

Humpty Doo Rural Activity Centre

Land Capability and Needs Assessment

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PART ONE: Introduction

The Northern Territory Planning Commission (Planning Commission) is responsible for preparing land use plans and policy as part of the strategic framework that guides land development.

The Humpty Doo Rural Activity Centre Area Plan (Area Plan) is a strategic policy document. It provides a framework for future land use to give certainty and confidence to residents, property owners and the broader community. The Area Plan is prepared to guide decision-making on future rezoning and development proposals.

Purpose of this Document

This document presents information that underpinned the preparation of the Area Plan.

This document brings together:

- previous planning work;
- land capability investigations;
- studies regarding social infrastructure, transport and essential services; and
- outputs from community engagement.

The Study Area

The locality of Humpty Doo within the Litchfield subregion, is located along the Arnhem Highway approximately 38 kilometres as travelled south east of the Darwin CBD and approximately 19 kilometres as travelled south east of the Palmerston CBD. The rural centre supports a large proportion of commercial, industrial and residential development and is a popular stopping point for travellers between Darwin and Kakadu National Park.

The Area Plan focusses on land uses within the Activity Centre boundary but also considers surrounding areas. In particular the subregional and local road networks as well as surrounding natural land features.

The boundary of Area Plan shown at Figure 1, differs from that of the Humpty Doo Land Use Concept shown within the Litchfield Subregional Land Use Plan 2016 at Figure 2.

The Area Plan continues to encompass the commercial centre of Humpty Doo and transition areas into the rural area, however the small service node east of Edwin's Creek is now excluded. Areas west of Hayball Road and Kennedy Road have now been included within the Rural Activity Centre boundary.

The Humpty Doo Rural Activity Centre is unique within the Litchfield municipality as it is the only rural centre to have both a reticulated water and reticulated sewer network. The provision of these services has allowed the establishment of commercial and industrial businesses, urban residential lots, and other key services and facilities such as schools and medical centres within the town centre.

Legacies from historic land uses exist within the Activity Centre that are considered barriers to future development, notably the former Humpty Doo landfill site and associated extractive material pits. Other natural constraints within and in close proximity to the Activity Centre such as seasonal waterlogged soils and permanent water bodies also limit future land use options.

The Growth Context of the Study Area

The Darwin Regional Land Use Plan 2015 identifies threshold populations of 150,000 and 250,000 people for the greater Darwin Region to guide the identification of land required to accommodate growth in the short and longer term. In 2016, the Litchfield Subregional Land Use Plan was premised on the need for Litchfield to accommodate 500 new dwellings to meet demand over the following 5 to 10 years, and a further 20,000 dwellings over the longer term of 40 to 50 years.

Longer term demands will be met by greenfield development and growth within existing rural activity centres. In the shorter term, the activity centres of Howard Springs, Coolalinga/Freds Pass and Humpty Doo will have an important role in accommodating some of this population growth.

How this document works

This report presents information collated from technical investigations and feedback relating to land use and development of the Activity Centre. Issues which informed the preparation of a draft Area Plan for Humpty Doo are overviewed.

The report structure is chronological with preliminary information and investigations addressed first, followed by land use themes then two focus areas which have been influenced by three stages of community consultation by the Planning Commission.

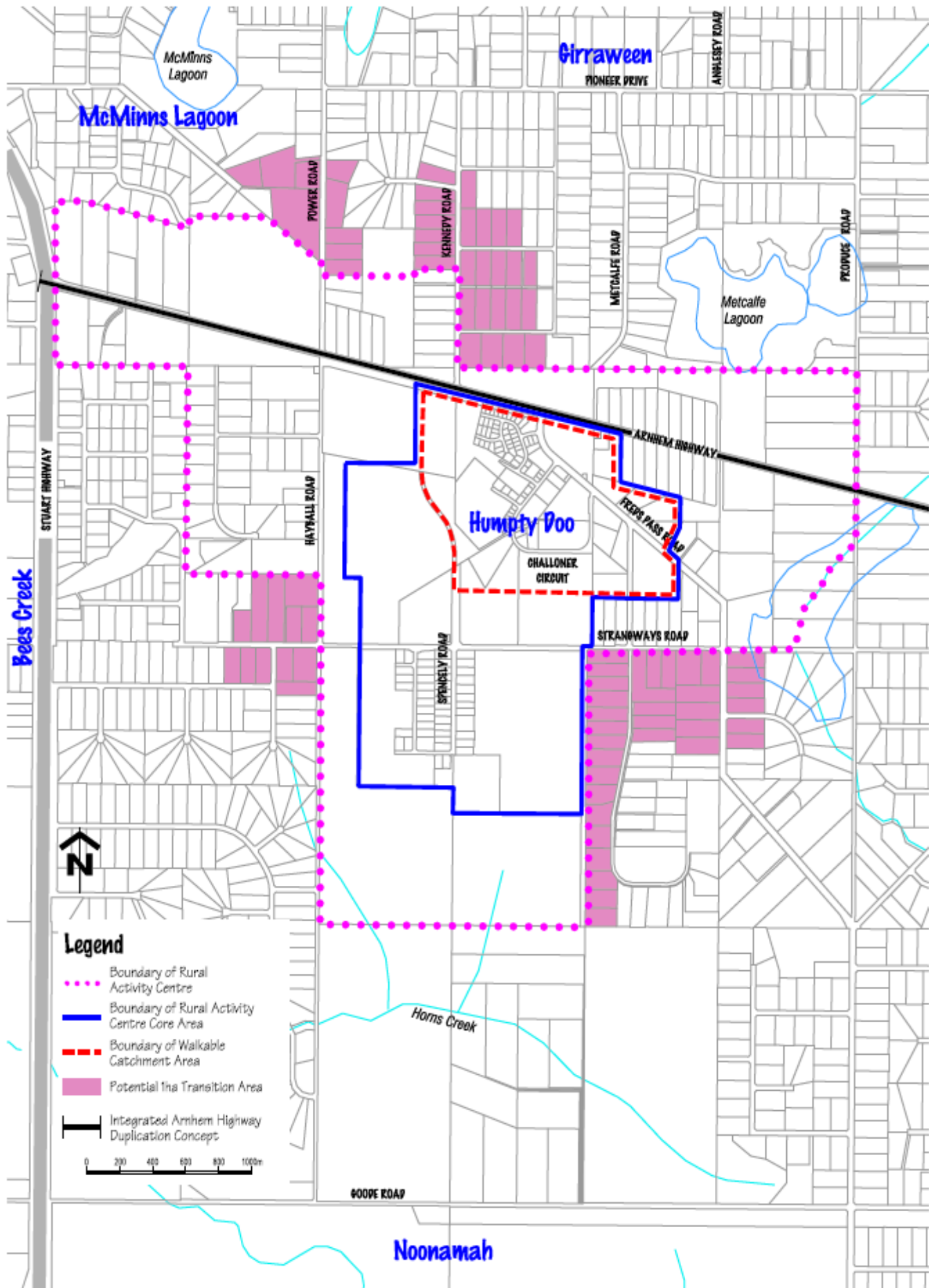
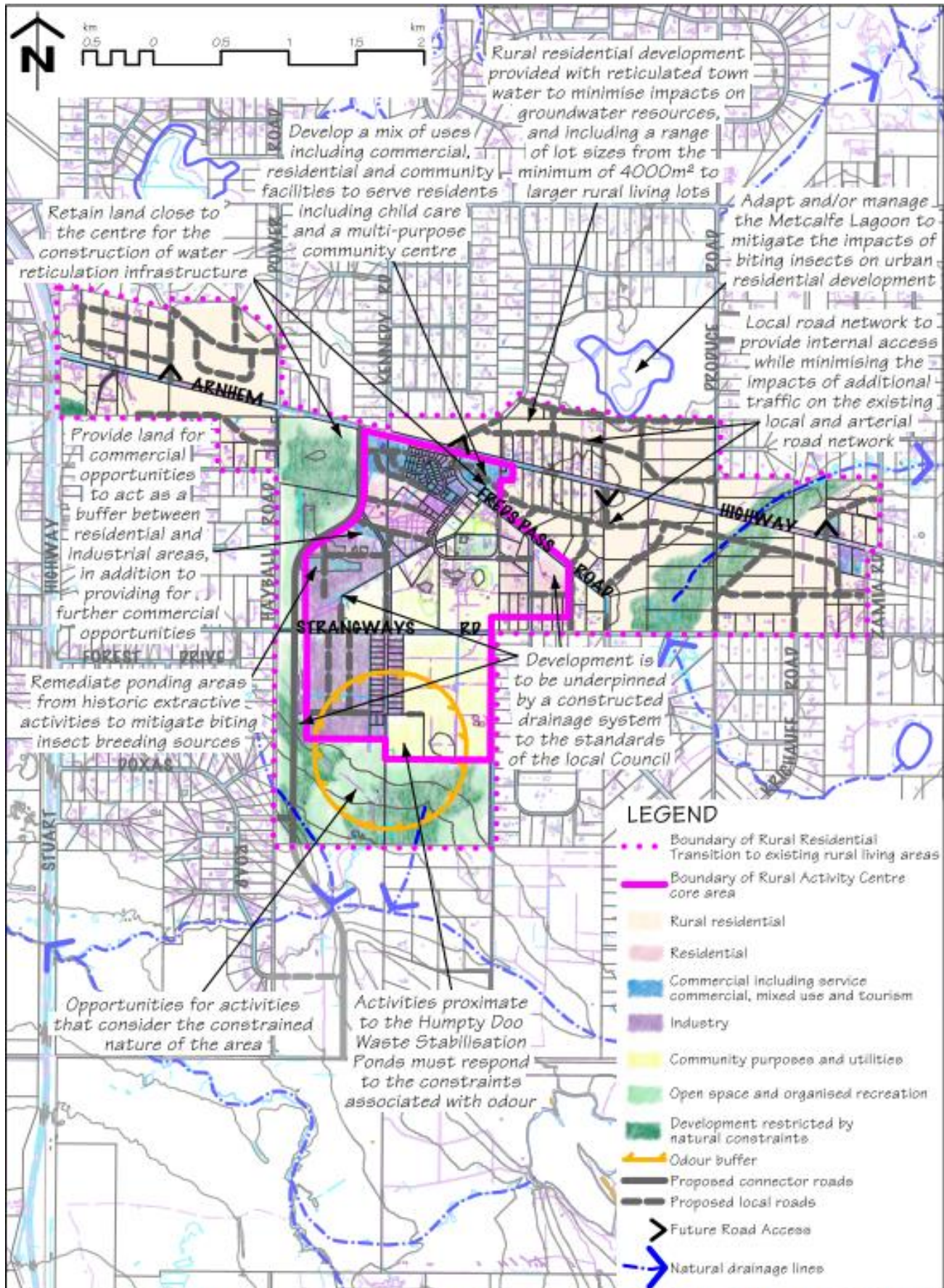


Figure 1: Locality and Context of the Humpty Doo Rural Activity Centre



LAND USE CONCEPT FOR HUMPTY DOO RURAL ACTIVITY CENTRE

Figure 2: Land Use Concept for Humpty Doo as it appears currently in the Litchfield Subregional Land Use Plan (LSLUP)

Regulatory and Policy Context

The use and development of land in Humpty Doo is regulated and guided by the following policy documents.

Northern Territory Planning Act 1999

The objects of the *Planning Act 1999* (the Act) are to plan for, and provide a framework of controls for the orderly use and development of land. These objects are to be achieved by:

- the strategic and sustainable use of land and resources;
- protection of the natural environment; and
- maximising the amenity of development for all stakeholders.

The Act also establishes the Planning Commission as an independent body with various functions, including to prepare and consult with the community regarding integrated strategic plans, guidelines, and assessment criteria for inclusion in the NT Planning Scheme.

The Planning Commission does not have decision-making powers under the Act. The inclusion of an area plan into the NT Planning Scheme remains a responsibility of the Minister.

Northern Territory Planning Scheme 2020

The *Planning Act 1999* enables the NT Planning Scheme 2020 (NTPS 2020) and allows it to contain:

- statements about land use policy;
- development controls, instructions, guidelines, and development assessment criteria to guide decision making of the consent authority;
- zoning maps; and
- plans, designs and diagrams.

Policy statements within the NTPS 2020 establish the expected nature of future development and guide the interpretation of the zones and associated development provisions. A zoning map of the study area is at Figure 3.

The NTPS 2020 includes area plans to assist with the interpretation of the NTPS 2020 and the determinations of the consent authority.

The Area Plan has been prepared to provide detailed guidance on future land uses within the rural activity centre.

This Land Capability and Needs Assessment document is intended to be referenced by the NTPS 2020 as a background document to the Area Plan.

Litchfield Subregional Land Use Plan 2016

The Litchfield Subregional Land Use Plan 2016 (LSLUP) is a policy document within Part 2 – Strategic Framework of the NTPS 2020 that establishes a strategic policy framework to guide the future growth and development of the municipality of Litchfield, including Humpty Doo.

The LSLUP guides land use, transport and infrastructure planning to deliver growth and infrastructure outcomes for the community while safeguarding the valued rural lifestyle.

The LSLUP also guides more detailed planning, including the preparation of area plans for rural activity centres. The statements of policy and land use concept in the LSLUP informed the Planning Commission's work to prepare the Area Plan.

The Area Plan will supersede the role of the land use concept in the LSLUP and the latter will be removed. The land use concept, as it appeared in the LSLUP, is at Figure 2.

The Compact Urban Growth Policy

The Compact Urban Growth Policy 2015 is a policy document in the NTPS 2020 that provides a framework to guide the development of area plans and to inform decisions on rezoning applications.

Compact urban growth allows the efficient use of land, services and infrastructure to create compact and mixed-use activity centres that play a role in improving people's lifestyle and convenient access to services.

The commercial area of Humpty Doo will accord with the Compact Urban Growth Policy as it continues to develop into a compact mixed-use centre within the broader rural area. The Area Plan will provide for a range of opportunities for people to work, rest and play, supported by physical and social infrastructure.

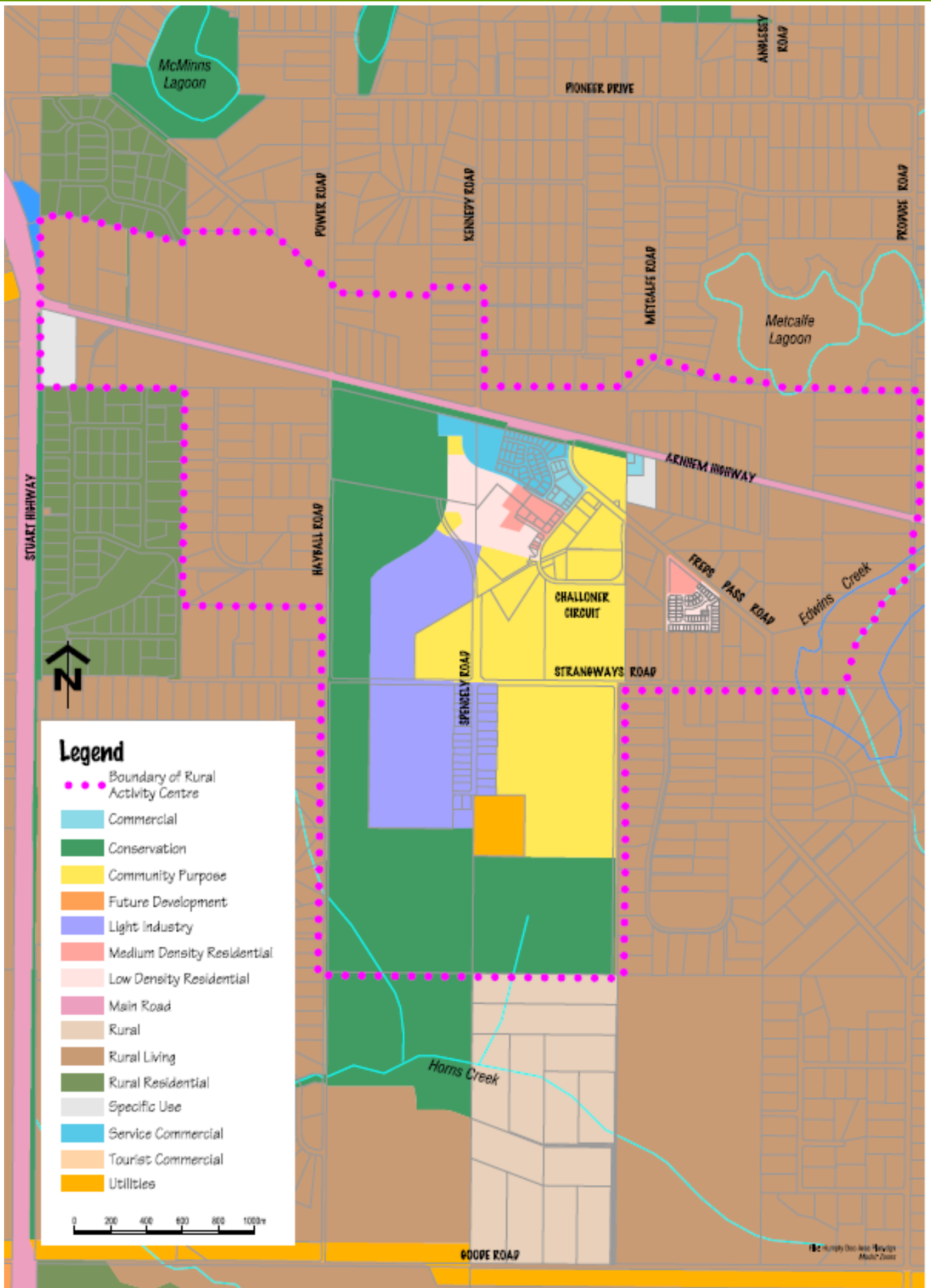


Figure 3: Existing Land Use Zoning within the Humpty Doo Rural Activity Centre

The Area Planning Process

The Area Plan for the Humpty Doo Rural Activity Centre has been prepared following the process outlined in Figure 4 below.

Stage 1 was supported by a Social Infrastructure Assessment completed by FYFE Consultants in 2016 for the LSLUP 2016; an engineering assessment for Humpty Doo completed by GHD in 2019; and work by the then Department of Infrastructure, Planning and Logistics Transport Division on local and subregional transport networks.

From this information the Planning Commission prepared a discussion paper for Stage 1 community consultation titled "Towards an Area Plan for the Humpty Doo Rural Activity Centre". Stage 1 also included establishing a Community Advisory Group (CAG) with the assistance of Litchfield Council.

Stage 2 was supported by information and feedback obtained during Stage 1 consultation and provided a draft Area Plan and Planning Principles as consultation material titled "Towards an Area Plan for Humpty Doo Rural Activity Centre". Stage 2 identified the need for additional investigations into local and arterial road networks.

Stage 2B was supported by a concept for the future duplication of the Arnhem Highway and local road connections along with feedback received from Stage 2 consultation. Stage 2B presented a draft Area Plan and Planning Principles and a fact sheet on the project to date as consultation material.

A final draft version of the Area Plan was placed on statutory exhibition in July 2024.

Expected Outcomes of the Area Plan for Humpty Doo

The Area Plan for the Humpty Doo Rural Activity Centre provides a detailed land use framework within the context of the strategic planning directions established by the Litchfield Subregional Land Use Plan.

The Area Plan responds to the development constraints, opportunities and feedback identified and received through the Planning Commission's three stages of community and stakeholder engagement.

These inputs and subsequent discussion with the Community Advisory Group and other relevant stakeholders, has shaped the Area Plan and informed land use policy that will guide future development.

As a framework for future land use, the Area Plan will inform further investigations and concepts required to ensure that infrastructure and services are provided commensurate with growth.

In summary, the Area Plan for Humpty Doo:

1. responds to the natural and built environment to facilitate growth within the rural activity centre;
2. identifies the constraints and opportunities of the locality and provides a framework for the coordinated provision of servicing infrastructure apace with growth;
3. provides a land use framework and associated policy to guide both public and private sector investment; and
4. provides residents, businesses and the wider community with confidence on future outcomes.

STAGE 1	STAGE 2	STAGE 2B	STAGE 3
<p>Initial investigation includes information gathering, analysis and definition of the character of the study area. Importantly, the capacities of engineering and social infrastructure to support growth are assessed.</p> <p>This informs the preparation of documentation for initial community engagement.</p>	<p>In response to initial investigations, any further studies and community feedback, options for a draft Area Plan are prepared in consultation with a community advisory group.</p> <p>Further engagement with the community provides a review of the options and a draft Area Plan is prepared.</p>	<p>In response to Stage 2 engagement, further studies on the transport network are carried out, notably a concept for the future duplication of the Arnhem Highway, to inform further development of the Area Plan.</p> <p>Further engagement with the community provides a review of the draft Area Plan prepared in response to previous Stage 2 engagement.</p>	<p>The NT Planning Commission finalises the draft Area Plan and forwards to the Minister for consideration as a draft Planning Scheme Amendment.</p> <p>The Minister decides whether to place the plan on exhibition. Submissions are considered. The Minister decides whether to amend the Area Plan into the Planning Scheme.</p>

Figure 4: Stages of the Planning Commission’s area planning process for the Humpty Doo Rural Activity Centre Area Plan

PART TWO: Land Capability Assessment

The study area, including the proposed core and transition area encompasses approximately 1,060ha of land and has a range of land types and capabilities. The core area is located on a broad gently sloping ridge falling away to small depressions and drainage lines to the east, south and west of the centre.

Natural bushland covers a large proportion of the study area on a range of Crown, council and privately owned land. There are many relics of past land uses and naturally constrained areas that have the potential to hinder development opportunities in certain places.

Developable land within the study area is located both north and south of the Arnhem Highway. Developable Crown land is located within close

proximity of the established commercial and community centre of Humpty Doo and is generally flat to gently undulating eucalyptus woodland or open forest with gradients less than 2.5%.

Pockets of more constrained land exist and are associated with the drainage catchments of the study area. These areas are generally swamp depressions of open or closed grevillea and melaleuca forests with gradients generally less than 0.5%. Some constrained land is associated with Priority Environmental Management (PEM) areas, including Edwins Creek and Metcalfe Lagoon.

Figure 5 shows the topography and surface level elevation of Humpty Doo. Figure 6 provides land units for the Humpty Doo location.

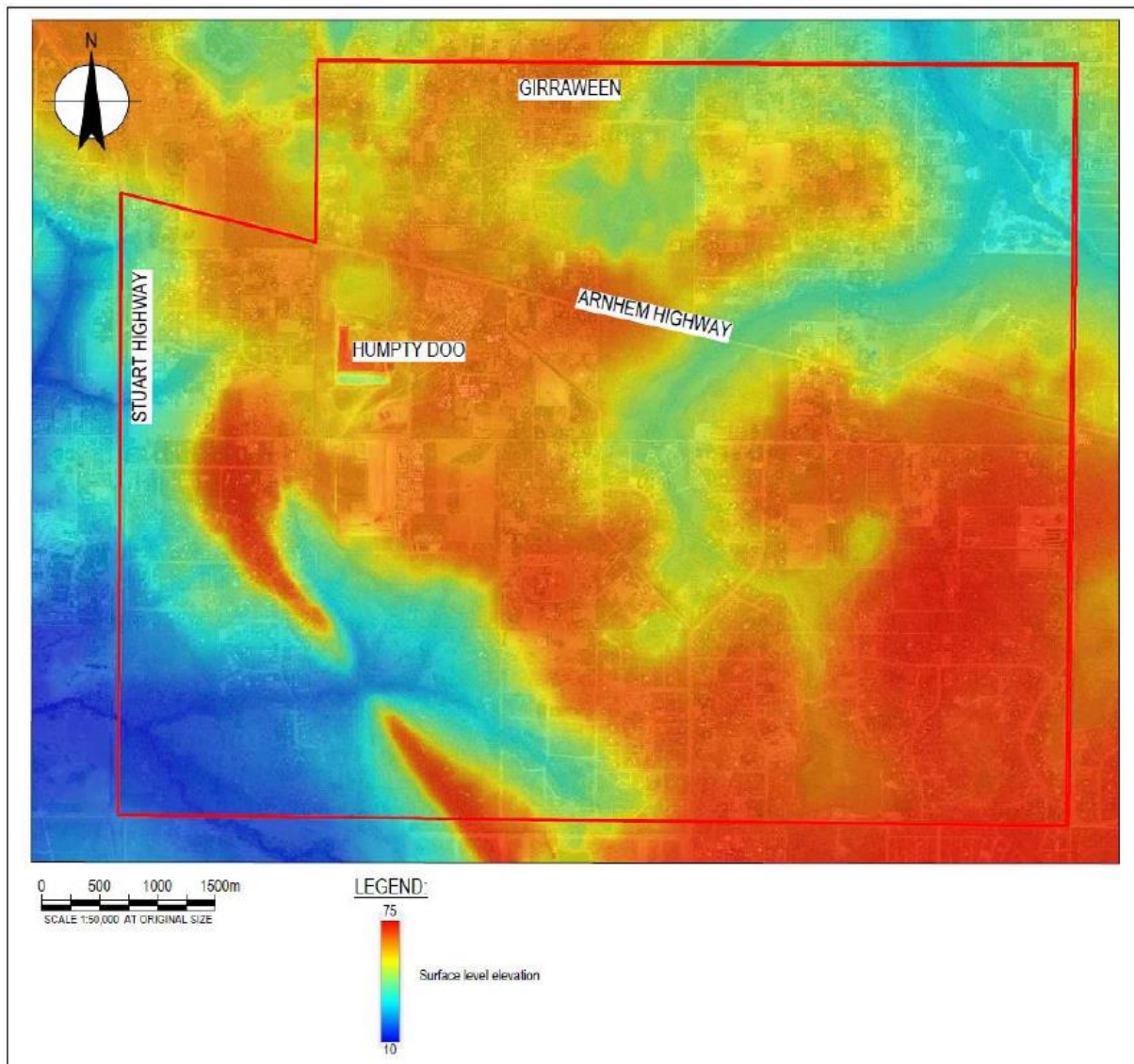


Figure 9-2 Topography

Figure 5: Topography and surface level elevation of the Humpty Doo area. Red and orange areas are of relatively high elevation and likely to be relatively safe from major flooding subject to suitable drainage infrastructure and grading.
Land Capability and Needs Assessment Reference Document 2024

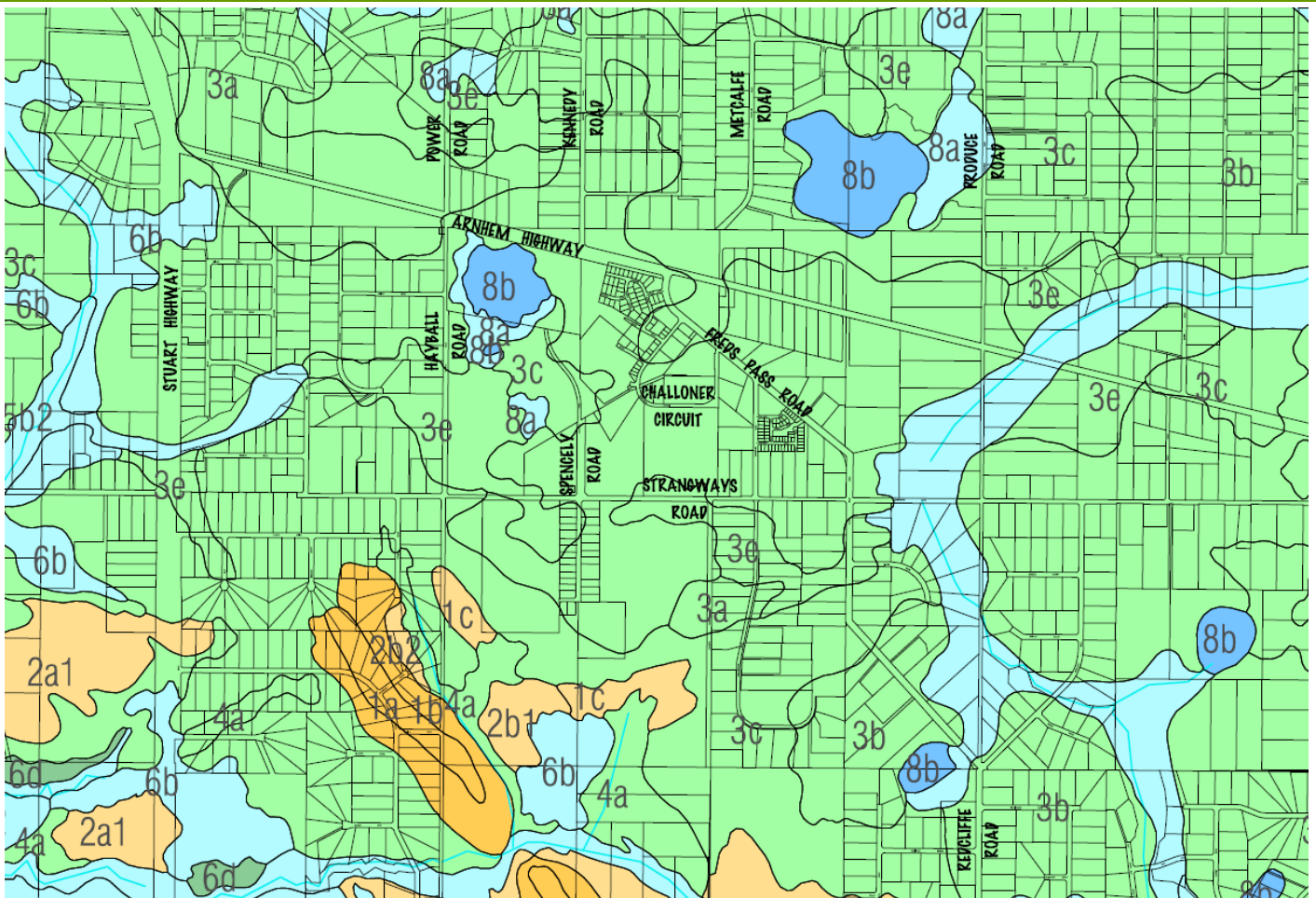


Figure 6: Land Units of the Humpty Doo Rural Activity Centre area. Land units of category 3 are generally flat to gently undulating uplands. Land units in category 8 are generally low lying and swampy areas. Land Units of categories 1 and 2 generally represent ridges or slopes.

Drainage Catchments and Flood Management

Edwins, Horns and Bees Creeks provide natural drainage lines within the study area and will require future development within their catchments to be sympathetic of the sensitive aquatic and riparian environments. There is also the potential to exacerbate any existing localised flooding issues to privately owned land and local roads which needs to be taken into consideration with any new development.

Seasonal Waterlogging

The following areas within the rural activity centre are affected by seasonal waterlogging:

- the Howard River floodplains in the eastern part of the study area;
- the southern end of Power Road;
- areas between Hayball and Spencely Road;
- areas in the south of the study area that are proximate to branches of Bees Creek; and
- areas on the fringe of Metcalfe Lagoon.

Figure 7 shows land susceptible to moderate and severe soil waterlogging within the study area.

Areas of Environmental Significance

The natural environment is an asset of the rural activity centre, providing natural amenity for the enjoyment of residents and visitors. Some of these natural areas have potentially significant environmental values and may present constraints that limit the feasibility of development.

Priority Environmental Management (PEM) mapping completed for Litchfield identifies areas of significance within the study area. Figure 7 illustrates the PEM mapping areas specific to the Humpty Doo Rural Activity Centre.

It can be noted that the PEM areas shown are also within the severely seasonally waterlogged areas. 'Sandsheet Heath' is a rare vegetation type that many plant and animal species have adapted to, including the Howard River Toadlet, and currently covers 56 square km of the Darwin region. Any proposal to develop these areas would need to address the identified environmental significance.

The Department of Lands, Planning and Environment have advised that a range of threatened flora and fauna species are known to occur or have a high likelihood of occurring within the study area, generally associated with significant and sensitive vegetation types discussed above.

These species include, but are not limited to, the Black-footed Tree-rat, Common Brushtail Possum, various subspecies of *Typhonium* and *Utricularia dunstainiae*.

These species are listed under Northern Territory and Federal legislation, being the *Territory Parks and Wildlife Conservation Act 1976* (NT) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

The Area Plan responds to the presence of these ecologically significant species within the study area by identifying affected land areas as 'Development Restricted by Constraints/Natural Environment' and a 'Future Investigation Area'. The Area Plan includes a new objective and supporting development responses, which stipulate the need for further assessment and investigations to be undertaken prior to rezoning and subdivision being considered.

The Area Plan identifies Section 3219 and the Edwins Creek and Metcalfe Lagoon Intact Woodland Corridor as specific areas that require future development to respond to environmental objectives as well. The Edwins Creek and Metcalfe Lagoon Intact Woodland Corridor is identified at Figure 7.

The uncoloured areas of Figure 7 are not constrained by areas of high natural environmental values and are considered preferred locations for development.

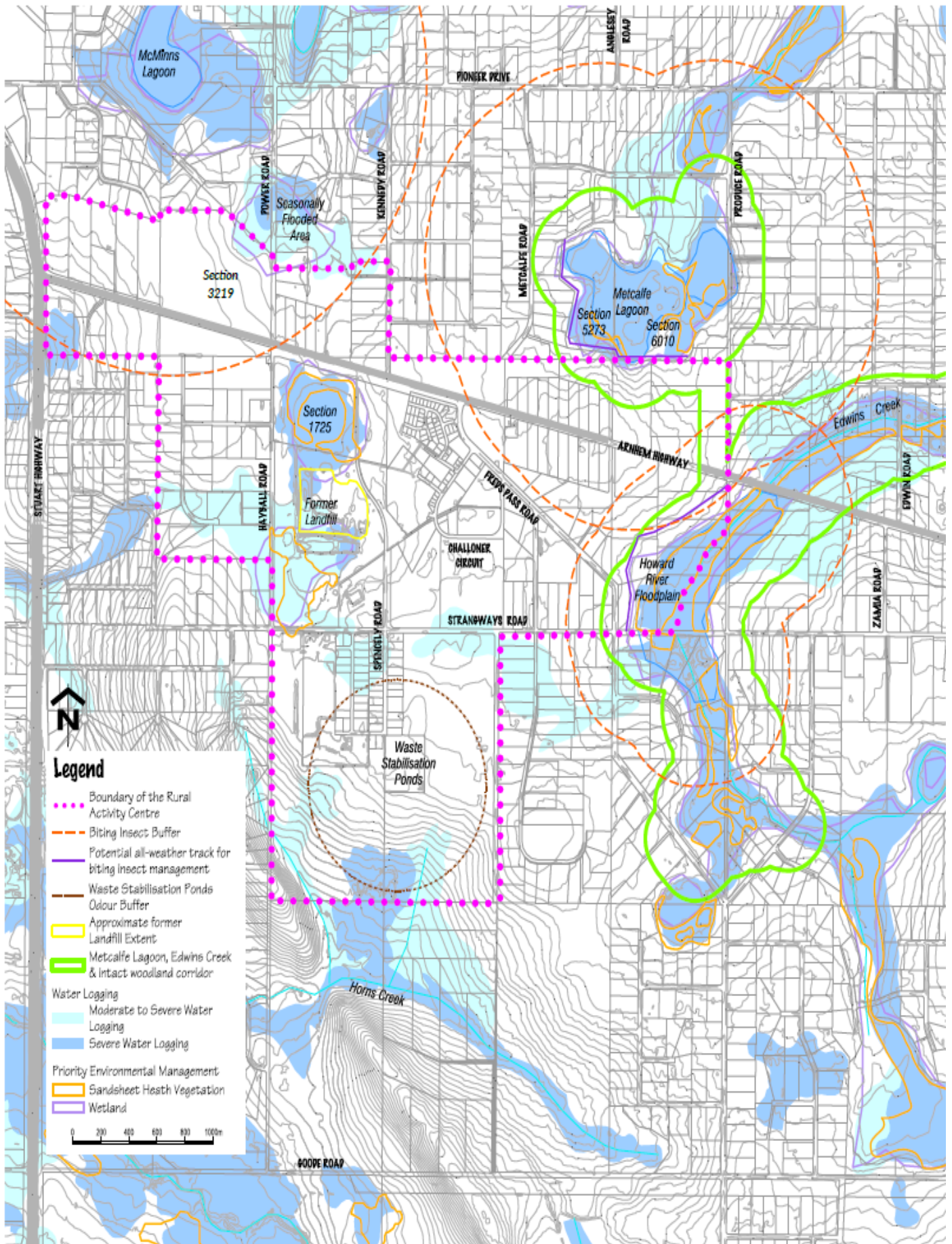


Figure 7: Landscape and Constraints

Groundwater Availability

Groundwater use in Humpty Doo currently exceeds sustainable yield and further subdivision reliant on groundwater allocation cannot be supported. The Northern Territory Government is undertaking ongoing groundwater assessments for the rural area and implementing management strategies.

The majority of the Humpty Doo Rural Activity Centre lies over the Koolpinyah Dolostone Aquifer, while a few properties in the west of the centre lie over the Mount Partridge Aquifer.

Any future development within the boundaries of the activity centre will be required to connect to reticulated water to minimise the impact on the groundwater resources. Rural Residential properties outside the boundary will also be required to connect to reticulated water should these lots be subdivided and developed. Because of this, Rural Residential 1ha and 0.4ha lots envisaged by the Area Plan allow for the provision of rural lifestyle lots without putting further strain on ground water resources due to water extraction.

Mosquito Breeding Areas

Preliminary studies carried out by the Department of Health identified seasonally moderate levels of mosquitos within the Humpty Doo Rural Activity Centre area.

Six potential mosquito breeding sites were identified that may impact the Rural Activity Centre:

- Metcalfe Lagoon north-east of the Activity Centre;
- The Howard River floodplain (headwaters of Edwin Creek) between Strangways Road and the Arnhem Highway;
- the seasonally waterlogged swamp in Section 1725 adjacent the Spencely Road and Arnhem Highway intersection;
- the remnant pits associated with the former Humpty Doo Landfill;
- the seasonally flooded areas at the southern end of Power Road; and
- McMinns Lagoon to the north-west of the Activity Centre.

The most productive mosquito trap sites were near the Freds Pass Road and Strangways Road intersection and Humpty Doo town centre and the former Humpty Doo Landfill. Moderate levels of mosquitos were recorded at both sites peaking in the early to mid-dry season. The Howard River floodplain and the remnant pits of the former Landfill site are attributed to the moderate mosquito numbers in these areas.

The Howard River floodplain is likely to be the most important mosquito breeding site affecting the eastern side of the Activity Centre. Seasonal ponding in Section 1725 (north of the former landfill) and Section 2642 (associated with the former landfill) are considered important breeding sites impacting the western side of the Activity Centre.

During very large breeding events, some species of mosquito are likely to disperse to the western edge of the Activity Centre from McMinns Lagoon.

Metcalfe Lagoon was not considered very productive during the baseline trapping carried out compared to monitoring in the 1980's. Metcalfe Lagoon may affect the Activity Centre to some extent, however the proposed urban residential areas of the Activity Centre are buffered by rural lots and the Arnhem Highway.

Additional advice received from Medical Entomology following the studies carried out were that there is no objection to urban residential lots being proposed on the northern side of Freds Pass Road given the existing and future buffers from Metcalfe Lagoon provided by rural subdivision and the Arnhem Highway. A suggestion to better strengthen the buffer is to provide a strip of commercial uses along the Arnhem Highway frontage, however this is not ideal from a land use perspective given the primary status of the highway and narrow road reserve in this location.

The potentially higher risk of mosquito borne disease to residents near these breeding sites is an issue that must be addressed through the Area Plan. Locating high density urban development outside the buffer zones will minimise any risks to the core of the activity centre, while adult mosquito control (fogging) during seasonally high periods of breeding would also reduce the number of bites.

Medical Entomology have identified the need for two all-weather access tracks to be constructed to allow for vehicle access to undertake fogging activities within the study area. The fogging tracks have been identified on the southern margin of Metcalfe Lagoon, and on the western edge of the Howard Springs floodplain between Strangways Road and the Arnhem Highway. The provision of all-weather access tracks is essential to allow for mosquito surveys and fogging. Whilst aerial control is generally preferable, civil aviation regulations may inhibit the ability to undertake aerial control.

Preliminary studies of the area also suggest the large

seasonally waterlogged and disturbed area in Section 1725 (north of the former landfill) and Section 2642 (associated with the former landfill), would need to be surveyed and rectified of residual shallow ponding before urban residential uses occur in close proximity to these locations. Stormwater drainage from the rural activity centre should flow through this area without creating ponding. The need for 1ha lots may be required fronting Spencely Road replace of smaller urban lots, if rectification of ponding and reduced water levels stemming from the seasonal lagoon cannot be accommodated.

urban lots which are directly adjacent to Metcalfe Lagoon, on the southern side, should ideally be a minimum 1ha in size, to reduce the number of potential residents living adjacent to the lagoon who may be susceptible to biting insects. The Land Use Structure Plan within the Area Plan document (Figure 5) responds by identifying subject lots adjacent to Metcalfe Lagoon as '1ha (2.5 acre) Rural Residential Transition'.

Figure 8 is an extract from preliminary mosquito studies within proximity of the rural activity centre area.

Medical Entomology have further advised that peri-

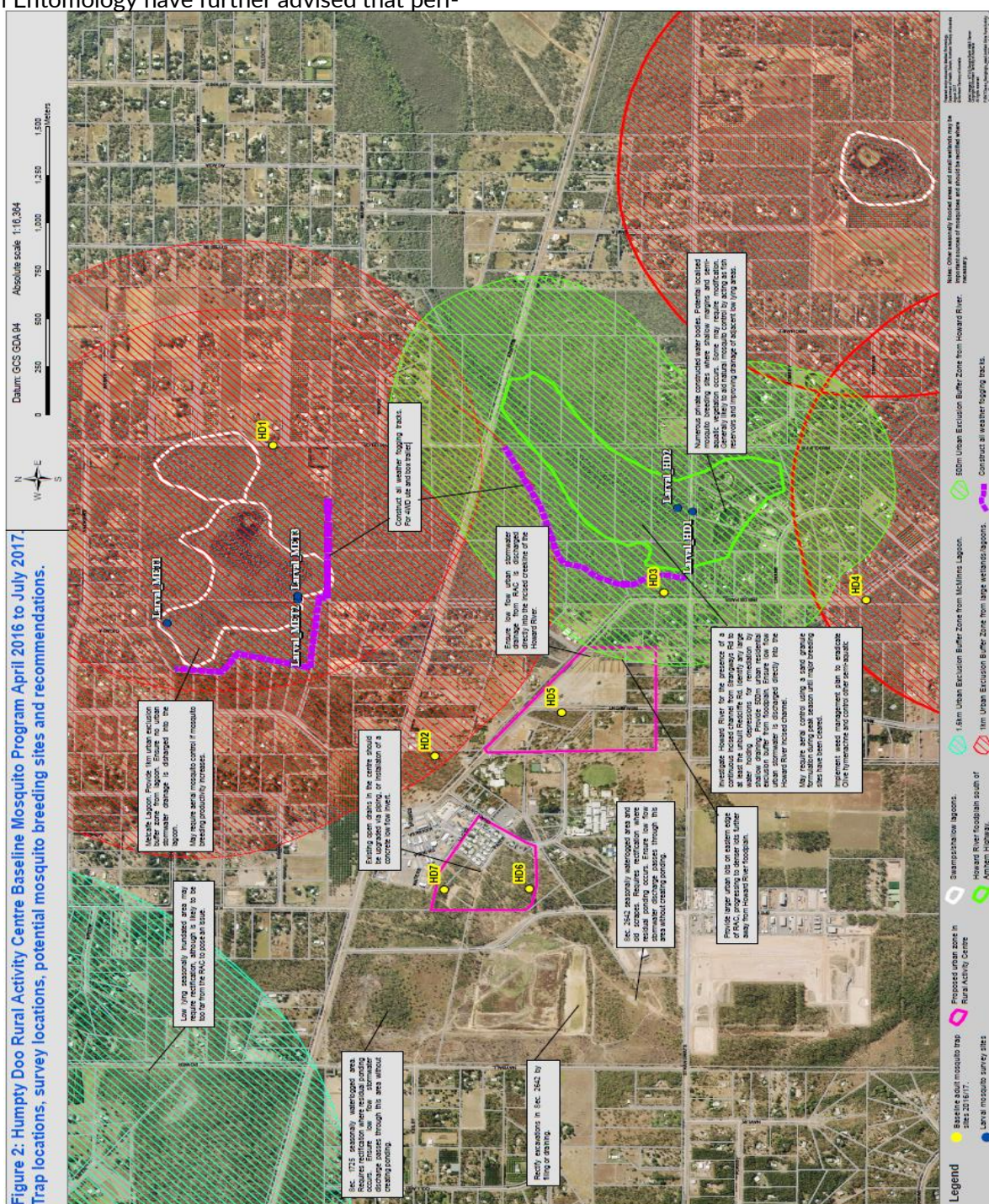


Figure 8: Known mosquito breeding locations showing locations of trapping undertaken and suggested buffers Land Capability and Needs Assessment Reference Document 2024

Heritage and Archaeological Features

A desktop review of heritage and archaeological features within the study area was undertaken by the Heritage Branch of the Northern Territory Government in 2015.

The search determined that there are no nominated, provisional or declared heritage places within the study area.

The closest declared heritage place in the vicinity of the Humpty Doo Rural Activity Centre study area is the Wishart Siding Fettlers Mess, which is located on the Stuart Highway and will not be impacted by development within the Area Plan boundaries.

Aboriginal Sacred Sites and Areas of Cultural Significance

The Larrakia People and Wulna People share traditional cultural interests in the Humpty Doo area and are the custodians of the sacred and cultural sites within the study area

The Aboriginal Areas Protection Authority (AAPA), a statutory body established under the *Northern Territory Aboriginal Sacred Sites Act 1989* (NTASSA) has reviewed the draft Area Plan as part of community consultation and have advised that there are two recorded sacred sites within the study area.

AAPA have advised that there are registered/recorded sites within the vicinity of the study area, which may be impacted by development opportunities. AAPA also acknowledge that the area has not been fully surveyed so their knowledge of sacred sites in the area is inconclusive.

The AAPA has previously issued 14 Authority Certificates which fall within or intersect the Area Plan boundaries, some of which have restricted work areas where only limited works are permitted.

The AAPA recommends that the Planning Commission obtain an Authority Certificate prior to undertaking any new work within the study area. This recommendation is reiterated within the Area Plan and will need to be addressed at future rezoning and development application stages.

Heritage Act 2011

The Heritage Branch administers the *Heritage Act 2011* and provides authoritative advice regarding obligations under the *Heritage Act 2011* to manage potential impacts on Aboriginal and Macassan archaeological places and objects.

The Heritage Branch have advised that whilst there are currently no previously recorded Aboriginal archaeological sites within the study area, there is a high possibility of Aboriginal archaeological material existing within undeveloped portions of the Area Plan study area, particularly near to water courses associated with the Howard River Floodplain.

The Area Plan responds to the potential presence of Aboriginal archaeological material through an objective and development response, which refers to the need for rezoning and subdivision proposals within the study area and specifically within the Edwins Creek and Metcalfe Lagoon Intact Woodland Corridor to demonstrate consideration of the *Heritage Act 2011* in accordance with the NTPS 2020.

Land Tenure

There are several forms of land tenure within the Area Plan boundaries. The predominant form of tenure however is freehold, government and vacant Crown land.

A large area of government and vacant Crown land adjoins or is in close proximity to the existing Humpty Doo commercial centre. These forms of land tenure are favourable in facilitating development and/or subdivision as development would not be dependent on a private landowner's aspirations to fill market gaps.

It is noted that a portion of the vacant Crown land between Hayball Road and Spencely Road is the site of the former Humpty Doo landfill. Further investigations and monitoring will be required regarding the state of the land and associated environmental or health risks prior to any subdivision and development within this area.

Outside of the rural activity centre core area, the predominant land tenure is freehold. This presents an opportunity for private landholders to subdivide and develop their lots as envisaged by the Area Plan. This form of land tenure does present some challenges with respect to biting insect management and mitigation measures, as there are several breeding sites within the study area which are located on private land.

Furthermore, private landholders are not obliged to develop, nor might there be the necessary service infrastructure to do so in the near term. This may result in identified areas for change or lots in close proximity to the Rural Activity Centre core taking longer time frames to develop or not being developed as envisaged by the Area Plan at all.

Figure 9 shows the make-up of land tenure within the Rural Activity Centre Boundary.

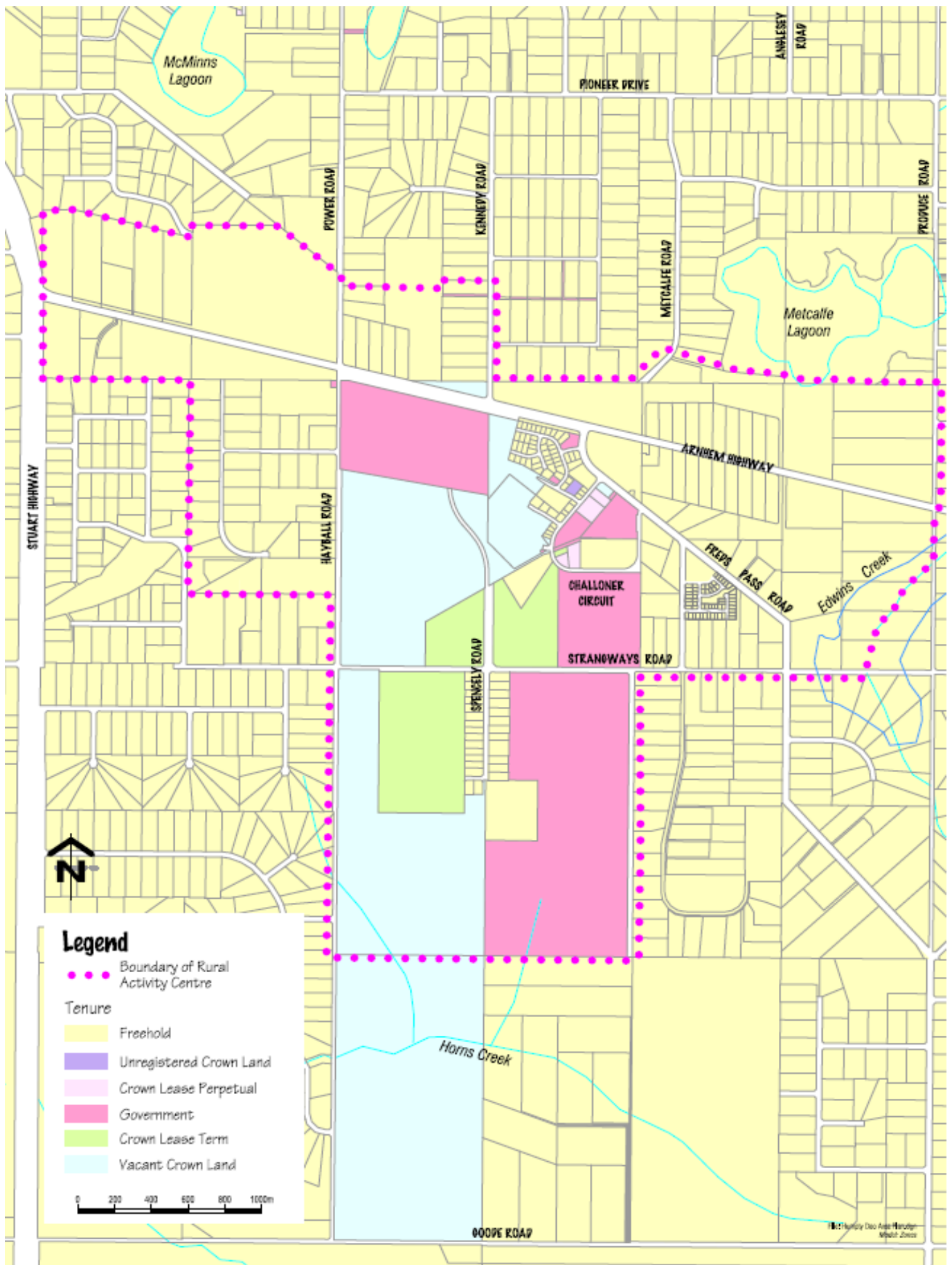


Figure 9: Land Tenure in Humpty Doo
Land Capability and Needs Assessment Reference Document 2024

Service Infrastructure

Service infrastructure includes power, water supply, sewerage, stormwater drainage and telecommunication networks.

Land use planning plays a key role in the planning and provision of service infrastructure.

Consideration of projected population growth and dwelling yields informs the demand for services, which in turn guides the design and construction of commensurate infrastructure.

Within the study area, the residential, industrial and commercial 'core' is the only area with access to full reticulated services. Potable water and power is available to most properties within Humpty Doo but reticulated sewerage is limited.

In the future, a sequence of prior development and infrastructure provisions may be required to enable land use change envisaged by the Area Plan.

Engineering Assessment

In 2019, GHD Pty Ltd was engaged to assess the infrastructure services available in the study area of Humpty Doo, and provide a preliminary strategy for the staged expansion of reticulated services.

The following is a brief summary of the existing services (power, water and sewer) and provisional actions to upgrade.

Power

The power supply to the activity centre will need upgrading to support new development. Power and Water Corporation (PWC) have advised that a service corridor will need to be provided on the southern side of the Arnhem Highway to allow for two new feeders and a possible future transmission line, which will need to be adequately offset to allow PWC to access and service this infrastructure.

A new transformer may need to be added to the Strangways Zone substation to provide lower utilisation contingency levels. The substation has provisions for this improvement but existing demand has not necessitated the upgrade. An additional feeder or adaption of surrounding feeders will be required for the envisaged level of development and to service the needs of the broader region.

Changes in customer behaviour, such as the installation of roof top solar power panels and efficiency measures could help to reduce the peak demand for electricity in the future.

Any new power supply within urban environments will be required to be installed underground. New power supply within rural residential areas may be located above ground.

PWC are planning extensive rehabilitation works for the existing transmission line on the northern side of the Arnhem Highway. Given the Area Plan provides high level details on possible road connections and locations, PWC cannot definitively confirm which electricity infrastructure would be impacted by such works at this time.

Figure 10: Humpty Doo electrical distribution network

Colour	Name
Red	PWC 66kV Network
Pale Green	McMinns (22SY02)
Brown	Noonamah (22SY12)
Purple	Herbert (22SY11)
Light Green	Darwin River (22SY15)
Pink	Lambells (22HD402)

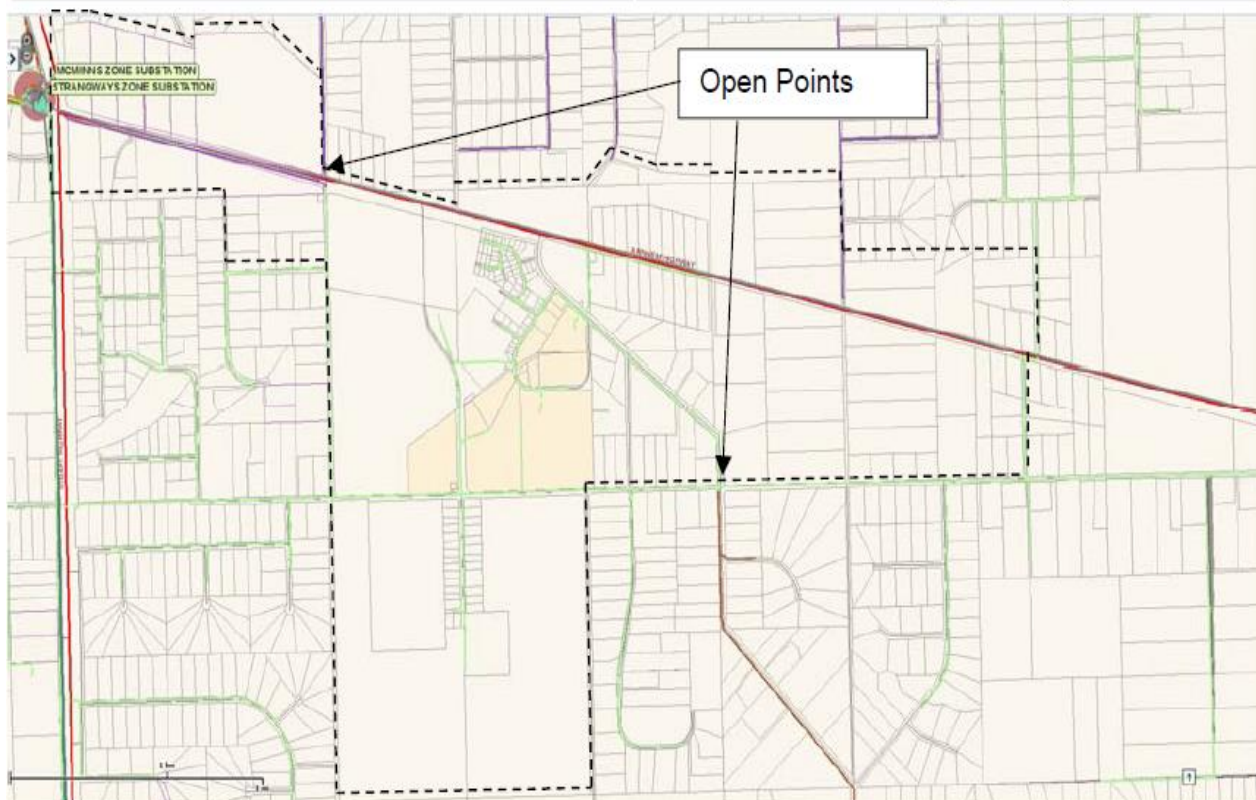
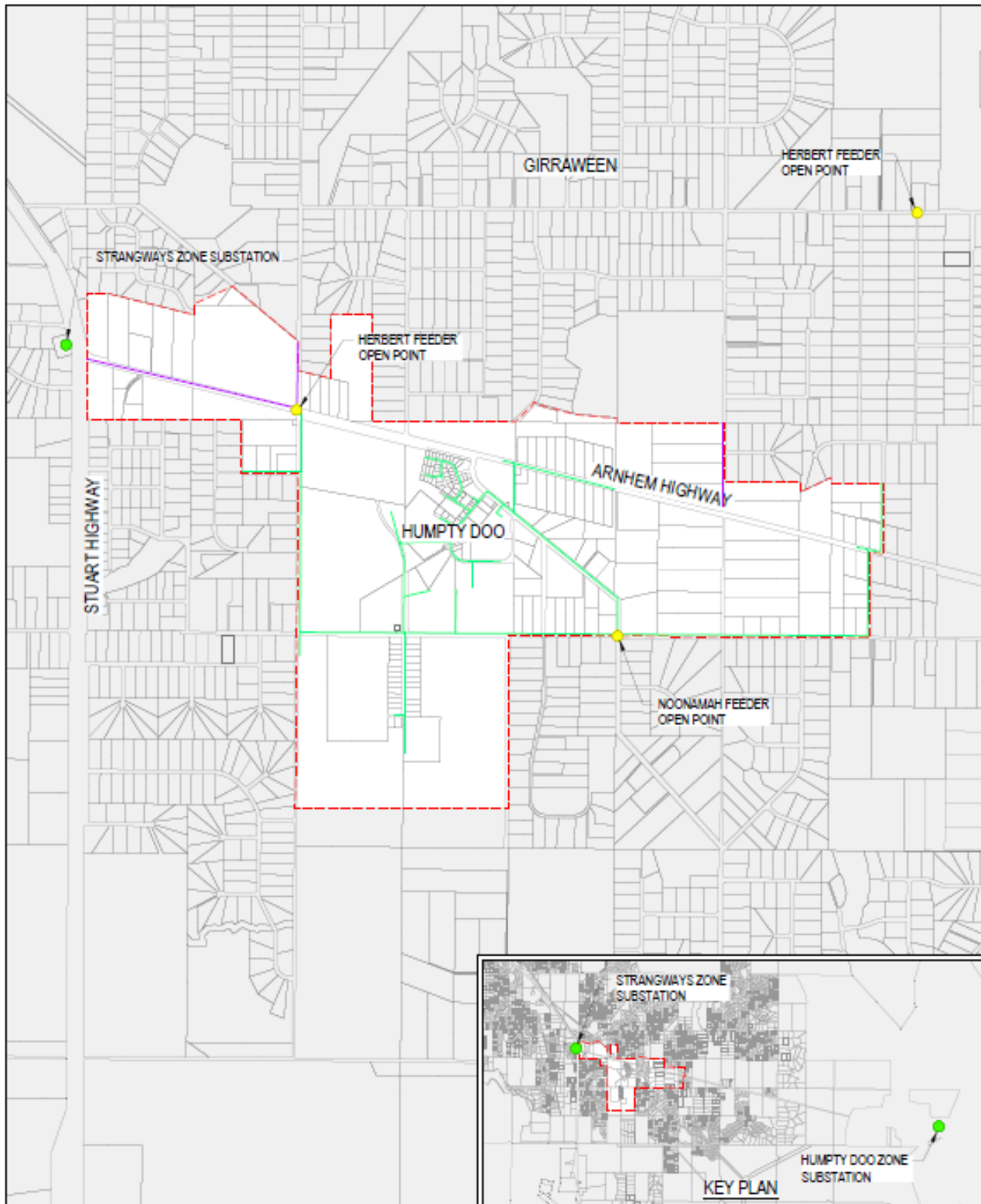


Figure 5-2 HDRAC 22kV Electricity Distribution Network



LEGEND:

- - - - - Study area
- McMinns Feeder (22SY02)
- Herbert Feeder (22SY11)
- Zone Substation
- Cadastre
- Open Point

			DEPARTMENT OF INFRASTRUCTURE, PLANNING AND LOGISTICS Job Number 43-227 12 HUMPTY DOO Infrastructure and Servicing Strategy Revision B HUMPTY DOO Existing Power Infrastructure Date 09 Feb 2018 Figure P001
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Figure 11: Existing power infrastructure in the greater Humpty Doo area

Water Supply

The study area falls within the Humpty Doo water zone, which is supplied by the McMinns Transfer Complex.

Humpty Doo is dependent on McMinns Transfer Complex and the supply is stored in a 0.5 ML elevated tank located along Freds Pass Road, opposite the primary school.

Presently, there is limited capacity for connection to the existing network. An increase in growth within Humpty Doo will require additional water storage facilities and expansion of the water system

network.

PWC have identified a number of water infrastructure upgrades that are required to support the proposed growth within the Activity Centre boundaries, including a new elevated storage tank, ground level storage tank and pump station.

The proposed land identified in preliminary studies and by the Area Plan for new water infrastructure is the PWC's preferred location and is preserved by the Area Plan. The timing for water infrastructure will be dependent on growth rates in the area.

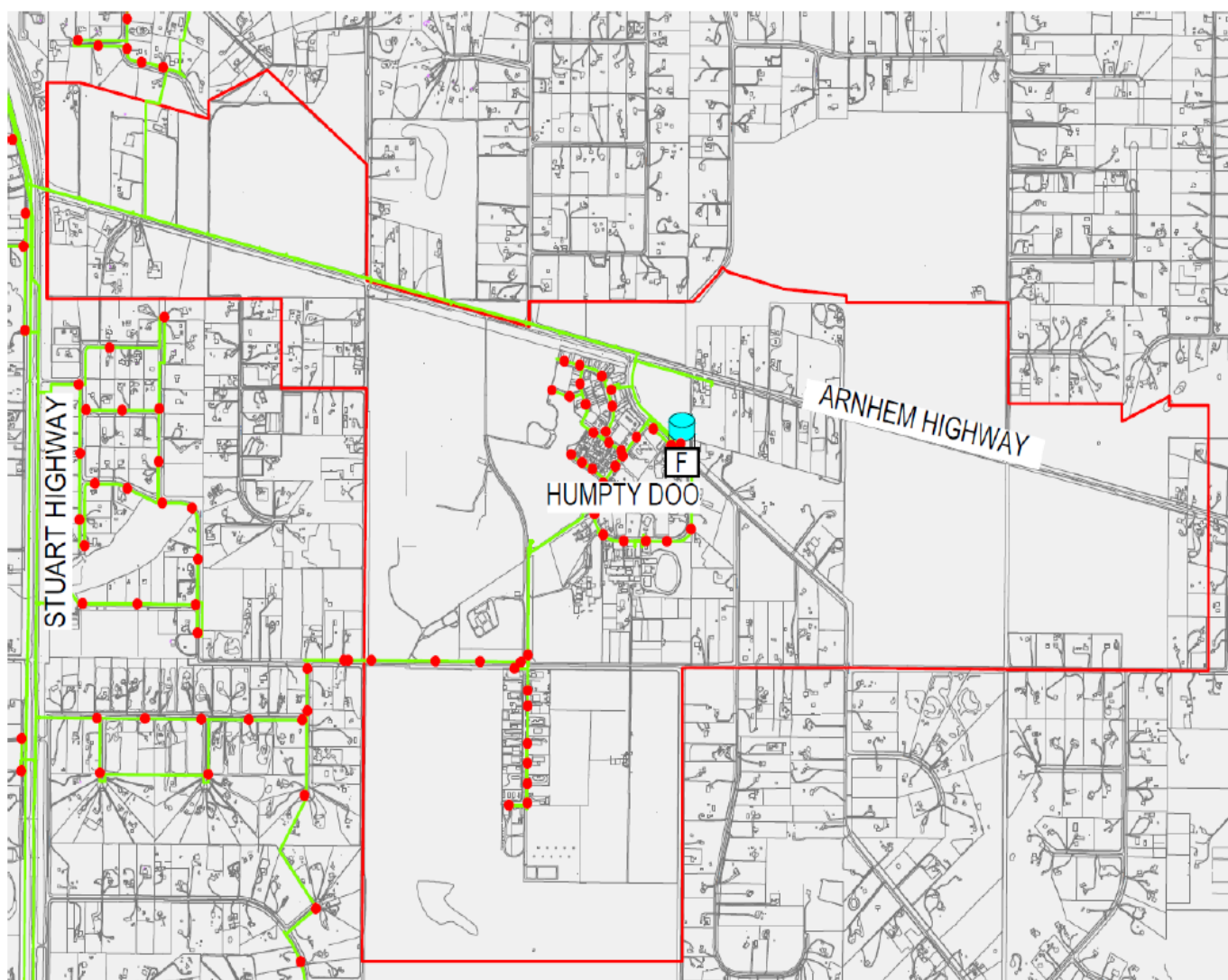


Figure 3-1 Existing water system

Figure 12: Existing Humpty Doo reticulated water system (green) showing location of valve points (red) and existing elevated tank (blue)

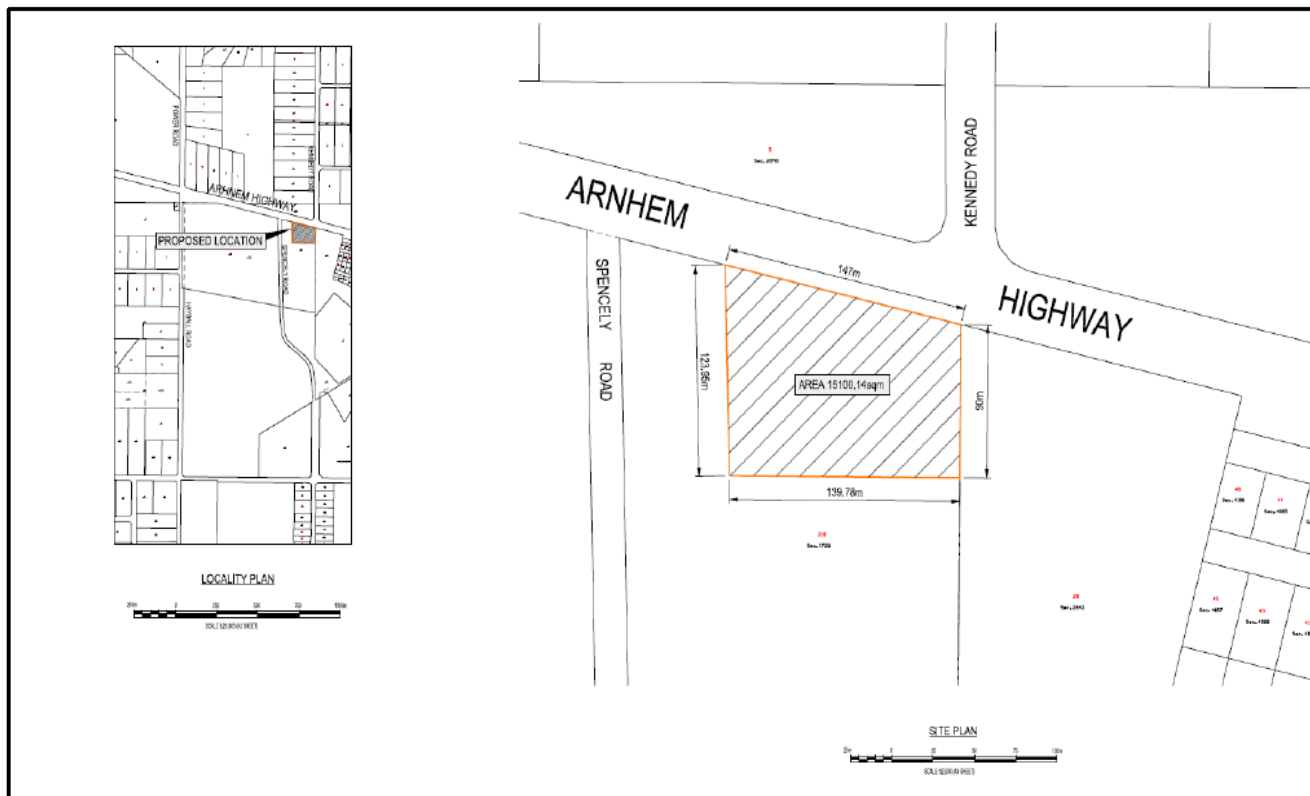


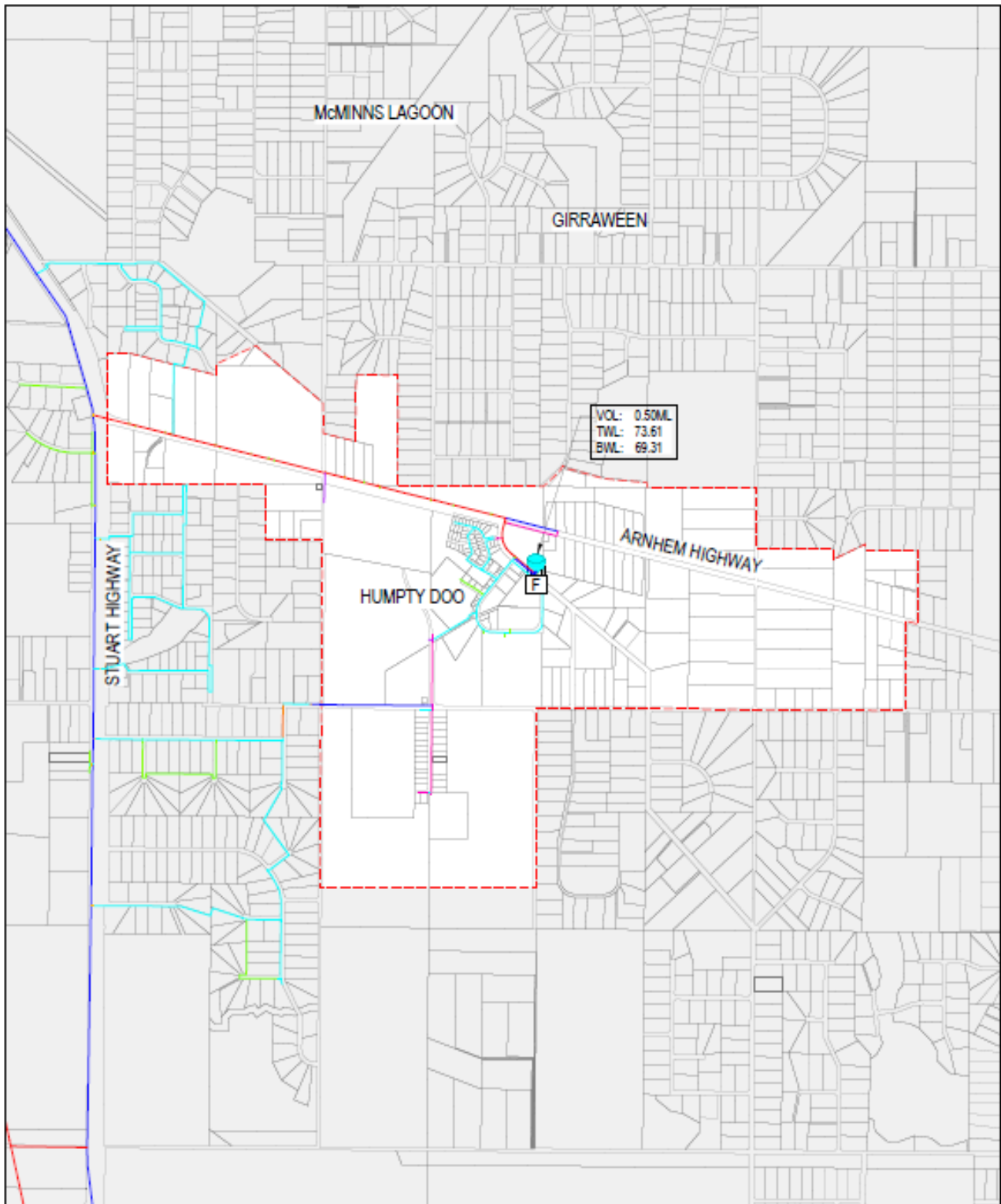
Figure 3-3 Proposed land for new ground level tank (provided by PWC)

Figure 13: Proposed land for new ground level tank (PWC)



Figure 3-4 Proposed land for future elevated tank (provided by PWC)

Figure 14: Proposed land for future elevated tank (PWC)



LEGEND:

- | | | | |
|----------------|---------|--------------|-----------------|
| --- Study area | — DN100 | — DN600 | 🏠 Elevated Tank |
| — Cadastre | — DN150 | — DN375 | 🏢 Facility |
| | — DN225 | — Pipe Other | |
| | — DN300 | | |

			DEPARTMENT OF INFRASTRUCTURE, PLANNING AND LOGISTICS Job Number 43-227 12 HUMPTY DOO INFRASTRUCTURE AND SERVICING STRATEGY HUMPTY DOO EXISTING WATER INFRASTRUCTURE	Revision 8 Date 09 Feb 2018
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Figure 15: Existing water infrastructure in the greater Humpty Doo area

Sewerage

Humpty Doo has a conventional gravity fed reticulated sewerage system, which primarily services the central commercial, industrial and residential area within the locality. Properties outside of this core area do not have access to reticulated sewerage and rely upon onsite wastewater systems.

The existing reticulated system is serviced by two pump stations that discharge into stabilisation ponds located at the end of Spencely Road. Treated waste water is then irrigated to land as the disposal mechanism for the catchment.

PWC have in recent years completed works on a new pump station at the corner of Spencely and Strangways Roads. In conjunction with Stage Two of the project to construct an in-ground sewer along Spencely road, the existing pump stations can be decommissioned and act to service the system from the one location.

The improvements made by PWC were designed to cater for significant development and growth in the area, which will service not only the existing network, but also any new developments within the core of the activity centre.

Overall expected population growth within the area will require either a large area of additional land for the irrigating of treated wastewater or alternate treatment options. PWC have not identified any sites within the Rural Activity Centre area which are suitable to facilitate expansion of wastewater treatment irrigation systems. It is suggested that a staged approach to accommodate future growth be established which will allow for further investigations to be undertaken.

PWC also advise that development adjoining a pumped sewer catchment within the study area shall give consideration to these land uses and the NT EPA guidelines for Recommended Land Use Separation Distances.

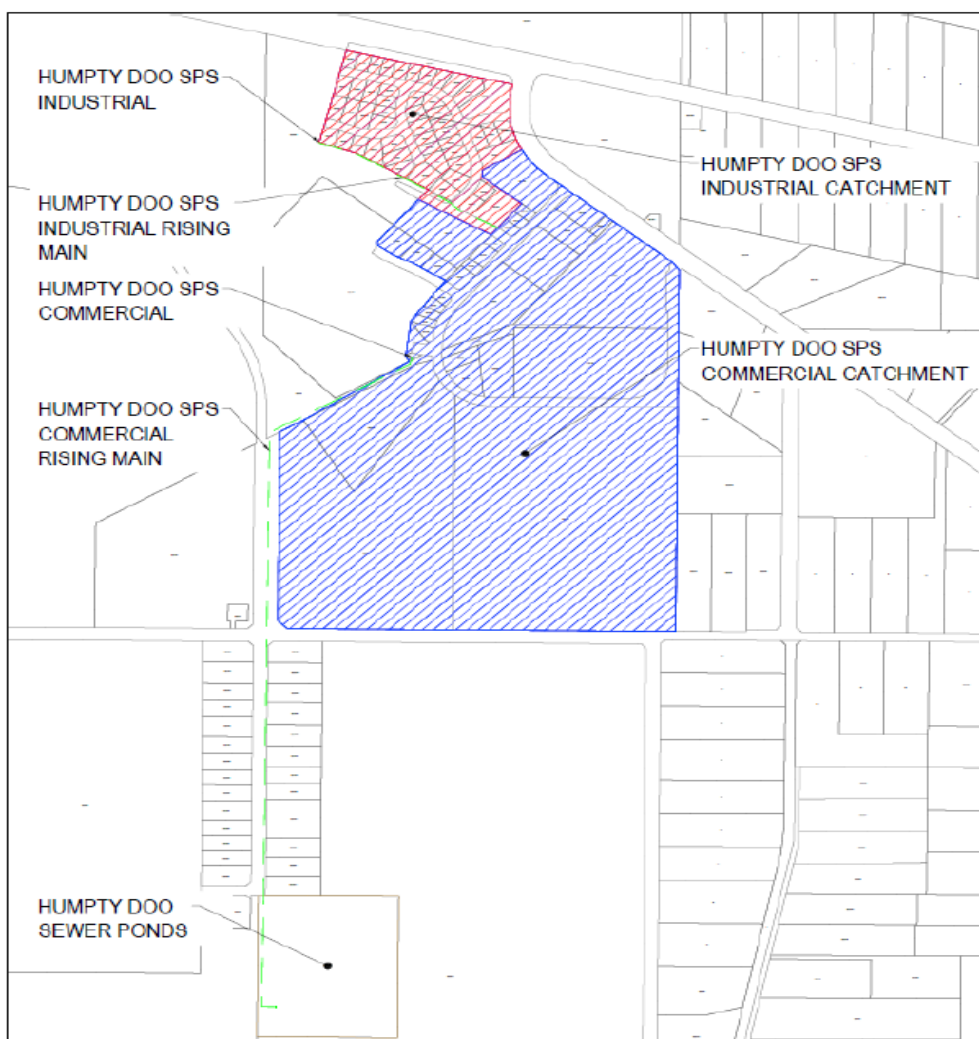
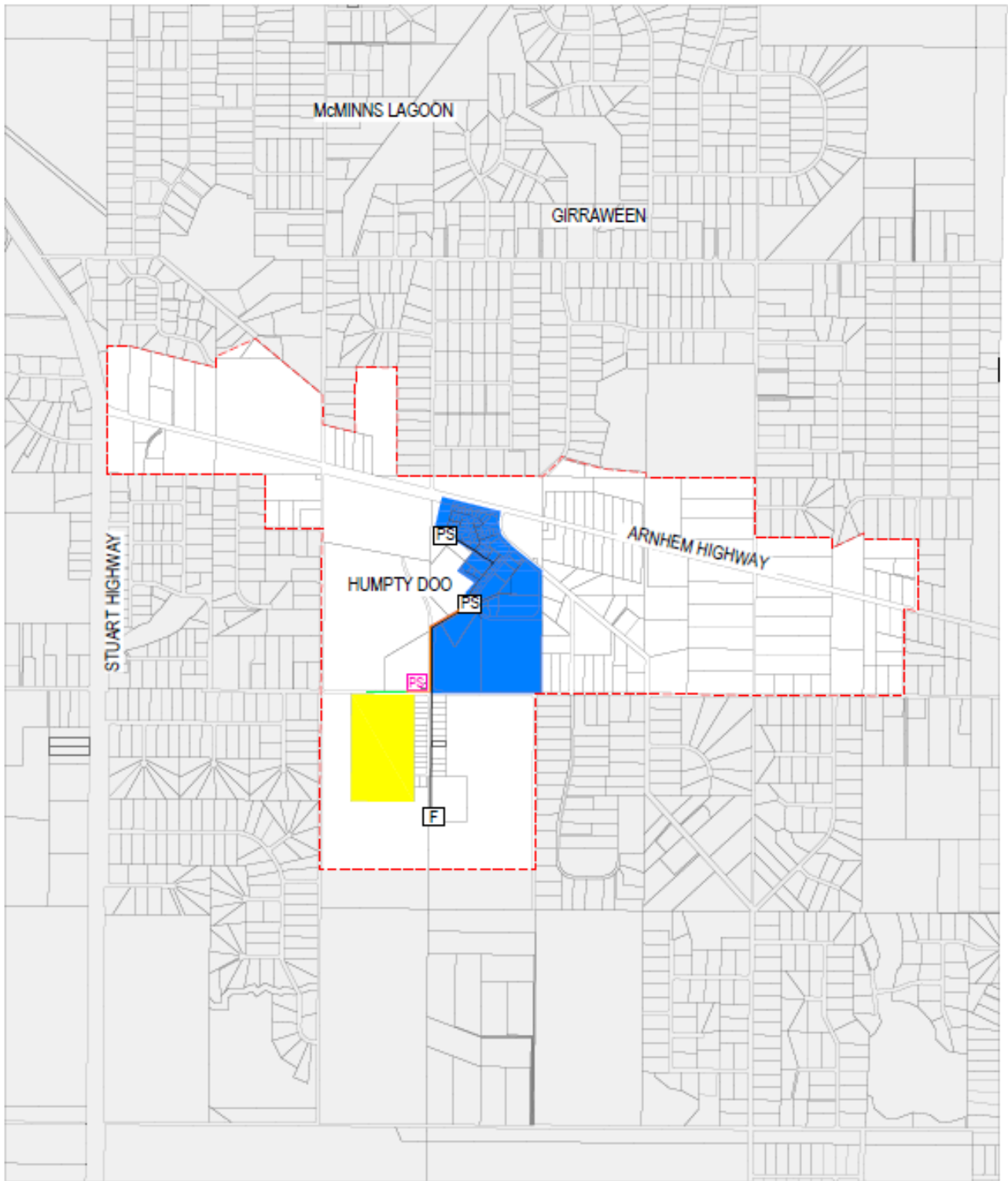


Figure 4-1 Existing sewer system

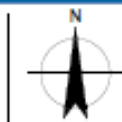
Figure 16: Existing Humpty Doo sewer system



LEGEND:

- | | | |
|------------------------|---------------------------------|----------------------------------|
| ----- Study area | ----- Near Term Upgrade | ■ Central SPS Catchment |
| ----- Cadastre | ----- Intermediate Term Upgrade | □ Pump Station Upgrade Near Term |
| ----- Gravity Main | □ Facility | ■ Additional Catchment |
| ----- Major Trunk Main | □ Pump Station | |

0 400 800 1200m
SCALE 1:40,000 AT ORIGINAL SIZE



DEPARTMENT OF INFRASTRUCTURE, PLANNING AND LOGISTICS Job Number 43-22712
 HUMPTY DOO Infrastructure and Servicing Strategy Revision B
 HUMPTY DOO Date 09 Feb 2018
 PLANNED OR PROPOSED SEWER INFRASTRUCTURE UPGRADES Figure S002

Figure 17: Existing and planned sewer infrastructure in the greater Humpty Doo area

Stormwater Drainage

Stormwater drainage in the commercial and residential area of Humpty Doo is underground and contained within the road reserves. Discharge is to the natural system. The industrial area is serviced by roadside open drainage that flows into pits which also discharge into the natural system.

Outside the core of the activity centre, stormwater drainage utilises roadside open drains.

The potential impact of stormwater from development on natural drainage and waterways is an issue identified by both the community and the Department of Health. Figure 18 shows the natural drainage pattern of the study area.

The natural drainage lines receive overland surface flow and concentrated runoff from the arterial and local road networks. This runoff may carry pollutants and nutrients to the receiving environment, and in addition, urban stormwater drainage tends to increase discharge volumes into the natural catchments.

It follows that the design of urban stormwater systems should mitigate potential down-stream impacts to ensure that future development does not cause or increase localised flooding issues.

Mitigation measures could include the construction of detention basins to reduce peak flows in identified troublesome areas.

Stormwater drainage design will also need to address the risk of biting insects breeding in the stormwater systems. Medical Entomology have provided recommendations to address biting insect matters which include:

- upgrading existing large open drains around the urban core to either piped drains or open drains with concrete low flow invert;
- ensure water is discharged to a suitable end point such as a suitably designed trunk drain, incised shaded creek line or permanent water body; and
- rectification of seasonal ponding and extractive pits located on Section 1725 Arnhem Highway (north of the former landfill) and Section 2642 Spencely Road (southern area of the former landfill).

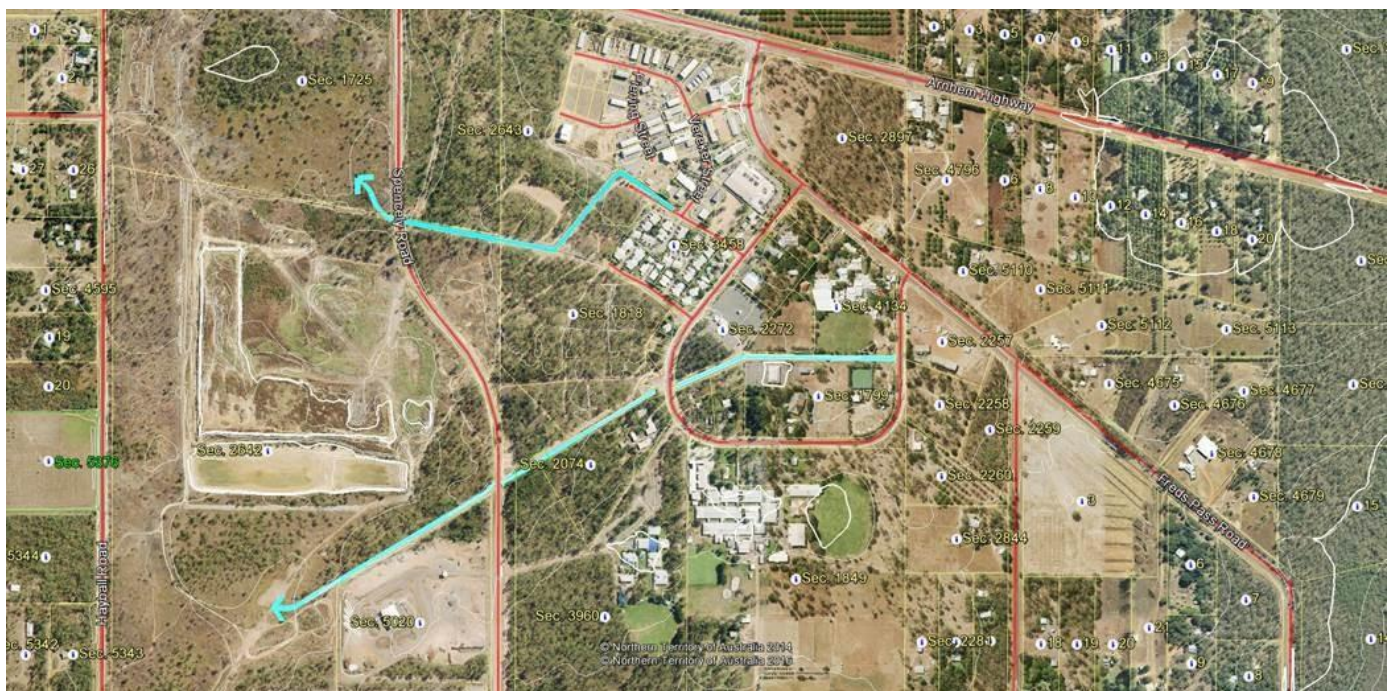
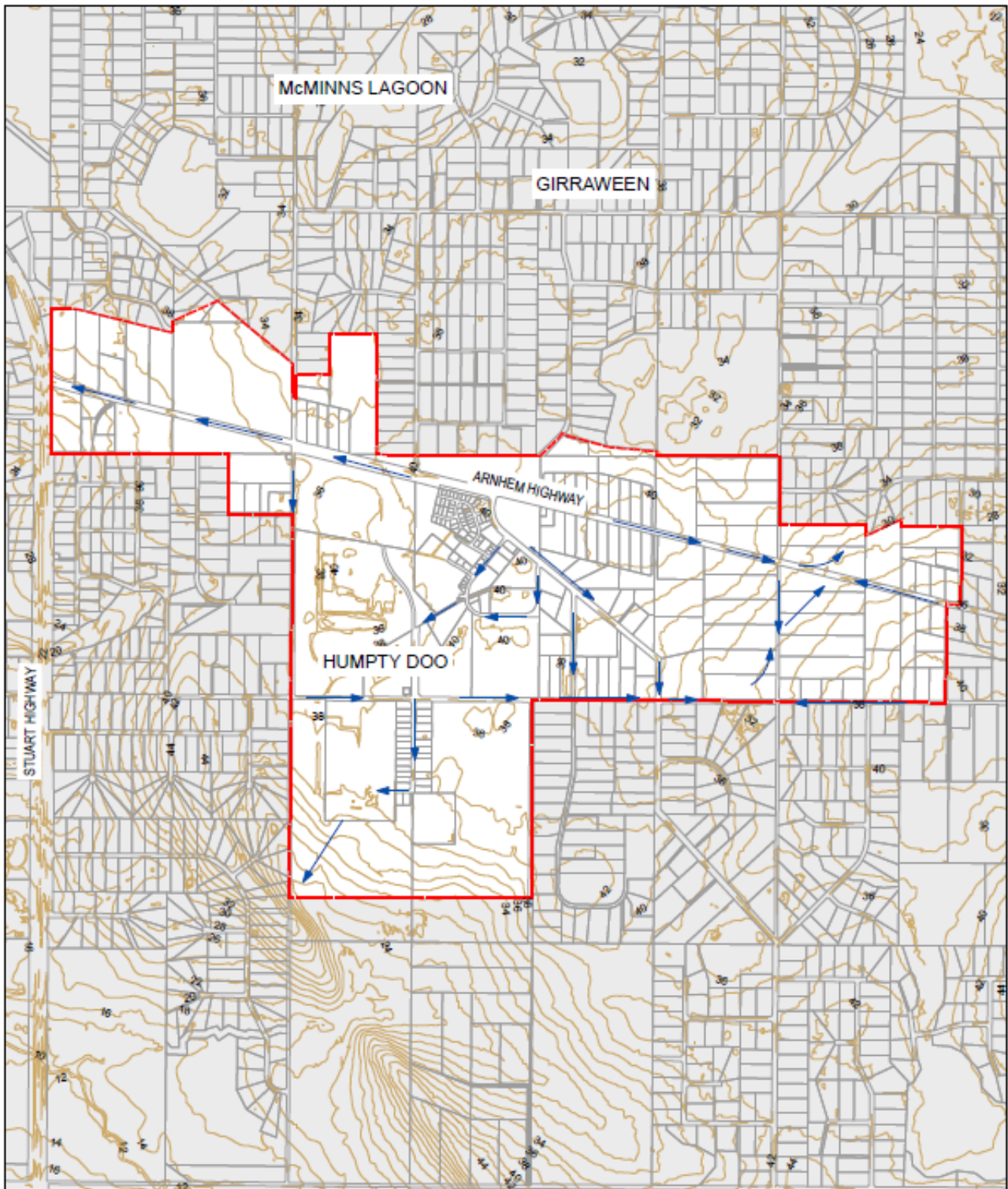


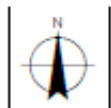
Figure 18: Existing stormwater discharge directions



LEGEND:

- Study area
- Stormwater flow direction
- Cadastre
- Contour (2 m AHD interval)

Paper Size A4
 0 200 400 600 800 1,000 m
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 52



DEPARTMENT OF INFRASTRUCTURE, PLANNING AND LOGISTICS
 HUMPTY DOO
 INFRASTRUCTURE AND SERVICING STRATEGY
 HUMPTY DOO - EXISTING STORMWATER
 FLOW BASED ON CONTOURS

Job Number 43-22712
 Revision A
 Date 09 Feb 2018

Figure C002

Figure 19: Existing stormwater and drainage flow direction based on contours

Transport and Connectivity

Safe and efficient multi-user transport networks are necessary to support economic and social activity. Development over time of an inter-connected road network for walking, cycling and public transport will contribute to a sustainable and liveable rural activity centre that meets the needs of the growing population.

Public Transport

Bus services are infrequent and primarily support the morning and afternoon peak periods. Bus services do not currently operate on Sundays or public holidays. Low patronage is a key issue. Only 5% of the population choose to use public transport as close to 80% of commuters from Humpty Doo prefer to drive.

The Humpty Doo bus interchange is located 200m from the commercial/retail centre of town and around the same distance from the high school. The interchange services both public and school services and acts as a transfer connection for people travelling to Darwin, Palmerston and other rural areas.

During initial consultation, relevant stakeholders raised concerns about the location of the Humpty Doo bus interchange and the impact it has on traffic accessing the immediate area during peak times.

A key outcome of the community workshops during Stage 1 consultation were suggestions for the relocation of the bus interchange to allow for better use of land within the Activity Centre core area, as well as to assist in alleviating traffic pressures.

The Area Plan responds to this by identifying a possible alternative location for the Humpty Doo bus interchange, being the former Humpty Doo landfill site. The Area Plan also protects remaining land within the existing bus interchange for its future expansion should the existing site be retained.

Cycling and Pedestrians

Cycling and walking are popular in the rural area. Annual bicycle counts consistently show high levels of cycling in Litchfield compared with other regional areas around Australia.

Figure 20 shows the existing pedestrian/cycle network in the Humpty Doo area. A bitumen pedestrian/cycle path exists along the southern side of the Arnhem Highway between Zamia Road and Hayball Road. A combination of bitumen and concrete pathways exist within the village centre of Humpty Doo along sections of Freds Pass Road and Beaumont Road. A concrete path extends the entire outer edge of Challoner Circuit.

Challoner Circuit functions as a hub for social infrastructure within the Humpty Doo community, with community purpose facilities and Zone CP (Community Purpose) land located on both sides of the road. As this is the case, it would be suitable that pedestrian footpaths be provided both sides of Challoner Circuit with appropriately placed pedestrian crossing points.

Similarly, the northern section of Freds Pass Road is bounded by Zone C (Commercial) and Zone CP land and is identified by the Area Plan as an area for a high degree of future community activity and movement. For this reason, the Area Plan identifies the section of Freds Pass Road within the Core Area of the Rural Activity Centre as suitable to locate footpaths both sides of Freds Pass Road.

The Existing Road Network

The Humpty Doo Rural Activity Centre is divided by the Arnhem Highway. The boundary of the Rural Activity Centre extends from Produce Road and Edwins Creek in the east to the national arterial Stuart Highway in the west.

The Stuart Highway is a Territory controlled, multi-lane divided road and the primary inter-regional road transport connection. The Stuart Highway and Arnhem Highway is a major intersection, with the Arnhem Highway currently being a single lane road which experiences high volumes of traffic, particularly during peak periods. The Arnhem Highway is a Territory controlled road.

The local road network is vested with the Litchfield Council. The local road network is generally poorly connected, with limited access to key arterial routes and connections to surrounding areas such as Howard Springs and Noonamah. Power Road and Hayball Road currently provide the only direct north to south aligned connection over the Arnhem Highway, however Power Road is currently an unsealed no through road at its southern most section near to the Arnhem Highway and is susceptible to inundation during the wet season. This connection is also an uncontrolled intersection.

Freds Pass Road provides key linkages to the core of the Humpty Doo Rural Activity Centre and key sites such as Taminmin College and the current Humpty Doo bus interchange facility. Again, this a major intersection within the area and is not a signalised intersection. Traffic issues may be further exemplified with additional development proposed within the activity centre core area, including the planned development site on Section 2897 located on the corner of Arnhem Highway and Freds Pass Road.

Other local roads including Kennedy Road, Strangways Road and Freds Pass Road provide key transit links throughout Humpty Doo. Goode Road provides a key east to west transit option; however it is only sealed from Redcliffe Road to Buckley Road. The Goode Road corridor does however extend to the Stuart Highway at the existing signalised Stuart Highway and Jenkins Road intersection.

Future Road Network

GHD were commissioned in 2019 to prepare an Infrastructure and Servicing Strategy. The report proposed several recommendations for upgrades to improve the road network performance around Humpty Doo.

The Area Plan identifies required and potentially required future road connections, however the most important works pertain to the proposed duplication of the Arnhem Highway which has delayed the preparation and implementation of the Area Plan. The preservation of the opportunity to duplicate the Arnhem Highway forms a key objective of the Area Plan.

The final concept design proposes to duplicate the Arnhem Highway from the intersection of the Stuart Highway in the west to the intersection of Kostka Road in the east. This is reflected in the Movement and Transport section of the Area Plan and is protected through land use and development responses which include prohibiting further development in the Arnhem Highway road reserve and restricting direct property access from the Arnhem Highway.

Where service roads adjoining the Arnhem Highway are identified by the Area Plan, this is due to the road reserve being wide enough to accommodate the Arnhem Highway duplication works and a service road without acquiring private property, and in turn will prevent further direct property accesses to the highway and potentially reduce the number of existing direct property accesses.

Tying into the proposed duplication, there are a number of new key signalised and priority controlled (stop/give way) access points identified along the Arnhem Highway. Signalised arterial road access points are identified at the intersections of Hayball Road/Power Road and extension of Challoner Circuit. These signalised intersections will also facilitate safe pedestrian crossing points of the Arnhem Highway.

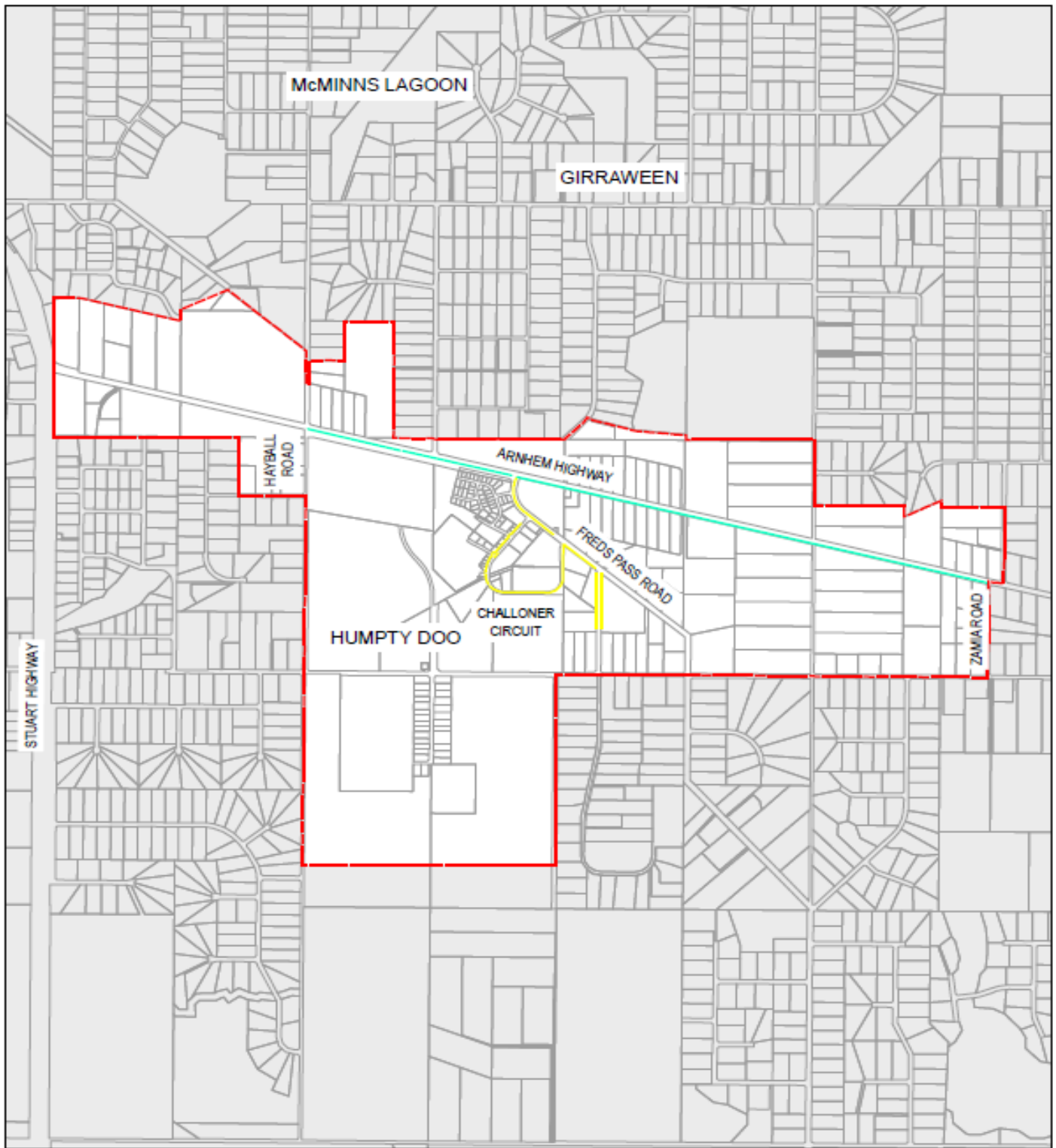
Whilst Challoner Circuit and Arnhem Highway is identified as a required signalised intersection, the community and Litchfield Council have strongly advocated for the existing intersection of Fred's Pass Road and Arnhem Highway to be upgraded to a signalised intersection in response to high levels of traffic and major incidents. Given the longer term timeframe for the duplication works, there is a possibility that this intersection may be upgraded prior to required connections shown by the Area Plan being developed.

Required future road connections are identified for Goode Road, Hayball Road and within the core area bordering Section 2897.

Potential road connections and service roads are identified throughout the Area Plan for the purpose of facilitating subdivision, providing for greater permeability and to facilitate alternative access to properties with frontage to the Arnhem Highway.

The extension of Metcalfe Road and connection to the Arnhem Highway is one of the potential roads envisaged by the Area Plan and historically within past land use planning documents. Throughout three stages of consultation Metcalfe Road residents have opposed the extension of Metcalfe Road, citing concerns over increased traffic, noise and general loss of amenity. Whilst it is identified as a potential connection, there is currently no timeframe for when these works would be undertaken. Furthermore, required road connections such as Power Road and Hayball road take precedence.

Transport and Civil Services have advised that certain roads such as Hayball Road may require a wider road reserve to facilitate upgrades of the road and to allow for provision of water and reticulated services within the road reserve. This is reflected in the transport section of the Area Plan.



LEGEND:

- - - Study area
- Pedestrian Pathway
- Cadastre
- Pedestrian / Cycle Path

<p>Paper Size A4</p> <p>0 200 400 600 800 1,000 m</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA 1994 Grid: GDA 1994 MGA Zone 52</p>			<p>DEPARTMENT OF INFRASTRUCTURE, PLANNING AND LOGISTICS HUMPTY DOO INFRASTRUCTURE AND SERVICING STRATEGY HUMPTY DOO EXISTING PEDESTRIAN NETWORK</p>	<p>Job Number 43-22712 Revision A Date 09 Feb 2018</p>
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Figure C001

Figure 20: Existing pedestrian/ cycle network in the greater Humpty Doo area

Arnhem Highway Duplication from Stuart Highway to Kostka Road



About the updated duplication concept design

The Arnhem Highway duplication concept design includes:

- dual lanes each way between the Stuart Highway and Kostka Road
- a hard median to safely separate traffic
- regular U-turn spaces to allow access to all businesses and properties on their side of the highway
- new intersection arrangements to improve safety and efficiency.

Updates based on community feedback

The concept design now includes the following key improvements based on feedback in late 2021:

- fully signalised traffic lights at Stuart Highway-Arnhem Highway intersection
- four way signalised intersection at Hayball Road and Power Road to allow properties to retain safe and direct access in all directions and facilitate a future north-south collector route through Humpty Doo
- no change to the alignment of Spenceley Road and no signalisation of Spenceley Road and Kennedy Road intersections
- extending and connecting Challoner Circuit to the Arnhem Highway to allow safe and efficient traffic through local shops and schools
- a P-turn between Zamia Road and Trippe Road to allow large vehicles to U-turn safely
- a staggered four-way intersection at Trippe Road to allow for heavy vehicle movements to and from the quarry to the south
- extending the existing shared path through the entire duplication area on the southern side of the highway

Figure 21: Extract from Arnhem Highway Duplication concept design
Land Capability and Needs Assessment Reference Document 2024

PART THREE: Needs Assessment

Demography and Growth

Referencing 2021 census data, the demographic character of Litchfield is summarised here in order to highlight the demographic differences between Humpty Doo and the broader subregion.

In 2021 the population of Litchfield had declined from 23,855 people in 2016 to 21,411 people, which amounts to an average yearly decrease of just over 2% for that census period.

The median age was 39, with 54.5% of residents being male and 45.4% being female. Aboriginal people made up 12.4% of the population.

At 2.8 people, the average household size was consistent with the Territory average of 2.8 and above the Australian average of 2.5.

Population Growth

Population rise and fall is relatively volatile in the Territory and particularly sensitive to interstate and overseas migration. Employment availability is a commonly driving factor.

In the Census period between 2016 and 2021, population growth had slowed which can be partly attributed to the completion of the Inpex LNG plant.

As of the 2021 Census, the population of the Humpty Doo locality is 4,313 persons which represents a slight decline from 4,380 persons from the 2016 Census.

Employment and Occupation

The unemployment rate in Humpty Doo is relatively consistent with the wider Litchfield region (3.9% compared to 3.5% respectively).

Approximately two-thirds of the population work full time (68.8%) and the main employing industry is construction. Technicians and trade workers make up 20.4% of the population.

Housing

The Litchfield Subregional Land Use Plan provides the broader framework for new urban residential land uses within designated rural activity centres and new Zone RR (Rural Residential) and Zone RL (Rural Living) lots within or in close proximity to peri-urban and rural residential transition areas.

This framework requires all new Zone RR lots to be connected to reticulated water, land which is outside of the defined activity centre boundary or rural transition area to be no less than 1ha and for land which is to be rezoned to Zone RR to be no less than 8ha to provide for an interconnected road network.

The Area Plan for Humpty Doo responds to the LSLUP and supports an increase in residential capacity by identifying new urban residential areas within the core area of Humpty Doo and rural residential lots in the transition areas.

The result will be a range of residential lot sizes supporting housing choice and availability, achieved through the use of a range of land use zones which respond to the core activity centre area and existing lower density 'rural' lifestyle lots within the broader locality.

The table below provides a summary of maximum lot yields that could be accommodated within the rural activity centre boundary, based on the zone and the identified area of each zone. For Zone RR, yields are broken into 0.4ha (1 acre) and 1ha (2.5acre) allotments as this responds to the identified transition areas in the Area Plan.

It is noted the figures used are approximate and based on 'maximum' total yields. The actual lot yield will be dependent on 'on the ground' development.

Zone	Approx. Maximum Total Lot Yield
Zone RR (0.4ha lots)	475
Zone RR (1ha lots)	71
Zone LR	296
Zone LMR	298
Zone CV	81 (Approx. Sites/Dwellings)
Total	1,221

In addition, the Area Plan provides for an 'outer transition area' from the boundary of the rural activity centre to existing rural properties, which provides potential opportunities for landowners to rezone their property within this area if compliant with the parameters of the Area Plan.

Feedback received from the Community Advisory Group for Humpty Doo led to a distance of 500m as

travelled from the boundary of the Activity Centre being used to determine the extent of transition areas (see also Figure 23). This figure has been incorporated within the Area Plan and is illustrated on the Locality Plan (Figure 2 of the Area Plan) and Land Use Structure Plan (Figure 5 of the Area Plan) in response to feedback from the community and stakeholders during consultation, where there was some confusion around the transition areas. The Area Plan now clearly identifies lots that are potentially suitable for the 1ha rural residential transition.

It has been calculated that a maximum of 169 new Zone RR 1ha lots could potentially be accommodated within the outer transition area subject to requirements for providing reticulated water and an area of 1ha of unconstrained land.

Through consultation, there was some opposition to the proposed 0.4ha (4,000m² or 1 acre) lots and associated transition areas. Criticism was generally focused on the rural character of the area and impacts of higher density development on rural amenity and native vegetation.

The proposed transition areas which include both Zone RR 0.4ha and 1ha lots respond directly to the requirements of the LSLUP, which envisages higher density development around existing commercial and community facilities within the core area.

Any new development for Zone RR 0.4 and 1ha lots will require reticulated water at a minimum and in many cases the provision of an interconnected local road network and will be at the complete discretion of the landowner as to whether subdivision and development is pursued.

Commercial and Industrial Land Uses

The LSLUP identifies Humpty Doo as a centre that supports a large proportion of commercial, community, industrial and residential development. The availability of reticulated services within the core of the centre has provided for the establishment of many successful businesses.

Population growth will drive development within the activity centre. In the short-term, there is a small amount of vacant lots available for commercial and industrial activities. The purpose of the Area Plan is to provide a timely response for long term sustained growth.

Retail

Humpty Doo is unique to other activity centres in the sense that it has a large secondary catchment for those utilising commercial facilities. The location

along the Arnhem Highway means that it is used by visitors travelling to Kakadu National Park, as well as the local population.

There is currently an undersupply of retail floor space in Humpty Doo, estimated at 5,063m². This is reflected in the Activity Centres Strategy Review commissioned by Macro Plan Dimasi.

Over time, there is scope for retail floor space to increase with expansion of existing commercial facilities, meaning the availability of space will increase and the range of goods and services for the community will increase.

Commercial growth in the rural activity centre will build upon the existing commercial precinct of Humpty Doo. There are opportunities for in-fill development within the existing Zone C (Commercial) areas including land to the south of the existing Woolworths and shopping centre complex.

The Area Plan identifies Section 2897 as being appropriate to accommodate a mix of land uses. This parcel is located adjacent to the existing Woolworths complex.

Commercial uses should be located directly adjacent to existing commercial development to complement one another and prevent the creation of competing commercial precincts.

The existing service commercial precinct has the potential to expand further west if required. Constraints associated with the former Landfill site first need to be addressed before this expansion can occur.

Tourism activities should be located near the existing commercial centre to encourage more people to use the area and prevent additional fragmentation of commercial uses within the core area of the rural activity centre boundary. Section 4796 is currently zoned to facilitate a caravan park and ancillary land uses, which can take advantage of its position on the Arnhem Highway and provide additional tourism opportunities within the core area.

Social Infrastructure

Social infrastructure relates to community, health, education and cultural facilities, and includes community centres, public libraries, parks, organised recreation and sporting facilities.

In 2016, FYFE Consulting completed a Social Infrastructure Assessment (SIA) to inform the Litchfield Subregional Land Use Plan. Rural activity centres were a focus of this study.

The need for social infrastructure to support population growth in the rural activity centres is a key element of future planning for Litchfield.

Components of social infrastructure considered as part of the SIA include:

- health services;
- aged care;
- child care establishments;
- educational establishments;
- places of worship
- civic and community facilities;
- community meeting and activity spaces;
- libraries;
- art and culture facilities;
- open space; and
- sport and recreation facilities.

At the time of the SIA being conducted, it was found that the Litchfield subregion had the following aspects of social infrastructure in undersupply:

- GP's;
- dentists;
- aged care facilities;
- community centre/ social support centre;
- an air-conditioned community meeting space;
- art and cultural facilities; and
- aspects of sports facilities (namely court facilities).

It is important to recognise that Litchfield residents utilise the social infrastructure of the Greater Darwin region especially facilities provided in Palmerston and Darwin.

Looking more closely at an activity centre level, Humpty Doo was identified as having a near term demand for:

- a dentist;
- an aged care facility;
- a childcare centre;
- a small scale community centre;
- a sporting field;

- two netball/ basketball courts; and
- two soccer pitches.

Far term demands in Humpty Doo are likely to require the provision of:

- one additional dentist;
- one additional childcare centre; and
- one additional netball/ basketball court.

Land east of Spencely Road is identified by the Area Plan to accommodate future recreational needs as per predicted demands above.

Health Services

Humpty Doo has two medical clinics, which house nine general practitioners. It also has two dental facilities, one physio, a local pharmacy and a radiology facility that provides a range of different procedures.

Compared to other rural activity centres in Litchfield, Humpty Doo has the highest number of health facilities. The SIA report indicates that present levels of health amenities will be largely sufficient to accommodate future growth, although two extra dentists (one near term and one far term) could possibly be needed.

Aged Care and Retirement in Place

In 2016, there were 991 people over the age of 70 in the Litchfield Subregion, which gives an average per capita less than the remainder of the Northern Territory, as well as Australia.

There are national benchmark figures for the provision of aged care through home care packages and residential care. By 2021-2022, the targeted figure for residential care is 78 beds per 1000 people aged 70 years and over.

The SIA identified that there are currently no aged care services in Litchfield and that Humpty Doo, along with Coolalinga/Freds Pass are the most appropriate locations for aged care facilities. Both rural activity centres are in central rural locations and have convenient access to public transport and social infrastructure.

The SIA recommends one aged care residential facility of approximately 40-50 people would be sufficient for Humpty Doo. The site should be located within close proximity to health services as well as retail and community uses. A development of this nature would assist in covering existing and near-term aged care facility gaps within the Litchfield municipality.

Child Care Services

In Litchfield there are four long-term childcare centres offering a total of 328 places. The subregion is currently well supplied but the long-term demand for childcare facilities to match predicted growth will mean that several more facilities will be needed.

Of the four listed, one is located in Humpty Doo but it is currently at capacity. The nearby Coolalinga/Freds Pass activity centre has two childcare facilities. Upon completion, there will be an oversupply in the Coolalinga/Freds Pass activity centre.

Parents dropping their children off in Coolalinga on their way to work in Palmerston or Darwin could assist in filling some of the present demand from Humpty Doo, but in the long term another facility in Humpty Doo will be needed to meet demand.

Education and After School Care

In Humpty Doo there are three schools that accommodate the needs of the wider area. These are the Humpty Doo Primary School, St Francis of Assisi Catholic Primary School and Taminmin College.

Statistics relating to enrolment for these schools are taken from the Litchfield Subregional Land Use Plan Social and Community Infrastructure Assessment which was commissioned by Fyfe in 2016.

Humpty Doo Primary School has a total capacity of 522 and was operating at 67% at the time of the assessment. It also offers after school care that can look after 40 children.

St Francis of Assisi Primary School offers an after school care system as well. The school's maximum capacity is 300 and was operating at just over 60% at the time of the assessment.

Secondary education is provided at Taminmin College and caters for Years 7 to 12. Enrolment data for Taminmin College was provided in 2020 as part of the needs assessment for the Holtze to Elizabeth River Subregional Land Use Plan. As of 2020, the college had a total enrolment of 1,174 students.

Construction of the STEAM (Science, Technology, Engineering, Arts and Mathematics) facility has expanded the school's overall capacity to 1,500 places. In 2016 it was considered that this will meet rural demand for the near to mid-term.

Community Facilities

Space for community groups to meet, undertake activities and hold events is an important element of

social infrastructure. These spaces assist in building community networks, support the health and wellbeing of residents, assist in addressing social issues, and promote community identity.

There are currently no community centres in the Humpty Doo rural activity centre. The SIA highlights that neighbourhood community centres have the ability to accommodate a variety of uses, including social support services, child care, youth and health services, and meeting spaces.

A multi-purpose small-scale community centre could help alleviate long term childcare service pressure. It could also be used as a community hall as Humpty Doo currently does not have one. Any new development in this regard should consider future opportunities for other community activities that can be incorporated into the design.

Open Space, Sport and Recreation Facilities

The Village Green is the primary recreation facility within Humpty Doo. A fully shaded skate park, playground with barbeque facilities, scout hall, lawn bowls green and a community garden are all located within the area.

There is no formal sporting field in Humpty Doo. The existing grassed area within the Village Green can be used for practising a range of sports or activities but there is currently nowhere to hold formalised sporting events.

The proximity of the Freds Pass Recreation Complex has meant that most local sporting teams participate there instead of Humpty Doo. Projected future growth will require a sporting field that is capable of hosting junior matches if there is no future expansion at Freds Pass Regional Reserve.

Any new sporting field should be designed to facilitate a range of different sports and be accessible by the public at all times. The need for community and sporting facilities to be multi-use was supported by stakeholders during community consultation, and is supported through objectives and development responses in the Area Plan.

Libraries

There is one public library within the Litchfield subregion and it is located in Humpty Doo as part of Taminmin College. It is a joint-use service operated by Taminmin College for students and the public.

The level of library facilities is considered sufficient to service a rural activity area of this size.

Places of Worship

There is no standard or broadly agreed ratio of providing places of worship per head of population. Although, it could be considered that Humpty Doo is well equipped as it is home to three of five listed facilities within the subregion of Litchfield.

Places of worship can provide halls and other spaces that can be utilised for community activities by the general community. They can also provide social support, especially in rural and semi-rural areas where social support is often not otherwise provided.

PART FOUR: Area Plan Themes and Focus Areas

Boundary of the Rural Activity Centre

The community and stakeholders have been involved in determining the extent of the Rural Activity Centre boundary and were provided the map at Figure 22 to consider as part of Stage Two consultation.

There was significant support for the inclusion of areas A and B.

Limited feedback on area C was received, however there were suggestions that it be retained for conservation regardless of its inclusion.

Balanced views were received on area D however support was provided from the Community Advisory Group and Litchfield Council for its removal. It was

considered appropriate to remove Area D also considering no land use changes are proposed for existing businesses and any land use change was to facilitate rural residential transition areas.

Submissions during Stage 2B requested the inclusion of area D to ensure good planning occurs within this area. However, it is generally a small area within the broader Humpty Doo locality and is a legacy development which is separate from the opportunities associated with the existing defined activity centre.

The majority of feedback on area E supported retaining it within the Activity Centre boundary.

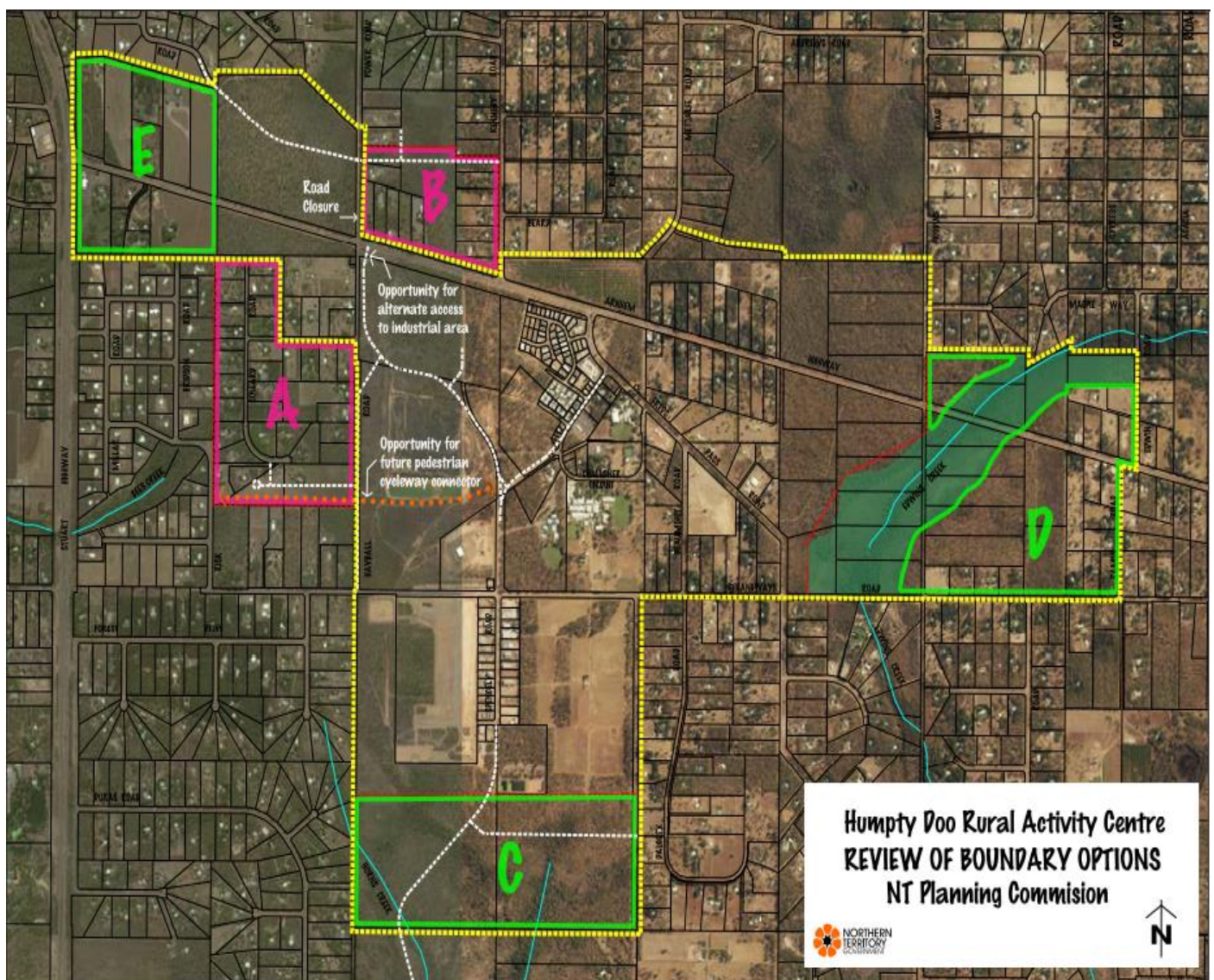


Figure 22: Consultation map for the review of the Rural Activity Centre boundary

Lot Sizes/ Housing Choices

The community and stakeholders were asked to provide feedback on the types of lot sizes they consider appropriate for Humpty Doo. There was general community support during consultation for urban residential lot sizes adjacent to the commercial centre. The community saw locating smaller lots within the centre would retain the rural amenity of the broader area.

The Area Plan has responded by identifying and limiting urban lot sizes to within close proximity of community and commercial services. Zone LMR (Low-Medium Density Residential) lots are limited to within 400m walking distance of Zone C (Commercial). This is the highest permitted residential density within the Area Plan and is consistent with the objectives of the Compact Urban Growth Policy (CUGP) in providing for higher density development.

Zone LR (Low Density Residential) lots are also identified for within the Rural Activity Centre Core Area and make up the remaining area identified as 'Urban Residential'. Under the Area Plan, proposed Zone LR will require minimum lot sizes of 800m² as an outcome of community consultation.

The Area Plan has introduced a development response which implements a maximum lot size of 1000m² for areas identified for 'urban residential' within the core area. This requirement ensures that 'urban residential' land, which is limited in the context of the entire Rural Activity Centre, is rezoned and subdivided to accommodate the highest and best use of this land. This not only ensures the timely and cost-effective provision of critical infrastructure to foster development, but also eases the burden of pressures on higher density development on the existing rural areas.

Zone LR and Zone LMR lots will also be required to be connected to both reticulated water and sewage, alleviating pressures on current groundwater resources.

Outside of the defined rural activity centre core area, there was some community support for 4,000m² and 1ha (2.5 acre) rural residential lots to provide an alternative and manageable option to the traditional 1ha and 2ha (5 acre) rural lots of the area. These lots must comply with the relevant policy established in the LSLUP, including the need to provide interconnected road networks and onsite wastewater treatment systems.

The Area Plan identifies 1ha (2.5acre) rural residential transition areas adjacent to the Arnhem

Highway and southern boundary of Metcalfe Lagoon. 1ha transition lots have been identified along the Arnhem Highway to assist in retaining the rural amenity of the area to vehicles passing through and to mitigate noise and visual impacts of the highway on residents of the lots.

The Area Plan stipulates that new 1ha lots adjacent to the Arnhem Highway have a minimum depth of 100m, which allows for new residential development to be adequately setback from the Arnhem Highway and the inclusion of any buffer treatments. The minimum depth has replaced the previous 2:1 depth to width ratio which has caused confusion amongst the community and stakeholders around the interpretation of this requirement.

1ha rural residential transition areas have been identified in proximity to Metcalfe Lagoon in response to medical entomology advice on biting insect management. There were concerns with the higher density 4,000m² (1 acre) lots in this area due to its proximity to the lagoon and number of potential residents that could be impacted by biting insects.

Medical entomology have advised that 1ha (2.5acre) lots are appropriate and this is reflected in the Area Plan.

A transition in residential lot sizes is proposed consistent with other rural activity centre area plans to minimise the impact of smaller lot sizes on existing and future rural lots. The lot transition requirements within the Area Plan for the Humpty Doo Rural Activity Centre proposes subdivision that 'minimises' the number of smaller lots that share a boundary with any one larger lot 'as is practicable'.

This differs from other rural activity centre area plans which specify that only two smaller lots share a boundary with any one larger lot. This has proven difficult to achieve and supports the changed approach under the Area Plan for the Humpty Doo Rural Activity Centre.

Road network/ North-South Collector Road route

The community and stakeholders were asked during consultation to provide a preference on a north-south collector road route through the Humpty Doo Rural Activity Centre linking Humpty Doo to other centres to the north and south.

Three options were provided to the community during Stage One consultation with generally mixed

feedback received and additional options being put forward by the community. Options presented by the community generally related to easing traffic pressures on Fred's Pass Road, as well as strong objections to Metcalfe Road being incorporated in the broader road network and connected to the Arnhem Highway.

Investigations and concept designs for the future duplication of the Arnhem Highway by the then Department of Infrastructure, Planning and Logistics confirmed the preferred location for the north-south collector route as using Hayball Road and Power Road.

This will require the upgrade and extension of identified roads as well as signalisation where Hayball and Power Roads intersect with the Arnhem Highway. This will improve connectivity within the sub-region, assist in reducing traffic volumes along the Arnhem Highway, and reduce pressures on Fred's Pass Road, Challoner Circuit and other intersections along the Arnhem Highway.

Outer 1ha Lot Transition Area

The Litchfield Subregional Land Use Plan 2016 provides for the establishing of Rural Residential (Zone RR 1ha) lots or an 'outer transition' (as referred to in this document) within 'close proximity to community facilities.' What constitutes close proximity varies between rural activity centres identified by the LSLUP.

The Community Advisory Group (CAG) for the Area Plan was approached prior to Stage 2B consultation on their preference of three options for an outer transition area for 1ha lots. The three options provided were:

- Option 1: lots within 1km of land zoned Zone C (Commercial);
- Option 2: lots within 500m travelled (on existing or planned roads) from within the defined Activity Centre boundary); and
- Option 3: lots within 500m travelled (on existing or planned roads) from within the Activity Centre boundary and 250m direct from the Activity Centre boundary.

The Community Advisory Group preferred Option 2, as this presented a more balanced option and gave consideration to requirements associated with subdivision and development, such as reticulated water, which may limit or control the uptake and development opportunities for some of the identified lots. The CAG also sought to understand community views on transition areas through further consultation.

Accordingly, the preferred and adopted option by the Area Plan is for a distance of 500m measured as travelled from within the defined boundary of the rural activity centre. Figure 23 is the preferred option for the 1ha transition lots outside of the rural activity centre boundary.

During community consultation, stakeholders requested details on the outer transition area and lots which are identified within this area. In response, the transition area map has been integrated within the Area Plan. The Transition Area Map has also been updated to remove land within the boundaries of Metcalfe Lagoon as a potential transition area in recognition of the community values associated with this natural feature and the constraints which are likely to inhibit development opportunities.

Rural Amenity

Protecting the rural amenity of Humpty Doo was a strong message heard during community consultation and is responded to in a number of ways by the Area Plan which includes:

- limiting built form, with the exception of utilities and other essential services, to two stories or a height generally not exceeding 8.5m;
- the retention and enhancement of a minimum 20m wide native vegetation strip fronting the Arnhem Highway where service commercial and commercial development occurs;
- limiting residential lot sizes to a minimum of 1ha where they front the Arnhem Highway; and
- identifying large areas where development is not to occur due to land constraints along the western and southern edge of the core area.

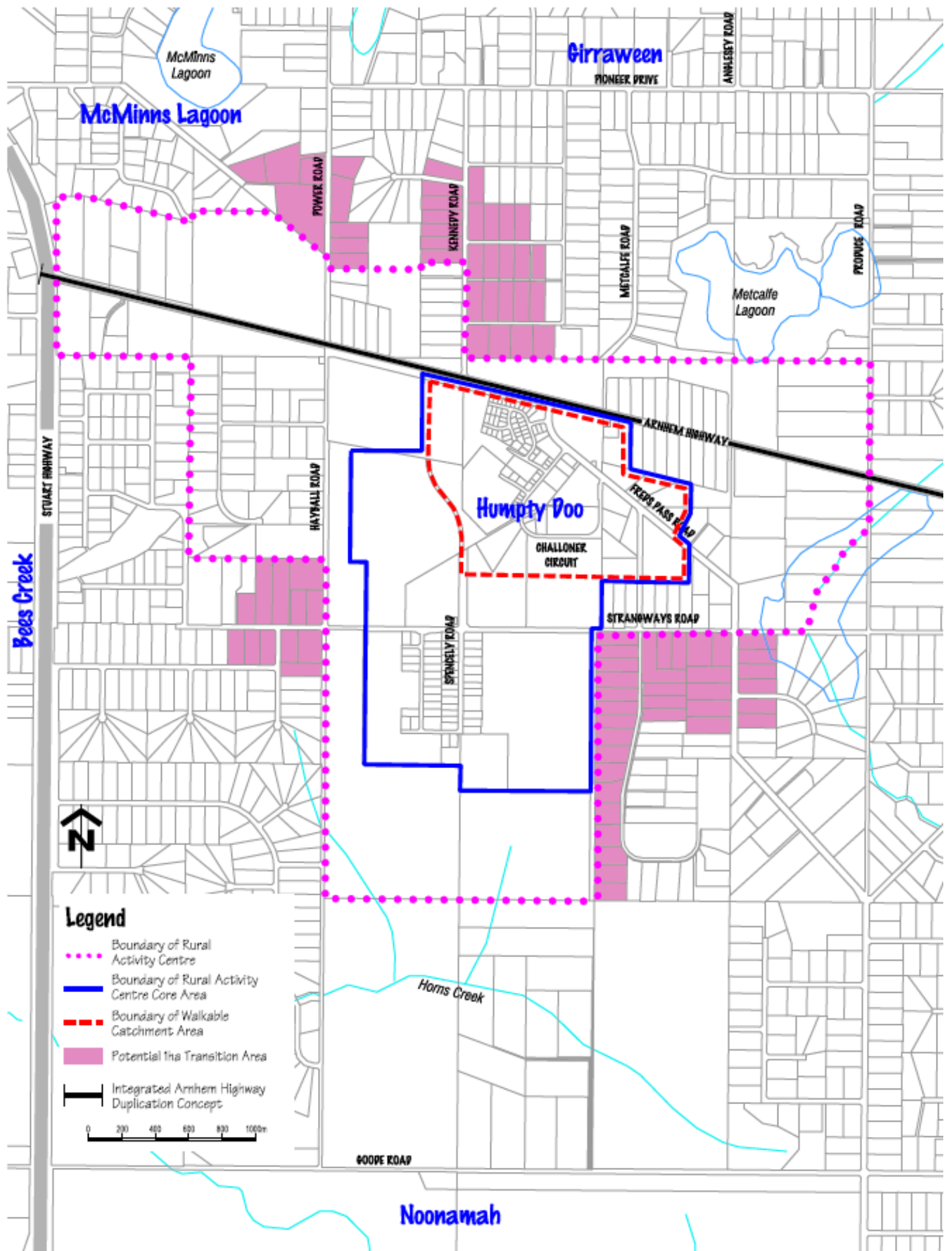


Figure 23: Proposed 1ha lot size outer transition area applicable to the Humpty Doo Rural Activity Centre
 Land Capability and Needs Assessment Reference Document 2024

Focus Area A

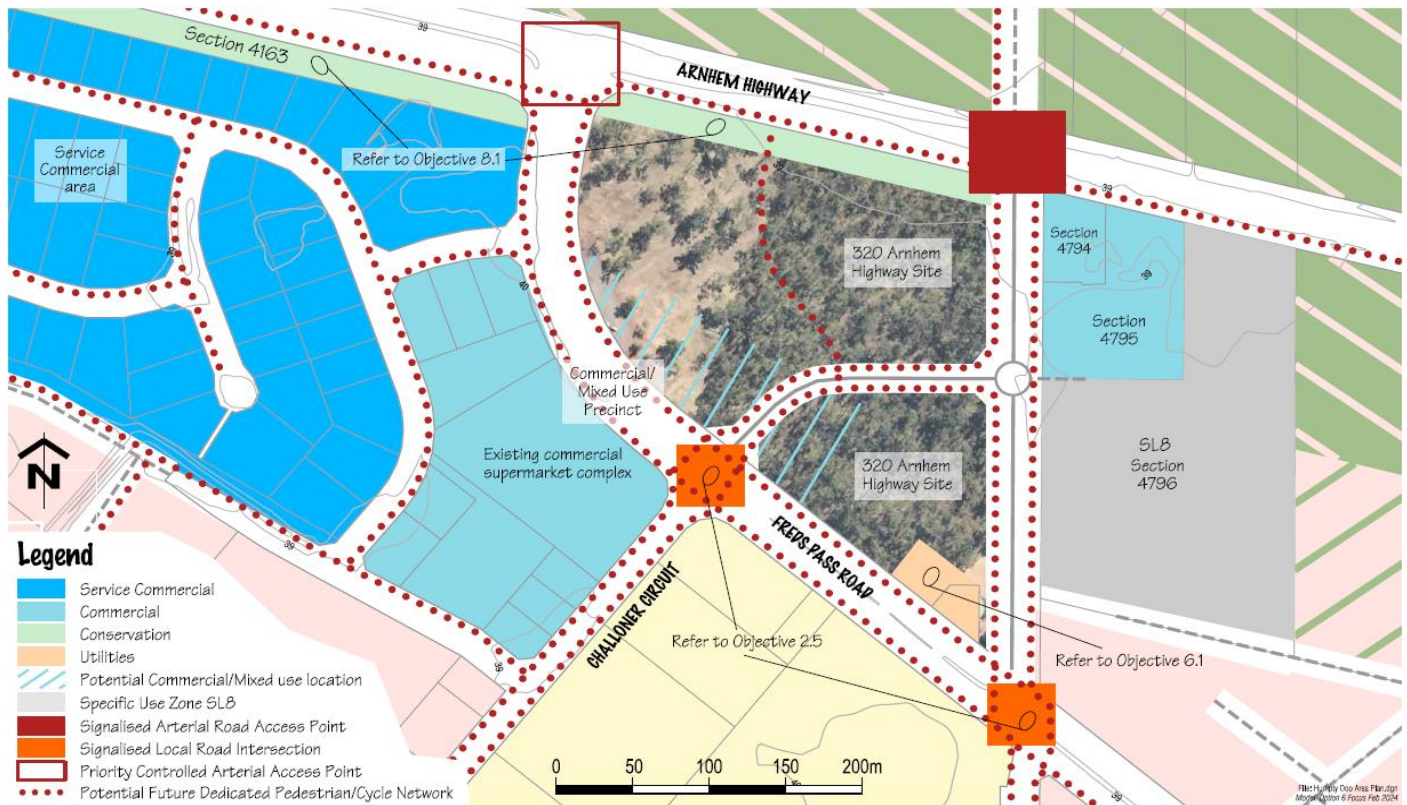


Figure 24: Focus Area A – Commercial centre, Council Lot and adjacent areas

The current Humpty Doo commercial area is located at the entry to Humpty Doo along Freds Pass Road and Challoner Circuit. It services all of Humpty Doo, neighbouring suburbs and passing trade. It is walking distance from the bus interchange, schools, other community facilities and urban residential lots. With expected growth there will be a need for the commercial precinct to expand in Humpty Doo and this should include community purpose facilities.

Comment from the community during consultation was in support of growth of the commercial centre. Submitters wanted to see more investment from the private sector to expand retail options.

Section 2897 (320 Arnhem Highway) has potential to accommodate future commercial growth. It is currently a greenfield site and has large frontages along both the Arnhem Highway and Freds Pass Road for optimum exposure. Should future commercial development occur on Section 2897, the scale and location of commercial development should complement the existing commercial complex and create a commercial precinct for Humpty Doo.

Commercial development is encouraged directly adjacent the established commercial area fronting Freds Pass Road creating a commercial 'high street' environment, and future road link through Section 2897 as depicted in Figure 24.

Required future local road connections through Section 2897 by the NT Government's concept for the Arnhem Highway duplication, will allow for the dispersing of traffic and potentially lower vehicle speeds more conducive to pedestrian movement throughout Focus Area A. As detailed under the transport section of this document, the community and key stakeholders strongly support upgrading the current intersection of Freds Pass Road and the Arnhem Highway. The Area Plan identifies this intersection as a stop/give-way controlled intersection. Transport Services have advised they are not intending to upgrade this intersection, but should an upgrade be undertaken then other road connections identified by the Area Plan may be impacted in response.

Sections 4794 and 4795 are currently zoned Commercial and the Area Plan does not identify alternative zoning for these sites, given proximity to the existing Humpty Doo commercial centre and Arnhem Highway.

Current Zone SL8 zoning of Section 4796 permits uses consistent with Zone CV (Caravan Park) which is supported by the Area Plan. Alternatively, urban residential development with densities similar to Zone SL8 are supported within this location. Commercial zoning of Section 4796 should be avoided to prevent fragmentation of the commercial area of the town centre.

Focus Area B

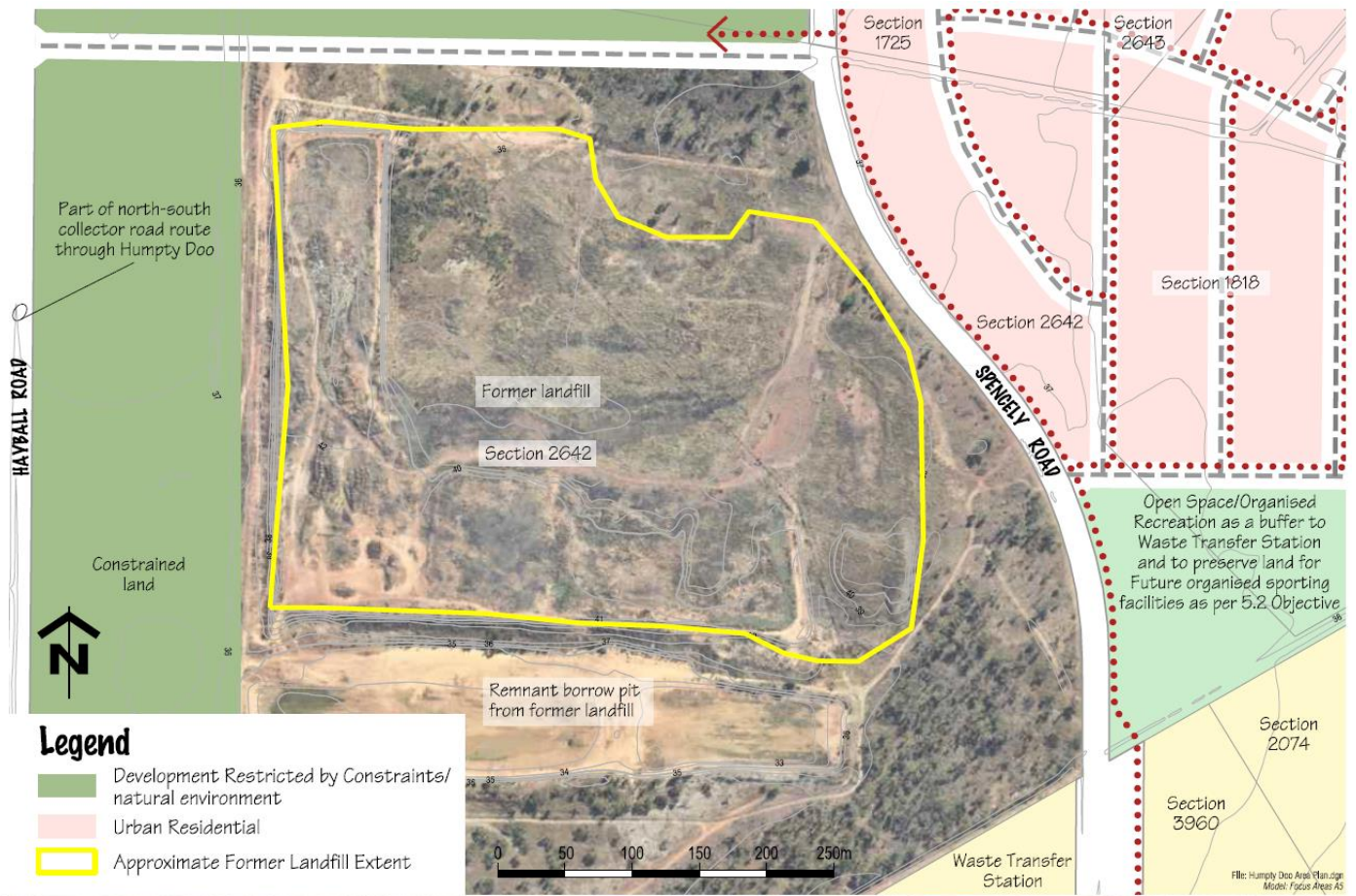


Figure 25: Focus Area B – Former Landfill Site and adjacent areas

The former Humpty Doo Landfill site was operational between 1976 and 2006 as a lease by the Litchfield Shire Council from the Crown. The extent of the former landfill covers approximately 17ha and is located between Hayball and Spencely Road.

Environmental monitoring of the site was conducted by a consultant in 2017 and identified degrading waste material as well as the presence of associated landfill gas and leachate.

A final report on the environmental monitoring concluded that there is an “acceptable” risk ranking for potential sensitive receptors onsite and on the former landfill perimeter; and an “insignificant” risk ranking for potential sensitive receptors off site (beyond 50m of the landfill boundary).

Due to limited site investigations, it was however noted that these should be considered preliminary conclusions and further monitoring should be planned for the site.

As a precaution the consultant recommended that a range of ongoing monitoring and testing programs

be established prior to any development within 500m of the site boundary. The report also considered the Humpty Doo waste transfer station is not at significant risk from ground gasses emanating from the site for reasons outlined in the report.

The Area Plan identifies the site as an area for future development and the need for future monitoring and testings programs prior to any development on a number of adjacent lots and areas. Objective 9.1 of the Area Plan specifically responds to recommendations for further monitoring and testing prior to any development within the area.

Due to there being little known about the waste composition or landfill management, potential future uses of the site may be limited. Suggested future uses by the Area Plan are in line with NT EPA *Guidelines for the Siting, Design and Management of Solid Waste Disposal sites*. Permanent structures are discouraged from being built on the former landfill site as areas continue to settle. Land surrounding or outside of the former landfill extent may have potential for permanent structures.

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