



**Impact Assessment of Proposed Development on
TransGrid 330kV Overhead Transmission Line
330kV Feeder No. 12, Structure Span 350 - 353
Site Location – Lot 33 in DP2359 & Lot 20 in DP 1173483
Corner Yarrunga Street & Bernera Road, Prestons NSW
Investigation Report**

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Document control						
Report title		Impact Assessment of Proposed Development on TransGrid 330kV Overhead Transmission Line				
Document ID			Project number		8480-15	
Client		DBL Property Pty Ltd	Client contact		Jeffrey Lord	
Rev	Date	Revision details/status	Prepared by	Author	Verifier	Approver
D1	11/12/2015	Issued To Client for Comments	HC	HC		
R1	11/12/2015	Issued for DA	HC	HC		
Current revision		Revision 01				

1. Project Background

LOGOS Property Group is proposing a new warehouse development at Corner of Yarrunga Street and Bernera Road, Prestons NSW. This proposal affects the section of TransGrid's Sydney South – Sydney West No.2 330KV transmission line (330kV Feeder No. 12, Structure span 350 – 353) which traverses the development site.

An easement is a right of way along the route of a transmission line which is acquired to protect members of the public by controlling activities under or near the line that potentially could create an unsafe environment or situation. Easements are also necessary to allow TransGrid to operate, repair and maintain the transmission line. TransGrid requires the proponent to undertake an Impact Assessment for development proposals that might adversely affect existing electricity infrastructure or involve placement of any part of the development within an existing easement. Consequently, DBL Property Pty Ltd, the project manager for the above warehouse development, engaged UEA Electrical Pty Ltd to undertake the impact assessment associated with the development.

2. Scope of Works

The objective of this investigation is to assess the impact on the existing TransGrid's Sydney South – Sydney West No.2 330KV transmission line (330kV Feeder No. 12, Structure span 350 – 353) due to the proposed warehouse development at Corner of Yarrunga Street and Bernera Road, Prestons and where necessary propose mitigation measures to be implemented during construction and operation of the proposed development.

3. Project Inputs

The existing overhead transmission line that has been affected by the proposed warehouse development has been identified as TransGrid's Sydney South – Sydney West No. 2 330kV transmission line. According to the information received from TransGrid, the section of the transmission line located on the development site is between Transgrid's tower structures no. 351 and no. 352 and sits within a 60.96 metre wide electrical easement. In most situations, the centreline of the transmission line forms the centreline of the easement thus in the case of a 330kV line the easement is approximately 30 metres either side of the transmission line centreline.

The overall site plan of the proposed development was presented to TransGrid in a meeting held at TransGrid's office at 200 Old Wallgrove Road, Eastern Creek on Wednesday, 11 of November 2015. The following representative from TransGrid, DBL Property P/L and UEA Electrical P/L attended the meeting to discuss the overall layout of the proposed warehouse development and consult TransGrid in regard to proposed construction of a new private access road, hardstand areas and visitor/ staff carpark areas within the existing transmission line easement.

- Sky Shanahan, Enquiries Services Coordinator, TransGrid
- Tim Cowdroy, Land Economist, TransGrid
- Jeffrey Lord, Director, DBL Property P/L
- Ben Harris, Engineering Manager, UEA Electrical P/L
- Hasika Caldera, Senior Electrical Engineer, UEA Electrical P/L

At the meeting TransGrid advised that in general they agree with the overall site plan and requested few modifications to be made to the proposed site plan as follows:

- Avoid truck standing area within the easement area
- Increase the clearance around the steel lattice towers to avoid accidental vehicle impact
- Lighting for the carparks and the access road must be mounted on low height bollards or flood lights off the buildings;
- TransGrid will require 24/7 access to the tower sites and the easement with appropriate TransGrid keys fitted to security gates;
- Any services, pits, metallic gates etc. proposed within or in the vicinity of the easement must be appropriately earthed;
- New fencing proposed within or adjacent to the easement will need to be earthed and isolated at every second panel;
- Only use low height landscaping within the easement area

Since the meeting the site plan has been updated to accommodate the above recommendations by TransGrid and a copy the revised site plan is included in Appendix B.

3.1. Electrical Clearances

An important part of the overall assessment is to evaluate the horizontal and vertical clearances of the proposed development to the transmission line and its easement to ensure compliance to electrical clearances specified by TransGrid. The following sections describe various electrical clearances applicable to the proposed development.

Minimum design ground clearances for transmission lines are stipulated in NSW Code of Practice for Electricity Transmission and Distribution Asset Management. TransGrid normally designs transmission lines with greater clearance than specified in this document. The table below compares TransGrid's normal requirements with the NSW Code of Practice guidelines.

Table 3.1-1 Standard Minimum Construction Clearances from Ground and Roadways for 330kV Transmission Line

Object being Crossed	TransGrid Design Clearance	NSW Code of Practice Guideline
Ground	9.0m	8.0m
Roadways (Local Council Roads Unlikely to be Reticulated)	10.0m	8.0m

The design clearances noted in the table above are the minimum clearances which occur only at the lowest point in a span and at the maximum operating temperature of 120deg C. Generally, at most locations along a transmission line, the ground clearance is well above the minimum design clearance. In special circumstances, subject to approval by the management, TransGrid may allow lesser clearances for existing lines.

The following table specifies the minimum clearance from electrical conductors to any non-electrical infrastructure such as structures and buildings.

Table 3.1-2 Standard Minimum Clearances to Structures for 330kV Transmission Line

Clearance	TransGrid Design Clearance	AS/NZS 7000 Clearance
Vertically above those parts of any structure normally accessible to person	7.0m	7.0m
Vertically above those parts of any structure not normally accessible to persons but on which a person can stand	6.5m	6.5m
In any direction (other than vertically above) from those parts of any structure normally accessible to persons, or from any part not normally accessible to persons but on which a person can stand	5.0m	5.0m
In any direction from those parts of any structure not normally accessible to persons	4.0m	4.0m

Position of the conductors of the existing transmission line under the influence of wind at any point along the span to be taken into account when assessing the proposed development for compliance to the minimum clearances noted above.

4. Impact Assessment

4.1. Detailed Description of the Development

The proposed warehouse development is located at the Corner Yarrunga Street & Bernera Road, Prestons NSW. The development occupies following Lots; Lot 33, 34, 35 & 43 DP2359 and Lot 20 DP 1173483.

The section of the existing TransGrid 330kV overhead transmission line/ electrical easement affected by the proposed development is located on Lot 33 DP2359 and Lot 20 DP1173483, this shown in the TransGrid Asset Management Information System (TAMIS) plan included Appendix A of this report.

The proposed warehouse development consists of warehouse and office buildings located adjacent to the existing overhead transmission easement and construction of a new private access road, hardstand areas and two visitor/ staff carparks within the easement. Further details concerning the proximity of the of the proposed warehouse/ office facilities to the TransGrid's easement boundary and access road and carparks located underneath the overhead transmission line can be found in the Site plan/s included in Appendix B of this report.

4.2. Clearances of the proposed development to TransGrid's Infrastructure and associated easements

Details of the proposed warehouse development including three dimensional (3D) drawings has been submitted to TransGrid to assess the clearance of the proposed development to the transmission line and the two steel lattice tower structures located within the development site. There will be ongoing consultation between TransGrid and the developer to ensure the horizontal

and vertical clearances of the proposed development to the transmission line and its easement complies with TransGrid requirements.

4.3. Risk Assessment

Generally, transmission line easements are established to prevent and mitigate against the electrical safety risks resulting from:

- Infringement of electrical safety clearances
- Electrical Induction
- Step and touch potentials under fault conditions in the network
- Failure of structures or line equipment
- Transfer of dangerous voltages off the easement
- Blowout of a conductor under high wind (or blow in of vegetation)

Consequently, a risk assessment has been undertaken to identify the changes in risk due to the proposed development and propose mitigation measures to ensure the existing transmission line easement area and its ongoing maintenance is not compromised.

The risk assessment undertaken for the proposed warehouse development is included in Appendix C of this report.

5. Conclusion & Recommendations

Transmission line easements are acquired by TransGrid to provide adequate clearance along the route of a transmission line for construction and maintenance work and to maintain certain property rights in place. Furthermore TransGrid prohibits certain activities and encroachments within the easement area that could otherwise create an unsafe situation either for persons or for the security of the transmission line. Any development proposals that might adversely affect existing TransGrid electricity infrastructure or involve placement of any part of the development within an existing easement should be designed in such a way that it does not involve such activities, nor introduce these encroachments; and does not encourage other parties to undertake such activities or introduce such encroachments in the future.

Following the desktop assessment carried out to assess the impact of the proposed warehouse development on the section of TransGrid's Sydney South – Sydney West No.2 330KV transmission line (330kV Feeder No. 12, Structure span 350 – 353), it can be concluded;

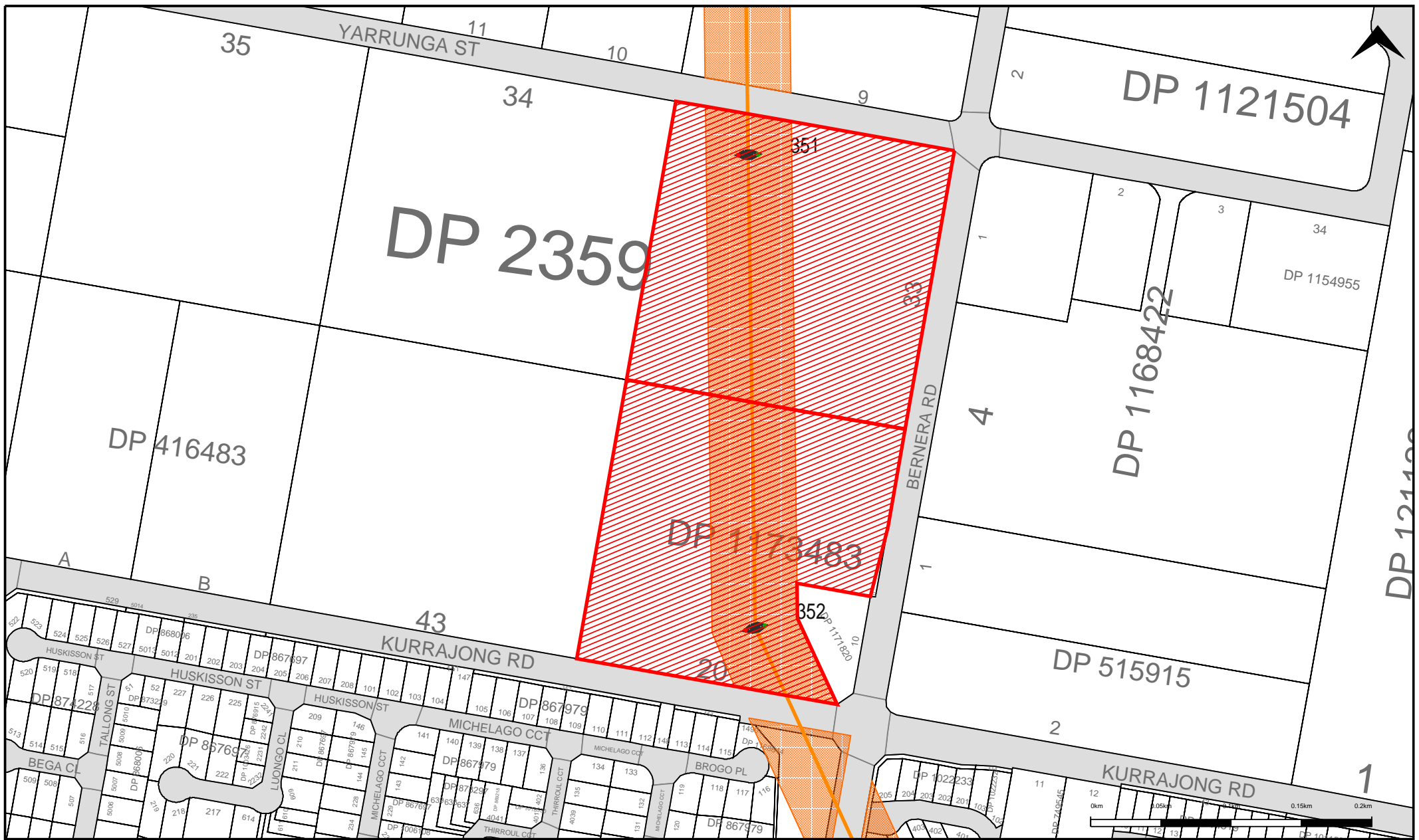
- The proposed development does not involve prohibited activities, nor introduce encroachments
- The proposed development does not encourage prohibited activities/ encroachments to occur within the easement
- Adversely affect the safety of general public or TransGrid employees/ contractors

It is noted that further consultation with TransGrid will be necessary to confirm the adequacy of the risk mitigation measures recommended in the enclosed risk assessment. TransGrid may recommend additional control measures to be implemented during the construction and operation of the proposed warehouse facility to ensure compliance to TransGrid and Statutory requirements applicable to the development.



It is also recommended to consult TransGrid with regard to proposed changes to the ground levels within and adjacent to the easement including the details of the structures and buildings proposed in the vicinity of the easement to ensure the horizontal and vertical clearances of the proposed development to the transmission line and its easement complies with TransGrid requirements.

Appendix A – TranGrid TAMIS plan



Legend



Structure



TransGrid Easement



Sydney South – Sydney West No2 330KV T/L

Feeder 12, Structure span 350 – 353

Property of Transgrid. No warranty is given that information shown is complete or accurate.

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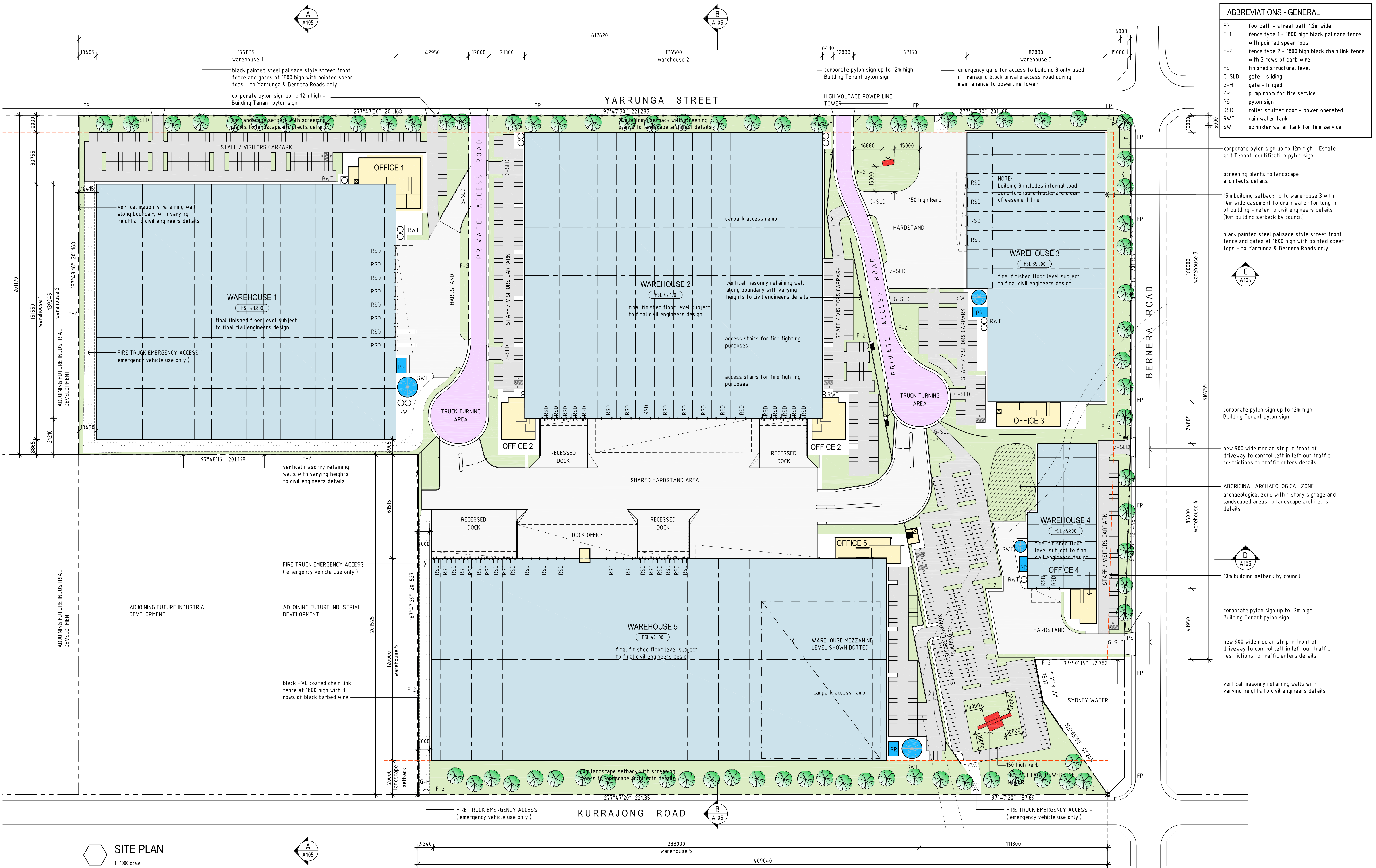
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Appendix B – Overall Estate Plan: Proposed Warehouse Development



ABBREVIATIONS - GENERAL	
FP	footpath - street path 12m wide
F-1	fence type 1 - 1800 high black palisade fence with pointed spear tops
F-2	fence type 2 - 1800 high black chain link fence with 3 rows of barb wire
FSL	finished structural level
G-SLD	gate - sliding
G-H	gate - hinged
PR	pump room for fire service
PS	pylon sign
RSD	roller shutter door - power operated
RWT	rain water tank
SWT	sprinkler water tank for fire service

Appendix C – Risk Assessment

Appendix C - Risk and Hazard Analysis

Item	Risk Category		Risk	Comments	Proposed Risk Treatment
1.1.1	Health and Safety	Safety Risk to General Public	Changes to ground levels within or in the vicinity of the easement	Proposed development will require minor changes to the existing ground level within and in the vicinity of the easement. Details of the proposed finished ground levels will be submitted to TransGrid to assess the transmission line (TL) for compliance to minimum conductor-to-ground clearance requirements specified in Table 3.1-1.	<ul style="list-style-type: none"> Avoid any modifications to the existing ground levels that would compromise minimum ground clearances applicable to 330kV TL. TransGrid to assess the development for required minimum vertical and horizontal clearances to the transmission line. Consult TransGrid with regard to result of this assessment.
1.1.2			Modifications to the easement or the nature of the land in the vicinity of the easement, that would encourage prohibited encroachments to occur within the easement	<p>The proposed warehouse development consists of warehouse and office buildings located adjacent to the existing overhead transmission easement and construction of a new private access road, hardstand areas and two visitor/ staff carparks within the easement. In addition low height landscaping has been proposed within the easement area along the property boundaries.</p> <p>TransGrid will be consulted to ensure that all development works within and adjacent to the easement and the steel lattice towers are acceptable to TransGrid and comply with their standards and requirements.</p>	<ul style="list-style-type: none"> Avoid any prohibited encroachments or activities such as; <ul style="list-style-type: none"> -The storage of flammable materials, corrosive or explosive material, -The placing of garbage, refuse or fallen timber, -The planting or cultivation of trees or shrubs capable of growing to a height exceeding 4 metres, -The placing of obstructions within 20 metres of any part of a transmission line structure or supporting guywire, -The parking or storage of flammable liquid carriers or containers, -The installation of site construction offices, workshops or storage compounds, -Placing any obstructions on access tracks or placed within the easement area that restricts access, within the easement area.
1.1.3			Any new developments within 30m of a transmission line structure or guy		<ul style="list-style-type: none"> Obtain TransGrid approval for all the planned developments woks within the easement and 30m from the two steel lattice towers
1.1.4			Installation of metallic structures or services in the easement		<ul style="list-style-type: none"> All UG and above ground services proposed within the easement area and immediately outside the easement to be non-metallic. All carpark and access way lighting proposed within the easement to be on low timber bollards
1.1.5			Proposed development resulting in voltages being transferred off the easement or bringing remote earths onto the easement		<ul style="list-style-type: none"> All UG and above ground services proposed within the easement area and immediately outside the easement to be non-metallic. Do not install any remote earths in the easement
1.1.6			Proposed development causing increase in step and touch potential hazards or encourage people to congregate within the step/touch potential zone of a structure	No public spaces or recreational areas proposed within the easement or in the vicinity of the tower structures	TransGrid to assess the step/ touch potential zone of the two tower structures located within the development site and advise of any modification required to the tower earthing arrangement
1.1.7			Proposed development causing people to congregate and/or spend time within the easement or immediately adjacent thereto		<ul style="list-style-type: none"> Avoid any proposal that would cause people to congregate and/or spend time within the easement or immediately adjacent to the tower structures

Item	Risk Category	Risk	Comments	Proposed Risk Treatment
1.2.1	Safety Risk to Non-Electrical Workers and Emergency Personnel	Installation of infrastructure that can be climbed compromising design clearances	The development proposal does not contain any infrastructure within the easement that can be climbed or require an EWP for maintenance	<ul style="list-style-type: none"> All proposed works within the easement to comply with TransGrid clearance requirements
1.2.2		Use of Elevated Work Platform (EWP) to maintain proposed structures within the easement compromising design clearances		<ul style="list-style-type: none"> Do not used EWPs within the easement without prior approval from TransGrid
1.2.3		Installation of proposed infrastructure that can bring remote earths onto the easement		<ul style="list-style-type: none"> All UG and above ground services proposed within the easement area and immediately outside the easement to be non-metallic. Do not install any remote earths in the easement
1.2.4		Proposed infrastructure that is a fire hazard, or that would encourage the storage or use of flammable material on the easement	No storage areas proposed within the easement	<ul style="list-style-type: none"> Do not store any material within the easement that is likely to cause fire or block the access to the easement or compromise design clearances
1.2.5		Proposed infrastructure that would require emergency workers (such as fire fighters) to come near, or their equipment to come onto or near high voltage conductors		<ul style="list-style-type: none"> Consult TransGrid regarding any infrastructure within the easement that would be accessed by emergency workers
1.3.1	Safety Risk to TransGrid Employees and Contractors	Alterations to access around any TransGrid structure that would prevent EWPs, crane or other plant access	Only Carpark areas and landscape areas proposed around the exiting tower structures. The new access way proposed likely to improve the access to the tower structures for future maintenance on the transmission line	<ul style="list-style-type: none"> Obtain TransGrid approval for all the planned developments works within the easement
1.3.2		Non-compliances to TransGrid's horizontal clearances	Proposed development will require minor changes to the existing ground level within and in the vicinity of the easement. Details of the proposed finished ground levels to be submitted to TransGrid to assess the transmission line (TL) for compliance to minimum conductor-to-ground clearance requirements specified in Table 3.1-1.	<ul style="list-style-type: none"> Avoid any modifications to the existing ground levels that would compromise minimum ground clearances applicable to 330kV TL. TransGrid to assess the development for required minimum vertical and horizontal clearances to the transmission line.
1.3.3		Modifications to the access to the easement that would introduce risks to TransGrid personnel including, although not limited to, asset inspectors or patrol staff	Access to the easement will be from the new access way proposed for the development site. Carpark and hardstand areas proposed adjacent to the tower structures likely to improve the future access to the transmission line.	<ul style="list-style-type: none"> Obtain TransGrid approval for all the planned developments works within the easement and 30m from the two steel lattice towers
1.4.1	Health Risk to General Public	Proposed public spaces or recreational areas within the easement that would encourage persons to congregate for lengthy periods of time	No public spaces or recreational areas proposed within the easement or in the vicinity of the tower structures.	<ul style="list-style-type: none"> Obtain TransGrid approval for all the planned developments works within the easement and 30m from the two steel lattice towers

Item	Risk Category		Risk	Comments	Proposed Risk Treatment
1.4.2			Proposed facilities outside of the easement but immediately adjacent thereto that would encourage persons to congregate within the easement	The development contains warehouse and office facilities proposed immediately outside the easement. However, no public spaces or recreational areas proposed within the easement that would encourage persons to congregate within the easement.	<ul style="list-style-type: none"> Do not establish any emergency assembly areas or facilities within the easement that would cause people to congregate within the easement
2.1	Operational Risk		Proposed ground level developments (including roads, driveways, parking lots and turning bays etc.) that would expose TransGrid transmission structures and lines to impact risk	<p>No access ways or parking lots proposed within 10m from the transmission tower structures.</p> <p>Raised kerbs proposed adjacent to tower structure sites to avoid any potential vehicular impact</p>	<ul style="list-style-type: none"> Obtain TransGrid's approval for the proposed carpark and hardstand areas proposed in the vicinity of the tower structures. Where necessary install removable bollards (non-metallic) to protect tower structures from vehicular impacts.
2.2			Modifications to water flows or drainage that would impact on the foundations or structural integrity of any TransGrid structure or guywire		<ul style="list-style-type: none"> Where relevant submit proposed drainage plans and modifications to existing water flows within the site to TransGrid for assessment. Avoid any drainage installations or changes to the water flow across site that would impact the foundation of the tower structures or cause water accumulation in/ around the tower sites.
2.3			Proposed excavations or surface activities that would impact TransGrid structures' foundations, stability or subterranean earthing systems	<p>All proposed excavation works/ surface activities to be approved by TransGrid.</p> <p>The proposed development does not contain any excavation works in the vicinity of the transmission tower structures.</p>	<ul style="list-style-type: none"> Do not commence any excavation works within or adjacent to the easement without TransGrid's prior approval. Consult TransGrid with regard to minimum clearance required from the structure foundations/ earthing systems during site excavation works
3.1	Maintenance Risk		Proposed roads, driveways or landscaping that would prevent or hinder TransGrid maintenance, or increase maintenance costs, for the above or below ground components of the transmission line structures	<p>Access to the easement will be from the new access way proposed for the development site. Carpark and hardstand areas proposed adjacent to the tower structures likely to improve the future access to the transmission line.</p> <p>Only low height landscaping has been proposed within the easement area along the property boundaries.</p> <p>TransGrid to assess the existing tower earthing system and consult the developer regarding any required modifications to it</p>	<ul style="list-style-type: none"> Obtain TransGrid approval for all the planned developments woks within the easement and in the vicinity of the two steel lattice towers
3.2			Proposed development causing the access to the easement or within the easement, to be obstructed, restricted or altered	The proposed access way and carpark/ hardstand areas likely to improve the access to the easement	<ul style="list-style-type: none"> Consult TransGrid in regard to access requirements to the site including 24/7 access to the easement for regular and emergency works on the transmission line
3.3			Proposed access roads, bridges, crossings and the like been able to withstand the weight and size of TransGrid maintenance plant (EWPs and Cranes)		<ul style="list-style-type: none"> Consult TransGrid on size and weight of general TransGrid maintenance plant and make necessary allowances in the design of the proposed access way, carpark and hardstand areas within the easement

Item	Risk Category		Risk	Comments	Proposed Risk Treatment
3.4			Proposed development encouraging placement of obstructions that would prevent access for routine or emergency works	No storage areas proposed within the easement	<ul style="list-style-type: none"> Avoid any developments within the easement that would encourage placement of obstructions or materials that would prevent access to the easement or tower structure sites
4.1	Development Design & Construction Risk		Proposed construction works restricting TransGrid from undertaking normal maintenance and inspection activities		<ul style="list-style-type: none"> Consult TransGrid with regard to: <ul style="list-style-type: none"> Likely construction commencement date Duration of construction works within and adjacent to the easement Proposed access arrangement to the easement during construction works Maintain access to the easement and the tower sites for undertaking normal maintenance and inspection activities by TransGrid personnel
4.2			Proposed development causing prohibited activities or encroachments to occur in the easement area during construction works	<p>The developer has consulted TransGrid and informed about the proposed development works within the easement area.</p> <p>Developer is well aware of the activities and encroachments prohibited in the easement area</p>	<ul style="list-style-type: none"> Avoid any prohibited encroachments or activities such as; <ul style="list-style-type: none"> The storage of flammable materials, corrosive or explosive material, The placing of garbage, refuse or fallen timber, The planting or cultivation of trees or shrubs capable of growing to a height exceeding 4 metres, The placing of obstructions within 20 metres of any part of a transmission line structure or supporting guywire, The parking or storage of flammable liquid carriers or containers, The installation of site construction offices, workshops or storage compounds, Placing any obstructions on access tracks or placed within the easement area that restricts access, within the easement area during construction phase.
4.3			<p>The health and safety risk assessment of the proposed development design lacking compliance to the following WorkCover NSW instruments:</p> <ul style="list-style-type: none"> ‘Work Near Overhead Power Lines’ Code of Practice 2006; and/or ‘Work Near Underground Assets’ Guide 2007 	<p>This risk assessment together with recommendations from TranGrid will be completed to ensure the proposed development comply with:</p> <ul style="list-style-type: none"> ‘Work Near Overhead Power Lines’ Code of Practice 2006; and/or ‘Work Near Underground Assets’ Guide 2007 	<ul style="list-style-type: none"> Avoid any modifications to the existing ground levels that would compromise minimum ground clearances applicable to 330kV TL. TransGrid to assess the development for required minimum vertical and horizontal clearances to the transmission line. Consult TransGrid with regard to result of this assessment Vehicles, plant or equipment having a height exceeding 4.3 metres when fully extended shall not be brought onto or used within the easement area without prior TransGrid approval.
5.1	Rights & Entitlements		Are TransGrid’s existing access rights preserved, pursuant to the terms of the easement?	The proposed development unlikely require any changes to TransGrid’s existing access rights	<ul style="list-style-type: none"> Consult TransGrid to seek advice on any changes required to the terms of the existing easement
5.2			Proposed development exposing TransGrid to new or higher maintenance costs (e.g. landscaping or other development changes impacting easement access, use and maintenance)	<p>TransGrid to use the proposed access way to access the easement and tower structure sites.</p> <p>Landscaping proposed within the easement will be maintained by the owner of the proposed development.</p>	<ul style="list-style-type: none"> Consult and obtain TransGrid’s approval for the proposed development works within the easement.