WOOD & GRIEVE ENGINEERS

# St Basils, Bexley

# NCC Section JV3 for Part J1 & J2 Design Report

## Prepared for:

**St.Basil's Homes**
**C/- Nick Baldas**

## Prepared by:

**Ray Leung**
Project No. 40546
P:\40546\PROJECT DOCUMENTATION\SUSTAINABILITY\SECTION J\SU_RE_JV3_001.DOCX

**Date:**
14/09/2018

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# Revision

| REVISION | DATE | COMMENT | APPROVED BY |
|---|---|---|---|
| 1 | 14/09/2018 | Issue 1 | ALK |

# Qualifications to this Report

The following qualifications apply to this report:

- Information has been based on our understanding of the proposed building and level of architectural documentation provided, as noted. The architect shall review & confirm any assumptions where required.
- This report outlines the performance requirements for NCC Section J JV3 for Part J1 & J2 design compliance only. Not all required details may be fully presented.
- The project design team (including the Architect) will be required to review and consider the implications of the thermal performance recommendations on their design for the project. For example:
  - Glazing requirements are nominated in relation to the combined glass + frame thermal performance only for NCC Section J energy efficiency compliance purposes.
  - Different insulation products will have varying spatial allowances. The design team should coordinate the proposed insulation types to achieve the required Total System R-values while simultaneously complying with any other design & construction requirements.
  - The design team should coordinate all recommendations with any specific acoustic, thermal, fire, wind, structural, façade, safety (during design/installation/operation), client or architectural requirements etc. for a particular project.

## Disclaimer

This energy model provides an estimate of the building's energy performance. This estimate is based on a necessarily simplified and idealised version of the building that does not and cannot fully represent all of the intricacies of the building and its operation. As a result, the energy model results only represent an interpretation of the potential performance of the building. No guarantee or warrantee of building performance in practice can be based on energy modelling results alone.

The results generated from this analysis are based on specific criteria outlined in the NCC Volume One and are not considered to be a true representation of the actual operation of the building. The intent of these criteria is to permit the comparison of the estimated annual energy consumption of a Proposed Building against that of a Reference Building and therefore determine if a specific building has the ability to be energy efficient.

The thermal properties described in the following report are nominated to meet the minimum building fabric and glazing energy efficiency requirements stated by the NCC Section J Part J1 & Part J2 provisions only (via the JV3 method). It does not directly account for any requirements for the following aspects: Thermal Comfort, Vapour Barriers & Condensation, Wind, Impact, Structural, Acoustic requirements, Fire Requirements, special client requirements exceeding minimum Section J, safety and the like.

**Professional Engineer / Appropriately Qualified Person**

**Name: Alex Kobler**
**Date: 14/09/2018**

# Revision

## File Records

For records the files used in this report are as follows:

- All modelling completed generally on the basis of the following PTW architectural documents issued on 7th of September 2018:
  - A-DA-04 – Basement Plan 2
  - A-DA-05 – Basement Plan 1
  - A-DA-06 – Ground Floor Plan
  - A-DA-07 – Level 1 Floor Plan
  - A-DA-08 – Level 2 Floor Plan
  - A-DA-09 – Level 3 Floor Plan
  - A-DA-11 – North & South Elevation
  - A-DA-12 – East & West Elevation
  - A-DA-13 – Internal North & South Elevation
  - A-DA-14 – Site Section A, B & C
  - A-DA-15 – Site Section D & E

- The following inputs and outputs are the basis of assessment for this report:

| Record | Reference | Proposed |
|---|---|---|
| **IES Thermal Model:** | **40546_Reference_Rev01.mit** | **40546_Proposed_Rev01.mit** |
| **Apache Vista File:** | **40546_Reference_Rev01.aps** | **40546_Proposed_Rev01.aps** |
| **Energy Analysis Results** | **40546_JV3_Energy Model_Template Rev 6.6 (VE2017)_01.xlsm** | |
| **Reference Glazing Calculators** | **40546_NCC GLAZING CALCULATOR VOLUME ONE_GF_Class9b_001.xlsx**<br>**40546_NCC GLAZING CALCULATOR VOLUME ONE_GF_Class9c_001.xlsx**<br>**40546_NCC GLAZING CALCULATOR VOLUME ONE_L1_001.xlsx**<br>**40546_NCC GLAZING CALCULATOR VOLUME ONE_L2_001.xlsx**<br>**40546_NCC GLAZING CALCULATOR VOLUME ONE_L3_001.xlsx** | **N/A** |

# Contents

# 1. Executive Summary

This report has been prepared for proposed St Basils Bexley Residential Aged Care Facility (RACF) located at 62-68 Harrow Road, Bexley NSW 2207. The purpose of this report is to identify thermal performance requirements for the building envelope against the NCC 2016 Volume One BCA Section J Part J1 & J2 provisions (utilising the JV3 Performance Solution methodology).

## 1.1 JV3 Building Fabric & Glazing Findings

Subject to the assumptions and requirements noted in this report, the Proposed Building's predicted annual energy consumption is demonstrated to be not more than the predicted annual energy consumption of the Reference Building. The corresponding "JV3 for Part J1 & J2" thermal performance requirements for the Proposed Building's building envelope is subsequently identified in this report.

Table 1 NCC 2016 JV3 Predicted Energy consumption summary and comparison.

| Model | Annual Energy Consumption (MWh) | Comparison | Design Compliance |
|---|---|---|---|
| **Reference Building** | 1618 | - | - |
| **Proposed Building** | 1615 | 99.8% | **Compliant** |

It is noted that any future variation to the design, conditions, assumptions and requirements may impact the performance outcomes and potentially affect the level of compliance.

## 1.2 Proposed Building - Specific Building Fabric & Glazing Thermal Performance Requirements

Overall thermal performance requirements of the proposed building's envelope (building fabric & glazing) for JV3 design compliance is shown below.

Table 2 NCC 2016 JV3 Part J1 Specific Building fabric thermal performance requirements

| Building Element that is part of the Section J Envelope | Minimum Total R-value* thermal performance requirement | Comments |
|---|---|---|
| **Roof** | **$R_T$ 3.2 (Heat Flow Downwards) with surface solar absorptance of not more than 0.4 (Light Color)** | Refer to APPENDIX A for location of Section J envelope insulation |
| **External Walls** | **$R_T$ 2.8** | |
| **Internal Walls** | **$R_T$ 1.8** | |
| **Suspended Floors** | **$R_T$ 2.0 (Heat Flow Downwards)** | |
| **Floor that is direct slab on ground** | **No minimum requirement** | |

*The Total R-value means the sum of the R-values of the individual component layers in a composite element including any building material, insulating material, airspace and associated surface resistances

Table 3: NCC 2016 JV3 Part J2 Specific Envelope glazing thermal performance requirements

| Item | Total System U-value ($W/m^2K$)* | Total System SHGC* | Comment |
|---|---|---|---|
| **Section J Envelope Glazing** | **4.7** | **0.47** | Possible single glazed low E Neutral tone glazing with standard aluminium frame window system, TBC by façade contractor or glazing supplier. |

*The Total System performance requirements above are for combined effect of glass + frame in accordance with Australian Fenestration Rating Council (AFRC) requirements

It is noted that the building must continue to demonstrate Deemed-To-Satisfy design compliance against the other parts of Section J not specifically addressed in this report, including (but not limited to) Part J0, general Part J1 (Part J1.2, Part J1.3 (d), Part J1.5(c) etc.), Part J3, Part J5, Part J6, Part J7, Part J8 and the like.

# 2. Introduction

This report should be read in conjunction with all relevant plans and specifications and any supplementary regulatory information.

It is noted that all JV3 modelling has been carried out in accordance with NCC 2016 Volume One Specification JV.

## 2.1 Site Context

The development location is outlined below in Figure 1.


Figure 1: Site Location (Google Maps)

## 2.2 Development Overview

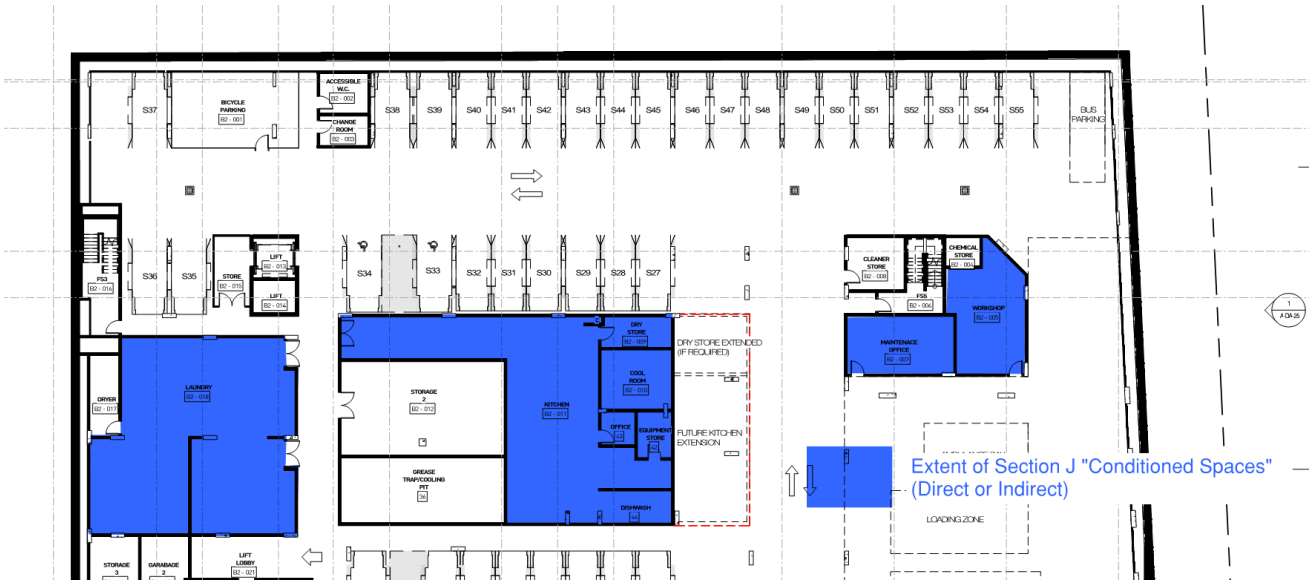
| | |
|---|---|
| **Property Title** | St Basils Bexley |
| **Address** | 62-82 Harrow Road, Bexley, NSW 2207 |
| **Building Description** | Residential Aged Care Facility (RACF) |
| **NCC Volume** | NCC 2016 |
| **NCC Volume One Climate Zone** | Climate Zone 5 |
| **Building Class** | Class 9c Aged Care (RACF)<br>Class 9b (Day Room) |
| **Name and Version of the Software used in the Analysis** | IES Virtual Environment, v2017 |


Figure 2: Climate Zone Map and Location of Development (abcb.gov.au)

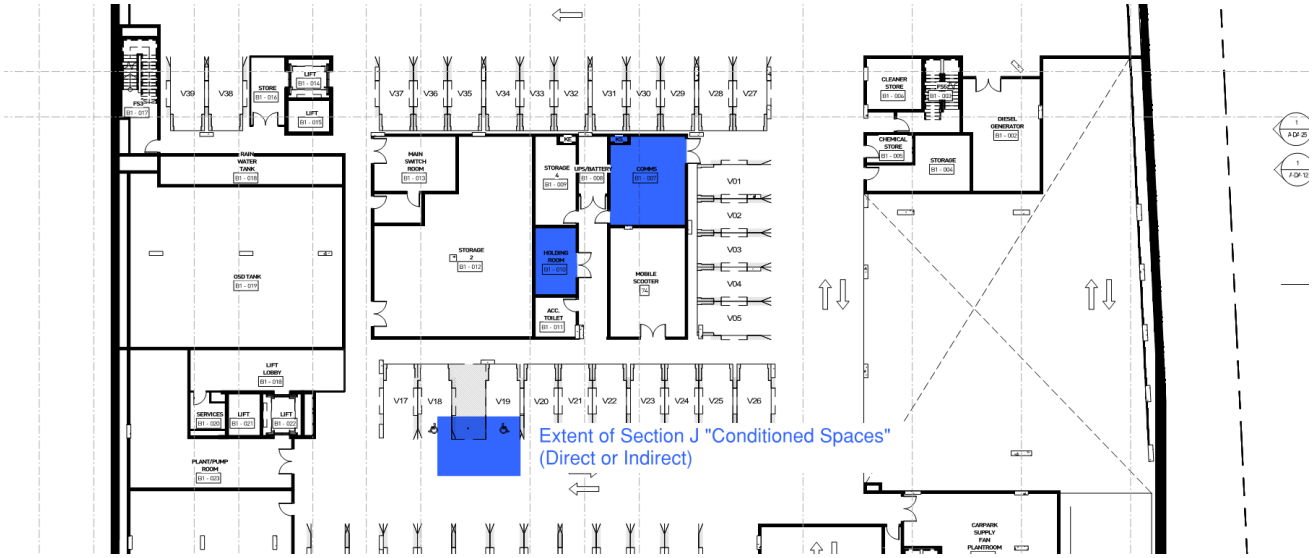
## 2.3 Air-conditioned Spaces and Section J Envelope

The following figure shows the assumed extent of air-conditioned spaces for the purposes of Section J. This includes spaces that are directly air-conditioned and those that are indirectly conditioned (via pressurisation or relief/exhaust of conditioned air).

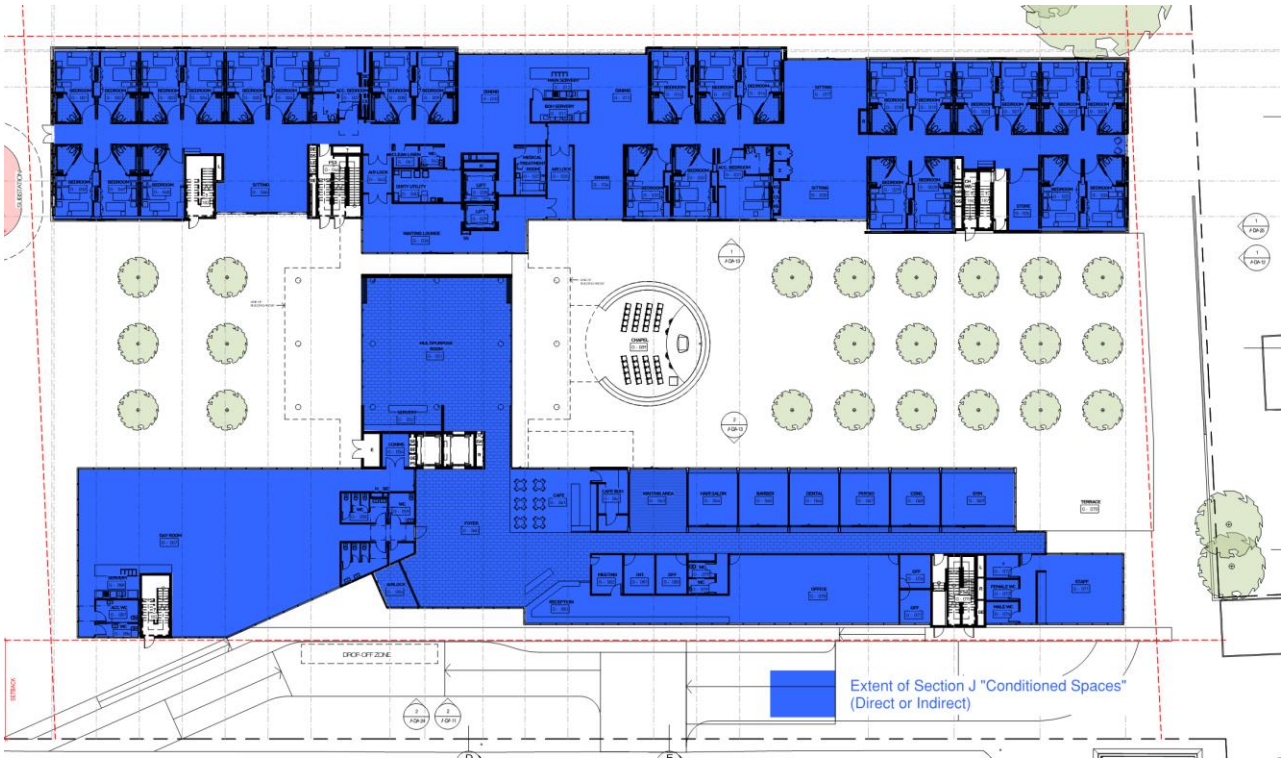
**Basement 2**




**Basement 1**



**Ground Floor**




**Level 1**

**Level 2**


**Level 3**

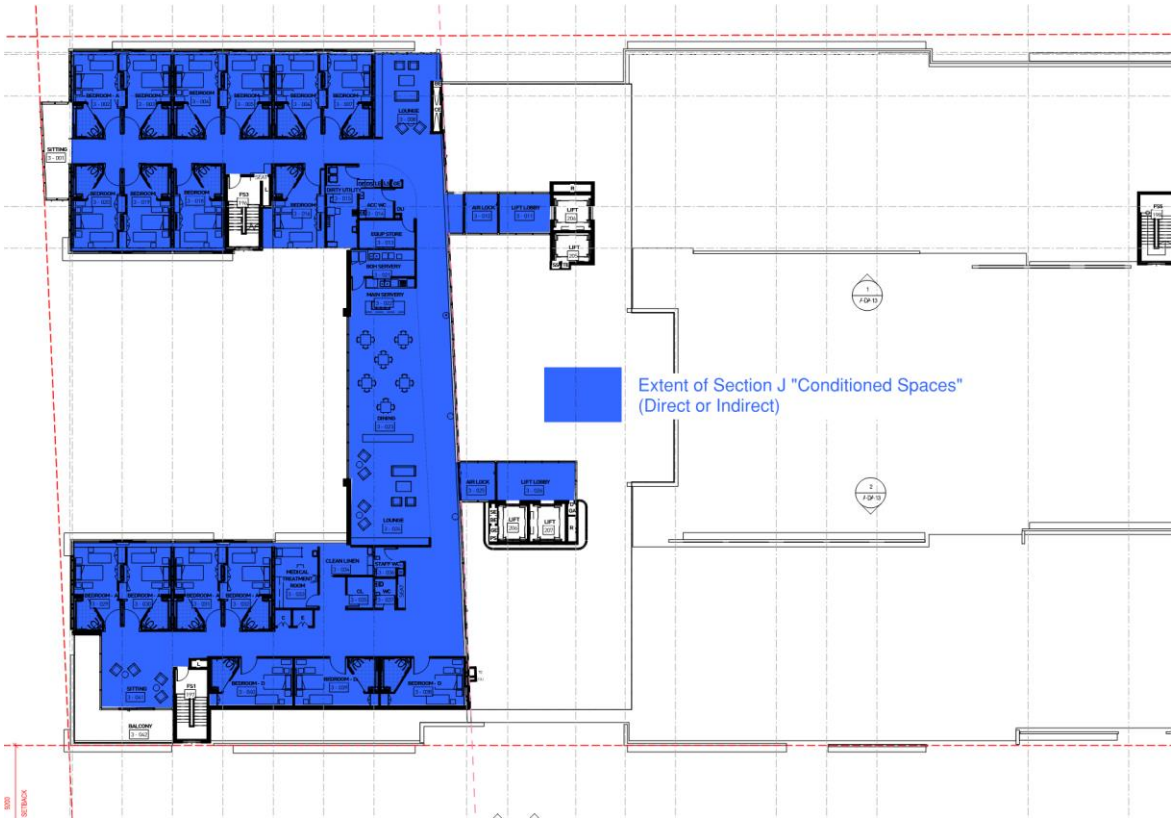



**Figure 3: Assumed Extent of Air-conditioned spaces for Section J (Direct and indirectly conditioned spaces)**

The Section J envelope is the part of the building's fabric that separates a conditioned space from the exterior of the building or a non-conditioned space.

## 2.4 JV3 Assumptions

The following lists the assumptions that have been made as part of this JV3 for Part J1 & J2 analysis:

1. The building has no skylights or roof lights present
2. Roof thermal insulation for the purpose of Part J1 compliance will be fixed to the underside of the roof. Ceiling insulation will be assumed not to be used for Part J1 purposes.
3. There are no in slab or in-screed heating/cooling systems within the building.
4. Where necessary, floor thermal insulation for the purpose of Part J1 compliance will be assumed fixed to the underside of the floor slab.
5. Where necessary, the required internal/external envelope wall thermal insulation shall be full height and extend from floor to the underside of roof/slab (that also contains the insulation) in order to satisfy the intent of BCA J1.2(a). This includes the requirement to allow for wall thermal insulation above the local ceiling line where necessary.
6. All new building conditioned spaces are assumed to be served by VRF AC units (heat pump)
7. Any process rooms with process air-conditioning may require specialist building envelope thermal performance advice outside the scope of this report.
8. In addition to the specific items raised in this report, the building fabric and glazing design & construction must continue to comply with the 'general' Part J1 & Part J2 DTS requirements of the following (including but not limited to):
    a. General thermal construction and installation requirements BCA Part J1.2
    b. Part J1.3(c) (if required)
    c. Part J1.3(d) (roof thermal break if required)
    d. Part J1.5(c) (wall thermal break if required)
    e. Etc.
9. The building must continue to demonstrate Deemed-To-Satisfy design compliance against the other parts of NCC 2016 Volume 1 BCA Section J not specifically addressed in this report, including (but not limited to) Part J0, Part J3, Part J5, Part J6, Part J7, Part J8 and the like.
10. The glazing thermal performance and marked-up location of thermal insulation required for JV3 design compliance (in the Appendix) is approximate based on the current level of design documentation. Any discrepancies or omissions must be clarified with the architect, client and project manager prior to tender, detailed design and construction

The thermal insulation & glazing performance mark-ups in this report only show the minimum required coverage and performance levels for "Section J JV3 for Part J1 & J2" design compliance. The actual coverage/performance of thermal insulation & glazing will need to be coordinated with other specific design requirements including (but not limited to) fire safety, buildability, thermal comfort, acoustics, structural, mechanical, architectural disciplines or any special client requirements to exceed Section J minimum performance.

# 3. JV3 Methodology

Design Compliance is verified when it is determined that the estimated annual energy consumption of the Proposed Building with its services is not more than the estimated annual energy consumption of a (deemed-to-satisfy compliant) Reference Building when:

i. The Proposed Building is modelled with the proposed services; and

ii. The Proposed Building is modelled with the same services as the Reference Building.

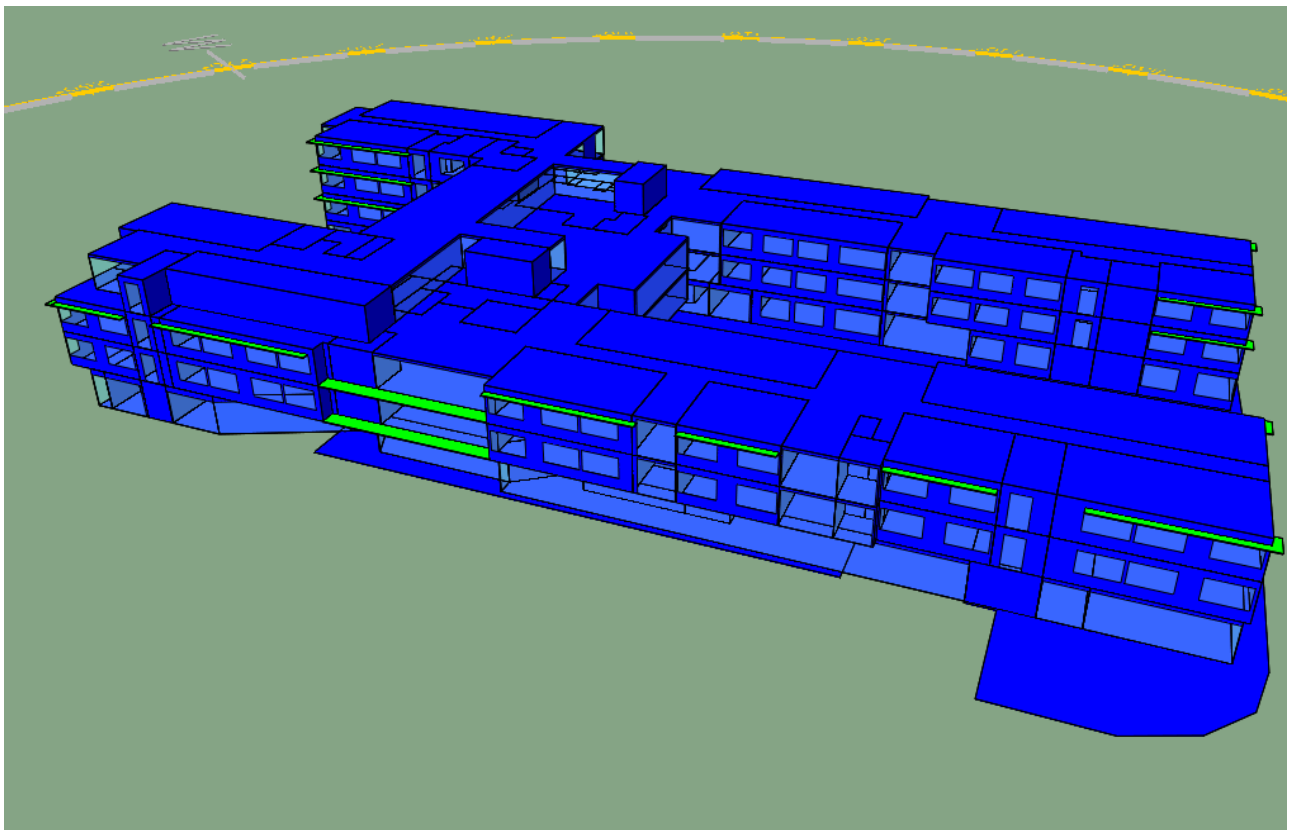
This JV3 for Part J1 & J2 analysis concerns building fabric and glazing, and assumes that the proposed building services are DTS compliant and have the same DTS services as the Reference Building. It is also assumed that the Proposed Building and Reference Building are both DTS compliant with Part J3.

As such, only two models are run and the annual predicted energy consumption compared as follows:

- Case 1: The Reference Building (with DTS Building Fabric and DTS services)
- Case 2: The Proposed Building (with Proposed Building Fabric and DTS Services)

## 3.1 Modelling Assumptions

Figure 4 below shows the 3D model of the proposed building developed for the purpose of this JV3 assessment. This geometry is used for both Case 1 Reference Building and Case 2 Proposed Building simulations. Note some adjacent buildings have been excluded from the model viewer, to provide a better view of the actual building.



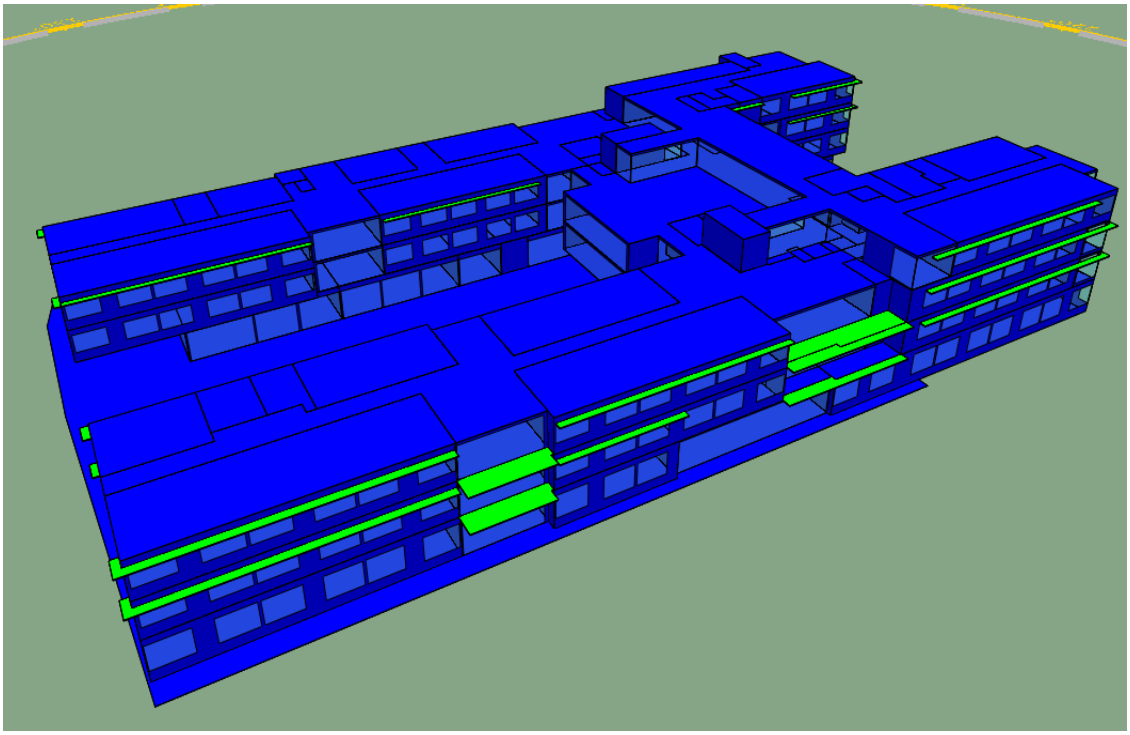


Figure 4: IES model of project

### 3.1.1 Internal Loads

The internal loads for both the Proposed and Reference Buildings are as per the design requirements stipulated in the NCC Volume One Section J.

**Profiles**

Occupancy, lighting, equipment and HVAC plant throughout the site were estimated to operate in accordance with the NCC Volume One JV Specifications.

Refer to APPENDIX B Occupancy and Operational Profiles for complete summary of modelling inputs.

**Lighting Levels**

The lighting load allowances incorporated into the energy model were as per allowances within NCC Volume One Section J6.

| Zone | Lighting Load ($W/m^2$) |
|---|---|
| Multipurpose Room/ Day Room/Foyer | 15 |
| Office Areas | 10 |
| Corridors | 8 |
| Bedrooms | 7 |
| Toilet Areas | 6 |

**Occupant Density & Heat Gains**

The occupant densities applied to the model are accordance with the requirements stipulated in the NCC Volume One Section D, Part D1, Table D1.13.

| Description | Sensible Heat (W/person) | Latent Heat (W/person) |
|---|---|---|
| JV3 Allowance | 75 | 55 |

| Zone | Occupant Density ($m^2$ per person) |
|---|---|
| Multipurpose Room | 1 |
| Office Area | 10 |
| Bedrooms | 15 |

**Appliances and Equipment**

The allowances for sensible and latent heat gain from equipment to all heating and cooling zones throughout the site as per the requirements stipulated in NCC Volume One Section J, Specification JV, Table 2h.

| Zone | Sensible ($W/m^2$) |
|---|---|
| Offices | 15 |
| Bedrooms | 5 |

### 3.1.2 Case 1: Reference Building with Reference DTS Services

**Construction Thermal Performance**

New reference building fabric constructions are generally in accordance with the Deemed-to-Satisfy requirements in NCC Volume One Section J Part J1.

**Glazing Thermal Performance**

The glazing thermal performance adopted for the Reference Building were calculated using the NCC Volume One Section J Part J2 Glazing Calculator. Please refer to Appendix D for the DTS Part J2 Calculator.

**Building Services for Case 1 Reference Building**

Heating and Air Conditioning

The following attributes for the HVAC system are in accordance with the Deemed-to-Satisfy requirements in NCC Volume One Specifications J5.2d and J5.2e:

| | |
|---|---|
| Assumed system: | Air-cooled AC System (including split unit & heat pump) |
| Cooling Efficiency: | 2.6 |
| Heating Efficiency: | 2.6 |
| Cooling Fuel: | Grid Electricity |
| Heating Fuel: | Grid Electricity |

In accordance with Specification JV Clause 2 (a) (i) the space temperature of the Reference Building is within the range of 18°C DB to 26°C DB for 98% of the plant operation time.

Space Temperature Range

Cooling Set-point: 24°C

Heating Set-point: 22°C

Mechanical Ventilation Rate – Outside Air

Mechanical ventilation has been modelled at the rates of introduction of outside air as per the design requirements stipulated in AS 1668.2.

Infiltration Air Change Rate

Infiltration air change rates have been modelled in accordance with NCC Volume One Section J JV3 (d) (i) (F).

Domestic Hot Water, Lifts, and Escalators Exclusions

Domestic hot water energy consumption, lifts, and escalators have been excluded from the calculation in accordance with the NCC Volume One Specification JV3 (e).

Internal equipment, External Lighting, Miscellaneous Ventilation, Pumps etc. Exclusions

The following energy consumption of various services/items are assumed not to be directly impacted by the building envelope design and has been excluded from the JV3 assessment and calculation comparison between cases:

- Internal equipment energy, External Lighting, Miscellaneous ventilation fan energy (laundry/toilet/shower/store exhaust, switch-room fans etc.), hydraulic pumps, fire services and the like.

### 3.1.3 Case 2: Proposed Building with Reference DTS Services

**Construction Thermal Performance**

Overall thermal performance of the proposed building fabric & glazing (that is part of the building envelope) is shown below.

**Table 4 NCC 2016 JV3 Part J1 Specific Building fabric thermal performance requirements**

| Building Element that is part of the Section J Envelope | Minimum Total R-value* thermal performance requirement | Comments |
|---|---|---|
| **Roof** | **$R_T$ 3.2 (Heat Flow Downwards) with surface solar absorptance of not more than 0.4 (Light Color)** | Refer to APPENDIX A for location of Section J envelope insulation |
| **External Walls** | **$R_T$ 2.8** | |
| **Internal Walls** | **$R_T$ 1.8** | |
| **Suspended Floors** | **$R_T$ 2.0 (Heat Flow Downwards)** | |
| **Floor that is direct slab on ground** | **No minimum requirement** | |

*The Total R-value means the sum of the R-values of the individual component layers in a composite element including any building material, insulating material, airspace and associated surface resistances

**Glazing Thermal Performance**

It is noted that 'Glazing' for the purposes of Section J includes glazed windows, glazed partitions and glazed doors (including its frames) located in the Section J envelope (including fixed or operable glazing).

The envelope glazing total thermal performance values have been nominated in Table 5. These are 'whole of window' properties and include the glass and frame combined. For Section J purposes, the final glazing selection must comply with the performance limits set by the whole of window Total System U-value and Total System SHGC.

Table 5 NCC 2016 JV3 Part J2 Specific Envelope glazing thermal performance requirements

| Item | Total System U-value ($W/m^2K$)* | Total System SHGC* | Comment |
|---|---|---|---|
| **Section J Envelope Glazing** | **4.7** | **0.47** | Possible single glazed low E Neutral tone glazing with standard aluminium frame window system, TBC by façade contractor or glazing supplier. Refer APPENDIX A |

*The Total System performance requirements above are for combined effect of glass + frame in accordance with Australian Fenestration Rating Council (AFRC) requirements

**Building Services for Case 2 Proposed Building (same as Reference Building)**

Heating and Air Conditioning

| | |
|---|---|
| Assumed system: | Air-cooled AC System (including split unit & heat pump) |
| Cooling Efficiency: | 2.6 |
| Heating Efficiency: | 2.6 |
| Cooling Fuel: | Grid Electricity |
| Heating Fuel: | Grid Electricity |

Space Temperature Range

Cooling Set-point: 24°C

Heating Set-point: 22°C

Mechanical Ventilation Rate – Outside Air

Mechanical ventilation has been modelled at the rates of introduction of outside air as per the design requirements stipulated in AS 1668.2.

Infiltration Air Change Rate

Infiltration air change rates have been modelled in accordance with NCC Volume One Section J JV3 (d) (i) (F).

Domestic Hot Water, Lifts, and Escalators Exclusions

Domestic hot water energy consumption, lifts, and escalators have been excluded from the calculation in accordance with the NCC Volume One Specification JV3 (e).

Internal equipment, External Lighting, Miscellaneous Ventilation, Pumps etc. Exclusions

The following energy consumption of various services/items are assumed not to be directly impacted by the building envelope design and has been excluded from the JV3 assessment and calculation comparison between cases:

- Internal equipment energy, External Lighting, Miscellaneous ventilation fan energy (laundry/toilet/shower/store exhaust, switch-room fans etc.), hydraulic pumps, fire services and the like.

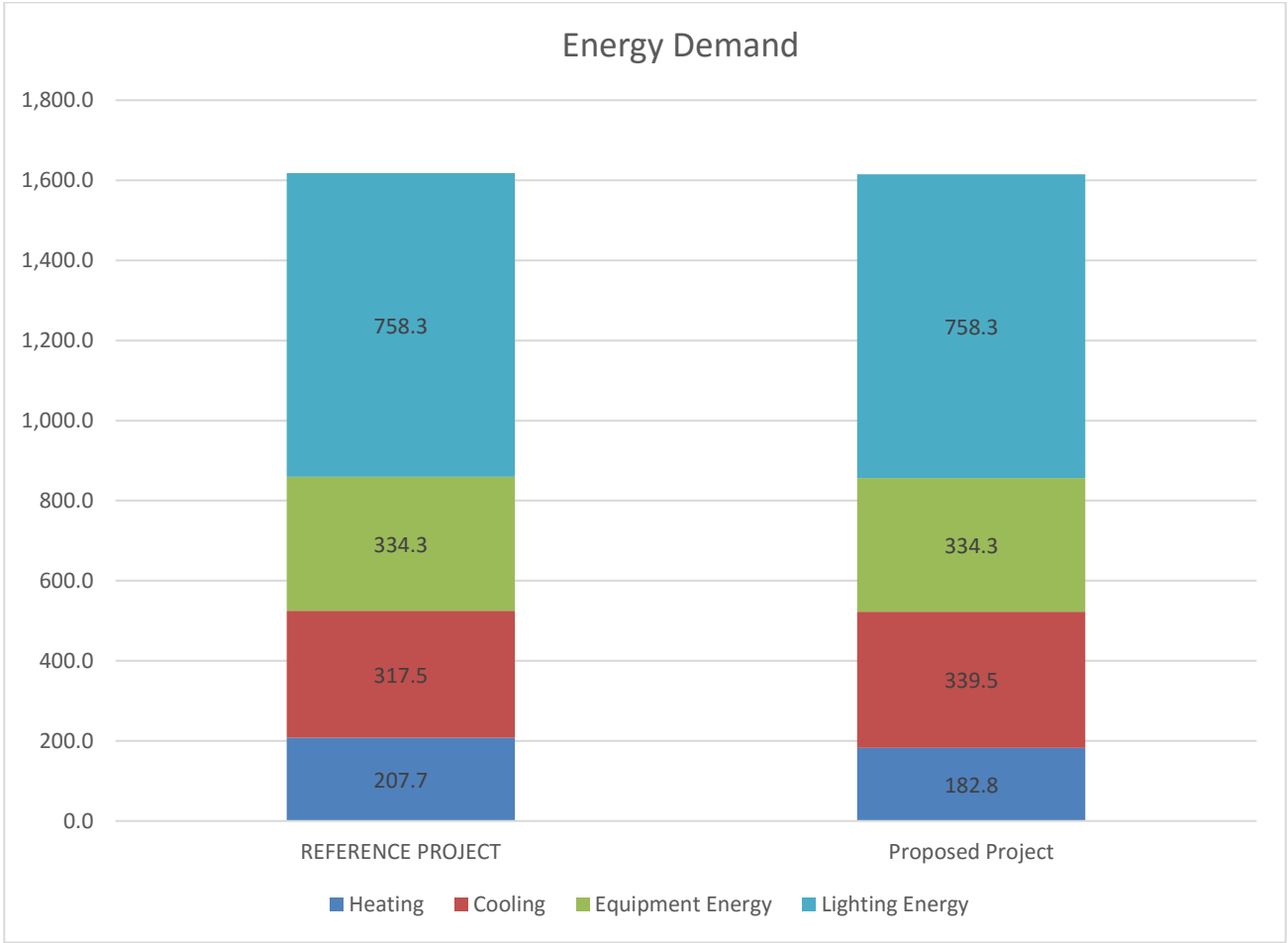
# 4. JV3 Energy Consumption Modelling Results

The simulation was undertaken using IES Virtual Environment 2017 incorporating the IES Apache Systems Module. The NSW_Sydney_RO_81_TRY weather file has been used for the JV3 simulations.

Based on the assumptions listed in this report, the following table shows Predicted Building predicted annual energy consumption (taken from the IES Virtual Environment Vista results file) for both the Reference and Proposed Buildings

Table 6 JV3 for Part J1 & J2 Energy Modelling Results

| Energy Consumption | Source | Energy Demand (MWh/annum) | | Energy Demand Improvement on Reference |
|---|---|---|---|---|
| | | REFERENCE | PROPOSED | |
| Heating | Grid Electricity | 207.7 | 182.8 | |
| Cooling | Grid Electricity | 317.5 | 339.5 | |
| Lighting | Grid Electricity | 758.3 | 758.3 | |
| Equipment | Grid Electricity | 334.3 | 334.3 | |
| **TOTAL** | | **1618** | **1615** | 0.2% |



## 4.1 Model Verification for predicted Space Temperature

In accordance with Specification JV3 (d) (i) (D) the space temperature of the Reference Building must be within the range of 18°C DB to 26°C DB for 98% of the plant operation time and must be consistent between Reference and Proposed Buildings.

In order to verify this requirement, IES Virtual Environment's Vista analysis software module was utilised to assess the results for each of the nominated heating and cooling zones. A check was carried out to identify the percentage of total hours per annum (between this range) that the space temperature was outside this specified temperature band during the HVAC profile hours (refer to A.1.APPENDIX B - Occupancy and Operational Profiles). The results of this are noted below.

**Table 7 Modelling Results – Model Verification Results**

| | Air temperature (°C) - % of hours in range | | | |
|---|---|---|---|---|
| | **<= 18.00** | **>18.00 to <=26.00** | **> 26.00** | **% Outside Range** |
| **REFERENCE PROJECT** | 0.0% | 100.0% | 0.0% | 0.0% |
| **PROPOSED PROJECT** | 0.0% | 100.0% | 0.0% | 0.0% |
| | **JV3 Temp Compliant** | **Yes** | | |

## 4.2 Conclusion

The modelling results indicate that the predicted annual energy consumption of the Proposed Building Case 2 (with Reference DTS Services) does not exceed the predicted annual energy consumption of the Reference Building Case 1 (with Reference DTS Services).

Subject to the limitations and assumptions listed in this report, "JV3 for Part J1 & Part J2" performance solution design compliance can be achieved for the proposed building model as long as:

- The necessary specific thermal performance requirements for the proposed building model envelope (e.g. building fabric and glazing) can be satisfied (as a minimum), AND
- All other design elements not specifically addressed in this report (e.g. related to BCA Part J0, general Part J1, Part J3, J5, J6, J7 & J8) must continue to be compliant with the DTS requirements of NCC Volume 1 Section J BCA 2016.

# APPENDIX A Section J Insulation Mark-ups

| Car Parking | | |
|---|---|---|
| Type | Description | Count |
| B2 | | |
| | Disabled Carpark Bay (AS2890-2009) | 4 |
| 5500 x 2500_Bus | Standard Bus | 1 |
| 5500 x 2500 | Standard Carpark Bay | 51 |
| B1 | | |
| | Disabled Carpark Bay (AS2890-2009) | 4 |
| 5500 x 2500 | Standard Carpark Bay | 59 |
| Grand total: 119 | | 119 |

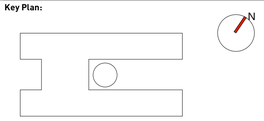

## Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Ceiling Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

WOOD & GRIEVE ENGINEERS

**PROJECT :**
**PROJECT NUMBER :** 40546-SYD-G
**SKETCH TITLE:** Insulation Mark-up
**AUTHOR :** Ray Leung
**DATE :** 14/09/2018

**Key Plan:**




**Drawing Disclaimer:**

Do not scale from drawings.
Verify all dimensions on site before commencing work.
Copying or reproduction of this drawing is strictly prohibited without the consent of PTW Architects

| Rv | Amendment | By | Ck | Date |
|---|---|---|---|---|

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Peddle Thorp & Walker P/L
ABN 23 000 454 624
trading as PTW Architects

NSW Nominated Architects
S Parsons Architect No.6098
D Jones Architect No.4778

**Project** PA016906.01

# St Basils Bexley

62 - 82 HARROW ROAD, BEXLEY, NSW 2207

**Title**

BASEMENT PLAN 2

**Drawing Number** **Revision**

A-DA-04

**Status**
FOR REVIEW

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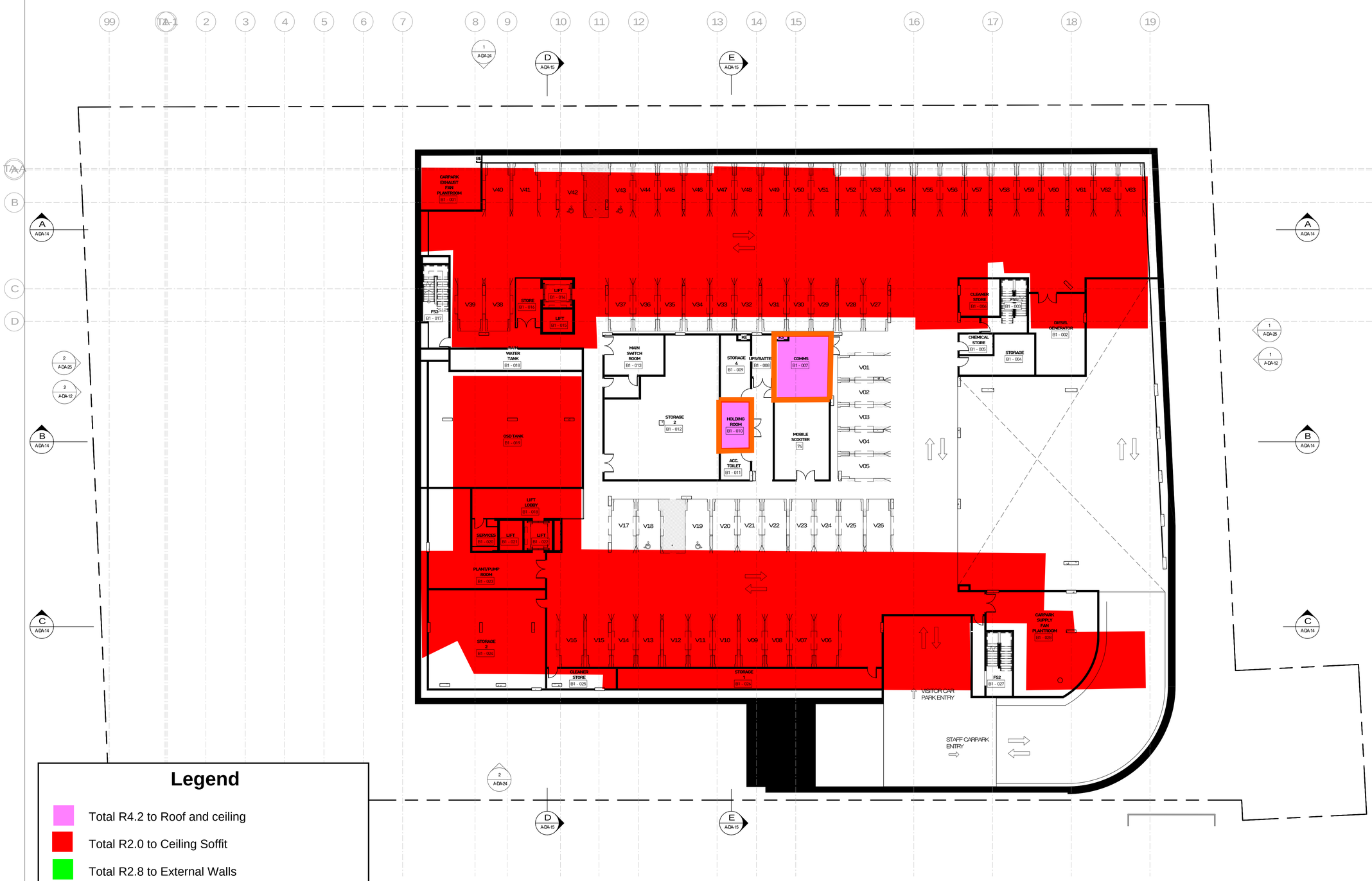



## Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Ceiling Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

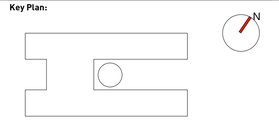
WOOD & GRIEVE ENGINEERS

**PROJECT :**
**PROJECT NUMBER :** 40546-SYD-G
**SKETCH TITLE:** Insulation Mark-up
**AUTHOR :** Ray Leung
**DATE :** 14/09/2018

1 BASEMENT PLAN 1
1 : 200

A1

**Key Plan:**



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| Rv | Amendment | By | Ck | Date |
|---|---|---|---|---|

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S Parsons Architect No.6098
D Jones Architect No.4778

**Project** PA016906.01

St Basils Bexley

62 - 82 HARROW ROAD, BEXLEY, NSW 2207

**Title**

BASEMENT PLAN 1

**Drawing Number** A-DA-05

**Revision**

**Status**
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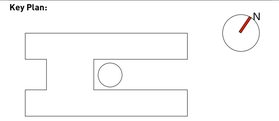
## Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Ceiling Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

WOOD & GRIEVE ENGINEERS

**PROJECT :**
**PROJECT NUMBER :** 40546-SYD-G
**SKETCH TITLE:** Insulation Mark-up
**AUTHOR :** Ray Leung
**DATE :** 14/09/2018

**Key Plan:**



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**Project** PA016906.01

# St Basils Bexley

62 - 82 HARROW ROAD, BEXLEY, NSW 2207

**Title**

## GROUND FLOOR PLAN

**Drawing Number** A-DA-06

**Revision**

**Status** FOR REVIEW

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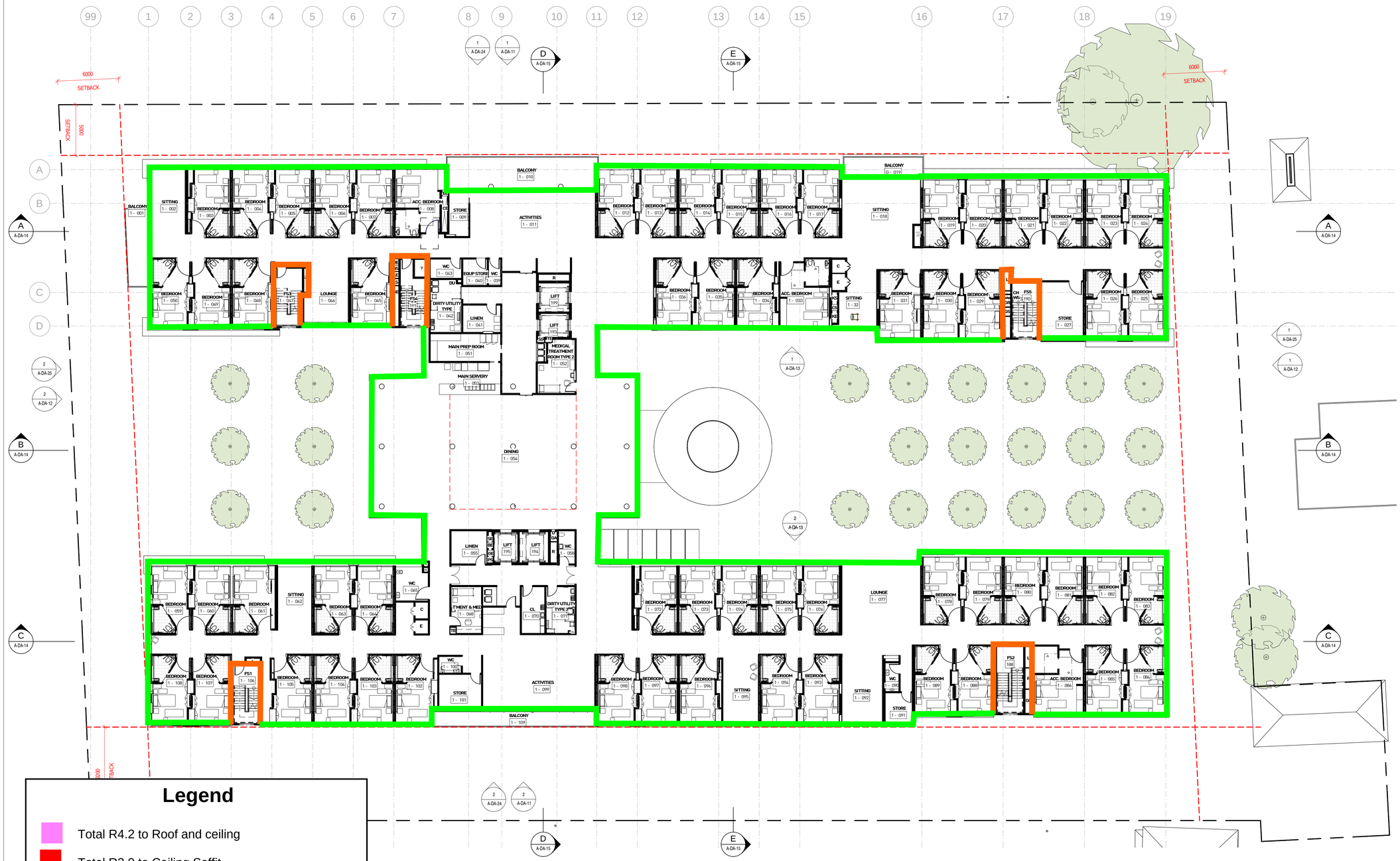


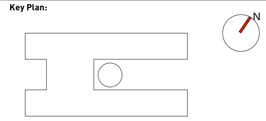

## Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Ceiling Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

WOOD & GRIEVE ENGINEERS

**PROJECT :**
**PROJECT NUMBER :** 40546-SYD-G
**SKETCH TITLE:** Insulation Mark-up
**AUTHOR :** Ray Leung
**DATE :** 14/09/2018

**Key Plan:**



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**Project** PA016906.01

# St Basils Bexley

62 - 82 HARROW ROAD, BEXLEY, NSW 2207

**Title**

LEVEL 1 FLOOR PLAN

**Drawing Number** A-DA-07

**Revision**

**Status**
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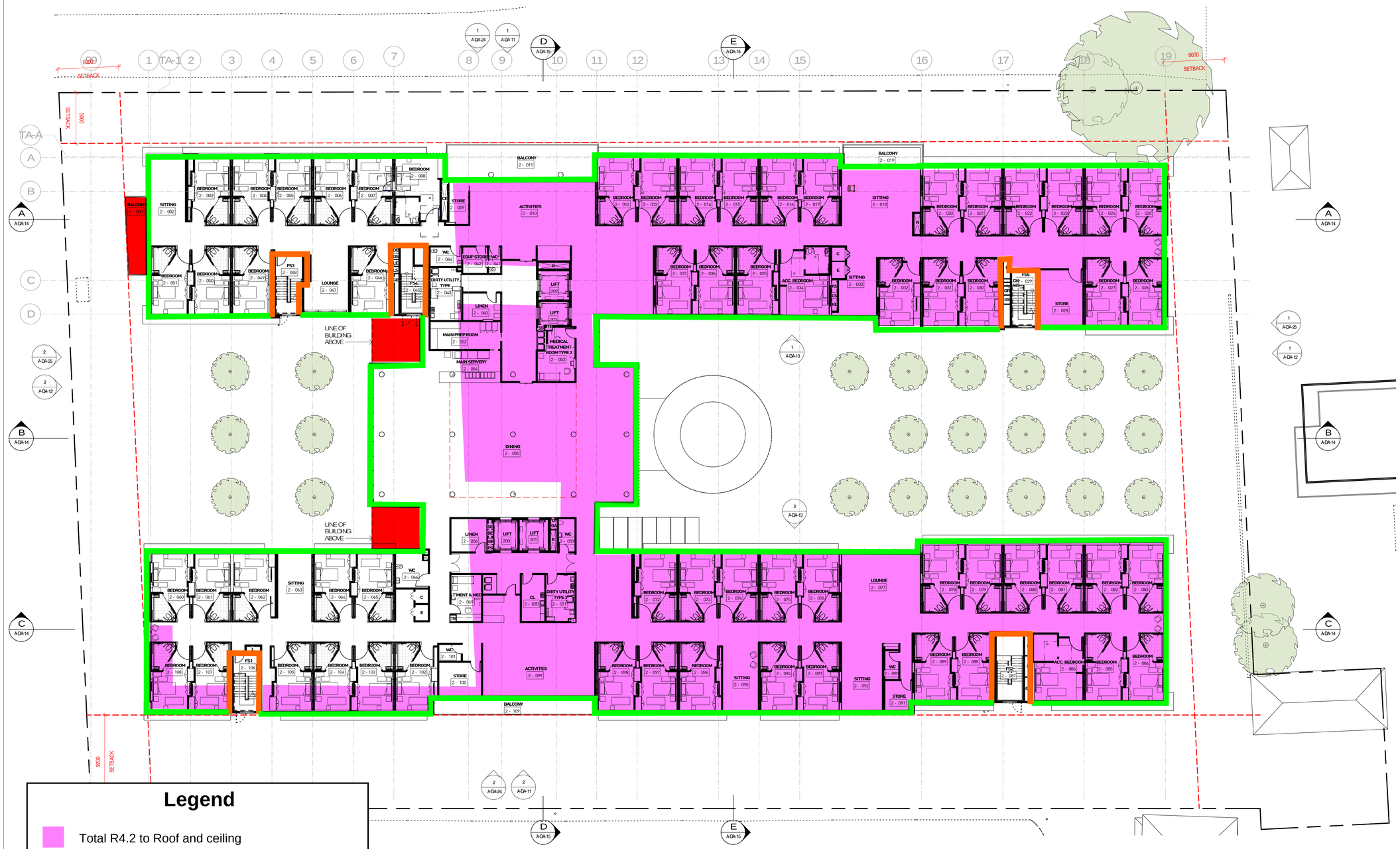


## Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Ceiling Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

WOOD & GRIEVE ENGINEERS

**PROJECT :**
**PROJECT NUMBER :** 40546-SYD-G
**SKETCH TITLE:** Insulation Mark-up
**AUTHOR :** Ray Leung
**DATE :** 14/09/2018

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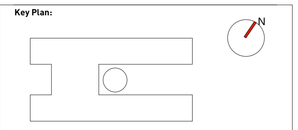
**Key Plan:**



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**Project** PA016906.01

# St Basils Bexley

62 - 82 HARROW ROAD, BEXLEY, NSW 2207

**Title**

LEVEL 2 FLOOR PLAN

**Drawing Number** A-DA-08

**Revision**

**Status** FOR REVIEW

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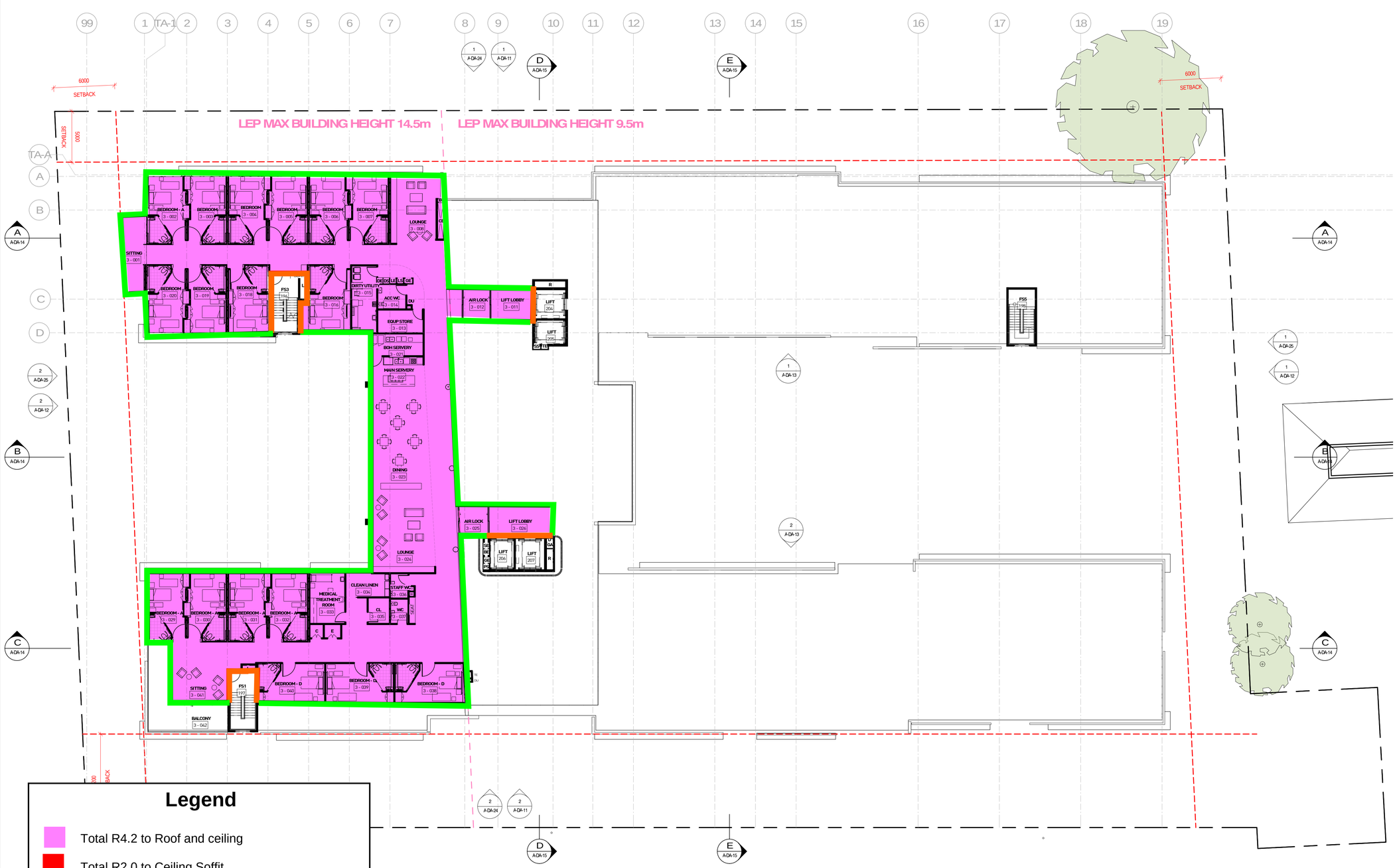


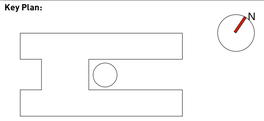

## Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Ceiling Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

WOOD & GRIEVE ENGINEERS

**PROJECT :**
**PROJECT NUMBER :** 40546-SYD-G
**SKETCH TITLE:** Insulation Mark-up
**AUTHOR :** Ray Leung
**DATE :** 14/09/2018

**Key Plan:**



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| Rv | Amendment | By | Ck | Date |
|---|---|---|---|---|

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D Jones Architect No.4778

**Project** PA016906.01

# St Basils Bexley

62 - 82 HARROW ROAD, BEXLEY, NSW 2207

**Title**

## LEVEL 3 FLOOR PLAN

0 1 2 5 10 15m

**Drawing Number** A-DA-09

**Revision**

**Status** FOR REVIEW

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# APPENDIX B Occupancy and Operational Profiles

The below tables are an extract from NCC Volume One Section J, Specification JV, Occupancy and Operational profiles.

**Class 9C Profiles**

| Hours of Day | Occupancy | Occupancy | Lighting | Lighting | HVAC | HVAC |
|---|---|---|---|---|---|---|
| (Local Standard Time) | (Monday – Friday) | (Saturday, Sunday and holidays) | (Daily) | (Daily) | (Monday – Friday) | (Saturday, Sunday and holidays) |
| 12:00am to 1:00am | 85% | 85% | 5% | 100% | On | On |
| 1:00am to 2:00am | 85% | 85% | 5% | 100% | On | On |
| 2:00am to 3:00am | 85% | 85% | 5% | 100% | On | On |
| 3:00am to 4:00am | 85% | 85% | 5% | 100% | On | On |
| 4:00am to 5:00am | 85% | 85% | 5% | 100% | On | On |
| 5:00am to 6:00am | 85% | 85% | 25% | 100% | On | On |
| 6:00am to 7:00am | 85% | 85% | 80% | 100% | On | On |
| 7:00am to 8:00am | 80% | 85% | 80% | 100% | On | On |
| 8:00am to 9:00am | 50% | 50% | 50% | 100% | On | On |
| 9:00am to 10:00am | 10% | 50% | 20% | 100% | Off | On |
| 10:00am to 11:00am | 10% | 20% | 20% | 100% | Off | Off |
| 11:00am to 12:00am | 10% | 20% | 20% | 100% | Off | Off |
| 12:00pm to 1:00pm | 10% | 20% | 20% | 100% | Off | Off |
| 1:00pm to 2:00pm | 10% | 20% | 20% | 100% | Off | Off |
| 2:00pm to 3:00pm | 10% | 20% | 20% | 100% | Off | Off |
| 3:00pm to 4:00pm | 10% | 30% | 20% | 100% | Off | Off |
| 4:00pm to 5:00pm | 50% | 50% | 20% | 100% | On | On |
| 5:00pm to 6:00pm | 50% | 50% | 50% | 100% | On | On |
| 6:00pm to 7:00pm | 70% | 50% | 50% | 100% | On | Off |
| 7:00pm to 8:00pm | 70% | 70% | 50% | 100% | On | Off |
| 8:00pm to 9:00pm | 80% | 80% | 50% | 100% | On | Off |
| 9:00pm to 10:00pm | 85% | 80% | 50% | 100% | On | Off |
| 10:00pm to 11:00pm | 85% | 85% | 50% | 100% | On | Off |
| 11:00pm to 12:00pm | 85% | 85% | 5% | 100% | On | Off |
| **Equivalent Peak Hours** | **13.7** | **14.6** | **7.3** | **24.0** | **17** | **12** |

**Class 9b Profiles**

| Hours of Day | Occupancy | Lighting | Equipment | HVAC |
|---|---|---|---|---|
| (Local Standard Time) | **(Monday – Friday)** | **(Monday – Friday)** | **(Monday – Friday)** | **(Monday – Friday)** |
| 12:00am to 1:00am | 0% | 5% | 5% | Off |
| 1:00am to 2:00am | 0% | 5% | 5% | Off |
| 2:00am to 3:00am | 0% | 5% | 5% | Off |
| 3:00am to 4:00am | 0% | 5% | 5% | Off |
| 4:00am to 5:00am | 0% | 5% | 5% | Off |
| 5:00am to 6:00am | 0% | 5% | 5% | Off |
| 6:00am to 7:00am | 0% | 5% | 5% | Off |
| 7:00am to 8:00am | 5% | 30% | 30% | On |
| 8:00am to 9:00am | 75% | 85% | 85% | On |
| 9:00am to 10:00am | 90% | 95% | 95% | On |
| 10:00am to 11:00am | 90% | 95% | 95% | On |
| 11:00am to 12:00am | 90% | 95% | 95% | On |
| 12:00pm to 1:00pm | 50% | 80% | 70% | On |
| 1:00pm to 2:00pm | 50% | 80% | 70% | On |
| 2:00pm to 3:00pm | 90% | 95% | 95% | On |
| 3:00pm to 4:00pm | 70% | 90% | 80% | On |
| 4:00pm to 5:00pm | 50% | 70% | 60% | On |
| 5:00pm to 6:00pm | 20% | 20% | 20% | Off |
| 6:00pm to 7:00pm | 20% | 20% | 20% | Off |
| 7:00pm to 8:00pm | 20% | 20% | 20% | Off |
| 8:00pm to 9:00pm | 10% | 10% | 10% | Off |
| 9:00pm to 10:00pm | 5% | 5% | 5% | Off |
| 10:00pm to 11:00pm | 5% | 5% | 5% | Off |
| 11:00pm to 12:00pm | 5% | 5% | 5% | Off |
| **Equivalent Peak Hours** | **7.5** | **9.4** | **9.0** | **10.0** |

# APPENDIX C Part J1 – Building Fabric

The following prescriptive performance requirements for the building envelope must be adhered to, as per the NCC. For further information, please refer to the relevant Section J part of the NCC 2016:

**J1.2 – Thermal Construction General**

Insulation must comply with AS/NZS 4859.1 and be installed so that it:

- Abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must butt against the member; and
- Forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
- Does not affect the safe or effective operation of a service or fitting.
- Reflective insulation must be installed with:
  - The necessary airspace to achieve the required R-value between a reflective side of the reflective insulation and a building lining or cladding; and
  - The reflective insulation closely fitted against any penetration, door or window opening; and
  - The reflective insulation adequately supported by framing members; and
  - Each adjoining sheet of roll membrane being:
    - Overlapped not less than 50mm; or
    - Taped together

Bulk insulation must be installed so that:

- It maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
- In a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50mm

**J1.3 (d) – Roof and ceiling construction**

- A roof that –
  - Is required to achieve a minimum Total R-Value; and
  - has a metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and
  - does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens

  must have a thermal break, consisting of a material with an R-Value of not less than R0.2, installed between the metal sheet roofing and its supporting purlins, metal rafters or metal battens.

**J1.5 (c) – Walls**

- A wall that –
  - Is required to achieve a minimum Total R-Value; and
  - has a lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to a metal fame; and
  - does not have a wall lining or has a wall lining 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 metal sheet roofing and its supporting purlins, metal rafters or metal battens.

**J1.6 (a) – Floors**

A floor that is part of the envelope of a building, other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, including a floor above or below a carpark or a plant room –

- Must achieve the total R-Value specified in table J1.6; and
- With an in-slab or in-screed heating or cooling system, must be insulated around the vertical edge of its perimeter with insulation having an R-Value of not less than 1.0.

**J1.6 (b) – Floors**

In climate zones 1 to 6, the minimum Total R-Value required in (a) may be reduced by R0.5 provided R0.75 is added to the Total R-Value required for the roof and ceiling construction.

**J1.6 (c) – Floors**

A concrete slab-on-ground-

- With an in-slab or in-screed heating or cooling system; or
- Located in climate zone 8,

Must have insulation installed around the vertical edge of its perimeter.

**J1.6 (d) – Floors**

Insulation required by (c) must-

- Have an R-Value of not less than 1.0; and
- Be water resistant; and
- Be continuous from the adjacent finished ground level-
  - To a depth of not less than 300mm; or
  - For the full depth of the vertical edge of the concrete slab-on-ground.

**J1.6 (e) – Floors**

The requirements of (a)(ii) and (c)(i) do not apply to an in-screed heating or cooling system used solely in a bathroom, amenity area or the like.

# APPENDIX D Part J2 – DTS Glazing Calculator

# NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **St Basils Bexley**

Application: **other**

Climate zone: **5**

Storey: **GF**

Facade areas

| | N | NE | E | SE | S | SW | W | NW | internal |
|---|---|---|---|---|---|---|---|---|---|
| Option A | | 115m² | | 318m² | | 138m² | | 346m² | |
| Option B | | | | | | | | | n/a |
| *Glazing area (A)* | | *74.7m²* | | *275m²* | | *97.3m²* | | *251m²* | |

Number of rows preferred in table below: **21** *(as currently displayed)*

| GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS | | | | | | | | | | | SHADING | | CALCULATED OUTCOMES OK (if inputs are valid) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glazing element | | Facing sector | | Size | | | Performance | | | | P&H or device | | Shading | | Multipliers | | Size | Outcomes |
| ID | Description (optional) | Option A facades | Option B facades | Height (m) | Width (m) | Area (m²) | Total System U-Value (AFRC) | Total System SHGC (AFRC) | | | P (m) | H (m) | P/H | G (m) | Heating ($S_H$) | Cooling ($S_C$) | Area used (m²) | Element share of % of allowance used |
| 1 | Wnw6 | NW | | 3.20 | 26.50 | | 8.0 | 0.28 | | | | | | 0.00 | 1.00 | 1.00 | 84.80 | 38% of 99% |
| 2 | Wnw7 | NW | | 3.20 | 3.00 | | 8.0 | 0.28 | | | | | | 0.00 | 1.00 | 1.00 | 9.60 | 4% of 99% |
| 3 | Wnw8 | NW | | 3.20 | 4.33 | | 8.0 | 0.28 | | | | | | 0.00 | 1.00 | 1.00 | 13.86 | 6% of 99% |
| 4 | Wnw9 | NW | | 3.20 | 5.28 | | 8.0 | 0.28 | | | | | | 0.00 | 1.00 | 1.00 | 16.90 | 8% of 99% |
| 5 | Wnw10 | NW | | 3.20 | 29.24 | | 8.0 | 0.28 | | | | | | 0.00 | 1.00 | 1.00 | 93.57 | 42% of 99% |
| 6 | Wnw11 | NW | | 3.20 | 2.83 | | 8.0 | 0.28 | | | 6.950 | 3.800 | 1.83 | 0.60 | 0.46 | 0.38 | 9.06 | 1% of 99% |
| 7 | Wnw12 | NW | | 3.20 | 7.30 | | 8.0 | 0.28 | | | 9.000 | 3.800 | 2.37 | 0.60 | 0.35 | 0.35 | 23.36 | 2% of 99% |
| 8 | Wsw5 | SW | | 3.20 | 9.50 | | 2.6 | 0.80 | | | 6.850 | 3.800 | 1.80 | 0.60 | 0.71 | 0.57 | 30.40 | 25% of 99% |
| 9 | Wsw6 | SW | | 3.20 | 15.90 | | 2.6 | 0.80 | | | 2.200 | 3.800 | 0.58 | 0.60 | 0.93 | 0.89 | 50.88 | 62% of 99% |
| 10 | Wsw7 | SW | | 3.20 | 3.50 | | 2.6 | 0.80 | | | 9.000 | 3.800 | 2.37 | 0.60 | 0.67 | 0.54 | 11.20 | 9% of 99% |
| 11 | Wsw8 | SW | | 3.20 | 1.50 | | 2.6 | 0.80 | | | 22.000 | 3.800 | 5.79 | 0.60 | 0.67 | 0.54 | 4.80 | 4% of 99% |
| 12 | Wse9 | SE | | 3.20 | 5.56 | | 1.0 | 0.50 | | | | | | 0.00 | 1.00 | 1.00 | 17.79 | 7% of 100% |
| 13 | Wse10 | SE | | 3.20 | 5.11 | | 1.0 | 0.50 | | | | | | 0.00 | 1.00 | 1.00 | 16.35 | 6% of 100% |
| 14 | Wse11 | SE | | 3.20 | 11.60 | | 1.0 | 0.50 | | | 2.500 | 3.800 | 0.66 | 0.60 | 0.91 | 0.85 | 37.12 | 12% of 100% |
| 15 | Wse12 | SE | | 3.20 | 12.68 | | 1.0 | 0.50 | | | 2.850 | 3.800 | 0.75 | 0.60 | 0.89 | 0.83 | 40.58 | 13% of 100% |
| 16 | Wse13 | SE | | 3.20 | 37.87 | | 1.0 | 0.50 | | | 1.350 | 3.800 | 0.36 | 0.60 | 0.97 | 0.95 | 121.18 | 45% of 100% |
| 17 | Wse14 | SE | | 3.20 | 12.97 | | 1.0 | 0.50 | | | 0.400 | 3.800 | 0.11 | 0.60 | 0.99 | 0.99 | 41.50 | 16% of 100% |
| 18 | Wne5 | NE | | 3.20 | 9.50 | | 8.0 | 0.40 | | | 5.100 | 3.800 | 1.34 | 0.60 | 0.74 | 0.54 | 30.40 | 34% of 100% |
| 19 | Wne6 | NE | | 3.20 | 5.38 | | 8.0 | 0.40 | | | 10.400 | 3.800 | 2.74 | 0.60 | 0.30 | 0.36 | 17.22 | 11% of 100% |
| 20 | Wne7 | NE | | 3.20 | 2.05 | | 8.0 | 0.40 | | | 7.600 | 3.800 | 2.00 | 0.60 | 0.30 | 0.36 | 6.56 | 4% of 100% |
| 21 | Wne8 | NE | | 3.20 | 6.40 | | 8.0 | 0.40 | | | 0.350 | 3.800 | 0.09 | 0.60 | 1.00 | 0.99 | 20.48 | 50% of 100% |

# NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **St Basils Bexley**

Application: **Class 9c aged care**

Climate zone: **5**

Storey: **GF**

Facade areas

| | N | NE | E | SE | S | SW | W | NW | internal |
|---|---|---|---|---|---|---|---|---|---|
| Option A | | 73.3m² | | 315m² | | 73.3m² | | 356m² | |
| Option B | | | | | | | | | n/a |
| *Glazing area (A)* | | 22.6m² | | 209m² | | 19.4m² | | 209m² | |

Number of rows preferred in table below: **50** *(as currently displayed)*

| GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS | | | | | | | | | | | SHADING | | CALCULATED OUTCOMES OK (if inputs are valid) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glazing element | | | Facing sector | | Size | | | Performance | | | P&H or device | | Shading | | Multipliers | | Size | Outcomes |
| ID | Description (optional) | | Option A facades | Option B facades | Height (m) | Width (m) | Area (m²) | Total System U-Value (AFRC) | Total System SHGC (AFRC) | | P (m) | H (m) | P/H | G (m) | Heating ($S_H$) | Cooling ($S_C$) | Area used (m²) | Element share of % of allowance used |
| 1 | Wnw1 | | NW | | 2.25 | 27.90 | | 8.0 | 0.23 | | | | | 0.00 | 1.00 | 1.00 | 62.78 | 33% of 98% |
| 2 | Wnw2 | | NW | | 3.20 | 17.55 | | 8.0 | 0.23 | | 0.650 | 3.500 | 0.19 | 0.30 | 0.99 | 0.95 | 56.16 | 27% of 98% |
| 3 | Wnw3 | | NW | | 2.25 | 9.30 | | 8.0 | 0.23 | | | | | 0.00 | 1.00 | 1.00 | 20.93 | 11% of 98% |
| 4 | Wnw4 | | NW | | 3.55 | 7.47 | | 8.0 | 0.23 | | 2.200 | 3.800 | 0.58 | 0.25 | 0.91 | 0.69 | 26.52 | 7% of 98% |
| 5 | Wnw5 | | NW | | 2.25 | 18.78 | | 8.0 | 0.23 | | | | | 0.00 | 1.00 | 1.00 | 42.26 | 22% of 98% |
| 6 | Wse1 | | SE | | 2.25 | 9.30 | | 2.8 | 0.10 | | | | | 0.00 | 1.00 | 1.00 | 20.93 | 10% of 99% |
| 7 | Wse2 | | SE | | 3.20 | 8.49 | | 2.8 | 0.10 | | | | | 0.00 | 1.00 | 1.00 | 27.17 | 13% of 99% |
| 8 | Wse3 | | SE | | 3.20 | 15.50 | | 2.8 | 0.10 | | Device | | 2.00 | 0.00 | 0.39 | 0.32 | 49.60 | 21% of 99% |
| 9 | Wse4 | | SE | | 3.20 | 8.78 | | 2.8 | 0.10 | | | | | 0.00 | 1.00 | 1.00 | 28.10 | 14% of 99% |
| 10 | Wse5 | | SE | | 2.25 | 10.82 | | 2.8 | 0.10 | | | | | 0.00 | 1.00 | 1.00 | 24.35 | 12% of 99% |
| 11 | Wse6 | | SE | | 3.55 | 8.47 | | 2.8 | 0.10 | | | | | 0.00 | 1.00 | 1.00 | 30.07 | 15% of 99% |
| 12 | Wse7 | | SE | | 2.25 | 6.20 | | 2.8 | 0.10 | | | | | 0.00 | 1.00 | 1.00 | 13.95 | 7% of 99% |
| 13 | Wse8 | | SE | | 2.25 | 6.38 | | 2.8 | 0.10 | | | | | 0.00 | 1.00 | 1.00 | 14.36 | 7% of 99% |
| 14 | Wsw1 | | SW | | 2.25 | 1.20 | | 7.9 | 0.10 | | | | | 0.00 | 1.00 | 1.00 | 2.70 | 14% of 100% |
| 15 | Wsw2 | | SW | | 2.06 | 1.64 | | 7.9 | 0.10 | | 2.140 | 3.800 | 0.56 | 1.74 | 0.96 | 0.93 | 3.38 | 17% of 100% |
| 16 | Wsw3 | | SW | | 2.25 | 1.20 | | 7.9 | 0.10 | | | | | 0.00 | 1.00 | 1.00 | 2.70 | 14% of 100% |
| 17 | Wsw4 | | SW | | 3.20 | 3.32 | | 7.9 | 0.10 | | 2.000 | 3.800 | 0.53 | 0.60 | 0.94 | 0.90 | 10.62 | 55% of 100% |
| 18 | Wne1 | | NE | | 2.25 | 1.20 | | 8.0 | 0.29 | | | | | 0.00 | 1.00 | 1.00 | 2.70 | 12% of 97% |
| 19 | Wne2 | | NE | | 3.55 | 2.14 | | 8.0 | 0.29 | | | | | 0.00 | 1.00 | 1.00 | 7.60 | 34% of 97% |
| 20 | Wne3 | | NE | | 2.25 | 1.20 | | 8.0 | 0.29 | | | | | 0.00 | 1.00 | 1.00 | 2.70 | 12% of 97% |
| 21 | Wne4 | | NE | | 3.20 | 3.00 | | 8.0 | 0.29 | | | | | 0.00 | 1.00 | 1.00 | 9.60 | 42% of 97% |
| 22 | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |

# NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **St Basils Bexley**

Application: **Class 9c aged care**

Climate zone: **5**

Storey: **1F**

Facade areas

| | N | NE | E | SE | S | SW | W | NW | internal |
|---|---|---|---|---|---|---|---|---|---|
| Option A | | 182m² | | 544m² | | 189m² | | 593m² | |
| Option B | | | | | | | | | n/a |
| *Glazing area (A)* | | *90.3m²* | | *273m²* | | *106m²* | | *304m²* | |

Number of rows preferred in table below: **48** *(as currently displayed)*

| GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS | | | | | | | | | | | SHADING | | CALCULATED OUTCOMES OK (if inputs are valid) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glazing element | | | Facing sector | | Size | | | Performance | | | P&H or device | | Shading | | Multipliers | | Size | Outcomes |
| ID | Description (optional) | | Option A facades | Option B facades | Height (m) | Width (m) | Area (m²) | Total System U-Value (AFRC) | Total System SHGC (AFRC) | | P (m) | H (m) | P/H | G (m) | Heating ($S_H$) | Cooling ($S_C$) | Area used (m²) | Element share of % of allowance used |
| 1 | Wnw1 | | NW | | 2.80 | 3.45 | | 8.0 | 0.30 | | 0.700 | 2.800 | 0.25 | 0.00 | 0.93 | 0.80 | 9.66 | 3% of 99% |
| 2 | Wnw2 | | NW | | 1.80 | 18.60 | | 8.0 | 0.30 | | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 33.48 | 9% of 99% |
| 3 | Wnw3 | | NW | | 3.10 | 12.35 | | 8.0 | 0.30 | | 3.400 | 3.350 | 1.01 | 0.25 | 0.68 | 0.45 | 38.29 | 5% of 99% |
| 4 | Wnw4 | | NW | | 1.80 | 18.60 | | 8.0 | 0.30 | | | | | 0.00 | 1.00 | 1.00 | 33.48 | 15% of 99% |
| 5 | Wnw5 | | NW | | 3.10 | 7.70 | | 8.0 | 0.30 | | 2.200 | 3.350 | 0.66 | 0.25 | 0.87 | 0.65 | 23.87 | 6% of 99% |
| 6 | Wnw6 | | NW | | 1.80 | 18.60 | | 8.0 | 0.30 | | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 33.48 | 9% of 99% |
| 7 | Wnw7 | | NW | | 1.80 | 9.30 | | 8.0 | 0.30 | | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 16.74 | 4% of 99% |
| 8 | Wnw8 | | NW | | 3.10 | 3.10 | | 8.0 | 0.30 | | | | | 0.00 | 1.00 | 1.00 | 9.61 | 4% of 99% |
| 9 | Wnw9 | | NW | | 1.80 | 6.20 | | 8.0 | 0.30 | | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 11.16 | 3% of 99% |
| 10 | Wnw10 | | NW | | 3.10 | 3.15 | | 8.0 | 0.30 | | | | | 0.00 | 1.00 | 1.00 | 9.77 | 4% of 99% |
| 11 | Wnw11 | | NW | | 1.80 | 15.50 | | 8.0 | 0.30 | | | | | 0.00 | 1.00 | 1.00 | 27.90 | 13% of 99% |
| 12 | Wnw12 | | NW | | 3.10 | 7.40 | | 8.0 | 0.30 | | | | | 0.00 | 1.00 | 1.00 | 22.94 | 10% of 99% |
| 13 | Wnw13 | | NW | | 1.80 | 18.60 | | 8.0 | 0.30 | | | | | 0.00 | 1.00 | 1.00 | 33.48 | 15% of 99% |
| 14 | Wse1 | | SE | | 1.80 | 9.30 | | 2.0 | 0.37 | | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 16.74 | 5% of 100% |
| 15 | Wse2 | | SE | | 3.10 | 4.20 | | 2.0 | 0.37 | | | | | 0.00 | 1.00 | 1.00 | 13.02 | 5% of 100% |
| 16 | Wse3 | | SE | | 1.80 | 3.10 | | 2.0 | 0.37 | | | | | 0.00 | 1.00 | 1.00 | 5.58 | 2% of 100% |
| 17 | Wse4 | | SE | | 3.10 | 5.28 | | 2.0 | 0.37 | | | | | 0.00 | 1.00 | 1.00 | 16.37 | 6% of 100% |
| 18 | Wse5 | | SE | | 1.80 | 9.30 | | 2.0 | 0.37 | | | | | 0.00 | 1.00 | 1.00 | 16.74 | 6% of 100% |
| 19 | Wse6 | | SE | | 1.80 | 4.62 | | 2.0 | 0.37 | | | | | 0.00 | 1.00 | 1.00 | 8.32 | 3% of 100% |
| 20 | Wse7 | | SE | | 3.10 | 4.15 | | 2.0 | 0.37 | | | | | 0.00 | 1.00 | 1.00 | 12.87 | 5% of 100% |
| 21 | Wse8 | | SE | | 1.80 | 9.79 | | 2.0 | 0.37 | | | | | 0.00 | 1.00 | 1.00 | 17.62 | 7% of 100% |
| 22 | Wse9 | | SE | | 1.80 | 6.20 | | 2.0 | 0.37 | | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 11.16 | 3% of 100% |
| 23 | Wse10 | | SE | | 1.80 | 6.20 | | 2.0 | 0.37 | | | | | 0.00 | 1.00 | 1.00 | 11.16 | 4% of 100% |
| 24 | Wse11 | | SE | | 1.80 | 12.40 | | 2.0 | 0.37 | | | | | 0.00 | 1.00 | 1.00 | 22.32 | 8% of 100% |
| 25 | Wse12 | | SE | | 3.10 | 11.00 | | 2.0 | 0.37 | | 1.450 | 3.350 | 0.43 | 0.25 | 0.88 | 0.83 | 34.10 | 11% of 100% |

| GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS | | | | | | | | | SHADING | | CALCULATED OUTCOMES OK (if inputs are valid) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glazing element | | Facing sector | | Size | | | Performance | | P&H or device | | Shading | | Multipliers | | Size | Outcomes |
| ID | Description (optional) | Option A facades | Option B facades | Height (m) | Width (m) | Area (m²) | Total System U-Value (AFRC) | Total System SHGC (AFRC) | P (m) | H (m) | P/H | G (m) | Heating ($S_H$) | Cooling ($S_C$) | Area used (m²) | Element share of % of allowance used |
| 26 | Wse13 | SE | | 1.80 | 9.30 | | 2.0 | 0.37 | | | | 0.00 | 1.00 | 1.00 | 16.74 | 6% of 100% |
| 27 | Wse14 | SE | | 3.10 | 3.10 | | 2.0 | 0.37 | | | | 0.00 | 1.00 | 1.00 | 9.61 | 4% of 100% |
| 28 | Wse15 | SE | | 1.80 | 6.20 | | 2.0 | 0.37 | | | | 0.00 | 1.00 | 1.00 | 11.16 | 4% of 100% |
| 29 | Wse16 | SE | | 3.10 | 6.92 | | 2.0 | 0.37 | | | | 0.00 | 1.00 | 1.00 | 21.45 | 8% of 100% |
| 30 | Wse17 | SE | | 1.80 | 6.20 | | 2.0 | 0.37 | | | | 0.00 | 1.00 | 1.00 | 11.16 | 4% of 100% |
| 31 | Wse18 | SE | | 1.80 | 9.30 | | 2.0 | 0.37 | | | | 0.00 | 1.00 | 1.00 | 16.74 | 6% of 100% |
| 32 | Wsw1 | SW | | 2.85 | 9.05 | | 2.0 | 0.43 | 2.100 | 3.350 | 0.63 | 0.50 | 0.84 | 0.76 | 25.79 | 21% of 100% |
| 33 | Wsw2 | SW | | 1.80 | 1.20 | | 2.0 | 0.43 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.76 | 2.16 | 2% of 100% |
| 34 | Wsw3 | SW | | 3.10 | 4.60 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 14.26 | 14% of 100% |
| 35 | Wsw4 | SW | | 3.10 | 12.90 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 39.99 | 40% of 100% |
| 36 | Wsw5 | SW | | 3.10 | 4.17 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 12.93 | 13% of 100% |
| 37 | Wsw6 | SW | | 1.80 | 1.20 | | 2.0 | 0.43 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.76 | 2.16 | 2% of 100% |
| 38 | Wsw7 | SW | | 3.10 | 2.00 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 6.20 | 6% of 100% |
| 39 | Wsw8 | SW | | 1.80 | 1.20 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 2.16 | 2% of 100% |
| 40 | Wne1 | NE | | 1.80 | 1.20 | | 8.0 | 0.21 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.69 | 2.16 | 1% of 100% |
| 41 | Wne2 | NE | | 3.10 | 2.15 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 6.67 | 8% of 100% |
| 42 | Wne3 | NE | | 1.80 | 1.20 | | 8.0 | 0.21 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.69 | 2.16 | 1% of 100% |
| 43 | Wne4 | NE | | 3.10 | 4.70 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 14.57 | 16% of 100% |
| 44 | Wne5 | NE | | 3.10 | 12.90 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 39.99 | 45% of 100% |
| 45 | Wne6 | NE | | 3.10 | 4.68 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 14.51 | 16% of 100% |
| 46 | Wne7 | NE | | 1.80 | 1.20 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 2.16 | 2% of 100% |
| 47 | Wne8 | NE | | 3.10 | 1.90 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 5.89 | 7% of 100% |
| 48 | Wne9 | NE | | 1.80 | 1.20 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 2.16 | 2% of 100% |

**IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR**

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters.
While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all.
Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

***if inputs are valid***

# NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **St Basils Bexley**

Application: **Class 9c aged care**

Climate zone: **5**

Storey: **2F**

Facade areas

| | N | NE | E | SE | S | SW | W | NW | internal |
|---|---|---|---|---|---|---|---|---|---|
| Option A | | 182m² | | 544m² | | 189m² | | 593m² | |
| Option B | | | | | | | | | n/a |
| *Glazing area (A)* | | *90.3m²* | | *273m²* | | *106m²* | | *304m²* | |

Number of rows preferred in table below: **48** *(as currently displayed)*

| GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS | | | | | | | | | SHADING | | CALCULATED OUTCOMES OK (if inputs are valid) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glazing element | | Facing sector | | Size | | | Performance | | P&H or device | | Shading | | Multipliers | | Size | Outcomes |
| ID | Description (optional) | Option A facades | Option B facades | Height (m) | Width (m) | Area (m²) | Total System U-Value (AFRC) | Total System SHGC (AFRC) | P (m) | H (m) | P/H | G (m) | Heating ($S_H$) | Cooling ($S_C$) | Area used (m²) | Element share of % of allowance used |
| 1 | Wnw1 | NW | | 2.80 | 3.45 | | 8.0 | 0.30 | 0.700 | 2.800 | 0.25 | 0.00 | 0.93 | 0.80 | 9.66 | 3% of 99% |
| 2 | Wnw2 | NW | | 1.80 | 18.60 | | 8.0 | 0.30 | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 33.48 | 9% of 99% |
| 3 | Wnw3 | NW | | 3.10 | 12.35 | | 8.0 | 0.30 | | | | 0.00 | 1.00 | 1.00 | 38.29 | 17% of 99% |
| 4 | Wnw4 | NW | | 1.80 | 18.60 | | 8.0 | 0.30 | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 33.48 | 9% of 99% |
| 5 | Wnw5 | NW | | 3.10 | 7.70 | | 8.0 | 0.30 | | | | 0.00 | 1.00 | 1.00 | 23.87 | 11% of 99% |
| 6 | Wnw6 | NW | | 1.80 | 18.60 | | 8.0 | 0.30 | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 33.48 | 9% of 99% |
| 7 | Wnw7 | NW | | 1.80 | 9.30 | | 8.0 | 0.30 | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 16.74 | 4% of 99% |
| 8 | Wnw8 | NW | | 3.10 | 3.10 | | 8.0 | 0.30 | | | | 0.00 | 1.00 | 1.00 | 9.61 | 4% of 99% |
| 9 | Wnw9 | NW | | 1.80 | 6.20 | | 8.0 | 0.30 | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 11.16 | 3% of 99% |
| 10 | Wnw10 | NW | | 3.10 | 3.15 | | 8.0 | 0.30 | | | | 0.00 | 1.00 | 1.00 | 9.77 | 4% of 99% |
| 11 | Wnw11 | NW | | 1.80 | 15.50 | | 8.0 | 0.30 | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 27.90 | 7% of 99% |
| 12 | Wnw12 | NW | | 3.10 | 7.40 | | 8.0 | 0.30 | | | | 0.00 | 1.00 | 1.00 | 22.94 | 10% of 99% |
| 13 | Wnw13 | NW | | 1.80 | 18.60 | | 8.0 | 0.30 | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 33.48 | 9% of 99% |
| 14 | Wse1 | SE | | 1.80 | 9.30 | | 2.0 | 0.41 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 16.74 | 5% of 100% |
| 15 | Wse2 | SE | | 3.10 | 4.20 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 13.02 | 5% of 100% |
| 16 | Wse3 | SE | | 1.80 | 3.10 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 5.58 | 2% of 100% |
| 17 | Wse4 | SE | | 3.10 | 5.28 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 16.37 | 7% of 100% |
| 18 | Wse5 | SE | | 1.80 | 9.30 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 16.74 | 7% of 100% |
| 19 | Wse6 | SE | | 1.80 | 4.62 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 8.32 | 3% of 100% |
| 20 | Wse7 | SE | | 3.10 | 4.15 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 12.87 | 5% of 100% |
| 21 | Wse8 | SE | | 1.80 | 9.79 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 17.62 | 7% of 100% |
| 22 | Wse9 | SE | | 1.80 | 6.20 | | 2.0 | 0.41 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 11.16 | 4% of 100% |
| 23 | Wse10 | SE | | 1.80 | 6.20 | | 2.0 | 0.41 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 11.16 | 4% of 100% |
| 24 | Wse11 | SE | | 1.80 | 12.40 | | 2.0 | 0.41 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 22.32 | 7% of 100% |
| 25 | Wse12 | SE | | 3.10 | 11.00 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 34.10 | 14% of 100% |

| GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS | | | | | | | | | SHADING | | CALCULATED OUTCOMES OK (if inputs are valid) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glazing element | | Facing sector | | Size | | | Performance | | P&H or device | | Shading | | Multipliers | | Size | Outcomes |
| ID | Description (optional) | Option A facades | Option B facades | Height (m) | Width (m) | Area (m²) | Total System U-Value (AFRC) | Total System SHGC (AFRC) | P (m) | H (m) | P/H | G (m) | Heating ($S_H$) | Cooling ($S_C$) | Area used (m²) | Element share of % of allowance used |
| 26 | Wse13 | SE | | 1.80 | 9.30 | | 2.0 | 0.41 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 16.74 | 5% of 100% |
| 27 | Wse14 | SE | | 3.10 | 3.10 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 9.61 | 4% of 100% |
| 28 | Wse15 | SE | | 1.80 | 6.20 | | 2.0 | 0.41 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 11.16 | 4% of 100% |
| 29 | Wse16 | SE | | 3.10 | 6.92 | | 2.0 | 0.41 | | | | 0.00 | 1.00 | 1.00 | 21.45 | 9% of 100% |
| 30 | Wse17 | SE | | 1.80 | 6.20 | | 2.0 | 0.41 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 11.16 | 4% of 100% |
| 31 | Wse18 | SE | | 1.80 | 9.30 | | 2.0 | 0.41 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 16.74 | 5% of 100% |
| 32 | Wsw1 | SW | | 2.85 | 9.05 | | 2.0 | 0.43 | 2.100 | 3.350 | 0.63 | 0.50 | 0.84 | 0.76 | 25.79 | 21% of 100% |
| 33 | Wsw2 | SW | | 1.80 | 1.20 | | 2.0 | 0.43 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.76 | 2.16 | 2% of 100% |
| 34 | Wsw3 | SW | | 3.10 | 4.60 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 14.26 | 14% of 100% |
| 35 | Wsw4 | SW | | 3.10 | 12.90 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 39.99 | 40% of 100% |
| 36 | Wsw5 | SW | | 3.10 | 4.17 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 12.93 | 13% of 100% |
| 37 | Wsw6 | SW | | 1.80 | 1.20 | | 2.0 | 0.43 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.76 | 2.16 | 2% of 100% |
| 38 | Wsw7 | SW | | 3.10 | 2.00 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 6.20 | 6% of 100% |
| 39 | Wsw8 | SW | | 1.80 | 1.20 | | 2.0 | 0.43 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.76 | 2.16 | 2% of 100% |
| 40 | Wne1 | NE | | 1.80 | 1.20 | | 8.0 | 0.21 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.69 | 2.16 | 1% of 98% |
| 41 | Wne2 | NE | | 3.10 | 2.15 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 6.67 | 8% of 98% |
| 42 | Wne3 | NE | | 1.80 | 1.20 | | 8.0 | 0.21 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.69 | 2.16 | 1% of 98% |
| 43 | Wne4 | NE | | 3.10 | 4.70 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 14.57 | 17% of 98% |
| 44 | Wne5 | NE | | 3.10 | 12.90 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 39.99 | 46% of 98% |
| 45 | Wne6 | NE | | 3.10 | 4.68 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 14.51 | 17% of 98% |
| 46 | Wne7 | NE | | 1.80 | 1.20 | | 8.0 | 0.21 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.69 | 2.16 | 1% of 98% |
| 47 | Wne8 | NE | | 3.10 | 1.90 | | 8.0 | 0.21 | | | | 0.00 | 1.00 | 1.00 | 5.89 | 7% of 98% |
| 48 | Wne9 | NE | | 1.80 | 1.20 | | 8.0 | 0.21 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.69 | 2.16 | 1% of 98% |

**IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR**

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While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all.
Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

***if inputs are valid***

# NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **St Basils Bexley**

Application: **Class 9c aged care**

Climate zone: **5**

Storey: **3F**

Facade areas

| | N | NE | E | SE | S | SW | W | NW | internal |
|---|---|---|---|---|---|---|---|---|---|
| Option A | | 142m² | | 209m² | | 162m² | | 221m² | |
| Option B | | | | | | | | | n/a |
| *Glazing area (A)* | | 129m² | | 78m² | | 85.9m² | | 127m² | |

Number of rows preferred in table below: **27** *(as currently displayed)*

| GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS | | | | | | | | | SHADING | | CALCULATED OUTCOMES OK (if inputs are valid) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glazing element | | Facing sector | | Size | | | Performance | | P&H or device | | Shading | | Multipliers | | Size | Outcomes |
| ID | Description (optional) | Option A facades | Option B facades | Height (m) | Width (m) | Area (m²) | Total System U-Value (AFRC) | Total System SHGC (AFRC) | P (m) | H (m) | P/H | G (m) | Heating ($S_H$) | Cooling ($S_C$) | Area used (m²) | Element share of % of allowance used |
| 1 | Wnw1 | NW | | 3.10 | 2.24 | | 8.0 | 0.25 | | | | 0.00 | 1.00 | 1.00 | 6.94 | 7% of 99% |
| 2 | Wnw2 | NW | | 1.80 | 18.60 | | 8.0 | 0.25 | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 33.48 | 17% of 99% |
| 3 | Wnw3 | NW | | 3.10 | 5.12 | | 8.0 | 0.25 | | | | 0.00 | 1.00 | 1.00 | 15.87 | 15% of 99% |
| 4 | Wnw4 | NW | | 3.10 | 8.19 | | 8.0 | 0.25 | | | | 0.00 | 1.00 | 1.00 | 25.39 | 24% of 99% |
| 5 | Wnw5 | NW | | 1.80 | 9.30 | | 8.0 | 0.25 | 0.700 | 1.800 | 0.39 | 0.00 | 0.86 | 0.68 | 16.74 | 9% of 99% |
| 6 | Wnw6 | NW | | 3.10 | 9.18 | | 8.0 | 0.25 | | | | 0.00 | 1.00 | 1.00 | 28.46 | 27% of 99% |
| 7 | Wse1 | SE | | 3.10 | 1.90 | | 2.0 | 0.63 | | | | 0.00 | 1.00 | 1.00 | 5.89 | 8% of 100% |
| 8 | Wse2 | SE | | 1.80 | 9.30 | | 2.0 | 0.63 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 16.74 | 18% of 100% |
| 9 | Wse3 | SE | | 1.80 | 3.10 | | 2.0 | 0.63 | 0.700 | 1.800 | 0.39 | 0.00 | 0.79 | 0.73 | 5.58 | 6% of 100% |
| 10 | Wse4 | SE | | 3.10 | 8.04 | | 2.0 | 0.63 | | | | 0.00 | 1.00 | 1.00 | 24.92 | 34% of 100% |
| 11 | Wse5 | SE | | 3.10 | 5.62 | | 2.0 | 0.63 | | | | 0.00 | 1.00 | 1.00 | 17.42 | 24% of 100% |
| 12 | Wse6 | SE | | 3.10 | 2.40 | | 2.0 | 0.63 | | | | 0.00 | 1.00 | 1.00 | 7.44 | 10% of 100% |
| 13 | | | | | | | | | | | ROW SKIPPED (OK if intentional) | | | | | |
| 14 | Wsw1 | SW | | 3.10 | 7.48 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 23.19 | 27% of 99% |
| 15 | Wsw2 | SW | | 3.10 | 12.90 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 39.99 | 47% of 99% |
| 16 | Wsw3 | SW | | 1.80 | 1.20 | | 2.0 | 0.43 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.76 | 2.16 | 2% of 99% |
| 17 | Wsw4 | SW | | 3.10 | 5.92 | | 2.0 | 0.43 | | | | 0.00 | 1.00 | 1.00 | 18.35 | 22% of 99% |
| 18 | Wsw5 | SW | | 1.80 | 1.20 | | 2.0 | 0.43 | 0.700 | 1.800 | 0.39 | 0.00 | 0.84 | 0.76 | 2.16 | 2% of 99% |
| 19 | | | | | | | | | | | ROW SKIPPED (OK if intentional) | | | | | |
| 20 | | | | | | | | | | | ROW SKIPPED (OK if intentional) | | | | | |
| 21 | | | | | | | | | | | ROW SKIPPED (OK if intentional) | | | | | |
| 22 | | | | | | | | | | | ROW SKIPPED (OK if intentional) | | | | | |
| 23 | Wne1 | NE | | 3.10 | 2.69 | | 8.0 | 0.13 | | | | 0.00 | 1.00 | 1.00 | 8.34 | 6% of 91% |
| 24 | Wne2 | NE | | 3.10 | 5.09 | | 8.0 | 0.13 | | | | 0.00 | 1.00 | 1.00 | 15.78 | 12% of 91% |
| 25 | Wne3 | NE | | 3.10 | 18.25 | | 8.0 | 0.13 | | | | 0.00 | 1.00 | 1.00 | 56.58 | 44% of 91% |

| GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS | | | | | | | | | | SHADING | | CALCULATED OUTCOMES OK (if inputs are valid) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glazing element | | Facing sector | | Size | | | Performance | | | P&H or device | | Shading | | Multipliers | | Size | Outcomes |
| ID | Description (optional) | Option A facades | Option B facades | Height (m) | Width (m) | Area (m²) | Total System U-Value (AFRC) | Total System SHGC (AFRC) | | P (m) | H (m) | P/H | G (m) | Heating ($S_H$) | Cooling ($S_C$) | Area used (m²) | Element share of % of allowance used |
| 26 | Wne4 | NE | | 3.10 | 3.14 | | 8.0 | 0.13 | | | | | 0.00 | 1.00 | 1.00 | 9.73 | 8% of 91% |
| 27 | Wne5 | NE | | 3.10 | 12.45 | | 8.0 | 0.13 | | | | | 0.00 | 1.00 | 1.00 | 38.60 | 30% of 91% |

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***if inputs are valid***