PROPOSED GENEX KIDSTON CONNECTION PROJECT

Corridor Selection Report

PREPARED BY

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4 DESCRIPTION OF THE PROJECT AREA

The study area commences near Mt Fox, approximately 100km north-west of Townsville and extends in a westerly direction for approximately 180km to the township of Kidston within the Etheridge Shire. The study area intersects three individual local government areas (LGAs) – Hinchinbrook Shire Council, Charters Towers Regional Council and Etheridge Shire Council.

The proposed substation near Mt Fox would likely be located within the Hinchinbrook Shire Council LGA. The nearest town to the substation would be Mt Fox and the nearest population centre would be Ingham (approximately 40km north-east of Mt Fox). The proposed Kidston substation would be located within Etheridge Shire Council with the nearest town being Einasleigh (approximately 40km north of Kidston, population 202). Approximately 115km of the proposed transmission line would be located within Charters Towers Regional Council with the nearest town being Greenvale (population 150).

The topography within the project area ranges from flat low lying land to steep crossings of multiple ranges, including part of the Pelican Range (70km west of Mt Fox) and the Great Dividing Range (100km west of Mt Fox). Elevation throughout the project area generally ranges from 400-800m AHD. Constructability through these areas is a key consideration in the development of feasible options.

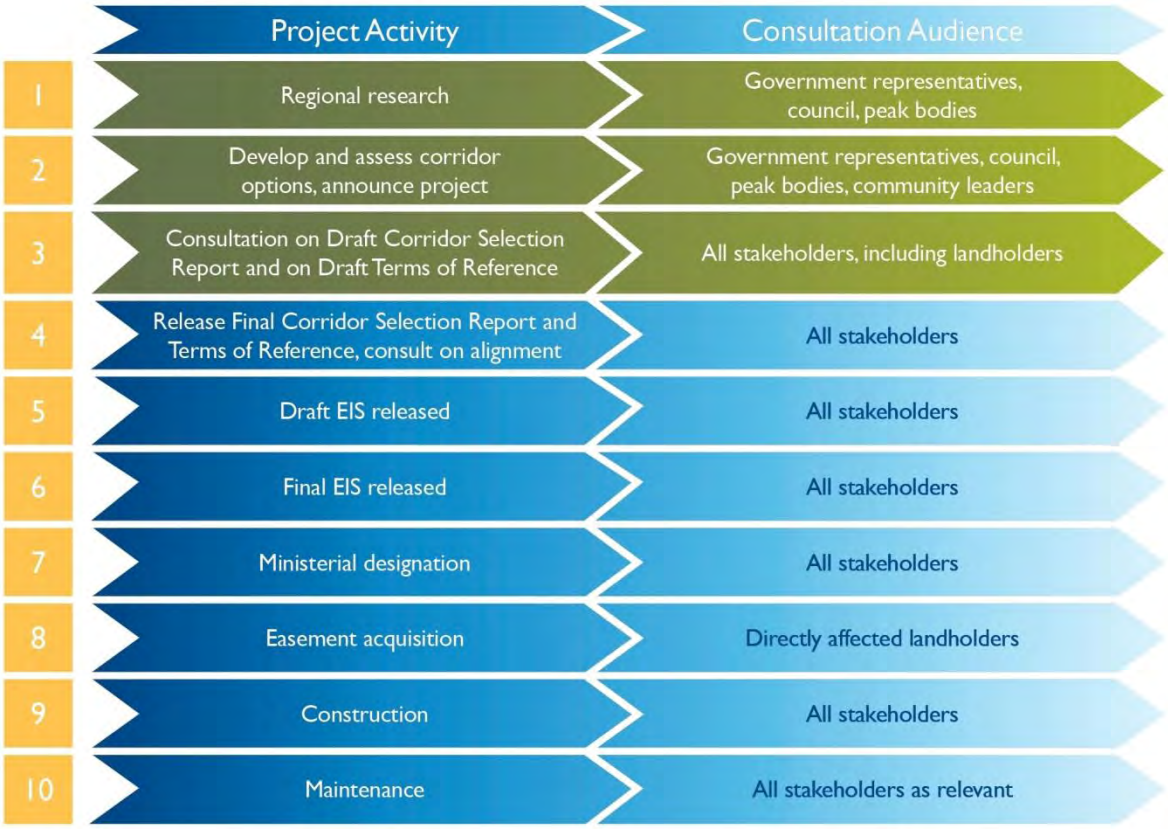
Existing infrastructure within the area includes an Ergon 66kV transmission line that runs 100km west from Mt Fox to Greenvale and another Ergon 132kV transmission line that runs from Ross to Kidston. Consideration of co-location opportunities with existing infrastructure corridors is a key consideration in the development of study corridor options within this report.

5 APPROACH AND METHODOLOGY

5.1 CORRIDOR DEVELOPMENT PROCESS

This CSR is one step in a broader development process for high voltage transmission projects which in turn is a subset of the project development for the combined hydro / solar at Kidston. The general development process is outlined in Figure 1.

Figure 1 – Corridor Development Process



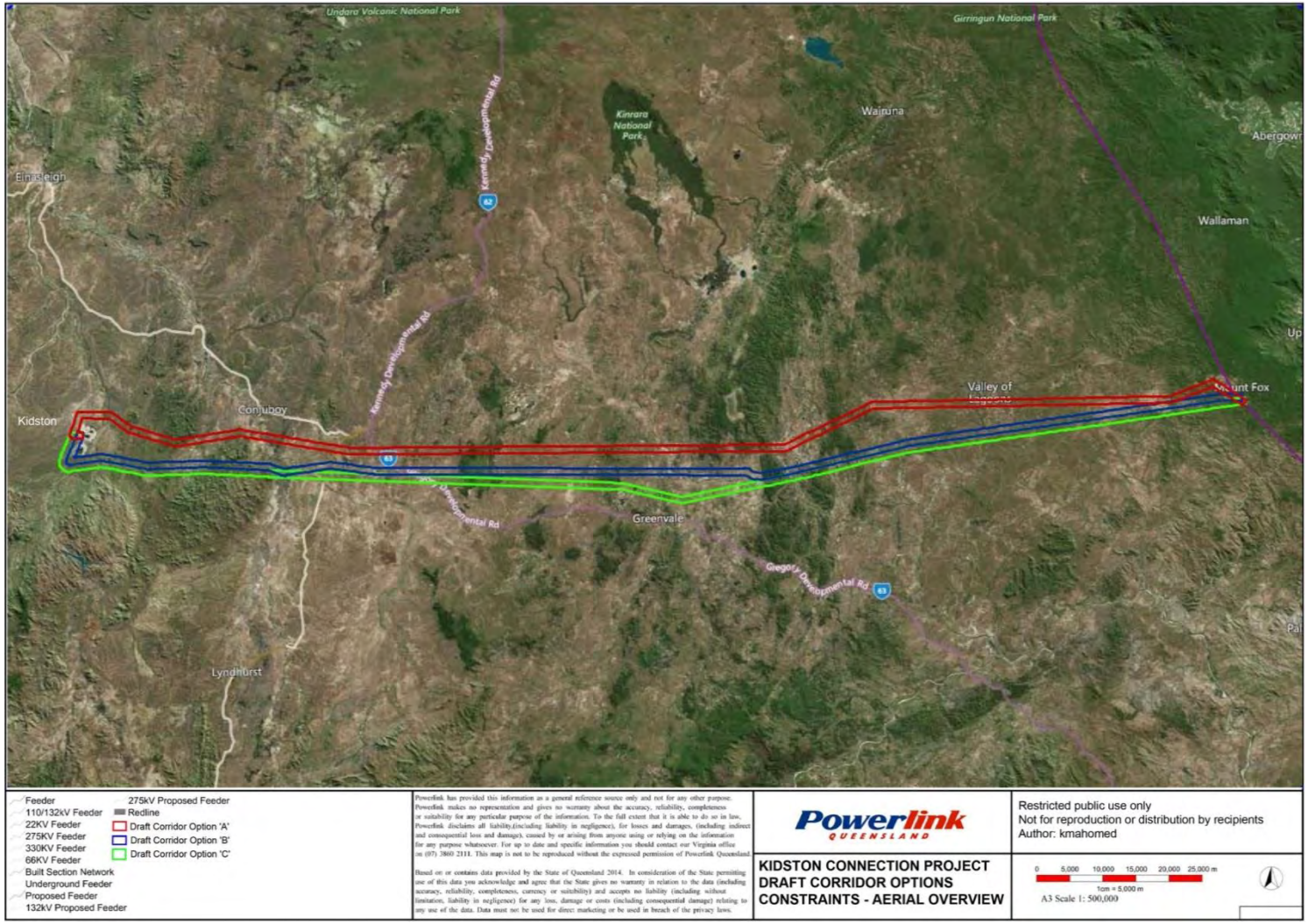
This CSR falls generally into steps 2 to 4 of Figure 1. It is important to note that Figure 1 represents a general process flow and the development process is tailored to individual projects.

In the case of Genex, the development processes is being undertaken in a staged manner. Each stage of the process represents a refinement of project scope and risk; allowing an opportunity to reassess the feasibility of the broader development. Sections 5.1.1 to 5.1.5 describe the stages of the corridor development process to date, including specific amendments to the study area during the development of this CSR. It is important to describe the approach to corridor development and refinement up front.

5.1.1 DRAFT CORRIDOR SELECTION REPORT

The DCSR was the first major step in the development process for Genex. The DCSR was completed in May 2016 and utilised publicly available datasets to identify three high level study corridor options for further assessment. The three study corridor options identified in the DCSR are shown in Figure 2.

Figure 2 – DCSR Study Corridor Options



The three study corridor options were discussed and developed with input from a range of stakeholders, including local and State government. Feedback from these stakeholders ensured the outcomes of the desktop studies in the DCSR included local knowledge and that major opportunities and constraints in the region were identified. The DCSR concluded that study corridor option A was the most constrained and for this reason it was excluded from further assessment as part of this CSR.

Study corridor option A was the most constrained of the three corridors identified in the DCSR due to:

- Intersection of the Mt Fox section of Girringun National Park
- Intersection of the Newcastle Range – Oaks Nature Refuge
- Proximity to Mt Fox Primary School
- Proximity to Kidston airstrip
- Highest relative intersection of steep terrain, major watercourse crossings, 'of concern' vegetation and potential habitat for protected species, including cassowary habitat near Mt Fox.

This CSR further explores study corridor options B and C as identified at the DCSR stage.

5.1.2 CORRIDOR SELECTION REPORT

The study area for this CSR is broadly defined by the outer bounds of study corridor options B and C from the DCSR, representing an iterative refinement of the study area. The study area for the CSR with study corridors B and C is depicted in Figure 3.

Figure 3 shows the study area expanded beyond the extent of the study corridors from the DCSR between Greenvale and Conjuboy. This is due to an amendment to the study area made during delivery of this CSR. A second amendment was also made at Mt Fox, refining the study area as greater understanding of the region was gained. The amendments are described in Sections 5.1.4 and 5.1.5.

This CSR has been developed based on a range of detailed desktop assessments, interrogation of existing agency data, aerial reconnaissance and stakeholder and landholder engagement. The following matters have been considered and informed by feedback from local representatives and landholders:

- Topography
- Hydrology
- Environment
- Native Title
- Cultural Heritage
- Tenure
- Local Government areas
- Residences
- Proximity to population

- Land use
- Existing infrastructure
- State planning interests and other State policy.

It is also important to note that because the project development process for Genex is being undertaken in stages, Powerlink's scope of work is to compile the CSR only at this stage. Terms of Reference (ToR), EIS, easement acquisition or construction activities are not currently scoped. Powerlink has significant experience scoping transmission projects and is available to assist Genex with these activities if required.

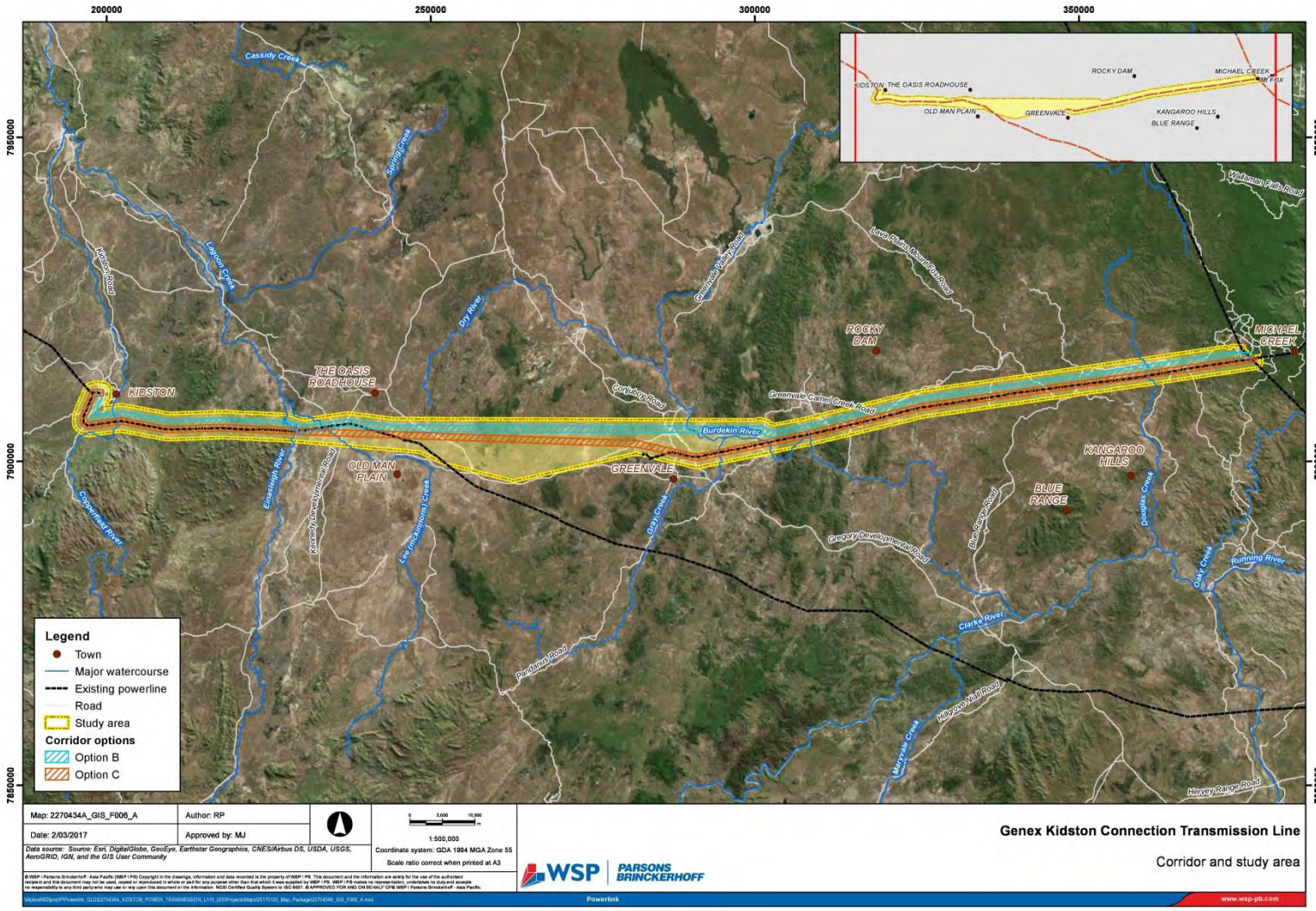
5.1.3 CONNECTION POINT

Irrespective of the corridor selected, a substation with switching capacity near Mt Fox will be required along with a 275kV substation at Kidston. The switching functionality is required to maintain the high reliability of the 275kV network. Without the switching capability, any fault/outage on the Kidston feeder section would remove one of the Ross to Chalumbin feeders from service and severely restrict the power flow and reliability of high voltage electricity supply to Far North Queensland. Mt Fox is considered an appropriate location for the proposed substation as it is the closest viable point to Kidston along Powerlink's existing 275kV Ross to Chalumbin transmission line.

Other locations for the substation were considered, but discounted because they were much further away or were constrained in other ways, such as potential impacts to National Park along Powerlink's existing 275kV Ross to Chalumbin transmission line (including the existing Chalumbin Substation). A study area commencing at Mt Fox also provides opportunity to co-locate with the existing Ergon transmission lines, which most other locations would not.

One of the other options considered was a connection to the existing Ross to Chalumbin line where it meets the existing Ergon 132kV line to Kidston at around Hervey Range. This location does offer the benefit of co-location opportunities, but is up to 40km longer overall than a connection to Mt Fox resulting in potentially greater social and environmental impacts, as well as increased construction costs.

Figure 3 – CSR Study Area and Study Corridors



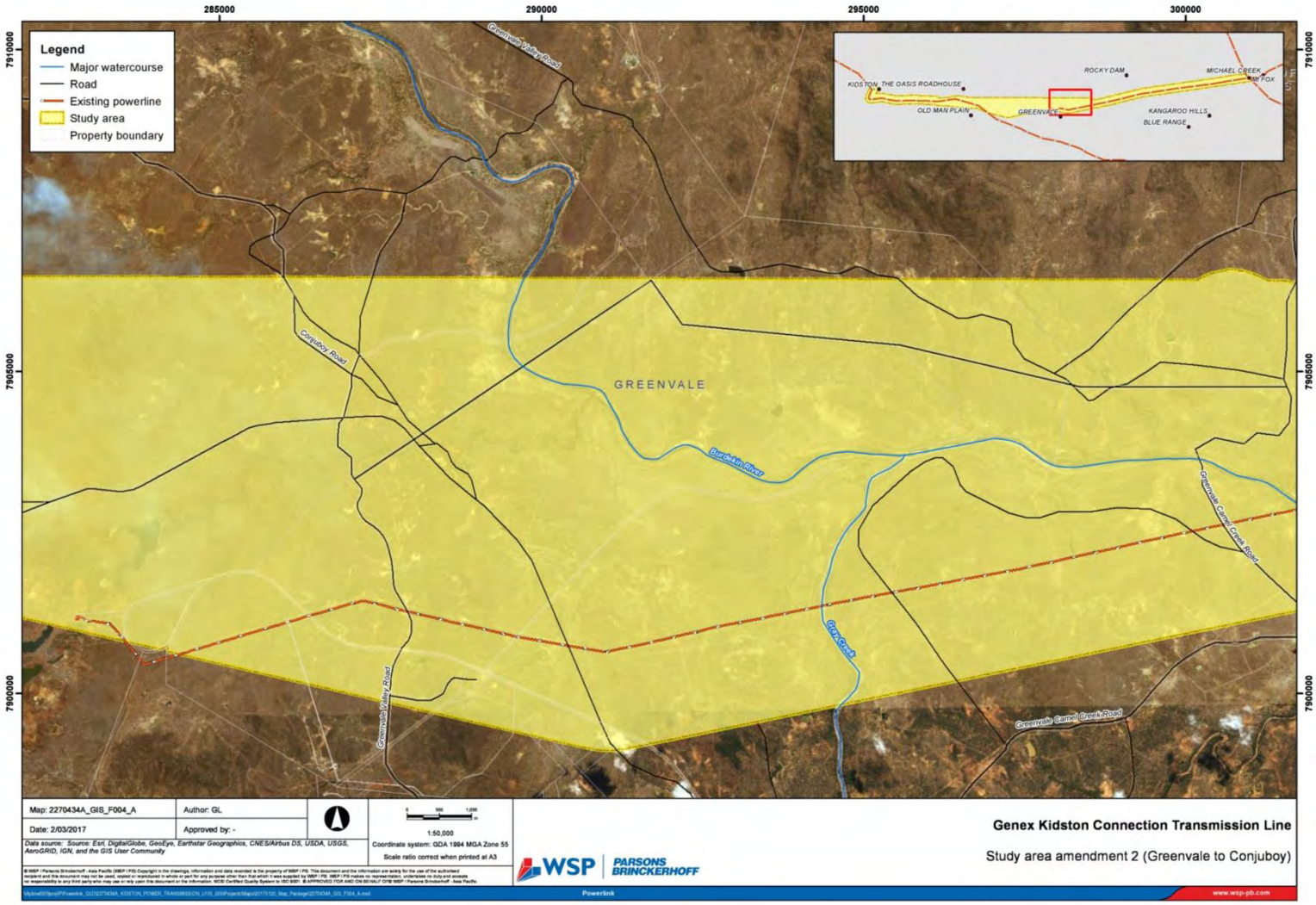
5.1.4 STUDY AREA AMENDMENT (WEST OF GREENVALE)

During investigations and visits to the proposed study area and with landholders as part of preparing this CSR, it became evident that terrain approximately 25km west of Greenvale is challenging from a construction perspective and that the study area needed to be broadened to offer greater opportunity to avoid these areas.

In this location the study area has been broadened significantly, as far south as the Gregory Development Road. Figure 4 shows the expanded study area. Importantly, the extension of the study area did not impact any additional new properties, with potential impacts limited to lots that were already intersected by the previous study area.

A preliminary alignment that avoided the most difficult terrain was also developed. The preliminary alignment deviates south of the initial extent of study corridor option C in this location, responding to the constraints identified in the field before reconnecting to the initial study corridor areas at Conjuboy. The preliminary alignment is discussed in Section 14.2.

Figure 4 - Study Area Amendment 25km West of Greenvale



5.1.5 STUDY AREA AMENDMENT (MT FOX)

The same refinement process was applied to the proposed study area around Mt Fox. As Powerlink travelled through the area and spoke with stakeholders and landholders it was evident that several of the properties impacted by the initial study area could be removed from the study area. The properties were removed for a range of reasons, including:

- The study area affected only a small part of the property and there was no real potential for Powerlink to identify a suitably sized substation site on the property
- The property backed directly onto Mt Fox Primary School (applies to 46 WU44).

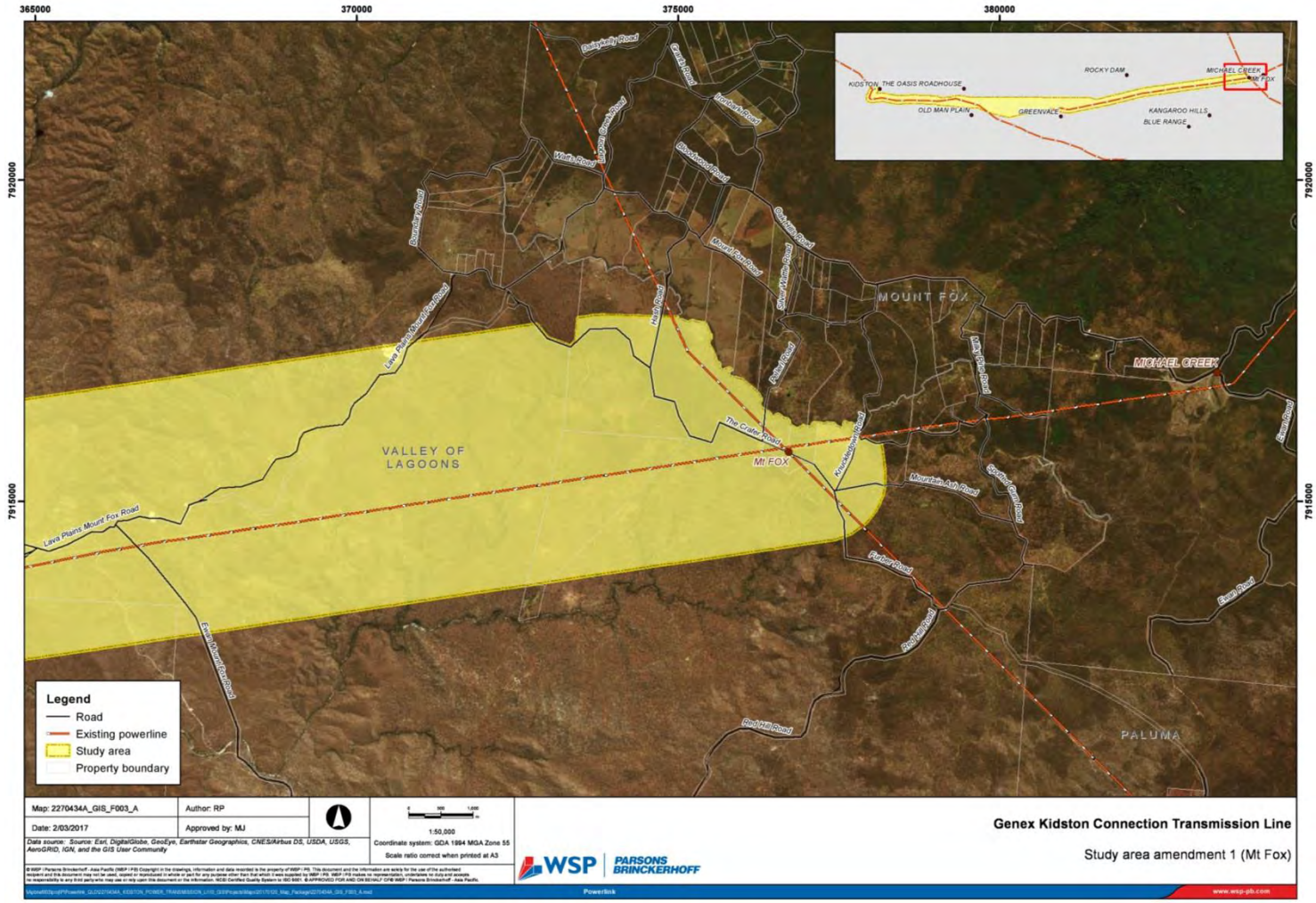
Multiple properties located to the east of Powerlink's existing Ross to Chalumbin 275kV transmission line were also removed from the study area. Several factors contributed to this amendment:

- Additional investigations identified topographic and environmental constraints at Mt Fox that would make extending the line to the east of Powerlink's existing Ross to Chalumbin transmission line more challenging from a construction perspective
- The Liefway Nature Refuge occurred in the area and would not represent a viable location for a substation
- Reducing the size of the study area minimises social impacts
- Several opportunities for a substation site exist in more preferential locations under and west of Powerlink's existing Ross to Chalumbin transmission line.

The proposed study area was therefore refined to be coincident with an unnamed creek immediately east of the existing Ross to Chalumbin transmission line. The creek line forms a logical natural boundary for the study area. Avoidance of a creek crossing is also considered beneficial where possible.

Figure 5 depicts the amended study area at Mt Fox. Properties removed from the study area were also contacted by phone and sent a letter to notify them of the change, and offer opportunities for further engagement if desired.

Figure 5 – Amended Study Area at Mt Fox



5.1.6 NEXT STEPS

This CSR will provide the basis for detailed investigations of the preferred study corridor and preliminary alignment by Powerlink in a future impact assessment process should the project proceed.

Genex has multiple process options available to progress the proposed connection project. Environmental and technical field investigations and further opportunities for stakeholder and landowner engagement will be integral parts of the process, irrespective of the approval path chosen.

Powerlink has significant experience in transmission line development in Queensland, including impact assessment, land acquisition, stakeholder and landholder engagement to support Genex in subsequent phases, whichever process is deemed preferable.

5.2 LIMITATIONS AND ASSUMPTIONS

This report has been prepared based on the following assumptions:

- The preferred study corridor and preliminary alignment are of variable width and are subject to localised amendment as constraints are further understood in subsequent assessment processes
- No ecological, geotechnical, resistivity, hydrological, water quality or other detailed field based technical assessment has been undertaken
- A 60m wide easement will be required for any future final corridor selected to accommodate a 275kV double circuit transmission line
- Access, laydowns and off easement property requirements are not known at present and therefore not assessable at this level of investigation.

Other assumptions and limitations are provided throughout the document where they are relevant to specific sections.

6 INFRASTRUCTURE REQUIREMENTS

6.1 TRANSMISSION LINE

This study has been based on a potential requirement to provide a 275kV double circuit transmission line from Powerlink's existing high voltage network to Genex's generation facility at Kidston. Based on draft corridors developed to date, approximately 188km of transmission line would be required. Configuration of the transmission line would likely be double circuit steel lattice tower design constructed within a new 60m wide easement.

Underground construction is not considered viable where sufficient space for overhead infrastructure exists. Underground construction is not only significantly more costly than overhead construction, but the easement must be kept clear of vegetation. Overhead infrastructure can be carefully sited to span sensitive environmental and cultural features. In the event of a fault it also often takes longer to restore service on underground transmission lines, with fault identification more difficult than equivalent overhead transmission lines.

No network limitations have been identified that would prohibit connection of the generation facility at Kidston. Temporary workers camps, accommodation and offices are also likely to be necessary. The location and scale of those facilities will be defined during subsequent detailed impact assessment processes.

6.2 SUBSTATION – MT FOX

A substation with switching capability is necessary for the connection to the Ross to Chalumbin transmission line as it allows for electricity to be transferred to either Ross Substation (south of Mt Fox) or Chalumbin Substation (north of Mt Fox) as required. The switching functionality is required to maintain the high reliability of the 275kV network. Without the switching capability, any fault/outage on the Kidston feeder section would remove one of the Ross to Chalumbin feeders from service and severely restrict the power flow and reliability of high voltage electricity supply to Far North Queensland.

The proposed Mt Fox Substation would be located along Powerlink's existing double circuit 275kV Ross to Chalumbin transmission line. Actual site configurations and technical arrangements will need to be developed as part of any future design and consultation activities, but this CSR discusses high level site opportunities.

6.3 SUBSTATION – KIDSTON

A 275kV substation at Kidston, located at the Genex generation site, is required to transform the solar and hydro energy generated to a voltage suitable to transmit to the grid connection point at Mt Fox. Powerlink understands that the Kidston substation will be located on Genex owned land at Kidston, as close as possible to the generation facility.

The study area enters the western side of the Genex owned land at Kidston. Doing so maximises co-location with the existing Ergon transmission lines, increases the distance to residences east of the Genex facility, and avoids a nature refuge north-east of the Genex facility.