



Sustainability Management Plan

Melbourne Grammar School – Centre for Humanities

Rev.01

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Document Verification

Melbourne Grammar School – Centre for Humanities	20230524
Sustainability Management Plan	

MGS					
Revision	Date				
Draft	28 April 2023	Description	Draft for review and comment by project team		
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			Prepared by	Checked by	Approved by
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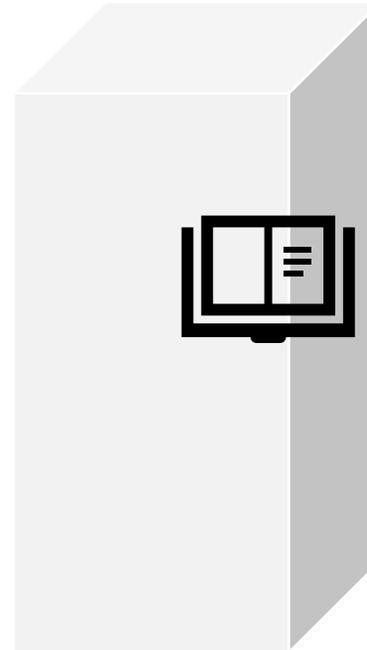
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Introduction

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Site Context

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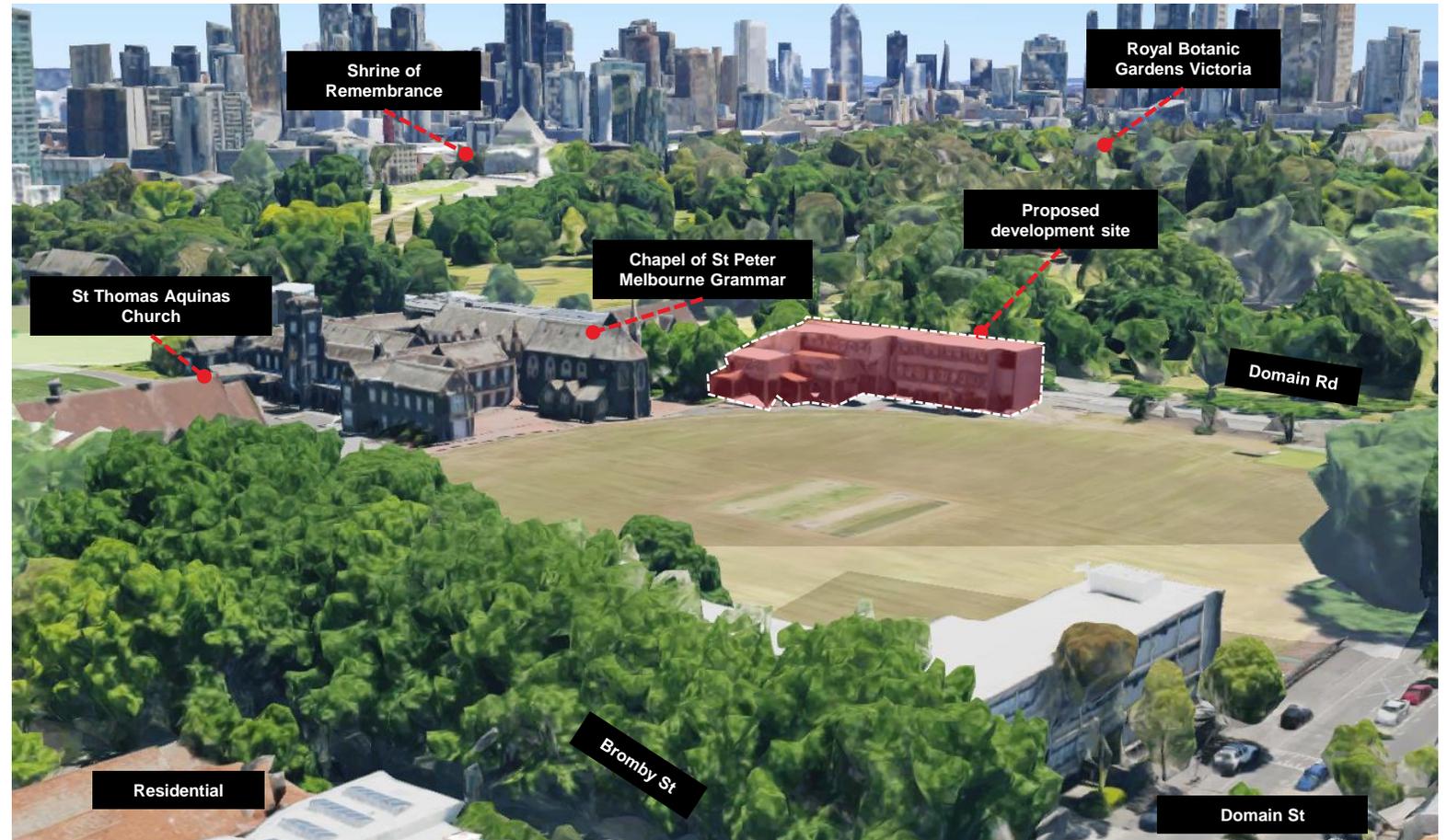
City of Melbourne context

The proposed development at Melbourne Grammar School is located in the heart of Melbourne. The proposed building is part of the educational precinct and will be developed to provide world-class education facilities for students, staff and visitors.

- Part of the City of Melbourne and in close proximity to the Shrine of Remembrance, Royal Botanic Gardens, St Thomas Aquinas Church, residential suburbs and many more associated facilities.
- Tree lined footpaths available on Bromby St and Domain Rd
- The site has a Walk Score of 83 and a Transit Score of 91, indicating great accessibility to many amenities and safe, walkable streets.
- Tram Stop 20 is a ~200m walk giving occupants access to a range of tramlines.
- A 5 minute walk to Royal Botanic Gardens Victoria
- The Melbourne Central shopping precinct is only a 10 minute cycle, providing access to significant amenity.

Melbourne Grammar School context

Close to some of Melbourne's most popular amenities





Project Overview

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Centre for Humanities

The proposed building is located at Melbourne Grammar's Senior School Campus, at 355 St Kilda Road, between Domain Road and the campus chapel, facing the school's main oval.

The building contains classrooms, staff rooms, change rooms and features a large atrium connecting all storeys of the building. The building contains four above ground storeys and on basement storeys, to a total of 5 storeys contained.

Through the sustainability workshops and survey, the key focus areas identified for MGS are:

1. Healthy
2. Low cost to operate
3. Renewable energy

Apart from the focus areas, MGS have expressed interest across all other aspects of sustainability. We have developed a customised Green Star pathway for the proposed design with focus on these nominated priorities for healthy, low operation cost and renewable energy. These initiatives are reviewed in conjunction with the minimum requirements from the building code and planning to form the overall strategy of the project.



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Strategy Overview

Legal, market lead and organisational influences.

This report provides an overview of the Sustainability Management Plan for the development of the Centre for Humanities by Melbourne Grammar School.

The design of the development is considered to meet and exceed these requirements and is committed to meeting the targets outlined within this report within the final design.

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Project drivers and influences

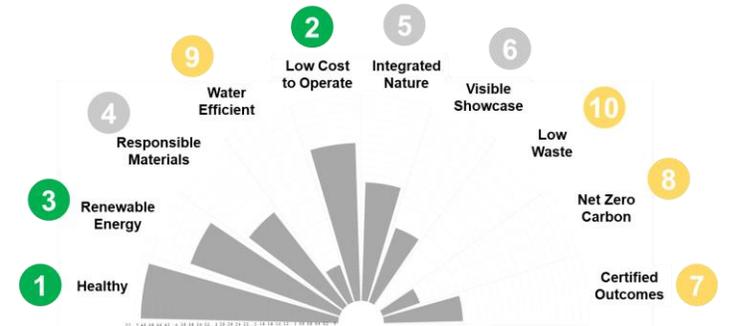
Primarily includes legal, tenant and organisational level

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Legal Requirements



MGS' Sustainability Focus Areas



Sustainability Strategy Responds to All Key Drivers

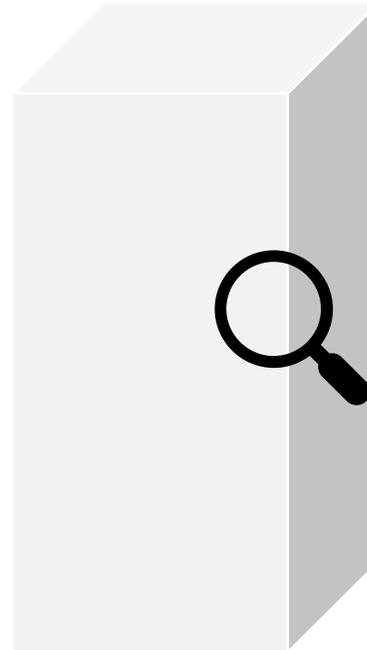


Policy Review

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Planning Scheme

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Policy Update

City of Melbourne has recently made some changes to the previous Energy, Water and Waste Efficiency Section (Clause 22.19). The recent issue on 21/09/2022 has moved this section to Clause 15.01-2L-01 and renamed it as Energy and resource efficiency.

The Clause 15.01-2L-01 forms the minimum requirements for this project regarding energy, water and Green Star.

It is noted that the performance requirements are almost identical between the two versions, which refers to requirements under the Green Star Education tool. It should be noted that the Green Star Education tool is a legacy tool superseded by the latest Green Star Buildings v1 rating tool.

Based on the review of the planning schemes, there is **no change in the requirements**.

	Old Policy 04/04/2013	New Policy 21/09/2022
Waste Management Plan in accordance with CoM's Guidelines for Waste Management Plans	Yes	Yes
Environmentally Sustainable Design Statement meeting policy objectives and requirements	A statement from ESD Consultant verifying that the building has the preliminary design potential to achieve the relevant required Performance Measures	A statement from ESD Consultant verifying that the building has the preliminary design potential to achieve the relevant required Performance Measures
Performance Measures – more than 2,000 m ² GFA	Section 22.19-5 (Education Centre): <ul style="list-style-type: none"> - Energy: 5 points for Ene-1 credit under Green Star Education rating tool or equivalent - Water: 3 points for Wat-1 credit under Green Star Education rating tool or equivalent - Waste: a waste management plan 	Section 15.01-2L-01 (Education Centre) <ul style="list-style-type: none"> - Energy: 5 points for Ene -1 credit under Green Star Education under Green Star Education rating tool or equivalent - Water: 3 points for Wat-1 credit under Green Star Education rating tool or equivalent
Performance Measures – more than 2,000 m ² GFA	Above plus 5 star rating under current version of Green Star – Education rating tool or equivalent	Above and 5 star rating under current version of Green Star – Education rating tool or equivalent

Comparison between old and new planning schemes

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Equivalent Requirements

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Latest Changes in Green Star

Green Star Education was published on November 2008, the requirements are not suitable for new buildings due to significant improvement in National Construction Code and industry. We have undertaken a review to propose the equivalent requirements using Green Star Buildings v1.

The inset table summarises the equivalent performance using the latest Green Star Buildings v1 tool, which is to be presented to the CoM for town planning.

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Recommended Response to Planning Scheme

Items	Planning Scheme Requirements	Proposed Equivalent Requirements	Further Comment
Waste Management Plan	Yes	Yes	Waste Management Plan by qualified consultant in accordance with CoM's Guidelines for Waste Management Plans
Energy	5 points for Ene-1 credit under Green Star Education rating tool or equivalent. Note: the 5 points represents 25% of the total available points of 20.	Credit Achievement (3 out of 6) for Credit 22 Energy Use under Green Star Buildings v1 Note: this represents 20% reduction from the reference building which is compliant with NCC 2022.	This is considered equivalent by demonstrating significant reduction against latest construction code. Given that the requirements in the construction code has improved significantly in the past 10 years.
Water	3 points for Wat-1 credit under Green Star Education rating tool or equivalent Note: 3 points represents a reduction of 30%-40% (depending on EoT provision).	Minimum Expectation (15% reduction) under Credit 25 Water Use in Green Star Buildings v1 plus additional 15% reduction in potable water use Note: 30% reduction in total under Credit 25 of Green Star Buildings v1	This is considered equivalent given Credit 25 in Green Star Buildings v1 does not award points in 1 point increment.
Green Star	Verify that the building has the preliminary design potential to achieve the requirements above plus 5 star rating under current version of Green Star – Education rating tool or equivalent Note: assume a certified rating is not mandatory	5 star rating under Green Star Buildings v1 (self-assessed) Note: assume a certified rating is not mandatory	This is considered equivalent as the Green Star Buildings v1 is the current tool and no change in targeted rating level.

Summary of equivalent performance using Green Star Buildings v1



Policy Summary

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Proposed Strategy

Based on discussion with Urbis and the project team, the minimum requirements for the project include the following:

- A 5 star rating under Green Star Buildings v1 (self-assessed) pathway with reasonable margin to match project’s sustainability focuses demonstrate the performance beyond minimum requirements.
- Compliance with NCC 2022 is considered the minimum requirements for the project.
- Other supporting plans required by the City of Melbourne Planning Scheme, which also inform the performance of credits in the proposed 5 star Green Star pathway.

The above minimum requirements are based on our interpretation of the Planning Scheme issue on 21/09/2022 and discussion with Urbis.

Minimum Requirements:

NCC + Green Star 5-star pathway (self-assessed) + Energy, Water and Waste targets



Compliance with NCC 2022 as the minimum requirements as advised by Urbis.

This report focuses on the building Part J4 Building Fabric of NCC Section J Energy Efficiency. Please refer to other specialists reports for compliance with other parts of Section J. Please refer to the appendix for preliminary Section J calculations and design options to achieve 30% improvements over the Deemed-to-Satisfy Provisions (DTS).



Green Star 5 star rating (self-assessed) using the latest Green Star Buildings v1 tool. This pathway has been developed by considering the requirements from the City of Melbourne and various focus areas from the stakeholders.

The project is targeting 44 points for the 5 star Green Star pathway, exceeding the minimum requirement of 35 points for a 5 star rating.



Supporting Plans

The City of Melbourne Planning Scheme also requires other supporting plans including Waste Management Plan and Stormwater Management plan to align with City of Melbourne’s best practice environmental management guidelines. Please refer to the following reports prepared by specialists:

- MGS Centre for Humanities Waste Management Plan - AECOM (17 April 2023)
- MGS Centre for Humanities WSUD Report – AECOM



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Green Star Pathway

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Green Star Overview

Green Star Buildings v1

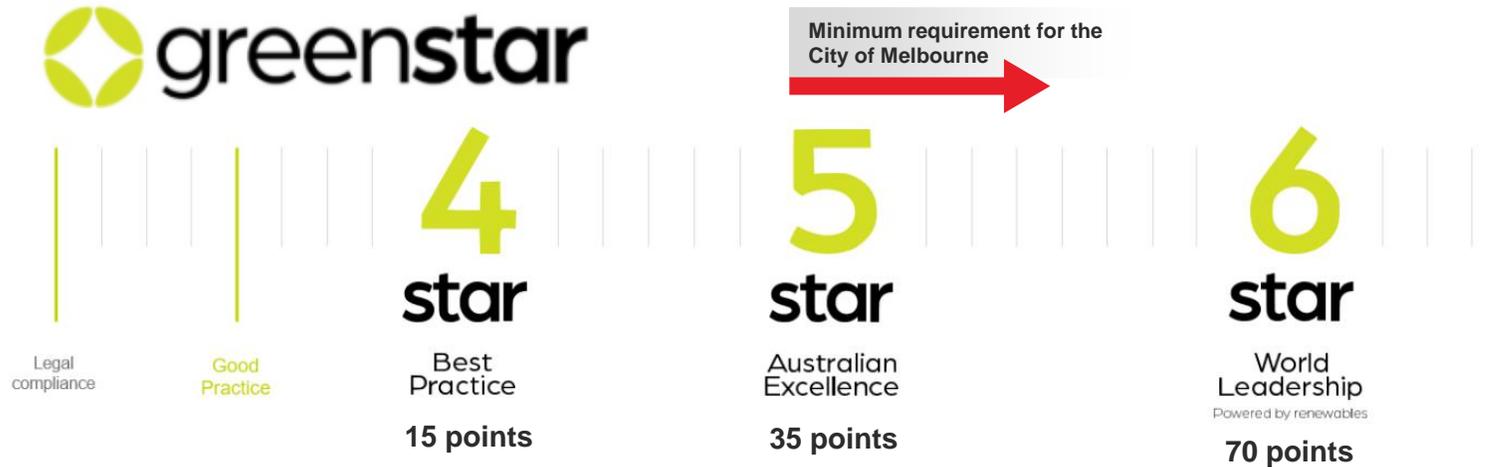
Green Star is Australia’s national and voluntary rating system for the assessment of the sustainable design, construction and operation of buildings, fit-outs and communities.

The Green Star rating tool helps to address the range of environmentally sustainable design practices, and supports a single holistic approach to sustainable building design.

The new Green Star Buildings v1 only applicable version of Green Star for new developments, the most ambitious version of the tool yet. The tool is made up of a number of minimum expectations, core credits and leadership credits.

- ✓ The Centre for Humanities development is targeting a 5- star (self-assessed) Green Star Buildings v1 rating with 44 points targeted, meeting the planning requirements.

It should be noted that the commitment for Green Star is the overall rating target with credits in the pathway being flexible and subject to minor adjustment throughout the design.



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Centre for Humanities (44 points targeted)



Strategy Overview

Driven by 5 star Green Star target

The Melbourne Grammar School – Centre for Humanities is committed to achieving a 5 star Green Star self-assessed target (44 targeted points) with associated reporting equivalent to a certified outcome produced by the project team.

Additional studies have been undertaken at this stage by assessing the design provisions against the performance requirements in the targeted credits. Please refer to the appendix for key study outcome to ensure the design is on track to achieve the 5 star rating. These studies have been coordinated with the design team and will be regularly reviewed and updated throughout the design process.

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Responsible

Recognises activities that ensure the building is designed, procured, built, and handed over in a responsible manner.



Healthy

Promotes actions and solutions that improve the physical and mental health of occupants.



Resilient

Encourages solutions that address the capacity of the building to bounce back from short-term shocks and long-term stresses



Positive

Encourages a positive contribution to key environmental issues of carbon, water, and the impact of materials.



Places

Supports the creation of safe, enjoyable, integrated, and comfortable places.



People

Encourages solutions that address the social health of the community.



Nature

Encourages active connections between people and nature and rewards creating biodiverse green spaces in cities.



Leadership

Recognises projects that set a strategic direction, build a vision for industry, or enhance the industry's capacity to innovate.

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Responsible

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11/17 Green Star points

Recognises activities that ensure the building is designed, procured, built, and handed over in a responsible manner.

The Responsible category in Green Star encourages implementation of practices that support best practice outcomes throughout the different phases of planning, design, procurement, construction, commissioning and operation of a development.

- 1 Industry Development** 1/1

Arup as a Green Star Accredited Professional (GSAP) has been contractually engaged to provide advice, support and information related to Green Star principles, structure, timing and processes, at all stages of the project, leading to certification. The project will also track the cost and market the sustainability outcomes.
- 2 Responsible Construction** 1/1

The project team has committed to set, measure and report on its environmental performance through the implementation of a project specific EMP. The performance shall be reported on quarterly, with methods appropriate for each stakeholder group. The contractor will provide sustainability training to site workers. At least 90% of the waste generated during construction and demolition will be diverted from landfill.
- 3 Verification + Handover** 1/1

The project is committed to achieving various energy, water and indoor environment targets in line with Green Star certification. The project will conduct an airtightness test, be commissioned and tuned as well as deliver comprehensive operations and maintenance documentation at the time of handover. An independent commissioning agent will be engaged to monitor these processes and documentation.
- 4 Responsible Resource Management** Minimum req.

The building will be appropriately designed to facilitate the separation and collection of waste and resource streams, including appropriately sized storage areas and safe and efficient access for occupants and collection contractors. This is consistent with the Waste Management Plan prepared.
- 5 Responsible Procurement** 1/1

The project will follow ISO 20400 Sustainable Procurement – Guidance by undertaking a risk and opportunities assessment. A responsible procurement plan is developed to help implement the opportunities and mitigate the risks identified in the assessment. This will be undertaken during detailed design to inform the material specifications. This exercise has been allowed for.
- 6 Responsible Structure** 3/5

The project will specify structural materials which have certifications demonstrating they meet standards relating to responsible procurement and sourcing. Such as FSC Certification for timber, WSA membership for steel manufacturers and chain of custody accreditation for concrete aggregates. This strategy will be defined as the design develops in detail to inform material specifications.
- 7 Responsible Envelope** 0/4

This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes more achievable as products come to market offering the appropriate specifications.
- 8 Responsible Systems** 2/2

The project will specify building services materials, including mechanical, transportation, hydraulic, electrical, lighting and security systems materials that meet responsible procurement and sourcing requirements. This includes Best Practice PVC for cables, pipework and conduits, EPDs etc. This strategy will be defined as the design develops in detail to inform material specifications.
- 9 Responsible Finishes** 2/2

The project will specify internal building finishes that meet responsible sourcing and procurement requirements. Such as FSC certification for timber finishes and eco-labels for carpets, ceilings, partitions etc. This strategy will be defined as the design develops in detail to inform material specifications.



Healthy

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9/14 Green Star points

Promotes actions and solutions that improve the physical and mental health of occupants.

We spend the majority of our time indoors so the quality of the indoor environment is crucial for our health and wellbeing and the Heathy category aims to ensure . Occupant wellbeing may also be supported by having access to nature and natural amenity such as daylight.

- 10 Clean Air Minimum req. 0/2 A higher level of fresh air (50% more) is provided to ensure levels of indoor pollutants are maintained at acceptable levels. This can also be considered with 800ppm criteria instead of 100% more outside air than the Australian Standard. Minimum separation distances between supply intake and exhaust are met and internal sources of pollutants are exhausted directly outside. This is allowed for in the design documented to date.
11 Light Quality 2/4 The building will be designed to provide best practice artificial lighting and daylight amenity, while mitigating the affect of glare to occupants and ensuring occupants have access to quality views outside or inside the building. This will be demonstrated across 95% of occupiable areas. The daylight is evidenced in the appendix, whilst the lighting design will be detailed as the design develops.
12 Acoustic Comfort 2/2 The buildings will be designed to meet high levels of acoustic comfort, by using appropriate finishes to reduce reverberation, acoustically insulated partitions to separate spaces and reduce the intrusion of external noise with appropriate envelope. This will be detailed as the design develops.
13 Exposure to Toxins 2/2 95% of paints, adhesives, sealants and carpets will be specified to meet strict VOC content and 95% of engineered wood products must meet thresholds for formaldehyde. This strategy will be defined as the design develops in detail to inform material specifications.
14 Amenity and Comfort 2/2 The project will include dedicated spaces that act as a parent rooms, relaxation room or an exercise room. 1m2 per occupant must be provided and must include appropriate amenities so as the rooms intended purpose can be met. The flexible leaning room and house rooms are nominated to meet the requirements of this credit.
15 Connection to Nature 1/2 Nature-inspired design interventions have been proposed in alignment with the Green Star principles, including reflection garden, green roof, landscape, timber finishes. This contributes to more than 5% of the building's floor area/ or site area (whichever is greater) allocated to nature in which occupants can directly engage with.

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Resilient

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1/8 Green Star points

Encourages solutions that address the capacity of the building to bounce back from short-term shocks and long-term stresses.

The Resilient category addresses the need for developments to have defences and mechanisms in place to respond to and mitigate changes in climate, supporting infrastructure and in emergency scenarios.

16 **Climate Change Resilience** 0/1
This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.

17 **Operations Resilience** 0/2
This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.

18 **Community Resilience** 0/1
This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.

19 **Heat Resilience** 1/1
The building's design will achieve the heat island reduction by a combination of green roof and light coloured roof.

20 **Grid Resilience** 0/3
This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.

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Encourages a positive contribution to key environmental issues of carbon, water, and the impact of materials.

Promotes actions and solutions that improve the physical and mental health of occupants.

21 Upfront Carbon Emissions 3/6
 The building's upfront carbon emissions are at least 20% less than those of a reference building. This has been tested on the basis of the reference design defined by Green Star. Please refer to appendix for more details.

22 Energy Use 6/6
 The building's energy use will be at least 30% less than a reference building. This has been demonstrated by the preliminary energy modelling exercise undertaken through exceeding the National Construction Code's fabric, all electric systems, HVAC and lighting requirements and the addition of 25 kW of solar photo-voltaic (PV) panels on the roof.

23 Energy Source 6/6
 100% of the building's energy will come from renewable sources, either on-site, or off-site through strategies such as Power Purchase Agreements (PPAs) or Green Power. This means no on-site gas combustion will be featured on the project, even for heating or cooking with all electric systems.

24 Other Carbon Emissions 2/4
 The project will seek to minimise impacts from refrigerants where possible and ultimately commits to offsetting emissions from refrigerants that remain.

25 Water Use 0/6
 This credit is not targeted at this stage but will commit to a minimum 15% reduction to align with planning requirements by specifying efficient water fittings and rainwater reuse. The project team will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.

26 Life Cycle Impacts 0/2
 This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes more achievable.

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Places

0/8 Green Star points

Supports the creation of safe, enjoyable, integrated, and comfortable places.

Promotes actions and solutions that improve the physical and mental health of occupants.

27

Movement and Place

Minimum req. 0/3

The building includes showers and lockers for building occupants, meeting the minimum expectation of this credit. The credit achievement is not targeted in the current Green Star pathway as a Sustainable Transport Plan is not required for this development. However, the design intent is to adopt the principles of the Green Star Movement and Place credit where possible.

28

Enjoyable Places

0/2

This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.

29

Contribution to Place

0/2

This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.

30

Culture, Heritage, Identity

0/1

This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.

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People

3/9 Green Star points

Encourages solutions that address the social health of the community.

Promotes actions and solutions that improve the physical and mental health of occupants.

- 31 Inclusive Construction 1/1**
The contractor once appointed will provide gender inclusive facilities and PPE and will have policies on site to increase awareness and reduce instances of discrimination and bullying. The head contractor will additionally provide high quality staff support including mental and physical health support. This will be a specified requirement.
- 32 Indigenous Inclusion 0/2**
This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.
- 33 Procurement and Workforce 0/3**
This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.
- 34 Design for Inclusion 2/3**
The building will be designed to be inclusive to a diverse range of people, acknowledging the different needs of people to ensure they enjoy an equal experience. The design outcome will be reached in collaboration and with meaningful engagement with appropriate groups through the design process as it develops.

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Nature

2/14 Green Star points

Encourages active connections between people and nature and rewards creating biodiverse green spaces in cities.

Promotes actions and solutions that improve the physical and mental health of occupants.

- 35 Impacts to Nature 0/2**

This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.
- 36 Biodiversity Enhancement 0/4**

This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.
- 37 Nature Connectivity 0/2**

This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.
- 38 Nature Stewardship 0/2**

This credit is not targeted at this stage but will continue to be investigated with the project team as the design develops in case the criteria becomes of interest to the project.
- 39 Waterway Protection 2/4**

The building demonstrates an annual average flow reduction (ML/yr) of 40% compared to pre-development levels and meets specified pollutants targets. Please refer to the separate civil WSUD report that includes stormwater modelling that demonstrate these targets are met combined with the City of Melbourne stormwater requirements.

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Leadership

1 Green Star points

Recognises projects that set a strategic direction, build a vision for industry, or enhance the industry's capacity to innovate.

Promotes actions and solutions that improve the physical and mental health of occupants.

40

Market Transformation

0 targeted

Further opportunities for Leadership will be explored as the design is developed with the project team. Where opportunities for market transformation are identified these will be presented to the GBCA for consideration as Leadership strategies.

41

Leadership Challenges

1 targeted

The Climate Positive Pathway Leadership challenge has been met through the alignment of the design with the Green Star Climate Positive Pathway credits, gaining an additional point.

Further opportunities for Leadership will be explored as the design is developed with the project team and more Leadership Challenges are published by the Green Building Council of Australia that can be applied to this type of project.

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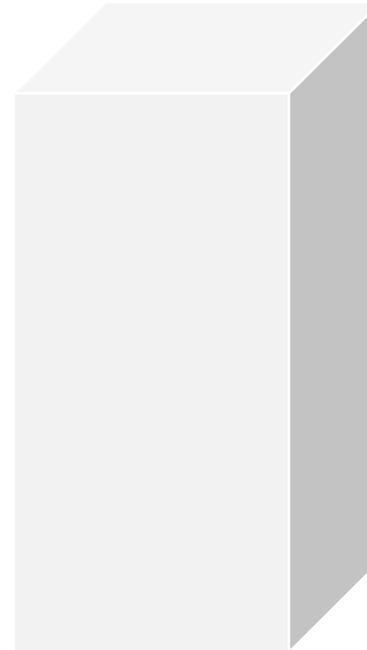
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Summary

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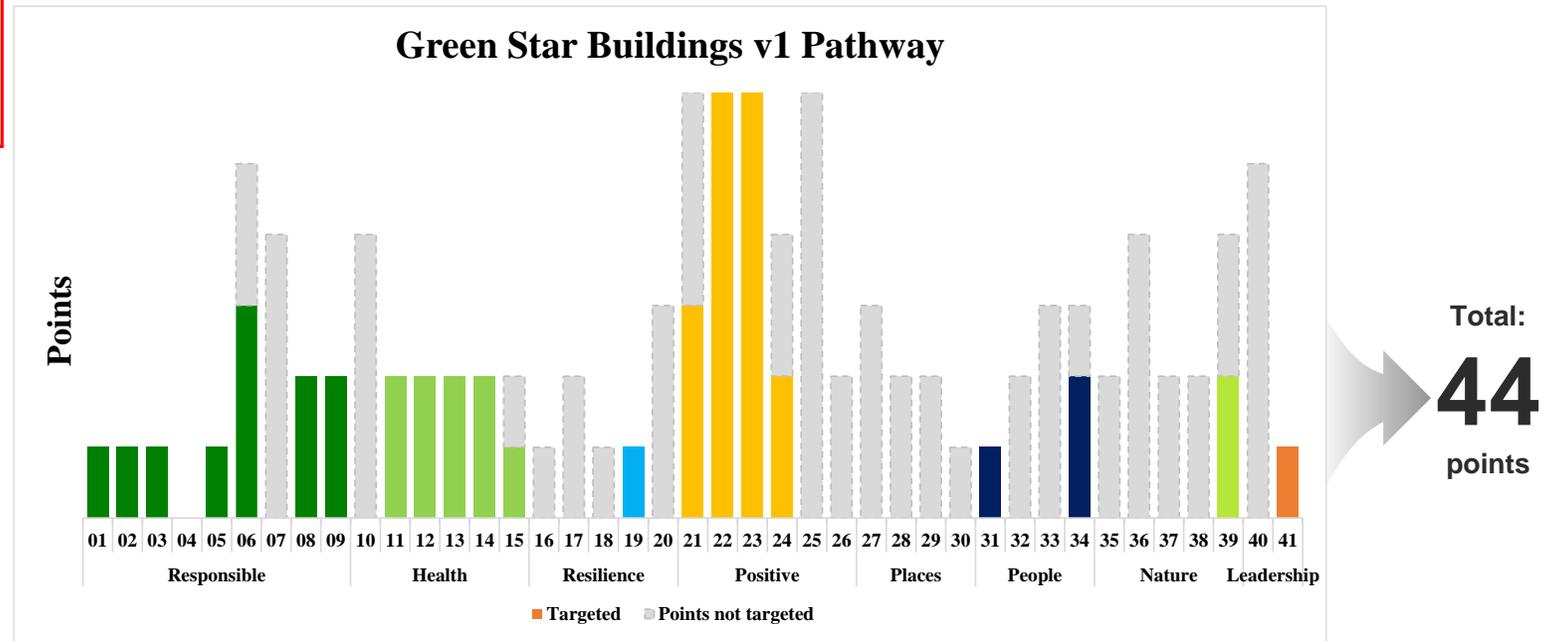
Pathway

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5 star Green Star target

The Centre for Humanities development is targeting ~44 points sufficient to achieve a self-assessed 5 star Green Star rating (minimum 35 points) using the current version of the Green Star rating tool. This includes an allowance for points to be lost during the detailed design and construction process.

A risk assessment demonstrating the total number of points targeted is sufficient for 5 star at this stage is included on the next page in addition to how the points are achieved for each category.



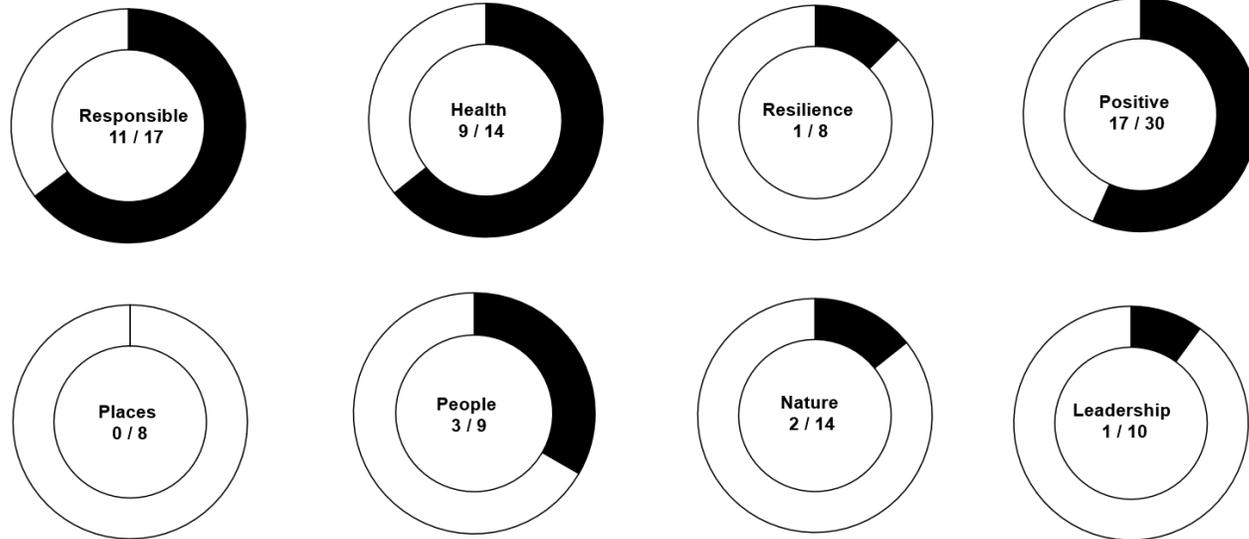
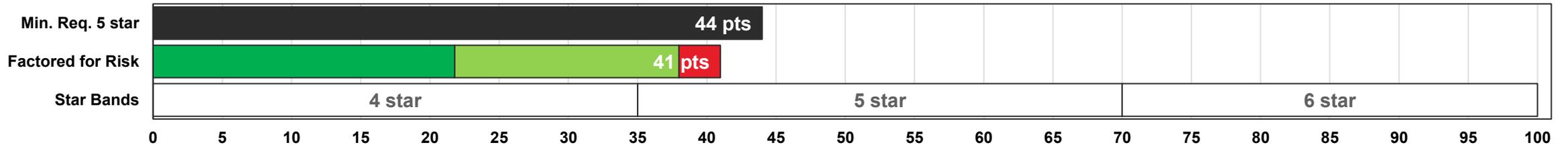
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Risk Assessment and Category Outcomes

Score + Risk Overview



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Scorecard

Green Star Buildings

The scorecard inset reveals the full pathway and the remaining credits within Green Star that will continue to be considered as the project develops in detail.

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Green Star Scorecard

Including risks per credit, responsibilities and timing

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Green Star Buildings v1

Pathway Manager

Scorecard

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ME – Minimum Expectations L = Low M = Medium H = High P = Primary A = Assistance X = Critical C = Consideration

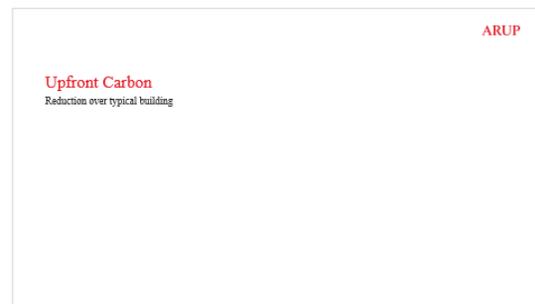
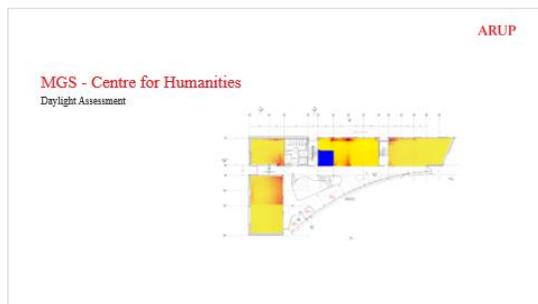
#	Credit	Min. Req.	Min. Req. 5 star			Project Team												Timing				Actions / Notes															
			Pathway	Ps	Risk	Client	Architect	Package	Method	Exec.	Hydr.	Structure	Landscape	Civil	ESD	Vermin	Acoustic	ES	RBS	ICA	Builder		Strategy	Concept	Design	Tender	Build	Handover	Use								
01	Industry Development		Credit	1	L	P	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Appoint a GSAP by SD, disclose the costs + market the outcome.			
02	Responsible Construction	ME	Credit	1	M	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	EMP, EMS, 90% landfill waste diversion, site staff training and audits				
03	Verification + Handover	ME	Credit	1	L	P	-	P	A	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ICA responsible to advise, monitor and verify the commission and tuning				
04	Operational Waste	ME	Minimum	Met	L	A	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Allow for suitably separated waste storage with access				
05	Responsible Procurement		Credit	1	M	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Design and delivery follows best practice enviro + social principles.			
06	Responsible Structure		Credit	3	M	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The structure must be specified with recognised accredited products.				
07	Responsible Envelope		Credit	0	M	A	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The envelope must be specified with recognised accredited products.				
08	Responsible Systems		Exceptional	2	H	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The systems must be specified with recognised accredited products.				
09	Responsible Finishes		Exceptional	2	H	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The finishes must be specified with recognised accredited products.				
10	Clean Air	ME	Minimum	Met	M	A	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Minimising pollutants, maximising fresh air and enabling maintenance.				
11	Light Quality	ME	Credit	2	L	A	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Best practice daylight and light to be provided.				
12	Acoustic Comfort	ME	Credit	2	M	A	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Acoustic strategy and best practice management.				
13	Exposure to Toxins	ME	Credit	2	L	A	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Low-zero VOCs and Formaldehydes with on-site testing.			
14	Amenity and Comfort		Credit	2	M	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Amenity rooms on-site for parents, relaxation and exercise.			
15	Connection to Nature		Credit	1	L	A	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Nature-inspired design and integrated nature rewilded			
16	Climate Change Resilience	ME	Credit	0	L	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Climate change risk mitigation strategy adopted.			
17	Operations Resilience		-	0	M	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Future building operations considered and blackout plan adopted. Arup with ACECOM				
18	Community Resilience		-	0	L	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Arup to undertake analysis and run workshop with project team			
19	Heat Resilience		Credit	1	L	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	At least 75% of the area mitigates the urban heat island.			
20	Grid Resilience		-	0	M	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10% reduction in peak electrical demand for 4 hours.			
21	Upfront Carbon Emissions	NZ	Credit	3	M	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Upfront greenhouse gas emissions are reduced compared to BAU.		
22	Energy Use	NZ	Exceptional	6	M	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Energy consumption is reduced compared to BAU.		
23	Energy Source	NZ	Exceptional	6	L	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Zero Carbon Action Plan plus 100% renewable energy procurement.			
24	Other Carbon Emissions	NZ	Credit	2	L	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Refrigerants are eliminated or offset.			
25	Water Use	ME	Minimum	Met	M	A	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The building uses less water than BAU.			
26	Life cycle Impacts		Credit	0	H	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	The building reduces life cycle impacts compared to BAU.		
27	Movement and Place	ME	Minimum	Met	L	P	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The building includes showers and lockers.			
28	Enjoyable Places		-	0	H	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The building delivers enjoyable places for people.			
29	Contribution to Place		-	0	L	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The building contributes to the wider urban context.			
30	Culture, Heritage, Identity		-	0	L	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The building's design reflects and celebrates locals and the history.			
31	Inclusive Construction	ME	Credit	1	L	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The building's construction practices are inclusive.		
32	Indigenous Inclusion		-	0	L	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MGS to provide Reconciliation Action Plan Report + project team member in RAP working group		
33	Procurement and Workforce		-	0	L	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Head contractor to demonstrate 2% PCV directed to employ disadvantaged groups. Arup review		
34	Design for Inclusion		Credit	2	L	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	JWA to undertake needs analysis in line with best practice guidelines. Arup review		
35	Impacts to Nature	ME	Minimum	Met	M	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not a site of high ecological value and light pollution minimised.		
36	Biodiversity Enhancement		-	0	H	A	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The building's site includes 300m2 of landscape area with diverse planting		
37	Nature Connectivity		-	0	L	A	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Species connectivity is encouraged through the site.		
38	Nature Stewardship		-	0	L	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Areas of restoration or protection are provided		
39	Waterway Protection		Credit	2	L	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Stormwater discharge is reduced and pollution targets are met.		
40	Market Transformation		-	0	H	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	The project implements a building solution or process that is considered leading.	
41	Leadership Challenges Responsible Products		-	0	H	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	Credit + both exceptional performance criteria met for all responsible materials credits		
41	Leadership Challenges Circular Economy		-	0	M	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Arup to conduct circularity assessment, facilitate workshop with project team
+	Climate Positive Pathway		Pass	1	L	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	15 points within the Climate Positive Pathway is achieved.

Total points: 44
Weighted for risk: 41.0
Estimated rating: 5 star

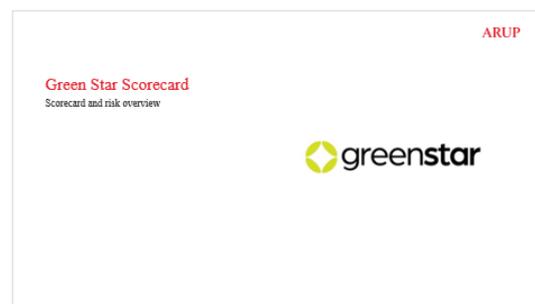
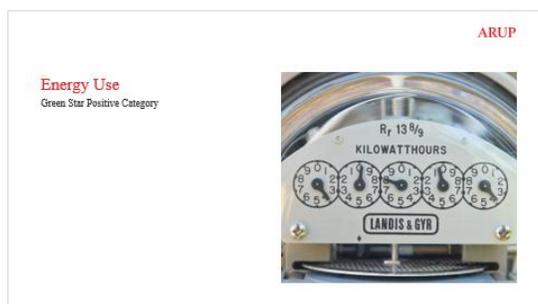
This is the total number of points including the leadership points. A limit of 100 is applied even if more than 100 are achieved.
The risk weighting factors being applied are 0.99 for low, 0.9 for medium and 0.75 for high.
The boundaries for each star rating are 0 for 4 star, 35 for 5 star and 70 for 6 star.

Appendices

Supporting Studies



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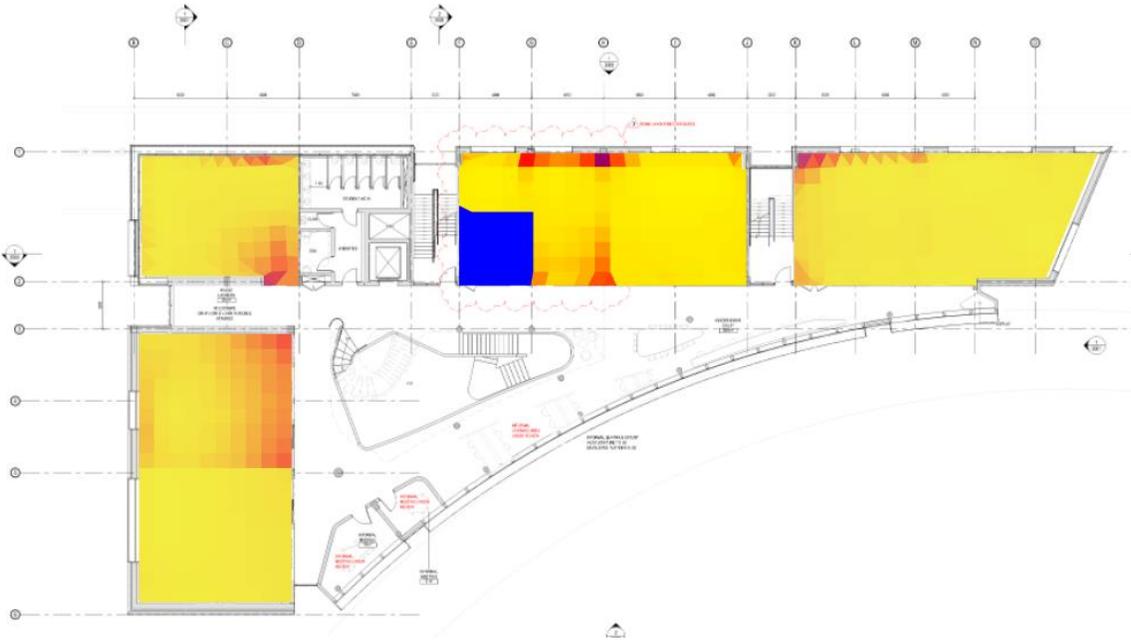
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Daylight Assessment

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Introduction

Green Star Buildings v1 – Credit 11 “Light Quality”

The new Green Star Buildings v1 tool has a new set of requirements regarding the light quality requirement.

This note provides details on the daylight requirements, which are summarised inset.

In order for any project to be certified, the Minimum Requirements must be met.

The Credit is then split into “**daylight**” and “**artificial light**” criteria.

- To achieve “Credit Achievement” (two Green Star Points), one or the other of these criteria must be met.
- To achieve “Exceptional Performance (four Green Star points), *both* must be met.

Based on the current Green Star pathway, the Credit Achievement should be achieved at minimum as part of the 5 star Green Star pathway. The Exceptional Performance has been targeted under the 5 star pathway.

This note focuses on the “daylight” criteria.

Green Star Buildings v1 – Credit 11 “Light Quality” requirements for Daylight

Green Star Requirement	Minimum Requirements	Credit Achievement and/or Exceptional Performance
Daylight for Occupants	Maximise the number of occupants in or near daylit areas – daylight calculation and narrative.	>40% average Daylight Autonomy (>160 Lux for 80% of working hours)
		No space with less than 20% Daylight Autonomy
Access to outside views	Ensure reasonable proximity to glazed facades, windows, or skylights – evidence in narrative.	As per Minimum Requirements
Indoor public common spaces	Provide unrestricted access to daylit indoor public common spaces – evidence in narrative.	As per Minimum Requirements
Glare Control	Control or mitigate external glare in daylit space – evidence in narrative.	Combination of blinds, screens, fixed devices or other means can be used to demonstrate one of three methods of compliance, which include calculations for fixed shades, blinds, and a performance pathway.
Learning, Healing and Living spaces	Maximise daylight to spaces that prioritise learning - all classrooms have access to a view and daylight.	As per Minimum Requirements



Methodology + Assumptions

The Centre for Humanities

Daylight Autonomy has been modelled across the nominated area between the assumed operational hours of 8am to 6pm. The nominated area is comprised of spaces that are regularly occupied for more than two hours - such as classrooms, offices, and staff hubs.

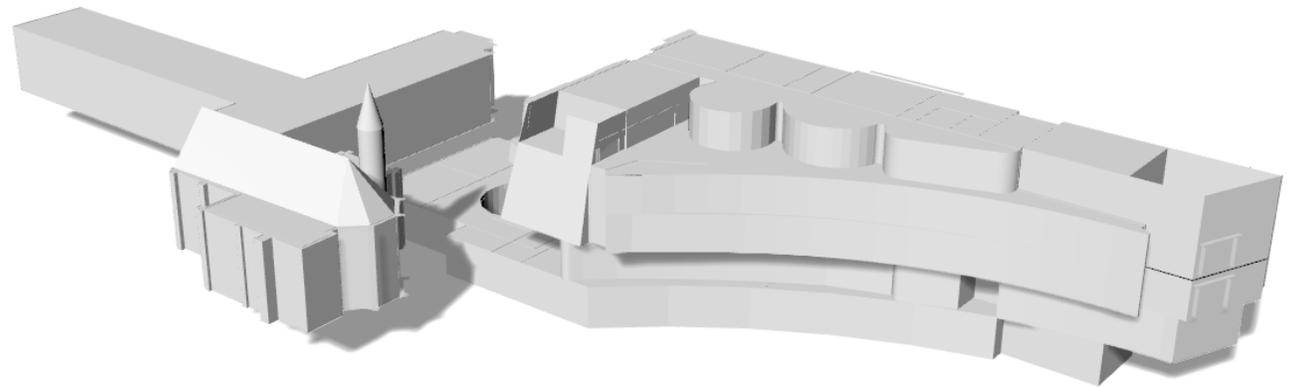
To achieve Credit 11 Light Quality, at least 40% of the regularly occupied areas across the building must receive high levels of daylight with no less than 20% on any floor or tenancy. High levels of daylight are deemed to have at least 160 lux due to daylight during 80% of the nominated hours. The entire nominated area is counted toward the DA assessment.

The daylight model is based on 50% SD drawing package including plan drawings, and elevations provided by John Wardle Architects. The model included the geometry for surrounding buildings to account for overshadowing, and fixed shading devices/window setbacks for the external glazing.

At this stage, five floors were selected for a Daylight Autonomy assessment to provide an overview of the building's daylight quality. The following values were defined initially to inform this preliminary target setting exercise:

- Glazing VLT: 50%
- Internal Glazing VLT: 80%
- Floor LRV: 30%
- Walls LRV: 70%
- Ceilings LRV: 80%
- Context (surrounding buildings) LRV: 30%

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3D model including surrounding buildings

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Daylight Results

Daylight - Overview

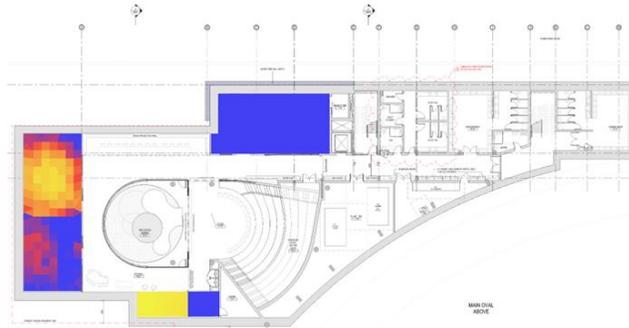
Initial assessment shows that high levels of daylight can be achieved from Ground floor to Level 3, contributing to an overall 60% of occupied spaces. For the basement, the percentage of occupied spaces with high levels of daylight is 24% but still above the minimum requirement for the Credit Achievement.

The Media and Broadcasting studio on the basement level has been excluded following the Green Star Submission Guidelines as it has been designed to avoid daylight to suit the purposed of film production.

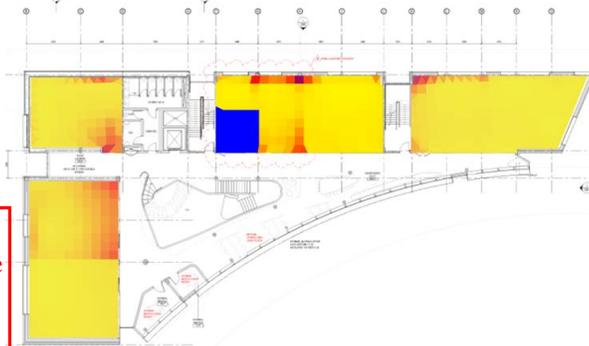
Please refer to the next page for the summary table and further discussions.

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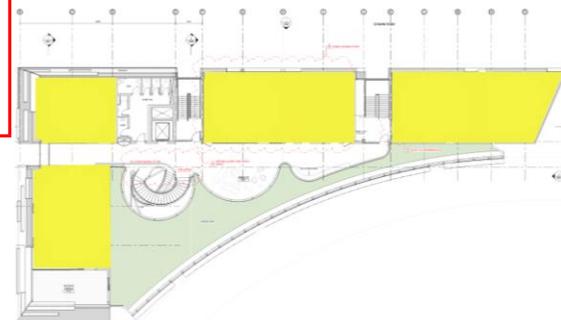
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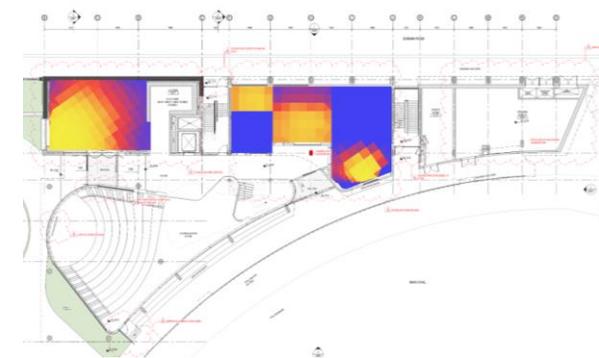
Basement



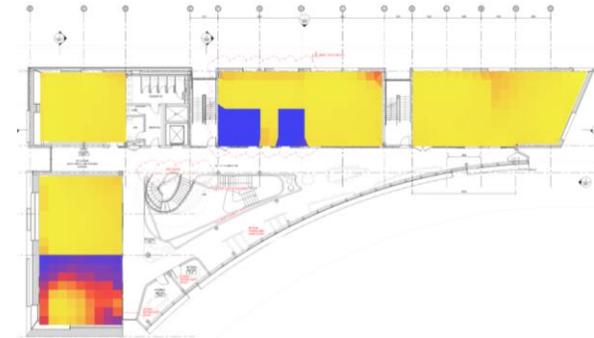
Level 1



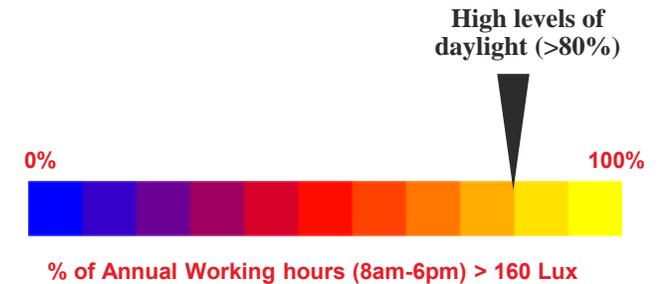
Level 3



Ground



Level 2





Daylight Results

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Daylight - Detailed Results

Most of the occupied spaces at the basement level and Ground floor receive low levels of daylight, resulting Daylight Autonomy being relatively lower compared to the rest of the building.

From Level 1 to Level 3, most of the occupied spaces achieved Daylight Autonomy >80% where Level 3 achieves 100% DA.

Overall, all assessed levels met the individual >20% DA threshold and would fulfill the Daylight criteria. The overall DA estimate across the five floors exceed the minimum requirement of 40% for the whole development.

Further design improvements could be considered:

- Basement: optimise the skylight for the classroom at the Southwest corner
- Ground floor: optimise the window size to improve daylight access

Centre For Humanities Daylight Autonomy Results

	Daylight Autonomy (%)	Area (m2)	Compliant Area (m2)	Daylight Autonomy >20%?
Basement	24%	178	44	✓ (Compliant, but room for improvement)
Ground	26%	262	68	✓ (Compliant, but room for improvement)
Level 1	86%	604	512	✓
Level 2	82%	571	470	✓
Level 3	100%	428	428	✓
Overall Estimate	62% ✓ (exceeding min. requirement of 40%)			

Note: Media Studio has been excluded following the Green Star Submission Guidelines as it has been designed to avoid daylight to suit the purposed of film production.

Upfront Carbon

Reduction over typical building

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Material Quantities

Inputs for design scenarios

The quantities for the proposed building have been provided by the cost consultant, Slattery.

It should be noted that benchmarks have been used for design elements to be designed in later stages. These quantities and the calculations will be reviewed and updated regularly throughout the design.

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Material	Proposed Design Quantities*
Concrete	3267m ³
Steel	347t
Reduction in materials	n/a
Other Materials	<ul style="list-style-type: none"> Includes building envelope, building services and interiors The quantities for other materials were assumed the same for both schemes and based on benchmarks Further opportunities for reduction can be explored as design progresses but overall less significant compared to structural materials

*note: quantities are prior to any material efficiency improvements that are tested on subsequent pages. These are the quantities as provided by Slattery on March 28th, 2023

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Scenario Outcomes

Low carbon concrete

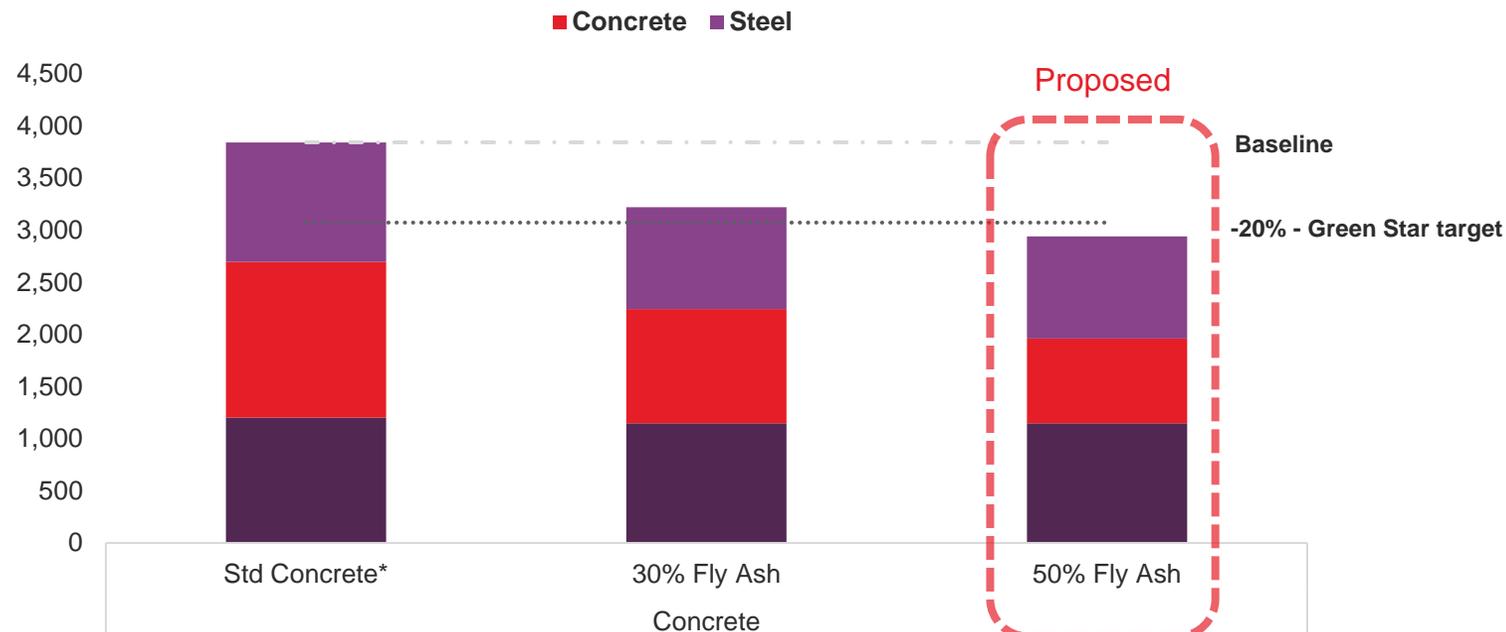
Preliminary calculations have been undertaken for the proposed building to develop the potential strategies required to achieve the 20% upfront carbon reduction target for Green Star. The quantities of structural elements were based on information provided by Slattery on March 28th, 2023.

The following table summarises the options assessed and the total upfront carbon:

Concrete Scheme	Upfront Carbon (Tonnes CO2e)
Std Concrete	3,843
30% Fly Ash	3,222
50% Fly Ash	2,940

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Upfront Carbon Comparison



Note

- We have assumed 20% cement replacement for the standard concrete in accordance with the Green Star Upfront Carbon Calculation Guide.
- Structural efficiency against the baseline has been accounted for in the 30% Fly Ash and 50% Fly Ash options.
- 10% reduction has been assumed for building interior with EPDs, which is aligned with the Green Star responsible materials credit.

To achieve the minimum target for upfront carbon reduction, 50% fly ash is to be specified for the concrete scheme.

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Section J

Preliminary Assessment

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J4D6 Walls and glazing

The Method 2 DTS pathway in NCC 2022 is consistent with NCC 2019, effectively setting targets for the total façade performance with regards to thermal and solar requirements.

It effectively requires the following criteria to be met:

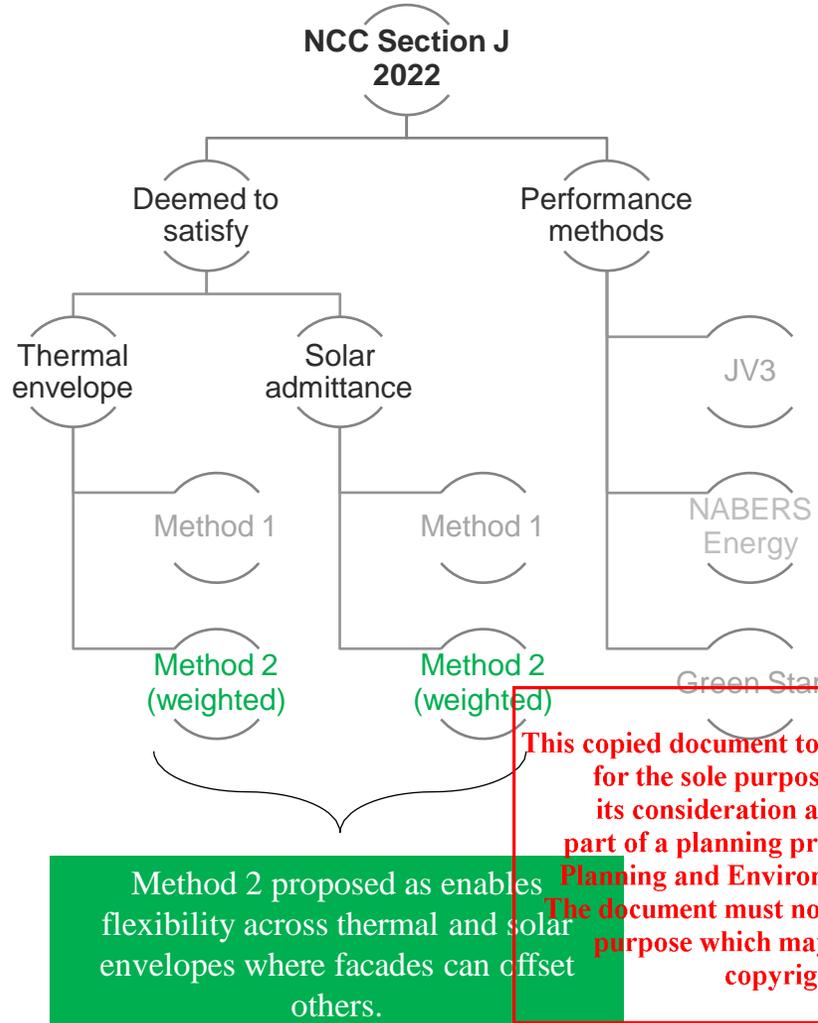
- Total system U-value of 2.0 W/m².K for combined window and wall performance.
- Overall solar effectiveness of 0.13 for combined window and wall performance, with adjustments made for orientation.

Method 1 would require all facades to meet this criteria which would be very onerous but Method 2 enables all facades to be considered in a combined calculation so trade offs can be calculated.

This effectively enables some areas of the building's performance to offset others.



NCC Section J for 2022 with combined window and wall requirements



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J4D6 Walls and glazing

[2019: J1.5]

- (1) The Total System U-Value of wall-glazing construction, including wall-glazing construction which wholly or partly forms the envelope internally, must not be greater than—
 - (a) for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area, U2.0; and
 - (b) for a Class 3 or 9c building or a Class 9a ward area—
 - (i) in climate zones 1, 3, 4, 6 or 7, U1.1; or
 - (ii) in climate zones 2 or 5, U2.0; or
 - (iii) in climate zone 8, U0.9.
- (2) The Total System U-Value of display glazing must not be greater than U5.8.
- (3) The Total System U-Value of wall-glazing construction must be calculated in accordance with Specification 37.
- (4) Wall components of a wall-glazing construction must achieve a minimum Total R-Value of—
 - (a) where the wall is less than 80% of the area of the wall-glazing construction, R1.0; or

Table J4D6a: Minimum wall Total R-Value - Wall area 80% or more of wall-glazing construction area

Climate zone	Class 2 common area, Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area	Class 3 or 9c building or Class 9a ward area
1	2.4	3.3
2	1.4	1.4
3	1.4	3.3
4	1.4	2.8
5	1.4	1.4
6	1.4	2.8
7	1.4	2.8
8	1.4	3.8

Table J4D6b: Maximum wall-glazing construction solar admittance - Class 2 common area, Class 5, 6, 7, 8 or 9b building or Class 9a building other than a ward area

Climate zone	Eastern aspect solar admittance	Northern aspect solar admittance	Southern aspect solar admittance	Western aspect solar admittance
1	0.12	0.12	0.12	0.12
2	0.13	0.13	0.13	0.13
3	0.16	0.16	0.16	0.16
4	0.13	0.13	0.13	0.13
5	0.13	0.13	0.13	0.13
6	0.13	0.13	0.13	0.13
7	0.13	0.13	0.13	0.13
8	0.2	0.2	0.42	0.36

NCC 2022 Extracts – Building Classes 2,5 & 9b (Residential, Office & assembly building) and Climate Zone 6 applied.

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New approach to facades
Separate solar and thermal requirements with walls and windows combined



Thermal Envelope

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Total System U-value of Wall-glazing Construction

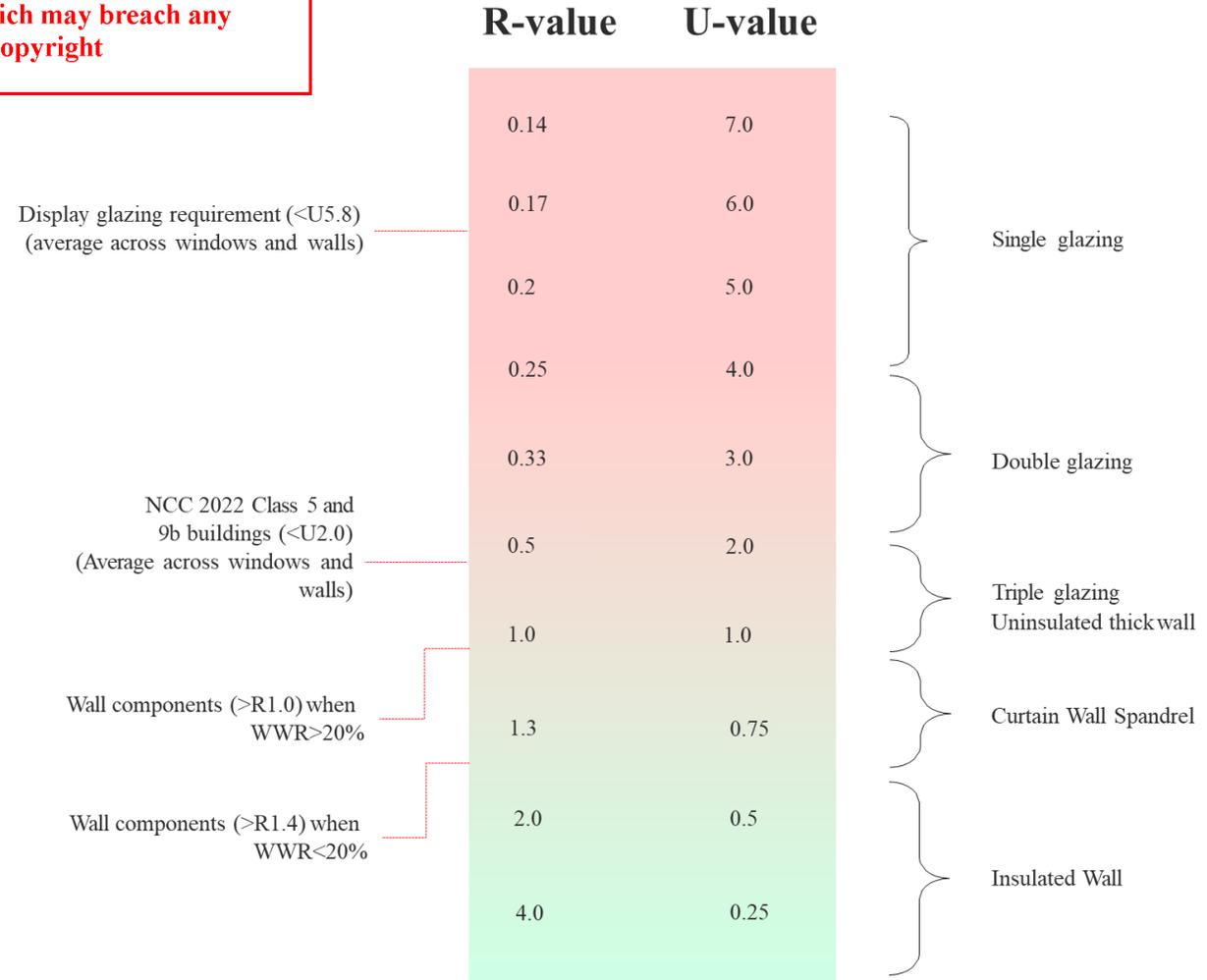
The building's overall thermal performance is dictated by the construction of the building's walls and windows.

An overall maximum U-value of 2.0 W/m².K (energy flow per area per degree Celsius in difference in the temperature between indoor and outdoors) is defined by the National Construction Code.

Note R-value in the inset figure does not represent the R-value of the insulation, but the R-value of the total wall or glazing build-up. Thermal bridging effect should be accounted for properly following NCC 2022.

The performance of the glass and walls must be considered together.

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Solar Envelope

Solar Admittance of Wall-glazing Construction

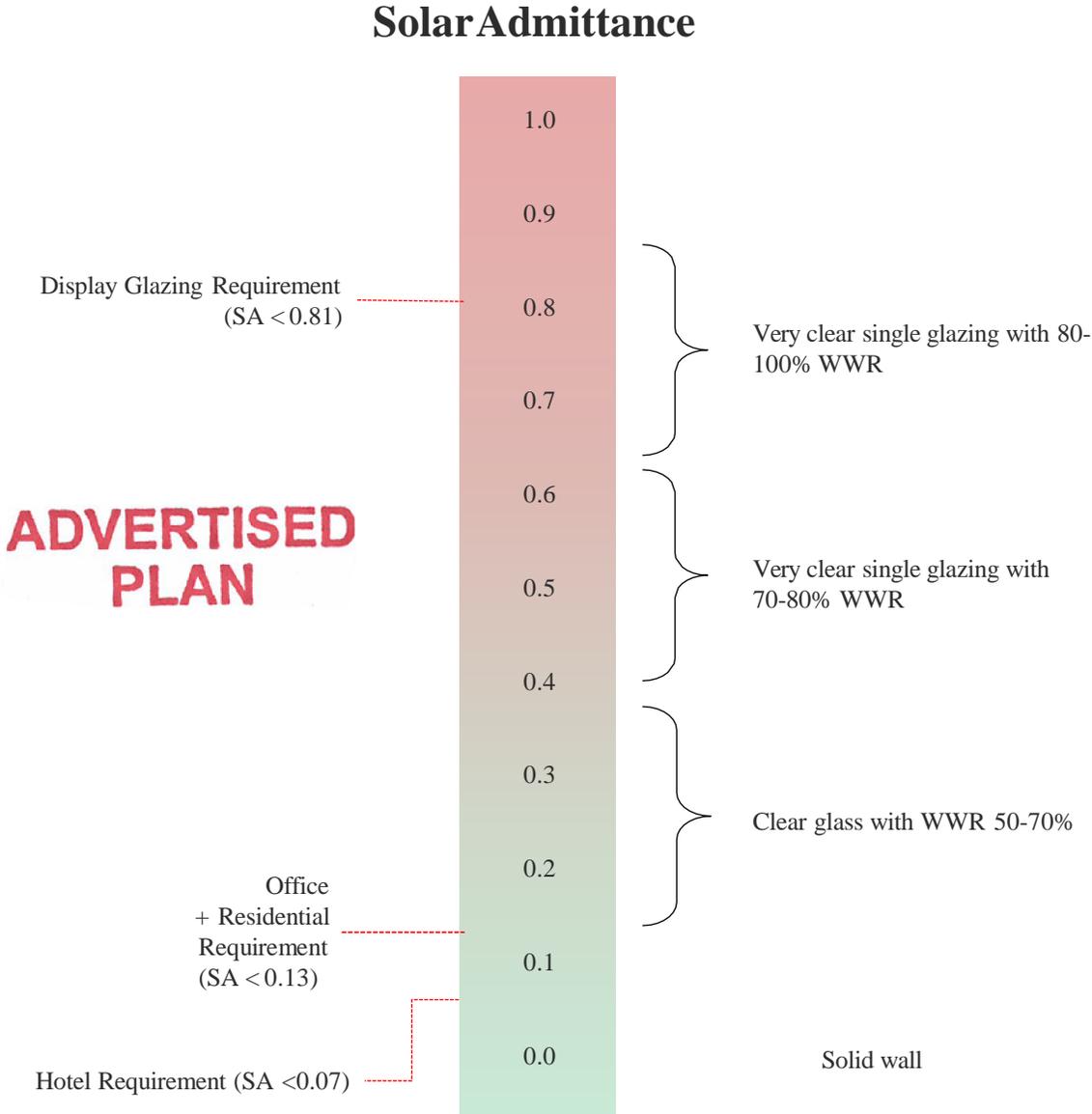
The solar envelope also has to comply with the NCC and can also be area weighted.

It is simpler to consider as walls have a solar admittance of zero but more complex in that orientation also comes into the equation.

For glazing the solar heat gain coefficient (SHGC) represents the solar admittance and is reduced by a shading factor.

The shading in the proposed design and relatively low window to wall ratios will help enable clear glass to be specified and maximise daylight levels.

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Wall-glazing Performance

Façade Design Options

A preliminary test have been undertaken using NCC DTS Method 2 to inform the performance of different design options.

The improvement over NCC DTS is currently ~20%, which has been reviewed against the overall reduction target under the Green Star Energy Use credit. External blinds can be considered to increase the flexibility of glazing selection and optimise the daylight when needed.

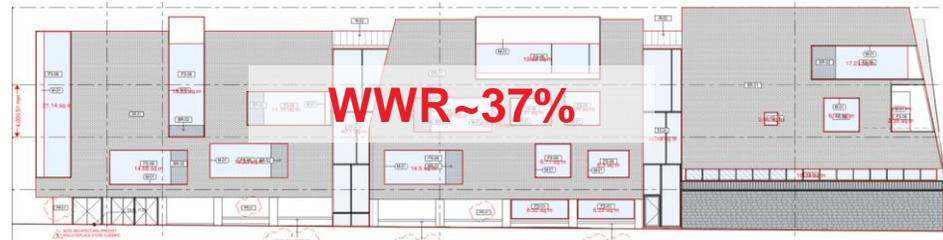
The performance targets for the opaque elements are as follows but to be further tested using energy model:

- Wall R-value: ≥ 1.8
- Roof R-value: ≥ 3.8
- Floor R-value: ≥ 2.5
- Please refer to the ESD markup attached for the locations of the insulation.

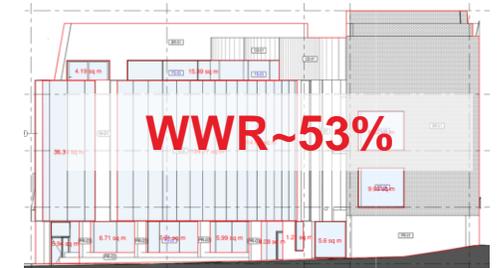
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Option	Glazing SHGC	Glazing U-value	External Shading*	Solar Performance	Thermal Performance
Baseline	0.26	2.6	North, East, West: SM0.85 (window setback)	19% better than DTS	22% better than DTS
Option 1	0.3	2.6	North: SM0.35 (blinds blocking 80% summer radiation)	25% better than DTS	22% better than DTS
Option 2	0.35	2.6	North: SM0.35 (blinds blocking 80% summer radiation) East: SM0.35 (blinds blocking 80% summer radiation)	23% better than DTS	22% better than DTS

*SM = Shading Multiplier



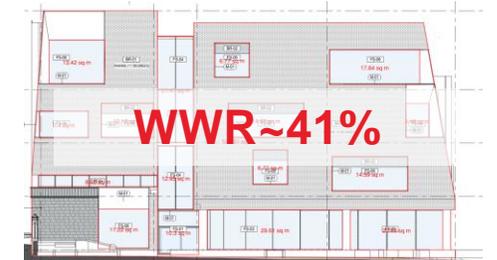
North Elevation



East Elevation



South Elevation



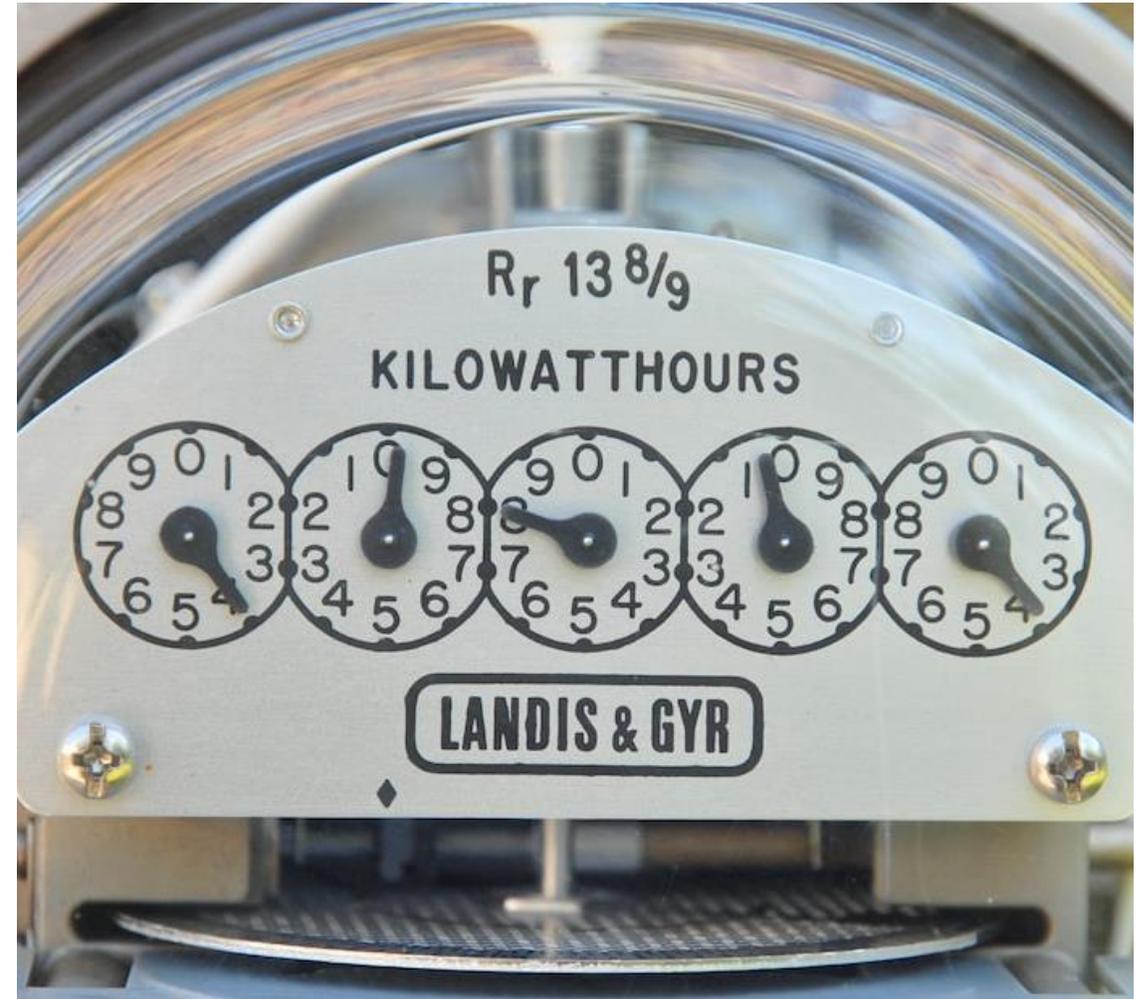
West Elevation

Energy Use

Green Star Positive Category

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Energy Use

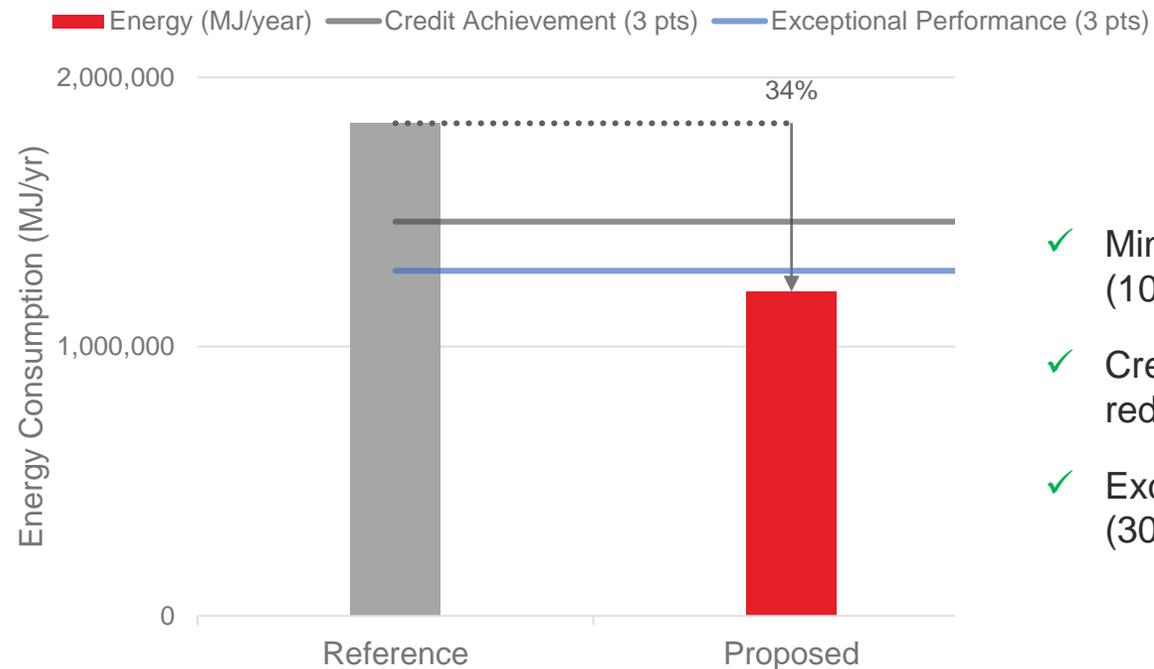
Reference Building Pathway

The preliminary energy analysis shows that the proposed building has the potential to achieve more than 30% reduction of energy use compared to a reference building. This is equivalent to the Exceptional Performance (6 points) under the Energy Use credit of Green Star Buildings v1. The following key assumptions have been included in proposed model and contributes to the overall energy use reduction:

- All electric design with high efficiency air cooled chillers and heat pumps for heating hot water and DHW
- FCUs with dedicated outside AHUs providing minimum 50% increase in outside air compared to AS1668. Demand control ventilation is enabled to modulate the amount of outside air.
- Efficient LED lights (~20% reduction in illuminance density compared to NCC 2022) with automatic controls.
- 25 kWp rooftop PV array (170m² roof area required with 140m² covered with PV).

It should be noted that other assumptions and benchmark values have been used for the energy modeling to manage the level of design details at this stage. These assumptions will continue to be reviewed and updated as design progresses.

Green Star - Energy Use



- ✓ Minimum Expectation (10% reduction)
- ✓ Credit Achievement (20% reduction)
- ✓ Exceptional Performance (30% reduction)

Green Star Scorecard

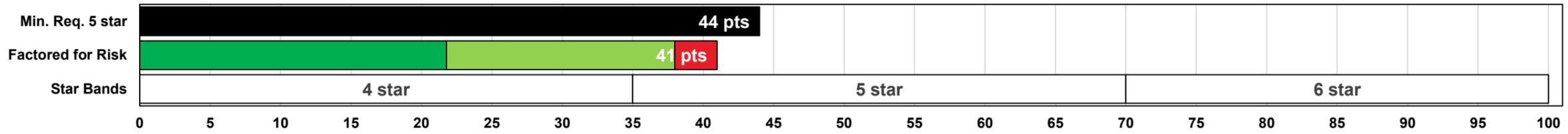
Scorecard and risk overview



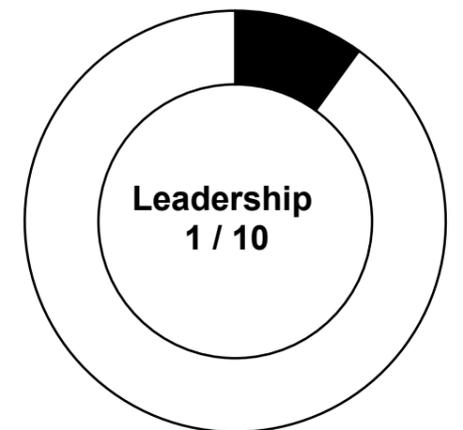
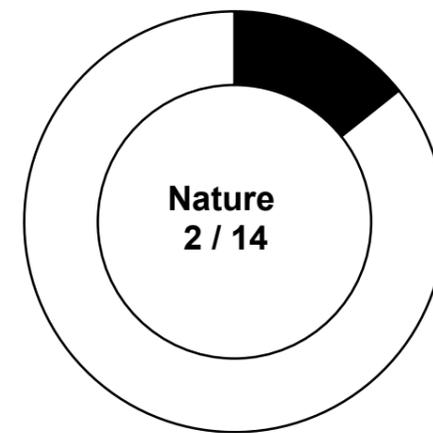
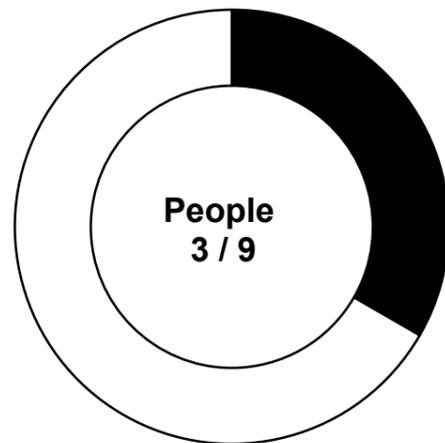
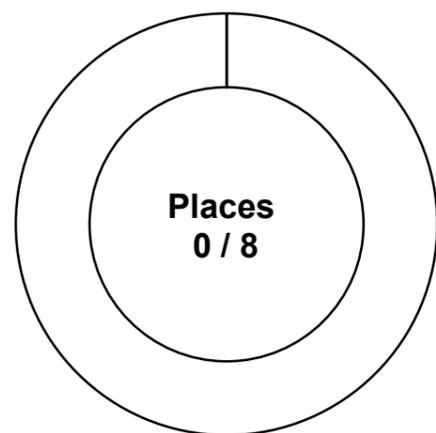
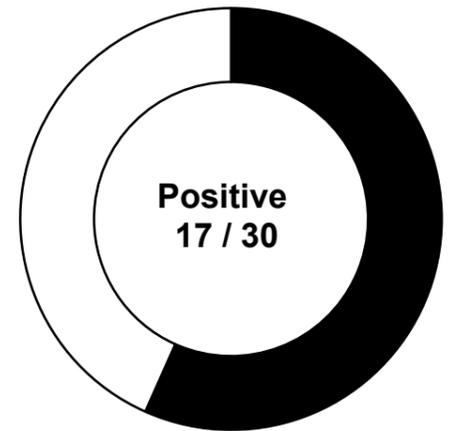
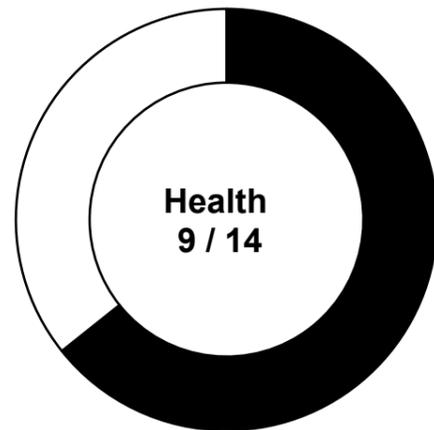
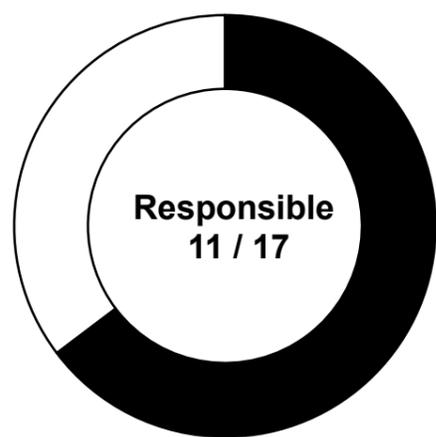
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Score + Risk Overview



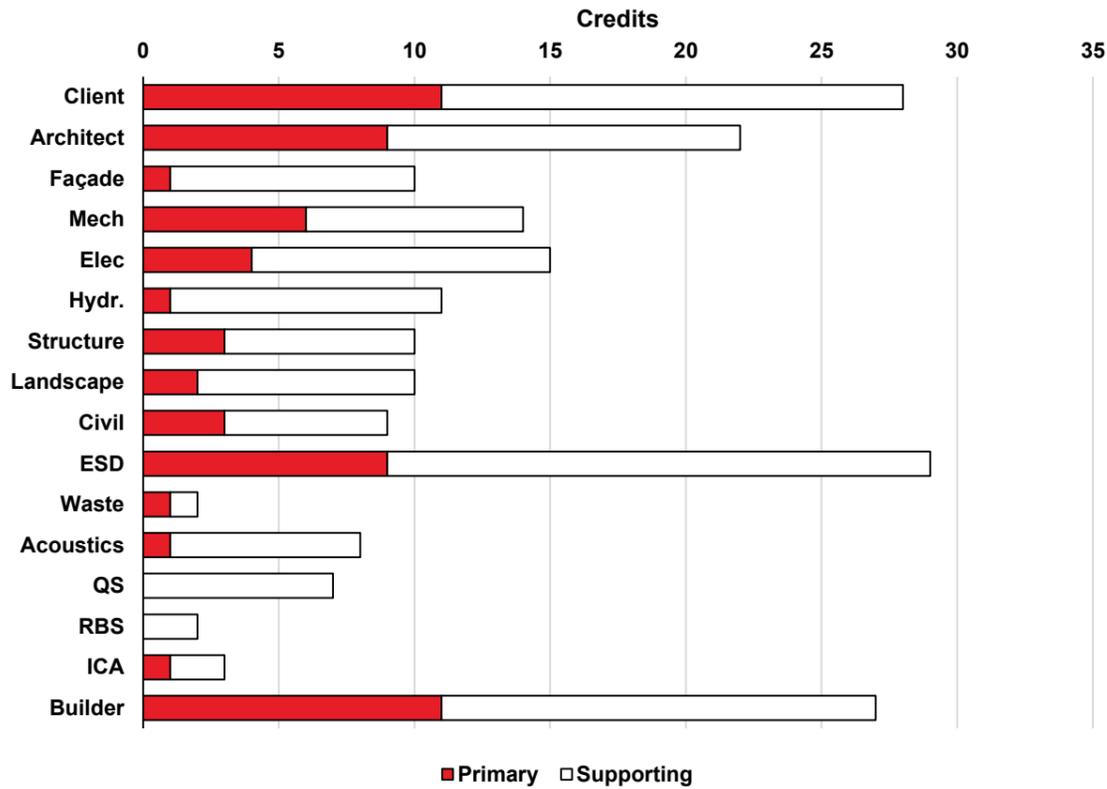
By Category



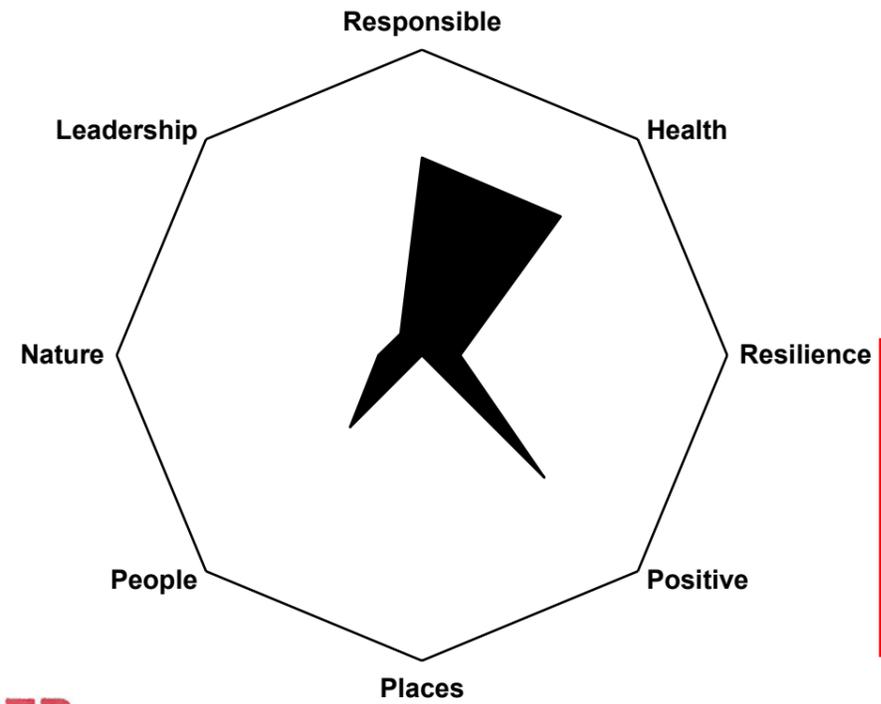
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Project Team Responsibility



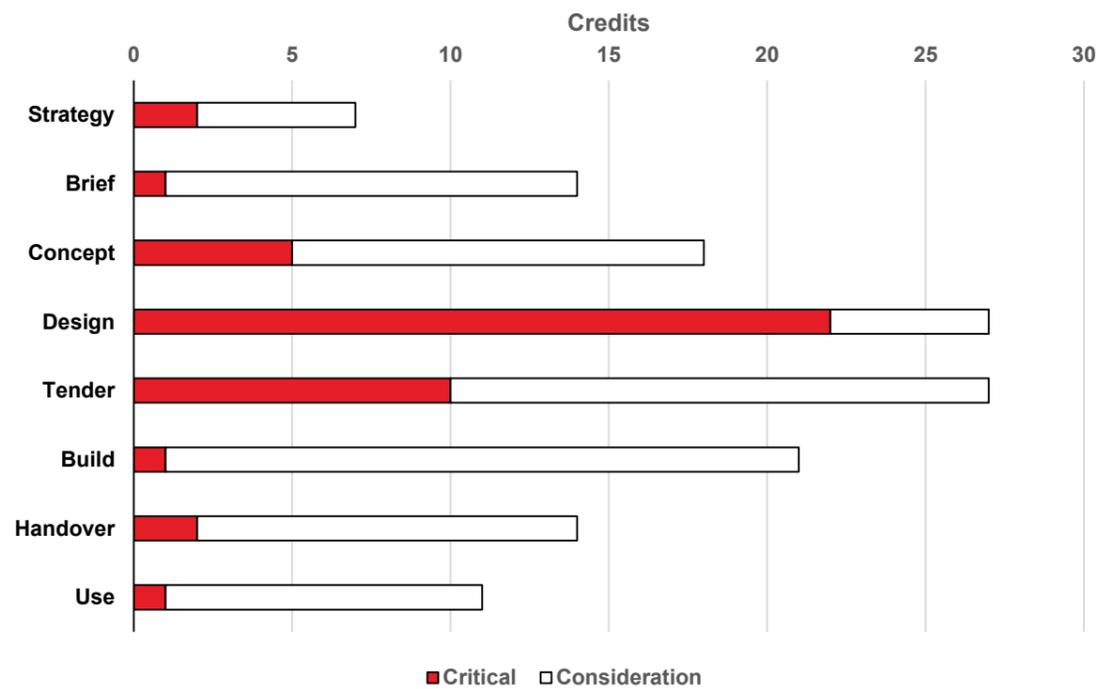
Current Pathway | Points Proportion by Category



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Timing Overview



Credit Performance Level Overview

