

Technical Memorandum

October 13, 2022

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From	Sarah Isbister Pali Jayasekara	Project No.	12582802	
Project Name	Maitland to Karratha 132 kV Transmission Infrastructure Project			
Subject	Maitland Additional Areas Reconnaissance/Basic Survey			

1. Introduction

1.1 Background

Horizon Power is proposing to expand the North West Interconnected System (NWIS) electricity network, by constructing an approximately 19 kilometre (km) long 132 kilovolt (kV) overhead transmission line between the Karratha substation on Stovehill Road and the Maitland Strategic Industrial Area (SIA) (the Project). The Maitland SIA is not currently connected to the NWIS. The Project will provide common user transmission infrastructure, owned and operated by Horizon Power, between the Maitland SIA and Karratha, supporting the connection of future renewable energy projects in this SIA into the NWIS.

Horizon Power has previously engaged GHD Pty Ltd (GHD) to complete biological surveys for the Project and adjacent areas, these included:

- (GHD 2020) Horizon Power Burrup Expansion Project Flora and Vegetation Survey
- (GHD 2022) Maitland to Karratha Terminal Flora and Fauna Survey.

These existing surveys cover 88% of the Project Development Envelope (DE). Through progressive Project design iterations an optimised transmission line route was developed, reducing the overall environmental impact of the Project. The purpose of this reconnaissance/basic survey was to assess native vegetation and flora present in previously unsurveyed areas comprising 12% of the DE boundary at the time of the survey (August 2022). The additional survey includes areas adjacent to existing vehicle access tracks, pipelines, and the North West Coastal Highway Road.

This survey is intended to inform and facilitate a Native Vegetation Clearing Permit (NVCP) application under Section 51E of Part V of the *Environmental Protection Act 1986* (EP Act).

1.2 Purpose

Horizon Power commissioned GHD to undertake a reconnaissance survey of the additional survey areas. The survey is required to verify that the dominant vegetation units, vegetation condition and associated fauna habitats of the additional survey areas are consistent with the results of the adjacent recent surveys (GHD 2020; 2022).

The purpose of the survey is to support an NVCP application for the Project, under Section 51E of Part V of EP Act.

This memorandum should be read in conjunction with the existing surveys identified in Section 1.1.

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1.3 Scope of works

GHD undertook the following scope of works:

- Review of existing surveys within the vicinity of the Project
- A site visit by a qualified botanist to verify the flora and vegetation and fauna values (which were verified by a Senior ecologist), including vegetation condition and undertaking opportunistic searches for significant flora and fauna
- A site visit by a qualified botanist to confirm the presence and extent of significant vegetation
- The preparation of a memorandum summarising the findings of the survey.

The areas being assessed for the Project include the three areas shown on Figure 1, Appendix A. The survey area covered 29.12 ha.

1.4 Limitations and assumptions

This memorandum has been prepared by GHD for Horizon Power and may only be used and relied on by Horizon Power for the purpose agreed between GHD and Horizon Power as set out in section 1.2 of this memorandum. GHD otherwise disclaims responsibility to any person other than CBH arising in connection with this memorandum. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this memorandum were limited to those specifically detailed in the memorandum and Horizon Power request correspondence. The opinions, conclusions and any recommendations in this memorandum are based on conditions encountered, locations surveyed and information reviewed at the date of preparation of the memorandum. GHD has no responsibility or obligation to update this memorandum to account for additional sampling locations, events or changes occurring subsequent to the date the survey was completed and memorandum prepared.

The opinions, conclusions and any recommendations in this memorandum are based on assumptions made by GHD described in this memorandum. GHD disclaims liability arising from any of the assumptions being incorrect.

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The opinions, conclusions and any recommendations in this memorandum are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this memorandum if the site conditions change.

This memorandum has assessed the flora and fauna within the defined additional survey areas. Should the survey area change or be refined, further assessment may be required.

2. Methodology

2.1 Field survey

GHD senior botanist Pali Jayasekara (flora licence no. FB62000208-2) completed the field survey over two days on 3-4 August 2022. Pali Jayasekara has extensive experience in undertaking biological surveys across Western Australia, and in particular the Pilbara region.

The field survey was undertaken to verify that the dominant vegetation units, vegetation condition and associated fauna habitats of the additional survey areas are consistent with the results of adjacent recent

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surveys (GHD 2020; 2022). Searches for significant flora and fauna species were also undertaken within the additional survey areas.

The survey method involved placing waypoints within each of the three distinct additional survey areas. The area around the waypoints was then traversed on foot, with opportunistic recordings and photographic reference points within identified vegetation units taken. The vegetation within the additional survey areas was mapped using the data collected from the waypoints, and in some areas extrapolated based on similar surrounding vegetation.

Navigation across the site and the recording of data in the field was achieved using hand-held GPS tools, including a Samsung tablet and Garmin GPS. This ensured accurate representation of features observed on the ground into spatial mapping.

The survey methodology employed by GHD was undertaken with reference to the EPA *Technical Guidance* – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016) and the EPA *Technical Guidance* - *Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020).

Vegetation condition

The vegetation condition was assessed and mapped in accordance with the Eremaean and Northern Botanical Provinces of Western Australia scale devised by Keighery (1994) and adapted by EPA (2016). The scale recognises the intactness of vegetation and consists of six rating levels.

2.2 Survey limitations

The EPA (2016, 2020) states that flora and fauna survey reports for environmental impact assessment in WA should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with this field survey are discussed in Table 1.

Table 1 Survey limitations

Aspect	Constraint	Comment
Sources of information and availability of contextual information.	Nil	Adequate information is available for the survey area, this includes broadscale (1:1,000,000) mapping by Beard (1975) and digitised by Shepherd et al. (2002) and database searches (DBCA and ALA).
Scope (what life forms were sampled etc.)	Nil	Vascular flora and terrestrial vertebrate fauna were surveyed. Non-vascular flora, invertebrate and aquatic fauna were not surveyed.
Proportion of flora and fauna collected and identified (based on sampling, timing and intensity)	Minor	The Reconnaissance/Basic Survey was completed on 3-4 August 2022, outside of the primary survey season (March to June) for the Eremaean region. Based on the EPA (2016) guidance (refer to Table 3 of the guidance), supplementary surveys can be completed in the dry season after winter rainfall. The primary objective of this survey was to expand vegetation mapping, vegetation condition mapping and fauna habitat mapping in previously unsurveyed areas of the DE. The conditions experienced were not expected to limit the survey findings for these objectives.
Flora determination	Nil	Flora determination was undertaken by the survey botanist in the field. Species that could not be identified in the field were collected and identified at the WA Herbarium by the experienced GHD taxonomic botanist Pali Jayasekara. The taxonomy and conservation status of the WA flora is dynamic. This report was prepared with reliance on taxonomy and conservation status current at the time report development, but it should be noted this may change in response to ongoing research and review of International Union for Conservation Nature criteria.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Nil	Waypoints were placed within each of the additional survey areas. The area around the waypoints was then traversed on foot, with opportunistic recordings and photographic reference points within identified vegetation units taken. The vegetation within the additional survey areas was mapped using the data collected from

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Aspect	Constraint	Comment
		the waypoints, and in some areas extrapolated based on similar surrounding vegetation. The survey areas were adequately surveyed during the field
		survey in line with the scope. Additional opportunistic sampling was undertaken throughout all survey areas to develop a comprehensive species inventory.
Mapping reliability	Nil	The vegetation and fauna habitats were mapped using high- resolution ESRI aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Beard 1975) and field data. Data was recorded in the field using hand- held GPS tools. Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units and GPS enabled tablets used for this survey are accurate to within 2-5 metres on average.
Timing/weather/ season/cycle	Moderate	The field survey was conducted during the dry-season (3-4 August 2022). In the four months prior to the survey (November-February), the Karratha Aero (station No. 004083) recorded a total of 249.2 mm of rainfall (Bureau of Meteorology 2022). Large rainfall was experienced in late May 2022.
		The Reconnaissance/Basic Survey was completed on 3-4 August 2022, outside of the primary survey season (March to June) for the Eremaean region. Based on the EPA (2016) guidance (refer to Table 3 of the guidance), supplementary surveys can be completed in the dry season after winter rainfall. The primary objective of this survey was to expand vegetation mapping, vegetation condition mapping and fauna habitat mapping in previously unsurveyed areas of the DE. The conditions experienced were not expected to limit the survey findings for these objectives.
Disturbances (e.g. fire, flood, accidental human intervention)	Nil	Some of the survey areas have been subjected to historical disturbance events (e.g. clearing, weeds); however, these disturbances did not affect the survey.
Intensity (in retrospect, was the intensity adequate)	Nil	The vascular flora of the survey area was sampled in accordance with EPA (2016) and terrestrial fauna sampled in accordance with EPA (2020). The survey area was sufficiently covered by the field botanist
		during the survey.
Resources	Nil	Adequate resources were employed during the field survey. One botanist undertook the survey over two days (total survey time being two person days).
Access restrictions	Nil	The survey area was accessed on foot and vehicle. There were no access restrictions.
Experience levels	Nil	The botanist who executed the survey is a practitioner suitably qualified and experienced in his field. The field team lead, Pali Jayasekara (flora licence no. FB62000208-2), is a senior botanist with more than 17 years' experience leading and conducting vegetation and flora surveys (detailed, basic and targeted) in the Eremaean province.

3. Results

3.1 Vegetation types and condition

The vegetation identified within the additional survey areas is consistent with the vegetation types and conditions previously identified by GHD (2020; 2022).

Five of the vegetation types identified by GHD (2020; 2022) extend into the additional survey areas. These vegetation types are detailed in Table 2 and shown on Figure 2, Appendix A. The additional survey areas

are located along existing vehicle tracks, a pipeline and the North West Coastal Highway Road. Vegetated areas cover 23.93 ha of the additional survey areas, with the remaining 5.19 ha being cleared.

Table 2 Vegetation types recorded within the Maitland additional survey area

GHD (2022) vegetation type code	Vegetation type description	Total extent (ha)
VT01	Triodia Grassland	1.42
	Acacia inaequilatera, Acacia bivenosa and Hakea lorea subsp. lorea open shrubland to scattered shrubs over Eremophila longifolia, Senna spp. and Solanum horridum sparse shrubland over Cymbopogon ambiguus, Themeda triandra and Cenchrus ciliaris open tussock grassland over Triodia wiseana and Triodia epactia hummock grassland on low undulating rocky rises and slopes.	
VT02	Eragrostis Tussock Grassland	4.16
	Eragrostis xerophila, Aristida latifolia and Chrysopogon fallax tussock grassland over Neptunia dimorphantha, Indigofera trita subsp. trita and Sida fibulifera scattered herbs on weak gilgai cracking clay plains.	
	Other common species include Salsola australis, *Cenchrus ciliaris, Operculina aequisepala, Heliotropium cunninghamii and Stemodia kingii.	
	Representative of Priority 3 PEC Horseflat land system of the Roebourne Plains.	
VT03	Acacia xiphophylla open shrubland over Triodia epactia and T. wiseana very open hummock grassland with Eragrostis xerophila, Chrysopogon fallax and Themeda triandra very open tussock grassland on sandy claypan with some patches of cracking clays.	8.10
VT04	Acacia bivenosa open shrubland over Triodia wiseana open hummock grassland on sandy clay loam plain with some rocky outcropping.	7.71
VT07	Corymbia hamersleyana low open forest to scattered trees over Acacia coriacea tall shrubland to scattered shrubs over *Vachellia farnesiana and Carissa lanceolata low shrubs over *Cenchrus ciliaris and Chrysopogon fallax tussock grassland on brown sandy loam on minor/broad drainage lines.	2.54
Total		23.93

Vegetation condition within the additional survey areas ranges from Very Good to Completely Degraded as detailed in Table 3 and shown on Figure 3, Appendix A.

The majority of vegetation is in Very Good condition, showing minimal signs of disturbance, with little to no weeds evident. The vegetation immediately adjacent to cleared areas, such as linear infrastructure (roads and vehicle tracks) is generally more disturbed. These areas are rated to be Degraded to Poor condition.

Table 3 Vegetation condition within the Maitland additional survey area

Vegetation condition	Total extent (ha)
Excellent	0
Very Good	11.69
Good	2.19
Good-Degraded	5.54
Degraded-Poor	2.65
Poor	1.61
Completely Degraded	0.25
Cleared	5.19
Total	29.12

3.2 Significant vegetation

One vegetation type (VT02) within the additional survey areas is considered to represent the Priority 3 Horseflat land system of the Roebourne Plains Priority Ecological Community (PEC) (Figure 4, Appendix A). The Horseflat Land System of the Roebourne Plains are extensive, weakly gilgaied clay plains dominated by tussock grasslands on mostly alluvial non-gilgaied, red clay loams or heavy clay loams. Perennial tussock grasses include *Eragrostis xerophila* and other *Eragrostis* spp., *Eriachne* spp. And *Dichanthium* spp. The community also supports a suite of annual grasses including *Sorghum* spp. And rare *Astrebela* spp. The community extends from Cape Preston to Balla Balla surrounding the towns of Karratha and Roebourne. This community does not include priority ecological communities 'Roebourne Plains gilgai grasslands' and the 'Chenopod association of the Roebourne Plains area'. There is 4.16 ha of this PEC within the additional survey areas.

In addition, one vegetation type (VT07) represented broad drainage lines and therefore is considered to be riparian vegetation. There is 2.54 ha of riparian vegetation within the additional survey areas.

3.3 Significant flora

No significant flora taxa were recorded within the additional survey areas during the survey. The likelihood of occurrence assessment is consistent with the assessment in GHD (2022), in that one species, *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (Priority 3) is considered likely to occur.

Dolichocarpa sp. Hamersley Station (A.A. Mitchel PRP1479)

Dolichocarpa sp. Hamersley Station (A.A. Mitchel PRP1479) is a spreading annual, herb which grows to 0.1 m high and flowers in March (blue flowers), and is known to occur in cracking clay (WA Herbarium 1998-).

This species was not recorded during the survey, however, is considered likely to occur within the additional survey areas, due to proximity to previous records and the presence of suitable habitat (GHD 2022). *Dolichocarpa* sp. Hamersley Station (A.A. Mitchel PRP1479) has previously been recorded in the clay to cracking clay community (GHD 2020). This habitat type is present within the additional survey areas and is representative of VT02.

3.4 Fauna habitats

Four of the fauna habitats identified by GHD (2020; 2022) extend into the additional survey areas (Table 4). These habitat types closely align with the vegetation types described in Section 3.1. Some of the habitats within the additional survey areas have been impacted by past disturbances including land clearing for infrastructure and linear corridors (i.e. roads). Fauna habitats cover 23.93 ha of the additional survey areas, with the remaining 5.19 ha being cleared. Cleared areas are not considered to be of value to fauna species.

Table 4 Fauna habitats recorded within the Maitland additional survey area

Fauna habitat	Total extent (ha)
Grassland Claypans	12.26
The grassland claypans habitat type consists of a low open tussock grassland of <i>Eragrostis xerophila</i> grassland with isolated patches of <i>Acacia xiphophylla</i> shrubs and <i>Triodia epactia</i> hummock grasses on weak gilgai clay plains. The area has been subject to varying degrees of degradation from historical clearing in adjacent areas, weed invasion and cattle grazing.	
The gilgai grassland provides suitable habitat for the Short-tailed mouse (Priority 4) who favours cracking clay and adjacent habitats.	
This habitat type aligns with VT02 and VT03.	
Hummock grasslands on sandy clay loam plains	7.71
This habitat type occurs on the plains. The vegetation is dominated by open shrublands of <i>Acacia</i> species (<i>Acacia bivenosa, A. ancistrocarpa, A. inaequilatera, A. pyrifolia</i>) over an open hummock and tussock grassland of <i>Triodia epactia, T. wiseana</i> and *Cenchrus ciliaris. This habitat type is generally in very good condition with vehicle tracks and weed invasion impacting some areas.	

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Fauna habitat	Total extent (ha)
The hummock grasslands provide refuge for reptiles (such as snakes, skinks, goannas and dragons), small mammals and ground dwelling birds. The <i>Acacia</i> shrublands provide refuge and a food source for native birds. This habitat type aligns with VT04.	
Broad drainage lines	2.54
The minor drainage lines are dominated by open woodlands to scattered trees of <i>Corymbia hamersleyana</i> , <i>Acacia coriacea</i> and occasional <i>Eucalyptus victrix</i> . Mixed <i>Acacia</i> shrublands dominated the mid layer over an open hummock and tussock grassland of <i>Triodia epactia</i> , <i>T. wiseana</i> and * <i>Cenchrus ciliaris</i> . Creeklines are considered to be important ecological corridors to other broader habitats within the local area and provide a source of water during periods of heavy rainfall. Trees and shrubs provide shelter and food resources to a number of native fauna species, in particular birds. This habitat type aligns with VT07.	
Low undulating rocky rises and slopes.	1.42
This habitat type is associated with stony/rocky plains and low undulating rises and consists of scattered shrubs of <i>Acacia</i> , <i>Hakea</i> and <i>Senna</i> species over a <i>Triodia</i> hummock grassland.	
The hummock grasslands provide refuge for reptiles (such as snakes, skinks, goannas and dragons), small mammals and ground dwelling birds. The open shrublands provide refuge and a food source for native birds. Rocky outcrops contain small crevices which provide refuge for reptile species and small mammals.	
This habitat type aligns with VT01.	
Total	23.93

3.5 Significant fauna

No significant fauna species were recorded within the additional survey areas. The likelihood of occurrence assessment is consistent with the assessment in GHD (2022), in that three fauna species are considered likely to occur. These species are discussed further in Table 5.

Table 5 Significant fauna species considered likely to occur within the Maitland additional survey area

Fauna species	EPBC Act	BC Act/DBCA status	Likelihood of occurrence
Oriental Plover (Charadrius veredus)	Migratory	Migratory	Likely The species is known from the region, however use would be opportunistic to the claypans and broad drainage areas/floodplain and utilised for foraging purposes only.
Peregrine Falcon (Falco peregrinus)	-	Other Specially Protected Fauna	Likely The habitats present within the Maitland DE represents suitable foraging habitat, however lacks suitable breeding habitat. Therefore, likely to occur at least on an occasional basis.
Northern Short-tailed Mouse (<i>Leggadina</i> <i>lakedownensis</i>)	-	Priority 4	Likely There is one record within 5 km of the Maitland DE. Suitable habitat (tussock grasslands and claypans) is present.

4. Conclusion

The vegetation identified within the additional survey areas is consistent with the vegetation types and conditions previously identified by GHD (2020; 2022).

Overall, there are five vegetation types within the additional survey areas, with vegetation condition ranging from Very Good to Completely Degraded. The majority of vegetation is in Very Good condition. Vegetation

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within the additional survey areas has been previously impacted by the presence of existing roads, access tracks, pipelines and infrastructure. There is a total of 4.16 ha of Priority 3 Horseflat land system of the Roebourne Plains PEC within the additional survey areas. In addition, there is 2.54 ha of vegetation that is considered to represent riparian vegetation.

No Priority flora species were recorded within the additional survey areas, however, one species, *Dolichocarpa* sp. Hamersley Station (A.A. Mitchel PRP1479) is considered likely to occur.

No significant fauna species were recorded, however three significant fauna species are considered likely to occur within the additional survey areas. Within the additional survey areas, five fauna habitat types were recorded.

Regards

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5. References

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Appendices

Appendix A

Figures

Figure 1 Location of additional survey	areas
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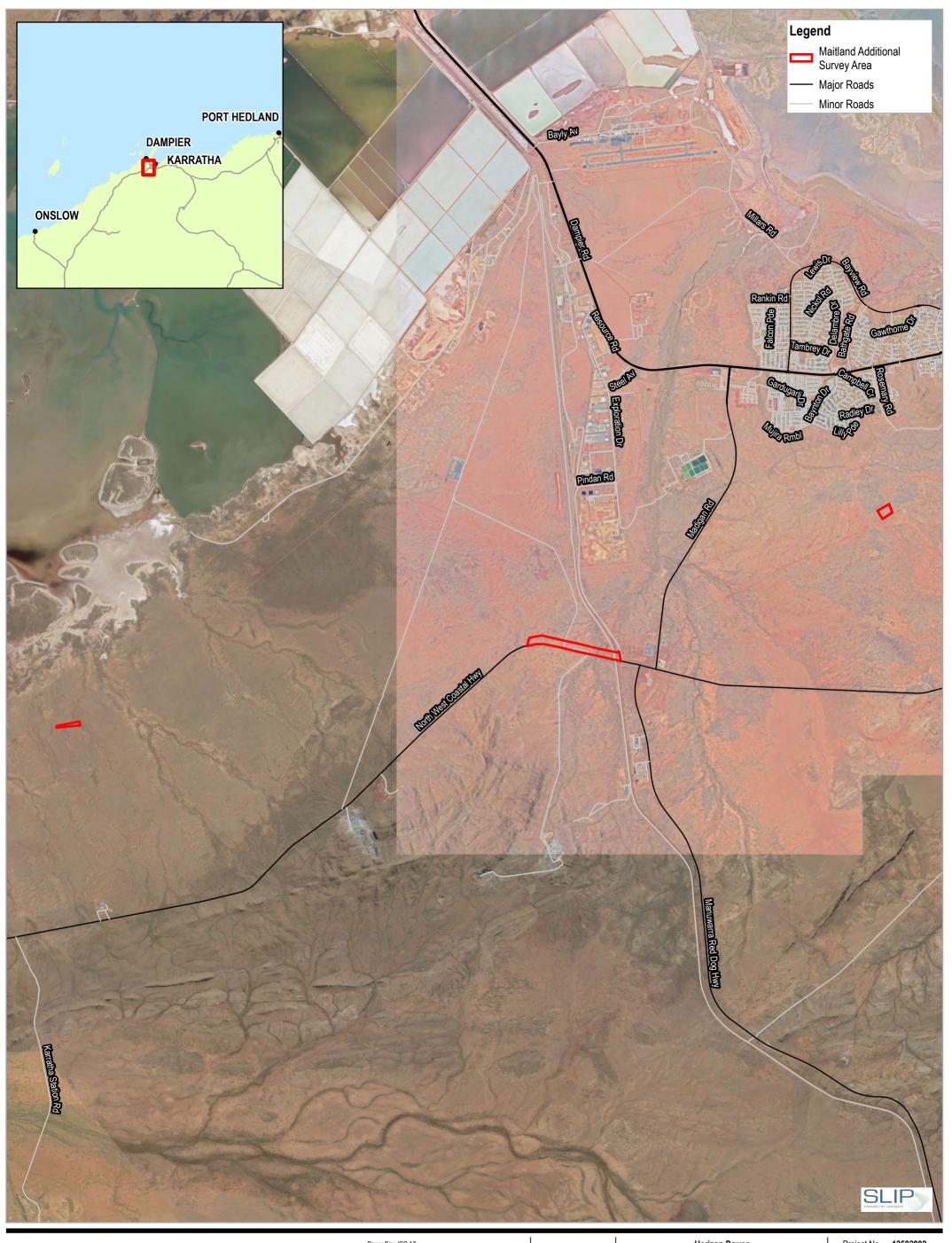
Figure 2 Vegetation types

Figure 3 Vegetation condition

Figure 4 Significant vegetation

Figure 5 Significant flora

Figure 6 Fauna habitat

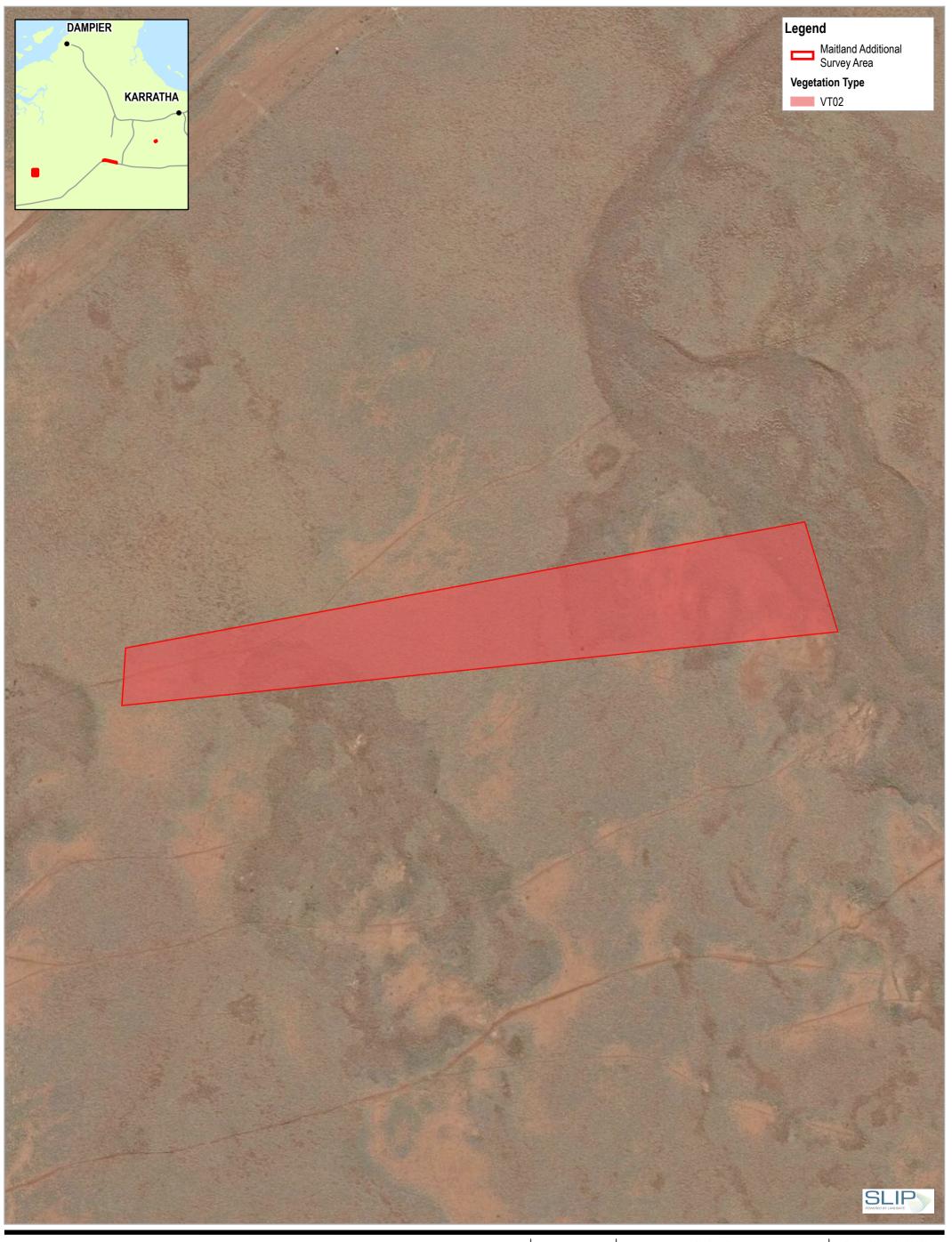






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Location of Maitland Additional Survey Areas Project No. **12582802**Revision No. **0**Date **13/10/2022**







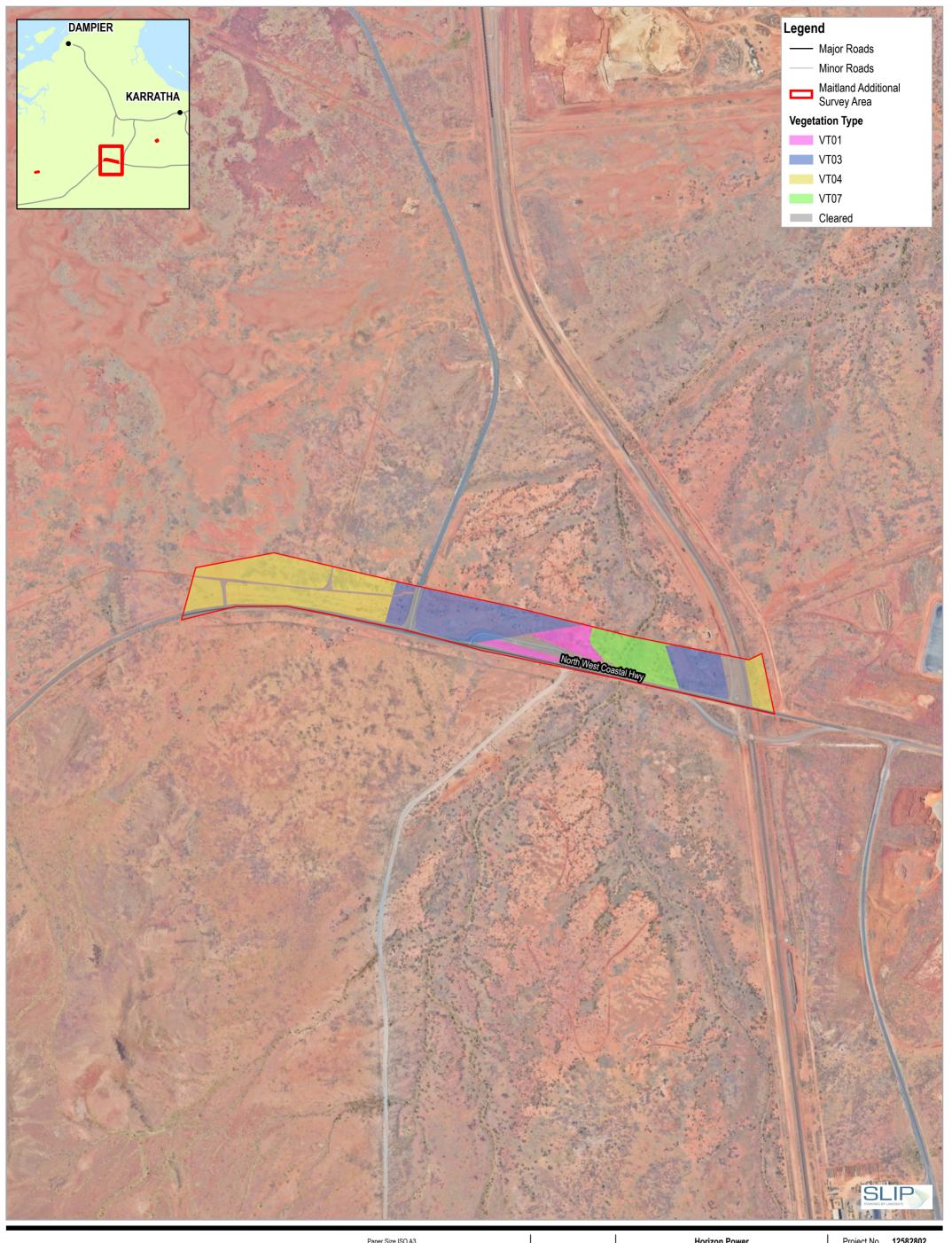


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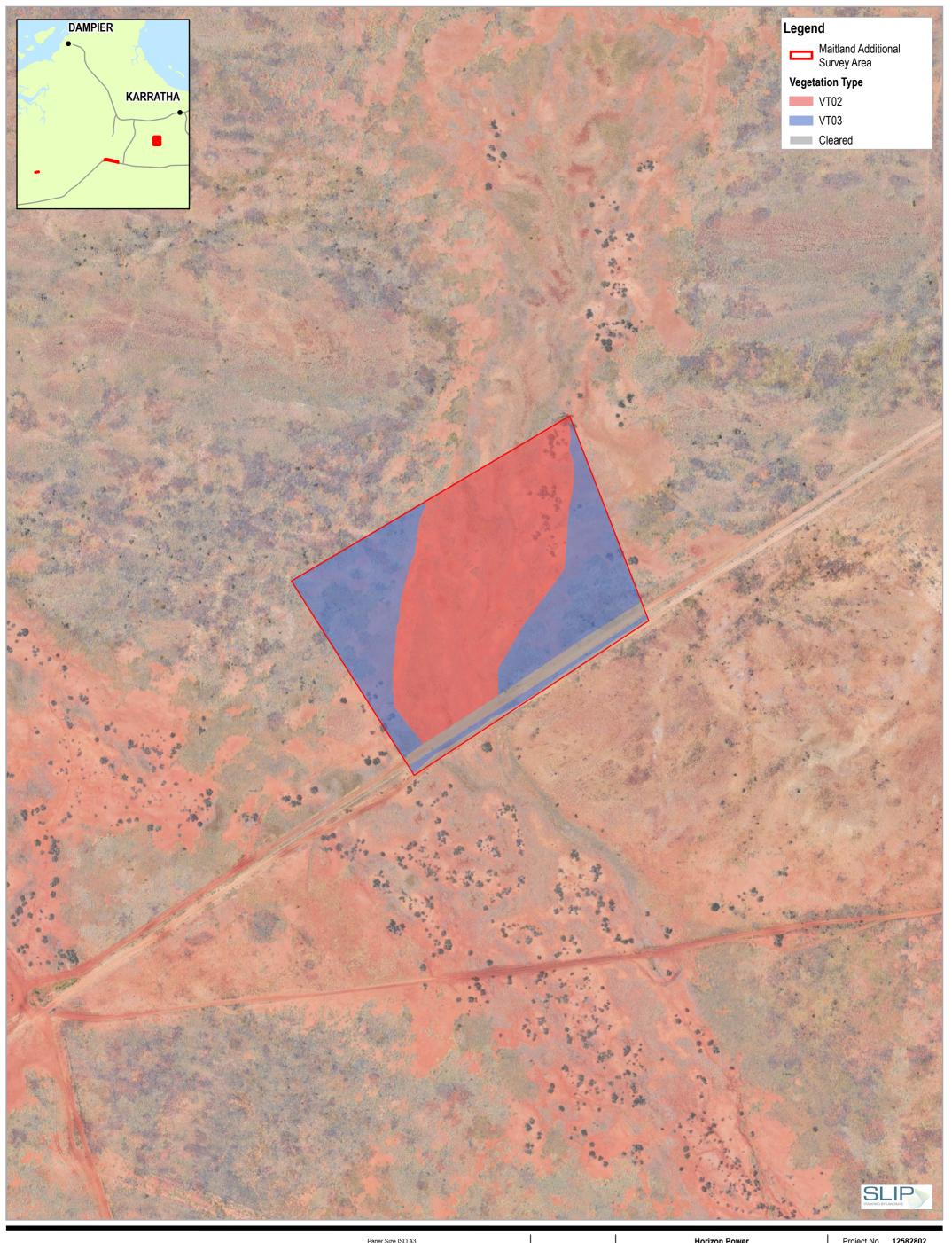


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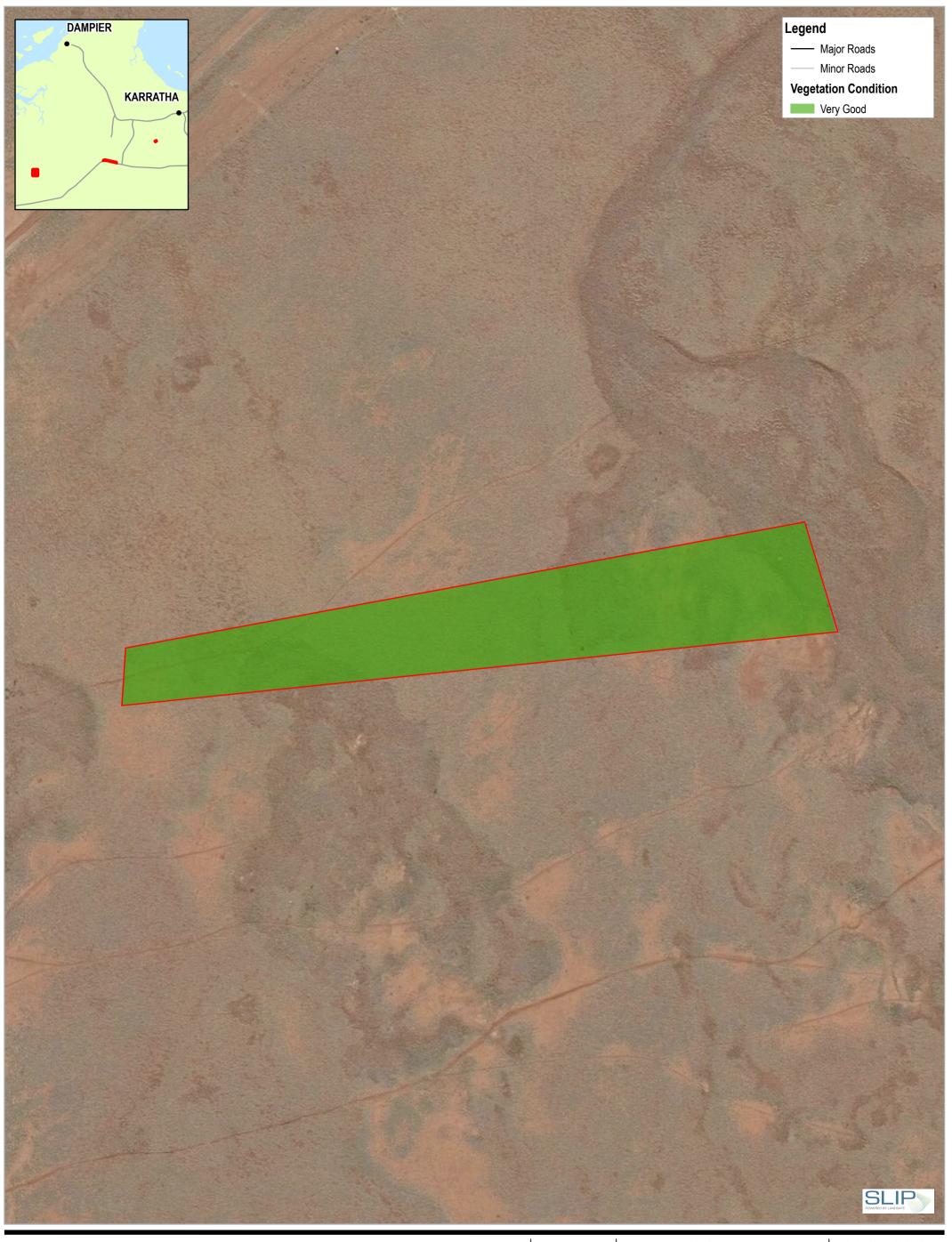


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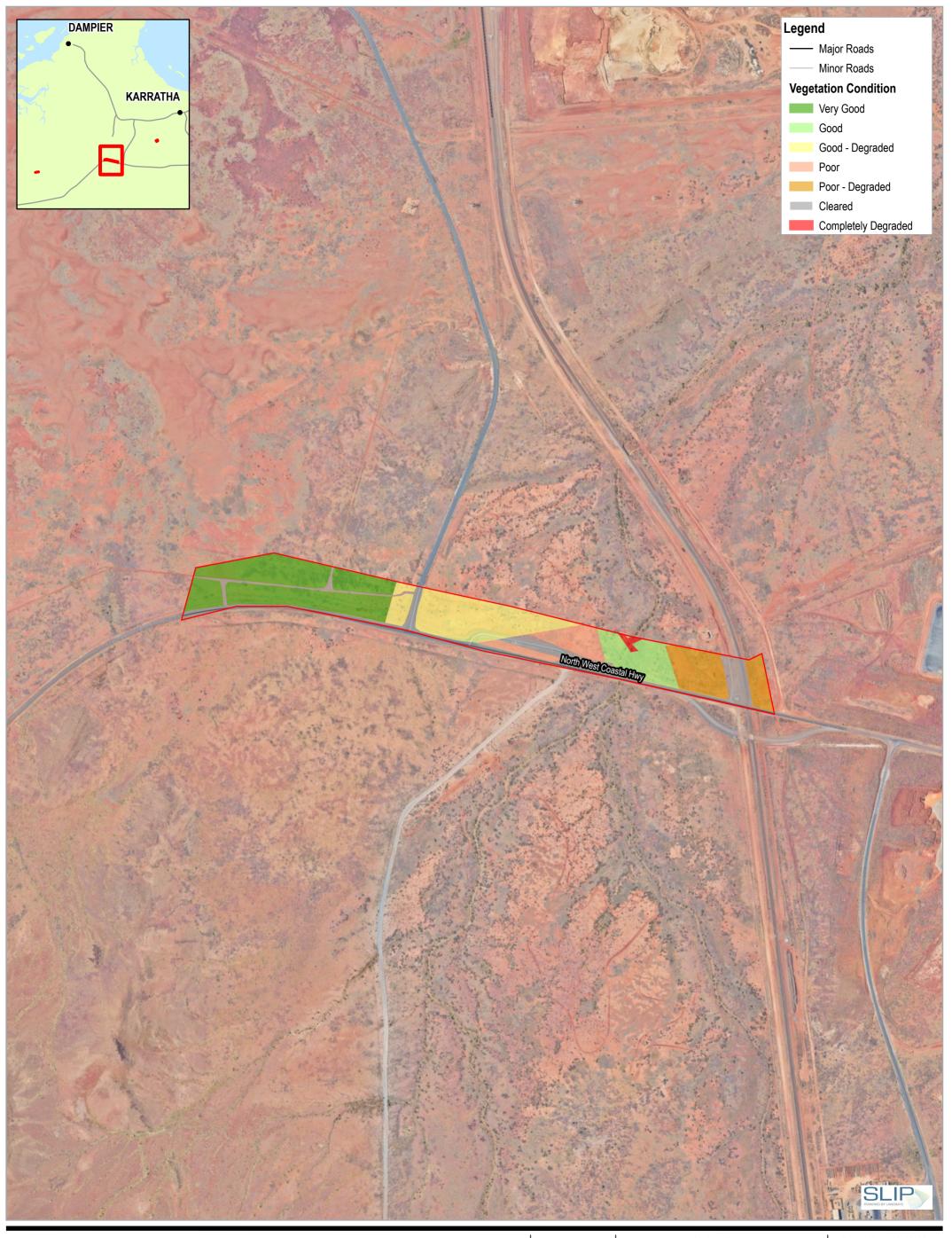


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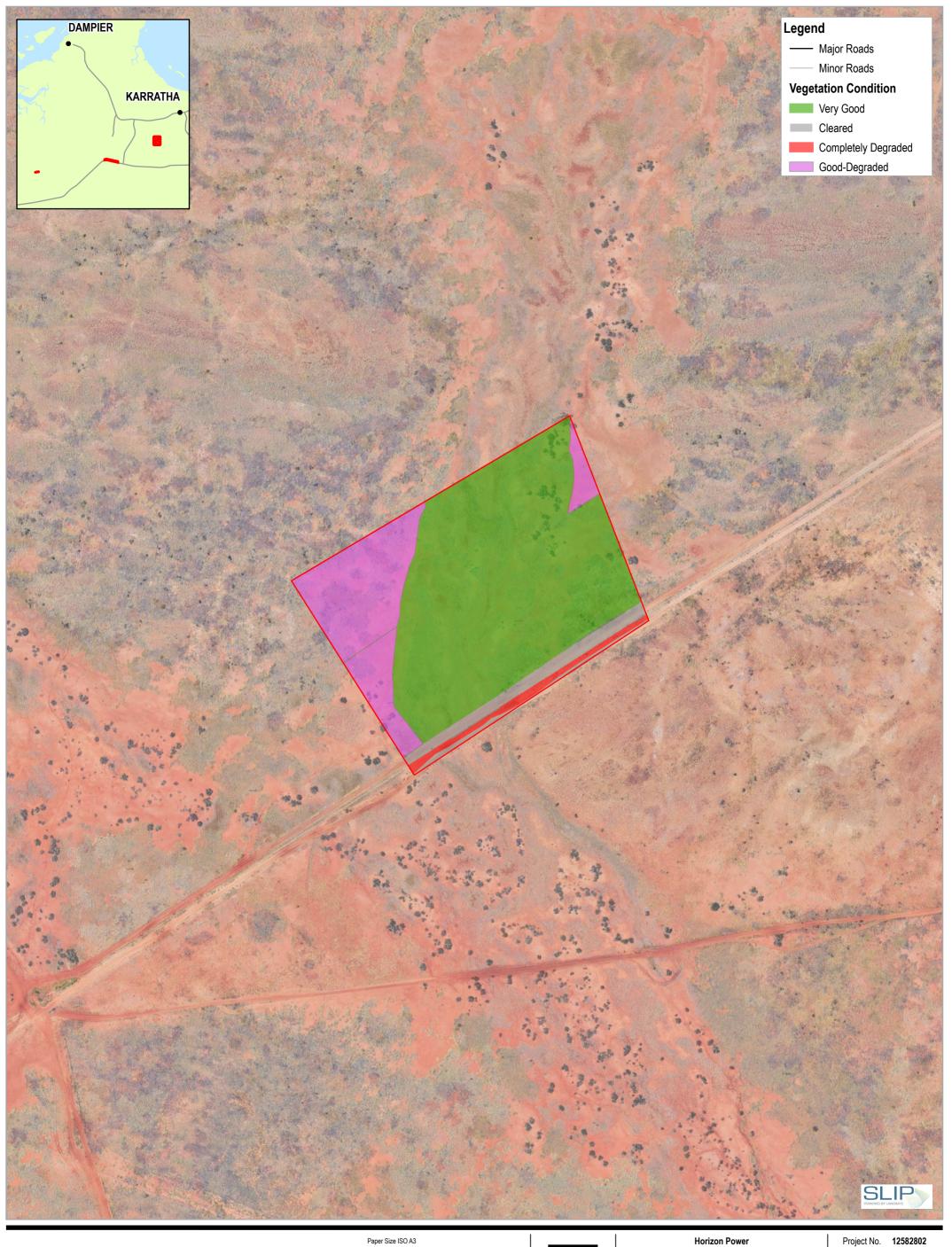


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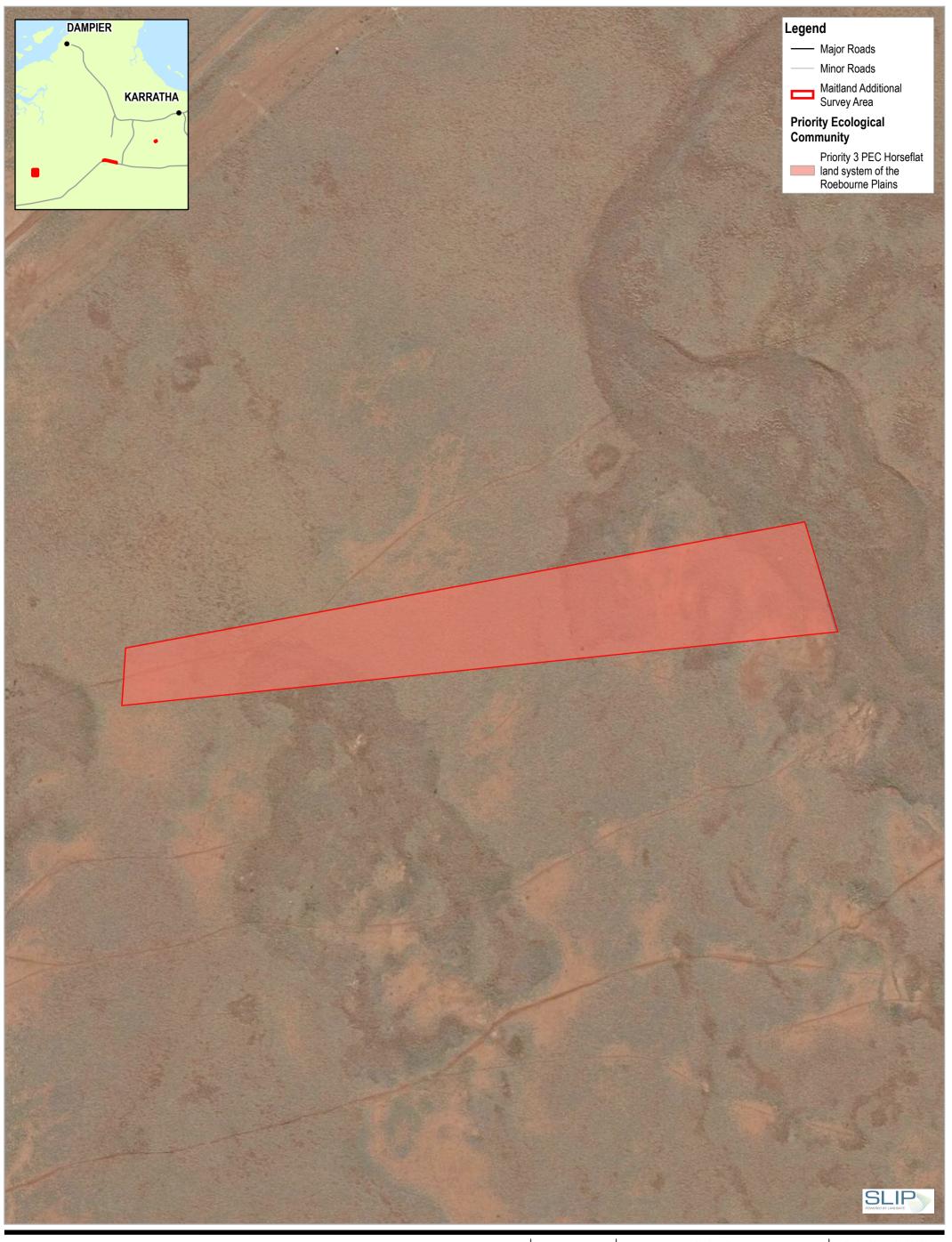
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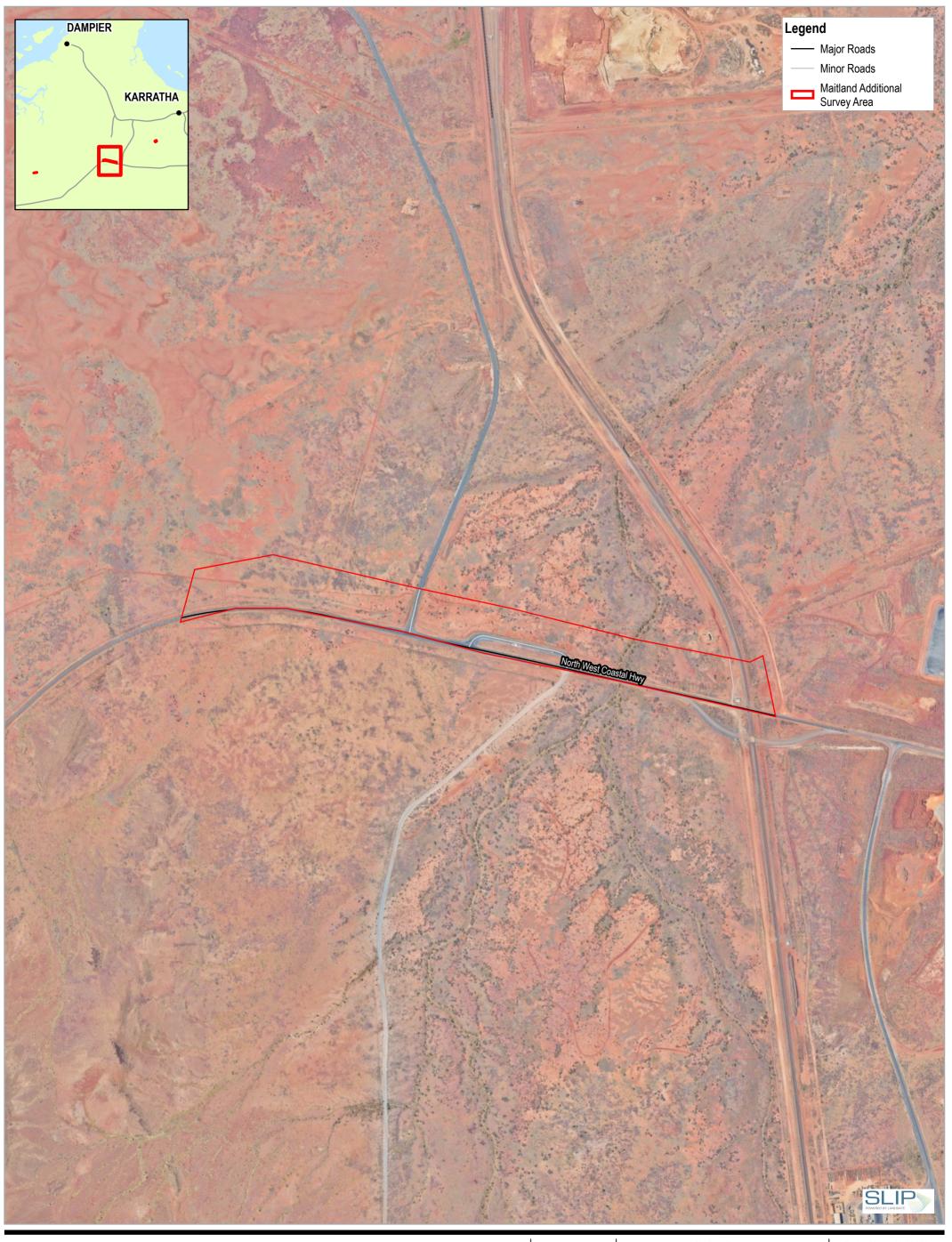


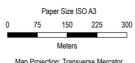
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Significant Vegetation Maitland Additional Areas

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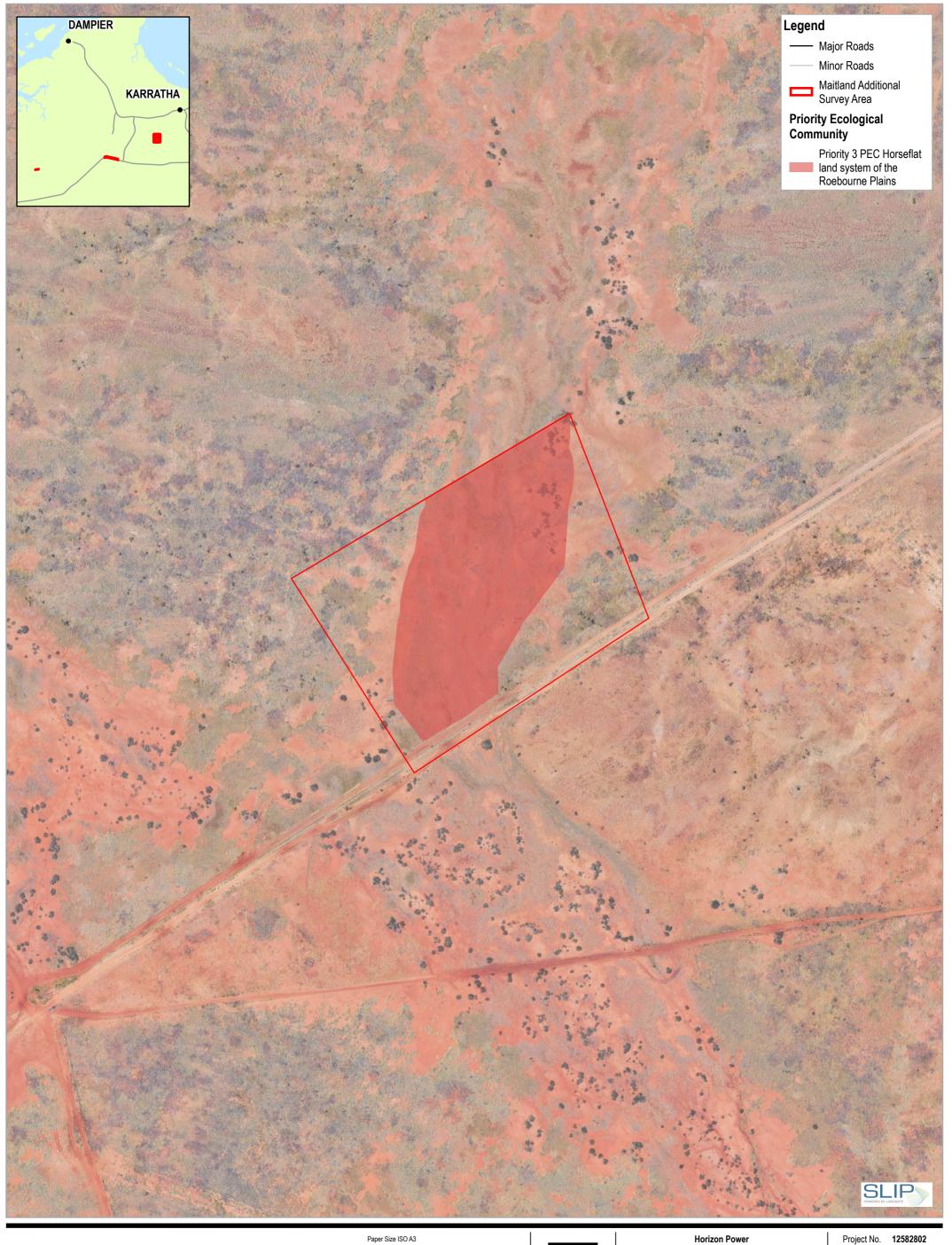


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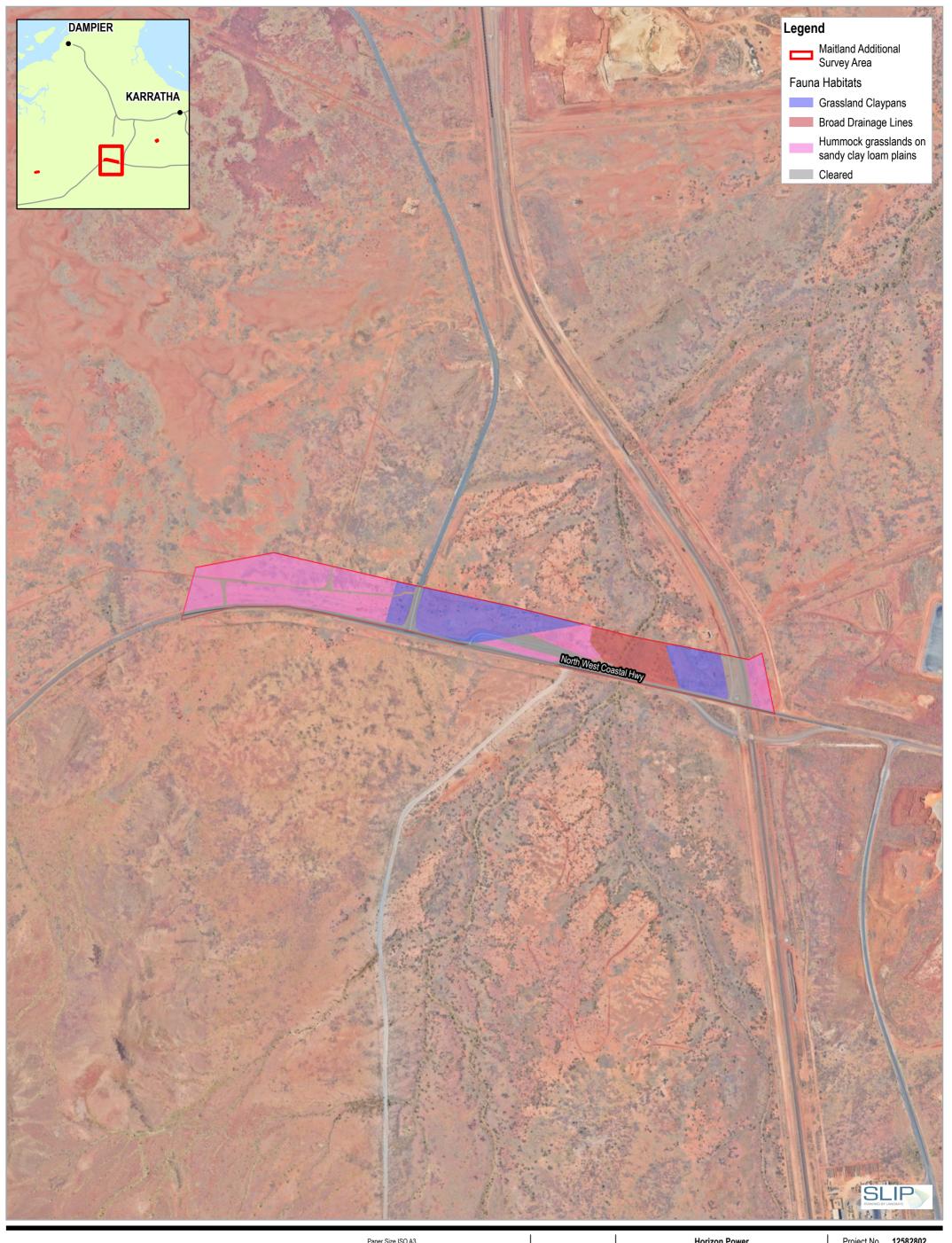




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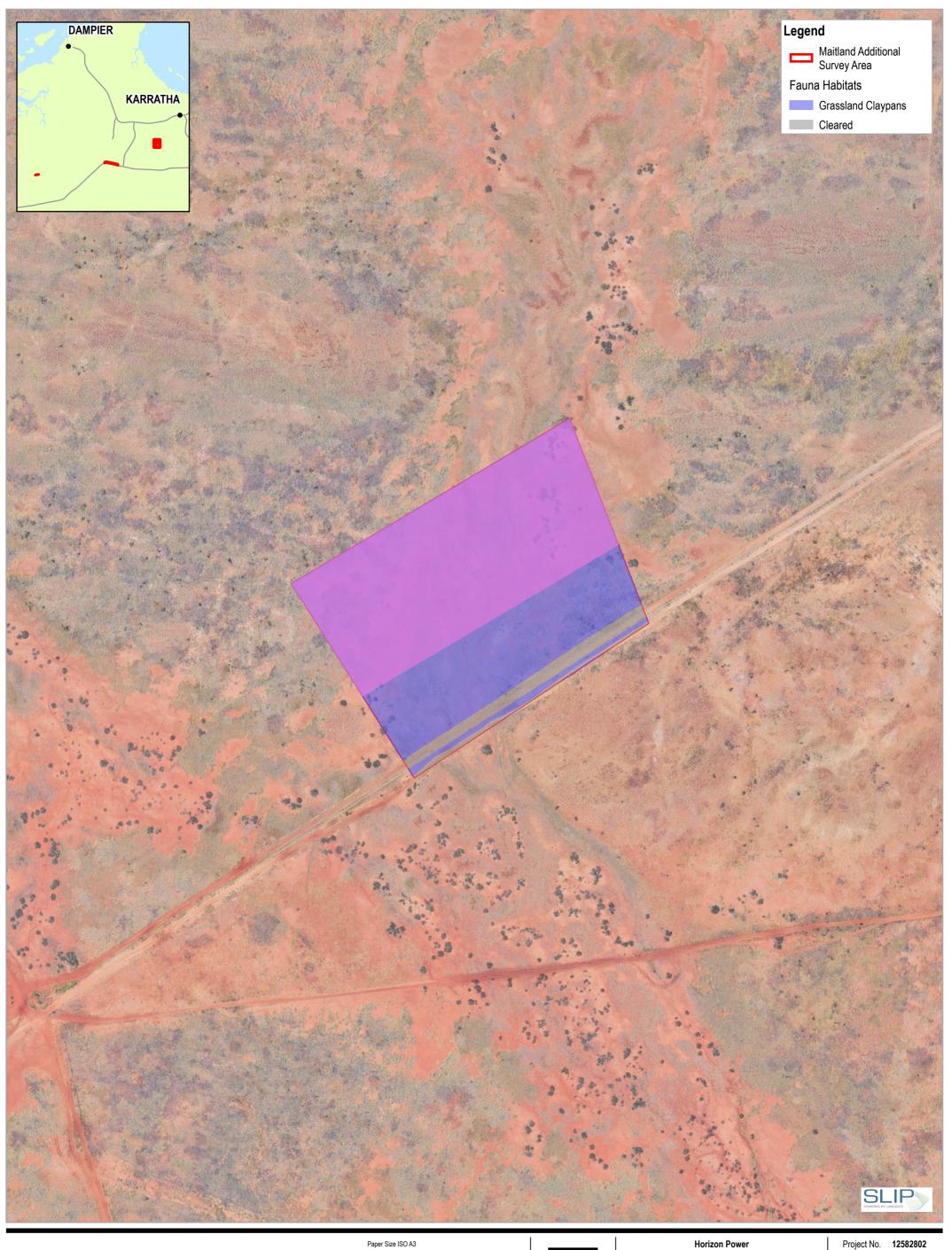




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