









-  Local Government Area (LGA) Boundary
-  Substation (Route End Points)
-  Built-up Area
-  Fauna Key Habitats

- Best Potential Route**
-  Overhead
 -  Underground
- Alternate Route**
-  Overhead
 -  Underground



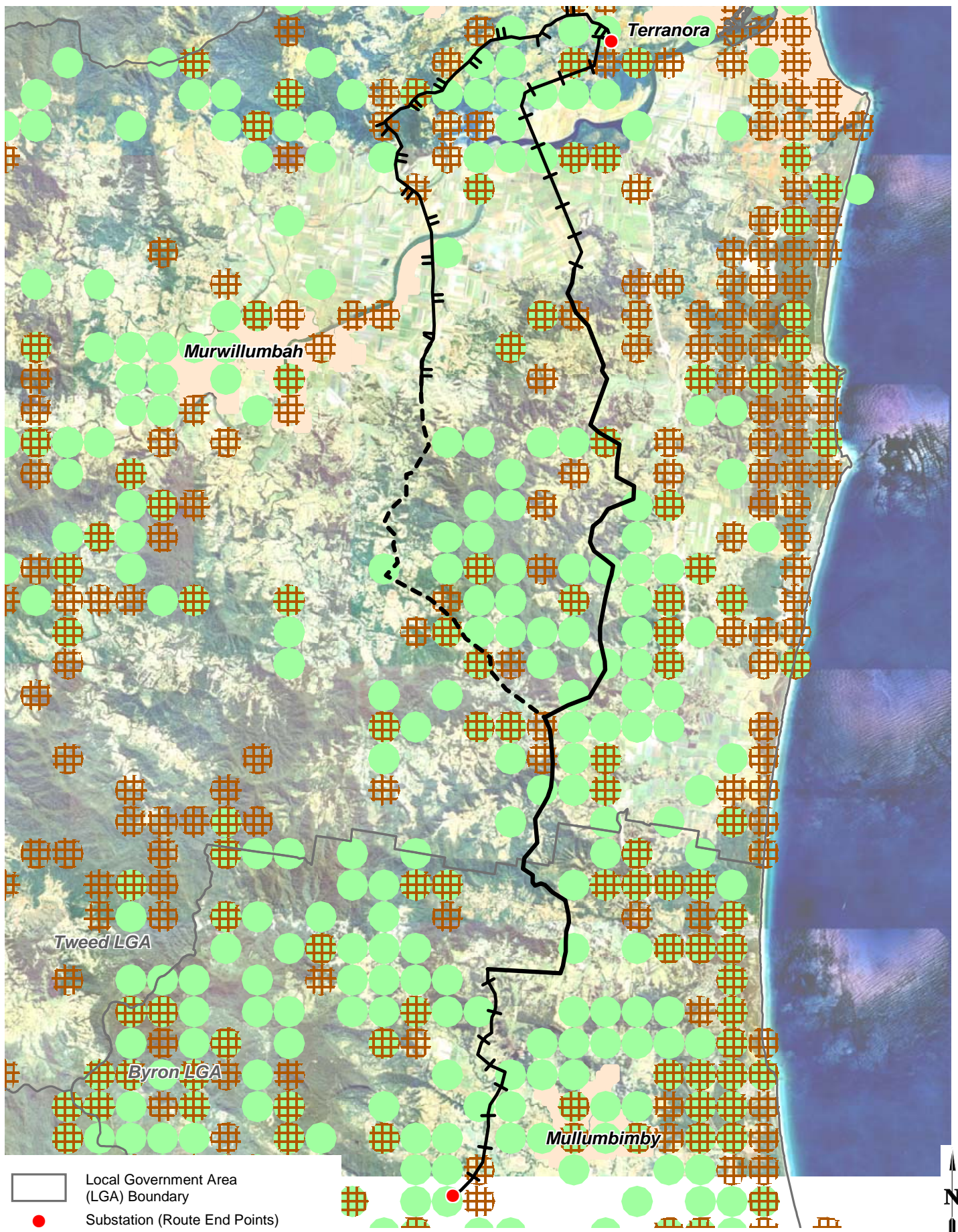
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 Author: CDS
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Fauna Key Habitats



MAP: 4b
 Status: FINAL
 Client: Burns & Roe Worley
 Location: T:\ProjGIS\50782\002\GIS\Workspaces\Maps\Map 4b.WOR

Project: Directlink 132kV Transmission Line Proposal. Project No.: 50782-002
 0 2.5 5
 kilometers
 Projection: MGA Zone 56
 Scale: 1:160 000 @ A4





-  Local Government Area (LGA) Boundary
-  Substation (Route End Points)
-  Built-up Area
-  Treatened Species - Fauna
-  Treatened Species - Flora

Best Potential Route

-  Underground
-  Overhead

Alternate Route

-  Overhead
-  Underground

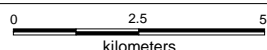


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MAP: 4c	Status: FINAL
Client: Burns & Roe Worley	
Location: T:\Proj\GIS\50782\002\GIS\Workspaces\Maps\Map 4c.WOR	

Threatened Species

Project: Directlink 132kV Transmission Line Proposal. Project No.: 50782-002



Projection: MGA Zone 56
Scale: 1:160 000 @ A4

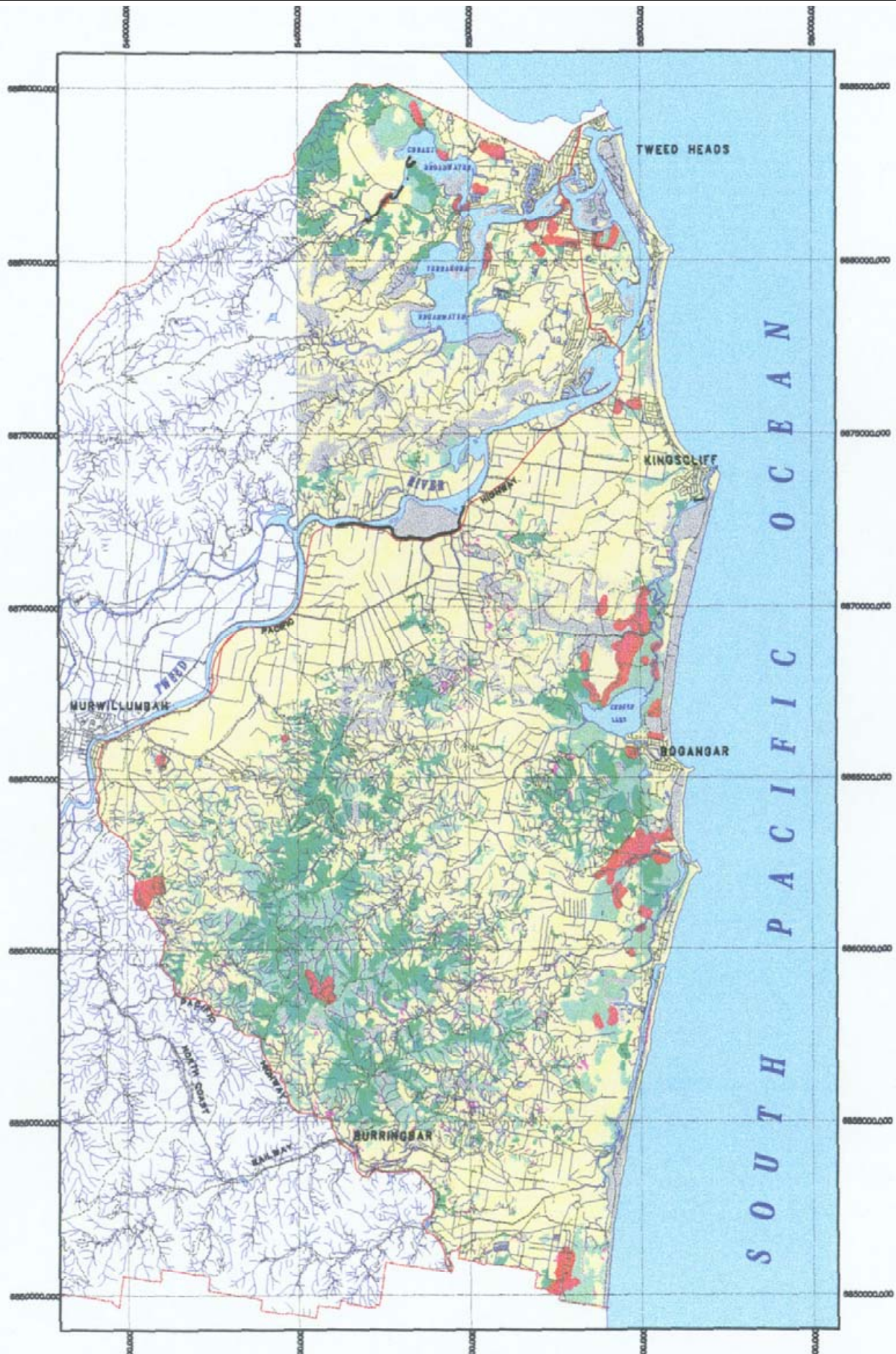
6.2.2 Koala Habitat

Koalas are the subject of State Environmental Planning Policy 44 and also listed under the *Threatened Species Conservation Act 1995*. Both Byron and Tweed LGAs are subject to SEPP 44. Koala habitat mapping has been undertaken by the Australian Koala Foundation in 1996 with core and secondary habitats identified for part of the Tweed LGA. There is no equivalent data available for the Byron Shire.

Constraint Level	Value
Not Applicable	No records/data
Low	Unknown Habitat Quality
Medium	Secondary Habitat Quality (Classes A and B)
High	Primary Habitat Quality

Source: Summary of the Tweed Coast Koala Habitat Atlas and Related Planning Matters @ <http://www.tweed.nsw.gov.au/stpuweb/koala.htm>

In an environmental impact assessment process (as opposed to a desk top study) preferred feed trees and primary habitat would need to be mapped and assessed. Map 5 illustrates the area identified as koala habitat within Tweed Shire.



- LEGEND**
- PRIMARY HABITAT
 - SECONDARY HABITAT (CLASS A)
 - SECONDARY HABITAT (CLASS B)
 - UNKNOWN HABITAT QUALITY
 - MAINLY CLEARED (SOME TREES)
 - OTHER VEGETATION COMMUNITIES

- LOCAL GOVERNMENT BOUNDARY
- HIGHWAY
- PAVED ROAD
- UNPAVED ROAD
- RAILWAY
- WATERCOURSE



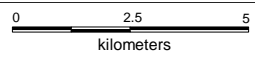
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 Approved: MSA
 MAP: 5
 Status: FINAL

Tweed Koala Habitat Classes

Client: Burns & Roe Worley
 Location:
 T:\Proj\GIS\50782\002\GIS\Workspaces\Maps\Map 4a1.WOR

Project: Directlink 132kV Transmission Line Proposal. Project No.: 50782-002



Projection: AMG Zone 56
 Scale: 1:160 000 @ A4

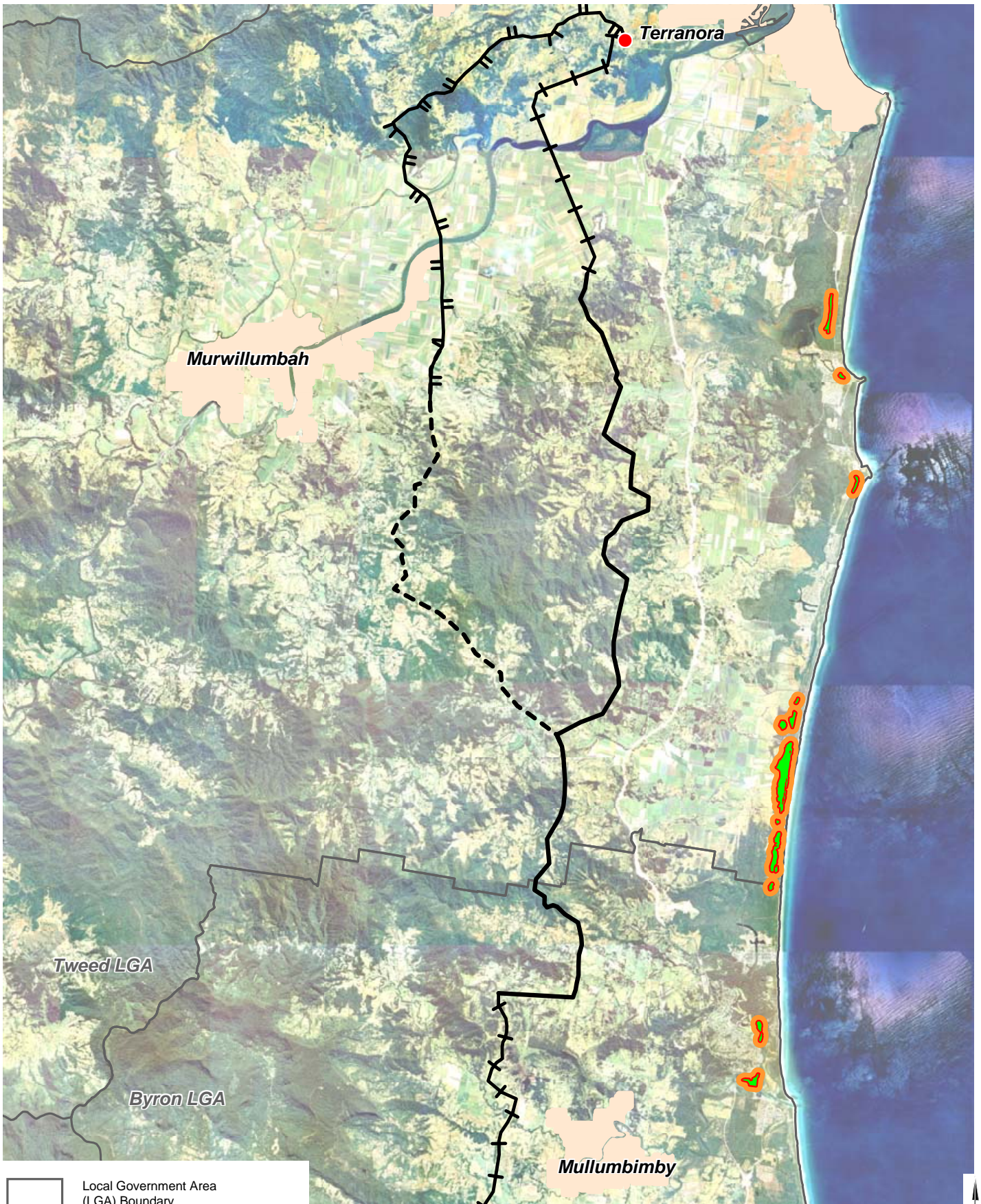
Source: The Australian Koala Foundation © 1996.







6.2.3 Littoral Rainforest





Littoral rainforests have been mapped by DIPNR. The gradient classification of this type of vegetation attempts to allow for any errors in mapping and account for secondary impacts from clearing adjacent lands such as light penetration, weed invasion and loss of connectivity.

Constraint Level	Value
Not Applicable	No records/data
Low	Within 200m
Medium	Within 50m
High	Mapped Littoral Rainforest

Map 6 illustrates the extent of littoral rainforests, restricted to the coastal margins.


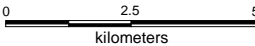


-  Local Government Area (LGA) Boundary
-  Substation (Route End Points)
-  Built-up Area
-  SEPP26 Littoral Rainforest
-  50m Buffer around SEPP26
-  200m Buffer around SEPP26

- Best Potential Route**
-  Overhead
 -  Underground
- Alternate Route**
-  Overhead
 -  Underground

Source: DIPNR



		URS Australia Pty Ltd	
Date Printed: 08/03/2004	Author: CDS Approved: MSA	SEPP26 - Littoral Rainforest	
MAP: 6	Status: FINAL	Project: Directlink 132kV Transmission Line Proposal. Project No.: 50782-002	
Client: Burns & Roe Worley			Projection: MGA Zone 56 Scale: 1:160 000 @ A4
<small>Location: T:\Proj\GIS\50782\002\GIS\Workspaces\Maps\Map 6.WOR</small>			

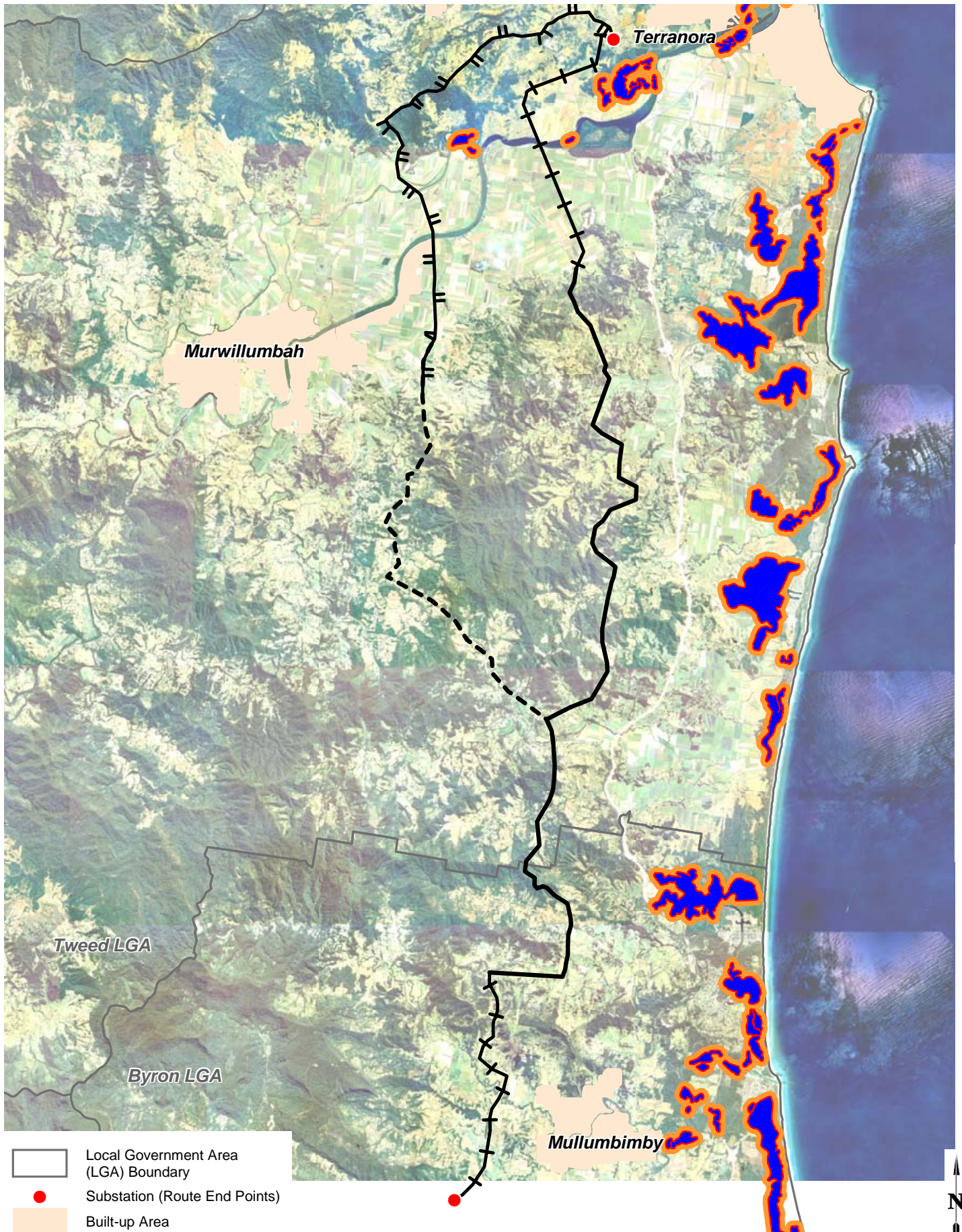
6.2.4 Wetlands

For the wetlands survey, the NSW coastline, coastal plain areas and major estuarine river system were covered by an aerial photographic survey, carried out in 1981. The survey followed specifications set up by the Department of Urban Affairs and Planning and are described in the 'Coastal Wetlands Survey' Report. The wetland boundaries were identified from the aerial photos on a botanical basis, using their vegetation features. As the coastal wetlands are under continuous temporal changes this data is amended every 12 months. The positional accuracy of the wetland boundaries is considered to be around 25 metres on 1:25000 maps. The attribute of this data set is the vegetation/land cover type. A limit of approximately 4 hectares was chosen as a minimum size for the mapping of Sedgeland, Freshwater Swamp and Wet Meadow components on a flood plain. For the other four wetland types, the minimum size delineated was limited only by the optical factors of interpretation.

Constraint Level	Value
Not Applicable	No records/data
Low	Within 200m
Medium	Within 50m
High	Mapped Wetland

From an impact assessment perspective, development upstream of these areas has the potential to cause impact on these wetlands. This criteria has not been mapped as a constraint for the current development proposal. An environmental management plan for a development proposal would identify these areas at high risk of being impacted upon from erosion and sediment and thus the subject of considerable stormwater controls.

Map 7 shows the location of SEPP 14 Wetlands along the northern NSW coastline.



Source: DIPNR

- Local Government Area (LGA) Boundary
- Substation (Route End Points)
- Built-up Area
- SEPP14 Wetland
- SEPP14 50m Buffer
- SEPP14 200m Buffer

- Best Potential Route**
- Underground
 - Overhead
- Alternate Route**
- Overhead
 - Underground

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MAP: 7	Approved: MSA		
Client: Burns & Roe Worley		Project: Directlink 132kV Transmission Line Proposal. Project No.: 50782-002	
Location: T:\Proj\GIS\50782\002\GIS\Workspaces\Map\Map 7.WOR		Projection: MGA Zone 56 Scale: 1:160 000 @ A4	

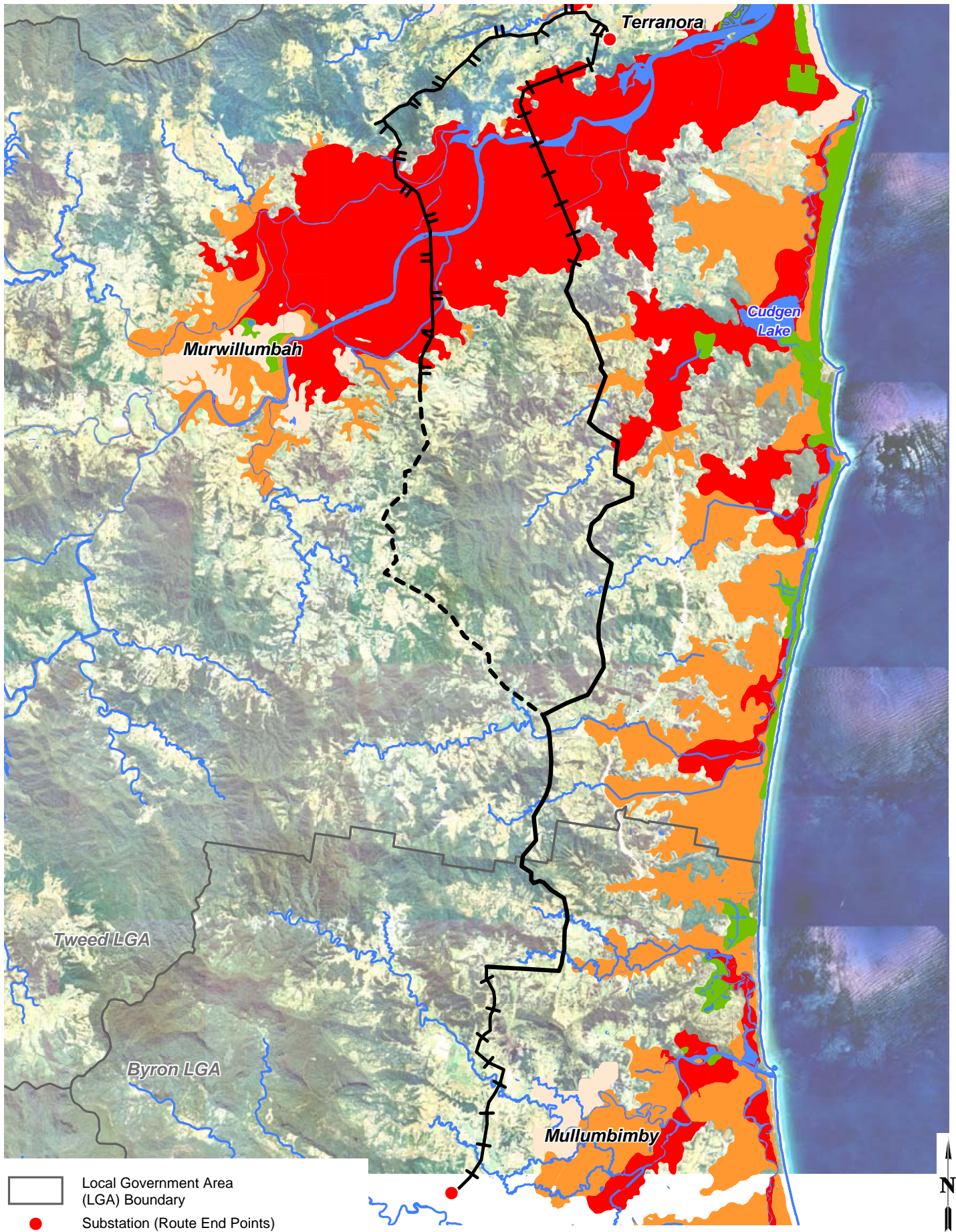
6.2.5 Acid Sulphate Soils

Acid sulfate soils are the common name given to soils containing iron sulphides or their oxidation products. These soils form when sea or brackish waters mix with sediments containing organic matter, and are part of the world’s natural sulphur cycle. The acid sulfate soils of most concern are those which formed within the past 10,000 years, during and after the last major sea level rise. Sulfate (SO₄-2) in the sea water reacted with iron oxides in sediments, in the presence of organic matter from mangroves and other coastal vegetation, to form these particular acid sulfate soils. In their natural state, these soils are submerged but when exposed or drained, they become oxidised and sulphuric acid is produced. This reduces soil fertility, kills vegetation and reduces fish populations. The identification of the location and extent of potential acid sulphate soils is the essential first step in managing this problem.

Acid Sulphate soils in themselves are not a total planning constraint, but present additional quantifiable costs in their management to ensure environmental breaches of other statutes do not occur, for instance the *Protection of the Environment Operations Act*. ASS maps are not intended to provide site specific ASS information. The information derived from the maps cannot be used in the assessment of the potential to effectively manage ASS in a particular development. When using ASS maps, it must always be remembered that that there can be expected to be extreme variations in the nature and distribution of ASS and that the depth to the ASS layer can be highly variable. The depths given in Map 8 key should be used as a guide only and not used for a specific assessment of development potential.

It is recommended that all land use activities likely to disturb ASS require appropriate soil investigations and a management plan to avoid environmental degradation. Tweed Shire Council has a Acid Sulfate Soil Hotspot, namely Cudgen Lake. This area is one of only seven funded in NSW. Council is working closely with landholders to develop a management plan addressing ASS in the lower floodplain of the Cudgen Lake catchment. Extensive major cane areas along Tweed River are also likely to have ASS that need to be managed to avoid pollution of the River. The data present in Map 8 for ASS was mapped at a scale of 1:25000 in 1997.

Constraint Level	Value
Not Applicable	No records/data
Low	Within 200m
Medium	Within 50m
High	Mapped Wetland



- Local Government Area (LGA) Boundary
- Substation (Route End Points)
- Built-up Area
- Drainage Line
- Water Body

- Best Potential Route**
- Underground
 - Overhead
- Alternate Route**
- Overhead
 - Underground

- Acid Sulphate Soils Risk of Occurrence**
- Low risk
 - High risk
 - Disturbed soils



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MAP: 8	Status: FINAL
Client: Burns & Roe Worley	
Location: T:\Proj\GIS\50782\002\GIS\Workspaces\Mapss\Map 8.WOR	

Acid Sulphate Soils Risk of Occurrence

Project: Directlink 132kV Transmission Line Proposal. Project No.: 50782-002

0 2.5 5
kilometers

Projection: MGA Zone 56
Scale: 1:160 000 @ A4

6.3 Heritage

6.3.1 World Heritage

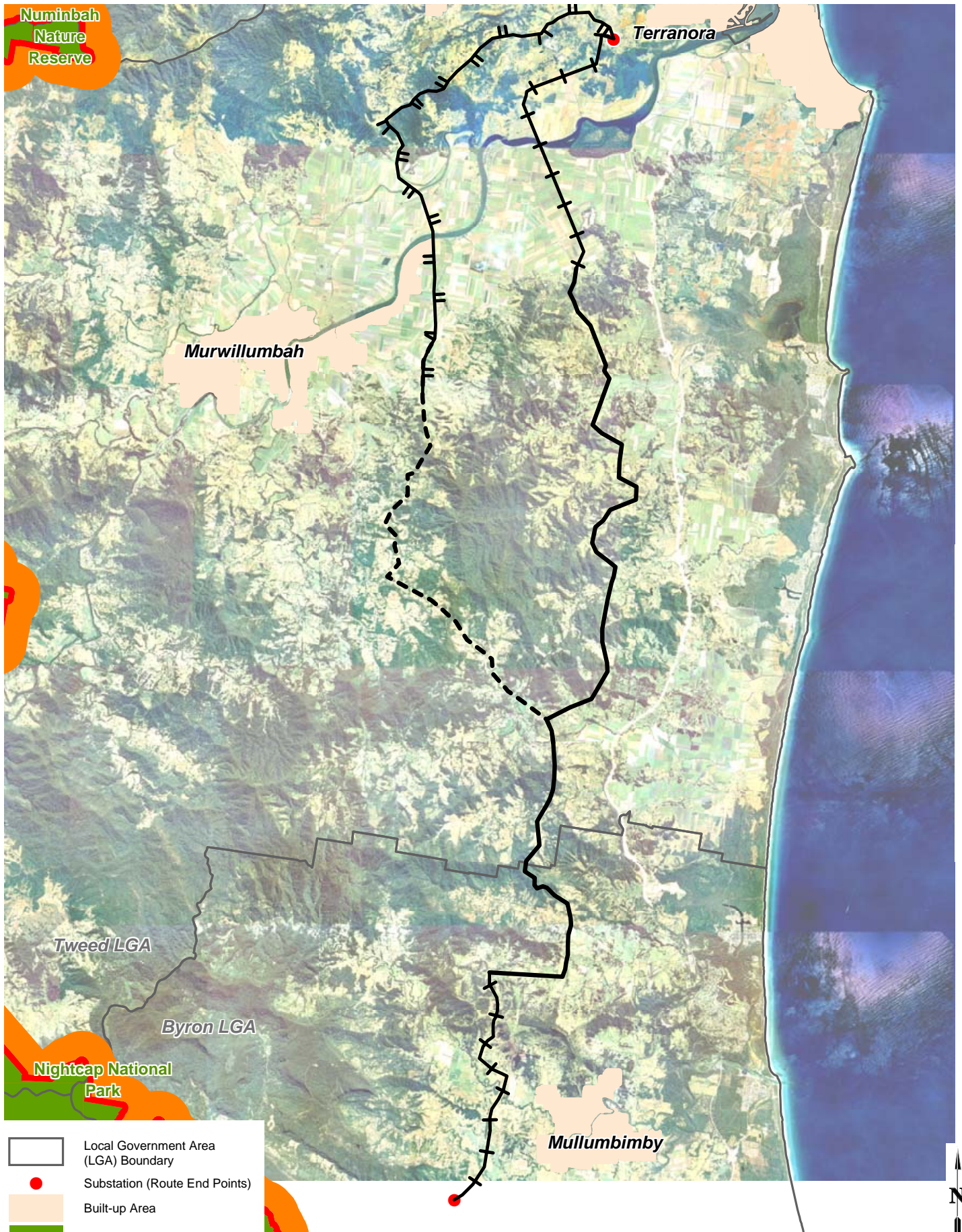
Within the two shires there are a number of World Heritage Listed National Parks. These Parks derive their international status from nomination and listing under United Nations Environment, Science and Cultural Organisation (UNESCO) World Heritage Convention. The listing is for the Central Eastern Rainforest Reserves which comprises several protected areas situated predominantly along the escarpment on the NSW and Queensland east coast. The outstanding geological features displayed around shield volcanic craters and the high number of rare and threatened rainforest species are of international significance for science and conservation. These areas were listed in 1986 for their outstanding natural universal values:







- as an outstanding example representing major stages of the earth's evolutionary history;
- as an outstanding example representing significant ongoing geological processes and biological evolution; and
- containing important and significant habitats for the in situ conservation of biological diversity.

Map 9 indicates that the World heritage areas form a western limit to any route selections and the National Parks that are listed as World Heritage within the two LGAs, including:



- Mount Warning NP;
- Numinbah NR
- Mebbin NP
- Liminwood NR;
- Richmond Range NR; and
- Nightcap NP.

Constraint Level	Value
Not Applicable	No records/data
Low	Within 1000m
Medium	Within 200m
High	Identified World Heritage Area





-  Local Government Area (LGA) Boundary
-  Substation (Route End Points)
-  Built-up Area
-  World Heritage National Park
-  World Heritage National Park - 200m Buffer
-  World Heritage National Park - 1000m Buffer

Best Potential Route

-  Underground
-  Overhead

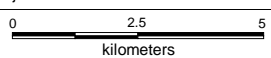
Alternate Route

-  Overhead
-  Underground



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MAP: 9	Approved: MSA
Client: Burns & Roe Worley	Status: FINAL
Location: T:\Proj\GIS\50782\002\GIS\Workspaces\Maps\Map 9.WOR	

World Heritage National Parks	
Project: Directlink 132kV Transmission Line Proposal. Project No.: 50782-002	
	Projection: MGA Zone 56 Scale: 1:160 000 @ A4



6.3.2 State & Local Heritage Values





Any proposed alterations to a heritage conservation area or a heritage item that may affect the heritage significance of the area or item within either LEP, can only be carried out with Council's development consent. Both the Tweed and Byron and REP heritage registers are detailed in Appendix One with the majority of these items and areas located with the urban development zones.

Constraint Level	Value
Not Applicable	No records/data
Low	Within 100m
Medium	Within 20m
High	Impacts Identified Heritage Item



Map 10 illustrates the locations of heritage items listed in the REP and LEPs. It should be noted that the maps do not indicate the location of Aboriginal cultural heritage places or items of significance. For such a development the Local Aboriginal Land Councils would need to be intimately involved in route selection and detail planning in the field possibly including placement of individual poles in certain localities. There has been no attempt to map Aboriginal cultural heritage places or items due to the sensitivities surrounding such information.





Source: DIPNR

-  Local Government Area (LGA) Boundary
-  Substation (Route End Points)
-  Built-up Area
-  Location of LEP and REP Heritage Items

Best Potential Route

-  Underground
-  Overhead

Alternate Route

-  Overhead
-  Underground

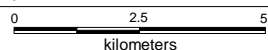


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MAP: 10	Status: FINAL
Client: Burns & Roe Worley	
Location: T:\Proj\GIS\50782\002\GIS\Workspaces\Maps\Map 10.WOR	

Locations of LEP and REP Heritage Items

Project: Directlink 132kV Transmission Line Proposal. Project No.: 50782-002



Projection: MGA Zone 56
Scale: 1:160 000 @ A4



6.4 Zoning/Land Use

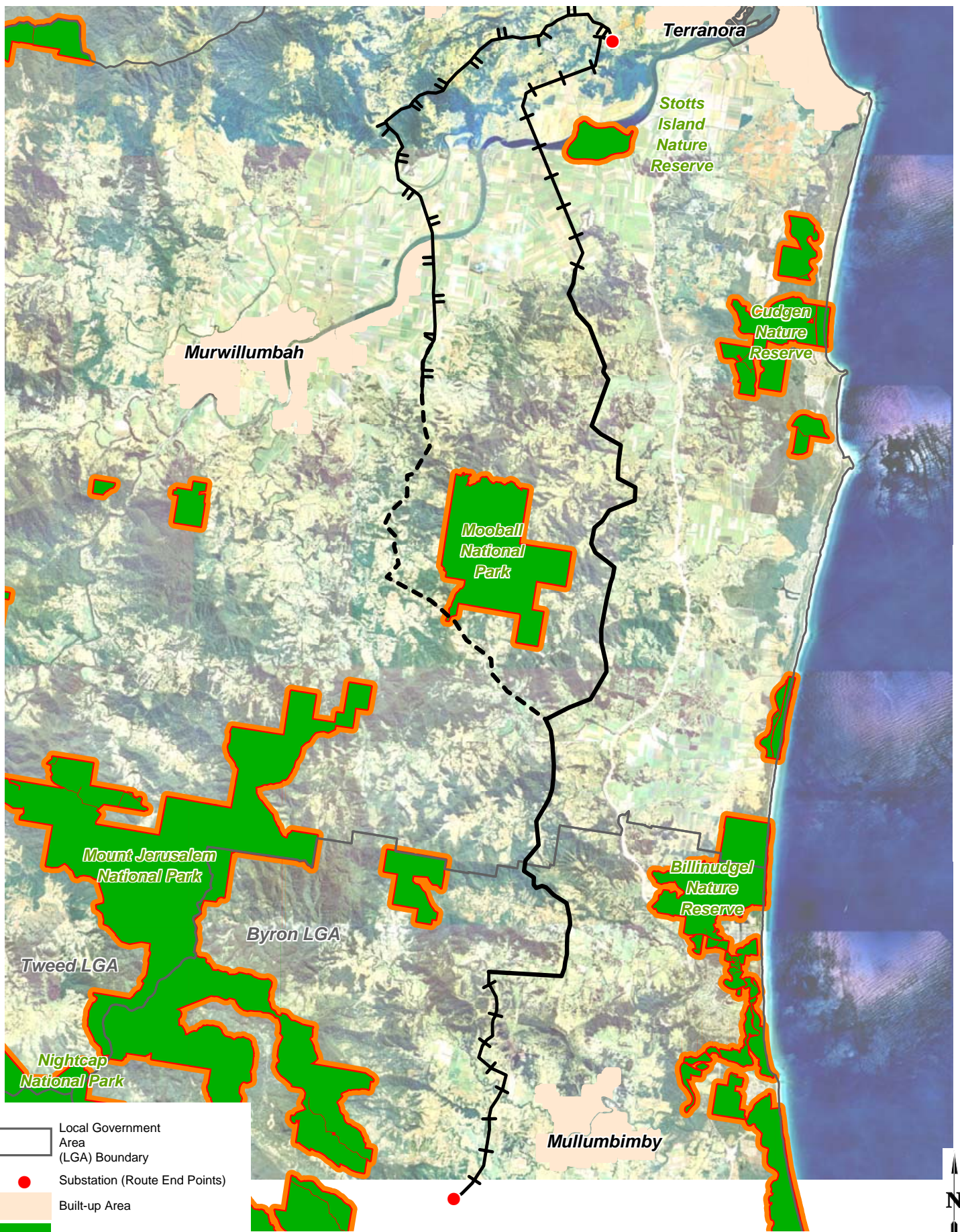
6.4.1 National Park







National Park estate has a number of planning restrictions under the *National Parks and Wildlife Act 1974* and related protection measures within the *Environmental Planning and Assessment Act 1979*. Whilst transmission lines and other linear developments have been constructed in national parks previously (TransGrid in Kosciuszko NP), we would advise that these areas be avoided due to the complex and often problematic approvals process coupled with very negative community perceptions about such developments.

The NPWS keeps a register of information on every lease, easement or right of way granted on national parks and reserves under the *National Parks and Wildlife Act* as required under section 151D of the Act.



Constraint Level	Value
Not Applicable	No records/data
Low	Within 200m
Medium	Within 50m
High	Gazetted National Park

Appendix 5 lists all the national parks in the two LGAs. The location of these national parks is illustrated in Map 11.





-  Local Government Area (LGA) Boundary
-  Substation (Route End Points)
-  Built-up Area
-  National Park/Nature Reserve
-  National Park/Nature Reserve - 50m Buffer
-  National Park/Nature Reserve - 200m Buffer

Best Potential Route

-  Underground
-  Overhead

Alternate Route

-  Overhead
-  Underground



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MAP: 11	Approved: MSA
Client: Burns & Roe Worley	Status: FINAL
Location: T:\Proj\GIS\50782\002\GIS\Workspaces\Maps\Map 11.WOR	

National Parks and Nature Reserves

Project: Directlink 132kV Transmission Line Proposal. Project No.: 50782-002
0 2.5 5 kilometers
Projection: MGA Zone 56 Scale: 1:160 000 @ A4



6.4.2 Tweed LEP Zoning

Zonings with the Tweed Shire present a planning framework for development and land use within the LGA. Whilst there are no provisions or development prohibitions against utility provisions in the majority of the zones, the following constraint levels have been assigned to zones reflecting social and environmental implications.

Constraint Level	LGA Zone (See LEP)
Not Applicable	Unzoned Land within the LGA, 1E Extractive Resources.
Low	Rural 1A, Industrial 4A, Commerce and Trade 3C.
Medium	Agricultural Protection 1B, Rural Living, Tourism 2F, Sub-regional Business 3A, General Business 3B, Waterfront Enterprise 3D, Special Uses 5A, Open Space 6A, Recreation 6B.
High	Low Density Residential 2A, Medium Density Residential 2B, Urban Expansion 2C, Village 2D, Residential Tourism 2E, Wetlands 7A, Coastal Habitat 7B, Scenic Escarpment 7D, Coastal Lands 7F1, Urban Coastal Lands 7F2, Scientific 7J, Habitat 7K, National Park 8A.

The above classification is illustrated in Map 12.