St Helena Government

HORSE POINT LANDFILL SITE MANAGEMENT MANUAL

Document: ERM-2015-007

Environmental Management Division

Saint Helena Government

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"Our Island. Our Environment. Our Responsibility."

St Helena Government

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1.0 HORSE POINT LANDFILL SITE MANAGEMENT MANUAL

1.1 Introduction

This document describes a series of procedures for waste management operations at Horse Point Landfill Site (HPLS). The procedures have been designed to meet the requirements of key documents summarised in Section 1.2, to reduce the attractiveness of the landfill to feral pigeons in order to reduce the risks of bird strike at Saint Helena Airport.

It is intended that the document is retained on site, for use by operatives in carrying out their daily duties. It should not be relied upon for other purposes unless formally agreed in writing by EMD.

This management manual is considered to be a 'live' document which should be routinely reviewed and updated by operational management, as a minimum on an annual basis.

Note: The Civic Amenity Area (CAA) has been renamed the Public Recycling Facility (PRF). Both terms are used within this document.

1.2 Key Documents

The following documents have been used in the preparation of this report:

1.2.1 CAP 772 Wildlife Hazard Management at Aerodromes (2014)

CAP 772 provides best practice guidance to support an airport operator managing bird/wildlife strike risks. CAP 772 notes that an "*aeronautical assessment*" should be performed, focusing on potential flight safety implications at the relevant aerodrome(s) that an existing or proposed bird attractant development may cause. Such a study should consist of the overall assessment of the ambient bird strike risk at the aerodrome and a site-specific risk assessment relating to any development or site in the vicinity.

HPLS is a site in the vicinity of the airport which has the potential to increase the risk of bird strike at the airport.

1.2.2 ICAO Annex 14, Volume 1 sets the basic standards for Aerodrome (Bird) Safeguarding, and the following text is relevant to the Horse Point Landfill Site and St Helena Airport.

> 9.4.3 Action shall be taken to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft.
>
> Note: Guidance on effective measures for establishing whether or not wildlife, on or near an aerodrome, constitute a potential hazard to aircraft operations, and on methods for discouraging their presence, is given in the Airport Services Manual (Doc 9137), Part 3.
>
> 9.4.4 The appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any other source which may attract wildlife to the aerodrome, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a wildlife hazard problem. Where the elimination of existing sites is not possible, the appropriate authority shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable.

Note: this report pertains only to the responsibility of EMD as Landfill Operator: Basil Read is responsible for wider bird strike issues under the Wildlife Hazard Management Plan – WHMP. The majority of these responsibilities are held by the Airport Operator.

Due to the size of the island, it is not possible to locate a landfill beyond the recommended 13km buffer zone for bird strike risk management.

1.2.3 Airport Operations Association & General Aviation Awareness Council supported by CAA. Safeguarding Aerodromes, Advice Note 5. Potential Bird Hazards from Landfill Sites (2nd Issue). Aug 2006.

Advice Note 5 proposes well maintained netted disposal cells can be used to control feeding bird populations, as birds tend not to wait in the landfill vicinity as is the case when active dispersal is the principal means of control.

1.2.4 ICAO Document 9137- AN/901 Part 3: -Airport Services Manual Part 3, Wildlife Control and Reduction (4th Edition, 2011)

Clause 7.2.2, subsection c) Waste Management Facilities

'If a refuse site in the vicinity of an airport cannot be closed, it likely will be necessary to try to influence the operators to provide control measure at the site to reduce its attractiveness… Such control could include fencing, netting or overhead wires to prevent access to the active surface and active dispersal of birds using pyrotechnics or other dispersal techniques.'

1.2.5 BIRD STRIKE AVIATION (DESK) STUDY (2011).

An Assessment of the Bird strike Risks at the New Saint Helena Airport Associated with the Operation of a Landfill site at Horse Point. (Nigel Deacon BSc) Airfield Wildlife Management Ltd. Draft 1 August 2011

This report looked broadly at the ambient potential bird strike hazards for the new airport as a whole. It identified that further field work would be required with respect to the HPLS. This additional work was reported in the 2012 field study report.

1.2.6 Email review of Deacon Report by Wildlife Management and Monitoring Bird Management Unit, The Food and Environment Research Agency (Dec 2011).

A review of the draft 2011 desk study by FERA (a subsidiary of DEFRA and provider of technical advice to UKOTs) was requested by SHG. The FERA review concluded:

That there was insignificant bird strike risk from mynah birds and unknown risk from feral pigeons. Providing a netted cell was identified as a proportionate response to the identified risk. FERA identified the need to confirm bird numbers once the netted cell had been implemented to establish the level of risk. Only if at this time the risks remained unacceptable then an active control regime would need to be designed. The review suggests a programme based on shooting or trapping to remove these species in combination with good a housekeeping programme (e.g. waste cover and segregation). Only if the (as yet unknown) risk cannot be reduced, would there be a need to go to an exclusion technique and SHG was advised that moving the landfill site was unnecessary unless issues other than bird management needed to be addressed.

On the basis of this advice and the guidance outlined in 1.2.2, 1.2.3 and 1.2.5 the landfill was not relocated, but upgraded to a covered reception building and netted active waste cell. The

Waste Reception Building (WRB) designed to accept waste on flight days and the netted cell as the ultimate burial site of domestic wastes.

FERA also noted: '*Also (it is worth) mention that to put this (report) into context there is no mention that* ***most airports around the world routinely operate with species in the red category*** *with the driver of the risk assessment process used being to identify where resources should be targeted to reduce this risk. Overall (the report) is fine (in identifying) "the consequences of an incident could be greatly* ***magnified by the local terrain and (but) in this case the difficulty of minimising the root hazard is not insurmountable."*** *i.e. there is very low risk and the hazard (birds on the landfill) can be managed.'*

1.2.7 BIRD STRIKE AVIATION (FIELD) STUDY (RC1c, 2012).

An Assessment of the Bird Strike Risks at the New Saint Helena Airport Associated with the Operation of a Landfill Site at Horse Point. Background Bird strike Hazard, the Additional Hazards Associated with the Current Horse Point Landfill Site and a Discussion of Future Waste Strategies and Alternate Sites for the Treatment of Organic Waste Materials. (Nigel Deacon BSc) Airfield Wildlife Management Ltd Draft RC1c (2012).

Deacon, a contributor to the development of CAP 772, was commissioned to assess birdstrike risk associated with Horse Point Landfill and identify any necessary measures to contain the potential for aircraft bird strike to acceptable levels. The 2012 report concluded that:

- *the risk of increased bird strikes occurring with* ***mynahs*** *as a consequence of the landfill location would be* ***low or very low****, particularly if the attraction of the site could be significantly reduced from current levels.*

- *The commuting* ***feral pigeon*** *traffic observed between the local colonies and the landfill site represents a* ***very low bird strike risk****, but the close proximity of the* ***local breeding colonies*** *to the airport is a* ***potential concern.***

- *The landfill site at Horse Point does not generate the same level of birdstrike hazard that would be expected at a similar European site because the number of different species and numbers of individual birds present are much lower, and the larger scavenging species such as gulls, kites, egrets, etc., are entirely absent.*

- *Due to the terrain the relative hazard as a result of a strike is greater than might be anticipated elsewhere.*

The Deacon report (2012) made the following recommendations:

Preferred measures:

- Enclosure of waste (netting of waste cell to exclude feeding or feral pigeons, although not mynah birds); and
- Partial organic waste segregation.

Supplemental considerations:

- Soil covering for waste;
- Minimise waste tipping area; and
- Scaring and lethal control.

1.2.8 St Helena Solid Waste Management Plan (2012)

Subsequent to Deacon Report (2011) a Solid Waste Management Plan was developed by SHG in 2012. The following improvements to the islands waste management operation were included in the Solid Waste Management Plan and are directly associated with reducing the potential risks from bird strike associated with the landfill:

- Delivery to Island of upgraded waste collection system comprising wheeled bins and new Refuse Collection Vehicles (RCVs) moving from black bags being left on the pavement for collection;
- Construction of bird proofed WRB for the contained deposit of waste and to limit public access to the landfilling area;
- Installation of netting over discrete deposition cells;
- Development of a Landfill Management Plan including methodology for the maintenance and management of the cell netting and other containment of organic waste.

In co-ordination with the Airport Landscape Ecology Mitigation Programme (LEMP), local composters are also being trialled around the island to segregate some of the organic waste.

1.3 Limitations of the Report

This report is produced for the exclusive use of SHG to enable the effective management of HPLS.

2.0 LANDFILL REFURBISHMENT

In 2012 SHG published a Solid Waste Management Strategy for St Helena and a companion Solid Waste Management Plan. The plan included the need to refurbish HPLS in order to reduce its attractiveness specifically to feeding feral pigeons and other feeding birds generally with the consequent reduction in potential risk of bird strike at the airport. In September 2013 a £1.36M contract was awarded for the landfill refurbishment and a contractor started on site in November 2013.

Recommendations for reducing the attractiveness of the landfill to bird populations outlined in the Deacon report (2012) were used as the basis of the landfill redesign and updating the landfill operation manual. Table 2.1 summarises the recommendations and their implementation.

Table 2.1: Birdstrike Mitigation Measures

Mitigation	Implemented	Date Implemented	Comment
Consider relocation of landfill further from the airport, or enclosure of waste within a netted cell with monitoring and maintenance system.	**X**	N/A	In 11.02.2012 SHG created a Bird Strike Policy Paper. It concluded that there were no suitable alternative sites available on island to re-locate the landfill. In accordance with FERA and Deacon (2012) conclusions.
Waste segregation and separation of putrescible waste with separate treatment facility.	**X**	N/A	Not developed. Some preliminary composting trials may separate a small proportion of putrescible wastes. Purpose - LEMP project.
Establish a SHG Waste Management Strategy.	✓	2012	
Regular cover material.	✓	From 2012	
Bird scaring and lethal control implemented as a supporting strategy	✓	October 2012 – October 2014	Used prior to netted cell use. Ceased October 2014.
Deposition in NETTED cells of a restricted size.	✓	From Sept 2014	
Restrict public access to Civic Amenity and landfill.	✓	From August 2015	
Phased restoration.	✓	July 2013	Endemics Planting
Implement a (landfill) working plan.	✓	August 2015	
Establishment of a HPLS Bird Management Plan.	✓	July 2015	

3.0 GENERAL INFORMATION

3.1 Location

The site is located in the north eastern corner of the island in excess of 500m from residential development (Drawing HPLS1). HPLS is located in the north eastern corner of the island, at grid reference 15.3592S, 05.4040W. A detailed site plan is provided in Drawing HPLS2.

3.2 Waste Management

HPLS provides St Helena's waste management facility. Given the remote nature of the island, its limited economy and lack of international hazardous waste agreements the site comprises historical uncontained landfilling of all materials. Preparations for airport certification have enabled the re-development of the landfill so that a degree of waste segregation is possible, notably separation of:

- Domestic waste into a netted, un-engineered, waste cell;
- Bulky waste disposal into an un-engineered un-netted cell;
- Green waste into a separate stockpile;
- Hazardous waste disposal into an engineered hazardous waste cell; and
- Thermal treatment of select biosecurity, medical waste and hazardous wastes in a Macrotec V70B incinerator.

In addition, a public recycling facility has been created, resulting in a reduction of public access to the wider site.

Further progress is being made in the development of a waste recycling programme to enable some of the more significant waste streams to be processed.

4.0 SITE SECURITY AND SUPERVISION

4.1 Gate Controls

Waste delivery vehicle access to Horse Point Landfill is gained through the main site entrance gate, located on the southern boundary of the site. A second gate provides public access to the PRF in the south western corner of the site (Drawing HPLS2).

The main gate will be open during working hours (see Section 5.0).

All vehicles loaded with waste for disposal must first report to the landfill site operator before depositing waste.

The entrance gate to the public recycling facility will be open during working hours.

Both entrances are secured with padlocked gates which will be closed and locked outside the normal hours of operation of the landfill, unless by operator authorised arrangement.

4.2 Supervision

At least one employee will remain at the site during working hours that the main entrance gates are open.

On arrival at the landfill site, all drivers of Refuse Collection Vehicles (RCVs) and vehicles carrying waste should report to the landfill site office and sign in. The landfill operator will direct them to the appropriate area of the landfill to discharge their load, and also provide any additional instructions that may be necessary.

The discharging of waste within the WRB or incinerator compound will be supervised by the landfill operator.

5.0 HOURS OF OPERATION

The normal working hours for Horse Point landfill Site will be as follows:

Monday to Sunday – 0900hrs to 1500hrs.

Public Holidays – Closed.

Access to the site will be closed after working hours and on Public Holidays.

The hours of operation will be strictly adhered to.

In the event of an emergency, or as deemed necessary, St. Helena Government may provide / authorize access to the landfill site at alternative times.

6.0 HEALTH AND SAFETY

The safety of site operating / management personnel and the public is of prime importance at all times. Site employees shall not endanger themselves or others on the site. Employees are obligated to report unsafe practices and are empowered to notify other employees or site users acting in an unsafe manner. All accidents, injuries, or near misses are to be reported and the following steps are to be taken:

- investigate the incident immediately;
- find out the cause;
- complete an Accident/Incident Report;
- take immediate measures to correct the cause and prevent it reoccurring; and
- conduct a safety meeting with all employees as soon as possible after the incident.

6.1 Safety Instructions – General

The safety instructions shall be subject to checks and periodic revision. The staff must be informed about all changes and revisions made to the instructions.

The landfill operator or his appointed representative shall be responsible for ensuring that each member of staff is acquainted with any updated issue of the safety instructions in force for Horse Point Landfill Site.

Machinery may only be used for the purpose for which it was constructed. The following general rules must be observed:

- Any adjustments of machinery and movable parts of the same may only be done while the machinery is turned off;
- A machine must never be left running idle. The engine shall be turned off and the key removed from the machinery / vehicle, if the operator leaves the machine;
- No machinery or vehicle may be left with the shovel of the front loader lifted;
- At all times the windows of the cabin of any machinery or vehicle shall be kept clean, in order to ensure a clear view for the operator.

Any persons under influence of alcohol, medicine or drugs are not permitted on Horse Point Landfill Site. They must not operate any machinery.

6.2 Safety of Site Users

It is the landfill operator's responsibility to ensure the safety of site users (general public, public authorities and commercial businesses) by informing users of the landfill rules, and ensuring that the rules are adhered to. To protect the safety of site users the following basic rules shall apply:

- only adults are allowed to unload vehicles and only in areas as directed by site operators;
- children, and individuals not unloading waste must remain in vehicles;

- smoking is not allowed on site;
- no scavenging is allowed on the main landfill area; and
- site users must leave the unloading area immediately after unloading of vehicles.

To protect the safety of site users, the landfill operator shall:

- control access to the site;
- inform site users of the rules upon arrival at the site;
- post and maintain adequate directional signs to segregate commercial and public vehicles;
- enforce the site speed limit;
- maintain an orderly site;
- immediately inform users of any unsafe practices.

6.3 Working Safely Around Public Vehicles

When working around the public the following are important considerations:

- the actions of the public are unpredictable;
- never stand/go/run behind vehicles;
- maintain eye contact with the driver at all times;
- keep tipping areas clear and level where practicable so vehicles can have easy access; and
- check the ground for glass, pipe, wire, wood, or other debris that could cause tripping hazards, and / or foot puncture hazards.

6.4 Safe Equipment Operation

- no machine shall be operated by any individual unless the operator has been properly trained, is appropriately licenced and is competent in the handling and operation of the vehicle;
- perform a pre-check walk-around;
- check braking system;
- always use a seat belt;
- clean windows and adjust mirrors for optimum vision;
- no machine shall be operated unless all safety devices are in good repair and fully operational, i.e. brakes, backup alarms, fire extinguishers, lights, horn, etc.;
- check site for safe operating conditions such as large bulky items that could cause equipment instability;

- ensure area around the machine is clear before moving;
- use stepping points and handholds when mounting and dismounting machinery;
- do not crush sealed containers that contain unknown contents;
- always use caution around site users who may not be aware of the dangers; and
- when parking the vehicle / machine always:
    - park on a level surface;
    - lower blades, buckets;
    - move transmission lever to neutral;
    - apply the parking brake; and
    - park up-wind of cell areas and not on the deposited waste.

6.5 Personal Protective Equipment

Appropriate Personal Protective Equipment (PPE) for landfill site work includes wearing the following: approved ankle supporting safety boots and high visibility clothing.

Staff working outside of buildings engaged with handling of waste shall always wear personal protection equipment. This includes:

- work clothing;
- safety footwear; and

In addition, the following personal protective equipment must be available and used by landfill operators and others working on the site, when necessary:

- hard / bump hats (helmets); and
- ear plugs/ear defenders (when around loud equipment).

Safety Caps must be worn when working in areas where there is a risk of falling objects e.g. near the front loader. When working outside at the tipping front or any other place in the landfill cells, where waste is handled, the following personal protective equipment shall be additionally used:

- dust masks; and
- goggles.

A first aid kit shall be available at the site. The contents of the kit shall be renewed when used or becomes out of date. At least one landfill operator, properly trained in first aid, shall be present on the site during all working hours.

The work on site must be organised in such a way, that direct contact with the waste is avoided. If this nevertheless happens, the affected body area must be washed with soap and water immediately. Dirty working clothes are to be replaced with clean clothes at the end of the working day.

In order to prevent the spreading of pathogenic microorganisms and hazardous materials it is prohibited for landfill operators to leave the site wearing working clothes or to take them home for washing.

All landfill operators and other personnel should shower at the end of the working day before leaving the site.

Eating, drinking and smoking are only permitted in designated areas of the site. Before and after eating, drinking and smoking, hands are to be washed thoroughly with soap and water.

7.0 WASTE RECEPTION AND DISPOSAL

7.1 Waste Reception

On arrival at the landfill site, all vehicles carrying waste should report to the landfill site office and sign in. The landfill operator will then direct them to either the PRF and indicate the appropriate location to discharge their load or direct to the bulky waste cell. The landfill operator may also provide additional instructions which may be necessary for the safe operation of the landfill.

The landfill operator may log the following information for each delivery of waste by a public body or commercial operator:

- Date and time of delivery;
- Truck registration number;
- Identity of the waste producer;
- Estimation of volume of waste; and
- Type of waste verified by visual inspection.

Any information recorded may be used to track the waste produced on St. Helena.

7.2 Refuse Collection Vehicles Waste

Placement of collected domestic waste in the netted landfill cell will be undertaken every working day. Waste Management Services staff will limit the time the netted cell is open for disposal of waste in order to minimise bird activity on site that may contribute to bird strike risk.

Note: Disposal of domestic waste is not dependent upon flight days.

7.3 Hazardous Waste

Hazardous waste is received at the landfill by the landfill operator in the following ways:

- From the public by delivery to the PRF during opening hours;
- From public bodies and commercial sector by agreed delivery to the Hazardous Waste Cell or PRF; and
- Clinical waste by specialise direct delivery to the incinerator.

All waste, with the exception of the domestic waste stream, shall be assessed and hazardous waste segregated by the landfill operator for appropriate disposal (recycling, thermal incineration or disposal in the hazardous waste cell).

Internal site hazardous waste movements shall be performed by site staff to one of the following locations:

- PRF containers for the temporary storage of hazardous materials;
- Engineered hazardous waste cell for burial; or

- Hazardous waste incinerator for thermal treatment.

Note: Disposal of hazardous waste is not dependent upon flight days.

7.4 Other Waste Types

All other wastes will be deposited directly to the netted general waste cell unless a separate procedure is described in the following sub-sections.

7.4.1 Bulky Waste

The process for the reception and disposal of bulky waste (not putrescible waste) is as follows:

- on arrival at the landfill site, the vehicle shall pass through the security gate and the driver shall report to the landfill site office and sign in;
- the landfill operator shall direct them to a bulky waste trench. The operator shall also provide any additional instructions that may be necessary;
- the vehicle shall travel along the site haul road to the designated area of the landfill;
- the driver shall position the vehicle at a safe location and discharge the waste where instructed by the landfill operator;
- once the waste has been discharged, the vehicle shall drive out of the landfill site along the haul road;
- the landfill 360^{o} excavator shall be used by the operator to compact the bulky waste and apply waste cover soils at the end of the day;
- before leaving site the driver shall clean down the vehicle to remove waste attached to the outside of the vehicle, which may otherwise fall off on public roads; and
- the driver shall sign out on leaving via the security gate.

Note: Disposal of bulky waste is not dependent upon flight days.

7.4.2 Clinical Waste

The process for the reception and disposal of clinical waste is as follows:

- on arrival at the landfill site, the vehicle shall pass through the security gate and the driver shall report to the landfill site office and sign in;
- the landfill operator shall direct them to the appropriate area for storage within the incinerator compound prior to incineration and also provide any additional instructions that may be necessary;
- the vehicle will travel along the site haul road to the designated site;
- the material shall be handled and stored as instructed by the landfill operator;
- before leaving site the driver will clean down the vehicle to remove waste attached to the outside of the vehicle, which may otherwise fall off on public roads; and

- the driver shall sign out on leaving via the security gate

Note: Disposal of clinical waste will be scheduled so as not to be undertaken on flight days.

7.4.3 Asbestos

The process for the reception and disposal of asbestos is as follows:

- on arrival at the landfill site the vehicle shall pass through the security gate and the driver shall report to the landfill site office and sign in. Asbestos waste shall be checked by the operator to ensure that it is sealed and double bagged;
- the landfill operator will direct them to the asbestos disposal pit to discharge their load. The operator may also provide additional instructions as necessary;
- the vehicle shall travel along the site haul road to the asbestos disposal pit;
- the driver shall position the vehicle at a safe location and discharge the waste where instructed by the landfill operator;
- once the waste has been discharged, the vehicle shall drive out of the landfill site along the haul road;
- the landfill 360^{o} excavator **SHALL <u>NOT</u> COMPACT THE WASTE** but shall apply waste cover soils at the end of the day (see Section 13.0);
- before leaving site the driver shall clean down the vehicle to remove waste attached to the outside of the vehicle, which may otherwise fall off on public roads; and
- the driver shall sign out on leaving via the security gate.

Note: Disposal of asbestos waste is not dependent upon flight days.

7.4.4 Green Waste

The process for the reception of green waste is as follows;

- on arrival at the landfill site, the vehicle will pass through the security gate and the driver will report to the landfill site office and sign in;
- the landfill operator will direct them to the green waste disposal area. The operator shall also provide any additional instructions that may be necessary;
- the vehicle shall travel along the site haul road to the designated area of the landfill;
- the driver shall position the vehicle at a safe location and discharge the waste where instructed by the landfill operator;
- once the waste has been discharged, the vehicle shall drive out of the landfill site along the haul road;
- before leaving site the driver shall clean down the vehicle to remove waste attached to the outside of the vehicle, which may otherwise fall off on public roads; and

- the driver shall sign out on leaving via the security gate.

Note: Disposal of green waste is not dependent upon flight days.

7.4.5 Septic Tank Waste

Septic tank waste shall continue to be disposed at Horse Point Landfill Site until the islands sewage treatment upgrade has been completed in 2017 (TBC), where-after septic tank waste will be disposed and treated at the relevant sewage treatment works.

Vehicles delivering this waste to the site presently discharge the waste onto flat areas of the landfill to soak-away into natural ground. These areas support lush vegetation growth which could be an attractant to feral pigeons. These areas shall be managed to reduce their attractiveness to birds, especially feral pigeons, through regular vegetation clearance and draining of any standing water.

Note: Disposal of septic tank waste is not dependent upon flight days.

7.5 On-going Procedure Review

The above procedures will be reviewed and updated (as required) on at least an annual basis.

8.0 HAZARDOUS WASTE MANAGEMENT

Refurbishment of the landfill has included the construction of two hazardous waste cells and the installation of a hazardous waste incinerator. These facilities enable the responsible management of hazardous wastes which can be thermally treated (including medical waste and biosecurity waste).

8.1 Hazardous Waste Incinerator Operation

A separate hazardous waste incinerator operational manual (report ERM-2015-006) has been written for use by landfill operators. The manual also includes an air quality monitoring protocol and environment risk assessment.

The incinerator is currently being used exclusively to manage hazardous waste associated with the airport construction phase. The incinerator will be handed over to Saint Helena Government at the end of construction, where it will replace the incinerator in Rupert's Valley. At handover, the incinerator will be fully serviced by the supplier and a 2 year service pack provided. During the servicing, landfill staff will be given training associated with incinerator operation.

8.2 Hazardous Waste Cell Operation

A separate hazardous waste cell operation manual will be published in November 2015.

The first hazardous waste cell will be used exclusively to manage airport construction hazardous waste which cannot be thermally treated at the incinerator. The second hazardous waste cell is for use by Saint Helena Government.

9.0 PUBLIC RECYCLING FACILITY

The Public Recycling Facility (PRF) is located adjacent to the landfill site office and the main site entrance. The site shall be open to the public at the designated times, who will be able to deposit their waste into designated hard standing bays and containers (see Drawing HPLS2).

The facility provides the public and commercial entities with an opportunity to deposit waste at Horse Point Landfill in person. The facility enables the segregation of recyclable waste and hazardous waste (vehicle oil, paint, batteries, waste electrical equipment) for appropriate disposal. This provides for significantly improved site health and safety by reducing the volume of public traffic movements within the main working site and allows better management of wastes e.g. waste is disposed in the correct area within the main working site. The separated waste within the public recycling facility is available for the public to retrieve for spare parts or reuse.

Waste from the public recycling facility which is not retrieved by the public shall be collected periodically and taken directly to the relevant disposal area on the site. Acceptable waste at the Public Recycling Facility will include:

- bulky waste;
- green waste;
- recyclable waste
- hazardous waste; and
- domestic waste (Saturdays and Sundays only)

The frequency of clearance will be dictated by the speed of waste accumulation. Where materials are likely to be desirable to the public they shall be maintained in the area of facility as the availability of space dictates.

The process of removing waste from the public recycling facility is as follows:

- the public shall deliver waste to the site and deposit materials in the appropriate bay;
- some materials shall be recycled / reused by other site users;
- when the landfill operator is removing materials from the public recycling facility for disposal, public access to the area will be prevented;
- depending on the volume of waste present, either the waste will be loaded into the trailer by the JCB tele-handler, or the JCB tele-handler will transport the waste directly; and
- waste will be taken to the appropriate area of the landfill for disposal or storage.

Organic (food) waste, and black bag waste (household or commercial), shall be accepted at the public recycling facility on **Saturdays and Sundays only**. A communal 1100 litre lidded bin is located in the PRF for this waste. In the event that these materials are deposited at the public recycling facility, the landfill operator shall remove them to the current active landfill cell as soon as possible and no later than the end of each working day.

10.0 AIRPORT OPERATIONS

10.1 Airport Waste Collection

Flight days will be primarily Saturdays but with ad-hoc aero-medical flights as and when required. Waste from the airport will be collected on Wednesdays by the RCV.

The RCV will collect waste from the security gate leading to Airside and from the Airport Terminal building.

10.2 Landfill Operation during Flight Days

All RCVs are to deposit their loads of domestic waste in the netted waste cell on flight days. Waste Management Services staff will limit the time the netted cell is open for disposal of waste in order to minimise bird activity on site that may contribute to bird strike risk.

Note: Disposal of domestic waste is not dependent upon flight days.

In the event that access to the netted waste cell is unachievable e.g. due to inclement weather then the following procedure will apply for the disposal of collected domestic waste;

- on arrival at the landfill site, RCVs will pass through the security gate and the driver will report to the landfill site office and sign in;
- the landfill operator will direct them to the WRB and indicate the appropriate area within it to discharge their load and provide any additional instructions that may be necessary;
- the RCV discharging waste in the building is to be reversed inside the WRB under the safe direction of the landfill operator;
- the roller shutter door is then closed;
- the RCV discharges waste in the location as instructed by the landfill operator;
- once the waste has been discharged, the roller shutter door is opened and the RCV is driven out forwards;
- the roller shutter door is then closed;
- before leaving site the driver will clean down the RCV to remove waste attached to the outside of the vehicle, which may otherwise fall off on public roads; and
- the driver signs out and leaves the site via the security gate.

Waste within the WRB will be managed by a JCB tele-handler fitted with a bucket and transported to the landfill using a tractor and trailer. For health and safety and environmental reasons waste will not be stored in the WRB longer than 5 days.

The process of removal and disposal of waste from the WRB is as follows:

- during loading of waste to the active landfill cell no RCV will enter the WRB;
- the tractor and trailer will park inside of the WRB;

- the roller shutter door will be closed;
- the JCB tele-handler will pick up the waste inside the WRB where it will load the trailer;
- a cover will be placed over the trailer to discourage birds and prevent windblown litter;
- the roller shutter door is opened;
- the tractor and trailer will then transport the waste to the active landfill cell;
- the entrance to the mobile aerial netting system will be opened to allow the tractor and trailer access;
- the tractor will locate the trailer at a safe position in the active landfill cell and within the mobile aerial netting system and discharge the waste;
- the tractor and trailer will leave the mobile aerial netting system;
- the entrance to the mobile aerial netting system will be closed;
- the landfill mobile plant will place and compact waste, and apply waste cover soils at the end of the day (see Section 13.0); and
- the entrance to the mobile aerial netting system will be closed and secured.

10.3 Bird Management Plan

As discussed in Section 1.0, the landfill has been refurbished in order to manage waste in a responsible manner to reduce the attractiveness of the site to feral pigeons and minimise the risks to aircraft from bird strike.

A bird management plan has been written for the landfill and is presented in Appendix B. The bird management plan provides a comprehensive assessment of bird strike risks, responsibilities and protocols for reducing the attractiveness of the landfill to feral pigeons. All landfill operation protocols described in this document and companion documents have been developed in order to reduce the attractiveness of the landfill to feral pigeons.

Successful implementation of the bird management plan will be attained through adhering to the protocols described in this document.

11.0 LANDFILL DEVELOPMENT

The landfill shall be excavated sequentially as specified in the design profile and will comprise a series of 18 cells of dimensions 24m x 12m x 10m. The initial construction process is outlined below:

1. the area of the landfill site will be set out by a Landfill Manager, to indicate the layout of the cells and excavation levels;
2. where present, top soil from the excavation area will be removed for use in restoration. It shall be hauled by tractor and trailer to a separate stockpiles defined by the operator;
3. the cell will be excavated to the lines and levels set out, the final excavated levels will be checked by a Landfill Manager;
4. the excavation arisings shall be stockpiled adjacent to the cell for use as daily cover or for re-profiling as part of restoration;
5. surface water ditches will be excavated using the 360^{o} excavator to divert rain water runoff around the landfill site;
6. the main access road is provided up to the point of entry to Cell 1; the access road into Cell 2 will be constructed as needed; and
7. the mobile aerial netting system shall be installed over the active landfill cell prior to commencing waste deposition.

Once constructed, the landfill site shall be filled on a phased basis, with only one active cell operational at any one time. The phased approach is intended to minimise the generation of leachate, reduce odours, manage landfill gas and encourage the progressive restoration of the site.

The phased development of the landfill is outlined below:

1. the cell to be filled shall be identified on site;
2. the cell shall be cleared of any vegetation and erosion of the slopes and base shall be repaired by infilling, particular care shall be taken when assessing the condition of slopes and bunds upon which the mobile aerial netting system may be founded making them suitable foundation for the netting;
3. access to the cell shall be established. This may require the construction of a ramp or forming a route across the restored areas of the landfill;
4. the mobile aerial netting system over the cell shall be installed;
5. waste shall be transported to the cell as described in Section 7.0;
6. waste shall be compacted in accordance with Section 13.0 and covered with soils in accordance with Section 14.0;
7. 6-monthly or as required topographic surveys of the cell shall be performed to monitor filling progress and as required set out final waste levels;
8. adjust / move the mobile aerial netting system as required to allow the required waste profile to be achieved;
9. once final waste levels are achieved, the final soil cover layer shall be laid such that no waste is exposed. The netting system shall be dismantled; and
10. restore the completed cell area in accordance with Section 15.0.

Individual cells will be separated by internal dividing bunds at base level (approximate 3-6ft – depending on the stability of the soil). These bunds will need to be approximately 1.0m in height and wide enough to accommodate the mobile aerial netting system.

12.0 MOBILE AERIAL NETTING SYSTEM

12.1 Introduction

The following section provides guidance on how the mobile aerial netting system is operated. This guidance is considered to be broadly applicable to any landfill netting system.

12.2 General Description of the Mobile Aerial Netting System

The disposal of RCV waste within the landfill is to be undertaken within the mobile aerial netting system. The mobile aerial netting system is a “tension structure”, which relies on the dead weight of its foundations to support nets over the whole of the active tipping area of the landfill. The structure consists of steel masts founded on moveable concrete bases, from which ropes spanning the width of the active landfill cell are held in tension. Nets are hung from the ropes to enclose the active area of the landfill.

12.3 Operating the Net

The net shall always be hoisted to the desired height on the windward side first followed by the leeward side. Great care shall always be taken to avoid snagging the net on projections from the waste surface, on the masts or rigging.

Once raised the net shall be fastened at the sides to the holding down ropes. The leeward side shall be fairly taut to avoid the net mesh snagging on the mast step irons. The windward side can be set somewhat slacker.

The door end of the net and the back of the net may be held down by tying to stakes driven into the deposited wastes or outside ground. As an alternative, it may be more convenient to tie both ends of the net to concrete filled tyres.

When working within the active landfill cell care must be taken to avoid catching/snagging the nets with mechanical plant that could damage the mobile aerial netting system, such as the arm of the excavator or the body of a tipping trailer when raised. A clearance of 2m shall be maintained between the nets and working plant. If a piece of plant catches the nets it must stop immediately and be carefully untangled. Failure to stop could not only rip the nets but also pull down the structure. To untangle the nets it may be possible to reverse slowly a short distance and lower the part caught in the nets. However, in severe cases it may be necessary to lower the nets and plant, to allow access to physically untangle the nets from the plant.

Lowering is a reversal of the hoisting process, with the leeward side being dropped first. Great care shall be exercised to avoid forming running turns on the winch drum, and leather palmed gloves should always be worn during the lowering exercise. As with raising, care shall be taken to avoid snagging the net.

When moving the netting system to a new location, the nets and ropes must be removed and transported separately from the base units. The proposed cell layout and details required for inter-cell bunds are to be confirmed and/or amended as required to ensure consistency with the operational requirements of the chosen netting system.

Daily records of maintenance shall be kept.

Damage to the nets should be repaired immediately to reduce the risks of attracting feral pigeons to the site and reducing access to a potential food source.

Note; See Huck Tek Manual for operational procedure for the mobile aerial netting system.

12.4 Wind

During high winds it will be necessary to reduce the tension on the ropes, which will result in the nets sagging. Graduations may be painted on the faces of the masts to indicate sag levels. The net shall normally be set approximately as follows for the stated wind gust speeds:

Wind Gust Speed (mph)	Beaufort Scale Force	Sag in Centre of Net (meters)
Up to 50	8	2
50 – 60	9	3
60 – 70	10	4

Above 75 – 80 mph wind gust speed, the net shall be lowered either onto or very close to the ground. In any emergency the net must be lowered to the ground.

12.5 Clearing Litter

The mobile aerial netting system will have a tendency to be self-cleansing in lower wind speeds, with the windblown litter tending to drop down to the foot of the net. However, the net is not intended to act as a litter net and should large amounts of litter be retained within the structure it is likely that the wind loads could damage the nets and possibly the structure. Therefore, litter is to be removed from the lower parts of the net on a daily basis, bagged and disposed of within the active landfill cell.

Larger items of plastic sheet and the like should be cleared from the net as soon as possible.

12.6 Inspection

The following inspections should be made by the landfill operatives:

- **Daily:** an inspection should be made of the general condition of ropes, stays and halyards. The net should also be studied for holes or tears;
- **Weekly:** a detailed inspection must be made of the condition of shackles, turnbuckles, ropes and halyards; and
- **Strong wind conditions**: the detailed inspection, as described under weekly inspections, must be made on a daily basis.

Remedial works shall be carried out or instigated without undue delay.

12.7 Spares

It is recommended that the following spares are held on site:

- six spare netting panels;
- spare base and mast unit;

- cable ties to repair small holes in nets;
- one spare winch and winch handles; and
- 2 No. spares of each element of rigging equipment.

12.8 Safety

For the safety of the netting system and site operatives:

- always carry out rigorous inspections of the equipment at least once a week;
- maintain a safe clearance between plant working within the active landfill cell and the nets;
- always wear and use the safety harness when climbing the masts;
- always wear sturdy leather or leather palmed gloves when lowering the net;
- always have an assistant when raising and lowering the nets;
- when lowering, make sure that the halyard is free to run and feet and legs are well clear;
- avoid running turns on the winches;
- always keep ropes and halyards neatly coiled and hitched clear of the ground when they are not being used to raise or lower the net; and
- always wear a safety helmet when carrying out work or making inspections.

13.0 LANDFILL ACTIVE CELL

The working face is defined as the active portion of the landfill where wastes are deposited and where they are spread and compacted with landfill equipment. Material shall be deposited at the furthest point and filled in strips back towards the cell entry points. Material will be compacted using the tracked landfill vehicle.

Compaction of solid waste is required to:

- maximize waste density to optimize utilization of the landfill airspace and to reduce consolidation and settlement;
- minimize soil cover by providing an even surface on which soil cover is placed; and
- reduce the potential for wind-blown litter.

The following compaction technique(s) shall apply:

- waste shall be spread in thin lifts not to exceed 0.6 metres in thickness and at the end of a push the machine should roll beyond the deposited refuse;
- waste shall not be placed on top of a previous 0.6m lift until the previous lift has been compacted by a minimum of three (3) equipment passes. Compact the refuse until the equipment “walks out” of the refuse (does not sink into the waste but stays on top);
- 3 - 5 passes are considered necessary to achieve the required level of compaction;
- trimming the refuse: before the cell is covered, the refuse shall be graded to as smooth a surface as possible. After the waste has been compacted, the operator shall re-grade, filling areas that have settled and trimming any high spots so that the finished cell has a smoothly graded surface; and
- care shall be exercised in placing waste to ensure that non-compatible or hard to compact bulky wastes are placed at the bottom or deep in the cell.

14.0 WASTE COVER SOILS

Waste cover soils shall be sourced from the stockpiled material excavated to form the cells. All waste shall be covered with an adequate amount of cover soils with such frequency that it:

- prevents windblown litter;
- prevents odours being a problem off-site;
- ensures that scavenging birds are not attracted to the site;
- ensures that flies and vermin are not attracted to the site or infest the site;
- ensures that the risk of fire on or within the site is minimised; and
- ensures that the visual appearance of the site is not seriously detrimental to the amenity of the locality.

Waste cells shall be covered with available soil material to a minimum depth of 150 mm. Cover soils shall be placed over waste no later than the end of each working day.

To minimize cover soil usage and maintain waste void space, the following steps shall be taken:

- minimize the waste surface area requiring soil cover;
- leave the waste surface smooth and void-free after compaction; and
- prior to placing additional waste, strip all available soil from the area over which the waste will be placed that day. This stripped soil shall be moved to the side of the cell and reused at the end of the day for daily cover.

15.0 RESTORATION AND CAPPING

As landfilling progresses above the original ground level the Landfill Manager will be required to set out the final waste levels.

Once the final waste surface elevation has been achieved within a cell, capping and restoration of the cell will commence. This shall consist of a regulating layer, capping layer and restoration soils.

Regulating Layer: is a layer of excavated soil materials placed over the final waste levels to provide an even free draining surface.

Capping Layer: This layer consists of a minimum of 500mm of clay compacted to form a low permeability barrier. The clay cap should be placed in 150mm thick layers and compacted with 8 passes of the tracked loading shovel or 360^{o} excavator. 'Clay' shall be sourced from the stockpiles of deeper excavated materials collected as part of the cell excavation process.

Restoration Soils: Restoration 'soils' shall be placed over the clay equal to a depth of 500mm. Soils shall be placed and care shall be taken not to compact the soils. Should areas become compacted the surface shall be carefully ripped using the bucket teeth of the 360^{o} excavator. Soils shall be sourced from the stockpiles of near surface materials excavated as part of the cell excavation.

Note: The capping and restoration design to be adopted for the areas of the site outside of the new netted landfill cells is described in Annex 1.

16.0 LANDFILL GAS MANAGEMENT

As part of the capping and restoration scheme, a simple passive venting system shall be used to allow any landfill gas produced to vent rather than build up beneath the capping layer.

Upon completion of waste placement in a cell, a 1m x 1m (minimum dimensions) hole will be excavated into the top of the waste, penetrating a minimum of 0.5m.

Within the excavation, a 2.5m long 100mm diameter pipe shall be installed. The lower 400mm of the pipe shall be perforated to allow gas to flow. Perforations shall be 5mm in diameter and drilled at 100mm intervals along the length of the pipe and at 90^{o} around the pipe perimeter (pipes may be drilled on site).

Once the pipe has been installed the excavation within the waste shall be backfilled with clean 20mm single size stone.

The pipe will penetrate up through the cap and restoration soils. Care must be taken not to damage the pipe when placing the clay cap and restoration soils. Within 500mm of the pipe, placement and compaction of the clay cap around the pipe should be undertaken using shovels to place 100mm layers of clay and a steel rammer to compact each layer.

At the surface, the pipe shall protrude by 0.5m and shall be fitted with a T-Junction to form a cowl preventing materials falling into the pipe and deterring access by vermin.

An alternative method of construction can be to excavate a hole upon completion of the capping and restoration. In this case a 1m x 1m (minimum dimensions) hole would be excavated through the soils into the top of the waste, penetrating a minimum of 0.5m. Care must be taken to excavate the soils and clay separately from the waste, for later use, and the excavated waste disposed of to the active cell. Backfilling would then be undertaken as described above. This method would eliminate the risk of damaging the pipe with mechanical plant when installing the cap and restoration soils.

17.0 ENVIRONMENTAL MANAGEMENT

17.1 Litter

The landfill operator shall carry out a daily visual litter inspection on arrival at site and record the findings in a Site Diary. Areas of litter which require attention shall either be cleared by the site operative or reported to the Environmental Risk Manager for further action to be taken. In addition to this, a series of surface water ditches should be excavated around the perimeter of the final landform to divert runoff away from the landfill. It should be noted that surface water should be managed during the development of the landfill and therefore consideration should be given to the location of temporary ditches. The location of such temporary ditches will be dependent on a number of factors such as the access routes, netting system dimensions and position, and number of cells developed at one time, and can only be determined once such details have been decided.

17.2 Landfill Cell Mobile Aerial Netting System

Guidance on monitoring of mobile aerial netting systems is presented in Section 12.6. Further details of monitoring requirements for the mobile aerial netting system which is deployed at Horse Point Landfill Site may be provided by the manufacturer.

17.3 Perimeter Fence

The perimeter fencing and gates shall be inspected monthly by the landfill operator, with the findings being recorded in a Site Diary. Any identified need for repair or maintenance shall be reported to the Environmental Risk Manager for further action to be taken.

17.4 Groundwater Monitoring

Groundwater monitoring shall be undertaken by EMD using the monitoring well located down gradient of the active cell and hazardous waste cell area of the landfill (HPL BH01).

The borehole shall be utilized to monitor groundwater levels and quality. Details of the proposed environmental monitoring regime are presented in Table 17.1 below.

Table 17.1: Proposed Groundwater Monitoring Schedule

Monitoring Location	Frequency	Measurement and Analytical Suite
Groundwater Monitoring Borehole HPL BH01	Monthly	Groundwater level (mAMSL)
	Quarterly	Temperature, pH, electrical conductivity, chloride, ammoniacal-nitrogen, total alkalinity (CaCO3), magnesium, potassium, sulphate, calcium, sodium, total organic carbon (TOC), total oxidised nitrogen (TON), manganese, iron, chromium VI, copper, lead, zinc, nickel (suite dependent upon available laboratory facilities and monitoring equipment)
	Annual	Hazardous Substance Suite to be determined (dependent upon relevant laboratory facilities and monitoring equipment)

The recommended approach to sampling of groundwater within and around landfill sites can be found within document TGN02 – Monitoring Landfill Leachate, Groundwater and Surface Water, available at www.environment-agency.gov.uk

Monitoring results will be maintained and reviewed periodically by EMD with findings being reported back to the operational management team.

17.5 Surface Water Management

Whilst the site is not designed to provide engineered containment, it is important to minimize the volume of leachate produced by the infiltration of precipitation and runoff into the waste mass. Final restoration levels for the general waste cells have been designed to help shed surface water thereby preventing infiltration and generation of leachate.

18.0 MEASURES TO REDUCE NUISANCES

During the operation of the landfill site odours, dust, wind-blown litter, vermin and noise can become significant nuisances for the surroundings.

18.1 Odour

Offensive odours may arise from:

- Digging activities in previously deposited waste;
- Handling of malodorous wastes, e.g. sewage sludge;
- Arial spraying (re-circulation) of leachate, open leachate lagoons or containers;
- Emission of landfill gas.

The principal means of minimising landfill odours will comprise:

- Effective compaction;
- Provision of adequate cover, especially the daily cover;
- Immediate deposition and covering of especially malodorous wastes;
- Effective gas collection and treatment system;
- Immediate deposition and covering of excavated wastes.

18.2 Dust

Emission of dust may occur under windy conditions:

- During unloading of waste;
- During installation of cover materials;
- When driving on dry, unpaved areas;
- When driving on paved but poorly cleaned areas.

The landfill operator shall organize the operations at the landfill in such a way, that dust is kept to a minimum. The following measures can be used:

- Surfaces with dry soil and service roads are sprinkled with water;
- Transportation activities are restricted to the service roads;
- Paved service roads are cleaned by sweeping;
- Sprinkling of dry soil or waste during excavation and reposition;
- Areas with temporary cover area seeded with grass.

18.3 Litter

A frequent reason for complaints from residents living near landfill sites is litter blowing outside the landfill area. The perimeter fence installed around the landfill site and planted windbreak zone help to contain litter and prevent it from being scattered to adjacent properties. Daily clean-ups, particularly at the end of the working day, limit the quantity of litter that can be carried to adjacent properties.

The amount of wind-blown litter can further be substantially reduced by:

- Keeping the working area as small as possible;
- Placement and compaction of the waste immediately after unloading;
- Installation and maintenance of daily, intermediate and temporary covers.

18.4 Vermin

Vermin include birds, cats, rats and other rodents, insects and other animals, each of which may be a potential carrier of disease and therefore becomes a health hazard.

The most effective practice in the control of vermin is:

- rapid and complete compaction and covering of all waste;
- The territory of the landfill must be maintained clean and tidy;
- The accumulation of stagnant water anywhere on the site must be prevented by proper grading, filling low spots, and placing cover soil over waste material.

Rats and mice may be brought into the site with the solid waste. Regular site inspections will indicate the prevalence of these animals. When significant numbers are identified, an experienced pest control specialist should be employed to deal with the problem.

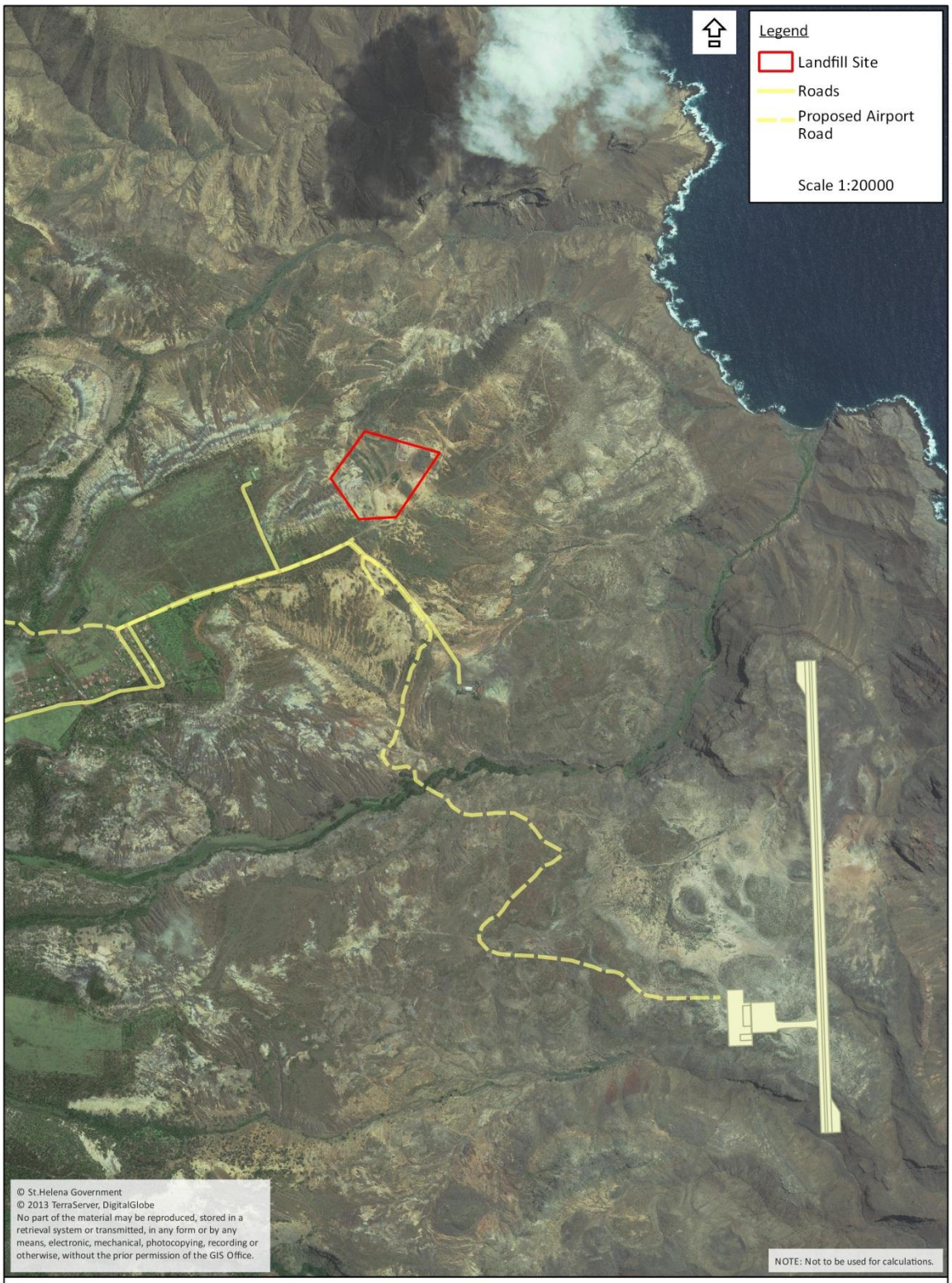
18.5 Noise

Nuisance from noise mainly may arise from mechanical equipment operating or moving at the site.

In order to mitigate noise all mechanical equipment shall be kept in good working order at all times. Special attention shall be given to the fitting and maintenance of any sound reducing equipment to vehicles, machinery and fixed plant.

DRAWINGS

Drawing HPLS1: Site Location



Horse Point Landfill Site, Site Location Plan.

Drawing No: HPLS 1
Created by: Samantha Cherrett. Checked by: Ceri Sansom on 06/03/15

Drawing HPLS2: Landfill Site Plan

ANNEX A – RESTORATION OF HISTORICAL AREAS OF WASTE

Area to be restored

The main area of previous landfilling to be restored is to the north of the new general waste cells and west of the bulky waste trench where an endemic plant restoration trial has been taking place. This area does not comprise putrescible waste and is not an attractant to birds.. Ideally, these areas would be re-profiled to improve the visual amenity of the area. There are no immediate plans to do so.

Restoration of the older areas of the site should be carried out in a similar manner to the future cell area (as described in Section 13.0). However, a layer of cover material has already been applied across some of the older landfilled areas. Therefore this layer can be used as the basis for the regulating layer.

Prior to completion of the restoration works, the layer of existing cover should be checked for consistency and levelled off or increased as required to provide an even, free draining surface. The capping and restoration layers should then be applied as follows:

Restoration Layer

This layer consists of a minimum of 500mm of excavated materials compacted to form a low permeability barrier. The materials should be placed in 150mm thick layers and compacted with 8 passes of the tracked loading shovel or 360^{o} excavator. Materials will be sourced from the stockpiles of excavated materials collected as part of the cell excavation process. If areas are to be seeded, the upper 150mm layer should be carefully ripped using the bucket teeth of the 360^{o} excavator or suitable agricultural equipment (rake/harrow attached to the tractor).

Planting to retain the surface layers will be assessed. Ideally, if stocks allow, topsoil will be used to cover the area of restoration. Alternatively, septic tank effluent cake could be used as a soil enhancer. The area would then be closely planted with endemics suited to the environment and then have limited requirement for on-going maintenance. Planting would ideally be mulched and flooded as a first watering. The St Helena National Trust (SHNT) is pursuing trials in the marginally more elevated Millennium Forest (MF) and a small experimental plantation was assessed on the landfill site itself. Species that maybe suitable include hair grass, bone seed and scrubwood. Consultation with the SHNT will be required to ensure appropriate plants are selected due to the possibility of hybridisation with endemic plants currently encountered at MF.

ANNEX B: BIRD MANAGEMENT PLAN

B1.0 Introduction

Horse Point landfill site (HPLS) has been operational for a number of years. It is situated 2.3km from Saint Helena airport which is currently under construction. As the landfill is within 13km of the airport, it has been necessary to consider the implications of the landfill operation on birdstrike risk encountered within airport airspace.

HPLS is owned and operated by St Helena Government (SHG). The airport is owned by SHG and operated by Basil Read. Birdstrike risks are managed at the airport by the airport operator (Basil Read) in accordance with methodologies outlined in the airport operator's Wildlife Hazard Management Plan (WHMP). As a responsible landowner SHG is required to use reasonably practicable means to reduce the attractiveness of the landfill to birds. In this case that is feeding feral pigeons.

B2.0 Site Information

HPLS is located in the north eastern corner of the island; at grid reference 15.3592S, 05.4040W, some 2.3km from the north end of the new runway. All island wastes are disposed of at the site including domestic, hazardous and bulky non-hazardous wastes.

HPLS has been identified as a food source for feral pigeons with the concern that it has raised the carrying capacity for the local area that includes the airport.

Given the generally difficult terrain it is considered that the tolerable threshold for birdstrike is less than might otherwise be appropriate.

B3.0 Context

The vast majority of birdstrikes (75%) are experienced below 500ft (150m agl) with 90% of birdstrikes below 2,300feet (700m agl) (Eschenfelder, 1998) so given airports are where aeroplanes descend and ascend through these heights they are the most vulnerable part of an aircraft's flight to birdstrike (Maktelow, 2000). With respect to HPLS, commercial airlines will not overfly the landfill itself as part of normal operations, but pigeons feeding at the landfill have some potential to prove problematic within the wider airspace; specifically the northern end of the runway

B4.0 Bird Strike and Aerodrome Safeguarding

ICAO Annex 14, Volume 1 sets the basic standards for Aerodrome (Bird) Safeguarding, and the following text is relevant to the Horse Point Landfill Site and St Helena Airport.

> 9.4.3 Action shall be taken to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft.
>
> Note.— Guidance on effective measures for establishing whether or not wildlife, on or near an aerodrome, constitute a potential hazard to aircraft operations, and on methods for discouraging their presence, is given in the Airport Services Manual (Doc 9137), Part 3.
>
> 9.4.4 The appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any other source which may attract wildlife to the aerodrome, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a wildlife hazard problem. Where the elimination of existing sites is not possible, the appropriate authority shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable.

B5.0 Target species

Two bird studies have been performed[1] and they identify that there are far fewer and smaller species of birds on St Helena than would be typically found on mainland landfill sites. The birds that occur at the landfill in any number are restricted to feral pigeons and Indian Mynah birds. Smaller species such as canaries and wirebirds are occasionally seen. Somewhat larger migrant birds, such as cattle egret, may be seen even less often.

Mynah birds have been discounted as a significant birdstrike risk[1] at the landfill Feral pigeon numbers have been determined as a cause for concern and therefore subject to reasonably practicable mitigation measures at the landfill, in proportion to the wider wildlife management risk. Prior to control measures being implemented to reduce the attractiveness of the site, up to 200 pigeons were recorded feeding at the landfill.

Feral pigeons are thought to rely on the landfill as a food source, and therefore supporting an increased bird population at the two roost sites; Horse Point and Fisher's Valley. These birds may also potentially be attracted to the operational airport, resulting in a raised risk of birdstrike. Control of the food source at HPLS was considered an indirect means of controlling wider pigeon numbers.

The landfill is not considered to be a roost site for any target species.

B6.0 Monitoring

The scale of birdstrike risk has not been quantified and is subject to on-going monitoring both at the landfill and at the airport, before and after the start airport operations. Monitoring will assess the size of the feeding pigeon population correlated to the pigeon population found in the airport airspace.

Baseline monitoring has been performed prior to the operation of the airport. This has been completed at and around dawn on an approximately quarterly or as required basis. This is reported in the Feral Pigeon Monitoring Report.

The standard method of count is as follows. An observer places themselves in a Land Rover or similar vehicle in a prominent position overlooking the undulating landscape of the landfill. The observer counts pigeon arrival and exit numbers and direction of entry/ exit.

Feral pigeons are counted in flight as they arrive or depart and a tally maintained. At the close of monitoring, the flock is lifted by car door slamming or car horn hooting and a swift estimate of bird number made to check tally estimates or in later events where birds are more dispersed counts of individual areas made. The proportions of mynah and pigeons vary. When large flocks lift, counts are not precise and this method was used for indicative accuracy of counted entry and exit from the site. The majority of figures are based on incoming and outgoing figures which are more accurate.

Currently, in order to provide a baseline, five consecutive counts have been performed approximately quarterly. Mean and standard deviation has been calculated for each group of monitoring data. On the operation of the airport a landfill provisional action peak feral pigeon trigger value of 100 birds at the landfill has been agreed with the Airport Operator. In the first instance of airport operation, landfill pigeon monitoring will continued quarterly in five day clusters and averaged. This will be compared with the action trigger value. It will also be

[1] Deacon, N. (2012) BIRD STRIKE AVIATION STUDY An Assessment of the Birdstrike Risks at the New Saint Helena Airport Associated with the Operation of a Landfill Site at Horse Point

compared with the experience of bird strike risk at the airport. This trigger action value will be evaluated in the wider context of risk experienced at the airport posed by other wildlife and in the light that current pigeon risk is considered to 'green' with mitigation measures by the Airport Operator. It will also be set in the context that as Landfill Operator EMD is responsible for using reasonable practicable means of reducing the attractiveness of pigeons to the landfill only. Other measures may be required by the Airport Operator as part of the WHMP to reduce pigeon numbers.

On finalisation of the Trigger Action Value regular monitoring at a frequency of a single four monthly count will be performed and compared to the final action trigger value. A watching brief shall be adopted by site operatives and rising pigeon numbers will be reported to the airport. At the same time an assessment of site operational procedures in accordance with habitat management below.

Should an action trigger level be exceeded then a cluster of five dawn monitoring counts will performed and averaged to compare with the trigger value. Simultaneously, landfill site operations shall be reviewed and key stakeholders as identified in the Airport Operator's Wildlife Hazard Management Plan (WHMP) alerted and consultation regarding proportionate action agreed both at the landfill in the light of pigeon activity in the wider area.

B7.0 Waste management measures to reduce attraction of birds to the landfill

To ensure that food waste is managed to prevent attraction to birds the following measures are proposed:

1. Netted waste cell to prevent access to birds while waste is being discharged;
2. WRB to receive waste from RCVs on flight days (when access to netted cell is unachievable);
3. If the netted waste cell fails, then waste remains in the WRB until the net is fixed;
4. Waste covering and compacting procedure within waste cell for most efficient landfilling; and
5. Waste entering the landfill other than by RCV to be checked to ensure that only inert waste is landfilled in the bulky waste cell

Netting management is provided within the manufacturer's instructions, which are held at the Horse Point Landfill site office and part of the Landfill Operations Manual. A daily inspection shall be recorded in the site diary.

A programme of daily monitoring will be established which will include checking the integrity of the netting and visual inspection of exposed areas and removal of any surface litter.

B8.0 Habitat management

HPLS is the main waste deposit for island waste. It accepts a full range of wastes and as such has a number of potential attractants:

- Organic waste (domestic and commercial);
- Weed seeds, notably *Atriplex semibaccata* (salt bush), which was found in quantity in culled birds crops. It may be that *Atriplex* is a key attractant, or it may be an artefact as a result of *Atriplex* being a robust seed that can be readily identified within a wide range of less recognisable crop contents;
- Standing water in newly excavated sewage settlement lagoons. Lagoons used by Connect do not have this attraction.

Monitoring records suggest that organic waste and weeds are the principal attractants. Standing water does not seem to be attractive where it has been associated with the disposal of septic tank effluent at the landfill, until a new lagoon was excavated in the last two months. This was excavated by Basil Read as a means of disposing of airport construction related effluent. An island-wide sewage treatment infrastructure project has recently started on Saint Helena, that, when implemented, will significantly reduce the volume of septic tank waste that is disposed at the landfill.

In order to manage habitat the following asset improvements and practices have been introduced.

- Maintenance of bird proofing of the WRB to reduce its attractiveness as a roost and as a feed source;
- Exclusion of uncontrolled public access to the site; and
- Adequate covering or capping of un-netted organic waste.

Organic waste will be received from domestic and commercial waste collections delivered to the site in Refuse Collection Vehicles (RCVs).

RCVs will deliver directly to the netted cell, opening the net before depositing waste and closing the net on departure.

Waste is also brought to the landfill in private vehicles. It is not expected that this will consist of significant quantities of organic waste. This will be separated at the Public Recycling Facility and putrescible waste will be taken to the netted waste cell for disposal.

Green waste from vegetation clearance is also brought to the landfill. While not identified as a major food source for birds, there is the possibility of green waste attracting birds. Options for treating this waste and composting it off site are being explored as part of the islands overarching Solid Waste Management Strategy

B9.0 Roles and Responsibilities

The following parties have roles and responsibilities to manage birdstrike risk in airport space:

<u>Airport Operator (Basil Read)</u>

To create, maintain and own a wildlife hazard management plan (WHMP) to include the management of birdstrike risk within airport airspace;

<u>Landfill Operator (EMD)</u>

To provide reasonably practical control measures for landfill operations to reduce their attractiveness to feral pigeons.

To monitor at an agreed frequency to ensure continued consistent management of attractiveness of the landfill to pigeons; and

To report these results to the Airport Operator for inclusion in their birdstrike management procedures.

B10.0 Communications

As a responsible neighbour, SHG, the landowner, and St Helena airport operator will maintain an on-going dialogue, discussing the overall establishment and on-going status for feral pigeons within airport airspace. This is proposed as a quarterly emailed report from a delegated

representative giving a brief on monitoring effort and results: i.e. presence and size of any flocks.

Records shall be available within 7 days of written request.

B11.0 Bird Management Plan: Additional Actions

The Rule of the Air (CAA Publication 393) requires '*except with written permission of the CAA, an aircraft should not be flown closer than 500ft to any person, vessel, vehicle or structure'.* In this context it is recommended that the landfill be marked on the aviation chart with the recommendation to avoid it.

On-going open dialogue and sharing of data between the landfill operation and the airport will enable joint efforts to be made to reduce pigeons within the airport airspace.

Should there be a rise in feeding pigeon numbers at the landfill beyond the agreed trigger level, a full review of site procedures will be carried out and any reasonably practical improvements required will be implemented promptly. Additional measures including lethal control may be introduced in the short term until the source(s) of any problems are identified and corrected. It would be combined with a review of site operational procedures, Action Trigger Values and consultation with key stakeholders.

B12.0 Conclusions

In summary bird management at Horse Point Landfill comprises the following actions:

- Manage the landfill to discourage pigeon feeding by limiting accessibility to waste and fruiting weeds;
- Finalise, in conjunction with the airport operator, proportionate action trigger feeding numbers at the landfill through on-going monitoring into the operational airport phase;
- Once the action trigger feeding pigeon number has been agreed, adopt a watching brief at the landfill supported by quarterly single dawn monitoring surveys;
- Mark the landfill on the aviation charts;
- Maintain an open and sharing dialogue between SHG landfill operations and the airport operator; and
- Review site operating procedures and liaise with key stakeholders should an action trigger level be recorded.

ANNEX C – DATA RECORDING

It is recommended that a formal system of data and information capture is applied to the operation of Horse Point Landfill, to allow practices, trends and incidents to be monitored and periodically assessed.

An example of a suitable 'Site Diary' daily pro forma is provided below.

Day							
Date							
Weather Conditions							
Active Tipping Cell							
Waste Loads Received	No.	Time	Vehicle Type	Vehicle Reg.	Waste Type	Estimated Quantity	Disposal Location
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
Issues, Incidents, Observations							
Recorded by (Name):							

This sheet is provided as an example and should be reviewed and amended as considered necessary by operational management to ensure that all relevant information and data is captured.