APPENDIX M

INLAND RAIL

Preliminary Fauna Movement Provision and Fencing Strategy

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT

IR_1534

ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

Inland Rail Border to Gowrie Project

Appendix M – Preliminary Fauna Movement Provision and Fencing Strategy

Australian Rail Track Corporation

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1 Introduction

Maintaining effective fauna movement across the rail corridor has been an important consideration in the development of the reference design for the Border to Gowrie Project (the Project). The purpose of this preliminary fauna movement provision and fencing strategy (the strategy) is to identify fauna corridors that the Project crosses and to nominate the optimal locations for fauna crossings and associated fencing. Fencing has been considered in combination with movement opportunities in order to provide funnelling of fauna to areas of safe passage.

This strategy seeks to focus on areas of greenfield development where existing fauna movement may be impacted upon by the Project. It also seeks to maintain fauna movement opportunities where they already exist (e.g. along vegetated drainage features).

Where practical, the strategy provides recommendations for conceptual fauna crossing design types and associated fencing with consideration for the Department of Transport and Main Roads (DTMR) Fauna Sensitive Road Design Manual – Volume 2 (2010) (the Manual). The Manual provides guidance and examples of approved fauna movement strategies for linear infrastructure, and the material is readily adapted to rail corridors. During the detail design phase of the Project, additional expert guidance in relation to specific design features will be sought to ensure that best practice is followed.

The intent of this strategy is to identify fauna movement and fencing opportunities that are to be investigated further during the detail design phase of the Project to confirm the appropriateness of each solution at the nominated location. This confirmation of suitability for each fauna connectivity opportunity will be reliant upon:

- Consultation with adjoining landholders to confirm the acceptability of the proposed connectivity or fencing approach at each nominated location
- Assessment of each opportunity for compatibility with the detail design, particularly with the vertical alignment (height) of the railway and the provision of cross drainage structures
- Consideration for additional maintenance constraints that a fauna connectivity or fencing opportunity may introduce.

Fauna movement opportunities, across the rail corridor, are discussed in Section 2 and the fencing strategy for the Project is discussed in Section 3. Each fauna movement and fencing opportunity will be investigated further during the detail design phase of the Project, in consultation with relevant stakeholders and landholders to confirm the appropriateness of each solution at the nominated location.

2 Fauna movement opportunities

2.1 Previous surveys

The impact assessment area for the Project has been subject to comprehensive flora, fauna and aquatic ecology assessments to identify significant ecological features and receptors. These include, but are not limited, to flora and fauna species (including migratory species) protected under the provisions of the *Nature Conservation Act 1992* (Qld) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

These assessments included a combination of desktop assessments, geographic information system (GIS) modelling and field-based assessment. An assessment of likelihood of occurrence of species was undertaken, including for those species known to occur within the impact assessment area from previous records (in last 5 to 10 years) and those species that were recorded during targeted field investigations.

2.2 Selection of fauna crossing location criteria

An assessment was undertaken to identify areas that were one or more of the following and would be severed by the Project:

- Remnant vegetation
- High value wildlife habitat
- Drainage features
- Areas containing historical records for fauna species
- Areas recognised as a biodiversity corridor.

These areas were the primary focus for the provision of fauna movement opportunities.

Relevant publicly available mapping overlays were considered when identifying locations for potential fauna movement opportunities. These datasets included:

- Biodiversity Planning Assessment – mapping for South East Queensland, published by the Department of Environment and Heritage Protection, now the Department of Environment and Science (DES) (refer Appendix A)
- Regional ecosystem mapping (DES) (refer Appendix B)
- Wildlife habitat mapping (DES) (refer Appendix C)
- Visual reviews of aerial photography, to confirm areas of connectivity, including vegetation cover and riparian zones (Google Earth and Queensland Globe aerial imagery)
- Predictive habitat mapping and site based records identified in Appendix J: Terrestrial Ecology Technical Report of the Border to Gowrie EIS.

Analysis of these datasets indicated that drainage features represent important fauna movement conduits across the Project footprint. This is due largely to the Project being located in a highly fragmented landscape, that is subject to considerable agricultural activities (e.g. cropping and grazing). As such, maintaining connectivity along drainage features is a key focus of this strategy.

2.3 Fauna crossing opportunities

2.3.1 Crossing opportunity locations

The Manual provides information relating to recommended fauna crossings. Table 2.1 outlines possible locations and design types for potential fauna movement opportunities. It also provides details related to the species considered likely to use the proposed crossing. Additional areas that may assist fauna movement (e.g. rail-over-road crossings) will be explored through the detail design stage in consultation with relevant stakeholders and landholders and will be incorporated into the design where feasible and appropriate.

Rehabilitation and revegetation at fauna crossing locations will be developed during the detail design phase of the Project and will be considerate of features to enhance fauna movement with regard to the target species (e.g. revegetation under bridges to assist the movement of aboral species; restoration of a “shrubby” layer to maintain connectivity and cover for insectivorous birds and cryptic species, etc.).

Nominated fauna crossing locations correspond with those shown in Figure 2.1. Whilst the provision of fencing to channel fauna to specific crossing locations has targeted rail bridges (i.e. those areas that contain natural fauna conduits associated with larger waterways), it is acknowledged that culverts may also act to facilitate fauna passage. The provision of fauna funnelling fencing associated with such structures will be further investigated during the detail design stage of the Project.

Table 2.1 Summary of fauna crossing opportunities for consideration in detail design

Crossing number	Chainage (km)	Possible crossing type	Target fauna species	Specific fencing/infrastructure opportunity
1	30.5 (NS2B) - 30.7 (NS2B)	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate fish passage.
2	30.7 (NS2B) - 31.1 (NS2B)	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate fish passage.
3	31.4 (NS2B) - 31.6 (NS2B)	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate fish passage.

Crossing number	Chainage (km)	Possible crossing type	Target fauna species	Specific fencing/infrastructure opportunity
4	32.2 (NS2B) - 32.8 (NS2B)	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species
5	48.10	Over track at natural level (cut/fill interface)	Macropods, arboreal species, terrestrial mammals, small size mammals, snakes and lizards, and invertebrates. **Endangered Vulnerable and Near-threatened (EVNT) Target Species** – Dunmall's snake, Koalas.	Refuge poles and other structures to encourage fauna to pass through the area. Specific rehabilitation/revegetation actions should be designed to encourage fauna to move perpendicular to the track at this location with minimal revegetation works undertaken within areas that are likely to encourage fauna to move parallel to the rail corridor. Natural earth/levels are to be maintained wherever possible.
6	52.48 - 52.69	Proposed rail bridge over watercourse	Macropods, arboreal species, terrestrial mammals, small size mammals, snakes and lizards, and invertebrates. **EVNT Target Species** – Dunmall's snake, Koalas.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species.
7	55.45 - 55.66	Proposed rail bridge over watercourse	Macropods, arboreal species, terrestrial mammals, small size mammals, snakes and lizards, and invertebrates **EVNT Target Species** – Dunmall's snake, Koalas.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure. Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species.
8	57.20	Canopy bridge overpass	Arboreal species including possums, gliders and koalas. **EVNT Target Species** – Greater glider.	Fencing not applicable. Opportunity for canopy bridge (refer Figure 2.4).
9	59.10	Over track at natural level (cut/fill interface)	Macropods, arboreal species, terrestrial mammals, small size mammals, snakes and lizards, and invertebrates. **EVNT Target Species** – Dunmall's snake, Koalas.	Refuge poles and other structures to encourage fauna to pass through the area. Specific rehabilitation/revegetation actions should be designed to encourage fauna to move perpendicular to the track at this location with minimal revegetation works undertaken within areas that are likely to encourage fauna to move parallel to the rail corridor. Natural earth/levels are to be maintained wherever possible.

Crossing number	Chainage (km)	Possible crossing type	Target fauna species	Specific fencing/infrastructure opportunity
10	67.18 - 67.52	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate fish passage.
11	88.21 - 88.34	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate platypus and fish passage.
12	93.84 - 94.02	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate platypus and fish and turtle passage.
13	97.43 - 97.73	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate platypus and fish and turtle passage.
14	100.07 - 100.69	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate platypus and fish and turtle passage.

Crossing number	Chainage (km)	Possible crossing type	Target fauna species	Specific fencing/infrastructure opportunity
15	104.3 – 104.4	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate platypus and fish and turtle passage.
16	127.95 - 128.18	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate platypus and fish and turtle passage.
17	138.01 - 138.35	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas, Condamine earless dragon.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Note: This opportunity is located on the Condamine River floodplain. The rail corridor will not be fenced across this floodplain to avoid the possibility of debris accumulation in fencing during flood events. Therefore, this fauna fencing opportunity may not be practicable from a safety perspective.
18	138.38 - 139.33	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** - Koalas, Condamine earless dragon.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate platypus and fish and turtle passage. Note: This opportunity is located on the Condamine River floodplain. The rail corridor will not be fenced across this floodplain to avoid the possibility of debris accumulation in fencing during flood events. Therefore, this fauna fencing opportunity may not be practicable from a safety perspective.

Crossing number	Chainage (km)	Possible crossing type	Target fauna species	Specific fencing/infrastructure opportunity
19	141.34 - 142.00	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas, Condamine earless dragon.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate platypus and fish and turtle passage. Note: This opportunity is located on the Condamine River floodplain. The rail corridor will not be fenced across this floodplain to avoid the possibility of debris accumulation in fencing during flood events. Therefore, this fauna fencing opportunity may not be practicable from a safety perspective.
20	142.60 - 144.51	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas, Condamine earless dragon.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Natural earth/levels are to be maintained wherever possible and the area is to be suitably rehabilitated to provide cover for the target fauna species. Obstructions to waterways are to be minimised so as to facilitate platypus and fish and turtle passage. Note: This opportunity is located on the Condamine River floodplain. The rail corridor will not be fenced across this floodplain to avoid the possibility of debris accumulation in fencing during flood events. Therefore, this fauna fencing opportunity may not be practicable from a safety perspective.
21	144.54 - 145.14	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas, Condamine earless dragon.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Note: This opportunity is located on the Condamine River floodplain. The rail corridor will not be fenced across this floodplain to avoid the possibility of debris accumulation in fencing during flood events. Therefore, this fauna fencing opportunity may not be practicable from a safety perspective.
22	147.76 - 149.33	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas, Condamine earless dragon.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2). Note: This opportunity is located on the Condamine River floodplain. The rail corridor will not be fenced across this floodplain to avoid the possibility of debris accumulation in fencing during flood events. Therefore, this fauna fencing opportunity may not be practicable from a safety perspective.

Crossing number	Chainage (km)	Possible crossing type	Target fauna species	Specific fencing/infrastructure opportunity
23	197.13 - 197.36	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas, Condamine earless dragon.	Opportunity for fauna funnelling fencing. Fencing is to extend 150 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2).
24	197.86 - 198.04	Proposed rail bridge over watercourse	Fish, frogs, macropods, arboreal species, terrestrial mammals, platypus, small size mammals, birds, snakes and lizards, turtles and invertebrates. **EVNT Target Species** – Koalas, Condamine earless dragon.	Opportunity for fauna funnelling fencing. Fencing is to extend 100 m beyond the proposed crossing location to guide fauna to the bridge structure (refer Figure 2.2).

The rationale behind each of the three proposed crossing types is outlined in Section 2.3.2 to Section 2.3.4.

2.3.2 Track crossings at natural level (cut/fill interface)

Crossings at locations five and nine in Table 2.1 have been selected as they occur in key areas of habitat connectivity which also occur at locations where cut changes to fill. This represents a line of sight for moving fauna which would be at risk of being trapped in battered sections of railway. Appropriate design solutions for fauna fencing, refuge poles and other infrastructure ("furniture") to encourage fauna use are proposed in Section 2.5.

In addition to the provision of structures, specific rehabilitation and revegetation actions should be designed to encourage fauna to move perpendicular to the track at designated crossing locations. Revegetation that is likely to encourage fauna movement parallel to the rail corridor should be minimised.

2.3.3 Canopy bridge overpass

A single canopy bridge overpass is nominated as a fauna crossing solution at location eight in Table 2.1. The nominated design solution for this overpass is a rope ladder style canopy bridge over a section of cut. It would be constructed as per specifications outlined in Section 6.4 of the Manual. This style of crossing is preferred by various arboreal species, such as possums and gliders.

The design specifics for this solution are outlined in Section 2.5. The feasibility of this structure will be subject to the vertical alignment (height) of the railway and width of rail corridor, which will be confirmed during the detail design phase.

2.3.4 Rail bridges over watercourses

With the exception of crossing locations five, eight and nine, all crossing locations coincide with the location of a proposed rail bridge over a watercourse (refer Table 2.1). In most instances, the cross-drainage solution provided in the reference design at each location will sufficiently enable fauna movement during dry conditions. However, fencing to channel fauna to the crossing point will be required in accordance with the Manual. Details associated with fencing are provided in Table 3.1.

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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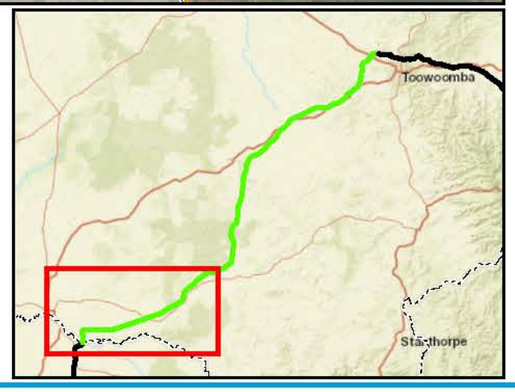
Legend

- 5 Chainage (km)
- Localities
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Existing rail (operational)
- Major roads
- Minor roads
- Watercourses
- NSW/QLD border

Proposed fauna crossings

- Proposed rail bridge over watercourse/drainage feature
- Canopy bridge overpass
- Over track at natural level (cut / fill interface)



A3 scale: 1:250,000

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Border to Gowrie
Figure 2.1a:
Location of proposed fauna crossings

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
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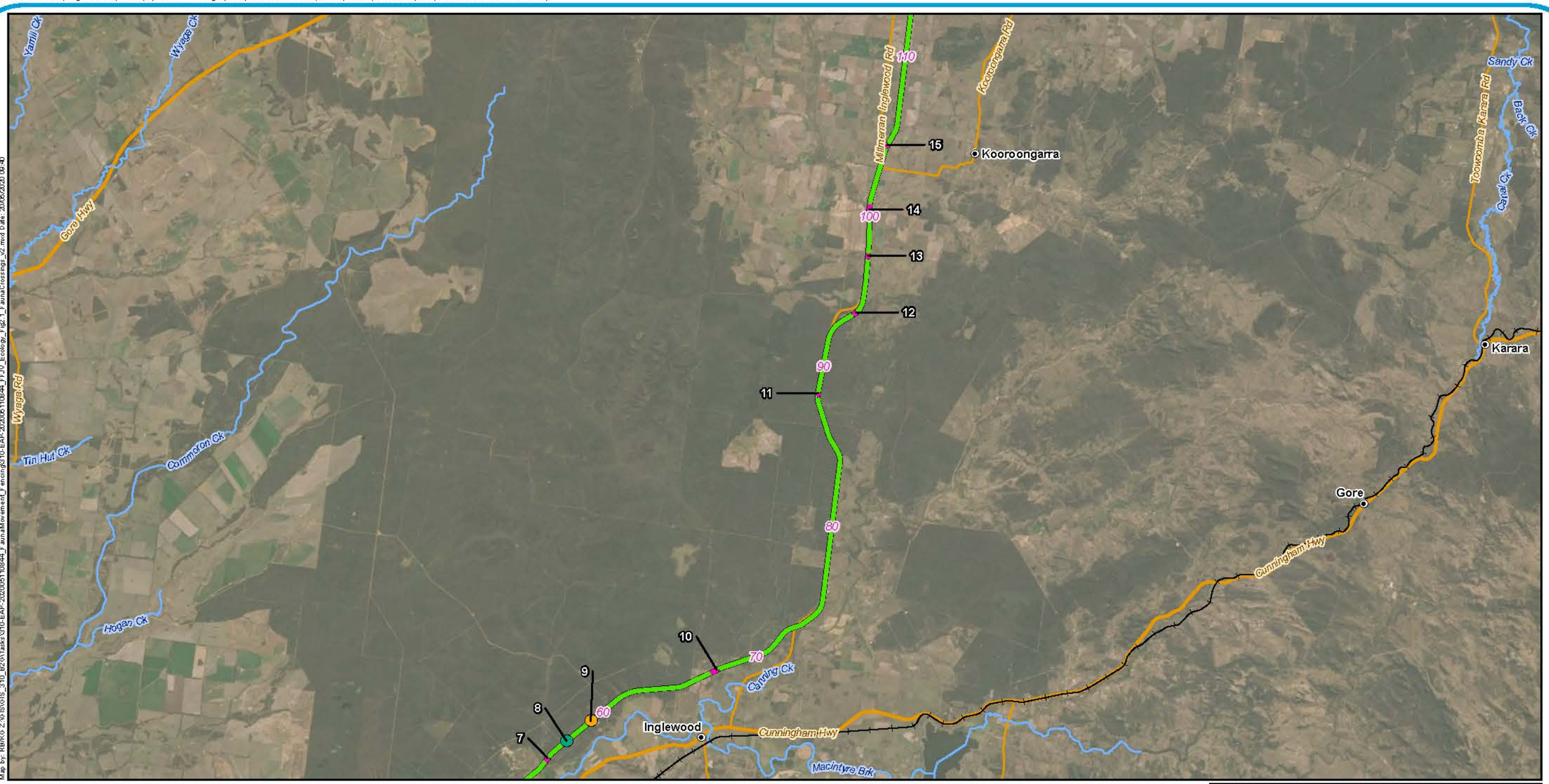

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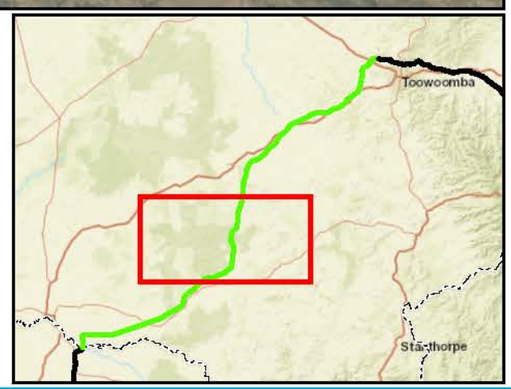
Legend

- 5 Chainage (km)
- Localities
- Border to Gowrie alignment
- Existing rail (operational)
- Major roads
- Minor roads
- Watercourses

Proposed fauna crossings

- Proposed rail bridge over watercourse/drainage feature
- Canopy bridge overpass
- Over track at natural level (cut / fill interface)



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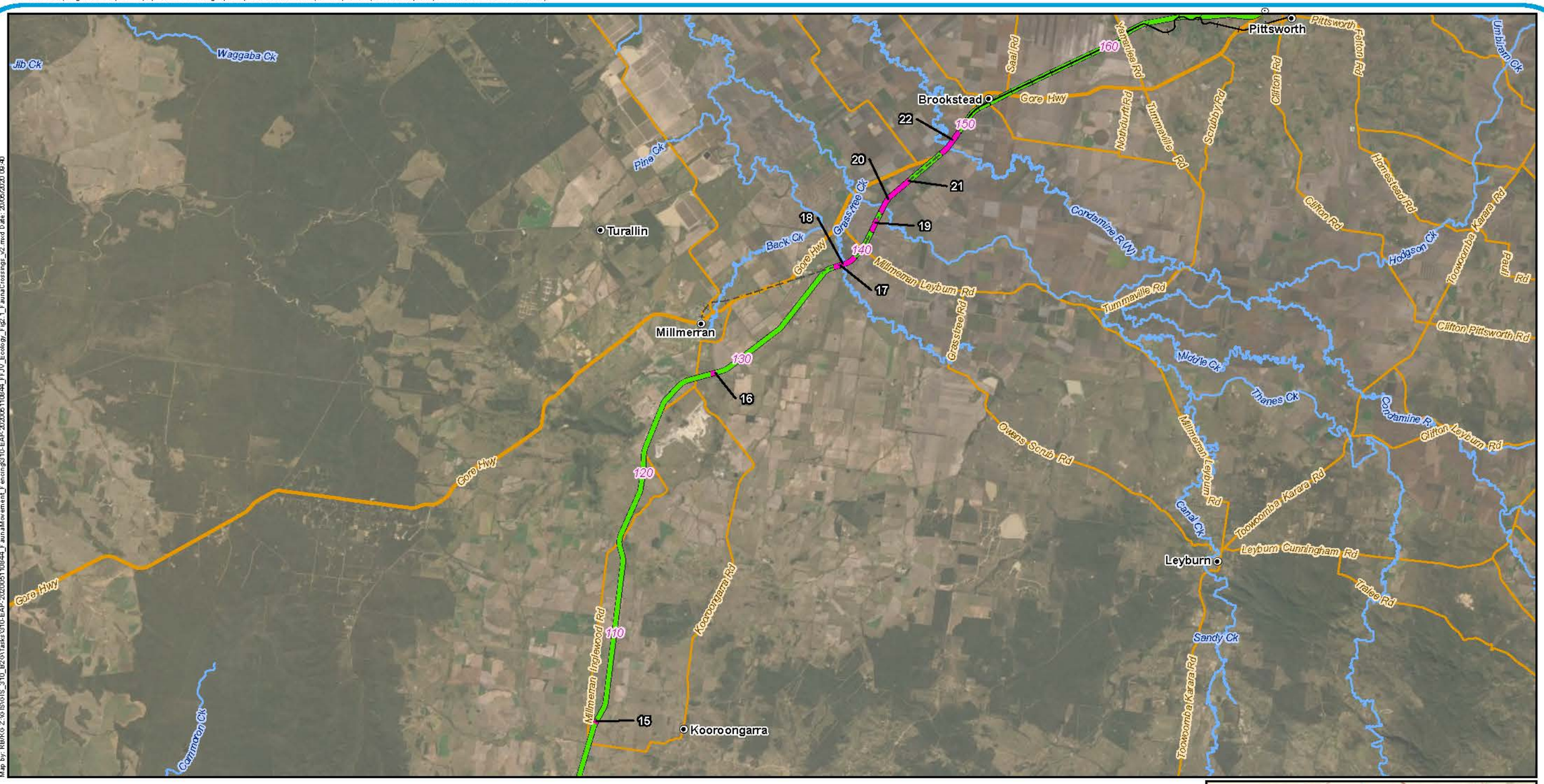
Border to Gowrie
Figure 2.1b:
Location of proposed fauna crossings



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Legend

- 5 Chainage (km)
- Localities
- Border to Gowrie alignment
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses

Proposed fauna crossings

- Proposed rail bridge over watercourse/drainage feature

A3 scale: 1:250,000

0 5 10 15km

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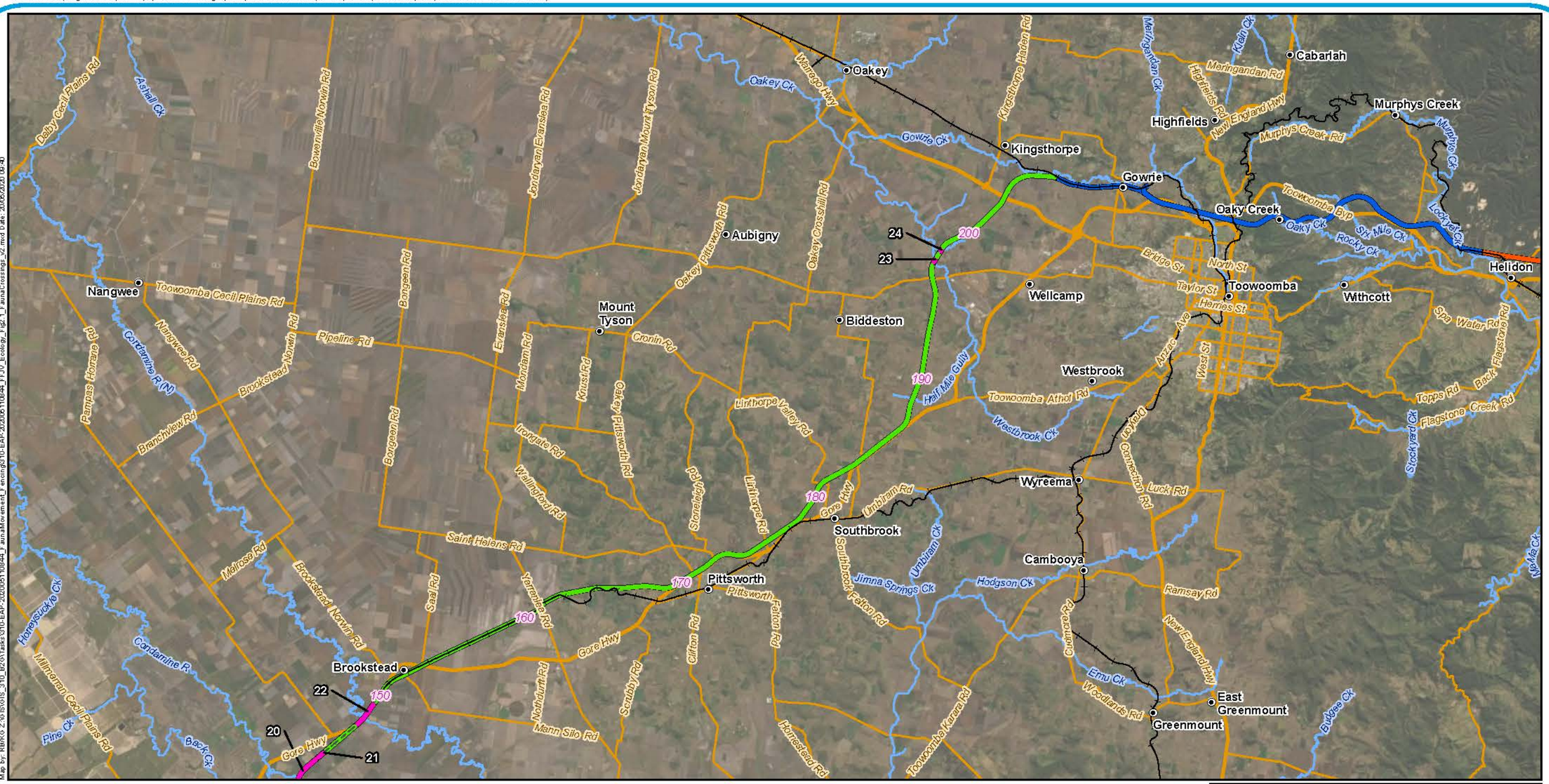
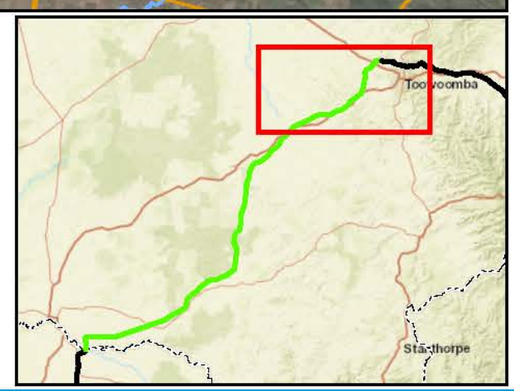
Border to Gowrie
Figure 2.1c:
Location of proposed fauna crossings





Legend

- 5 Chainage (km)
- Localities
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Helidon to Calvert alignment
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses

Proposed fauna crossings

- Proposed rail bridge over watercourse/drainage feature

A3 scale: 1:250,000

0 5 10 15km

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Border to Gowrie
Figure 2.1d:
Location of proposed fauna crossings

2.4 Fauna exclusion fencing

As indicated in Table 2.1, the opportunity to provide fauna exclusion fencing in association with fauna crossings has been identified. This fencing would guide animals towards the preferred fauna crossing structure or passage, whist reducing their potential to be struck by vehicles or trains. A 3 m buffer, clear of vegetation on the habitat side of the fauna exclusion fence, would be required to ensure that species cannot use vegetation to climb onto the exclusion fencing.

General fauna exclusion fencing associated with crossing points under bridge structures will be considered during detail design, as identified in Table 3.1 and Figure 2.1.

A schematic of the typical arrangement of fauna exclusion fencing is provided in Figure 2.2.

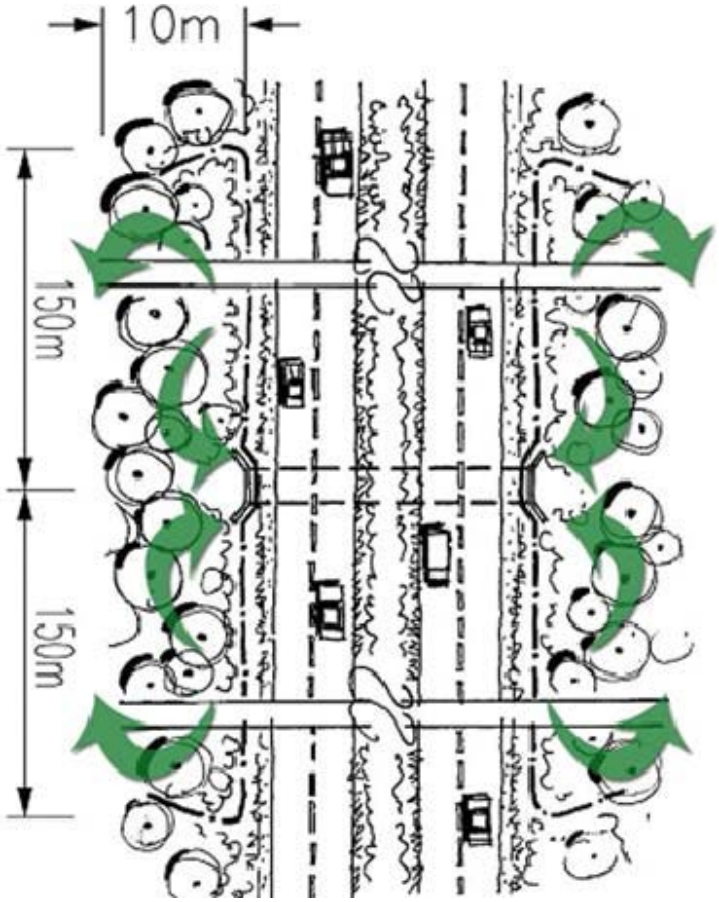


Figure 2.2 **Optimal design of fauna exclusion fencing on either side of a crossing structure with incorporated returns at both ends (from DTMR Design Manual Volume 2 (2010))**

2.5 Fauna furniture

There is an opportunity for crossings five and nine to be fitted with a fauna refuge pole at either side of the crossing for fauna to use in case of threat from predators. These poles would also serve to attract fauna to crossing at those points. Poles would be constructed in accordance with design specifications contained in Section 6.5.2 (b) of the Manual.

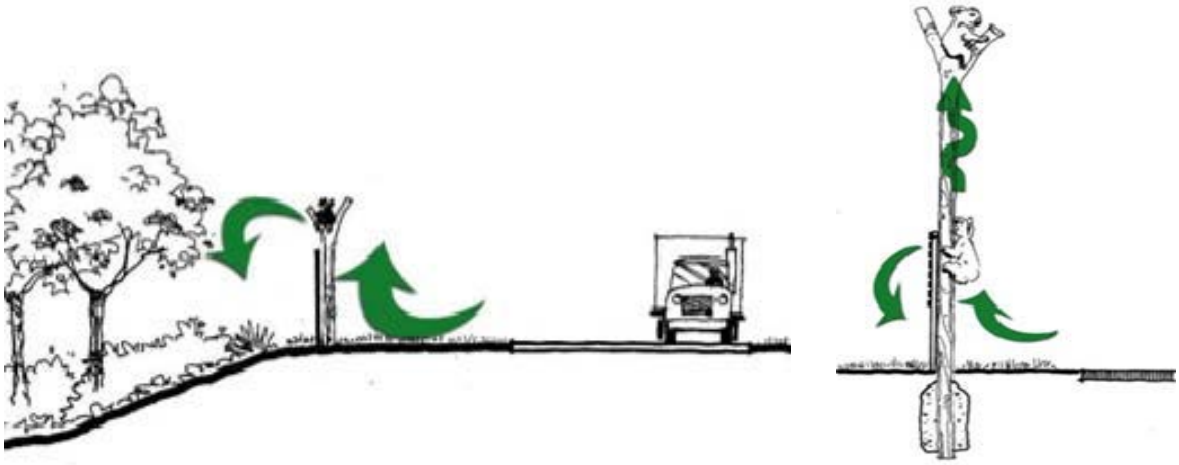


Figure 2.3 Fauna refuge poles (from DTMR Design Manual Volume 2 (2010)

The canopy bridge overpass proposed at crossing eight would be designed and constructed in accordance with design specifications contained in Section 6.4.2 of the Manual. Specifically, a rope ladder style of overpass is proposed as illustrated in Figure 2.4. It is also noted that rope bridges have been identified as successfully facilitating fauna passage under bridge structures. The potential for rope bridges to be provided under bridge structures will be further investigated during the detail design phase.

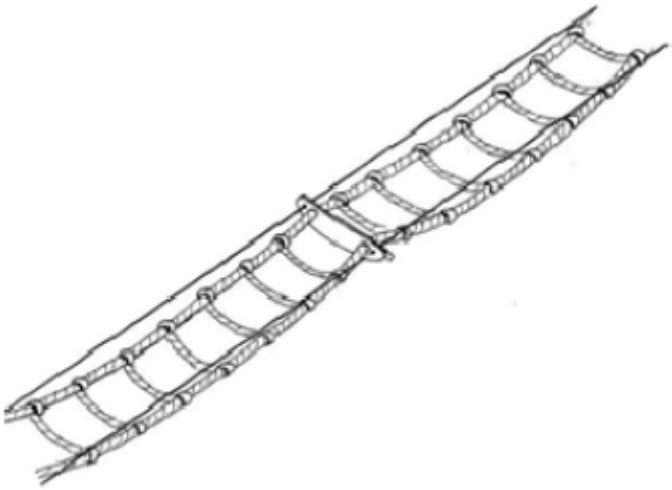


Figure 2.4 Rope ladder style canopy bridge overpass (from DTMR Design Manual Volume 2 (2010)

3 Fencing strategy

Fencing will act to protect adjoining lands from trespass and to prevent stock on adjoining land from gaining access to the railway. Where superior fencing is required (for example where tracks are in close proximity to roads and/or communities, or where trespass is occurring) a 1.8 m chain link boundary fence may be provided according to ARTC standard drawings STD-T0193 and STD-T0194 (refer Appendix D).

Recommended requirements for fauna exclusion fencing have been provided in Table 3.1. Standard fauna exclusion fence details can be found on ARTC standard drawings STD-T0173 and STD-T0174 (refer Appendix D) and should be referred to as the basis for development of fauna fencing opportunities during detail design. Further details related to fauna fencing is provided in Section 2.4.

The Project interacts with the existing wild dog check fence from Ch 26.8 km to Ch 56.0 km. The wild dog check fence will need to be reinstated on the left-hand side corridor boundary. Further liaison during detail design will be required with Goondiwindi Regional Council to determine if the ARTC standard fauna exclusion fence (STD-T0173 and STD-T0174, refer Appendix D) is suitable, or if specific fencing details are required for the wild dog check fence.

The Project intersects the existing Darling Downs - Moreton Rabbit Board rabbit fence at Ch 120.20 km. A rabbit trap like that installed on Millmerran-Inglewood Road is proposed to be installed at this location to maintain the integrity of the rabbit fence. Further liaison during detail design will be required with the Darling Downs - Moreton Rabbit Board to confirm the fencing and trap design specifics for this location. An example of a rabbit proof fence is provided in Photograph 3.1.

Photograph 3.1 Example of a rabbit-proof fence design with a gate trap

Source: Department of Agriculture and Fisheries 2019

Consultation has indicated that ‘pest-proof’ fencing is being installed by landholders in some locations. Further consultation with landholders through the detail design process will be required to determine the necessity of providing ‘pest-proof’ fencing in key locations.

Gates will be provided at suitable entry/exit locations to the rail corridor to allow convenient access to infrastructure. Gates will also be provided at private level crossings and stock crossings. Fencing returns and gates are to be provided as per ARTC standard drawings STD-T0166, STD-T0168 and STD-T0169 for the relevant level crossing type (refer Appendix D). The location of gates is not provided in this strategy.

Fencing returns will be required for bridge abutments and culverts as per ARTC standard drawings STD-T0201 and STD-T0202 (refer Appendix D). Fencing across small waterways will be designed to avoid storm damage and to retain effective stock control as per ARTC standard drawing STD-T0202.

The fencing strategy for the Project, as incorporated into the reference design, is presented in Table 3.1.

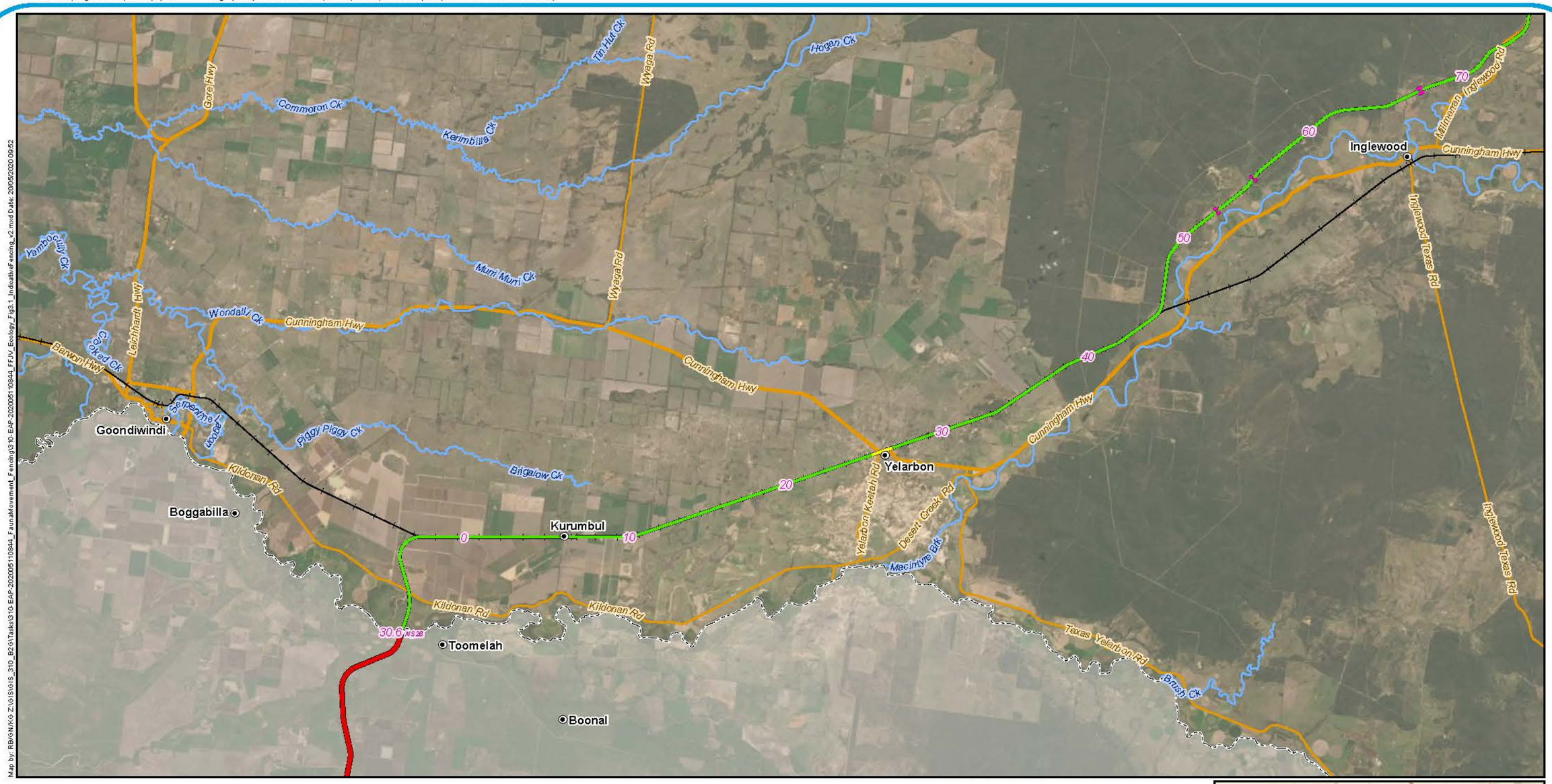
Table 3.1 Fencing strategy by chainage and land use

From chainage	To chainage	Left side land use	Left side fence type	Right side land use	Right side fence type
30.60 (NS2B) McIntyre River (NSW/QLD border)	2.95	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
2.95	25.50	Road corridor (Yelarbon-Kurumbul Road)	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
25.50	26.40	Community (Yelarbon)	Standard chain link boundary fence	Community (Yelarbon)	Standard chain link boundary fence
26.40	26.80	GrainCorp facility	Guide posts only	Community (Yelarbon)	Standard chain link boundary fence
26.80	30.30	Grazing	Wild dog check fence	East of Sawmill Road	Standard rural chain wire
30.30	37.70	Grazing and agriculture	Wild dog check fence	Grazing and agriculture	Standard rural chain wire
37.70	42.00	Forest	Wild dog check fence	Forest	Standard rural chain wire
42.00	43.50	Forest	Wild dog check fence	Agriculture and grazing	Standard rural chain wire
43.50	50.00	Forest	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
50.00	51.20	Agriculture and grazing	Wild dog check fence	Agriculture and grazing	Standard rural chain wire
51.20	52.48	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
52.48	52.69	Agriculture and grazing	Fauna exclusion fencing	Agriculture and grazing	Fauna exclusion fencing
52.69	54.60	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
54.60	55.45	Agriculture and grazing	Wild dog check fence	Agriculture and grazing	Standard rural chain wire
55.45	55.66	Agriculture and grazing	Wild dog check fence	Agriculture and grazing	Fauna exclusion fencing
55.66	56.00	Agriculture and grazing	Wild dog check fence	Agriculture and grazing	Standard rural chain wire
56.00	65.80	Forest	Standard rural chain wire	Forest	Standard rural chain wire
65.80	67.18	Grazing	Standard rural chain wire	Grazing	Standard rural chain wire
67.18	67.52	Grazing	Fauna exclusion fencing	Grazing	Fauna exclusion fencing
67.52	73.00	Grazing	Standard rural chain wire	Grazing	Standard rural chain wire
73.00	84.00	Road corridor (Millmerran Inglewood Rd)	Standard rural chain wire	Grazing	Standard rural chain wire
84.00	88.21	Road corridor (Millmerran Inglewood Rd)	Standard rural chain wire	Forest	Standard rural chain wire

From chainage	To chainage	Left side land use	Left side fence type	Right side land use	Right side fence type
88.21	88.34	Road corridor (Millmerran Inglewood Rd)	Fauna exclusion fencing	Forest	Fauna exclusion fencing
88.34	92.00	Road corridor (Millmerran Inglewood Rd)	Standard rural chain wire	Forest	Standard rural chain wire
92.00	93.84	Grazing	Standard rural chain wire	Grazing	Standard rural chain wire
93.84	94.02	Grazing	Fauna exclusion fencing	Grazing	Fauna exclusion fencing
94.02	95.00	Grazing	Standard rural chain wire	Grazing	Standard rural chain wire
95.00	97.43	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
97.43	97.73	Agriculture and grazing	Fauna exclusion fencing	Agriculture and grazing	Fauna exclusion fencing
97.73	100.07	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
100.07	100.69	Agriculture and grazing	Fauna exclusion fencing	Agriculture and grazing	Fauna exclusion fencing
100.69	102.90	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
102.90	120.20	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
120.20	120.20	Agriculture and grazing	Rabbit trap (similar to existing rabbit trap on Millmerran Inglewood Road)	Agriculture and grazing	Rabbit trap
120.20	121.00	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
121.00	123.70	Road corridor	Standard rural chain wire	Commodore Mine	Standard rural chain wire
123.70	126.20	Road corridor	Standard rural chain wire	Commodore Mine, agriculture and grazing	Standard rural chain wire
126.20	127.95	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
127.95	128.18	Agriculture and grazing	Fauna exclusion fencing	Agriculture and grazing	Fauna exclusion fencing
128.18	137.00	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
137.00	146.10	Agriculture (Condamine Floodplain)	Guide posts only	Agriculture (Condamine Floodplain)	Guide posts only
138.01	139.33	Agriculture (Condamine Floodplain)	Guide posts only - fauna exclusion fencing (*if feasible*)	Agriculture (Condamine Floodplain)	Guide posts only - Fauna exclusion fencing (if feasible)
139.33	141.34	Agriculture (Condamine Floodplain)	Guide posts only	Agriculture (Condamine Floodplain)	Guide posts only
141.34	142.00	Agriculture (Condamine Floodplain)	Guide posts only - Fauna exclusion fencing (if feasible)	Agriculture (Condamine Floodplain)	Guide posts only - Fauna exclusion fencing (if feasible)

From chainage	To chainage	Left side land use	Left side fence type	Right side land use	Right side fence type
142.00	142.60	Agriculture (Condamine Floodplain)	Guide posts only	Agriculture (Condamine Floodplain)	Guide posts only
142.60	145.14	Agriculture (Condamine Floodplain)	Guide posts only - Fauna exclusion fencing (if feasible)	Agriculture (Condamine Floodplain)	Guide posts only - Fauna exclusion fencing (if feasible)
145.14	146.10	Agriculture (Condamine Floodplain)	Guide posts only	Agriculture (Condamine Floodplain)	Guide posts only
146.10	147.00	Community (Pampas)	Standard chain link boundary fence	Community (Pampas)	Standard chain link boundary fence
147.00	147.76	Road corridor (Gore Highway)	Guide posts only	Agriculture (Condamine Floodplain)	Guide posts only
147.76	149.33	Road corridor (Gore Highway)	Guide posts only - Fauna exclusion fencing (if feasible)	Agriculture (Condamine Floodplain)	Guide posts only - Fauna exclusion fencing (if feasible)
149.33	149.80	Road corridor (Gore Highway)	Guide posts only	Agriculture (Condamine Floodplain)	Guide posts only
149.80	152.70	Road/rail corridor, GrainCorp facility, community (Brookstead)	Standard chain link boundary fence	Agriculture, some community residences	Standard chain link boundary fence
152.70	162.00	Agriculture	Standard rural chain wire	Agriculture	Standard rural chain wire
162.00	169.00	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
169.00	173.40	Agriculture and grazing	Standard rural chain wire	Road corridor (Gore Highway)	Standard rural chain wire
173.40	182.70	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
182.70	186.20	Agriculture and grazing	Standard rural chain wire	Road corridor (Gore Highway)	Standard rural chain wire
186.20	206.32	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
186.20	197.13	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
197.13	197.36	Agriculture and grazing	Fauna exclusion fencing	Agriculture and grazing	Fauna exclusion fencing
197.36	197.86	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire
197.86	198.04	Agriculture and grazing	Fauna exclusion fencing	Agriculture and grazing	Fauna exclusion fencing
198.04	206.32	Agriculture and grazing	Standard rural chain wire	Agriculture and grazing	Standard rural chain wire

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



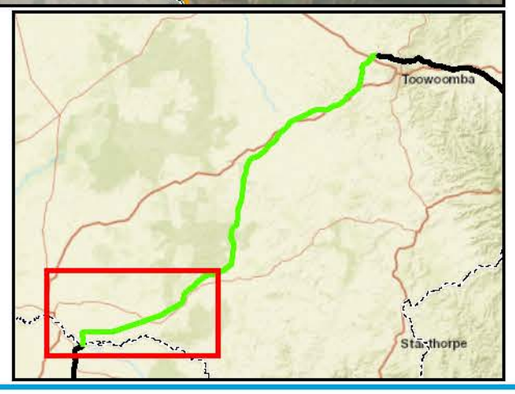
Map by: RB/GN/KG Z:\GIS\GIS_310_B2\6\Tasks\310-EAP-20200511\0844_FaunaMovement_Fencing\310-EAP-20200511\0844_FF-JV_Ecology_Fig3.1_IndicativeFencing_v2.mxd Date: 20/05/2020 09:52

Legend

- 5 Chainage (km)
- Localities
- North Star to NSW/QLD border alignment
- Existing rail (operational)
- Major roads
- Minor roads
- Watercourses
- NSW/QLD border

Fence type

- Fauna exclusion fencing 150m either side of chainage (excludes crossing point)
- Standard chain link boundary fence
- Standard rural chain wire



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Future Freight
Integrating Community, Environment and Engineering

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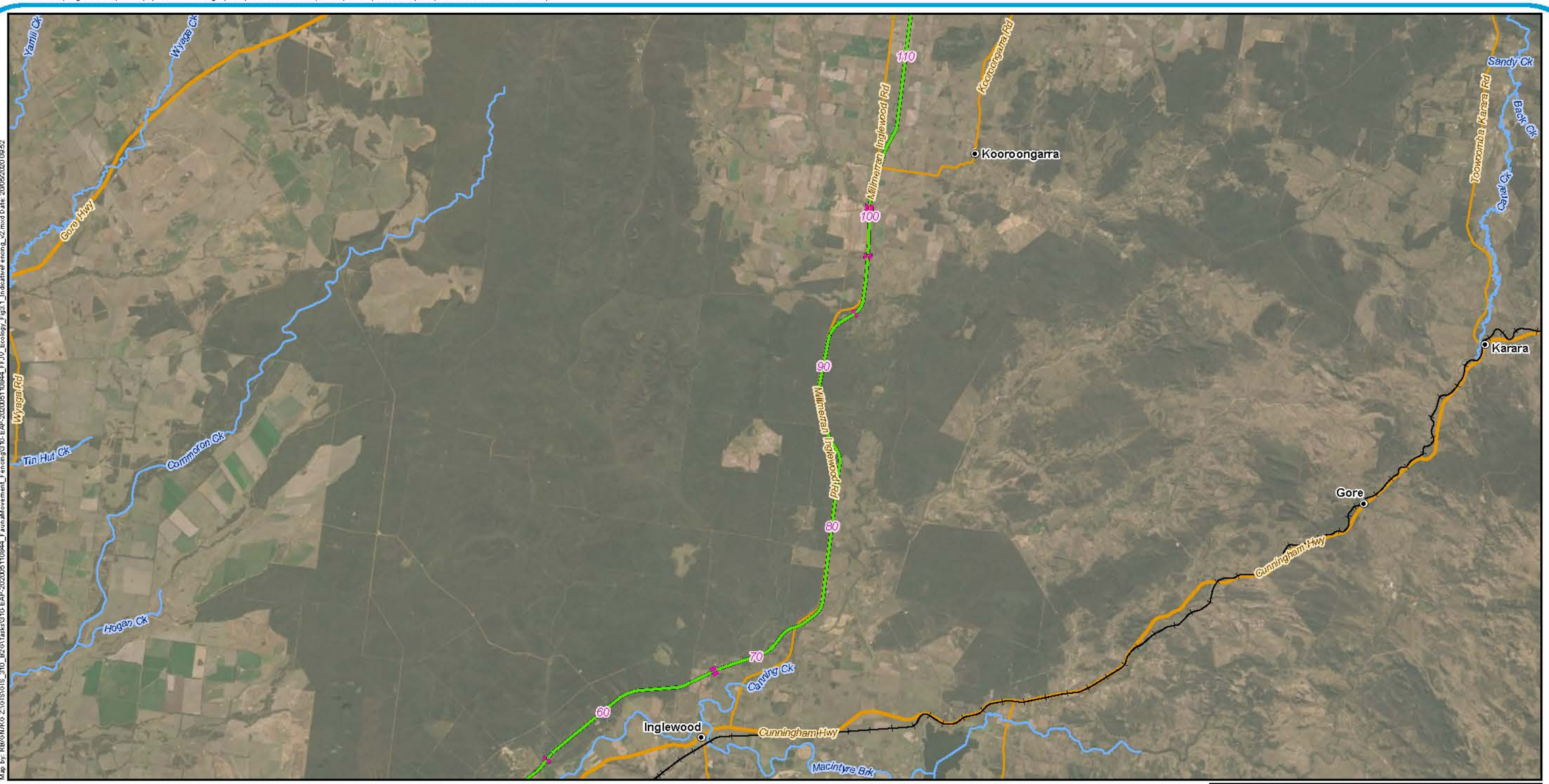
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure 3.1a: Location of indicative fencing including of fauna crossing solutions

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

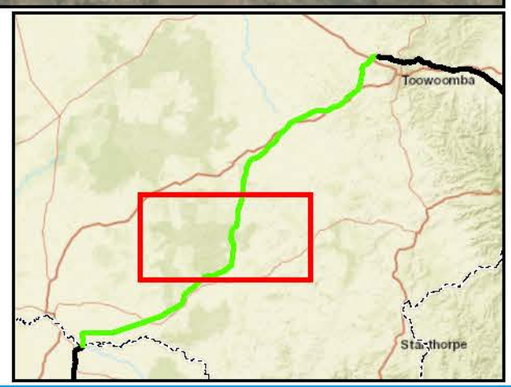


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Major roads
- Minor roads
- Watercourses

Fence type

- Fauna exclusion fencing 150m either side of chainage (excludes crossing point)
- Standard rural chain wire



A3 scale: 1:250,000

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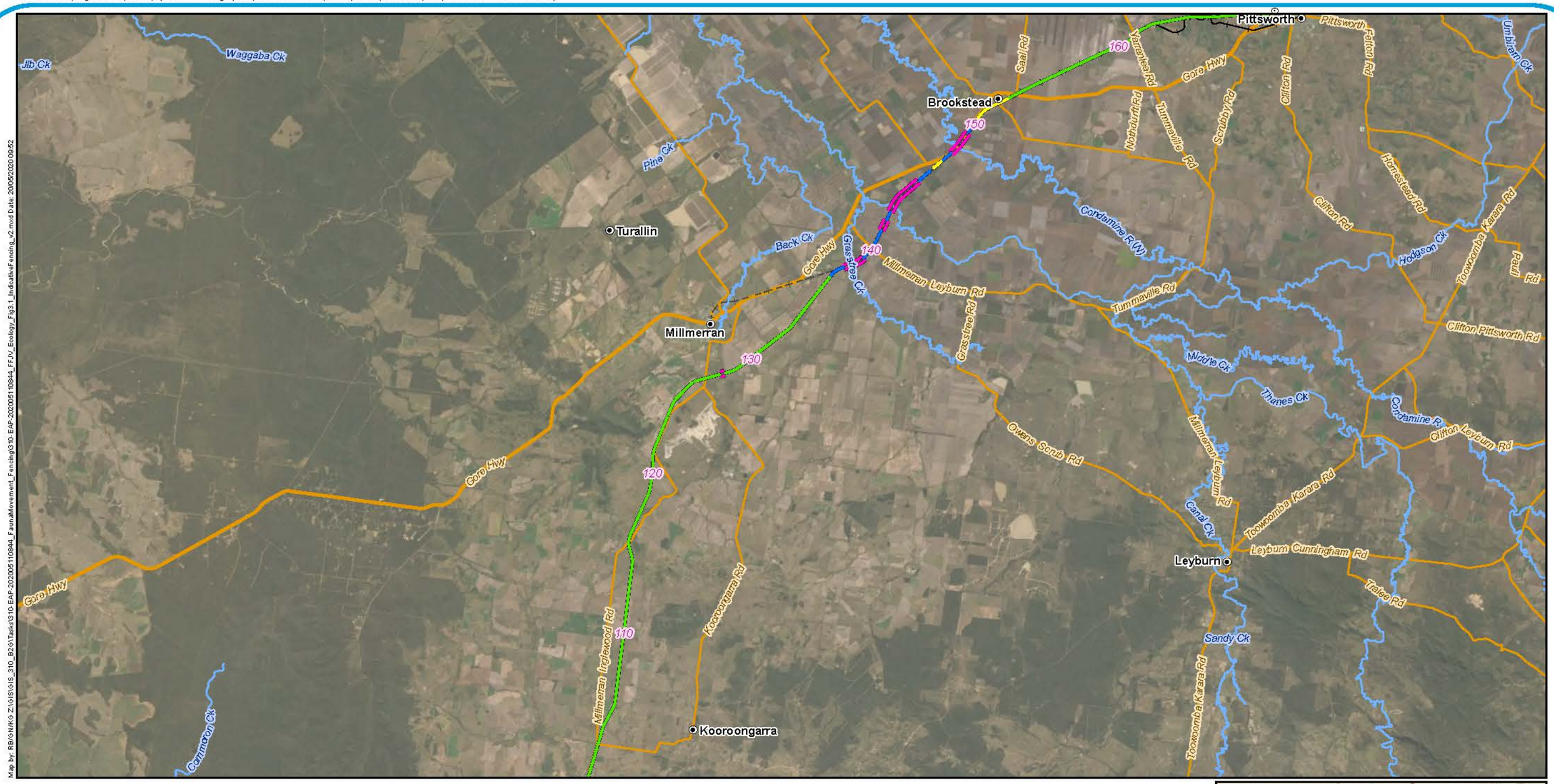
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure 3.1b: Location of indicative fencing including of fauna crossing solutions

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



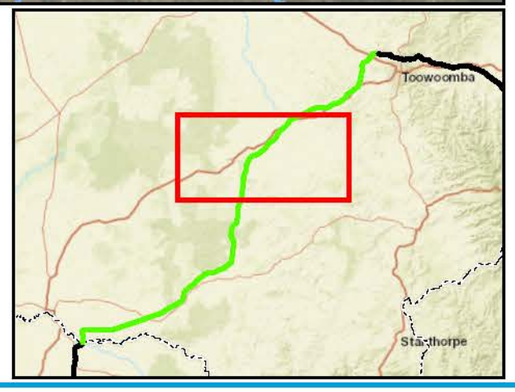
Map by: RB/GN/KG Z:\GIS\GIS_310_B2G\Tasks\310_EAP-20200511\0844_FaunaMovement_Fencing\310_EAP-20200511\0844_FF-IV_Ecology_Fig3.1_IndicativeFencing_v2.mxd Date: 20/05/2020 09:52

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses

Fence type

- Fauna exclusion fencing 150m either side of chainage (excludes crossing point)
- Guide posts only
- Standard chain link boundary fence
- Standard rural chain wire



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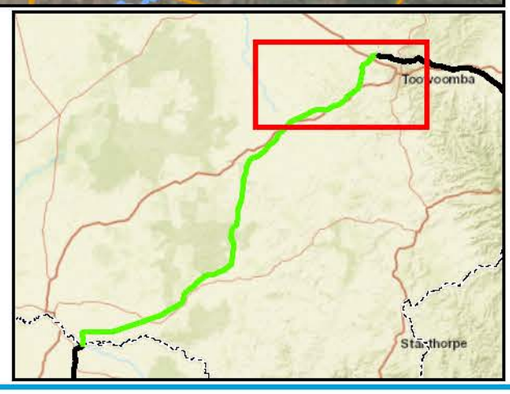
Issue date: 18/05/2020 Version: 1
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure 3.1c: Location of indicative fencing including of fauna crossing solutions

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- 5 Chainage (km)
- Localities
- Gowrie to Helidon alignment
- Helidon to Calvert alignment
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses

Fence type

- Fauna exclusion fencing 150m either side of chainage (excludes crossing point)
- Guide posts only
- Standard chain link boundary fence
- Standard rural chain wire

A3 scale: 1:250,000
0 5 10 15km

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Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure 3.1d: Location of indicative fencing including of fauna crossing solutions

4 Summary

The Project seeks to facilitate and encourage the natural movement of fauna between areas of habitat currently used as fauna corridors, and which would be fragmented by the Project, through the provision of fauna crossings. The intent of this strategy has been to identify fauna movement and fencing opportunities that are to be investigated further during the detail design phase of the Project to confirm the appropriateness of each solution at the nominated location. This confirmation of suitability for each fauna connectivity opportunity will be reliant upon:

- Consultation with adjoining landholders to confirm the acceptability of the proposed connectivity or fencing approach at each nominated location
- Assessment of each opportunity for compatibility with the detail design
- Consideration for additional maintenance constraints that a fauna connectivity or fencing opportunity may introduce.

Twenty four fauna movement opportunities have been identified in Table 2.1, with suggested fauna movement strategies provided.

Fencing of the rail corridor is required to define the railway and to prevent unauthorised trespass. The fencing strategy for the Project, as incorporated into the reference design, is presented in Table 3.1. The fauna fencing opportunities identified in Table 2.1 would, if incorporated through detail design, supplement the overall fencing strategy for the Project.

It is considered that the fauna crossing and fencing opportunities outlined in this document would adequately provide fauna movement opportunities for the various of fauna species whist upholding the overarching safety intent for fencing the rail corridor.

Appendices

APPENDIX M

Preliminary Fauna Movement Provision and Fencing Strategy

Appendix A Location of Terrestrial and Riparian Ecological Corridors

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT

IR_1534

Appendix A
Location of terrestrial and riparian ecological corridors

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

5 Chainage (km)

Localities

North Star to NSW/QLD border alignment

Existing rail (operational)

Major roads

Minor roads

Watercourses

NSW/QLD border

Project footprint

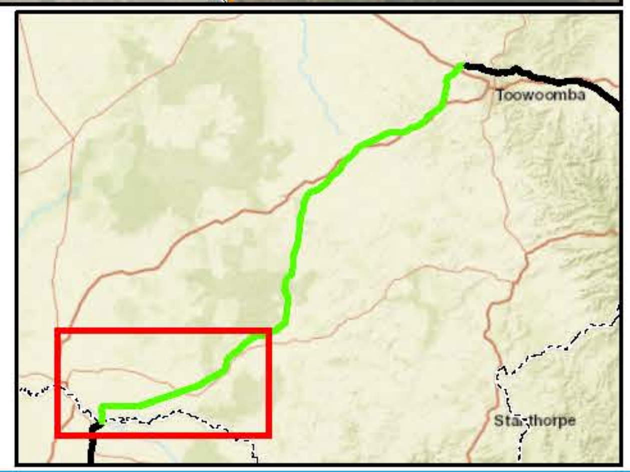
Ecological corridors (BPA mapping)

Riparian, Regional

Riparian, State

Riparian/Terrestrial, State

Terrestrial, State



A3 scale: 1:250,000

0 4 8 12 16 20 km

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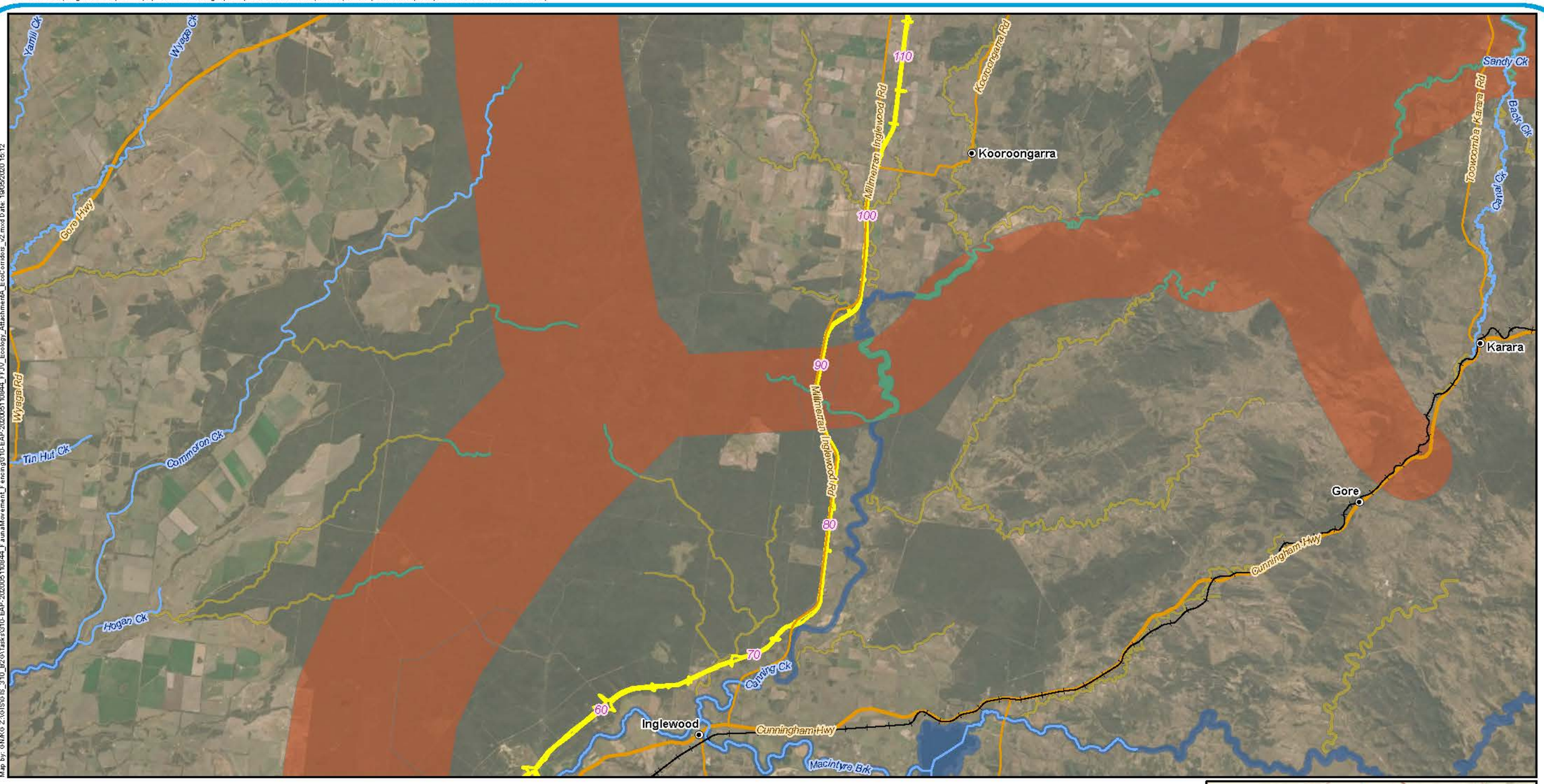
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment A1:
Terrestrial and riparian ecological corridors

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



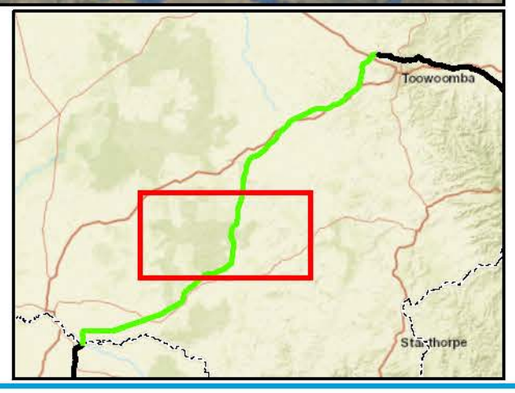
Map by: ONKG Z:\GIS\GIS_310_B2G\Tasks\310-EAP-20200510844_FaunaMovement_Fencing\310-EAP-20200510844_FF_IV_Ecology_AttachmentA_EcoCorridors_v2.mxd Date: 19/05/2020 15:12

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Major roads
- Minor roads
- Watercourses
- Project footprint

Ecological corridors (BPA mapping)

- Riparian, Regional
- Riparian, State
- Riparian/Terrestrial, State
- Terrestrial, State



A3 scale: 1:250,000

0 4 8 12 16 20 km

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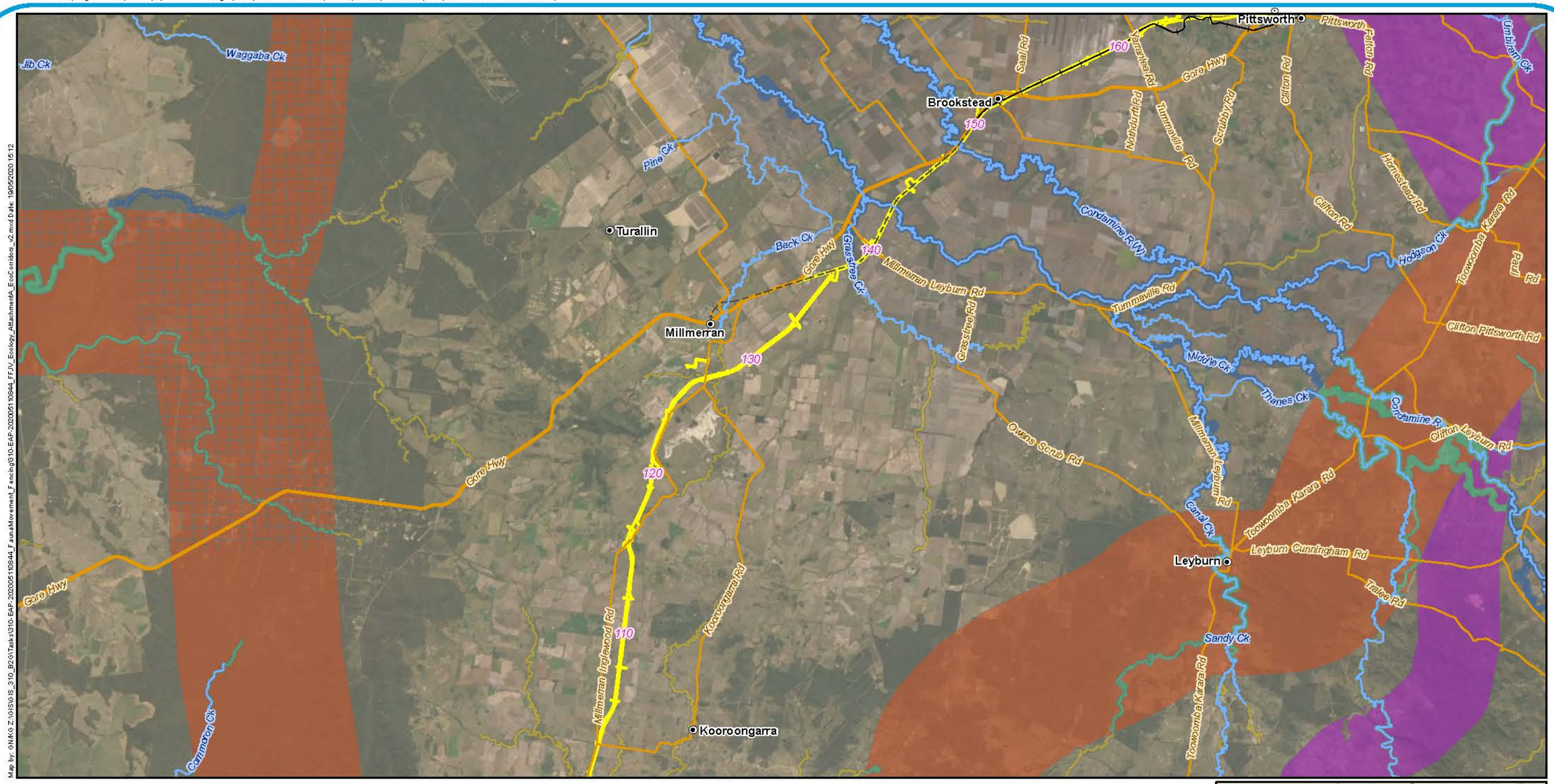
Issue date: 18/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment A2:
Terrestrial and riparian ecological corridors

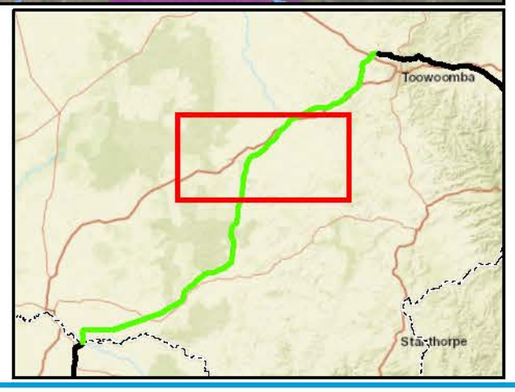


Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses
- Project footprint

Ecological corridors (BPA mapping)

- Riparian, Regional
- Riparian, State
- Riparian/Terrestrial, State
- Terrestrial, Regional
- Terrestrial, State



A3 scale: 1:250,000

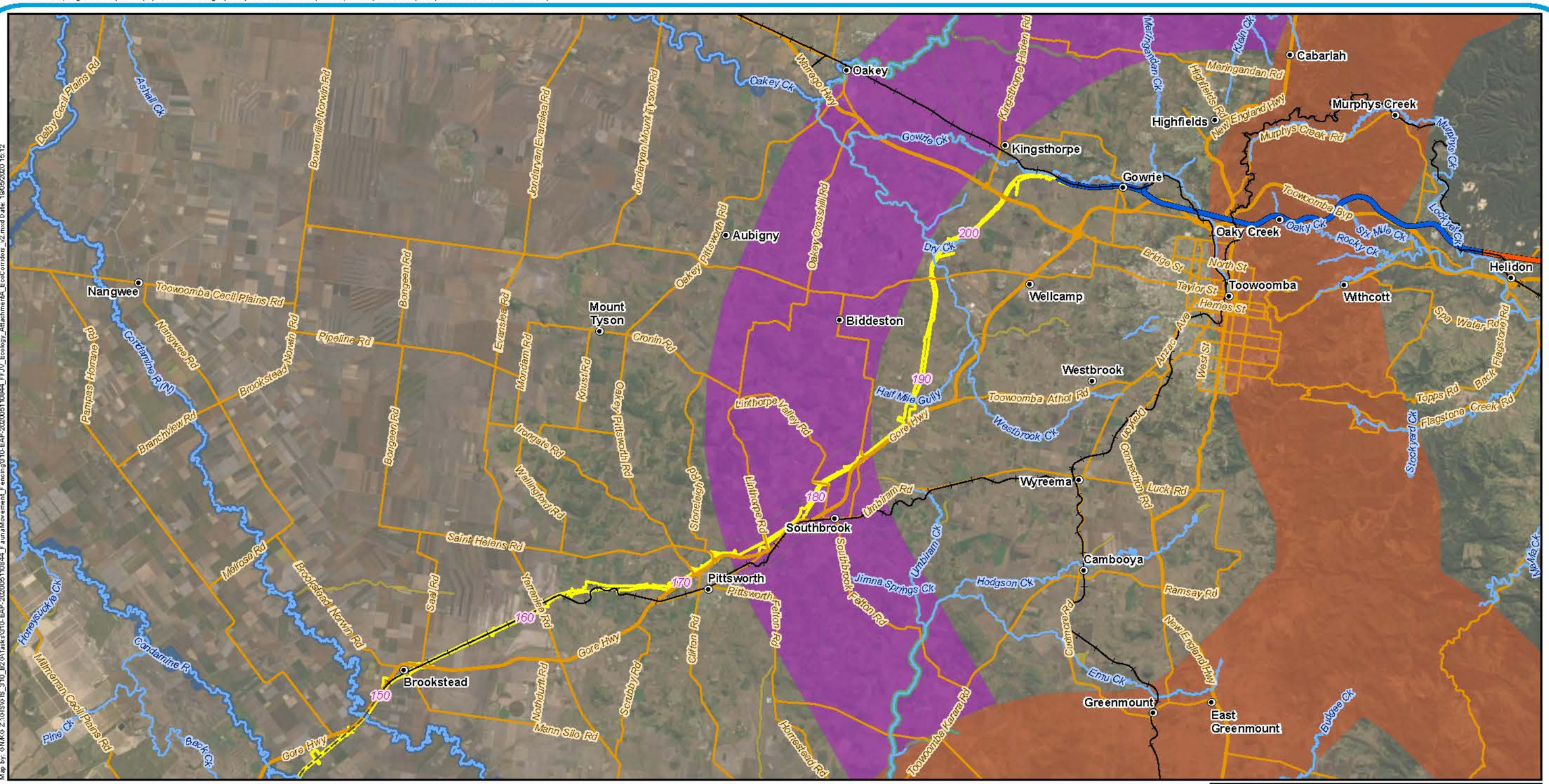
0 4 8 12 16 20 km

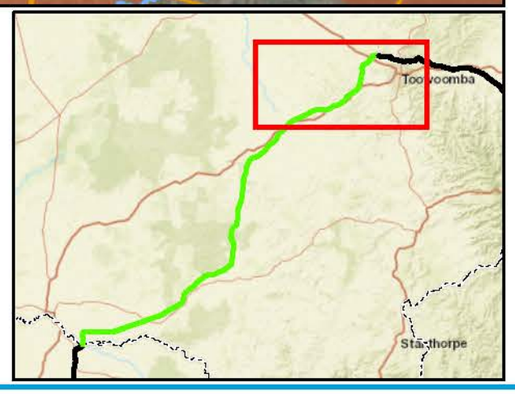
Future Freight
Integrating Community, Environment and Engineering

Issue date: 18/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment A3:
Terrestrial and riparian ecological corridors

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





A3 scale: 1:250,000
0 4 8 12 16 20 km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 18/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment A4:
Terrestrial and riparian ecological corridors

Map by: GNKG Z:\GIS\GIS_310_B2G\Tasks\310-EAP-20200511\0844_FaunaMovement_Fencing\310-EAP-20200511\0844_FJV_Ecology_AttachmentA_EcoCorridors_v2.mxd Date: 19/05/2020 15:12

APPENDIX M

Preliminary Fauna Movement Provision and Fencing Strategy

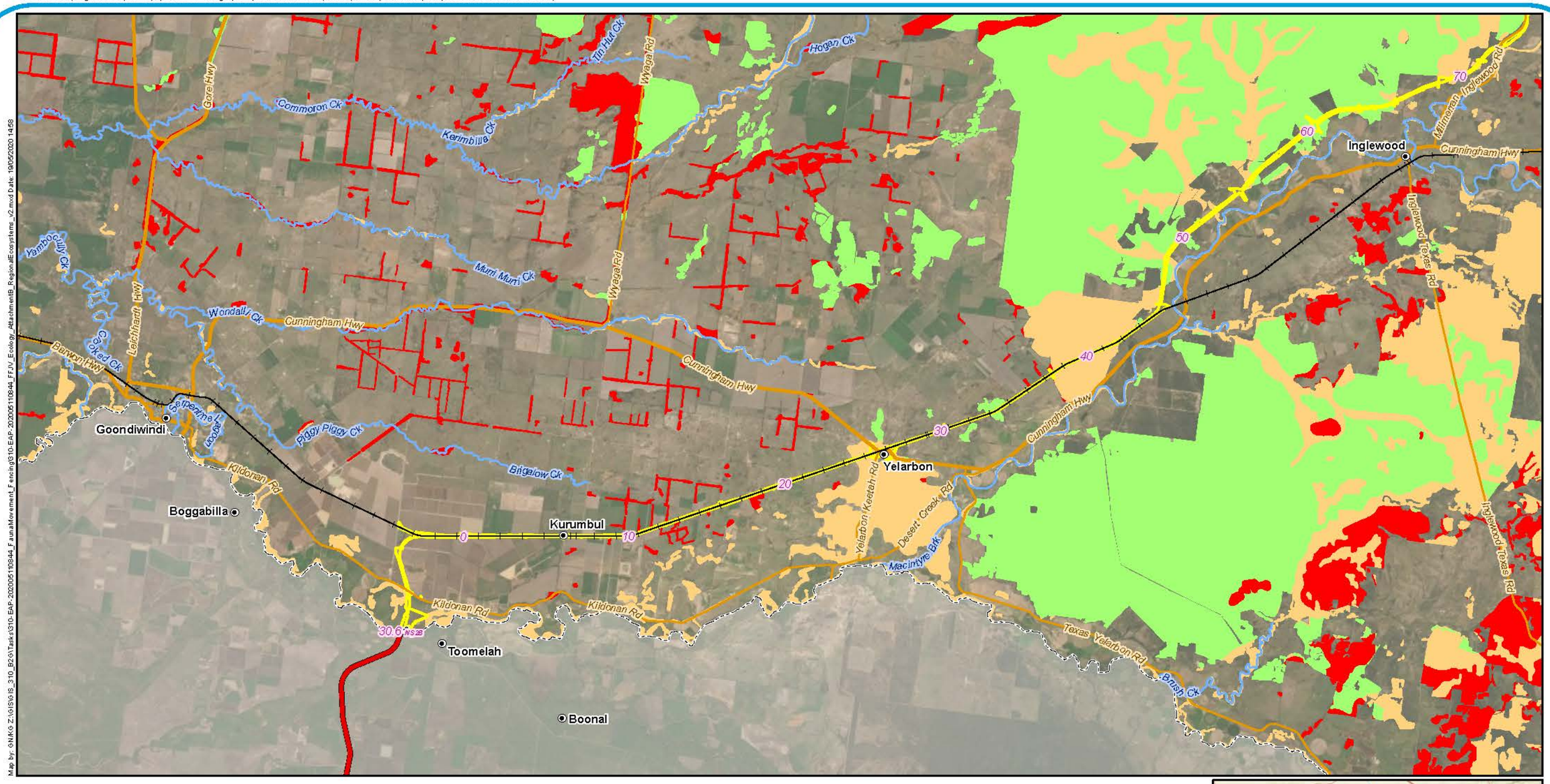
Appendix B Regional Ecosystem Mapping

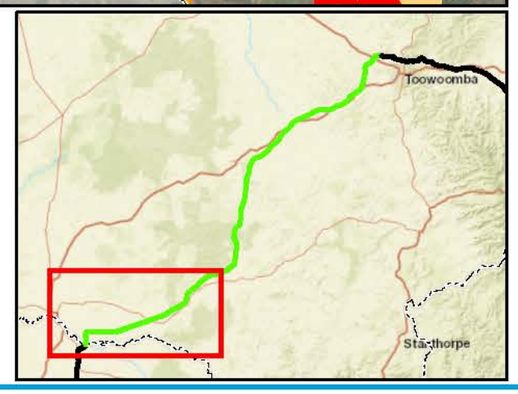
INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT

IR_1534

Appendix B
Regional Ecosystem mapping

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





Legend

- 5 Chainage (km)
- Localities
- North Star to NSW/QLD border alignment
- Existing rail (operational)
- Major roads
- Minor roads
- Watercourses
- NSW/QLD border
- Project footprint

Regional ecosystems

- Category A or B area containing endangered
- Category A or B area containing of concern
- Category A or B area that is least concern

A3 scale: 1:250,000
0 4 8 12 16 20 km

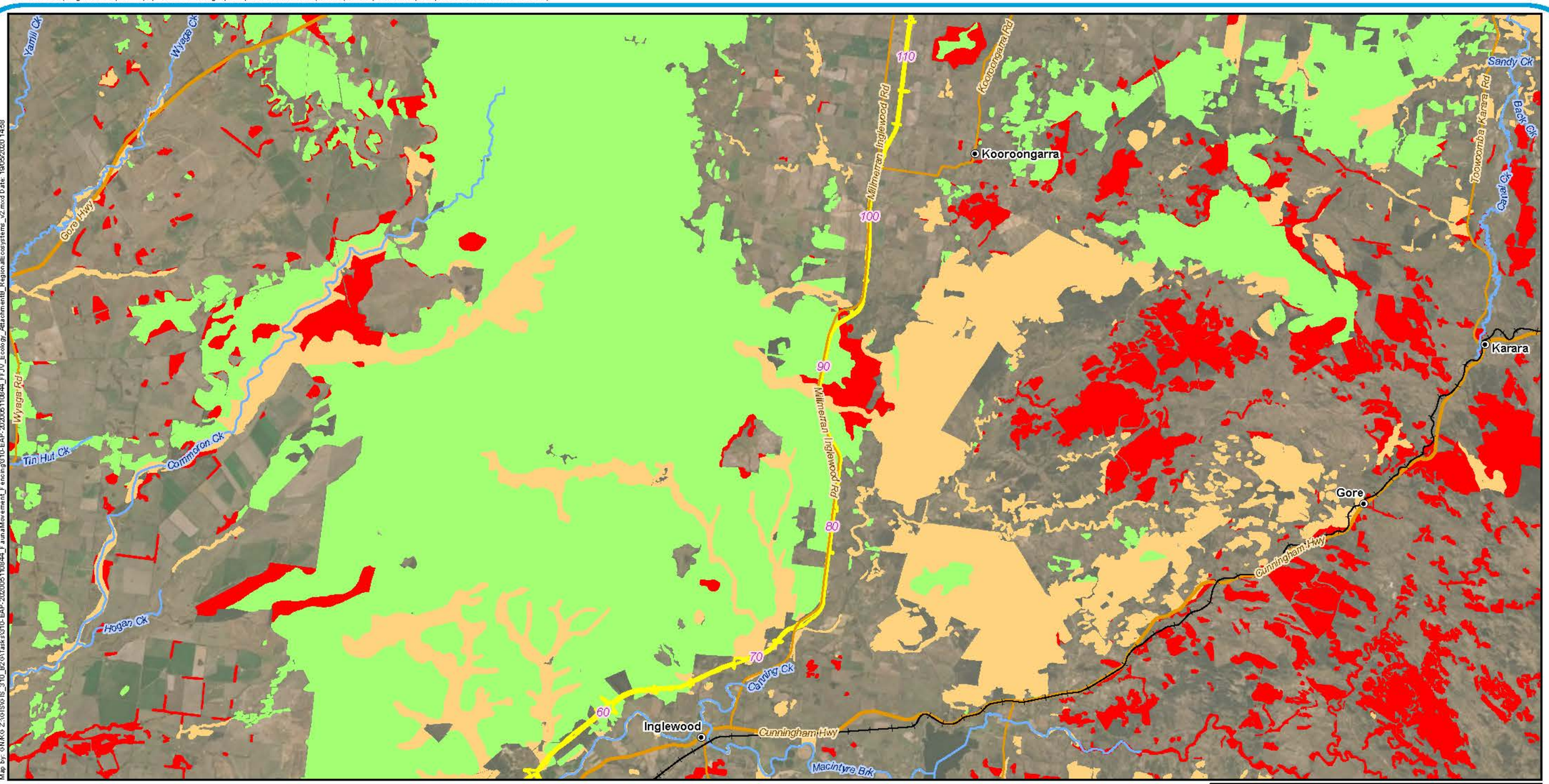
Future Freight
Integrating Community, Environment and Engineering

Issue date: 19/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment B1:
Distribution of Regional Ecosystems

Map by: GNK6 Z:\GIS\GIS_310_B2G\Tasks\310-EAP-20200511\0844_FaunaMovement_Fencing\310-EAP-20200511\0844_FrJV_Ecology_AttachmentB_RegionalEcosystems_v2.mxd Date: 19/05/2020 14:58

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



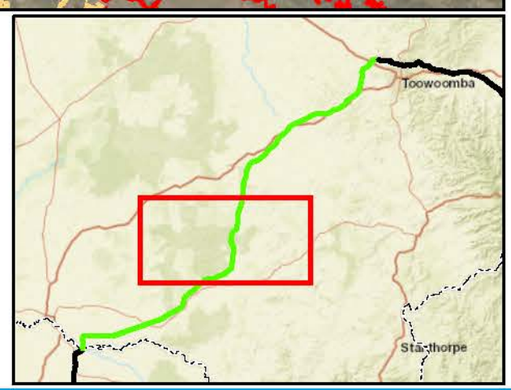
Map by: GNKG Z:\GIS\GIS_310_B2\GITasks\310-EAP-20200511\0844_FaunaMovement_Fencing\310-EAP-20200511\0844_FF_IV_Ecology_AttachmentB_RegionalEcosystems_V2.mxd Date: 19/05/2020 14:58

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Major roads
- Minor roads
- Watercourses
- Project footprint

Regional ecosystems

- Category A or B area containing endangered
- Category A or B area containing of concern
- Category A or B area that is least concern



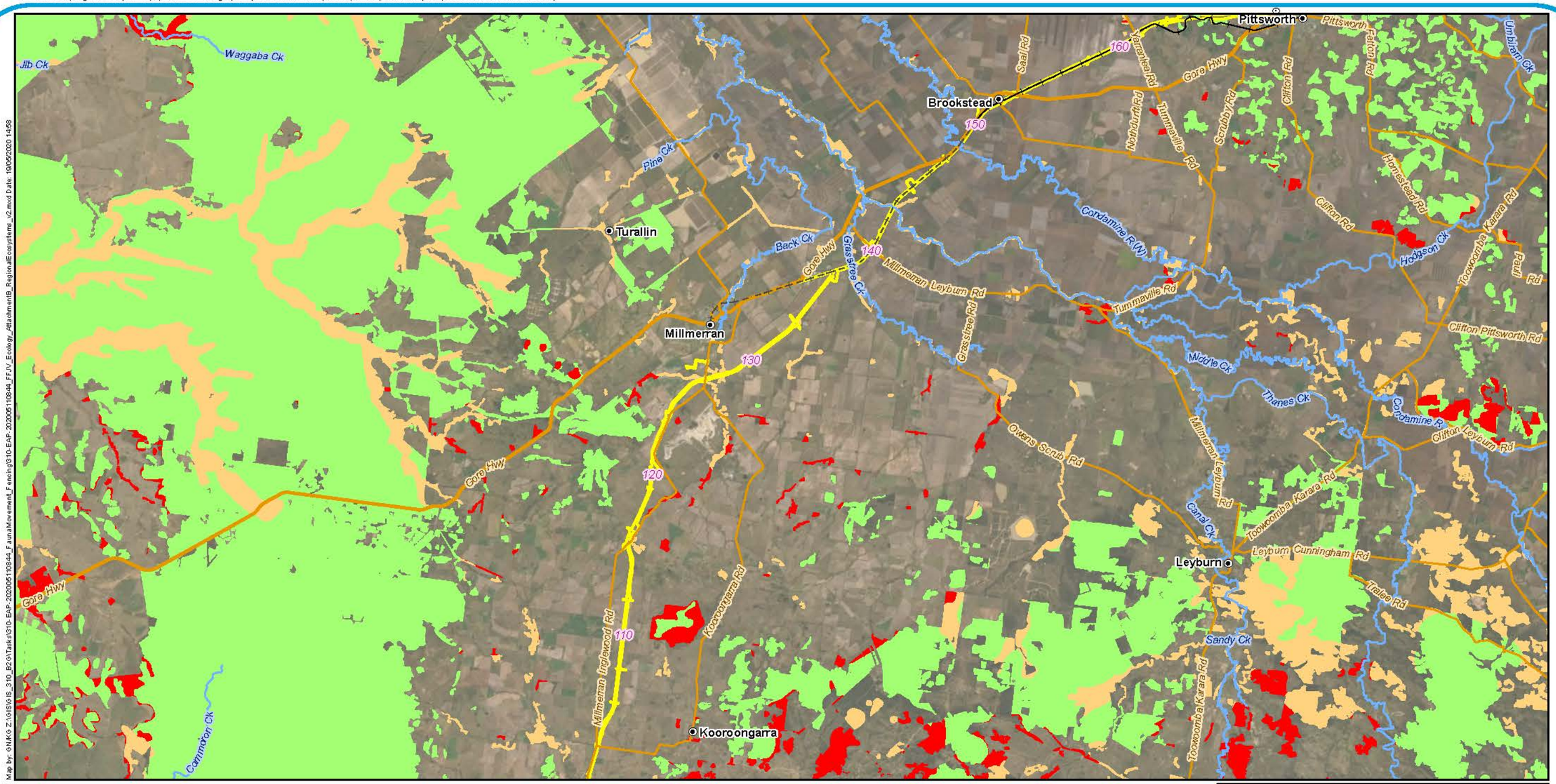
A3 scale: 1:250,000

0 4 8 12 16 20 km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 19/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment B2:
Distribution of Regional Ecosystems



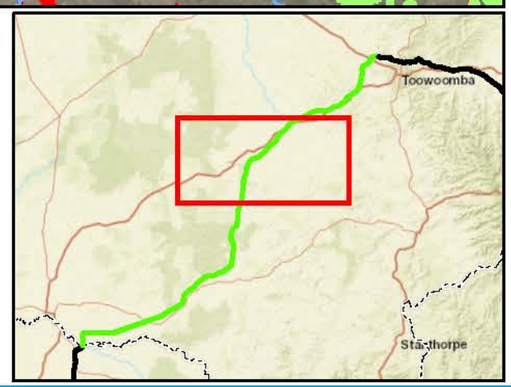
Map by: GNK:G:Z:\GIS\GIS_210_B2\GIS\Task\310-EAP-20200511\0844_FaunaMovement_Fencing\310-EAP-20200511\0844_FFJV_Ecology_AttachmentB_RegionalEcosystems_v2.mxd Date: 19/05/2020 14:58

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses
- Project footprint

Regional ecosystems

- Category A or B area containing endangered
- Category A or B area containing of concern
- Category A or B area that is least concern



A3 scale: 1:250,000

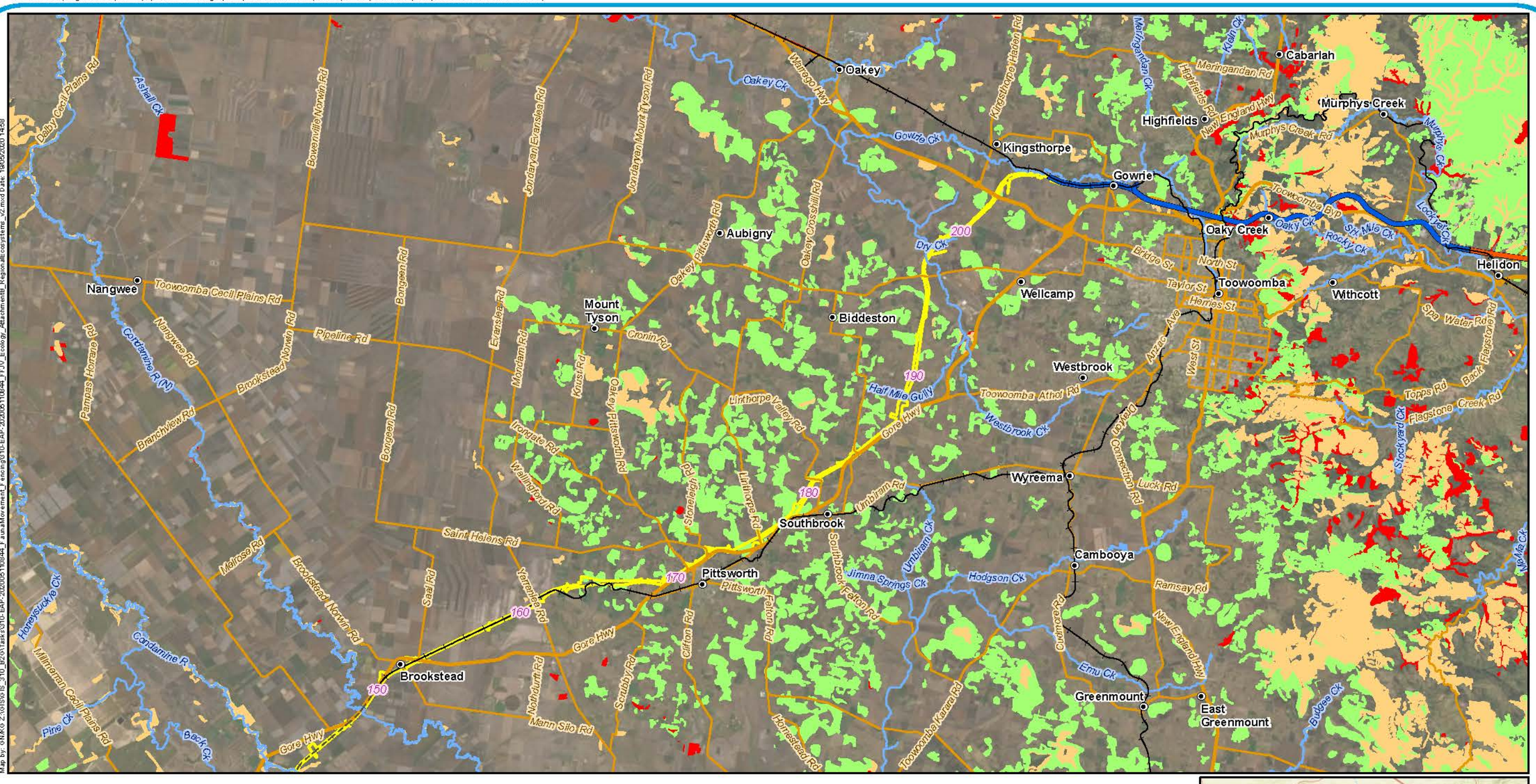
0 4 8 12 16 20 km

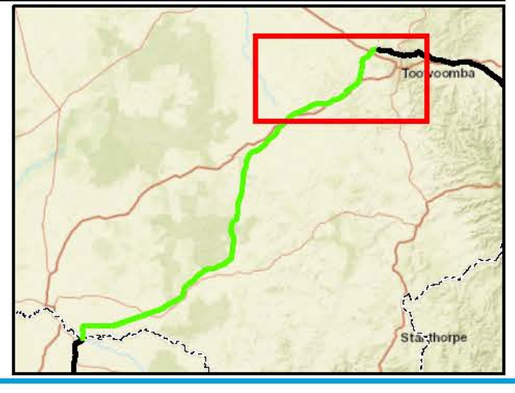
Future Freight
Integrating Community, Environment and Engineering

Issue date: 19/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment B3:
Distribution of Regional Ecosystems

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





Legend

- 5 Chainage (km)
- Localities
- Gowrie to Helidon alignment
- Helidon to Calvert alignment
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses
- Project footprint

Regional ecosystems

- Category A or B area containing endangered
- Category A or B area containing of concern
- Category A or B area that is least concern

A3 scale: 1:250,000

0 4 8 12 16 20 km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 19/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment B4:
Distribution of Regional Ecosystems

Map by: GNK09 Z:\GIS\GIS_310_B2GTasks\310-EAP-202005110844_FaunaMovement_Fencing\310-EAP-202005110844_FrJV_Ecology_AttachmentB_RegionalEcosystems_V2.mxd Date: 19/05/2020 14:58

APPENDIX M

Preliminary Fauna Movement Provision and Fencing Strategy

Appendix C Wildlife Habitat Mapping

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT

IR_1534

Appendix C
Wildlife habitat mapping

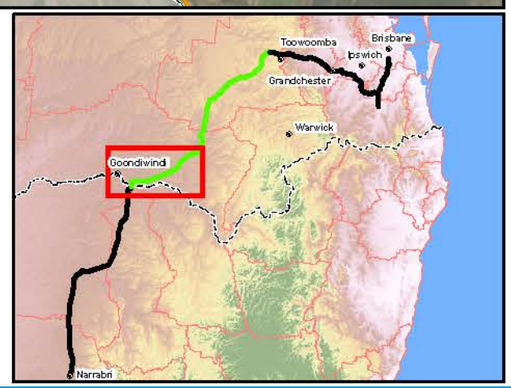
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Map by: RAZ\GNKG Z:\GIS\GIS_310_B2G\Tasks\310-EAP-20200510844_FFJV_Ecology_AttachmentC_MSES_v2.mxd Date: 19/05/2020 12:47

Goondiwindi
Boggabilla
Toomelah
Boonal
Kurumbul
Yelarbon
Inglewood
Gore Hwy
Leichhardt Hwy
Barwon Hwy
Cunningham Hwy
Kildonan Rd
Texas Yelarbon Rd
Yelarbon Keetah Rd
Inglewood Texas Rd
Millmerran Inglewood Rd
Wyaga Rd
Commoron Ck
Kerribilla Ck
Tin Hut Ck
Hogan Ck
Murri Murri Ck
Wondalli Ck
Yamboolilly Ck
Coked Ck
Piggy Piggy Ck
Bingalow Ck
Macintyre Brk
Desert Creek Rd
Brush Ck
Boomi River
30.6 NSB
0
10
20
30
40
50
60
70

Legend

- 5 Chainage (km)
- Localities
- North Star to NSW/QLD border alignment
- Existing rail (operational)
- Major roads
- Minor roads
- Watercourses
- NSW/QLD border
- Project footprint
- Essential habitat
- MSES wildlife habitat



A3 scale: 1:250,000

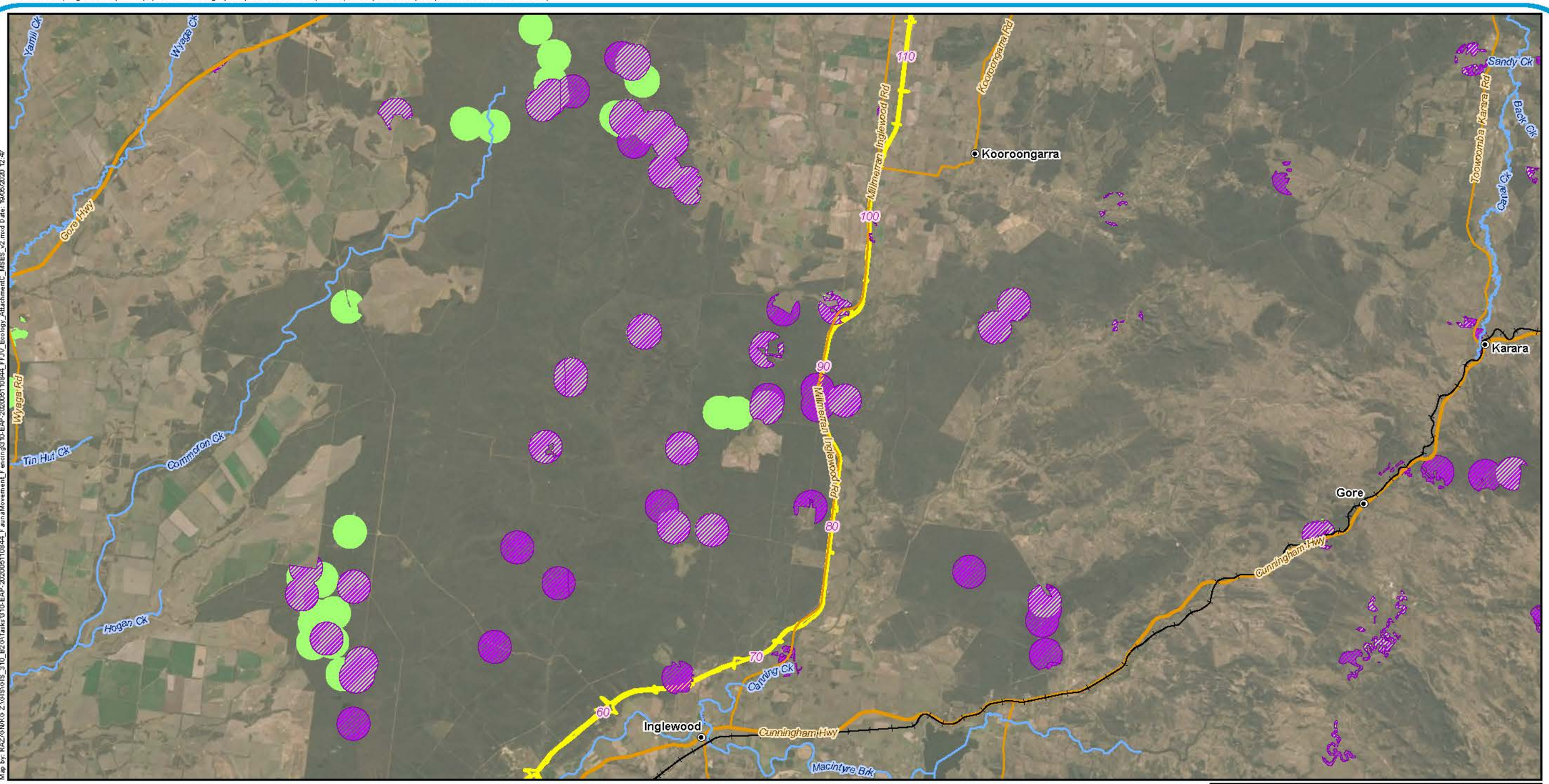
0 4 8 12 16 20 km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 19/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment C1: Matters of state environmental significance wildlife habitat

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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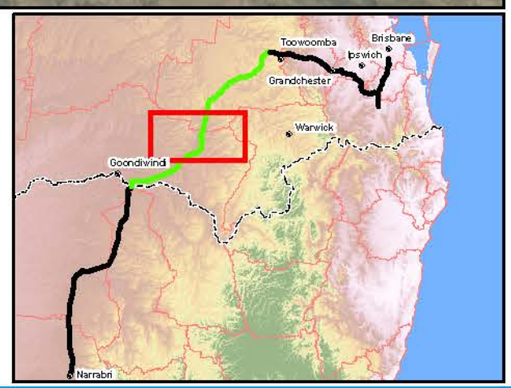
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Major roads
- Minor roads
- Watercourses
- Project footprint
- Essential habitat
- MSES wildlife habitat



A3 scale: 1:250,000

0 4 8 12 16 20 km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 19/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Attachment C2: Matters of state environmental significance wildlife habitat

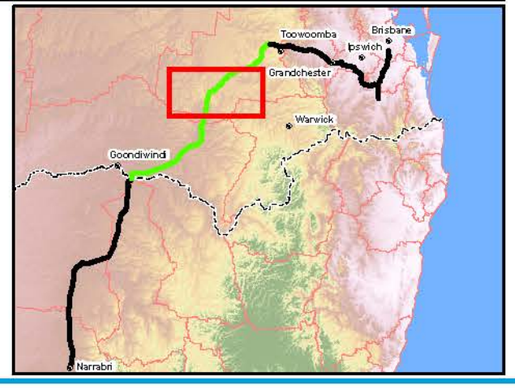
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Map by: RAZ/GNK G:\GIS\GIS_310_B2\Tasks\310-EAP-20200511\0844_FaunalMovement_Fencing\310-EAP-20200511\0844_FFJV_Ecology_AttachmentC_MSES_v2.mxd Date: 19/05/2020 12:47

Pittsworth
Brookstead
Turallin
Millmerran
Leyburn
Kooroongarra
Waggaba Ck
Jib Ck
Pine Ck
Back Ck
Gore Hwy
Grassfree Ck
Millmerran Leyburn Rd
Tummaville Rd
Cordamine R (W)
Middle Ck
Thanes Ck
Owens Scrub Rd
Canal Ck
Sandy Ck
Millmerran Inglewood Rd
Kooroongarra Rd
Toowoomba Karara Rd
Leyburn Cunningham Rd
Tralee Rd
Clifton Rd
Clifton Pittsworth Rd
Clifton Leyburn Rd
Hodgson Ck
Homestead Rd
Cammoron Ck
Saall Rd
Yarranlea Rd
Nothdurft Rd
Scrubby Rd
Umbiram Ck
Felton Rd
Pittsworth
Karara Rd
Peuli Rd
Cordamine R
Millmerran Leyburn Rd
Grassfree Rd
Toowoomba Karara Rd
Gore Hwy
Millmerran Inglewood Rd
Tummaville Rd
Clifton Rd
Clifton Leyburn Rd
Toowoomba Karara Rd
Leyburn Cunningham Rd
Tralee Rd
Sandy Ck
Cammoron Ck
160
150
140
130
120
110

Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses
- Project footprint
- Essential habitat
- MSES wildlife habitat



A3 scale: 1:250,000

0 4 8 12 16 20 km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 19/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

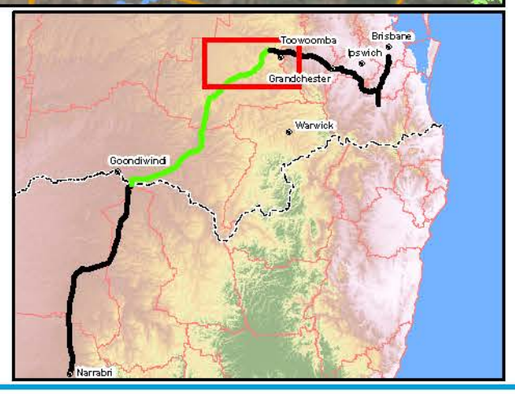
Border to Gowrie

Attachment C3: Matters of state environmental significance wildlife habitat

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Map by: RAZ/GNK/G Z:\GIS\GIS_310_B2G\Tasks\310_EAP_20200511\0844_FFJV_Ecology_Attachment\C_MSES_v2.mxd Date: 19/05/2020 12:47

Nangwee
Toowoomba Cecil Plains Rd
Daby Cecil Plains Rd
Ashtall Ck
Bowenville Norwin Rd
Jondaryan Evanslea Rd
Jondaryan Mount Tyson Rd
Bongeen Rd
Evanslea Rd
Moriarn Rd
Knust Rd
Oakey Pittsworth Rd
Oakey Crosshill Rd
Pipeline Rd
Cronin Rd
Brookstead Norwin Rd
Nangwee Rd
Cartamine R (N)
Pampas Horrane Rd
Branchview Rd
Irongate Rd
Wallingford Rd
Saint Helens Rd
Melrose Rd
Brookstead Norwin Rd
Saal Rd
Yarrambee Rd
Gore Hwy
Brookstead
Nothdurft Rd
Mann Silo Rd
Scrubby Rd
Clifton Rd
Stonelea Rd
Linthorpe Valley Rd
Linthorpe Rd
Pittsworth Felton Rd
Southbrook Felton Rd
Jimna Springs Ck
Hodgson Ck
Umbiram Ck
Umbiram Rd
Southbrook
Pittsworth
Cambooya
Greenmount Rd
Ramsay Rd
New England Hwy
Emu Ck
Greenmount
East Greenmount
Toowoomba Karara Rd
Homestead Rd
Budgee Ck
Ma Ma Ck
Honeysuckle Ck
Millmerran Cecil Plains Rd
Condamine R
Pine Ck
Back Ck
Oakey
Oakey Ck
Warrego Hwy
Gowrie Ck
Kingsthorpe Haden Rd
Kingsthorpe
Gowrie
Aubigny
Mount Tyson
Biddeston
Dry Ck
200
190
180
170
160
150
Half Mile Gully
Wellcamp
Westbrook
Toowoomba Athol Rd
Westbrook Ck
Wyreema
Meringandan Ck
Meringandan Rd
Highfields Rd
Highfields
Cabarlah
Murphys Creek
Murphys Creek Rd
Murphys Ck
Klein Ck
Toowoomba Byp
Oaky Ck
Oaky Creek
Six Mile Ck
Rocky Ck
Lockyer Ck
Bridge St
North St
Taylor St
Toowoomba
Hermes St
Withcott
Helidon
Spa Water Rd
Back Flagstone Rd
Topps Rd
Flagstone Creek Rd
Stockyard Ck
Arzac Ave
West St
Jondaryan Connection Rd
Luck Rd



Legend

- 5 Chainage (km)
- Localities
- Gowrie to Helidon alignment
- Helidon to Calvert alignment
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- Minor roads
- Watercourses
- Project footprint
- Essential habitat
- MSES wildlife habitat

A3 scale: 1:250,000

0 4 8 12 16 20 km

Future Freight
Integrating Community, Environment and Engineering

Issue date: 19/05/2020 Version: 2
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie
Attachment C4: Matters of state environmental significance wildlife habitat

APPENDIX M

Preliminary Fauna Movement Provision and Fencing Strategy

Appendix D ARTC Standard Drawings

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT

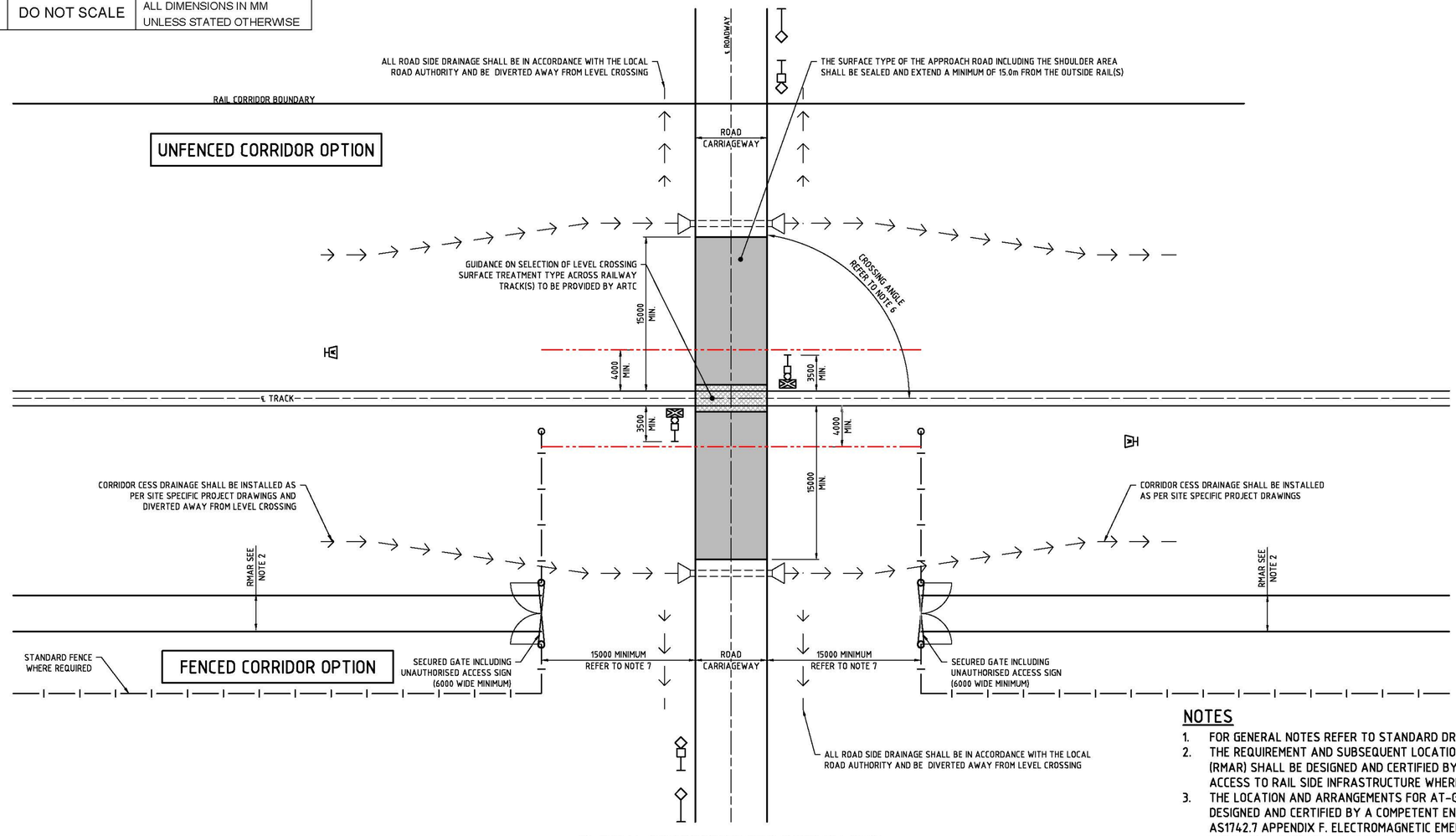
IR_1534

Appendix D
ARTC standard drawings

DRAWN TO AS1100

DO NOT SCALE

ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



TYPICAL PROTECTION FOR PUBLIC LEVEL CROSSING WITH ROADWAY SQUARE TO TRACK DRAWN FOR SINGLE TRACK

NOT TO SCALE

LEGEND

- SERVICES CONDUIT — REFER TO STANDARD DRAWING STD-T0163 NOTE 11
- WHISTLE BOARD — REFER TO STANDARD DRAWING STD-T0163 NOTE 12
- RAILWAY LEVEL CROSSING PASSIVE ASSEMBLY RX-1 OR RX-2 (MINIMUM)
  RAILWAY LEVEL CROSSING ACTIVE ASSEMBLY RX-5 PLUS BOOMS (WHERE REQUIRED)
  REFER TO STANDARD DRAWING STD-T0164 FOR DETAILS
- ADVANCE WARNING SIGNS
  TYPE AND LOCATION DEPENDS ON SITE SPECIFIC CONDITIONS
  THESE SHALL BE INSTALLED IN ACCORDANCE WITH AS1742.7
- SITE DRAINAGE STRUCTURE AND FLOW ARROW (INDICATIVE ONLY)
- FENCING

NOTES

1. FOR GENERAL NOTES REFER TO STANDARD DRAWING NUMBER STD-T0163.
2. THE REQUIREMENT AND SUBSEQUENT LOCATION OF THE RAIL MAINTENANCE ACCESS ROAD (RMAR) SHALL BE DESIGNED AND CERTIFIED BY A COMPETENT ENGINEER AND PROVIDE ACCESS TO RAIL SIDE INFRASTRUCTURE WHERE REQUIRED.
3. THE LOCATION AND ARRANGEMENTS FOR AT-GRADE PEDESTRIAN CROSSINGS SHALL BE DESIGNED AND CERTIFIED BY A COMPETENT ENGINEER AND SHALL BE IN ACCORDANCE WITH AS1742.7 APPENDIX F. ELECTROMAGNETIC EMERGENCY ESCAPE GATE LATCHES SHALL BE INSTALLED WHERE DIRECTED BY ARTC.
4. FENCING TO BE INSTALLED WHEN DIRECTED BY ARTC PROJECT REQUIREMENTS. FOR DETAILS OF FENCING AND SECURED GATES REFER TO ARTC STANDARD DRAWING NUMBERS STD-T0193 TO STD-T0202.
5. THE CONNECTION FROM THE RAILWAY MAINTENANCE ACCESS ROAD TO THE ROADWAY SHALL BE PROVIDED. THE DESIGN SHALL PROVIDE SAFE ENTRY AND EXIT FOR VEHICLES TO MEET LOCAL ROAD AUTHORITY REQUIREMENTS AND BE CERTIFIED BY A COMPETENT ENGINEER.
6. ANGLE BETWEEN THE ROAD AND THE RAILWAY CROSSINGS SHOULD BE DESIGNED TO ENSURE THAT SIGHTING ANGLES CAN BE ACHIEVED AS PER AS1742.7. IF THE ANGLE OF THE CROSSING RESULTS IN THE SIGHTING ANGLES EXCEEDED AS PRESENTED IN AS1742.7 APPENDIX D, PASSIVE CONTROL SHALL NOT BE USED.
7. THIS 15m OFFSET HAS BEEN PROVIDED TO ALLOW THE DESIGN VEHICLE TO SAFELY PARK WHILST GATES INTO THE RMAR ARE OPERATED. THIS MAY BE AMENDED BASED ON THE PROPOSED CORRIDOR ACCESS/FENCING SOLUTION AND ELIMINATED IF NO FENCE OR RMAR IS PROPOSED.
8. RAILWAY LEVEL CROSSING ASSEMBLY RX-2 IS THE PREFERRED TYPICAL PASSIVE CROSSING ASSEMBLY. RAILWAY LEVEL CROSSING ASSEMBLY RX-1 TREATMENT MAY BE USED WITH THE REQUIRED ADVANCE WARNING SIGNAGE AS SPECIFIED IN AS1742.7 IF ADEQUATE SIGHT DISTANCE IS AVAILABLE TO A ROAD VEHICLE DRIVER TO AN APPROACHING TRAIN. USE OF RX-1 MAY ONLY BE CONSIDERED ONCE A SITE SPECIFIC RISK ASSESSMENT HAS BEEN UNDERTAKEN.
9. WHERE FENCING IN THE RAIL CORRIDOR IS INSTALLED PARALLEL TO ROAD, THE FENCING SHOULD ALIGN WITH ANY EXISTING ROAD CORRIDOR FENCING, WHEREVER PRACTICAL.

Used on / Next higher assembly:

Scale: NOT TO SCALE

Filename: STD-T0166

Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
02	6/12/18	MINOR AMENDMENTS	MS	CD	AD	CD	DO
01	21/11/18	NOT ACCEPTED BY ARTC	MS	CD	AD	CD	
0.2	8/12/17	ISSUE FOR ARTC ACCEPTANCE	BD	CD	AD	CD	DO

Designing Company: SMEC — LEVEL 8, 480 ST PAULS TERRACE, FORTITUDE VALLEY QLD 4006, PHONE 07 3029 6600
Design Project Code: 30031593

			ARTC ACCEPTANCE
Designed	B. DUNNE	08/12/17	Approved By: C. DAS GUPTA; Accepted By: D. OGUCHA
Checked	C. DAS GUPTA	08/12/17	
Ind.Rev. Company	SMEC	Ind.Rev. Name: A. DUNN	Signed: C. DAS GUPTA; D. OGUCHA
Ind.Review Signature	A. DUNN	08/12/17	Approval Date: 08/12/17; Acceptance Date: 21/12/17

ARTC

0.2 01 02

Sheet No.

Scale:

SHEET SIZE A1

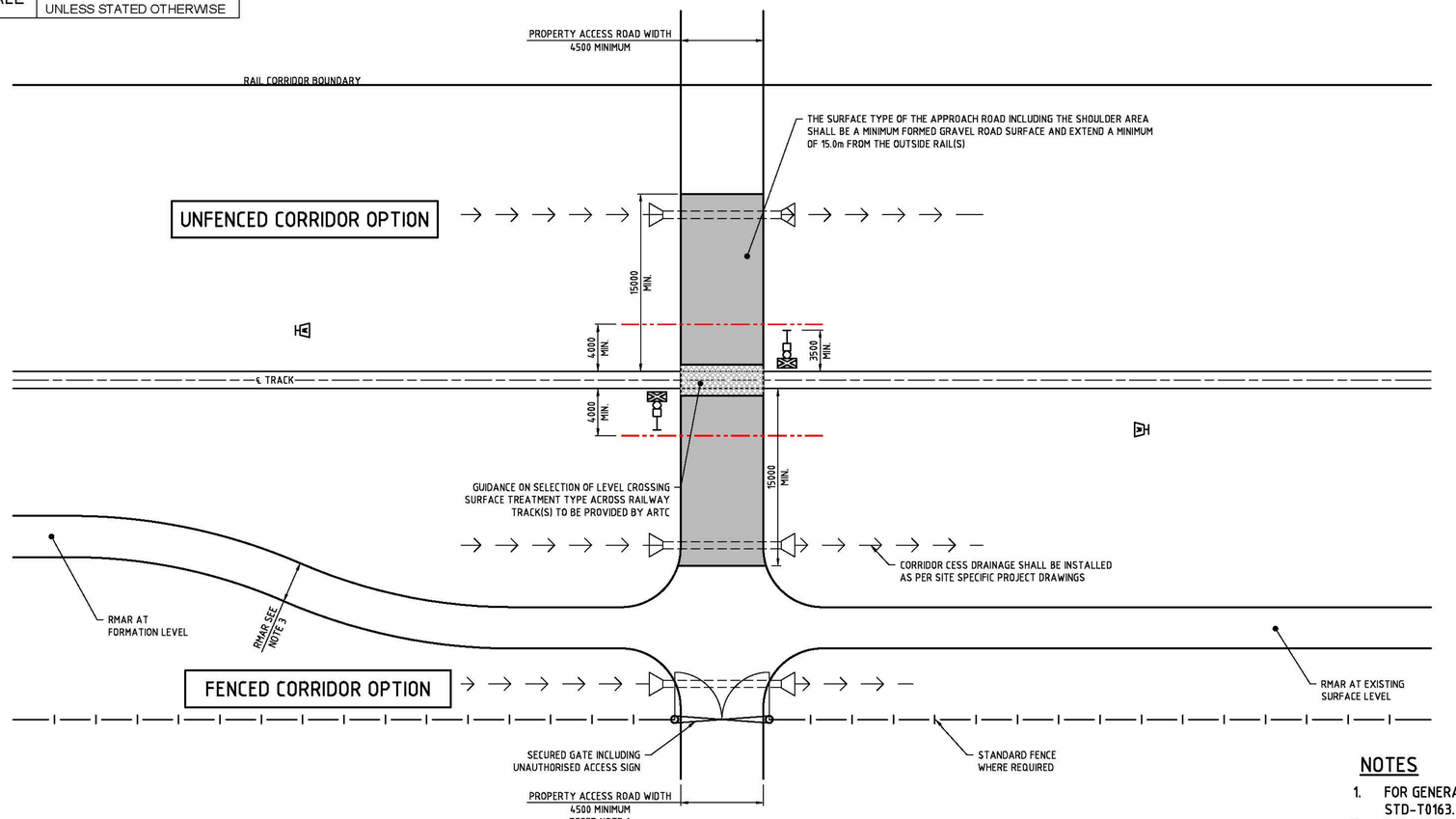
TITLE
STANDARD LEVEL CROSSING
TYPICAL PUBLIC LEVEL CROSSING

STD-T0166

Last Modified - Friday, Dec 14, 2018 1:42:03 PM

CAD File - V:_Vault\Projects\30031593\CAD\Drawings Standard\Sheets\STD-T0166.dwg

DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



TYPICAL PRIVATE LEVEL CROSSING FOR NON LIVESTOCK USE AND LOW USE LIVESTOCK WITH RAIL MAINTENANCE ACCESS ROAD DRAWN FOR SINGLE TRACK FOR FENCED AND UNFENCED CORRIDOR

NOT TO SCALE

LEGEND

- SERVICES CONDUIT — REFER TO STANDARD DRAWING STD-T0163 NOTE 11
- WHISTLE BOARD — REFER TO STANDARD DRAWING STD-T0163 NOTE 12
- RAILWAY LEVEL CROSSING PASSIVE ASSEMBLY RX-2 (MINIMUM) — REFER TO STANDARD DRAWING STD-T0164 FOR DETAILS
- SITE DRAINAGE STRUCTURE AND FLOW ARROW (INDICATIVE ONLY)
- FENCING

NOTES

1. FOR GENERAL NOTES REFER TO STANDARD DRAWING NUMBER STD-T0163.
2. FOR TYPICAL FENCING AND GATE DETAILS REFER TO ARTC STANDARD DRAWING NUMBERS STD-T0199 TO STD-T0202.
3. THE REQUIREMENT AND SUBSEQUENT LOCATION OF THE RAIL MAINTENANCE ACCESS ROAD (RMAR) SHALL BE DESIGNED AND CERTIFIED BY A COMPETENT ENGINEER AND PROVIDE ACCESS TO RAIL SIDE INFRASTRUCTURE WHERE REQUIRED.
4. WHERE THERE IS A BOUNDARY GATE, IF THE DISTANCE BETWEEN THE NEAREST RAIL AND BOUNDARY GATE IS NOT SUFFICIENT TO ACCOMMODATE THE 'DESIGN VEHICLE PLUS 5 METRES', THEN THE USE OF A RECESSED BOUNDARY GATE SHALL BE CONSIDERED AND DISCUSSED WITH THE LANDOWNER IN ORDER TO PREVENT SHORT STACKING ACROSS THE RAILWAY CROSSING. THE FENCING ARRANGEMENT TO BE DESIGNED AND CERTIFIED BY A COMPETENT ENGINEER.
5. MINIMUM PROTECTION WHERE LIVESTOCK TREATMENT IS REQUIRED SHALL HAVE A BOUNDARY FENCE AND GATE. (FENCED CORRIDOR OPTION)
6. ROAD WIDTH AND CORRESPONDING LEVEL CROSSING PANEL WIDTH NEED ONLY BE DESIGNED TO ACCOMMODATE THE REASONABLE ROAD PAVEMENT WIDTH NEEDED FOR OPERATION OF THE DESIGN VEHICLES SUBJECT TO THE DESIGN ROAD WIDTH NOT BEING LESS THAN 4.5m. SOME FARM MACHINERY E.G. HEADERS REQUIRE A WIDE GATE OPENING TO ALLOW THEM TO PASS THROUGH BUT DO NOT REQUIRE THE ROAD WIDTH TO MATCH THE WIDTH OF THE GATE OPENING. WIDE GATE OPENINGS SHALL BE DESIGNED FOR THE WIDTH OF THE OVERSIZE FARM MACHINERY PLUS 900mm MIN. CLEARANCE EACH SIDE. BOUNDARY GATE OPENINGS TO BE DESIGNED TO SUIT STANDARD GATE WIDTHS. SIGNAGE AT THE CROSSING AND OTHER INFRASTRUCTURE SHOULD BE POSITIONED TO MATCH THE GATE OPENING.

Used on / Next higher assembly:

Scale: NOT TO SCALE

Filename: STD-T0168

Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
02	6/12/18	MINOR AMENDMENTS	MS	CD	AD	CD	DO
01	21/11/18	NOT ACCEPTED BY ARTC	MS	CD	AD	CD	
0.2	8/12/17	ISSUE FOR ARTC ACCEPTANCE	BD	CD	AD	CD	DO

Designing Company: SMEC, LEVEL 6, 480 ST PAULS TERRACE, FORTITUDE VALLEY QLD 4006, PHONE 07 3029 6600
Design Project Code: 30031593

Designed	B. DUNNE	08/12/17	Approved By: C. DAS GUPTA	Accepted By: D. OGUCHA
Checked	C. DAS GUPTA	08/12/17		
Ind.Rev. Company: SMEC	Ind.Rev. Name: A. DUNN		Signed: C. DAS GUPTA	Signed: D. OGUCHA
Ind.Review Signature	A. DUNN	08/12/17	Approval Date: 08/12/17	Acceptance Date: 21/12/17

ARTC ACCEPTANCE

ARTC

0.2 01 02

Sheet No.:

Scale:

SHEET SIZE: A1

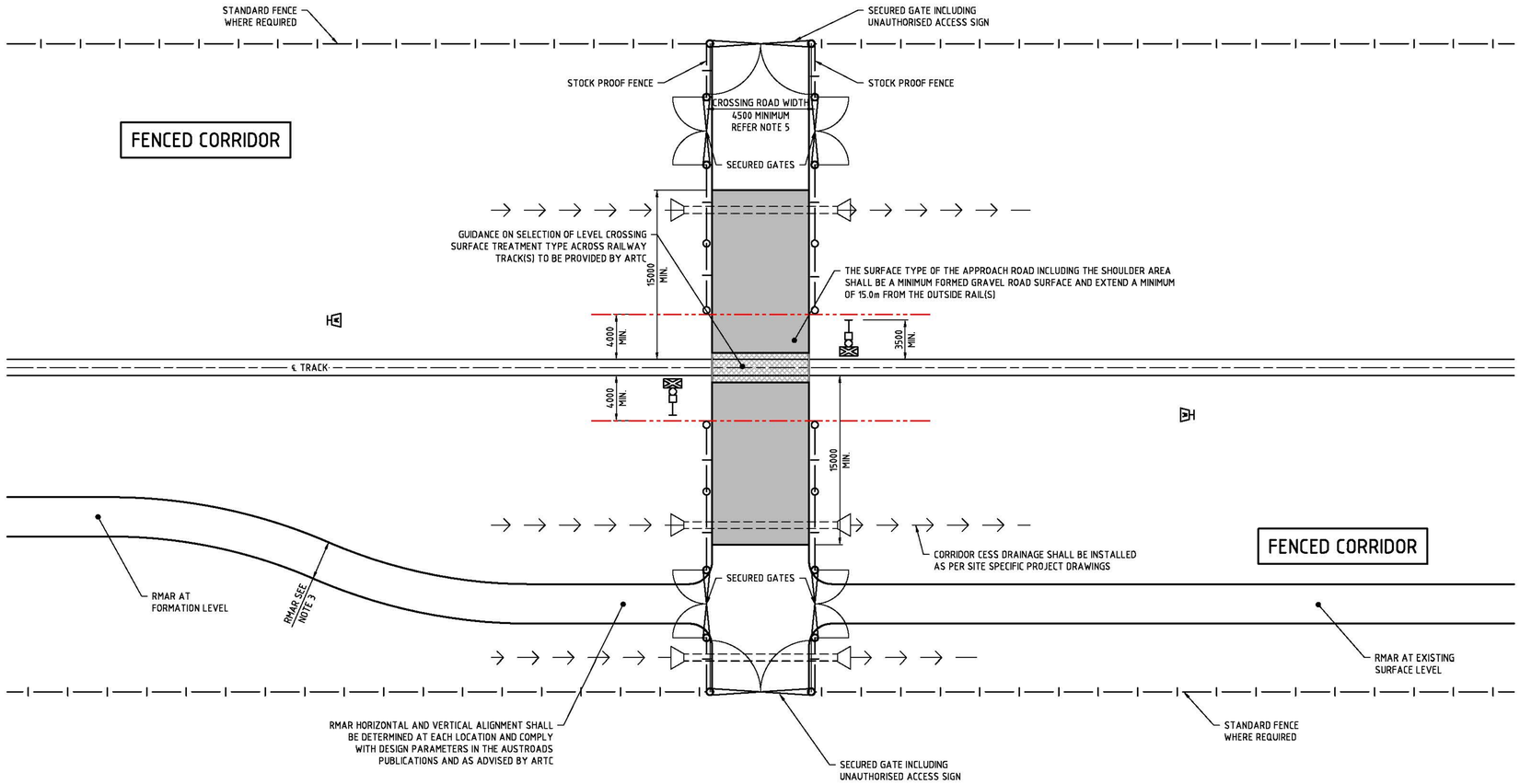
TITLE: STANDARD LEVEL CROSSING
TYPICAL PRIVATE LEVEL CROSSING FOR NON LIVESTOCK AND LOW USE LIVESTOCK

STD-T0168

Last Modified - Friday, Dec 14, 2018 1:42:25 PM

CAD File - V:_Vault\Projects\30031593\CAD\Drawings Standard\Sheets\STD-T0168.dwg

DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



TYPICAL PRIVATE LEVEL CROSSING FOR HIGH USE LIVESTOCK AND MACHINERY WITH RAIL MAINTENANCE ACCESS ROAD DRAWN FOR SINGLE TRACK

NOT TO SCALE

LEGEND

- SERVICES CONDUIT — REFER TO STANDARD DRAWING STD-T0163 NOTE 11
- WHISTLE BOARD — REFER TO STANDARD DRAWING STD-T0163 NOTE 12
- RAILWAY LEVEL CROSSING PASSIVE ASSEMBLY RX-2 (MINIMUM) — REFER TO STANDARD DRAWING STD-T0164 FOR DETAILS
- SITE DRAINAGE STRUCTURE AND FLOW ARROW (INDICATIVE ONLY)
- FENCING

NOTES

1. FOR GENERAL NOTES REFER TO STANDARD DRAWING NUMBER STD-T0163.
2. FOR TYPICAL FENCING AND GATE DETAILS REFER TO ARTC STANDARD DRAWING NUMBERS STD-T0199 TO STD-T0202.
3. THE REQUIREMENT AND SUBSEQUENT LOCATION OF THE RAIL MAINTENANCE ACCESS ROAD (RMAR) SHALL BE DESIGNED AND CERTIFIED BY A COMPETENT ENGINEER AND PROVIDE ACCESS TO RAIL SIDE INFRASTRUCTURE WHERE REQUIRED.
4. WHERE THERE IS A BOUNDARY GATE, IF THE DISTANCE BETWEEN THE NEAREST RAIL AND BOUNDARY GATE IS NOT SUFFICIENT TO ACCOMMODATE THE 'DESIGN VEHICLE PLUS 5 METRES', THEN THE USE OF A RECESSED BOUNDARY GATE SHALL BE CONSIDERED AND DISCUSSED WITH THE LANDOWNER IN ORDER TO PREVENT SHORT STACKING ACROSS THE RAILWAY CROSSING. THE FENCING ARRANGEMENT TO BE DESIGNED AND CERTIFIED BY A COMPETENT ENGINEER.
5. ROAD WIDTH AND CORRESPONDING LEVEL CROSSING PANEL WIDTH NEED ONLY BE DESIGNED TO ACCOMMODATE THE REASONABLE ROAD PAVEMENT WIDTH NEEDED FOR OPERATION OF THE DESIGN VEHICLES SUBJECT TO THE DESIGN ROAD WIDTH NOT BEING LESS THAN 4.5m. SOME FARM MACHINERY E.G. HEADERS REQUIRE A WIDE GATE OPENING TO ALLOW THEM TO PASS THROUGH BUT DO NOT REQUIRE THE ROAD WIDTH TO MATCH THE WIDTH OF THE GATE OPENING. WIDE GATE OPENINGS SHALL BE DESIGNED FOR THE WIDTH OF THE OVERSIZE FARM MACHINERY PLUS 900mm MIN. CLEARANCE EACH SIDE. BOUNDARY GATE OPENINGS TO BE DESIGNED TO SUIT STANDARD GATE WIDTHS. SIGNAGE AT THE CROSSING AND OTHER INFRASTRUCTURE SHOULD BE POSITIONED TO MATCH THE GATE OPENING.

Used on / Next higher assembly:

Scale: NOT TO SCALE

Filename: STD-T0169

Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
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01	21/11/18	NOT ACCEPTED BY ARTC	MS	CD	AD	CD	
0.2	8/12/17	ISSUE FOR ARTC ACCEPTANCE	BD	CD	AD	CD	DO

Designing Company: SMEC, LEVEL 6, 480 ST PAULS TERRACE, FORTITUDE VALLEY QLD 4006, PHONE 07 3029 6600
Design Project Code: 30031593

			ARTC ACCEPTANCE
Designed	B. DUNNE	08/12/17	Approved By: C. DAS GUPTA — Accepted By: D. OGUCHA
Checked	C. DAS GUPTA	08/12/17	
Ind.Rev. Company	SMEC	Ind.Rev. Name: A. DUNN	C. DAS GUPTA Signed: — D. OGUCHA Signed:
Ind.Review Signature	A. DUNN	08/12/17	08/12/17 Approval Date — 21/12/17 Acceptance Date

ARTC

0.2 01 02 STD-T0169

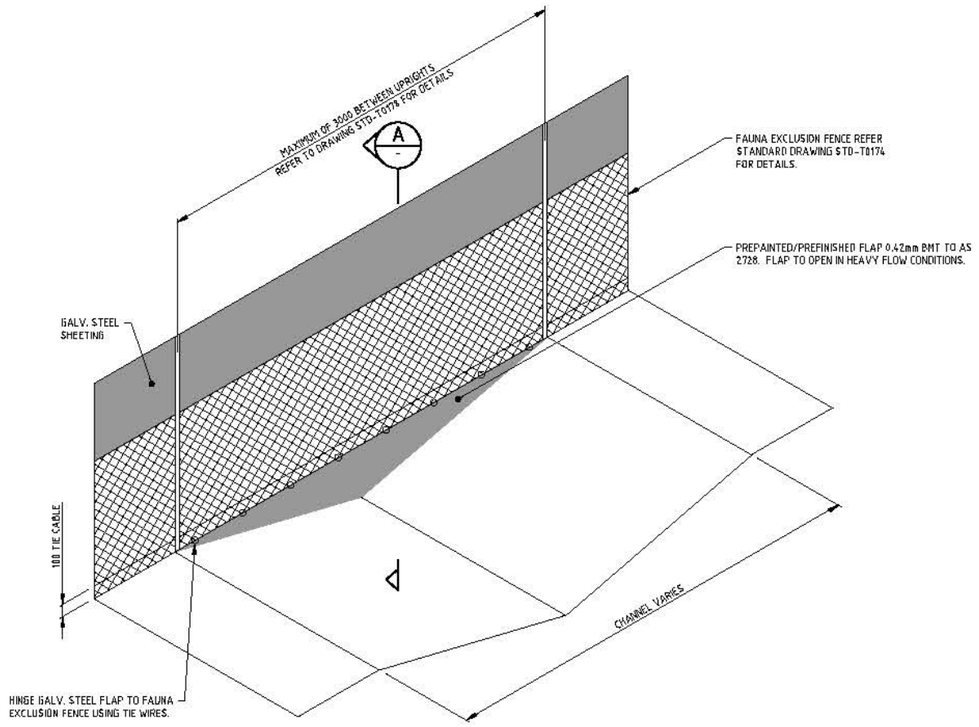
Sheet No.: Scale: SHEET SIZE A1

TITLE: STANDARD LEVEL CROSSING TYPICAL PRIVATE LEVEL CROSSING FOR HIGH USE LIVESTOCK

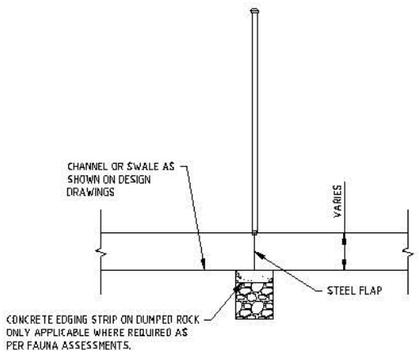
Last Modified - Friday, Dec 14, 2018 1:42:50 PM

CAD File - V:_Vault\Projects\30031593\CAD\Drawings Standard\Sheets\STD-T0169.dwg

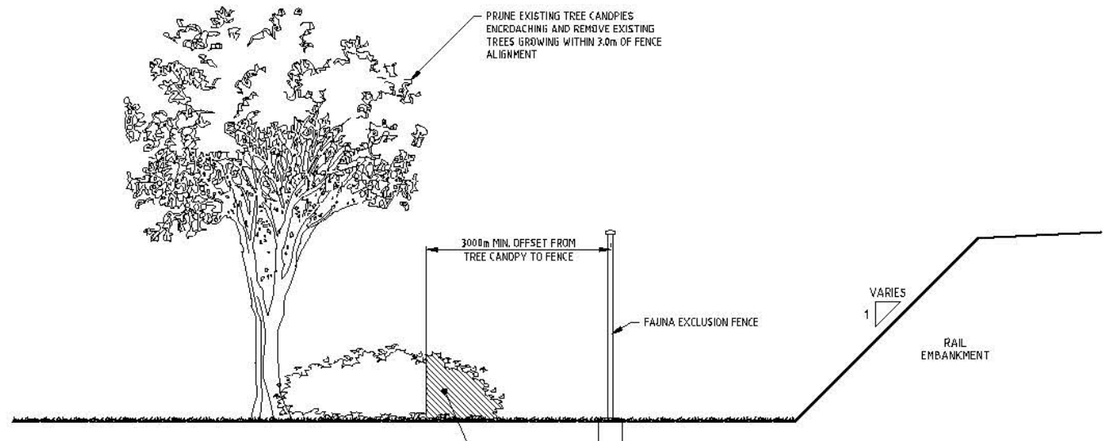
DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



ISOMETRIC VIEW
FAUNA EXCLUSION FENCE OVER CHANNEL
SCALE 1:25



SECTION A
SCALE 1:25



VEGETATION SETBACKS ALONG FAUNA EXCLUSION FENCE LINES - TYPICAL DETAIL
SCALE 1:50

NOTES
1. FOR ALL CHAIN LINK FENCE NOTES REFER TO STANDARD DRAWING STD-T0193.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH STANDARD DRAWING STD-T0174.

Used on / Next higher assembly:

Scale: A1/A3 1:25/1:50 0 500 1000mm

Filename:

Alternate DMS number:

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0	05/06/17	ISSUE FOR ARTC ACCEPTANCE	BD	RB	JR	CD	DO

Designing Company: SMEC, LEVEL 1, 194 MELBOURNE STREET, SOUTH BRISBANE QLD 4101, PHONE 07 3029 8888 FAX 07 3029 8899
Design Project Code: 30001509

Designed	B. DUNNE	21/03/17	Approved By: C. DAS GUPTA
Checked	R. BRAZIER	21/03/17	Accepted By: D. OGUCHA
Ind.Rev. Company	SMEC	Ind.Rev. Name: J. ROBINSON	Signed: C. DAS GUPTA
Ind.Review Signature	J. ROBINSON	05/06/17	Approval Date: 05/06/17

ARTC ACCEPTANCE
Signed: D. OGUCHA
Acceptance Date: 06/07/17

ARTC

0 STD-T0173

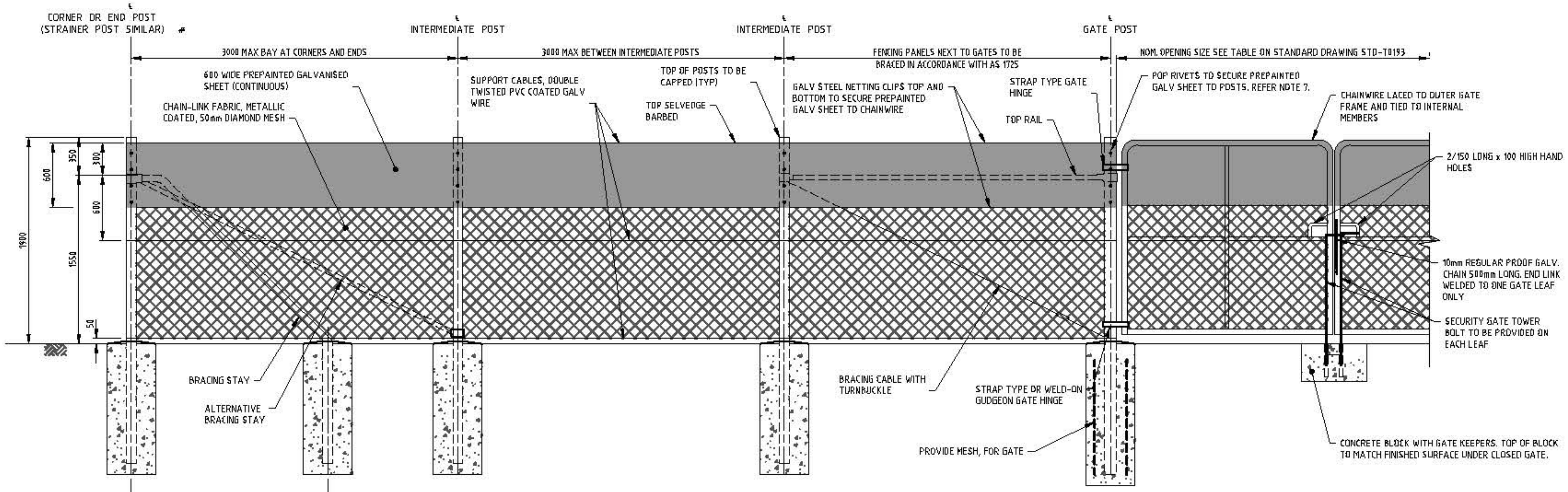
TITLE: STANDARD FAUNA EXCLUSION FENCE DETAILS SHEET 1

Sheet No.:
Scale:
SHEET SIZE: A1

Last Modified - Tuesday, Aug 08, 2017 4:20:26 PM

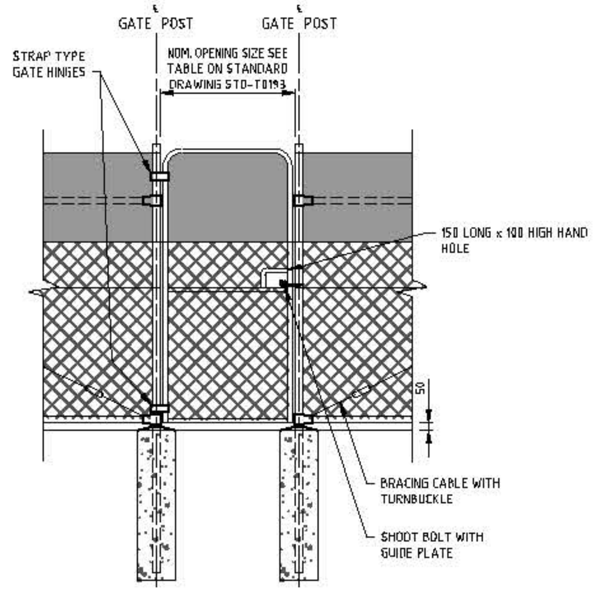
CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0173.dwg

DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



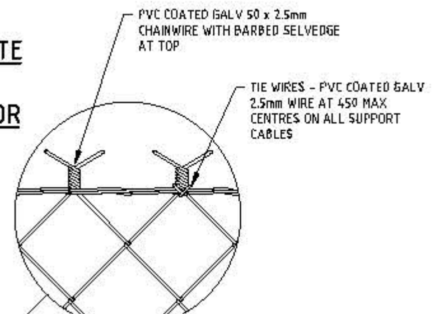
FAUNA EXCLUSION FENCE AND GATE
TYPICAL ELEVATION
VIEW FROM OUTSIDE RAIL CORRIDOR
SCALE 1:25

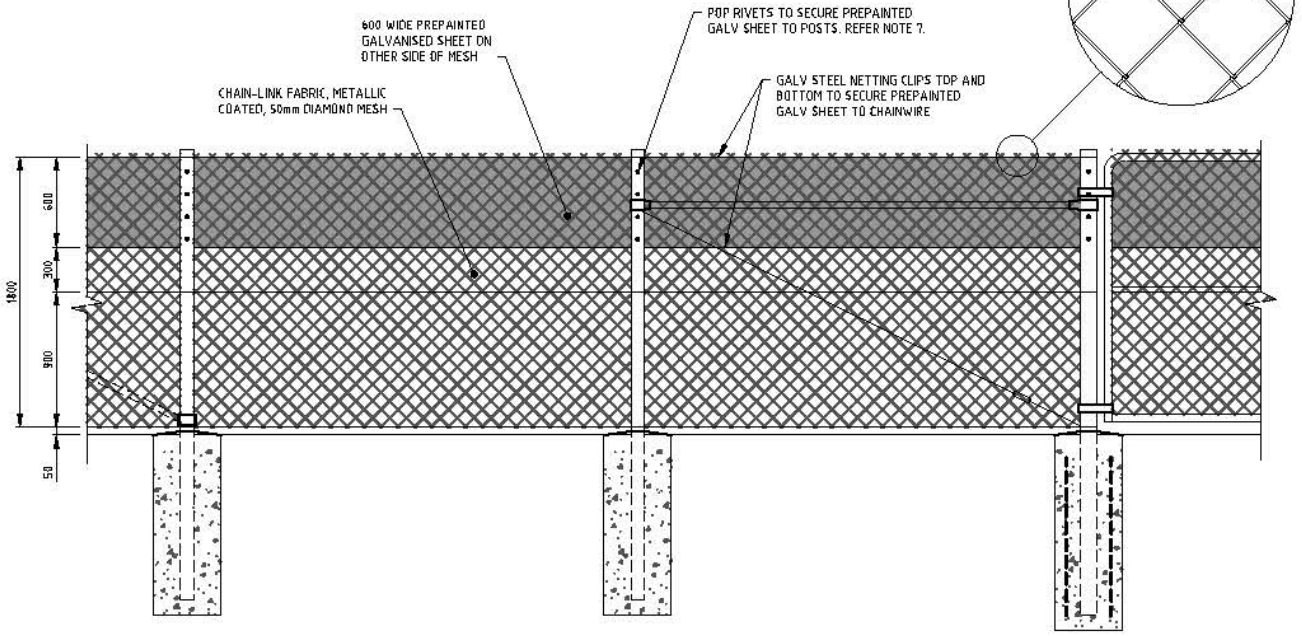
DOUBLE LEAF GATE
SCALE 1:25



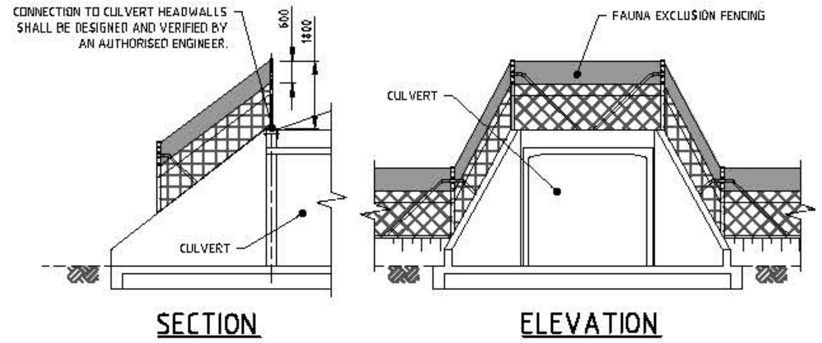
SINGLE LEAF GATE
SCALE 1:25

\# NOTE:
STRAINER POST ASSEMBLIES SHALL CONSIST OF DIAGONAL BRACING STAYS EACH SIDE OF POST AS SHOWN ON CORNER POST DETAIL. STRAINER POSTS SHALL BE INSTALLED AT 150m MAXIMUM INTERVALS ON STRAIGHT LENGTHS AND AT ANY SIGNIFICANT CHANGES IN DIRECTION IN ACCORDANCE WITH AS 1725.





FAUNA EXCLUSION FENCE AND GATE
TYPICAL ELEVATION
VIEW FROM INSIDE RAIL CORRIDOR
SCALE 1:25



FAUNA EXCLUSION FENCE AT CULVERTS
TYPICAL ARRANGEMENTS
SCALE 1:100

NOTES

1. FOR ALL CHAIN LINK FENCE NOTES REFER TO STANDARD DRAWING STD-T0193.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH STANDARD DRAWING STD-T0173.
3. CIRCULAR HOLLOW SECTIONS (CHS) TO BE GRADE C350 TO AS 1163.
4. GALVANISED CHAINWIRE SHALL CONFORM TO AS 2423 WITH A MESH SIZE OF 50mm AND 2.5mm DIAMETER WIRE AND COATED WITH GREEN PVC.
5. SELVEDGES: BARBED SELVEDGES SHALL BE USED AT TOP EXCEPT ON GATES WHERE KNUCKLED SELVEDGES ARE USED TOP AND BOTTOM.
6. PREFINISHED/PREPAINTED GALVANISED STEEL SHEET SHALL BE 0.42mm BMT TO AS 2728 COLOURED ON BOTH SIDES. THE COLOUR SHALL BE SUBJECT TO FINAL APPROVAL BY AN AUTHORISED ENVIRONMENTAL REPRESENTATIVE.
7. CHAINWIRE AND PREPAINTED GALVANISED SHEET SHALL BE LOCATED ON THE OPPOSITE SIDE OF THE POSTS TO THE RAILWAY TO PREVENT FAUNA CLIMBING THE CHS POSTS AND STAYS.
8. CORNER POSTS TO BE ADOPTED WHERE THE CHANGE IN ANGLE IN HORIZONTAL ALIGNMENT EXCEEDS 20 DEGREES.
9. BOLTS NUTS AND WASHERS TO BE HOT DIP GALVANISED TO AS 1214.
10. WELDING SHALL BE TO AS/NZS 1554.1.
11. CONNECTION TO CULVERT HEADWALLS SHALL BE DESIGNED AND CERTIFIED BY AN AUTHORISED ENGINEER.
12. DEPTH AND DIAMETER OF POST FOUNDATIONS SHALL BE DETERMINED AND CERTIFIED BY AN AUTHORISED ENGINEER.
13. ARRANGEMENTS SHOWN ARE TYPICAL ONLY. AN AUTHORISED ENVIRONMENTAL REPRESENTATIVE SHALL NOMINATE FENCE TYPE BASED ON ASSESSMENTS.
14. DIMENSIONS AND INCLUSIONS TO BE NOMINATED BY AN AUTHORISED ENVIRONMENTAL REPRESENTATIVE IN ACCORDANCE WITH THE RELEVANT JURISDICTION'S GUIDELINES.

Drawing standard in accordance with EGP-04-01 & EGP-04-02

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
0	05/06/17	ISSUE FOR ARTC ACCEPTANCE	BD	RB	JR	CD	DO

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Scale: A1/A3 1:25/1:50 — 0 500 1000mm
Filename:
Alternate DMS number:

Designing Company: SMEC
Designed: B. DUNNE 21/03/17
Checked: R. BRAZIER 21/03/17
Ind.Rev. Company: SMEC — Ind.Rev. Name: J. ROBINSON
Ind.Review Signature: J. ROBINSON 05/06/17
Approved By: C. DAS GUPTA — Signed: C. DAS GUPTA — Approval Date: 05/06/17
ARTC ACCEPTANCE — Accepted By: D. OGUCHA — Signed: D. OGUCHA — Acceptance Date: 06/07/17

ARTC
STD-T0174
Sheet No.: 0
SHEET SIZE: A1

TITLE: STANDARD FAUNA EXCLUSION FENCE DETAILS SHEET 2

DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE

ORDERING CONSIDERATIONS

MOWING STRIP	ONLY INSTALLED WHERE SPECIFIED BY ARTC.
PLASTIC COATING	NOT PROVIDED UNLESS SPECIFIED BY ARTC. COATING COLOUR PREFERENCE (BLACK OR GREEN) TO BE CONFIRMED WITH ARTC AND ADJOINING OWNER.
"LIGHT DUTY" (2.5MM) CHAIN LINK FABRIC	"HEAVY DUTY" (3.15mm) FABRIC MAY BE REPLACED WITH "LIGHT DUTY" (2.5mm) FABRIC ONLY WHERE SPECIFIED BY ARTC. NOTE: "LIGHT DUTY" CHAIN-LINK FABRIC PROVIDES FOR ONLY APPROX. 60% OF THE LOAD BEARING CAPACITY OF "HEAVY DUTY" CHAIN-LINK FABRIC
BARBED WIRE SECURITY	REFER STD DRG STD-T0194 FOR DETAILS. ONLY INSTALLED WHERE SPECIFIED BY ARTC.
CRANKED POST TOPS	REFER STD DRG STD-T0195 FOR DETAILS. ONLY INSTALLED WHERE SPECIFIED BY ARTC. 3 ROWS BARBED WIRE OR 2400 HIGH CHAIN-LINK FABRIC ALTERNATIVES TO BE CONFIRMED BY ARTC. CRANKED POST TOPS NOT TO PROJECT OUTSIDE ARTC PROPERTY.

SECURITY GATE TABLE

LOCATION	NOMINAL OPENING SIZE	LEAF TYPE (NOMINAL SIZE)
PEDESTRIAN - PUBLIC ACCESS	1800	SINGLE 1800 OR DOUBLE 900
PEDESTRIAN - ARTC STAFF ONLY	1200	SINGLE 1200
VEHICULAR	3000 MIN 8000 MAX	DOUBLE 1500 MIN DOUBLE 4000 MAX

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS STD-T0194, STD-T0195 AND STD-T0196.
2. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
3. ALL STEEL PLATES SHALL BE GRADE 250 (MIN.) IN ACCORDANCE WITH AS/NZS 3678.
4. ALL FILLET WELDS SHALL BE NOT LESS THAN 3 mm.
5. ALL WELDING SHALL BE IN ACCORDANCE WITH AS/NZS 1554 PART 1.
6. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH AS 1214.
7. AREAS WHERE GALVANISING (OR PLASTIC COATING) HAS BEEN REMOVED BY WELDING OR ABRASIONS SHALL BE CLEANED OF FOREIGN MATTER INCLUDING WELDING SLAG AND PAINTED WITH TWO COATS OF AN APPROVED ORGANIC ZINC-RICH PAINT TO PROVIDE A MIN. DRY FILM THICKNESS OF 0.10mm. COLOUR MATCHING SHALL BE ACHIEVED WHERE DIRECTED BY THE INSPECTOR.
8. SPACING OF INSULATION PANELS SHALL BE DETERMINED AND CERTIFIED BY AN AUTHORISED ENGINEER.

GATE NOTES:

9. GATE FRAME CONFIGURATION, FABRICATION AND INSTALLATION SHALL BE IN ACCORDANCE WITH AS 1725.
10. WHERE STRAP TYPE HINGES ARE USED AT BOTH TOP AND BOTTOM OF GATE, A COLLAR SHALL BE WELDED TO THE GATE FRAME TO PROVIDE A BEARING SURFACE FOR EITHER TOP OR BOTTOM HINGE. BOTH STRAP TYPE AND GUDGEON GATE HINGES SHALL BE WELDED TO GATE POSTS.
11. SINGLE GATES SHALL BE FITTED WITH SHOOT BOLT, DOUBLE GATES SHALL BE FITTED WITH FLAG PIN DROP BOLT AS SHOWN ON THE DRAWING.
12. ALL GATE FRAMES SHALL BE WELDED. FRAMES SHALL BE HOT DIP GALVANISED AFTER FABRICATION IN ACCORDANCE WITH AS 4680.
13. GATES SHALL BE INSTALLED FOR ARTC PURPOSES ONLY. GATES SHALL NOT BE INSTALLED FOR DOMESTIC USE.

FENCING NOTES:

14. ALL POSTS AND RAILS SHALL BE STEEL CIRCULAR HOLLOW SECTION (CHS) GRADE C250 IN ACCORDANCE WITH AS 1163.
15. EACH RAIL BETWEEN POSTS SHALL BE A CONTINUOUS LENGTH.
16. ALL TUBES, FITTINGS AND FASTENERS SHALL BE HOT DIP GALVANISED AFTER FABRICATION IN ACCORDANCE WITH AS 4680.
17. FENCING MATERIALS INCLUDING WIRES, BARBED WIRE AND CHAIN-LINK FENCING FABRIC SHALL BE MANUFACTURED IN ACCORDANCE WITH AS 2423.
18. ERECTION SHALL BE IN ACCORDANCE WITH AS 1725 UNLESS NOTED OTHERWISE.
19. FENCING WIRE SHALL BE CONTINUOUS FROM GATE POST TO GATE POST AND BE CONSTRUCTED WITH 1800mm HIGH CHAIN-LINK FABRIC. CHAIN-LINK FABRIC SHALL BE "HEAVY DUTY", MANUFACTURED FROM 3.15 mm DIA. CORE WIRE, WITH UNIFORM 50mm DIAMOND MESH. THE TOP SELVEDGE SHALL BE BARBED AND THE BOTTOM SELVEDGE SHALL BE KNUCKLED.
20. SUPPORT CABLES SHALL BE INSTALLED IN ACCORDANCE WITH AS 1725.
21. LACING WIRE SHALL IN ACCORDANCE WITH AS 1725.
22. TIE WIRE TO BE IN ACCORDANCE WITH AS 1725.
23. BRACING CABLES TO BE IN ACCORDANCE WITH AS 1725.
24. STRAINER ASSEMBLIES SHALL BE INSTALLED AT 150m MAXIMUM CENTRES ON STRAIGHT LENGTHS AND AT SIGNIFICANT CHANGES IN DIRECTION. ALL CORNER AND STRAINER PANELS SHALL HAVE BRACING INSTALLED IN ACCORDANCE WITH AS 1725.
25. BOLLARDS SHALL BE INSTALLED AT GATES TO SECURE OPEN GATE PANELS ONLY WHERE DIRECTED BY ARTC.
26. IN CORROSIVE ENVIRONMENTS EXTRA GALVANISING SHALL BE PROVIDED FOR POSTS AND/OR PLASTIC COATED MESH (WHERE ORDERED).

FENCING IN ELECTRIFIED AREAS:

27. IN GENERAL THESE FENCES ARE SELF EARTHING. HOWEVER, IN SPECIAL CIRCUMSTANCES, USUALLY DUE TO PROXIMITY TO ELECTRIFICATION WIRING OR WIRING EQUIPMENT SUPPORTS OR SUBSTATIONS, EARTHING OR INSULATED SECTIONS MAY BE REQUIRED IN ACCORDANCE WITH RELEVANT RAILWAY INFRASTRUCTURE MANAGER'S ELECTRICAL ENGINEERING REQUIREMENTS.
28. GATES AND BOLLARDS SHALL BE POSITIONED TO PREVENT AN OPEN GATE FROM COMING WITHIN 2.0m OF ELECTRIFICATION WIRING EQUIPMENT SUPPORTS OR ANY METALWORK CONNECTED TO THEM.
29. SUPPORT CABLES SHALL BE GALVANISED ONLY (NO PLASTIC COATING).
30. FOR INSULATION PANEL REFER TO STANDARD DRAWING STD-T0196.

TIMBER:

31. ALL WORKMANSHIP AND MATERIALS SHALL COMPLY WITH AS 1720.
32. ALL TIMBER SHALL BE SEASONED.
33. ALL TIMBER SHALL HAVE A MINIMUM STRESS GRADE OF F7.
34. TIMBER STRUCTURES OR TIMBERS IN CONTACT WITH GROUND SHALL BE PROTECTED FROM TERMITES AND OTHER PESTS USING THE APPROPRIATE METHOD IN ACCORDANCE WITH AS 3660.

Used on / Next higher assembly:

Scale: NOT TO SCALE

Filename:

Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
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Designing Company: SMEC
SMEC LEVEL 1, 154 MELBOURNE STREET SOUTH BRISBANE QLD 4101 PHONE 07 3029 8888 FAX 07 3029 8899
Design Project Code: 3009193

Designed	B. DUNNE	17/03/17	Approved By: C. DAS GUPTA
Checked	S. BOWRAN	17/03/17	Accepted By: D. OGUCHA
Ind.Rev. Company: SMEC	Ind.Rev. Name: A. DUNN	C. DAS GUPTA	D. OGUCHA
Ind.Review Signature	A. DUNN	05/06/17	Signed: 05/06/17 (Approval Date) / Signed: 06/07/17 (Acceptance Date)

ARTC ACCEPTANCE

ARTC

0 STD-T0193

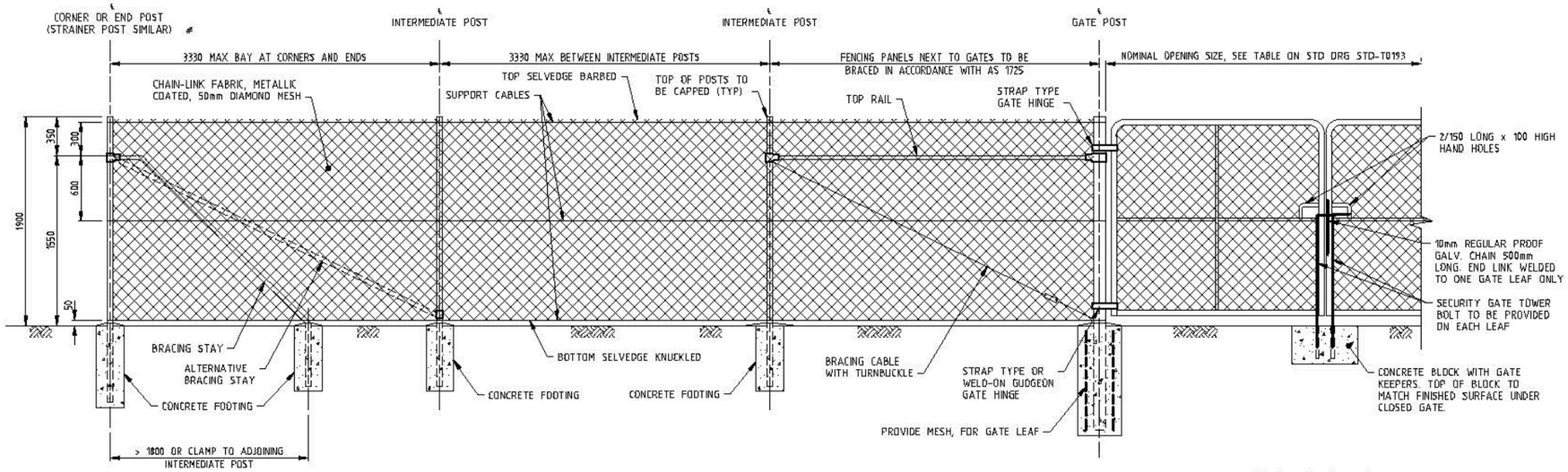
TITLE: STANDARD CHAIN LINK BOUNDARY FENCE NOTES

Sheet No.:
Scale:
SHEET SIZE: A1

Last Modified: Tuesday, Aug 08, 2017 4:20:17 PM

CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0193.dwg

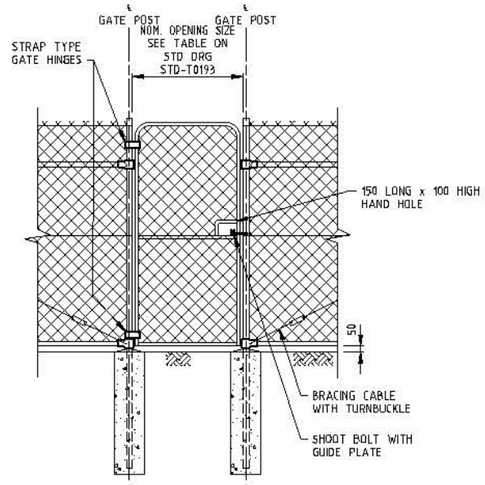
DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



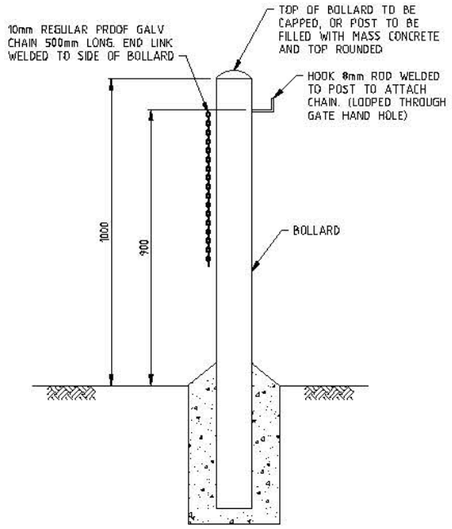
NOTE:
STRAINER POST ASSEMBLIES SHALL CONSIST OF DIAGONAL BRACING STAYS EACH SIDE OF POST AS SHOWN ON CORNER POST DETAIL. STRAINER POSTS SHALL BE INSTALLED AT 150m MAXIMUM INTERVALS ON STRAIGHT LENGTHS AND AT ANY SIGNIFICANT CHANGES IN DIRECTION IN ACCORDANCE WITH AS 1725.

TYPICAL ELEVATION
SCALE 1:25

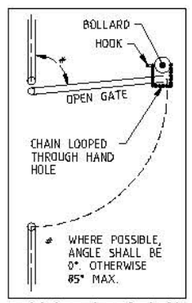
DOUBLE LEAF GATE
SCALE 1:25



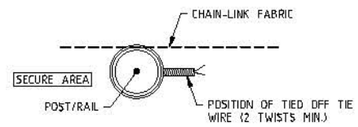
SINGLE LEAF GATE
SCALE 1:25



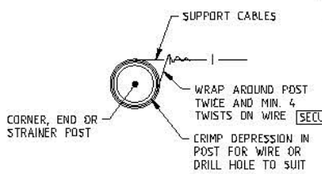
BOLLARD DETAIL
SCALE 1:10



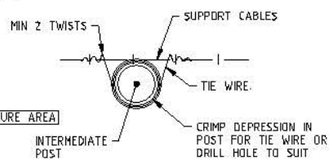
BOLLARD LOCATION RELATIVE TO GATE
N.T.S



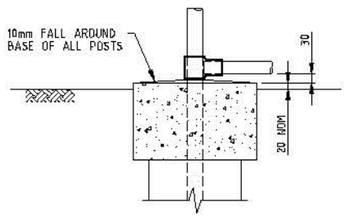
CHAIN-LINK FABRIC TIE-OFF DETAIL
N.T.S



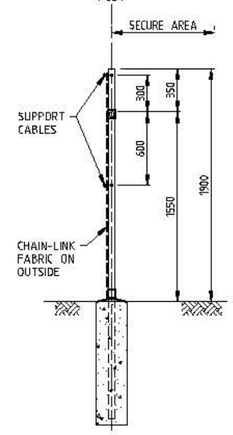
TIE-OFF DETAIL AT CORNER END OR STRAINER POSTS
N.T.S



TIE-OFF DETAIL AT INTERMEDIATE POSTS
N.T.S



MOWING STRIP
SCALE 1:10



TYPICAL SECTION
SCALE 1:25

NOTES:

1. FOR ALL OTHER NOTES AND TABLES REFER TO STANDARD DRAWING STD-T0193.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS STD-T0195 AND STD-T0196.

Used on / Next higher assembly:

Scale: A1/A3 1:25/1:50 0 500 1000mm

Filename:

Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
0	05/06/17	ISSUE FOR ARTC ACCEPTANCE	BD	SB	AD	CD	DO

Designing Company: SMEC, LEVEL 7 / 194 MELBOURNE STREET, SOUTH BRISBANE QLD 4101, PHONE 07 3029 8888 FAX 07 3029 8899
Design Project Code: 30017503

Designed	B. DUNNE	17/03/17	Approved By: C. DAS GUPTA
Checked	S. BOWRAN	17/03/17	Accepted By: D. OGUCHA
Ind.Rev. Company	SMEC	Ind.Rev. Name	A. DUNN
Ind.Review Signature	A. DUNN	05/06/17	C. DAS GUPTA Signed: 05/06/17 Approval Date
			D. OGUCHA Signed: 06/07/17 Acceptance Date

ARTC ACCEPTANCE

ARTC

TITLE: STANDARD CHAIN LINK BOUNDARY FENCE

0 STD-T0194

Sheet No.

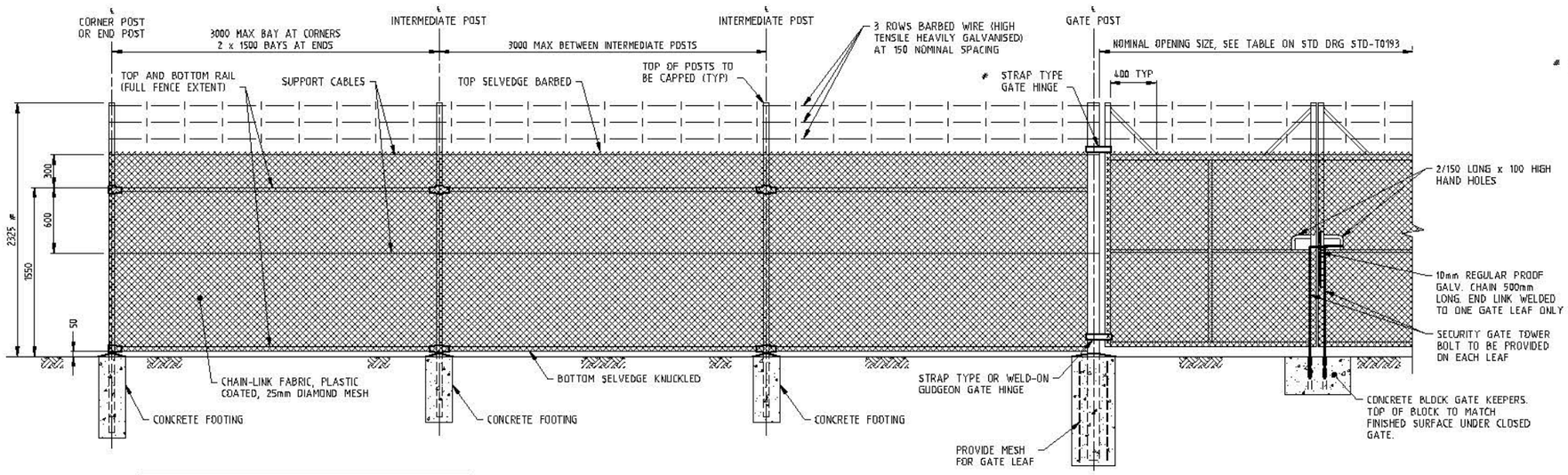
Scale:

SHEET SIZE A1

Last Modified: Tuesday, Aug 08, 2017 4:20:18 PM

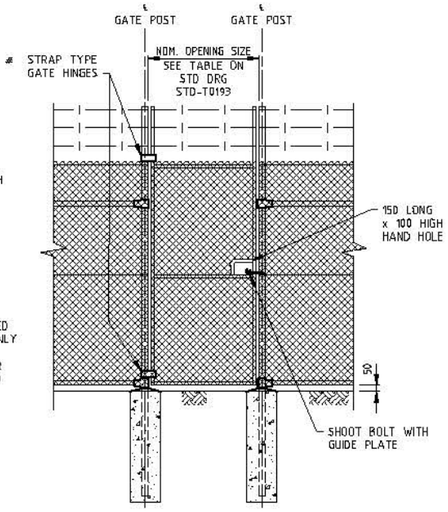
CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0194.dwg

DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



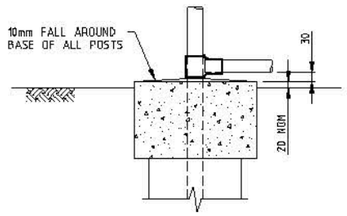
BARBED WIRE MAY BE OMITTED WHERE REQUESTED BY THE INFRASTRUCTURE OWNER. POST HEIGHT SHALL BE REDUCED TO 1900mm ABOVE SURFACE LEVEL. GATE FRAMES AND TOP HINGING POINT TO BE ALTERED TO SUIT.

TYPICAL ELEVATION
SCALE 1:25

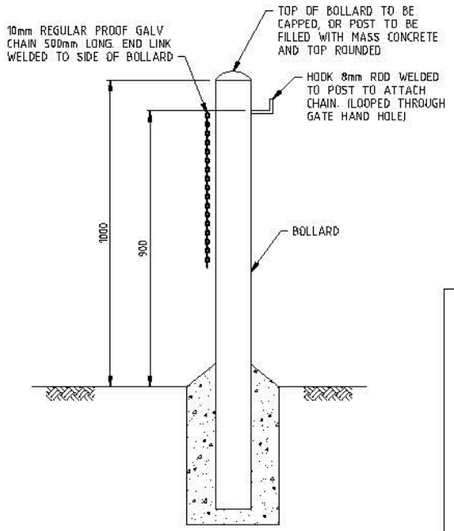


DOUBLE LEAF GATE
SCALE 1:25

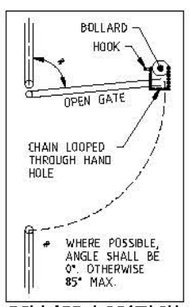
SINGLE LEAF GATE
SCALE 1:25



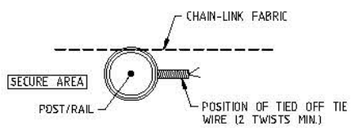
MOWING STRIP
SCALE 1:10



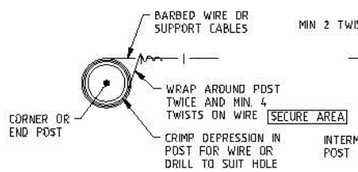
BOLLARD DETAIL
SCALE 1:10



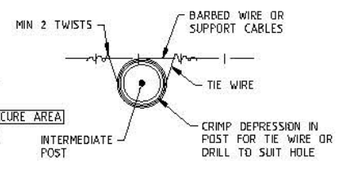
BOLLARD LOCATION RELATIVE TO GATE
N.T.S



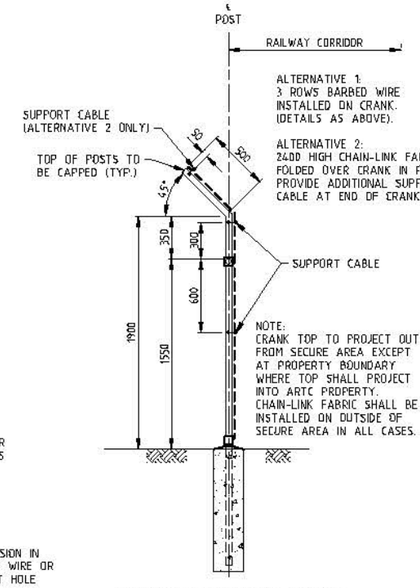
CHAIN-LINK FABRIC TIE-OFF DETAIL
N.T.S



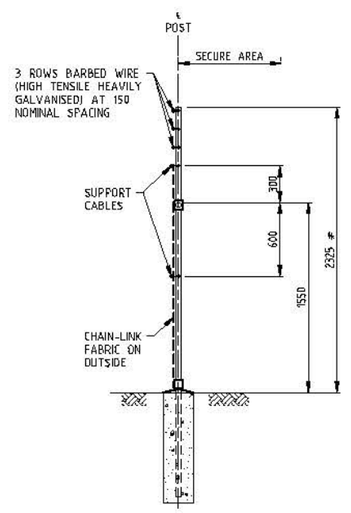
TIE-OFF DETAIL AT CORNER END OR STRAINER POSTS
N.T.S



TIE-OFF DETAIL AT INTERMEDIATE POSTS
N.T.S



SECTION THROUGH FENCE SHOWING CRANK TOP ALTERNATIVES
SCALE 1:25



TYPICAL SECTION
SCALE 1:25

NOTES:

1. FOR ALL OTHER NOTES AND TABLES REFER TO STANDARD DRAWING STD-T0193.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS STD-T0194 AND STD-T0196.

Used on / Next higher assembly:

Scale: A1 / A3 125 / 150 — 0 500 1000mm

Filename:

Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
0	05/06/17	ISSUE FOR ARTC ACCEPTANCE	BD	SB	AD	CD	DO

Designing Company: SMEC — LEVEL 1, 154 MELBOURNE STREET, SOUTH BRISBANE, QLD 4101, PHONE 07 3029 8888 FAX 07 3029 8899
Design Project Code: 30017513

			ARTC ACCEPTANCE
Designed	B. DUNNE	17/03/17	Approved By: C. DAS GUPTA — Accepted By: D. OGUCHA
Checked	S. BOWRAN	17/03/17	
Ind.Rev. Company: SMEC	Ind.Rev. Name: A. DUNN		C. DAS GUPTA — Signed: — D. OGUCHA — Signed:
Ind.Review Signature	A. DUNN	05/06/17	Approval Date: 05/06/17 — Acceptance Date: 06/07/17

ARTC

0 STD-T0195

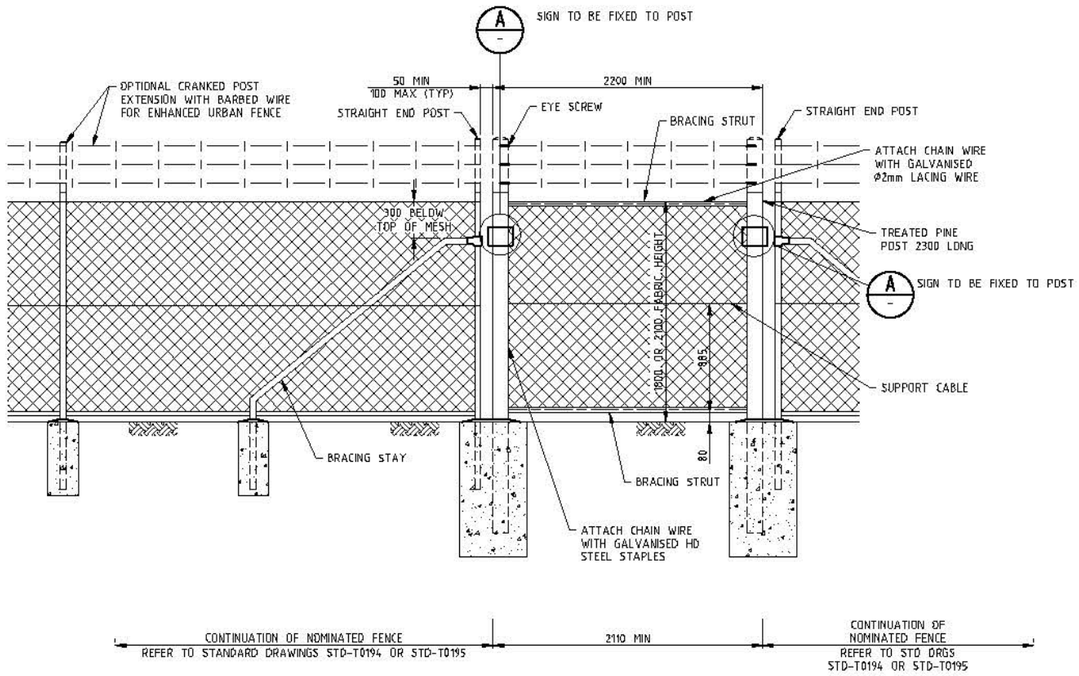
Sheet No. | Scale: | SHEET SIZE A1

TITLE: STANDARD CHAIN LINK BOUNDARY & HIGH SECURITY FENCE

Last Modified - Tuesday, Aug 08, 2017 4:20:19 PM

CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0195.dwg

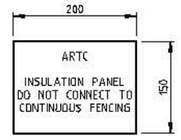
DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



INSULATION PANEL DETAIL
SCALE 1:25

NOTES:

1. FOR ALL OTHER NOTES AND TABLES REFER TO STANDARD DRAWING STD-T0193.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS STD-T0194 AND STD-T0195.



ALUMINIUM SIGN TO BE SUPPLIED. SIGN TO BE FIXED TO POST.

DETAIL A
SCALE 1:5

Used on / Next higher assembly:

Scale: A1 / A3 1:25 / 1:50 0 500 1000mm

Filename:

Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
0	05/06/17	ISSUE FOR ARTC ACCEPTANCE	BD	SB	AD	CD	DO

Designing Company: SMEC — LEVEL 1, 154 MELBOURNE STREET, SOUTH BRISBANE QLD 4101, PHONE 07 3029 8888 FAX 07 3029 8899

Design Project Code: 30021253

ARTC ACCEPTANCE

			Approved By	Accepted By
Designed	B. DUNNE	17/03/17		
Checked	S. BOWRAN	17/03/17	C. DAS GUPTA	D. OGUCHA
Ind.Rev. Company	Ind.Rev. Name		C. DAS GUPTA	D. OGUCHA
SMEC	A. DUNN		Signed:	Signed:
Ind.Review Signature	A. DUNN	05/06/17	05/06/17 Approval Date	06/07/17 Acceptance Date

ARTC

0

STD-T0196

Sheet No.

Scale:

SHEET SIZE A1

TITLE
STANDARD CHAIN LINK FENCE INSULATION PANEL

Last Modified - Tuesday, Aug 08, 2017 4:20:20 PM

CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0196.dwg

DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE

ORDERING CONSIDERATIONS

MOWING STRIP	ONLY INSTALLED WHERE SPECIFIED BY ARTC.
BARBED WIRE SECURITY	ONLY INSTALLED WHERE SPECIFIED BY ARTC.
LAPPED FENCE PALINGS	ONLY INSTALLED WHERE SPECIFIED BY ARTC.

TIMBER FENCE GATE TABLE

LOCATION	NOMINAL OPENING SIZE	LEAF TYPE (NOMINAL SIZE)
PEDESTRIAN - PUBLIC ACCESS	1800	SINGLE 1800 OR DOUBLE 900
PEDESTRIAN - ARTC STAFF ONLY	1200	SINGLE 1200
VEHICULAR	3600	DOUBLE 1800

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH STANDARD DRAWING STD-T0198.
2. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
3. ALL STEEL PLATES SHALL BE GRADE 250 MIN. IN ACCORDANCE WITH AS/NZS 3678.
4. ALL FILLET WELDS SHALL BE NOT LESS THAN 4mm.
5. ALL WELDING SHALL BE IN ACCORDANCE WITH AS/NZS 1554 PART 1 AND PART 2.
6. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH AS 1214.
7. AREAS WHERE GALVANISING HAS BEEN REMOVED BY WELDING OR ABRASIONS SHALL BE CLEANED OF FOREIGN MATTER INCLUDING WELDING SLAG AND PAINTED WITH TWO COATS OF AN APPROVED ORGANIC ZINC-RICH PAINT TO PROVIDE A MIN. DRY FILM THICKNESS OF 0.10mm.
8. CONCRETE SHALL BE GRADE N25 (MIN.). ALL CONCRETE WORK SHALL COMPLY WITH AS 3600.

GATE NOTES:

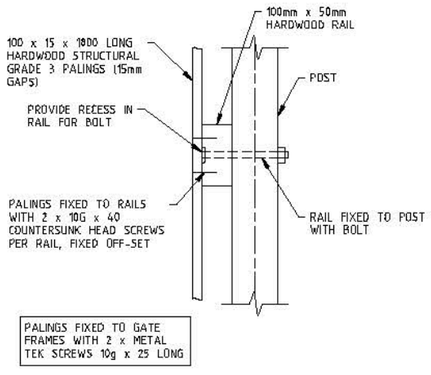
9. SINGLE GATES SHALL BE FITTED WITH SHOOT BOLT, DOUBLE GATES SHALL BE FITTED WITH FLAG PIN DROP BOLT AS SHOWN ON THE DRAWING.
10. ALL GATE FRAMES SHALL BE WELDED. FRAMES SHALL BE HOT DIP GALVANISED AFTER FABRICATION IN ACCORDANCE WITH AS 4680.
11. GATES SHALL BE INSTALLED FOR ARTC PURPOSES ONLY. GATES SHALL NOT BE INSTALLED FOR DOMESTIC USE.

FENCING NOTES:

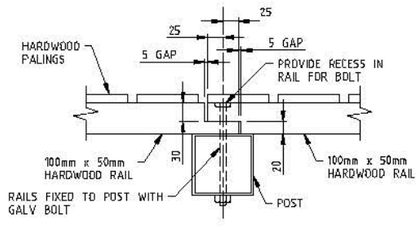
12. ALL POSTS AND GATE FRAMES SHALL BE STEEL RECTANGULAR HOLLOW SECTIONS (RHS) GRADE C350. "RHS" SHALL BE IN ACCORDANCE WITH AS 1163 "STRUCTURAL STEEL HOLLOW SECTIONS".
13. ALL TUBES, FITTINGS AND FASTENERS SHALL BE HOT DIP GALVANISED AFTER FABRICATION IN ACCORDANCE WITH AS 4680.
14. EACH RAIL BETWEEN POSTS SHALL BE A CONTINUOUS LENGTH.
15. BOLLARDS SHALL BE INSTALLED AT GATES TO SECURE OPEN GATE PANELS ONLY WHERE DIRECTED BY ARTC. SEE DETAILS THIS DRAWING.
16. ALL TIMBER COMPONENTS SHALL BE OF AN APPROVED SPECIES AS LISTED IN THE ARTC SPECIFICATION AND SHALL BE CLEAR OF SAPWOOD.
17. TIMBER PALINGS SHALL BE PLACED WITH 15mm (+0/-5) GAPS.

FENCING IN ELECTRIFIED AREAS:

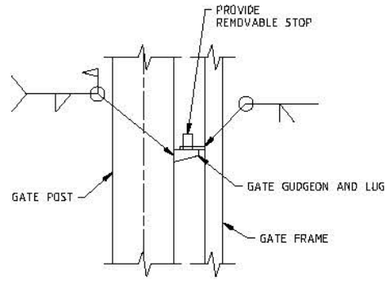
18. IN GENERAL THESE FENCES ARE SELF EARTHING. HOWEVER, IN SPECIAL CIRCUMSTANCES, USUALLY DUE TO PROXIMITY TO ELECTRIFICATION WIRING OR WIRING EQUIPMENT SUPPORTS OR SUBSTATIONS, EARTHING OR INSULATED SECTIONS MAY BE REQUIRED IN ACCORDANCE WITH RELEVANT RAILWAY INFRASTRUCTURE MANAGER'S ELECTRICAL ENGINEERING REQUIREMENTS.
19. GATES AND BOLLARDS SHALL BE POSITIONED TO PREVENT AN OPEN GATE FROM COMING WITHIN 2.0m OF ELECTRIFICATION WIRING EQUIPMENT SUPPORTS OR ANY METALWORK CONNECTED TO THEM.



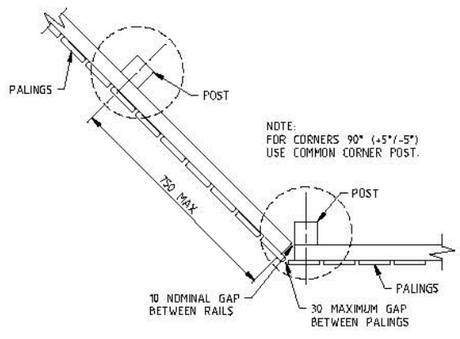
FIXING DETAILS
SCALE 1:5



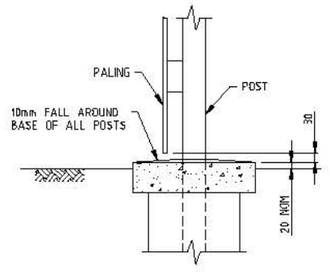
HARDWOOD RAIL JOINT DETAIL
SCALE 1:5



GATE HINGE DETAIL
SCALE 1:5



FENCE CORNER DETAIL
SCALE 1:10



MOWING STRIP
SCALE 1:10

Used on / Next higher assembly:

Scale: A1 / A3 1:10 / 1:20 0 100 200 300 400mm

Filename:

Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
0	05/06/17	ISSUE FOR ARTC ACCEPTANCE	BD	SB	AD	CD	DO

Designing Company: SMEC
SMEC LEVEL 1 / 194 MELBOURNE STREET SOUTH BRISBANE QLD 4101 PHONE 07 3029 8888 FAX 07 3029 8899
Design Project Code: 30017509

Designed	B. DUNNE	17/03/17	
Checked	S. BOWRAN	17/03/17	
Ind.Rev. Company	SMEC	Ind.Rev. Name	A. DUNN
Ind.Review Signature	A. DUNN	05/06/17	

ARTC ACCEPTANCE	
Approved By	Accepted By
C. DAS GUPTA	D. OGUCHA
Signed: C. DAS GUPTA	Signed: D. OGUCHA
05/06/17 Approval Date	06/07/17 Acceptance Date

ARTC | 0 | STD-T0197 | Sheet No. | Scale: | SHEET SIZE A1

TITLE: STANDARD TIMBER BOUNDARY FENCE NOTES

Last Modified - Tuesday, Aug 08, 2017 4:20:21 PM

CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0197.dwg

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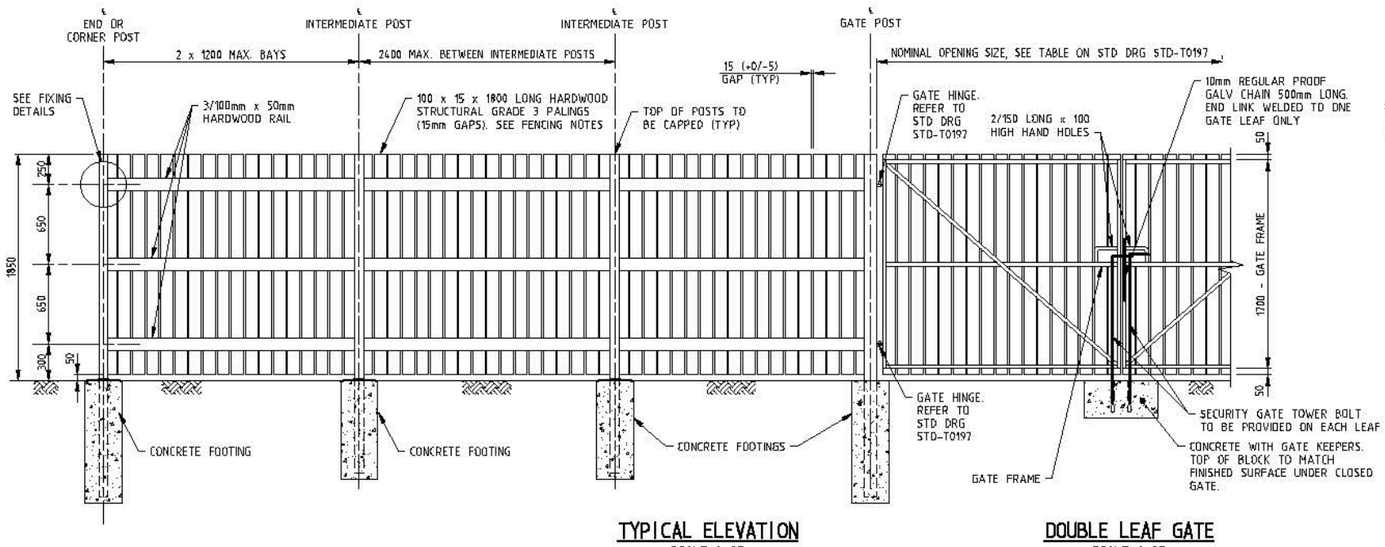
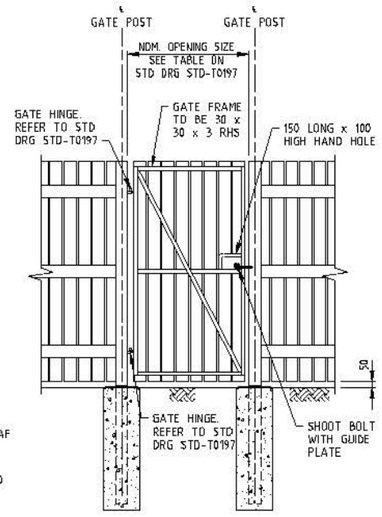
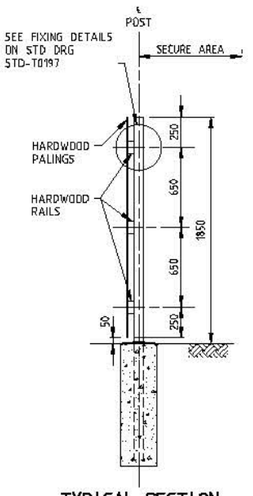


TYPICAL ELEVATION
SCALE 1:25

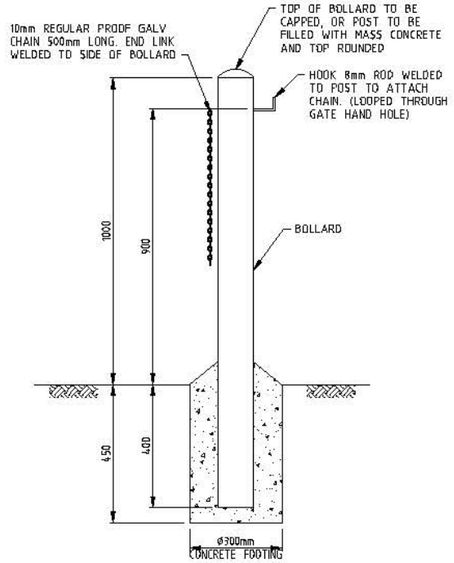
DOUBLE LEAF GATE
SCALE 1:25



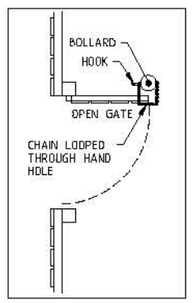
SINGLE LEAF GATE
SCALE 1:25



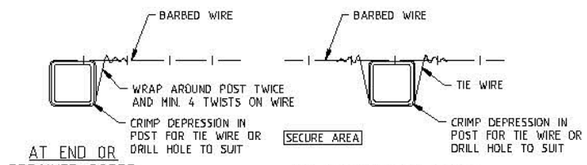
TYPICAL SECTION
SCALE 1:25



BOLLARD DETAIL
SCALE 1:10



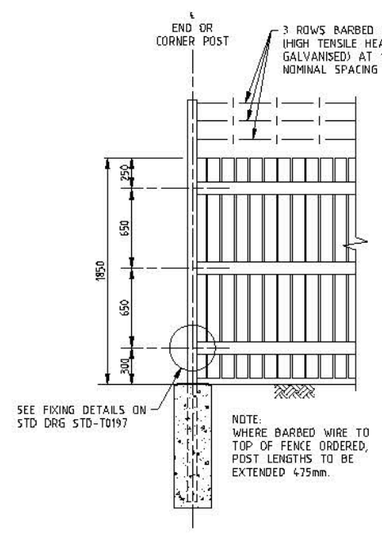
BOLLARD LOCATION RELATIVE TO GATE
N.T.S



BARBED WIRE TIE-OFF DETAILS (WHERE ORDERED)
N.T.S

NOTES:

1. FOR ALL OTHER NOTES AND TABLES REFER TO STANDARD DRAWING STD-T0197.



ELEVATION SHOWING EXTENDED POST FOR BARBED WIRE FIXING (WHERE ORDERED)
SCALE 1:25

Used on / Next higher assembly:

Scale: A1 / A3 1:25 / 1:50 0 500 1000mm

Filename:

Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
0	05/06/17	ISSUE FOR ARTC ACCEPTANCE	BD	SB	AD	CD	DO

Designing Company: SMEC, LEVEL 7 / 194 MELBOURNE STREET, SOUTH BRISBANE QLD 4101, PHONE 07 3029 8888 FAX 07 3029 8899
Design Project Code: 30091569

Designed	B. DUNNE	17/03/17	
Checked	S. BOWRAN	17/03/17	
Ind.Rev. Company	SMEC	Ind.Rev. Name	A. DUNN
Ind.Review Signature	A. DUNN	05/06/17	

ARTC ACCEPTANCE	Approved By	Accepted By
	C. DAS GUPTA	D. OGUCHA
	C. DAS GUPTA	D. OGUCHA
	Signed: 05/06/17	Signed: 06/07/17
	Approval Date	Acceptance Date

ARTC | 0 | STD-T0198 | Sheet No. | Scale: | SHEET SIZE A1

TITLE: STANDARD TIMBER BOUNDARY FENCE

Last Modified - Tuesday, Aug 08, 2017 4:20:22 PM

CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0198.dwg

DRAWN TO AS1100

DO NOT SCALE

ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE

STANDARD FENCES TABLE

AREA	DEVELOPED RURAL	RURAL
ADJOINING PROPERTY WITHOUT LIVESTOCK	4 PLAIN WIRE	4 PLAIN WIRE
ADJOINING PROPERTY WITH SHEEP	6 PLAIN WIRE	2 BARBED WIRE 4 PLAIN WIRE
ADJOINING PROPERTY WITH CATTLE	4 PLAIN WIRE	4 BARBED WIRE
ADJOINING PROPERTY WITH OTHER LIVESTOCK	SEE FENCING NOTES	SEE FENCING NOTES

STANDARD GALVANISED FENCING WIRE TYPES
PLAIN WIRE SHALL BE 4.00mm GALVANISED SOFT WIRE.
BARBED WIRE SHALL BE 2.50mm GALVANISED 4-POINT SOFT WIRE.

HIGH TENSILE WIRES MAY BE USED ONLY WHERE APPROVED BY ARTC AND THE ADJOINING LAND HOLDER IN AREAS SUCH AS LOW FIRE RISK AREAS.

GATE TABLE FOR STANDARD GATES

LOCATION	NOMINAL OPENING SIZE	LEAF TYPE (NOMINAL SIZE)
PEDESTRIAN – ARTC STAFF ONLY	1200	SINGLE 1200
PEDESTRIAN – PUBLIC ACCESS	1800	SINGLE 1800 OR DOUBLE 900
STATION YARD ACCESS	7200	DOUBLE 3600
TRACK CROSSING FOR VEHICLE - PUBLIC, PRIVATE OR ARTC	3600 TO 9600	SINGLE TO 4800 OR DOUBLE TO 9600 TO SUIT APPLICATION

FENCING NOTES:

1. THE TYPE OF FENCING WIRE INSTALLED (4 WIRE OR 6 WIRE/BARBED OR INCLUDING WIRE DIA. AND TENSILE STRENGTH, SHALL BE CONFIRMED BY ARTC, IN CONJUNCTION WITH ADJOINING LAND HOLDER REQUIREMENTS TO KEEP LIVESTOCK OFF RAIL CORRIDOR.
2. PLAIN WIRE SHALL BE FED THROUGH HOLES IN POSTS, BARBED WIRE SHALL BE ATTACHED TO POSTS ON THE SIDE REMOTE FROM THE RAILWAY. WIRE NETTING/PREFABRICATED FIELD FENCING FABRIC SHALL BE ATTACHED TO POSTS IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. FENCING MATERIALS INCLUDING PLAIN WIRE, BARBED WIRE, WIRE NETTING/ PREFABRICATED FIELD FENCING FABRIC SHALL BE MANUFACTURED IN ACCORDANCE WITH AS 2423.
4. FENCING MATERIALS INCLUDING PLAIN WIRE, BARBED WIRE, WIRE NETTING/PREFABRICATED FIELD FENCING FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
5. ALL WIRES SHALL BE GALVANISED IN ACCORDANCE WITH AS 4534.
6. STRAINER POSTS SHALL BE PROVIDED AT INTERVALS NOT EXCEEDING 400 METRES AND AT ALL CHANGES IN DIRECTION OF LINE AND AT FENCE INTERSECTIONS AND ENDS.
7. INTERMEDIATE POSTS SHALL BE PROVIDED AT INTERVALS NOT EXCEEDING 100 METRES AND WHERE A CHANGE IN VERTICAL GRADE OCCURS.
8. STAR POSTS SHALL BE HEAVY DUTY STEEL WITH PROTECTIVE PAINTED COATING.
9. FOR ENHANCED FENCE STRENGTH AND STABILITY, STAR POSTS MAY BE REPLACED WITH INTERMEDIATE POSTS AND APPROVED BY AN AUTHORISED ENGINEER.
10. ALL GATE POSTS SHALL BE STEEL CIRCULAR HOLLOW SECTION IN ACCORDANCE WITH AS 1163.
11. ALL TUBES, FITTINGS AND FASTENERS SHALL BE HOT DIP GALVANISED AFTER FABRICATION IN ACCORDANCE WITH AS 4680.
12. IN AREAS PRONE TO FLOODING, THE BOTTOM LINE (ONLY) OF BARBED WIRE FENCES SHALL BE REPLACED WITH PLAIN WIRE.

FENCING IN ELECTRIFIED AREAS:

13. IN SPECIAL CIRCUMSTANCES, USUALLY DUE TO PROXIMITY TO ELECTRIFICATION WIRING OR WIRING EQUIPMENT SUPPORTS OR SUBSTATIONS, EARTHING OR INSULATED SECTIONS MAY BE REQUIRED IN ACCORDANCE WITH RELEVANT RAILWAY INFRASTRUCTURE MANAGER'S ELECTRICAL ENGINEERING REQUIREMENTS.

GENERAL NOTES:

14. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
15. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH STD DRG STD-T0200, STD-T0201 AND STD-T0202.
16. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH AS 1214.
17. AREAS WHERE GALVANISING HAS BEEN REMOVED BY WELDING OR ABRASIONS SHALL BE CLEANED OF FOREIGN MATTER INCLUDING WELDING SLAG AND PAINTED WITH TWO COATS OF AN APPROVED ORGANIC ZINC-RICH PAINT TO PROVIDE A MIN. DRY FILM THICKNESS OF 0.10mm.
18. ALL CONCRETE WORK SHALL COMPLY WITH AS 3600.
19. "SL" DENOTES GRADE D500N REINFORCING MESH IN ACCORDANCE WITH AS/NZS 4671.
20. WHERE PRODUCT NAMES HAVE BEEN NOTED, AN APPROVED EQUIVALENT MAY BE SUBSTITUTED.
21. ALTERNATIVE FENCING SYSTEMS SHALL BE SUBMITTED TO ARTC FOR APPROVAL PRIOR TO INSTALLATION.

GATE NOTES:

22. WHERE STRAP TYPE GATE HINGES ARE USED AT TOP AND BOTTOM OF GATE A COLLAR SHALL BE WELDED TO THE GATE FRAME TO PROVIDE A BEARING SURFACE FOR EITHER TOP OR BOTTOM HINGE. STRAP TYPE HINGES SHALL BE WELDED TO GATE POSTS, GUDGEON TYPE HINGES MAY BE EITHER WELD-ON OR BOLT THROUGH TYPE.
23. GATE PANELS SHALL BE 5-BAR OR MESH INFILL PROPRIETARY ITEMS TO ARTC APPROVAL.
24. POSITIONS OF GATES FOR TRACK CROSSINGS FOR VEHICLES FOR PUBLIC, PRIVATE OR ARTC PURPOSES TO BE DETERMINED IN ACCORDANCE WITH THE RELEVANT SAFETY AND OPERATIONAL PROCEDURES.
25. ALL GATE FRAMES SHALL BE WELDED. FRAMES SHALL BE HOT DIP GALVANISED AFTER FABRICATION IN ACCORDANCE WITH AS 4680.

Used on / Next higher assembly:

Scale: NOT TO SCALE

Filename:

Alternate DMS number:

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0	05/06/17	ISSUE FOR ARTC ACCEPTANCE	BD	SB	AD	CD	DO

Designing Company: SMEC
Design Project Code: 30051503
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Ind.Rev. Company	SMEC	Ind.Rev. Name	A. DUNN
Ind.Review Signature	A. DUNN	05/06/17	Approval Date

ARTC ACCEPTANCE	
Approved By	Accepted By
C. DAS GUPTA	D. OGUCHA
Signed: C. DAS GUPTA	Signed: D. OGUCHA
05/06/17 Approval Date	06/07/17 Acceptance Date

ARTC

0 STD-T0199

Sheet No.:

Scale:

SHEET SIZE A1

TITLE
STANDARD RURAL CHAIN WIRE FENCE NOTES

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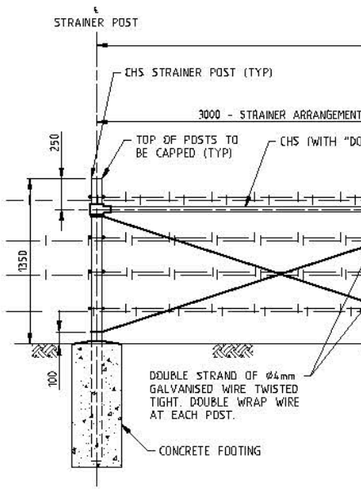
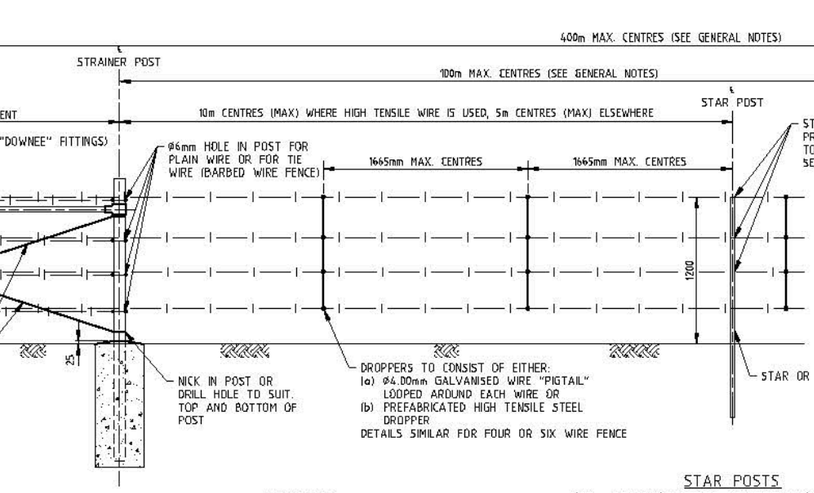
CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0199.dwg

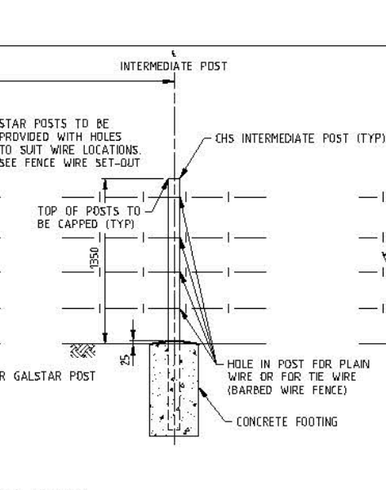
DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



ALTERNATIVE STRAINER ARRANGEMENT
FOR STRAIGHTS AND ENDS ONLY
(400m MAX CENTRES)

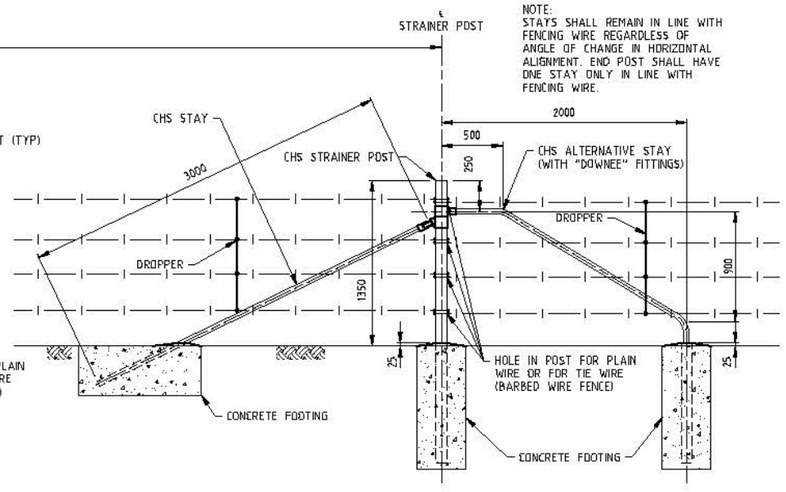


DROPPERS
(1665mm MAX CENTRES)



STAR POSTS
(10m MAX CENTRES WHERE HIGH TENSILE
WIRE IS USED 5m MAX CENTRES ELSEWHERE)

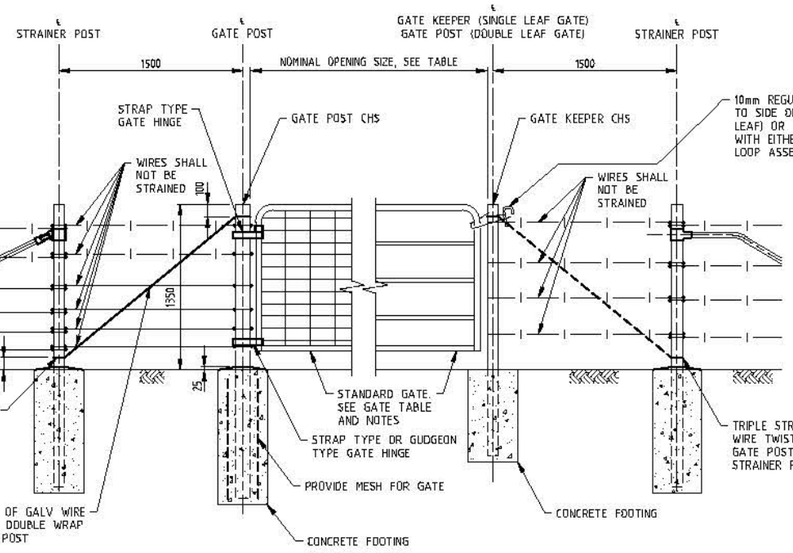
INTERMEDIATE POST
(100m MAX CENTRES)



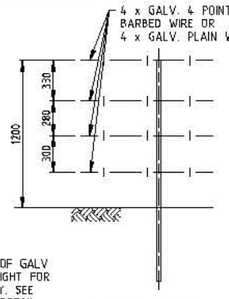
STRAINER ARRANGEMENT
(400m MAX CENTRES SEE GENERAL NOTES)

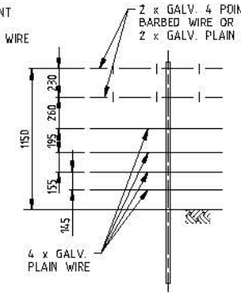
TYPICAL ELEVATION SHOWING COMPONENT SET-OUT (DRAWN FOR 4-WIRE, 6-WIRE AND WIRE NETTING/PREFABRICATED FIELD FENCING FABRIC COMPONENTS SIMILAR)

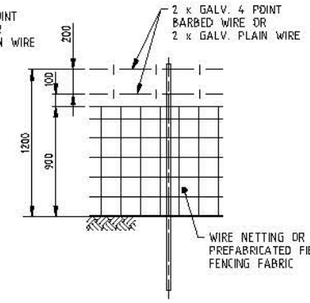
SCALE 1:25



STANDARD GATE
SCALE 1:25

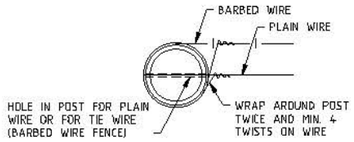




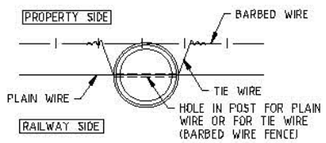


WIRE NETTING OR PREFABRICATED FIELD FENCING FABRIC

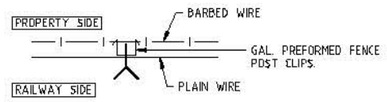
FENCE WIRE SET-OUT
SCALE 1:25



STRAINER POST



INTERMEDIATE POST



STEEL STAR POST

WIRE TIE-OFF DETAILS

SCALE 1:25

NOTES:

1. FOR ALL OTHER NOTES AND TABLES REFER TO STANDARD DRAWING STD-T0199.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS STD-T0201 AND STD-T0202.

Used on / Next higher assembly:

Scale: A1 / A3 1:25 / 1:50 0 500 1000mm

Filename:

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Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approved	Accepted
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Designing Company: SMEC, LEVEL 1, 154 MELBOURNE STREET, SOUTH BRISBANE, QLD 4101, PHONE 07 3029 8888 FAX 07 3029 8858
Design Project Code: 30097393

ARTC ACCEPTANCE

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Ind.Rev. Company: SMEC	Ind.Rev. Name: A. DUNN		Signed:	Signed:
Ind.Review Signature	A. DUNN	05/06/17	05/06/17 Approval Date	06/07/17 Acceptance Date

ARTC

0 STD-T0200

Sheet No.

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CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0200.dwg

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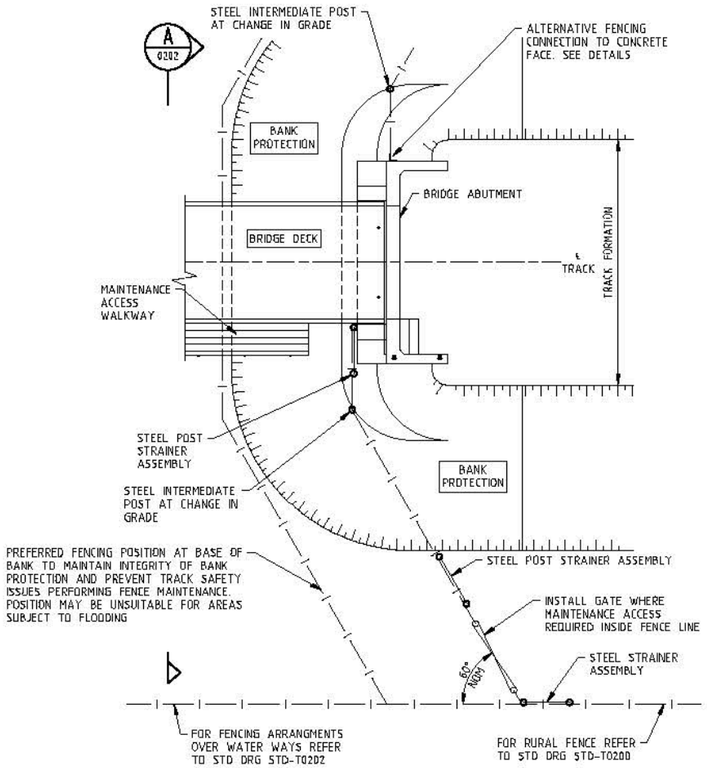
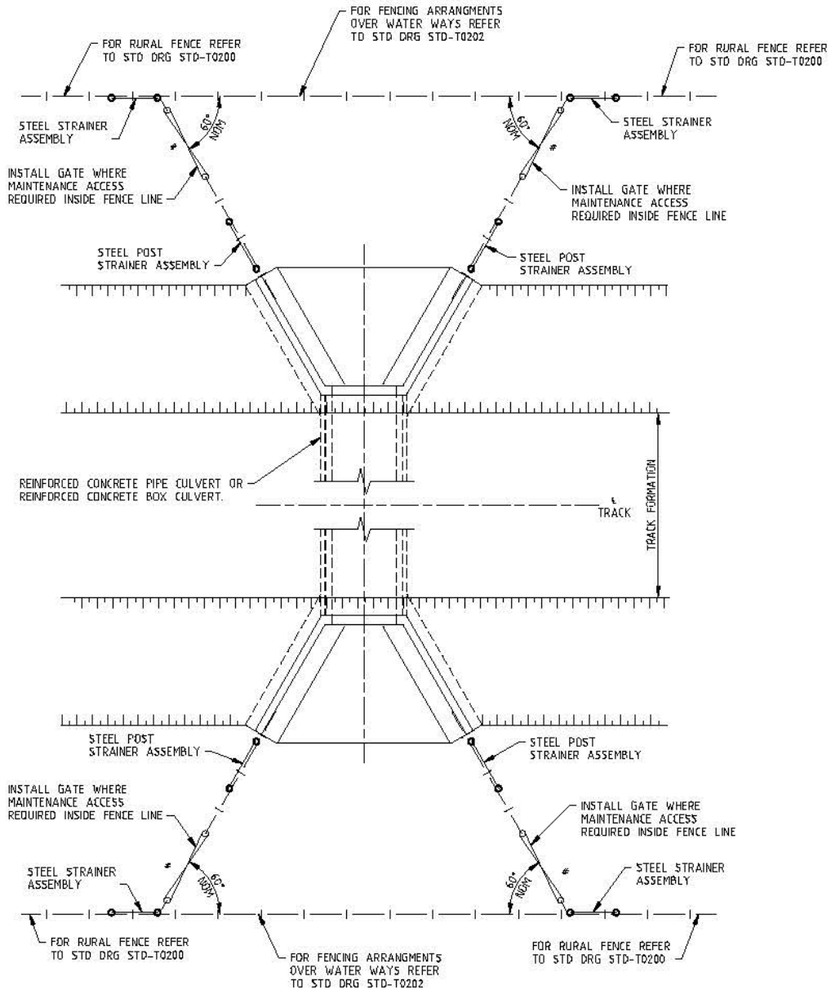


FENCING SETOUT AT BRIDGE ENDS WITH CONCRETE ABUTMENTS

SCALE 1:100



FENCING SETOUT AT CULVERTS (ALL TYPES)

SCALE 1:100

* WHERE CULVERTS ARE LOCATED IN A CLEARLY DEFINED WATERCOURSE, FENCING SHALL FOLLOW TOP OF BANK TO CULVERT HEADWALL/WINGWALLS. GATES SHALL BE INSTALLED AWAY FROM TOPS OF WATERCOURSE BANKS.

NOTES:

1. FOR ALL OTHER NOTES AND TABLES REFER TO STANDARD DRAWING STD-T0199.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS STD-T0200 AND STD-T0202.

Used on / Next higher assembly:

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Designing Company: SMEC
Design Project Code:

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Checked	S. BOWRAN	17/03/17	
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Ind.Review Signature		A. DUNN	05/06/17

ARTC ACCEPTANCE

Approved By	C. DAS GUPTA
Signed:	C. DAS GUPTA
Approval Date	05/06/17
Accepted By	D. OGUCHA
Signed:	D. OGUCHA
Acceptance Date	06/07/17

ARTC

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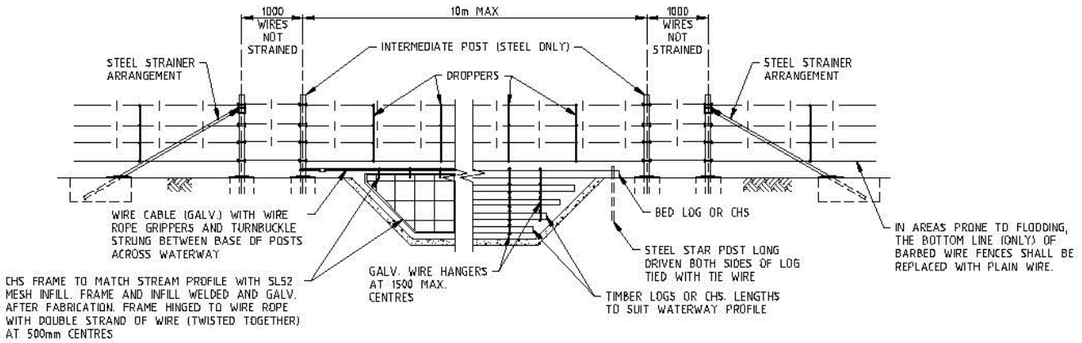
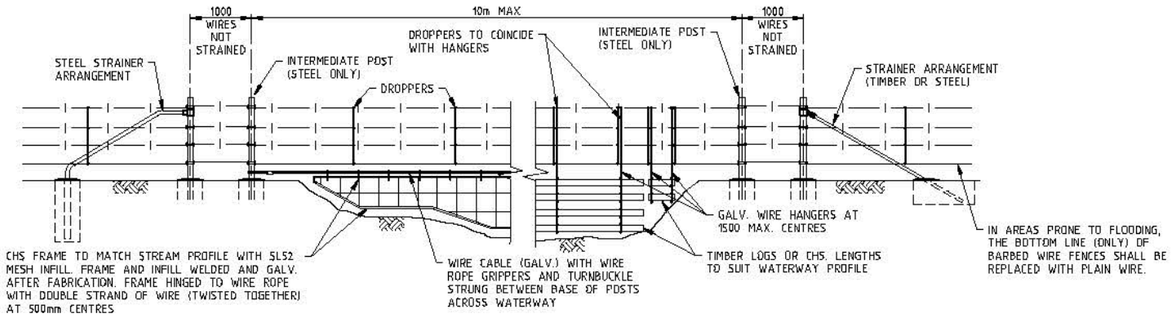
CAD File - V:\ProjectWise\ARTC_Projects\dms03225\STD-T0201.dwg

DRAWN TO AS1100 | DO NOT SCALE | ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



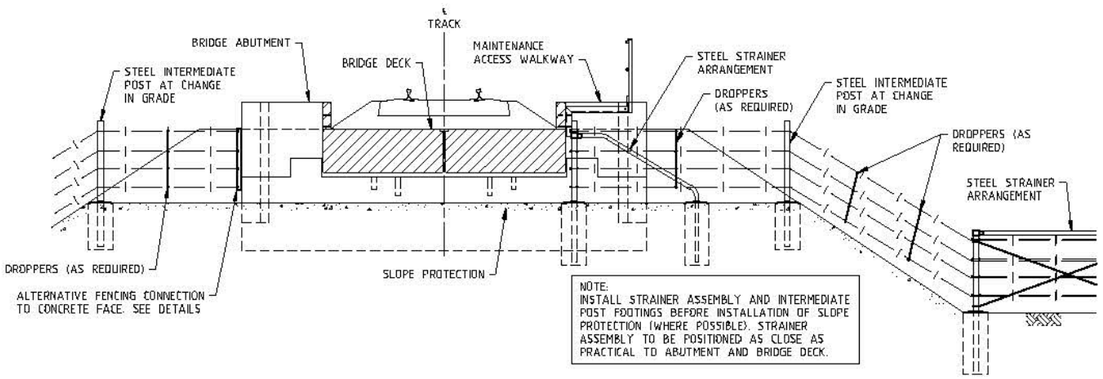
AT CONCRETE LINED DRAINS OR WATERWAYS WITH STABLE BANKS



AT NOMINAL WATERWAYS

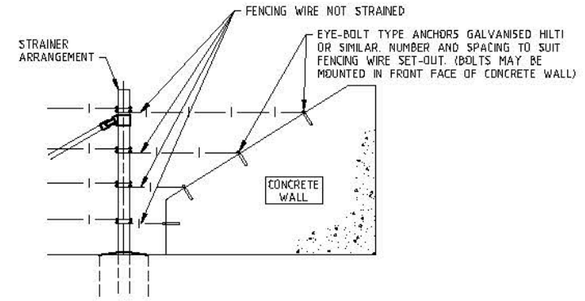
FLOOD GATES

SCALE 1:50

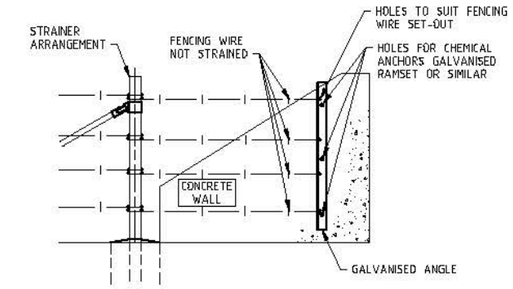


SECTION A (0201) FENCING AT BRIDGE ENDS WITH CONCRETE ABUTMENTS

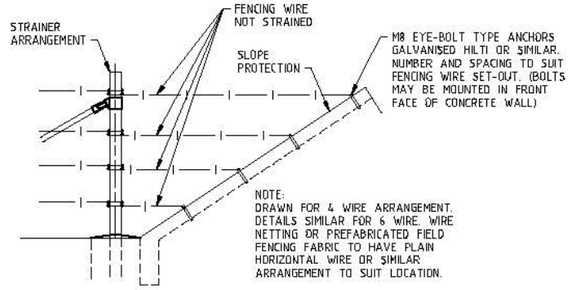
SCALE 1:50



TO WALL USING EYE BOLTS



TO WALL USING GALVANISED ANGLE



TO SLOPE PROTECTION

ALTERNATIVE FENCING CONNECTIONS TO CONCRETE FACES

SCALE 1:25

NOTES:

1. FOR ALL OTHER NOTES AND TABLES REFER TO STANDARD DRAWING STD-T0199.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS STD-T0200 AND STD-T0201.

Used on / Next higher assembly:

Scale: A1 / A3 1:50 / 1:100 0 1000 2000mm

Filename:

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Designing Company: SMEC, LEVEL 1, 154 MELBOURNE STREET, SOUTH BRISBANE QLD 4101, PHONE 07 3029 8888 FAX 07 3029 8899
Design Project Code: 3009159

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Ind.Rev. Company: SMEC	Ind.Rev. Name: A. DUNN		C. DAS GUPTA Signed: 05/06/17 Approval Date
Ind.Review Signature	A. DUNN	05/06/17	D. OGUCHA Signed: 06/07/17 Acceptance Date

ARTC ACCEPTANCE

ARTC

0 STD-T0202

Sheet No.

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