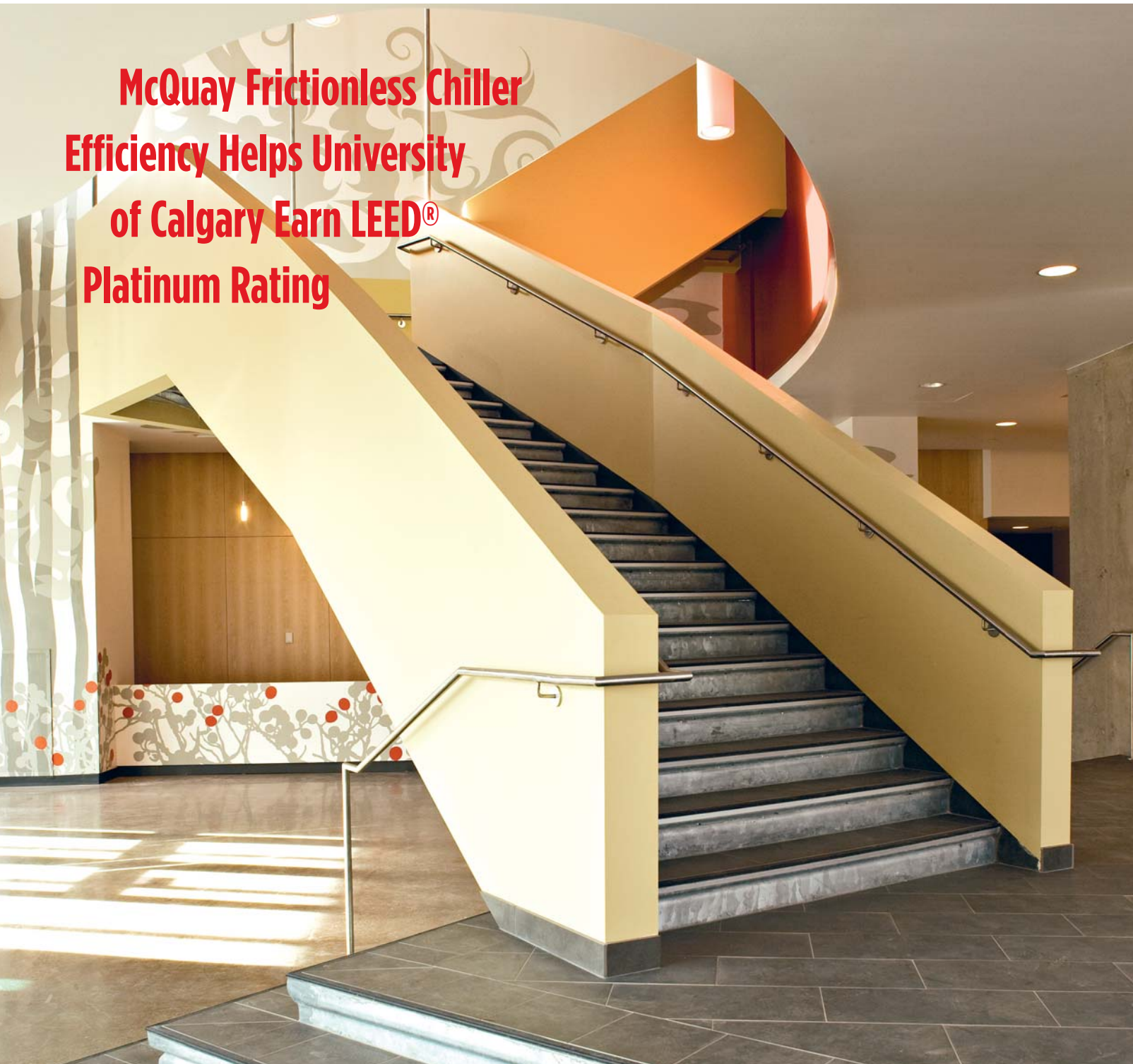


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**McQuay Frictionless Chiller
Efficiency Helps University
of Calgary Earn LEED®
Platinum Rating**

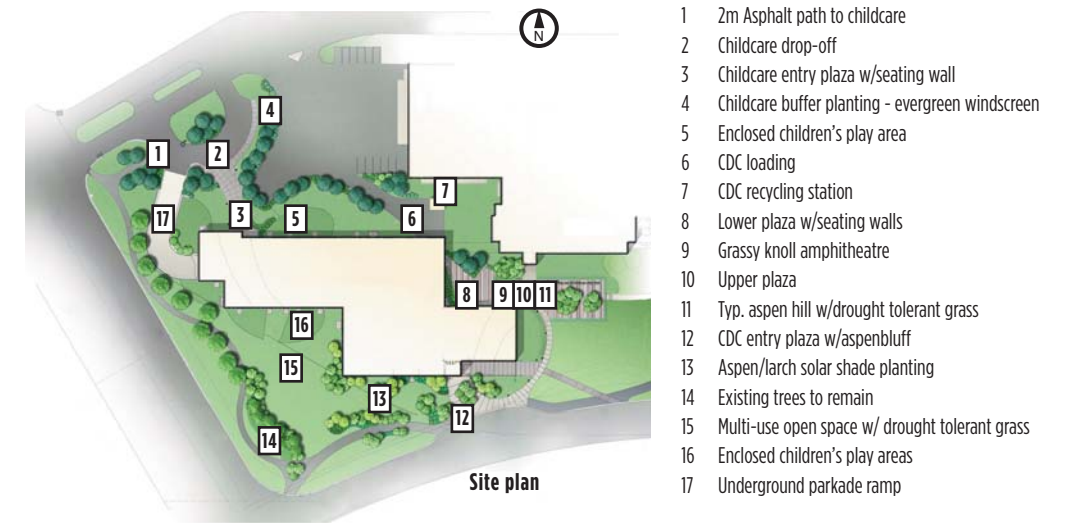


CHILD DEVELOPMENT CENTRE

Landmark LEED Platinum project scores highest in world for a cold climate building *Jim Taggart*



ARCHITECTURE AND INTERIOR DESIGN Kasian Architecture Interior Design and Planning Ltd., Calgary **PROJECT MANAGER** R.C. Peterson Ltd., Calgary
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PHOTOS [Photo 1 and 2] Robert Lemermeier, Calgary; [Photo 3, 4, 5, 6, 7] John Bilodeau, Calgary



With the engaging hand print decals decorating its east and west elevations, the Child Development Centre has quickly become a symbol of the University of Calgary's commitment to sustainable development, helped in no small part by its LEED Platinum rating.

Located at the entrance to the campus, and opposite the Alberta Children's Hospital, the Child Development Centre houses the University's second child-care facility and a full continuum of researchers, clinicians and frontline workers.

In addition to the University's own child development staff, occupants of the four storey, 125,000sf building, opened in October 2007, include major tenants such as the

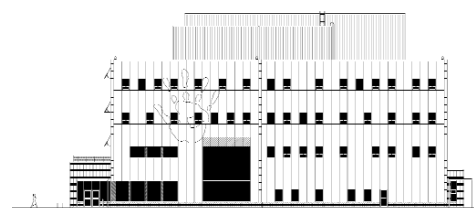
Calgary Health Region and a new U of C child care centre. The child care centre, with space for up to 80 children, occupies space on the ground floor which also includes an open-plan area that can be used for events and general interaction. It features a sculptural staircase, and is overlooked by a second floor lounge. The third and fourth floors will provide space for other future tenants with a child development focus.

Sharing knowledge is an important component in sustainable design, ensuring that as many new buildings as possible incorporate leading edge ideas and technology. As University President Harvey Weingarten observes, "Together with our design team, we have created a living laboratory for vital sustainability research. Researchers at the University, including students from the Faculty of Environmental Design and the Schulich School of Engineering, will conduct post-occupancy studies on the building's performance."

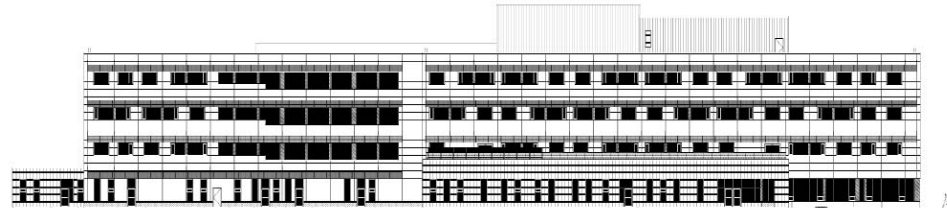
"The CDC is the most heavily instrumented building in North America," said Jim Love, Chair in Sustainable Building Technologies in the Faculty of Environmental Design who provided the energy engineering expertise on the project and who will pursue follow-up research on the building. "Nearly everything in this building can be directly monitored, from the boilers to the elevators. This creates an ideal environment for applied research and experiential learning."



THE EAST [WITH HANDPRINT GRAPHIC] AND SOUTH ELEVATIONS FEATURE ALUCOBOND AND ZINC CLADDING RESPECTIVELY - DURABLE FINISHES APPLIED AS A RAINSCREEN. [1] SUNSHADES OVER WINDOWS ON THE LONG SOUTH ELEVATION ARE PHOTOVOLTAIC PANELS, ONE OF THE LARGEST INSTALLATIONS IN CANADA GENERATING ENOUGH ELECTRICITY ANNUALLY TO RUN SIX HOUSES. [2]



East elevation



South elevation

Key environmental elements incorporated in the building include one of the largest photovoltaic arrays to be integrated into a building in Canada. It is capable of producing 65,000 kilowatt hours' worth of electricity annually, enough to run six single-family homes at current levels of consumption. Other features include high-performance boilers and water-efficient fixtures.

The building uses "grey water" from the cooling plant in dual-flush toilets, and low-flow taps. Zinc cladding was chosen for the building exterior to increase building durability and

decrease the need for maintenance. Access flooring and moveable walls facilitate future reconfiguration of space should the needs of occupants change over time.

Natural light is present throughout the building to reduce daytime electrical demand. As well, a comprehensive lighting control system, and the integration of daylight harvesting and occupancy sensors with the energy efficient lighting fixtures allowed for an optimal lighting environment that met the demanding energy requirements of 0.7 watts per square foot. The low energy lighting design helped to

achieve all available credits in the LEED Energy & Atmosphere category. Electrical sub-metering, normally used in multi-tenant applications such as shopping malls to measure and bill energy use of individual users, was adapted to the project by dividing it into distinct zones. Each zone was then sub-metered so that energy consumption could be more accurately measured and controlled.

As a result, there will be an estimated reduction in energy consumption of over 70% and a reduction in water use of more than 55% per year, compared to a conventionally designed



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building of the same size. Eighty three percent of construction waste for the project was diverted from landfills, and 11% of the building's consumed energy will be from renewable sources.

HVAC

The building houses a state-of-the-art mechanical fresh-air ventilation system that introduces air at low velocity, just below the desired ambient temperature, through low level vents in an under-floor ventilation system. As part of this system, air terminal boxes [variable air volume boxes] serve a given amount of floor area to regulate air flow based on cooling and ventilation needs. Fresh under-floor air displaces the warmer stale air in the room in a manner that promotes occupant comfort and energy conservation.

A natural gas-fired condensing boiler, fitted with a denser heating element, provides low temperature water as a heat source via perimeter radiant cabinets. An electric chiller was specified with magnetic bearings rather than oil-lubricated bearings to save energy.

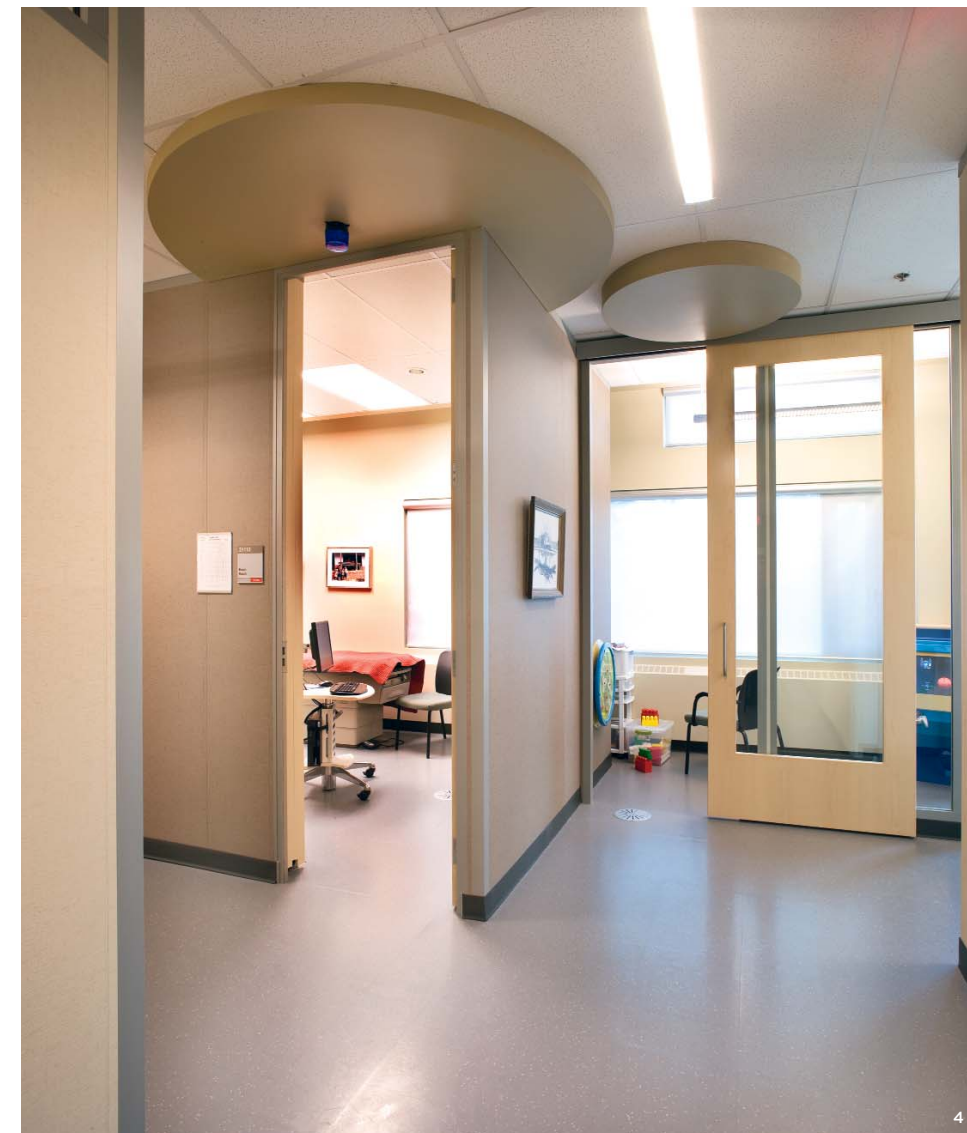
The lower floor, housing the more open day care areas, has its own air handling system to accommodate large volumes of admitted outdoor air, and is equipped with a total energy heat recovery wheel. The upper floors of partitioned offices and clinics have a separate air handling system.

Extruded, 1m wide aluminum panels, located at the floor-ceiling interface along the south and west elevations, serve as radiant cooling panels to reduce solar gain at glazed areas and, thus, cooling loads.

INDOOR AIR QUALITY

Appropriately for a health care facility devoted to the well being of children, the

A CLINIC WAITING ROOM. THE BUILDING IS DIVIDED INTO ZONES AND SUB-METERED, AS IN A TYPICAL SHOPPING MALL APPLICATION, TO MEASURE AND ACCURATELY CONTROL ENERGY USE. THE BUILDING IS THE MOST HEAVILY INSTRUMENTED IN NORTH AMERICA TO ALLOW ONGOING PERFORMANCE STUDY. [3] ACCESS FLOORING AND MOVEABLE WALLS ALLOW UNDER-FLOOR VENTILATION, CONVENIENT RECONFIGURATION OF SPACE IN FUTURE, AND REDUCED CONSTRUCTION WASTE. [4] PAINT, WOOD MILLWORK PANELS, AND A VARIETY OF FLOORING TYPES [MARMOLEUM, CORK, RUBBER AND CARPET TILE] ARE LOW IN VOCs FOR SUPERIOR INDOOR AIR QUALITY. [5]



4



5



CDC employs a variety of materials and techniques to ensure a high level of indoor environmental quality.

All major entries to the building have permanent recessed entryway systems that catch and

hold dirt. The finished flooring concrete system is durable, easy to maintain and requires only damp mopping to clean. This floor type also increases reflectivity up to 30% which helps create even lighting in the space.

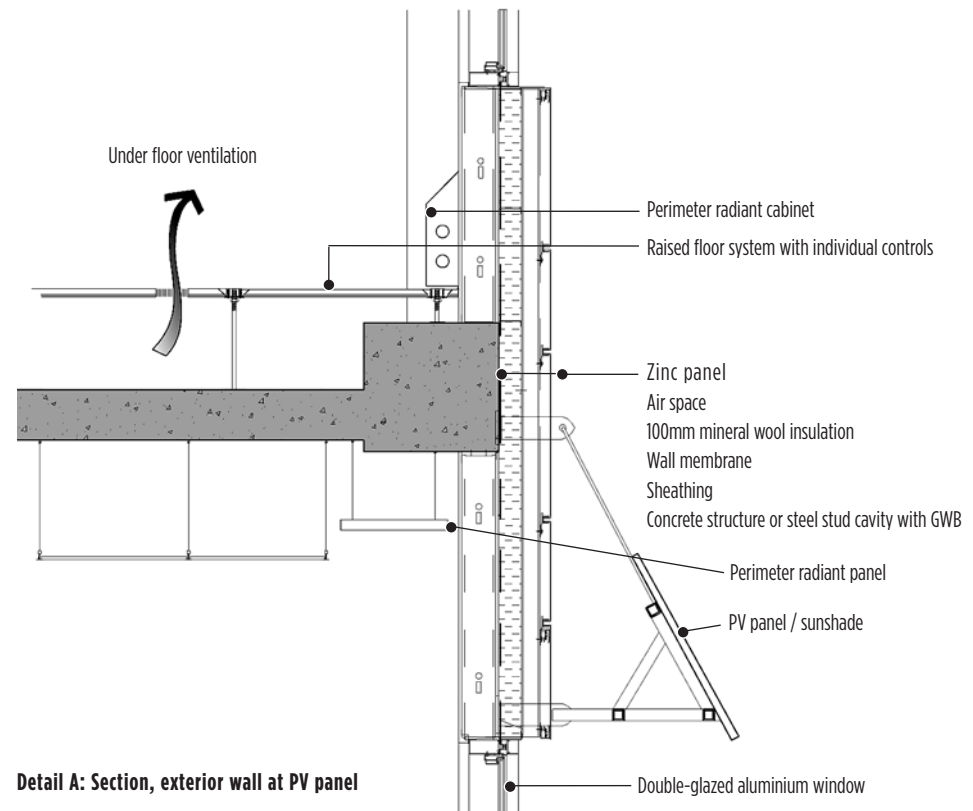
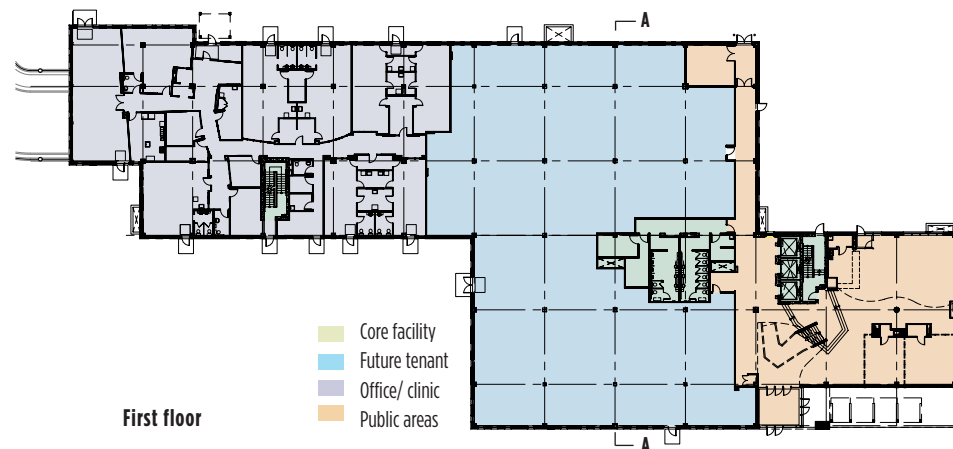
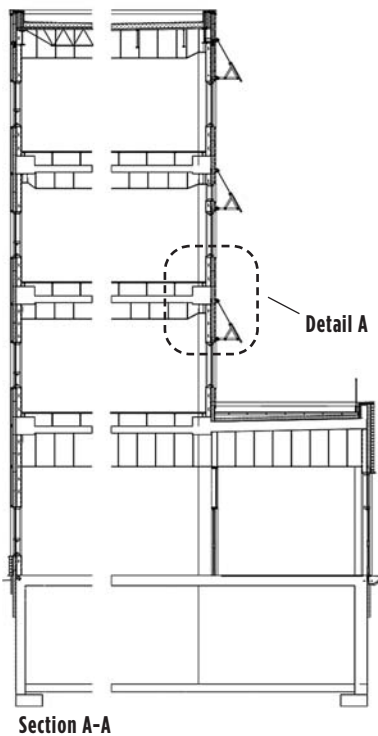
Other flooring choices - Marmoleum, cork, rubber, and Green Label-rated carpets and adhesives - improves the indoor air quality of the building because they are low-emitting and they release less harmful chemicals. All wood-panels for millwork, paints, primers and coatings installed in the building are low in volatile organic compounds [VOCs].

Such measures contributed to a LEED score of 57 points, the highest yet recorded in Canada and the highest in the world for a

cold climate building. Adds Weingarten, "Operationally, the Child Development Centre is a unique model for improving the quality of life for children and families. It is also setting the standard for sustainable design and construction across North America."

JIM TAGGART, MAIBC, IS EDITOR OF SABMAG.

THE RETROPLATE SYSTEM, AN ABRASION-RESISTANT, HARD AND HIGH LIGHT REFLECTIVITY SYSTEM, WAS USED TO FINISH THE BARE CONCRETE FLOORS. AXIS LIGHTING'S ARCHITECTURAL LUMINARIES HAD TO BE ONLY SLIGHTLY MODIFIED TO MEET THE DEMANDING ENERGY REQUIREMENTS OF 0.7 WATTS PER SQUARE FOOT. [6] DETAIL OF THE SCULPTURAL STAIR LEADING FROM THE MAIN LOBBY. [7]



Detail A: Section, exterior wall at PV panel

THE OPEN DAYCARE AREA HAS A SEPARATE AIR HANDLING SYSTEM, EQUIPPED WITH A TOTAL ENERGY RECOVERY WHEEL, TO HANDLE LARGE AMOUNTS OF FRESH OUTDOOR AIR. THE SUSPENDED RADIANT COOLING PANEL IS VISIBLE ABOVE THE WINDOWS. [8]

MATERIALS

Structure

- High fly ash mix concrete, steel

Exterior

- Aluminium Extruded, double glazed argon windows with solar control low-e glass; Zinc-cladding and Alucobond composite metal panel system with mineral wool insulation in a rain screen construction, photovoltaic panels that also act as sunshades, fully-adhered underslab vapor barrier supplied by Grace, Sarnafil roofing membrane

Interior

- Drywall painted with ICI Dulux Lifemaster, low VOC particle board for millwork, Tec-crete access flooring and moveable partition walls by Haworth

Flooring

- InterfaceFLOR carpet tile, Design Weave, Forbo Marmoleum, cork flooring by Solida Cork/ Eraco International, and Dinoflex recycled rubber flooring in childcare, RetroPlate System [high hardness, abrasion and weathering resistance, and 30% light reflectivity] on concrete floors applied by PermaBurnish Industries, Calgary

Lighting

- Fixtures by Axis Lighting, including indirect pendant luminaires that minimize light pollution escaping to the outside the building, addressable lighting controls, occupancy sensors, and electrical sub-metering

HVAC/Plumbing

- Under-floor air displacement ventilation, natural gas-fired condensing boiler for low temperature water heat source via perimeter radiant cabinets, McQuay International electric chiller fitted with magnetic bearings rather than oil-lubricated bearings to save energy, air handling system for lower floor equipped with a total energy heat recovery wheel, radiant cooling ceiling panels reduce solar gain
- Dual flush toilets, waterless urinals by Sloan Valve Company, infra-red hard-wire faucets by Delta Faucet Company





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