

PART C – REFINEMENT TO THE PROJECT DESCRIPTION

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1. CHANGES RELATED TO THE DAM OR ASSOCIATED INFRASTRUCTURE

No changes to the dam or associated infrastructure are currently proposed. This may alter when detailed design is undertaken but the potential scale of any change is not envisaged as affecting the results of the impact assessment.

2. PIPELINE REFINEMENT

2.1. Area 1

For sake of clarity, some of the text presented in this section repeats that presented in **Part B, Chapter 1**.

Area 1 is the length of pipeline that extends from the dam to Wandoan. SunWater is the proponent for the Woleebee Creek to Glebe Weir Pipeline project (W2G) which involves the beneficial use of treated Coal Seam Gas (CSG) water, including transport to the existing Glebe Weir and use within the Dawson Valley Water Supply Scheme. The lifespan of that project will in all likelihood overlap with the Nathan Dam and Pipelines Project, should the latter be approved. The availability of the treated CSG water will delay the need to construct the dam until such time as the volume of available CSG water cannot fulfil pipeline demands. The dam would then be constructed and the direction of flow in the W2G pipeline would be reversed such that river water could be delivered to pipeline customers.

The W2G pipeline is approved, constructed and operational.

The design of the W2G Weir pipeline incorporated certain fittings and design features which allow the linking of the Nathan pipeline and reversal of flow direction with minimum disturbance. The Nathan Dam and Pipelines Project therefore does not include many aspects of pipeline construction in Area 1 as these have been completed as part of the W2G project. The length of pipeline no longer included is approximately 69.4 km. The aspects which remain part of the Nathan Dam and Pipelines Project are (**Figure C.1**):

- construction of 3.3 km of pipeline from Nathan Dam to join the W2G pipeline;
- decommissioning of 10.3 km of the W2G pipeline between Glebe Weir and chainage 3.3 km;
- construction of pump station 2 and associated balancing storage at chainage 9 km;
- construction of pump station 3 at chainage 38 km (the balancing storage proposed at this location was also included in the W2G project); and
- connection of the Nathan pipeline to the W2G pipeline at chainages 3.3 km and 72.7 km.

Each of these activities were described and assessed in the EIS with the exception of decommissioning of a section of the W2G pipeline. That process is:

- above ground infrastructure will be removed and potentially re-used on the Nathan pipeline;
- any underground infrastructure will be blanked off and sealed;
- the maintenance track will be removed; and
- the easement will be rehabilitated with pasture species or native vegetation, depending on the location.

Of the 10.3 km to be decommissioned, 7.2 km is within the Nathan water storage area at Full Supply Level (FSL) so will be underwater when the dam is at FSL. In this section the maintenance track will not be removed and the extent of rehabilitation will be restricted to temporary grassing to prevent erosion until the dam fills.

2.2. Area 2

Area 2 is the length of pipeline that extends from Wandoan to Chinchilla. The changes to this area have resulted from design progression and EIS submissions (**Figure C.2**). The changes are:

- pipeline diameter;
- alignment changes to avoid entering State Controlled Roads (**Figure C-2a**);
- alignment changes to avoid impacts on land parcels where possible (**Figure C-2b**) and this mainly resulted in utilising local road reserves around Wandoan; and
- alignment changes to avoid vegetation.

One submission requested realignment of the route just prior to Chinchilla. SunWater has reviewed the suggestion, and other possible alternatives, but unfortunately it is very difficult to find an alternative that does not impact on significantly more remnant vegetation, including Queensland (RE 11.4.12) and EPBC (RE 11.3.3) endangered ecosystems. The major road reserve suggested as an alternative contains significant remnant vegetation. To place the pipeline in private property adjacent to the road reserve would avoid this vegetation but impact on a larger number of landholders. From the information provided in the submission it does appear that a route through the property which avoids most of the impacts identified is feasible and will be discussed with the landholder during detailed design.

One submission stated that the EIS should clarify that the proposed balancing storage will not involve any take of overflow. SunWater does not intend that the balancing storage, at approximately 110 km, collects overland flow water.

2.3. Area 3

Area 3 consists of the length of pipeline from Chinchilla to Dalby (**Figure C-3**). Two significant changes to the Project as described in the EIS have been incorporated as part of the Project now being assessed: termination of the pipeline near Warra rather than Dalby; and placing the pipeline on the opposite side of the highway just south west of Chinchilla to the new termination point.

2.3.1. Termination near Warra

Western Downs Regional Council informed SunWater that they would not potentially require water from Nathan Dam for approximately 30 years. As such, and because there were no other significant potential customers north of Dalby until approximately Warra, it was decided to terminate the pipeline just north of Warra at chainage 218.7 km. The original termination was at chainage 263.3 km. As a result no approval is sought and no works will be undertaken in the approximately 44.6 km between the termination near Warra and Dalby. Any future pipeline to Dalby will be treated as a lateral pipeline and relevant approvals will be sought at the appropriate time. No additional works are required as a result of this change. No terminal storage is required.

The point of termination was chosen to avoid affecting the township of Warra, several roads and items of infrastructure in this area and Cooranga Creek. The location allows relatively simple later development of the extension to Dalby, should it be required, adjacent to the highway while also providing access to possible future customers south of the alignment via Warra-Kogan Road or Winstons Road via minimal impact crossings of

Cooranga Creek. Termination in this area also avoids the need for works on the Jimbour floodplain between Warra and Dalby.

2.3.2. Re-location to the western side of the Warrego Highway

As a result of reduced availability of co-location opportunities to the east of the highway and of assessment of issues raised by submitters (particularly related to flooding on this side of the railway), alternative routes across the floodplain to the revised termination near Warra were investigated. Moving to the western side of the highway and railway was an alternative suggested by a number of respondents and was a sensible means of avoiding the flooding issues on the upstream side of this infrastructure. SunWater also assessed an alternative which travelled further south aligning with the Kogan Condamine Road, in order to avoid much of the floodplain cropping area. However this route was substantially longer and more expensive and required crossing the Condamine River twice.

The now preferred Western option (**Figures C-3a-g**) would follow the existing route until approximately 9 km south of Chinchilla before crossing the Warrego Highway approximately 500 m south of Hastings Road. This crossing point is preferred to any earlier point because it avoids remnant vegetation in and near the road reserve and also avoids conflicting with the Chinchilla Kogan Road intersection. The route then parallels the Warrego Highway within private property but skirts to the south of houses that front the highway, Brigalow State School, Brigalow township, significant but non-remnant vegetation immediately south of Brigalow, crosses Jingi Jingi Creek, avoids endangered remnant RE 11.9.6 and terminates 29 km south of Chinchilla at chainage 218.7 km.

The majority of currently identified major potential customers for the water are south of the highway so having the trunk pipeline on this side avoids the need to bore under the highway as each lateral connection is constructed.

A comparison of key characteristics of the eastern and western (side of the highway) options is provided in **Table C.1**.

Table C.1 Comparison between eastern and western options

Characteristic	Eastern (EIS option)	Western (revised option)
Length	20 km	20 km
Number of private land parcels	25	25
Number of roads	24	11
Property Access	13	14
Water Storages	6	1
Number of watercourses	9	9
Number of mapped wetlands	2	0

2.3.3. Summary of impacts as related to design changes

The design changes noted in the sections above result in a substantial reduction of impacts associated with the Project. Essentially the length of pipeline to be constructed as part of the Project has been reduced from 263.3 km to 149.3 km. All impacts associated with pre-construction, construction and operations are

commensurately reduced. **Table C.2** provides a summary of these attributes. The direct capital cost of the pipeline has reduced from \$750 million to \$540 million. The latter reflects current pricing as well as reductions in the scale of the Project.

Table C.2 Summary of impacts related to pipeline design and alignment changes

Item	As shown in EIS	As Revised
Pipeline length (km)	263.3	149.3
Individual lots impacted	225*	137
Roads impacted	123	66
Significant Watercourses crossed	13	10
Vegetation clearing required (ha)	123.6	109.5
Lengths of pipe	18750	10198
Pipe fittings	3200	1741
Number of above ground fittings	1024	588
Volume of bedding material (m ³)	500,000	450,000
Gravel (tonnes)	240,000	200,000
Road base (tonnes)	14,000	12,000
Rock facing (tonnes)	15,000	12,000
Rock fill (tonnes)	20,000	16,000
Clay (m ³)	175,000	150,000
Concrete (m ³)	30,000	15,000
Pavement (m ³)	90,000	74,000
Hardstand (lay down areas) (m ³)	10,000	8,200
Waste trench spoil (m ³)	378,000	340,200
Water (Ml)	432	324
Diesel fuel use (kl)	4790	3592

* Note the EIS actually showed 238 but this counted multiple impacts on the same lot, which the current count does not.

Appendix 2B of the EIS listed all land parcels impacted by the pipeline. The appendix has been updated to reflect the existence of the W2G pipeline and the changes in Area 3. These are presented in **Appendix B2**.

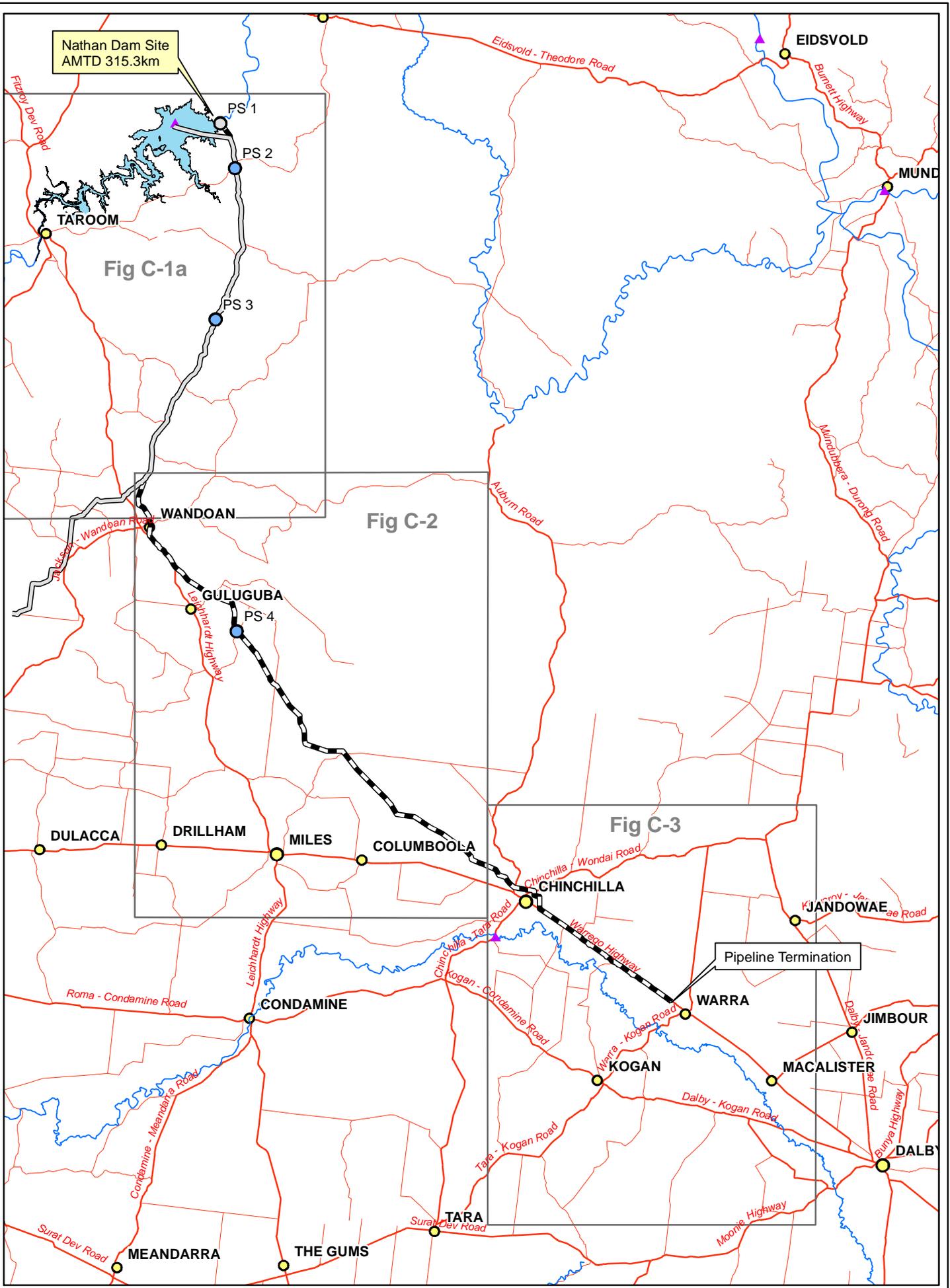
2.4. Other changes to pipeline construction or operation

Section 2.4.3.2 of the EIS noted that while approximately 500 m of pipeline trench would be open at any one time, it would reduce to approximately 50 m at the end of each day. The latter is impractical for construction contractors. Procedures will be adopted in accordance with the APIA Code of Environmental Practice such as frequent use of trench plugs or other material which allows fauna to escape the trench or provides shade to fauna which enters the trench.



The pipe sizes used for the W2G project differed slightly from those proposed for the Nathan Dam and Pipelines Project. These pipe sizes can be accommodated in the Nathan Dam and Pipelines Project and have been used to revise the trenching and transport requirements.

Document: T:\Asset Solutions\Dev\SunWater\P-A\SWP-0026-AAA-01-02 Nathan Dam Prelim Design & Business Case\Pipeline\Drawings\Arc\Map237633-D.mxd
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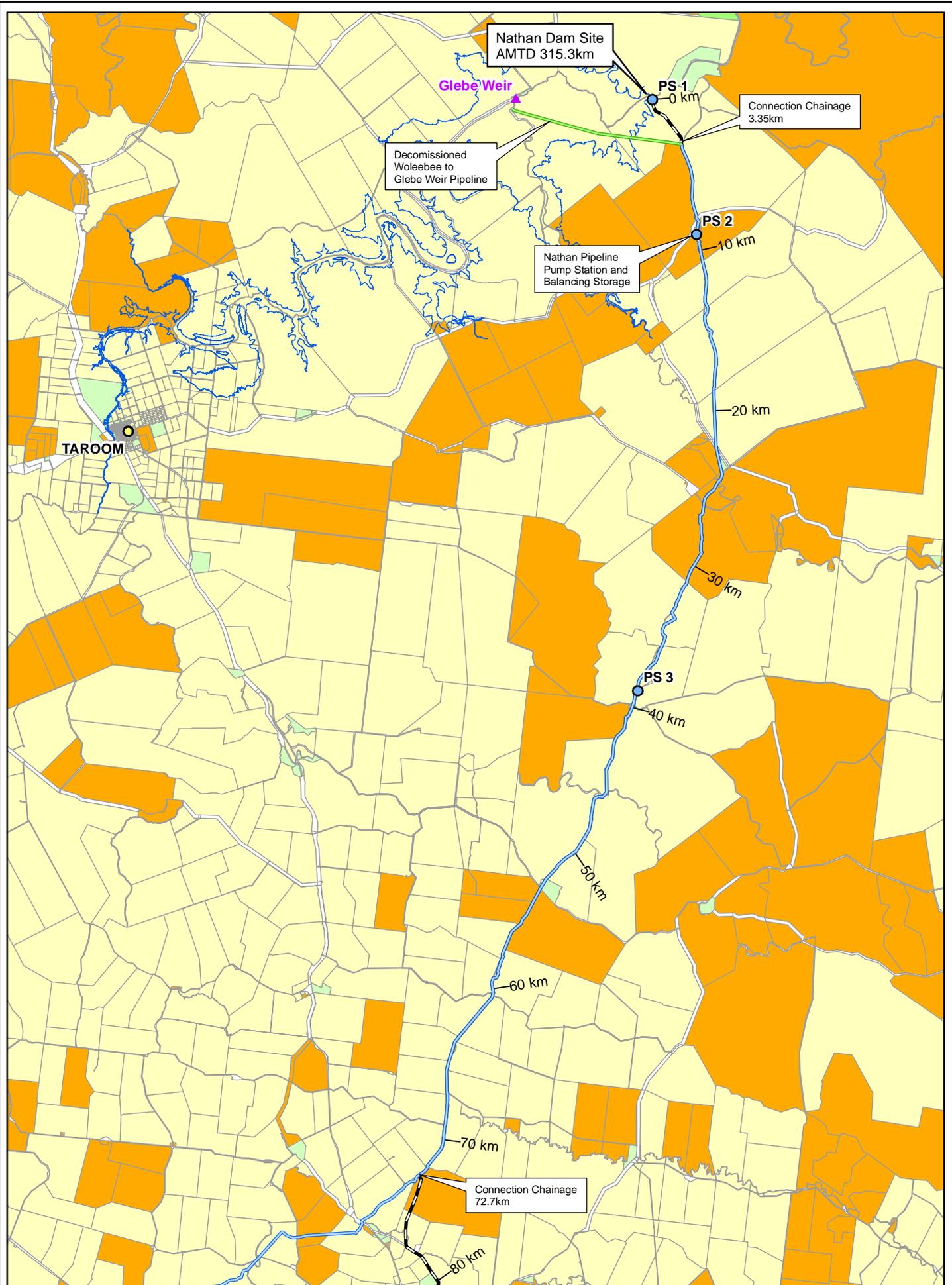
- LEGEND**
- Nathan - Warra Pipeline
 - Woleebee - Glebe Weir Pipeline
 - Pump Station
 - Pump Station & Balancing Storage

Projection: GDA94 Zone 56
Figure C-1

 Scale 1:900,000 (at A4)
 SW 237633D



NATHAN DAM AND PIPELINES PROJECT
Nathan Dam to Warra Pipeline



LEGEND

- | | | |
|--|--------------|---------------|
| Nathan - Warra Pipeline | Covenant | National Park |
| Woleebee - Glebe Pipeline | Easement | Reserve |
| Woleebee - Glebe Pipeline Decommissioned | Freehold | State Forrest |
| Pump Station | Housing Land | State Land |
| | Lands lease | No Tenure |

Projection: GDA94 Zone 56

Figure C-1a



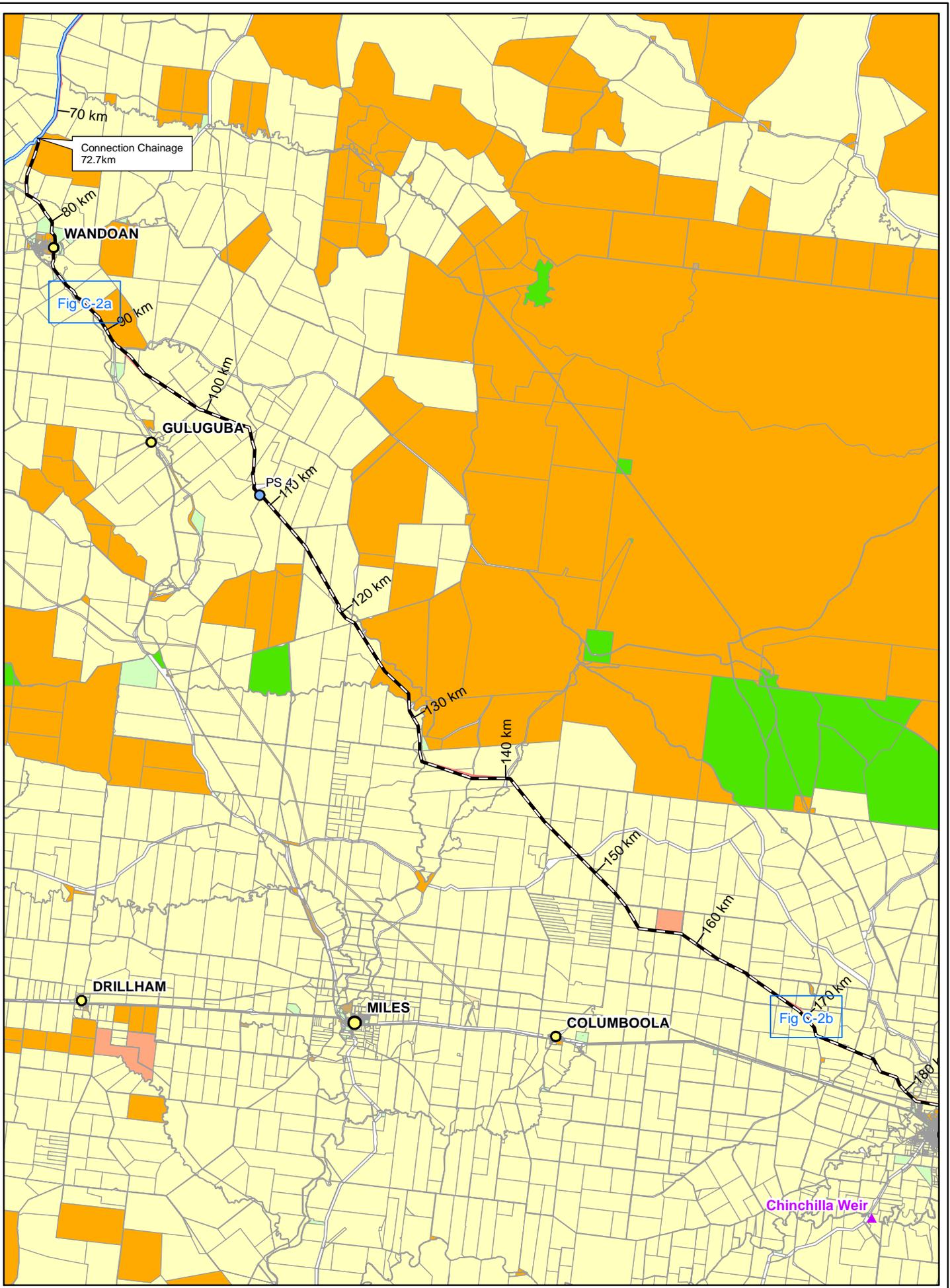
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SW 242902-A



NATHAN DAM AND PIPELINES PROJECT
Nathan Dam to Warra Pipeline



LEGEND

- | | | |
|--|--------------|---------------|
| Nathan - Warra Pipeline | Covenant | National Park |
| Nathan - Dalby Pipeline (Original EIS) | Easement | Reserve |
| Woleebee - Glebe Pipeline | Freehold | State Forrest |
| Pump Station | Housing Land | State Land |
| | Lands lease | No Tenure |

Projection: GDA94 Zone 56

Figure C-2

0 2 4 6
Kilometres

Scale 1:380,000 (at A4)

SW 242902-A

NATHAN DAM AND PIPELINES PROJECT
Nathan Dam to Warra Pipeline



LEGEND

Nathan - Warra Pipeline	Easement
Nathan - Dalby Pipeline (Original EIS)	Road
Affected Lots	Land
	Water

Projection: GDA 1994 - Zone 56
 Fig C-2a

 Meters
 Scale 1:20,000

 SW 242904-A

NATHAN DAM AND PIPELINES PROJECT
 PIPELINE CHANGES

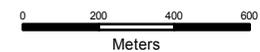


LEGEND

-  Nathan - Warra Pipeline
-  Nathan - Dalby Pipeline (Original EIS)
-  Affected Lots
-  Easement
-  Road
-  Land
-  Water

Projection: GDA 1994 - Zone 56

Fig C-2b

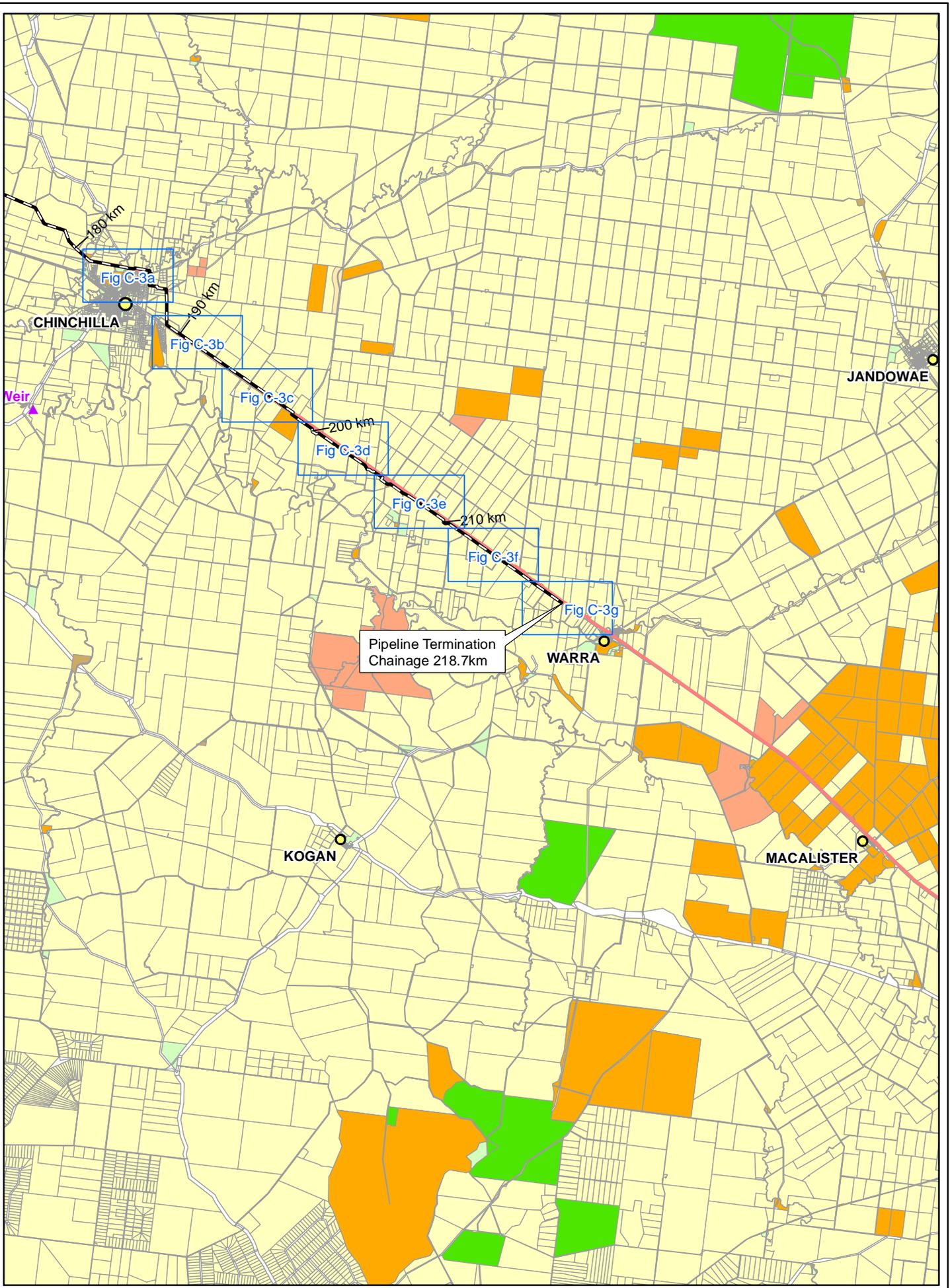


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SW 242904-A



NATHAN DAM AND PIPELINES PROJECT
 PIPELINE CHANGES

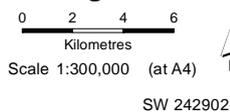


LEGEND

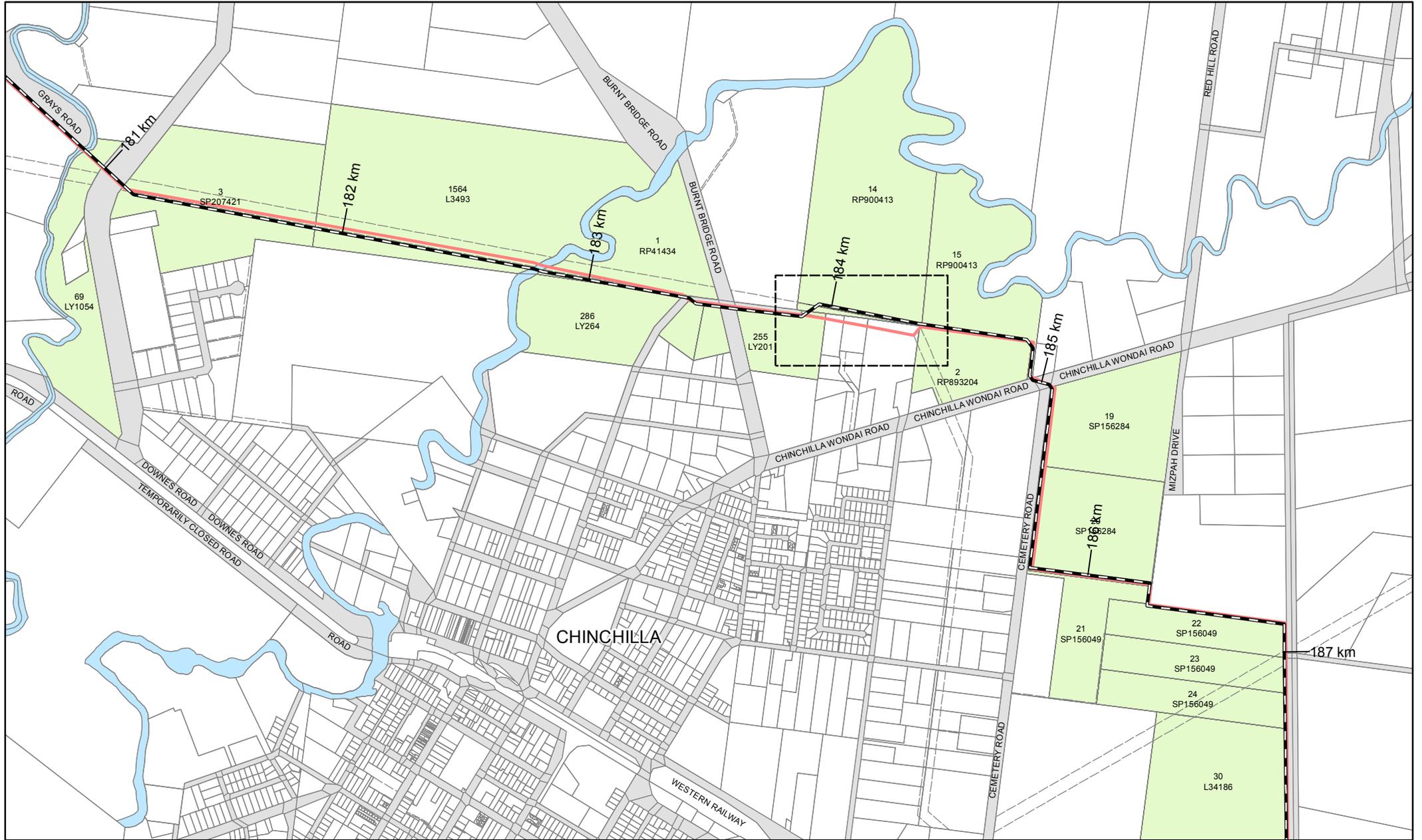
- | | | |
|--|--------------|---------------|
| Nathan - Warra Pipeline | Covenant | National Park |
| Nathan - Dalby Pipeline (Original EIS) | Easement | Reserve |
| | Freehold | State Forrest |
| | Housing Land | State Land |
| | Lands lease | No Tenure |

Projection: GDA94 Zone 56

Figure C-3



NATHAN DAM AND PIPELINES PROJECT
Nathan Dam to Warra Pipeline

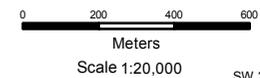


LEGEND

- Nathan - Warra Pipeline
- Nathan - Dalby Pipeline (Original EIS)
- Affected Lots
- Easement
- Road
- Land
- Water

Projection: GDA 1994 - Zone 56

Fig C-3a



SW 242904-A



NATHAN DAM AND PIPELINES PROJECT
 PIPELINE CHANGES



LEGEND

-  Nathan - Warra Pipeline
-  Nathan - Dalby Pipeline (Original EIS)
-  Affected Lots
-  Easement
-  Road
-  Water

Projection: GDA 1994 - Zone 56

Fig C-3b



Scale 1:20,000

SW 242904-A



NATHAN DAM AND PIPELINES PROJECT
 PIPELINE CHANGES

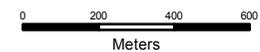


LEGEND

- Nathan - Warra Pipeline
- Nathan - Dalby Pipeline (Original EIS)
- Affected Lots
- Easement
- Road
- Water

Projection: GDA 1994 - Zone 56

Fig C-3c

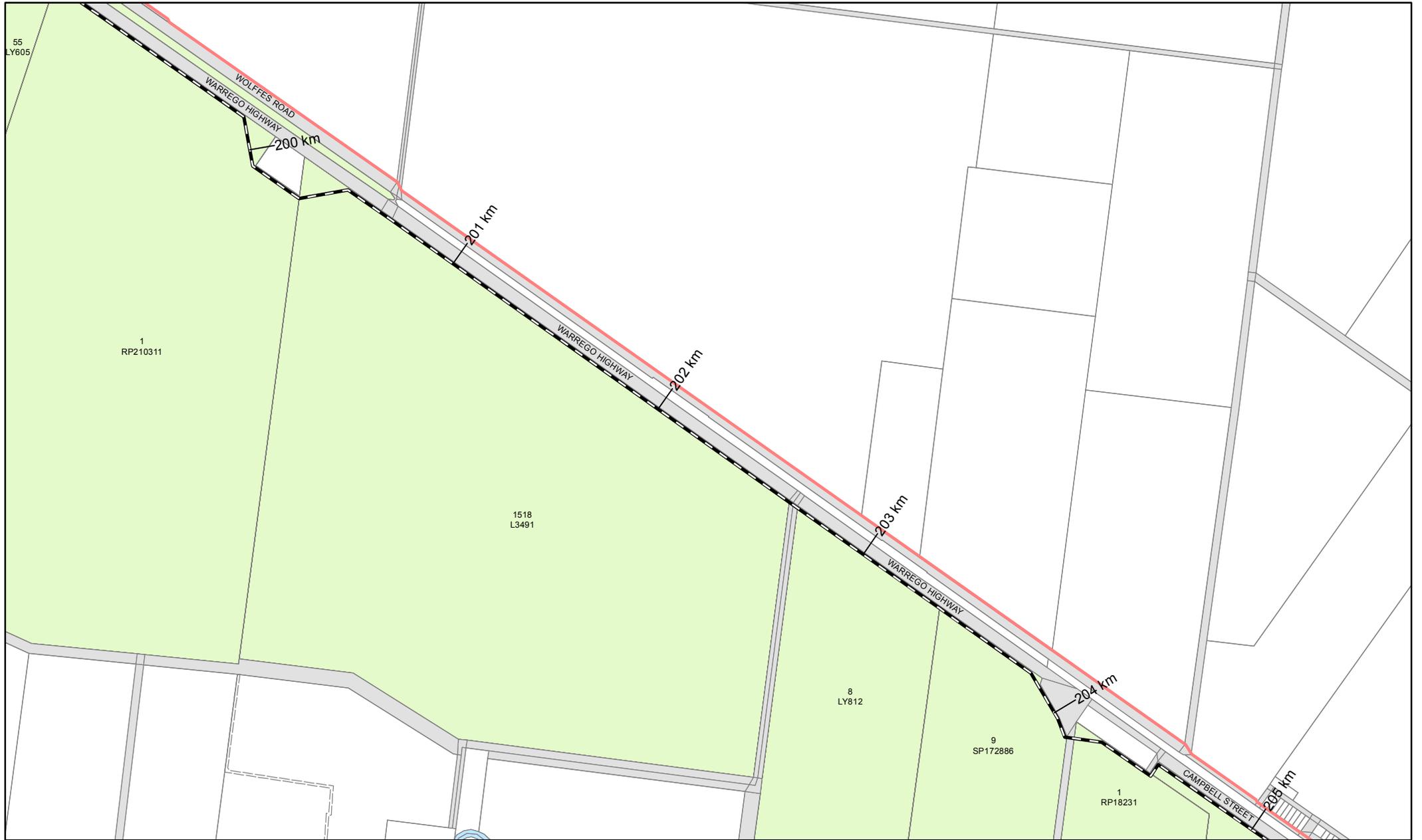


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SW 242904-A



NATHAN DAM AND PIPELINES PROJECT
 PIPELINE CHANGES

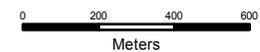


LEGEND

- Nathan - Warra Pipeline
- Nathan - Dalby Pipeline (Original EIS)
- Affected Lots
- Easement
- Road
- Land
- Water

Projection: GDA 1994 - Zone 56

Fig C-3d



Meters

Scale 1:20,000

SW 242904-A



NATHAN DAM AND PIPELINES PROJECT
 PIPELINE CHANGES

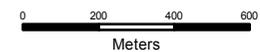


LEGEND

- Nathan - Warra Pipeline
- Nathan - Dalby Pipeline (Original EIS)
- Affected Lots
- Easement
- Road
- Land
- Water

Projection: GDA 1994 - Zone 56

Fig C-3e

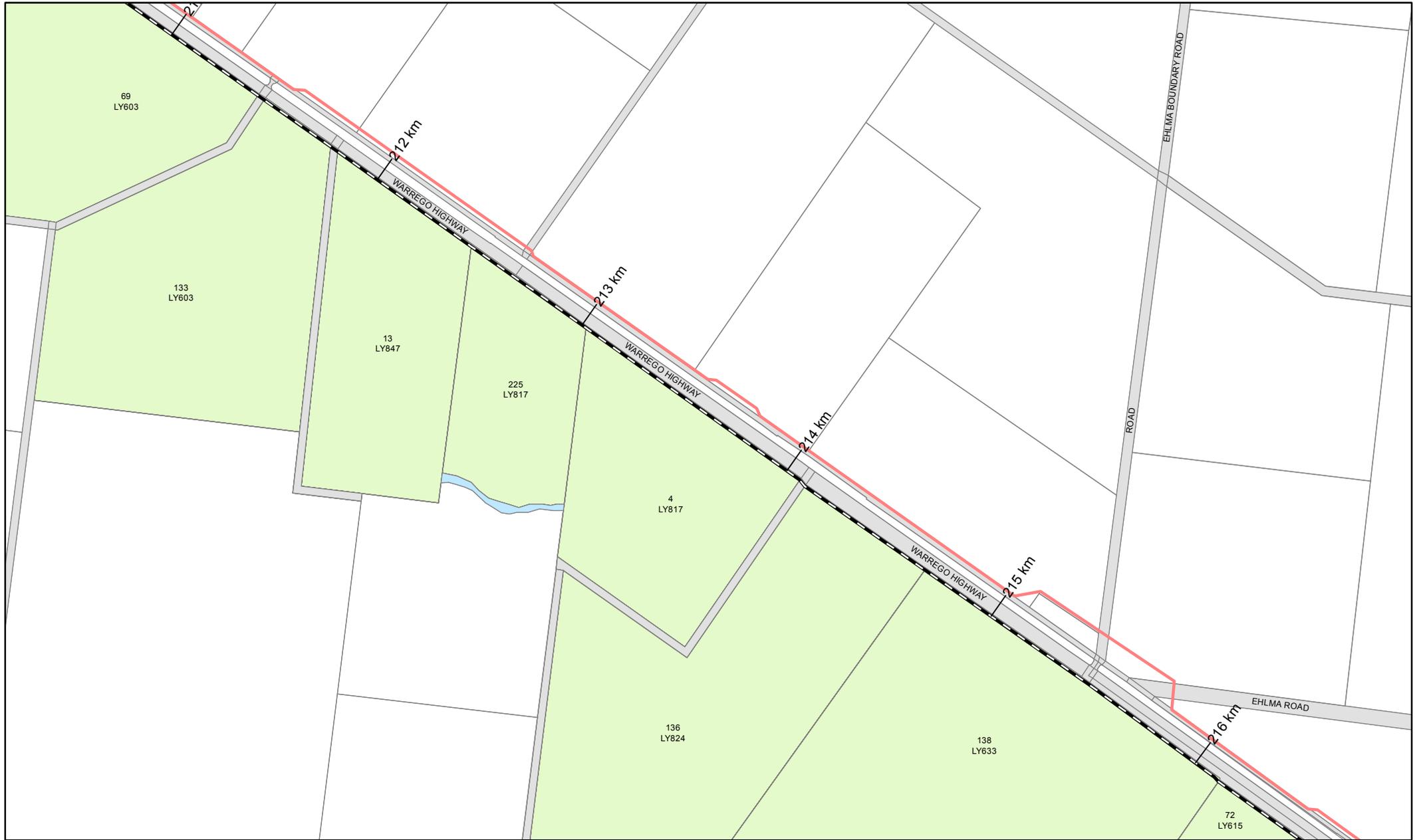


Scale 1:20,000

SW 242904-A



NATHAN DAM AND PIPELINES PROJECT
 PIPELINE CHANGES



LEGEND

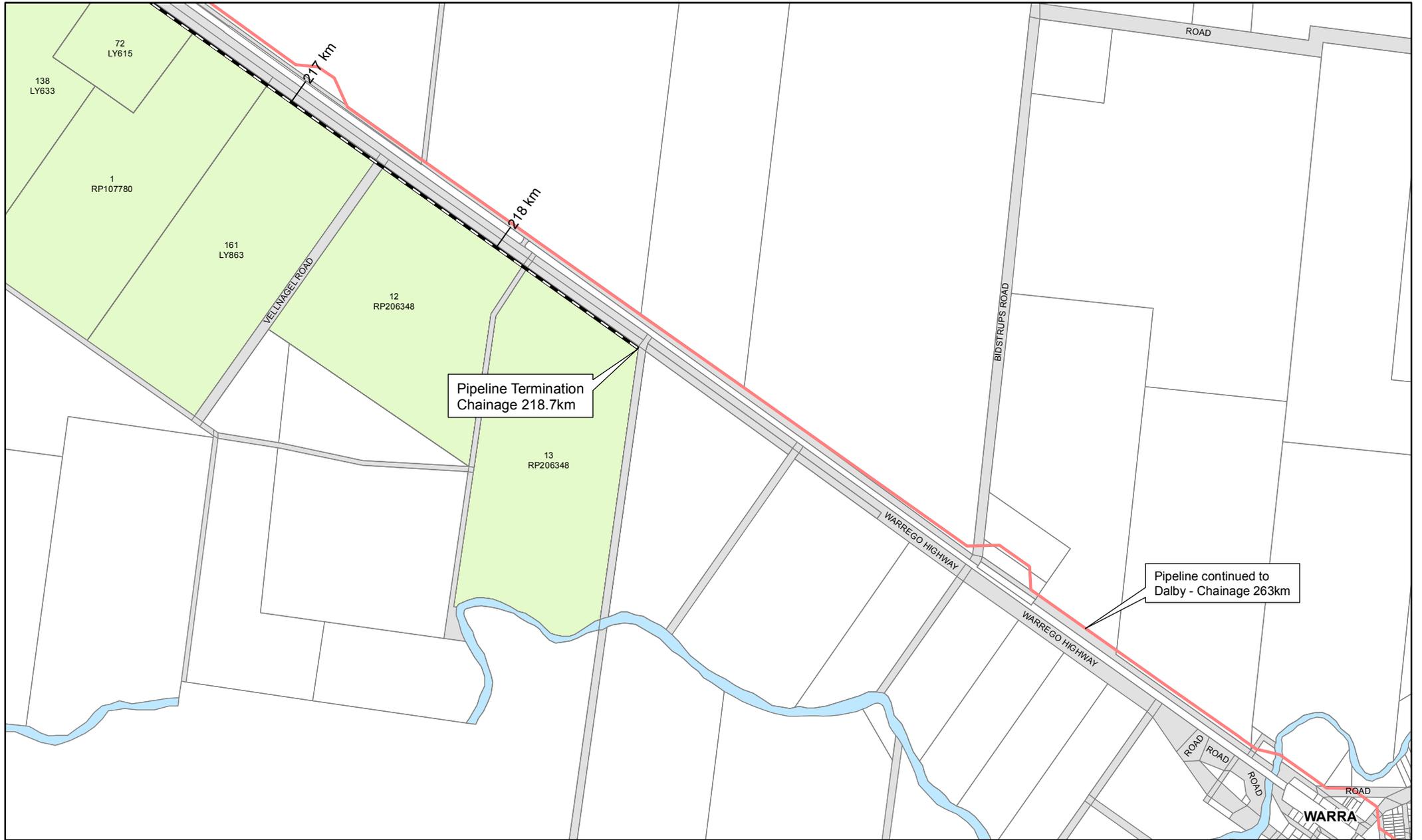
Nathan - Warra Pipeline	Easement
Nathan - Dalby Pipeline (Original EIS)	Road
Affected Lots	Land
	Water

Projection: GDA 1994 - Zone 56
 Fig C-3f

 Meters
 Scale 1:20,000

 SW 242904-A

Making Water Work
NATHAN DAM AND PIPELINES PROJECT
 PIPELINE CHANGES



Pipeline Termination
Chainage 218.7km

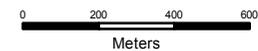
Pipeline continued to
Dalby - Chainage 263km

LEGEND

- Nathan - Warra Pipeline
- Nathan - Dalby Pipeline (Original EIS)
- Affected Lots
- Easement
- Road
- Land
- Water

Projection: GDA 1994 - Zone 56

Fig C-3g



Scale 1:20,000

SW 242904-A



NATHAN DAM AND PIPELINES PROJECT
PIPELINE CHANGES