iama

Sustainable Land Use Plan

PART 2

Source: Torres Strait Regional Authority

Land Use **Plan Structure**

PART 1

Context & Background

- Introduction, Background and Overview of the Torres Strait
- How to Use the Sustainable Land Use Plan

PART 2

Island Overview

A separate section of each island will detail the following topics–

- Island Overview
- Land Tenure & Native Title
- Natural Environment
  - plants, animals and birds
  - coastline
  - tides and storm surge
  - waterways and wetlands
  - land and soil
  - bushfire
- Cultural Heritage
- Community
  - population
  - housing
  - sustainable community expansion
  - community facilities and services
- Infrastructure
  - water
  - sewer
  - waste
  - electricity
  - telecommunications
  - roads
  - drainage
  - air access
  - sea access

Each topic includes best practice principles, an island overview, and an overview of the topic in the context of each island, land use strategies, land use projects, land use considerations, strategic outcomes and useful links.

PART 3

Interim Planning Assessment Process

A non-statutory framework for assessing development on the islands.

Executive **Summary**

In past years, the establishment of new and the growth of existing communities has often proceeded in a manner perceived as being unplanned and ad-hoc. Such an uncoordinated approach in remote communities has lead to land management problems such as inappropriate locations of housing and inefficient, costly ad haphazard provision of services such as water supply, sewerage, power and roads.

Source: Torres Strait Regional Authority

The primary objective of reviewing land uses on Iama is to provide a support decision making tool and guideline for Community to plan for and manage the impacts of future development and that such development is sustainable.

Iama is an area of significant cultural heritage value to the Traditional Owners and Community. Many sites are not recorded and are only known to the Traditional Owners. Consultation and liaison with Traditional Owners, engagement of cultural heritage observers and preparation of cultural heritage investigations are recommended for all development proposals.

Iama is located in the central group of islands in the Torres Strait, approximately 93 kilometres north east of Horn Island.

Iama is a vegetated granite island fringed with coral sand flats, approximately 2.2 kilometres long by approximately 1.5 kilometres wide giving an approximate area of 175 hectares. The island is distinguished by three distinct landforms.

The dominant landform is the vegetated, steep hilly country, which has limited grade access for standard vehicles and slightly more for 4WD vehicles. The second landform, which is inaccessible, is the flatter or plateau areas at the top of the steep slopes. Together there is limited flat land available for development. The remaining landform is the relatively flat areas around the coastline with the majority of areas inaccessible due to dense mangroves.

The main community is located at the north-western end of the island and covers an area of approximately 300 metres x 300 metres. The terrain at the main community area is relatively flat, rising to approximately one to one and half metres. This makes these areas susceptible to rising sea levels.

The **key environmental assets** of Iama are the:

- vine forests in the centre and elevated areas;
- mangrove forests in the north-east;
- coastal habitats on the southern coast;
- continuous habit along the coast;
- a sand spit on the north western coast; and
- wetland, north of the sand spit.

Identified **land issues** are:

- development along the 'Sand Spit';
- development in tide and storm surge affected areas;
- limited available land for future development;
- existing vacant lots cater for a population growth to 400 with the current population at 342;
- changing system of land tenure;
- increasing tide and storm surge levels;
- potential clearing of vegetation on slopes and erosion;
- intermittent water courses;
- potential acid sulfate soils;
- potential erosion;
- bushfire hazards;
- cultural heritage of Iama; and
- the need for a set down area of goods from the barge.

Identified **infrastructure issues** are:

- landfill is at or near capacity and cannot cater for an increase in population;
- the need to find a solution for the handling, sorting and disposal of waste;
- the need to reduce water consumption to 300 litres per person per day;
- that the current water infrastructure can cater for a population of about 500 persons, if the average water consumption to 300 litres per person per day;
- total population above 500 will require an upgrade to water plant capacity;
- the current sewerage design of 450 persons is predicted to be reached between 2013 and 2017;
- limited opportunity for viable alternative sources of energy;
- the existing generators site is near capacity and any upgrades may require relocation of the generators;
- cemetery will be full around 2010 and a new site must be found above coastal hazards;
- unsealed roads require continual maintenance with limited machinery available to undertake the work;
- existing beachfront road to the south of the village, running parallel to the beach is experiencing wave erosion during high tide and requires ongoing repairs; and
- barge channel through the reef needs to be dredged to remove sand build up.

Identified **population issues** are:

- current population is 342 people;
- population growth has slowed substantially, with an increase of 7.0% of the past ten years (1996-2006);
- population profile will change over the next 25 years, with a doubling of the 65 plus age group and a decrease of young people; and
- median household size of 5.0 persons.

Identified **housing issues** are:

- the sloping topography of the island and the narrow strip of coastal land limits the expansion opportunities of the village;
- existing vacant lots should be developed with either dual occupancies (duplex) or townhouses or units to maximise land availability;
- the need to use existing vacant lots for either dual occupancies (duplex) or townhouses or units to maximise land availability;
- the need to supply diverse, affordable and sustainable housing to meet population changes and move towards a sustainable environment;
- main village area already contains dense development but needs to allow denser development outside the areas impacted by natural hazards;
- relocate families from the 'Sand Spit' to other suitable locations; and
- The Gaurab Village Investigation Area, stage 2 subdivision contains 11 vacant lots that cater for an additional 55 people or for current predicted population growth to 2014. The following stage can include up to 20 lots or for an additional 100 people between 2015 and 2025.

Identified **growth issues** are:

- a low growth rate of 2% which will generate:
  - an extra 76 persons over ten years; and
  - additional housing need of 1.5 houses per year; and
  - an additional 15 houses over ten years;
- a high growth rate of 4% which will generate:
  - an extra 171 persons over ten years; and
  - additional housing need of 3.4 houses per year;
  - an additional 34 houses over ten years;
  - by adopting either, the low or high growth rates, growth pressure on Iama will be generated;
- based on the existing landfill capacity, Iama has reached 'full house';
- options available to manage growth on Iama are:
  - to increase residential density;
  - expansion of the residential areas; and
  - population capping; and
- studies are required to determine whether the two identified residential areas are suitable for development.

Together the identified assets and issues above provide the basis for land use strategies, questions to ask for any proposed development and key land use outcomes. In summary:

- Iama is at "full house" as the existing landfill is at or near capacity and the cemetery is also near capacity;
- vacant land will be consumed in five to ten years;
- Iama's current infrastructure will limit Iama population growth;
- community must decide how they are going to overcome Iama's 'full house'. What strategies are they going to adopt?
- if further development is to occur it:
  - should not be permitted in any area;
    - identified as an environmental asset;
    - identified as water catchment or in a known water catchment area;
    - encompassing head waters of waterways and wetlands;
    - where it has detrimental impact on natural flow regimes and quality water systems
    - in areas affected by tides and storm surges;
    - in areas of high bushfire risk and on slopes adjacent or part of areas identified as high bushfire risk;
    - near major infrastructure such as the Telstra Tower, sewerage treatment plants and generators; and
    - identified as affected by natural hazards such as tides, storm surges or acid sulfate soils
  - should be contained with the village and the identified investigation areas which will require an increase in residential density;
  - does not include the 'Sand Spit' which is to revert to a natural state and families relocated;
  - must include diverse, affordable and sustainable housing to meet the needs of current and future residents and visitors. Two areas are to be investigated for potential development; and
  - must incorporate all processes, policies and decisions that protect and enhance the natural and made environments including cultural values and beliefs.

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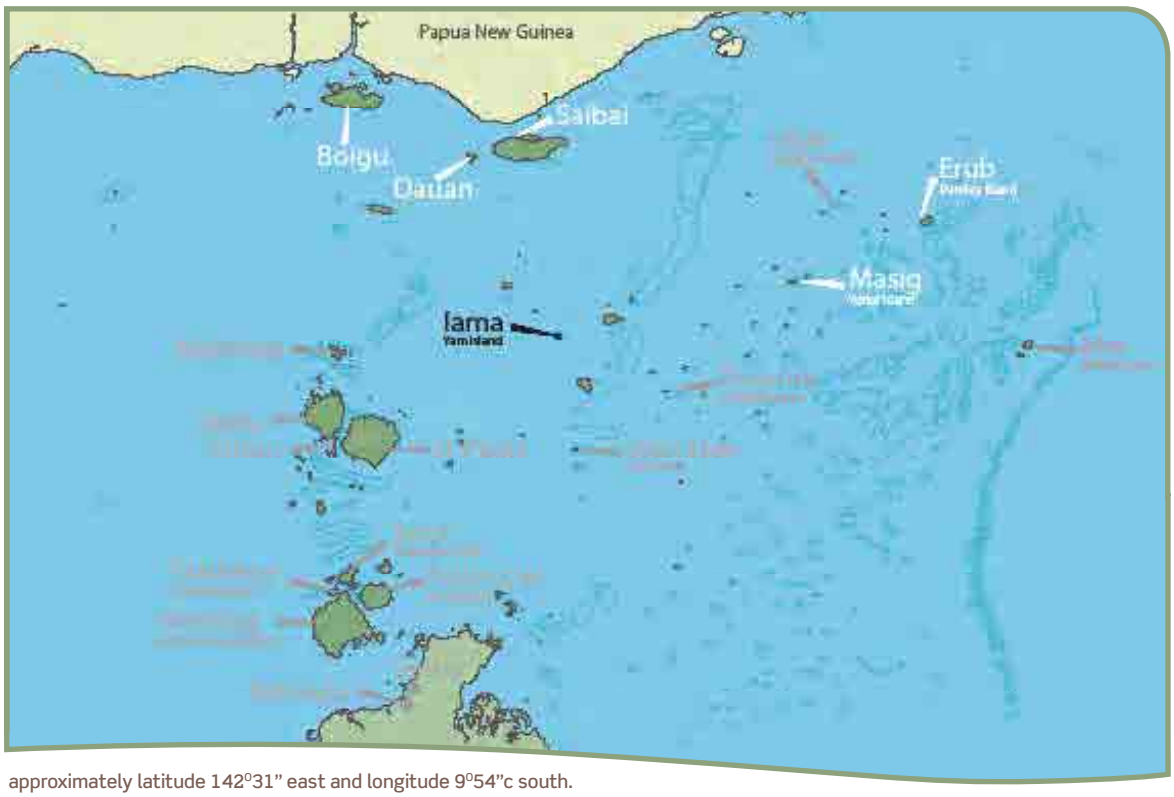
Island **Overview**

1.1 Location

Iama is located in the central group of islands in the Torres Strait, approximately 93 kilometres north east of Horn Island.

Map 1 shows the location of Iama in relation to the Torres Strait, other islands (grey text) and the other five islands that form this Sustainable Land Use Plan are indicated in the white text.

Map 1 Regional Location



approximately latitude 142°31" east and longitude 9°54"c south.

Map 2 Satellite Image of Iama

For more detail, refer to Map No 9409-400 contained in Volume 2 – Maps.

1.2 Physical Characteristics

The following is an overview of the physical characteristics of Iama.

1.2.1 Topography

Iama is a vegetated granite island fringed with coral sand flats, approximately 2.2 kilometres long by approximately 1.5 kilometres wide giving an approximate area of 175 hectares.

Map 2 shows a satellite image of Iama.

The island is distinguished by three distinct landforms. The dominant landform is the vegetated, steep hilly country, which has limited grade access for standard vehicles and slightly more for 4WD vehicles.
The second landform, which is inaccessible, is the flatter or plateau areas at the top of the steep slopes. Together there is limited flat land available for development.

The remaining landform is the relatively flat areas around the coastline with the majority of areas inaccessible due to dense mangroves.

The main community is located at the north-western end of the island and covers an area of approximately 300 metres x 300 metres. The terrain at the main community area is relatively flat, rising to approximately one to one and half metres. The airstrip, village and telecommunication areas are located on relatively flat land that rises to approximately one and half metres above sea level. This makes these areas susceptible to rising sea levels.

1.2.2 Geology

Iama is a high granite outcrop island with sandy soils.

1.2.3 Vegetation

The northern and eastern ends of the island are dominated by tall mangrove forests. Mangrove forests and associated sand flats afford a diverse and important habitat type on Iama.

The coastline is characterised by beaches, rocky headlands and exposed sand flats.

Vine forests occur in broad patches across the inland areas of Iama. Small patches of low vine thicket occur in clearings adjacent to inland-forested areas and around outcropped rocks. These thickets provide stepping-stones of habitat to broader tracks of habitat.

1.2.4 Waterways, Wetlands and Coasts

There are many watercourses on Iama, many that only flow during the wet season. The school in the main village is occasionally flooded by a nearby a creek.

Within walking distance of the village is a wetland, located on the north-west peninsula referred to in this Plan as the ‘Sand Spit’.

The village along the western coastline is susceptible to coastal flooding during high tides and storm surges. This is particular evident along the ‘Sand Spit’.

1.3 The Village

The village comprises of four areas:

The Village

The village or urban area is located between the airstrip and the barge ramp towards the north western coast of Iama. This residential area consists of residential dwellings supported by Council offices, churches, primary school, Ibis store, Council workshop and the SES depot.

Map 3 shows a satellite image of Iama Village.

Map 3 Satellite Image of Iama Village

For more detail, refer to Map No. 9409-400 contained in Volume 3 – Maps.

The Sand Spit

The second residential area adjoins the village and is located along a narrow sandy strip of land north of the barge ramp and desalination plant, known as the 'Sand Spit'. This area is elevated above the water level by 200 to 500mm. The Sand Spit is relatively flat with a gentle slope towards the wetland. Without substantial filling, there is only sufficient room for a narrow road and one row of houses.

Airstrip Area

The third area contains the airport buildings, a health centre and a recent and proposed subdivision area which form 'Gaurab Village' near the centre of the southern side of the airstrip.

Telstra Area

The fourth area is located on the northern side of Iama and includes the landfill (waste depot or dump or tip) sites, cemetery, sports stadium, oval and the Telstra Tower. Construction of the sports stadium commenced in 2006 and was completed in mid 2008.

Map 4 shows a satellite image of the airstrip and Telstra area.

1.4 Population

In 2006, the total population of Iama was 342, a 0.1% increase from the 2001 Census.

Map 4 Satellite Image of Airport Area and Telstra Area

For more detail, refer to Map No. 9409-400 contained in Volume 3 – Maps.

Land Tenure & Native Title

2.1 Land Tenure

2.1.1 Best Practice

- Recognise ownership of traditional lands.
- Understand land tenure systems, particularly customary systems, when development land.
- A co-operative approach between all parties to land tenure, native title, development and land-management issues.

2.1.2 Overview of Current Situation

Iama legal land tenure consists of a Deed of Grant in Trust (DOGIT) shown as Lot 13 on TS177, Parish of Giaka, County of Torres in the State of Queensland.

As the land is held in DOGIT, the term 'lot', in this Plan refers typically to the land surrounding a house or a building.

General the DOGIT covers most of the community including houses, council officers, shops and some roads and general infrastructure.

At the time of granting the DOGIT, some land was retained by the State of Queensland for specific purposes. Generally, these reservations were minor and may include land such as airstrips, some roads and community facilities such as schools. A search of the State government's land tenure system is required to determine the extract tenure of the land.

The Torres Strait Island Regional Council (TSIRC) is currently the trustee of the DOGIT, acting on behalf of the Torres Strait Islanders of the community. Council may issue leases over part of the DOGIT for various specific purposes including leases for infrastructure purposes (e.g. Telstra and Ergon Energy), Australian Customs Service facilities, health centres and commercial purposes. The existence of these leases is disclosed by searching the State's tenure database.

2.1.3 Issues Overview

Primary discussions are required to be held with Traditional Owners and the TSRIC with regard to approval for the provision of new development and infrastructure on the island. However, consideration also needs to be given to those members of the community who do not possess traditional land to ensure they and their families have the opportunity for housing.

The *Aboriginal and Torres Strait Islander Land Amendment Act 2008* was passed by the State government on 13 May 2008. The amendments in the Act aim to:

- encourage home ownership and provide long term leases for housing;
- assist the transfer of land not required for village purposes (outside of townships) to Indigenous land trusts;
- encourage economic development in Indigenous communities; and
- facilitate the construction of public infrastructure by providing a compulsory acquisition process.

This Act will change the land tenure on Iama and, once in effect must be monitored.

2.1.4 Sustainable Land Tenure Outcomes

- Consultation with the TSIRC, Native Title Prescribed Body Corporate, Land Trusts and Traditional Owners occurs on a regular basis with their knowledge and values respected.
- Communities are is the best position to identify and priorities their needs and recommend how governments can best meet those need.

2.1.5 Useful Resources

Legislation

Aborigines and Torres Strait Islanders (Land Holding) Act 1985 (Qld) outlines the process for providing the grant of leases in perpetuity and other land to members of Torres Strait Island Communities.

www.legislation.qld.gov.au

Land Act 1994 (Qld) deals with the administration and management of non-freehold land and DOGIT and the creation of freehold land.

www.legislation.qld.gov.au

The *Aboriginal and Torres Strait Islander Land Amendment Bill 2008* amends the *Aboriginal Land Act 1991*, the *Torres Strait Islander Land Act 1991*, the *Land Act 1994*, the *Local Government (Aboriginal Lands) Act 1978* and the *Native Title (Queensland) Act 1993.*

www.legislation.qld.gov.au

Torres Strait Islander Land Act 1991 (Qld) provides for the grant and claim and grant, of land as Torres Strait Islander Land and for other purposes.

www.legislation.qld.gov.au

Native Title Act 1993 (Cth) provides for the recognition and protection of Native Title rights and interest and establishes mechanisms for how future development and actions affect Native Title.

www.comlaw.gov.au

Policies, Guidelines and Fact Sheets

A Guide to Land Tenure in Queensland outlines the types of tenure used in Queensland, including DOGITs, their characteristics and the various provisions of legislation, which apply to each.

www.nrw.qld.gov.au/land/state/publications

Websites

Department of Natural Resources and Water

www.nrw.qld.gov.au

2.2 Native Title

2.2.1 Best Practice

- Native title should respect, protect and identify Iama's cultural heritage for present and future generations.
- A co-operative approach between all parties to land tenure, native title, development and land-management issues.
- Establish communication prior to starting a project to ensure inclusion and participation – involve Community in genuine negotiation at every stage of a project.
- Be sensitive of issues of language, naming and expression.
- Examine assumptions carefully – ask first, do not assume.
- Be informed about appropriate times to undertaken consultation and negotiation - be respective fully of deaths in communities and cultural events.

2.2.2 Overview of Current Situation

Native title rights are held by the Yam Community/Tudulaig People as determined by a consent determination on 24 May 2005. Native title rights exist in the entire determination area being Iama Island, Zagai Island (or Jeaka Island), Tudu Island and Cap Islet (or Mukar Islet or Muquar Islet) in the Torres Strait. Native title is managed by the Magani Lagaugal (Torres Strait Community) Corporation.

A native title sea claim is yet to be determined.

As of November 2008, the National Native Title Tribunal records indicated there were three Indigenous Land Use Agreements (ILUA's):

- Telstra Yam Agreement ILUA (No. QI2004/061 - Infrastructure);
- Yam Islanders/Tudulaig People (No. QI2004/038 – Infrastructure); and
- Yam Island - Ergon Energy ILUA (No QI2004/056 - Access).

Communication with the relevant Native Title Prescribed Body Corporate (PBC) will assist developers to identify local areas and objects of significance and avoid or mitigate disturbance. The Torres Strait Regional Authority (TSRA) through its Land and Sea Management Unit (LSMU) and Native Title Office can assist in contacting the relevant PBCs. The TSIRC will also be able to help with identifying the correct PBC contacts.

2.2.3 Issues Overview

Final decisions over native title claims can take time and it is essential to continue the provision of infrastructure to communities whilst a native title claim is being determined.

The *Native Title Act 1993* provides a system or process to facilitate dealings that may affect native title both during the claim process and after native title is recognised.

Native title claimants and those recognised as native title holders have the right to negotiate about some future acts, such as the proposal of a proposed development. As native title has been determined, a PBC has been established to represent native title interests. In many cases, an agreement is made between the PBC, the TSIRC and the proponent of the development to allow a development to proceed. Such developments have typically included the provision of major infrastructure such as reticulated sewerage schemes, or areas of land for subdivision expansion.

Enquiries should be made with the PBC, the TSIRC and or the TSRA's Native Title Office to determine is there are any existing agreements.

Indigenous Land Use Agreements

ILUAs are voluntary agreements about the use and management of land and or water made between a native title party and other people who have an interest in the land and or water covered by the claim such as pastoralists, farmers, resource explorers and producers, fishers, local government and State government officers. ILUAs are registered with the National Tribunal making them legally binding on the people who are parties to the agreement and all native titleholders for that area. ILUAs achieve certainty over access to and sustainable use of land, water and resources through negotiated recognition and just settlement leading to the resolution of native title claims.

2.2.4 Sustainable Native Title Outcomes

- Consultation with the Prescribed Body Corporate, Land Trusts and Traditional Owners occurs on a regular basis with their knowledge and values respected.
- ILUAs are encouraged, implemented and respected.
- Promotion of effective communication and transparent processes that are flexible to reflect particular circumstances of lama.

2.3 Useful Resources

Legislation

Native Title Act 1993 (Cth) provides for the recognition and protection of Native Title rights and interest and establishes mechanisms for how future development and actions affect Native Title.

www.comlaw.gov.au

Indigenous Land Use Agreements

National Native Title Tribunal

www.nntt.gov.au

Policies, Guidelines and Fact Sheets

Guidelines for Negotiation of an Indigenous Land Use Agreement provides information on negotiating and registering an ILUA including the different types of ILUAs, the steps for negotiating an ILUA and the process for registering an ILUA. It also includes a sample ILUA.

www.nrw.qld.gov.au/publications/nativetitle

Websites

Department of Natural Resources and Water

www.nrw.qld.gov.au

National Native Title Tribunal

www.nntt.gov.au

Natural **Environment**

The natural environment, or the land and sea, is the core of Torres Strait communities' way of life, both now and in the future. Its existence, condition and health are essential to Community health. Their future, economy and way of life cannot be separated from how the land and sea is managed.

Land and sea is so fundamental to Iama Community that the impacts on land and sea must be part of all decisions and plans.

This Plan addresses the following with regard to the natural environment:

- plants, animals and birds;
- coastline;
- tides and storm surges;
- waterways and wetlands;
- land and soil; and
- bushfire.

A report by Natural Solutions was undertaken on Iama over a five day visit in late 2007. This report provides a snap shot in time and a base line for future studies and identified key natural assets, habitats, watercourses and natural land use issues for Community. It is not intended to be a complete scientific analysis of Iama's natural environment. The report is written for the Iama Community, the TSIRC and the TSRA. The Fauna and Habitat Assessment of Iama, prepared by Natural Solutions Environmental Consultants, is included as Appendix 1.

Mapping of the Torres Strait regions remnant vegetation was undertaken in 2007/08 by 3D Environmental. The study identified vegetation communities across all islands and was undertaken to provide data suitable for adoption under the old State remnant vegetation regime administered by the Department of Natural Resources and Water (NRW). By late 2008, the draft mapping being provided by NRW had been completed but not made available to the public. The Vegetation Communities and Regional Ecosystem Assessment, prepared by 3D Environmental is included as Appendix 2.

3.1 Plants, Animals and Birds

3.1.1 Best Practice

- The present generation ensure the health, diversity and productivity of the plants, animals and birds is maintained or enhanced for the benefit of future generations through:
  - the protection and conservation of native plants, animals, birds, habitat and habitat corridors;
  - conservation efforts focus on those plants, animals and birds which are uncommon and at risk;
  - clearing of native vegetation, which results in the loss of uncommon, at risk or threatened plants or the animals and birds that live in those areas, is minimised;
  - using renewable natural resources sustainably and sensibly without significantly impacting other land uses;
  - managing animals, pests, weeds and disease so that their impact on the land and sea is minimised or avoided; and
  - integrating land and sea planning and management to ensure the negative impacts of human actions (e.g. development, vegetation clearing) on plants, animals and birds is minimised or prevented.
- The pattern of development on lama recognises the importance of plants, animals and birds, natural resources and their fundamental relationship to the quality of life and viability of lama and the wellbeing of its residents.
- Reduce the impacts of climate change on plants, animals and birds by:
  - recognising the importance of climate change on plants, animals and birds of lama;
  - avoiding decisions now that will make it more difficult to manage the impacts of climate change in the future; and
  - building understanding and knowledge of Community to address the impacts of climate change on the island's plants, animals and birds.

3.1.2 Overview of Current Situation

The land and sea of Iama is the home or habitat of a range of plant and animal species. Apart from Traditional Owners knowledge, there is very little recorded data on Iama. The preliminary fieldwork undertaken by Natural Solutions is part of the ongoing process of recording and identifying significant habitat, plants, birds and animals on Iama. The notable ecological and habitat features of Iama are the:

- well developed mangrove forests in the north-east of the island;
- coastal habitat of exceptional quality and supports rare and threatened birds on the southern coast of Iama;
- vine forests across the centre and elevated parts of the island that hold high quality habitat values and provide a range of specialist niches for fauna; and
- the Sand Spit and the wetland just north of this area.

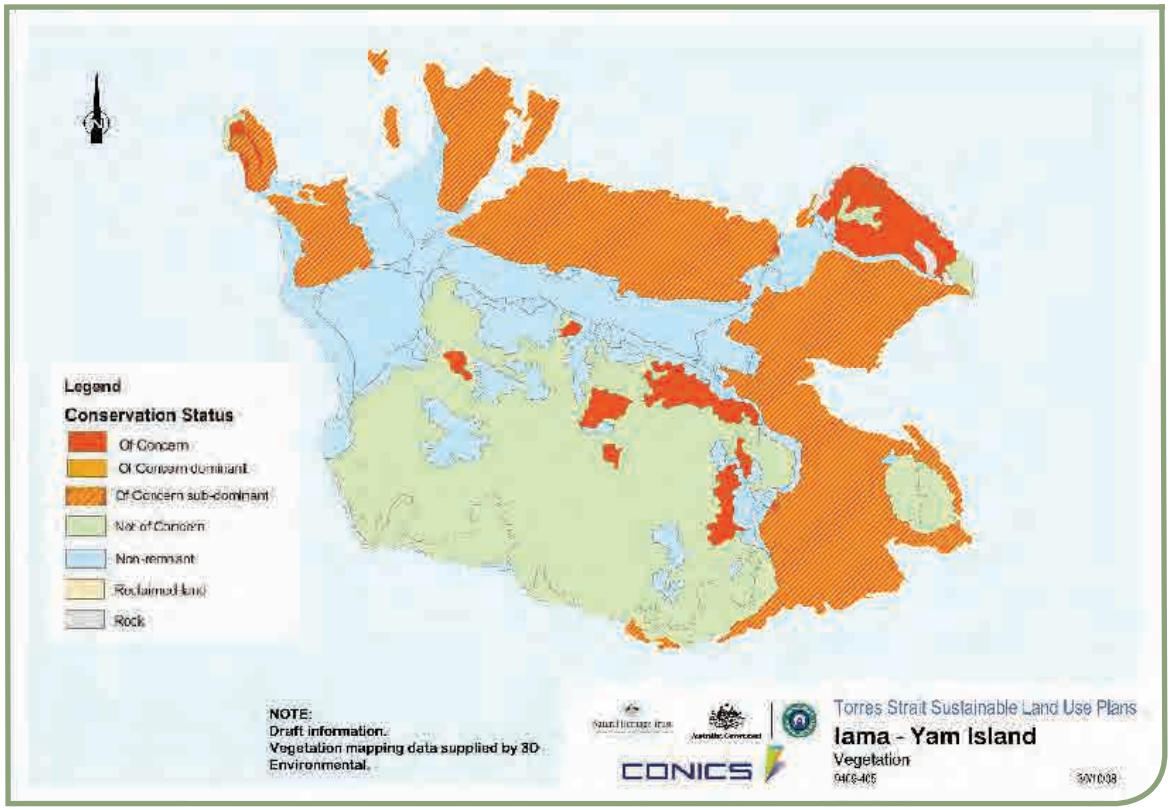
Notable rare and threatened fauna observed on Iama include:

- Little tern *(Sterna albifrons)* – listed as endangered under the *Nature Conservation Act 1992* (NCA);
- Eastern curlew (*Numenius madagascariensis*) – listed as rare under the NCA;
- Beach stone curlew (*Esacus neglectus*) – listed as vulnerable under the NCA; and
- Sooty oystercatcher (*Haematopus fuliginosus*) – listed as rare under the NCA.

Further details on habitat and fauna is included as Appendix 1.

Map 5 shows the significant vegetation communities on Iama.

Map 5 Vegetation



For more detail, refer to Map No. 9409-405 contained in Volume 3 – Maps.

”Plants, animals and birds are essential to the well being of Community as they are frequently associated with cultural significant activities and events. So, significant plants, animals and birds and their habitat need to be protected as they are part of the history and the future for the next generation.”

Four habitat types were identified on Iama, including:

Mangrove Habitat

Mangrove forest habitat occurs around the northern coastline of Iama. At the northeast corner of
the island, tall mangrove forests form impressive stands and are important, high quality habitat. The edges of mangrove vegetation adjacent to the village are in relatively good health but suffer from localised impacts.

Vine Forest Habitat

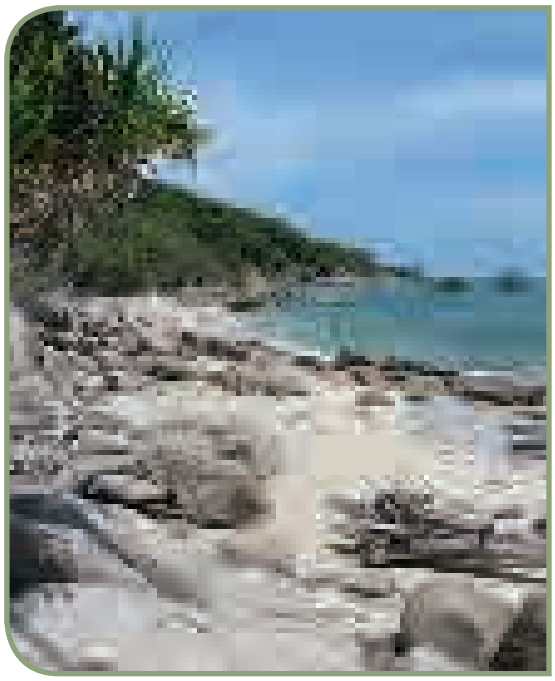
Vine forests cover a considerable area of elevated land on the centre and south of the island. These forests contain a number of specialist habitat niches and are important habitat for a range of fauna including reptiles and birds.

Small patches of vine thicket occur adjacent to larger tracts of vine forest. This low-growing vegetation type provides stepping-stones of connectivity across the island and is habitat for reptiles and birds. Vine thicket patches afford shelter for fauna during lean times – when food sources are low in other areas of habitat.

Coastal Environment Habitat

The coastal environment around Iama includes a number of habitats that are of ecological importance. These habitats include the near pristine southern beach and shoreline, sand flats and the Sand Spit at the northern tip of the island. Of particular significance is the shoreline around the south of the island. Here, four species of birds – listed under State and Commonwealth legislation were identified, including one endangered bird.

This area is afforded very high habitat quality because of its relatively undisturbed condition and the presence of rare and threatened birds.

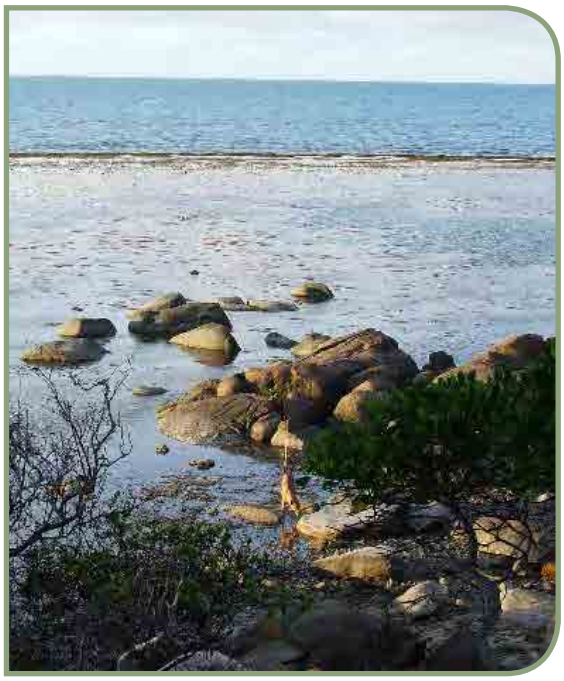


Modified Habitat

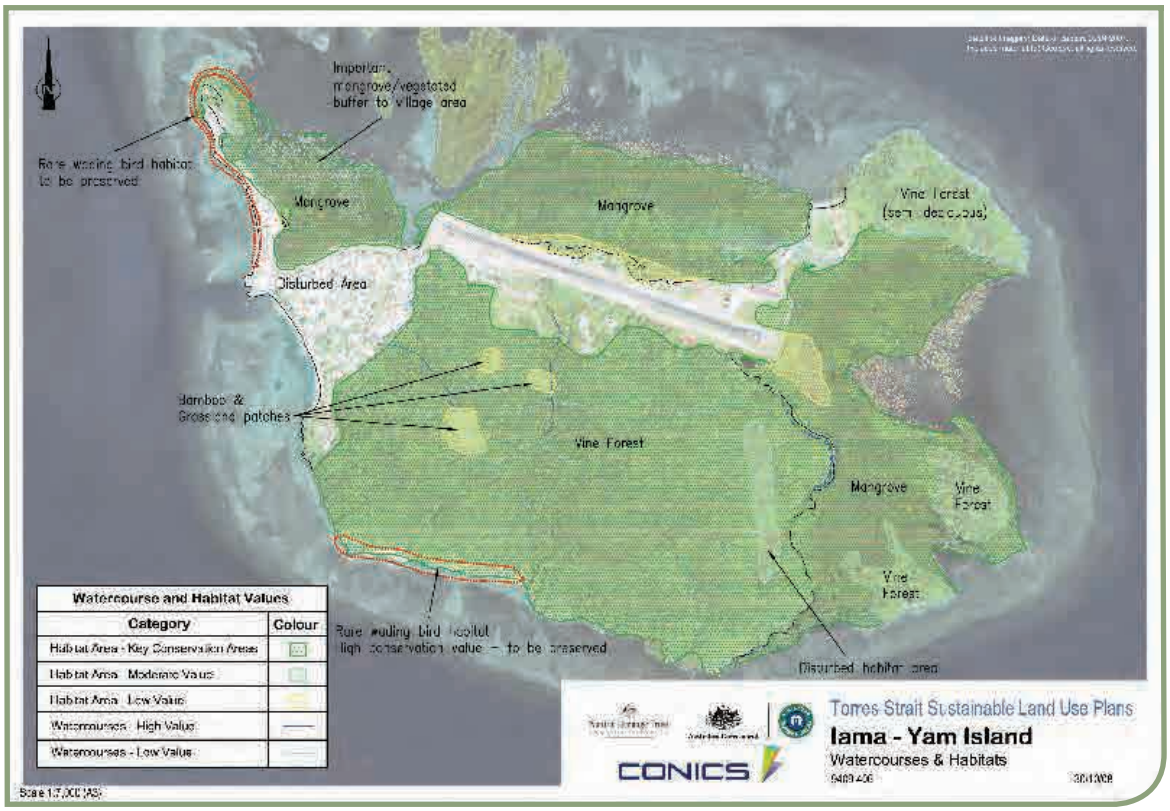
This group of habitats includes areas that have been affected and modified by the influence of human settlement and include the village area, refuge tip, sewerage line, land adjacent to the airstrip and patches of land and vegetation of inland areas of Iama Island. The fauna that occupy these niches are mostly hardy, generalist species that are able to exist in less than optimal habitat conditions.

Map 6 shows the habitat areas on Iama.

Maps 7 shows the identified ecologically significant watercourse and habitat areas.



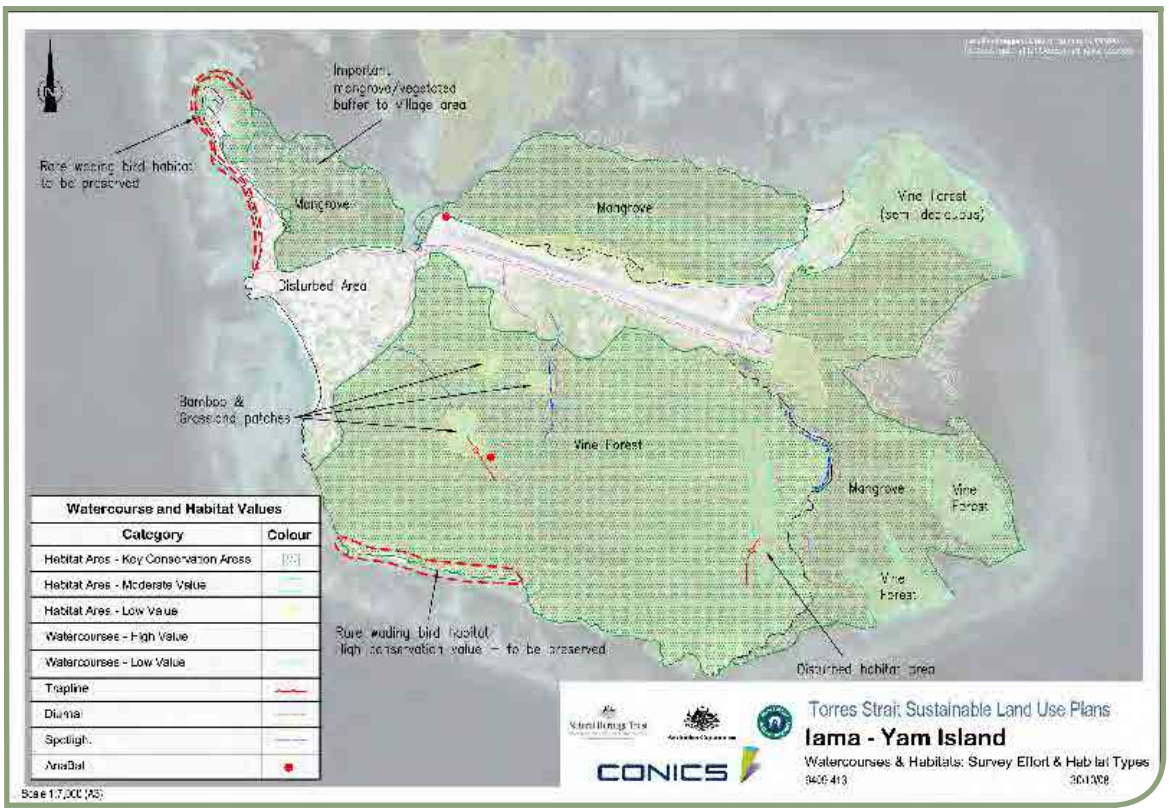
Map 6 Habitat Areas



For more detail, refer to Map No.9409-406 contained in Volume 3 – Maps.

"Habitat areas are the different places that plants, animals and birds live and grow. Habitat areas provide food, water and shelter for plants, animals and birds.

Map 7 Significant Watercourses and Habitats



For more detail, refer to Map No.9409-413 contained in Volume 3 – Maps.

"fragmentation is caused when vegetation and habitat areas are cleared resulting in these areas being divided into smaller, isolated patched"

3.1.3 Issues Overview

The distinct vegetated character of Iama relies on the retention of biodiversity and ecosystems. In addition, many of the fauna species identified on Iama are habitat specific or specialist animals – often requiring particular resources to persist in a given environment. The presence of threatened birds highlights the regional significance of Iama to provide high quality habitat and long-term safe refuge for species of conservation importance. Many of these areas also provide distinct views and vistas.

For these reasons, it is vital that land must be protected for conservation purposes. Ideally, these areas will represent the full range of habitats and species found across the island and form corridors for the safe movement and successful breeding of wildlife within the island.

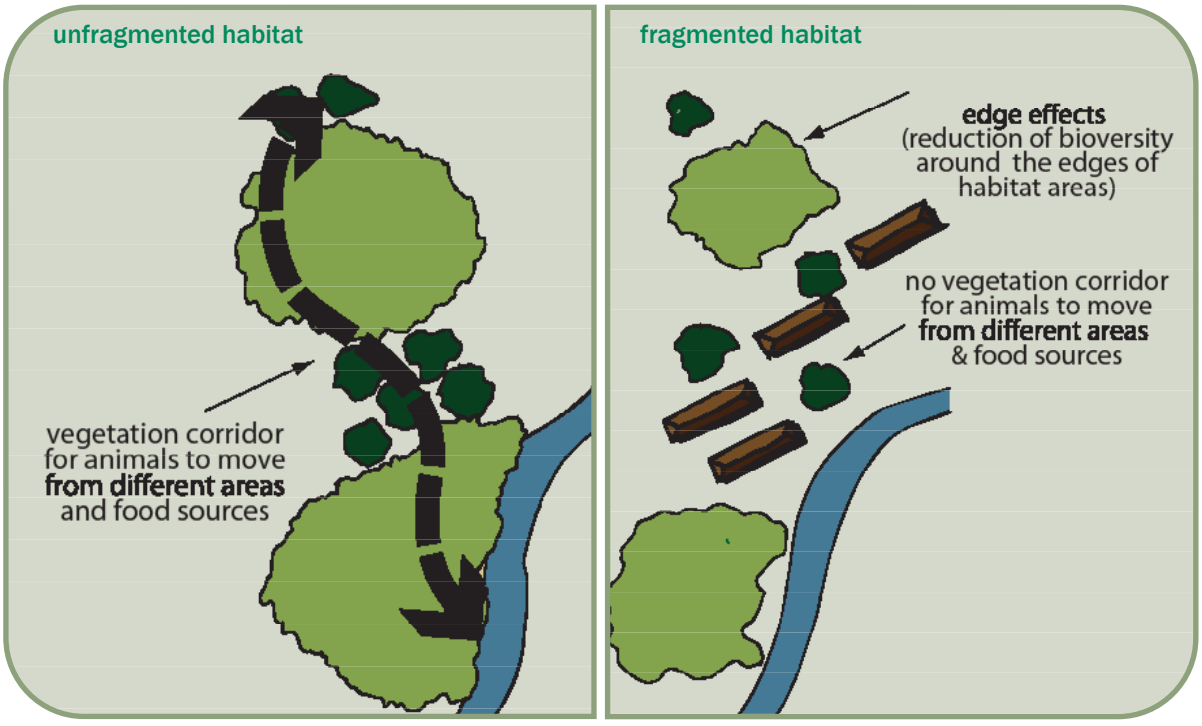
Such areas include the:

- coastal and beach area on the south of the island;
- vine forest vegetated hill slopes;
- continuous habitat to the rock-lined sandy coves and short stretches of beach along the shoreline rocky shoreline; and
- mangrove vegetation at the eastern end of the airstrip.

The main risk to continued health and diversity of local species is from continued fragmentation and disturbance of the existing habitat and the introduction of weeds and pests.

Figure 1 shows the effects of fragmentation on vegetation.

Figure 1 Vegetation Fragmentation



Weed and pest control is also required to protect the localised ecological health and community wellbeing (over-population of cats and stray dogs was reported to be problematic on the island). Control of these animals could be conducted through periodic culling of stray dogs and cats; as well as placing limits on the numbers of pets allowed to be kept by island residents.

3.1.4 Land Use Strategy

To minimise existing and future development on Iama's plants, animals and birds, the following strategy is recommended:

- Those areas that are of critical environmental significance, host rare and endangered species, are in pristine condition and corridors that provide for the safe movement and successful breeding of wildlife should be protected:
  - from development; and
  - with a buffer of peripheral plantings of dense tree species to minimise encroachment into adjacent areas.

3.1.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Plants, Animals and Birds Best Practice, Land Use Strategy and Sustainable Outcomes?
- Has the development addressed its impact on the natural environment of Iama?
- Has a minimum of 10 metres but up to 40 metres buffer been provided between the development and wading bird habitats and coastal vegetation (the buffer area should consist of coastal vegetation)?
- Is the development outside of areas identified for conservation particularly in areas such as mangrove forests or the south coast shoreline?
- Where new corridors are being created as part of a revegetation program do they:
  - have a minimum width of 50 metres;
  - link remnant areas of bushland habitat;
  - provide landscape connectivity;
  - propose to revegetate using seed collected from plants that are indigenous to the Island;
  - use plants grown from the area being revegetated;
  - introduce inappropriate non-indigenous plants into the natural areas; and
  - propose to control weed growth and remove areas of infestation?

- If development is being proposed in the village, or around existing infrastructure or in proposed investigation areas:
  - are buffers, a minimum of 50 metres wide being provided between the development and the area requiring protection;
  - does the proposed landscaping use plants native to lama;
  - will it introduce inappropriate plants into the natural areas; and
  - does it propose to control weed growth and eradicate areas of festation?

3.1.6 Land Use Projects

To minimise existing and future impact to lama plants, animals and birds, the following projects are recommended:

- Revegetate and restore the vegetation along the sewer line, including the establishment of other habitat corridors and linkages where opportunities exist.
- Revegetate around the perimeters of existing development, landfill, infrastructure, garden plots, wood collecting areas with densely landscaped peripheral plantings of native plants (including island feature species such as the Cardwell lily (*Proiphys amboinensis*) and the shrub - native honeysuckle (*Turraea pubescens*) be planted to minimise human encroachment into natural areas.
- Rejuvenate areas where there have been changes in landform, drainage patterns and nutrient levels and where these changes are having an adverse impact on neighbouring vegetation.
- Implement a cat and dog management plan.

3.1.7 Sustainable Plants, Animals and Bird Outcomes

- The unique environmental values of lama are maintained and enhanced for current and future generations.
- The ecologically significant systems, sensitive coastal systems, areas identified as rare, endangered or vulnerable or environmental value are preserved and protected for nature conservation, landscape/scenic quality, biodiversity and habitat values, to ensure the integrity of natural processes.
- Sustainable development practices minimise the effects of development on plants, animals and birds.
- Areas that have rare, endangered or vulnerable plants, animals and bird habitats should be protected from development.
- Intensification of land uses and new development sites should not reduce lama's plants, animals and birds.
- Encourage community participation in planning, restoring and protecting lama's natural environment.

3.1.8 Useful Resources

Legislation

Environmental Protection and Biodiversity Conservation Act 1999 (Cth) provides for the protection of the environment, particularly those areas of national significances, promotes the conservation of biodiversity and promotes a co-operative approach to the protection and management of the environment with Torres Strait Islanders.

www.comlaw.gov.au

Nature Conservation Act 1992 (Qld) provides a process to protect significant habitat areas and identify plants, animals and birds, which are rare, threatened or endangered and mechanisms to protect and conserve them.

www.legislation.qld.gov.au

Vegetation Management Act 1999 (Qld) deals with the management and conservation of remnant vegetation.

www.legislation.qld.gov.au

Policies, Guidelines and Fact Sheets

Biodiversity – on our agenda provides an overview of what is biodiversity and why it is important to conserve our plants, animals and birds

www.nrm.gov.au/publications/factsheets

National Strategy for the Conservation of Australia's Biodiversity outlines the processes and systems implemented by the federal government to protect biological diversity and maintain ecological processes.

www.environment.gov.au/biodiversity/publications/strategy

Queensland Biodiversity Policy Framework: sustaining our national wealth outlines the State government's approach to nature conservation, environmental protection and responsible land use planning to secure favourable environmental, economic and social outcomes.

www.epa.qld.gov.au/publications

Websites

Caring for our Country

www.nrm.gov.au

Environmental Protection Agency

www.nrw.qld.gov.au

3.2 Coastline

3.2.1 Best Practice

- The natural dynamic processes that shape the coast and beaches are respected.
- Maintain and enhance connectivity between marine and coastal habitat to ensure the healthy function of the coastal zone and marine environments.
- Coastal resources are used sustainably and sensibly.
- The Community's dependence on coastal resources for hunting and fishing is respected and integrated into the planning and management of the coastal zone.
- The ecological and cultural importance of the coastal zone is not compromised by inappropriate development and activities.
- Development within the coastal zone is managed in accordance with the principles of ecologically sustainable development and does not compromise access to the coastal zone.
- Reduce impacts of climate change on the coastline by:
  - recognising the importance of climate change on the coast;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the island's coastline.

3.2.2 Overview of Current Situation

Iama's coastline has largely been undeveloped and is in relatively pristine condition, apart from around the village.

The Iama village has a strong coastal focus, with the village concentrated along the western coastline of the island, including temporary development along the Sand Spit.

The planning and management of the coastal and marine environment of Iama is shared between the Commonwealth and State government and its agencies, the TSIRC and Traditional Owners. The Commonwealth government is responsible for waters beyond three nautical miles from low water mark of Iama coastline.

Inside the three nautical mile limit and for coastal land, the State government exercises control of activities including licensing of waste disposal, protection of rare and endangered flora and fauna, oil pollution, mineral exploration and exploitation, water quality, marine navigation and provision of boating facilities.

The TSIRC is responsible for land above low tide watermark.

3.2.3 Issues Overview

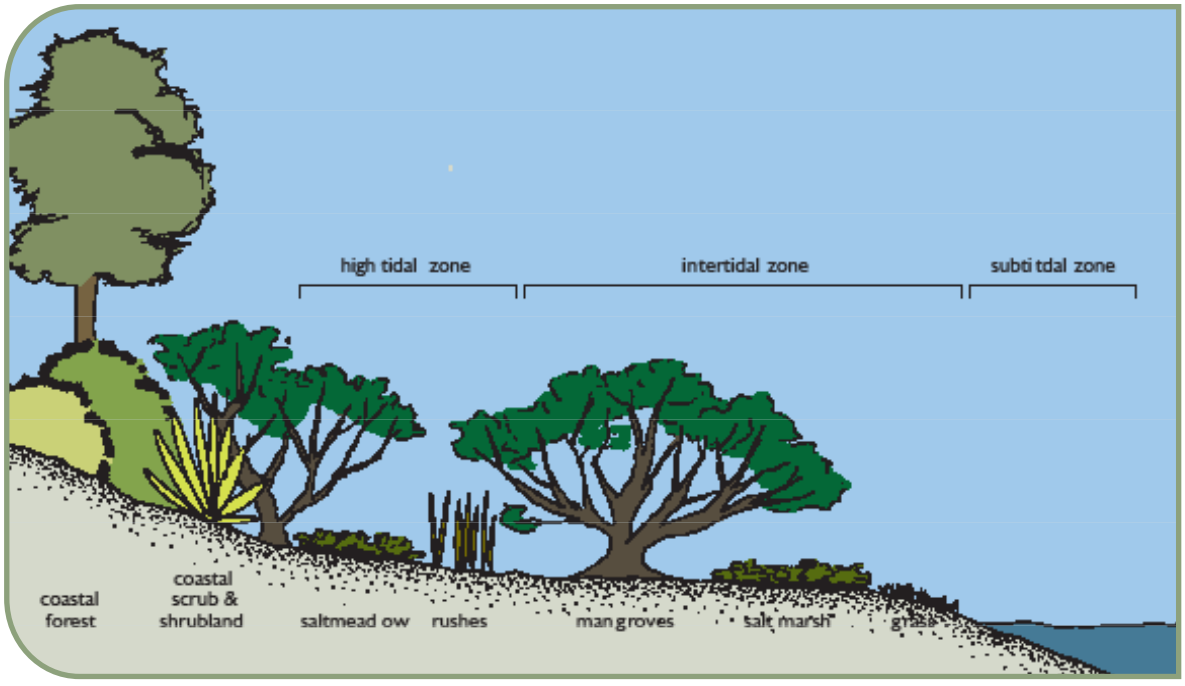
The primary consideration for Iama coastline is the conservation and protection of its coastal environments, which are subjected to urban pressure, increasing weeds and pest infestation, recreational use and the expansion of the village along the coast. The coastal expansion of the village could have a harmful impact on the existing landscape character of Iama. The protection of the pristine natural environment along Iama's coastline should be addressed in all planning documents and processes relating to Iama.

New development or changes to existing structures along the coast must be assessed for the long term suitability of the site, the vulnerability to natural coastal processes (coastal erosion, storm events and projected sea level rises). When constructing, upgrading or maintaining coastal infrastructure, there must be an increasing focus on the principles of ecologically sustainable development to ensure that the values and the attributes of the coastline are not compromised by inappropriate use and development of the environment.

Land use planning can only make good decisions if the best information is available and is understood and supported by Community. For example, Community believe that the rock wall along the Sand Spit and the large rock pile near the barge ramp are affecting the deposition of sand along the beaches and sea currents. The involvement of Community in the decision making process is essential for the successful implementation of any land use strategy.

Figure 2 shows all the different areas of the coastline, which form the 'coastal zone'.

Figure 2 The Coastal Zone



"Beaches are often referred to as the sandy area that separates the sea from the land. However, this area is only part of the beach system which beings in the sand dunes above the high water mark and stretches out to the sea past where the waves break.

3.2.4 Land Use Strategies

To minimise existing and future development on the coastline of Iama and the impacts of natural hazards, the following strategies are recommended:

- Not permit urban development and infrastructure along the northern and southern coasts of Iama, inaccessible parts of the coast and the Sand Spit.
- New development is contained with the village and the identified investigation areas.
- No new development is to occur in the Sand Spit.
- Families living on the Sand Spit are to be relocated to permanent houses in the village or if appropriate, the identified investigation areas at such time as, they are developed. After the relocation of a family, the structure is to be demolished and the area returned to its natural state.
- All development proposals must:
  - include landscaping and/or revegetation plans that are in accordance with the Best Practice, Land Use Strategies and Sustainable Outcomes in Section 3.1 Animals, Plants and Birds;
  - be developed in an ecologically sustainable manner;
  - maintain or improve the values of coastal wetland, estuaries, inlets, riverine corridors, dunes, shorelines, high scenic qualities and retain visual continuity; and
  - address the proposals vulnerability to natural coastal processes (coastal recession, storm events and projected sea level rises).

"In areas where beaches occur, vegetation sand dunes provide coastal protection. Sand dunes absorb the erosive energy of waves generated by cyclones and storms. Dunes also hold reservoirs of sand to replenish the beach during periods of wave erosion. Vegetation on the dunes trap and hold sand blown from the beach aiding dune build up and stopping sand from being blown inland and lost from the active beach and dune system"

3.2.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Coastline Best Practice, Land Use Strategies and Sustainable Outcomes?
- Is the development in the village? If so, does it:
  - complement existing and multiple-use of suitable sites;
  - reflect and enhance the coastal character of the village and surrounding areas;
  - incorporate ecologically sustainable design;
  - maintain or improve the values of the coastline, the high scenic qualities and visual continuity;
  - address the proposal's vulnerability to natural coastal processes (coastal recession, storm events and projected sea level rises;
  - address the impact of the proposal on water resources, environmental and social needs and infrastructure and population capacity; and
  - identify and protect important coastal assets of ecological, visual and cultural significance?

3.2.6 Sustainable Coastline Outcomes

- Protect and maintain Iama's coast, including the foreshore, coastal wetlands, dunes, marine ecosystems, coastal marine waters and areas of geological and geomorphological, cultural and historic significance.
- Coordinate the management and use of natural marine resources to enhance community, economic and environmental values.
- Land adjoining coasts and beaches are for community purposes.
- An integrated approach and application of best practice to catchment and coastal management, waterways and wetlands is utilised to provide for environmental flow and the highest quality of water within Iama's inland waters, estuaries and the sea.
- Community is involved in the protection and management of the coastline to ensure the protection of their cultural heritage.

3.2.7 Useful Resources

Legislation

Coastal Protection and Management Act 1995 (Qld) provides for the protection, conservation, rehabilitation and management of the coast including resources and biological diversity.

www.legislation.qld.gov.au

Policies, Guidelines and Fact Sheets

Marine Debris Factsheet outlines the cause and potential aims of marine based pollution and debris.

www.amcs.org.au

Marine Pollution Factsheet outlines the causes and potential aims of marine based pollution and debris.

www.amcs.org.au

State Coastal Management Plan: Queensland's coastal policy outlines the State government policies for the protection and management of Queensland coastal resources.

www.epa.qld.gov.au

Websites

Environmental Protection Agency

www.epa.qld.gov.au

Australian Maritime Conservation Society

www.amcs.org.au

CoastCare

www.coastcare.com.au

OzCoasts

www.ozcoasts.org.au

3.3 Tides & Storm Surge

3.3.1 Best Practice

- Natural dynamic processes that shape the coastline are respected.
- Reduce community risk, exposure and damage to the adverse impacts of natural hazards such as tides and storm surges by planning coastal use and development to ensure that significant adverse effects of tides and storm surges are avoided, mitigated or remedied.
- The impacts of tide inundation and storm surge are reduced by limiting development along the coast.
- Where development cannot be avoided in areas identified as affected by tides and storm surges, it is to be undertaken in a manner that minimises impacts.
- Reduce the vulnerability of Iama to the impacts of climate change by:
  - recognising the importance of climate change on the sea and land environments of Iama;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the tide and storm surge levels.

3.3.2 Overview of Current Situation

Due to the geographic location of the Torres Strait, the region is vulnerable to tropical cyclones and storms. The tropical cyclone and storm impacts on Community are exacerbated by poorly developed coastal infrastructure, inappropriate development along coastlines, lack of scientific research and housing design.

A James Cook University study in 2007/08 investigated the tide levels of Iama. Table 1 shows the finding of this study is regard to predicted tide levels.

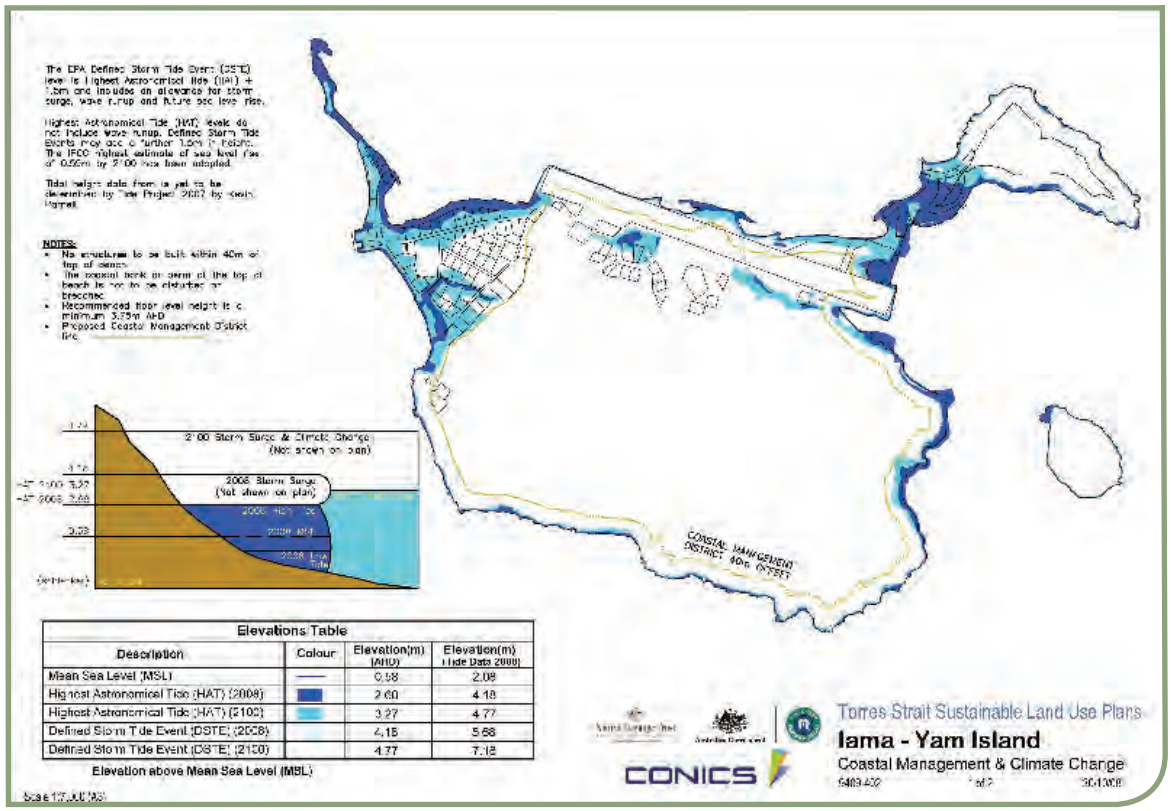
Maps 8 & 9 shows the impact of coastal inundation and sea level rise.

Table 1 Predicted Tide Levels

Tide Description	Australian Height datum	Tide Data
Mean sea Level (MSL)	0.58 AHD	2.8
Highest Astronomical Tide (HAT)	2.68 AHD	4.18

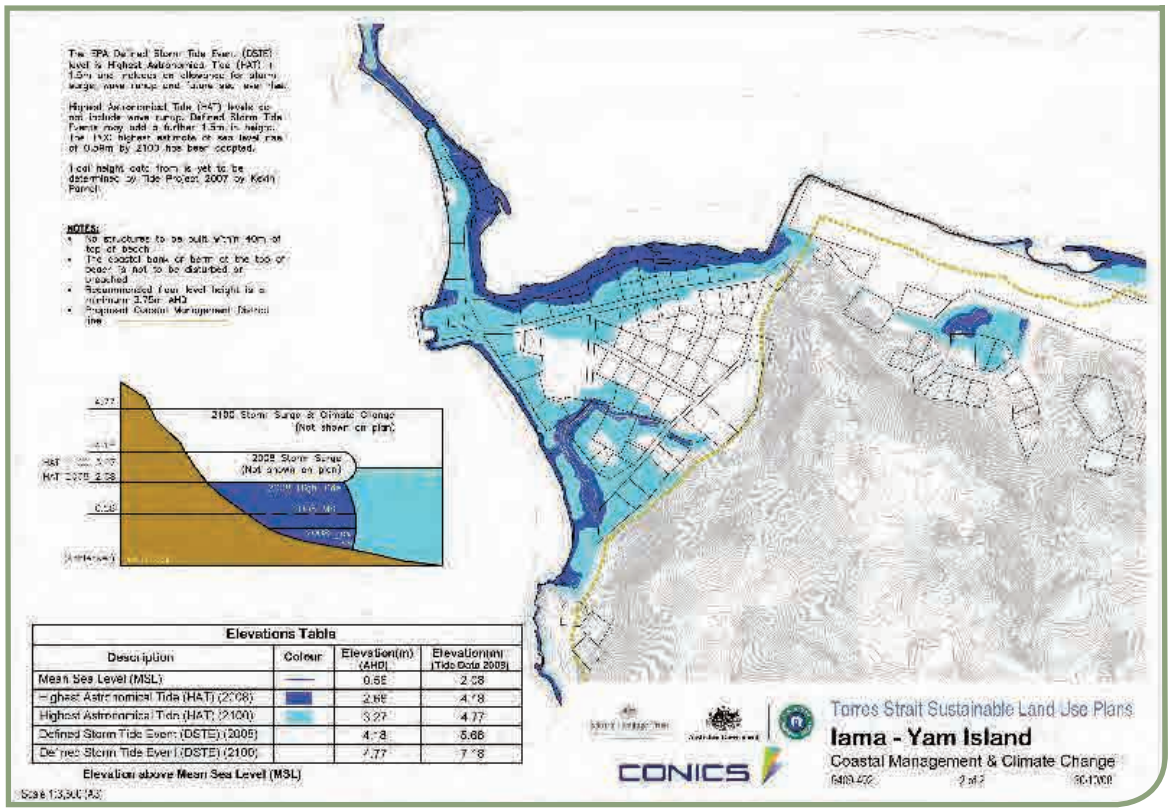
Source: Parnell & Smith, 1997.

Map 8 Coastal Management and Climate Change



For more detail, refer to Map No. 9409-402 contained in Volume 3 – Maps.

Map 9 Coastal Management and Climate Change (Iama Village)



For more detail, refer to Map No. 9409-402 contained in Volume 3 – Maps.

3.3.3 Issues Overview

The Intergovernmental Panel on Climate Change has projected sea levels to rise by the end of the twenty first century between 0.26 and 0.59 metres. The values predicting sea level rises are constantly being assessed, with some scientists advising of a further 0.2 metres be added to allow for melting ice caps. This would mean a total increase of 0.79 metres by 2100.

The sea level rise relates to a global worldwide average sea level rise and has been used, as there are no actual sea level predictions specifically for the Torres Strait. For this reason, this Plan has adopted a possible increase in sea level rise of 0.59 metres by 2100.

The adopted 0.59 metres should be revised at regular intervals to consider the current scientific consensus on sea level rise, as the impacts of sea level rising has a dramatic effect on Torres Strait communities. This is particularly important for the design and construction of infrastructure on the islands (such as sea walls, house slabs and desalination plants)

Figure 3 shows how storm surges impact on the village.

Figure 4 shows how with rising sea levels, storm surges will further impact on the village.

Map 8 & 9 shows the impact of coastal inundation and sea level rise.

Figure 3 Storm Surge Area

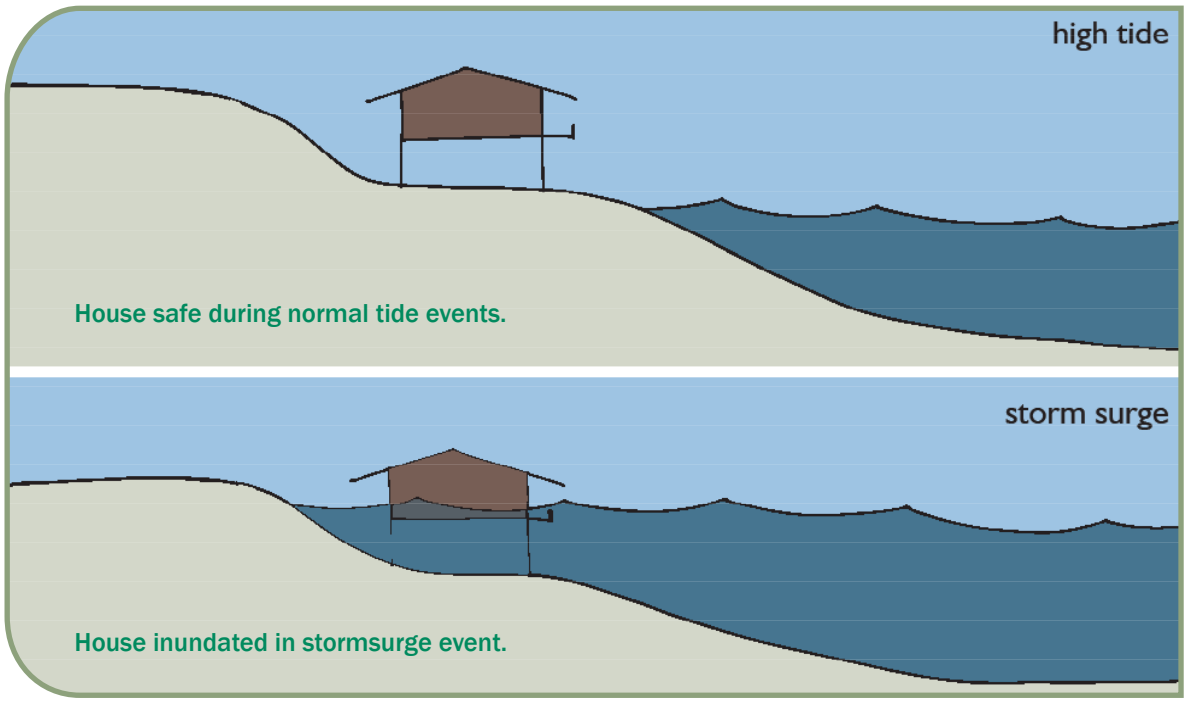
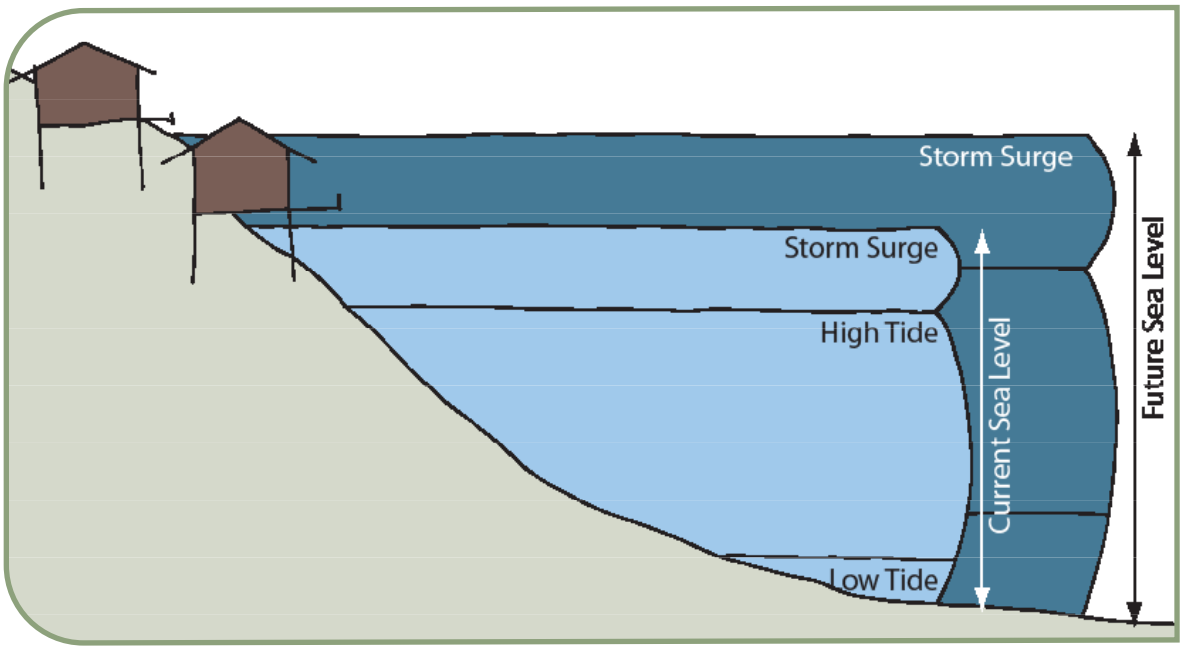


Figure 4 Climate Change & Sea Level Rise



For this reason, designs for new houses or modifications to existing houses should incorporate mitigation measures that include a "refuge area" designed to withstand possible storm surge and tidal inundation in extreme events. This can be easily incorporated into existing designs by amending the walls of the existing ground floor toilet area from weatherboards to reinforced masonry/concrete walls that extend from the concrete slab to the upper ceiling of the first floor. These areas can contain toilet or laundry facilities downstairs and bathroom/toilet areas on the first floor. Ideally, access stairs should be located next to this core "refuge" area.

The Coastal Planning for Adaptation to Global Climate Change identified physical impacts that include:

- submergence of low-lying wetland and dry land areas;
- erosion of soft shores by increasing offshore loss of sediment (e.g. beaches);
- increased salinity of estuaries and aquifers;
- rising coastal water tables;
- increased and more severe coastal flooding and storm damage.

Source: Feb 2007 Iama Community Council

Iama coastal ecosystems and fringe landforms — among them, mangroves, wetlands, coastal flood plains, forests, dunes, berms serve as natural shock absorbers for protecting coastal infrastructure and land uses against tropical storms; they also provide critical storage capacities for storm surges and floodwaters. When the functioning of these coastal and fringe systems is threatened and damaged Iama's coastal and urban areas are vulnerable. Action needs to be taken to conserve and enhance the ecological and human resilience to the sea level rise and storm surges through effective land use planning. However, there are no land-use planning and design guidelines in the Torres Strait to provide incentives for developers and their architects to recognise or accommodate vulnerability to climate variability and change.

For Iama, this includes a combination of strategies that are addressed in are addressed in Section 3.3.4.

Source: Feb 2007 Iama Community Council

3.3.4 Land Use Strategies

The first strategy is to encourage Community to move from the low-lying coastal floodplains and high hazard areas. The move, to be in line with State government coastal planning must be beyond a 40-metre setback. Over time, the area within the setback would be used for general community purposes. This strategy would result in development and infrastructure being setback 40 metres from the top of the beach to provide a buffer between the shoreline and the village, to minimise the impacts of tide inundation and storm surge.

However, in some Torres Strait communities, development anywhere on an island may impact on the coastal environment and in these cases, the entire island should be designated as 'Coastal Management District'.

On Iama, moving away from sea level rises and storm surges may not be an all-inclusive option due to a lack of suitable land for development, therefore a combination of strategies is required.

These include but not limited to:

- The village area to the foot of the hills behind the school to be designated as a Coastal Management District.

- Not encouraging in areas identified as affected by tides and storm surges
  - temporary buildings such as converted sheds
  - structures used for the manufacture or storage of hazardous materials
  - community infrastructure development such as shops or halls
  - an increase in the number of people living, working or congregating
  - an intensification of uses or works that are likely to increase the adverse impacts of tides and storm surges.

2 (including the photogrammetry by Schlenker, 1998)

- Converting the Sand Spit to a natural environment (see Section 3.2.4 'Land Use Strategies' for more information).

- Encouraging development not to affect the physical coastal processes in ways that result in the:
  - erosion of adjacent coastal areas
  - interference with the flow of water
  - alteration of existing water flows
  - damages conditions for existing coastal vegetation.

- Sea walls, however this requires a study to assess the impact on beach sand dynamics and is heavily capital intensive and expensive.

- The management and reduction of greenhouse gas emissions (mitigation) through the changing of Community awareness, knowledge and changing of behaviour.

- House designs for new or modifications to existing houses should incorporate mitigation measures that include:
  - a 'refuge area' which is built on concrete slab and includes reinforced masonry/concrete walls from the ground to the upper ceiling
  - a 'strengthen area' that is generally a bathroom/ toilet or laundry/ toilet
  - an upper living area floor
  - habitable floor levels a minimum of 3.75 metres AHD
  - mechanical and electrical works (e.g. pump stations) are above predicted 2100 HAT.

- The sea levels should be reviewed in 10 years to take into account the most current predictions.

3.3.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Tides and Storm Surge Best Practice, Land Use Strategies and Sustainable Outcomes?
- Is the development consistent with local and regional climate change response strategies?
- Where the development is proposed in an area identified as affected by tides and storm surges, is it:
  - accompanied by a detailed hydraulic study,
  - designed to resist water forces as a result of inundation,
  - designed to incorporate any recent sea level rise research that changes the current predicted se level rise of 0.59 metres
  - designed to prevent the intrusion of floodwaters as a result of inundation?

- Does the development affect counter disaster operations?

Source: Feb 2007 Iama Community Council

3.3.6 Land Use Projects

To protect the environments on Iama, a regular review of scientific data on predicted sea level rises is required. It is recommended that an investigation into the predicted sea level rise due to climate change should be undertaken specifically for the Torres Strait region. This investigation would provide information that is more relevant rather than the current adopted global value of 0.59 metres.

3.3.7 Sustainable Outcomes for Areas affected by Tides and Storm Surge

- Coastal use and development is planned and managed to ensure that significant adverse effects of tidal inundation and storm surges on the natural and man made environments are avoided, mitigated or remedied.
- Development and use of the coast is to maintain and, where possible, enhance the quality of life for residents and visitors by avoiding areas identified as being adversely affected by tidal inundation and storm surges.
- Community determine the level of storm tide risk they are willing to accept.

3.3.8 Useful Resources

Legislation

Coastal Protection and Management Act 1995 (Qld) provides for the protection, conservation, rehabilitation and management of the coast including resources and biological diversity.

www.legislation.qld.gov.au

Policies, Guidelines and Fact Sheets

Mitigating the Adverse Impacts of Storm Tide Inundation provides advice and information on the interpretation and implementation of the Coastal Hazard Policy of the State Coastal Management Policy.

www.epa.qld.gov.au/publications

2006 King Tides in the Torres Strait Factsheet gives an overview of king tides in the Torres Strait 2006 and how the Environmental Protection Agency (EPA) uses this information is king tide predictions for the rest of the State.

www.epa.qld.gov.au/publications

Queensland Storm Tide Information Resource Factsheet provides an overview of the Queensland Storm Tide Information Resource, which seeks to compile and consolidate all available storm tide information in Queensland into a single, stand-alone and portable resource.

www.epa.qld.gov.au/publications

Preparation of a Shoreline Erosion Management Plan Guideline provide advice to local governments in preparation a Shoreline Erosion Management Plan to proactively plan for erosion management in erosion hotspot areas.

www.epa.qld.gov.au/publications

Websites

Environmental Protection Agency

www.epa.qld.gov.au

National Tidal Centre

www.bom.gov.au

OzCoasts

www.ozcoasts.org.au

3.4 Waterways and Wetlands

3.4.1 Best Practice

- Natural waterways, wetlands, catchments and associated natural dynamic processes that shape them are respected, managed to protect the ecological processes, enhance the water quality, conserve riparian ecological values and landscape quality, while acknowledging nature based recreation opportunities.
- The quality of all water sources are protected and, wherever possible, enhanced.
- The ecological and cultural importance of waterways and wetlands and their sources are not compromised by inappropriate development and activities.
- Maintain and enhance riparian corridors and buffers to ensure the healthy function of the riparian zone of waterways and wetlands.
- Reduce the vulnerability of lama to the impacts of climate change by:
  - recognising the importance of climate change on the waterways and wetlands environments of lama;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on lama's waterways and wetlands.

3.4.2 Overview of Current Situation

On lama, small networks of watercourses exist. The watercourses flow intermittently, with peak flows occurring during the wet season months to, not at all, during the drier months when rainfall reaches it's minimum.

In the past, drainage channels for water management in association with cultivated terrace gardens have been built on elevated sections of lama. These artificial features, many of which are now derelict and overgrown by vine forest, serve a similar function to natural watercourses. Their protective cover, often similar to naturally formed watercourses on the island, also mean that they act as pathways for ground-dwelling wildlife movement.

The ecological services that the natural and artificial watercourses contribute to landscape processes, whether conspicuous surface features or partially underground, are crucial to the long-term environmental health of the island.

Permanent pools of still, brackish water are present at the base of the foothills with the interface with mangrove vegetation just to the south of the eastern tip of the airstrip. These pools, lined with large granite boulders are periodically flushed during very high tide events. They are a focal point for a range of birds and reptiles.

There is also a lagoon north of the Sand Spit. This lagoon has been identified in the Natural Solutions Report as an important habitat for wader birds. This lagoon is under immediate threat from the encroachment of urban development.

Map 6 shows the significant watercourse and habitat areas.

"A waterway can be a creek, brook, river or stream and include a lake, estuary or inlet at its base. Waterways also include floodplains and wetland systems that overflow into rivers, as well as any lakes or swamps that are filled by streams rather than shallow groundwater"

3.4.3 Issues Overview

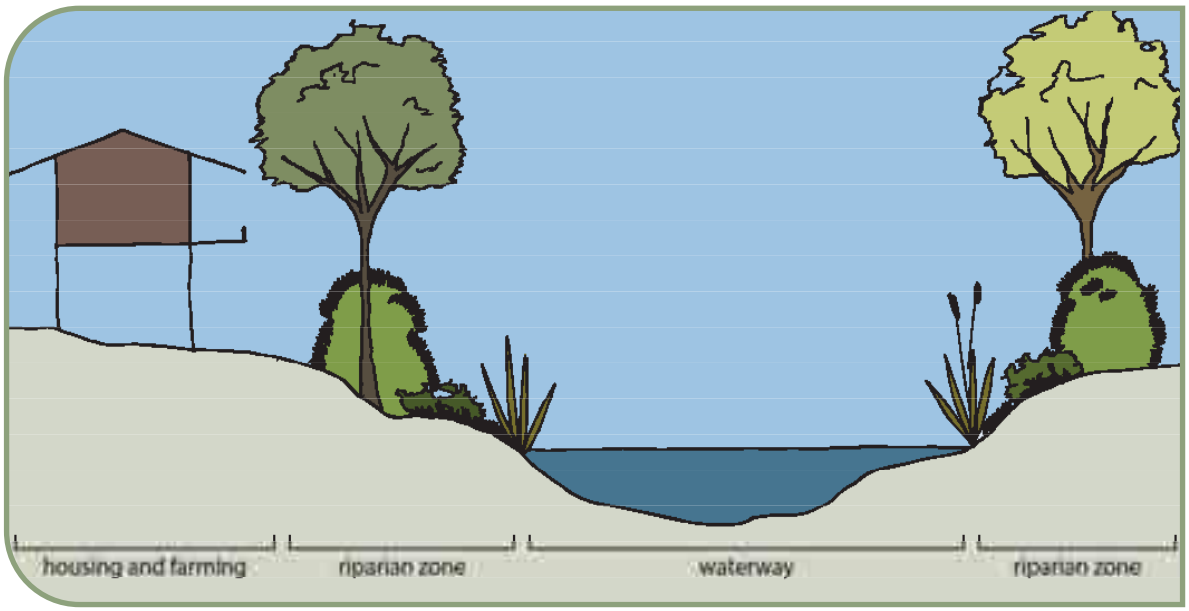
Waterways, wetlands, associated floodplains and riparian areas support a range of natural and economic functions, including habitat for land and sea wildlife, nursery grounds for creek and bay fisheries, potable water supplies, stormwater conveyance and provision of sand for building materials, ecological linkages, scenic amenity and recreational opportunities. In some cases, though not a common occurrence on Iama, waterways often provide the only ecological linkages and wildlife corridors remaining in developed and non developed areas.

Land use activities are changing Iama's waterways, wetlands and riparian areas. These changes include the loss and degradation of riparian vegetation, increased nutrient levels, reduction in environmental flow and destructive increases in peak flows. Wherever possible, particularly in areas of high conservation value, development should not be encouraged. Rehabilitating degraded waterways, wetlands and riparian areas should be undertaken to restore natural ecological functions.

Inefficient water use is a continuing problem on Iama due to the transient nature of the waterways and wetlands. As a result, an over-exploitation of groundwater resources will affect those wetlands fed from these sources. Any new or intensification of existing land uses on Iama should not utilise groundwater resources.

Figure 5 shows how if buffer areas are left between waterways and wetlands, it provides protection to the waterways and wetlands from the impacts of development.

Figure 5 Waterway & Wetland Buffer



3.4.4 Land Use Strategies

To minimise existing and future development impacts on Iama's waterways and wetlands the following strategies are recommended:

- All development proposals must:
  - include landscaping and/or revegetation plans that are in accordance the Best Practice, Land Use Strategies and Sustainable Outcomes of Section 3.1 Plants, Animals and Birds;
  - be ecologically sustainable development;
  - maintain or improve the values of coastal wetland, estuaries, inlets, riverine corridors, dunes, shorelines, high scenic qualities and retain visual continuity;
  - address the proposals vulnerability to natural coastal processes (coastal recession, storm events and projected sea level rises); and
  - where adjacent to a degraded riparian corridor, include rehabilitation plans for the corridor.

- Development controls based on the assessed risk for developments near waters and wetlands include controls on minimum elevations, setbacks and lot sizes, as well as maximum densities and site coverage.

- Development is not encouraged:
  - at the head waters of waterways and wetlands;
  - where it has detrimental impact on natural flow regimes and quality water systems;
  - in areas within 40 metres of waterways and wetlands to provide a buffer between riparian areas and development; and
  - to utilise groundwater resources.

"Wetlands are predominately areas that are permanently, seasonally or intermittently waterlogged or inundated with water that may be fresh, saline, flowing or static. Seasonal wetlands, particularly seasonal waterlogged wetlands, often have a higher plant and animal species richness that permanent wetlands."

3.4.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Waterways and Wetlands Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development:
  - protect water supply catchments and significant underground waterways;
  - retain vegetation cover to assist in maintaining an enhancing water quality;
  - maintain the absorptive capacity of soils;
  - maintain existing waterways and wetlands as a means of absorbing peak flows from floods or the effects of cyclones and storm surge; and
  - implement management practices during and after development to protect waterways and wetlands?

3.4.6 Sustainable Waterways and Wetland Outcomes

- Protect and where possible, restore catchments, waterways, water bodies, groundwater, water quality and dependent ecosystems such as marine environments while maintaining the economic and social values derived from water use.
- Development should not diminish the quality or quantity of water in groundwater systems, watercourses, nor should it diminish the volume of water flows in watercourses or wetlands.
- Water on Iama is managed in a sustainable and integrated manner to provide adequate supplies for human and environmental uses.

"A catchment area or basin is land which is bounded by natural features such as hills or mountains from which all runoff water flows to a low point. This low point will be a dam, a location in a river or the mouth of a river where the water enters the ocean."

3.4.8 Useful Resources

Policies, Guidelines and Fact Sheets

Catchment and Water Quality provides an overview of the link between the health of a water catchment and water quality.

www.nrw.qld.gov.au/factsheets

Gully Erosion gives an overview of what is gully erosion and what we can do to minimise its impacts.

www.nrw.qld.gov.au/factsheets

How Healthy is your Waterway? Assessing stream bank vegetation describes how to find out if your waterways are healthy by ensuring a well vegetated riparian zone in order to minimise the impacts of erosion on water quality

www.nrw.qld.gov.au/factsheets

Overland Flow Water provides an overview of what is overland flow water and why it is important to manage overland flow.

www.nrw.qld.gov.au/factsheets

Strategic Plan for the Conservation and Management of Queensland's Wetlands sets out the State government's intent for the conservation, values and functions of wetlands.

www.epa.qld.gov.au/publications

Streambank Planting Guidelines and Hints describes what type of vegetation you should plant in riparian zones and where to plant it.

www.nrw.qld.gov.au/factsheets

Streambank Vegetation is Valuable provides an overview of why we need vegetation riparian zones along our watercourses.

www.nrw.qld.gov.au/factsheets

The Hydrological Cycle described the water cycle, both above, on and below the earth's surface.

www.nrw.qld.gov.au/factsheets

The Value of Wetlands talks about the role of wetlands in nature conservation.

www.wetlandcare.com.au/fact_sheets.asp

What, Why and How Wetlands Works provides an introduction to the important role that wetlands play and why we should protect them.

www.wetlandcare.com.au/fact_sheets.asp

What is Bank Erosion talks about what is bank erosion and how it is caused.

www.nrw.qld.gov.au/factsheets

Websites

Department of Natural Resources and Water

www.nrw.qld.gov.au

Environmental Protection Agency

www.epa.qld.gov.au

WetlandCare Australia

www.wetlandcare.com.au

3.5 Land and Soil

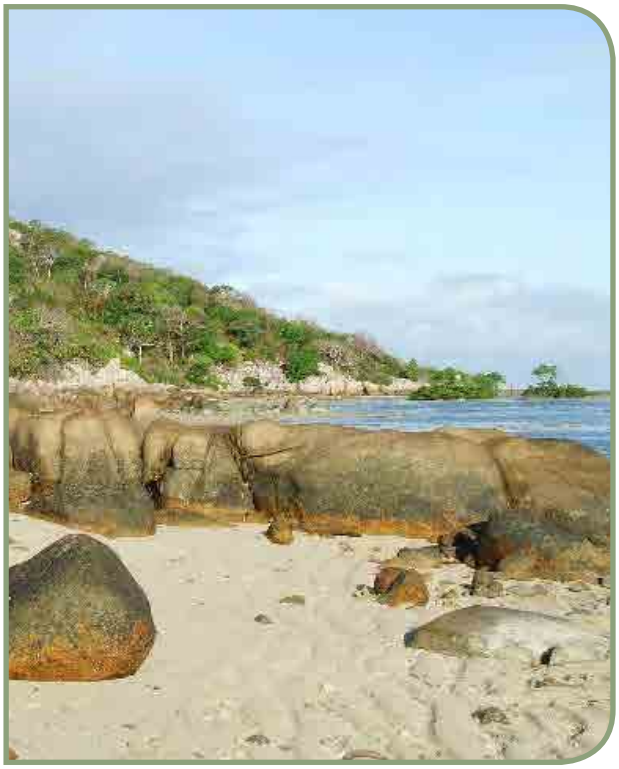
3.5.1 Best Practice

- Minimise the impact of salinity and rising water tables on land uses, buildings and infrastructure by minimising land and soil disturbance.
- The management of the land and soil will be designed to work with nature rather than against nature and integrated with sea planning and management to ensure the negative impacts of human actions (e.g. development, vegetation clearing) on plants, animals and birds is minimised or avoided.
- Reduce the vulnerability of Iama to the impacts of climate change by:
  - recognising the importance of climate change on Iama's land, soil and slopes;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Iama's land, soils and slopes.

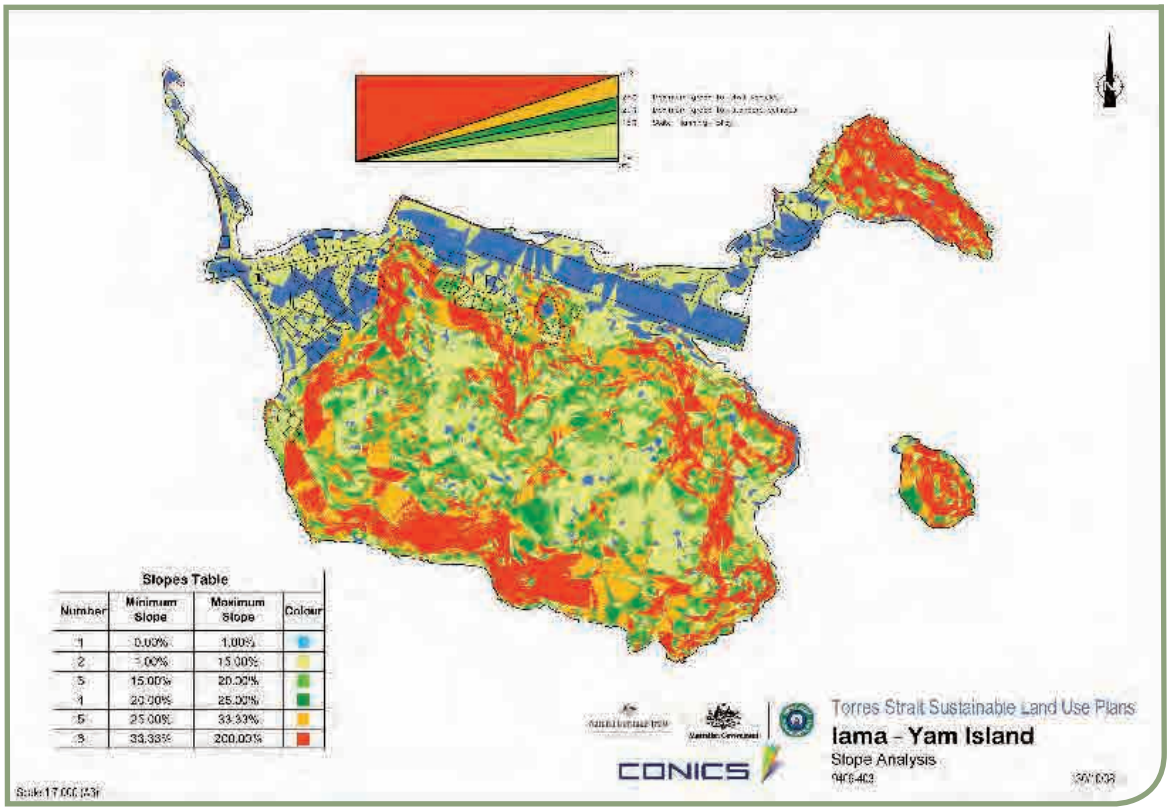
3.5.2 Overview of Current Situation

The topography of Iama is a mixture of hilly, undulating and flat land. The hilly areas have slopes between 10% and 30% with many covered by vine forest habitats which have been identified as areas to be preserved. The extensive vegetation cover has meant that land erosion is not major issue on Iama. However, if vegetation is cleared for development or garden plots, then the potential for land erosion to occur is high due to slopes and loss of vegetation.

Map 10 shows the level of degree of the slopes of Iama.



Map 10 Slope Analysis

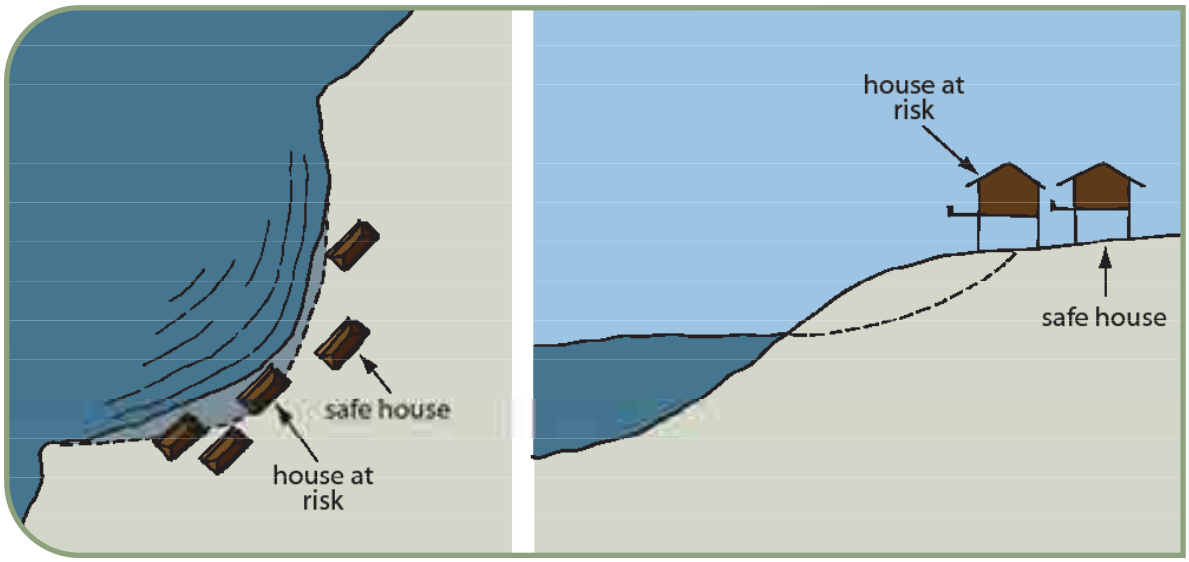


For more detail, refer to Map No. 9409-403 contained in Volume 3 – Maps.

The flat coastal fringes are subject to coastal erosion due to natural forces, development and increasing tide levels. However, these areas provide a buffer between the inland areas and the coast, which allows for the natural variations of the coast to occur without the need to intervention to protect human life and property. The existing urban area particularly along the Sand Spit is an area where development is affecting the natural processes. Community believe that the man made rock outcrop near the barge ramp has changed the water currents and therefore the natural deposition of sand and coastal erosion.

Figure 6 shows where the 'coastal erosion zone' can occur when there is no seawall.

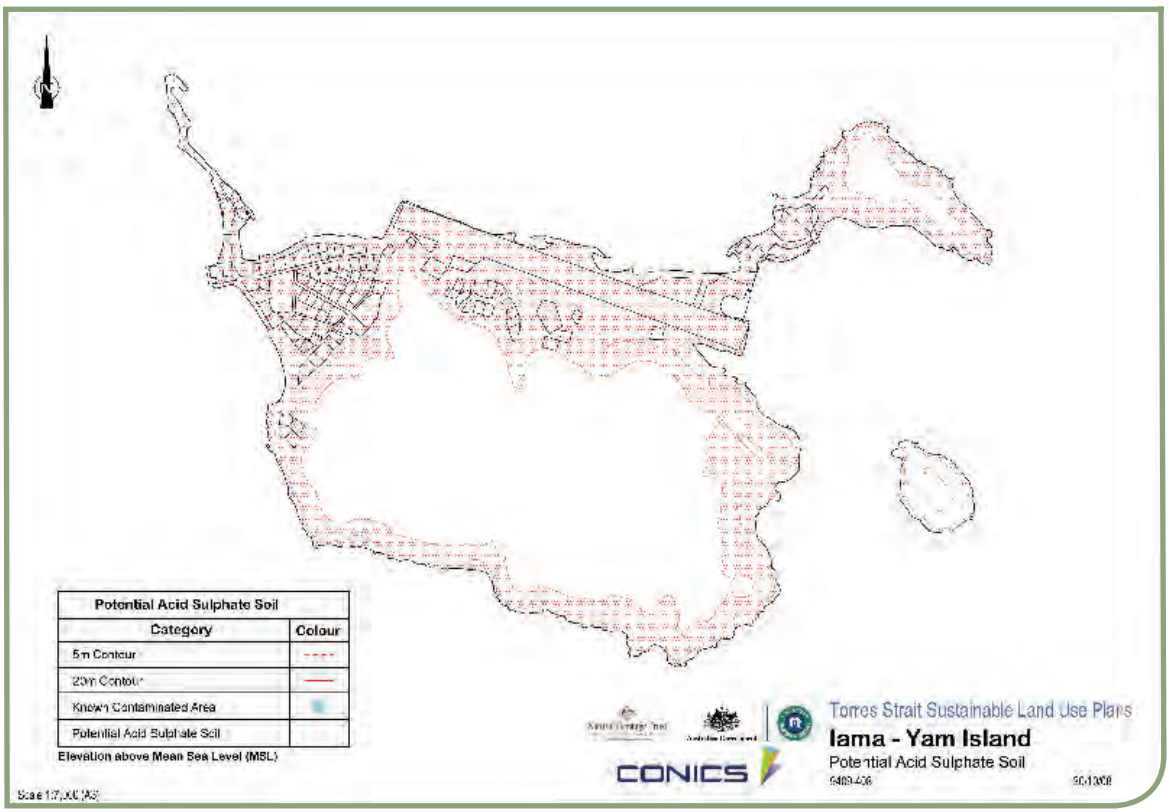
Figure 6 Coastal Erosion



There is a lack of data available on soil types on Iama. However, as Iama is below the 5 metres AHD, there is the potential for acid sulfate soils to be present.

Map 11 shows the potential location of acid sulfate soils.

Map 11 Potential Acid Sulfate Soils



For more detail, refer to Map No. 9409-408 contained in Volume 3 – Maps.

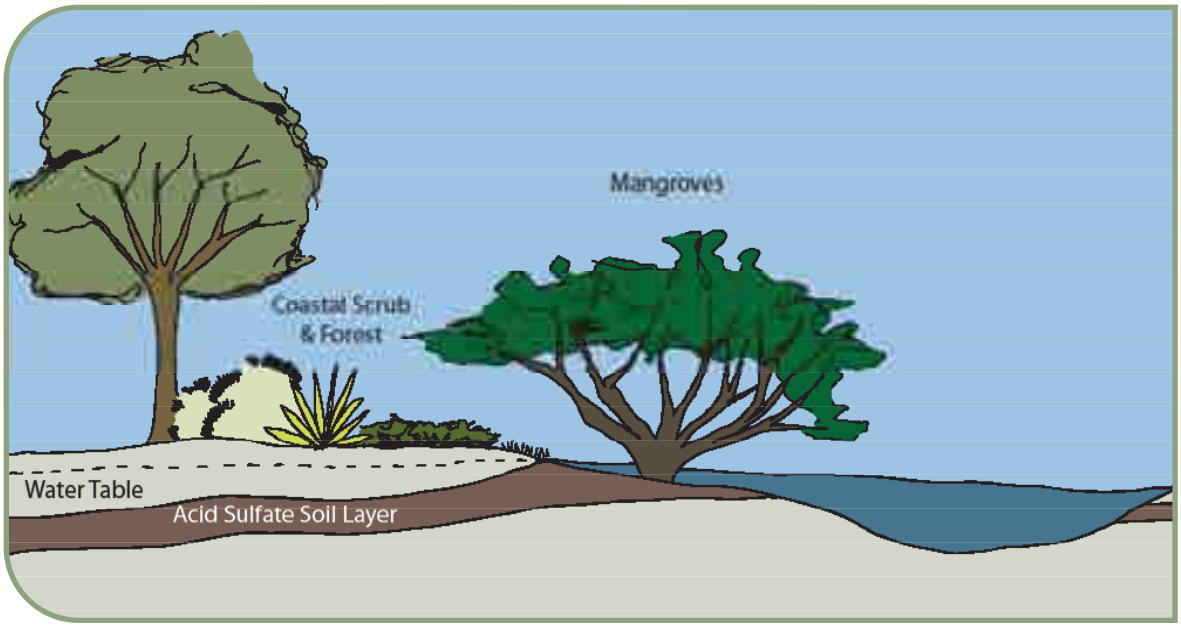
"acid sulfate soils are naturally occurring soils and sediment containing iron sulfides, most commonly pyrite. When acid sulfate soils are exposed to air, the iron sulfides in the soil react with oxygen and water to produce a variety of iron compounds and sulphuric acid. Initially a chemical reaction, the process is accelerated by soil bacteria. The resulting acid sulfate soils can release other substances, including heavy metals, from the soil and into the surrounding environment"

Acid sulfate soils can result in the corrosion of concrete, steel and some aluminium alloys used in buildings, drainage systems and roads. The use of acid sulfate soil material as site fill material or in embankments can affect plant growth and block pope drainage systems due to the formation of iron oxides. Acid waters entering estuarine, coastal or riverine environments can kill fish and crustaceans and affect aquatic plants through direct acid exposure.

The presence of acid sulfate soil material produces an offensive odour, which smells like rotten eggs.

Figure 7 shows where acid sulfate soils are located within the soil layers.

Figure 7 Acid Sulfate Soils



3.5.3 Issues Overview

Iama's landform constrains any significant expansion of the existing urban area in all directions except on the lower slopes adjoining the airstrip. Land use planning should promote development to complement the existing landform.

Given that much of the village and associated community facilities and infrastructure are located on the Iama's lower lying areas, there is the potential for acid sulphate soils to be exposed. Exposed acid sulfate soils can result in environmental harm such as fish kills and corrode infrastructure such as water and sewer pipes as well as building foundations.

Land erosion usually occurs where vegetation has been cleared. Whilst this has not been a significant issue on Iama, the need to expand the existing urban areas makes it a potential issue. New development near the airstrip may occur on vegetated slopes and the potential for land erosion and subsequent runoff needs to be effectively managed or be avoided.

3.5.4 Land Use Strategies

To minimise existing and future development on Iama land and soil, the following strategies are recommended:

- All development should include landscaping and/or revegetation plans that are in accordance with the Best Practice, Land Use Strategies and Sustainable Outcomes of Section 3.1 Plants, Animals and Birds.
- Limit development encroachment on slopes covered by vine forest habitats.
- Adequate services and access must be provided where development is located on steep slopes.
- Roads and driveways must take advantage and complement the existing landform and vegetation.
- Building on slopes is to minimise excavation/ cut and fills works.
- Where development is proposed in areas at or below 5 metres AHD, an acid sulfate soil investigation is to undertaken and where necessary, an environmental management plan is prepared.
- Highly erodible or unstable soils are to be left in their natural condition to prevent erosion, sedimentation and water quality degradation problems.
- During construction of a development, soil erosion and sedimentation control measures must be in place prior to and during construction and maintenance.

3.5.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Land and Soil Best Practice, Land Use Strategies and Sustainable Outcomes?
- If development occurs on a slope does it:
  - retain the existing landform or is the finished landform sensitive to the existing surrounding natural landform
  - retain existing vegetation especially the native canopy trees
  - integrate or protect unique or special natural features of the site such as landforms, rock outcroppings, mature trees and vegetation, drainage courses, hilltops and ridgelines
  - respect the existing views, privacy, access to light and safety of neighbouring properties.
- Where development occurs on slopes greater than ten percent (10%), is pier construction or multiple split-level building pads provided?
- Where development occurs on land below 5 metres AHD are the acid sulfate soils disturbed when excavating or otherwise removing soil or sediment, extracting groundwater or filling land? If so, is the development proposal accompanied by a report on an:
  - acid sulfate soil investigation
  - environmental management plan
  - ongoing management program for treating disturbed acid sulfate soils and drainage waters?

3.5.6 Sustainable Land and Soils Outcomes

- Development and use of the coast is to maintain and, where possible, enhance the quality of life for residents and visitors by avoiding areas identified as being adversely affected by acid sulphate soils, steep slopes, erosion and landslides.
- Drainage activities should avoid or minimise land degradation, including soil erosion, compaction, land instability, contamination, acidity, water logging, decline of native vegetation or, where appropriate, salinity and, where possible, land should be rehabilitated.
- Development involving acid sulfate soils should be planned and managed to avoid potential adverse effects on the natural and built environment (including infrastructure) and human health.

3.5.7 Useful Resources

Legislation

Coastal Protection and Management Act 1995 (Qld) provides for the protection, conservation, rehabilitation and management of the coast including resources and biological diversity.

www.legislation.qld.gov.au

Policies, Guidelines and Fact Sheets

State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide sets out the State government's interest in ensuring the natural hazards of flood, bushfire and landslide are adequately considered when making decisions about development.

www.dip.qld.gov.au/policies/index.php

State Planning Policy 2/02 – Planning and Managing Development Involving Acid Sulfate Soils sets out the State interest concerning development involving acid sulphate soils in coastal areas.

www.dip.qld.gov.au/policies/index.php

What is Bank Erosion talks about what is bank erosion and how it is caused.

www.nrw.qld.gov.au/factsheets

Gully Erosion gives an overview of what is gully erosion and what we can do to minimise its impacts.

www.nrw.qld.gov.au/factsheets

Acid Sulfate Soils in Queensland explains what acid sulfate soils are, how they are formed, where they occur and what happens when they are disturbed.

www.nrw.qld.gov.au/factsheets

Identifying Acid Sulfate Soils describes the scientific process for identifying acid sulfate soils in the soil.

www.nrw.qld.gov.au/factsheets

Managing Acid Sulfate Soils provides an overview of the techniques that can be used to manage acid sulfate soils if they are disturbed.

www.nrw.qld.gov.au/factsheets

Coastal Erosions introduces what is coastal erosion and what are the causes of coastal erosion.

www.bom.gov.au/pacificsealevel

Websites

Department of Natural Resources and Water

www.nrw.qld.gov.au

Environmental Protection Agency

www.epa.qld.gov.au

OzCoasts

www.ozcoasts.org.au

3.6 Bushfire

3.6.1 Best Practice

- The management of areas prone to bushfire is to work with nature rather than against nature.
- The location and design of development is undertaken in a manner that:
  - does not alter natural fire regimes
  - significantly increase the risk to human life, property and infrastructure from bush fire
  - minimises the potential risk to the safety and health of the community as a result of bushfire.
- Reduce the vulnerability of Iama to the impacts of climate change by:
  - recognising the importance of climate change on Iama's bushfire environment
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future
  - building understanding and capacity of Community to deal with the impacts of climate change Iama's bushfire environment.

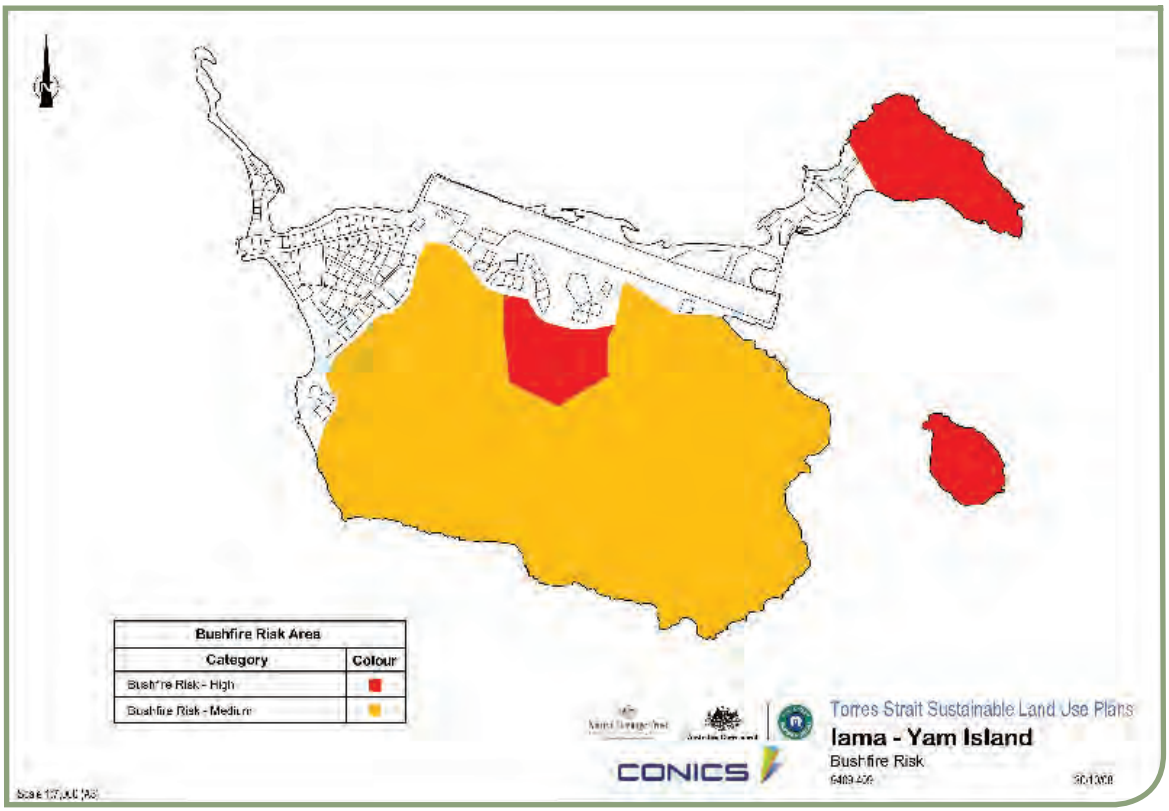
3.6.2 Overview of Current Situation

Iama is extensively covered with natural vegetation, which is subject to bushfire. The presence of human occupation raises the likelihood and frequency of fire, which may significantly alter the ecological characteristics of Iama. Inappropriate burning of vine forests could cause the margins of this vegetation type to contract – effectively reducing its area and function as habitat.

Using the State Planning Policy 1/03 " – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide" methodology, areas of Iama are identified as low, medium and high bushfire risk.

Map 12 shows the location of bushfire hazard areas.

Map 12 Bushfire Risk



For more detail, refer to Map No. 9409-409 contained in Volume 3 – Maps

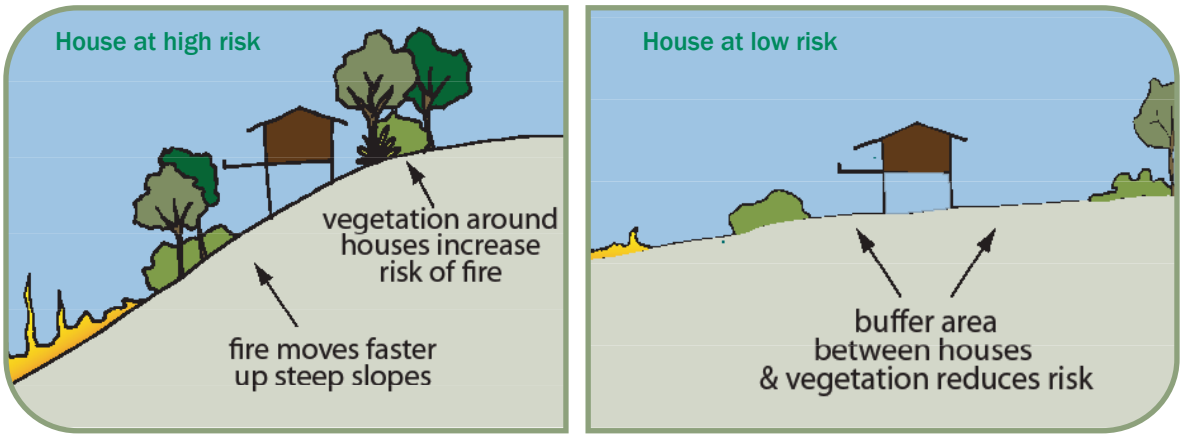
3.6.3 Issues Overview

Bushfires represent an ever present risk to life, property and the environment. While the obvious answer would be to avoid development near bushfire hazards or to prevent bushfires from occurring, neither are realistic options due to the growing demands for residential land and the growing understanding of the ecological processes dependent upon bushfire.

One of the ways of managing risks to life, land, property and the environment from bushfire is through appropriate land use planning strategies. Identifying bushfire prone areas across Iama will inform future generations and guide where development should or should not occur at the beginning of the planning process.

Figure 8 shows how be providing a fire break between dwellings and bushfire hazard areas assists in reducing the threat of bushfire.

Figure 8 Bushfire Risk



3.6.4 Land Use Strategies

To minimise the impacts of bushfire on existing and future development, the following strategies are recommended:

- Development is not permitted in areas of high bushfire risk and on slopes adjacent or part of areas identified as high bushfire risk otherwise development must be compatible with the natural hazard where there is no other site suitable and reasonably available.
- New development must have access to and is accessible by sealed roads or high quality unsealed roads to facilitate emergency vehicle access.
- All development adjacent to or within an identified bushfire risk area must:
  - have setbacks as a firebreak which is maintained on an ongoing basis;
  - have access to adequate water supply;
  - not increase bushfire hazard or public safety risk;
  - maintain the health, safety and wellbeing of the community; and
  - minimise the impacts from bushfire on existing development.

3.6.5 Land Use Considerations

When assessing the impacts of bushfire on future development, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Bushfire Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development consider:
  - alternative sites where it is in an area of high bushfire risk; and
  - the risk to people and property?
- Is the development constructed of appropriate materials?
- Are appropriate firebreak setbacks provided between buildings and structures, including houses and infrastructure and bushfire risk areas?
- Is there adequate water supply and pressure and other appropriate infrastructure to protect a building or infrastructure from a fire?
- Does the development have a bushfire management plan, which includes the type of fire regime required to manage the ecological processes within the natural environments?

3.6.6 Land Use Projects

To protect Iama's existing development and infrastructure and to assist in further studies of the Investigation Areas, the following projects are recommended:

- implement a bushfire management plan that covers at a minimum:
  - the establishment of firebreaks or control lines around grassland areas and long-term dry vegetation types (woodlands dominated by sclerophyll trees and shrubs) in areas adjacent to human settlements;
  - controlled burning outside of the driest periods when slow, low-intensity fires can be managed;
  - mosaic burning (e.g. small patches of controlled burning to reduce excess fuel load accumulation so that there is always habitat connectivity provided); and
  - fuel load maintenance; and
  - the need for fire trails and the potential impact on pristine natural environments.
- undertake Community capacity building on:
  - sustainable fire management; and
  - property preparedness including planning for and maintenance requirements.

3.6.7 Sustainable Bushfire Outcomes

Development is planned and managed to ensure that significant adverse effects of bushfire on the natural and man made environments are avoided, mitigated or remedied.

3.6.8 Useful Resources

Policies, Guidelines and Fact Sheets

State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide sets out the State government's interest in ensuring the natural hazards of flood, bushfire and landslide are adequately considered when making decisions about development.

www.dip.qld.gov.au/policies/index.php

Your Bushfire Action Checklist provides a list of tasks individuals and Community should do both during the bushfire season and out of season to ensure that if a bushfire occurs, minimum damage is done to property.

www.fire.qld.gov.au

Websites

Queensland Fire & Rescue Service

www.fire.qld.gov.au

Cultural **Heritage**

4.1 Best Practice

- Places of cultural heritage significance are identified, protected and retained for the benefit of present and future generations.
- Traditional Owners:
  - are the primary source of information on the value of their heritage and how this is best conserved;
  - must have an active role in any heritage planning process;
  - own intellectual property and other information relating to their culture and heritage; and
  - are the key stakeholders in land use planning through their relationship with land and sea management and resources.
- Reduce the impacts of climate change on Community's cultural heritage by:
  - recognising the importance of climate change to Iama's cultural heritage;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the Island's cultural heritage.

4.2 Overview of Current Situation

The entire island of Iama is an area of significant cultural heritage value to the Traditional Owners and the people of Iama.

While many significant and sacred sites are only known to Traditional Owners, a number of sites have been made known to the general public including:

- rock art;
- grinding grooves located on large slabs;
- relict garden site;
- the location of the old village site of Kemud towards the centre of the Island;
- a site with 'occupational debris' (presumably midden material) without stone artefacts was located along a northern beach;
- a bamboo grove in a small valley called Sapu;
- coconut groves;
- stone arrangements as garden boundary markers;
- four well sites on the island – Sarabuman (south coast), Damu (centre of Island), Babud (central north coast) and Gaurab (central north coast);
- stonewalled tidal fish traps on the central north coast;
- skulls of enemies (bones of Ausa lie within Sibargaumei Cave on a hill-side near Gaurab Kasa);
- the 'last resting place' of 'King' Kebisu is said to be located within the present village; and
- a rock painting site.

To protect the cultural significance of these sites, the location of these sites have not been disclosed.

Further details on Iama's culturally significant places and sites are included in Appendix 3 and on Map 13.

The cemetery is located along the northern side of the airstrip. Its capacity is extremely limited in area and there is restricted potential for increasing its current capacity.

"In the Torres Strait, cultural heritage includes all traces of human activity in the physical environment. These are irreplaceable sources of information on people's lives and activities and on the historical development of crafts, techniques and art. Because monuments, site and culturally significant environments are non-renewable resources, their management must have a long-term focus. Cultural monuments and significant sites are a source of emotional and aesthetic experiences for many people and today Island Communities can benefit from the preservation and active use of its cultural heritage"

4.3 Issues Overview

Cultural heritage is about places of significance to people and help us to understand the past and enrich the present. In the Torres Strait there are areas of particular significance to people because of island custom (*Ailan Kastom*) and history, including contemporary history. They may be meeting places, monuments and landscapes. Areas of cultural significance may not be physically evident. With regards to Torres Strait Islander tradition, given the sacred nature of areas of significance, many sites have not been recorded on official heritage inventories and registers that are accessible to the public. Hence, without consultation and liaison with Traditional Owners, engagement of cultural heritage observers and preparation of cultural heritage investigations, areas of significance may be inadvertently damaged or destroyed.

On Iama, there are numerous areas and objects of significant cultural, historical and archaeological significance. It is likely that the location of many of these have not been recorded. The *Torres Strait Islander Cultural Heritage Act 2003* provides blanket protection for Torres Strait Islander cultural heritage and its "Duty of Care" provisions require those conducting activities to take all reasonable and practicable measures to avoid harming it. Communication with the relevant PBC will assist developers to identify local areas and objects of significance and avoid or mitigate disturbance. The TSRA, through its LSMU and Native Title Office can assist in contacting the relevant PBC.

Given the nature of major development projects in the Torres Strait, the reality is that development often proceeds without undertaking appropriate studies, consultation or engagement of observers. As such, it is vital that any applicant of a development undertake their duty of care obligations and engage with Iama's Traditional Owners in order to manage and protect their unique areas of cultural significance.

Engagement and partnerships with Community provides opportunities for information sharing and effective management of cultural values and heritage. Information about places of cultural heritage significance must be managed in a way that satisfies the custodians of the area and ensuring that there is access to sufficient data to ensure proper management and protection of Iama's cultural heritage.

Not only are areas of significance at risk from development but also from impacts from storm surge, inundation and erosion, particular sites which are located close to the coastline such as middens and other low lying sites. The intensification of environmental impacts associated with climate change may result is some areas of significance being submerged or eroded. The existing cemetery is one case in point. Decisions need to be made whether or not the cemetery should be expanded in its present location or be relocated to avoid the tidal and storm surges.

4.4 Land Use Strategies

To protect Iama's cultural heritage from proposed development, the following strategies are recommended:

- All proposed developments must be discussed with the PBC on the potential impacts of the development on cultural heritage.
- A written agreement (cultural heritage management plan) be prepared as part of the development proposal which addresses:
  - genuine consultation with Community to determine how they wish to safeguard and control their culture and/ or heritage;
  - how the development will protect the culture and heritage item or place;
  - the requirement for a cultural heritage survey prior to development proceeding;
  - the role of the PBC and Traditional Owners as observers during construction to monitor the impact on the culture and heritage items;
  - methods such as temporary markers that identify a buffer zone around the heritage item or place that must be removed after the building has been completed;
  - a remediation plan which outlines how and when a cultural heritage item or place will be reinstated if removed or damaged during construction; and
  - a 'sign off' process after construction is completed. This sign off must ensure that all parties are satisfied with the condition of the cultural heritage item or place is left in after construction is completed.
- All proposed developments must:
  - include the written agreement such as a cultural heritage management plan; and
  - undertake a site inventory including a search of NRW and the PBC's records.
- Community must identify, conserve and manage places of significant cultural heritage particularly those affected by natural hazards and determine which information is readily or not available for general public knowledge.
- The precautionary principle should be adopted where there is uncertainty about the cultural significance of an area or a site.
- All processes, policies and decisions that protect and enhance the natural and made environments must incorporate cultural values and beliefs and the role of Traditional Owners in Iama's cultural heritage.

4.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Cultural Heritage Best Practice, Land Use Strategies and Sustainable Outcomes?
- Iama is a significant area of cultural heritage to Community, so have all appropriate persons and State agencies been consulted?
- Does the development have an agreed cultural heritage management plan for the affected are and/or site?
- Where the development threatens a cultural heritage item, does it have a disaster mitigation plan? If it does, does it address where disturbance is unavoidable, the temporary relocation of the implement to a safe place?
- Does the development threaten the integrity and setting of heritage items through water run off, soil erosion or soil movement?

Map 13 Cultural Heritage

For more detail, refer to Map No. 9409-407 contained in Volume 3 – Maps

4.6 Land Use Projects

To protect Iama's cultural heritage, the following projects are recommended to be undertaken.

- A systematic, island focused cultural heritage survey. This survey should:
  - identify the nature and location of major cultural heritage sites and their likelihood of being affected by changes in land use; and
  - consider the confidentiality of such information (should it remain confidential solely for the use of the PBC, or be made publicly available).
- An analysis of the future of the existing cemetery.
- Facilitate opportunities for young people to build understanding and capacity about Iama's areas of cultural significance.

4.7 Sustainable Indigenous Cultural and Heritage Outcomes

- Development is planned and managed to ensure impact on the culture and heritage of Iama is avoided, mitigated or remedied.
- The impact of climate change on Iama cultural heritage is managed in a sustainable and integrated way to provide appropriate solutions.
- Ensure Community are involved in ongoing consultation to support the protection and healing of country and culture for future generations.

4.8 Useful Resources

Legislation

Torres Strait Island Cultural Heritage Act 2003 (Qld) provides for the effective recognition, protection and conservation of Torres Strait Island cultural heritage.

www.legislation.qld.gov.au

Queensland Heritage Act 1992 (Qld) provides for the conservation of historical (non-indigenous) cultural heritage

www.legislation.qld.gov.au

Policies, Guidelines and Fact Sheets

Duty of Care and Management Plan Guidelines – Aboriginal Cultural Heritage Act 2003 sets out reasonable and practical measures for meeting the duty of care obligations established in the *Aboriginal Cultural Heritage Act 2003*.

www.nrw.qld.gov.au/cultural_heritage

Cultural Heritage – Your Duty of Care explains the duty of care provisions under the Aboriginal Cultural Heritage Act 2003.

www.nrw.qld.gov.au/factsheets

Cultural Heritage provides an overview of the *Torres Strait Islander Cultural Heritage Act 2003*.

www.nrw.qld.gov.au/factsheets

Aboriginal and Torres Strait Islander Cultural Heritage Places introduces the different types of cultural heritage places and sites e.g. middens, grinding groves etc.

www.nrw.qld.gov.au/factsheets

Cultural Heritage Management Plan explains what a cultural heritage management plan is and when one is required.

www.nrw.qld.gov.au/factsheets

Cultural Heritage Database and Register explains what the cultural heritage database and register is and how entries are processed.

www.nrw.qld.gov.au/factsheets

Cultural Heritage Studies provides an overview of why it is important to include sites of cultural significance on the cultural heritage register.

www.nrw.qld.gov.au/factsheets

Ask First: a guide to respecting Indigenous heritage places and values is a guide to providing effective recognition, protection and conservation of Indigenous cultural heritage.

www.environment.gov.au/heritage/ahc/publications

Publications

Cordell, J. and McNiven, I. (1999). *Torres Strait Community Socio-Cultural Interests and Heritage Study: PNG gas project consultancy report.* Prepared for the Island Co-ordinating Council (Pipeline Reference Group), Torres Strait

Neal, R. A. (1989) *An Archaeological Inspection of Alternative Telecom Locations on Mabuiag and Yam Island, Torres Strait.* Prepared for Department of Community Service and Ethnic Affairs, Brisbane.

Websites

Department of Natural Resources and Water

www.nrw.qld.gov.au

Environmental Protection Agency

www.epa.qld.gov.au

National Native Title Tribunal

www.nntt.gov.au

Australian Heritage Council

www.environment.gov.au/heritage/ahc

The Community

Demographic trends and changes have significant influence on future development needs, the provision of community services and infrastructure. For example, if the population is ageing, then planning must ensure that the housing choice reflects the needs of an ageing population as well as ensuring the right community services, facilities and infrastructure is in place to support the ageing.

Other topics such as community belonging, crime and safety, disability, food security and health are not addressed in this Plan as it outside the scope of the project. It is recommended that a community well being report be developed through a comprehensive community engagement process, as it would highlight the needs, concerns and aspirations of Community that will influence future development.

This Plan addresses the following with regards to the community:

- population;
- housing;
- sustainable community expansion; and
- community facilities and services.

5.1 Population

5.1.1 Best Practice

- Population and development are dealt with in a unified and comprehensive way with each Community developing its own solutions to population trends that reflect their values and cultural heritage.
- Land use development aligns with population profiles and trends.

5.1.2 Overview of Current Situation

The resident population of Iama has increased in the past ten years as indicated in Table 3.

Whilst population growth has slowed substantially, there is insufficient evidence to say that this is a trend as in the last ten years (1996 – 2006) there has been an increase of 7.0% it is widely considered that the 1996 Census does not reflect the correct number of residents as many did not complete the questionnaire.

Table 2 Population Growth

Year	Population	Growth / Year (%)	Population Density: persons/km²
1996	174	NA	NA
2001	341	14.4	NA
2006	342	0.1	198.7

Source: ABS, 1996, 2001 and 2006

The 2006 Census indicates following population characteristics:

- an average age of 20 years;
- 40.1% of the population is under the age of 15 years;
- 19.4% of the population is between the age of 15 and 24 years;
- 10.7% of the population is between the ages of 25 and 34 years;
- 24.3% of the population is between the ages of 35 and 54 years; and
- 5.5% of the population is 55 years and older.

5.1.3 Land Use Strategy

To ensure that population trends and profiles are reflected in land use planning on Iama it is recommended the population capacity, profiles and trends are reviewed regularly and appropriate adjustments made to ensure that an appropriate land supply and housing types are maintained.

5.1.4 Sustainable Population Outcomes

- Population profiles and trends are used to inform land use policy planning and development decision-making processes.
- Population and development capacity support a sustainable environment.

5.1.5 Useful Resources

Websites

Australian Bureau of Statistics (Census data)

www.nrw.qld.gov.au

1. In comparison, in Queensland, 20.7% of the population is under the age of 15, 13.8% of the population is between 15–24 years, 13.4% of the population is between 25-34 years, 28.6% of the population is between 35 – 54 years, and 23.6% of the population is 55 years and older.

5.2 Housing

5.2.1 Best Practice

- Provide a range of housing choices and opportunities in locations where there is a cost effective and efficient use of existing infrastructure and not be adversely impacted by natural hazards and climate change.
- Housing choices and stock matches demand and supply.
- Identifying new areas for residential development that provides a mix of housing types and densities without an adverse impact on existing infrastructure and the natural environment.
- Promotion and incorporation of sustainable design.
- Reduce the impacts of climate change on Community housing by:
  - recognising the importance of climate change on Iama's housing
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future
  - building understanding and capacity of Community to deal with the impacts of climate change on housing.

5.2.2 Overview of Current Situation

Iama's housing stock varies in size, architectural style, height and age. There are three distinct areas on Iama, namely:

Main Village Area

The houses located in the village are one or two storey containing three to five bedrooms. The older homes are of fibro construction either built on short concrete stumps with the more recent homes, slab-on-ground, two storeys and timber construction. The single storey dwellings are scattered throughout this area. Structures are in various states of repair from those unoccupied and in disrepair to those recently constructed with well-attended gardens.

Housing density around the Council offices is high with very few distinguishable back or front areas. However, as you travel towards the south-east perimeter of this residential area, greater space around the dwellings is prominent.

This residential area also contains visitor's accommodation, which is self-sufficient, sleeps seven persons and has two bathrooms/toilets. Visitors who wish to use the accommodation must book through the Local Council office.

The Sand Spit

On the north-west peninsula, accommodation is converted single storey sheds, some with external laundries. There is one exception: a two-storey dwelling of timber construction. Most of the dwellings in this area have two frontages with the main living areas facing due west and the ocean with the backs of the houses addressing the sandy road.

Gaurab Village Subdivision

The remaining residential area, near the airport and health centre contains 10 vacant, serviced lots. Six families are housed in this subdivision in a:

- single storey dwelling house;
- two, timber two-storey dual occupancy (duplex) (housing four families);
- timber two storey dual occupancy (duplex) housing two families relocated from the Sand Spit in late 2008; and
- timber two storey duplex with one side completed, housing one family. This has been designed as a duplex with the potential for the remaining part to be constructed.

The vacant land is overgrown with vegetation and weeds that are encroaching on the constructed road.

Family Composition

The 2006 Census indicates following characteristics of family composition on Iama:

- six couples with no children;
- 39 families with children under 15 years;
- five families with children over 15 years;
- 14, one parent families with children under 15 years; and
- five, one parent families with children over 15 years.

Household Composition

The 2006 Census indicates the following characteristics about Iama households:

- 59 households of which 11 consist of two people, 10 consist of three people and 14 consist of six or more people;
- seven lone person households; and
- an average household size of 4.3 persons per dwelling.

Housing Rental and Ownership

The 2006 Census indicates the following characteristics on Iama housing rental and ownership:

- 56 households paying rent to a State or Territory housing authority;
- 5 households paying rent to a housing cooperative or a community/church group;
- no household paying a housing loan repayment;
- no privately owned dwellings (either fully owned or being purchased); and
- the average rent is $50 per week.

In summary, housing on Iama is public housing with the current number of dwellings meeting the demands of Community. However, Papua New Guinea immigrants arrived in 2007/08, resulting in multiple families living together.

From the 2006 Census data, Iama has an average household size of 4.3 persons per dwelling. However, due to seasonal population fluctuations an average of 5.0 persons per dwelling is used to assist in the calculation of the number of lots and dwellings required.

5.2.3 Issues Overview

Growth pressure on Iama will be generated through population increases. Unless other locations are provided, the existing development pattern will be accommodating the population growth along the coast from the existing urban area. However, this is not recommended and other areas for urban development must be identified and investigated.

Refer to Section 5.3 Sustainable Community Expansion for more information.

As part of meeting population changes and preserving the land and sea relationship, providing diverse, sustainable, affordable housing options and a range of site sizes is a significant issue and key challenge for Community. Providing a range of housing choice assists in creating diverse communities and preventing social polarisation and displacement as well as protecting the natural environment. For example, it is important that affordable housing not be marginalised to fringe areas. It should be well located in relation to transport, community facilities and services, open space and recreation and education and employment opportunities.

In providing housing stock and choice to cater for the population growth and relocation of existing residents, the impact on the capacity of the existing landfill or dump must be taken into account. Refer to Section 6.3 Waste for more information.

5.2.4 Land Use Strategies

To enable housing demand and supply to meet the population growth and relocation of existing residents, the following strategy is recommended:

- Provide residential land to enable a supply of diverse, affordable and sustainable housing to meet the needs of current and future residents and visitors.

5.2.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Natural Environment, Cultural Heritage, Community and Infrastructure Best Practice, Land Use Strategies and Sustainable Outcomes?
- Is the development integrated with the landform and landscape?
- Does the development use:
  - energy efficiency principles in design;
  - minimise the reliance on fossil fuels for thermal comfort and water heating; and
  - minimise the use of materials, which deplete natural resources or create toxic pollution in their manufacture, use or disposal?
- If the development requires the demolition of an existing building, are the materials of the existing building to be reused? If so, where? If not, how are the materials to be disposed?
- Does the development provide sufficient onsite vehicle, boat parking and access areas for residents?
- If the development is in one of the two investigation areas, is all necessary infrastructure in place and operational for the development to proceed?

5.2.6 Sustainable Housing Outcomes

- Plan and manage urban area growth by limiting development along the coast and encouraging new development inland.
- Provide suitable residential land to enable a supply of diverse affordable and sustainable housing to meet the needs of current and future residents and visitors.
- The provision of a diverse choice of sustainable housing, which:
  - provides a high standard of sustainable living
  - provides a variety of different residential lifestyle opportunities
  - is responsive to climate, landscape and the changing population structure of Iama population while being affordable.
- Areas for residential use are developed to be consistent with the planned capacity for roads, community services and infrastructure for the island.

5.2.7 Useful Resources

Policies, Plans & Guidelines

Demographic Profile, Queensland Torres Strait Islander Communities provides an overview of the 1996 to 2001 Census data for the 17 Torres Strait Islands.

www.dip.qld.gov.au/population-forecasting/indigenous-population-trends.html

State Planning Policy 1/07 – Housing and Residential Development sets out the State government's interest in ensuring that local governments identify their community's housing needs and analysis and modify if necessary, their planning schemes to remove barriers and provide opportunities for housing options that respond to identified needs.

www.dip.qld.gov.au/policies/index/php

Websites

Australian Bureau of Statistics (Census data)

www.nrw.qld.gov.au

5.3 Sustainable Community Expansion

5.3.1 Current and Predicted Growth Overview

The population is expected to grow between a low growth rate of an additional 7 persons/year, being an additional 76 people between 2007-2017 and a high rate of 14 persons/year, being an additional 171 people between 2007-2017.

In summary, the population of Iama is predicted to be between 425 – 526 people.

Table 3 shows the estimate population growth and housing demand for Iama over the next 10 years.

Table 3 Estimated Population Growth and Housing Demand

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	addit. persons	addit. houses at 5pph
Low Growth (2.0%)	342	349	356	363	370	378	385	393	401	409	417	425	76 persons over ten years	15 houses over ten years
High Growth (4.0%)	342	356	370	385	400	416	433	450	468	487	506	526	171 persons over ten years	34 houses over ten years

Source: ABS 2006

This Plan considers two growth scenarios based on a low growth rate of 2.0% and a high growth of 4.0 % for the next ten years.

- A low growth rate of 2.0% which will generate:
  - an extra 76 persons over ten years
  - additional housing need of 1.5 houses per year at an average of 5 persons per household.
- A high growth rate of 4.0% which will generate:
  - an extra 171 persons over ten years
  - additional housing need of 3.4 houses per year at an average of 5 persons per household.

5.3.2 Issues Overview

Under any scenario, it is considered that the population of Iama will increase over time. In addition, it is considered that the existing development along the Sand Spit is inappropriate due to its impact on the environment and the potential risks from coastal inundation of tides and storm surges or other natural hazards.

Population trends indicate that family homes will still be required for at least the next five years.

Some of the options available to manage growth on Iama are:

- increase residential density;
- expansion of the residential areas; and
- population capping.

These options are outlined in detail.

Increase Residential Density

If the population on Iama continues to increase and there is no new land found for expansion, the existing housing in the two villages will need to provide houses for the additional persons.

As described above, the existing village is currently overcrowded with little private open space (back yards) or public open space (parks). The Gaurab Village subdivision has only 11 vacant lots remaining with a dual occupancy being constructed.

Increasing density is generally undertaken by providing a mix of housing types that use less land than a 3-bedroom dwelling house. Examples include dual occupancies (duplex or a house with two units), townhouses or units. The benefits of increased residential density include:

- more economic use of existing infrastructure and serviced land;
- reduced need for investment in new infrastructure;
- better access to existing services and facilities;
- combining existing land patterns whilst increasing the number of people living on Iama; and
- more sustainable housing patterns.

Expansion of the Residential Areas

As previously outlined, the coastal expansion of the village and the Sand Spit is inappropriate due to the negative impacts on the environment and the potential risks from tides and storm surge inundation or other natural hazards. Therefore, residential development needs to occur inland from the coast. While the topography of Iama, limits the scope for future village expansion, the lower slopes of the island are suitable for future development, particularly as they considered being of lower ecological value.

Gaurab Village Investigation Area

This area is on the southern side of the airstrip and adjoins the existing Gaurab Village subdivision.

It is often referred to as the Stage 2 subdivision that has 11 vacant lots. These lots can cater for an additional 55 people or for current predicted population growth to 2014. The following stage can include up to 20 lots or for an additional 100 people between 2015 and 2025.

Issues that need to be addressed include:

- extension of existing road;
- provision of adequate household water pressure;
- bushfire risk;
- impact on cultural heritage; and
- impact on vegetation and habitat particularly the vine forests.

Airstrip Investigation Area

This area is also on the southern side of the airstrip but close to its eastern edge.

Issues that need to be addressed include:

- extension of existing road;
- provision of sewerage pump station;
- bushfire risk;
- impact on cultural and heritage;
- impact on vegetation and habitat particularly the vine forests; and
- drainage.

The development of both areas is subject to future detail studies, design and liaison with Traditional Owners, Community and the Regional Council.

Population Capping

The timeline on the next page shows how Iama's current infrastructure will limit Iama population growth.

Figure 9 Timeline Limits on Population Growth

Based on the existing landfill (waste depot or dump), Iama has reached 'full house'. That is, the landfill cannot cater for an increase in population. By around 2010, the cemetery will be full. The question of whether to extend the cemetery or find a new site above the predicted sea and storm surge levels, needs to be addressed sooner rather than later.

Community must decide how they are going to address this 'full house'. What strategies are they going to adopt? For example:

- do they have a maximum number of people living on Iama (population cap) by voluntarily limiting return of people to Iama?
- do they restrict development without specifically limiting the number of residents and visitors, that is do not build any new houses.

Table 4 shows the advantages and disadvantages of a population cap.

5.3.3 Land Use Strategies

The population trends, profiles and infrastructure limitations mean that the land use strategies must be developed to:

- Manage the total population trend in a way that retains urban and island character.
- Relocate families from the Sand Spit to other suitable locations.
- Identify and locate land suitable for urban development in non-coastal areas. Two areas have been identifies with investigations required to address impacts on the environment and infrastructure.
- Provide choice in housing form and affordability in appropriate locations.
- To manage the total population of Iama, Community to consider a voluntary population cap.
- Increase the residential density in the village without comprising the amenity and character of the village and increasing the risk to natural hazards such as storm surge and tides.

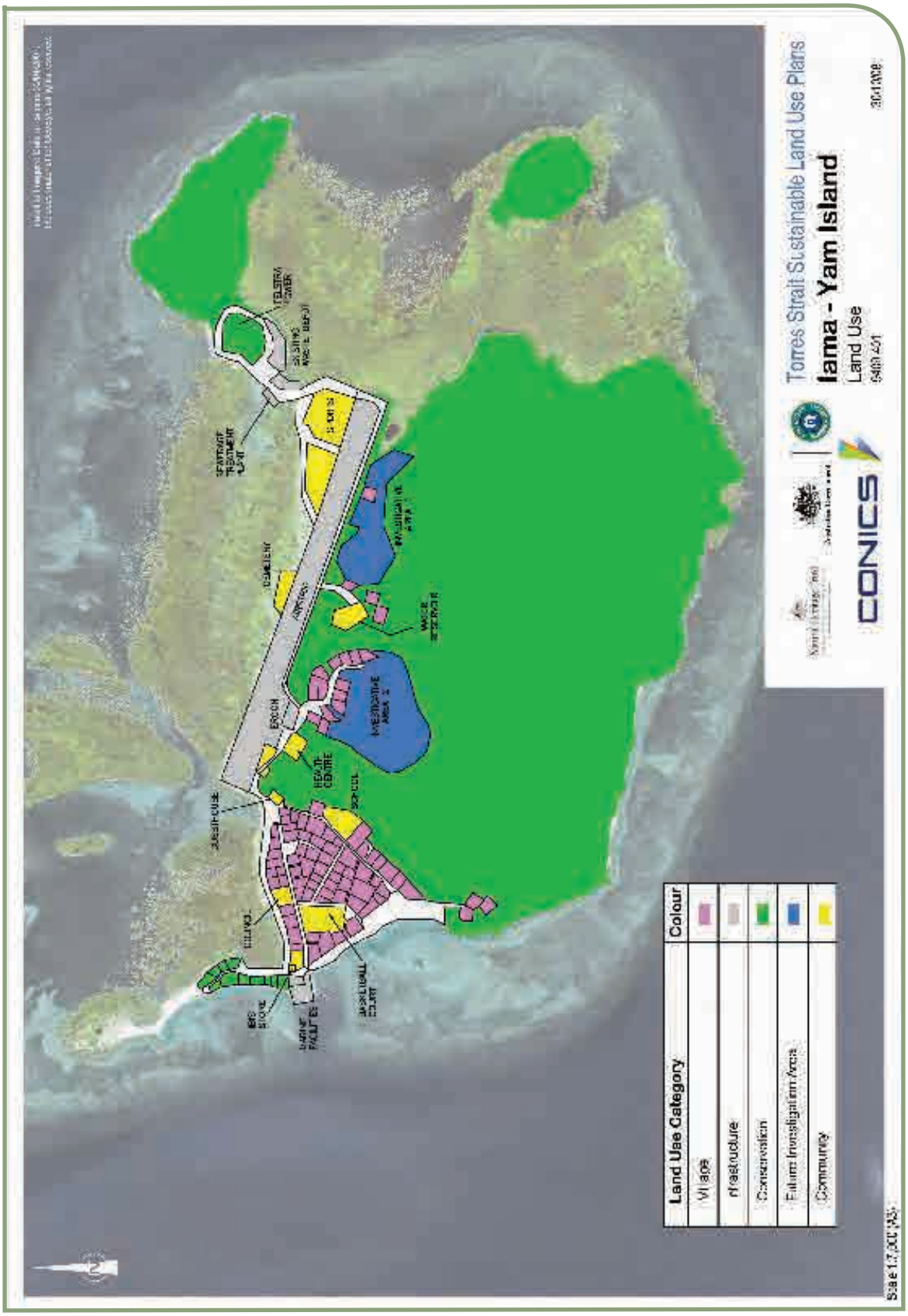
Map 14 shows the future land use intent for lots within the village.

Map 15a to 15c shows the lots, which are presently suitable for development due to access to services. These lots are shown as "Village". Areas that may be suitable for development in the future, subject to further investigation and/or the provision of services are shown as "Investigation Area".

Table 4 Advantages and Disadvantages of a Population Cap

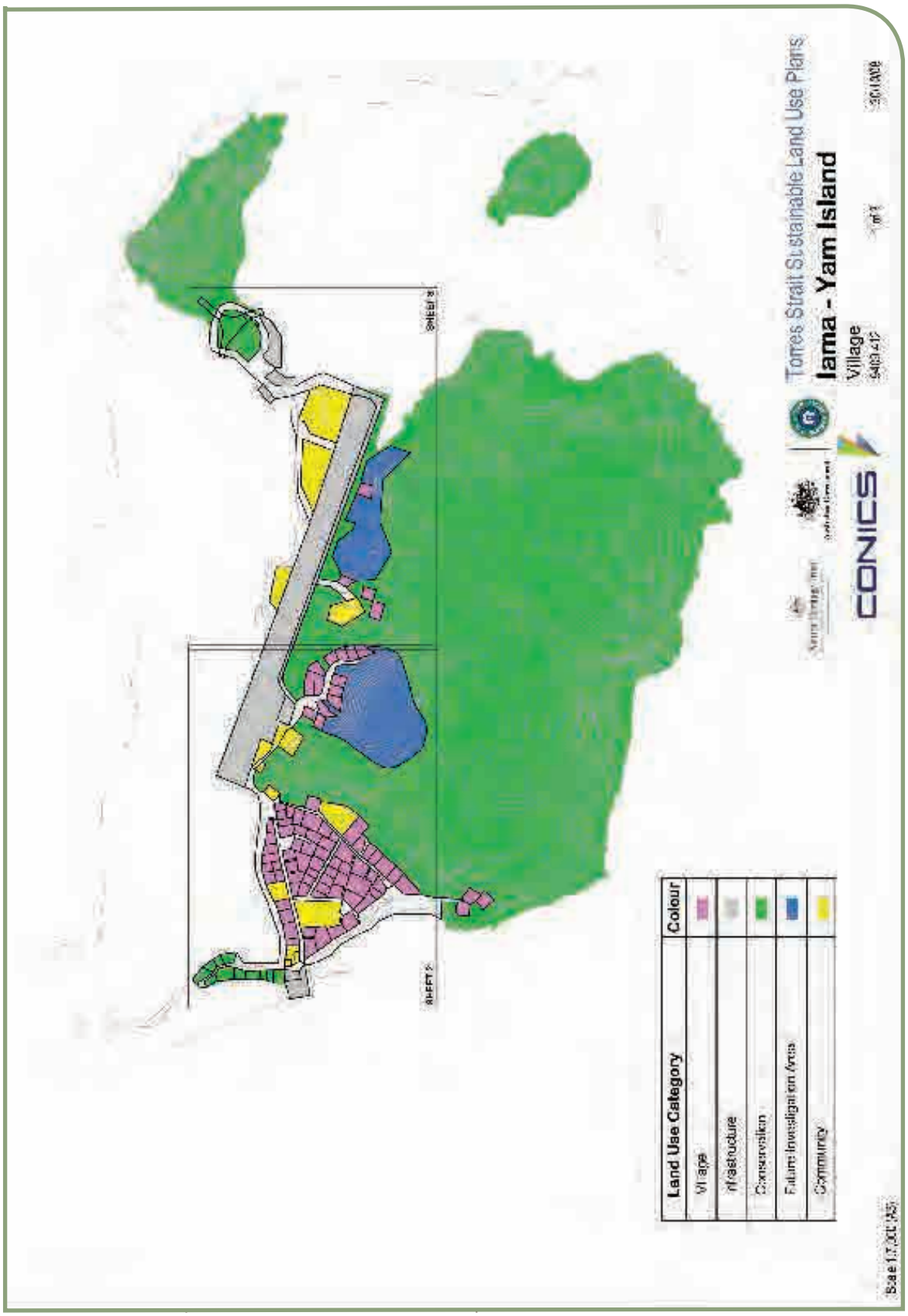
Advantages	Disadvantages
Protection of the natural environment, Iama character and Community cultural heritage	Does not protect the environment from new development
Certainty about infrastructure planning, particularly water supply, sewerage and roads	Further development becomes progressively more exclusive
Development is sustainable	Population of Iama may drift towards extreme levels.
Ongoing community engagement and support	Village character may loose some of its vibrancy due to the lack of population mix.
	Continuation of the population cap depends on Community will
	How development may impact on cultural heritage

Map 14 Land Use



For more detail, refer to Map No. 9409-401 contained in Volume 3 – Maps.

Map 15a Village



For more detail, refer to Map No. 9409-412 contained in Volume 3 – Maps.

Map 15b Land Use

For more detail, refer to Map No. 9409-412 contained in Volume 3 – Maps.

Map 15c Village

For more detail, refer to Map No. 9409-412 contained in Volume 3 – Maps.

5.3.4 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Sustainable Community Expansion Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development consider its impact on population capacity, profile and trends and the effects of growth and change on Iama?
- Is the development consistent with the strategies developed to address development growth?
- Does the development satisfactorily address its impact on the 'dump' and cemetery?

5.3.5 Sustainable Community Expansion Outcomes

- Decision making focuses on reducing the impacts of population growth and development on natural resources and the environment.
- A highly liveable community where there are a range of services and activities for all people who work together to identify, prioritise and address community issues.

5.4 Community Facilities and Services

5.4.1 Best Practice

- Communities are created with a recognisable character and sense of place which have a high level of amenity, safety, connectivity and integration between existing and new places.
- Create well-designed, safe and healthy environments that encourage active community participation, promote healthy lifestyles, prevent crime and maintain social equity and diversity.
- Maximise access to appropriate social and retail infrastructure for all residents.
- Reduce the vulnerability of existing and future community facilities and services to the impacts of climate change by:
  - avoiding decisions now that will make it more difficult to manage climate change risks in the future;
  - building understanding and capacity of the community to deal with the impacts of climate change on their community facilities and services; and
  - providing community facilities and services in locations not adversely impacted by natural hazards.

5.4.2 Overview of Current Situation

The 2006 Census indicated the following statistics:

Employment and Volunteering

The 2006 Census indicates the following characteristics for employment and volunteering:

- 133 people living on Iama are employed;
- an average household weekly income of $883.00;
- an average individual weekly income of $291.00;
- 29.3% of those working were between the ages of 15 to 24 years;
- 64.7% of those working were between the ages of 35 to 54 years;
- 46.1% of Community (over 15 years) undertake some form volunteer work in the 2006 Census. Volunteer work in the 2006 Census is someone who worked for an organisation or a group doing unpaid voluntary work in the 12 months prior to the Census;
- 13.1% of those undertaking volunteer work were between the ages of 15 and 24 years; and
- 30.4% of those undertaking volunteer work were between the ages of 25 and 54 years.

Table 5 shows the types of employment sectors people work in.

Educational Attainment

From the 2006 Census, 122 people were studying or undertaking some form of further education program or training. This is 39.5% of the total population. Of those undertaking education:

- 9.0% were attending pre school;
- 50.0% were attending primary school;
- 14.8% were attending secondary school;
- 9.8% were attending a technical or further educational institutional; and
- none were attending university
- 4.1% were undertaking another form of educational program or training.

The 2006 Census also shows that those that left school were over the age of 15, 44.1% left after completing Year 12 with another 29.8% leaving after completing Year 10. This means that 73.9% completed schooling after the age of 15 years.

Table 6 shows the community facilities that are available on Iama.

Table 7 shows the retail and public office facilities and services that are available on Iama.

Table 8 shows the recreational facilities that are available on Iama.

Table 5 Employment Sectors

Employment Industry	Construction	Public Administration & Safety	Education & Training	Health Care & Social Assistance	Wholesale Trade	Retail Trade	Other	Not Stated
People	0	111	7	4	0	7	4	0

Source: ABS 2006

Table 6 Community Facilities

Facility	Provided (✓ = Yes; ✗ = No)	Location
Pre school	✓	Included with Primary School
Primary School	✓	South-east perimeter of the village
Health Care Centre	✓	Near the airstrip
High school	✗	-

Table 7 Retail and Public Office Facilities and Services

Facility	Provided (✓ = Yes; ✗ = No)	Location
Administration Offices/Workshop	✓	Centre of the village
Community Hall	✗	-
Guest House	✓	Near the western end of the airstrip
Contractor Accommodation	✗	-
Church	✓	Two churches are located in the centre of the village
SES depot	✓	Adjacent to the airport buildings
Supermarket (IBIS store and or convenience store)	✓ (IBIS Store only)	Near the Desalination Plant
Banking facilities	✓ (in the IBIS Store)	-
Custom Depot	✗	-
Police Station	✗	-

Table 8 Recreational Facilities

Facility	Provided (✓ = Yes; ✗ = No)	Location
Picnic Grounds	✓	Near the desolation plant and barge ramp
Sports Oval	✓	Eastern end of the airstrip
Sports Courts	✓	Near Council offices

5.4.3 Issues Overview

On Iama, there are strong links between the physical environment, socio-economic issues and community health and wellbeing. Best practice planning and design of the built environment encourages physical activity and healthy lifestyle choices, provides a sense of community safety and assists in crime prevention. Communities that contain a broad mix of housing choices, appropriate local support services, adequate social infrastructure and strong community networks tend to be safer communities. This makes it vital that planning policies for community facilities and open space encourage multiple use and flexible design to allow for changing needs.

The community needs to accommodate services for convenience goods and services that meet the normal daily needs of its residents (e.g., food, personal services and prescription drugs). At the same time, due to the limited land supply, a mix of uses need to be balanced and contribute to the sense of a complete neighbourhood offering a variety of housing types, supporting convenience commercial, job opportunities, schools, parks and open spaces. This should be encouraged on Iama as the community facilities and services are scattered.

Some of the community services and facilities are located in areas identified as impacted by natural hazards. Consideration should be given to relocating these facilities and services to a safer location.

5.4.4 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is “NO” to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Natural Environment, Cultural Heritage, Community and Infrastructure Best Practice and Sustainable Outcomes?
- Is the development part of multipurpose community facilities and services?
- Can the development respond to changing and emerging community needs?
- If the development is for a new residential area, is there adequate provision made for public spaces and places for community activities?

5.4.5 Sustainable Community Facilities and Services Outcomes

- Community facilities that recognise and reflect the needs of the resident population including people with special needs such as older people, children, low-income earners and people with disabilities.
- New and existing residential areas are provided with community and social facilities that are convenient and highly accessible to Iama residents.
- Community is involved in the planning of community building and spaces to promote ownership and pride.
- Existing and new community facilities are multiple use buildings and not located in areas identified as impacted by natural hazards.
- Local sport and recreational opportunities continue to focus on natural and cultural activities.

5.4.6 Useful Resources

Websites

Australian Bureau of Statistics (Census data)

www.nrw.qld.gov.au

Infrastructure

Providing and managing infrastructure is a key issue facing the Torres Strait and Iama is no exception. For sustainable land uses and a healthy community, a close and strong relationship between policies and strategies is required.

Infrastructure plays a vital role in linking island communities within the region and mainland Australia. As a physical resource of strategic importance, infrastructure needs to be protected from any adverse effects (that may arise from land uses, natural hazards and climate change) that could affect the provision of an integrated, safe, responsive and sustainable infrastructure system. Similarly, negative environmental effects on land use activities resulting from infrastructure also need to be managed.

Infrastructure also has a significant role in the community and therefore land use and infrastructure planning whether for existing or future development must be provided in a way that is efficient, equitable, accessible and timely. On the other hand, demand and consumer behaviour must not be ignored to enable the maximisation of existing infrastructure and to minimise the need for additional infrastructure and services.

This Plan addresses the following with regard to infrastructure:

- water;
- sewer;
- waste;
- electricity;
- telecommunication;
- roads;
- drainage;
- air access; and
- sea access.

6.1 Water

6.1.1 Best Practice

- Water infrastructure is expensive to install and consideration must be given to the proximity of existing water infrastructure when planning future development.
- Protect and enhance the ecological health and water quality of surface and groundwater, including regional waterways, wetlands and estuaries.
- Development should not occur in water catchments.
- Water use should avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, water logging, decline of native vegetation or, where appropriate, salinity and, where possible, land should be rehabilitated.
- Water planning is based on a total water cycle management, which is reflected in all policy and decision-making and provides assured supplies of water to meet the reasonable needs of development and Community.
- Promote efficient use of water by improving demand management and reusing and recycling water.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on Community by:
  - recognising the importance of climate change on Iama's water infrastructure;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the island s water infrastructure.

6.1.2 Overview of Current Situation

The existing water infrastructure has the following features:

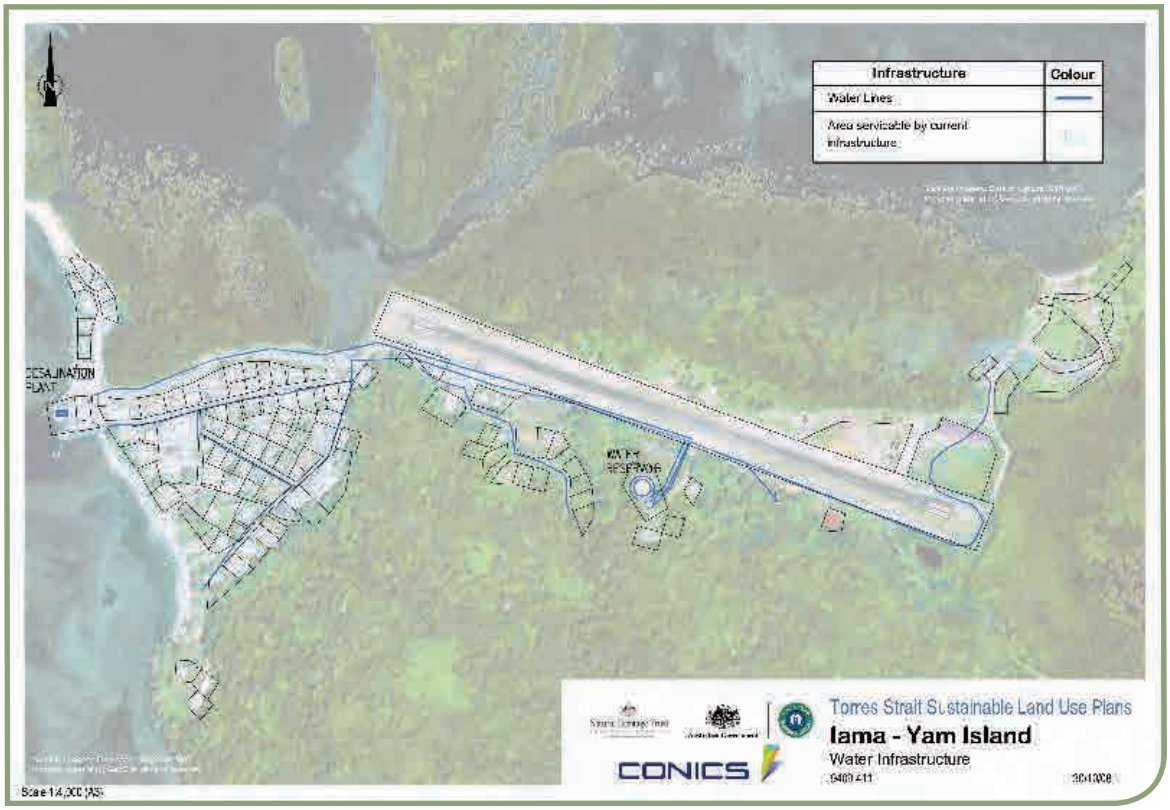
Source:	Water on Iama is sourced from: • two reverse osmosis desalination units located in a permanent treatment plant near the barge ramp; • a back-up supply from two wells adjacent to the airstrip (rarely used due to poor quality water and potential for contamination); and • supplementary household rainwater tanks.
Treatment:	Water is treated within the treatment plant building via chemical dosing and chlorination.
Storage:	Water from the desalination plant is pumped from the plant to two concrete reservoirs located on high ground the south of the airstrip.
Delivery:	Potable water is delivered to Community from the header tank via 100mm underground mains. All facilities are connected to the mains via branch lines. The majority of household water tanks can be topped-up by the reticulation system. Small individual pressure pumps deliver the water from the rainwater tanks to a single internal tap isolated from the mains as an emergency.
Capacity:	The combined capacity of the two desalination units is approximately 150kL of potable water per day. As each unit produces 50% of the total capacity, there is still capacity to provide potable water in the event of a single unit failure. The total existing elevated water storage capacity is 2.33ML. For the design population estimate of 450 persons and the adopted average daily consumption rate of 300L/person per day, there is approximately 17 days storage capacity, which is considered sufficient to meet water demand during periods of desalination plant breakdown and/or maintenance.
Usage:	The estimated current population is about 342 people. The average water usage from reservoir meter readings is around 140kL/day. This equates to approx 411L/person per day. Accordingly, the current water supply capacity appears to be adequate for the expected average water demand for the size of Community.

As with remote island communities, Iama's water is expensive to source and treat and water infrastructure is expensive to install and operate. At 2008 prices, the cost to supply barged water is $14 per kilolitre (about 26 times the national average) and desalinated water is $7 per kilolitre (about 10 times the national average).

Map 16 shows the areas serviced by the existing water infrastructure.

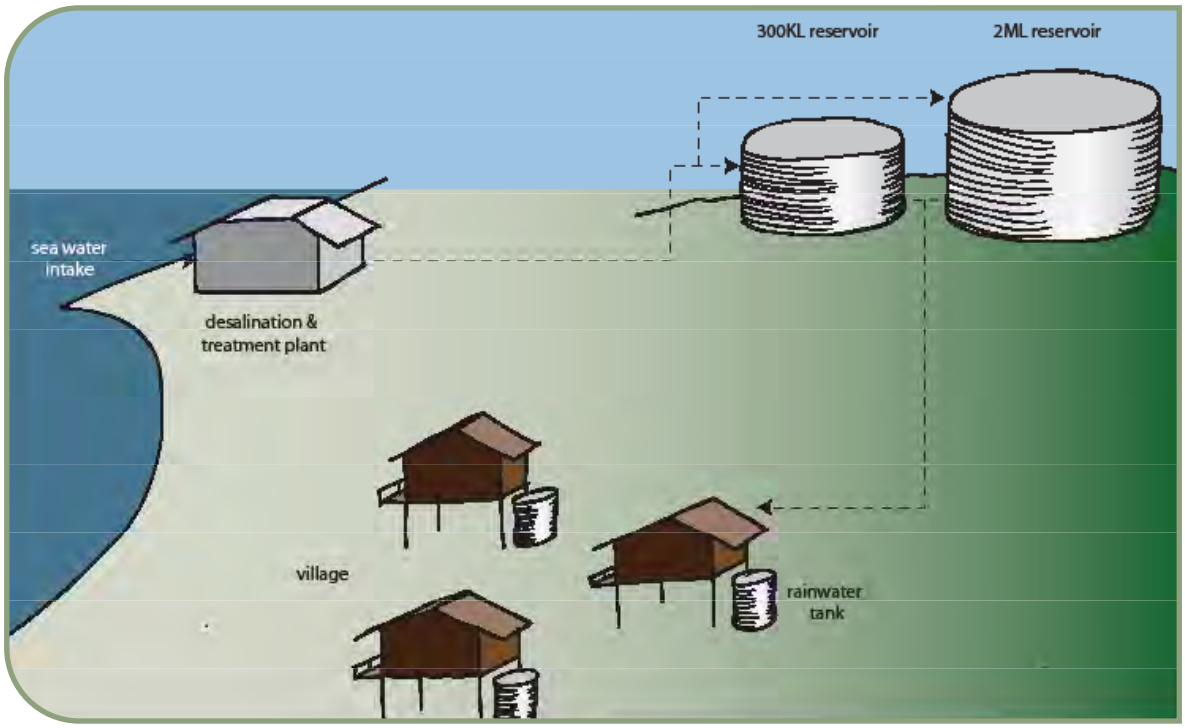
Figure 10 shows the water scheme process.

Map 16 Water Infrastructure



For more detail, refer to Map No. 9409-411 contained in Volume 3 – Maps.

Figure 10 Water Scheme



6.1.3 Issues Overview

For the purposes of determining the existing and future capacity of the water infrastructure, the following population growth forecast is used:

Existing Population	2008	= 342 persons
Predicted Population	2017	(Low Growth Estimate of 2.0% = 425 persons)
Predicted Population	2017	(High Growth Estimate of 4.0% = 525 persons)

There is currently no realistic alternative water supply for Iama other than the existing reliance on desalinated water. The existing plant has sufficient capacity to serve the current population at current consumption levels.

Current average yield including desalination water	150,000L per day
Achievable target consumption	300L per person per day
Population that existing water infrastructure can sustain	500 persons

Any population increase above 500 persons will require an upgrade to the plant capacity via replacement of an existing unit or the addition of a new unit. Any significant increase in plant capacity will almost certainly require the consideration of an increase in electrical power supply as desalination plant is a large user of electricity.

If future development is planned for the elevated area adjacent to the airport, a high-level reservoir header tank or variable speed pressure pump will be required to provide adequate household water pressure.

It should be noted that there are potential risks to the environment from the discharge of desalination plant effluent and that the potential impact increases with increase in desalination plant capacity. The wastewater discharge may affect coastal water quality due to the highly saline brine that is emitted to the sea, which may be increased in temperature, contain residual chemicals from any pre-treatment process and metal fragments from corrosion. However, the quantity of the discharge from this plant is generally considered negligible and too small to quantify, particularly due to the rapid dilution into the surrounding waters.

As with remote island communities, Iama's water is expensive to source and treat and water infrastructure is expensive to install.

6.1.4 Land Use Strategies

To minimise the impact of water infrastructure on the natural and man made environments and to ensure that the current and future efficiency and effectiveness of Iama water infrastructure, the following strategies are recommended:

- Development is not to occur in water catchments.
- A target of 300 litres per person per day or less is achieved by using water efficiently and managing consumer behaviour and demand for water.
- On reaching a population of 500 persons and the target consumption of 300 litres per person per day or less is achieved on a regular basis, an upgrade to the water plant capacity is to be considered.

6.1.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Water Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development adopt best practice principles in the planning, design and construction of water cycle infrastructure (including water supply, sewerage, drainage and water quality)?
- Does the proposal address its impact and cumulative impact on the existing water infrastructure?
- If the development is for a residential or community building:
  - is there a total water cycle management system addressing demand, reuse and recycling including the use of rainwater tanks for use within the building; and
  - are water saving devices proposed?
- Is the water catchment area (if one exists) affected by the development?
- Is the development located within the area serviceable by current infrastructure? If not, is the required additional infrastructure adequately funded?

6.1.6 Sustainable Water Infrastructure Outcomes

- Achieve targeted reductions in water consumption by using water efficiently and managing consumer behaviour and demand for water.
- Protect the quality of water draining from urban development and water infrastructure.
- All water infrastructure is inspected regularly and maintained to ensure that it is in effective working order.

6.2 Sewer

6.2.1 Best Practice

- Sewerage infrastructure is expensive to install and consideration must be given to the proximity of existing sewerage infrastructure when planning future development.
- Sewerage treatment plant design must accommodate specific design capacities and the impact of additional loading from future development.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on the sewer infrastructure by:
  - recognising the importance of climate change on Iama's sewer infrastructure;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Iama's sewer infrastructure.

6.2.2 Overview of Current Situation

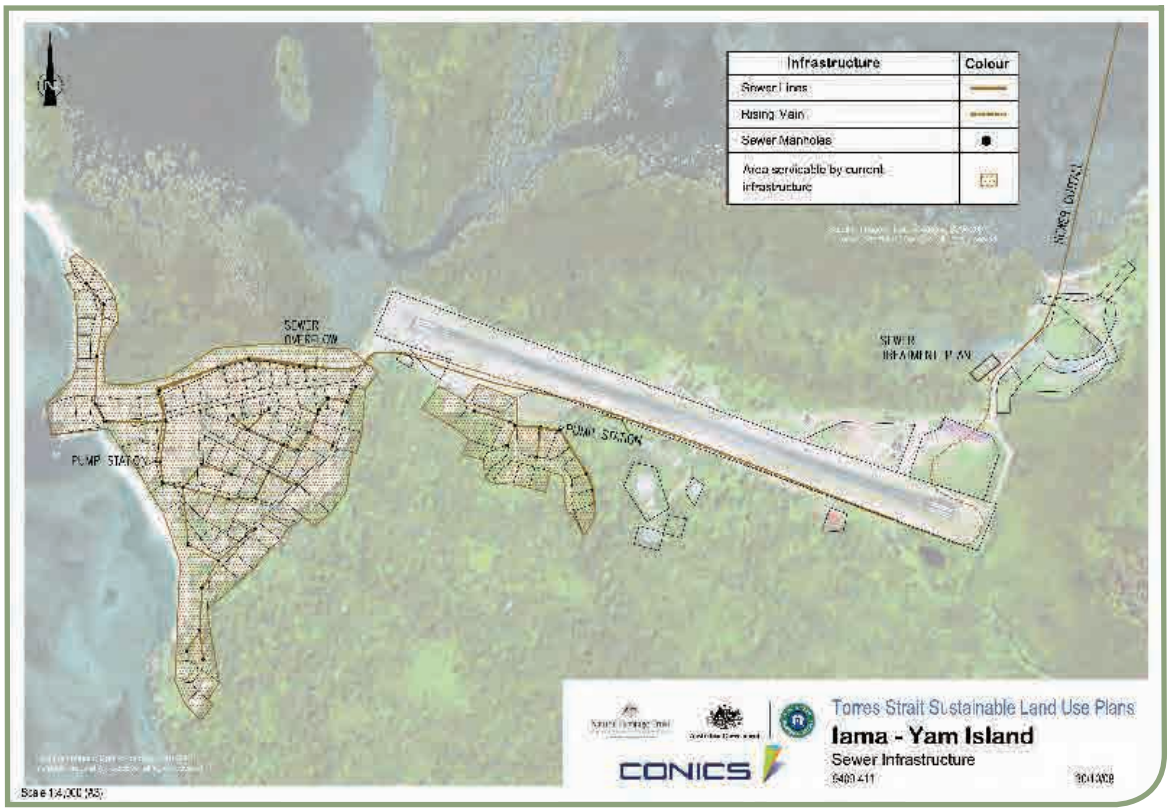
The existing sewerage infrastructure has the following features:

Collection:	Sewage is collected via a reticulated gravity sewage collection system serving the town and airport subdivision area.
Transfer:	Sewage from the reticulation system is collected in two pumps stations (one in the town area and one at the airstrip) and pumped via a rising main to the Sewerage Treatment Plant.
Treatment:	Sewage is treated at the packaged Sewerage Treatment Plant located at the western end of the island. The treatment plant is a rotating biological contactor type and has been designed to treat effluent to a secondary level.
Discharge:	Treated effluent is pumped from the Sewerage Treatment Plant to an ocean outfall at the north of the island. There is also a rising main overflow point from the pump station in the village, which, discharges to a small bay at the north west end of the airstrip.

The existing treatment plant has been designed for a capacity of 450 people. The plant currently handles the existing effluent load comfortably and does not require any upgrade works at this stage.

Map 17 shows the areas serviced by the existing sewer lines and desalination plant.

Map 17 Sewer Infrastructure



For more detail, refer to Map No. 9409-411 contained in Volume 3 – Maps.

6.2.3 Issues Overview

The existing treatment plant has the capacity to treat effluent for population of 450 persons. It has been designed to be upgraded to accommodate 600 persons with standard modifications to the plant for an estimated cost of $750,000. The current plant is not reported to be having any difficulty handling the existing load. It is anticipated that the plant will have spare capacity to handle general increases over the next few years.

The sewerage design population of 450 persons is predicted to be reached between 2013 and 2017.

If future development is planned for the elevated area adjacent to the airport, the existing pump station may require a minor upgrade to handle an increase in load, however both of these components would need to be confirmed.

Effluent Re-use

Effluent from the treatment plant is treated to a secondary level only and as such, is unsuitable to be considered for potable use. The treatment plant as designed is not readily modifiable to enable effluent treatment to a tertiary level.

There may be an opportunity to use the secondary treated water to irrigate the sportsfield or similar areas during the dry season, however this would involve the provision significant infrastructure and the need for strict environmental health management systems to be implemented. An indicative estimate for such as system is approximately $1,500,000.

6.2.4 Land Use Strategies

To minimise the impact of sewer infrastructure on the natural and man made environments and to ensure that the current and future efficiency and effectiveness of Iama sewer infrastructure, the following strategies are recommended:

- Not encouraging development to occur in close proximity to a sewerage treatment plant.
- Where development occurs outside the area serviced by the existing sewer infrastructure, sewer infrastructure must be provided in accordance with the Queensland Plumbing and Wastewater Code and AS/NZS1546:2001 On-site domestic wastewater treatment units – aerated wastewater treatment systems.

6.2.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Sewerage Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development adopt best practice principles in the planning, design and construction of sewerage infrastructure (including water supply, sewerage, drainage and water quality)?
- Does the proposal address its impact and cumulative impact on the existing sewerage infrastructure?
- Is the development near or adjacent to an existing or proposed sewerage treatment plan?
- Is the development located within the area serviceable by the current infrastructure? If not, is the required additional infrastructure adequately funded?

6.2.6 Land Use Projects

To maximise the use of secondary treated water, it is recommended that an investigation into the feasibility and costs of using the secondary treated water to irrigate the sportsfield or similar areas during the dry season be undertaken.

6.2.7 Sustainable Sewer Infrastructure Outcomes

- Waste water conservation should be practised and waste water production should be minimised.
- All sewer infrastructure is inspected regularly and maintained to ensure that they are in effective working order.

6.2.8 Useful Resources

Policies, Plans & Guidelines

Queensland Plumbing and Wastewater Code sets out the framework for Queensland's plumbing and drainage standards.

www.dip.qld.gov.au/plumbing/2.html

AS/NZS 1546:2008 is the Australian Standard for on-site wastewater treatment units.

www.standards.org.au

6.3 Waste

6.3.1 Best Practice

- The siting and maintenance of waste disposal facilities (dump) must not have a detrimental impact on the natural environment.
- Removal of waste from Iama is expensive and the minimisation of waste and associated environmental impacts and maximisation 'reduce, reuse, recycle' of waste generated occurs on a daily basis.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on Iama's waste generation and disposal facilities by:
  - recognising the importance of climate change;
  - avoiding quick decisions now that will make it more difficult to manage Iama's waste generation and disposal facilities; and
  - building understanding and capacity of Community to deal with the impacts of climate change Iama's waste generation and disposal facilities.

6.3.2 Overview of Current Situation

Iama currently has a waste depot located at the east end of the island near the Telstra Tower, just past the sports field and the sewage treatment plant.

The waste depot site is bounded on the east by mangroves and previously had occasional inundation from high tides. However, the build up of waste has now created a mound, which, although unsightly, buffers the waste depot from the mangroves.

Waste is currently collected by a minipactor rubbish truck, tipped on the ground and burnt where possible.

In 2005, the waste depot was fenced on the landward side and a concrete washdown slab constructed opposite the sewage treatment plant. Due to the limited space available in the depot, bulk waste such as cars, trucks, white goods & large metal objects were removed from Iama in 2005 and sent to Cairns for recycling.

6.3.3 Issues Overview

There is no land available for expansion of the waste depot on Iama. Land is either to steep, too rocky or covered in mangroves.

The current depot has no soil available for cover of waste and previous requests to source what little soil is available on the island has been unsuccessful.

The long-term impact of the existing waste depot onto the adjoining mangroves is yet to be determined.

Alternative options are:

- the introduction of a waste transfer station and removal of waste from Iama to another site (such as Cairns, Horn Island or a yet to be determined regional waste depot for the Torres Strait);
- the creation of additional land by creating a bund wall through the adjoining mangroves immediately to the east of the existing dump; or
- find a new site for the disposal of waste on Iama.

A significant issue for all Torres Strait island is the impact of disused vehicles once they have used their usable life. Typically, these vehicles are in poor condition when they reach the Torres Strait. Once broken down, they consume valuable space in the landfill sites. This space should be reserved for general domestic rubbish. Materials other than general domestic waste, should be separated and stocked piled so that they can be re-used or transported off the island.

Quarantine restrictions imposed for the Torres Strait protected zones mean that any material transported between zones requires Australian Quarantine and Immigration Service clearance, which usually involves removal of any dirt from old car bodies. This can be logistically difficult and expensive. Additional requirements of the Department of Primary Industries apply to the transfer of putrescibles matter between islands.

Given the above, consideration should be given to imposing a levy on all vehicles brought onto the island. Such a levy could pay for the ultimate removal of the vehicle from the island.

A solution for the handling, sorting and disposal of waste needs to be found for Iama. An alternative option is the introduction of a waste transfer station and removal of waste from Iama to another site (such as Cairns, Horn Island or a yet to be determined regional waste depot) for the Torres Strait.

6.3.4 Land Use Strategies

To minimise the impacts of waste infrastructure on Iama's natural and man made environments, the following strategies are recommended:

- Future landfills are located in geologically stable areas, not flood prone or adjacent to areas of high ecological significance or in areas identified as affected by natural hazards.
- Waste generation is avoided in the first instance. Where waste generation cannot be avoided, practices are implemented to reuse, recycle or recover wastes and materials prior to disposal.
- A voluntary target of reducing waste through recycling.
- Waste disposal to landfill is minimised through applying waste recovery techniques that gain optimum recovery of reusable and recyclable materials.
- Materials other than general domestic waste should be separated and stocked piled to enable their re-use or transportation off Iama.

6.3.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Waste Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development encourage conservation, composting and recycling of waste?
- Has the development considered the impact it will have on the capacity of the landfill site?
- If the development involves demolition of an existing structure, is the removal of
  - material from the island or its reuse
  - removal of contractor's vehicles from Iama at the end of the project addressed?

6.3.6 Land Use Projects

The following projects are recommended to be undertaken:

- A study to quantify the need for waste management capacity for all waste streams until 2020.
- A study to determine a solution for the handling, sorting and disposal of waste.
- Consider the cost and feasibility of a 'vehicle disposal levy' to cover the cost of removing abandoned vehicles from Iama.

6.3.7 Sustainable Waste Infrastructure Outcomes

- The development of an integrated and strategic approach to regional and local waste management.
- The volume of waste requiring disposal is reduced to a minimum, while maximising the economic value of resources during their life cycle through reuse, recycling, reprocessing and energy recovery.
- Any future landfills are located in geologically stable areas and are not flood prone or adjacent to areas of high ecological significance.
- Achieve targeted reductions in waste consumption by using waste efficiently and managing consumer behaviour and demand for waste.
- All waste infrastructure and landfill sites are inspected regularly and maintained to ensure that they are in effective working order.

6.4 Electricity

6.4.1 Best Practice

- Electric infrastructure is expensive to install and consideration must be given to the proximity of existing electricity infrastructure when planning future development.
- Provide energy generation production, transmission and distribution capacity to meet the needs of the population and support the use of viable alternative energy sources where appropriate.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on lama's electricity infrastructure by:
  - recognising the importance of climate change on lama's electricity infrastructure;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on lama's electricity infrastructure.

6.4.2 Overview of Current Situation

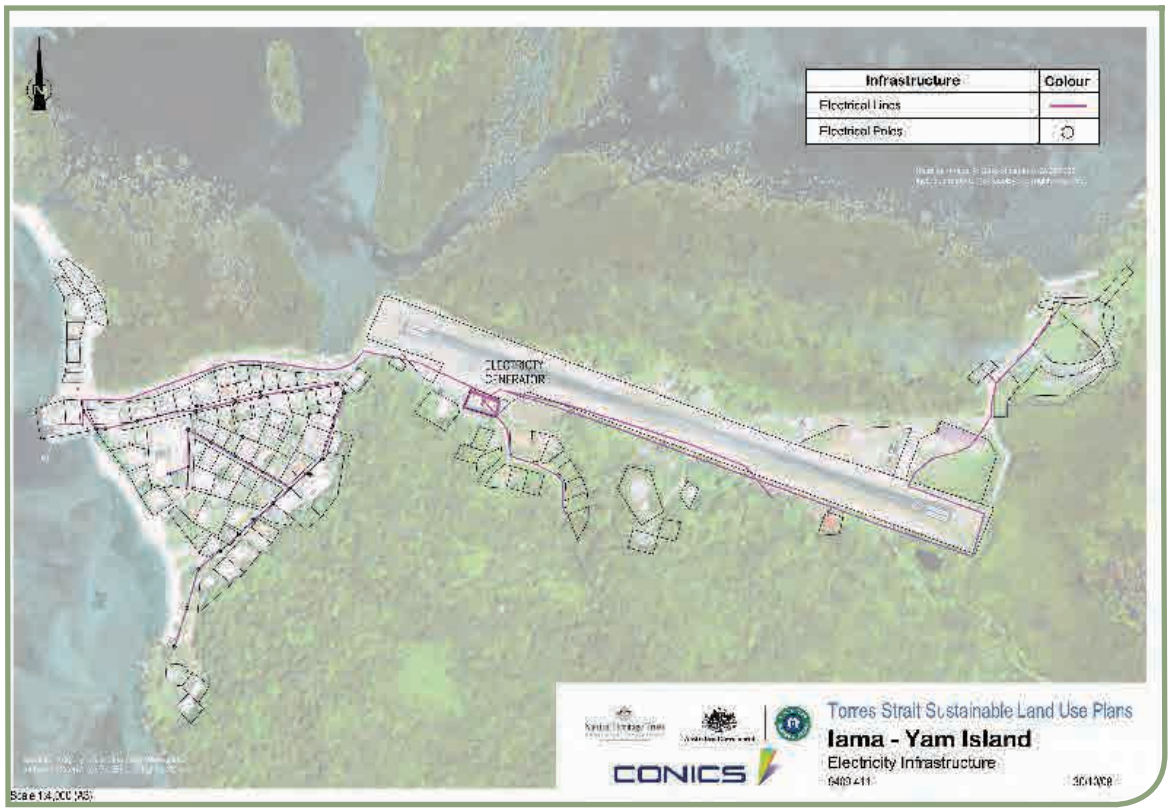
Electricity is supplied to lama from a central power station located adjacent to the airstrip at the western end of the strip. The generation, distribution and supply of electricity is undertaken by Ergon Energy on behalf of the State government. This is the case for all Torres Strait Islands.

Electricity is generated through multiple diesel generator sets (gensets) which are sized to match the load as it fluctuates during the day. The gensets are modular and interchangeable and as such, are relatively easy to repair or relocate without disturbance to the continuity of electricity supply.

The cost to generate electricity on remote islands is significantly higher than the income received from the consumers, between a factor of 5–10. The State Government Community Service Obligation as an equalised tariff, covers the difference in generation costs and income.

Map 18 shows the areas serviced by the existing electricity infrastructure.

Map 18 Electricity Infrastructure



For more detail, refer to Map No. 9409-411 contained in Volume 3 – Maps.

6.4.3 Issues Overview

Although the cost of electricity to consumers at Iama is the same as for anywhere in Queensland, there is a pressing need for the all people on the island to conserve electricity. Electricity generated by the combustion of diesel fuel causes significant greenhouse gas emissions and the burning of fossil fuels, is not a sustainable practice.

There is limited opportunity for viable alternative sources of energy on Iama. It may be feasible to use gas to fire the gensets, as gas is a lower emitter of greenhouse emissions. However, it is impractical and expensive to barge in large gas bottles for power generation.

Renewable energy sources such as wind and solar could be considered as a supplement to the base power supply. However, any renewable resource would not be able to completely replace the existing base diesel generator sets as the demand on the island is too high for a renewable supply to support and there is no realistic method of storing generated electricity during periods of low generation (lack of wind or solar radiation).

From a land use perspective, gradual increase in population and the corresponding increase in demand are generally met by the inherited scalability in the system, i.e. the modular gensets can be reshuffled to suit. Large-scale increases in demand might require the upgrade of a switching and distribution infrastructure. Any new development away from the main powerlines may require a contribution to Ergon for the installation of powerlines/transformers etc, however this is generally considered on a case-by-case basis.

Any significant increase in generation capacity may require consideration of enlarging the power station site or relocating the site as the existing site is reported to be of marginal capacity. If a new site is required, an analysis of potential noise levels should be undertaken to avoid background diesel generator noise pollution in residential areas.

6.4.4 Land Use Strategies

To ensure the effectiveness and efficiency of the electric infrastructure network, the following strategies are recommended:

- Development should not occur in areas in close proximity to the generators.
- If development occurs adjacent or nearby to the generators, noise retention, measures must be incorporated in the design of the development.
- Development must not impede the supply and access to the electric infrastructure network.
- The visual impact of electricity infrastructure on development and the natural environment is to be minimised through the provision of landscaping.
- Inappropriate land uses such as a school or a play area should not be located in an electricity easement or within close proximity of the generators.

6.4.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Electricity Best Practice, Land Use Strategies and Sustainable Outcomes?
- Can the existing electric infrastructure cater for the development without requiring an upgrade of the system?
- If the development is adjacent to or near a generator, does it include noise attenuation measures?
- If the development is for a new system or an enlargement of the existing infrastructure, have noise and landscape studies being undertaken?
- Has an agreement with Ergon regarding the supply of electricity been reached?

6.4.6 Sustainable Electricity Infrastructure Outcomes

- An efficient, sustainable and reliable electricity infrastructure.
- Energy efficient principles are included in the design and layout of new urban areas and developments.
- The visual and noise impact of electricity infrastructure on the natural and man made environments is minimised through landscaping and appropriate noise attenuation measures.
- All electricity infrastructure is inspected regularly and maintained to ensure that they are in effective working order.

6.5 Telecommunication Infrastructure

6.5.1 Best Practice

- Telecommunication facilities are expensive to install and consideration must be given to the proximity of existing telecommunication infrastructure when planning future development.
- The land around a telecommunication facility or service should be integrated and maintained to protect the land and marine environments.
- Planning around a telecommunication facility or service should aim to achieve and maintain a high standard of environmental quality and minimise noise to adjacent residential areas.
- All new infrastructure or modification to existing infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on Community by:
  - recognising the importance of climate change on existing and future telecommunication facilities or services;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on the Island s natural environments.

6.5.2 Overview of Current Situation

A large Telstra Tower is located at the eastern end of Iama, just past the sewerage treatment plant. There is mobile phone coverage over Iama.

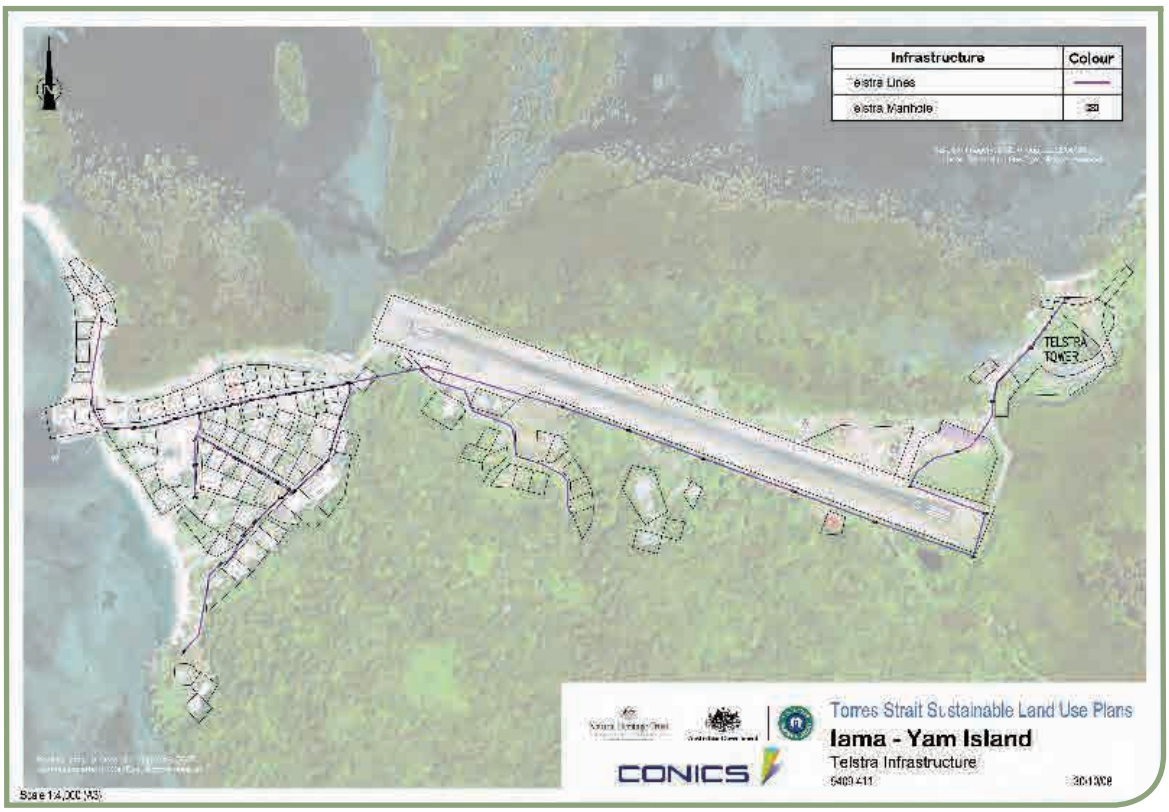
Map 19 shows the location of telecommunication infrastructure

6.5.3 Issues Overview

There are no known issues regarding telecommunications on Iama.

It is sound land use planning practice to ensure that compatible development occurs near telecommunication infrastructure. This, residential development should not be permitted near the Telstra Tower.

Map 19 Telstra Infrastructure



For more detail, refer to Map No. 9409-411 contained in Volume 3 – Maps.

6.5.4 Land Use Strategies

The following strategy is recommended:

- The Telstra Tower is protected from urban encroachment, including noise sensitive development and any other development that may impact on current or future operations.

6.5.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Telecommunication Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development provide affordable access to reliable telecommunication services?

6.5.6 Sustainable Telecommunication Outcomes

All telecommunications infrastructure is inspected regularly and maintained to ensure that they are in effective working order.

6.6 Roads

6.6.1 Best Practice

- Roads are expensive to construct and maintain so consideration must be given to the proximity of existing roads when planning future development.
- Foster investment in road improvements to ensure a high standard of road and adjoining environments.
- Encourage the use of walking and cycling rather than the use of vehicles.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change on Iama's road infrastructure by:
  - recognising the importance of climate change on the existing and future road infrastructure on Iama;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change on Iama's road infrastructure.

6.6.2 Overview of Current Situation

The majority of roads on Iama are constructed from sandy soils at varying widths and are unsealed. The roads can generally be trafficked in all weather, except for periods of localised flooding. The majority of stormwater runoff comes from the catchment area immediately behind the community, however the sandy nature of the soil permits reasonably quick drainage and flooding is not prolonged.

The unsealed roads require continual maintenance to ensure that the roads are kept in a serviceable condition; however Council has limited earthmoving equipment to undertake maintenance work

The road connecting the barge ramp to the Airstrip behind the Council office is a main thoroughfare for distribution of goods. This road has been reconstructed with fibre-reinforced concrete. The other high usage road is Moresby Street, which is a popular access for pedestrians. This road has been paved with concrete blocks for durability.

Some concrete lines drains starting from the base of the catchment area have been constructed in recent times. This has significantly improved overland drainage in the area.

The existing unsealed road to the south of the community running parallel to the beach is currently experiencing wave erosion during high tide and requires repair.

The 2006 Census indicates the following statistics:

- 62 privately owned vehicles;
- 49 households did not have a vehicle;
- 13 households had one vehicle; and
- no households had two vehicles.

Note: there are more vehicles on Iama than the Census indicates as it does not include vehicles used by the Council or construction workers.

6.6.3 Issues Overview

Council has advised that there is a need for road access from the southern end of the community to the IBIS store area as residents currently use the beach as the main access route.

Minor localised flooding behind the school and JMG Street still occurs. This may require further investigation into the inclusion of culverts and extension of concrete lined drains in the area.

6.6.4 Land Use Strategies

To minimise existing and future development on the natural environment of Iama and the impacts of natural hazards, the following strategies are recommended to be implemented:

- All development proposals must include landscaping and/or revegetation plans that are in accordance with the Best Practice, Land Use Strategies and Sustainable Outcomes outlined in this Sustainable Land Use Plan for Iama.
- Transport planning considers the risk of natural hazards such as cyclones, tides, storm surges and acid sulfate soils with transport infrastructure located and designed to avoid or minimize the impact of such events.
- A network of functional, legible and convenient street signs is established.
- A safe and convenient network for pedestrians is provided along street networks, linking residences and providing access to points of attraction within and beyond the urban areas.
- Parking areas do not affect the unique characteristics of sites and are linked to more sensitive features of each site with safe pedestrian and cycle ways.
- Encourage alternative forms of transportation around the community such as bicycle, scooter or golf buggies to reduce the reliance on petrol driven vehicles. This would also improve the problem of disused and abandoned vehicles consuming valuable space in the dump.

6.6.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Roads Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development integrate the land use, efficient movement of people and goods and growth for Iama?
- If the development is in a natural hazard area, is the road located and designed to avoid or minimize the impact of such events?
- If a new street or road is proposed,
  - does it provide for vehicles, pedestrians and cyclists adequately
  - is it highly connected within the development, with the surrounding area and between settlements
  - does it propose road signage in keeping with Iama's signage network?

6.6.6 Sustainable Road Infrastructure Outcomes

- The integration of land use and an efficient, safe and sustainable road network that minimises adverse impacts on the environment and reflects the needs of Community.
- Development encourages lower impact modes of travel such as walking and cycling
- All vehicles bought onto Iama are to be removed from the island after construction is completed.
- All road infrastructure is inspected regularly and maintained to ensure that it is in effective working order.

6.7 Drainage

6.7.1 Best Practice

- Protect drainage infrastructure and receiving waters from sedimentation and other contaminants.
- Ensure that streets operate adequately during major storm events and provide for public safety and minimise the drainage infrastructure cost of development.
- All new infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Manage quality and quantity of urban runoff by using stormwater in the landscape by incorporating multiple-use corridors that maximise the visual and recreational amenity of Iama.
- Reduce the impacts of climate change Iama's drainage system and infrastructure by:
  - recognising the importance of climate change on Iama's drainage system and infrastructure;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change Iama's drainage system and infrastructure.

6.7.2 Overview of Current Situation

The village area has sandy soil and as stormwater runoff generally soaks through the paved/sandy street into the soil, there is no piped drainage system. The concrete road from the barge ramp to the airstrip has no piped drainage. The Gaurab Village subdivision roads have headwalls and culverts under the roads, leading to a stormwater culvert under the airstrip.

6.7.3 Issues Overview

There is an open drainage channel within the village area running from south of the school through the houses to the beach. Whilst this has no doubt improved the stormwater drainage through the village, the Community considers that it has increased inundation backing up-water from the beach during high tides.

6.7.4 Land Use Strategies

The following strategy is recommended:

- That development not is permitted in overland flow paths or drainage paths.

6.7.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must be amended or not be accepted.

- Is the development in accordance with the Drainage Best Practice, Land Use Strategies and Sustainable Outcomes?
- Is the development designed to minimise its impact on the existing drainage network and adjoining properties.

6.7.6 Land Use Projects

To minimise flooding of properties caused by stormwater flows (as opposed to tidal inundation) it is recommended that a drainage study be undertaken to determine the impact of whether there is any overtopping of the existing drain in the village area.

6.7.7 Sustainable Drainage Infrastructure Outcomes

- Minimise damage to properties and inconvenience to residents from urban runoff by integrating stormwater treatment into the landscape.
- All drainage infrastructure is inspected regularly and maintained to ensure that it is in effective working order.

6.8 Air Access

6.8.1 Best Practice

- Efficient air transport to service both freight and passenger needs is provided.
- Freight and passenger air access is integrated and maintained to protect the adjoining natural and man made environments.
- Adjoining land uses and development are compatible with the operation of airstrip with houses shielded from the impact of aircraft noise by requiring appropriate noise attenuation measures.
- All new infrastructure or modification to existing infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change and fuel costs on air access to and from Iama by:
  - recognising the importance of climate change and fuel costs on air access to and from Iama;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change and fuel costs on air access.

6.8.2 Overview of Current Situation

The aircraft facilities at Iama comprise of a 770 metres long by 60 metres wide sealed airstrip located on the central flat area of the Island. Other facilities include a paved apron and waiting building.

The sealing of the airstrip in 2003 has effectively ended the previous problems associated with rutting and dust.

Air services exist between Iama and Saibai, Masig, Poruma, Warraber and Ngurupai (Horn) Islands, with regulated passenger transport provided between Iama and Ngurupai (Horn) Island. These flights occur three times a day, morning, midday and late afternoon.

Emergency access is available via medivac rescue helicopter (day and night) if required.

6.8.3 Issues Overview

Lighting of the airstrip would assist in night time emergency or bad weather access to the island, although it may be cost prohibitive and contribute to increase in energy consumption of the island.

The airstrip and the land around it, is a sensitive and valuable resources. It is the what, where and how we build that can endanger an airstrip; therefore, it is critical that compatible land use planning receives particular consideration.

6.8.4 Land Use Strategies

The following strategy is recommended:

- The airstrip is protected from urban encroachment, including noise sensitive development and any other development that may impact on current or future operations.

6.8.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Air Access Best Practice, Land Use Strategies and Sustainable Outcomes?
- If the development is located near or adjacent to the airstrip is it:
  - a compatible land use with the airstrip;
  - if so, does it incorporate noise attenuation measures?
- Does the development impact on the approach/take-off areas of the runway?

6.8.6 Sustainable Air Infrastructure Outcomes

- Recognise the importance of the airstrip to Community and the Torres Strait Islands.
- The integration of land use and air access purposes to ensure that there is minimal adverse impact on the development.
- All air infrastructure is inspected regularly and maintained to ensure that they are in effective working order.

6.9 Sea Access

6.9.1 Best Practice

- Planning around a barge ramp and jetty should aim:
  - to achieve and maintain a high standard of environmental quality;
  - minimise noise to adjacent village areas;
  - to protect land around a barge ramp and jetty to preserve their value for uses which depend upon proximity to the sea for access to services and facilities; and
  - to integrated and maintained sea access infrastructure to protect the land and marine environments.
- Provide efficient sea transport to service both freight and passenger needs.
- All new infrastructure or modification to existing infrastructure with a life of 10+ years should consider climate change risks now for function, design and location.
- Reduce the impacts of climate change and fuel costs on sea access to and from Iama by:
  - recognising the importance of climate change and fuel costs on sea access to and from Iama;
  - avoiding quick decisions now that will make it more difficult to manage climate change risks in the future; and
  - building understanding and capacity of Community to deal with the impacts of climate change and fuel coasts on sea access.

6.9.2 Overview of Current Situation

The marine facilities at Iama consist of a precast concrete barge ramp, a timber finger pier and a rock seawall, which extends around the desalination plant building. The barge ramp and finger facilities are accessed from the deep water by a dredged channel that is marked by navigational buoys.

The barge ramp and associated rock walls provide access for all goods transported to the island and are an essential part of the community's infrastructure.

Iama is serviced weekly by a barge service from Port Kennedy.

6.9.3 Issues Overview

The finger pier is a narrow timber deck that is supported on steel foundations. The structure is suitable for the mooring of small vessels, however it is understood that there is limited mooring space at certain periods.

The Barge Channel through the reef needs to be dredged to remove the sand build up. Ideally a specific set down area for the storage of goods being loaded/unloaded onto the barge would remove the short-term congestion around the barge ramp whenever the Barge is at the island. However, limited space on Iama makes this task difficult to achieve.

6.9.4 Land Use Strategies

The following strategy is recommended:

- Land use and barge ramp purposes are to be integrated to ensure that development is compatible with adjacent village development.

6.9.5 Land Use Considerations

When assessing the impacts of future development on Iama, the following key questions are to be asked. If the answer is "NO" to any of the questions, the proposal must justify the inconsistency, or be amended or not be accepted.

- Is the development in accordance with the Sea Access Best Practice, Land Use Strategies and Sustainable Outcomes?
- Does the development provide efficient access to the barge ramp and jetty?
- If the development is located near or adjacent to the barge ramp and the desalination plant is it a compatible land use for port activities and the adjacent or nearby village?

6.9.6 Sustainable Sea Access Outcomes

- Recognise the importance of sea access to Community and the Torres Strait.
- Develop and implement an integrated management plan for land uses around the barge ramp and jetty.
- All sea infrastructure on or abutting Iama is inspected regularly and maintained to ensure that they are in effective working order.

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