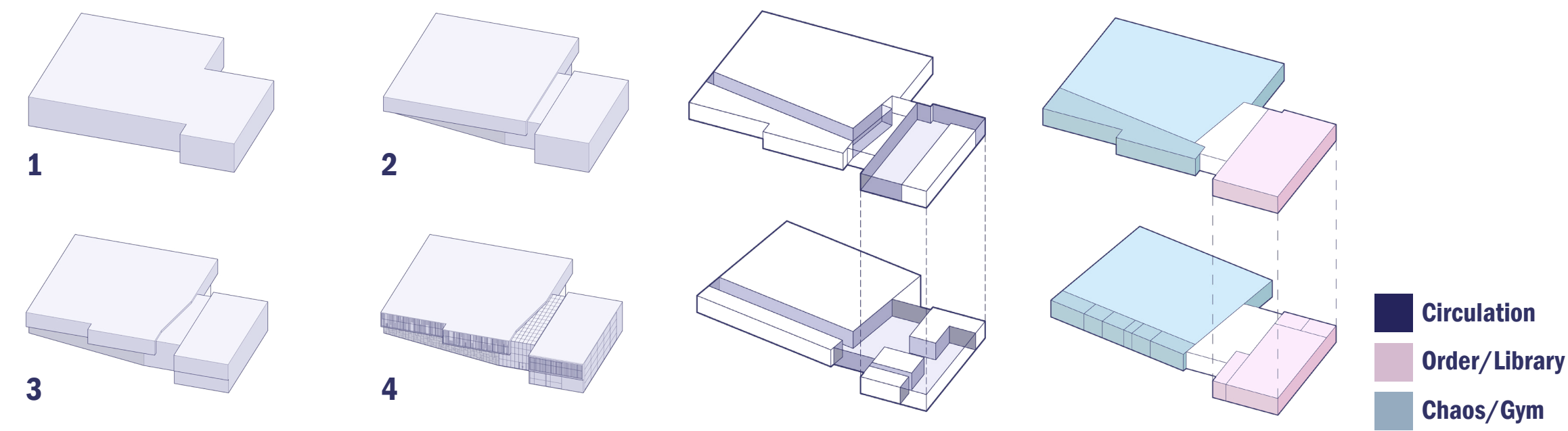


0 OSO COMMUNITY CENTRE

P4 Project

The OSO community center located in Cambridge Ontario creates an open and harmonious space that brings people together. The building creates harmony by combining a balance of chaos and order. The chaos aspect relates to the loudness and unpredictable nature of the gym and multipurpose spaces. Order, relates to the quiet and organized spaces such as the library and elder's room. Exteriorly, the chaos section of the building is shown through the irregular facade and non-uniform louvers while the louvers are uniform on the order side. Interior chaos is shown through the skew of the building portion creating spaces that are non-conventional. A large central atrium creates harmony between these contrasting elements with high visibility into each space, creating a metaphorical and literal Yin and Yang.



A Parti diagram

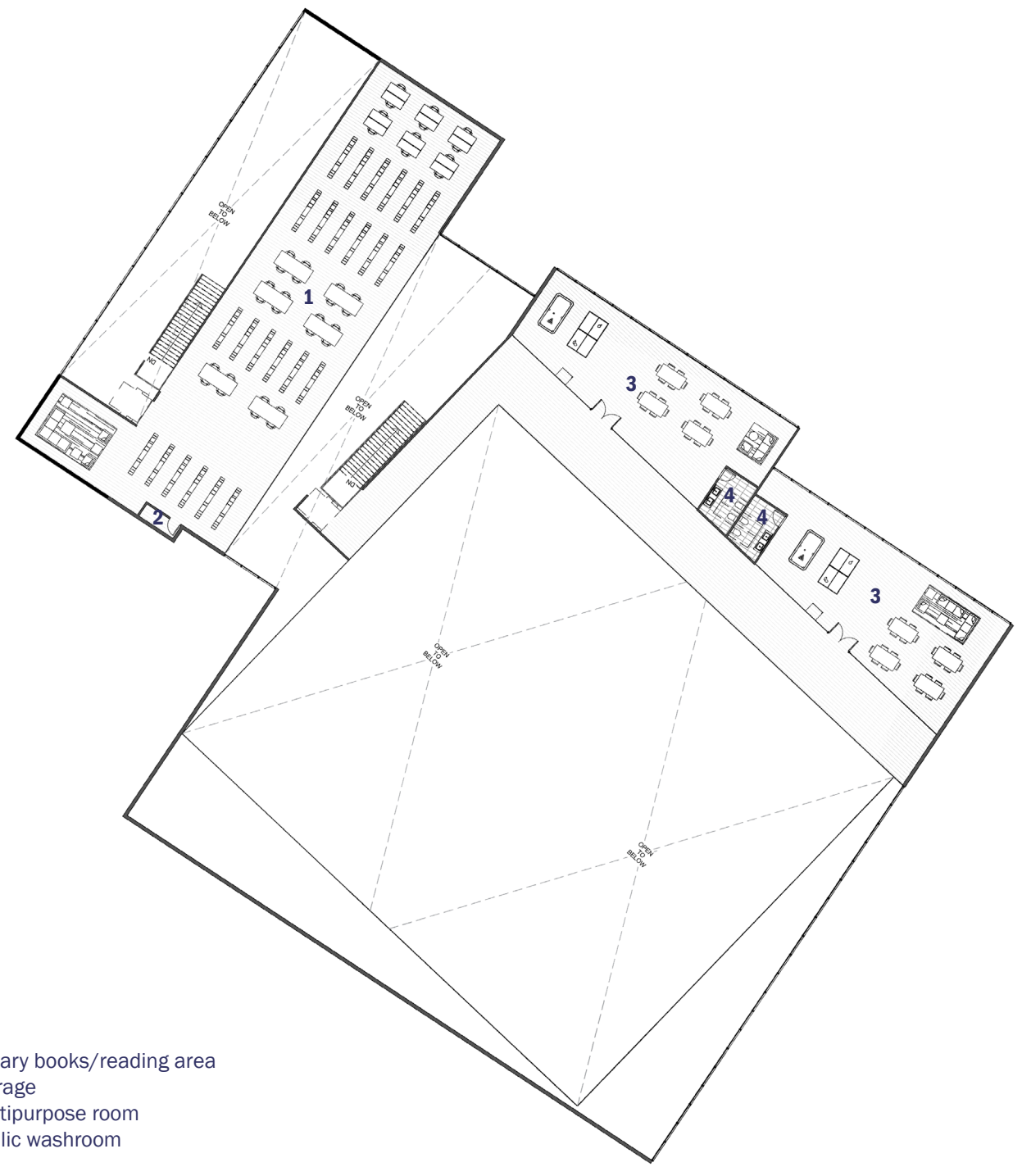
B Circulation diagram



E Site plan

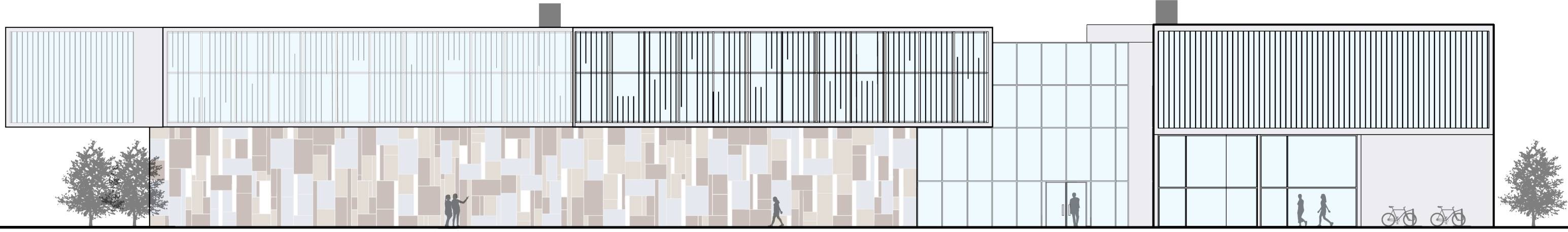


F Ground floor plan

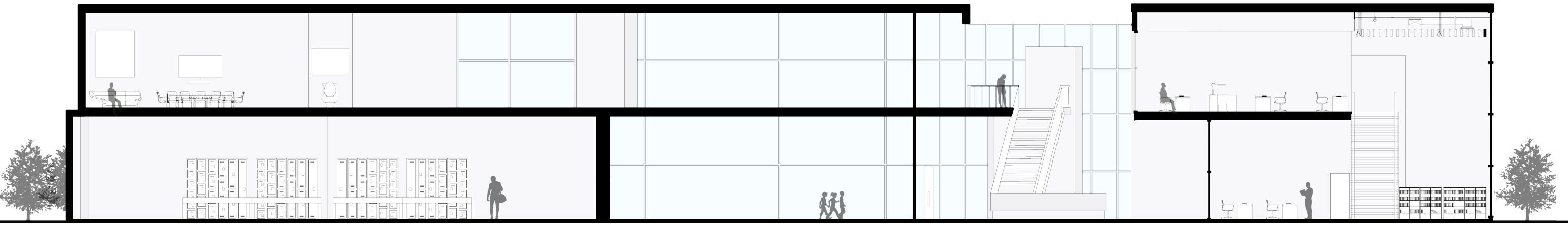


G Second floor plan

C South elevation



D South section



1 STRUCTURE

OSO Gymnasium



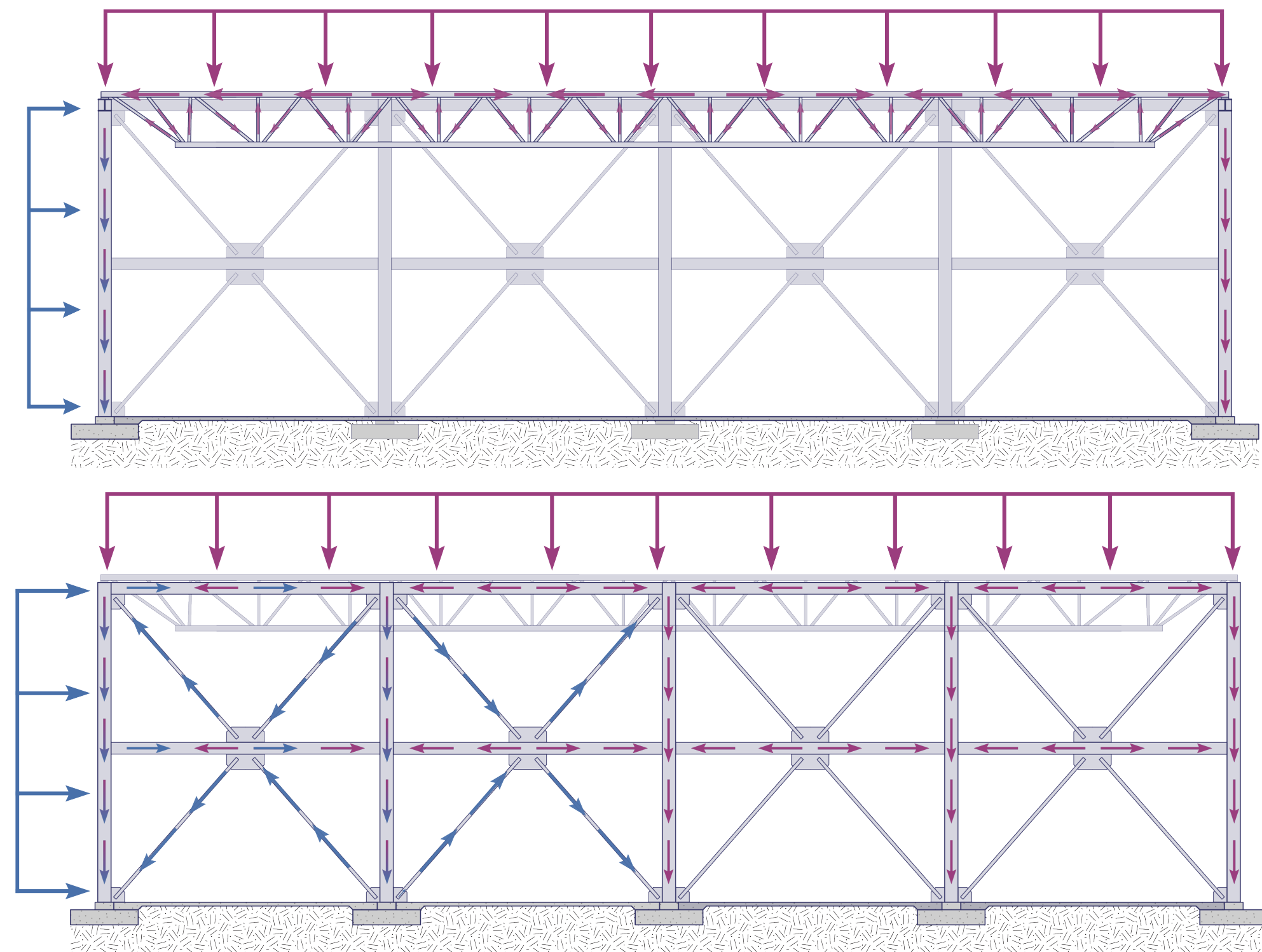
A GYMNASIUM STEEL SUPERSTRUCTURE

The OSO community center will be constructed with a steel superstructure. For the gym portion, HSS columns will support steel I-beams. Diagonal bracing will aid in the lateral stability of the structure. Open webbed steel joists will span over the gym and support the corrugated metal decking and roof. Steel was chosen as the structural material since it is more sustainable than wood. It is a material that can be infinitely recycled and does not need to worry about factors such as rotting and moisture that would affect the structural integrity.

Climate Response

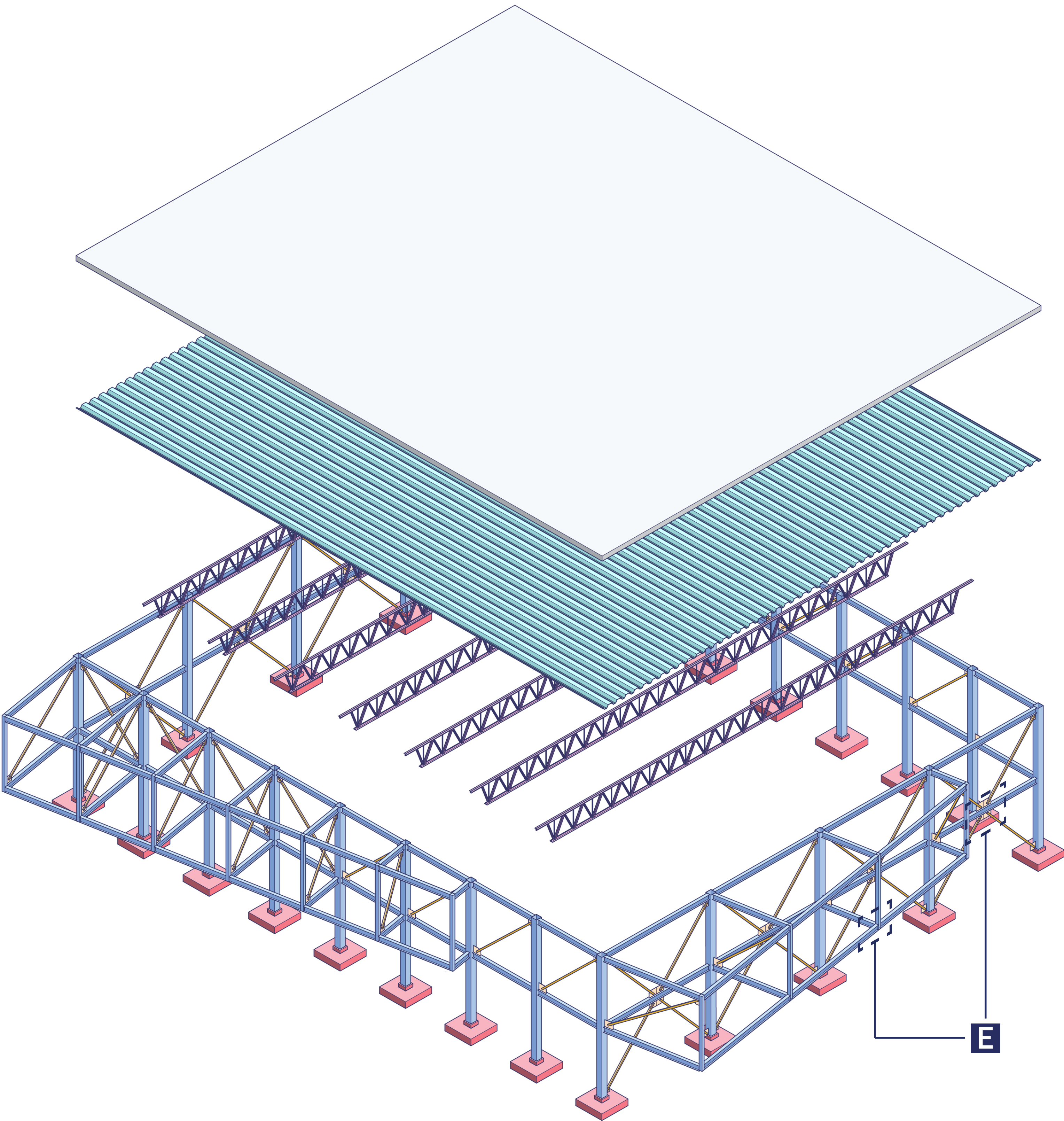
Extreme Summer Precipitation

It is detrimental to a building's structure if there's no proper drainage system. Furthermore, we propose to add a perimeter drain system to attract water accumulated from heavy rainfall or hydrostatic pressure away from the foundation to prevent structural corrosion. The PVC perforated pipe installed below-grade around the perimeter of the building's foundation will collect water in soil through slits and direct them away from the base. Having no foundation moisture protection can not only inflict structural instability over time due to corrosion, but it will also cause unruly costs for frequent maintenance and below-grade repair



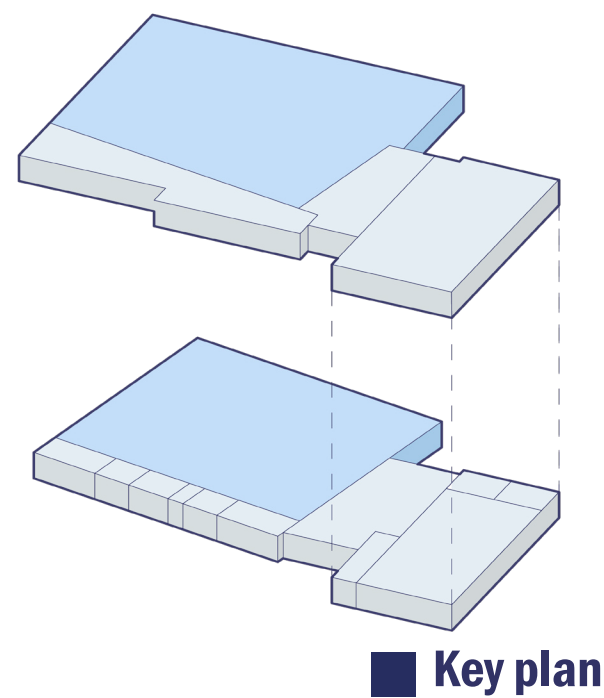
B STRUCTURAL SECTION

- Lateral loads**
Column - Cross-brace - Beam
- Gravity loads**
Roof - Beam - Truss - Column

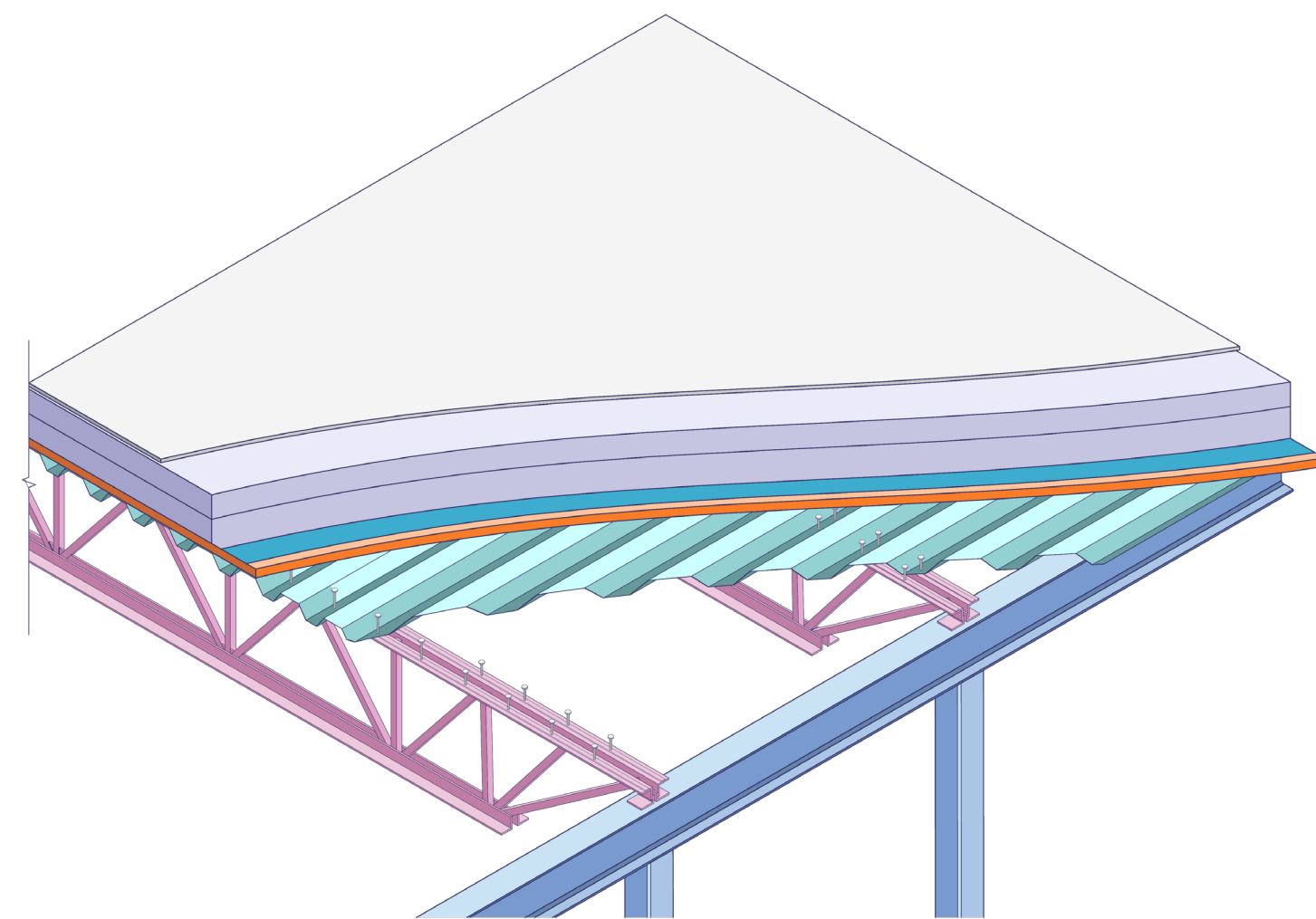


C STRUCTURAL ISOMETRIC

- Corrugated steel
- Foundation
- Steel superstructure
- OWSJ
- Steel gusset
- Sheathing + roof membrane

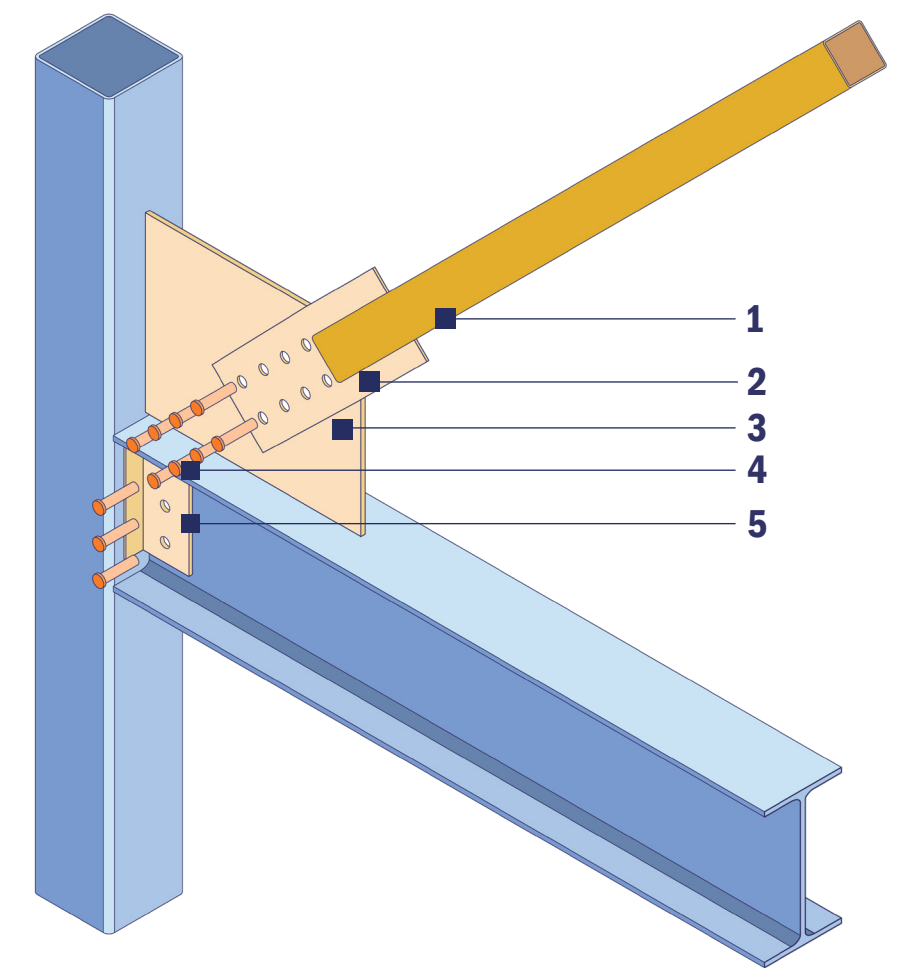


D STRUCUTRAL DECKING



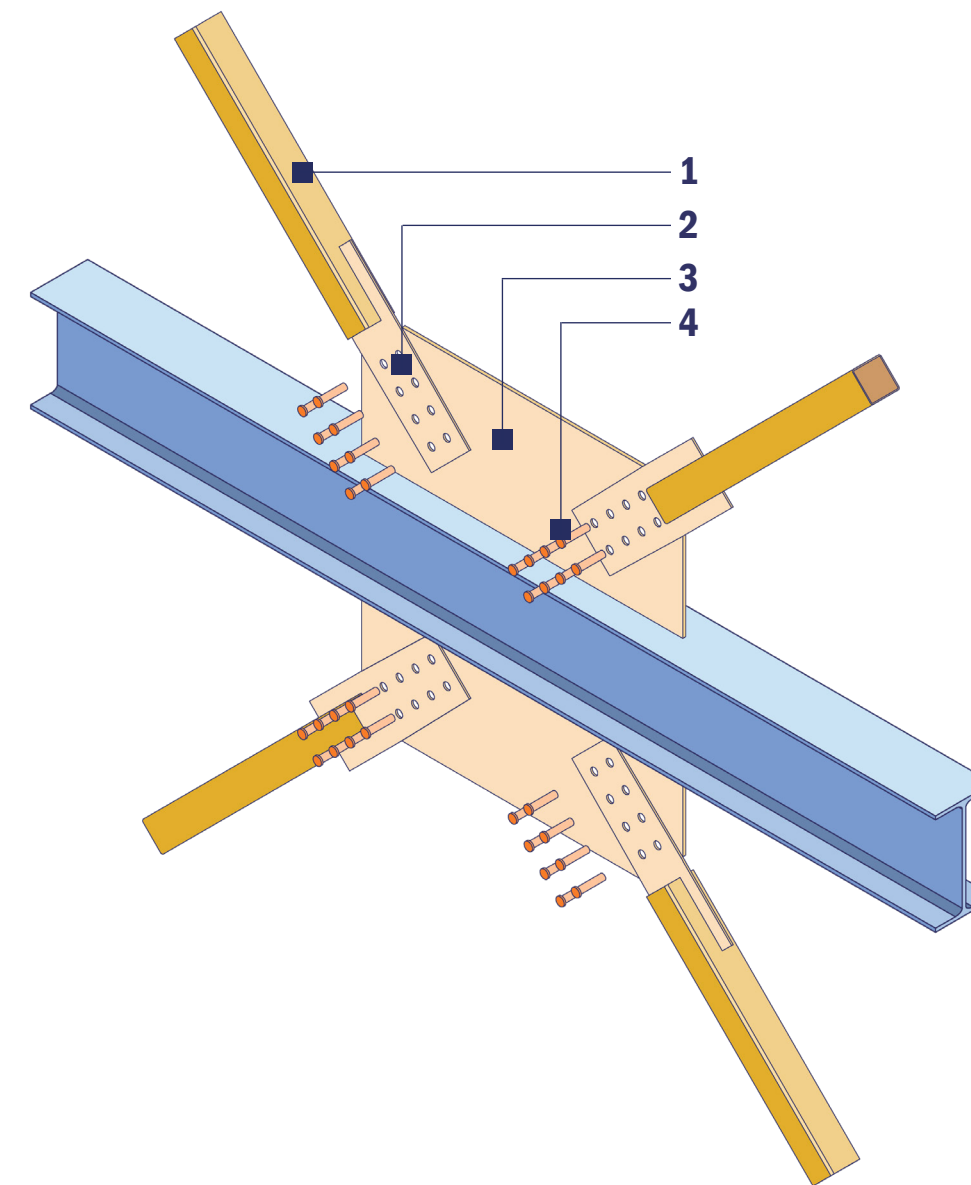
- Steel superstructure
- OWSJ
- Corrugated steel
- Sheathing + roof membrane
- Air/vapour barrier
- Sheathing board
- Rigid insulation

E STEEL GUSSET



1. HSS
2. Splice plate
3. Gusset plate
4. Steel bolts
5. Welded fin plate

- Steel superstructure
- Gusset connection



1. HSS
2. Splice plate
3. Gusset plate
4. Steel bolts

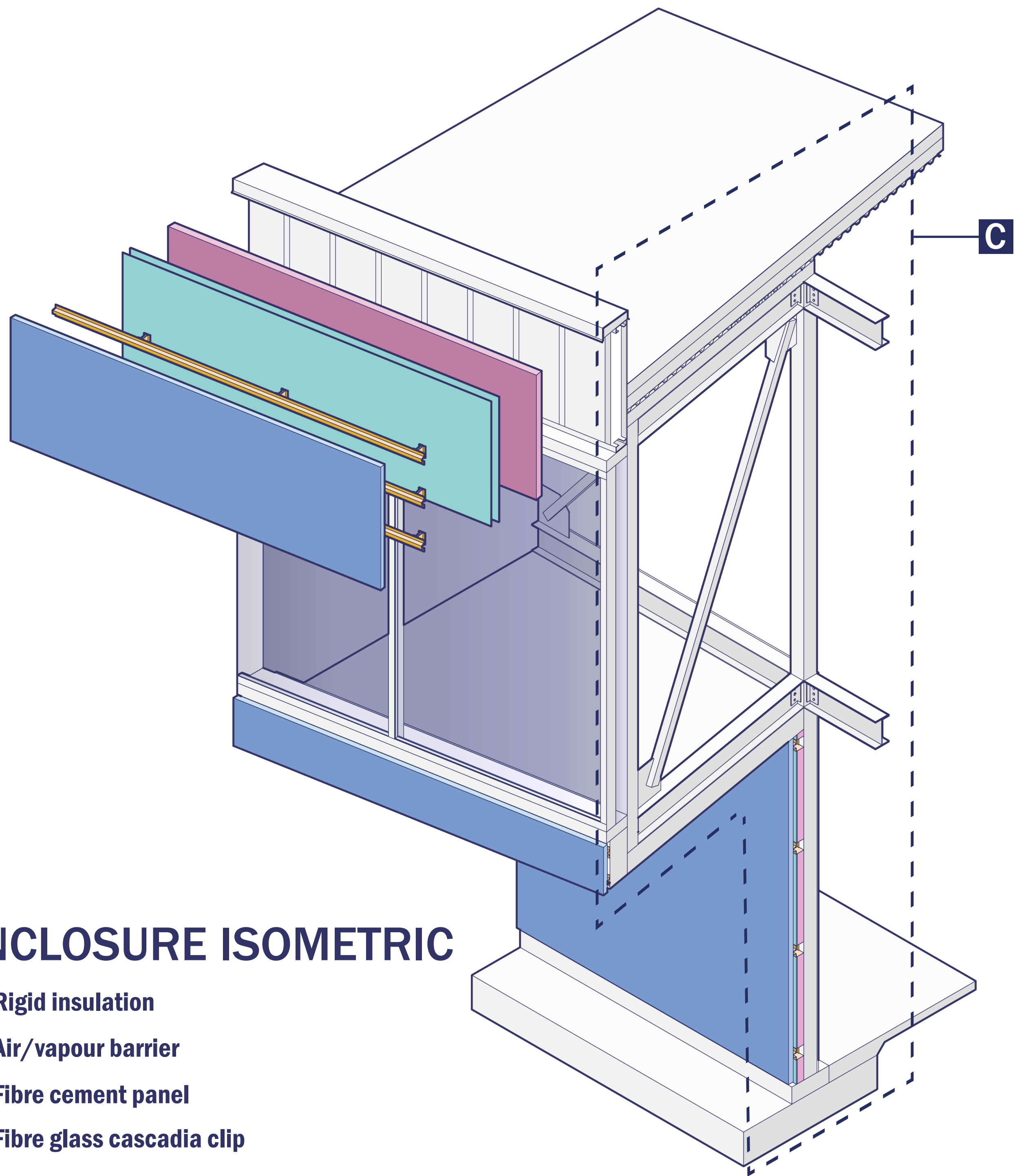
- Steel superstructure
- Gusset connection

2 ENCLOSURE

OSO Facade



A FIBRE CEMENT PANELS ENCLOSURE

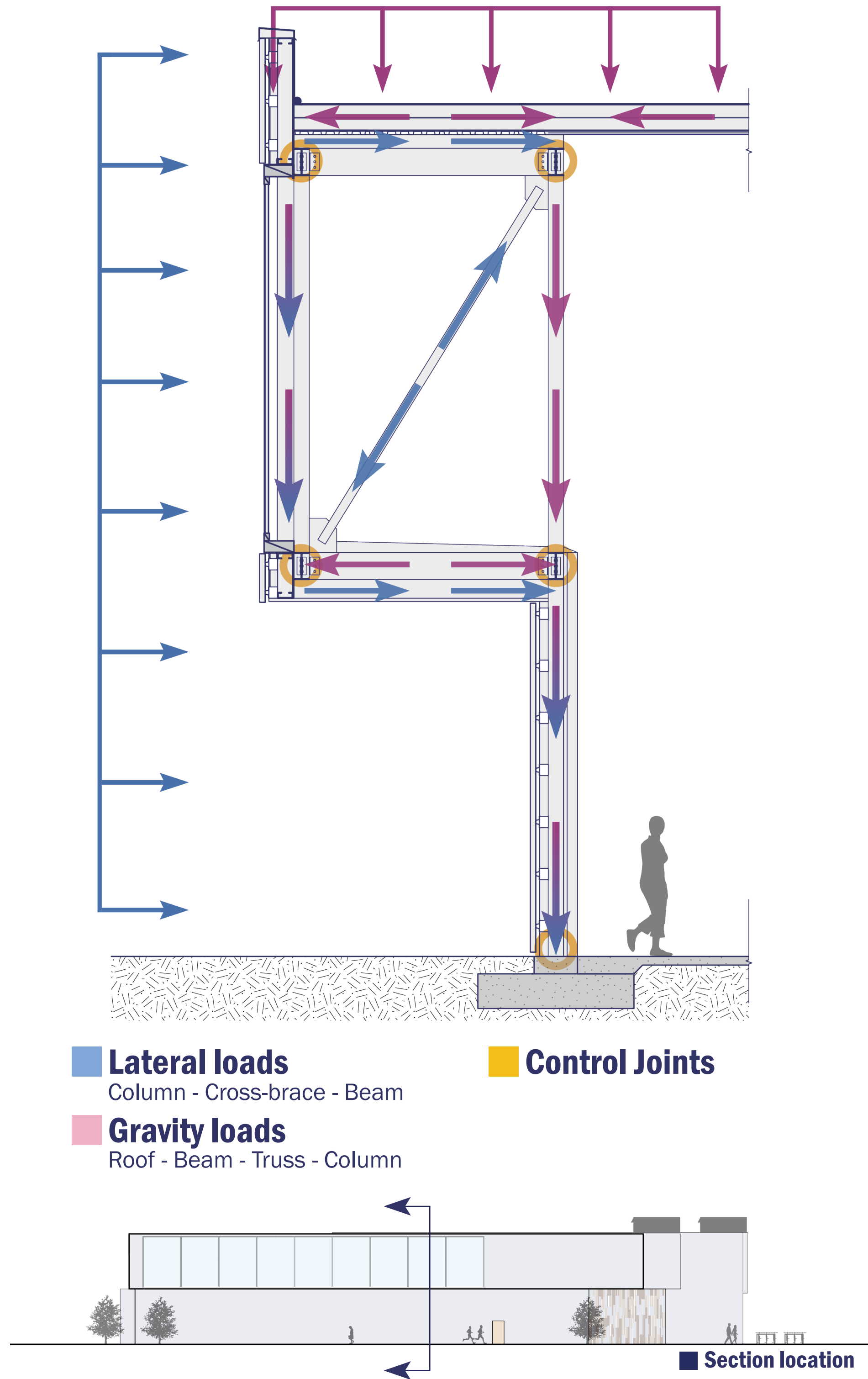


B ENCLOSURE ISOMETRIC

- Rigid insulation
- Air/vapour barrier
- Fibre cement panel
- Fibre glass cascadia clip

The enclosure of the community center aims to create a ventilated facade to ensure proper drainage of moisture. The air gap between the fiber cement panel cladding and the insulation prevents backflow and removes moisture and condensate from the envelope before causing leakage and material damage. The fiber cement panels are connected via Cascadia clips with aluminum girts that are connected to a system of steel studs. Air, vapor, and moisture barriers are implemented to ensure that external elements do not affect the structure and or energy efficiency of the community center.

C ENCLOSURE SECTION

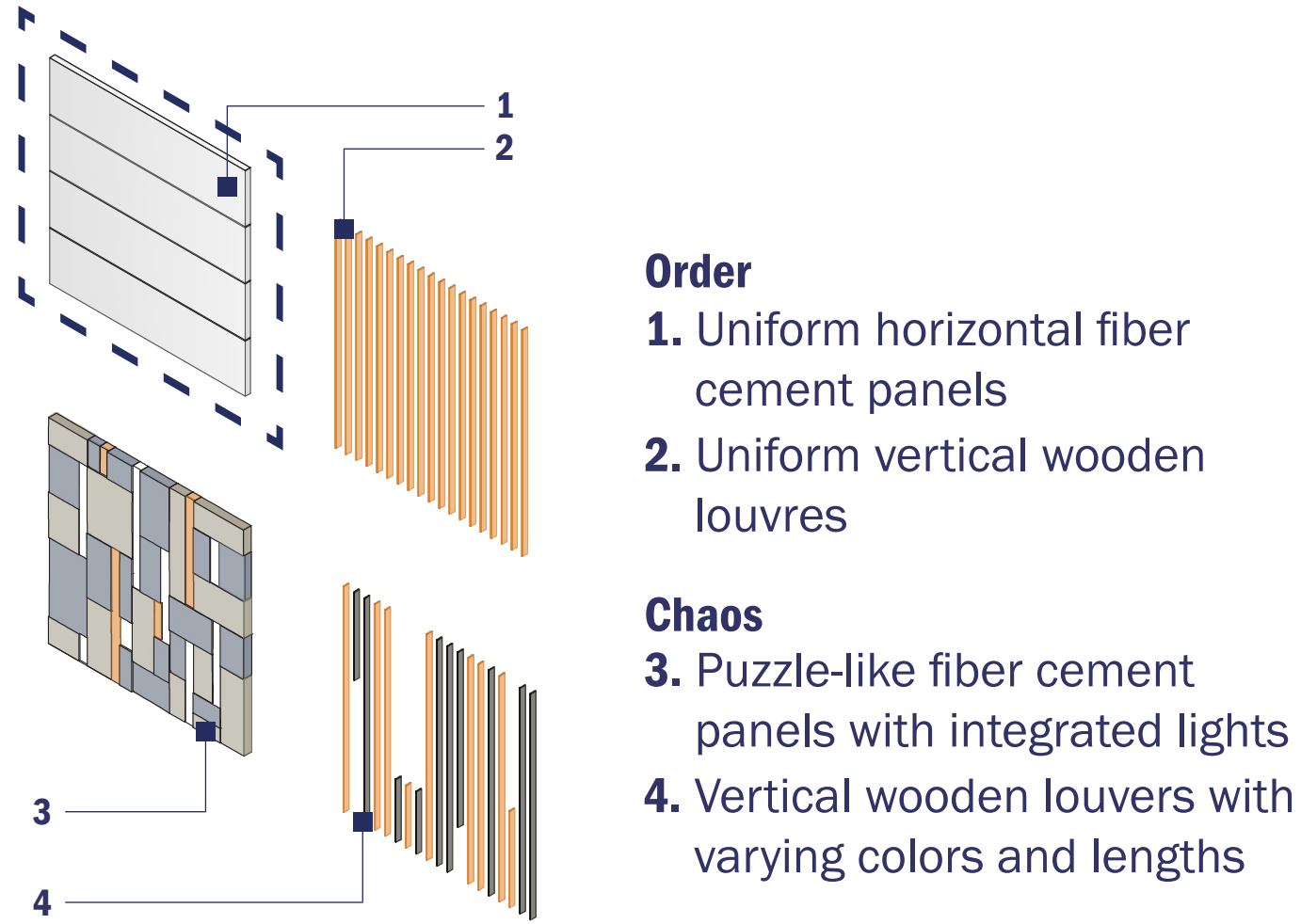


Climate Response

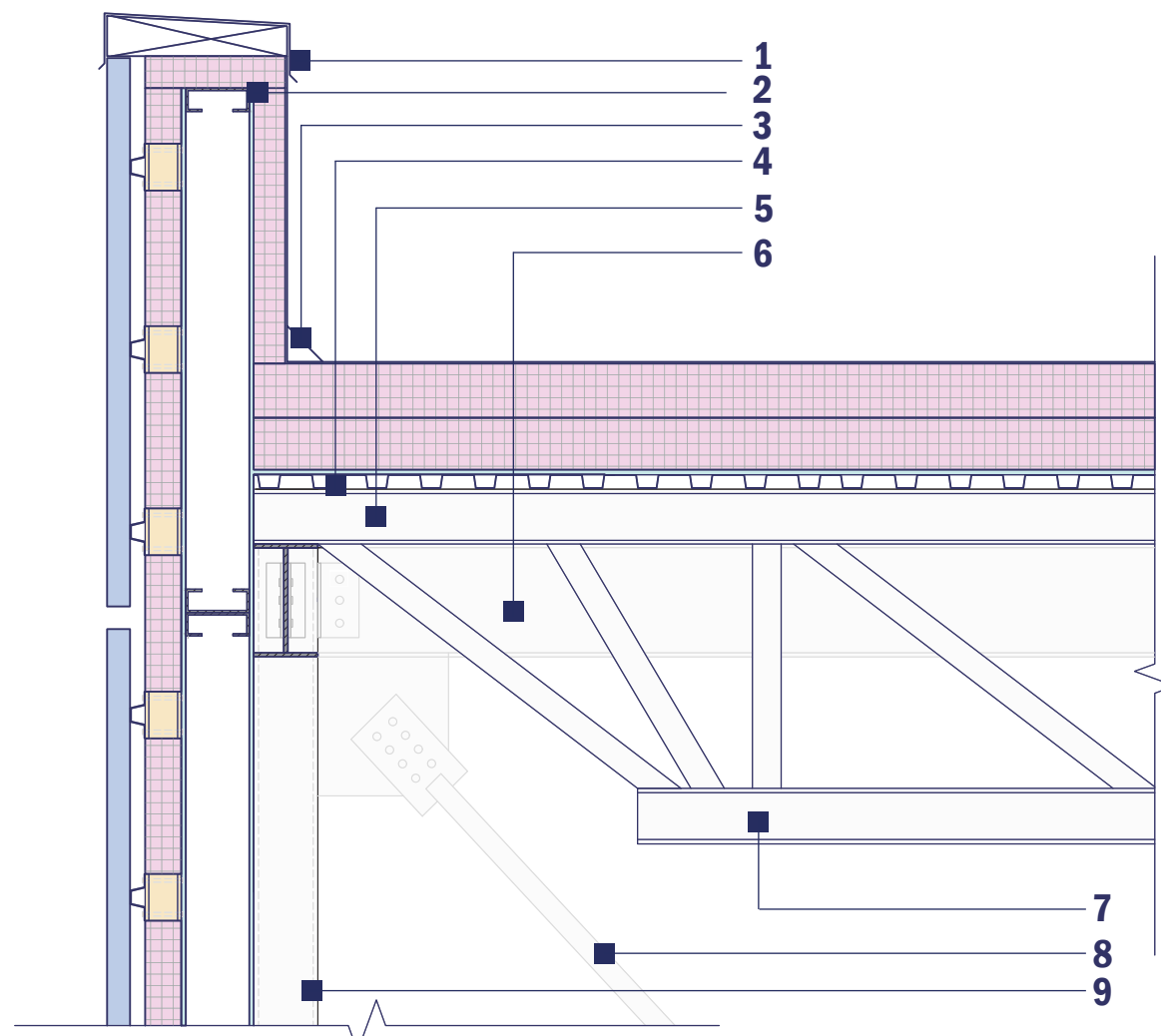
Summertime overheating
The building requires both passive and active climate resilience strategies to reduce solar gains and to lower interior temperature for optimal user comfort. Vertical wooden louvres are added for solar shading which also added an architectural flavour to the facade. In addition, reliance on active mechanical cooling is critical to combat overheating.

Extreme Summer Precipitation
Extreme Summer Precipitation is also detrimental to a building's enclosure if there's no proper drainage system. The ventilated facade design of the enclosure ensures proper drainage of moisture to the ground. The air gap between the fibre cement panel cladding and the insulation prevents backflow and removes moisture and condensate from the envelope before causing leakage and material damage.

D FACADE VARIATIONS

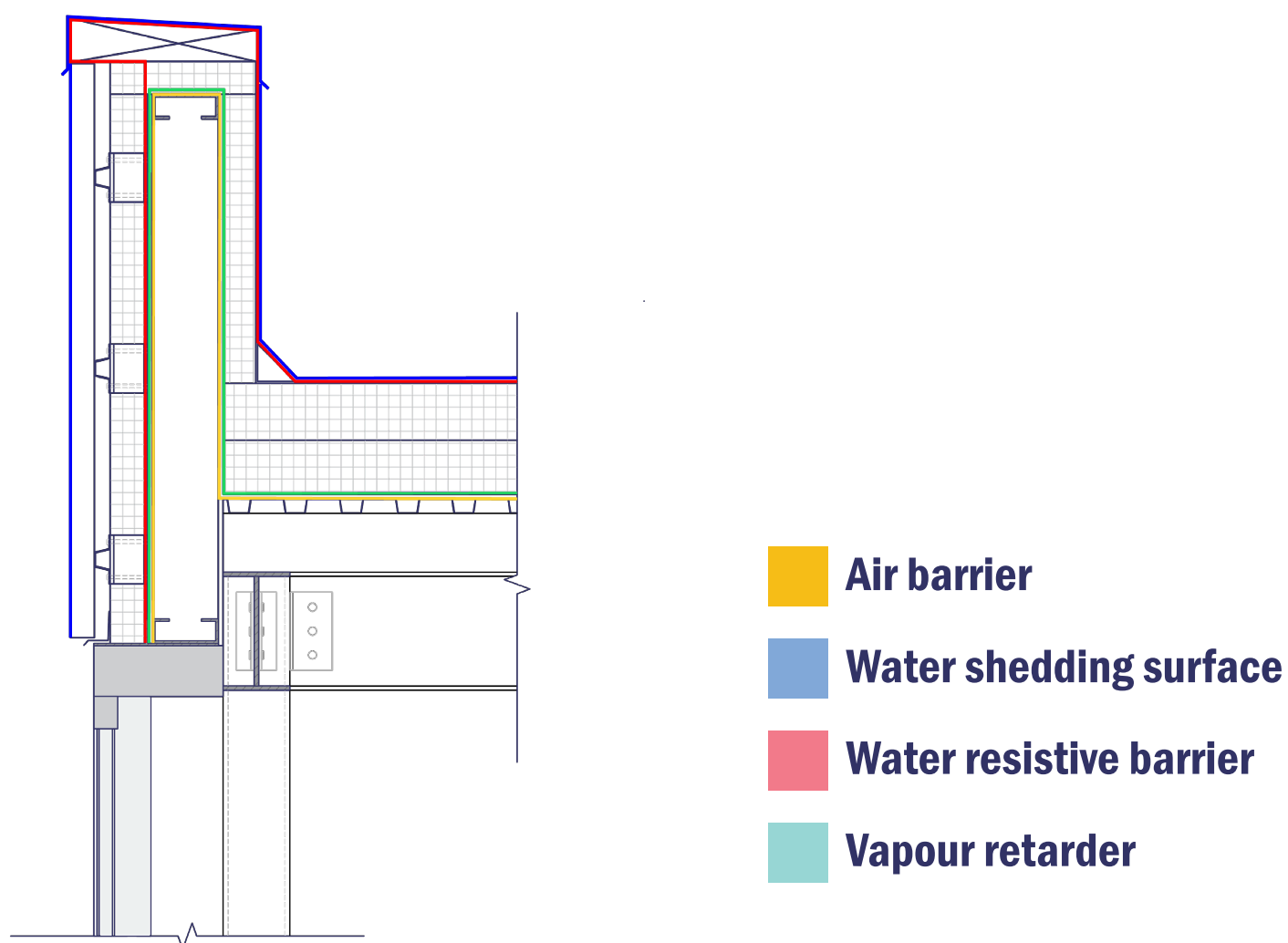


E FIBRE CEMENT PANEL



- 1. Parapet flashing
- 2. Steel stud
- 3. Backer rod
- 4. Corrugated steel
- 5. Steel C-channel
- 6. Steel I-beam
- 7. OWSJ
- 8. Cross-bracing
- 9. HSS column
- Fibre glass cascadia clip
- Fibre cement panel
- Air/vapour barrier
- Rigid insulation

F CONTROL LAYERS



3 SYSTEMS

OSO Library

A COMMUNITY CENTRE LIBRARY SPACE



The OSO community center aims to create a sustainable and comfortable space for all users. The primary mechanical system utilizes Variable Air Volume (VAV) for optimal energy efficiency. Systems are made to disappear through strategic architectural design. All M&E components on the second floor of the library are concealed by a bulkhead to create a smooth finish. All services in the double-height space of the library are hidden by horizontal wooden louvres to match the exterior facade design as well.

Climate Response

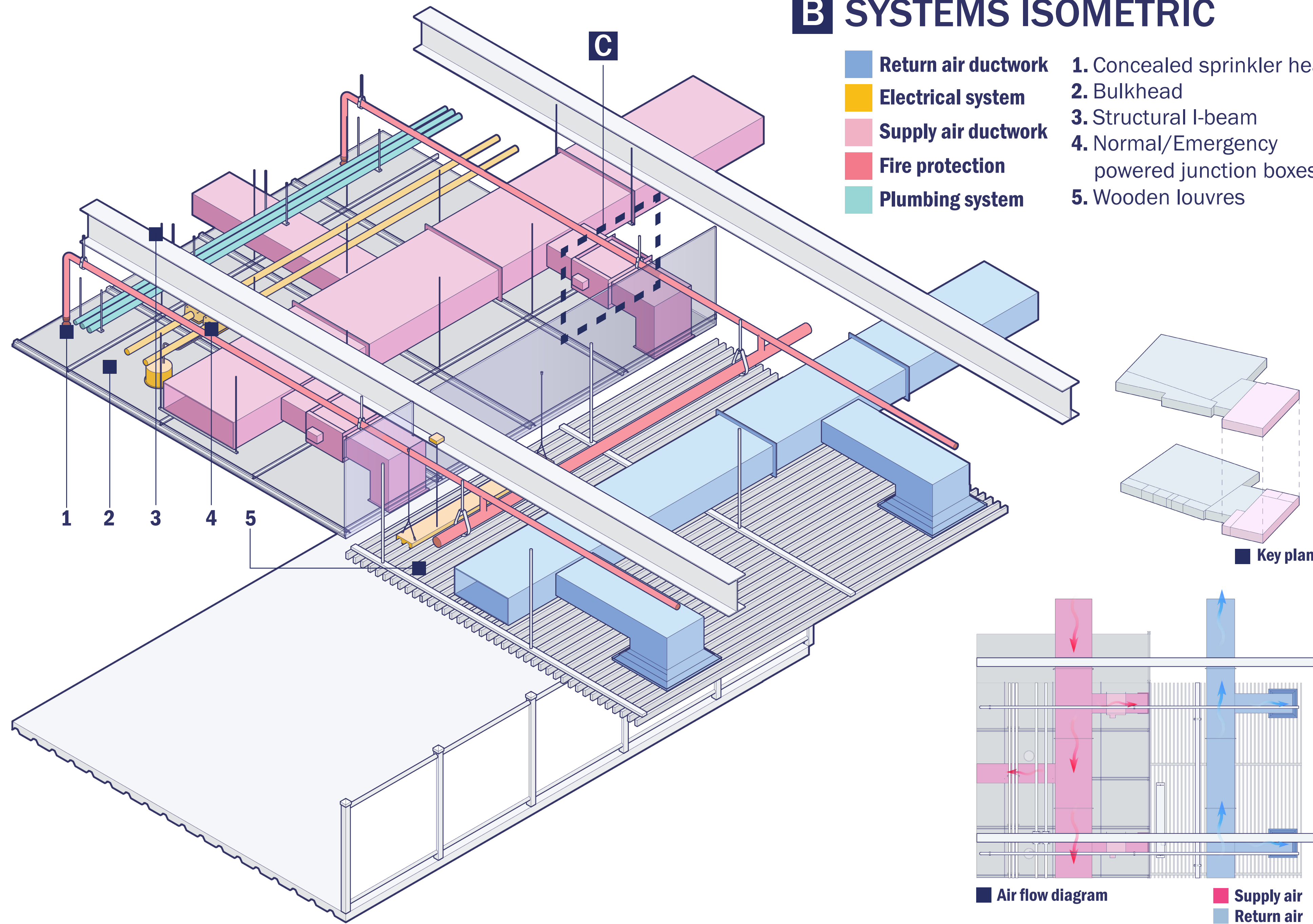
Summer Overheating

The thermostat installed in each zone provides accurate feedback to the VAV terminal for increasing or decreasing flow rate in order to meet cooling demands. Having two separate RTUs responsible for the two sides of the building also ensures that the mechanical system is not overheated due to high usage and energy consumption during heat waves.

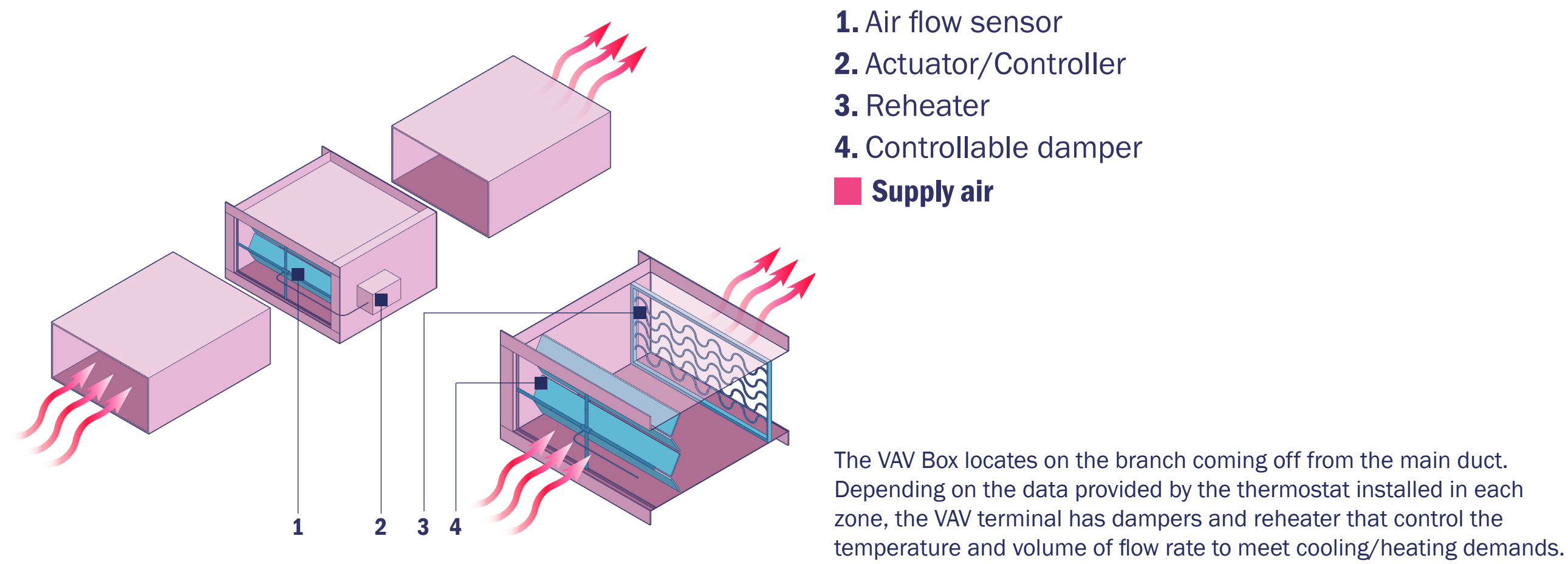
Power Outage

A hybrid backup PV System is used to combat Winter power outages. This is essential for users to safely evacuate themselves from the building before all power is lost. We are proposing to install solar batteries to collect and store unused power generated by the grid-tied solar panels. A battery bank can be installed in the mechanical room connected to the inverter. Therefore the hybrid backup system will be triggered automatically and supply temporary electricity to the building through the solar battery during the power outage.

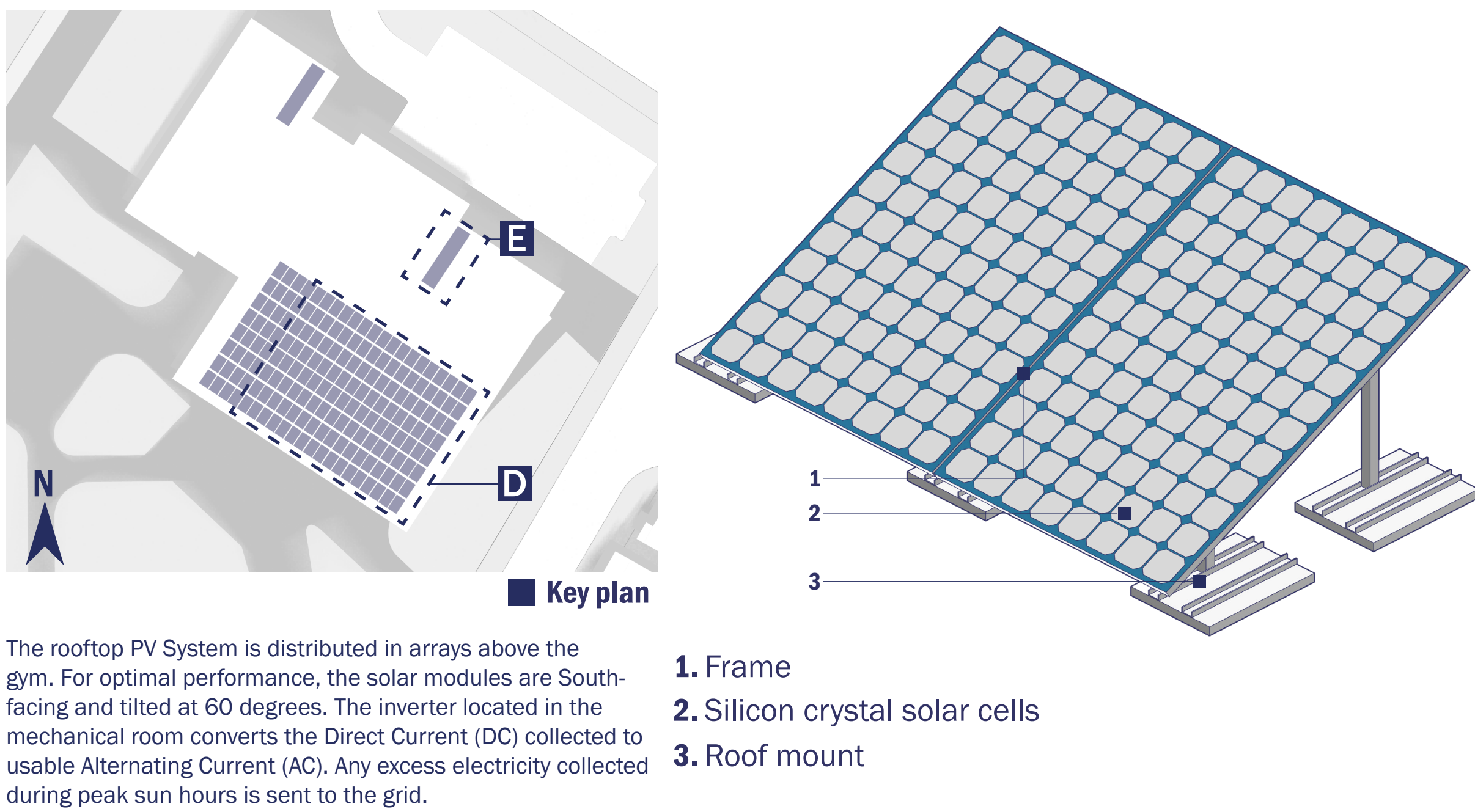
B SYSTEMS ISOMETRIC



C Variable air volume (VAV) unit



D 96 cell monocrystalline solar panel



E Roof top air handling unit (RTU)

