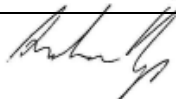
STEVE WATSON & PARTNERS

Wallace Wurth Building, UNSW

BCA Assessment Report

REPORT 2010/0057 R3.1

June 2010

Prepared by:	Anthony Ljubicic		16 June 2010
Verified by:	Andrew Rys		16 June 2010
Approved by:	Guiseppe Graziano		16 June 2010

BUILDING REGULATIONS CONSULTANTS AND CERTIFIERS
FIRE SAFETY ENGINEERS

LEVEL 5, 432 KENT STREET, SYDNEY NSW 2000
TEL +61 2 9283 6555 | FAX +61 2 9283 8500
sydney@swpartners.com.au
www.swpartners.com.au
ABN 48 102 366 576

EXECUTIVE SUMMARY

An assessment of the proposed design of the Wallace Wurth Building expansion has been undertaken against the Deemed-to-Satisfy provisions of the relevant sections of the BCA. The assessment has revealed that in order to comply a number of issues need to be resolved.

Section 8 of this report details the non-compliances identified that require either amendments to plans or an Alternative Solution to satisfy the Performance Requirements of the BCA.

The following are the main issues that require amendments to plans;

1. The proposed protection of openings as required under Clause C3.8 and D1.7 need to be specified.

2. The lower ground floor needs to be further detailed to ensure dead end travel distances do not exceed 20m and egress is provided from every room.

3. The existing hydrants system has hydrant outlets located outside the fire stairs. The hydraulic engineer is to assess the performance of the existing system to determine what non-compliances exist with AS 2419.1. The hydrant system is to be designed to comply with AS 2419.1. If any part of the design is unable to comply with AS 2419.1 an alternative solution will need to be investigated.

4. The door at the bottom of the southern stair serving the roof top plant room swings against the direction of egress. The doors are required to swing in the direction of egress in accordance with D2.20.

5. The hydrant and sprinkler pumproom does not have direct egress to road or open space.

6. The hydrant booster is not located in a compliant location in accordance with AS 2419.1.

The following are the main issues proposed to be addressed by the Fire Safety Engineer via an Alternative Solution;

7. Class 7b and 8 buildings generally require 4 hour fire rated construction. It is proposed to investigate a possible alternative solution to reduce the FRL's of the building.

8. The atrium connects ground floor to level 5, creating a fire compartment with a floor area of approximately 20,000m^2. The maximum fire compartment size permitted for a Class 8 building is 5,000m^2.

9. Openings within 6m of an adjacent building are required to be protected by sprinklers, fire doors or fire windows in accordance with Clause C3.4 of the BCA. The existing bridge connecting Wallace Wurth to the Biological Science building is currently separated from both buildings. The window openings to the bridge are not protected. The bridge is sprinkler protected with the water supply provided from the Wallace Wurth Building.

10. The openings in the external walls of the Wallace Wurth building or the Lowy Cancer Research that are exposed and within 6m of the external walls of the Biological Science building are required to be protected. The openings in the external wall of the Biological Science building exposed to the Wallace Wurth Building are also required to be protected.

11. A number of exits are provided through to the Biological Science building via the bridge link which serve as an exit similar to a horizontal exit. However, the exits do not fall under the definition of “horizontal exit” as defined under the BCA. The BCA does not permit egress from another sole occupancy unit.

12. The travel distances and distance between alternative exits exceed the maximum distances specified in the BCA.

13. The atrium has a number of issues in relation to the dimensions of the atrium well, the bounding construction and services provided to protect the atrium.

14. The swing of the egress doors into C25 Cancer Research Centre may need to be addressed as they are serving as exits from both Wallace Wurth and C25 Cancer Research Centre.

15. The hydrant system does not fully comply with the DTS provisions of the BCA and AS 2419.1. The design is to be reviewed and an appropriate solution developed in consultation with the NSW Fire Brigade is required.

16. It is proposed to investigate the possible deletion of the sprinklers to the level 2 overhang on the south east corner of the building.

17. The smoke hazard management systems are proposed to be designed on a performance basis to address the atrium and egress provisions of the BCA.

18. The design of the atrium does not comply with Part G3 of the BCA.

A number of compliance issues rely on interpretations as outlined in section 7.2 of this report.

Whilst not precluding the issue of a Construction Certificate, it is noted that many detailed design issues are not indicated on the drawings. These issues are designated “Not Specified” in the “Status” column of the assessment at Appendix B of the report and should be resolved prior to construction. Key issues should be clarified with SWP prior to construction.

TABLE OF CONTENTS

1. INTRODUCTION

This report presents the findings of an assessment of the design of the Wallace Wurth Building expansion against the Deemed-to-Satisfy (DTS) provisions of the relevant sections of the Building Code of Australia (BCA).

It has been prepared by building regulations consultants and certifiers Steve Watson and Partners for the University of New South Wales.

2. PURPOSE

The purpose of this report is to provide an assessment of the design documentation for the proposed project against the current requirements of the BCA.

The assessment is undertaken for the purpose of, and to the extent necessary for, construction certification to be issued under Part 4A of the NSW Environmental Planning and Assessment Act 1979 (The Act) and Regulation 2000 (EPAR).

3. SCOPE AND LIMITATIONS

3.1. SCOPE

The scope of this assessment is limited to the design documentation referenced in Appendix C of this report.

3.2. LIMITATIONS

The following limitations apply to the assessment:

- The plans are assessed to the extent necessary to issue a construction certificate under Part 4a of The Act. This means that the design has been assessed as able to comply with the BCA ie – the submitted plans are consistent with the BCA but certain design details may be not specified at this stage.

- Details in regard to access for people with disabilities have been assessed to the extent of the deemed-to-satisfy provisions of the BCA only. An assessment against AS 1428 is outside the scope of this report.

- The assessment does not consider the requirements for people with disabilities under the provisions of the Disabilities Discrimination Act 1992.

- The assessment does not consider the requirements of legislation other than the nominated sections of the EP&A Act which might address building works such as OH&S, Construction Safety or the like.

- Generally the assessment does not incorporate the detailed requirements of the Australian Standards.

4. STATUTORY FRAMEWORK

The following table summarises the key statutory issues relating to fire safety and the BCA in relation to the certification of new building works.

Issue	EPAR Clause Ref	Comment	Relevant section of this report
New Work	145	All new works must comply	8 and 13
Existing building fire safety	94	Council may require upgrading in some circumstances	-
Alts and adds – no change in use	143(3)	No reduction in the level of safety permitted	-

4.1. NEW WORK

Clause 145 of the Environmental Planning and Assessment Regulation 2000 (EPAR) requires that all new work comply with the current requirements of the BCA.

This means that all works proposed in the plans are required to comply but that existing features of an existing building need not comply with the BCA unless required to under other clauses of the legislation.

4.2. CONSENT AUTHORITY MAY REQUIRE BUILDING TO BE UPGRADED

When determining a development application a Consent Authority (Council) is required to assess fire safety in an existing building under Clause 94 of the EPAR.

The assessment must consider whether the measures contained in a building are inadequate

i) to protect persons using the building and facilitate their egress in the event of a fire or

ii) to restrict the spread of fire between buildings.

In determining a development application the consent authority is to take into consideration whether it would be appropriate for the building to be brought into total or partial conformity with the BCA. Normally this discretionary power would only be enacted in the following circumstances:

- the proposed scope of works encompasses a large portion of the building so that a total building upgrade would not be considered an onerous requirement (ie ½ the total volume of the building including other works undertaken in the last 3 years);
- the upgrading measure(s) significantly increase the level of safety and are able to be cost-effectively incorporated into the proposed works so that they would not be considered an onerous requirement
- the existing level of safety is so deficient that the council consider a upgrade is necessary irrespective of the scope of works proposed.

4.3. NO CHANGE OF BUILDING USE - STRUCTURAL STRENGTH & FIRE SAFETY

Clause 143 (3) of the Environmental Planning and Assessment Regulation 2000 (EPAR) prevents a certifying authority from issuing a construction certificate if the proposed new work will result in a reduction to the fire protection and structural capacity of the building.

4.4. DEVELOPMENT BY THE CROWN

Development by the Crown is regulated by Part 4 Division 4 and Part 4A Division 2 of the EP&A

Act. Section 109R of the Act requires that any demolition or building work cannot be commenced unless the works are certified as complying with the State's building laws at the date of calling for tenders. The above regulatory requirements generally still apply.

5. METHODOLOGY

5.1. PROCESS ADOPTED

The following method of assessment has been used in the preparation of this report:

1) Determine the basic assessment data for the building.
2) Assess the design of the building against the current Deemed-to-Satisfy requirements of Sections B, C, D, E, F, G, H and J of the BCA. Establish the status of each clause into the following categories:
   a) Clause is administrative information only **(Noted)**.
   b) Clause is or is not relevant to the proposed work **(Applicable or Not Applicable)**.
   c) The proposed work complies with the requirements of the clause **(Complies)**.
   d) Compliance with the requirements of the clause is unable to be determined from the documentation **(Not Specified)**. A recommendation in the "Comments" column will indicate if further information is required.
   e) Proposed work does not comply with the requirements of the clause **(Does Not Comply)**. An indication will be given in the Comments field as to the nature of the issue and whether an alternative solution has been proposed to address the issue.
3) Nominate the status of the design against each BCA requirement.
4) Provide comments against each BCA requirement as appropriate
5) In the case of alterations to, and/or a change in building use, assess the proposal against the aspects of The Act and EPAR nominated in Section 4 above.

6. DESCRIPTION OF PROPOSED DEVELOPMENT

The proposed development comprises the refurbishment and expansion of the Wallace Wurth Building at the University of New South Wales, Kensington campus.

The existing 7 storey building is constructed of concrete and masonry and contains labratories, offices, lecture theatres and storage areas. The proposed expansion will increase the floor area on all floors and add an additional storey.

7. ASSESSMENT DATA SUMMARY

The following basic assessment data has been drawn from the provisions of the BCA 2010.

7.1. ASSUMPTIONS

The following assumptions have been made in the preparation of this report:

1. The southern open stair serving level 1 as an exit has a clear width of 2.5m.
2. The exit doors leading into the Biological Science building have a clear width of 1.5m each.

7.2. INTERPRETATIONS

A number of issues within the BCA are recognised to be interpretive in nature. Where these issues are encountered, interpretations are made that are consistent with Standard Industry Practise and/or Steve Watson & Partners policy formulated in regard of each issue.

1. A laboratory in a university is classified as a Class 8 building. The BCA specifically nominates laboratories in a primary or secondary school as a Class 9b building. It does not specify that a laboratory within a university as a Class 9b building.

7.3. BUILDING CHARACTERISTICS

The following assessment data has been drawn from the provisions of the BCA.

7.3.1. Classification

The significant spaces in the proposed design have been classified in accordance with the requirements of Clause A3.2 of the BCA and are summarised in the table below:

Floor	***Space***	***Classification***
Lower ground	Animal holding rooms / Laboratories	Class 8
	Storage	Class 7b
Ground	Offices	Class 5
	Laboratories	Class 8
	Teaching	Class 9b
Level 1	Offices	Class 5
	Laboratories	Class 8
	Teaching	Class 9b
Level 2	Offices	Class 5
	Laboratories	Class 8
Level 3	Offices	Class 5
	Laboratories	Class 8
Level 4	Laboratories	Class 8
Level 5	Laboratories	Class 8
Level 6	Laboratories	Class 8

7.3.2. Summary of construction determination

The type of construction required for the proposed design is summarised in the table below. Refer to appendix B for further detailed assessment data on the proposed development.

Classification	Class 5, 7b, 8 and 9b
Number of storeys contained	8
Rise in storeys	8
Type of construction required	Type A
Effective height	24m

8. ISSUES REQUIRING RESOLUTION

8.1. ISSUES REQUIRING AMENDMENTS TO PLANS

The following issues need to be resolved before issuing the Construction Certificate.

Item	DTS Clause	Description of Non-compliance	Requirement to Satisfy BCA
1.	D1.4	Insufficient doors are provided on the lower ground floor to ensure egress from the animal facility, morgue, BRC wash and mechanical plant room. Egress from the morgue and BRC wash may potentially have dead end travel distances exceeding 20m.	Additional doors are to be provided to ensure dead end travel distances do not exceed 20m and egress is provided from every room.
2.	D2.20	The exits doors leading into C25 Lowy Cancer Research Building swing against the direction of egress. The door at the bottom of the southern stair serving the roof top plant room swings against the direction of egress.	The doors are required to swing in the direction of egress. The doors leading to C25 Cancer Research Centre Building also serve as exit doors from C25 Cancer Research Centre Building, Therefore, the doors need to be modified to swing in both directions, additional doors are to be installed or an alternative solution development to address the non-compliance.
3.	E1.3	The existing hydrants system has hydrant outlets located outside the fire stairs. The hydraulic engineer is to assess the performance of the existing system to determine what non-compliances exist with AS 2419.1. Hydrants installed in compliant locations will not achieve full coverage throughout the building, **Pumproom** The pumproom does not open to a road or open space or into a fire isolated passage or stair which leads to the road or open space. **Hydrant Booster** Where a fire hydrant booster is remote from the building it must be installed at the boundary of the site or within sight of the main entrance of the building; located adjacent to the principal vehicular access to the site and must be located not less than 10m away from the external walls of the building.	The hydrant system is to be designed to comply with AS 2419.1. If any part of the design is unable to comply with AS 2419.1 an alternative solution will need to be investigated.
4.	Sprinklers	A sprinkler valve enclosure must be located in a secure room or enclosure that has direct egress to road or open space. The proposed sprinkler pumproom does not have direct egress to road or open space.	The sprinkler valve enclosure is to be redesigned to have direct egress to road or open space or an alternative solution is to be developed.

8.2. ALTERNATIVE SOLUTIONS PROPOSED / REQUIRED

It is proposed to satisfy the following non-compliances by alternative solutions:

Item	Non-Compliance	DTS Clause	Description	Performance Requirement	Comments
1.	Type of Construction	C1.1 and Spec C1.1	Class 7b and 8 buildings generally require 4 hour fire rated construction. It is proposed to investigate a possible alternative solution to reduce the FRL's of the building.	CP1 and CP2	
2.	General floor area limitations	C2.2	The atrium connects ground floor to level 6, creating a fire compartment with a floor area of approximately 20,000m^2. The maximum fire compartment size permitted for a Class 8 building is 5,000m^2. The west side of the building is proposed to be separated from the atrium and east side of the building on a performance basis via an alternative solution. The west side will be approximately 9,000m^2 and east side 11,000m^2.	CP1, CP2, CP9 and EP2.2	
3.	Protection of openings in external walls	C3.2 and C3.4	The existing bridge connecting Wallace Wurth to the Biological Science building is currently separated from both buildings. The window openings to the bridge are not protected. The bridge is sprinkler protected with the water supply provided from the Wallace Wurth Building. The openings in the external walls of the Wallace Wurth building that are exposed and within 6m of the external walls of the Biological Science building or the Lowy Cancer Research building are required to be protected. The openings in the external walls of the Biological Science building that are exposed and within 6m of the external walls of the Wallace Wurth building are required to be protected.	CP2 and CP8	

Item	Non-Compliance	DTS Clause	Description	Performance Requirement	Comments
4.	Exit travel distances	D1.4	Egress is provided through to the Biological Science building via the bridge link and on the lower ground floor. The exits are similar to a horizontal exit. However, the exits do not fall under the definition of "horizontal exit" as defined under the BCA. The BCA does not permit egress from another sole occupancy unit. Egress is provided through to the C25 Lowy Cancer Research Building on levels 2 to 5 inclusive. The exits are similar to a horizontal exit. However, the exits do not fall under the definition of "horizontal exit" as defined under the BCA. The BCA does not permit egress through another sole occupancy unit. The travel distances do not comply in the following areas: 1. Lower ground floor approximately 50m worst case 2. Ground floor wet teaching prep lab dead end travel distance of approximately 27m 3. Ground floor approximately 50m total travel distance worst case. 4. Levels 1, 2, 3 and 4 approximately 50m worst case 5. Level 5 approximately 55m worst case 6. Level 6, approximately 52m worst case 7. Roof top plant room approximately 50m worst case	DP4 and EP2.2	

Item	Non-Compliance	DTS Clause	Description	Performance Requirement	Comments
5.	Distance between alternative exits	D1.5	The distance between alternative exits exceeds the maximum permitted of 60m in the following areas: 1. Lower ground floor approximately 65m. 2. Level 1 approximately 82m. 3. Level 2, 3, 4 and 5 approximately 87m worst case. 4. Level 5 approximately 88m worst case. 5. Level 6 approximately 86m worst case. 6. Roof top plant room approximately 64m worst case.	DP4 and EP2.2	
6.	Travel via fire-isolated exits	D1.7	The new northern fire stair discharges at a point which requires occupants to pass within 6m of the external wall of the building. The glazed facade within 6m of the path of travel from the discharge point of the fire stair is required to be drenched internally.	DP5	
7.	Travel by non-fire-isolated stairways or ramps	D1.9	The distance from the roof top plant room via southern stair is greater than 80m and does not discharge to a point which is direct egress to a road or open space or a fire isolated passage leading to a road or open space.	DP4, DP5 and EP2.2	
8.	Swinging doors	D2.20	The exits doors leading into C25 Lowy Cancer Research Building swing against the direction of egress. If the door is not able to be modified to swing in both directions or have additional doors provided, then alternative solution is required to address the non-compliance.	DP2	

Item	Non-Compliance	DTS Clause	Description	Performance Requirement	Comments
9.	Fire Hydrants	E1.3	Hydrants installed in compliant locations will not achieve full coverage throughout the building, **Pumproom** The pumproom does not open to a road or open space or into a fire isolated passage or stair which leads to the road or open space. **Hydrant Booster** Where a fire hydrant booster is remote from the building it must be installed at the boundary of the site or within sight of the main entrance of the building; located adjacent to the principal vehicular access to the site and must be located not less than 10m away from the external walls of the building..	EP1.3	
10.	Sprinklers	E1.5	A sprinkler valve enclosure must be located in a secure room or enclosure that has direct egress to road or open space. The proposed sprinkler pumproom does not have direct egress to road or open space. It is proposed to investigate the possible deletion of the sprinklers to the level 2 overhang on the south east corner of the building.	EP1.4	
11.	Smoke hazard management	E2.2	Refer to Section G3	-	
12.	Dimensions of atrium well	G3.2	The atrium wells are approximately 5.6m wide. The DTS provisions require the well to be capable of containing a cylinder with a horizontal diameter of 6m.	CP2 and EP2.2	
13.	Separation of atrium by bounding walls	G3.3	The southern atrium well is approximately 5.2m wide. The northern atrium well is a trapezium shape with the narrower end being approximately 5.3m wide. The DTS provisions require the well to be capable of containing a cylinder with a horizontal diameter of 6m. The sum of the floor area of the storeys connected by the atrium is 17,000m^2. The maximum permitted is 5,000m^2.	CP2 and EP2.2	

Item	Non-Compliance	DTS Clause	Description	Performance Requirement	Comments
14.	Construction of bounding walls	G3.4	The bounding walls of the atrium are not proposed to be constructed in construction with an FRL of 60/60/60 or with toughened safety glass or wired safety glass with wall wetting sprinklers complying with Specification G3.8.	CP2 and EP2.2	
15.	Construction of balconies	G3.5	A balustrade or other barrier that is imperforate and non-combustible must be provided around the perimeter of the atrium well.	EP2.2	
16.	Fire and smoke control systems	Spec. E2.2, Cl. G3.8 and Spec G3.8	Fire isolated exits are to be provided with automatic stair pressurisation, or open access ramps and balconies as required for atrium under Part G3. It is proposed to investigate the possible deletion of automatic stair pressurisation. The building must be provided with an automatic smoke detection and alarm system complying with Specification E2.2a as required for atrium under Part G3. It is proposed to provide a reduced level of smoke detection within the existing western wing of the building. The building must be provided with an automatic smoke exhaust system complying with Specification E2.2 and Specification G3.8. The smoke exhaust is proposed to be designed on a performance basis.	EP2.2	

9. ISSUES TO BE RESOLVED PRIOR TO CONSTRUCTION

The following identifies certain items which are not detailed or specified on the design documentation which may become issues if not designed in accordance with the requirements of the BCA. The items below are those items which we have experienced to be regular issues only. Not all unspecified items have been noted below:

Item	Clause	Description	Requirement to Satisfy BCA
1.	C2.7	Separation by fire walls	Fire walls are required to meet Fire Resistance Level (FRL) criteria for structural support, integrity and insulation. There are a number of ways in which a seemingly compliant system can fail through defective detailed design. • Structural steelwork crossing the fire wall – the steel will conduct heat across the wall so as to render an otherwise complying wall system non-compliant. • Tilt up panels - tilt up panels will often have published FRL's of 120, 180, or even 240 minutes. However, when these panels are supported by portal frames or other non-protected structural steelwork they will collapse in fire and offer no actual FRL at all. In certain instances where support is duplicated from both sides of the wall this can be acceptable. Also, Type C buildings are permitted this concession for external walls. In all other cases, tilt up panels required to be fire-resisting will need to be tied in to concrete slabs or other fire rated structural members in order to provide support. • Lightweight fire-rated internal walls beneath roofs – these wall systems do achieve non-structural FRL's. However, they need to be designed to support a failing roof structure in the event of fire so as to continue to prevent fire spread and structural collapse for the duration of their required FRL. In addition, structural steel members crossing these walls will affect the insulation rating. The solution envisaged by the BCA is that load bearing brickwork is used in this application. For residential buildings a fire-rated ceiling is recommended to the uppermost level in order to avoid the problems created by a design concept involving extending lightweight walls to the underside of the roof. A false ceiling can be installed below for the purposes of easy installation of light fittings, ventilation openings etc
2.	C3.4	Acceptable method of protection (wall-wetting sprinklers)	Wall-wetting sprinklers are allowed under BCA Clause C3.4 to protect window openings in walls required to have an FRL. However, these are often mistakenly used in conjunction with openable windows which is strictly prohibited under the clause. Only fixed pane windows are permitted due to the fact that the drencher spray needs to land on the glass for the barrier to be effective
3.	C3.15	Openings for services penetrations (mixed metal and PVC plumbing systems)	Metal pipes are allowed to penetrate fire-resisting construction on the basis that a wholly metal pipe system is reasonably resistant to fire and smoke. However, when metal pipework penetrates a floor and PVC is used within the same pipe system it does not comply. When PVC is used it should penetrate the slab and should be protected by a fire collar.
4.	D2.15	Thresholds	External doorway thresholds are generally required to be less than 190 mm and even less for health or aged care facilities. Often the door threshold signals the limit of design responsibility (or attention to design) so that the threshold height is omitted from the design.

Item	Clause	Description	Requirement to Satisfy BCA
5.	D2.16	Balustrades or other barriers (No climbable members for floors 4m above floor beneath)	Balustrades located more than 4 m above the ground below must not be climbable by children. Incorrect balustrade design can result in significant rectification works given that there are often large quantities of balustrading all constructed to the same detail (particularly in residential projects.) The interpretation of "must not facilitate climbing" as required under BCA clause D2.16(g) is the issue that can lead to significant problems as it is not adequately specified under the BCA. The non-climbable zone is between 150 mm and 760 mm from the floor. We therefore recommend that the Pool Fence Code AS1926 be consulted for clarification. The key is that any ledge of greater than 10 mm in width can be held to facilitate climbing if the angle to horizontal is less that 60°. Also, acceptable construction tolerances for building elements means that a complying design detail can easily be constructed so as not to comply. The 10 mm limit is not able to be extended to allow for tolerances. The following items can lead inadvertently to a defective detail: • Split balustrade elements (ie brick hob to 500 mm and then 500 mm clear glazing panel above) will almost certainly create a climbable ledge once built • End fixing points can create footholds where balustrade infill elements are fixed to posts • Not allowing enough height for tiles to be built up to create falls so that the dimensions from the finished floor do not comply • Taps and other fittings fixed to the balustrade Other climbable points located close to but not actually on the balustrade
6.	D2.17	Handrails	Handrails are often omitted from the design of ramps and stairs. Even as little as two steps is counted as a stairway and as such requires a handrail.
7.	D2.21	Operation of latch (door hardware)	BCA Clause D2.21 requires certain types of latches to all doors in the path of egress. This effectively means that every single door in commercial and industrial buildings needs to comply. The problem is that knob type handles do not and cannot comply. Deadlocks do not comply.
8.	D3.2	General building access requirements (Door widths)	The Access standard AS1428.1 has recently been amended to require a minimum of 800 mm wide door way openings. The problem is that a standard 820 mm door leaf is usually trimmed down and fitted to jambs with 10 mm reveals. That is, openings for standard 820 mm doors can never comply.
9.	D3.2	General building access requirements (Raised computer floors)	Often computer floors will be installed only in the computer room to a height of up to 300 mm above the rest of the floor. This creates the following conflicts: • Disabled access – a 1:14 ramp should be provided • Thresholds – attention should be paid to clause D2.15 of the BCA as steps and ramps are not permitted in or leading to doorways without a landing. Stair tread dimensions- do not design a floor height that means the tread dimensions cannot be met (115 mm-190 mm is permissible. A height of between 190-230 mm cannot be designed for)

Item	Clause	Description	Requirement to Satisfy BCA
10.	D3.3	Parts of buildings to be accessible (handrails)	Low rise retail, industrial and commercial premises do not have lifts but are required to have "accessible" stairs. This means that there are special requirements for handrails to the internal stairs including • Handrails to both sides of the stair • Handrails must extend 300 mm beyond the stair • See clause 9 of AS1428.1 for further details.
11.	D3.8	Tactile indicators	BCA clause D3.8 requires tactile ground indicators to be installed in certain locations. The "tactiles" must be 600 mm in depth and extend for the width of the stair, ramp, kerb ramp or other feature. Tactiles are often seen as a last minute item. However, they are often required to be set into concrete or terrazzo which can lead to costly and time-consuming retrofit activity.
12.	E1.3	Hydrants (Walls adjacent to external hydrants)	External Hydrants are required to be located 10 m from a building. Where this is not proposed, the external wall of the building is required to achieve a 90/90/90 fire rating for 2 m side from the centre of the hydrant outlet and 3 m above the hydrant (or to the roof line if this is lower.) Note that tilt-up concrete panels supported by steel portal frames will not achieve the fire rating unless the supporting structure is also fire-rated.
13.	E1.3	Hydrant booster	Fire brigade booster assemblies shall be located so that they are readily accessible to firefighters and are operable by fire brigade pumping appliances located within 8 m. If within, or affixed to, the external wall of the building, the booster shall be— (i) within sight of the main entrance to the building; and (ii) separated from the building by a construction with a fire resistance rating of not less than FRL 90/90/90 for a distance of not less than 2 m each side of and 3 m above the upper hose connections in the booster assembly If remote from the building, the booster shall be— (i) at the boundary of the site and be within sight of the main entrance of the building; (ii) adjacent to the principal vehicular access to the site; and (iii) located not less than 10 m from the external wall of any building served
14.	F2.4	Facilities for people with disabilities	Toilets for people with disabilities are required to comply with AS1428.1 in all respects. The standard regulates the locations, dimensions and details associated with taps, pans, grab rails, roll holders, basins, soap dishes and floor wastes. In fact, almost every element is regulated with respect to heights, offsets from walls, height beneath etc.

10. STATUTORY FIRE SAFETY MEASURES

The Statutory Fire Safety Measures listed in Appendix G of this report are required to be certified upon completion of the project and prior to occupation of the building by the owner of the building, by issuing a Final Fire Safety Certificate under the Act.

The owner is also required under the Act to certify each of the Fire Safety Measures annually by issuing a Fire Safety Statement.

11. CONCLUSIONS

The design complies with the requirements of the relevant sections of the BCA subject to resolution of the identified areas of non-compliance and compliance with the recommendations provided within the report.

12. APPENDIX A – DETAILED ASSESSMENT DATA

12.1. FLOOR AREAS AND VOLUMES

Floor	*Approx Area (m^2)*	*Approx Volume (m^3)*	*Comment*
Lower ground	3,000	12,700	
Ground	3,000	11,700	
Level 1	2,650	10,600	
Level 2	2,900	11,600	
Level 3	2,900	11,500	
Level 4	2,900	11,500	
Level 5	2,900	12,400	
Level 6	2,750	10,000	
Roof plant room	1,200	4,500	

12.2. NOMINATED FIRE COMPARTMENTS

Compartment	*Approx Area (m^2)*	*Approx Volume (m^3)*	*Comment*
Lower ground	3,000	12,700	
Ground to Level 6	20,000	79,300	
Roof plant room	1,200	4,500	

12.3. POPULATION

Relevant populations for the building are set out below.

Location	*Total Population*	*Student population*	*Comments*
Lower ground	5	0	Populations provided by the University of NSW
Ground	579	576	
Level 1	679	679	
Level 2	169	50	
Level 3	122	0	
Level 4	130	0	
Level 5	152	0	
Level 6	147	0	
TOTAL	**1,983**	**1,305**	

12.4. EXITS

The exits from the building are set out below:

Exit No	*Area*	*Type*	*Grid Ref*	*No of storeys connected*	*Comments*
1.	Lower ground	Fire stair	-	8	
2.	Lower ground	Fire stair	-	8	
3.	Lower ground	Fire door		-	Door leads into Biological Science Building
4.	Lower ground	Fire door	-	-	Door leads into C25 Lowy Cancer Research Building
5.	Ground	Fire stair	-	8	
6.	Ground	Fire stair	-	8	
7.	Ground	External door	-	-	(Sliding door leading to west)
8.	Ground	External door	-	-	(Sliding door leading to east)
9.	Ground	External door	-	-	
10.	Level 1	Fire stair	-	8	
11.	Level 1	Fire stair	-	8	
12.	Level 1	Open stair	-	2	
13.	Level 1	Fire door	-	-	Door leads into Biological Science Building
14.	Level 2, 3, 4, 5 and 6	Fire stair	-	8	
15.	Level 2, 3, 4, 5, 6 and roof top plant room	Fire stair	-	9	
16.	Level 2, 3 and 4	Fire Door	-	-	Door leads into C25 Building
17.	Level 2, 3, 4 and 5	Double door / bridge link	-	-	Door leads into bridge link (Biological Science Building)
18.	Level 2, 3, 4, 5 and 6	Single door / bridge link	-	-	Door leads into bridge link (Biological Science Building)
19.	Roof top plant room	Open stair		2	The stair is separated to the extent to provide fire separation between level 6 and the roof top plant room.

13. APPENDIX B – CLAUSE BY CLAUSE ASSESSMENT

13.1. SECTION B - STRUCTURE

Clause	Description	Status	Comments
B1.1	Resistance to actions	Not Specified	The resistance of a building or structure must be greater than the most critical action effect resulting from different combinations of actions.
B1.2	Determination of individual actions	Not Specified	The magnitude of individual actions must be determined in accordance with Clause B1.2 of the BCA.
B1.3	Loads	Not Specified	The building or structure must resist loads determined in accordance with AS 1170 Parts 1 to 4 as listed in Clause B1.3.
B1.4	Determination of structural resistance of materials and forms of construction	Not Specified	The structural resistance of materials and forms of construction must be determined in accordance with the relevant Australian Standards in accordance with Clause B1.4 of the BCA.

13.2. SECTION C - FIRE RESISTANCE

Clause	Description	Status	Comments
C1.1	Type of construction required	Not Specified / Does Not Comply	The building is to be erected in Type A fire resisting construction in accordance with Specification C1.1 of the BCA. Generally the building is required to be constructed in 4 hour fire rated construction. Refer to Appendix B for the relevant fire resisting requirements. The roof is not required to have an FRL if its covering is non-combustible and is sprinkler protected throughout. An assessment of the existing building by a structural engineer may need to be undertaken to determine the FRL's of the existing building elements. Class 7b and 8 buildings generally require 4 hour fire rated construction. It is proposed to investigate a possible alternative solution to reduce the FRL's of the building.
C1.2	Calculation of rise in storeys	Noted	Refer to Section 7.3.2 of this report.
C1.3	Buildings of multiple classification	Noted	
C1.4	Mixed types of construction	Not Applicable	
C1.5	Two storey Class 2, 3 or 9c buildings	Not Applicable	
C1.6	Class 4 parts of buildings	Not Applicable	
C1.7	Open spectator stands and indoor sports stadiums	Not Applicable	

Clause	Description	Status	Comments
C1.8	Lightweight construction	Not Specified	Lightweight construction used in a wall system must comply with Specification C1.8. Lightweight construction used as a fire-resisting covering of a steel column or the like, and where the covering is not in continuous contact with the column must have the voids filled to a height of not less than 1.2m above the floor and where the column is liable to be damaged must be protected by steel or other suitable material.
C1.9	-	-	No provisions.
C1.10	Fire hazard properties	Not Specified	The fire hazard properties of all floor materials, floor coverings, wall and ceiling lining materials must comply with Specification C1.10a. The fire hazard properties of all other materials must comply with Specification C1.10.
C1.11	Performance of external walls in fire	Not Applicable	
C1.12	Non-combustible materials	Noted	Gypsum, metal and laminated non-combustible materials containing combustible components are deemed to be non-combustible.
C2.1	Application of Part	Applicable	Clauses C2.2, C2.3 and C2.4 do not apply to a sprinkler protected carpark, open deck carpark or open spectator stand.
C2.2	General floor area limitations	Does Not Comply	The atrium connects ground floor to level 6, creating a fire compartment with a floor area of approximately 20,000m^2. The maximum fire compartment size permitted for a Class 8 building is 5,000m^2. The west side of the building is proposed to be separated from the atrium and east side of the building on a performance basis via an alternative solution. The west side will be approximately 9,000m^2 and east side 11,000m^2.
C2.3	Large isolated buildings (**NSW** Excludes the need for the additional services in buildings less than18,000m^2)	Not Applicable	
C2.4	Requirements for open spaces and vehicular access	Not Applicable	
C2.5	Class 9a and 9c buildings	Not Applicable	
C2.6	Vertical separation of openings in external walls	Not Applicable	The building is sprinkler protected
C2.7	Separation by fire walls	Not Specified	Separation of a Building: A fire wall must extend through all storeys of the building, be carried through to the underside of the roof covering. Separation of fire compartments: A fire wall must extend to the underside of a floor having an FRL required for a fire wall or the roof covering.

Clause	Description	Status	Comments
C2.8	Separation of classifications in the same storey	Not Specified	As the building has parts of different classifications located alongside one another in the same storey each building element must have the higher FRL prescribed in Specification C1.1 of the BCA or the parts must be separated by a fire wall.
C2.9	Separation of classifications in different storeys	Not Specified	As different classifications are situated one above the other in adjoining storeys they must be separated in accordance with the DTS provisions of the BCA.
C2.10	Separation of lift shafts	Not Specified	Any lift connecting more than 2 storeys or more than 3 storeys in a sprinkled building must be separated from the remainder of the building as specified in Clause C2.10. An emergency lift must be contained in a shaft having an FRL of not less than 120/120/120 Openings for lift landing doors and services must be protected in accordance with the DTS provisions of Part C3 of the BCA
C2.11	Stairways and lifts in one shaft	Complies	
C2.12	Separation of equipment	Not Specified	Equipment that comprises lift motors, lift control panels, central smoke control plant, boilers or batteries must be separated from the remainder of the building by construction with an FRL as required under Specification C1.1 but not less than 120/120/120.
C2.13	Electricity supply system	Not Specified	Electrical substations and main switchboards sustaining emergency equipment operating in the emergency mode must be separated from the remainder of the building by construction with an FRL not less than 120/120/120. All switchboards and electrical conductors are to comply with the requirements of Clause C2.13.
C2.14	Public corridors in Class 2 and 3 buildings	Not Applicable	
C3.1	Application of Part	Applicable	Concessions and definition of certain openings.
C3.2	Protection of openings in external walls (NSW (a) Deleted)	Does Not Comply	Openings within 6m of an adjacent building are required to be protected by sprinklers, fire doors or fire windows in accordance with Clause C3.4 of the BCA. The existing bridge connecting Wallace Wurth to the Biological Science building is currently separated from both buildings. The window openings to the bridge are not protected. The bridge is sprinkler protected with the water supply provided from the Wallace Wurth Building. The openings in the external walls of the Wallace Wurth building that are exposed and within 6m of the external walls of the Biological Science building or the Lowy Cancer Research building are required to be protected. The openings in the external walls of the Biological Science building that are exposed and within 6m of the external walls of the Wallace Wurth building are required to be protected.

Clause	Description	Status	Comments
C3.3	Separation of external walls and associated openings in different fire compartments	Not Applicable	External walls within the distances specified in Table C3.3 of the BCA are to be protected by construction with an FRL not less than 60/60/60 and the associated openings protected in accordance with Clause C3.4 of the BCA.
C3.4	Acceptable method of protection	Applicable / Does Not Comply	Window openings that are required to be protected are to be protected by wall wetting sprinklers with windows that are automatic closing or permanently fixed in the closed position, -/60/- fire windows or -/60/60 automatic fire shutters. Doorways are to be protected by wall wetting sprinklers used with doors that are self closing or automatic closing, or -/60/30 self closing or automatic closing fire doors. The method of protection to the openings required to be protected under Clause C3.2 have not been specified.
C3.5	Doorways in fire walls	Not Specified	Doorways in firewalls are to be protected by a fire door or fire shutter that has an FRL of not less than that required for the firewall except that the insulation rating must be at least 30.
C3.6	Sliding fire doors	Not Applicable	
C3.7	Protection of doorways in horizontal exits	Not Applicable	
C3.8	Openings in fire isolated exits	Not Specified	-/60/30 self-closing fire doors are required to doorways providing access to fire isolated stairways. The window in the external wall of the fire isolated exit must be protected in accordance with C3.4 as it is within 6m and exposed to a window or other opening in a wall of the same building other than in the same fire isolated enclosure.
C3.9	Service penetrations in fire isolated exits	Not Specified	Service penetrations other than electrical wiring for essential service installations, pressurisation ducts with an FRL of -/120/60, or water pipes for fire services are not permissible.
C3.10	Openings in fire isolated lift shafts	Not Specified	Openings in lift shafts are to be protected by -/60/- fire doors complying with AS1735.11. Lift indicator panels are to be backed by construction having an FRL of not less than -/60/60 if it exceeds 35,000mm2 (175 X 200 mm).
C3.11	Bounding construction: Class 2, 3, 4 and 9 buildings (NSW Requirements for Class 3 changed and additional requirements for Class 9)	Not Applicable	
C3.12	Openings in floors for services	Not Specified	Services passing through floors are to be placed within fire resisting shafts or in accordance with Clause C3.15. Loadbearing shafts are required to have an FRL of not less than that required for a shaft complying with Type A construction.

Clause	Description	Status	Comments
C3.13	Openings in shafts	Not Specified	In a building of Type A construction, an opening in a wall providing access to a ventilating, pipe, garbage, or other service shaft must be protected by: • If it is a sanitary compartment - a door or panel which together with its frame, is non combustible or has an FRL of not less than -/30/30, or • A self closing -/60/30 fire door or hopper, or • An access panel with an FRL of not less than -/60/30, or • If the shaft is a garbage shaft - a door or hopper of non-combustible construction.
C3.14	-	-	No provisions
C3.15	Openings for service installation	Not Specified	Methods and materials used are to be identical to tested prototypes and in accordance with AS4072.1 and AS1530.4, and having achieved the required FRL or resistance to the incipient spread of fire or other specified method.
C3.16	Construction Joints	Not Specified	Construction joints are to be installed in accordance with a tested prototype in accordance with AS1530.4.
C3.17	Columns protected with lightweight construction	Not Specified	Columns must be protected in accordance with the identical tested prototype.

13.3. SECTION D – ACCESS AND EGRESS

Clause	Description	Status	Comments
D1.1	Application of Part	Applicable	Does not apply to the internal parts of a sole occupancy unit in a Class 2, 3 or 4 building.
D1.2	Number of exits required	Complies	
D1.3	When fire isolated exits are required	Complies	

Clause	Description	Status	Comments
D1.4	Exit travel distances	Does Not Comply	Egress is provided through to the Biological Science building via the bridge link and on the lower ground floor. The exits are similar to a horizontal exit. However, the exits do not fall under the definition of "horizontal exit" as defined under the BCA. The BCA does not permit egress from another sole occupancy unit. Egress is provided through to the C25 Lowy Cancer Research Building on levels 2 to 5 inclusive. The exits are similar to a horizontal exit. However, the exits do not fall under the definition of "horizontal exit" as defined under the BCA. The BCA does not permit egress through another sole occupancy unit. Insufficient doors are provided on the lower ground floor to ensure egress from the animal facility, morgue, BRC wash and mechanical plant room. The travel distances do not comply in the following areas: 1. Egress from the morgue and BRC wash may potentially have dead end travel distances exceeding 20m. 2. Lower ground floor approximately 50m worst case 3. Ground floor wet teaching prep lab dead end travel distance of approximately 27m 4. Ground floor approximately 50m total travel distance worst case. 5. Levels 1, 2, 3 and 4 approximately 50m worst case 6. Level 5 approximately 55m worst case 7. Level 6, approximately 52m worst case 8. Roof top plant room approximately 50m worst case
D1.5	Distance between alternative exits	Does Not Comply	The distance between alternative exits exceeds the maximum permitted of 60m in the following areas: 1. Lower ground floor approximately 65m. 2. Level 1 approximately 82m. 3. Level 2, 3, 4 and 5 approximately 87m worst case. 4. Level 5 approximately 88m worst case. 5. Level 6 approximately 86m worst case. 6. Roof top plant room approximately 64m worst case.
D1.6	Dimensions of exits	Complies / Not Specified	In a required exit or path of travel, the unobstructed height throughout must be not less than 2m, except the unobstructed height of any doorway must be reduced to not less than 1980mm. The unobstructed width of each exit or path of travel to an exit except a doorway must not be less than 1m.
D1.7	Travel via fire-isolated exits	Does not Comply	The new northern fire stair discharges at a point which requires occupants to pass within 6m of the external wall of the building. The glazed facade within 6m of the path of travel from the discharge point of the fire stair is required to be drenched internally.

Clause	Description	Status	Comments
D1.8	External stairways in lieu of fire-isolated exits	Not Applicable	
D1.9	Travel by non-fire-isolated stairways or ramps	Does Not Comply	The distance from the roof top plant room via southern stair is greater than 80m and does not discharge to a point which is direct egress to a road or open space or a fire isolated passage leading to a road or open space.
D1.10	Discharge from exits	Not Specified	Suitable barriers such as bollards are to be provided to prevent the blockage of exits by vehicles, etc.
D1.11	Horizontal exits	Not Applicable	
D1.12	Non-required stairs, ramps or escalators	Not Applicable	
D1.13	Number of persons accommodated	Noted	Refer to section 7.3.2 of this report
D1.14	Measurement of distance	Noted	
D1.15	Method of measurement	Noted	
D1.16	Plant rooms and lift machine rooms: Concession	Applicable	
D1.17	Access to lift pits	Not Specified	Access to lift pits where the pit depth is not more than 3m must be through the lowest landing doors. Lift pits with a depth of more than 3m must have an access doorway that is level with the pit floor and not be less than 600mm wide by 1980mm high. Access to the doorway must be by a stairway complying with AS 1657. Doors must be horizontal sliding or outward opening and be self-closing and self-locking from the outside and be provided with signage on the landing side in letters not less than 35mm high stating: "**DANGER LIFTWELL- ENTRY OF UNAUTHORISED PERSON PROHIBITED – KEEP CLEAR AT ALL TIMES**"
D2.1	Application of Part	Applicable	
D2.2	Fire isolated stairs or ramps	Not Specified	Stairs or ramps within fire resisting shafts are to be constructed of non-combustible materials. The construction of the stairs is not to cause structural damage or impair the fire resistance of the shaft if there is local failure.
D2.3	Non-fire-isolated stairways and ramps	Not Specified	Required stairs that are not required to be within a fire-resting shaft are to be constructed of concrete, steel, or timber of specified minimum dimensions.
D2.4	Separation of rising and descending stair flights	Complies	Rising and descending fire isolated stairways must not be directly connected.
D2.5	Open access ramps and balconies	Not Applicable	
D2.6	Smoke lobbies	Not Applicable	

Clause	Description	Status	Comments
D2.7	Installations in exits and paths of travel	Not Specified	Electrical boards and the like are to be located within and enclosed by non-combustible construction or have a fire-protective covering with the doorway suitably sealed against smoke spreading from the enclosure. Generally the services or equipment may be enclosed in non-combustible construction such as MDF with a solid core door. Electrical wiring may only be installed in a fire-isolated exit if the wiring is associated with: • a lighting, detection, or pressurisation system serving the exit, or • a security, surveillance or management system serving the exit, or • intercommunication system or audible or visual alarm system in accordance with Clause D2.2 or • the monitoring or hydrant or sprinkler isolation valves.
D2.8	Enclosure of space under stairs and ramps	Not Specified	If the space below a fire-isolated stairway is within the fire isolated shaft it must not be enclosed to form a cupboard or similar enclosed space. The space below non fire-isolated stairs must not be enclosed to form a cupboard or similar enclosed space unless the enclosing walls have an FRL of not less than 60/60/60 and any doorway to the enclosed space is fitted with a self closing -/60/30 fire door.
D2.9	Width of stairways	Noted	Stairway width is to be measured clear of obstructions such as handrails, projecting parts of balustrades or other barriers and the like and extend to a height of not less than 2m. A stairway more than 2m in width is only counted as having a width of 2m unless it is divided by a continuous handrail or balustrade between landings and each division is less than 2m wide.
D2.10	Pedestrian ramps	Not Specified	Ramps serving as required exit must have a gradient not less steeper than 1:8. If the ramp is required for disabled access under Part D3 it must comply with AS1428.1. The surface of the ramp must have a non-slip finish.
D2.11	Fire-isolated passageways	Not Specified	Fire isolated passageways are to have an FRL equivalent to the fire resisting stair shaft as specified in Specification C1.1.
D2.12	Roof as open space	Not Applicable	
D2.13	Goings and risers	Not Specified	Stairs are to have risers measuring between 115-190mm and goings between 250-355mm. Goings and Risers are to satisfy the equation of 2R+G=700(max) and 550(min). Goings and risers are to be consistent throughout in one flight. Any gap between risers must not permit a 125mm sphere to pass through it. All treads to be fitted with non-slip finish or non-skid strips.

Clause	Description	Status	Comments
D2.14	Landings	Not Specified	Landings must comply with the requirements of Clause D2.14 of the BCA. Landings must be not less than 750mm long and have a non-slip finish throughout or an adequate non-skid strip near the edge of the landing where it leads to a flight below.
D2.15	Thresholds	Not Specified	A threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless the door opens to a road or open space, external stair landing or external balcony. and the doorsill is not more than 190mm above the finished surface of the ground balcony or the like to which the door opens.
D2.16	Balustrades	Not Specified	Balustrades complying with Deemed-to-Satisfy provisions of the BCA are to be provided to where the level of the surface below is 1m or more. Where the level of the surface below is 4m or more, a balustrade or other barrier must not facilitate climbing of horizontal elements between 150mm and 760mm above the floor. Any opening in the balustrade must not permit a 125mm sphere to pass through the balusters. Wire balustrades must be constructed to comply with Clause D2.16(h) and Tables D2.16a and D2.16b.
D2.17	Handrails	Not Specified	Handrails are to be provided to at least one side of stair flights and located not less than 865mm above the nosings of stair treads and the floor surfaces of landings. Handrails must be not more than 2m apart in the case of intermediate handrails. Note that under the requirements of Clause D3.3a handrail may be required to both sides of the stairway.
D2.18	Fixed platforms walkways, stairways, and ladders	Not Specified	Fixed platforms, walkways, stairways, ladders, landings, handrails, balustrades and any tread or riser in a plant room, lift motor room or the like is to comply with AS1657.
D2.19	Doorways and doors	Not Specified	As the main entry door leads to an open space it must automatically open if there is a power failure to the door or on the activation of a fire or smoke alarm anywhere in the fire compartment served by the door. The power-operated sliding doors must be able to be opened manually under a force of not more than 110N if there is a malfunction or failure of the power source.
D2.20	Swinging doors	Does Not Comply	The exits doors leading into C25 Lowy Cancer Research Building swing against the direction of egress. The door at the bottom of the southern stair serving the roof top plant room swings against the direction of egress.
D2.21	Operation of latch	Not Specified	The latch of a door in a required exit, forming part of a required exit or in the path of travel is to be readily openable without a key from the side of that faces a person seeking egress. It is to have a single downward action and to be located between 900mm and 1.1m from the floor unless it serves a sanitary compartment. This means lever handles are generally required.

Clause	Description	Status	Comments
D2.22	Re-entry fire-isolated exits	Not Applicable	
D2.23	Signs on doors	Not Specified	Signage on both sides is to be provided to fire and smoke doors alerting persons that the doors must not be impaired. Under Clause 183 of the Environmental Planning and Assessment Regulation 2000 a notice is to be displayed in a conspicuous location adjacent to a doorway providing access to but not within a fire isolated stairway, passageway or ramp. The words "OFFENCES RELATING TO FIRE EXITS" are to be provided in letters at least 8mm high and the remaining words are to be at least 2.5mm high. The notice is to state the following: **OFFENCES RELATING TO FIRE EXITS** It is an offence under the Environmental Planning and Assessment Act 1979: a) to place anything in or near this fire exit that may obstruct persons moving to and from the exit, or b) interfere with or obstruct the operation of any fire doors, or c) to remove, damage or otherwise interfere with this notice.
NSW D2.101	Doors in path of travel in a P.O.P.E.	Not Applicable	
D3.1	Application of Part	Applicable	
D3.2	Access to buildings	Not Specified	Access complying with AS1428.1 is to be provided to the following areas: 1. From the allotment boundary at the major points of entry. 2. To and within all areas normally used by the public or staff. 3. From any accessible carparking space on the allotment. 4. Through the principle public entrance
D3.3	Parts of buildings to be accessible	Not Specified	Access complying with AS1428.1 is to be provided to the following areas: 1. Any sanitary compartment required for the use of people with disabilities. 2. To areas used by occupants, excluding plantrooms, commercial kitchens, cleaners store rooms, maintenance accessways or the like. 3. The passenger lift.
D3.4	Concessions	Noted	
D3.5	Carparking	Not Applicable	

Clause	Description	Status	Comments
D3.6	Identification of access facilities, services and features	Not Specified	Braille and tactile signage complying with Specification D3.6 and incorporating the international symbol of access or deafness is to be provided to the sanitary facilities and the passenger lift within the building in accordance with AS1428.1.
D3.7	Hearing augmentation	Not Specified	Hearing augmentation installed in accordance with AS1428.1 is required in any conference room and/or meeting room with a floor area of more than 100m^2 containing an inbuilt amplification system.
D3.8	Tactile indicators	Not Specified	Tactile indicators are to be provided to all stairways, ramps and escalators used by the public. Tactile indicators are to Type B indicators complying with AS1428.4

13.4. SECTION E – SERVICES AND EQUIPMENT

Clause	Description	Status	Comments
E1.1	-	-	No provisions
E1.2	-	-	No provisions
E1.3	Fire Hydrants	Not Specified / Does Not Comply	The existing hydrants system has hydrant outlets located outside the fire stairs. The hydraulic engineer is to assess the performance of the existing system to determine what non-compliances exist with AS 2419.1. Fire hydrants must conform to the pressure and flow requirements and distance limitations specified in AS 2419.1. Hydrants installed in compliant locations will not achieve full coverage throughout the building, **Pumproom** The pumproom does not open to a road or open space or into a fire isolated passage or stair which leads to the road or open space. **Hydrant Booster** Where a fire hydrant booster is remote from the building it must be installed at the boundary of the site or within sight of the main entrance of the building; located adjacent to the principal vehicular access to the site and must be located not less than 10m away from the external walls of the building.
E1.4	Hose reels	Not Specified	Fire hose reels are to be installed internally within 4m of an exit or internally adjacent to a fire hydrant so that the fire hose reel will not need to pass through fire and smoke doors. Additional hose reels are permitted to be installed further then 4m from exit to achieve coverage. Fire hose reels are to be installed accordance with AS2441.
E1.5	Sprinklers	Not Specified / Does Not Comply	The building is to be provided with a sprinkler system throughout in accordance with Specification E1.5. A sprinkler valve enclosure must be located in a secure room or enclosure that has direct egress to road or open space. The proposed sprinkler pumproom does not have direct egress to road or open space. It is proposed to investigate the possible deletion of the sprinklers to the level 2 overhang on the south east corner of the building. The hydraulic engineer is to assess the performance of the existing system to determine what non-compliances exist with AS 2118.1.
E1.6	Portable fire extinguishers	Not Specified	Portable fire extinguishers are required to be provided in accordance with Table E1.6 of the BCA and AS 2444. Portable extinguishers to cover Class A risk fires are only required in fire compartments less than 500m^2 not provided with hose reels.

Clause	Description	Status	Comments
E1.7	-	-	No provisions.
E1.8	Fire control centres	Not Specified	A fire control centre is to be provided and comply with the requirements of Specification E1.8 of the BCA. The fire control centre must have egress to road or open space which does not involve a change in level of more than 300mm. Internal combustion engine, pumps, sprinkler control valves, pipes and pipe fittings must not be located in a fire control centre.
E1.9	Fire precautions during construction	Not Specified	During construction, not less than one fire extinguisher to suit Class A, B and C fires is required for each storey, and is required to be located adjacent to each exit. After the building has reached an effective height of 12m, hydrants and hose reels must be operational in at least every storey, except the 2 uppermost storeys, covered by the roof or the floor structure above and any required booster connections must be installed.
E1.10	Provisions for special hazards	Not Applicable	
E2.1	Application of Part	Not Applicable	Part is not applicable to • open deck car parks • open spectator stands • storerooms, etc less than 30m^2 • sanitary compartments • plantrooms or the like
E2.2	General requirements	Not Specified / Does Not Comply	An air-handling system that does not form part of the smoke hazard management system and recycles air from one fire compartment to another must be designed and installed to operate as a smoke control system in accordance with AS/NZS 1668.1 or incorporate smoke dampers and automatically shutdown upon activation of smoke detectors in accordance with Clause 4.10 of AS/NZS 1668.1. Fire isolated exits are to be provided with automatic stair pressurisation, or open access ramps and balconies as required for atrium under Part G3. It is proposed to investigate the possible deletion of automatic stair pressurisation. The building must be provided with an automatic smoke detection and alarm system complying with Specification E2.2a as required for atrium under Part G3. It is proposed to provide a reduced level of smoke detection within the existing western wing of the building. The building must be provided with a sprinkler system complying with Specification E1.5 as required for atrium under Part G3. The building must be provided with an automatic smoke exhaust system complying with Specification E2.2 and Specification G3.8. The smoke exhaust is proposed to be designed on a performance basis.

Clause	Description	Status	Comments
E2.3	Provisions for special hazards	Not Applicable	
E3.1	-	-	No provisions.
E3.2	Stretcher facility in lifts	Not Specified	The stretcher lift is to have the minimum dimension of 600mm wide x 2000mm long and 1400mm high above floor level.
E3.3	Warning against use of lifts in fire	Not Specified	A warning sign is to be displayed where it can be readily seen near every call button of the passenger lift. The warning sign is to comply with the details and dimensions set out in Figure E3.3 of the BCA.
E3.4	Emergency lifts	Not Applicable	
E3.5	Landings	Not Specified	Access and egress to and from the liftwell landings is to comply with the Deemed-to-Satisfy provisions of Section D of the BCA.
E3.6	Facilities for people with disabilities	Not Specified	The passenger lift is required to comply with the requirements of AS 1735.12 and be fitted with a door sensory device that will detect a 75mm diameter rod across the door opening between 50mm and 1550mm above floor level.
E3.7	Fire Services Control	Not Specified	Passenger lift cars are to be provided with fire service controls in accordance with AS1735.2.
E3.8	Aged care buildings	Not Applicable	
E4.1	-	-	No provisions.

E4.2	Emergency light requirements	Not Specified	Emergency lighting is to be provided throughout the building in accordance with Clause E4.2 of the BCA.
			Emergency lighting is to be provided in :
			• every fire-isolated stairway, fire-isolated ramp or fire-isolated passageway.
			• Every passageway, hallway, corridor or the like, that is part of the path of travel to an exit.
			• In every room having a floor area more than 100m^2 that does not open to a corridor or space that has emergency lighting or to a road or open space.
			• In any room having a floor area more than 300m^2.
			• In every required non-fire isolated stairway
			• To every room or space that has public access in a Class 6 or 9b building if:
			  • the floor area is more than 300m^2;
			  • or if any point on the floor is more than 20m from the nearest doorway opening directly to the road or open space; or
			  • if the egress involves a vertical rise within the building of more than 1.5m.

E4.3	Measurement of distance	Noted	

Clause	Description	Status	Comments
E4.4	Design and operation of emergency light	Not Specified	Emergency lighting shall be provided throughout the building in accordance with the requirements of Clause E4.4 of the BCA and AS 2293.1.
E4.5	Exit signs	Not Specified	Exit signs are to be provided in accordance with Clause E4.5 of the BCA. Exit signs must be clearly visible to person approaching the exit and must be installed on, above or adjacent to; 1. A door providing direct egress from a storey to a stairway, passageway or ramp serving as a required exit. 2. A door from an enclosed stairway, passageway or ramp at every level of discharge to a road or open space. 3. A horizontal exit. 4. A door serving as or forming part of a required exit in a storey required to be provided with emergency lighting.
E4.6	Direction signs	Not Specified	Where an exit is not readily apparent then exit signs with directional arrows must be installed in appropriate positions in corridors, hallways, lobbies and the like indicating the direction to a required exit in accordance with Clause E4.6 of the BCA.
E4.7	Class 2, 3 and 4 buildings: Exemptions	Not Applicable	
E4.8	Design and operation of exit signs	Not Specified	Exit signs are to operate in accordance with AS 2293.1 and be clearly visible at all times while the building is occupied.
E4.9	EWIS systems	Not Specified	An emergency warning and intercommunication system complying where applicable with AS 1670.4 and AS 4428.4 must be installed throughout the building.

13.5. SECTION F – HEALTH AND AMENITY

Clause	Description	Status	Comments
F1.1	Stormwater drainage	Not Specified	Stormwater drainage design shall be in accordance with AS/NZS 3500.3
F1.2	-	-	No provisions
F1.3	-	-	No provisions
F1.4	-	-	No provisions
F1.5	Roof coverings	Not Specified	Roof coverings are to comply with the relevant Australian Standards as per Clause F1.5.
F1.6	Sarking	Not Specified	Sarking type materials used for weatherproofing of roofs and walls must comply with AS/NZS 4200 Parts 1 and 2.
F1.7	Waterproofing of wet areas	Not Specified	Shower enclosure surfaces, floor surfaces in bathrooms, shower rooms, slop hoppers, sink compartments, laundry and sanitary compartments is required to be waterproofed in accordance with AS 3740.
F1.8	-	-	No provisions

Clause	Description	Status	Comments
F1.9	Damp-proofing	Not Specified	Moisture from the ground must be prevented from reaching the lowest floor timber and the walls above the lowest floor joists, the walls above the dam proof course and the underside of a suspended floor constructed of a material other than timber, and the supporting beams or girders. Damp proof course must consist of a material that complies with AS/NZS 2904 or an impervious termite shield in accordance with AS 3660.1.
F1.10	Damp-proofing of floors on the ground	Not Specified	A vapour barrier in accordance with AS2870 is to be provided beneath the lower ground floor slab.
F1.11	Provision of floor wastes	Not Applicable	
F1.12	Sub-floor ventilation	Not Applicable	
F1.13	Glazed assemblies	Not Specified	Windows, sliding doors with a frame, adjustable louvres, shopfronts and window walls with one piece framing in an external wall must comply with AS 2047 requirements for resistance to water penetration.
F2.1	Facilities in residential buildings	Not Applicable	
F2.2	Calculation of number of occupants and fixtures	Noted	
F2.3	Facilities in Class 3 to 9 buildings	Complies	Refer to Appendix E of this report. With each disabled facility counted once for each sex there are sufficient sanitary facilities provided.
F2.4	Facilities for people with disabilities	Complies / Not Specified	The number of sanitary facilities provided complies with the BCA. Sanitary facilities for people with disabilities are to be designed in accordance with AS1428.1.
F2.5	Construction of sanitary compartments	Not Specified	Doors to the fully enclosed toilets are to open outwards, slide or be readily removable from the outside of the sanitary compartment.
F2.6	Interpretation: Urinals and washbasins	Noted	
F2.7	Warm water installations (NSW – deleted)	Not Applicable	Not Applicable in NSW
F2.8	Waste	Not Applicable	
F3.1	Height of rooms and other spaces	Not Specified	Generally rooms must have a ceiling height of not less than 2.4m.
F4.1	Provision of natural light	Not Applicable	
F4.2	Methods and extent of natural light	Not Applicable	
F4.3	Natural light borrowed from adjoining room	Not Applicable	

Clause	Description	Status	Comments
F4.4	Artificial lighting	Not Specified	Lighting shall be provided throughout the building to comply with AS1680.0 in accordance with the requirements of Clause F4.4 of the BCA.
F4.5	Ventilation of rooms (NSW Reference to AS/NZS 3666.1 deleted for NSW)	Not Specified	Ventilation shall be provided throughout the building in by means of natural ventilation complying with Clause F4.6 or mechanical ventilation complying with the requirements of AS1668.2 as required by Clause F4.5 of the BCA.
F4.6	Natural ventilation	Not Applicable	
F4.7	Ventilation borrowed from adjoining room	Not Applicable	
F4.8	Restriction on position of water closets and urinals	Not Specified	
F4.9	Airlocks	Not Specified	
F4.10	-	-	No Provisions
F4.11	Carparks	Not Applicable	
F4.12	Kitchen local exhaust	Not Specified	A commercial kitchen must be provided with a kitchen exhaust hood complying with AS/NZS 1668.1 and AS 1668.2, where, • any cooking apparatus has a total maximum electrical power input exceeding 8kW, or • a total gas power input exceeding 29 MJ/h, or • the total maximum power input to more than one apparatus exceeds 0.5kW electrical power or 1.8 MJ gas per metre square of the room or enclosure.
F5.1	Application of part	Not Applicable	Applicable to Class 2, 3 and 9c buildings only.
F5.2	Determination of airborne sound insulation ratings	Not Applicable	
F5.3	Determination of impact sound insulation ratings	Not Applicable	
F5.4	Sound insulation rating for floors	Not Applicable	
F5.5	Sound insulation rating of walls	Not Applicable	
F5.6	Sound insulation rating of services	Not Applicable	
F5.7	Isolation of pumps	Not Applicable	

13.6. SECTION G – ANCILLARY PROVISIONS

Clause	Description	Status	Comments
G1.1	Swimming Pools (NSW – added subclause (c))	Not Applicable	

Clause	Description	Status	Comments
G1.2	Refrigerated chambers, strong-rooms and vaults	Not Specified	A refrigerator, cooling chamber, strong room or vault that is sufficient in size for a person to enter, must be provided with a door openable from the inside, internal lighting controlled internally, and indicator lamp positioned outside the chamber, and an alarm controllable from within the chamber.
G1.101	Provision for cleaning windows	Not Specified	A safe manner of cleaning windows is to be provided as windows are located 3 or more storeys above ground level. The windows must either be able to be cleaned wholly from within the building, or a method complying with the Construction Safety Act 1912 and Regulations is required.
G2.1	-	-	No provisions.
G2.2	Installation of appliances	Not Applicable	
G2.3	Open fireplaces	Not Applicable	
G2.4	Incinerator rooms	Not Applicable	
G3.1	Atriums affected by this Part	Applicable	3 storeys or more than 3 storeys if sprinkler protected.
G3.2	Dimensions of atrium well	Does Not Comply	The southern atrium well is approximately 5.2m wide. The northern atrium well is a trapezium shape with the narrower end being approximately 5.3m wide. The DTS provisions require the well to be capable of containing a cylinder with a horizontal diameter of 6m.
G3.3	Separation of atrium by bounding walls	Does Not Comply	It is not proposed to separate the atrium by bounding construction which is set back not more than 3.5m from the perimeter of the atrium well. It is proposed to provide a performance based fire separation between the east and west wings with the western wing having a floor area of approximately 9,000m^2 and the eastern wing approximately 11,000m^2. The maximum permitted for Type A construction is 5,000m^2.
G3.4	Construction of bounding walls	Does Not Comply	The bounding walls of the atrium are not proposed to be constructed in construction with an FRL of 60/60/60 or with toughened safety glass or wired safety glass with wall wetting sprinklers complying with Specification G3.8.
G3.5	Construction of balconies	Does Not Comply	A balustrade or other barrier that is imperforate and non-combustible must be provided around the perimeter of the atrium well.
G3.6	Separation at roof	Not Specified	The atrium roof must have an FRL of 240/90/60 or the roof structure and membrane are to be protected by a sprinkler system complying with Specification E1.5.
G3.7	Means of egress	Complies	

Clause	Description	Status	Comments
G3.8	Fire and smoke control systems	Does Not Comply / Not Specified	The building is required to be provided with the following fire and smoke control systems: 1) Sprinkler system complying with Specification E1.5 and Clause 2 of Specification G3.8. Includes roof protection, atrium floor protection and sprinkler systems to glazed walls. 2) Mechanical air handling system complying with AS/NZS 1668.1 and Clause 3 of Specification G3.8 3) Fire detection and alarms system complying with AS 1670.1 and Clause 4 of Specification G3.8. 4) Sound systems and intercom systems for emergency purposes complying with AS 1670.1 and Clause 5 of Specification G3.8. 5) Standby power system in accordance with Clause 6 of Specification G3.8. 6) Fire isolated exits to be provided with an automatic air pressurisation system in accordance with AS/NZS 1668.1 or with open access balconies in accordance with Clause D2.5. It is proposed to investigate reduce smoke detection in the existing western wing of the building and possible deletion of the automatic stair pressurisation. The automatic smoke exhaust is proposed to be designed on a performance basis.
G4.1	Application of Part	Not Applicable	Construction in alpine areas.
G4.2	-	-	No provisions.
G4.3	External doorways	Not Applicable	
G4.4	Emergency lighting	Not Applicable	
G4.5	External ramps	Not Applicable	
G4.6	Discharge of exits	Not Applicable	
G4.7	External trafficable structures	Not Applicable	
G4.8	Fire-fighting services and equipment	Not Applicable	
G4.9	Fire orders	Not Applicable	
G5.1	Application of Part	Not Applicable	Construction in bushfire prone areas.
G5.2	Protection	Not Applicable	

13.7. SECTION H – SPECIAL USE BUILDINGS

Not Applicable

13.8. SECTION J – ENERGY EFFICIENCY

Clause	Description	Status	Comments
NSW J(B)	**Energy Efficiency - Class 3 and Class 5 to 9 Buildings**	**Noted**	**The building is located in climate zone 5**
NSW J(B)1	Compliance with BCA provisions	Not Applicable	Class 3 and Class 5 to 9 buildings must comply with all of the national provisions of Section J that are applicable to the relevant classifications, except as varied by NSW J1.6 for Class 3 buildings, NSW J3.1 and NSW J8.2 for Class 3 and Class 5 to 9 buildings.
J1.1	Application of Part	Applicable	Applies to building elements forming the envelope of a Class 3 and Class 5 to 9 building.
J1.2	Thermal construction general	Not Specified	Insulation must comply with AS/NZS 4859.1 and be installed in accordance with Clause J1.2. Insulation must abut or overlap adjoining insulation, form a continuous barrier with ceilings, walls, bulkheads, floors or the like and not affect the safe or effective operation of services.
J1.3	Roof and ceiling construction	Not Specified	A roof or ceiling that is part of the envelope must achieve the Total R-Value specified in Table J1.3 for the direction of heat flow. The minimum total R-Value required for roofs or ceilings are specified in Appendix F. A roof that - i. is required to achieve a minimum *Total R-Value;* and ii. has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and iii. does not have a ceiling lining or ha a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens (see specification J1.3 Figure 2(c) and (f), must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the metal roofing and its supporting metal purlins, metal rafters or metal battens.
J1.4	Roof lights	Not Specified	Roof lights serving a habitable room, public area or an interconnecting space such as a corridor, hallway, stairway in a Class 3 building or forming part of the envelope of a Class 5 to 9 building must comply with Table J1.4 if the total roof light area is more than 1.5% but not more than 10% of the floor area of the room or space they serve. Roof lights may exceed 10% of the floor area of the room or space they serve only under certain circumstances.

Clause	Description	Status	Comments
J1.5	Walls	Not Specified	Each part of an external wall that is part of the envelope must satisfy one of the options in Table J1.5a or Table J1.5b except as specified in Clause J1.5. Refer to Appendix F for required minimum R-Values and other requirements. A wall that - i. is required to achieve a minimum *Total R-Value;* and ii. has lightweight external cladding such as weatherboards, fibre cement or metal sheeting fixed to a metal frame; and iii. does not have a wall lining or has a wall lining that is fixed directly to the same metal frame, must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the external cladding and the metal frame.
NSW J1.6	Floors	Not Specified	Floors are required to achieve a minimum R-Value in accordance with Table J1.6.
J2.1	Application of Part	Applicable	
J2.2	-	-	No Provisions
J2.3	-	-	No Provisions
J2.4	Glazing	Not Specified	The glazing in each storey including a mezzanine must be assessed separately in accordance with Clause J2.4(b) and (c) for- i) *glazing* in the external *fabric* facing each orientation; and ii) *glazing* in the internal *fabric* using the south orientation sector energy constants in Table J2.4b and shading multipliers in Table J2.4c and Table J2.4d. The aggregate *air-conditioning* energy value attributable to the *glazing* must not exceed the allowance obtained by multiplying the facade area that is exposed to the *conditioned space* for the orientation by the energy index in Table J2.4a. The glazing calculator must be completed and submitted with the Construction Certificate application as evidence of compliance.

Clause	Description	Status	Comments
J2.5	Shading	Not Specified	Where shading is required to comply with Clause J2.4, it must; a) be provided by an external permanent projection, such as a verandah, balcony, fixed canopy, eaves or shading hood which i. extends horizontally on both sides of the glazing for the same projection distance P in figure J2.4 of the BCA, or ii. provides the equivalent shading to that above with a reveal or the like, or b) be provided an external shading device such as a blind, vertical or horizontal building screen with blades, battens or slats, which i. is capable of restricting at least 80% of summer solar radiation, and ii. is adjustable is operated automatically in response to the level of solar radiation.
NSW J3.1	Application of Part	Applicable	Applies to elements forming the envelope of a Class 3, and Class 5 to 9 building other than as specified.
J3.2	Chimneys and flues	Not Applicable	
J3.3	Roof lights	Not Specified	A roof light must be sealed or capable of being sealed when serving a conditioned space.
J3.4	Windows and doors	Not Specified	A seal to restrict air infiltration must be fitted to each edge of an external door, openable external window or the like when serving a conditioned space.
J3.5	Exhaust fans	Not Specified	A miscellaneous exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space.
J3.6	Construction of roofs, walls and floors	Not Specified	Roofs, walls, floors and any opening must be constructed to minimise air leakage in accordance with Clause J3.6(b) when forming part of the external fabric of a conditioned space. These requirements do not apply to openings, grilles and the like required for smoke hazard management.
J3.7	Evaporative coolers	Not Specified	An evaporative cooler must be fitted with a self-closing damper or the like when serving a heated space.
J4.1	-	-	No Provisions
J5.1	-	-	No Provisions
J5.2	Air conditioning and ventilating systems	Not Specified	An air-conditioning unit or system must comply with the requirements of Clause J5.2 and Specification J5.2
J5.3	Time switch	Not Specified	A time switch in accordance with Specification J6 must be provided to control: • an air-conditioning system of more than 10kWr, or • a ventilation system with an air flow rate or more than 1000L/s, or • a heating systems of more than 10kW$_{heating'}$

Clause	Description	Status	Comments
J5.4	Heating and chilling systems	Not Specified	Systems that provide heating or chilling for air-conditioning systems must comply with Clause J5.4 and Specification J5.4.
J5.5	Miscellaneous exhaust systems	Not Specified	A miscellaneous exhaust system with an air flow rate of more than 1000L/s that is associated with equipment having a variable demand such as a stove in a commercial kitchen or a chemical bath in a factory must have the means for the operator to reduce the energy used or stop the motor when the system is not needed. It must be designed to minimise exhausting of air conditioning.
J6.1	Application of Part	Applicable	
J6.2	Interior artificial lighting	Not Specified	In a Class 5, 6, 7, 8, 9a or 9b the artificial lighting must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum power density in Table J6.2a.
J6.3	Interior artificial lighting and power control	Not Specified	The power control for artificial interior lighting must comply with the requirements of Clause J6.3. Artificial lighting of a room or space must be individually operated by a switch or other control device.
J6.4	Interior decorative and display lighting	Not Specified	Interior decorative and display lighting, such as for foyer mural or art displays, must be controlled separately from other artificial lighting as specified in Clause J6.4. Window display lighting must be controlled separately from other display lighting.
J6.5	Artificial lighting around the perimeter of a building	Not Specified	Artificial lighting around the perimeter of a building must be controlled by a daylight sensor or time switch as specified in Clause J6.5.
J6.6	Boiling water and chilled water storage units	Not Specified	Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification J6.
J7.1	-	-	No provisions
J7.2	Hot water supply	Not Specified	A hot water supply system for food preparation and sanitary purposes, other than a solar hot water supply system in climate zones 1, 2 and 3 must be designed and installed in accordance with Section 8 of AS/NZS 3500.4
J7.3	Swimming pool heating and pumping	Not Applicable	
J7.4	Spa pool heating and pumping	Not Applicable	
J8.1	Application of Part	Applicable	
NSW J8.2	Access for maintenance	Not Specified	Access to service must be provided to all services and their components.

14. APPENDIX C – REFERENCED DOCUMENTATION

The following documentation was used in the preparation of this report:

Drawing No.	*Title*	*Issue*	*Date*	*Drawn By*
C27-A-C-EA 03	Site Plan	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 05	Lower Ground Floor	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 06	Ground Floor	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 07	Level 1 Plan	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 08	Level 2 Plan	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 09	Level 3 Plan	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 10	Level 4 Plan	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 11	Level 5 Plan	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 12	Level 6 Plan	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 13	Level 7 Plant	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 14	Roof Plan	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 15	Street Elevations	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 16	North Elevation	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 17	East Elevation	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 18	West Elevation	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 19	Section A-A	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 20	Section B-B	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 21	Section C-C	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 22	Section D-D	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 21	Section C-C	-	8/6/2010	Lahznimmo Architects
C27-A-C-EA 34	Area Calculations	-	8/6/2010	Lahznimmo Architects

15. APPENDIX D – CONSTRUCTION DETAILS

TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS				
Building element	**Class of building - FRL:** (in minutes)			
	Structural adequacy/Integrity/Insulation			
	2, 3 or 4 part	5, 9 or 7a	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any fire-source feature to which it is exposed is-				
For loadbearing parts-				
less than 1.5m	90/90/90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/60/60	120/ 90/ 90	180/180/120	240/240/180
3 or more	90/60/30	120/ 60/ 30	180/120/90	240/180/ 90
For non-loadbearing parts-				
less than 1.5 m	-/90/90	- /120/120	- /180/180	- /240/240
1.5 to less than 3 m	-/60/60	- / 90/ 90	- /180/120	- /240/180
3 m or more	- / - / -	- / - / -	- / - / -	- / - / -
EXTERNAL COLUMN not incorporated in an external wall, where the distance from any fire-source feature to which it is exposed is-				
less than 3 m	90/ - / -	120/ - / -	180/ - / -	240/ - / -
3 m or more	- / - / -	- / - / -	- / - / -	- / - / -
COMMON WALLS and FIRE WALLS	90/90/90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS-				
Fire-resisting lift and stair shafts-				
Loadbearing	90/90/90	120/120/120	180/120/120	240/120/120
Non-loadbearing	- /90/90	- /120/120	- /120/120	- /120/120
Bounding public corridors, public lobbies and the like-				
Loadbearing	90/90/90	120/ - / -	180/ - / -	240/ - / -
Non-loadbearing	- /60/60	- / - / -	- / - / -	- / - / -
Between or bounding sole-occupancy units-				
Loadbearing	90/90/90	120/ - / -	180/ - / -	240/ - / -
Non-loadbearing	- /60/60	- / - / -	- / - / -	- / - / -
Ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of Combustion-				
Loadbearing	90/90/90	120/ 90/ 90	180/120/120	240/120/120
Non-loadbearing	- /90/90	- / 90/ 90	- /120/120	- /120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS	90/ - / -	120/ - / -	180/ - / -	240/ - / -
FLOORS	90/90/90	120/120/120	180/180/180	240/240/240
ROOFS	90/60/30	120/ 60/ 30	180/60/30	240/ 90/ 60

16. APPENDIX E – REQUIREMENTS FOR SANITARY FACILITIES

The status of sanitary facilities required by Part F2 of the BCA are set out below:

Occupant	**Occupant Numbers**			**WC** ***Required*** */ Provided*		**Urinal** ***Required*** */ Provided*		**Basin** ***Required*** */ Provided*	
	Total								
Students	1524	Male	762	12		22		20	
		Female	762	40		N/A		20	
		Unisex Disabled	-	1		N/A		1	
Staff	638	Male	319	16		8		11	
		Female	319	22		N/A		11	
		Unisex Disabled	-	1		N/A		1	
TOTAL	**2162**	**Male**	**1081**	**28**	**24**	**30**	**32**	**31**	**25**
		Female	**1081**	**62**	**54**	**N/A**	**-**	**31**	**25**
		Unisex Disabled	**-**	**1**	**9**	**N/A**	**-**	**1**	**9**

Note that unisex disabled facilities are able to be counted once for each sex.

17. APPENDIX F – ENERGY EFFICIENCY R-VALUES

ROOFS AND CEILINGS - MINIMUM TOTAL R-VALUE *(Table J1.3a)*

Climate zone	1, 2 & 3	4, 5 & 6	7	8
Direction of heat flow	**Downwards**		**Upwards**	
Minimum *Total R-Value* for a roof or ceiling with a roof upper surface solar absorptance value of not more than 0.5	3.2	3.2	3.7	4.8
Minimum *Total R-Value* for a roof or ceiling with a roof upper surface solar absorptance value of more than 0.5 but not more than 0.6	3.7	3.2	3.7	4.8
Minimum *Total R-Value* for a roof or ceiling with a roof upper surface solar absorptance value of more than 0.6	4.2	3.2	3.7	4.8

ADJUSTMENT OF MINIMUM TOTAL R-VALUE FOR LOSS OF CEILING INSULATION *(Table J1.3b)*

Percentage of ceiling area uninsulated	Minimum *R-Value* of ceiling insulation required to satisfy J1.3(a)							
	2.5	**3.0**	**3.5**	**4.0**	**4.5**	**5.0**	**5.5**	**6.0**
	Adjusted minimum *R-Value* of ceiling insulation required to compensate for loss of ceiling area insulation							
0.5% to less than 1.0%	2.8	3.4	4.0	4.7	5.4	6.2	6.9	
1.0% to less than 1.5%	2.9	3.6	4.4	5.2	6.1	7.0		
1.5% to less than 2.0%	3.1	3.9	4.8	5.8	6.8			
2.0% to less than 2.5%	3.3	4.2	5.3	6.5				
2.5% to less than 3.0%	3.6	4.6	5.9					
3.0% to less than 4.0%	4.2	5.7	Not Permitted					
4.0% to less than 5.0%	5.0							
5.0% or more								

Note:
Where the minimum *R-Value* of ceiling insulation required to satisfy **J1.3(a)** is between the values stated, interpolation may be used to determine the adjusted minimum *R-Value.*

OPTIONS FOR EACH PART OF AN EXTERNAL WALL THAT IS PART OF AN ENVELOPE *(Table J1.5a)*

Climate zone	Options
1, 2 and 3	(a) (i) Achieve a minimum *Total R-Value* of 3.3. (ii) The minimum *Total R-Value* in (i) is reduced— (A) for a wall with a surface density of not less than 220 kg/m^2, by 0.5; and (B) for a wall that is— (aa) facing the south orientation as described in Figure J2.3, by 0.5; or (bb) shaded with a projection shade angle in accordance with Figure J1.5 of— (AA) 15 degrees to not more than 45 degrees, by 0.5; or (BB) more than 45 degrees, by 1.0; and (C) if the outer surface solar absorptance value is not more than 0.6, by 0.5.
	(b) Where the only space for insulation is provided by a furring channel, top hat section, batten or the like— (i) achieve a minimum *Total R-Value* of 1.4; and (ii) satisfy *glazing* energy index Option B of Table J2.4a.
4, 5 and 6	(a) (i) Achieve a minimum *Total R-Value* of 2.8. (ii) The minimum *Total R-Value* in (i) is reduced— (A) for a wall with a surface density of not less than 220 kg/m^2, by 0.5; and (B) for a wall that is— (aa) facing the south orientation as described in Figure J2.3, by 0.5; or (bb) shaded with a projection shade angle in accordance with Figure J1.5 of— (AA) 30 degrees to not more than 60 degrees, by 0.5; or (BB) more than 60 degrees, by 1.0.
	(b) Where the only space for insulation is provided by a furring channel, top hat section, batten or the like— (i) achieve a minimum *Total R-Value* of 1.4; and (ii) satisfy *glazing* energy index Option B of Table J2.4a.
7	(a) Achieve a minimum *Total R-Value* of 2.8. (b) Where the only space for insulation is provided by a furring channel, top hat section, batten or the like— (i) achieve a minimum *Total R-Value* of 1.4; and (ii) satisfy *glazing* energy index Option B of Table J2.4a.
8	(a) Achieve a minimum *Total R-Value* of 3.8.
	(b) Where the wall is an earth retaining wall or earth-berm, achieve a minimum *Total R-Value* of 2.0.

AN ENVELEOPE WALL OTHER THAN AN EXTERNAL WALL - MINIMUM TOTAL R-VALUE *(Table J1.5b)*

Location	Climate zone						
	1	2	3	4	5	6	7
(a) With the non-*conditioned space*— (i) enclosed, with mechanical ventilation of not more than 1.5 air changes per hour of outside air; and (ii) *glazing* not more than that *required* by Part J2.	1.0	1.0	Nil	Nil	1.0	1.0	1.5
(b) For other than (a)	2.3	2.3	2.3	1.8	1.8	1.8	2.8

FLOORS - MINIMUM TOTAL R-VALUE *(Table J1.6)*

Location	Climate Zone							
	1	2	3	4	5	6	7	
(a) A slab on ground: (i) Without an in-slab heating or cooling system	Nil	Nil	Nil	Nil	Nil	Nil	Nil	N
(ii) With an in-slab heating or cooling system	1.25	1.25	1.25	1.25	1.25	1.25	1.25	2.
(b) A suspended floor without an in-slab heating or cooling system where the non- *conditioned space* is— (i) enclosed; and (ii) where mechanically ventilated by not more than 1.5 air changes per hour.	1.0	1.0	Nil	Nil	1.0	1.0	1.5	2
(c) A suspended floor with an in-slab heating or cooling system where the non- *conditioned space* is— (i) enclosed; and (ii) where mechanically ventilated by not more than 1.5 air changes per hour	1.25	1.25	1.25	1.25	1.25	1.25	1.75	2.
(d) For other than (a), (b) or (c)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3

Note:
A sub-floor space not more than 150% of the required sub-floor ventilation is considered enclosed.
Unenclosed perimeter.

18. APPENDIX G – STATUTORY FIRE SAFETY MEASURES

Schedule of Statutory Fire Safety Measures

Measure	Standard of Performance
Access panels, doors and hoppers to fire resisting shafts	BCA2010 Clause C3.13 and tested prototypes (AS 1530.4 – 2005)
Automatic fail safe devices	Scheduled devices release upon trip of smoke detection, fire detection or sprinkler activation in accordance with BCA2009 Clause D2.21.
Automatic fire detection and alarm system *(within atriums)*	BCA2010 Specification G3.8 and AS 1670.1 – 2004
Automatic fire detection and alarm system *(smoke detection system to automatically shutdown air-handling system or smoke detection system to activate smoke exhaust system or smoke and heat vents)*	BCA2010 Clause 5 of Specification E2.2a and AS/NZS 1668.1 – 1998
Automatic fire suppression systems *(Sprinklers)*	BCA2010 Specification E1.5 and G3.8 and AS 2118.1 – 1999
Emergency lighting	BCA2010 Clause E4.2, E4.4 and AS 2293.1 – 2005
Emergency warning and intercommunication system	BCA2010 Clause E4.9, Specification G3.8 and AS 1670.4 – 2004 and AS 4428.4 – 2004
Exit signs	BCA2010 Clause E4.5, NSW E4.6, E4.8 and AS 2293.1 – 2005
Fire control centre	BCA2010 Specification E1.8
Fire dampers	BCA20010 Clause C3.15 and AS/NZS 1668.1 – 1998 (AS 1682.1-1990 and AS 1682.2-1990)
Fire doors	BCA2010 Specification C3.4 and AS 1905.1 – 2005
Fire hydrants systems	BCA2010 Clause E1.3 and AS 2419.1 – 2005
Fire seals protecting opening in fire resisting components of the building	BCA2010 Clause C3.15, Specification C3.15 and AS 1530.4 – 2005 and AS 4072.1 – 2005 and installed in accordance with the tested prototype.
Hose reel system	BCA2010 Clause E1.4 and AS 2441 – 2005
Lightweight construction	BCA2010 Specifications C1.8, Clause A2.3 and AS 1530.4-2005
Mechanical air handling system *(automatic shut down of air-handling system)*	BCA2010 Clause E2.2 and AS/NZ 1668.1-1998
Mechanical air handling system *(automatic air pressurisation system)*	BCA2010 Table E2.2a and AS/NZ 1668.1-1998
Mechanical air handling system *(automatic smoke exhaust system serving an atrium)*	BCA2010 Specification G3.8 and AS/NZS 1668.1-1998
Portable fire extinguishers	BCA2010 Clause E1.6 and AS 2444 – 2001

Measure	Standard of Performance
Smoke detectors and heat detectors *(detectors for the automatic closing operation of fire doors and fire shutters in fire walls)*	BCA2010 Clause C3.5 and AS 1670.1 – 2004
Smoke detectors and heat detectors *(detectors for the automatic closing operation of fire doors to fire isolated exits)*	BCA2010 Clause C3.8 and AS 1670.1 – 2004
Stand-by power systems	BCA2010 Clause 6 of Specification G3.8
Wall wetting sprinkler and drencher systems	BCA2010 Clause C3.4, Specification G3.8 and AS 2118.2 – 1995
Warning and operational signs	BCA2010 Clauses D2.23, E1.4, E3.3, G4.3 and Specification G3.8

Note that the fire safety schedule may need to be amended subject to the inclusion of a fire engineered alternative solution.