St Helena Access Feasibility Study

Final Report

APPENDICES – VOLUME 2

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APPENDIX H: SPECIFICATION FOR GATHERING METEORLOGICAL DATA

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Glossary of Terms

AAL	Above Aerodrome Level
DFID	Department for International Development
DVOR/DME	Doppler Variable Omni Range/Distance Measuring Equipment
HMG	Her Majesty's Government
ICAO	International Civil Aviation Organisation
m	metres
MDH	Minimum Descent Height
MOC	Minimum Obstacle Clearance
NDB	Non Directional Beacon
OCH	Obstacle Clearance Height
PANSOPS	Procedures for Air Navigation and Operations
SHG	Saint Helena Government

Preface

Atkins estimates that the construction costs to design and build an aerodrome on St Helena are of the order of ¦ ¦ ¦ ¦ million. This estimate assumes an instrument runway approach.

Having a visual runway approach could reduce the cost of an aerodrome by about ¦ ¦ ¦ ¦ . This report explains the conditions which need to be fulfilled to allow a visual runway approach. There is a dearth, however, of meteorological evidence available in relation to the proposed runway site and orientation. In particular, there is no information about the height of the cloud base on the approaches to, and above, the proposed aerodrome. This information is critical in deciding whether a visual runway would be viable for St Helena.

This paper discusses the technical issues and recommends how the required data can be obtained.

1. Meteorological Requirements

BACKGROUND

The only credible diversion for flight operations is Ascension Island (ASI) located 700 nautical miles to the NNW of St Helena. Civilian Flights into ASI are currently limited to two rotations per week under the 2003 note, between the UK and the USA, agreeing civilian flights into Wideawake Airfield, ASI. Whilst there is provision in the original 1956 agreement for Wideawake Airfield to be used in emergency, the US authorities would still have to accept the use of Wideawake Airfield as a planned diversion. It is, therefore, a requirement that any aerodrome on St Helena should have as high a usability factor as practicable. Further, high diversion rates, because of weather, will not encourage the growth of tourism.

As a consequence, an aerodrome on St Helena will be required to operate in nearly all weather conditions. The Evaluation report proposed a runway usability of greater than 98% to be achieved. For these reasons, the current estimates for the construction of the new aerodrome on St Helena are based on building an instrument runway[1].

RUNWAY STRIP REQUIREMENTS

In order to be licensed, an instrument runway needs to be surrounded by a runway strip measuring 150m either side of the runway centre line and extending 60m past each runway end. The 150m strip in turn comprises two levels of ground work: land 105m either side of the runway must be cleared and graded and the land from 105m to 150m either side of the runway must be cleared with no upstanding obstacles. For a visual runway, i.e. one where only visual approaches are made, the requirements are less stringent. These are for a cleared and graded area 75m either side of runway centre line, extending 60m past each runway end.

For a visual runway of 2200m length, the reduction in the area of land to be cleared and graded is considerably reduced with associated reductions in construction costs. We estimate these savings (in earthworks and reduction of navigational aids) to be ¦ ¦ ¦ ¦ . Further savings may be possible during detailed design as the narrower strip can be positioned better on the site to optimise construction cost.

[1] See the Evaluation and Supplementary reports for more explanation.

MINIMUM DESCENT HEIGHTS

An initial assessment by Atkins has concluded that, with correct runway alignment, a minimum descent height (MDH) of c.400ft could be used for non-precision instrument approaches from the North of the site and a MDH of c.380ft for approaches from the South. There is a procedure for descending through cloud and establishing visual contact with the aerodrome commonly known as a cloud-break procedure but more properly called "an instrument approach with circle to land" or "approach to visual manoeuvring". Whilst this is an instrument procedure, because it is an approach to the aerodrome, rather than the runway, such a procedure may be carried out for landing on visual runways. Attached, at Annex A, is a paper examining the use of such a procedure at St Helena. The paper concludes that MDHs of c.600ft could be obtained in this case.

Although the difference between the MDHs for non-precision instrument and visual approaches would appear small, this could make the difference between achieving 98% usability and falling considerably short of this target.

Although meteorological data about St Helena has been collected by the Meteorological Office for some years, the observation site is located remote to the proposed aerodrome site. Further, the information being gathered is not completely aligned with the requirements for determining whether or not a visual runway would provide adequate usability. It is necessary, therefore, to gather meteorological data relevant to the decision. At <u>least</u> one year's data should be obtained before a final decision is made is made on the runway approach.

METEOROLOGICAL DATA REQUIREMENTS

In order to achieve the aims outlined above, data should be gathered from the spot height 71/21 (318), looking North to The Haystack. This spot equates closely to the location of the northern threshold of the proposed runway. It is important (because of the costs involved with, say, building a visual runway and then having to enlarge this to cater for instrument flying [¦ ¦ ¦ ¦] and the potential savings [¦ ¦ ¦ ¦]) to gather the most accurate information in relation to the Minimum Descent Heights and to runway visibility. Readings taken from spot height 71/21 will enable such, accurate, information to be gathered. Analysis of old meteorological taken at other locations on the Island will not yield the necessary accuracy and confidence. Detailed information needs to be gathered on the following: :

1. Cloud base;

2. Wind speed & direction;
3. Pressure;
4. Temperature; and
5. Visibility to the North.

2. Costs and Recommendations

METHODOLOGY

This data can be collected in two ways:

1. Purchase and installation of an automated weather station; or
2. Manually, by trained meteorological observers with appropriate instrumentation.

As an example, a specification and cost estimate from Vaisala[2] for an automatic meteorological station are given at Annex B. The cost of the package is estimated at ¦ ¦ ¦ ¦ excluding shipping. In addition, installation costs will add approximately ¦ ¦ ¦ ¦ to this bill. The total bill of this quotation then is around ¦ ¦ ¦ ¦ allowing for shipping and other costs. No allowance has been made above for power supply: this could be by spur connection from the Government Garage or by portable generator.

The Vaisala quotation includes an allowance for training local labour in basic maintenance and in operation. It is envisaged that the information will be downloaded and sent in e-form back to the UK for analysis (information gathered by observer would also have to be sent back to the UK for analysis. Operating and maintenance costs are estimated to be very small (say, four hours per week) in comparison with costs of observers.

It should be noted that an automatic meteorological station will be needed at the aerodrome later for use as part of the Air Traffic Control information suite. A station purchased now could be re-located to meet this requirement with associated reduction in aerodrome construction costs.

If trained meteorological observers are employed then, 24 hour 7 day observations will be required, covering the period from pre-dawn to post dusk (18 hours). They will also need dedicated transport and due allowance has been made for this in the equipment costs. To achieve this it is likely that SHG will need to hire, minimally, 2 observers and send them to the UK or perhaps South Africa for about a week's training. The recording and measuring equipment is likely to be considerably cheaper than the automatic station at around ¦ ¦ ¦ ¦ .

[2] Vaisala are a recognised, international, supplier of meteorological equipment and are recommended by the UK CAA

Table 2.1 sets out cost estimates of the two methods for an annual observation exercise. From this it can be seen that there is a marginal cost benefit in favour of training and equipping meteorological observers. There is a further benefit in that this solution would provide two new jobs on the island (these jobs would, given that the aerodrome is built, provide permanent employment). However, the longer term cost estimates indicate that the automatic station is likely to be the cheaper option. Further, the automatic station would provide more accurate and continuous data, and is more suitable for supporting the information requirements of Air Traffic Control in the longer term.

It should be noted that this paper is not robust in terms of lifetime cost analysis. The paper should be interpreted as indicative as no allowance has been made, inter alia, for inflation, long term maintenance, staff turn-over, fuel and electricity costs, equipment replacement etc.

Table 2. 1: Cost of Automated and Manual Methods

Item	Automated £	Manual £
Equipment	[illegible]	[illegible]
Installation	[illegible]	[illegible]
Power[1]	[illegible]	[illegible]
Observers[2]	[illegible]	[illegible]
Training[3]	[illegible]	[illegible]
Total	[illegible]	[illegible]

1 Calculated as

2 Annual salary of [illegible] per observer.

3 [illegible] travel, [illegible] salary, [illegible] course, accommodation & subsistence per observer

4 The equipment costs for the observers includes for one four wheel drive vehicle

5 It should be noted that this is one year's, initial costs; in the second year the automated system becomes the cheaper option.

RECOMMENDATION

An automatic meteorological station is the preferred solution in that it is more likely to provide the accuracy required to assist in the decision process, meets the future needs of the aerodrome given that it is built, and provides a cheaper long term solution.

As any information is better than none, until such time as robust data can be gathered, untrained observers should carry out carry out visual observations on site, three times per day as per the brief given to the access team leader, designate, in January this year.

Appendix A: Examination of the use of an Aerodrome Approach procedure with circle to land at St Helena

Whilst it would be possible to provide an aerodrome approach procedure with circle to land, visual manoeuvring over the sea down to a level below the elevation of the aerodrome, that would not be much use if the aircraft had to climb back up, possibly into cloud, to reach the level of the aerodrome. Such a procedure would be unlikely to be acceptable to the regulatory authorities. An Aerodrome Approach with circle to land is often referred to as a “cloud break procedure in aviation circles”. ICAO PANSOPS provides criteria for aerodrome approaches with circle to land. There should be no difficulty in getting such a procedure accepted by the ASSI, and the runway can therefore be a visual runway; in this case because the approach procedure is specific to the aerodrome rather than the runway, the runway strip needs only to be constructed to the dimensions needed for a visual runway. However, the criteria for such a procedure would have limitations in the St Helena situation due to the prescribed minimum heights for circling.

An "Aerodrome Approach with circle to land" would usually be referenced to the centre of the landing area. In the St Helena case a final approach is envisaged approaching the aerodrome from the East, roughly perpendicular to the proposed runway, aimed roughly at the midpoint of the runway. That would imply the siting of any navigational aids close to the midpoint of the runway. It is suggested that, in the case of St Helena the required navigation aids would be DVOR/DME with doubled up transmitters, and, possibly, a high powered NDB backup. A high powered NDB might be a good provision in any event. The Minimum Descent Height (MDH) for the procedure would be the MDH for circling (visual manoeuvring).

The visual manoeuvring obstacle clearance height (OCH), to which the MDH equates, is based on applying the minimum obstacle clearance (MOC) allowance appropriate to the aircraft category to the elevation above aerodrome level (AAL) of the highest obstacle within the visual manoeuvring area. The visual manoeuvring area is based on arcs centred on each runway threshold, with radii appropriate to the aircraft category, and the tangents to these arcs. The visual manoeuvring area for the proposed aerodrome on St Helena would include the high ground north of the aerodrome, which would result in the OCHs being non-viable.

It is allowable to sectorise the visual manoeuvring area using the Annex 14 approach surface appropriate to an instrument runway as the divider between sectors, the approach surface being common to each sector. At St Helena the area could be sectorised to areas east and west of the runway, using the approach surface as divider as mentioned above. **It is therefore important to ensure that the runway orientation is arranged so that the associated Annex 14 approach surface lies clear of the high ground to the north.** An Aerodrome Approach to visually manoeuvre as suggested above would therefore approach from the east, and become a visual manoeuvre at the MDH in the eastern sector (to land on either end of the runway). A Missed Approach Point would be located some distance (say 1 to 2nm) before the coast, and a missed approach procedure, probably turning south, would be required.

It would be important to ensure that the eastern visual manoeuvring sector remains as obstacle free as possible, since any obstacle significantly above aerodrome level (see paragraph below) would drive up the MDH by the height of the obstacle AAL. The drawback to all this is the Minimum Obstacle Clearance (MOC) values involved in visual manoeuvring. These are 295 ft for Categories A and B, and 394 ft for Category C aircraft. In addition there are prescribed minimum heights for visual manoeuvring, in round terms as follows: Cat A 400ft, Cat B 500ft and Cat C 600ft.

Accordingly, for Cat C aircraft, the procedure MDH would be at least 600 feet AAL. There would be scope for obstacles within the visual manoeuvring sector for obstacles up to 206 ft before the Cat C MDH/circling height would be driven above this minimum level. For Cat B aircraft, the corresponding figures would be MDH 500 ft AAL and up to 205ft.

Appendix B: Automatic Meteorological Station – Specification & Budget Estimate

This appendix has been redacted as it contains information that is commercial in confidence.

ATKINS

REFERENCE NUMBER: 5022355			DOCUMENT REF: *METEOROLOGICAL INFORMATION TO SUPPORT RUNWAY DESIGN DECISION*			
2	Final	jj	bip	adm	bip	24/2/04
1	Draft Final	jj	bip	jj	bip	19/2/04
0	Draft	jj	bip	jj	bip	17/2/04
		Originated	Checked	Reviewed	Authorised	Date
Revision	Purpose Description	WS ATKINS Management Consultants.				

APPENDIX I: USE OF WIDEAWAKE AIRFIELD

This appendix has been redacted as it contains information that is commercially sensitive.

APPENDIX J: FUEL STORAGE REQUIREMENTS

CONTENTS

EXECUTIVE SUMMARY

1. This paper establishes the need for a Bulk Fuel Facility exclusively for the reception, storage, management and supply of aviation fuel to an aerodrome on Prosperous Bay Plain. It recommends it be located at Rupert's Bay where the current fuel facilities are located and provisioning activities are carried on.

2. The paper presents estimates of the storage facilities required at Rupert's Bay and at the aerodrome, based on the number of flights of the different types of aircraft pertaining to the different runway designs considered by the Feasibility Study.

3. It also presents estimates of the capital and operating costs associated with providing and managing facilities of these types and speculates that at some future point in time the facilities will need to be upgraded and makes a corresponding capital allowance.

4. In the course of this work we contacted the MoD to enquire about use of their facilities on Ascension Island for the purpose of re-fuelling civil aircraft returning to St Helena. While we have been given to understand that this should not be a problem it will be for the appropriate contractor to establish that it could be converted to a contractual basis.

1 INTRODUCTION

CONTEXT

1.1 Whatever air service is selected to serve the needs of St Helena in the future, the aircraft will need to be re-fuelled at St Helena. Provision has to be made therefore, both in the capital spend and the operational costs, to cater for this requirement.

AIM OF THIS PAPER

1.2 This paper describes the proposed solutions for supplying aviation fuel on St Helena. Its purpose is to inform the Feasibility Study about arrangements (facilities required, work to be done) and costs.

SCOPE

1.3 The paper is limited to the storage of aviation fuel; in practice, should the proposals herein be adopted then other considerations will perforce need to be drawn in, being the provision of the island's other two types of fuel: diesel and petrol. It is apparent that all three types can be supplied by the same ship and that there could be common facilities ashore. It is also apparent that other works will need to be carried out, addressing current concerns with safety, possibly supply of the aerodrome's construction needs, and future uses of the particular shoreline and the immediate hinterland. These are all for future detailed planning.

ASSUMPTIONS FOR BULK FUEL STORAGE

1.4 Currently bulk diesel and petrol is supplied to Solomon's. Solomon's then stores these fuels and re-sells them to Islanders as the need arises. ¦ ¦ ¦ ¦ .

1.5 Our research indicates that the current (flexible) pipeline used by Solomon's or the supplying ship for transferring fuel to shore can by blown through by air and used safely for transferring aviation fuel. Assuming this and a continuation of the simple three-point mooring system for receiving the supplying ship, we envisage the creation of an Aviation Bulk Fuel storage facility at Rupert's Bay, ¦ ¦ ¦ ¦ .

1.6 If a decision to build an aerodrome is taken, ¦ ¦ ¦ ¦ , the necessary agreements put in place and a fuel sale price mechanism agreed.

1.7 We have not sought to calculate the selling price of aviation fuel to the airline. It should be noted that, when this study began, the world market crude price was around $37/barrel, it is now around $50/barrel, a price rise of 26%; reaching agreement on an equitable fuel sale price mechanism, one which will not unduly effect ticket pricing and hence tourist traffic, is therefore highly important. In this study, a pessimistic price for fuel provision to aircraft has been assumed and used as the basis for deriving ticket price estimates.

1.8 The management, maintenance and operation of the aviation Bulk Fuel Storage Facility will require trained staff. ¦ ¦ ¦ ¦ .

2 FACILITIES REQUIRED

DESIGN AIRCRAFT AND FUEL CONSUMPTION

2.1 We have examined two options for the provision of an air service:

- A medium length runway based on business jet operations
- A longer runway based on B737NG or equivalent aircraft.

2.2 In addition, we were alerted to a potential requirement for a fisheries protection capability to serve both St Helena and Ascension Island[1]. For prudence we have taken this requirement into our estimates.

2.3 It has been assumed that all aircraft outbound from St Helena will require re-fuelling and that most aircraft will land on St Helena carrying two hours 'island holding fuel'. All the aircraft have been assumed to use Jet A1 (jet engine fuel) with fuel consumptions for each aircraft as follows:

- B737NG - 5,800 lbs/hr
- Business Jet - 2175 lbs/hr
- Fisheries Aircraft - 735 lbs/hr.

2.4 The total amount of fuel required will depend on the frequency of flights of the various aircraft and the fuel re-supply requirement will grow as traffic increases, regardless of whether the Business Jet or the B737NG is the selected option. For the purpose of the cost estimates, total fuel consumptions compatible with meeting the requirements of the forecast mid-term market were chosen for use as the base parameter. The fisheries protection aircraft were assumed to fly 800 hours on station per year[2] with two sorties to Ascension Island per week[3].

BULK FUEL STORAGE REQUIREMENT

2.5 The re-supply policy has been assumed to be on a three monthly schedule. This is in line with policy for re-bulking the fuel tanks on Ascension Island. ¦ ¦ ¦ ; the aircraft will need to be re-fuelled there before returning to St Helena. This will need to be determined for certain by the contractor at the detailed planning stage.

2.6 It is prudent to keep a reserve fuel supply to manage the effects of late sailing, delays in off-loading at Rupert's Bay and consequent effect of late fuel delivery. The basis for sizing the bulk fuel storage requirements are shown in Tables 2.1 and 2.2.

Table 2.1 – Basis of estimate for storage – Long Runway

[1] Meeting FCO, DFID, 22nd July 2004
[2] Estimate based on actual yearly hours flown by the Falkland Islands fisheries protection aircraft
[3] These flights, as Government flights, should be exempt from the Ascension Island agreements: this will need to be ratified by the FCO

Item	Civil aircraft use	Fisheries protection
Aircraft	B737 or equivalent	Twin turbo-prop
Route assumptions	Week 1: CPT-STH-CPT Week 2: CPT-STH-ASI-STH-CPT (re-fuel at ASI)	On STH station: 800 hrs/year Transit ASI: 2 per week: 208 hrs
3 months storage	Per B737: 50,642 gals	1 aircraft: 27,582 gals
1 month reserve	Per B737: 16,881 gals	1 aircraft: 9,194 gals
Total, incl allowance for future growth	6 aircraft/week: 6 x (50,642 + 16,881) = 405,134 gals	1 aircraft: 36,776 gals
Total storage	441, 910: say 440,000 gals	
At bulk store	400,000 gals	
At aerodrome	40,000 gals	

Table 2.2 – Basis of estimate for storage – Medium Runway

Item	Civil aircraft use	Fisheries protection
Aircraft	19-seater business jet	Twin turbo-prop
Route assumptions	CPT-STH-ASI-STH-CPT (re-fuel at ASI)	On STH station: 800 hrs/year Transit ASI: 2 per week: 208 hrs
3 months storage	Per aircraft: 23,238 gals	1 aircraft: 27,582 gals
1 month reserve	Per aircraft: 7,746 gals	1 aircraft: 9,194 gals
Total, incl allowance for future growth	10 aircraft/week: 10 x (23,238 + 7,746) = 309,833 gals	1 aircraft: 36,776 gals
Total storage	346,609: say 360,000 gals	
At bulk store	330,000 gals	
At aerodrome	33,000 gals	

2.7 The total storage requirements were therefore, assessed as:

- B737NG: 440,000 gallons
- Business Jet: 360,000 gallons.

2.8 This fuel is planned to be stored, in the main, at Rupert's Bay and, in the lesser part, on the aerodrome ready for use, as indicated in Tables 2.1 and 2.2 above.

FUEL TRANSFER FROM RUPERT'S BAY

2.9 Because of the relatively small amounts of fuel transfer required, particularly in the first 5 - 10 years of operation, the optimum solution is to use the aircraft re-fuelling bowsers to transfer fuel from Rupert's Bay Bulk Storage to the aerodrome holding storage. The average re-fuel for a B737NG bound for Cape Town will be about 2700 gallons and to Ascension Island, 1750 gallons. With up to six B737NG aircraft per week, this is easily manageable. If a 2100 gallon fuel bowser is used to transfer the fuel from Rupert's Bay to the aerodrome, it could accomplish the mid-term fuel transfer requirement in say, 12 journeys per week. However, after that time the increasing trans-island tanker traffic may become an unacceptable burden on local roads.

POST MID-TERM STRATEGY

2.10 Post mid-term, the Bulk Fuel Storage capacity is likely to be insufficient if the traffic forecasts continue to be met. The fuel storage facilities will need upgrading both on and off the aerodrome. A capital allowance of ¦ ¦ ¦ has therefore been made in year 20 to allow for this upgrade and for the provision of a fuel transfer pipeline. If a viable, independent, air cargo service develops during the early years of aerodrome operation, then these upgrades and improvements may be required earlier and/or the capital allowance need to be increased.

3 CONCLUSION AND RECOMMENDATION

CONCLUSION

3.1 It is concluded that it is feasible to provide a re-fuelling service to an aerodrome at Prosperous Bay Plain by building a Bulk Fuel Facility at Rupert's Bay location, provided that:

- A service route, based on the existing roads and the planned aerodrome access road, is established from Rupert's Bay to the aerodrome that would support transport of the fuel by road tanker (which might later be replaced by a pipeline).
- Effective surveys are carried out at the Rupert's Bay location to establish the optimal location of the new tanks with respect to the pumping head requirements and the requirements of the existing diesel and petrol tank and pumping facilities.
- ¦ ¦ ¦ ¦ .
- A pricing mechanism is put in place that ensures aviation fuel is supplied at prices compatible with world benchmarks with a view to maintaining predictable ticket prices: this item is sensitive as it has a direct bearing on the demand for flights to St Helena.

RECOMMENDATIONS

3.2 In the event that a decision is made to build an aerodrome, SHG should confirm that aviation fuel may be supplied in tandem with the supply of diesel and petrol, i.e. that the present simple three-point mooring system in use at Rupert's Bay may be continued and exploited for the supply of aviation fuel.

3.3 A survey of the tank farm at Rupert's Bay and of the availability of land for erecting tanks sized by this paper should be carried out, along with a condition assessment of the current facilities to determine whether consideration should be given to adopting a new integrated approach to the reception, storage, management and supply of the three fuel types. That is, a mini business case needs to be drawn up to determine the most cost-effective solution to the overall fuel management question.

3.4 A policy for pricing aviation fuel compatible with effects on airfares should be drawn up.

APPENDIX K: TICKET PRICE ESTIMATES

CALCULATION OF TICKET PRICES

GENERAL

1. The cost of an airline ticket is derived from the fixed costs incurred by the air service operator and the operating or hourly costs of the aircraft including fuel consumption. To this must be added the costs of operating a particular route. These include such items as navigation fees, station fees, landing fees, crew transport, accommodation and allowances and passenger catering requirements. Any taxes, such as a departure tax or airport use levy can be added into the ticket cost but are normally charged to the passenger directly.

2. In the larger, international, market ticket pricing is highly competitive because to sell tickets cheaper than rival airlines on the same route will generally enable an airline to increase market share. In the case of St Helena, the number of passengers to be carried, even at the +40 year forecasts, is small when compared to the developed markets in Europe and the USA. It will be necessary to restrain ticket prices in the early years to ensure that these are sufficiently low to attract tourists and businesses to the Island. Mechanisms will therefore need to be developed to limit any air service operator's ticket price in the formative years: these will form the basis of any contract for the provision of air access.

AIM

3. The aim of this paper is to explain the logic behind the derivation of the estimated ticket prices used in the economic model and to provide an understanding of the requirements that will need to be agreed in the air service provision contract.

AIRCRAFT OPERATING COSTS

4. Aircraft operating costs are divided, broadly, into two types which are:

- fixed costs
- direct hourly costs.

5. Fixed costs equate to the overheads of a business and comprise such items as, inter alia, the following:

- flight crew costs including training
- cabin crew costs including training
- uniforms
- permanent facilities such as offices, hangars
- aircraft spares holdings
- insurance, hull, admitted and legal liability
- finance costs
- business costs, audit etc.

6. The direct hourly costs relate to the operation of the aircraft and make allowance for fuel consumption, maintenance, engines and other life'd item replacements.

BASIC TICKET PRICE CALCULATION

7. The fixed costs and the hourly costs are added together to calculate an aircraft operating cost per hour. This is then divided by the number of seats available[1] to provide an operating cost per seat mile. However, in order to derive this, it is necessary to know the number of hours flown in any one year. If the number of hours flown per aircraft is low, say 2000 hours per year, then the operating seat cost per mile will be high and the ticket price will also be high. If, on the other hand, the number of hours flown per aircraft is high, say 4000 hours, ticket prices can be much lower.

FINANCE COSTS AND UTILISATION

8. Aircraft are expensive to purchase, a B737-700 will be about ¦ ¦ ¦ depending on the purchasing weight of the buyer. Because of these high costs many operators lease aircraft to avoid large initial expenditure. Lease costs are typically a ¦ ¦ ¦ . This finance cost could well be ¦ ¦ ¦ . It is important therefore, for the air service provider to ensure as high an aircraft utilisation as possible.

9. In terms of St Helena, with a return flight to Cape Town consuming, say, 9 hours, to achieve economic aircraft utilisation an air service provider would need to fly 9 trips per week. With a Boeing B737-700 at 70% load factor this equates to the visitor forecast requirements for year +20 and at a 100% load factor meets these requirements for year +40. However, to attempt to operate one aircraft on this basis during the first 20 years would result in very high ticket prices or the necessity for substantial subsidies during the first 10 years of operation.

SCALE EFFECT

10. Two factors need to be considered when considering the affects of scale. The first is the size of the air service provider. If this is a reasonably large and efficient airline, then the direct operating costs will be lower as a proportion of operating cost per seat mile. Extreme examples of this are the low fare airlines such as EasyJet and Ryanair whose businesses are dependant on reducing overhead as much as possible whilst at the same time achieving very high aircraft utilisation rates.

11. The second factor is the size of the aircraft. Direct hourly operating costs are not a direct function of aircraft size. True, these aircraft cost more, fuel consumption is greater and maintenance is more expensive but these extra costs are not in proportion to the number of seats provided. It follows that, for these larger aircraft, the derived operating seat costs per mile are lower than the equivalent costs for smaller aircraft. For the B737 variants, the seat cost per mile for the -800 will be some 10-15% lower than the -700. This can have a noticeable effect on ticket prices and airline profit.

[1] This assumes one class only

12. For St Helena therefore, the optimum strategy for achieving low ticket prices is to have as long a runway as possible and to link the provision of the air service to a large and efficient airline.

LOAD FACTOR

13. The load factor is merely the percentage ratio of seats sold on flights compared to the number of seats available. The cost of the flight is paid for by the passengers and the more passengers, the cheaper the ticket prices: the less, the more expensive. Thus, say for a B737-800 operating a return flight to Cape Town, load factors of 50%, 70% and 90% ¦ ¦ ¦ . Achieved high load factors are therefore important in enabling tickets to be sold at low cost.

BUSINESS JET

14. The business jet used during the calculation was the Dassault Falcon 900. This is a very reliable aircraft but despite this, because business jets are not built to the same ruggedness of commercial aircraft such as the B737NG, it is not possible to achieve as high an utilisation. A maximum of 1500 flying hours per year is just possible. The business jet carries a maximum of 19 passengers and therefore needs to fly more rotations to carry the required number of passengers. Flight deck crew are allowed to fly a maximum of 900 hours per year under UK regulation[2] and therefore more pilots are needed to achieve the required passenger transfers.

15. The business jet solution needs more aircraft and more flight deck crew to meet the requirement than the single B737 option. These factors combine to give very high fixed costs and these more than outweigh the benefits of lower operating costs of each aircraft. Further, the business jet solution has to be assumed to be a stand alone service and therefore, needs a larger managing, marketing and maintenance team again increasing the fixed costs.

16. For the model, ticket prices were based on the +10 year forecasts. The envisaged air service comprised two business jet flown by 7 pilots with associated support. The operating cost per seat mile was calculated at ¦ ¦ ¦ giving a basic ticket cost for Cape Town return of ¦ ¦ ¦ . However when route costs, finance costs, profit and other business costs were factored in the derived ticket price rose to ¦ ¦ ¦ .

B737

17. Ticket costs for the B737 variants were calculated on two bases: firstly for a charter aircraft solution and secondly on the assumption that the aircraft would be supplied by an existing airline under contract. Boeing standard configurations were used for business and economy seating. These were: B737-700, 8B and 118E; B737-800 12B and 150E. Load factors of 70% have been used except where otherwise specified. All ticket prices are economy unless otherwise stated.

[2] This total varies slightly between nation states

B737 CHARTER SOLUTION

18. Charter estimates per flying hour were obtained from the market place. However, these estimates vary considerably in relation to the number of hours chartered per year: the greater the hours, the lower the charter cost per hour. A figure of ¦ ¦ ¦ per operating hour[3] was assumed as a medium range cost based on the use of one 124 seat aircraft rotation per week to Cape Town. This gave a derived return ticket price of ¦ ¦ ¦ . This included all route costs except landing fees. The charter option was also assumed to require a small marketing and business support team. When these factors were included, the return ticket price rose to ¦ ¦ ¦ .

19. If a charter to passenger demand scenario is adopted i.e. a frequency less than once a week in the early years but rising each year in line with achieved passenger traffic, it would be safe to assume very high load factors, say 90%. However the increase in load factors may, to a degree, be offset by the increase in hourly charter rate because of the decreased utilisation of the aircraft. A charter rate of ¦ ¦ ¦ has been assumed for this scenario. This gave a derived ticket price (including all costs) for the return Cape Town trip of ¦ ¦ ¦ .

B737 AIRLINE CONTRACT

20. The assumption was that a link with an existing airline enabled to air service to be provided taking advantage of the airlines economies of scale and would take advantage of the existing airline marketing and management support. The derived return ticket price came to ¦ ¦ ¦ .

AFFECT OF CARGO AND LOAD FACTOR

21. All the above calculations were based on load factors of 70%. If tickets were priced on a more competitive load factor 85% the airline option price would reduce to ¦ ¦ ¦ return. Further reductions in ticket prices can be obtained by utilising spare payload capacity to carry air freight. At 70% load factor a B737-800 operating, on an average day, into St Helena onto the long runway would have a spare payload capacity of some 4,000kg. A reasonable assumption, based on current market rates for air cargo costs would be ¦ ¦ ¦ per kg. Thus the extra income possible per in-bound flight[4] from cargo could be as high as ¦ ¦ ¦ , the income equivalent of 19 passengers. This would give an effective load factor of 88% and could reduce ticket prices by some ¦ ¦ ¦ on a return flight.

AIRLINE TICKET PRICING

22. Airlines operate a slightly different ticket price structure than those outlined above. There will be separate prices for one-way, last minute booking and discounts for advance booking (APEX). Further they will calculate at different load factors for different classes of travel i.e. first, business, world traveller, and basic economy. An example of this structure, quoting business, economy and APEX fares based on a similar length route was obtained from a European airline. The aircraft is a B737 with 60 reduced pitch business class seats and 102 economy class seats. The prices were derived assuming a 50% load factor for

[3] Based on airline and charter company information
[4] it has been assumed that the out-bound air cargo requirement will be very low in the early years of air service operation

business and 88% load factor for economy. These gave return fares of ¦ ¦ ¦ for business, ¦ ¦ ¦ for short booking economy and ¦ ¦ ¦ for advance (APEX) economy. It must be stressed that the aircraft configuration reflects the needs of the European market and this may not be suitable for ST Helena or reflect the configuration of the aircraft used by the air service provider. However, the prices are in line with the derived ticket prices given in the paragraphs above.

OPERATIONS FROM A 1400M LANDING /1675M TAKE-OFF RUNWAY

23. The short landing length runway would not unduly affect the B377-600 and ticket prices would remain roughly the same. However it should be noted that only 54 of these aircraft have been built and it is unlikely that one would be available to service the St Helena route. The -700 and the Airbus A319 would be payload limited inbound to St Helena. However, the aircraft should be able to carry full passenger loads and the payload penalty will only limit the amount of air cargo that could be carried. The -700 would be payload limited by 4,000kg which represents a potential ¦ ¦ ¦ income loss per flight. If potential air cargo income is considered in the ticket price calculation, then loss of this income could increase ticket prices by up to ¦ ¦ ¦ . For modelling purpose however, as potential cargo income has not been included, the -700 ticket prices should remain unchanged.

24. The -800 and the Airbus A320 would be limited but to differing amounts inbound and outbound. Based on the most limiting leg, the effect on the -800 would be to reduce the maximum possible load factor to 49%. This would mean that the best possible ticket price would be some ¦ ¦ ¦ return and more likely to be ¦ ¦ ¦ . Further, as above for the -700, only minimal advantage could be taken of the ability to carry air cargo.

AIR SERVICE CONTRACT PROVISIONS

25. There will need to be a formulaic approach to setting the acceptable air fare prices. This will need to relate to fuel, operating, costs, inflation, etc. Due recognition will need to be taken of the air service supplier's requirement to make a reasonable profit and grow the market. The air service supplier will need incentives to achieve this. Load factors should be set at a level so that the derived ticket price is consistent with the main aim of growing tourism and attracting other business to St Helena.

26. A 5-year contract period, with sole operating rights on the Cape Town route would be attractive to most airlines provided they had enough capacity or were given enough time to gear up to provide the extra capacity. Ticket prices based on a ¦ ¦ ¦ load factor and enabling the air service provider to make reasonable profit would appear to be a good basis for the initial years of operation. In the first years of the contract period forecast traffic will be lower than this but in the later part, if the traffic forecasts hold true, they will exceed this load factor.

27. ¦ ¦ ¦

APPENDIX L: AIR CARGO SUPPLY ARRANGEMENTS

CONTENTS

EXECUTIVE SUMMARY

1. This short Paper considers the opportunities for carrying goods by air represented by the medium-length and long runway Access Options for St Helena.

2. The Paper briefly reflects air cargo-carrying practices elsewhere so as to present the types of opportunity in simple cost-benefit terms.

3. Carriage of goods by air to and from St Helena would represent a ‘micro-market’ whose elasticities of supply and demand would be established only by presenting the opportunity and by providing access to it for all concerned. That is, we do not feel able to offer predictions about the behaviour of the market toward such an opportunity, other than to say that air cargo is a type of transport that has grown rapidly over the last twenty years.

1 INTRODUCTION

CONTEXT

1.1 This Paper forms an element of the overall question of providing air access to St Helena.

1.2 The carriage of air cargo is an integral part of the airline business. Air cargo is transported in two ways:

- by dedicated air cargo aircraft
- carriage in the holds of passenger aircraft, the 'belly hold'.

1.3 The use of dedicated air cargo aircraft is expensive if return loads cannot be made available. If the aircraft returns to its originating aerodrome empty, the cost of transportation outbound is doubled. For dedicated air cargo aircraft, the cargo requirement must be a two-way market to ensure reasonable costs per kilogram carried.

1.4 For belly hold cargo this is not the case. Advantage is taken of the extra payload capability of the aircraft to increase income per flight but the take-up of this extra payload capability, generally, does not affect the route economics, which will have been calculated on an assumption of percentage seats filled per flight.

AIM OF THIS PAPER

1.5 The aim of this brief Paper is to outline the opportunities for providing air cargo to St Helena and to show how opportunities can be met, or not.

SCOPE

1.6 Discussion is limited to the opportunities for air cargo represented by the medium-length runway and the long runway, and hence by the types of aircraft that can operate from them.

1.7 Although air cargo is a potential source of income to both the air service provider and SHG, possibly through the airport, the difficulties involved in forecasting a currently non-existent market and the way it will develop make any attempt to do this a mere guess. Any such income has not therefore been included in the modelling of the economic growth pursuant to providing Air Access.

2 TYPE OF CARGO

2.1 Air cargo can be anything that will fit into the aircraft. Generally, a decision to use air rather than sea or land, will be made on the basis of:

- speed of delivery
- security of transport
- care in handling
- cost.

2.2 The range of goods varies considerably from fresh produce, chilled or frozen foods through mail, newspapers, medical supplies and small packages to urgently needed equipment and spares. Islands with a strong tourist trade and developed supporting facilities tend to rely on air cargo for supplies. One example is the Seychelles, which relies almost totally on air cargo. On the other hand Grand Turk with a moderate tourist trade, relies on a weekly dedicated air cargo aircraft for fresh produce and urgently needed equipment. Easter Island uses air cargo extensively, apparently using sea cargo relatively infrequently (though it has a longer runway). Another example, underlining the versatility of air cargo, is the Thai restaurant in Vilnius, Lithuania, which imports fresh Thai meals, cooked in Bangkok, on a daily basis. The market is therefore, extremely varied and can, to an extent, depend on the entrepreneurial nature of its customers.

2.3 Niche markets, such as the Thai food supply quoted above, are a growth area in the air cargo business. It may well be that developing businesses on St Helena will be able take advantage of belly hold air cargo to supply a wide range of goods and food to visitors and tourists, hopefully also in future, to export goods.

CARGO TRAFFIC

2.4 Robust forecasts for the developing air cargo market on St Helena are not possible at present. As tourism and other sectors grow, so the need for air cargo will increase in response to real-time pressures. However to try to quantify this growth and the type of freight would be to rely on a series of inspired guesses which could be highly misleading. Based on other islands, the market is likely to be similar to that mentioned above but the balances between fresh produce, mail and equipment could be quite different. Based on others' experience, it may be expected that will be a need for air cargo to meet the requirements of a growing tourist industry and associated facilities. It may also be that some form of export market will develop on St Helena (e.g. agricultural products, coffee, fish) and a dedicated and regular air cargo service prove viable at some time in the future. The economic development process itself, in the provision of tourist facilities and extra amenities, may generate the need for the occasional air cargo charter.

2.5 Mail and package carriers such as DHL and TNT, commonly use belly hold cargo for transport rather than their own, dedicated aircraft, This is particularly appropriate for small markets such St Helena.

EFFECT OF RUNWAY LENGTH

2.6 The viability and benefits of utilising belly hold air cargo capacity depend heavily on the length of runway and the type of aircraft providing the air links.

2.7 For the medium length runway, operating with business jet aircraft, air cargo would almost certainly be limited to mail, small packages and urgent medical supplies: dedicated cargo aircraft such as the L100 Hercules would not be able to provide a service at all.

2.8 The best results will be possible using the larger aircraft and the longer runway as proposed in the long runway option. The dedicated air cargo aircraft such as the L100 Hercules can carry considerable loads up to say 20,000kg and would have the advantage of being able to transport larger, bulky freight. Any decrease in this runway length will have an associated decrease in the potential for operating a viable and profitable air cargo service, be it belly hold or dedicated air cargo charter. It will also decrease the ability of SHG to reduce subsidy costs in the early years and make offset gains in the latter years of the air service operation.

SIZE OF LOADS AND COSTS

2.9 For the range of aircraft assessed for possible use on St Helena, it is likely that belly hold freight capacity will range between 500kg and 5,000kg per flight, with the larger aircraft, i.e. B737-800 and A320, providing the greater capacity. Typical freight charges, under these circumstances, would start at around ¦ ¦ ¦ . The extra income generated per flight would be of the order of ¦ ¦ ¦ one-way. This equates to the ticket income generated by between three and 30 passengers on a return trip.

2.10 The 19-seater business jets will have very limited cargo capability. Because of this and the higher prices for tickets on the business jets, benefits that would be comparable to those possible from the long runway cannot be achieved. The BBJ is a ‘half-way house’. The hold space of the aircraft has been given over to the extra fuel tanks needed to support the longer range requirement. Cargo can be carried on the main deck but is space-limited.

EFFECT ON AIR SERVICE VIABILITY

2.11 The extra income generated by air cargo can be used to increase the air service provider’s operational profit or channelled back into the route cost calculations to reduce the ticket sale price. ¦ ¦ ¦ . Alternatively, it could be used to lower ticket prices as an incentive to building the tourist market faster.

Income to Aerodrome/SHG

2.12 In the longer term, part of the income from the carriage of air cargo, provided the right cargo agreements were in place with the air service provider, could be brought back to SHG and used to offset the aerodrome operational costs.

3 CONCLUSIONS

3.1 Other islands make extensive use of air cargo but there is no means of predicting its take-up in the event of an aerodrome being built on St Helena.

3.2 The cost of air cargo in comparison to that of carriage by sea is high, the multiplier being in the range of 25 to 35+, air to sea. Air cargo offers considerable advantages over sea cargo: speed; facilitates short-term decision-making when operating in a market; due to the variety of products that may be carried, opens up trading, e.g. in perishable goods. Thus operators in the economy of St Helena would have the opportunity to join in cost-benefit decisions that previously were denied them.

3.3 The medium length runway would severely limit the carriage of air cargo.

3.4 The long runway would offer greater choice of cargo sizes and costs, including operations by dedicated cargo-carrying aircraft.

3.5 SHG would have the opportunity to earn revenue from air cargo or to offset the extra income generated against lower ticket prices.

APPENDIX M : TECHNICAL FEASIBILITY – AIR ACCESS

CONTENTS

EXECUTIVE SUMMARY

1. This Paper outlines the relationship between regulatory requirements, aircraft type performance characteristics and runway design, and moves on to translate the net effect of these considerations to the physical impact on St Helena of constructing runways of two lengths: medium length (1999m) and maximum length (2250m). It is principally a technical paper, the costs arising from the outline design of runway being considered under the separate heading of Financial, Economic and Risk modelling.

2. The difference in construction impact between the two is, in the scheme of things, relatively small, being principally (though not only) the extent of in-fill required in Dry Gut – ¦ ¦ ¦ .

3. The paper also discusses the possibilities and some of the advantages and disadvantages of two alternative routes giving access from the sea to the construction site on Prosperous Bay Plain, being from Prosperous Bay on the windward side of St Helena, and Ruperts Bay on the leeward side. In this regard the paper cites costs; the decision on route being left open until the detailed design stage of the project, should it go ahead, are reached.

1 BACKGROUND

1.1 Our Options Paper[1] considered seven main options for the provision of an air service to an associated aerodrome on St Helena. Of these two options, a medium length runway to support business jet operations and a maximum length runway to support B737NG or equivalent aircraft operations were short-listed for further study.

AIM

1.2 The aim of this paper is to summarise the design philosophy of the runways and the selected construction methodology.

1.3 It is intended to give the reader an understanding of what is involved in designing and constructing a runway on St Helena.

SCOPE

1.4 The paper examines two options for the construction of a runway and two options for construction of a 'haul' road, i.e. an access route provided for the purpose of construction, along which equipment and materials may be hauled. It includes provision of airport buildings and services.

1.5 The paper draws on the results obtained from the Geotechnical[2] and Topographical[3] surveys of Prosperous Bay Plain undertaken from May to July 2004.

Status of this Paper

1.6 This paper is an element of the Final Report on the feasibility of providing access to St Helena as required by the TOR of 19th April 2004. Assumptions and technical specifications underlying this paper appear elsewhere[4] in the project's summary of assumptions, itself a working document.

[1] 5189 Options Paper, issued 16th June and 29th July (V1.0)
[2] 5301 Factual report on preliminary ground investigation for aerodrome on Prosperous Bay Plain, 10th Sept 04
[3] 5304 Topographical report, issued 18th Sept 2004
[4] 5320 Assumptions for Air & Sea Access, issue 27th Sept 2004

2 REGULATORY REQUIREMENTS

INSTRUMENT APPROACH

2.1 There is a regulatory requirement when supporting Extended Twin Engine Operations (ETOPS) for the aerodrome to have an instrument approach. The lowest level of aerodrome instrument approach is a descent through cloud and visual manoeuvre to land. Such an approach however, would only give a descent through cloud to a minimum height of some 600ft above aerodrome level and this might not result in an acceptable runway utilisation.

2.2 The next level of instrument approach is an approach to the runway using ground-based navigation aids such as a NDB[5] and a DVOR/DME[6]. This would give lower minimum descent heights but because of the high ground to the west of a northern approach, would require an offset approach. This is known as a non-precision instrument approach. The lowest achievable minimum descent heights require the coupling of an LLZ[7] with a DVOR/DME. The regulator, in this case ASSI[8], classes this as a precision instrument approach for aerodrome safeguarding purposes.

INSTRUMENT APPROACH INVESTIGATION

2.3 The northern approaches to Prosperous Pay Plain are flanked on the western side by high ground starting with the Barn. This makes the construction of an instrument approach difficult to achieve. The correct alignment and location of the runway are critical in achieving an instrument approach that will give the required minimum descent height. This in turn limits the scope for selecting the optimum engineering solution for construction. However without an instrument approach the provision of a viable air service is not possible. All three of these approaches have been assessed.

2.4 Initial designs for the approaches were undertaken with the following results:

- Descent through cloud with visual manoeuvre to land – minimum descent height 600ft;
- DVOR/DME/NDB – an adequate minimum descent height could not be achieved because of the offset requirements; and
- DVOR/DME/LLZ – minimum descent height 490ft.

2.5 It should be noted that future advances in the use of Ground Positioning Satellites (GPS) linked to a GPS Landing system (GLS) may well allow the use of lower descent heights. However, the runway safeguarding requirements will not change.

[5] Non-Directional Beacon (NDB)
[6] Doppler VHF Omni-range/Distance Measuring Equipment (DVOR/DME)
[7] Instrument Landing System Localiser (LLZ)
[8] Air Safety Support International, Crawley, UK

METEOROLOGICAL INFORMATION

2.6 Although there is a good data base of meteorological information about St Helena generally, this information is not specific to a potential aerodrome on Prosperous Bay Plain. Currently, the weather conditions are being recorded[9]; however, three years information will be required before definitive judgements can be made. The design has therefore assumed the worst case and planned for the lowest achievable minimum descent height that can be achieved by using an offset LLZ coupled with a DVOR/DME.

RUNWAY CLASSIFICATION

2.7 Runways are classified by a number that relates to length and a letter that relates to width. Runways between 800m and 1199m long are designated Code 2 and runways between 1200m and 1799m long are designated Code 3. Originally it was hoped that the medium runway could be designed to remain within the limits of a Code 2 runway. However, during the detailed investigation it was found that the performance requirements of business jets being considered needed a landing distance that just exceeded the Code 2 limitation (discussed further under the heading Medium Runway below).

2.8 Both runway options are, in consequence, Code 3 runways.

RUNWAY SAFEGUARDING REQUIREMENTS

2.9 An instrument runway needs to be safeguarded by a runway strip, which in the case of the maximum runway is 300m wide and runway length plus 120m long. For the medium runway this strip is 210m wide and runway length plus 120m. At either end of the runway strip provision has to be made for Runway End Safety Area (RESA). In both cases the RESA must be twice the width of the runway and 240m long.

2.10 The approaches to an instrument runway are safeguarded by an Approach Surface (APPS) which starts 60m before the beginning of the declared landing runway distance. Similarly, the take-off is protected by a Take-Off Climb Surface (TOCS). Two distances are used to delineate the take-off capability of a runway: these are the Take Off Run Available (TORA) which is the length of physical runway and the Take-Off Distance Available (TODA) which is the distance allowed for the aircraft to reach a height of, in this case, 35ft above the level of the aerodrome. As there are no relevant obstructions at either end of the proposed runways, the maximum allowance for TODA can be achieved. This is TORA plus 50%TORA. The TOCS starts at the end of the TODA. This long TODA gives a significant advantage for aircraft during take-off and enables the best performance to be achieved for the length of runway.

[9] Initiated as a result of the Access Feasibility Study, Spring 2004, to a structure acceptable for meeting requirements

3 RUNWAY DESIGN PHILOSOPHY

3.1 For most runways, both ends of the runway are protected by the runway strip and the RESA. However, such a design lengthens the land take required for the runway. During landing the aircraft needs the protection of RESA at both ends of the runway to cater for landing short of or overshooting the end of the runway. For take-off this is not the case; RESA is only needed to cover the overrunning of the runway end. Considerable savings in construction cost can therefore be achieved by using the land required for RESA to increase take-off distance.

ONE-WAY RUNWAY

3.2 Further savings in construction are possible if the runway can be constructed for take-off from the north only (i.e. into the prevailing winds on Prosperous Bay Plain). These savings result from the fact that the fill requirements in Dry Gut are much less onerous if RESA only is constructed. RESA needs only to be only twice the runway width and can have both longitudinal and transverse down-slopes of up to 5%.

3.3 Although there is little detailed weather information for Prosperous Bay Plain, there is a considerable data bank of information on the island on wind direction and speed. St Helena is located in the South East Trade Winds and the wind is generally from the same quarter. However, there are a limited number of occasions when the wind is in the northern quarter. A detailed investigation was undertaken into the strength and direction of the winds, using the known statistics, to examine the possibility of constructing a runway with full take-off capability in one direction only but with landing capability in both directions[10].

3.4 The study concluded that there would be only minimal disturbance, on rare occasions, to flying operations and that the cost of mitigation of these disruptions was negligible when compared to the savings in construction costs.

3.5 The wind analysis also revealed that there was a greater than 30% probability of a runway crosswind greater than 13kts. As a result of this the design width of the runways was increased from 23m and 30m to 30m and 45m respectively.

MEDIUM RUNWAY

3.6 The original concept was to examine the possibility of constructing an extended Code 2 runway to cater for business jets providing an air service to Cape Town, other West coast African airports, and Ascension Island. The maximum length extension that would be allowed for a Code 2 runway is 10% of 1199m, giving a total take-off run of 1319m. The major advantage of a Code 2 runway solution for St Helena is that the RESA need only be 120m long. Thus the original concept required a land take of 1679m[11] allowing for the use of a long starter strip. This obviated the need to fill large areas of Dry Gut.

[10] 5289 Construction of a runway with full payload take-off capability in one direction only, 18th August 2004
[11] 1319m landing distance plus 2 x 60m strip end plus 2 x RESA at 120m = 1679m

3.7 However, during the detailed investigation it was found that the business jets considered needed a take-off run of between 1340m and 1400m. It was not possible to apply the Code 2 runway concession and therefore the medium runway had to be classified as a Code 3 runway and this necessitated RESA of 240m. A take-off of 1399m was selected as this length enabled use to be made of a concession on strip width reducing this from 300m to 210m. However the total land take is now 1999m[12] and this requires considerable fill into Dry Gut.

3.8 The medium length runway is shown in drawing 5022355/CI/010 (attached). The runway declared distances would be:

- TORA 1674m
- TODA 2511m
- ASDA[13] 1674m
- LDA[14] 1399m.

Design aircraft for Medium runway

3.9 The design aircraft chosen was the Dassault Falcon 900 business jet. Other business jets were considered and their performance envelopes examined but the Falcon had the advantages of greater annual utilisation, also, at a practical level, maintenance facilities are available in Cape Town. The emergency/disaster relief would in this scenario, have to rely in the main on the use of military Hercules aircraft operating to Military Operating Standards (MOS). An examination of the performance of the RAF C130J Hercules showed that reasonable payloads could be carried into and out of this runway. Civilian air cargo operations however, would not be practicable.

MAXIMUM RUNWAY

3.10 As a result of the requirement to operate an open skies policy, the landing and take-off requirements of a number of aircraft were examined. These were:

- Boeing B737-600, -700, -900
- Boeing B727;
- Airbus A319, A320
- Antonov 148.

3.11 Detailed performance calculations were obtained from Boeing and Antonov. Airbus performance details were supplied by Leapp consultants. Whilst it was determined that the smaller aircraft, e.g. B737-700 and A319 could operate with landing distances as low as 1400m, the larger aircraft such as the B737-800 and the A320 required some 1650m to land carrying commercially effective payloads. The Antonov 148, whilst it could land within 1100m, needed a take-off run of 1950m to carry 60 passengers to Cape Town.

3.12 Aircraft performance was analysed for dry and wet runways and for wet runways which had either a porous friction course (PFC) or had been grooved. As a result of this analysis,

[12] 1399m landing distance plus 2 x 60m strip end plus 2 x RESA at 240m = 1999m
[13] Accelerate Stop Distance Available (ASDA)
[14] Landing Distance Available (LDA)

it was determined that the optimum solution to meet the open skies requirement was a PFC or grooved runway with 1650m landing distance. The maximum length runway is shown in drawing 5022355/CI/012 (attached). The runway declared distances would be:

- TORA 1925m
- TODA 2887m
- ASDA[15] 1925m
- LDA[16] 1650m.

3.13 The performance of a civilian L100 Hercules was analysed and this showed that independent air cargo operations could be carried out successfully from this runway. Additionally, if the passenger aircraft were not carrying full passenger loads, then advantage could be taken of payload capacity to carry air cargo thus optimising route cost efficiency.

RUNWAY END TURNING

3.14 Because of the limited land available and in order to maximise the take-off run in both cases, simulations were undertaken for the design aircraft for turning and lining up on the runway prior to take off. These simulations proved that with slow taxiing speeds, both the Falcon and the B737-800 could turn and line up within 25m using the turning criteria recently published in an amendment to Annex 14 to the Chicago Convention. These designs are shown at drawings no. 5022355/C1/29 and /30.

[15] Accelerate Stop Distance Available (ASDA)
[16] Landing Distance Available (LDA)

4 SITE SURVEY INPUTS

TOPOGRAPHICAL SURVEY

4.1 The survey provides the basic data required to determine a suitable vertical and horizontal alignment for an airstrip to satisfy aviation authority requirements. It forms the basis for a proposed masterplan layout to suit site constraints and identifies means of land and sea access for both the permanent and temporary construction access requirements.

4.2 The horizontal alignment is governed by the need to avoid mountainous landmark constraints which include The Barn, The Haystack and the disused signal station to the north, and Great Stone Top peak to the south (shown in drawing 5022355/CI/017, attached).

4.3 The terminal location proposed was positioned to avoid conflict with the identified sites of ecological interest and the permanent access route to the terminal. It was positioned accordingly to tie into the existing roads that approach Prosperous Bay Plain via the existing site of the Government Garage, thus maximising the use of existing roads (shown in drawing 5022355/CI/09, attached).

4.4 Routes identified as being feasible for the purpose of delivery of construction materials and equipment were limited to the route from Prosperous Bay and the route from Rupert's Bay via Deadwood Plain. One other route considered via Turks Cap Valley was rejected on safety grounds (shown in drawing 5022355/CI/09, attached). Both access routes require coastal marine works for the transfer of materials and equipment from sea to land. This could be in the form of temporary platforms or permanent construction. Ground levels and general topographic detail was recorded in order to enable ground level modelling, which is illustrated in drawings 5022355/CI/203 and 213 (attached).

GEOTECHNICAL INVESTIGATION

Runway site

4.5 Borehole cores, trial pit excavations and exposed ground inspections confirm that all construction associated with the current proposals for the aerodrome and access roads is achievable using standard and commonly used methods of construction. Samples retrieved indicate a high proportion of relatively high strength, durable rock materials which are likely to be suitable for most applications. All types of foundations associated with the construction of the aerodrome can be founded on existing ground, with ground preparation, if required, being limited to the provision of crushed rock to make up suitable levels. Ground levels vary significantly at the site of the airstrip and extensive excavation will be necessary to reduce the site to the required level.

4.6 At the proposed site of the airstrip at Prosperous Bay Plain soil and rock samples indicate top layers of material that are extensively fractured and weathered and that will be relatively easily excavated. Material excavated in these top layers can be re-used for general non-structural fill or can be screened to extract structural quality rock with the remainder used as non-structural fill. The rock quality designation of core samples retrieved indicates a relatively high level of discontinuities in the rock formation which will assist considerably in breaking the rock down to suitable size and grading for re-use as structural fill material. These discontinuities in the upper layers of the non-weathered rock will enable the material to be excavated with the aid of ripping equipment. The fracture planes continue into the lower levels of rock, however, the more densely stratified material will require some degree of rock blasting to improve fragmentation which will aid transportation of the material and reduce the extent of rock crushing required.

4.7 The degree of variability in quality of material across the site can be estimated from the core samples; however the true extent will not be determined until excavations take place. Excavated materials will be classified and re-used in the works as follows:

- Material excavated and suitable only for non-structural fill, stockpiled and placed as non-structural fill as surplus to requirements.
- Material excavated and screened with separated suitable material used for structural fill and remaining screenings used as non-structural fill.
- Material excavated and placed directly as structural fill.
- Material excavated and processed by rock crushing and used as structural fill or in the production of concrete or bound bituminous material.

4.8 Factors influencing required volumes of excavation and fill include bulking of material when excavated and rate of compaction when placing fill. High density Basalts encountered, which will be mainly used for fill, indicate that bulking factors will be high and could be in the region of 120% to 130% when placed in embankments. The proportions of material recovered and successfully re-used in construction will be determined as the work proceeds and these variables can be measured. In order to work within a balance of cut and fill and taking into consideration the above variables, it is recommended that the vertical alignment of the runway be allowed to vary by 1.0m above or below an approved profile to avoid unnecessary excavations and expensive overdig (which would be covered in cost as contractor risk), provided that Annex 14 vertical geometry requirements are met.

4.9 Laboratory analysis of the rock samples extracted from Prosperous Bay Plain during the course of the Access Feasibility Study indicate that the material will be suitable (subject to satisfactory conclusion of long term tests) for crushing and grading, for use in the production of course aggregates required in the production of concrete or bituminous bound materials. Fine aggregate sands for the use in the production of concrete and mortars would need to be imported, almost certainly from South Africa.

Access and Haul routes

4.10 The walk-over survey of the proposed access and haul routes indicated that a significant proportion of the roads could be constructed following contours along the steep hillsides ascending the valleys along both Prosperous Bay and Deadwood Plain routes (shown in drawing 5022355/CI/09, attached). This would require cutting into the rock formation, construction of retaining wall structures, and filling with suitable rock fill. Typical hillside road construction details are indicated on drawing 5022355/CI/06 (attached) with details 2 and 5 being the favoured options, as maximum use is made of locally available materials.

4.11 In some cases rock slope stabilising would be required, particularly along the Prosperous Bay route due to the mixed and weaker rock formation to the east of the valley. The majority of the length of the Deadwood Plain route passes through relatively clear countryside areas offering the advantage of relatively simple road construction through areas overlaid with firm soils which can be easily excavated and overlaid with granular sub-base and appropriate rigid or flexible road construction.

5 CONSTRUCTION

TYPE OF RUNWAY CONSTRUCTION

5.1 Ground conditions at the site of the runway are suitable for both flexible and rigid construction. However, the firm rock foundation lends itself particularly well to the use of rigid construction and the benefits of flexible pavements where settlement can be problematic are essentially ruled out. Both types of construction will require import of construction materials. Bituminous binder would be required for the flexible pavement and sand and cement would be required for the rigid construction.

5.2 Asphalt surfacing is susceptible to damage due to spillage of hydrocarbon fuels and therefore apron refuelling areas should be constructed in concrete in any event.

5.3 Major maintenance of the pavement in rigid construction will be less demanding as the flexible pavement will require major overlay treatment within the design life. Maintenance of the rigid concrete pavements will be limited to periodic repair of pavement joints and re-texturing of the surface to maintain skid resistance, the latter being an acceptable condition in respect of the relatively infrequent use of the runway which will not subject the surfacing to high rates of wear. In addition, replacement of any irreparably damaged concrete bays in the pavement can be carried out by essentially unskilled labour: it is a known technology.

5.4 Replacement of or overlay to bituminous material requires specialist plant and labour, which would need to be imported at the appropriate time.

5.5 The type of construction recommended is therefore a rigid concrete pavement laid over a dry lean concrete (DLC) sub-base. The DLC is recommended in order to provide an even working surface over the rough surface excavated in the underlying rock strata in addition to forming the design construction thickness.

PREPARATION

5.6 Basic preparation of the formation levels for the aerodrome site to suit airstrip profiles and ground flight path clearances will require levelling of the existing ground profile at Prosperous Bay Plain. This presently varies between 300m and 333m on the plateau of the plain. Also, localised filling of valleys to the north-west (depth approx 10m) and to the south-east (depth approx 35m) of the proposed runway location will be required regardless of the length of runway adopted (approx ¦ ¦ ¦ total in excavations).

5.7 Adopting the medium length runway will require filling of an area that extends south into Dry Gut valley a distance of approx 400m to an average depth of the order of 75.0m (approx ¦ ¦ ¦ total excavations).

5.8 Adopting the maximum length runway will extend into Dry Gut valley a further 200m at an average depth of 52m (approx ¦ ¦ ¦ total excavations).

5.9 ¦ ¦ ¦ .

CONSTRUCTION PERIOD

5.10 The construction period to complete the works will be governed by the time needed to carry out the major earthworks. This in turn is dependant upon the method of excavation and plant operations set-up. Economic efficiency of this type of works can only be achieved with the use of high volume output plant and equipment. The type of equipment normally employed in this type of operation would include large-capacity excavating shovels (bucket capacity 5-12 m^3) and haulage trucks (25-40 m^3 capacity). Assisted by heavy duty tractor dozers fitted with ripping gear and all used in conjunction with a planned blasting programme, the excavation works could be expected to be complete within a period of 2.5 to 3.5 years depending upon the number of machines employed.

5.11 Phasing of the works would enable construction of the pavements, infrastructure and terminal to commence approximately 18 months after commencement of the excavation works which would be compatible with an overall construction programme for project completion of 3 to 3.5 years.

HAUL ROAD

Construction

5.12 Construction of the haul road could be incorporated within the main contract for the airport works and could commence once the main contractor is mobilised to the island; alternatively the haul road works could be carried out in advance of mobilisation of the main contract. This could be achieved either as an independent contract using local contractors with proven experience in this type of work or by sub-letting from the main contract for the works and starting immediately upon award of contract, also using local contractors, and thus utilising off-island mobilisation time.

5.13 Construction of the haul road solely for the purpose of gaining access to the Plain for construction equipment would be less extensive than for general access. Delivery and transport of construction plant and equipment would be under attendance of guides along the temporary haul road which would need to be no more than track, along which the plant can pass.

5.14 Once plant and equipment has arrived at Prosperous Bay Plain and commenced excavation, the haul road could then be upgraded to the standard required for unattended use with the completion of road alignment improvements, retaining walls, safety barriers, road drainage, surfacing and rock slope stabilisation. ¦ ¦ ¦ .

5.15 The two optional routes for the provision of the haul road include the cross-island Deadwood Plain route from Rupert's Bay and the direct route from Prosperous Bay. The Deadwood Plain route ascends Rupert's Hill, running above and parallel with dwellings at the foot of the hill. Precautionary measures will be required for protection against rock falls during construction. The remainder of the route passes through open pastures, scrub land and badlands (semi-barren) areas.

5.16 The Prosperous Bay route lies entirely within barren areas from the entrance to Fishers Valley through to Prosperous Bay Plain. The direct route from Prosperous Bay is the more costly to build per metre of road due to the difficulty in working through the steep valley over a relatively short distance.

5.17 The Deadwood Plain route is less onerous in terms of hazardous construction and therefore construction costs per metre of road will be less expensive than that for Prosperous Bay. The Deadwood Plain route is however approximately four times longer than that of Prosperous Bay route and indicative costs can be taken as ¦ ¦ ¦ for the Deadwood Plain route and ¦ ¦ ¦ for the Prosperous Bay route.

The need to provide sea rescue facilities in connection with the aerodrome

5.18 The Regulator, ASSI, can be expected to require provision of sea rescue facilities, which will need to be easily deployed whenever aircraft are in operation.

5.19 The Prosperous Bay haul road could be used during operation of the aerodrome for access to a small sea rescue facility located in Prosperous Bay. Such a facility could be manned, in emergency, by the RFFS[17] crew located on the aerodrome (RFFS would not be needed on land if the aircraft had ditched in the sea close to St Helena).

5.20 If the Rupert's Bay/Deadwood Plain route is selected, and if the Prosperous Bay route was required by the Regulator, then the additional cost of providing fast land access to Prosperous Bay would ¦ ¦ ¦ . To avoid this additional cost, the sea rescue would therefore have to be mounted from either Rupert's Bay or Jamestown and need to be on station close to the aerodrome prior to an aircraft landing and for a time after departure. In this case also, a larger 'mother boat' would be needed when compared to the Prosperous Bay option. In the early days of development of traffic, this might not be too onerous; however, as traffic increases so will the requirement for the rescue boats to be on station. A decision to base the sea rescue facility remote from Prosperous Bay would therefore add significantly to the operating costs of the aerodrome.

The need to provide aviation fuel to the aerodrome, and other considerations

5.21 Provision of aviation fuel to the aerodrome could be via a pipeline or by road tanker. Investigations of the practicality of offloading aviation fuel to a beachhead at Prosperous Bay indicate that it would be expensive, probably requiring installation of a swivel-type offshore mooring and an underwater pipeline to shore. In turn, storage tanks and pumping facilities would be required on the beach, the fuel reaching the aerodrome by bowser – being cheaper than running a pipeline.

5.22 If the island were to consider doing this then it would make sense to consider importing its other fuel requirements – diesel and petrol – from the same vessel through the same underwater pipeline. This also would be transported back across the island by tanker.

5.23 On the other hand, Rupert's Bay as a beachhead for construction access offers other advantages: possible alternative site for future cargo operations, allowing possible development of the Jamestown waterfront – which is West-facing – for tourist use, by removing the container-handling operation; development of existing fuel farm for aviation fuel; continued use of the simple and cheap three-point mooring for fuel off-take to shore;

[17] Rescue and Fire Fighting Services (RFFS)

opening up the interior of the island with a new route and thus providing a means for developing new activities associated with a revived economy. Naturally it has its costs, one of which will be to address the safety problem surrounding the existing pipeline installations arising from rockfalls.

5.24 Investigation of the cost of providing a temporary beachhead at Prosperous Bay, by recourse to well-known maritime civil works contractors, indicates that an amount of the order of ¦ ¦ ¦ should be set aside for this purpose. We are allowing for this cost in our economic modelling. It is possible, though outside the scope of this study, that such an amount could go a long way toward achieving not only temporary landing facilities at Ruperts Bay but also the more permanent features listed in the previous paragraph. Ruperts Bay is located on the leeward side of the island, though susceptible to swell conditions travelling in the opposite direction to the SE Trade Winds, so is always going to be easier to exploit for sea-to-shore operations than Prosperous Bay, which is located on the windward side, though apparently with local protection afforded by a small headland to the south-east.

6 CONCLUSIONS

6.1 A runway can be built on Prosperous Bay Plain that satisfies the requirement of the Regulator for an instrument approach, providing that the necessary beacons, instrument landing and range measuring systems and lighting are installed. The principal influence of this requirement is on the alignment of the runway, which, given the limitations of land suitable for runway positioning and construction on St Helena, has a significant bearing on the practicality of construction.

6.2 The choice of aircraft for operational use has a direct bearing on the design of the runway, particularly the dimensions. This study has spent considerable effort in examining alternative aircraft (reported in other Papers by the Access Feasibility Study). This Paper assumes for the medium length runway a Dassault Falcon 900 business jet and a Boeing 737, in different variants, up and including the -800, or its equivalent Airbus (A319, A320).

6.3 A one-way runway can be built on Prosperous Bay Plain that satisfies the requirement of the Regulator and that minimises the cost of construction. The necessity to explore every available means of containing cost was driven throughout by the expectation that, to accommodate B737 type or equivalent aircraft, the feature known as Dry Gut at the southern end of the proposed site would need to be filled in.

6.4 Both the medium length runway and the long runway require incursion into Dry Gut. It is noticeable that the further incursion required by the long runway is, in the overall scheme of things, relatively small – ¦ ¦ ¦ of fill respectively.

6.5 The characteristics of the rock and the topographical features, when taken together, will allow construction of a runway without the need to import aggregates. This is due to the physical properties of the rock, particularly the bulking behaviour when excavated and crushed and rate of compaction when filling in.

6.6 Two types of runway completion were considered: asphalt ('flexible') and concrete ('rigid'). The maintenance considerations of each type lead to a conclusion that concrete will be easier and cheaper to maintain, given the remoteness of St Helena and the relatively light traffic levels expected over the life of the runway.

6.7 The construction period can be expected to be in the region of 3 to 3.5 years. To help offset the relatively long mobilisation period, it should be possible for the appointed contractor to begin constructing the access required from the shoreline to the Prosperous Bay Plain site – which is some 300m above sea level. This will allow possibilities to begin engaging St Helenians early in the programme, ¦ ¦ ¦ .

6.8 Access to the site from the sea can be by one of two routes: from Prosperous Bay beach or from Ruperts Bay via Deadwood Plain. The construction cost of the route is estimated at ¦ ¦ ¦ , respectively – a new route being required in either case.

6.9 The considerations as to which route is best, to be discussed further in our Final Report, include a regulatory requirement for provision of sea rescue whenever air operations are being conducted. The Prosperous Bay route is likely to be cheaper in this respect in both capital and operational cost terms, than the Ruperts Bay route but the Ruperts Bay route has other, more long-term economic attractions. It is not the purpose of this Paper to make a recommendation on the route, merely to point out the differences. This decision is one for later, at the detailed engineering stage, and when SHG and DFID have had more time to digest the 'big picture'.

APPENDIX - LIST OF DRAWINGS IN TEXT REFERRED ORDER

5022355/CI/010	MEDIUM LENGTH RUNWAY PHYSICAL CHARACTERISTICS, ONE WAY – LANDING FROM NORTH, TAKING OFF TO SOUTH
5022355/CI/012	MAXIMUM LENGTH RUNWAY PHYSICAL CHARACTERISTICS, ONE WAY – LANDING FROM NORTH, TAKING OFF TO SOUTH
5022355/CI/029	AIRCRAFT SWEPT PATH ANALYSIS MAXIMUM LENGTH RUNWAY
5022355/CI/030	AIRCRAFT SWEPT PATH ANALYSIS MEDIUM LENGTH RUNWAY
5022355/CI/009	AIRPORT ACCESS ROUTES
5022355/CI/006	ROAD CONSTRUCTION TYPICAL DETAILS
5022355/CI/017	MAXIMUM LENGTH RUNWAY AIRPORT OBSTACLES AND LIMITING CLEARANCE TWO WAY – LANDING FROM NORTH AND SOUTH, TAKE OFF TO SOUTH AND NORTH
5022355/CI/203	AIRSTRIP LONGITUDINAL SECTIONS
5022355/CI/213	AIRSTRIP TRANSVERSE SECTIONS

APPENDIX N : REDUCTIONS OF LONG RUNWAY SUB OPTION

CONTENTS

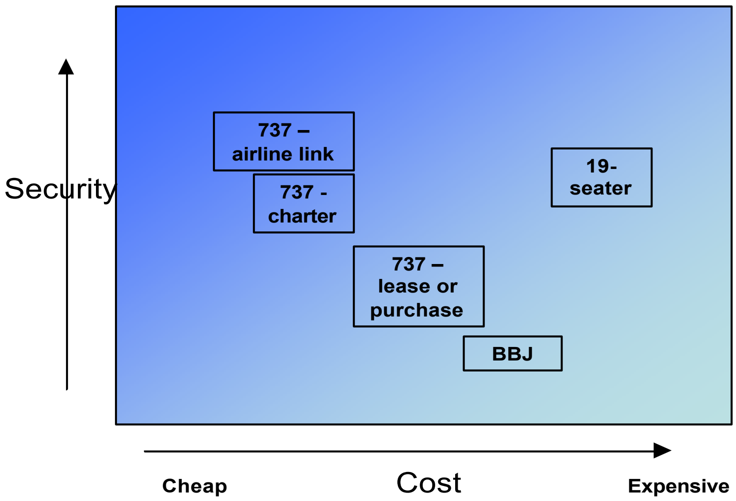
EXECUTIVE SUMMARY

1. The number of options available for providing access to St Helena is considerable. In particular, there are a large number of sub-options within the overall category of the 'long runway'. This paper demonstrates how we have reduced the list of possible solutions suitable for the long runway to those which best fit the requirements for secure access and which are most likely to deliver sustainable long term growth in the St Helena economy in the most cost effective manner. This exercise has been undertaken in order to deliver the option appraisal in a cost-effective way, whilst still providing a rigorous evidence-based analysis of those sub-options we reject at this stage.

2. The six sub-options for the long runway are: use of a 19-seater business jet, a 50-seater Boeing business jet, a Boeing 737 with a strong 'airline link' i.e. using the facilities of an established airline as explained below, a chartered Boeing 737, a leased Boeing 737, and the purchase of a used Boeing 737.

3. We have found that the 737 has the advantage in most areas of our analysis. The market is more established in terms of procurement options for 737s, and over the distances involved the smaller aircraft are significantly more expensive, even though for the small number of passengers involved there are benefits to having smaller aircraft.

4. We conclude that only the 737 should be taken forward for more detailed consideration within the economic and financial modelling, whilst procurement decisions cannot be finalised at this stage. The results of our analysis are summarised in the following chart:



1 INTRODUCTION

CONTEXT

1.1 It is intended that the detailed economic and financial modelling that will inform the final Access Option recommendation to SHG/DFID will be carried out on a maximum of three options. At present there are a number of distinct sub-options within one of the main options, the Long Runway Option, and we have therefore sought to reduce the number of these sub-options.

OBJECTIVES

1.2 We seek to demonstrate which of the Long Runway sub-options is most able to deliver the following objectives:

- Provision of secure access to St Helena, and
- Lowest likely whole-life cost.

SCOPE

1.3 Within the long runway option as defined in our Options Paper[1] there are six sub-options:

- 19-seater business jet
- 50-seater Boeing business jet ('BBJ')
- Boeing 737 – with a strong airline link
- Boeing 737 – charter
- Boeing 737 – lease
- Boeing 737 – purchase used.

1.4 Applying these alternative aircraft results in routeing effects that then become variants for consideration. Since we have not the time to study all variants through application of the full economic/financial model we need to reduce them by alternative means.

1.5 The approach adopted is described in Section 2, the results of analysis in Section 3 and the conclusions in Section 4.

Status of this paper

1.6 The outputs from this Paper will be taken forward into the Financial / Economic modelling and thence into the Final Report. It is stand-alone, an aid to decision-making and informative, no more or less than that. It does not represent final conclusions on passenger numbers, policies, routeing or any other such variable. It merely does what the Objectives and Scope above say it does.

[1] V1.0 of 29th July 2004

DEFINITIONS

1.7 The 19-seater business jet and the BBJ would both require to be leased or purchased, as explained below in the discussion of procurement flexibility. The price we have assumed in our workings for the 19-seater business jet is the price of a second-hand aircraft. For the BBJ, the market in second-hand craft is very limited, and given the requirement for re-fit costs we do not consider that this is a cost-effective approach.

1.8 The Boeing 737 sub-options differ in how the aircraft is procured. In all cases, there would be a St Helena entity established as part of the procurement, which would have responsibility for providing the service and be fully supported by SHG.

1.9 The 'strong airline link' sub-option involves all operations and marketing being performed by an established airline e.g. SA Airways. There would be a schedule of routes and a timetable agreed. ¦ ¦ ¦ ¦

1.10 The 'charter' sub-option involves an agreement whereby a certain timetable of flights would be established in advance, which would be delivered by a third party in return for a fee. In this arrangement, ¦ ¦ ¦ ¦ , which also has to arrange aspects of the operations including the marketing and ticketing.

1.11 'Leasing' has two types, 'wet' leasing (which includes provision of crew etc) and 'dry' leasing (which is the lease of the craft alone); we have based our analysis on the latter. The distinction is discussed below in the comparison of procurement options for each aircraft type, but each is a further step away from the purchase of a service and towards outright purchase of the aircraft. Dry leasing only differs from outright purchase in terms of the financing arrangements, and is the same as the leasing of any other capital asset.

1.12 We would caveat any consideration of lease options. A 30-year lease would require a lessee of high credit standing. Unless the lessee is a substantial carrier or guaranteed by the State this is not a feasible option; ie the UK government would need to be the lessee.

1.13 The 'purchase second-hand' 737 sub-option is self-explanatory. The possibility of outright purchase is included in the options under consideration because it offers the opportunity for capital savings if a second-hand craft is used. Apart from the capital savings associated with a second-hand aircraft the costs are very similar to dry leasing.[2]

1.14 It is possible that spare flight time with an aircraft that has been purchased or leased could be sold to a third party but we have not modelled such potential benefit of the relevant options, as this is another risk position over which SHG could have no control.

1.15 We have compared these sub-options propose which sub-options to take forward to more detailed consideration and inclusion within the economic modelling.

[2] For the purpose of comparing costs in the quantitative analyses below, we have in any event assumed that the financing for a purchased aircraft is arranged under a lease or similar arrangement in order to annualise the costs.

Note on demand levels assumed for this paper

1.16 For the purposes of this paper we have assumed tourist demand at the levels suggested by our Tourism Study[3]; the higher demand levels which can be derived by reference to the experiences of other islands[4] would, if applied to the approach adopted herein, accentuate the results in favour of the B-737. This is sufficient to determine the choice of aircraft.

[3] 5303 Tourism Market Study v6, 6th September 2004
[4] 5309 Island Proxies V1.0, 18th September 2004

2 METHODOLOGY

FACTORS CONSIDERED

2.1 The strengths and weaknesses of each sub-option have been assessed on a range of factors, organised to demonstrate the two objectives stated above i.e. security and cost. These factors have been identified as the key considerations affecting aircraft choice.

2.2 Our assumptions in terms of costs, passenger numbers etc. are set out in the Appendix.

2.3 We have worked on the basis of a simple route – flights to and from Cape Town only. We have not considered more complex route structures in the main body of this report, but in the conclusion we consider the implications of our recommended solution on broader policy matters. Johannesburg could be substituted for Cape Town, though we have not re-worked the analysis, simply because in the overall scheme of things, the differences in fares and distances are negligible.

2.4 The factors assessed are the following:

Security of access

- Factor 1: Flexibility in procurement strategy
- Factor 2: Break-even number of passengers required for airline viability
- Factor 3: Ability to meet requirements of tour operators
- Factor 4: Flight range

Lowest likely cost

- Factor 5: Minimum subsidy-free ticket prices

2.5 Other factors were considered as follows:

- All of the sub-options are regarded as technically feasible.
- The capital costs associated with a given sub-option are reflected in the minimum ticket prices calculation (e.g. leasing compared to charter), and also in the analysis of the flexibility in procurement strategy.
- The wider impact of the sub-options on the St Helena economy is considered within the analysis of ticket costs, and also in the consideration of the ability of the aircraft to meet the requirements of tour operators. The sub-options taken forward to the next stage will be incorporated in a more sophisticated economic modelling exercise.

ANALYTICAL METHOD

2.6 In relation to each factor listed above, we identified the potential advantages and disadvantages for each sub-option, and performed quantitative analysis as appropriate to the factor. This led to an analysis of each sub-option for each factor.

2.7 On the basis of our analysis we arrive at a recommendation about which sub-options should be taken forward for further consideration in the next stage of the option appraisal.

3 ANALYSIS OF STRENGTHS AND WEAKNESSES OF SUB-OPTIONS

PROVISION OF SECURE ACCESS TO ST HELENA

Factor 1: Flexibility in procurement strategy - discussion

3.1 For each of the three types of aircraft in the six sub-options, there are a number of alternative approaches to the procurement of services. One of the main distinctions is between the charter and purchase of aircraft, but this basic distinction is complicated by the large number of methods of chartering aircraft and marketing ticket sales that exist within the industry. We have not sought to recommend a detailed approach to procurement at this stage but have broken down the 737 approach into four significantly different sub-options, as indicated above.

3.2 In addition to the 737 there are two business jet sub-options. The position of these as regards procurement flexibility is different. The business jets cannot be chartered in the southern hemisphere. The overall market for these aircraft is much smaller and the chartering business model has not been applied to them to the extent it has for 737s, consequently there is not a supply of aircraft to be chartered. Whilst the market may develop over time, St Helena is likely to be too small a customer to stimulate it alone. Similarly, we understand from our research that existing operators would not be interested in running their own operation using a business jet, because business jets are not available for this type of service within existing airline fleets.

3.3 The fact that business jets would need to be purchased or leased is significant because of the cost implications. The 19-seater business jets cannot meet the levels of demand we are forecasting without several jets being in use. Two 19-seater business jets cost approximately as much as a new Boeing 737, whilst the Boeing Business Jet is itself approximately the same price as a new 737.[5]

3.4 On the assumption that the 19-seater business jets can fly a maximum of 1,500 hours p.a., and the flight to Cape Town is 4.5 hours, then a single aircraft can carry a maximum of 3,154 travellers p.a., which is forecast to be exceeded in Year 2. A single BBJ can transport up to 20,000 travellers in a year (partly as a result of a larger number of hours in the air than the 19-seater of up to 3,600). This is adequate for forecast demand up to year 25[3]. A 737-800, also on the basis of 3,600 hours in the air, can transport up to 64,800 travellers. Therefore, if the demand is as predicted, the 19-seater jets quickly become as or more expensive as the two larger craft in terms of capital cost. The BBJ is at a similar cost level to the 737, but without the range of procurement options. Setting aside the procurement question, from this analysis the costs of the BBJ may be at a similar level to the 737 if the latter is not full, but see later for analysis of costs.

3.5 It should be noted that in the early years there is more risk of overcapacity for the 737. The forecast of around 3,000 travellers in Year 1 requires only 19 flights a year for the 737,

[5] Price assumptions are as follows: 19-seater, $20m; BBJ or 737, $44m, and a second-hand 737-700 costs approximately $22.5m.

whereas we have assumed a requirement for a minimum of 52 flights a year in order to deliver a satisfactory service. This issue is reflected in our break-even analysis – see below.

3.6 The leasing market for 737s is well-established and we have assumed that outright purchase of a new Boeing 737 is not an attractive solution. The very high capacity of 737s indicated above – 64,800 passengers a year – is substantially in excess of the forecast assumptions used in this paper, even after 40 years. This indicates strongly that any form of purchase of an aircraft specifically for this route is unlikely to be economic compared to chartering or other more flexible forms of procurement, unless significant savings can be achieved through the purchase of a second-hand aircraft or re-sale of spare capacity.

3.7 Both the 'strong airline link' approach and chartering are well established in the mainstream airline industry, and offer advantages in terms of the ability to manage the travel demand risk and in practical areas such as aircraft maintenance.

3.8 There are possibilities that we have not formally included in this report but will continue to explore. These include:

- Leasing (or buying) an aircraft and selling on some of the spare capacity, as mentioned above; this is more plausible for the 737 because again it could potentially fit with the commercial requirements of other operators.
- Charter of business jets in Europe.
- 'Wet-leasing', as opposed to the 'dry-leasing' considered here, is an alternative whereby some services are supplied by the lessor in addition to the aircraft itself, in particular staffing and fuel. The overall costs are similar, but wet-leasing has advantages in terms of the amount of supporting services required.
- Consideration of a wider range of large aircraft than the Boeing 737-800, on which we have based our costs. From our research it appears that the 737s in the region that are available for charter are the 737-800 model. However, if a used craft is purchased it should be possible to acquire the slightly smaller 737-700, which may be slightly cheaper to purchase and run. We have not adjusted any of our costs for this. Similarly, the Airbus A319 and A320 are similar to the Boeing 737 in terms of overall size and economics, offering 124 and 150 seats respectively, and moreover they are being adopted by South African Airlines (one of the largest African carriers) in place of its current Boeing fleet. In this report we have focused on the Boeing aircraft (without making a distinction between the 737-600, -700 and -800) as being representative of these larger jets in terms of capability and costing.

3.9 Another disadvantage of leasing or purchasing a single aircraft (and to a lesser extent, two aircraft) is that there are significant operational risks in only having a single craft available, for example if mechanical breakdown occurs. Whilst the numbers of passengers may only require a single business jet or BBJ in the early years, the leasing of a single aircraft is therefore a risky approach to take. This is equally true for 737s if leased or purchased, but in the case of charter / airline link the risk of breakdown is faced by the owner of the aircraft, which should be in a position to manage the problem using other craft in its fleet.

3.10 There are benefits to procurement options other than outright purchase or leasing, as set out above. **We conclude that in terms of these points the airline link and charter 737**

sub-options have advantages over lease or purchase of a 737 and the two business jet sub-options. These issues interlink with the question of costs, which is addressed separately below.

Factor 2: The break-even number of passengers required for the airline to be financially viable

3.11 Smaller aircraft are likely to involve a lower breakeven number of passengers p.a. (BEP) (expressed as percentage of forecast demand) because they are smaller and some costs are related to aircraft size (e.g. fuel requirements, landing fees); although it should be noted that the BBJ is the same physical size as a 737. Moreover, if a certain minimum number of flights are required in order to provide a basic level of access then smaller aircraft are able to meet any given frequency requirement at a lower passenger capacity.

3.12 A low BEP implies a more financially secure service. We have investigated this potential relationship between security and aircraft size using quantitative analysis of the BEP. We have performed the analysis using the following steps:

- We have determined initial ticket prices such that profits of ¦ ¦ ¦ ¦ in net present value terms are achieved over the first 20 years. The figure of ¦ ¦ ¦ ¦ is an estimate of what would be required by a commercial operation regardless of aircraft type.[6] A discount rate of 10% was selected as representative of a private sector cost of capital. For the purposes of this analysis we have only considered flights to Cape Town.
- We have kept the ticket price for Saints at a maximum of ¦ ¦ ¦ ¦ in each case, i.e. allowing it to be equal to the tourist / business ticket price but not above ¦ ¦ ¦ ¦ , which we regard as a reasonable level and slightly less than current ticket prices on the RMS (£810 average, return to Cape Town). This assumption causes the tourist / business ticket prices to rise to ¦ ¦ ¦ ¦ for the 19-seater jet, ¦ ¦ ¦ ¦ for the BBJ, and ¦ ¦ ¦ ¦ for the 737, depending on the procurement approach - all to make ¦ ¦ ¦ ¦ profit as above.
- We then determined what proportion of the forecast passenger numbers would need to be realised every year, for the airline just to break even, i.e. for the present value of net revenue over 40 years to be just positive. This is the BEP. To clarify – the BEP is that factor which, applied to the forecast visitors in every year over a 40-year period, allows the airline just to achieve a positive profit, measured in NPV terms at a discount rate of 10%.

3.13 The results of the break-even analysis are shown in Table 3.1.

3.14 This indicates that the leased or purchased 737 are the least secure aircraft on this measure, because the highest proportion of passengers needs to be realised for the airline to be viable, whilst the other 737 approaches and the business jets (the 19-seater in particular) provide greater security of service.

[6] ¦ ¦ ¦ ¦ has been chosen in order to provide a comparison between the sub-options. It is equivalent to ¦ ¦ ¦ ¦ p.a. for 20 years, if discounted at 10% p.a. ¦ ¦ ¦ ¦ represents ¦ ¦ ¦ ¦ per passenger on the basis of the average assumed passenger numbers over that period and we regard this as a reasonable profit level for the purpose of this calculation.

Table 3.1 - BEP analysis assuming passenger numbers invariant across sub-options

Option	BEP as percentage of forecast traveller numbers
19-seater business jet	¦ ¦ ¦ ¦
Boeing 737	¦ ¦ ¦ ¦
Boeing Business Jet	¦ ¦ ¦ ¦

3.15 The above analysis keeps the numbers of visitors the same in each case. It therefore ignores the fact that the higher ticket prices required for the smaller jets would have an impact on demand. If the sub-options are placed on an even footing by assuming that passenger numbers will be lower for the smaller aircraft if ticket prices are higher, the analysis produces the results shown in Table 3.2.

Table 3.2 - BEP analysis assuming passenger numbers sensitive to ticket price

Option	BEP as a percentage of forecast traveller numbers
19-seater business jet	¦ ¦ ¦ ¦
Boeing Business Jet	¦ ¦ ¦ ¦

3.16 This second analysis involves an assumption that tourist and business traveller numbers will fall by 50% for the BBJ and 70% for the 19-seater business jet (subject to not falling below historic levels in the first few years). This then derives a ticket price of ¦ ¦ ¦ ¦ for the 19-seater craft and ¦ ¦ ¦ ¦ for the BBJ, using the same methodology as above, i.e. profits over first 20 years have NPV of at least ¦ ¦ ¦ ¦ . These are significantly higher prices and it is plausible that in reality these higher price levels should imply a much greater fall in tourism numbers. In that case it may be that the smaller jets are simply not viable without significant subsidy and the analysis of break-even is less relevant.

3.17 The focus of our work on traffic forecasts has been on the lower price levels used in the 737 sub-options, and the above is only as robust as our assumptions about tourist numbers and prices. These assumptions are at similar levels to those used in our Tourism Market Study[3]. If higher tourism forecasts are used the BEPs fall for each aircraft.

3.18 We have investigated the impact of using assumptions other than 50% and 70% traveller reductions (to reflect the higher ticket prices) and the results are not particularly sensitive in our view at around these levels . The analysis demonstrates that the BBJ remains less attractive and the 19-seater still demonstrates flexibility and hence security of service at a similar level to that of the 737 airline link / charter sub-options. However, we have performed the following analysis to demonstrate that larger rather than smaller falls are likely, and hence that the attractiveness of the smaller aircraft is more likely to be overstated than understated. We have received advice from an economist specialising in airline economics that a price elasticity of demand of ¦ ¦ ¦ ¦ might be appropriate to the leisure market. This is ignoring the impact of additional falls for the 19-seater and to a lesser extent the BBJ, due to operators being less interested in smaller aircraft. We calculate that if elasticity is ¦ ¦ ¦ ¦ , an increase in price from ¦ ¦ ¦ ¦ (representative of the 737 prices above) to ¦ ¦ ¦ ¦ (the BBJ price), leads to an 80% fall in demand, whilst an increase to ¦ ¦ ¦ ¦ (the 19-seater level) leads to a fall of 88%.

3.19 The key observations we would make are that the airline link and charter 737 sub-options break even at ¦ ¦ ¦ ¦ of forecast passengers, the 19-seater business jet breaks even at only ¦ ¦ ¦ ¦ , whilst the BBJ requires just over ¦ ¦ ¦ ¦ and the other 737 sub-options also require over ¦ ¦ ¦ ¦ . **Our conclusion from this is that the sub-options that demonstrate greatest capacity for secure service provision in the face of passenger number volatility and uncertainty in future forecasts are the 737 airline-link and charter, and the 19-seater business jet.**

3.20 Refer to the Appendix for the assumptions made in this analysis.

Factor 3: Ability to meet the requirements of tour operators

3.21 The business jets, particularly the 19-seater, are too small for tour operators[3], who require flexibility around making and cancelling bookings which is not easily manageable by the operators of such small craft. Even if SHG provide some form of support to the operator, this reflects a real problem because overbooking is difficult for such small aircraft and this imposes downwards pressure on achievable average load levels. The exclusion of tour operators would have a negative impact on overall levels of tourism. This would have a knock-on effect on the ability of the access choice to deliver sustainable development of the island's economy.

3.22 In our Tourism Market Study we have concluded that "The small number of seats on a business jet relative to the average tourist group size for any individual operator would make it difficult for the operator and the airline alike to negotiate flexible booking and cancellation terms."

3.23 **In this respect the 737 is better able to offer a secure service**.

Factor 4: Flight range

3.24 Estimates of range are sensitive to load, wind conditions, and runway length. However, with that caveat, it can be said that the BBJ has significantly more range than the 737 or Airbus equivalent, or the 19-seater aircraft. The BBJ (with a smaller passenger capacity) would carry passengers to Europe or the Southern United States, whilst the other sub-options would not have this flexibility. The design of the BBJ is essentially the same aircraft body as the smaller models within the 737 series, with longer wings and more fuel capacity, allowing greater range.

3.25 The availability of a wider range of destinations is likely to benefit the development of the tourist market and therefore the economy. **In this area the BBJ has the advantage**.

LOWEST LIKELY COST

Factor 5: Minimum ticket prices

3.26 Tickets are likely to be more expensive for the smaller aircraft, because of higher costs per passenger.

3.27 Tables 3.3 and 3.4 set out the costs for each aircraft type under two scenarios, broken down into variable and fixed costs. Because a significant proportion of costs are semi-variable or fixed, the most meaningful picture in terms of the ticket price implications is provided by considering traveller number scenarios. Ticket prices need to at least equal the figures in the final columns of each table, before they can start making a profit for the operator.

3.28 The figures of 3,000 and 10,000 passengers p.a. (including Saints and business travellers) have been chosen as representative of the forecasts for the early years of the project. If the higher tourist numbers for later years are achieved then **the results remain favourable to the 737 sub-options, with leasing becoming increasingly attractive**.

3.29 Table 3.3, based on 3,000 travellers (i.e. round-trips) p.a., shows that in this scenario the 737 sub-options will result in significantly lower ticket prices than either business jet under the 'airline link' approach, to a lesser extent under charter, whilst purchasing and especially leasing are more expensive options. The BBJ is the most expensive, although this is largely due to the much higher costs of leasing the aircraft, particularly in comparison to the two cheaper 737 sub-options.

3.30 Table 3.4, based on 10,000 travellers p.a., shows that **the 737 sub-options all result in significantly lower ticket prices at these higher traffic levels**. The 19-seater is more expensive than the BBJ at this traffic level. This trend is apparent in the variable costs as well as the fixed costs.

3.31 **Our conclusion from this analysis is that the 737 offers the best likelihood of affordable ticket prices, in particular the non-lease options. This also means that these 737 options offer the best likelihood of stimulating the St Helena economy**.

Table 3.3 – Costs based on realising 3,000 passenger-movement p.a.

Aircraft type	Variable costs				Fixed costs				TOTAL cost per passenger (£)
	Variable costs per flight excluding staff costs and hourly costs (£)	Staff costs per flight (£)	Hourly costs per flight (£)	Total variable cost per passenger (£)	Fixed costs per aircraft p.a. - mainly lease costs for aircraft (£)	Number of aircraft required	Other overheads (£)	Fixed cost per passenger (£)	
19-seater business jet	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing Business Jet	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing 737 – 'strong airline link'	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing 737 – charter	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing 737 – lease	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing 737 – second-hand purchase	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦

Table 3.4 – Costs based on realising 10,000 passenger-movement p.a.

Aircraft type	Variable costs				Fixed costs				TOTAL cost per passenger (£)
	Variable costs per flight excluding staff costs and hourly costs (£)	Staff costs per flight (£)	Hourly costs per flight (£)	Total variable cost per passenger (£)	Fixed costs per aircraft p.a. - mainly lease costs for aircraft (£)	Number of aircraft required	Other overheads (£)	Fixed cost per passenger (£)	
19-seater business jet	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing Business Jet	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing 737 – 'strong airline link'	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing 737 – charter	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing 737 – lease	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦
Boeing 737 – second-hand purchase	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦	¦ ¦ ¦ ¦

4 CONCLUSIONS

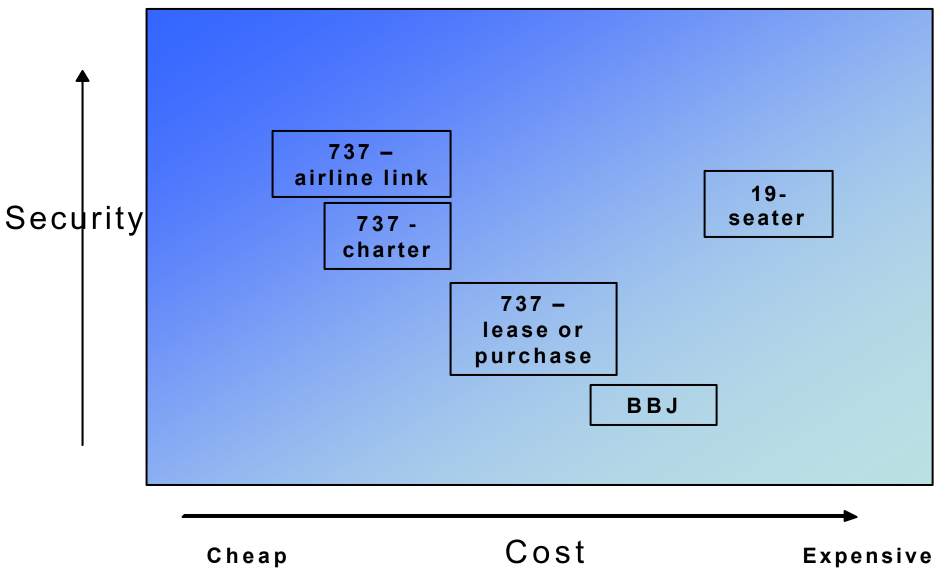
4.1 In summary, the outcome of the considerations listed above is shown in table 4.1.

Table 4.1 – Summary of results

Consideration	Assessment of impact
Objective 1: Provision of secure access	
Ability to charter	Favours 737 other than leasing or purchase of new aircraft.
Break-even number of passengers	Favours 19-seater business jet or non-leased/purchased 737
Tour operator use / economic development	Favours 737
Range of flights	Favours BBJ
Objective 2: Cost	
Minimum ticket prices	Favours 737, in particular non-lease options

4.2 Figure 4.1 provides a graphical representation of the above, in which the greater the intensity of the blue shading the more attractive is the sub-option.

Figure 4.1 – Illustration of result



4.3 The 737 sub-options, especially the non-lease / purchase sub-options, feature in almost all of the above areas, as represented by their being in the top-left quarter of the above chart. **The conclusion we draw is that only the 737, in the airline link and charter sub-options, should be taken forward for more detailed consideration within the economic and financial modelling, and that leasing and purchasing, including second-hand purchase, should not be considered further**.

4.4 While the potentially small number of passengers raises the possibility of business jets being more suitable, the 737 is significantly more economic over long distances such as those from St Helena even just to Cape Town, and this together with the more developed markets for supply and for interaction with tour operators makes the 737 a more attractive option.

4.5 The analysis also highlights the fact that procurement strategy may have a significant impact on the outcome of the access choice. We must be able to reflect that in our analysis going forward. In terms of planning for the long term, it may be appropriate to consider changes in the procurement methodology as the market becomes more established. One further point to note is that at this stage we have not made any distinction between the models within the Boeing 737 range, or between them and the equivalent Airbus aircraft, the A319 and A320.

4.6 In terms of the number of variant sub-options on which to perform the full economic modelling, only the 737 airline link and charter sub-options should be included for the long runway at this stage. It is plausible that these will produce similar results, and that either both will support the case for the long runway or neither will. The recommendation about whether to build a long runway can then be made, and recommendations about procurement can be regarded as a separate exercise. In this case no further long runway sub-options need be considered. However, if the results of the economic modelling are inconclusive in this regard, for example the 737 airline link is more attractive than the medium-length runway, which is in turn preferable to the 737 charter, then further work on procurement, in terms of refining the details further and considering alternative aircraft ie the Airbus, will be required before a final recommendation about which main access option (i.e. replacement ship, medium-length runway, long runway) can be made.

ADDITIONAL POLICY IMPLICATIONS

4.7 We have concluded that the 737 is significantly better suited to providing the air service for St Helena, if the long runway is recommended as the preferred access choice. No other of the aircraft under consideration competes in terms of cost and flexibility, therefore if the long runway is built it will be important to establish a service using the 737 (or potentially equivalent Airbus aircraft). However, some questions arise which we can start to consider in this paper notwithstanding that more detailed consideration will be required at a later stage:

- Adopting an open skies policy could lead to the emergence of alternative carriers, possibly including services offering high-end tourism using smaller aircraft such as the BBJ. This is particularly relevant given that the BBJ offers the possibility of direct flights from Europe or the southern United States as discussed above. When it comes to making decisions on such matters it will be important to understand the potential impact on an existing 737 service. It should also be noted that the outcome of any policy choice will be affected by regulatory issues such as the high hurdles to achieving ETOPS compliance, which may limit the ability of newcomers to provide *ad hoc* services to St Helena. As stated above (para. 1.15) as our assumptions about tourist demand develop it appears possible that higher forecasts should be made, and if this is borne out it will suggest that the 737 has considerable scope to cope with the loss of passengers to alternative carriers, in particular high-cost ones. However, if the demand levels remain at the levels used in this paper, our BEP analysis suggests that the 737 is better able to withstand competition than the BBJ. Negotiations with operators will have to reflect the most up-to-date estimations of forecast demand, as well as the many other factors that a commercial operator will wish to consider.

- We have developed the quantitative elements of our analysis using a service to and from Cape Town only. There are a number of alternative likely destinations, for example Ascension Island, Europe (with a re-fuel), and alternative African airports such as Johannesburg. We have concluded that only the 737 should be taken forward as the central element of a long runway service. However, none of this extended range of destinations has been rejected at this stage.

APPENDIX – COST ASSUMPTIONS USED IN BREAK EVEN POINT ANALYSIS AND COST ANALYSIS

The following tables contain the assumptions used in the quantitative analyses above. The tables in the body of the report are based on these figures.

The figures are specifications derived during preparation of the options paper, issued in June 2004.

Table A.1 - Cost and ticket price figures (ticket prices used in break even analysis)

Scenario name	737-800 airline link	737-800 charter	737-800 dry lease	Buy 737-700 2ndhand	BBJ	19 seater
Capacity of planes	162	162	162	129	50	19
Load factor for each plane	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Minimum number of flights required	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Flight time per single trip	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Maximum no. hours per plane p.a.	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Nav fees, landing etc per flight leg	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Crew salaries etc and lease costs per aircraft p.a. (£)	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Direct hourly cost - including fuel (£)	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Crew salary – per captain p.a. (£)	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Crew salary – per co-pilot p.a. (£)	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Management costs p.a. (£)	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Discount rate used in profit calculation	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦	¦¦¦¦
Derived prices for return ticket, with price for Saints held at a maximum of ¦¦¦¦ :						
Tourists (£)	¦¦¦¦				¦¦¦¦	¦¦¦¦

Table A.2 - Tourism and business traveller assumptions

Year	Tourist traveller numbers	Business traveller numbers
1	1,493	250
5	6,464	300
10	11,646	400
20	15,986	450
40	26,160	500

The tourist visitor forecasts are drawn from our Tourism Market study. For business travellers, we have based the forecast on the experience of the last few years, with a small forecast of growth although not significant compared to the tourist travellers.

For years other than those stated a simple linear interpolation has been performed.

Saints traveller numbers

3,000 travellers p.a. assumed in all years.

We have not assumed any growth in this figure in future years. This is a fairly conservative estimate. It does not affect our analysis of minimum ticket prices, but for the BEP analysis the 737 would be relatively more attractive with a higher number of Saints visitors, because we have kept Saints ticket prices at a low level, thus less able to cover the (higher) variable costs of the business jets.

APPENDIX O: LONG RUNWAY

CONTENTS

BACKGROUND

1.1 The construction of a North-South runway on Prosperous Bay Plain is limited by the steeply sloping bluffs to the North and the gullied nature of the Plain and cliffs to the South. In particular, earthworks at the southern end add considerably to cost. The land at the end of a runway must allow for Runway End Safety Area (RESA) of, in this case, 240m in length and twice runway width. A two-way runway (landing and take-off in both directions) can be built to serve the needs of St Helena that uses the RESA as a take-off extension. In this manner, the overall length of the runway plus RESA can be minimised. This is depicted in Diagram A. However, runway extensions must be level and surrounded by a runway strip of, in this case, at least 75m but with some decrease at the beginning of the take-off run. RESA, on the other hand, can be constructed with 1:20 slopes both laterally and longitudinally. Further, the surface of RESA need not be prepared to the same standard as that of the associated graded strip. Therefore, a runway that only allows for full payload take-off into the prevailing winds, but with landing in either direction, can be designed. It would generate construction cost savings over a two-way runway design of the order of¦ ¦ ¦ ¦ and reduce the engineering risk. This is illustrated in Diagram B.

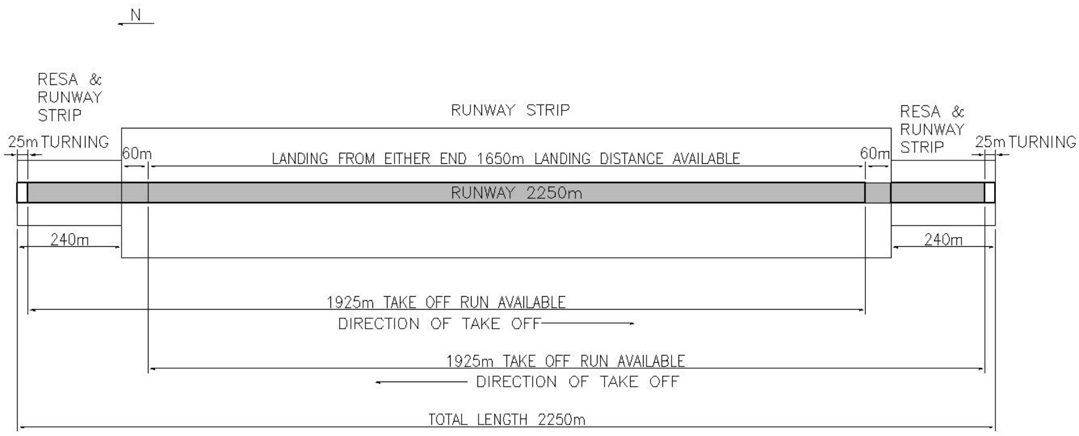
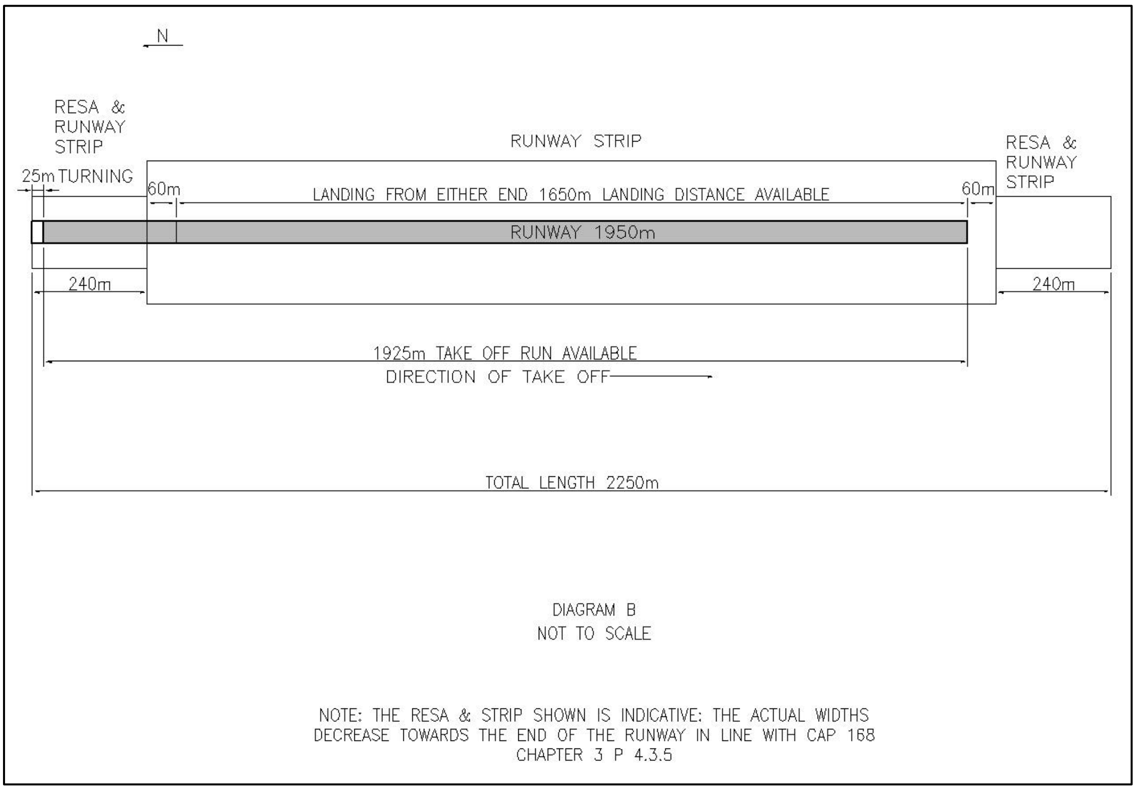


DIAGRAM A
NOT TO SCALE

NOTE: THE RESA & STRIP SHOWN IS INDICATIVE: THE ACTUAL WIDTHS DECREASE TOWARDS THE END OF THE RUNWAY IN LINE WITH CAP 168 CHAPTER 3 P 4.3.5

Note: In these diagrams, the 25m turning distances are included in the term 'runway' as paved areas, although separately shown as non-shaded elements.



AIM OF THIS PAPER

1.2 The aim of this paper is to examine the feasibility of providing an Air Service to St Helena using a runway with full payload take-off capability in one direction only but one with landing capability in either direction.

WEATHER EFFECTS

1.3 Inter alia, three weather factors influence the performance of an aircraft during take-off and landing. These are:

- Wind speed and direction
- Temperature
- Wet or dry runway.

1.4 The degradation of performance for landing on wet runways can be mitigated by the provision of a porous friction course on or by grooving the runway. However, the take-off performance is limited for all types of wet runway.

1.5 Ordinarily an aircraft commander will elect to take-off into wind as this gives the best take-off capability. However, all aircraft can operate safely with an element of tail wind if required. It is important to realise that only very low velocity tail winds can be tolerated by a commercial aircraft in take-off mode.

WEATHER ANALYSIS

UK Meteorological Office Data

1.6 An examination of the surface winds[1] on St Helena for the years 1984 – 2003 using data which summarised the results of 85,568 observations was undertaken. A summary of the raw data is shown in Annex 1. The percentage table was re-calculated to four decimal places to ensure the accuracy of the assessment. Diagram C shows the distribution of mean wind direction against frequency. This is highly peaked with the majority of winds coming from between 080° - 135°.

1.7 From the base data a wind rose was constructed[2] and this is shown at Annex 2. Analysis of the wind rose indicates that the probability of a tail wind on a North-South runway is 0.82% and that the probability of a tail wind greater than 5 knots is 0.35%. Further analysis of the frequency table shows that the majority of observations[3] (785 out of 1012) where there is a tail wind component occur in the sector 035° - 079°. In this case the tail wind component is between 75% and 30% of the recorded wind strength. A statistical analysis, factoring all winds with a tail wind component greater than 5kts was also undertaken. This gave the probability of a greater than 5kts tailwind occurring as 0.36%, thus supporting the results of the wind rose analysis. These outcomes indicate very low probabilities of adverse wind conditions affecting take-off.

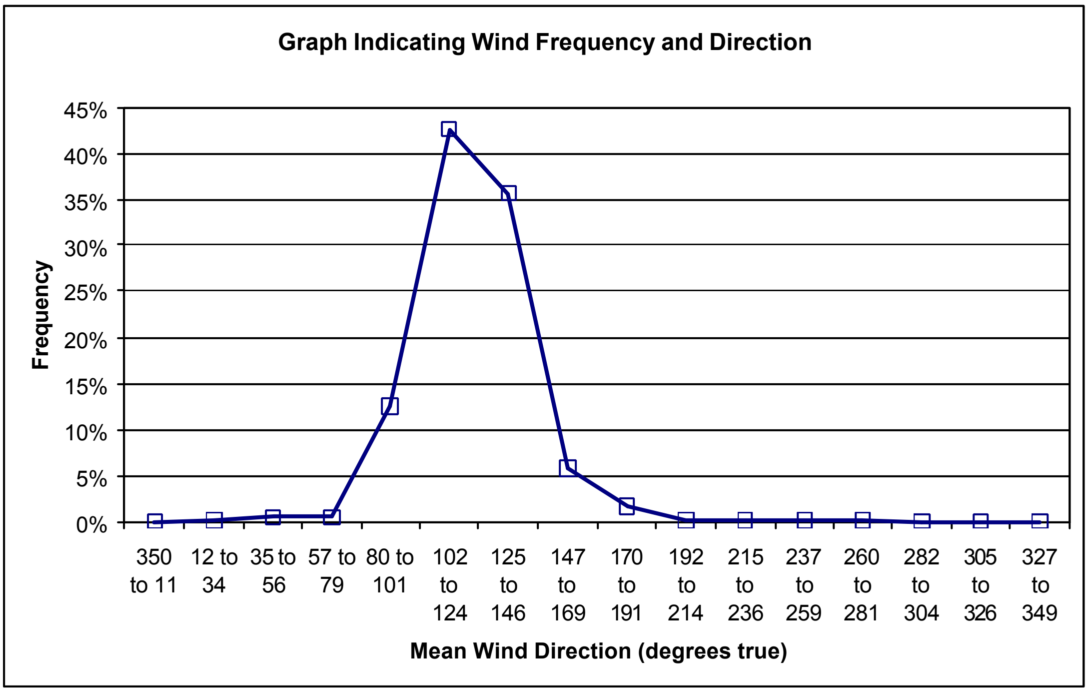


Diagram C

[1] Data provided by the UK Meteorological Office
[2] R Horonjeff, Planning & Design of Airports
[3] An observation is one reading, in this case hourly

St Helena Meteorological Office Data

1.8 Additional data on the occasions when a tail wind was observed on Prosperous Bay Plain was obtained from the St Helena Meteorological Office. The results of eight occasions over 20 days involving 181 observations were analysed. Tail winds tended to last for two to three days with an average duration of 8 - 9 hours per day. From extrapolation, it is concluded that the most likely scenario for flight planning purposes was a tail wind having an impact over a 2-3 day period in which takeoff capability could be affected, but with no tail wind component for around 50% of that period.

1.9 Further examination of the records by the St Helena Meteorological Office showed that on only one occasion had winds from the northern sectors been accompanied by rain; on that occasion there was light precipitation starting at 18:30 hrs and lasting for about 3 hours. An analysis of the temperatures during the times when tail winds occurred shows that the average daily temperature was 20° C with average peaks of 22.5° C. Brief peaks up to 25° C were experienced on four occasions but it is considered that, if relevant on the day, flights could be planned to avoid these brief periods.

ST HELENA RUNWAY DESIGN

1.10 The critical runway dimension is determined by analysis of the aircraft performance, bearing in mind the weather considerations.

1.11 In this case, the Landing Distance Available has been determined as 1650m for a B737-800 on a PFC[4] wet runway. The load limiting leg is the flight to St Helena from Cape Town with the aircraft landing heavy, as a result of having to carry 'Island Holding' fuel. The aircraft can land at either end of the runway, making the runway length for landing secondary to that for take-off.

1.12 For the provision of extra take-off run, the most economical solution is to make use of the land that must be provided for RESA and Strip-end. This generates a take-off run available (TORA) of 1925m, depending on the exact geometry of the aircraft turn pad at the runway end.

BOEING ANALYSIS

1.13 Boeing Flight Operations Engineering, Seattle, provided performance figures (July 2004) for the B737-600, -700 and -800 aircraft. The assumptions for calculating the take-off case were:

- Take Off Run Available – 1925m
- Temperature 23° C
- Runway altitude 1000ft
- Route distance 1700nm
- Alternate Distance 200nm
- 85% Annual Winds
- Typical two-class aircraft layout

[4] A wet runway with a Porous Friction Course or Grooved surface ('PFC wet')

- 3% performance degradation[5].

1.14 Two cases were examined: zero wind and 5 knot tail wind. Three runway conditions were considered: dry, smooth wet and PFC wet. Both the B737-600 and -700 would be able to take-off with a 5 Kt tail wind on a dry or PFC wet runway with unrestricted pay load on the route to Cape Town. The B737-800 would need to reduce its payload by 2404 kg taking off for Cape Town. The maximum passenger load for the -800, in two-class configuration, is 162. Given a mass of each passenger (84 kg) and baggage (15kg)[6] of 99 kg, the maximum passenger mass should be no more than 16,038 kg (13608 kg passengers and 2430 kg baggage). If this figure is used as the desired take-off pay load, then the reduction would be only 873 kg (1921 lbs).

1.15 The flight time to Walvis Bay is approximately one hour less than the flight time to Cape Town (1200nm Vs 1700nm). The fuel burn of the B373-800 in cruise is approximately 5,800 (2636 kg) lbs/hr[7]. Under these circumstances, the aircraft could fly to Walvis Bay, re-fuel and fly on to Cape Town without any penalty to the passengers other than a slightly longer transit time. Consideration would need to be given to connecting flight times out of Cape Town for transit passengers. However, this could be mitigated by suitable flight planning.

1.16 For the PFC wet runway, zero wind, therefore, the -800 would be limited to a take-off payload of 15,902 kg (160 – 161 passengers from 162 maximum) unless it diverted to Walvis Bay to refuel en route. It should be noted that the great majority of the time the aircraft would have a head wind component of between 5 and 15kts on take-off and this would allow the maximum number of passengers to be carried.

DISCUSSION

Forecast Traffic

1.17 The initial forecasts for passenger traffic indicate that the requirement for the first four years can be met by one 737-800 operating on a once-weekly rotation of Cape Town to/from St Helena. Up to year 20, given that the forecasts are achieved, this schedule increases to three rotations per week with a likely mix of destinations to Cape Town and other African gateway airports. These other African airports are, on average, 1450nm from St Helena and would be reached in approximately 3.75 hours flying time. The long term (40 years) forecasts indicate that six rotations per week will be required to meet traffic needs.

Aircraft Operations

1.18 There is a minimal probability that aircraft operations will be affected by adverse weather in the first four years (52 flights in 365 days) but as the number of rotations increases to three per week (152 flights in 365 days), so does the probability that a flight will have to take off with a tail wind component. By year plus 40, (312 flights in 365 days), it is almost certain that two or three flights per year will have to take off with a tail wind component.

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[5] To represent a well maintained but used aircraft
[6] JAR-OPS 1.620
[7] Source: Boeing Flight Operations Engineering

1.19 On these few occasions, the majority of aircraft would be able to fuel stop Walvis Bay or, possibly, Namibe (Yuri Gagarin) Airport, Angola, around 1050nm from St Helena. However, although this latter airport has a long enough runway (2,500m), fuel provision and quality cannot always be guaranteed at present. Currently, adequate fire cover provision also appears to be a little uncertain. The penalty would, again, be fuel and landing fees at the diversion airports. It is possible that flight crew duty time limitations might prove an issue. However, as from the meteorological evidence, the winds are forecastable and any potential flight crew duty time problems could be planned out prior to the aircraft departing Cape Town.

1.20 It should be noted that, if agreement were reached with the US DoD[8] to allow aircraft to refuel at Wideawake airfield, Ascension, say up to three times per year, when there was a tail wind component at St Helena, then there would be no effect on the aircraft bad-carrying capability but again, crew duty time might be an issue. The ability to re-fuel at Wideawake Airfield would be particularly relevant to flights, payload limited by a tail wind component, operating out of St Helena to other African airports to the North and East of Ascension Island.

Aircraft Loads

1.21 The performance calculations are based on trying to achieve carriage of the maximum number of passengers. In reality and in the longer term, this will be a mix of passengers and freight and it will be a rare occurrence that the maximum number of passengers will be flown at any one time. The passenger load is more likely to between 60% and 90%, in which case there would be no passenger off-loading problems. In the event of a tail wind, where the aircraft is planned to carry the maximum allowable payload, the most likely decision would be to off-load freight rather than passengers. If sufficient payload saving could not be achieved by this, then consideration would be given to off-loading passengers' baggage for later forwarding. Only after this would a decision be made to offload passengers.

Effect on Passengers and Incurred Costs

1.22 In the unlikely event of passengers having to be off-loaded, compensation would have to be paid. The cost of this per passenger will be greatest during the first four years because the passenger would be forced to remain on the island for seven days. There is a probability that this may happen once in the first four years. If, on that occasion, the aircraft was planned to operate to maximum payload capacity and no freight could be off-loaded, then consideration would be given to off-loading passenger baggage. One passenger equates to 5.6 passenger bags (84 kg to 15 kg). ¦ ¦ ¦ ¦ However it should be stressed that this cost would only be incurred for maximum loads with a tail wind component greater than 5kts and when the aircraft was planned to carry the maximum number of passengers: the probability of this latter occurring will be much less than 0.36%.

1.23 As traffic grows and the number of rotations increases, the passenger compensation decreases (less time waiting on the Island). However, the probability of a tail wind affecting a flight also increases. Further, with increased numbers of rotations, the likelihood is that the aircraft will not be operating to maximum capacity and that the aircraft will proceed to

[8] Untied States Department of Defense

Cape Town without payload penalty. Delay time to passengers decreases with increased number of rotations and therefore the compensation payment to each passenger also reduces. ¦ ¦ ¦ ¦ .

Mitigation

1.24 The majority of occasions in which a tail wind component occurs can be catered for by diverting to Walvis Bay if necessary. If agreement can be obtained to refuel at Ascension Island, then there will never be a problem with operating with a light tail wind component flying to other African airports. An alternative mitigation strategy could be to limit planned loads slightly during the rare occasions when there is likely to be a tail wind component, thus avoiding the problem from the outset.

Operating Costs and Fees

1.25 It is likely that, by year plus 40 one or two aircraft per year may have to refuel en-route to Cape Town or other African airports. Based on flying to Cape Town, ¦ ¦ ¦ ¦ . In the first four years of operation, with one aircraft per week, it is possible that there may be one occurrence where passengers are affected and one other where the aircraft diverts to Walvis Bay. ¦ ¦ ¦ ¦ . By year 40 plus, the forecast is for 6 rotations per week, 312 rotations per year. ¦ ¦ ¦ ¦ .

Total On-Costs

1.26 Allowing for passenger compensation of ¦ ¦ ¦ ¦ , during the first four years of operation, it is possible that there may be one occurrence where passengers and baggage are off-loaded. ¦ ¦ ¦ ¦ . Such small increases in ticket costs are most unlikely to affect ticket sales or traffic growth.

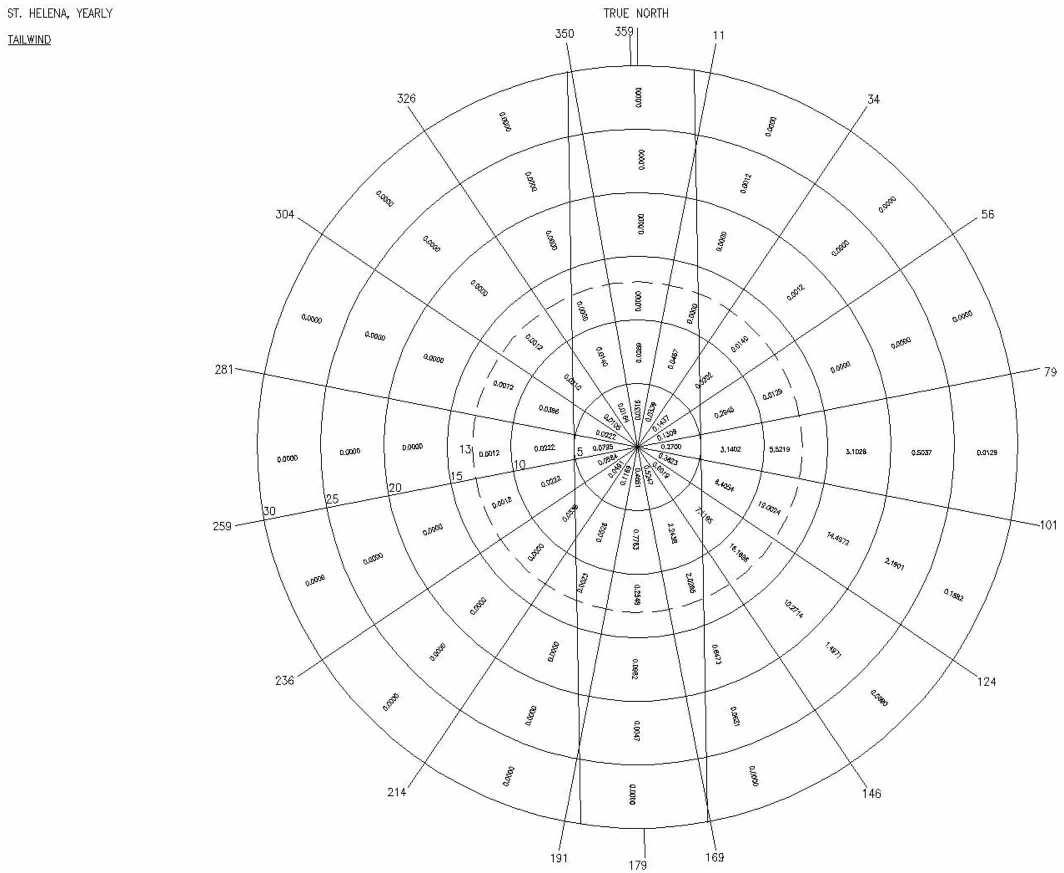
CONCLUSIONS

1.27 The prevailing wind direction is from the South East. here is a very low probability of tail winds in excess of 5kts. Full use can be made of the RESA at the northern end of the runway to maximise take-off run. An efficient air service serving St Helena can operate from a runway that only allows for full payload take-off into the direction of the prevailing winds. Any minor disruption to operations can, in the main, be accommodated by diverting to Walvis Bay for refuelling en-route to Cape Town. The adoption of this policy is likely to increase ticket costs marginally to make allowance for compensation payments and aircraft diversion costs but any such marginal increases would not deter potential travellers to St Helena or depress traffic growth. Once the air service provider has gained experience operating into St Helena, it should also be possible to adopt operating procedures which will mitigate any payload penalties on these rare occasions and, in consequence, minimise these potential on-costs. The adoption of this design philosophy would generate construction cost savings of the order of ¦ ¦ ¦ ¦ .

ANNEX 1 – SUMMARY OF RAW DATA

PERCENTAGE TABLE	Mean wind direction (deg true)																
	350 to 11	12 to 34	35 to 56	57 to 79	80 to 101	102 to 124	125 to 146	147 to 169	170 to 191	192 to 214	215 to 236	237 to 259	260 to 281	282 to 304	305 to 326	327 to 349	
Mean wind speed (KT)																	
0	0.0000%	0.0000%	0.0000%	0.0000%	0.0047%	0.0140%	0.0222%	0.0070%	0.0012%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**0.1449%**
1 to 5	0.0316%	0.0339%	0.1437%	0.1309%	0.2700%	0.3623%	0.6019%	0.5247%	0.4651%	0.1169%	0.0491%	0.0584%	0.0795%	0.0222%	0.0105%	0.0164%	**2.9170%**
6 to 10	0.0269%	0.0467%	0.3202%	0.2945%	3.1402%	6.4054%	7.1195%	2.2438%	0.7783%	0.0526%	0.0339%	0.0222%	0.0222%	0.0386%	0.0210%	0.0140%	**20.5801%**
11 to 15	0.0000%	0.0000%	0.0140%	0.0129%	5.5219%	19.0024%	16.1696%	2.0265%	0.2548%	0.0023%	0.0000%	0.0012%	0.0012%	0.0012%	0.0012%	0.0000%	**43.0091%**
16 to 20	0.0000%	0.0000%	0.0012%	0.0000%	3.1028%	14.4972%	10.2714%	0.8473%	0.0982%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**28.8180%**
21 to 25	0.0000%	0.0012%	0.0000%	0.0000%	0.5037%	2.1901%	1.4971%	0.0631%	0.0047%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**4.2598%**
26 to 30	0.0000%	0.0000%	0.0000%	0.0000%	0.0129%	0.1882%	0.0690%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**0.2700%**
31 to 35	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0012%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**0.0012%**
36 to 40	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**0.0000%**
41 to 45	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**0.0000%**
46 to 50	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**0.0000%**
51 to 55	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**0.0000%**
56 to 99	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	**0.0000%**
ALL OBS	**0.0584%**	**0.0818%**	**0.4792%**	**0.4382%**	**12.5561%**	**42.6608%**	**35.7505%**	**5.7124%**	**1.6022%**	**0.1718%**	**0.0830%**	**0.0818%**	**0.1028%**	**0.0619%**	**0.0327%**	**0.0304%**	**100.0000%**

ANNEX 2 –WIND ROSE



APPENDIX P: 1400M LDA/1650M TORA RUNWAY

PERFORMANCE OF B737-600, -700 AND -800 OFF A RUNWAY WITH 1400M LDA AND 1650M TORA

Landing Case

1. The three cases considered are:

- Landing dry
- Landing PFC wet
- Landing Smooth wet.

2. The aircraft performances for landing Dry and PFC[1] wet are broadly similar. We have Boeing Data for a 1650m LDA[2] smooth wet runway and this equates to 1390m Dry. Based on this, both the -600 and -700 perform reasonably well. The -600 is not performance-limited and although the -700 is payload-limited, it could still carry a compliment of 123 passengers in mixed configuration. The -800 however would be limited to carrying approximately 79 passengers from a maximum of 162. To achieve the PFC wet performance the operator would have to have the acquired the Boeing special Flight Manual appendix for the 737NG series of aircraft.

3. If the runway were Smooth wet then there would be greater performance loss with the -600 being limited to 80 from 110 passengers, the -700 to 70 from 126 and the heavier -800 limited to 20 from 162. We stress that the figures in this paragraph were derived using the Boeing Manual and therefore should be treated as indicative only.

Take-Off Case

4. For take-off from a runway based on balanced field performance (TORA =TODA=ASDA[3]) as advised by Boeing, the -600 would not be limited. The -700 could be payload limited but could still carry a full compliment of 124 passengers and the -800 limited to about 116 passengers. These figures have been derived from Boeing computed aircraft performance data and equate to the performance off a PFC wet runway. However from a dry runway, the operator can take advantage of the TODA and this would improve the load factors for all the aircraft.

Boeing Business Jet

5. The Boeing Business Jet (BBJ) can be fitted out with between 1 and 9 auxiliary fuel tanks to increase range. The decision on how many tanks would be based on the customer's particular route requirements. In keeping with the mission profile, a BBJ with 7 auxiliary tanks was selected for analysis. The BBJ has been assumed to be fitted with CFM56-7B27 engines and winglets. The BBJ, which carries a maximum of 50 passengers, should be able to take-off from a 1650m runway for Cape Town, carrying a full complement of passengers. At flaps 40, the BBJ would appear, from the manual, to be able, just, to carry a full passenger load landing onto a 1400m long dry runway. However, the BBJ could not land at all on a 1400m smooth wet runway with flaps 40 or onto a 1400m dry runway with

[1] Porous Friction Course or grooved runway (PFC)
[2] Landing Distance Available (LDA)
[3] Take-Off Run Available (TORA), Take-Off Distance Available (TODA), Accelerate Stop Distance Available (ASDA)

flaps 30. We would need to seek advice from Boeing on the viability of landing over a turbulent approach in runway-limiting conditions with flaps set at 40 before commenting further.

Airbus Aircraft

6. The performance of the A318 is similar to the -600, the A319 compares to the -700 and the A320 is similar to the -800 but carries only 150 passengers in mixed configuration.

Ascension Island

7. Flights from Ascension Island would land with the same restrictions as given in paragraph 1 above. For the take-off case, neither the -600 nor the -700 would be payload-limited. The -800 is likely to be limited to about 139 passengers into Ascension Island.

Flights to Europe and Cape Verde

8. The non-stop operational capability of Boeing B737-600, -700 and -800 aircraft flying direct to London (LDN), Paris (PAR), Madrid (MAD), Amsterdam (AMS) and Cape Verde, Sal Amilcar Cabral (CVS) has been estimated. The estimates must be subject to a number of caveats as distance has had to be estimated on a great circle basis and not flying airways over Europe which would be the case in reality. If anything, therefore, the estimates probably over-estimate the capability of the aircraft. These assumptions are:

- JAR[4] requirements
- JAR international fuel reserves
- Operating Empty Weight plus 2%
- Aircraft not fitted with winglets
- Engines, -600 CFM56-7B22, -700 CFM56-7B26, -800 CFM56-7B26
- No allowance for aircraft performance degradation
- Standard day, zero wind, upper air
- Aerodrome 1000ft above sea level, zero wind and temperature at ISA plus 15°
- Wet runway
- Route distances estimated from flat maps and website data
- Long range cruise at 31,000ft/35,000ft
- Great Circle routeing.

[4] Joint Aviation Requirements (JAR), European aviation requirements

9. For comparison, both the 1650m and 1925m take-off runway cases have been estimated and the results are summarised below.

1650m Take-Off Runway	**B737-600**	**B737-700**	**B737-800**	**BBJ**
Maximum Passengers (PAX)	110	124	162	50
STH - LDN	Not possible	Not possible	Not possible	10 PAX
STH - PAR	Not possible	Possible, 0 PAX	Not possible	12 PAX
STH - MAD	Possible 0 PAX	100 PAX	Possible, 0 PAX	30 PAX
STH - AMS	Not possible	Not possible	Not possible	5 PAX
STH - CVS	37 PAX	124 PAX	45 PAX	50
STH – ASC	110	124	139	50
ASC – STH	110	124	79	50
STH - CPTN	110	124	116	50
CPTN - STH	110	124	79	50

1925m Take-Off Runway	**B737-600**	**B737-700**	**B737-800**	**BBJ**
Maximum Passengers (PAX)	110	124	162	50
STH - LDN	Not possible	Not possible	Not possible	50
STH - PAR	Not possible	Possible, 0 PAX	Not possible	50
STH - MAD	70 PAX	100 PAX	40 PAX	50
STH - AMS	Not possible	Not possible	Not possible	50
STH - CVS	108PAX	124 PAX	135 PAX	50
STH – ASC	110	124	162	50
ASC – STH	110	124	162	50
STH - CPTN	110	124	162	50
CPTN - STH	110	124	162	50

Flight Safety

10. It should be noted that by operating the B737NG off a 1400m landing runway, all the operations would be runway-limiting. This means that every flight requires the use of all the runway length on every occasion. It is the opinion of the Regulator that this would increase the risk of an undershoot or an overshoot on landing and the risk of an overshoot in the case of an aborted take-off. Further, in the case of a catastrophic failure just after V1 (decision speed), the aircraft commander might have no option but to attempt an immediate landing with a heavy aircraft onto a runway which would be too short.

Air Cargo Operations

11. Although not specially part of this assessment, the carriage of air cargo in the aircraft holds (belly hold cargo) needs mention. This is addressed in greater detail in the paper on air cargo but the main conclusion deserves mention here: that the shorter runway would severely limit the ability for SHG to profit from using spare payload capability for the carriage of air cargo. Further, operations by dedicated air cargo aircraft such as the L100 Hercules would not be viable at all from a 1400m landing/1650m take-off runway.

Emergency and Disaster Relief

12. It should also be noted that if the shorter runway is adopted, then acceptable emergency and disaster air relief will only be possible by the use of military aircraft operating to military operating standards.

Runway with Full Take -Off capability in One Direction Only

13. This would not affect the B737-600 payload capability on take-off. However, for the design case (PFC wet with a 5kt tail wind) the -700 would be payload limited but could still carry 124 passengers; the -800 would be limited to 91 passengers from a possible 116 passengers.

Future Aircraft

14. These assessments have been undertaken using the capabilities of aircraft currently in service. The trend by airlines has been to use progressively larger aircraft to meet route requirements. This is the logical way of meeting increased demand. It is more efficient to use one aircraft at a 100% load factor than two smaller aircraft at a 70% load factor: airlines are in business to make profits not losses. In the near- to medium-future therefore, it can be expected that the smaller aircraft will be replaced by larger aircraft. This trend is well demonstrated by analysing sales of B737NG[5] aircraft: Boeing has sold only 54 off B737-600 (110 seats) whilst it has sold some 500 B737-700 (124 seats). The -700 sales are now falling but the -800 (162 seats) and -900 (177 seats) sales show strong market interest. It is almost certain that if the shorter runway is built, there will be problems finding suitable aircraft to provide the air service by, say, year +10. The result would be either very expensive ticket prices (because of low payload capability) or investment in a runway extension at a likely cost of some ¦ ¦ ¦ ¦ .

Caveat

15. The aircraft performance estimates included above should be regarded as estimates for comparison purposes only and should not be used as a basis for planning and setting up an air service. Manufacturer's computer derived performance data should be acquired if further analysis is needed.

16. The 737-800/900 short field performance improvement package has the potential to reduce take-off and landing field length by up to 50 metres. However the performance improvements have not yet been flight tested or certified[6]; all that is available is preliminary information. Also, any given airline operator may or may not choose to incorporate the performance improvements. The manufacturer advises that it would be imprudent to count on the 50 metre reduction. Finally, it should be noted that this modification, if introduced into service, will apply only to the B737-800 and B737-900.

[5] New Generation - NG
[6] Information received from Boeing, Seattle, August 2004

APPENDIX Q: AIR TRAFFIC SYSTEMS SPECIFICATION

SPECIFICATION FOR AIR TRAFFIC SYSTEMS

AERODROME SURVEY

1. WGS84 Implementation, Navigation and Aerodrome Facility Survey, GA Survey to ICAO Annex 14 Surfaces, Precision/Non-precision Instrument Approach Surveys, Departure Area Survey, Visual Manoeuvring/Circling Minima Survey, Type 'A' Survey.

AIRSPACE ISSUES

2. En-route, arrival and departure procedures.

VISUAL CONTROL ROOM (CABIN)

3. Visual Control Room comprising 2-position cabin with air-conditioning.

ATC EQUIPMENT

4. VCR Operator Console comprising ATC operator desk, Assistant 1 Operator desk, Work surfaces, Flight strip panels, Integral lighting, Dimmer switches, PTT foot switch, 3 x Handsets, Flight strip holders, 2 x Operator chairs', ALDIS lamp with filters, 2 x Binoculars, Furniture, Fax machine.

5. Radio Communications System comprising 4 x VHF/AM Transmitters, 4 x VHF/AM Receivers, Integrated Voice Communications System, Emergency transceiver, VHF/FM Base Station, 5 x VHF/FM Handheld Transceivers, HF/SSB Transceiver with broadband antenna, 16-channel Voice recorder, 5 x Headsets, Installation materials

6. ATC Equipment comprising Master clock with 2 displays, Crash Alarm, AGL control and monitoring system, UPS & DC power supplies, Installation materials.

7. Met/AFTN System comprising 2 x Computer terminals with 17” displays, Dual server, Software Licenses, AFTN Module, Met Module, Wind Speedand Direction Sensors, Temperature & humidity sensors, Radiation shield, Power supplies, Digital barometer unit, Line modems, Met displays, Installation materials, Documentation

8. Cables and Installation Material comprising Ethernet cable, Screened multi-core cable, Power cable, Fixings & panel mounts, Cable tray and trunking, RF cables with connectors, 2 x 19" equipment rack, Main Distribution frame, Tools, Surge arrestors and spark gaps, Earth rods, strip, cable and connectors, Krone blocks, Lightning protection

9. Recommended Spare Parts for ATC equipment

   Engineering Services
   Factory Training

10. Recommended General Purpose Test Equipment comprising 75MHzOscilloscope, Digital Multi-meter, Frequency Counter, Fast Installation Tester, Vector Voltmeter, RF Signal generator, Digital Peak Power Meter

AERONAUTICAL GROUND LIGHTING

- Approach Lights – North Runway
- Approach Lights – South Runway
- Threshold and End Lights
- Runway Edge Lighting
- PAPI - Runway 1and 2, doubled
- Taxiway/Apron Lighting
- Regulators
- AGL Control and monitoring - see ATC Equipment
- Illuminated Signs
- Warning Lights
- Remote Obstacle Lights
- Illuminated Wind Socks
- Spares
- Engineering Services
- Factory Training

DVOR/DME AND NDB

11. Dual DVOR comprising Transmitter Cabinet 30-100 Watt Dual -"CE", Accessory box including consumable spares, AC/DC-Converter, DVOR Antenna Switching Unit Cabinet, System Cabling Technical Documentation and Circuit Diagrams, Maintenance-free lead-Acid Battery 48 V/72 Ah (3 hrs), DVOR Antenna System with Antenna Decoupling, Monitor Antenna and 10m mast, Installation Materials, DME collocation Kit (Central installation), Modem ADM, RCMS terminal & software.

12. DVOR Antenna Counterpoise comprising 30m Counterpoise Extension to 30m diameter, Counterpoise 30m / 5m high, including cable ducts, Antenna Ring, Antenna Cables length 17.3m, Lightning Protection Box.

13. Dual DME (100W) comprising DME Transponder Cabinet 100W Dual, Modem adapter, DME Operating Program for PC, Tool Kit, Technical Documentation & Circuit Diagrams Omnidirectional Antenna (9dB gain) with Obstacle Light, 25m Antenna cables.

14. DVOR/DME Remote Control & Status System comprising Remote Control and Status Unit AC/DC Converter, Configuration Software (site files), UPS, Modem ADM, Set of Technical Documentation & Circuit Diagrams, Control Tower Unit.

15. DVOR/DME Equipment Cabin comprising Insulated equipment cabin, Air Conditioner, Work surface, Heat sensor system DVOR/DME Special to Type Test Equipment comprising Specific Test Equipment for DVOR, Specific Test Equipment DME, Service Terminal (Notebook) Spares comprising DVOR Spare Modules SN 400 Common Prop. 1,

DME Spare Modules Specific to DVOR 432 Prop.1 RCMS Spare Modules Specific to DME 435 Prop. 1

16. NDB with mast and accessories

Engineering Services
Flight Inspection (on task, excludes transit charges)
Factory Training DVOR/DME and NDB

ILS LOCALISER/DME SYSTEM

- DME
- Equipment Cabin
- Test Equipment
- Spares
- Factory Training
- Flight Inspection (on task, excludes transit charges)

ENGINEERING SERVICES

17. Consultants Engineering Services provides for project management and design services including, draft systems design specification, design review assessment with final system design documentation and detailed project plan, supervision of equipment testing, installation and commissioning, training and customer inspection/acceptance.

18. Contractors Engineering Services provides for the installation and commissioning by qualified and experienced contractor's Engineers and Technicians to complete the following tasks:

- installation of equipment
- the provision of technical specifications for "Commissioning" and "Site Acceptance Tests"
- engineer electrical and mechanical interface requirements
- commission all the equipment in accordance with the Specification and the recording of all results achieved
- verification of the performance of electrical and mechanical interfaces for all the equipment in accordance with the agreed specification.

CIVIL WORKS BY OTHERS

19. Visual Control Room - support structure for the cabin of either concrete of clad steelwork. The facility should include an Equipment Room and Rest Room.

20. ATC Equipment - Concrete bases for meteorological sensors and across site trenching/cabling for power and telephone line between ATC tower and sensors

21. Aeronautical Ground Lighting - Concrete bases for all fittings and signs, power Substation Building for switchgear and regulators, cable trenching between Power Substation Building

and fittings, transformer pits for secondary transformers and primary cable ducts and inspection pits.

22. DVOR/DME and NDB - Foundation bases for equipment cabin and counterpoise, across site trenching/cabling for power and telephone line and foundation base and communications cabling for monitoring equipment.

23. ILS Localiser/DME System - Foundation bases for equipment cabin and antenna array, across site cabling for power and telephone line and foundation base and communications cabling for monitoring equipment.

APPENDIX R: PROVISION OF SEA CARGO UNDER AIR ACCESS

CONTENTS

1 INTRODUCTION

BACKGROUND

1.1 The current cargo demand by St Helena is small by comparison with standards of world shipping movements. Monthly container imports vary between 15 and 30 containers. Monthly break-bulk volumes are around 1000 tonnes on average, in addition to the containers. Movements are almost entirely one-way, few exports leaving the island (small quantities of fish and coffee), along with any personal possessions being shipped out. It is all moved by the RMS St Helena, on an exclusive commercial arrangement.

1.2 The RMS is owned by SHG via its St Helena Line (SHL). The current management contract is with Andrew Weir Shipping Ltd (AWSL), which has had it since 2001 (previously with Curnow Shipping Ltd). The vessel was purposely designed for the route and as the principal means of access for the island. It can carry 868 tonnes in 56 off 20ft[1] containers, each carrying 16 tonnes of freight (the box itself being a further 2t) in two holds and on deck, six of them as electrically-charged frozen goods containers ('reefer boxes'). Additionally it can carry 1850 tonnes of break-bulk cargo, making a maximum total of 2718 tonnes of cargo, whose achievement is very much subject to a 'stowage factor'; effective capacity is about 2000 tonnes[2]. The RMS carries break bulk[3] probably more for historic reasons and to accommodate the minimal on-island handling facilities than because it can't be accommodated in containers. The RMS cannot carry 40ft containers due to the dimensions of its holds, though it can accommodate some 20ft containers back-to-back. Therefore it may be expected that if 40ft containers could be handled on-island most of its cargo needs arriving by sea could be containerised. Inspection of the cargo liftings by AWL over the past few years supports this contention. The island's cargo marshalling area can accommodate around 60 off 20ft containers, including reefers[4].

Demand levels

1.3 The RMS, in the mid-1990s before the population declined[5], was transporting around 25,000 tonnes per year[2] study. Partial analysis of recent AWL movements indicates an annual volume of around 20,000 tonnes per year – quite possibly it is less than this. The current budget[6] is based on 23,263 tonnes (South Atlantic based schedule), which assumes 25 freight tonnes as the net container payload. This budget includes demand arising from Walvis Bay and Luderitz, previously not visited by the RMS. For a variety of reasons, it is unlikely to be achieved in full.

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[1] Containers come in at least two standard lengths – 20 ft and 40ft. Their cross-section used to be an international standard of 8ft by 8ft (1970s standard) but nowadays these dimensions seem to have reverted to pre-1970s practice and can be any combination of 8 ft to around 9ft, by same. This is in the name of customer-driven flexibility but it makes handling requirements more unpredictable and increases handling costs.
[2] See *RMS St Helena – Rescheduling Review*, Economic Studies Group, April 1995, page 4/4-5
[3] Break-bulk refers to cargo carried loose, usually on pallets to allow movement by fork-lift vehicles. At one time, the majority of ships' cargo other than bulk cargoes was carried this way until the container revolution got going in the 1960s and 70s. Some specialised ships still have 'tween decks, some of them movable, to accommodate palletised and other cargo, the RMS included.
[4] Source: AWL.
[5] May 21st 2002 saw UK citizenship and passports restored to St Helenians and an exodus occurred.
[6] *RMS St Helena Business Plan Year 4*. Source: AWL

AIM OF THIS PAPER

1.4 This cargo market study was carried out to provide a basis for informed choice about the alternatives for moving cargo to and from the island.

SCOPE OF THIS PAPER

1.5 Whether an airport is constructed or not, there will always be a requirement for cargo to be delivered by sea. One reason is the relatively high cost of air freight, which ranges around £2.50-3/kg to £7/kg, another being the type of goods, e.g. bulk materials, large items and heavy items. The requirement for cargo access during construction of an airport, of a rather specialist nature, e.g. heavy plant and aggregates, is dealt with separately

1.6 This paper reviews the opportunities and constraints facing SHG in thinking about future sea access, specifically cargo movements and is structured as follows:

- Situation A – Reliance on the commercial market, in two forms:
  - A1: Supply on demand
  - A2: Supply under form of contract
- Situation B – SHG assumes responsibility (current situation) by
  - B1: Chartering
  - B2: Purchasing.
- Section A1 and B1 use the following questions to help in formulating solutions:
  - How responsive is the market likely to be to periodic orders?
  - What would be the minimum order quantity?
  - Is the requirement for a self-loading vessel a severe or medium limitation, especially when the requirement is for a combination of containers and breakbulk?
  - What frequency could be obtained?
  - Would fuel and dry cargo be able to be carried in the same vessel?

METHOD ADOPTED

1.7 The market study was conducted bottom-up, that is, it established contact with 12 ship brokers based in the UK; six shipping lines; eighteen freight forwarders based in South Africa; and a few entrepreneurial individuals interested in providing services to St Helena. Extensive contact was also made with AWL for information relating to cargo analysis and operating costs. Previous reports carried out by others were used where appropriate as sources of information.

2 SITUATION A: RELIANCE ON THE COMMERCIAL MARKET

2.1 The question here is whether potential exists in the South Atlantic region for the commercial shipping market to respond to the demands for cargo from St Helena. Would shipping companies be willing to make direct journeys to St Helena for this volume of cargo or would a detour from their normal shipping route be economically viable?

A1. SUPPLY ON DEMAND

2.2 'Supply on demand' in this context means that the market responds to someone on the island wishing to place an order. In such a scenario no exclusivity would be granted to any party.

How responsive is the market likely to be to periodic orders?

2.3 The consensus amongst the shipping brokers and shipping companies was that there would be some response to periodic orders but that it would be very limited and that the cost of response is likely to be high.

UK to South or West Africa

2.4 The current low volumes lead to relatively high costs per tonne of cargo shipped to St Helena, exacerbated by the one-way nature of the traffic. It is unlikely that there would be much interest from the shipping lines normally serving South and West Africa, for reasons such as:

- low volumes (artificially high freight rates would need to be invoked)
- profitable routes have already been established
- diversion to St Helena would add significant voyage length
- no port facilities available to unload from container ships.

2.5 Shipping companies operating liner trading businesses ('liner' meaning pre-arranged schedules) need predictability to retain custom. Most ocean trading container vessels could be expected to carry at least and often much more than say, 600 containers. Container vessels tend not to have on-board container handling facilities. They trade to and from ports set up for the purpose and their specifications are heavily influenced by the physical characteristics of and facilities provided by these ports. Turn-round time is a key component of the container shipping concept. Hence, stopping for two to three days (which is what it takes the RMS) to 'rotate' say, 30 containers, at a remote and off-route island, is likely to involve significantly more cost than profit and would give the competition a tactical advantage.

2.6 The timing of the order is a significant aspect of the market's response. It is questionable whether a vessel (at potentially short notice) would have sufficient space for the extra 'spot[7] volumes' of St Helena cargo and at the same time be following a route that allows a call at Jamestown without an expensive diversion.

2.7 Another factor is South Atlantic sea conditions. The combination of long routes, economies of scale, the necessity to operate year-round schedules and ocean conditions mean in practice that shipping lines serving South and West Africa have to use ocean-going container ships, which tend to be of the larger variety. The smaller 'feeder' types of vessel that trade on the African coast, moving cargo to and from local 'hubs' and smaller ports typically may not be suitable for despatching to St Helena, a round trip from west Africa of 2,500 – 3,000 nautical miles. Other feeder types, classified as ocean-going, might be too big or not have own cargo-handling gear.

2.8 There are many shipping lines operating to West and South Africa from the UK, using ships carrying upwards of 600 containers[8] as a minimum. They have segmented themselves on global routes, their customers offering repeat business on reliability of service and competitive freight rates. For a typical liner container vessel to justify calling at St Helena, our research indicates that there would need to be a demand of around 100-150 containers – up to five times more than the island seems able to muster in one order[9].

2.9 Should an airport be built, there is the possibility that demand from St Helena may double, over a period of some years. However, even this volume would be unattractive to the established shipping lines. The industry considers 300 containers to be a small-sized operation. Even if current demand for St Helena doubled, it would still only represent approximately 60 containers per month and say, 1,500 freight-tonnes[10] of break-bulk. Much of what gets delivered to a ship as break-bulk is loaded into containers as Loose Container Loads (as opposed to those containers that are stuffed at inland consolidation points) but the St Helena volumes would still not be adequate to warrant a detour from an established shipping route.

2.10 The chances of the shipping market responding to spot calls, at least from the established trading shipping companies, are thus limited, expensive and unreliable at best, and non-existent at worst.

Other South Atlantic Routes

2.11 There is an alternative whereby vessels already travelling to nearby destinations in the South Atlantic Ocean, such as Ascension Island or the Falkland Islands, may respond to the demand because this represents a business opportunity. The vessels carrying cargo

[7] 'Spot' meaning incidental, not pre-scheduled
[8] For comparison purposes, one broker quoted a 'feeder' type with a capacity of 550 containers and a tonnage of 14,666 dwt – a large ship in St Helena terms. It is not known what other carrying capacities this ship had.
[9] The weight of a loaded container can be between 15 and 25 tonnes and 30 tonnes is not uncommon, though 25t is supposed to be a maximum. Containers are 'stuffed', that is, loaded, an art that is complex and entails varying levels of sophistication – may be computer-programmed for example – and experience and inter-communication between various parties, depending on where the container originates, where it is stuffed, where it must be off-loaded, re-loaded and where it must end up. Containers are accompanied by staggering amounts of paper-work, which must both accompany them and be transmitted around the globe in advance of the actual movement.
[10] Loaded tonnes and freight tonnes have different meanings for different parties; freight tonnage is the basis for charging 'freight rates' and is related to cubic capacity, i.e. space available in the ship used to carry cargo. For example, when containers are carried empty, they are still accounted for as freight tonnage because someone has to pay for their carriage.

to the Falklands or Ascension Islands are not always fully loaded, so incremental cargoes destined for St Helena would increase revenue for the journey. Additionally, the Falkland Islands are similar to St Helena in that neither exports large quantities of goods; the Falkland Islands export small quantities of wool (a seasonal export).

2.12 Darwin shipping company currently carries cargo from the UK to the Falkland Islands. It may or may not be reluctant to detour via St Helena but it has been in talks about shipping goods from the UK to Ascension Island, where the goods would then be picked up by the RMS (in its new South Atlantic-based schedule) and taken to St Helena. The cost of this would be around ¦ ¦ ¦ ¦ for any goods less than a container load to Ascension plus additional costs for shipping goods on the RMS from Ascension to St Helena. This cost is high when compared to historic RMS St Helena prices, where break-bulk was charged at an average of ¦ ¦ ¦ ¦ /freight tonne[11]. The 'Darwin alternative' also relies on the RMS remaining in operation or an equivalent being provided. Either a new shuttle service would need to be set up to run between Ascension and St Helena or the RMS is replaced.

2.13 Jeppesen-Heaton, ship broker, provides the Falkland Islands Company with charter vessels to move goods from UK to the Falkland Islands. This is a specialist source of support that holds some promise for providing a cargo link to St Helena (discussed below).

South/West Africa to Europe/SE Asia

2.14 Zedcore[12] freight forwarders investigated the possibility of getting containers to St Helena by commercial shipping lines on the premise that this would be cheaper than the RMS. They claim to have identified commercial lines plying routes between Europe, South Africa and destinations in SE Asia would that would stop at St Helena, providing that they have eight[13] containers or more to unload. Their main customer on St Helena, WA Thorpe & Sons, asked the Island authorities if they would allow such use of commercial shipping lines. The need to keep the RMS on a viable footing means that exclusivity must prevail for the duration of the current vessel management contract. There is therefore evidence of South Africa-based interest in serving the St Helena demand but one could expect it also to be accompanied by a requirement for exclusivity. We also found other entrepreneurial evidence of this type in South Africa, claiming knowledge about where to source charter vessels.

What would be the minimum order quantity?

2.15 Shipping lines serving other islands in the South Atlantic Ocean appear willing to carry small quantities of cargo so long as the marginal revenue exceeds the marginal costs, even with demand at current levels. That commercial shipping lines plying existing routes would make a detour for a minimum of eight containers is not reliable.

2.16 The Falkland Island Company's practice[14] of chartering a vessel for each consolidated order indicates that a cargo of around 2,000 tones is just about economically viable from

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[11] Calculated based on average revenue per freight tonne for RMS voyages 52, 53, 55; source: AWL
[12] A small (six full-timers) 'buying agency' based in Cape Town serving wholesale and retail businesses on St Helena, Ascension and Tristan da Cunha, who consolidate cargoes in containers.
[13] This could not be substantiated and we suspect that once the conditions at St Helena become known, such a stop would not be contemplated by a liner-type operation and certainly could not be counted upon as 'secure'.
[14] Source: Jeppesen-Heaton Ltd, ship brokers, Epsom

UK, one way. That is, the vessel comes off charter immediately upon discharge and must find itself another cargo in the vicinity – not a basis of commercial reliability to adopt for secure supply to St Helena. In other words, if this solution were to be considered, the cost of the vessel returning empty must be picked up.

2.17 Removing exclusivity to form a market opportunity to supply St Helena would be unlikely to cause the landed price of goods to drop dramatically because of the costs involved in taking cargo there. While it may cause a few shipping lines to declare interest in delivering cargo to St Helena, any company would only be taking small quantities. Given the low base demand, competition is unlikely to be strong. However, an advantage to the island may be more frequent delivery of goods than at present, helping to reduce the levels of stock needed and therefore help with cash flow.

Is the requirement for a self-loading vessel a severe or medium limitation, for a combination of containers and break-bulk?

2.18 While there are vessels that have self-loading facilities, they are more difficult to obtain than standard container vessels, unless they were currently serving similar markets (e.g. other South Atlantic islands with no port facilities).

2.19 Smaller self-loading vessels are available in the market and could be identified. The facilities at Jamestown (in particular, storage) would be unattractive to self-unloading container vessels, which are also difficult to source[15].

2.20 A considerable commercial factor is paying for time used by the vessel while it is unloading, known as 'demurrage', charged by the hour. Thus two to three days at St Helena could be quite expensive if contracts were placed on a spot charter basis.

What frequency could be obtained?

2.21 The frequency of delivery is closely related to the minimum economic order quantity. It would depend on the conditions under which the commercial market supplied St Helena. If any number of shipping lines had the ability to stop at St Helena (i.e. had on-board loading facilities), then the frequency could, theoretically, increase. However, if too many shipping companies divided the demand between them, it would become uneconomical to unload at Jamestown. Some form of exclusivity would appear to be a pre-requisite. Whether there would be an opportunity for different shippers to serve St Helena at the same time, i.e. no exclusive arrangement, can only satisfactorily be established by testing the market. This has to be done by SHG if prices are to be obtained, commercially meaningful prices.

2.22 The frequency of demand generated by the Falklands Islands Company is approximately one sailing every two months from UK (for a population about half that of St Helena).

Would fuel and dry cargo be able to be carried in the same vessel?

2.23 E A Gibson Shipbrokers and others quoted several vessels in operation able to carry fuel (diesel, petrol) and containers. We have received specifications of several such vessels[16].

[15] When the RMS broke down a few years ago SHL counted itself extremely lucky to engage the services of such a ship for the duration of the repair.

2.24 However these vessels are not always suitable for deep-sea ocean-going voyages. Therefore, it is unlikely that many of these vessels would voyage to St Helena to deliver the fuel and cargo requirements either on a 'response from the commercial market' situation or on a charter basis.

2.25 There are therefore strong indications that it would be necessary to build an ocean-going vessel if the combination of dry cargo and fuel became a requirement. E A Gibson believes that none are currently available on the market for charter or contract. This broker is one of only a very few that we found among all those that we contacted that could offer either useful information or positive views on how the market could support St Helena's specific needs.

2.26 Although it is technically feasible, there appears to be no good reason to combine delivery of fuel and dry cargo in one vessel unless the long-term economics of owning such a vessel outright suggested a viable business case. Such a study lies outside our current scope of work.

Supply-on-demand conclusions

2.27 Overall, despite the disinterest of the dominant mass-trading shipping lines, the possibility remains of some positive response from the commercial market to serve the cargo needs of St Helena. It would be from the specialist end of the shipping market and would be tailored to demand and thus require careful management.

2.28 A number of variables would affect the method of cargo delivery to St Helena. The principal variable is the number of shipping companies willing and able to go to the island – if this number is significant, then the volumes each shipping line carries is likely to be small and may reduce the viability. There are limitations to the type of vessel that can serve the island due to the lack of port facilities and its ocean-based remoteness.

A2. SUPPLY UNDER FORM OF CONTRACT ('RISK SHARING')

2.29 Under this concept, a ship-owner would agree to a contract to deliver cargo to St Helena, with financial inducement – as opposed to being the recipient of incidental spot-type calls. This would be a term contract to guarantee security of supply to St Helena. This notional arrangement would allow more security because a shipping line would be obligated to deliver cargo to St Helena on demand. There would be a degree of risk-sharing undertaken by the shipping line but the contract would be underwritten by SHG's access to subsidy funding – but only if necessary to make it a secure source of transport.

2.30 There would be a need for a person or organisation to coordinate delivery of cargo to the relevant port of departure. This could be subcontracted to a freight forwarder based in the UK or South Africa – depending on where the vessel is contracted to depart from. The freight forwarder would be required to collate and manifest the cargo ready for shipment. Similarly – and in any case – there would be a need for the same function to be performed on the island in reverse, demand-led. The Solomon's company could be assumed to play this role (though we have not asked it).

[16] Fuel is currently delivered to St Helena on contract from the Dutch company Jo Tankers; if an airport is built, aviation fuel will also be required.

2.31 The same limitations as were discussed above apply concerning which type of vessels can voyage to St Helena, the lack of port facilities there and the possible necessity to detour from other destinations.

2.32 It would seem unrealistic to try to contract with shipping lines that currently serve West and South Africa from the UK due to the high revenues that these routes must generate and the time factor involved with unloading at St Helena. The container ships that typically serve these routes are anyway typically large and typically do not have on-board loading facilities.

2.33 It may be possible to contract with a shipping line that currently serves the Falkland Islands or Ascension Island or its equivalent, perhaps sourced from South Africa. A detour from these routes to St Helena might be contractually viable. Additionally, when vessels are not fully loaded, increasing tonnage with St Helena freight would help absorb the variable and fixed costs of running the vessel.

2.34 It is evident from liaising with ship brokers that it would be feasible to contract a shipping line or ship owner to undertake a voyage at regular intervals as required. Therefore, with effective management of cargo orders, it could be feasible to manage and thereby contract a ship to make a voyage to St Helena once per month or once every two months.

2.35 However, although the possibility has been expressed by shipping lines and shipbrokers, this option could only be guaranteed once the commercial terms were agreed and the shipping lines had full information provided to them – such as volumes, mix, number and size of containers, frequency, unloading time, export requirements, trans-shipment or return of empty containers and so on. It is likely that to make it work commercially, a strict regime of ordering to a pre-arranged time schedule would be required – which could prove impractical.

3 SITUATION B: SHIP MANAGEMENT BY SHG

3.1 This notion considers two types of solution:

- Chartering a vessel
- Purchasing a vessel for use on St Helena.

3.2 It may not be necessary for the St Helena Government to charter or buy a vessel. It may be possible that a private consortium can organise or manage the chartering of a vessel and the delivery of goods. However, it would take a driving force from the island to ensure that this occurred rather than relying on market forces within the industry.

B1. CHARTER

3.3 There are two methods in which the shipping could be undertaken on a chartered basis:

- 'Spot' charters - where SHG would pay market rates of the day, cargo by cargo.
- 'On-time' charter where the ship owner is responsible for day-to-day management of the ship but does not take responsibility for any commercial aspects of the shipping – e.g. the ports of call, cargo carried – these remain the responsibility of the charterer. In this arrangement, the ship may be likened to a truck provided with a driver and a meter, acting under the instructions of the hirer.

3.4 If chartering is used to secure delivery, the chartered vessel must have self-loading facilities on-board. To charter a vessel, the minimum information required by ship brokers is the estimated size of the vessel; volume of cargo required; any heavy one-off pieces of equipment being transported; what lifting capability is required; and of course, when.

Is it feasible in the South Atlantic region?

3.5 It seems possible to obtain both forms of charter from the South Atlantic Ocean market but we are not confident enough to say that full security of supply could be satisfied purely from the region. A spot market contract would be a one-off, immediate contract with a shipping company that will deliver the goods as agreed. The contracting agency (SHG or a private entity) would contract with a ship owner or shipping line to make a one-off visit to St Helena.

3.6 The study identified that security of supply would be more likely obtained from the UK / Europe. Chartering would require effective order management and consolidation. A similar operation is in place for the Falkland Islands. The Falkland Islands Company coordinate the freight orders and uses a broker to find and charter a vessel to voyage from the UK to the Falkland Islands. For example, in July 2004 the broker (Jeppesen-Heaton Limited) spot-chartered a 2300 deadweight tonne (dwt) vessel to deliver freight from Shoreham, UK, to the Falkland Islands. The cost at current market rate is approximately ¦ ¦ ¦ ¦ for a one-way voyage, including fuel, crew and normal maintenance costs – which does not include the cost of loading and discharging freight at the departure and destination ports. The charter may be only for a one-way voyage; the Falkland Islands

Company only currently charters two return voyages per year – the return voyages are used to bring back the empty containers to the UK and are used to export wool. The terms are fixed in accordance with INCOTERMS (International Commercial Terms)[17] by the Falkland Islands Company, not by the ship broker. The broker finds the vessel and undertakes to organise delivery of specific items of cargo to a central container-stuffing depot – in some ways like a supermarket internet-delivery service.

3.7 The example of sea cargo provision to the Falklands Islands acts as a proxy for St Helena: it is remote, its population is about half that of St Helena, it has to use sea cargo for provisioning itself. The type of vessel used, the type of duty they are required to perform, type of cargo carried, type of contract under which they are procured, rates paid – all add up to a model that SHG can use with confidence. They can even be procured from the same source, whether for single voyage charter or for time charter. Our research indicates that it will not be possible to replicate this kind of service from southern Africa – these types of vessel (which have to be self-unloading) are not available there. Ships know no boundaries and crews are transported around the world by air, so discussion of journey time or port of origin is not relevant. There will be nothing to preclude a chartered vessel from operating exclusively in the South Atlantic, if that is enough to satisfy the demand. The same factors can be used in the decision whether to buy a vessel.

3.8 Ship brokers estimate the cost of chartering a vessel from the UK to Ascension Island would be in the order of ¦ ¦ ¦ ¦ , for a minimally-sized vessel, not including charging and discharging the vessel. The cost of receiving, handling and delivering (RHD) at Shoreham is approximately ¦ ¦ ¦ ¦ . Additionally, demurrage rates typically would be chargeable on a spot charter contract.

3.9 To move say, 1800t of cargo per trip, assuming 12 round trips (21,600t per year moved) to UK / Cape Town, at an average cost per trip of say, ¦ ¦ ¦ ¦ would cost ¦ ¦ ¦ ¦ , all vessel and port costs included.

3.10 It seems that Denmark is a principal source of supply of such vessels, small but classified as ocean-going and with own lifting gear. This raises the question as to how long these specialised vessels will be available – in the context of St Helena's needs, long enough to prove the concept and allow SHG to consider purchasing one of its own.

3.11 Spot chartering also carries the risk of variation in rates; the market tends to firm up in the last quarter of the year, then fall off again.

3.12 Due to the one-way nature of St Helena's cargo requirement and the lack of capacity for storing containers there, it is likely that even a spot-charter would need to be for a return voyage as the empty containers would need to be returned to the country of origin – or some point of collection. If a time charter was used, this problem would be resolved as the ship would be chartered for voyages that had been decided by the organisation responsible for chartering the vessel.

3.13 A longer-term charter would ensure more reliability because the vessel would be available for voyages whenever required. However, should the vessel be chartered on a time-basis,

[17] Incoterms are standard trade definitions most commonly used in international sales contracts. They are devised, maintained, updated and published by the International Chamber of Commerce. Correct use of incoterms provides the legal certainty upon which mutual confidence between business partners must be based.

e.g. a period of one year, there will be many occasions when the vessel is not being used to its full capacity and these costs will need to be absorbed either by increasing freight rates or by some form of subsidy and/or by looking for cargoes elsewhere, just as AWL has done for the new RMS schedule. It is not possible for the ship in these circumstances to undertake other, longer voyages with other cargoes to increase revenues (e.g. South Africa to Australia or SE Asia or South America) because the vessel will need to be back in the UK or South Africa for the next scheduled voyage.

3.14 Chartering a suitable vessel will be possible only from a niche market due to the small volumes of cargo required and the additional requirement of on-board loading facilities. The response, although available, is limited as there are not a large number of ship owners that wish to transport cargo to the South Atlantic because revenues do not always cover cost.

3.15 The cost of time-chartering is likely to range as follows:

Length m	Dwt[18] tonnes approx	Year of build	No. of containers[19]	Time-charter day rate USD[20]	Equivalent yearly cost, £k[21]
81.00 BP[22]	4300	1986	256 off 20ft x 8' x 8'6"; alt 119 off 40ft; 20 reefer points	¦ ¦ ¦ ¦	¦ ¦
88.40 OA	4110	1993	247 off 20ft; alt 105 off 40ft	¦ ¦ ¦ ¦	¦ ¦
81.07 OA	3540	1993	185 off 20ft; incl reefer alt 76 x 40ft + 29 x 20ft	¦ ¦ ¦ ¦	¦ ¦
83.20 OA	2764	1991	145 x 20ft incl 24 reefer	¦ ¦ ¦ ¦	¦ ¦

3.16 These vessels carry their own lifting gear and would make the same passage speed as the current RMS, which is scheduled to make 17 round trips to Cape Town Sept 04 to Sept 05 (including AI, Walvis Bay and Luderitz). On this basis they offer a potential range of around 2600t – 3600t per trip, or 44,000t to 61,000t per year – two to three times what the RMS offers. In practice, the number of trips would be reduced and time spent loading and unloading increased, with the limiting factor being the realisable crane capacity; also in practice it is likely that a slightly smaller vessel would suffice, thus reducing the yearly cost further.

3.17 Port charges in UK are around ¦ ¦ ¦ ¦, stowed (receiving, handling, delivery to ship), corresponding to ¦ ¦ ¦ ¦ for a load of 2600t. To accommodate eight UK round trips would absorb in the region of ¦ ¦ ¦ ¦ for an annual lift of around 21,000t. The corresponding cost in fuel would be in the order of ¦ ¦ ¦ ¦ [23]. The total annual cost of operating a time-charter

[18] Dwt is a measure of load-carrying capability and excludes the weight of the ship's own hull structure and equipment, including machinery, crew and effects. It varies according to the loading configuration of a vessel.
[19] Assume no break-bulk carried and assume 14t freight per container.
[20] For yearly contract.
[21] At £1 to 1US$ 1.87 and 365 days on hire, crew costs included. Costs of fuel additional.
[22] BP: between perpendiculars (the perpendicular on the intersection of the hull and the load waterline) as opposed to length overall (LOA), which includes the less utilitarian fine-shaped bow and stern sections.
[23] At $U400/t, burning around 4t/day.

to accommodate eight round trips UK – St Helena – UK is therefore in the region of ¦ ¦ ¦ ¦ . A combination of UK and Cape Town round trips would cost around the same amount and offer more trips.

3.18 It is obvious that time-chartering, even allowing for the cost of fuel and port charges, would be considerably cheaper, by a factor of between two and three, although there are many variables that would need to be taken into account that would act to close the gap, e.g. crew repatriation, should the vessel on time-charter be based in the South Atlantic for a year, or vessel maintenance costs arising from use.

What would be the minimum order quantity?

3.19 Effectively there would be no minimum quantity applicable to a charter. In practice, should the contract be for larger volumes, then it is likely that this will still result in a high cost per tonne or container due to the low volume demands of the island.

3.20 There are also limitations to contracting the vessel on a time basis. The route would need to be calculated to maximise the revenues from the voyage. The organisation responsible for managing the contract would need to develop a business plan for a proposed route and evaluate any limitations, e.g. returning empty containers.

Is the requirement for a self-loading vessel a severe/medium limitation, especially when the requirement is for a combination of containers and breakbulk?

3.21 There are vessels in the market, suitable for charter to St Helena, with self-unloading facilities. These will be more difficult to obtain than standard container vessels unless they are currently serving similar markets (e.g. other South Atlantic islands with no port facilities).

3.22 There is another consideration and that is the ability of the Jamestown port facilities to move and store containers. This paper is prepared on the understanding that there will be no investment in harbour development such as a breakwater and that ship-to-shore movement will continue as it always has. However, it may be necessary to upgrade existing facilities. We understand that a request has been submitted to increase the shore side craneage capacity to 100 tonnes, which would accommodate other work purposes also, such as lifting out fishing or other vessels. Similarly, we understand that discussions have taken place on improving the size and configuration of the barges used to transport cargo ashore. Adopting the time-charter solution has the advantage of relieving pressure on all of these facilities because time to rotate containers at Jamestown and the cost of time matters less under this solution. This is probably not a situation that could be ignored if the demand for sea-cargo increases.

What frequency could be obtained?

3.23 Within the industry there is a belief that the spot market contract would be more limiting due to the requirement of:

- a vessel immediately available (very short term)
- a vessel willing to detour to St Helena
- a self-loading vessel

- a vessel capable of undertaking deep-sea ocean voyages.

3.24 It may not be possible for a ship broker dealing with a spot contract to find a suitable vessel when required. If this is the case, then there could be substantial delays in the shipments being delivered to St Helena. If a suitable vessel was found and then more than one shipment was agreed, this would not constitute a spot contract.

Would fuel and dry cargo be able to be carried in the same vessel?

3.25 Although vessels are available to carry fuel and dry cargo, it would be more difficult to find a ship that is equipped for this type of journey in addition to being capable of deep-sea voyages.

Conclusion – chartering

3.26 The spot charter solution would be feasible as there are precedents based on the Falklands Islands and elsewhere and there are suitable vessels to be found. To maintain security of supply this solution would need constant attention to demand on the one hand and to availability of vessels on the other. This would require an established relationship between the island's co-ordinator, e.g. Solomon's, and the international community of ship brokers and freight forwarders – one that was effective in locating and hiring a supply of vessels.

3.27 The time-charter solution is similarly feasible and would offer greater security of transport at considerably less cost of the equivalent in spot charters, of say, ¦ ¦ ¦ ¦ per annum. This compares with the current (2004 – 2005) subsidy cost pertaining to management of the RMS of ¦ ¦ ¦ ¦ (although it is not directly comparable since the RMS subsidy covers passenger movements as well as the net income received from freight rates).

3.28 Whatever solution is adopted, chartering will require a land-based operation to act as a container hub, around which the stuffing operation will revolve. This would require premises, an organisation and facilities for receiving, stuffing and moving containers – possibly also in two hemispheres.

B2. PURCHASE A VESSEL

3.29 Jeppesen-Heaton has previously owned a vessel (in partnership with the Falkland Islands Company). However, this was expensive, with operating costs being too high to justify the six or seven voyages per year to the Falkland Islands, especially considering there were no north-bound cargoes. The operating costs for a suitable vessel could be in the region of ¦ ¦ ¦ ¦ . Additionally, every year the vessel must be surveyed and every four years, a major survey undertaken. In the UK the Maritime and Coastguard Agency is stringent, which can sometimes increase costs further.

3.30 It would be possible for SHG to enter into this arrangement and the management of the vessel contracted out as at present. The most likely scenario would be for time-chartering to be adopted as the initial solution, to allow views to be taken on demand and type of cargoes, both dry and fuel types, and time to consider the cost of purchase of either a used vessel or of commissioning a purpose-built vessel, perhaps even to handle fuel delivery as well.

3.31 The purchase price of a vessel roughly equivalent to those considered above for time-charter could be expected to be of the order of a few £million[24].

3.32 ¦ ¦ ¦ ¦

FREIGHT RATES

3.33 AWSL use very specific freight rates for calculating the cost of carriage. We have no means of calculating how much of this cost is passed on to the buyer on St Helena because the subsidy required to keep the ship as the island's only form of access is not reflected in the freight rate calculation (nor for that matter, in the cost of passenger tickets). Neither is there any easy way of computing the landed price per tonne due to the number of variables involved (specific rates per type of item carried break-bulk; rates per container depending on whether partially or fully loaded; effects of the range of port handling charges; effect of the AWSL management fee).

3.34 Rough averages can be computed from records of previous voyages, of revenue earned by AWSL for gross tonnes carried, in break-bulk and containers. If the subsidy is ignored and average historic revenue earned figures applied, it can be seen that there is rough parity between this 'cost per tonne' and the cost per tonne that would result if time chartering is employed, the RMS numbers being higher. The RMS range could lie in the region ¦ ¦ ¦ ¦ / tonne, while the chartering range might lie in the region ¦ ¦ ¦ ¦ /tonne. There are too many variables involved to make meaningful freight rate comparisons, for example, how much cargo carried on one voyage: the ship might only be 50% loaded. This is one reason why shipping lines quote rates at very detailed levels corresponding to the type of item carried, down to for example, pallet sizes or partly filled containers.

3.35 To get to the bottom of the question of whether passing through all shipping costs arising from any of the options considered above for future cargo provision to the consumer on St Helena would require extensive analysis.

TREATMENT OF COSTS FOR THE FEASIBILITY STUDY

3.36 The economic analysis can assume that all costs are passed on to the customer (and it is probable that the cif price would be less than the historic RMS cif price) or it can show some or all of the freight cost.

SUMMARY OF FINDINGS

3.37 The cargo market research has shown with confidence that there is a choice of solutions for providing security of sea-borne cargo supply open to SHG in the event that air access is provided and the RMS withdrawn. These are (not in any particular order):

- buy a used cargo vessel, contract out its management and trial this approach for a few years (probably the most cost-effective solution in the long-term but actual demand data would be helpful in this decision)
- charter vessels on single-voyage basis for a period of time

[24] There is an abundance of suitable vessels of the 3000 dwt size with very good lifting gear. One with say, 8 – 10 years of commercial life remaining might be purchased for an attractive price, having perhaps been 'written down' by its original owner by that stage. The process could then be repeated.

- charter vessels on time-charter for a year or more at a time (significantly cheaper than single-voyage chartering)
- seek a risk-sharing agreement with a shipping company.

3.38 Should an airport be built it is quite likely that air freight, despite its cost premium, will be invoked. For the purposes of this exercise we are assuming no effect on sea cargo demand. As a proxy, Easter Island apparently takes much of its consumables via air freight and apparently is served only twice a year by sea. It does however have B747 capability so it has more opportunity for air freight. We make the assumption that sea-borne cargo transported to St Helena will remain about the same in volume terms only to err on the side of prudence, and therefore costs. If single-voyage chartering is adopted as the solution then it makes no difference as the frequency of use can be adjusted to suit demand. If time-chartering or owning is adopted, then the vessel's speed can be reduced, so saving fuel cost, or it can voyage further afield or it can afford to spend longer loading and unloading. It would be prudent to use chartering for the first years before deciding to purchase a vessel, to establish the pattern of demand and so choose the optimum sized vessel.

3.39 Flexibility is important if partially-filled ships are to be avoided: it is a balance between suppressing costs and obtaining goods in a timely fashion. This will be a challenge to whoever is to take on this task.

3.40 It may be concluded that security of supply cannot be established by relying on the 'passing ships' option, in which SHG or its representative or any other buyer would try to place orders on an ad hoc basis. Stated another way, SHG will have to take a positive action to ensure security of supply, i.e. one of the choices listed above.

4 CONCLUSIONS

4.1 It is unlikely that St Helena could rely on the market to respond to its needs for security of transport of sea-borne cargo without putting some positive arrangements in place to give it some control.

4.2 It is a possibility that some risk might be absorbed by shipping companies were an exclusive arrangement to be granted and made the basis of security of supply ¦ ¦ ¦ ¦ . The strength of interest would need to be tested by some form of market testing (which would require SHG to draw up a terms of reference against which the shipping market would respond).

4.3 The international shipping market offers spot charters – single voyage hire – and time-charters, for example one or more years on contract, of vessels suitable for the purpose of moving cargo to and from St Helena. Such vessels are more likely to be supplied from Europe than from South Africa.

4.4 The yearly cost of a time-charter solution appears to be of the order of two to three times less expensive than the equivalent in spot charters but of course the confidence would need to be present to support a time-charter contract. The re-basing of the RMS St Helena in the South Atlantic as from September 2004 for a year is timely and will yield evidence to help with this decision. To move the equivalent of the current apparent demand at today's rates would cost in the order of ¦ ¦ ¦ ¦ per annum on a one-year time-charter. To this must be added the cost of the land-based operation of stuffing and moving containers to the port of embarkation.

4.5 It would be possible to combine movement of dry goods and fuel in one ship but it is likely that to achieve this would require a purpose-built vessel.

4.6 SHG will always have the option of purchasing a used cargo vessel or vessels and contracting out the management function, as at present. Purchasing of suitable used vessels is relatively easy. It also has the option of re-deploying the RMS as a cargo-only vessel.

4.7 This market study assumes no significant investment in St Helena's port facilities other than upgrading its existing handling facilities.

RECOMMENDATION

4.8 SHG should take action towards establishing security of supply by exploring the options listed above. It should proceed by adopting as its starting point that all costs are passed on to the consumer, on the assumption that the costs will be less than those charged by AWSL. SHG will need to establish the required level of expertise ¦ ¦ ¦ ¦ in areas such as order planning, order sizing, order management, freight forwarding, vessel procurement, order tracking, receiving and storing, distribution, container management, maintenance of handling and storage assets. There will be a need for capability in cost-benefit analysis and business planning (to make decisions about value for money when deciding which supply option to choose).

APPENDIX S: ENVIRONMENTAL IMPACT REPORT

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GLOSSARY

A&F	Agriculture and Forestry
APU	Auxiliary Power Units
ASSI	Air Safety Support International
BFI	Bulk Fuel Installation
CAA	Civil Aviation Authority
DEPD	Department for Economic Planning and Development
DFID	Department for International Development
DMRB	Design Manual for Roads and Bridges
EA	Environmental Assessment
EC	European Commission
ECo	Environmental Co-ordinator
EIA	Environmental Impact Assessment
ESIA	Environment and Social Impact Assessment
EMP	Environmental Management Plan
ExCo	Executive Council
HMG	Her Majesty's Government
HPR	High Point Rendell
OP	Operational Policy (World Bank)
OTEP	Overseas Territories Environment Programme
PBP	Prosperous Bay Plain
SEA	Strategic Environmental Assessment
SEDS	Sustainable Environment and Development Strategy
SHG	St Helena Government
ToR	Terms of Reference
UKOT	UK Overseas Territory
UKOTCF	UK Overseas Territories Conservation Forum
UNDP	United Nations Development Programme

EXECUTIVE SUMMARY

Introduction

1. This report reviews environmental protection on St Helena, examines procedures for undertaking EIAs and scopes potential impacts for the airport site, the alternative haul routes and the alternative operational access routes. Environmental impacts of tourist development are also scoped and the likely Environmental Assessment (EA) process containing the Environmental and Social Impact Assessment (ESIA) and Environmental Management Plan requirements described.

St Helena's Environmental History

2. St Helena's natural environment has largely been destroyed by the introduction of goats in the sixteenth century and by the introduction of flax in the nineteenth century. Piecemeal attempts have been made to protect the environment but no consistent attempts were made until the 1990s.

Environmental Legislation and EA Procedures

3. St Helena has some environmental legislation but no procedures set out for undertaking EIAs and no regulatory procedures. The Environment Charter signed by SHG in 2001 commits to undertaking EIAs but does not have legal status as yet. Different procedures for undertaking EIAs following EC, DFID and World Bank guidelines are reviewed and a composite best practice approach is proposed in line with DFID policy where no local guidelines exist.

4. The ESIA is part of the overall process of Environmental Assessment (EA) which identifies, studies and mitigates physical and social development impacts. The main components of the EA are:

- Environmental Scoping
- Agreement of the Terms of Reference for the Environmental and Social Impact Assessment
- The Public Consultation and Disclosure Plan (PCDP)
- The ESIA Report
- The Environmental Management Plan (EMP) and its implementation

5. The SHG Environmental Co-ordinator will need technical assistance in order to fulfil a regulatory role for a major project such as airport construction.

Impact Scoping of the Airstrip

6. Environmental scoping has been undertaken for the long runway option since the medium runway impacts will be contained within that assessment. A replacement ship option is seen as largely neutral in environmental terms. The main potential impacts of airport construction are on the Prosperous Bay Plain (PBP) ecosystem as a whole and specifically

on landscape, with just under 100 ha affected by the construction (including the filling of Dry Gut), and on the globally important endemic invertebrate community in PBP's Central Basin. Lesser impacts will be on the flora of the area and the Wirebird. There are a number of other lesser impacts.

7. While the impact on the landscape and invertebrates will be significant, careful design and construction will mitigate the effects substantially. Already the precise siting of the runway and terminal building reflects the need to try and preserve the invertebrate community in the Central Basin as far as possible while the construction of the runway in concrete will blend in with the natural landscape. The visual impact of the embankment in Dry Gut will be limited from a seaward direction.

Impact Scoping of the Haul Routes

8. Three potential haul routes were examined in detail. The one to Turks Cap was eliminated because of rockfall risks and poor landing potential. The route via Prosperous Bay is short at 3.8 km, the cheapest to construct and offers the advantage of rapid response to the sea in the event of an emergency. It has few other advantages and represents an intrusion into a largely unknown (from an invertebrate point of view) and wild landscape. If Prosperous Bay is selected as the preferred haul route an invertebrate survey should be undertaken of the affected area.

9. The route from Rupert's Bay is much longer at 14.2 km but construction is generally easier (and possible with existing island technology) so that costs are not significantly more than the route from Prosperous Bay. The main impact will be the crossing of Deadwood Plain and the effect on the Wirebird but this can be mitigated by careful final route planning to keep the length of impact short and by creation of new Wirebird habitat; timing to avoid peak breeding / nesting season would also lessen the impact. The route offers development potential in the Rupert's area and can also be used as an operational access route. Existing safety concerns connected with fuel distribution in Rupert's will have to be addressed.

Impact Scoping for Operational Routes

10. Five operational access routes have been studied; they are all of similar length in terms of distance from the terminal to Jamestown arch (15-16 km). Two along Fishers Valley offer fairly cheap development and connect into a small business and housing development area being proposed in Beales Valley under the Draft Land Development Control Plan. A route via Woody Ridge has no obvious advantages. The existing route through Longwood village may serve the airport in the early years but a traffic forecast is needed during the design phase. The Rupert's route following the haul route offers a number of advantages and is the preferred route should the Rupert's haul route be selected. If the Prosperous Bay haul route is selected then one of the Fishers Valley routes would be preferable if the existing route through Longwood is considered unsuitable.

Impact Scoping for Tourist Development

11. The impact of tourist development is likely to be minimal when tourist numbers remain below 200 per day. As numbers develop to between 200 to 500 impacts may occur on some marine activities such as dolphin watching and in vulnerable areas such as the

Peaks and wilderness walking. Some level of control may be needed. Above 500 impacts are likely to increase significantly both on the natural; environment and on utilities. Under the ESIA a more detailed capacity analysis should be undertaken if this has not already been completed under a proposed OTEP project. The effects of tourism on Easter Island's environment should be studied and used as a comparator.

EA Process and Public Consultation

12. The EA process is set out and the need for a public consultation and disclosure plan highlighted. The ESIA is part of the EA process. The key stages in the EA process are

1. Finalise draft ESIA ToR
2. Develop Public Consultation and Disclosure Plan
3. Develop project description and circulate to stakeholders together with draft ESIA ToR
4. Hold public meetings to gain stakeholder feedback on ToR
5. Finalise ESIA ToR
6. Undertake ESIA simultaneously with design stage
7. Develop mitigation strategy and environmental management plan (EMP)
8. Consult with stakeholders on draft ESIA
9. Finalise ESIA.
10. Implement EMP

13. Terms of reference for the ESIA are contained in Appendix T to the main Report.

14. It is important to have consulted the public on the draft ESIA ToR before finalising the ToR and proceeding with the ESIA study.

Environmental Management Plan and Mitigation

15. Requirements for an Environmental Management Plan are set out and include mitigation strategies. The most significant mitigation strategies are a detailed re-instatement programme for PBP arising out of more detailed field investigation of natural conditions and an expansion of Wirebird habitat.

16. At the start of the EIA the leading authorities on St Helena's environment should be consulted through a seminar to guide the mitigation process and construction management process.

17. Costs associated with environmental related activities are as follows:

Item	**Period for execution**	**Budget estimate £**
Signing and Protection of PBP	Upon project approval	
Land re-instatement investigations	During the ESIA	
Wirebird status update	During the ESIA	

Pasture improvement at Bottom Woods	Implementation of EMP	
Undertake Environmental and Social Impact Assessment	During design phase	
Provision of TA environmentalist	3 year input starting after project approval	
Provision of local ecologist	Implementation of EMP	
Total Budget Estimate		

1 INTRODUCTION

BACKGROUND

1.1 Like most remote oceanic islands St Helena possesses a unique and fragile environment that is extremely vulnerable to outside influences. The island has experienced significant impacts and environmental change from almost the first day of discovery in 1502. Shortly after their arrival the Portuguese discoverers released goats into the wild as a food source and this single action proved to be the most environmentally destructive in the island's history.

1.2 Despite the island's history of degradation the environment remains one the island's greatest assets. The largely man-made landscape exhibits scenery of the highest quality whilst relics of the endemic flora and fauna add an interest that ensures that St Helena continues to receives international attention amongst scientists, environmentalists and the general public alike.[1]

1.3 The Access Project will be the biggest civil engineering project the island has experienced certainly since the construction of High Knoll fort by the Royal Engineers in 1874. The project is located in a relatively isolated and unstudied part of the island but in general the direct physical and social impacts of construction are benign for a project of this size on such a small island.

1.4 The impacts of economic development, particularly tourism, resulting directly from the provision of air access are more difficult to define but are likely to be greater on the social environment than on the natural and physical environment.

1.5 Over the last 200 years St Helena has had a resident population of between 3,500 and 5,500. A low was experienced following the withdrawal of the Garrison in 1907 and highs in 1871 and 1987; the current decline in population should be viewed in this context. The resident population has increased substantially for short periods, notably in 1901 when just under 5,000 Boer POWs were held in camps on the island and during the 1850s, when several thousand liberated African slaves were on the island for short periods.

1.6 St Helena is not highly endowed with productive natural resources. Its main purpose has been as a port of call and victualling station on the retum route from southern Africa and the Far East. It has never been self-supporting apart from very short periods such as during a time of high world fibre prices at the end of the First World War and during the Korean War. Its history has been punctuated by short booms followed by long periods of economic stagnation and decline when the authorities have sought hard to find ways to generate income.

[1] St Helena together with Mauritius are the examples of tropical island vegetation used by the Eden Project

OBJECTIVES OF THIS REPORT

1.7 This report contains an environmental analysis which responds to the terms of reference contained in Annex A. The overall objective is to provide the basis for the detailed Terms of Reference for the Environmental and Social Impact Assessment (ESIA).

SCOPE OF THIS REPORT

1.8 The report is based on the review of previous environmental reports and investigations and a short island visit by the author, the team's environmentalist, during June 2004, as part of the Atkins team visit. Discussions have also been held with a wide number of persons in the UK who are concerned with aspects of St Helena's environment.

1.9 In addition to reviewing local and international environmental procedures the report considers the Environmental Assessment (EA) process and provides the ToR for the ESIA. Primarily however the report acts as a scoping document and identifies the range of natural environment issues likely to be encountered in the full ESIA. Because of the amount of previous work undertaken the level of detail presented sometimes exceeds that normally expected in a scoping report. While a number of baseline activities are still required, much of the ESIA effort will be free to concentrate on the details of construction activity and to develop a robust and practical environmental management plan.

1.10 We were requested in our ToR to undertake a strategic environmental assessment (SEA) (Annex A para 4.8 bullet point 3).

1.11 While an SEA might have been appropriate when a wide range of alternative access options were being considered now that the only sea access option is the base case *RMS St Helena* replacement it is suggested that it is not appropriate to conduct a strategic environmental assessment (SEA). The Tourism Master Plan of 1997 is the only basis on which to conduct such an appraisal and this is now out of date in some respects and implemented in others. Given that an SEA addresses the impacts of policy development it is not clear what policy would be assessed. We have discussed this issue with the DFID and the SHG environmental advisers both of whom consider that it is not appropriate to complete such a study under the above circumstances. It is therefore recommended that for this project an SEA is not undertaken.

DOCUMENT STRUCTURE

1.12 One of the aims of this report is to draw together all environmental references of relevance to the Access Project and to provide a background for the ESIA ToR. We assume that the majority of readers will be familiar with the basic facts about St Helena's contemporary environmental setting so do not repeat them here. They are well described in P & M Ashmole's book *St Helena and Ascension Island: a natural history* (2000).

1.13 Following this introduction we provide a synopsis of St Helena's environmental protection history (Chapter 2) before considering the procedures for conducting EIAs and environmental regulation in Chapter 3.

1.14 Chapters 4, 5 and 6 scope the impacts of the access proposal, the access routes and the impact of tourism development respectively. Chapter 7 sets out the requirements for the environmental process.

2 DEVELOPMENT OF ENVIRONMENTAL PROTECTION ON ST HELENA

HISTORICAL SETTING

2.1 St Helena's environmental decline started almost as soon as man set foot on the island in 1502. So swift was the change that during the eighteenth century the ruling East India Company was forced to take action and the island experienced some of the earliest government attempts to manage the environment through livestock control, tree protection orders and re-planting.[2] However these attempts were not maintained and did little more than arrest a continuing process of decline which has continued almost to the present day.

2.2 The significance of St Helena's general environment, and flora in particular, has long been recognised. The island received the attention of a number of eminent naturalists during the late eighteenth and nineteenth centuries, summarised in Table 2.1.

Table 2.1 – Naturalists' Interests in St Helena

Name	Date of visit	Main interests
Joseph Banks (Cook's Endeavour voyage)	May 1771	Economic botany, agricultural production, tree planting and examination of the endemic flora
Johann Forster (Cook's Resolution voyage)	May 1775	Endemic flora
William Burchell	1805-1810	Endemic flora
William Roxburgh	1813-1814	General vegetation. Produced a plant list
Charles Darwin	July 1836	Geology and endemic flora and fauna
Joseph Hooker (Ross Antarctic expedition)	1839 and 1843	Endemic flora

2.3 The publication of J C Melliss's *St Helena* in 1875 combined much of the information gathered by these early workers and represented something of a watershed in developing the understanding of St Helena's environment. A year earlier in 1874 the first attempts at developing the flax industry commenced and, although this was unsuccessful, a second more long lasting attempt was made in 1907. The development of the flax industry was to have a great impact on the island's environment, second only to the effect of goats, and is

[2] Richard Grove Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism 1600-1860 (1995).

still being felt to-day. Little significant interest was taken in the environmental impact of the flax industry during the first half of the twentieth century and it was left to historians such as Philip Gosse to provide comment on its destructive effects[3].

DEVELOPMENT OF ENVIRONMENTAL AWARENESS SINCE 1950 [4]

2.4 During the 1950s environmental awareness gradually re-awakened. The decision of the distinguished naturalist Arthur Loveridge to retire on the island in 1957 was the starting point for this process and the work he undertook until his death in 1974 was of considerable importance.

2.5 Simultaneously the work of Norman Humphrey (1951-1959), as Agriculture and Forestry Officer, and Norman Kerr headmaster (1953-1956) developed the understanding of the significance of the island's flora and fauna and was supported by an entomologist C R Wallace (1957-1959). Humphrey was largely responsible for the first piece of legislation aimed at protecting plants – *The Forestry and Indigenous Trees and Plants Preservation Rules* 1959 (last amended 1993). Kerr's most lasting legacy was probably the introduction of island born George Benjamin to the island's flora.

2.6 During the 1960s interest in the environment flagged with the exception of a Belgian Zoological Expedition which was active on the island between 1965 and 1967; unfortunately the expedition's results[5] were largely published in French which limited their impact. This was a time of severe economic stress with the collapse of the flax industry, the island's principal employer, following a report by H H West (1965) [6] which recommended a doubling of government wages. It is not surprising that environmental matters should have been neglected.

2.7 Environmental concerns were once again raised by the work of the ODA Land Resources Adviser Linda Brown (1974-1977) and in particular by the work of George Benjamin throughout the 1970s and 1980s, who was able to identify and rescue specimens of the nearly extinct flora. This work was placed on the international stage by the work of Quentin Cronk who made a number of visits during the 1980s to work with Benjamin and to develop research on the endemics and was strongly supported by the Agriculture and Forestry Department (A&F). Simultaneously work by the London Zoological Society gained international recognition for the island's invertebrate population.

2.8 During the 1980s A&F continued to implement protective measures largely using the somewhat piecemeal legislation that had followed since 1959 notably *the Pasturage Ordinance* 1950 (amended 1990, 1992, 1995), the *Game and Wild Birds Protection Ordinance* 1950 (amended 1989) and the *Wildlife Protection Ordinance* 1984.

2.9 The involvement of Kew Gardens and the London Zoological Society in the endemic protection programme and also Neil McCulloch's work on the endemic Wirebird increasingly raised the profile of St Helena's environment and, following the Rio Earth

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[3] Gosse, P St Helena 1502-1938 (1938 and 1990)

[4] Information in this section is in part condensed from P&M Ashmole St Helena and Ascension Island: A Natural History, 2000. This book is the basic reference for understanding environmental matters on St Helena.

[5] Basilewsky, P. La Faune Terrestre de L'ile de Sainte-Helene, 1970 (4 vols)

[6] West H H, Report on the Emoluments and Structure of The Public Service of St Helena. 1965

Summit in 1992, St Helena became the first territory to develop a Sustainable Environment and Development Strategy (SEDS) in 1993.

2.10 The SEDS report made a series of recommendations including 12 projects and studies and a further eight research projects. The majority of these recommendations have not been implemented in their original form but have had significant influence on the development of the island's environment protection and management during the 1990s. The post of Environmental Co-ordinator (ECo) was originally charged with taking forward the implementation of SEDS and the report continues to provide a useful reference when considering the island's environmental management.

2.11 During the last ten years protective measures for St Helena's environment have greatly increased and the creation of Diana's Peak as a National Park in 1996 set in motion a process that has led to the creation of a further 15 national protected areas which altogether cover about 30 percent of the island's total area of 121 km^2. The protected areas are shown in Figure 2.1 (attached) and their characteristics described in Annex B. Under this system Prosperous Bay Plain is designated a Habitat Management Area.

2.12 The creation of the Millennium Forest at Horse Point has been another major achievement led by island botanist Rebecca Cairns-Wicks and this and the sustained involvement of Philip and Myrtle Ashmole in the island's environmental affairs and the focus created by the ECo has raised environmental consciousness amongst islanders.

2.13 The islanders' interest in their environment is symbolised by the endemic Wirebird being commonly used as an emblem and by the signing of the St Helena Environment Charter in 2001 (Annex C and discussed in Chapter 3).

3 REGULATORY PROCEDURES

INTRODUCTION

3.1 In the previous section we have provided a brief review of the development of environmental protection on St Helena. Although there have been considerable advances in environmental protection procedures the island, in common with most small states, lacks detailed guidelines for undertaking environmental assessment and management.

3.2 In this section we consider the procedures for undertaking an Environmental Assessment (EA) and an Environmental and Social Impact Assessment (ESIA). In the first instance we consider the environmental procedures adopted by the International Funding Agencies before considering the existing legal and institutional situation on St Helena and providing recommendations as to how the ESIA can be undertaken and the airport access project implementation be environmentally regulated.

3.3 The ESIA is part of the overall process of Environmental Assessment (EA) which identifies, studies and mitigates physical and social development impacts. The main components of the EA are:

- Environmental Scoping
- Agreement of the Terms of Reference for the Environmental and Social Impact Assessment
- The Public Consultation and Disclosure Plan (PCDP)
- The ESIA Report
- The Environmental Management Plan (EMP) and its implementation

INTERNATIONAL PROCEDURES FOR ENVIRONMENTAL ASSESSMENTS

European Commission

3.4 Directive 85/337/EC amended by 97/11/EC applies for EIAs. The principal aspects of the procedures are as follows:

3.5 The EIA will describe and assess the direct and indirect effects of a project on the following:

- Human beings, fauna, flora
- Soil, water, air, climate and the landscape
- Material assets and cultural heritage
- The interaction between the factors mentioned above

3.6 The information to be provided shall include at least:

- A description of the project comprising information on the site, design and size of the project

- A description of the measures envisaged in order to avoid, reduce and if possible remedy significant adverse effects
- The data required to identify and assess the main effects which the project is likely to have on the environment
- An outline of the main alternatives studied by the developer and an indication of the main reasons for his choice, taking into account the environmental effects.
- A non-technical summary of the information mentioned in the previous indents.

3.7 Under Article 4 of the Directive an EIA is mandatory for construction of airports with a basic runway length of 2,100 m or more but for airports with a runway of less than 2100 m Member States can use their own legislation to decide whether an assessment is required. The medium length runway option is therefore regarded as having a lower impact status than the long runway option under the Directive.

DFID

3.8 *The Environmental Guide: A Guide to Screening* (2003) applies. Also *The Manual of Environmental Appraisal* (1993) could also apply (and was used by HPR in their Land and Sea Access Report) but is not mentioned in the later DFID publication.

3.9 The 2003 Guide is primarily aimed at DFID desk officers for completing project documentation and the document is specific only to that end. However there are a number of comments and observations that need highlighting.

3.10 **"When is an EIA Needed?"**

"An EIA is the appropriate environmental appraisal tool to use for major development projects – and, to a lesser extent, multi-project programmes – and so it is not often applied to DFID initiatives. However where DFID provides technical assistance to support infrastructure developments financed by other agencies, an EIA must be undertaken".

3.11 **"National Ownership"**

"An EIA will usually be undertaken under the auspices of the national government of the partner country. Most partner countries have statutory environmental standards or advisory guidelines that must be applied to development interventions. In the absence of such standards, DFID's approach is to develop specific standards with partner government, which takes into account local environmental conditions, costs of compliance, obligations under international law etc. Publication of the EIA is the responsibility of the partner governments, in accordance with their own legislation".

3.12 **"Role of Donors"**

"If an EIA is to be undertaken, funding and additional technical assistance may be provided by DFID or the lead donor agency".

3.13 **"Monitoring Environmental Impacts"**

"The monitoring programme should be presented as part of a broader environmental management plan (EMP) which is used to guide implementation of the project and which would include:

- Significant environmental risks and uncertainties
- Applicable environmental legislation and standards
- Mitigation measures (including in-country institutional support)
- Monitoring programme
- Resources and funds required for environmental management
- Contractual and management arrangements
- Consultation and participation arrangements"

3.14 **"Strategic Environmental Assessment"**

"An SEA is a process for analysing the environmental consequences (positive and negative) of proposed policies, plans, major investment decisions and other strategic interventions. It is undertaken to inform and enhance strategic decision-making and to ensure that the costs and benefits of policy choices are considered. "

3.15 "SEA may be appropriate in a wide variety of situations. It can be used to evaluate existing policy choices … It can also influence the range of policy and strategic options developed."

The ODA Manual of Environmental Appraisal

3.16 The so-called Green Guide was used extensively during the 1990s and was used as a guideline by HPR in the Air and Sea Access Study (2001).

3.17 Section 8 of the Green Guide covers EIAs and describes the EIA process and the contents of the EIA as being:

- The "no project" comparison
- The main environmental impacts
- The spatial effects of the impacts
- Size and severity of effects using cost-benefits where possible including social cost-benefits
- Features of the proposal designed to limit environmental damage
- The degree of confidence in the assessment

3.18 Having completed this aspect of the study the Guide then calls for the study to consider legislative measures to minimise impact, actions required of project sponsors and monitoring and evaluation requirements.

3.19 While the Green Guide provides some useful background material it is now well over ten years old and some of the procedures it describes are out of date particularly in relation to environmental monitoring and the Environmental Management Plan.

World Bank Guidelines

3.20 World Bank Environmental Assessment (EA) Guidelines are set out in Operational Policy 4.01 (1991). The procedure divides projects into Category A for which a full EA is required, Category B which require only some environmental analysis and Category C which do not require environmental analysis. Although not specifically listed airports would constitute Category A projects.

3.21 The EA is seen as examining:

- Project alternatives and ways of improving selection and design
- Mitigation and preventative measures
- Natural environment, human health and safety, social aspects
- Trans-boundary effects
- Natural and social aspects in an integrated way
- The country's environmental policies and commitments
- Pollution prevention and abatement

3.22 For Category A projects the borrower should retain independent experts not affiliated to the Project to carry out the EA and an independent panel of experts should be retained for highly contentious or risky projects.

3.23 Public consultation and disclosure is regarded as a very important part of the EA process and that the borrower should consult all stakeholder groups at least twice.

3.24 The content of an EA should be as follows:

- Executive Summary
- Project Description
- Baseline Data
- Environmental Impacts
- Analysis of alternatives
- Environmental Management Plan
- Appendices

3.25 The Environmental Management Plan is an essential part of the EA and has the following components

- Mitigation
- Monitoring
- Capacity development and Training
- Implementation Schedule and Cost estimates
- Integration of the EMP with the Project

3.26 In addition to the OP 4.01 the Bank has a number of specific OPs of which OP 4.04 Natural Habitats is probably the most relevant.

3.27 The World Bank guidelines provide one of the more detailed international approaches available for dealing with Environmental Assessment and often form the basic methodology for EAs even for Projects not being conducted under bank auspices. They have provided an important basis for our approach to this study.

ST HELENA ENVIRONMENTAL LEGISLATION

3.28 The policy and legal setting for undertaking impact assessments prior to 2001 is set the HPR Air and Sea Access Report (Annex C2.10 and Annex C.2). The HPR report proposed that environmental screening should follow the DFID procedure but did not specially comment on the procedure to be followed when conducting the full EA. In addition HPR proposed that an SEA should also be undertaken "in order to determine where cross-sectoral policy linkages occur" It is presumed that the reason for an SEA being included in the ToR for the present study may stem form this source.

3.29 Since completion of the HPR report there have been a number of important changes governing St Helena's official approach to the environment. These have been as follows:

a) Establishment of the St Helena Environment Charter which was signed in September 2001. The Charter (reproduced in Annex C) sets out a number of commitments for both HMG and SHG to honour. Of particular relevance SHG has committed to ensuring "environmental impact assessments are undertaken before approving major projects" and "open and consultative decision making on developments and plans which may effect the environment".

   On the HMG side there is a commitment to "assist St Helena in reviewing and updating environmental legislation".

b) An ordinance "to provide protection of endangered, endemic and indigenous species of animals and plants and to regulate the trade in endangered species" (6.6.03).

c) An ordinance "to provide powers to permit the establishment of parks, nature reserves, sanctuaries and areas of historical interest and generally for the conservation of the natural environment and ecology of St Helena".(2.12.03) The designated protected areas are shown in Fig 2.1.

d) An ordinance "to establish and make provision for the St Helena National Trust" (5.12.2001).

3.30 In addition the Land Development Control Plan (to replace the Strategic Land Use Plan) is in the process of being developed at the time of writing of this report and is expected to reinforce some of the environmental processes.

EXECUTING ENVIRONMENTAL POLICY ON ST HELENA

The Existing Situation

3.31 The handling of environmental issues within SHG is split between three main groups as follows:

- The Environmental Co-ordination Unit, which is inappropriately situated in the Development and Economic Planning Department (DEPD). The Environmental Co-ordinator (ECo) operates with an assistant but little other technical support.

- The Marine Scientific Officer who comes under the Fisheries Directorate and thence ANRD.

- The Environment Conservation Section which also comes under ANRD.

3.32 Although two of these groups come under ANRD they have no links within the Department and no formal links with the Environmental Unit.

3.33 Also of importance is

- The Environment Advisory Consultative Forum which exists to drive forward implementation of the Charter but lacks support and strength.

- The UK Overseas Territories Conservation Forum (UKOTCF). St Helena receives support through UKOTCF lead by Dr Mike Pienkowski who visited the island during August 2004. The Forum has been prominent in promoting the development of Environment Charters in all the UKOTs.

- The Overseas Territories Environmental Programme (OTEP) is a joint FCO and DFID programme covering all UKOTs. St Helena currently has three OTEP projects one of which is to develop the Environment Charter and is facilitated by UKOTCF.

- DFID's Overseas Territories Department's Senior Natural Resources and Environment Adviser who provides advice and support.

3.34 The SHG Environment Unit has, in the course of 2004, received institutional technical assistance through the auspices of UNDP. The objective of this support was "to provide guidance and support at strategic planning level to staff within the Environment Planning and Development (EPD) Section, other St Helena Government and non-government officers as appropriate (e.g. Director of Tourism, Agriculture and Natural Resources Conservation Section, Marine Scientific Officer, Director St Helena National Trust, etc); in pursuit of developing a framework for sustainable environmental development on St Helena."

3.35 While a broad framework is in place for dealing with the environmental aspects of development on the island this has largely evolved through the need to comment on the impacts of relatively small developments. A procedure for undertaking environmental screening has been established but to date no EIAs or ESIAs have been carried out.

3.36 Only one major project has been forwarded since the establishment of the above procedures and this was the Shelco planning application for a Hotel and Golf Course submitted in December 2002. This was approved in January 2003 by the Land Planning and Development Control Agency but subsequently overturned by ExCo in February 2003. Although the reason for overturning the decision was mainly based on the fact that Green Belt land was involved, it appears that was consideration not given to the need for an EIA prior to approval despite the fact that the development was to take place in a sensitive part of the island and the Environmental Charter had been signed only 15 months earlier.

Proposals for Change

3.37 A more detailed review of institutional arrangements for handling the environment should be undertaken with a view to establishing an environment agency or equivalent with responsibility for all environmental matters.

3.38 Such an organisation would also develop procedures and policies for environment protection.

3.39 Initially an environment agency would be charged with handling all environmental aspects relating to the airport development. To this end technical assistance would be provided which might initially be part-time but would become full-time during the 2-3 years of airport construction. The post would be expatriate and filled by a broad based environmentalist. In the later stages the post would be counter-parted by a local ecologist who would continue on a permanent full-time basis to provide technical support to the agency. Costs for these posts are budgeted at ¦ ¦ ¦ ¦ ¦ ¦ ¦ (see Table 7.1).

REQUIREMENTS FOR ENVIRONMENTAL REGULATION OF THE ACCESS PROJECT

3.40 Environmental regulation by SHG will be required during the following key stages of the development of air access. The important stages in the regulation process are likely to be

a) Drafting of the Design Contract

- In the absence of strong environmental legislation it will be important to ensure that design and construction contracts are carefully worded to provide tight environmental regulation.
- The ESIA (including public consultation) would then be undertaken on these designs.

b) The ESIA

- SHG will need to approve the ToR for the ESIA and to hold public consultation about their content.
- Approval of ESIA consultants
- Providing guidance to the ESIA consultants while the ESIA is underway to ensure that they are following their ToR and meeting SHG/DFID requirements.
- Reviewing the ESIA to ensure that all issues are covered and that suitably detailed mitigations are proposed and that a practicable environmental management plan has been developed.

c) Construction Contract

- The construction contract would be drafted to incorporate recommendations of the ESIA and EMP and would include detail on site management and operation.

d) Construction Phase

- SHG will need to ensure that the environmental details of the construction contract are adhered to. Difficult issues and conflicts will inevitably arise requiring strong, independent and environmentally sound decision making.
- Earth moving, storage and restoration will be major issues in the sensitive area of Prosperous Bay Plain. Site procedures will also require regular monitoring.
- It will be necessary to ensure that the contractors implement the environmental monitoring plan and to establish the processes under which the EMP will continue to be implemented after construction is complete.

3.41 During stages a) and b) SHG might require only intermittent environmental support but during stages c) and d) it is recommended that a full time environmentalist is provided to support the ECo. This should be for two to three years and could be linked to the development of an environment agency.

4 IMPACT SCOPING FOR THE ACCESS PROJECT

INTRODUCTION

The Access Options

4.1 The feasibility study has focussed on an examination of three short-listed options developed out of a long list of all possible access options. This is documented in the Atkins Options Paper[7] and fulfils a preliminary requirement for any EIA to show that all possible alternatives for achieving the project objective have been examined.

4.2 The three short-listed options are a replacement *RMS St Helena*, a medium runway of 1,999m capable of operating small business jets at a relatively high cost and a long runway of 2,250m capable of handling medium sized aircraft such as 737s and providing a more flexible and cheaper operational cost (per head).

Sea Access Option

4.3 The sea access option, being a straight replacement of the existing ship, incurs no environmental impact beyond that related to the loading and unloading of the ship. Since this operation will replace an existing process it is environmentally neutral. In any event the impacts are of a very small nature and do not warrant a separate environmental investigation.

4.4 If, as a result of a new ship being introduced, cargo handling facilities were improved either at Rupert's Bay or at Jamestown then an environmental assessment would be required but this is outside the scope of the Access project in its present form. However it is useful to note that for the Jamestown Wharf Improvement Project, following investigations undertaken by Coode Blizard in 1996, a report entitled Further Environmental Studies was produced in Nov 1998. The main concern of this report was the impact of proposed quarry development in Rupert's Valley required to develop the Wharf area. However marine environment issues would need to be examined in detail under any wharf improvement proposals.

4.5 If a replacement ship became the preferred option then no environmental impact assessment would be required and normal codes of practice would be applied to avoid pollution incidents etc. This option is therefore not considered further in this report.

Air Access Options

4.6 The two air access options will have a broadly similar impact. This impact has three components – the impact of airport construction and its operation, the construction and operation of haul routes and operational access routes and the impact of tourism development.

[7] 5189 Options Paper v1.0, issued 29th July 2004

4.7 While the impact of these two options will be similar the medium runway will have a lower overall impact by virtue of its size. Fewer tourists would arrive via a medium runway so that operational impacts and tourism development impacts would be marginally less.

4.8 Apart from this difference the list of the main impacts would be the same for either runway. The impacts on landscape quality and on flora and fauna, impacts of the access route(s) and the impact of tourism development particularly in terms of carrying capacities would all be similar although in most cases slightly less for a medium runway.

4.9 The remainder of this chapter and the following two chapters therefore deal with these three areas of impact for the long runway only, making reference to the medium runway only where there is likely to be significant difference in impact for the item under consideration.

4.10 Overall the construction and operational impacts of an airport development at Prosperous Bay Plain are remarkably benign for such a small island with such rugged terrain. The impact on the invertebrate community on Prosperous Bay Plain is probably the most significant individual impact but this has already been reduced by careful positioning of the runway strip and mitigations can reduce the level of the impact further.

4.11 Greater impacts could be experienced by the development of the routes required to access the airport; this is discussed in Chapter 5. Impacts are also likely to be created by the development of tourism in the years following completion of construction as discussed in Chapter 6.

AIRPORT LOCATION

4.12 The HPR report (2001) discussed a number of options for airstrip location. The principal sites considered were at Prosperous Bay Plain originally considered by the Civil Aviation Authority (CAA) in 1973, at Deadwood Plain originally considered by the CAA in 1983 and at Horse Point, which does not appear to have been considered previously. After discussions with ASSI the Deadwood and Horse Point sites were ruled out on operational grounds (low cloud and cross-winds respectively). Both locations would also have had a higher environmental impact than Prosperous Bay Plain.

4.13 HPR also considered a number of options for alignment on Prosperous Bay Plain and concluded that a 2000m runway was required. None of the three alignments examined were eliminated and they included a North-South runway developed by Shelco as part of a dual runway proposal. This runway is approximately on the alignment of the runway being considered in this report.

4.14 The Atkins Options report[7] reconsidered the Prosperous Bay Plain alignments in more detail and showed that any East-West alignment would not be acceptable on aviation grounds and that a North/South or North West/South East alignment was required. The North West/South East alignment with an approach over Deadwood was then eliminated on low cloud cover and high construction cost grounds. Thus the North-South alignment remained as the only feasible option ¦ ¦ .

AIRPORT CONSTRUCTION IMPACTS

Introduction

4.15 In this section we briefly describe the Project and consider each area of potential construction impact as originally listed in our Access Feasibility Study Proposal[8]. We comment on the significance of each impact and what further investigation is required under the full EIA. In completing the EIA it is to be expected that all the following issues will be re-examined in the light of detailed design information.

Description of the Airport

4.16 The long runway will comprise a concrete strip 2250 m long and 45 m wide. On either side of the runway there will be an 82.5 m wide stabilised granular covered strip. Outside this there will be a sloping embankment of either exposed rock or rock fill extending to a width of 45 m. The total width of the runway reservation will therefore be 300 m. At each end of the runway there will be a Runway End Safety Area (RESA) with combined areas of 3 ha so that the total runway reserve will be about 70 ha.

4.17 The terminal building and parking area, located at the south-west end of the runway will occupy a further 5 ha.

4.18 The area of disturbed ground to complete both the runway and terminal area will extend to about 70 ha plus a further 20 ha of fill in Dry Gut so that the total affected area will be just under 100 ha.

4.19 It is the area of embankment on either side of the runway covering about 20 ha that will require restoration and habitat recreation. The embankment in Dry Gut will require slope protection which may not be compatible with habitat recreation since vegetated surfaces do not form part of the PBP habitat.

Landscape Impact

4.20 Prosperous Bay Plain is designated a Habitat Management Area under SHG's Protected Areas Plan (photo 1). "The Plain is viewed by many as a sterile and forbidding landscape. The environment is hostile and the animals and plants that live on the plain have special adaptations to cope with it. It is a relatively level area of land, a saucer-shaped depression known as the Central Basin surrounded by a higher level plateau. Today, the vegetation is dominated by the shrub *Suaedia frucosa* (indigenous), herbaceous *Atriplex semibaccata*, the mat forming creeper *Carpobrotus edulis* and annual *Hydrodea cryptantha* (endemic) and *Portulaca oleacea* (indigenous). Few other species can grow on the arid ground because of the presence of mineral salts (gypsum and calcium sulphate), visible as the white deposits in the lower part of the Plain".[9]

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[8] V5, issued 17th May 2004

[9] Description contained in the citation of Prosperous Bay Plain as a National Protected Area (see Annex A).

4.21 The orientation of the airstrip running right across this area will have a significant impact on the landscape particularly when approaching from the high ground at Longwood. Some argue that the civil engineering achievement of the runway will more than mitigate any other visual loss. However, as has been shown above, this is the only feasible site on the island so if an airport is to be built the change in landscape must be tolerated but can also mitigated by careful construction and restoration practices.

4.22 In addition to the impact on Prosperous Bay Plain there will also be a significant landscape impact on Dry Gut. Dry Gut, as its name implies, is a valley which carries only an occasional stream. It forms part of St Helena's coastal wilderness and contains one of the coastal walks that are popular with visitors and islanders alike. The impact will comprise the construction of an 80 m high embankment with a base width of approximately 800 m. The toe of the embankment will rest just above one of two waterfalls which are reported to be spectacular when there is flow in the stream. The lower part of the valley, which includes the full length of the footpath, would not be affected by the proposal and the embankment is likely to be invisible from most of the route of the footpath. The intermittent flows in the river would similarly be unaffected.

4.23 In addition to the airstrip the terminal building will take up about 5 ha and will require careful design and landscaping so as to blend with the surrounding semi-desert landscape. This will be achieved to a certain extent for the airstrip by the use of a concrete runway which will blend in with the colour of the natural landscape.

4.24 If the airport is to go ahead some loss of quality landscape is inevitable at the only suitable site on the island but careful restoration can provide a measure of mitigation. During the ESIA, artists' impressions of the airport should form part of the public consultation and disclosure programme to re-assure the public. The visual impact on Dry Gut should also be assessed to show that the impact on the most scenic part of the valley is not great.

Flora Impact

4.25 A reconnaissance survey of the flora of the airport footprint was undertaken as part of this environmental analysis and is reported on in Annex D. Prosperous Bay Plain is an extremely fragile environment where vehicle tracks can leave scars that remain for many years. As described above vegetation is scanty and dominated by a very few plants. In most of the affected areas the invasive creeper *Carpobrotus* dominates. Sub-populations of endemic and indigenous species will be lost. The species are not threatened, although Babies' Toes (*Hydrodea cryptantha*) has been classified by Cronk (2000) as rare.

4.26 In general, impact on vegetation will not be severe and the construction offers the opportunity for mitigation, which will enhance the environment. No further investigation of the vegetation distribution is considered necessary under the ESIA although a mitigation strategy will need to be developed.

Fauna Impact (invertebrates)

4.27 The Protected Area designation for PBP notes that "the invertebrate diversity provides further significant biological interest. Almost nothing was known of these until the work of the Belgians in 1965–7. Prosperous Bay Plain was one of their 80 study areas. Their collection included 55 endemic species out of an island total of just over 400. Of these 22 were found nowhere else on the island, and several more occur only on the Plain and in immediately adjacent areas."

4.28 Further work by the London Zoological Society during 1987/88 and 1993 again highlighted the importance of the area and drew attention to the very recently extinct Giant Earwig (*Labidura herculeana*) but it wasn't until Philip and Myrtle Ashmole undertook a survey of the invertebrates of PBP in late 2003 that the full significance of the area was realised.

4.29 The Ashmole report is expected to be finalised towards the end of 2004 but already their work has had a significant impact on the airport project. The interim report[10] drew a number of important conclusions:

- The presence of a number of species new to science has been confirmed.
- The taxonomic status and names of several of the previously known species are open to doubt.
- Prosperous Bay Plain is by no means a uniform habitat. Of particular importance is the Central Basin with its level sandy floor. It has unusual geological features and is of outstanding biological interest. Diversity of endemic spiders is especially high, and although these are largely invisible by day, they provide an intriguing spectacle by torchlight after dark.
- The Central Basin represents a mature desert ecosystem deserving rigorous protection and international recognition as a remarkable product of island evolution.

4.30 While the Ashmoles have highlighted the importance of the area, and the Central Basin in particular, their approach has been pragmatic in attempting to find a balance between the future of the island and the preservation of its environment. During the feasibility study we have had a number of discussions with them which have had influence both on the way the site investigations have been undertaken[11] as well as on the final alignment of the airstrip and positioning of the terminal building.

4.31 The Central Basin occupies an area of approximately 60 ha. Approximately 10 ha of the basin on the eastern side will be disturbed representing about 15 percent of the area. While preservation of the Basin is seen as the highest priority the eastern side of the basin is of least importance. The terminal building area will be located outside the south-east corner of the basin.

4.32 Drawing no. 5022355/CI/015, companion to this Paper as a separate document, shows the location of the Ashmole's observations (shown numbered, in circles). The most important areas are in the vicinity of observations 1,8 and 15 on the western side of the area and in the dusty area around observations 22 and 24 (P Ashmole pers. comm). The valley head to the east of this area acts as a funnel to the South-East Trade Wind, which may have had a considerable impact on the formation of this micro-landscape (around obs 22 and 24) but this feature will be replaced by the 'inform' embankment of the airstrip.

[10] Ashmole. P & M (2003) Surveying the Invertebrates of Prosperous Bay Plain, St Helena, Interim Report.

[11] Feasibility site investigations followed a procedure set out in Atkins (2004) Prosperous Bay and Prosperous Bay Plain Ecological Environment Protection Report

4.33 Impact on PBP's invertebrate community is likely to be one of the major environmental impacts of this project. However, sensitive planning and careful mitigation may enhance the environment in this area while the project itself may in the long-term have a beneficial effect by arresting a long period of gradual and uncontrolled decline of a habitat whose significance was not appreciated. The mitigation strategy for the Central Basin is discussed below.

Fauna Impact (Wirebird)

4.34 The Protected Area designation notes that "despite the presence of several introduced plant species, it is thought that this site is probably closer than any other to the nature of the Wirebird's original habitat."

4.35 A report on the potential impact on the Wirebird (*Charadrius sanctaehelenae*) of the proposals contained in the HPR report was produced by Neil McCulloch in 2001 and updated in 2004[12]. The main conclusions of the report (with respect to PBP) were:

- The Prosperous Bay area holds 17% of the total Wirebird population of about 400. There is some evidence that the population size at Prosperous Bay Plain is reduced during the peak of breeding activity, while that at Deadwood Plain is then at its maximum.
- Permanent habitat loss is likely to lead to displacement of birds from the area.
- Habitat degradation appears likely to have been a major factor in the recent decline of the Wirebird. It is therefore unlikely that birds displaced from the airport site will be able to re-establish themselves in habitat of similar quality. This is likely to reduce the productivity of the population as a whole.
- Disturbance associated with airport operation can adversely affect bird populations through habitat deterioration and effects on behaviour. After construction the habitat may continue to hold all necessary resources but may also be effectively reduced in quality by noise and increased human activity leading to avoidance by birds. If birds do continue to use areas adjacent to runways, behaviour alteration in response to novel stimuli may result in reduced breeding success and lower foraging efficiency. However, species closely related to the Wirebird do frequently show tolerance of low-intensity airfield operations.
- Restoration of degraded, formerly important, Wirebird sites and habitat modification within areas affected by construction work are suggested as mitigation measures.

Fauna Impact (other birds)

4.36 The main area of potential impact on other bird species will be on seabirds nesting along the coastline. Until very recently there has been a colony of Sooty Terns (*Sterna fuscata*) breeding at Gill Point while Shore Island and George Island are important breeding areas for a number of species. Baseline data collection for seabirds is being improved under the

[12] McCulloch N, 2001 (updated 2004) A Preliminary Assessment of the Impact of Airport Construction at Prosperous Bay Plain and Deadwood Plain, St Helena, on the Wirebird *Charadrius sanctaehelenae*

OTEP project entitled "Establishing a Monitoring Scheme and Awareness Programme for Seabirds and Turtles".

4.37 In general, impact on these species will be low. They fly well below the top of the cliffs and aircraft flights will not be frequent enough to cause significant disturbance. During the ESIA investigations seabird impact should be re-examined, particularly in the light of any new data on the Sooty Tern colony at Gill Point.

4.38 It is estimated that while 17% of the Wirebird population is contained in the PBP area only about five breeding pairs are likely to be affected by runway construction (McCulloch pers. comm.). Careful sire management should reduce the impact on the remaining population.

4.39 Despite the work which has been done on the Wirebird it remains a fragile species. There is the potential to expand its habitat under the mitigation strategy. It is not considered necessary to undertake further fieldwork to develop the Wirebird mitigation strategy unless the Rupert's route is selected as the haul route. However Neil McCulloch should be closely involved with developing the final mitigation strategy with or without paying a further visit to the island.

Meteorology

4.40 Although the Meteorological Office has been maintaining a station at Bottom Woods since 1977, only about 3km from the proposed runway site, data from this source are not sufficiently specific to meet Air Safety Support International's (ASSI) requirements. [13]

4.41 In order to meet ASSI requirements it is necessary to collect specific meteorological data from the northern threshold of the proposed runway. The most important data are cloud bases and visibility range. Data need to be available for three years.

4.42 We produced a note on these requirements in March 2004 and understand that recording started in July 2004.

Acquisition of Materials

4.43 All materials for the construction of the airstrip will be won on site or brought in via the haul route. A separate quarry will not be required as the operation is essentially one of cut and fill.

4.44 The main materials to be brought in will be sand (not available on the island) and cement.

4.45 The terminal area will require materials suitable for building construction in addition to the construction of an apron for aircraft parking.

Noise

4.46 The runway is remote from any noise-sensitive receptors, the nearest being at Longwood, some 2 km to the west. (There are two properties which are closer but these are a garage/depot owned by the Government and the meteorological station, and as such are

[13] ASSI is a subsidiary of the Civil Aviation Authority with regulatory responsibility for the UKOTs.

not noise-sensitive). Construction activities at the airport site are likely to be audible, but at this distance any disturbance will be minimal.

4.47 Good site practice, as advised in BS 5228: Part 1: 1997 should be followed. It is particularly important that where blasting is necessary this is done progressively, at a set time during the less sensitive normal working day, and local residents are given advance warning that it will occur. Acceptable hours of working for construction should be specified.

4.48 Given the small number of properties adversely affected by construction noise and traffic, the distance from the works to the properties, the temporary nature of any negative impacts, and assuming that the contractor adopts good practice, it is unlikely that disturbance through noise during the construction phase will be of more than minor significance.

4.49 Adverse impacts could arise from the noise of aircraft landing and taking off, ground noise at the airport (aircraft taxiing, APU operation etc.) and road traffic generated by the airport.

4.50 Given the prevailing winds and the north-south orientation of the proposed runway all approaches and departures will be largely over open sea. There are no noise-sensitive properties directly under or near the approach and departure paths. The types and numbers of aircraft permitted to operate at the airport can be restricted if appropriate to keep the cumulative impact within acceptable levels.

4.51 Ground-noise can be reduced by minimizing taxiing distances, and providing fixed power units to minimise the use of on-board APUs.

4.52 In conclusion it is unlikely that noise, either during the construction or the operational phase, will be a major concern. With noise sensitive planning and practice residual noise impacts should be controlled and minor.

Air quality

4.53 There could be negative impacts on local air quality during both the construction and operational phases, due in the main to the release of dusts from site operations.

4.54 Favourable conditions for dust generation are dry weather conditions combined with high winds. These conditions are more frequent during April to September when the potential for dust nuisance from the site would be greatest. Continual or severe concerns are most likely near to dust sources (usually within 250 m).

4.55 The wind, when sufficiently strong, may re-suspend dust from the ground transporting the particles from the site towards neighbouring properties. The amount of dust re-suspended by the wind depends upon the wind strength, physical condition of the surface and size range of the dust present. Disturbed, dry and uncovered surfaces permit the greatest re-suspension of dust particles.

4.56 Particles in the size range 70 – 125 µm are the most susceptible to re-suspension by the wind, but the relationship between dust re-suspension, particles size and wind speed is complex. Larger dust particles (>30 µm) are rapidly deposited to the surface under average wind conditions (2-6 m/s). The overwhelming majority of dust will therefore deposit within 100 m of the source. The small fraction of smaller particles (in the size fraction 10-30 μm) will travel up to 250 - 500 m. Particles less than 10 μm, which make up a small proportion of dust emitted, can travel up to 5 km and beyond. As a guide, at more than 500 m from a site, dust is unlikely to have any significant effects.

4.57 The proposed runway is remote from any receptor locations (e.g. homes, schools and hospitals), the nearest being at Longwood, some 2 km to the west. However, due to the likely long-range atmospheric dispersion of dusts and the potential for such dusts to form a visible plume, the environmental impact of the construction activities should be re-assessed and appropriate mitigation measures proposed.

4.58 Effects on ambient air quality during the construction phase are likely to include (but are not necessarily limited to) dust released from blasting and earth moving activities, the laying of sub-base and base layer foundations, the storage and use of bulk aggregate materials and the use of diesel powered plant and machinery. The duration, extent and location of the undertaking of such activities and the use of plant in sensitive locations should be considered. Some helpful information on the assessment of the impact of construction works can be found in the appropriate UK government's guidance note[14] .An assessment of the likely impact of the use of plant and machinery should make reference to the methods set out in the Design Manual for Roads and Bridges (DMRB)[15].

4.59 During operation, adverse impacts on ambient air quality could arise from the exhaust emissions of aircraft landing and taking off, from ground plant and equipment and from vehicles and road traffic generated by the staff and users of the facility.

4.60 It is unlikely that the impact on air quality of the operation of the airport will be a major concern. An assessment of the potential to cause air quality guidelines to be breached can be made using the DMRB.

4.61 In conclusion it is unlikely that the impact on air quality of the operation of the airport, either during the construction or the operational phase, will be a major concern. With appropriate and sensitive planning and the adoption of good practice in the use of materials, equipment and plant, residual air quality impacts should be controlled and minor.

Fuel

4.62 Fuel storage will be required for both the construction phase and during operation. Fuel storage requirements are not expected to be finalised until the detailed design stage. Storage is likely to be at the point of landing which could either be at Rupert's Valley or Prosperous Bay, though we favour adapting Rupert's (see Aviation Fuel Storage paper[16]). Transport is likely to be by road bowser.

4.63 Fuel and fuel handling for all stages of the project will be an important aspect of the full EIA to ensure safety and efficiency and to minimise the risks of pollution.

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[14] Review and Assessment – Estimating emissions (LAQM.T2(00), May 2002, DETR.

[15] Design Manual for Roads and Bridges, Volume 1, Section 3, Part 1, Air Quality, February 2003, DoT

[16] 5332 Aviation fuel supply V2, issued 1st October 2004

Drainage

4.64 Drainage issues are divided between clean water and dirty water disposal.

4.65 Prosperous Bay Plain drains to the North, down the lower reaches of Fishers Valley, so that the siting of the airstrip will not affect the general drainage pattern of the area. Although PBP is a low rainfall area intensive storms occur and there have been reports in the past of the Central Basin becoming a temporary lake. Because of the sensitive nature of the Central Basin it would be appropriate and also easier to direct airstrip runoff to the east into the various guts that flow down to the sea.

4.66 The embankment filling Dry Gut will require a culvert through its base to take the intermittent flow along the Gut. There is seldom water in this stream because the valley head lies just below Woody Ridge where mean annual rainfall is about 450 mm. Flash floods will be an issue and when completing the designs for the culvert it would be useful for the designer to examine the detailed hydrological analysis carried out for the construction of the Harpers Dam in 1993.

4.67 On an island always conscious of its water resources suggestions of using the Dry Gut embankment as an impounding reservoir are likely to surface but should be resisted. The site is too low for economical use and the flows too small to warrant such a development.

4.68 Dirty water will mainly emanate from the airport buildings. A suitable treatment system should be designed to allow discharge of wastewater into Dry Gut and to prevent any flow into the Central Basin.

Water Supply

4.69 Water will be required during construction for compaction of fill and possibly for dust laying. A potable supply will also be required.

4.70 It may be possible to use sea water for some engineering activities although this will require a lift of about 300 m. A more appropriate source is the spring in Sharks Valley known as Hencock's Hole which lies at an elevation of 265 m about 2 km from the site of the proposed terminal building. The spring has a minimum yield of about 400 m^3 per day and is slightly saline with an electrical conductivity of around 1,000 mS/cm but this should not restrict its use for most purposes.[17]

4.71 Hencock's Hole has long been seen as one of the principle untapped water sources on the island but development has been hampered by its low level and distance from demand. A private attempt was made to develop the source during the 1990s but was not successful for these reasons. However as a supply for the airport these restrictions do not apply and the development of a pipeline to the proposed terminal building would be relatively straightforward. Because of the location of the source a diesel rather than electric pump would be required.

[17] St Helena Water Plan 1990-2010, PWSD 1990.

Solid and Hazardous Waste

4.72 Solid and hazardous waste will be generated mainly during the construction period but also to a lesser extent during operation. With the island's waste tip nearby at Horse Point solid waste disposal will be relatively straightforward. In general however it will be important to ensure that the procedures for waste disposal are clearly stipulated in the construction contract particularly with regard to hazardous waste which would need to be disposed of off island.

Power Supplies

4.73 At present the closest power supply for the airport is at the Government Garage at Bradleys – a distance of about 2 km from the site of the proposed terminal building. During the design phase it will be determined whether it is feasible to extend this supply to the construction site on PBP and the EIA will need to consider routing of the transmission cables.

Installation of Navigation Systems

4.74 Lighting will be required on all high points surrounding the airport – Great Stone Top, The Barn and The Signal Station and possibly other sites. These will create a slight visual intrusion but will only be lit during aircraft movements.

Emergency Procedures

4.75 Rescue Fire Fighting Services (RFFS) will be required to have sea access and this could affect the choice of route development to the airstrip. This is a decision that will be made during the design phase of the project.

Construction Camp

4.76 During investigations for this study it has been established that the expatriate St Helena population possesses the majority of the requisite skills to meet the needs of the construction programme. It is also evident that they would be willing to return to the island to work on the project so long as the wage rates were not substantially lower than those currently being received for offshore work.

4.77 Assuming that the wage rate issue can be resolved, the use of a St Helenian labour force has profound social and physical advantages.

Health and Safety

4.78 During the ESIA and in developing the construction contract, health and safety requirements conforming both to St Helena's requirements and international practice should be clearly set out.

5 IMPACT SCOPING FOR ACCESS ROUTES

ACCESS ROUTE REQUIREMENTS AND OPTIONS

5.1 Access routes are required to provide a means of hauling plant and construction materials to site (the haul routes) and to provide access once the airport is operational (the operational routes).

5.2 Three haul routes and five operational routes have been considered in varying degrees of detail, shown in the attached drawing, 5022355/CI/09. The cost of construction of any of the routes is a relatively small part of the overall project cost and it is expected that a decision on the final routes will not be made until the detailed planning stage of the project.

5.3 The three haul routes are:

- Prosperous Bay
- Turks Cap
- Ruperts Bay

5.4 The five operational access routes are

- Longwood (the existing road)
- Ruperts (following the above haul route)
- Woody Ridge
- Fishers Valley to Longwood Gate
- Fishers Valley to Hutts Gate

HAUL ROUTES

Description

5.5 During the survey visit to the island a number of haul routes were considered but only the three listed above were considered worthy of further investigation.

5.6 The Prosperous Bay route is 3.8 km long from sea to terminal (photos 2-5). Prosperous Valley has been described by the paleornithologist Storrs Olsen as follows:

"The most productive site for bird remains was at the bottom of the deep gorge known as Prosperous Bay Valley on the north-east side of the island. One of the island's major streams, arising in the central ridge and running through Fisher's Valley, flows in turn into the canyon of Prosperous Bay Valley, there to descend over 300m in a series of three waterfalls. The canyon is about a mile long and is rimmed with sheer cliffs several hundred feet high. Access to the bottom of the valley is gained by a narrow footpath snaking down the eastern face. The remote and silent canyon, with its dark, towering walls flecked with immaculate white nesting Fairy Terns and with its rushing falls at one end and in a narrow wedge of sea visible at the other, is one of the most memorable scenes to be found on St Helena"[18] .

5.7 It appears that only the lower part of the valley would be affected by the proposed route which winds up a side valley to the East of the main valley through very difficult terrain. The beach area did not impress Darwin who noted "Prosperous Bay, although with so flourishing a name, has nothing more attractive than a wild sea beach and black utterly barren rocks"[19]

5.8 The Turks Cap route is 8.2 km long and has arguably greater scenic value than Prosperous, particularly at its seaward end. However the exceptional difficult geology of the area causing a high risk of rockfalls and also poor landing potential has meant that this route has been eliminated.

5.9 The Rupert's route (photos 6-9) is very much longer at 14.2 km but offers much more than a haul route. Despite its length it has a relatively low environmental impact and can be constructed with existing island technology.

Comparison of Prosperous and Ruperts Routes

5.10 Table 5.1 summarises the impacts, advantages and disadvantages of the two routes.

5.11 The principal advantage of the Ruperts route is that the infrastructure installed to facilitate construction of the airport can then be used for other purposes – particularly for developing container handling at Ruperts and relieving the pressure on Jamestown wharf. Prosperous does not realistically offer this as it has no other infrastructure and is remote from the rest of the island.

5.12 The difficulties of constructing the Prosperous route also count against it despite its shortness but it does offer emergency access of the quality required by ASSI. Also the opening up of another sea access route other than Jamestown, Ruperts and Sandy Bay would be welcomed by islanders.

5.13 On ecological grounds concerns have been raised about impact on invertebrate communities on the Prosperous route. Although both an endemic snail previously thought to be extinct and an endemic silverfish have been identified by the Ashmoles along the approximate route alignment it is important not overplay the significance of these finds which are likely to turn up in other parts of the area if a survey was undertaken (P Ashmole pers. comm.). The point about the Prosperous Bay route is that it is further intrusion into a fragile and potentially significant ecosystem about which there is only very limited knowledge. The Rupert's route does not create this type of impact and the main ecological concern, the effect on Deadwood, is both limited and much better understood and can be mitigated by careful route alignment across the Plain.

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[18] Storrs L Olsen, Paleornithology of St Helena Island, Smithsonian Institute,1975.

[19] Charles Darwin's Beagle Diaries ed R D Keynes, 2001

Table 5.1 - Comparison of Impacts and Relative Advantages of Prosperous and Ruperts Haul Routes

	Prosperous	Rupert's
Sea State	Unknown but probably protected from NW swell	Known and satisfactory much of the time but exposed to NW swell
Landing	Eastern side protected (where English army landed 1672). Landing craft access feasible	Water depth increases rapidly. Landing craft access feasible? Pier a better and longer term option?
Collection Area	Good sized area behind beach	Existing fisheries buildings behind BFI could be removed to provide satisfactory area
Length difficult (km)	1.8	1.0
Length easy (km) `	2.0	13.2
Total Length (km)	3.8	14.2
Construction cost (£ m)	¦ ¦ ¦ ¦ ¦ ¦ ¦	¦ ¦ ¦ ¦ ¦ ¦ ¦
Marine	Turtles breeding offshore.	Already impacted area with regular tanker calls, sea wall development etc
Housing	None	Possible direct effect on one or two houses in lower Ruperts
Agric. land loss	None	0.5 ha of pasture on Deadwood mitigated by pasture improvement at Bottom Woods
Landscape	Severe impact on wilderness area	Some impact on Deadwood but tracks already present. Otherwise low.
Archaeology	English landing place at Prosperous Bay but no remains.	(i) Slight impact on Boer encampment but can be largely avoided. (ii) Fortified wall at Ruperts Bay may be partly removed but could be fully restored
Wirebird	None beyond that created on PBP by airstrip	Impact on important breeding area on Deadwood but behaviour adjustment likely and mitigation by habitat creation on Bottom Woods.
Paleornithological	Possible impact on important fossil bird bone deposits in lower reaches of valley.	None
Invertebrates	Severe. Endemic snail *Nesopupa Turtoni*, thougt to be extinct, recently identified in route vicinity. Also endemic *Ctenolepisma sanctaehelenaea* (silverfish) and possible new silverfish species found at Prosperous beach.	Slight mainly in PBP airstrip area
Flora	Not significant. Populations (mostly small and fragmented) of endemic & indigenous species may be destroyed. (see Annex E for results of reconnaissance survey).	Not significant. Route is largely through heavily eroded areas some of which have been the focus of planting of introduced species for soil erosion control. (see Annex E).
Noise and vibration	Not significant	Severe effect on workers at Argos/Fisheries/Canning/BFI.
Dust	Not significant	Severe effect on workers at Argos/Fisheries/Canning/BFI
Health and Safety	Major concerns from rockfalls	Non-construction workers in site vicinity in Ruperts. Proximity of fuel lines and fuel storage
Wirebird	None beyond that created on PBP by airstrip	Slight. Behaviour modification likely. Mitigation proposed
Health and Safety	Major concerns from rockfalls	Busy road running up centre of valley. Rockfalls
Advantages	i) Provides quick access for emergency sea rescue ii) Improved public access to PB beach.	i) Forces resolution of Ruperts health and safety issue ii) Could provide permanent improvement to island sea access iii) High operational value. Provides second access to Ruperts. Can be used as multi-purpose operational route iv) Provides an alternative route to Longwood v) Concentrates fuel storage vi) Skills required for road construction already available on island which could mean early start to construction sending positive signal and PWSD capacity enhancement. vii) Opens up Pipe Ridge for forestry/recreational development
Disadvantages	i) Threat of rockfalls ii) Need to import skills required for construction iii) Damage to wilderness area / invertebrates iv) Limited operational value.	i) Impact on local community ii) Haul costs higher iii) Construction costs iv) Difficulties with sea rescue. v) Possible heightened safety risk? vi) crowded collection area

OPERATIONAL ROUTES

Description

5.14 The five operational routes have been examined in less detail than the haul routes. The Ruperts route developed from a consideration of access routes, the Woody Ridge route was originally proposed by Shelco and is mentioned in the draft Land Use Control Plan (2004) as is the Fishers Valley route via Longwood Gate. The Fishers Valley route via Hutts Gate was suggested by the Planning Department on St Helena. The lengths of each route are shown in Table 5.2.

Table 5.2 Approximate Operational Route Lengths (Jamestown arch to terminal km)

Route via	Length (km)
Longwood (existing route)	16.7
Ruperts	15.5
Woody Ridge	15.6
Fishers Valley (via Longwood Gate)	15.3
Fishers valley (via Hutts Gate)	15.3

Comparison of Operational Routes

5.15 There is little difference in length between all five routes, although the existing route through Longwood is slightly longer when measured from Jamestown arch to the proposed terminal.

5.16 The existing Longwood route could serve the airport during the early years of development in particular, but concerns have been expressed about increased traffic flows through Longwood village. During the detailed design phase a simple traffic forecast should be undertaken to place the question of operational access in perspective. This should be done in conjunction with a consideration of the needs for emergency access to the airport.

5.17 If it was decided that a new operational route is required consideration needs to be given in the first instance to the routes along Fishers Valley. These routes have been proposed under the Draft Land Use Control Plan because an area of lower Beales Valley has been identified for both residential and business development. To link this route to the airport is obvious to the East, and to the West the route can either run to Longwood Gate (photo10, possibly by-passing the Gate) or to Hutts Gate.

5.18 During his recent visit Dr Pienkowski[20] noted Fishers Valley as a potential Ramsar wetland site. The valley is virtually the only one on the island which retains wet conditions and green vegetation throughout its length and is probably the most important drinking and

[20] Of the UK Overseas Territories Conservation Forum

bathing area for the wirebird. However careful alignment of a new road would not necessarily impact on the integrity of the area.

5.19 If Prosperous Bay was selected as the haul route then one of the Fishers Valley routes would seem to be the best operational access solution. The Woody Ridge route does not appear to offer any advantages over these routes and, while of similar length, would involve increasing traffic on a very narrow and winding section of the Peaks ring road between Woody Ridge and Hutts Gate.

5.20 The selection of the Rupert's route as an operational route depends upon its selection as a haul route. The great advantage of this route is that it would concentrate development in Ruperts Valley. This would require a resolution of the safety concerns recently raised in the St Helena Disaster Capability Management Report which relate to the exposed pipelines along the valley linking the BFI with the power station. If Ruperts becomes the landing point for plant and materials then it is logical to use the infrastructure installed for the aerodrome project to develop the area in the long-term. This does not preclude the development of a Fishers Valley road, although funding might be harder to justify under an aerodrome project.

6 IMPACT OF TOURISM DEVELOPMENT

INTRODUCTION

6.1 Construction of an aerodrome will be justified largely by the increased number of tourists that improved access can be expected to bring. However at a certain level tourist numbers will damage the attractions that drew them in the first place. This will result in a decline in the industry and also a decline in the environment for the resident population.

6.2 An assessment of carrying capacity should form an important part of the EIA. At this stage of the analysis we have identified the main (vulnerable) components of St Helena's tourism product and attempted to make a preliminary assessment of that vulnerability. We understand that SHG is currently developing a submission for OTEP funding to study the issue of carrying capacity. If this goes ahead the results will feed directly into the ESIA and possibly reduce the requirements for this aspect of the assessment.

6.3 A simple way of assessing carrying capacity is to consider the numbers of tourists likely to be on the island at any one time and to assess the impact of those numbers on both a one off basis and on a sustained basis. Also the type of tourist needs to be considered since different types of tourists provide different types of 'load'. In general people wishing to visit St Helena are likely to be environmentally sensitive and represent the lower end of the 'load' scale.

6.4 During the island visit we asked consultees to consider the impact of 200 tourists on the island at one time. Some thought that this was probably the number on the island for the Q5 celebrations in May 2002. The number of holiday arrivals in the month preceding the 21.5.02 was in fact 205 assuming none left before the Q5 and what was particular about this period was that most tourists were staying for several weeks. So this seems to be a reasonable assessment of numbers and the common consensus was that once out of Jamestown the extra tourists were not noticeable.

6.5 In our estimates of tourist demand contained in the Tourism Market Study the inferred daily tourist maximum is about 500. The Island Proxy Analysis raised the question of the need to cap tourist numbers if tourism took off although in the most successful model quoted, Easter Island, of comparable size to St Helena but less terrestrially vulnerable, maximum daily numbers can be inferred to be about 700. However this has had significant negative social impact due to a set of circumstances which are not all applicable to St Helena[21]. Nevertheless a review of the impact of tourism on Easter Island's environment (or indeed other similar environments) would be a useful exercise to conduct during the ESIA. [Our economic modelling exercise applies a cap of 1500, for investigatory purposes].

[21] Georgia Lee, Easter Island Foundation, pers.comm.

POTENTIAL IMPACT AND CARRYING CAPACITY

Marine Based Activities

6.6 St Helena's tourist attractions can be divided between marine and terrestrial. Marine activities involve dolphin watching, deep sea fishing, scuba diving, wind surfing and swimming and snorkelling. A preliminary assessment of vulnerability is as follows:

6.7 **Dolphin watching:** there is a regular dolphin run along the leeward coast of St Helena which has recently been developed as a tourist attraction. At present a boat with capacity of about 30-40 goes out on demand; local opinion is that a couple of boats a week will cause no problem but more than this may cause disturbance. This suggests a carrying capacity of no more than 100 per week.

6.8 **Deep sea fishing:** the resource is largely unexploited but has been known amongst South African fishermen for years. An enthusiastic account describes it as follows:

"The anglers ….were convinced that the excellence of the fishing at St Helena placed it in a world class, far above anything to be found on the East or West Coasts of Southern Africa.
Several species of tuna abound in the waters of St Helena and can be caught apparently in all seasons of the year…..Besides these grand game fish there is the magnificent fighter, the wahoo, which grows to 130 lb and also blue marlin, bonito and sharks…" [22]

6.9 A system of tag release has been in operation for some time but knowledge both of the resource and its capacity is very limited. Deep sea anglers are travelling to Ascension in increasing numbers and development there may provide a guide for St Helena. Capacity will be limited by the number of boats available.

6.10 **Scuba Diving:** the potential for scuba diving is currently limited by the lack of a decompression chamber which makes insurance unavailable. A chamber costs about £50,000 and is expensive to run. If scuba diving is to develop, legislation is required to ensure that, for example, all divers are accompanied by a local, qualified diver and that wrecks, particularly in James Bay, are protected. The use of local divers should ensure that numbers are not excessive.

6.11 **Swimming and Snorkelling:** no capacity problems within the likely range of visitor numbers.

Land Based Activities

6.12 **Walking:** walking is a popular activity on St Helena which offers a range of different types of walks. Paths are often in poor condition and improvements would be required in some areas particularly those close to Jamestown. No capacity problems are envisaged on these general walks. It is worth distinguishing between walks that are of a general recreational nature eg Fairyland to Peak Dale or of specific ecological interest eg the Peaks and what can be termed wilderness walks.

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[22] Expedition St Helena; The Adventures of Four Anglers. 1953. D and KSH Brink

6.13 Wilderness walks have a limited capacity (photo 11). These walks involve a certain amount of difficulty combined with spectacular scenery and a feeling of remoteness. There are only about 10-15 such well defined walks on the island although many more exist by following so-called “fishermen’s paths” that can be dangerous. Of the 10-15 two – Dry Gut and Prosperous are could be directly affected by the airport development. The experience of these walks is rapidly diminished by crowding while the objective of most routes, the rocky beach, is small and not capable of holding more than a few people at one time. A rough estimate of capacity might be taken as about 100-150 being one party of ten on each walk in any one day.

6.14 It is understood that a project to improve path maintenance and signage is also being put together for submission to OTEP. The distinction between wilderness walks and other types of walks might be reflected in a different type of treatment under such a project.

Endemic Flora

6.15 The endemic vegetation of the dry zone tends to be relatively scattered and often inaccessible which provides a good measure of protection although there will be a need to ensure that access to isolated specimens such as the Boxwood (*Melissia begonifolia*) below Lots Wife is controlled.

6.16 In the wet zone endemic vegetation is concentrated in Diana’s Peak National Park and the northern tip of Sandy Bay National Park. Both these areas are vulnerable to large numbers of walkers (photo 12). At Diana’s Peak the ridge is extremely narrow and often wet and fairly unstable. The recent introduction of steps has improved the situation but under the ESIA an attempt should be made to develop a plan of how to manage access under different weather conditions for both Diana’s and High Peak.

6.17 While erosion is probably the main concern the nature of the risk of direct damage to rare plants should be defined and procedures for minimising the damage identified.

Bird Watching

6.18 Bird watching is likely to focus on the Wirebird and on seabirds. The Wirebird has a fairly widespread habitat and is easily seen by casual visitors. No serious threat is envisaged from the number of tourists expected and the Tourist department have already produced a leaflet entitled the “The Endemic St Helena Wirebird” which contains a Wirebird code for visitors.

6.19 Seabirds similarly can be viewed from many points both onshore and offshore. The only really vulnerable areas are the off shore stacks where landing is hazardous and unlikely to be attempted by many visitors if allowed.

6.20 On shore a sensitive area is Gill Point near the proposed airport site. Consideration needs to be given to further protection for this area (which might be included in the proposed OTEP project).

Fortifications and Other Buildings

6.21 Many of St Helena's fortifications are located in spectacular settings but all are in a very poor state of repair. Decline from weathering is likely to cause as much damage as visitors but at the more accessible ones such as Banks and Half Moon Batteries (photo 13) it will be important to stop visitors climbing off well-defined paths. Under the ESIA the fortifications which are most vulnerable should be considered and ideas for protection developed.

6.22 Other buildings which will attract visitors are the French controlled areas and Plantation House (including the tortoises). Assessing impact of visitors to these properties is outside the general scope of the ESIA but impact of access to some of the more remote ruins should be considered.

IMPACT ON INFRASTRUCTURE

6.23 While the type of tourists St Helena attracts might be light 'load' in terms of ecological impact their impact on utilities, particularly the use of water, may be rather heavier.

6.24 At present water supply is not a problem in terms of quantity but problems exist with quality. Supply problems might re-appear as temporary and permanent population combined approach 6000.

6.25 Power is also potentially an area requiring increased capacity.

6.26 Under the ESIA, with firmer tourist projections in place, the impact on utilities should be assessed.

6.27 An assessment of traffic flow in key areas should also be undertaken so as to draw attention to weaknesses in the road system's capacity.

7 EA PROCESS AND COSTS

INTRODUCTION

7.1 This chapter has three components following this introduction. In the first instance we consider how the Environmental Assessment (EA) process will develop following completion of the feasibility study and assuming that an airport project is agreed; this is followed by a consideration of the form of the Environmental Management Plan (EMP) and finally the various costs associated with recommendations in this report.

THE ENVIRONMENTAL ASSESSMENT (EA) PROCESS

7.2 In chapter 3 we considered the EIA approaches used by the EC, DfID and the World Bank. These approaches have considerable common ground reflected in subsequent chapters of this report. In defining the EA process we have similarly developed a procedure that reflects this common approach in the context of the Access Project. The key stages are:

1. Finalise draft ESIA ToR
2. Develop Public Consultation and Disclosure Plan
3. Develop project description and circulate to stakeholders together with draft ESIA ToR
4. Hold public meetings to gain stakeholder feedback on ToR
5. Finalise ESIA ToR
6. Undertake ESIA simultaneously with design stage
7. Develop mitigation strategy and environmental management plan (EMP)
8. Consult with stakeholders on draft ESIA
9. Finalise ESIA.
10. Implement EMP

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Objectives and Principles

7.3 The objective of the environmental management plan, which would be developed during the ESIA, is to provide a framework for implementation of the recommendations and mitigations proposed by the ESIA.

7.4 The following principles should be used in developing the EMP:

- Focus on health, safety and environmental risk prevention
- Conformance with relevant standards, codes and practices in the application of safe technologies
- All activities will be performed in a safe and effective manner and all equipment will be maintained in good operating condition for protection of the health and safety of all persons to conserve the environment and property.

- All necessary precautions will be taken to control, remove or otherwise correct any leaks and/or spills of hazardous materials or other health and safety hazards

EMP Components

7.5 Using the above guiding principles the EMP can be expected to address:

- Environmental management policies and systems to include a pollutant spill contingency plan, health and safety management plan, waste management plan training plan and a traffic management plan for both construction and operation.
- Mitigation plans, procedures and programmes
- Monitoring activities
- Implementation schedule and cost estimates
- Plan for integrating the EMP with the overall project development plan (which should include a method statement covering all aspects of construction and environmental management).

7.6 Some of the above plans will be developed by the contractor during the design phase but it will be the role of the EMP to ensure that all the necessary planning has be undertaken and can be easily referenced.

Mitigation Strategies

7.7 We have identified outline mitigation strategies that will be required by the project. These are:

- Pasture improvement Bottom Woods (and elsewhere if identified). The purpose will be the creation of further Wirebird habitat and also to improve the area of grazing available to the Deadwood Grazing Syndicate should the Ruperts haul access route be selected. Cost estimate ¦ ¦ ¦ ¦ ¦ ¦ ¦ .
- A detailed land re-instatement programme for the airstrip and access routes. On PBP the objective should be to create an environment that will be favourable for re-colonisation of invertebrates and endemic vegetation. To achieve this at an overall cost estimate of ¦ ¦ ¦ ¦ ¦ ¦ ¦ will require

  a) A soil survey of PBP to show soil depths and types and act as a guide to soil stripping, stockpiling and restoring. The survey will be done mainly using a hand auger supplemented by the trial pit data from site investigations.
  b) A *Carpobrotus* (creeper) survey and investigation to gain a greater insight into the effect of this plant on the landscape and to determine whether, as an invasive, it has an overall positive or negative effect.
  c) Seed collection on a limited scale although the extent of this will depend upon the restoration plan.
  d) Development of a restoration plan.

- A Wirebird investigation to assess the impact of the Ruperts haul route (if selected) and to assess the impact of the airstrip construction (a full survey only required if the Ruperts haul route is selected). Cost ¦ ¦ ¦ ¦ ¦ ¦ ¦ .

- Signing and protection for PBP to minimise traffic damage: ¦ ¦ ¦ ¦ ¦ ¦ ¦ .

7.8 At the start of the EIA the consultants should hold a seminar to bring together the main workers on St Helena's environment with a view to gaining a consensus on the issues raised in this report. Invitees should include as a minimum P & M Ashmole (invertebrates and natural history), N McCulloch (birds) and R Cairns-Wicks (plants) and a number of other workers in the field including a conference link up to key workers on St Helena.

ENVIRONMENTAL COSTS

7.9 The costs of undertaking environmental work associated with air access fall into three main groups – mitigation costs, the ESIA costs and institutional support costs. Table 7.1 provides a summary.

Table 7.1 Summary of Environmental Costs

Item	**Period for execution**	**Budget estimate £**
Signing and Protection of PBP	Upon project approval	
Land re-instatement investigations	During the ESIA	
Wirebird status update	During the ESIA	
Pasture improvement at Bottom Woods	Implementation of EMP	
Undertake Environmental and Social Impact Assessment	During design phase	
Provision of TA environmentalist	3 year input starting after project approval	
Provision of local ecologist	Implementation of EMP	
Total Budget Estimate		

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ENVIRONMENTAL ANALYSIS ANNEX A

TERMS OF REFERENCE

TERMS OF REFERENCE FOR CURRENT STUDY (EXTRACTED FROM FULL TOR)

Scope of Work Environmental Analysis

4.8 The environmental analysis will:

- identify, document and review all available environmental information relevant to consideration of options for access, both to inform the feasibility study and in preparation for the implementation of a full environmental impact assessment once a preferred option has been selected;
- identify, or confirm, the key environmental implications, both positive and negative, associated with each of the options, and identify the scope of mitigating measures for any adverse environmental effects;
- inform the preparation of draft terms-of-reference for an environmental impact assessment of the preferred option, at both strategic and project levels;

Main Tasks - Environmental Analysis

5.23 In addressing the scope of work set out in paragraph 4.8 above the consultants will, among other things:

- consider the extent to which any environmental screening and/or scoping studies that may have been previously undertaken, form an adequate basis for proceeding with an EIA, and make recommendations accordingly;
- liaise closely with DFID and with the St Helena Government so as to ensure that no previous work of relevance to the study - whether formally published or not - is overlooked;
- recommend, in the absence of specific legislation in St Helena, an appropriate approach to, and protocols for, the implementation of strategic and project level EIA in accordance with international best practice;
- recommend at what stage(s) in the project implementation schedule the EIA of the preferred option should be carried out, so that advantage may be taken of opportunities for integration with other project components (eg design);
- provide a cost estimate for a combined strategic and project level environmental impact assessment.

ENVIRONMENTAL ANALYSIS ANNEX B

NATIONAL PROTECTED AREAS

DIANA'S PEAK NATIONAL PARK:

This area, with the exception of High Peak, is the last remaining relic of natural tree fern and cabbage tree woodland left on St Helena. The area has an exceptionally high degree of endemicity in terms of the animal and plant species that it supports.

Objectives for management:

1) To perpetuate representative samples of endemic and indigenous species and habitat's to conserve species and genetic diversity.
2) To protect the outstanding natural and scenic features of the landscape for educational, recreational, tourist, inspirational and scientific purpose.
3) To manage visitors use for recreation, education, inspirational and scientific use.

SANDY BAY NATIONAL PARK:

The area of the Park proposed includes, Sandy Bay (including Sandy Bay Flatts and streams flowing through the Agricultural Station from the Bridge) Potato Bay, Sandy Bay Barn, White Sands, Lime Kilns, Arch, Broad Gut, Lot, Lot's Wife, Gates of Chaos, High Peak, Mt Vesey, the Depot, Peak Dale, Norman Williams Nature Reserve, Asses Ears, Man and War Roost and all coastal islands, coastline and land through to South West Point.

This area provides the only example on St Helena of the full cross section of species that once made up the different habitat types on St Helena from the tree fern thicket of the highest altitude (High Peak) through the moist mid-altitude zone of the Gumwood forest to the dry zone of Scrubwood scrub (Scrubwood, boxwood, plantain, salad plant, ebony, rosemary) to desert conditions of the coast where annuals, babies toes, salad plant, bone seed and euphorbia grow. These species are all surviving in small fragmented and in some cases isolated populations. Some of these populations are naturally regenerating, others are stable and others are declining (High Peak) due to the invasion of alien plants. All are threatened populations that could become extinct, in part due to alien plant invasion, if nothing is done to conserve them.

The area proposed contains the most dramatic and beautiful land and seascapes on St Helena. The physical features of the landscape are not only visually impressive but represent scientifically important geological features (e.g. Lot is the plug of a volcano and Lot's Wife, the Gates of Chaos, the Asses Ears, and Speery Island form part of a volcanic dyke).

The area also contains important heritage sites: the arch and fortification, the limekiln, Horses Head battery and Beach Hill battery.

Sandy Bay is a popular amenity site for recreation (picnicking, paddling, walking) and fishing. This are has been developed as part of the Tourism Master Plan to improve the amenity and encourage use.

Objectives for management:

1) To protect outstanding natural and scenic features of the landscape.
2) To perpetuate representative samples of endemic and indigenous species and habitats to provide species and genetic diversity and ecological stability.
3) To manage visitor use for recreation, education, cultural, scientific and tourist use.

4) To take account of the needs of local people (including subsistence use, to promote forestry, gardens), in so far as these will not adversely affect the other management objectives.

HORSE POINT PLAIN / MILLENNIUM FOREST:

An area that historically formed part of the "Great Wood" a native forest of Gumwoods and Ebonies, in which Gumwoods have been successfully re-introduced. The area was also the last known habitat of the Giant Earwig. This area has been expanded and is now called the Millennium Forest.

Management Objectives:

1) To manage the area for the conservation and re-introduction of gumwoods and other associated endemic and indigenous plant species.
2) To manage the area for conservation of the wirebird
3) To manage the area for conservation of endemic invertebrates.
4) To provide for recreation, interpretation and tourism use.

FLAGSTAFF HILL, THE BARN, BANKS BATTERY AND SUGAR LOAF:

An area of outstanding natural beauty, and one of the most prominent features of the island's landscape. Snail fossils found at the base of the hill are of evolutionary significance, having been studied by Charles Darwin.

Management Objectives:

1) To protect the outstanding natural features of the Flaggstaff and the Barn.
2) To preserve the site of fossils and deposits.
3) To improve information and interpretation relating to the area.
4) To preserve the scenic quality of the area and it's associated historical buildings and fortifications.

HEART SHAPE WATERFALL:

A scenically beautiful area, incorporating the site of a nature trail currently being developed as part of the Prince Andrew School Environmental Educational Programme.

Management Objectives:

1) To preserve the outstanding natural feature of the waterfall.
2) To maintain access to the site for recreational use.

HIGH HILL & EBONY PLAIN:

An isolated population of the endemic rosemary clings to the barren rock face on High Hill and Old Man's Head. The population of less than 30 and 12 individuals are two of three populations remaining on St Helena. The island wide population is less than 200 individuals. Pine trees are the prominent vegetation of the hill and a path takes you through the pinewood to the summit and the site of an old battery. Ebony Plain is historically the site of an ebony thicket, the presence of wood, collected for inlay work is still within living memory. Ebonies, Scrubwood, gumwoods and hybrids have been successfully re-introduced in to the area.

Management Objectives:

1) To protect, rehabilitate and expand the populations of rosemary on High Hill and Old Man's Head.
2) To manage High Hill for recreational use.
3) To protect the area as a reintroduction site for the ebony and other associated endemic and indigenous species.

PROSPEROUS BAY PLAIN:

Prosperous Bay Plain is viewed by many as a sterile and forbidding landscape. The environment is hostile and the animals and plants that live on the plain have special adaptations to cope with it. It is a relatively level area of land, a saucer shaped depression known as the Central Basin surrounded by a higher-level plateau. Today, the vegetation is dominated by the shrub Suaedia frucosa (indigenous), herbaceous Atriplex semibaccata, the mat forming creeper Carpotrotus edulis and annual Hydrodea cryptantha (endemic) and Portulaca oleacea (indigenous). Few other species can grow on the arid ground because of the presence of mineral salts (gypsum and calcium sulphate), visible as the white deposits in the lower part of the plain.

Despite the presence of several introduced plant species, it is thought that this site is probably closer than any other to the nature of the Wirebird's original habitat. The only regular human activity at the site is small-scale quarrying and vehicular access for fishing, walking and motor cross.

The invertebrate diversity provides further significant biological interest. Almost nothing was known of these until the work of the Belgians in 1965 – 7. Prosperous Bay Plain was one of their 80 study areas. Their collection included 55 endemic species out of an island total of just over 400. Of these 22 were found nowhere else on the island, and several more occur only on the Plain and in immediately adjacent areas.

Management Objectives:

1) To protect one of the most important sites for endemic invertebrates on the island.
2) To manage the area for the conservation of the Wirebird.
3) To conserve the naturally regenerating endemic and indigenous species.
4) To remove or minimise the threats to the area from vehicular traffic and stone removal.

DEADWOOD PLAIN:

Deadwood Plain is an area of pastureland covering, with the adjacent valleys of Netley Gut and Sheep Pound Gut, some 220 ha in the North of St Helena. The Plain rises in a shallow, but somewhat concave, slope form an altitude of 480m at Deadwood village in the South to 640m below the summit of Flagstaff Hill. The main plain itself is no more than 800m wide at any point and is bordered in the West and North East by steep, eroded slopes with extensive gully systems.

Deadwood Plain's grassland is of relatively recent origin, having been established as a result of felling of extensive tracts of native Gumwood forest, which originally covered the Deadwood/Longwood area. Clearance of this "Great Wood" was complete by the middle of the 18th century.

In November 1998 Deadwood Plain held approximately 21% of the wirebird population (70 –80 individuals). No other single site on the island held more than 10% of the population. Maintenance of the integrity of the breeding habitat on Deadwood Plain is likely to be a major factor if the wirebird is to be successfully conserved.

The pastures at Deadwood Plain are divided into around 15 paddocks, amongst which grazing is carried out on a rotational basis overseen by a syndicate of cattle owners. The presence of the Deadwood settlement around it's Southern and South-western margins results in a considerable amount of daily human activity on the lower part of the Plain, and much of it is associated with the movement of cattle and provision of fodder.

Historically there was a Boer Prisoner of War Camp (1900 – 1902) sited on Deadwood Plain and there was a road link to Rupert's along the Boer Road.

Management Objectives:

1) To protect and maintain the conservation of the St Helena wirebird.
2) To promote sound management practises for the sustainable production of cattle.
3) To protect the natural resource base from being alienated to other land use purposes that would be detrimental to the wirebird.
4) Protection of the site of the Boer Prisoner of War Camp

GREAT STONE TOP:

Great Stone Top boasts the highest sea cliff on St Helena, and in the Southern Hemisphere, at 494m above sea level. Impressive views can be had from the Top down the cliffs and seaward to George and Shore Island. Endemic populations of Scrubwood and salad plant are regenerating well, with tea plant holding it's own. The cliffs provide important nesting sites for sea birds in particular the Tropic Bird.

Management Objectives:

1) To acknowledge the highest sea cliffs in the Southern Hemisphere and other geological features.
2) To acknowledge the important biological diversity of the area: salad plant, Scrubwood, tea plant.
3) To protect an important site for nesting seabirds.

GILL POINT & GEORGE AND SHORE ISLANDS:

Gill point adjacent to Shore Island is used by seabirds as an inland nesting site. With limited availability of safe and suitable nesting sites, Gill Point is an important mainland site for nesting seabirds. An interesting ornithological conundrum is why there are two different varieties of the masked boobies inhabiting these islands, seen in the presence of birds with two feet colours, either yellow or blue?

Management Objectives:

1) To preserve the cliffs and islands for seabirds.
2) To limit public access and minimise disturbance.

3) To monitor seabird activity and if necessary to control predation by cats.

EGG, PEAKED AND THOMPSONS VALLEY ISLANDS:

The offshore islands provide the only safe nesting sites for seabirds.

Management objectives:

1) To preserve these habitats for seabirds.
2) To limit access and minimise disturbance.

DEEP VALLEY:

In the cliffs forming part of Deep Valley small fragmented populations of gumwoods have managed to survive. These are now being actively conserved with the aims of expanding the populations to re-establish self sustaining populations.

1) For the conservation and active management of the area to restore the Gumwood forest.

CASON'S, INCLUDING GEORGE BENJAMIN ARBORETUM AND NATURE TRAIL:

The nature trail follows a path though part of Cason's wood and was developed with assistance from the Governor's Discretionary Fund. The Arboreta and nature trail provide valuable education tools for people of all ages, providing examples of the endemic, indigenous and introduced flora. The area provides an attractive setting and base for recreational pursuits (walking/picnicking).

1) Protection and enhancement of the landscape in particular as a setting for compatible outdoor recreation.

PLANTATION FOREST:

Plantation Forest is a mixed species forest, much of which has not been managed for productive use. The forest provides an attractive setting for walking and other recreational pursuits with the advantage that it is reasonably level.

Management Objectives:

1) To manage the area of the National Forest as a public park.
2) The protection and enhancement of the landscape as a setting for compatible outdoor recreation including education and interpretation.

MARINE BIOLOGICAL RESERVE LONG LEDGE TO DRY GUT BAY:

The coastline from Long Ledge to dry gut bay, extending half a kilometre offshore is designated a marine biological reserve.

This area is reserved for scientific research, recreational use and tourist activities. The area is chosen to provide protection, understanding and enjoyment of the marine environment. It holds a variety of marine life representative of the island's species. The area is sheltered and provides an excellent insight into the aquatic marine ecosystems.

It will be observed that in this area there will be:

- No dumping of any material from rocks or vessels, except for shedding of ballast in emergency situations where human life is endangered.
- No littering with any materials, including fishing weights, lines, hooks and other gear.
- No commercial extractive uses, including fishing for financial gain, shell collecting, potting for lobsters and sand extraction.

Management Objectives:

2) To provide for the protection of marine habitats and species.
3) To provide for the sustainable use of marine resources
4) To provide for scientific, educational recreational and subsistence uses.

ENVIRONMENTAL ANALYSIS ANNEX C

ST HELENA ENVIRONMENT CHARTER

Environment Charter

ST. HELENA

Guiding Principles

For the UK government, for the government of St. Helena and for the people of St Helena.

1 To recognise that all people need a healthy environment for their well-being and livelihoods and that all can help to conserve and sustain it.

2 To use our natural resources wisely, being fair to present and future generations.

3 To identify environmental opportunities, costs and risks in all policies and strategies.

4 To seek expert advice and consult openly with interested parties on decisions affecting the environment.

5 To aim for solutions which benefit both the environment and development.

6 To contribute towards the protection and improvement of the global environment.

7 To safeguard and restore native species, habitats and landscape features, and control or eradicate invasive species.

8 To encourage activities and technologies that benefit the environment.

9 To control pollution, with the polluter paying for prevention or remedies.

10 To study and celebrate our environmental heritage as a treasure to share with our children.

Eric W. George
ST. HELENA
26 September 2001

Valerie Amos
UNITED KINGDOM
26 September 2001

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9. To control pollution, with the polluter paying for prevention or remedies.
10. To study and celebrate our environmental heritage as a treasure to share with our children.

Eric W George
St Helena
26 September 2001

Valerie Amos
United Kingdom
26 September 2001

Commitments

The government of the UK will:

1. Help build capacity to support and implement integrated environmental management which is consistent with St. Helena's own plans for sustainable development.
2. Assist St. Helena in reviewing and updating environmental legislation.
3. Facilitate the extension of the UK's ratification of Multilateral Environmental Agreements of benefit to St. Helena and which St. Helena has the capacity to implement.
4. Keep St. Helena informed regarding new developments in relevant Multilateral Environmental Agreements and invite St. Helena to participate where appropriate in the UK's delegation to international environmental negotiations and conferences.
5. Help St. Helena to ensure it has the legislation, institutional capacity and mechanisms it needs to meet international obligations.
6. Promote better cooperation and the sharing of experience and expertise between St. Helena, other Overseas Territories and small island states and communities which face similar environmental problems.
7. Use UK, regional and local expertise to give advice and improve knowledge of technical and scientific issues. This includes regular consultation with interested non-governmental organisations and networks.
8. Use the existing Environment Fund for the Overseas Territories, and promote access to other sources of public funding, for projects of lasting benefit to St. Helena's environment.
9. Help St. Helena identify further funding partners for environmental projects, such as donors, the private sector or non-governmental organisations.
10. Recognise the diversity of the challenges facing Overseas Territories in very different socio-economic and geographical situations.
11. Abide by the principles set out in the Rio Declaration on Environment and Development (See Annex 2) and work towards meeting International Development Targets on the environment (See Annex 3).

The government of St. Helena will:

1. Bring together government departments, representatives of local industry and commerce, environment and heritage organisations, the Governor's office, individual environmental champions and other community representatives in a forum to formulate a detailed strategy for action. (See Annex 1).
2. Ensure the protection and restoration of key habitats, species and landscape features through legislation and appropriate management structures and mechanisms, including a protected areas policy, and attempt the control and eradication of invasive species.
3. Ensure that environmental considerations are integrated within social and economic planning processes; promote sustainable patterns of production and consumption within the territory.
4. Ensure that environmental impact assessments are undertaken before approving major projects and while developing our growth management strategy.
5. Commit to open and consultative decision-making on developments and plans which may affect the environment; ensure that environmental impact assessments include consultation with stakeholders.
6. Implement effectively obligations under the Multilateral Environmental Agreements already extended to St. Helena and work towards the extension of other relevant agreements.
7. Review the range, quality and availability of baseline data for natural resources and biodiversity.
8. Ensure that legislation and policies reflect the principle that the polluter should pay for prevention or remedies; establish effective monitoring and enforcement mechanisms.
9. Encourage teaching within schools to promote the value of our local environment (natural and built) and to explain its role within the regional and global environment.
10. Promote publications that spread awareness of the special features of the environment in St. Helena; promote within St. Helena the guiding principles set out above.
11. Abide by the principles set out in the Rio Declaration on Environment and Development (See Annex 2) and work towards meeting International Development Targets on the environment (See Annex 3).

ENVIRONMENTAL ANALYSIS ANNEX D

AIRSTRIP RECONNAISSANCE VEGETATION SURVEY

VEGETATION SURVEY OF THE PROPOSED AIRPORT ACCESS, AIRSTRIP AND TERMINAL BUILDINGS

Method

The proposed airport road route to the airport terminal (from Cook's Bridge) and the footprint of the airstrip (and associated buildings) were surveyed by walking the full length of the road, from the junction where the new road turns off from the road to PBP, and the runway from end to end, including the surrounding 'affected' area. Species presence was recorded in terms of frequency of occurrence and particular reference was made to species of significance, for example, indigenous or endemic. A special note was made of the distinctive environmental factors and features of areas that were believed to influence the presence of particular individuals or groups. Trial Pit, Bore Hole and Central Basin Markers were used to identify sites on the ground in the absence of details of alignments or the availability of GPS.

Description	Species Present (scientific name followed by common name in general use)	Ecological Status	Notes (Abundance & general description)
From the turning (marked terminal) the vegetation is Prickly Pear scrub. (Photo DSC0 6085)	Opuntia vulgaris, Prickly Pear/Tungy Carpobrotus edulis, Creeper Suaeda fruticosa, Samphire Atriplex semibaccata Mesembryanthum crystallinum, Ice Plant *Eragrostis cilianensis* Portulaca oleracea, Purslane	Introduced Introduced Indigenous Introduced Introduced Indigenous Indigenous	Prickly Pear main vegetation type, with the latter three species re-colonising the road track.
At Road Test Pit 12 there is a distinct change from Prickly Pear dominated scrub to Creeper. The substrate is rocky scree. Eragrostis, Ice Plant, Prickly Pear and Portulaca are present in low numbers amongst the Suaeda and (Photos DSC0 6087 & 6092)	Carpobrotus edulis, Creeper Suaeda fruticosa, Samphire Atriplex semibaccata Mesembryanthum crystallinum, Ice Plant *Eragrostis cilianensis* Portulaca oleracea, Purslane Opuntia vulgaris, Prickly Pear	Introduced Indigenous Introduced Introduced Indigenous Indigenous Introduced	Creeper forms near complete ground cover with patchy distribution of Atriplex and Suaeda which is quite rare amongst the Creeper but locally common in isolated silty patches where it remains the dominant vegetation type. There are three small areas (less than 50m wide) where Suaeda still remains bounded (and invaded) by Creeper, which are notable and through which it appears the proposed road will pass. The largest is south of Trial pit 15 (Photo DSC0 6099) where the silty substrate has formed in a lower lying area bounded to the north by a small rocky ridge, itself covered in Creeper.
From the central basin co-ordinate CB09 there again there is another area of slightly lower lying ground and a distinct change in the substrate to one that is fine and silty, with an absence of surface rock.	Suaeda fruticosa, Samphire Hydrodea cryptantha, Babies' Toes Atriplex semibaccata	Indigenous Endemic annual (IUCN category Rare numbers vary greatly from yr to yr but found in several places from Sugar Loaf to Asses Ears Introduced	The abundance of Suaeda at this site is less dense than the three previous but now also present is Babies Toes.

Description	**Species Present (scientific name followed by common name in general use)**	**Ecological Status**	**Notes (Abundance & general description)**
	Eragrostis cilanensis Mesembryanthum crystallinum Chenopodium sp. (photos DSC06016 & 6017) Chenopodium sp. (photo DSC06019)	Indigenous Introduced Relatively recent introduction? Possibly indigenous species?	
Trial pit 16 conveniently marks the end of the Suaeda dominated vegetation once more as the land slopes up southwards and becomes rockier.	Opuntia vulgaris, Prickly Pear Atriplex semibaccata Suaeda fruticos Eragrostis cilanensis Mesembryanthum crystallinum, Ice Plant Hydrodea cryptantha, Babies Toes	Introduced Introduced Indigenous Indigenous Introduced Endemic	Prickly Pear, Atriplext and Suaeda now present in relatively equal proportions. Abundant Occasional/rare Occasional/rare
From Trial Pit 16 to BH137 and thereafter to BH 33.The vegetation remains similar (the different types of species present remains fairly constant, although relative abundance of each species varies)			
On the ridge to the south of the Plain following runway alignment	Prickly Pear Suaeda fruticosa Atriplex semibaccata Hydrodea cryptantha Babies Toes Cotula coronopifolia	Introduced	Rare Dominant vegetation type along with Atriplex The distribution of Babies Toes is patchy but can be locally common Locally common growing close to CH1100 west edge of strip 28
A small, isolated population of Tea Plant survives on the exposed rocky	*Frankenia portulacifolia*, Tea Plant	Endemic (IUCN category; Rare – total population size	The tea plant survives here but its success is extremely limited (three small plants noted and one

Description	**Species Present (scientific name followed by common name in general use)**	**Ecological Status**	**Notes (Abundance & general description)**
cliffs beyond the runway skirt close to the trial pit in the 'Dust Bowl' and close to Ashmole site SO7. (Photo DSC06107)		difficult to estimate because largely confined to inaccessible cliffs)	dead mature plant) and it is likely that the Tea plant has been pushed in to this marginal habitat. It could well have grown in more accessible places on the ridges around Prosperous Bay Plain.
	Unknown Yellow lichen (Photo 6109) – specimen collected.	Growing on weathered rock in the 'Dust bowl' close to Trial pit.	
	Unknown brown lichen (like that noted along Rupert's access route) – specimen collected	Growing on weathered rock in the 'Dust bowl' close to Trial pit.	

SUMMARY OF IMPACTS

Airport Road

The main point of note for this area is that it is an extremely fragile environment where vehicle tracks can leave scars that remain for many years. And like the haul roads the creation of a new road could provide new or better opportunities for colonisation by the introduced species.

Construction impacts of the road will be minimal because a track has previously been cut leading off the main track from Cook's Bridge to Prosperous Bay Plain right to the ridge west of the Plain. This track is currently marked 'Terminal' with a wooden marker.

From markers on the ground it appears that in some places the proposed airport road will deviate from the existing tracks. The vegetation is largely creeper with a few exceptions in silty gullies where Suaeda still remains. The new road passes through one particularly notable area. It is suggested that where this is the case the existing track scars should be repaired (possibly using any sand removed as fill???).

Measures should be taken to control the spread of Creeper in those areas where Suaeda still has a strong hold.

Cook's Bridge – now overgrown with Wild Mango and thatching grass. Was an area where moorhens, Wirebirds and Partridges could be seen. – possibly improved post road works and linked to Ramsar?

In some cases Test drill sites have not been properly reinstated (coarser rock from lower layers now on surface) and in some cases Bore Hole sites have not been filled in. This leaves scars which whilst it can be argued are going to be completely insignificant in the wider scale of the proposed construction do not help in establishing value of this environment.

Airstrip and Terminal Building

Sub-Populations of endemic and indigenous species will be lost. The species are not threatened, although Babies' Toes has been classified by Cronk (2000) as Rare. Impact on vegetation is slight and manageable.

Proposed mitigation

- Collection of seed of endemic and indigenous species (*Eragrostis*, Suaeda, Babies' Toes, Purslane, Chenopodium and Scrubwood (*Commidendrum rugosum*[23])) prior to construction – possibly linked to the Kew Seed Bank Project which will provide training in seed collection and establish seed collections of key species – Steve Alton project leader expected to visit St Helena later this year. For use in re-establishing vegetation cover on the airstrip 'skirt' post construction.
- Reintroduction of Tea Plant and Scrubwood post construction.

[23] Scrubwoods are present alongside the road to the Signal Station and the surrounding cliffs. Like the Tea Plant it is likely that it has been pushed into more inaccessible areas because of predation pressures.

- It is possible that rabbit predation will impact re-establishment efforts.

Recommendations for further work

More detailed data collection on the presence of plant species is not considered necessary as part of the EIA. However it is worth considering carrying out studies that will help in the process of reinstating the endemic and indigenous species (and better understanding their ecology) once major construction work has been completed. Such as the impact & spread of the Creeper and the establishment of permanent monitoring sites.

ENVIRONMENTAL ANALYSIS ANNEX E

AIRSTRIP RECONNAISSANCE VEGETATION SURVEY

Prosperous Beach	Turk's Cap	Rupert's
Sub-Populations of endemic and indigenous species will be lost.	Sub-Populations of endemic and indigenous species will be lost. The species are not threatened, although Babies' Toes has been classified by Cronk (2000) as Rare.	Sub-populations of indigenous flora will be affected.
The species concerned have populations that are widespread, though usually small. The loss of sub-populations associated with the haul road is considered not to affect the long term persistence of the species concerned.	The species concerned have populations that are widespread, though usually small. The loss of sub-populations associated with the haul road is considered not to affect the long term persistence of the species concerned.	The species concerned have populations that are widespread, though usually small. The loss of sub-populations associated with the haul road is considered not to affect the long term persistence of the species concerned.
Overall, the impact on vegetation is considered not to be significant.	Overall, the impact on vegetation is considered to be slight and manageable.	Overall, the impact on vegetation is considered not to be significant
Introduced and highly competitive species dominate in areas where water is seasonally available. The disturbance associated with construction of road and thereafter the potential for water run-off could provide an opportunity for these species to increase in abundance. Management of the construction of the road and post construction should consider ways of limiting opportunities for the spread of these competitive introduced species.	Introduced species present. More prevalent at Gregory's Battery but not found in large numbers in the valley. The disturbance associated with construction of road and thereafter the potential for water run-off could provide an opportunity for these species to increase in abundance. Management of the construction of the road and post construction should consider ways of limiting opportunities for the spread of these competitive introduced species.	Introduced and highly competitive species dominate the vegetation along the route. The disturbance associated with construction of road and thereafter the potential for water run-off could provide an opportunity for these species to increase in abundance. Management of the construction of the road and post construction should consider ways of limiting opportunities for the spread of these competitive introduced species.
More detailed survey of the vegetation is not required.	More detailed survey of the vegetation is not required.	Further investigation recommended to identify thread like grass species found. Suggested grass is *Scirpus antarcticus* but could be *Bulbostylis neglecta*??? and lichens[25].

[24] Training on seed collection to be given by Steve Alton as part of Kew seed bank project for the OTs. Extend species to be collected and carry out with ANRD staff or under contract??

[25] Collect specimens and send to Kew for identification of plant material and Natural History Museum for lichens. Possibly a charge for identification. Minimum of £40 per specimen ??

Seed collection is however recommended for re-seeding post construction if this route is chosen[24]. Establishing protocols for re-seeding and replanting are also recommended.	Seed collection is however recommended for re-seeding post construction if this route is chosen. Establishing protocols for re-seeding and replanting are also recommended.	Seed collection is recommended for re-seeding post construction if this route is chosen. Establishing protocols for re-seeding and replanting are also recommended.

APPENDIX T: TOR FOR ESIA

CONTENTS

1 BACKGROUND

1.1 St Helena is a remote UK overseas territory (UKOT) situated in the South Atlantic Ocean approximately 700 miles from the nearest land (Ascension island) and 1,100 miles from the nearest mainland (Angola).

1.2 The island's remoteness is complimented by an extremely rugged terrain and high coastal cliffs so that sites suitable for an airport are very limited. At present the island is served by a purpose built cargo-passenger ship the *RMS St Helena* which was commissioned in 1990. The effective life of the ship is deemed to be approximately 20 years.

1.3 In addition to poor access the island has recently suffered a period of economic decline. Depopulation has occurred leaving an ageing population of just under 4,000 on the island. The main employer is government which receives budgetary and other aid of approximately £10 million per year from HMG. Poor access has been identified as the principle obstacle to economic development.

1.4 In common with most oceanic islands St Helena has a fragile and unique environment that has been devastated by the indirect and direct activities of man. While the island retains a spectacular landscape it is largely man made with only pockets of the original flora and fauna surviving.

1.5 The decision to provide St Helena with air access was announced by the Secretary of State on ………… The decision follows many years of discussion about the feasibility of such a project and specific investigations of Air and Sea Access options by High-Point Rendell in 2001. DFID/SHG have also held detailed discussions with a private sector developer, Shelco, and most recently a feasibility study of Access Options has been completed by Atkins Management Consultants. This study concluded that a 2250 m runway on Prosperous Bay Plain is the most cost-effective solution for solving St Helena's access problems.

1.6 As part of the Atkins feasibility study physical and social scoping was undertaken and reported in Sections 6.3 and 6.4 of the final report. Recommendations for maximising the achievement of social benefits are set out in Section 7.x. The scoping for the physical environment is included in the Environmental Analysis contained in Annex … The Environmental Analysis reviewed previous environmental work on the island, discussed regulatory procedures, set out the approach for conducting a full Environmental and Social Impact Assessment (ESIA) and scoped the issues to be addressed with regard to the physical environment. These terms of reference should therefore be read in conjunction with the Atkins Feasibility Final Report.

2 OBJECTIVES OF THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

2.1 The ESIA is part of the overall process of Environmental Assessment (EA) which identifies, studies and mitigates physical and social development impacts. The main components of the EA are:

i) Environmental Scoping
ii) Agreement of the Terms of Reference for the Environmental and Social Impact Assessment
iii) The Public Consultation and Disclosure Plan (PCDP)
iv) The ESIA Report
v) The Environmental Management Plan (EMP) and its implementation

2.2 The objectives of the EA, of which the ESIA is a part, are to:

a) Assess the direct and indirect physical and social impacts of the airport construction and operations
b) Provide guidance for the final selection of haul and operational access routes and an assessment of the impact of the selected route(s).
c) Assess the range of impacts from expected economic development arising from improved access – notably tourism.
d) Identify community concerns and respond to them
e) Recommend measures to mitigate negative effects and maximise benefits in all areas
f) Develop a management plan, which includes monitoring proposals for both the physical and social environment, within a robust regulatory framework.

3 AVAILABILITY OF INFORMATION

3.1 A considerable body of knowledge exists, much of it in the UK, about St Helena's environment and its issues. It is not envisaged that any additional baseline work on the physical environment will be required to complete the ESIA beyond that proposed under the mitigation strategies identified in the Environmental Analysis..

3.2 In view of recent demographic, social and economic changes on the Island, and amongst the wider St Helenian community, it will be necessary to determine at an early stage whether existing socio-economic data are sufficient to identify the effects on the community as a whole and sub-groups within the community likely to be affected by the proposals. It has been suggested that the census schedule may be revised; otherwise it is likely to be necessary to undertake a suitable data collection exercise.

4 PUBLIC CONSULTATION

BACKGROUND

4.1 Public consultation forms an important part of the Environmental Assessment process with direct bearing on the ESIA particularly as the St Helenian community is so scattered.

4.2 Timely and effective consultation has an important role to play in the smooth development of design and proposals through the provision of clear information, answering questions, avoiding the development of entrenched position based misinformation, allowing a forum for resolution of opposed views, and encouraging agreed outcomes to meet the needs of all parties.

THE PUBLIC CONSULTATION PROCESS

4.3 Consultation has three key elements, all of which need to be in place for it to be successful:

- Information
- Dialogue
- Feedback

4.4 The consultation process should include:

- Preliminary consultation with key workers and interested parties to achieve consensus regarding the terms of reference for the ESIA, and to encourage the contribution of data from both formal and informal sources
- Summary of earlier consultative work in connection with the proposals
- The production of a consultation and disclosure plan
- Identification of broad issues of concern among the consultees
- Detailed consultation to address issues requiring development on mitigation or monitoring

THE PUBLIC CONSULTATION AND DISCLOSURE PLAN

4.5 A PCDP should be developed at the start of the EA process. The plan should state clearly:

- the principles and aims of the consultation exercise
- the process by which stakeholders will be identified
- the stages of implementation, which stakeholders will be involved and the mechanisms for consulting them in each stage
- the nature of information to be made available to the consultees and general public at each stage
- the way in which the consultation process will be recorded
- the process for feedback about outcomes and response to issues raised

4.6 The identification of stakeholders should include all groups and individuals with a claim to interest in the proposals. The St Helenian community is spread over several locations as well as on the Island. Provision must be made for new interest groups to form during the course of the consultation. The PCDP is regarded as an organic document which should be kept up to date recording activities as the EA process develops.

MANAGING PUBLIC CONSULTATION

4.7 It is not clear to what extent public consultation will handled directly by the SHG Air Access Department. In any event a manager for the consultation process should be appointed as early as possible. Early publication of the consultation plan will re-assure the community that their views will be taken into consideration, and provide information about the phasing of the design.

5 ISSUES IDENTIFIED DURING THE SCOPING STUDY

THE AIRPORT DEVELOPMENT

5.1 The Environmental Analysis and Sections 6.4 and 7.x of the Atkins Report set out the main physical and social issues associated with the airport development. The ESIA should review and address the full range of construction and operational impacts identified in the Atkins Report plus any others that may emerge during the ESIA investigations.

5.2 For the physical environment the most significant potential impacts are likely to be on the landscape, on the invertebrate community of Prosperous Bay Plain (PBP) and to a lesser extent on the endemic wirebird for which PBP forms part of its habitat.

5.3 For the social environment, beyond the range of issues identified in the Atkins Final Report (Section 6.4), issues that should be given particular attention are land acquisition and compulsory purchase, opportunities for local employment, accommodation of temporary workers, impact on residential amenity, and social equity in access to air services.

ACCESS ROUTES

5.4 The Environmental Analysis identifies three possible haul routes and five operational access routes and scoped the environmental impacts of each route.

5.5 A traffic study should be undertaken of the haul routes and the operational access routes and it is assumed that this together with environmental information and other operational and constructional considerations will be used to make a selection of the preferred route(s).

5.6 The ESIA should be undertaken on the selected route(s) following data in the Environmental Analysis and Chapter 6.4 and include any other impacts that may emerge.

IMPACT OF DEVELOPMENT RESULTING FROM IMPROVED ACCESS

5.7 Tourism development was seen by Atkins as the means for justifying investment in air access. The Environmental Analysis reviewed environmental impacts arising from tourism and in particular considered the issue of carrying capacity for each of the main areas of expected tourist activity.

5.8 The ESIA should develop this analysis making recommendations where appropriate on capacity limits and how they might be implemented.

5.9 In undertaking this work similar problems and their solutions from other parts of the world should be brought to bear. One such place is Easter Island, identified in the Atkins Proxy Island Study as being of similar size to St Helena and with a number of similar problems.

5.10 The social impacts of air access on all groups within island society should be examined with reference to direct effects arising from greater freedom of movement, indirect effects arising from employment opportunities and economic growth, and tertiary effects generated by increasing the population, changing the age structure, and migration.

6 THE ESIA REPORT

6.1 The ESIA report should follow a format dealing with each issue in terms of baseline, impact and mitigation from both a social and physical viewpoint. The main chapters of the ESIA are likely to be as follows:

1. Introduction
2. Description of the Project
3. Regulatory Procedures
4. Airport Construction Impact and Mitigation
5. Access Roads Impact and Mitigation
6. Tourism and other Development Impacts and Mitigation
7. Project Construction and Operation
8. Public Consultation and Disclosure
9. Environmental Management Plan

6.2 In completing the social components of the above chapters the methodology used to assess community profile and impacts should be stated.

6.3 The ESIA should commence at the same time as the final design process gets under way and run in parallel to ensure that designs have taken due account of environmental impact and the potential for mitigation. The ESIA will report at the same time as the completion of the design process.

7 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

7.1 The Environmental Management Plan (EMP) will be the means by which the proposals contained in the ESIA are implemented on the ground. The principles of the EMP are set out in the Environmental Analysis. In the absence of a strong regulatory framework the contractor will be required to sign up to the EMP so that it becomes contractually binding. This action would be expected to take place at the end of the design period and before the start of construction.

7.2 The main components of the EMP are expected to be:

- A contractor's manual that sets out all processes for landing materials, constructing access routes, hauling materials to site and site construction. This manual will draw on international good practice modified for the particular conditions of the project.
- Contribution to relevant areas of the operations manual for the airport and associated facilities
- Development of a monitoring plan which will include definition of the process by which the contractor's activities will be monitored and a means by which disputes can be resolved as well
- Plan for longer term monitoring of physical and social impacts arising from tourism and other developments.
- A development of the mitigation strategies identified in the Environmental Analysis into detailed plans with implementation schedules and costs. Some of these activities should take place under the ESIA notably a soil survey of PBP, a study of *carpobrotus* and its effects on the PBP habitat, limited seed collection programme, development of a land restoration plan and a survey of existing wirebird condition.
- A description of social measures to mitigate negative or optimise positive effects, including (but not limited to) the recommendations set out in Section 7.x of the Atkins Feasbility Study Final Report.

APPENDIX U: ISLAND VISIT AND OTHER MEETINGS

ACTIVITIES

1.1 The team's main activities on St Helena comprised meetings and group discussions as shown in the Tables below. Most of these were attended by two or more Study team members. Details of group discussions held on St Helena, Ascension Island, the Falkland Islands and in the UK are also shown.

Table 1 - Meetings: St Helena

Department	Principal Informants	Team Members Attending
1. Government Departments/ Officials		
Social Work Manager	Timothy Scipio	PA
Tourism Department	Pamela Young	NC,DW,IM
Employment and Social Security	Ronald Coleman, Cynthia Bennett	PA
Agriculture and Natural Resources	Wendy Clingham, Arthur Leo, Vincent Williams	IM
Government Economist	Adrian Green	DW
Air Access Team	Sharon Wainwright	NC,DW,IM,PA
Personnel Department	Barbara George	NC
Economic Development & Planning (statistics)	Janet Lawrence	PA, NC, DW
Fisheries Directorate	Gerald Benjamin, Emma Bennett	IM
Education Department	Pamela Lawrence, Ann Dillon	PA, NC
Environmental Co-ordinator	Isabel Peters, Adrian Malia (environmental adviser)	IM
Post Office	Beverley Francis	DW
Prince Andrew School	Derek Henry	PA
Bank	Richard Winch	DW
Police, Emergency Services, Immigration	Derek Thomas, Alan Thomas, Trevor Magellan	PA, NC
St Helena Development Agency	George Stevens, David Tyler, Graham Sim, Reg Yon, Gilbert Yon, Colin Yon (Government Economist also attended)	PA, NC, DW
Public Health and Social Services Department	Ivy Ellick, Derek Topliss	PA,NC
Finance	Desmond Wade, Linda Clemett	DW
Attorney General	Alan Nicholls (acting)	NC, DW
Planning Department	Gavin George, Glynis Fowler	PA, IM

HE The Governor	David Hollamby	NC, DW, IM, PA
St Helena Media	Ralph Peters, Stuart Moors	NC, DW, IM, PA
Public Solicitor	Colin Forbes	NC
2. Departmental Committees		
Fisheries	Chair: Greg Cairns-Wicks	IM
Public Works and Services	Bill Scanes, Eric George	IM, DW, NC
Agriculture and Natural Resources	Mervyn Yon	IM
Public Health and Social Services	Chair: Councillor Hopkins	PA, NC
Education	Chair: Councillor Drabble	PA
Air Access	Sharon Wainwright et al (exc. John Styles and Eric George)	NC, DW, IM, PA
3. NGOs		
Heritage Society	¦ ¦ ¦	IM
Citizenship Commission	¦ ¦ ¦	PA, NC
National Trust	¦ ¦ ¦	IM, PA
4. Businesses		
Cable and Wireless	¦ ¦ ¦	DW
Solomons	¦ ¦ ¦	DW
Chamber of Commerce	¦ ¦ ¦	PA, NC, IM, DW
Shelco	¦ ¦ ¦	PA, NC, IM, DW
Argos	¦ ¦ ¦	IM
5. Others		
LegCo	¦ ¦ ¦	PA, NC, IM, DW
Invertebrate Group	¦ ¦ ¦	IM
French Consul	¦ ¦ ¦	NC, DW
Leisure Group	¦ ¦ ¦	PA, NC
Longwood Care Centre	¦ ¦ ¦	PA

Table 2 - Group Discussions: St Helena

Nature of Group	Location and date	Team Members Attending
Small Businesses (8 – sectors represented inc. manufacturing, retail, transport, training, agriculture, tourism/hospitality)	6th July 2004, Council Chamber	PA, DW
Public Sector Employees (7)	7th July 2004, Consulate Hotel	PA. NC
Retired People (8)	7th July 2004, Consulate Hotel	PA, NC
Private Sector Employees (6)	8th July 2004, Council Chamber	PA
Unemployed and Single Parent (1)	8th July 2004, Council Chamber	PA
Prince Andrew School Students (14)	8th July 2004, Prince Andrew School	PA, IM
Recent Returnees (8)	9th July 2004, Consulate Hotel	PA, NC

Table 3 – Meetings: Ascension Island

Department	Principal Informants	Team Members Attending
1. Government Departments/ Officials		
Administrator	Andrew Kettlewell	NC, DLW
Administration Manager	Cathy Cranfield (2 meetings)	NC, DW, IM, PA
Chief of Police	Reg Williams	NC,DW
Commander British Forces	Brian Pattinson	NC, PA
2. Employer Representatives		
Serco	¦ ¦ ¦	NC, PA
BBC / Merlin	¦ ¦ ¦	NC
CSR	¦ ¦ ¦	NC
Turners GCMS	¦ ¦ ¦	PA

Table 4 - Group Discussions: Ascension Island

Nature of Group	Location and date	Team Members Attending
Drawn from local community (10)	1 July 2004, Council Chamber	PA, NC
Drawn from local community (12)	1 July 2004, Council Chamber	PA, DW
Drawn from local community (7)	2 July 2004, Council Chamber	PA, IM

Table 5 – Meetings: Cape Town, RSA

Department	Principal Informants	Team Members Attending
1. Government Departments/ Officials		
Cape Town Tourism	¦ ¦ ¦	NC
SHG Representative	Adam Kossowski	NC, PA
Former Director Cape Town Tourism	¦ ¦ ¦	NC, PA
2. Tourism Operators		
Thompsons	¦ ¦ ¦	NC
Uyaphi	¦ ¦ ¦	NC
Greenlife	¦ ¦ ¦	NC
Telephone interviews	¦ ¦ ¦	NC, PA
3. Other		
Chair, Friends of St Helena, Kwa Zulu Natal.	¦ ¦ ¦	PA (telephone interview)

Table 6 - Group Discussions: Cape Town, RSA

Nature of Group and numbers attending	Location and date	Team Members Attending
Saints Community / interested persons (8)	19th July 2004, Townhouse Hotel	PA, NC
Saints Community / interested persons (5)	19th July 2004, Townhouse Hotel	PA, NC

Table 7 – Meetings: Falkland Islands

Department	Principal Informants	Team Members Attending
1. Government Departments/ Officials		
LegCo	¦ ¦ ¦	PA
Director of Civil Aviation	¦ ¦ ¦	PA
2. Employer Representatives		
Sodhexho	¦ ¦ ¦	PA
3. Other		
Former Director of Civil Aviation	¦ ¦ ¦	PA
Informal St Helena Representative	¦ ¦ ¦	PA

Table 8 - Group Discussion: Falkland Islands

Nature of Group and numbers attending	Location and date	Team Members Attending
Employees at Mount Pleasant Airbase (Sodhexo, NAAFI, Turners, Interserve) (5 + 1 telephone interview)	24 June 2004, MPA Conference Room	PA
Drawn from Stanley community (7)	25th June 2004, Council Chamber	PA
Hotel workers (3)	28th June 2004, Malvina House Hotel	PA
Drawn from Stanley community (11)	28th June 2004, Council Chamber	PA
NB: no members of the British Forces participated		

Table 9 - Group Discussions: UK

Nature of Group and numbers attending	Location and date	Team Members Attending
Drawn from local Saints community (10)	27 July 2004, Marriot Hotel, Swindon	PA, KM
Drawn from local Saints community (11)	28 July 2004, Atkins offices, Euston Tower, London	PA, HT
Drawn from local Saints community (8)	29 July 2004, Holiday Inn Hotel, Southampton	PA, HT

APPENDIX V: COMMENTS ON SHG LDC (ENVIRONMENTAL)

Comments on Environmental Aspects of the Draft Land Development and Control Plan

1. The Plan notes the commitment made by SHG through the Environmental Charter (para 2.1.1 and 14.1.1.) which is part reproduced in Appendix 2 however the commitments such as under Item 3 SHG will "ensure that environmental considerations are integrated within social and economic planning processes" and under item 4 "ensure that environmental impact assessments are undertaken before approving major projects" are not discussed in the main body of the report and the brief mention of the Charter in the main report downgrades its importance.

2. The process for undertaking environmental assessments needs to be defined

3. Similarly National Protected Areas are described in Appendix 4 and mentioned in 14.3.1 but not really put in context of how they might function as protective instruments.

4. Para 8.3.2/8.4.4 and Policy E7 need to take into account Ramsar designation for Fishers Valley being proposed by UKOTCF.

5. Para 8.4.1 and Policies E4 and S.1.1 see Ruperts being retained for employment uses including possible expansion of the airport. The very sensitive nature of Ruperts in the light of fuel storage should be mentioned in the light of the Disaster Mitigation Plan. Also the whole valley is littered with bones from the mass graves of liberated slaves who died following landing on the island. There are believed to be at least 5000 bodies in unknown sites along the floor of the valley. Many have been disturbed including during construction of the existing power station in the mid 1980s. Disturbance of graves on this scale is now likely to be seen as an issue of international importance.

6. Para 9.4.4 the building referred to is an old Quarantine Station and is located behind the fortifications.

7. Para 12.2.10 Walking. Atkins introduced the idea of Wilderness Walks which require different management to inland and short walks

8. Policy R.L.1 under the Atkins feasibility study Bottom Woods paddocks are seen as a wirebird habitat creation area. This is not necessarily incompatible with use as a playing field but the joint use should be kept in mind during planning.

9. Para 14.2.3 statement is incorrect – the PBP invertebrates exist independently of endemic flora.

10. Policy CN1 is somewhat prescriptive. It is worth bearing in mind that St Helena's landscape is almost entirely in its present form as the result of human activity. It could be argued e.g. that the airport proposal has lead to the study which highlighted the importance of invertebrates. It is possible to develop and preserve the environment simultaneously but the issues need to be fully explored not just ignored.

11. Policy AF 1 is possibly not tight enough. The 1989 land use survey identified only about 80 ha of cultivated land. Now some of this may not be used e.g. Broad Bottom but is important

to preserve it. Much of the St Helena's agricultural land is in fact in small parcels of 0.4 ha or less so AF1 doesn't afford much protection.

12. Airport Planning Considerations should be re-written in the light of the Atkins Feasibility report. The section on routes 18.4.7 and 18.4.8 in particular needs reviewing and draws conclusions based on little evidence. Policies A1 to A6 should be re-written in the light of the Atkins report. They are far too prescriptive at present.

13. Policy AD8 is welcome but the process for determining environmental impact needs to be defined.

APPENDIX W: DESCRIPTION OF ECONOMIC MODEL

GENERAL

The model is a demand-led model of the St Helena economy. The main driver of demand is the forecast number of visitors to the Island, principally comprising tourists. Tourism is exogenous to the model. The key outputs are the required level of total budgetary support to the St Helena Government by the United Kingdom Government and Gross National Product (GNP).

The following paragraphs set out the core economic equations in the model.

CORE EQUATIONS

National Accounting Identity

The core equations aggregate to the National Accounting Identities:

GDP = PC + GC + PI + GI + E – I, and GNP = GDP + NFI.

Where:

GDP = Gross Domestic Product
GNP = Gross National Product
PC = Private Consumption
PI = Private Investment
GC = Government Consumption
GI = Government Investment
E = Exports
I = Imports
NFI = Net factor Income from Abroad.

Consumption Functions

The Private Consumption function is of the form:

$PC_t = A1*p_t + B_1*GDPR_{t-1} + B_2*PC_{t-2} + TC_t + BTC_t + CY_t + PCA_t$

Where A_1, B_1 and B_2 are constants estimated from a linear regression of PC per capita against GDPR per capita and PC per capita for the previous year for historic St Helena data. GDPR is GDP less gross direct tax revenue plus the value of overseas remittances in that year. $GDPR_{t-1}$ is here defined as GDPR in the previous quarter and PC_{t-2} is defined as PC in the previous year. TC is tourist consumption, BTC is Business Traveller Consumption and PCA is private consumption associated with the construction labour force. TC and BTC are calculated from estimated tourism and business traveller expenditure. PCA is calculated from the number of immigrant construction related workers (St Helenians and others) multiplied by the estimated on-island expenditure per worker. p_t is population in year t.

Where: TC_t = No. of tourists in year t * average gross tourist expenditure;
BTC_t = No. of business travellers in year t * average gross business traveller expenditure;
and CY_t = No. of cruise and yacht visitors in year t * average spend for this group.

Government Consumption is aggregated over all SHG departments, as set out in the Expenditure Budget, and may be expressed in the form:

$$GCt = S\ GED_{it} * p_t/p_{t-1} + S\ GED_{jt} * GDP_t/GDP_{t-1} + S\ GED_{kt} * DEP_t * p_t + S\ GED_{lt} * (1+r_l)$$

Where GEDit = SHG departmental expenditure items set to vary with population.
GED_{jt} = SHG departmental expenditure items set to vary with GDP.
GED_{kt} = SHG departmental expenditure items set to vary with dependency ratios and population.
GED_{lt} = SHG departmental expenditure items set to vary by specified growth rates.
r_l = Growth rate applied to department l.
DEP = the dependency ratio. Defined as the percentage of the population of school age and/or retired.

Investment Functions

Private Investment is defined as:

$$PI_t = (B_3 * GDP'_{t-1}) – \text{public investment excl. access choice} + S\ TI_t$$

Where B_3 is a constant estimated from total investment as a proportion of GDP for proxy island data and TI represents major one-off tourism investments. GDP'_{t-1} is here defined as GDP in the previous quarter less access choice investments. PI before TI is subject to a de minimis level.

Government Investment is defined as:

GIt = SPWSt * GDPt/ GDPt-1 + S AIt + S SIt

Where PWS = the Public Works and Services investment expenditure in year t.
S AI_t = Sum of airport related investments.
S SI_t = Sum of RMS related investments.

Exports

Exports are assumed as constant in the model, based on the trend value at the start of the evaluation period. Exports exclude elements of tourist expenditure which is all counted as consumption.

Imports

Imports are defined by the equation:

It = B4 * C’t + S ACIt + B5 * TEt + TC + OST

Where B4 is a constant estimated from a linear regression of Imports against aggregate Consumption excluding consumption relating to access, tourism, technical cooperation and development expenditure, from St Helena data. C’t is defined as total consumption excluding consumption relating to access, tourism, technical cooperation and development expenditure. CET is consumption expenditure excluding tourism and access related expenditure, and IET is investment expenditure excluding tourism and access related expenditure. ACI is the sum of imports deriving from the access choice investments and TE is expenditure by tourist visitors, including cruises and yachts. B5 is a constant calculated from the breakdown of the components of tourism expenditure and the proportion estimated to represent import leakage. TC and OST represent projected technical cooperation and overseas training costs respectively.

Direct Taxes

Direct Tax revenue is defined by the following equation:

DTt = B6 * PC t + B7 * GCt + HTRt

Where DT is Direct Tax revenue and PC and GC have the same meanings as above, and HTR is Hotel Tax Revenue. Constants B6 and B7 are estimated from a linear regression of direct tax revenue against consumption separately for private and government consumption, from St Helena data. HTR is hotel tax revenue and is calculated as 10% of accommodation costs (bare room costs only).

Private Sector consumption is taken as a proxy for private sector wages and corporate income, and Government Consumption is taken as a proxy for public sector wages. Allowance is made for adjustment of the constant B6 through time to provide for growth in the private sector tax take and an initial rate of 2% pa growth has been assumed.

Indirect Taxes

Indirect Taxes, IT, are calculated as:
$IT_t = B_8 * (VIt + SS_t) + S\ ART_{it} + S\ MIT_{it} * GDP_t / GDP_{t-1} + SMIT_{jt} * p_t/p_{t-1} + SMIT_{kt} * (1+rk)^t$

Where B_8 = Import duties as a proportion of visible imports plus shipping services.
VI = Visible imports, and SS = Shipping services. ART = Access related indirect tax revenues, such as passenger and aircraft landing fees, navigation charges, etc
MIT_{it} = Miscellaneous indirect tax revenues from the SHG Revenue Budget which increase pro rata to GDP.
MITjt = Miscellaneous indirect tax revenues from the SHG Revenue Budget which increase on a basis dictated by changes in population.
MIT_{kt} = Miscellaneous indirect tax revenues from the SHG Revenue Budget which are set to vary by specified growth rates.
We have assumed that imports directly related to access choice investment will be exempt from import duties during the construction period, and in line with worldwide practice that aircraft fuel is exempt throughout the evaluation period.

PRINCIPAL INPUTS FROM OTHER MODELS

Airport Construction Costs

Detailed airport construction costs are imported from a matrix template. This enables adjusted engineering cost estimates to be input to the model in one operation. The detailed matrix is shown in Annex B above.

Visitor Forecasts

The forecast visitor numbers for each option (given in Annex A above) are imported from a number of spreadsheets giving annual forecasts by:

- international tourists
- St Helenian's visiting friends and family and on holiday
- business visitors.

The tourism input sheet also contains information on:

- tourist numbers
- average tourist spend
- average tourist retention, i.e. amount not spent on imports (used to calculate the extent of tourism expenditure "leakage" to imports)
- proportion of tourism spend on accommodation (used to calculate hotel tax revenues).

Population Forecasts

A separate proprietary demographic model is used to forecast the population number and structure and these figures are imported into the economic model. There is no equation directly linking tourism, employment, net migration and population. Direct and indirect employment numbers are estimated from multipliers applied to the tourism forecasts within the economic model and these are used to derive net migration in the demographic model.

A cohort component model has been adopted to project population. This approach permits simultaneous variations to be made to the levels and patterns of mortality, fertility, and net migration influencing the population within the study area.

The principle underlying cohort component projection is straightforward and can be thought of as an extension of the basic demographic equation

$$P(1) = P(0) + B - D + (I - E)$$

where:

P(1) = the population of the study area at the end of the projection period
P(0) = the population of the study area at the start of the projection period
B = births in the period
D = deaths in the period
I = immigration to the area during the period
E = emigration from the area during the period

The equation can be applied not only to the population as a whole but to the component sub-groups determined on the basis of age and sex. While the principles of component projection are simple, the practical application of the method rapidly becomes complex since the number of calculations required is very large, irrespective of the numbers in the population.

The application of this method requires three inputs: (i) the base population from which the projection commences, (ii) sets of assumptions about the course of demographic events during the period of the projection, and (iii) mathematical relationships through which the assumptions are applied to the base population.

APPENDIX X: RISK ANALYSIS OF LONG RUNWAY OPTION

This appendix has been redacted as it contains information that is commercially sensitive.

APPENDIX Y: PROCUREMENT APPROACH: RMS REPLACEMENT

1. Funding Arrangements

The shipbuilder would expect an advance payment and would be required to provide bank security acceptable to SHG/DFID. The shipbuilder would be required to provide a performance guarantee secured by a performance bond issued by a bank acceptable to SHG/DFID.

Memorandum of Understanding between DFID and SHG setting out value of the grant, its purpose and conditions attached and financial limit to DFID's liability.

Establishment by SHG of a bank account with a UK bank.

Payments due under contracts are then made by the UK bank on behalf of SHG direct to Designer (s)/ Builder on production of Grant Payment Certificates approved by Consultant Engineer acting on behalf of SHG.

2. Ship Operational contract

Ship management contract let between Owner (Special Ship co) and Ship Manager.

This contract would probably not be covered by the EU Regulations as it includes a right for the manager to charge for the services (therefore excluded from the Public Services Contract Regulations under s.2(i)(e)

Owner monitors performance of Ship Manager possibly under a contract between SHG and Owner.

SHG and DFID need to decide on new ship management arrangements to be adopted in the future (currently under review)

Contract is let between SHG and provider of personnel to Owner.

APPENDIX Z: AIR SERVICE CONTRACT APPROACH

This appendix has been redacted as it contains information that is commercially sensitive.

APPENDIX AA: REVIEW OF PROCUREMENT ROUTES

CONTENTS

1 PRIVATISED OR PRIVATE PROVISION OF THE AERODROME

1.1 The procurement of an aerodrome through a fully private solution is impractical as the level of predicted revenue is always inadequate to make a commercially viable enterprise. The analysis does not therefore dwell on privatisation or BOOT options. Similarly no analysis is provided of procurement through a private commercial developer cross-subsidising the aerodrome: in reviewing the responses to the Expressions of Interest in 2003 we had already concluded that this approach was not sustainable.

1.2 Commercially operated aerodromes have significantly greater passenger throughput than is forecast under any regime from St Helena. As a rule these arrangements apply to hub airports although there are examples of others that operate in special circumstances. Luton for example, has successfully arranged a BOT scheme under which its commercial property, car parking and infrastructure have been upgraded, but this is a prime location for charter flights situated in the South East of England. London City Airport, a privately owned and operated aerodrome on the other hand, has struggled for viability, despite its geographic situation. Established in 1987, throughput has only now reached 1.5 million passengers, constrained as it was by poor communications. Access to a large volume market is therefore fundamental to the viability of a commercial aerodrome. In recent years international aerodrome operators such as BAA have taken over the commercial operation of a wide range of aerodromes. Generally these take advantage of the commercial potential of the retail and business property interests.

FRANCHISE ARRANGEMENT

1.3 This contract structure simulates an operating lease between SHG and franchisee, but is more commonly used where the franchisee takes significant revenue risk.

1.4 Under franchising, the public benefits from the operational cost and performance risk being transferred to the private sector. Monthly regular contracted payments are made to the franchisee, subject to retentions for poor performance.

1.5 The approach is used widely in public transport for buses, train operations and ferry services. The level of market revenue that can be anticipated from the St Helena aerodrome would not make it a sufficiently attractive proposition to differentiate Franchising from the Managed Service Contract approach. The franchisee may take risk on aerodrome revenues, but the contract would have to be underpinned by SHG payments for ‘availability’ (i.e. all facilities maintained to a standard that ensures they are available for use for say, 98% of the time). These would have to cover operational and maintenance costs on a predetermined basis.

1.6 There would never be enough airport revenue on St Helena to support this arrangement. Little risk transfer would be passed in practice to the private sector and the benefit of any integration with the infrastructure developer/ contractor would be lost.

PFI/PPP PROCUREMENT OF THE AERODROME AND ITS OPERATION

Contract structure

1.7 This would require a medium- to long-term Concession contract (25+ years) between SHG and a concessionaire, under which the concessionaire would be paid a single predetermined periodic amount from the time that the aerodrome became operational to the end of the concession period. This Unitary Payment (UP) would relate to the 'availability' of the facilities and the level of service provided. The development of the aerodrome would be funded by the private sector, although DFID might make a grant towards these costs. The private sector would fund the capital through the debt market and equity. Investors would receive a fair return on investment capital. In the event that the facilities were not completed to the stipulated operational standard by a given longstop date the lenders could expect compensation and the equity players to lose most of their investment. Monitoring of performance would be through the Project Agreement and failure to meet the output specification service standard would lead to deductions from the UP and ultimately to termination of the contract for persistent failure.

1.8 This approach would require SHG to contract with a Special Purpose Company (SPC) that would borrow significant amounts with long term obligations. The lenders to the SPC would require adequate security that under the terms of the contract they would be repaid either through the normal performance of the contract or through the use of compensation terms, including provisions requiring SHG to provide compensation (including in the event of step in due to concessionaire default). We have consulted with CA Legal and the St Helena Attorney General whose advice is reported below.

Funding Arrangement

1.9 Assuming partial funding by DFID, a Memorandum of Understanding would be written between DFID and SHG providing for purpose and conditions of grant. The UP amounts to the concessionaire – subject to an agreed inflator - must be included in Budgetary aid allocation.

Comment on market appetite

1.10 PPP is a widely recognised procurement methodology. It could attract a wide range of international contractors with in depth experience of this route. They will be interested if it can be demonstrated that risk transfer is reasonable to this project and its location and that reasonable returns can be made on the risk capital invested. If contractors are to take any risk on the completion and operation of the aerodrome there can be no significant risks outside their control that might cause delay or cancellation of the contract. The resolution of the Wideawake access will be a condition precedent to any contract being signed. No finance could be raised if the legal basis for operations is in any way uncertain.

Cashflow

1.11 Apart from any initial grant funding, SHG/DFID would be required to make regular predetermined monthly payments. These would be determined by the agreed financial model at Financial Close. Payments would commence only at start of operation of the aerodrome and would be subject to deductions for poor performance.

Forecast Outturn

1.12 As set out in Table 12.4 above, the impact on the NPV of total HMG support to St Helena of implementing a PPP solution has been estimated at ¦ ¦ ¦ ¦ compared to ¦ ¦ ¦ ¦ for conventional procurement. When the impact of risks is included in the calculation the differential drops, as shown in Table 12.4.

Legal requirements

1.13 The concessionaire (and its funders) would require substantially more by way of warranties, guarantees and indemnities from SHG (and possibly direct from DFID) in respect of various aspects of the project. The warranties plus other guarantees would be included in the concession agreement.

1.14 If the contracts are between SHG and an offshore company, the lenders would require that they could enforce their security in the courts of St Helena. In addition they may seek to join DFID in any action in the courts of England and Wales.

1.15 The borrower or any contractor may sue SHG in the courts of St Helena and /or UK.

1.16 SHG have rights of set-off of claims against the contractor under Section 43(1) of the Financial Management Ordinance. The contractor would seek similar rights. This would be available under common law but may be expressly stated in the contract.

1.17 A PPP contract may require certain funds to be held in trust. S.45 of the Financial Management Ordinance provides for SHG to hold trust funds. In the absence of local trust law these funds would be subject to English law and held offshore.

1.18 It is likely that the structure of any loan would require substantial reserve accounts for debt service and periodic maintenance. The lenders would probably require these to be held in accounts in London or if the loans are not in sterling in other offshore centres, but be the property of the borrower. If the borrower is St Helena registered it may still hold these accounts offshore. We understand that there is no local law preventing a St Helena entity from holding accounts outwith the territory.

Timeframe in Implementation plan

1.19 Delivery of a PPP/PFI project can be difficult and frustrated if not well managed. It requires a clear and detailed understanding of the output specifications and service delivery, a reasonable approach to risk sharing, understanding of the obligations of the public sector and the legal basis for entering into them and the ability of the procuring Authority to meet its financial obligations- current, future and contingent.

1.20 Once this is established a credible Outline Business Case and a Public Sector Comparator can be completed. Much of the work undertaken in this current exercise will contribute towards substantial delivery of these objectives.

1.21 The drafting of an outline concession agreement and an invitation to tender (ITT) or negotiate (ITN) will not take excessive time as much of the information has already been assembled and contracts now follow a standard form.

1.22 The time from the point when the ITN is issued to financial close can vary significantly. This will depend upon:

1. The complexity of the transaction and the clarity of the payment mechanism
2. Acceptance of realistic risk sharing
3. Adherence to model contracts
4. Experience of the Authority team (including advisers) in letting these contracts
5. Clarity in the legal position of the Authority, its rights and obligations
6. Ability to make decisions quickly and commercially. Where SHG is represented by committees these must be properly constructed with sufficient delegated authority and a clear mandate
7. Ability to ensure that all conditions precedent to the transaction securing commercial or financial close being addressed and finalised before issue of the ITN or early in the negotiation process at the latest.

Risk transfer

1.23 Full delivery risk of the project is transferred to the private sector, including completion, cost and performance risk. (Ultimately, of course in the event of total failure the cost will fall on DFID who would be obliged to find a replacement contractor. The procurement strategy will reduce this risk and the effect of it.)

1.24 A contractor will be obliged to complete the aerodrome to the required service level by an agreed long-stop date. Failure to do this could lead to the contract being terminated with consequential loss of equity in the project. It is customary to have regular inspections by an Independent Engineer who will report whether the construction is on target and delivering the quality required to meet the whole life cost targets. The lenders will be equally concerned to see that the project is properly managed. Once the aerodrome is operational, the contractor will be obliged to operate at a pre-agreed service level. Failure to do so would lead to deductions from revenue. Since the contracts are all let on fixed prices (subject to inflation) inability to perform at these prices could lead to significant losses. If the contractor is unable to sustain the performance levels contracted the agreement may be terminated by SHG. Whilst any senior loan funds may be compensated, the contractor could lose a significant amount of equity.

Applicability and implications of HMG procurement regulations

1.25 Assuming that EC Procurement Regulations are to be applied then, as the contract includes both works and services, the question arises which regulations: works or services?

1.26 The significance of the answer to this question is that if the contract is to be considered a services contract it would be unregulated because it would include a right for the contractor to charge for the services it provides (this type of contract is expressly excluded in the definition of 'public service contract' (r2(1)(e)PSCR).

1.27 If the contract is a works contract then it will be a works concession contract and while the Works Regulations will apply, it will only be to a limited extent as works concession contracts are treated differently. Nevertheless some regulations will apply, such as advertising and time limits for response. These would not impact on the implementation of a project of this nature.

1.28 The answer to the question – works or services – is perhaps academic, particularly as a competition will be run. It is suggested that the regulations relating to Works concessions should be applied.

Value for money

1.29 PPP seeks to optimise the risk transfer to the private sector which is incentivised to provide best value whole life management. In addition the contractor receives a reasonable reward for its equity or risk loss of capital for performance failure. A detailed value for money assessment following HM Treasury guidelines is given below.

PFI/PPP ASSESSMENT UNDER HM TREASURY RULES

1.30 This assessment of the procurement and the procurement options for the aerodrome infrastructure follows the qualitative guidance issued by HM Treasury[1], which principally addresses the applicability of PPP/PFI.

1.31 Value for Money Assessment Guidance points to the following factors which need to be addressed if a PFI/PPP procurement approach is being considered. Projects should only be considered for PFI/PPP if they meet these criteria:

1. A major capital investment programme, requiring effective management of risks associated with construction and delivery
2. The private sector has the expertise to deliver and there is good reason to think it will offer VFM
3. The structure of the service is appropriate, allowing the public sector to define its needs as service outputs that can be adequately contracted for in a way that ensures effective, equitable, and accountable delivery of public services into the long term, and where risk allocation sharing between public and private sectors can be clearly made and enforced
4. The nature of the assets and services identified as part of the PFI scheme are capable of being costed on a whole-life, long-term basis
5. The value of the project is sufficiently large to ensure that procurement costs are not disproportionate
6. The technology and other aspects of the sector are stable; and not susceptible to fast-paced change
7. Planning horizons are long term, with assets intended to be used over long periods into the future
8. There are robust incentives on the private sector to perform.

1.32 On the face of it the St Helena aerodrome project meets these objective criteria.

[1] HM Treasury 'Value for Money Assessment Guidance' August 2004, Section 5.

PPP ASSESSMENT OF THE ST HELENA AERODROME IN ACCORDANCE WITH TREASURY GUIDANCE

1.33 The Treasury PPP Value for Money Guidance requires a qualitative analysis before any decision is made. These steps are set out below, reviewing viability, desirability and achievability.

Viability of PFI/PPP

Programme level objectives and outputs.

1.34 Output specifications or Employer's Requirements can be very clearly set out for the runway and the other airside facilities. These are already established and form the basis for the current scope and indicative costs. The Employer's Requirements must in any event be sufficient to meet air safety standards as a minimum. There are no options and they will be independently certified before the facilities can be brought into use.

1.35 Similarly, whilst there are many different ways to meet the output requirements for the terminal facilities these are capable of clear description. However one would expect these facilities rather than the infrastructure, to be capable of expansion or adaptation for the growth in traffic to uncertain levels. The nature of the facilities and services should be capable of change over time as the class and volume of departures and arrivals develops, unless both are oversized at inception. A minimal service may be adequate for the initial small volumes – 1 flight per week; but these rise in 10 years to 2 flights per week and 9 rotations per week in 40 years. Nonetheless in 40 years time it is unlikely that there will be significant volumes of passengers in transit at the terminal at any one time. Commercial outlets will therefore remain limited, but the service provision level will grow. The way in which these services will be managed may therefore change marginally over time. The volume of passengers in transit is however never of sufficient size to change the overall scale and nature of the terminal and generate a viable commercial business.

Table 1

Year	Annual passenger traffic	Rate of annual growth	Cumulative % growth	Flights per annum (returns)	Return flights per week	Average passengers per flight	Passengers through terminal per rotation
1	7,294	n/a	n/a	78	1.5	94	187
5	12,756	15.00%	75%	99	1.9	129	258
10	21,268	10.80%	192%	165	3.2	129	258
15	37,127	11.80%	409%	287	5.5	129	259
20	57,384	9.10%	687%	443	8.5	130	259
25	79,225	6.70%	986%	612	11.8	129	259
30	81,281	0.50%	1014%	628	12.1	129	259
35	83,115	0.40%	1040%	642	12.3	129	259
40	85,217	0.50%	1068%	658	12.7	130	259

1.36 The throughput demonstrated in Table 1 refers to the long runway option. Whilst the medium runway may increase the frequency of flights the number of passengers per rotation would be reduced making it even more difficult to provide terminal services on a commercial basis.

1.37 There is a wide range of services required to run a safe and efficient aerodrome. The services are fragmented to the extent that no employee could be fully occupied on any one service area. Multi tasking would be common and overall supervision would be critical. However, each of the tasks is a hard or soft facilities management service which is both definable and readily measurable.

Operational flexibility

1.38 The uncertain growth in the operational requirements would indicate that the cost of flexibility will be difficult to determine. However, the low level of activity and the period over which change will occur should allow for the services to be planned well ahead. The facilities similarly could be expanded simply with a year's notice.

1.39 Whether the nature of the usage will change is also impossible to predict. This is particularly true of cargo handling E.g. change in business development or tourist demand may lead to needs for specific cargo handling – frozen goods, security, medical storage, or horticultural imports and exports may each demand changes to infrastructure. In many cases the operational changes could be catered for by a separate development if the economics justified it. There is little requirement for these to be written into a long term contractual obligation.

Equity, efficiency and accountability

1.40 There are no specific reasons of Public equity, efficiency and accountability which would require this project to be procured through normal public procurement rather than PPP.

1.41 The facility is an aerodrome, little different in its services from any other site managed currently by private concerns or local authorities. Whilst it is not a military base or one of critical political, environmental or logistical sensitivity, it will become the keystone of the economy and whatever the fortunes of the operator or business outcome, it is critical to the survival of the islanders.

1.42 Whilst there is no reason why a PPP contract could not be let, this is not an environment accustomed to such complex arrangements and a number of refinements to existing law will need to be made to ensure that lenders can be sure of valid security (including direct obligations from DFID) and reach financial close without undue delay.

Overall viability

1.43 At this stage we have not undertaken any direct market testing with outline draft contracts to ascertain the depth of interest in investing in a form of PPP for the air access. The basis upon which such a contract would be formed would need to include details of the support regime from HMG. This would require clarification before any market testing could be undertaken.

1.44 There is no intrinsic reason why a PPP contract could not be constructed for the service contract. Payments would need to be on an availability basis as there is no scope for third party income or other risk sharing e.g. property development and retail. The scope for volume related payments generally is small. The collection of departure taxes and landing fees is so limited that it is unlikely ever to cover the operating costs and in the early years is likely to amount to no more than one-third of the total costs.

1.45 More importantly, the nature of the traffic development must be regarded as venture capital risk and incompatible with a bankable PPP contract.

1.46 A PPP structure would have the advantages of integrating the delivery of the infrastructure and buildings with the overall responsibility for the delivery of the service to ASSI standards and to the levels of public service required. This would be placed with a single whole life operator risking its investment to operational failure. Responses to the 'EOI'[2] indicated that there is some interest in developing this approach to the aerodrome as opposed to taking development risk.

1.47 The degree of contract flexibility required over the long term may be managed within the general scope of the facilities designed at inception. However, whilst the capital value of the project is substantial the total operating costs of ¦ ¦ ¦ ¦ per annum are probably too small to allow sufficient profit on which to take material equity risk in this type of location on a long term contract.

Desirability of PFI/PPP

Risk management

<u>Construction risk</u>

1.48 The project is relatively straight forward in its design and operation but has certain unique complexities which affect completion. A detailed risk assessment has been undertaken, which is considered in detail in the economic appraisal.

1.49 One of the greatest risks applicable to this contract is the critical nature of the runway alignment. A few degrees out of alignment will render this aerodrome useless. Correcting alignment would not be a simple matter. The designs can be delivered to meet ASSI minimum requirements and the construction works monitored, but the best approach to risk reduction in this context would be an integrated approach where the runway and facilities cannot be handed over and income generated until satisfactory operational completion is proven.

1.50 During construction there are a number of risks which might affect the outcome in cost and completion timing. These relate particularly to ground conditions and bulking of spoil to create the fill required for levelling the site. Similarly there are risks associated with available labour supply, access and material supply which are specific to this project. Any unexpected requirements for material or specialist labour will also be reflected in higher cost and time risk due to the location of the site. There is therefore a significant risk which needs to be transferred from the public sector to the private sector during construction.

[2] Expressions of Interest July 2003

Nonetheless, whilst the contractual arrangements of a PPP under which the principal contractor risks equity and contractual penalties for non completion, there is no reason why a turnkey contract could not be written with adequate incentives for the contractor to complete on time and for a fixed price.

1.51 The construction work has significant risk which would be passed to the contractor in most circumstances. In structuring the contract, consideration needs to be given to the level of warranties which may need to be given over ground condition and environmental data if the bidding can be undertaken in a cost-effective manner. At current levels of access through the RMS it may not be practical to expect all bidders to spend significant time and cost on the island at risk to gather sufficient data to take risk on these aspects[3]. Reliance upon warranties from SHG would however transfer significant risk back to SHG from the contractor and undermine VfM from the PPP contract. Any form of contract which requires the contractor to guarantee cost and completion dates will require significant pre contract site work. This may be undertaken after selection of preferred bidder. This reduces the risk-sharing in so far as any discovery will affect the price after the competition has been closed.

<u>Technology risk</u>

1.52 The principal technology risk applies to the Air Traffic Services. Proper operation of this equipment is absolutely fundamental to the operation of the airport. However there is no untested technology and all operators have similar risks which are manageable.

<u>Revenue risk</u>

1.53 Whilst it is possible to design a PPP contract where the operator takes a risk on the landing fees and departure taxes, it is not feasible to raise this income to a point in this project where it plays a significant influence on risk sharing. Similarly, service payments linked to throughput would be unattractive given the nature of the project. Third party income generation is insignificant and does not play a role at any stage in the contract life of this project. Demand risk is not for the aerodrome operator to manage.

Innovation

1.54 There are few opportunities for innovation in the provision of this facility given

1.55 The limitations imposed by ASSI on minimum standards for air traffic services as a result of the location of the island and the constraints placed on the project by the site, providing very few operational options. It is not feasible to contemplate compromising standards or adopting alternative strategies.

1.56 The level of activity requires the minimum facilities to meet the basic safety operational standards.

1.57 Given the low level of usage the terminal requirements would expect to be fairly basic. The design needs to be sympathetic to the St Helena environment, but the essential simplicity

3 The EOI included only 2 respondents who had visited the island to collect sufficient data to make a suitable response to that invitation. One of these had considerable island information developed for their own purposes.

could still allow scope for design innovation. An award-winning building need not mean additional cost. There may be opportunities to demonstrate innovative environmental approaches but it is doubtful whether any significant energy savings could be made.

Service provision

1.58 There are no intrinsic issues of public sector provision which need to be taken into account. There are no competing or existing air services. The demise of the ship will create limited opportunities for Saints to transfer employment to the airport.

Incentive and monitoring

1.59 The outcomes and outputs of the airport investment programme may be described in unambiguous and measurable contractual terms. The service can be measured against agreed standards and are subject to regular checks against international aviation standards. However it is doubtful whether the incentives or service levels would be meaningfully enhanced through a PFI payment mechanism to create any VfM.

Life cycle and residual value

Obsolescence and residual value

1.60 Over a period of 30 years it is inevitable that the air traffic services technology will be superseded. Contracts can place this risk with the operators or technology suppliers. The change in flight frequency in the time horizon considered is unlikely to require any changes to the level of technology supplied. The airside facilities will be constantly maintained to ensure that at any time a minimum future life is guaranteed. The level of traffic is not expected to affect this. There will be little risk of residual problems on handback at the end of a contract life.

1.61 The airside operations must be fully integrated to provide a safe and certifiable airworthy system to international standards. A long term contract would require careful benchmarking and VfM provisions to ensure that changes are effectively managed. Given the unique nature of the project, benchmarking may not be practical which would indicate that retendering may prove a more effective process.

1.62 The design solution for the runway is concrete rather than tarmac. This will require little additional capital cost but will result in lower cost of maintenance, as it will require limited patching and refilling of the joints. Other solutions may require the expensive importation of heavy equipment or the purchase of such equipment which remains idle for much of its life. The options in this case are somewhat limited and letting a long term PPP contract would not of itself yield greater whole life savings.

1.63 The design life of the runway is 40 years- well outside the scope of a PPP contract. The residual value in the infrastructure on termination of any PPP contract would be assured by strict handback conditions, but the level of use during a 20 year contract, when the level of traffic rises to barely 2 flights a week, would not indicate any substantial risk in the maintenance profile to achieve the handback requirement.

Overall desirability

1.64 The construction and operation of the aerodrome requires an integrated form of management. This will tend to mitigate the risk of failure to complete and then to hand over an airport which can be operated and maintained to international standards. The provision of various elements may be from a range of suppliers give the high level of technology required on the one hand and the provision of very general construction and hard services to low level soft level services on the other. These are best managed by an integrated supplier. The potential for PPP to realise VfM through enhancements to the whole life costing and services in an operation of this nature with very little throughput is however small. There is little evidence that PFI is appropriate to small volume start up airports. There is only one example of a PFI airport project. The PFI project in Inverness limits itself to the terminal and does not take into account the full aerodrome and Air traffic services. To quote the Highland and Islands Company

> *"By the standards of most British airports, we currently earn very low levels of non-aeronautical revenue from our airports, both as a percentage of total income, and as actual revenues per passenger handled.*
>
> *The reasons for this are mainly the small scale nature of our airport operations and insufficient passenger throughput to support large-scale concessions in retailing, car-parking or on-site hotels. The situation is compounded by the existing PFI deal for use of the terminal building at Inverness Airport, which places a considerable annual cost burden upon us.*
>
> *We plan, however, to obtain more revenues from our airport land holdings, particularly at Inverness through the development of Inverness Airport Business Park".*
>
> *"The passenger volume-based costs arising from the PFI contract for the supply of terminal building services at Inverness by Inverness Air Terminal Limited (IATL) is now seen as a restriction on our ability to negotiate deals with airlines. The contract runs to 2024 and the cost to us in 2003/04 was £1.6 million based on passenger throughput. In conjunction with the Scottish Executive, we are exploring options to either gain control of the terminal or set a fixed annual cost."*[4]

1.65 This is set against a background of Inverness airport managing an annual passenger level of 484,000. (8 times the level St Helena may achieve in 40 years time)

Achievability

<u>Transaction costs</u>

1.66 Clearly the transaction costs associated with a PPP or PFI transaction will exceed the costs of writing a D&B contract on its own. (We estimate this to be of the order of ¦ ¦ ¦ ¦ . These should however be seen in the round as a well defined PFI project can be bid and negotiated in a period of 18 months from issue of the tender. This would take into account a significant range of contractual services which would be outside the scope and time frame of any construction contract. Traditional procurement would be subject to the

[4] Highlands and Islands Limited Corporate plan

changes to the project scope or service requirement that may ensue and these would then add to the cost of managing the project.

Competition

1.67 There is little evidence of interest in a total service PFI solution. There may be some interest from groups of contractors experienced in runway work and aerodrome operators, but the range of response to the EOI did not indicate a wide market for this project. We should expect interest from Serco and TBI for a total service solution, but little interest from other airport operators who see their business as managing retail facilities in the terminal. This is not the size of airport which would attract many consortia to bid together.

Overall achievability

1.68 A prospectus for PPP/PFI would generally attract interest if it is well constructed around an availability payment for the facilities with a credible payment mechanism reflecting the critical nature of certain services. To make it bankable will need a realistic sharing of risk and adequate financial support. There would be no interest in traffic risk sharing or commercial development in this situation. It is unlikely that any service operator or contractor would take an equity risk on the traffic development in the long term. Initially one might expect a significant preference for fixed price service contract for a medium term period. The one PFI contract which has been signed is for an airport for the Highlands and Islands in Inverness which is confined to the terminal provision and is not felt by HAIL to be a success.

1.69 PPP would provide benefits from the integration of the construction and operations. It provides a comprehensive package of services which cannot be readily procured and managed locally. It achieves a significant level of risk transfer although this is limited by the nature and use of the facility. The limitations on the risk transfer however due to the low level of activity and simplicity of operations means that equity returns would be more secure than many similar utility investments. The PPP approach would bring

- significant funding costs
- significantly higher establishment costs through documentations and due diligence for funders
- further delay to a commercial contract being effective which would be poor value for money.

1.70 On qualitative grounds therefore it is not recommended that a PPP be pursued for this project provided an alternative approach can be found which manages the relevant integration and operational risks until the facility has a proven track record.

2 MANAGED SERVICE CONTRACT

Contract structure

1.71 Supply, install, operate and maintain contract between SHG and Manager. Managers performance has to be measured against predetermined service/performance levels. This is more appropriate to the circumstances than a franchise. Need for appointment of company/department to monitor performance and sign off payments. This contract is unlikely to include all of the airside infrastructure requirements.

Funding Arrangement

1.72 Predetermined amounts included in financial aid allocation, possibly to be included in MOU – see contract structure/financial arrangement chart, Appendix AB to main Report.

Comment on market appetite

1.73 Total service contracts package all of the air traffic services and terminal operations in a fixed fee contract for a period of years and are favoured for smaller airports. Companies such as Serco and TBI have a wide range of experience in delivering this contract under which the air traffic systems may be provided under a managed service agreement. It is not necessary to contract for long term commitments to obtain well structured services with measurable incentivised standards.

Likely outturn cost

1.74 This procurement approach would control the risk of variation in operating costs but is unlikely to effectively control the design and build costs whose probable outturn is discussed below.

Risk transfer

1.75 Cost and performance risk are transferred to the private sector. A Managed Service Contractor will require warranties as to condition of infrastructure.

Cashflow

1.76 Monthly regular contracted payments to managed service contractor subject to retentions poor performance. The contractor may take risk on aerodrome revenues. SHG contracted payments would cover periodic maintenance costs etc. without variation.

Legal requirements

1.77 Nothing over and above issues raised above under Legal Requirements.

Timeframe in Implementation plan

1.78 Such a contract would be put in place within the infrastructure construction timeframe and does not affect the Implementation Plan.

Applicability /implications of HMG procurement regulations

1.79 Public Service Contracts Regulations applicable unless manager has right to charge public for his service in which case contract unregulated.

Value for money

1.80 Provides good value approach to operations as it harnesses performance measurement and professional management of the facility but would need to be awarded together with a contractor to ensure the infrastructure was in lace to the operating standards. This approach should be reviewed either as a partner with the public sector who deliver the airside infrastructure or as a contract subsequent to termination of a D&B contract.

3 CONTRACTOR FINANCED CONTRACT

Contract structure

1.81 One contract with single point completion responsibility on Contractor for design and build to meet 'Employer's Requirements' which have to meet 'fitness for purpose' standard. No payments made to contractor until handover achieved.

1.82 Contract between SHG and Contractor (Contractor may sub-contract design but still retains primary liability for it).

1.83 Supervision/monitoring and sign off of payments carried out by Employer's Representative under contract between SHG and Consulting Engineer (acting as "Employer's Representative") on behalf of SHG.

Funding Arrangement

1.84 Bilateral Memorandum of Understanding between DFID and SHG setting out value, purpose and conditions of grant. Establishment by SHG of an account with UK bank for payment of sum due direct to contractor on behalf of SHG upon production of Grant Payment Certificate approved by Employer's Representative on behalf of SHG.

1.85 –See contract structure/financial arrangement chart, Appendix AB to main Report.

Comment on market appetite

1.86 This may have limited appeal but could still be sought as a variant proposal and be advantageous where contractors choose to price on the basis of marginal cost of capital rather than WACC

Cashflow projections

1.87 No payment until full working accepted aerodrome. At that point contractor may be paid in full or over a period of say 2-3 years if deferred terms have been agreed.

Likely outturn cost

1.88 The risk work will be the same as performed for the DBOT procurement of the long runway. The cost will be inflated to include funding cost at the contractor marginal cost of capital.

Legal requirements

1.89 Nothing over and above issues raised above under Legal Requirements.

Timeframe in Implementation plan

1.90 While funding arrangements tend to be simple this will add to the implementation time by at least three months.

Applicability /implications of HMG procurement regulations.

1.91 Public Service Contracts Regulations apply to appointment of Employer's Representative.

1.92 Public Works Contract Regulations apply to construction. Unlikely to impact on time limit given complexity of project.

Risk transfer

1.93 As fixed price contract, but with finance risk during construction period passed to the contractor at a cost.

Value for money

1.94 Transfer of design and completion risk to the contractor could procure good value. If the contractor is also able to fund at Marginal Cost of Capital this could also provide a valuable procurement strategy, especially if DFID have a preference to limit their immediate cost exposure.

4 DESIGN AND BUILD TURNKEY CONTRACT

CONCEPT

1.95 This is a traditional method for public sector procurement of large infrastructure projects, undertaken in accordance with, e.g. FIDIC Silver Book, including supply and installation of all relevant equipment.

Contract structure

1.96 Design developed by contractor to meet Employers Requirements under one contract with single point completion responsibility on Contractor for design and build. This will require Works to be fit for purpose. Milestone payments made against achievement of work. Completion is required by contractual date, otherwise liquidated damages payable. Liquidated damages would need to be set at a level to compensate for continued subsidy to RMS subject to a reasonable cap.

1.97 Contract between SHG and Contractor (Contractor may sub-contract design but still retains primary liability for it). Contract between SHG and Consulting Engineer to act as "Employer's Representative" on behalf of SHG to monitor Contractor's performance and sign off Grant Payment Certificates.

Funding arrangements

1.98 Memorandum of Understanding between DFID and SHG setting out value, purpose and conditions of grant. Establishment by SHG of an account with a UK bank for payments due direct to contractor on behalf of SHG on production of Grant Payment Certificates approved by Employer's Representative on behalf of SHG.

1.99 Funding should include cost of Employer's Representative.

Comment on market appetite

1.100 This is a widely practiced contract but which would require a contractor with excellent project management skills and the appetite to price and control the risk of failure to complete. There are a number of international contractors who should be expected to respond for any Invitation to Tender.

Likely outturn cost

1.101 This approach would be expected to take longer to bring to a commercial close than the traditional contract route. It will require the contractor to make a detailed assessment of the design and construction risks which otherwise remain with SHG. An allowance of 3.6 months should be made for this additional work. The impact on cost is not so much through the additional contract negotiations and time as the identification of risk by the contractor and his pricing. The pricing exercise, if there is sufficient competition should provide a cost which is below that which would be deterministically derived from the risk modelling. In the model we have assumed that this approach may give rise to additional risk premium of no more than ¦ ¦ ¦ ¦ of the contract price.

Cashflow projections

1.102 Regular payments following commencement of the construction on S –curve with deductions for remedial work- usually standard percentage half recovered on completion and half on completion of snagging. Whilst there may be changes to this profile the total will not be exceeded and contractor will pay Liquidated and Ascertained Damages (LADs) for late completion.

Legal requirements

1.103 Nothing over and above issues raised above under Legal Requirements.

Timeframe in Implementation plan

1.104 This form of contract would take a few weeks longer to price and negotiate than a traditional contract in view of the additional risks taken by the contractor.

Risk transfer

1.105 Provides Price and construction programme certainty. Contractor takes design development risk, subject to SHG variation risk. Single point responsibility for design, construction and equipment

1.106 Works not handed over until Employer's Requirements are met. Contractor only gets paid for work done.

1.107 Contractor provides performance bond to cover failures/delays and Contractor should take full insurance risk

1.108 SHG takes risk of variations in scope – limited risk

Applicability/implications of EU Procurement Regulations

1.109 Services Regulations for appointment of Employer's Representative, Works Contract for construction.

Value for money

1.110 VfM is achieved with optimum design solution combined with build-ability and shortest construction duration as it is not open to ad hoc variations from employer's supervision. Whilst not fully integrated with the operator the procurement route would ensure a fully operable facility on time and to a fixed cost.

5 DESIGN AND CONSTRUCTION CONTRACTS LET SEPARATELY

CONCEPT

1.111 This is also a traditional method for public sector procurement of large infrastructure projects, undertaken in accordance with, e.g. FIDIC Red Book, including supply and installation of all relevant equipment.

Design contract(s)

1.112 Let as a single contract. Key conditions include duty of reasonable care, skill and diligence. Scope will include preparation of full design – drawings and specification. Payments will be made against design milestones

Construction contract

1.113 Let as single contract. Key conditions includes for works to be constructed to Employers drawings and specification. Payment is made against milestone or periodic payments. Completion is to be by contractual date, otherwise liquidated damages payable.

Contract structure

1.114 This would be a collection of separate contracts let by SHG and paid by DFID. It may be possible to transfer responsibility for design from designer to Contractor by way of a novation agreement between SHG/Designer/Contractor.

1.115 Contract between SHG and Consultant Engineer to act as 'Engineer' under the construction contract and to monitor the Contractor's performance and sign off Grant Payment Certificates.

Applicability/implications of procurement regulations

1.116 Public Service Contract Regulations apply to design contract. Services Regulations apply to appointment of Engineer and Works Contract to construction. This process is unlikely to impact on time line due to complexity of project.

Funding arrangements

1.117 Memorandum of Understanding between DFID and SHG setting out value of the grant, its purpose and conditions attached.

Comment on market appetite

1.118 There are a number of international contractors in UK, South Africa and elsewhere who would be prepared to bid for this contract.

Likely outturn cost

1.119 This approach is the assumption in the Base Case Model. The construction cost and time is subject to the risks described below and discussed in detail in the Economic Modelling, Section 9 of Main Report. The Risk Modelling, Section 11, identified a cost and time which it is calculated had 95% confidence that will not be exceeded.

Cash flow

1.120 Regular payments during the procurement through construction until end of defects period. Small retention held until during construction period with half released at construction handover and rest after 12 months defects liability period

Legal requirements/issues

1.121 Nothing over and above issues raised above under Legal Requirements.

Timeframe in Implementation Plan

1.122 This could represent the shortest procurement route if well managed but leaves significant risk to variation during the construction phase. This is particularly true if the operating contracts are not let in parallel.

Risk transfer

1.123 SHG would retain the ultimate responsibility for the design. If the finished project is not fit for purpose due to design deficiencies, SHG retain risk for upgrading etc. this could be very significant as slight deviations in alignment make the aerodrome inoperable. Design development variations are at SHG risk. Small changes in design could give rise to considerable delay if different or additional goods or staff is required.

1.124 This approach would provide no single point responsibility for design and construction.

1.125 Unknown ground conditions would remain at SHG risk

1.126 Delays caused by and interfaces with equipment suppliers are at SHG risk

1.127 Contractor should take full insurance risk

Value for money

1.128 Potentially poor value as SHG may not be best placed to optimise the design and manage the construction. This could lead to long lead time and construction period, with significant risk being retained by SHG especially as there is no ready integration with the operator requirements and capability.

6 PUBLIC SERVICE CONTRACT / OUTSOURCE OPERATING CONTRACT

Contract structure

1.129 Delivery of specified services to prescribed measurable standards for a fixed period of time; e.g. 5-7 years- possibly renewable. Service may be split between equipment services and hard and soft services. Payment deductions in the event of service failures

1.130 Services contract between SHG and service provider. Person(s) appointed either from within SHG public sector to monitor provision of services, or could be DFID appointee under Technical Co-operation contract if necessary.

Funding Arrangements

1.131 Predetermined amounts included in Financial aid allocation for service fee and costs of monitoring.

Comment on market appetite

1.132 It is more likely that in the early years the source of operating expertise will be procured through the managed service contract. Public service contracts would be viable only once the operations were established and local staff trained.

Likely outturn cost

1.133 This is not deemed a feasible approach to procuring the services for this project in the initial bedding in phase of the project and the probably outturn is likely to be worse than any other option.

Cashflow projections

1.134 Monthly payments, but periodic cash hit for maintenance and renewals will require budgeting.

Legal requirements

1.135 Important to establish performance criteria and for accurate and regular monitoring.

Timeframe in Implementation plan

1.136 Would need to be negotiated alongside construction contract.

Applicability /implications of HMG procurement regulations

1.137 Public Services Contracts Regulations apply unless manager given right to charge for service to members of the public in which case unregulated.

Risk transfer

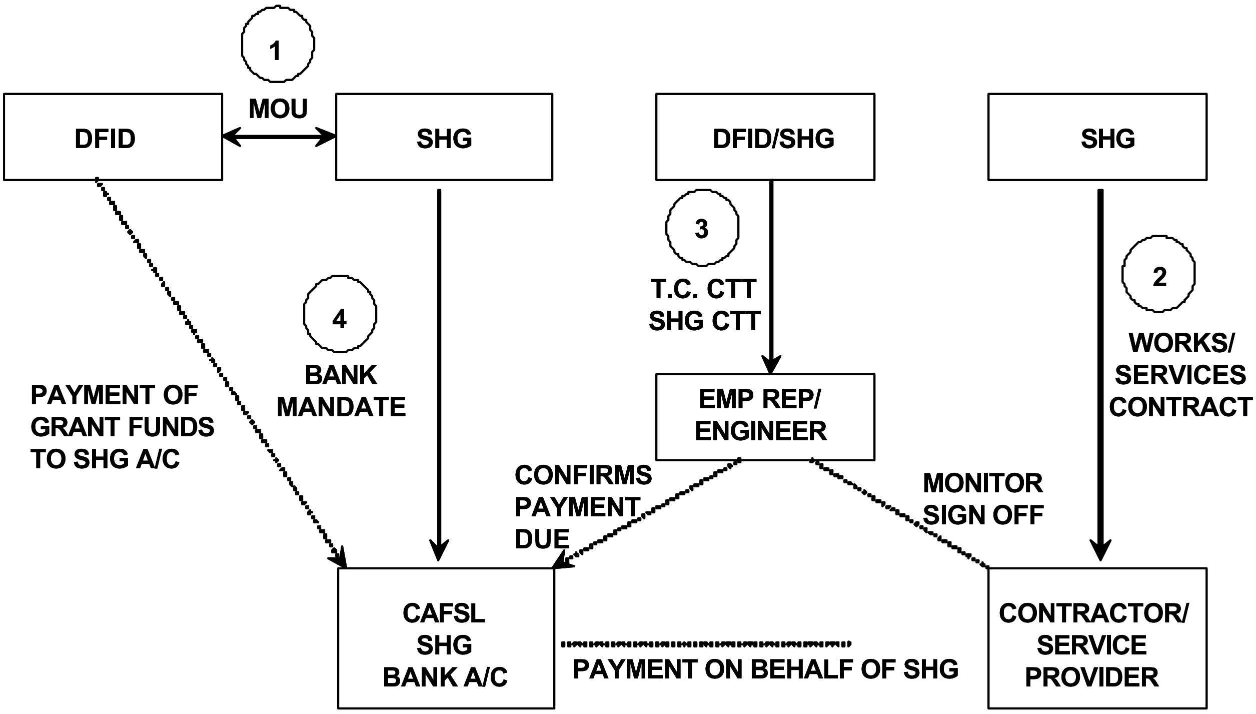
1.138 Subject to variation for service scope changes. May be little control over inflation changes (these have not been modelled). Risk of cost increase if supplier needs to be replaced- supplier credit risk. Probable requirement for additional contract to provide periodic maintenance. Equipment refresh risk retained by SHG due short length of contract. Potential SHG liability to new contractor in relation to actions caused by previous contractor. Ongoing monitoring and measurement required.

Value for money

1.139 Adequate incentives would need to be in place for measurable performance. Single overall contract would simplify administration. This option would provide value for money.

APPENDIX AB: DFID/SHG/CONTRACTOR FUNDING STRUCTURE

DFID/SHG/CONTRACTOR - CONTRACT/FUNDING STRUCTURE



1. DFID Memorandum of Understanding with SHG

This will probably be in the form of an exchange of letters. DFID's letter to SHG will set out the value of the grant and the purposes for which it is made available. In addition, DFID's letter will set out various conditions attached to the grant. The conditions are likely to include, but not be limited to some or all of the following:

i) prior written approval ('non objection') by DFID of works/services contracts ('project contracts') to be funded from the grant

ii) project contracts not to become effective until DFID's written approval;

iii) no amendments/variations in scope or value or assignment of any interest in project contracts without prior written approval of DFID

iv) financial limit to DFID's commitment

v) commitment by SHG to implement specified legislative steps e.g. tax, immigration, customs procedures, an Ordinance to set up special account for grant funds etc etc

vi) commitment by SHG to implement necessary transactions in interests in land (e.g. compulsory purchase, lease)

vii) commitment by SHG to grant requisite planning consents

viii) commitment by SHG to enter into concessions to be specified

ix) appointment of Employers Representative or Engineer to monitor contractor's performance under project contracts and to sign off achievement of milestones, delivery of services and to approve application for payment by contractors

x) commitment to enter into necessary contracts in the future e.g. management and operation contracts

xi) commitment by SHG to allow DFID access to sites and project documentation etc

xii) appointment by SHG of UK bank to receive grant funds from DFID and to disburse funds to contractors upon confirmation by Employers Representative/Engineer and indemnify the UK Bank against third party claims

xiii) ¦ ¦ ¦ ¦

xiv) end date

xv) return of funds in the event of call on bonds/liquidated damages.

DFID's letter will set out the payment procedures and prescribe the form and wording of payment certification to be used.

SHG's letter to DFID will be a simple acknowledgement and acceptance of DFID's letter.

2. SHG contract for works/services with contractor

This contract or combination of contracts will provide for the scope of works and services, method of price calculation, payment procedures, concessions if appropriate, and will also include provisions that reflect SHG's commitment to DFID in the MOU, for example an undertaking from the contractor to allow DFID access to site and project documentation.

3. DFID/SHG contract with Employers Representative/Engineer

Under this contract a company will be appointed to act as an Employer's Representative (e.g. FIDIC Silver Book turnkey contract) for the purposes of supervising and/or monitoring (as appropriate) the performance by the contractor(s) of his obligations under the contract(s). ¦ ¦ ¦ ¦ .

4. SHG mandate to UK Bank

This is to authorise the UK Bank to:

a) receive grant funds from DFID on behalf of SHG

b) receive applications for payment by the contractor(s) certified by Employers Representative/Engineer

c) check certified applications

d) make payments direct to contractor.

Note: it would be usual for SHG to provide the UK Bank with an indemnity in respect of any third party claims. This would have to be approved by DFID and UK Parliament.

5. Ship Funding Arrangements

The shipbuilder would expect an advance payment and would be required to provide bank security acceptable to SHG/DFID. The shipbuilder would be required to provide a performance guarantee secured by a performance bond issued by a bank acceptable to SHG/DFID.

Memorandum of Understanding between DFID and SHG setting out value of the grant, its purpose and conditions attached and financial limit to DFID's liability.

Establishment by SHG of a bank account with a UK bank. Payments due under contracts are then made by the UK bank on behalf of SHG direct to Designer (s)/ Builder on production of Grant Payment Certificates approved by Consultant Engineer acting on behalf of SHG.

6. Ship Operational contract

Ship management contract let between Owner (Special Ship co) and Ship Manager. This contract would probably not be covered by the EU Regulations as it includes a right for the manager to charge for the services (therefore excluded from the Public Services Contract Regulations under s.2(i)(e)

Owner monitors performance of Ship Manager possibly under a contract between SHG and Owner.

SHG and DFID need to decide on new ship management arrangements to be adopted in the future (currently under review)

Contract is let between SHG and provider of personnel to Owner.

APPENDIX AC: MARKET INTEREST

This appendix has been redacted as it contains information that is commercially sensitive.

APPENDIX AD: REVIEW OF TELECOMMS INFRASTRUCTURE

1 INTRODUCTION

1.1 The remote island of St Helena, in the Southern Atlantic Ocean, measuring only some 47 square miles, has a population of approximately 4,000.

1.2 The telecommunications infrastructure to serve this island, is provided uniquely by Cable and Wireless Ltd. The chief employer on the Island is the St Helena Government. Other employment is based on local industries such as small scale farming, retailing, tourism and ongoing investment related projects. The Government of St Helena wishes to investigate the provision of a "world class standard" of telecommunications infrastructure on the Island. It is anticipated that the provision of such an infrastructure would be instrumental in the future economic development of the island, facilitating a growth in e-business activities allowing islanders access to the global economy while continuing to live on the Island.

2 STUDY OBJECTIVES

2.1 In order to ascertain the level of investment that would be required to achieve "world class standard" of communications on the Island, it is first necessary to:

a. Define what is meant by "world class standard";
b. Determine the level of infrastructure currently deployed on the Island.

2.2 For the purposes of this short study, assumptions have been made regarding the meaning of "world class standard". We have drawn heavily on our experience of the provision of telecommunications infrastructure in some of the most remote parts of the United Kingdom, viz the Western Isles of Scotland. One of the objectives of this study therefore, is to take as a model the Western Isles infrastructure, and scale this down to "fit" St Helena. Once the level of telecommunications infrastructure currently deployed is understood, assumptions can then be made as to how this could be built on to best achieve this fit.

3 METHODOLOGY

3.1 The approach taken to this study is as follows:

a. Develop a questionnaire to determine the status of the current telecommunications infrastructure;
b. Issue this questionnaire to those responsible for the provision of telecommunications services on the Island, in this case Mr John Reynolds and Mr. Hensil O'Bey;
c. Interview these people;
d. Collate the replies;
e. Determine the similarities between St Helena, and the Western Isles of Scotland;

f. Estimate the investment that would be required on St Helena, to achieve the same level of telecommunications infrastructure as the Western Isles;

g. Prepare and issue a report detailing the findings.

4 QUESTIONNAIRE

4.1 The questions are:

- With respect to the current telecoms infrastructure:
  - What off-island connectivity is provided?
  - What is its capacity?
  - How is it provided?
  - How many telephone exchanges are there on the island?
  - Where are they located?
  - How many connections/customers are serviced from each exchange?
  - What is the customer mix on each exchange (residential, commercial, industrial etc?)
  - What services are available to customers from these exchanges
    - PSTN
    - Leased line
    - Isdn
    - E1, E3 etc
    - DSL, ADSL
  - How these services are delivered, ie what technologies are deployed (including local access)?
  - How are the exchanges interconnected?
  - Are there any areas, or potential customers which the current infrastructure cannot serve?
  - Does the network have the capacity for upgrade or expansion?
  - Are any QoS and SLA's in place?
  - Is the network delivering satisfactory performance in terms of integrity, and reliability, and what are it's limitations in this respect?
- With respect to mobile communications:
  - Do the emergency services and utilities have any mobile communications infrastructure on the island?
  - If so, what?
  - How many hilltop sites would you estimate to be needed to provide adequate radio coverage throughout the island?

5 RESPONSES TO QUESTIONNAIRE

5.1 Messrs Reynolds and O'Bey kindly provided the following response to the above questionnaire:

- What off-island connectivity is provided?
  - There is no submarine fibre/cable connecting the Island.
  - The only off-island connectivity is provided via satellite.
- What is its capacity?
  - Normally a 512kb/sec link is provided, but Cable and Wireless monitor the usage of the link and can negotiate for additional bandwidth (up to 2mb/sec) should this be required.
- How is it provided?
  - This link is provided by Intelsat.
- How many telephone exchanges are there on the island?
  - There is one exchange on the Island.
- Where are they located?
  - The exchange is located in Whitegate.
- How many connections/customers are serviced from each exchange?
  - Approximately 2200 customers are serviced from the exchange.
- What is the customer mix on each exchange (residential, commercial, industrial etc?)
  - Business users 12%
  - Government 9%
  - Residential users 76%
  - SOHO (Small Office Home Office) 3%
- What services are available to customers from these exchanges?
  - PSTN Yes
  - Leased line Yes
  - Isdn Yes (Primary Rate)
  - E1, E3 etc No
  - DSL, ADSL Yes
  - Internet Yes
- The overall customer numbers by service are:
  - Telephone 2212
  - Dial-up internet416
  - Internet leased cct 11

- Television 1148

- How these services are delivered, ie what technologies are deployed (including local access)?
  - All services are delivered over Copper.

- How are the exchanges interconnected?
  - N/A Since only one exchange on Island.

- Are there any areas, or potential customers which the current infrastructure cannot serve?
  - No.

- Does the network have the capacity for upgrade or expansion?
  - Yes, although there has been no demand for this to date.

- Are any QoS and SLA's in place?
  - A customer charter is in place for all telephone customers. This covers the following KPI's
    - Service provisioning, telephone and internet (installed within Customer Charter Commitment)
    - Service Restoration, telephone and internet (response within Customer Charter Commitment)
    - Service Restoration, telephone and internet (repair within Customer Charter Commitment)
    - Faults reported against lines in service
    - Service provisioning, TV (installed within Customer Charter Commitment)
    - Service Restoration, TV (repair within Customer Charter Commitment)

- Is the network delivering satisfactory performance in terms of integrity, and reliability, and what are it's limitations in this respect?
  - The network is delivering a satisfactory performance. Cable and Wireless routinely measures its performance against standard industry benchmarks which it generally exceeds.

5.2 With respect to mobile communications:

- Do the emergency services and utilities have any mobile communications infrastructure on the island?
  - Yes

- If so, what?
  - Basic Private Mobile Radio systems

- How many hilltop sites would you estimate to be needed to provide adequate radio coverage throughout the island?
  - 4 sites are currently used to provide full coverage

5.3 There is no mobile phone service covering the Island

6 WESTERN ISLES ANALOGY

6.1 The Western Isles Connected Communities project was designed to deliver high performance broadband connectivity to residences, businesses and public sector organisations located throughout the islands of Lewis, Harris, North Uist, South Uist, Benbecula and Barra.

6.2 Utilising radio as the predominant transmission technology, the communications infrastructure comprises high and medium capacity licensed digital microwave links forming a backbone network spanning the islands, linking various community nodes back to a central hub site in the town of Stornoway. At each community node, fixed wireless access technology provides high, medium and low bandwidth connectivity for the various user groups. The hub sit provides connectivity to the internet and onward routing of traffic to the public sector nodes in Stornoway via fibre optic links.The Western Isles has a population of some 27,000 people and covers an area of 2,898 sq km.

6.3 The capital cost of the provision of this network is approximately £5.2M

6.4 The detailed comparison of the requirements of St Helena, against those of the Western Isles is well outside the scope of this limited investigation. However, if we assume that the St Helena requirements are broadly similar to those of the Western Isles, and that the cost of a smaller scale version of the Western Isles network in St Helena would be proportional to:

a. The size of the population;

b. The area of the land mass

6.5 Then given that the area to be covered on St Helena is a mere fraction of that of the Western Isles, and that full radio coverage can be achieved from just 4 hilltop sites then on a **<u>very broad brush basis</u>**, a similar network could perhaps be provided there for ¦ ¦ ¦ ¦ . This of course takes no account of the costs of getting equipment to the island, installing commissioning and maintaining it, nor of designing the system in the first instance.

7 CONCLUSIONS

7.1 This brief study into the telecommunications infrastructure on St Helena has revealed that the islanders are served by a system which could be upgraded to "world class" (with reference to the Western Isles model), should this be stimulated by demand and the necessary funding be made available.

7.2 It is foreseen that demand would be stimulated and driven by a gradually improving economy, and the need to have ready access to applications and internet services, which are now available (or rapidly becoming so) in Europe, North America, the South Eastern Asian countries, and other developed economies.

7.3 The off-island link, at present provided solely by satellite link (old copper cable links are now all redundant), will likely need to be upgraded in the future to cope with this demand. When this needs to be done, it would be advisable for the island to consult the 'satellite marketplace' to seek a best value solution.

APPENDIX AE: PORTFOLIO MANAGEMENT OF PROJECTS

“Programme Management” *in its widest sense*

Introduction

‘Programme Management’ means different things to different people depending on the level of maturity around the use of a structured and disciplined approach to delivering strategic outcomes. There remains a perception that such an approach is confined to IT projects or that the pragmatic use of industry standard methodologies is a costly overhead that can be complied with through the implementation of an ‘administrative’ function.

For the purpose of this briefing document ‘Programme Management’ is a key strategic function providing real value in mitigating overall delivery risk across customer, supplier, partnership and supply chain communities. This equally applies to business, construction, engineering, IT and transformation programmes contributing to the strategic ambitions of an organisation. The definition used in this document incorporates the following disciplines or management methodologies:

- **Delivery life-cycle management** – a wide range of activities required to be managed through a range of internal controls to mitigate strategic delivery risks
- **Portfolio Management** – suite of programmes or activities contributing to the overall strategic direction of an organisation
- **Programme Management** – a group of projects or activities, usually multi-disciplinary, delivering to a common strategic outcome normally involving change. The scope remains unclear
- **Project Management** – a group of related tasks with clearly defined outputs normally to be delivered within a clear start and end date.
- **Technical Project Management** – project management confined within a technical or expert environment. Can be used in support of a business’s operational business.

Any organisation serious about reducing delivery risk needs to look at the whole range of management, methodologies, tools and techniques rather than being hooked into a name. What is more important is that any organisation implementing ‘Programme Management’ values it as a key strategic tool rather than an administrative overhead.

Delivery is a Board Responsibility

The ultimate responsibility for the successful delivery of strategic targets and ambition in both public and private sector organisations rests with the Board of Directors. Corporate Governance requires that appropriate internal controls are put in place to ensure that an organisation delivers and performs to expectations – this covers the delivery of both new and improved outcomes.

The Board has a key role to play in creating the right management environment (e.g. decision-making and empowerment) in which successful delivery can be achieved.

New Outcomes

Where the outcomes are new; the team organisation is complex or there are other major inherent risks - the internal controls that need to be put in place can be aligned with Programme and Project Management best practice.

Improved Outcomes

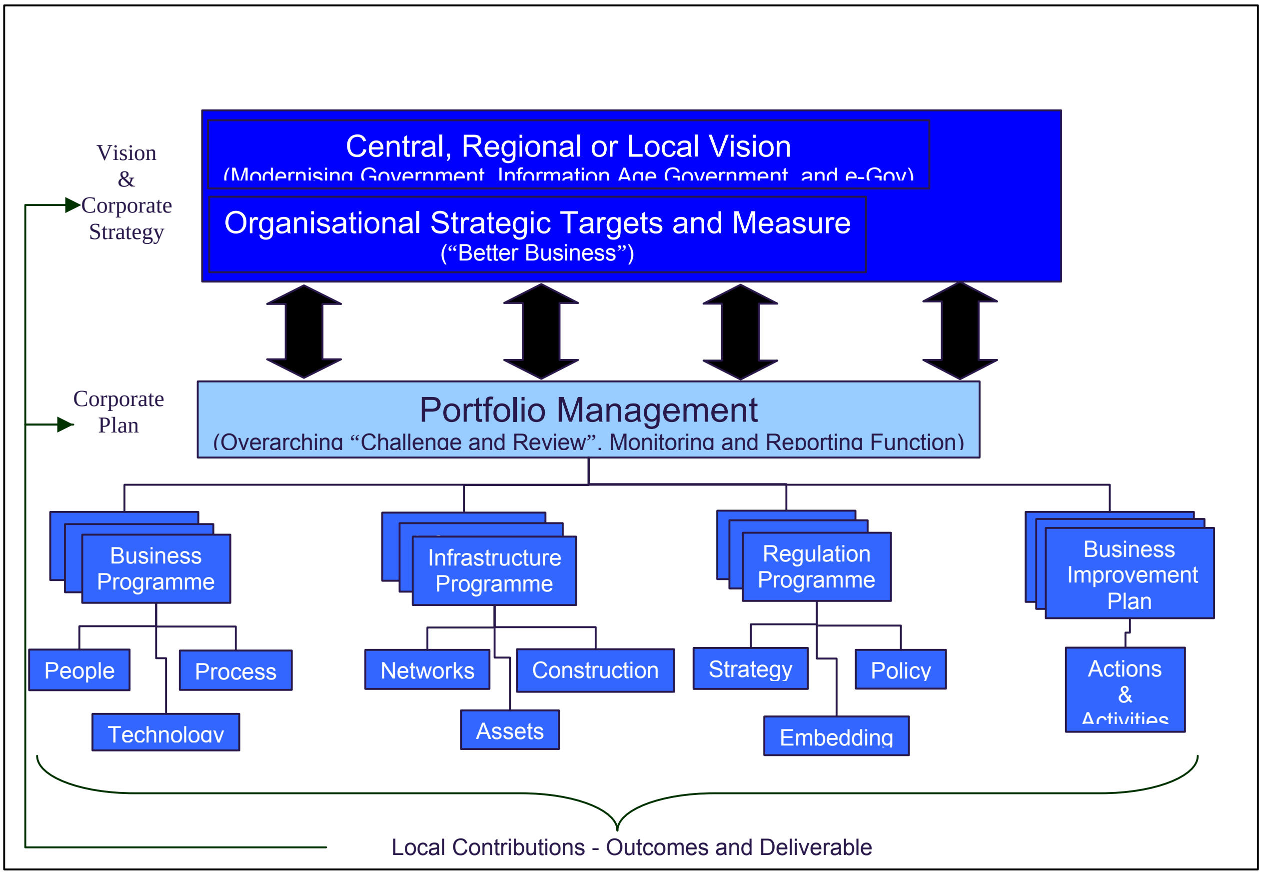
Where the need is to build on previous success through a process of continual improvement then it may be more appropriate to apply internal controls more in line with Performance Management. This is generally managed across the whole Business Operations environment.

Accountability

As organisations become more accountable to both internal and external stakeholders there is a need to demonstrate, throughout the delivery cycle, that progress is being made towards the ultimate strategic targets and ambitions.

Visibility

Portfolio Management pulls together the expected outcomes of both Programmes and Performance Management and maps them to your organisations strategic undertakings. Additionally, where an organisation is required to implement legislation this can also be incorporated at this level. The Board can then see that they are doing the right range of activities. Additionally delivery teams can see how their hard work is adding value and contributing to the overall success of the organisation.



When effectively implemented **'Programme Management'** will deliver the following benefits to the s**trategic management** across both Programmes and Business Operations:

- Reduced risk in delivering to strategic undertakings (customer and supplier side)
- Integrated corporate and programme governance
- Clear focus on outcomes and benefits realisation
- Consistent methodologies, tools and techniques
- Visibility of partners and supply chain plan and targets
- Informed decision making through aggregated executive reporting
- Facilitates 'Challenge and Review' to facilitate prioritisation and sequencing
- Integrated Programme, Project and Performance Management
- Access to a wide range of specialist expertise to support personalised delivery needs

'Programme Management' does not remove the need for appropriate application of the wide range of best practice tools, techniques and guidance supporting the delivery life cycle. In fact these are vital to ensuring that consistent yet tailored controls are put in place.

'Programme Management' focuses the Board, Executives and Senior Management expertise on whether they are undertaking the right activities to guarantee delivering strategic success.

Competency based resourcing

In addition to access to experienced and talented 'Programme Management' competencies (Programme Directors, Programme Managers, Project Managers and Technical Project Managers) organisations will need to be able to call on wide range of specialist resources at variable times throughout the life of the strategic programme. Listed below is an example list (not exhaustive) of the competencies you will need to have access to:

- Strategy Design and Management
- Executive Leadership
- Programme and Project Management
- Programme and Project Delivery
- Value Management
- Cost Management (Life Cycle)
- Vendor Management
- Solution Design
- Estate Management
- Benefits Management
- Organisational Learning
- Contract and Performance Management
- Corporate and programme governance
- Portfolio design and formulation
- Performance Management
- Risk and Issue Management
- Construction Management
- Property Management
- Life-Cycle Management
- Technical Design
- Asset Management
- Stakeholder Management
- Procurement
- Service Management

APPENDIX AF: COMMENTARY ON IMPLEMENTATION PLAN

APPENDIX Y: OUTLINE IMPLEMENTATION PLAN COMMENTARY

ID	Owner	Activity	Task	Sub-Task	Comments
1		PHASE 1			
2	DFID		Ministers approval		By end of 2004
3	DFID/SHG		Appoint DFID/SHG team for aerodrome project		Support for duration of project (time allowed implies all people identified are available and accept)
4	DFID/SHG		Agree contractual arrangements between SHG, DFID & 3rd Parties		Establish high level authority boundaries between DFID and SHG and concept for programme management. Clarify which procurement option is to be adopted. Sufficient delegated authority is required to a small, experienced commercial team capable of making sound decisions, but reporting effectively
5	DFID		Clarify interactions with other OTD programme initiatives		
6		INTERNATIONAL AIR SERVICE AGREEMENTS			
7	DFID/FCO		Clarify ASI agreements		MOD , USDOD for use of Ascension Island particularly in view of liabilities and operating procedures – **FCO action**
8		PROCUREMENT			
9	DFID/SHG		Procure TA & Legal Contracts		
10	DFID/SHG			Develop TOR for legal and technical	

ID	Owner	Activity	Task	Sub-Task	Comments
				advisors	
11	DFID/SHG			Issue TOR for TA & Legal contracts	
12	3RD PARTIES			Competition for TA & Legal contracts	
13	DFID/SHG			Review Tenders	
14	DFID/SHG			Agree Mandate	Negotiate fees, scope, team members and liability
15	DFID/SHG			Award of TA & Legal Contracts	
16			Procure Design, Build & Operations Contract (Prime Contract –PC)		
17	DFID/SHG			Issue Prior Information Notice	
18	DFID/SHG/TA			Draft Employers Requirements	This relates to an integrated operational spec.
19	SHG/DFID/Legal			Agree with SHG on concessions, warranties & other obligations	e.g. - waivers and taxes and duties - land –holding - compensation rules - information warranties
20	DFID/SHG/Legal			Prepare enabling legislation	
21	DFID/SHG/TA			Draft and issue OJEU	
22	TA			Recommendation of shortlist recipients of ITN	
23	Legal/DFID/SHG			Prepare contract	The contract should be drafted to

ID	Owner	Activity	Task	Sub-Task	Comments
				documentation	incorporate recommendations of the EIA and would include detail on site management and operation
24	DFID/SHG/TA			Prepare ITN documents	Preparation of the Invitation to Negotiate (ITN) including bid timetable, nature and acceptability of variant proposals, timetable including time for island visits and consultation, information available, service level requirements and output specification, contract structure and payment mechanism, financial issues. List of tender information to be supplied. Agree basis for evaluation of tenders.
25	DFID/SHG			Issue ITN	
26	3RD PARTIES			Competition for contract	Time for bidders to prepare responses to ITN
27	3RD PARTIES/SHG			Contractor site visits	Allow 3 months. This will need to be managed with group presentations to all bidders & private sessions. N.B RMS St Helena availability
28	DFID/SHG/TA/Legal			Review tenders	
29	DFID/SHG/TA/Legal			Negotiate with preferred bidder	3-6 months
30	DFID/SHG			Award design, build & operations contract	Award is based on programme management capability, price and soft issues e.g. environmental practice, experience and credit worthiness
31	PC			Initial sub-contracts (inc. supply contracts)	Local workforce on St Helena

ID	Owner	Activity	Task	Sub-Task	Comments
32	SHG/PC		Set up contract arrangements		Fuel supply Water and sewerage drainage - Saint Helena Government - Principal civil engineering contractor would sink a borehole and arrange his own water supply. They could sub-contract this but it should be sourced from a new well and not be sourced from the main Island water supply resources AFTN – aeronautical fixed telecommunication network (Cable and Wireless)
33	DFID/SHD/PC		Initiate recruitment programme for Saints workers		Build up database of contacts who are interested in returning to Saint Helena to work on the aerodrome construction
34	DFID/SHD/PC		Procure communications ship		Charter 30 seat ship to run between STH and ASI
35	DFID/SHD/PC		Communications aircraft market test		Test the market – to replace the communications ship when temporary runway is ready
36		UK & OVERSEAS REGULATION			
37	ASSI/DFT/TA		Security regulation		Department for Transport need to verify security procedures as input to design
38		ENVIRONMENTAL IMPACT MANAGEMENT/REGULATION			
39	PC		Consultation on EIA TOR		SHG will need to approve the TOR for the EIA and to hold public consultation about their content
40	PC		Finalise EIA TOR		
41	PC		Implement EIA		Implement EIA on designs

ID	Owner	Activity	Task	Sub-Task	Comments
42	PC		Complete EMP		Complete environmental management plan for the construction phase
43	PC		Appoint TA environmental regulator		Appoint technical assistant environmental regulator to support SHG and implement EMP during construction. It will be necessary to ensure that the contractors implement the EMP and establish the processes under which the EMP will continue to be implemented after construction is complete.
44	PC		Support SHG and implement EMP during construction phase		
45		PHASE 2			
46		FINAL DESIGNS			
47	PC		Finalise enabling works design		Services/Haul Road/Accommodation etc SHG/Local contractors to implement construction
48	PC		Finalise aerodrome design		Design and verification. Air operator should be interacting with the prime contractor during this phase
49	DFID/TA/PC/DFT		Approval on designs		Prior to construction starting
50	PC		Phased consultation in support of EIA		Public consultation on final designs
51		CONSTRUCTION			
52			Construction Enabling Works		For enabling works to begin before the main workforce has been mobilised it assumes independent contracts in place using local contractors with experience in this sort of work or sub-letting from the main design and

ID	Owner	Activity	Task	Sub-Task	Comments
					build contract for the works and starting immediately upon award of contract, also using local contractors, and thus utilising off-island mobilisation time.
53	PC			Workforce mobilisation delay period	Period of time allowed for workers to arrange the logistics i.e. hand in notice period for current employers, travelling to Saint Helena, family arrangements etc
54	PC			Advance enabling pack	Take initial enabling pack to STH on the RMS (small generators etc)
55	PC			Upgrade of access road from Govt Garage	Access to site – implement as enabling works construction
56	PC			Construction of temp access road to terminal area	Access to site - implement as enabling works construction
57	PC			Construction of temp haulage road	We are only concerned initially with construction plant access and essentially carving a route along which it can crawl under supervised conditions. Once the additional plant and labour has arrived the road can be upgraded to a more suitable standard for transport of materials and equipment. Final surfacing and tidying up as necessary will occur at the end of the programme. 6 months should be adequate but would require local/outside contractor input
58	PC			Preparation of site for	includes the provision of services for the

ID	Owner	Activity	Task	Sub-Task	Comments
				works and accommodation	works i.e. water supply/borehole etc.
59	PC			Site accommodation construction	Stand alone camp for construction workers
60	PC			Ecology site boundary fencing	Protection of endemic species
61			Prosperous Bay/Rupert's Bay		
62	PC			Off load facility	Barge pier with facilities for off loading plant equipment and imported materials. Off load facility necessary to get main plant equipment onto island.
63	PC			Temporary harbour construction	
64	PC			Container storage areas	
65	PC			Container cranes	
66	PC			Haul road paving and lighting	Finish haul road to suitable standard for future use during aerodrome operation
67	PC			Offices	Support temporary harbour facilities
68			Power		
69	PC			Temporary power and fuel store	Site needs during construction – handover to permanent workers
70	PC			Generator House	Creation of stand alone aerodrome power supplies
71	PC			Generator fuel store	
72	PC			Generator workshops/office/store	
73	PC			Supply generators	

ID	Owner	Activity	Task	Sub-Task	Comments
74	PC			Distribution grid	Distribution of electrical power
75			Construct runway		
76	TA			Mobilise TA team to site	DFID /TA team
77	PC			Main workforce mobilisation	Build up of labour force to full strength
78	PC			Main plant delivery	Delivery of heavy earth moving and crushing equipment
79	PC			Major earthworks	Levelling of Prosperous Bay Plain (action for phasing in of temporary runway) – site procedures will also require regular environmental monitoring
80			Temporary Re-Supply		
81	PC			Communications ship service	Fast boat –between STH and ASI
82	PC			Temporary runway	Duties of boat taken over by aircraft
83	PC			Aircraft contract	
84	PC			Aircraft fuel	
85	PC			Runway completion	Paved runway
86	PC		Construct Runway	Runway imports	Sand and cement
87	PC			Internal roads	Creation of roads within airport boundary – provides access for inspections
88	PC			Terminal area earthworks	Creation of base area for buildings to be erected - Second phase site for contractors site works accommodation
89	PC			Runway repair storage area,	Building and kit – maintenance stock piles for general repairs to runway strip and safety

ID	Owner	Activity	Task	Sub-Task	Comments
				baggage and kit	area
90	PC			Boundary and security fencing	
91	PC			Hand over plant & equipment to PWSD and local contractors	For future development of St Helena – building breakwaters etc
92			Facilities		
93	PC			Apron & taxiways	Self explanatory
94	PC			Interceptors	Water drainage to prevent environmental damage
95	PC			Aerodrome fuel farm	Aerodrome fuel storage – formed as part of mass earthworks
96	PC			Ruperts Bay Bulk	Bulk fuel storage – storage from rock excavated at Prosperous Bay Plain
97	PC			Terminal and medical (inc. services)	Passenger terminal and fit out with facilities
98	PC			ATC tower	(Air traffic control tower) - forms part of the fire station or terminal building
99	PC			RFFS facility	Fire station
100	PC			A/C equipment storage inc. E recovery	Rapid removal of damaged aircraft and maintenance e.g. tyre changes
101	PC			General and Buildings workshop	Maintenance facilities for aerodrome
102	PC			Power and utilities	Internal grid
103	PC			Communications	Links to internal and external (including radio)
104	PC			AGL	Airfield ground lighting
105	PC			Navaids	Navigational aids - Ground based

ID	Owner	Activity	Task	Sub-Task	Comments
					NAVAIDS/DVOR/DME/NDB offset ILS localiser
106	PC			Met station	Stand alone as specified in previous paper
107	PC			Navaids calibration	Calibration flights to test accuracy of instrument approaches prior to licensing
108	PC			Obstacle lighting	Placed on sides of prominent obstacles on flight path and other places surrounding the aerodrome – requirement for licensing
109			Cargo facilities		
110	PC			Cargo shed	Cargo facility for storing inbound and outbound goods including facilities for Customs and Excise (and Health)
111			Access road		
112	PC			Permanent road surfaces	Permanent surface to serve access to the aerodrome
113		PHASE 3			
114		VEHICLES/BOATS			Allow 6 months between order to delivery
115	PC		RFFS vehicles		
116	PC		Fuel Bowsers – A/C		
117	PC		Mogas/Diesel fuel store		
118	PC		A/C tractor		
119	PC		Baggage tractor and train		
120	PC		Vans		
121	PC		Cars		
122	PC		Buses		
123	PC		Boat(s)		
124	PC		Rafts		
125	PC		Ambulance		
126	PC		Sweeper		

ID	Owner	Activity	Task	Sub-Task	Comments
127		RECRUIT/TRAIN OPERATIONS PERSONNEL			Need to allow enough time in order to give Saints the opportunity to take these posts
128	PC/SHG		ATCO		Air traffic control officer
129	PC/SHG		ATS Eng		Air traffic service engineer
130	PC/SHG		Met Eng		
131	PC/SHG		RFFS		Airport fire service
132	PC/SHG		Sea Rescue		
133	PC/SHG		Medical		
134	PC/SHG		Fuel		Training also needed for Solomon's staff at Rupert's Bay
135		REGULATION			
136	PC/ASSI/DFT/TA		Aerodrome manual		Strong liaison with ASSI required during phase
137	PC/ASSI/DFT/TA		WGS 84 survey		World Geographical Survey 1984 – mandatory requirement prior to production of AIP
138	PC/ASSI/DFT/TA		AIP production		Separate sub-contract needed - (ASSI do not have the capability)
139	PC/ASSI/DFT/TA		Aerodrome licensing		
140		AIR SERVICE CONTRACT			
141	DFID/SHG		Market testing		Market testing for airline participation. Agreement on flight strategy. Agree basis for evaluation of tenders.
142	DFID/SHG/TA		Short-listing /Tender period		Assessment of responses to OJEU. Recommendation of shortlist recipients of ITN. Discussion with selected carries. Issue of ITN. Responses to ITN. Review responses.
143	DFID/SHG/TA		Identify preferred bidder		Report upon preferred bidder Agree

ID	Owner	Activity	Task	Sub-Task	Comments
					selection of preferred bidder.
144	DFID/SHG/TA/ASO		Air service agreements including take and pay levels.		
145	DFID/SHG/ASO		Sign contract		Including ETOPS route certification – done in country of residence
146	ASO		Set up support		Includes minor servicing and aircraft turn around equipment
147	ASO		Negotiate flight catering supply		if required
148	ASO		Deploy		
149	ASO		Route Prooving		With ASSI
150	ASO		Start air service operations		
151		ACTIVATE AIPORT OPERATIONS CONTRACT			
152	PC		Work up of takeover of facilities and acceptance		Airport operator
153	PC		Start of full airport operations		
154		MARKETING			
155	SHG/TA		Tourism Master Plan		Decide whether to use existing plan or an updated version
156	SHG/TA		Establish destination management company (DMC) on St Helena		Outputs from the Tourism Master Plan. In order to develop a destination the DMC has to educate the tour operators and media.
157	SHG/TA		Develop marketing plan		
158	SHG/TA		Upgrade tourist attractions and facilities		Tourism Master Plan informs the focus for tourism development on the island. Upgrades on tourist facilities, including

ID	Owner	Activity	Task	Sub-Task	Comments
					accommodation should be as complete as possible before the flight operations begin in 2010. It should however continue indefinitely into the future. Assumed private sector funded
159	SHG/TA		Establish offices/representatives in source markets		DMC representation established abroad in the source markets
160	SHG/TA		Prepare marketing material		Output of marketing plan. Unable to complete a 'Travel Planner' (a comprehensive info/marketing document for the trade) brochure until a preferred bidder for air services is in place. Tour Operators prepare their brochures for the following year in the period May-September.
161	SHG/TA		Construct website		For consumer and trade use
162			Establish & maintain relationships with the trade		Overseas offices begin to build relationships with the trade (media, agents and tour operators) – ongoing task
163	SHG/TA			Contact/correspondence with operators	
164	SHG/TA			Contact database development and maintenance	
165	SHG/TA			Image library	Build up library as developments occur on the island
166	SHG/TA			Update trade on accommodation/tourist attraction improvements	Essential to keep contact with the trade and inform them of developments – ongoing task

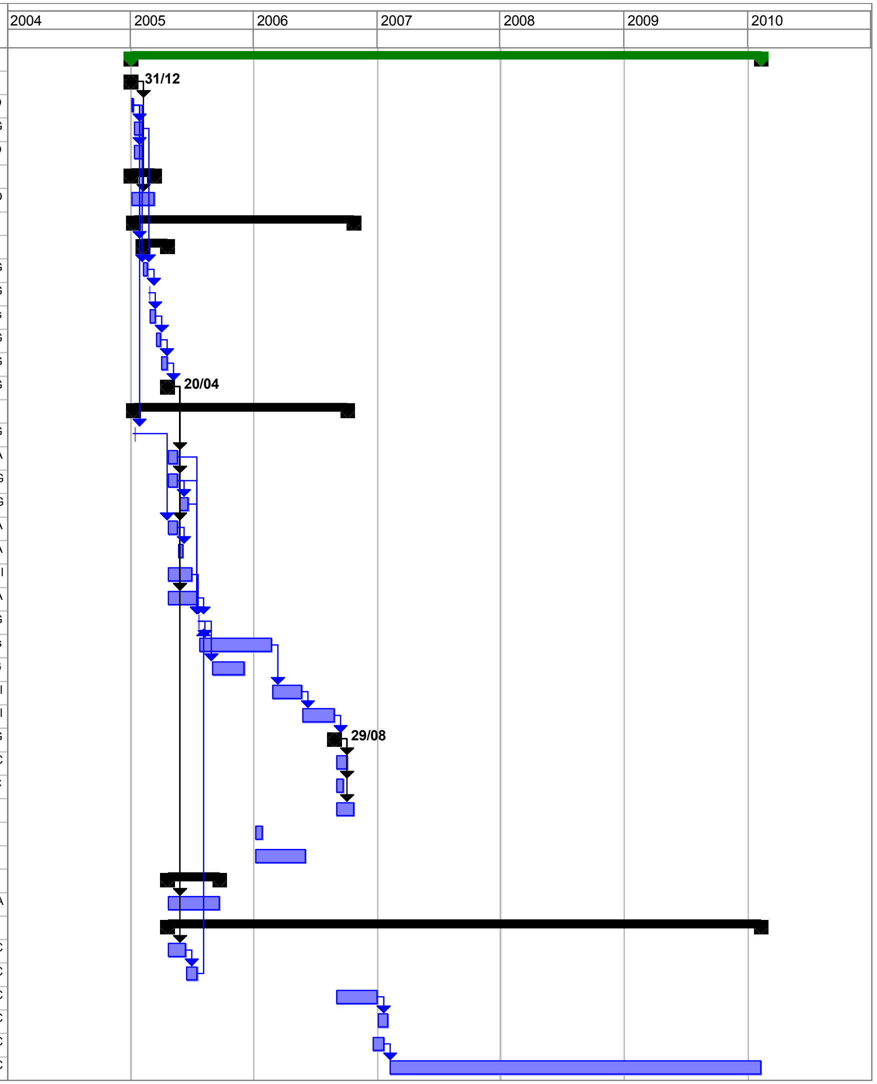
ID	Owner	Activity	Task	Sub-Task	Comments
167	SHG/TA			Updates on website	Ongoing task
168	SHG/TA			Meetings/Trade visits	Visits to source markets
169	SHG/TA		Road shows with operators and media on STH		The DMC arrange for the tour operators to visit the island as well as the trade media
170	SHG/TA		Trade shows		The main trade fair is the ITB in Berlin in March where contracting takes place. A major promotional event is the World Travel Market every November.
171	SHG/TA		Consumer shows		In source markets
172	SHG/TA		Joint marketing		To include direct marketing, advertising, promotions and competitions. Most will occur after the road shows.
173		INSTITUTIONAL			
174			Technical Cooperation (short-term)		
175	SHG			Planning Specialist	temporary
176	SHG			Planning: Consultancy Inputs	temporary
177	SHG			Legal Expert	temporary
178	SHG			Engineers (x2)	temporary
179	SHG			Financial Accountant	temporary
180	SHG			Tourism Development Expert	temporary

ID	Owner	Activity	Task	Sub-Task	Comments
181			Permanent Posts		
182	SHG			Environment Technician	onwards
183	SHG			Planning Officer	onwards
184	SHG			Additional Tourism Staff	onwards
185			Strengthening		
186	SHG			Operations Contract Management Unit	onwards
187	SHG			SHDA	onwards
188	SHG			Vocational Training	onwards
189		STRATEGY FOR SEA CARGO			
190	DFID/SHG		Review Andrew Weir's contract		1st quarter in 2007
191	DFID/SHG		Develop understanding of South Atlantic cargo requirements		Necessary to build up picture of the size and frequency of the cargo vessel requirement. Impact of air cargo will be unknown
192	DFID/SHG/TA		Market testing for risk share contract		
193	DFID/SHG/TA		Business case to identify best sea cargo options		Various options available to St Helena – as outlined in the cargo paper:

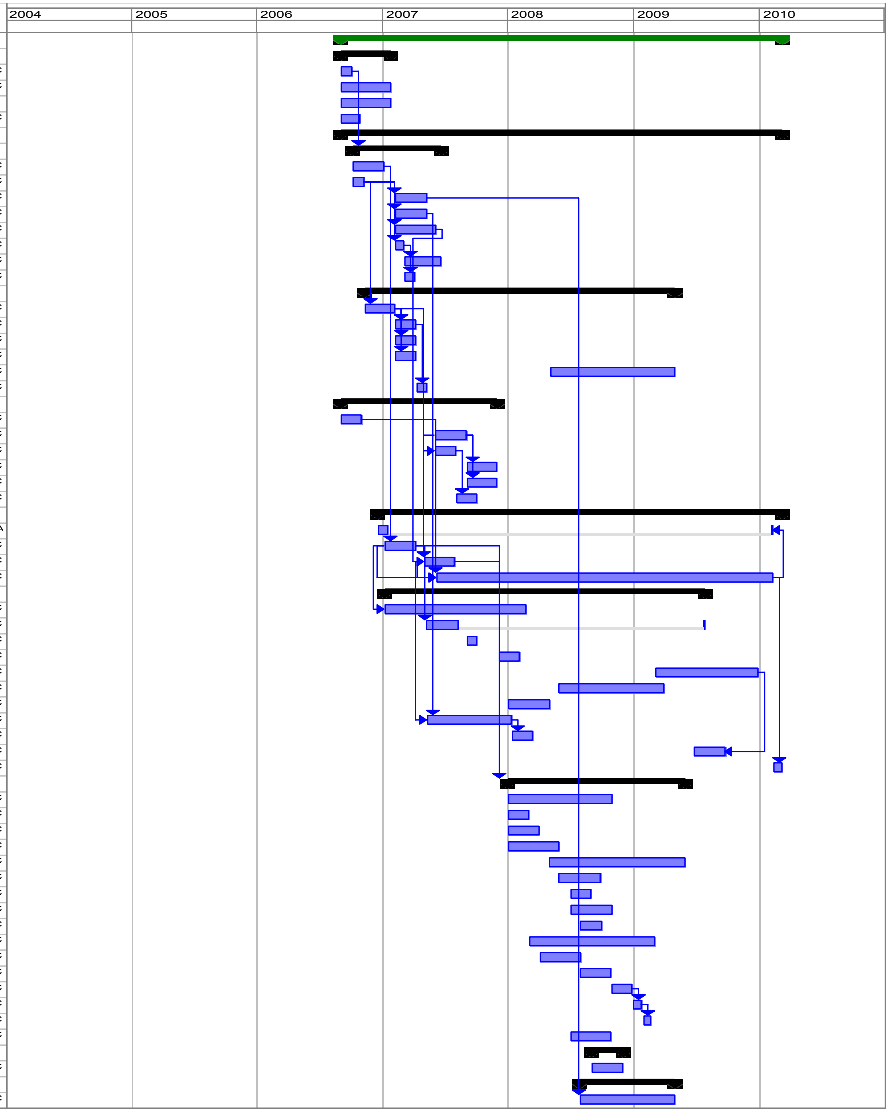
ID	Owner	Activity	Task	Sub-Task	Comments
					- Used ship contracting out the management of it - Charter ship (time charter or voyage charter) - Andrew Weir decide to purchase RMS - Risk sharing contract
194	DFID/SHG/TA		Decide future of RMS		2008
195	DFID/SHG/TA		Appraisal of options		
196	DFID/SHG/TA		Decision on supply arrangements		
197	DFID/SHG/TA		Publish RMS overlap schedule		12 months in advance of 1st flight
198	DFID/SHG/TA		Decommission RMS		Need a period of overlap with flight operations
199		PROGRAMME MANAGEMENT			
200	TA		Project Management		Various tasks- technical advisors
201	DFID/SHG		Contract Management (construction & operations)		Mainly for payment - propose an 'Access Implementation Unit' to coordinate and drive the programme, and an 'Access Forum' to direct it
202	DFID/SHG/TA		Risk Management		
203	DFID/TA		OGC Reviews		
204	SHG/TA		External inward investment		Continuous activity
205	SHG/TA		Domestic inward investment		Continuous activity

Figure 14.1 Outline Implementation Plan

ID	Activity	Owner
1	**PHASE 1**	
2	Ministers approval	
3	Appoint DFID/SHG team for aerodrome project	DFID
4	Agree contractual arrangements between SHG, DFID & 3rd Parties	DFID/SHG
5	Clarify interactions with other OTD programme initiatives	DFID
6	**INTERNATIONAL AIR SERVICE AGREEMENTS**	
7	Clarify ASI agreements	DFID/FCO
8	**PROCUREMENT**	
9	**Procure TA & Legal Contracts**	
10	Develop TOR for TA and Legal advisors	DFID/SHG
11	Issue TOR for TA & Legal contracts	DFID/SHG
12	Competition for TA & Legal contracts	3rd Parties
13	Review tenders	DFID/SHG
14	Agree Mandate	DFID/SHG
15	Award TA & Legal Contracts	DFID/SHG
16	**Procure Design, Build & Operations Contract (Principal Contract (PC))**	
17	Issue Prior Information Notice	DFID/SHG
18	Draft Employers Requirements	DFID/SHG/TA
19	Agree with SHG on concessions, warranties & other obligations	SHG
20	Prepare enabling legislation	SHG
21	Draft and issue OJEU	DFID/SHG/TA
22	Recommendation of shortlist recipients of ITN	DFID/SHG/TA
23	Prepare contract documentation	Legal
24	Prepare ITN	DFID/SHG/TA
25	Issue ITN	DFID/SHG
26	Competition for contract	3rd Parties
27	Contractor site visits	3rd Parties/SHG
28	Review tenders	DFID/SHG/TA/Legal
29	Negotiate contract with preferred bidder	DFID/SHG/TA/Legal
30	Award design, build & operations contract	DFID/SHG
31	Issue initial sub-contracts (inc. supply contracts)	PC
32	Set up contract arrangements	SHG/PC
33	Initiate recruitment programme for Saints workers	DFID/SHG/PC
34	Procure communications ship	DFID/SHG/PC
35	Communications aircraft market testing	DFID/SHG/PC
36	**UK & OVERSEAS REGULATION**	
37	Security regulation	ASSI/DFT/TA
38	**ENVIRONMENTAL IMPACT MANAGEMENT/REGULATION**	
39	Consultation on EIA TOR	PC
40	Finalise EIA TOR	PC
41	Implement EIA	PC
42	Complete EMP	PC
43	Appoint TA environmental regulator	PC
44	Support SHG and implement EMP during construction	PC



ID	Activity	Owner
45	**PHASE 2**	
46	**FINAL DESIGNS**	
47	Finalise enabling works designs	PC
48	Finalise aerodrome designs	PC
49	Approval on designs	ASSI/DFID/TA/PC/DFT
50	Phased public consultation in support of EIA	PC
51	**CONSTRUCTION**	
52	**Construction Enabling Works**	
53	Workforce mobilisation delay period	PC
54	Advance enabling pack	PC
55	Upgrade of access road from Govt Garage	PC
56	Construction of temp access road to terminal area	PC
57	Construction of temporary haulage road	PC
58	Preparation of site for works and accommodation	PC
59	Site accommodation construction	PC
60	Ecology site boundary fencing	PC
61	**Prosperous Bay/Rupert's Bay**	
62	Off Load Facility	PC
63	Temporary Harbour Construction	PC
64	Container Storage Areas	PC
65	Container Cranes etc	PC
66	Haul Road Paving and Lighting	PC
67	Offices	PC
68	**Power**	
69	Temporary Power and Fuel Store	PC
70	Generator House	PC
71	Generator Fuel Store	PC
72	Generator Workshops/Office/Store	PC
73	Supply Generators	PC
74	Distribution Grid	PC
75	**Construct runway**	
76	Mobilise TA team to site	TA
77	Main Workforce Mobilisation	PC
78	Main Plant delivery	PC
79	Major Earthworks	PC
80	**Temporary Re-Supply**	
81	Communications ship service	PC
82	Temporary runway construct...maintain	PC
83	Aircraft Contract	PC
84	Aircraft Fuel	PC
85	Runway Completion	PC
86	Runway Imports	PC
87	Internal Roads	PC
88	Terminal Area Earthworks	PC
89	Runway Repair Storage Area, Building and Kit	PC
90	Boundary and Security Fencing	PC
91	Hand over plant & equipment to PWSD and local contractors	PC
92	**Facilities**	
93	Apron and Taxiways	PC
94	Interceptors	PC
95	Aerodrome Fuel Farm	PC
96	Ruperts Bay Bulk Fuel (aviation)	PC
97	Terminal and Medical (inc. services & security)	PC
98	ATC Tower	PC
99	Fire Station	PC
100	A/C Equipment Storage inc E Recovery	PC
101	General and Buildings Workshop	PC
102	Power and Utilities	PC
103	Communications	PC
104	AGL	PC
105	Navaids	PC
106	Met Station	PC
107	Navaids calibration	PC
108	Obstacle lighting	PC
109	**Cargo Facilities**	
110	Cargo Shed	PC
111	**Access Roads**	
112	Permanent Road Surfaces	PC



ID	Activity	Owner
113	**PHASE 3**	
114	**VEHICLES/BOATS (ORDER TO DELIVERY)**	**PC**
115	RFFS vehicles	PC
116	Fuel Bowsers - A/C	PC
117	Mogas/Diesel Fuel Store	PC
118	A/C Tractor	PC
119	Baggage Tractor and Train	PC
120	Vans	PC
121	Cars	PC
122	Buses	PC
123	Boat(s)	PC
124	Rafts	PC
125	Ambulance	PC
126	Sweeper	PC
127	**RECRUIT/TRAIN OPERATIONS PERSONNEL**	
128	ATCO	PC/SHG
129	ATS Eng	PC/SHG
130	Met Eng	PC/SHG
131	RFFS	PC/SHG
132	Sea Rescue	PC/SHG
133	Medical	PC/SHG
134	Fuel	PC/SHG
135	**REGULATION**	
136	Aerodrome Manual	PC/ASSI/DFT/TA
137	WGS 84 Survey	PC/ASSI/DFT/TA
138	AIP Production	PC/ASSI/DFT/TA
139	Aerodrome Licensing	PC/ASSI/DFT/TA
140	**AIR SERVICE CONTRACT**	
141	Market Testing	DFID/SHG
142	Shorlt listing/Tender period	DFID/SHG/TA
143	Identify preferred bidder	DFID/SHG/TA
144	Take & Pay level	DFID/SHG
145	Sign contract	DFID/SHG/ASO
146	Negotiate flight catering supply	ASO
147	Set Up Support	ASO
148	Deploy	ASO
149	Route Prooving	ASO
150	Start air service operations	ASO
151	**ACTIVATE AIRPORT OPERATIONS CONTRACT**	
152	Airport operator work up for takeover of facilities and acceptance	AO
153	Start of full airport operations	AO
154	**MARKETING**	
155	Tourism Master Plan	SHG/TA
156	Establish destination management company on STH	SHG/TA
157	Develop marketing plan	SHG/TA
158	Upgrade tourist attractions and faculties	SHG/TA
159	Establish offices/representatives in source markets	SHG/TA
160	Prepare marketing material	SHG/TA
161	Construct website	SHG/TA
162	**Establishing & maintaining relationships with the trade**	**SHG/TA**
163	Contact/Correspondence with operators	SHG/TA
164	Contact database development & maintenance	SHG/TA
165	Image library & maintenance	SHG/TA
166	Update trade on accommodation/tourist attraction improvements	SHG/TA
167	Updates on website	SHG/TA
168	Meetings/Trade Visits in source markets	SHG/TA
169	Road shows with operators and media on STH	SHG/TA
170	Trade shows	SHG/TA
171	Consumer shows	SHG/TA
172	Joint marketing	SHG/TA
173	**INSTITUTIONAL**	
174	**Technical Cooperation (short-term)**	**SHG**
175	Planning Specialist	SHG
176	Planning: Consultancy Inputs	SHG
177	Legal Expert	SHG
178	Engineers (x2)	SHG
179	Financial Accountant	SHG
180	Tourism Development Expert	SHG
181	**Permanent Posts**	**SHG**
182	Environment Technician	SHG
183	Planning Officer	SHG
184	Additional Tourism Staff	SHG
185	**Strengthening**	**SHG**
186	Operations Contract Management Unit	SHG
187	SHDA	SHG
188	Vocational Training	SHG
189	**STRATEGY FOR SEA CARGO**	**SHG**
190	Review Andrew Weir's contract	DFID/SHG
191	Develop understanding of South Atlantic cargo requirements	DFID/SHG
192	Market testing for risk share contract	DFID/SHG/TA
193	Business case to identify best sea cargo options	DFID/SHG/TA
194	Decide future of RMS	DFID/SHG/TA
195	Appraisal of options	DFID/SHG/TA
196	Decision on supply arrangements	DFID/SHG/TA
197	Publish RMS overlap schedule	DFID/SHG/TA
198	Decommission RMS	DFID/SHG/TA
199	**PROGRAMME MANAGEMENT**	
200	Project Management (technical advisors)	TA
201	Contract Management (construction & operations)	DFID/SHG
202	Risk Management	DFID/SHG/TA
203	OGC Reviews	DFID/TA
204	External inward investment	SHG/TA
205	Domestic inward investment	SHG/TA