



Northern
Territory
Government

Department of
Lands, Planning and the Environment

Darwin Regional Land Use Plan 2015



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Foreword



Darwin is a unique place – a tropical, harbour city situated in a dynamic region, with a prosperous economy, diverse population, range of cultures, enjoyable lifestyle and magnificent natural environment.

For Darwin, strategically positioned as Australia's closest capital city to South-East Asia and a leader in advancing the development of Northern Australia, high quality regional planning is vital.

As Darwin continues to grow, so too does the requirement for a regional land use plan that provides a clear, coherent framework for the future development of the city and the region.

The key purpose of this Darwin Regional Land Use Plan 2015 is to identify the essential characteristics and needs that will shape future growth in the region and establish an overarching framework for future development.

With the future growth of Darwin's population together with continuing regional development, services and infrastructure will be expanded, and business, tourism, trade, education and other opportunities will be increased, reinforcing the status and important role of the city and the region in a national and international context.

An important priority of the plan is to ensure that the Darwin Region continues to evolve as a place that is affordable, prosperous and sustainable, integrating existing and new urban areas to provide for individual character, identity, choice and a diversity of lifestyles for residents.

This plan provides a strategic framework to anticipate and manage future growth in the Darwin Region. The framework and policy approach established by the plan will result in better integrated land use, transport and infrastructure planning, to deliver more sustainable and cost-effective outcomes, and provide for economic and community growth in balance with protection of the environment.

This regional land use plan is the result of an extensive process that has involved broad consultation, incorporating strategic planning work undertaken by successive NT Government's and the NT Planning Commission, together with input from local government, key stakeholders and the community.

I am pleased to endorse the Darwin Regional Land Use Plan 2015 which will provide a strong foundation for the continued growth and prosperity of the Darwin Region into the future.

Hon Dave Tollner

Minister for Lands and Planning

June 2015

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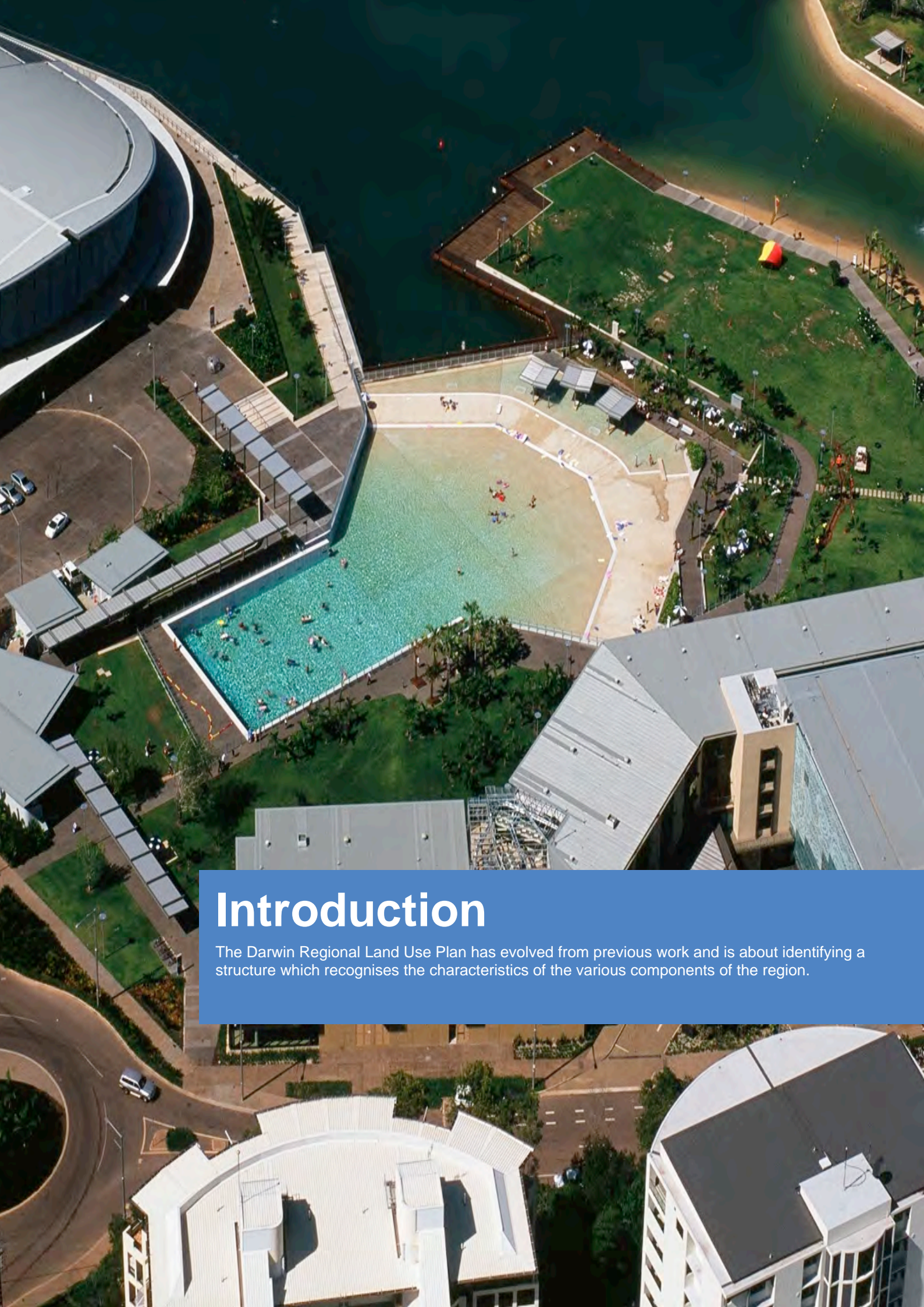
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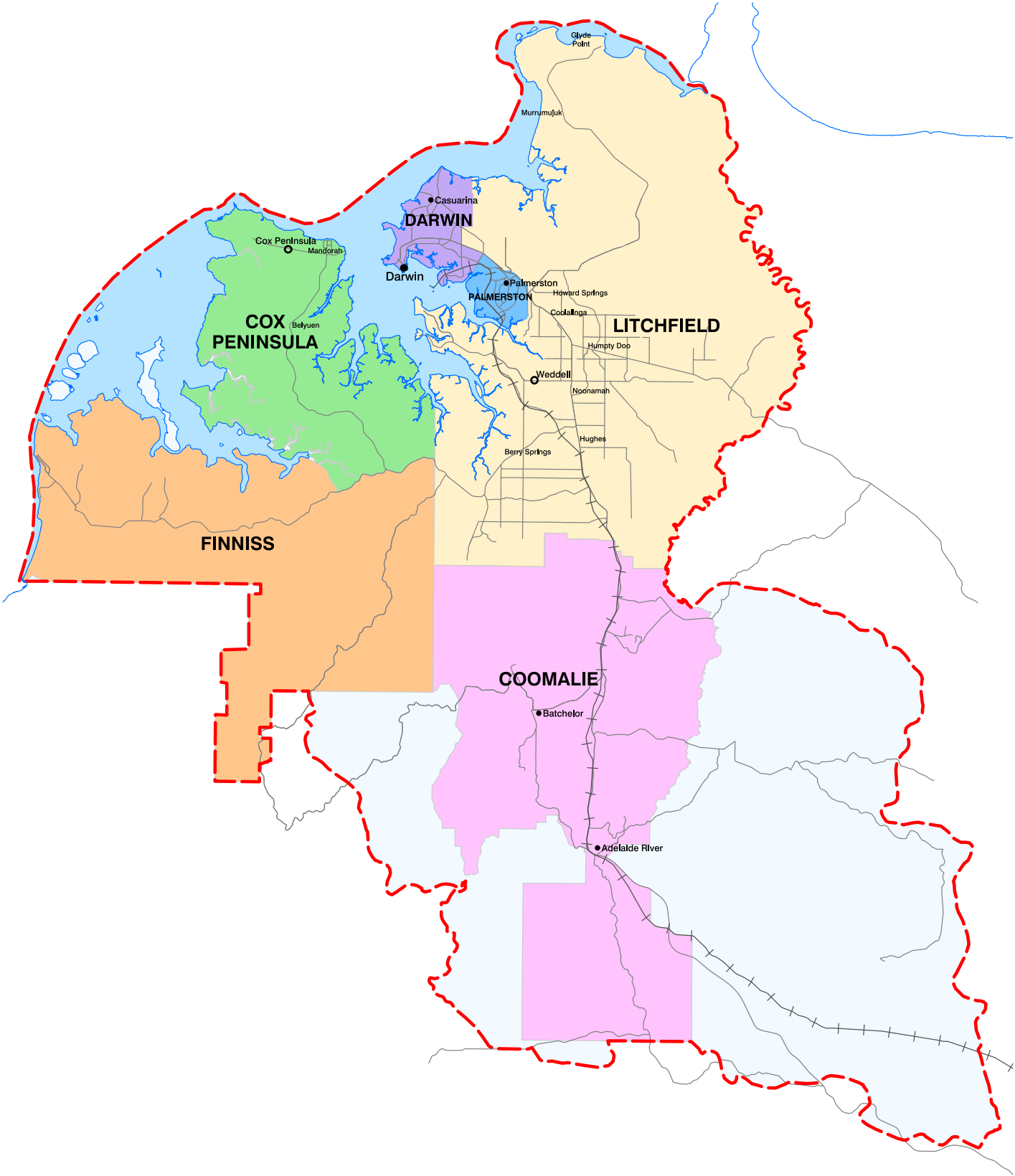
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Introduction

The Darwin Regional Land Use Plan has evolved from previous work and is about identifying a structure which recognises the characteristics of the various components of the region.



LEGEND

- Plan Area
- Ocean / Sea
- Road Centreline
- Railway
- Coastline

Subregions

The title of this *Darwin Regional Land Use Plan 2015* includes the year of publication to establish the vision, goals and intended outcomes of future development at a particular point in time. The documented vision and goals will inform more detailed planning for particular localities and the means, sequence, timing and specific responsibilities for implementation.

Plan Boundaries

The Darwin Region, for the purpose of this plan, is defined as all areas from the sea in the north, the Adelaide River to the east and the Finniss River catchment to the west, and land within the catchments of potential water supply dams. This defined region encompasses both Darwin and Bynoe harbours and associated coastal features as shown on the Subregions Map.

Within this extensive Darwin Region, subregional boundaries are defined principally by established administrative divisions and associated responsibilities. These include Darwin, Palmerston, Litchfield, Coomalie, Cox Peninsula and Finniss.

Recognising that boundaries based on administrative entities are artificial in a natural environment, the plan is not blind to relevant environmental and development interdependencies outside administrative boundaries.

Darwin Central Business District, the administrative centre of the region, is located on the end of a peninsula in Darwin Harbour. As shown on the diagram below this position significantly limits the opportunities for development around the centre compared to other Australian capitals. Opportunities are further limited by the susceptibility of the relatively low lying landform and the extensive coastal areas subject to inundation from the sea during cyclonic events.

These and other geographical characteristics of the region present significant challenges, but also provide great opportunities for developing Darwin into a world class city of metropolitan scale.

While engineering solutions can overcome some natural constraints, a framework for future development must be designed within the context of natural constraints and be particularly sensitive to economic costs and impacts on the environment.



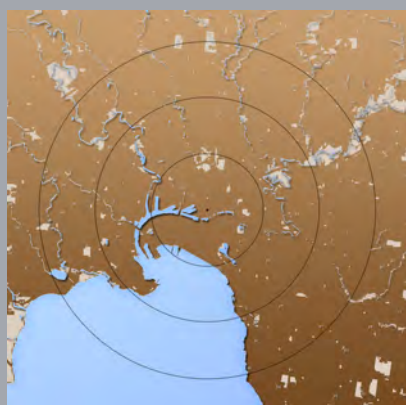
Adelaide



Darwin



Hobart



Melbourne



Perth



Sydney

Comparison of Darwin to other Australian capital cities.

Plan Context

Darwin is the seat of government and capital city of the Northern Territory and as such has a similar status to the nation's state capitals. Although progress on constitutional change has been painstakingly slow, many still promote Statehood for the Northern Territory and continue to work towards that goal. In that context, it is valid to consider Darwin as the capital city of a future fully-fledged state.

The Australian Government's inquiry into the Development of Northern Australia enhances the strategic location of Darwin as the natural capital of Northern Australia as well as of the Northern Territory.

The Australian Government's vision to further the economic development of Northern Australia will contribute to maintaining the momentum of recent growth associated with major private and public investment in the region.

As Darwin's population grows in step with continuing regional development, services will be expanded and business, trade and other opportunities increased, reinforcing the status and important role of the region and city on a national and global front. For Darwin, strategically placed as Australia's closest capital city to Asia, high quality regional planning is vital.

Plan Purpose

The key purpose of this Darwin Regional Land Use Plan 2015 is to identify the essential characteristics and needs that will shape future development in the region and establish an overarching framework for that development.

The plan presents a broad rational foundation for long term use and development of land and other natural resources, highlighting key regional policies that respond to the immediate and foreseeable issues associated with the region's natural environment and the human communities within it.

Some people contend that preparing long term land use plans is unjustified because predictions are too uncertain. Others claim that long term plans irresponsibly promote growth and development that has the potential to damage the environment or existing lifestyles. Historical experience demonstrates, however, that waiting for absolute certainty debilitates strategic thinking, so that communities inherit actions that should have been avoided while necessary actions are overlooked.

The most rational approach to land use planning is to establish a broad framework to guide responses to probable or even possible future circumstances. Neglecting planning is irresponsible, inviting poor outcomes for both the environment and regional development.

Land use plans for any region should be dynamic, not static, so they can be refined as certainty about future needs increases and actual development nears its starting date. This essential flexibility is distinct from, and should not be confused with, the chaos of unplanned futures, or the lack of timely action to preserve longer term strategic objectives and their planned outcomes.

The *Planning Act (NT)* and the *Northern Territory Planning Scheme* regulate the use and development of land in the Darwin Region. Schedule 2 of the NT Planning Scheme provides the opportunity to incorporate policies to guide interpretation of the provisions of the scheme. Area Plans in Part 8 of the scheme identify more fine grained policy in relation to the expected nature of future development to further guide the interpretation of the scheme.

Incorporation of the *Darwin Regional Land Use Plan 2015* in Schedule 2 of the scheme will establish a policy framework for the future development of the Darwin Region. In addition to providing guidance to the interpretation of the provisions of the scheme, the plan will also inform more detailed Area Plans for particular localities. The preparation of Area Plans and their inclusion in the scheme will influence specific zones and will also be subject to further public consultation.

Given that timeliness and currency is imperative to the relevance of all levels of planning, it is envisaged that the *Darwin Regional Land Use Plan 2015* will be subject to review in response to future growth or other changing circumstances.

Plan Evolution

Functions of the Northern Territory Planning Commission include consultation with the community to inform the preparation of integrated strategic plans for inclusion in the NT Planning Scheme.

The Commission's development of a draft Land Use Plan for the Darwin Region involved an extensive process including:

- consideration of the strategic directions established by Framing the Future - the NT Governments Strategic Plan
- review of past documents of relevance to the future development in the region including the Greater Darwin Plan 2012 (drafted but not finalized by the Henderson ALP government) and Planning for Greater Darwin - A Dynamic Harbour City (A discussion paper published in 2010 by the CLP in Opposition)
- release of a Briefing Note and a subsequent brochure Towards a Darwin Regional Land Use Plan 2014 presenting the thinking in relation to feedback received in response to the Briefing Note
- release of a draft Darwin Regional Land Use Plan 2014 followed by stakeholder briefings and public displays and invitations for submissions
- consideration of feedback and preparation of and submission of a final draft to the Minister of Lands and Planning with a request that he consider amending the NT Planning Scheme to include the plan as a policy.

The Minister chose to amend the plan received from the Commission before exhibiting it as a proposed planning scheme amendment in early 2015. This formal process provided a further opportunity for community feedback and minor alterations to the plan responded to the feedback received and the Darwin Regional Land Use Plan 2015 is now included as a policy document within the NT Planning Scheme.

The next stage of planning for future land use and development in the region is preparation of more detailed subregional land use plans and/or area plans for particular localities and investigations to inform sequencing, timing and funding of development.

Format of the Plan

The sections of this regional plan can be summarised as follows:

- **Introduction:** identifying regional and sub-regional boundaries, the context within which the plan has been prepared, its evolution from previous work, and its purpose and role in guiding future development
- **Regional Vision and Strategic Approach:** encapsulating key themes that inform the desired future for the region

- **Land Use Structure:** describing the overall structure of existing and future land use and development, discussing factors of influence in each land use category and highlighting constraints and opportunities
- **Regional Context and Policies:** summarising how Darwin has evolved to date, the key factors that have influenced and will continue to influence development and describing desired outcomes and objectives that will guide land use planning decisions in the Darwin Region.





Vision and Strategic Approach

The Darwin Regional Land Use Plan 2015 draws on the aspirations of the community to establish a strategic direction for long term growth.



Vision

A Darwin Region that is alive and prosperous, led by a thriving global city with high-quality amenity and connectivity.

A region with a diverse economy and strong society that promotes innovation and tropical concepts, and holds an enduring connection to the natural environment.

The vision guiding this land use plan is a response to Darwin's regional geography and history, recognising its vital present and future roles in a national and international context. The vision also captures many community aspirations expressed in submissions and at stakeholder briefings. Key elements of the vision for Darwin in the context of the Government's four strategic goals identified in Framing the Future are outlined below.

International and National Centre of Strategic Importance

- Darwin holds a pivotal position in the Asia-Pacific Region as an international destination close to economic and transport hubs of South-East Asia such as Singapore and Jakarta.
- As the only major city and port on Australia's north coast, Darwin continues to benefit from the development of Northern Australia and the expansion of its role as a major service, tourism and trade centre.
- The Darwin Region retains a key role in Australia's national defence.
- As the capital of the Northern Territory, Darwin has a key role as the centre of administration and governance.

Prosperous Regional Economy

- The Darwin Region continues to evolve as a place that is affordable, prosperous and sustainable, integrating existing and new urban areas to provide for individual character, identity, choice and diversity of lifestyles for residents.

- The region continues to experience growth in a vibrant, diverse and prosperous regional economy that:
 - creates wealth and jobs as a national and international hub for transport and exports, and a key centre for oil and gas operations, providing maintenance and a workforce
 - is open, competitive and innovative, capturing ideas, energy and opportunities across the Territory
 - attracts new local, national and international investment
 - is built on exports and the needs of our trading partners
 - stimulates continued growth in our capacity and reputation, locally and internationally as a hub for education, health services and tourism
 - acts as a key tourist gateway to natural and cultural destinations including the World Heritage listed Kakadu National Park

Strong Society and Confident Culture

- The ongoing land use in, and development of, the Darwin Region facilitates people continuing to enjoy a strong sense of community, while valuing a diverse population and range of cultures, from traditional Larrakia owners to the newest arrivals.
- The Darwin Region has a constantly evolving society that:
 - values individual right to freedom
 - acknowledges the long history of sustainable management by Indigenous people
 - provides all people with access to opportunities

and resources to allow them to contribute and participate in the community and the economy

- supports the vulnerable and is safe for all people in all circumstances
- fosters a culture that is proud and confident of Territory community values
- celebrates diversity in the inclusion of people of all backgrounds, language groups, ages, genders and religions
- supports significant community occasions and events
- focuses on a healthy, active and enjoyable lifestyle taking advantage of unique Northern Territory features.

- Conservation of wildlife and natural areas through provision of protected areas and nature corridors.

Strategic Approach

Achieving the vision for the Darwin Region requires a rational foundation for long term land use and development of a world-class metropolitan-scale city in an attractive and prosperous supporting region, characterised by economic and environmental sustainability.

The Darwin Regional Land Use Plan 2015 establishes an overarching regional framework to manage growth in anticipation rather than in response. The plan includes a Land Use Structure that identifies development opportunities throughout the region and, within the Regional Context and Policies section, objectives which will guide more specific planning within the context of these opportunities.

The focus of the strategic framework and supporting policies is better integration of land use, transport and infrastructure planning, delivery of more sustainable and cost-effective outcomes for the community, with sensitivity to environmental and heritage values.

More detailed planning and subsequent development that is aligned with this strategic approach and informed by the objectives, will assist in balancing the community's social and economic needs and the needs of the environment.

Balanced Protection and Use of Regional Environment

- Darwin regional land use focuses on sustainability, catering for economic and community growth in balance with protection of the environment.
- This is a developing region where residents live in harmony with the tropical environment, making the most of all seasons, the natural biodiversity and landscape.
- Continued management of Darwin Harbour, an asset of international significance due to its social, economic, environmental, and cultural importance for the local community, governments and industries.



Major private and public investment in the first decade of this century has driven rapid growth in the Darwin Region and further growth is likely in association with continued expansion of oil and gas projects, mining exports, airport and rail upgrades and Defence and port development. The potential volatility of future growth in the region reinforces the need for a land use structure to be dynamic and capable of further refinement as certainty about future needs increases and / or development in particular localities becomes imminent.

Properly identifying and managing regional resources, starting with a broad scale regional land use plan, will provide a framework for orderly and efficient growth. This land use structure is intended to establish the 'what', 'where' and 'why' to inform more detailed planning and investigations that will establish the 'how' and 'when' of implementation.

Although non-residential land uses significantly affect opportunities for future growth in relatively isolated regions such as Darwin, the appropriate location for many of these activities is influenced by unique and specific parameters. The most variable influence in determining the land use structure for the Darwin Region is the location and form of residential development and the importance of the link between where people live and work.

The key influences, opportunities and constraints are outlined in the Regional Context and Policies. Evaluation of these factors has led to the adoption of the land use structure shown on pages 13 and 14 as the most appropriate distribution of land uses to accommodate regional development.

More detailed concepts for development within this structure will be subject to further investigations and community consultation.

Residential

Key Residential Objectives

- Integrate new and existing residential development to maintain character and create a cohesive society that meets the diverse needs and aspirations of all sectors of the community.
- Ensure sustainable development by encouraging:
 - the efficient use of land, water, energy and other resources
 - accessible and efficient public transport to reduce transport demands
 - cost effective provision and efficient utilisation of infrastructure and services
 - development that is consistent with the community's economic, social, cultural and environmental values
 - the creation of character and identity
 - opportunities for community initiatives that support happier, healthier and inclusive communities

Recent experience in the Darwin housing market demonstrates the problems that occur when the supply of adequate and affordable serviced land for housing lags behind demand. Potential home or residential land buyers are disadvantaged by the acute supply shortage as house and land prices rise beyond the reach of many, particularly first home buyers.

The plan seeks to ensure that suitable land is identified for efficient residential development long into the future. Recent analysis has identified land requirements to accommodate a short term population of 150 000 and a population of 250 000 in 40 to 50 years.

The land use structure identifies residential land with the potential to eventually accommodate a regional population in excess of 500 000 people. The plan adopts basic philosophies for future residential development that include:

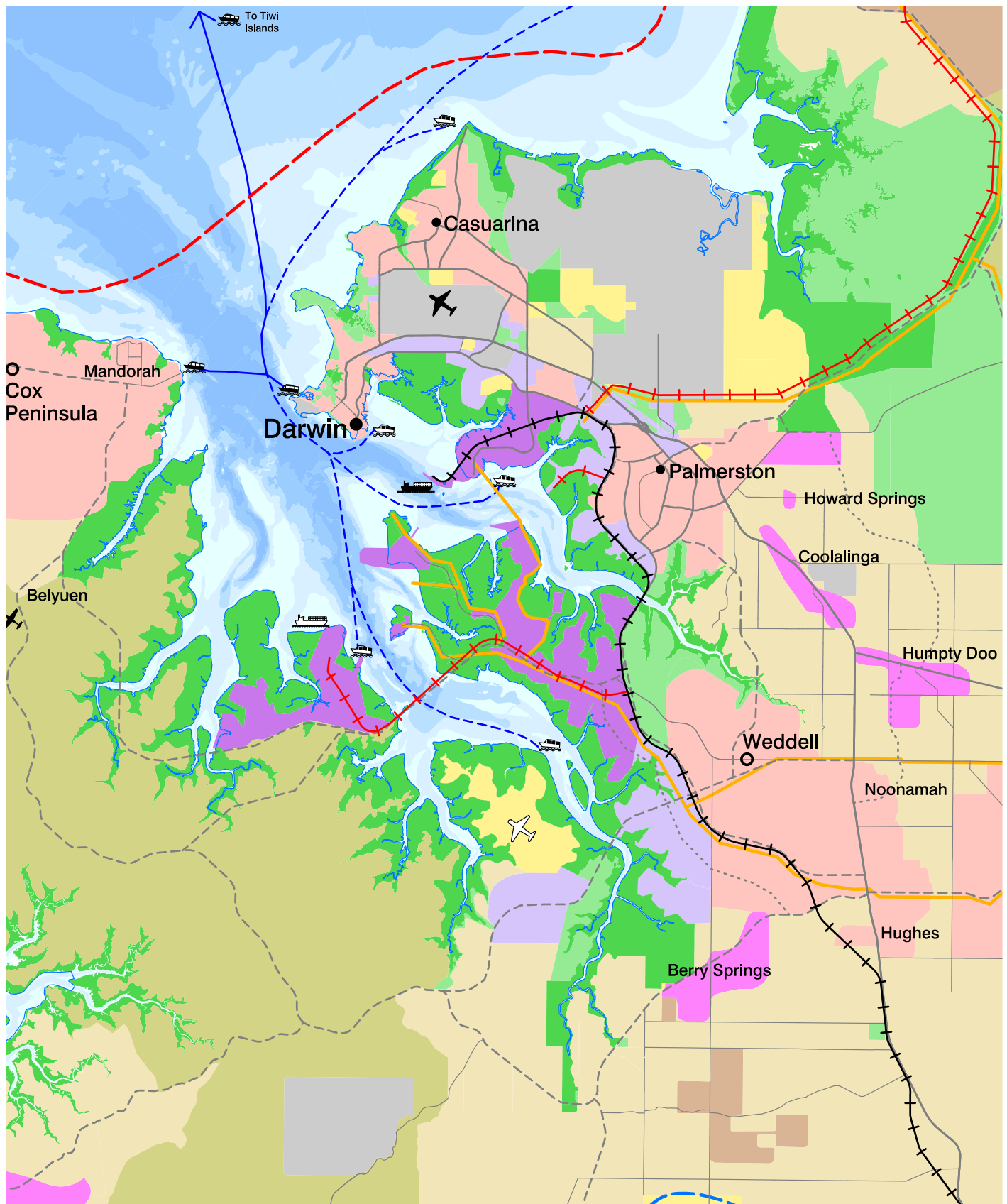
- meeting the continued demand for traditional low density houses on individual lots
- increasing the choices in housing types, both on higher density more compact urban residential lots and a range of rural lifestyle lots
- recognising the increasing importance of:
 - readily available and affordable housing
 - integration of land use and transport
 - a more efficient urban form
- opportunities to use undeveloped or underdeveloped sites in established areas to increase housing diversity.

The land use plan identifies a number of locations to accommodate various forms of residential development across the region including urban and peri-urban and rural lifestyle areas.

Urban and peri-urban areas identified on the plan include infill options in Darwin and Palmerston, continued development of the eastern suburbs of Palmerston, and staged development at Holtze, Weddell, Murrumujuk, Noonamah, Hughes and Cox Peninsula. These areas will include a transition from higher densities to lower densities to provide a buffer to constrained areas or between the new development and existing lower density areas, particularly adjoining rural lifestyle areas.

The plan also endorses the continuation and ongoing development of rural lifestyle lots within the Litchfield Municipality, and the Finnis and Coomalie Sub-regions with an increased range of lot sizes particularly in rural activity centres.

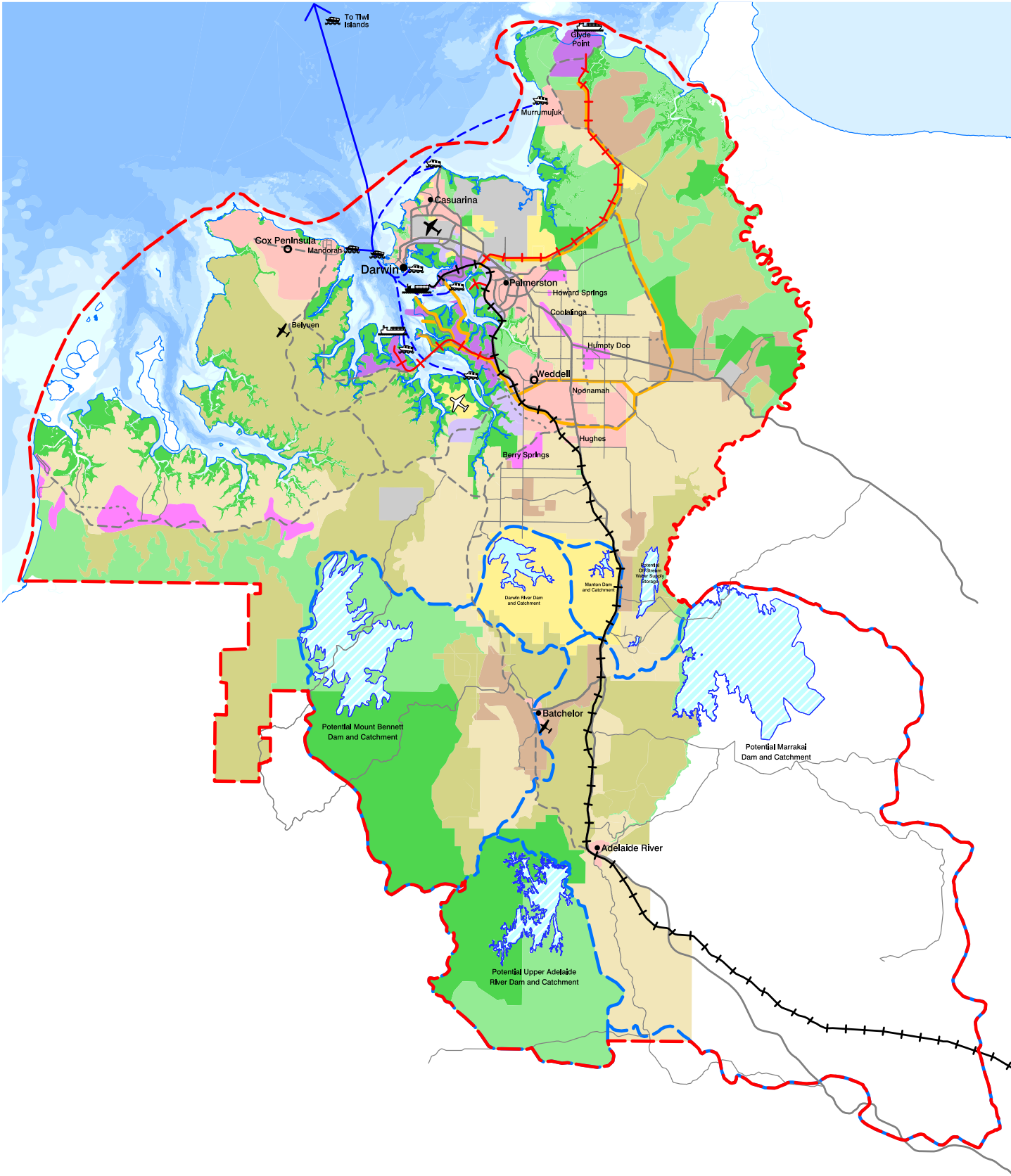
The plan is predicated on the importance of concurrent development in a number of locations to ensure an adequate supply and variety of housing types and competition in the market. The timing of development of residential land within the land use structure established by this plan will be influenced by future infrastructure investigations and the preparation of Area Plans for individual localities.



LEGEND

 Plan Area	 Strategic Industry	+ + + + Existing / Planned Railway
 Urban / Peri-Urban	 Commonwealth	- - - - Existing / Planned Ferry Route
 Rural Lifestyle	 Rural Activity Centre	- - - - Existing / Planned Arterial Road and Transport Corridor
 Horticulture	 Grazing / Agriculture	- - - - Existing / Planned Collector Road
 Community / Government	 Utility Corridor	✈ Existing / Planned Airport
 Open Space / Natural Area	 Water Supply Catchment	🚢 Existing / Planned Sea Port
 Mangrove / Conservation	 Existing Waterbody	🚢 Existing / Planned Ferry Terminal
 Industry	 Potential Waterbody	✈ Aerodrome
	— Coastline	● Existing / Planned Regional Centre

Land Use Structure



LEGEND

- Plan Area
- Urban / Peri-Urban
- Rural Lifestyle
- Horticulture
- Community / Government
- Open Space / Natural Area
- Mangrove / Conservation
- Industry
- Strategic Industry
- Commonwealth
- Rural Activity Centre
- Grazing / Agriculture
- Utility Corridor
- Water Supply Catchment
- Existing Waterbody
- Potential Waterbody
- Coastline

- Existing / Planned Railway
- Existing / Planned
- Existing / Planned Arterial Road and Transport Corridor
- Existing / Planned Collector Road
- Existing / Planned Airport
- Existing / Planned Sea Port
- Existing / Planned Ferry Terminal
- Aerodrome
- Existing / Planned Regional Centre

Land Use Structure

Urban and Peri-Urban Residential

Key Urban and Peri-Urban Residential Objectives

- Identify sufficient suitable opportunities for residential development to ensure an ongoing supply of lots to meet market demand.
- Encourage a diverse range of dwelling types and residential localities to cater for changing demographics (including single person households and an ageing population), to meet increasingly diverse community aspirations and minimise the impacts of development on established localities.
- Focus urban and peri-urban development close to established areas or collocated in localities suitable for such uses to enhance the economic viability of required infrastructure.
- Encourage detailed design that:
 - recognises the contribution natural and cultural sites make to urban character
 - provides for appropriate protection and maintenance of natural and conservation areas
 - is climatically appropriate and avoids the creation of heat islands.

Examples of recent infill residential developments include:

- The Heights, Durack – a residential community on land previously part of the Charles Darwin University campus, close to the Palmerston CBD
- The Avenue, Parap – a mixed use activity centre on land previously used for industrial purposes.

Sites with potential for infill residential developments include:

- Berrimah Farm
- the old Darwin Hospital site and Myilly Point
- former fuel storage sites on the fringe of the Darwin CBD
- Motor Vehicle Registry site in Parap
- the Government Bus Depot site in Stuart Park
- various older public housing sites such as Kurringal Flats in Fannie Bay
- strategically located underdeveloped sites such as Darwin Post Office and the old Woolworths building in the Darwin CBD.

Potential for residential development in association with activity centres is discussed at page 20.

Infill Development

Over recent years there has been an increasing recognition of infrastructure efficiencies associated with more compact urban forms. As the population of the region continues to grow, the need to balance infill and greenfield development and to achieve a more compact urban form has become a prominent influence on the regional land use structure.

The land use plan supports ongoing infill residential development, particularly on underutilised land close to existing transport networks and community or commercial facilities, and where there is potential for mixed-use activity centres. The plan is predicated on the opportunities increased residential densities close to such centres create for improved public transport and for local employment and the associated reduced need for commuter travel. Infill development in areas readily accessible to public transport and local facilities and services will help minimise the impacts of increasing population growth in the region on the majority of existing residential areas.

Some sites previously used for industrial purposes may require remediation to address contamination. The potential for appropriate infill development is also influenced by property ownership and the need to upgrade service infrastructure. Irrespective of ownership and assessment of servicing requirements, completing necessary amendments to planning provisions is often a lengthy process requiring consideration of the impacts of such development on established use and development.



The Avenue in Parap

Urban and Peri-Urban

Peri-urban areas are neither geographically or conceptually well-defined but have both urban and rural characteristics and relate to both the urban areas which they adjoin and the broader region in which they are located.

Urban and peri-urban areas identified in the land use structure include established areas and broad hectare land potentially suitable for future development.

These areas will accommodate a full range of land uses such as:

- a variety of housing types
- retail and commercial
- community facilities and services
- sport, recreation and urban open space
- natural and conservation areas.

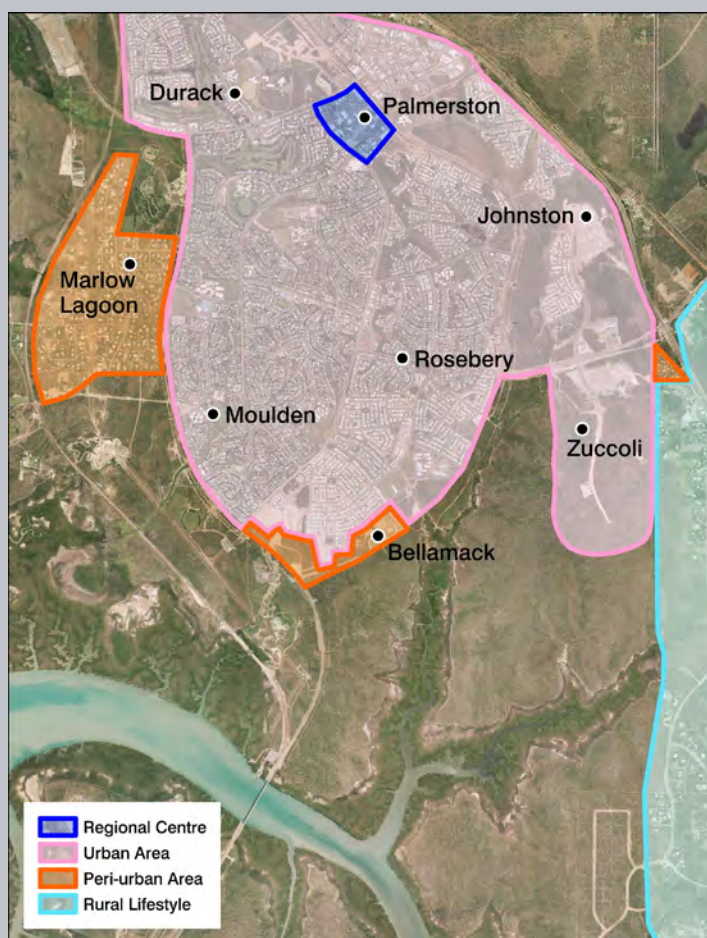
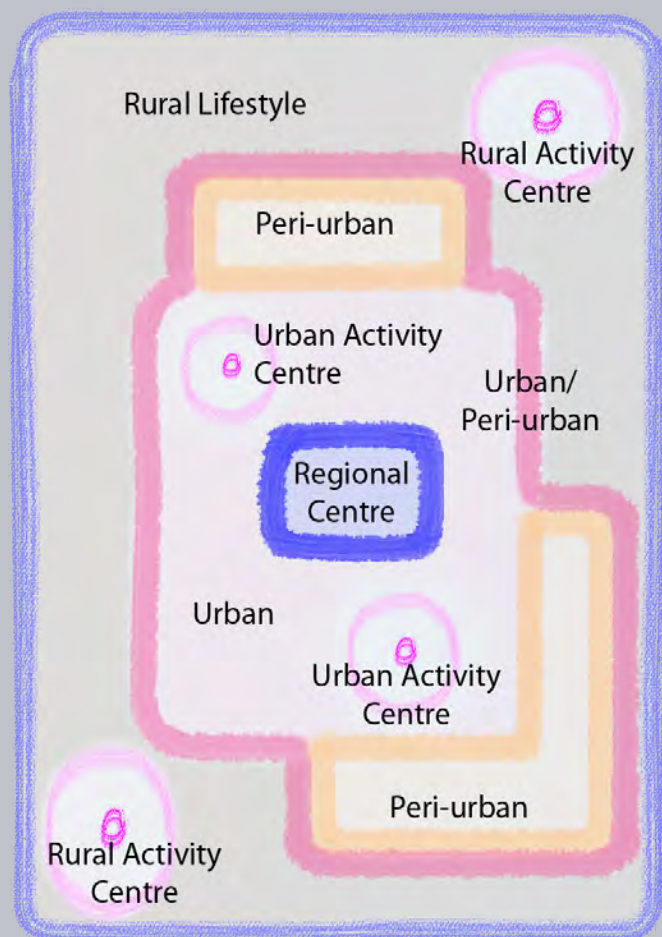
Land for industry and strategic industry has been identified separately because of the need to minimise the potential impacts on other urban activities.

Often identified in response to detailed land capability considerations, peri-urban areas can have a number of roles. For example, they can provide a buffer of very low density residential development that shares many characteristics of the adjacent urban residential area.

A buffer of large but developed lots can limit the number of people exposed to the risk of biting insects as well as create a degree of buffering for the residents in the urban residential areas.

The larger lots can also provide a transition between urban areas and less intense development, such as rural lifestyle to minimise the potential for future land use conflicts

Peri-urban areas usually have limited or no local facilities and services, relying instead on the full range available in the adjacent urban area.



An example of current Urban and Peri-Urban development in the Darwin Region.

Greenfield Development

The land use plan also recognises the role of greenfield development in maintaining housing choice and mitigating housing affordability risks.

The Lee Point locality in Darwin's northern suburbs and the eastern suburbs of Palmerston are the final greenfield developments possible within existing urban boundaries. Without new greenfield development opportunities, completion of these two areas would result in sole reliance on infill development.

Of the other opportunities for greenfield development in the region, some are close to established urban areas, while others are more remote but create opportunities for private sector contributions to urban development. Localities providing opportunities for both public and private development create synergies and the potential to improve the economic viability of providing the required major infrastructure.

Holtze

The Holtze locality (to the north of Palmerston within the Litchfield Municipality) is the selected site for a new hospital. Development of the hospital, on the northern side of the Stuart Highway opposite Temple Terrace,

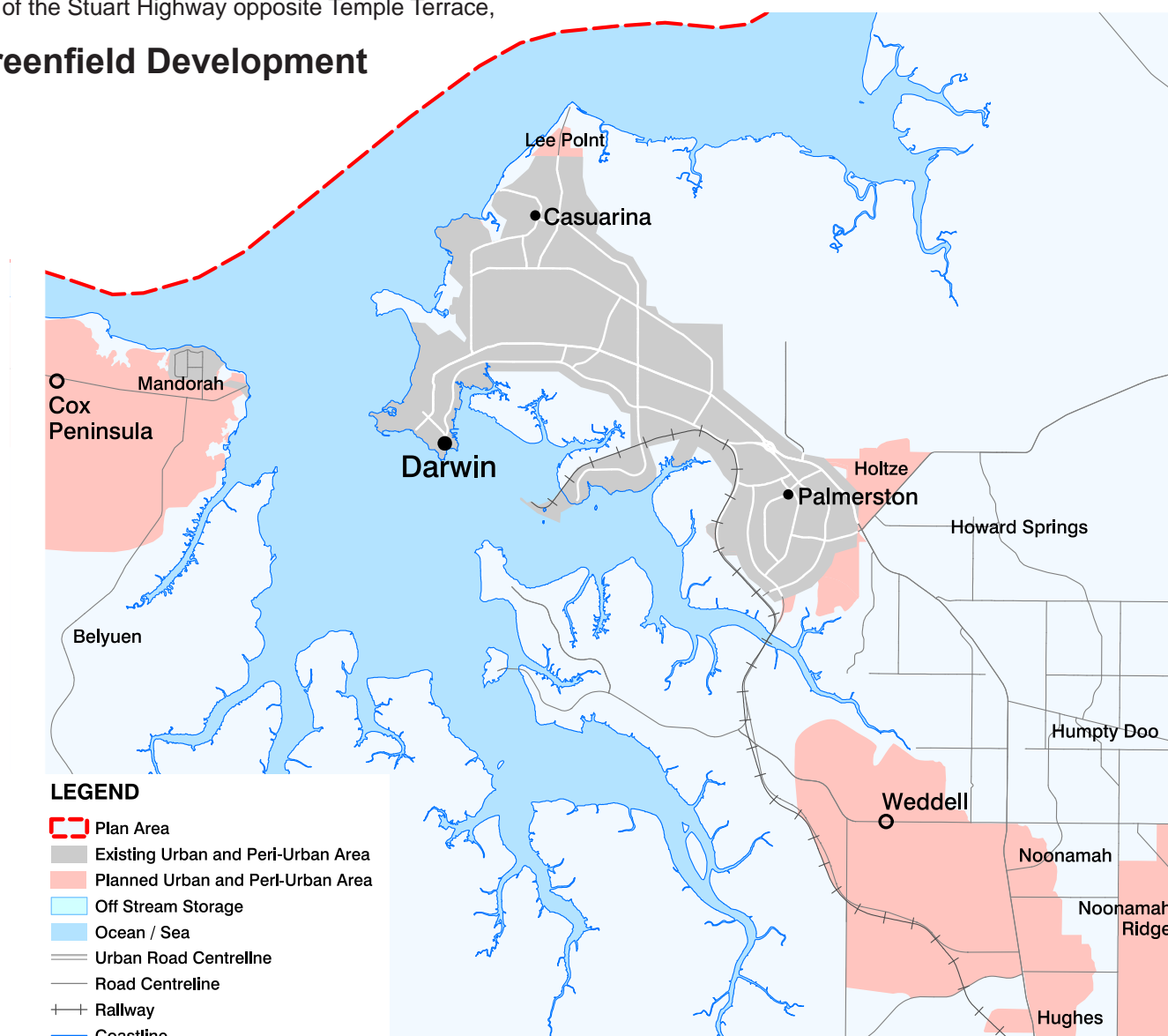
will create a focus for urban development of previously undeveloped land between the Palmerston CBD and Howard Springs Road.

Preliminary concepts being considered for residential development in this locality include opportunities for mixed use and compact urban development in association with activity centres, traditional urban residential lots and rural residential lots. These concepts will be refined in the context of ongoing investigations related to the hospital and required new infrastructure. The early estimates suggest a potential total yield of 9500 dwellings, but will depend on these investigations. Future preparation of an Area Plan will provide opportunities for community consideration of the detailed concepts for future development.

Weddell

The future city of Weddell (south of Palmerston and bounded by the Elizabeth and Blackmore rivers, Middle Arm Peninsula and the Stuart Highway) has been a key component of all Darwin Regional plans since 1984. Scenarios for future development of Weddell and associated development areas around Hughes and Noonamah are evolving. Within this context Weddell remains a strategic opportunity to accommodate at least 40 000 residents.

Greenfield Development



Hughes, Noonamah and Noonamah Ridge

Private owners of land next to or relatively near the Stuart Highway, generally south and east of Noonamah, propose urban and peri-urban development of significant areas. Development could provide a range of residential opportunities including urban lots and a range of peri-urban, rural residential and rural lifestyle lots providing a transition to the surrounding existing rural lifestyle areas. Initial proposals suggest a total of some 13 500 lots may be developed in stages, eventually accommodating up to 45 000 residents.

Subject to successful completion of due processes under planning and environmental protection legislation, and agreements with government and local government about infrastructure contributions, there is potential for development of this area in conjunction with privately owned land between Weddell and the Stuart Highway.

The sequencing of the development in this locality within the context of development in the broader region will influence the range of facilities and services provided. One or more activity centres with a range of commercial, community and recreation facilities will be identified as part of the planning process.

Murrumujuk

Murrumujuk is located on the Gunn Point Peninsula overlooking Shoal Bay. Its potential has been a component of various regional plans since 1984 when the locality was first identified as a rural centre. Subsequent plans identified the potential for more substantial development in association with major industrial development at nearby Glyde Point, one of the few opportunities in the region for a deep water port.

The relative isolation of Murrumujuk in the Litchfield Municipality, about 60 km from the Darwin CBD and 40 km from Palmerston, and the associated costs of extending the required infrastructure have precluded development to date.

Substantial areas of relatively flat land next to Glyde Point are again subject to detailed investigation to facilitate future industrial development. Such development would have synergies with an urban centre at Murrumujuk, rural lifestyle lots and potential horticultural development. Previously planned transport and infrastructure corridors will integrate the locality with the broader region and minimise the potential impacts on existing networks. Future investigations into land capability, environmental issues and infrastructure requirements will inform more detailed planning.

Cox Peninsula

With the exception of the existing communities at Wagait Beach (freehold sections at the north-east corner of the peninsula) and Belyuen (on Aboriginal land in the centre of the peninsula), the Cox Peninsula Subregion is largely undeveloped. The long running Kenbi Land Claim under the *Aboriginal Land Rights (Northern Territory) Act 1976 (Cth)* has been significant in delaying development.

As is the case for the Darwin Peninsula, the Cox Peninsula has extremely limited local freshwater resources (surface or groundwater). Further development on the peninsula will therefore depend on resolution of the land claim and major infrastructure investments particularly to supply water.

The regional plan anticipates long term development for a range of urban purposes including residential and associated community facilities and services, and commercial and industrial uses on the northern half of Cox Peninsula. The extent and timing of development will depend on strategies for the provision of the required essential services. These strategies, that may identify opportunities for staged development will have to be prepared in consultation with existing private landowners and the Larrakia Development Corporation, which manages development on behalf of Larrakia traditional owners.

Batchelor and Adelaide River

The townships of Batchelor and Adelaide River provide urban residential opportunities and function as service centres to the broader Coomalie subregion.

The significance of the subregion during WWII and the associated historical infrastructure continue to contribute to the existing and potential future development. The historical role of the area contributes to tourist activity as does its' location as the gateway to Litchfield National Park. The Batchelor Aerodrome, which was used as a RAAF base during the war, continues to provide for a range of light aircraft opportunities and this activity combined with mining and the role of Batchelor as an education centre create significant opportunities. Unresolved native title claims have limited opportunities for development over recent years.

The resolution of these claims, the growing importance of tourism and the increasingly diverse aspirations of residents in the broader region will create opportunities for additional residential development in these centres. An increased population will establish the thresholds needed to support a greater range of community and commercial facilities and services.



Shoal Bay as viewed from the cliffs of Murrumujuk

Rural Lifestyle Areas

Key Objectives for Rural Lifestyle Areas

- Identify opportunities for rural lifestyle development to meet market demand.
- Encourage opportunities for a choice of lifestyle in terms of lot size and access to services.
- Provide appropriate buffers between different residential localities to maintain and enhance the amenity of established areas and protect the natural environment.

Existing rural lifestyle areas provide a significant component of housing in the Darwin Region with Litchfield Council providing services to a municipality with an area of about 3100 km² and a population of 21 380 as at 30 June 2013. The more recently developed Finnis/Dundee Subregion provides an alternative for those seeking a rural lifestyle, albeit without the benefit of productive underlying aquifers or a reticulated water supply.

The increasingly diverse aspirations and demands of residents in the region has prompted consideration of opportunities to provide a wider range of lifestyle choices in localities outside the urban areas. Growing concern about the impact of such development on the natural environment and established rural lifestyle localities indicates the need for responsible development and land use management.

Litchfield

Recognising the physical size of the Litchfield Municipality and its proximity to urban areas, some speculate that the region's future urban development will eventually subsume existing rural lifestyle areas. Opportunities have long been identified for urban development in some parts of the municipality, such as Weddell, previous regional plans have consistently recognised the rural lifestyle choice of many in the community as an affordable alternative to urban living and a legitimate land use in the regional context.

The land use plan maintains the endorsement of the rural lifestyle as a legitimate land use in the region and gives priority to the protection of established localities, while recognising the difficulties of accommodating all future population growth outside urban areas on large unserviced lots. Undeveloped sites within the broader rural lifestyle areas, particularly those located adjacent to transport networks and/or existing and identified activity centres, have the potential to provide increased housing choice within the context of the increasing focus on improving efficiencies and affordability.

This approach offers a practical response to the predicted continued population growth in the rural areas and the environmental challenges of such growth while protecting the amenity of the majority of the existing rural lifestyle areas. It also recognises rural lifestyle lots in the municipality have particular value because:

- They can be sustained by direct self-sufficient connection to the region's only significant groundwater aquifers. This is impossible to replicate elsewhere in the region because of the limited availability of groundwater and the associated need to provide reticulated water.
- The serendipity of 2 ha lots and limited development facilitates a sustainable cycle of annual groundwater recharge and sufficient area, in most situations, to separate bores and septic wastewater treatment and avoid pollution.
- Rural land uses can make a significant contribution to environmental sustainability, the NT economy through horticultural production and regional community amenity via proximity and easy access to rural areas.
- The lots make an important contribution to broadening available residential options in the region.

Finniss

The Finnis Subregion has long been recognised as a valuable recreation and rural lifestyle resource in the regional context. Initial development responded to those seeking to escape what was considered by some to be an increasingly complex and unacceptable interference with rural lifestyle in Litchfield, and some people simply attracted to the recreation and conservation function of the area.

Development that started in the mid 1980s was predicated on providing opportunities for a self-sufficient rural lifestyle with limited or no control on the use and development on individual lots. As had happened previously in Litchfield, population growth in the Finnis Subregion generated increasing demand for services and infrastructure and concern about the use and development on individual lots and the impacts of development on the environment.

Previous regional planning documents have recognised the role of the subregion in providing recreational and rural lifestyle opportunities to complement development elsewhere in the region with the potential for appropriately located service centres to provide commercial and community facilities.

The potential for urban development has not been supported in previous plans because of the remoteness of the locality, the land capability and water resource constraints and the need for significant changes to the natural environment, particularly along the Bynoe Harbour Coast and the Finnis River Floodplain (to deal with potential health problems associated with biting insects).

This land use plan continues to give priority to protecting recreation and environmental values of the subregion and recognises the most appropriate predominant land use in the Finnis Subregion to be ongoing development for rural lifestyle purposes. The plan also identifies the potential for rural activity centres subject to appropriate contributions from developers to infrastructure improvements.

Activity Centres

Key Activity Centre Objectives

- Identify a regional hierarchy of activity centres to:
 - establish an efficient and equitable framework for the distribution of retail, commercial and other community needs and to provide a range of residential opportunities
 - encourage vibrant centres providing a mix of activities appropriate to the type of centre and the target population
 - maximise local employment opportunities to encourage diversification of the regional economy
 - encourage active transport including walking and cycling and enhanced access to public transport
 - foster liveable and sustainable communities
- Promote regional activity centre viability and vitality via a proactive planned approach to land use policies and infrastructure provision.

Activity centres in urban and rural areas are characterised by a mix of retail, commercial, community and residential development that provides wide-ranging social, economic and environmental benefits. As identified in the preceding sections dealing with Urban and Peri-Urban Residential and Rural Lifestyle, a key component of the framework for future development in the region is the potential for infill development around mixed-use activity centres.

Activity Centres can be classified by a broad hierarchy based on the role and function of each centre with the role and function influenced by factors including the level of retail activity, the characteristics of the population catchment they serve and the co-location of uses.

The level of retail activity is a particular influence on categorisation of Activity Centres because of:

- the importance of retail activity in centre activation
- its contribution to encouraging walkability
- the strong correlation between retail activity and the provision of public transport focused on the Darwin CBD and Primary Activity centres.

Relating retail activity to the Activity Centre Hierarchy also provides the market with an indication of locations where new retail activity can add to the amenity and convenience of residents without unnecessarily impacting on the role and function of existing Activity Centres.

Within the Darwin Region the scale and characteristics of the catchment population is also a significant influence on the levels of retail activity. The tropical location of the Darwin Region increases the attractiveness of large air-conditioned shopping centres that provide undercover parking, particularly in traditional suburban areas that lack the population thresholds to support a range of local facilities and services. More compact residential areas with increased densities have the potential to support vibrant local centres providing a mix of uses. Levels of retail activity in the Darwin

Region can be broadly categorised as CBD, Regional, Town centre, Sub Regional, District, Neighbourhood and Convenience retailing.

Table 1 describes the characteristics of the existing activity centre hierarchy in the Darwin Region, the broad level of retail activity typically found within each Activity Centre, and also the opportunities to enhance the roles and functions of the various centres

The land use plan recognises the need for an appropriate framework to guide the location and development of future centres to minimise the impacts on the existing hierarchy and to maximise the social, economic and environmental benefits which can flow from appropriately located centres providing a mix of activities to serve the target population.

There is potential for new non-local centres in association with both greenfield and infill urban development. Determination of the appropriate location for required centres should be cognisant of the potential impacts on the role and function of both existing centres and the proposed centre. The preparation of more detailed Area Plans for such development will provide the opportunity to identify the scale and location of centres that will be appropriate in the context of the likely population capacity of the particular development.

With the exception of the Millner Home Maker Village, bulky goods retailers in the Darwin Region tend to be dispersed along arterial transport corridors or collocated with other retail activities in town or regional centres. The potential community benefits associated with the aggregation of these retailers in a single location suggests there may be future interest in another bulky goods centre. Factors which should be considered in determining an appropriate location for such a centre include impacts on the role and function of established and proposed centres, impacts on traffic, the accessibility to public transport and the opportunity to collocate with existing centres.



Smith Street Mall

Table 1 - Activity Centre Hierarchy

Activity Centre	Description
Central Business District	<p>The Darwin CBD provides a full range of facilities and services and performs the critical capital city role and higher order function as the Northern Territory's dominant commercial, cultural, administrative, tourist and civic centre.</p> <p>Continued growth of the retail role of the CBD will be important to maximise tourism expenditure and to support further residential and commercial floor space growth.</p>
Primary	<p>Primary Activity Centres include Town Centres (Palmerston and in future Weddell) and the Regional Centre (Casuarina Square). Town Centres require vibrant retail floor space to underpin a mix of commercial, social, administrative and local cultural functions in a street based environment. In the medium and long term Town Centres can become important employment hubs and high density residential living options.</p> <p>The elevated retail role and function of the Regional Centre means it draws from a wider catchment creating opportunities for a viable mix of commercial, service, community and entertainment facilities.</p> <p>Primary Activity Centres typically incorporate one or more full line discount department stores and one or more supermarkets with a range of speciality retail businesses.</p>
Secondary	<p>Secondary Activity Centres include sub-regional, district and neighbourhood centres, and typically incorporate one or more supermarkets and depending on the size of the catchment, a discount department store.</p> <p>These centres should not unduly impact on the role and function of Town Centres as they focus primarily on retailing and not the broad provision of social services, administration and access to community facilities. Their size should be governed by catchment size, and designated floor space ranges established by more detailed policy and the evaluation of the potential to impact on the role and function of Town Centres in terms of existing and future growth potential.</p> <p>Centres such as Nightcliff, Hibiscus, Northlakes and Karama typically incorporate a supermarket with scope for commercial, service, community and social and entertainment to a level governed by their relative role and catchment.</p> <p>The retail component of centres such as Rapid Creek and Parap Village are more akin to convenience level retailing but the range of facilities and services provided in these centres create the scale of activity normally associated with Secondary Activity Centres.</p> <p>The competitive advantage of neighbourhood centres is their ability to meet the needs of the defined immediate catchment and their appeal to the broader community. Convenience is due to either location (within walking distance) or access in terms of car parking or location compared to larger centres.</p>
Rural	<p>Centres such as Humpty Doo and Howard Springs in established rural lifestyle areas provide for retail, commercial, service, community, industrial and recreation facilities to meet the needs of residents in the area. These centres provide a neighbourhood level of retailing.</p>
Local	<p>Local Convenience Retailing provides for an immediate catchment and are distributed across the urban and rural areas in various localities including (but not limited to) Tiwi, Jingili, Virginia and Noonamah.</p> <p>There is potential for regeneration of many of the existing centres and development of new centres in appropriate locations to encourage mixed use and contribute to the enhanced viability of the retail component of these centres and to improved urban form.</p>
Bulky Goods / Specialist	<p>Specialist Activity Centres include a range of centres that do not fit within the general categories outlined above. These centres focus on unique themes such as bulky goods, marine, health or education and are destination centres servicing a regional catchment. Such centres include the Homemaker Village in Millner, the Cullen Bay marina, Charles Darwin University, Royal Darwin Hospital and Fishermans Wharf.</p> <p>The location of any future such centres should be considered in the context of maximising the benefits to the community and minimising the impacts of the centres on others in the hierarchy.</p>

Because of the dynamic nature of retailing it is unlikely that all proposed future development will necessarily fit within the identified Activity Centre Hierarchy. To minimise the impacts of out of centre or out of sequence development, individual proposals should be considered in the context of detailed evaluation of existing and future retail demand, the implications on roles and functions of established centres and the hierarchy and net community benefit that may be delivered by the project.

A range of vibrant activity centres throughout the region will contribute to improving the efficiency of transport systems and to the creation of walkable, healthy communities. The centres will be the focus of higher density residential development to improve housing choice and affordability and to assist in addressing the increasingly diverse aspirations of residents in relation to preferred lifestyle and type and cost of housing.

Identification of the Activity Centre Hierarchy and factors which should be considered in determining the appropriate location, role and function of future centres



Darwin City

establishes framework to inform more detailed planning and consideration of individual proposals.

Darwin CBD performs a critical capital city role and higher order function and is the dominant commercial, cultural, administrative, tourist and civic centre. Previous investments, combined with its historical significance as the home of the administration of the Northern Territory, suggest it will retain its role as the predominant centre of the region.

The potential for a critical mass in terms of residential density is important as it will support the continued planning of the Darwin CBD as the key node offering international standard lifestyle and amenity. From a floor space allocation perspective this would mean:

- a focus on quality office precincts
- planning for residential environments
- planning for tourism experiences
- planning for gaps in the retail market.

The draft *Darwin City Centre Masterplan* (funded by the City of Darwin, the Northern Territory Government and Australian Government) provides a blueprint to guide growth of the CBD. The vision outlined in the draft is:

- Darwin is Australia's northern gateway capital city
- Darwin's city centre is the primary urban place in the region
- Darwin's city centre is a great place to live, work, play and shop and is the priority setting for office-based employment
- Darwin's city centre is an exciting, engaging and inclusive place
- Darwin city centre clearly reflects the tropical lifestyle of Darwin.

Although the *Darwin City Centre Masterplan* has not yet been finalised, the redevelopment of the inner city into a vibrant hub providing a range of activities including residential, retail, commercial, entertainment, tourism, recreation and education is well underway.

The final masterplan will provide detailed principles to guide future development of the centre as the pre-eminent centre of the region serving local residents and visitors.

The Darwin CBD services are augmented by the hierarchy of primary, secondary, local and bulky goods/specialised activity centres distributed across the urban areas. Each of these centres fulfils significant economic, commercial and retail functions with individual characteristics influenced by location and catchment populations.

Both Casuarina and Palmerston localities have primary activity centres incorporating full line discount department stores and supermarkets. The elevated retail role of these centres contributes to their ability to draw from a wider catchment and support a mix of commercial, service, community, social and entertainment facilities.

The Casuarina centre has to date developed as a traditional centre servicing the entire region. Current expansion proposals include a department store and student accommodation serving the nearby Charles Darwin University. There is potential for further expansion of the centre and its ability to serve the broader region.



Casuarina Square

Palmerston city centre functions as both a civic administrative centre and principal activity centre, providing a range of activities, including retail, commercial, entertainment, tourism, recreation and education serving the broader region.

The City of Palmerston has developed a masterplan to achieve better planning and urban design outcomes, facilitate ongoing development of the centre and create an identity for the relatively young city. The masterplan aims to provide an integrated and coordinated approach to future development, recognising that the centre has a role in the broader region while supporting the current and future populations of Palmerston. The proposed Gateway Shopping Centre will enhance the range of retail opportunities available to residents of Palmerston and the broader region.

Proposed retail expansion and recent residential development at Coolalinga will further enhance this centre's role in meeting the needs of existing and future residents from the rapidly developing Litchfield Municipality and other rural sectors.

In the longer term, activity centres will be required to meet the needs of major urban expansions at Weddell and Cox Peninsula. As these urban areas develop the centres will evolve to become primary activity centres providing an elevated retail role and an associated mix of residential, commercial, service, community and entertainment facilities.



Highway House, Palmerston



Palmerston Library, Palmerston

Urban Activity Centres

Development of higher density housing around a number of established urban activity centres (e.g. Parap, Fannie Bay and Nightcliff) and along major transport corridors (e.g. Stuart Highway at Stuart Park) reflects increasing interest in housing variety, particularly options close to employment, transport networks and local facilities and services. Higher density dwellings integrated with activity centres will play a significant role in increasing housing choice and affordability, improving public transport and enhancing the viability of the centres.

More detailed Area Plans will guide the development of individual localities. Initial investigations focus on the southern suburbs of Darwin including Stuart Park, Parap, Woolner, Fannie Bay, The Narrows and The Gardens. This will be followed by future investigation of Ludmilla to Nightcliff and then Casuarina.

Further infill development will be informed by individual infrastructure strategies to facilitate development in accordance with the land use plan.



Millner Shops



Parap Village, Parap

Rural Activity Centres

Litchfield

The early 1980s saw rural 'district centres' identified to provide local community facilities and services for the increasing rural population. The lack of water supply and sewerage infrastructure has generally constrained the concentration of activities envisaged in these centres. The exception has been Humpty Doo, where reticulated water and sewerage supported development, over time, of a wide range of activities including commercial, service commercial, light industry, community uses and some urban style residential.

Large rural lifestyle lots continue to be valued by many and this regional plan generally endorses continuing the rural land uses and lifestyles. However, there is increasing interest in alternatives to larger lots, particularly from some older residents seeking retirement options and younger people seeking more affordable options to enter the housing market.

The availability of some undeveloped land close to existing and planned centres creates opportunities to establish the viability of essential service infrastructure, the critical population mass required to support a concentration of activities and increased housing choice outside urban areas.

Smaller appropriately serviced residential lots in rural activity centres could also increase the sustainability of larger rural lifestyle lots by reducing the impacts of future population growth on natural resources, particularly groundwater, and expanding local facilities and services and new employment opportunities.

The land use plan recognises the benefits accruing from the development of appropriately serviced rural activity centres. These benefits will include housing affordability, local employment opportunities, environmental and economic sustainability, strong and connected communities, and accommodating continued regional growth without compromising the amenity of established rural living areas, the environment or natural resources.

The range of uses and infrastructure provision within each of the centres will depend on the preparation of Area Plans. These plans will be informed by detailed planning which has been undertaken in recent years and by ongoing investigations focusing on the identification of synergies between opportunities for a range of land uses and the provision of infrastructure. The underlying aim of detailed planning for rural activity centres will be to enhance the range and scale of local facilities and services and housing choice available to existing and future residents in the sub-region. A priority of this work will be the identification of the core of the centre proving commercial and community facilities and urban residential lots and a transition of density to minimise impacts of these centres on the amenity of the majority of the established rural lifestyle areas.

Although the Howard Springs Pine Forest has been the subject of ongoing discussion over many years there has been only limited investigation or consideration of future opportunities. The identification of the area as a rural activity centre recognises the potential for the future development of this strategic site to provide increased

residential options in the rural area while recognising the need for future investigation and planning to establish detailed proposals.

While the Hughes and Noonamah locality is identified as an urban and peri-urban area that will support an extensive range of facilities and services, it is likely initial development will be served by a limited range of services effectively akin to a rural activity centre.

Finniss

Previous regional land use plans identified the potential for appropriately located and serviced centres in the Finniss Subregion to meet the needs of residents on existing and planned rural lifestyle lots.

This land use plan continues to recognise the long term potential for rural activity centres to provide a range of community and commercial land integrated with some smaller residential lots if a suitable, sustainable and reticulated water supply can be established at appropriate sites.



Coolalinga



Howard Springs



Berry Springs



Humpty Doo

Industrial

Key Industrial Objectives

- Identify adequate industrial land to:
 - encourage a range of opportunities to accommodate the diverse needs of industry with a particular focus on high quality light industrial estates, superior access to transport networks and reasonably priced larger lots
 - support competition in the industrial land market to avoid the unnecessary upward pressure on land prices
 - provide lead times for appropriate detailed strategic and infrastructure planning
 - provide confidence and direction for investors and
 - assist in building growth and critical mass in the sector.
- Ensure the detailed planning for future development in the region takes account of the limited opportunities to appropriately locate strategic industrial development to minimise the potential for future land use conflict and detrimental impacts on the environment.

Light and General

The location for light and general industries is influenced to some extent by the focus of the activities, the need for access to major transport infrastructure and the affordability of appropriate sites. Light industries typically require localities convenient to the client population. General industries are more likely to be attracted to localities providing convenient access to major transport networks and key infrastructure.

The land use plan identifies land for ongoing industrial development in new well located, high quality light industrial areas to meet the trend and growing interest in business park development and the increased demand for light industrial land in rural locations.

Existing industrial areas at Winnellie, Coconut Grove, Berrimah, Wishart and Pinelands will continue to provide opportunities for the government and private landowners to respond to demand. The identification of the existing service commercial areas at Yarrowonga and along the Stuart Highway at Winnellie as industrial on the land use structure plan reflects the current character of the area but does not preclude development in accordance with the existing zone.

The proposed industrial area at Berrimah North and the potential for port related development at Elrondie Peninsula will provide new opportunities for a variety of industrial activities.

In the longer term Archer to the west of Palmerston, Middle Arm Peninsula to the west of Weddell and land to the north-west of East Arm Peninsula will provide opportunities for further light and general industrial development.

Rural activity centres, Batchelor and Adelaide River will provide opportunities for the future development of industries to meet the needs of local residents. In particular the existing industrial area adjacent to the Batchelor Aerodrome has the potential to accommodate aviation related activities subject to the resolution of native title claims.

Strategic

Construction from 2003 to 2006 of the Liquefied Natural Gas (LNG) plant at Wickham Point in Darwin Harbour was the first demonstration of the prospects for major industrial development in the Darwin Region based on offshore oil and gas. Since then another LNG project under construction at Bladin Point in Darwin Harbour has put Darwin on an irrevocable course for growth as a gas industry hub. The associated development of a marine supply base adjacent to East Arm Wharf secures the city's future as a major oil and gas supply and service centre.

Darwin Harbour is also of strategic importance in supporting Defence capability in the north of Australia. HMAS Coonawarra supports homeported or visiting patrol vessels while commercial facilities in the harbour support larger RAN and foreign naval vessels. The strategic importance of the harbour will be further enhanced by investment in a new Multi-User Barge Ramp Facility, the ongoing use of Darwin Port in mounting operations, support for joint training exercises, and the associated resupply and crew rest facilities.

Future strategic industrial development will depend on the availability of sufficiently large and suitable land in association with deep water port facilities and access to other major transport networks.

The East Arm Logistics Precinct, close to the Port of Darwin's East Arm Wharf and the Adelaide to Darwin rail freight terminal with major road and air transport connections, is ideally located to continue to develop as a key logistics precinct. The precinct is designed to assist business to grow and capitalise on future projects in the region with a particular focus on the region's expanding oil and gas, marine and logistic industries. East Arm and Middle Arm Peninsula will provide for future strategic industrial development in the region.

Full utilisation and improved efficiency of the existing port infrastructure has potential to accommodate ongoing industrial development. However the land use plan recognises that, in the longer term, existing deep water port development at East Arm, Darwin's CBD, and Wickham and Bladin Points is unlikely to meet long term demands, and that additional deep water port development will be vital infrastructure in the continued development of major industry.

Investigations in relation to potential port sites have led to the selection of Glyde Point, east of Gunn Point, as the preferred site for further major gas based industrial development outside Darwin Harbour. This selection recognises that the availability of large areas of land potentially suitable for strategic industry will maximise the opportunities for development of a port serving the

specific requirements of such industry as opposed to the range of activities associated with established port facilities within the harbour.

Glyde Point provides the necessary isolation to minimise the impacts of strategic industrial development on established urban areas. The proposed urban area at Murrumujuk will provide opportunities for employees to live locally and the long identified transport and infrastructure corridors will provide access to the broader region.

Land on Middle Arm Peninsula in Darwin Harbour, opposite Channel Island, was identified in previous regional land use plans as an area with potential for a deep water port and associated strategic industry development including meeting the needs of special industries and Defence needs, although land suitable for industrial development is less plentiful than at Glyde Point.

Identification in this plan of land for long term strategic industrial development is predicated on:

- ongoing staged construction of deep water port infrastructure at East Arm in Darwin Harbour
- continued operation of the existing privately owned single-user deep water port facilities at Wickham Point in Darwin Harbour
- completion of the privately owned single-user deep water port facilities at Bladin Point, opposite and upstream of the East Arm Wharf in Darwin Harbour
- construction of further privately owned deep water port facilities at Elrundie Peninsula, upstream of the East Arm Wharf in Darwin Harbour
- construction in stages of a new deep water multi-user port at Glyde Point in conjunction with the development of an adjacent major industry estate
- further consideration of the potential for future deep water port facilities at Channel Island in the Middle Arm of Darwin Harbour, and on the opposite side of Middle Arm
- possible long term consideration (with traditional owners) of the potential for future deep water port facilities at Port Patterson/Point Margaret on the Cox Peninsula, in conjunction with the future development of a major industry estate.

Primary Industry

Key Primary Industry Objectives

- Protect land resources of potential importance to future economic development and self-sufficiency in the region by:
 - identifying and protecting areas with potential for horticulture and agriculture
 - identifying areas with potential for extracting construction material while considering limitations that future land uses may impose on access to these resources.

Horticulture and Agriculture

Horticultural and agricultural development in the Darwin Region, particularly mangoes, Asian vegetables and other fruits and vegetables, are important contributors to the Territory economy. Increasing sophistication of these industries, combined with new land precincts, improved transport infrastructure and expanded domestic and off-shore markets, will create greater opportunities for further development of existing and new niche products.

The land areas that have the greatest potential for horticulture or agriculture are identified in the plan. Proposed alternative use of this land should therefore be considered in the context of the lost opportunity to:

- increase regional and Territory self-sufficiency in primary produce, with associated reduction in transport costs
- expand and diversify the economies of the region, territory and nation.

Construction Materials

This land use plan recognises that the extraction of soils, gravels and rock materials required in construction and building is an essential activity. It is also recognised as potentially incompatible with existing and future land uses, and inherently associated with environmental degradation hazards. The potential impacts on the environment and the prospects for subsequent development and use of mined land must be carefully balanced with the need to extract and deliver construction materials.

Conflicts can be avoided by locating extractive activities in areas close to but separated from proposed development, or in areas where there is potential for the extractive activities to be beneficial to subsequent land use, by reducing costs and environmental impacts.

There are opportunities under mining legislation to impose reservations from mining activities to limit potential detrimental impacts of extractive mining on other activities. However, the ongoing challenge is to establish and maintain appropriate balances between the interests of other land uses and operational management to mitigate potential incompatibilities.

Stockpiling, treatment (e.g. sand washing) and distribution of extractive materials also have potential for incompatibility with existing and future land uses. Convenient locations for these activities, close to existing or proposed arterial roads, are important. However, equally important is locating stockpiling and treatment sites an appropriate distance from incompatible land uses and managing operations to contain unacceptable impacts within the sites.

Open Space and Natural Areas

Key Open Space Objectives

- Retain the region's natural landscapes, vegetation and habitats where compatibility with appropriate urban and rural development can be maintained.
- Minimise the impact of development on the natural environment during the construction phase and ongoing use.
- Recognise and promote Darwin Harbour as the region's most valuable natural asset, minimising detrimental impacts from development in the harbour catchment and on its foreshore.
- Provide appropriate open space reserves for the conservation of natural environment and heritage features, and for resident and visitor recreation in active and passive activities.
- Recognise the role of remnant vegetation corridors in providing interconnectivity of open space and protecting amenity.
- Recognise the role of urban green space in reducing urban heat impacts and providing community amenity.

Open spaces and conservation areas throughout the Darwin Region have roles in protecting land and water resources, the conservation of significant vegetation communities and wildlife habitats, and enhancing green infrastructure within the urban environment. The land use plan recognises the continued contribution of these areas to improving community well-being in the tropics, where heat minimisation is an important aspect of liveability and to providing links between environmental landmarks. The land use plan also recognises that accommodating future growth will require selective impacts on the natural environment and biodiversity enjoyed by residents. Creating new human habitat cannot be achieved without some impact on existing natural habitat, new development should maintain or provide urban green space in public and private areas including parks, street trees, landscaping and vegetation corridors.

The land use plan also places a priority on land reserved to protect particularly valuable environmental elements, including special topographic and other geographic features, key natural habitat areas and unique or especially valuable vegetation. As total consensus regarding significant areas is difficult to achieve, the plan aims to provide a appropriate balance between the obligation to protect the natural environment and to provide for the recreational needs of the community.

A significant vegetation community identified as being of value is the mangroves, which is important because of its 'ownership' of specific ecosystems and its function of protecting coastal areas from erosion and accretion over time.

Darwin Harbour is regarded by many as the city's most valued natural asset for the combination of its critical roles of supporting northern Defence, LNG production

and commodity exports, and boundless opportunities for fishing, boating, tourism and other recreational pursuits. It is a powerful magnet used and loved for the lifestyle it provides for residents from across the region.

The plan aims to maintain a sensible balance between the harbour's diverse working role, recreational needs and the obligation to protect its natural environment. Within this context the Stormwater Strategy for the Darwin Harbour Region released by the NT Environment Protection Authority in association with the Darwin Harbour Water Quality Protection Plan prepared by the Department of Land Resource Management establishes a framework to minimise the impacts of future urban development in the catchment on the high water quality in the harbour.

The potential for urban development around the harbour will ensure future residents also have ready access to the recreational opportunities associated with the harbour.

Other recreational pursuits valued by many in the community include 4WD activities, hunting, bush walking and camping. The plan is predicated on the need for appropriate management of natural areas to provide continued access to opportunities for such activities within the context of protection of areas of conservation significance.

Darwin Harbour, Shoal Bay, the Howard Springs Sand Plains, Finnis River and Adelaide River Coastal Floodplains and Fogg Bay are all recognised as being of national and international significance. Key Environment and Heritage Objectives in the Regional Context and Policy section of this plan establish a framework to ensure more detailed planning and assessment of development occurs in the context of appropriate identification and protection of areas of conservation significance.

The identification of Priority Environmental Management (PEM) areas in the Litchfield Municipality recognises the importance of providing links between environmental landmarks and guides consideration of areas of significance outside parks and reserves. Future detailed planning will consider the need for refinement of the existing PEM areas and for identifying similar areas in other localities.



George Brown Darwin Botanic Gardens

Community Facilities and Services

Key Community Facilities Objectives

- Maintain a high standard of community service provision through:
 - appropriate provision and management of regional recreation facilities to encourage involvement of residents in sport, and to provide for healthy living and premier sporting activities
 - encouraging the co-location of recreation facilities with other community uses particularly schools to maximise potential for multi-use
 - recognising the role of parks and reserves in meeting the recreation needs of the community
 - appropriate provision of land for schools, child care centres, aged care and facilities for seniors and other community facilities via detailed plans for future urban and peri-urban areas, and in association with infill development and urban and rural activity centres

The provision of a range of facilities and services to meet the needs of local communities assist in the creation of local character and identity that contribute to the creation of strong and healthy communities.

Active Recreation

Facilities to cater for the sports and active recreation needs of the community range from premier regional sporting facilities for regional peak bodies and high profile international and national sporting events, to local facilities to meet local needs.

Regional

Parks and reserves in the Darwin Region offering significant recreational opportunities for residents and visitors can be divided into a number of broad categories, each providing differing experiences:

- reserves within or adjacent to urban areas that provide recreational resources for residents and are within easy reach of visitors, such as Casuarina Coastal Reserve that attracts around 700 000 visitors annually
- parks and reserves providing outstanding wildlife experiences for interstate and international visitors, such as Fogg Dam Conservation Reserve and Windows on the Wetlands
- other parks and reserves offering more visitor orientated experiences including Berry Springs Nature Park and Manton Dam Recreation Reserve
- showcases for the Territory's unique experiences, such as the Territory Wildlife Park and George Brown Darwin Botanic Gardens.

Litchfield National Park, to the west of Coomalie, is a popular destination for residents and visitors to the region. It provides opportunities to experience Top End landscapes, scenic waterfalls, safe swimming, camping, four wheel driving and bush walking.

Recreation facilities at the Marrara Sports Complex provide a range of premier sporting facilities catering for local, regional, national and international events.

The Freds Pass Recreation Reserve also provides for a range of recreational activities, including equestrian activities (polocrosse and dressage), and Palmerston has a range of premier sporting facilities distributed across the urban area. The historic Gardens Oval complex, the original regional facility, continues to provide an alternative venue for both local and regional events. All three complexes have club rooms and spectator facilities and Marrara and Freds Pass provide opportunities for expansion and improvement.

While Marrara will remain the principal location in the region for premier sporting facilities, additional facilities will be required in future urban areas. The specific location of these facilities will be addressed in more detailed future planning, with particular attention given to ready access to the arterial road and public transport networks.

The Hidden Valley Motor Sports Complex and Micket Creek Shooting Complex meet specific recreation needs. Future development of these facilities is anticipated to meet the needs of continued population growth.

As the regional population continues to grow there will be an increased demand for additional specialist facilities that have relevance to residents and visitors, including a national standard aquatic centre and improved facilities for equestrian events.

Local

Detailed planning for urban areas and rural activity centres will focus on opportunities to collocate local sporting facilities with other community facilities, particularly schools. This approach encourages multi-use and increased activation of local areas.

Education Facilities

The ongoing provision of adequate and affordable land to accommodate a range of educational facilities is a key imperative in this plan. Specific requirements and sites for new school infrastructure will be determined by a number of factors including:

- the location of greenfield and infill development
- the contribution of government and non-government sectors
- the impacts of Defence personnel movement
- convenience with respect to public transport services

- opportunities for co-location with recreation and other community facilities (particularly child care centres)
- enrolment management.

The land use structure established by this regional plan will help guide future planning.

Charles Darwin University (CDU) supports the professional and personal aspirations of residents of the region. Since its humble beginnings as a community college, CDU has evolved into a significant employer in the Darwin Region and one of the largest Territory-based export earners. A resident student population uses major campuses in Casuarina and Palmerston and new facilities at the Darwin Waterfront will soon commence operations.

The location of existing campuses, the possible future consolidation of facilities, particularly in the health sector, as well as anticipated international student growth and accommodation have potential to significantly impact infrastructure requirements. The focus of the university on international outreach and partnerships with neighbours including Timor-Leste, Indonesia and China make a major contribution to cultural diversity within the region.

The active involvement of CDU in the future detailed planning for specific localities will ensure these future plans reflect university initiatives and potential contribution to future regional growth and the required infrastructure.

Health Services

The key health care facilities in the Darwin Region, the Royal Darwin Hospital and the Darwin Private Hospital, are on the northern fringe of the urban area. As the growing community's 'centre of gravity' moves to the east and south, the need for additional health care facilities has been recognised.

The site for the new hospital at Holtze, immediately to the north of Palmerston on the northern side of the Stuart Highway opposite Temple Terrace, will provide for staged development to improve convenience and reduce emergency travel distances.

Ongoing detailed planning for health care will adequately provide for both public and private sector participation in developing facilities and delivering services, and for the changing demographic profile of the region (e.g. increasing numbers of seniors choosing to live in the region after they retire).

Detailed strategic planning for health care facilities will not be limited to major facilities, or just the public sector. There is a strong policy commitment to distributing health related jobs and services throughout the region for reasons that include:

- providing service convenience
- minimising emergency response times
- minimising travel times and distances
- minimising energy and associated environmental costs in private and public transport.

Lesser community health care facilities and services will be integrated in urban and rural activity centres.



Infrastructure

Key Infrastructure Objectives

- Identify and protect natural freshwater sources, including aquifers and surface water catchments.
- Identify and protect transport corridors and facilities for an efficient movement network.
- Integrate land use with transport planning.
- Identify and protect a site to accommodate a regional waste facility.

Essential Services

Water Supply

The Darwin Region water supply system currently sources water from Darwin River Dam (85 per cent) and McMinns and Howard East borefields (15 per cent) and provides reticulated supply to five supply zones: Darwin Rural/Palmerston, Stuart Park, Casuarina, Karama and Channel Island. The system provides water to approximately 50 000 properties (including commercial, industrial and government) and serves a population of about 118 500 people.

The variability and scale of consumption of water (three times the Australian average) in the Darwin Region and future growth in demand suggests that even if current programs aimed at reducing consumption are successful there will be a need for significant increases in the capacity of supply in the region. Power and Water Corporation is currently augmenting the Howard East Borefield to ensure security of supply. A return of Manton Dam to service is another possible option for short term augmentation of supply.

Given that the availability of adequate and affordable freshwater is fundamental to future development, the land use plan prioritises the identification and protection of water sources, including surface catchments and aquifers.

Possible solutions to secure supplies in the medium term (beyond 2020) include; one of three previously identified dam sites, further augmenting the supply available from Manton Dam through raising the height of the dam, a desalination plant, or the Adelaide River off-stream storage basin. Review of previously identified dam sites by Power and Water Corporation indicates the Upper Adelaide River Dam would be the preferred development priority of the three in-stream dam sites. This will be assessed against the three alternative options to establish the most appropriate approach to medium term supply.

The need for water is driven by demand and augmenting supply is a costly response to increased demand. Reducing demand through water efficiencies will delay the need for augmentation. In October 2013, Power and Water Corporation launched the 'Living Water Smart' program, which is aimed at reducing demand through water efficiencies to delay the need for augmentation.

Power and Water Corporation's 2014 *Darwin Region Water Supply Strategy* addresses in more detail the issues of water demand and infrastructure planning.

The land use structure in this regional plan simply identifies all potential medium and long term future sources of water and takes account of associated constraints on development. While the water supply strategy retains both the Marrakai and Mt Bennett Dams as options for further assessment in the long term, it also recognises that neither is an ideal option because of the range of potential environmental impacts and constraints associated with existing land use in the catchments.

The Water Reticulation Map shows the reticulated water network in the Darwin Region. The available capacity across the network and further development in some areas including Knuckey Lagoons and the rural areas will depend on specific and detailed investigations.

Electricity

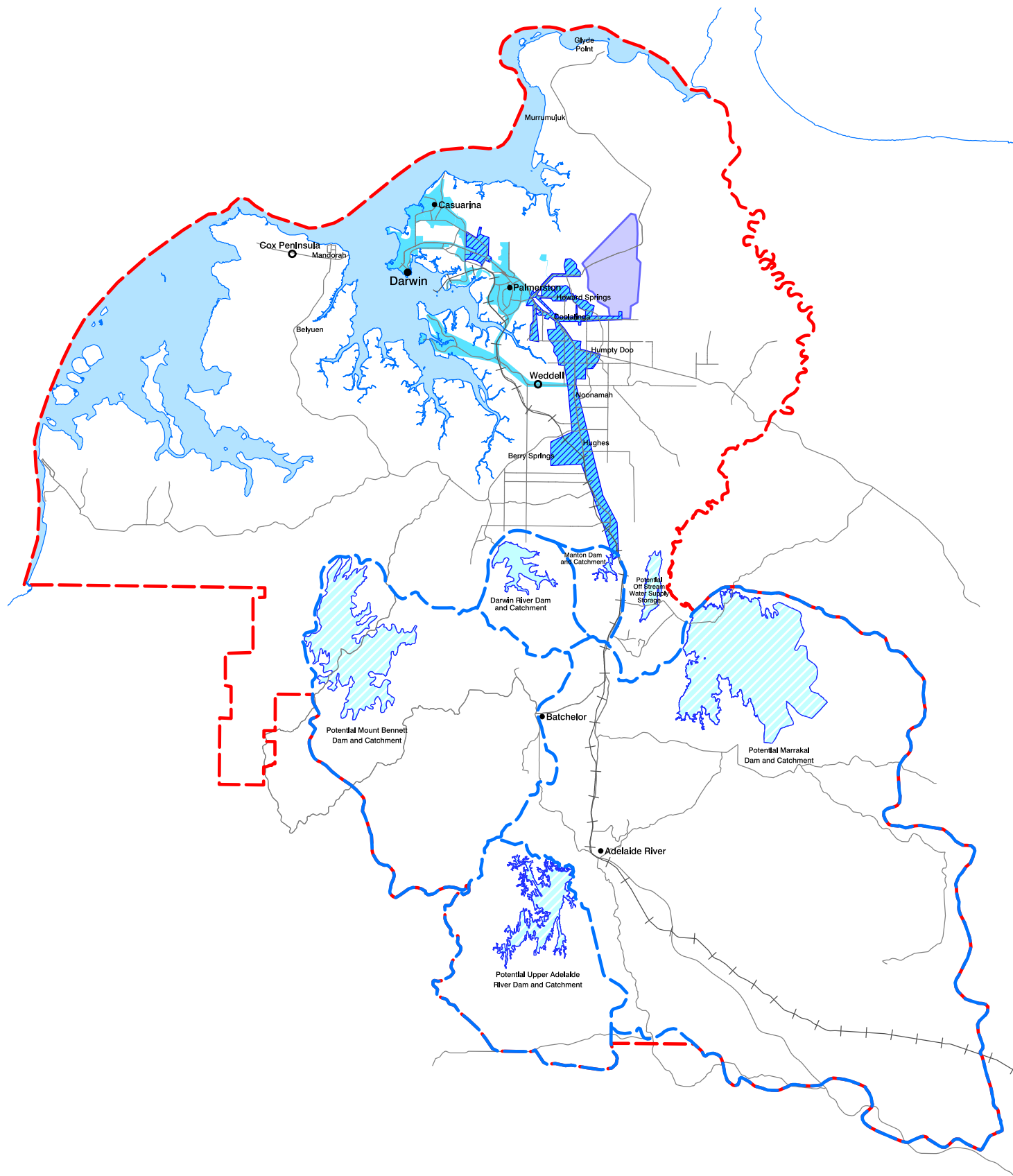
The Darwin Region is supplied by the largest electricity network in the Northern Territory, which extends as far south as Mataranka, and services the towns and centres along the Stuart Highway. Electricity within this network is generated at Channel Island, Weddell, Pine Creek and Katherine. These power stations currently generate electricity through gas turbines.

The demand for electricity is driven by a number of factors including new dwelling approvals, population growth, gross state product and the number of particularly hot days. In 2012/13 the Darwin – Katherine network delivered approximately 290 Mega Watts of electricity, with a forecast average annual growth rate of between 1.95 per cent and 3.2 per cent over the next 20 years.

The capability of the system is however not measured by the energy consumed, but by the capacity of the system during peak periods. Regular assessment and demand forecasting ensures that the growth in customer demand is being matched by the development of generation capacity at Channel Island and Weddell Power Stations.

Renewable energy will become increasingly important as a sustainable option to meet power generation requirements in the future. There are already a number of existing renewable energy projects in the region, including the Shoal Bay Waste Management Facility that produces electricity from methane gas and powers 1 000 Darwin homes. There are a range of potential opportunities for future expansion of renewable energy on a large scale including solar, hydro-electric, tidal, geothermal and bio-fuel. Solar is the most obvious choice due to the region's abundance of sunny days. There are opportunities for hydro-electric power from dams, tidal-power from large tidal velocities in the region, geothermal energy from the region's geothermal basins and bio-fuel from crops and crop waste. These options require further feasibility assessments.

As the extent of urban land in the Darwin Region grows, new corridors and substation sites must be identified and reserved to allow provision for an expanding electrical distribution network. Many of the high voltage corridors have been identified, reserved through the NT Planning Scheme and continue to be acquired. Future substation and distribution sites will be identified in the early planning phases of new urban areas as the distribution extent becomes known.



LEGEND

- Plan Area
- Water Supply Catchment
- Reticulated Water Supply Area
- Reticulated Water Supply Area - Limited Capacity
- Existing Water Supply Storage
- Potential Water Supply Storage
- Borefield
- Ocean / Sea

- Road Centreline
- Railway
- Coastline

Water Reticulation

Source: Power and Water Corporation

Sewerage

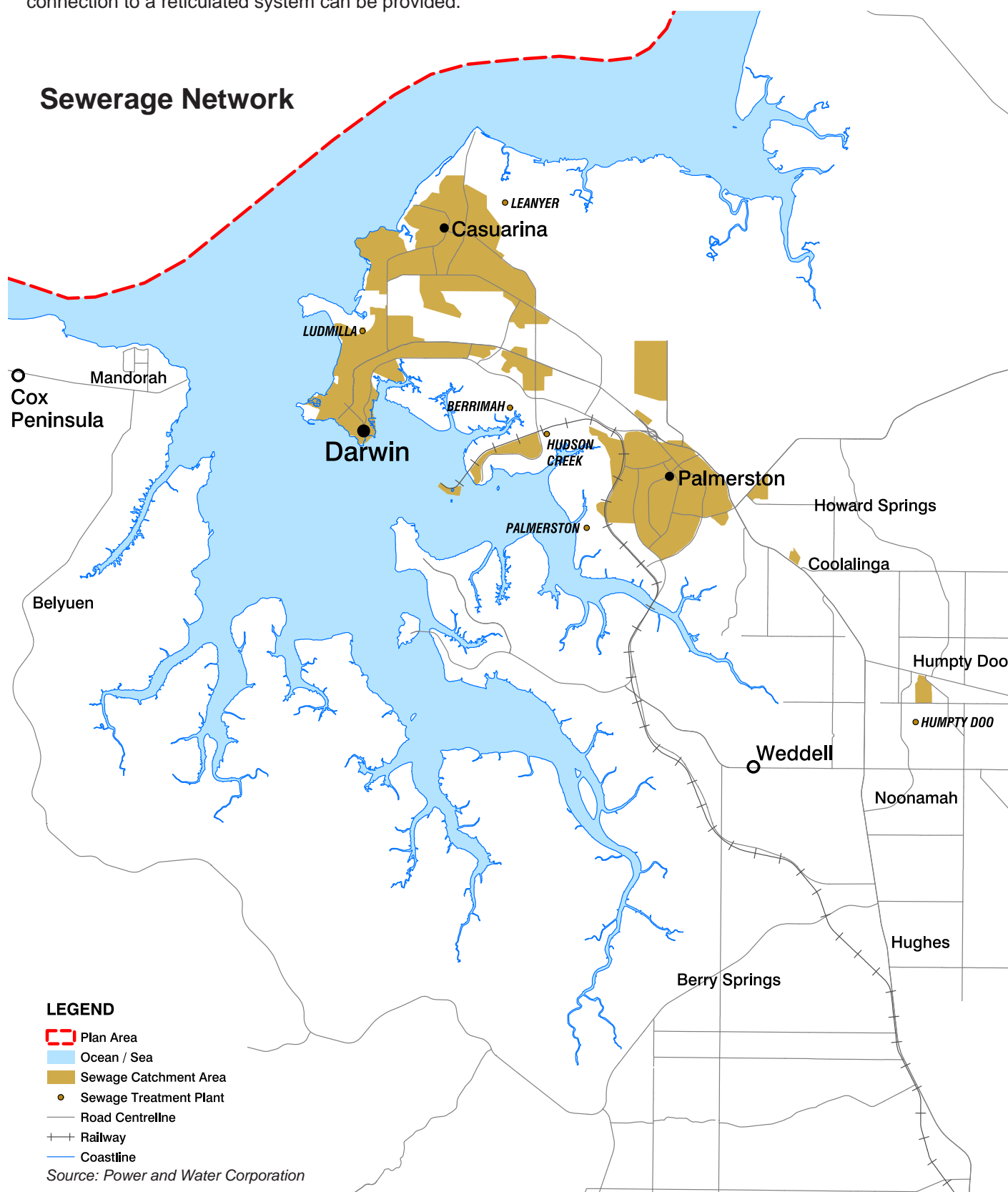
The Sewerage Network Map illustrates the existing sewerage network, which collects sewage from urban areas and transports it to treatment facilities. The capacity within the existing network varies and further investigations will be required to determine the potential for further development, particularly infill development.

In the rural areas sewage is generally treated on site although a reticulated system has been provided at Humpty Doo and a package treatment plant has been provided to service development at Coolalinga until connection to a reticulated system can be provided.

Options to implement the necessary upgrades of existing, or provide appropriate new waste disposal infrastructure, whether it be on site or reticulated, will influence planning for more detailed development within the land use structure.

This will be a particularly important consideration in areas overlying valuable groundwater resources and in water catchment areas.

Sewerage Network



Waste

The Shoal Bay Regional Waste Facility, that receives waste from transfer stations throughout the region, is the primary location for the storage and processing of waste. The facility has a limited lifespan dependent on, but not limited to, population growth, commercial and industrial productivity, and the extent of impact resulting from cyclonic events. A second regional waste facility will be required in a growing economy and as the population base expands.

The identification of an appropriate site for a future regional waste facility will depend on the design of efficient systems to handle receipt, storage, treatment, recycling and/or disposal of waste. Ongoing investigations will involve stakeholders at all levels of government to identify a site suitable to provide an additional regional waste management facility to cater for recycling and organic waste, as well as normal domestic and industrial wastes. Site selection will be influenced by the final design of the facility and will be informed by consideration of potential negative impacts the facility may have on adjacent amenity.

Transport

Integrating transport and future land use is fundamental to ongoing sustainable development in the region. At the regional scale the imperative is to secure the necessary corridors for future infrastructure to provide efficient links between varying land uses and localities.



Road

Road based transport is likely to remain the primary transport system in the Darwin Region. As the region continues to grow the priority is to identify necessary corridors to provide interconnectivity and the safe and efficient movement of people and goods.

Key arterial transport corridors identified on the land use structure in this plan will accommodate high capacity urban roads and premium public transport services. The identified corridors include the links to the strategic industry area at Glyde Point, links around the harbour and to Batchelor and the Weddell arterial linking the Stuart Highway to existing infrastructure at the Elizabeth River bridge.

The Glyde Point corridor will provide convenient access between the existing port at East Arm and the future industrial area and between Murrumujuk and higher order urban services available in Palmerston. A second



link from the Stuart Highway at Cox Peninsula Road to Glyde Point will connect the future industrial area to the major transport link to southern Australia and limit the potential impacts of heavy transport on the network in built up areas.

Routes have been identified for future links that will be required to provide efficient connections between potential developments around the harbour including the second airport site on Blackmore Peninsula. Given the significant investment required for this link it will be a long term proposal in responding to future development of the airport and/or development on Cox Peninsula.

The plan also identifies a number of roads which will be important in connecting proposed urban and peri-urban areas with higher order centres. These include the link from Noonamah to the Glyde Point arterial via Humpty Doo and the planned Middle Arm connector link between Cox Peninsula and Channel Island Roads.

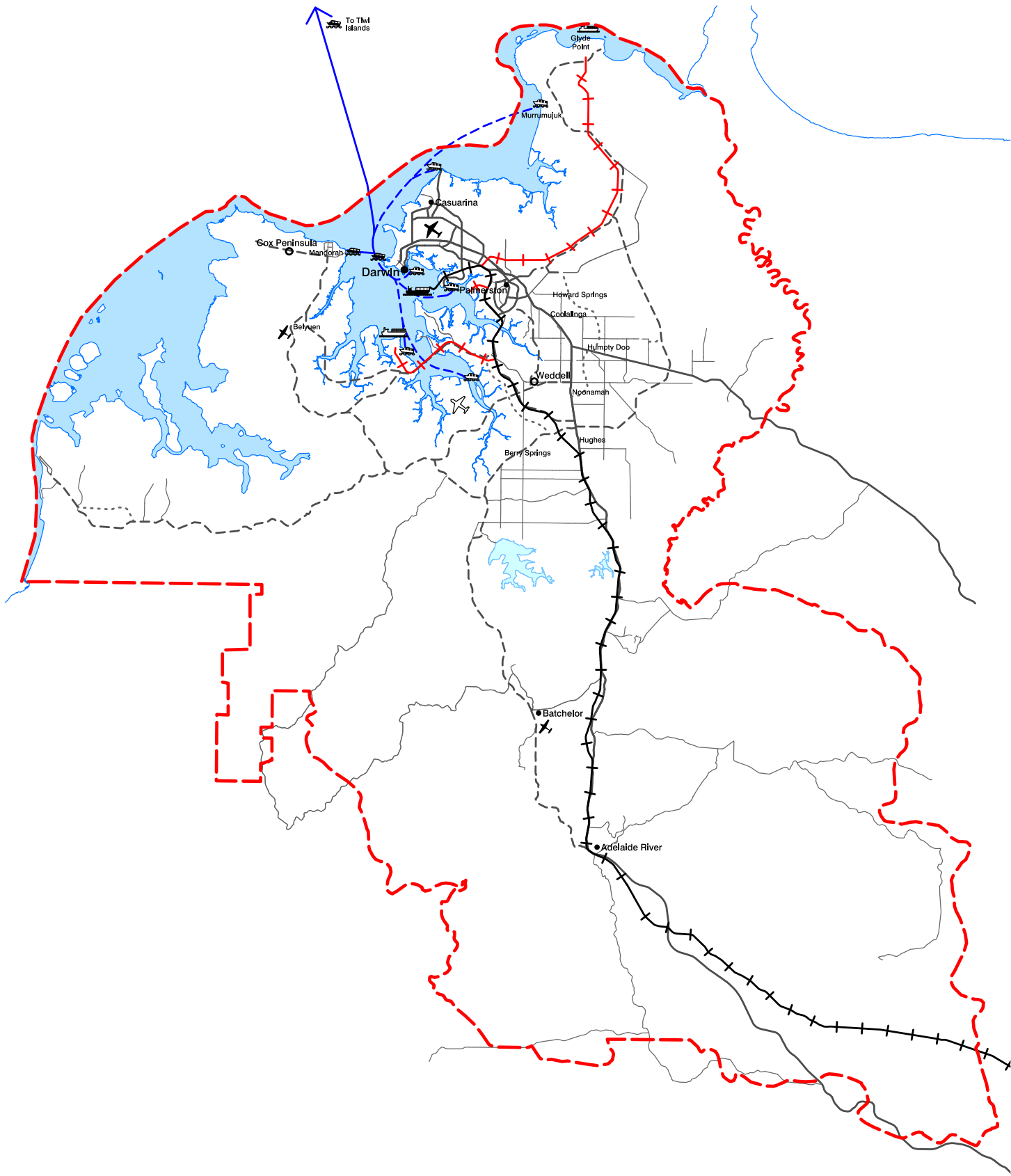
The original North Australian Rail corridor through Coomalie provides the opportunity for a future arterial link between Batchelor and Darwin River Dam Road with a possible future extension to Adelaide River. This will provide an alternative access to the region from the south and to the many tourist sites in the Coomalie area. It will also solve issues associated with historic land holdings in the north west of Coomalie.

Active Transport

The land use plan recognises the role of active transport (including cycling, walking and public transport) in fostering liveable and sustainable communities and the contribution it makes to transport networks particularly in, around and between urban and rural activity centres.

Public transport is planned to remain road based, moving between the key nodes of Darwin Central Business area, Palmerston and Casuarina to provide an interconnected regional service. The demand for public transport services will grow in line with population growth and the development of new urban centres.

The demand for public transport services will also be influenced by the ease of connectedness between residential and employment locations, network efficiency and cost. The demand for public transport will grow and thereby increase the viability of introducing other forms of public transport, including rapid bus lanes along



LEGEND

- | | |
|---|-----------------------------------|
| Plan Area | Existing / Planned Airport |
| Existing Water Supply Storage | Existing / Planned Sea Port |
| Ocean / Sea | Existing / Planned Ferry Terminal |
| Existing / Planned Rail | Aerodrome |
| Existing / Planned Ferry Route | |
| Existing / Planned Arterial Road and Transport Corridor | |
| Existing / Planned Collector Road | |

Future Regional Transport

established public transport routes that may be suitable for light rail in the future. The identified arterial transport corridors will provide opportunities for future premium public transport services.

The review of the public transport network will consider identified urban and peri-urban areas and rural activity centres. Within the context of that review it is likely that an extension of the current park and ride network, incorporating facilities along public transport spine routes, is likely to provide efficient public transport services in these localities. The significant ongoing costs of school transport service required to serve identified greenfield sites will be considered in more detailed planning particularly for the more remote localities.



Rail

The Adelaide to Darwin Railway was completed in 2004 and now forms an integral component of the logistics chain moving goods and natural resources in and out of the region.

Future development of the rail will be associated with strategic industrial development. Planned links are identified between the strategic industrial area at Glyde Point and the existing rail, as are extensions to connect to strategic industry areas on Middle Arm Peninsula and on Middle Arm opposite Channel Island and the Elrundie Peninsula industrial area.

The timing of developing these connections will depend on the scale and characteristics of future development and the need for links between major port infrastructure and industries.

As discussed above the identified arterial transport corridors are intended to provide future opportunities for light rail based public transport.

Air

Darwin International Airport is the principal airport in the region and operates as a joint user facility accommodating civil and Defence activities. In 2012–13 over 2.2 million domestic and international passengers moved through the terminal - an increase of over 200 000 in just five years.

Defence and civil operations are anticipated to continue to grow in line with the economic performance of the region, population growth and Defence presence. As the number of flights increases over the long term, it is anticipated that an additional airport will be required to meet the demand.

Darwin International Airport will maintain its role as the primary international and domestic passenger terminal, but there is potential for a second airport to meet increasing cargo transport or general aviation needs.

The land use structure within this land use plan identifies a site for a second airport on Blackmore Peninsula to the west of Middle Arm. Identifying a site for this future major infrastructure will minimise the potential for encroachment of incompatible land use in areas close to the site.

The land use plan also recognises the potential for future development of the existing Batchelor Aerodrome as a base for light aircraft operations and maintenance and for industrial development utilising air services.



Sea

There are currently four components to sea based transport in the Darwin Region: local passenger ferries, domestic and international tourist ships, domestic freight and international freight shipping.

Passenger ferries provide connections from Cullen Bay to Mandorah and to the Tiwi Islands. The potential for growth in this sector will depend on the timing and extent of future development and the ability of these services to be more efficient than alternative commuter transport. While existing services will increase in viability with population growth, private charter services are likely to be the focus of additional harbour based services.

As it is an attractive destination and a major centre on the northern coast of Australia, Darwin is expected to continue to benefit from passenger ship tourism. Facilities in Darwin Harbour will continue to provide berthing services for passenger ships.

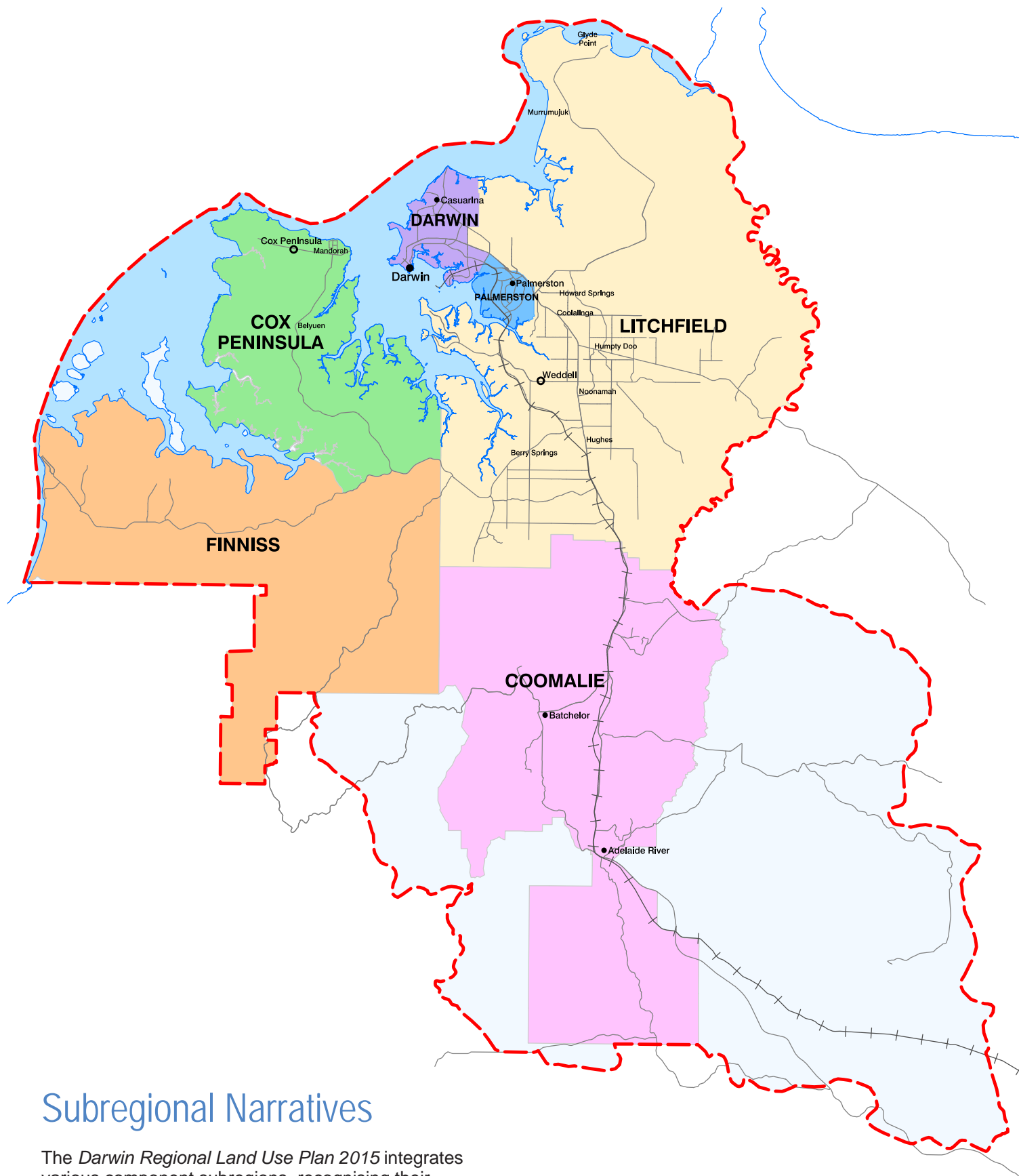
East Arm Port is the current shipping port for all forms of ship based cargo including containers, vehicles, fuel, cattle and ore. Full utilisation and improved efficiency of the existing infrastructure combined with population and industrial based economic growth in the region will continue to stimulate port based logistics at East Arm.

In the longer term an additional port at Glyde point will create opportunities for specialisation to further enhance efficiency. The location of Glyde Point outside the harbour will minimise the potential for future issues associated with shipping congestion in the harbour.

Darwin's climate, particularly the heavy rains during the wet season, causes remote coastal communities to become disconnected by road and dependent on freight services delivering on a regular and reliable basis. Domestic shipping will continue to provide services to remote communities along the northern Australian coastline.



East Arm Port



Subregional Narratives

The *Darwin Regional Land Use Plan 2015* integrates various component subregions, recognising their individual characteristics and features. Some subregional areas coincide with local government boundaries, but others include areas not currently incorporated within formal administrative boundaries.

Outlined on the following pages are the characteristics, constraints and opportunities in each subregion within the context of the planned directions for future growth in the broader region.

Subregions

LEGEND

- ▬ Plan Area
- ▬ Ocean / Sea
- Road Centreline
- + + Railway
- Coastline

Darwin

Components:	Darwin Municipality, Waterfront Precinct and the Darwin Rates Act Area
Area Illustrated:	143 km ²
Location:	From Lee Point in the north to East Arm of Darwin Harbour in the west and south and east to Vanderlin Drive the Stuart Highway and Pinelands
Population:	81 670 (ABS - June 2013 Estimated Resident Population)
Characteristics:	The dynamic and cosmopolitan capital city of the Northern Territory

George Goyder set up camp at the foot of Fort Hill in 1869 and commenced the first surveys of land in the Northern Territory. This camp, which served as the Territory's first Lands Office and accommodated the incoming population, subsequently grew into the town of Palmerston (now Darwin).

Darwin has evolved from these humble beginnings to become the vibrant capital of the Northern Territory and a critical hub of Australia's north.

The CBD of Darwin is the focus of significant economic activity and employment as the seat of government, and the primary regional commercial and tourist hub.

Future infill and redevelopment opportunities within the urban area will enhance our unique lifestyle. Retail activity is focused on the regional centre at Casuarina in the northern suburbs with associated commercial and community uses.

Broad hectare land with potential for development in Darwin is virtually exhausted. An increasing proportion of dwellings will be supplied by infill on remnant vacant sites or redevelopment of underdeveloped sites. Priority will be given to maintaining the character of existing suburbs while maximising self-containment through development of localised economies focused on activity centres close to high frequency public transport routes.

Casuarina will be a focus of such development and in combination with walkable local activity centres will provide alternatives to car travel and increasing housing choice.

Further detailed planning for specific activity centres and transport routes will be informed by ongoing community consultation.

The Darwin Rates Act Area comprises land outside the Darwin Municipality and includes Charles Darwin National Park, Berrimah Farm and the East Arm Peninsula. The peninsula is the focus of significant regional industrial development and major transport infrastructure (railway and deep water port).



The Gardens, Stuart Park and Darwin City.

Palmerston

Components:	Palmerston Municipality and the Elrundie Unincorporated Area
Area Illustrated:	63 km ²
Location:	Between the Stuart Highway and the Elizabeth River to the west of Litchfield Council
Population:	32 088 (ABS - June 2013 Estimated Resident Population)
Characteristics:	A planned community that continues to experience rapid growth

The City of Palmerston in part occupies land acquired by the Australian Government in 1971 in recognition of the limited supply of land in Darwin to accommodate urban growth. In 1979, soon after self-government was granted to the Territory, the decision was made to proceed with the development of a new town at Palmerston (initially known as Darwin East). Development of the town commenced in 1980 and it was declared a city in 2000.

At the edge of the rapidly developing broader Darwin Region, Palmerston has achieved growth rates substantially higher than the rest of the region and other Australian cities. With the completion of development of its remaining eastern suburbs, Palmerston will accommodate more than 40 000 people.

Palmerston, planned as a satellite of Darwin, remains predominantly residential, with retail in the town centre and the light industrial precinct at Pinelands and service commercial precinct at Yarrowonga providing local services and jobs.

The planned hospital and the proposed Gateway Shopping Centre will increase local employment. Future industrial development on Elrundie Peninsula with associated port facilities also has the potential to contribute to local employment.

The city has a young population including a significant number of Defence personnel and their families. The focus of the Palmerston Council is to establish 'a place for people', with a range of recreational and community facilities to serve the active community, including a local campus of the Charles Darwin University.



Rosebery

Litchfield

Area Illustrated:	3100 km ²
Location:	From Gunn Point in the north to Manton Dam in the south, Adelaide River in the east to Harvey Creek in the west
Population:	21 380 (ABS - June 2013 Estimated Resident Population)
Characteristics:	Rural lifestyle with a focus on local communities

The Litchfield Subregion occupies the farm lots originally surveyed in 1869 (see 'The Past', page 46). The area formed Australia's front line during WWII with a concentration of men and materials set up in a series of fortresses and the construction of three military airfields along what is now the Stuart Highway. The remnants of this military activity continue to contribute to the rich heritage and amenity enjoyed by residents and visitors.

Until local government was introduced in 1985 the area, known simply as the 'Darwin Rural Area' was considered as a component of the wider region. Now a separate identifiable entity, the Litchfield Municipality continues to be important in the regional context in terms of water and land resources, natural and cultural heritage, and regional urban and rural growth.

Although initial land survey was intended to foster agriculture, the availability of freehold lots and destruction of Darwin by Cyclone Tracy in December 1974 were the catalysts for significant interest in rural lifestyles. People escaped the vulnerability of coastal Darwin and were attracted by the perceived immunity from administrative interference associated with urban living on (then) leasehold land under planning control.

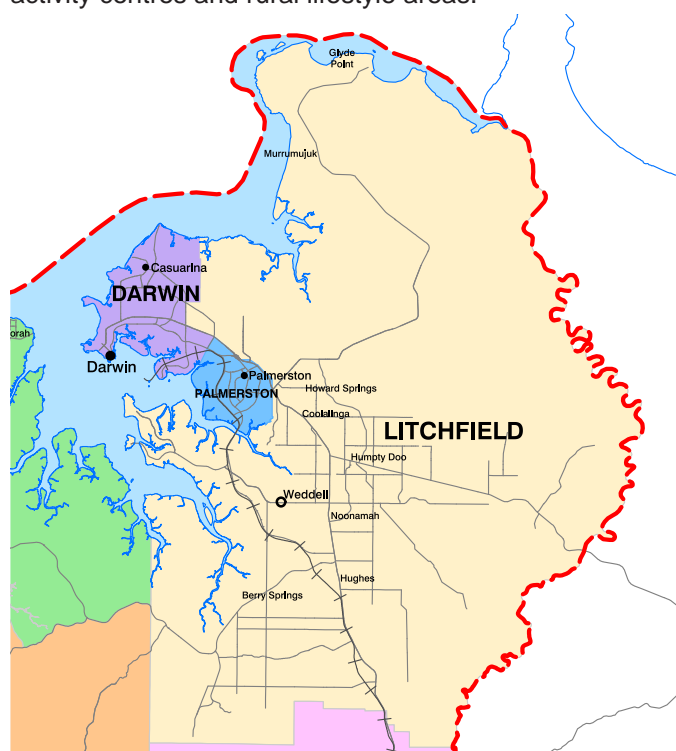
A series of 'village centres' (more recently called 'district centres') were identified at Humpty Doo, Howard Springs, Freds Pass and Berry Springs. Humpty Doo, on the Arnhem Highway and serviced by reticulated water and sewerage, has flourished. The Stuart Highway location at Coolalinga attracted major development and it has emerged as a key centre.

Rural lifestyles continue to attract a significant number of residents in the Darwin Region and this choice is recognised as a legitimate land use. Litchfield's proximity to established urban concentrations and abundant land inevitably dictates that future urban development will be located within its boundaries. This is evidenced by the long term plans for a new city at Weddell and proposed urban development at Holtze, parts of Hughes, Noonamah and Noonamah Ridge, and Murrumujuk in conjunction with Glyde Point port and industry.

Rural Activity centres will build on the previous concept for district centres providing a core of commercial and community development and a range of residential options decreasing in density from urban residential within the core and a transition of larger lots to provide a buffer to adjoining unserved rural lifestyle areas. The economic viability of the infrastructure required to support the core activities will be enhanced through the utilisation

of that infrastructure to serve smaller rural lots. The increased local population will support a greater range of local facilities, including public transport and improve local employment opportunities.

Future detailed infrastructure investigations and planning will guide coordinated and efficient development to meet the needs of existing and future residents within rural activity centres and rural lifestyle areas.



Coolalinga shops

Coomalie

Area Illustrated:	1500 km ²
Location:	From Manton Dam in the north to the Town of Adelaide River in the south, Adelaide River in the east to Litchfield National Park in the west
Population:	1310 (ABS - June 2013 Estimated Resident Population)
Characteristics:	An emerging area with important links to historical WWII, mining and horticulture activity and an increasing focus on education and tourism

Various agricultural and mining enterprises and the significant role of the Coomalie Subregion during WWII provided the initial impetus for growth.

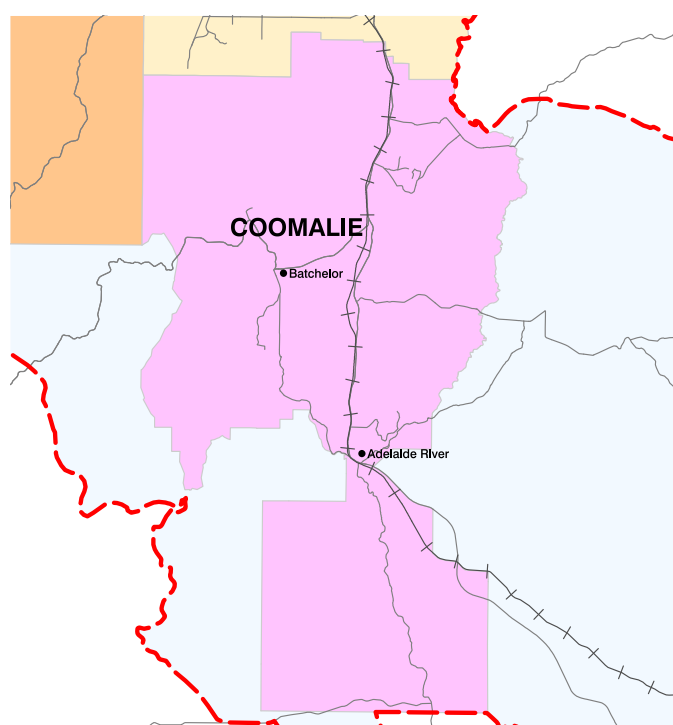
Adelaide River, originally established as a depot for the Overland Telegraph Line workers, subsequently became a rest stop and river crossing on the journey south to the Pine Creek goldfields and a major station on the railway. The town was the centre of significant activity during WWII and continues to provide residential options, local services and a convenient rest stop and tourist centre on the Stuart Highway.

The Rum Jungle uranium mine started operating in the 1950s and the township of Batchelor, built to accommodate the workforce, provided a range of community and recreational facilities. With the closure of the mine in the early 1970s, Batchelor was transferred to the NT Administration and became a tertiary education centre. Tourism has become increasingly important to the town and the region, particularly since the establishment of Litchfield National Park in 1986, and the town provides a population base and local services.

Coomalie continues to contribute to growth of the region in areas of tourism, education and horticulture and agriculture. It is also of particular importance with respect to mineral and regional water resources.

The Coomalie Community Government Council was established in 1990 with the first election in 1991. The council's vision is to sustain and nurture the lifestyle of residents and positive experiences for visitors.

Resolving native title claims will create opportunities for development of Batchelor and Adelaide River, particularly industrial development in association with the Batchelor Aerodrome and resolving historic access issues will similarly create opportunities for new rural lifestyle development.



Mini replica of Karlstein Castle, Batchelor

Finniss

Area Illustrated:	1700 km ²
Location:	From Bynoe Harbour in the north to Litchfield National Park and land owned by the Delissaville / Wagait / Larrakia Aboriginal Land Trust in the south and west from Litchfield Municipality and Coomalie Community Government Council area
Population:	Approximately 550
Characteristics:	Rural lifestyle and recreational opportunities for residents of the broader region and visitors

The impetus for development in this subregion was the sale in 1986 of parts of the former Finniss River Pastoral Lease as Crown Leases, for the purpose of land use evaluation and development for a variety of uses including weekender or rural living, agriculture, horticulture or grazing, tourism and recreation.

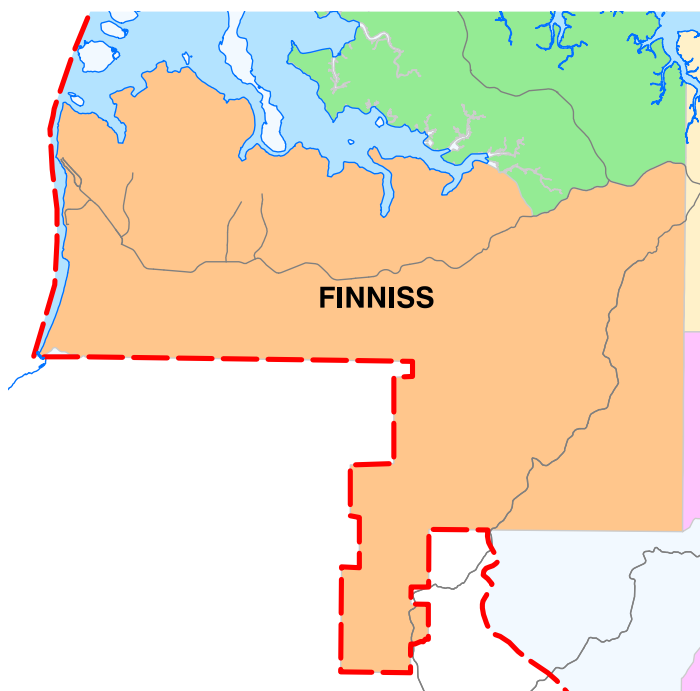
Communities at Dundee Beach, Dundee Downs and Bynoe were originally marketed as weekend retreats with ready access to excellent coastal and island recreation fishing. The small resident population increases significantly at weekends and holiday periods as locals and visitors head to weekender lots and tourist accommodation.

There is no reticulated water or sewerage in the Finniss subregion, groundwater resources are negligible, and community facilities are limited to a small school and a first aid post at Dundee Beach. The Kangaroo Flats Defence Training Facility is located in the east of the subregion and the Aboriginal outstation of Woolaning includes a secondary school with boarding facilities.

Fog Bay Road, the sole road access to the subregion, has been partly upgraded and sealed, the exceptions including a number of significant creek crossings. Action to address this constraint is a priority, but until the work is completed, road access is restricted in severe wet season conditions.

Urban development at Finniss is not supported because of isolation from existing regional commercial and community facilities, and the lack of infrastructure. Without adequate reticulated services, a relatively self-sufficient rural community is the only legitimate development option.

As most of the undeveloped land is private freehold or leasehold, scope of future development including rural activity centres will depend on the private landowners establishing the viability of extending required transport and essential services infrastructure, and providing the required local community facilities and services.



Dundee Beach

Cox Peninsula

Area Illustrated:	875 km ²
Location:	From Darwin Harbour and Litchfield Municipality in the north and east to Bynoe Harbour in the west and the southern boundary formed by a line from the River Charlotte estuary east to the Litchfield Municipality boundary
Population:	647 (ABS - June 2013 Estimated Resident Population)
Characteristics:	Largely undeveloped apart from residential areas at Wagait Beach and Belyuen

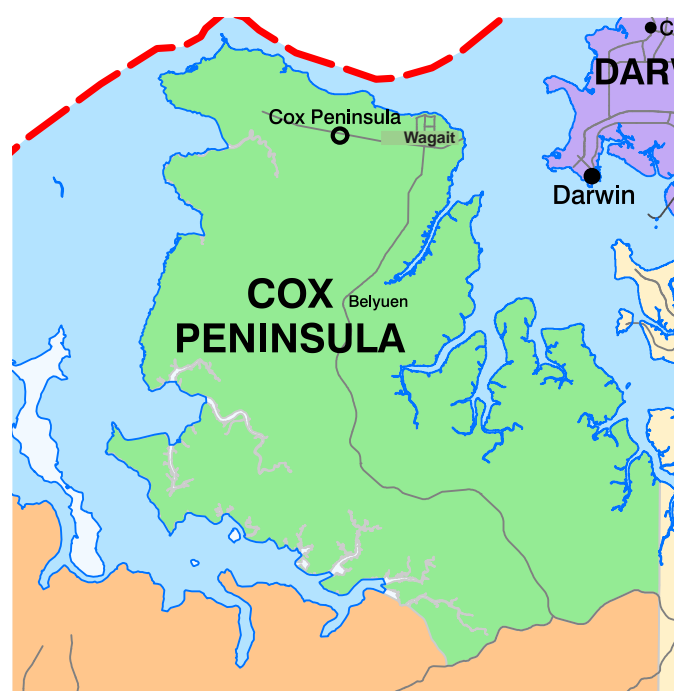
Existing land use on Cox Peninsula is limited to fishing and recreational activities with the exception of the Aboriginal community at Belyuen (population 213) and the Wagait community (population 434).

Factors contributing to the lack of development on the peninsula include the lack of essential services infrastructure, limited access via ferry and road distance, and the unresolved Kenbi Land Claim. Associated with the land claim are concerns and considerations about protecting sites of significance to Aboriginal people.

The anticipated resolution of the land claim will create opportunities for development, including urban uses, subject to adequate transport and essential services infrastructure being provided. Point Margaret on the Port Patterson/Bynoe Harbour coast, and land on Middle Arm in Darwin Harbour opposite Channel Island are relatively close to natural deep water channels that may, in the long term, offer opportunities for deep water ports and associated strategic industry development on Cox Peninsula.

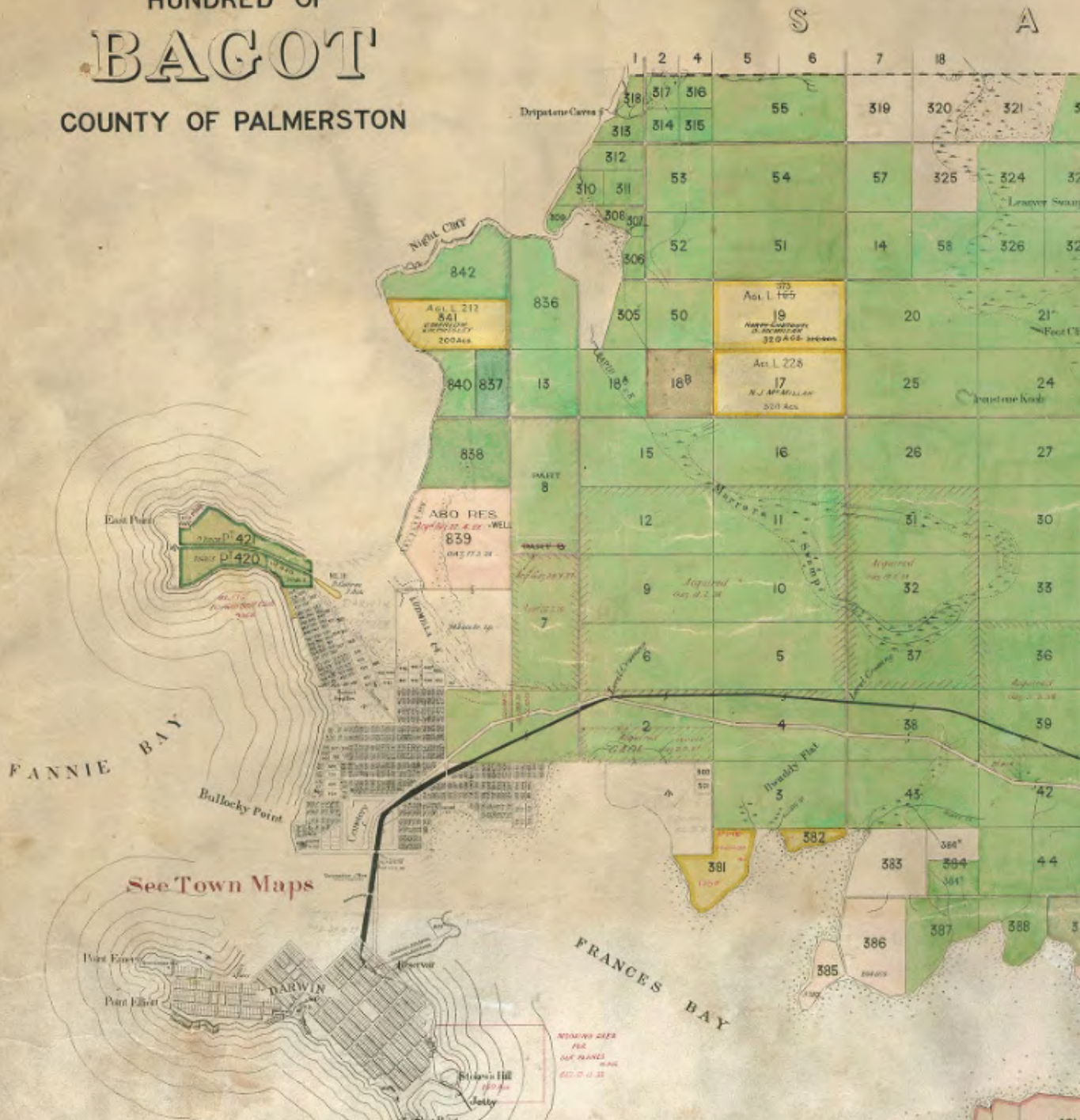
A feature of the northern and western parts of the peninsula, rare in the Darwin Region, is a coast largely free from mangroves and other coastal wetlands. This feature can contribute to environmentally attractive urban areas with high amenity for residents and visitors.

Major development on Cox Peninsula will depend on comprehensive investigations of land capability and opportunities and options for provision of transport and essential services infrastructure.



Mandorah Jetty

HUNDRED OF
BAGOT
COUNTY OF PALMERSTON



Regional Context and Policies

The Darwin Region is diverse ranging from modern vibrant urban areas to wild natural habitats. The diversity of the natural environment and other factors must be considered in deciding the direction for future growth.

Darwin is strategically located to benefit economically from offshore oil and gas development, its growing role as Australia's northern trade hub and the current focus on developing Northern Australia. The potential for significant growth underlies the vital need for the Territory Government and community to adopt a broad creative vision for Darwin regional land use and development that will lead to more detailed land use plans and implementation strategies.

Although the Darwin Region is vast, especially considering its population, a number of diverse factors strongly affect and limit the options available to accommodate future growth. These include the natural physical environment and historic and ongoing socioeconomic influences.

This section of the plan summarises elements that affect the planned land use structure and outlines policies that will guide more detailed planning and land use decisions.



Cavenagh Street in 1944



Parap Road in 1944.

The Past

Larrakia, Woolna and Kungarakany Aboriginal people have lived in the Darwin Region for tens of thousands of years. Their descendants remain a vital part of the Darwin community today. Archaeological places and objects associated with the Aboriginal occupation of the region and the visits from the Macassans are automatically protected by the *Heritage Act (NT)*, whether their existence is currently known or not. Examples of such places and objects include middens, stone tools and skeletal remains.

In 1869, after a number of unsuccessful settlement attempts elsewhere, the Surveyor-General of South Australia, George Goyder, established the first non-Aboriginal settlement in Port Darwin and the first framework for regional land use when he and his party surveyed 999 lots for towns at Darwin, Virginia, Southport and Daly and 2200 farm lots – more than 270 000 ha in all. Goyder's survey remains influential today as the primary foundation for establishing property boundaries and land titles, particularly in the rural areas.

Even after the Commonwealth took control of the Northern Territory in 1911 Darwin remained a small isolated outpost until WWII led to an influx of military and construction personnel. Japanese bombing in 1942 and 1943 led to many thousands of personnel occupying the region until 1945. These events established and entrenched Darwin's role as a base for military personnel and Defence operations.

A number of remnants of early European settlement that remain today include:

- the route and physical remains of the original North Australian Railway, which was constructed in the 1870s and 1880s
- the Overland Telegraph Line, which became operational in 1872 and was the largest infrastructure project in Australia at the time
- sites directly associated with WWII including anti-aircraft installations, numerous airfields, aircraft crash sites and remains of camps and field hospitals.

The Adelaide River War Cemetery is a poignant reminder of those who died during the war. The identification and consideration of this and other significant sites associated with this early European settlement will inform future detailed planning for development in accordance with the land use structure.

In response to rapid growth, Harcourt Long was appointed in 1963 as the first resident planner in the Territory. When he arrived, Darwin was home to fewer than 18 000 residents and his tasks included considering the directions for future growth. He prepared the *Darwin Metropolitan Region 1965*, Darwin's first regional plan, which has made a significant contribution to subsequent regional planning.

Following the damage done by Cyclone Tracy (Christmas Eve 1974) the Federal Government established the Darwin Reconstruction Commission (DRC) to plan, coordinate and rebuild the city. The DRC coordinated many construction projects, including building hundreds of new homes, but created controversy and confusion in relation to land use planning and development.



Darwin's first regional plan (1965)

This confusion was eventually resolved following the Commonwealth granting of Northern Territory Self-Government in 1978. The first elected Legislative Assembly created a pragmatic hybrid of pre- and post-cyclone town plans, also granting freehold titles to replace existing leases to eliminate conflicts between town plan and lease land use provisions.

Regional planning was a priority of the new Territory Government. Significant steps in the process that continue to influence the framework for future development include:

- gazettal of a new Darwin Town Land Boundary to encompass the area that had been under the control of the DRC and was considered to be required for long term urban and regional development, including Darwin Harbour and Cox Peninsula
- approval by Government in 1979 of Darwin East (now Palmerston) as a new town to be built
- endorsement by Government in 1980 of a long term strategy for staged development around Darwin Harbour to Cox Peninsula
- publication of the *Darwin Regional Land Use Plan 1984*, which provided more detail of the endorsed strategy and was the foundation for the *Darwin Regional Land Use Structure Plan 1990* and a series of subsequent plans providing varying degrees of detail.

A change of Northern Territory Government in 2001 led to regional land use policy changes, although a new regional plan was never formally endorsed. Another change of government in 2012 brought the creation of the NT Planning Commission, with responsibilities that include the preparation of strategic land use plans.

The preparation of the draft *Darwin Regional Land Use Plan 2014* by the NT Planning Commission builds on previous land use planning and development investigations and associated strategic plans.

The Present

Recent and ongoing rapid economic development with strong population growth is a feature of the Darwin Region. Challenges facing the community, including the housing crisis and issues with essential infrastructure, illustrate the need for immediate regional planning action. Establishing certainty with respect to the long term policies is a key ingredient for successful and appropriate regional growth.

A significant stakeholder in that policy development is the Indigenous population. Aboriginal people are diverse and culturally rich, their lands and waters are resource rich and therefore a major contributor to the growth of the Darwin Region.

Many detailed technical investigations that supported previous strategic long term planning for the Darwin Region remain relevant today and have been the starting point for this plan. Essential updating and further technical investigations will be crucial to the refinements and further detailed planning that are normal in a dynamic strategic planning process.

The Future

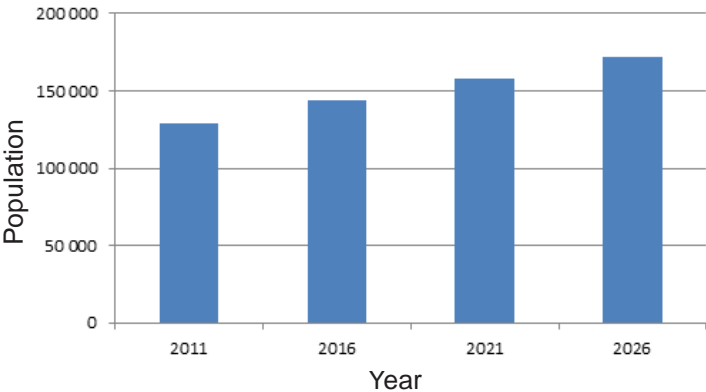
The fundamental growth factors to be considered in planning for the future are population and economic growth potential. Population growth drives residential land development, and has a strong influence on retail floor space expansion and light industrial land development. Economic growth contributes to these same areas, as well as general and strategic industrial land development and commercial floor space growth.

The resident population of the Darwin Region at the 2011 census was 130 585, with estimates closer to 137 000 people at June 2013. Of that population 11% identifies as Indigenous. Their contribution to the economy of the region will increase in the future as they leverage their land assets to create economic and social benefits for themselves and their communities.

Threshold populations of 150 000 and 250 000 have been adopted to guide the identification of land required to accommodate growth in the short term and the longer term. Population growth projections at Figure 2 suggest that a population of 150 000 could be reached within 5 years (NT Department of Treasury and Finance 2014) and a population of 250 000 could be reached within 40 - 50 years (MacroPlanDemasi 2013).

Targets based on projected population allow responses to emerging needs to facilitate efficient and economic investment in infrastructure and land development for housing, industry, commerce and community facilities.

Figure 1 - Population Growth Projections



Land for Residential Development

The occupation rate across the region remains at 2.7 persons per dwelling, and has been steady for 10 years. The high median prices for buying and renting dwellings support the continued use of 2.7 persons per dwelling as the basis for projecting future needs in the short term, despite incoming migration suggesting a lower rate could apply.

The anticipated population growth and projected occupancy of 2.7 persons per dwelling plus an allowance for additional dwellings required to account for vacancies, seasonal fluctuations and delays prior to the sale of houses, means about 5700 new dwellings will be required in the short term.

Table 2 compares dwelling types across the Darwin Region to the rest of Australia, as a percentage of the existing stock, and as a percentage of the dwelling types built between 2006 and 2011. Single dwellings comprise 62 per cent of housing stock in the region, but only 39 per cent of the housing stock built between 2006 and 2011, significantly less than the Australian average. Over the same period growth was experienced in the multiple dwelling and apartment sectors, which could reflect a combination of a change in preference for dwellings away from traditional single dwellings and a response to residential land availability constraints and high housing prices across the region.

Table 2 - Dwelling Type Distribution 2001 - 2011

Existing	Darwin Region	Australia
Separate House	62%	75%
Multiple Dwelling	11%	9%
Apartment	20%	14%
Other	7%	2%
New Construction 2006–2011		
Separate House	39%	64%
Multiple Dwelling	36%	15%
Apartment	26%	21%

The property market will continue to influence dwelling type preference and encourage diversity within new subdivisions. Historic trends provide a guide for the housing types required and give an indication of potential future demand. Table 3 identifies locations with potential to accommodate where new dwellings could be located to meet demands of anticipated short term population growth through infill and greenfield development.

Table 3 - Short Term Forecast Dwellings by Greenfield and Infill.

Greenfield	Dwellings
Darwin Northern Suburbs	680
Palmerston and Litchfield	2 220
Sub-Total	2 900
Infill	Dwellings
Darwin CBD	930
Darwin Inner Suburbs	800
Darwin Northern Suburbs	360
Palmerston and Litchfield	770
Sub-Total	2 800
Total	5 700

Long term projections suggest that 48 000 additional dwellings will be required to cater for a further population growth of 100 000 people. With existing development areas such as Palmerston nearing capacity, new opportunities for greenfield development will be required. Infill development will continue to provide dwelling stock in areas where opportunities exist.

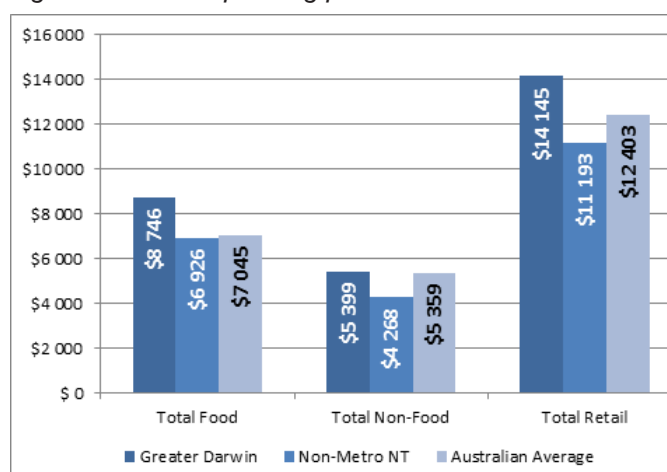
Land for Retail Development

As population growth has a direct relationship with retail expenditure growth; demand for retail floor area will increase as the population increases.

Figure 2 compares retail spending behaviour of Darwin Region residents with the Non-Metropolitan NT and Australian averages. Retail spending per person of Darwin residents is slightly above the Non-Metro average and about 14 per cent more than the national average.

While some of this spending will be online, the above average figure may suggest that the present Darwin population supports larger retail floor area per person than the Australian average. However, it may also reflect typically higher retail prices in Darwin than the Australian average. This would mean future retail floor space requirements may not differ greatly from the per person Australian average. Also, with the trend towards more online spending, future demands in floor space may be more in warehousing than retail.

Figure 2 - Retail Spending per Person



As shown in Figure 3, Darwin exhibits an unusual retail hierarchy when floor space provision is compared with the Australian average. The focus on the provision of floor space is in principal activity centres at the expense of neighbourhood and local centres.

Figure 3 - Retail Floor Space Comparison

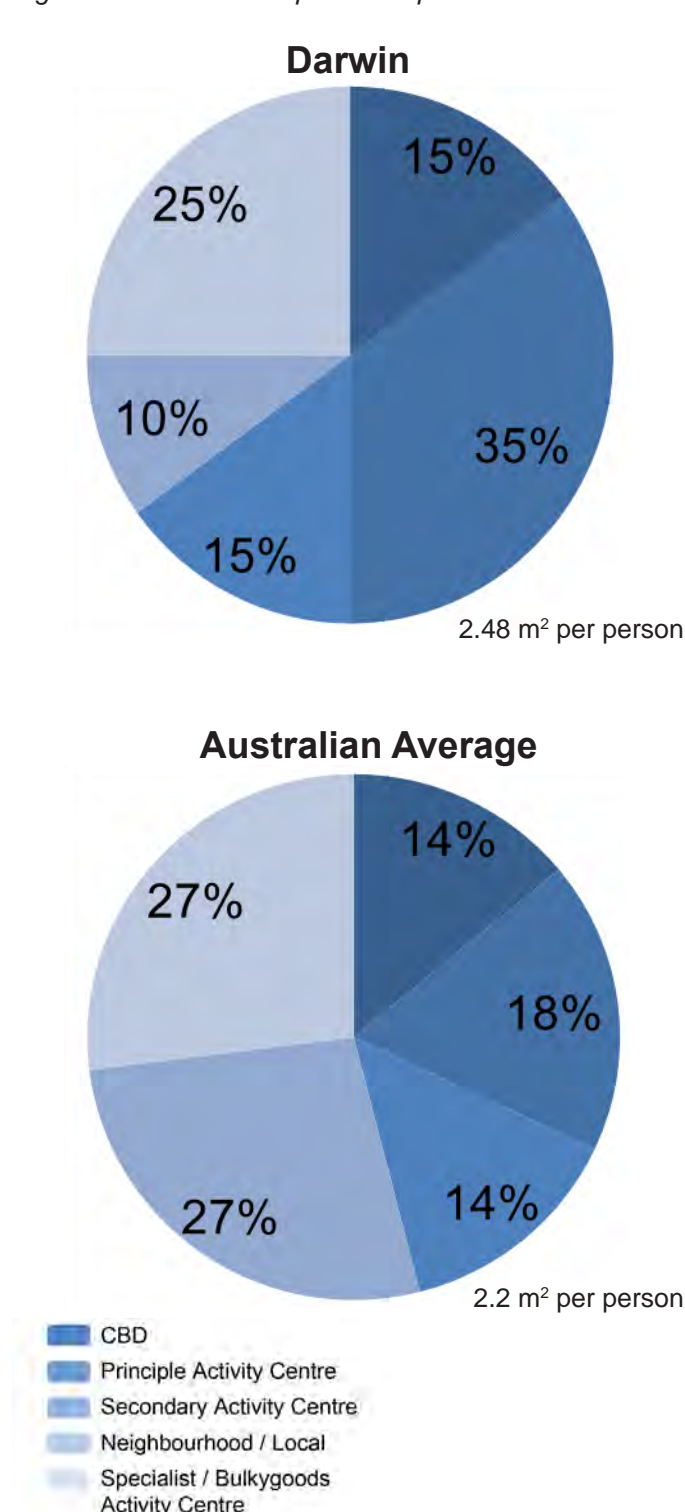


Table 4 - Floor Space Market Demand by Centre Type

Market Gap by Centre Type (m ²)	Today	Short Term	Long Term
Darwin CBD	50 678	55 787	92 978
Principal Activity Centre	118 249	130 169	216 948
Secondary Activity Centre	50 678	55 787	92 978
Neighbourhood/ Local Activity Centre	33 785	37 191	61 985
Subtotal	253 390	278 933 +25 543	464 888 +211 498
Specialist / Bulky Goods Activity Centre	84 463	92 978	154 963
Total	337 853	371 910 +34 057	619 850 +281 997

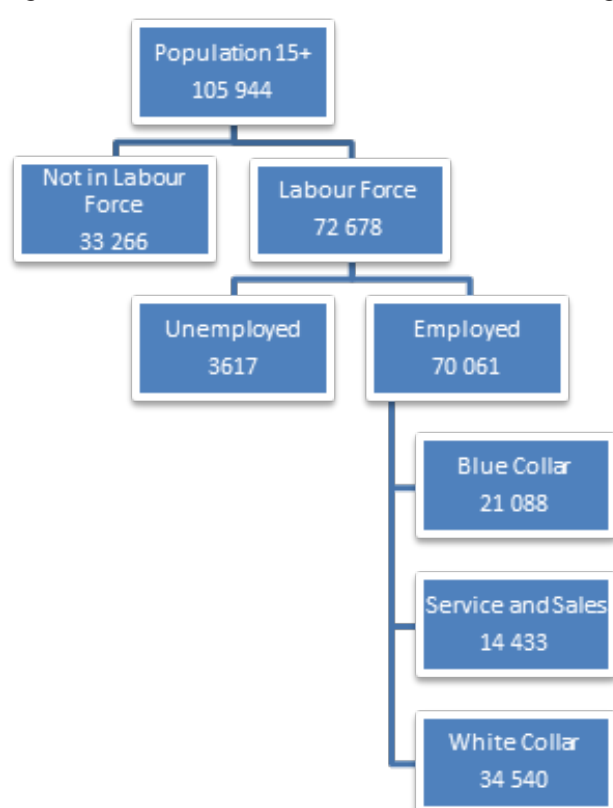
As the population grows there will be proportional demand for additional floor space across all retail sectors. Table 4 shows the current requirement for floor space across the Darwin Region, and the likely future demand in the defined near term (150 000 population) and far term (250 000 population). Retail floor space requirements beyond these population thresholds must also be considered in identifying and allocating suitable land.

Demand drivers specific to the Darwin Region include:

- population growth
- higher than average retail expenditure per capita
- desire for larger centres as a response to climate and the need for convenience.

In the context of the current provision and distribution of retail floor space in the region it can be anticipated that the future focus will remain on expanding principal activity centres at existing and new locations. However with increasing recognition that Darwin lacks a range of walkable local centres, a revised focus on providing a range of centres to meet the needs of local communities is required.

Figure 4 - White Collar Workforce in the Darwin Region



Land for Commercial (Office) Development

In the Darwin Region, office floor space has historically been provided in the Darwin CBD and principal activity centres. It is anticipated that a significant proportion of office floor space expansion will continue to take place in the Darwin CBD. However, the increasing focus on the role of mixed use activity centres in providing a range of social, community and environment benefits suggests potential for the creation of local employment within such centres.

Office floor space requirements are derived from the population of white collar employees. Figure 4 shows the process of estimating the full-time equivalent white collar labour force in the Darwin Region. It suggests that, of a labour force of 72 000, around 34 540 are employed in white collar jobs such as managers, administrators and professionals.

Not all white collar workers require commercial office space in activity centres; some work from home, some on-site and some out of the region.

The white collar workforce currently occupies 264 485 m² of office space across the region. Floor space per capita has been calculated at an average of 24.7 m², a figure that is not expected to change significantly in the short term.

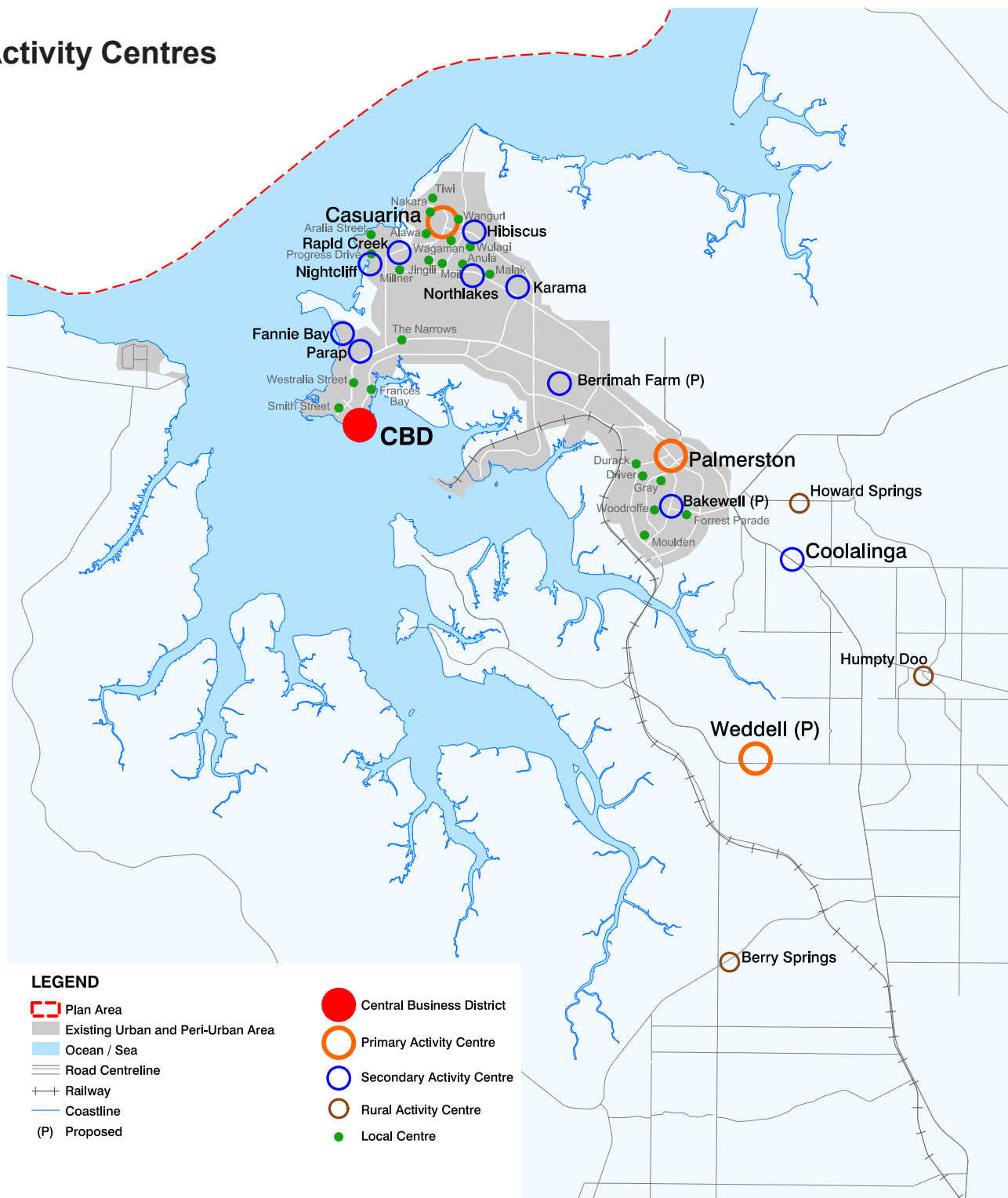
Projections illustrated at Table 5 suggest that, in the short term, the white collar workforce will grow to approximately 23 500 and will require 292 000 m² of floor space, while long term projections suggest growth to 39 000 workers requiring about 486 000 m² of floor space in existing and emerging activity centres.

Table 5 shows the potential distribution of office space in the region to meet the anticipated demand. Office floor space requirements beyond these population thresholds must also be considered in identifying and allocating suitable land.

Table 5 - Distribution of Office Jobs

Office Jobs Location (Jobs)	Today	Short Term	Long Term
Home-based office or no workplace address	1 713	1 890	3 149
Activity Centre	10 708	11 810	19 684
- Darwin CBD	8 566	9 448	15 747
- Other Activity Centres	2 142	2 362	3 937
Employment Node	8 995	9 921	16 534
Total	21 416	23 621	39 367
Office Floor Space Demand (m ²)			
Darwin CBD	211 588	233 369	388 949
Other Activity Centres	52 897	58 342	97 237
Total	264 485	291 712 +27 227	486 186 +221 701

Activity Centres



Land for Industrial Development

Regional and national economic performance is likely to have a significant influence on growth in general and on strategic industrial development. Population growth will have the strongest influence on the growth of building, construction, light and service industries, such as hardware, building supplies and auto repairs, and extractive industries providing construction materials.

The growth of general and strategic industrial uses will likely be driven by many factors including:

- growth in transport, storage and logistics to meet demand for consumer items
- live cattle exports
- major projects such as the Marine Supply Base and new Palmerston hospital
- mining and energy production, with ongoing major growth in liquefied natural gas developments and exports
- supply and maintenance to the marine industry sector as Darwin evolves as a major hub to service the surrounding oil and gas fields
- continued strong growth in engineering, building and construction
- continued growth as Australia's Asian Gateway and a global energy centre
- development of a deep water multi-user port and major industries estate at Glyde Point to meet future demands, particularly for natural gas-based industries.

Evaluation of land sales and consumption (MacroPlanDimasi 2013) indicates:

- increasing demand for large warehouses on the East Arm Peninsula, reflecting interest from companies involved in the Inpex LNG Project and local companies expanding to provide support services
- increasing market demand for more affordable smaller industrial lots
- increasing attractiveness of Winnellie as a location for industries due to the availability of strata title units and direct access to the Stuart Highway

The ongoing availability of adequate and affordable land to provide for future industrial development is essential in three segments:

- strategic industry such as gas-based, mining, railway or port related industries
- general industry such as transport, warehouse and storage, manufacturing, component assembly, trade and technology parks
- light industry such as light fabrication, showrooms and sales, hardware, building supplies, auto parts and repairs.

Analysis indicates that there is about 4500 ha of currently zoned industrial land in the Darwin Region, of which some 1530 ha is available for development. Sufficient zoned land is available to meet current needs. However, there has been a limited supply for some industrial uses, particularly land that supports freight and logistics. This presents the opportunity for the development of freight and logistics services.

The Land Development Corporation is also developing industrial waterfront land at East Arm to establish a Marine Industry Park. The park will be developed in stages to accommodate demand for the forecasted growth in vessel repair and maintenance activity associated with growth in the marine industry sector.

Analysis by MacroPlanDimasi in 2013, as shown at Table 6, indicates that an additional 172 ha of industrial land will be required to meet a regional population of 150 000 and a further 1333 ha for a population of 250 000.

Industrial land requirements beyond these population thresholds must also be considered in identification of industrial land to accommodate future growth.

Estimating the land requirement for strategic industries is difficult. With the current focus on developing the north and major project attraction and facilitation there is a potential requirement for significant areas to accommodate major industry. Such activity will require separation from urban areas and access to deep water port facilities.

Table 6 - Serviced Industrial Land Demand

Serviced Industrial Land Demand (ha)	Today	Short Term	Long Term
Light and General Industry	1 569	1 741	2 902



Berrimah Industrial Area

Regional Landscape and Natural Resources

Desired Regional Outcome

Natural attributes of the Darwin Region, that have high biodiversity values and contribute to the amenity enjoyed by residents and the economy, are identified and managed sustainably.

The Darwin Region is rich in natural resources and associated natural attributes. These present many and varied opportunities for urban and rural development able to sustain human occupation in well-managed and attractive environments while contributing to the growth, wellbeing and prosperity of successive generations of local, regional, territory and national communities.

As elsewhere, natural resources must be used and managed in appropriate and sustainable ways, recognising the pressure that development can place on finite and renewable resources and the environment. Therefore, development opportunities must be weighed against constraints inherent in the natural environment and the potential impacts of developments.

While technologies can sometimes be responsibly and feasibly employed to overcome constraints, the economic and environmental costs may not always be justified. The preparation of a long term regional land use plan is a key factor in identifying the opportunities and constraints, and in establishing broad policies with the objective of delivering balanced outcomes over time.

Environment and Heritage

The relatively flat landform of the Darwin Region, the extensive coastal areas and the highly seasonal rainfall create development constraints associated with large tidal ranges and seasonal inundation. These factors also contribute to a diverse mosaic of ecosystems, including restricted vegetation communities and rare and threatened species of plants and animals.

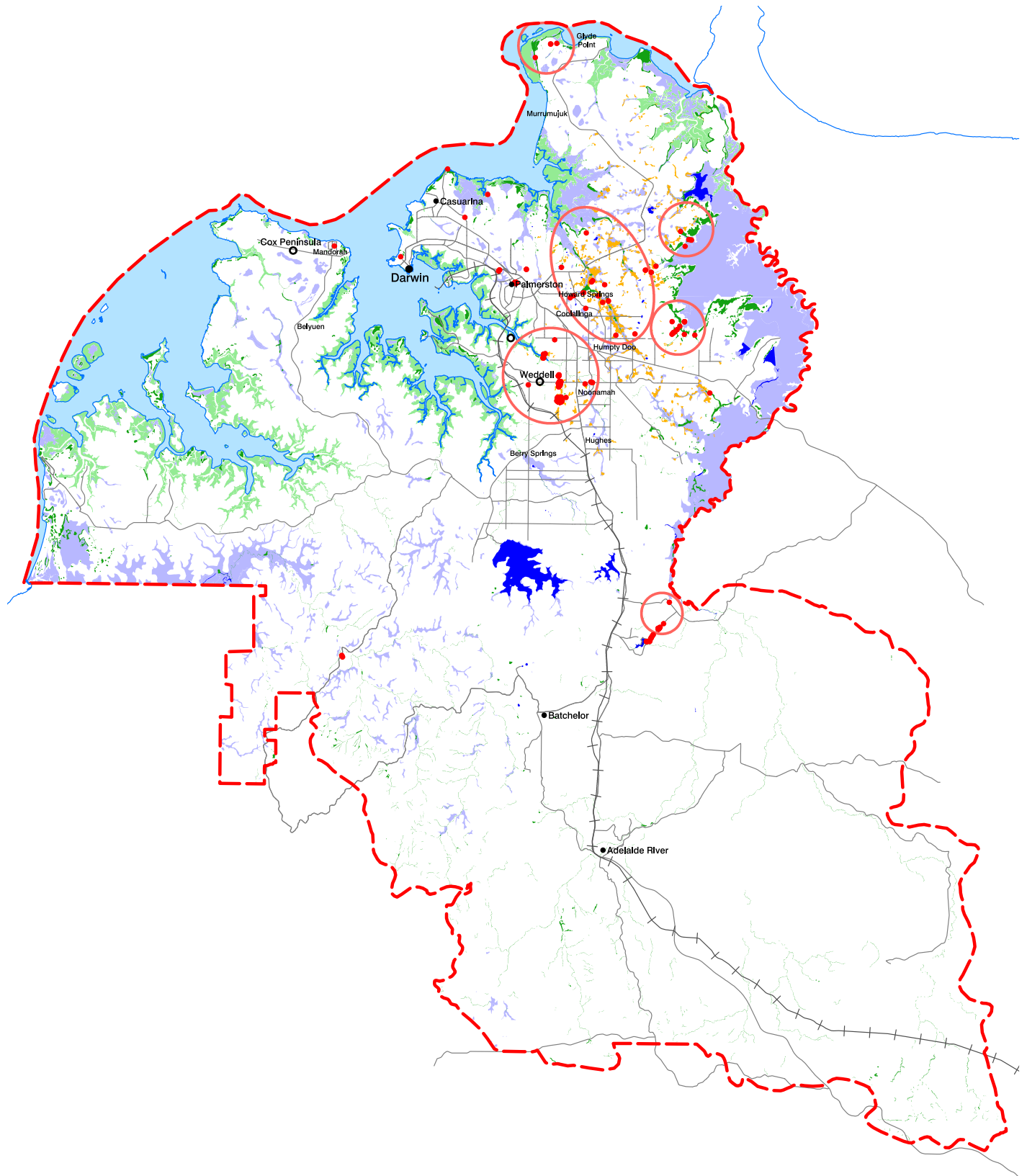
The region's landscape and environment contain many significant biodiversity values and provide a backdrop for tourism and recreation, as well as a range of opportunities for primary production. The ancient and rich Aboriginal heritage provides a context for traditional cultural activities and community recognition. Land is fundamental to Indigenous identity and cultural vitality and as such, in any planning for growth, the identification of heritage sites, buildings and objects based on Indigenous culture, tradition and historical events must be prominent.

Around 40 per cent of the region is currently formal open space, conservation reserves, natural areas and mangroves. These features provide substantial environmental, economic and social benefits. Parks, reserves, conservation areas and remnant vegetation have many functions; providing essential recreational experiences for residents, adding significantly to the amenity of residential areas and conserving native plants and animals.

The community places a high value on the protection and conservation of the natural environment, particularly Darwin Harbour and its coastal habitats, and inland wetlands, lagoons, streams and riparian vegetation. These habitats are often linked by seasonal surface and groundwater flows. It is therefore imperative that planning for future development includes an integrated approach to protecting these natural values.

Key Environment and Heritage Objectives

- Recognise positive contributions the region's natural landscape and habitats make to the amenity enjoyed by residents, tourists and other visitors and ensure detailed planning considers the need to further enhance these contributions by providing appropriate protection to contributors to the natural estate.
- Select development localities with a view to minimising direct and indirect environmental impacts and maintaining a 'green region' with a particular emphasis on recognising the importance of ongoing interconnectivity between components of the natural landscape.
- Protect and maintain the significant biodiversity and habitats (natural landscapes) of the region, including the threatened plants and animals under the *Parks and Wildlife Commission Act (NT)* and the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*.
- Protect prescribed archaeological places and objects, including sites of Aboriginal and Macassan origin via the provisions of the *Northern Territory Aboriginal Sacred Sites Act (NT)*.
- Protect and manage regional culture and heritage (particularly WWII sites), recognising their capacity to enrich lives and provide a sense of connection for locals and visitors via the provisions of the *Heritage Act (NT)*.
- Minimise the detrimental impact of development on the environment through:
 - conserving wildlife corridors and minimising human impacts on key populations and habitats of the unique flora and fauna of the region
 - considering the characteristics of soil drainage to minimise the impact of storage and disposal of waste water on the ecology of surface and groundwater resources
 - appropriately managing potential acid sulfate soils to minimise the risk to the environment and the development
 - appropriately managing stormwater drainage and other potential impacts on Darwin Harbour
- Recognise the role of innovative strategic planning responses, including engineering solutions, in managing the coastal impacts of predicted climate change, particularly sea level rise and the associated increased storm tide hazard risk to the environment (as well as people and property).



LEGEND

- Plan Area
- Threatened Vegetation Concentration
- Rainforest
- Sandsheet Heath
- Wetland
- Mangrove
- Waterbody
- Ocean / Sea
- Road Centrelines
- + + Railway
- Coastline
- Threatened Vegetation Location

Significant Concentrations of Threatened Vegetation

Source: NT Department of Land Resource Management, Flora and Fauna

The Darwin Region has extensive biodiversity assets including significant habitats, restricted and sensitive vegetation types (sandsheet heath, rainforest, mangroves, swamps and wetlands) and an increasing number of plant and animal species listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* or the *Parks and Wildlife Commission Act (NT)*. Some of these species are found nowhere else. The Significant Concentrations of Threatened Vegetation Map (page 55) shows the known distribution of significant concentrations of threatened plant species and some significant vegetation communities (such as mangroves, rainforest and sandsheet heath). Many of these threatened species are currently not protected by national parks and reserves.

The Sites of Conservation Significance Map illustrates that substantial parts of the Darwin Region are identified as being of national and international significance, with their key values summarised below:

- Darwin Harbour – a rich coastal environment backed by savannah woodlands and patches of monsoon rainforest that supports a range of estuarine, freshwater and terrestrial environments including extensive area of tidal mudflats and a large and diverse area of mangroves, which in turn support highly specialised fauna particularly bird species restricted to mangrove environments
- Howard Sand Plains – extensive seasonally inundated wetlands with shallow lagoons and swamps and sandy substrates that provides habitat for communities of carnivorous plants (bladderworts) that are internationally significant because of their species richness, a nationally threatened plant species (*Trifolium taylori*) found nowhere else in the world, a threatened palm found nowhere else in the Northern Territory (*Ptychosprema macarthurii*), a threatened species of bladderwort (*Utricularia dunstaniae*), and a threatened species of frog (the Howard toadlet, *Uperoleia daviesae*) found nowhere else in the world. The future survival of this centre of unique biodiversity is dependent on the identification and establishment of areas capable of ensuring their long term protection.
- Shoal Bay – the lower reaches of the Howard River and other small tidal creeks differs from most other bays in the Top End in not being associated with any large rivers or freshwater swamps. The extensive tidal flats are important feeding and roosting areas for migratory shorebirds
- Fog Bay – including the coastline and associated tidal flats and the chain of small islands to the north of Native Point. The area to the north of the Finniss River is characterised by sandy beaches and grassy dunes while, to the south, there are extensive intertidal mudflats backed by mangroves. The area supports large numbers of migratory shorebirds and is also significant for flatback turtle nesting
- Finniss River Floodplain – differs in character from better known floodplains of the Adelaide-Mary-Alligator Rivers in being dominated by seasonally inundated grassland and sedgeland with areas of paperbark open forest.

Obviously, regional development inherently changes the environment: directly where natural vegetation

and habitats are replaced with new human habitats and indirectly where these changes have an impact on the surrounding natural environment. The maps of the Significant Concentrations of Threatened Vegetation and Sites of Conservation Significance identify known locations of areas of significance that inform regional planning. The mapping of these areas also establishes localities where future detailed planning must place a particular emphasis on the evaluation of the potential impacts of the proposed development, and the determination of appropriate protection of the particular components that contribute to the significance of the environment e.g. the Howard Springs Toadlets that inhabit the Howard Sand Plains. The identification of these areas in no way limits the potential for significant habitats or concentration of significant species elsewhere in the landscape and the need for future detailed site specific investigations.

A key consideration in this plan and future detailed planning is the ongoing management of risks to the environment associated with development (e.g. sediment, pollution and fragmentation of remnant vegetation, increased weeds, feral animal and fire management).

Land Suitability

Key Land Suitability Objectives

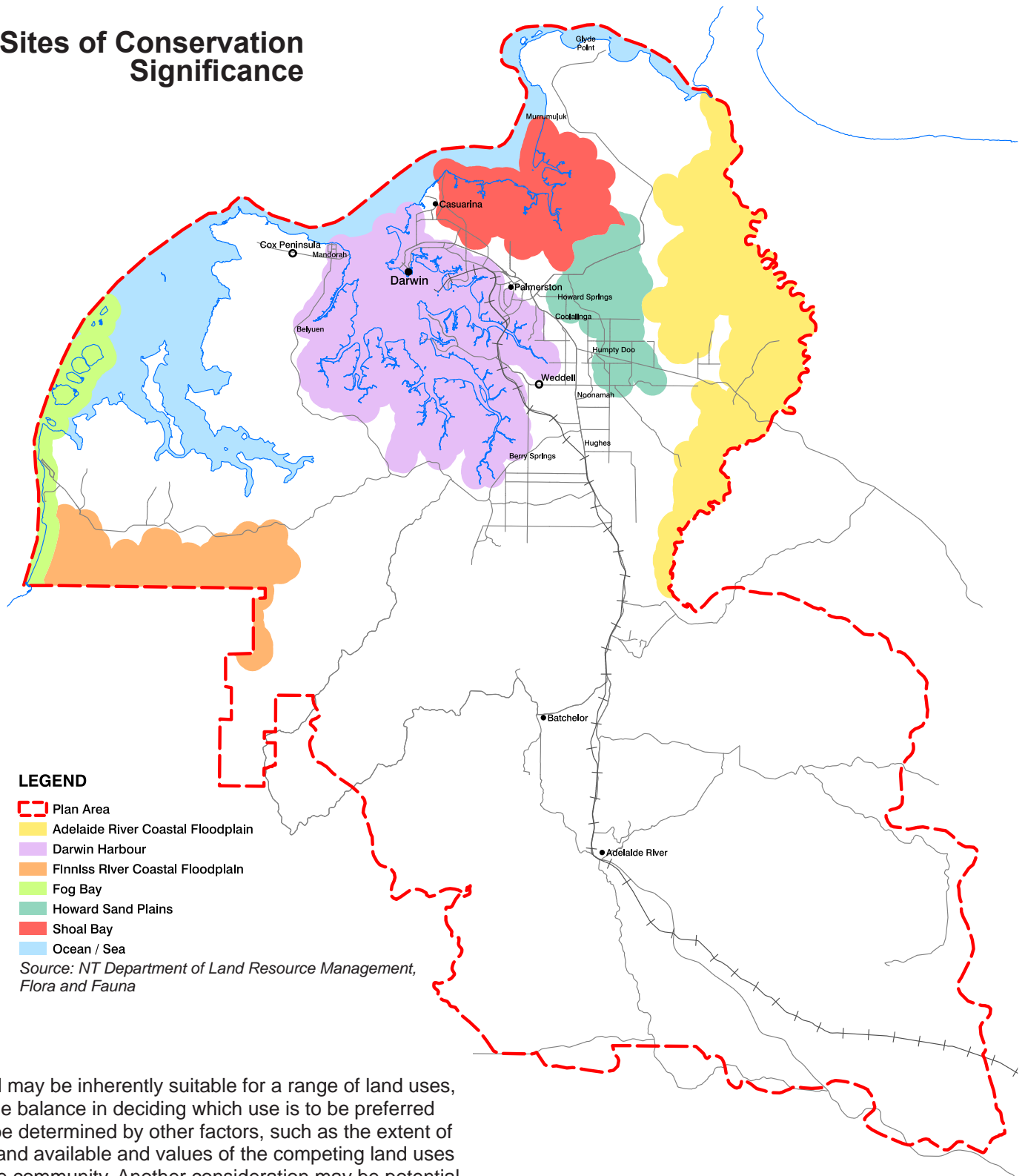
- Evaluate potential for development within the context of the sustainable use of land by identifying opportunities and constraints associated with a variety of inter-related factors, including:
 - soil characteristics
 - natural vegetation
 - topography
 - water resources
 - natural drainage systems
- Minimise the potential costs associated with addressing impacts on the environment and appropriate locations for various land uses by giving priority to consideration of the suitability of land.

Evaluating the suitability of land within the region for particular land uses and specific developments is a key element in preparing a regional land use plan. Land and water resources have a fundamental influence on determining an appropriate land use structure.

In simple terms, land suitability refers to the fitness of a given area to accommodate a particular land use. Land evaluation is the process of evaluating the suitability of land to accommodate different land uses, so potential consequences can be predicted.

Consideration of land use issues surrounding a region's natural resources may not be straightforward and one dimensional. For example, it may seem obvious that deeper, more arable soils close to ground or surface freshwater sources should be dedicated for horticulture and agriculture. However, the same soils may provide the most economic option for urban development (with excavations for essential services and building footings) or soil mining for landscaping projects elsewhere.

Sites of Conservation Significance



Land may be inherently suitable for a range of land uses, so the balance in deciding which use is to be preferred will be determined by other factors, such as the extent of the land available and values of the competing land uses to the community. Another consideration may be potential impacts on the natural environment and sustaining regional resources. For example, groundwater resources may present opportunities for development on land above the aquifers to exploit the water resource. However, if the land use is not appropriate, the resource may be irrevocably polluted or accelerated runoff associated with development might deny the essential annual recharge to ensure the resource is sustainable. The lack of underlying aquifers may be seen as a constraint but, equally, can be perceived as an opportunity to locate development where aquifer pollution and interruption of recharge are avoided.

Climatic, amenity and functional factors may also influence land uses being planned and established in locations where the natural land capability is poor. For example, the

location of efficient port infrastructure must be influenced by marine conditions even if construction costs and impacts on coastal environments present challenges. Premium urban residential developments may be located where topography or coastal proximity provide views and cooling breezes, despite underlying rocky soils with poor land suitability for use and extra costs associated with providing services and constructing dwellings.

Notwithstanding the variable considerations, mapping soils, vegetation and landform (presented as land units) provide a useful guide to identifying the suitability of land to various uses. The Darwin Region does present challenges for some land uses, but responsible planning can identify opportunities leading to positive outcomes.

Drainage

Freshwater lagoons, perennial streams, seasonal floodways and areas subject to inundation and cyclonic storm tides create complex constraints and opportunities. Although there is often overlap with flooding (discussed under 'Natural Hazard Risks' at page 66), soil drainage is a separate consideration.

The classifications on the Soil Drainage Map identify areas with potential soil drainage constraints associated with intertidal areas, coastal floodplains, wetlands, swamps, lakes, depressions, and subsurface water.

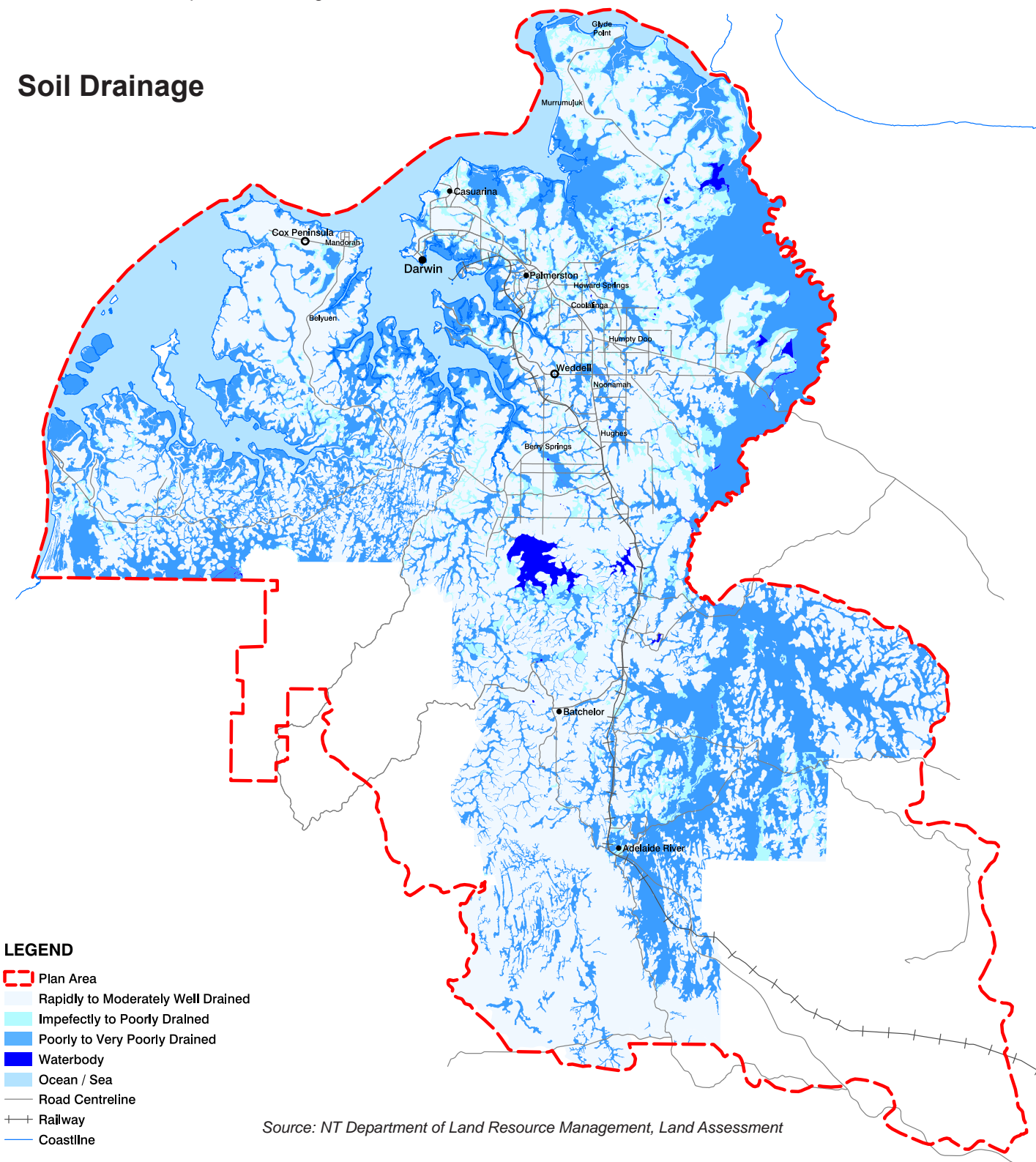
Poor soil drainage can create environmental, health, social and cultural impacts, including:

- impacts on the operation of absorption-based septic systems
- the transmission of soil borne disease
- lifestyle constraints due to soil saturation or inundation of land.

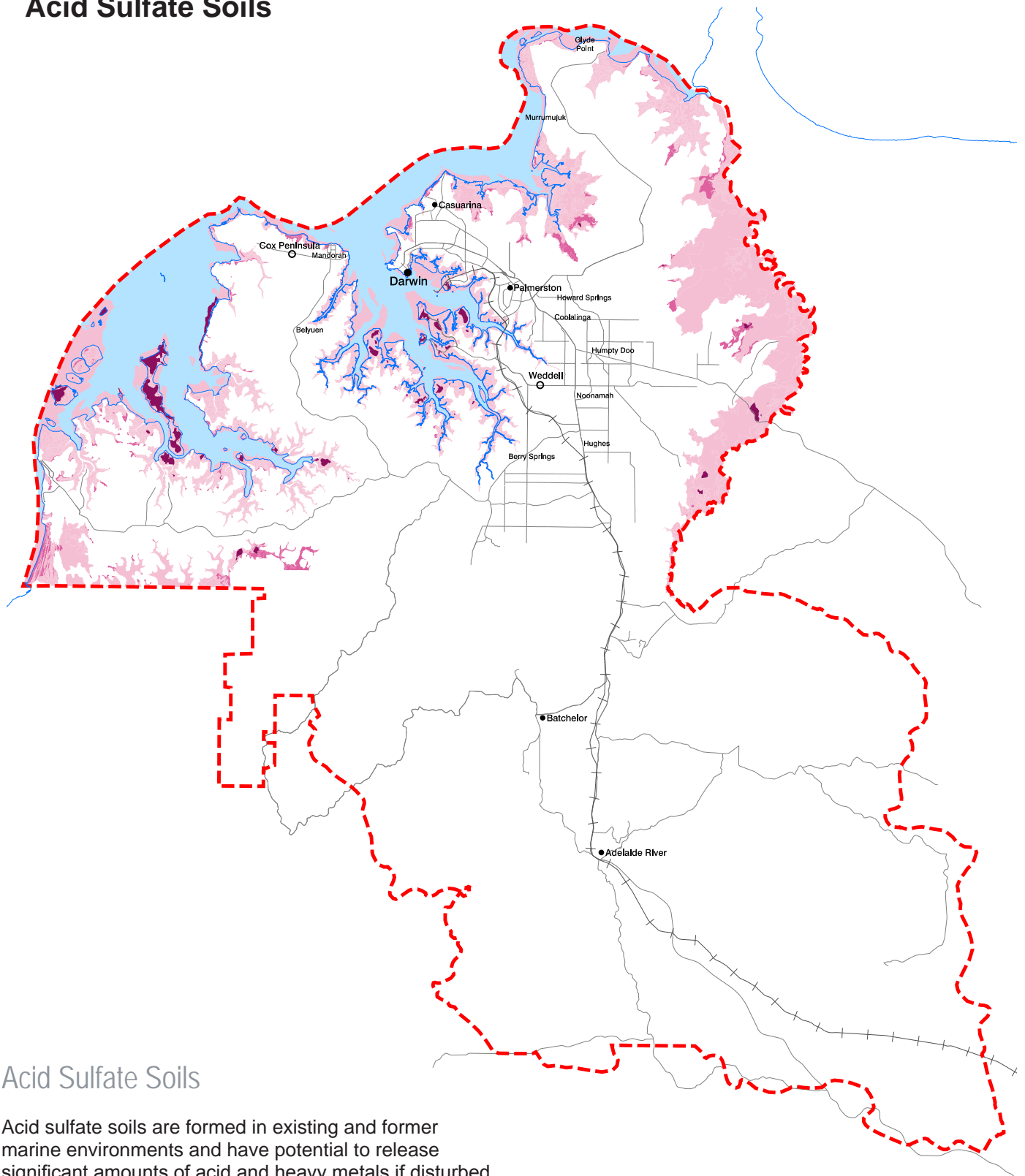
Considering soil drainage is particularly important in identifying locations for rural lifestyle lots that rely on on-site water supply and waste disposal.

Poorly drained soils may indicate the potential for riparian vegetation that has a significant role in environmental connectivity throughout the region.

Soil Drainage



Acid Sulfate Soils



Acid Sulfate Soils

Acid sulfate soils are formed in existing and former marine environments and have potential to release significant amounts of acid and heavy metals if disturbed or exposed to oxygen. Slow release of acid into waterways or other coastal environments can have a devastating impact on concrete infrastructure, fisheries and the environment.

Generally, when undisturbed in a natural state they are inert, so avoiding disturbance is usually the most cost effective management option and the least risk to the environment. If disturbance is unavoidable, effective mitigation methods can be employed at a cost. The Acid Sulfate Soils Map identifies land areas where particular care is required to minimise the potential risk associated with disturbing acid sulfate soils.

LEGEND

- Plan Area
- High Probability of Occurrence of Acid Sulfate Soils
- Low Probability of Occurrence of Acid Sulfate Soils
- No Known Occurrence of Acid Sulfate Soils
- Ocean / Sea
- Road Centreline
- Railway

Source: NT Department of Land Resource Management, Land Assessment

Natural Resource Management

Natural resources in the region underpin economic activity including agriculture, mining and construction activity, and support land use and development.

Key Resource Management Objectives

- Foster responsible and efficient use of land resources to maximise the economic benefits and minimise detrimental impacts on the environment particularly through:
 - identifying, protecting and managing natural freshwater sources including aquifers and surface water catchment to provide ongoing access to adequate and affordable freshwater sources
 - identifying and protecting land with high capability for agriculture and horticulture, particularly where this land occurs in association with sustainable water resources
 - identifying, protecting and appropriately using extractive mineral resources required for construction

Water Resources

The Darwin Region is envied Australia wide for its bountiful and reliable supplies of water during annual wet seasons, which see natural waterways revitalised and groundwater aquifers replenished. However, the variability of the wet season rain, many long dry months with high evaporation and the need to store wet season rain mean there is no room for complacency about supplies. Furthermore, Darwin households typically consume almost three times as much water as the national average. The continued availability of adequate and affordable freshwater is one of the most fundamental requirements in developing the region.

Seven significant aquifers underlie the Darwin Region, along with a number of other low yielding aquifers with potential to support some domestic rural water supplies. The significant aquifers are identified on the Water Resources Map.

Water drawn from aquifers supports a variety of land uses and, in areas beyond the reticulated supply, the aquifers are the primary source of potable water.

The Koolpinyah Dolomite Formation is the most significant water resource in the Darwin Region. Recent investigations indicate that this groundwater system consists of five distinct, poorly connected sub-systems that exhibit individual behaviours. The Acacia Hills formation comprises a similar system of two poorly connected subsystems.

Rural uses within the catchments of the aquifers have both benefits and potential detrimental impacts on the resource. The low ratio of impervious to natural surfaces associated with rural lifestyle uses assists in maintaining annual aquifer recharge and the sustainability of this

resource. On-site waste disposal, usually associated with rural lifestyle development must be appropriately managed to avoid the risk of contamination.

Identified sustainable yield from the aquifers represents approximately 20 per cent of the annual recharge. Investigations suggest extraction may be approaching or, in some cases, already exceed sustainable yields, and that further investigation is required to establish the sustainability of further water extraction.

Reticulated water supplies are currently sourced from the Darwin River Dam and borefields drawing from the Howard East aquifer within the Koolpinyah Dolomite. The aquifer also sustains extensive rural lifestyle and horticultural development in the Litchfield Municipality.

Continued development in the region depends upon efficient storages being available. The *Darwin Regional Water Supply Strategy 2014* includes actions to encourage more efficient use of water and to supply additional water. The short term water source augmentation includes further development of the Howard East Borefield and a return of Manton Dam to service. Options being considered in the medium term include a new in-stream dam on the upper Adelaide River, an off-stream storage to be filled from flood flows in the Adelaide River, augmentation of Manton Dam's storage, and desalination. The strategy retains previously identified options for water storage, including the Marrakai and Mount Bennett dams, for further assessment in the longer term.

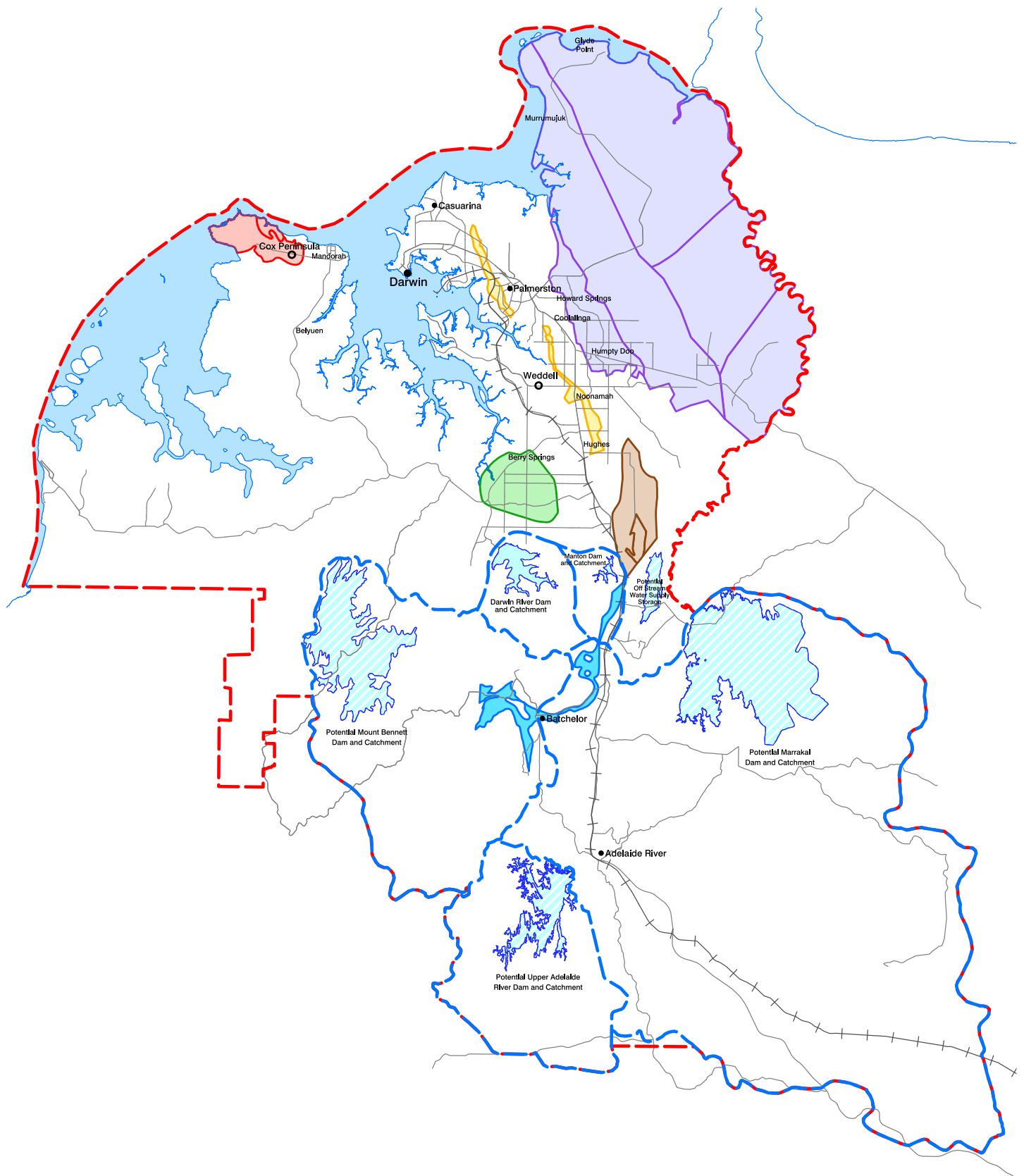
The catchments of aquifers and surface storages have potential impacts on the quantity and quality of water resources. The catchments therefore influence the creation of an appropriate land use framework for ongoing development and controls needed to limit the impacts of development on the catchments.

The closed catchment of Darwin River Dam minimises the need for water treatment, and the potential for the Upper Adelaide River Dam to also have a closed catchment has significant ongoing cost advantages.

Maximising the extraction of significant mineral resources within the impoundment areas and the catchments of the Upper Adelaide River and Marrakai dams will reduce potential issues associated with future access to these resources.



Darwin River Dam
Source: Power and Water Corporation.



LEGEND

- | | |
|---|--------------------------------|
| Plan Area | Existing Water Supply Storage |
| Koolpinyah Dolomite | Potential Water Supply Storage |
| Berry Springs Dolomite | Water Supply Catchment |
| Acacia Hills | Ocean / Sea |
| Coomalie Dolomite | Road Centreline |
| Knuckey, Palmerston and Virginia Dolomite | Railway |
| Charles Point Aquifer | Coastline |

Source: NT Department of Land Resource Management, Water Resources

Water Resources

Horticulture and Agriculture Soils

The remote location of the Darwin Region, transport costs and relatively small population make the provision and cost of food a significant challenge. Land capable of supporting agricultural or horticultural development is a rare resource in the region and, although potential for increased local food production is limited by seasons and difficult climatic conditions, land capable of supporting primary production is a valuable resource to be considered as part of the land use framework.

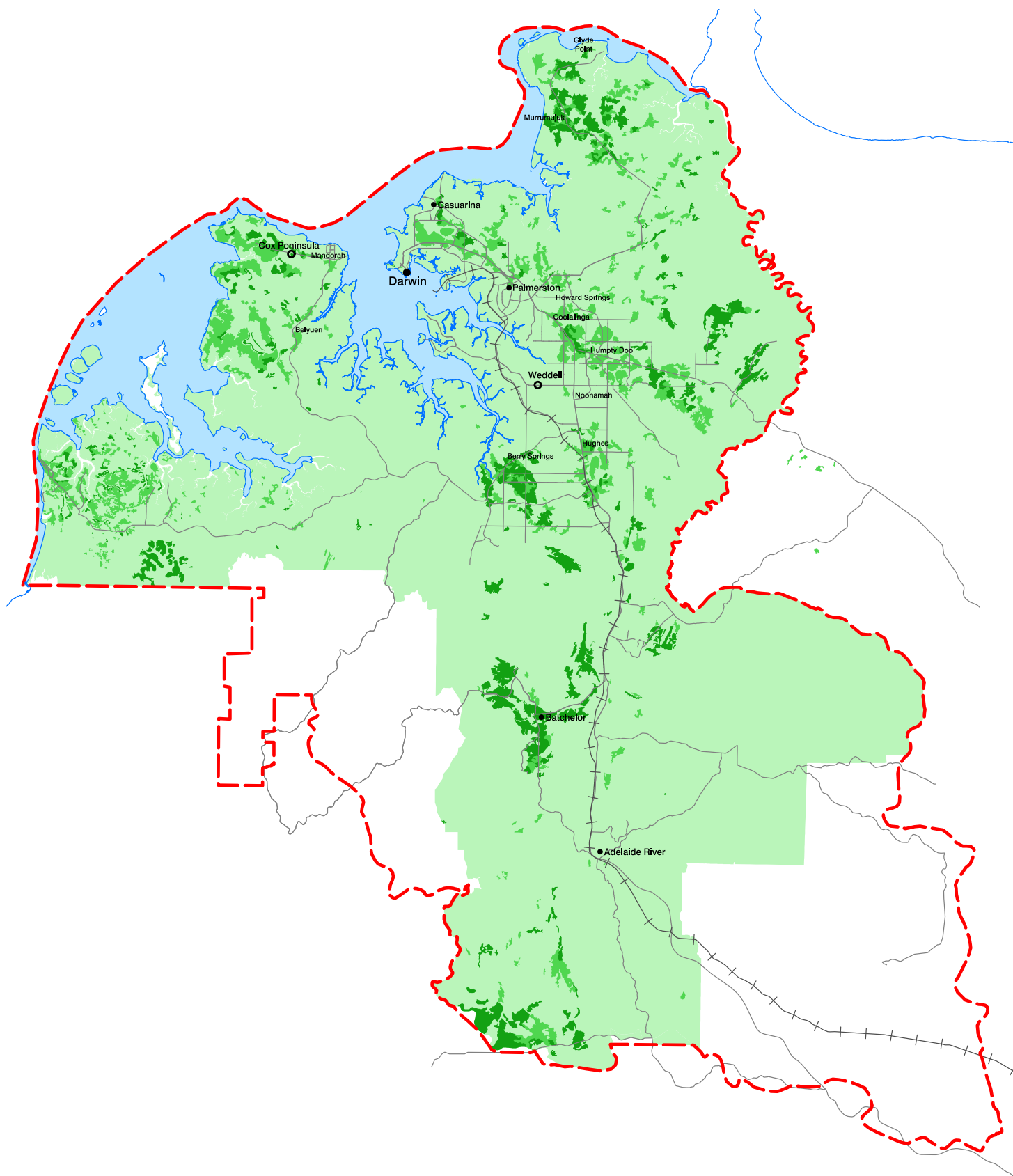
The Department of Land Resource Management, in consultation with the Department of Primary Industry and Fisheries, has identified land capable of supporting horticultural development as shown on the Horticultural Potential Map. Table 7 shows the characteristics of these areas.

Timely and affordable provision of irrigation water to these areas will determine the ultimate potential for primary production. However, the limited extent of this land resource warrants identification and protection to maximise future opportunities that may include value adding (such as canning, juicing, and freezing) particularly when considered in the context of improved transport and infrastructure and potential expansion of domestic and off-shore markets.

Table 7 - Horticultural Soil Characteristics

Land Use	Annual Horticulture	Perennial Horticulture
Drainage	Rapid to moderately well drained	Rapid to moderately well drained
Slope	<2%	<2%
Rock Outcrop	<10%	<10%
Soil Depth	>50 cm	>100 cm





LEGEND

- Plan Area
- High Perennial Horticultural Potential
- High Annual Horticultural Potential
- Low Horticultural Potential
- Ocean / Sea
- Road Centreline
- Railway
- Coastline

Horticulture Potential

Source: NT Department of Land Resource Management, Land Assessment

Construction Materials

Virtually all construction and development in the Darwin Region depends on access to adequate and affordable construction materials. Expanding urban development, new infrastructure and major works including ports and land reclamation require huge quantities of rock and fill material. There is a constant demand for road base material and this demand may significantly increase in association with the future construction of rail connections between major industrial developments and the port.

Old and new roads require ready supplies of bitumen and virtually every construction site requires significant quantities of aggregate and cement.

The Darwin Region is not well endowed with construction materials:

- Limestone suitable for cement manufacture is not available.
- Quarry rock is scarce with most material extracted in the hinterland and transported 80 km or more to construction sites.
- Terrestrial sand sources are limited, often requiring excavation in or close to natural wetlands, raising many questions about impacts on the environment.
- Marine sands are available in selected areas but mining involves many environmental impact considerations.
- Excavations for development in coastal locations typically produce organic marine mud with poor bearing capability in landfill and potential to change chemically if incorrectly handled and placed, and there is a risk of unacceptable environment impacts.
- Terrestrial road base and general fill sources are difficult to find and increasingly located at considerable distance from construction sites.

Extractive and mining activities are regulated via various mining titles issued under the *Mineral Titles Act (NT)*. Particular titles are utilised depending on the proposed activity. Various exploration titles are usually used to establish the existence and or extent of a resource prior to the application for the appropriate title required for the removal of the resource.

The *Mineral Titles Act (NT)* also provides for the reservation of land from some or all types of mining. Such a reservation precludes the application for a grant of a mining title but does provide for the application for a grant of a mineral authority that allows mining activity. As such a reservation does not necessarily preclude all mining activity but ensures the activity is not contrary to the purpose of the reservation.

The Minerals and Extractive Minerals Map shows the location of existing reservation and mining titles in the Darwin Region.

The reservations from mining in the Darwin Region generally apply to environmentally significant areas or areas where there is significant potential for mining or extractive activity to conflict with existing or proposed future land use, particularly urban development.

The granted exploration and mining titles provide an indication of the location of resources currently being used. While the titles indicate the existence of a resource, the absence of titles does not necessarily indicate an absence of a resource. Rather, the lack of titles in an area simply shows that the area is currently of no interest to the industry because of a lack of resource or distance from demand.

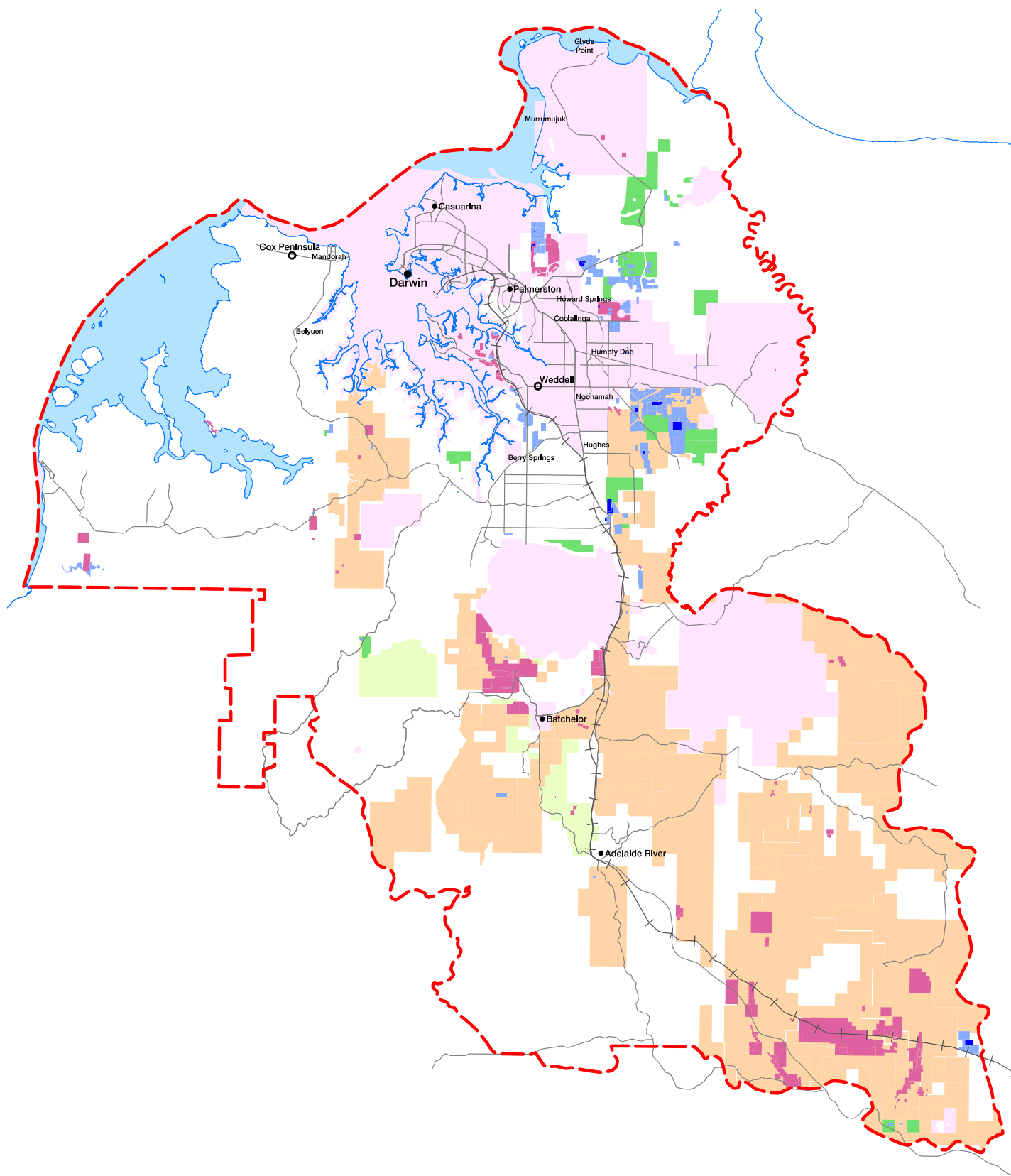
Activities associated with extracting topsoil, sands, gravel and rock have the potential to conflict with other land uses and activities including rural lifestyle, conservation and water resources.

However, the costs of these commodities, which are significantly influenced by transport costs, have significant potential economic implications.

Extractive activity is recognised as an essential land use within the regional context. The underlying need is for a balance between protecting access to the resource and limiting the potential incompatibilities with other land uses and detrimental impacts on the environment.



Mount Bunday Quarry



LEGEND

- Plan Area
- Extractive Mineral Exploration License
- Extractive Mineral Permit
- Extractive Mineral License
- Mineral Lease
- Mineral Exploration License
- Reserves From Mining
- Mineral ALRA Moratorium
- Ocean / Sea

- Road Centreline
- +— Railway
- Coastline

Minerals and Extractive Minerals

Source: NT Department of Mines and Energy, Mineral Titles
November 2014

Natural Hazard Risks

Desired Regional Outcome

Development that provides appropriate security for people and property.

History in many parts of the world demonstrates that hazard risks for people and property can be exacerbated by irresponsible, ill-considered and imprudent development in the context of risks associated with the natural environment. The land use plan is founded on a comprehensive land use structure where location of existing and proposed land uses is determined following detailed evaluation of opportunities and constraints. The plan will therefore have a significant role in minimising the potential for future development to create new and unacceptable risks for people and property.

The plan considers the range of diverse and complex natural hazard risks to people and property in the Darwin Region. Risks include wildlife, biting insects, destructive weather events and climate change.

Key Natural Hazard Risk Management Objectives

- Minimise the potential impacts of biting insects on community health and amenity, particularly in choosing the location for and design of urban residential development.
- Adopt responses to risk associated with natural disasters that accord with the Council of Australian Government's (COAG) *National Strategy for Disaster Resilience*, including:
 - limiting the intensification of land use within the 1 per cent Annual Exceedence Probability (AEP) flood and storm tide level and locating new development above these levels
 - adopting design responses during more detailed planning and design for future development and on an individual site basis to minimise the potential for damage from destructive weather events
- Recognise strategic planning responses, including engineering solutions that can provide opportunities for marine recreational activities safe from the risks of crocodiles and marine stingers.

Environment Related

Wildlife

Darwin Region is home to a rare combination of native wildlife that can be a hazard to health and in extreme circumstance to life itself. In common with much of the rest of Australia, open space and conservation areas in the urban area provide habitat for snakes. While non-venomous snakes assist in vermin control their venomous relatives do occasionally find their way into suburban gardens creating a potential hazard.

Of far greater hazard in the Darwin Region is the risk associated with saltwater crocodiles. The extensive coastal areas and tidal wetlands provide an ideal habitat for these reptiles. After decades of protection, crocodile numbers have significantly increased and they are increasingly appearing in fishing and recreation areas, placing pressure on catch and relocate programs.

No regional land use plan can mitigate all hazard risks associated with wildlife, especially when conservation of natural habitats and species is among policy objectives. However, this plan cannot ignore the increasing potential for crocodile attacks and opportunities to provide for water based activities in localities that would be easier to monitor.

Marine stinging jellyfish are another significant hazard associated with the marine environment that seasonally impinges on residents and tourists' enjoyment of the marine environment.

Strategies to mitigate wildlife-related hazard risks have potential to align with protecting people and property from other marine-related hazards, in particular biting insects and cyclonic storm tide.

Biting Insects

A much less obvious but equally potentially dangerous wildlife group is biting insects, particularly midges and mosquitoes. Major breeding areas for midges include the mangroves and associated tidal wetlands. The mobility of midges is enhanced by prevailing winds making areas downwind particularly susceptible. Although there is no evidence that midges carry human disease, some individuals suffer an almost unbearable reaction to bites.

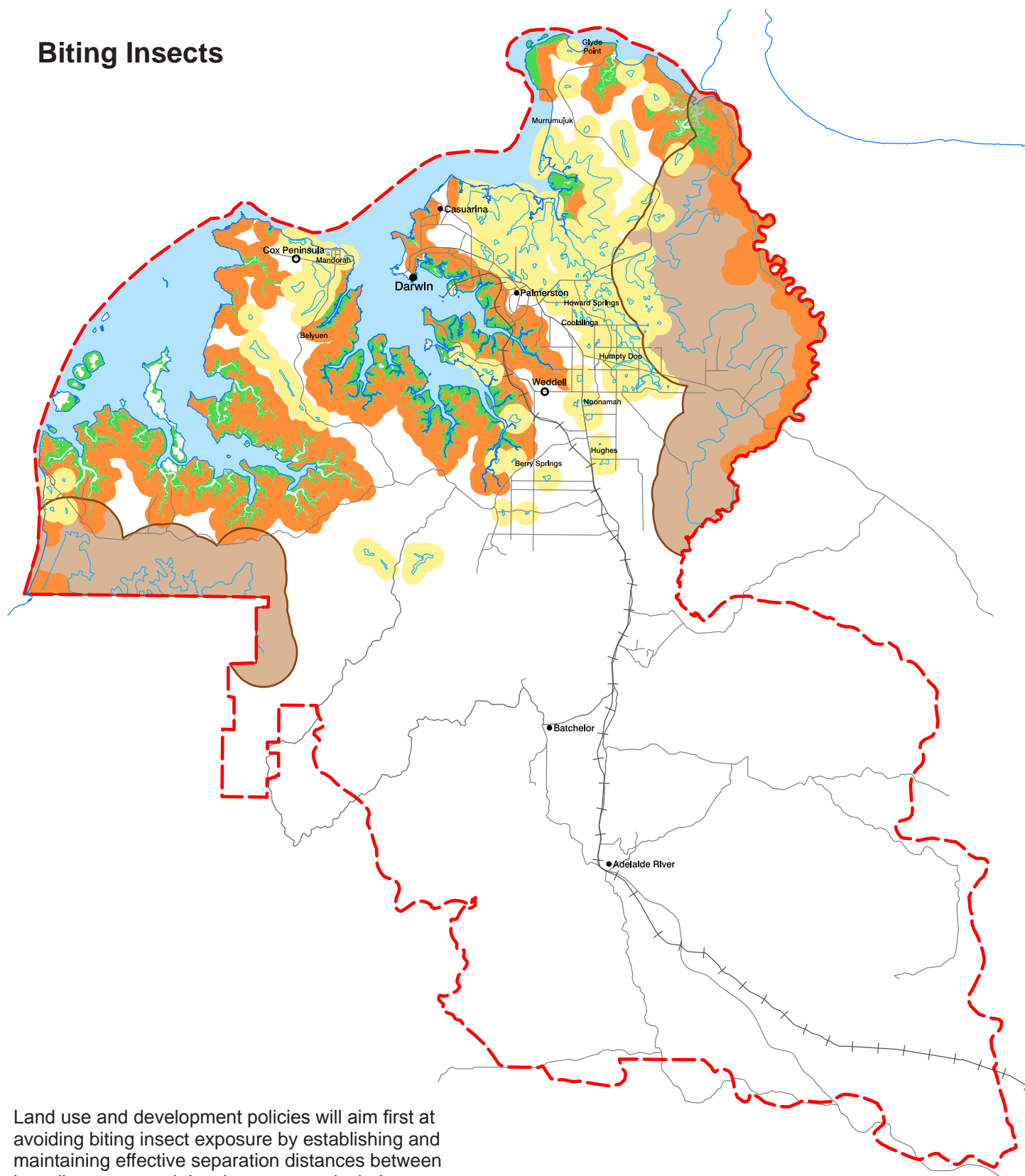
While some mosquito species endemic in the Darwin Region can be added to the nuisance list, other species are known carriers of human diseases including Malaria, Ross River Virus and Murray Valley Encephalitis. Although vigilant management has limited the impact of these diseases to date the proximity of carrier breeding sites to human populations (particularly urban density residential) can create a significant health risk.

The land use plan takes seriously the major nuisance and public health hazards associated with insect breeding areas in mangroves, tidal wetlands and freshwater lagoons. The Biting Insects Map shows indicative buffers around sources of potentially unacceptable levels of biting insects.

As high levels of human exposure to biting insects in urban residential areas will not be accepted, future more detailed planning must include site-specific investigations of potential breeding sites and of solutions to minimise biting insect exposure.

In particular the extent of future urban residential areas at Holtze, Murrumujuk, Weddell and beyond will depend on investigations to determine appropriate responses to biting insect hazards. Appropriate responses will be refined in consultation with medical entomologists.

Biting Insects



Land use and development policies will aim first at avoiding biting insect exposure by establishing and maintaining effective separation distances between breeding areas and development, particularly urban residential. Where justified, this may include engineering measures to eradicate breeding sites that would otherwise put people at risk of suffering major nuisance or serious illness.

Previously utilised techniques such as repeated applications of chemicals, delivered by regular fogging will not be an acceptable biting insect control strategy, given the potential for indiscriminate and severe environment impacts (possibly including introduced health hazards for residents) and the ongoing cost.

LEGEND

- Plan Area
- Ocean / Sea
- Mangroves
- Inland Waterbodies
- Potentially Affected by Midges - 1.6km from Back of Mangroves
- Potentially Affected by Mosquitos - 1.6km from Inland Waterbodies
- Potentially Affected by Mosquitos - 5km from Finnis River & Adelaide River Floodplains
- Road Centreline
- Railway
- Coastline

Source: NT Department of Health, Medical Entomology

Weather Events

Weather events have the potential to bring significant hazards to people in the Darwin Region, most graphically demonstrated by the events surrounding Cyclone Tracy on Christmas Eve 1974. The cyclone demolished much of Darwin in a matter of a few hours, with the loss of some 60 lives from a population of about 47 000.

The twin agents of destruction from weather events are wind and water, often in combination. Although cyclones pose the greatest weather threat to the region, 'normal' annual monsoon rains and tropical storms bring regular hazard risks, the most common being flooding. Climate change predictions indicate a need for a particular focus on the potential for these hazard risks.

Storm Tide Flooding

Storm tide flooding is caused by the temporary rise in sea-level caused by surges associated with tropical cyclones combined with normal tides. The extensive coastline of the Darwin Region, its monsoonal climate, the relatively flat topography and the large tidal range mean that storm tide flooding is a significant risk and influence on development.

Storm tide flood maps prepared for the Darwin Region in 2010 updated previous assessments of storm tide risk, incorporating high resolution topographic data and consideration of the potential impacts of future climate change on sea level rise and tropical cyclones characteristics.

The Storm Tide Map shows the primary and secondary storm tide level established in the 2010 study.

The Northern Territory adopts the Primary Storm Tide which represents one per cent Annual Exceedence Probability (AEP) as the basis for land use planning and endorses the general policy of locating future urban development, especially residential uses, where these serious risks can be avoided. The plan supports property protection strategies that include appropriately engineered standards for developing and maintaining infrastructure, such as roads and stormwater drains and, in selected locations, land reclamation and tidal barriers.

While there are many potential changes associated with climate change, the dominant risk in the Darwin Region is the predicted sea level rise. Given that the most recent storm tide flood maps have taken account of the potential impacts of climate change, a continuation of current policies will address the increased risks associated with climate change.

Riverine and Stormwater Flooding

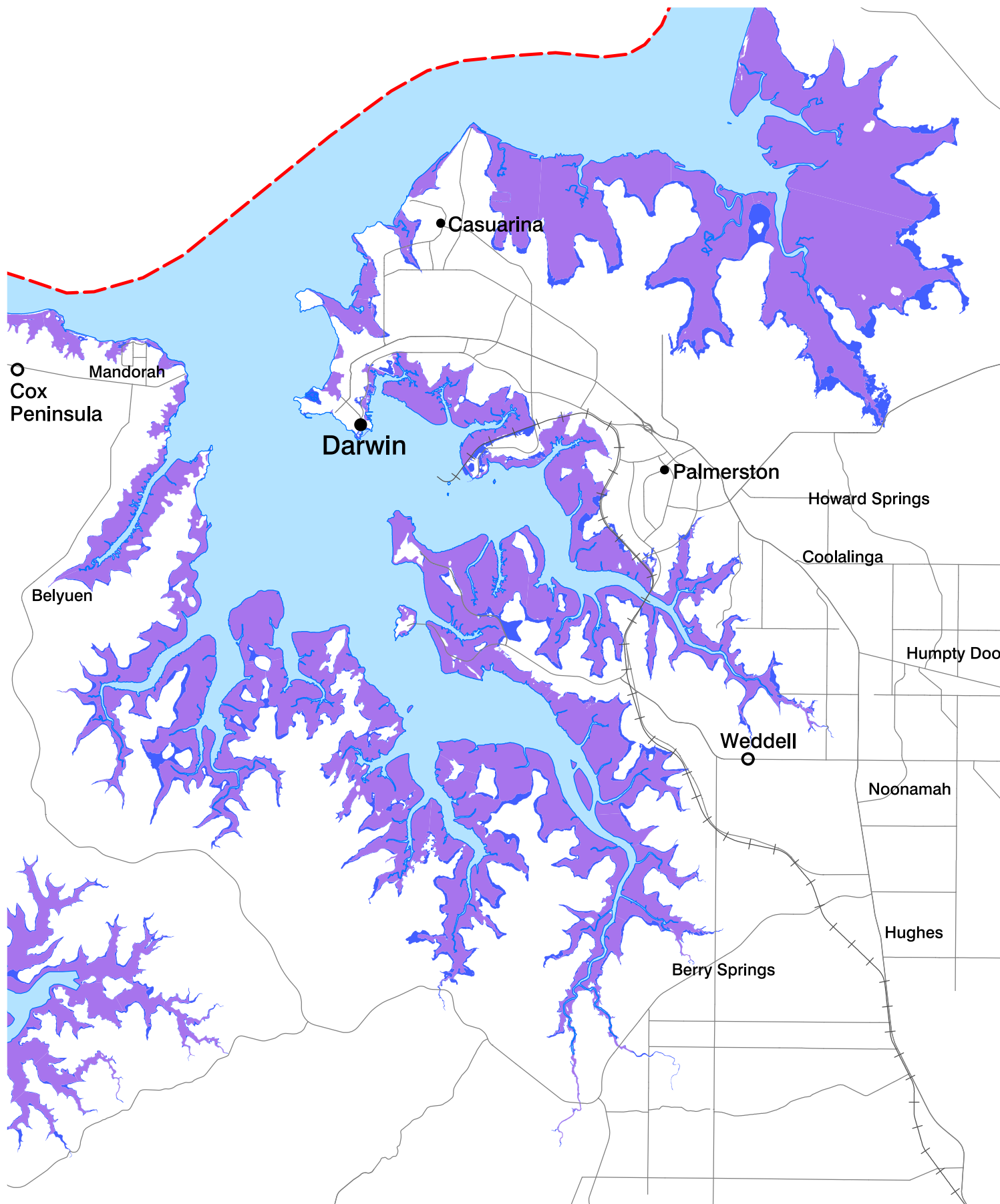
Monsoonal rain or rain associated with cyclones or severe storms can cause riverine and flash flooding, which can exacerbate local drainage problems and cause groundwater to rise above the natural surface.

Riverine flooding occurs when heavy rain causes high water levels in rivers or creeks to overtop the banks and is one of the major natural hazards in the Northern Territory.

Flash floods result from relatively short, intense bursts of rainfall, often associated with severe storms. Issues arise when the drainage system is unable to cope with the quantity of runoff and water flows outside natural water channels or stormwater infrastructure. Although flash floods are generally localised, they pose a significant threat to human life because of high velocities, unpredictability and rapid onset.

The Northern Territory adopts the one per cent Annual Exceedence Probability (AEP) flood extent and floodway as the basis of land use planning. This means development is restricted in any area where there is a one per cent or greater chance of inundation in any one year.

This approach accords with the National Strategy for Disaster Resilience, which advocates a resilience based approach to disaster management and identifies a resilient community as one with land use planning systems and building controls that reduce, as far as practical, community risk from known hazards.



LEGEND

- Plan Area
- 1000 Year Extent
- 100 Year Extent
- Ocean / Sea
- Road Centreline
- + + Railway
- Coastline

Storm Tide

Source: NT Department of Lands, Planning and the Environment, Lands Planning

Development Related Constraints and Opportunities

Desired Regional Outcome

A region that offers a range of well-planned, discrete, and sustainable communities providing convenient and accessible residential, employment, transport and other service opportunities.

Anticipated growth across the region will be significant, placing high demand on the regional fabric, infrastructure and services. The location, distribution, and operational aspects of existing and future development can significantly influence accessibility, cost efficiency, community quality and opportunities for economic activities.

Development Structure

Key Development Structure Objectives

- Recognise the diversity of the community and the consequential range of aspirations in relation to housing type, location and lifestyle.
- Enhance the economic viability of infrastructure and services by creating sustainable local communities.
- Create more compact development, in particular localities that minimise the development impacts on the majority of established communities.
- Encourage consolidated and compact development that facilitates land use and infrastructure efficiencies, increases choice and conserves the regional environment.
- Encourage mixed use development, focused in and around activity centres and public transport nodes or high frequency routes.
- Encourage the provision of a range of housing options that facilitate housing choice and affordability to meet diverse community needs.
- Encourage urban design that takes account of the tropical climate to minimise the creation of heat islands.
- Develop activity centres to maximise local employment opportunities, availability of services, walkable neighbourhoods and the use of public transport.

Compact Urban Form

Population growth in the Darwin Region has historically been predominantly accommodated in new low density urban suburbs or on rural lifestyle lots of 2 ha or 8 ha. This approach, responding to the preference of many residents for single detached houses, has seen extensive areas of natural vegetation and habitat replaced with human habitat and, in some cases, less than optimal use of land and infrastructure.

The undersupply of urban residential land in recent years has contributed to rising housing costs and, increasingly, higher density residential development in the city centre and more compact new suburbs. Notwithstanding these changes, housing prices and the residential rental market remain beyond the reach of many, particularly those wanting to move to the region or enter the market.

While many residents continue to aspire to traditional urban or rural lifestyle lots, affordability is encouraging many in the community to consider alternatives. Within that context a fundamental principle in the land use plan is the provision of land to accommodate genuine choice of housing types and locations, and an appropriate supply of each to address affordability.

The overarching priority in accommodating growth is to maintain the amenity enjoyed by the majority of residents in existing suburbs and established rural lifestyle areas, while providing opportunities for infill development close to facilities and services (particularly public transport) to satisfy the varying aspirations within the community.

Future urban growth areas will provide a range of housing opportunities including traditional single detached dwellings, with more compact and higher densities in appropriate locations particularly those close to facilities and services.

Within existing urban and rural lifestyle areas priority will be given to maximising the potential population capacity of infill sites. This will:

- make the most efficient use of available infrastructure capacity and local services
- contribute to the creation of viable communities
- limit the impact on the majority of existing residents
- reduce the need to travel
- improve access to services
- reduce impacts on the environment and natural resources.

More compact residential development, particularly on previously undeveloped sites in established areas and in greenfield developments, creates opportunities for synergies between various land uses such as education and health facilities. It also assists in protecting the landscape and resources. More compact development, which provides mixed uses and greater housing choice while limiting the impact on established areas, can also assist in creating stronger and more active communities.

Urban form needs to be managed in a way that:

- uses land efficiently
- minimises transport demands
- encourages cost effective provision of infrastructure and services
- is consistent with the diversity of the community's economic and environmental values
- creates and supports viable activity centres offering a range of services and opportunities for local employment
- fosters a sense of local community and identity.

The lifestyle and character valued by many residents in established areas is recognised. The focus is on finding the appropriate balance between protecting the aspirations of existing residents while providing for the varying aspirations of others.

Housing Choice and Affordability

Housing need is influenced by a range of factors including life-cycle needs, socioeconomic circumstances, specific needs of people with disabilities and the needs for short term and emergency accommodation.

Housing needs are changing. The region is experiencing rapid population growth and the population is ageing. The percentage of traditional households of couples with children is declining and the percentage of people living alone without children or as lone parents is increasing. The decline in housing affordability is also impacting on housing choice.

A greater range and mix of dwellings is needed to create a more liveable, stronger community. The land use plan can encourage housing choice and influence affordability by identifying opportunities for residential development of various types in a number of locations. It is impossible to completely eliminate impacts on all established residential and rural lifestyle areas.

However, identifying specific localities for new and innovative housing styles will reduce the potential impacts of ad hoc proposals distributed randomly throughout existing urban and rural lifestyle areas. Future detailed planning for particular localities will provide opportunities for the community to consider specific proposals.

While the land use plan can identify opportunities for housing choice and improved affordability, the plan has little or no influence over factors such as market demand and interest rate and mortgage deregulation.

Activity Centres

Activity centres vary in scale, composition and character, depending on the area they serve. In essence, they function as community hubs where people can shop, work, meet, relax and often live. Distinctive characteristics of individual centres are influenced by their location, the range of facilities provided and the catchment population.

Usually well-served by public transport, they range in size from local neighbourhood centres to major regional shopping centres. Benefits of focusing development in activity centres include:

- equitable community access to goods and services with higher order centres being a major focus of retail and commercial activity and the public transport system
- promotion of economic and social vitality associated with the concentration of higher density residential development and employment in compact centres
- contribution to a sustainable public transport system
- creation of attractive public spaces to encourage community engagement and establish a sense of place.



Entertainment at Mindil Beach Sunset Market

Rural Lifestyle

Rural lifestyle development in the Darwin Region is characterised by large lots in a rural setting where reticulated services are generally limited to a power supply. The low to very low densities are attractive to a considerable number in the community but do occupy significant areas to house a relatively small number of people. This relatively inefficient use of land results in pressure for further expansion of developed areas to accommodate growth.

Other economic, social and environmental impacts of the low density of development include:

- higher proportional cost of infrastructure, including roads
- higher transport costs
- potential pollution over time through a concentration of on-site effluent disposal systems
- weed proliferation due to the high cost of required maintenance
- potential cross-subsidisation of services by urban residents.

Rural lifestyle is recognised as a valid land use in terms of satisfying the aspirations of many in the community and minimising the potential impacts of higher density development on valuable groundwater resources.

With the increasing focus on affordability and sustainable use of resources, the land use plan includes a focus on opportunities to accommodate some who seek a lifestyle outside urban areas on smaller lots in and around rural activity centres. This approach:

- offers practical solutions to the predicted population growth outside urban areas and the environmental challenges of such growth
- minimises uncoordinated responses to continued growth
- improves housing choice and affordability
- generates the thresholds required to support local business and associated employment opportunities and services.

Sequencing

Appropriate sequencing of future development will have a significant influence on cost efficiency, accessibility to facilities and services and opportunities for economic activity factors that all contribute to the quality of a community. The land use structure in this land use plan will guide orderly and efficient land use and infrastructure delivery.

In the normal course of events, the development of land for residential purposes follows investment in key trunk infrastructure. This model provides certainty of infrastructure capability and cost efficient development. This model allows for a tailored provision of community facilities based on the needs of an identified community as opposed to a supply of generic facilities where a community has not been established. Current development fronts taking advantage of the efficiencies of this model include Palmerston East and Muirhead.

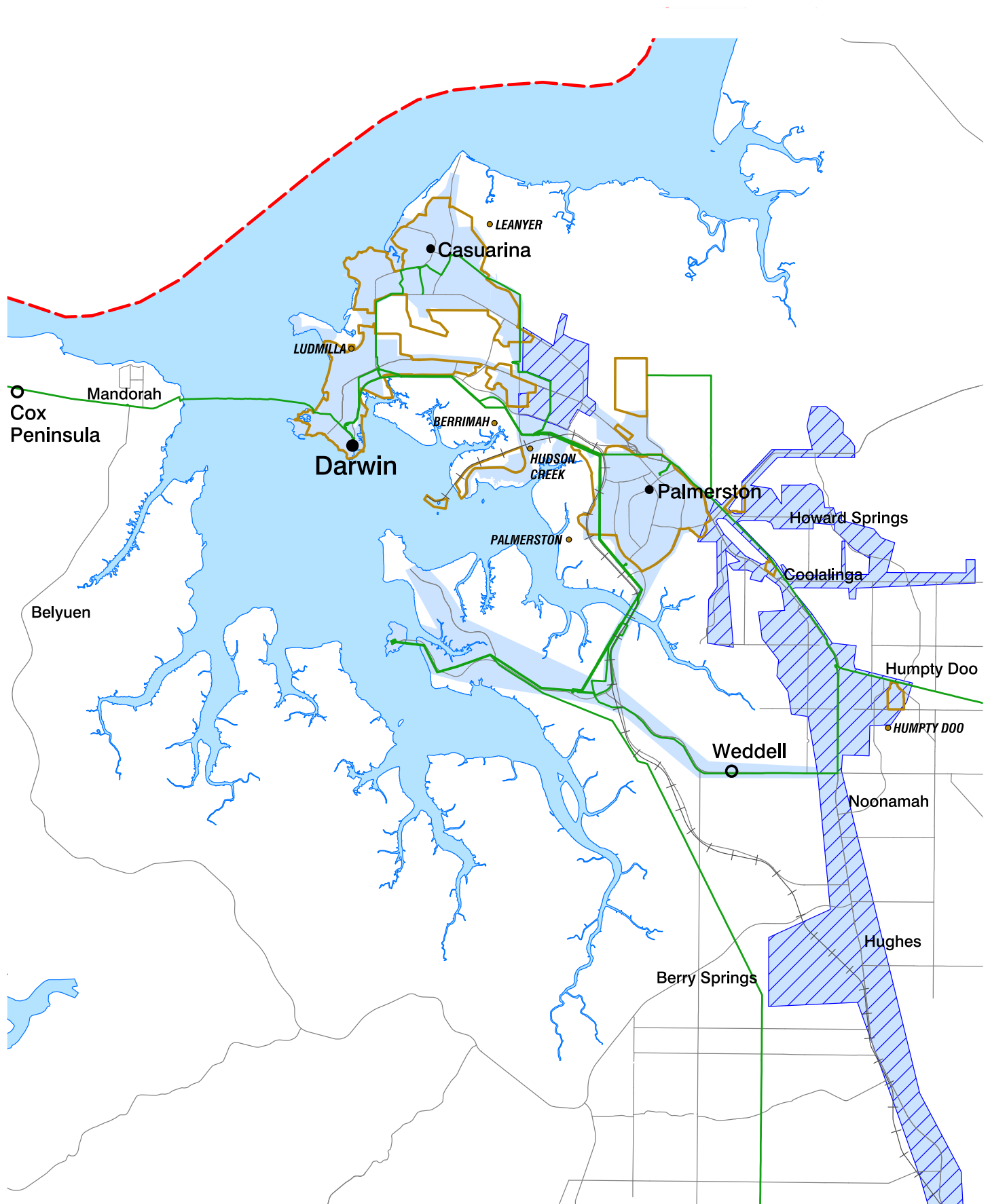
Urban development well beyond the current development fronts is typically more expensive than developing in sequence. Additional costs arise from the need to construct connections to established essential services over substantial distances, including power, water and sewer. The scale of development may too require other infrastructure to be upgraded to meet the additional demands, such as additional lanes on arterial roads or lights at intersections.

There is desirability for concurrent development in multiple locations to meet market objectives such as diversity of product choice, continuity of supply and competition in the market.

The land use plan identifies a number of new greenfield and infill locations to accommodate growth that must be considered holistically in the context of the regional structure. Determination of the sequence of development will be driven by demand for various land uses based on many criterion. The Reticulated Services Map identifies the extent of current reticulated services to give indication of where initial investigations for future development should be focused. Normal land use and infrastructure planning is the appropriate mechanism for site-specific evaluation to minimise adverse physical or environmental constraints.



Whitewood Road, Howard Springs

**LEGEND**

- Plan Area
- Ocean / Sea
- Reticulated Water Supply Area
- Reticulated Water Supply Area - Limited Capacity
- Sewage Catchment Area
- Sewage Treatment Plant

- Electricity Transmission Main
- Road Centreline
- + + Railway
- Coastline

Source: Power and Water Corporation

Reticulated Services

Significant Land Uses

RAAF Base Darwin and Darwin International Airport

Aviation has made a significant contribution to the region ever since pioneer aviators first used Darwin as the most obvious land point connecting the rest of the world to development in the south of the Australian continent. WWII further reinforced the strategic importance as a base for military aircraft. RAAF Base Darwin was established on the present site in 1940 and civil operations commenced on a joint-user basis in 1945.

Darwin International Airport continues to operate as a joint user airport under the *Airports Act 1996 (Cth)*. A Joint User Deed with the Department of Defence governs the collocated operation of Darwin International Airport Pty Ltd and Royal Australian Air (RAAF) Base Darwin. It is a key commercial, military and recreational facility for Northern Australia.

There are a number of constraints associated with the proximity of the airport to established urban areas.

Defence (Areas Control) Regulations under the *Defence Act 1903 (Cth)* regulate the construction of buildings or the height of buildings in areas close to Defence facilities. The Darwin Airport Constraints and Defence Properties Map identifies those areas requiring approval for building of various heights around RAAF Base Darwin.

Areas surrounding the airport will also be exposed to noise generated by military and civil aircraft. This noise may impact on the quality of life for residents. While operators make efforts to minimise noise exposure, aviation activities cannot always be modified.

The Australian Noise Exposure Forecast (ANEF) system uses contours to show where cumulative aircraft noise may adversely affect land uses. In association with Australian Standard 2021-2000 (AS 2021), it provides guidance for the siting and construction of buildings to minimise aircraft noise intrusion. The ANEF contours indicate those areas affected to varying degrees by aircraft noise.

The contours are reviewed regularly, providing a guide to constraints that require further investigation in association with more detailed planning or evaluation of specific development proposals.

The *Airports Act 1996 (Cth)* and the Airport (Protection of Airspace) Regulations declare prescribed airspace and give statutory protection from intrusion into this airspace. The *Darwin Airport Masterplan* identifies the specific parameters that will also inform more detailed land use planning for sites in and around the airport or the evaluation of specific proposals.

Commonwealth and Defence Properties and Buffers

Historically, Darwin has played a key role in national defence and this remains a major land use in the region. The many Defence personnel and their families based in the Darwin Region, the stationing of US troops and the role of the Darwin Region in hosting joint military training exercises mean that Defence makes a significant contribution to the NT economy.

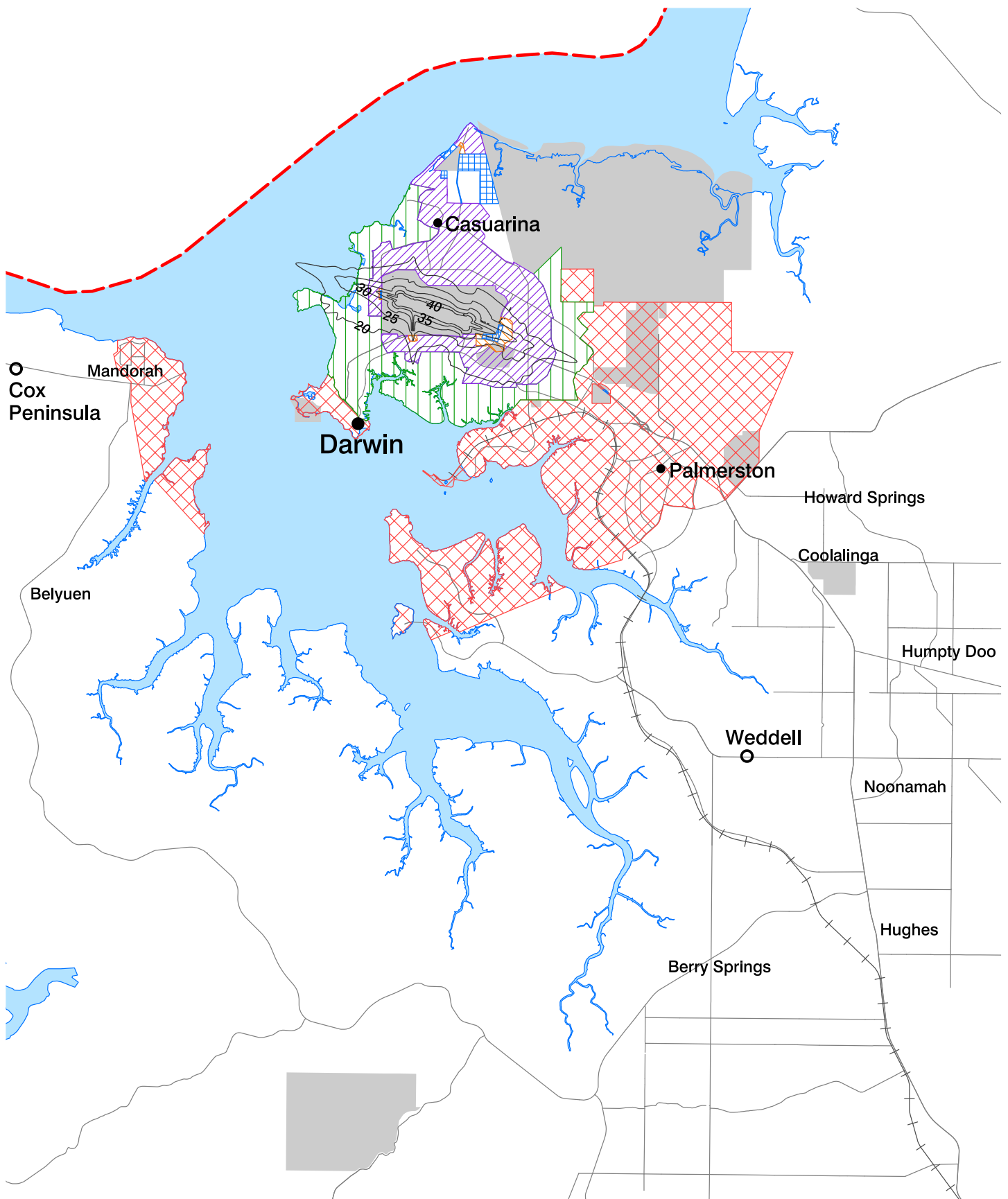
The Department of Defence has major land holdings in the region, and the army, Navy and RAAF all have establishments (Darwin RAAF Base, Darwin Naval Base, Robertson Barracks, and Defence Establishment – Berrimah). In addition to the provision of housing for personnel there is an increasing focus on the opportunities to grow the Defence support sector.

There are a number of constraints associated with military facilities, such as the buffer required around the Shoal Bay Receiving Station and the constraint associated with the Darwin RAAF Base, mentioned above.

The Darwin Airport Constraints and Defence Properties Map shows the major Defence establishments in the Darwin Region. It is imperative that more detailed planning, within the framework of the land use plan, continues in consultation with the Commonwealth to ensure that there is adequate suitable land for Defence facilities.



HMAS Coonawarra (Larrakeyah)



LEGEND

- Plan Area
- > 0m Building Approval
- > 7.5m Building Approval
- > 15m Building Approval
- > 45m Building Approval
- > 90m Building Approval
- Defence Property (Commonwealth)
- Ocean / Sea

- 40- ANEF Contours
- Road Centreline
- Railway
- Coastline

Darwin Airport Constraints and Defence Properties

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