



GUNDARY SOLAR FARM

OSOM Route Study

Date: May 2025
Client: Umwelt
Type: Desktop Survey
Rev: 1

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Revision History

Revision	Date	Details	Prepared	Checked	Approved
0	24/04/2025	First issue	ICW	JW	JJM
1	20/05/2025	Updated with client comments	ICW	JW	JJM

Disclaimer

This report has been prepared for advisory purposes only. Information provided within the report is based on data provided by the Client as well as publicly available information and, to the best of ARES Group's knowledge and experience, is accurate at the time of publication. All proposed routes, methodologies and schedules described in this report are subject to approval and issue of permits from the relevant stakeholders. Transport equipment is based on ARES Group vehicles and trailers, and swept path analysis results may differ if using equipment by third parties.

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Introduction

Gundry SF (or Solar Farm) is a renewable energy development located near Goulburn in New South Wales. The facility has a proposed capacity of 400MW (DC) with a supporting BESS (or Battery Energy Storage System) also part of the development.

The project is located approximately 10km south-east of Goulburn, in the Goulburn Mulwaree region. It is ideally located adjacent to transmission infrastructure as well as a regional load centre (the town of Goulburn).

ARES have been tasked by our customer Umwelt to undertake a Route Survey from the Ports of Botany and Port Kembla to site. The purpose of the study is to determine the pinch points along the routes and give best estimates of modifications and works required to enable oversize overmass (OSOM) cargo to be brought to site.

The study is designed for those involved in the project that have a limited knowledge of transportation, including a comprehensive outline of the routes and actions required to achieve delivery.





01

Overview

Project Overview

The Gundry SF is a renewable energy development near Goulburn in New South Wales currently in the planning and approvals stage.

Scope of Survey

Gundry SF is located just south of the regional town of Goulburn in New South Wales, within the Goulburn Mulwaree Local Government Area.

ARES has been tasked with surveying the route from the proposed Ports of Import (**Botany** and **Port Kembla**) to the project site. The survey will include everything up to the site entrance. The turn into the site entry point will be assessed for swept path requirements for input into civil design.

This is a desktop survey, relying on existing aerial imagery from sources such as Google and Nearmaps. ARES has also previously driven the transport route up to Goulburn from both Ports as part of other assessments and has included data gathered from those trips in this assessment.

We recommend that a physical survey of the entire route is completed at a later stage, once the route is confirmed and final OSOM component dimensions are known, to verify the results of this desktop survey.

Ports of Import

There are two proposed Ports of Import (POI) for the Project: Port of Botany (Sydney) and Port Kembla (Wollongong).

Port Botany is the main container port in NSW and also processes break bulk cargoes. The route out of the

port is constrained by overhead structures in Sydney metro, but is otherwise a well developed and established oversize route.

Situated close to Wollongong, Port Kembla has seen numerous large infrastructure projects over the last five years. ARES has worked out of Port Kembla on multiple projects, including several wind farms with hundreds of oversize components requiring transport.

Port Kembla has excellent break bulk cargo offloading capacity through the AAT berths. AAT also has a large concreted storage area where cargo can be stored and staged for deliveries to site, with additional options for off-site storage should they be required.

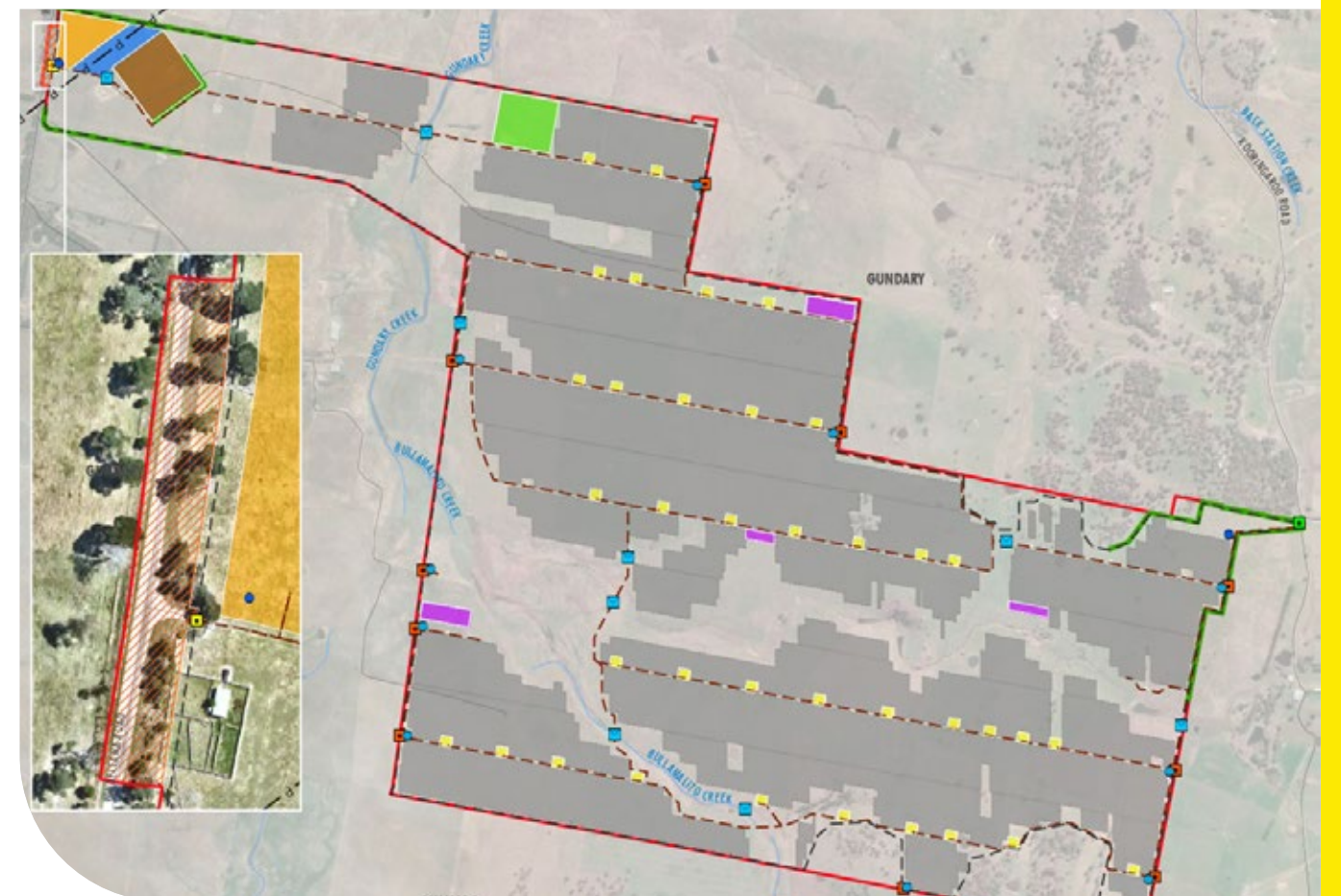
Site

The project is accessed via Windellama Rd to the south of Goulburn. There is a single access point turning left (east) into the project area. A preliminary civil design for the site access point was provided by the client for reference.

ARES have assessed the turn into the site access track for swept path as part of our scope of works.



Above: Aerial view of Port Kembla, showing AAT terminal and storage areas on right. **Below:** Site overview of the Gundry SF facility.



Transport Methodology

Specialized cargo requires specialized transport solutions.

Cargo Dimensions

The majority of deliveries to the project will be in gauge and able to be delivered under gazette. The largest oversize, overmass (OSOM) component of the project is the delivery of the one-off main transformer. The exact weights and dimensions of this load is yet to be finalised but the following has been assumed for the purposes of this route assessment:

- Length: 9.95m
- Width: 3.33m
- Height: 4.2m
- Weight: 170 tons

Equipment

Due to the height of the load, it will need to be

transported on a custom platform trailer with drop frame. The drop frame ensures the transformer sits as low as possible to clear overhead obstructions along the route.

Refer to the equipment schematic shown below for a mock-up of the proposed transport arrangement. Overall dimensions are:

- Length: 47.5m (excluding rear block truck)
- Width: 4.3m
- Height: 4.8m
- Gross Combination Mass: 295 tons
- Mass per Axle: 17.0 tons

Note: axle weights are approximate as the proposed length of the transformer would require a longer drop frame than what is shown below, which can only accommodate 7.5m components.

The transformer is classified as a 'High Risk' OSOM Load" by Transport for NSW due to its weight. An OSOM Transport Management Plan (TMP) will be required and approved by TfNSW prior to transport.

Pilots & Escorts

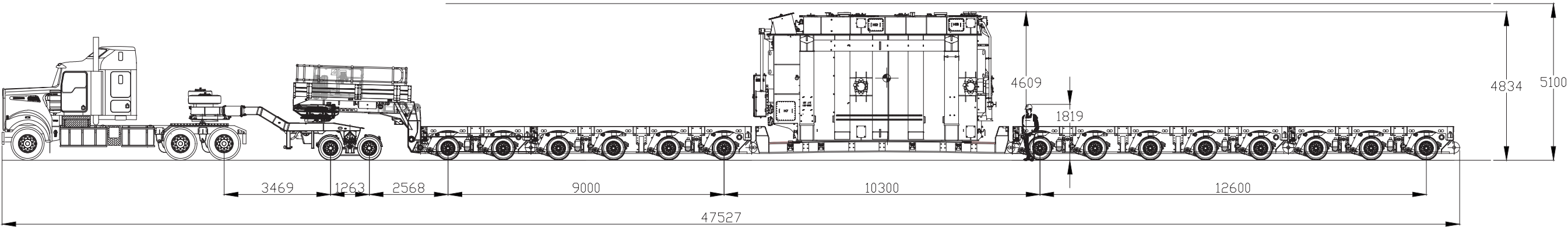
The load will be accompanied by both NSW police escort vehicles and oversize pilot vehicles. NSW police will carry out all required traffic management and control at pinch points, whilst the pilot vehicles will provide advanced warning (front and rear) of the OSOM load's approach and assist the police escorts as directed.

If any street furniture such as signs need to be removed for the load to pass, the pilots will perform this task and replace the items once the load is through.



Above: ARES transporting a 170-ton transformer on a custom drop frame trailer. Below: Schematic of proposed trailer for Gundry SF.

14R8 & 2R8 DOLLY (WITH DROP FRAME)
17.0T PER ROW - MAX P/L: 170T



General Route Notes

Port Botany/Port Kembla to Gundry SF (all routes)

Road Quality

The transport routes will be primarily along the NSW state highway and motorway network, which is generally designed to a higher specification and able to handle heavier and higher volumes of traffic. The route is fully paved up to the site access road.

The routes follow roads on the approved NSW OSOM Load Carrying Vehicle Network, deviating only when exiting the Hume Hwy (Route 2) and upon reaching Bungonia Rd/Windellama Rd on the final section into site.

Overhead Structures

There are numerous low structures down to around 5.1m clearance when exiting Sydney and along the Hume Hwy. The route taken out of Sydney is a common OSOM corridor and height constraints are well documented.

The oversize overmass route out of Port Kembla involves taking the M1 Princes Motorway and Picton Rd to the Hume Hwy. There are a number of low bridges over the motorway when departing Port Kembla. The lowest of these is the University Avenue Bridge, which has a clearance of **5.2m** in the left hand lane. There are also several other bridges with between 5.3-5.4m clearance. These are all non-bypassable.

The ARES transport solution allows the 4.2m high

transformer to be transported at a height of 4.8m, allowing the load to pass under all bridges with no issues.

Overhead Power Lines

In general, a travel height below around 5.5m is not an issue with respect to power lines. Loads above 4.6m travel height will require a high load permit from the power authorities prior to travel.

We recommend that an overhead power line survey is conducted closer to the date of transport to confirm that no lines need to be lifted or modified to accommodate the OSOM loads for this project.

The route traverses through the Endeavour Energy and Essential Energy distribution networks.

Bridges and Culverts

Structures on state highways and roads are generally not a concern as they will be designed to handle heavy vehicle loads. Bridge assessments will still be required from the state road authority (Transport for NSW) or relevant asset owners to confirm that bridges along the route can be crossed.

Rail Crossings

There are no rail level crossings along the route.

Approvals may be required when travelling over railway lines on bridges.

Road Works

There are planned roadworks and road upgrade projects along the route which will need to be considered when planning for transport of OSOM components to the Project. These include:

- Mount Ousley interchange project - there will be a new overpass of the M1 Princes Motorway as part of



Above: Artist's impression of Mt Ousley Interchange (Source: TfNSW)

these works which may cause disruptions for OSOM traffic on the route.

Close co-ordination with Transport for NSW will be required once dates firm up for the project to ascertain which road upgrade projects are active at the time of transport, and whether there are special conditions or access restrictions for OSOM loads (e.g. detours, speed restrictions, width restrictions etc).

Approvals

Transport permits will need to be obtained from the National Heavy Vehicle Regulator (NHVR) prior to travel. The permit process includes getting feedback from state transport authorities as well as any local councils along the route.

Third party approvals include electricity authorities, rail authorities, toll road and tunnel operators.



Above: University Avenue overpass of M1 Motorway - 5.2m clearance in left hand lane

Below: Princes Hwy overpass of M1 Motorway - 5.3m clearance in right hand lane

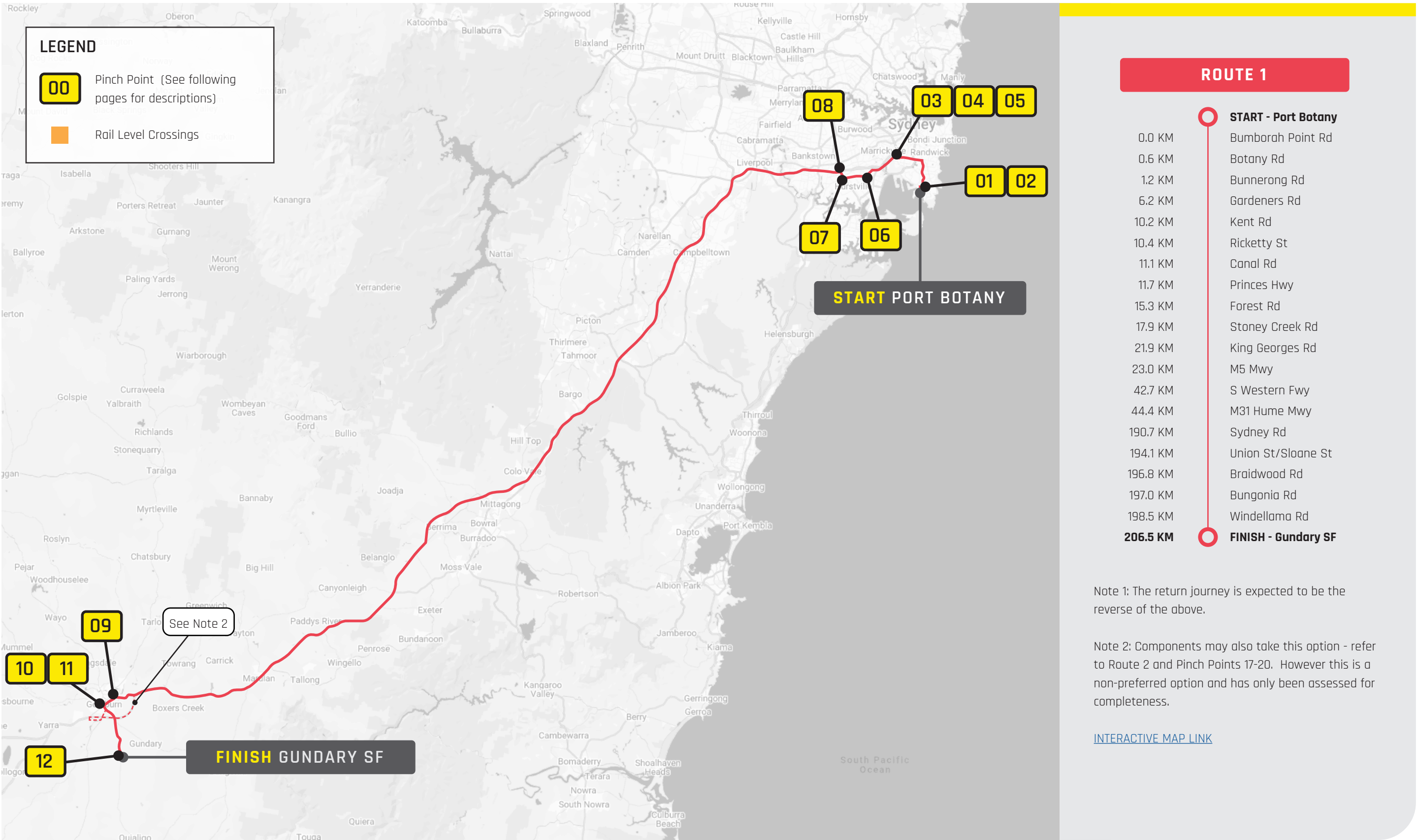




02

**Route 1 - Port Botany to
Gundary SF**

Route 1 Overview



Pinch Point

01

RIGHT TURN
Bumborah Point Rd
& Botany Rd

ROUTE 1

No modifications are required to turn onto Botany Rd, although the trailer will need to use the opposing slip lane and mount both the concrete traffic island on Bumborah Point Rd and the median strip on Botany Rd.

Police escorts will need to control traffic on Botany Rd in both directions whilst the contraflow manoeuvre is being completed.



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CUSTOMER: Umwelt

SIZE:

PROJECT: Gundry SF

SCALE NTS

DRAWING TITLE: SWEPT PATH DRAWING

SHEET NO:

DRAWING NAME: Route Survey

REV

ARES GROUP - L1.05, 480 ST KILDA RD, MELBOURNE VIC 3004

Pinch Point

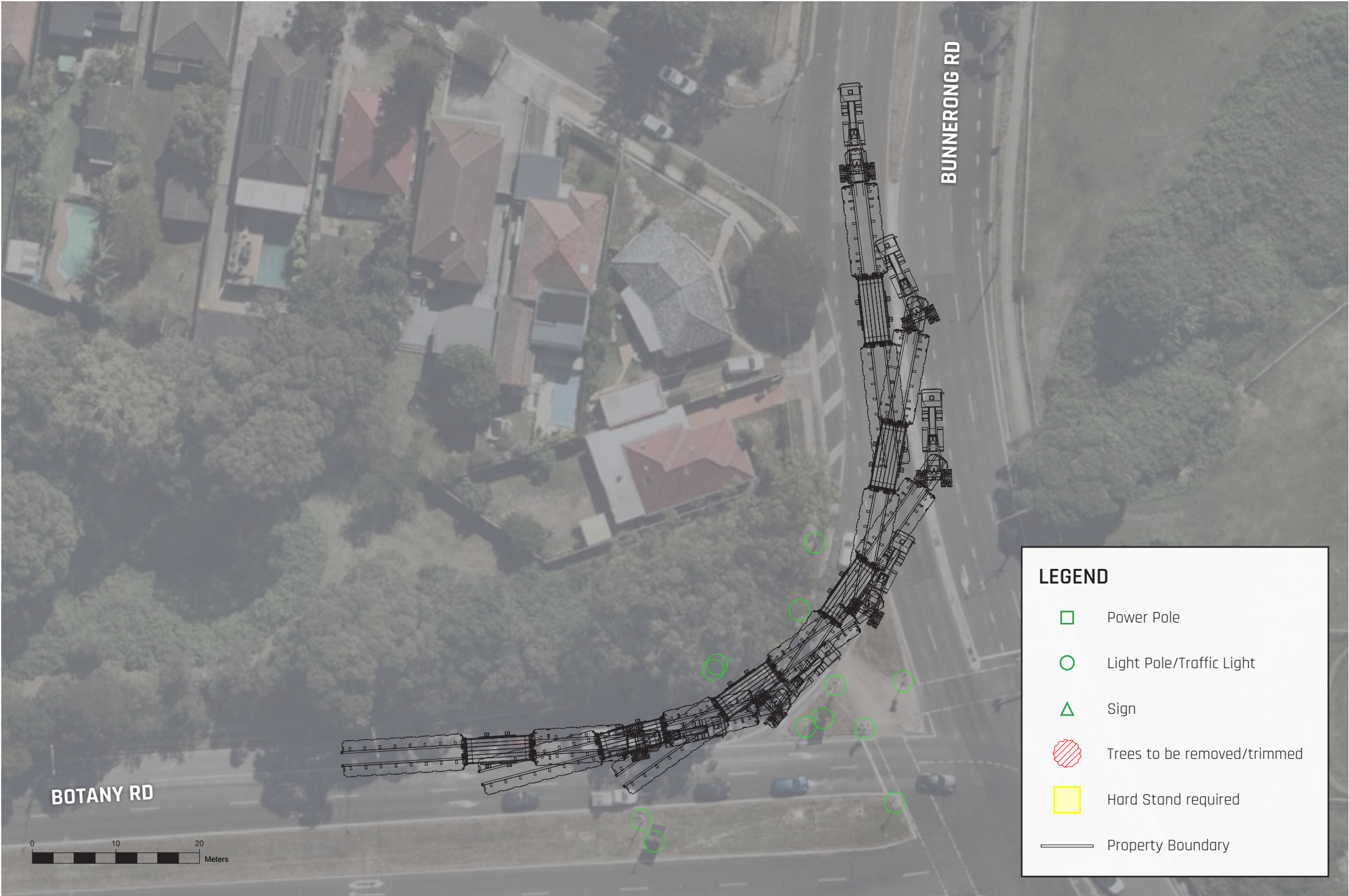
02

LEFT TURN
Botany Rd &
Bunnerong Rd

ROUTE 1

The transport combination can take this turn conventionally using the existing slip lane. Clearance to traffic lights is very tight and will require careful steering of the trailer around the corner.

The truck and trailer will need to mount the initial traffic island as well as cross the median onto the opposite side of Bunnerong Rd temporarily before returning to the correct side. Police escorts will need to control southbound traffic on Bunnerong Rd while this takes place.



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Pinch Point

03

LEFT TURN
Gardeners Rd
& Kent Rd

ROUTE 1

The transformer trailer will need to cross over onto the opposite side of Kent Rd when making this turn, requiring police escorts to control traffic. Otherwise, no modifications are required.



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Pinch Point

04

RIGHT TURN
Kent Rd &
Ricketty St

ROUTE 1

The transport combination can make this right hand turn conventionally with no modifications.



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Pinch Point

05

LEFT TURN
Canal Rd &
Princes Hwy

ROUTE 1

The left turn onto Princes Hwy at St Peters will require the transport combination to turn into the opposing lanes temporarily. The rear of the trailer will also swing into the opposite lanes on Canal Rd when turning.

Police escorts will need to control traffic during the turn. No modifications are required.



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Pinch Point

06

RIGHT TURN
Forest Rd &
Stoney Creek Rd

ROUTE 1

The right turn onto Stoney Creek Rd is relatively shallow and will not require any modifications.



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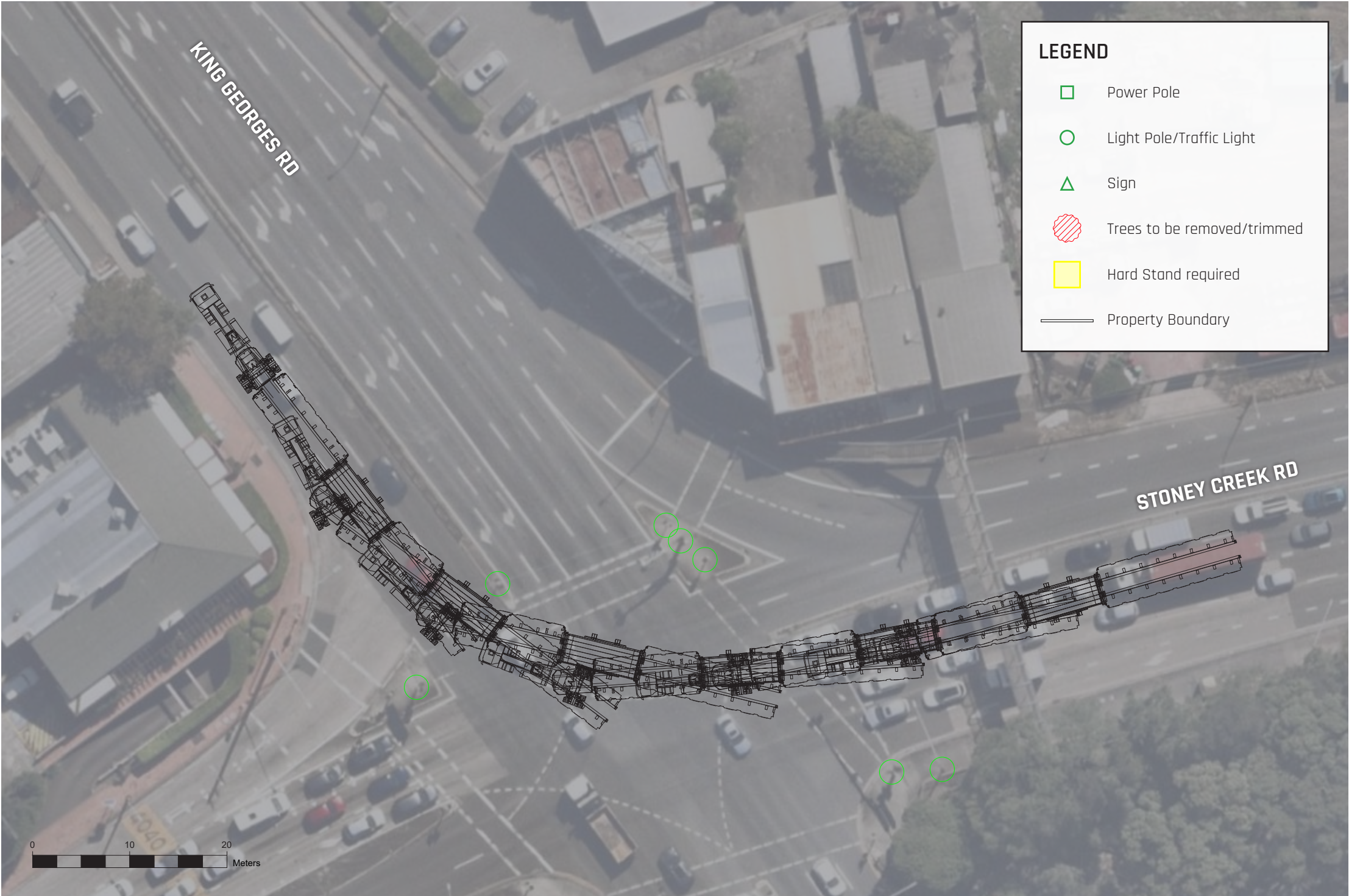
Pinch Point

07

RIGHT TURN
Stoney Creek Rd &
King Georges Rd

ROUTE 1

This turn is very wide with multiple lanes and can be taken with no modifications.



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Pinch Point

08

LEFT TURN
King Georges Rd
& M5 Mwy

ROUTE 1

The trailer can use the existing slip lane to turn onto the M5 onramp. The rear of the trailer will mount the concrete traffic island. No modifications are required.



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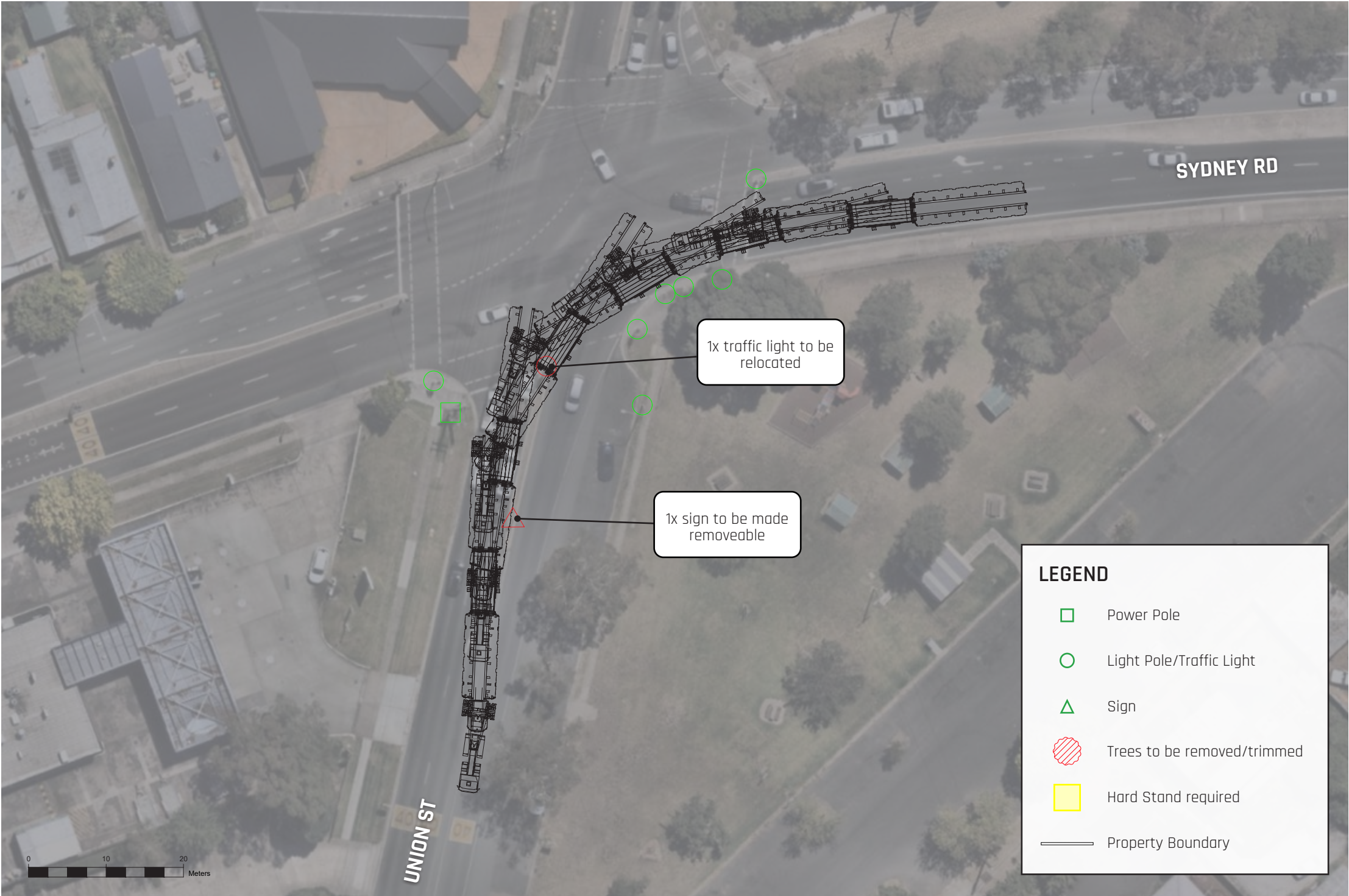
Pinch Point

09

LEFT TURN
Sydney Rd
& Union St

ROUTE 1

In east Goulburn, the load will need to take a left turn into Union St. A traffic light in the central median will need to be relocated, along with a road sign. The trailer will need to use the full width of the road when turning to avoid traffic lights and light poles on the inside of the corner. Police escorts will need to control traffic on Union St while the load turns.



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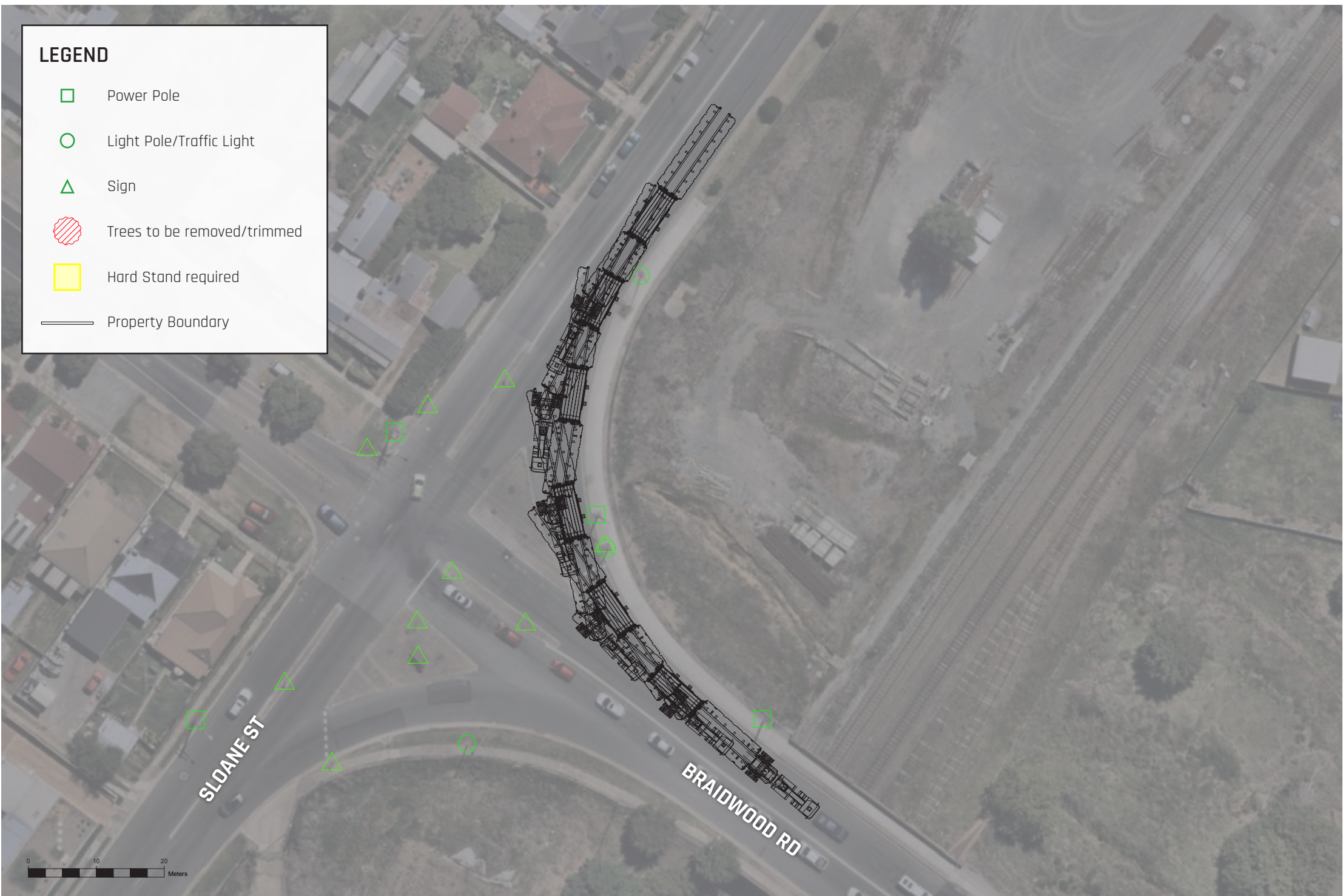
Pinch Point

10

LEFT TURN
Sloane St &
Braidwood Rd

ROUTE 1

This turn onto Braidwood Rd poses no issues for the transformer load. The rear of the trailer will mount the concrete traffic island but no modifications are required.



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Pinch Point

11

LEFT TURN
Braidwood Rd
& Bungonia Rd

ROUTE 1

The transformer can turn into Bungonia Rd with no modifications required. The rear of the trailer will swing into the opposite lane on Braidwood Rd and also mount the traffic island, which will require police escorts to control northbound traffic.



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Pinch Point

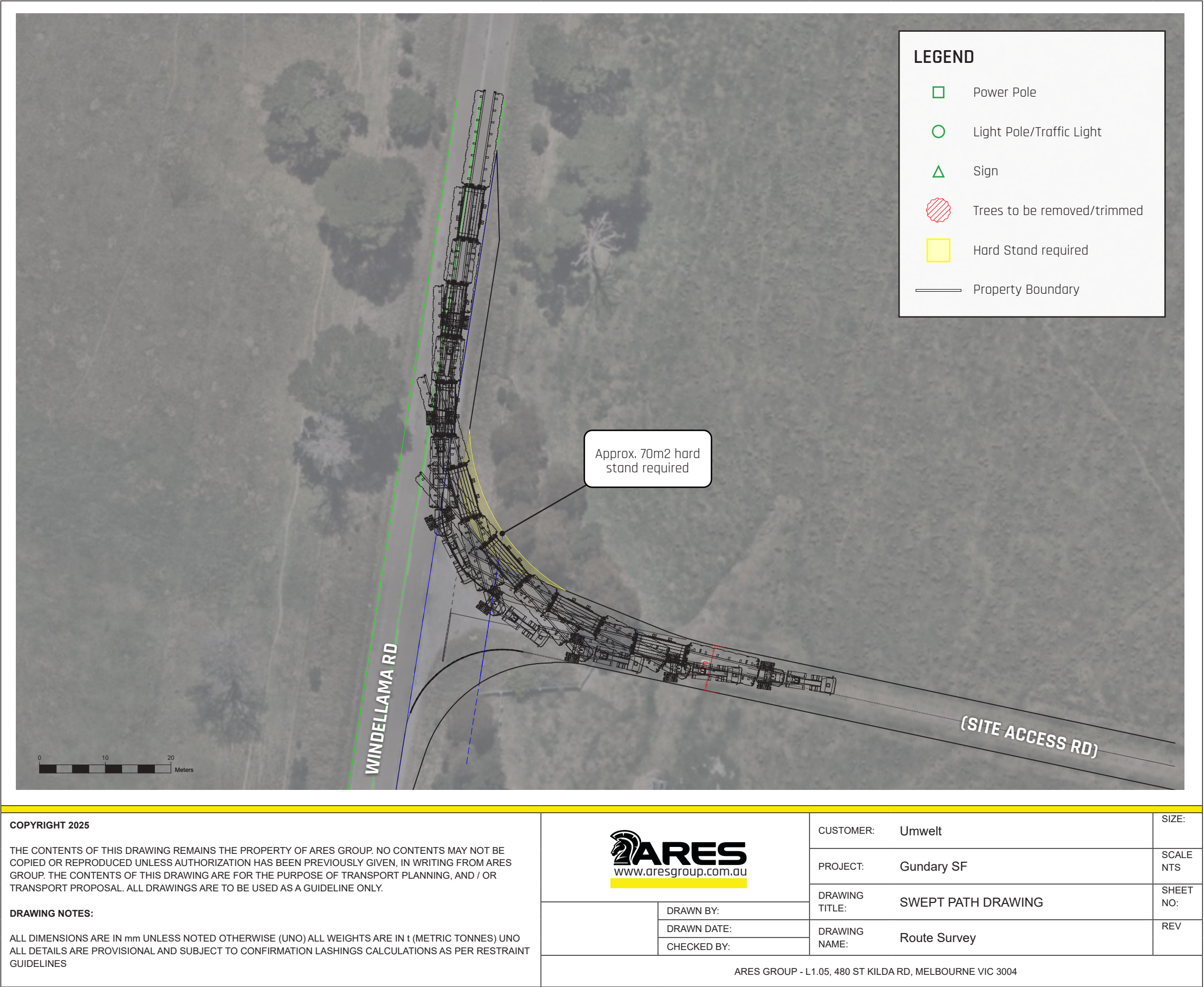
12

LEFT TURN
Windellama Rd
& Site Entrance

- ROUTE 1
- ROUTE 2

The turn into the site access road for the project will be upgraded for general heavy vehicle traffic. The current design has been overlaid on the aerial imagery to the right and assessed for swept path requirements for the OSOM transformer trailer.

As shown, some additional widening of the inside of the corner is required to accommodate the transformer delivery. We understand that the trees on the inside of the corner will be removed as part of the site entrance design so they should not cause any issues.





03

**Route 2 - Port Kembla to
Gundary SF**

Route 2 Overview



ROUTE 2

0.0 KM	START - Port Kembla
0.3 KM	Tom Thumb Rd
1.4 KM	Springhill Rd
2.2 KM	Masters Rd
13.7 KM	M2 Princes Mwy
40.5 KM	Picton Rd
161.4 KM	M31 Hume Mwy
161.6 KM	Hume St
163.4 KM	Garroorigung Rd
165.0 KM	Sloane St
165.3 KM	Braidwood Rd
166.8 KM	Bungonia Rd
174.8 KM	Windellama Rd
	FINISH - Gundry SF

Note 1: The return journey is expected to be the reverse of the above.

Note 2: Components may also take this option - refer to Route 1 and Pinch Points 09-11. This is the preferred option to take components through Goulburn and Pinch Points 17-20 have only been assessed for completeness.

[INTERACTIVE MAP LINK](#)

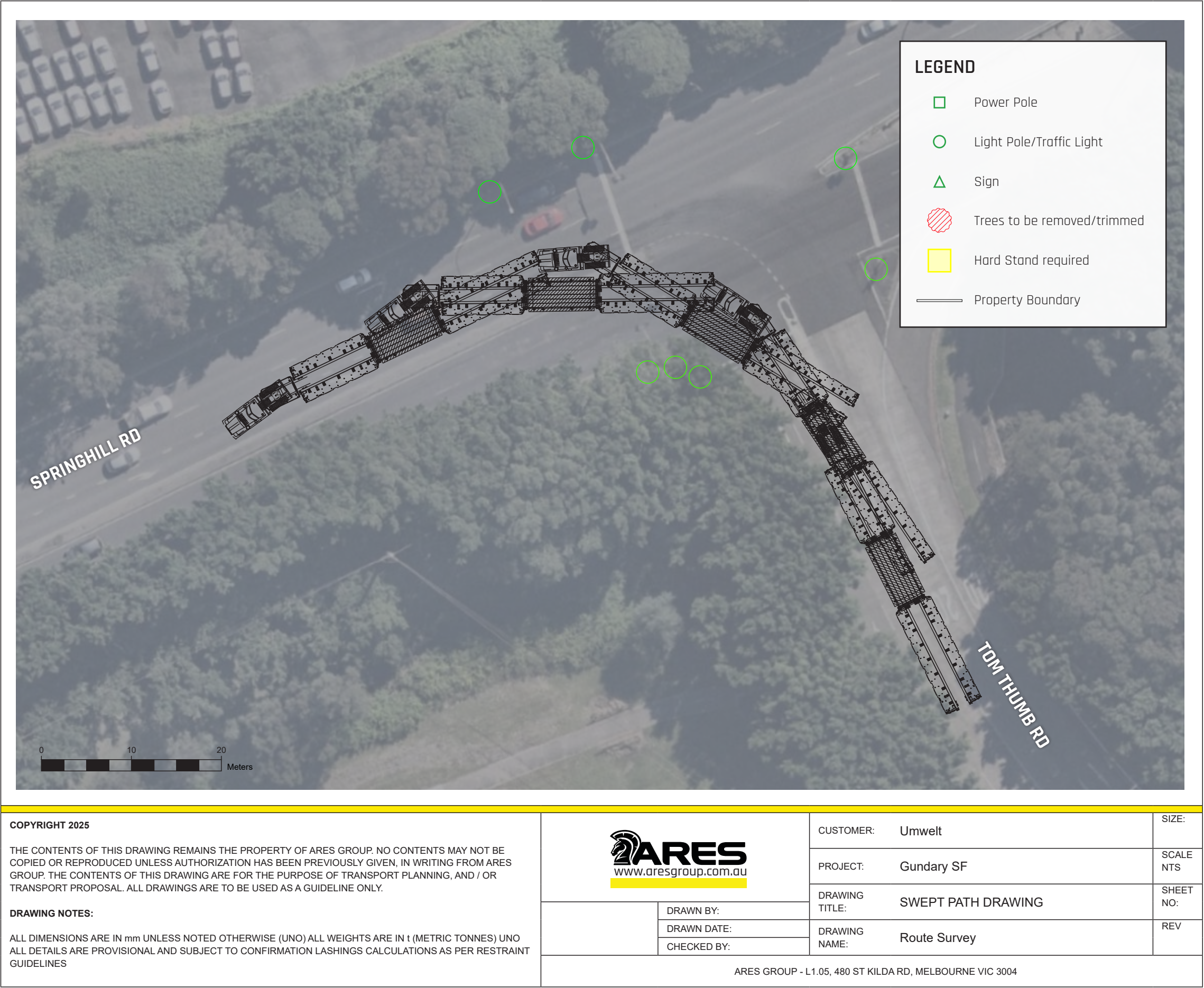
Pinch Point

13

LEFT TURN
Tom Thumb Rd
& Springhill Rd

ROUTE 2

The OSOM load will exit the Port of Port Kembla via Tom Thumb Rd then turn onto Springhill Rd. The turn is wide and can be done with no modifications, although the length and width of the combination means that the load will need to use the opposing lanes to make the turn. Police escorts will need to control and manage traffic whilst the turn is being taken.



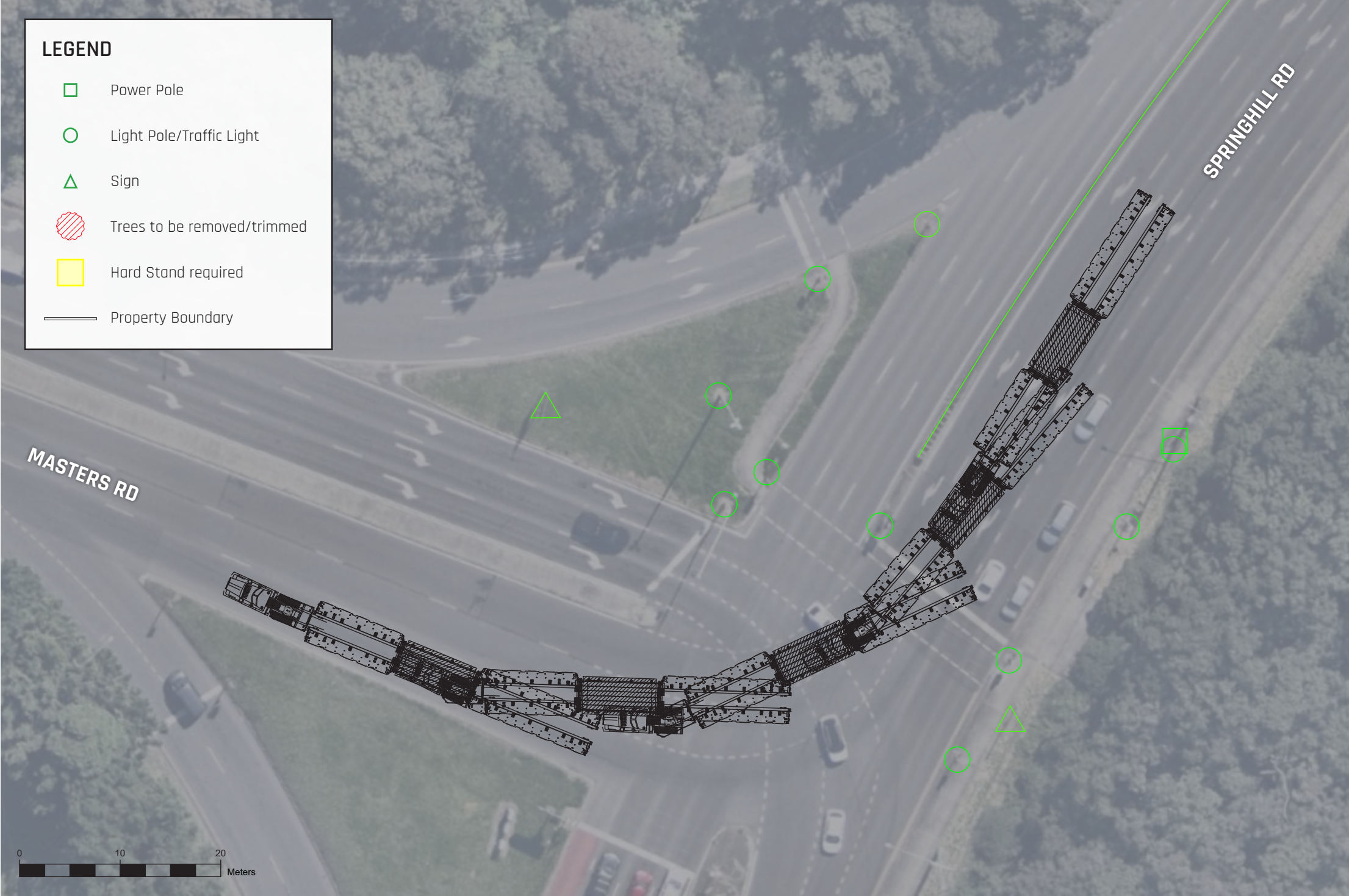
Pinch Point

14

RIGHT TURN
Springhill Rd
& Masters Rd

ROUTE 2

The right turn onto Masters Rd is very wide with multiple turning lanes. The transformer combination will have no issues making this turn with no modifications.



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		PROJECT:	Gundry SF	SCALE NTS
		DRAWING TITLE:	SWEPT PATH DRAWING	SHEET NO:
	DRAWN BY: DRAWN DATE: CHECKED BY:	DRAWING NAME:	Route Survey	REV
		ARES GROUP - L1.05, 480 ST KILDA RD, MELBOURNE VIC 3004		

Pinch Point

15

LEFT TURN
M1 Motorway
& Picton Rd

ROUTE 2

The transformer load will be able to take the slip lane onto Picton Rd with no issue. The rear of the trailer will mount the traffic island but it is trafficable and will cause no issues.



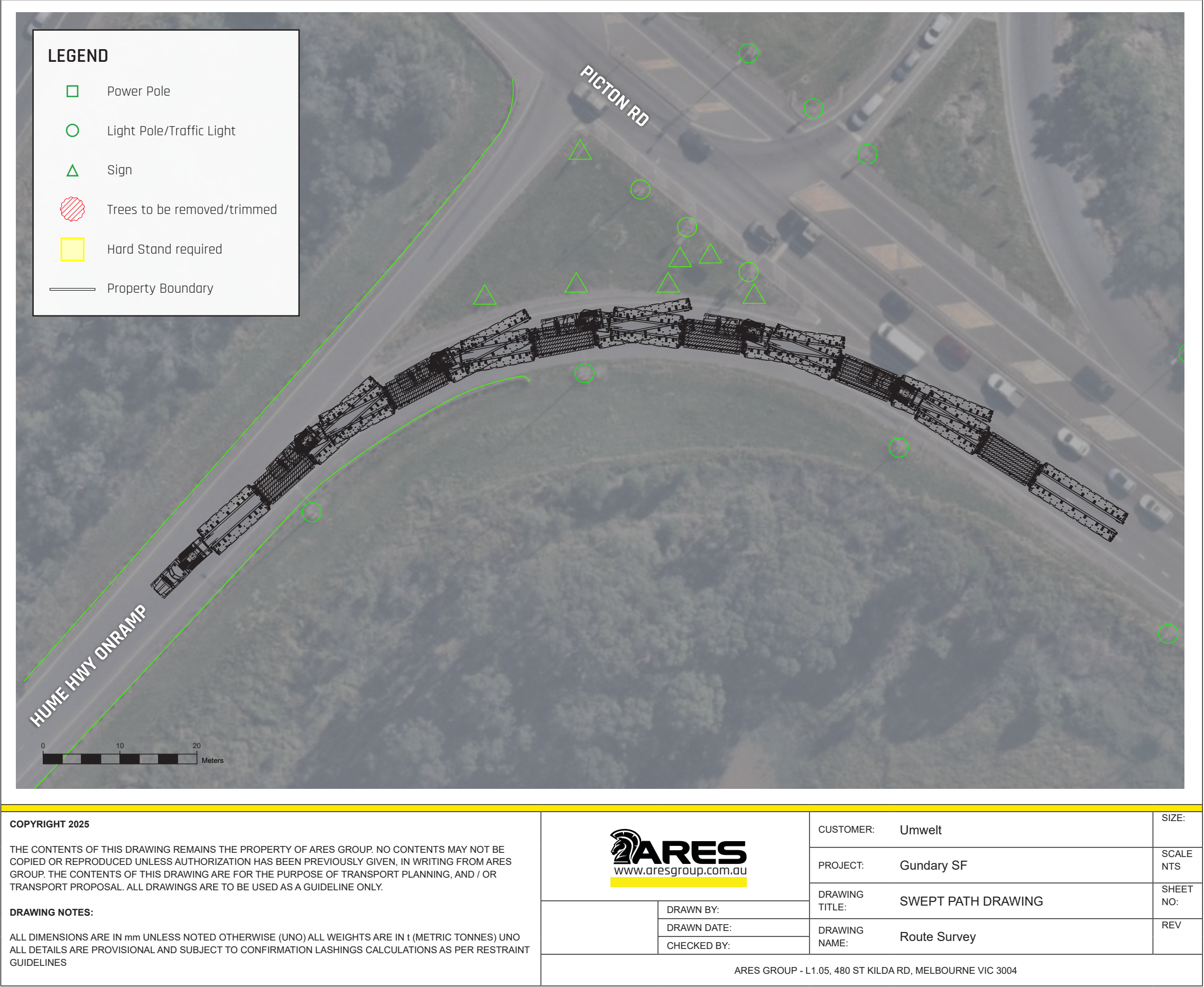
Pinch Point

16

LEFT TURN
Picton Rd &
Hume Hwy

ROUTE 2

Likewise, there is a generous slip lane to get onto the Hume Hwy from Picton Rd and the transformer combination will have no issues making this turn.



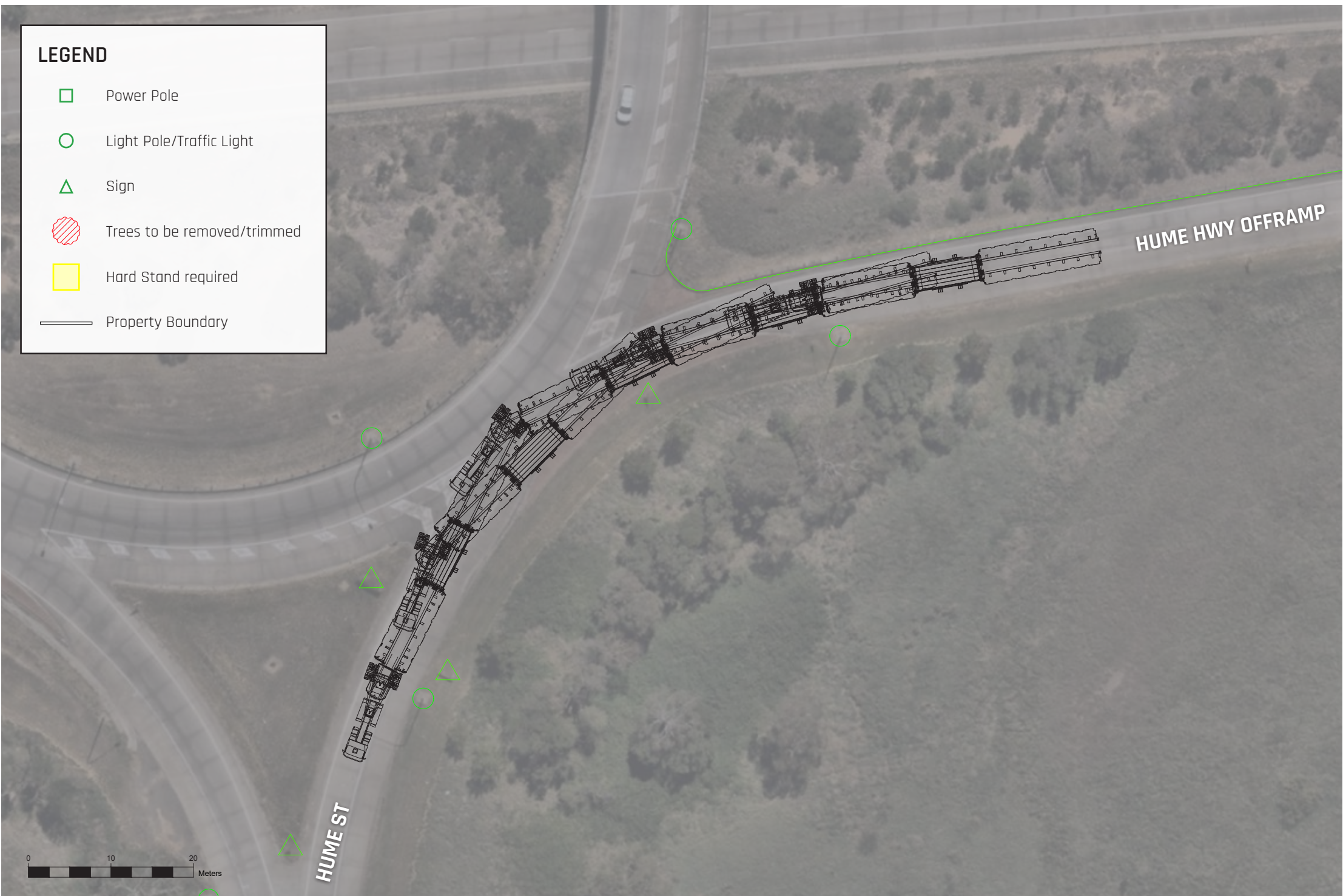
Pinch Point

17

LEFT TURN
Hume Hwy &
Hume St

ROUTE 2

The turn off the Hume Hwy south west of Goulburn is very wide and will require no modifications.



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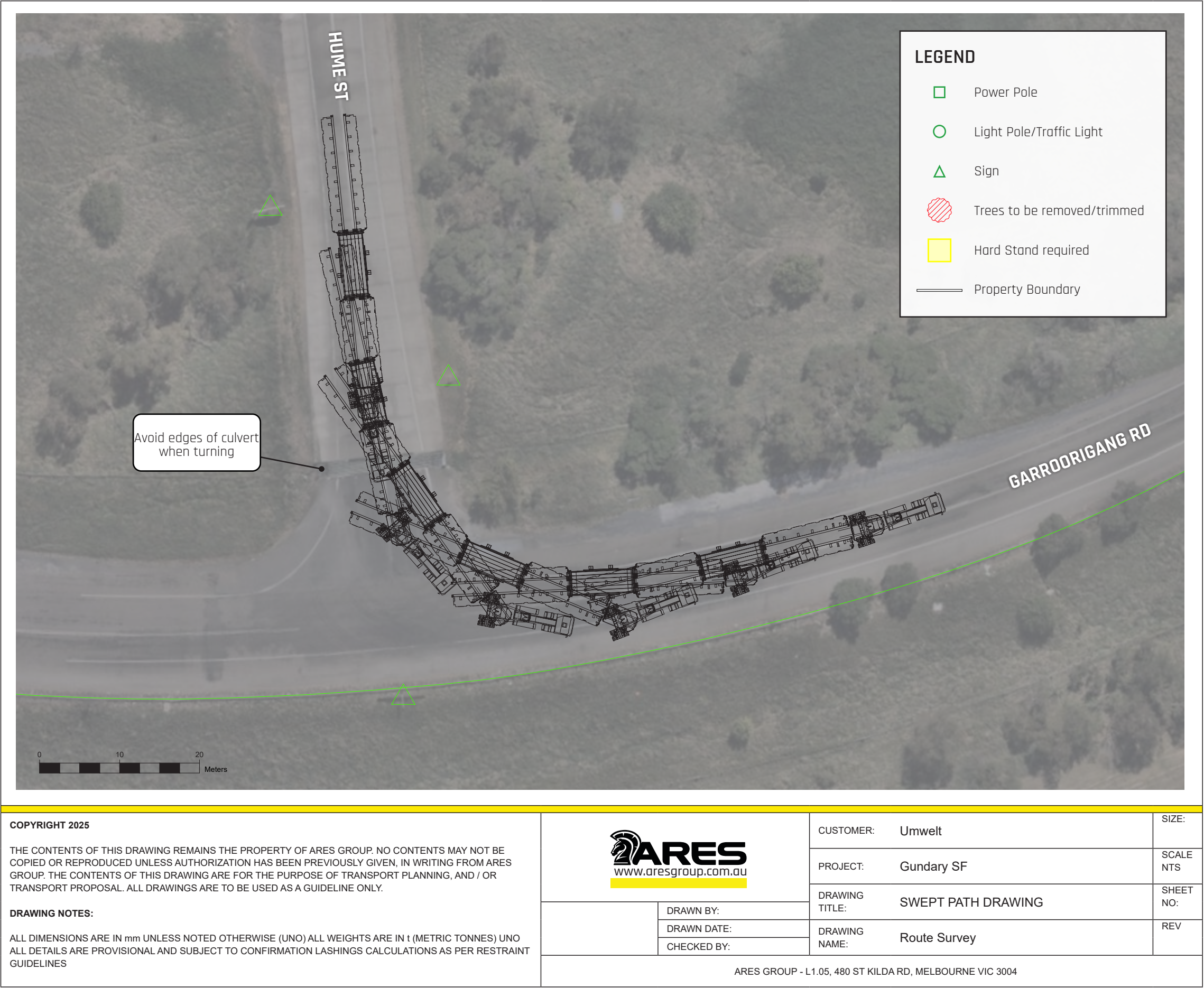
Pinch Point

18

LEFT TURN
Hume St &
Garroorigang Rd

ROUTE 2

Loads will need to turn left at the end of Hume St. No modifications are required, but the load will need to use the full width of Garroorigang Rd to turn, and the rear of the trailer will also require the full width of Hume St. Care will need to be taken to avoid impacting the culvert, especially with the rear of the trailer.



Pinch Point

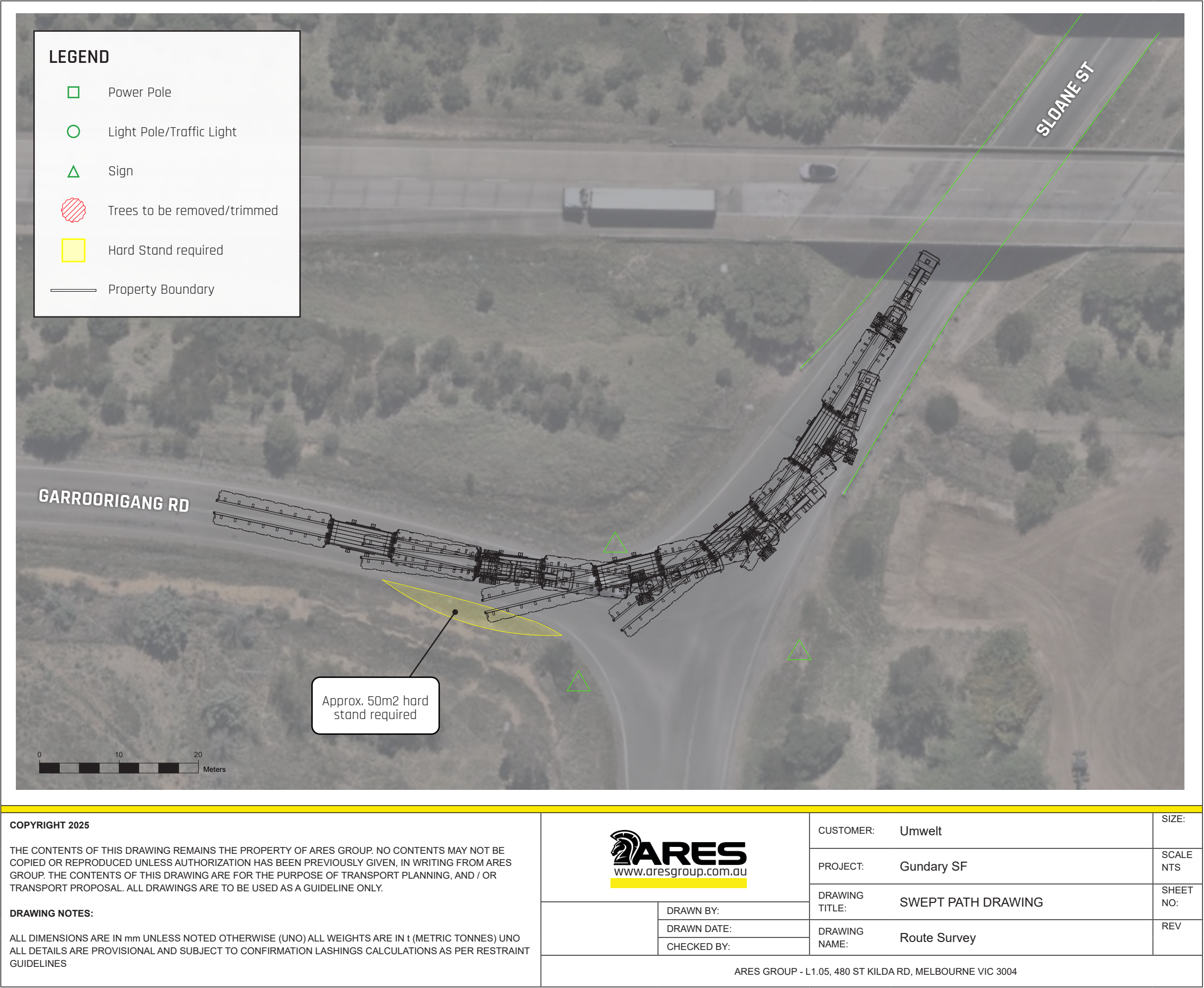
19

LEFT TURN
Garroorigang Rd
& Sloane St

ROUTE 2

This turn onto Sloane St can be negotiated by the trailer with the addition of some hard stand on the south side of Garroorigang Rd. The trailer will need to avoid the inside of the corner as there is an embankment.

Police escorts will need to control traffic on Sloane St to allow the truck and trailer to swing out wide to avoid the inside.



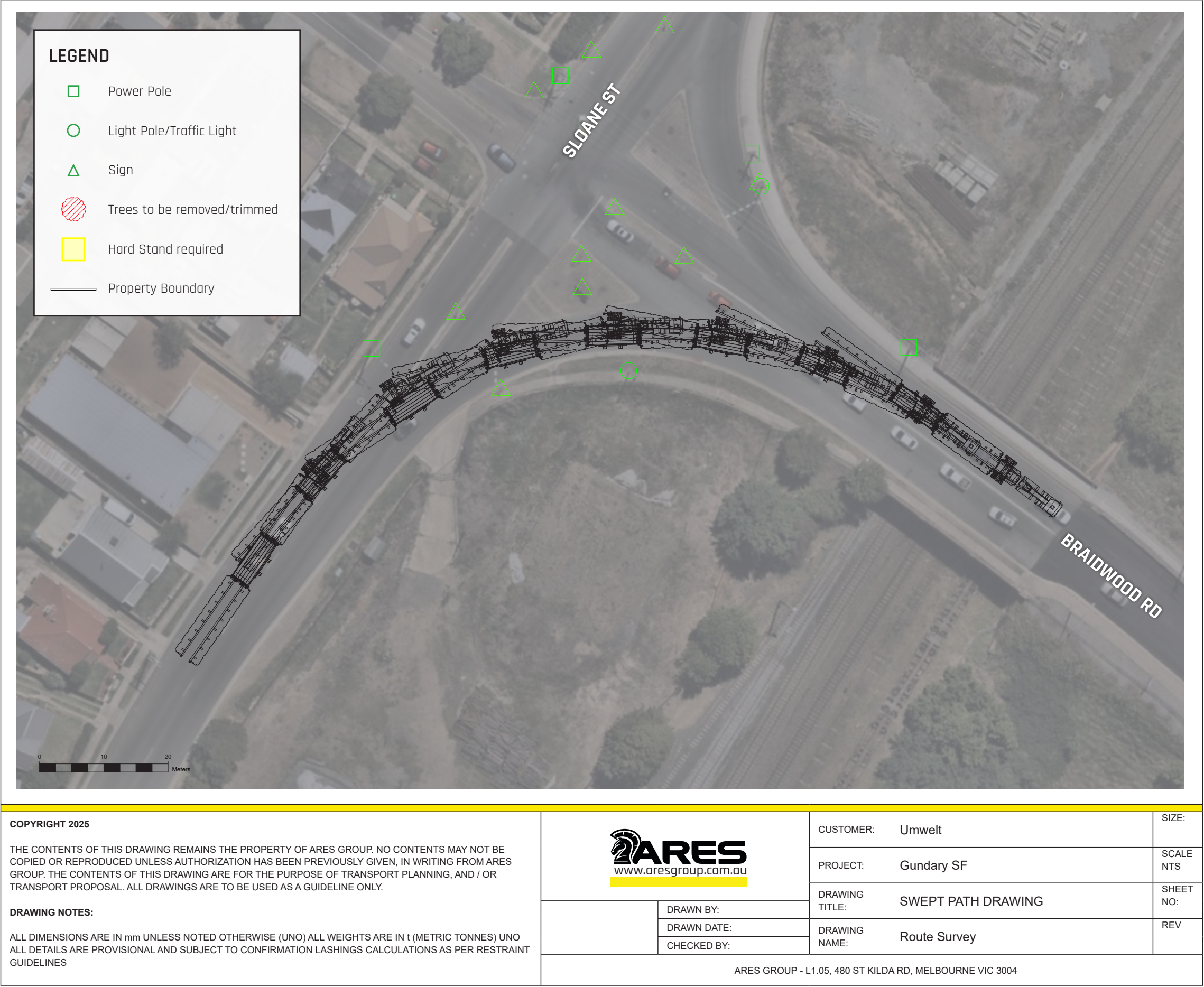
Pinch Point

20

RIGHT TURN
Sloane St &
Braidwood Rd

ROUTE 2

This right turn can be taken with no modifications, with the trailer required to contraflow using the opposing slip lane. Police escorts will be required to control traffic on both streets while the contraflow takes place.





04

Conclusion

Conclusion

A brief outline of the report's major findings and any recommendations for actions.

Summary

Following our desktop survey and analysis, ARES believe that transport of the oversize overmass (OSOM) components for the Gundry SF project from the ports of **Port Botany** and **Port Kembla** is feasible along the proposed transport routes, with only minor modifications required to make the route suitable for the OSOM load for the project, which is a 170-ton transformer.

There are no issues with using either port to receive the cargo. Both are capable of receiving a large break-bulk component such as a transformer and both have berthside or near-berth storage options available should they be required.

The routes from each port use roads on the approved NSW Oversize Overmass Load Carrying Vehicles Network map, which are commonly used to take OSOM components out of either Sydney or Wollongong and onto the Hume Hwy. From the Hume Hwy at Goulburn, there are two options to get onto Windellama Rd - a northern and a southern option, both of which have been assessed. The northern option requires the relocation of one traffic light in Goulburn. The southern option is slightly easier but deviates off the OSOM Load Carrying Vehicles network.

The main challenge for transport is the height of the transformer. At 4.2m high, the only way to take this

load out of either Port is to use a specialised drop frame solution or a beam set, which would add a lot of mass and complexity to the transport job. We have proposed the use of the drop frame to keep risk and complexity to a minimum.

The project site has a single proposed access point off Windellama Rd south of Goulburn. The turn into this access point was assessed for swept path and found to be suitable with minor modifications.

Next Steps

Based on the findings in this route survey, we recommend the following actions:

- Initiate dialogue with TfNSW regarding timing of major upgrade projects and any impacts, especially the Mount Ousley Interchange project
- Confirm final choice of Port and route
- Confirm final weights and dimensions of selected transformer
- Conduct a physical survey of the route to validate the results of this desktop survey closer to transport date



...transport of OSOM components to Gundry SF is feasible.

Summary of Road Modifications

The following table lists all required modifications to allow transport of components to take place.

Pinch Point	Route	Road/Intersection	Modifications Required	Risk
09	1	Sydney Rd & Union St	1x traffic light to be relocated, 1x sign to be made remove-able	Medium
12	1&2	Windellama Rd & Site Entrance	Temporary hardstand to be laid down (approx. 70m2)	Low
19	2	Garroorigang Rd & Sloane St	Temporary hardstand to be laid down (approx. 50m2)	Low

Risk Ratings: Low - minor modifications such as signs or minor civils only.
Medium - moderate works including civils and removal of power and lighting assets.
High - requires 3rd party stakeholder input/approvals, or large scope of upgrades



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