# ST HELENA AIRPORT PROJECT

# ANNUAL ENVIRONMENTAL REPORT 2012-13

## February 2014

View of the Dry Gut fill in April 2013

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We have just passed the two year mark in the Project timeline as well as achieving the 50% mark of the fill to Dry Gut. Activities are underway on almost all areas of the project site from Rupert's Valley to Prosperous Plain. Part of our success to date has been our commitment to minimise and eliminate the potential adverse environmental effects that a legacy project of this size can have on the environment.

I wish to express my thanks to our CEMPC, Bryony Walmsley, who stepped into this role in June 2013 and who has had a major positive effect on the Project. In addition, my thanks go Annina Van Neel and the Basil Read team, to the PMU, St Helena Government and all other parties who have all contributed to the process.

There will be continual environmental challenges ahead of us but I believe that the team that we have in place are competent and motivated to face up to these challenges.

**Jimmy Johnston, Basil Read Airport Director**

## ACKNOWLEDGEMENTS

A number of people have contributed to the first Annual Environmental Report for the St Helena Airport Project, notably: George Vorster, Annina van Neel and her team, Julie George. Charles Schwartz, Deon de Jager and all the on-island production managers.

Graham Temlett reviewed the report and Denain Venter provided much appreciated administrative support.

## LIST OF ACRONYMS

| | |
|---|---|
| ADA | airport development area |
| ADAB | airport development area boundary |
| ADT | articulated dump truck |
| AER | annual environmental report |
| B | boron |
| BFI | bulk fuel installation |
| BR | Basil Read |
| BS | British Standard |
| Ca | calcium |
| CECO | Contractor's Environmental Control Officer |
| CEMP | Contractor's environmental management plan |
| CEMPC | Contractor's Environmental Management Plan Coordinator |
| Cl | chloride |
| CLO | Community Liaison Officer |
| D | day |
| dB(A) | decibel (A-weighted) |
| DBO | design, build and operate |
| DfID | Department for International Development |
| DEFRA | Department for Environment, Food and Rural Affairs |
| EAAD | Environmental Assessment and Audit Department |
| eC | electrical conductivity |
| EC | European Commission |
| EIA | environmental impact assessment |
| EMP | environmental management plan |
| ES | environmental statement |
| EU | European Union |
| HO | head office |
| Hr | hour |
| HR | human resources |
| Hz | hertz |
| ISO | International Standards Organisation |
| K | potassium |
| kg | kilogram |
| $km^2$ | square kilometres |
| KPI | key performance indicator |
| kWh | kilowatt hour |
| LA90 | noise level exceeded for 90% of the measurement period |
| LAeq | equivalent continuous A-weighted sound pressure level |
| LAmax | maximum level that the A-weighted sound pressure level reaches in a given period |
| LEMP | landscape and ecological mitigation plan |
| m | metre |
| $m^2$ | square metre |
| $m^3$ | cubic metre |
| Mg | magnesium |
| mg | milligram |
| ml | millilitre |

| | |
|---|---|
| mm | millimetre |
| mS/m | milliSiemens per metre |
| MSDS | material safety data sheet |
| N | nitrogen |
| Na | sodium |
| NGO | non-governmental organisation |
| $NO_2$ | nitrite |
| $NO_3$ | nitrate |
| Ni | nickel |
| OECD | Organisation for Economic Cooperation and Development |
| Pb | lead |
| PBP | Prosperous Bay Plain |
| PM10 | particulate matter (smaller than 10 micron) |
| PMU | Project Management Unit |
| ppm | parts per million |
| ppt | parts per thousand |
| PPV | peak particle velocity |
| PR | public relations |
| RA | risk assessment |
| RESA | runway end safety area |
| RMS | Royal Mail Ship |
| S | second |
| SANS | South African National Standards |
| SEF | stakeholder engagement forum |
| SHEQ | Safety, Health, Environment, Quality |
| SHG | St Helena Government |
| SHNT | St Helena National Trust |
| $SO_4$ | sulphate |
| SWMP | site waste management plan |
| TA | technical assistant |
| TDS | total dissolved solids |
| TFF | temporary fuel facility |
| TSP | total suspended particulates |
| TSS | total suspended solids |
| TWQR | target water quality range |
| µg | microgram |
| UK | United Kingdom |
| VDV | vibration dose value |
| WHO | World Health Organisation |
| WMP | Contractor's waste management plan |

## EXECUTIVE SUMMARY AND KEY PERFORMANCE INDICATORS

In November 2011, the South African construction firm, Basil Read (Pty) Limited, was awarded the contract to construct an airport on St Helena Island by the St Helena Government (SHG). Site establishment and *temporary* early works commenced on the island in January 2012, while the *permanent* works commenced in July 2012. One of the deliverables during the airport construction period, as specified in Schedule v4.1.19A: Environmental Management Requirements, is an annual environmental report (AER) of the permanent construction works. This AER therefore covers the 12-month period from July 2012 to June 2013, but it does include the activities which took place during the temporary works period (i.e. January to June 2012).

During the reporting period Basil Read (BR) established and maintained their commitment to responsible environmental stewardship, and to minimising and eliminating potential adverse environmental impacts. This was achieved by putting in place the necessary human and financial resources to implement the environmental requirements specified in the Design, Build and Operate contract.

A set of key performance indicators (KPIs) have been developed for the annual environmental report and these are grouped under the following headings:

- Legal compliance;
- Environmental structures;
- Environmental systems; and
- Environmental performance (social and biophysical).

For each KPI, an assessment rating has been provided. 'Yes' in green means that the target or goal has been achieved. 'Partial' in orange means that there has been progress made towards achieving the goal, or that the KPI has been partially achieved. 'No' in red indicates where the KPI has not been achieved in the current reporting period. These KPIs will be used in subsequent annual reports so that progress can be compared. The table below provides a brief comment, with reference to the section in the annual report where the matter is discussed more fully.

Of the 30 KPIs, 9 have not been achieved, substantial progress has been made in 5 and 14 indicators have been attained. There are two unknown/not applicable indicators for this report.

| Key performance indicator | Description | Assessment rating | Comments |
|---|---|---|---|
| **LEGAL COMPLIANCE** | | | |
| Legal compliance with laws and regulations of St Helena | No non-compliance notices, stop orders or penalties have been issued in terms of environmental laws in force | Yes | |
| Compliance with the CEMP | No environmental incidents with ratings of level 3 or more have occurred | No | Three incidents with a level 3 rating and two incidents with a rating of 4 occurred during the reporting period. Corrective |

| Key performance indicator | Description | Assessment rating | Comments |
|---|---|---|---|
| | | | actions were taken and the incidents have been closed out. *See section 3.4.* |
| **ENVIRONMENTAL STRUCTURES** | | | |
| The environmental management team, as specified in the Contract is in place | Appointment and employment of the following positions throughout the reporting period:<br>CEMPC<br>CECO<br>Technical assistants<br>CLO | Partial | There were some periods when there was no TA due to difficulties in obtaining commitments from possible candidates.<br>*See section 3.2.* |
| Reporting commitments achieved (as per requirements of contract) | 100% completion of the following:<br>Weekly CECO reports<br>Monthly CECO reports<br>6-monthly update of CEMP (Jan, June 13)<br>6-monthly audit (Jan, June 13)<br>Annual environmental report (July13) | Partial | Weekly reports: not 100%<br>Monthly reports: not 100%<br>6-monthly update of CEMP:<br>• Jan13 update significantly delayed (submitted and accepted in May13);<br>• June update completed and submitted in July13.<br>6-monthly audit: conducted Jan13. June audit planned for Sept13 (due to change in CEMPC)<br>AER: this report.<br>*See Table 5.* |
| Meetings held (as per requirements of contract) | The following meetings occur as scheduled:<br>Weekly environmental management meeting<br>Monthly environmental management meeting<br>Weekly project meeting | Yes | *See Table 4.* |
| **ENVIRONMENTAL SYSTEMS** | | | |
| Ongoing input to design | Environmental issues are taken into account during project design | Yes | Regular attendance at bi-monthly technical design meetings by CEMPC and at site project meetings by CECO.<br>*(Section 6.1 and Table 7).*<br>Site walk-overs conducted prior to construction in each new area.<br>EIAs conducted for all developments where there has been a significant departure from the Reference Design e.g. the |

| Key performance indicator | Description | Assessment rating | Comments |
|---|---|---|---|
| | | | permanent wharf, the open channel drain.<br>*See section 6.2.* |
| Environmental monitoring systems are in place (as per the requirements of the contract and CEMP) | The following are monitored on a regular (as specified in the CEMP) basis: air quality (PM10 and TSP), water (marine, surface water and groundwater), noise, vibration, building condition, waste quantities, resources use, wirebirds, pests, invasive species, visual impact, climate and heritage. | Partial | Total suspended particulates (dust) have not been monitored due to inability to obtain correct equipment (now rectified).<br>*See section 6.3.1.*<br>Water quality is being monitored on a daily, monthly and 6-monthly basis in excess of EMP requirements.<br>*See section 6.3.2.*<br>Noise, vibration and building condition monitoring being monitored as per EMP.<br>*See sections 6.3.3 and 6.3.4.*<br>Waste volumes are monitored.<br>*See section 6.3.5.*<br>The use of water, diesel and power is monitored.<br>*See section 6.3.6.*<br>Wirebirds were monitored by SHNT until July 2012 and by BR from October 2012.<br>*See section 6.3.7.*<br>Visual impact is being monitored.<br>*See section 6.3.8.*<br>Climate records are kept.<br>*See section 6.3.9.*<br>Monitoring of possible damage to heritage buildings is monitored.<br>*See section 6.3.10.* |
| Comments hot line and complaints procedure established (as per contract) | Meaning that there is a 24 hour hot line and all complaints are registered and followed up within 1 day | Yes | *See section 4.3.* |
| **ENVIRONMENTAL PERFORMANCE: SOCIAL & COMMUNITY SERVICES** | | | |
| Stakeholder engagement forum (SEF) established by PMU and functioning | SEF set up and monthly meetings held | Partial | SEF only established in June 2013 and first meeting held in July 2013 |
| Number of complaints received | No serious complaints received.<br>Less than 3 minor | Partial | No serious complaints received.<br>Four minor complaints received in March 2013. |

| Key performance indicator | Description | Assessment rating | Comments |
|---|---|---|---|
| | complaints per month. | | *See Figure 7.* |
| Employment of Saints | Direct creation of 112-225 construction jobs for Saints | Yes | 330 Saints currently employed. |
| No additional pressure on island medical facilities | BR to appoint own primary health care practitioner.<br>BR to pay full cost if hospitalisation required | Yes | Primary health care practitioner in place since February 2012.<br>BR conducts a psychometric and health screening assessment prior to departure to the island for all permanent staff. |
| No incidents of communicable diseases caused by BR and its sub-contractors | HIV and AIDS awareness and testing programmes are in place for all staff | No | No awareness campaign is in place. |
| Anti-social behaviour and crime | No BR employee or sub-contractor is convicted of any crime while on the island | Yes | All employees require a police clearance certificate before leaving for the island.<br>Majority of expatriate workforce is housed at the Bradley's camp. |
| Incidents of disturbance to heritage resources | No level 3 incidents or higher reported | No | A slave grave was disturbed in Rupert's valley – a level 4 incident.<br>*See section 3.4.* |
| Impact on housing and accommodation | No impact on local housing markets from immigrant workers.<br>Benefit to local guest houses and rental market. | Yes | Majority of expatriate workforce is housed at the Bradley's camp.<br>45 private premises are leased out to BR staff.<br>*See section 4.4.* |
| Impact on existing waste landfill facilities | The waste generated from construction works must not put pressure on island waste disposal facilities | Yes | BR has created new waste cells and helped to clean up Horse Point landfill.<br>As much waste as possible is re-used, re-cycled or minimised.<br>*See section 6.3.5.* |
| Safe disposal of hazardous waste | BR must export all hazardous waste from the island[1] | No | BR unable to fulfil its contractual requirements due to the restrictions of the Basel Convention.<br>*See section 6.3.5.* |
| Minimise impact on Island water supplies | BR to minimise use of island water supplies and develop new sustainable sources of | Yes | BR has sourced all the water needed for construction from newly drilled boreholes. Water is pumped on a sustainable yield |

[1] Requirement to be reviewed in view of restrictions imposed by the Basel Convention and the Ban Amendment

| Key performance indicator | Description | Assessment rating | Comments |
|---|---|---|---|
| | water for construction | | basis. A very small amount of water provided by SHG is used for domestic purposes and for mixing concrete. |
| **ENVIRONMENTAL PERFORMANCE: BIOPHYSICAL** | | | |
| Incidents of dust emissions over prescribed limit | No exceedances over permitted limits recorded | No | PM10 levels at PBP exceeded respirable dust limits on 9 occasions over 9 months (but there are no human receptors nearby). *See section 6.3.1.* |
| Incidents of noise emissions over prescribed limit | No exceedances over permitted limits recorded | No | Permitted day time noise levels in Rupert's Valley exceeded the 70 dB(A) limit on 4 occasions – three times due to wind and once due to construction activity. *See section 6.3.3.* |
| Incidents of vibration (peak particle velocity) readings over prescribed limit | No exceedances over permitted limits recorded | No | Annoyance threshold for peak particle velocity exceeded in Rupert's Valley on 3 out of 8 days when measurements were taken. *See section 6.3.4.* |
| Incidents of water quality over prescribed limit | No exceedances over permitted limits recorded | Unknown | No baseline water quality data available from ES to compare results, although it is possible that suspended sediment levels in Rupert's Valley have been increased due to construction activity. |
| Incidents of significant accidental spills (oil, diesel, concrete) | No level 3 incidents or greater involving accidental spills | No | Two accidental hydrocarbon spills and one incident of a concrete spill into the marine environment (level 3 or greater) were recorded during the reporting period. |
| Total land used for project outside of ADAB | Additional land taken by the project must not exceed 10% of the total ADA. | Yes | The ADA has not increased by more than 10%. |
| Incidents of illegal driving, plant collection, animal trapping | No level 3 incidents or greater involving biodiversity issues | No | One major (level 3) incident occurred in June 2013 where a vehicle was driven through the Millennium Forest. |
| Rare and endangered | No level 3 incidents or | Yes | None. |

| Key performance indicator | Description | Assessment rating | Comments |
|---|---|---|---|
| species affected (excluding Wirebirds) | greater involving biodiversity issues | | |
| Number of Wirebird territories disturbed | No displacement of Wirebirds beyond the ADA | Yes | Wirebird numbers appear to be stable in areas surrounding the works areas |
| Bio-control measures are in place | No contaminated containers allowed onto the island | Yes | All contaminated containers were intercepted prior to despatch to construction sites. |
| Land rehabilitated as per LEMP programme | Number of hectares planted per year. | - | No areas available for rehabilitation yet. |

# 1 INTRODUCTION

In November 2011, the South African construction firm, Basil Read (Pty) Limited, was awarded the contract to construct an airport on St Helena Island by the St Helena Government (SHG). Site establishment and *temporary* early works commenced on the island in January 2012, while the *permanent* works commenced in July 2012. One of the deliverables during the airport construction period, as specified in Schedule v4.1.19A: Environmental Management Requirements, is an annual environmental report (AER) of the permanent construction works. This AER therefore covers the 12-month period from July 2012 to June 2013, but it does include the activities which took place during the temporary works period where relevant (i.e. January to June 2012).

During the reporting period Basil Read (BR) established and maintained their commitment to responsible environmental stewardship, and to minimising and eliminating potential adverse environmental impacts. This was achieved by putting in place the necessary human and financial resources to implement the environmental requirements specified in the Design, Build, Operate contract.

The guiding principles for ongoing management of the airport construction project are found in the Environmental Management Plan (EMP), completed by AECOM in February 2011. Using this as the base, BR developed a detailed Contractor's Environmental Management Plan (CEMP) to guide day-to-day activities across the entire project site. The CEMP is the cornerstone for environmental management on this project and, through its six-monthly updates, it is a living document which is responsive to the ever-evolving project demands.

The main objectives of the environmental management team are to protect St Helena's unique environment and heritage resources, and practice good environmental management and stewardship, within the time and budgetary constraints which are inevitably part of such a large capital project.

The airport access project comprises many different components and stretches across the island from Rupert's Bay in the north-west, to the site of the airport and all appurtenant works at Prosperous Bay Plain (PBP) in the north-east (Figure 1). For ease of reference, the various construction areas and activities have been allocated letters, as shown on Figure 1 and in Table 1 below. As of June 2013, not all of the construction elements had commenced, so Table 1 indicates which aspects of the development are covered in this report.

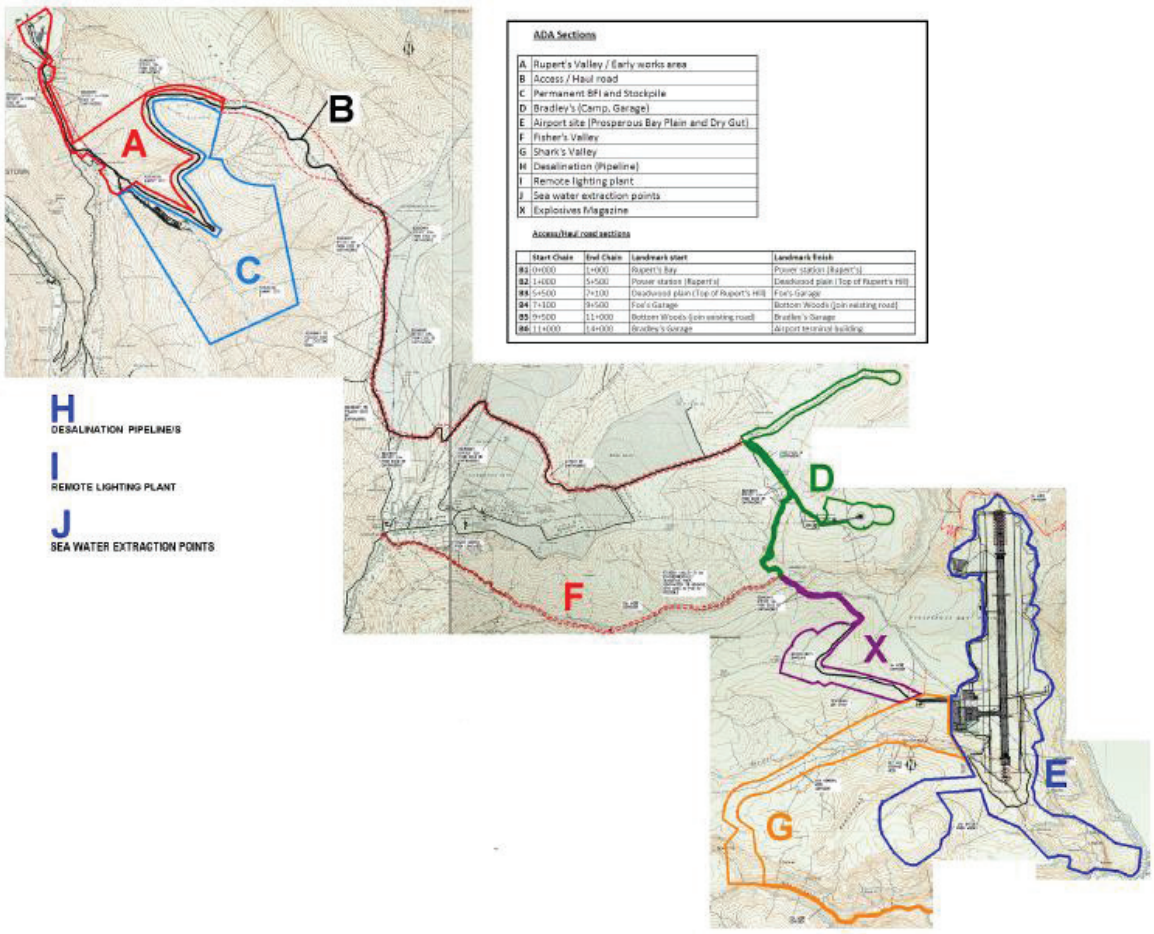



**Figure 1: Map of the airport works areas**

**Table 1: Airport construction work areas and status as of end June 2013**

| Designation | Area name | Construction works | Construction status at end June 2013 |
|---|---|---|---|
| A | Rupert's Valley | • Temporary jetty<br>• Public road upgrade<br>• Workshops<br>• Laboratory<br>• Stores<br>• Laydown areas,<br>• Temporary fuel facility (TFF)<br>• Permanent wharf and access road<br>• Lower quarry | • Complete, operating<br>• Not yet started<br>• Complete, operating<br>• Complete, operating<br>• Complete, operating<br>• Complete, operating<br>• Complete, operating<br>• Design phase<br>• Quarry opened up |
| B | Access / haul road | • New construction from Rupert's valley to Deadwood<br>• Road upgrade from Deadwood to Foxy's garage<br>• New construction from Foxy's to Bottom Woods<br>• Road upgrade from Bottom Woods to Bradleys<br>• New construction from Bradley's to PBP | • Haul road complete, access road not yet started<br>• Access road not yet started, services to be relocated<br>• Haul road complete, access road not yet started<br>• Access road not yet started<br>• Haul road complete, access road not yet started |
| C | Upper Rupert's Valley | • Permanent bulk fuel facility (BFI)<br>• Middle quarry<br>• Upper quarry<br>• Road spoil area<br>• Temporary hazardous waste storage area<br>• Concrete waste disposal area<br>• Storage of hazardous materials (gas bottles, fuel)<br>• Temporary water reservoirs and pump stations, | • Under construction<br>• Not yet developed<br>• Not yet developed<br>• Complete, to be rehabilitated<br>• Complete, operating until permanent solution found<br>• Complete, operating<br>• Complete, operating<br>• Complete, operating, to be rehabilitated |
| D | Bradley's | • Temporary contractor's camp<br>• Garage<br>• DVHF beacon<br>• Waste disposal and recycling area<br>• Revegetation nursery | • Complete, operational<br>• Conversion complete<br>• Construction not yet started<br>• Operational<br>• Under construction |
| E | PBP and Dry Gut | • Contractor's laydown area<br>• Site offices<br>• Vehicle refuelling<br>• Batch plant<br>• Crusher<br>• Runway works area<br>• Terminal buildings works area | • Operational<br>• Operational<br>• Operational<br>• Operational<br>• Operational<br>• Under construction<br>• Design complete, construction not yet started |

| Designation | Area name | Construction works | Construction status at end June 2013 |
|---|---|---|---|
| | | • Dry Gut fill<br>• Open channel works area<br>• Plant and insect relocation areas<br>• Water reservoirs and pump stations | • Under construction<br>• Design phase<br>• Design phase<br>• Operational |
| F | Fisher's Valley | • Cook's Bridge crossing | • Design phase |
| G | Shark's Valley | • Permanent water supply infrastructure | • Planning stage |
| H | Rupert's to PBP | • Desalination pipeline | • No longer required |
| I | Around airport | • Remote lighting and navigational aids | • Design phase |
| J | Gill Point | • Sea water abstraction pumps and pipelines | • No longer required |
| X | Creeper Hill | • Explosives magazine<br>• Borrow pit | • Operational<br>• Not yet developed |

# 2 AIMS AND OBJECTIVES OF THE ANNUAL ENVIRONMENTAL REPORT

The AER presents an overview of the environmental performance of the airport contractor (Basil Read) over the reporting period 1st July 2012 to 30th June 2013. It provides an opportunity to present to the public the following:

- The environmental governance structures (Chapter 3);
- Our progress in building relationships with our stakeholders (Chapter 4);
- The environmental risks posed by the construction project (Chapter 5);
- Our environmental activities and the results of our environmental monitoring systems (Chapter 6); and
- The targets and challenges for the 2013-14 year ahead (Chapter 7).

A summary of performance and progress against key performance indicators is presented in the Executive Summary.

The aim is to present an honest, transparent and concise picture of the work we are doing, bearing in mind the difficult and challenging circumstances of working on a remote island with limited access to scientific expertise and specialist equipment.

# 3 ENVIRONMENTAL GOVERNANCE STRUCTURES

## 3.1 Basil Read Sustainability Statement

An international air service to St Helena will open up the island to the global market place. It will also raise numerous issues that need to be resolved as to how to protect the uniqueness of St Helena's

people, heritage and environment, when these are the very resources on which future development will be based.

Recognising this, as well as taking into consideration Basil Read's Safety, Health, Environment and Quality (SHEQ) Policy (Annexure A), the Island's Land Development Control Plan, the St Helena Environmental Charter and the draft Sustainable Development Strategy for St Helena, our approach to environmental management during the design, construction and operation of the airport and related works is predicated on the fundamental tenets of sustainability. This approach will ensure that the proposed project is socially desirable, environmentally acceptable, technically sound and financially viable.

The key to achieving these aims is to ensure that environmental issues are taken seriously at all levels of management. This has been achieved through awareness training and a highly integrated approach to environmental management throughout all stages of the project.

## 3.2 Environmental Management Team

In recognition of the challenges facing the environmental management team due to the distance of the island (in time and space) from the BR Head Office in Johannesburg, South Africa, we adopted the following structure: a South African-based Contractor's Environmental Management Plan Co-ordinator (CEMPC) and a site-based Construction Environmental Control Officer CECO (Figure 2).

The aim of this structure is to provide an environmental manager in or near the BR Head Office to ensure that environmental management issues are properly incorporated into project design during the design phase, and that environmental issues are dealt with at senior management levels and in a timely manner during construction. This organisational structure has been used successfully on other 'remote' construction sites and has the benefit of making sure that environmental issues are addressed at all levels of the contractor's management structure.

The site-based CECO will be based on St Helena for the entire construction phase and is responsible for implementing the CEMP. The CECO reports directly to the CEMPC, the SHEQ Manager and the Employer's Environmental Monitor (Figure 2). The CECO was supported during the reporting period by 3 technical assistants.

In addition to the CEMPC, BR retained the services of an Environmental Advisor to provide comment, guidance and advice on specific issues when required. However, when the Environmental Advisor took over the position of CEMPC on 1st June 2013, thus consolidating the two positions, the role of Environmental Advisor fell away.

Supervising the entire airport project on behalf of the St Helena Government (the Employer), is the Project Management Unit (PMU). The PMU team includes an Environmental Monitor who has been appointed for the duration of the contract and resides on the island to oversee all environmental management activities (Figure 2).

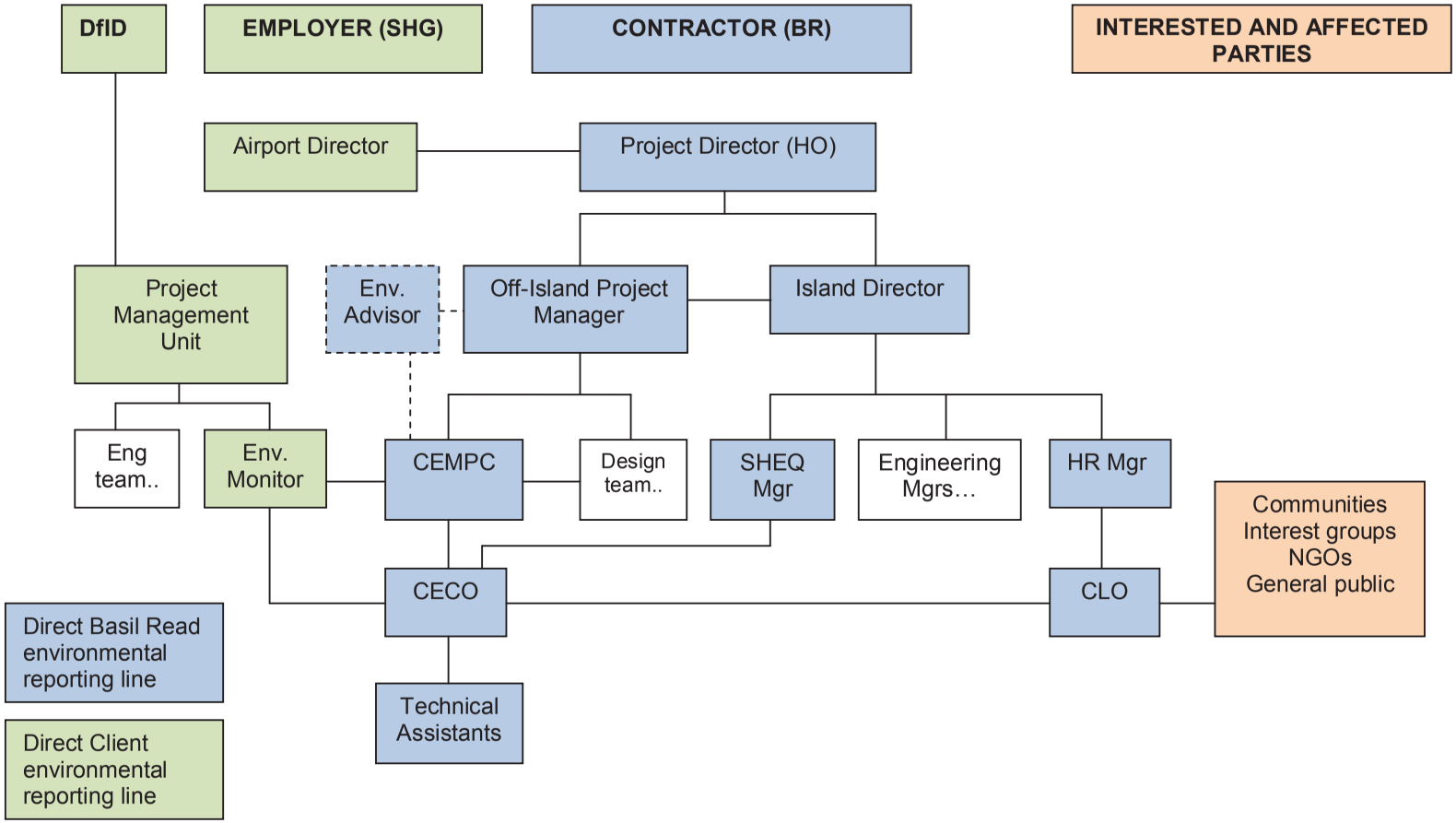



**Figure 2: Environmental Reporting Structure up to end June 2013**

## 3.3 Environmental Management Plans

Environmental management on site is controlled by a hierarchy of plans:

The **Environmental Management Plan** (EMP) was completed by AECOM in February 2011, based on the findings of the Environmental Statement, which was completed by AECOM/Faber Maunsell in 2008. The EMP forms part of the Employer's Requirements and the Contractor (and all sub-contractors) has to comply with it during the design, implementation and operational phases of the project. The EMP thus aims to protect the interests of local residents, the general public, businesses and the environment in the vicinity of the construction works.

The **Contractor's Environmental Management Plan** (CEMP) must adhere to the requirements set out in the EMP. As the project commenced within two months of the award of the contract, it was initially decided to compile the CEMP in a phased approach, with the first phase comprising a CEMP to manage the environmental impacts of the early construction activities and site establishment. This CEMP was referred to as the 'early works' CEMP and was completed and approved by the PMU during March 2012. The early works CEMP covered the following activities:

- Establishment of laydown areas, offices and a workshop in lower Rupert's Valley;
- Construction of the temporary wharf at Rupert's Bay;
- Construction of the temporary fuel storage facility in Rupert's Valley;
- Upgrading of the road in lower Rupert's Valley;
- Construction of the access road from Rupert's Bay to the first cutting at the lower quarry site in Rupert's Valley; and
- Geotechnical drilling.

After several revisions, CEMP 1 for the main construction phase was submitted to the PMU for approval at the end of May 2013. The document was approved subject to certain additions which were to be addressed in the next scheduled update in June 2013. These revisions were completed and CEMP 2 was submitted for approval at the end of June 2013. The next update (CEMP 3) is scheduled for October 2013 and thereafter it will be reviewed every April and October.

CEMP 2 covers all activities listed in Table 1 and addresses the following environmental issues:

- Road traffic safety
- Affected roads and footpaths
- Agricultural land access
- Dust and air quality
- Waste management
- Surface and ground water
- Noise
- Built heritage
- Archaeological remains
- Terrestrial ecology
- Marine ecology
- Landscape and visual
- Vibration

- Temporary land take and disturbance to agricultural land.

However, as the CEMP is a living document, various **protocols, procedures and management plans** are added as appendices to the CEMP as and when they arise. So far, the following additional documents have been prepared and approved:

- Protocol for the Management of Invasive Vegetation
- Protocol for the Protection of Built Heritage and Archaeological Remains
- Protocol for the Protection of Invertebrates
- Protocol for the Protection of Wirebirds
- Protocol for Use of the Bioremediation Site
- Protocol for the Management and Protection of the Mole Spider
- Protocol for Pest and Predator Control
- Protocol for the Management of Hydrocarbon Spills
- Protocol for the Management of Topsoil and Endemic Vegetation
- Waste Management Plan
- Traffic Management Plan
- Emergency Preparedness and Response Plan
- Secchi Disk Monitoring Technique
- Incident Log.

## 3.4 Compliance Monitoring and Auditing

There is a comprehensive system of compliance monitoring and auditing in place on site:

Prior to new sites being developed, **site walk-overs** are conducted by the CECO, relevant BR manager, PMU, SHG and any relevant local specialists or interested parties to determine the key environmental issues of concern. The aim of the walkovers is to highlight any environmental sensitivities or aspects, as well as areas of ecological constraint that might be affected by the activity.

**Plate 1: Walkover on access road from Bradley's to airport building with Marjorie Fowler (BR conservation assistant), Gavin Ellick (Wirebird Conservation Officer- National Trust) and Isabel Peters, EAAD (Photo: A van Neel)**

**Plate 2: Walkover at Rupert's Bay for the permanent wharf with Annina van Neel (BR CECO), Isabel Peters, EAAD and Robert Kleinjan, PMU (Photo: B Walmsley)**

**Work-place audits** are conducted by the CECO every week and the findings are captured in the weekly report (see Table 5). The weekly audits are site-specific and are carried out with the site manager or the foreman in charge.

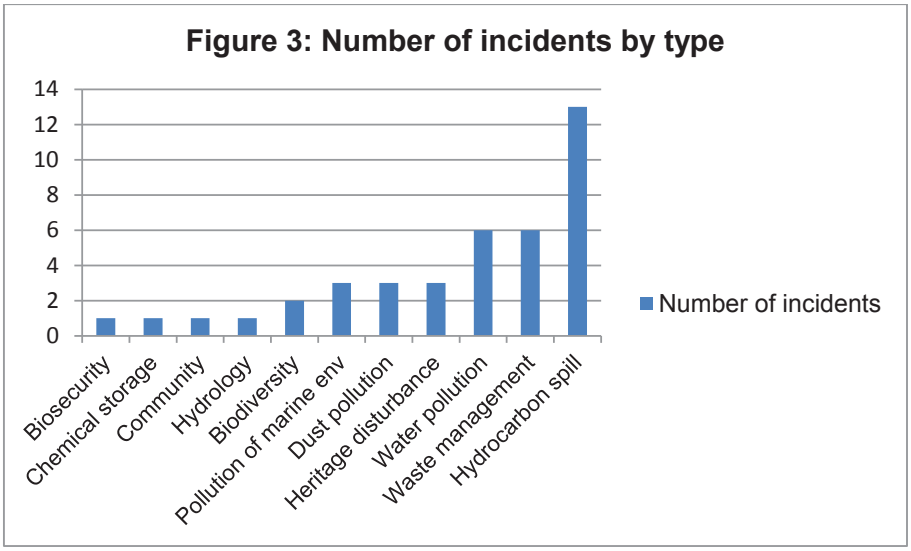
**Site inspections** are carried out on a daily basis by the CECO and any observations are noted in the CEMP log. If any incidents are noted, these are reported to the PMU within 24 hours of the incident occurring. Any observations noted by the CECO are communicated to all managers in the weekly production meeting.

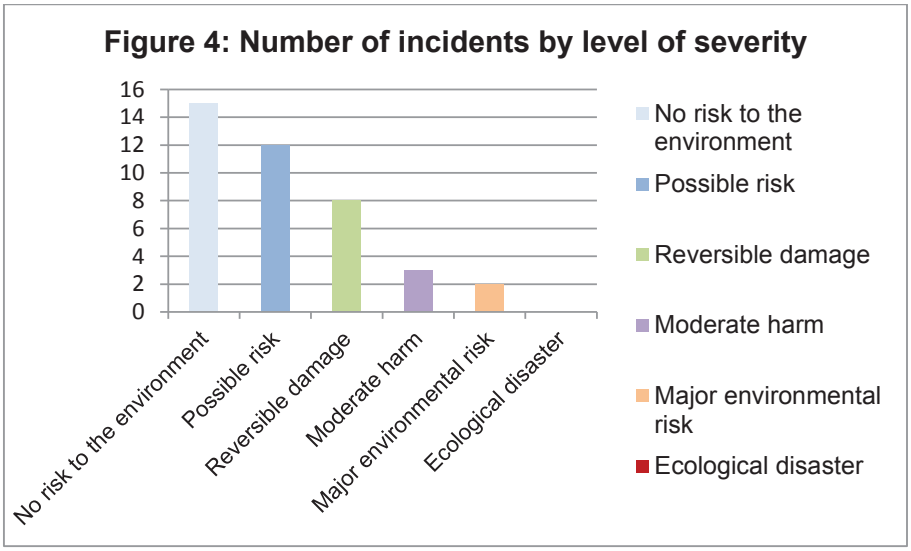
Forty incidents were recorded during the 18 month period of the project (January 2012 to 30 June 2013), but all have been successfully closed out. The incidents are rated on a scale of 0-5 as shown in Table 2.

**Table 2: Incident rating scale**

| Loss type | 1<br>Insignificant | 2<br>Minor | 3<br>Moderate | 4<br>Major | 5<br>Catastrophic |
|---|---|---|---|---|---|
| **Harm to people (safety & health)** | First Aid case; | Medical treatment; Exposure to minor health risk | Lost time injury; Reversible, moderate impact on health | Single fatality or loss of quality of life; Irreversible impact on health | Multiple fatalities; Impact on health ultimately fatal |
| **Environmental impact** | Possible risk to the environment | Reversible damage to the ecosystem | Moderate environmental harm or degradation of the ecosystem | Major environmental harm; Legal non-compliance | Irreversible, significant environmental harm; Loss of species; Ecological disaster |
| **Impact on reputation** | Slight impact; public awareness but no public concern | Limited impact; Local public concern | Considerable impact; Regional public concern | National impact; National public concern and outrage | International impact; Major public outrage |

A summary of these incidents is provided in Figures 3 and 4 below.




It can be seen that the majority of the incidents (87.5%) involved no damage or low to minor, reversible harm to the environment. However, the project experienced three incidents of moderate harm to the environment and two major environmental non-conformances over the past 18 months.

The first significant risk (level 4) occurred during August 2012 when human remains believed to be from the slave era were exposed on the access road alignment. A skull fragment, premolar and molar were discovered partially exposed alongside the existing haul road. The site was not an active construction site, but use of the haul road had loosened the soil material and revealed the archaeological specimens. All work in the area was stopped immediately and BR issued an instruction to their workers and contractors to prohibit them from entering this area and the site was demarcated and closed off. The finds were collected, labelled and surveyed according to the CEMP Protocol for the Protection of Built Heritage and Archaeological Remains.

**Plate 3: Human remains exposed alongside the haul road in Rupert's Valley (Photo: A van Neel)**

The second major incident occurred in March 2013, when a rock fall damaged the hydraulic cylinder hoses of an excavator working on PBP, causing spillage of hydrocarbons in a sensitive ecological area. Spill clean-up equipment was deployed and the contaminated soil was removed to the hazardous waste store at Bradley's workshop to await ultimate treatment by bioremediation.

The three level 3 incidents included the following (in chronological order):

- During the construction of the temporary jetty in Rupert's Bay in April 2012, the shuttering for the concrete works collapsed and wet concrete entered the marine environment. Work was stopped immediately and the site foreman was informed that no further concrete pours could take place without the correct mitigation measures in place.

- In March 2013, the driver of a concrete mixer truck tipped out left-over concrete into a water course. The area was cleaned up and the concrete disposed of in the designated area.

- A BR employee drove a vehicle through the Millennium Forest in June 2013 while taking a short cut from the haul road to the public road; 4 ebonies and 1 gumwood tree were destroyed. The SHNT, which is responsible for the Millennium Forest, was informed, the old tracks were barricaded off and the five destroyed trees were replaced by BR plus an additional five.

The Contract requires a **full site audit** to be conducted by the CEMPC every six months during the construction of the permanent works phase. The first audit took place in January 2013, but the report was delayed and only produced in June 2013. The next audit is scheduled for September 2013, with subsequent audits every March and September thereafter.

The January 2013 audit found that overall compliance with the CEMP was good, but some improvements could be implemented. The findings, recommendations and status of the corrective actions are summarised in Table 3.

**Table 3: Findings, recommendations and status of corrective actions from the January 2013 audit**

| Action required | Corrective action |
|---|---|
| The concrete bunding at the drainage point of the washbay in Rupert's Valley should be repaired | Bunding and drainage line repaired and strengthened to ensure that all wash water is channelled into the oil separator |
| The washbay at Prosperous needs bunding to contain all wash water | Bund wall built around the slab to contain all wash/rain water and channel into oil separator |
| A dedicated waste storage area at Rupert's Valley equipped with secondary containment, adequate signage and controlled access need to be established | All waste generated at Rupert's Workshop temporarily stored at the 'site office' adjacent to workshop. This site has roofing and concrete slab, but no bunding. Thus all waste stored in 210 litre drums for containment |
| Drip trays should be used to collect oil or hydrocarbon spillage at the workshop area at Rupert's Valley | More drip trays ordered and issued for the workshops and service trucks. |
| Known areas of burial grounds should be properly demarcated and access to these areas should be prohibited. The area at C6 is an example | Sites known to be archaeologically sensitive were barricaded and signed appropriately. |
| It is recommended that the remaining portion of the temporary road through Deadwood plain be covered with crusher rock to reduce dust impacts on surrounding communities | Suitable material/wearing course was laid down and compacted to reduce dust emissions and improve accessibility for residents and syndicate members during the rainy season |
| It is recommended that a temporary dust screen be erected at the turn in toward Bradley's to protect the flora of the Millennium Forest against excessive dust deposition | A dust screen was erected, 30 m long x 1.5 m high. Dust suppression was also increased on that particularly sensitive section of road. |
| A hazardous waste store should be erected at Bradley's complete with bunding, signage and access control | A concrete bund was constructed around the existing slab at the entrance to the Government Garage to contain the increasing volumes of hazardous waste. Also, the concrete slab at the wash bay was extended to accommodate the 'tank-tainer' designated for all waste oil. A concrete bund wall was constructed around the waste oil container for secondary containment. |
| It is recommended that signage to indicate no entry and some restrictions be erected where the road in the Middle Fill valley bypasses the adjacent Central Basin. This is a sensitive and extremely valuable ecological site and needs to be protected | A 2 m high soil berm was pushed to the ADA boundary to act as physical barrier between the Central Basin and all airport construction works taking place along the eastern edge of the Central Basin |
| A closely managed composting facility should be established close to Bradley's Camp (largest source of food waste); the product derived from this will be of great value for the reintroduction of endemic plant material to rehabilitated areas | A composting bin was provided for the camp and environmental staff placed in charge of mixing. Other food wastes are delivered to local pig farmers on a regular basis. |
| The appointment of a community liaison officer will assist the contractor in effectively dealing with complaints from the community and keeping the public informed | A community liaison officer (CLO) was appointed in March 2013. |
| The establishment of a nursery and rehabilitation trial | A nursery has been established at |

| Action required | Corrective action |
|---|---|
| plots will ensure that future remediation attempts are made easier by the availability of endemic vegetation and the relevant expertise by tried and tested methods | Bradley's Camp, and several endemic/native plants rescued from site are cultivated for rehabilitation plots that need re-vegetation in the near future |
| Water monitoring should be conducted to determine the potential impact of water abstraction on ground water levels | Ground water levels are measured on a monthly basis on all borehole locations on site. Water samples are taken at various locations to determine the surface water quality on site. |
| Water volumes used should be logged | The volume of water used on site is an estimation made up of water used for Dry Gut fill, water used for dust suppression and water consumed by the batching plant. |

## 3.5 Meetings and Reporting

The following schedule of meetings is followed to keep track of progress and corrective actions. Note that only those meetings where environmental matters are discussed, are listed.

**Table 4: Schedule of meetings where environmental matters are discussed**

| Activity | Responsible persons | Outputs |
|---|---|---|
| Weekly environmental meetings (on island) | **Chair**: Environmental Monitor, PMU<br>**BR:** CECO,<br>**SHG**: Manager Environmental Assessment and Audit Division (EAAD) | **Minutes covering:**<br>Actions outstanding<br>Matters arising |
| Monthly environmental management meetings (on island) | **Chair**: Environmental Monitor, PMU<br>**BR**: CEMPC (by phone), CECO, SHEQ Manager,<br>**SHG**: Airport Director and Deputy Director, Manager EAAD,<br>**DfID:** Environmental Lead (via phone)<br>**PMU**: PMU Manager | **Minutes covering:**<br>LEMP<br>Waste management<br>Environmental reporting<br>Any other business |
| Weekly Client meetings (on island) | **Chair**: PMU Manager<br>**BR**: Island Director, Production Managers, CECO, SHEQ Manager, Project Planner, Design representative, Community Liaison Officer (CLO)<br>**SHG**: Airport Director and Deputy Director, Manager EAAD<br>**PMU**: Deputy Resident Engineer, Environmental Monitor, Health and Safety Officer, Civil Engineer | **Minutes covering:**<br>Progress in previous week;<br>Works planned for forthcoming week;<br>Construction programme;<br>Design and construction;<br>Quality control;<br>Communications;<br>Variations;<br>Environment;<br>Health and safety;<br>Any other business; |

| Activity | Responsible persons | Outputs |
|---|---|---|
| | | Next meeting date. |
| Weekly production meetings (on-island) | **Chair:** Island Director<br>**BR:** Logistics manager, SHEQ Manager, CECO, Quality Manager, Production Manager (BFI and Access Road) and Production Manager (Airport Site), Workshop Manager, Blasting Manager, Designer, Planner, HR Manager | **Minutes covering:**<br>Actions outstanding<br>Matters arising |
| Weekly SHEQ Meeting | **Chair:** SHEQ Manager<br>**BR**: Quality Assurance Manager, QA Assistant, CECO, CLO, TA-CECO, Head Nurse, Paramedic, Safety Officer, Safety Administrator | **Minutes covering:**<br>Actions outstanding<br>Matters arising |
| Bi-monthly technical meetings (off island) | **Chair**: Technical Manager<br>**BR**: Project Director, Off-island Project Manager, CEMPC, Environmental Advisor<br>**Other**: design consultants | **Minutes covering:**<br>All design aspects of the project |

In addition to the meetings listed above, the environmental management team issues the following reports on a regular basis (see Table 5). All these reports should be submitted for approval to the Environmental Monitor.

**Table 5: Environmental reporting**

| Report type | Author(s) | Coverage |
|---|---|---|
| Weekly environmental report | CECO | Outstanding issues;<br>Summary of activities (during week);<br>Summary of weekly audit findings and corrective actions;<br>Incidents and corrective actions;<br>Complaints report and corrective actions. |
| Monthly environmental report | CECO | Environmental Compliance<br>Walkovers<br>Documentation<br>Environmental indicators (waste disposal, recycling, resource use)<br>Environmental monitoring<br>EIAs or studies commissioned<br>Audits<br>Rehabilitation<br>Personnel and training<br>Community engagement<br>Photo diary |
| Six-monthly audit report | CEMPC | Introduction;<br>Audit objectives;<br>Audit scope;<br>Aspects assessed;<br>Audit findings;<br>Recommendations. |

| Report type | Author(s) | Coverage |
|---|---|---|
| Annual environmental report | CEMPC,<br>CECO,<br>CLO | Introduction;<br>Aims and objectives;<br>Environmental governance structures;<br>Stakeholder relationships;<br>Environmental risks;<br>Environmental management: activities and results;<br>Summary of Key Performance Indictors;<br>Conclusions. |

In addition to these regular reports, *ad hoc* studies are commissioned as required. These studies and their associated reports are described in Chapter 6.

# 4 BUILDING RELATIONSHIPS WITH STAKEHOLDERS

BR is acutely aware of the fact that the construction of the airport on St Helena Island will have a profound effect on many different stakeholders, both on and off the island.

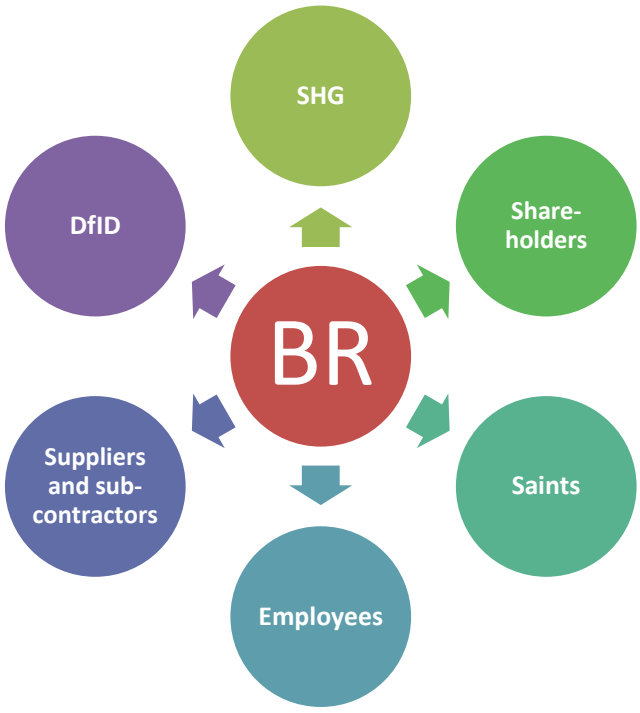
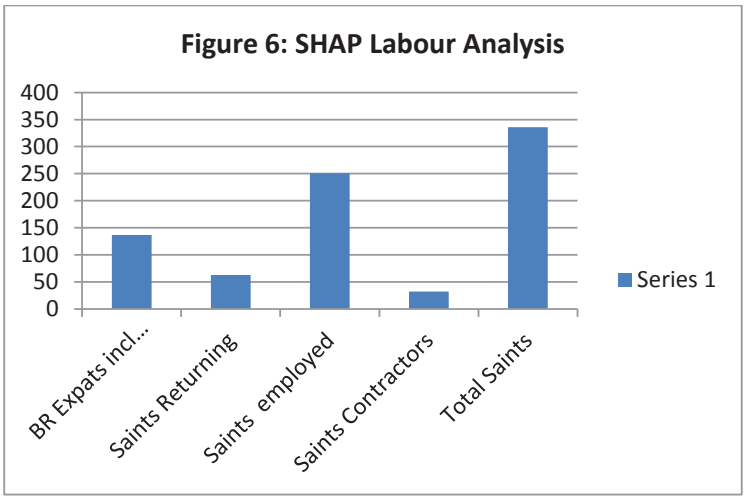



**Figure 5: Stakeholder relationships**

## 4.1 Employment and Employee Development

The company's approach to all its employees is set out in the SHEQ Policy (Annexure A).

One of the key benefits of the airport construction project was identified as being the employment of local Saints, including encouraging Saints living abroad to return home. Corporate policy has, from the outset, been to support local business, utilise local labour and island resources where feasible. At the height of construction, approximately 350 Saints will be employed on the project, many as operators of heavy plant. Successful efforts are being made to employ Saints living abroad. At the end of the reporting period, the breakdown of employment was as per Figure 6.




Employment opportunities are diverse and offer opportunities to all age and gender categories made possible only by our commitment to provide certified training to Saints as opposed to sourcing skills elsewhere. The following skills training has been conducted since inception of the contract:

- One hundred and thirty-eight plant operators, including but not limited to excavator, dozer, articulated dump truck (ADT), crane etc., have been trained in the effective operation of heavy plant. The majority of the 138 operators were previously unskilled in the category of plant being used on the project. The Basil Read Plant Training Officer, Abdul Shaw, has provided extensive training to all operators, many on more than one plant type in order to prepare them for certification.[2]

- Basil Read has also worked closely with the St Helena vehicle licensing department regarding the issuance of appropriate vehicle licences after/during certification (see footnote 2), thus enabling plant operators to drive and work on the national roads.

- Approximately 80 persons were trained in the various safety and health disciplines in partnership with SHG. Of these, 60% were local BR staff, 2% expatriate BR staff and 38% were non-project, local Saints.

[2] Since July 2013 Brandt Shasha has commenced a process of formal certification for the operation of Volvo vehicles and plant. This process was finalised at the end of October 2013. The island authorities have issued all trained operators with a J4 licence (Heavy Plant Operator).

**Plate 4: The majority of heavy equipment operators and drivers are Saints (Photo: B Walmsley)**

- In addition to formal skills training, all new employees undergo an environmental induction programme, where they are familiarised with the key environmental and social issues on the island, the contents and importance of compliance with the CEMP and the Environmental Code of Conduct. A total of 457 people received environmental induction training in the reporting period.

The CECO and technical assistants conduct weekly toolbox talks to all construction teams to raise awareness on specific environmental issues, such as: waste separation and recycling, water consumption and wastage, use of oil spill kits, etc. However, additional toolbox talks are presented on an *ad hoc* or activity-specific basis to address pertinent issues.

## 4.2 Stakeholder Engagement Forum.

The Stakeholder Engagement Forum (SEF) was started as an additional communication process between the project team and the community, which in this case consists of the island's stakeholders that may be directly or indirectly affected by the construction of the project. The main purpose of the SEF is to contribute to the effective delivery of the airport project through regular exchanges of information and views on environmental matters between the project and local stakeholders.

The SEF is chaired by the Project Management Unit and attendees from the airport project team include Basil Read's CECO and CLO, with other BR staff attending when relevant matters are to be discussed. Although the SEF was set up during the reporting period, the first meeting was only held on Tuesday 9th July 2013. The invited stakeholders included:

- The Heritage Society
- The Farmer's Association
- The Fisherman's Association
- St Helena National Trust
- St Helena Nature Conservation Group
- Tourism Association
- East Electoral Area Councillor (to represent the local business and residents).

All meetings are recorded with minutes; the sector representatives are then responsible for distributing these minutes to their members.

## 4.3 Community Liaison

A full-time Community Liaison Officer (CLO) was appointed in March 2013[3]. This role is to provide a constant communication link between the contractor, Basil Read, and the affected communities as well as the broader island community. The CLO will manage and assist the communities in conjunction with the CECO to identify possible impacts and causes during the construction period and to recommend effective mitigation measures. The responsibilities of the CLO are as follows:

- Informing residents and the community of where and when construction activities may occur;
- Manning the PR/information telephone line between the hours of 7am and 5pm. Outside of these hours the phones are manned by Basil Read security personnel who will relay any complaints on to the CLO or other designated parties on duty;
- Responding to complaints/queries through effective communication between Basil Read personnel and the affected community or public;
- Assist with media liaison and briefings where applicable;
- Arrange site visits when required;
- Providing advice to Basil Read management on community and public affairs;
- Ensuring that the Interested and Affected Parties register is kept up to date;
- Arrangement of public and or community meetings as and when required;
- Conduct building condition assessments before and after blasting and construction work in a given area e.g. quarrying activities, trucking of heavy materials, road construction and excavation.

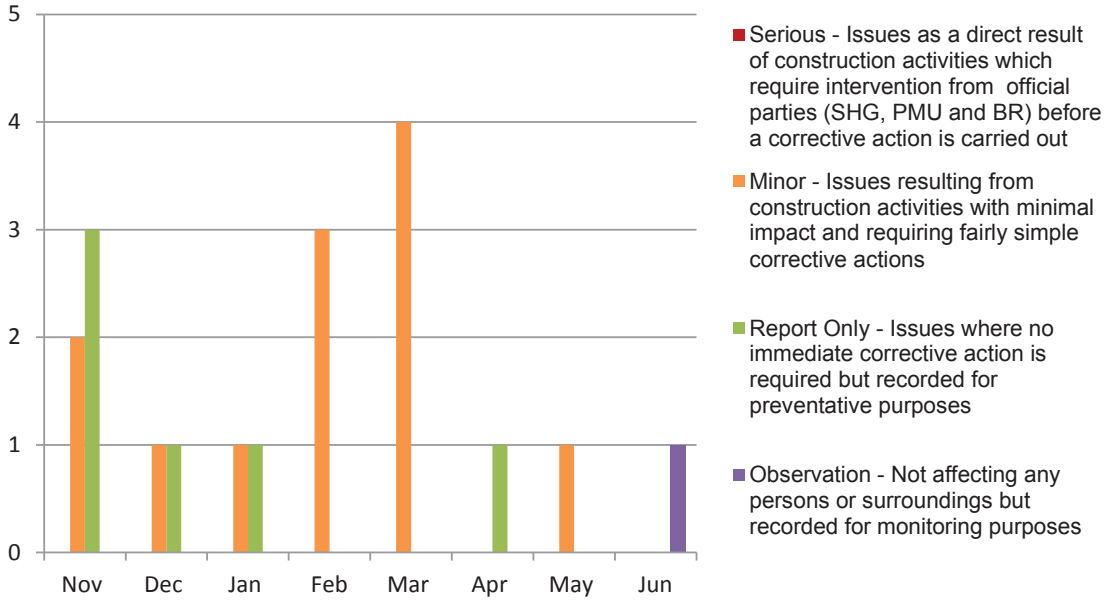
A procedure has been set up to deal with and record complaints from the public:

- The complainant reports their concern/complaint to BR personnel/CLO;
- CLO makes the complaint known to the relevant area manager or foreman and solicits a solution to the problem;
- CLO records the complaint and the corrective actions taken on a spreadsheet which is uploaded onto Aconex on a monthly basis.

In the eight month period up to 30 June 2013, no serious complaints had been received but 12 minor issues had been reported (Figure 7).

[3] Prior to March 2013, the CECO fulfilled this role.

**Figure 7: Number and rating of complaints received**




## 4.4 Corporate Social Responsibility Programme

St Helena is a small island of 121 km$^2$, with a population of approximately 4,000 people, and an aging workforce of 2,109. A large part of the workforce is employed in the lower-skilled vocational and service industries, with little or no formal qualifications, and an average annual income of £6,000. Prior to airport development, there were limited employment opportunities and a declining population due to out-migration of younger Saints to seek opportunities abroad.

It is against this background in which both the direct and indirect social contribution and impact of Basil Read on the Island must be viewed.

Since inception of the project, direct sponsorships made to schools, churches, social and sporting clubs, community organisations and event organisers in the form of cash donations, material supply, clothing and building improvements equates to £40,000.00.

The employment boom, together with an influx of approximately 150 expatriates, has resulted in increased spending and economic optimism for local retailers, hardware stores and restaurants. Currently 45 private premises are leased to meet expatriate housing demands. Private enterprises and sub-contractors are providing services, materials and labour to the project and are key to the building of the airport.

A close working relationship exists with social welfare, prison and SHG to assist as and where possible in respect of employment. The following demographics indicate the effect BR has had on the Island with regards employment. As at the end of the reporting period:

| | |
|---|---|
| Saint staff employed under 21 years of age | 13 female; 31 male |
| Saint staff employed over 60 | 42 |
| Total Saint females employed | 58 |

All waste paper, some packaging and other recyclable materials are donated to SHAPE on a regular basis.

**Plate 5: Cardboard collection for SHAPE (Photo: A van Neel)**

## 5 ENVIRONMENTAL RISK IDENTIFICATION

The Environmental Statement was developed to provide a summary of the findings from the EIA that was conducted over a two-year period from 2005-7. The key environmental aspects identified in the ES include the following:

- Land use (including agriculture and nature conservation);
- Marine ecology;
- Indigenous flora;
- Indigenous fauna, especially wirebirds and invertebrates;
- Surface water resources;
- Ground water resources;
- Built heritage structures;
- Archaeological remains (human remains and artefacts);
- Sensitive business receptors;
- Landscape and visual amenity;
- Community health (air quality, noise, vibration);
- Roads, traffic and footpaths;
- Employment;
- Social structure.

One of the contractual requirements for BR is that an environmental risk register should be developed. An environmental risk assessment was conducted by the CEMPC in early 2013 and a summary of the assessment is shown in Table 6. The aim of the risk assessment (RA) was to identify and evaluate all potential environmental risks, so as to prioritise activities to manage those risks. The RA was conducted using the Guidelines contained in ISO 31000: "*Risk Management – Guidelines on*

*Principles and Implementation of Risk Management"* as well as the *Australian Risk Management Standard AS/NZ4360*. Each environmental risk was evaluated in terms of:

- The potential causal factors;
- The likelihood or probability that the risk will occur within a certain time frame;
- The severity of the consequences for the health and safety of people and the environment.

**Table 6: Summary of environmental risk assessment**

| Risk Area | Components | Risk rating without mitigation | Risk rating with mitigation controls |
|---|---|---|---|
| **Terrestrial Ecology** | Endemic flora | High | Low |
| | Endemic fauna | High | Low |
| | Agricultural use | Low (Tolerable) | Low |
| | | | |
| **Surface Water** | Wetland ecology | Very High | Low |
| | Surface streams | Very High | Low |
| | Water Quality | Very High | Low |
| | | | |
| **Ground Water** | Groundwater use | Very High | Low |
| | Water quality | High | Very Low |
| | | | |
| **Dust and Air Quality** | Endemic flora | Very High | High* |
| | Endemic fauna | Very High | High* |
| | Residents | Very High | High |
| | Commercial businesses | High | Low (Tolerable) |
| | | | |
| **Social significance** | Built heritage | High | Low |
| | Archaeological remains | Very High | Low (Tolerable) |
| | Human remains | Very High | Low (Tolerable) |
| | Roads, footpaths and recreational use. | High | Low (Tolerable) |
| | Agricultural use | Low (Tolerable) | Low |
| | Industries | Low (Tolerable) | Very Low |
| | | | |
| **Marine** | Marine habitat. | Low (Tolerable) | Low |

| Risk Area | Components | Risk rating without mitigation | Risk rating with mitigation controls |
|---|---|---|---|
| **Ecology** | Marine life | Low | Low |
| | Water flow regime | Low | Very Low |
| | Water quality | Low (Tolerable) | Low |

* Even with mitigation measures in place, dust impacts from certain activities e.g. blasting, and in certain areas, notably PBP, will have an impact on fauna and flora. The impact of construction activities on dust in other areas such as Rupert's Valley, are being mitigated quite effectively, and therefore this risk rating reflects the worst case scenario.

It can be seen from Table 6 that most of the high and very high risks can be managed and reduced to tolerable low levels through the appropriate environmental mitigation and controls. The two greatest residual risks relate to the impacts of dust on endemic fauna and flora in Central Basin; attempts at finding solutions to these risks are constantly evolving.

# 6 ENVIRONMENTAL MANAGEMENT: ACTIVITIES AND RESULTS

This chapter summarises all the environmental work undertaken during the reporting period.

## 6.1 Input to Design

Through an ongoing process of design, review, site inspection and comment by various parties such as the CEMPC, CECO, PMU and SHG, there have been several major environmental inputs to the final designs. The key inputs are summarised in Table 7 below.

**Table 7: Summary of key environmental inputs to the design phase**

| Area of development | Areas where environmental inputs were considered during design |
|---|---|
| **A - Rupert's Valley** | • Design of hazardous waste storage facility to ensure secondary containment.<br>• Wash bay area designed to ensure collection of run-off and separation of hydrocarbons.<br>• Storm water channel and culverts designed to ensure adequate drainage during high rainfall events and to prevent contamination of "clean" rain water.<br>• Placement of laydown areas to reduce disturbance and ensure protection of known and unknown archaeological sites.<br>• Road alignment and width to reduce footprint where possible.<br>• Temporary wharf design to ensure minimum disturbance to marine environment.<br>• Consult with SHG, Rupert's community and stakeholders prior to drawing up rehabilitation plan/ design.<br>• Rehabilitation of temporary land use areas to desired approved end state with least disturbance to archaeological sites i.e. import topsoil. |

| | |
|---|---|
| | • Position of permanent wharf moved to avoid need for dredging and impacts on water circulation and beach access.<br>• Wharf lighting designed to minimise impacts on seabirds, fish and cetaceans.<br>• Bridge widening over Rupert's Run designed to avoid damage to Rupert's Lines.<br>• Provision of temporary access to beach and amenity area during wharf construction to avoid social impacts.<br>• Provision of temporary access to Argos during bridge construction. |
| **B - Access/haul road** | • Storm water channel and culverts designed to ensure adequate drainage during high rainfall events and to prevent contamination of "clean" rain water run-off into the marine environment.<br>• Road alignment and width to reduce footprint where possible.<br>• Road position to minimise disturbance to the Boer desalination pipeline<br>• Placement of spoil material to prevent or reduce the impact on terrestrial ecology.<br>• Rehabilitation using native and endemic species where appropriate.<br>• Provision of fencing, signage, information boards and parking at sites of historical and conservation interest along the new access road.<br>• Realignment of access road to reduce land take and direct loss of 150 endemic gumwood trees at the Millennium Forest. |
| **C - Bulk fuel installation** | • Storm water channel and culverts designed to ensure adequate drainage during high rainfall events and to prevent contamination of "clean" rain water.<br>• Diversion of the stream to allow for natural drainage.<br>• Temporary fuel installation storage design to cater for 110% containment.<br>• Placement of laydown areas to reduce disturbance and ensure protection of known and unknown archaeological sites.<br>• Road alignment and width to reduce footprint where possible.<br>• Fuel pipeline specification for protection of water resources and spillages.<br>• Fuel pipeline routing from new wharf to BFI to minimise environmental impacts. |
| **D - Contractors camp at Bradley's** | • Footprint of camp reduced due to sensitivity with regards to Mole spider habitat and Wirebird breeding site.<br>• Sewage treatment facility designed and constructed with French drain system for protection of ground and surface water resources.<br>• Hazardous waste storage facility designed to include secondary containment.<br>• Swill bay designed and constructed for collection of waste food and minimising pests.<br>• Fat trap designed and constructed for collection of fats from food processing.<br>• Placement of contractor's camp considered in design phase to allow for minimal disturbance of terrestrial ecology (prefab units placed on plinths).<br>• Waste separation and recycling system. |

| | |
|---|---|
| | • Rehabilitation using native and endemic species. |
| **E - Prosperous Bay Plain and Dry Gut** | • Storm water culvert designed to ensure adequate drainage during 1 in 100 year flood events.<br>• Road alignment, placement and width to reduce footprint where possible and to protect ecologically sensitive areas.<br>• Runway drainage designed to ensure protection of the terrestrial ecology and surface water resources.<br>• Water abstraction investigated during design to ensure that ground and surface water resources are not depleted.<br>• Infrastructure footprint kept within the ADA as far as possible.<br>• Protection of conservation areas ensured during placement of surface infrastructure in design phase.<br>• Terminal building designed to blend as far as possible with surrounding environmental aesthetics.<br>• Consideration of route alternatives for the open channel to minimise impacts on rare lichens, cave features and invertebrates and selection of route with least impact.<br>• Translocation of rare lichens and invertebrates prior to construction of open channel.<br>• Minimisation and optimisation of haul roads (routes, number and width) leading to and from the open channel.<br>• Rehabilitation of the open channel cut and benches with appropriate native species and specialist input with design considerations such as ephemeral stream hydrology. |
| **F - Fisher's Valley** | • Culvert crossing (at Cook's Bridge) to consider impacts on water course and Ramsar site proposals.<br>• Abstraction of ground water monitored and limited – impacts on downstream water flows minimised |
| **G - Sharks Valley** | Not required. |
| **H - Desalination plant and pipeline** | Not required |
| **I - Remote obstacle lighting** | • Placement of lighting to ensure protection of heritage structures.<br>• Use of alternative energy supply to reduce footprint.<br>• Aesthetics. |
| **J - Sea water abstraction and pipeline** | Not required |
| **X - Site compound and explosives magazine** | • Temporary land use areas to be rehabilitated on completion of the project.<br>• Location of the site was done with consideration of terrestrial ecological sensitivities.<br>• Rehabilitation. |

## 6.2 Studies Commissioned

During the course of construction, a number of specialist studies have been commissioned. The reasons have included:

- Some areas within the proclaimed ADA were found to be more environmentally sensitive than previously thought;
- Significant changes to the Reference Design;

- The specialist studies commissioned as part of the AECOM EIA did not cover all areas of the ADA in sufficient detail; and
- Changes to the reference design resulting in works needing to take place outside of the ADAB or in areas not previously surveyed.

### *6.2.1 Southern Ridge and Dry Gut*

Although the ES (2008) included specialist studies on all aspects of endemic fauna and flora, and although the consultants who prepared these studies were aware of the fact that Dry Gut would have to be filled, very little survey work was undertaken on the southern ridge of PBP or in Dry Gut – even though these areas were within the ADA. But when construction was about to commence in this area in June 2012, concerns were raised by local scientists regarding the impacts on lichens, plants and invertebrates – especially the Wolf and Mole spiders. Thus SHG commissioned a study on the habitats of the southern ridge and Dry Gut. It was concluded that these habitats would be significantly adversely affected directly and indirectly by the proposed works. Where possible some construction elements were moved (e.g. the terminal access road), but where the impacts could not be avoided, BR implemented the remedial measures required under the EMP and recommended by Cairns-Wicks and Lambdon, the authors of the study. Topsoil from the area thought to be inhabited by Mole spiders was collected and spread on a nearby unaffected area and monitored for re-colonisation by spiders. A plant rescue operation was also conducted by SHG scientists and BR staff.


**Plate 6: Mole spider area on southern ridge (Photo: B Walmsley)**

**Plate 7: Mole spiders being observed moving into new area**

### *6.2.2 Permanent Wharf*

The original Environmental Statement (2008) for the airport project included a possible wharf located in the centre of Rupert's Bay – in the vicinity of the current refuelling boom. However, the airport contractor's design engineers, in optimising the wharf design, decided to move it to the south-west point of Rupert's Bay. In view of this major change, the St Helena Planning Division requested BR to compile an Addendum to the 2008 Environmental Statement (ES) to support the required application for an amendment to the development permission for the airport.

While it was acknowledged that much of the information contained in the ES remained valid, two additional surveys, three assessments and two modelling exercises were undertaken during April and May 2013 specifically for the new wharf location:

- A marine ecological survey undertaken by the staff of the Marine Darwin Project;
- A traffic survey undertaken by the Roads Department on Field Road;
- A cliff stability assessment;
- A shipping risks assessment;
- An assessment of risk to cultural heritage;
- Marine dispersion modelling in Rupert's Bay; and
- Sediment movement modelling in the bay.

The Addendum was undertaken by BR's Environmental Advisor at the time, Ms B Walmsley. The detailed scope of work was determined during meetings held with SHG and the PMU during the period 15-19 April 2013. The ES Addendum included the following components of the permanent wharf facility:

- All aspects relating to the construction of the wharf up to the Port Control Area, including the bridge over Rupert's Run;
- The access road through Rupert's Valley and associated construction traffic;
- A quarry in mid or upper Rupert's Valley;
- The pre-cast and Core-Loc yard (above the permanent BFI);
- A possible concrete batch plant located at the pre-cast yard;
- Airport sea rescue boat facility and launch ramp;
- All aspects relating to wharf operations up to the entrance to the Port Control area.

The scope of the Addendum *excluded* the Port Control area.

The study found that the main impacts which may occur during construction, *after* mitigation is applied, were:

- Noise, dust, vibration and road safety issues related to the increase in heavy traffic, especially in Rupert's Valley, but also where the haul road passes close to the residential areas of Deadwood and Bottom Woods;
- Noise, dust and vibration from quarrying activities in mid- and upper Rupert's Valley, especially for the residents of Deadwood and Rupert's Valley;
- Loss of access to the beach and picnic area for a period of time;
- The economic impact of loss of access to Shears jetty for fish unloading activities for a period of time.

In terms of risk, the permanent wharf was found to increase the risk of:

- Oil spills from vessel grounding, shipping collisions and during fuel transfer operations, and the impact that such an incident would have for the marine ecology;
- The introduction of alien invasive species into the marine environment via ship's ballast water;
- Introduction of communicable diseases and undesirable social behaviours.

No *major* negative impacts associated with wharf operation were identified, which could not be readily mitigated. There may be some job losses associated with the loss of the lighterage business and Rupert's beach may be closed for a few days each month but these can be mitigated to a certain extent and are considered to be of minor significance.

On the other hand, the wharf will realise a number of benefits, such as:

- Greater monetary savings and efficiencies from having a fixed wharf facility;
- Employment opportunities;
- Boost for small, micro and medium-sized businesses in Rupert's Valley;
- Alternative, safer landing for cruise ship passengers during rough sea conditions;
- More potential for the fishing industry – larger boats can be accommodated, boat ramp, provision of refuelling facilities, safer offloading conditions, etc;
- More attractive facilities for visiting yachts;
- Potential for new habitat to be created along the seaward face of the breakwater.

The visual impact could be viewed as being a major negative or positive impact depending on the viewer's perception.

Before

After

**Plate 8: Visual simulation of the new wharf from Bank's Battery path (Photos: B Walmsley; simulation by Newtown Landscape Architects)**

The Addendum included a range of mitigation measures to address these impacts during the design, construction and operational phases to the wharf.

The ES Addendum for the permanent wharf was approved by the PMU and subsequently became part of the planning application documentation.

### *6.2.3 Open Channel Drain in Dry Gut*

The original reference design for the St Helena Airport Project proposed that two closed concrete culverts be constructed underneath the Dry Gut fill to convey any runoff from the Dry Gut catchment and the south-western portions of the airfield footprint. One culvert was proposed for operation and the other to serve as a backup in the case of an emergency and to provide safe access for any maintenance requirements. At tender stage, BR proposed that the above system be replaced by a

single closed culvert coupled with a temporary attenuation dam upstream of the culvert in Dry Gut to prevent any storm water flow from entering the bulk fill works area.

During the design stage a number of alignment options were investigated for the culvert, but significant risks were associated with each, relating primarily to the risk of culvert subsidence. In addition to the above, an increase in the quantity of unsuitable bulk fill material (from the runway footprint) has resulted in a shortage of approximately 800,000 cubic metres of quality fill material to construct the Runway End Safety Area (RESA) over the Dry Gut valley.

A solution was thus required to address the drainage of storm water from Dry Gut away from the toe of the rock fill; and to find a source of suitable rockfill material. The option of constructing an open diversion drainage channel on the southern side of Dry Gut was therefore investigated in order to provide a sound engineering solution to solve both these problems, whilst also providing effective long-term maintenance solutions for the Dry Gut catchment area.

In view of the proposed changes to the reference design (2007) and the fact that some of the work will take place outside the agreed Airport Development Area (ADA), it was determined that an amendment to the development permission for the airport was required for the proposal and that a specialist study on invertebrates should be undertaken.[4] An Addendum to the ES was prepared by the BR environmental team during April to June 2013.

The study concluded that the main impacts of the open channel proposal would be on invertebrates and lichens – rated by the entomologist as **minor to moderate adverse** before mitigation was applied, but careful re-routing of the channel has ensured that the most sensitive areas will be avoided thus minimising the impact on the ecology to **minor adverse**. In addition, a range of mitigation measures were recommended in the Addendum including the collection of species of concern (lichens and invertebrates) and removal to a site with similar habitat, altitude and aspect. This work and the monitoring results will be presented in the next annual report.

The major benefit of this proposal was that it will provide most of the rock shortfall for the Dry Gut fill from an area largely within the ADAB and certainly within the area of disturbance, without having to develop new or existing quarries elsewhere on the island and truck the material in. It also means that a dam need not be built in Dry Gut above the rockfill.

The Addendum for the open channel was approved by the PMU in June 2013 and it was submitted, together with the planning application to the Governor in Council for approval. Consent for an amendment to the Airport Development Permission to enable the Open Channel Proposal to proceed was granted by the Governor in early July 2013.

[4] Undertaken by David Pryce, an entomologist. The study also included lichens.

| | | |
|---|---|---|
|  |  |  |
| **Plate 9: *Dimelaena triseptata* occurs abundantly on Bencoolen ridge (Photo: B Walmsley)** | **Plate 10: The rare lichen species, *Rocella sanctae-helenae* (Photo: B Walmsley)** | **Plate 11: One of the few areas where *Rocella sanctae-helenae* occurs. The channel alignment was moved to avoid these cliffs (Photo: B Walmsley)** |

### *6.2.4 Boer War Rubbish Site*

During construction works for the new access road through Deadwood, a previously unknown old rubbish dump or 'midden' dating from the time of the Boer War prisoner of war camp was found. The finds mostly comprised a thin scattering of fragments of glass and ceramics. Construction work was halted immediately and the finds on the site were systematically recorded and cleared. A number of trenches were dug to try and determine the extent of the 'midden'. The trenches provided some very limited further finds. More importantly, the lack of significant finds in the trenches suggested that the bulk of the finds are located in the pasture adjacent to the work site.

### *6.2.5 Boer Pipeline*

Prior to the commencement of construction of the haul road along Pipe Ridge, the route of the old Boer water pipeline was marked out and historical finds were collected, positions plotted on GPS and photographs were taken.

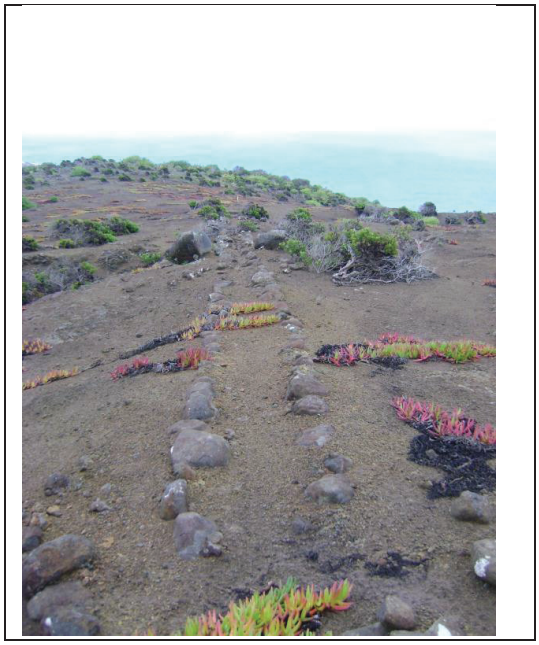


**Plate 12: Track of the old Boer water pipeline on Pipe Ridge (Photo: A van Neel)**

## 6.3 Environmental Monitoring

The following environmental aspects were monitored on a regular basis during the reporting period:

- Air quality;
- Water quality;
- Noise;
- Vibration and building condition;
- Waste types and quantities;
- Resource use;
- Wirebirds;
- Marine environment;
- Visual impact;
- Climate; and
- Heritage.

The responsibility for all monitoring lies with the Contractor's Environmental Control Officer (CECO) and the appointed technical assistants (TA).

Monitoring data are reported at weekly meetings and in future will be presented in the monthly environmental report, which will be circulated to the SHEQ manager, the CEMPC, the PMU, and senior on-island and off-island managers. When results exceed specified limits, the CECO notifies the PMU and the BR construction management team immediately. Such exceedances are regarded as an environmental incident and corrective measures have to be implemented as agreed with the PMU.

The monitoring systems used and the results for the year are presented below.

### *6.3.1 Air Quality*

The main air quality issue on this construction site is dust. The two aspects that are monitored are:

- **PM10:** particulates finer than 10 micron can enter human lungs and be harmful to health; and
- **Total suspended particulates (TSP):** Nuisance dust can affect domestic, industrial and agricultural activities, it smothers plant stomata, and can close micro-pores in soil affecting soil micro-fauna.

The dust monitoring plan is shown in Table 8.

**Table 8: Air quality monitoring plan**

| Parameters monitored | Monitoring equipment | Locations (when construction activities are present) | Frequency |
|---|---|---|---|
| Total suspended particulates (TSP) | Dust buckets erected on poles | Rupert's Valley upwind of residential area;<br>Deadwood residential area;<br>Bottom Woods residential area;<br>Millennium Forest;<br>Bradley's camp;<br>Central Basin x2. | Monthly (when required) |
| Respirable dust (PM10) | MiniVol Tactical Air Samplers on stands | Rupert's Valley upwind of residential area;<br>Deadwood residential area; | Daily (when required) |

While PM10 has been monitored at the main construction sites during the entire reporting period, namely at Rupert's Valley and PBP, problems in obtaining the correctly sized dust buckets has prevented the team from monitoring TSP during this period.

**Plate 13: MiniVol PM10 dust sampler outside a house in Deadwood (Photo: B Walmsley)**

The ES (2008) assessed the dust impacts before and after mitigation is applied (Table 9) in relation to the WHO and EU Guideline daily (24 hr) limits of 75 $\mu g/m^3$ and 50 $\mu g/m^3$ respectively. These predictions can be compared to the actual results for two of the areas in Figures 8 and 9.

**Table 9: ES dust impact predictions (from Table 7.2 of Vol 2 of the ES, 2008)**

| Construction activity | Impact before mitigation | Residual impact after mitigation |
|---|---|---|
| Offices, workshop, compound, laydown areas in Rupert's | Minor to moderate adverse | Minor adverse |
| BFI | Minimal | Negligible |
| Mid-quarry | Moderate adverse | Minor adverse |
| Upper quarry | Minor adverse | Minor adverse |
| Road construction through Rupert's Valley | Major adverse | Minor adverse |
| Road construction from Rupert's to Deadwood | Moderate adverse | Minor adverse |
| Road construction from Deadwood via Mulberry Gut, Longwood and Bottom Woods | Minor adverse | Negligible |
| Road construction from Bottom Woods to PBP | Major adverse on ecology | Variable depending on species and efficacy of mitigation |
| PBP airport construction works | Major adverse on ecology | Variable depending on species and efficacy of mitigation |
| Contractor's camp at Bradley's | Minor to moderate adverse | Minor adverse |

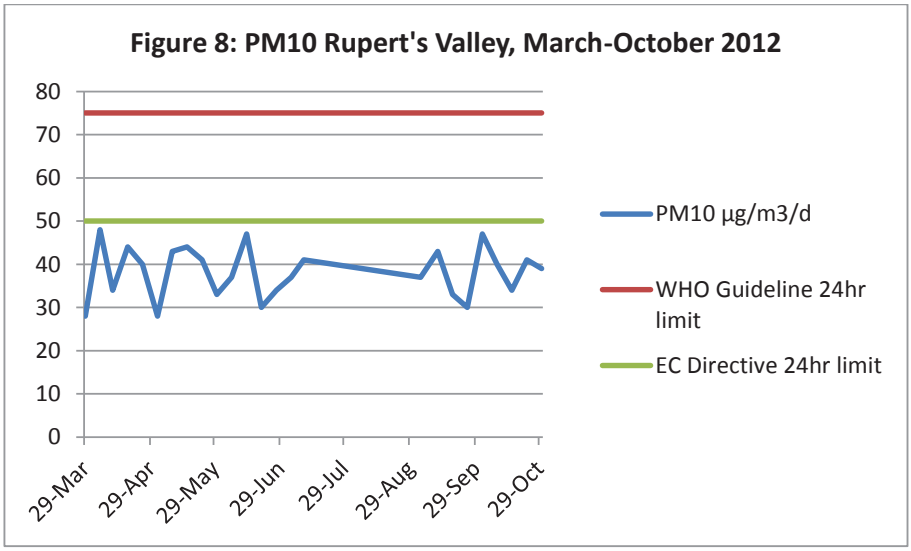


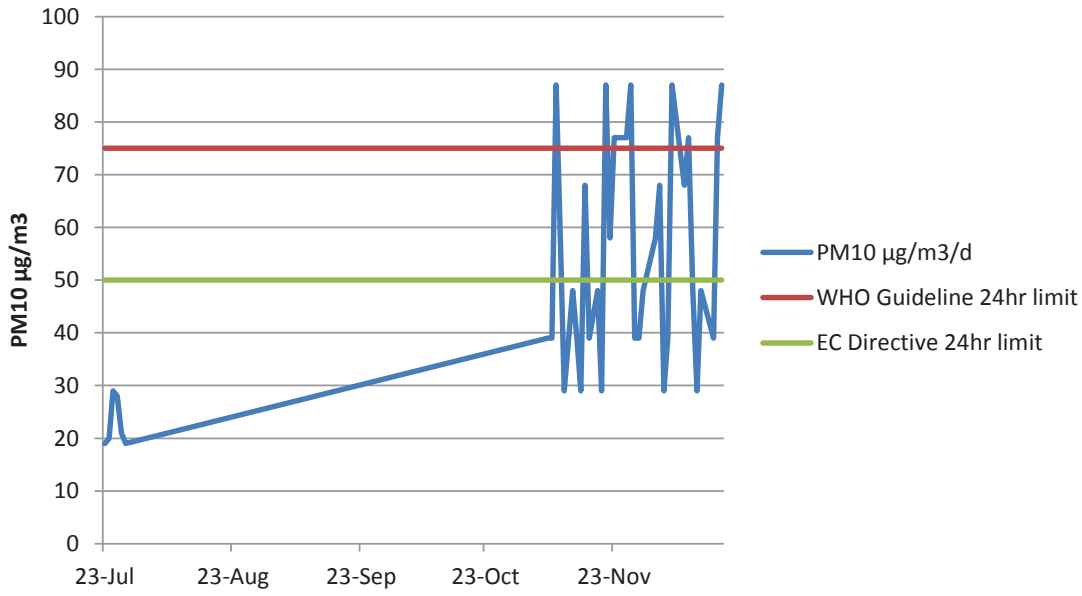

Figure 8 shows respirable dust (PM10) readings for Rupert's Valley from March to October 2012. The PM10 monitor was placed here during this time due to the amount of construction work taking place in the valley. Once the main dusty activities had ceased (or had moved away), the PM10 sampler was redeployed to Central Basin. It is clear from Figure 8 that the PM10 24 hour dust emission guidelines have not been exceeded in Rupert's Valley during site establishment and early works, including construction of the haul road out of the valley, quarrying operations, construction of the temporary wharf and the TFF. The ambient PM10 level measured in November 2005 was 39 µg/m$^3$, but as this was a once-off measurement on a relatively calm day at a different time of year, it is difficult to make

sound comparisons. However, the prediction that construction activities would have a minor effect on residents in Rupert's Valley is correct so far. This also indicates that the dust suppression measures are effective.

The situation at PBP also reflects the predictions in the ES even though no baseline measurements were taken at that time (the closest being at Bradley's where two measurements were taken in November 2005). It can be seen from Figure 9 that dust levels during site establishment and preliminary earthworks in July 2012 were within the guideline limits, but once blasting, crushing and major earth moving commenced in November, the dust levels increased significantly, with the EU guidance level frequently exceeded and the WHO limit exceeded on nine occasions over a two month period[5]. A combination of the dry climate, windy conditions, the fine volcanic dust and the large-scale nature of the earthworks means that dust is both inevitable and difficult to control – especially during blasting. Even before construction started the PM10 readings at Bradley's ranged from 57-71 µg/m$^3$, already indicating a dusty environment.

While the fine dust (PM10) is unlikely to affect residents due to the distance involved, there has been a noticeable impact on Central Basin, with visible dust accumulations on the vegetation and soil surface.

**Figure 9: PM10 at Prosperous Bay Plain, July and Nov-Dec 2012**




### *6.3.2 Water Quality*

The water quality monitoring points were chosen based on the location of potentially pollution-inducing works in relation to water resources that may be used for domestic consumption, industrial use (in the context of this project, that includes fire fighting, dust suppression, vehicle washing) and

[5] There are some discrepancies in the data and the volume calculations after December 2012. These data will be presented fully in the next AER.

those that support ecological systems (terrestrial and marine). The water quality monitoring plan is shown in Table 10 below.

**Table 10: Water quality monitoring plan**

| Parameters to be monitored | Monitoring equipment | Locations | Frequency |
|---|---|---|---|
| pH, conductivity (eC), salinity, total suspended solids (TSS) | Portable pH / conductivity metre | Champagne Pools (at toe of Dry Gut fill)<br>Middle Fill upstream of silt trap<br>Middle Fill downstream of silt trap | Weekly (if water flowing) |
| pH, conductivity (eC), salinity, total suspended solids (TSS) | Sample bottles<br>Cooler box<br>Portable pH / conductivity metre | Fisher's Valley (at Cook's Bridge)<br>Rupert's Run | Monthly (if water flowing) |
| Salinity, eC, depth, yield | Sample bottles<br>Cooler box<br>Portable pH / conductivity metre | Boreholes 2, 4, 5 and 6 in Dry Gut | Monthly |
| Salinity, eC, depth | Sample bottles<br>Cooler box<br>Portable pH / conductivity metre | 2 boreholes on Tungi Flats<br>1 borehole in Fisher's Valley<br>1 borehole in Rupert's Valley | Monthly |
| pH, TDS, eC, total suspended solids, K, Na, Ca, Mg, SO4, Cl, NO3 + NO2, alkalinity and hardness, Ni, B, Pb | Sample bottles<br>Cooler box | Borehole 5 in Dry Gut | 6-monthly (starting from September 2013) |
| pH, TDS, eC, total suspended solids, K, Na, Ca, Mg, SO4, Cl, NO3 + NO2, alkalinity and hardness | Sample bottles<br>Cooler box | Champagne Pools (at toe of Dry Gut fill)<br>Middle Fill downstream of silt trap<br>Fisher's Valley (at Cook's Bridge)<br>Rupert's Run<br>Borehole AX2 on Tungi Flats<br>Boreholes 2, 6 and the mixed dam in Dry Gut<br>Rupert's borehole | 6-monthly (if water flowing) (starting from September 2013) |

Unfortunately, the water quality baseline was not established in the ES and so it is difficult to compare current water quality with pre-construction conditions. Some limited sampling was, however, carried out by the current CEMPC in January 2012 (prior to construction) on samples taken from pools in Dry Gut, which showed that the pH increased in a downstream direction from 6.31 at the top of the rockfill area to 8.95 at the top of the waterfall just below the present toe of the rockfill (now known as 'Champagne Pools'). More interestingly, total dissolved solids readings were off the scale of the portable pH/conductivity metre. The salinity in Champagne Pools was 12.36 parts per thousand and the presence of thick salt crusts surrounding all the pools confirmed high concentrations of sodium

chloride. It is assumed therefore that the aquatic ecology has adapted to natural conditions that range from relatively 'fresh' following rainfall, to extremely salty as the pools slowly evaporate.

**Plate 14: Small, salt-encrusted pools in Dry Gut prior to construction starting (January 2012) (Photo: B Walmsley)**

It has also been noted (visual observations) over the reporting period that natural flows down Rupert's Run have a high suspended solids load. While it is acknowledged that construction of the culverts for the haul road crossing over the run has increased the sediment load, the additional impact is perhaps smaller than predicted (Table 11 below), given that the ES predictions were not based on actual measurements.

**Table 11: ES water quality impact predictions (from Table 15.2 of Vol 2 of the ES, 2008)**

| Construction activity | Impact before mitigation | Residual impact after mitigation |
|---|---|---|
| Mobilisation of sediment laden runoff which could enter into local water courses and drains | Moderate to major adverse | Neutral |
| The potential risk of chemical and fuel spillages enter local water courses | Moderate to major adverse | Neutral |
| Disposal of sewage* | Neutral | Neutral |
| Use of sea water for rock fill compaction* | Moderate adverse | Neutral |

* Note that sewage disposal is the responsibility of SHG and seawater is not being used to compact the rock fill.

Although the EMP only specifies that the contractor shall not exceed pH, total suspended solids, ammoniacal nitrogen, biochemical oxygen demand and visible oil at the outlet of water treatment facilities and temporary outfalls (s. 2.9.1.5 of the EMP), BR has adopted a more robust (and appropriate) set of water quality standards relating specifically to the potential end-users of the water i.e. industrial, ecological and domestic users. The standards are based on international best practice and guideline limits for no detrimental effects.

**Table 12: Water quality standards used**

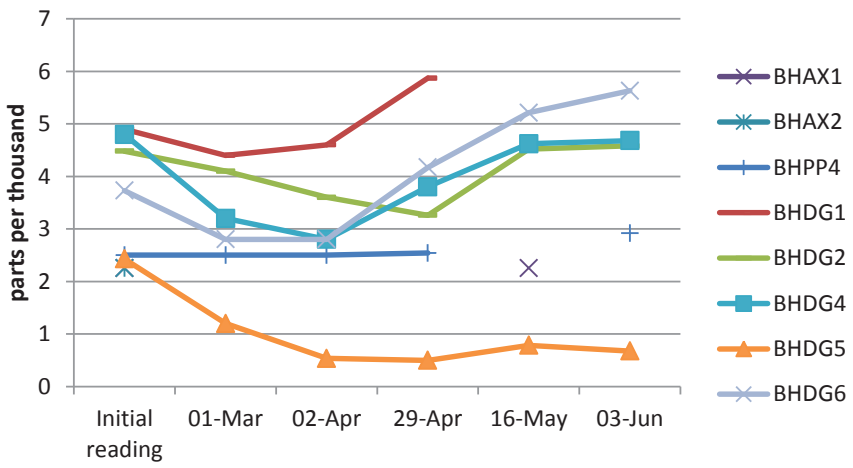
| Water quality parameter | Drinking water standards | | | Industrial use | Concrete mix | Aquatic ecology |
|---|---|---|---|---|---|---|
| | WHO 1993 | RSA TWQR 1996 (no effects) | UK | RSA target water quality range for industrial use | Industry standards | RSA TWQR for aquatic ecosystems |
| Potassium as K | | 0-50 | | | | |
| Sodium as Na | 200 | 0-100 | 200 | | | |
| Calcium as Ca | | 0-32 | | | | |
| Magnesium as Mg | | 0-30 | | | | |
| Sulphate as $SO_4$ | 250 | 0-200 | 250 | | | |
| Chloride as Cl | 250 | 0-100 | 250 | | | |
| Nitrate and Nitrite as N | | 0-6 | 0.5 | 0-1600 | 500 | |
| Orthophosphate as P | | | | | | |
| Fluoride as F | | 0-1 | 1.5 | | | 0.75 |
| TDS | 1000 | 0-450 | | | 50000 | |
| Electrical conductivity (mS/m) | | 0-70 | 250 | 0-250 | | Change <15% from ambient |
| pH (units) | 6-9 | 6-9 | 6.5-10.0 | 5-10 | 5-9 | |
| Hardness as $CaCO_3$ | | | | 0-1000 | 400 | |
| Alkalinity as $CaCO_3$ | | | | 0-1200 | 1000 | |
| Ryznar index | | | | | | |
| Suspended solids | | 0-1 | | 0-25 | | <100; change <10% from ambient |
| Copper as Cu | 2 | 0-1 | 2 | | | |
| Iron as Fe | 0.3 | 0-0.1 | 0.2 | | | |
| Nickel as Ni | 0.02 | | 0.02 | | | |
| Zinc as Zn | 3 | 0-3 | | | | |
| Arsenic as As | 0.01 | 0-0.01 | 0.01 | | | |
| Boron as B | 0.3 | | 0.001 | | | |
| Cadmium as Cd | 0.003 | | 0.005 | | | |
| Lead as Pb | 0.01 | 0-0.01 | 0.025 | | | |

Salinity readings for eight of the 13 boreholes are shown in Figure 10 below. The data show the salinity readings taken at borehole establishment and at monthly intervals from March to June 2013. Interpretation of the trend lines shows:

- The boreholes located in Dry Gut valley (boreholes 1, 2, 4 and 6), with the exception of borehole 5 (BHDG5), are also geochemically similar, exhibiting consistently high salinity concentrations above 3 ppt. This suggests that the water has been in contact with saline rocks for some time with little or no recharge from rainfall;

- Borehole 5 is the exception; although the salinity reading at establishment was high (2.43 ppt), it quickly fell on commencement of pumping to a consistent level at less than 1 ppt, which is considerably lower than the other boreholes in the vicinity (BHDG4 and BHDG6). This is hard to explain as the boreholes were drilled to similar depths and the static water levels in nearby boreholes 4 and 6 are similar. This suggests that borehole 5 must tap into a different aquifer which is recharged by rainfall.

**Figure 10: Borehole salinity readings, March - June 2013**




The natural salinity of the borehole water (except borehole 5) means that it is unsuitable for most uses except dust suppression and use for rockfill compaction. On the basis of the monthly salinity readings and the results obtained from the full analyses conducted in September, Borehole 5 could be used for concrete mixing, domestic consumption and irrigation.

There are no indications that water quality is being affected by construction activities, except in Rupert's Run where a reading of 143 mg/l was obtained for suspended sediment in the sample collected in September 2013. However, as noted earlier, in the absence of baseline data, it is difficult to know how much of this is natural sediment in runoff following rain, or how much may be ascribed to construction works.

### *6.3.3 Noise*

Noise can affect sleep, concentration and peace of mind and therefore noise on site is monitored as follows:

**Table 13: Noise monitoring plan**

| Parameters to be monitored | Monitoring equipment | Locations (when construction activities are present) | Frequency |
|---|---|---|---|
| LAmax<br>LA90<br>LAeq<br>(over 1, 8 and 16 hour periods) | Portable Type 1 precision Integrating Sound Level Metre, mounted on a tripod | Government garage (i.e. Bradley's)<br>Rupert's Valley residential area adjacent to haul road;<br>Deadwood residential area adjacent to haul road;<br>Bottom Woods residential area adjacent to haul road; | Weekly on a rotating basis at each monitoring point during periods of work in area; or when heavy construction in an area demands more frequent measurements |

The baseline noise levels measured during the preparation of the ES (probably in 2005, but no dates were provided) at each of the sensitive receptors were as shown in Table 14.

**Table 14: Baseline average noise levels**

| | Average Noise Levels (dB(A)) | |
|---|---|---|
| | Day time | Night time |
| Rupert's Valley | 46 | 39 |
| Deadwood | 47 | 50 |
| Bilberry Field Gut | 41 | n/m |
| Bradley's | 45-50 | 42 |
| PBP (Fisher's Valley) | 36-38 | n/m |
| PBP | 41 | n/m |
| Longwood | 48 | 46 |
| Woody Ridge | 41 | n/m |

n/m means 'not measured'

These noise levels are comparable with the various noise level guidelines that have been applied.

**Table 15: Noise level guidelines**

| | WHO Guidelines | BS5228:2009[6] | South African Guidelines (SANS 10103) | EMP maximum limit |
|---|---|---|---|---|
| Day time | 55 | 65 | 55 | 70 |
| Night time | 45 | 45 | 45 | 45 |
| Evening and weekends | - | 55 | - | 60 |
| Blasting (day time) | - | - | - | 125 |

In the ES (2008), noise levels in certain areas were predicted using noise models, and the impacts for all areas were assessed before and after the recommended mitigation measures are applied. The predicted levels and assessed impact ratings are shown in Table 16:

[6] Guidelines for where construction noise levels will not exceed the ambient by more than 5 dB (rounded to the nearest 5 dB)

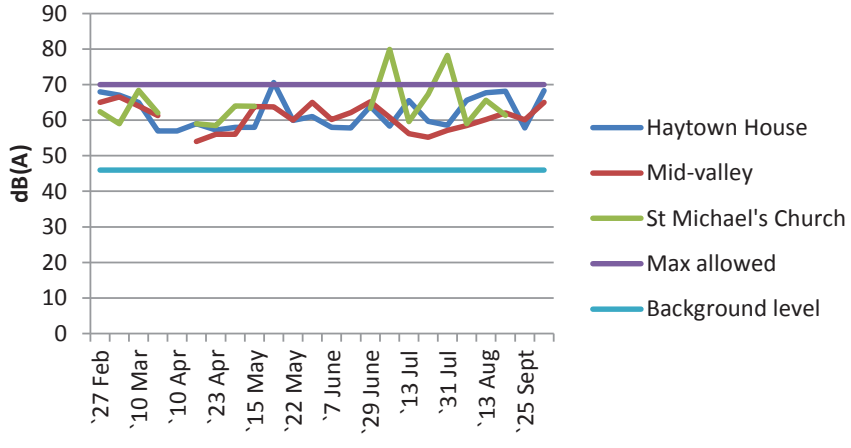
**Table 16: Predicted noise levels (ES, 2008)**

| Activity | ES predicted noise level (dB(A)) | Assessed impact before mitigation | Residual impact after mitigation |
|---|---|---|---|
| Construction of temporary jetty (trucks) | 66 (at 10 m) | Moderate adverse | Moderate adverse |
| Compound areas | - | Minor adverse | Minor adverse |
| BFI | - | Minor adverse | Minor adverse |
| Blasting at quarry | - | Moderate adverse | Moderate adverse |
| Construction of haul road from Rupert's Valley to PBP | 78 (at 10 m)<br>71 (at 25 m)<br>65 (at 50 m)<br>58 (at 100 m) | Moderate to major adverse | Minor to moderate adverse |
| Traffic on haul road | | Moderate adverse | Minor adverse |
| Construction of Bradley's camp | - | Moderate adverse | Minor adverse |
| Earthworks and blasting on runway site | - | Negligible to minor adverse | Negligible to minor adverse |

The noise environment in Rupert's Valley has changed significantly since the airport project commenced due to the movement of heavy vehicles and equipment being transported to the airport site, an increase in the amount of daily light traffic to and from the Basil Read workshops, stores, laboratory and laydown areas, as well as from blasting at the quarry and construction of the new haul road. In anticipation of this, three locations in Rupert's Valley were established as noise monitoring points: at St Michael's Church (upwind position), mid-valley outside residences (25 m from road), and outside Haytown House.

The noise monitoring data (excluding blasting) from a period of 7 months in 2012 show that noise levels have exceeded the maximum allowable limit specified in the EMP of 70 dB(A) on four occasions: three of these may be ascribed to strong wind noise, while the fourth (70.6 dB(A)) was due to heavy haul traffic (Figure 11). Once the main noisy activities had ceased (or had moved away) from Rupert's valley, there was no more need for noise monitoring in this location.

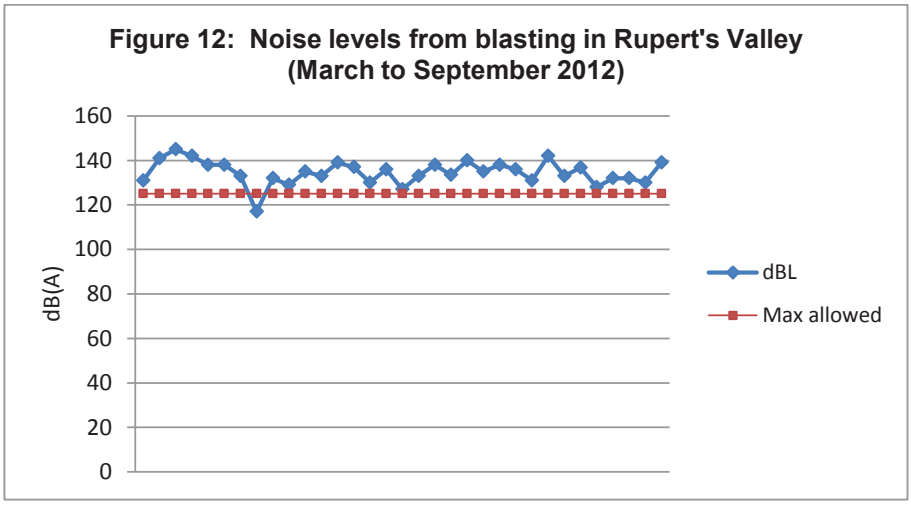
**Figure 11: Noise levels in Rupert's Valley, Feb-Oct 2012**



It is clear that the majority of the sound level readings are largely consistent with the modelled value of 66 dB(A) for jetty construction and the worst case scenario for haul road construction. However, analysis of the data clearly indicates that wind is a significant contributor to the noise levels, but that there is a correlation between heavy vehicle movements, rock drilling and noise levels throughout the valley.

In terms of the EMP, the noise levels from blasting are not supposed to exceed 125 dB(A), but the average sound level during blasting operations for the Rupert's haul road was 135 dB(A), with a maximum of 145 dB(A) and a minimum of 117 dB(A) being recorded (Figure 12). The noise readings in Figure 12 were taken during blasting activities in Rupert's Valley and along the lower sections of the haul road between March and September 2012. Noise measurements ceased when blasting activities finished.

**Figure 12: Noise levels from blasting in Rupert's Valley (March to September 2012)**




### *6.3.4 Vibration and Building Condition Monitoring*

Vibration monitoring is conducted as shown in Table 17 below.

**Table 17: Vibration monitoring plan**

| Parameters to be monitored | Monitoring equipment | Locations | Frequency |
|---|---|---|---|
| Vibration dose values (VDV) (1Hz to 80Hz) Peak particle velocity (PPV) | Nomis seismograph. Mini seismograph | Government garage (i.e. Bradley's) Rupert's Valley residential area adjacent to haul road; Deadwood residential area adjacent to haul road; Bottom Woods residential area adjacent to haul road; | For 15 minute duration prior to, and during a period of construction when vibration may occur e.g. a period of blasting; or movement of heavy vehicles. |
| Building condition (structural | Standard record form, before and | As above. | Pre-activity survey followed by a post-activity survey |

| Parameters to be monitored | Monitoring equipment | Locations | Frequency |
|---|---|---|---|
| cracks, plaster work, condition of gutters and drains, etc) | after photographs | | |

There are numerous guideline limits relating to the impacts of vibration but they can be broadly split into two: those limits required to protect the occupiers of buildings (Vibration Dose Values (VDV)); and those required for the protection of buildings and structures (Peak Particle Velocity (PPV)). Tables 17 and 18 below bring together the various sources of guidance on vibration criteria to form a set of proposed control limits and associated actions for this project (Appendix 6, Vol. 4, ES 2008).

**Table 18: Vibration control limits for protection of occupiers**

| Period | Building/Location | Criterion | Purpose |
|---|---|---|---|
| Day time (07h00-23h00) | Inside dwellings<br><br>Outside dwellings | 0.4 $m/s^{1.75}$ eVDV<br>or<br>1.5 mm/s PPV | Annoyance threshold |
| Night time (23h00-07h00) | Inside dwellings<br><br>Outside dwellings | 0.13 $m/s^{1.75}$ eVDV<br>or<br>0.5 mm/s PPV | Annoyance threshold |

**Table 19: Vibration control limits for protection of buildings and structures**

| Building Type | Limits for Transient Vibration (PPV mm/s) | | | Limits for Continuous Vibration (PPV mm/s) | | |
|---|---|---|---|---|---|---|
| | <10 Hz | 10-50 Hz | >50Hz | <10 Hz | 10-50 Hz | >50Hz |
| Industrial/commercial (light and flexible structure) | 10 | 20 | 40 | 5 | 10 | 20 |
| Industrial/commercial (heavy and stiff structure) | 15 | 30 | 60 | 7.5 | 15 | 30 |

The impacts of vibration were assessed in the ES (2008) and the following ratings were given for each of the major construction areas where vibration may be an issue.

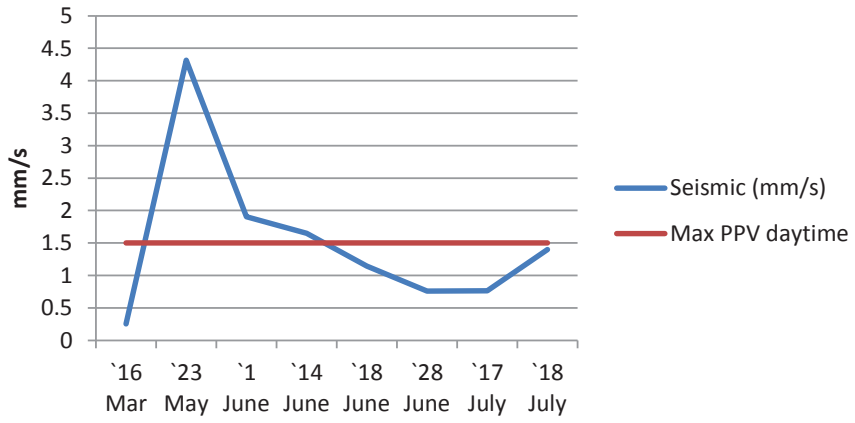
**Table 20: Vibration impact predictions**

| Activity | Assessed impact before mitigation | Residual impact after mitigation |
|---|---|---|
| Truck movements associated with the temporary jetty | Minor adverse | Minor adverse |
| Blasting at quarry | Moderate adverse | Moderate adverse |
| Haul road construction activity | Minor adverse | Minor adverse |
| Haul road blasting | Moderate adverse | Moderate adverse |
| Vibration from construction traffic | Minor adverse | Minor adverse |
| Blasting at the runway site | Minor adverse | Minor adverse |

The actual vibration measurements taken over a four-month period in Rupert's Valley are shown in Figure 13.

It can be seen from Figure 13 that the annoyance threshold for residents in Rupert's Valley exceeded the maximum PPV value of 1.5 mm/s on three out of the eight days that measurements were taken. These exceedances occurred near the beginning of construction, when work at the quarry and on the haul road was being conducted closest to Rupert's Valley residences. As work progressed up the valley and further away, the vibration impacts decreased.

**Figure 13: Peak particle velocities measured in Rupert's Valley (March to July 2012)**




Building condition surveys have also be carried out in residential areas in close proximity to construction work as shown in Table 21 below.

**Table 21: Building surveys undertaken**

| Location | No of properties surveyed | Date | Reason |
|---|---|---|---|
| Rupert's Valley | 16 | February 2012 | Prior to quarrying, construction of early works and haul road |
| Rupert's Valley | 18 | August 2013 | Follow up survey (post-early works construction) and pre-wharf construction |
| Bradley's | 3 | November 2012 | Prior to blasting on PBP |
| Deadwood | 26 | April – June 2013 | Prior to new access road construction |
| Bottom Woods | 23 | June – August 2013 | Prior to new access road construction |
| Mulberry Gut | 4 | October 2013 | Prior to new access road construction |

**Plate 15: Conducting a building condition survey (Photo: A van Neel)**

### *6.3.5 Waste Management*

A Waste Management Plan (WMP) has been developed to provide guidelines for waste management practices during construction of the St Helena Airport. The WMP is based on the waste management hierarchy of avoid, reduce, reuse and recycle. What cannot be reused or recycled will be disposed of in a responsible manner and according to the legal requirements of the island and the contractual conditions.

Wastes arising from construction activities can be broadly divided into two categories: non-hazardous waste and hazardous waste. Non-hazardous solid waste comprises the following:

- Compostable organic waste, including non-invasive vegetation, which excludes endemic and indigenous species of conservation interest, cleared from the construction sites and selected food waste (raw vegetables and fruit);
- Non-compostable organic waste, including alien invasive species e.g. prickly pear, putrescible and cooked food waste;
- Recyclable solid waste such as: plastic, paper / cardboard, rubber (tyres), metal, glass, etc.;
- General waste (non-recyclable and non-compostable) such as polystyrene, certain plastics, nylon, non-hazardous light bulbs, air filters, empty cement bags, etc.;
- Inert building rubble;
- Spoils from soil / substrate excavation at some of the development areas such as the haul road and various areas on PBP.

Typical hazardous wastes that are being generated during construction include:

- Used oil / fuel;
- Oily wash water from vehicle wash bays;
- Contaminated oil rags;
- Hydrocarbon contaminated soil;
- Hydrocarbon containers (plastic jerry cans and drums);
- Medical waste;
- Lead-acid batteries;
- Electrical equipment containing hazardous substances;

- Solvent-based inks and paints;
- Ink cartridges;
- Acids;
- Asbestos based brake shoes;
- Explosives boxes;
- Redundant chemicals and chemical containers.

The volumes of waste generated and disposed of are monitored. Over the reporting period, the estimated average waste volumes generated per month and the disposal options used were as shown in Table 22 below.

**Table 22: Estimated average monthly waste volumes**

| Waste description / type | Estimated average monthly volumes | Disposal option |
|---|---|---|
| Plastic | 50 kg | Shredded or compressed and recycled. |
| Metal | 500 kg | Size reduction and recycled<br>Sold to scrap metal dealers off-island |
| Glass | 100 kg | Crushed and recycled on island or off island if recycling on island is not feasible |
| Paper | 20 kg | Recycle on island |
| Food waste | 1,200 kg/week pig slops<br>100 kg/week for composting | Provide to farmers for pig feed<br>Compost |
| Rubber | 100 kg | Tyres recycled on island<br>Shredded and possibly sold to off-island cement manufacturers |
| No invasive vegetation | Dependent on area of development | Compost |
| Invasive vegetation | Dependent on area of development | Treat as per the Protocol for the Management of Invasive Vegetation, Appendix 20 of the CEMP |
| Inert building rubble | To be determined | Landfill or used as fill where possible. |
| Spoils from excavation | To be determined | Used as fill in dedicated areas such as the Middle Fill area. |
| Explosives boxes | 5 kg | Compact<br>Hazardous waste storage. |
| Sewage from chemical toilets | 100 litres | SHG disposal system |
| Sewage from septic tank system | 200 $m^3$ | French drain system |
| Waste oil | 22,000 litres | Recycle off-island |
| Redundant lead-acid-batteries | 2 per month | Recycle |
| Acid | 10 litres | Hazardous waste site |
| Chemical containers | 20 kg | Hazardous waste site |
| Contaminated oil rags | 5 kg | Hazardous waste site |
| Solvent based inks and | 1 kg | Hazardous waste site |

| Waste description / type | Estimated average monthly volumes | Disposal option |
|---|---|---|
| paints | | |
| Empty cement bags nylon type | 100 kg | Off island recycling |
| Used oil filters | 10 per month | Compact<br>Hazardous waste site |
| Used air filters | 10 per month | Compact<br>SHG disposal site |
| Old brake pads / discs | 20 per month | Hazardous waste site |
| Redundant vehicle parts | 100 kg | Return to suppliers<br>Sell |
| Redundant spark plugs | 20 kg | Return to suppliers<br>Sell |
| Grease | 2 kg | Hazardous waste site |
| Used welding rods | 2 kg | Hazardous waste site |
| Used cutting disks | 5 kg | Return to suppliers<br>Sell |
| Used paint brushes | 10 kg | Return to suppliers |
| Empty paint containers | 30 kg | Compact<br>SHG disposal site<br>Re-use |
| Medical waste | 5 kg | Incinerate on island |
| Fat from fat-trap | 20 kg | SHG disposal site |

By far the largest amount of waste per month is canteen waste, comprising 76% of the total waste stream. Scrap metal at 8% and food waste for composting (6%) are the next highest in terms of weight. Rubber, boxes, containers, cement bags, redundant vehicle parts and spares together contribute another 6% according to weight, but some of these are high volume wastes (rubber, containers, boxes) which are a challenge to store and dispose of.
The EMP (2011) states that *"all special and hazardous wastes shall be removed from the island for disposal"*, and that *"a strategy for dealing with the international transfer of waste materials off island shall be presented by the contractor"*.

The Basel Convention on the Trans-boundary Movement of Hazardous Wastes and their Disposal, 1992, prohibits the export of hazardous wastes between countries. This complicates the export of hazardous waste from St Helena and therefore, BR is looking at several options to minimise the quantity, and find methods of safe disposal of the hazardous waste, including:

- Compacting;
- Washing out hydrocarbon containers to render them innocuous;
- Shredding;
- Incineration; and
- Construction of a hazardous waste cell near the Horse Point facility.

Until a long-term, sustainable and permanent solution has been agreed, all hazardous waste is stored in clearly signed, bunded storage areas.


**Plate 16: Hazardous waste store at Bradley's workshop (Photo: B Walmsley)**

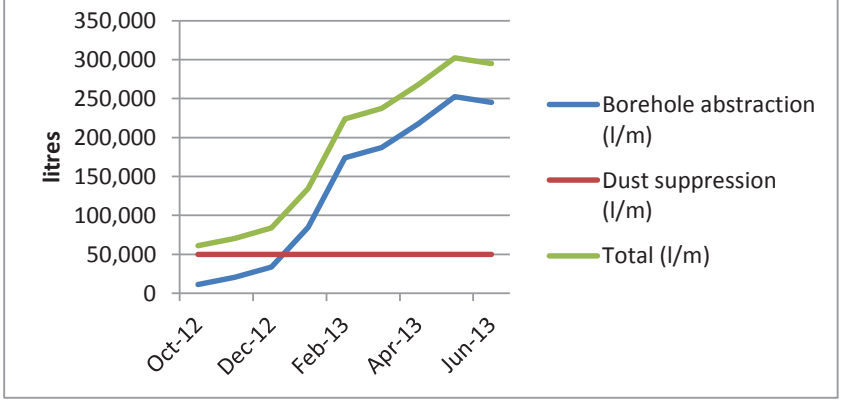
### *6.3.6 Resource Use*

Records are kept of the following and reported on a monthly basis:

- Groundwater pumped from each borehole (litres);
- Municipal water (litres);
- Electricity (kWh);
- Diesel (litres).

Over the 9-month period October 2012 to June 2013, a total of 1.68 million litres of water was abstracted from the boreholes described in section 6.3.2 above. Of this, 1.23 million was used to compact the rockfill in Dry Gut and 0.45 million litres was used for dust suppression. The amount has steadily been increasing as the volume of rockfill placed each month has increased.

**Figure 14: Water use per month**




The total amount of diesel used per month has been steadily increasing as the size of the vehicle fleet has increased to meet the construction demands. The total amount of diesel used up until June 2013 was 2.675 million litres (Table 23).

**Table 23: Total diesel consumption during reporting period**

| Period | Litres |
|---|---|
| From Start to December 2012 | 594,101 |
| Jan-13 | 237,617 |
| Feb-13 | 314,228 |
| Mar-13 | 297,011 |
| Apr-13 | 323,364 |
| May-13 | 421,687 |
| Jun-13 | 486,716 |
| **Total diesel consumption** | **2,674,724** |

### *6.3.7 Wirebirds*

Up until the end of July 2012, Wirebirds on PBP, Dry Gut and Creeper Hill were monitored monthly by the St Helena National Trust (SHNT). The BR environmental team received training on Wirebird monitoring from the SHNT in September, 2012 and monitoring started in October. The monitoring sites are:

- Concrete batch plant and crusher area;
- Bradley's camp;
- Central basin;
- Dry Gut dams;
- Explosives magazine;
- Stockpile areas 1 and 2;
- Spider hill;
- Terminal building area;
- Tungi Flats

**Plate 17: Environmental team receiving Wirebird training (Photo: A van Neel)**

**Plate 18: Wirebird and chick (Photo: D Mouton)**

Although the number of Wirebirds per habitat have been recorded over the years, it is difficult to compare the numbers seen prior to airport construction with the data collected by BR, because the

habitat areas covered by the earlier surveys are different, with the older surveys covering much larger areas than those being conducted around specific construction sites.

However, an analysis of the data shows that Wirebird populations appear to be relatively stable, with 1-3 birds or more observed at each monitoring location on every visit (Figures 15-17). On some occasions far greater numbers were observed which is probably related to the presence of prey and/or water. At least one nest was observed at every site, with successful hatching of chicks.

What is surprising is that the Wirebirds were still present at the terminal building site which is in the centre of the construction site (Figure 17). However, numbers do appear to be declining at Tungi Flats (Figure 18). What is not apparent from the data is whether the birds move into a new territory once their existing area has been destroyed or disturbed. It is also not clear from the data how many individuals are present in total, but on each day of observation, between 7 and 21 adult birds were noted in total. However, not all sites are monitored on every occasion, or on the same day, and so it is again difficult to draw any conclusions. The average number of birds counted on PBP on 5 separate occasions between 1988/89 and 2006/7 was 20 (ranging from 15 - 31) and so it would appear that numbers have not been significantly impacted, but more monitoring is required to verify this initial finding.

**Figure 15: Number of adult birds, concrete batch plant**

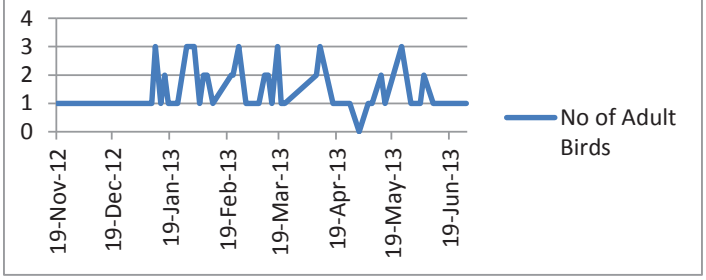
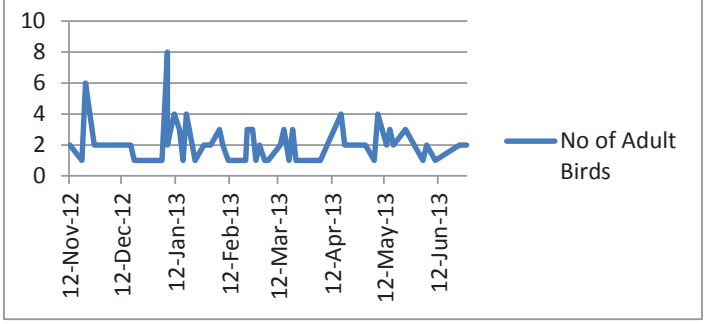
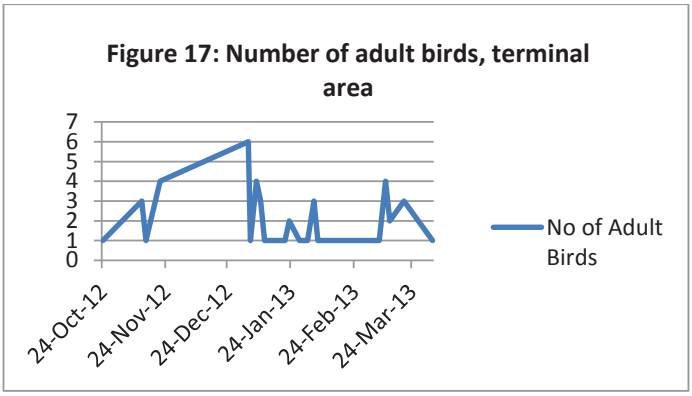
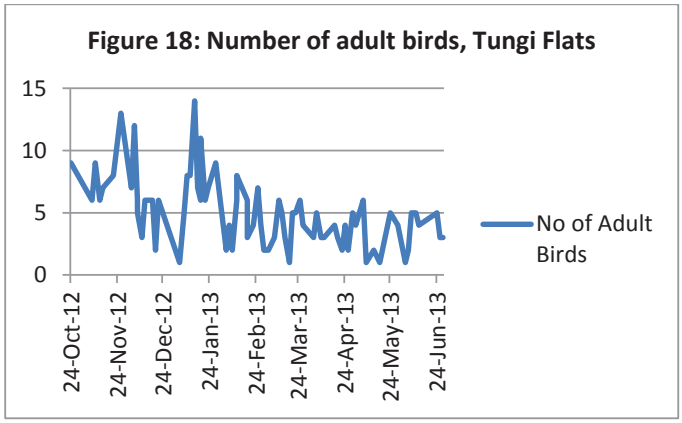



**Figure 16: Number of adult birds, explosives magazine**






### *6.3.8 Visual Impact*

Photographs are taken from numerous fixed positions across the construction site every week. The following plates show selected before and after situations in Rupert's Bay, on Pipe Ridge and Dry Gut.

**Plate 19: Rupert's Valley before construction started (January 2012) (note Church is just off left of photo (Photo: B Walmsley)**

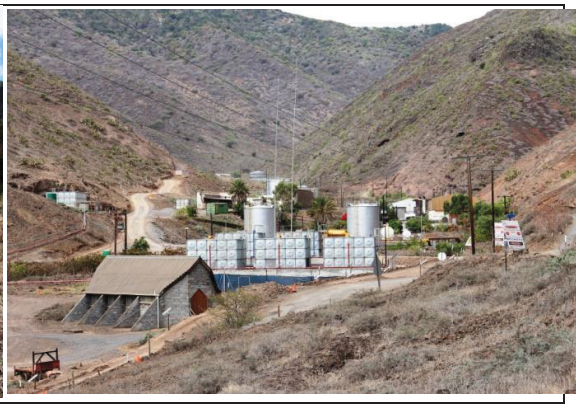


**Plate 20: Rupert's Valley after construction of the temporary fuel farm and haul road (April 2013) (Photo: B Walmsley)**

**Plate 21:View west along Pipe Ridge (January 2012) (Photo: B Walmsley)**

**Plate 22: Same view showing the new access road under construction (September 2013) (Photo: B Walmsley)**

**Plate 23: View of Dry Gut prior to filling (January 2012) (Photo: B Walmsley)**

**Plate 24: Similar view of Dry Gut with rock filling in progress (April 2013) (Photo: B Walmsley)**

### *6.3.9 Climate*

In order to provide the airport operator and airport users with historic weather conditions, a weather station was installed and commissioned at the St Helena airport site by the Department for International Development (DfID) in June 2012. The weather station was originally located (in 2006) at the airport construction site at an elevation of approximately 1,000ft above sea level. However, it was moved to Bradley's Camp on 29 June 2012 and was operational shortly thereafter. Since establishment there have been a few teething problems: no data are available for August 2012 – January 2013 nor for March 2013 due to system errors and issues experienced with downloading data from the weather station.

The weather data are collected and processed once a month by the Basil Read construction team.

The following parameters are monitored: wind, temperature, relative humidity, air pressure, precipitation, cloud cover and visibility.

### *6.3.10 Heritage*

Regular observations are made in active construction areas for impacts on, or damage to, heritage sites. Furthermore, building condition surveys are carried out prior to blasting or other activities which may cause an impact to building integrity.

## 6.4 Landscape restoration and rehabilitation

The landscape and ecological mitigation plan (LEMP) was still in the process of development during the reporting period. Furthermore, no construction works had been completed yet and therefore no rehabilitation programmes had commenced as of end June 2013. This aspect will be reported on more fully in the next annual report.

# 7 CONCLUSIONS

Construction of the St Helena airport project got off to a very rapid start, before many of the environmental systems were properly in place. Although the CECO was on site from almost the beginning, it has taken time to build up the environmental team and its expertise. Added to this, the ES was conducted many years prior to actual development starting and on a reference design that has since changed – quite radically in some cases. Thus the ES and even the EMP of 2011 failed to provide adequate and relevant guidance to the environmental team on many issues of concern. With time, these gaps have been filled and the environmental management systems have been developed in order to afford robust control systems for the construction site. This has only been achieved with the wholehearted support from the BR management team and with strict oversight by PMU. Nevertheless, the distance of the island from South Africa and the time it takes to get the right equipment and/or specialists to the island continues to pose a challenge.

It is hoped that the next annual report for the period July 2013 to June 2014 will provide more depth into the main issues of concern and that compliance with the key performance indicators will be far higher.

**Targets for 2013-14**

- Completion of 2013-2014 AER in August 2014;
- 6-monthly audits in September 2013 and March 2014;
- CEMP update 3 in October 2013 (the CEMP2 and associated appendices will be completely revised);
- CEMP update 4 in April 2014. This update will include a more effective document management system;
- Improved compliance with the CEMP and with the key performance indicators listed in the Executive Summary of this AER;
- Wharf construction impacts - as or less than predicted;
- A safe and effective solution to hazardous waste disposal will be implemented;
- Better quantification of the following:
    - Percent waste re-used or recycled;
    - Direct energy used;
    - Water use per tonne of fill;
    - Greenhouse gas emissions;
    - Social indicators.

- An effective pest control and invasive alien plant eradication programme will be up and running;
- The LEMP programme will have commenced. The roll out of this programme by SHG has been significantly delayed and this has already caused some problems for the environmental management team, particularly in relation to revegetation of the rockfill benches. The LEMP will be on the critical path for the forthcoming year.

# APPENDIX A

## BASIL READ'S SAFETY, HEALTH, ENVIRONMENT AND QUALITY POLICY

# SHEQ POLICY STATEMENT

## (Safety, Health, Environment and Quality)

**Basil Read is building the future offering clients in the construction industry a comprehensive range of services spanning buildings, roads and civil engineering.**

### OUR DEFINITION:

The Oxford English Dictionary defines quality as a "degree of excellence".
At Basil Read, our degree of excellence is defined in our ISO 9001 Quality, OHSAS 18001 Occupational Health and Safety and ISO 14001 Environmental implementation.

### OUR AIM:

Our SHEQ system serves as an on-going measurement tool to ensure effective management of the priority items identified through our assessments.

### OUR OBJECTIVES:

**Safety and Health (SH)**

- To proactively reduce the frequency and severity of injuries.
- Awareness of risk-.
- To promote an environment where all employees accept responsibility for their own Health and Safety and the Health and Safety of everyone engaged in our core business.
- Ensure we comply with the OHS Act, relevant legal anc other requirements.

**Environment: (E)**

- Prevent Pollution
- Legal compliance with the relevant Environmental Legislation and other requirements.
- Continual Improvement of monitoring to ensure an effective management system.

**Quality: (Q)**

- In our company, quality standards are achieved when our joint effort in delivering a service or product meets or exceeds ours client's specified requirements.
- We value and nurture our client relationships.
- We carefully evaluate and select our suppliers, sub-contractors and partners, striving for mutually beneficia relationships.
- We promote learning, increasing knowledge and transferring skills according to an identified programme

### OUR APPROACH:

At all levels in the company, managers implement a clear system of Safety and Health, Environmental and Quality checks by:

- Identifying aspects, impacts, hazards and risks.
- Determining priorities.
- Setting SHEQ objectives.
- Formulating action plans.
- Measuring progress regularly and analysing the results by specialists.

By being focused on SHEQ, we control risks and enhance efficiency.

### OUR COMMITMENT:

At EXCO level we are personally committed to achieving excellence and we commit all employees to achieve their SHEQ objectives.

### IMPROVEMENT:

At Basil Read, we implement an Annual Plan for Improvement. The Improvement Plan is consistent with our business strategy, and ensures continuous improvement of the SHEQ System.

### YOUR ASSURANCE:

Our implementation of OHSAS 18001 Occupational Health and Safety, ISO 14001 Environment and ISO 9001 Quality assures successful identification of priorities for effective management.

FROM THE CEO'S OFFICE

20 May 2011