWA: 590 mg/m ³

Immediately Dangerous to Life or Health.

Other Exposure Guidelines	Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).
Engineering Measures	Explosion proof ventilation systems. Local exhaust ventilation to prevent accumulation of high concentrations and maintain air-oxygen levels at or above 19.5%.
Ventilation	Use ventilation adequate to keep exposures below recommended exposure limits.
<u>Personal Protective Equipment</u>	
Eye/Face Protection	Wear protective eyewear (safety glasses).
Skin and Body Protection	Work gloves and safety shoes are recommended when handling cylinders. Cotton or Nomex® clothing is recommended to prevent static build-up.
Respiratory Protection	
General Use	No special protective equipment required.
Emergency Use	Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%).
Hygiene Measures	Wear suitable gloves and eye/face protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless.	Odor	Slight garlic.
Odor Threshold	No information available	Physical State	Compressed gas
Flash Point	No information available.	Autoignition Temperature	296°C / 565°F
Decomposition Temperature	No information available.	Boiling Point/Boiling Range	-83.8°C / -118.8°F
Freezing Point	-80.6°C / -113°F	Molecular Weight	26.04
Water Solubility	Soluble in water.	Evaporation Rate	No information available
Vapor Pressure	635 psig @ 70°F/21.1°C	Vapor Density	0.9 (air = 1)
VOC Content (%)	Not applicable.	Flammability Limits in Air	
		Upper	100%
		Lower	2.3%

10. STABILITY AND REACTIVITY

Stability	Unstable-shock sensitive in the liquid state. Do not allow free gas (outside of cylinder) exceed 15 psig. Do not expose cylinders to sudden shock or heat. Acetylene will decompose violently with cylinder failure. Do not set gas regulators to a discharge pressure above 15 PSIG.
Incompatible Products	Oxidizing agents. Halogens. Copper. Halogenated compounds. Silver. Mercury. Brasses containing >66% copper and brazing materials containing silver or copper.
Conditions to Avoid	Heat, flames and sparks.
Hazardous Decomposition Products	Carbon monoxide (CO). Carbon dioxide (CO ₂). Hydrogen gas.
Hazardous Polymerization	Temperatures as low as 250°F (121°C) at high pressure, or at low pressure in the presence of a catalyst are sufficient to initiate a polymerization reaction. The hazard is that the polymerization normally liberates heat and may lead to ignition and decomposition of acetylene if conditions permit.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral: No information available.

LD50 Dermal: No information available.

LC50 Inhalation: No information available.

Inhalation High concentrations (10-20% in air) cause symptoms similar to that of being intoxicated. As a narcotic gas or intoxicant, it causes hypercapnia (an excessive amount of carbon dioxide in the blood). Repeated exposures to tolerable levels has not shown deleterious effects. TCLo, human-inhalation of 20 pph inhaled has been shown to cause headaches and dyspnea.

Repeated Dose Toxicity No information available.

Chronic Toxicity

Chronic Toxicity None known.

Carcinogenicity Contains no ingredient listed as a carcinogen.

Irritation	No information available.
Sensitization	No information available.
Reproductive Toxicity	No information available.
Developmental Toxicity	Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.
Synergistic Materials	None known.
Target Organ Effects	Central nervous system (CNS). Respiratory system.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Will not bioconcentrate.

Ozone depletion potential; ODP; (R-11 = 1): Does not contain ozone depleting chemical (40 CFR Part 82).

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Acetone		LC50 96 h: 4.74 - 6.33 mL/L (Oncorhynchus mykiss) LC50 96 h: 6210 - 8120 mg/L static (Pimephales promelas) LC50 96 h: = 8300 mg/L (Lepomis macrochirus)	EC50 = 14500 mg/L 15 min	EC50 48 h: 10294 - 17704 mg/L Static (Daphnia magna) EC50 48 h: 12600 - 12700 mg/L (Daphnia magna)

Chemical Name	Log Pow
Acetylene	0.32
Acetone	-0.24

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Linde for proper disposal.

14. TRANSPORT INFORMATION

DOT

Proper shipping name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
Description	UN1001, Acetylene, dissolved, 2.1
Emergency Response Guide Number	116

TDG

Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
Description	UN1001, ACETYLENE, DISSOLVED, 2.1

MEX

Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
Description	UN1001, Acetylene, dissolved,2.1

IATA

UN-Number	UN1001
Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
ERG Code	10 L
Description	UN1001,Acetylene, dissolved,2.1
Maximum Quantity for Passenger	Forbidden
Maximum Quantity for Cargo Only	15 kg
Limited Quantity	No information available.

IMDG/IMO

Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
EmS No.	F-D, S-U
Description	UN1001, Acetylene, dissolved,2.1

ADR

Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
Classification Code	4F
Description	UN1001, Acetylene, dissolved,2.1

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS/ELINCS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
 DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
 EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	Yes
Reactive Hazard	Yes

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Risk and Process Safety Management Programs

This material, as supplied, contains one or more regulated substances with specified thresholds under 40 CFR Part 68 or regulated as a highly hazardous chemical pursuant to the 29 CFR Part 1910.110 with specified thresholds:

Chemical Name	U.S. - CAA (Clean Air Act) - Accidental Release Prevention - Toxic Substances	U.S. - CAA (Clean Air Act) - Accidental Release Prevention - Flammable Substances	U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals
Acetylene		10000 lbs	

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPS) (see 40 CFR 61)

This product contains the following substances which are listed hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act:

Chemical Name	CAS-No	HAPS data	VOC Chemicals	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Acetylene	74-86-2		X		
Acetone	67-64-1		X		

CERCLA/SARA

This material, as supplied, contains one or more substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	TPQ
Acetone	5000 lb		

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Acetylene	X	X	X		X

International Regulations

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

A Compressed gases

B1 Flammable gas

F Dangerously reactive material



16. OTHER INFORMATION

Prepared By	Product Stewardship 23 British American Blvd. Latham, NY 12110 1-800-572-6501
Issuing Date	05-Mar-2010
Revision Date	13-Jan-2012
Revision Number	3
Revision Note	(M)SDS sections updated. 1. 3. 5. 10.

<u>NFPA</u>	Health Hazard 0	Flammability 4	Stability 2	Physical and Chemical Hazards -
<u>HMIS</u>	Health Hazard 2	Flammability 4	Physical Hazard 2	Personal Protection -

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

General Disclaimer

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde LLC, Linde Merchant Production, Inc. or Linde Gas North America LLC (or any of their affiliates and subsidiaries) and the purchaser.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

End of Safety Data Sheet

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

PRODUCT NAME: Carbon Dioxide
CHEMICAL NAME: Carbon Dioxide **FORMULA:** CO₂
SYNONYMS: Carbonic Anhydride, Carbonic Acid Gas, Carbon Anhydride
MANUFACTURER: Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501

PRODUCT INFORMATION: 1 - 800 - 752 - 1597
MSDS NUMBER: 1005 **REVISION:** 5
REVISION DATE: March 1993 **REVIEW DATE:** March 1994

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

CONCENTRATION: Carbon dioxide is sold as pure product > 99%.
CAS NUMBER: 124-38-9
EXPOSURE LIMITS:
OSHA: PEL-TWA = 5000 ppm established **ACGIH:** TLV-TWA = 5000 ppm **NIOSH:** None

SECTION 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Carbon dioxide is a nonflammable liquefied compressed gas packaged in cylinders under its own vapor pressure of 838 psig at 70 °F (21.1 °C). High concentrations can cause rapid suffocation and can also increase respiration and heart rate. Contact with liquid may cause frostbite. Avoid breathing gas. Self contained breathing apparatus (SCBA) may be required by rescue workers.

EMERGENCY TELEPHONE NUMBERS

800 - 523 - 9374 Continental U.S., Canada, or Puerto Rico
610 - 481 - 7711 other locations

POTENTIAL HEALTH EFFECTS:

INHALATION: Carbon dioxide is an asphyxiant. Concentrations of 10% or more can produce unconsciousness or death.

EYE CONTACT: Contact with liquid or cold vapor can cause freezing of tissue.

SKIN CONTACT: Contact with liquid or cold vapor can cause frostbite.

EXPOSURE INFORMATION:

ROUTE OF ENTRY: Inhalation

TARGET ORGANS: Central nervous system

EFFECT: Asphyxiation (suffocation). Overexposure may cause damage to retinal ganglion cells and central nervous system.

SYMPTOMS: Headache, sweating, rapid breathing, increased heartbeat, shortness of breath, dizziness, mental depression, visual disturbances, and shaking.

CHRONIC EFFECTS: None established.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None

CARCINOGENICITY: Carbon dioxide is not listed by NTP, OSHA or IARC.

SECTION 4. FIRST AID

INHALATION: Persons suffering from overexposure should be moved to fresh air. If victim is not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain prompt medical attention.

EYE CONTACT: Contact with liquid or cold vapor can cause freezing of tissue. Gently flush eyes with lukewarm water. Obtain medical attention immediately.

SKIN CONTACT: Contact with liquid or cold vapor can cause frostbite. Immediately warm affected area with lukewarm water not to exceed 107 °F.

NOTES TO PHYSICIAN: There is no specific antidote. Treatment for overexposure should be directed at the control of symptoms and the clinical condition.

SECTION 5. FIRE AND EXPLOSION

FLASH POINT:

Not Applicable
Nonflammable

AUTOIGNITION:

Nonflammable

FLAMMABLE LIMITS:

EXTINGUISHING MEDIA: Carbon dioxide is nonflammable and does not support combustion. Carbon dioxide is an extinguishing agent for class B and C fires. Use extinguishing media appropriate for the surrounding fire.

HAZARDOUS COMBUSTION PRODUCTS: None known.

FIRE FIGHTING PROCEDURES: Evacuate personnel from danger area. Carbon dioxide is nonflammable. If possible, without risk, remove cylinders from fire area or cool with water. Self contained breathing apparatus (SCBA) may be required for rescue workers.

UNUSUAL HAZARDS: Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures. Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Evacuate all personnel from affected area. Increase ventilation to release area and monitor oxygen level. Use appropriate protective equipment (SCBA). If leak is from cylinder or cylinder valve call the Air Products emergency telephone number. If leak is in user's system close cylinder valve and vent pressure before attempting repairs.

SECTION 7. HANDLING AND STORAGE

STORAGE: Cylinders should be stored upright in a well-ventilated, secure area, protected from the weather. Storage area temperatures should not exceed 125 °F (52 °C). Storage should be away from heavily traveled areas and emergency exits. Avoid areas where salt or other corrosive materials are present. Valve protection caps and valve outlet seals should remain on cylinders not connected for use. Separate full from empty cylinders. Avoid excessive inventory and storage time. Use a first-in first-out system. Keep good inventory records.

HANDLING: Use a suitable hand truck for cylinder movement. Never attempt to lift a cylinder by its valve protection valve cap. Never apply flame or localized heat directly to any part of the cylinder. Do not

allow any part of the cylinder to exceed 125 °F (52 °C). High temperature may cause damage to cylinder and/or premature failure of pressure relief device which will result in venting of cylinder contents. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve causing a leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps.

Only the proper CGA connections should be used, never use adapters. Use piping and equipment adequately designed to withstand pressures to be encountered. If liquid product is being used ensure steps have been taken to prevent entrapment of liquid in closed systems. The use of pressure relief devices may be necessary. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow.

Carbon dioxide is compatible with all common materials of construction. Pressure requirements should be considered when selecting materials and designing systems.

Use a "FULL", "IN USE", and "EMPTY" tag system on cylinders. This will reduce the chances of inadvertently connecting or operating the wrong cylinder.

SPECIAL REQUIREMENTS: Always store and handle compressed gases in accordance with Compressed Gas Association, Inc. (ph. 703-979-0900) pamphlet CGA P-1, *Safe Handling of Compressed Gases in Containers*. Local regulations may require specific equipment for storage or use.

CAUTION: Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with the owner's written consent is a violation of federal law.

SECTION 8. PERSONAL PROTECTION / EXPOSURE CONTROL

ENGINEERING CONTROLS: Provide ventilation and/or local exhaust to prevent accumulation of carbon dioxide concentrations above 5000 ppm.

RESPIRATORY PROTECTION:

Emergency Use: Self contained breathing apparatus (SCBA) or positive pressure airline with mask and escape pack are to be used in oxygen deficient atmosphere. Air purifying respirators will not provide protection.

EYE PROTECTION: Safety glasses are recommended when handling, connecting, or disconnecting cylinders, and when pressurizing systems

OTHER PROTECTIVE EQUIPMENT: Safety shoes and leather work gloves when handling cylinders.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE, ODOR AND STATE: Colorless and odorless. A slightly acid gas. It is felt by some to have a slight pungent odor and biting taste.

MOLECULAR WEIGHT: 44.01

GAS DENSITY (at 70 °F (21.1 °C) and 1 atm): 0.1144 lb/ft³ (1.832 kg/m³)

VAPOR PRESSURE (at 70 °F (21.1 °C)): 838 psig

SPECIFIC GRAVITY (Air =1): 1.522

SPECIFIC VOLUME (at 70 °F (21.1 °C) and 1 atm): 8.74 ft³/lb (0.5457 m³/kg)

BOILING POINT: -109.3 °F (-78.5 °C)

TRIPLE POINT (At 60.4 psig): -69.9 °F (-56.6 °C)

SOLUBILITY IN WATER (Vol./Vol. at 68 °F (20 °C)): 0.90

SECTION 10. STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID: None

INCOMPATIBILITY (Materials to Avoid): None

REACTIVITY:

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION: Will not occur

SECTION 11. TOXICOLOGICAL INFORMATION

Carbon dioxide is an asphyxiant. It initially stimulates respiration and then causes respiratory depression. High concentrations result in narcosis. Symptoms in humans are as follows:

CONCENTRATION	EFFECT
1%	Slight increase in breathing rate
2%	Breathing rate increases to 50% above normal. Prolonged exposure can cause headache and tiredness.
3%	Breathing increases to twice the normal rate and becomes labored. Weak narcotic effect. Impaired hearing, headache, increase in blood pressure and pulse rate.
4-5%	Breathing increases to approximately four times the normal rate, symptoms of intoxication become evident and slight choking may be felt.
5-10%	Characteristic sharp odor noticeable. Very labored breathing, headache, visual impairment and ringing in the ears. Judgment may be impaired, followed within minutes by loss of consciousness.
50-100%	Unconsciousness occurs more rapidly above 10% level. Prolonged exposure to high concentrations may eventually result in death from asphyxiation.

SECTION 12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected. No adverse ecological effects are expected. Carbon dioxide does not contain any Class I or Class II ozone depleting chemicals. Carbon dioxide is not listed as a marine pollutant by DOT (49 CFR 171).

SECTION 13. DISPOSAL

UNUSED PRODUCT / EMPTY CYLINDER: Return cylinder and unused product to supplier. Do not attempt to dispose of unused product. Ensure cylinder valve is properly closed, valve outlet cap has been reinstalled, and valve protection cap is secured before shipping cylinder.

WASTE DISPOSAL METHODS: For emergency disposal, secure the cylinder and slowly discharge gas to the atmosphere in a well ventilated area or outdoors. Small amounts may be disposed of by reacting with a mild base.

SECTION 14. TRANSPORT INFORMATION

DOT SHIPPING NAME: Carbon dioxide

HAZARD CLASS: 2.2 (Nonflammable Gas)

IDENTIFICATION NUMBER: UN1013

PRODUCT RQ: None

SHIPPING LABEL(s): Nonflammable gas

PLACARD (when required): Nonflammable gas

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure upright position in a well ventilated truck. Never transport in passenger compartment of a vehicle.

SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

ENVIRONMENTAL PROTECTION AGENCY (EPA):

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 requires notification to the National Response Center of a release of quantities of hazardous substances equal to or greater than the reportable quantities (RQ's) in 40 CFR 302.4.

CERCLA Reportable Quantity: None.

SARA TITLE III: Superfund Amendment and Reauthorization Act of 1986

SECTION 302/304: Requires emergency planning on threshold planning quantities (TPQ) and release reporting based on reportable quantities (RQ) of EPA's extremely hazardous substances (40 CFR 355).

Extremely Hazardous Substances: None

Threshold Planning Quantity (TPQ): None

SECTIONS 311/312: Require submission of material safety data sheets (MSDSs) and chemical inventory reporting with identification of EPA defined hazard classes. The hazard classes for this product are:

IMMEDIATE HEALTH: Yes

PRESSURE: Yes

DELAYED HEALTH: No

REACTIVITY: No

FLAMMABLE: No

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR 372.

Carbon dioxide does not require reporting under Section 313

40 CFR Part 68 - Risk Management for Chemical Accident Release Prevention: Requires the development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Carbon dioxide is not listed as a regulated substance.

TSCA - TOXIC SUBSTANCES CONTROL ACT: Carbon dioxide is listed on the TSCA inventory.

OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals. Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Carbon dioxide is not listed in Appendix A as a highly hazardous chemical.

STATE REGULATIONS:

CALIFORNIA:

Proposition 65: This product does NOT contain any listed substances which the State of California requires warning under this statute.

SCAQMD Rule: VOC = Not applicable

SECTION 16. OTHER INFORMATION

HAZARD RATINGS:

NFPA RATINGS:

HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0
SPECIAL: SA*

HMIS RATINGS:

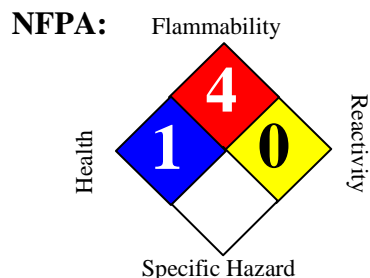
HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

*Compressed Gas Association recommendation to designate simple asphyxiant.

Revision information: New format with additional sections added. Reformatted September 1998.

Safety Data Sheet

LPG



SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	LPG			
Synonyms	:	Liquefied Petroleum Gases; Stabilizer Bottoms; SNG Enrichment LPG, 888100004454			
SDS Number	:	888100004454	Version	:	2.5
Product Use Description	:	Fuel, Refinery intermediate Stream			
Company	:	For: Tesoro Refining & Marketing Co. 19100 Ridgewood Parkway, San Antonio, TX 78259			
Tesoro Call Center	:	(877) 783-7676	Chemtrec (Emergency Contact)	:	(800) 424-9300

SECTION 2. HAZARDS IDENTIFICATION

Classifications	:	Flammable Gas – Category 1 Gases Under Pressure – Liquefied Gas Carcinogenicity – Category 1B Mutagenicity – Category 1B Specific Target Organ Toxicity (Single Exposure) – Category 3
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Pictograms



Signal Word : DANGER

Hazard Statements

Extremely flammable gas
Contains gas under pressure; may explode if heated.
May cause cancer by inhalation if 1,3-butadiene is a component.
May cause genetic defects by inhalation if 1,3-butadiene is a component.
May cause drowsiness or dizziness.
High concentration may sensitize heart to adrenaline.

Precautionary Statements

Prevention :

Keep away from heat/sparks/open flame/hot surfaces. No smoking.
Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
Wear protective clothing such as gloves, goggles, and face shield if needed to prevent skin and eye contact. Avoid breathing gas.

Response	Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so. If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed or concerned: Get medical advice or attention.
Storage	Store in secure or locked up location in well ventilated place. Protect from sunlight.
Disposal	Dispose of contents/container in accordance with local, Regional and national regulations.
Supplemental Hazard Information	Exposure to concentrations above 100% of the LEL such as 5% or 50,000 ppm may sensitize heart and cause irregular heartbeat. High concentrations may exclude oxygen and cause dizziness and suffocation. Contact with liquid or cold vapor may cause frostbite or freeze burn. Exposure to concentrations above 10% of the LEL may cause a general central nervous system (CNS) depression typical of anesthetic gases or intoxicants. Aliphatic hydrocarbon gases may build up in confined spaces and may cause dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in narcosis, unconsciousness, and possibly lead to death.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Weight %
Propane	74-98-6	60 - 90%
Butane	106-97-8	10 - 30%
Propene; Propylene	115-07-1	1 - 5%
Isobutane	75-28-5	1 - 5%
1,3-Butadiene	106-99-0	0 to 0.2%

SECTION 4. FIRST AID MEASURES

Inhalation	: Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. Give oxygen. Seek medical attention immediately.
Skin contact	: For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). In case of massive exposure, remove contaminated clothing while showering with warm water. Obtain medical attention.
Eye contact	: Immediately flush eyes thoroughly with warm water for at least 15 minutes. Remove contact lenses. Rinse with water. Take victim immediately to hospital. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. If eye irritation persists, seek medical attention.
Ingestion	: Ingestion is considered unlikely. If swallowed, obtain medical attention.
Notes to physician	: Symptoms: Dizziness, Headache, Nausea, Frostbite, Vomiting, Discomfort Hazards: This material may be a cardiac sensitizer; avoid the use of epinephrine. Treatment: Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	: Water spray, Dry chemical, Foam, Carbon dioxide (CO ₂), Fire should not be extinguished unless flow of gas can be immediately stopped.
Specific hazards during fire fighting	: Flammable Gas. Vapors are heavier than air and may travel long distances to a point of ignition and flash back.
Special protective equipment for fire-fighters	: Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.
Further information	: Allow the fire to burn under controlled conditions. Fire should not be extinguished unless flow of gas can be immediately stopped. Stop leak if you can do it without risk. Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Use water to cool equipment, surfaces and containers exposed to fire and excessive heat. For large fire the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	: Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. Emergency eye wash capability should be available in the vicinity of any potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and laundry before reuse. Consider disposal of contaminated clothing rather than laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.
Environmental precautions	: Prevent entry into waterways, sewers, basements or confined areas.
Methods for cleaning up	: Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning. Allow liquid to evaporate from the surface. All equipment used when handling the product must be grounded. Do not direct water at spill or source of leak. Do not touch or walk through spilled material. If possible, turn leaking containers so that gas escapes rather than liquid. Isolate area until gas has dispersed. Prevent spreading of vapors through sewers, ventilation systems and confined areas. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Allow liquid to evaporate from the surface.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling	: Keep away from fire, sparks and heated surfaces. No smoking near areas where material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification.
	: Hydrocarbon liquids including this product can act as a non-conductive flammable liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage

tanks or other containers. Precautions to prevent static-initiated fire or explosion during transfer, storage or handling, include but are not limited to these examples:

- (1) Ground and bond containers during product transfers. Grounding and bonding may not be adequate protection to prevent ignition or explosion of hydrocarbon liquids and vapors that are static accumulators.
- (2) Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha).
- (3) Storage tank level floats must be effectively bonded.

For more information on precautions to prevent static-initiated fire or explosion, see NFPA 77, Recommended Practice on Static Electricity (2007), and API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents (2008).

Conditions for safe storage, including incompatibilities

- : Keep away from flame, sparks, excessive temperatures and open flame. Use approved containers. Keep containers closed and clearly labeled. Empty or partially full product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose containers to sources of ignition. Store in a well-ventilated area. The storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".
- : Keep away from food, drink and animal feed. Incompatible with oxidizing agents. Incompatible with acids and copper.
- : Keep in a dry place. Keep away from heat. No decomposition if stored and applied as directed.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

List	Components	CAS-No.	Type:	Value
OSHA Z1	Propane	74-98-6	PEL	1,000 ppm 1,800 mg/m ³
	1,3-Butadiene	106-99-0	TWA	1 ppm
		106-99-0	STEL	5 ppm
ACGIH	Propane	74-98-6	TWA	1,000 ppm
	Butane	106-97-8	TWA	1,000 ppm
	Isobutane	75-28-5	TWA	1,000 ppm
	1,3-Butadiene	106-99-0	TWA	2 ppm

- Protective measures** : Avoid contact with skin. When using do not smoke. Keep out of reach of children. Keep away from heat and flame.
- Engineering measures** : Use only intrinsically safe electrical equipment approved for use in classified areas.
- Eye protection** : Goggles and face shield as needed to prevent eye and face contact.

Hand protection	: Neoprene gloves Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly effect glove durability; inspect and replace worn or damaged gloves. If product is hot, thermally protective gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.
Skin and body protection	: Where contact with liquid may occur, wear apron and faceshield.
Respiratory protection	: NIOSH/MSHA approved positive-pressure self-contained breathing apparatus (SCBA) or Type C positive-pressure supplied air with escape bottle must be used for gas concentrations above occupational exposure limits, for potential of uncontrolled release, if exposure levels are not known, or in an oxygen-deficient atmosphere. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.
Work / Hygiene practices	: Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Colorless gas. Cold vapor cloud may be white but the lack of visible gas cloud does not indicate absence of gas. A colorless liquid when pressurized.
Odor	Faint, gasoline-like odor.
Odor threshold	Reported thresholds range from 2500 to 5000 ppm.
pH	Not applicable
Melting point/freezing point	-187 °C (-305 °F)
Initial boiling point & range	-0.5 °C (31.1 °F) at 1,013.25 hPa
Flash point	< -60 °C (< -76 °F) Method: ASTM D 92
Evaporation rate	High
Flammability (solid, gas)	Gas
Lower flammability limit	1.8 % (V)
Upper flammability limit	8.5 % (V)
Vapor pressure	2,399.8 hPa at 20 °C (68 °F)
Vapor density	2.007 at 21.1 °C (70.0 °F) (Air = 1.0)
Relative density	0.56 at 15 °C
Solubility (H2O)	Negligible
Partition coefficient (Octanol/H2O)	No data available

Auto ignition temperature	287 °C (549 °F)
Decomposition temperature	Heating may cause a fire or explosion. Material does not decompose at ambient temperatures. Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke) are possible hazardous decomposition products.
Viscosity	No data available
Conductivity	Hydrocarbon liquids without static dissipater additive may have conductivity below 1 picoSiemens per meter (pS/m). The highest electro-static ignition risks are associated with "ultra-low conductivities" below 5 pS/m. See Section 7 for sources of information on defining safe loading and handling procedures for low conductivity products. Note that conductivity can be reduced by environmental factors such as a decrease in temperature.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	Vapors may form explosive mixture with air. Hazardous polymerization does not occur.
Chemical stability	Stable under normal conditions.
Hazardous reactions	: Can react with strong acids, strong oxidizers, and copper. Explosion hazard when exposed to nickel carbonyl/oxygen mixture
Conditions to avoid	: Keep away from flame, sparks, excessive temperatures and open flame.
Incompatible materials	: Can react with strong acids, strong oxidizers, and copper.
Hazardous decomposition products	Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke) are possible hazardous decomposition products.

SECTION 11. TOXICOLOGICAL INFORMATION

Inhalation	: May cause central nervous system disorder (e.g. narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Simple asphyxiant: Acts by displacing oxygen in the lungs thereby diminishing the supply of oxygen available to the blood and tissues. Symptoms include shortness of breath, rapid heart rate, incoordination, lethargy, headaches, nausea, vomiting, and disorientation. Continued lack of oxygen may result in convulsions, loss of consciousness and death. Since exercise increases the tissue need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment. Oxygen in enclosed spaces should be maintained at 21 percent by volume. Exposure to high concentrations may cause cardiac sensitization.
Ingestion	: Considered unlikely.
Skin and eye contact	: Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due evaporative cooling.
Further information	: Chronic Effects And/Or Target Organ Data: May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite (cold burn). Simple asphyxiant: Acts by displacing oxygen in the lungs thereby diminishing the supply of oxygen available to the blood and tissues. Symptoms include shortness of breath, rapid heart rate,

incoordination, lethargy, headaches, nausea, vomiting, and disorientation. Continued lack of oxygen may result in convulsions, loss of consciousness and death. Since exercise increases the tissue need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment. Oxygen in enclosed spaces should be maintained at normal atmospheric percentage (about 21 percent by volume).

Component:

Propene; Propylene	115-07-1	<u>Acute inhalation toxicity:</u> LC50 rat Dose: 658 mg/l Exposure time: 4 h <u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation
Butane	106-97-8	<u>Acute inhalation toxicity:</u> LC50 rat Dose: 658 mg/L 4h
Propane	74-98-6	<u>Skin irritation:</u> Classification: Irritating to skin. Result: Skin irritation <u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation

Carcinogenicity:

NTP	This product may contain a material identified by NTP as a known or anticipated carcinogen: 1,3-Butadiene (CAS-No.: 106-99-0).
IARC	This product may contain a material identified by IARC as a possible, probable, or confirmed human carcinogen: 1,3-Butadiene (CAS-No.: 106-99-0) .
OSHA	This product may contain more than 0.1% of a material identified by OSHA as a carcinogen: 1,3-Butadiene (CAS-No.: 106-99-0).
CA Prop 65	WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm: 1,3-Butadiene (CAS-No.: 106-99-0).

SECTION 12. ECOLOGICAL INFORMATION

Bioaccumulation	: Inherently biodegradable. Accumulation in terrestrial organisms is unlikely.
Toxicity to fish	: Not expected to be harmful to aquatic organisms.
Additional ecological information	: Liquid release is only expected to cause localized, non-persistent environmental damage, such as freezing. Biodegradation of this product may occur in soil and water. Volatilization is expected to be the most important removal process in soil and water. This product is expected to exist entirely in the vapor phase in ambient air.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal	: Dispose of container and unused contents in accordance with federal, state and local requirements.
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SECTION 14. TRANSPORT INFORMATION**CFR**

Proper shipping name : PETROLEUM GASES, LIQUEFIED
 UN-No. : 1075
 Class : 2.1
 Packing group :

TDG

Proper shipping name : PETROLEUM GASES, LIQUEFIED
 UN-No. : UN1075
 Class : 2.1
 Packing group :

IATA Cargo Transport

UN UN-No. : UN1075
 Description of the goods : PETROLEUM GASES, LIQUEFIED
 Class : 2.1
 ICAO-Labels : 2.1
 Packing instruction (cargo aircraft) : 200

IATA Passenger Transport

UN-No. : UN1075
 Class : 2.1
 Not permitted for transport

IMDG-Code

UN-No. : UN 1075
 Description of the goods : PETROLEUM GASES, LIQUEFIED
 Class : 2.1
 IMDG-Labels : 2.1
 EmS Number : F-D S-U
 Marine pollutant : No

SECTION 15. REGULATORY INFORMATION

TSCA Status : On TSCA Inventory
 DSL Status : All components of this product are on the Canadian DSL list.
 SARA 311/312 Hazards : Fire Hazard
 Acute Health Hazard
 PENN RTK US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Components**CAS-No.**

Propane 74-98-6
Butane 106-97-8
Propene; Propylene 115-07-1
Isobutane 75-28-5

MASS RTK US. Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

<u>Components</u>	<u>CAS-No.</u>
Propane	74-98-6
Butane	106-97-8
Propene; Propylene	115-07-1
Isobutane	75-28-5

NJ RTK US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

<u>Components</u>	<u>CAS-No.</u>
Propane	74-98-6
Butane	106-97-8
Propene; Propylene	115-07-1
Isobutane	75-28-5

SARA III US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

<u>Components</u>	<u>CAS-No.</u>
Propene; Propylene	115-07-1

California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIROMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil. Fractions of crude oil, and products (both finished and intermediate) from the crude oil refining process and any indigenous components of such from the CERCLA Section 103 reporting requirements. However, other federal reporting requirements, including SARA Section 304, as well as the Clean Water Act may still apply.

SECTION 16. OTHER INFORMATION

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision Date : 11/29/2012

289, 1005

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

PRODUCT NAME: Oxygen, Compressed
CHEMICAL NAME: Oxygen **FORMULA:** O₂
SYNONYMS: Oxygen gas, Gaseous Oxygen, GOX
MANUFACTURER: Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195 - 1501

PRODUCT INFORMATION: 1-800-752-1597

MSDS NUMBER: 1012 **REVISION:** 5
REVISION DATE: January 1995 **REVIEW DATE:** August 1997**

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Oxygen is sold as pure product > 99%.
CAS NUMBER: 7782-44-7
EXPOSURE LIMITS:
OSHA: Not established **ACGIH:** Not established **NIOSH:** Not established

SECTION 3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

Oxygen is an odorless, colorless, nonflammable gas stored in cylinders at high pressure. It is an oxidizing gas and vigorously accelerates combustion. Keep away from oils or grease. Rescue personnel should be aware of the extreme fire hazards associated with oxygen-enriched (greater than 23%) atmospheres, and that self contained breathing apparatus (SCBA) may be required.

EMERGENCY TELEPHONE NUMBERS

(800) 523-9374 Continental U.S., Canada and Puerto Rico
(610) 481-7711 other locations

POTENTIAL HEALTH EFFECTS INFORMATION:

INHALATION: Breathing 80% or more oxygen at atmospheric pressure for more than a few hours may cause nasal stuffiness, cough, sore throat, chest pain and breathing difficulty. Breathing oxygen at higher pressure increases the likelihood of adverse effects within a shorter time period. Breathing pure oxygen under pressure may cause lung damage and also central nervous system effects resulting in dizziness, poor coordination, tingling sensation, visual and hearing disturbances, muscular twitching, unconsciousness and convulsions. Breathing oxygen under pressure may cause prolongation of adaptation to darkness and reduced peripheral vision.

EYE / SKIN CONTACT: No adverse effect.

EXPOSURE INFORMATION:

ROUTE OF ENTRY: Inhalation

TARGET ORGANS: Eyes, central nervous system

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Patients with chronic obstructive pulmonary disease retain carbon dioxide abnormally. If oxygen is administered to them, raising the oxygen concentration in the blood depresses their breathing and raises their retained carbon dioxide to a dangerous level.

CARCINOGENIC POTENTIAL: Oxygen is not listed as a carcinogen or potential carcinogen by NTP, IARC, or OSHA Subpart Z.

SECTION 4. FIRST AID

INHALATION: Move victim to fresh air or if in elevated pressures reduce oxygen pressures to one atmosphere. Call a physician. The physician should be advised that the victim has been exposed to a high concentration of oxygen. No treatment is required in the absence of symptoms or high pressure exposure.

EYE / SKIN CONTACT: Not applicable

NOTES TO PHYSICIAN: Animal studies suggest that the administration of certain drugs, including phenothiazine drugs and chloroquine, increase the susceptibility to toxicity from oxygen at high pressures. Animal studies also indicate that vitamin "E" deficiency may increase susceptibility to oxygen toxicity.

Airway obstruction during high oxygen tension may cause alveolar collapse following absorption of the oxygen. Similarly, occlusion of the Eustachian tubes may cause retraction of the eardrum and obstruction of the paranasal sinuses may produce "vacuum-type" headache.

All individuals exposed for long periods to oxygen at high pressure and who exhibit overt oxygen toxicity should have ophthalmologic examinations.

SECTION 5. FIRE AND EXPLOSION

FLASH POINT:
Not applicable

AUTOIGNITION:
Nonflammable

FLAMMABLE LIMITS:
Nonflammable

EXTINGUISHING MEDIA: Oxygen is nonflammable but will support combustion. Use extinguishing media appropriate for surrounding fire.

HAZARDOUS COMBUSTION PRODUCTS: None

SPECIAL FIRE FIGHTING INSTRUCTIONS: Evacuate all personnel from the danger area. If possible, shut off flow of oxygen which is supporting the fire. Immediately cool containers with water spray from maximum distance. When cool move cylinders from fire area, if possible without risk. Self contained breathing apparatus may be required for rescue workers.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Oxygen vigorously accelerates combustion. Some materials which are noncombustible in air will burn in the presence of an oxygen enriched atmosphere (greater than 23%). Fire resistant clothing may burn and offer no protection in oxygen rich atmospheres. Oxygen may form explosive compounds when exposed to combustible materials or oil, grease, and other hydrocarbon materials. Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function. Upon exposure to intense heat or flame cylinder will vent rapidly and/or rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures. Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Evacuate all personnel from affected area. Shut off source of oxygen if possible. Increase ventilation to release area. Personnel who have been exposed to high concentrations of oxygen should stay in a well-ventilated or open area for 30 minutes before going into a confined space or near an ignition source.

If leak is from container or its valve, call the Air Products emergency telephone number. If leak is in user's system close cylinder valve and vent pressure before attempting repairs.

SECTION 7. STORAGE AND HANDLING

STORAGE: Cylinders should be stored upright in a well-ventilated, secure area, protected from the weather. Storage area temperatures should not exceed 125 °F (52 °C) and area should be free of combustible materials. Storage should be away from heavily traveled areas and emergency exits. Avoid areas where salt or other corrosive materials are present. Cylinders should be separated from flammables by a minimum distance of 20 ft. or by a barricade of non-combustible material at least five ft. high having a fire resistance rating of at least 1/2 hour. Valve protection caps and valve outlet seals should remain on cylinders not connected for use. Separate full from empty cylinders. Avoid excessive inventory and storage time. Use a first-in first-out system. Keep good inventory records.

HANDLING: Do not drag, roll, or slide cylinder. Use a suitable handtruck designed for cylinder movement. Never attempt to lift a cylinder by its cap. Secure cylinders at all times while in use. Use a pressure reducing regulator or separate control valve to safely discharge gas from cylinder. Use a check valve to prevent reverse flow into cylinder. Do not overheat cylinder to increase pressure or discharge rate. Always open cylinder valve slowly. Do not use rapid opening valves (i.e., ball valves). If user experiences any difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve causing a leak to occur. Use an adjustable strap-wrench to remove over-tight or rusted caps.

All gauges, valves, regulators, piping and equipment to be used in oxygen service must be cleaned for oxygen service in accordance with Compressed Gas Association pamphlet G-4.1.

Carbon steel, stainless steel, copper, brass, nickel and their alloys are materials of construction that can be used in oxygen service. Use piping and equipment adequately designed to withstand pressures to be encountered. Oxygen is not to be used as a substitute for compressed air. Never use an oxygen jet for cleaning purposes of any sort, especially clothing, as it increases the likelihood of an engulfing fire. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow.

When used in welding and cutting read and understand the manufacturer's instructions and the precautionary label on the products. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

SPECIAL REQUIREMENTS: Always store and handle compressed gases in accordance with Compressed Gas Association, Inc. (ph. 703-412-0900) pamphlet CGA P-1, *Safe Handling of Compressed Gases in Containers*. Local regulations may require specific equipment for storage or use.

CAUTION: Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with the owner's written consent is a violation of federal law.

SECTION 8. PERSONAL PROTECTION / EXPOSURE CONTROL

ENGINEERING CONTROLS: Provide ventilation and/or local exhaust to prevent accumulation of high concentrations of gas (greater than 23%).

RESPIRATORY PROTECTION:

GENERAL USE: None required

EMERGENCY: Use SCBA do to possibility of fire when concentrations exceed 23%.

OTHER PROTECTIVE EQUIPMENT: Safety shoes and work gloves are recommended when handling cylinders. Clothing exposed to high concentrations may retain oxygen 30 minutes or longer and become a potential fire hazard. Stay away from ignition sources.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless gas
ODOR: Odorless
MOLECULAR WEIGHT: 32.0
BOILING POINT (1 atm): -297.3 °F (-183.0 °C)
SPECIFIC GRAVITY (Air =1): 1.10
SPECIFIC VOLUME (at 70 °F 21.1 °C) and 1 atm): 12.08 ft³/lb (0.754 m³/kg)
FREEZING / MELTING POINT: -361.9 °F (-218.8 °C)
VAPOR PRESSURE: Not applicable at 70°F
GAS DENSITY (At 70°F (21.1°C) and 1 Atm): 0.083 lb /ft³ (1.326 kg/m³)
SOLUBILITY IN WATER (Vol./Vol. at 32°F (0°C)): 0.049

SECTION 10. REACTIVITY / STABILITY

CHEMICAL STABILITY: Stable
CONDITIONS TO AVOID: None
INCOMPATIBILITY: Oils, grease, hydrocarbons and flammable materials.
HAZARDOUS DECOMPOSITION PRODUCTS: None
HAZARDOUS POLYMERIZATION: Will not occur

SECTION 11. TOXICOLOGICAL INFORMATION

At atmospheric concentration and pressure, oxygen poses no toxicity hazards. Premature infants exposed to high oxygen concentrations may suffer delayed retinal damage which can progress to retinal detachment and blindness. Retinal damage may also occur in adults exposed to 100% oxygen for extended periods (24 to 48 hr).
At two or more atmospheres central nervous system (CNS) toxicity occurs. Symptoms include nausea, vomiting, dizziness or vertigo, muscle twitching, vision changes, and loss of consciousness and generalized seizures. At three atmospheres, CNS toxicity occurs in less than two hours, and at six atmospheres in only a few minutes.

SECTION 12. ECOLOGICAL INFORMATION

The atmosphere contains 21% oxygen. No adverse ecological effects are expected. Oxygen does not contain any Class I or Class II ozone depleting chemicals. Oxygen is not listed as a marine pollutant by DOT (49 CFR 171).

SECTION 13. DISPOSAL

UNUSED PRODUCT / EMPTY CONTAINER: Return container and unused product to supplier. Do not attempt to dispose of residual or unused quantities.
DISPOSAL: For emergency disposal, secure cylinder and slowly discharge gas to the atmosphere in a well ventilated area or outdoors.

SECTION 14. TRANSPORTATION

DOT HAZARD CLASS: 2.2 (Nonflammable Gas)	DOT SHIPPING LABEL: Nonflammable Gas, Oxidizer
DOT SHIPPING NAME: Oxygen, compressed	IDENTIFICATION NUMBER: UN 1072
REPORTABLE QUANTITY (RQ): None	PLACARD: Nonflammable Gas or Oxygen

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure upright position in a well ventilated truck. Never transport in passenger compartment of a vehicle. An oxygen label may be used for domestic shipment in the United States and Canada in place of the Non-flammable and Oxidizer labels (49CFR Part 172).

SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

EPA - ENVIRONMENTAL PROTECTION AGENCY:

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 requires notification to the National Response Center of releases of quantities of hazardous substances equal to or greater than the reportable quantities (RQ) in 40 CFR 302.4.

CERCLA Reportable Quantity: None

SARA TITLE III: Superfund Amendments and Reauthorization Act of 1986

SECTION 302: Requires emergency planning based on threshold planning quantities (TPQ) and release reporting based on reportable quantities (RQ) of EPA's extremely hazardous substances (40 CFR 355).

Oxygen is not listed as an Extremely Hazardous Substance.

SECTIONS 311/312: Require submission of material safety data sheets (MSDSs) and chemical inventory reporting with identification of EPA defined hazard classes. The hazard classes for this product are:

IMMEDIATE:	No	PRESSURE:	Yes
DELAYED:	No	REACTIVITY:	No
		FIRE:	Yes

SECTION 313: Requires submission of annual reports of releases of toxic chemicals that appear in 40 CFR 372.

Oxygen is not listed as a toxic chemical.

40 CFR PART 68: Risk Management for Chemical Accident Release Prevention. Requires the development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Oxygen is not listed as a regulated substance.

TOXIC SUBSTANCE CONTROL ACT (TSCA): Oxygen is listed on the TSCA inventory.

OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals. Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Oxygen is not listed as a Highly Hazardous Chemical.

STATE REGULATIONS

CALIFORNIA:

Proposition 65: This product does NOT contain any listed substances for which the State of California requires warning under this statute.

SCAQMD Rule: VOC = Not applicable

Advetec 6000

COSHH ASSESSMENT

1. IDENTIFICATION OF THE PRODUCT AND COMPANY UNDERTAKING

Product Name: ADV6000

Supplier Name: Advetec limited

Unit A, Lentney Farm Buildings, Somerset, BA3 5SL

Emergency Tel No.: +44(0) 7775521816 **Office:** +44(0) 1761 433434 **Fax.No:** +44 (0) 1761 433365

2. COMPOSITION/INFORMATION ON INGREDIENTS

Composition: Biostimulant Liquid

Formulation: Mix of plant extracts, polymer and proteins

3. HAZARDS IDENTIFICATION

Human Health Hazard: mild risk of eye irritation

4. FIRST AID MEASURES

Inhalation: None

Ingestion: None

Skin Contact: None

Eye Contact: Flush eyes with copious amounts of water, as there is a mild surfactant, which may cause irritation

5. FIRE FIGHTING MEASURES

Flash point: Non-Flammable

Special fire fighting Procedure: Beware of slippery floors if spillage occurs.

6. ACCIDENTAL RELEASE MEASURES

Product will make surfaces slippery if spilled in large amounts, dilute with fresh water and sweep to waste.

7. HANDLING AND STORAGE

Handling: Product may be handled without adverse effect, rubber gloves are recommended

Storage: Product should be kept stored in supplied container. Exposure to direct sunlight is not recommended due to increased deterioration and thus reducing shelf life. Maximum storage time is recommended as one year.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Exposure Control: rubber gloves are recommended.

Eye protection goggles are strongly desirable to protect against splashing.

No additional protections are required as product is non-toxic.

9. PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid

Colour: Brown

Odour: Characteristic Vegetable odour.

Specific Density: 1.01

Solubility: 100%

Ph: 6-8

Boiling point: 87C (188F)

Freezing Point: -2C (29F)

Solubility in Water: 100%

Date of issue: 1st^h January 2008

Page 1 of 2

10. STABILITY AND REACTIVITY

Stability: The product is stable.
Conditions to avoid: Temperatures 0 degrees C and below, insulation protection required.
Materials to avoid : Unknown
Hazardous decomposition products: None apparent

11. TOXICOLOGICAL INFORMATION

Local Effects: Mild surfactant may cause eye irritation
Toxicity: May be ingested without significant harmful effects

12. ECOLOGICAL INFORMATION

Ecotoxicity: The product is rated as harmless to aquatic and marine animal and plant life.

13. DISPOSAL CONSIDERATIONS

Method of Disposal: Product may be diluted and flushed to drainage. Container/packaging according to local Regulations, or where applicable returned to supplier for recycling.

14. TRANSPORT INFORMATION

International Transport Regulations: Product is classified non hazardous for transport

15. REGULATOR INFORMATION

EU Regulations:

Hazard Symbols: None
Hazard Classification : None
Product Use: Confined to labelled and prescribed applications and

classifications.

16. OTHER INFORMATION

History:

Date of issue : 1stth January 2008
Date of Previous Issue : 20th October 2005
Version ID : AD-HS-DOC-ADV6000-010106.3
Prepared by : CASHaw

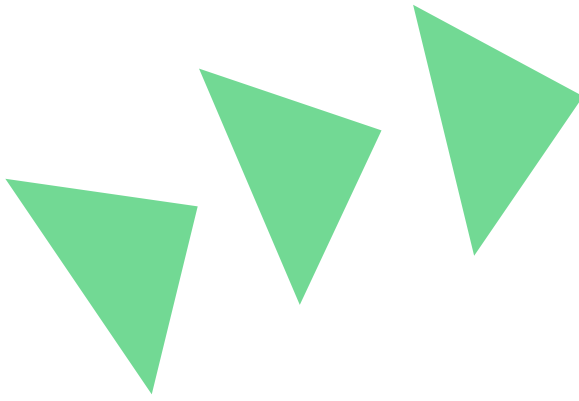
NOTICE TO READER

Advetec Ltd Disclaimer: "The information and recommendations presented herein are based on sources believed to be reliable as of the date hereof. Advetec Ltd and NRP Ltd makes no representation as to the completeness or accuracy thereof. It is the user's responsibility to determine the product's suitability for it's intended use, the product's safe use, and the product's proper disposal. No representations or warranties not expressly set forth herein are made hereunder, whether express or implied by operation of law or otherwise, including, but not limited to any implied warranties of merchantability or fitness. Advetec Ltd and NRP Ltd neither assumes nor authorised any other person to assume for it, any other additional liability or responsibility resulting from the use of, or reliance upon, this information."

Date of issue : 11st January 2008
2 of 2

Page

AD-HS-DOC-ADV6000-010106.3



Advetec BTB Inoculant

1. IDENTIFICATION OF THE SUBSTANCE

Commercial product name: Advetec BTB Inoculant

Description: Biothermic Reactor bacteria inoculant

Manufacturer

Advetec Limited

Emergency Tel: 01761 433434

2. COMPOSITION AND INFORMATION ON INGREDIENTS

Chemical characterization of active component: A blend of naturally occurring non-pathogenic bacteria

Synonyms: Not applicable.

3. HAZARDOUS IDENTIFICATION

None.

This product consists of naturally occurring bacteria on a feed material carrier.

4. FIRST AID MEASURES

Skin contact: Mild irritation to skin. However, it is recommended that prolonged contact with skin be avoided. In case of contact with skin, wash skin with soap and water. Remove contaminated clothing and wash.

Eye contact: Product is not known to cause eye irritation. However, it is recommended that direct contact with eyes be avoided. In case of contact with eyes, flush eyes with low pressure water for at least 15 minutes. If irritation develops, seek medical attention.

Ingestion: Ingestion of material is not known to result in significant adverse health effects. If swallowed, rinse mouth and throat thoroughly with tap water. Drink water.

Inhalation: May cause sensitization by inhalation in hypersensitive individuals. Avoid dust generation. If inhaled remove from contaminated area to fresh air. Report situation. Seek medical attention if allergic response is exhibited.

5. FIRE FIGHTING MEASURES

Not readily combustible in solid form. Low hazard.

Suitable fire fighting extinguishing media: Water, Foam, Carbon dioxide, Halones.

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Registered Company: 5376927 VAT No: 886 1232 12



ISO 9001:2000 GB. 2001931



Non-suitable media: None.

Special exposure hazards: None.

Protection against fire and explosions: Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Sweep up accidental spillages by using equipment such as a vacuum cleaner to avoid generating dust, and store in closed containers prior to disposal.

7. HANDLING AND STORAGE

All materials should be handled under good housekeeping practices. Wash hands after use. Wear gloves if exposure is prolonged. Care should be taken to ensure product is not introduced to drinking water or foodstuffs. Store container in a cool and dry place.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Personal protective equipment: Goggles/Face shield.

Respiratory protection: Dust Respirator.

Hand protection: Gloves recommended.

Eye protection: Recommended when handling large quantities.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Granular

Colour: Grey/Brown.

Odour: Aromatic

pH: Not applicable

Solubility in water: Insoluble.

Boiling Point: Not applicable.

Melting Point: Not applicable.

Flash Point: Not applicable.

Flammability: Non flammable.

Vapour Pressure (mm Hg): Not applicable.

Specific Gravity: 1.16 – 1.27

10. STABILITY AND REACTIVITY

The material is stable under normal conditions of use.

Conditions to avoid: Avoid formation of dust.

Materials to avoid: None.

Hazardous decomposition products: None.



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11. TOXICOLOGICAL INFORMATION

Toxicity: No acute toxicity.

Pathogenicity: Component bacteria are non-pathogenic and generally regarded as safe.

Carcinogenicity: Not applicable.

12. ECOLOGICAL INFORMATION

This product is believed not to be dangerous to the environment with respect to mobility, persistency and degradability, bioaccumulative potential, aquatic toxicity and other data relating to ecotoxicity.

13. DISPOSAL CONSIDERATIONS

No special method required, except that it be in accordance with current local authority regulations.

14. TRANSPORT INFORMATION

Non-hazardous powder.

15. REGULATORY INFORMATION

Preparation does not contain ingredients listed as a dangerous substance in annex 1 of the EEC directive 67/548.

Is not prohibited through any known regulatory agency.

16. OTHER INFORMATION

The information contained in this Safety Data Sheet, as of issue date, is believed to be true and correct. However, the accuracy of completeness of this information and any recommendations or suggestions, are made without warranty or guarantee. Since the conditions of use are beyond the control of our company, it is the responsibility of the user to determine the conditions of safe use of this product.

Date Issued: 7th July 2011.



ADVETEC LIMITED ADVANCED ENVIRONMENTAL TECHNOLOGIES

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Registered Company: 5376927 VAT No: 886 1232 12



ISO 9001:2000 GB. 2001931



Material Safety Data Sheet**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING**

Material Name : Shell Rimula R4 X 15W-40
Uses : Engine oil.
Product Code : 001E7746

Manufacturer/Supplier : Shell South Africa Marketing (Pty) Ltd
 The Campus
 Twickenham
 57 Sloane Street
 Bryanston
 2021
 South Africa

Telephone : (+27) 08604674355
Fax : (+27) 0214211308
Email Contact for Safety Data Sheet : enquiries-ZA@shell.com

Emergency Telephone Number : 011 608 3300 (including poison information).
 Netcare (for life-threatening emergencies) - 082 911.

2. HAZARDS IDENTIFICATION

EC Classification : Not classified as dangerous under EC criteria.

Health Hazards : Not expected to be a health hazard when used under normal conditions. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis. Used oil may contain harmful impurities.

Signs and Symptoms : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Ingestion may result in nausea, vomiting and/or diarrhoea.

Safety Hazards : Not classified as flammable but will burn.
Environmental Hazards : Not classified as dangerous for the environment.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture Description : Highly refined mineral oils and additives.

Hazardous Components

Chemical Identity	CAS	EINECS	Symbol(s)	R-phrases	Conc.
Polyolefin polyamine succinimide, polyol				R53	< 5,00 %

Material Safety Data Sheet

Calcium long chain alkaryl sulphonate				R53	< 3,00 %
Zinc alkyl dithiophosphate	68649-42-3	272-028-3	Xi, N	R41; R51/53	< 2,40 %
Calcium long chain alkaryl sulphonate			Xi	R43; R53	< 0,90 %

Additional Information : The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346. Refer to chapter 16 for full text of EC R-phrases.

4. FIRST AID MEASURES

General Information : Not expected to be a health hazard when used under normal conditions.

Inhalation : No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.

Skin Contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.

Eye Contact : Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

Ingestion : In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

Advice to Physician : Treat symptomatically.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Specific Hazards : Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.

Suitable Extinguishing Media : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media : Do not use water in a jet.

Protective Equipment for Firefighters : Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.

Protective measures : Avoid contact with skin and eyes. Use appropriate containment

Material Safety Data Sheet

- to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
- Clean Up Methods** : Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.
- Additional Advice** : Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

- General Precautions** : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
- Handling** : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.
- Storage** : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Store at ambient temperature.
- Product Transfer** : This material has the potential to be a static accumulator. Proper grounding and bonding procedures should be used during all bulk transfer operations.
- Recommended Materials** : For containers or container linings, use mild steel or high density polyethylene.
- Unsuitable Materials** : PVC.
- Additional Information** : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Oil mist, mineral	ACGIH	TWA(Inhalable fraction.)		5 mg/m3	

Biological Exposure Index (BEI) - See reference for full details

Material Safety Data Sheet

No biological limit allocated.

- Exposure Controls** : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
- Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
- Respiratory Protection** : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].
- Hand Protection** : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognise that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material.
- Eye Protection** : Wear safety glasses or full face shield if splashes are likely to occur.
- Protective Clothing** : Skin protection not ordinarily required beyond standard issue work clothes.
- Monitoring Methods** : Monitoring of the concentration of substances in the breathing

Material Safety Data Sheet

according to EC directive 2001/58/EC

zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods <http://www.cdc.gov/niosh/>
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha.gov/>
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances <http://www.hse.gov.uk/>
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany. <http://www.dguv.de/inhalt/index.jsp>
L'Institut National de Recherche et de Sécurité, (INRS), France <http://www.inrs.fr/accueil>

Environmental Exposure Controls : Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Amber. Liquid at room temperature.
 Odour : Slight hydrocarbon.
 pH : Not applicable.
 Initial Boiling Point and Boiling Range : > 280 °C / 536 °F estimated value(s)
 Pour point : Typical -36 °C / -33 °F
 Flash point : Typical 230 °C / 446 °F (COC)
 Upper / lower Flammability or Explosion limits : Typical 1 - 10 %(V) (based on mineral oil)
 Auto-ignition temperature : > 320 °C / 608 °F
 Vapour pressure : < 0,5 Pa at 20 °C / 68 °F (estimated value(s))
 Specific gravity : Typical 0,89 at 15 °C / 59 °F
 Density : Typical 888 kg/m³ at 15 °C / 59 °F
 Water solubility : Negligible.
 n-octanol/water partition coefficient (log Pow) : > 6 (based on information on similar products)
 Kinematic viscosity : Typical 109 mm²/s at 40 °C / 104 °F
 Vapour density (air=1) : > 1 (estimated value(s))
 Electrical conductivity : This material is not expected to be a static accumulator.
 Evaporation rate (nBuAc=1) : Data not available

Material Safety Data Sheet**10. STABILITY AND REACTIVITY**

Stability	: Stable.
Conditions to Avoid	: Extremes of temperature and direct sunlight.
Materials to Avoid	: Strong oxidising agents.
Hazardous Decomposition Products	: Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	: Information given is based on data on the components and the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
Acute Oral Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	: Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	: Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	: Expected to be slightly irritating.
Respiratory Irritation	: Inhalation of vapours or mists may cause irritation.
Sensitisation	: Not expected to be a skin sensitiser.
Repeated Dose Toxicity	: Not expected to be a hazard.
Mutagenicity	: Not considered a mutagenic hazard.
Carcinogenicity	: Not expected to be carcinogenic. Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC).

Material	Carcinogenicity Classification
Highly refined mineral oil (IP346 <3%)	: ACGIH Group A4: Not classifiable as a human carcinogen.
Highly refined mineral oil (IP346 <3%)	: IARC 3: Not classifiable as to carcinogenicity to humans.
Highly refined mineral oil (IP346 <3%)	: GHS / CLP: No carcinogenicity classification

Reproductive and Developmental Toxicity	: Not expected to be a hazard.
Additional Information	: Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

Material Safety Data Sheet

Continuous contact with used engine oils has caused skin cancer in animal tests.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

- Acute Toxicity** : Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract. Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.
- Mobility** : Liquid under most environmental conditions. If it enters soil, it will adsorb to soil particles and will not be mobile. Floats on water.
- Persistence/degradability** : Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
- Bioaccumulation** : Contains components with the potential to bioaccumulate.
- Other Adverse Effects** : Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

- Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
- Container Disposal** : Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
- Local Legislation** : Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION**ADR**

This material is not classified as dangerous under ADR regulations.

RID

Material Safety Data Sheet

This material is not classified as dangerous under RID regulations.

ADNR

This material is not classified as dangerous under ADN regulations.

IMDG

This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)

This material is either not classified as dangerous under IATA regulations or needs to follow country specific requirements.

Additional Information : MARPOL Annex 1 rules apply for bulk shipments by sea.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

EC Classification	:	Not classified as dangerous under EC criteria.
EC Symbols	:	No Hazard Symbol required
EC Risk Phrases	:	Not classified.
EC Safety Phrases	:	Not classified.
Chemical Inventory Status		
EINECS	:	All components listed or polymer exempt.
TSCA	:	All components listed.
Sensitiser not sufficient to classify	:	Contains calcium long chain alkaryl sulphonate. May produce an allergic reaction.

16. OTHER INFORMATION

R-phrases)

	Not classified.
R41	Risk of serious damage to eyes.
R43	May cause sensitization by skin contact.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R53	May cause long-term adverse effects in the aquatic environment.

SDS Version Number : 1.0

SDS Effective Date : 21.12.2012

SDS Revisions : A vertical bar (|) in the left margin indicates an amendment

Material Safety Data Sheet

- from the previous version.
- SDS Regulation** : The content and format of this safety data sheet is in accordance with Notification of Ministry of Industry, Subject: Hazard Classification and Communication System of Hazardous Substances B.E.2555 (2012).
- SDS Distribution** : The information in this document should be made available to all who may handle the product.
- Disclaimer** : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Material Safety Data Sheet**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING**

Material Name : Shell Spirax S1 ATF TASA
Uses : Transmission oil.
Product Code : 001D8294

Manufacturer/Supplier : Shell South Africa Marketing (Pty) Ltd
 The Campus
 Twickenham
 57 Sloane Street
 Bryanston
 2021
 South Africa

Telephone : (+27) 08604674355
Fax : (+27) 0214211308
Email Contact for MSDS : enquiries-ZA@shell.com

Emergency Telephone Number : 011 608 3300 (including poison information).
 Netcare (for life-threatening emergencies) - 082 911.

2. HAZARDS IDENTIFICATION

EC Classification : Not classified as dangerous under EC criteria.

Health Hazards : Not expected to be a health hazard when used under normal conditions. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis. Used oil may contain harmful impurities.

Signs and Symptoms : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Ingestion may result in nausea, vomiting and/or diarrhoea.

Safety Hazards : Not classified as flammable but will burn.
Environmental Hazards : Not classified as dangerous for the environment.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation description : Highly refined mineral oils and additives.

Hazardous Components

Chemical Identity	CAS	EINECS	Symbol(s)	R-phrases(s)	Conc.
Methacrylate copolymer			Xi	R36	< 3,00 %

Additional Information : The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346. Refer to chapter 16 for full text of EC R-phrases.

Material Safety Data Sheet

4. FIRST AID MEASURES

- General Information** : Not expected to be a health hazard when used under normal conditions.
- Inhalation** : No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
- Skin Contact** : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
- Eye Contact** : Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
- Ingestion** : In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
- Advice to Physician** : Treat symptomatically.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

- Specific Hazards** : Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.
- Suitable Extinguishing Media** : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
- Unsuitable Extinguishing Media** : Do not use water in a jet.
- Protective Equipment for Firefighters** : Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.

- Protective measures** : Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
- Clean Up Methods** : Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.
- Additional Advice** : Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

- General Precautions** : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Properly dispose of any

Material Safety Data Sheet

- contaminated rags or cleaning materials in order to prevent fires. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
- Handling** : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used.
- Storage** : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Storage Temperature: 0 - 50°C / 32 - 122°F
- Recommended Materials** : For containers or container linings, use mild steel or high density polyethylene.
- Unsuitable Materials** : PVC.
- Additional Information** : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Oil mist, mineral	ACGIH	TWA [Mist.]		5 mg/m3	
	ACGIH	STEL [Mist.]		10 mg/m3	

- Exposure Controls** : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
- Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
- Respiratory Protection** : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].

Material Safety Data Sheet

Hand Protection	: Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
Eye Protection	: Wear safety glasses or full face shield if splashes are likely to occur.
Protective Clothing	: Skin protection not ordinarily required beyond standard issue work clothes.
Monitoring Methods	: Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Environmental Exposure Controls	: Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Red. Liquid at room temperature.
Odour	: Slight hydrocarbon.
pH	: Not applicable.
Initial Boiling Point and Boiling Range	: > 280 °C / 536 °F estimated value(s)
Pour point	: Typical -42 °C / -44 °F
Flash point	: Typical 170 °C / 338 °F (COC)
Upper / lower Flammability or Explosion limits	: Typical 1 - 10 %(V) (based on mineral oil)
Auto-ignition temperature	: > 320 °C / 608 °F
Vapour pressure	: < 0,5 Pa at 20 °C / 68 °F (estimated value(s))
Density	: Typical 880 kg/m ³ at 15 °C / 59 °F
Water solubility	: Negligible.
n-octanol/water partition coefficient (log Pow)	: > 6 (based on information on similar products)
Kinematic viscosity	: Typical 40 mm ² /s at 40 °C / 104 °F
Vapour density (air=1)	: > 1 (estimated value(s))
Evaporation rate (nBuAc=1)	: Data not available

10. STABILITY AND REACTIVITY

Stability	: Stable.
Conditions to Avoid	: Extremes of temperature and direct sunlight.
Materials to Avoid	: Strong oxidising agents.
Hazardous Decomposition Products	: Hazardous decomposition products are not expected to form during normal storage.

Material Safety Data Sheet**11. TOXICOLOGICAL INFORMATION**

Basis for Assessment	: Information given is based on data on the components and the toxicology of similar products.
Acute Oral Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	: Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	: Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	: Expected to be slightly irritating.
Respiratory Irritation	: Inhalation of vapours or mists may cause irritation.
Sensitisation	: Not expected to be a skin sensitiser.
Repeated Dose Toxicity	: Not expected to be a hazard.
Mutagenicity	: Not considered a mutagenic hazard.
Carcinogenicity	: Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC). Other components are not known to be associated with carcinogenic effects.
Reproductive and Developmental Toxicity	: Not expected to be a hazard.
Additional Information	: Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity	: Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.
Mobility	: Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.
Persistence/degradability	: Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
Bioaccumulation	: Contains components with the potential to bioaccumulate.
Other Adverse Effects	: Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical

Material Safety Data Sheet

ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

- Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
- Container Disposal** : Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
- Local Legislation** : Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION**ADR**

This material is not classified as dangerous under ADR regulations.

RID

This material is not classified as dangerous under RID regulations.

ADNR

This material is not classified as dangerous under ADNR regulations.

IMDG

This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)

This material is not classified as dangerous under IATA regulations.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

- EC Classification : Not classified as dangerous under EC criteria.
- EC Symbols : No Hazard Symbol required
- EC Risk Phrases : Not classified.
- EC Safety Phrases : Not classified.
- Local Inventories**
- EINECS : All components listed or polymer exempt.
- TSCA : All components listed.

Material Safety Data Sheet

16. OTHER INFORMATION

R-phrases(s)

R36 Not classified.
 Irritating to eyes.

- MSDS Version Number** : 1.0
- MSDS Effective Date** : 23.06.2010
- MSDS Revisions** : A vertical bar (|) in the left margin indicates an amendment from the previous version.
- MSDS Regulation** : The content and format of this safety data sheet is in accordance with Commission Directive 2001/58/EC of 27 July 2001, amending for the second time Commission Directive 91/155/EEC.
- MSDS Distribution** : The information in this document should be made available to all who may handle the product.
- Disclaimer** : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Annex 7: Sewer Discharge Permit Application



Triq Hal Qormi, Hal Luqa LQA 9043
 Freephone: (+356) 8007 6400 Fax: (+356) 2244 3900
 E-mail: customercare@wsc.com.mt Website: www.wsc.com.mt

Application for a Public Sewer Discharge Permit

(based on L.N. 139 of 2002 Schedule D)

SECTION A

I DISMA ATTARD (Full Name), I.D. Card number 177575(M)
 residing at SQAQ IL-FDAL TAL-HADID, LUQA, MALTA

telephone 2166 7857 fax / mobile 99493592
 e-mail info@ddeattard.com
 as representative of DDE ATTARD LTD

am applying for a permit to discharge effluent into the public sewer, during the one year period

from

DD	MM	YY
30	05	2017

 to

DD	MM	YY
30	05	2018

Address of premises from which effluent will be discharged:

SITE AT SQAQ IL-FDAL TAL-HADID, LUQA, MALTA.

The following is a brief outline of activities/processes envisaged to be carried out at the above premises during the above mentioned period:

SCRAPYARD, RECYCLING PLANT, ELV FACILITIES, COMPOSTING

The substances that will be used at the above premises (not necessarily discharged in the effluent) during the said period are:

Substances	Kg
<u>REFER TO ATTACHED</u>	

The proposed point of discharge is indicated in the attached site plan, scale 1:2500, which is signed by Architect and Civil Engineer

JOE BUGEJA
 name in BLOCK LETTERS

Declaration by Applicant (tick appropriate box)

I declare that the effluent to be discharged from the above mentioned premises is exclusively domestic sewage i.e. effluent resulting exclusively from activities related to the habitation of humans, such as the use of toilets, wash hand basins, showers and kitchen facilities.

I declare that the effluent to be discharged from the above mentioned premises is trade effluent having the same characteristics as approved in Public Sewer Discharge Permit No _____ covering the period from

DD	MM	YY
----	----	----

 to

DD	MM	YY
----	----	----

(If one of the above options are chosen, you may proceed to SECTION E)

I declare that the effluent to be discharged from the above mentioned premises is, at least partly, trade effluent, as defined in the Environment Protection (Sewer Discharge Control) Regulations, 2002. For this reason, I am supplying the following information which, I understand, shall be treated as strictly confidential:

PA 4172/16 - In Process
 PA 1876/15 - Approved
 PA 5538/07 - Approved.
 IPPC Reference: IP 0001/13

SECTION B to be filled in for the discharge of trade effluent, please tick appropriate box/boxes

Type of industrial activity/process envisaged to take place in above premises during the year

Activity I – Manufacturing and Processing

- | | | |
|---|--|---|
| <input type="checkbox"/> Textiles & clothes | <input type="checkbox"/> Soap & detergent | <input type="checkbox"/> chemical(s) <i>specify which</i> |
| <input type="checkbox"/> Shoes | <input type="checkbox"/> Carpentry | _____ |
| <input type="checkbox"/> Food | <input type="checkbox"/> Glass & porcelain | _____ |
| <input type="checkbox"/> Beer | <input type="checkbox"/> Electronic components | _____ |
| <input type="checkbox"/> Wines & spirits | <input type="checkbox"/> Metal goods | _____ |
| <input type="checkbox"/> Soft drinks | <input type="checkbox"/> Batteries | _____ |
| <input type="checkbox"/> Mineral water | <input type="checkbox"/> Leather | _____ |
| <input type="checkbox"/> Paint & pigments | <input type="checkbox"/> Tiles | <input type="checkbox"/> Other <i>specify which</i> |
| <input type="checkbox"/> Paper & cardboard | <input type="checkbox"/> Glue | _____ |
| <input type="checkbox"/> Plastic & resin | <input type="checkbox"/> Explosives | _____ |
| <input type="checkbox"/> Tobacco | <input type="checkbox"/> Rubber | _____ |
| <input type="checkbox"/> Stone & marble | <input type="checkbox"/> Lime | _____ |
| <input type="checkbox"/> Carpentry | <input type="checkbox"/> Candles | _____ |

N/A

Activity II – Servicing

- Electroplating Laundries Other *specify which*
 Motor vehicles Dry cleaning _____
 Photographic printing Shipbuilding _____

N/A

Activity III – Miscellaneous

- Catering Waste processing Other *specify which*
 Agricultural Petroleum _____
 Animal husbandry Power generation _____
 Hotel Hospital/clinic _____
 School Dyeing _____
 Water desalination Printing _____
 Aquaculture

SECTION C

VOLUME of effluent to be discharged during the year: 810 m³

MAXIMUM FLOW per hour: 430 L

SECTION D

I declare that the effluent characteristics will be as follows:

NAME OF SUBSTANCE	(a) *	(b) **
<u>SANITARY WASTES FROM TOILETS,</u>		
<u>SHOWERS AND WASH-HAND BASINS</u>	<u>N/A</u>	<u>N/A</u>
<u>WATER CONDENSATE – NON-HAZARDOUS</u>	<u>Limits stated</u>	<u>60,000 kg</u>
<u>EFFLUENT GENERATED FROM THE</u>	<u>in LN 139 of 2002</u>	
<u>COMPOSTING OF FOOD WASTE</u>	<u>will not be</u>	
	<u>exceeded.</u>	

NAME OF SUBSTANCE

(a) *

(b) **

* (a) Maximum concentration in effluent, expressed in mg/L

** (b) Total amount of material to be discharged in sewerage system during year, expressed in Kg

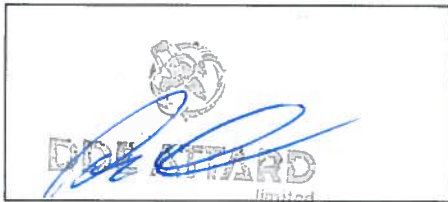
SECTION E

I declare that the information contained above is true.

Signed 

Date 30/05/2017

Name in Full DISMA ATTARD

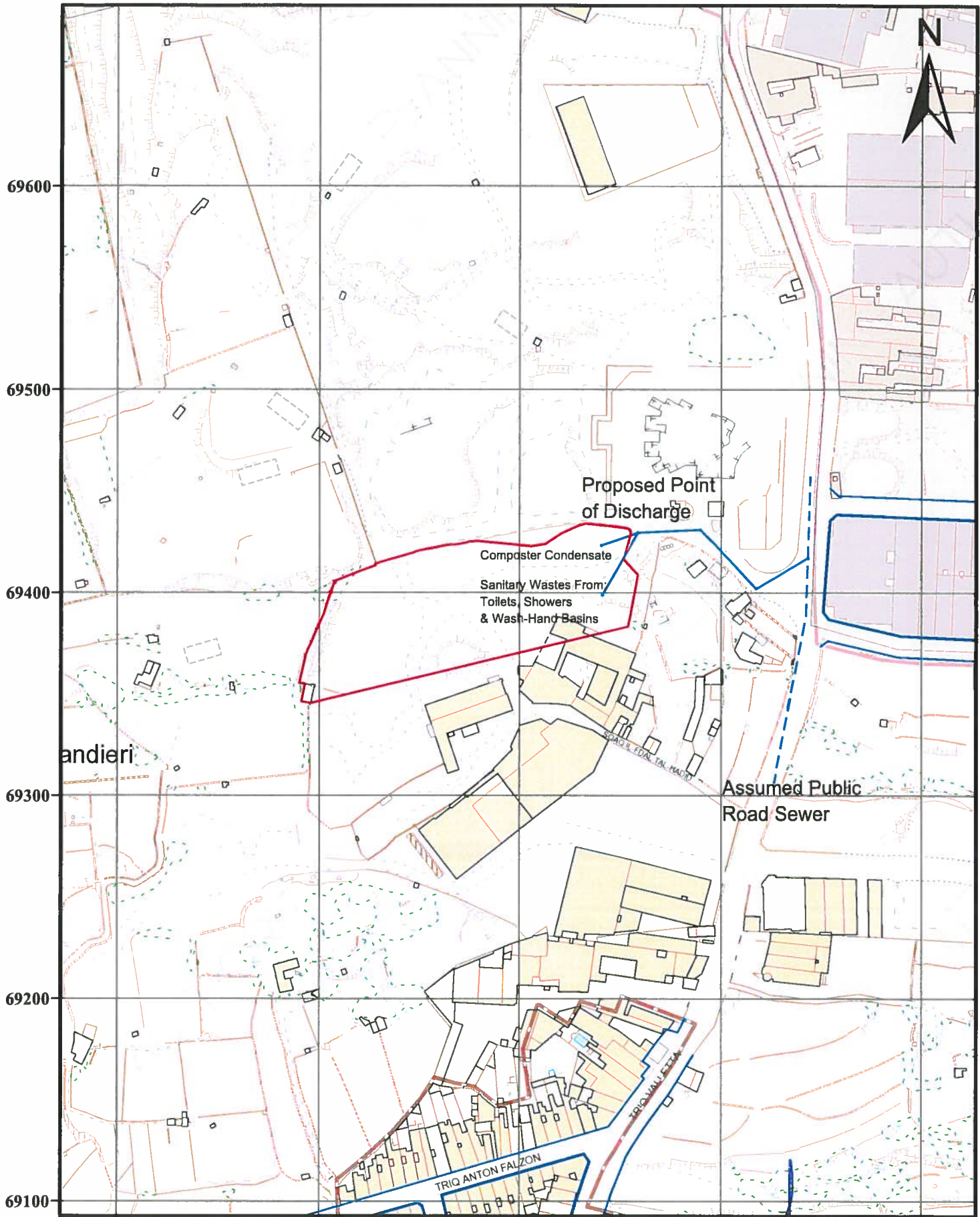


Official company/personal stamp of industrial concern

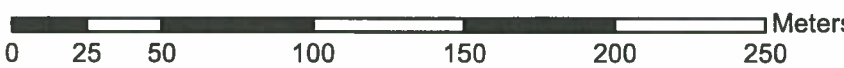
**€11.65 fee for the first application
or any subsequent application not being a renewal**

DATA PROTECTION

The information in this application form is used by the Water Services Corporation but may also be shared with Enemalta Corporation in accordance with the Water Services Corporation Act (Chapter 355) and shall be dealt with in strict confidence. You have the right to access, rectify, and where applicable, erase any data that concerns you. The Water Services Corporation guarantees fair processing of personal data. Furthermore, the Water Services Corporation will only send you information related to the Corporations' own services.



53700 53800 53900 54000 54100



Public Geoserver

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 Data Captured from: 1988, 1994, 1998, 2004 & 2008 aerial photography and updates from 2012 orthophotos.
 Truncated U.T.M. Coordinates. Levelling Datum M.S.L. (Mean sea level). Contours when shown are at 2.5m vertical interval. Not to be used for interpretation or scaling of scheme alignments
 Copyright © PA - Planning Authority. Not for resale

Joe Bugeja
 A & C E
 Mole Leal, Hondoq Road,
 Hondoq Industrial Estate, Qormi GR1 4000
 Tel: 2144 2020 Fax: 2149 2299
 www.joebugeja.com

1:2,500 **08/06/2017**

PLANNING AUTHORITY
 St.Francis Ravelin, Floriana.
 Tel: +356 2290 0000, Fax: +356 2290 2295
 www.pa.org.mt, mappingshop@pa.org.mt



Environmental Permit

Environment and Development Planning Act (CAP. 504; Act X of 2010)

Permit number
WM 0009/06/K

The Malta Environment and Planning Authority (hereinafter the Authority; the Competent Authority or MEPA) in exercise of its powers under the Environment and Development Planning Act (CAP. 504; Act X of 2010) and the Waste Regulations, 2011 (L.N. 184 of 2011 as amended), hereby authorises:

DDE Attard Ltd
Company registration number: **C 4938**

(hereinafter "the Operator" or "the Permit Holder"),
Of / Whose Registered Office (or principal place of business) is at:

DDE Attard Ltd
3, Scrap Lane
Valetta Road
Luqa, LQA 03, Malta

to carry out waste management activities related to storage and processing of specified non-hazardous waste at:

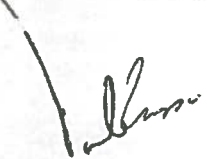
DDE Attard Ltd
3, Scrap Lane
Valetta Road
Luqa, LQA 03, Malta

to the extent authorised by and subject to the conditions of this Permit.

This permit is valid for **six (6) months** from the original issue date below. An application for renewal of this permit is to be submitted at least six weeks prior to expiry of this permit.

Signed

Date

 Perit Vincent Cassar F/Director Environment Protection	Permit Issued: <u>14</u> / <u>03</u> / 2016
--	---

Authorised to sign on behalf of the Competent Authority

MALTA ENVIRONMENT & PLANNING AUTHORITY
L-AWTORITA' TA' MALTA DWAR L-AMBIJENT U L-IPPJANAR

P.O. BOX 200, MARSA MRS 1000, MALTA
TEL: (+356) 2290 0000 • FAX: (+356) 2290 2295
<http://www.mepa.org.mt> • email: enquiries@mepa.org.mt

Section A:

Raw material	Annual consumption
Diesel EN 590 (0.1% sulphur)	140,000 L
Acetylene	18,400 kg
LPG	1,600 kg
Oxygen	46,000 kg
Water	500 m ³
Nutrients (Advetec 6000)	54 L
Extremophilic bacteria	4.8 kg
Wood chips	Variable
Packaging material	3 kg
Engine oil	4,800 L
Transmission oil	1,200 L

Incoming waste	Estimated annual quantity
End-of-life vehicles	4,800 t
Tyres	1,000 t
Washing machines	250 t
Cookers	7,500 t
Water meters	<10 t
Scrap metal	750 t
Cables (non-hazardous)	200 t
Wood	2,000 t
Sealed containerised waste	600 t
Food waste	162 t

Boundary as per PA5538/07: 9,041sqm
 Revised Boundary: 9,028sqm

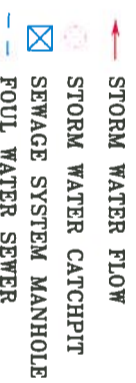
SOFT LANDSCAPING - SOIL & OLIVE/CYPRESS/PINE TREES AS APPROVED IN PA 1876/15

AREA OF CONTAINMENT BOUNDARY

PROPOSED NEW ACCESS

Private Access Road

POSTER SHED



- LEGEND**
1. BALING OF TYRES
 2. E.V. (VEHICLES AWAITING DISMANTLING)
 3. E.V. (EQUIPMENT FOR DEPOLITON OF VEHICLES AND DISMANTLING)
 4. E.V. (STORAGE OF DISASSEMBLED PARTS)
 5. STAFF FACILITIES - OFFICE, TOILETS & CANTEN
 6. DISMANTLING OF WHITE GOODS (COOKERS AND WASHING MACHINES)
 7. WIRE STRIPPING
 8. STORAGE OF SPARE PARTS (GENERAL)
 9. STORAGE OF PROCESSED WOOD
 10. SHREDDING/CRUSHING
 11. GARAGE FOR PARKING & MAINTENANCE OF YARD EQUIPMENT
 12. STORAGE OF TYRES
 13. STORAGE OF SCRAP METAL
 14. STORAGE OF WOOD
 15. STORAGE OF ALUMINIUM
 16. STORAGE OF PLASTIC
 17. STORAGE (TEMPORARY) OF SEALED CONTAINERS FOR ONWARD SHIPPING
 18. QUARANTINE
 19. PARKING AREA
 20. TEMPORARY STORAGE
 21. WEIGH BRIDGE
 22. COMPOSTER SHED
 23. TYRE WASH FACILITY
 24. WEIGHBRIDGE OFFICE
 25. GENERATOR
 26. FUEL STORAGE CONTAINER
 27. STORAGE OF COPPER



SITE AT SQAQ
 FDAL IL-HADID, LIQA
 AMENDMENT TO
 APPROVED PA05538/07
 AND PA01876/15

EXISTING
 BLOCK PLAN

12/14/2010 dat: 118237
 12/14/2010 dat: 118237
 12/14/2010 dat: 118237

Joe Bugeja
 A.B.C. Engineering
 12/14/2010 dat: 118237

Data: 9/6/17 Nru. ta' l-irċevuta
Date: Invoice no. **№ 127697**

Irċivejt minghand **DPE Attard Ltd.**
Received from

is-somma ta' **Eleven** Ewro
the sum of Euro

65 ċenteżmi cents **€ 11.65**

ghal **DMM 7400**
in respect of

Firma **G. Ghigo.** Discharge Permit Unit
Signature IWT - Water Services Corporation

Gianluca Ghigo
Clerk

L-irċevuta ma' valida jekk iċ-ċekk ma jissarrafx.
Dishonoured cheques automatically invalidate this receipt.



Triq Qormi, Luqa LQA 9043
Freephone: (+356) 8007 2222
Fax: (+356) 2244 3900
E-mail: customercare@wsc.com.mt
Website: www.wsc.com.mt
VAT No. MT12435416
VAT Permit No. 71/04

Nru. taċ-Ċekk **CASH**
Cheque No.



CSD/FIN 104/1 1x2 01/15

Annex 8: Air Monitoring Report

Dr. George Peplow B.Sc.(Hons.)(Lond.), M.Sc.(Salford), Ph.D.(Salford), EurChem, C.Chem., F.R.S.C.
Crystal Blue
Block B No 5
Mac Iver Street
Sliema SLM 3130
Malta.

Telephone: +356 21 31 1665,

Mobile: +356 9947 0204,

E-mail: peplowg@gmail

Technical Report

Report Date: 26 November 2014

Report Presented to: Mr Disma Attard

Director- DDE Attard Ltd
Scrap Lane
Luqa

Project Name: Sampling and Measurements for Air-borne Particulate Matter.

Location Details: DDE Attard Scrap Yard, Luqa.

Process: Compliance to IPPC Permit Requirements.

Location of Sampling and Monitoring.

The operation consisted of the sampling and measurements of PM₁₀'s as well as Total Suspended Matter, TSP (less than 100µm diameter particles) from within the DDE Attard Scrap Yard at Luqa. The Sampler was located on a roof overlooking the open scrapyards, exposed downwind to the prevailing north-west winds.

Sampling was carried out for seven consecutive days.

The method of sampling for PM₁₀ was based on EN-12341. Sampling was carried out for 23.5 hours for each daily measurement.

The method of sampling for TSP was based on EPA/625/R-96/010a. Sampling was carried out for 23.5 hours for each daily measurement.

Attached Photo shows the location of the sampler with respect to the open scrap-yard.

Attached site plan shows the location of the samplers.

Objectives of /Monitoring

DDE Attard Ltd appointed the undersigned to measure the respective particulate matter in order to verify compliance to IPPC applications.



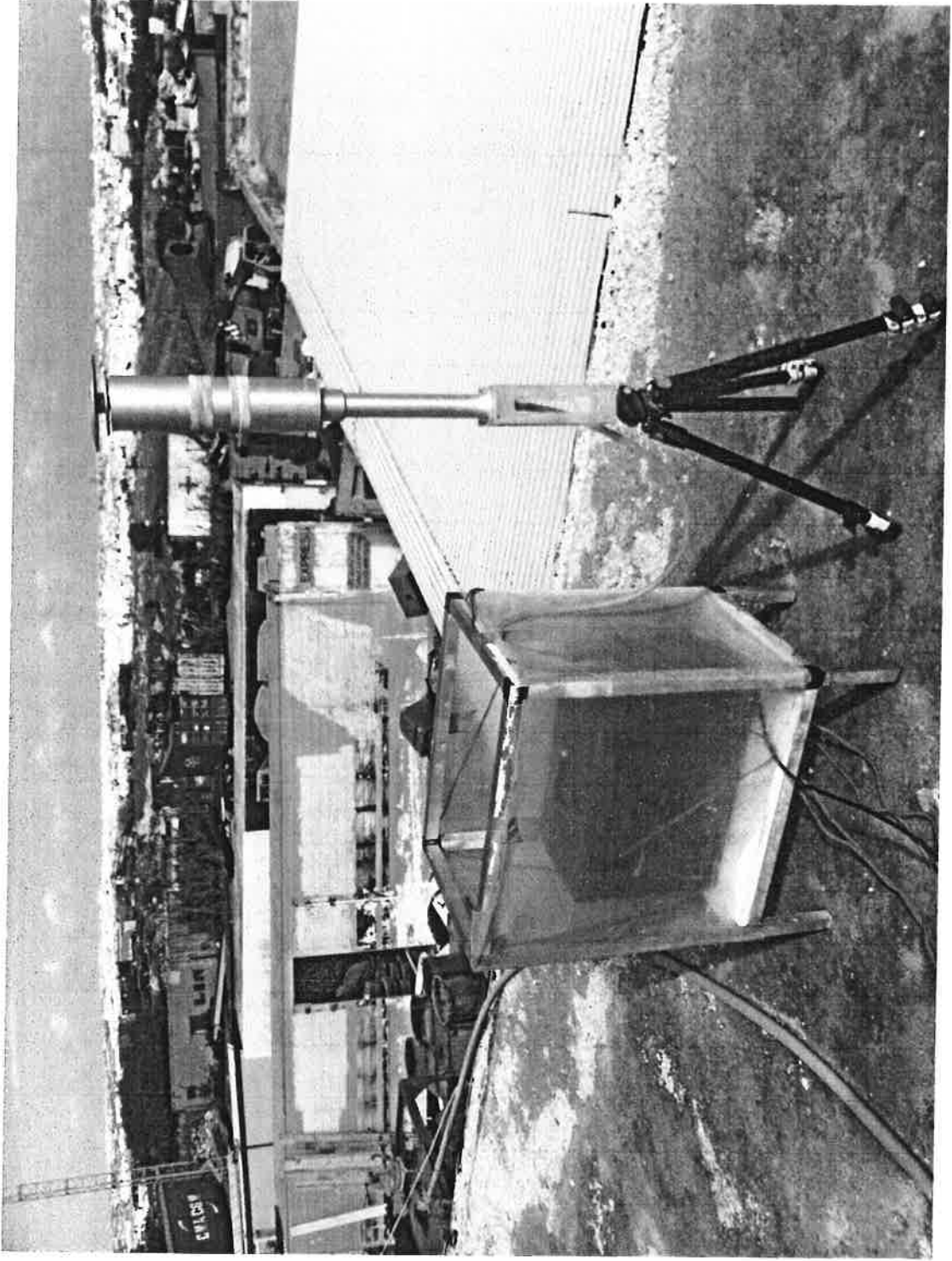
Site Plan with location of Samplers.

2



W

Photo showing location of Sampler with respect to the Scrap yard.



RESULTS.						
DATE	PM10 $\mu\text{g}/\text{m}^3$	TSP ($<100\mu\text{m}$) $\mu\text{g}/\text{m}^3$	WIND DIRECTION	MEAN WIND SPEED	REMARKS	
THU 13 2014	65	437	W	20	The PM ₁₀ exceeded the ambient limit of 50 $\mu\text{g}/\text{m}^3$ by 30%.	
FRI 14 2014	48	245	WNW	12	Within EU ambient limits.	
SAT 15 2014	49	305	SSW	9	Within EU ambient limits.	
SUN 16 2014	35	388	WNW	9	Within EU ambient limits.	
MON 17 2014	45	417	SE	7	Within EU ambient limits.	
TUE 18 2014	53	331	WNW	4	The PM ₁₀ exceeded the ambient limit of 50 $\mu\text{g}/\text{m}^3$ by 6%.	
WED 19 2014	57	420	NW	6	The PM ₁₀ exceeded the ambient limit of 50 $\mu\text{g}/\text{m}^3$ by 14%.	

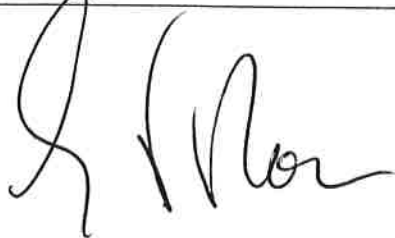
Risk Assessment

According to the sampling and measurements carried out, the levels of PM₁₀ can be assumed to be within the levels normally measured in Maltese rural areas. The TSP was found to be on the high side. But again, the levels are considered to be normal rural levels for suspended particles.

Samples collected by

Dr George Peplow

Approved By



Dr George Peplow

Annex 9: Sound Level Meter Calibration Certificates

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
www.campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106



Certificate of Calibration

CALIBRATION

UKAS Laboratory 0789

Certificate number: U16097

Test object: Sound Level Meter, Type 1 (Precision)
Manufacturer: Norsonic
Type: 140
Serial no: 1405007

Customer: En-Sure Ltd
Address: Kappara Business Centre,
113, Triq Birkirkara, San Gwann,
SGN 4197. Malta.
Contact Person: Adrian Mallia - Managing Director

Method :

Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. The following items have been calibrated as set out in BS 7580 Part 1:1997

	Producer:	Type:	Serial No:	Certificate number
Microphone	Norsonic	1225	149544	16095
Calibrator*	Norsonic	1251	33407	U16096
Preamplifier	Norsonic	1209	14564	Included

Additional items that also have been submitted for verification


Wind shield	Norsonic	Nor1451
Attenuator	None	
Extension cable	None	

These items have been taken into account wherever appropriate.

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	100.637 kPa	21.7 °C	47.1 %RH

Date received : 14/04/2014
Date of calibration: 24/04/2014
Date of issue: 25/04/2014

Engineer


Palanivel Marappan B Eng (Hons), M.Sc

Supervisor


Darren Batten Tech IOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

* The calibrator was complete with any required coupler for the microphone specified

Calibration Certificate

UKAS Laboratory Number 0789

Certificate Number:- U16097

Method

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to BS EN 60651 and or BS EN 60804. The reference range, reference sound pressure level, primary indicator range, secondary indicator range, pulse range, linearity range and display range as specified by the manufacturer were used for the verification. The sound level meter was set to A weighting and adjusted to read correctly in response to the associated sound calibrator the reading was derived from the calibrator calibration certificate and manufacturer's instruction manuals. A measurement of the self noise of the sound level meter was then made using a dummy microphone having a capacitance of $\pm 20\%$ of the associated microphones self capacitance. The sound level meter was then tested, and its overall sensitivity adjusted, in accordance with Section 5 of BS 7580:Part 1:1997. The acoustic calibration at 1 kHz specified in sub-clause 5.6.1 of the standard was performed by application of a reference sound calibrator, whilst the tests at 125 Hz and 8k Hz (sub-clause 5.6.2) were performed by the electrostatic actuator method. At the end of the test, the associated sound calibrator was reapplied to the sound level meter and the meter reading was recorded and is noted below in the statements section.

Traceability :

The following measured values are traceable to the National Physical Laboratory, United Kingdom.
Sound Pressure Level, Voltage, Frequency, Barometric Pressure, Temperature & Relative Humidity

Measurement Results:

Indication at the calibration check frequency - BS7580 #5.4	Passed
Noise test - BS 7580 #5.5.2	Passed
Level Linearity Test - BS 7580, #5.5.3	Passed
Frequency weightings: A Network - BS 7580 #5.5.4	Passed
Frequency weightings: C Network - BS 7580 #5.5.4	Passed
Frequency weightings: Z Network - BS 7580 #5.5.4	Passed
Time weightings F and S - BS7580 #5.5.5	Passed
Peak response - BS7580 #5.5.6	Passed
RMS accuracy - BS7580 #5.5.7	Passed
Time weighting I - BS7580 #5.5.8	Passed
Integrating Test : Time averaging - BS7580 #5.5.9	Passed
Integrating Test : Pulse range - BS7580 #5.5.10	Passed
Integrating Test : Sound exposure level - BS7580 #5.5.11	Passed
Overload SPL Test - BS 7580 #5.5.12	Passed
Overload Leq Test - BS 7580 #5.5.12	Passed
Acoustic tests - BS 7580 #5.4 and 5.6	Passed
Summation of acoustic tests - BS 7580 #5.5.4	Passed

Statements

The sound level meter in the configuration tested conforms to the requirements of BS 7580 Part 1.

The self-generated noise recorded in the test specified in § 5.5.2 was: (Below MSD) 9.0dB(A), (Below MSD) 10.8dB(C) and (Below MSD) 18.7dB(Z).

The final response obtained using the associated calibrator was (§5.6.3): 113.8dB(A)

This reading should be used henceforth to set up the sound level meter for field use.

A stricter test than that specified in paragraphs 5.5.6 of BS7580:1997 has been used by verifying that the 10 ms reference pulse is also correct. The level uncertainty of the Laboratory's 1 kHz sound calibrator used during this verification is ± 0.1 dB.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

The sound level meter in the configuration tested was found to comply with BS 7580:1997 part 1 for a type 1 device. The associated calibrator has been corrected for barometric pressure at the time of calibration in accordance with the relevant manufacturer's instructions

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UKAS Laboratory 0789

Certificate number: U16096

Certificate of Calibration and Conformance

Test object: Sound Calibrator
Manufacturer: Norsonic
Type: 1251
Serial no: 33407

Customer: En-Sure Ltd
Address: Kappara Business Centre,
 113, Triq Birkirkara, San Gwann,
 SGN 4197, Malta.

Contact Person: Adrian Mallia - Managing Director

Measurement Results:	Level	Level Stability	Frequency	Frequency Stability	Distortion
1:	113.99 dB	0.06 dB	1000.29 Hz	0.00 %	<0.3 %
2:	113.99 dB	0.06 dB	1000.29 Hz	0.00 %	<0.3 %
3:	113.98 dB	0.06 dB	1000.28 Hz	0.00 %	<0.3 %
Result (Average):	113.99 dB	0.06 dB	1000.29 Hz	0.00 %	<0.3 %
Expanded Uncertainty:	0.10 dB	0.02 dB	1.00 Hz	0.01 %	0.10 %
Degree of Freedom:	>100	>100	>100	>100	>100
Coverage Factor:	2.00	2.00	2.00	2.00	2.00

The stated level is relative to 20µPa. The level is traceable to National Standards.
 The stated level is valid at reference conditions. The following correction factors have been applied during the measurement: Pressure: 0.0005 dB/kPa Temperature: 0.003 dB/°C Relative humidity: 0.000 dB/%RH Load volume : 0.0003 dB/mm³


The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\2014\NOR1251_33407_M1.nmf

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	101.139 ± 0.044 kPa	22.0 ± 0.3 °C	49.8 ± 2.3 %RH

Date received for calibration: 14/04/2014
 Date of calibration: 24/04/2014
 Date of issue: 24/04/2014
 Engineer

Supervisor


 Palanivel Marappan B. Eng(Hons), M.Sc


 Darren Batten TechIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full without the prior written approval of the issuing laboratory.



Certificate number: U16096

Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Measurements

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Method

Calibration has been performed as set out in the current version of CA Technical procedure TP01

Instruments and program

A complete list of equipment, hardware and software that has been used in this calibration is available from the calibration laboratory on request.

Traceability

The measured values are traceable to the following laboratories:

Sound Pressure Level: National Physical Laboratory, United Kingdom

Voltage: National Physical Laboratory, United Kingdom

Frequency: National Physical Laboratory, United Kingdom

Ambient Pressure: National Physical Laboratory, United Kingdom

Temperature & Relative Humidity: National Physical Laboratory, United Kingdom

Comment

Level adjusted from 114.22dB.

Statement of conformance

As public evidence was available¹, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of that BS EN IEC 60942:2003.

¹ This evidence is held on file at the calibration laboratory.

Notes:

The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in **BOLD** are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Measurements performed by



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Page 2 of 2