27 January 2022

Elias Joya
Hansen Yunken Building 1,
L3, 75-85 O'Riordan Street
Alexandria NSW 2015
ejoya@hansenyuncken.com.au

Dear Elias

Re: Submission in respect of translucent sheeting to be used on buildings located at Lot 201, 202, 204 & 206, DP 1244593 335-337 Burley Rd Horsley Park

Travers Bushfire & Ecology has been requested to undertake a review of bushfire development consent conditions for an industrial development being constructed on the above land – see Figure 1 below.

Figure 1 - location aerial of the subject site

The development is State Significant Development located on bushfire prone land as mapped by Fairfield City Council. This requires that any development be assessed in accord with the NSW Rural Fire Service planning policy entitled *Planning for Bushfire Protection* (2019).

The development footprint, within the southern sector, is 590 metres on the east-west axis whilst, in the northern sector, the development extent on the same east-west axis is 479m.

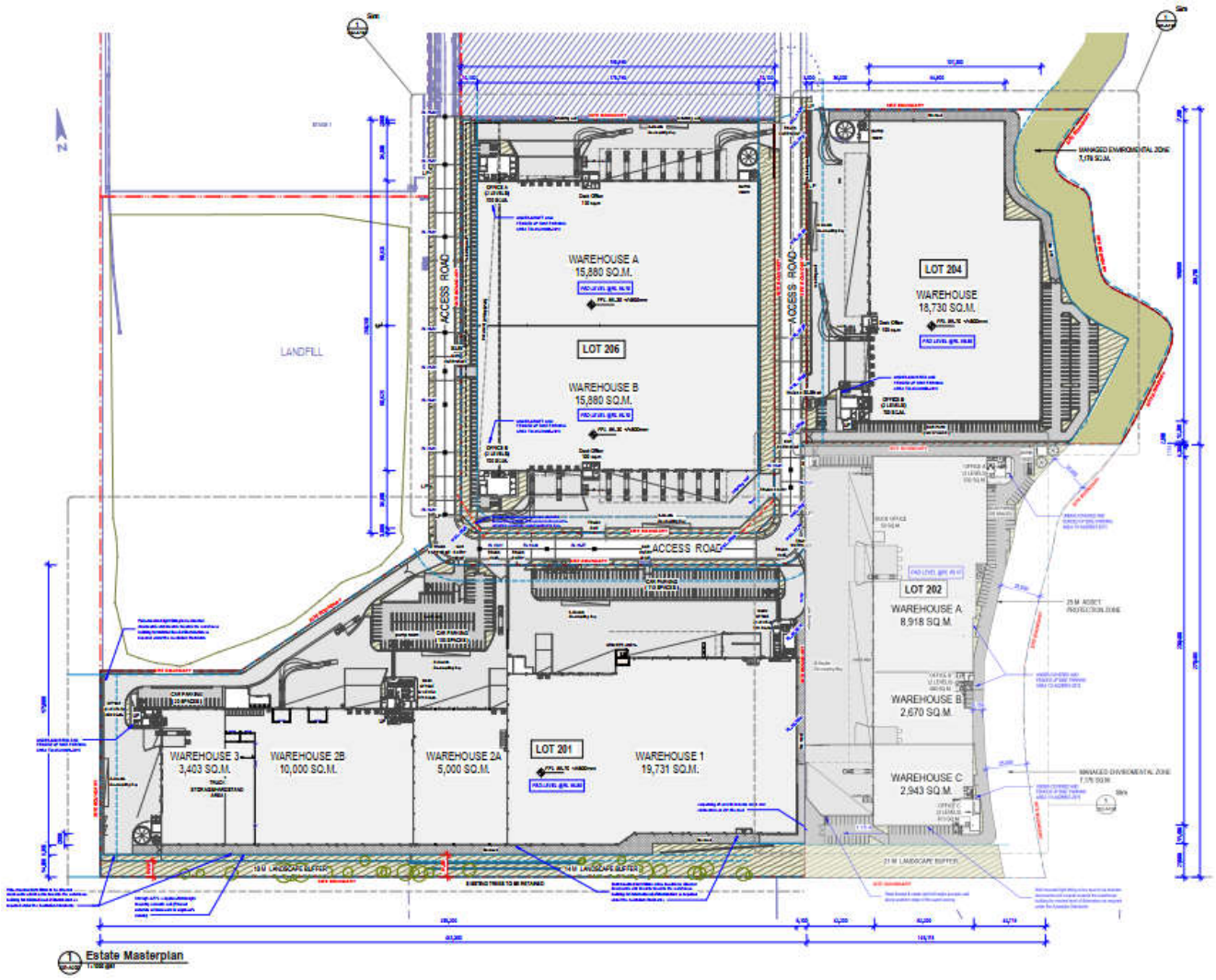


Figure 2 – location of the subject site and the proposed building footprints

Issue

Building 201 and Building 202 are nearing construction completion and the translucent roof sheeting proposed for a portion of the roof, on each building, is contrary to AS3959 (2018).

This is because the translucent sheeting does not meet the construction requirements for BAL 12.5 of AS3959 nor Condition 40 of the development consent, namely SSD-10436, issued on the 21st March 2021 by the *Department of Planning, Industry and Environment (DPIE).*

Plans submitted with the development clearly showed the building walls to be constructed out of steel; and with steel colorbond roof sheeting with 10% of the roof being covered by translucent sheeting. The sheeting was to be equally distributed across the roof – as per the plan.

This is a significant matter which requires resolution.

Background

The RFS Consent

The RFS provided advice on 20th August 2020 (REF: DA20200520001740-EIS & DA) to DPIE in respect of a state significant development at 335-337 Burley Rd Horsley Park. The RFS advice was based on a bushfire report prepared by *Eco Logical Australia* dated June 2020.

The development is 'the construction of four (4) large warehouses' on four (4) lots these being Lots 201, 202, 204 & 206. Each lot will have a warehouse building. For ease of reference, we will refer to each lot by the building number as shown on the plans e.g. Lot 201 will be referred to as Building 201 or more succinctly as B201; and so forth for the others lots (buildings).

This matter, being brought to the attention of the RFS, relates essentially to the construction of B201 and B202 which are under construction now. B203 and B204 are yet to begin construction but have the same problem.

The RFS consent issued in required as follows:

"*New construction of the proposed warehouse buildings on Lots 201, 203 and 204 must be non- combustible, and comply with Sections 3 and 5 (BAL 12.5) Australian Standard AS3959-2018 Construction of buildings in bush fire-prone areas or NASH Standard (1.7.14 updated) National Standard Steel Framed Construction in Bushfire Areas – 2014 as appropriate, and Section 7.5 of Planning for Bush Fire Protection 2019*"

Note: We assume that the omission of Lot 206 (referred to by the RFS as Lot 202) was its distance away from bushfire hazards and it was not required to be conditioned by the RFS.

DPIE made conditions of development consent commensurate with the RFS advice (and also omitting B206 in respect of Condition B40) and in that regard Conditions B38, B39 & B40 reflected the bushfire advice proffered by the RFS – see Appendix 2 for RFS Conditions.

It is Condition B40 of the DPIE consent that is the problem. Specifically, AS3959, or the NASH Standard, has been applied as a requisite 'construction standard' condition with a further requirement that new construction should be non-combustible. This does not provide for the roof top translucent sheeting.

By way of background **all** industrial warehouses, on the scale proposed, are constructed with a steel or masonry external skin; and with translucent sheeting on the roof to enable natural light permeation into the building. Thus, the matter is not new and or unusual.

The Australian Standard AS3959

AS3959 advises in Section 1.2 that its objective is to *prescribe construction detail for buildings to reduce the risk of ignition from a bushfire, appropriate to the;*

(a) Potential for ignition caused by burning embers, radiant heat or flame generated by a bushfire, or
(b) *Intensity of the bushfire attack on the building*.

AS3959 states it should be used for all classes of buildings yet its written language and graphical illustrations throughout the entirety of the document are purely for habitable dwellings - not for buildings that would not be approved for human occupation and ongoing habitation.

Curiously the November 2018 amendments to the previous version of AS3959 did not advise of this significant change. Changes were clearly enunciated in the Preface section on page 2 of AS3959. The subsequent impact of the inclusion of all building class(s) in AS3959 means that the document, as written;

- Fails to reference industrial Class 5 buildings
- Fails to provide designed construction solutions for Class 5 buildings.

Indeed, there are many instances, within the Standard, where it specifically uses words and drawings (in Appendix D and Appendix H). In this case it refers to verandas, carports or awning roofs that are separated from the main building and this provides clarity that the references relate only to a habitable dwelling. AS3959 also refers to structural framing using a wood material and not steel such as would be the case in an industrial building.

AS3959 advises in the Forward on page 5 that it *is primarily concerned with improving the ability of buildings in designated bushfire-prone areas to better withstand attack from bushfire thus giving a measure of protection to the building occupants (until the fire passes) as well as the building itself* – refer Paragraph 1 on page 5 of AS3959. In the following paragraph, on that page, it refers to property owners taking responsibility for mitigating damage from the onslaught of fire.

At best AS3959 is an indicative guideline for Class 5 industrial buildings and not a construction standard as it is for Class 1, 2 & 3 residential buildings.

BAL 12.5 of AS3959

BAL 12.5 is required to adhere to Section 3 and Section 5 of AS3959.

Section 3 identifies the 'level of threat' for BAL 12.5 as being ember attack – see Table 3.1 extracted from AS3959.

TABLE 3.1

BUSHFIRE ATTACK LEVELS AND CORRESPONDING SECTIONS FOR SPECIFIC CONSTRUCTION REQUIREMENTS

Bushfire Attack Level (BAL)	Classified vegetation within 100 m of the site and heat flux exposure thresholds	Description of predicted bushfire attack and levels of exposure	Construction Section
BAL—LOW	See Clause 2.2.3.2	There is insufficient risk to warrant specific construction requirements	4
BAL—12.5	≤12.5 kW/m²	Ember attack	3 and 5
BAL—19	>12.5 kW/m² ≤19 kW/m²	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux	3 and 6
BAL—29	>19 kW/m² ≤29 kW/m²	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux	3 and 7
BAL—40	>29 kW/m² ≤40 kW/m²	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux with the increased likelihood of direct contact with flames	3 and 8
BAL—FZ	>40 kW/m²	Direct exposure to flames from fire front in addition to heat flux and ember attack	3 and 9

AS3959 BAL 12.5 does not provide construction requirements for external walls above 400mm from the ground or a deck – see 5.4.1.

5.6.1(a) requires *roof sheets and roof covering accessories to be made of non-combustible* materials.

5.6.3 (a) requires roofs to be fully sarked; and acts to provides *a secondary form of ember protection to account for minor gaps that may develop in the roof sheeting* – refer to C5.6.3.

5.6.4(b) provides clarity that translucent roof sheeting can be used on a veranda, carport or awning roof where the roof is separated from the main roof by an external wall – refer to Figures D1(b) and D1(c) in AS3959.

This an important point of reference as is the reference in this section that there is no requirement to use sarking on any such external structure – where it is separated from the main roof space (of the habitable dwelling).

The RFS advice in respect of Class 5-8 buildings

In PBP Section 8.3.1 the NSW RFS has provided advice in respect of AS3959 and the NASH Standard.

"*In NSW, AS3959, or the NASH Standard **are not** considered as a set of Deemed to Satisfy provisions of the National Construction Code (NCC), however compliance with AS3959 and the NASH Standard must be **considered** when meeting the aims and objectives of Planning for Bushfire Protection (as published by the NSW RFS)*".

The RFS in their *Planning for Bushfire Protection* at Section 8.3.1 state; *"under the building classification system within the National Construction Code (NCC) Class 5 to 8 buildings include factories and warehouses (and) the NCC does not provide for any bush fire specific performance requirements for these particular classes of buildings.*

So, in terms of AS3959 or the NASH Standard this needs to be considered on a case-by-case basis as referenced by PBP on Page 76 last paragraph in Section 8.3.1. "*the general fire safety construction provisions of the NCC are taken as acceptable solutions however construction requirements for bush fire protection will need to be considered on a case-by-case basis*'.

Additional bushfire safety considerations

Other fire safety provisions pertaining to incident management, hazard & risk and dangerous goods are dealt with by the provisions of DPIE Conditions B45 to B45. For example;

INCIDENT MANAGEMENT

B45. Prior to the commencement of construction of each warehouse building, the Applicant must finalise detailed designs of each buildings fire and life safety systems, including their configuration, in consultation with Fire and Rescue NSW (FRNSW).

B46. Prior to the issue of a construction certificate for each warehouse building, the Applicant must undertake a fire engineering brief questionnaire in consultation with FRNSW.

HAZARDS AND RISK

B47. The Applicant must store all chemicals, fuels and oils used on-site in accordance with:

(a) the requirements of all relevant Australian Standards; and

(b) the NSW EPA's *Storing and Handling of Liquids: Environmental Protection – Participants Manual'* if the chemicals are liquids.

B48. In the event of an inconsistency between the requirements B47(a) and B47(b), the most stringent requirement must prevail to the extent of the inconsistency.

Dangerous Goods

B49. The quantities of dangerous goods stored and handled at the site must be below the threshold quantities listed in the Department of *Planning's Hazardous and Offensive Development Application Guidelines – Applying SEPP 33* at all times.

In regard, to the fire safety construction provisions, they are all deemed to satisfy or otherwise dealt with in the fire engineers report (*Scientific Fire Services*, August 2021). This report provides a comprehensive assessment of the development, and we refer the RFS to the Executive Summary (of the Fire Service report) between pages vi and xiv.

Notwithstanding the complexity of the assessment there is an internal roof sprinkler system that initiates at 218 seconds from thermal heads on the sprinklers located just below the roof.

In regard to the bushfire protection assessment, they are dealt with by *EcoLogical* (June 2020) in their approach to bushfire protection 'measures in combination' where *EcoLogical* provided complying responses for asset protection zones, construction BAL, access capability, the supply of water, electricity and gas.

EcoLogical argued that the development met the "*the aims and objectives of PBP*" for this type of development *e.g;*

- *safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation.*
- *suitable emergency and evacuation (and relocation) arrangements for occupants of the development.*
- *adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building, and*
- *storage of hazardous materials away from the hazard wherever possible".*

Subsequently the RFS agreed and provided DPIE with their agreement to the development.

In regard to risk assessment of dangerous goods *Riskcon Engineering* undertook their risk assessment in September 2021. Their report, entitled 'Dangerous Goods Design Report', provided a comprehensive assessment of the development and we refer the RFS to the Executive Summary between pages i and ii.

The report undertook a review of the proposed dangerous goods storage and operations to determine compliance with the Work Health and Safety Regulation 2017 (Ref. [1]) and all relevant design standards such as;

- Liquid Storage Shed - Mixed DG Package Store – AS/NZS 3833:2007.
- Flammable Liquids Dispensary (Package Store) – AS 1940:2017
- Bulk Tanks of Acids and Bases – AS 3780:2008
- DAF Facility – AS 3780:2008 and AS 4326:2008
- LPG Tank - AS/NZS 1596:2014

Translucent sheeting proposed to be used

The translucent sheeting to be used is *Ampelite Cool-Lite GC SR76* – see fire test report attached at Appendix 5.

Importantly, the roof shape for each building provides a very low pitch which enables the roof to be a 'self shedding design' that aids in denying the build-up of leaf material/s which could, when sufficiently aggregated, be ignited by airborne embers. See roof shape below in Figure 3.

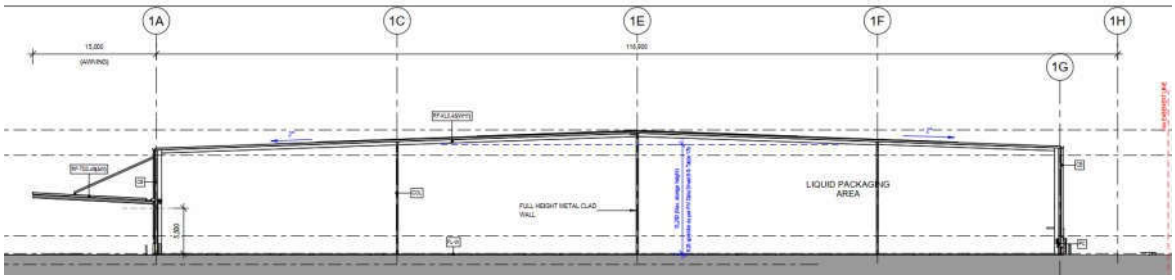


Figure 3 – roof profile for B201 (HLG Architects)

Building specifics

Of the four (4) buildings two of those buildings (B201 and B206) are sufficiently well distanced away from the E2 conservation bushland in the east to be of little to no concern from bushfire attack. Herein, is a precis of each building and the level of threat they are exposed to.

1. **B201** is located two hundred and forty metres (138m) from the woodland within the E2 conservation zone in the east and 6m from a narrow 10m wide landscaped verge in the south. Grassland is located in the south and rural residential in the south-east. (Note: The 6m is a *Fire & Rescue NSW* requirement)

   This building is not subject to flame contact and or significant radiant heat flux affection arising from the woodland in the east. *Flamesol* calculations advise the radiant heat affection would be 0.81 k/Wm^2 (not considering the radiant heat barrier benefit gained from the B202 adjacent in the east – see Appendix 3.

   B201 is also not subject to a significant fire scenario from the southern aspect due to the insitu grass paddocks and a narrow 10-14m wide landscaped zone parallel with B201 along the southern boundary. This landscaped verge has a 3m high masonry wall located on its northern edge (as shown on the architect plans prepared by *HLG Architects*.

   The impact from that a bushfire in that 10-14m wide zone would be minor. Short fire run modelling depicts the radiant heat affectation of 2.93 k/Wm^2 and a flame height of 7.96m – based on the widest 14m vegetation width (*John Delaney* model) - see Appendix 4.

   Conclusion: B201 is subject to less than 0.81 k/Wm^2 RH from the east and 2.93 k/Wm^2 RH from the south.

2. **B206** is located two hundred and three metres (203m) from woodland in the east. This building is not subject to flame contact and or significant radiant heat flux affection arising from the woodland in the east; and is protected by B204 to its immediate east.

   Conclusion: B206 should be deleted from further commentary in respect of bushfire attack probability.

3. **B204** is located thirty two metres (32m) from the woodland conservation parcel in the east. The radiant heat affection affectation from the woodland in the east has been calculated as being 11.74 k/Wm^2 (*Flamesol*) – see Appendix 3.

   Arising from this low RH affectation radiant heat could not affect the roof or the translucent sheeting on the roof. Embers could land on the low sloping roof but with no roof extrusions those embers would blown off.

   Conclusion: B204 is subject to less than 11.74 *k/Wm^2* from the east and is subject to BAL 12.5.

4. **B202** is located 31m (25+6m) from woodland conservation parcel in the east and 6m from a 21m wide landscaped verge on the southern boundary; and rural residential allotments in the south. The impact of the woodland in the east would be 12.22 *k/Wm^2* from the east based on conventionally fully developed modelling by *Flamesol* – see Appendix 3. If this same aspect is assessed under short fire run modelling the RH would be 8.03 *k/Wm^2* - see Appendix 4. Short fire run modelling based on 197m fire run length on 3.3 degree downslope.

Figure 4 – location of the widest portion of the vegetation hazard

We note the fire run length of 197m is in excess of the RFS required 175m for SFR modelling but in this case the additional 22m (to 197m) is supported because there is no contiguous hazard link between the E2 vegetation landscape (east of B202/B204) with any other vegetated hazards and importantly the average width is 171m – see Figure 5. We believe the RFS would accept this variation in this instance due to the industrial development category as opposed to a residential subdivision category.

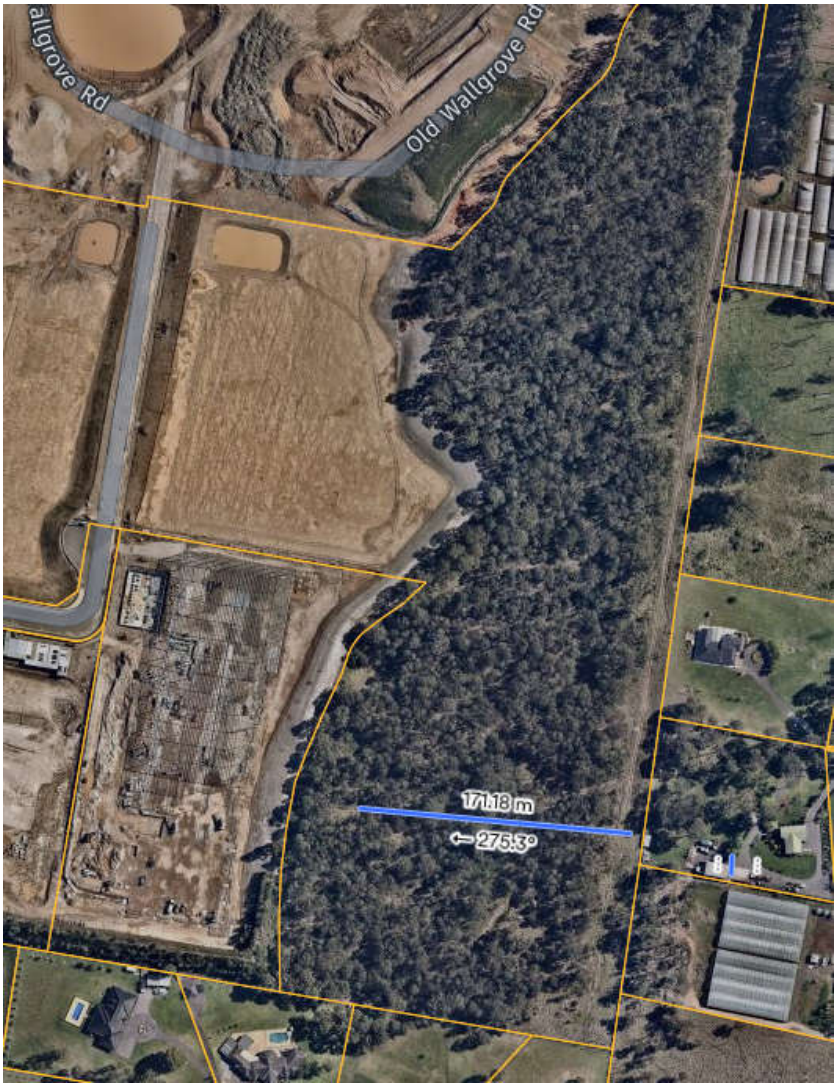


Figure 5 – mean width of vegetation parcel

By using *short fire run* modelling the impact from the southern 21m wide native vegetation landscape zone would be 4.11 k/Wm^2 from the south (*John Delaney* model) – see Appendix 4.

Arising from the short flame length of 13.17m then flame is not an attacking force upon the 12m high roof given the 25m APZ.

Arising from the low 8.03 *k/Wm²* of radiant heat affectation the RH flux could not affect the roof (it also has a very low pitch) as embers could land on the low sloping roof but with no roof extrusions those embers would be blown off.

Conclusion: B202 is subject to less than 8.03 *k/Wm²* from the east and 4.11 *k/Wm²* from the south.

Summary

1. The RFS have the capability to apply conditions of consent on a case by case basis – see PBP 8.3.1 on page 78.

2. AS3959 does not reference industrial buildings by way of designed construction solutions.

3. AS3959 does not provide a construction standard for external walls on an industrial building above 400mm from the ground or a deck.

4. The proposed industrial development buildings are not proposed for habitable occupation nor are subject to mixed development uses.

5. Matters pertaining to access, water, electricity and emergency arrangements are compliant with PBP 2019 as evidenced by the RFS GTA's dated 20th August 2020.

3. Matters pertaining to *general fire safety construction* provisions of the NCC and which are deemed as the acceptable solutions for incident management, hazard & risk and dangerous goods are dealt with by the provisions of DPIE development consent Conditions B45 to B45 and are compliant e.g;

    - Liquid Storage Shed - Mixed DG Package Store – AS/NZS 3833:2007.
    - Flammable Liquids Dispensary (Package Store) – AS 1940:2017
    - Bulk Tanks of Acids and Bases – AS 3780:2008
    - DAF Facility – AS 3780:2008 and AS 4326:2008
    - LPG Tank - AS/NZS 1596:2014

4. Matters pertaining to bushfire construction for this site is primarily driven by the external building wall metal sheeting (with no gaps) and the associated bushfire protection 'measures in combination'; and the general fire safety construction provisions raised in Item 4 above.

5. B201, B202 & B204 are subject less than 7.73 *k/Wm²* bushfire attack as evidenced by the equations provided within Appendix 3 and 4 herein.

6. The buildings have internal roof sprinkler system that initiates at 218 seconds from thermal heads on the sprinklers located just below the roof.

7. The very low roof profile on the buildings are self-shedding design in terms of leaf accumulation and possible attack from airborne embers.

Conclusion

Translucent sheeting, on these buildings, is an acceptable building roof material that achieves the aims and objectives of PBP under low bushfire attack probability.

This is supported by the equations in Appendix 3 and 4 herein; and item 5 above.

Recommendations

The following recommendations are made in light of the information provided above;

1. B201 should be re-considered, in this case, to require no BAL affection as it is;

    - 240m from the nearest woodland bushfire hazard, and,
    - 12m from a grass hazard with a narrow landscaping zone that overall provides little bushfire threat against a 12m high wall metal clad building.

2. B202 and B204 should be reconsidered to be BAL 12.5.

3. B204 and B202 (and B201) should be subject to the general fire safety construction provisions of the NCC as acceptable solutions (as provided by the RFS on Pp 77 Sect'. 8.3.1 second past paragraph).

4. Translucent roof sheeting has been approved for use, as per the approved plans under SSDA 10436, as plans were submitted to the RFS for due consideration.

If you require any further information please do not hesitate to contact our office on 1300 896 998 or at info@traversecology.com.au.

Yours sincerely

John Travers - *B. App. Sc. / Assoc. Dip / Grad. Dip / BPAD Level 3*
Travers bushfire & ecology

Appendix 1

DPIE – bushfire conditions of development consent

BUSHFIRE PROTECTION

B38. The Applicant must ensure each warehouse building complies with the relevant provisions of the latest version of *Planning for Bush Fire Protection* (PBP) (RFS, 2019) and the asset protection zones recommended in the *Bushfire Protection Assessment – Horsley Logistics Park, Lots 201, 202, 203, 204*, prepared by Eco Logical Australia, dated 16 June 2020.

B39. The Applicant must manage the site as an inner protection area (IPA) in perpetuity in accordance with the requirements of Appendix 4 of the PBP.

B40. The Applicant must ensure warehouse buildings on Lots 201, 203 and 204 are constructed of non-combustible building materials and comply with Section 3 and 5 (BAL 12.5) of the Australian Standard *AS 3959-2018 Construction of buildings in bushfire-prone areas* or *National Standard – Steel Framed Construction in Bushfire Areas* (NASH, 2014) as appropriate, and Section 7.5 of the PBP.

Appendix 1 RFS

bushfire advice to DPIE 20th August 2020

NSW GOVERNMENT

NSW RURAL FIRE SERVICE

Department of Planning and Environment (Sydney Offices)
GPO Box 39
Sydney NSW 2001

Your reference: SSD 10436
Our reference: DA20200520001740-EIS & DA Exhibition-1

ATTENTION: Bruce Zhang

Date: Thursday 20 August 2020

Dear Sir/Madam,

State Significant Development – Warehouse or Distribution Centre
Request for comments – exhibited Environmental Impact Statement (EIS)
ESR Horsley Logistic Park (SSD-10436) 6 Johnston Crescent Horsley Park NSW, (none)

Reference is made to correspondence dated 27/07/2020 seeking comments regarding the Environmental Impact Statement (EIS) currently being exhibited, for the above State Significant Development in accordance with the *Environmental Planning and Assessment Act 1979*.

The New South Wales Rural Fire Service (NSW RFS) has reviewed the EIS and provides the following comments;

Asset Protection Zones
Intent of measures: to provide suitable building design, construction and sufficient space to ensure that radiant heat levels do not exceed critical limits for firefighters and other emergency services personnel undertaking operations, including supporting or evacuating occupants.

1. From the start of building works and in perpetuity, Lots 201 to 204 and the landfill site must be entirely managed as an inner protection area (IPA) in accordance with the requirements of Appendix 4 of *Planning for Bush Fire Protection 2019*. When establishing and maintaining an IPA, the following requirements apply:
   - Tree canopy cover be less than 15% at maturity;
   - Trees at maturity are not touching or overhang the building;
   - Lower limbs are removed up to a height of 2m above the ground;
   - Tree canopies are separated by 2 to 5m;
   - Preference is given to smooth-barked and evergreen trees;
   - Large discontinuities or gaps in vegetation are provided to slow down or break the progress of fire towards buildings;
   - Shrubs are not located under trees;
   - Shrubs do not form more than 10% ground cover;
   - Clumps of shrubs are separated from exposed windows and doors by a distance of at least twice the height of the vegetation.
   - Grass to be kept mown (as a guide grass should be kept to no more than 100mm in height);
   - Leaves and vegetation debris are removed; and
   - NSW Rural Fire Service's document *Standards for asset protection zones*.

Postal address
NSW Rural Fire Service
Locked Bag 17
GRANVILLE NSW 2142

Street address
NSW Rural Fire Service
4 Murray Rose Ave
SYDNEY OLYMPIC PARK NSW 2127

T (02) 8741 5555
F (02) 8741 5550
www.rfs.nsw.gov.au

Construction Standards
Intent of measures: to minimise the risk of bush fire attack and provide protection for emergency services personnel, residents and others assisting firefighting activities.

2. New construction of the proposed warehouse buildings on Lots 201, 203 and 204 must be non-combustible, and comply with Sections 3 and 5 (BAL 12.5) Australian Standard AS3959-2018 *Construction of buildings in bush fire-prone areas* or NASH Standard (1.7.14 updated) *National Standard Steel Framed Construction in Bushfire Areas – 2014* as appropriate, and Section 7.5 of *Planning for Bush Fire Protection 2019*.

3. Any new Class 10b structures as defined per the *National Construction Code* shall be non-combustible.

Access Requirements
Intent of measures: to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.

4. All roads (including property access roads and proposed 'fire roads') must comply with the general and non-perimeter road requirements under Table 5.3b of *Planning for Bush Fire Protection 2019*.

Water and Utility Services
Intent of measures: to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

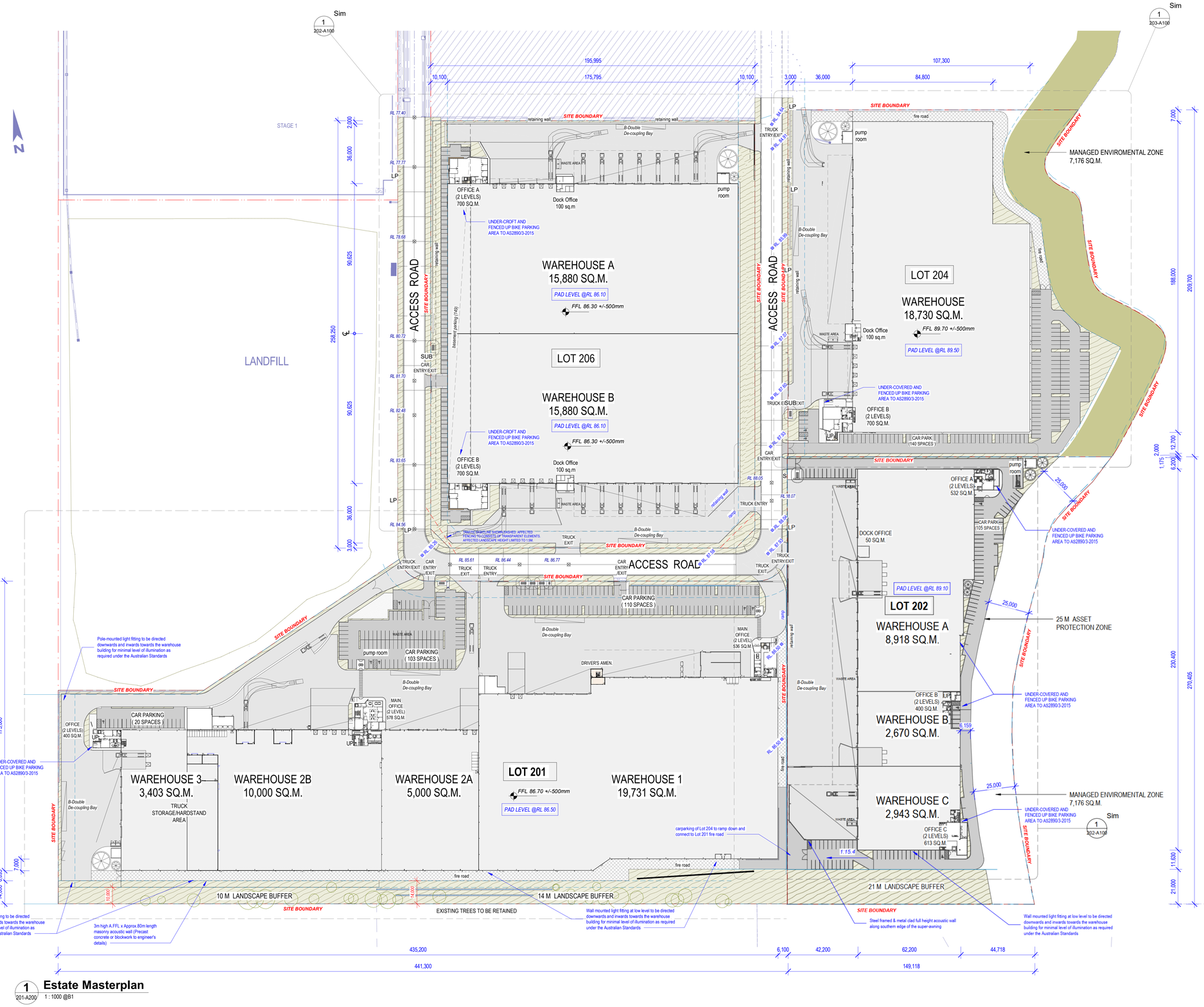
5. The provision of water, electricity and gas must comply with Table 5.3c of *Planning for Bush Fire Protection 2019*.

For any queries regarding this correspondence, please contact Simon Derevnin on 1300 NSW RFS.

Yours sincerely,

Kalpana Varghese
Team Leader, Dev. Assessment & Planning
Planning and Environment Services

Appendix 2
Lot layouts with building envelopes for B201, B202, B204 & B206



1 Estate Masterplan

201-A200 1 : 1000 @B1

2 Location Plan

201-A200 1 : 10000 @B1

DEVELOPMENT TOTAL AREA	
TOTAL SITE AREA	208,168 sqm
TOTAL BUILDING AREA	109,592 sqm
TOTAL EFFICIENCY	52.65 %

DEVELOPMENT SUMMARY (LOT 201)	
SITE 1 AREA (Warehouse 1)	36,582 sqm
SITE 2 AREA (Warehouse 2 & 3 & Cafe Site)	40,728 sqm
SITE AREA (Lot 201 Total)	77,310 sqm
EFFICIENCY	52.48%
WAREHOUSE 1	19,731 sqm
MAIN OFFICE 1 (2 Level)	536 sqm
WAREHOUSE 1 DRIVER'S AMENITIES	38 sqm
WAREHOUSE 1 Switch & Compressor Room	140 sqm
WAREHOUSE 1 Storage Area	375sqm
WAREHOUSE 2	15,000 sqm
MAIN OFFICE 2 (2 levels)	578 sqm
WAREHOUSE 2 GENERAL WASTE AREA	100 sqm
WAREHOUSE 2 PLANT ROOM	200 sqm
WAREHOUSE 3	3,403 sqm
MAIN OFFICE 3 (2 levels)	415 sqm
ESTATE CAFE	60 sqm
TOTAL BUILDING AREA	40,576sqm
CAR PARKING PROVIDED	232 spaces
CAR PARKING PROVISIONAL	2 spaces

DEVELOPMENT SUMMARY (LOT 202)	
SITE AREA (APZ included- 7,166 sqm)	40,080 sqm
EFFICIENCY	40.23 %
WAREHOUSE A	8,918 sqm
DOCK OFFICE	50 sqm
OFFICE A (2 levels)	532 sqm
WAREHOUSE B	2,670 sqm
OFFICE B (2 levels)	400 sqm
WAREHOUSE C	2,943 sqm
OFFICE C (2 levels)	613 sqm
TOTAL BUILDING AREA	16,126 sqm
AWNING (5m)	105 sqm
AWNING (15m)	2,297 sqm
AWNING (42m)	1320 sqm
CAR PARKING PROVIDED	105 Spaces
HEAVY DUTY PAVEMENT (H)	9,027 sqm
LIGHT DUTY PAVEMENT (L)	4,948 sqm

DEVELOPMENT SUMMARY (LOT 204)	
SITE AREA (Incl. Enviromental Zone - 6,464 sqm)	40,295 sqm
EFFICIENCY	48.47 %
WAREHOUSE	18,730 sqm
OFFICE & DOCK OFFICE	800 sqm
TOTAL BUILDING AREA	19,530 sqm
CAR PARKING PROVIDED	140 Spaces
HEAVY DUTY PAVEMENT (H)	6,160 sqm
LIGHT DUTY PAVEMENT (L)	4,120 sqm

DEVELOPMENT SUMMARY (LOT 206)	
SITE AREA	50,483 sqm
EFFICIENCY	66.08 %
WAREHOUSE A	15,880 sqm
OFFICE & DOCK OFFICE A	800 sqm
WAREHOUSE B	15,880 sqm
OFFICE & DOCK OFFICE B	800 sqm
TOTAL BUILDING AREA	33,360 sqm
CAR PARKING PROVIDED	147 Spaces
HEAVY DUTY PAVEMENT (H)	11,230 sqm
LIGHT DUTY PAVEMENT (L)	3,900 sqm
SUSPENDED SLAB	2,550 sqm

BIM 360://327-335 Burley Rd/02_1/3 Burley Rd.rvt
5/07/2021 6:26:40 PM
SOLIBAKER

ESR

PROJECT MANAGER

PROJECT ESR HORSLEY LOGISTIC PARK

ADDRESS 327-335 BURLEY ROAD
HORSLEY PARK NSW

PROJECT NUMBER 200226

Rev	Description	Date
P8	SSDA modifications.	30.04.21
P9	Lot 204 Warehouse Tenancy break-up revised, with associated changes in docks and office details.	05.07.21
P10	Lot 204 renumbered as Lot 202. Tenancy configuration amended with associated loading area and parking layout adjustment as clouded.	25.08.21
P11	Masterplan Update to reflect revised Lot 204 layout, Kerbs updated, Office A and B revised	15.10.21
P12	Lot 204 Revised floor plans and elevations to suite new office facade design	02.11.21
P13	Masterplan update to reflect as-approved Lot 201 & 204 layout.	14.12.21

General Notes:-
Architectural drawings to be read in conjunction with all other consultants detailed drawings, specifications & reports.
Do not scale this drawing. Verify all dimensions on site.
Refer all discrepancies to HLA before commencing any work.

HL Architects Pty Ltd A.C.N. 161 638 320
nominated architect: Kok Hong LAU
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hla architects

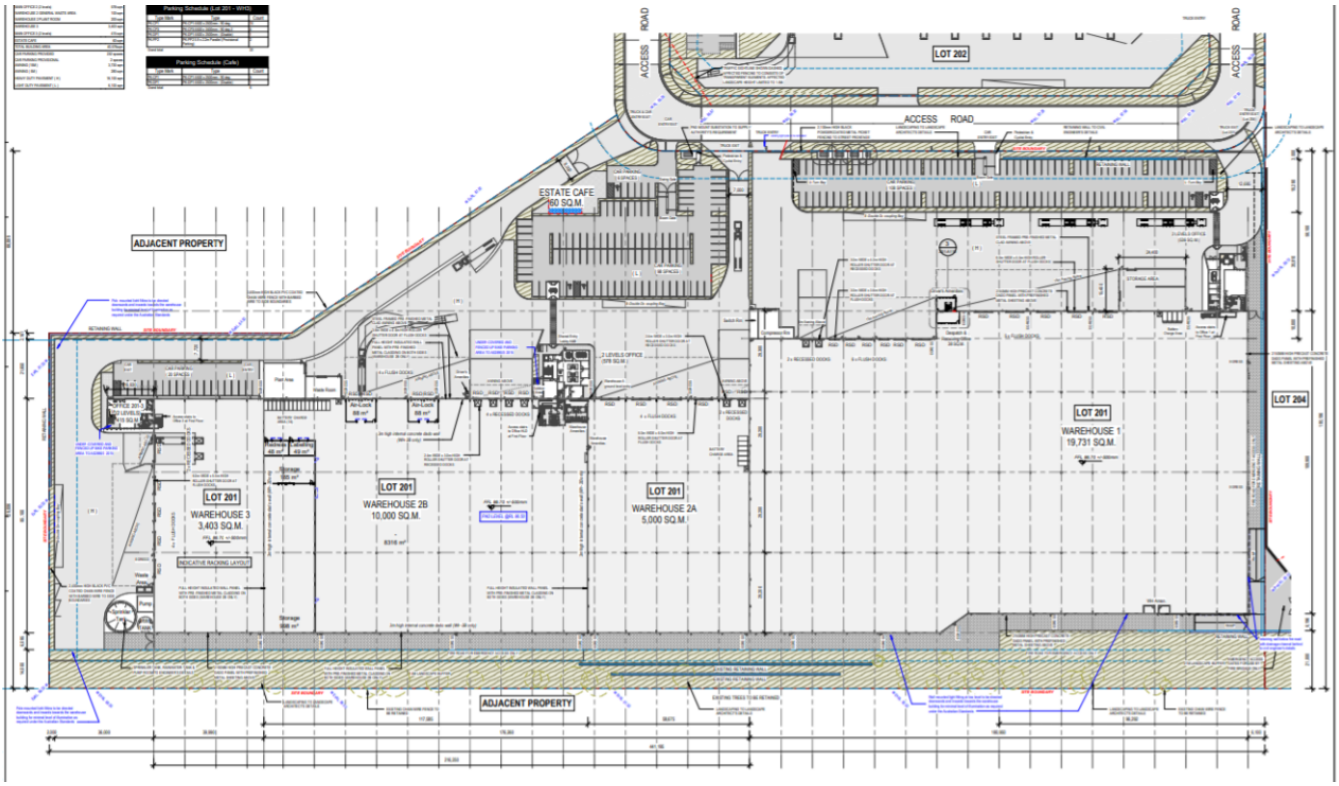
TN

DRAWING TITLE
ESTATE MASTERPLAN

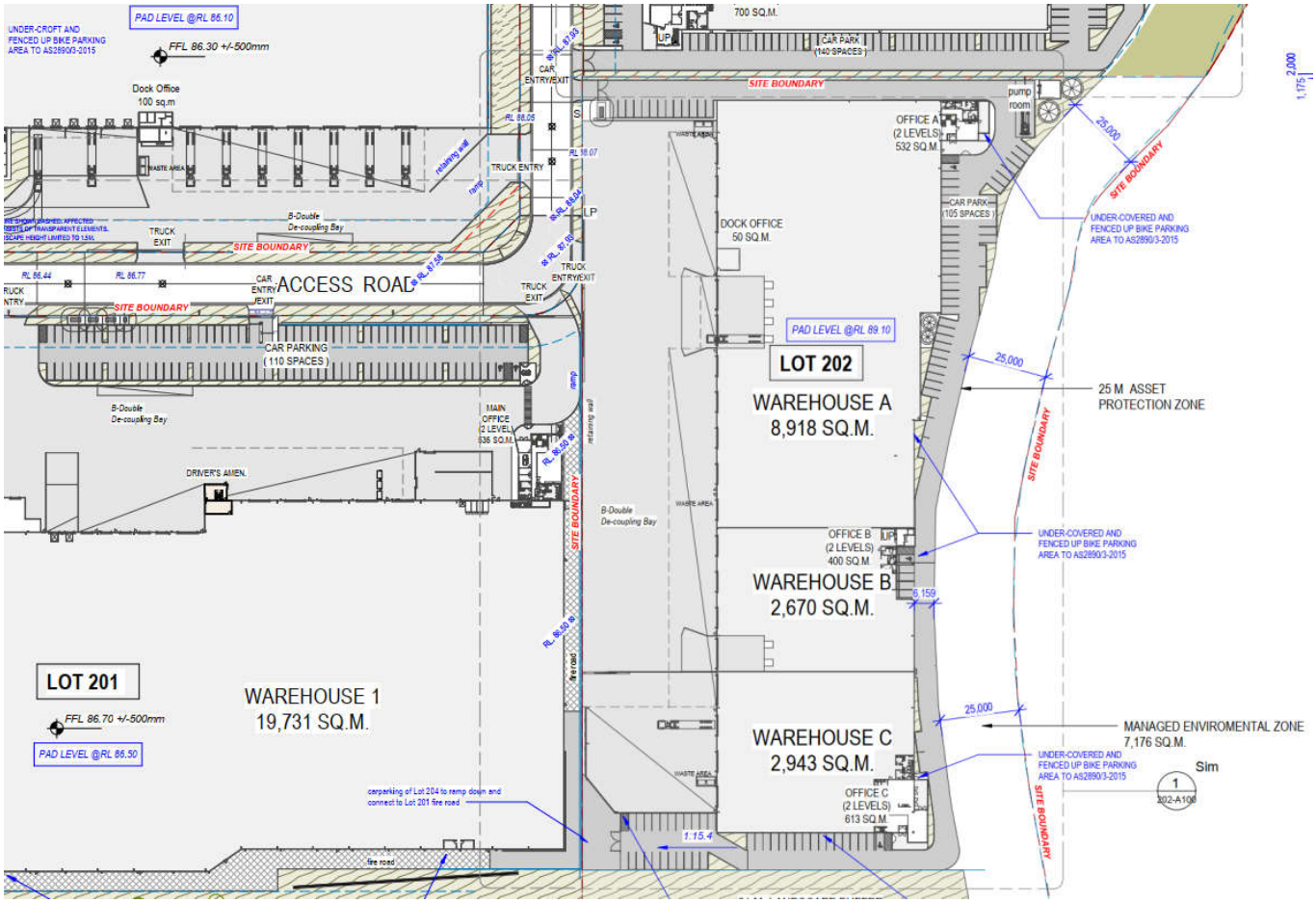
DRAWING NUMBER
200226 - DA - MS-A010

DRWN	CHK	ISSUE
AB	HL	P13

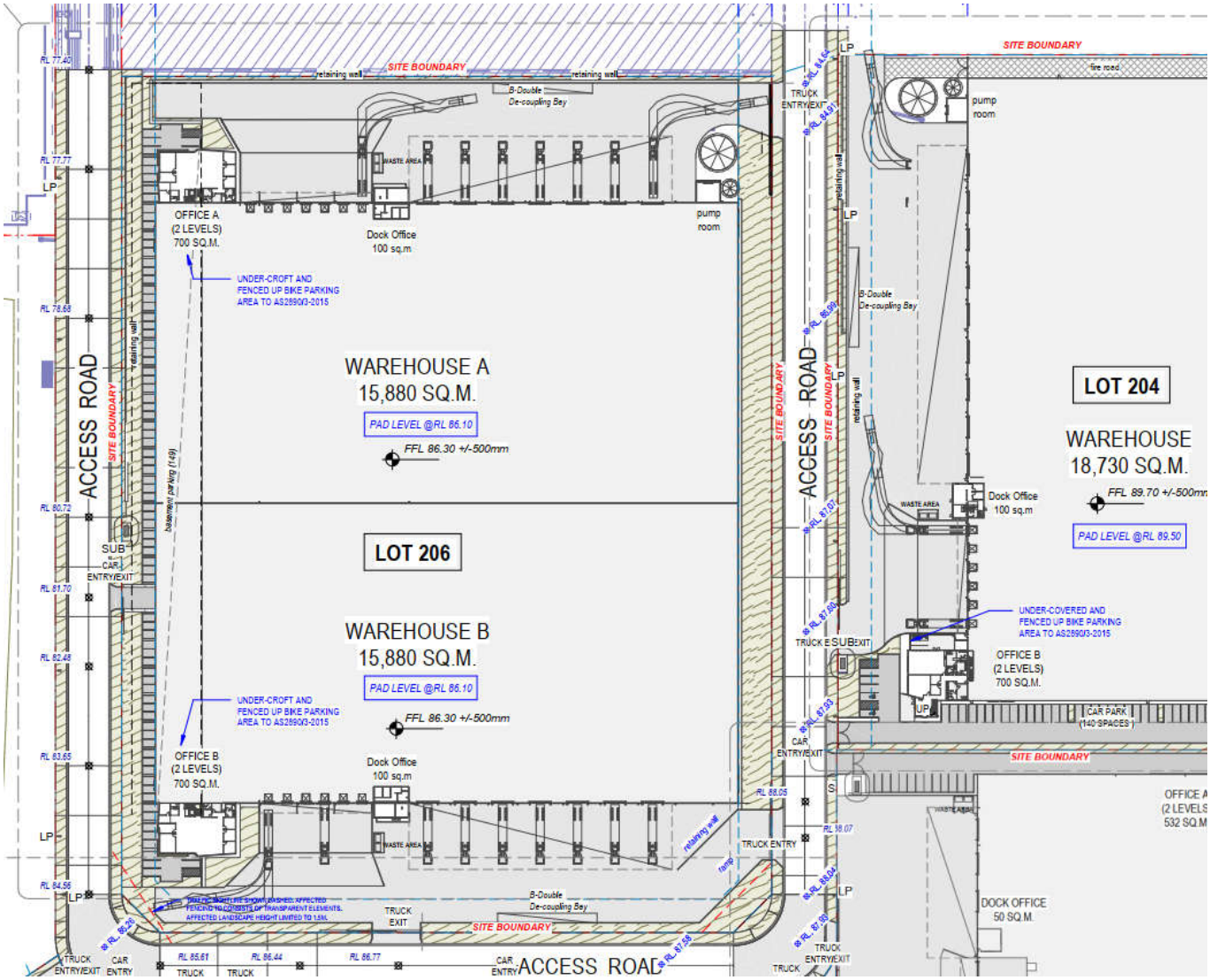
B201


ACCESS ROAD
ACCESS ROAD
LOT 202
ACCESS ROAD
ESTATE CAFE
160 SQ.M.
ADJACENT PROPERTY
LOT 201
WAREHOUSE 3
3,403 SQ.M.
INDICATIVE RACKING LAYOUT
LOT 201
WAREHOUSE 2B
10,000 SQ.M.
LOT 201
WAREHOUSE 2A
5,000 SQ.M.
LOT 201
WAREHOUSE 1
19,731 SQ.M.
LOT 204
ADJACENT PROPERTY

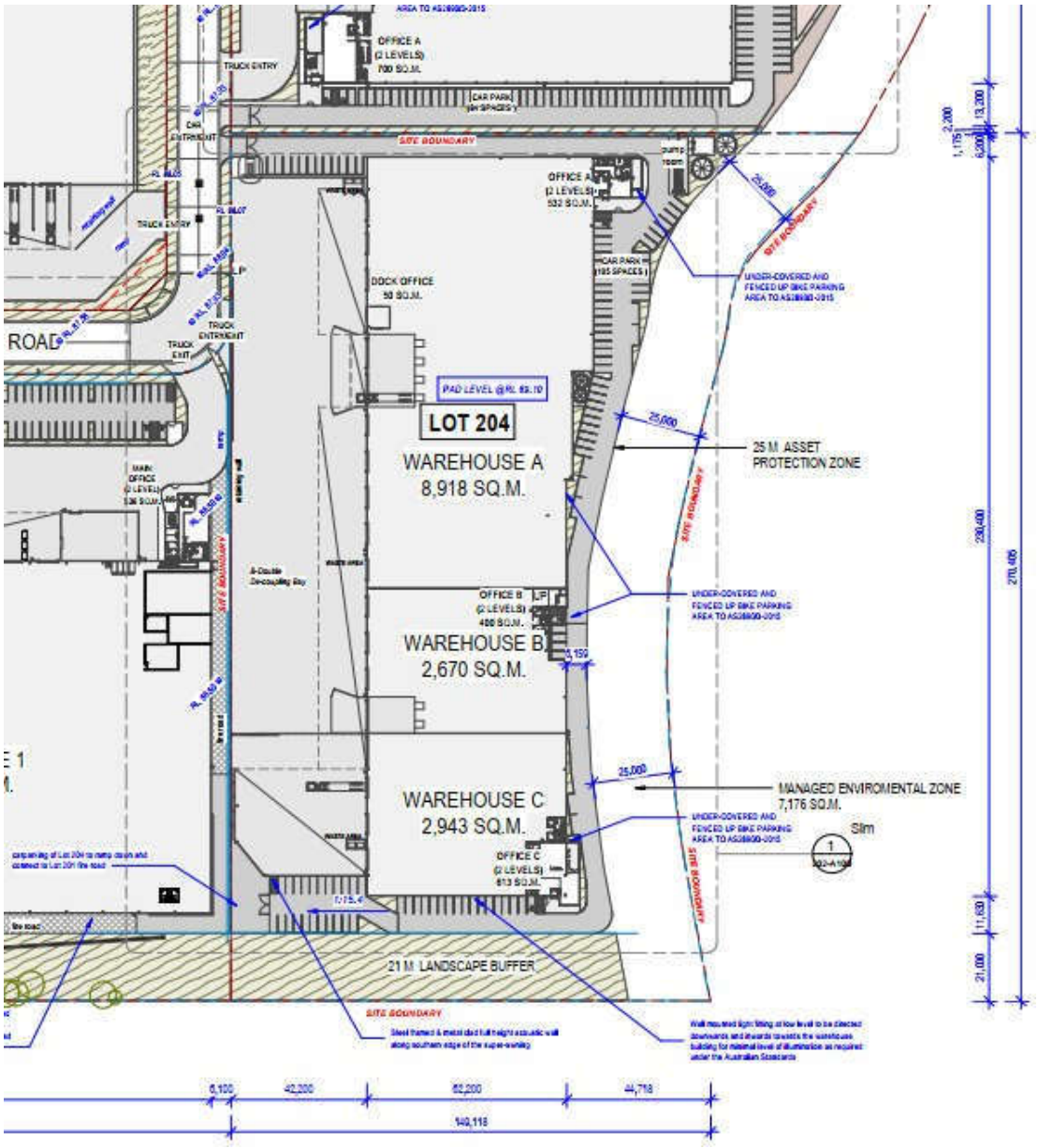
B202


PAD LEVEL @RL 86.10
UNDER-CROFT AND FENCED UP BIKE PARKING AREA TO AS2890/3-2015
FFL 86.30 +/-500mm
Dock Office 100 sq.m
700 SQ.M.
CAR PARK (140 SPACES)
SITE BOUNDARY
pump room
OFFICE A (2 LEVELS) 532 SQ.M.
CAR PARK (105 SPACES)
UNDER-COVERED AND FENCED UP BIKE PARKING AREA TO AS2890/3-2015
TRUCK ENTRY
TRUCK EXIT
B-Double De-coupling Bay
ACCESS ROAD
CAR ENTRY/EXIT
DOCK OFFICE 50 SQ.M.
PAD LEVEL @RL 89.10
LOT 202
WAREHOUSE A 8,918 SQ.M.
25.000
25 M ASSET PROTECTION ZONE
CAR PARKING (110 SPACES)
MAIN OFFICE (2 LEVELS) 535 SQ.M.
DRIVER'S AMEN.
OFFICE B (2 LEVELS) 400 SQ.M.
WAREHOUSE B 2,670 SQ.M.
6.159
LOT 201
WAREHOUSE 1 19,731 SQ.M.
FFL 86.70 +/-500mm
PAD LEVEL @RL 86.50
WAREHOUSE C 2,943 SQ.M.
MANAGED ENVIROMENTAL ZONE 7,176 SQ.M.
OFFICE C (2 LEVELS) 613 SQ.M.
carparking of Lot 204 to ramp down and connect to Lot 201 fire road
fire road
1.15.4
Sim
1
202-A100

B206


SITE BOUNDARY
retaining wall
B-Double De-coupling Bay
TRUCK ENTRY/EXIT
pump room
WASTE AREA
OFFICE A (2 LEVELS) 700 SQ.M.
Dock Office 100 sq.m
UNDER-CROFT AND FENCED UP BIKE PARKING AREA TO AS2890/3-2015
ACCESS ROAD
WAREHOUSE A 15,880 SQ.M.
PAD LEVEL @RL 86.10
FFL 86.30 +/-500mm
LOT 206
WAREHOUSE B 15,880 SQ.M.
PAD LEVEL @RL 86.10
FFL 86.30 +/-500mm
OFFICE B (2 LEVELS) 700 SQ.M.
Dock Office 100 sq.m
SUB
CAR ENTRY/EXIT
TRUCK EXIT
TRUCK ENTRY
CAR ENTRY
LOT 204
WAREHOUSE 18,730 SQ.M.
FFL 89.70 +/-500mm
PAD LEVEL @RL 89.50
UNDER-COVERED AND FENCED UP BIKE PARKING AREA TO AS2890/3-2015
OFFICE B (2 LEVELS) 700 SQ.M.
CAR PARK (140 SPACES)
OFFICE A (2 LEVELS 532 SQ.M
DOCK OFFICE 50 SQ.M.
TRUCK ENTRY/EXIT
RL 77.40
RL 77.77
RL 78.68
RL 80.72
RL 81.70
RL 82.48
RL 83.65
RL 84.56
RL 85.61
RL 86.44
RL 86.77
RL 88.05
RL 88.07
RL 87.93
RL 87.50
RL 87.55

B204


OFFICE A
(2 LEVELS)
700 SQ.M.
TRUCK ENTRY
CAR PARK
SITE BOUNDARY
OFFICE A
(2 LEVELS)
532 SQ.M.
DOCK OFFICE
50 SQ.M.
CAR PARK
195 SPACES
UNDER-COVERED AND FENCED UP BIKE PARKING AREA TO AS2890.3-2015
ROAD
TRUCK ENTRY
TRUCK EXIT
PAD LEVEL @ RL 69.10
LOT 204
WAREHOUSE A
8,918 SQ.M.
25 M ASSET PROTECTION ZONE
OFFICE B
(2 LEVELS)
400 SQ.M.
WAREHOUSE B
2,670 SQ.M.
WAREHOUSE C
2,943 SQ.M.
MANAGED ENVIROMENTAL ZONE
7,176 SQ.M.
OFFICE C
(2 LEVELS)
613 SQ.M.
21 M LANDSCAPE BUFFER
SITE BOUNDARY
25,000
5,100
42,200
89,200
44,718
149,118
270,405
230,400
21,000
11,630
13,200
2,000
1,175
6,000

Appendix 3

Flamesol modelling results for B202 and B204 from the eastern native vegetation conservation zone

B201 modelling results for eastern aspect

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	1.2 km/h
Vegetation classification	Woodland	Flame length	9.960000000000001 m
Understorey fuel load	10 t/ha	Flame angle	86 °
Total fuel load	18.04 t/ha	Panel height	9.94 m
Vegetation height	n/a	Elevation of receiver	4.97 m
Effective slope	0 °	Fire intensity	11,184 kW/m
Site slope	0 °	Transmissivity	0.698
Distance to vegetation	138 m	Viewfactor	0.0153
Flame width	100 m	Radiant heat flux	0.8100000000000001 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

B204 modelling results for eastern aspect

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	1.69 km/h
Vegetation classification	Woodland	Flame length	13.17 m
Understorey fuel load	10 t/ha	Flame angle	76 °
Total fuel load	18.04 t/ha	Panel height	12.78 m
Vegetation height	n/a	Elevation of receiver	6.39 m
Effective slope	5 °	Fire intensity	15,792 kW/m
Site slope	0 °	Transmissivity	0.803
Distance to vegetation	32 m	Viewfactor	0.1921
Flame width	100 m	Radiant heat flux	11.74 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

B202 modelling results for eastern aspect

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	1.69 km/h
Vegetation classification	Woodland	Flame length	13.17 m
Understorey fuel load	10 t/ha	Flame angle	76 °
Total fuel load	18.04 t/ha	Panel height	12.78 m
Vegetation height	n/a	Elevation of receiver	6.39 m
Effective slope	5 °	Fire intensity	15,792 kW/m
Site slope	0 °	Transmissivity	0.806
Distance to vegetation	31 m	Viewfactor	0.1994
Flame width	100 m	Radiant heat flux	12.22 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Appendix 4

Short fire run modelling results using the John Delaney Model for B201 and B202

B201 Short fire run modelling results
from southern native vegetation 14m length

Forest/Woodland - FDF & SFR Calculation page:

Fire run specifics	Horsley Park

Common and bushfire behaviour contributor INPUTS

Predominant vegetation	Coastal Valley Grassy Woodlands - 10 & 18.07 - Low - 0m - < 0.3m				
Surface & Elevated Fuel Load	10	tph	Overall fuel load	18.07	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
Average elevated fuel height	1.4	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	5	Metres	Target elevation of receiver	12.65	Metres
Effective slope	0	Degrees	Ambient temperature	308	Kelvin
Site slope	0	Degrees	SFR fire run length	14	Metres
FDF nominal head width	100	Metres			

TPUTS - Fully Developed Fire (FDF) DO NOT EDIT OUTPUT CELLS			**TPUTS - Developing Fire Run (DFR)**		
Wind Speed	45	kph	Wind speed	30	kph
Default elevation of receiver	4.984	Metres	Default elevation of receiver	3.980	Metres
FDF Flame Angle	90	Degrees	SFR Flame Angle	90	Degrees
FDF Flame Length	9.97	Metres	SFR Flame Height	7.960	Metres
FDF Intensity	11203	kW/m	SFR Intensity	6200	kW/m
FDF FROS	1.2000	kph	SFR FROS	1.2000	kph
FDF Flame transmissivity	0.8834	kW/m	SFR Flame transmissivity	0.8834	kW/m
FDF View Factor	0.2283		SFR View Factor	0.0436	
			Calculated SFR Head Width	5.125	Metres
			SFR fire run length	14	Metres
			Approx. SFR travel time	11:40	min/sec
FDF Radiant Heat	15.33	kW/m²	**SFR Radiant Heat**	2.93	kW/m²

B202 Short fire run modelling results
from southern native vegetation 21m fire run

Forest/Woodland - FDF & SFR Calculation page:

Fire run specifics	Horsley Park

Common and bushfire behaviour contributor INPUTS

Predominant vegetation	Coastal Valley Grassy Woodlands - 10 & 18.07 - Low - 0m - < 0.3m				
Surface & Elevated Fuel Load	10	tph	Overall fuel load	18.07	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
Average elevated fuel height	1.4	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	5	Metres	Target elevation of receiver	12.65	Metres
Effective slope	0	Degrees	Ambient temperature	308	Kelvin
Site slope	0	Degrees	SFR fire run length	21	Metres
FDF nominal head width	100	Metres			

TPUTS - Fully Developed Fire (FDF)
DO NOT EDIT OUTPUT CELLS

Wind Speed	45	kph
Default elevation of receiver	4.984	Metres
FDF Flame Angle	90	Degrees
FDF Flame Length	9.97	Metres
FDF Intensity	11203	kW/m
FDF FROS	1.2000	kph
FDF Flame transmissivity	0.8834	kW/m
FDF View Factor	0.2283	
FDF Radiant Heat	**15.33**	**kW/m²**

TPUTS - Developing Fire Run (DFR)

Wind speed	30	kph
Default elevation of receiver	3.980	Metres
SFR Flame Angle	90	Degrees
SFR Flame Height	7.960	Metres
SFR Intensity	6200	kW/m
SFR FROS	1.2000	kph
SFR Flame transmissivity	0.8834	kW/m
SFR View Factor	0.0612	
Calculated SFR Head Width	7.687	Metres
SFR fire run length	21	Metres
Approx. SFR travel time	17:30	min/sec
SFR Radiant Heat	**4.11**	**kW/m²**

B202 Short fire run modelling results from
eastern E2 conservation zone based on 197m fire run

Forest/Woodland - FDF & SFR Calculation page:

Fire run specifics	Horsley Park

Common and bushfire behaviour contributor INPUTS

Predominant vegetation	Coastal Valley Grassy Woodlands - 10 & 18.07 - Low - 0m - < 0.3m				
Surface & Elevated Fuel Load	10	tph	Overall fuel load	18.07	tph
Average Canopy Height	20	Metres	Fire weather district	100	FDI
Average elevated fuel height	1.4	Metres	Flame temperature	1090	Kelvin
Distance to vegetation	31	Metres	Target elevation of receiver	3.98	Metres
Effective slope	3.3	Degrees	Ambient temperature	308	Kelvin
Site slope	0	Degrees	SFR fire run length	197	Metres
FDF nominal head width	100	Metres			

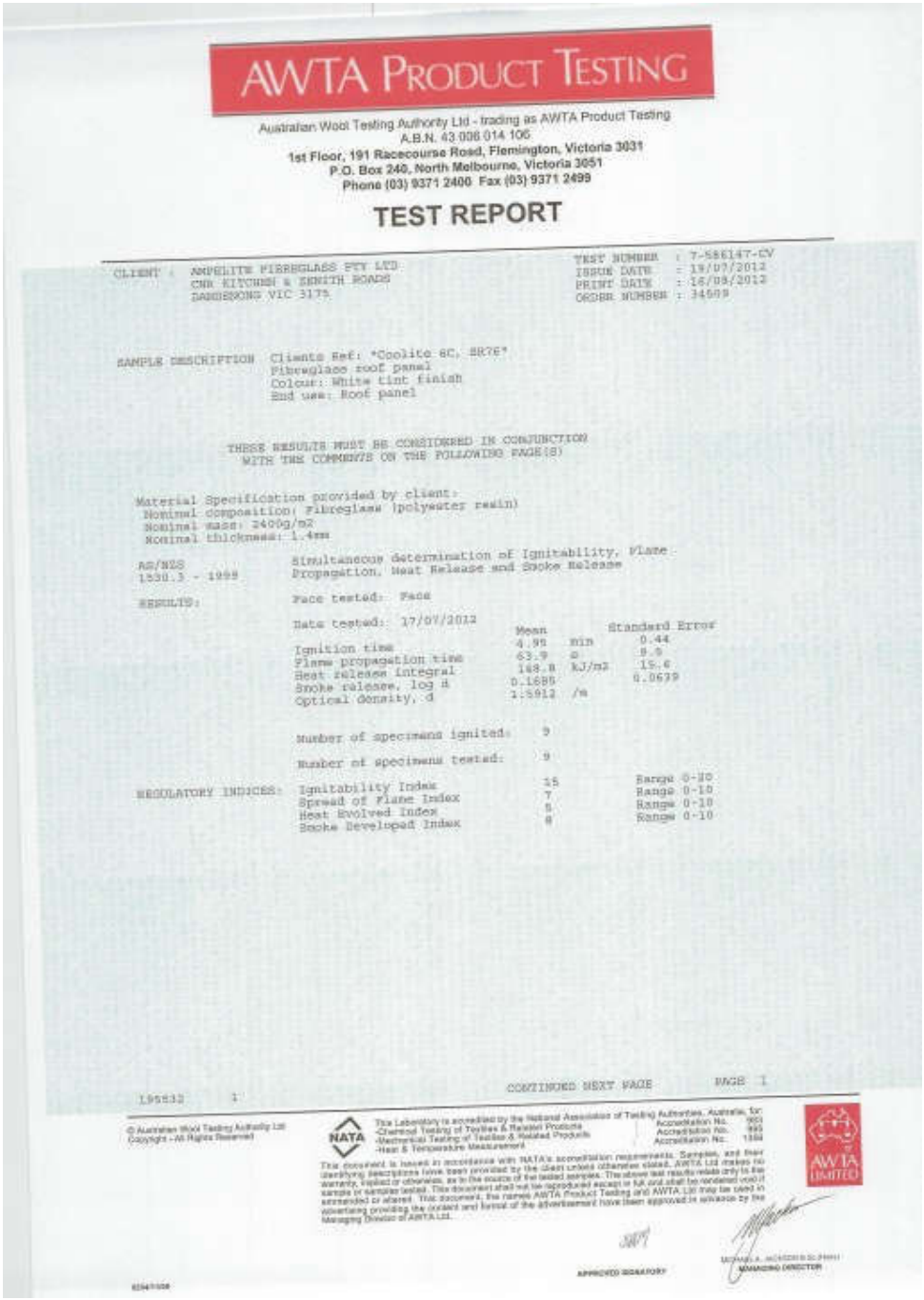
TPUTS - Fully Developed Fire (FDF) DO NOT EDIT OUTPUT CELLS			**TPUTS - Developing Fire Run (DFR)**		
Wind Speed	45	kph	Wind speed	30	kph
Default elevation of receiver	5.981	Metres	Default elevation of receiver	4.692	Metres
FDF Flame Angle	77	Degrees	SFR Flame Angle	79	Degrees
FDF Flame Length	11.96	Metres	SFR Flame Height	9.385	Metres
FDF Intensity	14068	kW/m	SFR Intensity	7785	kW/m
FDF FROS	1.5069	kph	SFR FROS	1.5069	kph
FDF Flame transmissivity	0.8057	kW/m	SFR Flame transmissivity	0.8046	kW/m
FDF View Factor	0.1798		SFR View Factor	0.1314	
			Calculated SFR Head Width	72.109	Metres
			SFR fire run length	21	Metres
			Approx. SFR travel time	10:44	min/sec
FDF Radiant Heat	11.01	**kW/m²**	**SFR Radiant Heat**	8.04	**kW/m²**

Input cells

Locked output cells - **DO NOT EDIT OUTPUT CELLS**

Appendix 5

Fire Test Report for Ampelite - Coolight 6C - SR76



AWTA PRODUCT TESTING

Australian Wool Testing Authority Ltd - trading as AWTA Product Testing
A.B.N. 43 006 014 106
1st Floor, 191 Racecourse Road, Flemington, Victoria 3031
P.O. Box 240, North Melbourne, Victoria 3051
Phone (03) 9371 2400 Fax (03) 9371 2499

TEST REPORT

CLIENT : AMPELITE FIBREGLASS PTY LTD
CNR KITCHNER & ZENITH ROADS
DANDENONG VIC 3175

TEST NUMBER : 7-586147-CV
ISSUE DATE : 19/07/2012
PRINT DATE : 16/08/2012
ORDER NUMBER : 34609

SAMPLE DESCRIPTION Clients Ref: "Coolite SC, SR76"
Fibreglass roof panel
Colour: White tint finish
End use: Roof panel

THESE RESULTS MUST BE CONSIDERED IN CONJUNCTION
WITH THE COMMENTS ON THE FOLLOWING PAGE(S)

Material Specification provided by client:
Nominal composition: Fibreglass (polyester resin)
Nominal mass: 2400g/m2
Nominal thickness: 1.4mm

AS/NZS 1530.3 - 1999 Simultaneous determination of Ignitability, Flame Propagation, Heat Release and Smoke Release

RESULTS:

Face tested: Face

Date tested: 17/07/2012

	Mean		Standard Error
Ignition time	4.95	min	0.44
Flame propagation time	63.9	s	8.5
Heat release integral	148.8	kJ/m2	15.6
Smoke release, log d	0.1685		0.0639
Optical density, d	1.5912	/m	

Number of specimens ignited: 9

Number of specimens tested: 9

REGULATORY INDICES:

Ignitability Index	15	Range 0-20
Spread of Flame Index	7	Range 0-10
Heat Evolved Index	5	Range 0-10
Smoke Developed Index	8	Range 0-10

L95833 1

CONTINUED NEXT PAGE PAGE 1

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-Mechanical Testing of Textiles & Related Products Accreditation No. 993
-Heat & Temperature Measurement Accreditation No. 1384

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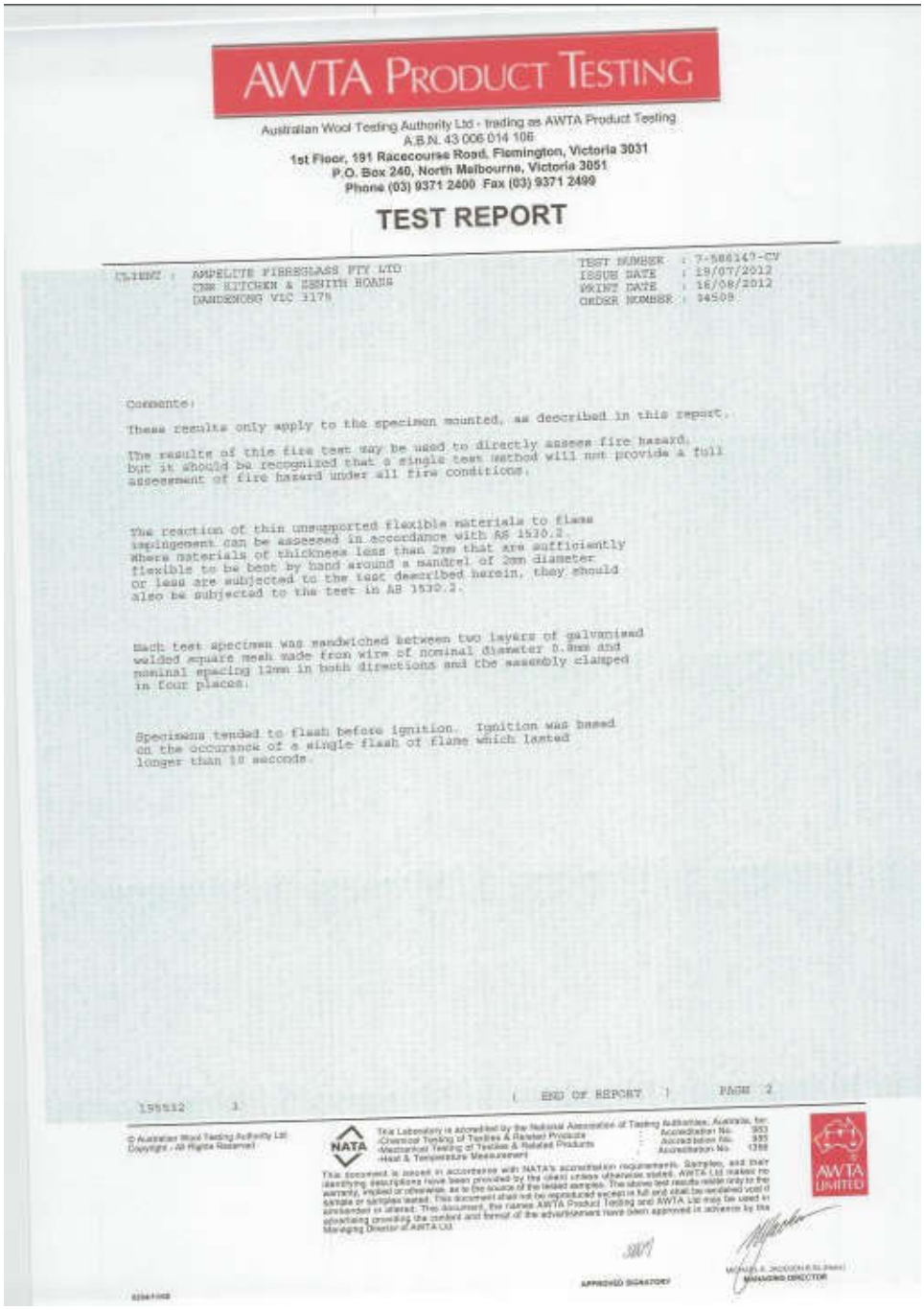
AWTA LIMITED

APPROVED SIGNATORY

MANAGING DIRECTOR



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P.O. Box 240, North Melbourne, Victoria 3051
Phone (03) 9371 2400 Fax (03) 9371 2499

TEST REPORT

CLIENT : AMPELITE FIBREGLASS PTY LTD
CNR KITCHEN & SMITH ROADS
DANDENONG VIC 3175

TEST NUMBER : T-586147-CV
ISSUE DATE : 18/07/2012
PRINT DATE : 16/08/2012
ORDER NUMBER : 34509

Comments:

These results only apply to the specimen mounted, as described in this report.

The results of this fire test may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions.

The reaction of thin unsupported flexible materials to flame impingement can be assessed in accordance with AS 1530.2. Where materials of thickness less than 2mm that are sufficiently flexible to be bent by hand around a mandrel of 2mm diameter or less are subjected to the test described herein, they should also be subjected to the test in AS 1530.2.

Each test specimen was sandwiched between two layers of galvanised welded square mesh made from wire of nominal diameter 0.8mm and nominal spacing 12mm in both directions and the assembly clamped in four places.

Specimens tended to flash before ignition. Ignition was based on the occurance of a single flash of flame which lasted longer than 10 seconds.

195512 3 (END OF REPORT) PAGE 2

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MANAGING DIRECTOR