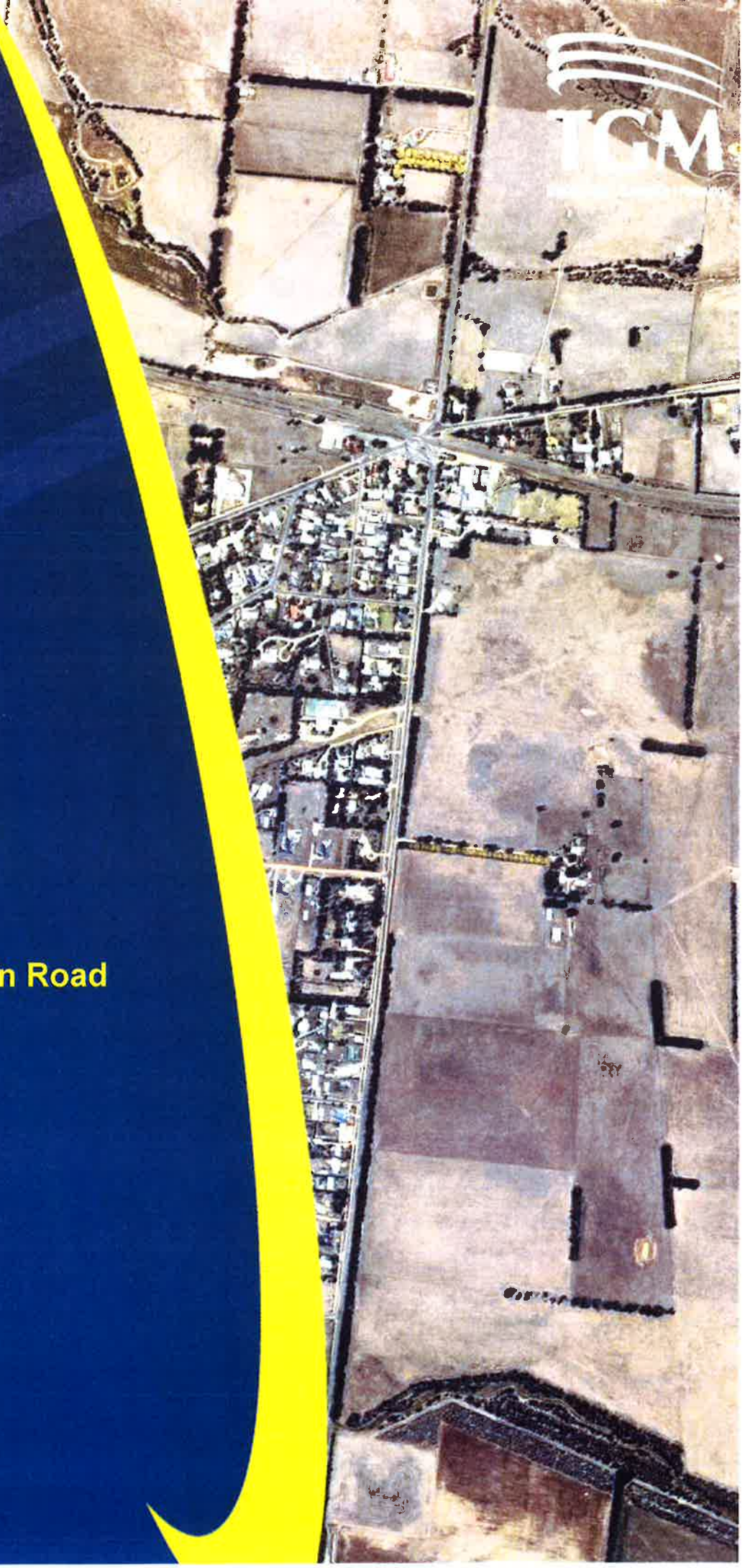
Attachment Five

Urban Services Report



799 & 815 Hendy Main Road
Moriac

Servicing Report

February 2016

TGM GROUP PTY. LTD.
Level 1, 27-31 Myers Street
Geelong, Victoria 3220
Phone: (03) 5202 4600

Reference: 11811-01
February 2016

Prepared for: John & Wendy Earl and Adrian & Patricia Farrall

Prepared by: TGM Group Pty Ltd

Quality Information

Document:	Service Report
Reference No.	11811-01
Date	February 2016
Revision No.	1
Prepared by	Chris Marshall
Reviewed by	Chris Marshall

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ATTACHMENTS

Attachment 1 ..... Geotechnical Report

Attachment 2 ..... Barwon Water Report

Attachment 3 ..... Powercor Report

Attachment 4 ..... Telstra Report

Attachment 5 ..... Vic Track Report

1. SERVICE REPORTS

Schedule 11 of the Development Plan Overlay requires *"An Urban Services report that details how physical infrastructure will be provided. As reticulated sewerage is not provided in Moriac, minimum requirements as to how each lot shall treat and retain wastewater on site in accordance with existing regulatory requirements should be documented."*

TGM Group has conducted a Dial before you Dig investigation in relation to 799 – 815 Hendy Main Road, Moriac to determine the services available to supply the future subdivision of the land.

The results of such investigation are attached in this Service Report. Each individual Service Report indicates all services on or in the area of 799 – 815 Hendy Main Road, Moriac.

This report also indicates in particular which services are capable of being connected at 799 – 815 Hendy Main Road, Moriac and demonstrates in the Land Capability Assessment Report that each lot proposed will be capable of managing on-site sewerage.

Yours sincerely
TGM GROUP PTY. LTD.
Per:

Chris Marshall
Group Manager – Town Planning

DIAL BEFORE YOU DIG www.1100.com.au

Job No 10272918

Phone: 1100
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Caller Details

Contact:	Miss Nicole Dixon	**Caller Id:**	1549826	**Phone:**	0352024600
Company:	TGM Group	**Mobile:**	Not Supplied	**Fax:**	0352024691
Address:	Level 1, 27 - 31 Myers Street Geelong VIC 3220	**Email:**	nicoled@tgmgroup.com		

Dig Site and Enquiry Details

WARNING: The map below only displays the location of the proposed dig site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

User Reference: 11811-01
Working on Behalf of:
Private

Enquiry Date:	Start Date:	End Date:
12/02/2016	22/02/2016	07/03/2016

Address:
815 Hendy Main Road
Moriac VIC 3240

Job Purpose: Design
Onsite Activity: Planning & Design
Location of Workplace: Both
Location in Road: CarriageWay,Footpath,Nature Strip

- Check that the location of the dig site is correct. If not you must submit a new enquiry.
- Should the scope of works change, or plan validity dates expire, you must submit a new enquiry.
- Do NOT dig without plans. Safe excavation is your responsibility. If you do not understand the plans or how to proceed safely, please contact the relevant asset owners.

Notes/Description of Works:
Not Supplied

Your Responsibilities and Duty of Care

- If plans are not received within 2 working days, contact the asset owners directly & quote their Sequence No.
- ALWAYS perform an onsite inspection for the presence of assets. Should you require an onsite location, contact the asset owners directly. Please remember, plans do not detail the exact location of assets.
- Pothole to establish the exact location of all underground assets using a hand shovel, before using heavy machinery.
- Ensure you adhere to any State legislative requirements regarding Duty of Care and safe digging requirements.
- If you damage an underground asset you MUST advise the asset owner immediately.
- By using this service, you agree to Privacy Policy and the terms and disclaimers set out at **www.1100.com.au**
- **For more information on safe excavation practices, visit www.1100.com.au**

Asset Owner Details

The assets owners listed below have been requested to contact you with information about their asset locations within 2 working days. Additional time should be allowed for information issued by post. It is **your responsibility** to identify the presence of any underground assets in and around your proposed dig site. Please be aware, that not all asset owners are registered with the Dial Before You Dig service, so it is **your responsibility** to identify and contact any asset owners not listed here directly.
** Asset owners highlighted by asterisks ** require that you visit their offices to collect plans.
# Asset owners highlighted with a hash require that you call them to discuss your enquiry or to obtain plans.

Seq. No.	Authority Name	Phone	Status
50795530	Barwon Water	1300656007	NOTIFIED
50795528	Powercor - Geelong	132206	NOTIFIED
50795529	Telstra VICTAS	1800653935	NOTIFIED
50795527	Victrack Access	0396198078	NOTIFIED

END OF UTILITIES LIST

ATTACHMENT 1

Geotechnical Report

PROVINCIAL GEOTECHNICAL PTY. LTD.

CONSULTING GEOLOGISTS

A.B.N. 88 090 400 114

PRINCIPALS: ANDREW P. REDMAN BSc

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91 Nicholas Street, NEWTOWN VIC 3220
P.O. BOX 1161, GEELONG VIC 3220
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E-MAIL: admin@pgvic.com.au

LAND CAPABILITY ASSESSMENT REPORT

PROPOSED RESIDENTIAL SUB-DIVISION
No.'s 799 & 815 Hendy Main Road
MORIAC

Prepared for:	J & W EARL & A & P FARRALL
Prepared by:	Andrew Redman Provincial Geotechnical Pty Ltd 91 Nicholas Street NEWTOWN VIC 3219
Reference No.	E4142
Date:	11th July 2014

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1. INTRODUCTION

THE CONSULTANTS

Provincial Geotechnical Pty Ltd has been engaged to undertake a Land Capability Assessment (LCA) for a site on the east side of Hendy Main Road, bounded by a railway easement to the north, a government road to the east and adjoining properties to the south. The property reports for the site are appended (Appendix i). The field investigation and report have been undertaken and prepared by suitably experienced staff. Provincial Geotechnical Pty Ltd has appropriate professional indemnity insurance for this type of work. Our professional indemnity insurance certificate is available on request.

REPORT SUMMARY

We understand that this report may accompany applications for a Septic Tank Permit to Install submitted to Surfcoast Shire Council for onsite wastewater management systems . A 51 lot residential sub-division to allow construction of private residences with on-site wastewater systems on each of the newly created lots is proposed.

At the time of reporting a proposed sub-division plan containing 51 lots sized at 4000m² plus was proposed. This total area is referred to in this report as "the site". The proposed plan of subdivision is appended (Appendix ii).

This document provides information about the site and soil conditions present during our investigation. It also provides a detailed LCA and includes a conceptual design for a suitable onsite wastewater management system, including recommendations for monitoring and management requirements.

SITE OVERVIEW

The site has been cleared of all original vegetation and has cover in the form of thick grasses. Scattered mature trees are present as well as boundary windbreaks.

The site slope is considered very slight to slight which reflects the local geology and geography which is remnant volcanic (lava) plains.

There is sufficient land available for sustainable onsite effluent management that maintains appropriate buffers to protect sensitive receptors on each proposed allotment.

SITE OVERVIEW CONTINUED:

We have considered a number of options for both the treatment system and Land Application Area.

This site **cannot** sustain conventional septic tank systems with primary treated waste distributed by absorption trenches.

Effluent must be treated to secondary level by an AWTS, single-pass sand filter or suitable alternative, with land application by sub-surface irrigation or a Wick Trench and Bed system recommended.

2. Description of the Development

Site Address: No.'s 799 & 815 Hendy Main Road, Moriac.

Owner/Developer: J & W Earl & A & P Farrall

Postal Address: C/- 815 Hendy Main Road, MORIAC VIC 3240

Contact: Wendy Earl 5266 1540 or 0428 661 540

Council Area: Surfcoast Shire Council

Zoning: Farming Zone (FZ)

Proposed Allotment Size: 4000m² +

Domestic Water Supply: Assume reticulated supply available.

Anticipated Wastewater Load: Assume as a minimum a 3 bedroom residence with full water-reduction fixtures @ 4 people per max. occupancy. Wastewater generation = 150 L/person/day; total design load = 600 L/day (source Table 4 of the EPA Code of Practice 891.3).

Availability of Sewer: The area is unsewered and highly unlikely to be sewered within the next 10-20 years, due to low development density in the area and the considerable distance from existing wastewater services.

3. SITE AND SOIL ASSESSMENT

Andrew Redman and David Horwood undertook a site investigation on the 10th June, 2014.

3.1 SITE KEY FEATURES

Table 1 summarises the key features of the site in relation to effluent management proposed for the site.

NOTE:

- The site is within the declared Corangamite water supply catchment area.
- The site experiences negligible stormwater run-on.
- There is no evidence of a shallow watertable.
- The risk of effluent transport offsite is considered low.

Land Channel Property Reports provide a locality plan and indicates the location of the site of the proposed development (Appendix i). An aerial and site photographs are appended to provide recent and current site context (Appendix ii). A proposed plan of subdivision was supplied.

3.2 Table 1: Risk Assessment of Site Characteristics

Feature	Description	Level of Constraint	Mitigation Measures
Buffer Distances	All relevant buffer distances in Table 5 of the Code (2013) are achievable from possible effluent management area.	Minor	Specific location of Land Application Area
Climate	Average annual rainfall 628.3mm Buckley (Balliwindi) No.087124. Average annual pan evaporation is 1200-1300mm.	Minor	NN
Drainage	No visible signs of surface dampness, spring activity or hydrophilic vegetation in proposed effluent management area or surrounds. Mottling was observed in the assessed soil profiles.	Moderate	1. Secondary treatment 2. Disposal via specific means
Erosion & Landslip	No evidence of sheet or rill erosion; the erosion hazard is low. No evidence of landslip and landslip potential is low.	Minor	NN
Exposure & Aspect	Site cleared, with an all round aspect and has a very good sun and wind exposure.	Minor	NN

*NN: not needed

3.2 Table 1: Risk Assessment of Site Characteristics Continued:

Flooding	We understand the proposed effluent management area is located above the 1:100 year flood level.	Minor	NN
Groundwater	No signs of shallow groundwater tables to 1.5 m depth.	Minor	NN
Imported Fill	No imported fill material was observed anywhere on the proposed Land Application Area site.	Nil	NN
Land Available for LAA	Considering all the constraints and buffers, the site has suitable land for land application of treated effluent.	Nil	NN
Landform	Slightly undulating plains.	Nil	NN
Rock Outcrops	No evidence of surface rocks or outcrops.	Nil	NN
Run-on & Runoff	Minor stormwater run-on and minor run-off hazard.	Minor	NN
Slope	The possible effluent management areas have negligible slope.	Nil	NN
Surface Waters	The site does not contain any surface water features or shallow drainage depressions.	Nil	NN
Vegetation	Predominantly a mixture of grasses ie – pasture (occasional mature trees).	Nil	NN

*NN: not needed

3.3 SITE ASSESSMENT RESULTS

Based on the most constraining site feature-buffer distances the overall land capability of the site to sustainably manage all effluent onsite is satisfactory. The possible effluent management areas are located above the 1:100 flood level and by using secondary treatment and disposal via irrigation or a Wick trench and Bed system, there will be ample protection of surface waters and groundwater.

3.4 SOIL KEY FEATURES

The site's soils have been assessed for their suitability for onsite wastewater management by a combination of soil survey and desktop review of published soil survey information.

3.5 SOIL SURVEY AND ANALYSIS

A soil survey was carried out at the site to determine suitability for application of treated effluent. Soil investigations were conducted at all possible 51 allotments with a borehole in areas that may be potential Land Application Areas, as shown in the Test Site Location Plan (Appendix v), using a hydraulic drilling rig to 2.0m maximum depth. This was sufficient to adequately characterise the soils as only minor variation would be expected throughout the area of interest. Two soil types were encountered in these investigations. Full profile descriptions are provided in the Borelogs (Appendix vi). Samples of all discrete soil layers for each soil type were collected for subsequent laboratory analysis of pH, electrical conductivity and Emerson Aggregate Class where it was deemed necessary. Table 2 describes the soil constraints in detail for each of the soils encountered.

Soils in the vicinity of possible Land Application Areas are characterised as light clay topsoils overlying heavy clay, which becomes heavier with depth. The A1 horizon has a moderate structure.

Table 2 below provides an assessment of the physical and chemical characteristics of each soil type.

3.6 TABLE 2: RISK ASSESSMENT OF SOIL CHARACTERISTICS

Feature	Assessment	Level of Constraint	Mitigation Measures
Cation Exchange Capacity (CEC)	Laboratory test not deemed necessary. No evidence on site of restricted plant growth.	Nil	NN
Electrical Conductivity	Soil conditions do not appear to be restricting plant growth.	Nil	NN
Emerson Aggregate Class	Topsoil: 4	Minor	NN
	Subsoil: 7	Moderate	Prohibit use of absorption trench system.
pH	Soil conditions do not appear to be restricting plant growth.	Nil	NN
Rock Fragments	<5% coarse fragments throughout the soil profile.	Minor	NN
Sodicity (ESP)	Laboratory test not deemed necessary. No evidence on site of restricted plant growth.	Nil	NN
Sodium Absorption Ratio (SAR)	Laboratory test not deemed necessary. No evidence on site of restricted plant growth.	Nil	NN
Soil Depth	Topsoil: <600 mm	Minor	NN
	Subsoil: >300 mm. Total soil depth generally greater than 1.5 m and no hardpans occur. * Scattered floaters throughout profiles.	Minor	NN

NN: not needed

3.6 TABLE 2: RISK ASSESSMENT OF SOIL CHARACTERISTICS CONTINUED:

Soil Permeability & Design Loading Rates	Topsoil: Moderately structured Light Clay; 0.06-0.12mm /day saturated conductivity (K*sat*) to 3.0 mm/day Design Loading Rate (DLR) for irrigation system and 8.0mm/day for Wick System (Code, 2013).	Moderate	1. Secondary Treatment 2. Disposal via specific means
	Subsoil: Moderately structured Heavy Clay; <0.6mm/day saturated conductivity (K*sat*);2 mm/day DLR for irrigation system and 5mm/day for Wick System (Code of Practice, 2013).	Major	1. Secondary Treatment 2. Disposal via specific means
Soil Texture & Structure	Topsoil (<600mm): Moderately structured Light Clay (Category 5)	Minor	NN
	Subsoil (>300 mm): Moderately structured Heavy Clay (Category 6) in accordance with AS/NZS/NZS 1547:2012	Minor	NN
Watertable Depth	Groundwater not encountered, boreholes terminated at 0.6m -1.5 m.	Minor	NN

NN: not needed

3.7 OVERALL LAND CAPABILITY RATING

For the soils in the proposed land application area no features present a major constraint that cannot be mitigated. Soil permeability is the major constraint but treatement and method of disposal mitigate this feature.

Based on the results of the site and soil assessment tabled above and provided in the Appendices, the overall land capability of the proposed effluent management area is not constrained to a degree that a suitable wastewater system cannot be installed on this site.

4. WASTEWATER MANAGEMENT SYSTEM

The following sections provide an overview of a suitable onsite wastewater management system, with sizing and design considerations and justification for its selection. Detailed design for the system should be undertaken at the time of the building application and submitted to Council.

4.1 TREATMENT SYSTEM

The secondary effluent quality required is:

- BOD < 20 mg/L;
- SS < 30 mg/L;

Refer to the EPA website for the list of approved options that are available http://www.epa.vic.gov.au/en/your-environment/water/onsite-wastewater. Any of the secondary treatment system options are capable of achieving the desired level of performance. The property owner has the responsibility for the final selection of the secondary treatment system and will include the details of it in the Septic Tank Permit to Install application form for Council approval.

4.2 EFFLUENT MANAGEMENT SYSTEM

A range of possible land application systems have been considered, such as absorption trenches, evapotranspiration/absorption (ETA) beds, subsurface irrigation and mounds.

The preferred system is either pressure compensating subsurface irrigation or a Wick Trench and Bed system. Subsurface irrigation will provide even and widespread dispersal of the treated effluent within the root-zone of plants. This system will provide beneficial reuse of effluent, which is desirable given that the site is not serviced by town water. It will also ensure that the risk of effluent being transported off-site will be negligible.

4.2.1 DESCRIPTION OF THE IRRIGATION SYSTEM

A detailed irrigation system design is beyond the scope of this report, however a general description of subsurface irrigation is provided here for the information of the client and Council.

Subsurface irrigation comprises a network of drip-irrigation lines that is specially designed for use with wastewater. The pipe contains pressure compensating emitters (drippers) that employ a biocide to prevent build-up of slimes and inhibit root penetration. The lateral pipes are usually 1.0 to 1.5 m apart for clay loams, installed parallel along the contour. Installation depth is 1.5m in accordance with AS/NZS 1547:2012. It is critical that the irrigation pump be sized properly to ensure adequate pressure and delivery rate to the irrigation network.

A filter is installed in the main line to remove fine particulates that could block the emitters. This must be cleaned regularly (typically monthly) following manufacturer's instructions. Vacuum breakers should be installed at the high point/s in the system to prevent air and soil being sucked back into the drippers when the pump shuts off. Flushing valves are an important component and allow periodic flushing of the lines, which should be done at six monthly intervals. Flush water can be either returned to the treatment system, or should be released to a small dedicated gravel-based trench.

All trenching used to install the pipes must be backfilled properly to prevent preferential subsurface flows along trench lines. Irrigation areas must not be subject to high foot traffic movement, and vehicles and livestock must not have access to the area otherwise compaction around emitters can lead to premature system failure.

4.2.2 SIZING THE IRRIGATION SYSTEM

Example: 3 bedroom dwelling – Four occupants.

1. **Water Balance:**

To determine the necessary size of the irrigation area water balance modelling has been considered using the method and water balance tool in the Victorian Land Capability Assessment Framework (2014) and the EPA Code (2013). The final sizings of the irrigation system has been undertaken adopting a DIR from Table 9 of the EPA code (2013). The results show that the required irrigation area is 200m^2. The calculations are summarised below.

4.2.2 SIZING THE IRRIGATION SYSTEM CONTINUED:

The sizings equation can be expressed as:

A = Q/DIR

A = irrigation area m²
Q = daily flow (L/day)
DIR = Design irrigation rate (m/day)

A = 600/3.0
= 200m² (for a 3 bedroom dwelling)

2. Nutrient Balance:

As well as water balance modelling a preliminary nutrient balance has been considered to check that the Land Application Area is of sufficient size to ensure nutrients are assimilated by the soils and vegetation. It is acknowledged that a proportion of nitrogen will be retained in the soil through processes such as mineralisation and volatilisation.

Hypothetical Nitrogen (N) Balance using design factors from Model LCA Report Water Balance

1. Determine the daily N load

Total Nitrogen (TN) effluent concentration: 25 mg/l (EPA Publication 464.2 cites TN range of 10-30 mg/L for secondary systems)

Daily Hydraulic load: 600 L/day

Daily N load: 25 mg/L x 600 L/day = 15,000 mg/day

2. Determine the annual N load

15,000 mg/day x 365 days/year = 5,475,000 mg/year

Annual N load = 5.48 kg/year

4.2.2 SIZING THE IRRIGATION SYSTEM CONTINUED:

1. Allow 20% loss through denitrification, volatilization, microbial digestion and other processes

5.48 kg/year x 0.8 = 4.38 kg/year

Annual N load = 4.38 kg/year

2. Allow for N uptake by plants of 220 kg/year

Where available, plant uptake rates that relate specifically to the site should be utilized. This figure is suitable for a regularly maintained grass cover. Refer Appendix F of EPA Publication 464.2 (2003).

Divide the annual N load by the N uptake rate

4.38 kg/year ÷ 220 kg/ha/year = 0.0199

multiply by 10,000 m^2 /ha

0.0199 ha x 10,000 m^2 /ha = 199

Minimum area required for N uptake = 199 m^2

Using a nominated area of 200 m^2 (minimum area based on water balance) the nutrient balance shows a negligible nitrogen deficit based on an annual balance.

4.2.3 Sizing the Disposal System: Wick Trench & Bed System

The Wick Trench and Bed land application system was developed by Kerry Flanagan of 'Kerry Flanagan Wastewater' (www.kerryflanaganwastewater.com.au) for use in clay soils for primary and secondary effluent. The Wick System may also be used in other soil categories and on small blocks (where applicable), as the system is designed to maximize the movement of effluent up through the soil to plant roots and the atmosphere.

The Wick System is a series of trenches with adjacent evapo-transpiration (EVT) beds that are underlain and joined by a layer of geotextile. The EVT bed may be installed on either side of the trench. The surface of the combined trench and EVT bed, which is approximately three times the width of a conventional trench, is planted with herbaceous vegetation to maximize the wicking effect over the large surface area. The geotextile acts as the 'wick' to continuously draw liquid upwards through capillary action. Plant roots and leaves, the sun and the wind act as 'pumps' to draw the liquid upwards out of the soil and into the atmosphere.

Design and Installation:

Photographs of the Wick Trench and Bed System installation procedures can be found on pp. 137-141 of the Sydney Catchment Authority's manual *Designing and Installing On-Site Wastewater Systems* (SCA 2012). The manual can be downloaded at http://www.sca.nsw.gov.au/publications/designing-and-installing-on-site-wastewater-systems. The design and installation procedures to be followed in Victoria, particularly in regard to the geotextile component of the system, are listed below.

Design:

- The Wick Trench and Bed System must be installed on flat land. Where the available land is not flat, it must be terraced to provide a flat platform.
- The trench must have uniform depth to provide uniform performance along its length.
- For effective gravity flow from the septic tank to the Wick Trench the surface level of the Wick Trench must be at least 150mm below the invert of the septic tank outlet (e.g. where the tank outlet invert is 400mm below the top of the tank, the ground level of the Wick Trench must be at least 550mm lower). On sites where it is not possible to have a 550mm height difference between the septic tank outlet invert and the Wick Trench, a suitably-sized distribution pump must be used.

Sizing calculations:

Legend:

Q = Daily design flow rate in L/day

W = Width of trench and bed

DLR = Design Loading Rate in mm/day in Table 9 (adapted from AS/NZS 1547:2012). The loading rate is the same for primary and secondary effluent.

F = factor of 1.2

Arch trench refers to a plastic self-supporting arch 410mm wide x 1.5m long.

Secondary Treated Effluent:

Length of Wick Trench System for a standard 3-bedroom house on heavy clay soil:

Length of Trench/Bed = Q/ [DLR x (W/F)]
= [(3 bedrooms + 1) x 150 L/day] / [10L/m^2 x 1.6m / 1.2]
= 600L/ [10L/m^2 x 1.6m / 1.2]
= 600L/ 13.3 L/m
= 45.1m (say 45m)

This would be built with two 22.5m Wick Trench/Beds or three 15m long systems.

Area of the Wick Trench and Bed System = Length x Width
= 45m x (600mm + 1000mm)
= 45m x 1.6m
= 72m^2 (plus spacing between the Trench/Bed units).

Installation:

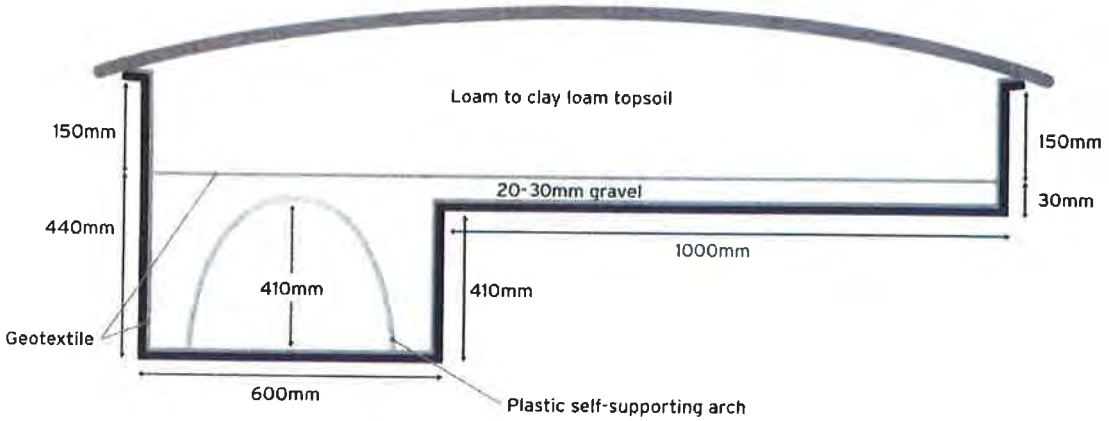
1. Peg out the trench and pan areas
2. Remove the topsoil and stockpile. Where this is a friable, loamy soil it can be reused as the final layer of the Wick Trench and Bed. Otherwise neither the topsoil nor lower soil horizons are to be reused in the system, and suitable loamy soil must be imported.
3. Excavate the trench to a depth of 600mm and the adjacent pan to 130mm for secondary effluent and 180mm for primary effluent systems.
4. Continuously check the level of the bed of the trench and the pan with a laser level to ensure they are flat.
5. Lay the 'A12 grade' geotextile fabric (with dry pore size 230 µm) in a continuous length across the trench and pan i.e. down the outer side wall of the trench, across the base of the trench, up the inner side wall of the trench, across the base of the pan and up the outer side wall of the pan.
6. Ensure the geotextile extends at least 50mm further than the top of the side walls
7. Overlap the edges of the geotextile down the length of the trench and pan system until all bases and side walls are covered.
8. Place the plastic self-supporting arch in sections 410mm wide and 1500mm long, into the trench on top of the geotextile.
9. Install inspection ports at trench entry points and the connection points to other trenches.
10. Install a mica-flap vent at the end of the each trench to facilitate air being drawn into the trench, up the pipe line into the septic tank, through the pipe line into the house drainage system and up through the roof vent. The mica-flap acts as a marker for the end of the trench.
11. Spread clean 20-30mm gravel over the arch in the trench and across the pan to a depth of 30mm. Ensure the top of the gravel layer is level.
12. Lay overlapping lengths of geotextile across the top of the gravel layer, ensuring the geotextile extends at least 50mm further than the side walls of the trench and pan.
13. Spread good quality friable and permeable loamy soil over the top of the geotextile to a depth of 100mm for secondary effluent and 150mm for primary effluent systems. Never use soil from lower soil horizons.
14. Slightly mound the surface of the topsoil across the trench and bed to help shed rainwater off the system (see the diagram below).
15. Plant the topsoil with a suitable grass of plants that thrive when their roots are continuously wet, especially those with large leaves as they will transpire more water than plants with small leaves.
16. Install stormwater diversion drains to direct stormwater away from the Wick System.

Maintenance:

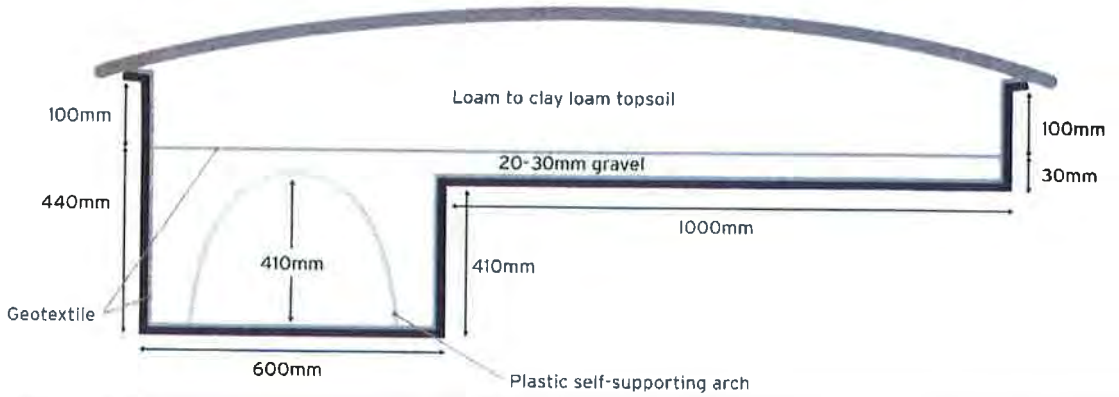
The septic tank must be periodically desludged to ensure proper functioning of the Wick Trench and Bed System.

Code of Practice Onsite Wastewater Management

Wick Trench & Bed System
For primary treated effluent



For secondary treated effluent



Summary and Discussion

It is worth noting that modeling of both methods of disposal includes several significant factors of conservatism:

- Hydraulic load. This assumes a maximum occupancy of the residence at a rate of 150 Litres/person/day.

  It is likely that the actual occupancy and water usage will be less than this;

- From the nutrient balances, in the absence of site specific data very conservative estimates of crop nutrient uptake rates and total nitrogen lost to soil processes are considered.

5. Siting and Configuration of the Land Application Area

Whilst there is ample area for application of effluent, it is important that buffer distances be adhered to. It is important to note that buffers are measured as the overland flow path for run-off water from the effluent irrigation area.

The main constraint on this subdivision site is the setback requirements for future boundaries and buildings.

Provincial Geotechnical can confirm specific scaled Land Application Areas shown on a provided site plan if required but considering the proposed allotment sizes and the lack of sensitive environmental receptors this may not be needed.

6. BUFFER DISTANCES

Setback buffer distances from effluent land application areas and treatment systems are required to help prevent human contact, maintain public amenity and protect sensitive environments. The relevant buffer distances for this site, taken from Table 5 of the Code (2013) are:

- 20 metres from groundwater bores.
- 30 metres from non-potable watercourses; and
- 3 metres if area up-gradient and 1.5 metres if area down-gradient of property boundaries, swimming pools and buildings (conservative values to be adopted).

All buffer distances are achievable.

7. MONITORING, OPERATION AND MAINTENANCE

Maintenance is to be carried out in accordance with the EPA Certificate of Approval of the selected secondary treatment system and Council's permit conditions. The treatment system will only function adequately if appropriately and regularly maintained.

To ensure the treatment system functions adequately, residents must:

- Have a suitably qualified maintenance contractor service the secondary treatment system at the frequency required by Council under the permit to use;
- Use household cleaning products that are suitable for septic tanks;
- Keep as much fat and oil out of the system as possible; and
- Conserve water (AAA rated fixtures and appliances are recommended).

To ensure the land application system functions adequately, residents must:

- Regularly harvest (mow) vegetation within the LAA and remove this to maximise uptake of water and nutrients;
- Monitor and maintain the subsurface irrigation system following the manufacturer's recommendations, including flushing the irrigation lines;
- Regularly clean in-line filters;
- Not erect any structures and paths over the LAA;
- Avoid vehicle and livestock access to the LAA, to prevent compaction and damage; and
- Ensure that the LAA is kept level by filling any depressions with good quality topsoil (not clay).

8. Stormwater Management

As mentioned above, stormwater run off may be a concern on this subdivision site. However, the construction and maintenance of surface diversion drains would provide precaution against surface water flow onto the Land Application Area. Roof stormwater must not be disposed in the Land Application Area.

9. Conclusions

As a result of our Investigations we recommend that sustainable onsite wastewater management systems can be built to meet the needs of a new residences on the proposed residential sub-division.

This report addresses many of the physical and environmental factors that require investigation. Social factors fall outside our field of expertise and are best addressed at planning stages.

Physical factors addressed include Lot size, slope, soil permeability rate, depth to rock/springwater and annual rainfall.

Based on investigation of these features, the subdivision area is regarded as suitable for conventional secondary treatment and disposal systems.

Environmental Factors that require attention are:

- Declared Special Water Supply Area
- Flood Plain (frequency) of Annual Exceedance Probability
- Discharge of waste water

These factors require consultation with the relevant local authorities to determine their relevance.

In respect to allotment size (4000m² plus), our investigation indicates that with 600m² at most required for effluent disposal envelopes for say a 5 bedroom dwelling, a low density development is possible.

Specifically, we recommend the following as a minimum requirement:

- Secondary treatment of wastewater.
- Land application of wastewater into either shallow subsurface irrigation systems or Wick Trench and bed system.
- Installation of water saving devices in the new residences to reduce the effluent load for onsite disposal.
- Use of low phosphorus and low sodium (liquid) detergents to improve effluent quality and maintain soil properties.

9. Conclusions Continued

- Operation and management of the treatment and disposal system in accordance with the recommendations made in this report.
- Construction of diversion drains on the upslope side of the LAA to divert stormwater.
- Provincial Geotechnical Pty Ltd be consulted to either determine or confirm Land Application Area's for the proposed allotments.

ANDREW REDMAN BSc.
SENIOR GEOLOGIST.

C.E.T. ACCREDITED

AR: bc

10. REFERENCES

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Environment Protection Authority (1991). *Guidelines for Wastewater Irrigation* Publication 168.

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Isbell, R.F. (1996). The Australian Soil Classification. CSIRO Publishing, Melbourne.

Municipal Association of Victoria, Department of Environment and Sustainability and EPA Victoria (2013) *Victorian Land Capability Assessment Framework.*

Sargeant and Imhof (2000). *Major Agricultural Soils of the Maffra Region.* Department of Natural Resources and Environment, Victoria, Australia.

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11. APPENDICES

i. Property Reports
ii. Proposed Plan of Subdivision
iii. Geovic Map
iv. Bureau of Meteorology Climate Report for Buckley (Balliwindi)
v. Test Site Location Plan
vi. Borelog Descriptions
vii. Aerial and Site Photographs

APPENDIX i

PROPERTY REPORTS

Land .vic.gov.au

Property Report from www.land.vic.gov.au on 29 May 2014 01:16 PM

Address: 799 HENDY MAIN ROAD MORIAC 3240
Lot and Plan Number: Lot 2 PS341009
Standard Parcel Identifier (SPI): 2\PS341009
Local Government (Council): SURF COAST **Council Property Number:** 156110
Directory Reference: VicRoads 93 D5

This property is in a designated bushfire prone area.
Special bushfire construction requirements apply. Planning provisions may apply.

Further information about the building control system and building in bushfire prone areas can be found in the Building Commission section of the Victorian Building Authority website www.vba.vic.gov.au

State Electorates

Legislative Council: WESTERN VICTORIA (2005)
Legislative Assembly: SOUTH BARWON (2001)
The following electorates using the 2013 boundaries will not apply until the election in November 2014
Legislative Council(2013): WESTERN VICTORIA (2013)
Legislative Assembly(2013): SOUTH BARWON (2013)

Utilities

Regional Urban Water Business: Barwon Water
Rural Water Business: Southern Rural Water
Melbourne Water: outside drainage boundary
Power Distributor: POWERCOR (Information about choosing an electricity retailer)

Planning Zone Summary

Planning Zone: FARMING ZONE (FZ)
SCHEDULE TO THE FARMING ZONE
Planning Overlay: None

Planning scheme data last updated on 22 May 2014.

A **planning scheme** sets out policies and requirements for the use, development and protection of land. This report provides information about the zone and overlay provisions that apply to the selected land. Information about the State, local, particular and general provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council or by visiting Planning Schemes Online

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the Planning & Environment Act 1987. It does not include information about exhibited planning scheme amendments, or zonings that may abut the land. To obtain a Planning Certificate go to Titles and Property Certificates

The Planning Property Report includes separate maps of zones and overlays

For details of surrounding properties, use this service to get the Reports for properties of interest

To view planning zones, overlay and heritage information in an interactive format visit Planning Maps Online

For other information about planning in Victoria visit www.dpcd.vic.gov.au/planning

Victoria

Area Map

Land .vic.gov.au

Property Report from www.land.vic.gov.au on 29 May 2014 01:17 PM

Address: 815 HENDY MAIN ROAD MORIAC 3240
Lot and Plan Number: Lot 1 TP582044
Standard Parcel Identifier (SPI): 1\TP582044
Local Government (Council): SURF COAST **Council Property Number:** 8990
Directory Reference: VicRoads 93 D5

This property is in a designated bushfire prone area.
Special bushfire construction requirements apply. Planning provisions may apply.

Further information about the building control system and building in bushfire prone areas can be found in the Building Commission section of the Victorian Building Authority website www.vba.vic.gov.au

State Electorates

Legislative Council: WESTERN VICTORIA (2005)
Legislative Assembly: SOUTH BARWON (2001)
The following electorates using the 2013 boundaries will not apply until the election in November 2014
Legislative Council(2013): WESTERN VICTORIA (2013)
Legislative Assembly(2013): SOUTH BARWON (2013)

Utilities

Regional Urban Water Business: Barwon Water
Rural Water Business: Southern Rural Water
Melbourne Water: outside drainage boundary
Power Distributor: POWERCOR (Information about choosing an electricity retailer)

Planning Zone Summary

Planning Zone: FARMING ZONE (FZ)
SCHEDULE TO THE FARMING ZONE
Planning Overlay: None

Planning scheme data last updated on 22 May 2014.

A **planning scheme** sets out policies and requirements for the use, development and protection of land. This report provides information about the zone and overlay provisions that apply to the selected land. Information about the State, local, particular and general provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council or by visiting Planning Schemes Online

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the Planning & Environment Act 1987. It does not include information about exhibited planning scheme amendments, or zonings that may abut the land. To obtain a Planning Certificate go to Titles and Property Certificates

The Planning Property Report includes separate maps of zones and overlays

For details of surrounding properties, use this service to get the Reports for properties of interest

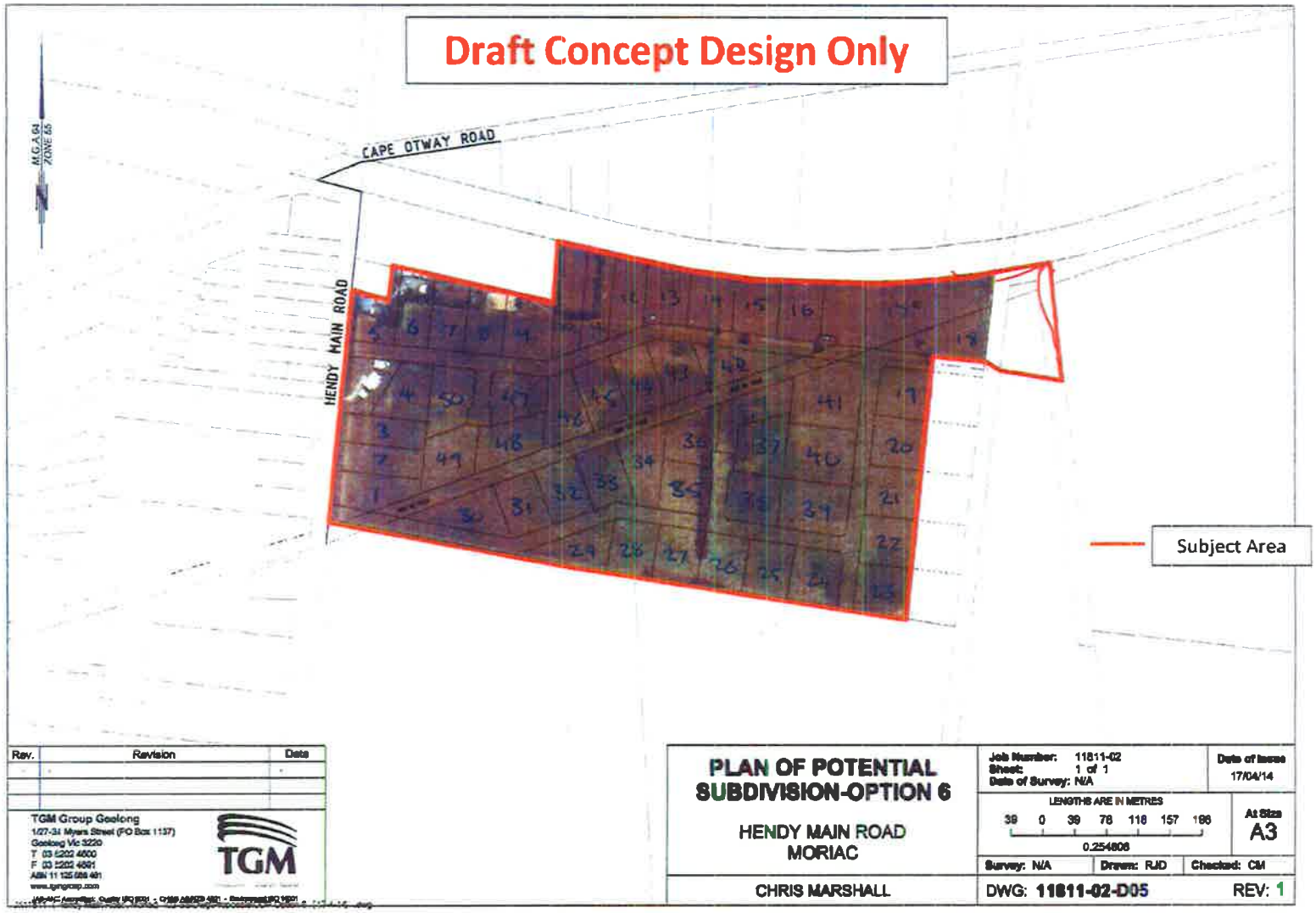
To view planning zones, overlay and heritage information in an interactive format visit Planning Maps Online

For other information about planning in Victoria visit www.dpcd.vic.gov.au/planning

Area Map

APPENDIX ii

PROPOSED PLAN OF SUBDIVISION

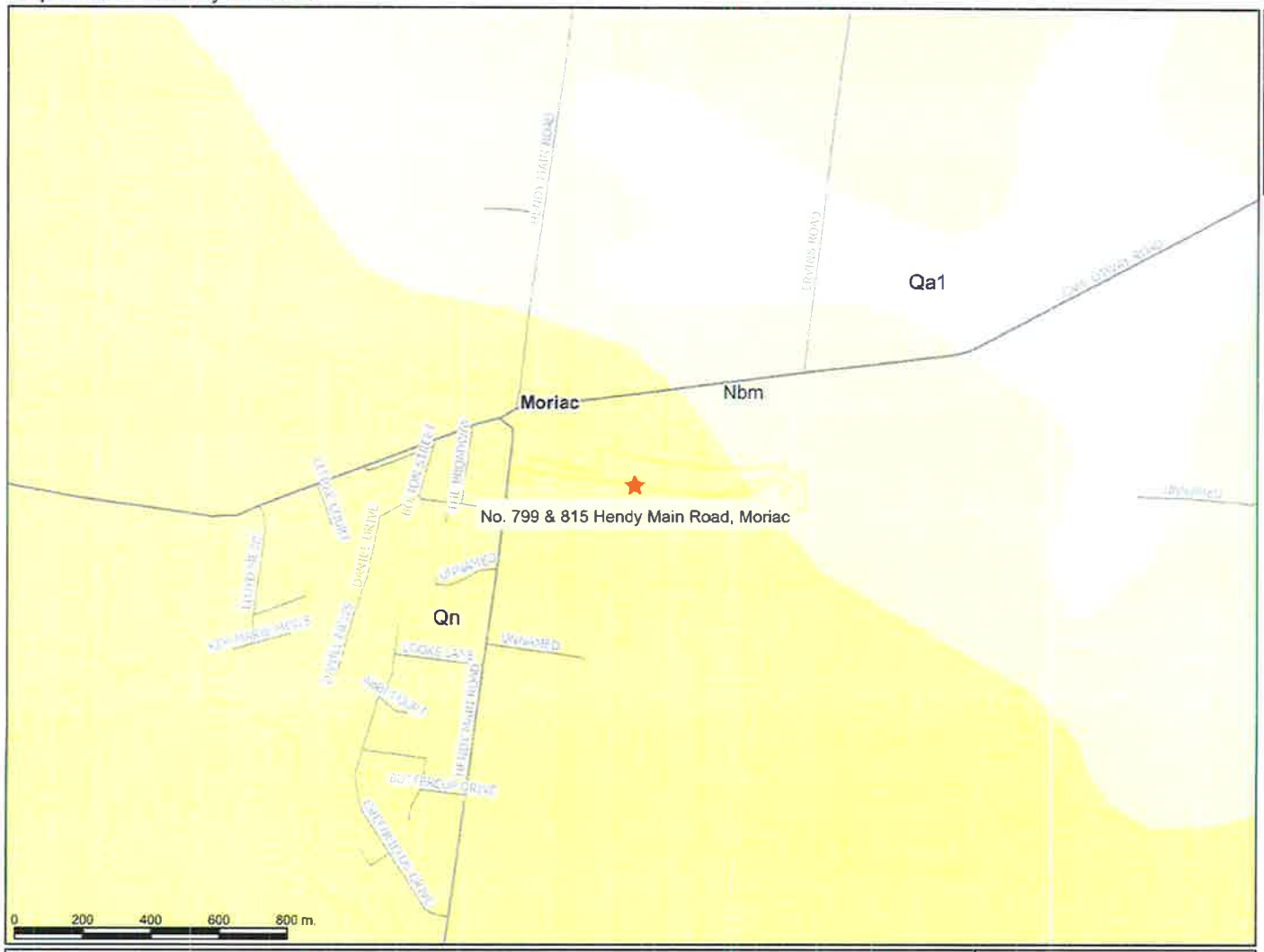

Draft Concept Design Only
MGA94 ZONE 55
CAPE OTWAY ROAD
HENDY MAIN ROAD
Subject Area
Rev.
Revision
Date
TGM Group Geelong
1/27-34 Myers Street (PO Box 1137)
Geelong Vic 3220
T 03 5202 4600
F 03 5202 4601
ABN 11 125 089 481
www.tgmgroup.com
TGM
PLAN OF POTENTIAL SUBDIVISION-OPTION 6
HENDY MAIN ROAD
MORIAC
CHRIS MARSHALL
Job Number: 11811-02
Sheet: 1 of 1
Date of Survey: N/A
Date of Issue 17/04/14
LENGTHS ARE IN METRES
39 0 39 78 118 157 196
0.254606
At Size A3
Survey: N/A
Drawn: RJD
Checked: CM
DWG: 11811-02-D05
REV: 1

APPENDIX iii

GEOVIC MAP

No. 799 & 815 Hendy Main Road, Moriac

Department of Primary Industries



Legend

Towns (25K)

Roads (vmtrans)

- Freeway
- Highway
- Main Road
- Other

Contact Metamorphism Zones 100K

Geological Polygons 100K

- Qc3 Unnamed slump deposits
- Qc Unnamed colluvium
- Qrc1 Unnamed
- Qrt Unnamed
- Qdl1 Unnamed coastal dune deposits
- Qc5 Unnamed
- Qc4 Unnamed granite-derived colluvium
- Qd1 Unnamed inland dune deposits
- Qc2 Coonambidgal Formation
- Qdi Unnamed inland dune deposits
- Nwo Coonambidgal Formation

GDA Vicgrid94

Victoria

Printed on 15 July 2014 12:57:24

Map Scale 1:15,624

NOT FOR NAVIGATION

APPENDIX iv

BUREAU OF METEOROLOGY CLIMATE REPORT FOR BUCKLEY (BALLIWINDI)

Monthly Rainfall (millimetres)

BUCKLEY (BALLIWINDI)

Station Number: 087124 · State: VIC · Opened: 1968 · Status: Open · Latitude: 38.25°S · Longitude: 144.09°E · Elevation: 135 m

Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	41.2	35.2	33.9	44.1	53.3	54.2	56.9	64.0	62.6	64.9	54.3	40.7	612.3
Lowest	0.8	0.0	1.6	8.0	9.2	19.6	13.6	20.6	17.4	13.4	11.4	1.3	323.6
5th percentile	4.8	0.9	4.0	9.1	16.1	25.0	19.3	28.8	26.4	20.0	18.9	5.4	423.3
10th percentile	7.9	2.5	7.8	13.4	17.3	28.5	23.7	31.6	31.6	29.7	22.7	11.9	473.8
Median	34.7	22.0	32.2	39.4	56.6	47.8	60.6	64.1	54.6	68.4	47.8	34.4	602.6
90th percentile	71.4	79.6	57.9	80.8	88.9	91.8	86.8	93.1	96.9	102.0	95.4	88.6	763.0
95th percentile	115.6	108.9	72.8	90.3	93.2	102.9	103.8	97.9	117.2	122.2	108.7	100.9	776.6
Highest	142.4	175.8	89.4	175.8	128.2	119.2	116.6	107.0	133.2	141.0	160.0	112.0	951.2

Statistics calculated over the period 1961-1990

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	41.5	32.1	42.0	48.3	63.3	50.4	56.2	64.5	63.5	69.9	52.5	44.0	628.3
Lowest	5.8	0.6	5.0	12.2	16.4	19.6	13.6	20.6	17.4	19.5	11.4	1.3	323.6
5th Percentile	6.7	1.0	15.7	17.4	19.6	22.5	18.7	30.2	24.4	22.9	18.3	4.8	425.4
10th percentile	9.6	2.1	16.9	17.7	23.6	28.5	22.8	32.6	26.6	32.5	21.9	7.7	469.7
Median	39.4	13.0	39.4	47.8	66.0	45.4	60.6	63.2	59.2	76.4	47.6	36.8	634.9
90th percentile	64.8	66.7	73.3	86.4	92.7	68.2	83.2	95.1	94.6	99.0	87.8	93.9	761.5
95th percentile	77.3	110.9	80.4	91.3	121.3	96.1	106.2	98.5	118.2	120.6	108.3	102.2	779.9
Highest	112.7	175.8	89.4	93.8	128.2	103.8	116.6	100.6	133.2	141.0	160.0	110.4	951.2

1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

3) Further information

http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml.

APPENDIX v

TEST SITE LOCATION PLAN

PROVINCIAL GEOTECHNICAL PTY. LTD.
CONSULTING GEOLOGISTS
A.B.N. 88 090 400 114

TEST SITE LOCATION PLAN

Client: J & W EARL & A & P FARRALL
Ref. Number: E4142
Date: 25/06/2014
Site: No.'s 799 & 815 Hendy Main Road, MORIAC

APPENDIX vi

BORELOG DESCRIPTIONS

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 1				TEST SITE 2				TEST SITE 3			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY (Light Clay)**		5	100	**SILTY CLAYEY SAND**		5	100	**SILTY CLAY**		5
200	**grey/brown**			200	**yellow/brown**			200	**grey/brown dry & hard**		
300	**dry & hard**			300	**dry & medium dense**			300	**& ferruginous gravels**		
400	**CLAY (Heavy Clay)**		6	400	**CLAY**		6	400	**CLAY**		6
500	**dark grey/orange/brown**			500	**orange/brown**			500	**dark grey/orange/brown**		
600	**mottle**			600	**dry & stiff**			600	**mottle**		
700	**dry & very stiff**			700	**SILTY CLAY**			700	**dry & very stiff**		
800				800	**grey/brown**			800			
900				900	**dry & firm**			900			
1000	**yellow/brown**			1000	**CLAY**			1000			
1100	**slightly moist & very stiff**			1100	**dark grey/orange/brown**			1100			
1200				1200	**mottle**			1200			
1300				1300	**dry & very stiff**			1300			
1400				1400				1400			
1500				1500				1500			
1600				1600				1600	**END BORE HOLE**		
1700				1700				1700			
1800				1800	**END BORE HOLE**			1800			
1900				1900	**UNABLE TO PENETRATE**			1900			
2000				2000	**BASALT**			2000			
2100	**END BORE HOLE**			2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 4				**TEST SITE 5**				**TEST SITE 6**			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		**5**	100	**SILTY CLAY**		**5**	100	**SILTY CLAY**		**5**
200	**grey/brown moist & firm**			200	**grey/brown moist & firm**			200	**grey/brown moist & firm**		
300	**& gravels**			300	**& ferruginous gravels**			300	**& ferruginous gravels**		
400	**CLAY**		**6**	400	**CLAY dark grey/**		**6**	400			
500	**dark grey/orange/brown**			500	**orange/brown mottle**			500	**CLAY**		**6**
600	**mottle**			600	**dry & hard & highly**			600	**dark grey/orange/brown**		
700	**moist & firm & highly**			700	**weathered basalt**			700	**mottle**		
800	**weathered basalt**			800	**END BORE HOLE**			800	**dry & hard & highly**		
900				900	**UNABLE TO PENETRATE**			900	**weathered basalt**		
1000	**yellow/brown**			1000	**BASALT**			1000			
1100	**moist & stiff**			1100				1100	**END BORE HOLE**		
1200				1200				1200	**UNABLE TO PENETRATE**		
1300	**END BORE HOLE**			1300				1300	**BASALT**		
1400	**UNABLE TO PENETRATE**			1400				1400			
1500	**BASALT**			1500				1500			
1600				1600				1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 7				**TEST SITE 8**				**TEST SITE 9**			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5	100	**SILTY CLAY**		5	100	**CLAY**		6
200	**grey/brown moist & firm**			200	**grey/brown moist & firm**			200	**dark grey**		
300	**& ferruginous gravels**			300	**& ferruginous gravels**			300	**moist & firm**		
400	**CLAY**		6	400				400			
500	**yellow/brown/grey mottle**			500	**CLAY**		6	500	**grey**		
600	**moist & stiff**			600	**yellow/brown/grey mottle**			600			
700				700	**moist & stiff**			700			
800				800				800			
900				900				900			
1000				1000				1000			
1100	**END BORE HOLE**			1100	**END BORE HOLE**			1100			
1200	**UNABLE TO PENETRATE**			1200	**UNABLE TO PENETRATE**			1200	**yellow/brown**		
1300	**BASALT**			1300	**BASALT**			1300	**moist & stiff**		
1400				1400				1400			
1500				1500				1500			
1600				1600				1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100	**END BORE HOLE**		
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:***	E4142 ***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 10				TEST SITE 11				TEST SITE 12			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5	100	**SILTY CLAY**		5	100	**SILTY CLAY**		5
200	**grey/brown**			200	**grey/brown moist & firm**			200	**grey/brown moist & firm**		
300	**dry & firm**			300	**GRAVEL (Basalt Scora**			300	**GRAVEL (Basalt Scora**		
400	**& gravels**			400	**Floater)**			400	**Floater)**		
500	**CLAY**		6	500	**grey**			500	**grey moist & medium dense**		
600	**dark grey/brown**			600	**moist & medium dense**			600	**END BORE HOLE**		
700	**slightly moist & stiff**			700				700	**UNABLE TO PENETRATE**		
800				800	**END BORE HOLE**			800	**DENSE FLOATERS**		
900				900	**UNABLE TO PENETRATE**			900			
1000				1000	**DENSE FLOATERS**			1000			
1100				1100				1100			
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500				1500				1500			
1600				1600				1600			
1700	**END BORE HOLE**			1700				1700			
1800	**UNABLE TO PENETRATE**			1800				1800			
1900	**BASALT**			1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			
2600				2600				2600			
2700				2700				2700			
2800				2800				2800			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:***	E4142 ***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 13

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY grey/brown**		5
200	**moist & firm**		
300	**CLAY grey/brown**		6
400	**dry & very stiff**		
500	**END BORE HOLE**		
600	**UNABLE TO PENETRATE**		
700	**BASALT**		
800			
900			
1000			
1100			
1200			
1300			
1400			
1500			
1600			
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

TEST SITE 14

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5
200	**grey/brown**		
300	**moist & firm**		
400	**& gravels**		
500			
600			
700	**CLAY grey/brown**		6
800	**dry & very stiff**		
900	**END BORE HOLE**		
1000	**UNABLE TO PENETRATE**		
1100	**BASALT**		
1200			
1300			
1400			
1500			
1600			
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

TEST SITE 15

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5
200	**dark grey**		
300	**moist & firm**		
400	**CLAY**		6
500	**dark grey/black**		
600	**moist & stiff**		
700			
800			
900			
1000			
1100			
1200			
1300	**END BORE HOLE**		
1400	**UNABLE TO PENETRATE**		
1500	**BASALT**		
1600			
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:***	E4142 ***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 16

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		**5**
200	**dark grey/brown**		
300	**moist & firm**		
400	**& gravels**		
500	**CLAY yellow/**		**6**
600	**orange/brown dry & stiff**		
700	**& highly weathered basalt**		
800	**rock fragments**		
900	**END BORE HOLE**		
1000	**UNABLE TO PENETRATE**		
1100	**BASALT**		
1200			
1300			
1400			
1500			
1600			
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

TEST SITE 17

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		**5**
200	**dark grey/brown moist &**		
300	**firm & ferruginous gravels**		
400	**CLAY yellow/**		**6**
500	**orange/brown**		
600	**dry & stiff**		
700			
800	**END BORE HOLE**		
900	**UNABLE TO PENETRATE**		
1000	**BASALT**		
1100			
1200			
1300			
1400			
1500			
1600			
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

TEST SITE 18

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		**5**
200	**dark grey/brown**		
300	**moist & firm & gravels**		
400	**and basalt floaters**		
500			
600	**CLAY**		**6**
700	**yellow/brown/grey**		
800	**mottle**		
900	**dry & stiff**		
1000			
1100			
1200			
1300			
1400			
1500			
1600			
1700			
1800			
1900			
2000			
2100	**END BORE HOLE**		
2200			
2300			
2400			
2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 19				TEST SITE 20				TEST SITE 21			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY dark grey/**		5	100	**SILTY CLAY dark grey/**		5	100	**SILTY CLAY dark grey/**		5
200	**brown dry & firm**			200	**brown dry & firm**			200	**brown dry & firm**		
300	**& ferruginous gravels**			300	**& ferruginous gravels**			300	**& ferruginous gravels**		
400	**CLAY**		6	400	**CLAY**		6	400			
500	**yellow/brown**			500	**yellow/brown**			500	**CLAY**		6
600	**dry & very stiff**			600	**dry & very stiff**			600	**yellow/brown**		
700	**END BORE HOLE**			700				700	**dry & very stiff**		
800	**UNABLE TO PENETRATE**			800				800	**& highly weathered**		
900	**BASALT**			900				900	**basalt rock fragments**		
1000				1000	**END BORE HOLE**			1000			
1100				1100	**UNABLE TO PENETRATE**			1100	**END BORE HOLE**		
1200				1200	**BASALT**			1200	**UNABLE TO PENETRATE**		
1300				1300				1300	**BASALT**		
1400				1400				1400			
1500				1500				1500			
1600				1600				1600			
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 22				TEST SITE 23				TEST SITE 24			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5	100	**SILTY CLAY**		5	100	**SILTY CLAY**		5
200	**dark grey/brown**			200	**dark grey/brown**			200	**dark grey/brown**		
300	**moist & firm**			300	**moist & firm**			300	**moist & firm**		
400	**& ferruginous gravels**			400				400	**& ferruginous gravels**		
500				500				500			
600	**CLAY**		6	600	**GRAVEL (Dense basalt**			600	**CLAY**		6
700	**orange/brown**			700	**floaters)**			700	**grey/orange mottle**		
800	**dry & very stiff**			800	**grey/brown**			800	**moist & stiff**		
900	**& highly weathered basalt**			900	**dry & medium dense**			900			
1000	**rock fragments**			1000				1000			
1100				1100	**END BORE HOLE**			1100			
1200	**END BORE HOLE**			1200	**UNABLE TO PENETRATE**			1200			
1300	**UNABLE TO PENETRATE**			1300	**BASALT**			1300			
1400	**BASALT**			1400				1400			
1500				1500				1500	**yellow/brown**		
1600				1600				1600	**moist & stiff**		
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100	**END BORE HOLE**		
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 25				TEST SITE 26				TEST SITE 27			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5	100	**SILTY CLAY**		5	100	**SILTY CLAY**		5
200	**grey/brown**			200	**grey/brown**			200	**grey/brown**		
300	**dry & firm**			300	**dry & firm**			300	**dry & firm**		
400	**light grey & ferruginous**			400	**light grey & ferruginous**			400			
500	**gravels**			500	**gravels**			500			
600	**CLAY**		6	600	**CLAY**		6	600	**CLAY**		6
700	**orange/brown/grey**			700	**orange/brown/grey**			700	**orange/brown/grey**		
800	**mottle**			800	**mottle**			800	**mottle**		
900	**moist & stiff**			900	**moist & stiff**			900	**moist & stiff**		
1000				1000				1000			
1100				1100				1100			
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500	**yellow/brown**			1500				1500			
1600				1600	**END BORE HOLE**			1600	**END BORE HOLE**		
1700				1700	**UNABLE TO PENETRATE**			1700			
1800				1800	**BASALT**			1800			
1900				1900				1900			
2000	**END BORE HOLE**			2000				2000			
2100	**UNABLE TO PENETRATE**			2100				2100			
2200	**BASALT**			2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 28				**TEST SITE 29**				**TEST SITE 30**			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		**5**	100	**SILTY CLAY**		**5**	100	**SILTY CLAY**		**5**
200	**dark brown**			200	**dark brown**			200	**dark brown/grey**		
300	**moist & firm**			300	**moist & firm**			300	**moist & firm**		
400	**& ferruginous gravels**			400	**CLAY**		**6**	400	**& ferruginous gravels**		
500	**CLAY**		**6**	500	**dark grey/orange mottle**			500	**CLAY**		**6**
600	**dark grey/orange mottle**			600	**moist & stiff**			600	**orange/brown/grey**		
700	**moist & stiff**			700				700	**mottle**		
800				800				800	**moist & stiff**		
900				900				900			
1000				1000				1000			
1100				1100				1100	**brown**		
1200				1200				1200			
1300	**yellow/brown**			1300				1300			
1400				1400				1400			
1500				1500				1500			
1600	**END BORE HOLE**			1600	**END BORE HOLE**			1600	**END BORE HOLE**		
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:***	E4142 ***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 31				TEST SITE 32				TEST SITE 33			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5	100	**SILTY CLAY**		5	100	**SILTY CLAY**		5
200	**dark brown/grey**			200	**dark brown/grey**			200	**grey/brown**		
300	**moist & firm**			300	**moist & firm**			300	**moist & firm**		
400				400	**& ferruginous gravels**			400			
500				500				500	**CLAY**		6
600	**CLAY**		6	600	**CLAY**		6	600	**grey/brown/orange**		
700	**orange/brown/grey**			700	**orange/brown/grey**			700	**mottle**		
800	**mottle**			800	**mottle**			800	**moist & very stiff**		
900	**moist & stiff**			900	**slightly moist & very stiff**			900			
1000				1000				1000			
1100				1100				1100			
1200				1200				1200			
1300				1300				1300			
1400				1400	**END BORE HOLE**			1400			
1500				1500	**UNABLE TO PENETRATE**			1500			
1600	**END BORE HOLE**			1600	**BASALT**			1600	**END BORE HOLE**		
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 34				**TEST SITE 35**				**TEST SITE 36**			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		**5**	100	**SILTY CLAY**		**5**	100	**SILTY CLAY**		**5**
200	**grey/brown**			200	**grey/brown**			200	**grey/brown**		
300	**moist & firm**			300	**moist & firm**			300	**moist & firm**		
400				400				400			
500				500				500			
600	**CLAY**		**6**	600	**CLAY**		**6**	600	**CLAY**		**6**
700	**grey/brown/orange**			700	**grey/brown/orange**			700	**grey/brown/orange**		
800	**mottle**			800	**mottle**			800	**mottle**		
900	**moist & very stiff**			900	**moist & very stiff**			900	**moist & stiff**		
1000				1000				1000			
1100				1100				1100			
1200				1200	**orange/brown**			1200			
1300				1300				1300			
1400				1400				1400			
1500				1500				1500			
1600	**END BORE HOLE**			1600	**END BORE HOLE**			1600	**END BORE HOLE**		
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:***	E4142 ***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 37				TEST SITE 38				TEST SITE 39			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5	100	**SILTY CLAY**		5	100	**SILTY CLAY**		5
200	**dark grey/brown**			200	**dark grey/brown**			200	**dark brown**		
300	**moist & firm**			300	**moist & firm**			300	**moist & firm**		
400	**& ferruginous gravels**			400	**CLAY**		6	400	**CLAY**		6
500				500	**dark grey/orange mottle**			500	**dark grey/orange mottle**		
600	**CLAY**		6	600	**moist & very stiff**			600	**moist & stiff**		
700	**orange/brown/grey**			700				700			
800	**mottle**			800	**orange/brown**			800			
900	**dry & very stiff**			900				900			
1000				1000				1000			
1100				1100				1100			
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500	**yellow/brown**			1500	**yellow/brown**			1500			
1600	**moist & very stiff**			1600	**& ferruginous gravels**			1600	**END BORE HOLE**		
1700				1700	**& highly weathered**			1700			
1800				1800	**basalt fragments**			1800			
1900				1900	**moist & stiff**			1900			
2000				2000				2000			
2100	**END BORE HOLE**			2100	**END BORE HOLE**			2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 40

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY dark grey/**		5
200	**brown moist & firm**		
300	**& gravels**		
400	**CLAY**		6
500	**orange/brown/grey**		
600	**mottle**		
700	**moist & stiff**		
800			
900			
1000			
1100			
1200			
1300			
1400			
1500			
1600	**END BORE HOLE**		
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

TEST SITE 41

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY dark grey/**		5
200	**brown moist & firm**		
300	**& gravels**		
400			
500	**CLAY**		6
600	**dark grey/orange/brown**		
700	**mottle**		
800	**moist & very stiff**		
900			
1000	**END BORE HOLE**		
1100	**UNABLE TO PENETRATE**		
1200	**BASALT FLOATERS**		
1300			
1400			
1500			
1600			
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

TEST SITE 42

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY dark grey/**		5
200	**brown moist & firm**		
300	**& gravels**		
400			
500	**CLAY**		6
600	**yellow/brown/grey**		
700	**mottle**		
800	**moist & stiff**		
900	**& highly weathered**		
1000	**basalt floaters**		
1100			
1200	**END BORE HOLE**		
1300	**UNABLE TO PENETRATE**		
1400	**BASALT FLOATERS**		
1500			
1600			
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 43

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5
200	**grey/brown moist & firm**		
300			
400	**CLAY**		5
500	**grey/brown/orange mottle**		
600	**moist & very stiff**		
700			
800			
900			
1000			
1100	**grey/brown**		
1200	**moist & stiff**		
1300			
1400			
1500			
1600	**END BORE HOLE**		
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

TEST SITE 44

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5
200	**grey/brown moist & firm**		
300	**CLAY**		6
400	**grey/brown/orange mottle**		
500	**moist & very stiff**		
600			
700			
800	**yellow/brown**		
900			
1000			
1100			
1200	**END BORE HOLE**		
1300	**UNABLE TO PENETRATE**		
1400	**BASALT**		
1500			
1600			
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

TEST SITE 45

Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5
200	**grey/brown**		
300	**moist & firm**		
400	**CLAY**		6
500	**dark grey/brown/orange**		
600	**mottle**		
700	**moist & very stiff**		
800			
900			
1000			
1100	**yellow/brown**		
1200			
1300			
1400			
1500			
1600	**END BORE HOLE**		
1700			
1800			
1900			
2000			
2100			
2200			
2300			
2400			
2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:***	E4142 ***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 46				TEST SITE 47				TEST SITE 48			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		**5**	100	**SILTY CLAY**		**5**	100	**SILTY CLAY**		**5**
200	**grey/brown moist & firm**			200	**grey/brown moist & firm**			200	**grey/brown**		
300	**CLAY**		**6**	300				300	**moist & firm**		
400	**dark grey/brown/orange**			400	**CLAY**		**6**	400			
500	**mottle**			500	**dark grey/brown/orange**			500	**& ferruginous gravels**		
600	**moist & very stiff**			600	**mottle**			600			
700				700	**moist & very stiff**			700	**CLAY**		**6**
800				800				800	**dark grey/brown/orange**		
900				900				900	**mottle**		
1000				1000				1000	**moist & very stiff**		
1100	**yellow/brown**			1100	**yellow/brown**			1100			
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500				1500				1500			
1600	**END BORE HOLE**			1600	**END BORE HOLE**			1600	**END BORE HOLE**		
1700				1700				1700			
1800				1800				1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			

PROVINCIAL GEOTECHNICAL PTY LTD

CLIENT:	J 7 W EARL & A & P FARRALL	***REFERENCE NUMBER:*** E4142	***DATE:*** 10/06/2014
PROJECT ADDRESS:	No.'s 799 & 815 Hendy Main Road, MORIAC	***GEOLOGIST:***	Andrew Redman
		DRILLING METHOD:	100mm diameter drill rig or hand auger

TEST SITE 49				TEST SITE 50				TEST SITE 51			
Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT	Depth mm	SOIL PROFILE	Fill	CAT
100	**SILTY CLAY**		5	100	**SILTY CLAY**		5	100	**SILTY CLAY**		5
200	**grey/brown moist & firm**			200	**grey/brown moist & firm**			200	**dark grey/brown**		
300				300				300	**moist & firm**		
400	**CLAY**		6	400				400	**CLAY**		6
500	**dark grey/brown/orange**			500	**CLAY**		6	500	**dark brown**		
600	**mottle**			600	**dark grey/brown/orange**			600	**moist & stiff**		
700	**moist & very stiff**			700	**mottle**			700			
800	**orange/brown**			800	**moist & very stiff**			800			
900				900	**orange/brown**			900			
1000				1000				1000			
1100				1100				1100	**yellow/brown**		
1200				1200				1200			
1300				1300				1300			
1400				1400				1400			
1500				1500				1500			
1600	**END BORE HOLE**			1600	**END BORE HOLE**			1600	**END BORE HOLE**		
1700				1700	**UNABLE TO PENETRATE**			1700			
1800				1800	**BASALT**			1800			
1900				1900				1900			
2000				2000				2000			
2100				2100				2100			
2200				2200				2200			
2300				2300				2300			
2400				2400				2400			
2500				2500				2500			

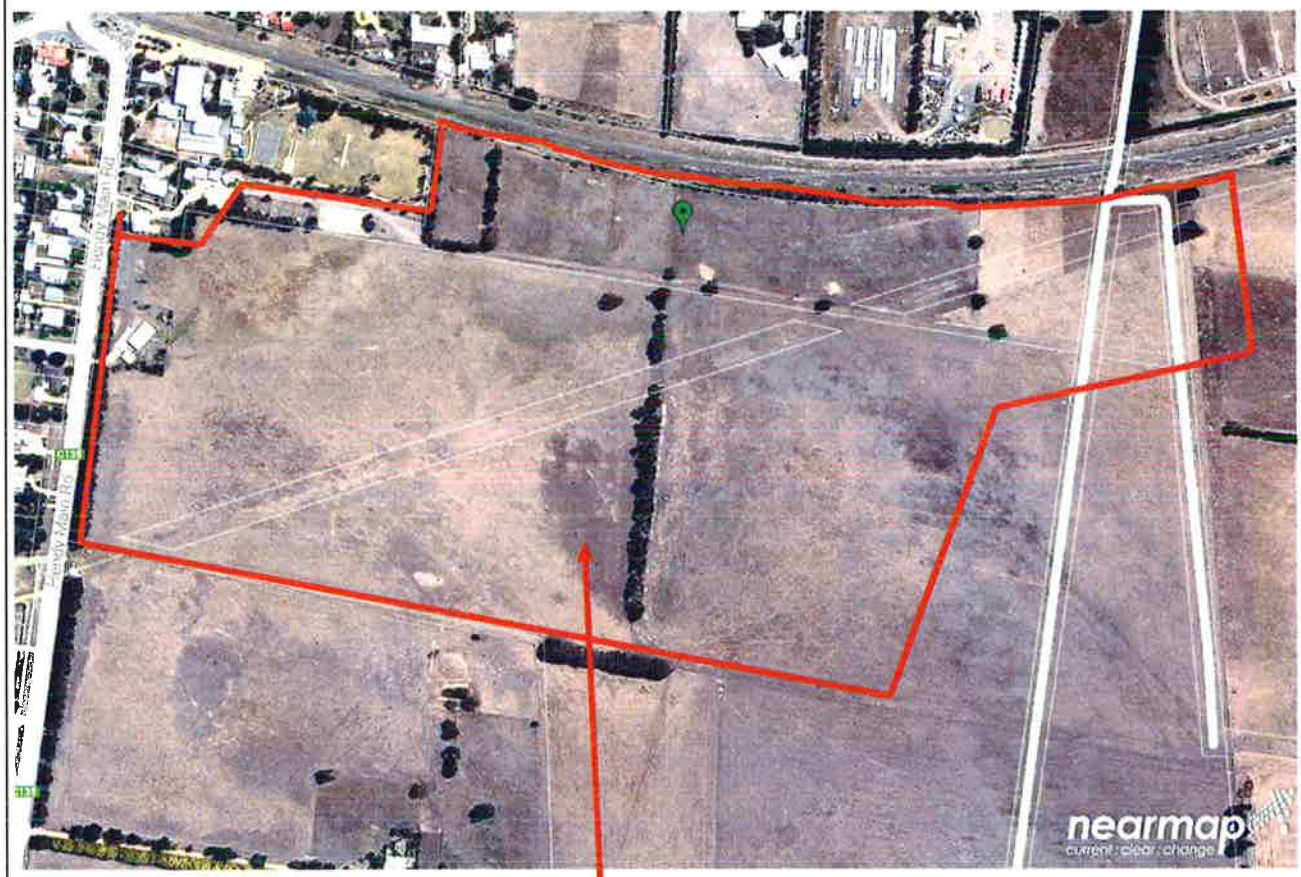
APPENDIX vii

AERIAL AND SITE PHOTOGRAPHS

PROVINCIAL GEOTECHNICAL PTY. LTD.
CONSULTING GEOLOGISTS

AERIAL PHOTOGRAPH

Client: J & W EARL & A & P FARRALL
Ref. Number: E4142
Date: 25/06/2014
Site: No.'s 799 & 815 Hendy Main Road, MORIAC



SUBJECT ALLOTMENT

PROVINCIAL GEOTECHNICAL PTY. LTD.
CONSULTING GEOLOGISTS

SITE PHOTOGRAPHS

Client: J & W EARL & A & P FARRALL
Ref. Number: E4142
Date: 25/06/2014
Site: No.'s 799 & 815 Hendy Main Road, MORIAC

SITE PHOTOGRAPHS

Client: J & W EARL & A & P FARRALL
Ref. Number: E4142
Date: 25/06/2014
Site: No.'s 799 & 815 Hendy Main Road, MORIAC

PROVINCIAL GEOTECHNICAL PTY. LTD.
CONSULTING GEOLOGISTS
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LAND CAPABILITY ASSESSMENT REPORT

No.799 & 815 - Hendy Main Road MORIAC

ADDENDUM TO REPORT 27th June 2014

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Reference No. E4142

Date: First Issue: 11/07/2014
Addendum Issue: 30/06/2016

ADDENDUM TO LCA REPORT

for No.799 & 815 - Hendy Main Road MORIAC

Reference: E4142 *Report dated 11 July 2014*

Request for further information – Surf Coast Shire Council

The Surf Coast Shire Council has requested further information dated 16 May 2016 Planning Permit No. 16/0096 to support the planning application for subdivision.

The additional areas needing to be addressed for the above site are:

1. Review soil testing to determine soil type and design irrigation rates;
2. Hydrological impacts of on-site systems during wetter months;
3. Cumulative impacts of development on land and surface waters;
4. Determination of soil type considering soil layer clearance depth;
5. Impact of allotment size on cumulative impacts off-site;
6. Capability of different lot and dwelling sizes based on site characteristics;
7. Water and nutrient balance calculations to determine minimum land application areas;
8. Evaluate setbacks between land application areas and stormwater retention dams;
9. Upgrading of exiting septic tanks systems within the subdivision, and
10. Incorporate most recent subdivision plan into report.

Wisconsin Mound System

Delegates to 10th National Symposium on Individual and Small Community Sewage Systems, inspecting mound system serving winery domestic wastewater system.

Photo: JR Lawrey, Sonoma Valley, California USA. 21 March 2004

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1. REVIEW SOIL TESTING TO DETERMINE DESIGN IRRIGATION RATES

Issue:
Design irrigation rate DIR of 1.7 mm required by Moriac DWMP for medium to heavy clay.

Objective:
Soil categories are determined by criteria set-out in AS/NZS 1547:2012, C 5.2.3.1, where soil category is based on the most restrictive soil layer within the clearance depth. Clearance depth is taken to be 0.6 metre. For Mound system 0.6m is preferable and for SSDI 0.6m is desirable.

Criteria:
DIR determined from soil category within clearance depth by constant head hydraulic conductivity or by soil texture analysis as described in AS/NZS 1547:2012. Dosing rates prescribed in EPA Code of Practice –Onsite Wastewater Management, Appendix A, Table 9 vary from 2 mm/d for drip irrigation in medium clay up to 5 mm/day in sandy loam.

A further set of soil samples were obtained by EWS Environmental on 10 June 2016 and delivered to EML (CHEM) Pty Ltd. on the 14/6/16. Details of samples obtained and analysed are shown below:

Three sample sets were taken at different depths from the site location:

Date	Sample	Test site	Depth(mm)	Material	Lab identification
10/6/2016	1	1	400mm	Light CLAY	N061320
10/6/2016	2	19	500mm	Light CLAY	N061321
10/6/2016	3	27	600mm	Med. CLAY	N061322

The laboratory soil test results (see Attachment A.) included the following:

• *Cation Exchange Capacity*	*9.2, 19, 11meq/100g*	*no impact on pasture*
• *Electrical Conductivity (EC)*	*74, 110, 100 µS/cm*	*low salinity*
• *pH*	*6.2, 6.2, 6.6*	*slightly acidic*
• *Sodicity- ESP, and*	*5.8, 6.3, 7.6%*	*< 8% minor risk*
• *Sodium Absorption Ratio (SAR).*	*2.3, 4.6, 2.8*	*< 5 & EC < 500 is safe*

The results of the more accurate laboratory testing confirm most of the field observations. Importantly, sodicity rating at less than 8% is in the minor risk range and not a constraint. Other tests parameters, EC and pH are at optimum levels, as are the SAR values. [4]

Dispersiveness (Emerson Aggregate Class) in distilled water at 20^0 C exhibited only dispersion.

Soil tests which show strong dispersion in distilled water tests often do not disperse in wastewater such as treated sewage in which electrical conductivity is typically in the range 500 - 800 *µS/cm*. *Reference:* EPA *Guidelines for Wastewater Irrigation*, Publication 168.

For 60% of the allotments, DIR of 1.7 mm/d applies for sites with less than 600mm clearance. Three (3) constant head permeability tests as per AS/NZS 1547 were conducted with results of 50mL/min, 8 mL/min and 7 mL/min. K_{sat} = 0.06 m/day consistent with Light Clay.

Number of soil test holes observation satisfies Hazelton CSIRO [4].

Mitigation measures:
Alternative dispersal methods available are:
1. Import soil to raise ground level for minor compliance with clearance distance.
2. Install Mound systems (600mm lift) for significance short fall of clearance distance.
3. Use a DIR of 3mm/d for dripper and DLR of 5mm/d for Mounds with clearance for Light CLAY.
4. Recommend additional of liquid gypsum equal 1 kg/m^2 every three years, see Appendix C.

Table 1: Risk Assessment of Soil Characteristics

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Electrical Conductivity	<0.8	0.8 - 2	>2	(ECe) 0.1 dS/m as a measure of soil salinity [1]
Emerson Aggregate Class	4, 5, 6, 8 Top soil	7 Sub-soil	1, 2, 3	Minor with gypsum (in context of sodicity)
Gleying **(see Munsell Soil Colour Chart)**	Nil	Some evidence of greenish grey / black or bluish grey / black soil colours	Predominant greenish grey / black, bluish grey / black colours	Minor
Mottling **(Munsell Soil Colour Chart)**	Very well to well-drained soils generally have uniform brownish or reddish colour	Moderately well to imperfectly drained soils have grey and/or yellow brown mottles	Poorly drained soils have predominant grey with yellow brown or reddish brown mottles	Minor
pH **(range for plants)**	5.5 - 8 is the optimum range for a wide range of plants	4.5 - 5.5 suitable for many acid-loving plants	<4.5, >8	pH 6.3 - 6.6 Minor
Rock Fragments **(size & volume %)**	0 – 10%	10 – 20 %	>20%	
Sodicity **(ESP %)**	<6%	6 – 8%	>8%	Moderate @ 7%
Soil Depth to Rock or impermeable layer	>1.5 m	1.5 – 1 m	<1 m	
Soil Structure **(pedality)**	Highly or Moderately structured	Weakly-structured	Structureless, Massive or hardpan	Minor - moderate structure
Soil Texture, **Indicative Permeability**	Cat. 2b, 3a, 3b, 4a	Cat. 4b, 4c, 5a	Cat. 1, 2a, 5b, 5c, 6b	Reduced to Cat. 6 below 600mm
Watertable Depth (m) below base of the LAA	>2 m	2 – 1.5 m	<1.5 m	

Legend:

Nil or Minor: If all constraints are minor, conventional/standard designs are generally satisfactory.

Moderate: For each moderate constraint an appropriate design modification over and above that of a standard design, should be outlined.

Major: Any major constraint might prove an impediment to successful on-site wastewater management, or alternatively will require in-depth investigation and incorporation of sophisticated mitigation measures in the design to permit compliant onsite wastewater management.

Footnotes

1. pH <4.5 may lead to aluminum or manganese toxicity; pH>8 may reduce availability of trace elements and phosphate and make gypsum ineffective as an amendment to lower sodicity.
2. A value of ESP = 8% is taken as the threshold between a sodic and non-sodic soil but it depends on the type of clay mineral in the soil. Soils with elevated ESP are often very dispersive and have low permeability.
3. Shallow soil depth or a high seasonal water table may result in inadequate depth of aerobic soil to adequately treat and dissipate the wastewater.

2. HYDROLOGIC IMPACTS DURING WETTER MONTHS

Issue:
Combined hydrologic impacts of onsite systems in a subdivision development.

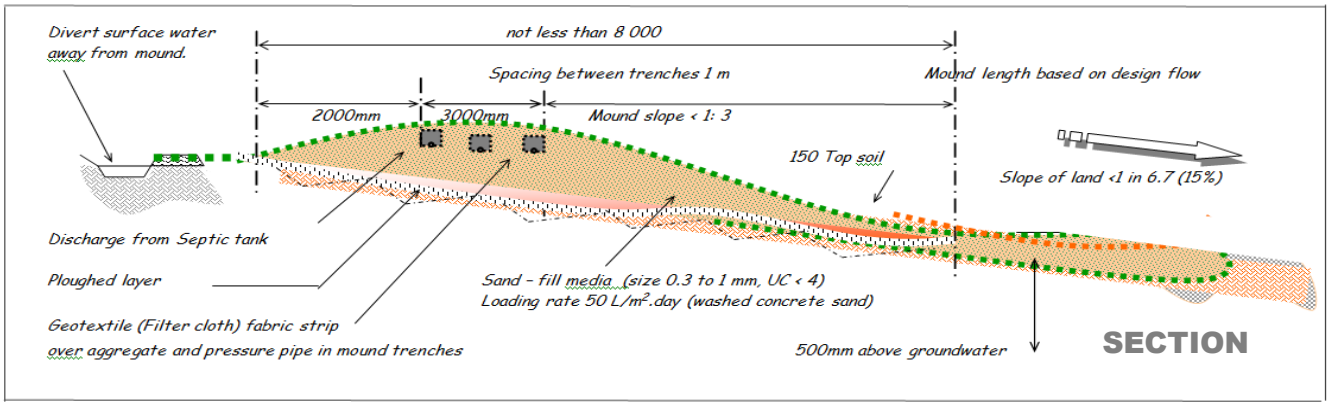
Objective:
To ensure soil structure does not become water logged during wetter months impacting on dispersal area.

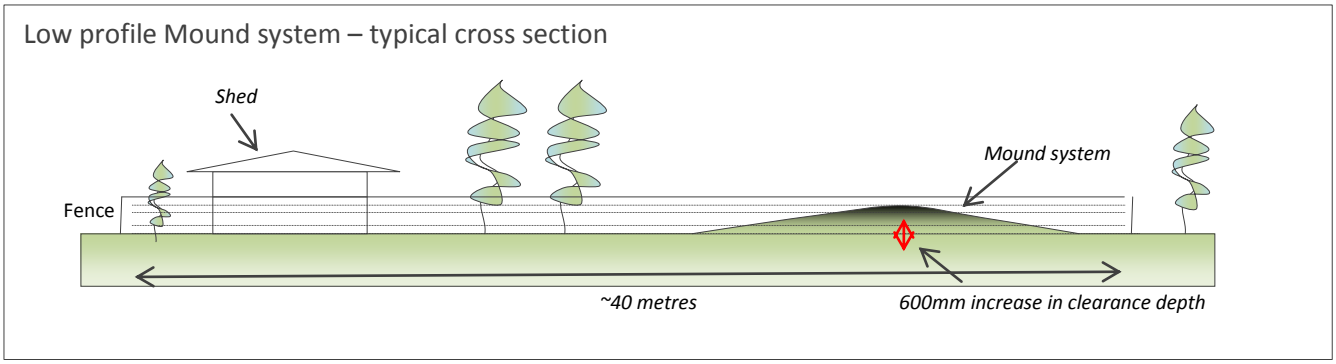
Criteria:
Where the soil category is determined to be a category 6, ie. medium to heavy clay, AS/NZS 1547:2012, requires water balance calculations based on soil category with the most restrictive soil layer within the clearance depth. Clearance depth is taken to be 600mm.

Mitigation measures:
1. Manage water usage by adopting best water conserving devices to reduce volume by 50%.
2. Design effluent dispersal management area using water balance analysis.
3. Adopt a Mound type system per Appendix N, AS/NZS 1547, where a 600mm clearance is not available to increase the clearance distance to the restrictive soil layer by raising depth by 0.6m.
4. Construct stormwater cut-off drain on upslope of LAAs.

See Table 8, for allotments that may be preferable to adopt Mound type systems as best practice.

Diagram of a combined treatment and dispersal "Mound" system from AS/NZS 1547:2012





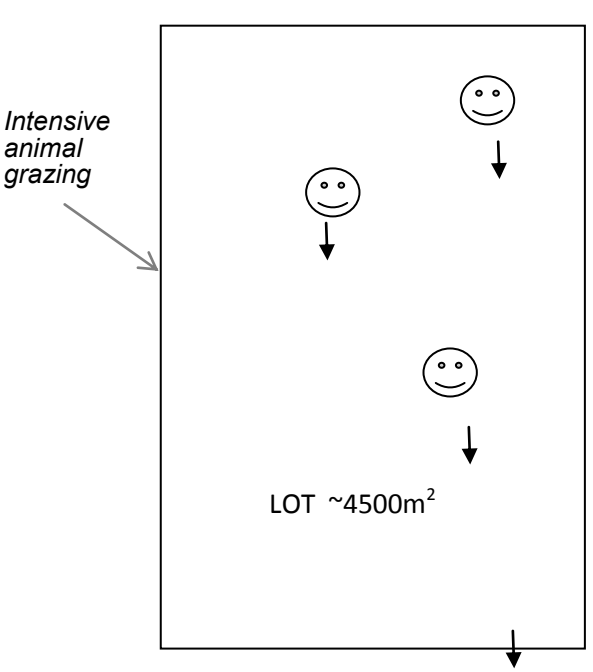
Note:

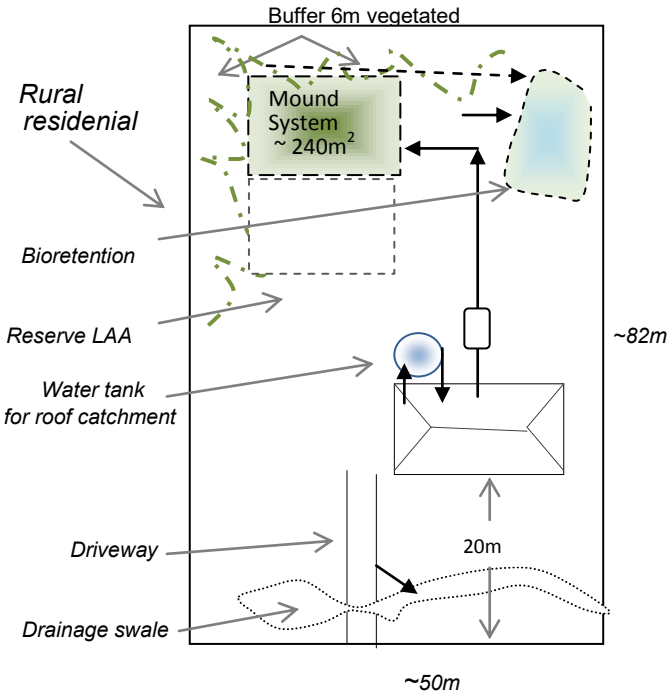
1. EPA Code[3] (Clause 2.3.5.1) Reducing wastewater in accordance with principles of the waste hierarchy.
2. EPA Code [3] (Clause 2.4) notes that Wick and bed systems with primary effluent allow for a *biomat* to grow and facilitate wastewater into the biological active topsoil layer thereby providing the groundwater with better protection.

Hydrologic analysis rural activity and rural residential.

Experimental evidence suggest that sewered areas with higher dwelling density will usually export more N and P per hectare than non-sewered rural residential areas.[10]

See below measures to reduce risk by a change in use from rural to residential may pose.





Nitrogen runoff ~5 kgTN/year

Nitrogen runoff ~2.5 kg/year

Conventional rural activity	*Proposed rural residence*
100% grass	*85% grass - 10% vegetation*
No treatment of waste products	*5% roof catchment – water storage*
	Up to 90% treatment of pollutants
	Buffer zones on boundary
	Wastewater LAA equal to 15% of site
	Surface stormwater runoff to retention ponds

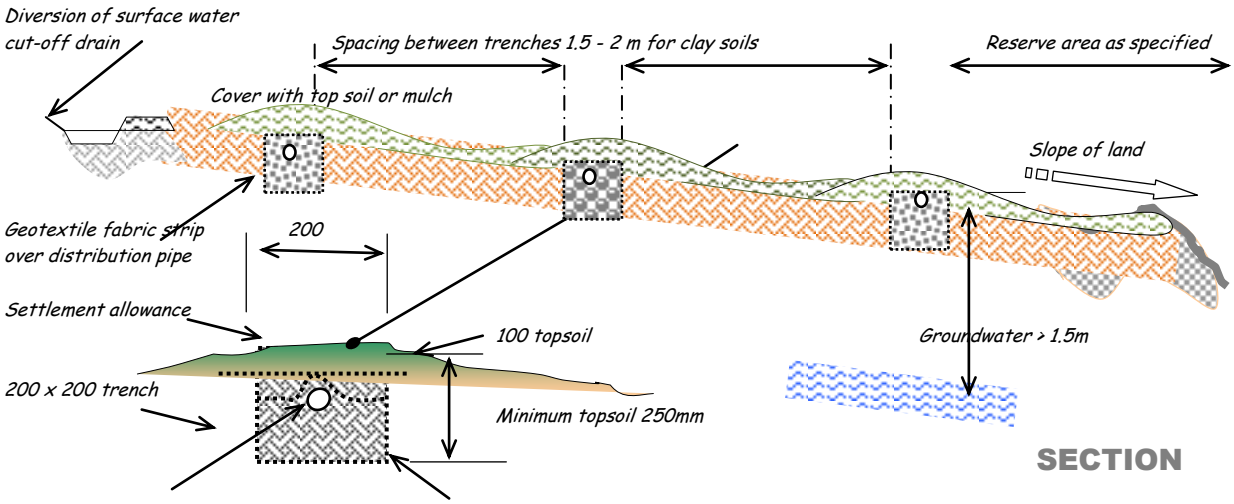
Table 1. Comparison of the effect of allotment density on the annual export loads calculated using the MUSIC model. Also shown are the N, P and faecal coliform export loads calculated for non-sewered areas in Pine Rivers Shire, Queensland.

Development Type	Allotment Size m²	Impervious %	Runoff %	TN kg/ha/yr	TP kg/ha/yr	FC cfu/ha/yr
High Density Urban	228	68%	70%	17	3	1.47×10^{11}
Medium Density Urban	500	47%	56%	12	2	4.54×10^{9}
Traditional Urban	700	42%	53%	11	2	4.21×10^{9}
Peri-urban	1600	14%	34%	7	1	2.34×10^{7}
Rural Residential	5000	4%	27%	5	1	1.68×10^{7}
Non-sewered Area in Pine Rivers Shire (6600 ha)	9000	N/A	N/A	3	0.02	7.7×10^{9}

Reference: E.Gardiner, A Vieritz, C Beal. *Are on-site systems environmentally Sustainable?* WATER February 2006

Alternative shallow dispersal option

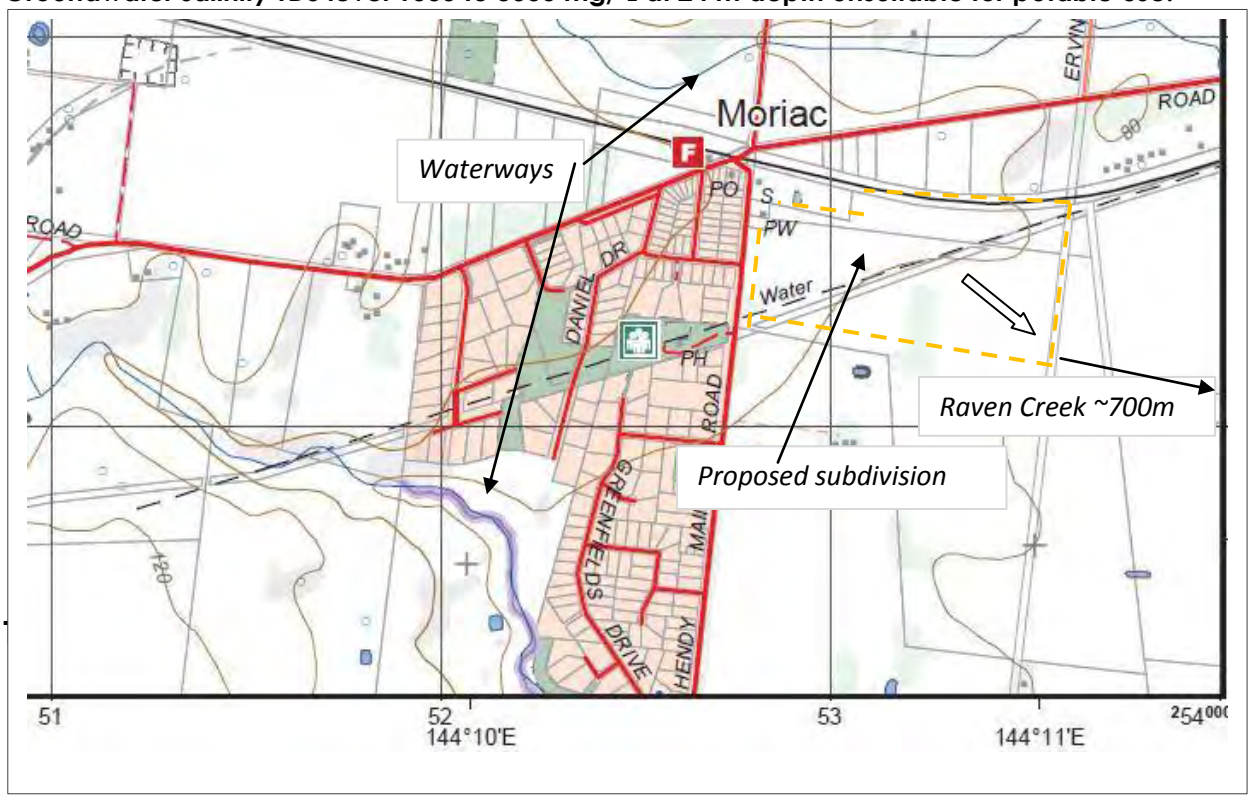
Low Pressure Effluent Dispersal from AS/NZS 1547:2012 *(Mounding over trench improves drainage)*



20DN Distribution pipe 4mm holes @ 500mm *Distribution aggregate (10 -15mm)* *All manifold connections valved*
AS/NZS 1547 Section 5.5.3.1 Pressurised distribution pipes from 32mm pressure main and header pipe.
NOTE: LEPD lines may be used to replace distribution pipes when pressure dose loading effluent into trenches
All effluent pipes to be lilac coloured or striped in accordance with AS 1345. (*all dimensions in millimetres*)

Topographic map at scale 1:20,000 below indicates no waterways are located within 300 metres

Groundwater salinity TDS level 1000 to 3000 mg/ L at 24 m depth unsuitable for potable use.



3. CUMULATIVE IMPACTS OF DEVELOPMENT

Issue:
Cumulative detrimental impact of development.

Objective:
Collate and analyse information in relation to both the development site and any possible cumulative detrimental impacts that the development may have on beneficial uses of the surrounding land, surface waters and groundwater.

Criteria:
State Environment Protection Policy (Water of Victoria) 2003, Clause 32, states:

"On-site domestic wastewaters needs to be managed to prevent the transport of nutrients, pathogens and other pollutants to surface waters and to prevent any impacts on groundwater beneficial uses."

(2) municipal councils need to:

(e) (i) "review land capability assessments and available domestic wastewater management options to prevent the discharge of wastewater beyond allotment boundaries and prevent impacts on groundwater beneficial uses";

From the land capability assessment the limitations of the site are principally the location of the wastewater dispersal area and *pollutant attenuation* within the boundaries of the premises.

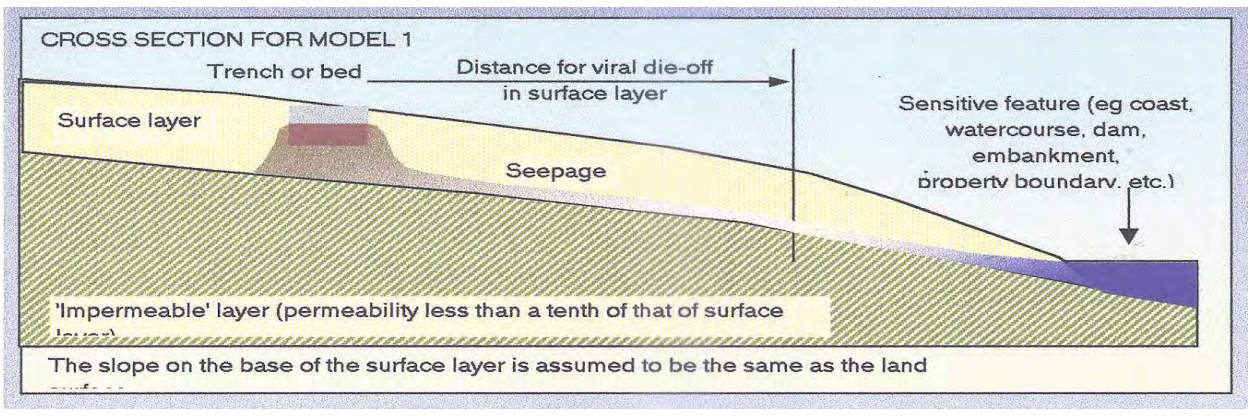
The adequacy of setback distances can be determined by demonstrating attenuation of pollutants within the allotment boundaries. To demonstrate that no cumulative impacts occur beyond the boundaries of the allotment modelling has been undertaken for virus movement from wastewater to limit the potential impact on groundwater quality. The assumption of the model is that if viruses are reduced to acceptable levels, bacteria and other pollutants will be too.

The TRENCH 3.0 © (AIEH) model aims to estimate separation distances between a dispersal site and down gradient sensitive features, using accepted scientific principles taking into account wastewater quality and site specific factors.

The separation distances are estimated in TRENCH using a combination of:

(a) Die-off times for water-borne viruses, and

(b) Groundwater flow velocities. Note: Groundwater TDS 1000-3000mg/L – non potable.



Groundwater model for setback from sensitive feature
Trench 3.0 (Australian Institute of Environmental Health)

Assessment	Subdivision	Assessment Date	28-June-16
for	Wendy & John Earl	Reference No.	E4142
Assessed site	815 Hendy Main Road MORIAC	Site inspected	10 June 2016
Local Authority	Surf Coast	Assessed by	JOHN LAWREY

The horizontal separation distance in saturated soil between wastewater application and nearest sensitive feature can be determined using a modified form of Darcy's Law;

$D = (tKi) / n_e$

where,

D = separation distance in metres
t = travel time (days)
K = hydraulic conductivity (m/day)
i = hydraulic gradient (m/m)
n_e = effective porosity of the aquifer.

Using the AIEH Computer model ***Trench 3***, the minimum separation distance is:

GROUNDWATER MODEL- 1,

TWO-LAYERED SOIL WITH IMPERMEABLE SUBSOIL: NO WATER TABLE, PRIMARY SEPTIC EFFLUENT

Surface slope (degrees)	1.5
Surface layer permeability (m/day)	0.50
Effective porosity of soil (%)	30
Minimum wastewater temp. (deg. C)	12
Level of viral reduction required	7
Approx. viral die-off period (days) =	60
Wastewater travel distance in die-off period =	6

Using the AIEH Computer model ***Trench 3***, the minimum separation distance is:

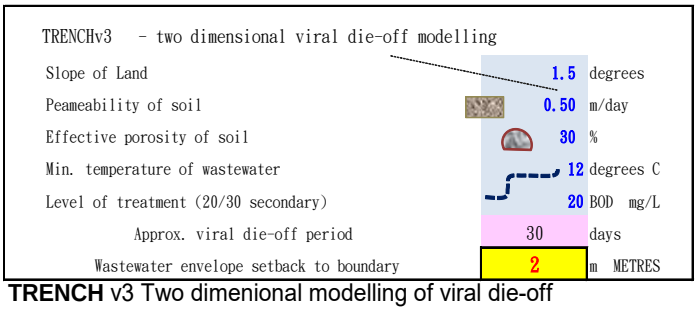
GROUNDWATER MODEL- 1,

TWO-LAYERED SOIL WITH IMPERMEABLE SUBSOIL: NO WATER TABLE, SECONDARY 20/30 EFFLUENT

Surface slope (degrees)	1.5
Surface layer permeability (m/day)	0.16
Effective porosity of soil (%)	30
Minimum wastewater temp. (deg. C)	12
Level of viral reduction required	3
Approx. viral die-off period (days) =	30
Wastewater travel distance(m) in die-off period =	2

Two-dimensional viral die-off modelling on flat ground and low permeable soils compared to worst case.

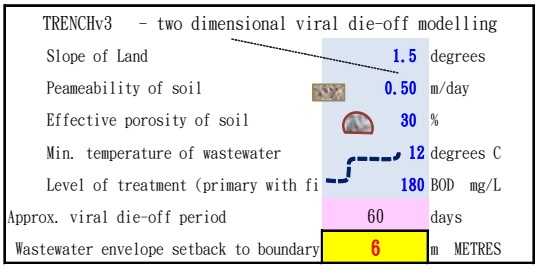
Treatment to secondary standard



TRENCH v3 Two dimenional modelling of viral die-off

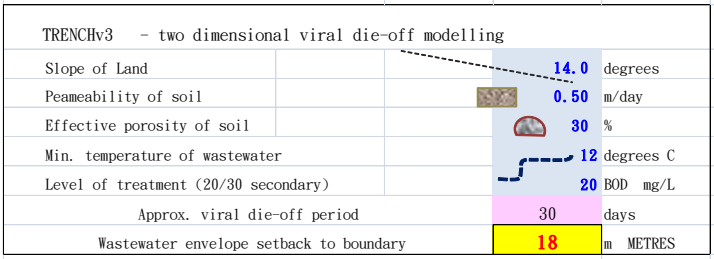
Enhanced primary effluent with outlet filter

TRENCHv3 Two dimenional modelling of viral die-off



Worst case situation on steep slope and very permeable soil compared to a flat site.

Treatment to secondary standard



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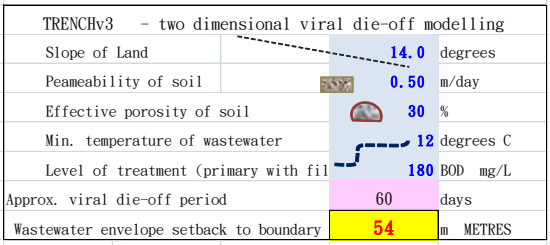


Mitigation measure:

1. Collect roof rainfall for reuse on property;
2. Land application area sized by water balance to enhance evapo-transpiration
3. Adopt boundary buffer setback distance of 6 metres (EPA Code)[3]
4. Restrict LAA method to 15% of property area, ie. 15% of 4000m^2 = 600m^2

The cumulative effect of all allotments can be considered using the discrete constraints of lot size, distance to waterways and groundwater, lot slope and soil suitability. Analysis of the constraints suggests that all are within limits determined by regulators to be insignificant.

Taken overall, limited evidence suggests that sewered areas with

Level of significance after analysis and mitigation: *Insignificant impact*

4. DETERMINATION OF SOIL TYPE (DIR) AND CLEARANCE DEPTH

Issue:
DIR & DLR design irrigation and loading rate methodology as per AS/NZS 1547.

Objective:
Determine applications rates based on most restrictive soil layer within clearance depth.

Criteria:
Clearance depth is taken to be 0.6m based on requirements Table K1 and K2 of AS/NZS 1547:2012, for medium to heavy clay and Moriac DWMP.

Method of soil classification as per AS/NZS 1547:2012.

Mitigation measures:

1. Soil category is based on the most restrictive soil layer within the clearance depth appropriate to type of approved effluent dispersal system adopted.
2. Subsurface drip irrigation areas based on Medium clay DIR of 1.7 mm/day as per Moriac DWMP.
3. Mound systems clearance depth minimum 1000mm based on DLR Light Clay of 5 mm/day, and
4. LPED trenches, clearance distance 600mm based on 2,5mm/day as per Table 9 EPA Code[3].

Enquires of the current land-owners at #815 in occupation for more than 30 years indicates that surface water on land has only been observed occasionally for a few days.

5. IMPACT OF ALLOTMENT SIZE ON CUMULATIVE IMPACTS OFF-SITE

Issue:
Cumulative impact of many systems within the proposed subdivision development.

Objective:
Identify constraints of sites in regard to dwelling size and wastewater generation rates.

Criteria:
AS/NZS 1547:2012, for medium to heavy clays is desirable.

Identify degree of drainage constraint to removal water from soil.

Mitigation measure:
Mound systems will provide for many allotments:
1. Additional separation for boundary clearance of 1000mm.
2. Enhance surface rainfall runoff from LAA with a surface 25% slope.

Table 4: Risk Assessment of Site Characteristics

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Aspect (affects solar radiation)	North / North-East / North-West	East / West / South-East / South-West	South	Minor
Climate (difference in annual rainfall and evaporation)	Excess of evapo-ration over rainfall in wettest months	Rainfall approximates to evaporation	Excess of rainfall over evaporation in the wettest months	Minor
Erosion (potential for erosion)	Nil or minor	Moderate	Severe	Moderate addressed with additional of gypsum
Exposure to sun and wind	Full sun and/or high wind or minimal shading	Dappled light	Limited patches of light and little wind to heavily shaded	Minor
Fill (imported)	No fill or minimal fill, or fill is good quality topsoil	Moderate coverage and fill is good quality	Extensive poor quality fill and variable quality fill	Minor
Flood frequency (ARI)	Less than 1 in 100 years	Between 100 and 20 years	More than 1 in 20 years	Minor
Groundwater bores	No bores onsite or on neighbouring properties	Setback distance from bore complies with requirements in EPA Code of Practice 891.3 (as amended)	Setback distance from bore does not comply with EPA Code 891.3	Minor
Land area available for LAA	Exceeds LAA and duplicate LAA and buffer distance requirements	Meets LAA and duplicate LAA and buffer distance requirements	Insufficient area for LAA	Minor with adequate land for reserve areas
Rock outcrops (% of surface)	<10%	10-20%	>20%	Minor
Rock outcrops (% of surface)	<10%	10-20%	>20%	Minor
Landslip (or landslip potential)	Nil	Minor to moderate	High or Severe	Minor

Characteristic	Level of Constraint			Assessed Level of Constraint for Site
	Nil or Minor	Moderate	Major	
Slope Form (affects water shedding ability)	Convex or divergent side-slopes	Straight side-slopes	Concave or convergent side-slopes	Moderate
Slope gradient (%)				
(a) for absorption trenches and beds	<6%	6-15%	>15%	Slope 1% Minor
(b) for surface irrigation	<6%	6-10%	>10%	Minor
(c) for subsurface irrigation	<10%	10-30%	>30%	Minor
Soil Drainage [7] (qualitative)	No visible signs or likelihood of dampness, even in wet season	Some signs or likelihood of dampness	Wet soil, moisture-loving plants, standing water in pit; water ponding, soil pit fills with water	Moderate Provide cut-off drains
Stormwater run-on	Low likelihood of stormwater run-on		High likelihood of inundation by stormwater run-on	Minor Cut-off drains
Surface waters - setback distance (m) [9]	Setback distance complies with requirements in EPA Code of Practice		Setback distance does not comply with requirements in EPA Code 891.3	Minor
Vegetation coverage over the site	Plentiful vegetation with healthy growth and good potential for nutrient uptake	Limited variety of vegetation	Sparse vegetation or no vegetation	Moderate Add good quality topsoil to trenches

Soil Drainage (Field Handbook definitions)	Rapidly drained. Water removed from soil rapidly in relation to supply, excess water flows downward rapidly.	Well drained. Water removed from the soil readily, excess flows downward. Some horizons may remain wet for several days after addition	Moderately well drained. Water removed somewhat slowly in relation to supply, some horizons may remain wet for a week or more after addition	Imperfectly drained. Water removed very slowly in relation to supply, seasonal ponding, all horizons wet for periods of several months, some mottling	Poorly/Very poorly drained. Water remains at or near the surface for most of the year, strong gleying. All horizons wet for several months	Moderate Constraint addressed by installing cut-off drains

Legend:

Nil or Minor: If all constraints are minor, conventional/standard designs are generally satisfactory.

Moderate: For each moderate constraint an appropriate design modification over and above that of a standard design, should be outlined.

Major: Any major constraint might prove an impediment to successful on-site wastewater management, or alternatively will require in-depth investigation and incorporation of sophisticated mitigation measures in the design to permit compliant onsite wastewater management.

6. WATER AND NUTRIENT BALANCE CALCULATIONS FOR (LAA)

Issue:
Irrigation area sizing requires water balance calculations.

Objective:
To avoid water logged during wetter months, water balance calculations using evapo-transpiration rates and 70th% rainfall events are used to determine LAAs for various house sizes.

Criteria:
Water balance spread sheets detailed in MAV[7] are modelled for a number of bedroom options.

Mitigation measures:
In the water balance model an indicative permeability for medium to heavy CLAY has been used for drip irrigation Light Clay for dispersal where a 600mm clearance can be provided. See Appendices B1, B2, B3 and B4.

Appendix B 1 – Water and nutrient balances – drip irrigation

Appendix B 2 – Water and nutrient balances – mound system

Appendix B 3 – Water balances – mound system - primary effluent

Appendix B 4 – Water balances – low pressure effluent dispersal

7. SETBACKS AND STORMWATER RETENTION DAMS

Issue:
Setback separation distances in a subdivision development and stormwater retention basins.

Objective:
Attenuation of pollutants within the boundaries of each allotment.

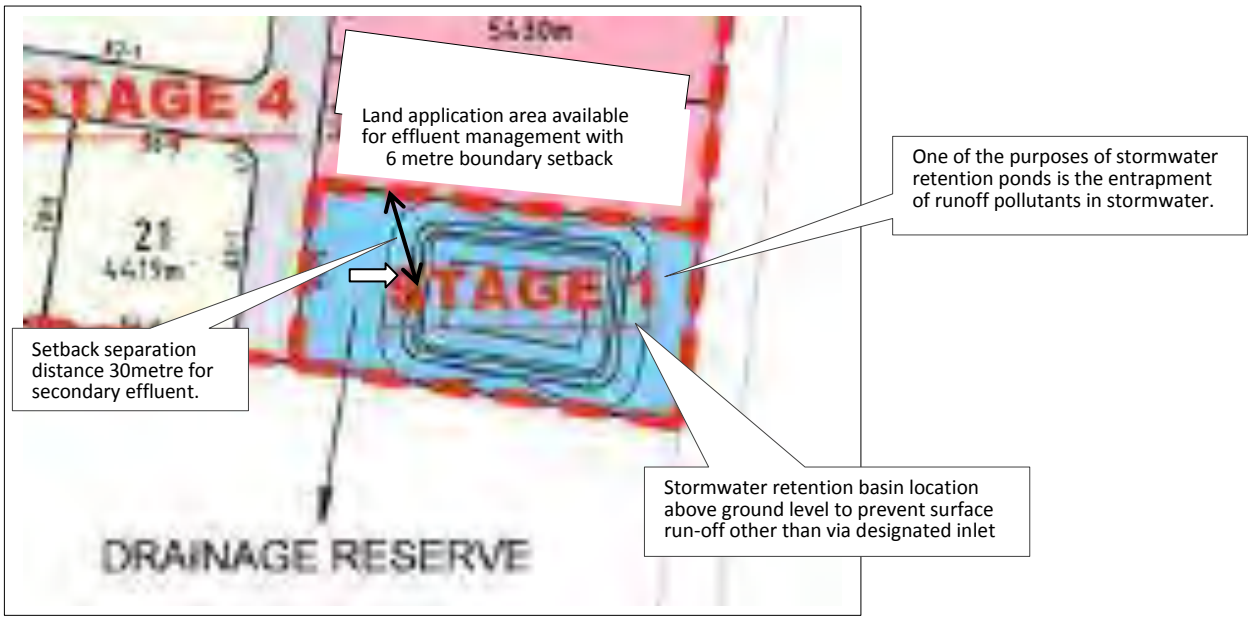
Criteria:
All setback distances, as per Table 5, EPA Code of Practice (2013) *as amended post July*, up-slope of boundaries and treatment system to residence of 3 metres is adopted and downslope of adjacent allotment at 1.5m or as indicated on site plan attached.

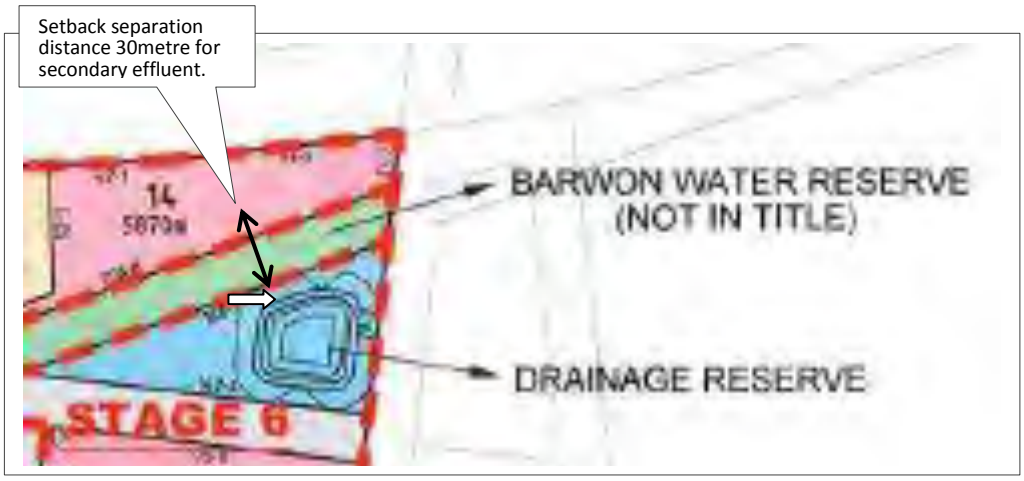
However, does not apply to dams located above ground-level which cannot receive run-off. See footnote 8 of EPA[3] Code, Table 5.

Mitigation measure:
Restrict LAA to 600m^2 or 15% of site area for effluent application, ie. as per Stormwater Code.

Adopt setback clearances to stormwater drains and boundaries as for primary effluent ie., 6 metres.

For stormwater retention basins where one of the principle objective is retention of pollutants in stormwater 6 metres is considered appropriate.





8. LOT AND DWELLING SIZES BASED ON SITE CHARACTERISTICS

Issue:
Cumulative impacts from many systems within a subdivision development requires consideration of sustainable total lot numbers and minimum lot size.

Objective:
Should be considered before approval, particularly as soil structure will become water logged during wetter months.

Criteria:
Require water balance calculations where soil category is based on the most restrictive sol layer within the clearance depth. Clearance depth is taken to be 0.6m based on requirements Table K1 and K2 of AS/NZS 1547:2012, medium to heavy clay,

Mitigation measures:
Consideration and following minimum requirements applying to subdivision to provide protection against cumulative adverse effects:

- Two dimensional modelling for viral die-off modelling;
- Proximity to surface water and flood prone areas;
- Consideration of ground slope, and
- Downslope attenuation of pollutants.

As a result of our investigations it is concluded that sustainable onsite wastewater management is feasible with appropriate mitigation measures, as outlined, for up to (5) five -bedroom residences.

Table 8: Recommended LAA irrigation areas from bedroom options *

No. of bedroom	No. of persons	Drip Irrigation 2^0	Mound system I^0	Mound system 2^0	LPED system 1^0
3 bedrooms	4	825 m^2	330 m^2	170 m^2	440 m^2
4 bedrooms	5	1030 m^2	420 m^2	210 m^2	550 m^2
5 bedrooms	6	1240 m^2	505 m^2	240 m^2	660 m^2
6 bedrooms	7	1400m^2	580 m^2	300 m^2	770 m^2

* Based on standard fixtures and 180 litre s/person/day assuming a future reticulated water supply.
Water balance undertaken using 70th% rainfall, ie. wettest in 5 years, 1^0 primary, 2^0 secondary effluent.
Minimum areas below for different dispersal systems derived from water & nutrient balances in Appendix B.

Area available for LAA, reserve (duplicate) and buffer setbacks exceed requirements.
Minimum areas below for different dispersal systems for a 5 bedroom dwelling

Lot sizes (m2)	Setbacks, private open space & buildings	Area available for dispersal	Area required for Mound system	Area required for drippers 2^0	% of available area for LAA
4000 -4500	2000 m^2	2000 m^2	505 m^2	1240	62
4500 - 5000	2200 m^2	2300 m^2	505 m^2	1240	54
> 5000	2400 m^2	2600 m^2	505 m^2	1240	48

* Based on standard fixtures and 180 litres/person/day assuming a future reticulated water supply.

Table 7 - Area requirements for effluent attenuation within proposed allotments.

Old Bore #	New Lot No.	Boundary constraint	LAA area Bedrooms	Dispersal LAA recommended minimum (m^2)	Allotment area (m^2)	Minimum setback to sensitive feature (m)	Environmental risk level *
5	1	500 mm	5	600	4026	6 m to East boundary	Low
6	2	500 mm	5	600	4012	6 m to East boundary	Low
7	3	500 mm	5	600	4013	6 m to East boundary	Low
8	4	500 mm	5	600	4029	6 m to East boundary	Low
9	5	100 mm	5	600	4811	6 m to East boundary	Low
10	6	520 mm	5	600	4890	6 m to East boundary	Low
11	7	800 mm	5	600	4134	6 m to East boundary	Low
12	8	500 mm	5	600	4048	6 m to East boundary	Low
13	9	300 mm	5	600	4090	6 m to East boundary	Low
14	10	700 mm	5	600	4052	6 m to East boundary	Low
15	11	400 mm	5	600	4051	6 m to East boundary	Low
16	12	500 mm	5	600	4083	6 m to East boundary	Low
17	13	400 mm	5	600	4800	6 m to East boundary	Low
18	14	600 mm	5	600	5870	6 m to Water Reserve	Low
19	15	400 mm	5	600	5420	6 m to South boundary	Low
20	16	400 mm	5	600	5430	6 m to South boundary	Low
21	17	500 mm	5	600	5430	6 m to South boundary	Low
22	18	600 mm	5	600	5430	6 m to South boundary	Low
23	19	600 mm	5	600	5430	6 m to South boundary	Low
23	20	600 mm	5	600	5430	30 metre to SW basin	Low
23	21	600 mm	5	600	4419	6 m to S & E boundaries	Low
24	22	600 mm	5	600	4025	6 m to S & E boundaries	Low
25	23	600 mm	5	600	4025	6 m to S & E boundaries	Low
26	24	600 mm	5	600	4025	6 m to S & E boundaries	Low
27	25	600 mm	5	600	4006	6 m to S & E boundaries	Low
28	26	500 mm	5	600	4095	6 m to S & E boundaries	Low
29	27	400 mm	5	600	4468	3 m to South boundary	Low
30	28	600 mm	5	600	4013	6m to East boundary	Low
31	29	600 mm	5	600	4013	6m to East boundary	Low
32	30	600 mm	5	600	4029	6m to East boundary	Low
33	31	500 mm	5	600	4467	6m to East boundary	Low
35	32	600 mm	5	600	4000	3 m to SE boundary	Low
34	33	600 mm	5	600	4063	3 m to SE boundary	Low
36	34	600 mm	5	600	4337	3 m to SE boundary	Low
37	35	600 mm	5	600	4335	6m to E & S boundary	Low
38	36	400 mm	5	600	4164	6m to E boundary	Low
38	37	400 mm	5	600	4400	3m to South boundary	Low
39	38	400 mm	5	600	4600	6m to South boundary	Low
40	39	400 mm	5	600	4600	6m to South boundary	Low
41	40	500 mm	5	600	4660	6m to South boundary	Low
42	41	500 mm	5	600	4033	6m to West boundary	Low
42	42	500 mm	5	600	4139	6m to West boundary	Low
43	43	400 mm	5	600	4155	6m to West boundary	Low
44	44	300 mm	5	600	4155	6m to West boundary	Low
45	45	400 mm	5	600	4080	6m to West boundary	Low
46	46	300 mm	5	600	4034	6m to South boundary	Low
48	47	700 mm	5	600	4364	3m to South boundary	Low
49	48	400 mm	5	600	4178	3m to South boundary	Low
47	49	500 mm	5	600	4014	6m to South boundary	Low
50	50	500 mm	5	600	4000	6 m to S & E boundaries	Low
4	51	400 mm	5	600	4673	6 m to S & E boundaries	Low
3	52	400 mm	5	600	4120	6 m to S & E boundaries	Low
2	53	400 mm	5	600	4119	6 m to S & E boundaries	Low
1	54	400 mm	5	600	4051	3 m to S & E boundaries	Low
Mean	**Mean**		**5**	**includes** reserve	**4369**	Mean dispersal area / lot area **13.7 %**	

* 15% site to LAA site coverage required for 5 bedroom residence. **Low** % site coverage

9. *UPGRADING OF EXITING SEPTIC TANKS SYSTEM*

Issue:
Existing dwellings on proposed lots having existing septic systems should be up-graded in accordance with LCA if to remain onsite and sold as part of subdivision.

Objective:
All systems are required to demonstrate that all-waste water can be treated and retained within the boundaries of each allotment.

Criteria:

State Environment Protection Policy (Water of Victoria) 2003, Clause 32:

"On-site domestic wastewaters needs to be managed to prevent the transport of nutrients, pathogens and other pollutants to surface waters and to prevent any impacts on groundwater beneficial uses."

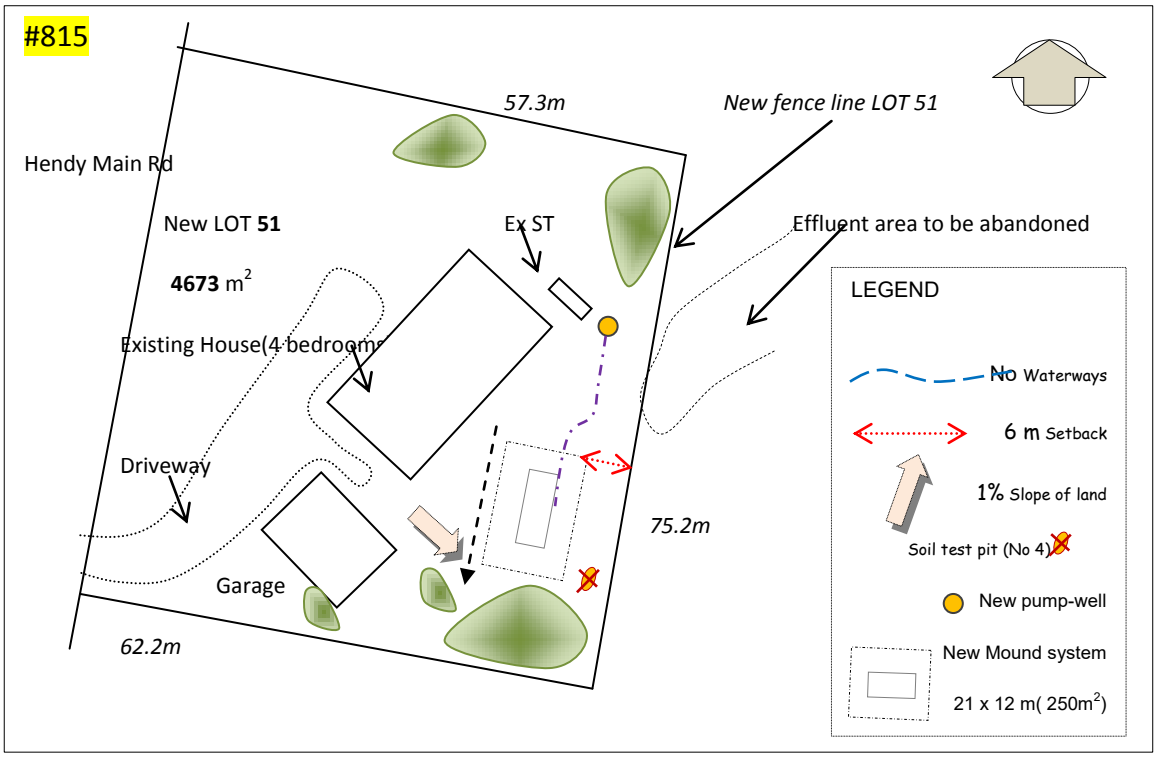
(2) municipal councils need to:

(e) (i) "review land capability assessments and available domestic wastewater management options to prevent the discharge of wastewater beyond allotment boundaries and prevent impacts on groundwater beneficial uses";

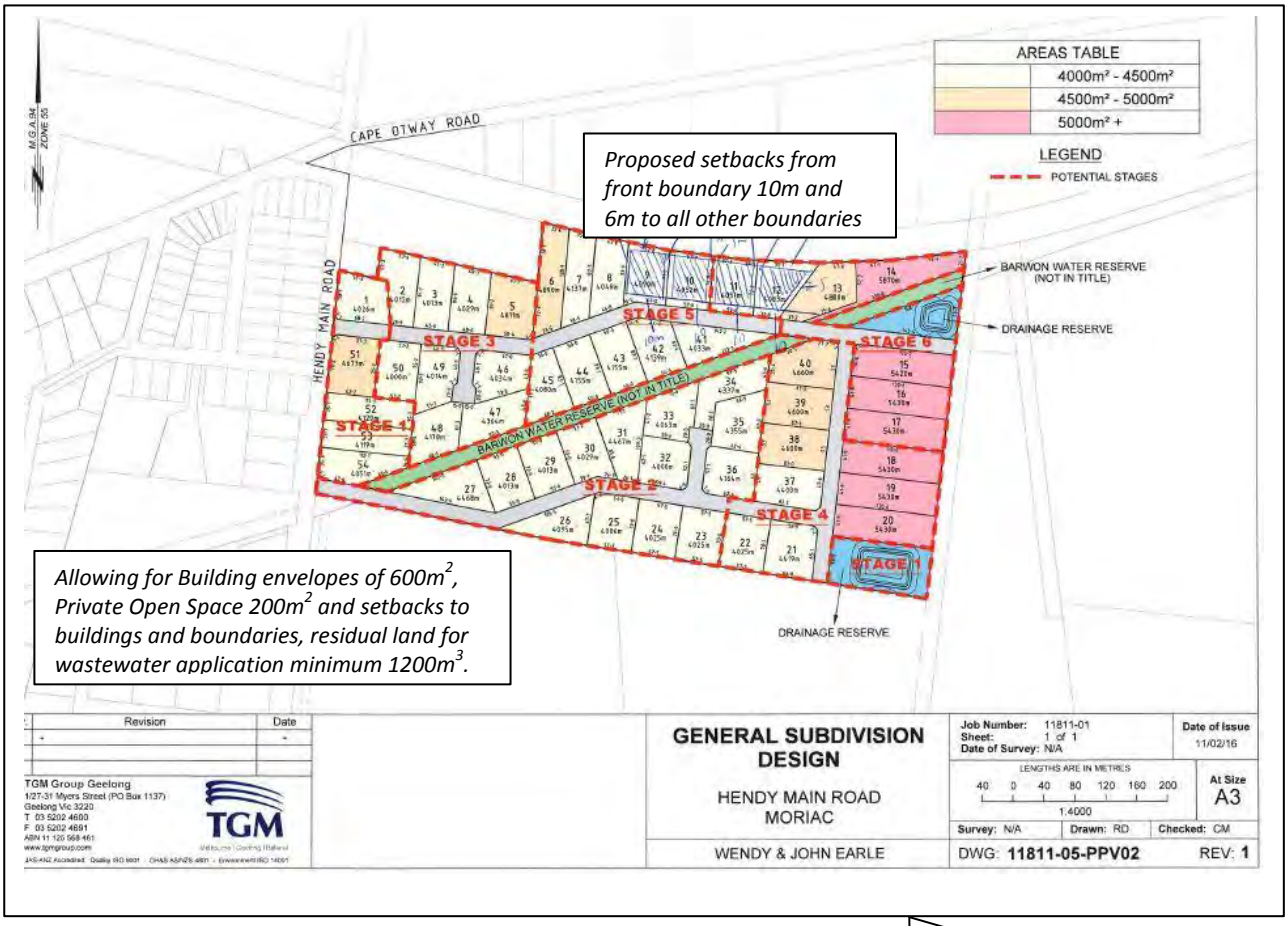
Proposed measure:

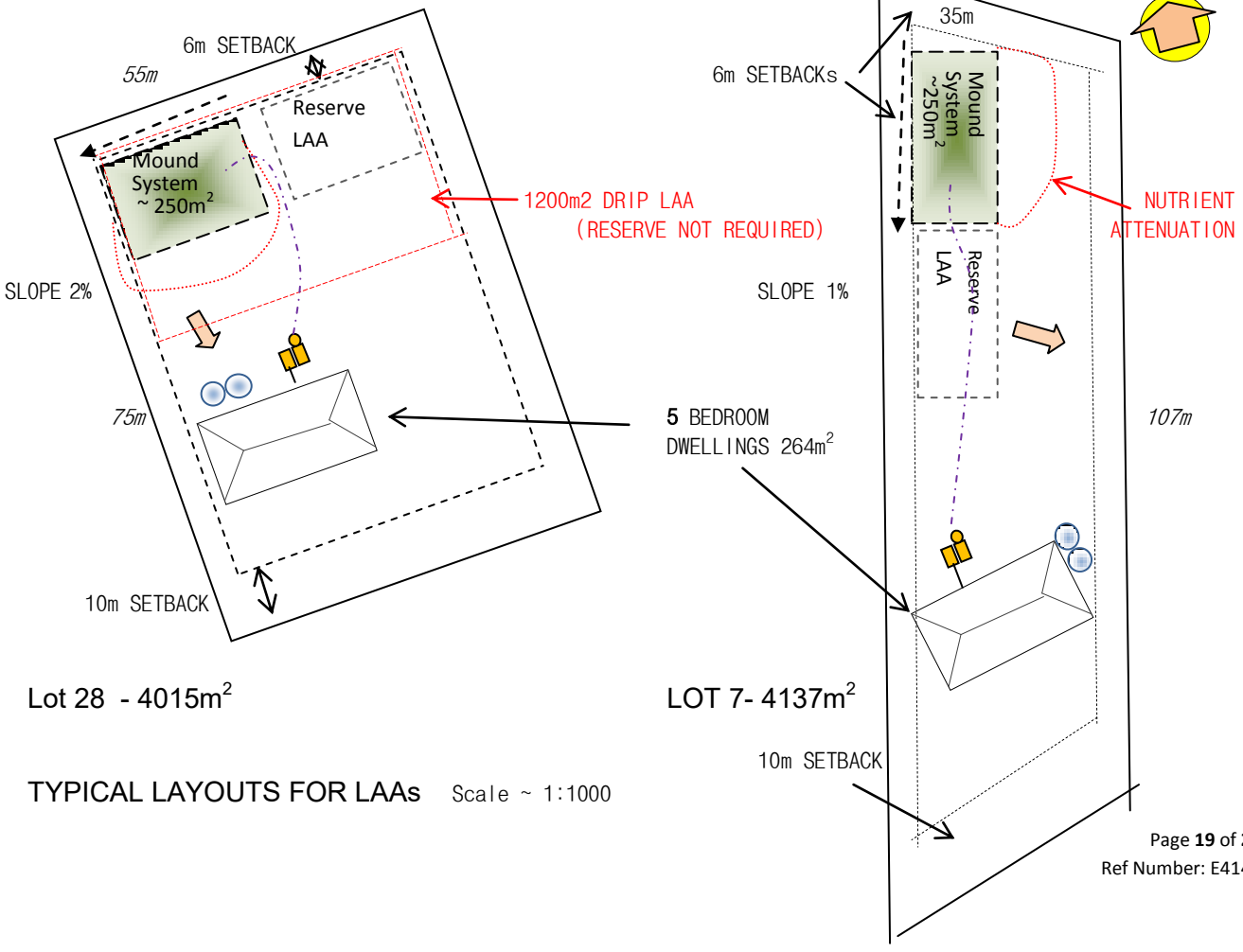
As the only principal residence within the proposed subdivision, the septic system will be upgrade to ensure all wastewater is contained within the boundaries of new Lot 51 of 4673 m^2.

When the decision to grant a permit is given, an application to alter the existing system will be made to install a new EPA approved treatment plant and effluent dispersal area. The old effluent field (shown below) will be abandoned and distribution pipes sealed at the new boundary.



10. SUBDIVISION PLAN LAYOUT





Lot 28 - 4015m²

LOT 7- 4137m²

TYPICAL LAYOUTS FOR LAAs Scale ~ 1:1000

CONCLUSIONS

The review of additional areas raised about LCA (2013) have been addressed and has concluded that there are sufficient options for treatment and dispersal so that any cumulative risk is very low.

The sole objective of this addendum is to establish the overall suitability of the land and proposed lots to treat and retain pollutants within the boundaries the allotments.

It is not the intention of this report to address the specific requirements for an individual design of any particular dwelling that may be built on an allotment to an owner's specific needs.

Such systems will need individual design specific to an owner's proposal based on bedrooms, type of water supply and other design requirements of the owner.

The LCA has addressed nutrients as required by EPA Guidelines and found that nutrients and other pollutants are attenuated within the boundaries of the allotments and that there will be no cumulative impacts on surface waters or the beneficial uses of the groundwater.

All proposed allotments have been assessed for the ability to treat and retain wastewater effluent (that is, attenuation of pollutants and impacts on groundwater) within the allotment boundaries.

Assessment of the land required for dispersal of effluent from a five bedroom dwelling including where necessary a reserve area will take up to 50% of the total area available within each allotment.

A minimum of 2000 m^2 is available on all lots for wastewater management of which at least 600 m^2 should be reserved for the exclusive purpose of effluent dispersal.

REFERENCES

1. EPA (2003). Guidelines for *Environmental Management: Use of Reclaimed Water,* Publication 464.2.

2. Environment Protection Authority (1991). *Guidelines for Wastewater Irrigation,* Publication 168.

3. Environment Protection Authority (2013). Pub. 891.3, *Code of Practice for Onsite Wastewater Management*.

4. Hazelton, P and Murphy, B. (2007). *Interpreting Soil Test Results – What Do All The Numbers Mean?* CSIRO Publishing, Melbourne

5. Isbell, R.F. (1996). The Australian Soil Classification. CSIRO Publishing, Melbourne.

6. McKenzie, N, Coughlan, K & Cresswell, H. 2002, Soil Physical Measurement and Interpretation of land Evaluation, CSIRO Publishing.

7. Municipal Association of Victoria, Department of Environment and Primary Industries and EPA Victoria (2015) *Victorian Land Capability Assessment Framework*.

8. Standards Australia / Standards New Zealand (2012). AS/NZS 1547:2012 *On-site domestic-wastewater management.*

9. USEPA (2002). *Onsite Wastewater Treatment Systems Manual.* United States Environmental Protection Agency.

10. Kinhill, 1997, *Caboolture rural residential effluent treatment and disposal study*, for Caboolture Shire Council, KinhillPty Ltd., Brisbane.

This assessment has been undertaken in accordance with statutory requirements in:

- Part IV- Septic Tank Systems, *Environment Protection Act 1970*, and
- *State environment protection policy* (Waters of Victoria) and
- *State environment protection policy* (Groundwaters of Victoria).

ACRONYMS & DEFINITIONS

- EPA – Environment Protection Authority, Victoria
- LCA – Land capability assessment
- LAA - Land application area
- LPED – Low pressure effluent distribution
- Reserve area - a duplicate land disposal area reserved for use when the original land disposal area needs to be rested for future unforeseen contingencies.
- Reticulated water - water supply obtained from mains supply, including any bore, stream or dam.
- Secondary treatment - biological and/or physical treatment following primary treatment of wastewater.
- TP(1) - Test pit (1)
- Unsewered area – land where no sewer pipes are adjacent to the allotment boundaries.
- Waterway – as defined by the Water Act 1989

Appendix A - Soil Analysis Results, EML (CHEM) Laboratories

EML (CHEM) PTY LTD
A.C.N. 006 948 321 A.B.N. 86 006 948 321
P.O. Box 466, Canterbury, VIC 3126
417-425 Canterbury Road, Surrey Hills VIC 3127
Telephone (03) 9836 1999 - Facsimile (03) 9830 0961
Email: emlchem@emlchem.com.au

FINAL REPORT

Report No: N061320
Job No: 1606/211
Page: 1 of 2
Date: 24 June 2016

EWS Environmental
PO. Box 4
BOX HILL VIC 3128

Attention: Mr John Lawrey

Dear Sir/Madam,

Re: Analysis of Soil Sample ex 815 Hendy Main Rd MORIAC
Job Number #S400

METHOD LIST

Method	Method Description (in-house method based on)	Method	Method Description (in-house method based on)
CATIONS	21st Ed. 2005 A.P.H.A. Method 3010 A, 3030, 3111, 3114	CEC	Rayment, G. E., and Lyons D. J., Soil Chemical Methods - Australasia, CSIRO Publishing 2011 Method 15A1 Exchangeable Bases (Ca2+, Mg2+, Na+, K+)
COND-M	21st Ed. 2005 A.P.H.A. Method 2510 A, B	ESP	Soil Chemical Methods - Australia, CSIRO Publishing 2011 Method 15N1 *
PH-SOIL	Australian Laboratory Handbook of Soil and Water Chemical Methods, 1992. Victoria EPA Publication No. 139 Nov 1991 - Chemical Analysis of Polluted Soils.	SAR	Manual calculation based on 20th Ed. 1998 A.P.H.A. Method 2340 A, B. NATA Accreditation does not cover the performance of this service.

Yours faithfully
EML (CHEM) PTY LTD

K Charlson BAppSc
(Managing Director)

Important Notes

1. This is a final report and it supercedes any previous interim reports pertaining to this work that you may have received.
2. The results in this report pertain to samples as submitted to the laboratory.

NATA Accreditation No. 2731. Accredation for Compliance with ISO/IEC 17025

Consulting Chemists and Microbiologists MELBOURNE

EML (CHEM) PTY LTD A.C.N. 006 948 321 A.B.N. 86 006 948 321

Report prepared for: EWS Environmental

Report No: N061320
Page: 2 of 2
Date: 24 June 2016

Sample Description			Hendy Main Rd #S400
Received Method			10/6/16 Received
Date			14/06/2016
EML Lab No.			EML-8909
Analyte	Unit	Method	
Conductivity of a 1+5 Water Extract	uS/cm AB	COND-M	74
pH of a 1+5 Water Extract	pH (AB)	PH-SOIL	6.4
Water Soluble Calcium as Ca	mg/Kg AB	CATIONS	19
Water Soluble Magnesium as Mg	mg/Kg AB	CATIONS	14
Water Soluble Sodium as Na	mg/Kg AB	CATIONS	120
Exchangeable Calcium as Ca	mg/Kg AB	CEC	560
Exchangeable Magnesium as Mg	mg/Kg AB	CEC	360
Exchangeable Sodium as Na	mg/Kg AB	CEC	120
Exchangeable Potassium as K	mg/Kg AB	CEC	86
Cation Exchange Capacity	meq/100g AB	CEC	9.2
Exchangeable Sodium Percentage (ESP)	%	ESP	5.8
SAR of a 1+5 Water Extract		SAR	2.3

EML (CHEM) PTY LTD A.C.N. 006 948 321 A.B.N. 86 006 948 321

Report prepared for: EWS Environmental

Report No: N061321
Page: 2 of 2
Date: 24 June 2016

Sample Description			Subsoil #S500
Received Method			10/6/16 Received
Date			14/06/2016
EML Lab No.			EML-8910
Analyte	Unit	Method	
Conductivity of a 1+5 Water Extract	uS/cm AB	COND-M	110
pH of a 1+5 Water Extract	pH (AB)	PH-SOIL	6.6
Water Soluble Calcium as Ca	mg/Kg AB	CATIONS	15
Water Soluble Magnesium as Mg	mg/Kg AB	CATIONS	17
Water Soluble Sodium as Na	mg/Kg AB	CATIONS	240
Exchangeable Calcium as Ca	mg/Kg AB	CEC	900
Exchangeable Magnesium as Mg	mg/Kg AB	CEC	1200
Exchangeable Sodium as Na	mg/Kg AB	CEC	270
Exchangeable Potassium as K	mg/Kg AB	CEC	180
Cation Exchange Capacity	meq/100g AB	CEC	19
Exchangeable Sodium Percentage (ESP)	%	ESP	6.3
SAR of a 1+5 Water Extract		SAR	4.6

CATION EXCHANGE CAPACITY RATED AS A LOW RISK being greater than 12 meq/100g.

Add liquid gypsum to pump well equal to 1 kg/m^2 /3 years

EXCHANGEABLE SODIUM PERCENTAGE RATED AS A LOW RISK being more than 8%.

SODIUM ABSORPTION RATE RATED AS A LOW RISK being less than 3. NON-SODIC

EML (CHEM) PTY LTD A.C.N. 006 948 321 A.B.N. 86 006 948 321

Report prepared for: EWS Environmental

Date: 24 June 2016

Sample Description			Subsoil #S600
Received Method			10/6/16 Received
Date			14/06/2016
EML Lab No.			EML-8911
Analyte	Unit	Method	
Conductivity of a 1+5 Water Extract	uS/cm AB	COND-M	110
pH of a 1+5 Water Extract	pH (AB)	PH-SOIL	6.3
Water Soluble Calcium as Ca	mg/Kg AB	CATIONS	27
Water Soluble Magnesium as Mg	mg/Kg AB	CATIONS	19
Water Soluble Sodium as Na	mg/Kg AB	CATIONS	170
Exchangeable Calcium as Ca	mg/Kg AB	CEC	870
Exchangeable Magnesium as Mg	mg/Kg AB	CEC	460
Exchangeable Sodium as Na	mg/Kg AB	CEC	190
Exchangeable Potassium as K	mg/Kg AB	CEC	98
Cation Exchange Capacity	meq/100g AB	CEC	11
Exchangeable Sodium Percentage (ESP)	%	ESP	7.6
SAR of a 1+5 Water Extract		SAR	2.8

Appendix B1 – Water & Nutrient Balances for Drip Irrigation- DIR 1.7mm/day, 5 Bedrooms

Irrigation Area sizing using Nominated Area Water Balance, Nutrient Balance & Storage Calculations

INPUT DATA	DRIP IRRIGATION			Model:	MAV, January 2014			Assessor: JR Lawrey MIEAust Reg. 142295
Design Wastewater Flow	Q	1080	L/day	Based on maximum potential occupancy and derived from Table 4 in EPA Code of Practice (2013).				
Effluent TN concentration	TN	25	mg/L	Crop N uptake 220 kg/ha/yr equal to	60	mgTN/m2.day. Phosphorus sorption capacity not limiting.		
Design Irrigation Rate	DIR	1.7	mm/day	Based on soil class permeability and derived from Table 9 in EPA Code of Practice (2013).				
Land Application Area	L	1236	m sq	Sub-surface Drip Irrigation to AS/NZS 1547.				
Crop Factor	C	0.6 –0.8	unitless	Estimates of evapotranpiration as a fraction of pan evaporation; varies over season and crop type.				
Retained Rainfall	RF	0.9	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff.				
Rainfall Data	Rainfall for Buckley (mm)			90th% 763 50th% 612				
Evaporation Data	BOM evaporation Geelong			Station 087214				

Run-off coefficient for grassed areas: < 10% slope 0.90
> 10 % ...0.85, > 15 %...0.80, > 20% ...0.75 > 25%....0.70

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month (occupancy)	D	₩	days	31	28	31	30	31	30	31	31	30	31	30	31	**365**
Rainfall	R	₩	mm/month	42	36	34	45	54	54	57	64	64	65	55	42	**612**
Evaporation	E	₩	mm/month	191	181	149	91	66	72	53	70	77	107	134	172	**1363**
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	153	145	119	64	46	50	37	49	54	86	107	138	**1048**
Percolation	B	DIR x D	mm/month	54	49	54	52	54	52	54	54	52	54	52	54	**635**
Outputs		ET+B	mm/month	207	194	173	116	100	103	91	103	106	140	159	192	**1683**
INPUTS																
Retained 70th % Rainfall	RR	R x RF	mm/month	47	40	38	50	61	61	64	72	72	73	62	47	**687**
Effluent Irrigation	W	(QxD)/L	mm/month	27	24	27	26	27	26	27	27	26	27	26	27	**319**
Inputs		RR+W	mm/month	74	65	65	77	88	87	91	99	98	100	88	74	**1006**
STORAGE CALCULATION																
age remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-132.5	-128.7	-107.9	-39.2	-12.5	-15.8	0.0	-4.0	-8.1	-39.5	-71.5	-117.3	**-308.1**
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Maximum Storage for Area	N		mm	0.00												
Total Volume of Storage	V	NxL	L	0												
LAND AREA REQUIRED FOR ZERO STORAGE			m^2	210	197	248	495	847	771	1236	1076	945	503	332	232	396

MINIMUM AREA REQUIRED FOR ZERO STORAGE:	####	m^2	LAND APPLICATION AREA FOR MOST LIMITING NUTRIENT	360	m2
			(Minimum area required within buffer setbacks)		

Appendix B 2 - Water and Nutrient Balance Calculations for Mound System, Secondary effluent- DLR 5mm/day, 5 Bedrooms

Irrigation Area sizing using Nominated Area Water Balance, Nutrient Balance & Storage Calculations

INPUT DATA	MOUND SYSTEM			**Model:** MAV, January 2014	**Assessor:** JR Lawrey MIEAust Reg. 142295
Design Wastewater Flow	Q	1080	L/day	Based on maximum potential occupancy and derived from Table 4 in EPA Code of Practice (2013).	
Effluent TN concentration	TN	25	mg/L	Crop N uptake 220 kg/ha/yr equal to 60 mgTN/m2.day. Phosphorus sorption capacity not limiting.	
Design Loading Rate	DLR	5.00	mm/day	Based on soil class permeability and derived from Table 9 in EPA Code of Practice (2013).	
Land Application Area	L	360	m sq	Sub-surface Drip Irrigation to AS/NZS 1547.	
Crop Factor	C	0.6 -0.8	unitless	Estimates of evapotranpiration as a fraction of pan evaporation; varies over season and crop type.	
Retained Rainfall	RF	0.7	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff.	
Rainfall Data	Rainfall for Buckley (mm)			90th% 763 50th% 612	
Evaporation Data	BOM evaporation Geelong			Station 087214	

Run-off coefficient for grassed areas: < 10% slope 0.90
> 10 % ...0.85, > 15 %...0.80, > 20% ...0.75 > 25%....0.70

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month (occupancy)	D	₩	days	31	28	31	30	31	30	31	31	30	31	30	31	**365**
Rainfall	R	₩	mm/month	42	36	34	45	54	54	57	64	64	65	55	42	**612**
Evaporation	E	₩	mm/month	191	181	149	91	66	72	53	70	77	107	134	172	**1363**
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	153	145	119	64	46	50	37	49	54	86	107	138	**1048**
Percolation	B	DIR x D	mm/month	155	140	155	150	155	150	155	155	150	155	150	155	**1825**
Outputs		ET+B	mm/month	308	285	274	214	201	200	192	204	204	241	257	293	**2873**
INPUTS																
Retained 70th % Rainfall	RR	R x RF	mm/month	37	31	30	39	47	47	50	56	56	57	48	37	**534**
Effluent Irrigation	W	(QxD)/L	mm/month	93	84	93	90	93	90	93	93	90	93	90	93	**1095**
Inputs		RR+W	mm/month	130	115	123	129	140	137	143	149	146	150	138	130	**1629**
STORAGE CALCULATION																
age remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-178.1	-169.4	-151.5	-84.4	-61.1	-63.3	-49.4	-55.1	-58.0	-90.9	-119.2	-162.9	**-634.2**
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Maximum Storage for Area	N		mm	0.00												
Total Volume of Storage	V	NxL	L	0												
LAND AREA REQUIRED FOR ZERO STORAGE			m^2	123	119	137	186	217	211	235	226	219	182	155	131	169

MINIMUM AREA REQUIRED FOR ZERO STORAGE: 235 m^2

LAND APPLICATION AREA FOR MOST LIMITING NUTRIENT 360 m2

(Minimum area required within buffer setbacks)

Appendix B 3 - Water and Nutrient Balance Calculations for Mound system, Primary effluent DLR 5mm/day, 5 Bedrooms

Irrigation Area sizing using Nominated Area Water Balance, Nutrient Balance & Storage Calculations

INPUT DATA	MOUND SYSTEM			Model:	MAV, January 2014	Assessor: JR Lawrey MIEAust Reg. 142295
Design Wastewater Flow	Q	1080	L/day	Based on maximum potential occupancy and derived from Table 4 in EPA Code of Practice (2013).		
Effluent TN concentration	TN	35	mg/L	Crop N uptake 220 kg/ha/yr equal	60	mgTN/m2.day. Phosphorus sorption capacity not limiting.
Design Loading Rate	DLR	5.00	mm/day	Based on soil class permeability and derived from Table 9 in EPA Code of Practice (2013).		
Land Application Area	L	504	m sq	Sub-surface Drip Irrigation to AS/NZS 1547.		
Crop Factor	C	0.6 -0.8	unitless	Estimates of evapotranpiration as a fraction of pan evaporation; varies over season and crop type.		
Retained Rainfall	RF	0.7	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff.		
Rainfall Data	Rainfall for Buckley (mm)			90th% 763 50th% 612		
Evaporation Data	BOM evaporation Geelong			Station 087214		

Run-off coefficient for grassed areas: < 10% slope 0.90
> 10 % ...0.85, > 15 %...0.80, > 20% ...0.75 > 25%....0.70

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month (occupancy)	D	₩	days	31	28	31	30	31	30	31	31	30	31	30	31	365
Rainfall	R	₩	mm/month	42	36	34	45	54	54	57	64	64	65	55	42	612
Evaporation	E	₩	mm/month	191	181	149	91	66	72	53	70	77	107	134	172	1363
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	153	145	119	64	46	50	37	49	54	86	107	138	1048
Percolation	B	DIR x D	mm/month	155	140	155	150	155	150	155	155	150	155	150	155	1825
Outputs		ET+B	mm/month	308	285	274	214	201	200	192	204	204	241	257	293	2873
INPUTS																
Retained 70th % Rainfall	RR	R x RF	mm/month	37	31	30	39	47	47	50	56	56	57	48	37	534
Effluent Irrigation	W	(QxD)/L	mm/month	66	60	66	64	66	64	66	66	64	66	64	66	782
Inputs		RR+W	mm/month	103	91	96	104	114	111	116	122	120	123	112	103	1316
STORAGE CALCULATION																
ge remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-204.7	-193.4	-178.1	-110.1	-87.6	-89.0	-75.9	-81.7	-83.8	-117.4	-144.9	-189.5	-815.9
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Storage for Area	N		mm	0.00												
Total Volume of Storage	V	NxL	L	0												
LAND AREA REQUIRED FOR ZERO STORAGE			m^2	123	119	137	186	217	211	235	226	219	182	155	131	169

MINIMUM AREA REQUIRED FOR ZERO STORAGE: 235 m^2

LAND APPLICATION AREA FOR MOST LIMITING NUTRIENT 504 m2
(Minimum area required within buffer setbacks)

Appendix B 4 - Water and Nutrient Balance Calculations for LPED system, Primary DLR 2.5mm/day – 4 Bedrooms

Irrigation Area sizing using Nominated Area Water Balance, Nutrient Balance & Storage Calculations

INPUT DATA	LPED IRRIGATION			Model: MAV, January 2014	Assessor: JR Lawrey MIEAust Reg. 142295
Design Wastewater Flow	Q	900	L/day	Based on maximum potential occupancy and derived from Table 4 in EPA Code of Practice (2013).	
Effluent TN concentration	TN	30	mg/L	Crop N uptake 220 kg/ha/yr equal to 60 mgTN/m2.day. Phosphorus sorption capacity not limiting.	
Design Irrigation Rate	DIR	2.50	mm/day	Based on soil class permeability and derived from Table 9 in EPA Code of Practice (2013).	
Land Application Area	L	551	m sq	Sub-surface Drip Irrigation to AS/NZS 1547.	
Crop Factor	C	0.6 –0.8	unitless	Estimates of evapotranpiration as a fraction of pan evaporation; varies over season and crop type.	
Retained Rainfall	RF	0.9	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff.	
Rainfall Data	Rainfall for Buckley (mm)			90th% 763 50th% 612	
Evaporation Data	BOM evaporation Geelong			Station 087214	

Run-off coefficient for grassed areas: < 10% slope 0.90
> 10 % ...0.85, > 15 %...0.80, > 20% ...0.75 > 25%....0.70

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month (occupancy)	D	₩	days	31	28	31	30	31	30	31	31	30	31	30	31	365
Rainfall	R	₩	mm/month	42	36	34	45	54	54	57	64	64	65	55	42	612
Evaporation	E	₩	mm/month	191	181	149	91	66	72	53	70	77	107	134	172	1363
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	153	145	119	64	46	50	37	49	54	86	107	138	1048
Percolation	B	DIR x D	mm/month	78	70	78	75	78	75	78	78	75	78	75	78	913
Outputs		ET+B	mm/month	230	215	197	139	124	125	115	127	129	163	182	215	1960
INPUTS																
Retained 70th % Rainfall	RR	R x RF	mm/month	47	40	38	50	61	61	64	72	72	73	62	47	687
Effluent Irrigation	W	(QxD)/L	mm/month	51	46	51	49	51	49	51	51	49	51	49	51	596
Inputs		RR+W	mm/month	98	86	89	100	111	110	115	122	121	124	111	98	1283
STORAGE CALCULATION																
age remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	–132.5	–128.7	–107.9	–39.2	–12.5	–15.8	0.0	–4.0	–8.1	–39.5	–71.5	–117.3	–308.1
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Storage for Area	N		mm	0.00												
Total Volume of Storage	V	NxL	L	0												
LAND AREA REQUIRED FOR ZERO STORAGE			m^2	152	144	176	306	442	417	551	510	473	309	224	166	258

MINIMUM AREA REQUIRED FOR ZERO STORAGE: 551 m^2

LAND APPLICATION AREA FOR MOST LIMITING NUTRIENT 360 m2

(Minimum area required within buffer setbacks)

APPENDIX C – GYPSUM ADDITION, SOIL AMELIORATION

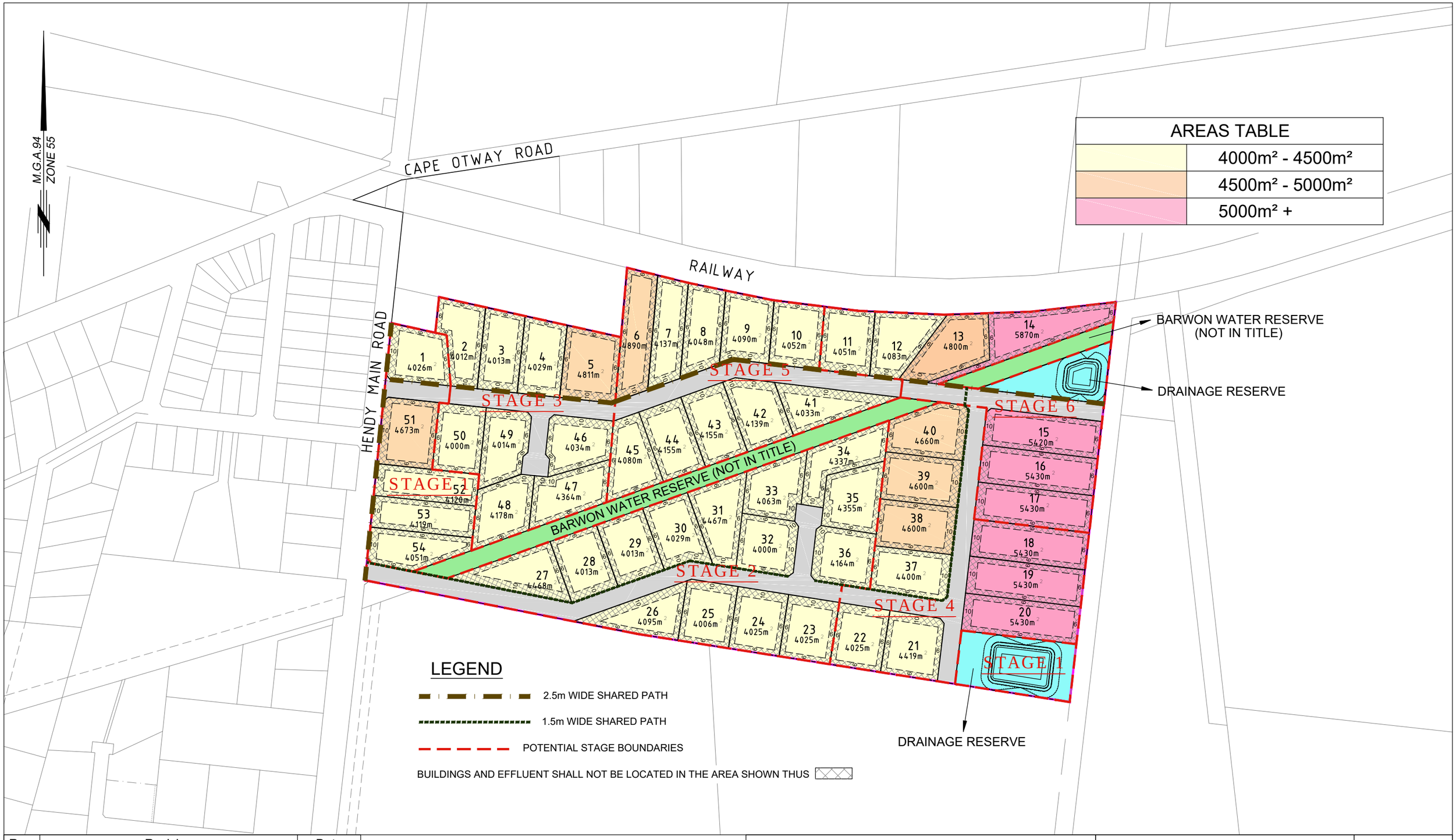
RECOMMENDED DIRECTIONS OF USE FOR SOILS FOUND TO BE DISPERSIVE @ 1 kg/m2

Soil type	Coverage	Repeat applications	Frequency
Clay soils	200 m2	Clay soils & High sodium soils	Once every 3 years when septic tank is desludged, add 2 litres to pump well.
High sodium soils	400m2		
Loamy soils	800m2		

for general maintenance and to boost calcium and sulfur levels.

Note: 2 litres of liquid *eco-flo gypsum* equal to 80 kg powdered gypsum.

APPENDIX D – PLAN OF SUBDIVISION LAYOUT



Rev.	Revision	Date
-	-	-

TGM Group Geelong
1/27-31 Myers Street (PO Box 1137)
Geelong Vic 3220
T 03 5202 4600
F 03 5202 4691
ABN 11 125 568 461
www.tgmgroup.com
Melbourne I Geelong I Ballarat
JAS-ANZ Accredited: Quality ISO 9001 - OH&S AS/NZS 4801 - Environment ISO 14001

PROPOSED BUILDING ENVELOPES PLAN

HENDY MAIN ROAD
MORIAC

WENDY & JOHN EARLE

Job Number: 11811-05
Sheet: 1 of 1
Date of Survey: N/A

Date of Issue
27/06/16

LENGTHS ARE IN METRES
40 0 40 80 120 160 200
1:4000

At Size
A3

Survey: N/A | **Drawn:** RD/BG | **Checked:** CM

DWG: **11811-05-BE01V1** REV: **1**

ATTACHMENT 2

Barwon Water Report

Barwon Water

DBYD Job No.: 10270129 **DBYD Sequence No.:** 50782190

11/02/2016

TGM Group
Level 1, 27 - 31 Myers Street
Geelong VIC 3220

Attention – Miss Nicole Dixon

Dial Before You Dig Enquiry - 815 Hendy Main Road, Moriac

Thank you for your recent Dial Before You Dig enquiry.

Please find attached plans detailing the location and information of Barwon Water assets in the enquiry area. These plans have been produced to the best of Barwon Water's knowledge and records at the time of the request.

Barwon Water assets must be located by hand excavation before any:

- mechanical excavation or
- underground boring.

Care must be taken when excavating near bends and fittings on pressure pipelines to ensure thrust blocks are not disturbed.

The plans provided only detail Barwon Water-owned water, recycled water and sewerage pipelines. Barwon Water suggests you locate any privately owned water, recycled water and sewerage pipelines not detailed on the attached plans (for example, house connections).

IMPORTANT NOTICE

If the proposed work is within six (6) metres of any main 300mm or greater in diameter, you MUST notify Barwon Water's Operations department of the exact nature and extent of the work. Please email is-ops-dbyd@barwonwater.vic.gov.au

You will be contacted within three (3) business days if it is determined the work may impact the Barwon Water asset.

Barwon Water will not be responsible for any damage caused. If you damage any asset, you must immediately telephone Barwon Water on 1300 656 007.

The replacement of bedding around pipes, trench backfill and minimum pipe clearance standards must be completed as per the Water Services Association Water Supply and Sewerage Codes of Australia.

For further information, please telephone Barwon Water on 1300 656 007 or email info@barwonwater.vic.gov.au

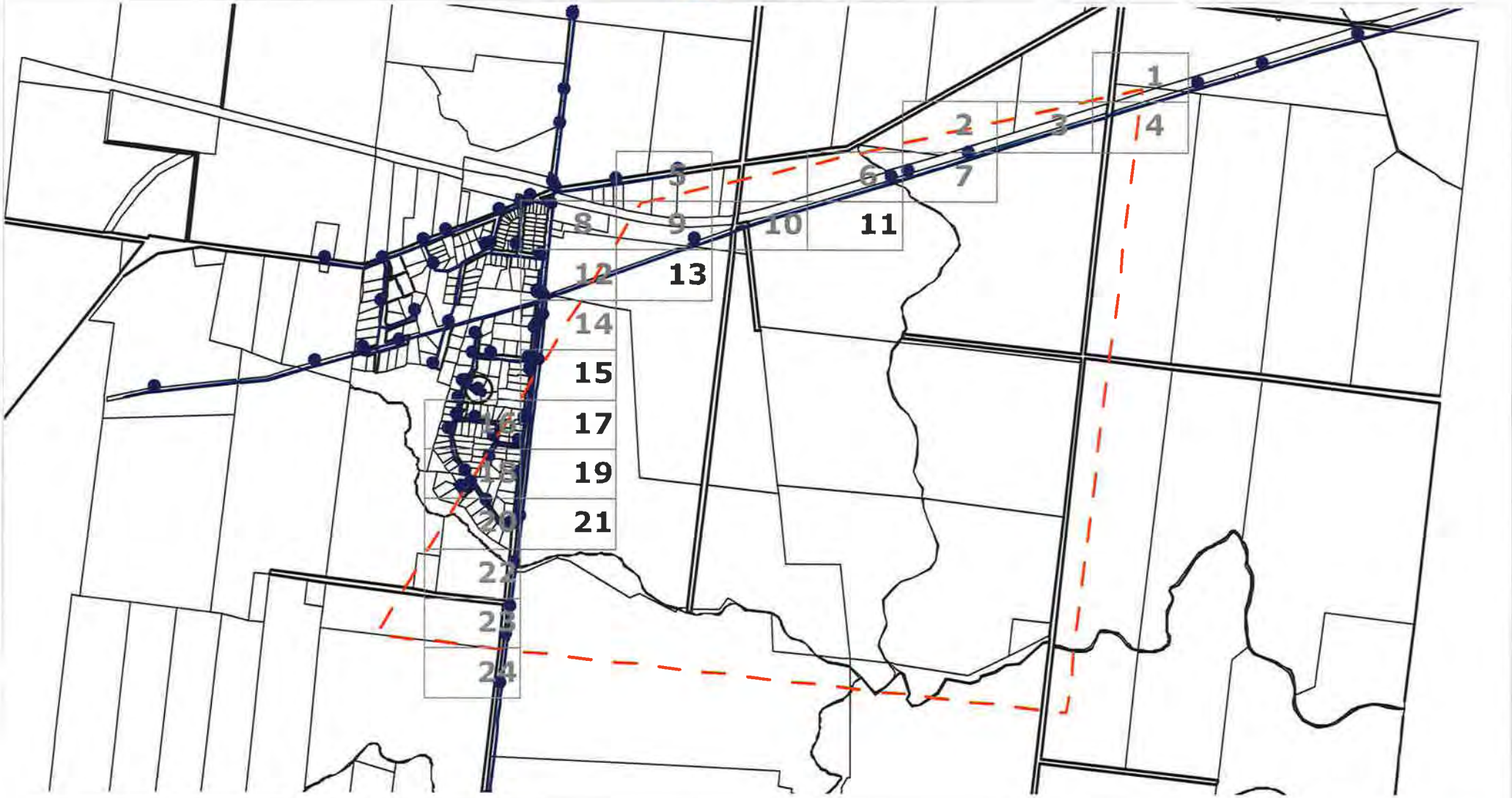
Barwon Region Water Corporation
ABN 86 348 316 514

P.O. Box 659, Geelong, Victoria, 3220 TEL: 1300 656 007 FAX: +61 3 5221 8236

www.barwonwater.vic.gov.au

Water Assets

Sequence No: 50782190
Location: 815 Hendy Main Road, Moriac, VIC 3240
Date: 11/02/2016



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N

Water Assets

Pipe
Decom Pipe
Fitting
Offset 2.0
Serv Connection
Fire Serv Connection

Recycled Water Assets

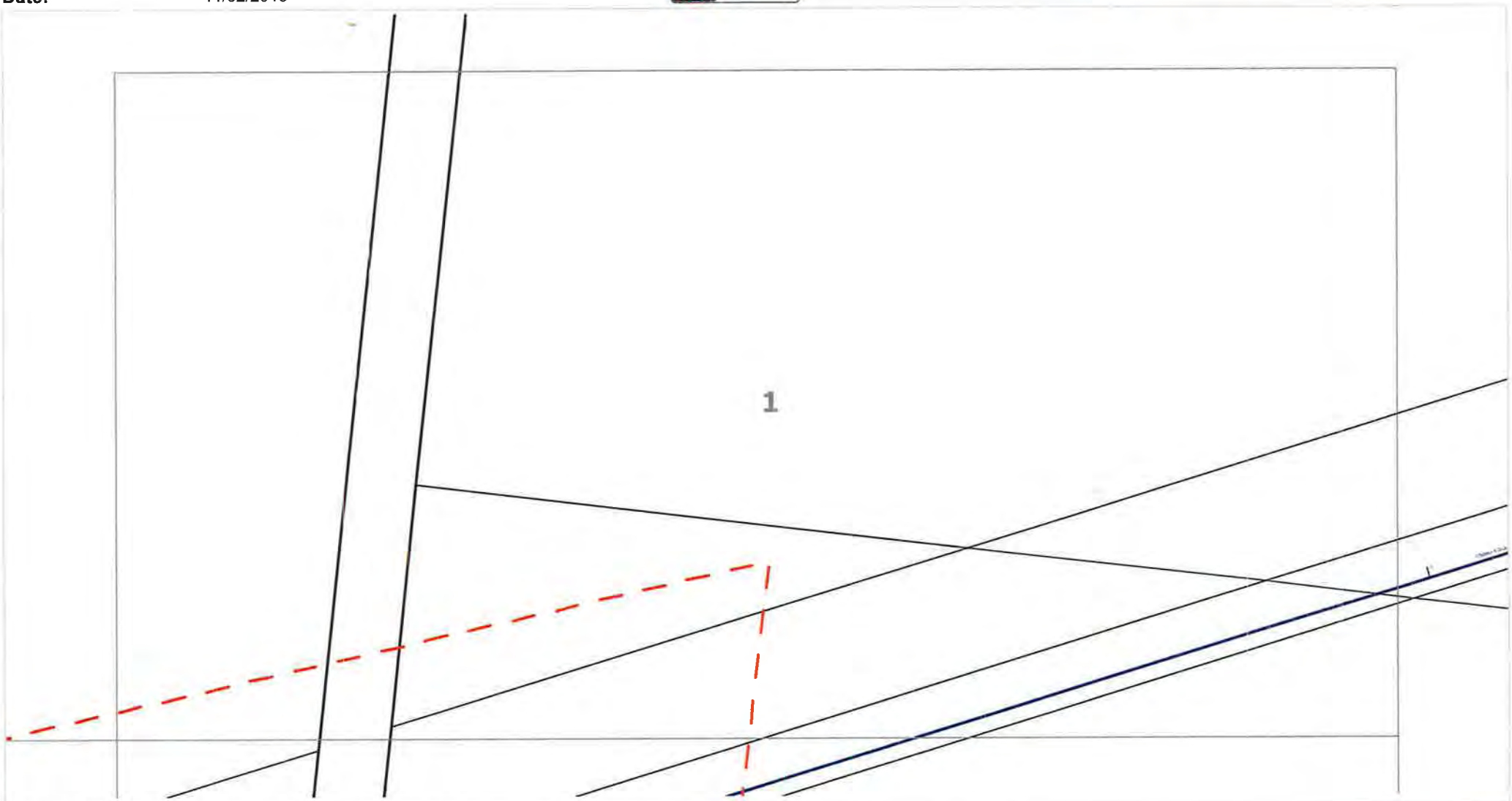
Pipe
Decom Pipe
Fitting
Offset 2.0
Service Connection

OH&S Hazards

Cracked AC Pipes exist. Exercise Caution

Water Assets

Sequence No: 50782190
Location: 815 Hendy Main Road, Moriac, VIC 3240
Date: 11/02/2016



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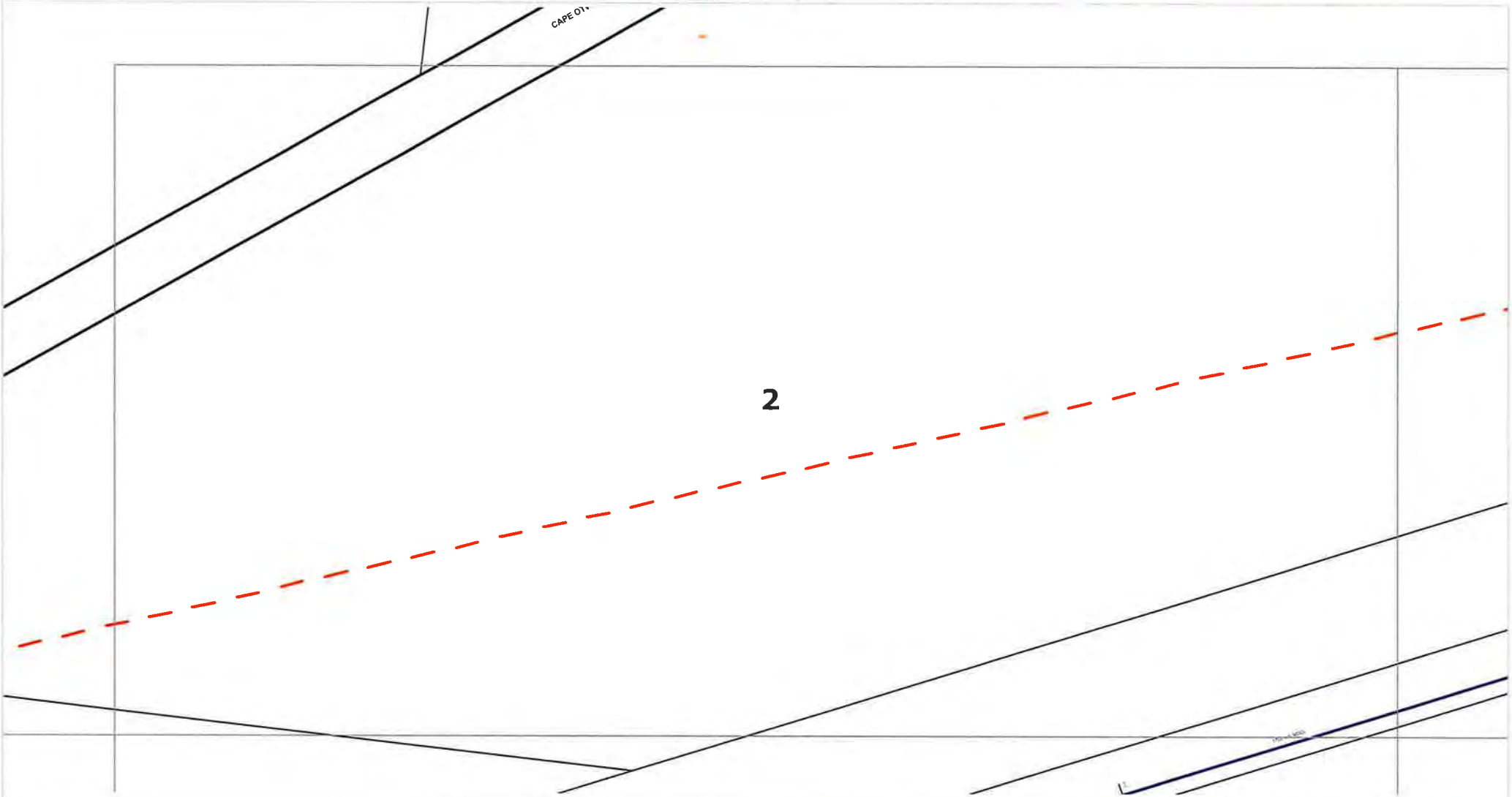

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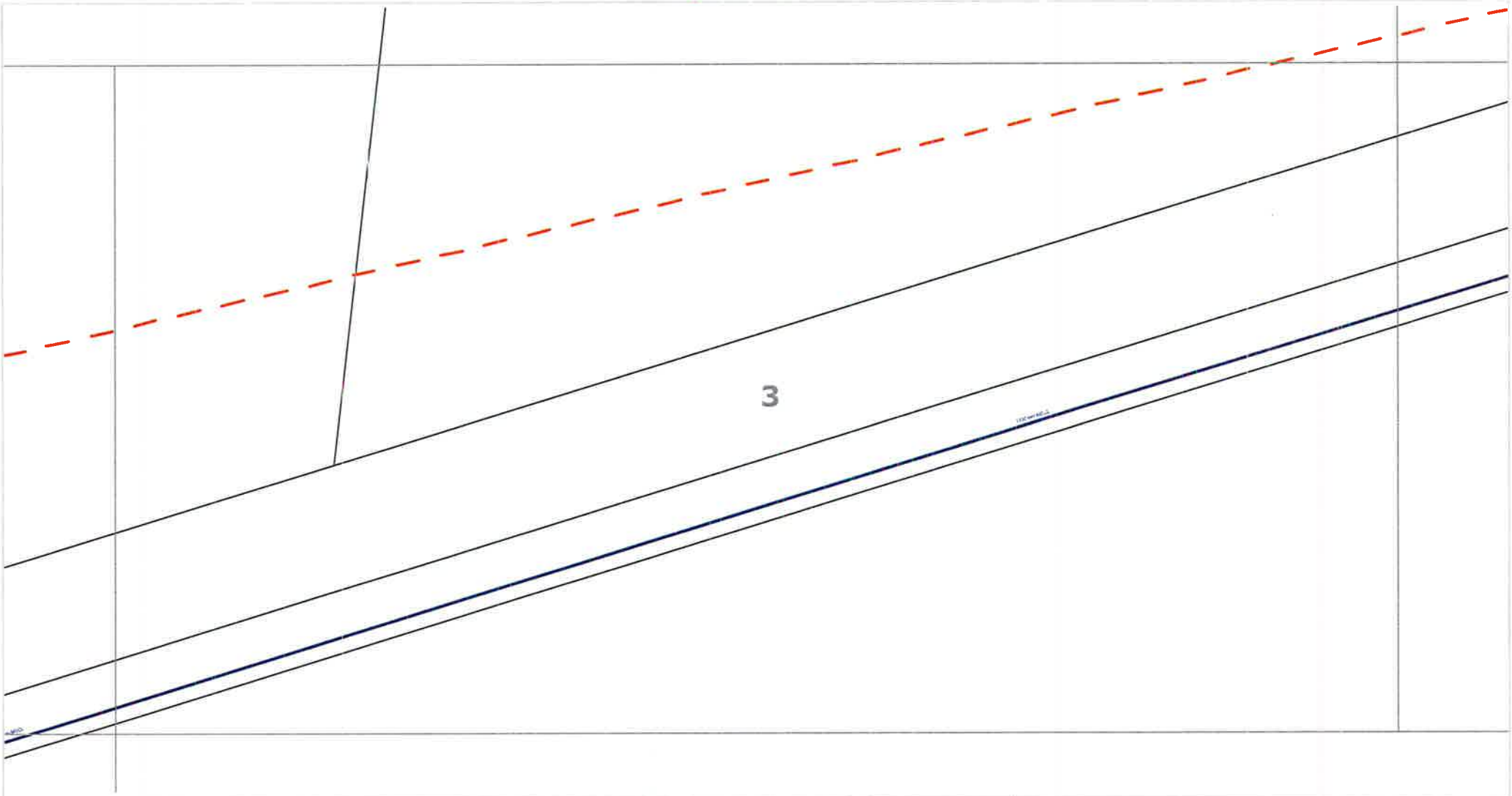

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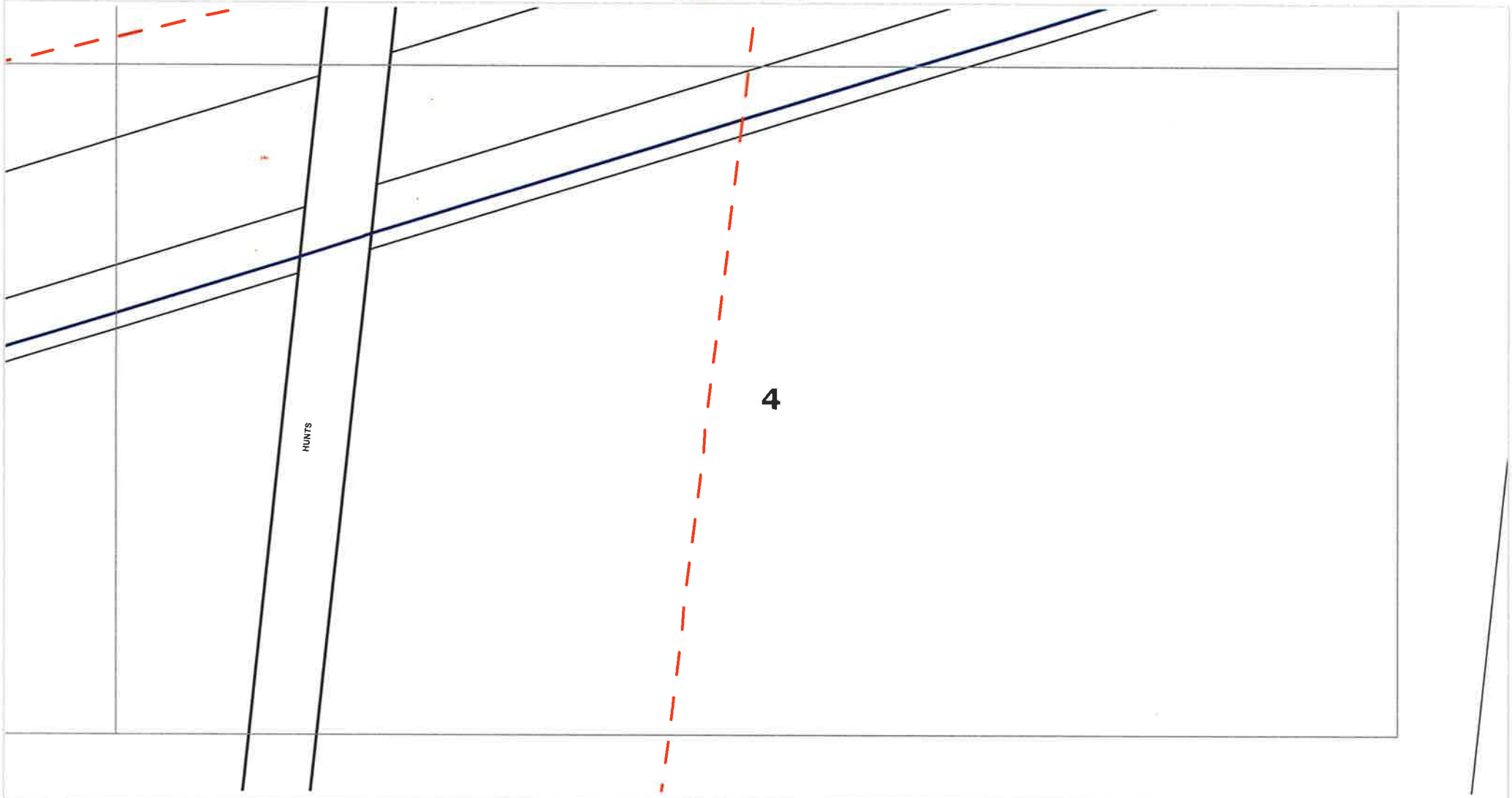

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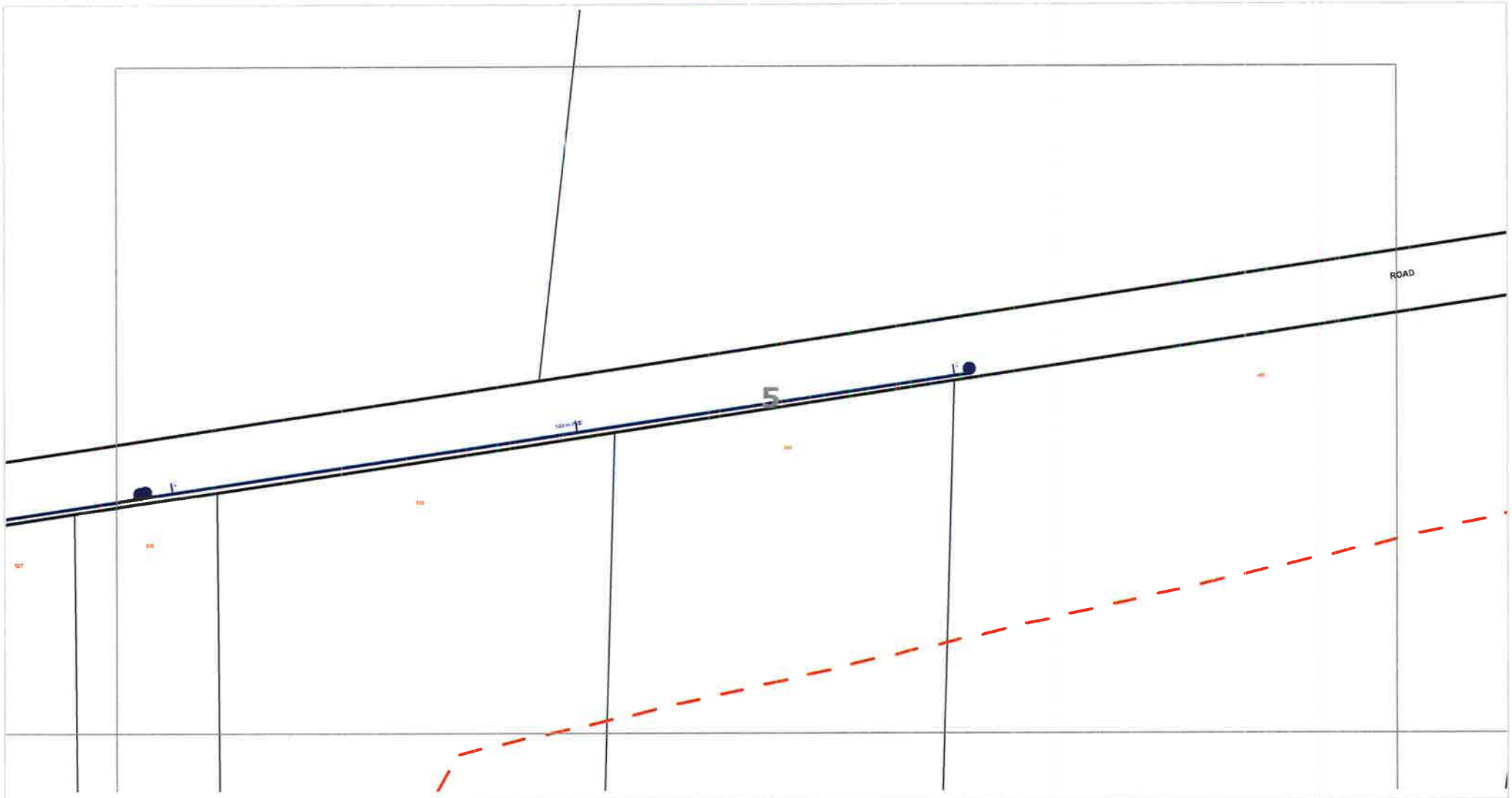

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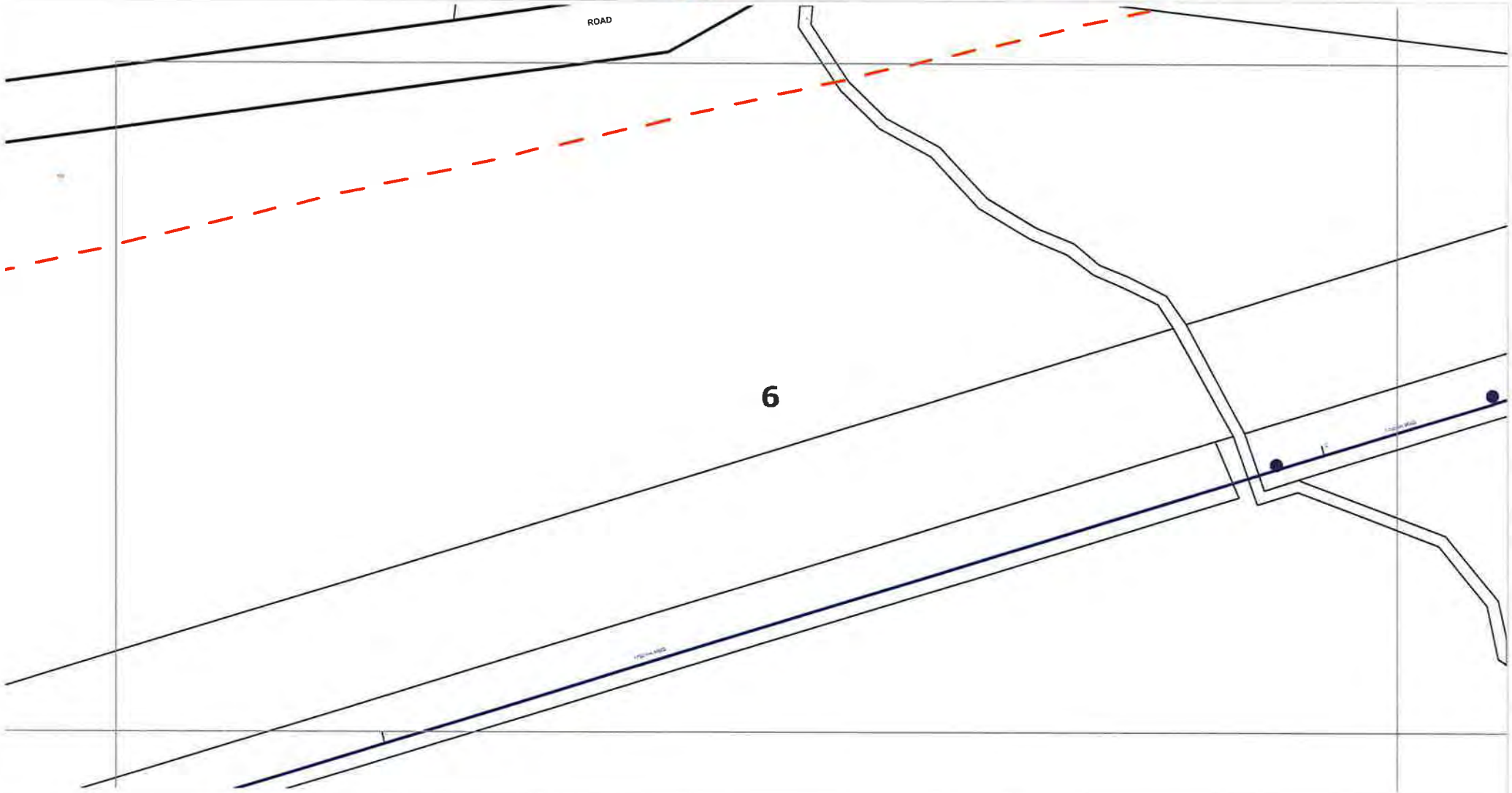

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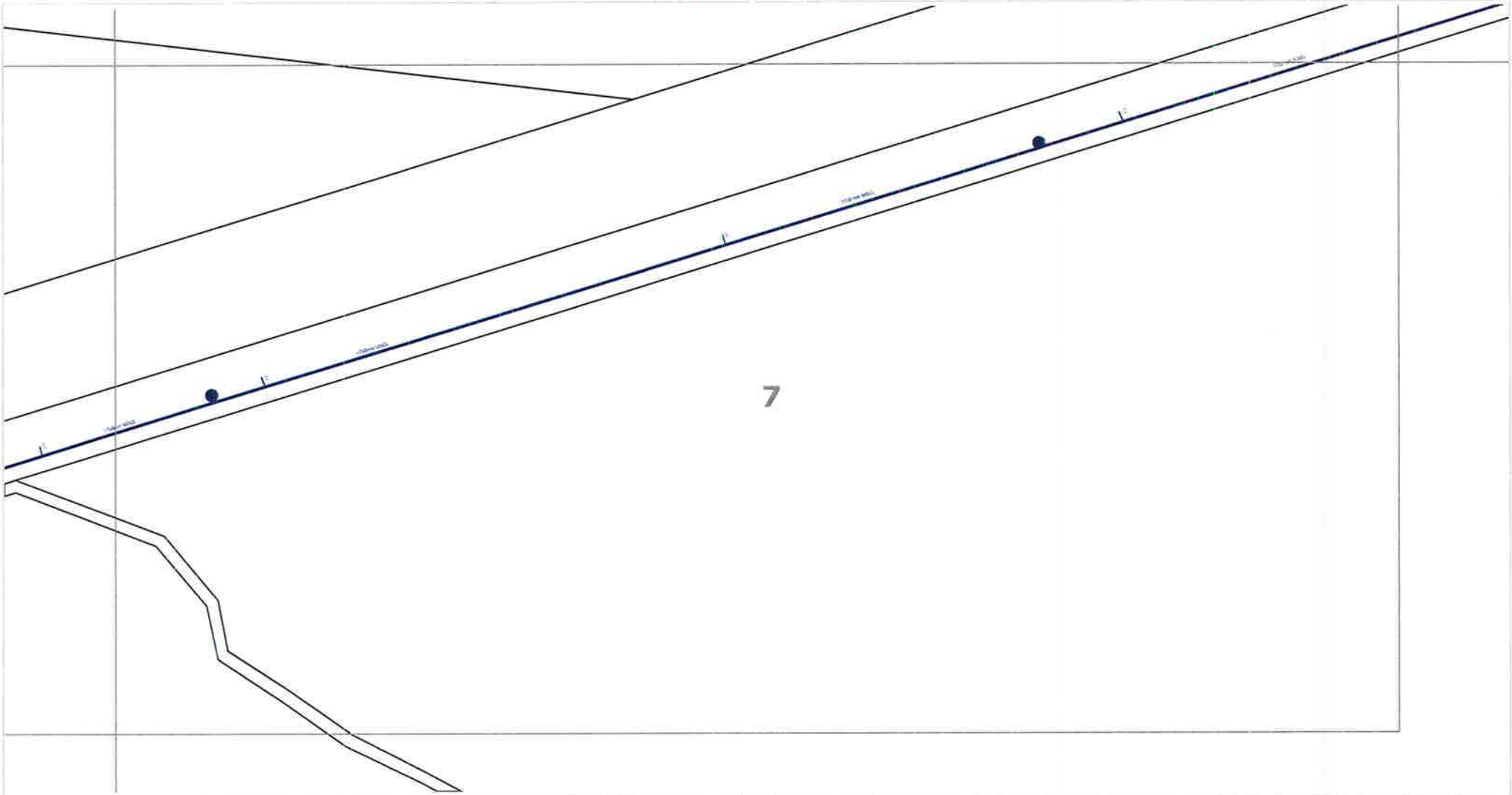

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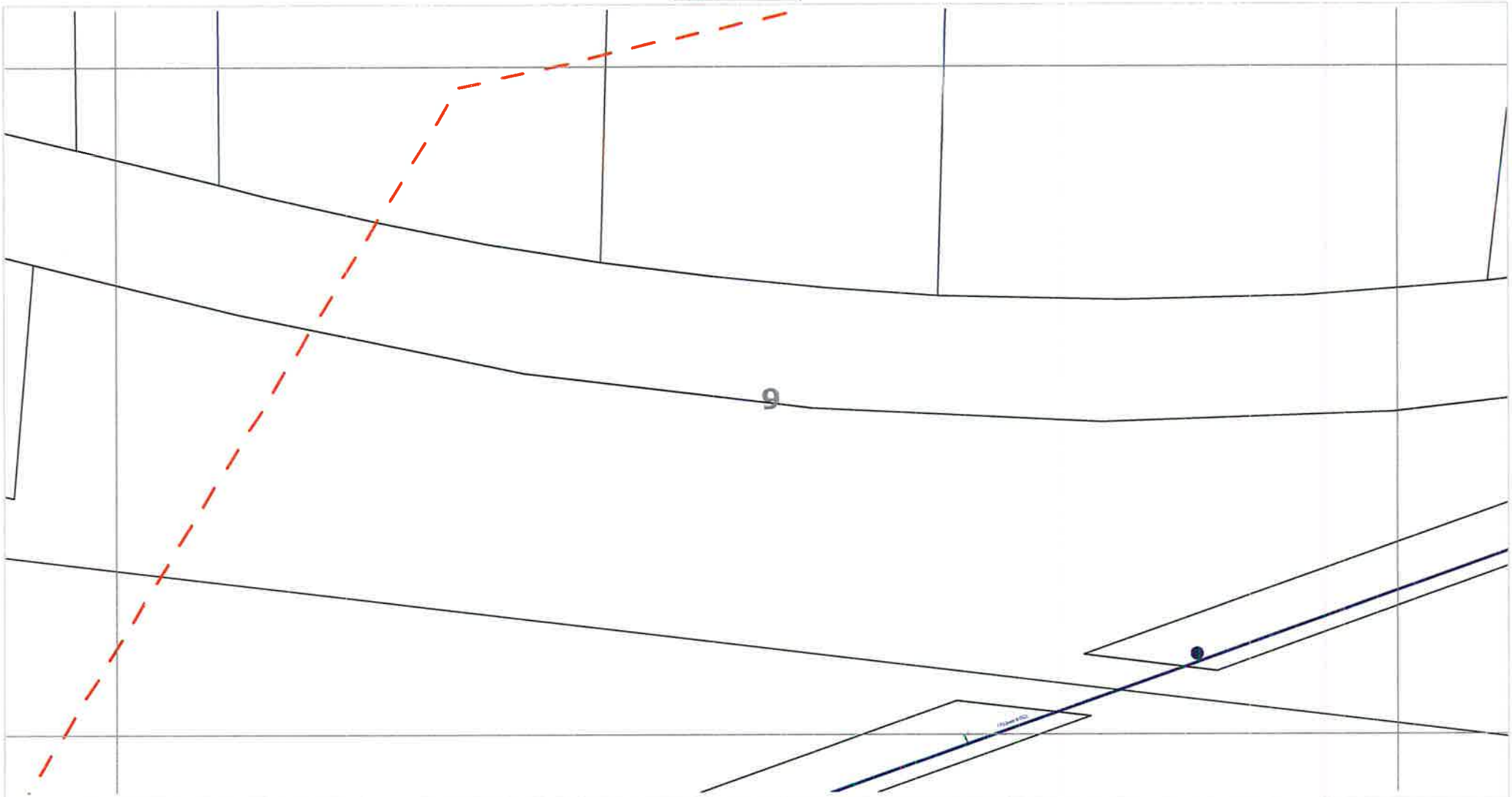
Date: 11/02/2016



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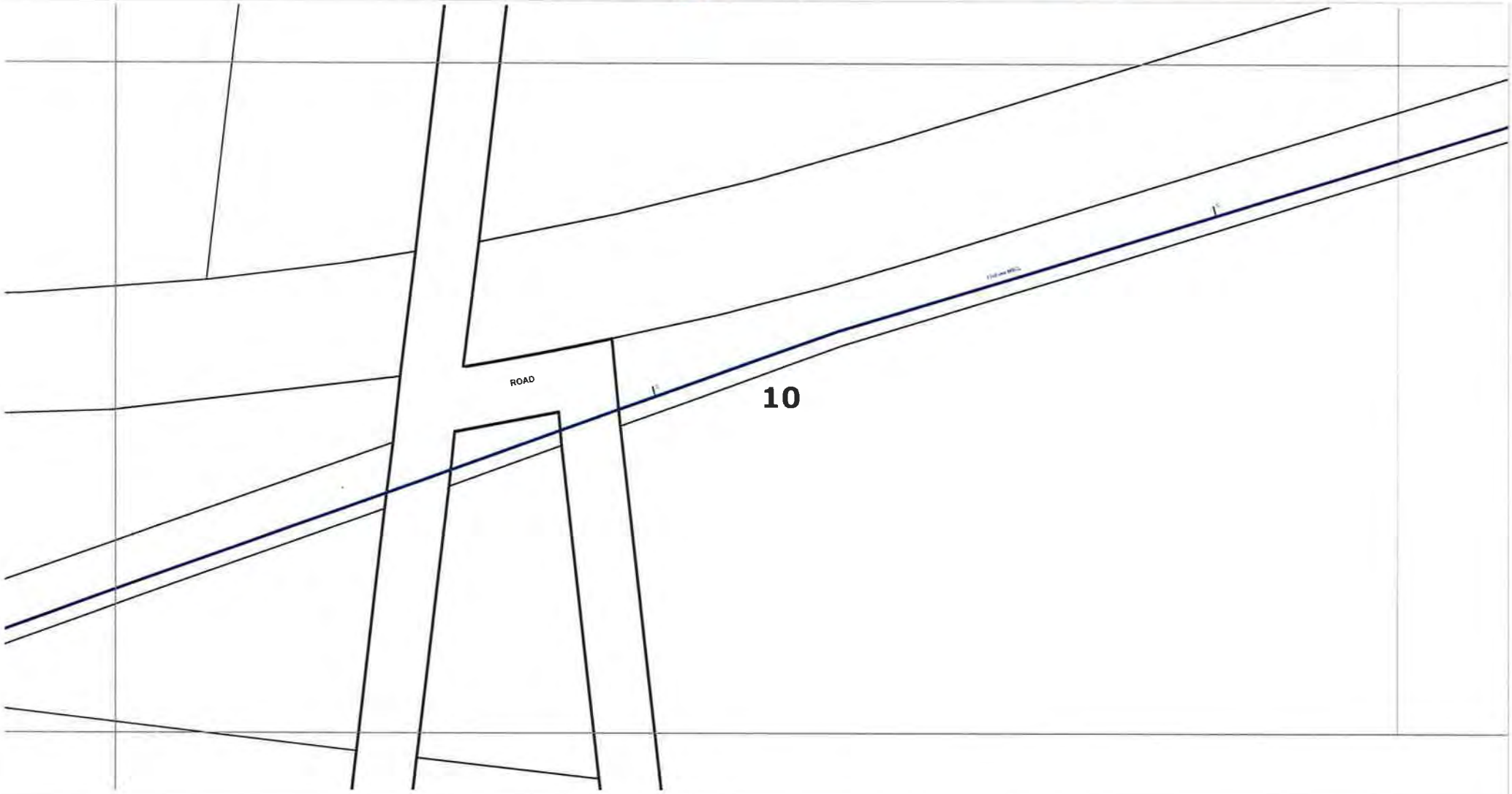
Date: 11/02/2016



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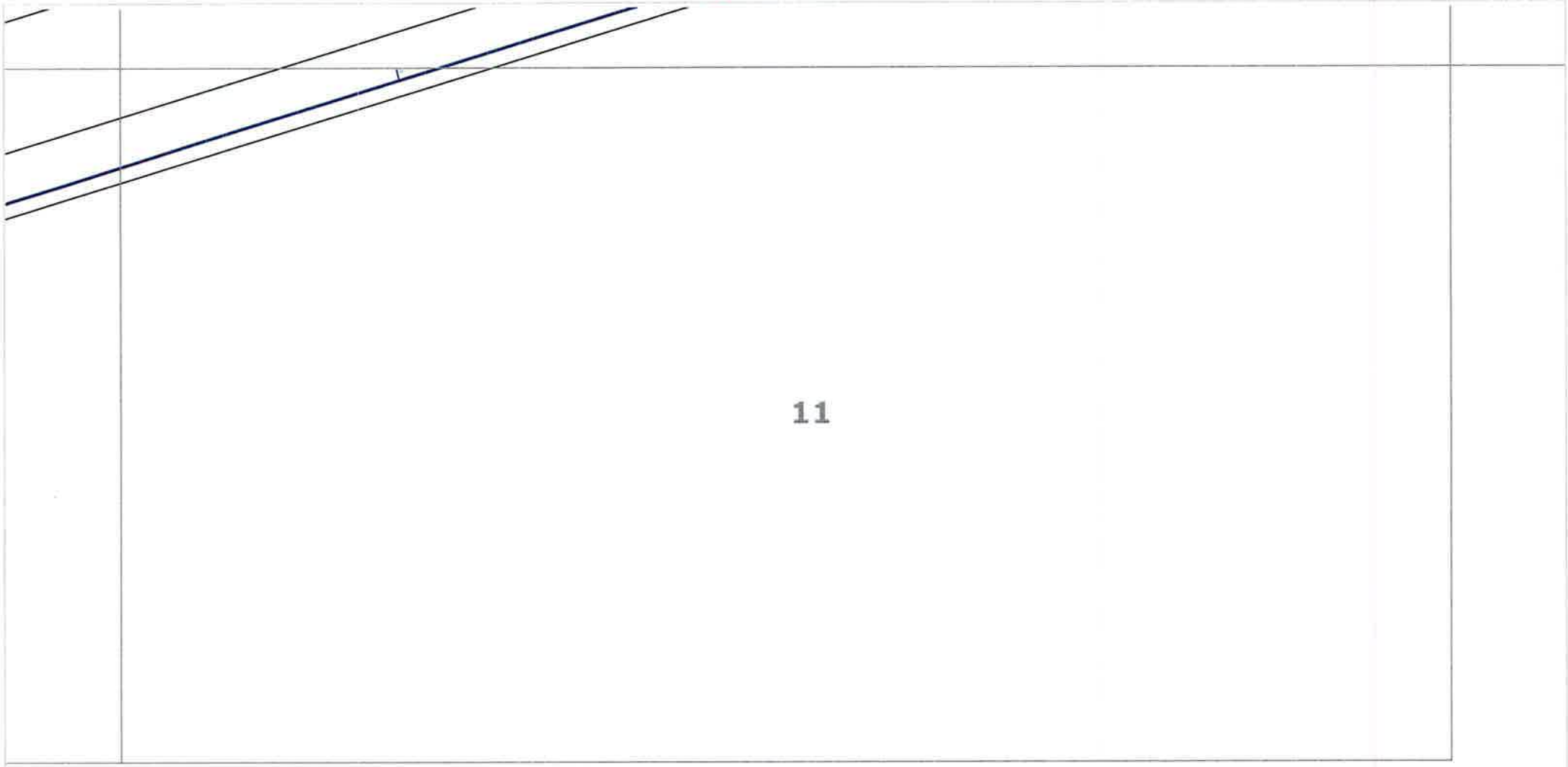
Location: 815 Hendy Main Road, Moriac, VIC 3240
Date: 11/02/2016



N

Water Assets

Pipe
Decom Pipe
Fitting
Offset 2.0
Serv Connection
Fire Serv Connection

Recycled Water Assets

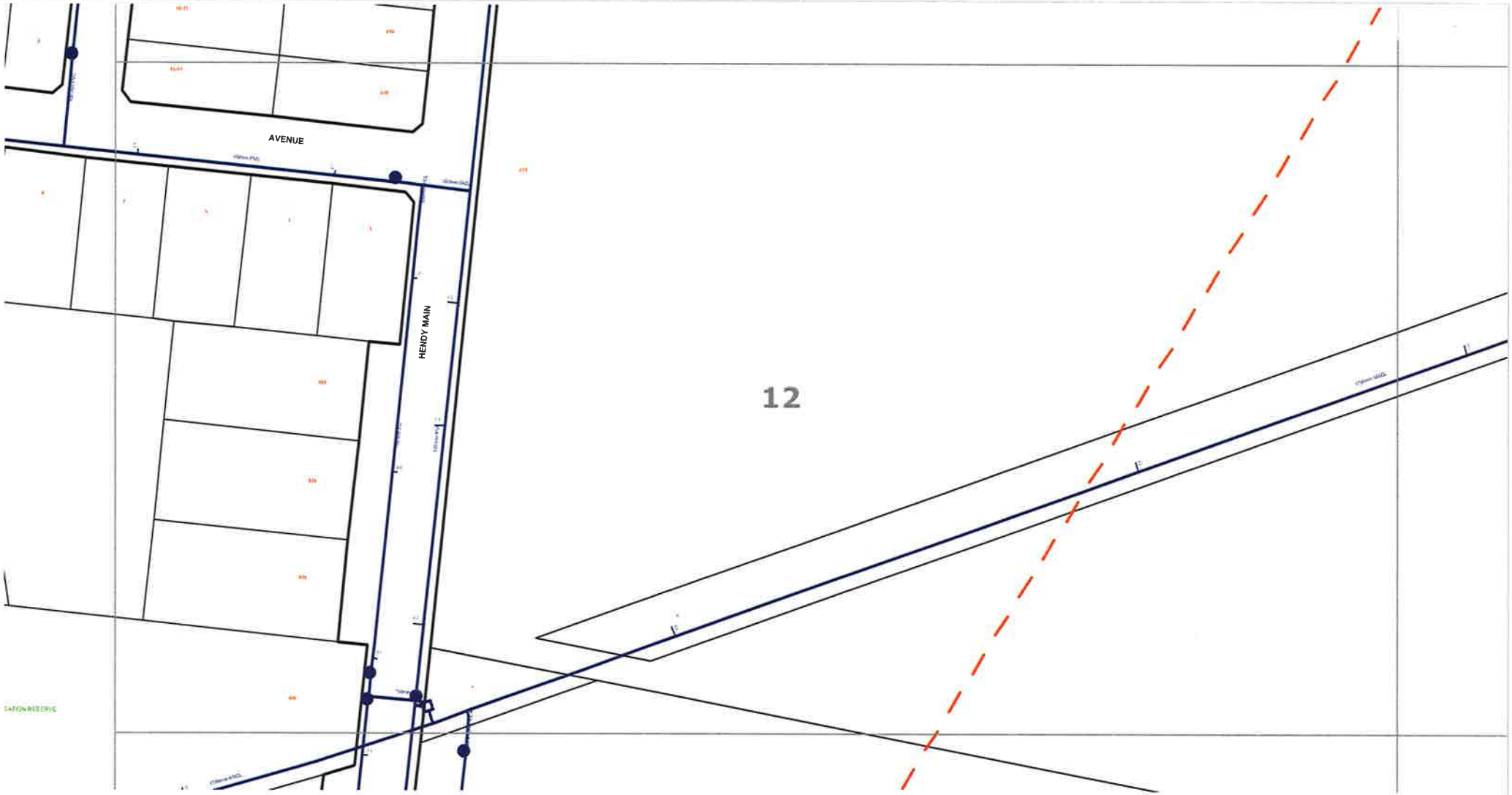
Pipe
Decom Pipe
Fitting
Offset 2.0
Service Connection

OH&S Hazards

Cracked AC Pipes exist. Exercise Caution

Water Assets

Sequence No: 50782190
Location: 815 Hendy Main Road, Moriac, VIC 3240
Date: 11/02/2016



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N

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Fitting
Offset 2.0
Serv Connection
Fire Serv Connection

Recycled Water Assets

Pipe
Decom Pipe
Fitting
Offset 2.0
Service Connection

OH&S Hazards

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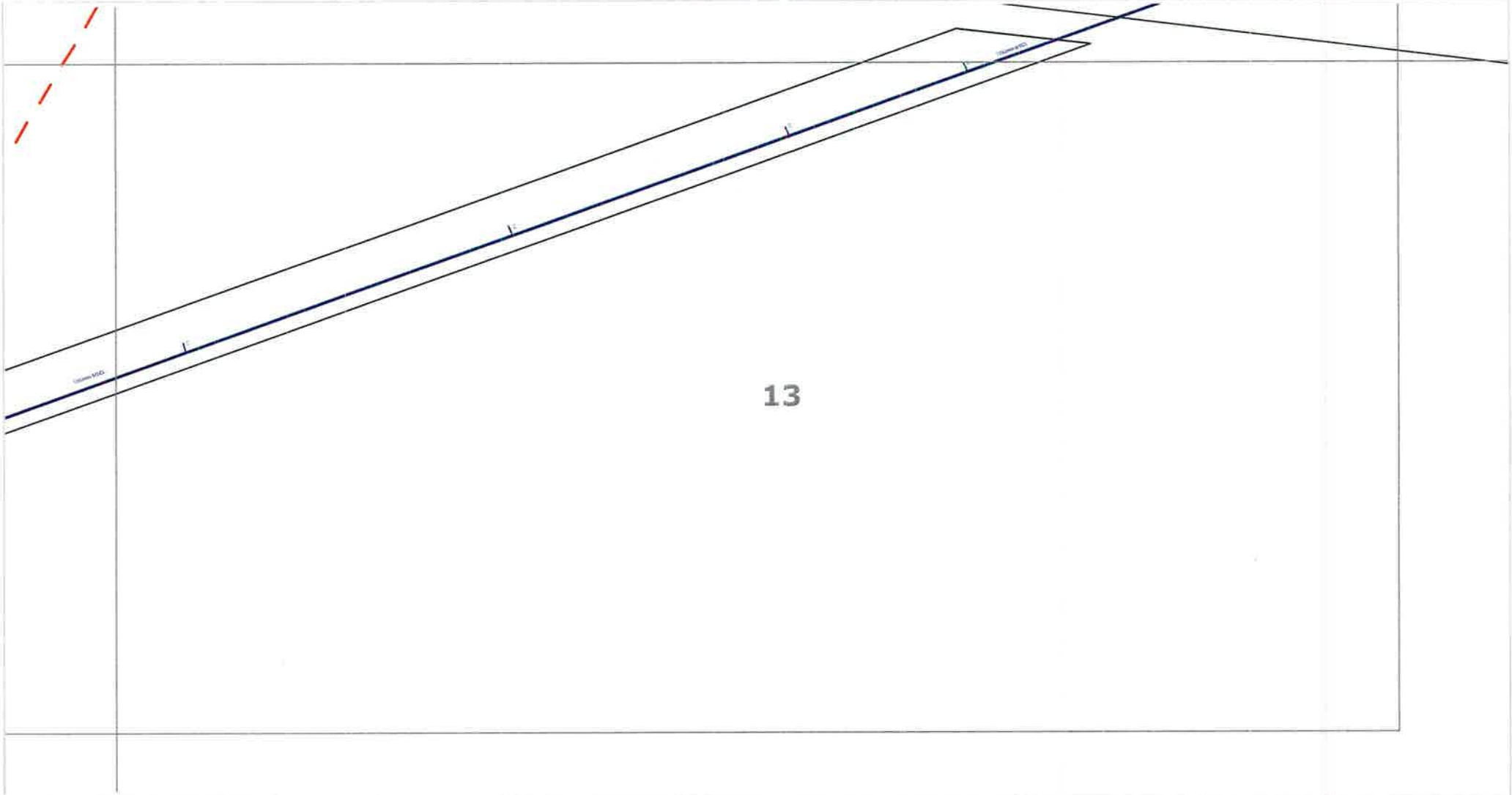
Water Assets

Sequence No: 50782190
Location: 815 Hendy Main Road, Moriac, VIC 3240
Date: 11/02/2016



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OH&S Hazards

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Water Assets

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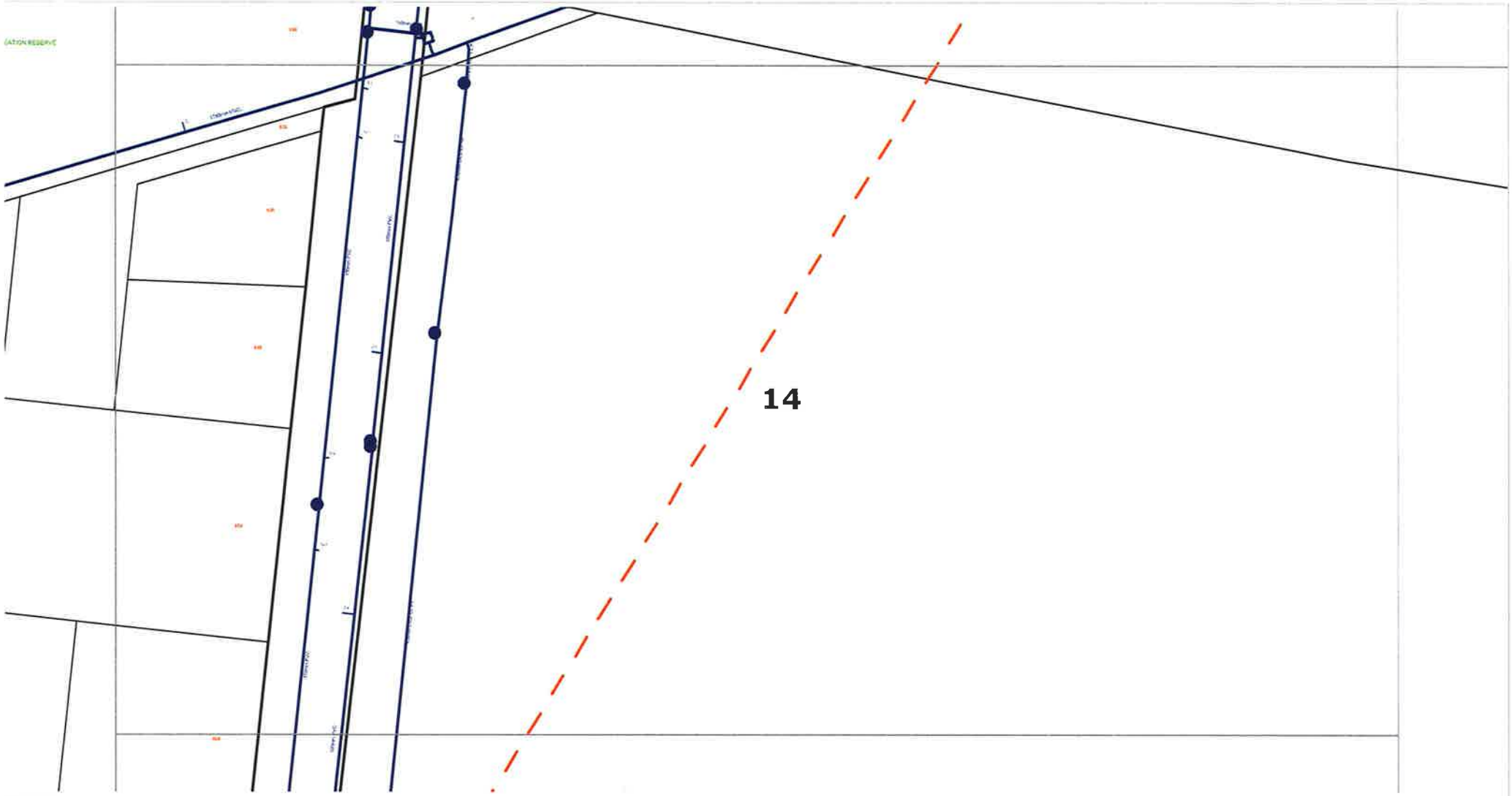

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Recycled Water Assets

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Cracked AC Pipes exist.
Exercise Caution

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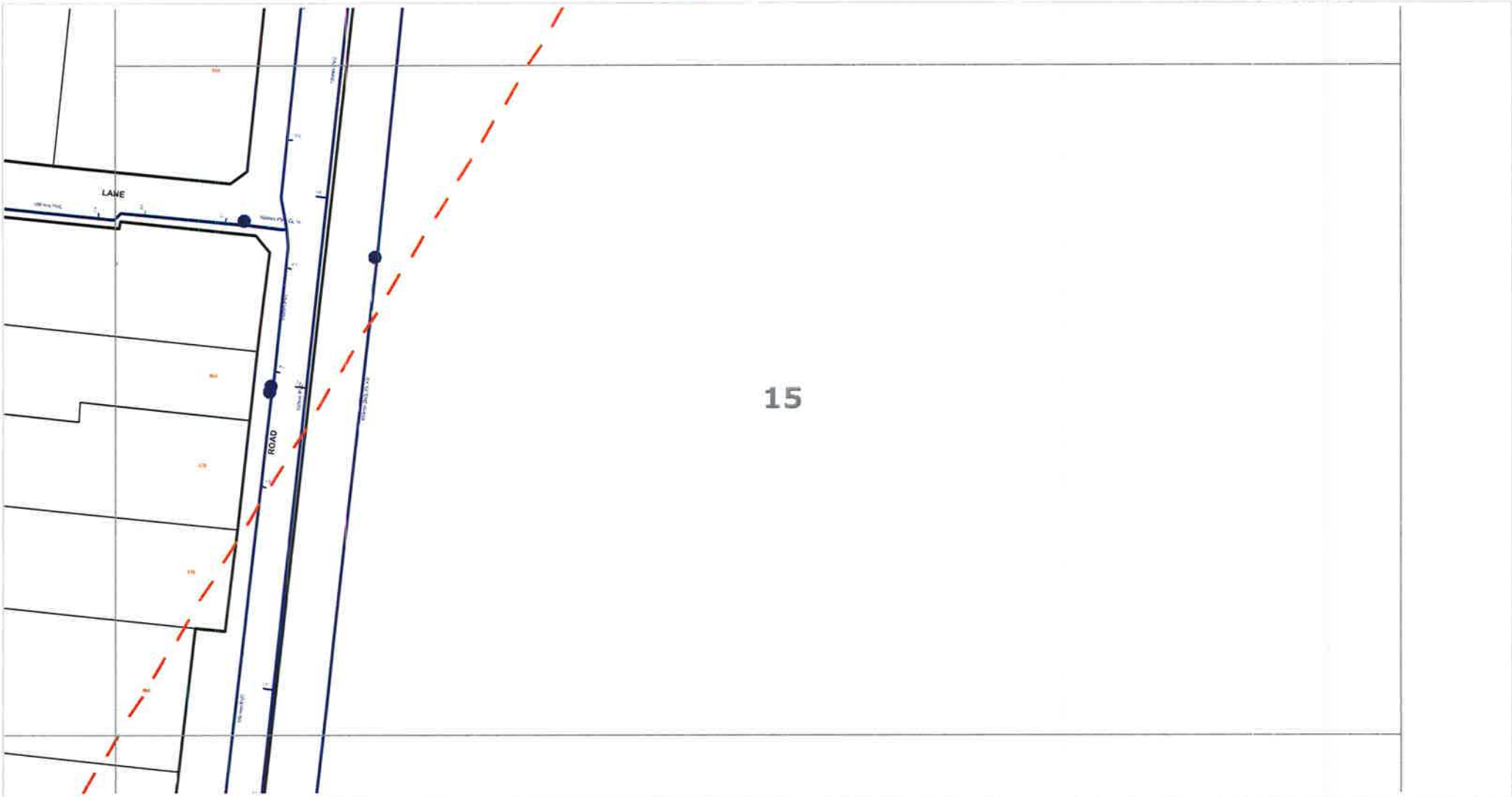

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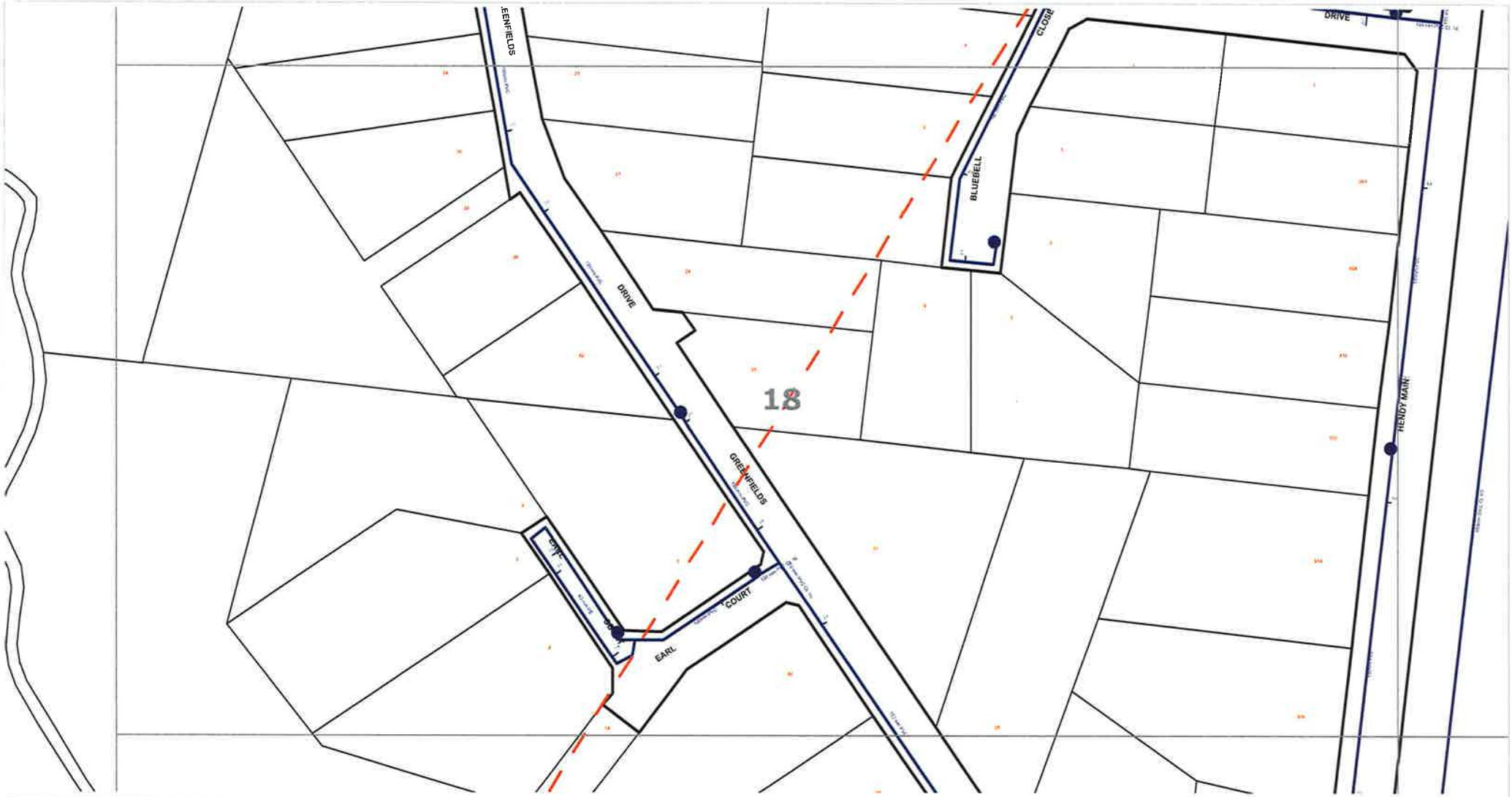
DIAL BEFORE YOU DIG www.1100.com.au

Barwon Water



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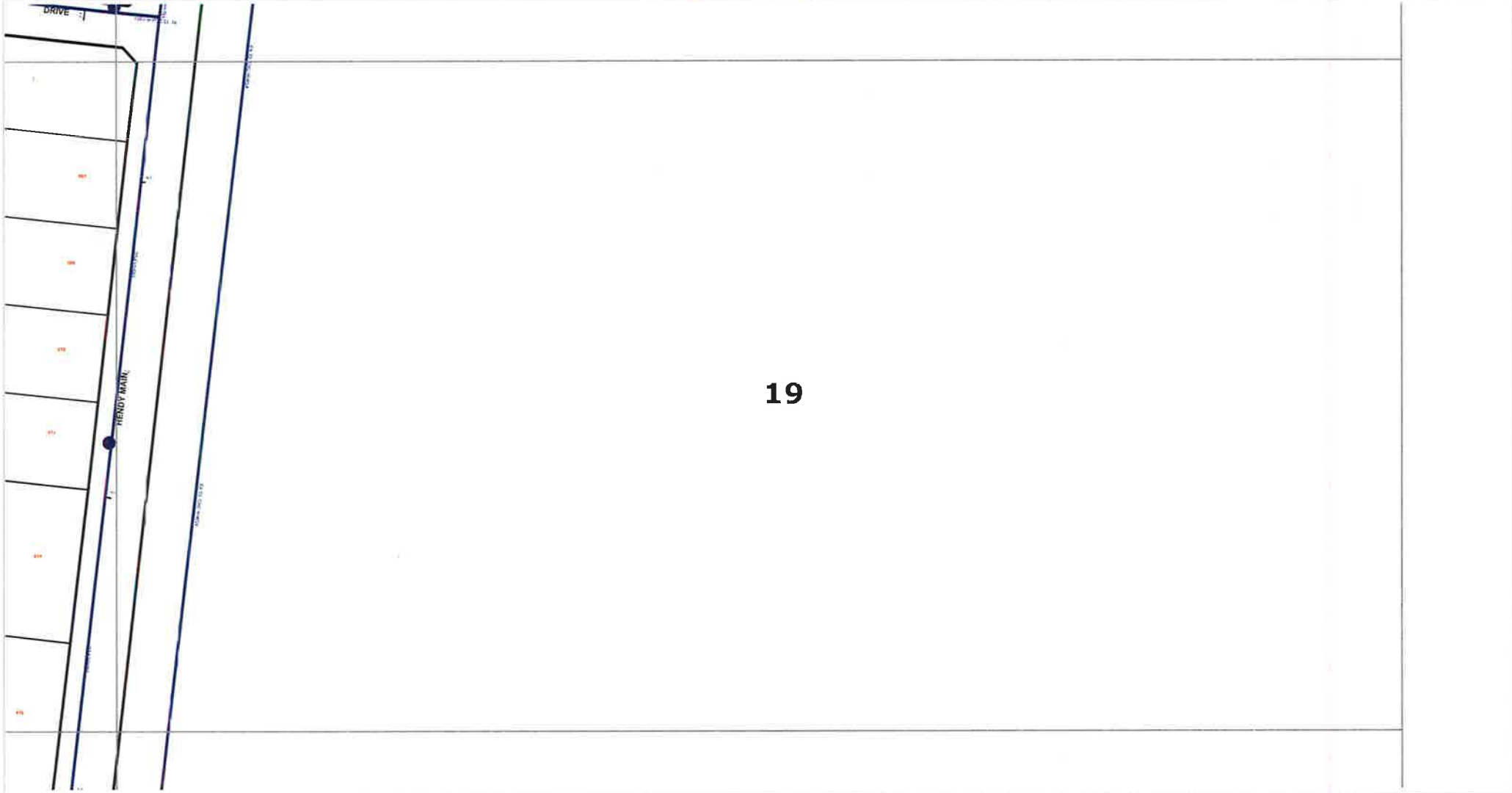

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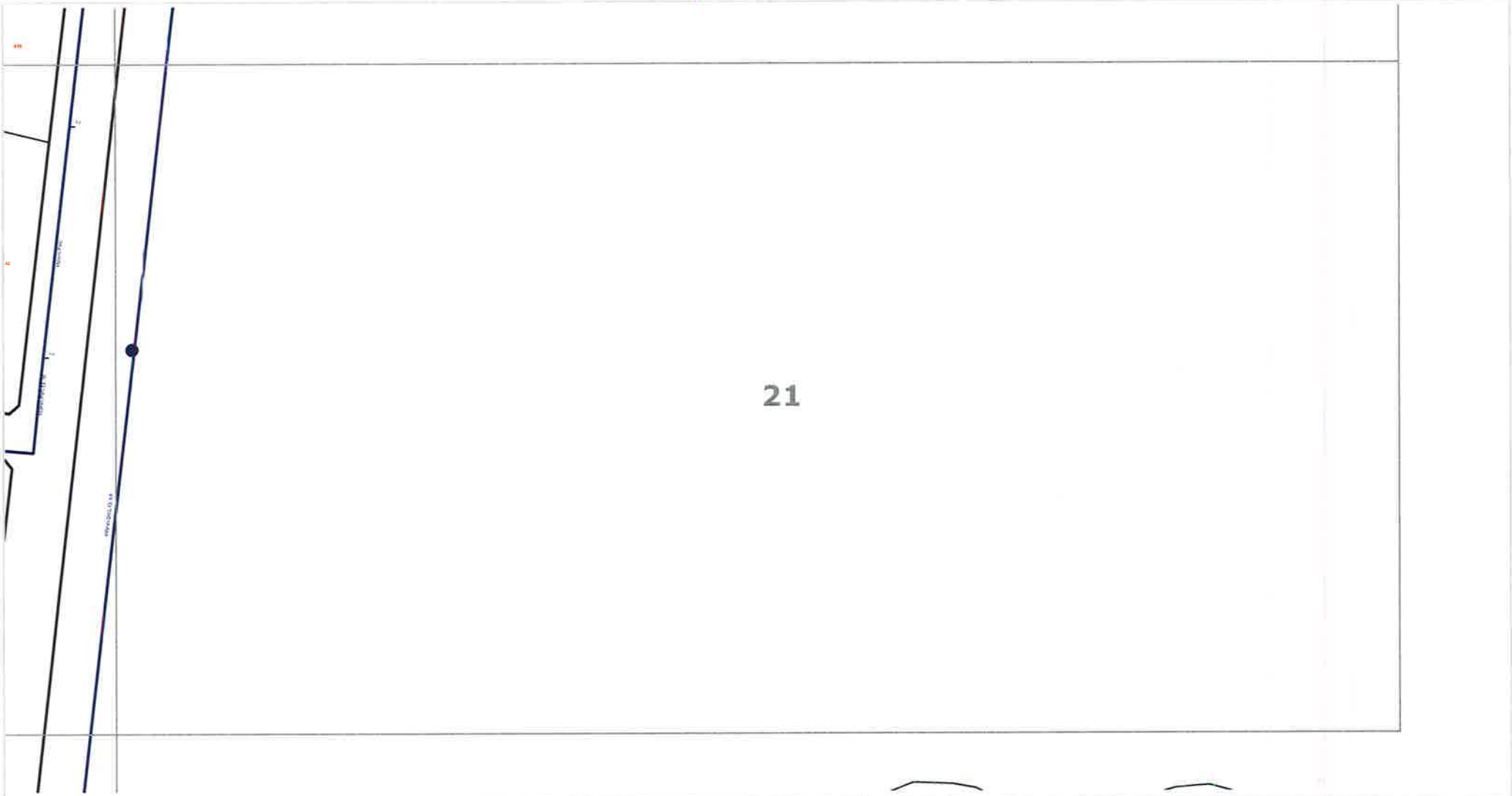

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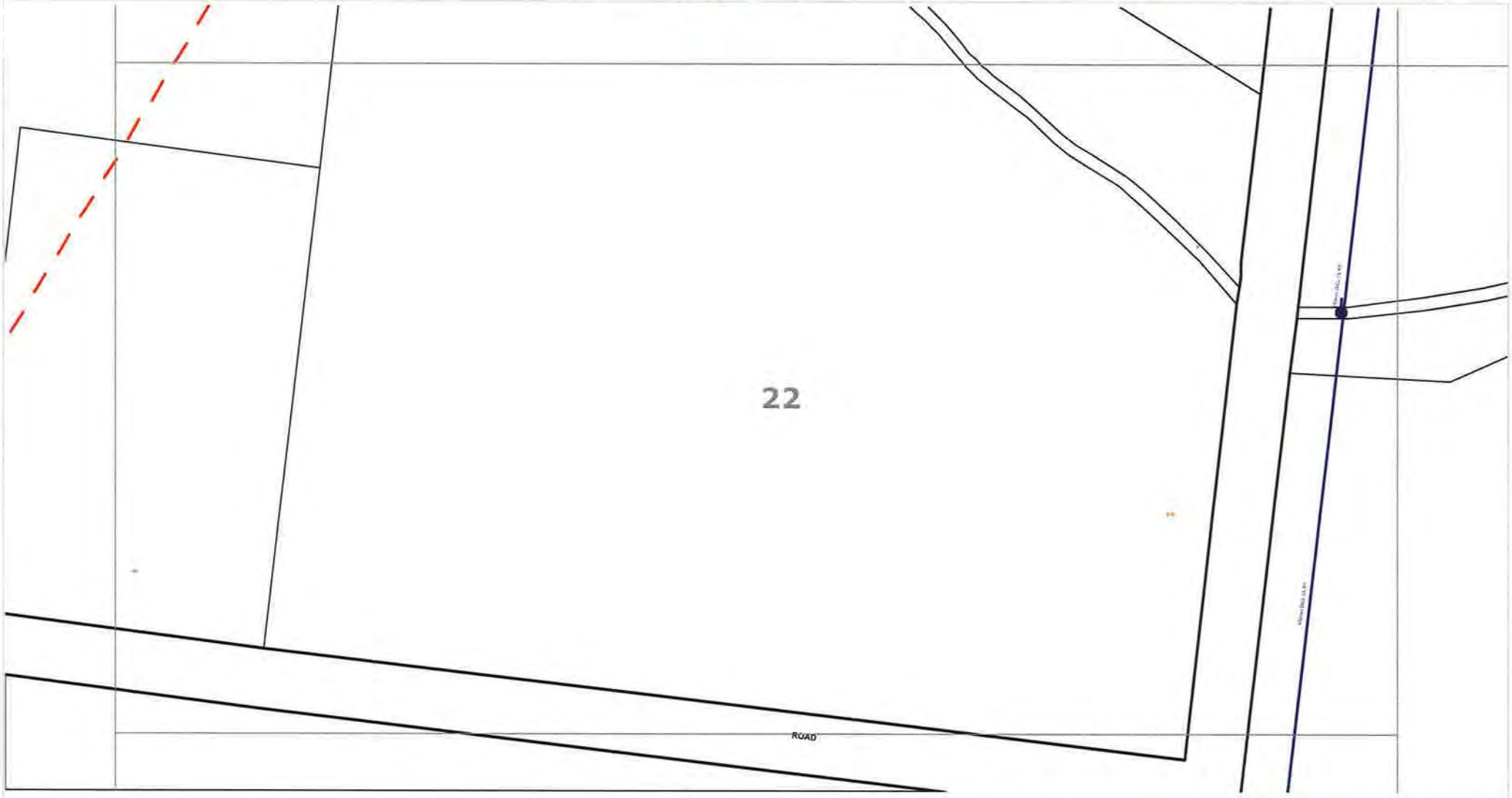

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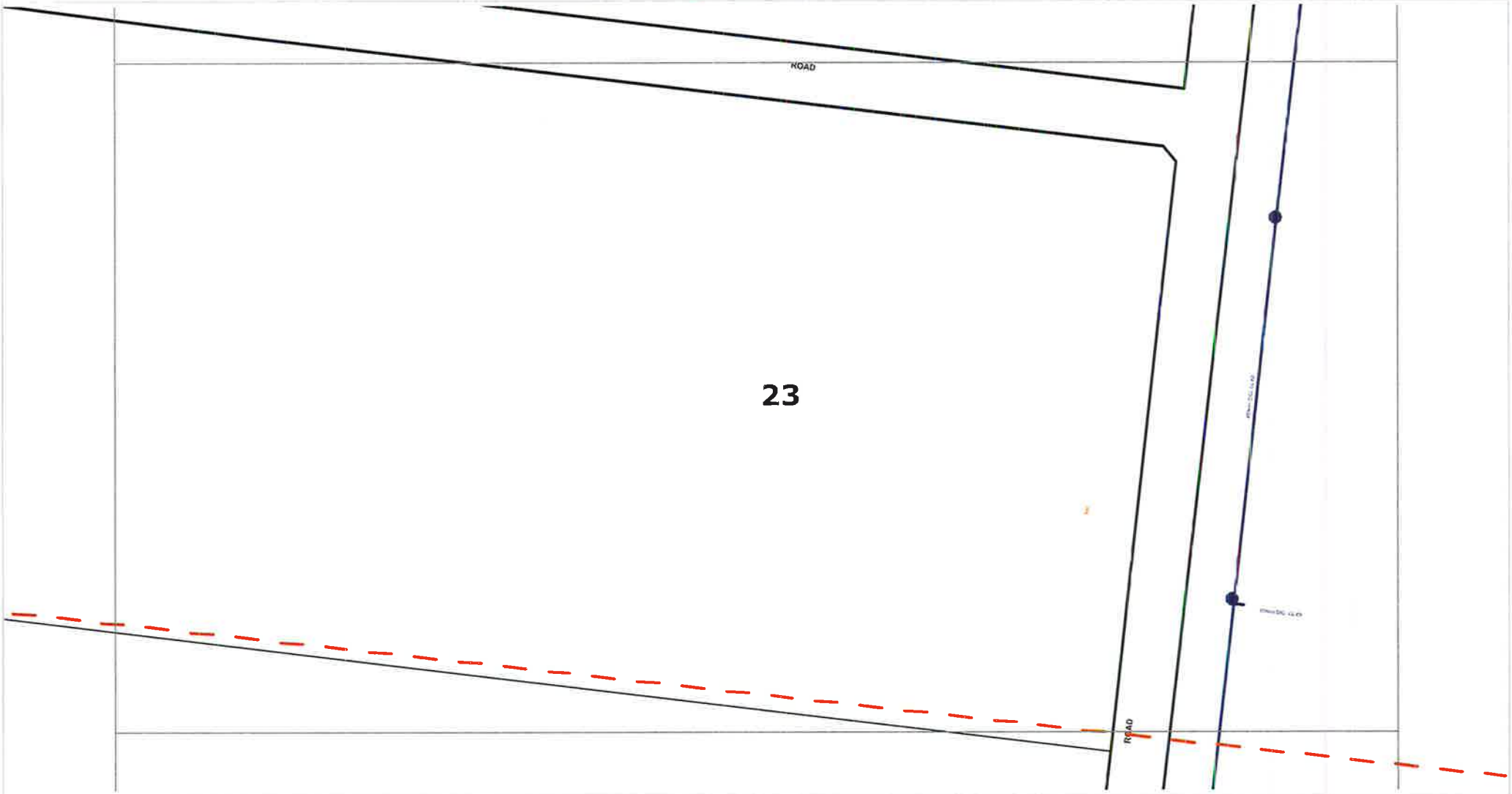

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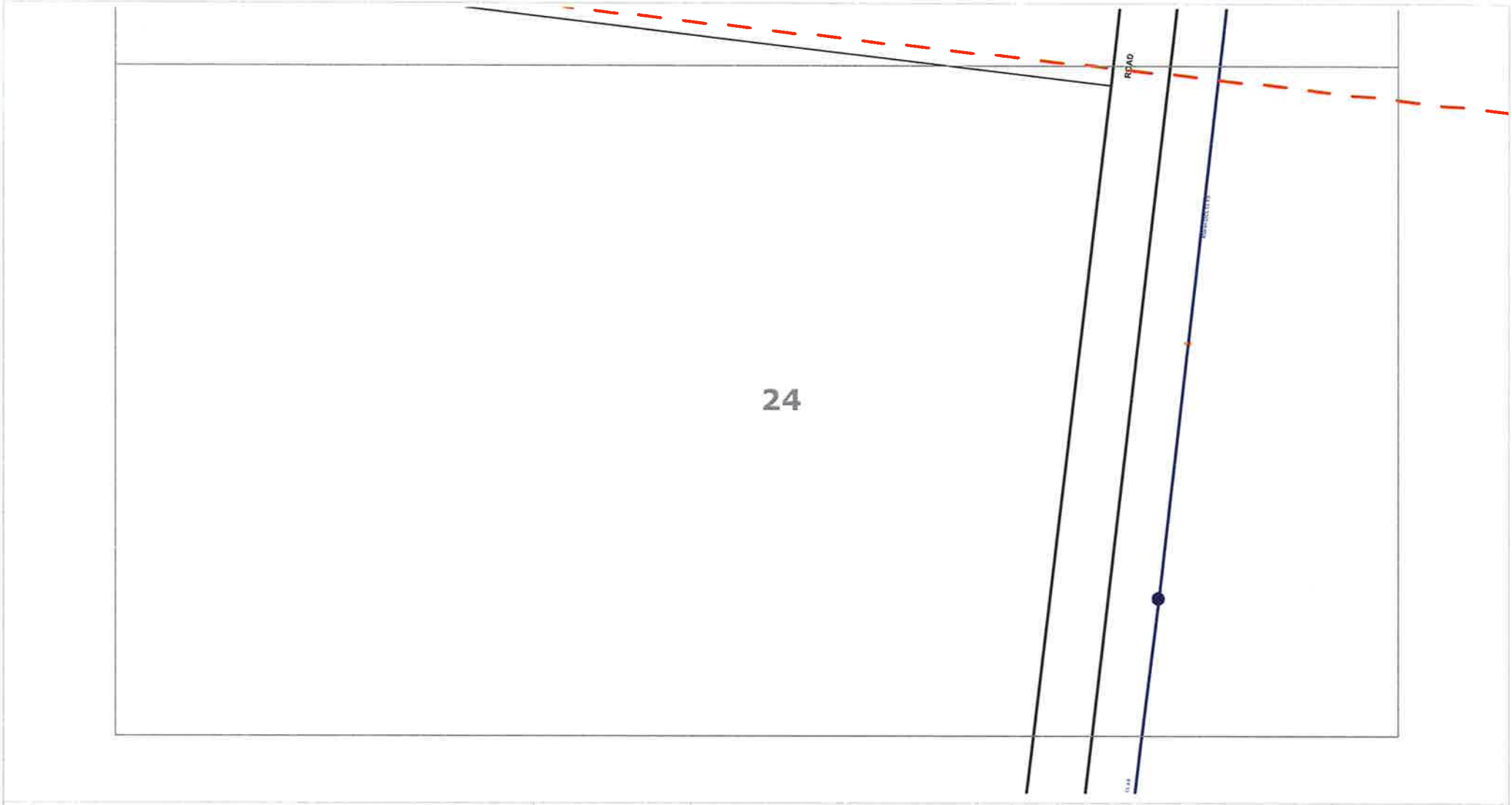

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Recycled Water Assets

Pipe
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Fitting
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Service Connection

OH&S Hazards

Cracked AC Pipes exist. Exercise Caution

ATTACHMENT 3

Powercor Report

CitiPower Pty
ABN 76 064 651 056
www.citipower.com.au

Head Office: 40 Market Street
Telephone: (03) 9683 4444 Facsimile: (03) 9683 4499 DX 433 Melbourne
Postal Address: Locked Bag 14090 Melbourne Victoria 8001 Australia

Powercor Australia
ABN 89 064 651 109
www.powercor.com.au

11/02/2016

Miss Nicole Dixon
TGM Group
Level 1, 27 - 31 Myers Street
Geelong VIC 3220

Reference Number 50782188

Dear Customer

Thankyou for your enquiry on 11/02/2016 regarding the work at:
815 Hendy Main Road Moriac

Our records have revealed that there are high voltage underground assets within the area of your request.

To ensure that your proposed works do not impact on safety, our assets or current regulations, **no work is to be undertaken in the vicinity of our assets** until the completion of a further technical assessment of the area.

This technical assessment can be arranged by completing a **Request for Site Visit** form available on the CitiPower and Powercor website shown above or by using the following path:

www.citipower.com.au/working-with-us/suppliers/online-permit-applications/site-visit/

If you need assistance in determining if you need a site visit please call:

CitiPower on 131 280

Powercor on 132 206

Upon receipt of your **Request for Site Visit** form you will be contacted by a responsible officer to assess your requirements. A site visit will be organised if required. During the site visit we will determine the location of our assets and any Permit to Work conditions applicable to your works. We will also be able to provide further details of any additional works which may be required.

Please note that the Permit to Work site visit timeframes are subject to enquiry volumes and specific site locations, therefore it may require up to 10 working days to contact you and arrange a site visit

Regards,

Rod Jenkin

Dial Before You Dig (DBYD)
Electrical Asset Location Information

CitiPower/Powercor
Locked Bag 14090, Melbourne VIC 8001
General Enquiries Telephone: 132 206

To: ('Enquirer')
TGM Group - Miss Nicole Dixon
Level 1, 27 - 31 Myers Street
Geelong VIC 3220

Enquiry Details

Utility ID	50022
Sequence Number	50782188
Enquiry Date	11/02/2016 15:10
Response	**STOP WORK - Permit Required**
Address	815 Hendy Main Road Moriac
Location in Road	CarriageWay,Footpath,Nature Strip
Activity	Subdivision

Enquirer Details

Customer ID	1549826		
Contact	Miss Nicole Dixon		
Company	TGM Group		
Email	nicoled@tgmgroup.com		
Phone	0352024600	**Mobile**	Not Supplied

Enquirer Responsibilities

This notification is valid for 14 days from the issue date. CitiPower/Powercor assets are critical infrastructure and great care must be taken to avoid asset damage and risk to public safety. The information supplied in the DBYD Response is intended to be indicative only. External parties should make their own enquiries to ensure the accuracy of the information, including but not limited to:

- Check that the location of the dig site indicated is correct, if not you must submit a new enquiry.
- Should your scope of works change or the plan validity dates expire, you must submit a new enquiry.
- If you do not understand the plans provided please contact CitiPower/Powercor prior to works commencing.
- Always perform an onsite inspection to establish the presence of assets.
- Ensure you adhere to any State legislative requirements regarding Duty of Care and safe digging requirements.

Report any asset damage immediately on 132 206. Note: CitiPower/Powercor reserves the right to recover compensation for damages.

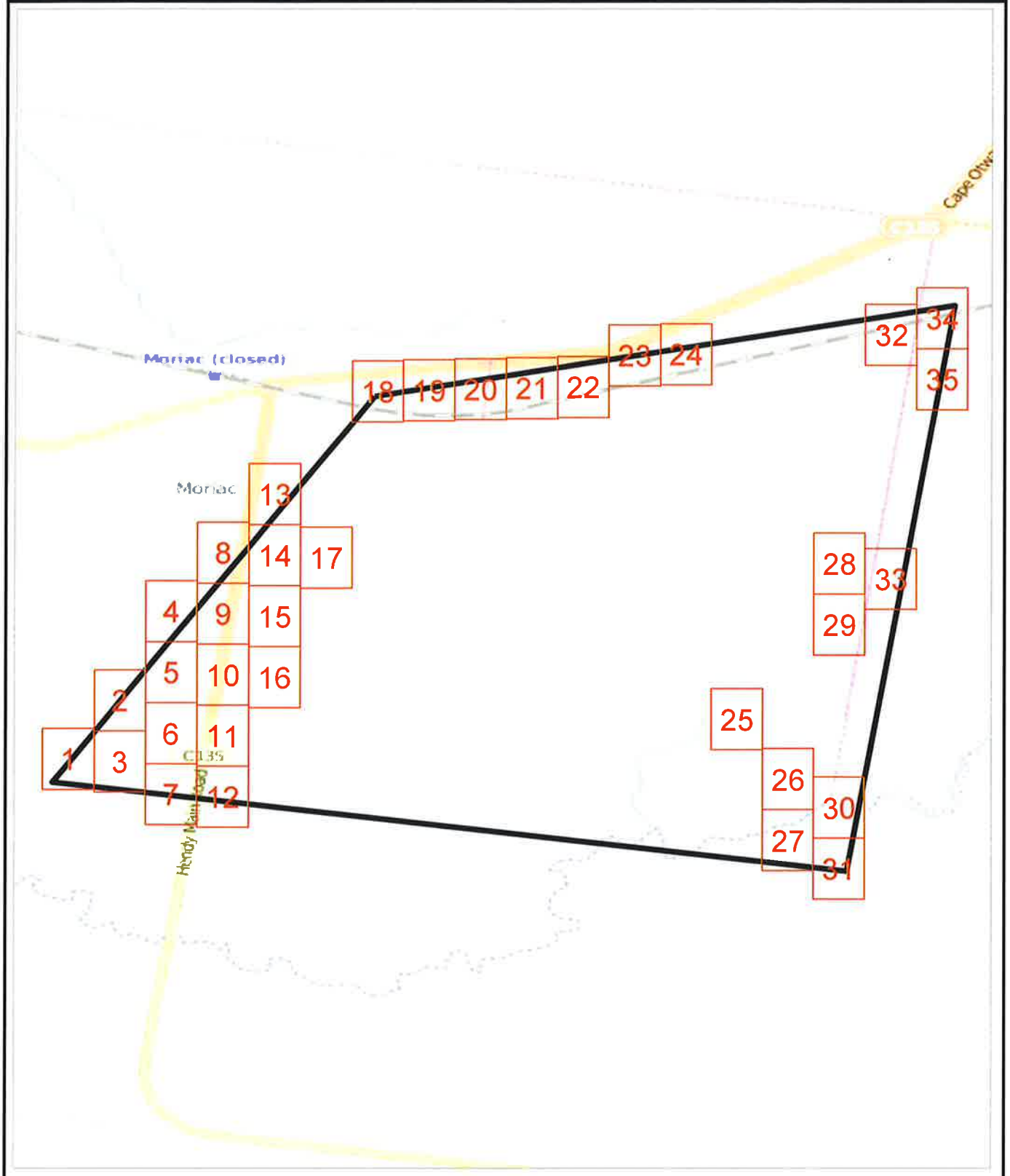
Date: 11/02/2016

Locality Map

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area | SWER Substation | High Voltage Cable | Communication Cable

Zone Substation | Distribution Substation | Low Voltage Cable | Earth Cable

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

0 0.2km

N

Powered by dbyd

Date: 11/02/2016

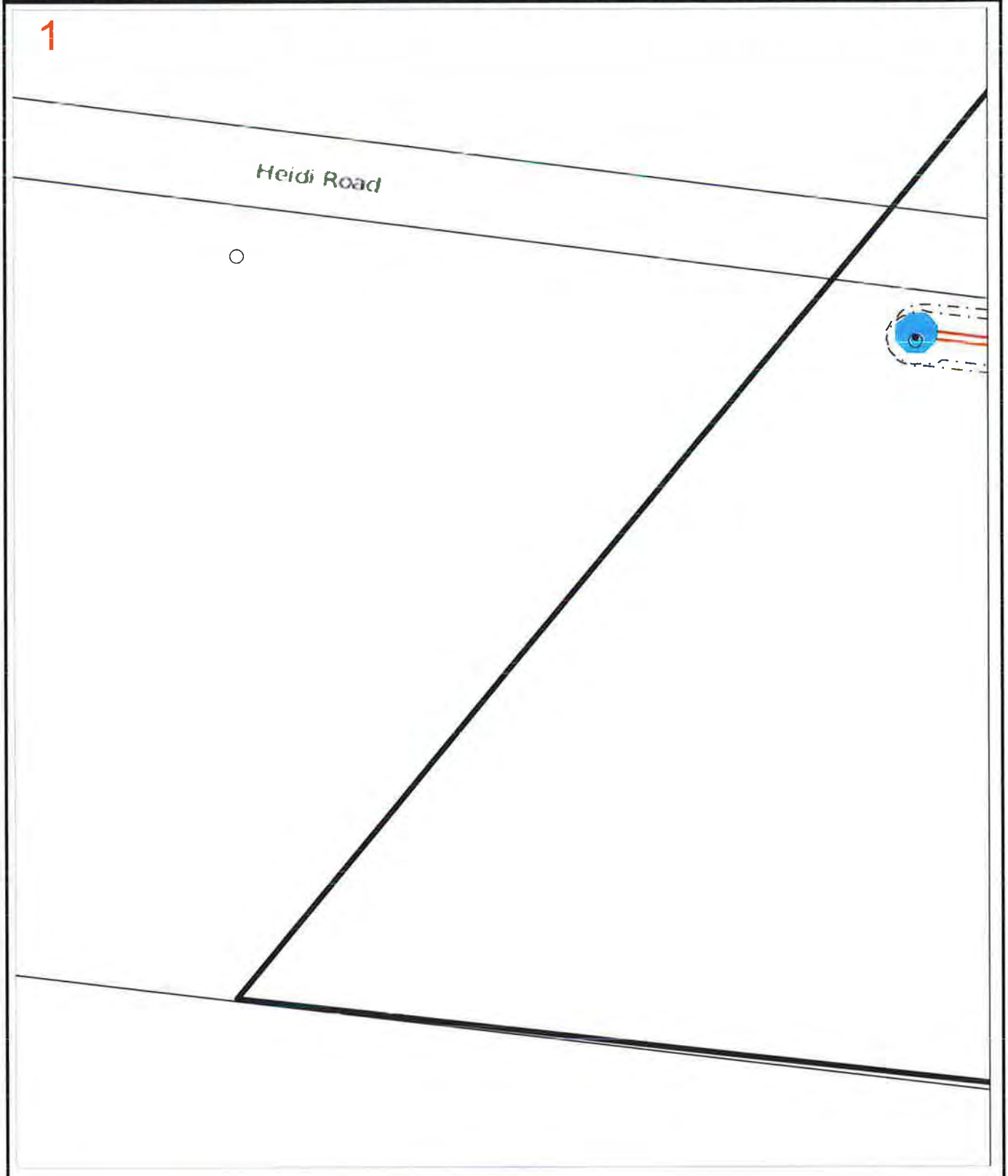
CITIPOWER Powercor AUSTRALIA

Map 1

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

0 0.01km

N

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Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

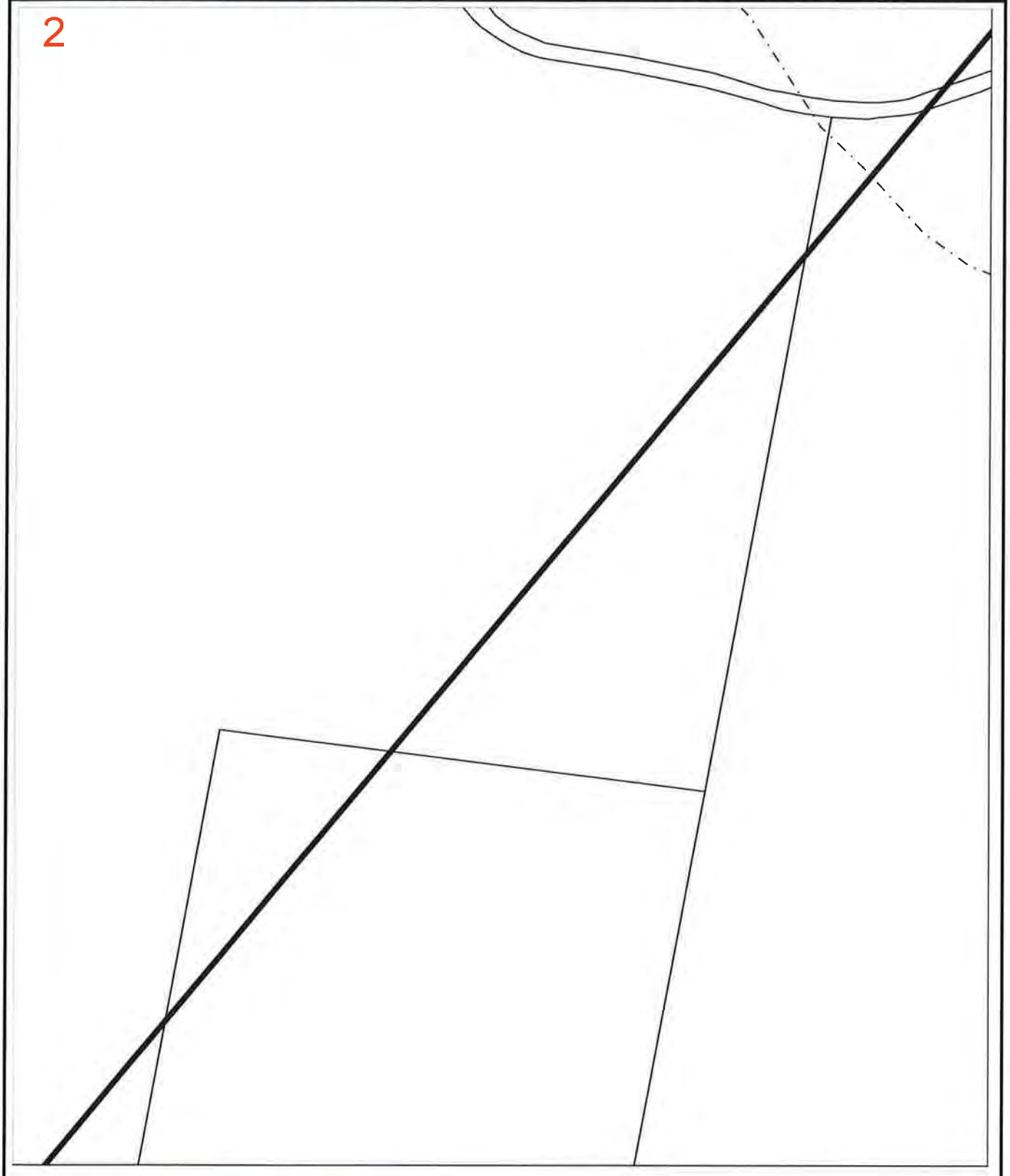
CITIPOWER Powercor AUSTRALIA

Map 2

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by x-info dbyd

Date: 11/02/2016

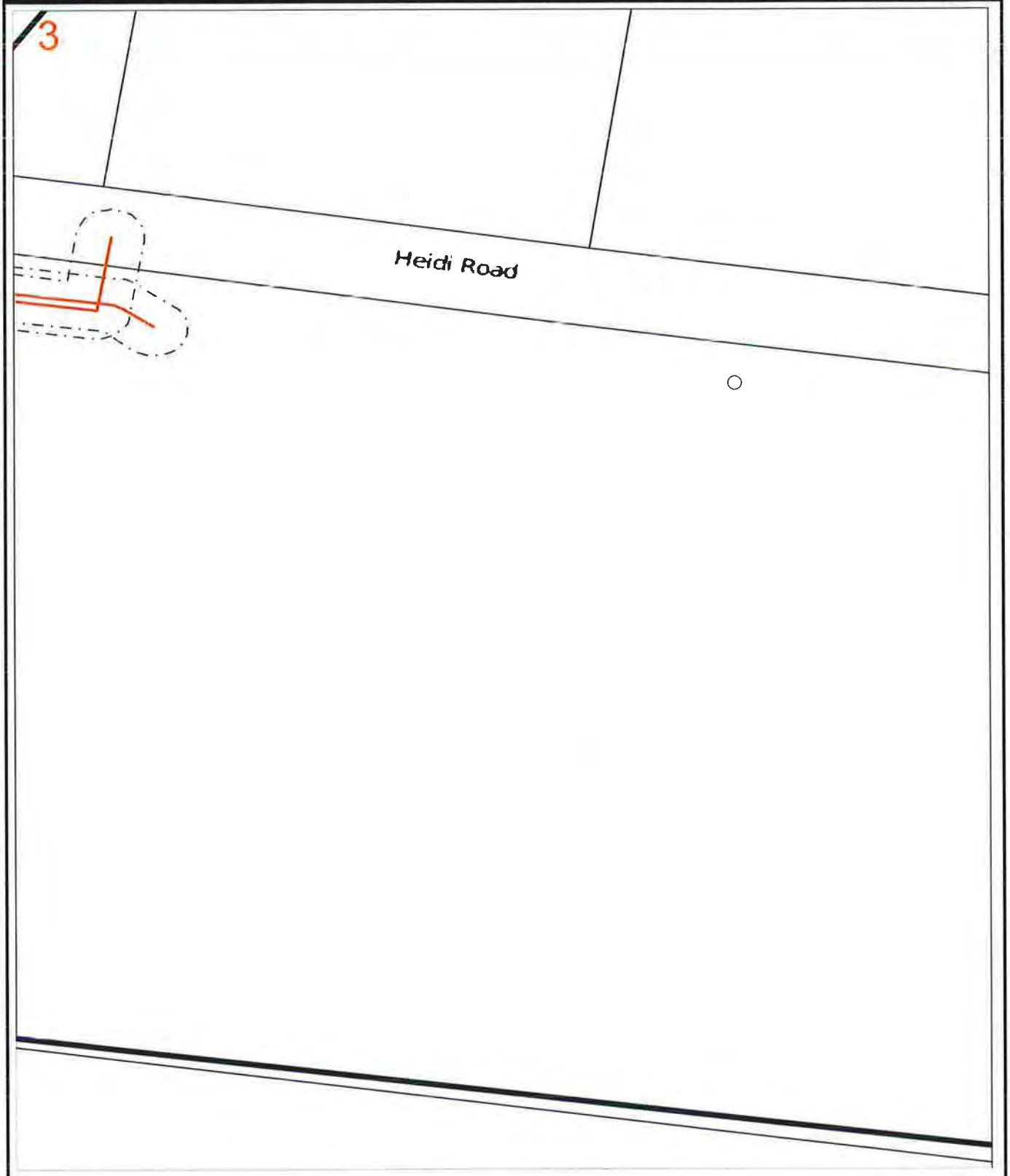
CITIPOWER Powercor AUSTRALIA

Map 3

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

0 0.01km

N

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Imagery sourced from Open StreetMaps

Powered by dbyd

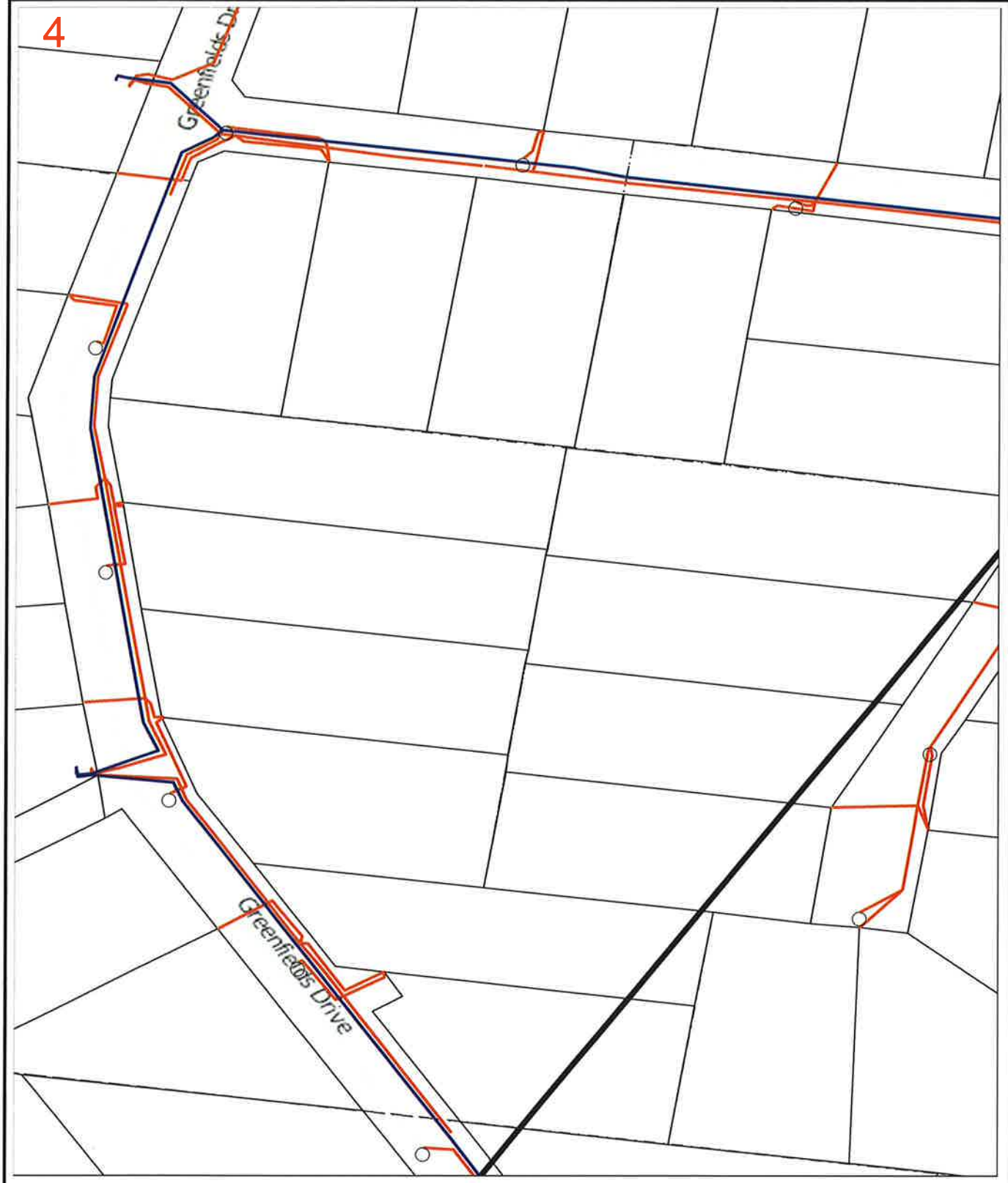
CITIPOWER Powercor AUSTRALIA

Map 4

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

- DBYD Work Area
- Zone Substation
- SWER Substation
- Distribution Substation
- High Voltage Cable
- Low Voltage Cable
- Communication Cable
- Earth Cable
- Pole (Subtransmission)
- Pole (HV)
- Pole (LV)
- Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by x-info dbyd

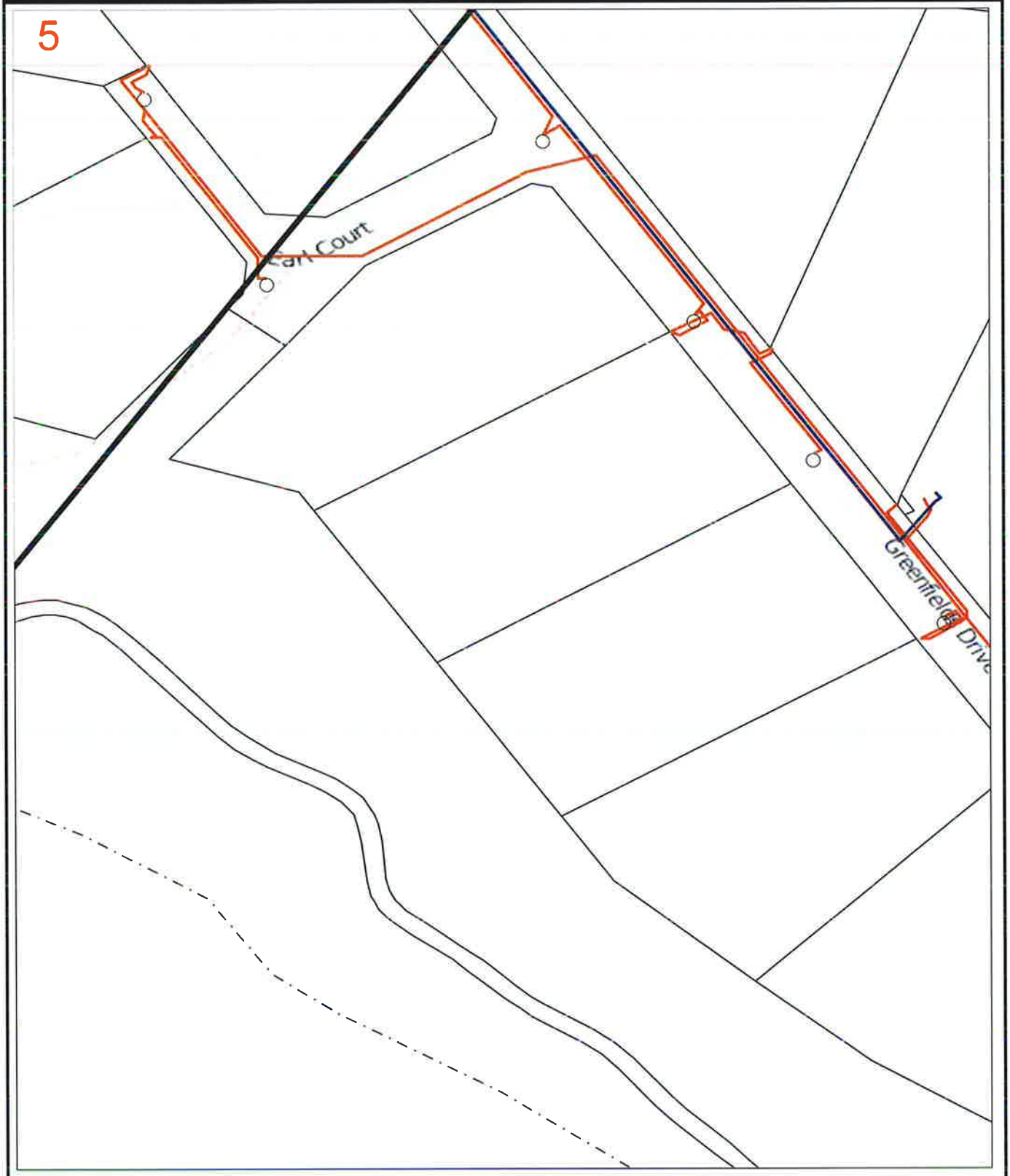
CITIPOWER Powercor AUSTRALIA

Map 5

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

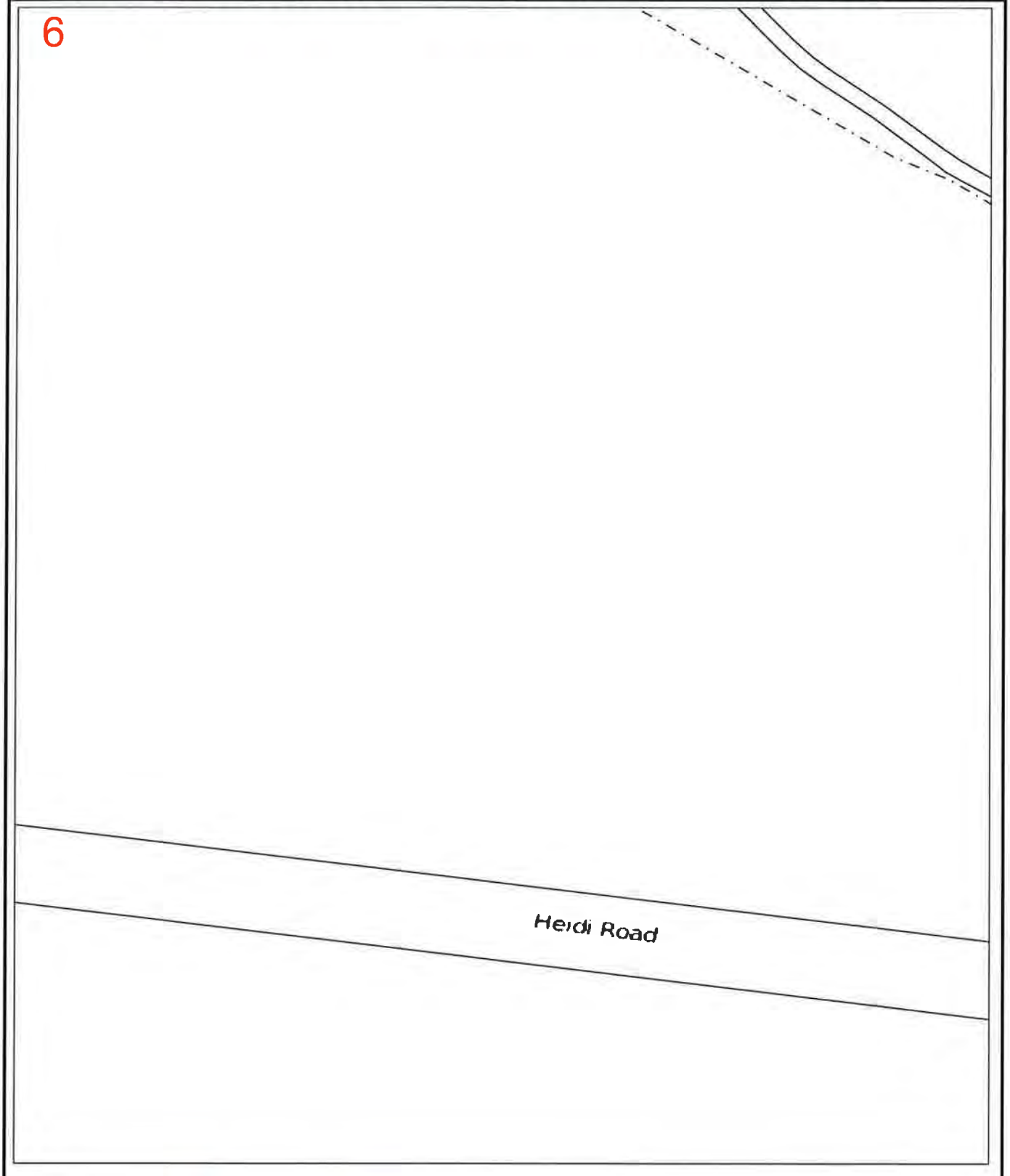
CITIPOWER Powercor AUSTRALIA

Map 6

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0 01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

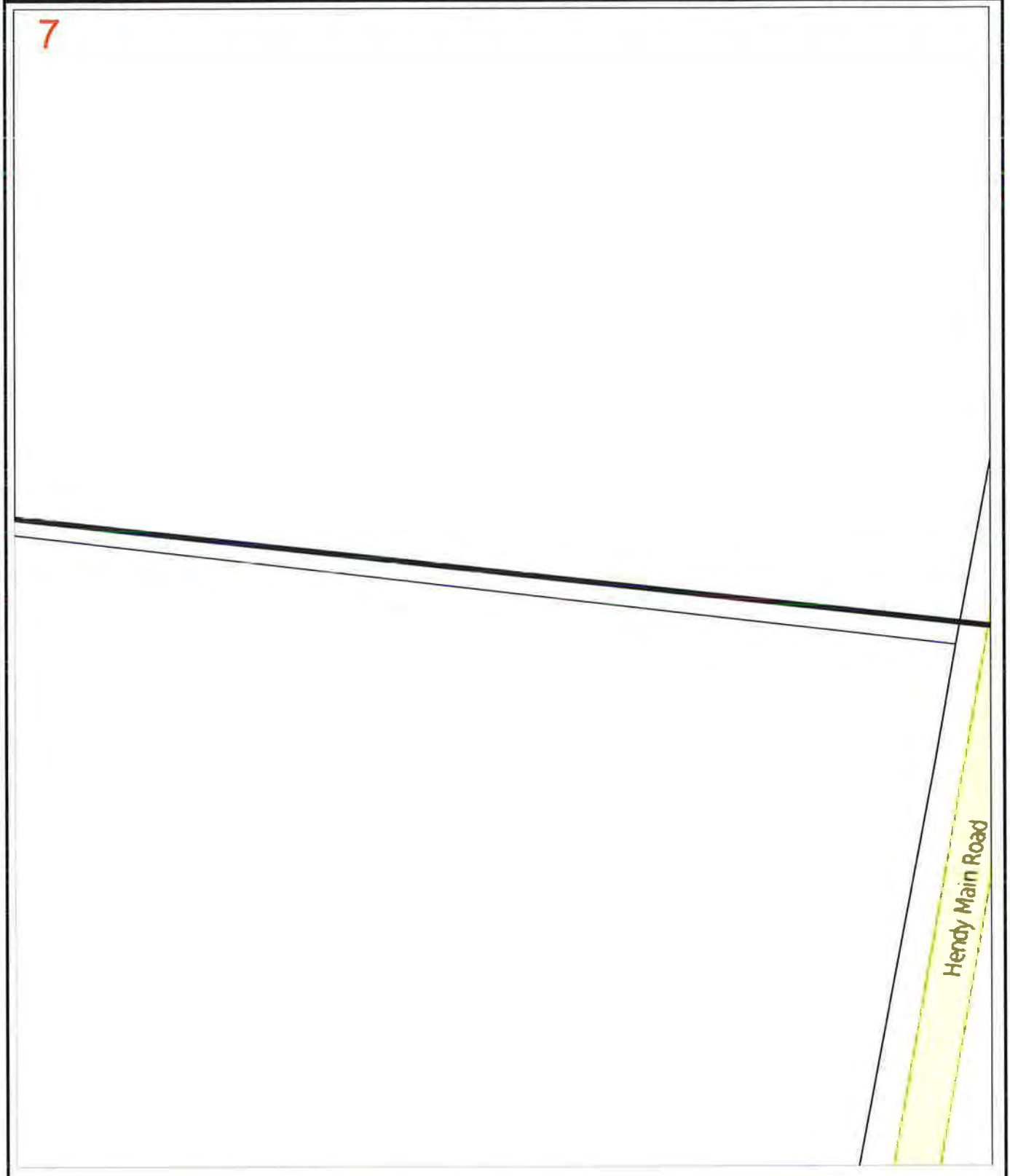
CITIPOWER Powercor AUSTRALIA

Map 7

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

Powered by dbyd

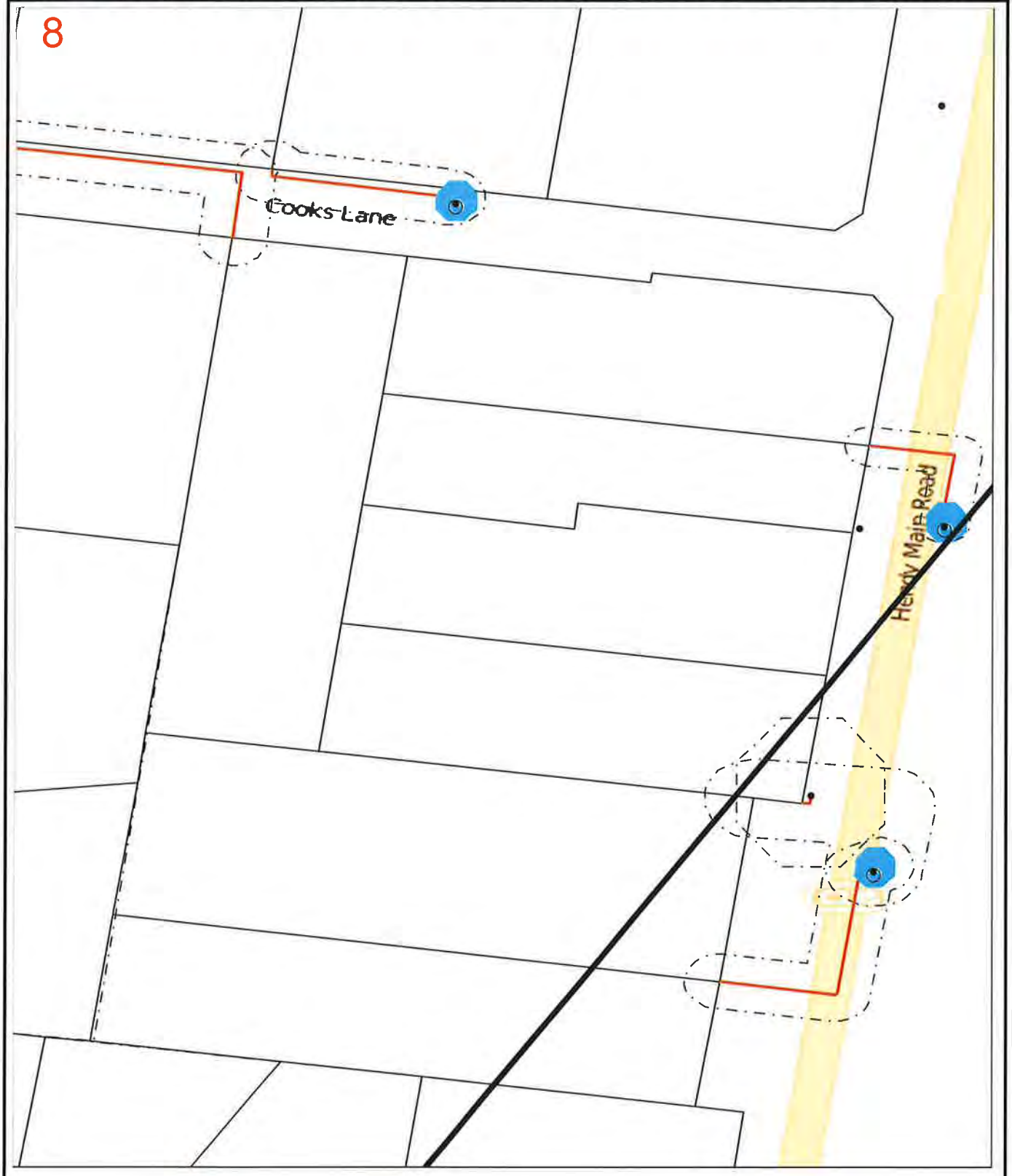
CITIPOWER Powercor AUSTRALIA

Map 8

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

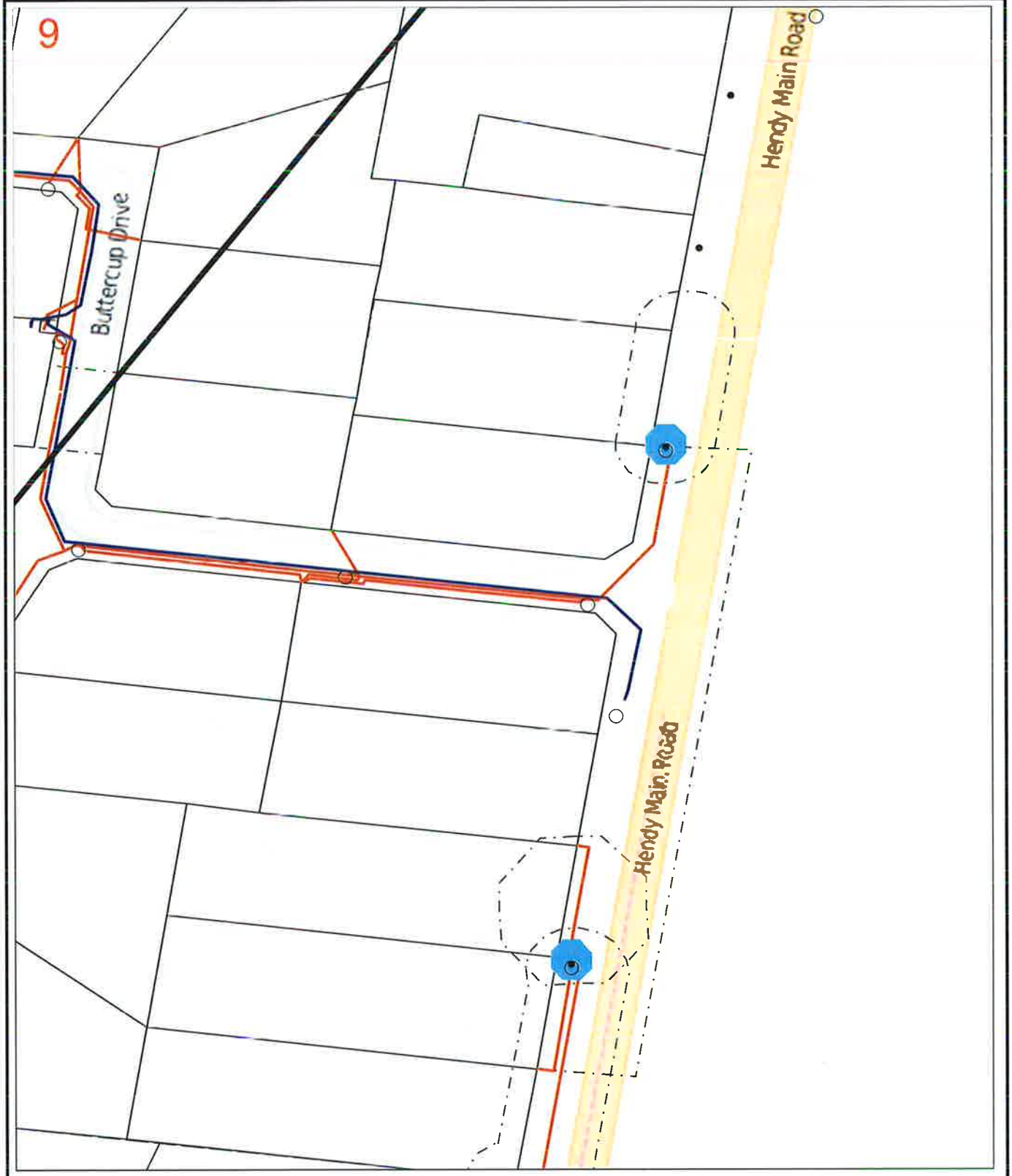
CITIPOWER Powercor AUSTRALIA

Map 9

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

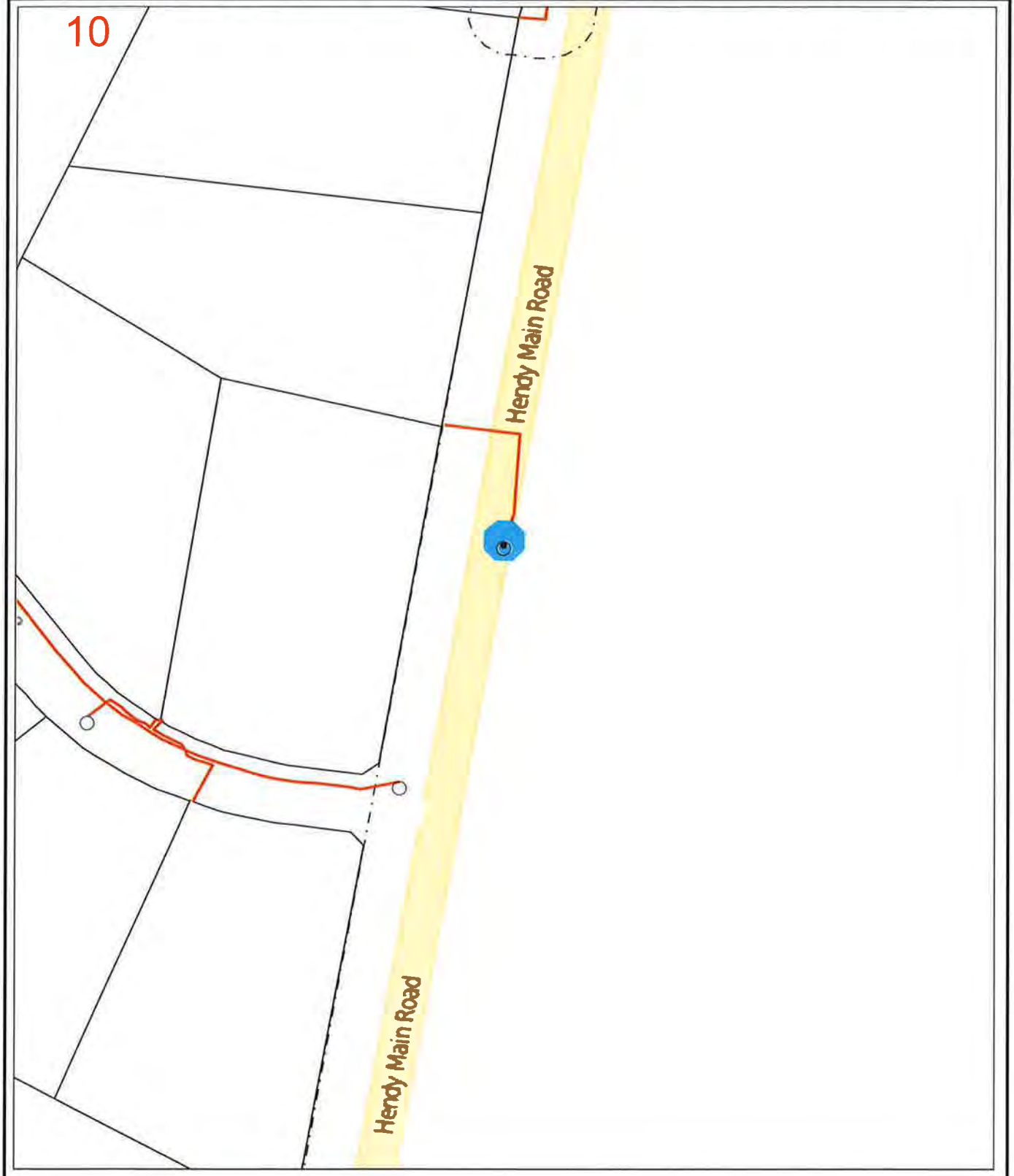
CITIPOWER Powercor AUSTRALIA

Map 10

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0 01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

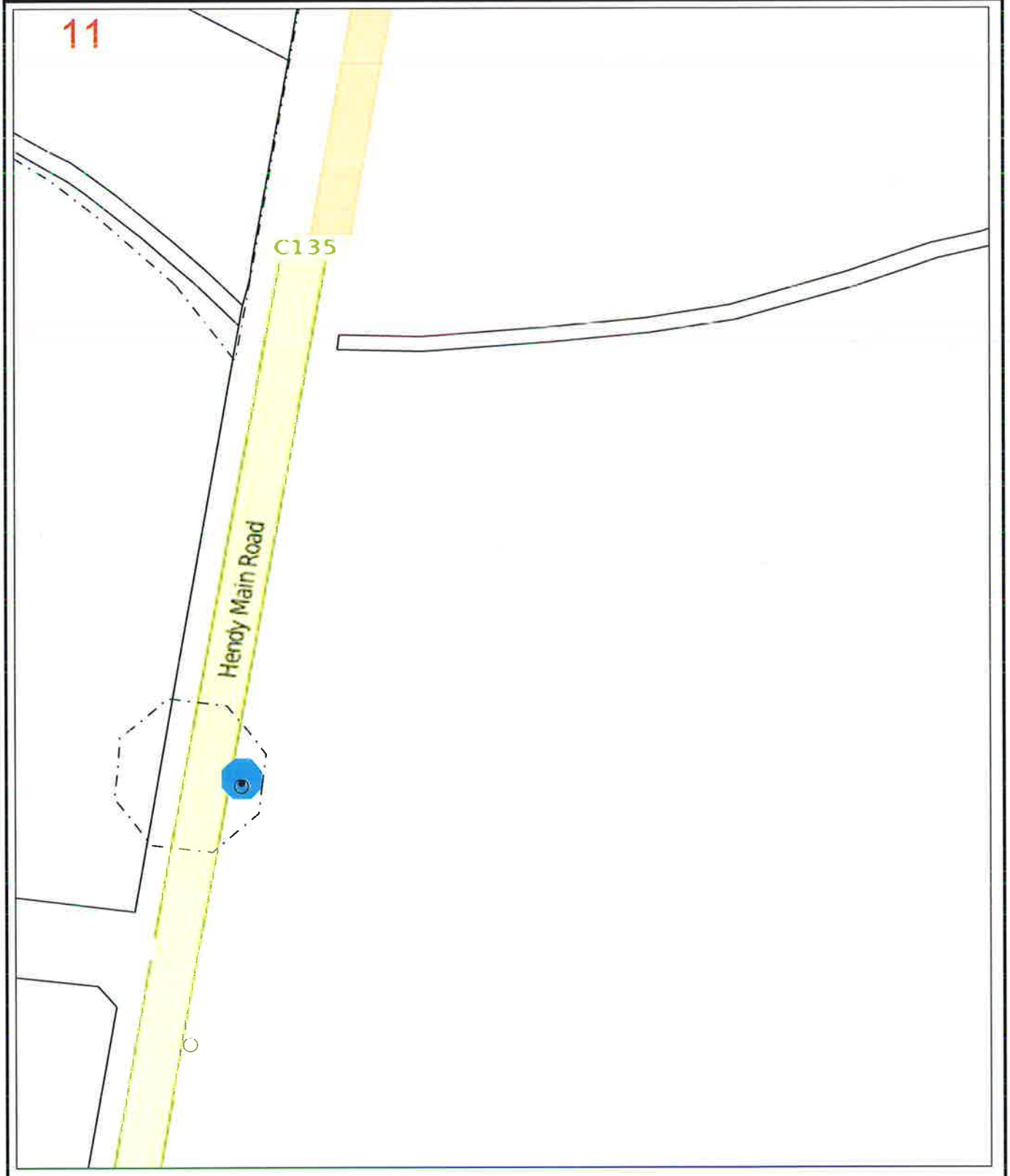
CitiPower Powercor AUSTRALIA

Map 11

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

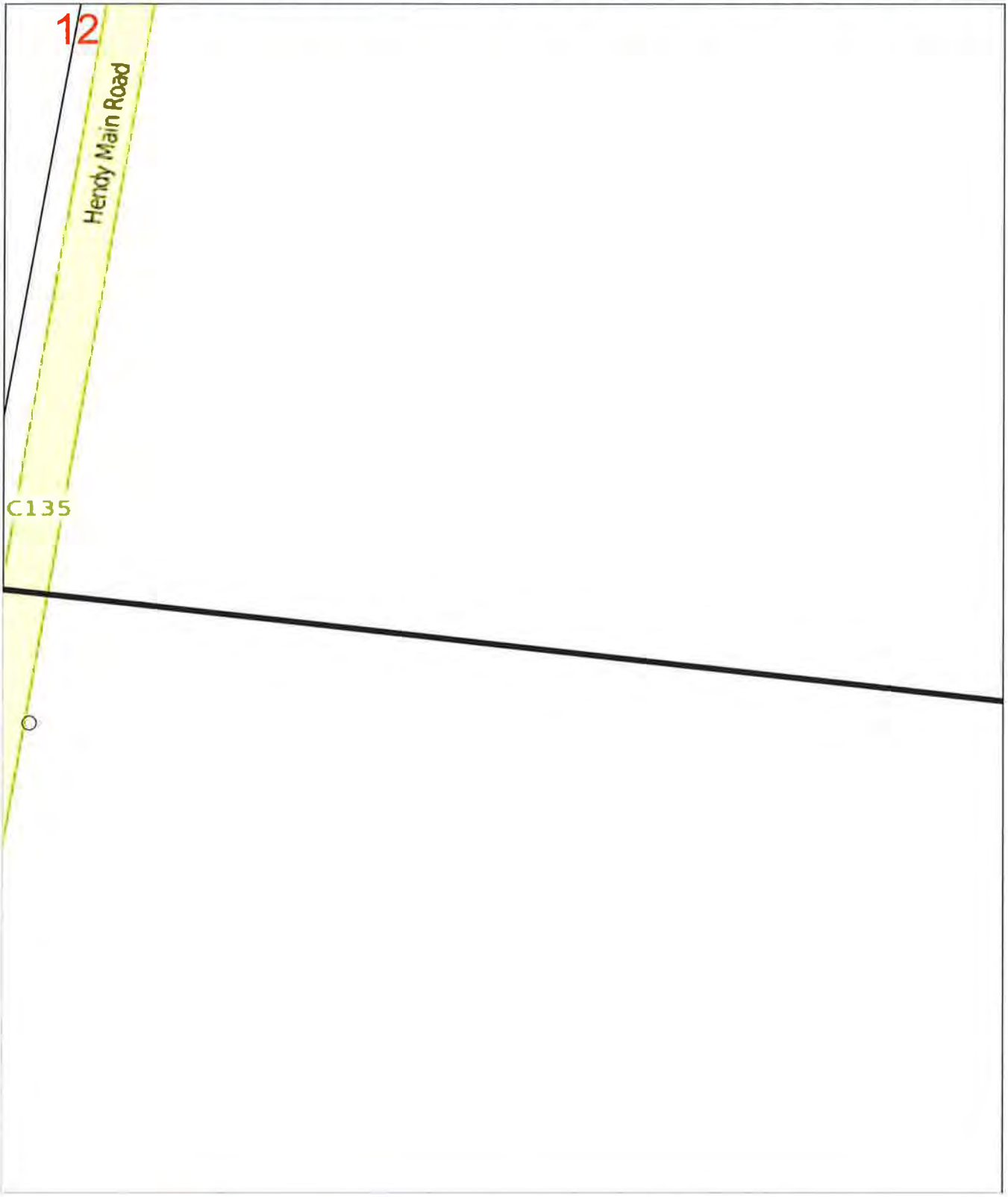
CITIPOWER Powercor AUSTRALIA

Map 12

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd x-info

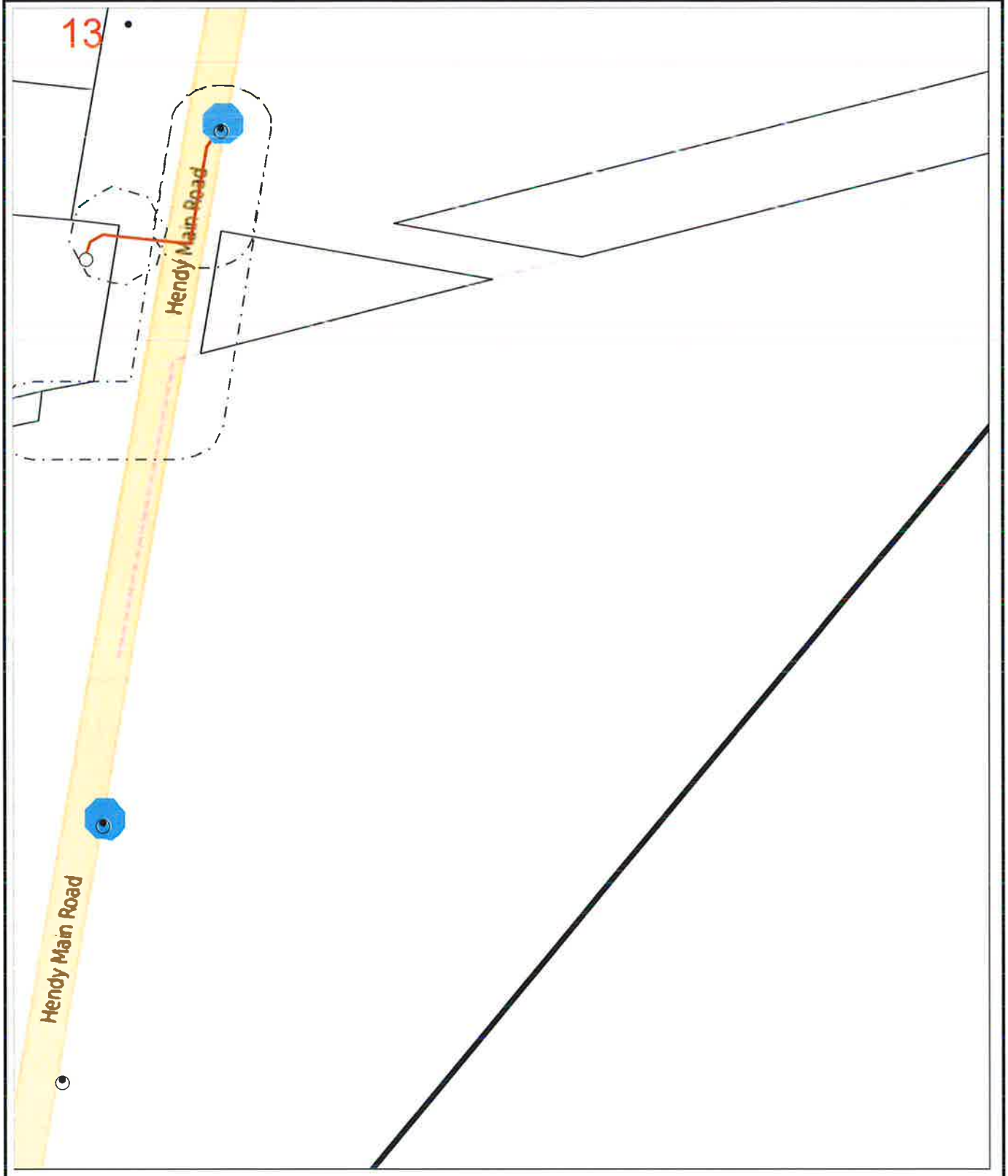
CITIPOWER Powercor AUSTRALIA

Map 13

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

Powered by dbyd

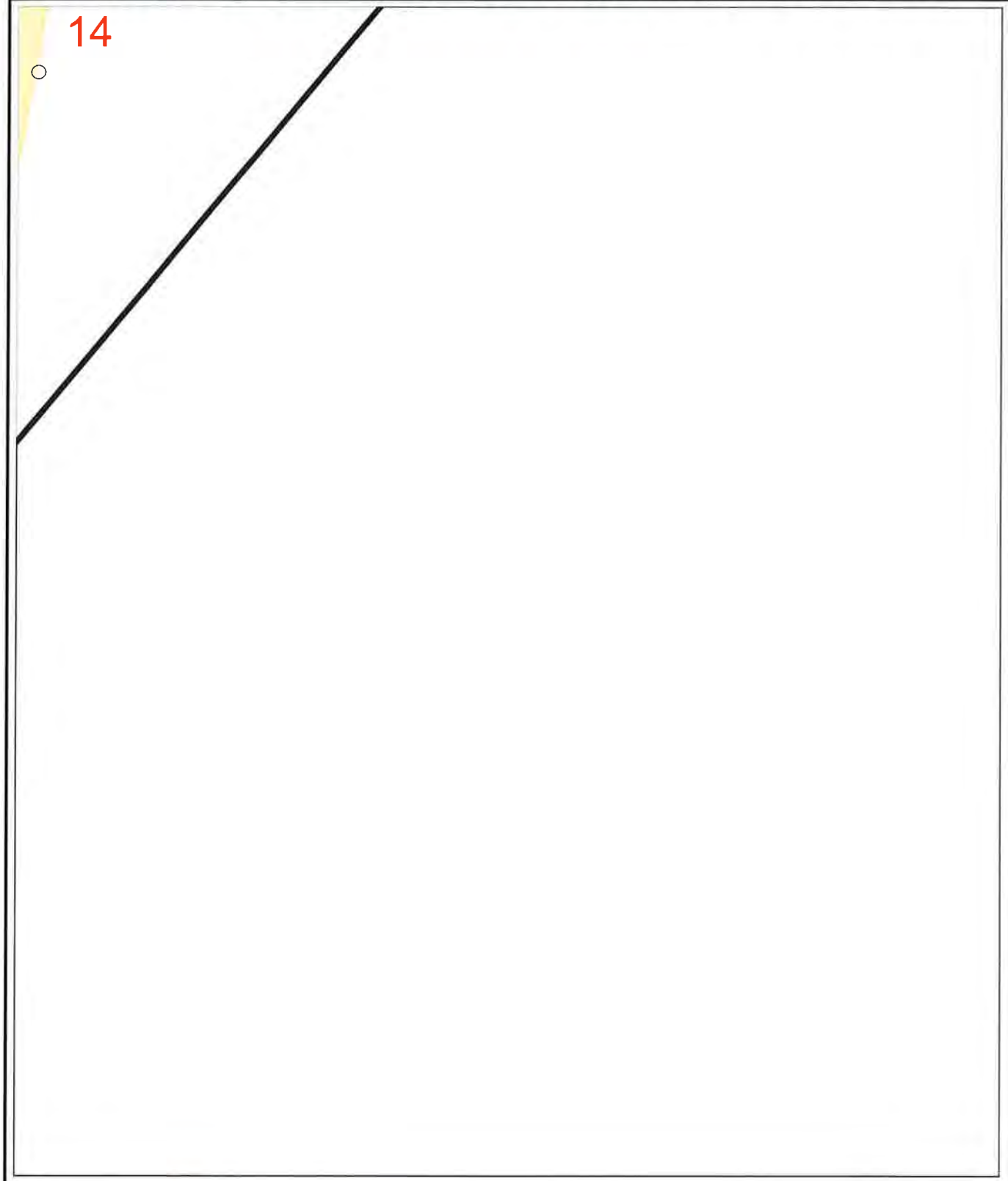
CITIPOWER Powercor AUSTRALIA

Map 14

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0 01km

N

Imagery sourced from Open StreetMaps

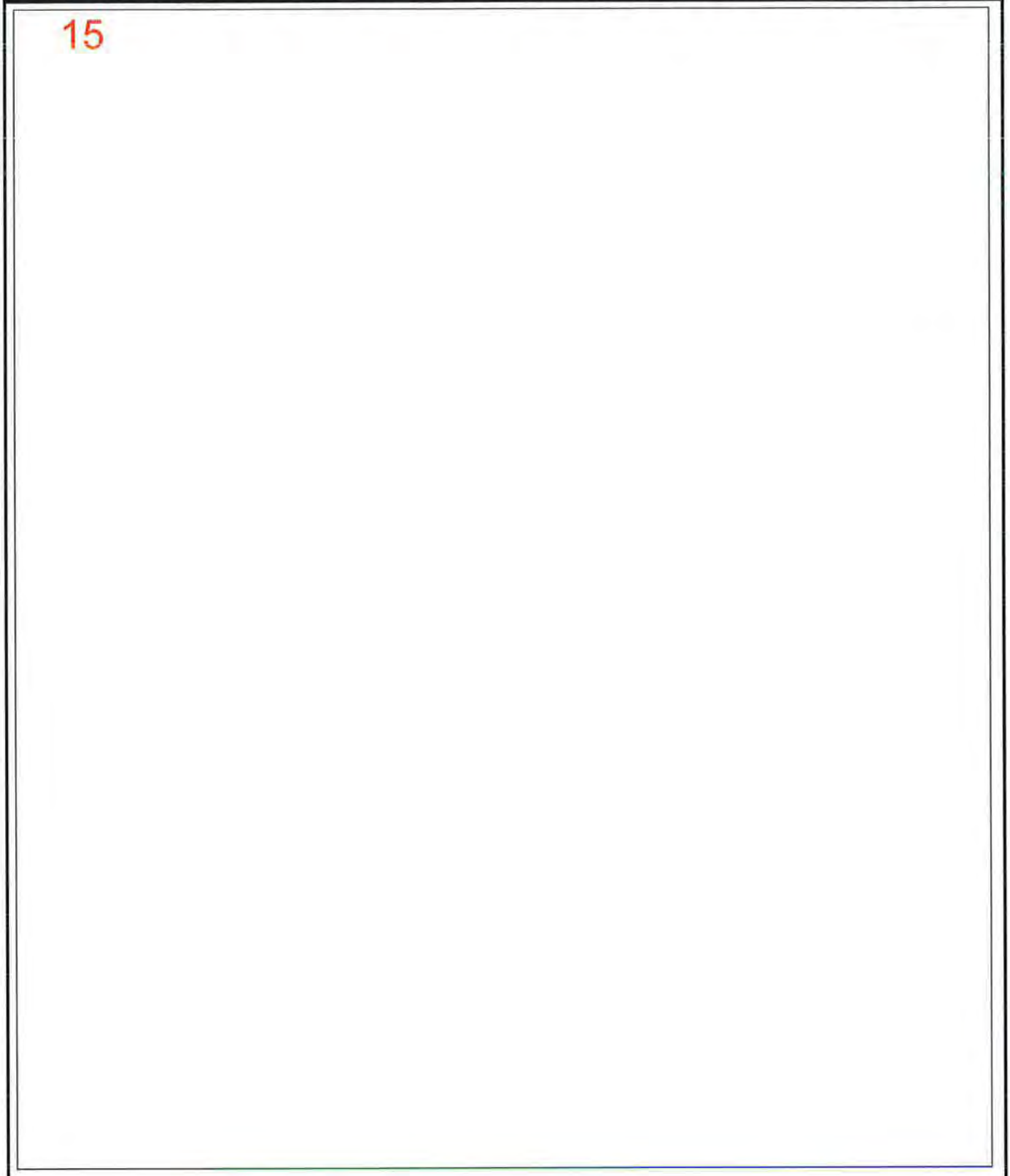
CitiPower Powercor Australia

Map 15

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

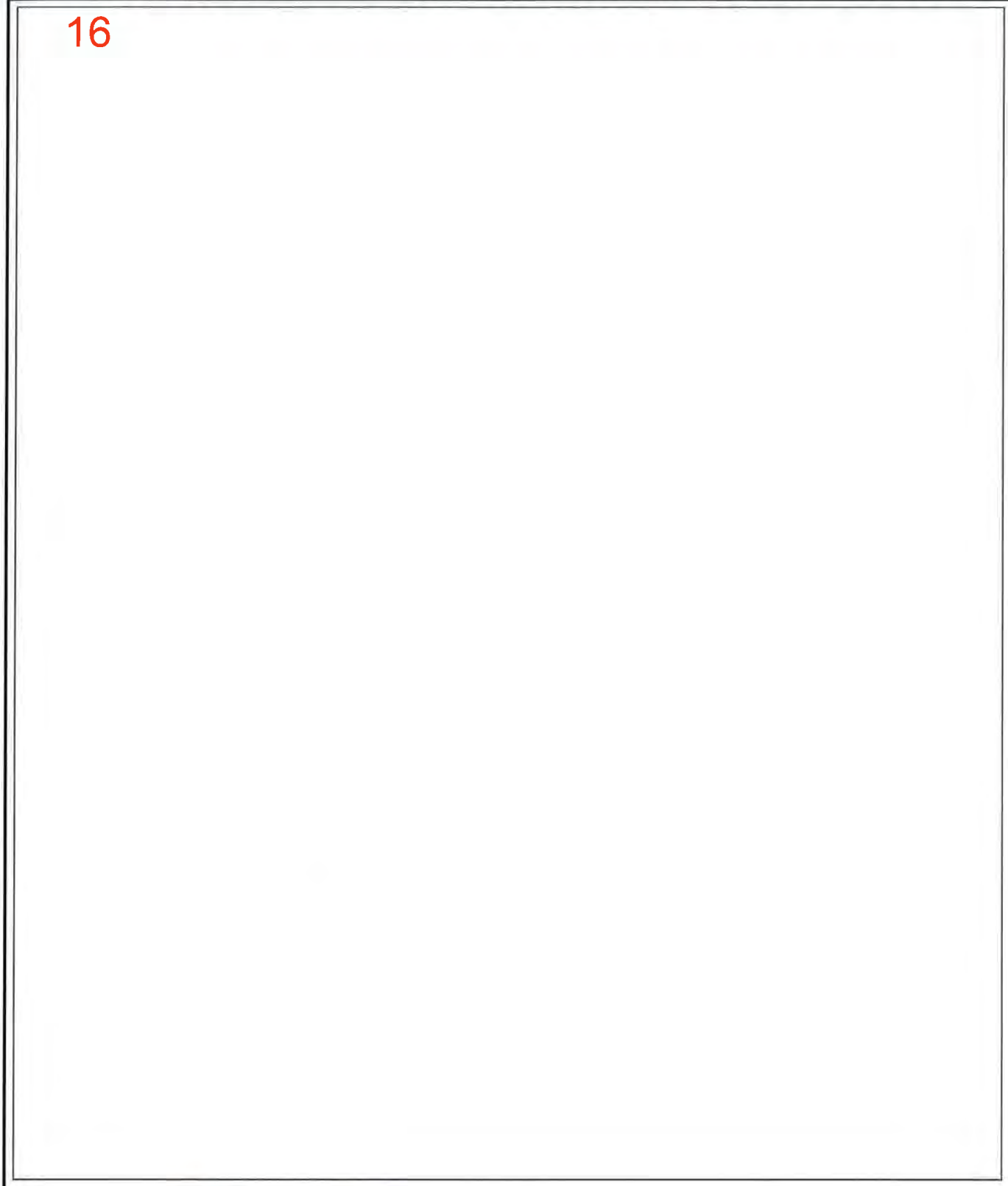
CITIPOWER Powercor AUSTRALIA

Map 16

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0 01km

N

Imagery sourced from Open StreetMaps

Powered by x-info dbyd

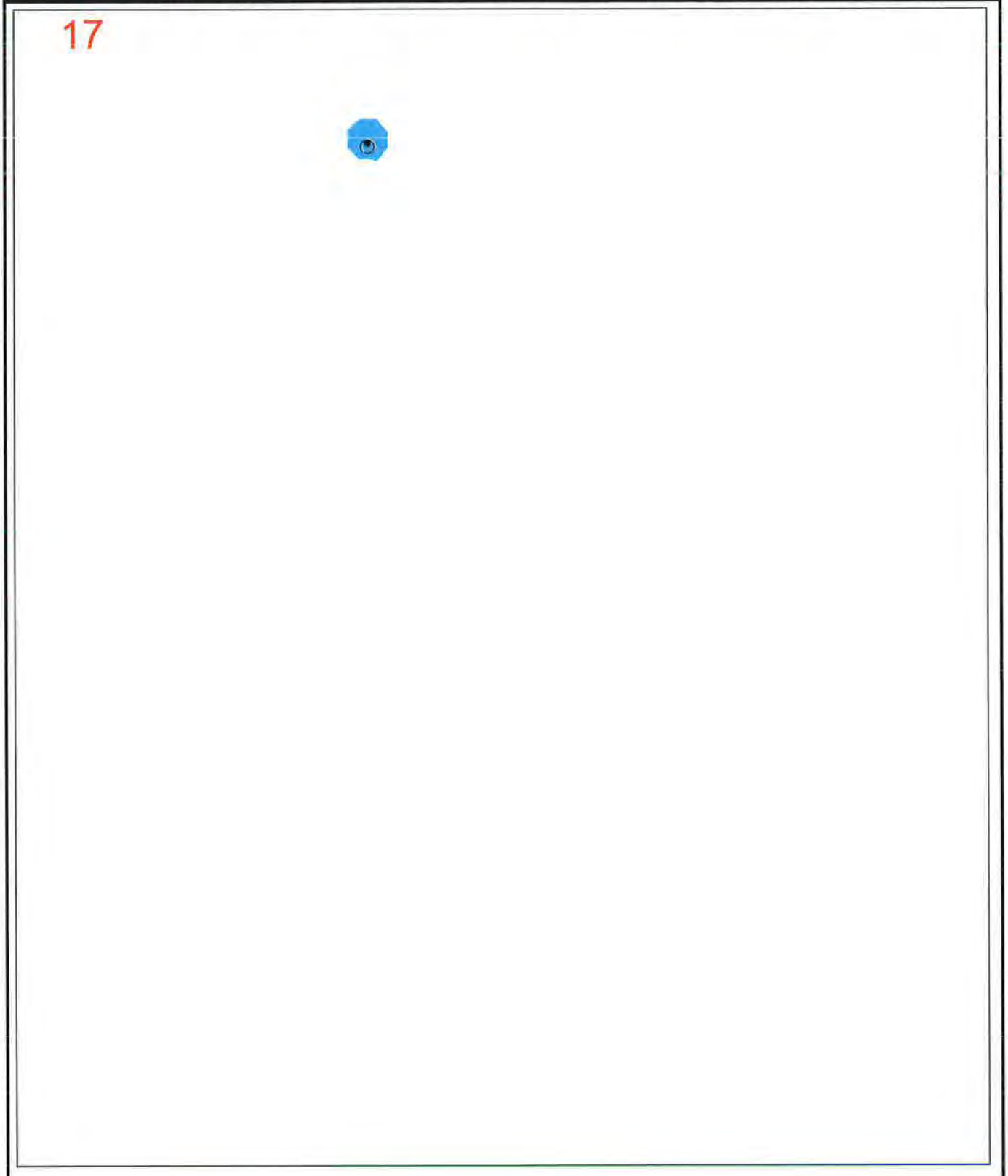
CITIPOWER Powercor AUSTRALIA

Map 17

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

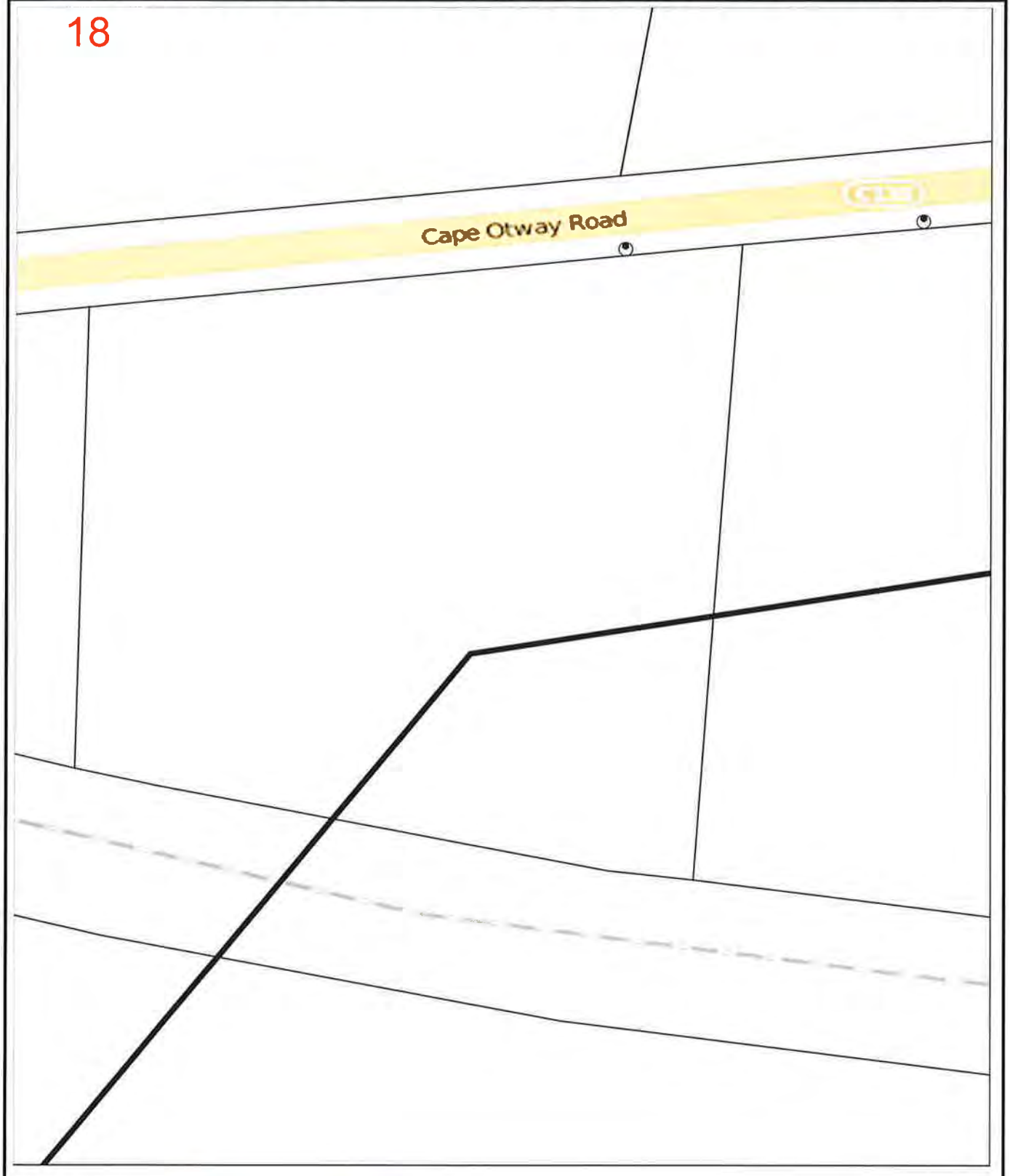
CITIPOWER Powercor AUSTRALIA

Map 18

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0 01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

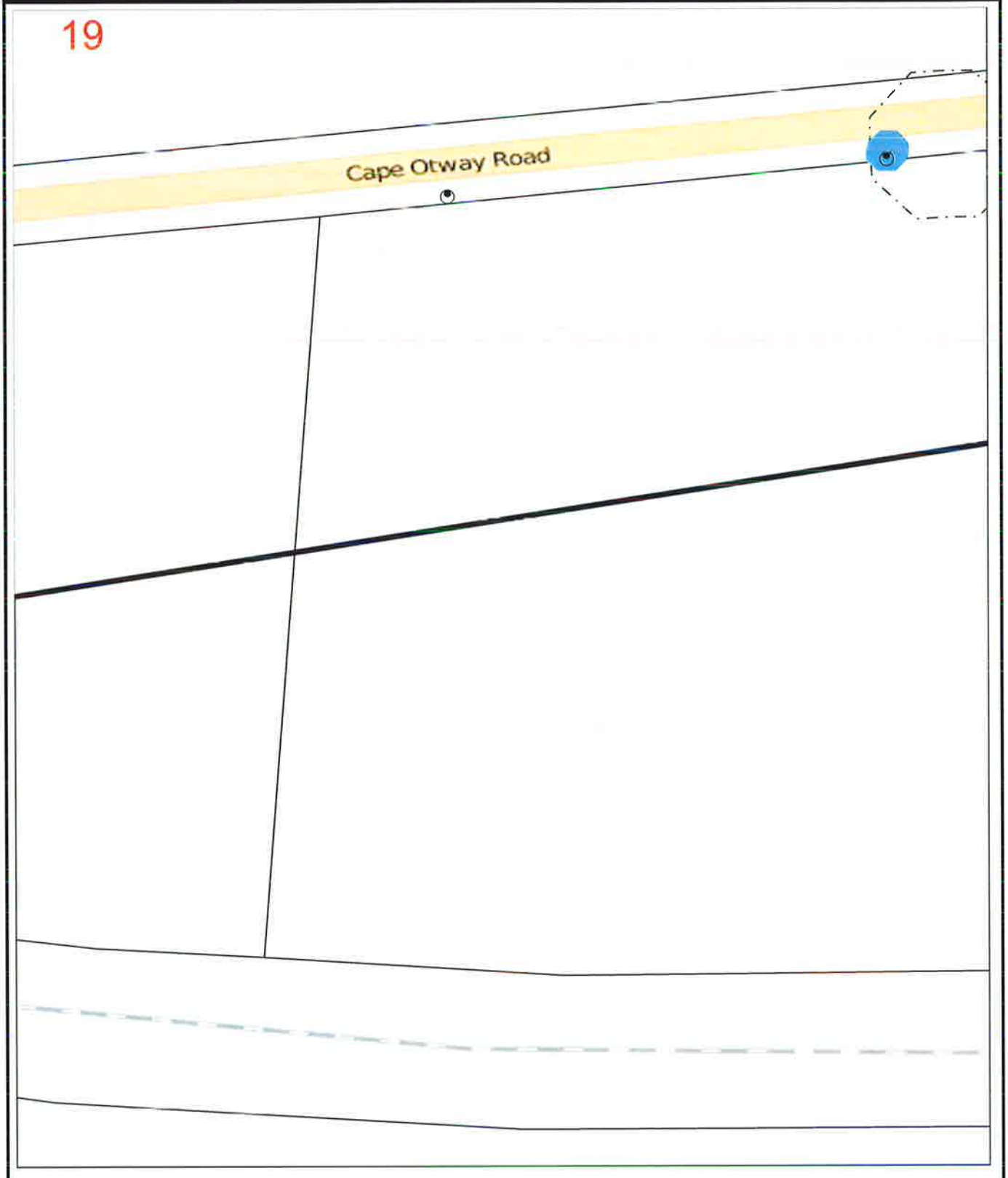
CITIPOWER Powercor AUSTRALIA

Map 19

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

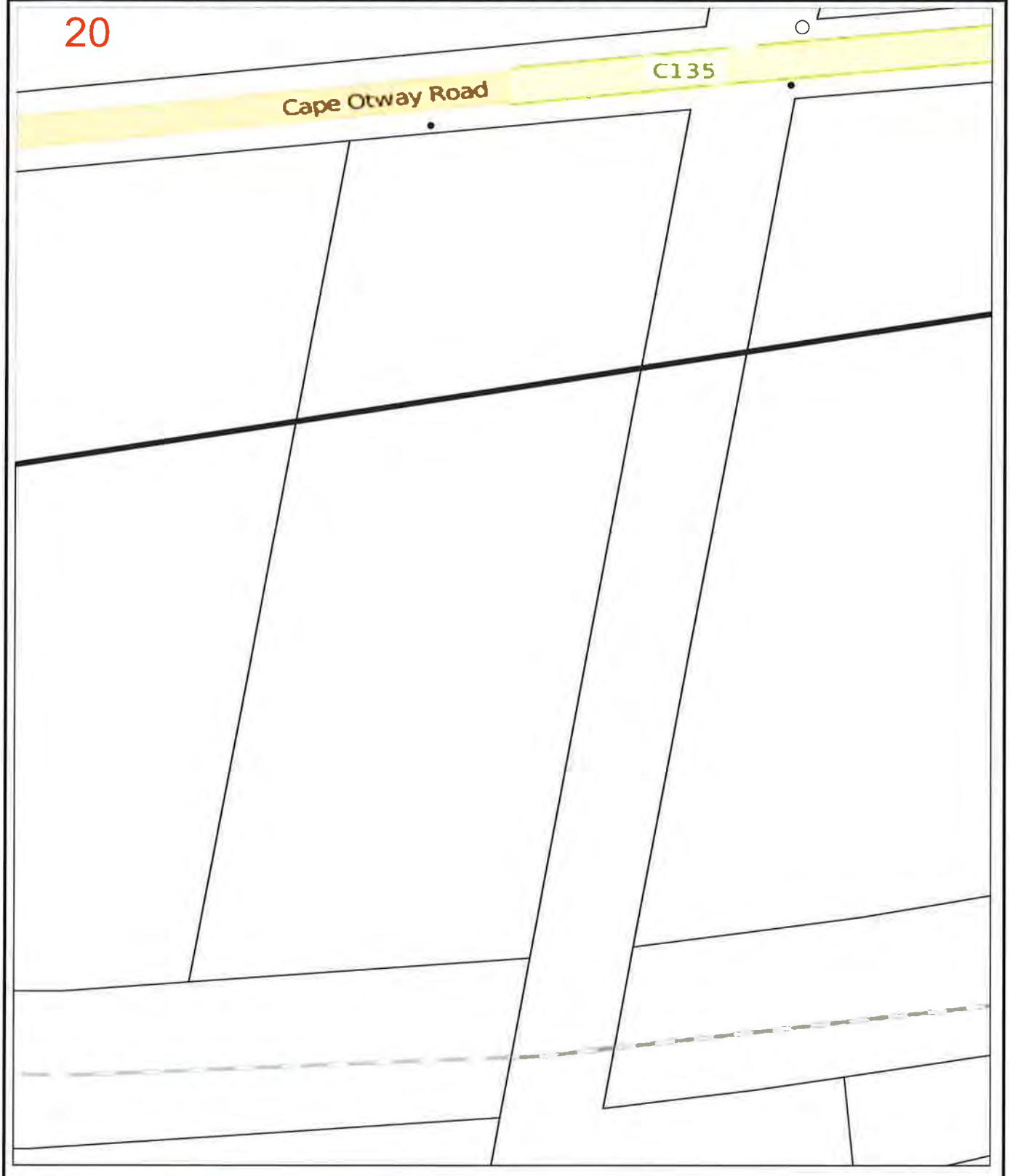
CITIPOWER Powercor AUSTRALIA

Map 20

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

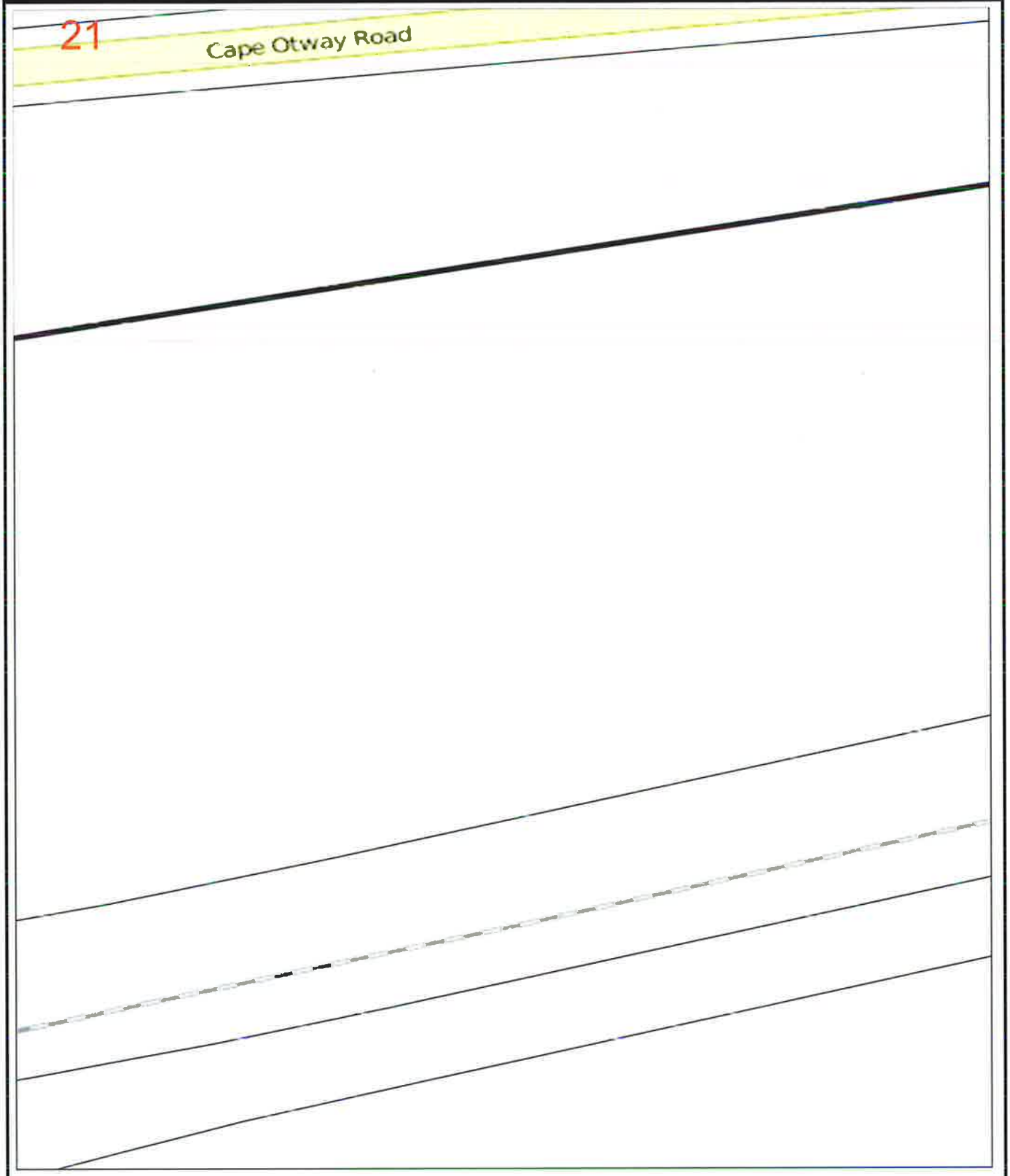
CITIPOWER Powercor AUSTRALIA

Map 21

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

Powered by dbyd

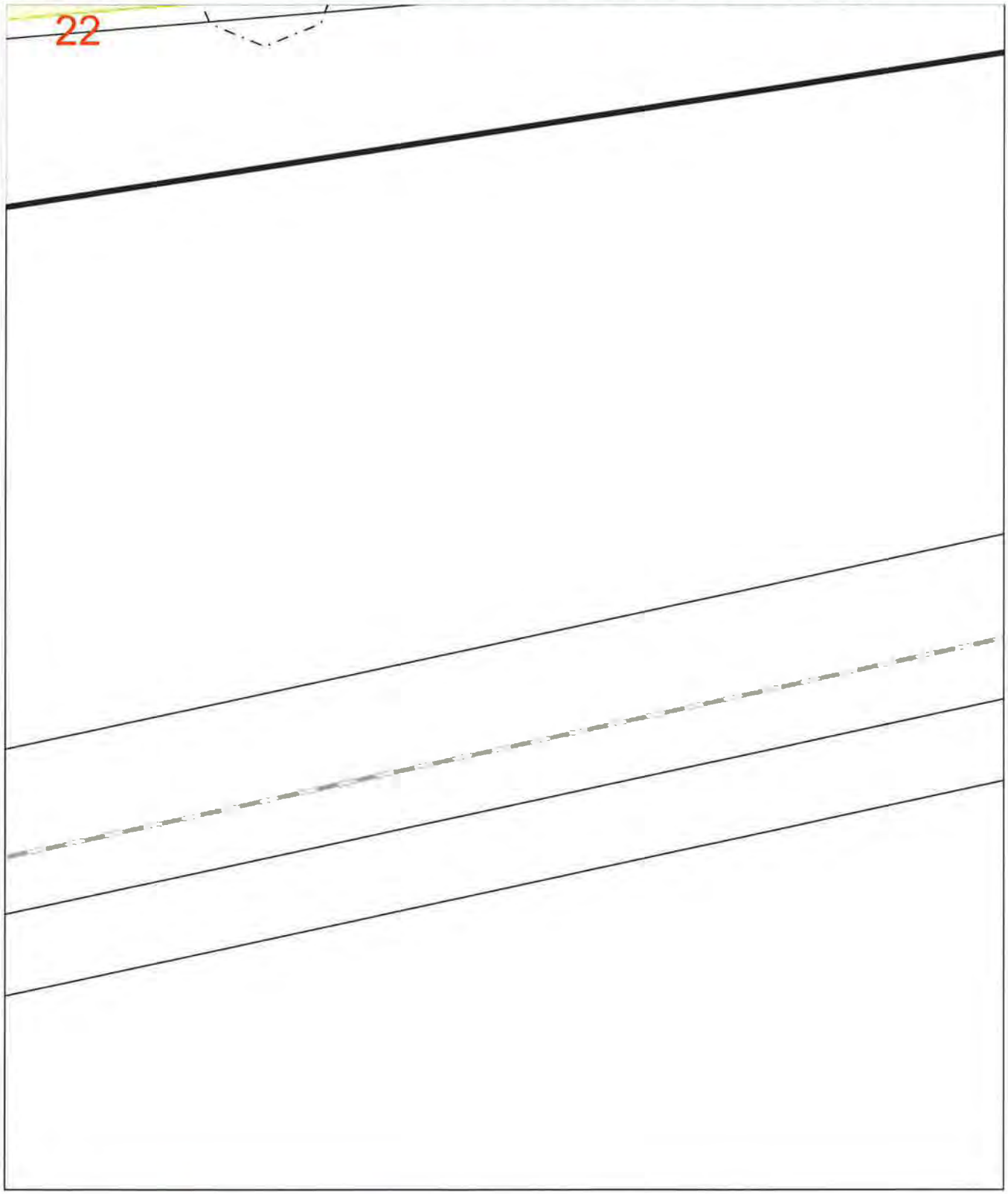
CITIPOWER Powercor AUSTRALIA

Map 22

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

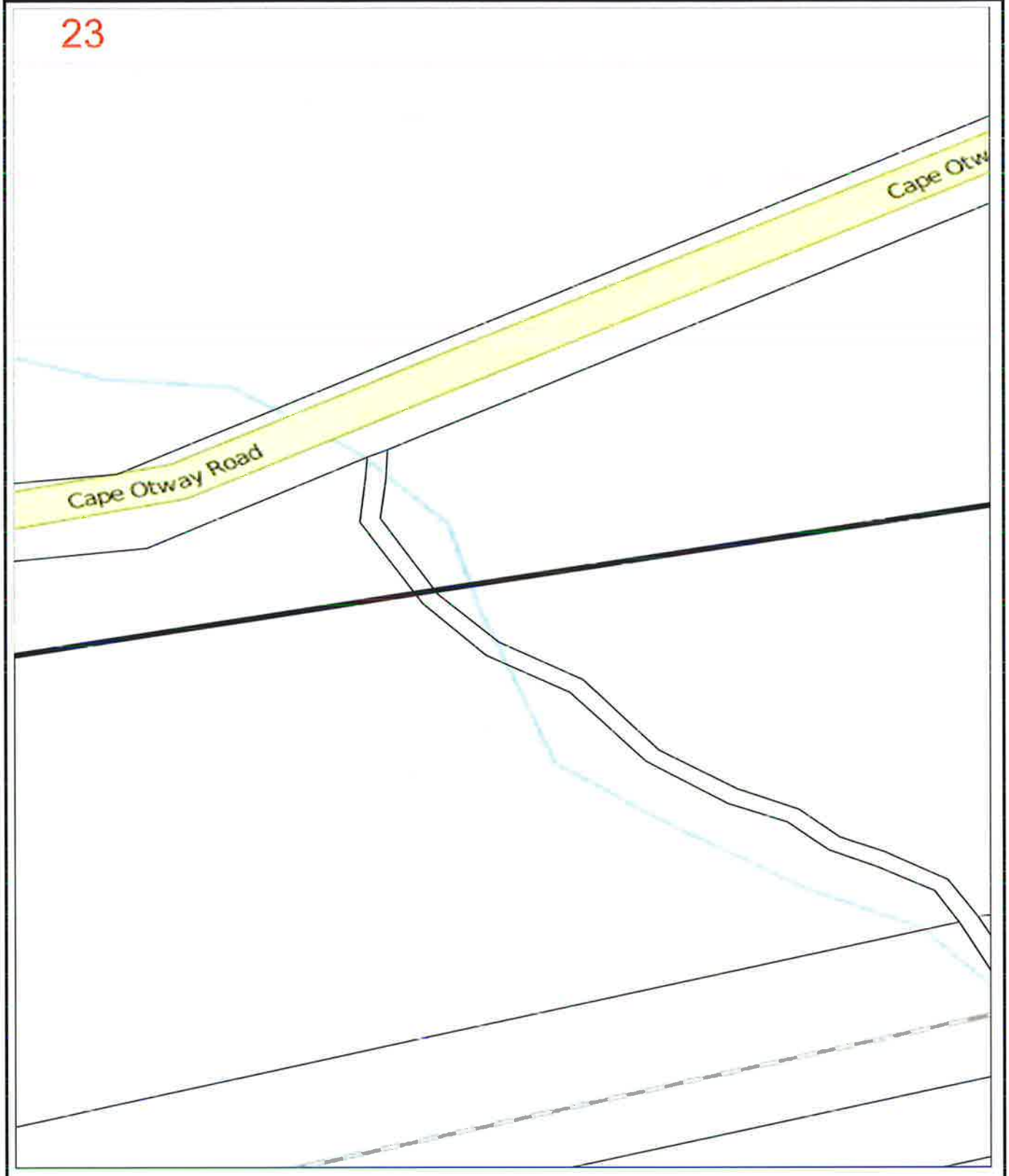
CitiPower Powercor Australia

Map 23

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

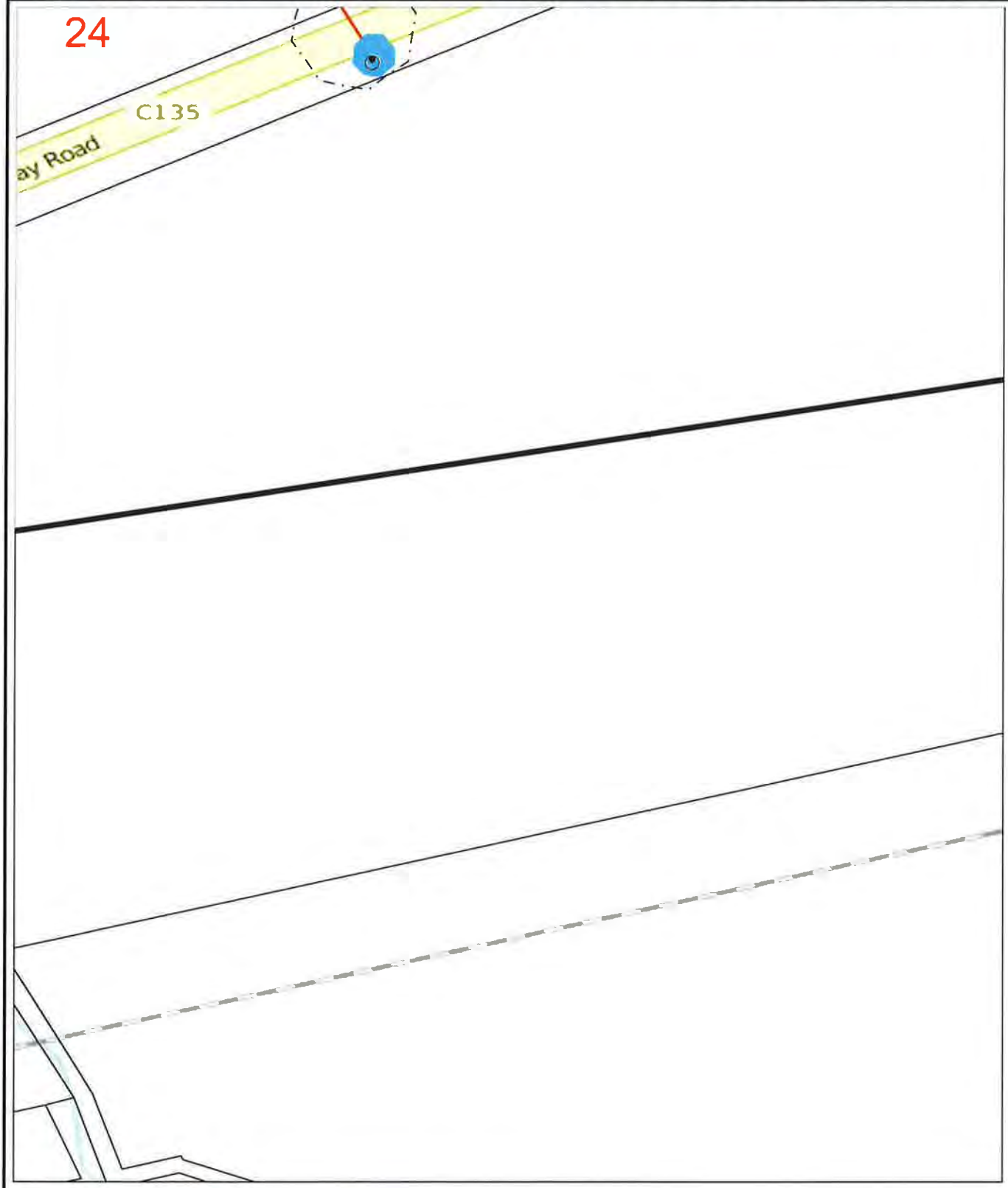
CITIPOWER Powercor AUSTRALIA

Map 24

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by x-info dbyd

Date: 11/02/2016

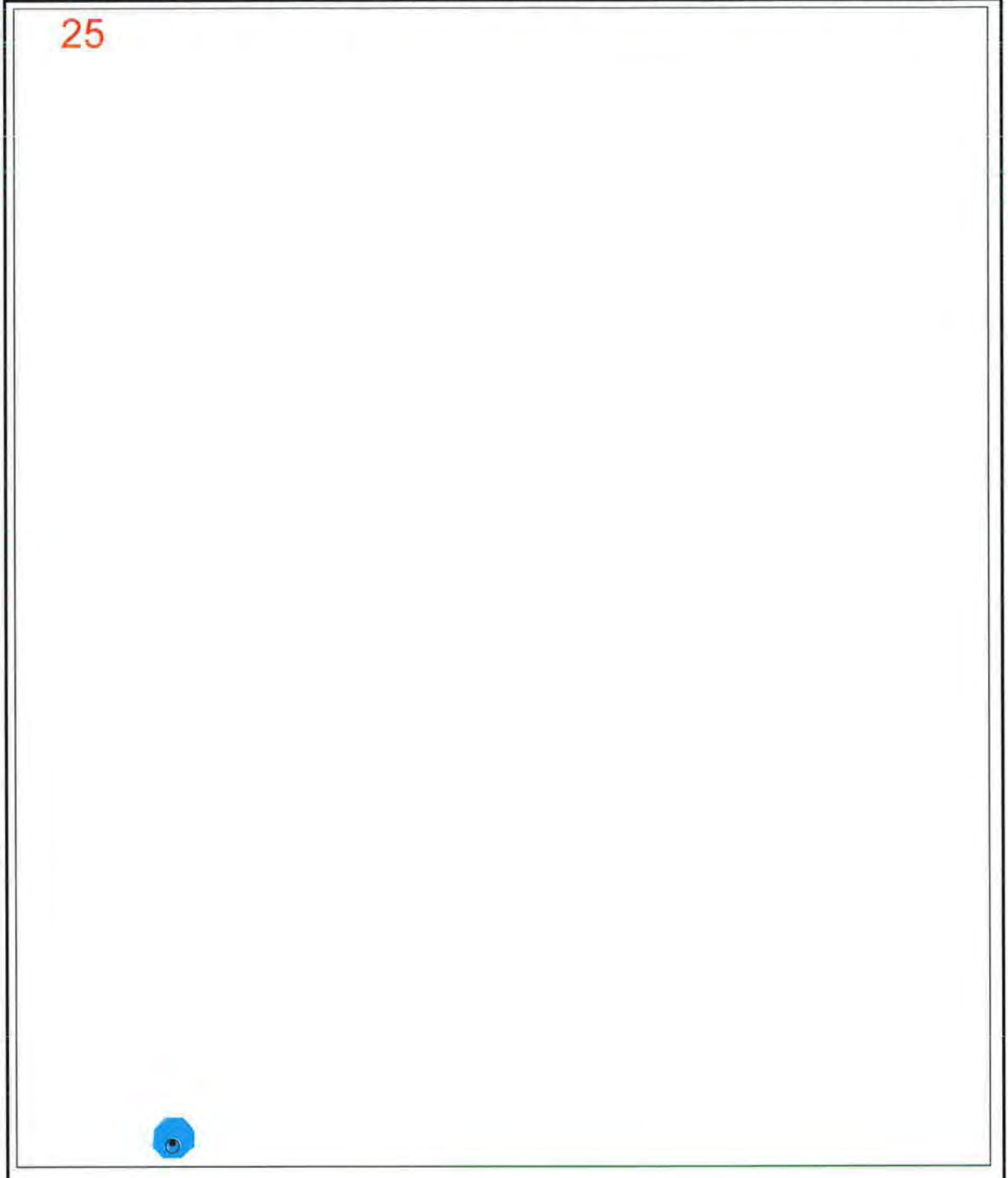
CITIPOWER Powercor AUSTRALIA

Map 25

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

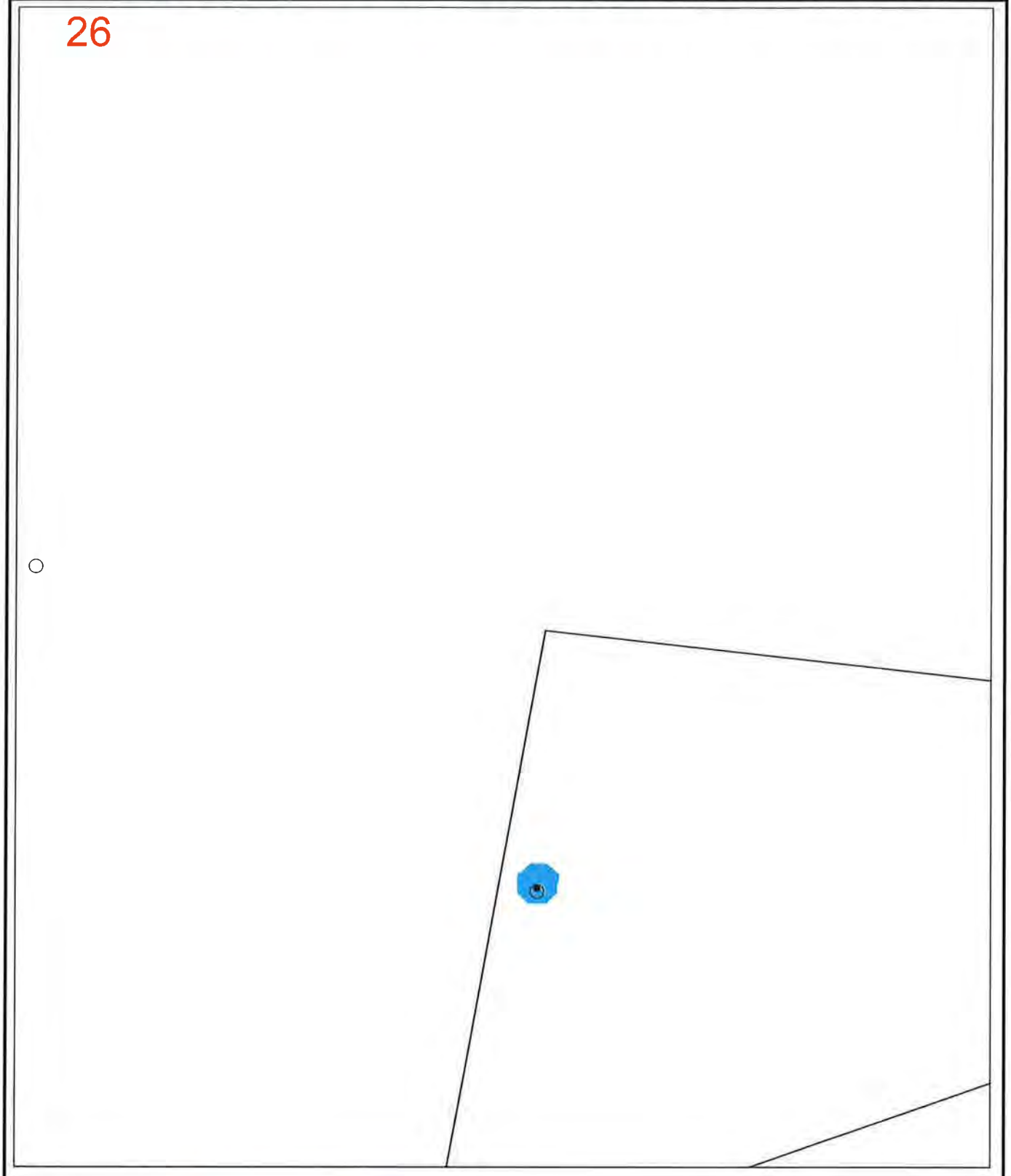
CITIPOWER Powercor AUSTRALIA

Map 26

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0 01km

N

Imagery sourced from Open StreetMaps

Powered by x-info dbyd

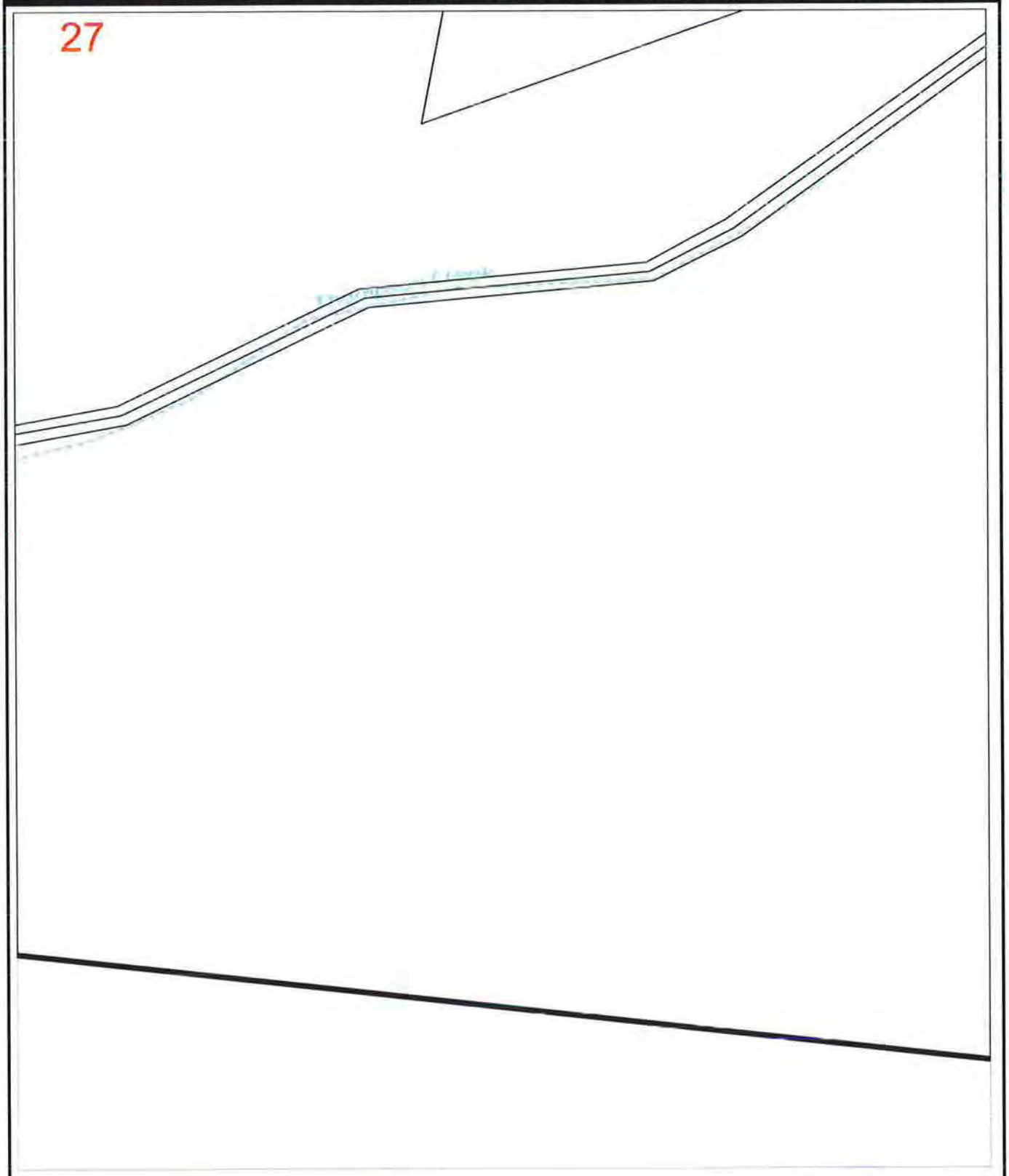
CITIPOWER Powercor AUSTRALIA

Map 27

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

Imagery sourced from Open StreetMaps

Date: 11/02/2016

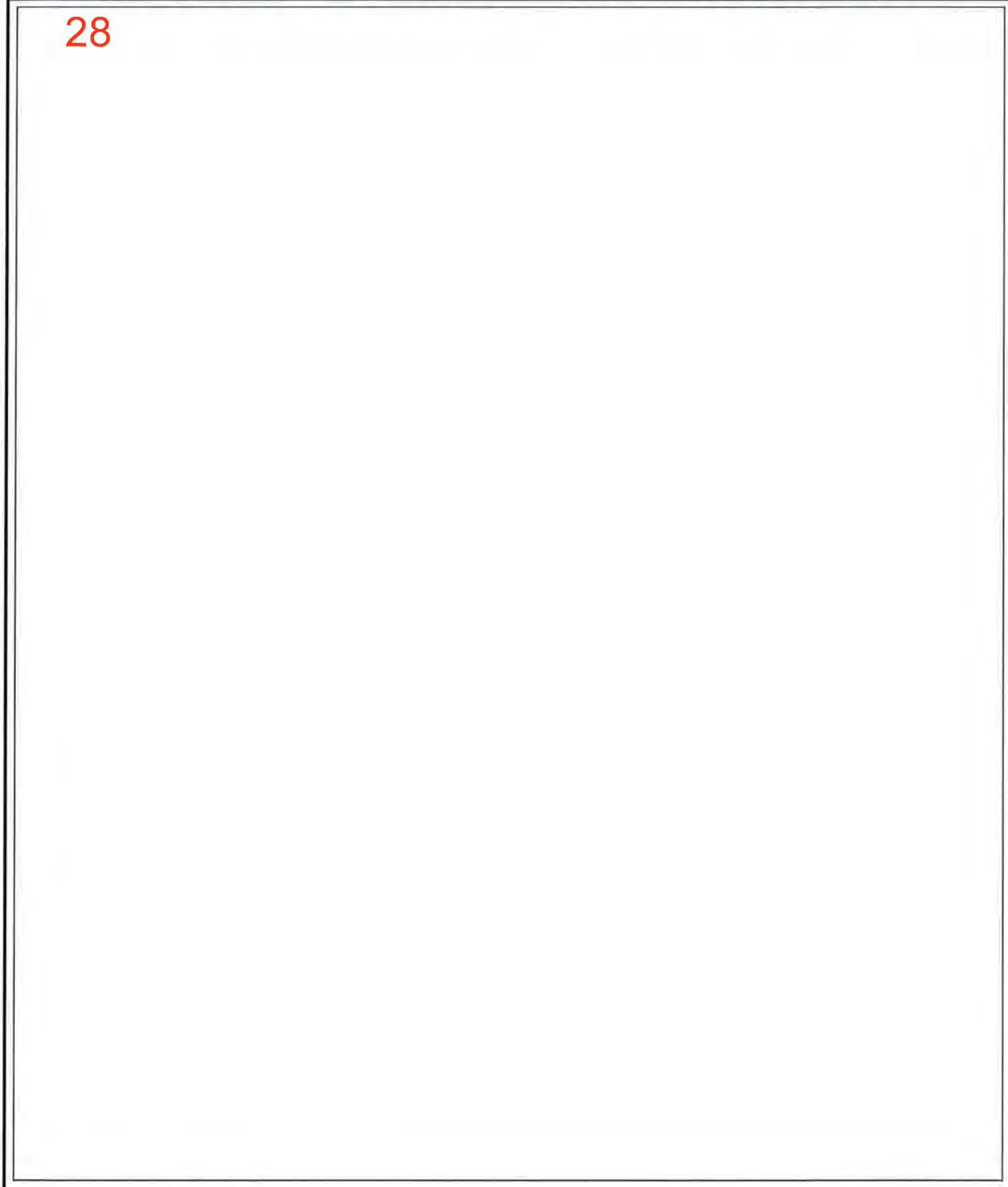
CITIPOWER Powercor AUSTRALIA

Map 28

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0 01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

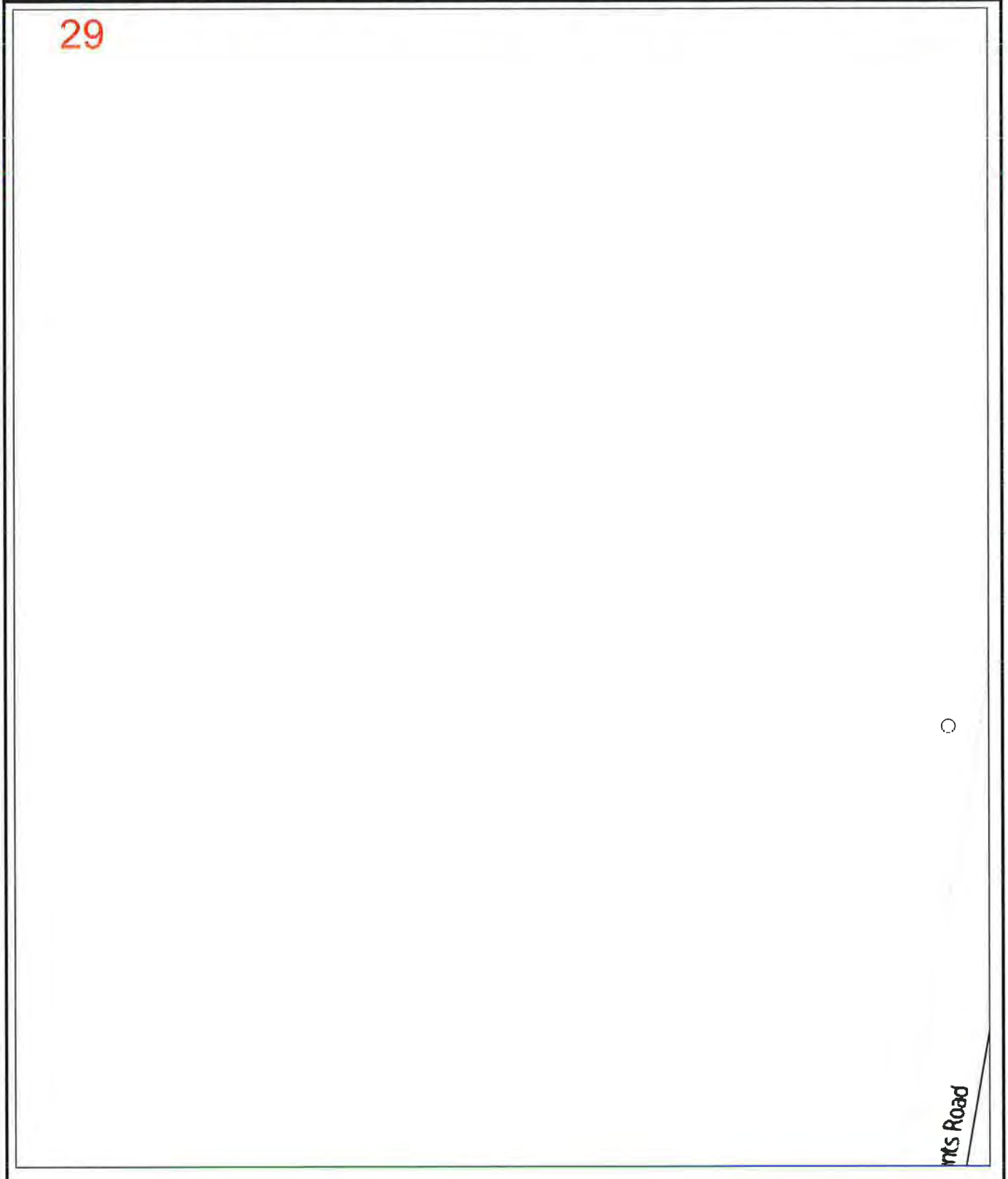
CITIPOWER Powercor AUSTRALIA

Map 29

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

Date: 11/02/2016

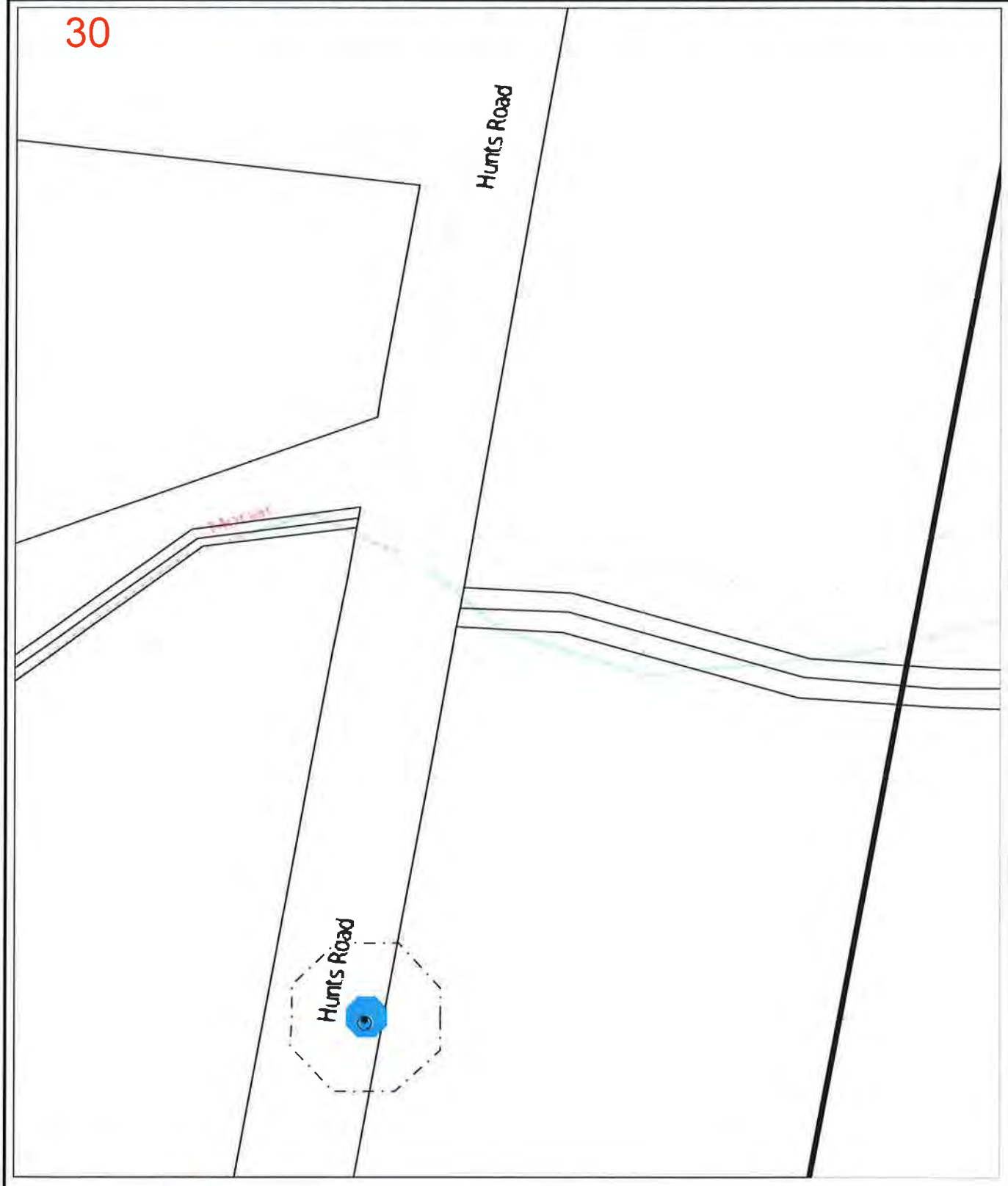
CITIPOWER Powercor AUSTRALIA

Map 30

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd x-info

Date: 11/02/2016

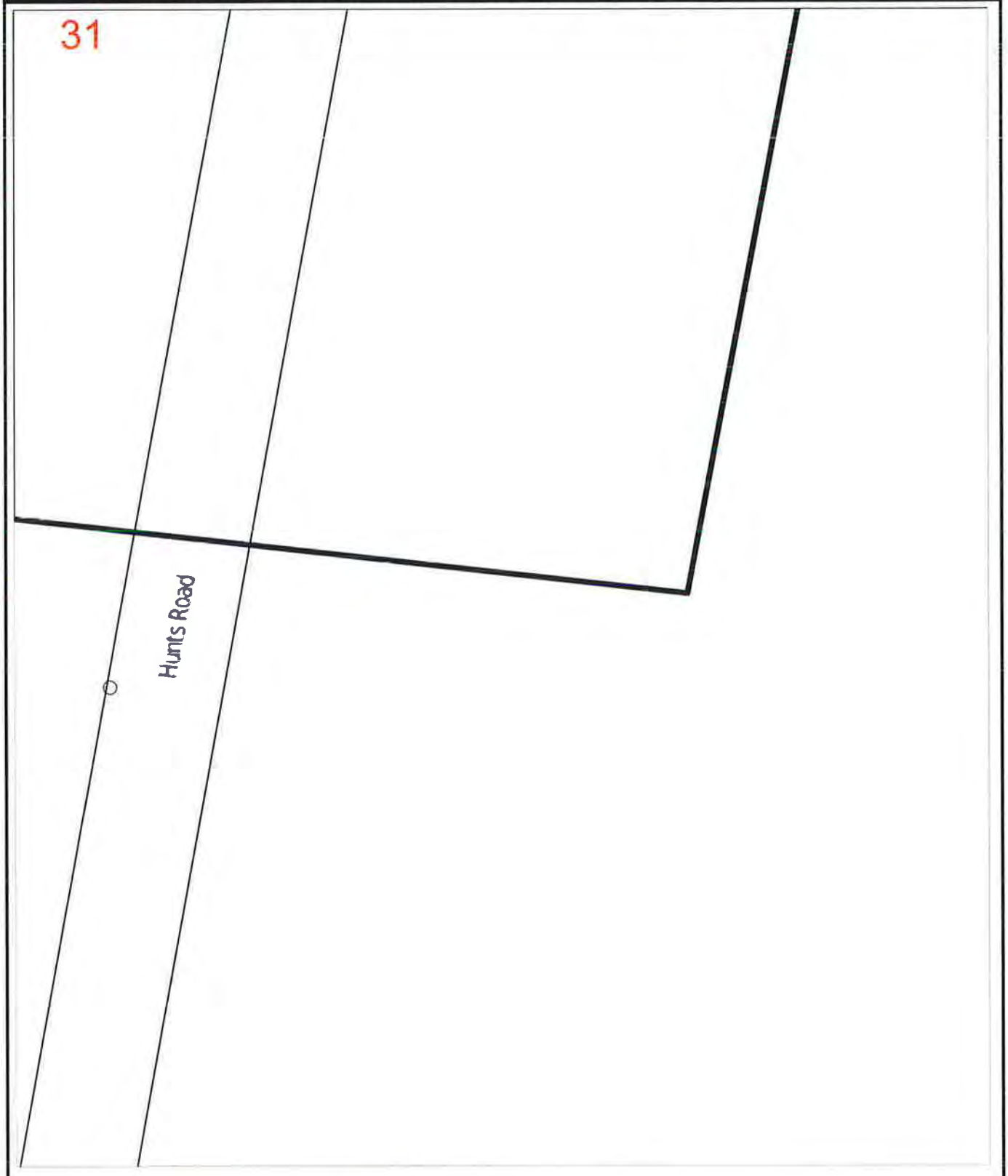
CITIPOWER Powercor AUSTRALIA

Map 31

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

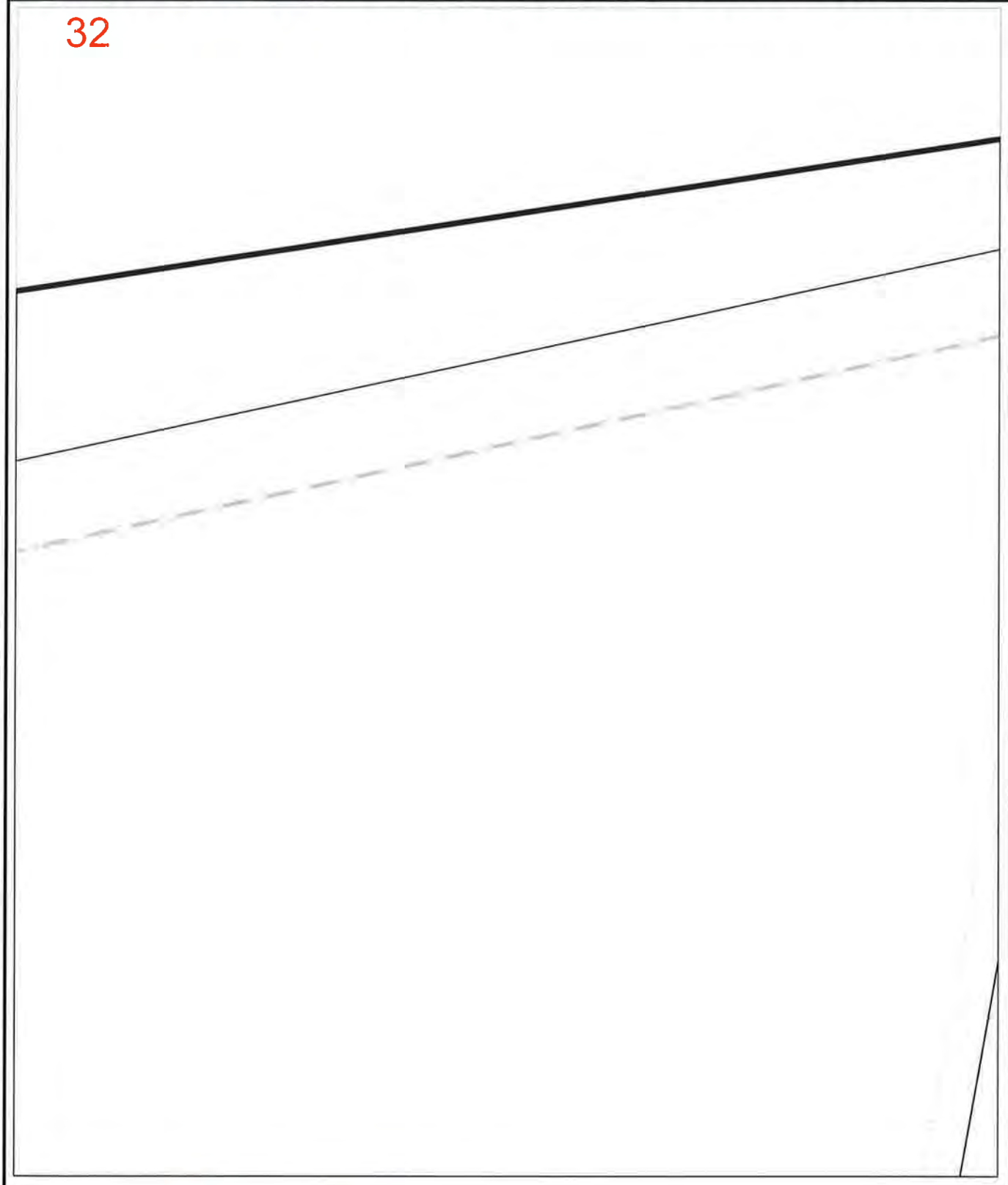
CITIPOWER Powercor AUSTRALIA

Map 32

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

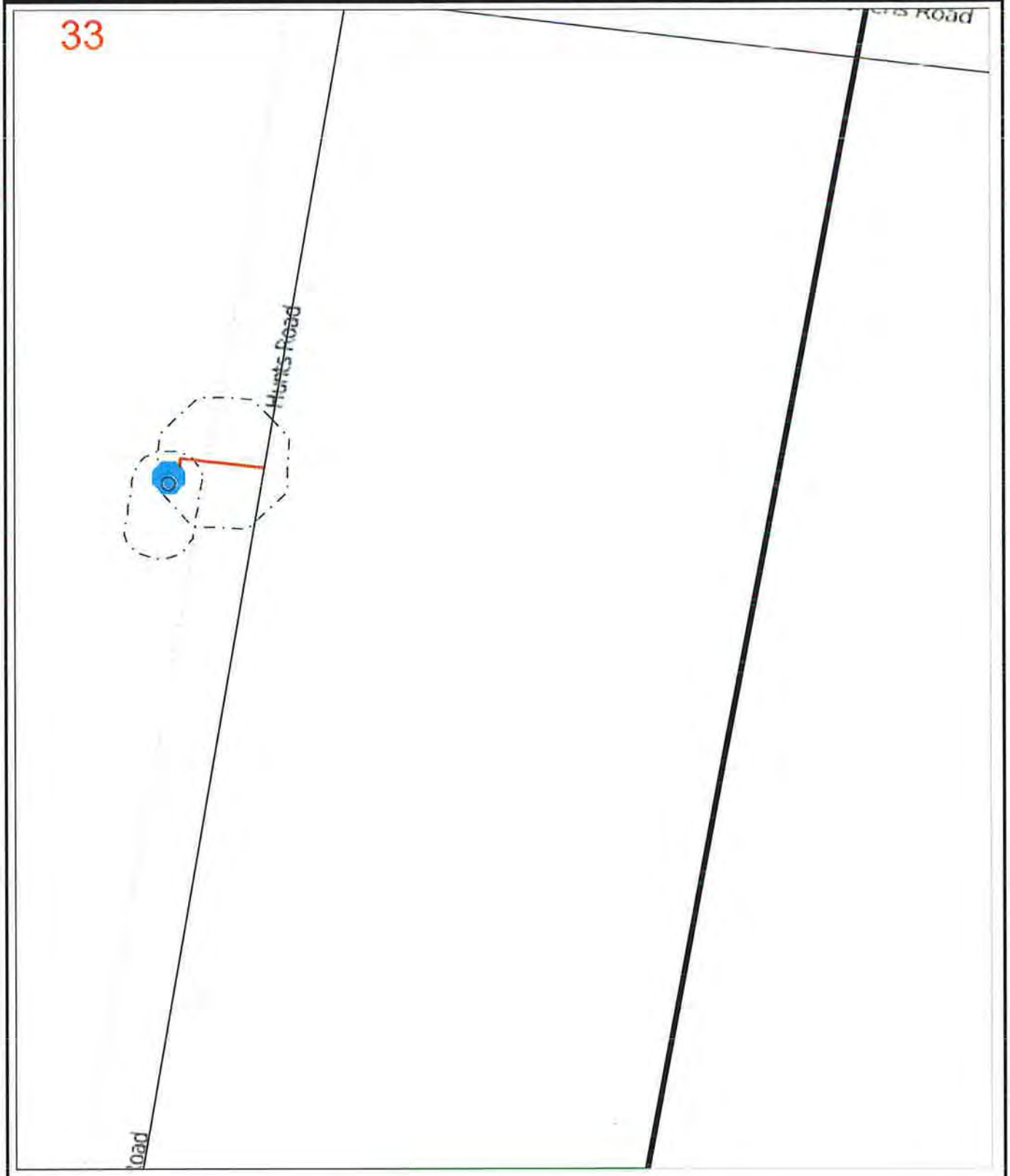
CITIPOWER Powercor AUSTRALIA

Map 33

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area

Imagery sourced from Open StreetMaps

Powered by dbyd

Date: 11/02/2016

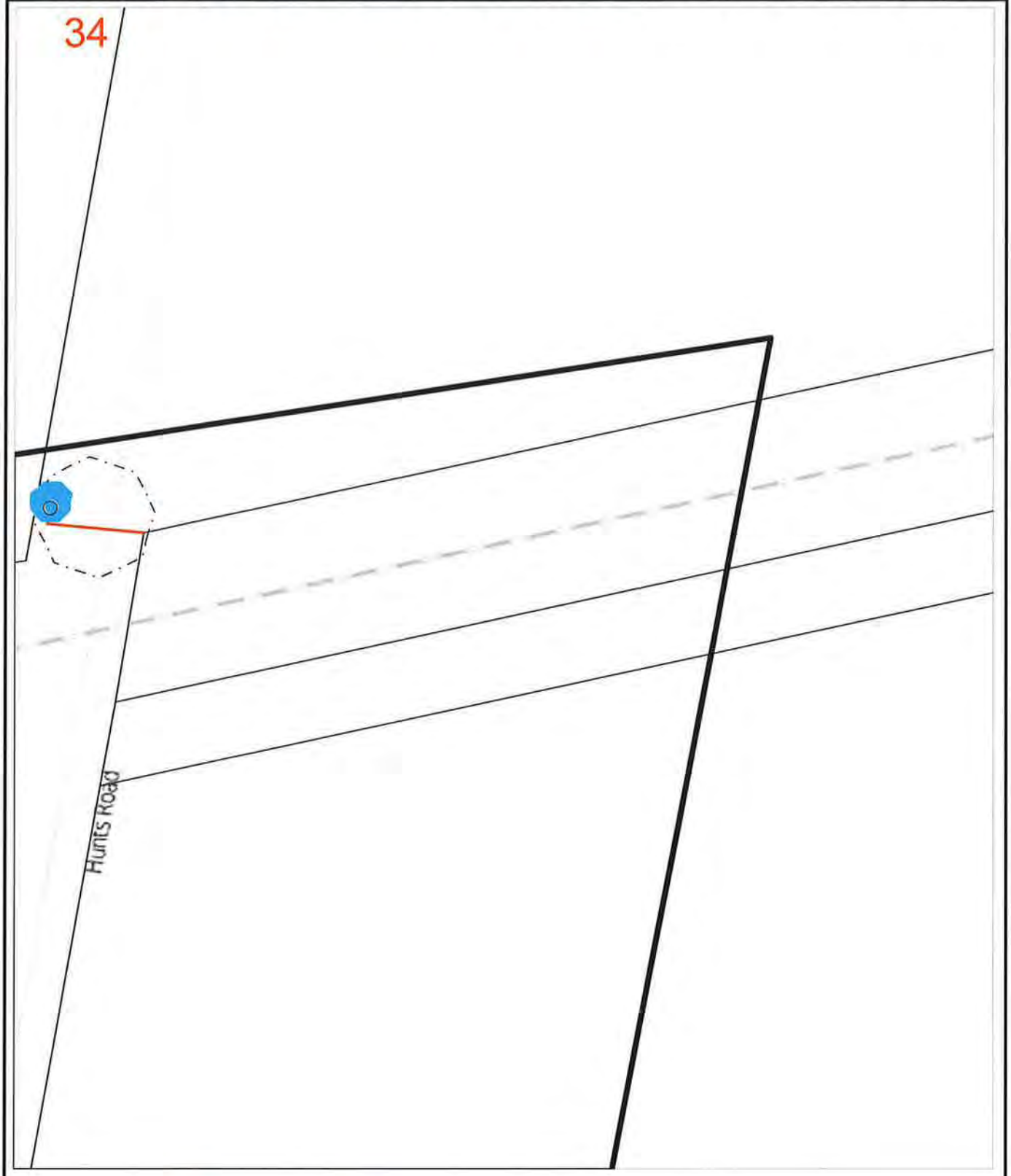
CITIPOWER Powercor AUSTRALIA

Map 34

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
SWER Substation
High Voltage Cable
Communication Cable
Pole (Subtransmission)
Pole (LV)
Zone Substation
Distribution Substation
Low Voltage Cable
Earth Cable
Pole (HV)
Property Boundary

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

0 0.01km

N

Imagery sourced from Open StreetMaps

Powered by dbyd

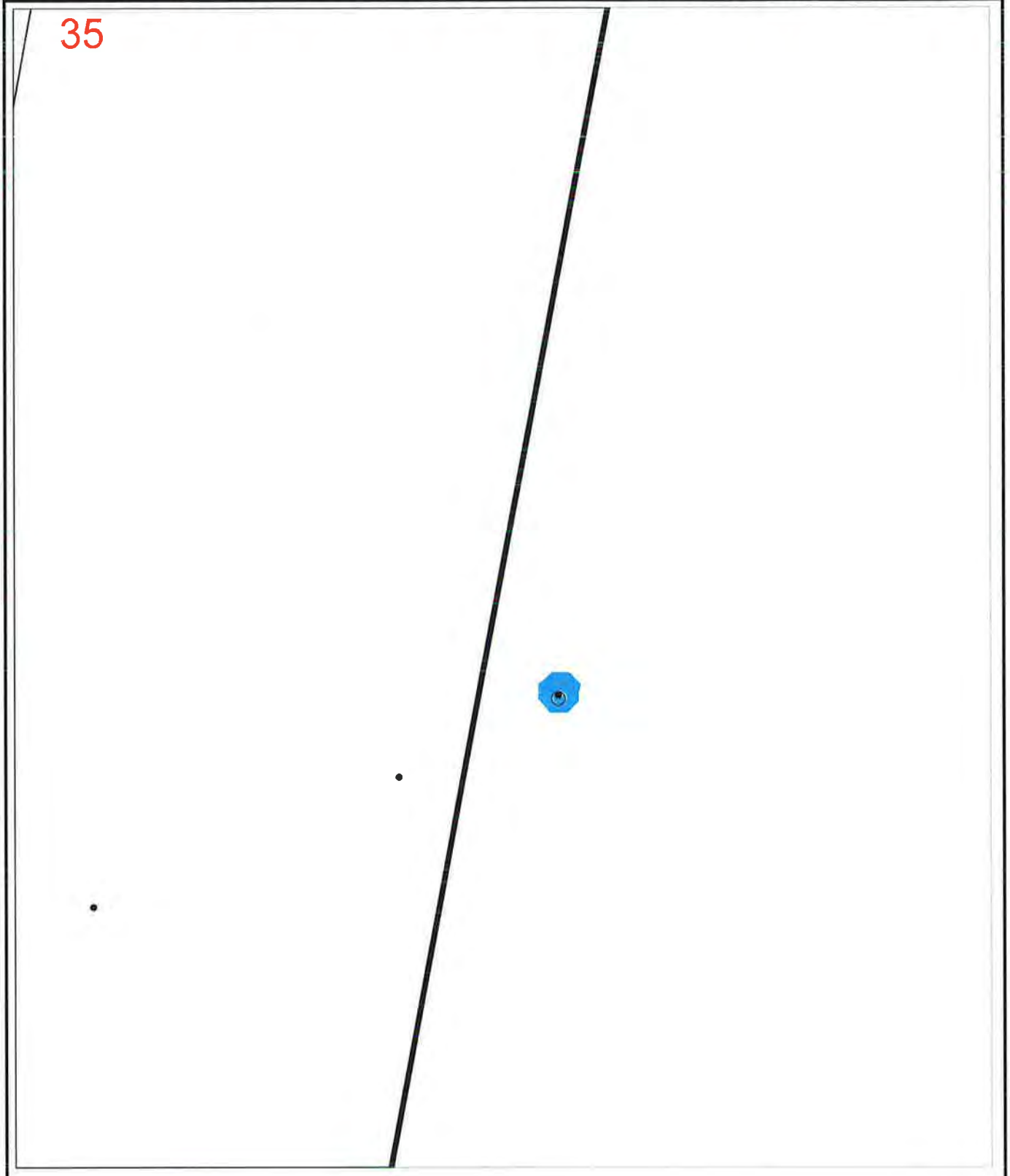
Date: 11/02/2016

Map 35

Sequence No: 50782188

815 Hendy Main Road Moriac

MAP IS A GUIDE ONLY- REFER TO CABLE PLANS FOR ACCURATE ASSET LOCATIONS



LEGEND:

DBYD Work Area
Zone Substation
SWER Substation
Distribution Substation
High Voltage Cable
Low Voltage Cable
Communication Cable
Earth Cable
Pole (Subtransmission)
Pole (HV)
Pole (LV)
Property Boundary

0 0.01km

N

This map represents the location of the submitted DBYD Work Area and all CitiPower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.

Imagery sourced from Open StreetMaps

Powered by dbyd

Dial Before You Dig (DBYD)
IMPORTANT—Conditions

DUTY OF CARE

All reasonable care has been taken to ensure that information regarding underground cables shown on this plan is accurate. Some variations from records may exist and complete accuracy cannot be guaranteed. Some underground assets of Powercor exist without any records having been established. If you observe obvious electrical cables going underground and they appear to be additional to information supplied, including "All Clear" advice, please call for further assistance.

Where CitiPower/Powercor assets are at the work site or in close proximity to proposed work, the exact position of the cable must first be determined by careful hand excavation. A Permit to Work will be required where excavation work is to be carried out within the "Exclusion Zone".

Cable cover slabs, if present, must not be disturbed.

Validity of information is only for 14 days from date of issue.

"No Go Zone" requirements for works in the vicinity of overhead powerlines must also be met.

It is your obligation to ensure that no damage injury or loss arises out of the performance of your works.

Further assistance may be obtained if necessary by telephoning CitiPower/Powercor Cable Locations on 132206

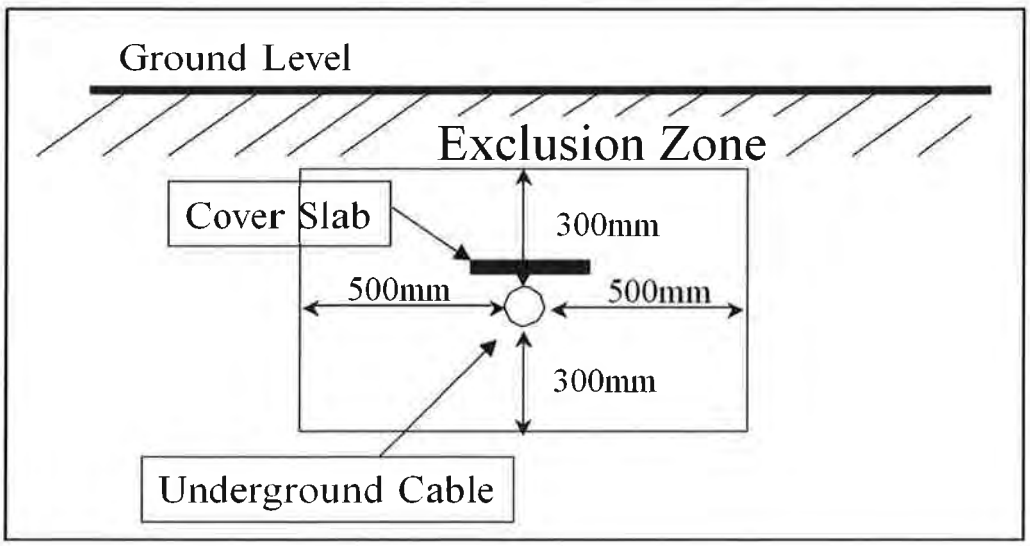
NOTE: CitiPower/Powercor does not have plans of privately owned cables on private property. e.g.-Pit to Meter Board or outside of defined easements.

PLEASE NOTE - Other Electricity Businesses or Authorities may have underground cables in the vicinity of your inquiry that CitiPower/Powercor has no records or knowledge of. e.g. Traffic Signal cables.

Conditions for Working in the Vicinity of CP/PAL Underground Cables

Permit to Work

A Permit to Work (hereinafter referred to as a Permit) is required when any excavation will result in a disturbance of the underground asset, protective cover slab or conduit. A permit is also required for any non-manual excavation work within the exclusion zone as shown below.



If the excavation is carried out very carefully with unpowered hand tools only up to the protective cover slab or conduit, will not disturb the covering, and CitiPower/Powercor has been consulted, a permit may not be required. This process is known as hand probing and is used to accurately locate underground assets adjacent the proposed worksite. A permit is not required for hand tool excavation where hand probing has established the cable location.

No excavation with mechanical excavating plant shall be carried out within the Exclusion Zone.

Dial Before You Dig (DBYD)
IMPORTANT—Conditions

Conditions for Working in the Vicinity of CP/PAL Underground Cables

Type of Protective Covers on CitiPower/Powercor Underground Cables
CitiPower/Powercor cable/s have protective covers of either

1. Concrete or P.V.C. cover slabs
2. P.V.C., A.C. or G.I. pipe conduit
3. Concrete encased P.V.C. pipe
4. Thin plastic marker tape (orange)
5. Wooden troughing

Note: Some cables are known to be buried without protective covers

In no case shall the protective covering be removed without obtaining approval from a CitiPower/Powercor Responsible Officer.

Location of Cable/s
CitiPower/Powercor takes all reasonable care to ensure that the location and level of cable/s shown on the CABLE PLANS is correct at the time of installation, however, reference points may change. Locating of the cable/s and or conduit/s by hand probing is essential when working in close proximity to them.

NOTE: CitiPower/Powercor does not accept responsibility for any inaccuracies in the maps & plans of its assets. The party carrying out any excavation irrespective if such is with or without a permit, is liable for all injury, damage and loss caused by these works. Further, the party is liable for all damage to CitiPower/Powercor underground assets.

Pole Footings and Stay Anchorages
There are specific regulations concerning excavation in the vicinity of poles or stays that must be assessed to ensure that the stability of the assets is not compromised. These regulations are applied on a site by site basis and may require permits.

Excavation using Unpowered Hand Tools
Excavation with hand tools shall be carried out with care up to but not closer than the minimum distances specified as follows:

Above Underground Asset
Where CitiPower/Powercor underground assets are protected, such as by concrete/polymeric cover slabs or excavation, careful excavation using un-powered hand tools can be done with the asset energised. This type of excavation may be allowed up to the protective cover or to the asset if no cover in place. It's important to ensure that no disturbance of the CitiPower/Powercor asset including the protective cover shall occur. Any disturbance must be reported immediately to CitiPower/Powercor on 132412

Below Underground Asset
Excavation must not be carried out below the CitiPower/Powercor underground asset unless steps are taken to ensure that no disturbance of the asset will occur. Under-crossings shall be at right angles wherever possible. Such excavation below the CitiPower/Powercor asset should not come within a distance of 300mm below the asset located at the lowest point.

During excavation any requirements on clearance to any other authorities underground assets shall be maintained.

Beside Underground Asset
Any excavation that falls within 500mm of the edge of CitiPower/Powercor underground asset shall only be undertaken under Permit conditions.

EMERGENCY CITIPOWER/POWERCOR NUMBERS

POWER FAILURE/STREET LIGHT FAILURE: **132 412** CUSTOMER ENQUIRIES: **132 206**

Note: CitiPower/Powercor also has some Transmission and Communication cable/s in Council Electricity Supply Areas.

Dial Before You Dig (DBYD)
IMPORTANT—Conditions

Conditions for Working in the Vicinity of CP/PAL Underground Cables

Mechanical Excavation Plant

Mechanical excavating plant may be used with care up to but no closer than the minimum distances specified as follows. Any work required within these distances shall be undertaken under Permit conditions. The location of the asset shall be first be proved by careful hand probing before proceeding with any work involving mechanical excavation plant. Requirements of the ESV Overhead "No Go Zone" must also be met. A suitable retaining wall barrier may be required between the work and the CP/PAL underground asset so as to prevent disturbance of the CP/PAL underground asset during the work, to the satisfaction of a CP/PAL responsible Officer.

Pole Hole Boring Machine (Vertical Boring) — Permit required within 500mm

A minimum clearance of 300mm from the edge of the CitiPower/Powercor asset shall be maintained for pole hole boring under Permit conditions.

Directional Boring Machine — Permit required within 500mm

A trench shall be dug one metre from the edge of the CitiPower/Powercor underground asset on the side from which the auger will approach, ensure a clearance of 300mm from the asset can be maintained under Permit conditions.

For directional boring parallel to CitiPower/Powercor underground asset and at the level of the asset a clearance of 500mm shall be maintained from the edge of the nearest underground asset. If boring is above or below CitiPower/Powercor underground asset a minimum clearance of 300mm shall be maintained from the edge of the nearest underground asset.

Excavating Parallel to CP/PAL Underground Asset — Permit required within 500mm

Where the excavation is being carried out parallel to the CP/PAL underground asset the following shall be ensured under Permit conditions:

1. Hand Probing shall be carried out at regular intervals of no more than 10m to prove the actual location of the CP/PAL asset.
2. The side of the excavation shall not be closer than 300mm to the nearest edge of the asset.
3. If an excavation will exceed the depth of the CP/PAL asset and/or will disturb protective covering, slab or the bedding material around the asset, CP/PAL responsible Officer is to determine if cables are to be relocated.

Excavating Across CP/PAL Underground Asset — Permit required within 500mm

Where the excavation is being carried out across the CP/PAL underground asset the following shall be ensured under Permit conditions:

1. Prior to mechanical excavation, location of CP/PAL underground asset must be proven by careful hand probing.
2. A minimum clearance of 300mm from nearest CP/PAL asset shall be maintained for all non electrical installation works.
3. In no case shall any protective covering be removed without obtaining approval from CP/PAL Responsible Officer.
4. If width and depth of excavation will expose CP/PAL asset, contact CP/PAL Responsible Officer to determine if cables are to be relocated.

Heavy (Crawler Type) Machinery — Permit required within 500mm (above the asset)

Where heavy "Crawler Type" machinery is required to carry out road works over the top of CP/PAL underground assets or ducts such as major road reconstruction, a minimum sound cover of 450mm to the top of the CP/PAL underground asset must be maintained whilst the heavy machinery is in operation.

Explosives — Permit required under all circumstances

Use of explosives within 1500mm of CP/PAL assets shall not be approved. Nevertheless, if explosives used beyond 1500mm damage CP/PAL assets the contractor responsible for blasting will be held liable for the cost of restoration.

Pile Driving — Permit required under all circumstances

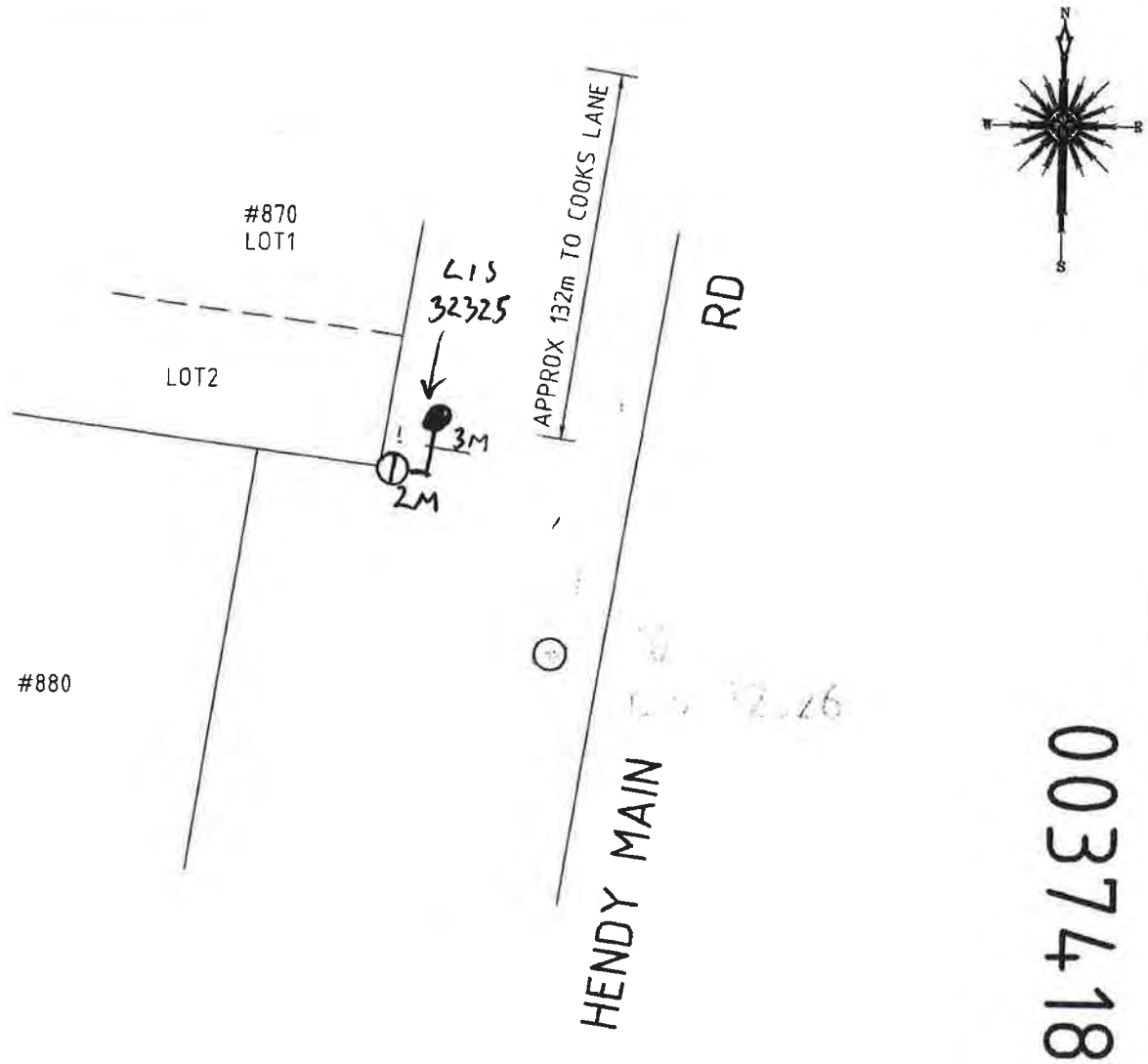
Pile driving within 1500mm of CP/PAL assets shall not be approved. The exact location and depth of all adjacent CP/PAL underground assets shall be physically proven by hand probing prior to commencement of work.

FURTHER INFORMATION

To obtain CitiPower/Powercor underground cable plan information, please contact "Dial Before you Dig" on telephone 1100. Any queries regarding precautions required for working in the vicinity of Underground Cables and to make application for a permit to work please do not hesitate to call CITIPOWER/POWERCOR GENERAL ENQUIRIES on telephone **132 206**

Route Plan - Underground Service Cable

IMDF No. 003741808



003741808

Cable Depth 600mm min (unless otherwise stated)

Scale : None

Cable Size
16mm².2/c.LV

Map Reference
Vic Roads 93

C.H.P. LIS No.
32326

PM Order No.
2082451

Draftsman
C.Waters

Date Drawn
20/1/2000

Revision

Date Revision

Address 870 HENDY MAIN RD

Locality MORIAC

IMPORTANT

USERS OF THIS PLAN PLEASE NOTE

ALL REASONABLE CARE HAS BEEN TAKEN TO ENSURE THAT INFORMATION REGARDING UNDERGROUND CABLES SHOWN ON THIS PLAN IS ACCURATE. SOME VARIATIONS FROM RECORDS MAY EXIST AND COMPLETE ACCURACY CANNOT BE GUARANTEED.

WHERE WORK IN CLOSE PROXIMITY TO A CABLE IS PROPOSED THE EXACT POSITION OF THE CABLE MUST FIRST BE DETERMINED BY CAREFUL HAND EXCAVATION. CABLE COVER SLABS IF PRESENT MUST NOT BE DISTURBED.

VALIDITY OF THE INFORMATION IS ONLY FOR ____ DAYS FROM DATE OF ISSUE

FURTHER ASSISTANCE MAY BE OBTAINED IF NECESSARY BY TELEPHONING ________

ISSUED BY ____________ DATE OF ISSUE

LEGEND

- HV UNDERGROUND CABLE (35 3/c 22 kV U.O.S.)
- LV UNDERGROUND MAINS CABLE (120 3/c LV U.O.S.)
- UNDERGROUND SERVICE CABLE (16 3/c LV U.O.S.)
- UNDERGROUND PUBLIC LIGHTING CABLE (6 2/c LV U.O.S.)
- UNDERGROUND CABLE TEE JOINT
- UNDERGROUND CABLE STRAIGHT JOINT
- UNDERGROUND CABLE INSULATED END
- UNDERGROUND CABLE SEALED END
- PARALLELING PILLAR
- LV CABLEHEAD POLE
- HV CABLEHEAD POLE
- CABLE CONDUIT (63mm O.D. U.O.S.)
- SERVICE PIT
- PUBLIC LIGHT & COLUMN (80W M.V. U.O.S.)
- DEPTH TO TOP OF CABLE
- DEPTH TO TOP OF OBSTRUCTION
- T.P. TANGENT OR TURNING POINT
- I.P. INTERSECTION POINT
- D.P. DEEP POINT
- E.O.D. END OF DUCT
- PROJ PROJECTION
- B/L BUILDING LINE
- B.O.K. BACK OF KERB

ALL CABLES EXCEPT WHERE IN DUCTS ARE COVERED WITH PLASTIC SLABS

CHAINAGES ARE MEASURED ALONG BACK OF KERB UNLESS OTHERWISE STATED

ORIGINAL SCALE 1 : 500

WORK No	[illegible]
JOB NUMBER	[illegible]
SYSTEM REFERENCE	[illegible]
SYSTEM SHEET	[illegible]
MELWAY REFERENCE	[illegible]
SWITCHING ZONE No	[illegible]

DATE	REV	REVISION DESCRIPTION		PROJECT OFFICER
[illegible]	A	LV PILLAR BASE & COVER ADDED	[illegible]	[illegible]
[illegible]	B	CABLE SIZES REVISED	[illegible]	[illegible]
[illegible]	A	FINAL PICKUP DETAILS ADDED	[illegible]	[illegible]

DRAWN: R. HUTCHINSON — PROJECT OFFICER: R. HUTCHINSON — 12/2/1998 for D. & S.S. MANAGER — 13/2/1998 for NETWORK MANAGER

POWERCOR AUSTRALIA LIMITED
DESIGN & SUPPORT SERVICES – GEELONG
P.O. BOX 145
GEELONG VICTORIA 3220

DRG No VD5/468/2 'A'

UNDERGROUND CABLE LAYOUT
MORIAC MEADOWS ESTATE STAGE 3
BUTTERCUP DRIVE
MORIAC

678 x 574 — A1

ROUTE PLAN UNDERGROUND SERVICE CABLE

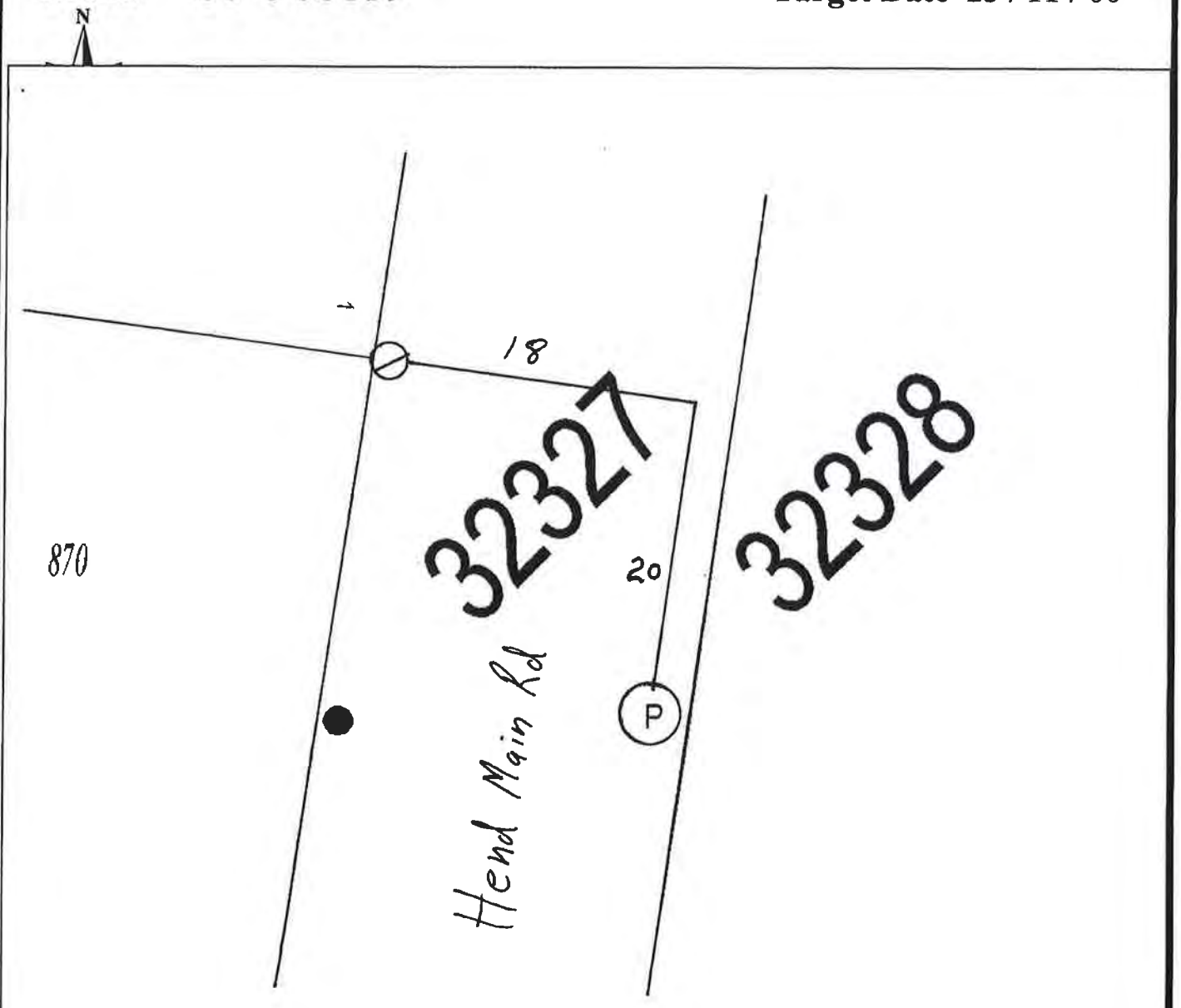
PM Order No. 2129736 **LIS # 32328** **Date Job Completed 03 /12 /00**

Address 870 Hendy Main Road Modewarre

Cable Size 4 x 16 mm sq CFA, Vic Roads 93 D5 Melway Date 26 /10 /00

N.T.S.

IDMF # 003900659 **Target Date 23 / 11 / 00**



Ring 52467563 on day of construction **CIVIL WORKS BY P/S**

CONTACT OFFICER :- MICK WILLIAMS **POWERCOR** **TELEPHONE: 03 52467563**

PIT PLAN TEMPLATE

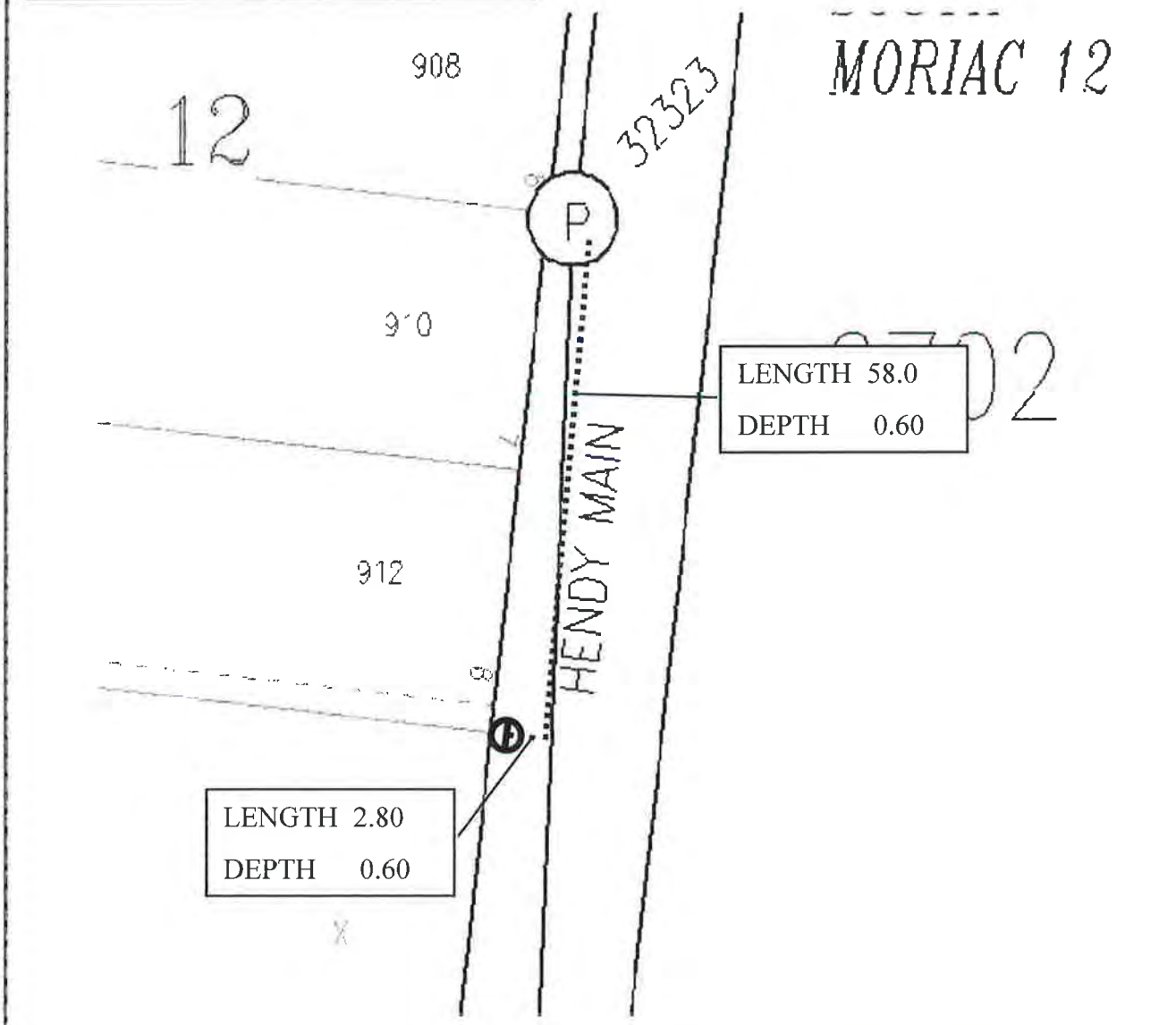
Address 914 HENDY MAIN RD

Locality MORIAC

Installation Date 18/07/06 **CABLE SIZE** 4 C 35 mm xlpe **type**

Not to Scale	SERVICE PIT U/G CABLE O/HEAD CABLE	HV POLE SUBSTATION	LV POLE CUSTOMER PILLAR

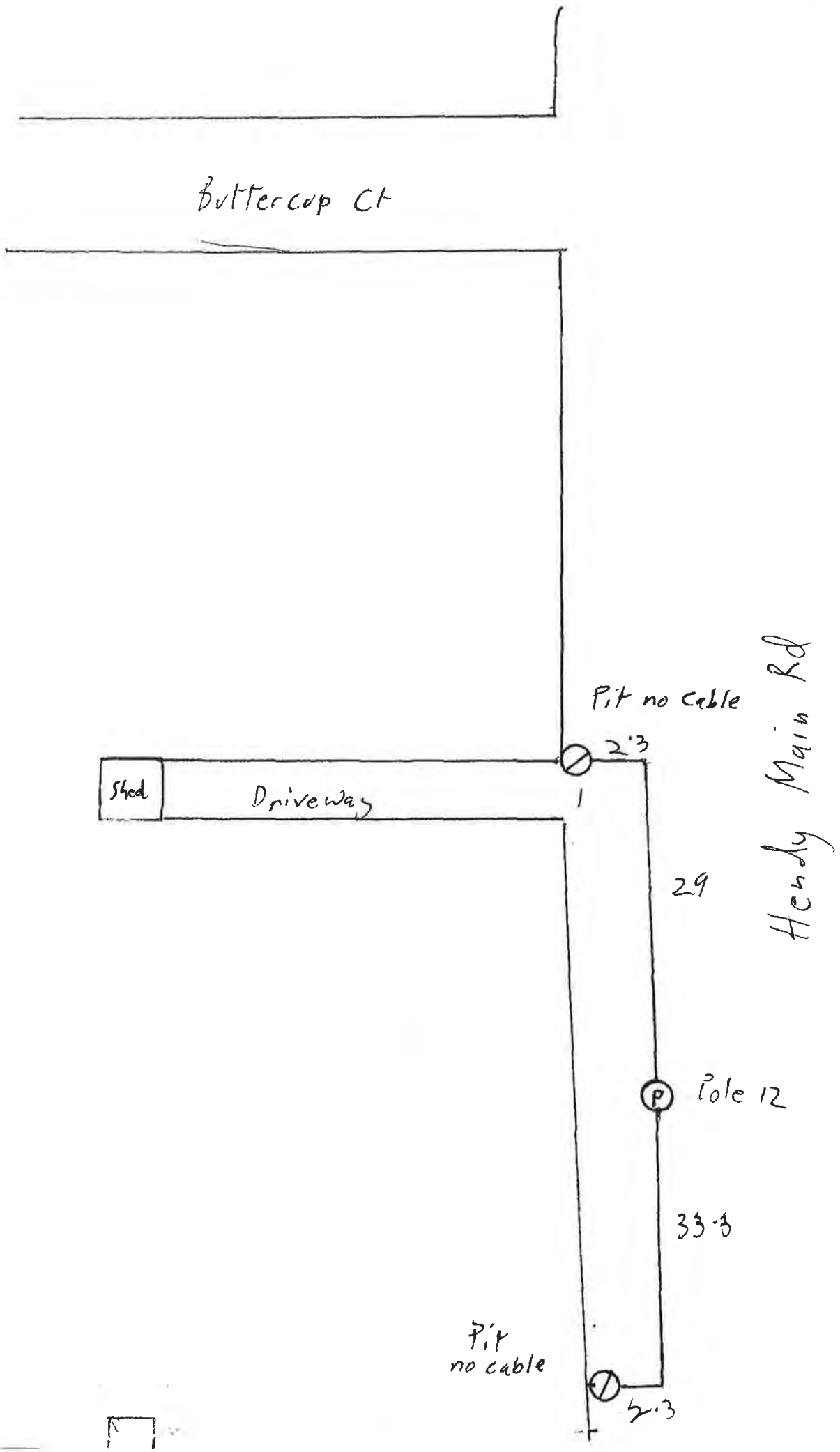
Refer : SOUTH MORIAC 12 S/STN



ALL MEASUREMENTS IN METRES

POWERCOR USE ONLY

PM ORDER NUMBER	2518966	LIS NUMBER	32323-8121
CPM REF	C11361	POWERCOR CONTACT CENTRE 132 206	
BUSINESS CENTRE	GEELONG		
VIC ROADS / MELWAYS REF	94 D6	DRAWING NUMBER	


Buttercup Ct
Pit no cable
2·3
Shed
Driveway
1
29
Hendy Main Rd
P
Pole 12
33·3
Pit
no cable
2·3

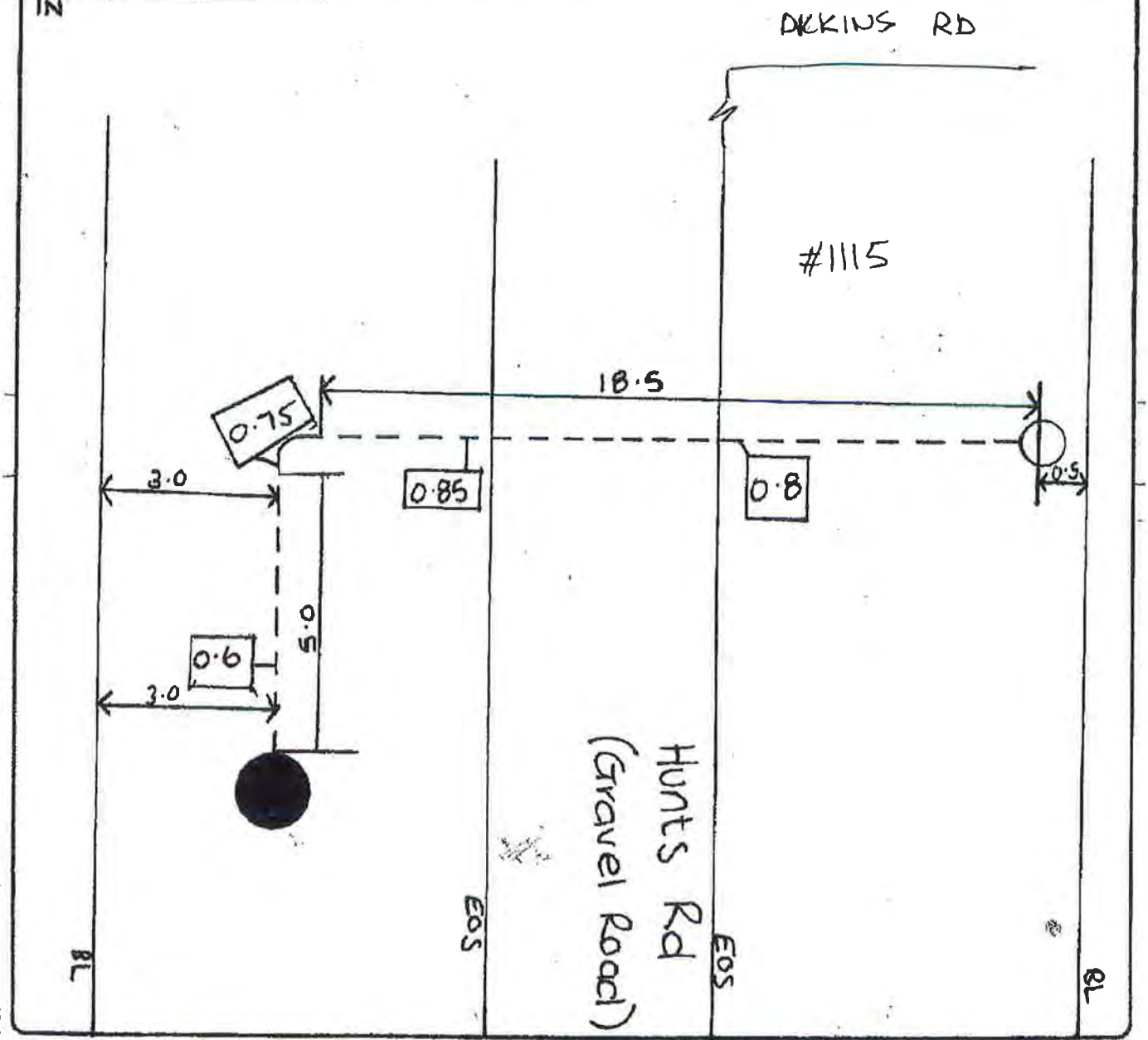
UNDERGROUND SERVICE CABLE INSTALLATION / ALTERATION

ADDRESS	1115 DICKINS ROAD						SUBURB	FRESHWATER CREEK	
CABLE DETAILS	SIZE	CORES	TYPE	CONDUCTOR	CONNECTION	DATE INSTALLED	24·2·10	POLE NUMBER	777352
	16	4	XLPE	Cu / Al	FOLCB / FSD				
INSTALLER	PS TRENCHING								

UNDERGROUND CABLE	SERVICE PIT	LV POLE (GENERAL)	POLE SUBSTATION
OVERHEAD LINE	SERVICE PIT (ROADWAY)	SERVICE CONNECTION FACILITY	SERVICE PILLAR

SERVICE CABLE IN 1x63 HD PVC CONDUIT UNLESS OTHERWISE STATED

NOTES:



PROJECT NUMBER	1176069
BUSINESS CENTRE	GEELONG
CONTACT OFFICER	S·CLEELAND
ROAD DIRECTORY	93 E6
BASE PLAN No.	

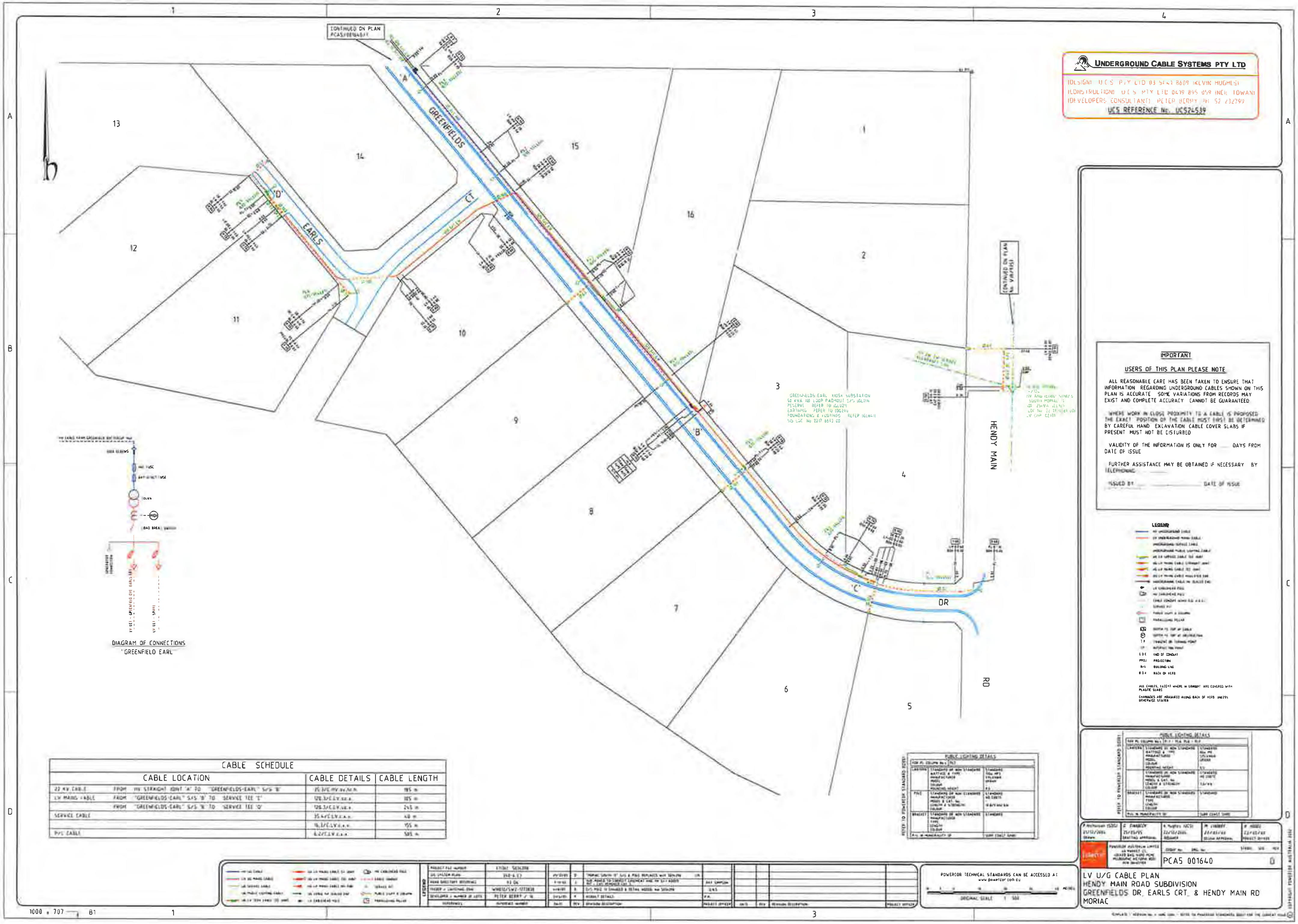
CITIPOWER

Electricity Networks
Locked Bag 14090
Melbourne 8001
www.citipower.com.au
www.powercor.com.au

SCALE		MEASUREMENTS ARE IN METRES	
DRAWING NUMBER	PCA50/5062316 B		
DRAWN	CHECKED	OP/CA APPROVED	

REVISION : B REVISED ADDRESS & SUBURB

Electricity Networks - EN UG CABLE POLE TO PIT A4-V1.0


UNDERGROUND CABLE SYSTEMS PTY LTD
(DESIGN) U.C.S. PTY LTD 03 5243 8609 (KELVIN HUGHES)
(CONSTRUCTION) U.C.S. PTY LTD 0419 895 059 (NICK TOWAN)
(DEVELOPERS CONSULTANT) PETER BERRY PH 52 232799
UCS REFERENCE No. UCS24539
IMPORTANT
USERS OF THIS PLAN PLEASE NOTE
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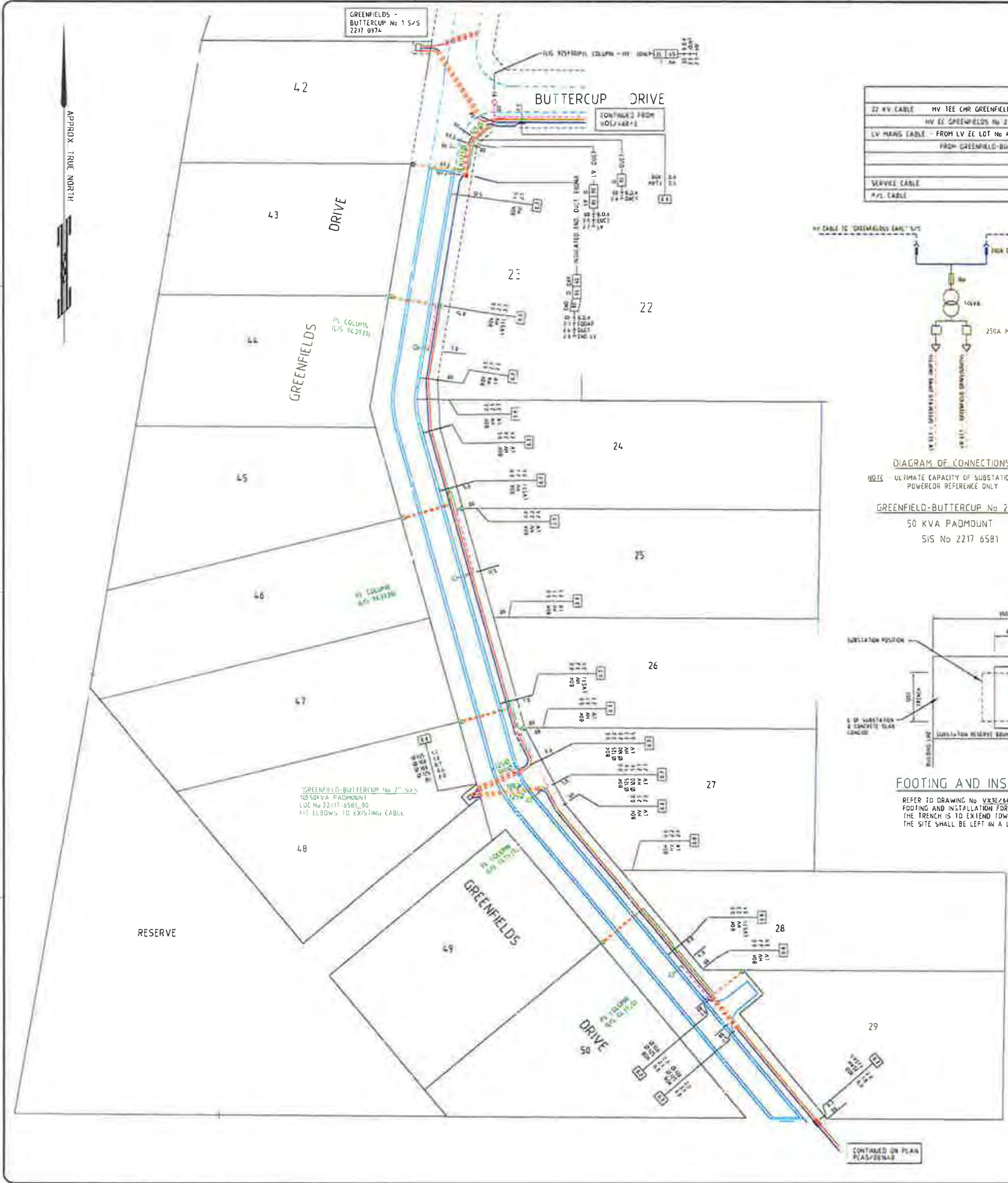
WHERE WORK IN CLOSE PROXIMITY TO A CABLE IS PROPOSED THE EXACT POSITION OF THE CABLE MUST FIRST BE DETERMINED BY CAREFUL HAND EXCAVATION. CABLE COVER SLABS IF PRESENT MUST NOT BE DISTURBED
VALIDITY OF THE INFORMATION IS ONLY FOR ___ DAYS FROM DATE OF ISSUE
FURTHER ASSISTANCE MAY BE OBTAINED IF NECESSARY BY TELEPHONING ___
ISSUED BY ___ DATE OF ISSUE
LEGEND
GREENFIELDS
EARLS
CT
DR
HENDY MAIN
RD
CONTINUED ON PLAN
DIAGRAM OF CONNECTIONS
"GREENFIELD EARL"
CABLE SCHEDULE
CABLE LOCATION | CABLE DETAILS | CABLE LENGTH
22 KV CABLE FROM HV STRAIGHT JOINT 'A' TO "GREENFIELDS-EARL" S/S 'B' | 185 m
LV MAINS CABLE FROM "GREENFIELDS-EARL" S/S 'B' TO SERVICE TEE 'C' | 185 m
FROM "GREENFIELDS-EARL" S/S 'B' TO SERVICE TEE 'D' | 245 m
SERVICE CABLE | 48 m
| 155 m
P/C CABLE | 585 m
PUBLIC LIGHTING DETAILS
POWERCOR TECHNICAL STANDARDS CAN BE ACCESSED AT www.powercor.com.au
ORIGINAL SCALE 1 : 500
PCA5 001640
LV U/G CABLE PLAN
HENDY MAIN ROAD SUBDIVISION
GREENFIELDS DR, EARLS CRT, & HENDY MAIN RD
MORIAC
1000 x 707 B1



CABLE SCHEDULE

CABLE LOCATION	CABLE DETAILS	LENGTH
22 KV CABLE HV TEE CNR GREENFIELDS & BUTTERCUP TO GREENFIELD-BUTTERCUP No 2 S/S	35 3/C 22 [illegible]	[illegible]
HV EC GREENFIELDS No 2 S/S TO LOT 29 GREENFIELDS DR	[illegible]	[illegible]
LV MAINS CABLE - FROM LV EC LOT No 44 GREENFIELDS DRIVE TO GREENFIELD BUTTERCUP No 2 S/S	[illegible]	[illegible]
FROM GREENFIELD-BUTTERCUP No 2 S/S TO LV EC LOT 29 GREENFIELDS DRIVE	[illegible]	[illegible]
SERVICE CABLE	[illegible]	[illegible]
P/L CABLE	[illegible]	[illegible]

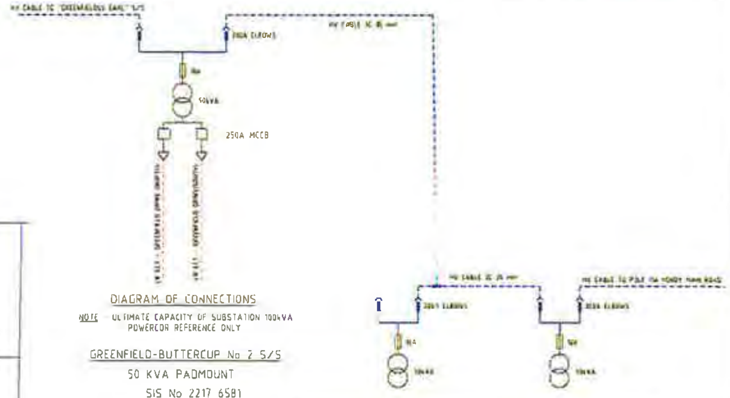


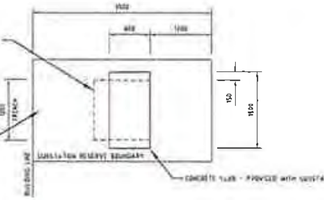
DIAGRAM OF CONNECTIONS

NOTE ULTIMATE CAPACITY OF SUBSTATION 100kVA POWERCOR REFERENCE ONLY

GREENFIELD-BUTTERCUP No 2 S/S
50 KVA PADMOUNT
SIS No 2217 6581

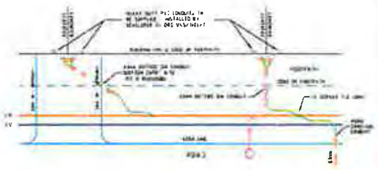
GREENFIELDS BUTTERCUP No 1 S/S
SIS No 2217 0974

BUTTERCUP BLUEBELL S/S
SIS No 2217 3936



FOOTING AND INSTALLATION DETAILS

REFER TO DRAWING No VX30/64/72 FOR TRENCH FOOTING AND INSTALLATION FOR 100kVA PAD MOUNT SUBSTATION. THE TRENCH IS TO EXTEND TOWARD THE ROAD FRONTAGE OF THE EASEMENT. THE SITE SHALL BE LEFT IN A LEVEL CLEAN CONDITION.



TYPICAL PIT INSTALLATIONS

NOT TO SCALE

IMPORTANT

USERS OF THIS PLAN PLEASE NOTE

ALL REASONABLE CARE HAS BEEN TAKEN TO ENSURE THAT INFORMATION REGARDING UNDERGROUND CABLES SHOWN ON THIS PLAN IS ACCURATE. SOME VARIATIONS FROM RECORDS MAY EXIST AND COMPLETE ACCURACY CANNOT BE GUARANTEED.

WHERE WORK IN CLOSE PROXIMITY TO A CABLE IS PROPOSED THE EXACT POSITION OF THE CABLE MUST FIRST BE DETERMINED BY CAREFUL HAND EXCAVATION. CABLE COVER SLABS IF PRESENT MUST NOT BE DISTURBED.

VALIDITY OF THE INFORMATION IS ONLY FOR ____ DAYS FROM DATE OF ISSUE

FURTHER ASSISTANCE MAY BE OBTAINED IF NECESSARY BY TELEPHONING ________

ISSUED BY ________ DATE OF ISSUE

LEGEND

ALL CABLES EXCEPT WHERE IN CONDUITS ARE COVERED WITH PLASTIC SLABS

CHAINAGES ARE MEASURED ALONG BACK OF KERB UNLESS OTHERWISE STATED

ORIGINAL SCALE 1 : 500

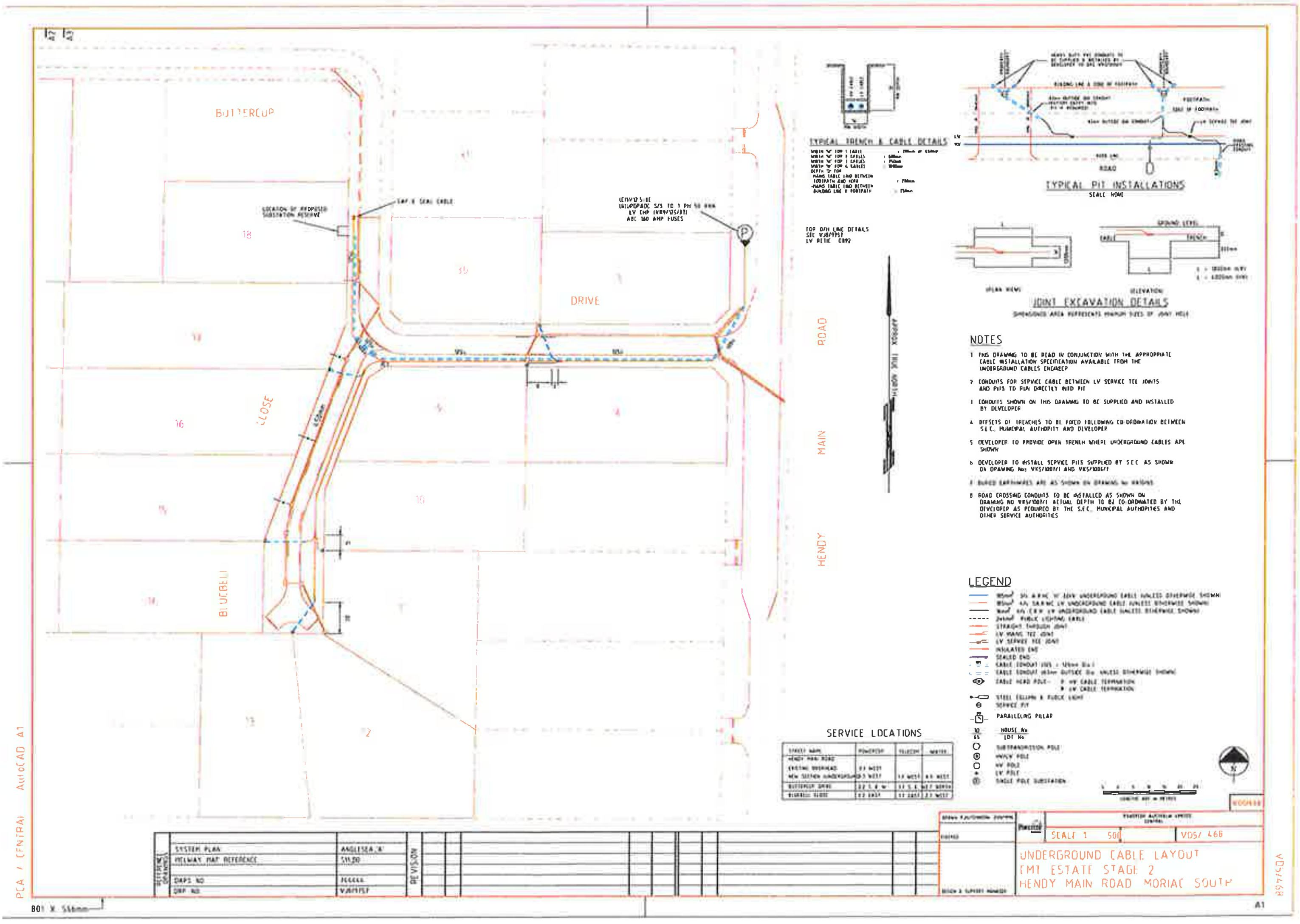
DRG No PCA5/001640/1D

POWERCOR AUSTRALIA LIMITED
DESIGN & SUPPORT SERVICES GEELONG
P.O. BOX 185
GEELONG VICTORIA 3220

HV & LV U/G CABLE PLAN
MORIAC MEADOWS ESTATE STAGE 5
GREENFIELDS DRIVE
MORIAC

URD PLAN PLOTTED USING A PCL

A1


UNDERGROUND CABLE LAYOUT
EMT ESTATE STAGE 2
HENDY MAIN ROAD MORIAC SOUTH
SCALE 1 : 500
VD5/ 468
A1
801 X 566mm
PCA / CENTRAL AutoCAD A1
SYSTEM PLAN
MELWAY MAP REFERENCE
DAPS NO
DRP NO
ANGLESEA 'A'
REVISION
HENDY MAIN ROAD
DRIVE
CLOSE
BLUEBELL
BUTTERCUP
LOCATION OF PROPOSED SUBSTATION RESERVE
SERVICE LOCATIONS
TYPICAL TRENCH & CABLE DETAILS
TYPICAL PIT INSTALLATIONS
SCALE NONE
ROAD
JOINT EXCAVATION DETAILS
PLAN VIEWS
ELEVATION
GROUND LEVEL
TRENCH
CABLE
APPROX TRUE NORTH
NOTES
1 THIS DRAWING TO BE READ IN CONJUNCTION WITH THE APPROPRIATE CABLE INSTALLATION SPECIFICATION AVAILABLE FROM THE UNDERGROUND CABLES ENGINEER
2 CONDUITS FOR SERVICE CABLE BETWEEN LV SERVICE TEE JOINTS AND PITS TO RUN DIRECTLY INTO PIT
3 CONDUITS SHOWN ON THIS DRAWING TO BE SUPPLIED AND INSTALLED BY DEVELOPER
4 OFFSETS OF TRENCHES TO BE FIXED FOLLOWING CO-ORDINATION BETWEEN S.E.C., MUNICIPAL AUTHORITY AND DEVELOPER
5 DEVELOPER TO PROVIDE OPEN TRENCH WHERE UNDERGROUND CABLES ARE SHOWN
6 DEVELOPER TO INSTALL SERVICE PITS SUPPLIED BY S.E.C. AS SHOWN ON DRAWING Nos VKS/1007/1 AND VKS/1006/1
8 ROAD CROSSING CONDUITS TO BE INSTALLED AS SHOWN ON DRAWING NO VKS/1007/1 ACTUAL DEPTH TO BE CO-ORDINATED BY THE DEVELOPER AS REQUIRED BY THE S.E.C., MUNICIPAL AUTHORITIES AND OTHER SERVICE AUTHORITIES
LEGEND
PARALLELING PILLAR
HOUSE No
LOT No
N

ROUTE PLAN UNDERGROUND SERVICE CABLE

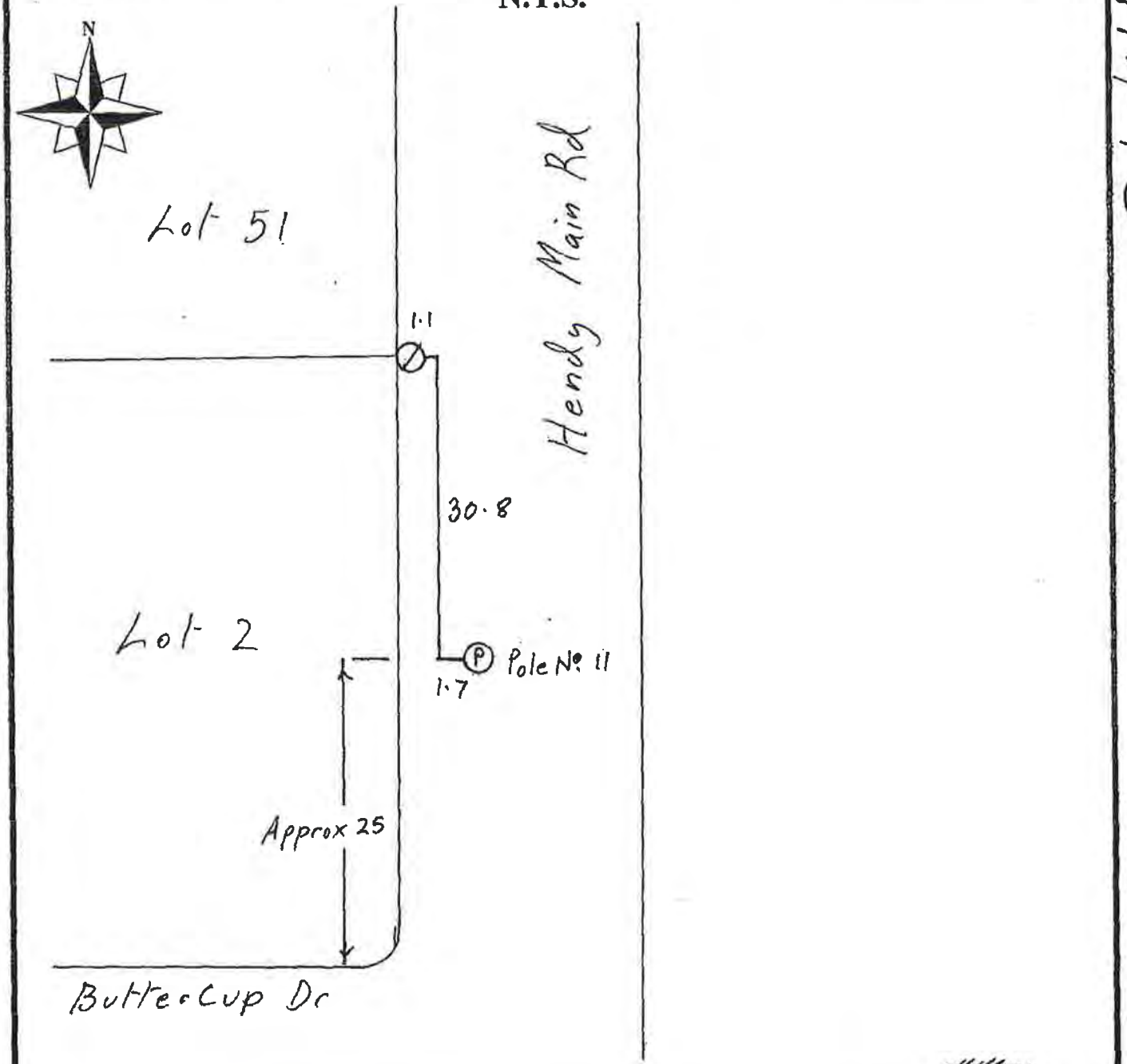
FILE _____ DRP 59757 LV RETIC _____ UG# H490

ADDRESS L51 Hendy Main Rd
Moriac

CABLE SIZE 4 X 16 mm sq CFA 1112N DATE 14/1/98

H490

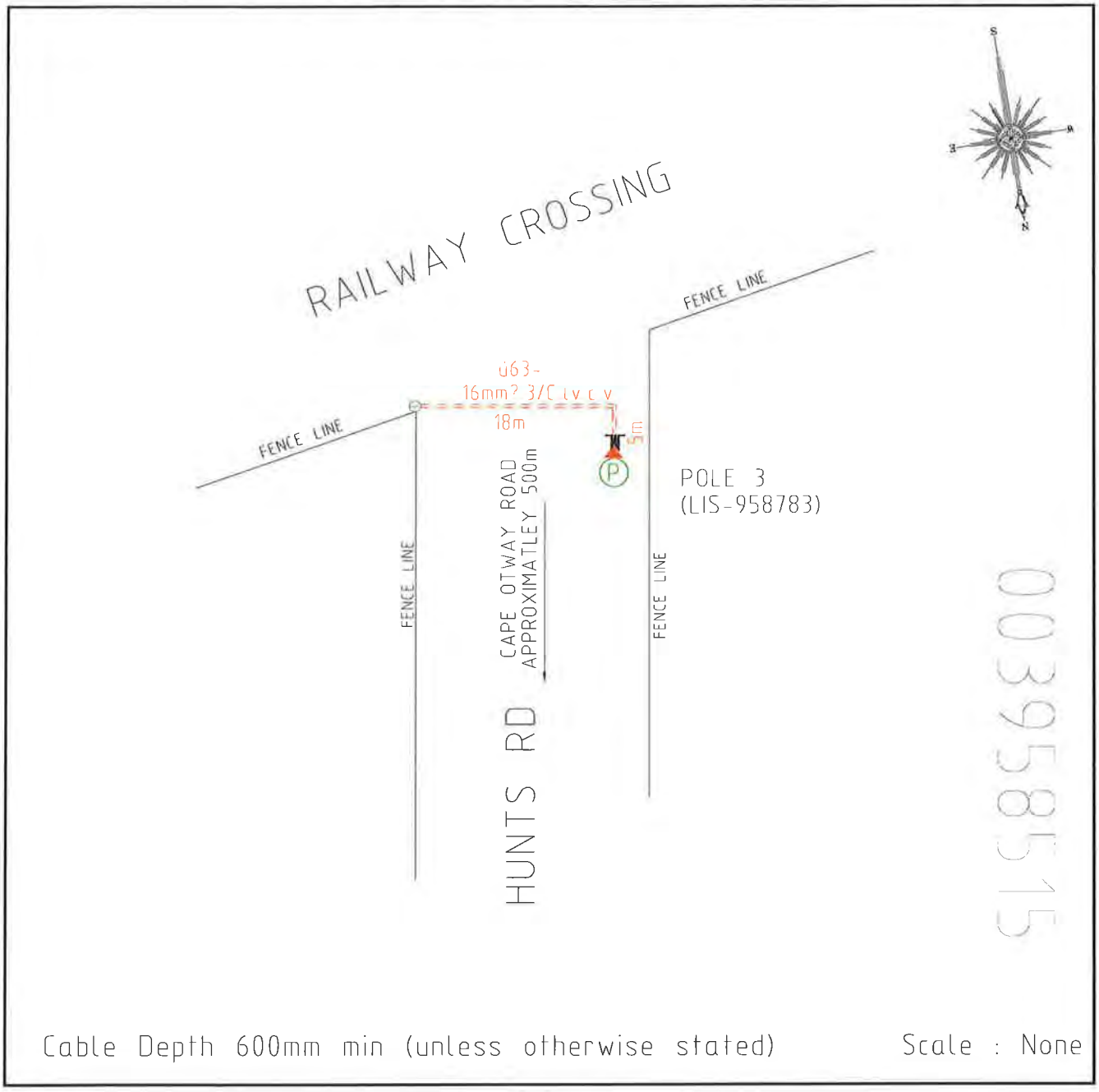
N.T.S.



REC :- POWERCOR CENTRAL REGION (GEELONG / SUNSHINE) [redacted] COMP

CONTACT OFFICER :- MICK WILLIAMS TELEPHONE: 0352 797 263

Route Plan - Underground Service Cable DRAWING No 003958515



Cable Depth 600mm min (unless otherwise stated) Scale : None

Cable Size
16mm² 3/c LV

Map Reference
Vic Roads 93 E5

C.H.P. LIS No
LIS-958783

PM Order No
NW 5022814

Draftsman
D Macpherson

Date Drawn
9/8/02

Revision

Date Revision

Address HUNTS RD RAILWAY CROSSING

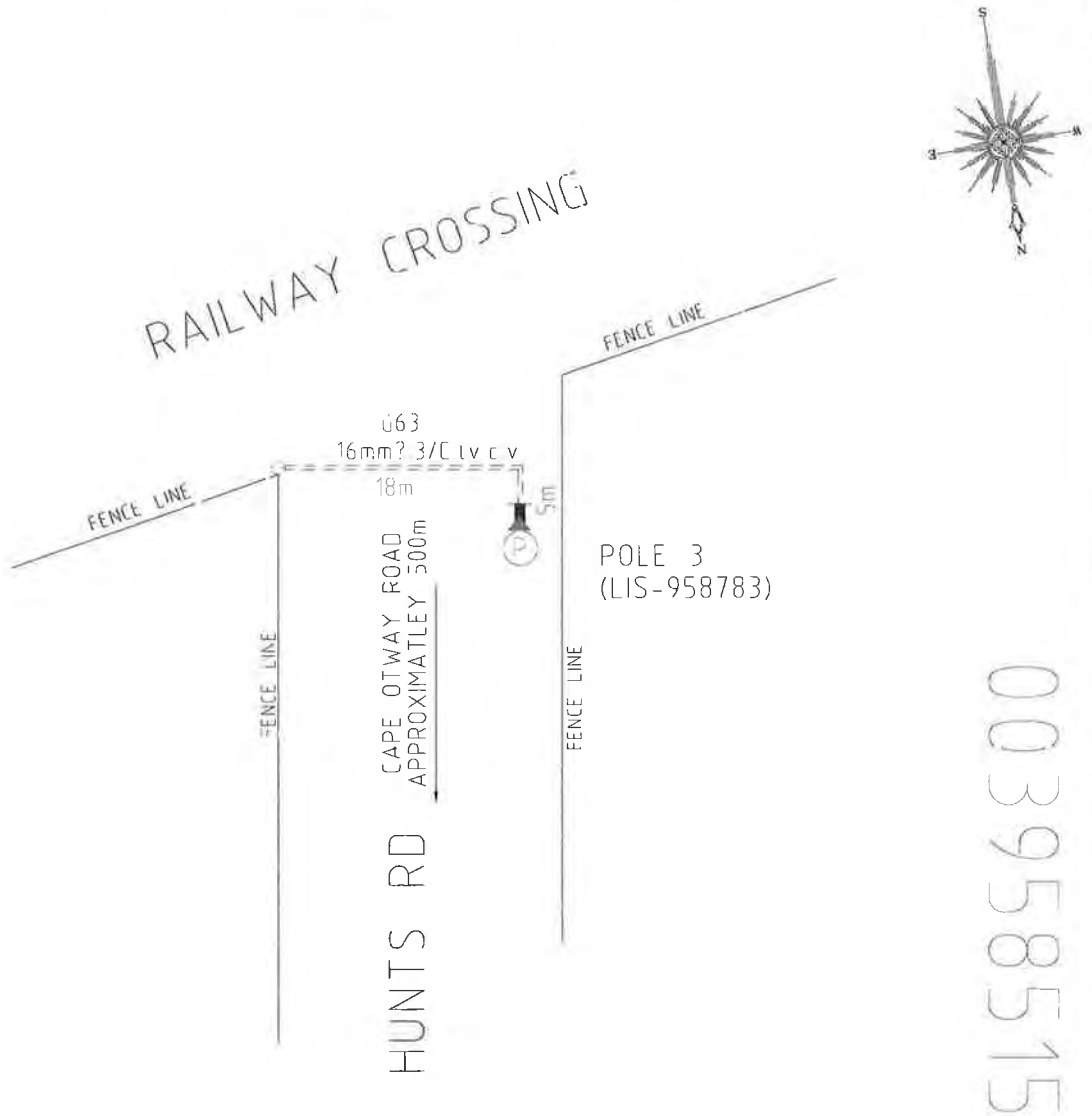
Locality MORIAC

210 x 297

DRAWING PLAN PLOTTED USING A4MOCS.PCP

POWERCOR AUSTRALIA STANDARD A4

Route Plan - Underground Service Cable DRAWING No 003958515



Cable Depth 600mm min (unless otherwise stated) Scale : None

Cable Size
16mm² 3/c LV

Map Reference
Vic Roads 93 E5

C.H.P. IIS No.
LIS-958783

PM Order No.
NW 5022814

Draftsman
D Macpherson

Date Drawn
9/8/02

Revision

Date Revision

Address HUNTS RD RAILWAY CROSSING

Locality MORIAC

210 x 297

DRAWING PLAN PLOTTED USING A4MOCS PCP

POWERCOR AUSTRALIA STANDARD A4

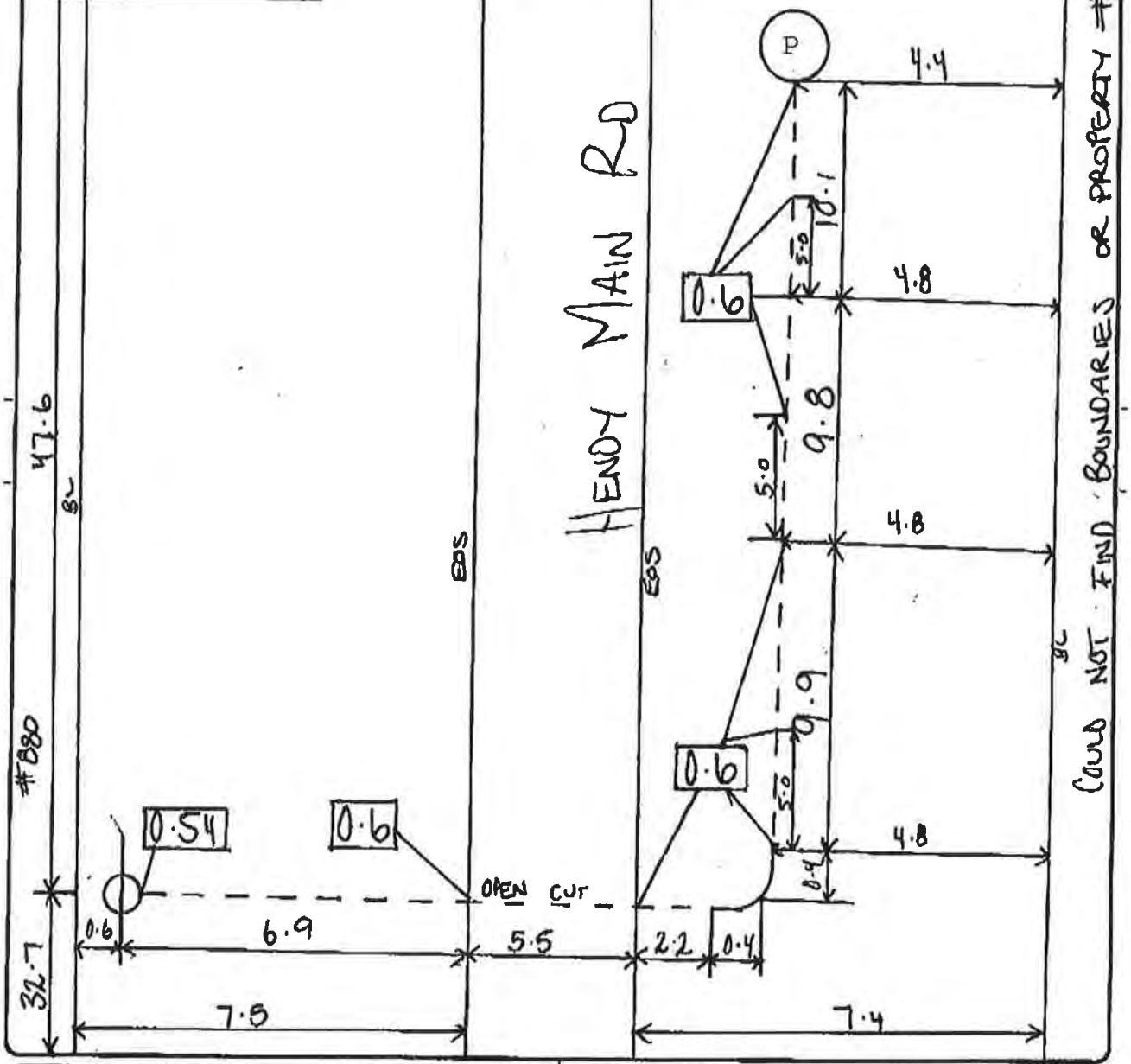
UNDERGROUND SERVICE CABLE INSTALLATION / ALTERATION

ADDRESS	880 HENDY MAIN RD						SUBURB	MORIAC	
CABLE DETAILS	SIZE	CORES	TYPE	CONDUCTOR	CONNECTION	DATE INSTALLED	2/4/13	POLE NUMBER	10 (LIS-981230)
	16	4	XLPE	Cu/A	FOLCB / EBD				
INSTALLER	PS TRENCHING								

UNDERGROUND CABLE	SERVICE PIT	LV POLE (GENERAL)	POLE SUBSTATION
OVERHEAD LINE	SERVICE PIT (ROADWAY)	SERVICE CONNECTION FACILITY	SERVICE PILLAR

SERVICE CABLE IN 1x63 HD PVC CONDUIT UNLESS OTHERWISE STATED

NOTES:



PROJECT NUMBER	80165352
CPM REF No.	NOT AVAILABLE
BUSINESS CENTRE	GEELONG
CONTACT OFFICER	B. TOURNIER
ROAD DIRECTORY	93, D5 V.R
BASE PLAN No.	N/A

CITIPOWER

Powercor Australia

Electricity Networks
Locked Bag 14090
Melbourne VIC 8001
www.citipower.com.au
www.powercor.com.au

NOT TO SCALE		MEASUREMENTS ARE IN METRES	
DRAWING NUMBER	PCA50/80165352		
DRAWN	CHECKED	OP.PCA APPROVED	
PS TRENCHING	BALA	SID	

Electricity Networks - EN UG CABLE POLE TO PIT A4-V1.1

04-35-F0003

A4

POWERCOR GEELONG

FILE _____ **UG#** H480.

Address 970 HENDY MAIN RD MORIAC

SERVICE CABLE 2 (3) 4 **Wire** (16) 50 185 240 mm **TO** (Pit) Pillar SW/B

Customer K. RUSSELL **Responsible Officer** RJD **Ext** 236

Rec DAVID CHRIMES **Phone** 0418 129501

Rec's Address 110 THREESPRINGS RD CERES **P / Code** 3221

NIW Received 7/2/97 URPS Raised 11/2/97

Comp / ~~Elect.~~ _____ Civil Works By POWERCOR Ian Robinson

Remarks:- Mick, up to you in regards to pit location Faxed 25/2 823835

Function Code _____	F/Code	Res Centre	Job No.
Units	107	59944107	C8CG.....
Business	108	108	" .....
New Service	112	112	" 11200
Replacement Service	151	151	C8CG15100

ORDER TO UNDERTAKE WORKS SIGNED :- YES/NO

COSTS DETERMINED BY :- FIXED CHARGES. 16mm / 50mm ☐ FILE ☐

FIXED CHARGES TO BE COLLECTED BY :- RESPONSIBLE OFFICER / MJW

MJW/PC 16/7/96

Filed on PC Date 25/2/97 **Advised Shire** ___ **Telstra** ___ **RCA** ___

Water uthority ___ **Gas & Fuel** ___ **REC** ___ **Construction** ___

Civil Works Contractor ___ **Drawing Office** ___ **Date** __/__/__

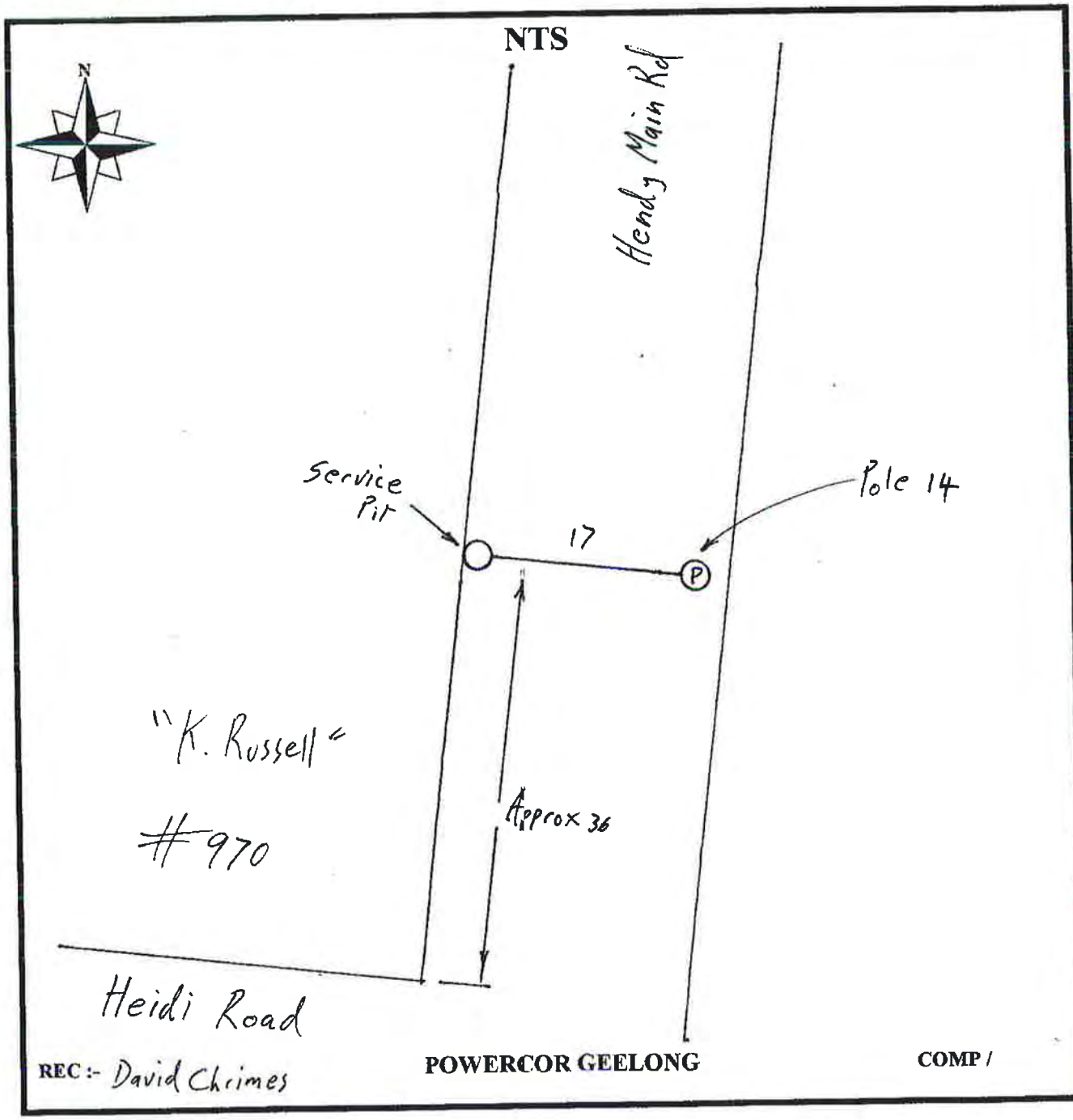
MICK

CUSTOMER WILL RING RE: PROGRESS OF THIS JOB WED. 12.3.

FILE _____ DRP 54757 LV RETIC _____ UG# H480.

ADDRESS #970 Hendy Main Road
Moriac

CABLE SIZE 3 X 16 mm sq DATE 25/2/97



CONTACT OFFICER :- MJ WILLIAMS mjw/pc TELEPHONE 797263

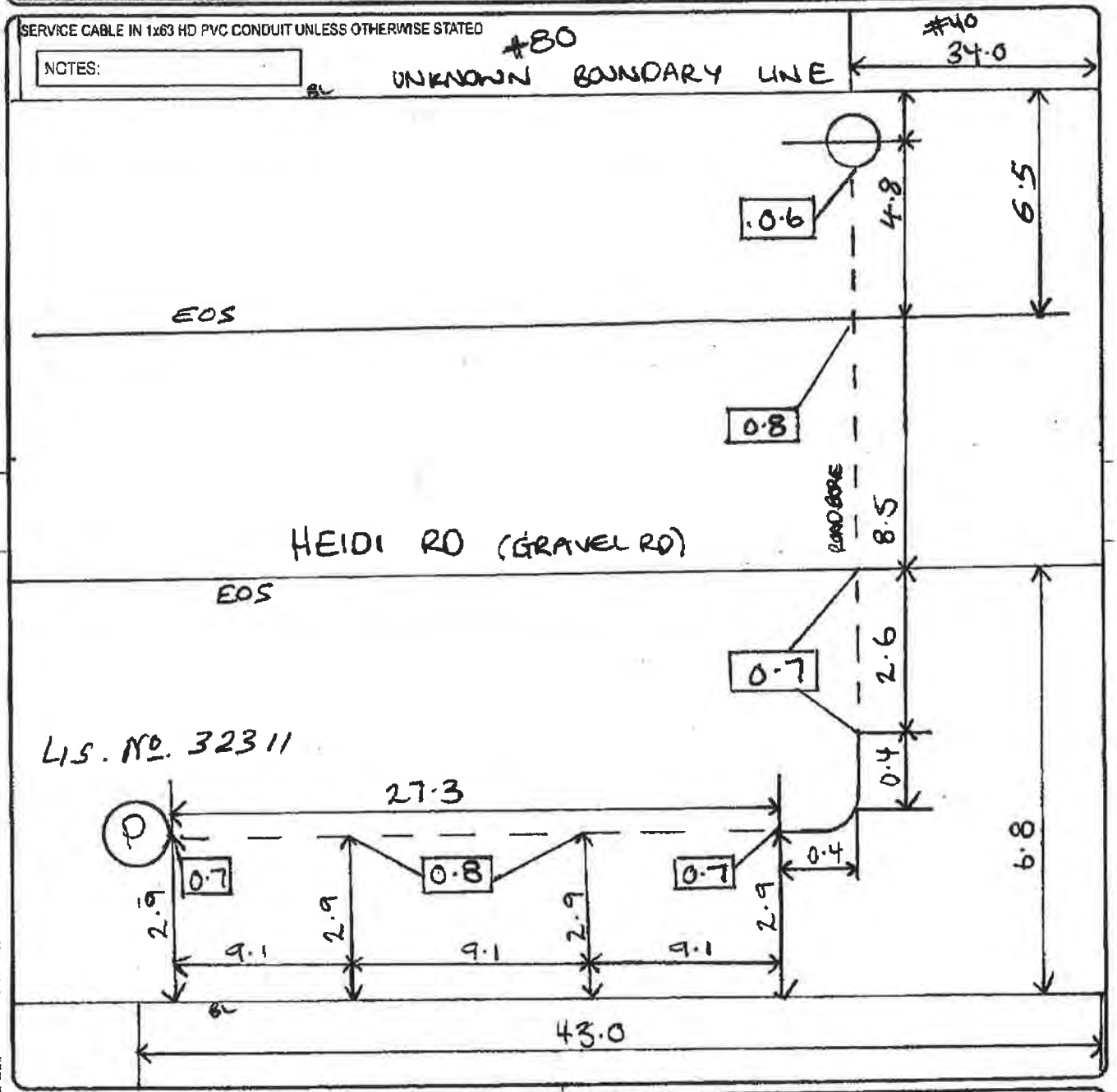
UNDERGROUND SERVICE CABLE INSTALLATION / ALTERATION

ADDRESS	40 HEIDI RD							SUBURB	MORIAC
CABLE DETAILS	SIZE	CORES	TYPE	CONDUCTOR	CONNECTION	DATE INSTALLED	7/1/11	POLE NUMBER	32311
	16	4	XLPE	Cu/~~Al~~	FOLCB / ~~FSP~~				
INSTALLER	PS TRENCHING								

UNDERGROUND CABLE	SERVICE PIT	LV POLE (GENERAL)	(P) POLE SUBSTATION
OVERHEAD LINE	SERVICE PIT (ROADWAY)	SERVICE CONNECTION FACILITY	SERVICE PILLAR

SERVICE CABLE IN 1x63 HD PVC CONDUIT UNLESS OTHERWISE STATED

NOTES:



PROJECT NUMBER	2926228
BUSINESS CENTRE	GEELONG
CONTACT OFFICER	D. GOWAN
ROAD DIRECTORY	93, D6-VR
BASE PLAN No.	N/A

CitiPower / Powercor Australia

Electricity Networks
Locked Bag 14090
Melbourne 3001
www.powercor.com.au

NOT TO SCALE	MEASUREMENTS ARE IN METRES
DRAWING NUMBER	PCA50/2926228
DRAWN: PS TRENCHING	CHECKED: SID
APPROVED: T.J	

A4

Electricity Networks - EN UG CABLE POLE TO PIT A4-V1.0

04-35-F0003

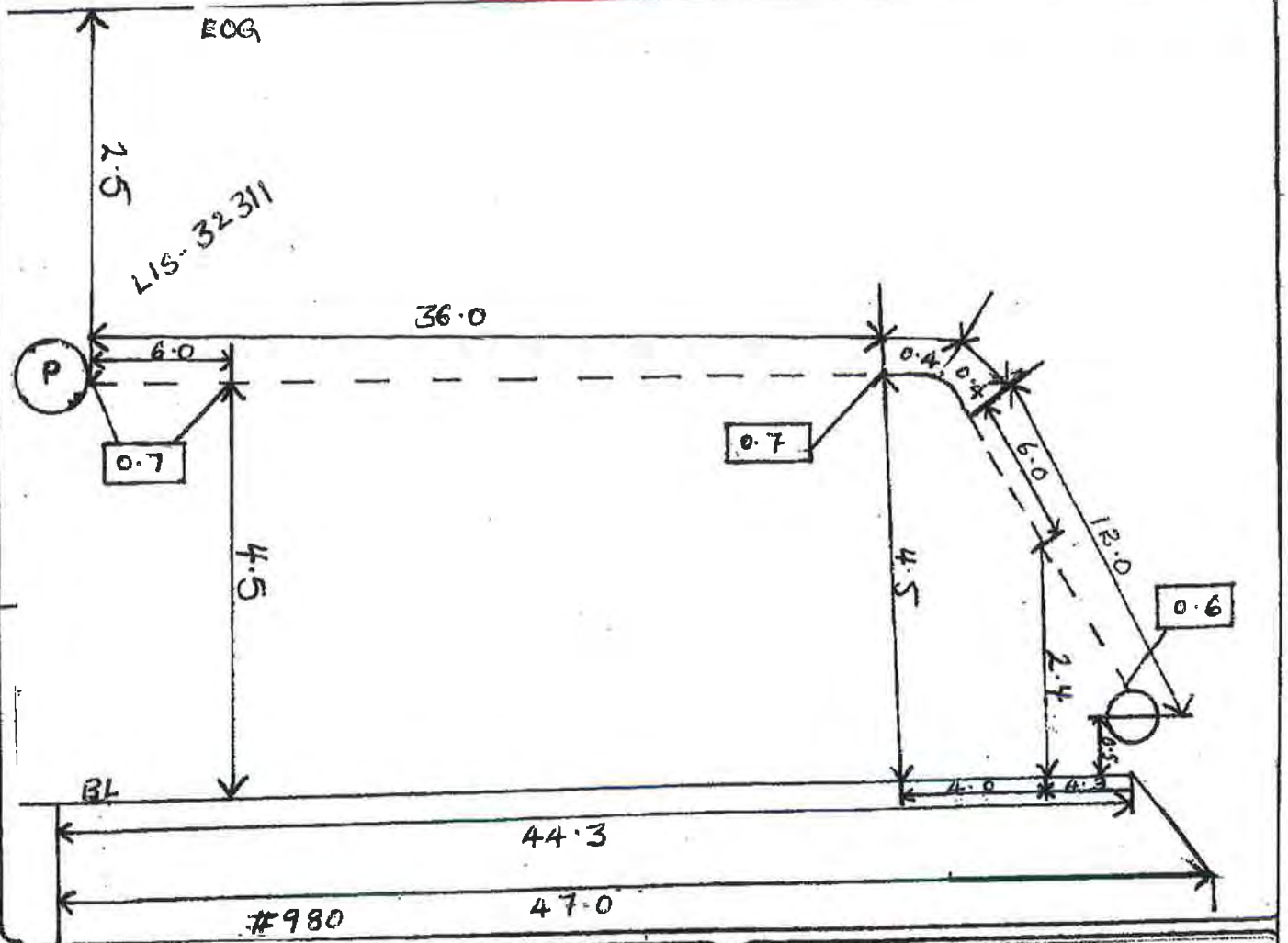
UNDERGROUND SERVICE CABLE INSTALLATION / ALTERATION

ADDRESS	HEIDI RD, CNR HENDY MAIN RD							SUBURB	MORIAC
CABLE DETAILS	SIZE	CORES	TYPE	CONDUCTOR	CONNECTION	DATE INSTALLED	6/8/10	POLE NUMBER	32311
	16	4	LV	Cu/AT	FOLCB / ~~FSD~~				
INSTALLER	PS TRENCHING								

UNDERGROUND CABLE	SERVICE PIT	LV POLE (GENERAL)	POLE SUBSTATION
OVERHEAD LINE	SERVICE PIT (ROADWAY)	SERVICE CONNECTION FACILITY	SERVICE PILLAR

SERVICE CABLE IN 1x63 HD PVC CONDUIT UNLESS OTHERWISE STATED

NOTES:



PROJECT NUMBER	11830 88/5067652
BUSINESS CENTRE	GEELONG
CONTACT OFFICER	B. DIGBY
ROAD DIRECTORY	9306 VR
BASE PLAN No.	NA

CITIPOWER

Electricity Networks
Locked Bag 14090
Melbourne 8001
www.citipower.com.au
www.powercor.com.au

SCALE: NTS	MEASUREMENTS ARE IN METRES	
DRAWING NUMBER	PCA50/5067652A	
DRAWN: PS TRENCH	CHECKED: SID	CAPC APPROVED: TJ.

Electricity Networks - EN UG CABLE POLE TO PIT A4-V1.0

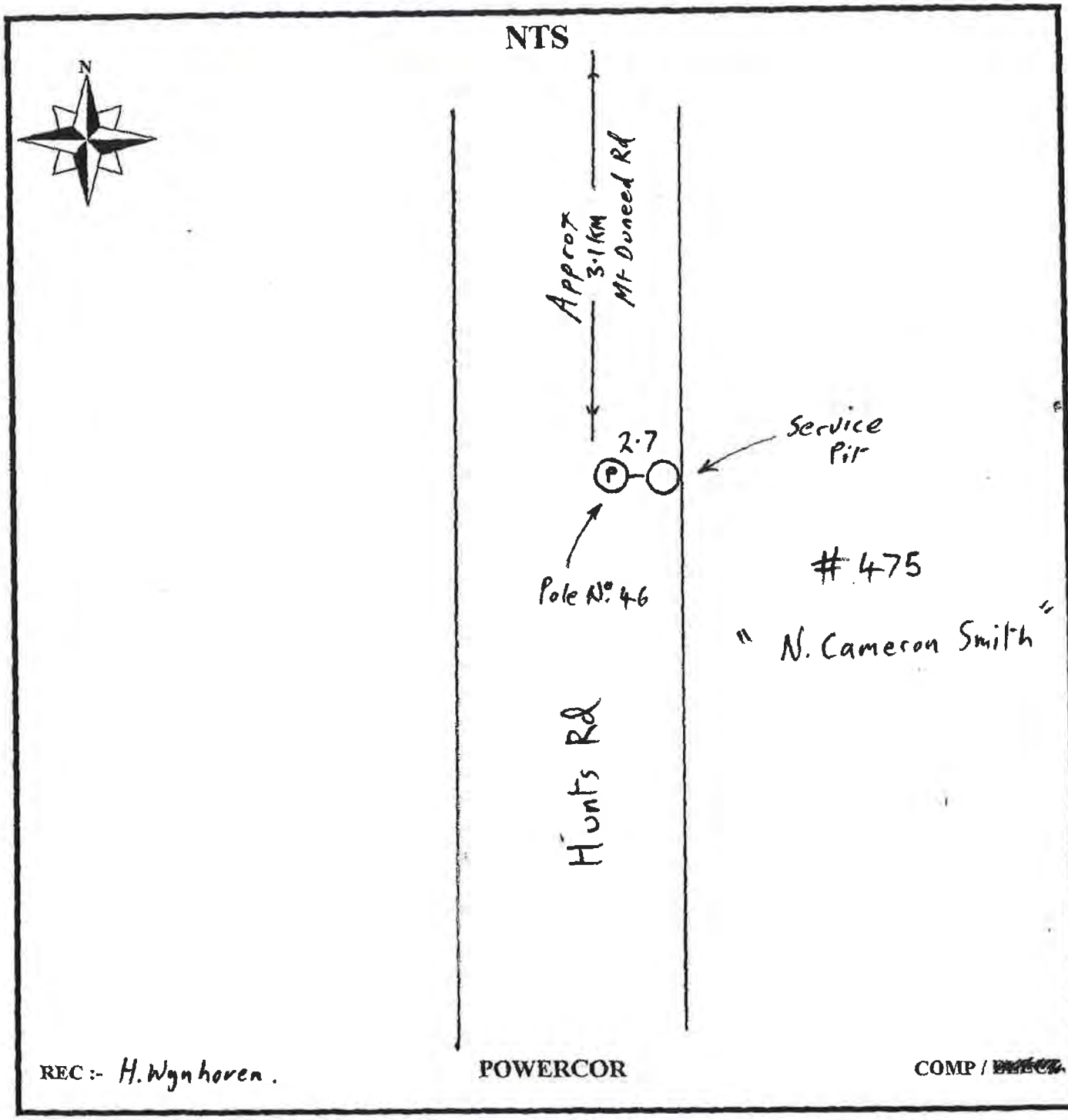
ROUTE PLAN UNDERGROUND SERVICE CABLE

FILE 74274 DRP VD8/2371/2 LV RETIC _____ UG# H473

ADDRESS 475 HUNTS RD.

MORIAC

CABLE SIZE 3 X 16 mm sq DATE 21/6/96



REC :- H. Wynhoven. POWERCOR COMP / [redacted]

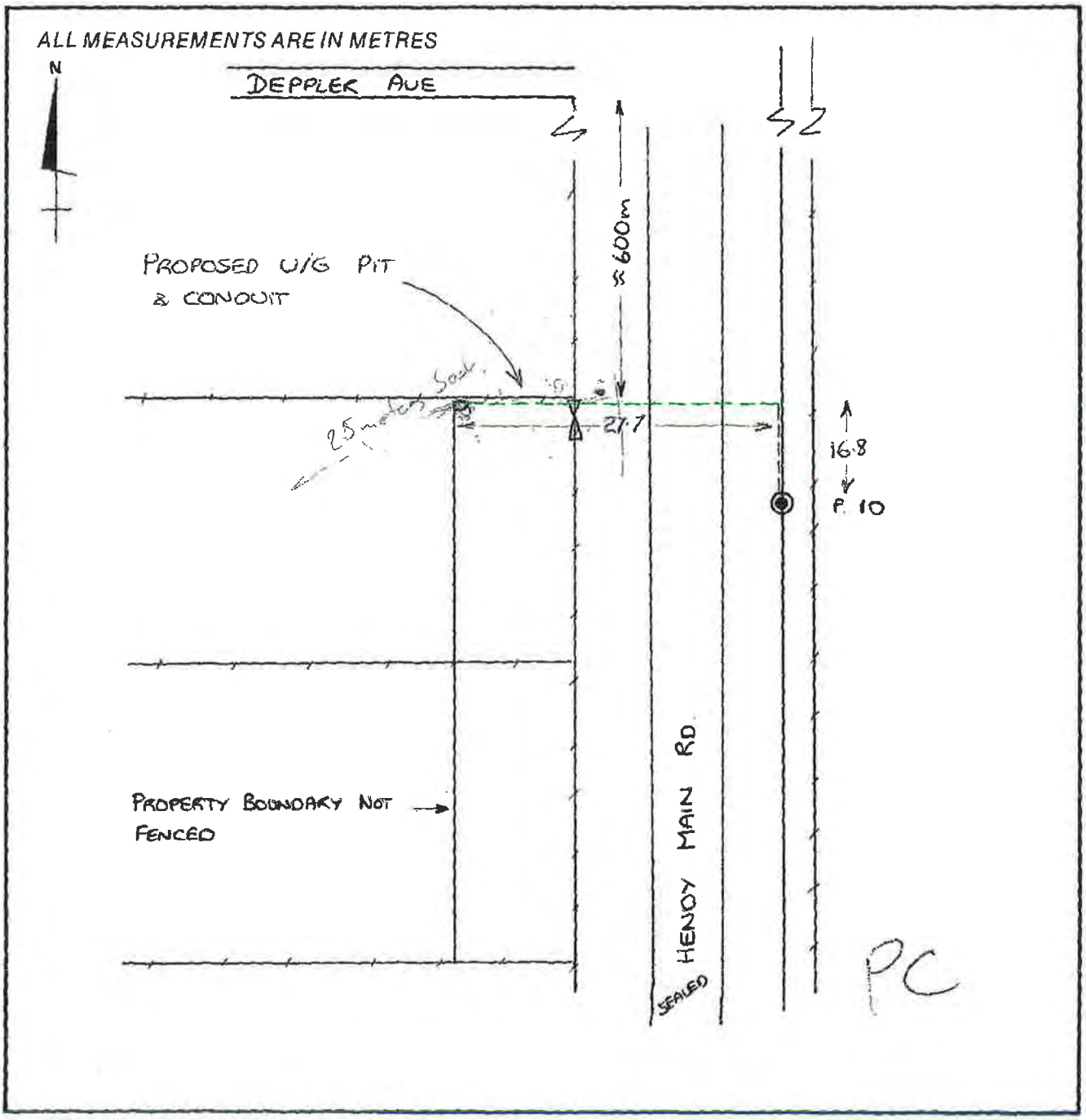
CONTACT OFFICER :- MJ WILLIAMS TELEPHONE 797263

19. H356.

ROUTE PLAN
UNDERGROUND SERVICE CABLE

Address MR. C. CAMPBELL
HENDY MAIN RD MORIAC.

Cable Size 16 mm² CRNo. / DSM Reference 0049



519-1780

SEC Contact Officer JOHN COX
District/~~Area Centre~~ COLAC
Telephone 335255
Date 17-7-87

Map Reference
Key/Base 0086
F.B./Drg. 0086

UNDERGROUND REGISTER PROGRESS SHEET
POWERCOR

FILE 74274 UG# H473

Address 475 HUNTS RD. MORIAC.

SERVICE CABLE 2 (3) 4 Wire (16) 50 185 240 mm TO (Pit) Pillar SW/B

Customer N. CAMERON-SMITH. Responsible Officer JAM Ext 248

Rec H. WYNHAVEN. Phone _____

Rec's Address _____ P / Code _____

NIW Received __/__/__ URPS Raised 21/6/96

Comp / ~~Elect~~ Comp. Civil Works By POWERCOR. P/S

Remarks:- _____

_____

Function Code 112	F/Code	Res Centre	Job No.
Units	107	59944107	C8CG.....
Business	108	108	" .....
New Service	112	112	" 11200
Replacement Service	430	430	X59944430

ORDER TO UNDERTAKE WORKS SIGNED :- YES/NO

COSTS DETERMINED BY :- FIXED CHARGES. 16mm / 50mm ☐ FILE ☐

FIXED CHARGES TO BE COLLECTED BY :- RESPONSIBLE OFFICER / MJW

Advised Shire ✓ Telstra____ RCA____ Water uthority____

Gas & Fuel____ REC____ Civil Works Contractor ✓ Construction ✓

Drawing Office ✓ Date 27/6/96 Completed into PC Date 26/6/96

H473

ATTACHMENT 4

Telstra Report

IT'S HOW
WE CONNECT

DUTY OF CARE

TELSTRA CORPORATON ACN 051 775 556

IMPORTANT:

Please read and understand all the information and disclaimers provided below.

YOU MUST VALIDATE THE EXACT LOCATION OF TELSTRA PLANT PRIOR TO COMMENCING CONSTRUCTION WORK.
Telstra plan and location information conforms to Quality Level 'D' (QL-D) of the Australian Standard AS 5488 – Classification of Subsurface Utility Information. In accordance with AS 5488 QL-D, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to AS 5488 QL-D. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers. Please note AS 5488 Quality Level 'A' is the only quality level that defines a subsurface utility as 'validated'. Refer to AS 5488 for further details.

A Telstra Accredited Plant Locator is an essential part of the process to validate the exact location of the Telstra assets and to ensure the asset is protected during construction work. Only Telstra Accredited Plant Locators with a current photo ID card are authorised by Telstra to access Telstra network for location purposes. The exact position of Telstra assets can only then be validated (AS 5488 QL-A) by physically exposing it. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for the accuracy shown on the plans.

Telstra DBYD plans are not suitable for identifying Telstra network within a Telstra exchange site.
For advice on locating Telstra network within a Telstra exchange site contact Telstra Plan Services.

"DUTY OF CARE"

When working in the vicinity of telecommunications plant you have a "Duty of Care" that must be observed.

Works or proposed works should be planned to allow for minimal impact and appropriate protection of Telstra plant. Telstra can provide plans and sketches showing the presence of its network to assist at the design stage. Telstra will also work with you to avoid damage to Telstra's plant during construction works.

It is your responsibility to:

1. Request plans of Telstra plant for a particular location at a reasonable time before construction begins. ***http://www.1100.com.au***
2. **Engage an Accredited Plant Locator who must have a current Telstra issued accreditation card**. A list of accredited locators is attached to this email. (Allow enough time to arrange for one).
3. After engaging a Telstra Accredited Plant Locator, validate the exact location of Telstra plant by hand digging or using non destructive water jet method (pot holing) where construction activities may be next to, damage or interfere with Telstra plant (see "Essential Precautions and Approach Distances" section for more information); and -
4. Contact Telstra's Plan Services (see below for details) if Telstra plant is wholly or partly located near planned construction activities and you require further advice about how to protect the plant or you need to relocate the plant to complete your construction activities. *(**Telstra.Plans@team.telstra.com**)*

Important note: *The construction of Telstra's network dates back over many years. Some of Telstra's pits and ducts were manufactured from asbestos-containing cement. You must take care in conducting any works in the vicinity of Telstra's pits and ducts. You must refrain from in any way disturbing or damaging Telstra's network infrastructure when conducting your works. We recommend that before you conduct any works in the vicinity of Telstra infrastructure that you ensure your processes and procedures eliminate any possibility of disturbing, damaging or interfering in any way with Telstra's infrastructure. Your processes and procedures should incorporate appropriate measures having regard to the nature of this risk.*

ASSET RELOCATIONS

You are not permitted to relocate or alter or repair any Telstra assets or network under any circumstances.

For all enquiries relating to the relocation or protection of Telstra assets please phone **1800 810 443** or email **NetworkIntegrity@team.telstra.com**

Only Telstra and its contractors may access and conduct works on Telstra's network (including its plant and assets). This includes performing modification or relocation works. This requirement is to ensure that Telstra can protect the integrity of its network, avoid disruption to services and ensure that the relocation meets Telstra's requirements.

DAMAGE TO TELSTRA'S NETWORK MUST BE REPORTED TO 132203 IMMEDIATELY.

You will be held responsible for all plant damage that occurs or any impacts to Telstra's network as a result of your construction activities. This includes interfering with plant, conducting unauthorised modification works and interfering with Telstra's assets in a way that prevents Telstra from accessing or using its assets in the future.

Telstra reserves all rights to recover compensation for loss or damage to its cable network or other property including consequential losses.

EMERGENCY SITUATIONS - RECEIVING TELSTRA PLANS

Telstra's automated mapping system will provide a fast response for emergency situations. (Faster than an operator can provide manually). Automated responses are normally available 24/7.

To receive a fast automated response from Telstra your request must -

- be a web request lodged at DBYD (**www.1100.com.au**). The request will be then forwarded directly to Telstra.
- contain your email address so you can receive the automated email response.
- be for the purposes of 'mechanical excavation' or other ground breaking DBYD activity. (requests with activity types conveyancing, planning & design or other non digging activities may not be responded to until the next business day).
- be for an area less than 350 metres in size to obtain a PDF map (over 350 metres will default to DWF due to size) This does not include congested CBD areas where only DWF may be supplied.
- be for an area less than 2500 metres in size to obtain a DWF map (CBD's less)

NATURAL DISASTERS

Natural Disasters include (amongst other things) earthquakes, cyclones, floods and tsunamis.

In the case of such events, urgent requests for plans or information relating to the location of Telstra network can be made directly to Telstra Network Integrity Team Managers as follows:

NSW – John McInerney 0419 485 795

QLD – Glenn Swift 0419 660 147

VIC/TAS - David Povazan 0417 300 947

SA/NT - Mick Weaver 0419 828 703

WA - Angus Beresford-Peirse 0419 123 589

TELSTRA PLAN SERVICES - for all Telstra Dial Before You Dig related enquiries

email - **Telstra.Plans@team.telstra.com**

phone - **1800 653 935** (general enquiries, business hours only)

for Telstra DBYD plan information -	Shalin	07 3455 2997
	Glen	07 3455 1011
for advice on preventing damage -	Shalin	07 3455 2997
	Lachlan	07 3455 3132
Accredited plant locator enquiries -	Mike	0477 377 036
	Taylor	07 3455 3208

(Including how to become an Telstra Accredited Plant Locator to locate Telstra network)

Road closures and easements -	Megan	07 3455 0834
	Glen	07 3455 1011

Please note - to make an enquiry the plans must be current (within 60 days of issue). If your plans have expired you will need to submit a new request via DBYD.

CONCERNING TELSTRA PLANS:

Please note the following:

- For Telstra plans contact **Dial Before You Dig** (**www.1100.com.au**) at least 2 business days prior to digging. (Note - further lead time may be required for you to arrange for a Telstra Accredited Plant Locator from the provided list)
- Fast response can be provided by Telstra if an email address is supplied. (if posted, this may take up to one week or longer to receive plans)
- Telstra plans and information provided are **valid for 60 days** from the date of issue.
- Telstra owns and retains the copyright in all plans and details provided in conjunction with the applicant's request. The applicant is authorised to use the plans and details only for the purpose indicated in the applicant's request. The applicant must not use the plans or details for any other purpose.
- Telstra plans or other details are provided only for the use of the applicant, its servants, agents or Telstra-accredited plant locators. **The applicant may not give the plans or details to any parties other than these, and may not generate profit from commercialising the plans or details.**
- Please contact **Telstra Plan Services** (see above for details) immediately should you locate Telstra assets not indicated on these plans.
- Telstra, its servants or agents shall not be liable for any loss or damage caused or occasioned by the use of plans and or details so supplied to the applicant, its servants and agents, and the applicant agrees to indemnify Telstra against any claim or demand for any such loss or damage.
- Please ensure Telstra plans and information provided remains on-site at all times throughout the inspection, location and construction phase of any works.
- Telstra plans conform to Quality Level 'D' of the Australian Standard (AS5488) – Classification of Subsurface Utility Information (SUI). For further information refer to AS 5488.

ESSENTIAL PRECAUTIONS AND APPROACH DISTANCES:

NOTE: If the following clearances cannot be maintained, please contact Telstra Plan Services for advice on how best to resolve this situation. (see above for contact details)

On receipt of plans and sketches and before commencing any excavation work or similar activities near Telstra's plant, you must validate the exact location of the Telstra plant. Refer to the information marked 'Important' on the cover page of this document.

1. Where Telstra's plant is in an area where road and footpaths are well defined by kerbs or other features a minimum clear distance of 600mm must be maintained from validated Telstra assets.

In non established or unformed reserves and terrain, this approach distance must be at least 1.5 metres.

In country/rural areas which may have wider variations in reasonably presumed plant presence, the following minimum approach distances apply:

a) Parallel to major plant: 10 metres (for optic fibre and/or copper cable over 300 pairs)
b) Parallel to other plant: 5 metres

NOTE: Even manual pot-holing needs to be undertaken with extreme care, commonsense and employing techniques least likely to damage cables. For example, orientate shovel blades and trowels parallel to the cable rather than digging across the cable.

If construction work is parallel to Telstra plant, then careful hand digging or using non destructive water jet method (pot-holing) at least every 5m is required to validate the location of all plant before work commences.

2. Maintain the following minimum clearance between construction activity and **actual validated location** of Telstra Plant.

Jackhammers/Pneumatic Breakers	*Not within 1.0m of **actual validated location.***
Vibrating Plate or Wacker Packer Compactor	*Not within 0.5m of **actual validated location** of Telstra ducts.* *300mm compact clearance cover before compactor can be used across Telstra ducts.*
Boring Equipment (in-line, horizontal and vertical)	*Not within 2.0m of **actual validated location**.* *Constructor to hand dig or use non-destructive water jet method (pot-hole) and expose plant.*
Heavy Vehicle Traffic (over 3 tonnes)	*Not to be driven across Telstra ducts (or plant) with less than 600mm cover.* *Constructor to check actual depth via hand digging.*
Mechanical Excavators, Farm ploughing and Tree Removal	*Not within 1.0m of **actual validated location.*** *Constructor to hand dig or use non-destructive water jet method (pot-hole) and expose plant.*

All Telstra pits and manholes should be a minimum of 1.2m in from the back of kerb after the completion of your work.

All Telstra conduit should have the following minimum depth of cover after the completion of your work:-

Footway 450mm

Roadway 450mm at drain invert and 600mm at road centre crown

For clearance distances relating to Telstra pillars, cabinets and RIMs/RCMs please contact Telstra Plan Services (see above for details).

FURTHER ASSISTANCE:

Assistance can be obtained by contacting Telstra Plan Services (see contact details above)

Where on-site location is provided, you are responsible for all hand digging or use non-destructive water jet method (pot-holing) to visually locate and expose Telstra plant for validation purposes. (For advice on damage prevention please contact Telstra Plan Services)

If plant location plans or visual location of Telstra plant by digging reveals that the location of Telstra plant is situated wholly or partly where you plan to work, then Telstra's Network Integrity Group must be contacted to discuss possible engineering solutions.
Please phone **1800 810 443** or email **NetworkIntegrity@team.telstra.com**

NOTE:

If Telstra relocation or protection works are part of the agreed solution, then payment to Telstra for the cost of this work shall be the responsibility of the principal developer, constructor or person for whom the work is performed. The principal developer or constructor will be required to provide Telstra with the details of their proposed work showing how Telstra's plant is to be accommodated and these details must be approved by the Regional Network Integrity Manager prior to the commencement of site works.
Please phone **1800 810 443** or email **NetworkIntegrity@team.telstra.com**

RURAL LANDOWNERS

Where Telstra owned cable crosses agricultural land, Telstra may provide on-site assistance with cable location. The Telstra Plan Services operator will provide assistance in determining eligibility.

Please note:

- The exact location, including depth of cables, must be verified by pot holing, which may not be covered by this service.
- This service is only available to assist private rural land owners.
- This service normally covers one hour on-site only. Any time required in addition to Telstra funded time can be purchased directly from the Accredited Plant Locator.

For further information including terms and conditions, please contact Telstra Plan Services.

PRIVACY NOTE

Your information has been provided to Telstra by DBYD to enable Telstra to respond to your DBYD request. Telstra keeps your information in accordance with its privacy statement entitled "Protecting Your Privacy" which can be obtained from Telstra either by calling 1800 039 059 or visiting our website at www.telstra.com.au/privacy

DATA EXTRACTION FEES

In some instances a data extraction fee may be applicable for the supply of Telstra information. Typically a data extraction fee may apply to large projects or requests to be supplied in non standard formats. For further details contact Telstra Plan Services.

ELECTRONIC PLANS - PDF AND DWF MAPS

If you have received Telstra maps via email you will have received the maps as either a PDF file (for smaller areas) or DWF file (for larger area requests). If you are unable to launch any one of the softcopy files for viewing and printing, you may need to download and install one or more of the free viewing and printing products such as Adobe Acrobat Reader (for PDF files) or Autodesk Design Review (for DWF files) available from the internet.

PDF files

PDF is the default softcopy format for all requests for areas up to approx *350m in length. (*depends on geographic location of request). The PDF file is formatted to A3 portrait sheet however it can be printed on any size sheet including from A4 to AO, either as the full sheet or selected areas to suit needs and legibility. (to print a selected area zoom up and print 'current view') If there are multiple layers of Telstra network you may receive up to 2 sheets in the single PDF file attachment supplied. There are three types or layers of network normally recorded - local network, mains cables or a combined layer of local and mains (usually displayed in rural or semi rural areas). If mains cable network is present in addition to local cables (i.e. as separate layer in a particular area), the mains will be shown on a separate sheet. The mains cable information should be read in conjunction with the local cable information.

DWF files

This is the default softcopy format for all requests for areas that are over 350m in length. Maximum length for a DWF automated response is approx 2500m - depending on geographic location of request (manually-processed plans may provide larger coverage). The DWF files differ from PDF in that DWF are vector files made up of layers that can be turned on or off and are not formatted to a specific sheet size. This makes them ideal for larger areas and for transmitting over email etc.

How to view Telstra DWF files -

Telstra DWF files come with all layers turned on. You may need to turn individual layers on or off for viewing and printing clarity. Individual layer names are CC (main cable/conduit), DA (distribution or local area network) and sometimes a combined layer - CAC. Layer details can be viewed by either picking off the side menu or by selecting 'window' then 'layers' off the top menu bar. Use 'layers' to turn individual layers off or on. (double click or right click on layer icon.)

How to print Telstra DWF files -

DWF files can be printed on any size sheet. They can be printed in their entirety or by selected areas of interest. Some DWF coverage areas are large and are not suited to printing legibly on a single A4 sheet - you may need several prints if you only have an A4 printer. Alternatively, an A3, A1 or larger printer could be used. To print, zoom in or out and then, by changing the 'print range' settings, you can print what is displayed on your screen to suit your paper size. If you only have a small printer, e.g. A4, you may need to zoom until the text is legible on your screen for it to be legible on the print. (which is why you may need several prints). To print what is displayed on your screen the 'view' setting should be changed from 'full page' to 'current view'. The 'current sheet' setting should also be selected. You may need to print layers separately for clarity and legibility. (Details above on how to turn layers on or off)

How to change the background colour from white to black (when viewing) Telstra DWF files -

If using Autodesk Design Review the background colour can be changed by selecting 'Tools' then 'options' then 'sheet'. Tick the box 'override published paper colours' and select the colour required using the tab provided.

Telstra Automated Mapping System (TAMS)

Telstra provides an automated plan response for the majority of DBYD requests received.

Requestors must supply a current email address on their request to DBYD and must also be able to accept a standard format of PDF or DWF. An automated response can be provided much faster than the alternative of a mailed hardcopy, and can avoid unnecessary delays in waiting for plans to arrive. Being softcopy, it can easily be sent directly to a worksite and can be available 7 days a week. The automated system can be configured for individual requestors to receive either PDF/DWF (where small requests are PDF and larger requests are DWF) or, alternatively, all in DWF (both small and large requests). Please contact Plan Services for further details or to have your preferences updated. **Please note that all requests over *350m (approx.) in size or congested CBD areas can only be supplied in DWF format** and there are size limits on what can be provided. (* actual size depends on geographic location of requested area)

TELSTRA ACCREDITED PLANT LOCATORS (For your area)

All Accredited Plant Locators locating Telstra network must have a current identification card issued by Telstra. A list of Telstra Accredited Plant Locators is provided with the Telstra Dial Before You Dig plans.

Telstra does not permit external parties (non-Telstra) to access or conduct work on our network. Only Telstra staff, Telstra contractors or locators who are correctly accredited are authorised to work on or enter our manholes, pits, ducts, cables etc. This is for safety as well as for legal reasons.

Please note it is a criminal offence under the *Criminal Code Act 1995* (Cth) to tamper or interfere with communication facilities owned by a carrier. Heavy penalties may apply for breach of this prohibition, and any damages suffered, or costs incurred by Telstra as a result of any such unauthorised works may be claimed against you.

The provided list contains the names and contact details for Accredited Plant Locators who service your area and can provide you with assistance in locating Telstra assets for validation purposes. These organisations have been able to satisfy Telstra that they have a sound knowledge of telecommunications plant and its sensitivity to disturbance; appropriate equipment for locating telecommunications plant and competent personnel who are able to interpret telecommunications plans and sketches and understand safety issues relevant to working around telecommunications plant.

Please Note:

- Optic fibre cable locations must be performed by a locator with Telstra optic fibre cable location accreditation. (Not all copper accredited locators have optic fibre accreditation). The locators with additional optic fibre cable location accreditation are indicated by a 'yes' in the column headed 'Fibre' in the lists of locators that are published with the DBYD plans. Telstra Accredited Plant Locators that are DBYD Certified Locators are also fibre accredited. Inspection of photo ID cards will confirm whether locators are just copper accredited or copper + fibre accredited.
- An Accredited Plant Locator is NOT permitted to provide depth of communications plant unless it is physically exposed by hand digging.
- The details of any contract, agreement or retainer for site assistance to locate telecommunications plant shall be for you to decide and agree with the organisation engaged. Telstra is not a party to any contract entered into between you and an Accredited Plant Locator. The Accredited Plant Locators are able to provide guidance concerning the extent of site investigations required.
- Payment for the site assistance will be your responsibility and payment details should be agreed before the engagement is confirmed.
- Telstra does not accept any liability or responsibility for the performance of or advice given by an Accredited Plant Locator. Accreditation is an initiative taken by Telstra towards the establishment and maintenance of competency standards. However, performance and the advice given will always depend on the nature of the individual engagement.
- You have the right to request the organisation you engage to show their Telstra issued ID card.
- Neither the Accredited Plant Locator nor any of its employees are an employee or agent for Telstra. Telstra is not liable for any damage or loss caused by the Accredited Plant Locator or its employees.

Telstra offers free Cable Awareness Presentations & Advanced Cable Reading Presentations, if you believe you or your company would benefit from this offer please contact Network Integrity on 1800 810 443 or **NetworkIntegrity@team.telstra.com**

*For details on how to become an Accredited Plant Locator to be able to locate Telstra network please contact Telstra Plan Services – Mike (0477 377 036) ***mugl@dominoapp.in.telstra.com.au***

Telstra Accredited Plant Locators - Victoria / Tasmania

Telstra plans are intended to be indicative only. A plant location service (Telstra accredited) is required to identify the exact location of the plant and ensure that the asset is protected during construction work. It is your responsibility as part of your "Duty of Care" to engage an Accredited Plant Locator.

Please contact a Telstra accredited locator from the list below (fees apply).

*Optic fibre cable locations must be performed by a locator with Telstra optic fibre location accreditation. Locators with Telstra optic fibre cable location accreditation are indicated by either a 'yes' in the 'Fibre' column or the DBYD Certified Locator Symbol. (All Telstra Accredited DBYD Certified Locators are fibre accredited).

Tasmania

Name & areas covered	*Fibre	Contact details
AJ Water & Leak Detection - *Launceston* *Tas - North, North East & North West*	Yes	0457 710 684 W: www.ajwater.com.au
Archer's Underground Services Locations – *Hobart, Devonport & Burnie depots.* *Servicing all areas of Tasmania*	Yes	(Matt) 0418 737 299 – southern tas. (Bob) 0459 807 299 – north & n.w. tas. F: (03) 6245 1299 E: auslocations@bigpond.com
Astrotec – *Margate* *Covering all Southern Tasmania*	Yes	0408 479 601 E: simon@astrotec.net.au
Bill's Locating Service - *Cremorne* *All of Tasmania*	Yes	0417 581 775 F: (03) 6248 9736
Cable Locators Northern Tasmania - *Rosevears* *0363 Area Code*	Yes	0418 321 311 (03) 6394 3994
Corrosion Mitigation Pty Ltd - *Kensington* *All areas*	No	(03) 9376 4216 0418 367 295
Desmar Civil Contracting Pty Ltd – *St Leonards* *Launceston, Northern Tasmania & Hobart, Southern Tasmania.*	No	0437 113 087 E: Admin.desmar@bigpond.com
Environmental Locations Systems - *Hallam* *Metropolitan Melbourne and all of Victoria*	Yes	(03) 9314 5335 0414 352 472
Juls Projects Pty Ltd - *Pakenham*	Yes	0417 511 114 E: craigj@julsprojects.com.au
LOC84U (MD Smith) - *St Marys* *North East Coast, Swansea North, Fingel Valley to Avoca*	No	0408 059 521
Nigel Mawby Enterprises - *Devonport* *All of Tasmania*	Yes	0408 635 357 E: nigelamawby@bigpond.com
Radiotech Geo-Structural Surveys - *Greensborough*	No	(03) 9444 9183 F: (03) 9434 4694

Victoria

Name & areas covered	Fibre	Contact details
Able Pipe Cable & Leak Location Services- *Cheltenham* *Melbourne Metro & Mornington Peninsula*	No	0418 318 186 F: (03) 9584 0137
Accredited Pipe & Cable Locators - *Pakenham* *Pakenham, SE Melbourne and Gippsland*	Yes	(03) 5941 4299 0418 368 591 F: (03) 5941 4291
Accurate Locating Pipes & Cables - *Barossa Valley* *Adelaide, Adelaide Hills, Barossa Valley and all regions of SA. Areas of NSW, VIC & NT also.*	Yes	0407 464 882
Advanced Pty Limited - *Lancefield* *Melbourne Metro, Geelong, Bendigo, Lancefield*	No	(03) 5429 1739 0402 883 536
All About Pipes – *Kilmore* *All of VIC*	Yes	1300 634 200 0408 790 010 work@allaboutpipes.com.au www.allaboutpipes.com.au
All Areas Asset Locating (Scantek Group Pty Ltd) – *Macleod* *Melbourne Metro, Greater Melbourne and Regional Areas*	No	0409 234 121 E: scantek1100@bigpond.com
All Melbourne Cable & Pipe Locating – *Ringwood North* *Eastern Suburbs, Yarra Valley, Melbourne and Greater Metropolitan Area*	No	0417 202 000 F: (03) 9876 5716
All States Contracting Pty Ltd - *Shepparton* *Central, North Central, Goulburn Valley, Shepparton, Seymour, Cobram, Euroa*	Yes	0408 216 653 (03) 5821 6653
Asset Detection Services Pty Ltd - *Newport* *All of VIC*	Yes	0413 949 400 F: (03) 9391 6204 E: info@assetdetection.com.au
Asset Exposure – *Lysterfield* *Melbourne Metro, Greater Melbourne and all Regional Areas*	Yes	0419 222 999 E: info@assetexposure.com.au
Australian Underground Survey Solutions Pty Ltd - *Narre Warren*	No	(03) 9700 2311 0419 488 883 F: (03) 9314 1568
Barry Bros Specialised Services - *Mulgrave* *Yarra*	Yes	(03) 9574 9888 0407 319 930
Barry Johnstone Locations and Communications - *Mt Gambier.* *S.E. South Australia (Limestone Coast), SW Vic.*	No	0418 834 804
Bendigo District Cable and Pipe Locations - *Bendigo*	Yes	(03) 5447 1148 or 0413 035 386 (03) 5447 1804
Billy Charnock Electrical - *Swan Hill* *Swan Hill and Surrounding Districts*	Yes	(03) 5032 1866 F: (03) 5033 1866

Name & areas covered	Fibre	Contact details
C & L Cable Locators - *Bendigo*	Yes	0407 393 405 or 0459 111 191 E: info@cablelocators.com.au
Cablenet Industries Pty Ltd - *Sunshine*	No	(03) 9311 6605 F: (03) 9311 6610 E:info@cablenetindustries.com.au
Capogreco Excavations Pty Ltd - *Mildura South* *Mildura, Wentworth, Gol Gol, Dareton, Ouyen, Robinvale, Merbein*	Yes	(03) 5022 2070 0428 356 269 F: (03) 5022 7003 E: info@capoex.com.au
Cardno Pty Ltd -*Highett* *All Areas*	No	1300 224 664 E: cardnoaus@cardno.com.au
Carey Civil Contractors - *Gordon* *Melbourne and surrounding areas*	No	0408 579 915 (03) 5368 0000 E: matthew@careycivil.com.au
Cavan Constructions Pty Ltd – *Warrnambool* *Warrnambool, Ballarat, Hamilton and western suburbs of Melbourne*	Yes	03 5568 7240 or 0404 241 679 mick@cavanconstructions.com.au www.cavanconstructions.com.au
CHS Group Australia - *Horsham* *Melbourne East and Surrounds*	No	(03) 53816400 0438 824 557 F: (03) 5381 1985
Clean It Industrial Services - *Sale*	Yes	0417 517 391
Cobram Electrical and Data Pty Ltd - *Cobram* *North East Victoria and NSW*	Yes	(03) 5871 2807 0438 503 973 F: (03) 5871 2907 E:info@cobramelectricalanddata.com
Corrosion Mitigation Pty Ltd - *Kensington* *All areas*	No	(03) 9376 4216 0418 367 295
CSA Specialised Services - *Seaford* *All of Victoria*	Yes	1300 859 829 E:courtney@csaspecialised.com.au
D-TECH Ground and Overhead Services Ptd Ltd - *Notting Hill* *All of Vic*	Yes	0421 697 090 E: tina@d-tech.net.au
Daylesford Underground Cable Location – *Daylesford* *Daylesford & surrounding areas*	No	0427 485 520 (03) 5348 5520
deCastella Walsh Consulting Pty Ltd t/as Utility Locating Victoria - *Yarra Glen & Doncaster East areas*	Yes	0417 327 570 E:damien.decastella@gmail.com
Down Under Pipeline Surveys Pty Ltd - *Orangeville*	No	(02) 4653 1286 or 0418 675 374 F: (02) 4653 1747
Drain Solutions Pty Ltd - *Thomastown* *Melbourne, Melbourne Metro, Greater Melbourne Metropolitan areas, Mornington Peninsular and all Regional Areas*	Yes	1300 546 348 0412 111 600 E: info@drainsolutions.com.au

Name & areas covered	Fibre	Contact details
Dunlop & Pitson Earthmoving - *Bendigo* *Bendigo Region*	No	(03) 5441 1809 0419 761 427 F: (03) 5441 5571 E: tim@dpearth.com.au
Earthscan Technology Pty Ltd - *Ballarat* *Central and South West*	No	0402 210 445 F: (03) 5331 7611 E: njcahir@hotmail.com
Echuca and District Cable Locations - *Echuca* *Northern VIC, Southern NSW*	Yes	0419 001 843
Eiicon Locations - *Wodonga* *Wodonga, Albury, Wagga Wagga, Wangaratta, Towong Shire, Alpine Shire, Indigo Shire*	Yes	0419 568 331
Environmental Locations Systems - *Hallam* *Metropolitan Melbourne and all of Victoria*	Yes	(03) 9314 5335 0414 352 472
Fletcher Plumbing – *Southern NSW and North East Victoria*	No	(02) 6057 1100 0404 030 305 F: (02)6043 3199
G.J & R.K Smith – *Mirboo North*	No	0409 803 583 E: rob-greg@bigpond.com
Geelong Cable Locations - *Geelong* *All areas*	DIAL BEFORE YOU DIG CERTIFIED LOCATOR	0418 108 543 1800 449 543 E: info@geelongcablelocations.com.au
Geosafe Pty Ltd – *Airport West* *Melbourne & Country Victoria*	Yes	03 9336 4086 E: enquiries@geosafe.com.au W: www.geosafe.com.au
GeoScan Utility Location Service - *Torquay* *Victoria Statewide*	Yes	0417 309 710 F: (03) 5261 9619
Gippsland Pipe & Cable Locations - *Wy Yung* *Gippsland*	Yes	(03) 5152 4417 0409 386 817 F: (03) 5152 4480
Gippslocate - *Traralgon* *Gippsland*	Yes	(03) 5174 9831 0429 349 391 E: info@gippslocate.com.au
HMR Partners Aust Pty Ltd – *Lockwood Sth* *North Central Victoria*	No	0423 870207 E: hmrpartners@gmail.com
Independant Plumbing Inspirations – *Yarra Glen* *Yarra Glen & Yea area*	Yes	0411 111 839 E:Iplumbinspections@outlook.com
Juls Projects Pty Ltd – *Pakenham*	Yes	0417 511 114 E: craigj@julsprojects.com.au
Mark W Brehaut t/as Pipe & Cable Locating - *Ballarat* *Ballarat*	Yes	0402 411 843 F: 03 9011 9750 E: house3d@gmail.com

Name & areas covered	Fibre	Contact details
Murray Valley Locating and Electrical – *Cobram* *Murray Valley, North East Victoria and Southern NSW*	Yes	0417 426 731 E: officemvle@gmail.com
On Point Utility Locating Pty Ltd - *Woodpark*	Yes	0405 149 529
Pipe & Cable Underground Solutions Pty Ltd – *Ascot Vale. Metro & Country*	No	0418 378 935
Pipeline Technology Services - *Marleston*	No	(08) 8351 7000 0419 878 220 F:(08) 8159 7537
Qest Environments – *North Geelong*	Yes	1300 308 172 After Hours: 0417 478 732 F: 1300 456 863
R & R McClure – *Castlemaine* *Bendigo, Castlemaine, Kyneton, Gisborne, Heathcote, Mildura, Robinvale, Ouyen*	Yes	(03) 5472 3256 F: (03) 5472 4558 E: admin@rrmcclure.com.au
Radiotech Geo-Structural Surveys- *Greensborough*	No	(03) 9444 9183 F: (03) 9434 4694
SADB Directional Drilling – *Newton* *Adelaide, Metro and outer Regions*	Yes	(08) 8168 7200 E: reception@sadb.com.au W: www.SADB.com.au
Sensing Cables - *Toolangi*	Yes	0427 265 075 E: sensingcables@hotmail.com
Somerset Communications - *Wangaratta* *North East Victoria (Wangaratta, Bright, Yarrawonga, Mansfield, Benalla), Kiewa Valley, Corowa, Rutherglen*	Yes	0407 228 280
Spence Plumbing – *Colac* *Central & South-West Victoria*	Yes	0400 147 385 E: cabletracing@gmail.com
Spot on Group – *Swan Hill* *Central & North-East Vic, Southern NSW*	No	1300 531 431 0407 505 226 F: (03) 5032 1173
SR Excavations – *Newhaven* *South Gippsland, Bass Coast & Phillip Island*	Yes	0418 537 278 E: admin@srexcavations.com.au
Steger & Associates Registered Land Surveyors – *Kambah* *Southern NSW, ACT, Northern and Eastern VIC*	Yes	(02) 6296 4089 F: 02 6296 4090 E: enquiries@steger.com
Swanson Site Services – *North Shore* *Geelong Region, Western Victoria & Greater Melbourne*	Yes	0403 883 454 E:info@swansonsurveying.com.au
Symes Contracting Services - *Wangaratta* *North East Victoria*	No	0427 215 600 E: wsymes1@bigpond.com
Ted Finchett Pty Ltd - *Hamilton* *South West Vic*	No	(03) 5572 3388

Name & areas covered	Fibre	Contact details
UES (Victoria) Pty Ltd - *Kyabram* *Northern Victoria, Goulburn Valley, Southern Riverina*	Yes	0407 120 201 F: (03) 5852 1577 E: uesvicptyltd@bigpond.com
Underground Locating Services - *Devon Meadows* *Gippsland, Mornington Peninsula*	Yes	0414 409 619
Underground Services Detection Pty Ltd - *Taylors Lakes*	Yes	0401 268 915 F: (03) 8390 9574
Underground Service Detectives - *Hawthorn East* *Melbourne and Greater Metropolitan Area*	No	1300 781 486 0418 995 975
Underground Service Solutions – *Macedon Ranges* *All Areas*	Yes	0402 071198 E:Underground.solutions13@gmail.com
Utility Mapping (Aust) Pty Ltd – *Port Melbourne*	Yes	1300 MAPPING E:melbourne@utilitymapping.com.au W: www.utilitymapping.com.au
Utility Vision Pty Ltd - *Craigieburn* *All of Victoria*	Yes	(03) 9333 8435 0409 525 973 E:clayton@utilityvision.com.au
Vac Group Operations Pty Ltd t/as Earthspy - *Melbourne* *Melbourne, Gippsland, Bendigo, Ballarat*	Yes	1300 822 834 M: 0447 466 566
Watters Electrical Pty Ltd – *Shepparton & Mildura based*	Yes	(03) 5821 3944 F: (03) 5831 1101

LEGEND

IT'S HOW WE CONNECT

For more info contact a Telstra Accredited Locater or Telstra Plan Services 1800 653 935

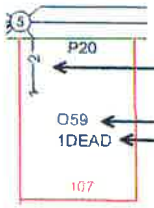
Exchange
(major cable present)

Footway access chamber
(can vary from 1-lid to 12-lid)

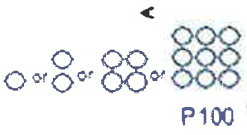
Pillar/cabinet
(above the ground / free standing)

Above ground complex equipment housing (eg RIM)
Please Note This equipment is powered by 240V electricity

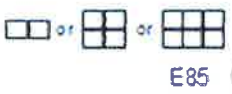
OC **other carrier**



2 pair lead-in to property from pit in street
1 pair working (pair ID 059)
1 pair dead (i.e. spare, not connected)



Single to multiple round conduit
Configurations 1, 2, 4, 9 respectively
(Attached text denotes conduit type and size)



Multiple square conduit
Configurations 2, 4, 6 respectively
(Attached text denotes conduit type and size)

Cable jointing pit
(number indicating pit type)

Elevated cable joint
(above ground joint on buried cable)

Telstra Plant in shared utility trench

Aerial Cable
(above ground)

Aerial Cable
(attached to joint use pole e g. power)

Direct buried cable

Marker post installed

Buried transponder

Marker, transponder

SMOF **Optical fibre cable direct buried**

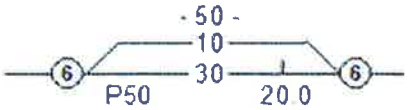
Some examples of conduit type and size:

A - Asbestos cement, P - PVC / plastic, C - Concrete, GI - Galvanised iron, E - Earthenware.

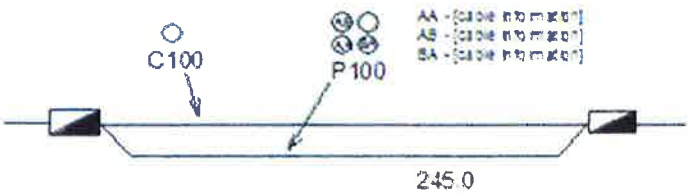
Conduit sizes *nominally* range from 20mm to 100mm.

P50	50mm PVC conduit
P100	100mm PVC conduit
A100	100mm asbestos cement conduit
E 85	85mm square earthenware conduit

Some examples of how to read Telstra plans:

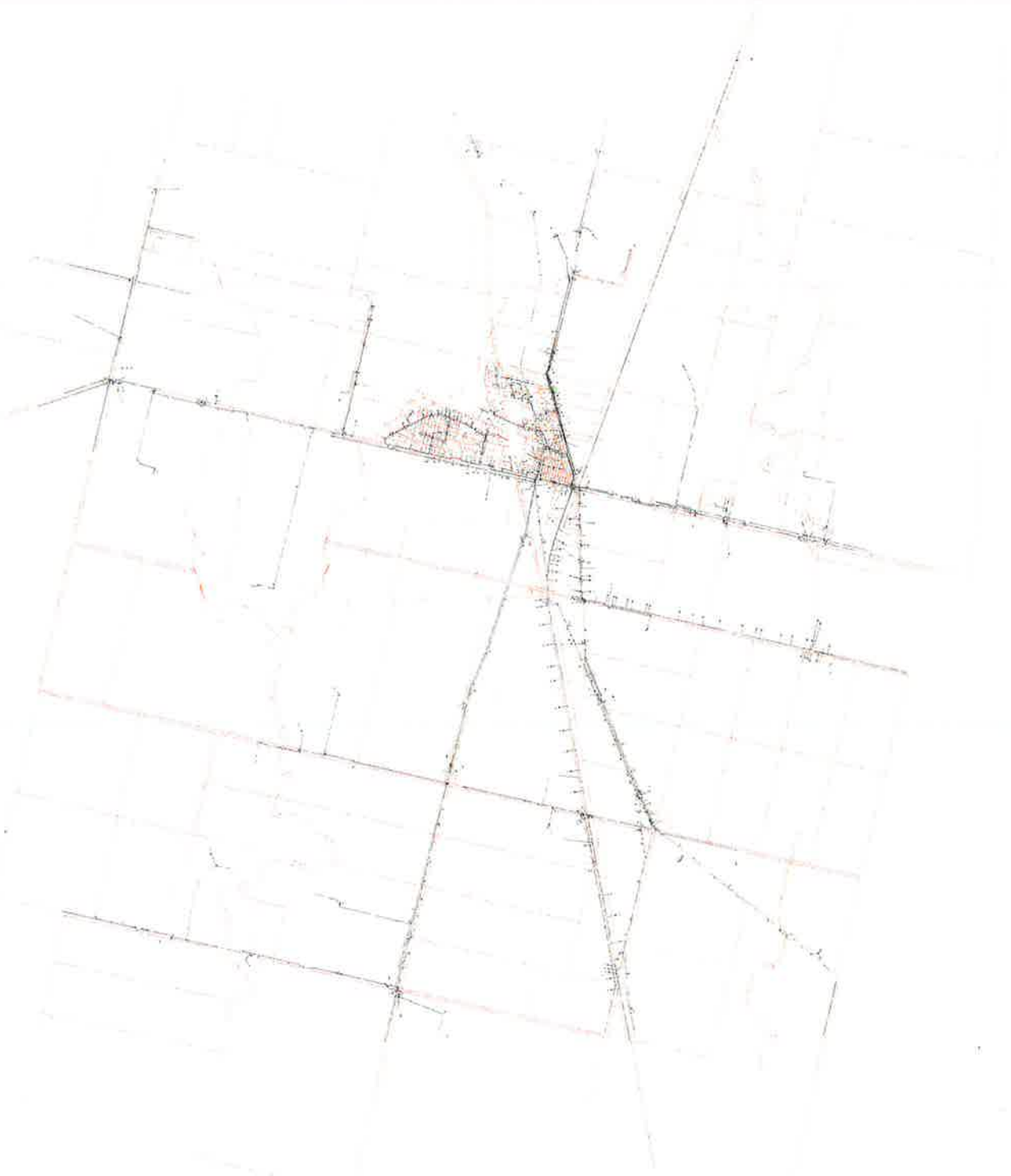


One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits, 20.0m apart, with a direct buried 30-pair cable along the same route



Two separate conduit runs between two footway access chambers (manholes) 245m apart. A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100) along the same route

WARNING: Telstra plans and location information conform to Quality Level 'D' of the Australian Standard AS 5488 - Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans. FURTHER ON SITE INVESTIGATION IS REQUIRED TO VALIDATE THE EXACT LOCATION OF TELSTRA PLANT PRIOR TO COMMENCING CONSTRUCTION WORK. A plant location service is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works. The exact position of Telstra assets can only be validated by physically exposing it. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.



ATTACHMENT 5

Vic Track Report

VicTrack

VicTrack
Level 8, 1010 LaTrobe Street
Docklands, VIC 3008
P.O. Box 1681
Melbourne, VIC 3001
Ph: (03) 9619 8850
Fax: (03) 9619 8851
victrack@victrack.com.au

To:
TGM Group - Miss Nicole Dixon
Level 1, 27 - 31 Myers Street
Geelong VIC 3220
nicoled@tgmgroup.com

VicTrack has been advised that you have placed an enquiry through the Dial Before You Dig service, with the following details. Please be advised on the response.

Sequence Number	50782187
Enquiry Date	11/02/2016 15:10
Response	**AFFECTED WITHIN RAIL RESERVE**
Address	815 Hendy Main Road Moriac
Location in Road	CarriageWay,Footpath,Nature Strip
Activity	Subdivision

To obtain information and plans within the Rail Reserve forward your enquiry to **External.Property@VICTRACK.com.au.** Include a brief description of your intended works.

Please also see VicTrack's Network Protection Plan attachment. This protection plan must be adhered to at all times.

If you have any queries, please contact:

Joe De Luca on 0417 119 601, or
Greg Peel on 0417 584 179, or
Frank Grillo on 0419 337 601, or
Habib Dagher on 0488 226 700.

Yours sincerely,

Joe De Luca
External Plant Manager

TELECOMMUNICATIONS SPECIFICATION

VicTrack Telecommunications Department

TELECOMMUNICATIONS NETWORK PROTECTION PLAN

TS-SP-015_V03_R1.1

Source: Technology and Strategic Planning

VicTrack

VicTrack	VicTrack Telecommunications Department Technology and Strategic Planning	TS-SP-015 V03 R1.1

Telecommunications Network Protection Plan

REVIEWED AND ENDORSED	INITIALS
Senior Network Architect	
Manager, Network Protection	
Manager, Network Infrastructure Services	
Manager, Service Assurance	

Sponsor Group:

Technology and Strategic Planning

Prepared/Amended by:

P. Gamble; Laurie Beckwith

Checked by:

J. De Luca & R. Watson

Number of Pages:

23

Document Approval:

.....
(Signature)

.....
(Date)

Head of Engineering & Operations

.....
(Designation)

RECORD OF AMENDMENT/CHANGE

VERSION	VERSION DATE	SUMMARY OF CHANGE	DOCUMENT AUTHORITY
V01 / R1	20/5/2004	First Draft.	Manager, Telecommunications Services, VicTrack Access
V01 / R2	27/5/2004	Minor revisions	Manager, Telecommunications Services, VicTrack Access
V02 / R1	26/11/09	Revision and updating.	Fibre Network Planning Engineer
V02 / R2	19/04/10	Minor revision and updating.	Senior Network Architect
V02 / R3	3/05/10	Minor revision.	Senior Network Architect
V3/_R1	13/02/14	Review by Bob Watson and Laurie Beckwith	Senior Network Architect
V3/_R1.1	Dec 2014	Full review by Laurie Beckwith	Head of Engineering & Operations

Contents

1

VicTrack is a licensed Telecommunications carrier under the Telecommunications Act 1997. It owns considerable Telecommunications infrastructure in the form of fibre optic cables, copper cables and supporting facilities. This infrastructure is used to provide Telecommunications services to a number of customers including:

- The rail industry for voice, data and train signalling and control;
- Various state government departments; and
- Other licensed carriers.

As a result, the infrastructure must be protected from damage.

The purpose of this document is to specify the work protocols to be observed by contractors and rail operators working near VicTrack's Telecommunications infrastructure so that it is not damaged in any way and the services carried on that infrastructure are not adversely affected in any way.

It is a fundamental principle of this protocol that all Contractors will exercise Due Care and observe good engineering practice while working near VicTrack's Telecommunications infrastructure and will take all reasonable precautions to avoid damaging that infrastructure. VicTrack will, in this respect, assist Contractors by providing to them or their subcontractors the best available information and advice.

VicTrack, as a licensed Telecommunications carrier, retains certain rights under the Telecommunications Act in regard to protection of its infrastructure. Contractors are reminded that it is an offence, for which penalties may apply under the *Criminal Code Act* 1995 *(Commonwealth),* to tamper with or interfere with a facility owned or operated by a Telecommunications carrier. The potential penalties are more severe, if the normal operation of carriage services supplied by a Telecommunications carriage service provider is hindered.

2 Scope

This specification is applicable to VicTrack staff, rail franchisee staff or Contractors who will be carrying out any works within 5 metres of VicTrack's Telecommunications infrastructure. While the majority of VicTrack's infrastructure is on Victorian rail corridors, an increasing amount is off the rail corridors.

This infrastructure may be:

- In the rail corridor (GST/GLT/Buried Conduit/Direct Buried);
- Underground, in road reserves in VicTrack or other carriers' conduits;
- In Station Buildings, CER's and SER's;
- Aerial on tram or power poles; or
- Underground in private land.

3 Definitions

1100	This is the phone number for "Dial Before You Dig" - Australia's National Referral Service for Information on Underground Pipes & Cables. A free referral service for information on underground pipes and cables anywhere in Australia from all member Utilities and Authorities. Also: www.1100.com.au
1800 619 111	This is the phone number displayed on VicTrack route marker posts to contact VicTrack to seek information on underground communication and signalling cables in the Victorian rail corridors.
1800 887 662	This is the phone number of the VicTrack Network Operations Centre (NOC).
ARO	Accredited Rail Operator
Carrier	A body licensed under the Telecommunications Act, 1997 (or its replacement), as a general or mobile Telecommunications carrier.
Contractor	Any person or persons carrying out discovery, construction, installation or maintenance activities.
CER	Communications Equipment Room
CSR	Combined Services Route where communications and other cabling assets share the same route, but use separate conduits and pits.
Due Care	Appropriate care as required by the principles of the law of Tort and Contract as well as pursuant to Criminal Statute; along with the requirements for good engineering practices as required by the Act and the Telecommunications Code of Practice. Due care needs to be observed when undertaking works in accordance with the processes set out in this document.
DBYD	Dial Before You Dig
External Plant	Includes all VicTrack fibre optic cables, copper cables, pits, bollards, conduits, trunking (GST), surface ducting (GLT), route markers, buildings, marker tape, termination boxes and associated infrastructure used to provide the communications services.
External Plant Relocation	A physical alteration to the configuration or alignment of an existing Telecommunications cable or facility, with or without a cable cutover.
FOC	Fibre Optic Cable.
Franchisee	A Train or Tram Operator operating under a licence granted by the State. The Franchisees having responsibility for fixed infrastructure include Metro Trains Melbourne (MTM) (metropolitan lines), V/Line (country lines), Australian Rail

	Track Corporation (ARTC) (interstate corridors) and Yarra Trams. Also known as an ARO.
GLT	Ground Level Troughing (steel, plastic or concrete)
GST	Galvanised Steel Troughing
Hazard PTW	Works that may pose a risk of damage to VicTrack Telecommunications infrastructure but do not require outages to services.
HV	High voltage power cable (over 1000V).
Incident Report	A report to be provided by the Contractor in the event of damage to VicTrack External Plant detailing events leading up to and including the damage event, plus proposed actions to be put in place to prevent a recurrence of this type of event in the future.
Industry Specialist	Industry Specialists are experienced design and construction companies capable of understanding protective and relocation works upon the live network without disruption to VicTrack customer traffic, without asset depreciation of network plant, and under broad VicTrack direction and with limited supervision.
Internal Plant	Racks, shelves, wall boxes and cabinets containing external cable termination equipment and/or VicTrack network equipment.
Location, Confirmed	Where the location of the cable or conduit has actually been confirmed by exposing it by Potholing or other non-destructive exposure methods.
Location, Nominal	Locations obtained by use of plans, verbal information, marker posts, trench lines, electronic devices or lines between confirmed locations (not to be treated as confirmed location).
Network Protection Manager	Position within the VicTrack Operations group that is dedicated to network protection and maintenance activities.
NIS	**Network Infrastructure Services** – This is the team within VicTrack Customer Operations Group that provides damage minimisation principles and information on the location of VicTrack External Plant. VicTrack may delegate some or all of this function to an external company.
NOC	**Network Operations Centre** – This is the area responsible for the integrity and operation of VicTrack's network. It is staffed on a 24-hour 7-day basis. Contact can be made via the VicTrack Call Centre on 03-9619 1111 or 1 800 619 111.
NPP	**Network Protection Plan**. A document that sets out the procedures to be followed during the carrying out of Works to ensure satisfactory protection of VicTrack assets.
Outage PTW	PTW that involves outages to services
PTW - Permit To	A request to the VicTrack Change Management group for

Work	permission to work on, or near, VicTrack Telecommunications infrastructure.
Pothole	See Potholing below.
Potholing	Potholing is a non-destructive digging procedure which uses water lance and vacuum excavation techniques to expose a cable, conduit or marker tape. This process is also known as "Exploratory Trenching". At all times while carrying out such activities, Due Care is to be exercised to avoid any damage to the External Plant. If HV cables are present, the relevant ARO may require power isolation to be effected before potholing is carried out.
SER	Signalling Equipment Room
SWMS/JSEA	Safe Work Method Statement (previously known as Job Safety and Environment Analysis
Target Separation	Agreed minimum offsets for which no Potholing precautions are required to protect VicTrack's Plant.
Telecommunications	Voice and Data services and infrastructure
VicTrack	Victorian Rail Track, associated companies or their agents.
VRT	Victorian Rail Track, associated companies or their agents.
Works	For the purpose of this document, the carrying out of any investigative, construction or maintenance activities.

4 References

4.1 TS-SP-013 Installation and Maintenance Specification – External Plant (VicTrack);

4.2 AS/ACIF S008:2006 Requirements for authorised cabling products;

4.3 AS/ACIF S009:2006 Installation requirements for customer cabling (Wiring Rules);

4.4 AS/NZS 3000:2007 Electrical Installations (known as the Australian / New Zealand Wiring Rules);

4.5 AS 4799 – 2000 Installation of underground utility services and pipelines within railway boundaries;

4.6 IS-P009 – VicTrack Change Policy; and

4.7 Where requirements clash between standards, the more stringent requirement is to be adopted.

5 Background information

5.1 Information on the location of VicTrack's Telecommunications External Plant is obtainable by contacting 1800 619 111. Information on the location of ARO External Plant is obtainable from the maintenance contractors for the rail franchisees. In the metropolitan area, the maintenance contractor is Metro Trains Melbourne. In the country area, the maintenance contractor for V/Line and ARTC is internal to those organisations;

5.2 Some of VicTrack's telecommunication cables are carried in shared infrastructure. This includes trunking (GST), surface ducting (GLT), pits, and in some cases trenches (CSR). The infrastructure is generally shared with signalling cables that may contain low and high voltage cables (HV is 1000V+);

5.3 External cable infrastructure will terminate in external cabinets or racks, shelves, wall boxes or cabinets within buildings;

5.4 The Telecommunications cable plans are only a guide and the drawings should not be scaled to locate the cable. No warranty is given that the information is accurate or complete. Furthermore, the information supplied is valid for 14 days only;

5.5 In the event that suspected asbestos is identified or suspected during works conducted by VicTrack personnel or contractors, the material will be managed in accordance with Section 15.3 of the VicTrack Asbestos Management Plan – VT-SP032. An extract of Section 15 can be found in Attachment 1 in this document; and

5.6 The use of asbestos products in new telecommunication infrastructure is prohibited.

6 Inductions and Worker Accreditation

In order to maintain our network standards for installation and maintenance, it is required that:

6.1 All workers that will have access to our network external plant shall attend induction workshops where they will be given the required information as contained within TS-SP-013 (Installation and Maintenance Specification – External Plant), TS-SP-015 (Network Protection Plan) and TS-SP-066 (Attachments to Tram Poles);

6.2 On demonstrating an adequate understanding of our network requirements, these staff will be issued with a "VicTrack Network – External Plant" accreditation card. This card will enable these workers to work on or near VicTrack external plant for a period of five (5) years, after which a refresher workshop will be held. As industry workers often change employers, it is required that companies used by VicTrack for external plant work will advise VicTrack on changes of staff to allow us to organise workshops for new workers and/or refresher courses.

6.3 The courses may be different for different areas of expertise, such as planning and design guidelines for design staff, and detailed courses on pits, conduits, etc. for field supervisors.

6.4 Minor specification changes will be advised to card holders as a matter of keeping up to date with our standards.

6.5 Installation and maintenance contract companies will be required to advise

which of their staff will be working on or near VicTrack external plant and will be required to provide their current accreditation details before those staff can perform those works.

7 Underground works

7.1 Planning Phase Process

7.1.1 The Contractor shall apply to DBYD to seek plans from all underground asset owners well in advance of any Works activity;

7.1.2 Note that details of railway assets in rail corridors such as Telecommunications and signalling cables are not listed with DBYD. For these assets, the Contractor is to contact the VicTrack Property Group who will in turn notify the relevant VicTrack asset manager;

7.1.3 As soon as practicable during its Planning/Design Phase, the Contractor shall provide to VicTrack Network Infrastructure Services (NIS) for each section of the Work's activities;

7.1.3.1 Advice of its intention to undertake discovery, construction or maintenance Works in the vicinity of VicTrack Internal and External Plant;
7.1.3.2 Detailed Works programs including timelines;
7.1.3.3 Works details, including scale drawings and method of carrying out the Works; and
7.1.3.4 Details of how the Contractor will protect VicTrack's assets from damage;

7.1.4 The VicTrack NIS group, with whatever assistance it may require of the Contractor, will refer to the information supplied by the Contractor for its general awareness and understanding of the Works only. The Contractor shall examine its maps and plans, designs and protocols against VicTrack's network information and plans. VicTrack shall provide such plans free of charge as part of the standard External Plant location process. However, if the Contractor requires urgent plans or a large amount of simultaneous plans from VRT, then VRT may charge the Contractor a reasonable amount. Depending on the complexity and size of the Contractor's project, VicTrack may insist on the Contractor's key design and construction staff attending a VicTrack induction workshop where the Network Protection Plan (this Specification) and relevant portions of TS-SP-013 Installation and Maintenance Specification – External Plant will be presented;

7.1.5 Based upon network plans and information provided by VicTrack, the Contractor will:

1. Identify any crossing points and close parallel working distances to VicTrack's network within agreed Target Separations and other potentially High Risk situations;

2. Attempt to "design out" crossing points and areas inside agreed Target Separations;

3. Notify NIS where the Target Separations cannot be achieved and engage in consultation with NIS to agree upon appropriate work methods which may include the requirement for VicTrack personnel to be in attendance during Outage PTW's;

4. Undertake associated hazard prediction and risks to VicTrack plant; such as ancillary machinery activity, vehicle movements, temporary fencing, buildings or, storage compounds, star pickets, signs, likely soil ground differential settlement or disturbance because of proposed construction, and the like. NIS must be notified of such activities for advice and resolution as appropriate;

5. Prepare a Network Protection Plan that will set out the procedures to be followed during the carrying out of the Works to ensure satisfactory protection of VicTrack Plant. This is also to include the protection of the alignment of underground conduits, not just visible assets. No excess trenching spoil or storage of materials is to be placed over the existing conduit alignment or within 5 metres of that alignment, without prior approval from the VicTrack Project Manager. The NPP is to be forwarded to NIS for approval prior to the commencement of any works. Collaboration with the VicTrack Network Protection Manager is advisable to ensure all items are covered and the time frame is minimised;

6. Apply for a Permit to Work (PTW) from the VicTrack Change Management group and receive the necessary approval to carry out the Works. The current PTW application form and information requirements can be sourced from the VicTrack Change Management Team on 03-9619 8008. Approval of a PTW application may take a minimum of ten business days for Works near existing External Plant. Where relocation of existing External Plant is required, the time depends on the complexity of the change; and

7. Where necessary, apply to the relevant rail corridor ARO for permission to work on the corridor. Note that the VicTrack's approval of the PTW *DOES NOT* confer any rights to enter the rail corridor.

7.1.6 With Outage PTW's , NIS and the Contractor shall agree on work methods prior to the commencement of work. After agreement has been reached on work methods, the Contractor shall give NIS a minimum of 2 days advance notice in the Melbourne metropolitan area and 5 days advance notice in rural areas of its intention to commence those works;

7.1.7 The Contractor shall locate (Pothole for underground cabling), mark and protect VicTrack Plant in accordance with set and agreed procedures (see Section 6). No costs are to be borne by VicTrack in this regard;

7.1.8 VicTrack agrees to provide the Contractor with its standard level of free plan provisioning and engineering advice services as set out in accordance with VicTrack's Plant location procedure and policy. The Contractor will provide the necessary level of Industry Specialist support in the design and construction stages to ensure the observance of good engineering practice when working within the vicinity of VicTrack Plant. The Contractor is to refer to the design guidelines within TS-SP-013 when designing cable routes. VicTrack accepts that

the Contractor may resource its Industry Specialist resources as it so chooses. This to be done to:

1. Minimise the impact of the Contractor's requirements on NIS's resources; and

2. Ensure that the Contractor's construction program is adequately resourced in both the design and construction stages with the appropriate level of Industry Specialist servicing such that VicTrack's network is not placed at risk.

7.1.9 Any agreed relocation of VicTrack Plant shall only take place in accordance with set and agreed procedures (see Section 9).No costs are to be borne by VicTrack in this regard and all works are to comply with the requirements of TS-SP-013 Installation and Maintenance Specification – External Plant;

7.1.10 The Contractor will exercise Due Care and all agreed precautions taken when carrying out Works near VicTrack External Plant;

7.1.11 The Contractor is required to assess and predict circumstances or problems affecting the safety and wellbeing of VicTrack plant, and consult with NIS accordingly, before construction proceeds in that vicinity;

7.1.12 The Contractor recognises that NIS may at times require or deem it necessary to brief the Contractor's staff or its agents in relation to External Plant location and construction activity near VicTrack External Plant. This may be done in the form of Cable Awareness Presentations, toolbox meetings, induction meetings, etc. This shall be undertaken at a time mutually agreed between VicTrack and the Contractor; and

7.1.13 The Contractor shall consult with NIS as soon as a design change is proposed that may affect VicTrack plant. This is to minimise the risk of damage to VicTrack plant due to ad-hoc changes

8 Locating VicTrack Underground External Plant

8.1 External Plant locations obtained by the use of plans, verbal information, marker posts, trench lines, electronic devices or lines between locations are Nominal Locations only and MUST NOT be treated as Confirmed Locations;

8.2 The actual location of VicTrack External Plant can only be confirmed by physical exposure of that External Plant, i.e. Potholing. VicTrack NIS reserves the right to be present at the time, proffer advice, or to coordinate potholing activity near VicTrack External Plant;

8.3 The use of water lance and vacuum extraction technology is the preferred method of physical exposure of VicTrack External Plant. Should this not be possible, then the Contractor must propose an alternative method to VicTrack for approval prior to works being carried out. It is to be noted that water lance pressure must be less than 1500psi (10443kPa) to prevent damage to the marker tape and direct buried cables. Once the level is below the marker tape, the pressure can be increased if all cables are in conduit, but care must still be taken. The water flow is to be stopped before removing the water lance to avoid

damaging the marker tape;

8.4 It should be noted that, while the majority of VicTrack's buried cables are in conduit, some cables are directly buried. Also, in many cases, signalling control and power cables share the same trench;

8.5 When inside the required Target Separation distances, the Contractor is required to locate VicTrack External Plant with sufficient certainty to avoid damaging that External Plant. The External Plant location requirement needs to be ascertained by the Contractor well prior to excavating within the vicinity of VicTrack External Plant. If the marker tape trace wire is broken during the location process, it must be repaired using stainless steel 3mm wire and connected using crimp connectors suitable for underground use. Twisting the wire is not an acceptable connection method. If any other infrastructure (conduit, cable) is damaged during the location process, work is to temporarily cease and the Network Protection Manager is to be contacted via the VicTrack Call Centre on 1 800 619 111. The Network Protection Manager will ascertain what corrective measures are required at the Contractor's cost. Work cannot continue until advised by the Network Protection Manager;

8.6 Once VicTrack External Plant is located, the Contractor must ensure it is clearly marked and all necessary protective measures are to be implemented to ensure the integrity of the VicTrack External Plant during the Works. The potholes are to be left open and the Network Protection Manager contacted to arrange for on-site pothole inspections;

8.7 The Contractor must erect temporary markers to make the Plant location obvious and to act as an identifying mark for the proposed works showing where potholing has confirmed the actual location at the time;

8.8 Upon completion of the Works, the Contractor must make good permanent reinstatement for the protection of VicTrack External Plant and stabilisation of the existing network alignment. This must include reinstatement of any marker tape, marker posts or bollards that were removed or damaged during the Works activity, or otherwise and the filling in of any potholes;

8.9 Where new marker tape with trace wire is used, the trace wire must be joined with an approved compression type connector approved by the Network Protection Manager;

8.10 VicTrack NIS will attend the Works site:

(a) At its discretion; or

(b) To give direction from time to time; or

(c) In the event that the Contractor, after undertaking all reasonable efforts, is unable to locate the VicTrack External Plant, at the Contractor's request at a fair and reasonable cost to be agreed by the parties; and

8.11 The Contractor will ensure that all supervisors, plant operators, sub-contractors, and the like, are briefed of both the actual and nominal locations of all External Plant within the vicinity prior to the commencement of any work. The Contractor accepts and acknowledges that all accountability and responsibility needs to be taken for the actions of agents and sub-contractors in accordance with both the normal and tortious obligations of a vicarious liability employer.

9 Parallel Operations (Target Separations) from Underground Plant

9.1 The Contractor agrees that as a design principle, Works should be designed to avoid jeopardising or damaging existing underground External Plant;

9.2 The Contractor recognises that the location and alignment of existing underground plant can only be confirmed by exposing it (i.e. Potholing). Any other form of location is nominal only (see Section 5.4). In addition, the Contractor recognises that the alignment of existing plant may suddenly deviate for reasons that might not be obvious sometime after the plant had been installed;

9.3 In designing its Works, the Contractor will endeavour to secure the Target Separation from VicTrack External Plant. The following Target Separation from the nominal location of existing Plant must be used as a design target when planning Construction works:

Installation	Target Minimum Separation
Mechanical excavation parallel to External Plant	5 metres
NDD parallel to Plant	1 metre

9.4 VicTrack acknowledges, however, that this may not be achievable in all cases particularly where the Contractor is carrying out the Works in a narrow corridor;

9.5 When excavating parallel to the nominal or assumed line of VicTrack's network, the following potholing regime shall be followed unless written agreement is given by NIS to an alternate regime to confirm the location of the External Plant:

Approach distance	Min. pothole frequency
< 1 metre	Every 5 metres
> 1 m, but less than 2.5m	Every 10 metres
2.5m to 5m	Every 15 metres
> 5m	No potholing required
Change in cable direction	Pothole twice
If the excavation is by NDD between 1-5 metres	No potholing required provided the VicTrack asset has been electronically located.

The minimum pothole depth shall be to the cable marker tape if present, otherwise, until the cable or conduit is exposed;

In certain circumstances, e.g., where the corridor is narrow, or where the likely

path of the cable is not straight, VicTrack may direct more frequent potholing;

9.6 The Contractor must exercise particular care at creek and river crossings and elsewhere where the line of the existing route might not be clear;

9.7 Where installation of the Works is to take place within the Target Separation area the Contractor shall:

(a) consult with NIS;

(b) agree with NIS on appropriate work methods (which may include a requirement to horizontal bore some critical sections as negotiated between NIS and The Contractor or its agents); and

(c) Before commencing work, physically locate (Pothole) and protect VicTrack Plant;

9.8 Pits and above ground plant, such as bollards, route marker posts and fibre terminating boxes are to be protected during the Works. Where damage might occur to these items, they are to be protected by star pickets and para-webbing to provide a 1.5m buffer around the External Plant. If a 1.5m buffer zone cannot be created, then pits are to be protected by the placement of 25mm steel plate (length minimum three metres and width minimum 2 metres). Pit protection bollards and cable marker posts are to be removed and subsequently replaced after the Works have been completed, all at the Contractors' cost. Ongoing inspections are to be carried out by VicTrack External Plant staff to ascertain if any damage may be occurring because of heavy construction vehicles. If damage is occurring or there is a high potential of damage, then further plant protection measures must be taken to the satisfaction of the VicTrack Network Protection Manager;

9.9 In carrying out Works within the Target Separation area (1 to 5 metres), the Contractor shall exercise Due Care to avoid damage to VicTrack Plant. If works are to be carried out within 1 metre of the nominal asset location then the Contractor is to present protective measures to VicTrack for approval. The Contractor is to comply with VicTrack's requirements for that asset protection. Damage is to be prevented at all cost and in the event of any such damage occurring the Contractor shall:

(a) immediately cease work at that location; and

(b) Immediately notify VicTrack Network Operations Centre on 1800 887 662;

9.10 See also Section 12: "Damage to existing External Plant" for a complete description of requirements following damage to VicTrack's plant;

9.11 Some of VicTrack's telecommunication cables are carried in trunking (GST) and surface ducting (GLT). In these instances the plant is easily visible making it much easier to avoid damage. In some of these instances the FOC is carried in sub-duct to provide additional protection. In carrying out Works on, or near, GST and/or GLT, the Contractor shall exercise Due Care to avoid damage to VicTrack External Plant and advise the NIS of protective measures to be put in place to protect these assets. The Contractor is also to exercise Due Care to avoid damaging the GLT and/or GST. This includes movement of the GST support posts or misalignment of the GLT sections.

10 Crossing of VicTrack Cables

10.1 The Contractor recognises that underground External Plant and GLT/GST may suffer damage from heavy surface loads and the Contractor will take all necessary steps to prevent exposure of underground External Plant and GLT/GST to such loads. For example, calculations would need to be undertaken by the Contractor, where machinery or other equipment might cross or impart any form of surface load to the in-situ underground plant alignment;

10.2 Where The Contractor crosses VicTrack underground External Plant, The Contractor shall:

(a) Locate the underground External Plant in accordance with Section 7 – Locating VicTrack External Plant;

(b) Provide VicTrack NIS with a detailed specification for each point of major cable crossing conflict. The options for The Contractor in this regard are to either cross over or under the existing underground plant, the most appropriate option becoming apparent following NDD excavation, and identification of the existing underground plant. However, VicTrack's preferred option will be for The Contractor to install plant over VicTrack existing plant; and

(c) In areas of High Risk, agree with VicTrack NIS a work method which covers;

(i) Identification and exposure of VicTrack External Plant;

(ii) The Contractor installation process; and

(iii) Protection of VicTrack External Plant;

10.3 Whether the Contractor is crossing under or over VicTrack underground External Plant, a minimum of 100 mm vertical separation is required (unless a greater separation is required by a standard or code) between the underground External Plant and the Works unless alternative methods of protection are agreed between NIS and the Contractor well in advance. Manual Construction works are the only form acceptable in such circumstances. Back filling around the Plant must be with a suitable bedding material such as sand or stabilised sand;

10.4 In order to minimise risk of damage to existing underground VicTrack External Plant, suitable fully controlled mechanical excavation of the proposed crossing must be used between 5.0 metres and 0.5 metres from the existing (Potholed) underground External Plant alignment. This excavation must be fully controlled, including using a spotter and an appropriate Industry Specialist. Under 0.5

metres, NDD must be used. Ripping, ploughing, impacting, or hammering shall not be considered as fully controlled mechanical excavation techniques and may not be used within 5.0 metres of an existing cable except as otherwise agreed upon by NIS well in advance. Excavations involving explosives are not permitted. See Figure 1;

10.5 If a Contractor is carrying out excavation works in the vicinity of GLT of GST, Due Care must be taken to avoid damaging these infrastructures. GLT and/or GST may be carrying operational HV cabling so permission is to be obtained from the relevant ARO section managing these HV cables, prior to any work being carried out. VicTrack is also to be advised if the excavation works are within 5 metres of the GLT/GST; and

10.6 If the Work involves cable installations or removals within the GLT/GST, all relevant ARO's are to be advised to gain site access and permissions to work within the GLT/GST. VicTrack is also to be advised to obtain a Hazard PTW.

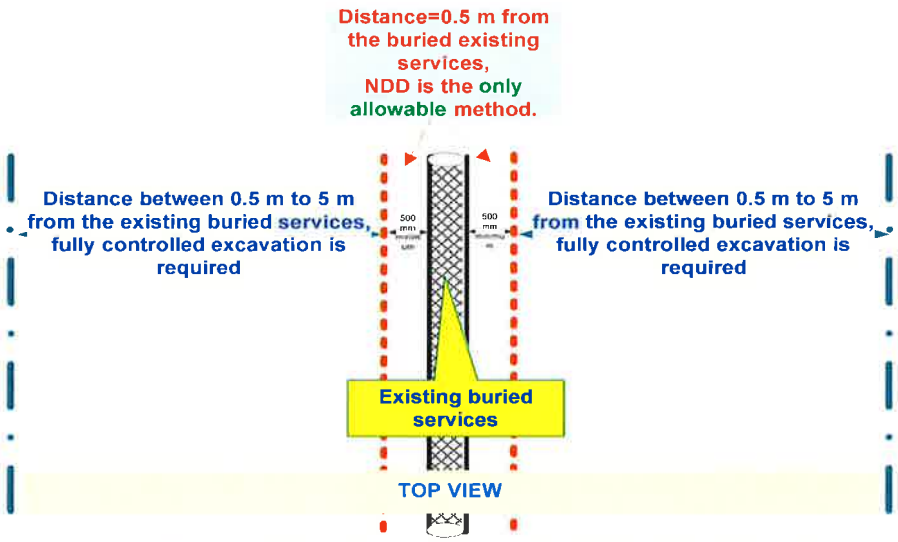


Figure 1 – Excavations when crossing VicTrack buried assets

11 External Plant Relocation

11.1 Relocation of existing External Plant, particularly FOC, with or without a cable cutover, is a last resort to resolving cable crossing or close proximity issues and will only be considered in those cases where it is not practical for the Construction works to avoid interference with the existing External Plant without relocation, and/or it is not feasible to use an alternative route;

11.2 Relocation can only occur with the prior agreement of VicTrack's Telecommunications Fibre Design Section;

11.3 Should VicTrack NIS and the Contractor agree that the best course of action is for VicTrack External Plant to be relocated, then the following must be observed:

(a) All relocation work must be carried out so as not to cause any interruption to existing services;

(b) Industry Specialists are required to perform such work, and all relocations must be managed by VicTrack's NIS Group;

(c) Existing External Plant to be relocated must first be located and protected (see Section 7);

(d) All new construction works are to comply with the requirements of TS-SP-013 Installation and Maintenance Specification – External Plant;

(e) All land access/tenure issues must be considered and addressed; and

(f) All costs associated with any relocation work are to be at the expense of the Contractor; no costs are to be borne by VicTrack. Recovery of costs necessarily incurred for the relocation work will be based on a fixed price quotation. Items should include, but are not restricted to, planning and supervision of the works, excavation of existing plant, alteration to depth and alignment of existing plant, provision of new underground conduits and/or GLT/GST, pits, cable hauling, cable jointing, and materials such as cable, joint enclosures and jointing chambers.

12 Hauling Cables in Infrastructure containing VicTrack Cables

12.1 Where the Contractor is required to haul cables in infrastructure containing VicTrack cables, irrespective of who manages the infrastructure, the following steps apply:

(a) Apply to VicTrack for permission to use the infrastructure. The application should include:

i. an accurate description of the location of the infrastructure;

ii. the type and dimensions of the infrastructure;

iii. the number and types of existing cables in the infrastructure;

iv. the number and type of cables to be hauled;

v. a work method statement; and

vi. a network protection plan.

(b) VicTrack will then consider the application, will correspond with the relevant ARO where necessary, and may require a site inspection and / or further

consultation to clarify and confirm the proposed works. The Contractor will then be advised of the approval or rejection of the application;

(c) Undertake associated hazard prediction and risks to VicTrack plant, such as ancillary machinery activity, vehicle movements, temporary fencing, buildings or, storage compounds, star pickets, signs, likely soil ground differential settlement or disturbance because of proposed Works, and the like;

(d) Prepare a Network Protection Plan, which will set out the procedures to be followed during the carrying out of the Works to ensure satisfactory protection of VicTrack Plant. The NPP is to be forwarded to NIS for approval prior to the commencement of any works; and

(e) Should the proposed Works be approved, the Contractor will be required to lodge a PTW with the VicTrack NOC for approval.

12.2 Where the infrastructure in question is GLT, GST or external cable tray, these infrastructures will most likely contain ARO power (LV & HV) cables, signalling cables and possibly air lines, therefore the following steps apply;

12.2.1 An application will be made to VicTrack as per Section 11.1 above; and

12.2.2 An application will also be made to the relevant ARO/s to obtain site access and any specific requirements for working within the above ground infrastructure, such as working near HV cables.

12.3 The Contractor will exercise Due Care and all agreed precautions taken when carrying out Works near VicTrack External Plant; and

12.4 VicTrack NIS will attend the Works site:

(a) At its discretion; or

(b) To give direction from time to time.

13 Damage to Existing External Plant

13.1 Nothing in the following should be taken to presume that damage might be permissible or acceptable, nor should it be read that damage could be a reasonable outcome or expectation. It is incumbent upon the Contractor to ensure that damage does not occur;

13.2 In those situations where VicTrack External Plant suffers damage or suspected damage, because of the activities of the Contractor or its agents, the following procedures apply in all instances, irrespective of the apparent severity of the damage:

(a) Notification, as soon as possible, to VicTrack via the 1800 887 662 - Network Operations Centre number and the following details given:

i. PTW number

ii. Location;

iii. Description and identity (if known) of the damaged External Plant;

iv. Description of the extent of the damage; and

v. Identity and contact details of the reporting party;

(b) The Contractor staff or their agents responsible for the damage are to:

i. Immediately cease all activities described in the relevant PTW;

ii. Remain on site if possible until a representative from VicTrack, or otherwise attends the site; and

iii. If requested, provide reasonable assistance with the immediate repair treatment of the damage;

13.3 Both VicTrack and The Contractor are to carry out their respective "In House" reporting and debriefing procedures and shall participate, if requested by each other, in a joint on site meeting within 48 hours of the incident in order to analyse the full circumstances of the damage. This meeting can also provide a forum for deciding action to avoid future damage incidents. A preliminary written report (Incident Report) is to be supplied to VicTrack by The Contractor with appropriate supporting documentation within 24 hours. The final Incident Report is to be provided within 72 hours. If the incident occurs during a critical occupation where many others are relying on the Contractor to complete their work, the incident reporting process will need to be accelerated. However the Contractor cannot resume the PTW activities until VicTrack has received and accepted the Incident Report, so it is incumbent on the Contractor to manage those accelerated activities;

13.4 The written report must contain a description of the incident and the activities leading up to it. The report must also include a risk management strategy to ensure there are no further occurrences of this type;

13.5 VicTrack reserves the right to suspend the Works until the above requirements are met and VicTrack is satisfied that its External Plant will be suitably protected in future;

13.6 Under no circumstances shall The Contractor staff or their agents repair damage unless specifically authorised by VicTrack;

13.7 The Contractor must take responsibility for ensuring that the site is safe and that no further damage occurs;

13.8 The foregoing deals only with accidental damage. VicTrack retains the right to take appropriate action where damage is caused by negligence or deliberate action;

13.9 The Contractor recognises it will be charged the costs necessarily incurred by VicTrack in carrying out repairs to External Plant brought about by damage as a result of the activities of The Contractor or its agents not exercising due care or, acting in a negligent or criminal manner;

13.10 This charge shall include, but is not limited to, supervision of temporary and final repairs, repairs to or replacement of cable, jointing chamber replacement, consequent acceptance testing of repaired External Plant or suspected damaged External Plant, re-establishment of services, business loss, and any consequential loss if repairs are not completed in a prescribed time period, etc.;

13.11 It should be noted that unplanned outages in networks can have catastrophic effects on business and costs for outage such as lost revenue and third party

customer impacts, would also be recovered; and

13.12 Recovery of costs will be based on existing standard procedures presently in place with VicTrack.

14 Project Review and Escalation of Issues

14.1 All parties are to first attempt to resolve issues on site in a cooperative manner and in an effort to seek a reasonable and practical solution;

14.2 VicTrack employees and / or contractors will, in the first instance, refer the issue to VicTrack's project manager for interpretation and resolution with the nominated VicTrack contacts. The appropriate project manager will be nominated for specific projects. Subsequent escalation will be to the Head of Engineering and Operations; and

14.3 The Contractor is required to provide VicTrack's nominated project manager with the name and contact details of the Project Manager and / or Field Supervisor involved in carrying out the Works.

15 Internal and above ground Telecommunications assets

15.1 Apart from underground assets VicTrack has many assets in/on above ground infrastructure (aerial, GST, GLT and external cable tray) and internal situations such as cable terminations in racks in equipment rooms. The equipment rooms can be dedicated VicTrack equipment rooms, shared station equipment rooms, or signal equipment rooms and external signal cabinets; and

15.2 Any planned works within 5 metres of these above ground and internal assets will require a PTW submission and no works are to commence until VicTrack has reviewed and approved the PTW.

16 ATTACHMENT 1 – Extract from VicTrack Asbestos Management Plan

ASBESTOS REMOVAL

15.1 General

The Victorian OHS Regulations require that the removal of ACMs be undertaken by contractors holding an appropriate asbestos removal licence. The regulations require that
any friable asbestos containing materials be removed by a licensed contractor. The regulations do allow some minor removal of non-friable material to be undertaken by personnel that do not hold a licence, however, any asbestos removal at properties under VicTrack management and control, whether friable or non-friable of any quantity, must only
be undertaken by contractors holding an appropriate asbestos removal licence. The licences required for types of asbestos removal are shown in the following table:

Table 9 - Asbestos Removal Licence Requirements

TYPE OF ASBESTOS REMOVAL LICENSE REQUIREMENTS

Removal of friable asbestos containing materials	*Class A Licence*

Removal of non-friable asbestos containing materials	*Class B Licence*
Removal of asbestos contaminated dust, debris or contaminated soil	*Class A Licence*

Additional information detailing VicTrack's preferred licensed asbestos removalists is provided in Section 25.2.

15.2 VicTrack Requirements and Minimum Standards

Prior to the commencement of asbestos removal work from VicTrack assets, VicTrack must:

- *Provide a copy of the most recent asbestos survey report, risk assessment and register to the asbestos removalist contractor;*
- *Obtain from the asbestos removal contractor a copy of their licence to ensure that the licence is adequate for the proposed asbestos removal;*
- *Obtain from the asbestos removal contractor a copy of the removalist's asbestos control plan. A review of this plan should be undertaken, in consultation with relevant stakeholders, where required, to ensure that the asbestos control plan is adequate to control the risk of asbestos exposure during the removal works. This should include, where applicable, the erection of protective enclosures, the definition of appropriate asbestos removal boundaries, warning signs and barricades and the use of decontamination procedures;*
- *Obtain from the asbestos removal contractor, a copy of the notification document provided to WorkSafe;*
- *When required, obtain training records from the asbestos removal contractor;*
- *Consult with relevant stakeholders with respect to the proposed removal works including adjacent sites, affected tenants etc;*
- *Engage the services of an approved analyst to undertake para-occupational airborne asbestos fibre monitoring during the removal of friable ACMs, as per the requirements set out in Section 16); and*
  analyst to undertake para-occupational airborne
  asbestos fibre monitoring during the removal of non-friable ACMs, as per the requirements set out in Section 16).

After completion of the removal work from VicTrack assets, VicTrack must;

- *Engage an independent qualified asbestos consultant to undertake a visual inspection (as per Section 16.3) of the removal area to confirm that the asbestos removal was completed to a satisfactory standard in accordance with the requirements of the Victorian OHS Regulations;*
- *Engage an approved asbestos analyst to undertake para-occupational airborne asbestos fibre clearance air monitoring within the removal zone, when the removal is undertaken indoors, prior to removal of any protective enclosure (Refer Section 16.3);*

and

- *Obtain a clearance certificate (Refer Section15.3) from an appropriately qualified asbestos consultant confirming that there is no visible asbestos remaining in the removal zone and when the removal was undertaken indoors, that clearance air*

monitoring confirms that airborne asbestos concentrations are <0.01 F/mL.
Following asbestos removal works undertaken on VicTrack assets, VicTrack must:

- *Provide the results of the visual inspection to the asbestos removalist;*
- *Provide the results of the airborne asbestos fibre monitoring to the removalist following receipt from the occupational hygienist; and*
- *Provide the results of the airborne asbestos fibre monitoring to all relevant stakeholders, including health and safety representatives.*

15.3 Telecommunication Assets

A key function of the telecommunications business unit is to install, operate and maintain telecommunication assets along the rail network and within various structures. As many of the assets, particularly telecommunication pits, were installed prior to the prohibition of asbestos, they may contain asbestos.
Having identified that the telecommunications asset contains damaged or deteriorated asbestos as per requirements set out in Section 9, VicTrack must undertake one of the following:

- *Arrange for the asbestos to be removed from the asset, or remove the entire asset and replace with a non-asbestos equivalent;*
- *Find an alternative non-asbestos asset in which to undertake the desired work; or*
- *Construct a new non-asbestos containing asset in the desired location.*

If the asset contains asbestos that is in good condition, the telecommunications asset can be utilised, subject to re-inspection.
The telecommunications group have established protocols when undertaking works on assets which may contain asbestos. Where pits or other items of asbestos are identified which are damaged, the pit will be removed in accordance with Section 15 of this AMP.
When telecommunications staff or contractors are conducting minor works in a building or structure, reference must be made to the asbestos register (provided either by VicTrack or third party lessee). If an asbestos register is not available, the Asbestos Manager should be requested to arrange an inspection.
It is noted that the disposal of asbestos must be undertaken in accordance with IWRG 611.1 (Refer to Section 3.11).

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