Canterbury Ice Rink

Section J DtS and ESD Opportunities Report

Prepared for: Canterbury Ice Rink

Project No: SYD2599
Date: 16 July 2024
Revision: 02

Project:	Canterbury Ice Rink
Location:	17A Phillips Ave, Canterbury 2193 Canterbury, NSW 2193
Prepared by:	ADP Consulting Pty Ltd Level 6, 33 Erskine Street Sydney NSW 2000
Project No:	SYD2599
Revision:	02
Date:	16 July 2024

Rev	Date	Author	Technical Review	Authorisation & QA
01	08.07.24	PJ	KS	BB
02	16.07.24	PJ	KS	BB

Project Team	
Client / Principal	Canterbury Ice Rink
Architect	Kennedy Associates Architects
Project Manager	Hunter Scott

Contents

Executive Summary

The primary objective of this report is to provides the minimum Section J Deemed-to-Satisfy (DtS) requirements to support the Development Application. Additionally, this report outlines high-level Environmentally Sustainable Design (ESD) strategies for the development of a high-quality sporting facility that is sustainable and comfortable for both staff and visitors

ESD Opportunities

This report has been prepared in line with NCC 2022 and the Canterbury Bankstown DCP requirements.

Following a review of the project brief, site location and architectural drawings, we propose the following areas of sustainability to be explored during the design, construction, and operation of the proposed development:

- **Energy Efficiency**: Using a combination efficient HVAC systems and suitable insulation to maintain thermal comfort within the facility.
- **Water Efficiency and Conservation**: Utilizing efficient water fixtures and Incorporating Water Sensitive Urban Design (WSUD) practices to conserve water.
- **Renewable Energy**: Reusing existing PV panels to reduce dependence on the grid and support HVAC systems / increasing climate resilience.
- **Materials**: Incorporating climate resilient and toxicity-free materials to improve indoor air quality. Furthermore, reducing embodied carbon emissions of the project.
- **Climate Resilient Development**: To mitigate negative impacts of climate change and to increase the lifespan of the development.
- **Biodiversity in Design**: To minimize impacts to nature and enhance biodiversity.

Section J4 and J5 DtS Compliance – Building Fabric

The following Sections 2 and 3 in the report details the building fabric and building sealing requirements under the NCC 2022 Volume One following the Deemed-to-Satisfy (DTS) pathway as applicable to Canterbury Ice Rink.

This development is in accordance with the Deemed-To-Satisfy (DTS) requirements of Section J of the Building Code of Australia BCA, Energy efficiency. With the required wall and roof insulation, the new areas of the building are compliant with the Performance Requirements J1P1 of the National Construction Code 2022 Volume One as related to Part J4 to J5.

1. Introduction

1.1 Report Overview

This report has been prepared for Canterbury Ice Rink and provides Environmentally Sustainable Design (ESD) recommendations and Section J DtS minimum compliance requirements for the proposed development.

Upon reviewing the project brief, site location and architectural drawings, the following areas of sustainability are proposed to be explored during the design, construction, and operation of the proposed development:

- Energy Efficiency
- Water Efficiency and Conservation
- Materials
- Biodiversity in Design
- Climate Resilient Development

The following sections 2 and 3 in the report detail the building fabric and building sealing requirements under the NCC 2022 Volume One following the Deemed to Satisfy (DtS) pathway for Canterbury Ice Rink.

1.2 Project Background

The Canterbury Ice Rink was established in 1971 and is situated close to the Canterbury Leisure and Aquatic Centre. The organisation has since then been actively promoting fitness and ice sports to the local community and surrounding areas.

The development will undergo roof and amenities upgrade to deliver a world class training facility that encourages national and state sporting events. Furthermore, the development aims to provide a safe, enjoyable, and affordable active recreational option for the local community.

The project scope is as follows:

- A new roof structure with solar panels
- Five multipurpose/change rooms
- Skate hire facilities, including storage for 600 pairs of skates, seating, and lockers
- Concrete ice floor and barrier system
- Upgraded spectator seating areas

The proposed development is located in Climate Zone 5- Warm Temperate, as identified by the Australian Building Codes Board (ABCB) and is a Class 9b building- Sporting Clubs

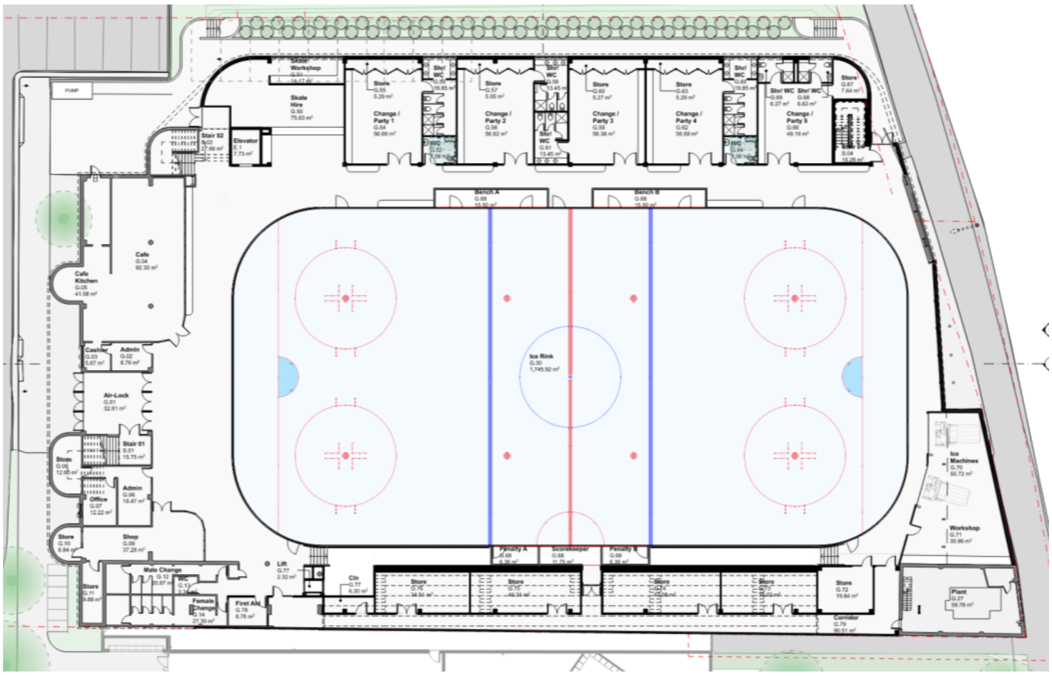

Figure 1: Proposed development Site: Canterbury Ice Rink- Ground Floor

1.3 Relevant Documentation

The following documentation has been used to inform this report:

> Architectural Drawings issued by Kennedy Associates Architects, Rev P6, dated 31.05.24

> Canterbury Bankstown Development Control Plan 2023

> Section J provisions of NCC 2022, Volume One

2. Section J4 DtS Compliance – Building Fabric

2.1 NCC Section J Energy Efficiency compliance requirements

In 2006, energy efficiency provisions were introduced in Volumes One and Two of the National Construction Code by the Australian Building Codes Board (ABCB) as part of a comprehensive strategy undertaken by the Commonwealth, State and Territory Governments to reduce greenhouse gas (GHG) emissions.

The energy efficiency provisions require buildings to achieve minimum levels of energy efficiency and are designed to improve the thermal performance of buildings, reduce the use of artificial heating and cooling, and improve the energy performance of building services.

To achieve compliance with Section J of the NCC 2022 Volume One, the Performance Requirements of J1P1 must be met.

2.2 Assessment methodology – Deemed-to-Satisfy

A Deemed-to-Satisfy (DTS) Solution applies the DTS Provisions and any referenced documents contained within the NCC. These provisions include prescriptive examples of materials, components, design factors, construction, and installation methods, which if followed in full, are deemed to comply with the Performance Requirements of the NCC.

2.3 Disclaimer

The intent of this report is to confirm that the proposed design as documented complies with the energy efficiency provisions of Section J Part J4 & J5. It is however noted that this report is based on the information provided by the Client as listed in Section 1.2 and other assumptions as noted within the report.

No guarantee or warranty of building performance in practice can be based on this report alone and it is the responsibility of the Building Surveyor to confirm that compliance with this report and the NCC is achieved during construction.

2.4 General Building Parameters

The following parameters have been used to complete this assessment.

Table 1 General building parameters.

General Building Parameters	
Address	17A Phillips Ave, Canterbury 2193
Climate Zone	5 – Warm Temperate
Site Rotation from true North	45°
Building Class	Class 9b: Sporting Clubs
Building Code	NCC 2022 Volume 1

General Building Parameters	
Total assessed floor area	993.1 m^2

2.5 Section J4D3: Thermal Construction – General

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

- Abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like; and
- Forms a continuous barrier with ceilings, walls, bulkheads, floors, or the like; and
- Does not affect the safe or effective operation of a service or fitting.

Reflective insulation (if any) 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,
- 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 is compressed between cladding and supporting members, 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.

2.5.1 Building Fabric

Boundary conditions used in the building fabric thermal calculations are as below, noting all internal Wall conditions assumed to be the same, all external wall conditions also assumed to be the same.

Table 2 Boundary Conditions used in building fabric thermal calculations.

Boundary Condition		**Heat transmission resistance [m²K/W]**	
Internal Walls	4 - Still air - on a wall	Interior R_{si}	0.120
External Walls	1 - Moving air - not more than 3 m/s	Exterior R_{se}	0.040
Air space ventilation	Slightly ventilated airspace		

Below are the Section J4 requirements for opaque constructions that forms part of the thermal envelope.

Table 3 Section J1 requirements for opaque constructions that forms part of the thermal envelope.

Building Component	Minimum Requirement R_T (m^2.K/W)[1]	Insulation Details
J4D4 Roof and Ceiling	≥3.7	Minimum of total system R3.7 and a solar absorptance of the upper surface of no more than 0.45.
J4D5 Walls	≥1.4	Minimum of total system R1.4 (see Appendix B for insulation markup).
J4D7 Floors	≥2.0	Minimum of total system R2.0 for the floor construction being slab-on-ground required for Section J compliance. As per section J4D7 of NCC 2022, **no added insulation is required** in the slab on ground construction to achieve the total system R-value of 2.0.

Total R-values are calculated by taking into account thermal bridging in accordance with AS/NZ4859.2.

The proposed external glazing and associated performance values are described in below:

Table 4 Proposed glazing requirements.

System Type	U_w (W/m^2.K)	$SHGC_w$
All proposed glazing aspects	≤ 5.8	≤ 0.70

3. Section J5 DtS Compliance - Building Sealing

3.1 Section J5D5: Windows and doors

All edges of external windows should be fitted with a seal to restrict air infiltration.

External swing doors (except fire and smoke doors) must be fitted with a draft protection device on the bottom edge and seals to restrict air infiltration on the other three edges. For all other edges of openable doors this can be a foam or rubber compression strip, fibrous seal, or the like. Entrance doors that do not lead into an airlock must be self-closing.

3.2 Section J5D6: Exhaust fans

All miscellaneous exhaust fans must be fitted with a self-closing damper or the like. For this development compliance should be covered by the mechanical engineer's design and signoff.

3.3 Section J5D7: Construction of roofs, walls, and floors

Roofs, ceilings, walls, floors, and any opening such as a window frame, door frame roof light frame or the like located on the external fabric must be constructed to minimise air leakage. Therefore, they must be either:

> Enclosed by internal lining systems that are close fitting at ceiling, wall, and floor junctions; or

> Sealed by caulking, skirting, architraves, cornices, or the like.

4. Environmentally Sustainable Design (ESD) Opportunities

This section outlines Environmentally Sustainable Design (ESD) design measures, in line with the Bankstown Canterbury Council DCP requirements, including additional opportunities that may be considered during the detailed design stage of the project to support council's sustainability ambitions and targets.

4.1 Energy Efficiency

The main ice rink hall has been carefully considered in the architecture to ensure conditions within this space are efficiently maintained. The new extension to the west also provides an additional separately airconditioned buffer to the colder ice rink hall

The following initiatives will be explored to reduce energy consumption and greenhouse gas emissions:

4.1.1 Building Fabric Design

> Provision of high-performing glazed window systems to help reduce heat loss in winter and heat gain in summer, whilst maintaining adequate indoor thermal comfort.

> Glazing selections that allow for high levels of Visual Light Transmission (VLT), for useful daylight levels throughout the day.

> Select roof and façade materials with a low solar absorptance (SA0.45), via a light coloured roof to help keep the building cooler on hot sunny days.

> Use of Timber structure or framing due reduce the effects of thermal bridging. Additionally, procuring timber from FSC-certified or PEFC-certified sources is encouraged

> To improve the thermal comfort of the existing warm-up space, the project may explore addition of ceiling insulation, which will help maintain the internal operative temperatures for thermal comfort.

> Although there are no performance requirements for the internal glazing between Multipurpose room and the ice rink, the project may explore a double-glazed solution to reduce heat transfer and ensure thermal comfort.

> Owing to the bespoke purpose of the building, adding extra insulation, over the minimum requirement, will achieve the following benefits:

- Increased thermal comfort for staff and visitors
- Improves condensation control and prevents mould growth
- Acts as an additional acoustic barrier
- Improved energy efficiency
- Reduced electricity bills

4.1.2 Heating, Ventilation, & Air Conditioning (HVAC) Design

- The current refrigeration plant within Canterbury Ice Rink has ample spare capacity. As such, the proposed strategy is for the new mechanical plant to utilize this excess capacity. As the existing refrigeration plant operates in an on/off cycle, it is suggested that two new buffer tanks be installed.
- These tanks, one for hot glycol and one for cold glycol, will ensure stable heating and cooling operations even when the refrigeration plant cycles on and off throughout the day.
- The cold glycol buffer tank will supply new Air Handling Units (AHUs) and Fan Coil Units (FCUs) with conditioned air, whilst the hot glycol tank will ensure a continuous supply for the ice melt pit, under-rink heating, and ice resurfacing water.
- Where appropriate, allow for operable windows for offices and other spaces that are occupied by people to reduce the need for mechanical ventilation and air conditioning.
- Select high-efficiency HVAC systems for conditioned spaces and configure for optimum performance including the following features:
  - Demand-controlled ventilation
  - Heat Recovery Ventilation
  - Economy Mode Ventilation
- Select HVAC equipment that is suitable for low-Global Warming Potential refrigerants (GWP < 10) to minimise the risk of emissions through refrigerant leakage.

4.1.3 Lighting Design

- Reduce the need for artificial lighting by maximising daylight entering the building.
- Select high-efficiency LED lights to provide adequate lighting levels and colour rendering with minimal energy expenditure.
- Consider careful design of daylighting controls to adjust electric lighting in response to daylight levels without causing undesirable noticeable switching effects or interactions.
- Use motion sensors and light sensors to ensure lighting is automatically dimmed or switched off when not required.

4.1.4 Energy and emissions management

- Consider energy monitoring to identify main energy consumption factors and reduce energy consumption on building components that are associated with energy leakage/wastage.
- Consider ongoing monitoring and reporting of building energy use to inform energy efficiency ratings and inform ongoing energy management.

4.1.5 Renewable Energy

- Reuse existing PV panels to reduce dependence on the electricity grid and support the HVAC Systems
- Increasing climate resilience of the building
- Disposing of solar panels responsibly is crucial to avoid environmental damage. The project team can utilise one of the following methods for responsible management and disposal of existing panels:
  - Recycling PV Panels through organisations such as Reclaims PV Recycling
  - Selling PV Panels to organizations that use it for poorer countries

  - Contact local council for solar panel disposal programs to ensure proper dismantling of panels to avoid leaching of harmful materials in the ground.

4.2 Water Efficiency & Conservation

The project will explore the opportunities to reduce water consumption and optimise reuse.

> To reduce office potable water use, the project considers installing highly efficient WELS rated fittings and fixtures, and appliances.

> Select low-water and drought resistant native planting for all green spaces on the precinct to minimise or completely omit landscape irrigation.

> Implement Water Sensitive Urban Design Techniques to help manage stormwater run-off and pollution. These techniques may include:
  - permeable paving for motorised vehicles and footpaths, where applicable.
  - garden beds designed for infiltration in deep soil zones surrounding the development and within the site boundary.
  - swales and soak wells that can retain stormwater and allow for slow infiltration into the soil.

4.3 Biodiversity in Design

The project explores the following initiatives to minimise its impacts to nature and enhance biodiversity:

> Explore selection of external lighting for the precinct with the right light fitting and colour to reduce light spill to the surrounding environment and minimise the impact on the day-night rhythm of animals.

> Protect local waterways and reduce the impacts of flooding and droughts by reducing average annual stormwater discharge rates and meeting stormwater pollution reduction targets.

> Allow for native plants and landscaping on unused or dedicated green areas on the precinct to provide habitat opportunities for wildlife.

4.4 Materials

The project considers reducing its environmental impacts through the following responsible materials initiatives:

> Design the building and consider construction methodologies for optimum reuse and recyclability of building components.

> Select materials for low-maintenance and long life to minimise compounding material impacts through repairs and refurbishments over the building's lifetime.

> Ensure the buildings structure, envelope, systems, and finishes are comprised of responsibly selected products.

4.5 Climate Resilient Development

The project improves its resilience to adverse effects of climate change through the following measures:

> Undertake a comprehensive review of the acute shocks and chronic stresses likely to influence future building operations and address them in design and future operational plans.

> Design to maintain the building's a level of survivability and design purpose in a blackout.

> Future climate files to be used for mechanical sizing to account for higher temperatures, higher
> humidity, and frequent hot days
> Maximize passive heating and cooling in the building to reduce energy usage when weather conditions
> are not extreme.
> Utilize water sensitive design strategies to address increased rainfall like increased ground permeability, hardy native planting, swales, responsible stormwater, and rainwater discharge
> At least 75% of the whole site area comprises of one or a combination of strategies that reduce the heat island effect to improve local environment and outdoor thermal comfort in the surroundings such as:
  – Increased green cover
  – Light color roof and shading material or finishes with low Solar Reflectance Index (SRI)
  – Shading pavement areas
  – Include water features
  – Create grid resilience by designing infrastructure to deliver an appropriate demand response strategy or utilizing active generation and storage systems on site if found suitable for the project.

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Appendix A
NCC Façade Calculator

DtS Report
Canterbury Ice Rink- New Extension Areas

ABCB

Façade

Report

National Construction Code

Calculator

Project Summary

Date
8/07/2024

Name
Priya Joshi

Company
ADP Consulting

Position
ESD Engineer

Building Name / Address
Canterbury Ice Rink
0

Building State
NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 9b - sports venues or the like

Storeys Above Ground
2

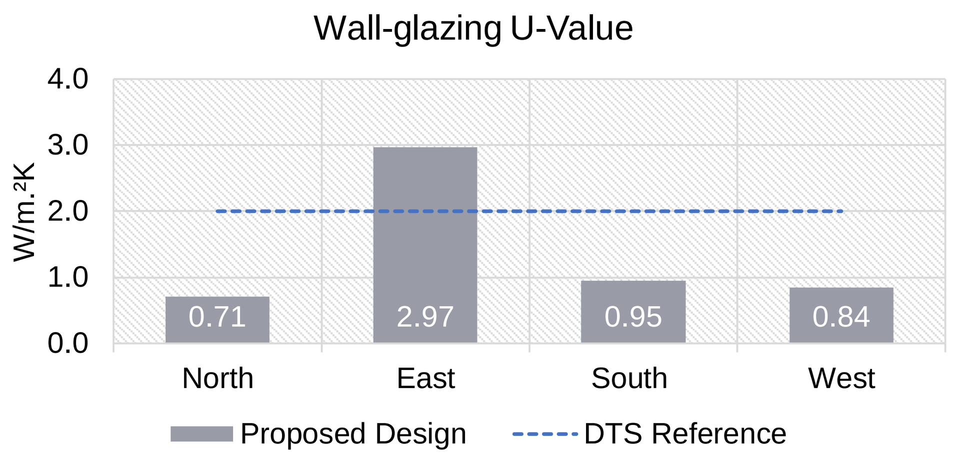
Tool Version
1.2 (June 2020)

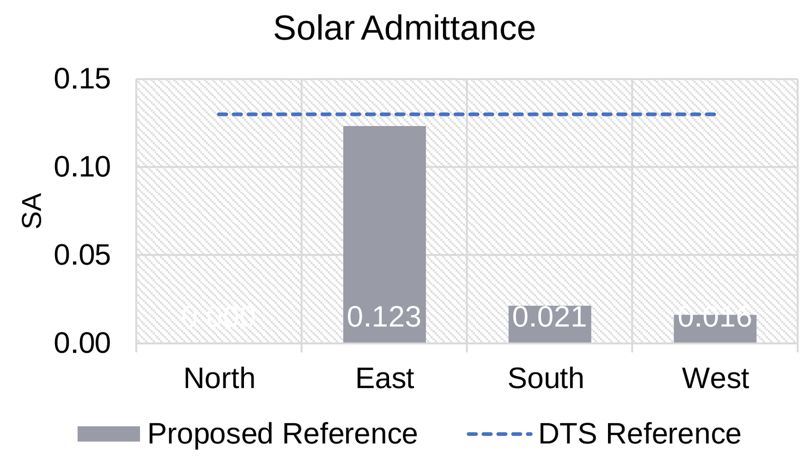
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

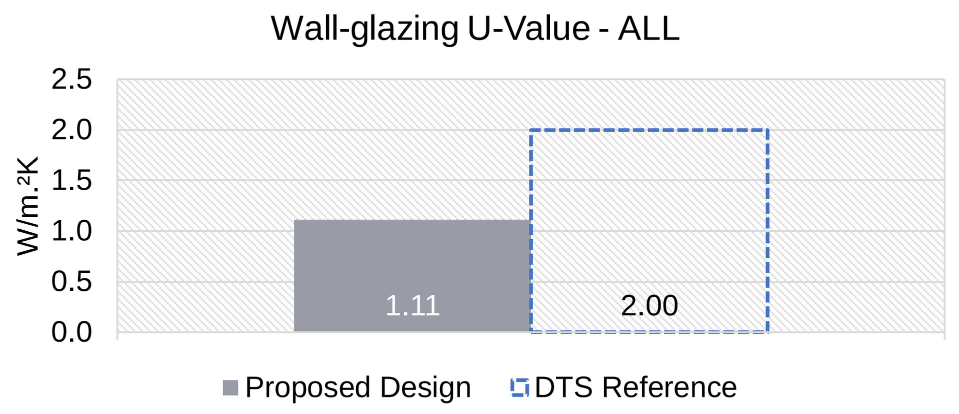
	Method 1 North	Method 1 East	Method 1 South	Method 1 West	Method 2 All
Wall-glazing U-Value (W/m².K)	0.71	2.97	0.95	0.84	1.11
Solar Admittance		0.12	0.02	0.02	
AC Energy Value					20

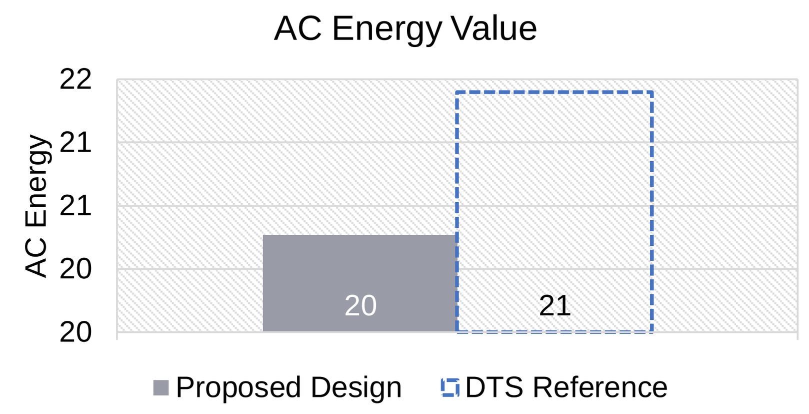
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	0	39.298	3.73	13.12
Glazing to Façade Ratio	0%	41%	5%	3%
Glazing References		West 3	South 2	West 1 West 2
Glazing System Types		0	0	0
Glass Types		0	0	0
Frame Types		0	0	0
Average Glazing U-Value (W/m².K)		5.80	5.80	5.80
Average Glazing SHGC	0.00	0.70	0.70	0.70
Shading Systems	Horizontal	Horizontal	Horizontal	Horizontal
Wall Area (m²)	87.3	56.4	75.11	480.36
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	Wall >80% CZ:All, CL:5,6,7,8,9a,9b	Wall <80%	Wall >80% CZ:All, CL:5,6,7,8,9a,9b	Wall >80% CZ:All, CL:5,6,7,8,9a,9b
Wall Thickness	0	0	0	0
Average Wall R-value (m².K/W)	1.41	1.01	1.41	1.41
Solar Absorptance				

DTS Construction Values

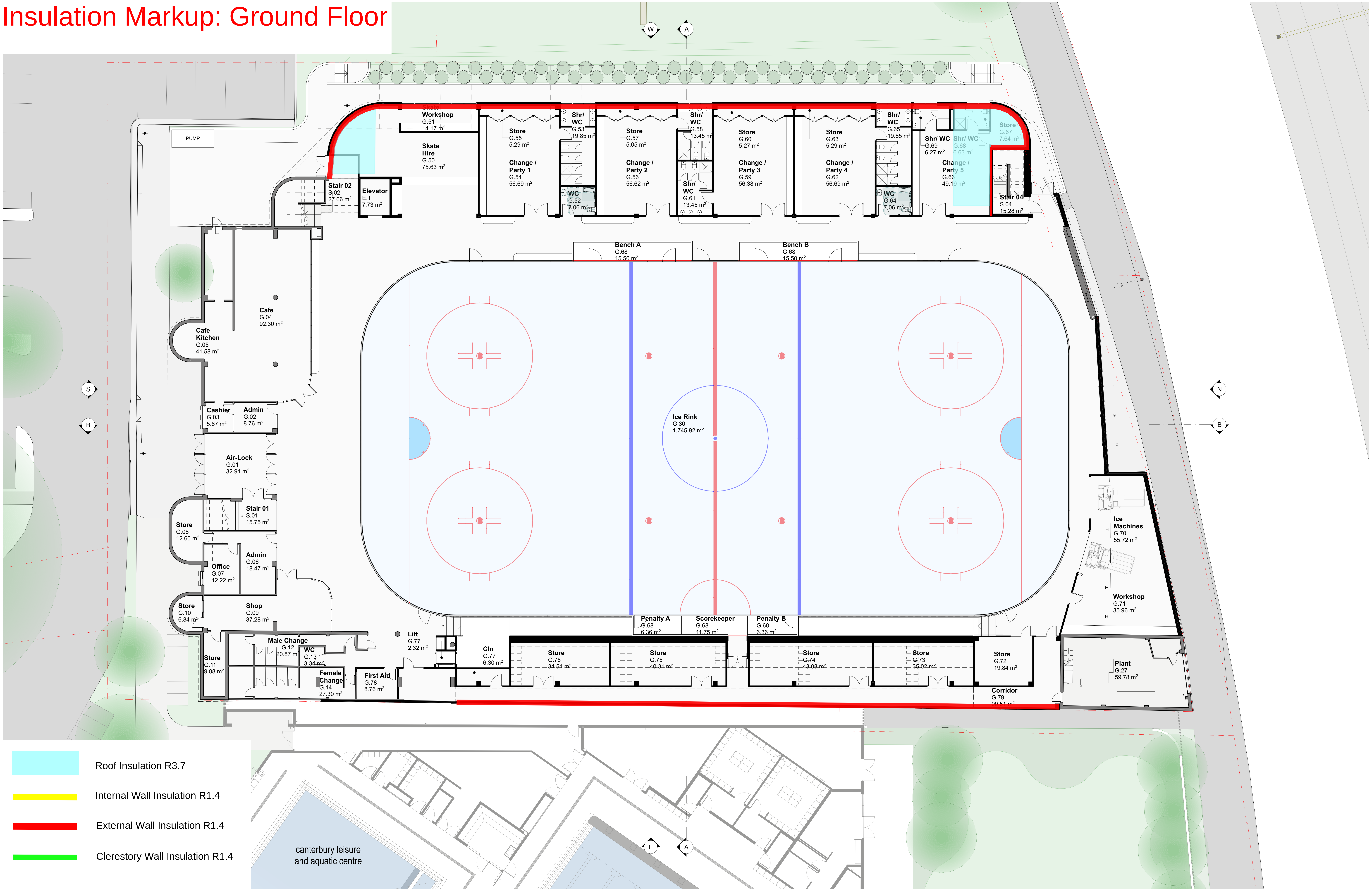
Appendix B
Thermal Insulation Markup

Floor Insulation

Roof and Ceiling Insulation

Wall Insulation

Insulation Markup: Ground Floor



Roof Insulation R3.7

Internal Wall Insulation R1.4

External Wall Insulation R1.4

Clerestory Wall Insulation R1.4

P6 Preliminary Schematic Design 31/5/2024

source file: 2221 - SD Master_v26.pln

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1:200 @ A2

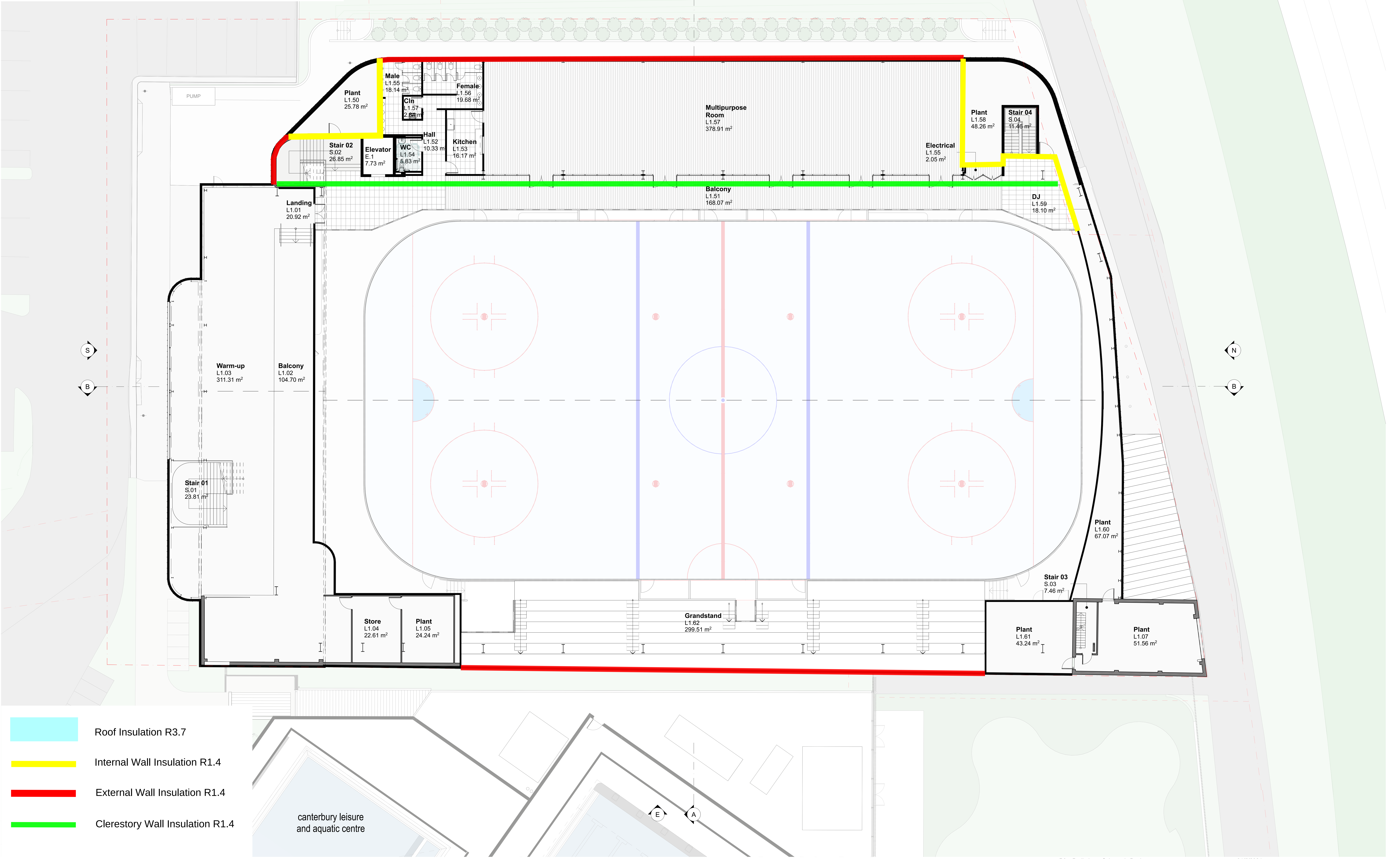
project: Canterbury Olympic Ice Rink Redevelopment
17A Phillips Ave, Canterbury NSW 2193

drawing name: Ground Floor - Proposed Plan

project no.	drawn by	checked by	date
2221	DR	SK	31/05/24

drawing number: 2221-SD100 rev no. P6

Insulation Markup: Level 01



P6 Preliminary Schematic Design 31/5/2024 source file: 2221 - SD Master_v26.pln

1:200 @ A2

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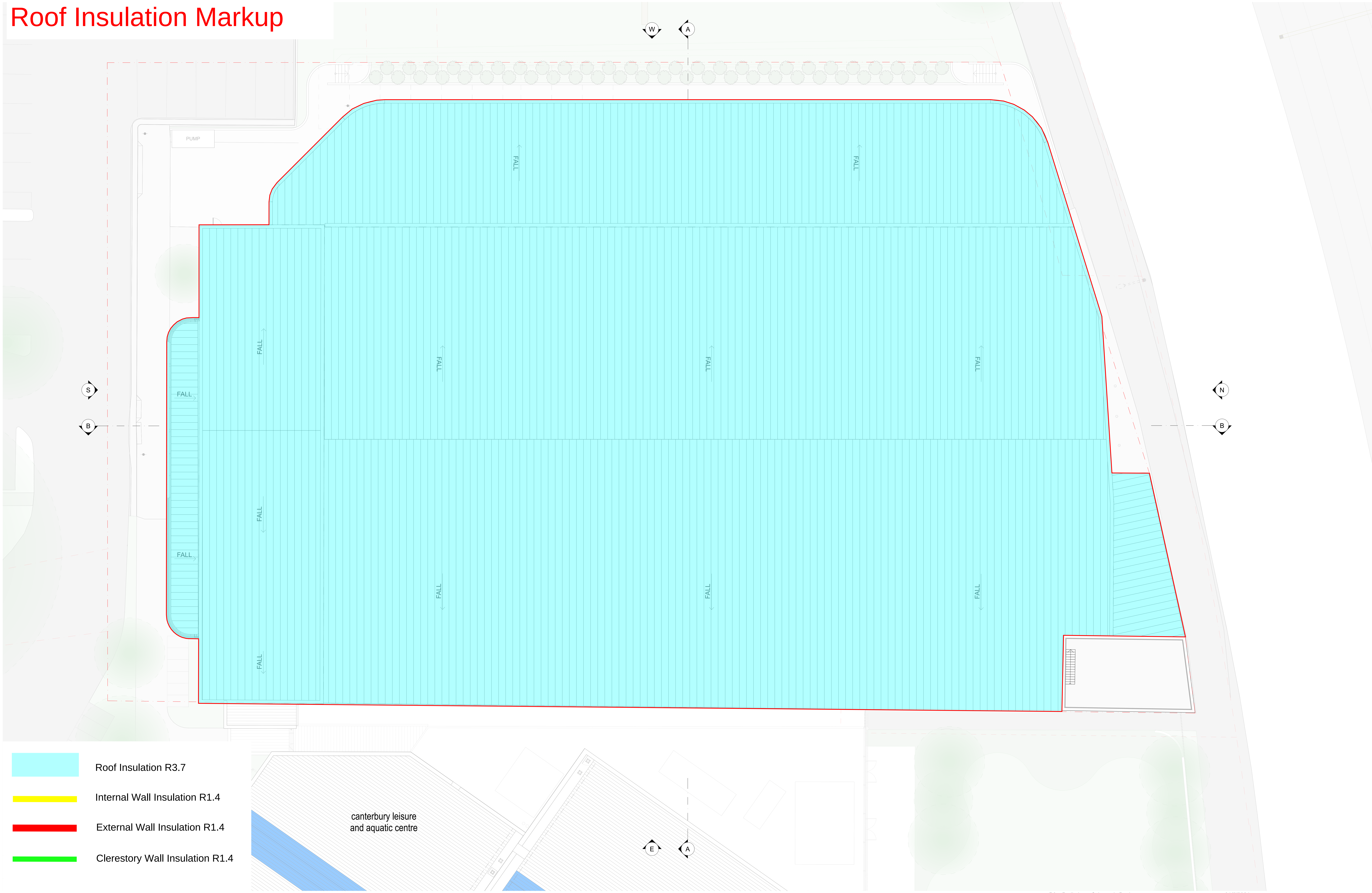
project	drawing name	project no.	drawn by	checked by	date
Canterbury Olympic Ice Rink Redevelopment 17A Phillips Ave, Canterbury NSW 2193	First Floor - Proposed Plan	2221	DR	SK	31/05/24
		drawing number - 2221-SD101			rev no. P6

Roof Insulation Markup



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project
Canterbury Olympic Ice Rink Redevelopment
17A Phillips Ave,
Canterbury NSW 2193

drawing name
Roof - Proposed Plan

project no.	drawn by	checked by	date
2221	**DR**	**SK**	**31/05/24**

drawing number -	rev no.
2221-SD102	**P6**

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