

## **GHALLIS NON-HAZARDOUS WASTE LANDFILL**

**Application for Renewal and Variation of IPPC  
permit IP 0001/06/B**



**@econsulting** has prepared this report for the sole use of Wasteserv Company Ltd.; the contents of this report are based primarily upon information provided by the client, and such information has not been independently verified unless explicitly stated. Such information provides the basis for any conclusions and recommendations included in this document, which are not to be construed as legal or tax advice, and which are to be considered in the context within which the entire document was prepared. No liability is accepted for the use of this document other than the purposes for which it was drafted.

Cover image from Google Earth (2017)

## Introduction & Non-Technical Summary

1. The Ghallis Non-Hazardous Landfill consists of an engineered landfill facility for the disposal of non-hazardous wastes, and forms part of the Maghtab waste management complex. The latter is dedicated to the disposal needs of all non-hazardous waste streams generated in Malta, or to the diversion of waste streams to recovery or recycling processes in other permitted facilities.
2. This facility was designed as a disposal facility that implements the requirements of Directive 1999/31/EC on the landfill of waste as transposed by Legal Notice 168 of 2002 Waste Management (Landfill) Regulations. The landfill facility was originally approved for development by PA 04834/04 after an Environmental Impact Assessment process. Various development permits on site were required to permit various modifications and upgrades as part of a Master Plan for the Maghtab Environmental Complex, which was assessed via an update to the original EIS (GF 00121/06).
3. The operations of this facility were originally permitted on the 6th April 2007 through the issue of the integrated pollution prevention and control permit IP001/06/A; the renewal of this permit was decided on 31st January 2013 through the issue of IP001/06/B.
4. Construction of the landfill proceeded in phases consisting of independent cells; the latter were certified via Construction Quality Assurance reports that were prepared during the construction of each cell. The engineering specifications were derived from the results of hydrogeological, landfill gas and stability risk assessments, to ensure that operations at the installation would not result in an adverse effect on the surrounding environment. Each cell has its own leachate collection/extraction system, as well as a gas extraction system connected to a central gas management facility.
5. At present, the construction of the final cell is completed, and the gas extraction system that was the subject of the IPPC permit renewal in 2013 is being implemented.
6. The closure of the Ghallis non-hazardous landfill is not planned to occur during the subsequent renewal period, which is planned to extend to 2022. Nevertheless, given the restricted landfill void space available, the next operational period will involve extensive work on the development of further waste management solutions to extend the landfill life span as much as possible.
7. This permit renewal seeks the competent authority's consent for:
  - Continued operations of the non-hazardous landfill as approved under IP001/06/B;
  - The extension of available landfill void space through construction of a retaining wall using stabilised waste, as described in the attached Project Description Statement (Annex 1);
  - The use of selected wastes such as non-odorous Malta North rejects, as daily cover; and
  - The shredding of mattresses prior to landfilling.

8. This project involves the use of compacted waste, using lining materials and engineered reinforcement, to create a free-standing, retaining wall. This wall would have a steeper profile than that currently implemented, and extend along the Ghallis landfill in the area identified in Plan 1. The retaining wall would not involve any interventions in the old Maghtab landfill, and would provide the Ghallis landfill with a capping layer as required by the Landfill Directive 1999/31/EC. No increase in height beyond the permitted limits is being contemplated.
9. These engineering works would extend the Ghallis landfill life time by around 9 to 12 months, by increasing void space by circa 300 - 350,000m<sup>3</sup>. Implementation of the project would be carried out by *geom. Ciro Frisoli & C. S.a.s.*, an Italian company specialised in landfill engineering, and that owns the patents pertaining to the technologies that allow the construction of such retaining walls in landfills. This technology has been implemented successfully in the Pariti 2 and the Passo Breccioso Landfills in Foggia.
10. The selection of the technology used in this variation has followed studies presented in SLR (2016) *Ghallis Non Hazardous Landfill – Landfill Optimisation of Void Space Assessment* (Annex 22). This study considered the following 4 options:
  - i. by increasing the height of the final restoration contours;
  - ii. by increasing the footprint of the landfill beyond the currently proposed scheme;
  - iii. by improved waste compaction; and
  - iv. by altering the containment design at the perimeter slopes (vertical lining system).

Increasing the height of the landfill or expanding the landfill westwards are not being considered at present. The development of a landfill cell at the site previously designated as a hazardous waste will be the subject of a fresh project proposal. The option of extending the landfill over the Maghtab landfill footprint, or retrofitting a vertical lining system, were not considered favourably.

11. This renewal and variation should be considered as part of an ongoing effort to upgrade the Maghtab Environmental Complex in a holistic manner. Besides the planned development of a Waste to Energy plant and the upgrading of the Malta North facilities, the following projects are currently under development, to ensure appropriate management of the landfill facility:
  - A development permit application for the **capping** of the Ghallis landfill, detailing the manner in which the approved final contours will be achieved – the target date for submission of the application is in 2020;
  - The attainment of a **leachate treatment** agreement with third parties, or the development of a leachate treatment facility, where a pilot treatment system is planned for implementation in 2020, to determine the suitability of the selected technology to the leachate characteristics present at the Ghallis landfill (see paragraph 12);
  - **Upgrading of the Malta North facilities** in 2020 to further divert biodegradable waste away from landfill;
  - The **improvement of pre-treatment facilities** by providing reception facilities for skip loaders and other wastes not suitable for the bulky line, by 2021; and
  - A holistic review of the Maghtab Environmental Complex hydrology and water management, to upgrade and optimise water management on site.

12. The National Waste Management Plan required by The Waste Regulations, S.L. 549.63 sets various targets for waste management that aim '*to reduce the generation of waste and to increase source separation so as to promote recycling and reduce landfilling*'. Wasteserv has implemented various management and infrastructure projects – that are not within scope of this IPPC permit - that are aimed towards achievement of the above targets.
13. Wasteserv is currently in the process of identifying the technologies required for treatment of leachates. To this end, the following study SLR (2016) *Ghallis Non-Hazardous Landfill: Leachate Management and Disposal Options Report* (Annex 24) was commissioned to determine the options that were available. Consideration of the leachate parameters highlighted the need for more detail with respect to the design of appropriate leachate treatment solutions, with the result that Ing. Marco Cremona has been contracted to assist in the identification of solutions that will result in pilot trials.
14. This application has been reviewed by the Environment and Resources Authority, as well as the Statutory Consultees as identified within SL 549.76 Industrial Emissions (Framework) Regulations. The feedback of the Authority, as well as the applications responses, are provided as Annex 23. The information provided within the feedback has been integrated into this application to form the final consolidated version of this IPPC application.

## Scope of the application

15. This permit renewal and variation seeks the competent authority's consent for:
- Continued operations of the non-hazardous landfill as approved under IP001/06/B;
  - The extension of available landfill void space through construction of a retaining wall using stabilised waste, as described in the attached Project Description Statement (Annex 1) and PA 1586/18; and
  - The shredding of mattresses prior to landfilling.
16. The application for renewal includes the following documentation (as annexes), to facilitate review of implementation of permit requirements and operations:
- Form A
  - Form C
  - Annex 1 – Project Description Statement
  - Annex 2 – Improvement Programme Status
  - Annex 3 – Outstanding Pending Issues (A) Compliance Audit
  - Annex 4 – Outstanding Pending Issues (B) ERA inspection report
  - Annex 5 – Outstanding Pending Issues (A) – Responses to Compliance Audit
  - Annex 6 – Outstanding Pending Issues (B) – Responses to ERA inspection report
  - Annex 7 – Leachate Management
  - Annex 8 – Specifications for Fuel Storage
  - Annex 9 – Draft Closure Plan
  - Annex 10 – Emergency Response Plan
  - Annex 11 – Specifications of Hazardous Waste Containers for Quarantine Area
  - Annex 12 – Certification of Incorporation
  - Annex 13 – Hydrological Risk Assessment and Surface Water Management
  - Annex 14 – Stability Risk Assessment
  - Annex 15 – Site Report
  - Annex 16 – Environmental Impact Assessment Documents
  - Annex 17 – EMS Structure
  - Annex 18 – Environmental Monitoring Plan
  - Annex 19 – Construction Method Statement
  - Annex 20 - permits
  - Annex 21 – Site Management System
  - Annex 22 – Void Optimisation Report
  - Annex 23 – Regulatory Consultation process
  - Annex 24 – Leachate Treatment and Disposal Study
17. **Mattress shredding:** Shredder Specifications included with this feedback in Annex 8, where the model is the 700/1500 with a throughput of 25t per hour. Actual throughput of mattresses is 0.855 tons per hour, which is less than 10 tons per hour during daylight working hours. Rated Thermal Input calculated to be 0.762 MWth.
- The input stream will be EWC 20 03 07, and the output stream will be EWC 19 12 12. The shredder is mobile, and the shredding area moves to accommodate operational exigencies (tip face). In the future, mattresses will be directed to the new Multi Material Recovery Facility (MMRF) which shall be built at Hal-Far (adjacent to the CA Site).

## **ANNEX 1: Project Description Statement**

## ANNEX 2: Improvement Programme of IP 0005/13/A

**Table 1.5.1: Improvement programme requirements**

No.	Reference	Improvement	Date	Status
14.	2.3.66	Inspection and maintenance contract	To be submitted by end March 2013	Superseded by update to management practices where maintenance requirements are contracted directed via Wasteserv Malta Ltd.
18.	2.5.5	Draft version of closure plan	To be submitted by end December 2013	Submitted together with this application for renewal see ANNEX 9
20.	4.1.2 – 4.1.21	Submission of environment management system (EMS)	To be submitted by end March 2013	Submitted in February 2017.



## **ANNEX 3: Outstanding Pending Issues (A)**

**IPPC Compliance Audit Report of: Ghallis Landfill (IPPC Permit Number IP 0001/06/B)**

**Wardell Armstrong (January 2014)**

## **ANNEX 4: Outstanding Pending Issues (B)**

ERA inspection report

## **ANNEX 5: Outstanding Pending Issues (A) - Responses**

### **IP 0001/06/B (IPPC PERMIT FOR GHALLIS NON-HAZARDOUS WASTE LANDFILL)**

The following tables have been adapted from those presented in Annex 3, which list the non-conformities detected on site by the Wardell Armstrong report dated January 2014. These tables refer to sections of the permit relevant to these non-conformities and include descriptions of the measures taken by Wasteserv Ltd. as corrective actions.

Also included are issues listed as pending in the ERA inspection report dated 27<sup>th</sup> February 2017.

Status updates marked as 'CLOSED' indicate that measures have been taken to resolve the non-conformity.

Status updated marked as 'ONGOING' indicate that:

1. The issue is a matter which requires constant attention as part of the regular operational management;
2. the corrective actions are in the process of being implemented; or
3. part of long term measures being developed to be proposed as subsequent variations to the permitted operations, including proposals submitted for consideration by ERA to facilitate the closure of such issues.

**TABLE 1: NON-CONFORMANCES RELATING TO SECTION 1 GENERAL CONDITIONS - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
1.1 - Permitted activities	1.1.1	Additional Waste Management Operations being undertaken beyond the permitted D1-Tipping activity. This specifically relates to the manual sorting of wastes into various recyclates for further off-site processing and shredding of waste such as wood and mattresses.	Category 2 - Significant	These operations have been discontinued. The need for such operations has been superseded by the commissioning of the Malta North plant. It is proposed that the shredding of mattresses is allowed at the tipface as part of the waste handling process, to allow for improved compaction. Furthermore, shredding will only take place when no winds are present, so as to mitigate against transport of material off site.	CLOSED
	1.1.2	Evidence of non-permitted wastes entering and being disposed of at the site. Specifically relating to gypsum based material.	Category 2 - Significant	Waste acceptance procedures have been improved through commissioning of the Malta North plant. Furthermore, new procedures have been adopted with respect to managing waste queries from clients, to direct waste streams towards the appropriate facility, and to direct inspections carried out by staff on site.	ONGOING
1.2 – Site	1.2.2, 3.10.1.6	Part of site tipped above pre-settlement contours by up to 2.9m. Site Manager aware of over tipping and explained that material will be regarded to comply with levels in due course.	Category 3 - Minor	Settlement and progressive capping of the various cells is expected to resolve this issue, which will be resolved as part of the final closure plan.	ONGOING
1.4 - Overarching management conditions	1.4.2, 1.5.1	EMS not submitted by end of March 2013.	Category 2 - Significant	EMS submitted in 2017.	CLOSED
1.5 - Improvement programme	1.5.1	Inspection and Maintenance Programme and EMS not submitted by end of March 2013.	Category 2 - Significant	Superseded by update to management practices where maintenance requirements are contracted directly by Wasteserv Ltd. EMS submitted in 2017.	CLOSED
	1.5.2	Revised and consolidated Monitoring Programme not submitted by end of March 2013.	Category 2 - Significant	A revised and consolidated monitoring programme was finalised in December 2014.	CLOSED
1.9 - Off-site conditions	1.9.1, 5.2.2	Litter had escaped part of the site onto adjoining land, contravening the requirement to ensure that waste does not escape to the environment.	Category 2 - Significant	Commissioning of the Malta North plant has facilitated management of litter by improving acceptance procedures; management procedures in terms of regular clean-up have improved the situation.	ONGOING

	1.9.3	The annual average Hydrogen Sulphide and Methane concentrations at the majority of the nine off-site monitoring locations exceeded the respective limit values of 0.15mg/m <sup>3</sup> and 10ppm. However, it is considered that off-site factors may influence the results.	Category 2 - Significant	Noted, furthermore, a contingency plan for management of landfill gas is included as part of the approved monitoring programme (section 4 - page 12) of Adi Associates Environmental Consultants Ltd, 2014. <i>Non-Hazardous Engineered Waste Landfill at Ghallis. Environmental Monitoring Programme required by IPPC permit IP 0001/06/B</i> . San Gwann, December 2014; vii + 61 pp.	ONGOING
--	-------	---	--------------------------	---	---------

**TABLE 2: NON-CONFORMANCES RELATING TO SECTION 2 SITE ENGINEERING - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
2.1 - Site engineering	2.1.1.5 (Table 2.1.1 - b, c and f)	During a period of heavy rainfall, water overfilled the sump in the quarantine area and flowed off the concrete pavement onto uncontained ground. The building used to store diesel, engine oil, hydraulic oil and gear oil was not fully bunded. The building incorporated a concrete floor. Access was gained through a metal, lockable door. There was a gap beneath the door through which liquids could escape in the event of spillage or leakage from the tank or a drum. 200 litre drums used to store waste oil were placed on uncontained ground.	Category 2 - Significant	Wastes accepted in the quarantine areas do not include materials that can leach. Specialised hazardous waste containers are being procured; in the interim, wastes that can leach are kept on spill trays and removed from site as soon as possible. Interim – long term as measure  Fuel storage facilities are being upgraded (see specifications provided in annex 8).	
	2.3.1	No evidence that the Quarantine Area has been subject to CQA.	Category 2 - Significant	Refer to previous entry. Specialised containers for storage of hazardous wastes are being procured for the quarantine area – see Annex 10.	

**TABLE 3: NON-CONFORMANCES RELATING TO SECTION 3 SITE OPERATIONS - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
3.2 - Control of mud, debris and loose waste	3.2.1.1	Wheelwash not working effectively. Wheelwash is not located in the most efficient and effective location. No written evidence of daily inspections of wheel cleaning facilities and its effectiveness.	Category 2 - Significant	Wheelwash relocated as indicated in audit inspection report, and records being maintained as per procedure MEC EP07 Wheel Wash Management, which has been updated to include maintenance of records.	CLOSED
	3.2.1.2	Evidence of vehicles exiting the site without mounting the wheelwash.	Category 2 - Significant	Refer to previous entry on 3.2.1.1	CLOSED
3.4 - Leaks and spillages	3.4.1.2	The building used to store diesel, engine oil, hydraulic oil and gear oil was not fully bunded. The building incorporated a concrete floor. Access was gained through a metal, lockable door. There was a gap beneath the door through which liquids could escape in the event of spillage or leakage from the tank or a drum. 200 litre drums used to store waste oil were placed on uncontained ground.	Category 2 - Significant	As per entry for 2.1	
3.5 - Fires on the site	3.5.3	There is no continuous supply of water at a pressure of 5-10 bars from a 64mm hose at the site.	Category 1 - Major	The Malta North project includes reservoirs which can be utilised in case of fire. An Emergency Response Plan is attached; it is projected that this plan will be reviewed within the next year.	
	3.5.4.1	Clear evidence of ash and burned textiles as a result of burning mattresses at the site.	Category 1 - Major	This was the result of an accident when shredder caught fire.	CLOSED
	3.5.5.2	No immediate notification or written incident reports have been provided to MEPA as a consequence of fires at the site.	Category 2 - Significant	Incident notification to ERA included as procedure MEC EP02 Emergency Preparedness & Response Procedure.	CLOSED
3.7 - Monitoring and control of pest infestations	3.7.1	A number of rodent control locations were noted to be empty with no traps, baited lines or poisoned grain observed.	Category 3 - Minor	Corrective action taken to ensure proper deployment of rodent control measures.	CLOSED
3.8 - Control	3.8.1 (Table	Presence of dogs within the boundary of the site.	Category 2	Dogs no longer present on site.	CLOSED

of scavenging birds and other scavengers	3.8.1 b)	No notes observed within the site diary with regards to the presence of dogs on the site. Holes in the boundary fence allow access for dogs to migrate onto site.	- Significant		
3.9 - Control of litter	3.9.1	Evidence of litter from the site was observed on adjacent land and property.	Category 2 - Significant	Commissioning of the Malta North plant has facilitated management of litter by improving acceptance procedures; management procedures in terms of regular clean-up have improved the situation.	ONGOING
3.10 - Waste acceptance and control procedures	3.10.1.1	There was no evidence to suggest that visual inspection of waste loads was being undertaken at the point of deposit. Evidence of non-conforming wastes being deposited.	Category 1 - Major	Commissioning of the Malta North plant has facilitated inspection of waste loads by improving acceptance procedures, reducing the possibility of wastes being brought on site without proper scrutiny. Regular monitoring is also carried out at the tip face, and inspections reports are available; site rules have been circulated to clients; warning letters and penalties are employed where necessary.	ONGOING
	3.10.1.2	Anecdotal evidence of waste inputs being allowed to tip initially without appropriate WAC testing.	Category 2 - Significant	See entry for 3.10.1.1	
	Table 3.10.2 b)	Current quarantine area does not meet the required engineering specification stipulated in the permit. Waste electrical equipment stored outside of the quarantine area and appears to have been stored longer than the maximum 5 working day period.	Category 1 - Major	See entry for 2.1.1.5  ERA inspection report of February 2017 noted the proper use of the quarantine area.	ONGOING

**TABLE 4: NON-CONFORMANCES RELATING TO SECTION 4 SITE INFRASTRUCTURE - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
4.1 - Provision of Site identification board	4.1.1	A site identification board with all the required information was not on display at the site entrance.	Category 3 - Minor	Site identification board updated at new entrance.	CLOSED
4.2 - Site security	4.2.1	Area of the site perimeter fence have poor structural integrity.	Category 2 - Significant	Site perimeter fence in the process of being upgraded and continually maintained.	ONGOING
Table 4.2.1 – Maintenance standards		Site perimeter fence defects and damage are not being recorded in the site diary. No evidence of daily temporary repairs.	Category 2 - Significant	Records will be kept as part of regular security checks.	CLOSED

**TABLE 5: NON-CONFORMANCES RELATING TO SECTION 5 EMISSIONS - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
5.7 – Odour	5.7.1, 5.7.3 (Table 5.7.1 - b), 5.7.4	Large areas of waste were either inadequately covered or had no cover applied. Strong smell of odour on parts of the landfill and site boundary.	Category 2 - Significant	ERA inspection report dated February 2017 recorded that ' <i>no odours were noted on the outside whilst approaching the facility. Odours within the facility were considered normal for the operations being carried out at the time.</i> ' Recognising that management of Municipal Solid Wastes have particular risks in terms of potential for odour, particular attention is given to the management of the tip face, to ensure proper deployment of the daily cover, and provision of attention to particular waste streams where risk of odour is high, to ensure that the material is covered as soon as possible.	ONGOING



**TABLE 6: NON-CONFORMANCES RELATING TO SECTION 6 MANAGEMENT & TECHNICALLY COMPETENT PERSON - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
6 – Management and technically competent person	6.2, 6.3, 6.4	Lack of awareness and internal training of key permit and management control requirements such as record keeping, waste acceptance, notifications and permissible activities.	Category 1 - Major	Training on the EMS was provided to operational staff; the following stages will involve the development of a skills training matrix to identify and implement the specific training needs that will improve awareness.	ONGOING
	6.6	No specific skills/training matrix has been developed.	Category 2 - Significant	As per entry above.	ONGOING
	6.9, 6.10	Anecdotal evidence to suggest that not all non-conformances and complaints are being appropriately investigated in line with company procedures.	Category 2 - Significant	As per entry above.	ONGOING
	6.12	No recording of site attendance for the technically competent person.	Category 3 - Minor	This is being recorded electronically via a punch clock.	ONGOING

**TABLE 7: NON-CONFORMANCES RELATING TO SECTION 7 EFFICIENT USE OF RAW MATERIALS - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
7 - Efficient use of raw materials	7.1	Energy consumption figures were not recorded. Energy efficient lighting did not appear to be in use. No energy efficiency plan.	Category 3 - Minor	Energy consumption data is not available, but consumption is limited to that of the site office, which is not expected to exceed that of a domestic residence.	CLOSED

**TABLE 8: NON-CONFORMANCES RELATING TO SECTION 8 ACCIDENT PREVENTION & CONTROL - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
8 – Accident prevention and control	8.1	No notification has been provided to the authority regarding the 2 year review of the Accident Management Plan.	Category 3 – Minor	<i>MEC EP02 Emergency Preparedness &amp; Response Procedure</i> has been adopted for use in April 2016.	ONGOING
	8.2	Evidence of smoking in areas of the site in contravention of the site health & safety rules.	Category 2 – Significant	Management vigilance on this point has been increased.	ONGOING

**TABLE 9: NON-CONFORMANCES RELATING TO SECTION 10 SITE RECORDS - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
10 – Site Records	10.4	No site diary entries are being recorded with regard to defects and damage to site security systems and technically competent management on site.	Category 3 – Minor	See response to 4.2.1 on site security, and section 6 on the technically competent person.	CLOSED

**TABLE 10: NON-CONFORMANCES RELATING TO SECTION 11 REPORTING - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
11 - Reporting	11.2	Energy consumption figures are not being included in the previous Annual Environmental Report submissions.	Category 3 – Minor	See comments for section 7.1.	CLOSED
	11.6	Records of waste types quarantined and removed from the site are not being accurately reported.	Category 2 – Significant	Records on use of quarantine area are being kept in a <i>Quarantine Waste Log</i> .	CLOSED

**TABLE 11: NON-CONFORMANCES RELATING TO SECTION 12 NOTIFICATIONS - (IPPC PERMIT NUMBER IP 0001/06/B)**

Main Permit Section	Sub-section(s)	Details of Non-Conformance	Risk Rating	Action by Wasteserv Ltd.	Status
12 – Reporting	12.1.2, 12.2.4 & 12.2	Accidents & incidents that have the potential for significant environmental harm are not being formally notified as required by the permit.	Category 3 – Minor	Incident notification to ERA included as part of procedure MEC EP02 Emergency Preparedness & Response Procedure.	ONGOING

## **ANNEX 6: Outstanding Pending Issues (B) – Responses to ERA inspection report**

## ANNEX 7: Leachate Management

Leachate management has the subject of discussion with the ERA in previous inspection reports, due to the ponding of leachate during the construction of certain cells. As described in the IPPC Compliance Audit Report for Ghallis Landfill (January 2014), *'leachate is extracted from the base of cells and recirculated through parts of the fill via additional leachate wells or sumps located towards the periphery of a cell and within the engineered liner system. There is no leachate treatment on site or discharge to sewer or removal off-site to an authorised treatment facility.'*

The following elements of the cells as constructed were evaluated:

- CQA certification for the correct deployment of landfill liner;
- The cell depths plotted as indicated in the attached plans; and
- The quantity of leachate detected in the various wells as indicated in the following table.

**Table 1: Ghallis Leachate Collection Points (LCP) – leachate depth**

LCP	Depth of leachate (m) present in LCP (December 2016)	Depth of leachate (m) present in LCP (March 2017)	Volume of cell (m <sup>3</sup> ) at maximum leachate level present in LCP (December 2016)	Volume of cell (m <sup>3</sup> ) at maximum leachate level present in LCP (March 2017)
1	Dry	Dry	N/A	N/A
2	Dry	Dry	N/A	N/A
3	Dry	Dry	N/A	N/A
4	worst case <sup>1</sup>	worst case <sup>1</sup>	4149	4149
5	worst case <sup>1</sup>	0.54	378	133
6	worst case <sup>1</sup>	worst case <sup>1</sup>	4608	4608
7	Dry	Dry	N/A	N/A
8	worst case <sup>1</sup>	worst case <sup>1</sup>	774	774
9	Dry	Dry	N/A	N/A
10	Dry	Dry	N/A	N/A
11	2.5	2.5	985	985
12	3.24	2.24	1402	181
<b>Total</b>			<b>12296</b>	<b>10830</b>

Note 1: Where readings were unavailable (either because the LCP was damaged as in the case of LCP 6, or the methodology gave results that were unclear given that the LCPs are not perfectly aligned in the vertical plane), a worst-case scenario is assumed where the bund on the landfill bottom is considered flooded.

The maximum amount of leachate detected was found to occur within the leachate wells over the deepest parts of the cells, as highlighted in blue in the attached plan 1. This implies that the leachate being circulated within the landfill is accumulating at the deepest points of the landfill, and this may account for the problems encountered with leachate management during previous phases of cell construction. The cell volumes at the leachate levels measured during December 2016 and March 2017 are plotted in plans 2 and 3.

Plans 2 and 3 illustrate how leachate pools have been contained by the bund structures that have been constructed on the landfill bottom. In both sets of readings, the volumes of the cells at the level where leachate was detected was of a magnitude of circa 10,000m<sup>3</sup>. The total volume of leachate in the landfill is expected to be substantially less, given that most of this volume is actually composed of compacted waste mass, where the accumulated leachate is present only in the interstitial spaces of the compressed waste mass.

Certain leachate ponds in the individual cells may have a surface level rather close to the edge of the liner, as is the case in the cells underlying leachate collection points 5 and 6. The latter points are close to the area where the final landfill cell has been excavated, where the edge of the landfill liner has been prepared for the extension of the liner to cover the floor of the landfill cell (after the underlying layers have been prepared).

Ponding of leachate has been noted at various points during the construction phase, as a consequence of the fact that construction of new cells was carried out in parallel with landfilling of waste. It is pertinent to note that circa 5m<sup>3</sup> per day is collected for recirculation of leachate, and that this is currently sufficient to control leachate levels and prevent overspill over the liner edge.

Leachate management is an essential part of the management of landfill facilities. As described by the Irish EPA in their *Final Draft BAT Guidance Note on Best Available Techniques for the Waste Sector: Landfill Activities* (December 2011), leachate recirculation is described as follows: *'this engineering practice reduces the volume of effluent for treatment and assists in accelerating the degradation/stabilisation of the waste in the landfill however leachate recirculation may only be considered in engineered, lined cells where suitable leachate collection systems, leachate level monitoring is in place and the lined cell is capped to the satisfaction of the Agency'*.

Given the above, the following actions are recommended:

1. Completion of the lining of the final cells, completing the containment system required to manage leachate;
2. Monitor leachate levels within the wells, and the leachate volumes that are present within the landfill;
3. Determine the optimal leachate head that should be maintained within the landfill mass to ensure that sufficient leachate is maintained in the system to facilitate degradation, while ensuring that excessive volumes do not accumulate; and,
4. Establish a long-term plan for leachate management on site, in correlation with the development of plans for the eventual capping and closure of the landfill. Permitting for such a facility is planned for 2019, with deployment of a pilot project commencing in 2020.

## **Annex 8 – Specifications for Fuel Storage & Shredder**

## **Annex 9 – Draft Closure Plan**



## **Annex 10 – Emergency Response Plan**

## **Annex 11 – Specifications of Hazardous Waste Containers for Quarantine Area**



## **Annex 12 – Certification of Incorporation**

## **Annex 13 – Hydrological Risk Assessment and Surface Water Management**

## **Annex 14 – Stability Risk Assessment**

## Annex 15 – Site Report

- A. Since the last renewal of the IPPC permit, infilling at the Ghallis landfill has continued until the point where it is estimated that that landfill lifetime is expected to last till circa 2022 at current landfilling rates. Operations at the landfill tipface are expected to continue as per current practice; however, pre-treatment of wastes to be landfilled is expected to improve given the planned upgrades to the Malta North facilities. This variation is expected to extend the lifetime of the landfill, where recontouring of the landfill profile will provide further void space.
- B. The landfill closure and aftercare are expected to be the subject of the next IPPC permit application. The landfill will be brought to the approved pre-settlement height and profile through a cut and fill exercise, and the capping structures will be implemented. Permit applications for this process will be submitted in 2020, and it is expected that this will also address aftercare provisions.
- C. The environmental monitoring carried out to date has been submitted to the ERA via the regular submission of the Annual Environmental Report, as required by IPPC permit conditions. The following points are worthy of note:
- The air quality monitoring results are generally satisfactory, barring exceedances in PM10 dust fractions and hydrogen sulphide. However, the monitoring results observed that various other sources would have contributed to these exceedances, namely the various construction activities carried out in the vicinity in the case of PM10, and the Salini water body in the case of the hydrogen sulphide. It should be noted that limited levels of hydrogen sulphide were detected in the leachate gases, and various points on the landfill (such as the tipface).
  - Certain exceedances in ammoniacal nitrogen, arsenic, cadmium, and nickel were detected during the groundwater monitoring; however, there is no correlation with leachate composition, where a far wider range of pollutants would be expected if these levels were due to leachate overspill or leakage.
  - Odour monitoring results have indicated that odours have been noted at various points of the site perimeter; the indication is that meteorological conditions prevalent at the tip face have contributed to propagation of the odour past the site boundary. In this regard, while the use of daily cover has contributed to containing the impact, the major improvement that is required is the upgrading of the Malta North facilities to (1) deviate biodegradable and odorous wastes away from landfill and to anaerobic digestion, and (2) ensure sufficient processing capacity to handle all the biodegradable wastes.

## **Annex 16 – Environmental Impact Assessment Documents**



## **Annex 17 – EMS Structure**

## **Annex 18 – Environmental Monitoring Plan**

## **Annex 19 – Construction Management Plan**

## **Annex 20 - Permits**

## **Annex 21 – Site Management System**

## **Annex 22 – Void Optimisation Report**

## **Annex 23 –Regulatory Consultation process**

## **Annex 24 – Leachate Treatment and Disposal Study**