

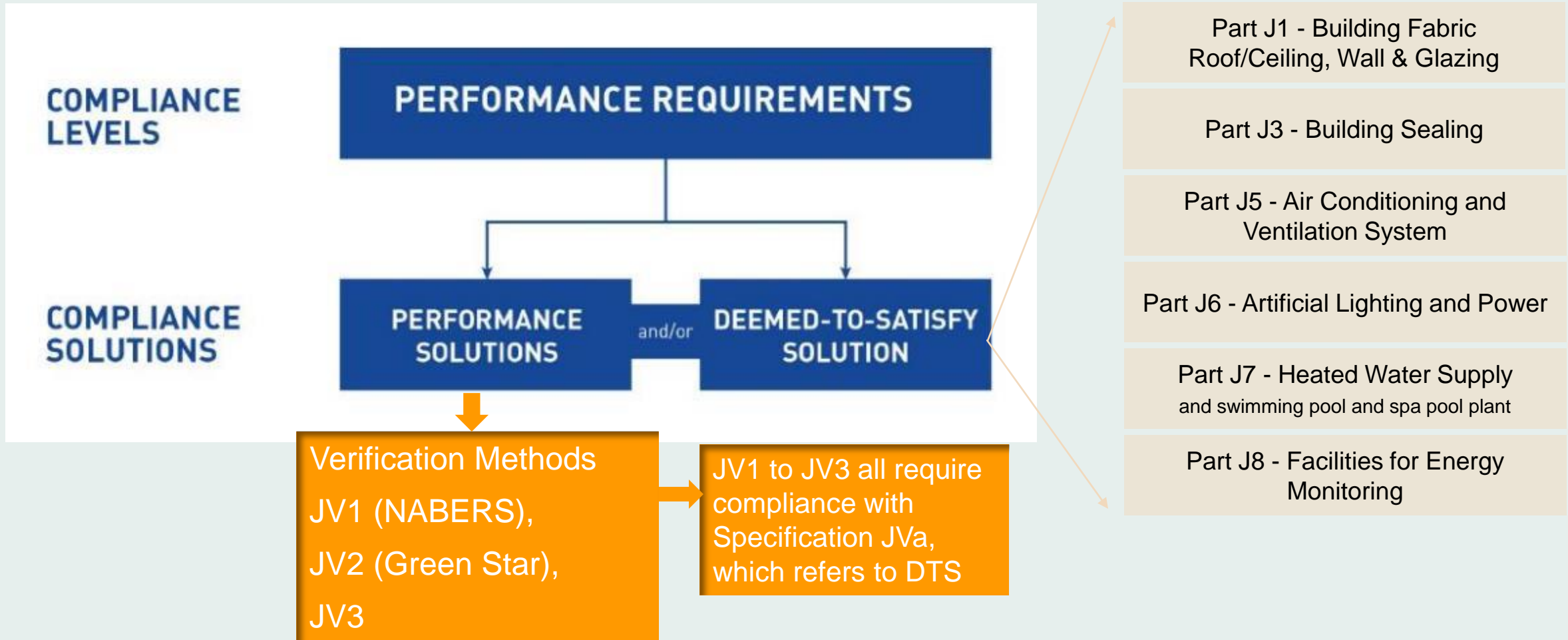
Section J in the NT Public Consultation

7th April 2022

Overview

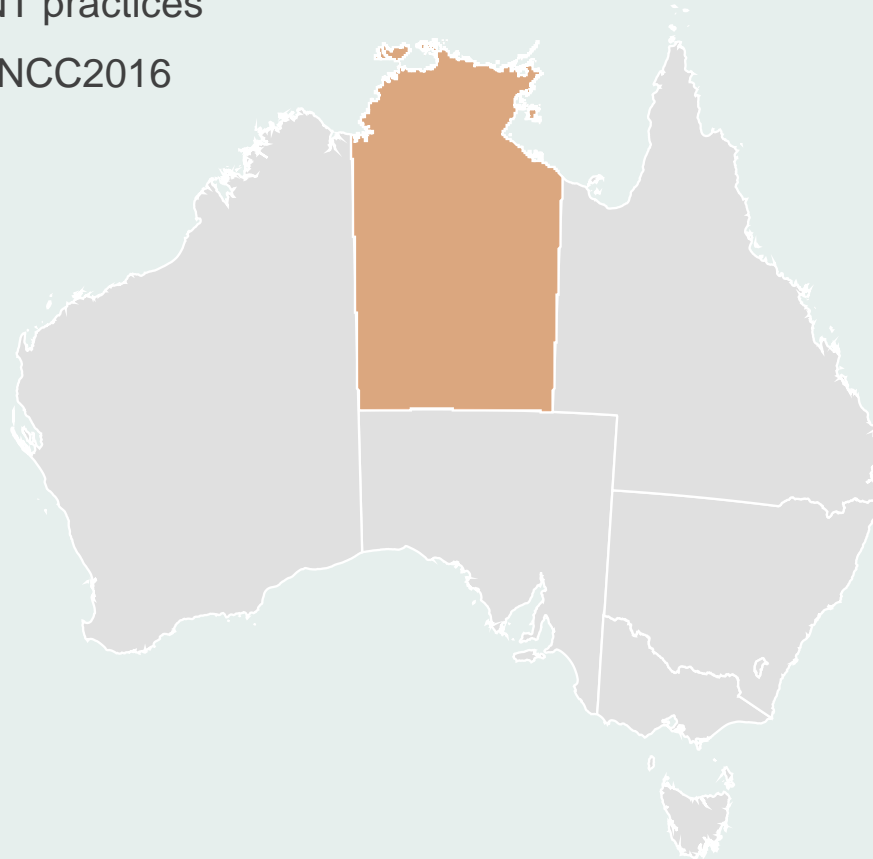
1. Introduction – Section J and approach taken
2. Territory-wide findings
 - Energy Savings
 - Construction Changes
3. Changes at the building-level
 - Roof
 - Floor
 - Wall-Glazing
 - Building Services

How do you comply with the NCC Section J?

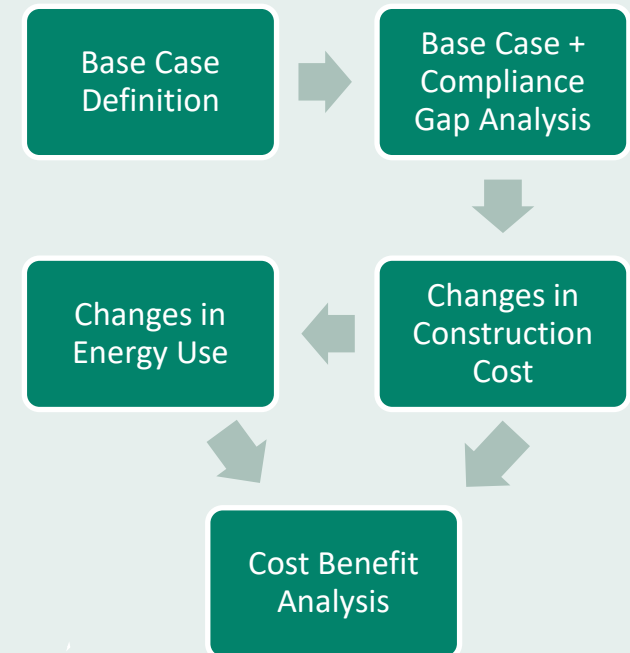


How did we determine if it is cost-beneficial to introduce Section J in the NT?

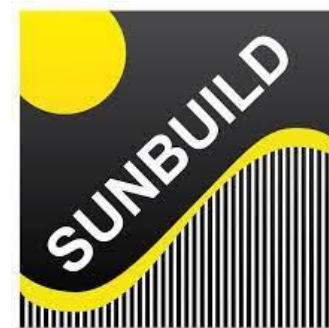
- ▶ Consulted local builders and service engineers
- ▶ Contextualised for the local industry
- ▶ Base cases defined using common NT practices
- ▶ Comparison of costs and benefits of NCC2016 and NCC2019



Methodology

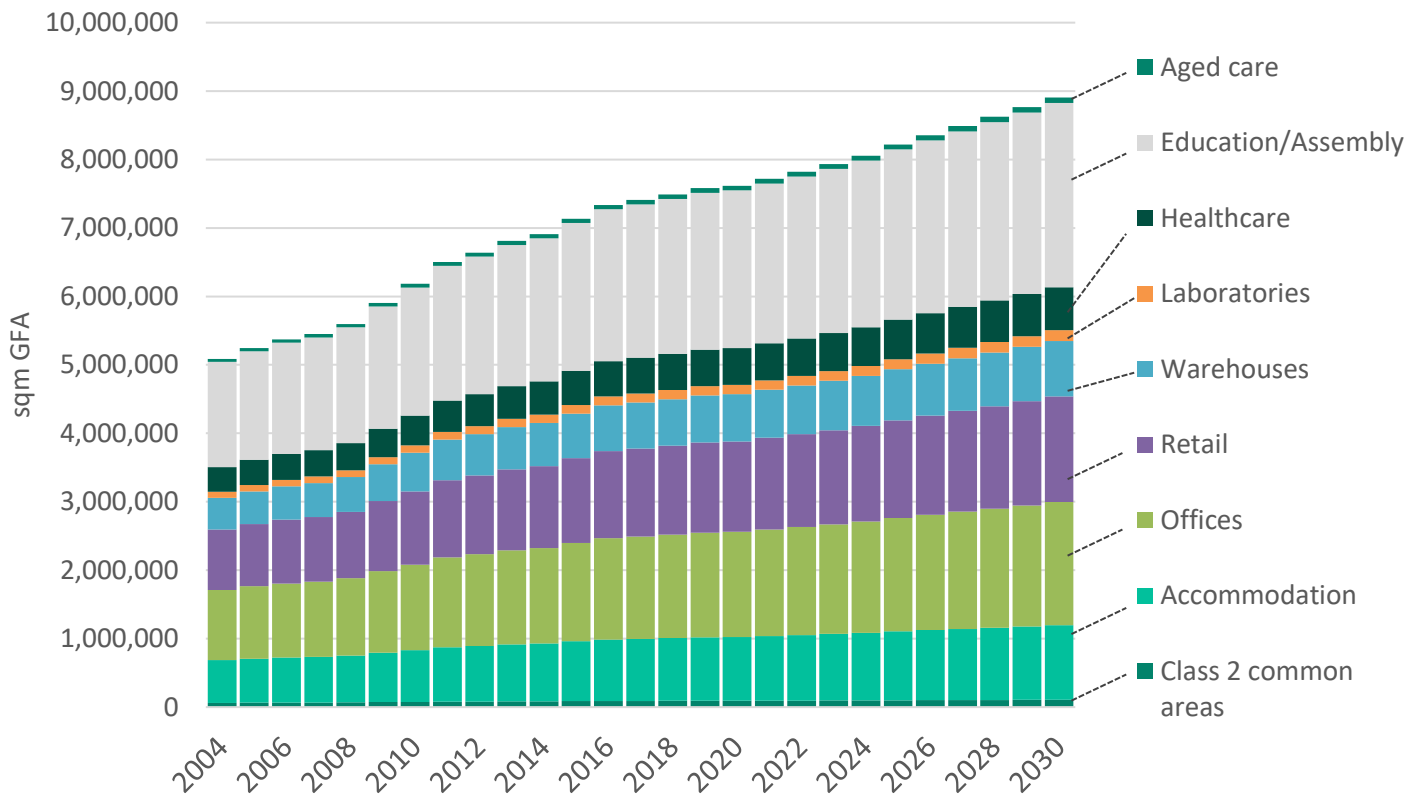


Consortium Members



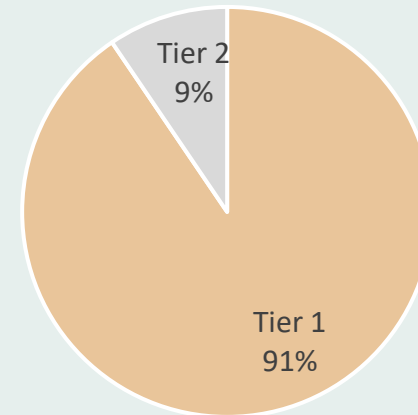
Which buildings and areas are affected?

- ▶ Offices and Education/Assembly buildings constitute a large part of the building stock
- ▶ ~90% of new construction activity occurs in Tier 1 areas



Northern Territory: Non-Residential Stock by Building Type

FY2012 - FY020
New Construction floor area
(approval, sqm)



This study

Building archetypes:

- Schools
- Offices (multi-storey and single-storey)
- Hotels
- Retail
- Hospital Wards

Locations:

Alice Springs and Darwin

Building Control Areas:

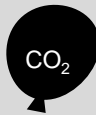
Tier 1 + Tier 2

Territory-Wide Findings

Territory-Wide Findings

NCC2019 is more cost beneficial than NCC2016

Greenhouse gas emissions saved

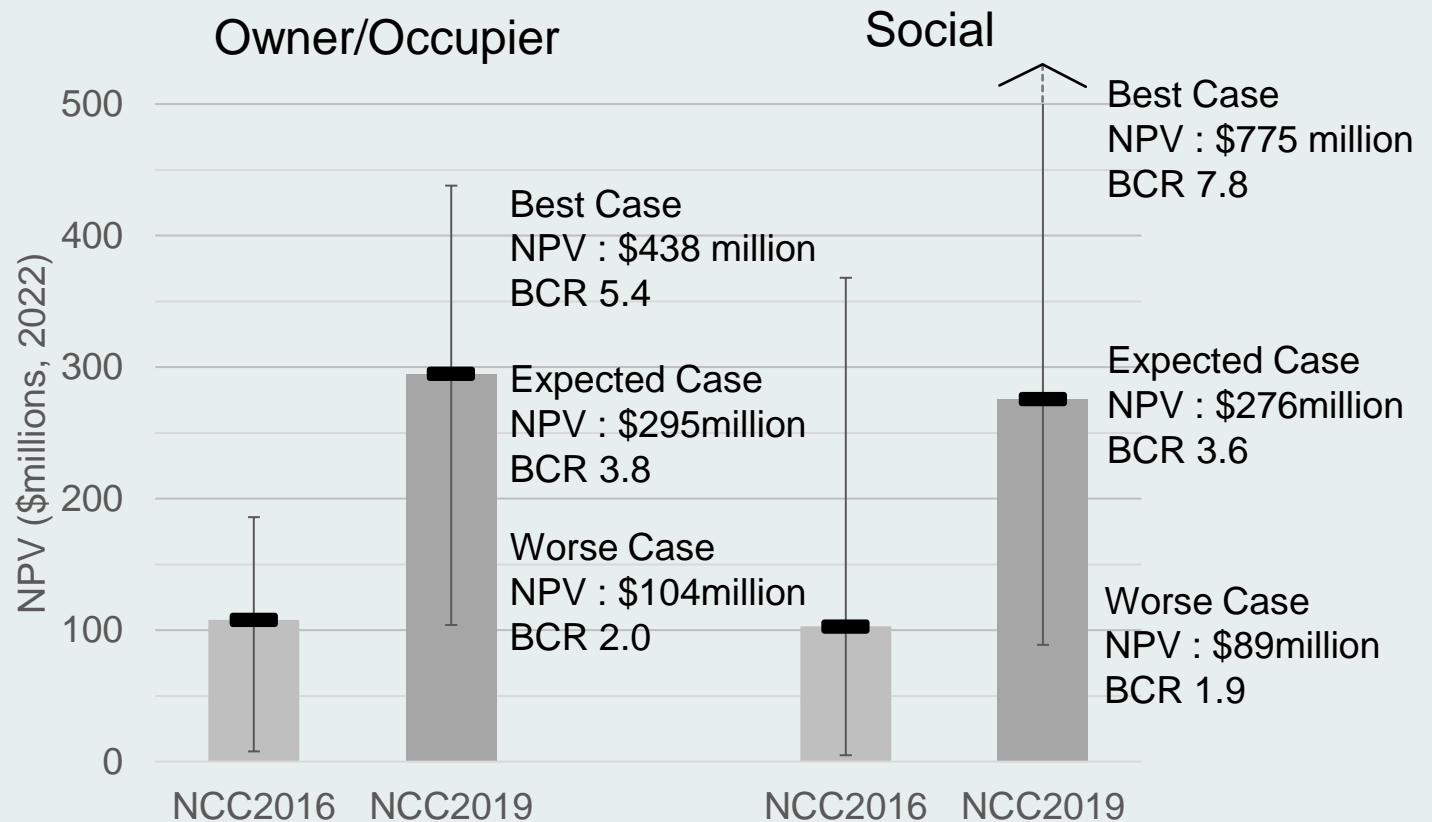


2019: 891,000 tCO₂-e saved
 2016: 469,000 tCO₂-e saved
 (cumulatively FY2023 – FY2070)

Peak Electrical demand reduction by FY2030



2019: 27.3MW
 2016: 17.1MW



Energy Savings

► NCC2019-compliant modelled building archetypes use less energy than NCC2016 versions

Average energy savings
(relative to the base case)

Darwin:

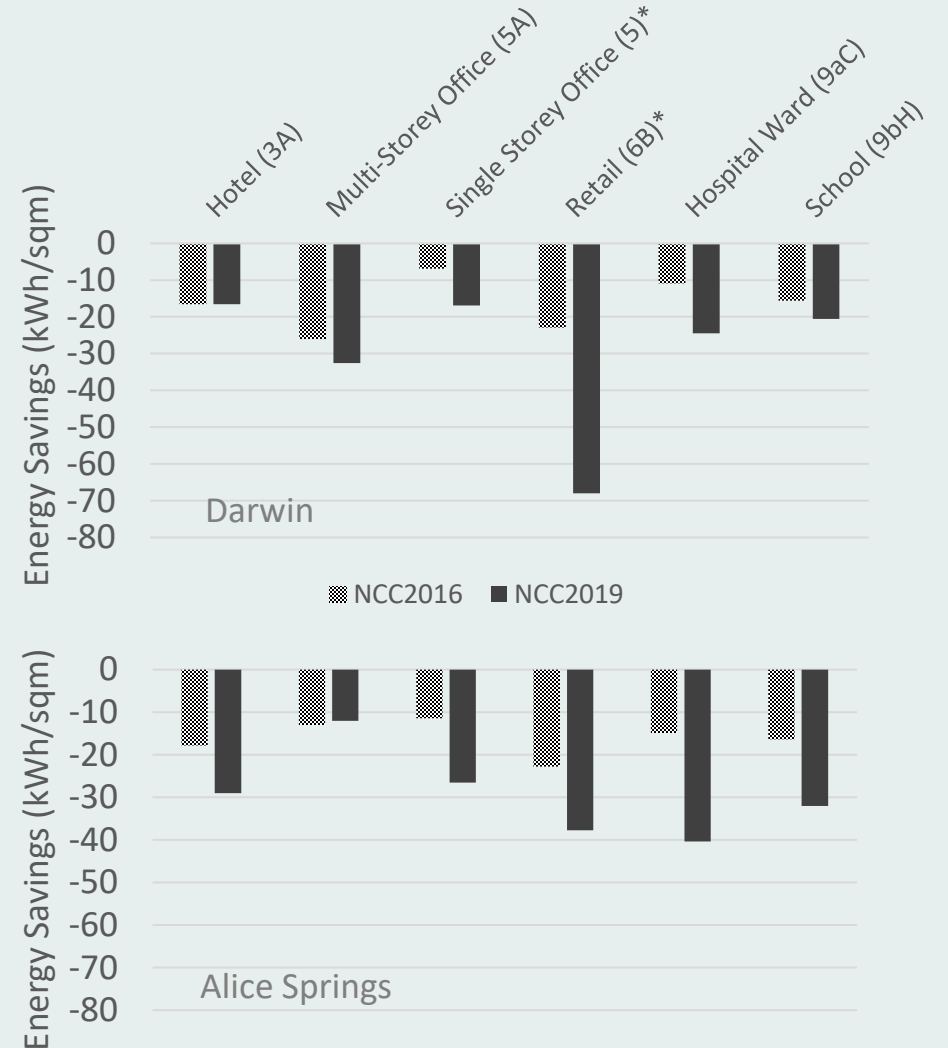
NCC2019: 23% (13– 34%)

NCC2016: 12% (6-27%)

Alice Springs:

NCC2019: 29% (21-40%)

NCC2016: 17% (11-23%)



Construction Costs Changes

► ***NCC2019-compliant modelled building archetypes have marginally higher (<1%) construction cost than NCC2016 versions.***

Incremental Construction Costs (relative to the base case)

Darwin:

● NCC2019: 1.4% – 2.4% (\$57 – \$81 per m²)

● NCC2016: 1.7% – 2.6% (\$59 – \$72 per m²)

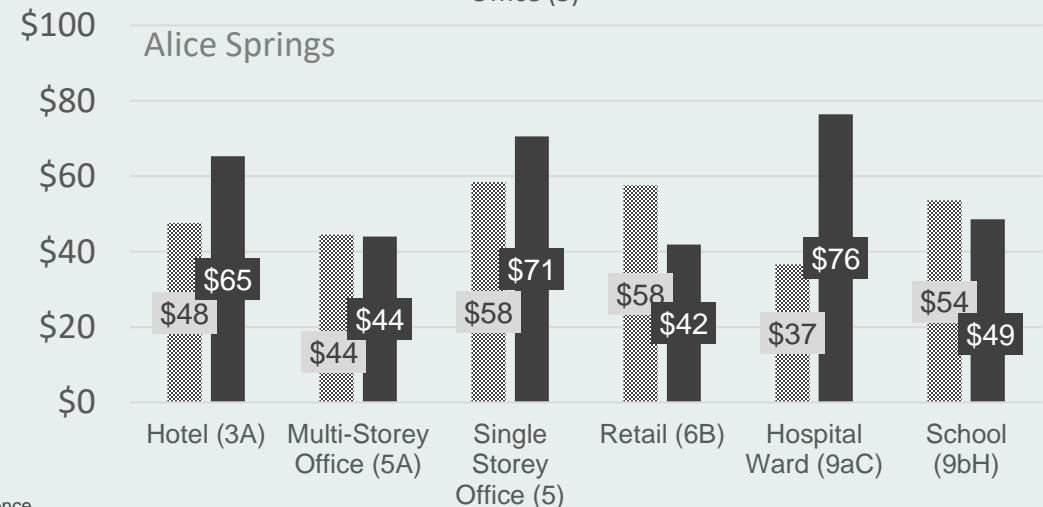
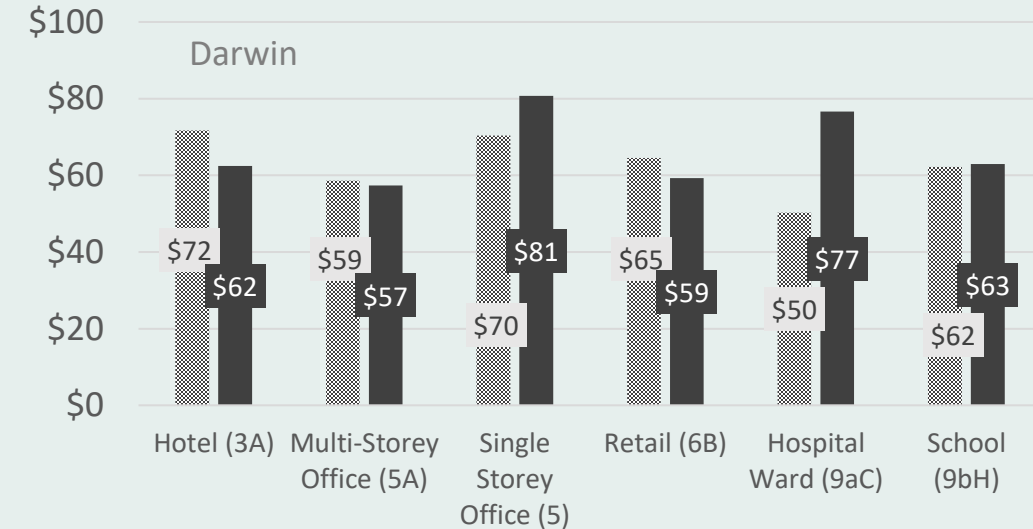
Alice Springs:

● NCC2019: 1.3% – 1.7% (\$42 - \$76 per m²)

● NCC2016: 1.3% – 2.1% (\$44 – \$58 per m²)

Total Incremental Construction Cost (\$/sqm)

■ NCC2016 ■ NCC2019



Building-Level Findings

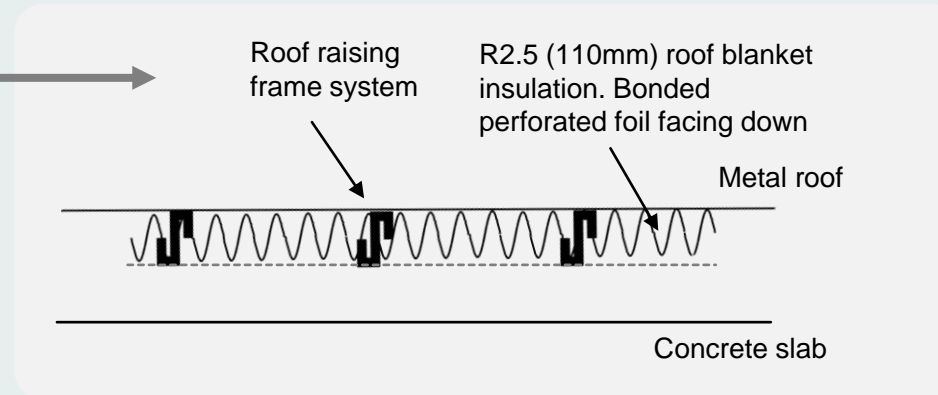
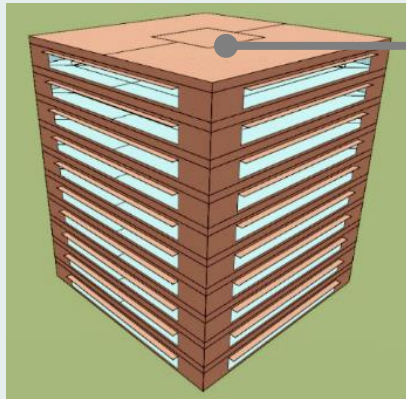
NCC2019 Section J-compliant buildings

Roof Construction

- ▶ Currently roofs have insufficient levels of insulation
- ▶ The least-cost solution considered has more insulation. Roof-raising framing systems are required to accommodate thicker blankets.

For hotels and multi-storey office (Flat roof).

Currently uninsulated

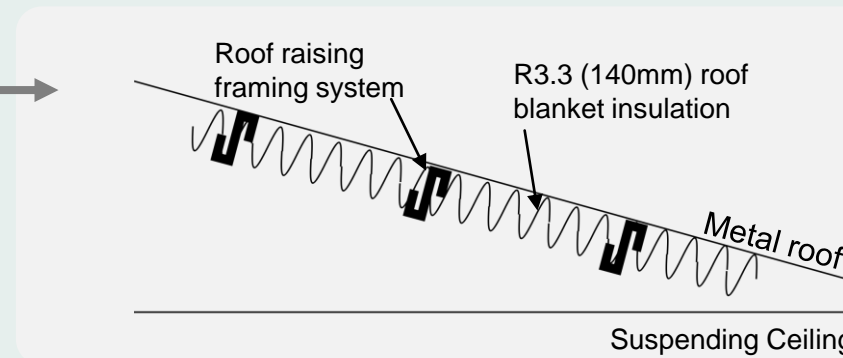
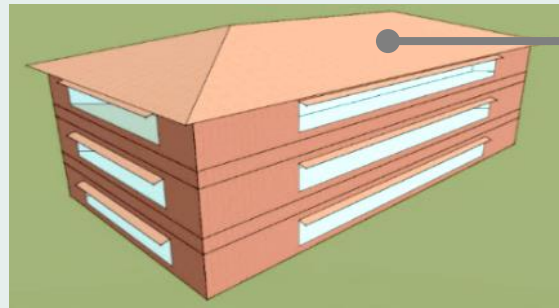


Roof insulation with insulation spacer system (HR-D1)

Total R-Value 3.96

For single-storey office, retail, hospital ward, schools (15° pitched roofs)

Currently have R1.5 roof blanket insulation (75mm)



Roof insulation with insulation spacer system (LR-A2)

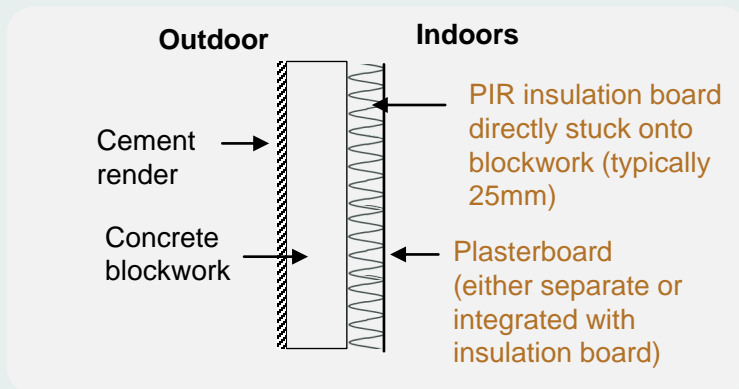
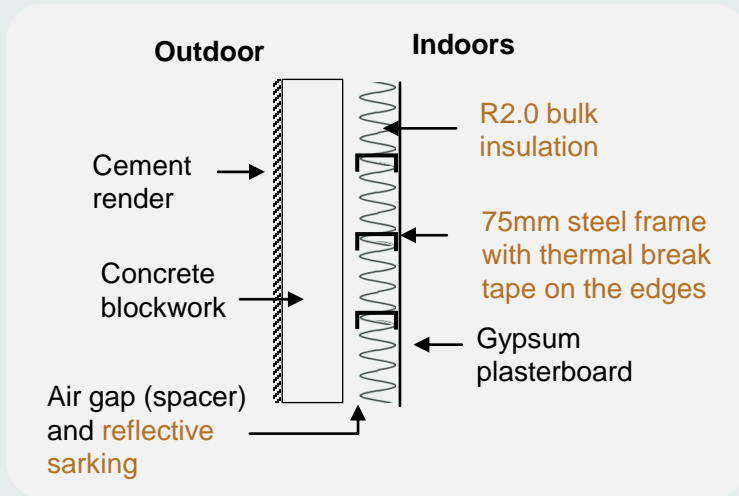
Total R-Value 3.76

Walls and Glazing

Wall Construction – Added Insulation

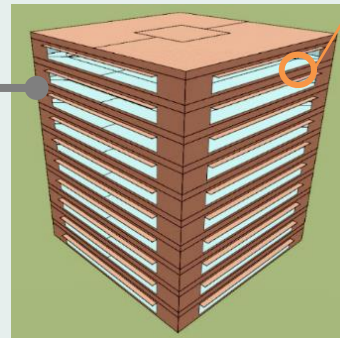
- ▶ A higher R-value for the wall is required, This can be achieved by adding insulation on the inside (or outside) of the blockwork.

NCC2019 Compliant Wall Construction



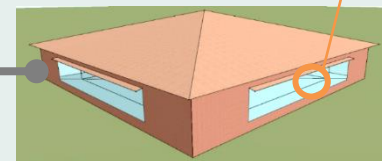
For hotels, multi-storey office, schools, retail (multi-storey models)

Currently uninsulated



For single-storey office, hospital wards, (single-storey)

Currently uninsulated



Glazing – Higher Performance

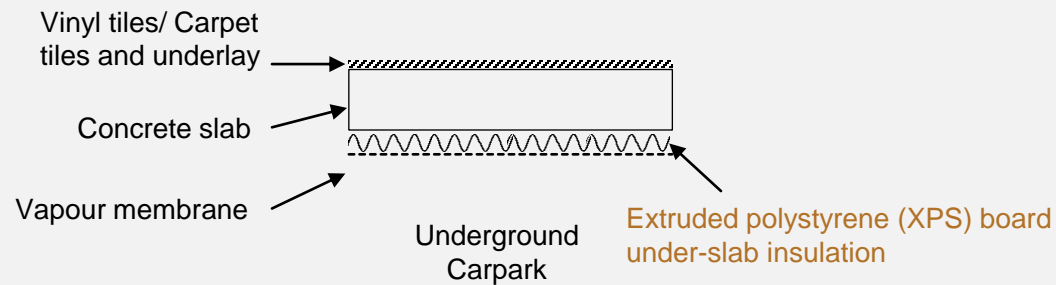
- ▶ Currently, all buildings have single pane glazing.
- ▶ Glazing will need to change from single pane to double glazed low E in many cases.
- ▶ Single-storey offices can be compliant with single-pane glazing (grey tinted or low-E)

The thermal performance of wall and glazing are assessed as a whole entity NCC2019

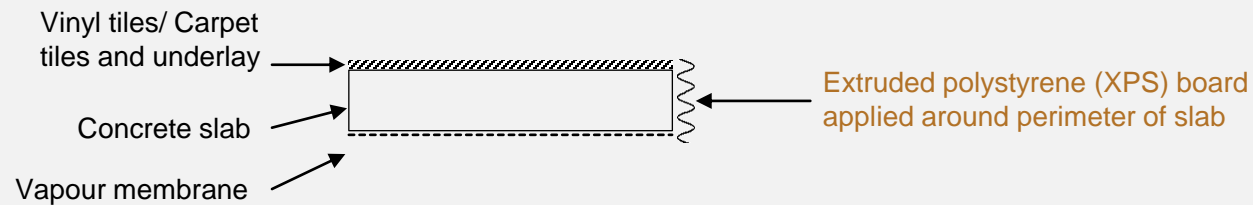
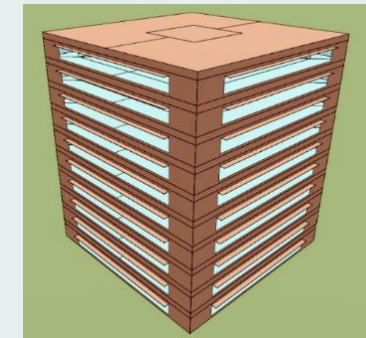
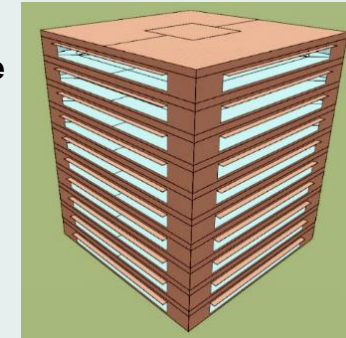
- ▶ Higher performing glazing will be required if the building has more glazing (area).
- ▶ If the building has more wall than glazing, you will need to ensure that the wall has a higher thermal performance.

Floor Construction

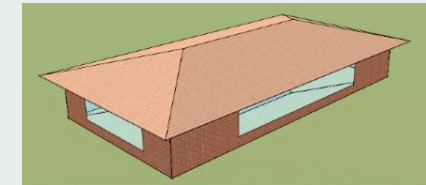
- ▶ Hotels, multi-storey and single-storey office require additional floor insulation



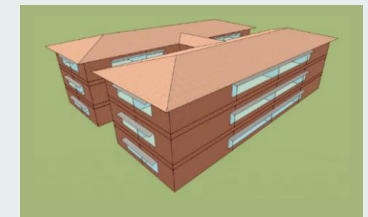
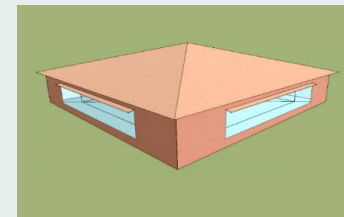
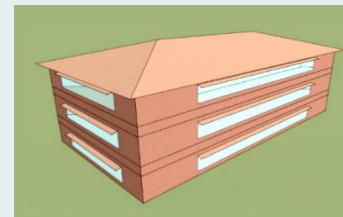
For hotels, multi-storey office



For single-storey office




- ▶ Base case floor construction for retail, hospital wards and schools are already compliant with NCC2019 Section J.




Building Services



Air Conditioning and Ventilation System (Part J5)


Non-Compliant	 Hotel	<ul style="list-style-type: none">• Increase the control dead band between heating and cooling from 1° C to 2° C• Incorporate/ use<ul style="list-style-type: none">• variable chilled/heating water supply temperature setpoint• Variable speed pumps• demand-controlled ventilation
	Multi-Storey Office	
	Single-Storey Office (ASP)	
	Retail	
	Hospital Ward (ASP)	
	School	

Heated Water Supply (Part J7.2)


	Hotel	<i>All Compliant No changes to base case</i>
	Multi-Storey Office	
	Single-Storey Office	
	Retail	
	Hospital Ward	
	School	

Artificial lighting and power (Part J6)

	Multi-Storey Office	Incorporate <ul style="list-style-type: none">• time clock control for lighting• additional lighting control circuits
	Retail	
	School	

 Hotel, Single-Storey Office, Hospital Ward

Facilities for Energy Monitoring (Part J8)

	Hotel	Incorporate <ul style="list-style-type: none">• energy metering system• meter data collation system
	Multi-Storey Office	
	School	

 Single-Storey Office, Retail, Hospital Ward

Summary

- ▶ **Adopting Section J of the NCC2019 is more cost beneficial than NCC2016**, from both the social and owner/occupier perspective

- ▶ **Benefits of adopting Section J (NCC2019)**

Energy savings,

GHG emissions savings,

Lower Peak Loads



23% and 29% in Darwin and Alice Springs



891,000 tCO₂-e saved (FY2023 – FY2070)



27.3MW peak load reduction from new buildings

- ▶ **Construction Changes and Costs**

- a) Marginal increase in construction costs
- b) Increase in insulation in building fabric and higher performing glazing
- c) Minor changes to building services

Any Questions?

