

PRE-RELEASE - WORK IN PROGRESS



School Infrastructure Pattern Book: Standardised Designs for Schools

Volume 2 Building Components

Revision 4 - 18/09/24

Revisions

Revision	Date(dd/mm/yy)	Description
1	09/08/24	Draft for internal review
2	09/09/24	Draft for internal review
3	16/09/24	Draft for internal review
4	18/09/24	Draft for review

How to Navigate the Interactive Pattern Book

The screenshot shows a navigation bar at the top with buttons for Contents, Introduction, Circulation, Services, Envelope, Interior, and Pre-Schools. The 'Circulation' button is highlighted with a red circle. Below the navigation bar, the page displays 'Chapter 2' and a list of sections: 2.1 Chapter Section 1, 2.2 Chapter Section 2, and 2.3 Chapter Section 3. Navigation instructions are provided for each element:

- Click any of the buttons at the top right corner of the page to navigate to your desired chapter
- This red circle indicates the current chapter
- Click this button to return to the contents page of this volume
- Click this button to navigate back
- Click this button to navigate forward
- Click red text to navigate to the individual sections within each chapter

The Pattern Book Volumes

Volume 1 - Schedules of Accommodation and School Building Layouts

1	Introduction
2	Public Schools
3	High Schools
4	SSP
5	Pre-Schools

Volume 2 - Building Components (this volume)

1	Introduction
2	Circulation
3	Services
4	Envelope
5	Interior
6	Pre-Schools Components

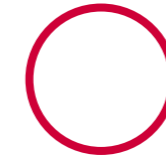
Volume 3 - Room Layouts and Room Data Sheets (separate volume provided in future release)

1	Room Layout Sheets
2	Room Data Sheets

Volume 4 - Digital Resources

Volume 2: Building Components - Contents

Introduction		Circulation		Services		Envelope	
1.1	Introduction	2.1	Overview	3.1	Services Core Overview	4.1	Facade Fundamentals
1.2	Flexibility	2.2	Walkway & Balustrade	3.2	Ceiling Void Strategy	4.2	Street Facade
		2.3	Lift	3.3	Mechanical Strategy	4.3	Walkway Facade
		2.4	Stairs	3.4	Comms Strategy	4.4	End Facade
		2.5	Circulation Worked Example	3.5	Electrical Strategy	4.5	Roof
				3.6	Photovoltaic Solar Power	4.6	Worked Example
				3.7	Amenities		
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Interior		Pre-Schools Components					
5.1	Overview	6.1	Overview				
5.2	Floor Finishes	6.2	Stand-alone Pre-Schools				
5.3	Ceiling Finishes	6.3	Integrated Pre-Schools				
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5.5	Sliding Doors						
5.6	Worked Example						



Introduction

- 1.1 Introduction
 - 1.2 Flexibility
-

1.1 Introduction



Introduction

The School Infrastructure NSW Pattern Book builds upon the standardised approach to school designs by creating a minimum standard with repeatable design elements and components, which can be applied to new and upgrade schools.

The opportunities of standardisation, certainty and repeatable components supports equity within our schools. It enables the application of either traditional or modern methods of construction, and enables increased industry productivity and product innovation in the design and delivery of schools.

The school building designs in the Pattern Book are intentionally agnostic to structural material. This is to ensure industry can bring best practice and innovation to the design and construction of school infrastructure.

Stakeholder input

The Pattern Book was developed in collaboration with School Infrastructure Delivery, Planning, Cost Planning, Asset Management, Design and Infrastructure Standards, Digital Engineering and Sustainability. It also leveraged external expertise in cost planning, sustainability, building services, construction and buildability, manufacturing and architecture.

The efficacy of the Pattern Book was tested on a dozen projects to evaluate fit for purpose outcomes, and as such, it represents a culmination of effort from numerous external teams. It is the first step in providing a design benchmark and certainty for industry and stakeholders.

The purpose of the Pattern Book baseline model is to encourage industry, which includes consultants, construction contractors, manufacturers and education experts, to innovate in their approach to the design, manufacturing, assembly and construction of school infrastructure.

How to use the Pattern Book

The Pattern Book includes standardised templates for school building designs including the expandable Public and High Schools, COLAs, Halls and toilet amenities.

The Pattern Book is both in 2D PDF form and also as Revit models for building types. Users of the Pattern Book can navigate through the book to review designs, understand components, refer to EFSG Design and Technical Requirements for more information on technical standards and performance criteria and also download building envelopes from the EFSG Autodesk Construction Cloud.

The Pattern Book is an essential part of the EFSG, and all the designs and components are EFSG compliant. If there are discrepancies between the Pattern Book and EFSG, the Pattern Book assumes a higher order of precedent over the EFSG. This is in part because the EFSG is undergoing a significant edit of content to bring it up to current standards and it is envisaged this may take a number of years.

1.2 Flexibility



Baseline Design Assumptions

The Pattern Book assumes a 'baseline design' which represents the majority of new school buildings that are constructed each year in NSW. These are mostly 3 storey schools in greenfield and regional areas. The Pattern Book illustrates this baseline model which assumes:

- Single glazing with fixed panes of glass and a fixed panel of louvres for natural ventilation
- A Deemed-to-Satisfy fire strategy
- A 4 degree mono-pitch roof with large eaves
- 3 x Façade types to respond to the street façade, side and walkway facades

Flexibility within standardisation

All projects will have site specific requirements and to ensure there is sufficient flexibility in school building designs to respond to their context, the Pattern Book has fixed and flexible elements outlined in the summary table below.

All colour and material choices must comply with reflectivity requirements.

Element	Fixed Criteria	Flexible Criteria
Glazing	<p>Single glazing</p> <p>Min: 8.2m² to achieve daylight requirements (Apply to GLS only)</p> <p>Max: Approx. 8.8m² for Section J thermal requirements (Apply to GLS only)</p>	<p>Glazing area may increase if double glazing is adopted based on environmental conditions</p> <p>Areas for specialist spaces to be derived from area of rooms in association with the ESD consultant on a project basis</p>
Fixed louvre for natural ventilation	<p>Min 4.3m² to achieve 6.25% of room area ventilated area to be confirmed by project teams (Apply to GLS only)</p> <p>Insulated door panel behind to achieve nom. R1.4</p> <p>Glass louvres not permitted due to maintenance issues</p>	Colour and material choices
Mechanical louvre	<p>Mechanical louvre above 2750mm high ceiling zone to Learning Common zone façade based on the adopted mechanical system (Apply to GLS Hub only)</p>	<p>Colour and material choices</p> <p>Extent for specialist spaces to be derived from area of rooms in association with the mechanical consultant on a project basis</p>

Table continues next page

1.2 Flexibility



Element	Fixed Criteria	Flexible Criteria
Spandrel	<p>Comply with NCC DTS fire separation of opening requirements</p> <p>700mm high fire rated wall + 200mm slab to achieve overall 900mm</p> <p>Preferred finish of the façade to be CFC for robust performance</p>	<p>Project team may adjust sill height to comply with NCC based on structural slab thickness (minimum 600mm above FFL as per the NCC).</p> <p>Fire rated material and finish</p> <p>Compressed fibre cement sheet as final finish is preferred as the base case</p> <p>Other materials and colour may be considered provided it is compliant with budget and robustness</p>
Framing element	To be incorporated to give depth and articulation to the façade	<p>Flexibility subject to budget.</p> <p>Project team may adjust the depth, width, proportion, and arrangement</p> <p>Opportunity to adjust extent in conjunction with sun shading elements if required</p> <p>Colour and material choices</p>

Element	Fixed Criteria	Flexible Criteria
Plinth	<p>Building to sit on a solid plinth to allow for mowing / landscape zone to abut building base. Recommended configuration:</p> <p>For 3 storeys building – 3 storeys of framed façade on a concrete or masonry plinth to manage topography change.</p> <p>For 4 storeys or above – Project team may consider extending plinth up to the first level</p>	<p>Material to provide a grounding to the building and robust construction.</p> <p>Colour and Material choices.</p> <p>The height of the base material relative to the overall height of the building</p>
Sun Shading	<p>To be applied to facades to achieve ESD requirements for various building orientations</p> <p>15 degree slope for horizontal shading elements to prevent bird roosting and in accordance with the Steensen Varming ESD report</p>	<p>Colour and material choices</p> <p>Arrangement</p> <p>Depth of elements relative to orientation</p>

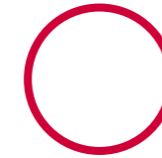
Table continues next page

1.2 Flexibility



Element	Fixed Criteria	Flexible Criteria
Roof	<p>4 degree single pitched roof falling towards street side</p> <p>Roof to cantilever over the walkway at courtyard side</p> <p>Downpipes not permitted on walkway side due to climbability issues</p> <p>Walkway side to have appropriate protection from rain at the top floor of the building to a height of 2750mm</p> <p>Depth of roof profile to be in accordance with Manufacturers requirements for roof length – nominal Klip-Lok or similar</p>	<p>Colour of roof (to be determined in accordance with appropriate SRI values)</p> <p>Colour of soffit</p>
Core	<p>Location and size as appropriate to the expansion strategy and scale of building</p> <p>To incorporate toilets, BCR, cleaners room, EDB and mechanical services</p>	<p>Material and colour of cladding</p> <p>Scale of core is subject to services strategy for the school</p>
Walkway - Cantilevered	<p>Minimum 2100mm clear width (plus an allowance for tolerance)</p> <p>Coved finish to concrete floor.</p>	<p>Safety tensile mesh add-on</p> <p>Glass enclosure add-on</p>
Balustrades	<p>1300mm high (plus an allowance for tolerance) modular face fixed Galvanised steel panels as per drawings</p>	<p>Perforated panel add-on</p> <p>Solid panel add-on</p>

Element	Fixed Criteria	Flexible Criteria
Stair	<p>Minimum 2100mm clear width stair</p> <p>Double height handrails to both sides of stair</p> <p>Full height perforated screen balustrade to perimeter</p> <p>Location of the stair to minimize blocking of light into the teaching spaces along the corridor</p>	<p>Colour of material</p> <p>Orientation of the stair relative to the expansion strategy</p> <p>Stair cladding material to take into account durability and location to say marine environments</p>
Lift	<p>Location as appropriate to the expansion strategy</p> <p>One lift per 14 bays of building located centrally within the length of the walkway side, subject to connection between buildings.</p> <p>Location of the lift to minimize blocking of light into the teaching spaces</p>	<p>Material and colour of lift shaft</p>

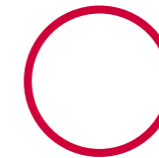


2

Circulation

- [2.1 Overview](#)
- [2.2 Walkway & Balustrade](#)
- [2.3 Lift](#)
- [2.4 Stairs](#)
- [2.5 Circulation Worked Example](#)

2.1 Overview

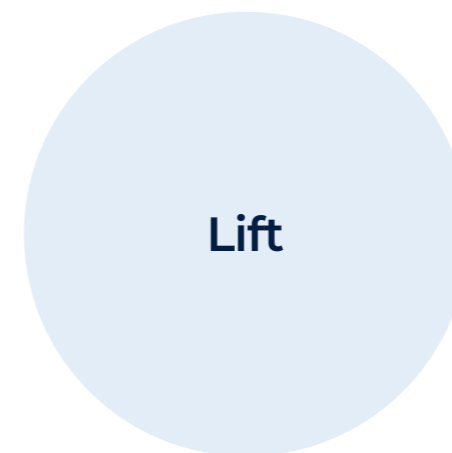


External Circulation Components

The external circulation components are efficiently designed to provide the primary means of circulation within a school.

They combine to provide covered access to the learning spaces and cores and are integral to the visual experience from within the school grounds.

It provides opportunity to add some site specific choices of configuration, colour and material.



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2.2 Walkway & Balustrade



Walkway Design Intent

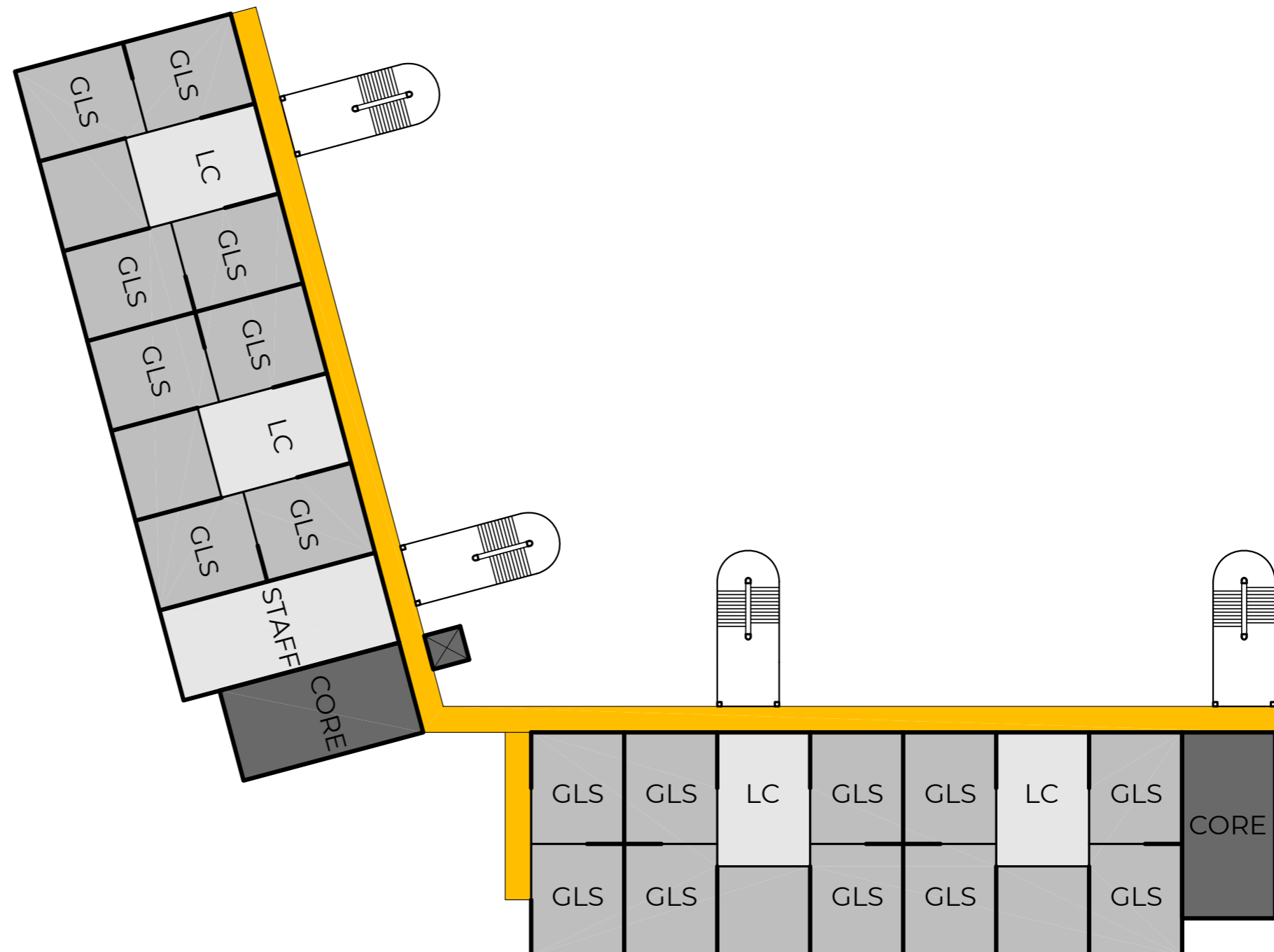
Walkways are concrete finished laid to crossfall, covered by the slab or roof above and contained with a balustrade.

Balustrade Design Intent

Designed to be durable, robust and low maintenance with a galvanised steel flat bar panel detail. Panels size should not exceed 1m width to enable ease of handling, installation and replacement.

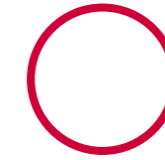
To ensure each school presents a unique identity and respond to project specific requirements, there is the need to bring additional elements to the baseline design to accommodate colour, texture, variety and potentially additional safety measures.

Panels of colour, texture and perforated metal can be added to the baseline panel design. There is also the flexibility to add a tensile mesh and fully enclosed glazed solution to address concerns of safety or comfort in colder climates.



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2.2 Walkway & Balustrade



Walkway Design

Walkway

- External walkway to achieve minimum 2100mm clear width. Project team to incorporate sufficient tolerance in detail design based on preferred construction methodology i.e. top or face fixed
- Exposed concrete with covered finish to provide required slip rating
- Walkway to achieve minimum 1:80 fall in accordance with NCC
- Waterproofing system in accordance with NCC and AS4654
- Maintain accessible transition between internal and external space as per AS1428.1

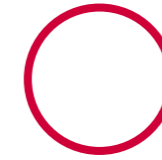
Balustrade

- Balustrade to be minimum 1300mm high
- Balustrades must not contain openings greater than 100mm in width
- All balustrades must not contain a toehold in the zone of 150-760mm above the floor.

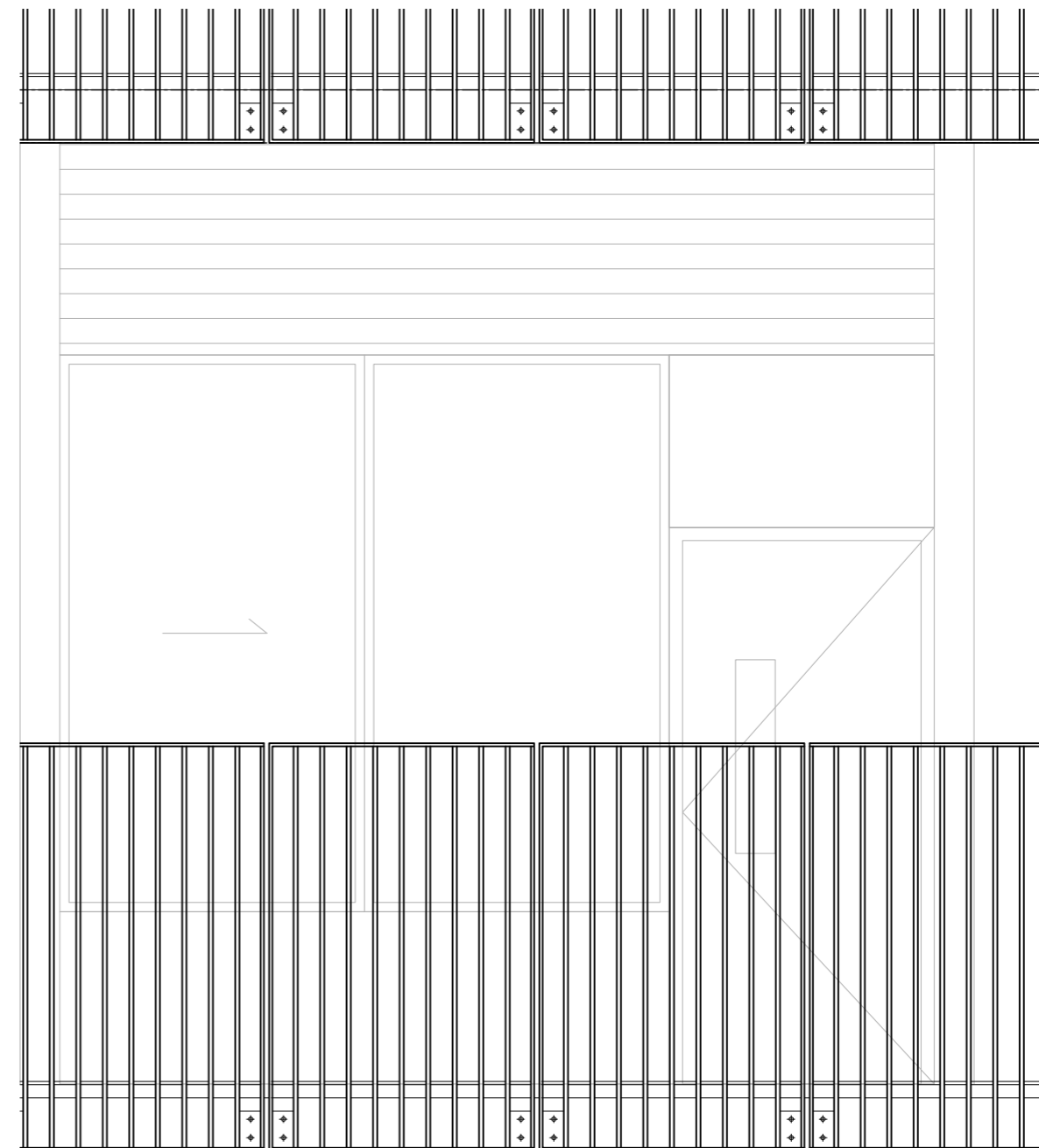
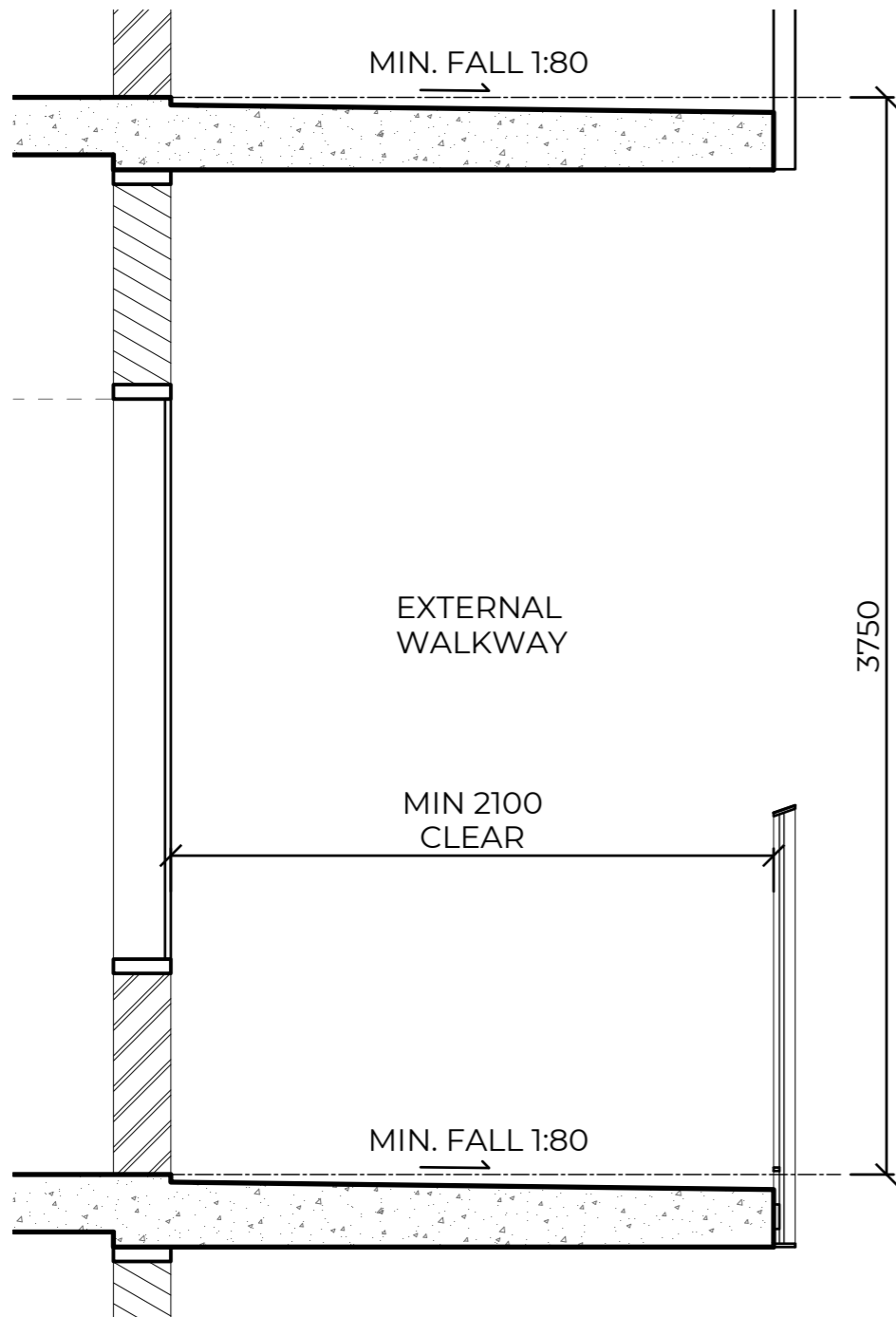


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2.2 Walkway & Balustrade

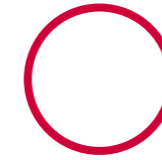


Walkway Design



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2.2 Walkway & Balustrade

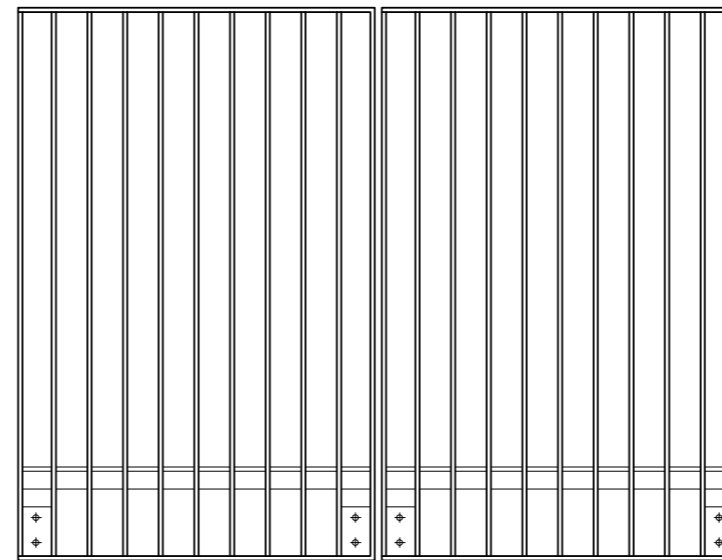


Balustrade Design - Face Fixed Galvanised Steel Flat Bar

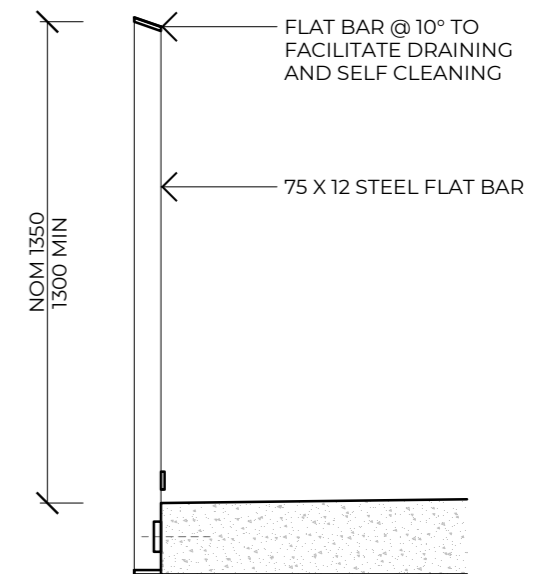
PERSPECTIVE



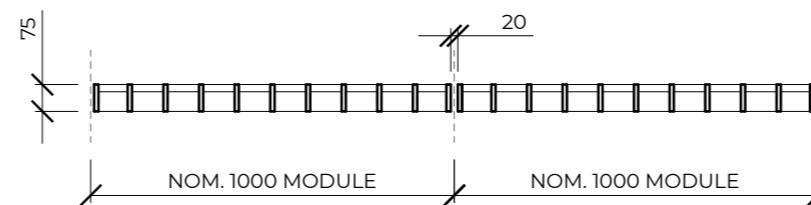
ELEVATION



SECTION

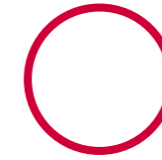


PLAN



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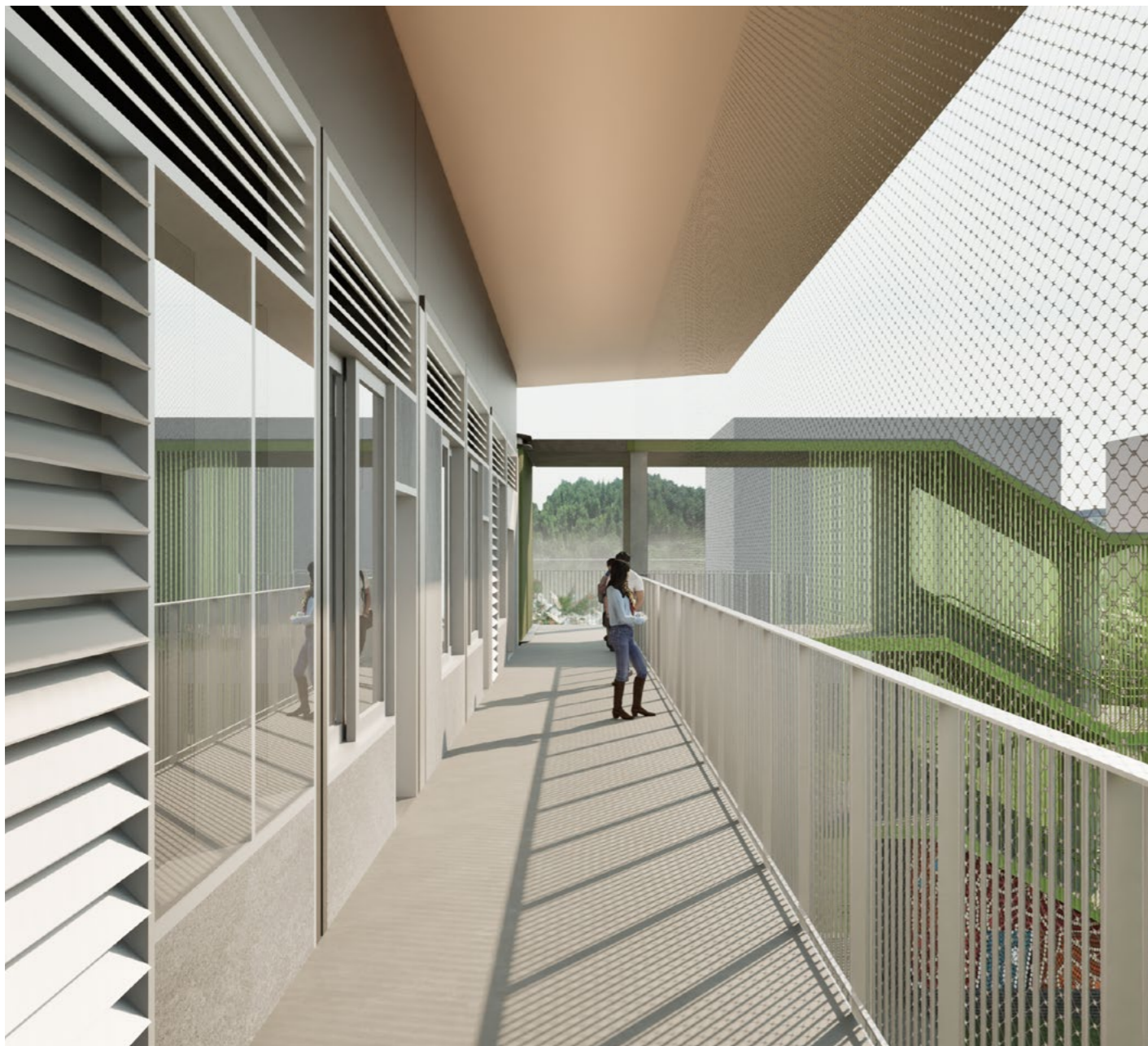
2.2 Walkway & Balustrade



Walkway Add-ons

Safety Tensile Mesh

Suitable for when additional safety measure is required



Full Height Glass

Suitable for when additional weather protection is required

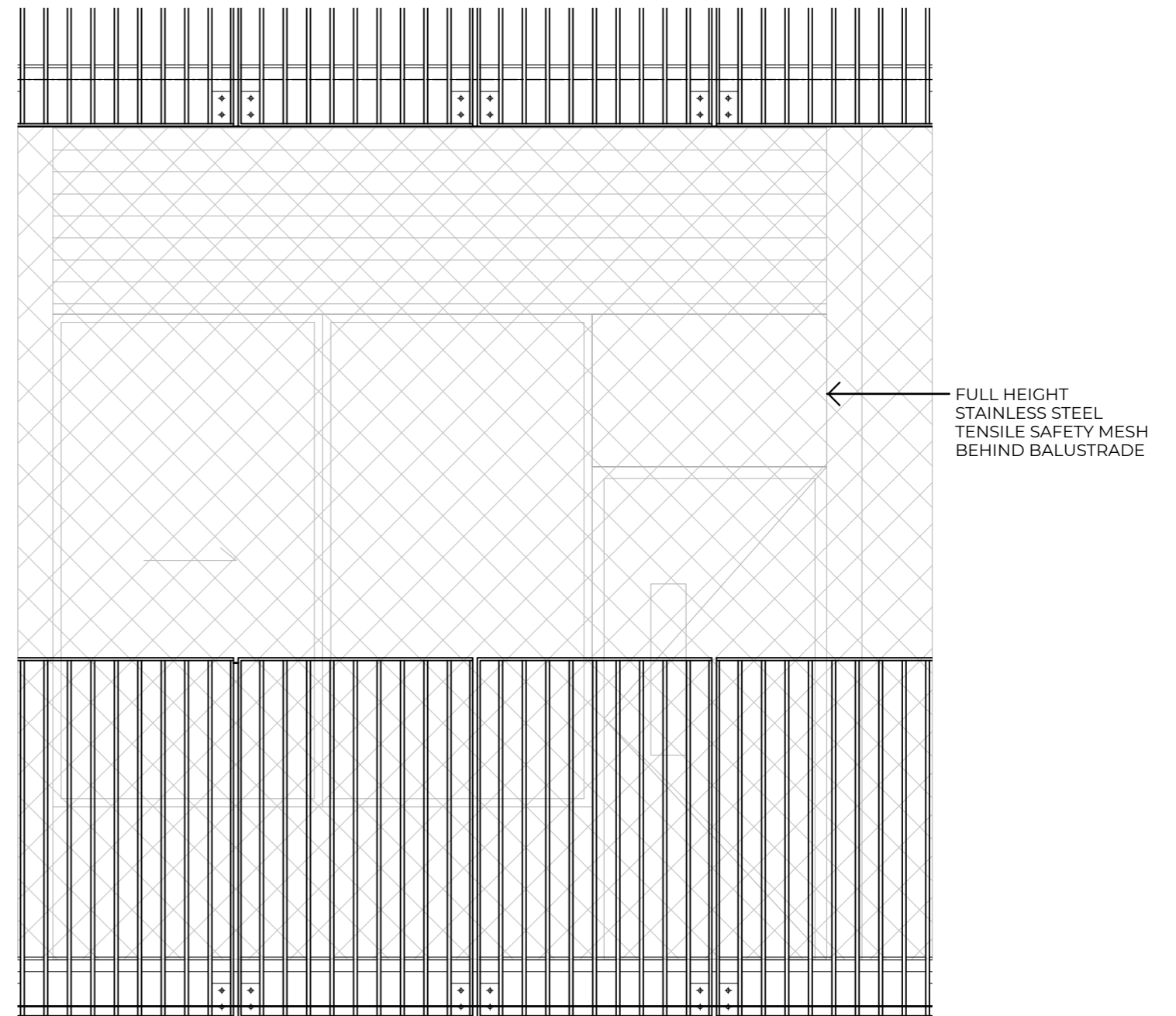
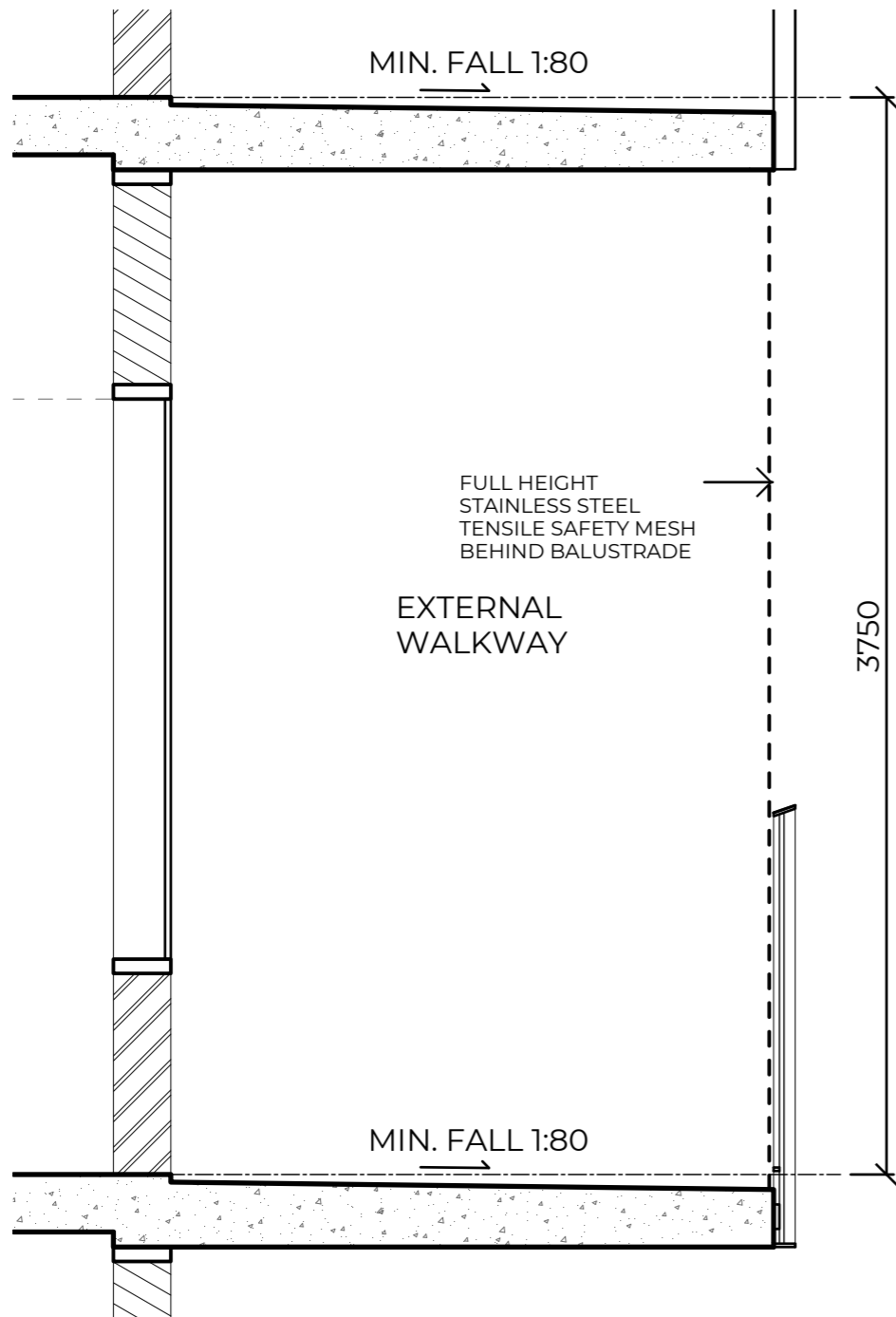


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2.2 Walkway & Balustrade

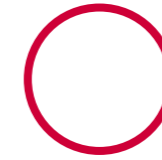


Walkway Add-ons - Safety Tensile Mesh

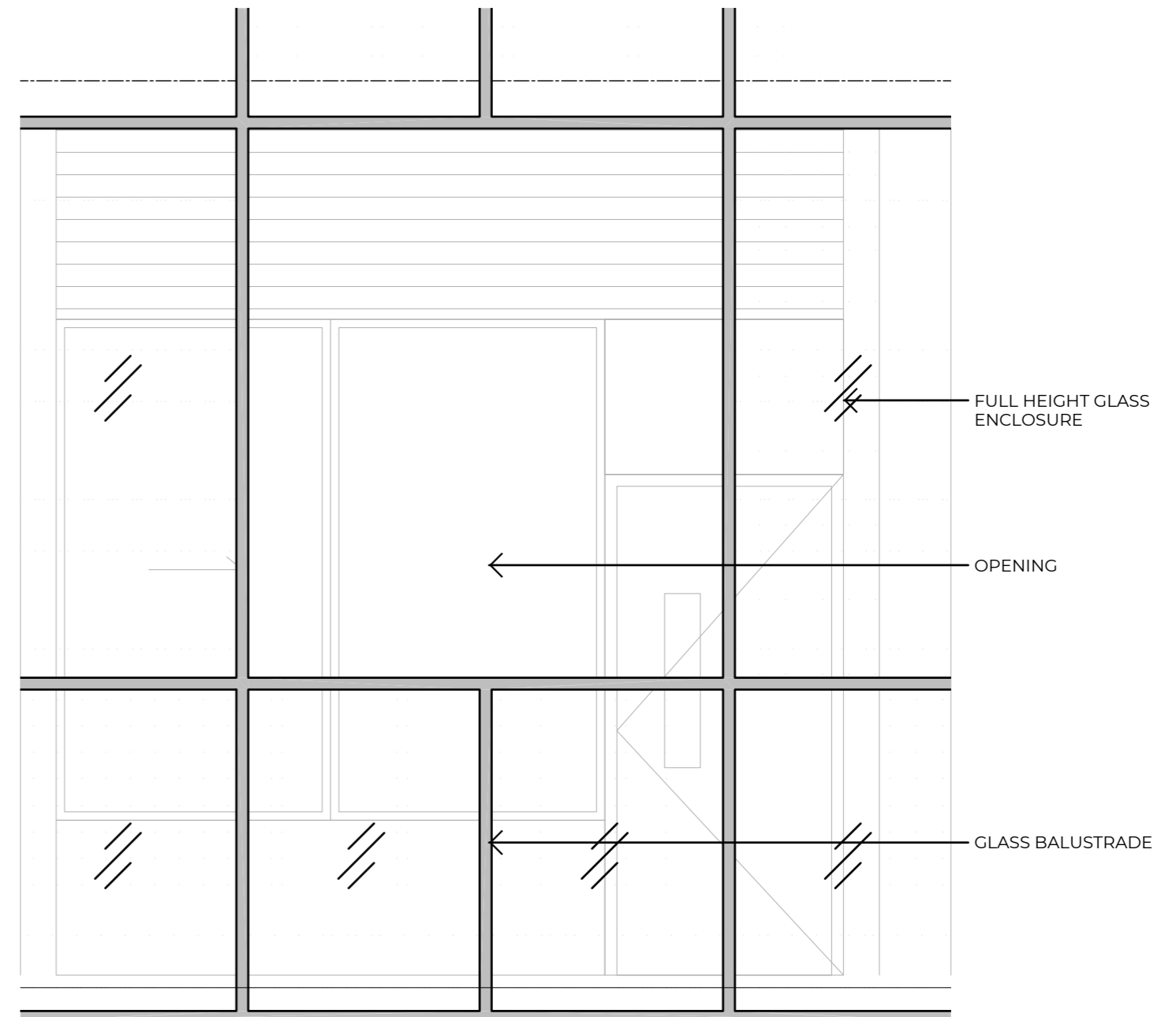
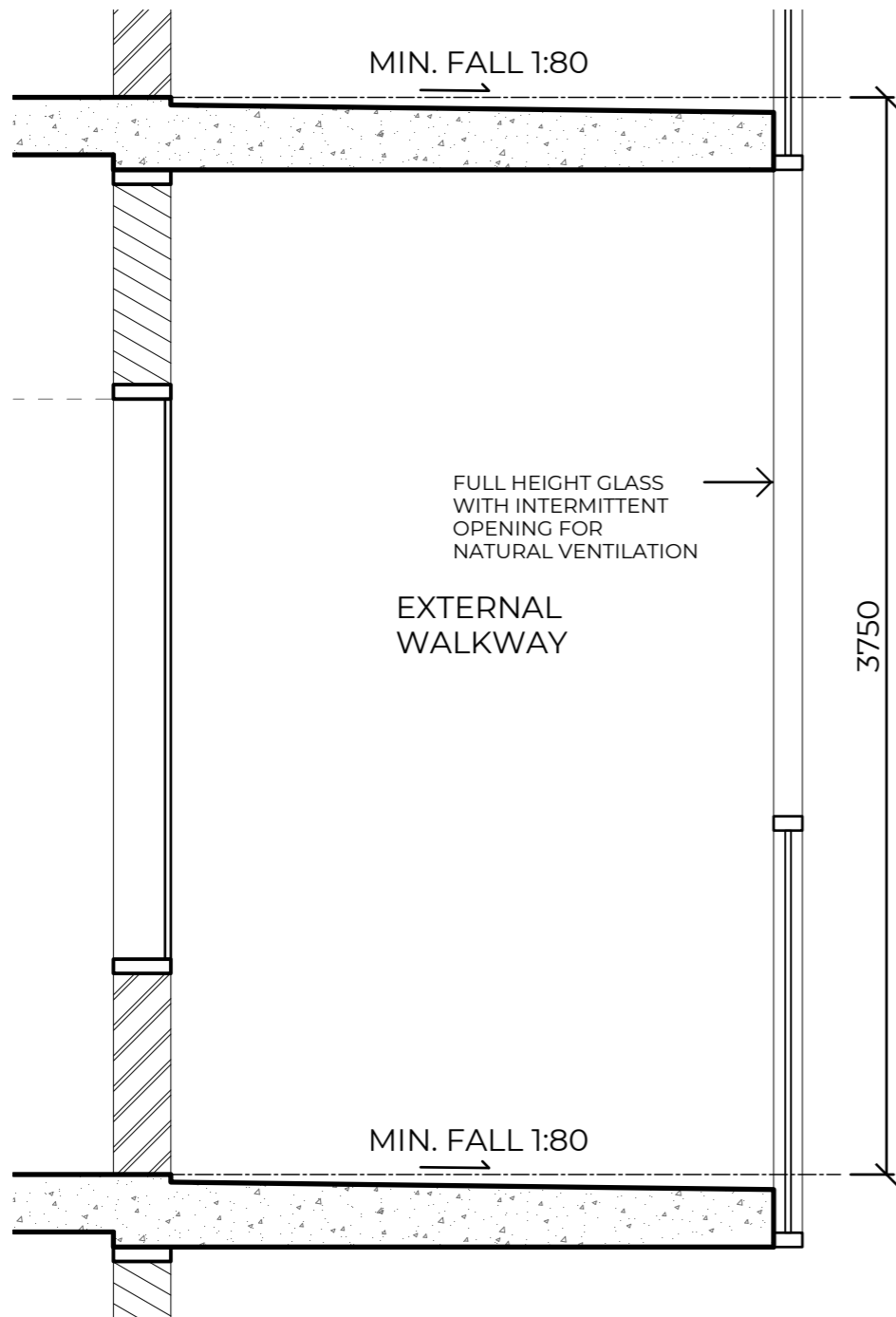


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2.2 Walkway & Balustrade

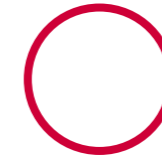


Walkway Add-ons - Full Height Glass



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2.2 Walkway & Balustrade



Balustrade Add-ons

Additional elements may be added to the baseline design to accommodate colour, texture, variety to ensure each school presents a unique identity

Add-on 1 - Perforated Screen

Perforated Screen added to the front of balustrade to add texture



Add-on 2 - Solid Panel

Perforated Screen added to the front of balustrade to add texture



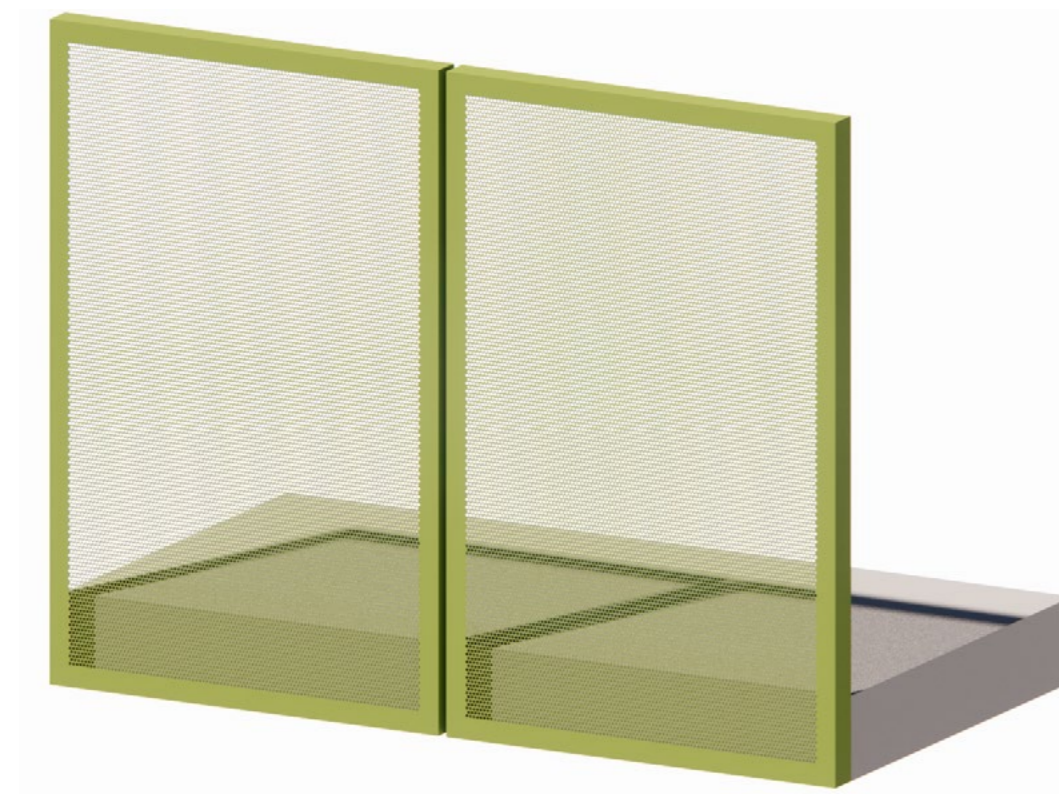
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2.2 Walkway & Balustrade

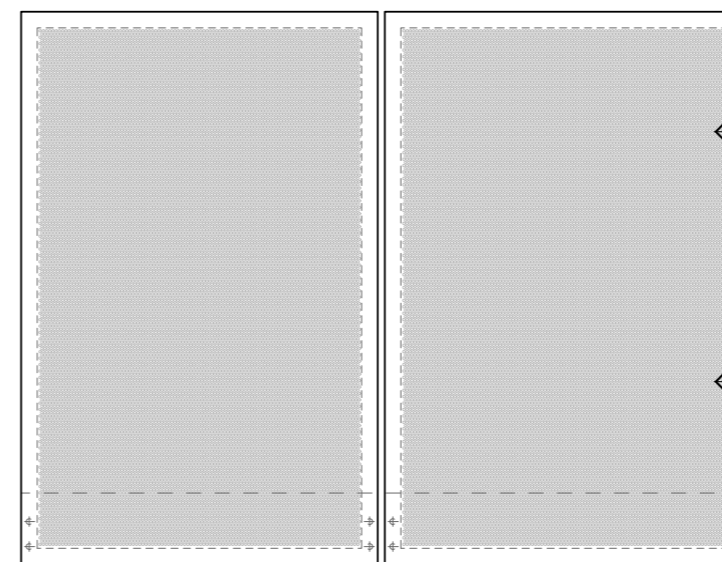


Walkway Add-ons - Perforated Metal Panel

PERSPECTIVE



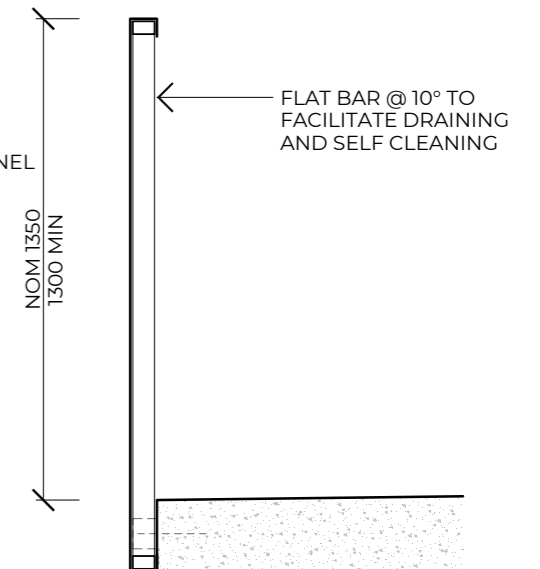
ELEVATION



POWDERCOATED PERFORATED METAL PANEL

MAX Ø 7mm HOLES

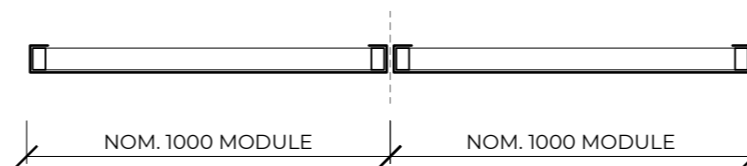
SECTION



FLAT BAR @ 10° TO FACILITATE DRAINING AND SELF CLEANING

NOM 1350
1300 MIN

PLAN

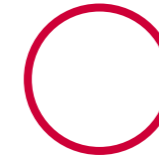


NOM. 1000 MODULE

NOM. 1000 MODULE

PRE-RELEASE - WORK IN PROGRESS

2.2 Walkway & Balustrade

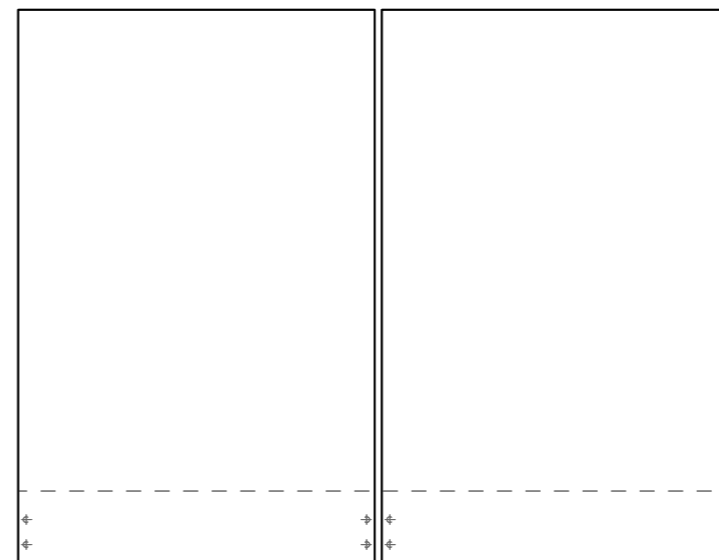


Balustrade Add-ons - Solid Metal Panel

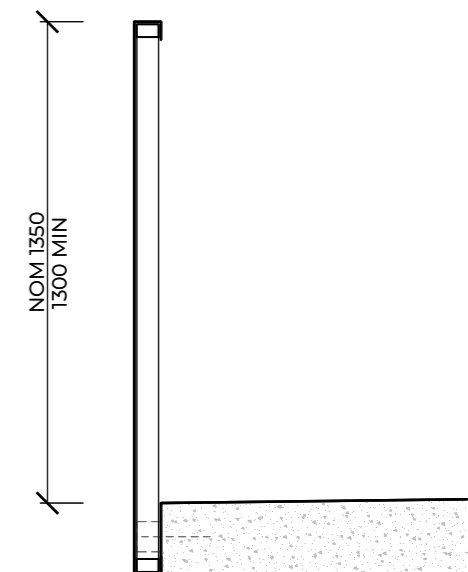
PERSPECTIVE



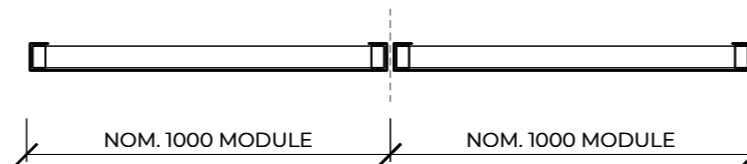
ELEVATION



SECTION



PLAN



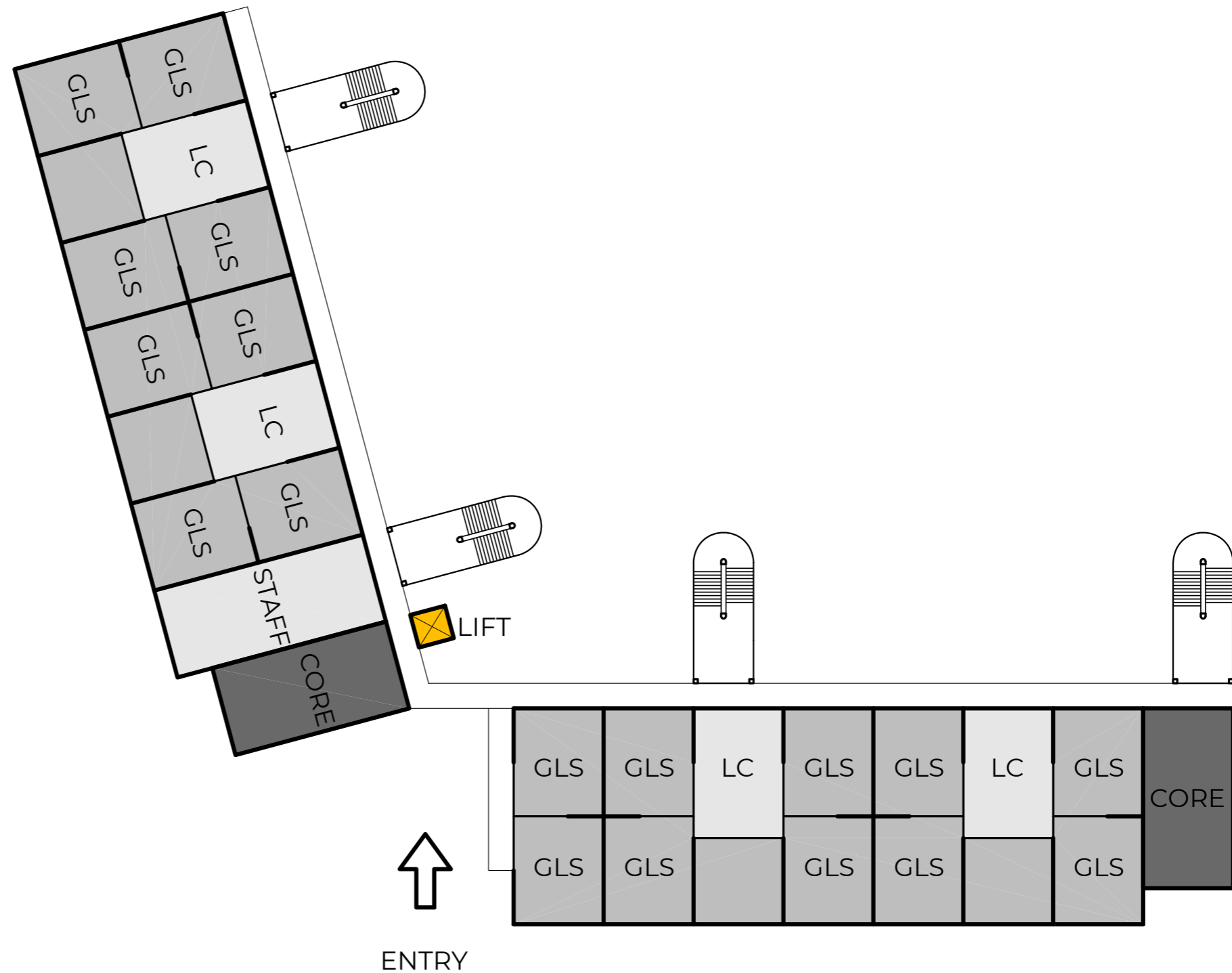
2.3 Lift



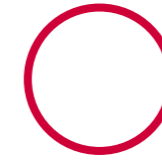
Lift Design Intent

Lift services are installed to buildings that are 2 storeys and above. The primary purpose of lifts is for use by teachers, accessible access and transporting goods. Stairs are the primary mode of movement for students unless otherwise directed by a teacher. The number of lifts is to be determined by a vertical transport consultant however as a secondary mode of movement they are to assume a less prominence than stairs.

Lifts are to be positioned near the main entry and spaced evenly along the walkway to provide equitable access to the school and can be aesthetically treated to blend into their environment with a textured concrete finish or as prominent feature.

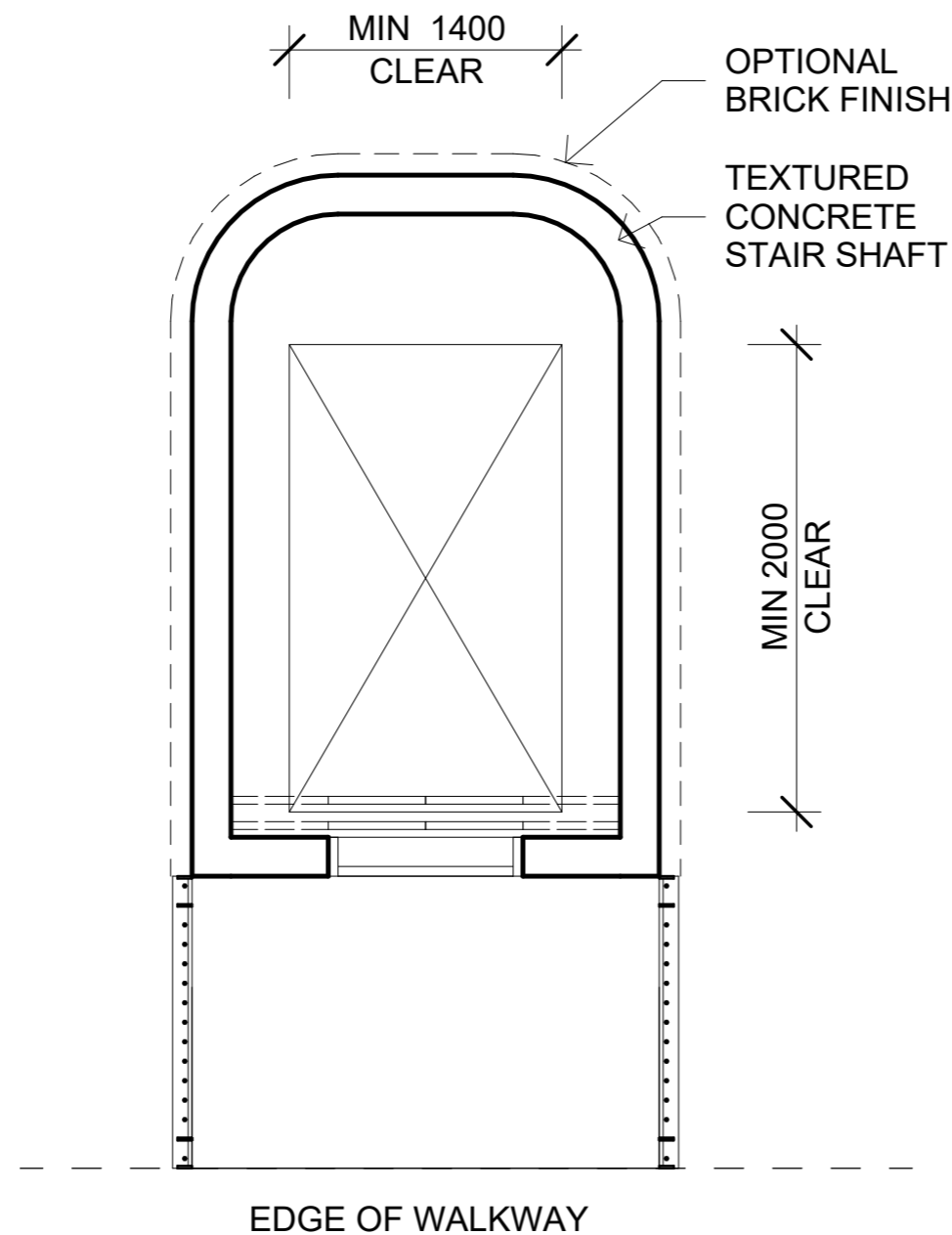


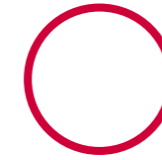
2.3 Lift



Lift Design

All lifts to be Machine Room Less (MRL) with minimum car size of 1400mm wide by 2000mm deep. Provision for stretcher lift to be provided as per NCC. Final size to be determined by project team based on specific project requirements.





Lift Shaft Finishes

Textured concrete



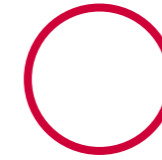
Concrete painted with artwork



Brick



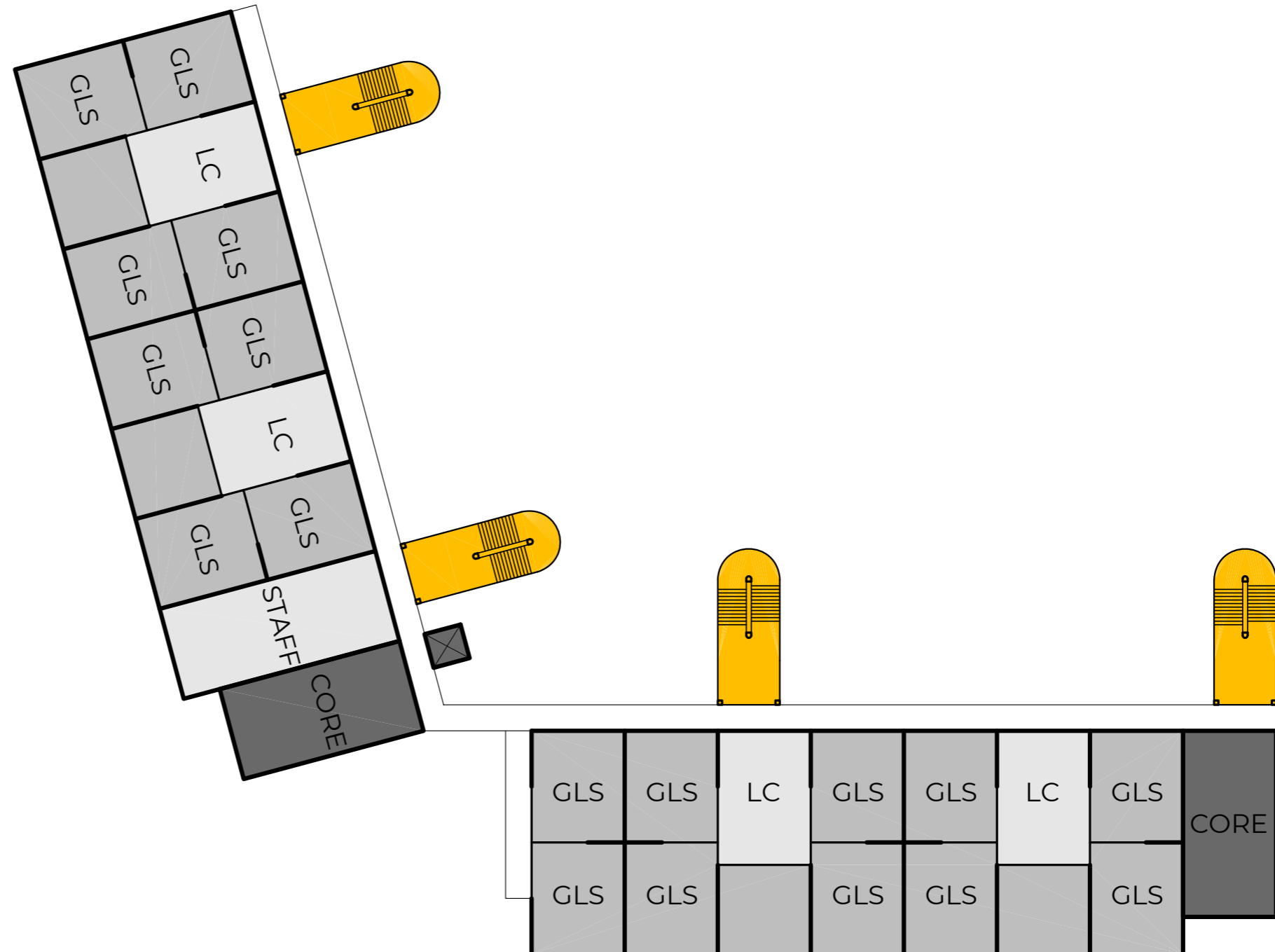
2.4 Stairs



Stairs Design Intent

Stairs are the primary mode of circulation for students and they are designed to feel welcoming, light and safe to use. The form is rounded to soften bulk and scale. A full height perforated metal screen wraps the stair to eliminate risk of falling and provide transparency for passive surveillance. A solid base constructed of concrete or brick encloses the bottom of the stair for safety purposes. Alternatively, project team may consider integrating the stair into landscape design depending on site conditions.

Stairs should be located to minimise obstruction to natural light into the classrooms and ensure passive surveillance of the walkway. Locations should be outside cores ideally and then outside Learning Commons with locations outside GLSs avoided.

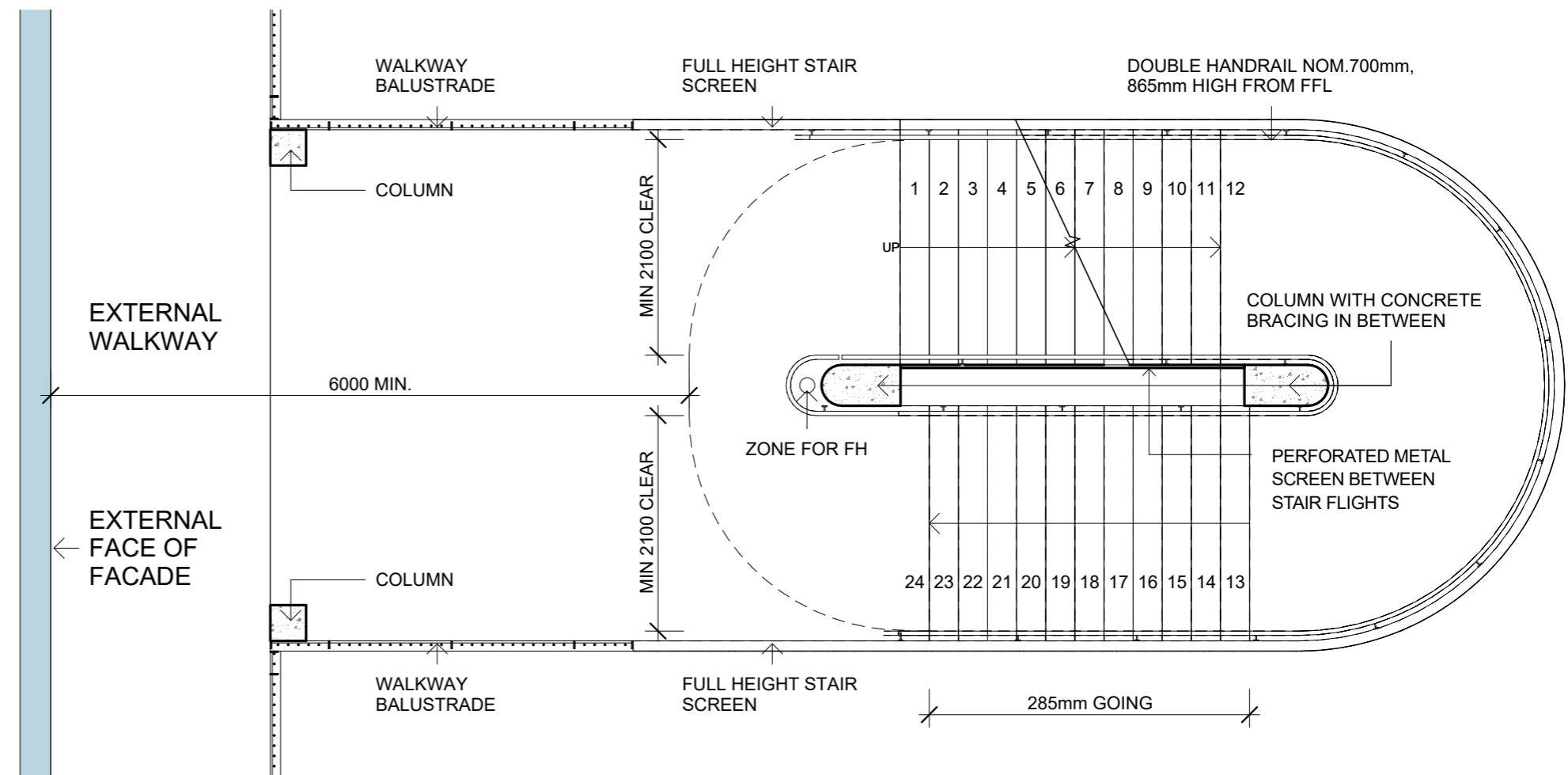


2.4 Stairs

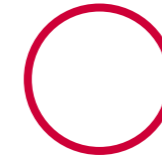


Stair Plan

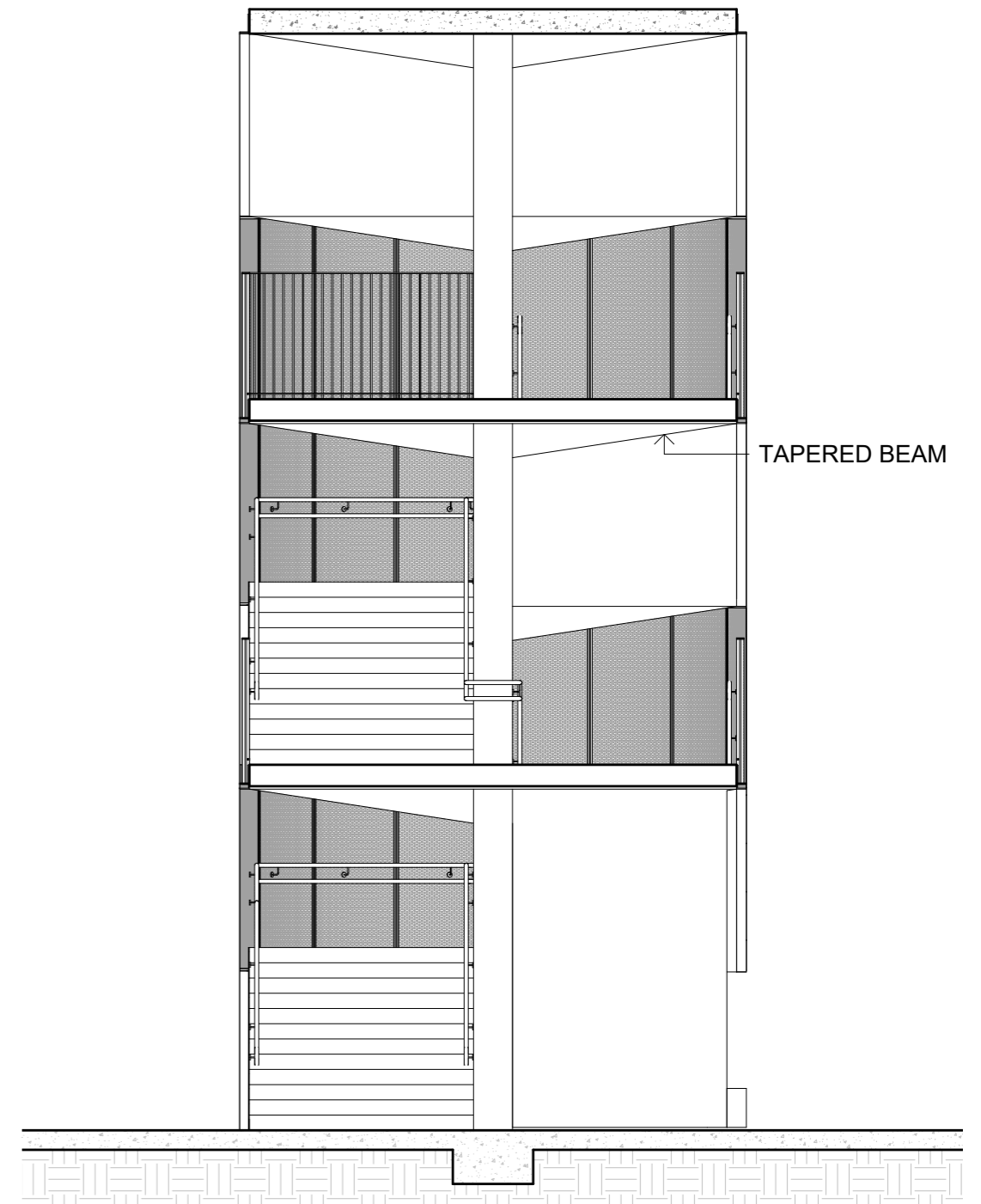
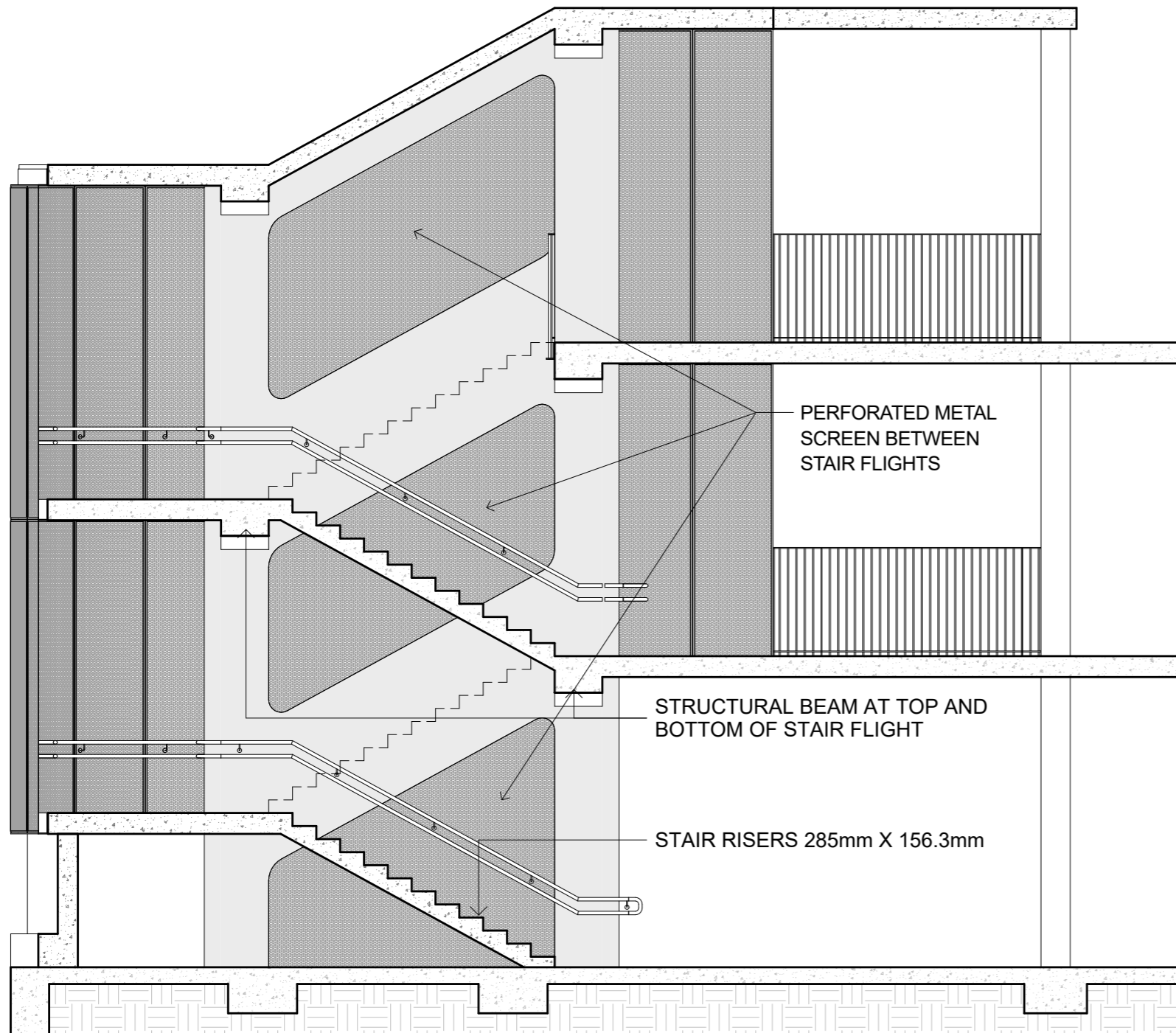
- Minimum 2100mm clear width
- Aggregated width to meet EFSG mass circulation requirement
- Each flight of stairs must have a minimum of 3 risers and a maximum of 14 risers
- Height of stair risers in both Primary School and High School to be nominal 156mm (+/- 10mm) for both Primary School and High School (based on the standard 3750mm storey height)
- Stair going dimension is to be 285mm
- Generally designed as Deemed-to-Satisfy solution
- If NCC egress widths and EFSG circulation requirements can be met with an extended travel distances, then a fire engineered Performance Solution may be applied in the interest of reducing the number of stairs.
- A zone is provided for the Fire Hydrant (FH), further coordination between project teams and fire engineer/BCA consultants is required.



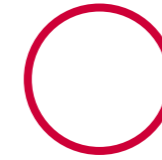
2.4 Stairs



Stair Section

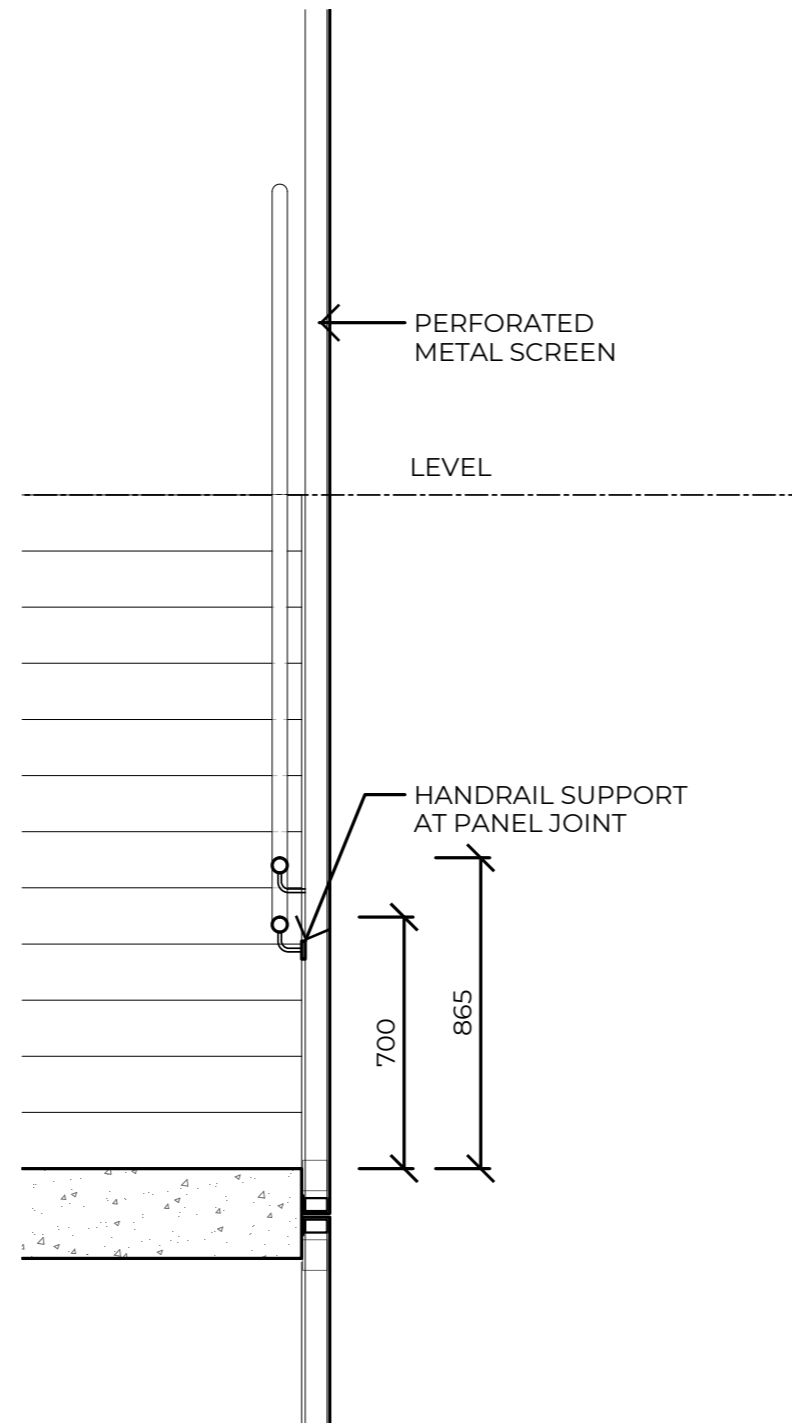


2.4 Stairs

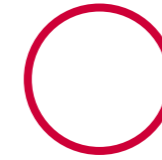


Perforated Screen Design

- Full height powdercoated perforated metal screen
- Maximum 7mm diameter perforated metal screen to prevent finger trap and climb-ability
- Consider suitability of powdercoating in coastal regions prone to rusting.



2.5 Circulation Worked Example



Worked Example

CONCRETE LIFT SHAFT
WITH PAINTED ARTWORK

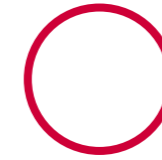
1.3m GALVANISED
STEEL FLAT BAR
BALUSTRADE

CONCRETE STAIR BASE
WITH PAINTED ARTWORK
TO MATCH LIFT

FULL HEIGHT PERFORATED
METAL STAIR SCREEN



2.5 Circulation Worked Example



Baseline Design with perforated metal balustrade add-ons

CONCRETE LIFT SHAFT WITH PAINTED ARTWORK

1.3m GALVANISED STEEL FLAT BAR BALUSTRADE

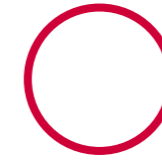
PERFORATED METAL PANEL ADD-ON

CONCRETE STAIR BASE WITH PAINTED ARTWORK TO MATCH LIFT

FULL HEIGHT PERFORATED METAL STAIR SCREEN



2.5 Circulation Worked Example



Full height glazing add-on

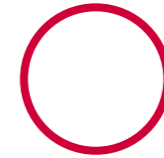
CONCRETE LIFT SHAFT
WITH PAINTED ARTWORK

FULL HEIGHT GLASS
ENCLOSURE ADD ON

CONCRETE STAIR BASE
WITH PAINTED ARTWORK
TO MATCH LIFT

FULL HEIGHT PERFORATED
METAL STAIR SCREEN





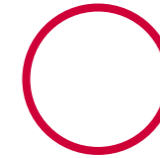
3

Services

- 3.1 Services Core Overview
- 3.2 Ceiling Void Strategy
- 3.3 Mechanical Strategy
- 3.4 Comms Strategy
- 3.5 Electrical Strategy
- 3.6 Photovoltaic Solar Power
- 3.7 Amenities
- 3.8 Service Core Worked Example

PRE-RELEASE - WORK IN PROGRESS

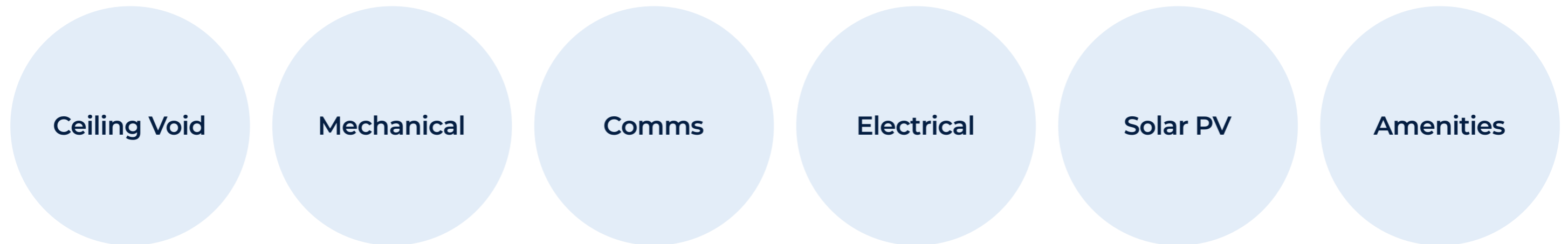
3.1 Services Core Overview



Services Components

The standardised schools include a core associated with each building which houses student toilets, comms rooms, cleaners rooms, mechanical plant, and electrical services.

This section of the Pattern Book outlines the strategies for each of the components shown below.



PRE-RELEASE - WORK IN PROGRESS

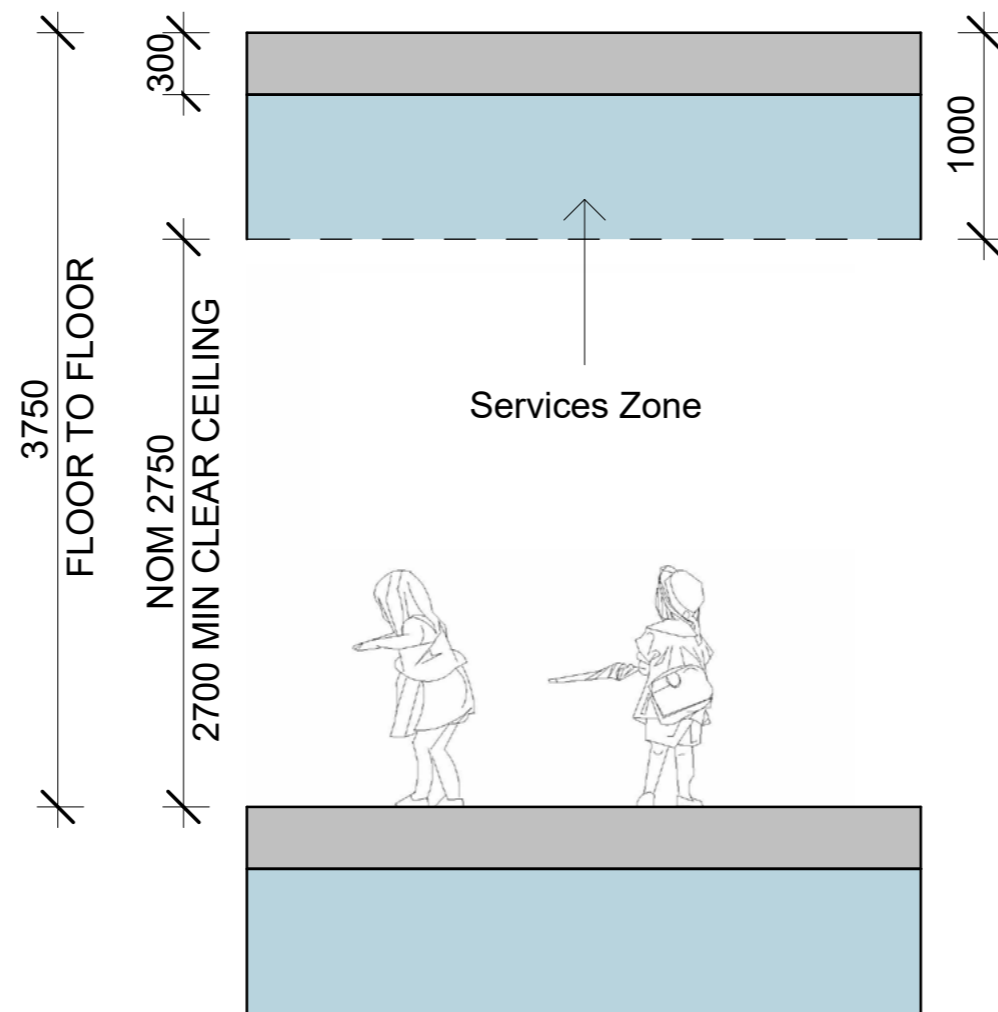
3.2 Ceiling Void Strategy



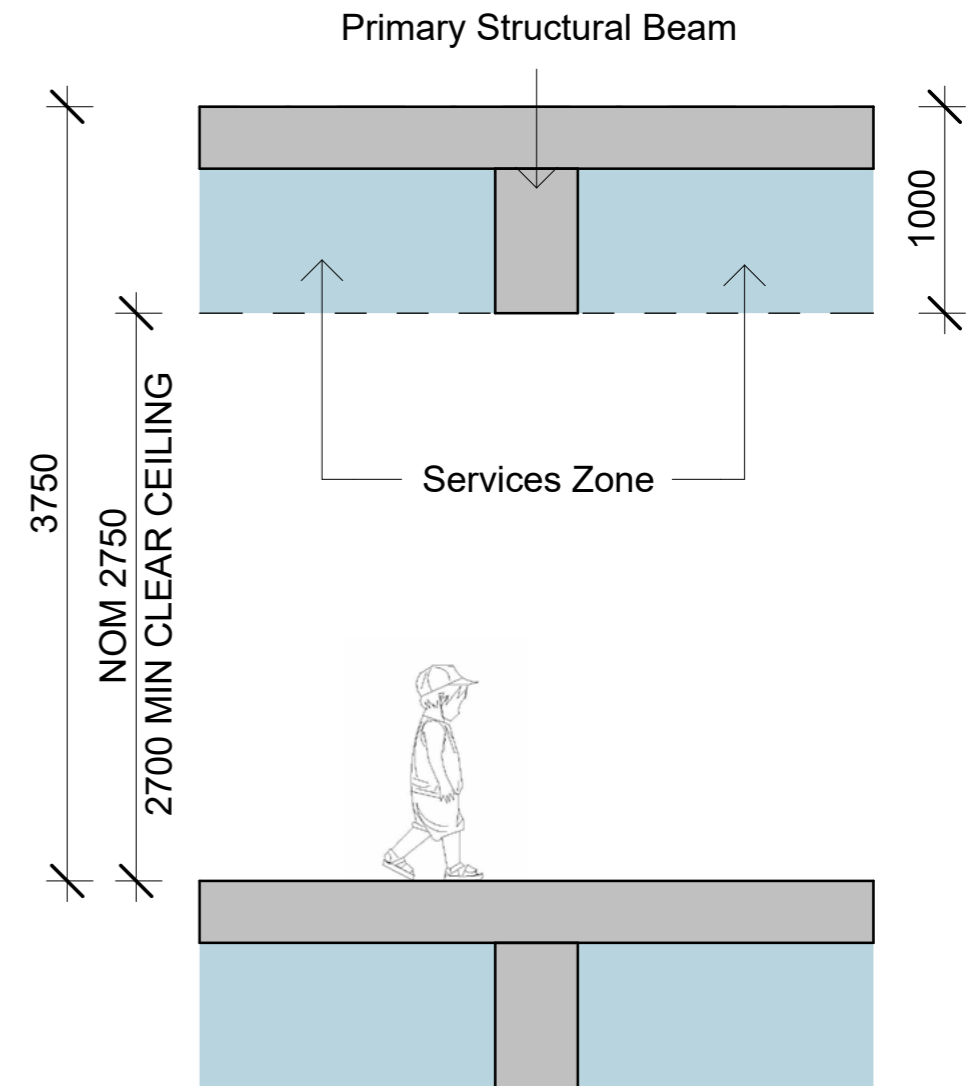
Service Zone Design Intent

The standardised school designs provided are structurally agnostic, which enables industry product innovation and best practice to be applied to building services. To support a structurally agnostic approach and optimise flexibility in the choice of structure, a floor to floor height of 3.75m has been nominated and a floor zone of 300mm.

The floor to floor height will be included in planning approvals and does not prohibit industry innovation to lower the floor to floor height to accommodate lean structural systems, provided the building services are not compromised. Additionally, a minimum floor to ceiling height of 2700mm must be maintained.



With flat slab structural strategy



With framed structural strategy

3.3 Mechanical Strategy



Mechanical Design Intent

Each building, which is typically 7 grid bays long, is to be serviced with mechanical plant located in the core, and refrigerant pipework reticulated through the ceiling voids.

Condensers are located on the top floor of the core (open to sky).

There are two types of reticulation and fan coil locations as follows.

Type 1 - Centralised Fan Coil Units

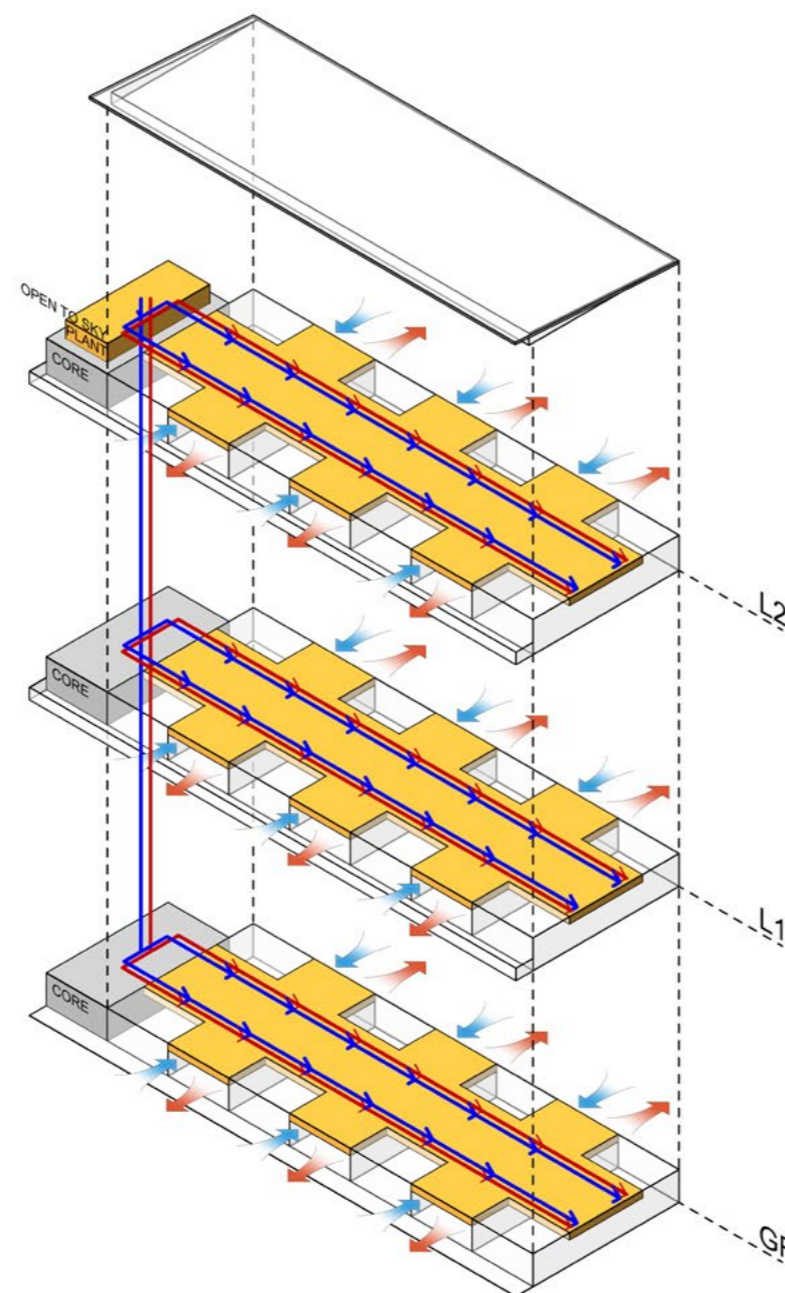
Air intake and exhaust are to be within the learning commons, and then distributed to adjacent rooms in a central bulkhead zone.

This strategy is suitable for flat slab construction allowing mechanical ductwork to travel between bays unencumbered by beams.

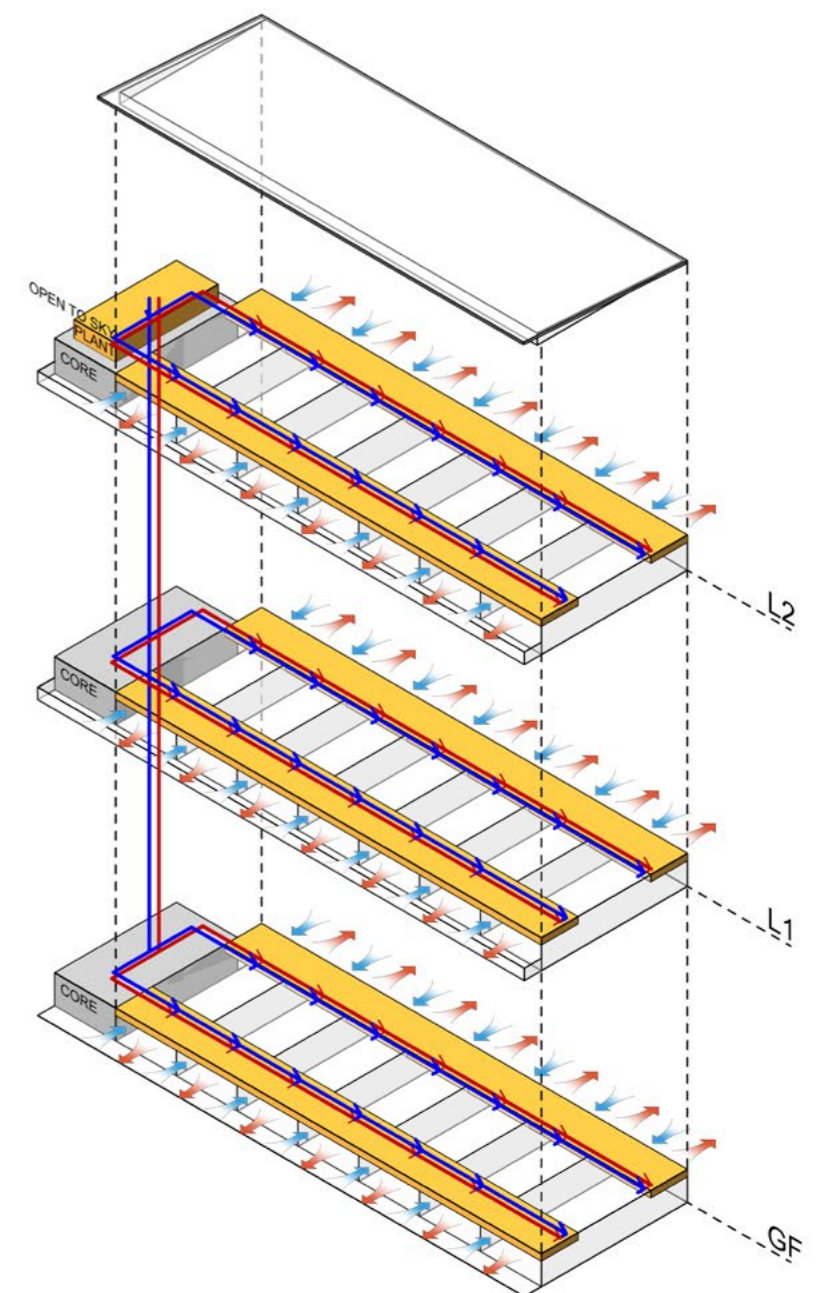
Type 2 - Facade-Aligned Fan coils

Fan Coil Units are to be located along the facades, with air intake and exhaust directly connected. This strategy creates bulkhead zones along the facade and is compatible with all structural systems.

Type 1 - Centralised Fan Coil Units



Type 2 - Facade-Aligned Fan Coils



3.4 Comms Strategy



Comms Design Intent

The comms strategy is designed to optimise spatial efficiency of the service core by configuring the Building Comms Room (BCR) to service multiple levels, up to maximum of 3.

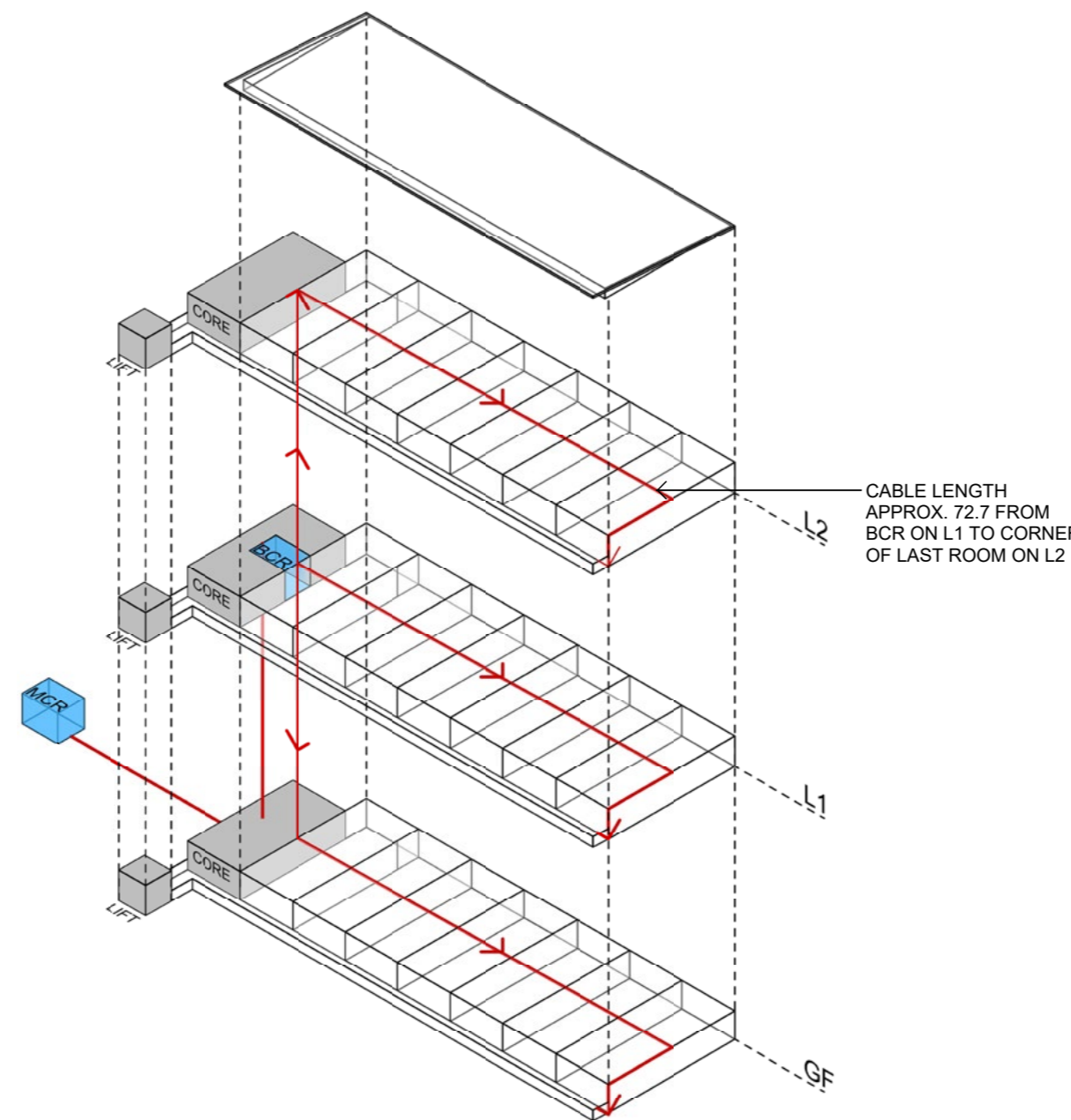
In a typical 3 storeys building, the BCR is to be located on Level 1 in the service core. With cables reticulating in the ceiling voids servicing the top and bottom floor.

For 4 storeys or above, an additional BCR to be incorporated to evenly distribute load.

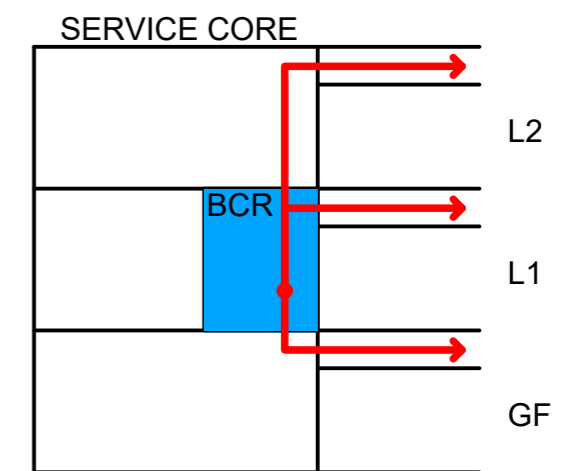
The diagram illustrates that this strategy enables the cables to remain within length limitations and be fully reticulated within internal spaces.

Main Comms Rooms (MCR) can be located centrally such as in the hall block or at the ground floor of one of the cores.

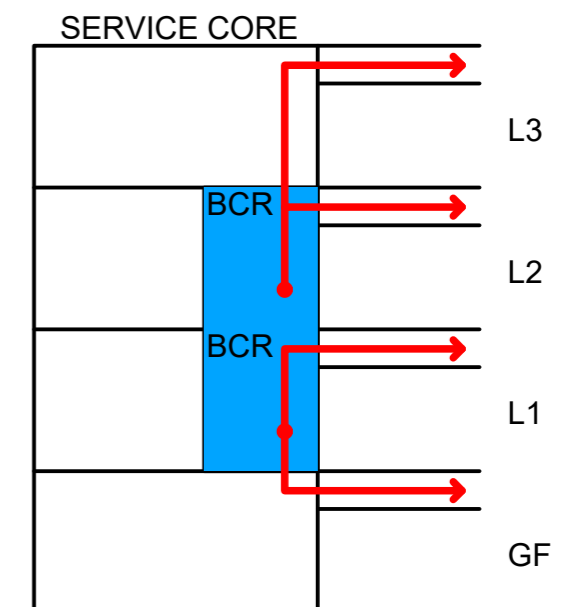
Building Comms Room (BCR) location and reticulation



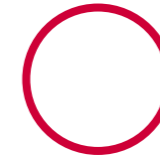
3 Storeys Strategy



4 Storeys Strategy



3.5 Electrical Strategy



Electrical Power Design Intent

The Main Switch Board (MSB) to be located on the ground floor of one of the service cores to enable ease of access for maintenance. Alternatively the MSB can be located in the Hall block.

Electrical Distribution Boards (EDB) Past Practice

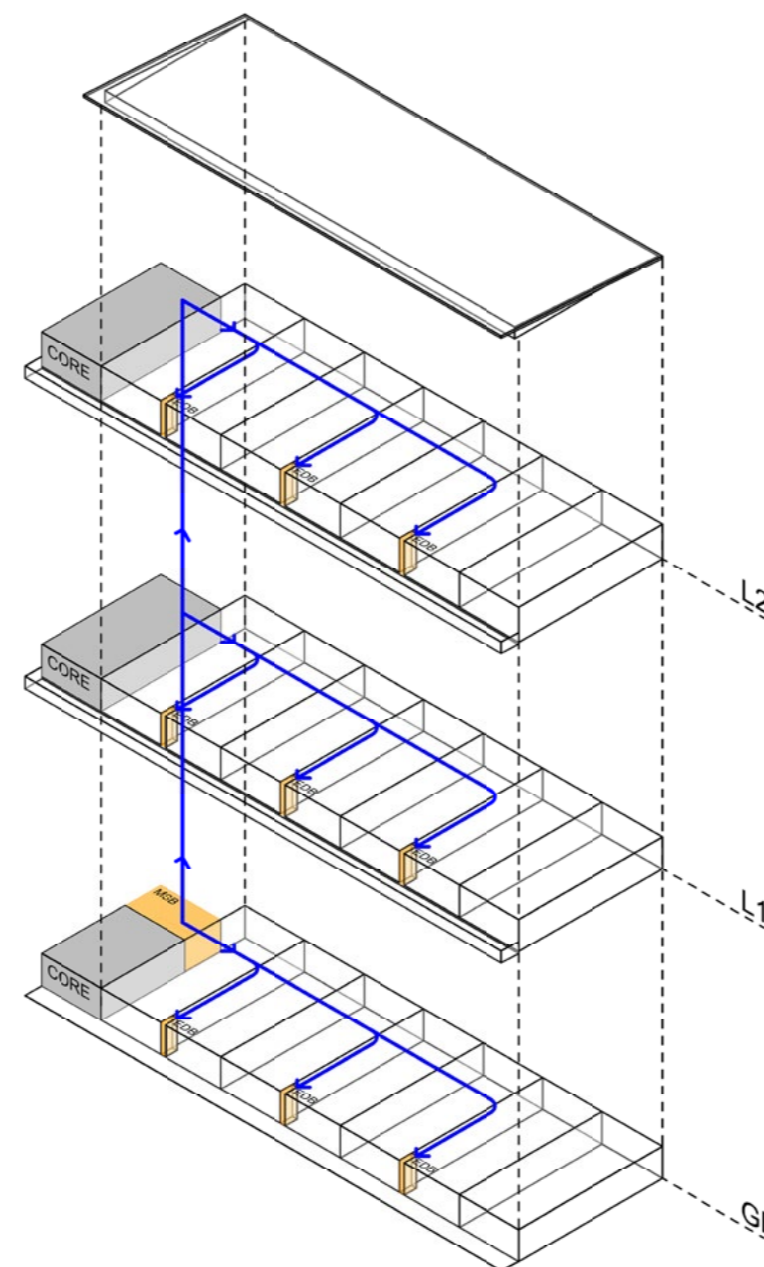
EFSG 1.0 locates EDBs across the floor plate which calls for a spacing of EDBs no greater than 30m.

Standardised EDB Strategy

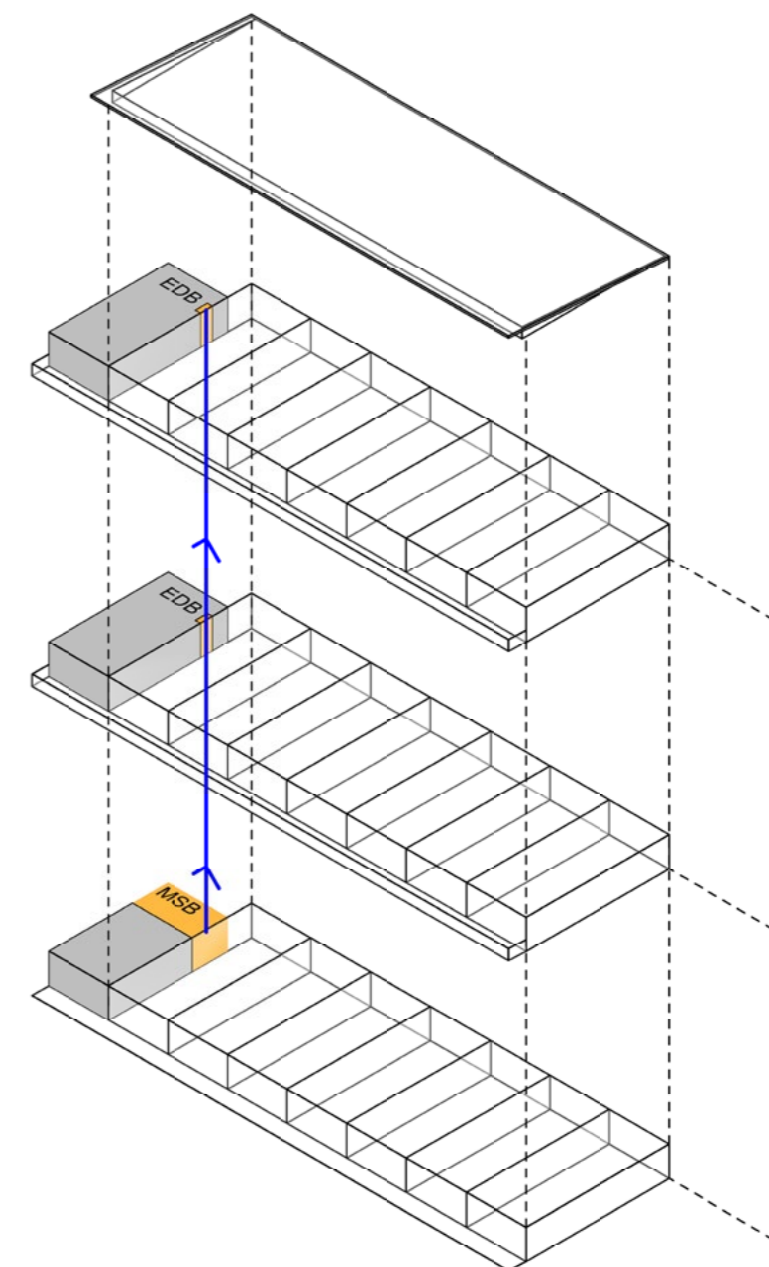
The Electrical Distributed Boards (EDBs) are to be located within the service core. This places them away from student areas for better maintenance personnel separation from students, and enables clutter-free learning spaces and facades. This is so that the facade can remain flexible for future refurbishments to enable the Expandable Schools strategy.

Note this is a departure from the current EFSG.

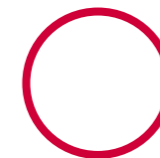
EFSG 1.0 Requirement



Standardised Electrical Distribution Board Strategy



3.6 Photovoltaic Solar Power

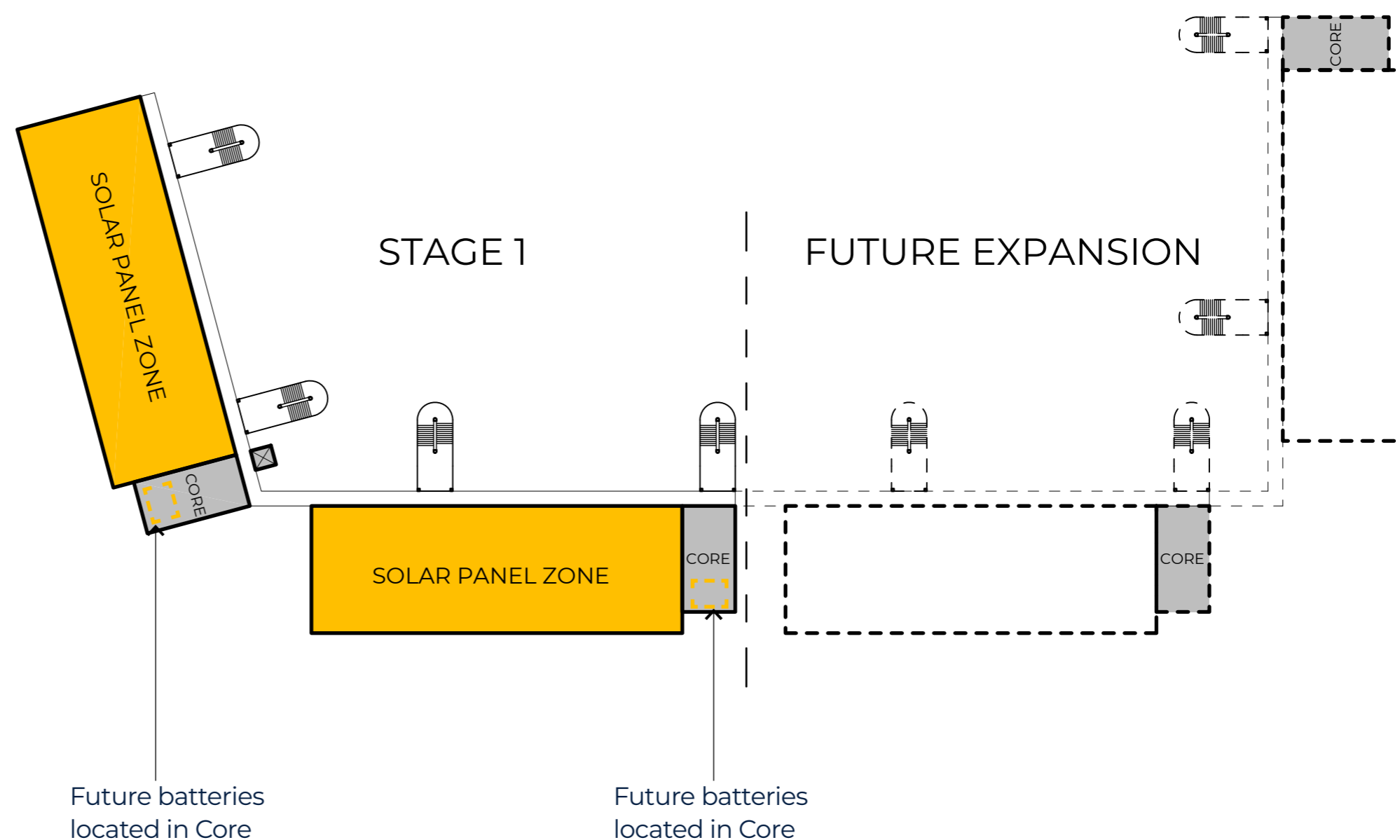


Photovoltaic Design Intent

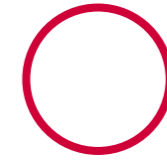
A photovoltaic (PV) solar power grid-connect rooftop system shall be provided to offset power consumption at the school.

Requirements:

- The PV system must be designed and installed in accordance with the most recent Australian Standards and Clean Energy Council guidelines
- System size to be designed as per EFSG according to school size
- In expandable schools, PV system to be installed in the first stage buildings.
- Provide suitable spaces space in the MSB and a dedicated circuit(s) as required for future.
- Batteries may be incorporated in the service core and in location that is inaccessible to students. Refer to Chapter 2.8 for services core worked examples.



3.7 Amenities

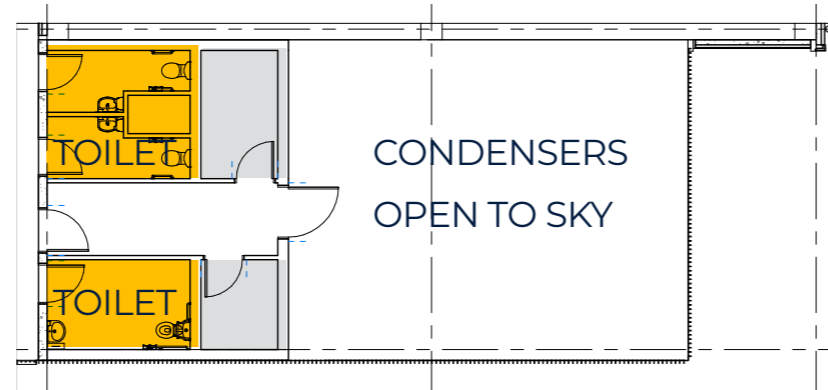


Amenities Design Intent

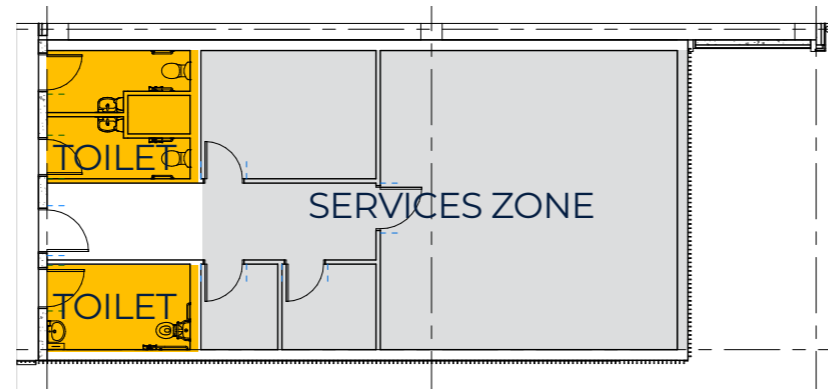
Student toilets are to be configured with the majority of them on the ground floor (and in the hall) where they are used most during recess, lunch, and before and after school.

The standardised service core provisions a large bank of Male, Female and accessible (including ambulant) toilets on the ground floor. On upper levels a minimal bank of Male and Female ambulant toilets are provided to meet BCA requirements and provide a small amount of toilets on each floor.

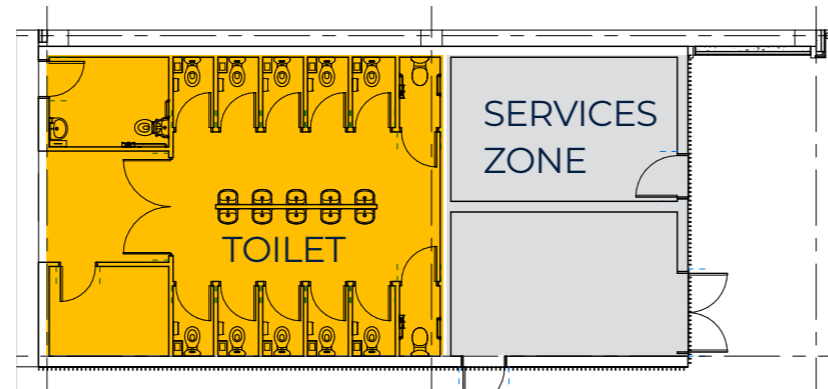
This arrangement allows for the efficient use of space for the core to also accommodate the required mechanical and electrical services.



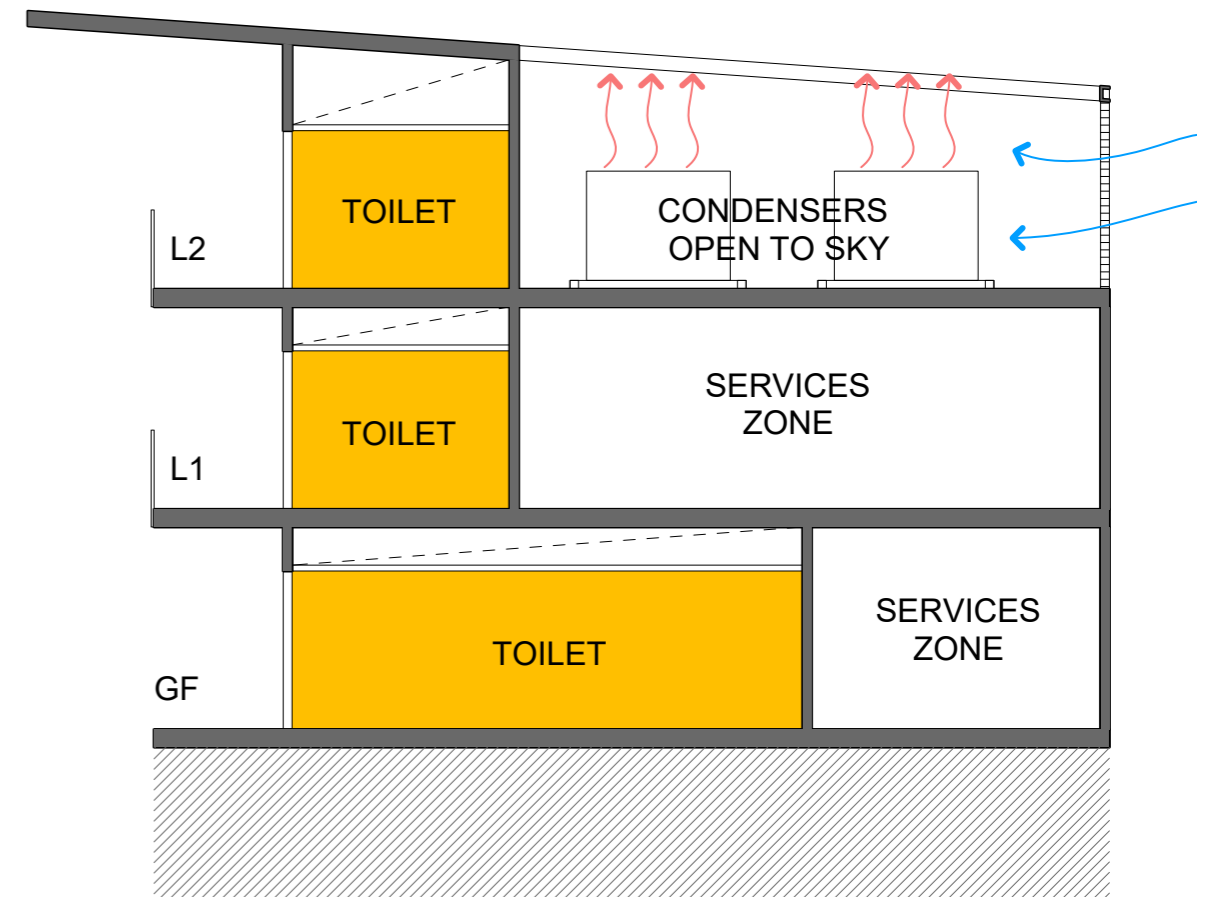
Level 2 Plan



Level 1 Plan

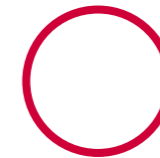


Ground Floor Plan



Section

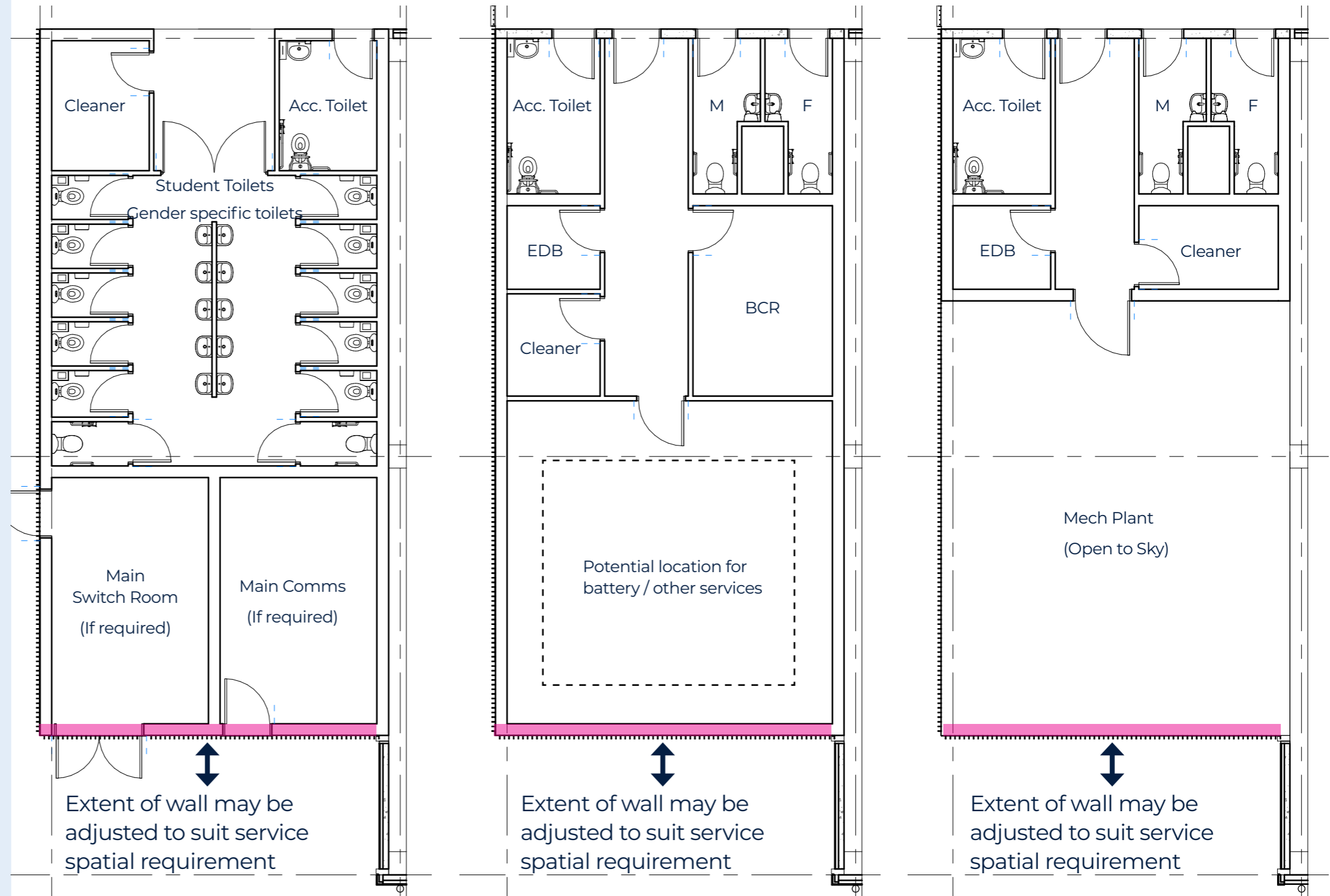
3.8 Service Core Worked Example



Service Core Worked Example

The service core is designed in accordance with the following criteria:

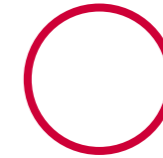
- Student amenities, mech and services are co-located in a central core on each level of the building
- The ground floor core houses the majority of student amenities with some services with dedicated external access
- Subsequent floors have a limited number of toilets and allow access to the bulk of mech and services located within the core
- Toilets have good surveillance from corridors



Ground Floor

Level 1

Level 2

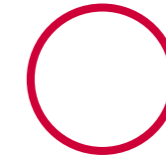


4

Envelope

- 4.1 Facade Fundamentals
- 4.2 Street Facade
- 4.3 Walkway Facade
- 4.4 End Facade
- 4.5 Roof
- 4.6 Worked Example

4.1 Facade Fundamentals

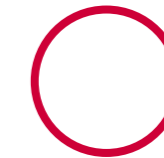


Components

This section of the Pattern Book covers the facade and roof design of standardised schools and includes the two main facade types - Street Side and Walkway Side facades.



4.1 Facade Fundamentals



Facade Design Intent

The Pattern Book facade is specifically designed to be achieve an efficient and high performing building, targeting a net construction cost which is aligned with project budgets.

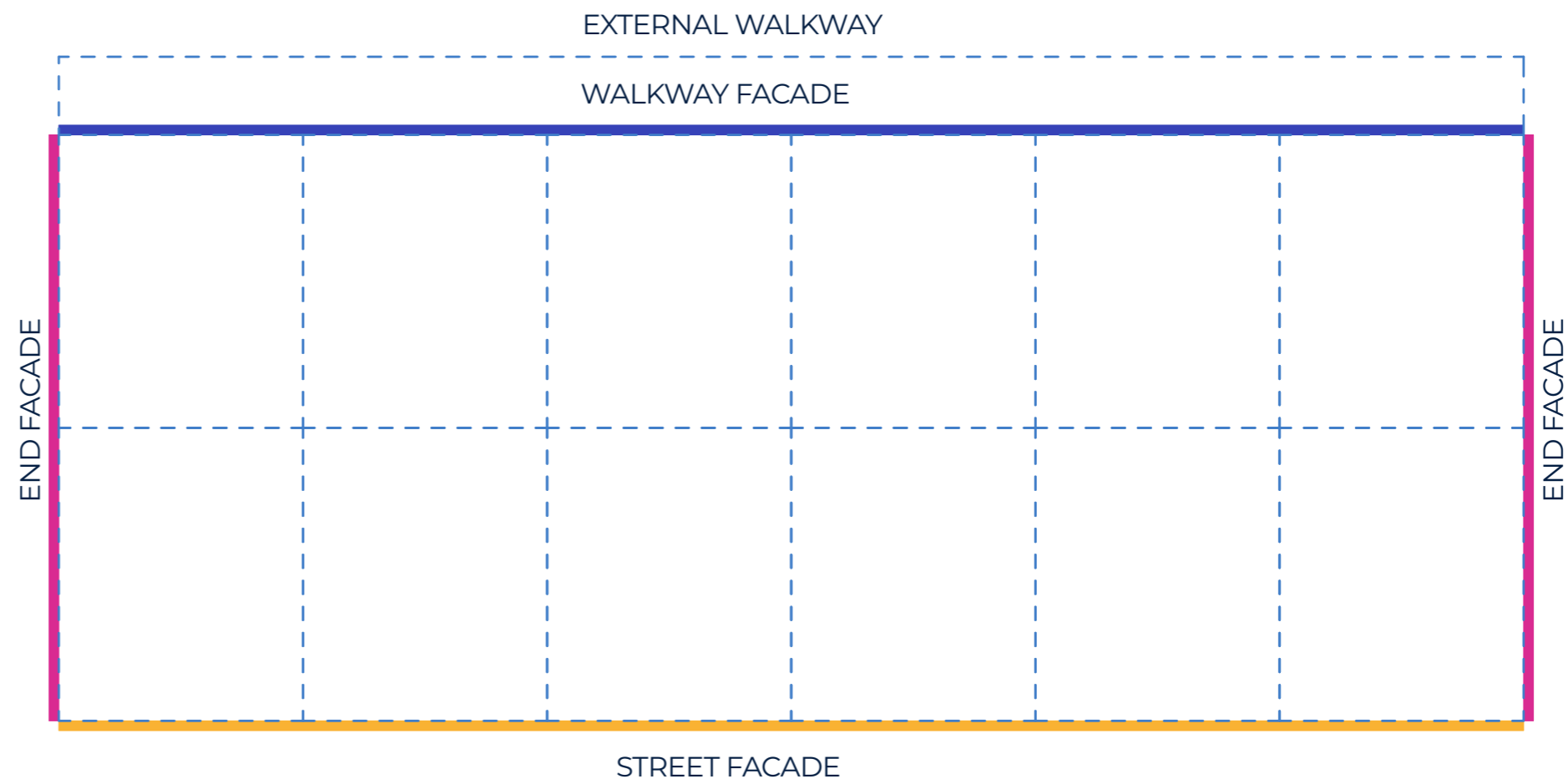
The façade is a very important element both in terms of the thermal performance of the building and the resultant indoor environment quality, as it related to daylight, ventilation and a biophilic connection to the outside.

It is also central to the presentation to its surrounding context and the internal character to the school.

The design incorporates key metrics for façade glazing and natural ventilation which underpin the design of the two main types of the facades (street side and walkway side).

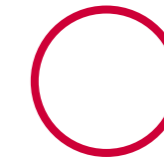
The facade design also incorporates student safety and security as well as reducing long term maintenance requirements.

The facades are standardised where possible to meet GLS requirements, but must be configured by project teams to meet the various requirements of specialist spaces.



PRE-RELEASE - WORK IN PROGRESS

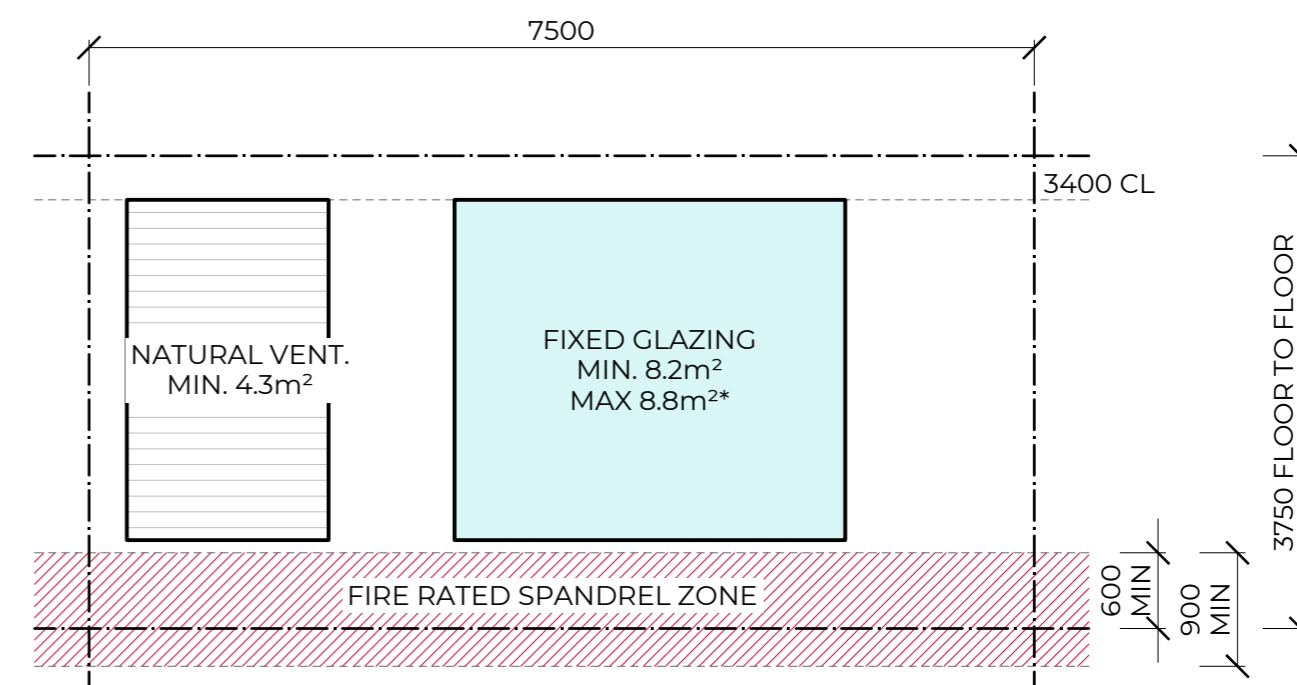
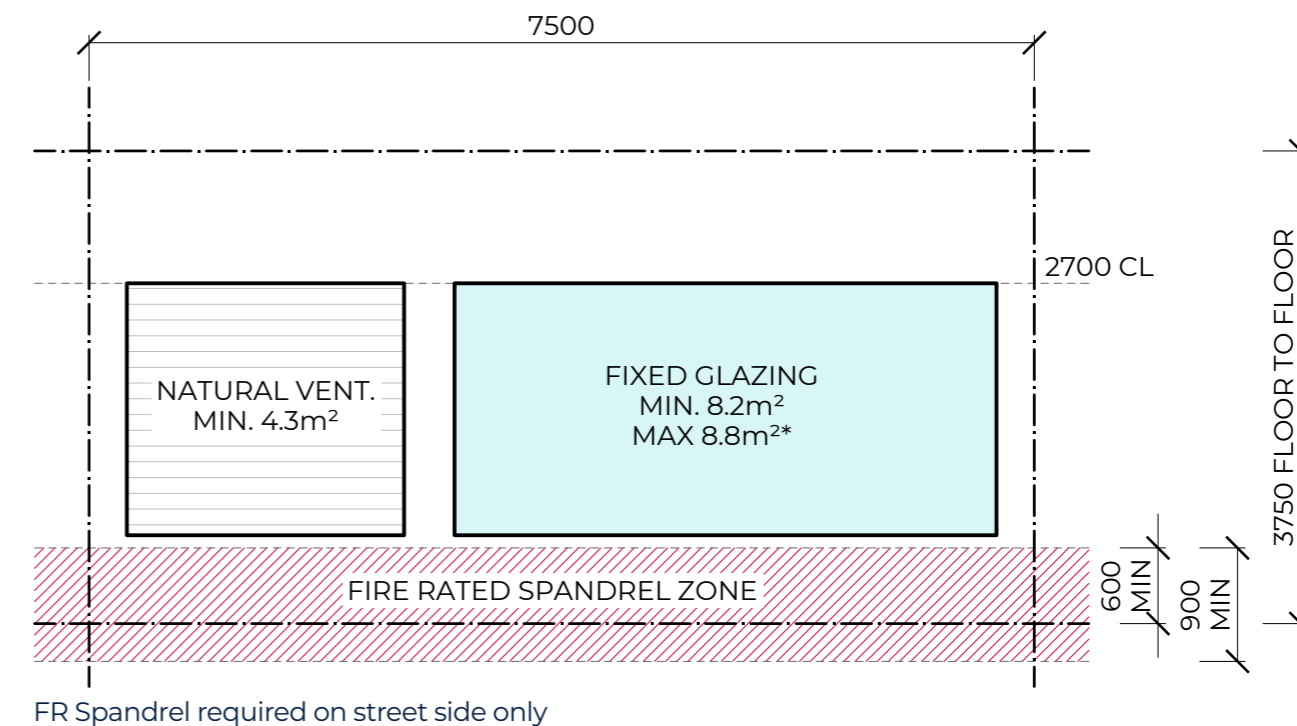
4.1 Facade Fundamentals



Performance Guideline

The facade design is based on the following assumptions and parameters for a typical GLS:

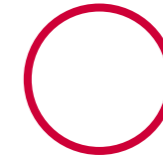
- Minimum glazed area of 8.2 m² per classroom for daylight purposes.
- Minimum louvre area of 4.3 m² per classroom for natural ventilation purposes.
- Wall R-value 1.4 (all Climate Zones).
- Roof R-3.7 (all Climate Zones, except 6 with R-3.2).
- Slab R-2.0 (all Climate Zones).
- Single-glazing with an overall U-value of 6.2, SHGC of 0.55 and VLT of 0.6, including framing.
- Vertical and horizontal fins of max 600 mm for street-facing facades towards North, East and West, around each of the 4 panels.
- Mechanical system of a VRF type system with individual fancoil units per space, such as LG or Daikin. Classroom cooling capacity of approximately 15 kW with a FCU fan power of approximately 250 W per classroom.
- Temperature setpoint of 20°C to 25°C.
- Lighting wattage of 4.5 W/m².
- Glare control to be managed via internal blinds.
- Louvres should be selected to have appropriate levels of sealing for air and water tightness and acoustic performance.
- DTS fire separation spandrel requirement



* APPROXIMATE, MAY VARIES BASED ON WHOLE PROJECT SECTION J MODELLING

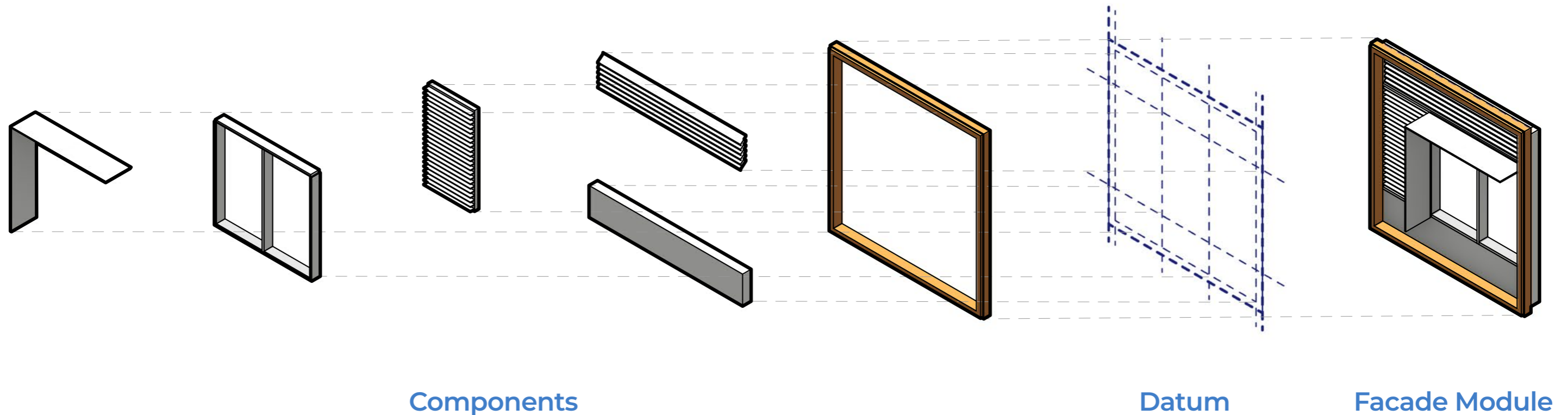
PRE-RELEASE - WORK IN PROGRESS

4.1 Facade Fundamentals



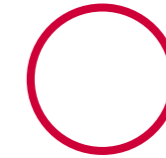
Facade system

The design is built on a modular system to align with the schools standard grid, with components that enable project teams the flexibility to reconfigure to suit project needs.



PRE-RELEASE - WORK IN PROGRESS

4.1 Facade Fundamentals



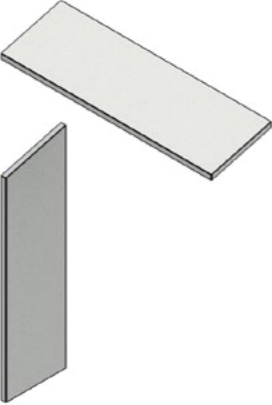
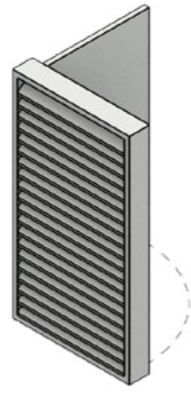
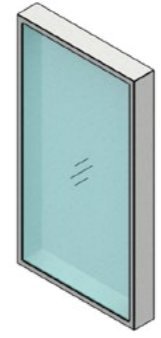
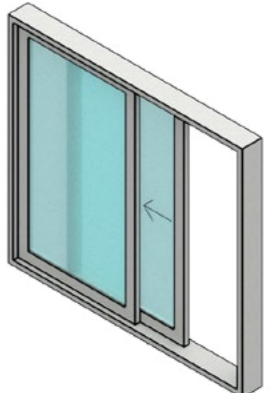

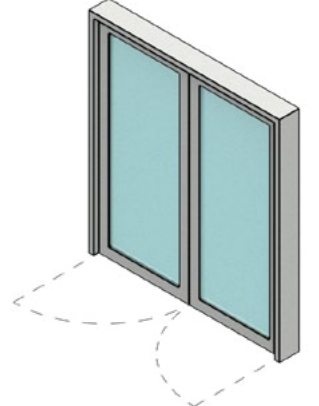
Facade Components

The facade comprises the follow typical components. Project teams may vary the composition and finish of these components based on project needs
Full width louvres are used at high level for mechanical connection.

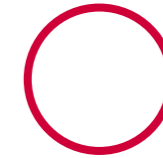
Shading fins are used using frameless folded aluminium sheets, sloping to negate bird roosting.

Natural ventilation fixed louvres are to be used in lieu of operable windows (on the street facade) with insulated doors on the inside.

Glass louvres are not permitted as they pose security, safety and maintenance risks and perform thermally poorly.

 <p>Mechanical Louvre Powdercoated Aluminium</p>	 <p>Shading Powdercoated Aluminium</p>	 <p>Fixed louvre with insulated door behind Powdercoated Aluminium</p>	 <p>Fixed glazing Single glazing</p>	 <p>Sliding Window Powdercoated Aluminium</p>
 <p>Cladding Compressed Fibre Cement Sheet Corrugated metal cladding (in location not accessible by students)</p>	 <p>Fire rated spandrel Concrete, Blockwork or equivalent system to achieve FRL60/60/60</p>	 <p>Framing elements Powdercoated Aluminium</p>	 <p>Solid door with vision panel</p>	 <p>Glazed double door</p>

4.2 Street Facade



Street Facade Design Intent

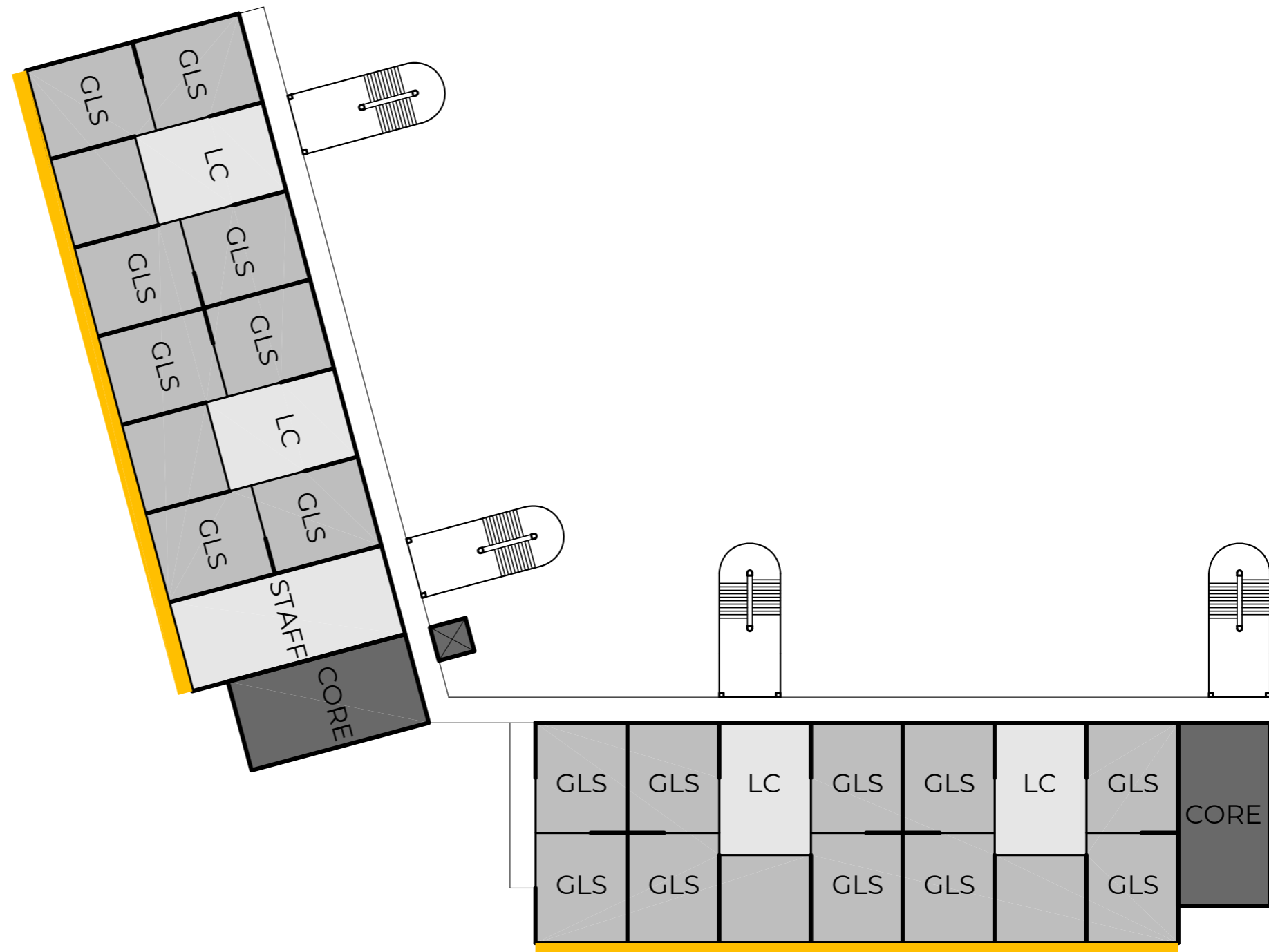
Generally facing site boundaries

Fire rated spandrel

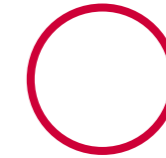
Shadings design according to building orientation

Window and louvre arrangement designed to respond to functional program behind.

No glass louvres permitted.

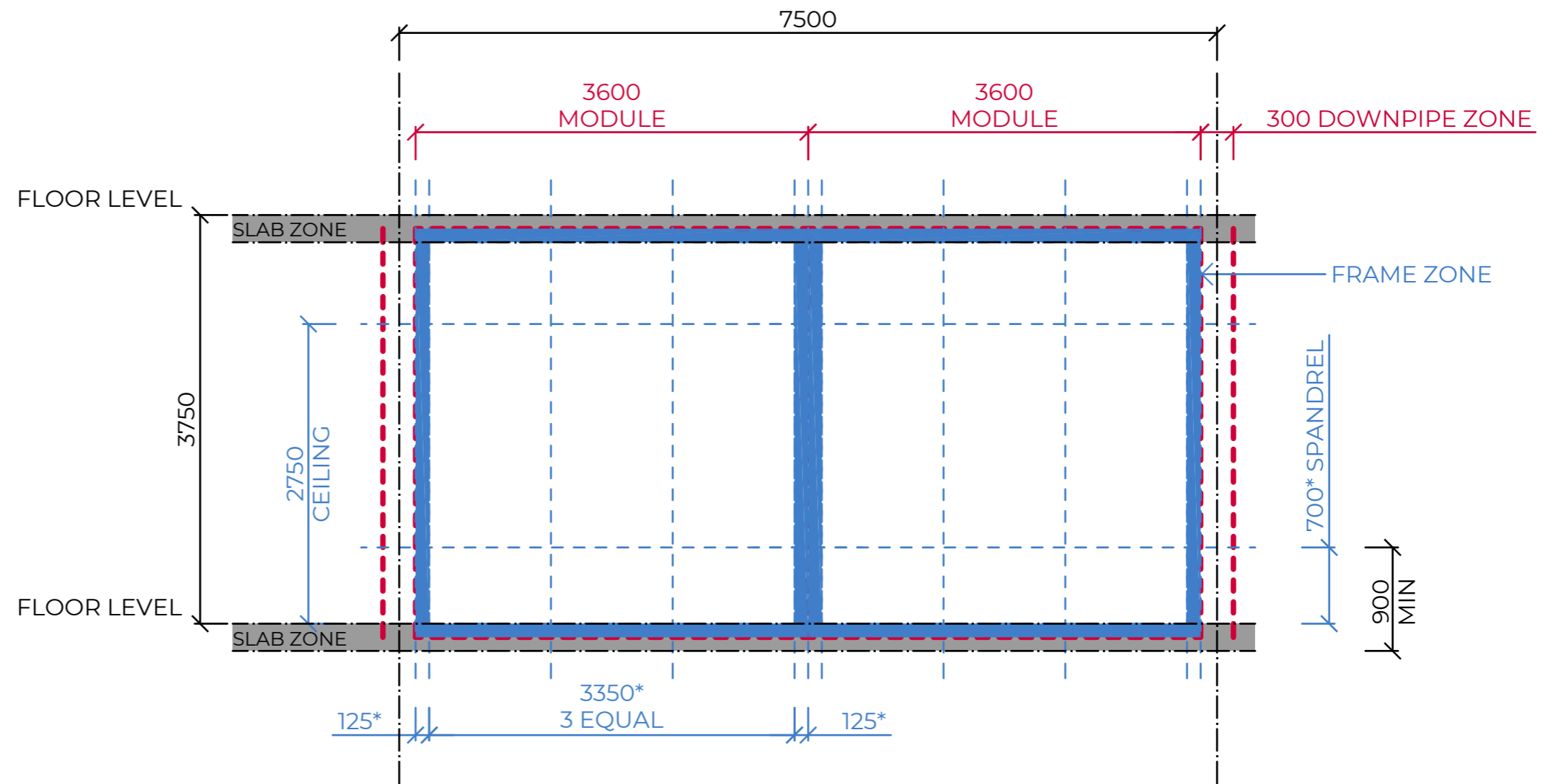


4.2 Street Facade

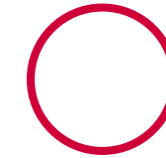


Street Facade Grids and Datum

The system is based on the building grid. Each 7.5m bay comprises a 300mm recessed zone for downpipe and two 3600mm modules.



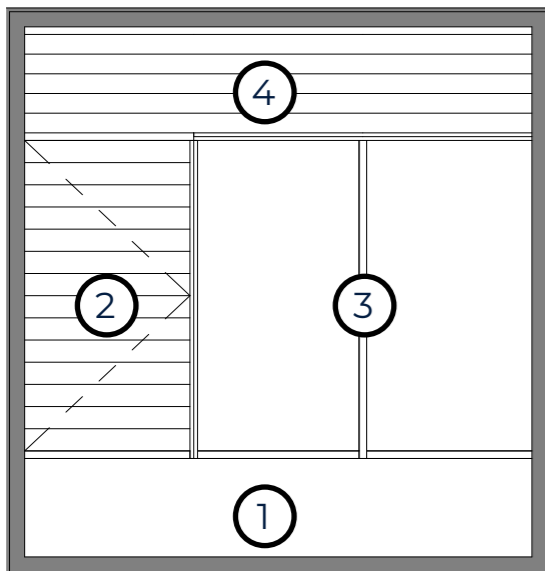
4.2 Street Facade



Street Facade Panel Types

The following panel types are assembled using the standard facade components. Project team may vary the composition based on project requirements to create other panel types to suit project needs.

Panel Type 1

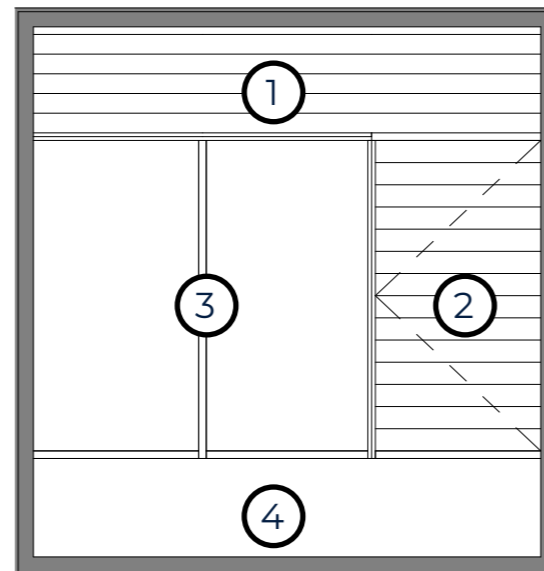


1. Cladding
2. Natural ventilation fixed louvre
3. Fixed glazing
4. Mechanical fixed louvre

Potential applications:

- GLS
- Multi-purpose room
- Staff room
- Admin

Panel Type 2

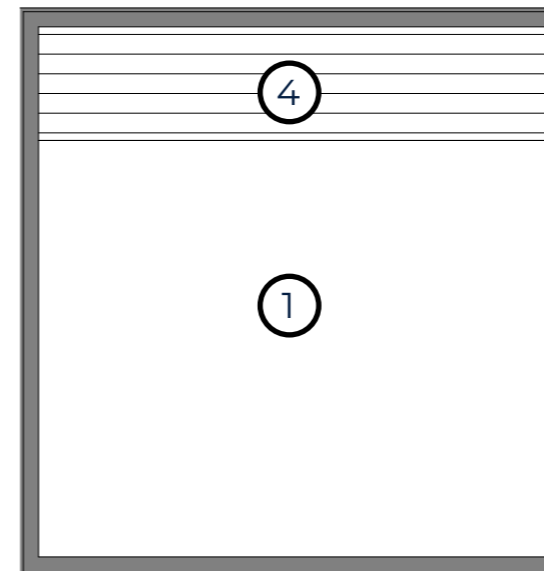


1. Cladding
2. Natural ventilation fixed louvre
3. Fixed glazing
4. Mechanical fixed louvre

Potential applications:

- GLS
- Multi-purpose room
- Staff room
- Admin

Panel Type 3

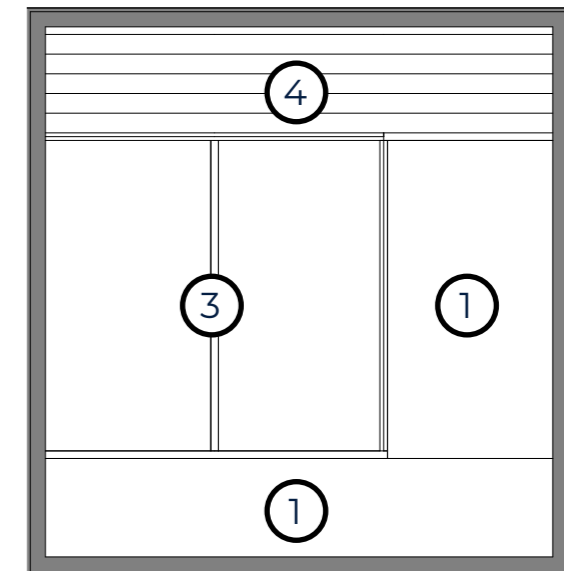


1. Mechanical fixed louvre
2. -
3. -
4. Mechanical fixed louvre

Potential applications:

- Change room
- Storage room

Panel Type 4

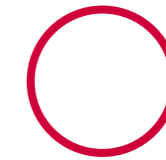


1. Mechanical fixed louvre
2. -
3. Fixed glazing
4. Mechanical fixed louvre

Potential applications:

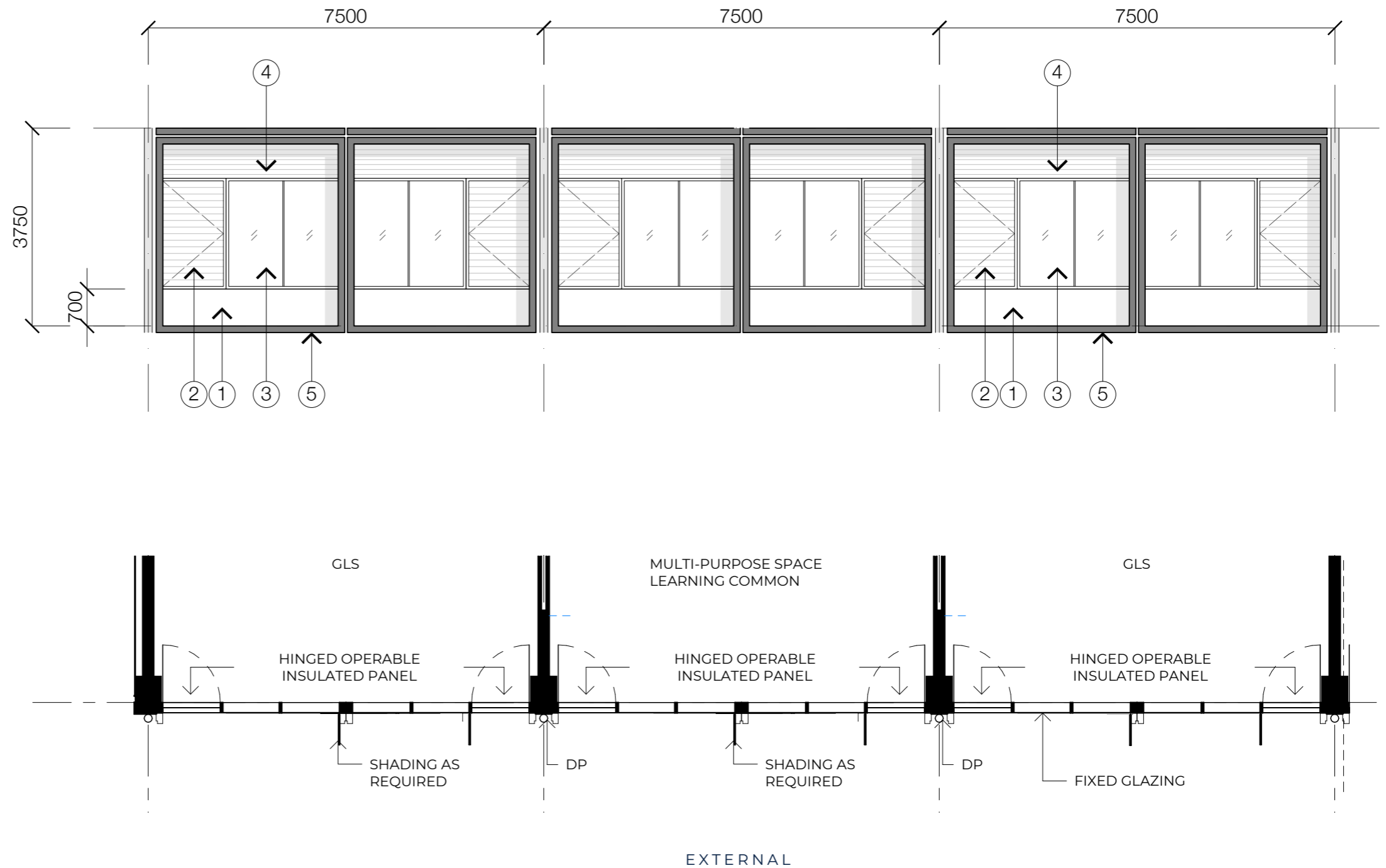
- Library
- Admin

4.2 Street Facade



Street Facade Typical Elevation

- 1. Solid cladding
- 2. Natural ventilation panel
- 3. Fixed glazing - Sun shading as required
- 4. Mechanical louvre
- 5. Framing element



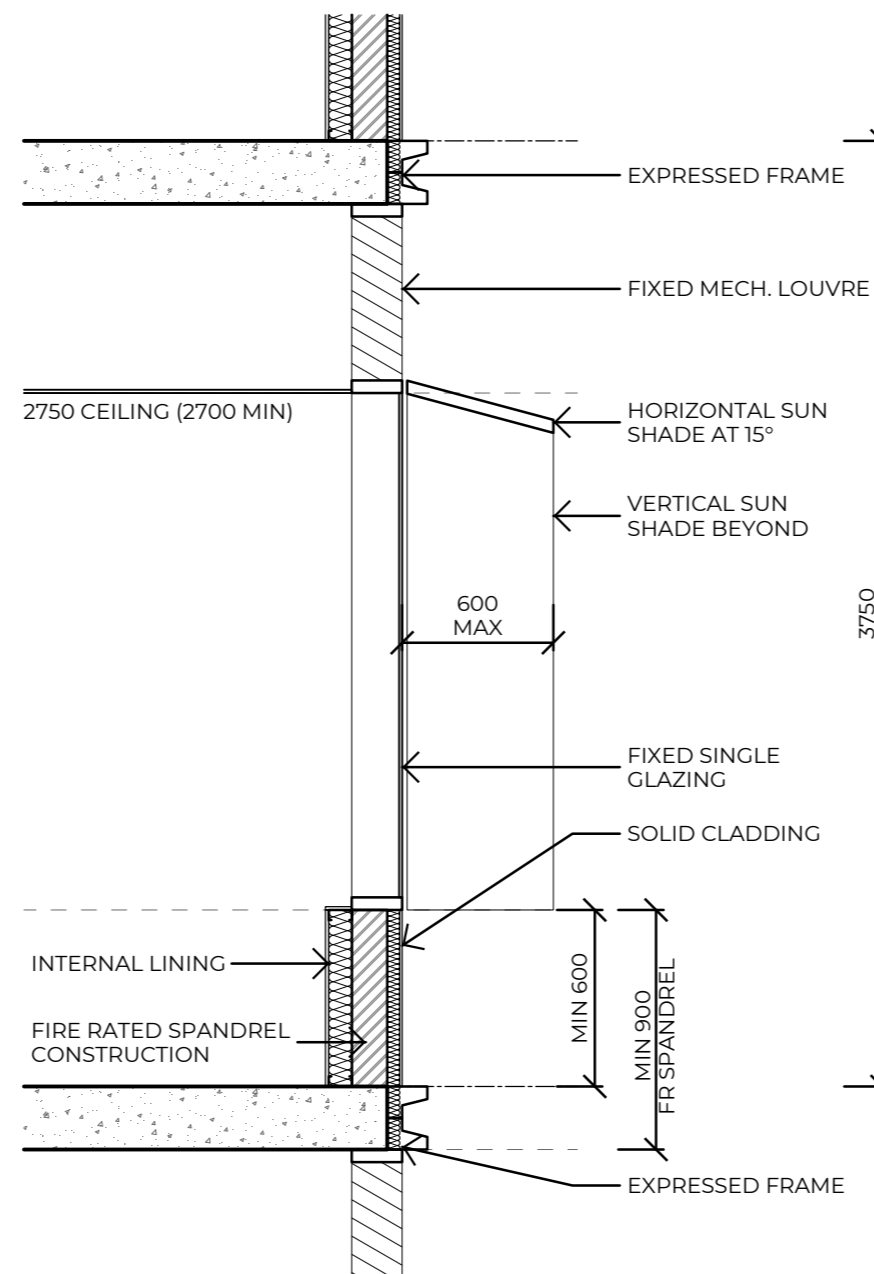
4.2 Street Facade



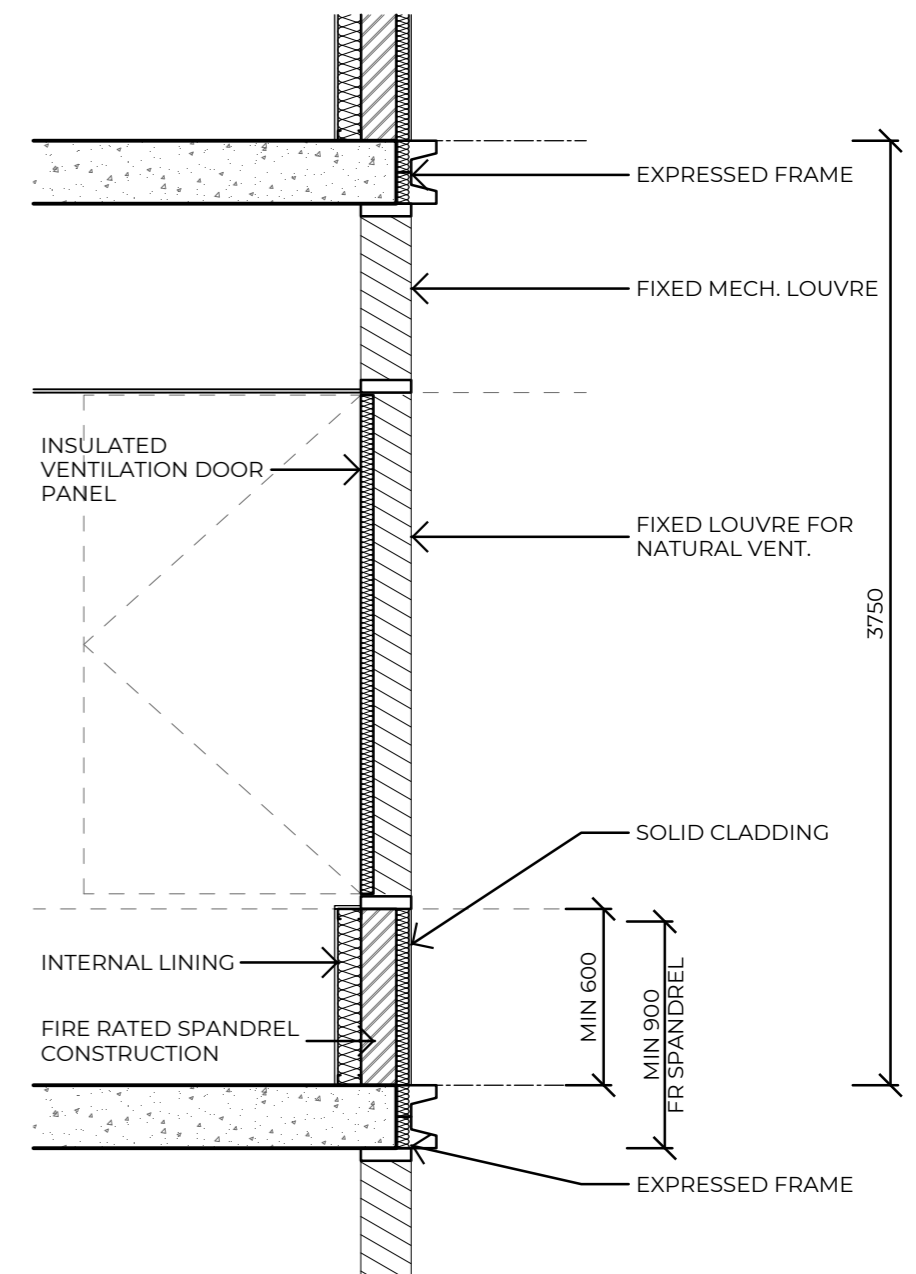
Street Facade Typical Sections

For reference only. Project teams are to develop details based on preferred construction methodology and project specific requirements to achieve the design intent and meet project BCA, Green Star and EFSG compliance.

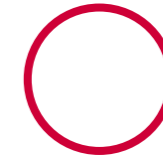
Street Side Fixed Glazing Section



Street Side Fixed Louvre Section



4.2 Street Facade



Street Facade Variances

Variations can be applied for each project (refer to Introduction for table showing permitted variances).

Solar shading to be provided as required to suit the facade orientation.

Baseline design with shading

Colour option applied to service cores and solar shading

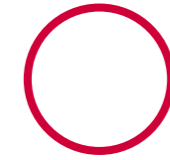


Baseline design with reduced shading

Reduced shading as required by solar design



4.2 Street Facade



Street Facade Variances (continued)

Variations can be applied for each project (refer to Introduction for table showing permitted variances).

Solar shading to be provided as required to suit the facade orientation.

Recessed frame design

Window arrangement tailored to functional need behind

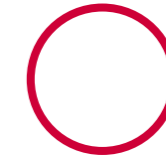


Expressed window design

Window arrangement varied to adapt to different ceiling height in GLS and Learning Common



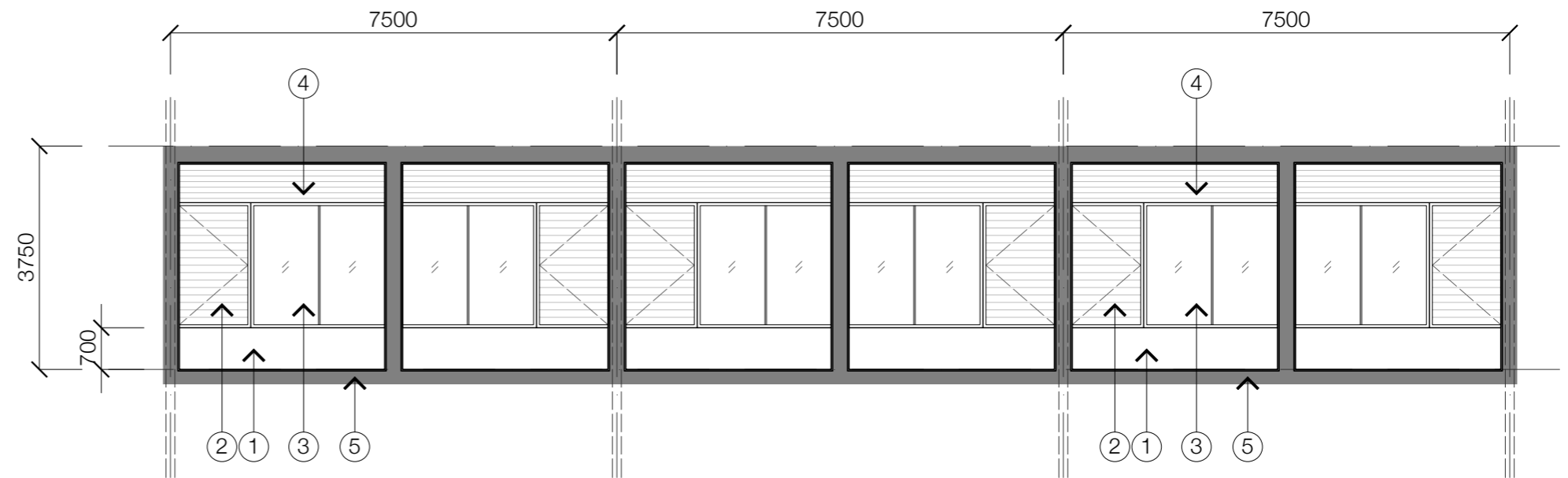
4.2 Street Facade



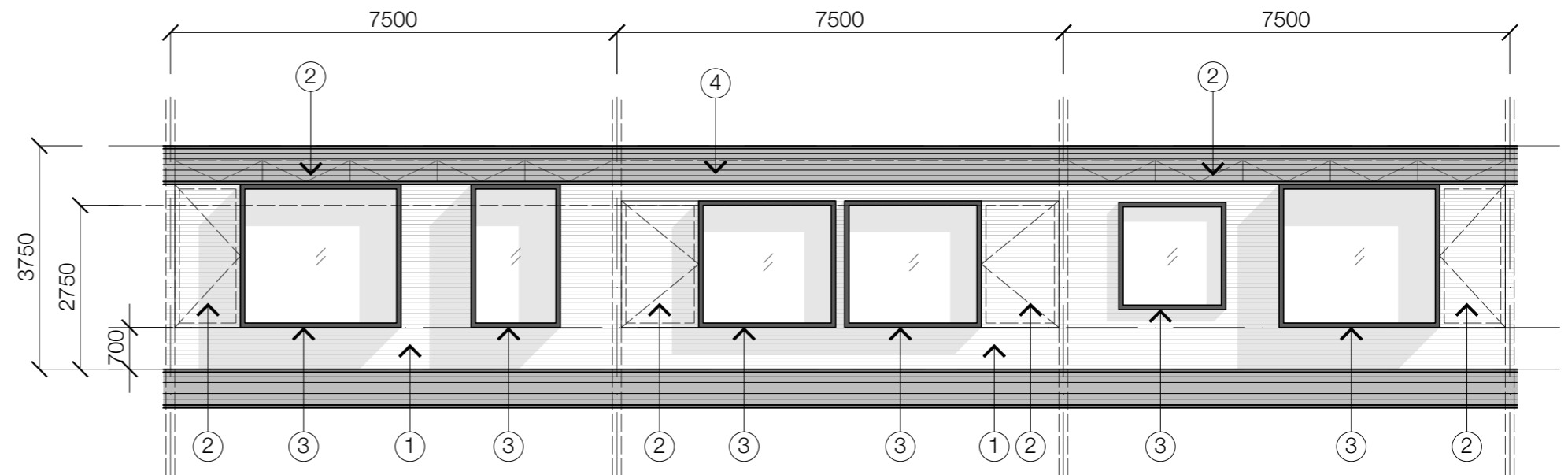
Street Facade Variances (continued)

- 1. Solid cladding
- 2. Natural ventilation panel
- 3. Fixed glazing - Sun shading as required
- 4. Mechanical louvre
- 5. Recessed Framing element

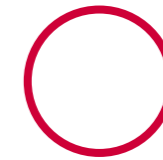
Recessed frame design



Expressed window design



4.3 Walkway Facade



Design Intent

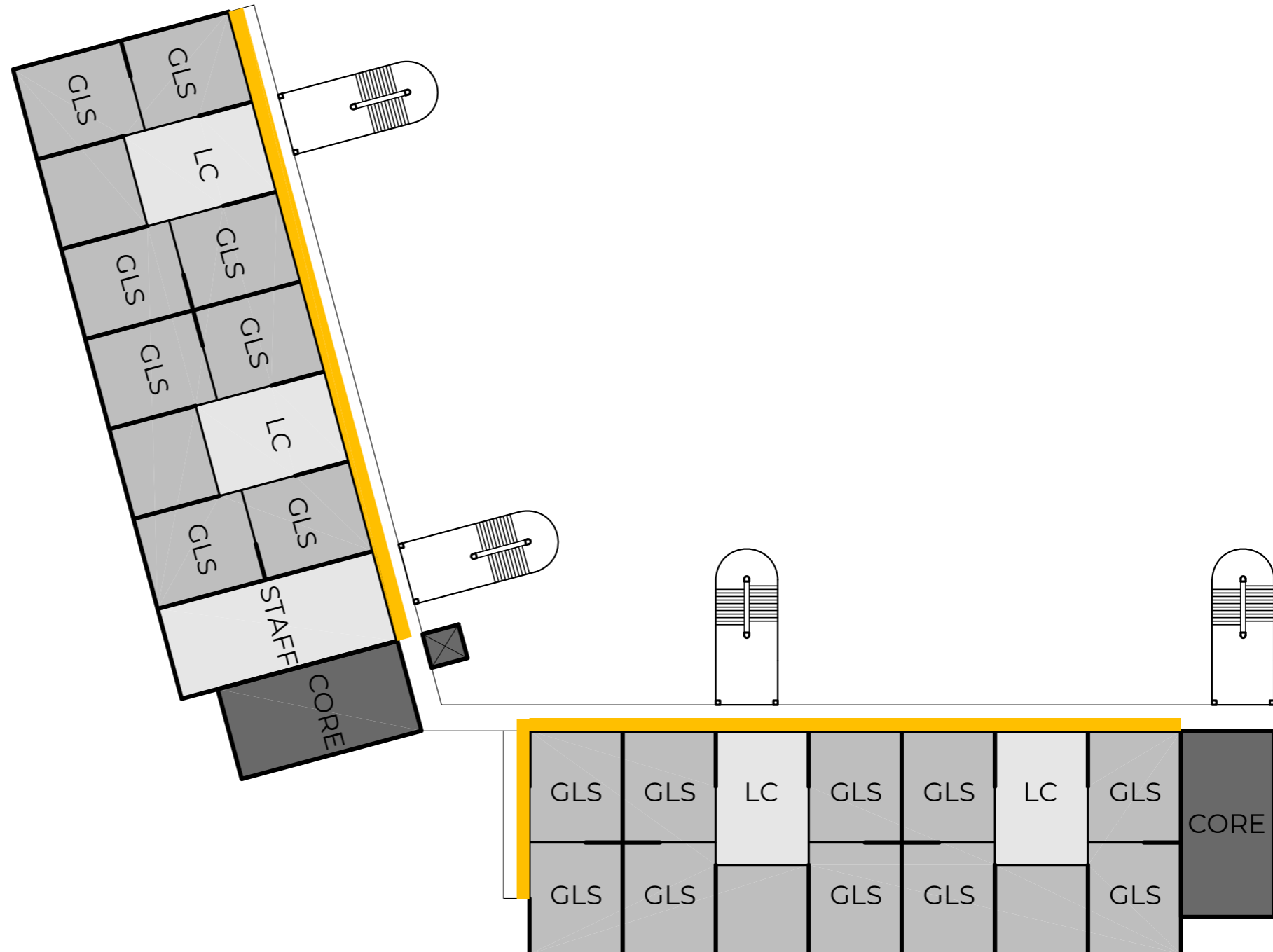
Meet performance requirements

No fire rated spandrel required due to external walkway, however spandrel maintained with durable material such as CFC

Sliding windows can be used along the walkway to maximise ventilation while not posing risk of falling

No awning windows permitted on walkway side below 2100 due to safety concerns colliding with open windows

No glass louvres permitted



4.3 Walkway Facade

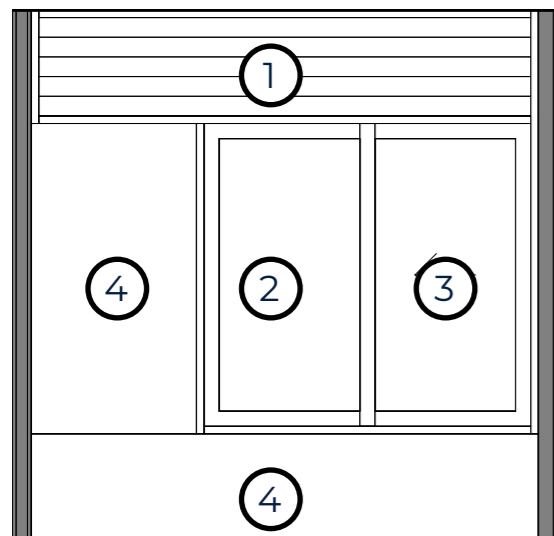


Walkway Facade Panel Types

The following panel types are assembled using the standard facade components. Project team may vary the composition based on project requirements to create other panel types to suit project needs.

Panel Type 1

Top of frame to be added for top level



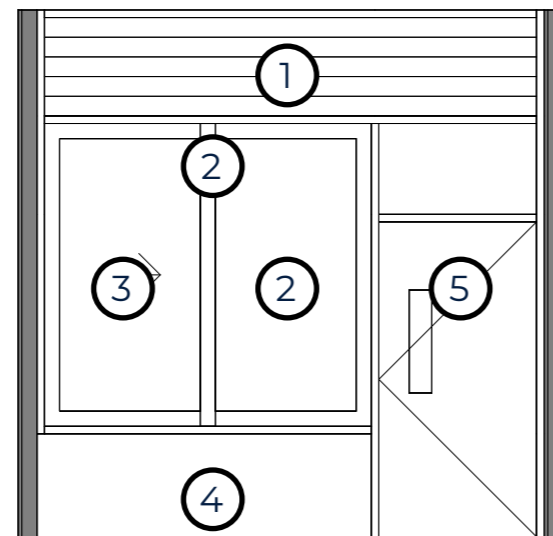
1. Mechanical fixed louvre
2. Fixed glazing
3. Sliding window
4. Cladding

Potential applications:

- GLS
- Staff room
- Admin

Panel Type 2

Top of frame to be added for top level



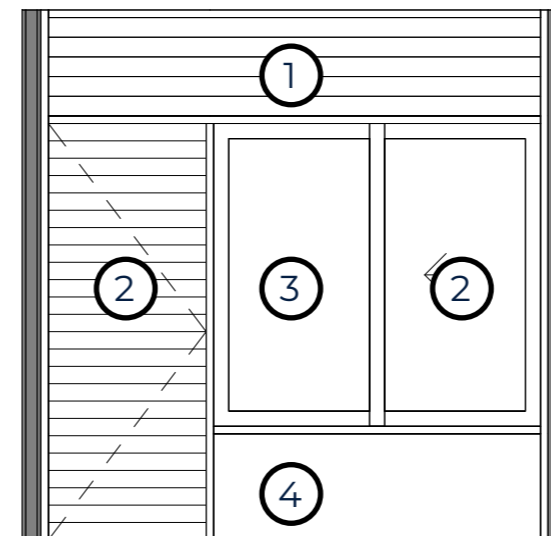
1. Mechanical fixed louvre
2. Fixed glazing
3. Sliding window
4. Cladding
5. Solid door with vision panel

Potential applications:

- GLS
- Staff room
- Admin

Panel Type 3

Top of frame to be added for top level



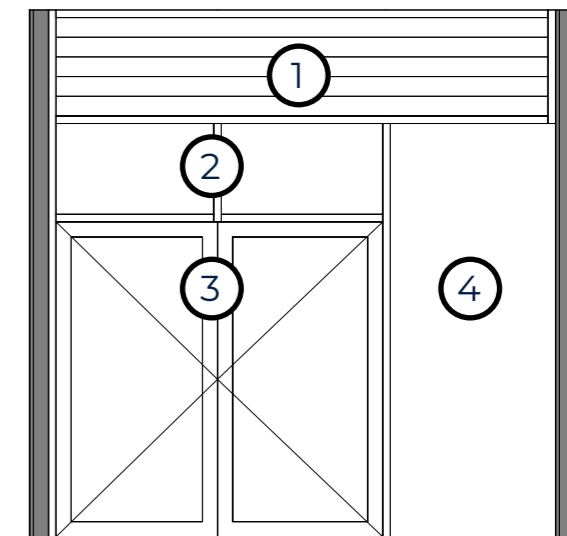
1. Mechanical fixed louvre
2. Natural ventilation fixed louvre
3. Fixed glazing
4. Sliding window
5. Cladding

Potential applications:

- Learning common
- Workshop
- Library

Panel Type 4

Top of frame to be added for top level

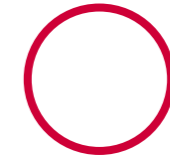


1. Mechanical fixed louvre
2. Fixed glazing
3. Glazed double door
4. Cladding

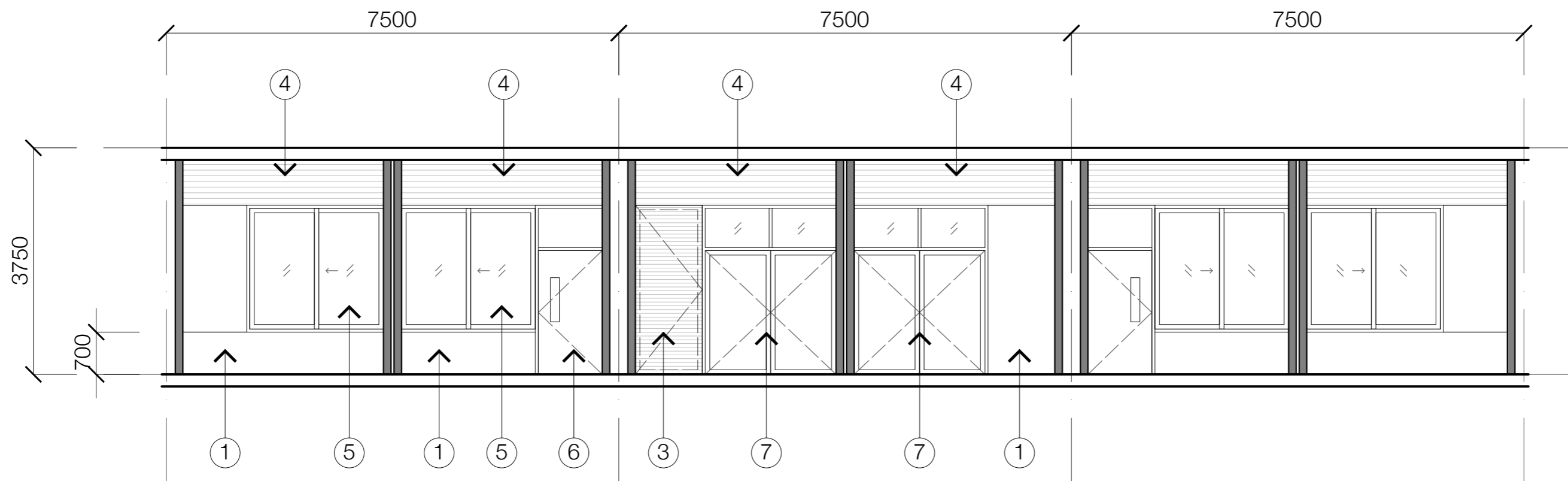
Potential applications:

- Learning common
- Workshop
- Library

4.3 Walkway Facade

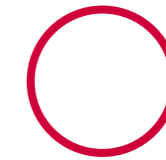


Typical Walkway Facade Hub Elevation



1. Solid cladding
2. Natural ventilation panel
3. Fixed glazing - Sun shading as required
4. Mechanical louvre
5. Sliding window
6. Single door with vision panel
7. Glazed double door

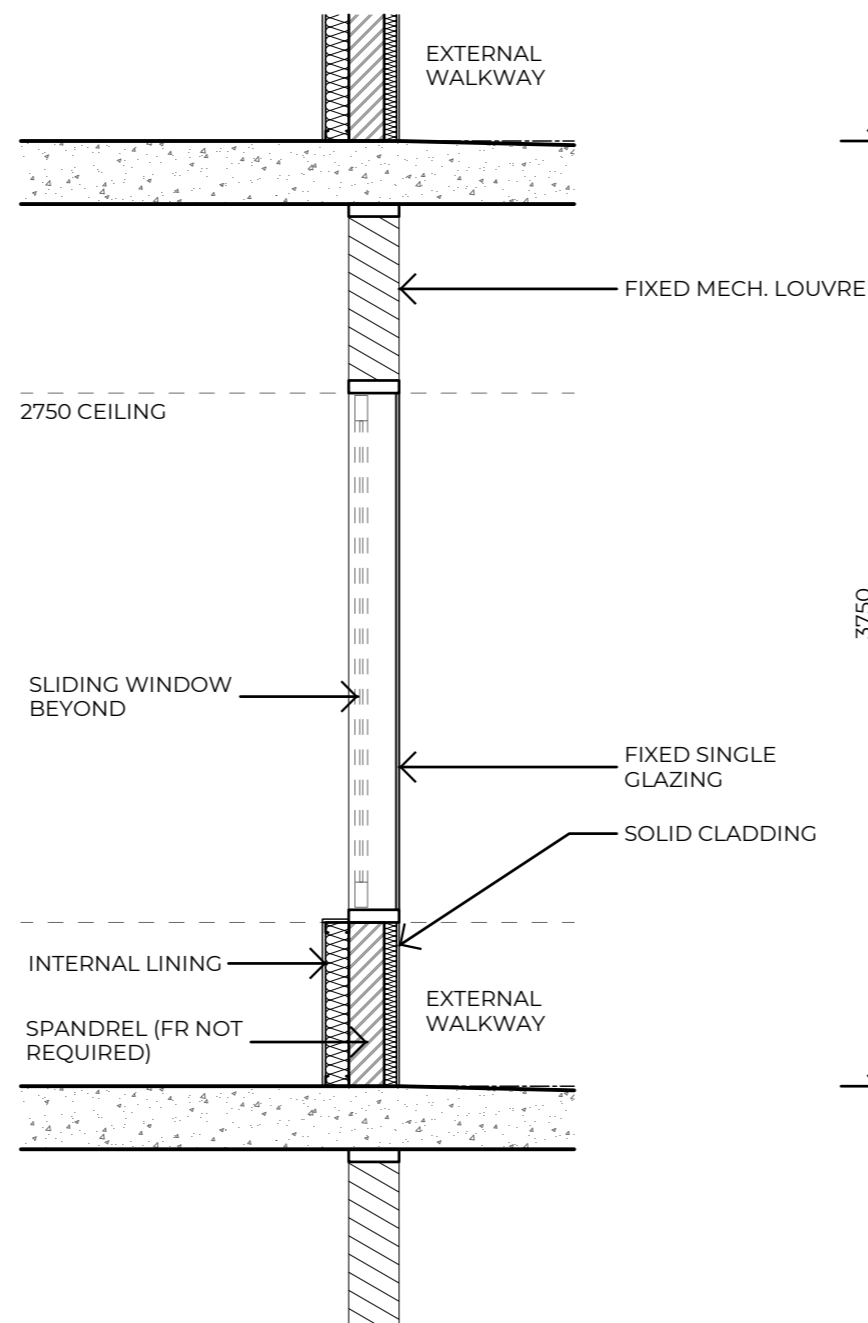
4.3 Walkway Facade



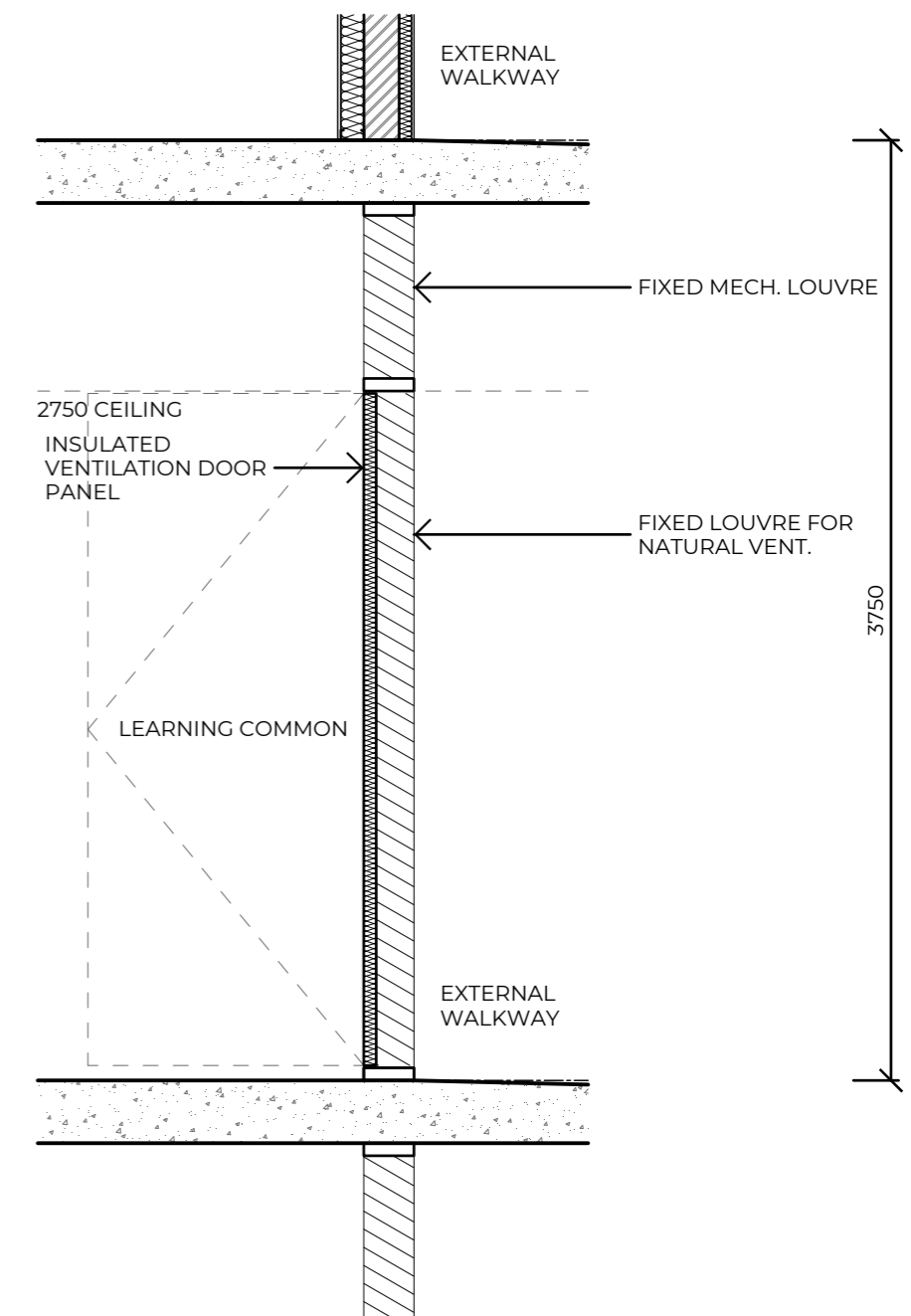
Typical Walkway Facade Sections

For reference only. Project teams are to develop details based on preferred construction methodology and project specific requirements to achieve the design intent and meet project BCA, Green Star and EFSG compliance.

Walkway Side Glazing Section



Walkway Side Fixed Louvre Section



PRE-RELEASE - WORK IN PROGRESS

4.4 End Facade



Available in Future Release

4.5 Roof



Roof Design Intent

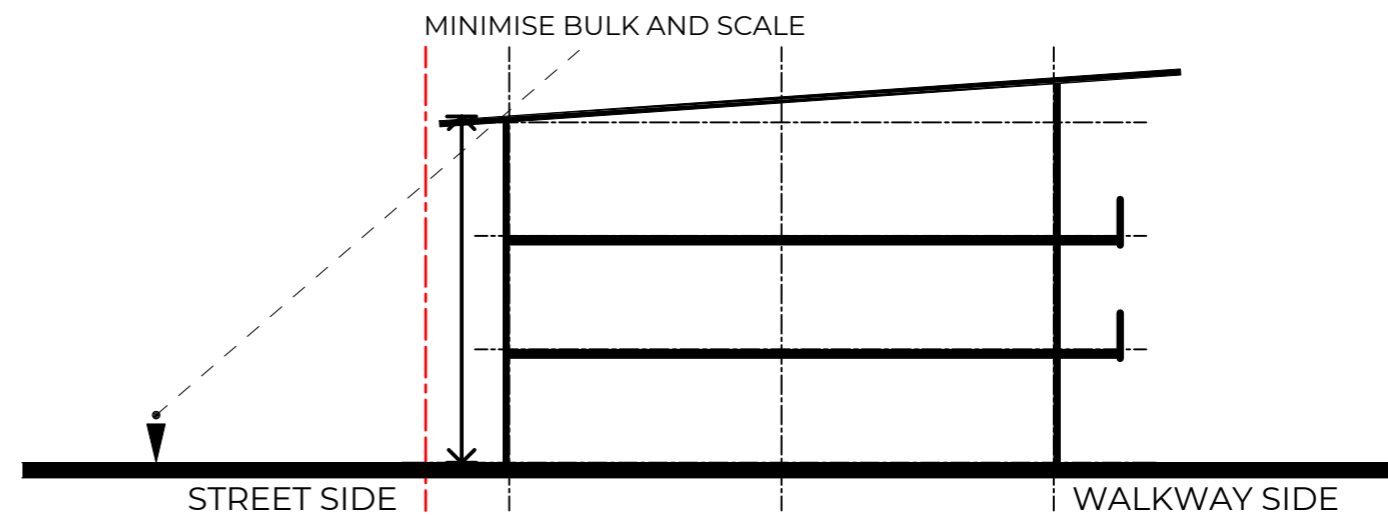
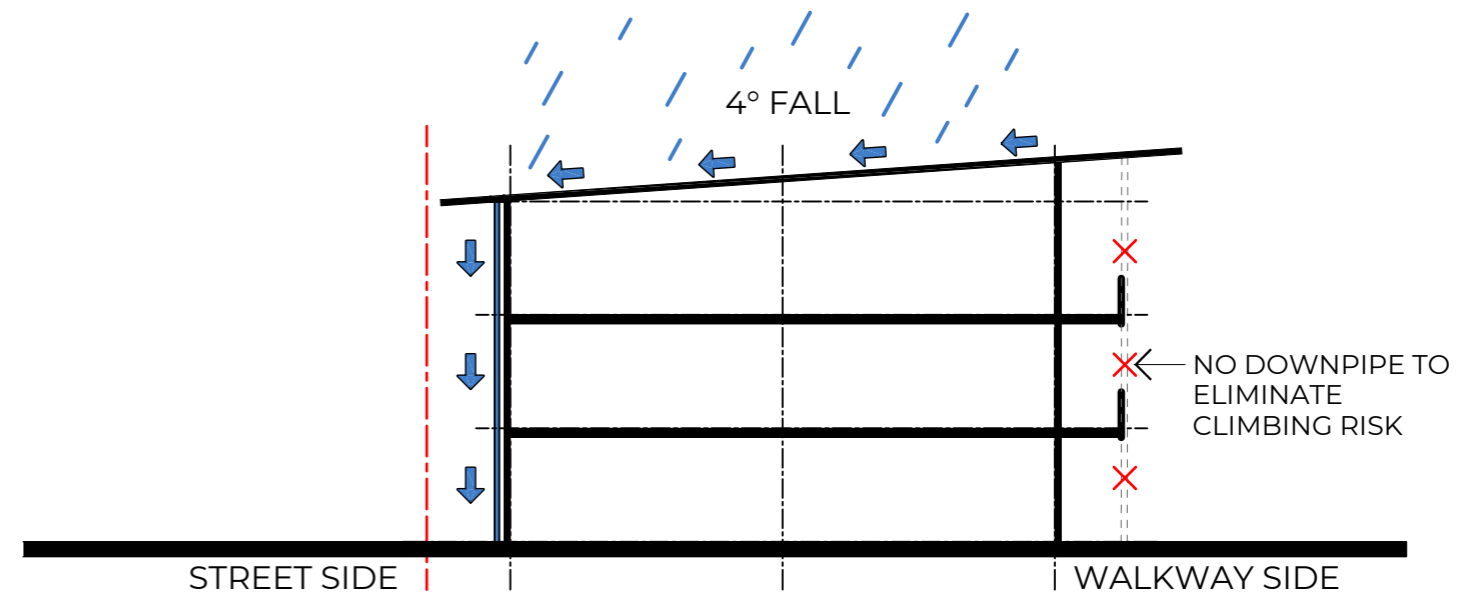
The standardised design includes a monopitch roof at 4 degrees with eaves overhangs.

Safety consideration:

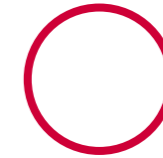
The roof is designed to fall towards the street side in order to eliminate risk of climbing downpipes along the walkway side. Gutter and downpipes have been designed to be an integral part of the street side facade.

Bulk and scale:

Sloping to the street side reduces bulk and scale to the streetscape and neighbouring properties.

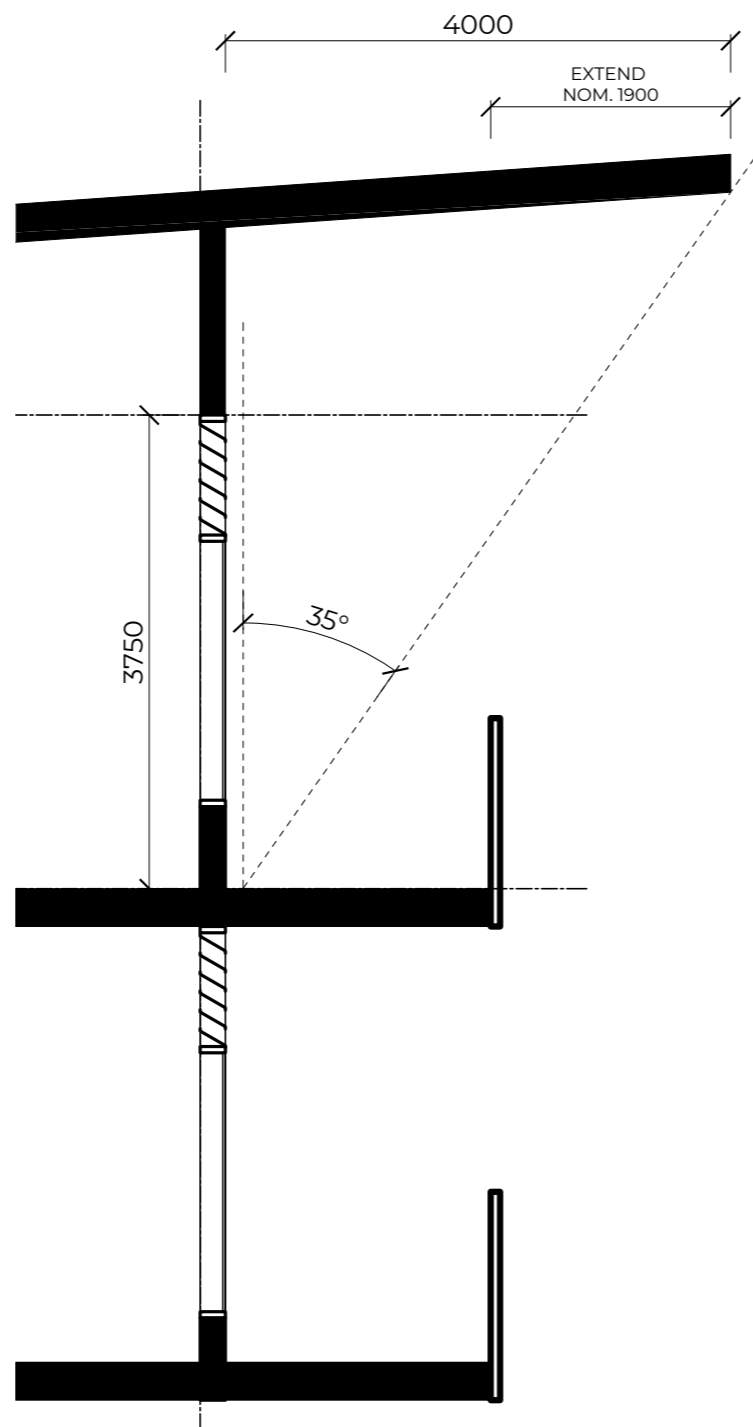


4.5 Roof



Roof Overhang

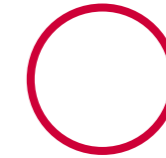
The roof eave extends beyond the walkway to provide weather protection to the top floor walkway and the levels below. The eave extension past the walkway also further mitigates climb ability issues by preventing students from climbing onto the roof from the walkway.

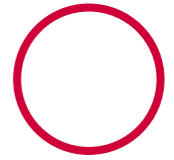


4.6 Worked Example



4.6 Worked Example



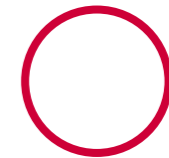


5

Interior

5.1	Overview	
5.2	Floor Finishes	
5.3	Ceiling Finishes	
5.4	Joinery	
5.5	Sliding Doors	
5.6	Worked Example	

5.1 Overview



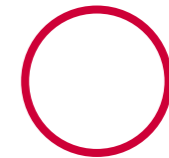
Interior Design Components

Interior Design components have been included in this section to inform the spatial arrangement, operability and general aesthetics of a typical General Learning Space.

Colour selections are to be made by the project teams within the reflectivity parameters and adapted for specialist spaces.



5.2 Floor Finishes



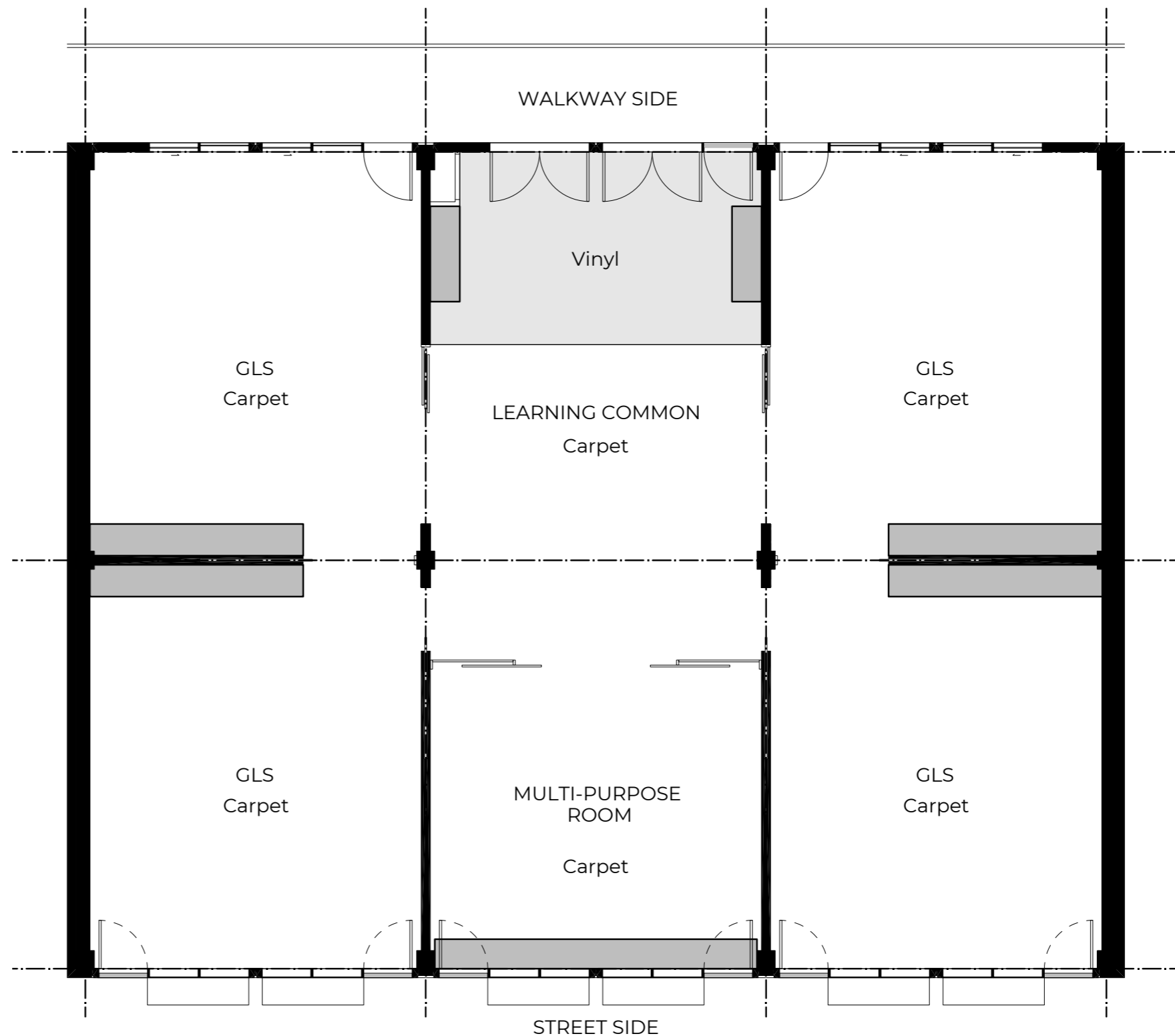
Layout Design Intent

The typical GLS hub features 4 GLS plus a 5th room that can be used as a reduced size GLS or Multiple Purpose Room.

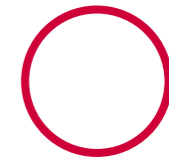
Floor Finish Design Intent

Floor finishes are to be robust, hard wearing, meet acoustic requirements and be cost effective.

Carpet is used throughout all learning spaces with a vinyl floor at the Learning Commons entry area.



5.3 Ceiling Finishes



Ceiling Finish Design Intent

Ceilings are selected to be cost effective, feature uncut tiles to reduce wastage, meet acoustic requirements and provide an easy maintenance access to the ceiling void.

Tiled ceiling areas

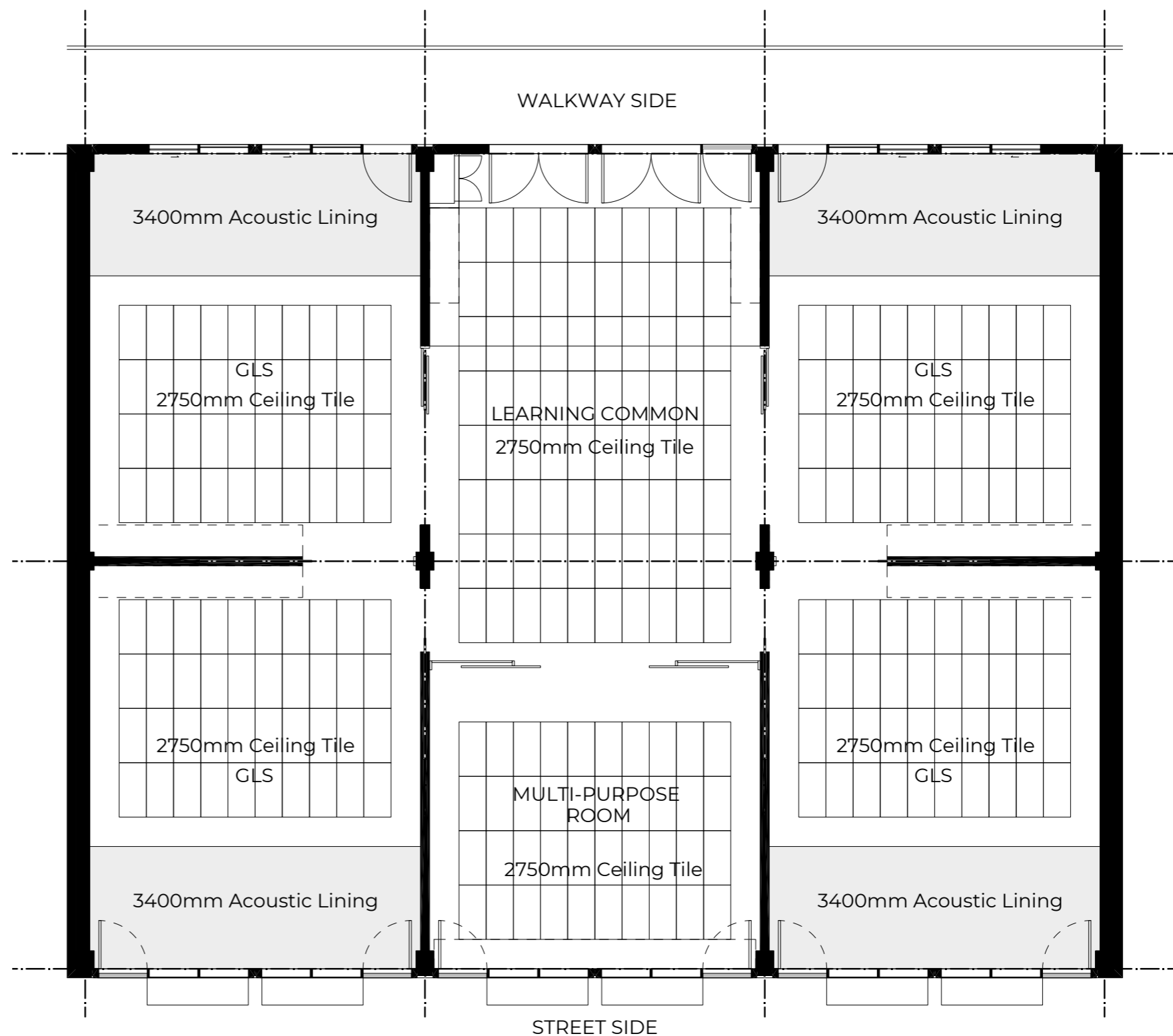
Generally 2750mm ceiling height to allow for tolerance to achieve minimum 2700 clear.

- Set plasterboard ceiling edge surround
- Ceiling tile 1200 x 600mm

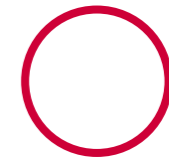
High ceiling areas

Acoustic Panel at 3400mm

Extent of high ceiling zone to be fine tuned by project team based on ceiling service spatial requirement.



5.4 Joinery



Joinery Design Intent

This section describes the general joinery location strategy. The Room Layout Sheets (future version) will show details of joinery requirements for each room.

Generally, joinery is to be located in areas away from high ceiling zones to be full height to avoid cleaning and hiding issues above.

Learning Commons

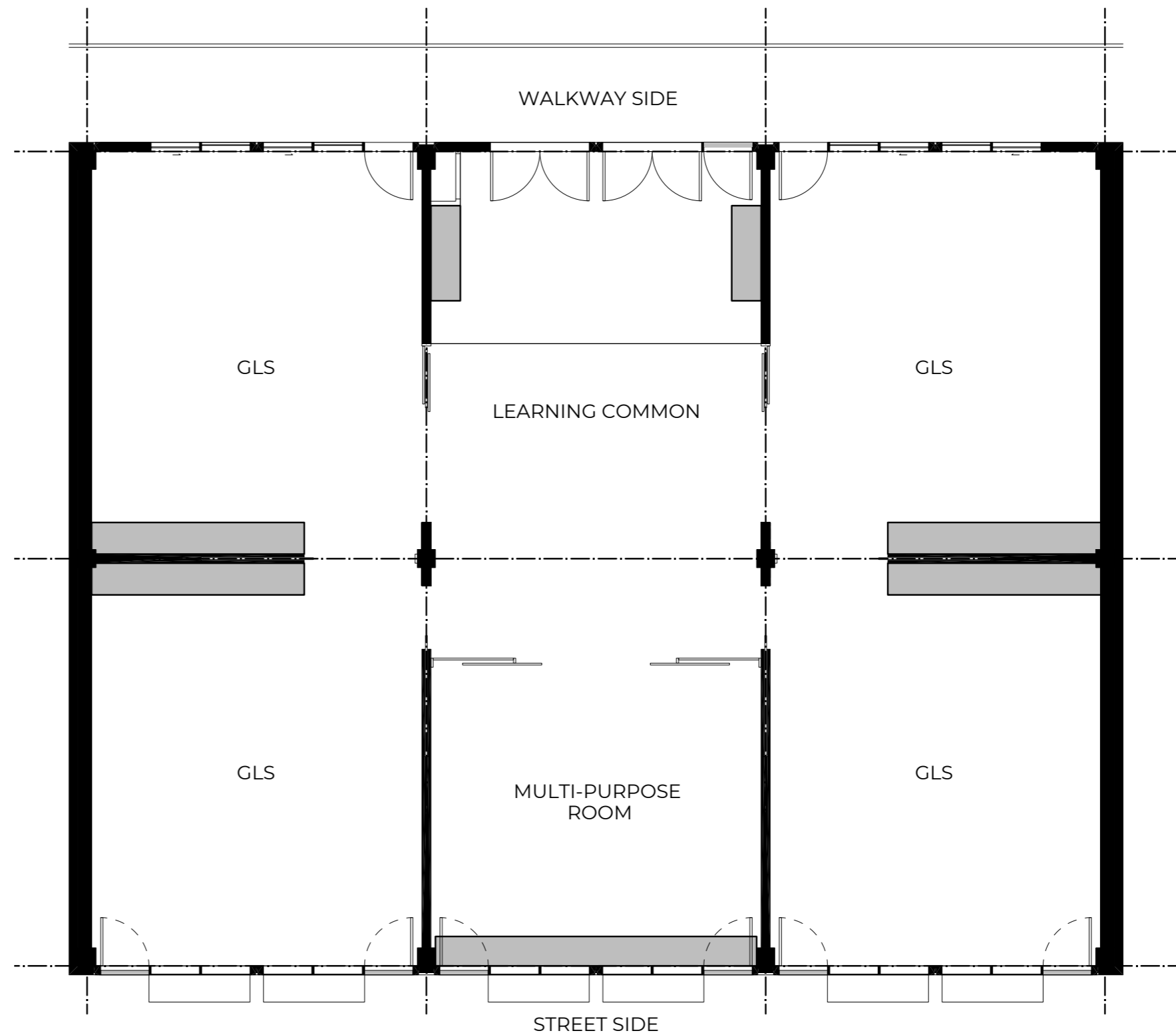
1200mm - 1500mm clear zone at entry. This allows full opening of ventilation door on the facade.

In Public Schools where two sink troughs are required, joinery to be placed on both sides and set back from the entry zone.

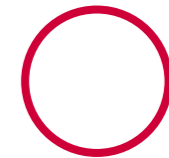
In high school where one PAA is required, locate the joinery on the opposite side of the ventilation door.

GLS/Multi-Purpose Room

Joinery to be located under window along facade to allow for wide contiguous room space.



5.5 Sliding Doors



Sliding Doors Design Intent

Glazed sliding doors enable flexible learning configurations and create a sense of hub connectivity.

Doors are designed to balance clear width, cost effective design and minimise heavy weights for operability.

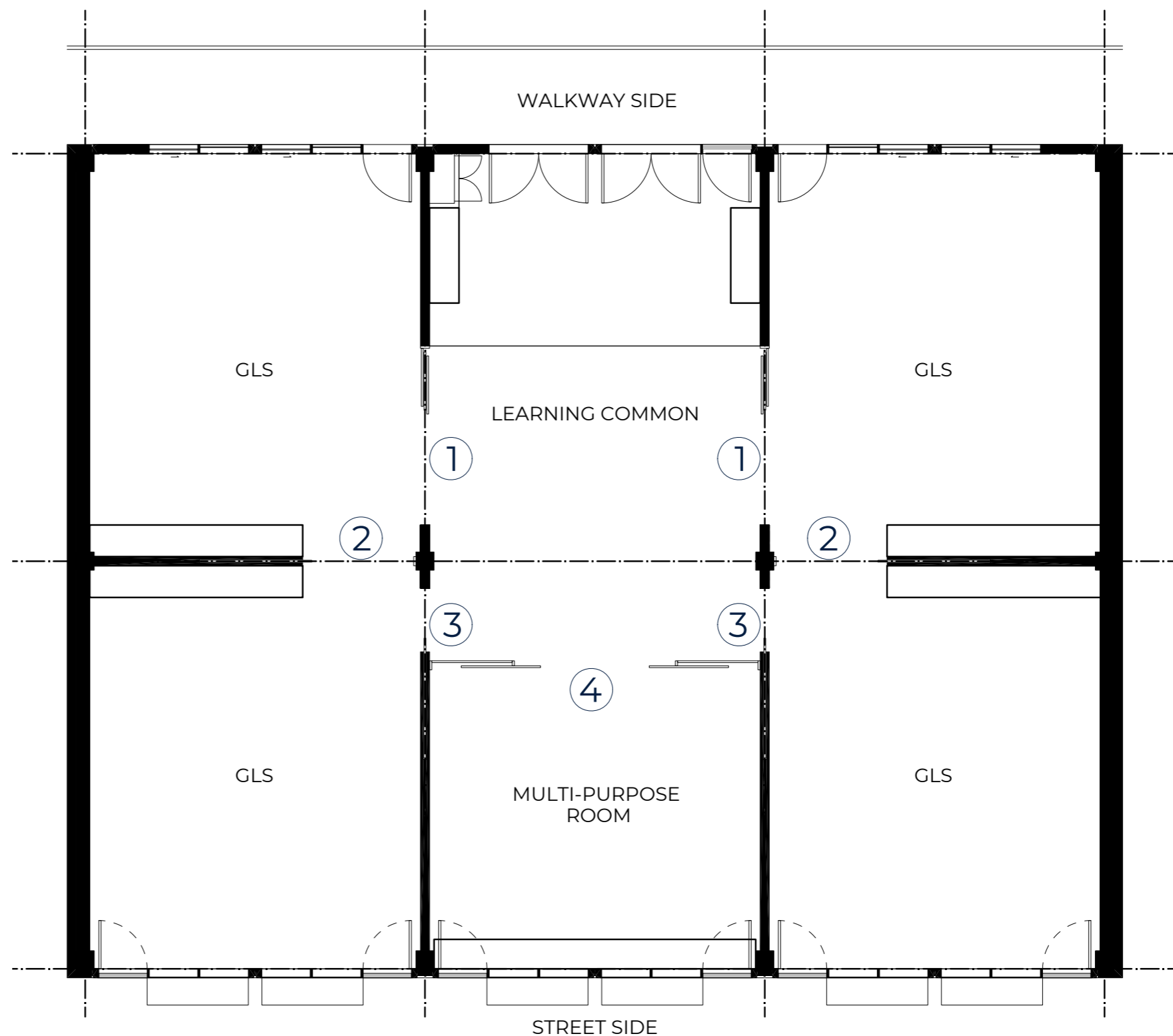
There are 4 types of sliding doors:

Type 1 - GLS Entry Large Door

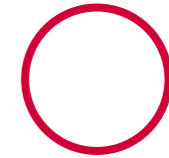
Type 2 - Inter-GLS Door

Type 3 - GLS Entry Small Door

Type 4 - Multi-purpose Room Door

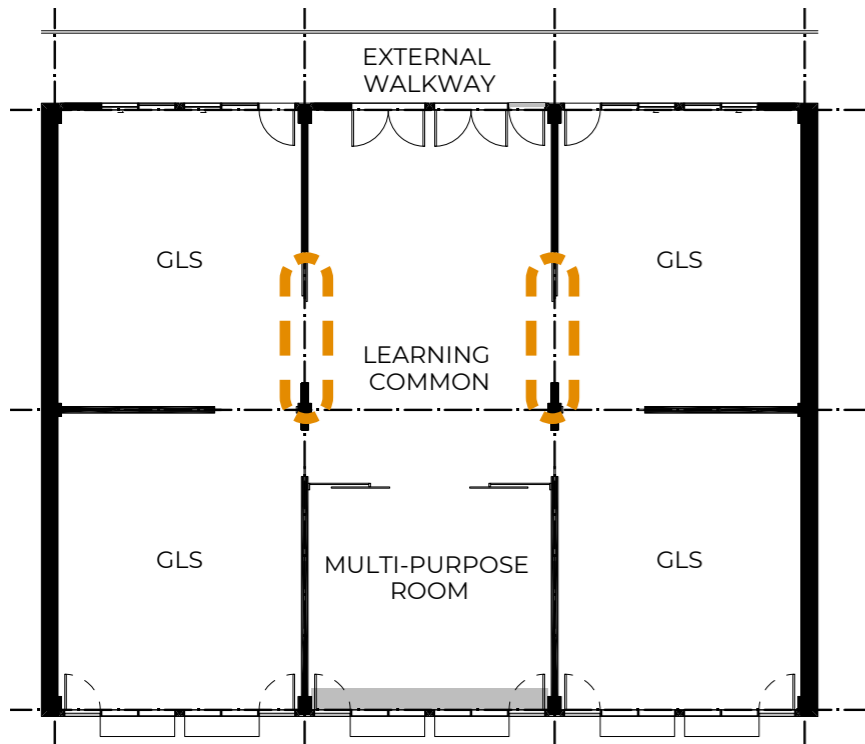


5.5 Sliding Doors

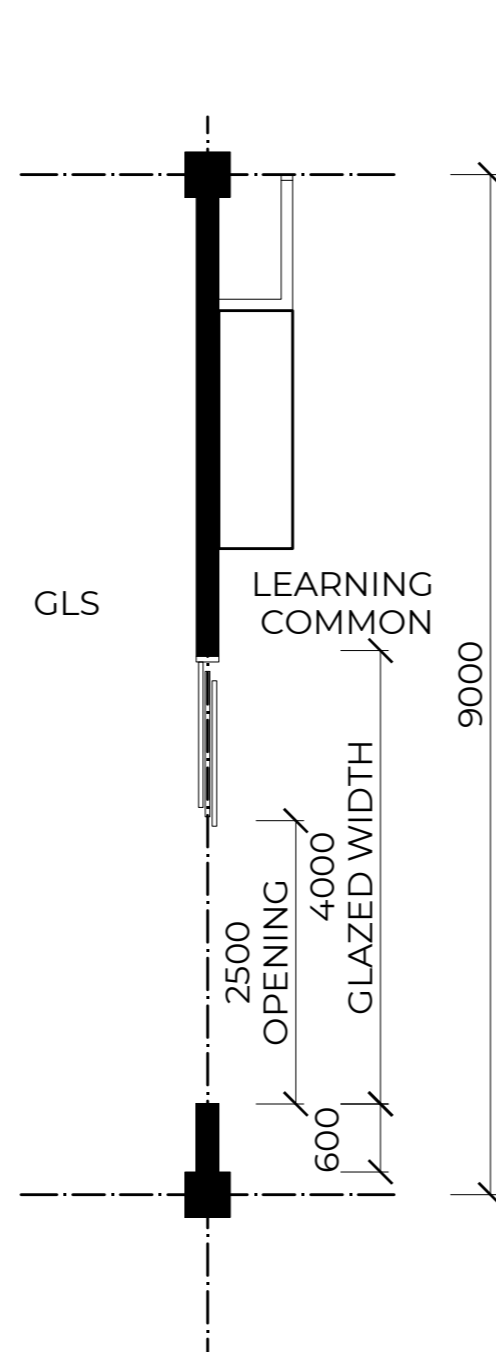


Type 1: GLS Entry Large Sliding Door

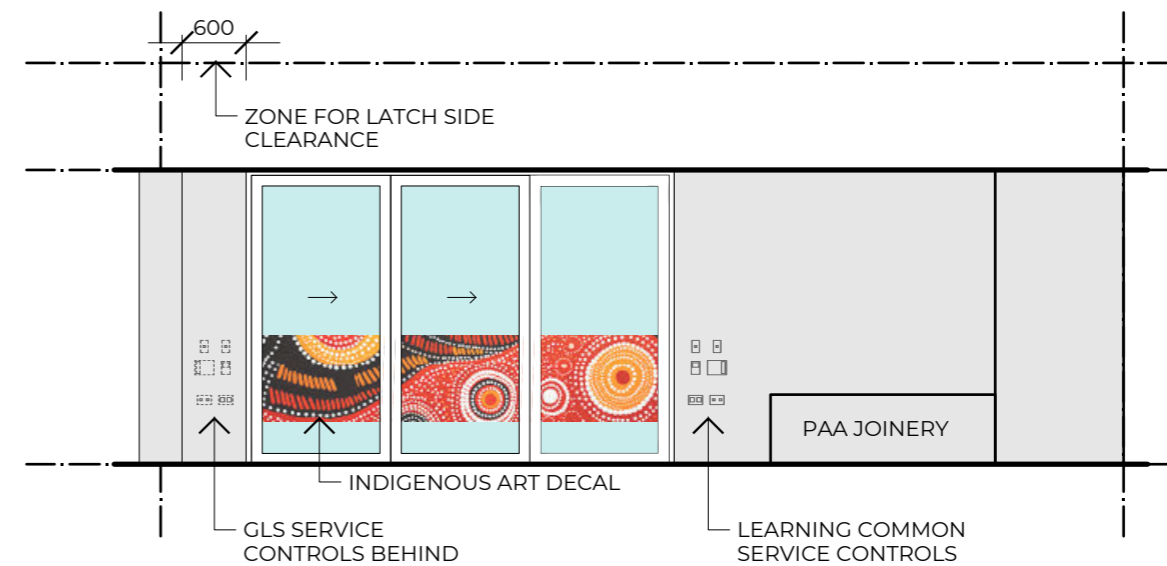
Key Plan



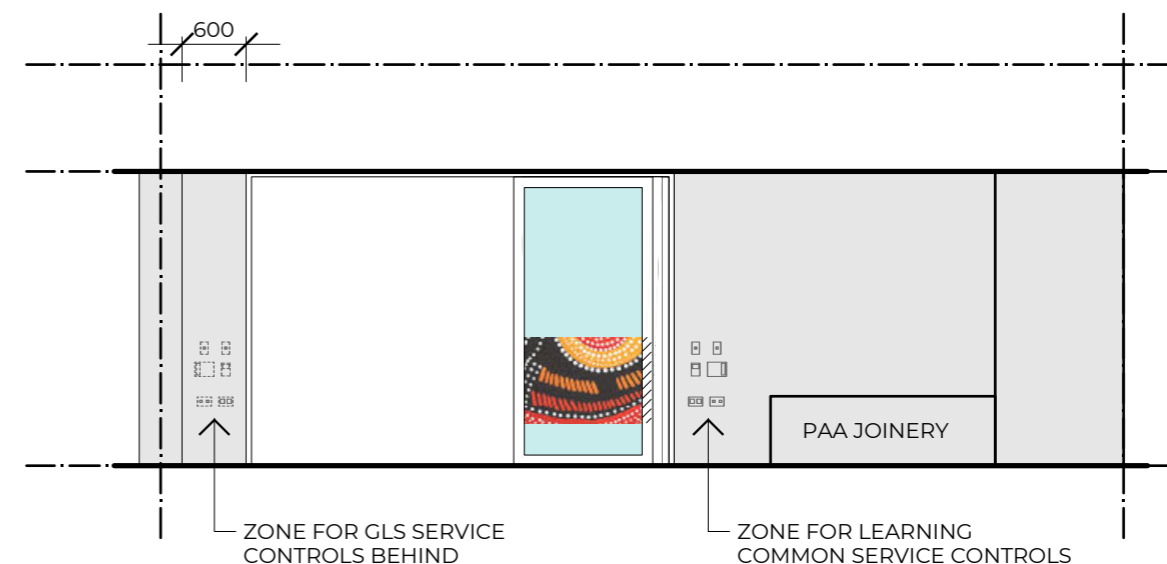
Plan



Elevation - Door closed

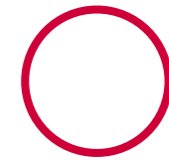


Elevation - Door opened



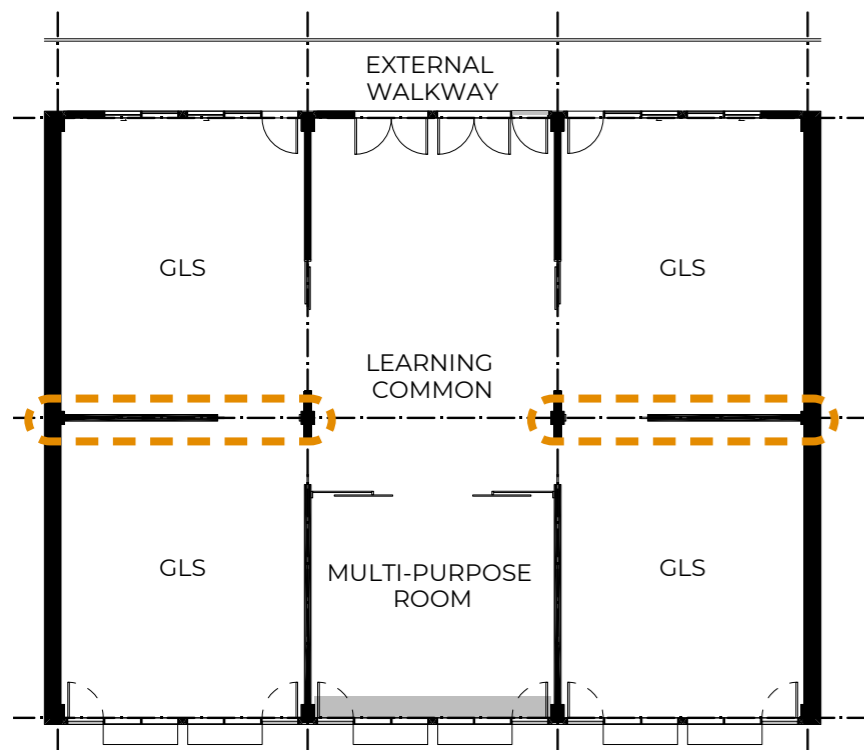
- 3 panels (two sliding parking in front of one fixed)
- Comply with AS1428
- Rw32 acoustic rating
- Indigenous art decal to dimensions shown to provide privacy and visual contrast requirements

5.5 Sliding Doors

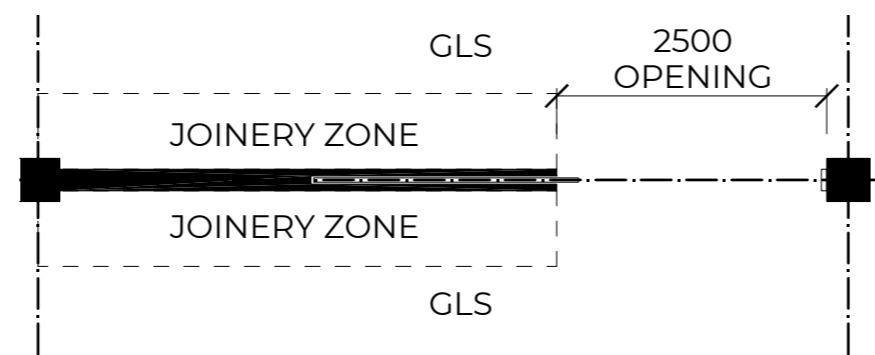


Type 2: Inter-GLS Sliding Door

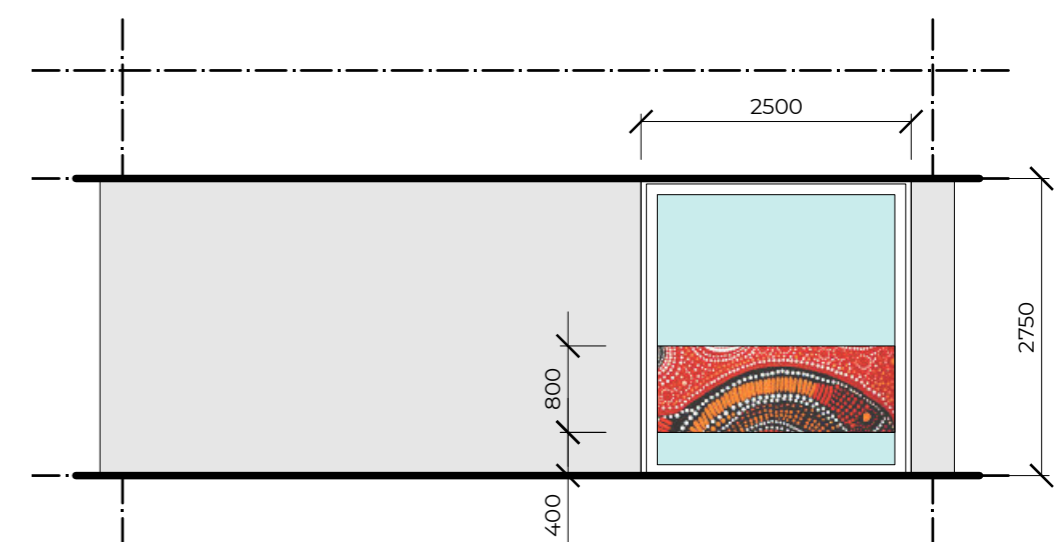
Key Plan



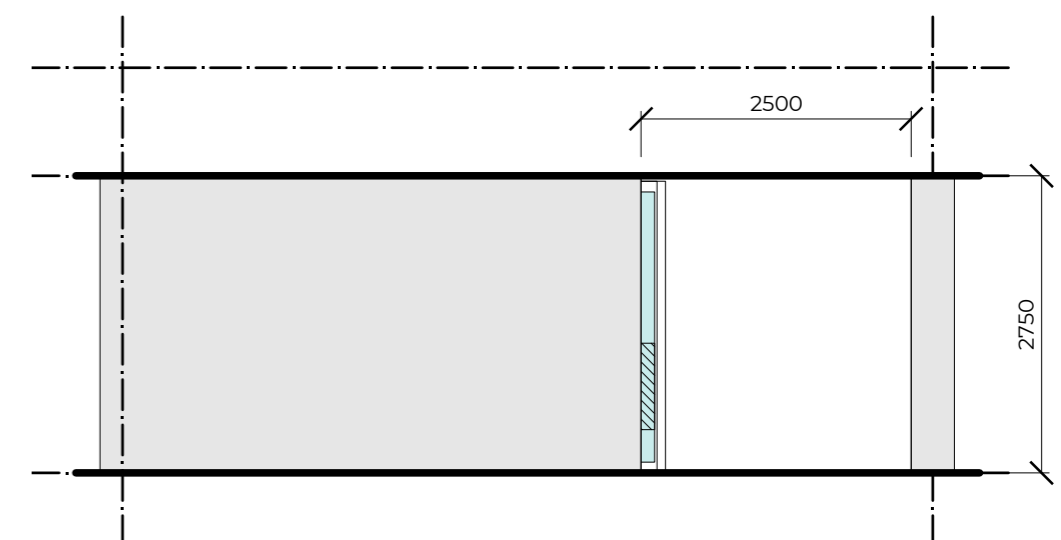
Plan



Elevation - Door closed

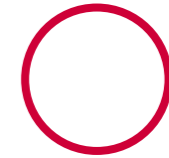


Elevation - Door opened



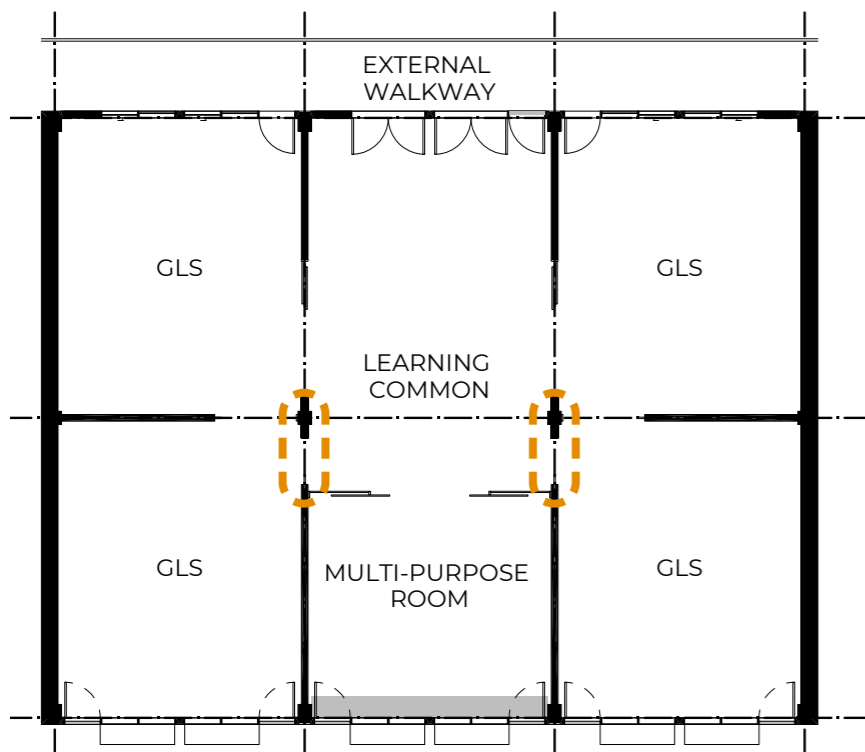
- Secondary access between GLS, not considered as main room access therefore AS1428 latch side clearance not required
- Door to achieve Rw32 acoustic rating
- One panel sliding into plasterboard cavity
- Comply with AS1428
- Rw32 acoustic rating
- Indigenous art decal to dimensions shown to provide privacy and visual contrast requirements

5.5 Sliding Doors

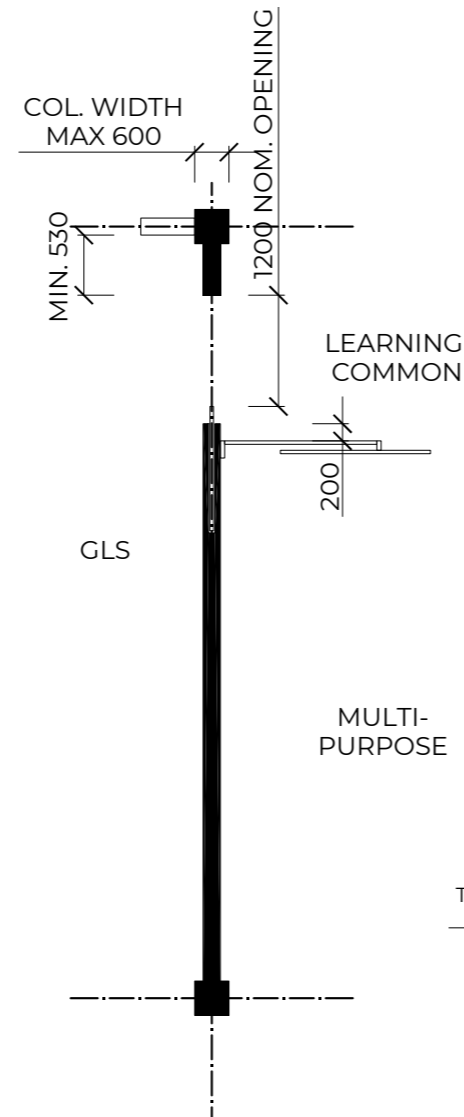


Type 3: GLS Entry Small Sliding Door

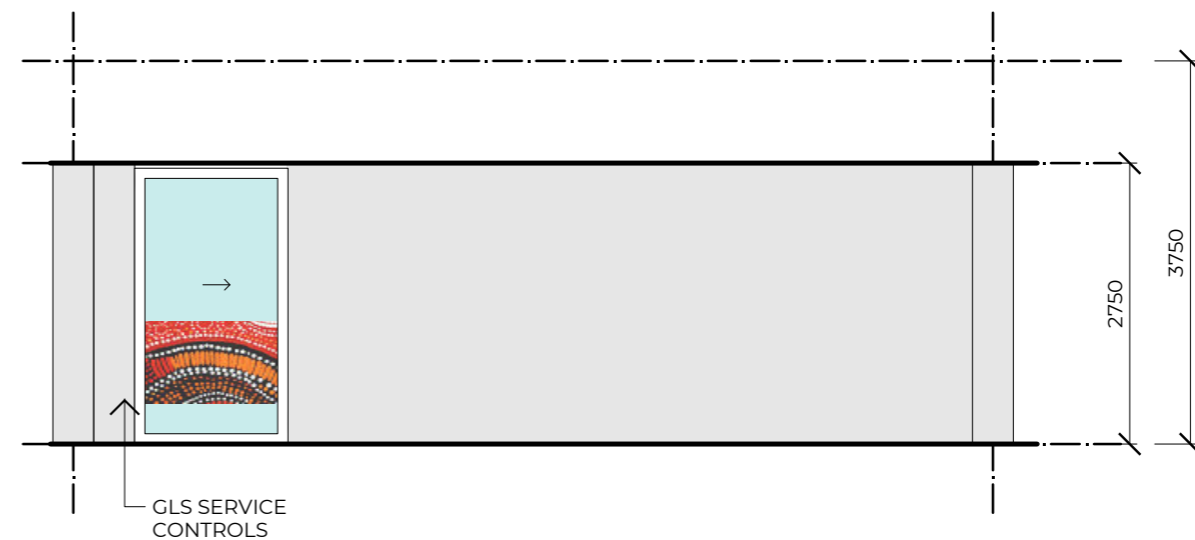
Key Plan



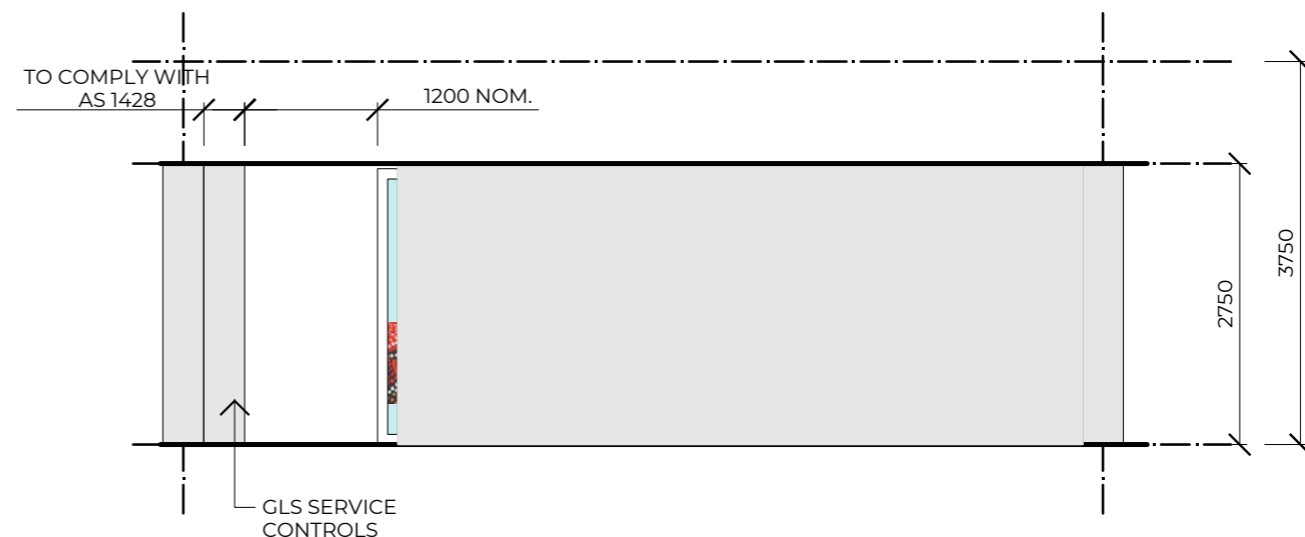
Plan



Elevation - Door closed

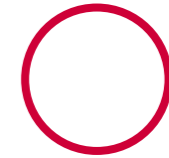


Elevation - Door opened



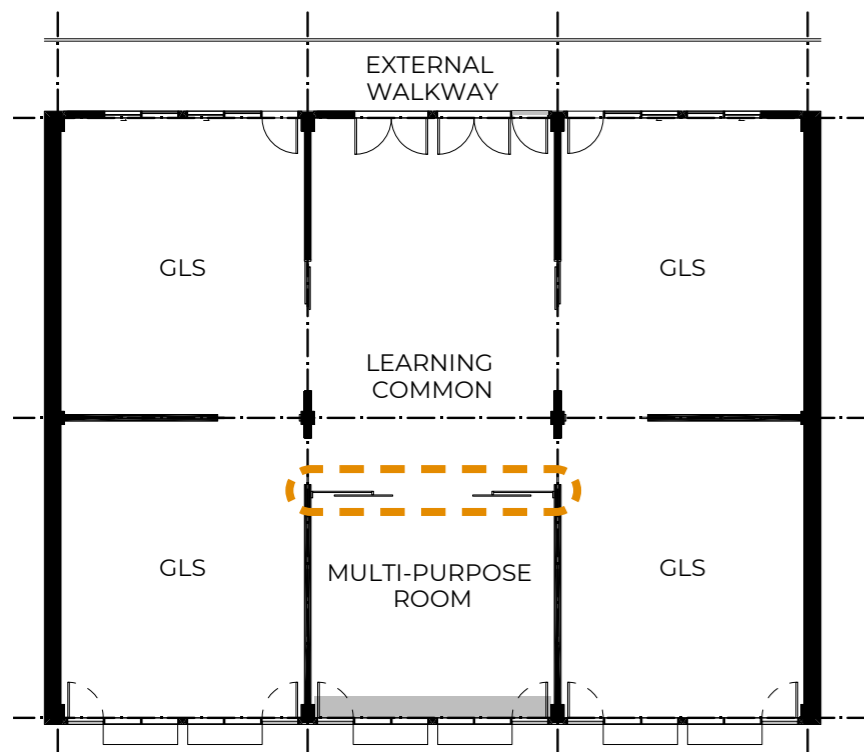
- 1 panel sliding into plasterboard cavity
- Comply with AS1428
- Rw32 acoustic rating
- Indigenous art decal to dimensions shown to provide privacy and visual contrast requirements

5.5 Sliding Doors

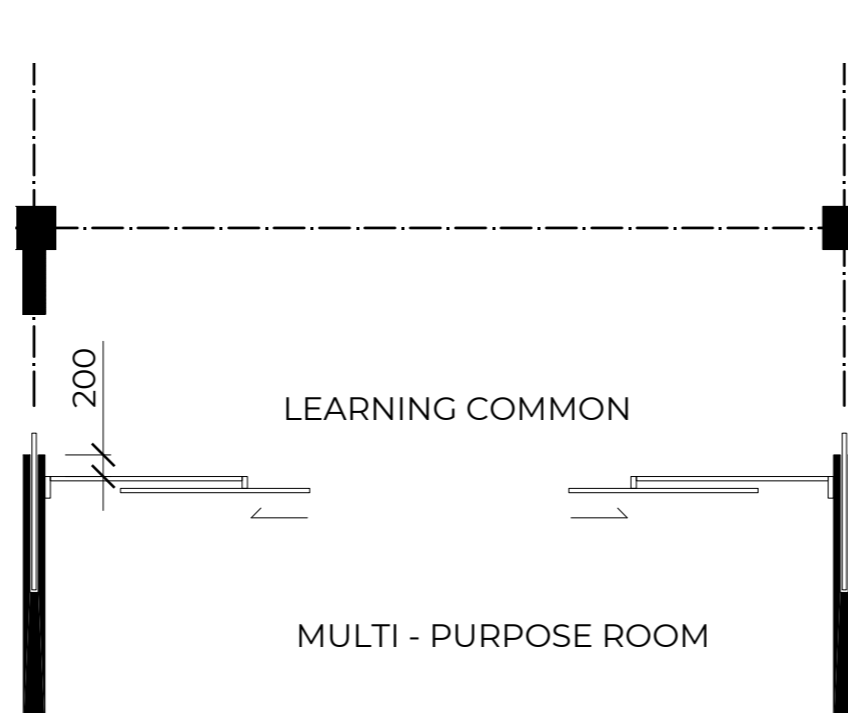


Type 4: Multi-purpose Sliding Door

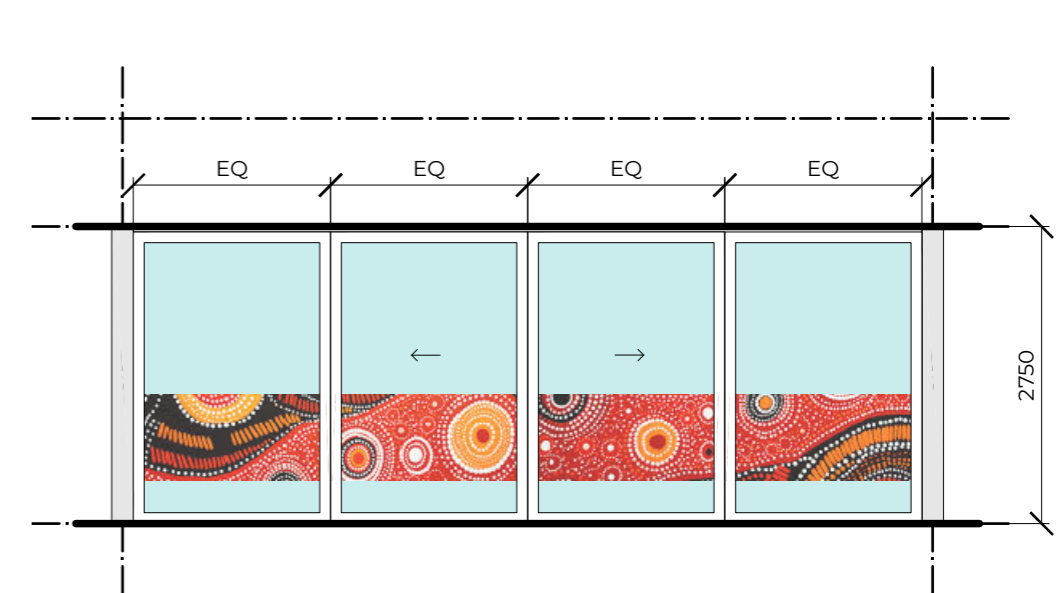
Key Plan



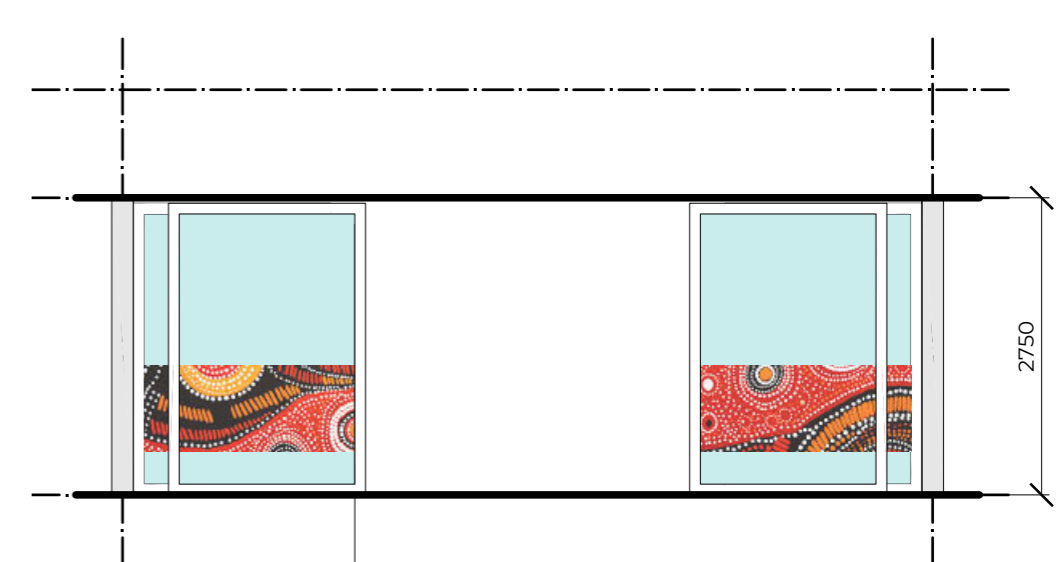
Plan



Elevation - Door closed

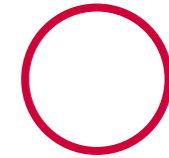


Elevation - Door opened



- 4 panels (centre opening sliding onto fixed panels either side)
- Comply with AS1428
- Rw32 acoustic rating
- Indigenous art decal to dimensions shown to provide privacy and visual contrast requirements

5.6 Worked Example



View from Learning Commons

PLASTERBOARD EDGE

CEILING TILE

SLIDING DOOR
TYPE 1 WITH
INDIGENOUS ART DECAL

VINYL FLOOR TO ENTRY
ALIGN WITH SLIDING
DOOR OPENING

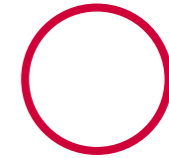
EDB

CARPET

FIXED ALUMINIUM
LOUVRE WITH
INSULATED DOOR PANEL



5.6 Worked Example



View from walkway side GLS

SLIDING DOOR TYPE 2 WITH
INDIGENOUS ART DECAL

LOCKABLE STORAGE
ON SIDE WALL

TEACHING WALL: WALL
MOUNTED AV SYSTEM
WITH PINBOARD /
WHITE BOARD

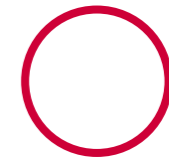
CEILING TILE WITH
PLASTERBOARD EDGE

HIGH CEILING ZONE
WITH ACOUSTIC
CEILING PANEL

SLIDING WINDOW
TO WALKWAY



5.6 Worked Example



View from street side GLS

HIGH CEILING ZONE WITH ACOUSTIC CEILING PANEL

FIXED ALUMINIUM LOUVRE WITH INSULATED DOOR PANEL

CEILING TILE WITH PLASTERBOARD EDGE

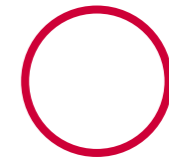
TEACHING WALL, WALL MOUNTED AV SYSTEM WITH PINBOARD / WHITE BOARD

LOCKABLE STORAGE ON SIDE WALL

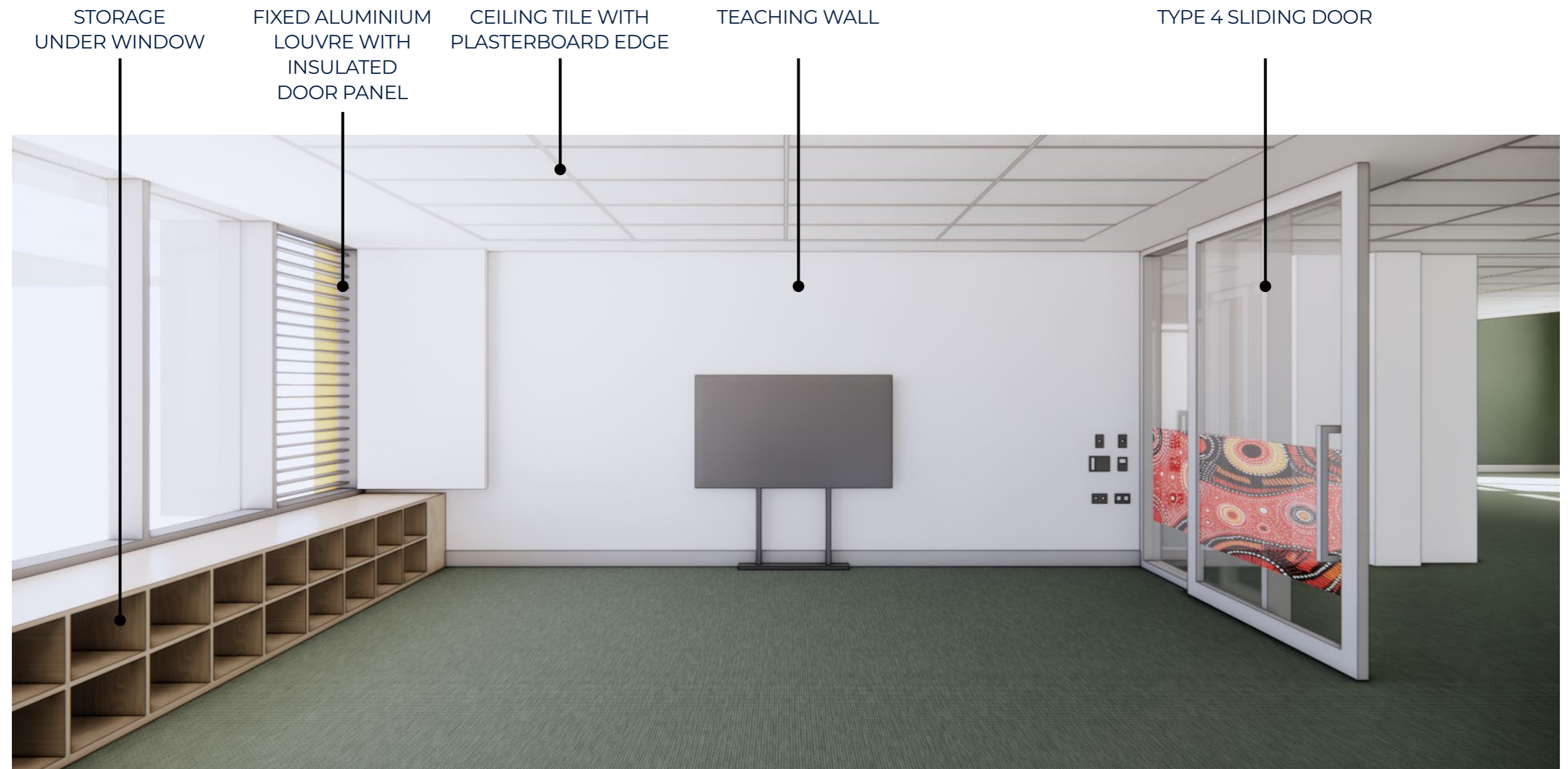
SLIDING DOOR TYPE 2 WITH INDIGENOUS ART DECAL

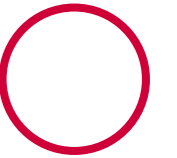


5.6 Worked Example



View from GLS/Multi-Purpose Room



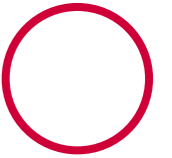


6

Pre-Schools Components

- 6.1 [Overview](#)
- 6.2 [Stand-alone Pre-Schools](#)
- 6.3 [Integrated Pre-Schools](#)

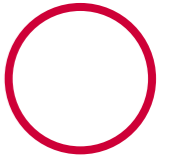
6.1 Overview



Available in Future Release

PRE-RELEASE - WORK IN PROGRESS

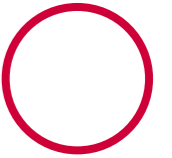
6.2 Stand-alone Pre-Schools



Available in Future Release

PRE-RELEASE - WORK IN PROGRESS

6.3 Integrated Pre-Schools



Available in Future Release