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# TARAWA URBAN FUTURES PROJECT

## Executive Summary

This report concludes that the Tarawa Urban Futures Project, based on the information currently available, represents a viable opportunity for major urban resettlement on Tarawa which will represent an exemplary landmark project of its type across the Pacific Island States.

Again on the basis of information and investigation to date, the project can be successfully delivered embracing the philosophies of

- Integrated Sustainability
- Cultural appropriateness
- Economic viability

A staged project is encouraged whereby, under an approved Conceptual Master Plan, work can be progressively undertaken at a rate that meets government priorities, demand and available funds. Each individual stage however will be complete in its own right.

The Temwaiku Urban Development, when complete, could house approximately 15,000 residents in 1,800 dwellings (not including the use of the fish farm precinct). On currently buildable land (Stage 1) the developed area would hold 11,000 people on 1,200 lots.

## Introduction

This report presents findings and recommendations regarding the basic feasibility of the initial concept plan for Tarawa Urban Futures with special attention devoted to the Temwaiku resettlement proposal.

The report describes a sustainable urban development that provides a clear vision of a way forward for addressing Tarawa's severe urban crisis in a holistic, sustainable manner. It presents a clear picture not only of what a future Tarawa could look like, but also how to achieve it and how it should work (the social, environmental, legislative and economic strategies that go with the plan).

The report has been prepared by a team of professionals representing a diverse range of disciplines from the Queensland University of Technology, Brisbane. Details of the group, together with their support professionals, are outlined at the end of the report.

The team visited Tarawa during a period from 11 November 2004 to 23 November 2004, for two of the group and from 15 November 2004 to 19 November 2004, for the remaining three.

Based on the available data, interviews and field inspections, the report is able to make reasonably definitive observations which indicate that such a proposal is viable and which establishes a firm strategy and direction to move the project forward.

## **Purpose**

The purpose of the report is to provide the Kiribati government with the information it requires to make decisions on the progress of this initiative.

It is hoped that this project (the urban development itself) and the processes of planning for, implementing and living in / managing the development, will become blueprints for any future development of Tarawa and the outer islands in the future.

## **Principal Philosophies**

The Conceptual Master Plan and supporting plans for the Temwaiku Urban Development presented in this report are based on four principal issues or philosophies:

### ***1. Holistic approach to integrated sustainability***

This is a complex project of major significance. It brings together a range of physical, environmental, social, political and economic issues that must be addressed in a complete and integrated manner over a number of years to provide a land mark solution to the benefit of Kiribati and its citizens.

### ***2. A platform for action***

This report cannot address in detail all of the issues pertaining to the Temwaiku site but does set a firm foundation and strategy upon which the various components of planning and later development and management of the site can be established with confidence.

### ***3. Culturally appropriate***

The report is cognizant of the fact that a critical success factor of the entire project is that in design and later occupation it incorporates the cultural characteristics of the Kiribati people and further exhibits their unique culture and know how, both now and in the future.

### ***4. Practicality and economic viability***

The study emphasises practical outcomes. Despite the scale and potential capital cost the proposals have included considerations of risk management and, where at all possible, have involved evolutionary and staged development. This includes the ability within those stages to change timings depending on the availability of funding and levels of demand. Finally these considerations also include the maximisation of widely defined economic and wider community benefits flowing from the project over time.

## **Project Outline**

In accordance with “Tarawa Urban Futures Concept Project’ document, this report consists of an analysis of a site to determine its suitability for a sustainable urban development, a Conceptual Master Plan of the development, an implementation process and observations relating to future management.

## Site description and specific issues

Temwaiku is located in the south east corner of Tarawa on government land. The site is bounded on the ocean side by private land and on the lagoon side by the Temwaiku causeway. The proposed development area is approximately 3.066 square kilometres with maximum elevation of 4 metres. It contains no features of particular ecological significance. It is close to Bonriki International Airport and Bikenibeu. Most of the Temwaiku site was once swamp and natural wetlands. Since the construction of the Temwaiku Causeway the tidal flows have been eliminated but remnant swampland still exists in parts.

The site comprises largely of a government owned fish farm (approximately 26 % of the site) and a government owned coconut plantation (approximately 17% of the site) with the remainder being sparsely vegetated low lying areas including freshwater wetlands. Figure 1a shows an aerial view of the proposed development site whilst Figure 1b shows the site boundaries and major site features.



**Figure 1a: Temwaiku site**



**Figure 1b: site boundaries and major site features**

### **Specific Site Issues**

**a) Milk fish farm:** Discussions have been held with the Deputy Director of Fisheries in regards to this facility. The viability and operations of this enterprise are outside the scope of this report, however it is a premise of this report that this facility is to remain in situ for the time being. It is stressed that, if in the future the farm ceases its commercial viability, the site it occupies needs to be reinvestigated regarding the options to utilise it for further residential development or alternative agricultural activities. In this case the area could be used for landfill (waste disposal) and reinstated.

**b) Coconut Plantation:** The government owned plantation does not appear to be maintained or managed on a formal scale. It is beyond the expertise of the

current team to assess the health of the plantation and we recommend that the government access the report “Effects of pumping from infiltration galleries on crop health and production in low coral islands” (White and Falkland, November 2004) which describes some factors that influence coconut production. It is believed, though, that the coconuts have significant value for domestic use and thereby the Conceptual Master Plan proposes to incorporate them into the development, with minimal removal of palms. There are some small scale, but reasonably effective, low constructed levee walls which keep the plantation areas inundation free. There is no other infrastructure or improvements related to the plantation.

- c) **Vehicle Dumping Site at Tamoia:** The Conceptual Master Plan identifies this site as suitable for residential purposes (stage 1). The site is cleared and levelled and contains a large number of derelict and wrecked government vehicles. These vehicles could be more usefully deployed for erosion control and/or causeway construction (refer to the Waste Management Strategy).
- d) **Better future developments:** options for potential future development of the site form the bulk of this report.

## Overall Strategy

The development of this proposal has involved several inter-related stages

- Establishing and defining the parameters
- Collection of information (Mapping & spatial information , previous investigations and reports, site visits, discussions with relevant stakeholders / information holders)
- Analyses of information
- Development of strategies to address each of the sustainability components
- Development and design of Conceptual Master Plan

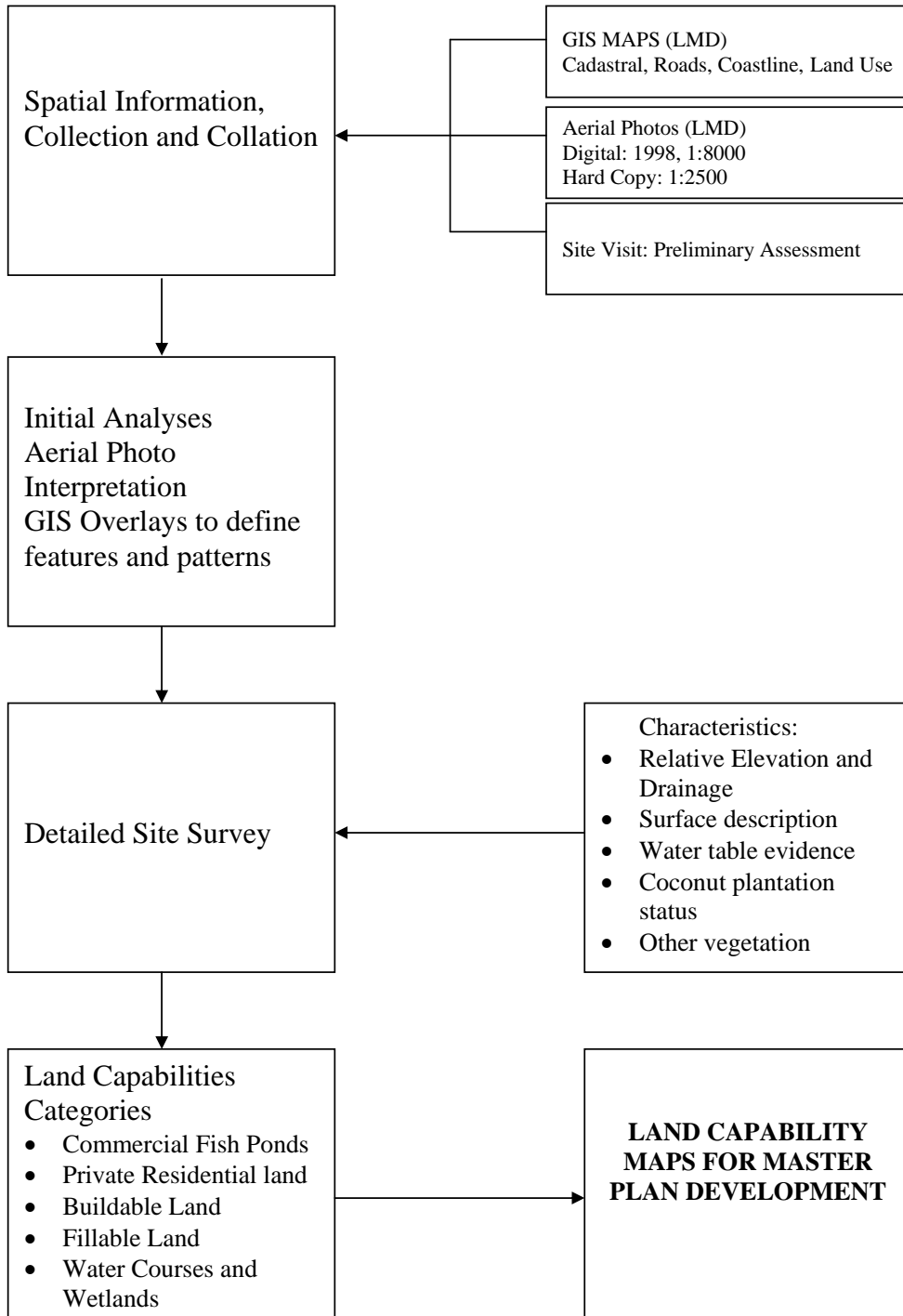
However the information and recommendations within this proposal are constrained by the information available to the team and the time availability.

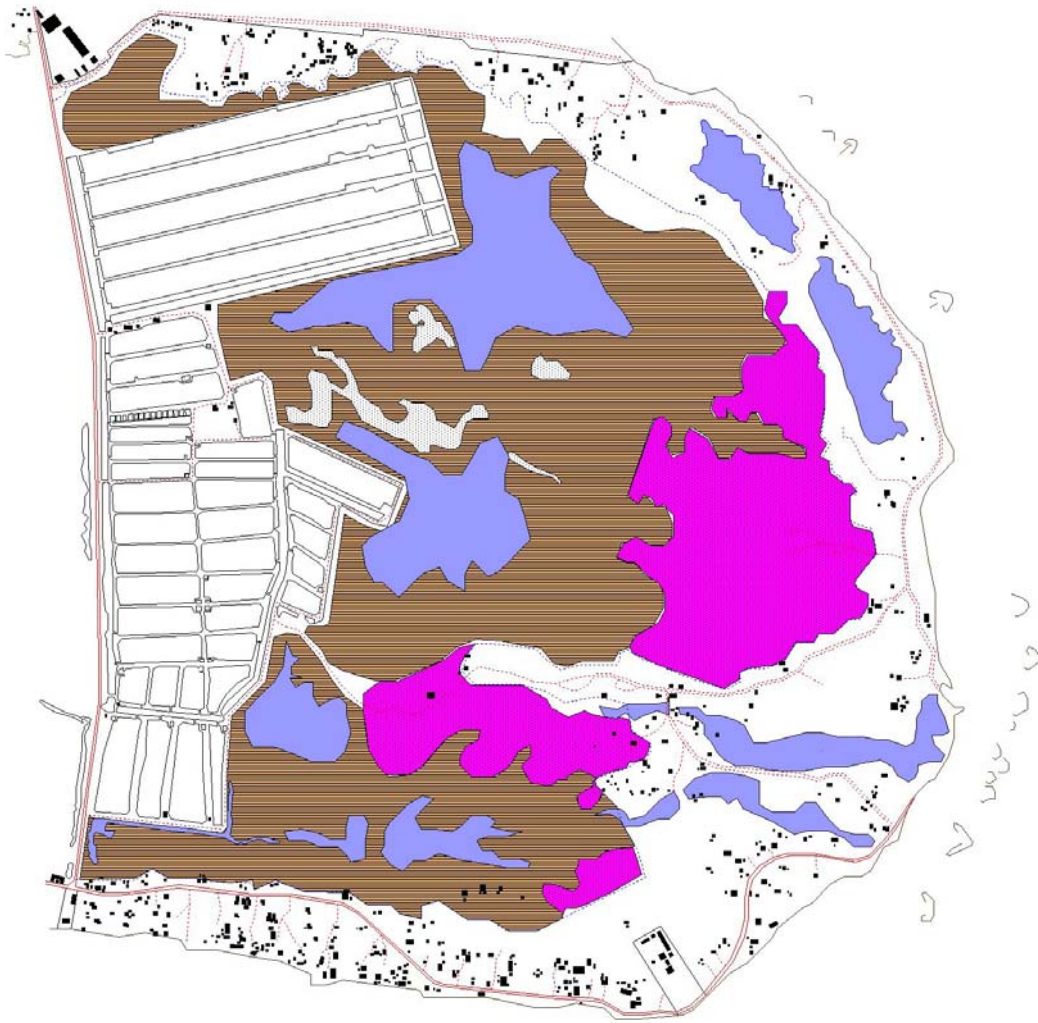
## Land Capability Study

The following flowchart outlines the methodology used to determine the land categories that are used as a basis for the development proposal.

Figure 2 contains a land capability map and is followed by Table 1 which summarises the physical descriptions of the land categories.

**LAND CAPABILITY ASSESSMENT**








**Figure 2: Land Capability Map**

**TEMAIKWU CONCEPTUAL MASTER PLAN LAND CAPABILITY MAPPING**

**TABLE 1: SUMMARY PHYSICAL DESCRIPTIONS OF LAND CATEGORIES**

Land Category	Total Area (Sq. m)	Elevation and Drainage	Apparent Water Table	Surface Conditions	Coconut Plantation Status	Other Vegetation
<b>BUILDABLE LAND</b> 	463,700 sq m Includes three areas: Sth 18,411 126,022 East 309,267	Highest elevations Drains towards water courses and wetlands through Fillable Land.	Excavated ponds indicate water table approx 0.2 m below duricrust layer.	Visible surface duricrust in dryer areas. Compacted calcareous sand and aggregate patches. Minimal organic soil development	Palms healthiest on site, but suboptimal development. Some harvesting and local use for toddy.	Sparse undergrowth, grasses, scattered pandanus, isolated Casuarina trees.
<b>FILLABLE LAND</b> 	857,968 sq m Through central N-S section of site, wetlands occur within this (area not included in above figure)	Lower elevations within plantation area. Areas adjacent to Buildable Land. Drains towards water courses and wetlands	Excavated ponds indicate water table near surface, but below duricrust.	Wet peaty bog soils. Some water ponding. Duricrust impedes infiltration. Footpaths and roads built to 0.5 m, provides dry surface.	Palms stressed, underdeveloped. Mortalities around wetlands and in saturated areas.	Sedges, restia sp, wetland creepers, some grasses where dryer. Panadanus. Dodda infestations in scrubby undergrowth areas.
<b>WATER COURSES AND WETLANDS</b> 	335,246 sq m Water course to south of site (W to E flow) Three areas adjacent to Commercial Fish Ponds along W. area of site.	Surface water ponding Constructed walls and dams restricting drainage to west in S water course. N-S bund in N-E area restricts flow to east (former lagoon area). Mud/silt flats adjacent to commercial fish ponds appear to drain to west (part of former tidal lagoon area).	Duricrust below surface water levels. Water table probably above surface.	Southern area watercourse dammed to form fresh water pools, disconnected along course. Stagnant water pools, saturated mud/silt flats in NW areas.	Unsuitable for coconuts, plantation not in this area.	Water courses- sedges, restia, scrub species along edges. Flats - surface algae and weeds, minimal vegetation.

## Conceptual Master Plan

The following plans and diagrams contain the concept for the development of the entire Temwaiku site.

**Figure 3: Conceptual master plan**

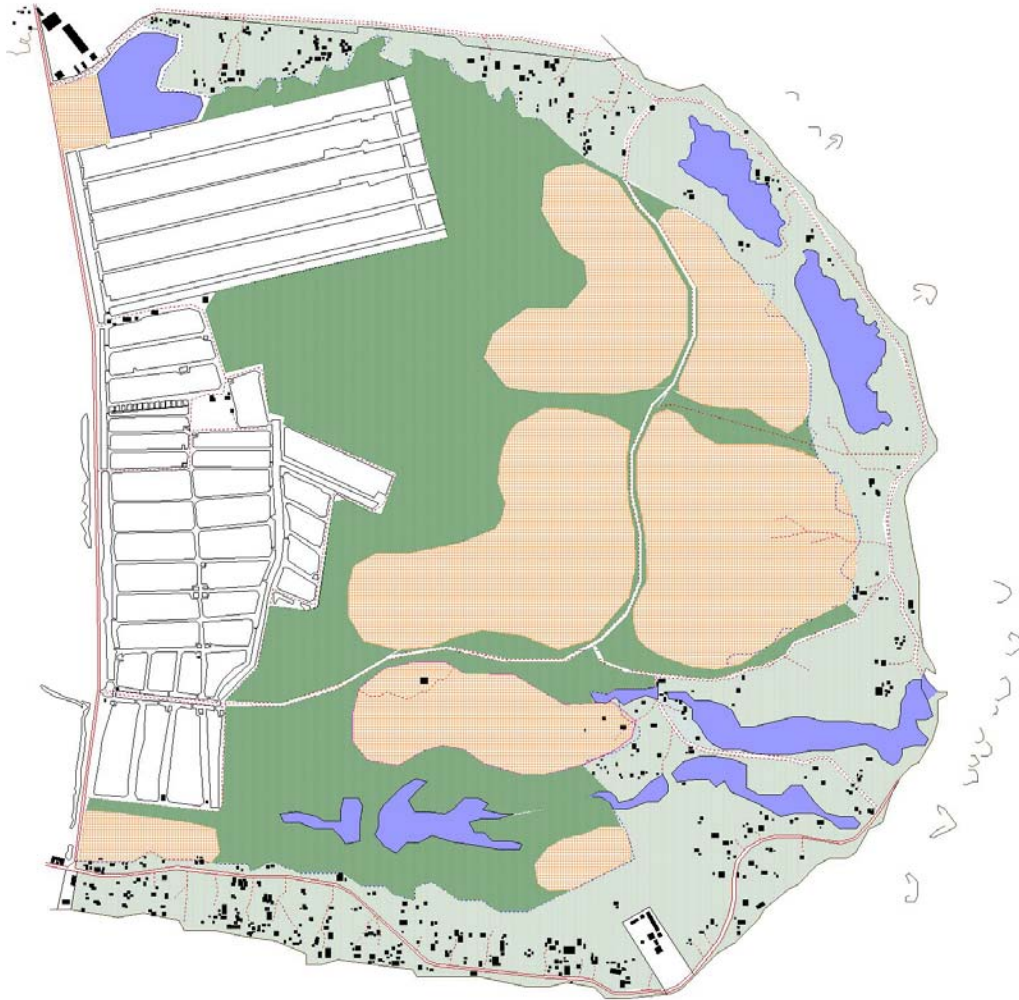
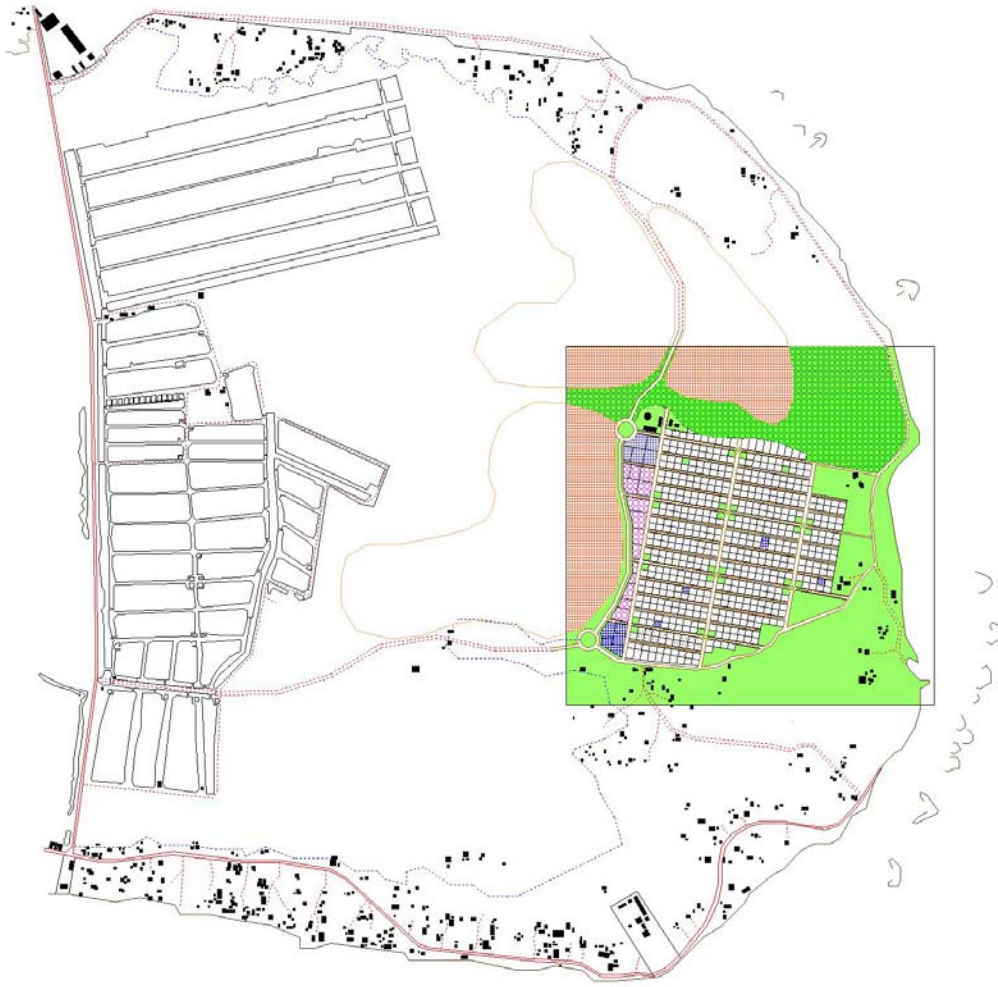
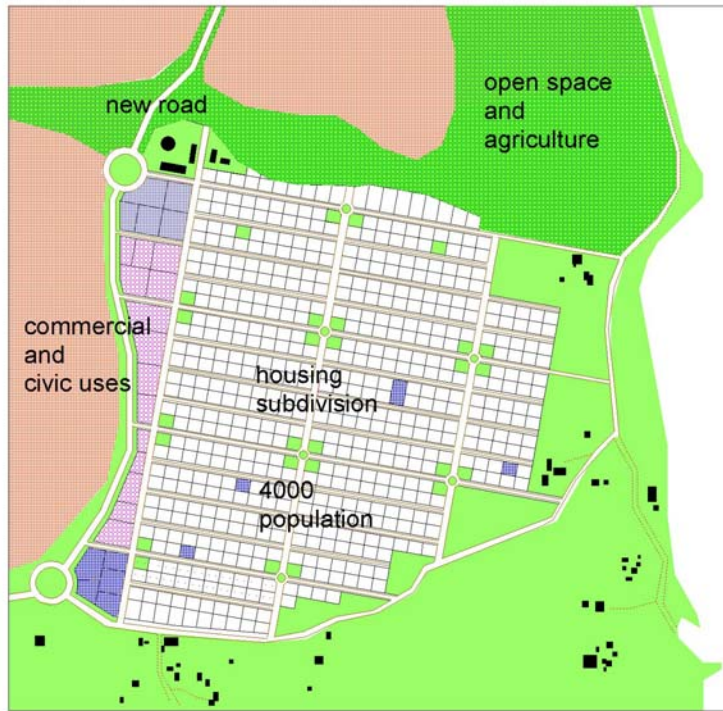


Figure 4: Stage 1 village



**Figure 5: Village layout and components**



**Figure 6: Housing site layouts**

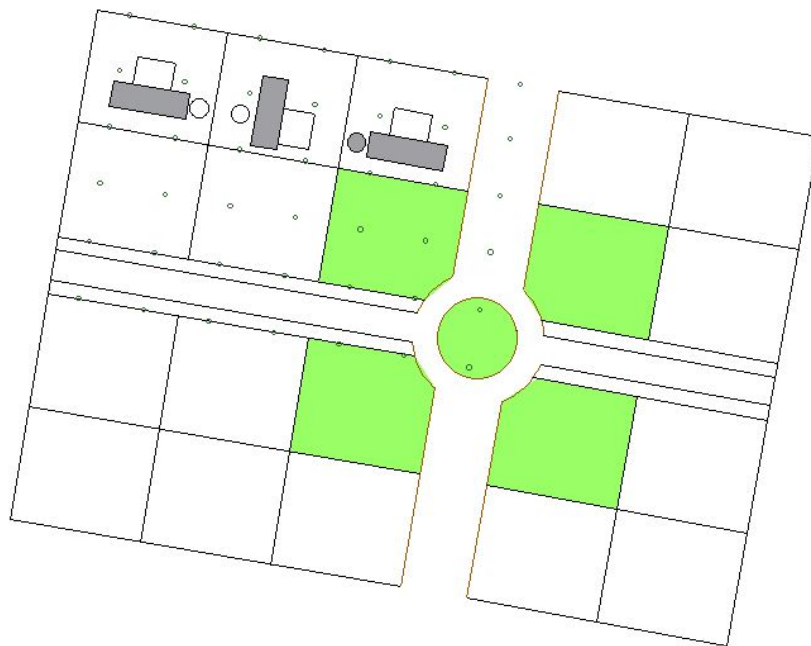
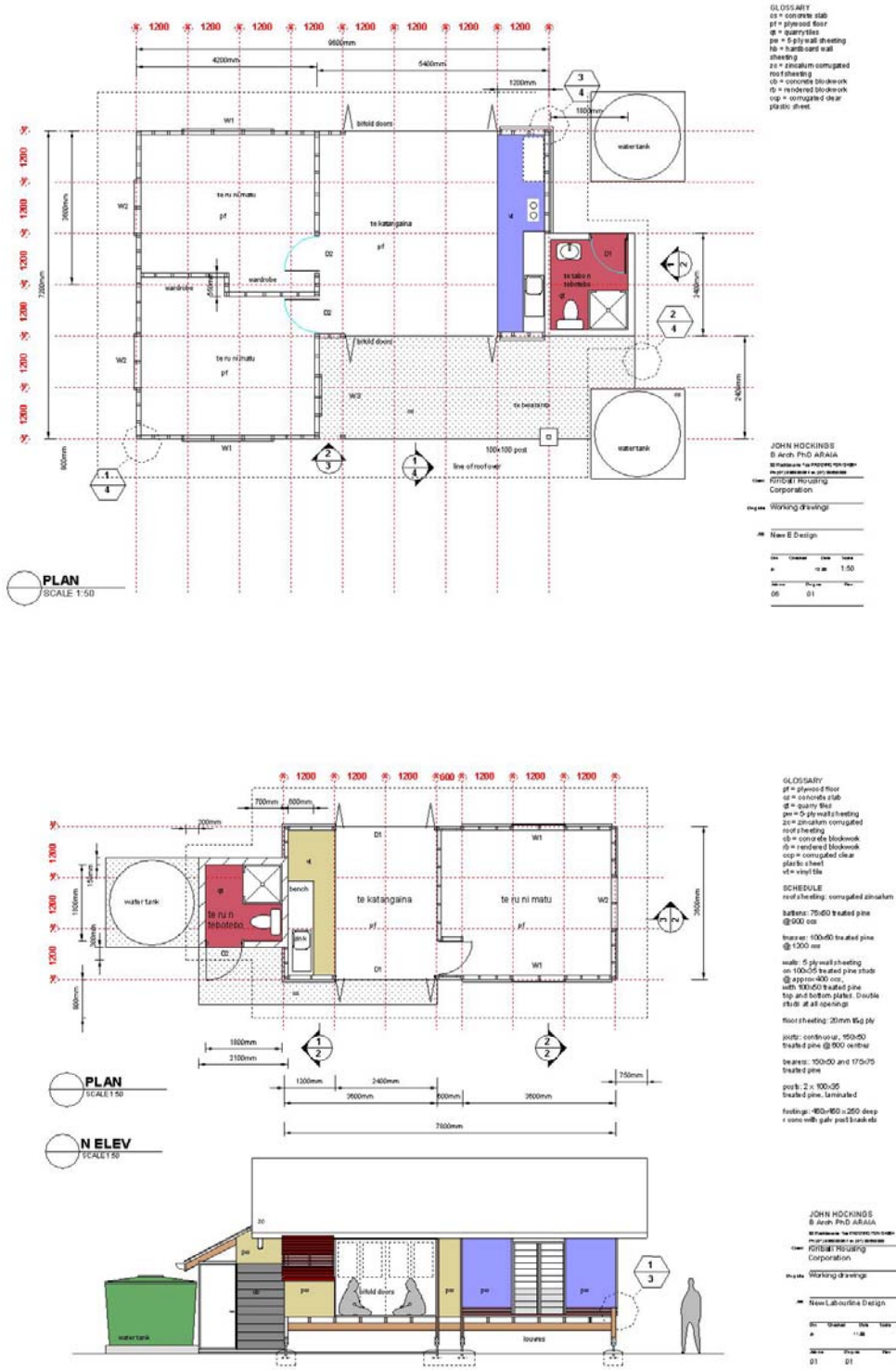


Figure 7a and 7b: Housing designs

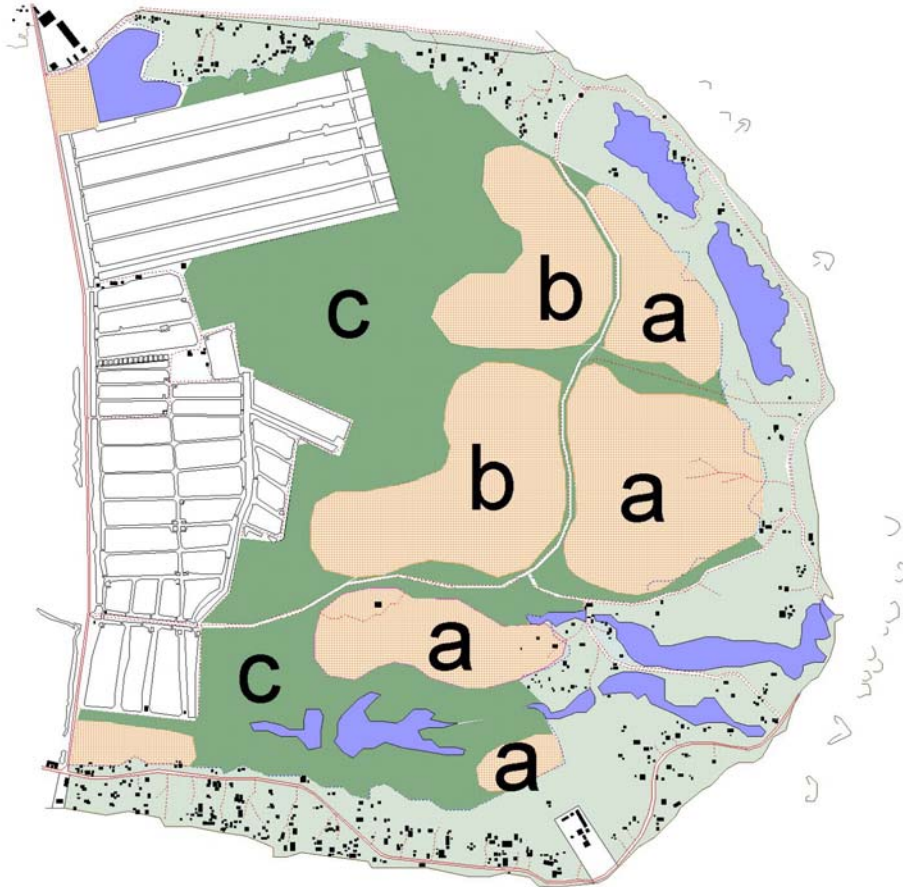


### Staging

Figure 8 (the conceptual master plan) identifies areas that can be developed in stages.

- Areas marked 'A' can be developed immediately
- Areas marked 'B' need some minor reclamation prior to development
- Areas marked 'C' will require significant reclamation

**Figure 8: Staged development**



## Integrated Components

### 1. Land and Drainage

It is proposed to reinstate the two drainage systems located in the south east corner of the site by opening these to tidal flow on the ocean side (see Figure 9). The western section of the lower drainage system at Temwaiku causeway will use a drainage gate to only allow flow out of the system at low tide. This will reduce the risk of saltwater intrusion throughout the site. Retaining walls will be constructed along these drainage systems to control flow and limit flooding in extreme high tide events.

**Comment [h1]:** Add sentence about building a rock wall for drainage system

Opening these systems to the ocean will eliminate upstream damming where water levels are elevated due to these constructed constrictions. This will also enable better flushing of the system and subsequently allow draining of large tracts of low-lying land across the site. This may in turn reduce the amount of reclamation required.

The benefits of opening these drainage systems to tidal flow would be:

- “buildable land” would increase in area as “fillable land” around the edges is drained,
- increased environmental health as system is presently stagnant and contains rubbish and abundant algal growth, and
- restore natural drainage across the area enhancing runoff across the indurated surface during rainfall events.

**Comment [h2]:** Insert comment on using sand from north Tarawa for reclamation; benefits etc

It is recommended that a hydraulic study of the southern drainage systems be carried out to determine flow directions, tidal dynamics and potential as drainage conduits.

Sand for reclamation could be accessed from the lagoon side of North Tarawa over time to fit in with the staged development process. Acquiring this sand would provide long-term employment and utilise existing equipment.

### 2. Energy Supply and Management

The project represents an excellent opportunity for Kiribati to establish and promote a clean energy environment as an example for the rest of the world. A large proportion of its national budget is spent on fossil fuels for diesel generation of electricity, as well as for transport, representing not only a drain on its national budget but also contributing to greenhouse pollution and the problems of climate change.

Having said this, however, it is also recognized that access to reliable energy supplies that meet the energy service requirements of a population is essential to the economic, physical and social health of the society. This section presents some possible options for meeting the energy needs of the population whilst

- Decreasing the greenhouse intensity of its energy supplies
- Increasing energy supply reliability
- Decreasing reliance on imported fossil fuels
- Maximising local energy resources
- Taking into account economic viability on a national level and affordability issues at a household level
- Considering ease of maintenance and operation

### **a. Energy Load Assessment**

Energy supply, in the form of electricity, is not a limitless resource, and, before designing a generation and supply system, it is vital to have an accurate assessment of current and likely future energy demand. It has not been possible, in the short amount of time available, to conduct a full energy audit of the nation, taking into account energy use per sector (industry, transportation, agriculture, commercial and public services and residential use). Such a survey, including not only energy consumption by sector, but also an energy load profile, needs to be carried out on a regular basis (perhaps every 3 or 4 years). This data would prove invaluable to the government in planning power generation, supply and maintenance activities as well as future urban and commercial development.

Based on information gained from the CIA World Factbook for 2004, electricity consumption is currently 0.192 kWh / pp / day. This figure, in itself, is of no assistance in designing an energy system for an urban development as it does not delineate electricity consumption by the various sectors.

No data regarding commercial and government electricity use was gathered.

The basic energy services required by Kiribati residents appear to be illumination, refrigeration, cooking, information/communication and entertainment. There are, in some residences and businesses/services, also a need and/ or a demand for cooling (fans or air conditioners) and a small requirement for hot water.

Lighting, refrigeration and communication / entertainment services are met via electricity supply, whilst cooking requirements are met via kerosene stoves or firewood. Gas is also utilised for some cooking.

Based on discussions with local residents, it is calculated that residential electricity (where available) use ranges between 600 wh (lights and small appliances only) and 2kWh (lights, small appliances and freezer) per day. This figure needs verification from the public utility. The current cost per household is \$37 / month (\$1.23 / day), equating to an estimated cost per unit in the vicinity of \$0.60 / kWh.

It is recommended that whatever energy system is chosen, it will incorporate a load assessment that allows for, at a minimum, 3 lights, a limited number of appliances (e.g. a radio or tape player and a television) and a freezer. The freezer represents, by far, the major energy user, and individual smaller units are much less efficient than fewer larger units. The government and community may wish to consider community freezer facilities (e.g. one larger freezer shared between several families) as one means of managing the energy load. This needs to be considered in the light of cultural appropriateness. Other 'shared' electrical appliances (e.g. electric sewing machines, power tools) could be incorporated into community shared facilities or work cooperatives.

### **b. Energy System Options**

Once the load assessment and profile is determined there are essentially four main options for the supply of electricity to the Temwaiku development.

1. Connection to the main diesel grid network only, resulting in mains power (240V) to all dwellings. The advantage of this option is that it

utilises the existing public utility and generation capacity. The disadvantage is that it does not decrease the nation's dependence on imported fossil fuels with its current economic and supply volatility. It also does nothing to address power reliability (if the main power station fails, no one has any power) nor utilisation of the nation's most abundant energy resource, the sun.

2. Connection to the main diesel grid network (240 V mains to all homes) with local photovoltaic (or other renewable energy generators) systems connected to the grid. In these systems, the renewable energy generator supplies the power during the day (in the case of photovoltaics), with backup provided by the main grid at night and in inclement weather. No batteries are generally used; the grid network itself is used as the energy storage in essence. A slight variation of this system would include a local Uninterrupted Power Supply (UPS) at a local level, automatically switching the power supply to a local backup (e.g. batteries) for a short period if the main grid were to fail. It is difficult to find a disadvantage in such a system, although the economic viability would need to be assessed (generally these systems are much cheaper than Stand-alone Power Systems because of the absence or minimisation of battery systems and it is estimated that the cost would NOT be more than current electricity production costs and may indeed be cheaper over a period of time). There are many advantages:
  1. such a system would utilise both public utilities (the PUB and the SEC);
  2. It would utilise the abundance of solar energy
  3. It would dramatically decrease the reliance on fossil fuels
  4. It would improve the reliability of supply
3. Wiring of each 'village' within the development on its own independent DC low voltage grid, supplied by renewable energy systems, batteries and back-up generators. This type of system, because of its low voltage, is more efficient than 240V AC systems because of energy losses in conversion and distribution associated with higher voltages. Economies of scale can be gained by installing systems on a mini-grid, as opposed to individual households.
4. Individual Stand-alone Power Systems for each household. These systems are the same as is currently utilised by the Solar Energy Company (SEC) for rural electrification. They have proven to be reliable and cost effective.

Options 2 and 3 are considered to be the most viable for this particular development, with a preference, based on existing data to hand, for option 2.

### ***c. Renewable Energy Resources***

Kiribati has a number of renewable energy resources that are currently largely underutilised or totally un-utilised. This section categorises several of these according to their potential to meet a range of energy services.

1. Electricity generation
  - a. By far the most abundant renewable energy resource is the sun, and it has already been utilised in rural areas for

- electricity generation through photovoltaic power systems. These have proven to be reliable and cost-effective. Urban areas can also benefit from making more use of this technology.
- b. Solar Concentrator dishes for electricity production are a potential future source of electricity production, however, given the relative newness of the various technologies in this area and the remoteness of the Republic, they are not recommended at this stage.
  - c. The Wind Resource has not been, to our knowledge, adequately mapped to determine the viability of wind generation systems. A steady rate of at least 5 m/s would be required for small wind turbines to be economically viable. However if the wind was found to be in the range of 5 m/s or higher, wind generation systems prove to be much more economically viable than photovoltaic systems (about 50% less).
2. Transport fuels: There appears to be significant scope for establishing local biodiesel production facilities both in Temwaiuku and possibly other urban centres. Such a facility would 'manufacture' biodiesel from waste cooking oils and possibly coconut oil. The biodiesel can be utilised to replace and/or supplement petroleum-based diesel for motor vehicles and water craft. These facilities could represent a significant commercial opportunity for a small number of people and are relatively inexpensive to establish and easy to maintain. The production of biodiesel enhances sustainability by decreasing consumption of fossil fuels and utilising waste products (e.g. cooking oils) that would otherwise go to landfill. A full economic viability study would need to be done (e.g. the extent of the availability of the waste cooking oil and other potential vegetable oil stocks, the method of collection, the sale of the end product for local consumption etc.)
  3. Gas production: An initial preliminary assessment of general municipal waste seems to indicate that a substantial percentage of the waste is organic in nature and could be utilised in a manner in which the resultant methane gas produced from the waste breaking down over time could be captured and utilised for cooking. The manner in which this could be best achieved would need to be investigated, but could possibly include the sorting of household waste at a local level and the establishment of an organic waste disposal facility in the project site.
  4. Hot Water: there appears to be little need for hot water at a household level, however wherever hot water is required for community facilities or services such as schools, health care centres etc, solar systems should be utilised. The type of system chosen would depend on whether low grade, medium grade or high grade temperatures are required.

#### **d. Energy Management**

1. Demand Side Management: The energy system will not meet the needs of the Temwaiku residents unless a clear Demand Side Management (DSM) Strategy is implemented which is clearly understood by all stakeholders and is enforceable. Rapid and uncontrolled growth in demand will jeopardise supply as well as place severe technical pressure on the generation and transmission networks and the associated financial, social and political strains. The government is advised to consider a range of DSM strategies for this development and for the nation as a whole, including the possibility of limiting the appliances allowed to be imported (e.g. only 5 star appliances are allowed; how will the installation of air conditioners be controlled?), encouraging the use of practices and technologies that don't require electricity use or fuel consumption (encourage cycling?) and providing local services that negate the need for residents to travel long distance frequently (e.g. relocate some government ministries to Temwaiku).
2. System Operation and Management: If option 2 for electricity supply is chosen (grid-connected renewable energy systems), then the government would need to address any legislative or regulatory barriers that would preclude the PUB and the SEC from working collaboratively. A business model allowing these two utilities to operate jointly would need to be established, outlining who would own, operate and maintain such a system and how will revenue be collected and assigned.

#### **3. Water Supply**

Water Supply for Temwaiku will utilize the existing pipe network, which is in the process of being upgraded through the SAPHE project. It is recommended that rainwater tanks on a household level supplement the water supply network. Additional header tanks will be required throughout the staged development. There is also a possibility of using onsite freshwater lenses.

More detailed site surveys will be required to determine whether the freshwater lenses located onsite can be successfully harvested via water galleries. These galleries could be located under recreational fields and would need to be designated water reserves where freshwater production takes place. There is an opportunity to involve the new communities in the management of these water reserve areas including the involvement in planning and construction of these activities. In areas where reclamation takes place there is potential for higher yielding freshwater lenses over time.

#### **4. Waste Management Strategy**

For an integrated sustainable development 'waste' should be considered a resource and the following recommendations are made on this assumption. This report proposes that the Waste Management Strategy include processes and procedures for the sorting and utilising of 'waste' on site.

### **a) Sewerage**

At present most reticulated sewage is disposed of untreated into the ocean. The proposal for the Temwaiku Development is to utilise small community treatment systems where individual properties will have salt-water flushing pedestals and between 50 and 100 of these are connected to packaged treatment plants that treat the effluent to a level that can be reused on site or discharged (treated) into the ocean. The resultant solids would be pumped out periodically and added to the organic waste facility for gas production.

### **b) Household waste**

Currently somewhere between 25% and 75% of household waste is collected by council. General municipal solid waste appears to contain a mix of organic, recyclable and inorganic materials.

#### **1. Organic waste**

Removing the organic material from the waste cycle prevents the degradation of the groundwater quality as well as providing compost for soil conditioning to encourage agricultural activities (e.g. market gardens) and/or methane gas production. This will build on, and ties in with, the composting for gardening initiative run by FSP and the Pacific Regional Agriculture Program and the Green Health initiative (for the growth and use of traditional medicinal plants and remedies). Organic waste that is not suitable for or needed for composting will be deposited in the organic waste facility that can be utilised for methane production over time (with the resultant gas used for cooking.)

#### **2. Recyclables**

The development needs to implement a program to promote extensive recycling practices for a variety of waste products including cardboard, plastics, aluminium, batteries, glass and engine oils. Such a program would build on existing government initiatives as well as provide local employment opportunities.

#### **3. Inorganic**

Small household items that are deemed to be uneconomical or impractical to reuse or recycle should be utilised as strategic landfill as part of the land reclamation strategy for the development.

Large items that are no longer usable (e.g. appliances, car bodies, hard fill) should be stripped of any usable components, and utilised for structural land fill as determined by the government (e.g. erosion control and causeway construction)

These initiatives may already be a component of government initiatives or may be easily added.

## **Development Management (post occupancy)**

The monitoring and management of the various aspects of the sustainable services needs to be devolved to the community level. It is recommended that 'prefects' or 'rangers' be elected and/or appointed by clusters of households to manage various aspects (e.g. energy, recycling, composting, sewage . . .). These prefects would have responsibility within their small clusters for

- representing their cluster within a larger 'village' context
- acting as a point of contact for any queries and problems
- ensuring that the residents have appropriate information

As well as providing local employment, such a program would assist in ensuring that the urban development continues to operate sustainably for the health and economic welfare of its inhabitants.

## **Flow-on Benefits and Opportunities**

### ***1. Labour and Employment***

The principal components of the construction project are purposely labour intensive and include filling and reclamation works (potentially including 'waste' redistribution and sand recovery and transportation), construction, management and administration and maintenance.

### ***2. Capacity Building***

This project can be used as an exemplar for the acquiring skills and capacity within the local community. This can be done at the planning and project level (in association with institutes such as QUT). The concept so developed would be transferable to other projects across Kiribati and other Pacific nations.

At an operational level capacity building would include new construction skills together with knowledge transfer in improved market gardens and a range of practical community activities.

### ***3. Waste Management Strategies***

The strategy developed for Temwaiku builds on existing government waste management strategies and can be replicated throughout Kiribati.

## Development Structure / Vehicle

### 1. Tenure

It is understood that the Government of Kiribati holds unfettered ownership to this the project sit and, on that presumption the following observations are made:

#### a. Current Usage

- i. Current land usage on the site consists of two government owned operations, the fish farm and the coconut plantation (discussed in more detail in an earlier section.)
- ii. Private land abuts the site on all sides and there appear to be encroachments from adjacent landholders and ‘illegal occupancy’ at a number of locations. These problems, which have parallels with the current uncontrolled use of the plantation will continue to be an issue through the project and are best addressed as early as possible – in the first instance, to limit the problems to their current scale, and secondly, over time to control or remove the existing encroachments). A critical first step will be the exact definition of the site through cadastral, boundary survey. Without that, no definitive action to control these problems can begin.

#### b. Tenure options

- i. Tenure arrangements are matters for government policy and legislation. It is also noted that the government may wish to continue to hold a substantial number of the lots created for the provision of staff housing in which case transfer of ownership would not be involved. However as regards any land transfer to private owners the following observations are made.
- ii. Leasehold tenure arrangements can be seen as having the benefits of low capital cost to the final occupants and in providing a higher level of control (i.e. of future development / use) by the lessor (government) – though such development management can be effected through other means.
- iii. Freehold tenure has significant benefits including:
  1. immediate cash flow back to the project to help fund further stages;
  2. (likely) more attractive tenure (sense of full ownership) by purchasers;
  3. Better ability to use the asset for collateral at some time in the future.
  4. Certainty and indivisibility of title
- iv. All other things being equal and based on experiences elsewhere, freehold tenure may be preferred. In effect, once the occupant takes up residency and invests capital in the form of construction the two equitable interests under a lease are effectively inseparable in any case which frustrates the overall concept of leasehold ownership. Issues of

capital cost may be addressed through the provision of acquisition loans, or discounts for cash payment. Development control can be addressed more specifically through building/planning permits than through lease conditions.

## **2. Development Control**

A nexus has to be established between the need to maintain the design integrity and population density of the entire project and the need to reasonably incorporate the flexible demands for housing by Kiribati families. It is recommended that some form of simple development / building control be applied to the entire site.

Under such arrangements owners would be required to make application to the government for additions to their houses or additional outbuildings etc. This would be required prior to any development work taking place. The intent of such approvals would be to reasonably allow such changes but with the right by the government to reject or amend such applications on the grounds of too high population density on site, inappropriate uses, unsafe structures and/or affects on services.

## **3. Development Vehicle**

Given the large scale long term nature of this project consideration needs to be given to the manner in which the government will provide strong and continuous management administration of the project.

Whilst all stakeholders including local councils and community groups will need to be involved through the entire project it would appear essential that the government maintains close and direct control through the range of activities including

- Strategy and design
- Development of component parts of the development
- Grant applications
- Finance and capital works
- Operations and land management
- Sales and tenure

The government may wish to consider of a development corporation (of which it is the single shareholder) to carry out such a task. Such a body will provide a single point of contact, continuity, financial transparency and the ability (subject to government control) to contract with contractors etc. A significant benefit from such an approach is that it provides an appropriate distance between the government and the day-to-day operations of the undertaking and from firm commercial and operational decisions that will be necessary through the life of the project. Such a corporation would of course need to be carefully structured as regards governance, delegations, reporting and audit.

## **4. Financial framework**

To ensure that the financial / economic viability of the project is managed and achieved the following matters have to be addressed:

- Establishment of a free standing cost centre so that all expenditure and income be allocated clearly to the project from its instigation

- Government has to decide on the input value of the en globo site, holding charges during the development, market prices for realisable lots and internal rate of return sort by government. (Given the nature of the project it might be envisaged that the input land value might be at a nominal amount, holding charges be assessed at current government borrowing rates and financial return to government be acceptable at ‘financial breakeven’. However such determinations must be clearly established at the start of the project.)

## Queensland University of Technology

### **Capabilities**

The Queensland University of Technology (QUT) in Brisbane is one of Australia’s largest and most successful Universities and has a strong reputation as a ‘University for the Real World’ – combining research and educational excellence with applied problem solving with government, industry and community partners.

A major theme of the University is in sustainability which is coordinated through a cross faculty initiative. QUT brands this as ‘Sustainable Living’ – reflecting the integrated approach now required across disciplines to solve complex, contemporary sustainability issues.

QUT’s strengths are already in the key component areas of sustainability – Built Environment, Design and Engineering, Environment and Property Law, Science (particularly related to water and natural resource management), Business, Energy and Social Sciences. Its recent focus on an integrated approach to sustainability provides the opportunity to both better coordinate within the University but, more importantly, to provide a complete research partnership to the organisations it serves.

QUT seek long-term partnerships on major projects that it considers as ‘living laboratories’ – cases that require significant research skills from across its faculties to problem solve and deliver. The university understands that such relationships take both time and real commitment and will only be successful if the emphasis is always on the delivery of real, innovative and timely outcomes that are to the benefit of both parties.

The Tarawa Urban Futures Project is one such opportunity.

QUT hopes that its effort and commitment to the project to date proves its level of enthusiasm in establishing a long term research relationship on this and other projects. From this current report, QUT would like to enter further negotiations with the Kiribati government to advance the research components identified.

## Recommendations

The following specific recommendations are presented as a mechanism to move the project forward.

### Short Term

- a. The Conceptual Master Plan for the development be approved in principal and comments from interested parties and stakeholders called.
- b. The cadastral information for the site be established.
- c. Firm costings and project planning be validated on stages 1 and 2
- d. The government decide the tenure system and management structures required for the project.
- e. A maintenance and management plan be established, as possible, still retain and improve the condition of the coconut plantations and better control its use.
- f. Developed presentation material (based on information contained in this report) be presented to potential sponsors as soon as possible.
- g. On an appropriate grid, undertake a detailed topographic survey including a survey to establish the extent of the duricrust and water table elevation.
- h. Undertake practical studies across the site to test various fill and drainage options including potential landfill sources.

Comment [h3]: ???

Comment [h4]: ????

Comment [h5]: ?????

### Medium Term

- i. Funding groups / grant schemes
  - i. Identify potential funding groups / schemes
  - ii. Introduce and promote the project to them
  - iii. Develop and submit specific grant applications
- j. Design and development
  - i. Assemble consultant and project team
  - ii. Carry out detailed urban design and infrastructure layouts on stage A
  - iii. Detailed building design for residences and community facilities stage A
  - iv. Contract for development of stage A with option to continue to stage B
  - v. Commence construction

## Consulted References

(to be provided under separate cover)