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OVERHEAD POWER MAINS ASSESSMENT

Panania, 48 Hendy Ave

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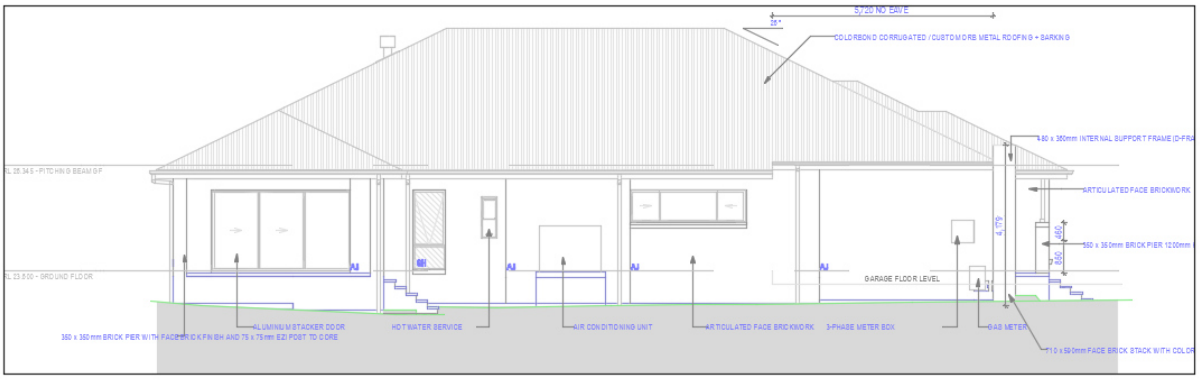

LEFT ELEVATION
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RIGHT ELEVATION
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Document History

Revision	Date	Approved By	Revision Details
Final 1.0	23.02.2022		

DISCLAIMER

This Overhead Mains Clearance assessment is subject to an ongoing review, the information in this document may be amended at any time by the Author, AA Power Engineering. This document has been developed using information available from MJH Group, Aspect Development & Survey Pty Ltd Surveyors, Sydney Trains and other sources and is intended to be applicable to the overhead mains in relation to the proposed structures and building/construction works.

AA Power Engineering disclaims any and all liability to any person or persons for any procedure, process or any other thing done or not done, as a result of this overhead power mains assessment in regards to the construction works, as this report is not intended as a construction management plan. AA Power Engineering can confirm information in this report is correct based on the information nominated and provided by external parties being correct. This assessment is a mechanism produced to report on a development proposal's compliance to industry standards. Industry safety standards must be adhered to at all times. This report is to be revisited upon any changes to the plans issued by Studio Make Made after the date of this report.

INTERPRETATION

If, in the event that a user of this Overhead Power Mains Assessment is uncertain about any information or provision, the user should request clarification from AA Power Engineering.

Contents

SCOPE

This assessment is to address blow out calculation as requested by Sydney Trains in response to a Transport Sydney Trains request. The assessment is based on a proposed development at 48 Hendy Ave, Panania. 33kV Sydney Trains mains exist adjacent the rear property boundary.

This assessment only takes into consideration Sydney Trains Mains. The assessment is based on:

- MJH Group – Construction Drawing 606379 – 6/07/22
- Aspect Development 7 Survey Pty Ltd – Ref 606379 – 6/05/22
- Sydney Trains provided information – 8/02/22
- Site visit and assessment

The report aims to address the impact of the development on Sydney Trains overhead power mains located adjacent the development property and within the adjacent rail corridor. No other impacts or technical assessments were addressed other than those relating to existing overhead 33kV mains adjacent the northern property boundary.

The assessment was based on clearances of proposed building structure to Sydney Trains mains along the western property boundary of the development, to assess compliance with below standards:

  - Compliance with AS 7000
  - Compliance with ISSC 20, Guideline for the management of activities with Electrical Easements and Close electrical infrastructure.
  - Compliance with SMS-06-GD-0268 – Working around electrical equipment
  - Compliance with relevant Transport for NSW Asset Standards Authority standards/guidelines

Regarding the construction methodology, the nominated builder is to prepare a construction management plan if requested by Sydney Trains to show compliance with the above nominated standards and policies. Additional to the above standards and policies the construction management plan is to also comply with the following code and guide.

- Work Cover “Work Near Overhead Power Lines” Code of Practice 2006
- Australian Standard “AS/NZS 4576:1995 Guidelines for scaffolding”

Proposed Development Site on Hendy Ave

BLOWOUT DESIGN AND CALCULATIONS

Conductor blowout is the horizontal 'sag' or deviation of powerline conductors from the central position, caused by wind forces.

A blowout calculation is required to determine the distance/clearance of existing Sydney Trains 33kV Feeder 742 between poles 6B and 6A along the northern side of the proposed development, to the closest point of the proposed structure.

Blowout calculation specifications

33kV Feeder: 33kV Feeder (742) – Conductor 19/3.75 AAC tension 18% @ 5'C

Span Reference: Between Poles 6B & 6A

Span Length: 81m

Maximum Blow Out at 50 °C = 1510mm

Sydney Trains Pole/Mains Adjacent Development

BLOWOUT CONCLUSION

Due to the design of the proposed building and arrangement of the existing spans, the maximum determined blowout is for centre of the 81m span (40.5m), from poles 6B to 6A. Maximum blowout at the northern boundary of development is 1.51m for the 33kV feeder. The northern boundary was determined to be the location of the closest point between the proposed structure and the existing 33kV feeder once blowout had been taken into consideration. The lowest conductor was used for this assessment at it is the closest to the proposed structure.

After taking blowout into consideration at the location of the existing overhead mains, the minimum radial clearance to proposed building structure for 33kV is 5271mm (see attached appendix A).

AS7000

AS/NZS 7000:2010 – Overhead line design – Detailed procedures: This standard has been prepared by the AN/NZS committee to provide an industry standard for overhead line design. The standard goes through extensive and detailed overhead line design in which majority of details are not required for the findings of this report. In this situation we are assessing existing power lines in relation to a new building development. AAPE have applied the guidelines in Section 3 "Electrical Requirements" part 3.11.2 "Clearances to buildings, other lines and recreational areas", and particularly 3.11.2.1 "Structures and Buildings"

The approach taken to determine the findings was a reverse engineering approach. AAPE have used the survey information of existing overhead power mains along with a site investigation and assessed the site based on the DA Plans and other relevant information against the AS7000 standard.

Findings as per Table 3.8 "Clearances from structures" under section 3.11.2 "Clearances to buildings, other lines and recreational areas" are listed below:

Clearance of nearest conductor to proposed structures. (determined taking exaggerated blowout into consideration)	**Minimum clearance to Conductor - Up to 33kV**	**Outcome by applying Table 3.8 in AS7000**	**Findings**
1. Vertically above those parts of any structure normally accessible to persons	4.5m	The overhead power mains are not above any building structures; therefore, this restriction does not apply.	Complies
2. Vertically above those parts of any structure not normally accessible to persons but on which a person can stand	3.7m	The proposed structures are clear to air within the 3.7m restriction zone, with no electrical conductor. This clearance requirement also requires compliance to extend outwards in an arc taking into account dimension in 3 below.	Complies
3. In any direction (other than vertically above) from those parts of any structure not normally accessible to persons but on which a person can stand	2.1m	Closest conductor in worst case scenario to building is more than 2.1m clear of any structure normally accessible to persons but on which a person can stand.	Complies

4. In any direction from those parts of any structure not normally accessible to persons	1.5m	The closest part of the building structure is more than 1.5m.	Complies
5. In any direction from ground	5.5m	Conductor more than 5.5m from the ground.	Complies

Table 1: AS7000 Compliance

COMPLIANCE WITH AS7000

Taking a reverse engineering approach, findings show clearances of overhead 33kV Sydney Trains mains to proposed new building structure complies with AS7000. The findings are based on the nearest 33kV overhead conductor phase to proposed structures, considering blowout.

ISSC 20

ISSC 20 - Guideline for the Management of Activities within Electricity Easements and Close to Electricity Infrastructure. As the name implies the ISSC 20 document is a guideline document to manage works close to electricity infrastructure and as defined in the scope of the document:

- Ensure public safety
- Minimise the likely impact of structures or other impediments on electricity easements and infrastructure
- Maintain unimpeded access to electricity easements and infrastructure for the purposes of the electricity network operators
- Define responsibilities of developers, property owners and occupiers, consent authorities and proponents with respect to activities close to electricity easements and infrastructure.

As per section 5 of ISSC 20, approval from the Sydney Trains must be sought for any works deemed within close vicinity to its electricity infrastructure. This assessment is a request to seek approval from Sydney Trains for works within close vicinity to the 33kV overhead mains within the development property.

As mentioned above, the electrical infrastructure of relevance is the overhead 33kV mains running along the northern property boundary. Section 7 of the ISSC 20 document states that a clearance distance of 5m (minimum) from conductors taking blow-out into consideration for a typical span. In this instance we have a clearance to the proposed building of approx. 5271mm in a location in which a person can stand as per Appendix A (closest point between the structure and blow out). This clearance dimension is therefore compliant with ISSC20, taking the worst-case location of the proposed structure.

SMS-06-GD-0268

SMS-06-GD-0268 is a NSW Transport System Guide to working around Electrical equipment. The guide is quite thorough in detailing the hazards associated with working around electrical apparatus and the procedures required to eliminate the risk or minimise risk as far as is reasonably practicable.

For purposes of this report and the proposed building structure within close vicinity to the 33kV overhead mains, we have assessed the proposal in taking into consideration:

- Section 3 (Summary of Safe Approach Distances)
- Section 11 (Safe Approach Distances)
- Appendix B Temporary Structures around Electrical Equipment

Section 3/Section 11 (Summary of Safe Approach Distances "SADs")

- Table 1: Minimum Safe approach distances for *nominal voltage* above 11,000V up to and including 33,000V is 3m for non-accredited persons. Minimum approach distance for personnel of 3m will need to be maintained during construction. The structure is 5271mm from the conductor in the worst-case location. Conductor blowout has been considered in this calculation. Compliance has been achieved in relation to SAD's and is therefore satisfactory.
- The nominated builder is to refer to Appendix A and ensure this 3m restriction is not breached under any circumstances during construction.

Appendix B Temporary Structures Around Electrical Equipment

- Table A – Minimum Safe Approach Distances for a Temporary Structure / Temporary Structure Work and Live Exposed Electrical Equipment unless performed under an Electrical Permit is 4m. This is based on a conductor span of 125m or less. The applicable conductor span is less than 125m therefore Appendix B is applicable. Scaffold cannot be installed within the 4m scaffold restriction shown on Appendix A (AAPE drawing). The proposed structure is single storey and built within very close proximity to the rear boundary, therefore it would not be possible to install scaffold within this restriction. The proposed structure is also 5271mm from the conductor after blow-out.

- The nominated builder is to refer to Appendix A and ensure no temporary structures are installed within this 4m restriction during construction, under any circumstance.

COMPLIANCE WITH SMS-06-GD-0268

The clearance between the proposed building structures and Sydney Trains overhead conductor's, taking blowout into consideration is approx. 5271mm. Minimum safe approach distances for personnel and tools of 3m, and scaffolding clearances to temporary structure of 4.0m minimum, are required for the structure to be constructible. Based on the above, compliance is achieved in regards to SMS-06-GD-1268.

SUMMARY AND COMPLIANCE WITH RELEANT TRANSPORT FOR NSW ASSET STANDARDS AND AUTHORITY STANDARDS/GUIDELINES

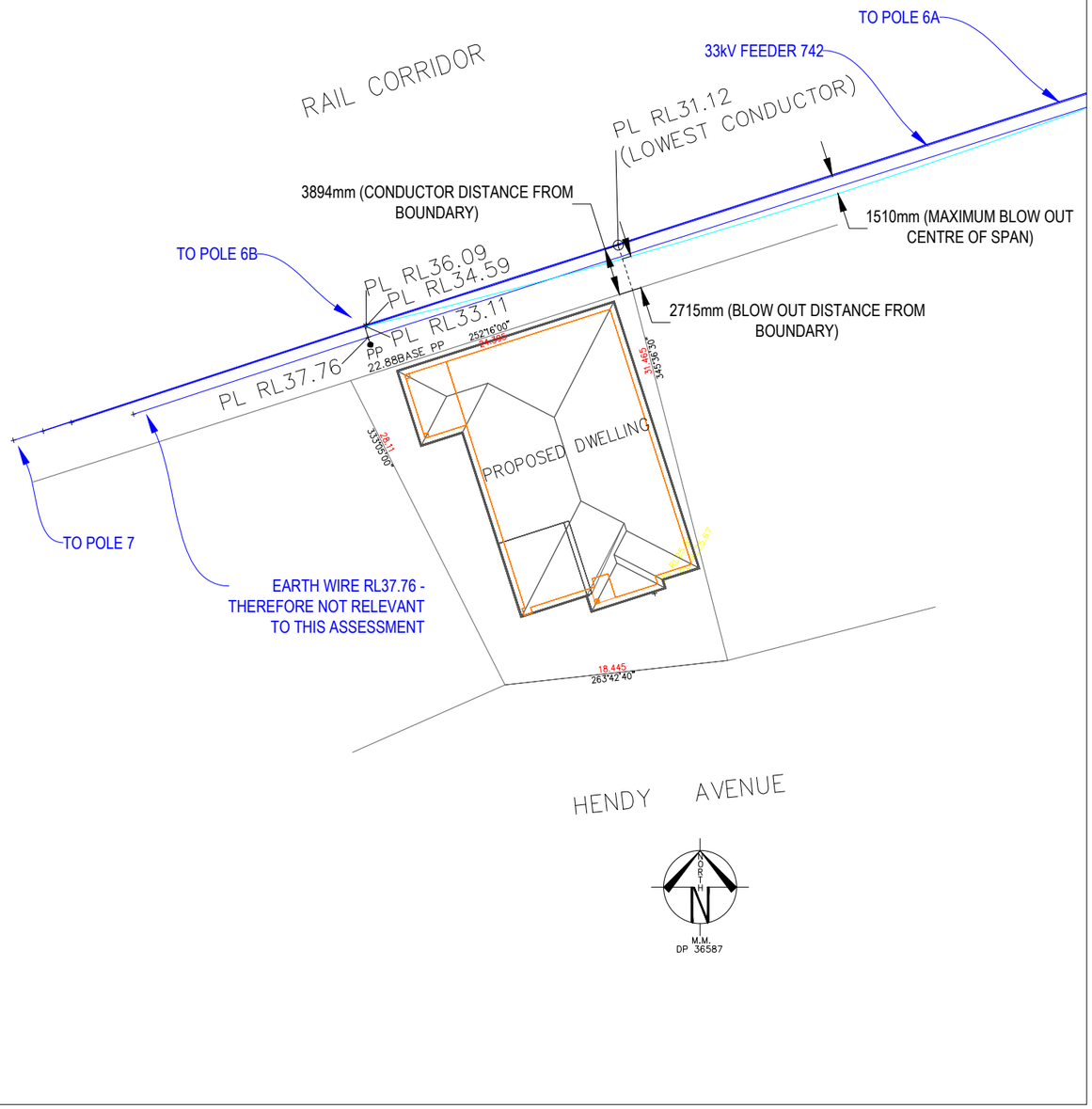
Combined with industry norms and practices, this report has been based on the following references and standard guidelines being:

- AS 7000
- ISSC 20
- SMS-06-GD-0268
- Work Cover “Work Near Overhead Power Lines” Code of Practice 2006
- Australian Standard “AS/NZS 4576:1995 Guidelines for scaffolding”;

The radial clearances between 33kV overhead power lines and the proposed building structure at 48 Hendy Street, Panania are compliant with the minimum clearance distances required in AS7000 and other mentioned standards above.

The outcome is based on the architectural plan with blowout shown in Appendix A. This applies to existing overhead span between poles 6B and 6A (33kV feeder 742). This is the only span on Sydney Trains 33kV feeder 742 in which present potential concerns to the proposed development.

48 HENDY AVE, PANANIA - AS7000 & BLOW OUT ASSESSMENT:



SITE PLAN

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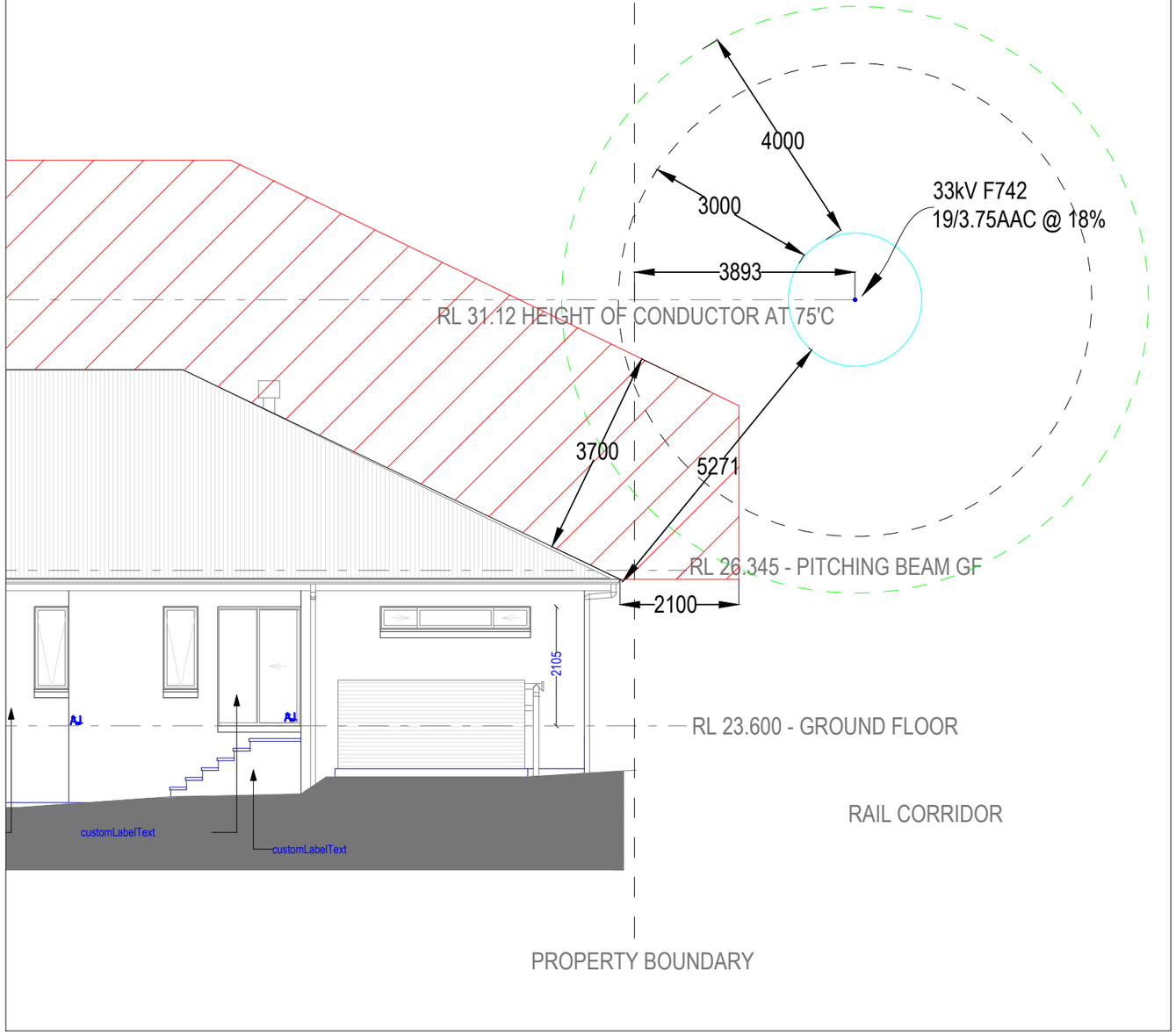

RIGHT ELEVATION

Scale: 1:100

Legend:

- Maximum Blow-out (1.51m)
- AS7000 Clearance C (2.1m X 3.7m)
- 33kV Sydney Trains Mains
- 3m ISSC20 Personnel Restriction
- Scaffold Restriction (4.0m)

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Sag Tension Temperature Calculation Results

Conductor Details

- Code:PL
- Name:Pluto
- Alt Name:19/3.75 AAC
- Diameter:18.8 mm
- CSA:209.8 mm²
- CBL:31.9 kN
- Mass:0.576 kg/m
- Mod. Elast.:65 GPa
- Exp Coeff:0.000023 /°C

Lengths

- Horizontal:81 m
- Vertical:0 m
- MES/RS:81.00 m

Temperatures

- Standard:5 °C
- Actual:15 °C

Wind Pressure

- 500 Pa (wind 1)
- 750 Pa (wind 2)
- 500Pa (blowout)

Tension

- %CBL:18
- Std Tens:5.74 kN
- Table:123

Sag

@ Standard Temp

- Sag:0.81 m
- % Span:1.00

@ Actual Temp

- Sag:1.01 m
- % Span:1.24

Wind Effects

Wind 1 @ 5°C

- Transverse Force: 0.38 kN
- Total Force on Pole: 8.44 kN

Wind 2 @ 5°C

- Transverse Force: 0.57 kN
- Total Force on Pole: 10.29 kN

Blowout @ 50°C

- 1.51 m

Actual Tension

Date of report:23/02/2022

	kN	%CBL
No Wind Hor. (@ 15°C)	4.61	14.44

	kN	%CBL
Wind 1 Hor. (@ 5°C)	8.43	26.44
Wind 2 Hor. (@ 5°C)	10.28	32.21

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	Left Structure	Right Structure
No Wind (@ 15°C)	0.23	0.23
Wind 1 (@ 5°C)	0.23	0.23
Wind 2 (@ 5°C)	0.23	0.23