

# 01. Victoria Meadows Village (Phase 1)

Course: AE 400, Project Studio 1

Location: Collingwood, Ontario, Canada

Date: August 2025

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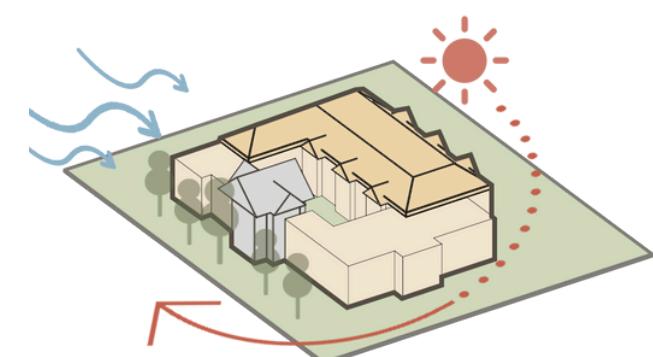
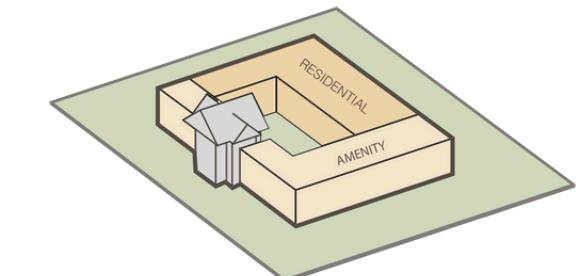
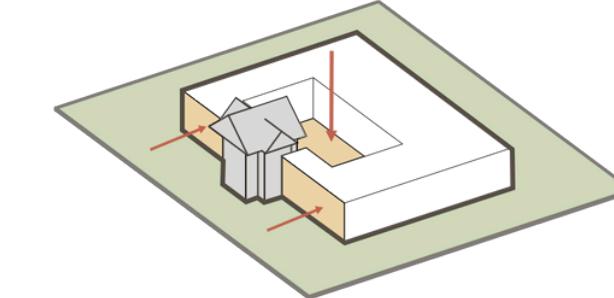
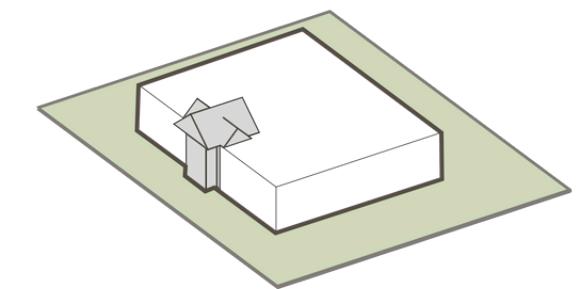
*Victoria Meadows Village (VMV)* is a fourth-year capstone design project, completed as Phase 1 of 2 in AE 400. The project proposes a long-term care (LTC) facility in Collingwood, Ontario, located on a historic site that includes the 1890s *Victoria Schoolhouse*. Responding to provincial trends that highlight the need for both increased capacity and improved quality of life for residents, VMV presents a 2-storey LTC facility housing 60 beds for 24-hour resident care. Its primary design considerations focus on architecture and systems design, with secondary design considerations of envelope, structures, and sustainability. The design is guided by the Living Building Challenge (LBC), with goals of achieving the petals of Health and Happiness and Beauty, alongside the imperatives of Energy + Carbon Reduction and Responsible Materials. In Phase 2, the project will advance with additional engineering analysis, quantitative data generation, and design refinements, while further testing compliance with the LBC framework.



## site context



1. Existing schoolhouse with general mass
2. Push to create courtyard + expose existing facade
3. Massing separation by programming
4. Site considerations of NS sun and NW wind



## *site plan*



## level 1 floor plan



## level 2 floor plan



The programming of Victoria Meadows Village was developed around a “dementia village” model, prioritizing resident dignity, autonomy, and quality of life. The facility is organized into distinct “neighbourhoods” with a clear public-private hierarchy. Level 1 integrates resident suites and private lawns with shared amenities such as dining, café, art gallery, and landscaped courtyards, while Level 2 focuses on health, wellness, and recreation, including therapy, fitness, and sensory spaces. Circulation loops on each floor provide safe, continuous movement, while courtyards and biophilic design elements connect residents to nature. This layout balances privacy with opportunities for social interaction, creating a home-like environment that exceeds Ontario LTC standards and aligns with the Living Building Challenge’s goals for health, happiness, and beauty.



1. RESIDENT SUITES
2. ON-CALL NURSE OFFICE
3. SHOWER ROOMS
4. PUBLIC W/C
5. LOBBY
6. ART GALLERY
7. CAFE
8. ADMIN OFFICE
9. MAIL ROOM
10. MUSIC ROOM
11. PLANT STORE
12. CONVENIENCE STORE
13. BARBER/SALON
14. DINING HALL
15. DIETARY SERVICE SPACE
16. KITCHEN
17. MECH
18. ELEC
19. COMMS
20. TRASH
21. JANITOR
22. STORAGE
23. CACF
24. READING ROOM
25. FITNESS
26. STAFF
27. PHYSIO
28. PHYSICIAN SUPPORT
29. WELLNESS SUPPORT
30. SENSORY ROOM
31. MULTI-PURPOSE
32. THEATRE
33. LAUNDRY
34. UTILITY

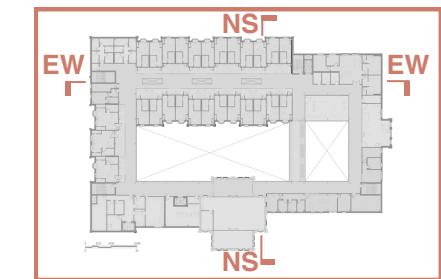
*interior courtyard*



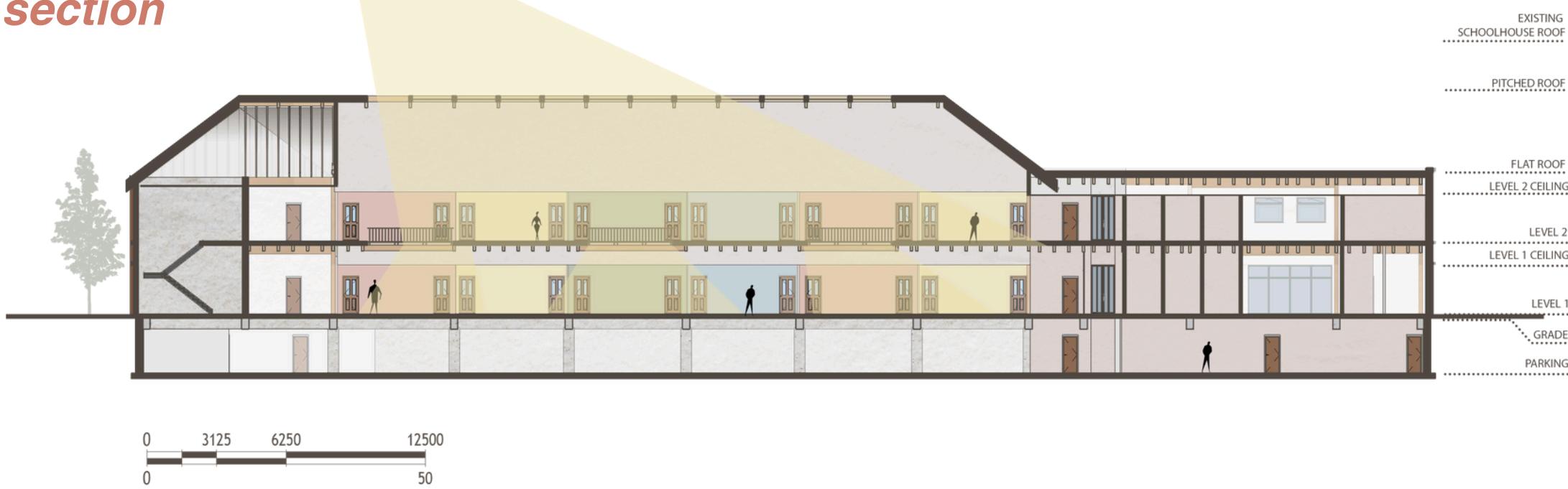
## *resident suites*



## *ns section*



## *ew section*



Daylight is brought deep into the building through skylights and strategic openings in the floor plates, allowing first-floor resident suites and corridors to share natural light from above. Light-colored interior finishes further enhance reflectance, bouncing daylight throughout the spaces to improve visual comfort and reduce reliance on artificial lighting.

### east elevation



### north facade



### west elevation



### north elevation

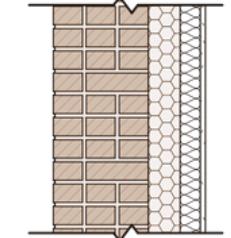
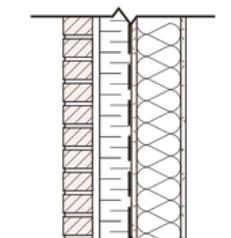
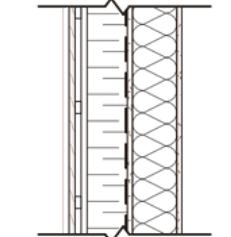


### south elevation

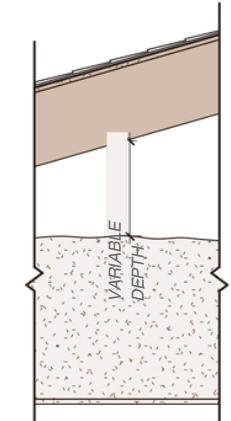
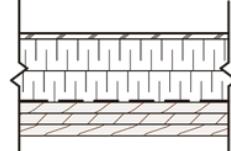
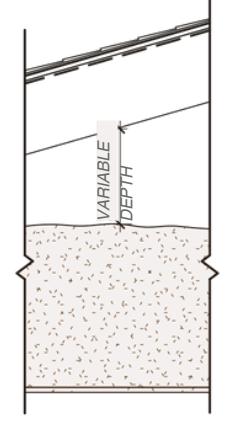


The facade design draws from Collingwood's architectural character, incorporating red brick and wood cladding to reflect the surrounding residential fabric and preserve the site's historic identity. These materials provide warmth and continuity with the town's heritage while creating a contemporary, welcoming care environment. The roof strategy combines pitched forms for residential wings with flat roofs for amenity and service areas, reinforcing programmatic hierarchy and simplifying construction.

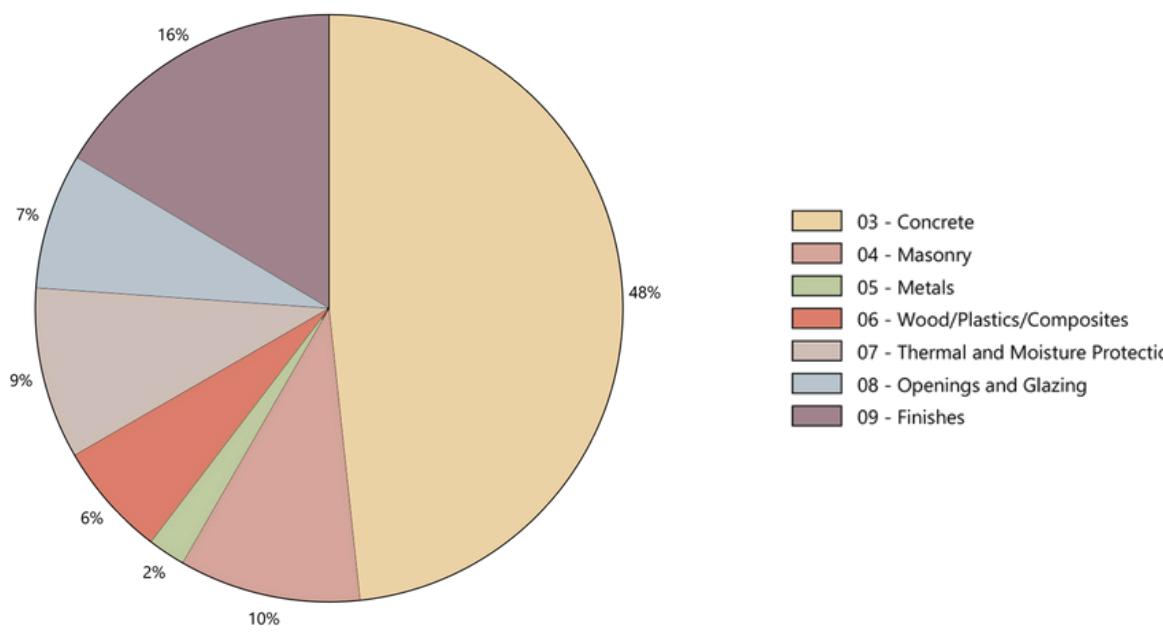
## wall assemblies

TYPE	SECTION	DESCRIPTION (EXTERIOR TO INTERIOR)	R-VALUE
W01		<u>RETROFIT BRICK WALL</u> 300MM 3-WYTHE BRICK (EXISTING) 100MM CLOSED-CELL SPRAY FOAM 64MM WOOD STUD W/ MINERAL WOOL FILL 13MM GYPSUM BOARD	R-22
W02		<u>NEW PREFAB BRICK CLAD WALL</u> 90MM BRICK 25MM AIR GAP 100MM RIGID MINERAL WOOL SELF-ADHERED AB VRB MEMBRANE 13MM OSB SHEATHING 140MM WOOD STUD W/ MINERAL WOOL FILL 13MM GYPSUM BOARD	R-38
W03		<u>NEW PREFAB BOARD AND BATTEN WALL</u> 19MM BOARD AND BATTEN 19MM HORIZONTAL STRAPPING 300MM O.C. 19MM VERTICAL STRAPPING 400MM O.C. 127MM RIGID MINERAL WOOL SELF-ADHERED AB VRB MEMBRANE 13MM OSB SHEATHING 140MM WOOD STUD W/ MINERAL WOOL FILL 13MM GYPSUM BOARD	R-41

## roof assemblies

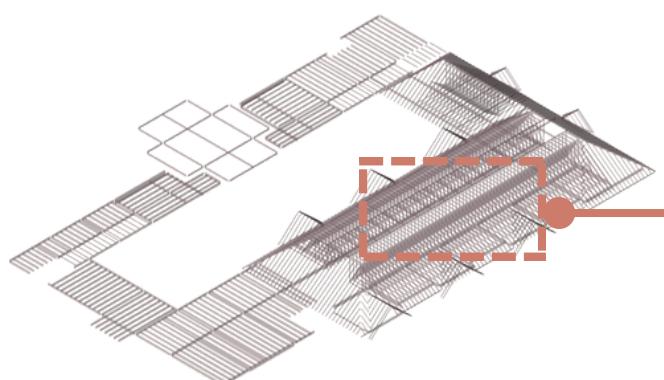
TYPE	SECTION	DESCRIPTION (EXTERIOR TO INTERIOR)	R-VALUE
R01		<u>RETROFIT VENTILATED SLOPED ROOF</u> SHINGLES ROOF UNDERLAYMENT (EXISTING) 13MM OSB SHEATHING (EXISTING) 235MM ROOF JOISTS (EXISTING) CONTINUOUS AIR GAP SOFFIT VENT TO RIDGE VENT 500MM LOOSEFILL INSULATION 13MM GYPSUM BOARD	R-60
R02		<u>FLAT ROOF EPDM ROOFING MEMBRANE</u> 13MM COVER BOARD 250MM RIGID MINERAL WOOL SELF-ADHERED AB VRB MEMBRANE 3-PLY CLT PANEL ROOF DECK	R-49
R03		<u>VENTILATED SLOPED ROOF</u> SHINGLES ROOF UNDERLAYMENT 13MM OSB SHEATHING SELF-ADHERED WRB MEMBRANE 235MM ROOF JOISTS CONTINUOUS AIR GAP SOFFIT VENT TO RIDGE VENT 500MM LOOSEFILL INSULATION 13MM GYPSUM BOARD	R-60

## gwp impact by material



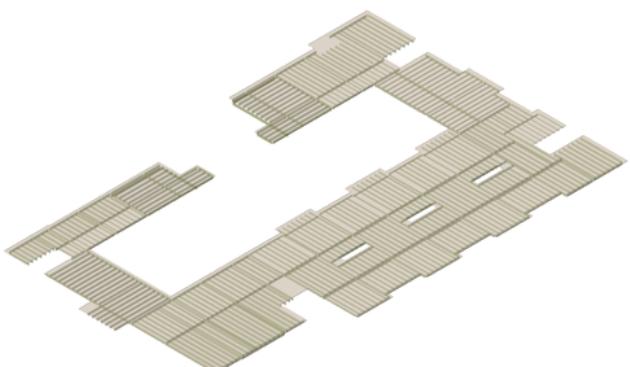
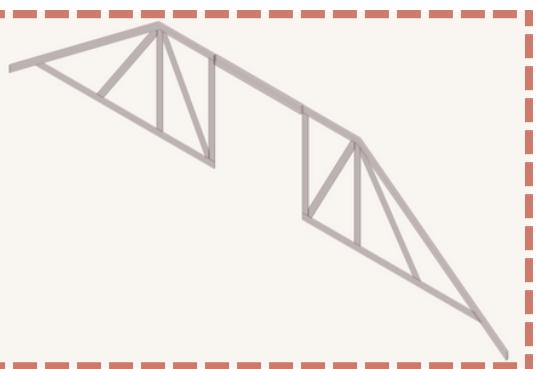
The enclosure design was developed to exceed code thermal performance while aligning with the LBC imperatives. Wall and roof assemblies were detailed with Declare-labeled, Red List-free products and low-carbon insulation strategies, reducing operational loads while ensuring material transparency. Life Cycle Analysis confirmed a GWP of 125 kg CO<sub>2</sub>e/m<sup>2</sup> (A1-A3), which is well below the Toronto Green Standard Tier 2 benchmark of 250 kg CO<sub>2</sub>e/m<sup>2</sup>. Concrete and interior finishes remain the largest contributors, identified as key areas for further optimization in future phases.

## *structural system*



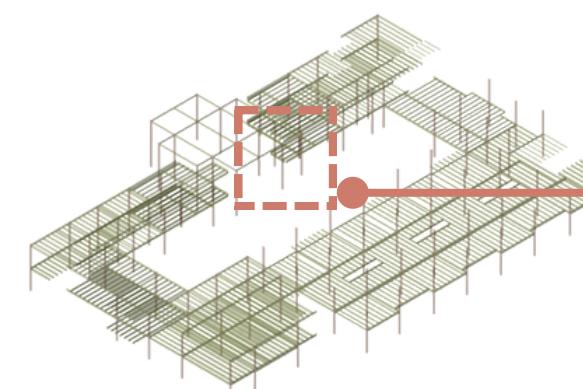
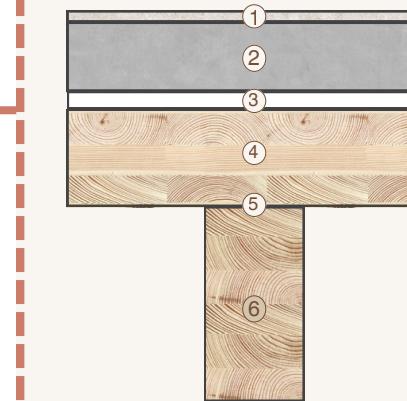
### **Roof Framing System**

Light-wood framing & CLT rib panels  
Intermediate beam & mono hip-cap truss



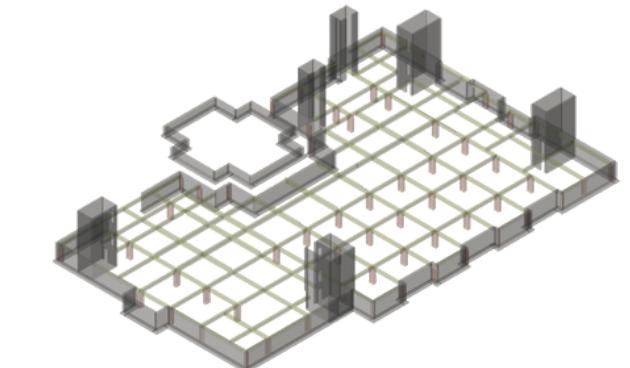
### **Floor Decking System**

CLT rib panels



### **Framing System**

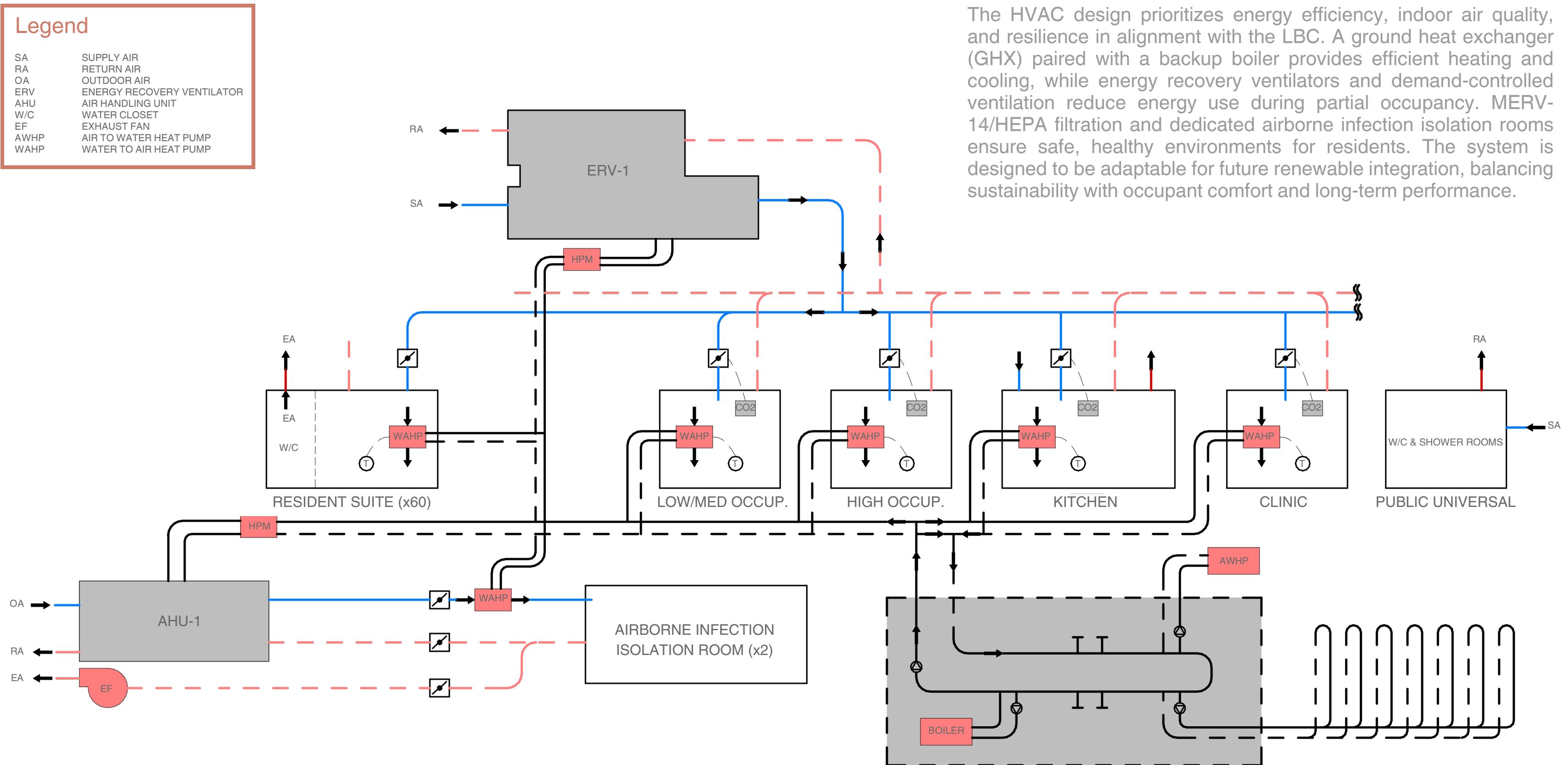
Glulam posts and beams  
Steel-timber hybrid cantilever framing system



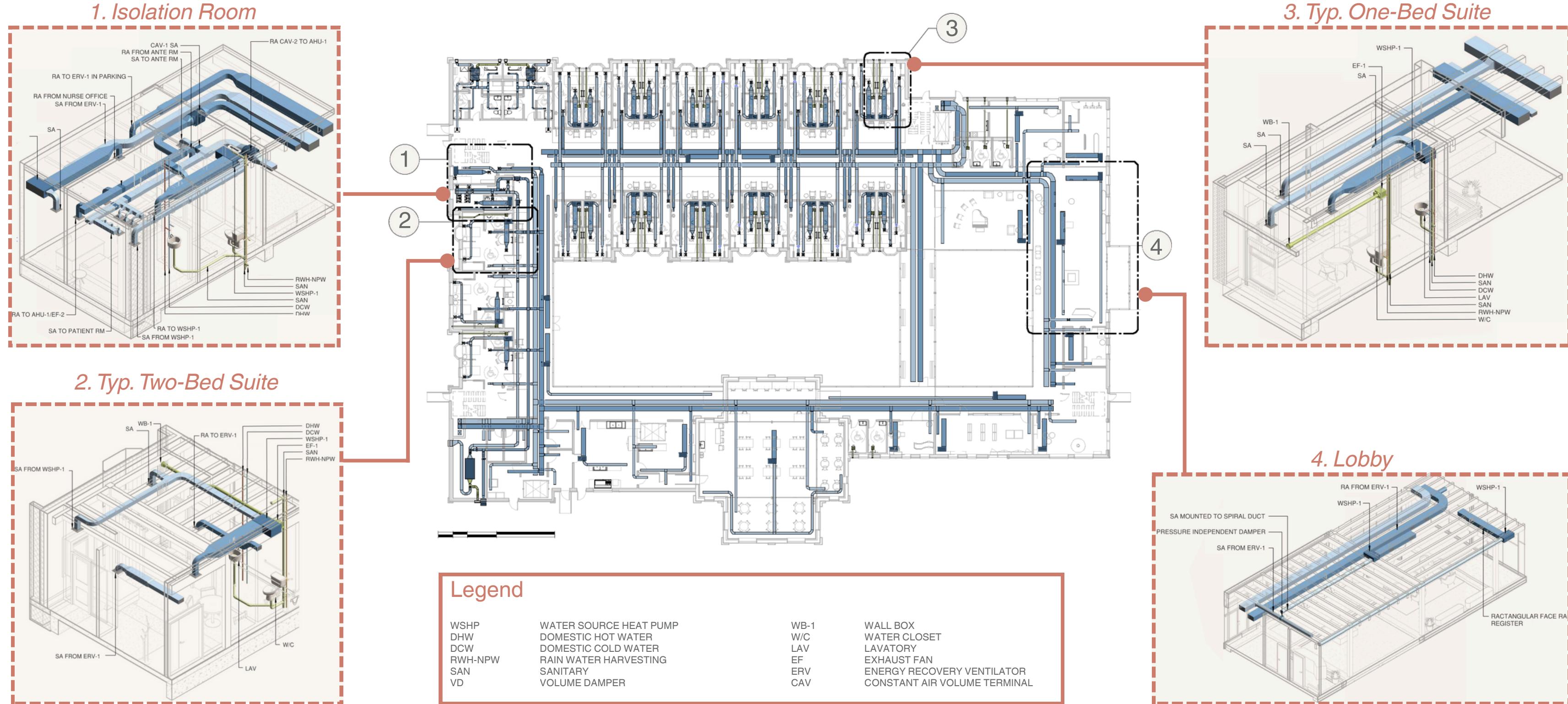
### **Foundation System**

Cast-in-place concrete beam and column system.  
Transfer beams for increased spacing between columns.  
Foundation wall offset around existing schoolhouse foundations.

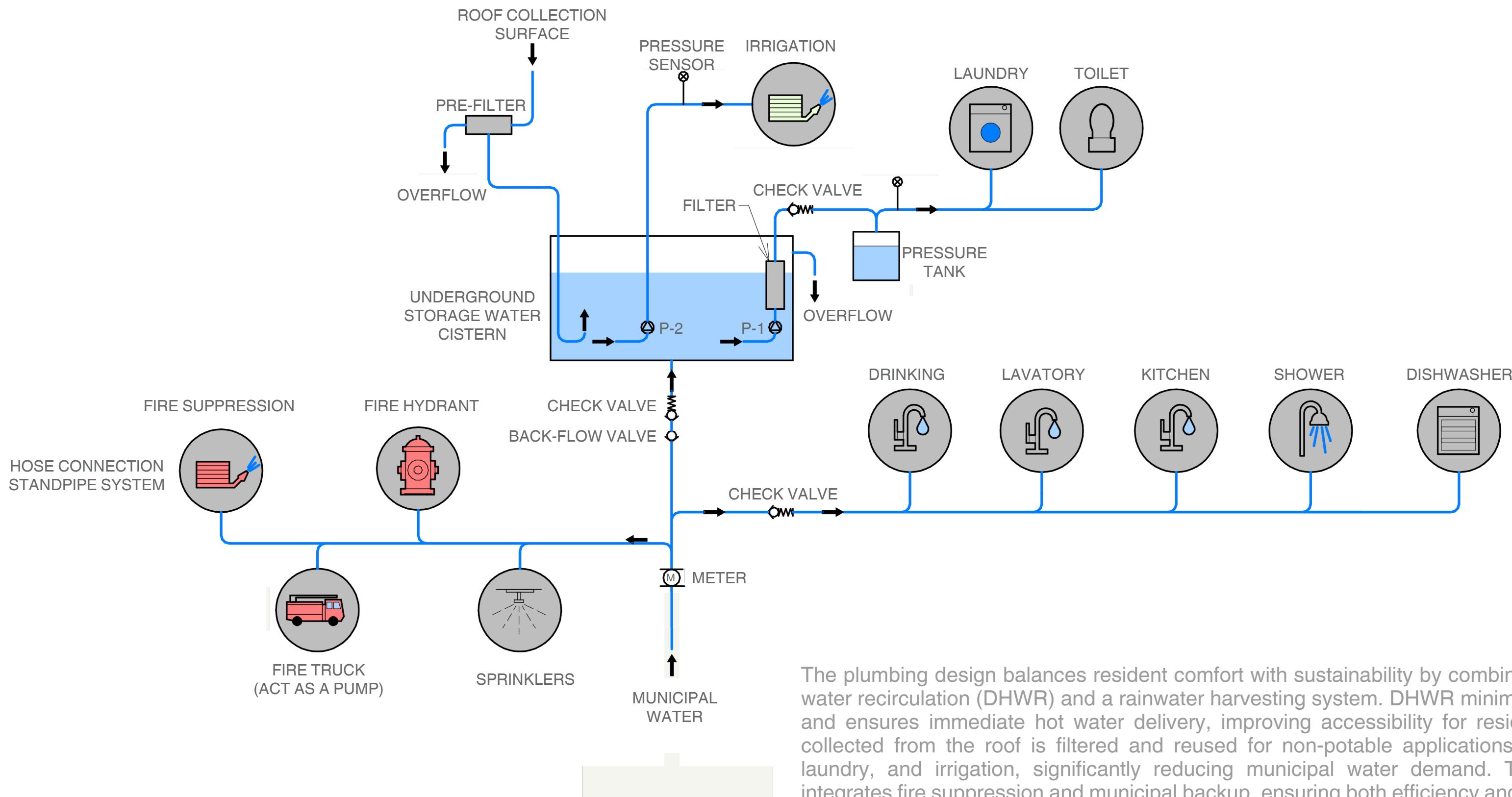
## hvac system schematic



## level 1 hvac system distribution

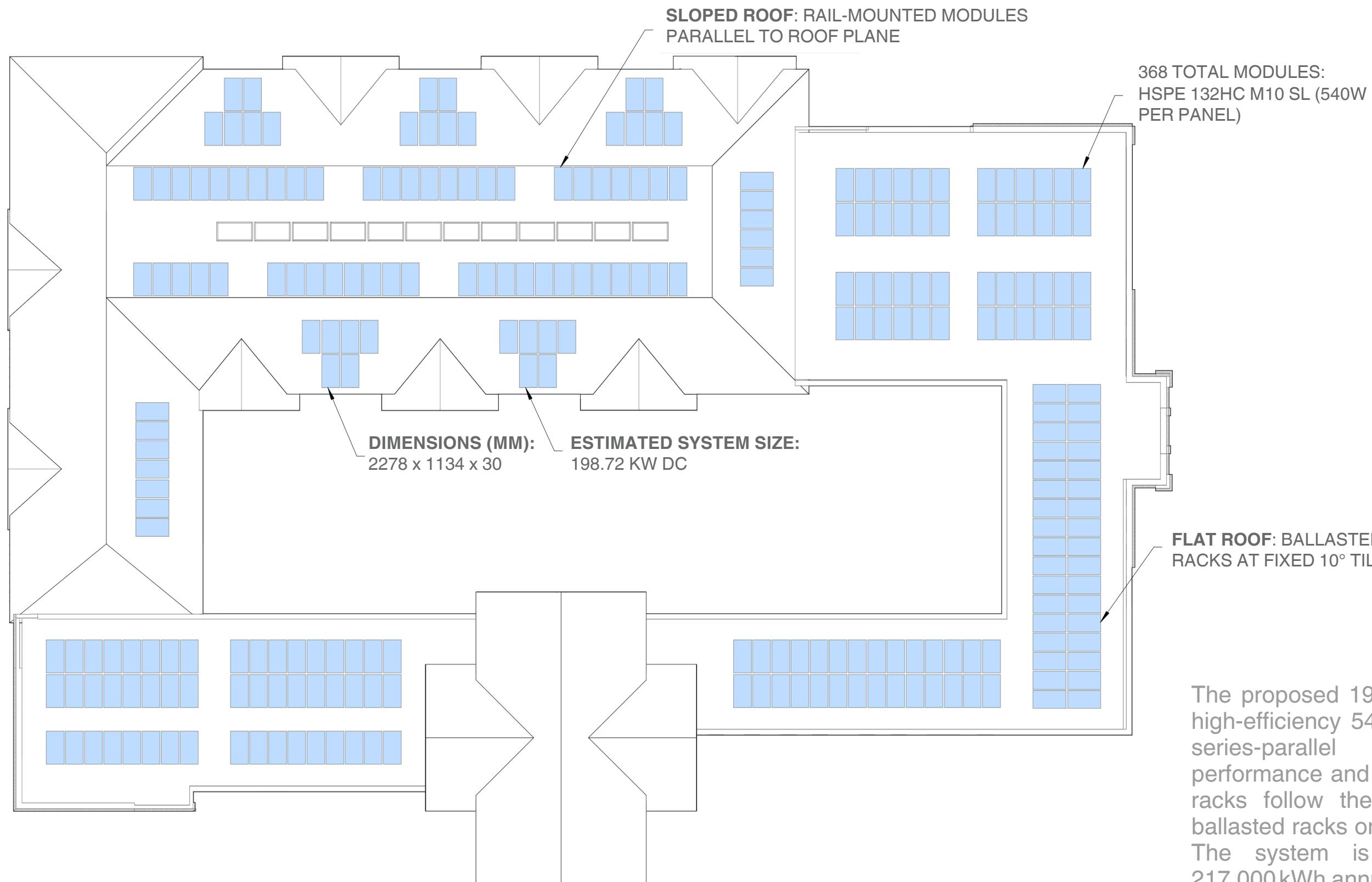


## plumbing system schematic



The plumbing design balances resident comfort with sustainability by combining domestic hot water recirculation (DHWR) and a rainwater harvesting system. DHWR minimizes water waste and ensures immediate hot water delivery, improving accessibility for residents. Rainwater collected from the roof is filtered and reused for non-potable applications such as toilets, laundry, and irrigation, significantly reducing municipal water demand. The system also integrates fire suppression and municipal backup, ensuring both efficiency and resilience.

## *solar roof panel layout*



The proposed 198.7kW DC solar array uses 368 high-efficiency 540W monocrystalline panels in a series-parallel configuration to optimize performance and shading tolerance. Rail-mounted racks follow the slope of pitched roofs, while ballasted racks on flat roofs minimize penetrations. The system is projected to generate over 217,000 kWh annually,