architecture

Millennium Water:
The Southeast False Creek Olympic Village
Vancouver, Canada

THE CHALLENGE SERIES

04

CREATING SOCIAL SUSTAINABILITY

What does it mean to live in community? In our current cities, too often it means defining a boundary with positive relationships inside and uncertain interactions beyond.

The SEFC sustainability mandate encompassed not only environmental performance, but social sustainability as well. A harder concept to make tangible, it nevertheless played a major role in determining design. A sustainable community, after all, is one where resilience is high – where people support each other, share resources, enjoy communal experiences and develop trust. The built environment can significantly help – or hinder – these things.

The Olympic Village project creates more points of interaction between people than is typical in tower and podium development. Glassed stairwells, inviting lobbies, open-air corridors, pedestrian pathways and building courtyards offer serendipitous experiences where people will bump into neighbours, stop to chat, or just be visually aware of others going about their day. Stand in the middle of Parcel 10 on a typical morning: the kids are out on the balconies, students are going off to school and somebody's pulling their blinds. The distances, while comfortable, are intimate: you see a friend across the courtyard and call out an invitation – shall we go down and have a coffee? In the mix of shared sights and experiences, people will less often be socially sidelined, or completely alone.

Repeated interaction over time builds relationships, and relationships are the essence of community. Supported by inviting communal spaces, daylit common areas and an interactive environment, it is hoped that people will come to know each other here. Socio-economic differences are downplayed as market and non-market housing intermingle; the wealth of common amenities is shared. It is a markedly different idea of a good life from that expressed by the suburbs, with their fenced distances between homes and common areas primarily relegated to cars.

As the limits of global resources become clear, it is obvious that humanity must cluster around resources to use them in a more efficient and effective way. The question is how to enhance livability so that this environmentally efficient model is also desirable (or it will not be adopted).

The challenge, in part, lies within us. How will we perform in this more intimate environment? Who will we become? What do we value most – the private lawn or the proximity of rich relationships? We do not have the answers to these questions yet – but the design of the Olympic Village offers the chance to see them emerge over time.

CHAPTER FOUR OVERVIEW

With the SEFC vision grounded in its official development plan, the public spaces designed and moving into construction, and the 2010 Olympic Games coming to town, the push to build the Millennium Water Olympic Village was underway.

The architects selected to design buildings entered an integrated design process with other building professionals to achieve multiple design targets: prescribed environmental performance, including minimum LEED Gold eligibility; appropriate density and marketability; a high degree of social sustainability features; a mix of market, rental, non-market, commercial and community uses; and successful integration of individual buildings into the narrow streetscape and public areas. These were to culminate in an enduring example of state-of-the-art sustainable community design to showcase to the world during the Olympic Games and beyond.

The designers started with passive design principles to maximize energy efficiency and moved into the task of defining the exterior and interior spaces that would provide texture and dimension to the village's built environment. This chapter explores the basics of passive design and highlights aspects of architectural design across each parcel. It includes stories of the architects' experiences as they worked to meet the complex program within the Olympic time frame. The chapter concludes with an examination of the building envelope systems used in the village to ensure the buildings will provide high quality living experiences with low maintenance and extended durability.

Throughout these stories weaves a larger theme, of a concerted, collaborative effort to break through past conceptions of architecture to bring a new urban experience to life. In so doing, the community of designers and builders in BC enriched their own experience, deepening their shared understanding of sustainability and enhancing a commitment to permanently shift the parameters of urban design for the better.

Artist's rendering of Millennium Water Olympic Village at SEFC.

James Cheng - A Changing Architecture for a Changing People

To understand the importance of the Olympic Village, you have to think about the kind of settlers who chose to come live on the west coast. In the gold rush days, the first wave had a pioneer mentality. The second wave were wanting to escape the social stigma and restrictions of the east coast. These free spirits wanted to have their own individual identity, their own little house in the mountains and their own little piece of nature. They tended to have a mistrust of big government, so they didn't build much big shared architecture.

That was the ideal of early artists, such as B.C. Binning or Gordon Smith: to live out in communion with nature. Some of our architects became masters at putting beautiful little houses into the landscape. But it's no longer there; our subdivisions today have nothing to do with that original ideal. Now, we've learned that in order to preserve our beautiful nature, we need to build this new form, the denser city. Because if we don't densify, we see what happens. It's suburbia, and it will keep going and going.

I think we're ready for this change. I think the hippie population has reached the point where they understand that they need other people. We're going to need medical attention, we need assistance, we can't be the hermit in the mountains anymore. This is the reality: when we get older, we need more help. And we turn more sentimental, we remember all the good times we had when we were in school with our friends and we look forward to seeing someone we haven't seen in 40 years. Even the hermit needs to come to the village.

The Olympic Village project will inform us. It shows there is an alternative to tall slim buildings; it will help us visualize how we can densify other areas of the city. I think the people of Vancouver have to see this and experience it. We can look at this as a test model for urban design. As a citizen, I don't mind if it goes over budget, because we're getting a lot more than just monetary benefits out of it.

That's why I enjoy architecture and urban design – because it is always changing. We're here at a certain moment in time, but today's solution is only right for today. If you go forward 20 years, it will change again. Right now, this is our next step.

James Cheng, MAIBC

Even the hermit needs to come to the village.

The design of the buildings at the Olympic Village began with a division of the site into "parcels" – city block-sized tracts of land that would each hold up to four buildings. Each parcel was overseen by a different architect, adding diversity and making it possible to design the whole site within the tight timeline. The process began with a consideration of passive design techniques and progressed to the fine detail that differentiates parcels from each other.

Natural Systems Dictate Design

From the early plans and visions for SEFC through the re-zoning and design process, the designers of the Olympic Village were handed a clear mandate: create a livable, dense urban village – with high standards of environmental performance built in. To help achieve the required energy efficiency, the team's approach focused on the use of passive design.

Passive design is a current term that describes an age-old concept: designing buildings that respond to their natural environments. It recognizes that the simplest way to create a bright, comfortable indoor environment is by taking advantage of the free and plentiful energy of the sun.

The City of Vancouver defines passive design as "an approach to building design that uses building architecture to minimize energy consumption and improve thermal comfort." This relatively straightforward notion has fallen out of practice where inexpensive energy has encouraged the use of mechanical systems instead of passive techniques – illustrated by many of the recent buildings in Vancouver.

The cost of implementing passive design is relatively inexpensive, yet the energy savings can be significant. "You can also create a high-performance building by designing a super high-efficiency mechanical system," says Albert Bicol of Cobalt Engineering, the lead mechanical consultant for the Olympic Village. "However, if you implement passive design strategies at the outset, you can have a better performing building (in terms of comfort and energy use) with a significantly less complex, less expensive mechanical system. Passive strategies are proactive and mechanical systems are reactive."

PROFILE

Kenneth Chow

MEng, PEng, PE, CP, MSFPE
Principal, Pioneer Consultants

As the certified professional and code consultant on the project, Ken Chow facilitated the balancing act of ensuring that the project would proceed on schedule, retain its architectural identity and comply with code regulations every step of the way. By doing this, he helped to ensure that the buildings would be able to obtain occupancy permits quickly, on deadline. "The thing I enjoyed most on this project was resolving difficulties – working with contractors and consultants to solve problems without sacrificing compliance or quality," says Chow.

Chow and his team at Pioneer were responsible for delivering "alternative solution" reports when the project did not conform to code requirements – a frequent occurrence in a project with this level of complexity. Many of the sustainable design features applied at the Village were considered unconventional from a code point of view. These reports describe how the design team's approach, while "unconventional", still complied with code.

On the topic of deadlines, Chow says he was not overwhelmed by the pressure of the Olympics' fixed schedule. On the contrary, he says, "I am used to fast-tracking. I thrive on a tight deadline." This is understandable, considering he has over 32 years of experience in the industry, including other mega-projects such as EXPO '86 and the Coquihalla Highway.

THE BASICS OF PASSIVE DESIGN

Daylighting

Natural daylighting reduces the need for electric lighting and contributes to bright and productive indoor environments. The selection, size and placement of windows will determine the level of natural daylighting in a room. Things to consider are the path of the sun and seasonal variations, optimal amount of daylight, glare control and the resultant heat gains and losses associated with the choice of windows and frames.

Passive Heating

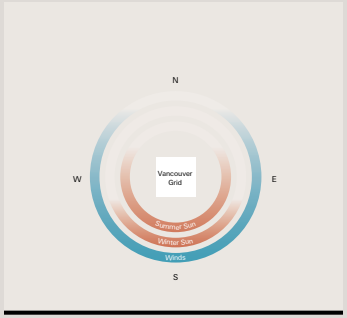
Buildings can attract and retain solar heat energy through window design and the choice of building materials. It is important to have a well-insulated envelope to deter unwanted heat losses. Window to wall ratios must be carefully determined in order to reap the benefits of views and daylight, while avoiding the heat losses associated with too much window area. Materials such as concrete with high thermal mass – the capacity to store and slowly release heat energy – help to regulate indoor temperature.

Passive Cooling

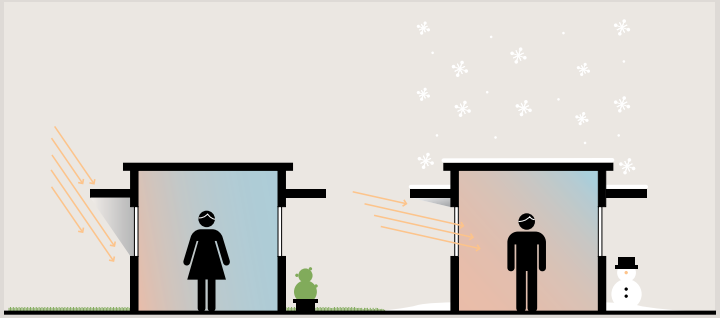
Passive cooling strategies prevent buildings from overheating by blocking excessive solar gains. Cooling can be achieved by installing shading devices on the exterior of the building. There are a number of options for shading, ranging from roof or balcony overhangs to louvers, panels and operable shades. Building materials can also contribute to a building's cooling capacity; for example, light-coloured materials reduce heat gain by reflecting rather than absorbing the sun's energy.

Passive Ventilation

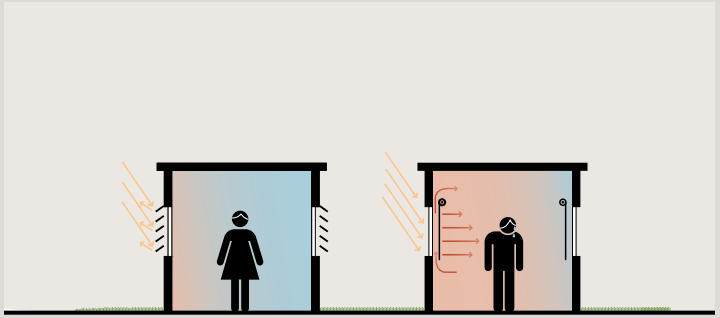
Passive ventilation involves circulating fresh air from the outdoors by passive means. Design for passive ventilation requires taking into account natural wind and air flow patterns and designing buildings to take advantage of them. Operable windows are key to achieving effective ventilation, as they allow a fresh supply of outdoor air and provide the opportunity for cross-ventilation.



ORIENTATION The first step to passive building design is understanding the parameters of the building site. Taking into account the relationship between the path of the sun and a building's form is a priority. This diagram illustrates the climatic variation on each side of a building's façade (in the northern hemisphere).



SHADING DEVICES Shading devices can be designed to block the sun's rays to avoid overheating in the summer (when the sun is at a high angle) and to allow the sun to heat the building in the winter (when the sun is at a low angle).

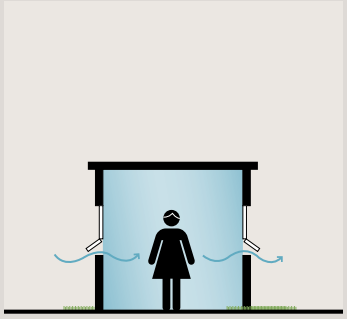


EXTERIOR VS INTERIOR SHADING The choice of shading devices can greatly affect a building's cooling capacity. Shades on the exterior of a building block the sun before it meets the building envelope. Interior shades allow the sun's energy to penetrate the window, heating up the building's interior.

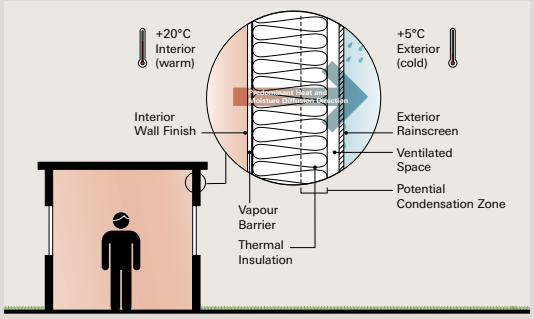
Thermal Comfort

One of the primary goals of passive design is to optimize human thermal comfort – a person's thermal perception of their surroundings. To maximize the level of comfort, designers must keep in mind air temperature, surface temperature, humidity and wind velocity. In order to address this range of conditions, designers had to work together creatively, and consider the experience and comfort of the building occupants as the key design goal.

The simplest way to create a bright, comfortable indoor environment is by taking advantage of the free and plentiful energy of the sun.



CROSS-VENTILATION Cross-ventilation is a cheap and simple way to ventilate a building with fresh air. It can also be implemented as part of a passive cooling strategy.

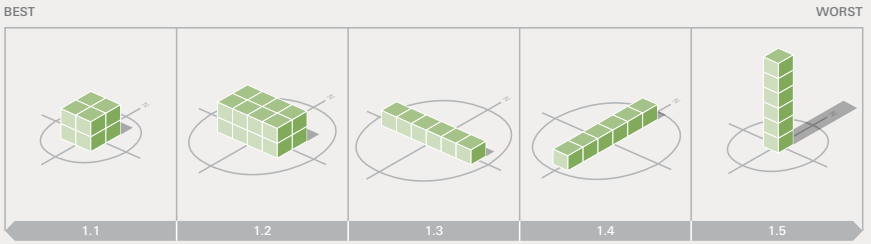


ENVELOPE AND INSULATION A building must have a well-insulated envelope to perform well in terms of energy efficiency. Effective wall assemblies and insulation prevent heat and moisture diffusion. Windows and window frames must be selected and installed efficiently in order not to compromise the envelope's overall performance.

Working Together to Maximize Efficiency

Energy efficiency was high on the list of priorities for the Olympic Village design team and a cornerstone of its integrated approach to sustainable design. As such, architects, mechanical engineers and envelope and sustainability consultants became involved in establishing these principles at the outset of design. Instead of tailoring the mechanical design to meet the energy-efficiency goals, the team used passive design to greatly reduce building energy requirements before even considering mechanical systems. Once the baseline energy loads were established, mechanical comfort control systems could be sized appropriately.

The integrated design team worked to maximize the application of passive design principles. The process was not without challenges. For example, optimal building orientation that takes advantage of the path of the sun could not be achieved due to the previously established orientation of the street grid. The team recognized the constraints, and optimized as best they could under the circumstances. In the case of orientation, architects ensured that each façade of the building responded to the particular directional conditions: rain and wind, sun and shade.

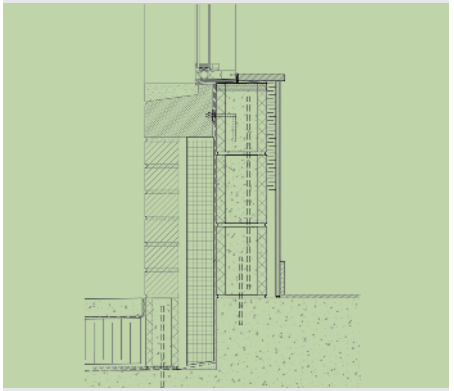


BUILDING MASSING AND ORIENTATION The total surface area of the envelope will determine the efficiency of a building. The more surface area, the more opportunity for heat loss or excessive heat gains through the envelope.

PASSIVE FEATURES AT MILLENNIUM WATER

This table highlights a sampling of the passive strategies that were incorporated at the Olympic Village. It illustrates the energy efficiency and livability benefits of each particular strategy. All images are from Parcel 10.

Passive design is a current term for an age-old concept: designing buildings that respond to their natural environments.

	Blinds + Shades	Deep Balconies	Insulation + Envelope
			
Description of Strategy	Operable blinds are installed on the exterior of several buildings, on south- and west-facing façades. Fixed and moveable shades are also present on buildings throughout the Village.	Balconies were extended in order to improve their effectiveness as shading features.	Additional insulation was applied to the façades of buildings, adding a total of two inches of thickness to all exterior walls.
Energy-Efficiency Benefits	Blinds and shades block the sun's rays from entering through the window, thereby blocking excessive heat gains.	During the warm summer months while the sun is at a high angle, deeper balconies provide shade for a larger area in the unit beneath.	Efficient insulation is integral to meeting the energy-efficiency goals of the buildings. Proper wall assemblies and insulation help to ensure there is no unwanted heat losses through a building's envelope.
Livability Benefits	The indoor environmental atmosphere is under the control of the user. Shading devices and operable blinds allow occupants to determine the amount of sunlight and heat energy that enters into their suite. They can control heat gains to their desired thermal comfort level.	Besides the cooling benefits of shading, larger balconies offer the added benefit of increased outdoor area per suite.	Steady temperature and humidity levels in a building's interior helps to maximize thermal comfort.

Exterior Corridors

Corridors and access-ways are located on the exterior of many of the buildings.

Exterior corridors reduce the energy loads associated with daylighting and space conditioning in indoor corridors.

Exterior corridors are open to the central courtyards of the apartment blocks, encouraging social interaction and creating a sense of place and a shared space with one's neighbours.

Cross-Ventilation + Cooling Ponds

Units, where possible, are designed to allow opportunities for cross-ventilation. Ponds are present in many of the courtyards, cooling the air that circulates in and out of the buildings.

Cross-ventilation and natural ventilation strategies minimize the need for mechanical ventilation.

Enabling cross-ventilation is key in improving natural ventilation in buildings, and keeping a continuous flow of fresh air. Indoor environmental quality and associated health benefits are improved.

Stairwells, Circulation + Light Access

Stairwells are widened and exposed to natural daylight (where possible). This was accomplished in some of the buildings by pulling the stairwell to the exterior of the building, making it a design feature and part of the building's façade.

Wider, daylit stairwells and corridors reduce the need for electric lighting and encourage occupants to use the stairs, thereby reducing the frequency of elevator use.

Stairwells were designed to be bright, comfortable, airy and safe – making the prospect of regular use more desireable than in a conventional enclosed stairwell. This has the effect of encouraging physical activity.

CHALLENGE

To municipal planners and administrations, to consider and accommodate passive design parameters during the initial layout of neighborhoods and streets in order that new developments can appropriately align buildings to maximize energy efficiency and improve occupant comfort.

FEATURE PROFILE

ITC Construction Group

ITC Construction Group is one of Western Canada's leading general contractors and has been recognized as one of Canada's 50 Best Managed Companies every year since 2003.

ITC played a key role in building the Olympic Village, responsible for the construction of 530,000 square feet of residential and commercial space. The scope of the project, combined with coordination of a huge consultant team and the grueling schedule were all challenges that ITC faced on a daily basis as it fast-tracked through the project. "There are reasons why nobody normally does all of these types of works at once," says Brent Olund, ITC's Project Director. "The coordination implications have been profound."

Among the coordination challenges was the safe operation of 12 tower cranes with many overlapping each other on the construction site at one time. "Imagine a tower crane operator having to talk to individuals on six different radios at once and safely focus on the task at hand," says Olund. To prevent accidents, ITC trained its own crane operators and those from MetroCan to use TAC-3000, a tower crane anti-collision system never before used in Canada.

Thanks to the safety efforts of a conscientious construction team, the project achieved below industry average workforce injury rates.

What does sustainability look like?

That question was debated thoroughly by members of Millennium's design team as they worked to define the appearance of a community the company would be building from scratch on the shore of SEFC. At the time, environmental buildings sometimes celebrated their 'eco' pedigrees with an exhibitionist aesthetic, not unlike the way early hybrid cars and Birkenstock sandals departed from tradition to herald their difference. But Millennium was seeking something more enduring.

"We didn't want sustainability to have a passing look to it," says Millennium's Peter Malek. "It could be different even from 2006 to 2012. We wanted something more timeless, so we aimed instead for a 'quiet sustainability.' So the design team was asked to come up with buildings that would not become dated."

Millennium gave the team a number of elements to work with. They provided classic images of solid European buildings with colonnades and asked for similar arcades (recessed walkways along the front of the building that shelter storefronts and entryways). They favoured modern curved glass facades, and continuous balconies that would support passive design while maximizing indoor-outdoor living. They sought a blend of materials that would mix classic with modern. And they asked the architects to do their best to reduce the potential "boxy" look of the rectilinear street layout.

"We provided them with a paradox," says Malek. "Very modern images and very classic ones, to effectively create a 'modern classic.' Plus we asked them to make the Village appear that it was not all built at once. This Village is on the waterfront, on a prominent site, and it will be on centre stage, so we wanted architecture that Vancouver would be proud to display to the world. We have to give the design team a lot of credit. The solutions didn't always come overnight, but they rose to these challenges, and we think they pulled it off very well. You can see these ideas throughout the design of Millennium Water."

Curving glass and continuous balconies, such as those shown on the Marina Baie des Anges in southern France (right) and the Yve Apartment building in Melbourne (middle), were two features encouraged by Millennium. The developer also requested arcades for the buildings fronting the plaza, to provide the classic feel and vibrant street life of European buildings, such as those shown in Paris (main and left).

SOCIAL OPPORTUNITY // DAYLIGHT INSIDE // AIR THROUGH // GREEN EDGES // SOLAR SCREENING // WINDOWS THAT OPEN // SUITE ENTRIES WITH PRESENCE // USEFUL STAIRS AND TERRACES // A VIEW FROM EVERY FLOOR // CREATIVE AMENITY SPACES

After years of visioning, planning and specifying passive design parameters, it was time to design the actual buildings that would create a new community on the shores of Southeast False Creek.

The Millennium team included architects from Merrick Architecture and gBL Architects, and grew to include Nick Milkovich, Arthur Erickson, Rob Ciccozzi, Walter Francl, Brian Sim and the firm of Acton Ostry.

Their job was to breathe three-dimensional life into the idea of a new type of urban development – high density, highly livable, sustainable.

The process began with integrated design meetings – where the team arrived at a set of principles that would be applied across all parcels – to articulate tangible elements of sustainable design and to provide some consistency from building to building.

From a mostly abandoned and post-industrial site, architects conjured up the Olympic Village, filling in details from cladding and courtyards to gardens and glazing. This section tells the story of these emerging designs.

gBL ARCHITECTS – PARCEL 2

PARCEL 2 STATS
Usage: West building is market housing. East building is non-market family housing.
Materials: Fritted glass and cementitious panels.

West Building
138,800 SF
13 Stories
127 Suites

East Building
87,100 SF
5 Stories
84 Suites

One of two parcels that includes non-market family housing, Parcel 2 is also distinctive because of its cladding: "spring green" fritted (enameled) glass panels attached with stainless steel studs. Glass and brick were chosen for their local availability and reduced carbon footprint.

A market building overlooks Hinge Park on the west side of the parcel. The non-market building wraps around the other three sides of the courtyard. "We sought a seamless mix of the two," says Stu Lyon of gBL Architects, "such that you wouldn't be able to identify a market building versus a non-market building when you're walking through the Village."

The units on the wings of the non-market building have exterior corridors, giving residents fresh air on both sides of their suites. West-facing windows include sun shades and rain barrels collect water for gardening. A spacious glassed oval lobby creates a "ceremonial front door."

"Building this has been a fascination and a love – we really got to figure out how to make these concepts work," says Tom Bell of gBL, designer of the non-market building. "One of the things I love is that I can imagine people living there, and enjoying it, and that they have a better life. It feels good."

A "seamless mix" of market housing and non-market (social) housing.

North elevation of Parcel 2 as seen from Walter Hardwick Avenue.

The Friendly Roof

"On a typical building, the roof is a dead zone," says Bell. "But on this [non-market] building, the roof has been designed for people. You can walk along your exterior corridor to an outdoor staircase, and go to the roof at any time."

The centre section of Parcel 2's non-market building (social housing) has an extensive green roof that traps and slows stormwater, protects the rooftop membrane and adds to the insulation value. The buildings' two wings feature accessible areas where residents can garden, picnic or just pass the time outdoors.

"It's there as part of the social sustainability of the building," says Bell. "Kids can play on the roof, people can grow vegetables there. In other buildings, you go from underground parking, up an elevator into a dark corridor to your unit. With this building, you have a safe place that's not the street and not your house. It's like a front yard where people can gather, a place where you can get some connectivity you don't get on most buildings' roofs. I believe it will be the social centre of the building."

Perspectives of Parcel 2, showing fritted glass panels and playground courtyard. An eight-foot visor system (far right) shields the building's parapet from rainwater, increasing material longevity. Water collected on the visor flows to rooftop rain barrels and a cistern in the parkade, to be used for garden irrigation and toilet flushing.

"I decided to treat the subject of rain falling on buildings, since that's such an issue in Vancouver," says architect Tom Bell. The visor, green roof and garden rain barrels provide "a visible demonstration of how water can be collected and used for purposes other than going down the drain."

gBL ARCHITECTS – PARCEL 5

PARCEL 5 STATS

Usage: West building is non-market family housing. East building is market housing.
Materials: Reynobond metal panels and glass.

West Building
40,000 SF
8 Stories
62 Suites

East Building
83,900 SF
7 Stories
89 Suites

Retail
9,000 SF
2 Stories

The smallest parcel in terms of total floor space, Parcel 5 also mixes non-market family housing (the building on the centre and west of the parcel) with market housing (the building on the east edge of the parcel). At the southwest corner, Pocket Park offers a green refuge and will feature the Canron gantry crane as a reminder of the site's industrial heritage. Rooftop gardens offer residents another outdoor amenity.

Unit sizes for non-market housing are dictated by BC Housing. For the market building, however, gBL decided to add some lower-priced units to the Olympic Village mix. "We developed a small unit on Parcel 5," says Stu Lyon of gBL. "We were looking to make a point of difference there by designing a market unit averaging around 565 square feet. They're through units [opening to the outdoors on both sides] so those were fun to do, a little different."

Parcel 5's market building also hosts two storeys of retail space facing east to the Salt Building. The commercial façade will be highlighted with red awnings over shop windows, matching similar awnings on Parcel 9's commercial windows.

Our corridors are very animated…
we wanted those good feelings of the street indoors.

One of many suite variations on Parcel 5, this one offering one bedroom plus "flex," with 630 square feet of indoor living space and 198 square feet of balcony.

Designing the Social Experience

Stu Lyon oversaw design across the gBL parcels (2, 5 and 9), focusing on connections between buildings as well as the structures themselves. "We tried to add some assets we expect in single-family neighbourhoods," he says. "You walk along the sidewalk under boulevard trees, say hi to a neighbour, pick up a toy and move it out of the way, enter a front door that is personalized. We tried to bring that feeling into the buildings.

"We've always said maybe we could engineer vertical streets instead of cold elevator lobbies and dark corridors. So our corridors are very animated. They're all daylit, so you know what the weather is outside and you can see people on the street and they can see in. We wanted those good feelings of the street indoors.

"On the street, there's always interest and animation: individual residences with windows and porches and stairs; patios and barbecues; storefronts; interesting lobbies that are very permeable, very glassy."

"I think [this type of design] is pioneering," says Lyon. "It's interesting socially and from a livability point of view. But there's nothing particularly iconic about it; it's really just a great backdrop and hopefully a great place to live."

Elevation drawings show Parcel 5's buildings as seen from the north on Walter Hardwick Avenue (bottom) and from the east on Manitoba Street. Inset detail of the scale model shows the colour palette of deep orange and dark greys. Construction photos taken August 2009.

PROFILE

Tom Bell

MAIBC, MRAIC
PRINCIPAL, gBL ARCHITECTS

Tom Bell started his career with a degree in environmental design at the Nova Scotia College of Art and Design. Encompassing multiple disciplines – architecture, interior design, industrial design – it was also heavily influenced by the nascent environmental movement of the time. "We learned how to do environmental sensitivity analysis," he says. "It gave me a very strong interest in environmental protection."

Bell then studied architecture at the University of Calgary Faculty of Environmental Design and worked in Calgary for 14 years, coming to Vancouver in 1989.

Bell greatly enjoyed enhancing the sustainability performance of his building in the Olympic Village. "I haven't had the chance to do a fully functional green roof to this extent before," he says. "We've learned all sorts of valuable things that we'll take to the next project."

Bell says it will be difficult to go back to designing standard buildings. "I saw a building in Kelowna recently with this huge glazed element out front. It looked nice, but with 30 degree weather it was introducing this huge solar gain into the building. Those buildings are going to go extinct because we can't afford them anymore, on any level. They're the dodo birds of the past."

A profile of Stu Lyon was published in Chapter Two.

gBL ARCHITECTS – PARCEL 9

PARCEL 9 STATS
Usage: Seniors non-market and market housing.
Materials: Swisspearl and brick.

East Building
124,400 SF
13 Stories
106 Suites

South Building
40,000 SF
6 Stories
50 Suites

North Building
42,000 SF
7 Stories
69 Suites

Retail
12,600 SF
2 Stories

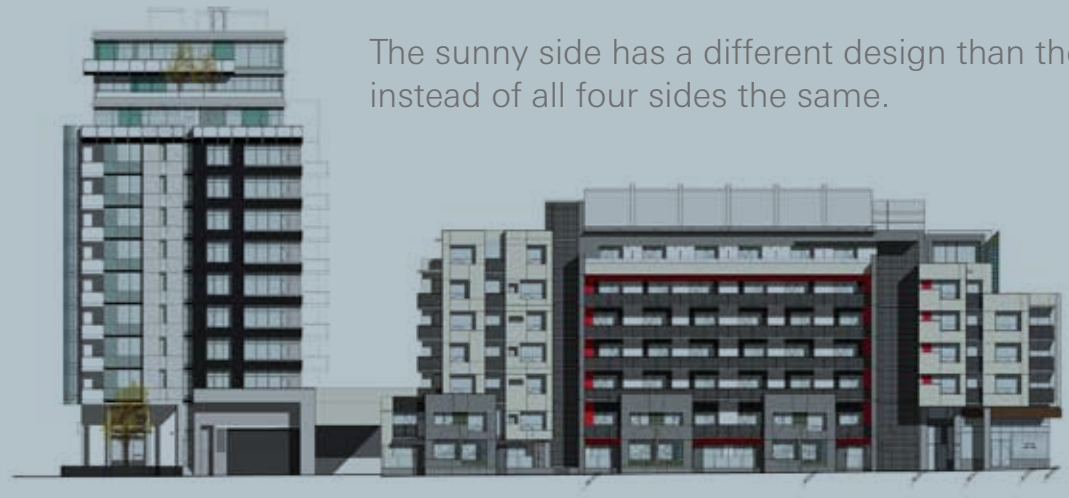
One of the largest parcels in terms of developed area, Parcel 9 is also complex, with a mix of market and non-market housing, plus commercial uses. A "net zero" building – designed to produce as much energy as it uses – it captures waste heat from the food store and heats water with solar energy. The building will be used for non-market seniors' housing.

On its east side, the market building features an undulating glass wall. "The curved wall gave us the opportunity to better align the suites with the view," says Stu Lyon of gBL. "It orients them in part towards the water and breaks up the mundane square wall."

Designing each façade differently to respond to different environmental factors was interesting, says Lyon. "The sunny side of the building has a different design than the shady side," he says. "It's much more typical to conceive of a building with all four sides the same."

One challenge was planning for truck access to the grocery store. "We had a requirement to accommodate the largest size of truck allowed into the City of Vancouver, and this site was not built to allow that size of truck," says Lyon. "So the complexity of that building was unusual!"

The sunny side has a different design than the shady side, instead of all four sides the same.



Above: Elevation drawing from Walter Hardwick Avenue. The ground floor space on the right side of the image will be the location of the grocery store.
Next page: The east façade of Parcel 9 features wavy glass walls that expand residents' views. The bottom inset photo shows a detail of the solar hot water system being installed on the roof of the net zero building.

Integrated Design Process

"Once upon a time once you'd hire an architect, he'd do a site plan for you and then he'd build it," says Tom Bell. "That model is just about gone."

Design for the Olympic Village buildings began with an integrated design process where participants worked to articulate shared principles and solve mutual problems. "Having structural, mechanical, electrical, landscape all together, all informing each other, was great," remembers Bell. "At the start-up phase, you don't really know how it ought to turn out. You're learning together."

Stu Lyon agrees. "It was interesting, a lot of dialogue and sometimes heated discussions around interpreting what's good green building practice. I haven't worked on anything more complex; this is the most dynamic group of players and requirements I've encountered. It's been very exhilarating."

Creating a building that responds to its environment produces new design outcomes, says Bell. "It's all based on the specific conditions the building will experience," he says, "instead of towers you could put in Edmonton or Toronto that are all the same."

Bell believes the work that was done will help create lasting change. "These changes will go back and be embedded in the building code – all it takes is time. Hopefully we've moved the bar up a level."

Net Zero Housing

One of the hallmark projects of the Olympic Village is the seniors' affordable housing project that is targeting Net Zero annual energy use. This is the first multi-unit residential building in Canada to pursue Net Zero, and a huge step toward the City's ultimate goal of carbon neutral buildings. The SEFC Net Zero building will achieve its goal through a comprehensive approach to energy use reduction in combination with heat recovery and renewable energy systems. The building will be heated using waste heat recovered from an adjoining grocery store. The remainder of the building's energy use will be offset through the production of hot water using roof-mounted solar thermal technology.

MERRICK ARCHITECTURE – PARCEL 3

PARCEL 3 STATS
Usage: Market and rental housing.
Materials:
Lower base: Majority two-storey limestone arcades with full height glazing beyond.
Upper levels: Brick, Swisspearl (cementitious composite panel system), glass.

West Building
95,100 SF
11 Stories
91 Suites

North Building
44,000 SF
5 Stories
25 Suites

East Building
44,100 SF
7 Stories
48 Suites

Running through the centre of the Olympic Village site are Parcels 3, 6, and 10, designed by Merrick Architecture Borowski Lintott Sakumoto Fligg Limited. These buildings are heavily context-oriented, since they predominantly face other Village venues.

Paul Merrick provided concept sketches for the parcels, but from there it was up to three designers to bring the concepts to life. Mitch Sakumoto took Parcel 3, with its three buildings, 180,000 sf of living space and 164 suites. A "bookend" building, the design incorporates a woven glass façade and deep balconies on the west side to make the most of views onto Hinge Park and Habitat Island.

"This parcel is a great example of how the design of the village will really promote walking and meandering in and out of the buildings," says Sakumoto. A pedestrian walkway connects north-sound from Parcel 2 through to Parcel 4 right down to the seawall. Another path cuts east from Parcel 3's courtyard into Parcel 6. "It's going to be a great neighbourhood for people – livable and vibrant," he says. "People will want to gather and live there."

This parcel is a great example of how the Village design will really promote walking and meandering.

Top: Renderings of Parcel 3 highlight material details on the balconies, and a strong presence from the ground.
Bottom: Elevation drawings of Parcel 3 showing views from the west (Columbia Street) and from the north (Athletes Way). The pedestrian walkway between buildings continues through the middle of Parcel 4 to the waterfront.

Designing Diversity

"Three personalities, but one family," says Rob Ciccozzi, as he describes his experience designing one of the three Merrick parcels. "Paul's a strong designer with strong ideas, so we all drew from his sketches. Then we dressed them up in our own way."

"Having different architects for the parcels was good," says Mitch Sakumoto. "We didn't want them to look too similar. There are differences; they're not homogeneous. In any case, it was happening so quickly we were basically designing simultaneously!"

"If you go building to building you can see a different hand at work even within a similar palette of materials," agrees Greg Borowski. "It crops up in small details – the proportion of things is different, even though there's an overall vocabulary of strong horizontal lines and anchoring vertical pieces common to all the parcels. The stone coursing is different on the parcels, and the guardrail details are completely different. But overall they are a family. Across the site, I like that there are other voices in there as well. It enriches it."

"There's a common thread across the whole site, despite a lot of personalities," says Ciccozzi. "With the plaza, the street design, the interior courtyards – it's not just the building form itself, it's the in-between spaces that bring it all together quite nicely."

Sun shades installed on the southwest corner of Parcel 3 provide passive design benefits by shielding afternoon sun from penetrating into the stairwells, keeping them cool and inviting to use.

PROFILE

Mitch Sakumoto

DipT, BArch, MAIBC, MRAIC
Merrick Architecture Borowski Lintott Sakumoto Fligg Ltd.

A partner at Merrick Architecture since 2004, Mitch Sakumoto enjoyed the unusual challenge of the Olympic Village project, where he designed Parcel 3.

"The timeframe was challenging: trying to achieve the client's goals and making sure that we can get the suites right, have the proper elevations, and design what they considered to be timeless and elegant, all at the same time," he says. "Usually something like that takes another third to half as long. Seeing your project realized so quickly – that's enjoyable."

Sakumoto says the project provided a valuable learning curve. "It was interesting to see the implementation of sustainability initiatives, and it's becoming really relevant in design these days, something that we in architecture should be thinking about. For me, the project made me more aware of a lot of those initiatives."

"It's something that I've started incorporating in my work more than I did before. I'm working on another project with much higher density, and we have similar through-units and courtyards in the middle. So it's starting to make change; I'm pushing in that direction. I think it's a good model."

MERRICK ARCHITECTURE – PARCEL 6

PARCEL 6 STATS

Usage: Non-market housing along south and part of west side; commercial at ground floor along east and part of north side. Remainder is market housing.

Materials: Swisspearl and limestone at the ground level with brick and/or Swisspearl and glass above.

North Building
62,900 SF
6 Stories
33 Suites

East Building
57,200 SF
9 Stories
39 Suites

South Building
16,300 SF
3 Stories
23 Suites

Retail
18,500 SF
2 Stories

"All the sides of these parcels respond to their immediate context," says Rob Ciccozzi, designer of Merrick Parcel 6. "This parcel has the marina in front, and the plaza and Parcel 10 on the east, so the architectural elements try to respond to those. The south side is a response to the sun, with its sun control elements. On the west side there's the public path going through, and also the east elevation of parcel 3.

"All three Merrick parcels have courtyards incorporating water. In this parcel, it's a little waterfall, but it's a calm element, like a Zen garden. In Parcel 10 they really made a story of the water; there's more drama."

"A key challenge I had with this project was to bring some order to it. Out of 200 units there are 80 unit types, plus we have market housing, rental, and commercial. There's a separation between them, but also common areas serving both. It was also interesting because for 10 years I've been trying to make my units smaller and smaller – but some of these units are quite large. That was a challenge too, to make sense of the space."

Some of these units are quite large…
it was a challenge to make sense of the space.

Elevation drawings of Parcel 6 showing views from the east (Manitoba Street and the plaza) and the north (Athletes Way and the marina).

Design to Deadline

Throughout the shared experience of developing the Olympic Village, there is a common story: the pressure of an inflexible deadline. For the Merrick architects, the challenge started in early 2007.

"We went through four or five iterations on Parcel 6 with the client sitting right next to us," recalls Rob Ciccozzi. "We'd do eight hour stints – they'd bring lunch in, I've got the tracing paper, we're coming up with solutions then and there. I've never had to do that before. I enjoyed it to some degree, but it was draining, it was a lot of pressure."

"The toughest thing for me was my perfectionist nature," says Greg Borowski. "This process was like you go, go, go, you don't look back. If anything is off to the side you gather it in and keep moving forward. And I don't think anything has been shortchanged, because the timelines also meant if you made a design decision, it's actually happened. There wasn't time for things to get reconsidered and cut.

"I felt that it pushed my game a little bit - it's that chaos/opportunity concept. It caused frustrations, but it's also been sort of exciting – more satisfying than I would have expected."

All parcels feature courtyards that offer a semi-private refuge from the more public street. The courtyard in Parcel 6 (shown here under construction) will include a little waterfall, a calm element "like a Zen garden."

PROFILE

Rob Ciccozzi

MAIBC, AIA
Robert Ciccozzi Architecture Inc.

After studying at Carleton University, Rob Ciccozzi worked for Paul Merrick Architects Ltd. for five years, taking on projects such as City Square, the Medical Student and Alumni Centre and the Royal Roads Military College Dining Hall. In 1992 he started an independent practice that has grown to 20 people.

Asked to join Merrick to support its work designing three parcels in the Olympic Village, Ciccozzi found himself stepping into a lead role on Parcel 6 when the original architect slipped on ice and project timelines would not allow a delay until he could return.

"By then a lot of conceptual work was done," says Ciccozzi. His challenge was to "bring order to the program" on a parcel with 200 units and about 80 different unit types.

Ciccozzi says the design process may have benefitted from the intensity of deadline pressure. "All these things happening so fast worked to our advantage in a way. [The Village] has the diversity of a lot of different personalities on site. There's still a common thread; the in-between spaces glue it all together quite nicely. I'm happy with the way it turned out, and proud to be part of the team."

MERRICK ARCHITECTURE – PARCEL 10

PARCEL 10 STATS

Usage: Commercial at the ground floor along the west and part of the north side and all of the residential is market housing.
Materials: Limestone walls for tall buildings with Swisspearl panels for the top two floors. Landscape walls have granite. There is a straight window wall and curtain wall, with a variety of custom mullion caps and fins.

West Building
66,700 SF
9 Stories
51 Suites

North Building
28,600 SF
5 Stories
25 Suites

East Building
93,185 SF
11 Stories
94 Suites

South Building
17,500 SF
4 Stories
16 Suites

Retail
18,600 SF
2 Stories

"There's a 20 foot high stone water wall in Parcel 10, like a waterfall inside the building," says architect Greg Borowski. "It appears to bring water from the Level 3 exterior courtyard down to the ground floor main lobby below a structural glass atrium.

It connects the magic of the garden with the lobby and the public realm outside, allowing visitors and passersby to enjoy the building."

Parcel 10 is among the largest in the Olympic Village, with a total of 225,000 sf and 186 suites. The west side includes two storeys of retail space facing the plaza, with arcades that create sheltered gathering spaces.

The west side also features exterior blinds to manage sun exposure. "Having them on the face of the building means you have an ever-changing façade," says Borowski. "Maybe they're all open in the morning, maybe all closed in the evening, maybe a mix. The facade could practically be a sheet of fabric, or you'll see the glass and limestone. I also like that you can be out on your balcony but put your blind down – outdoors but private. Where else in an urban environment can you do that?"

This is a neighbourhood where you feel the buildings rather than look up at them… a different urban environment than elsewhere in Vancouver.

At left, an elevation drawing of Parcel 10 as seen from the south, on Walter Hardwick Avenue.
At right, construction photos show details of balconies and exteriors, including an exterior corridor facing into the courtyard (bottom left). This ensures suites receive fresh air from both sides.

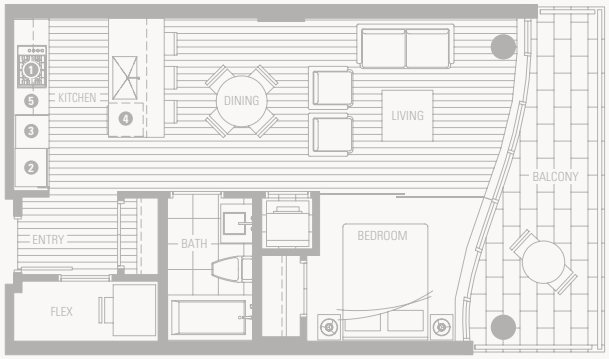
The Street-Level Experience

"This is a neighbourhood where you really feel the buildings, rather than look up at them," says Greg Borowski. "So often, buildings are built to be looked up at, but with the narrow roadways and little pedestrian pathways everywhere, this is such a different urban environment than elsewhere in Vancouver."

"There were a lot of birds-eye perspectives done at first, but we tried to come down to grade," says Rob Ciccozzi. "What's it going to feel like for people walking along the street? That's an important part of design. Things like little stairwells where the building connects to the public space, and you bring the public space in. A lot of effort went into that."

"I like that we added limestone," says Mitch Sakumoto. "It's a good choice; it adds a nice quality at street level."

"These aren't "object" buildings, you're not admiring them at a distance" says Borowski. "When you're walking around, it's the details that you see. You look more closely at the materials, the railings, the steps, the terraces, the textures, the patterning of the materials. I find the limestone really beautiful. It's heavy and enduring. And it has all these fossils – millions of years ago, there was a little sea mollusk, and there it is, in the village."



At left, one of several suite plans shows a one bedroom plus "flex" which offers 578 square feet of living space and 119 square feet of balcony.
At right, a photo of the presentation centre shows a similar sized suite.

PROFILE

Greg Borowski

MAIBC, MRAIC, BA, BArch (Hons)
Merrick Architecture Borowski Lintott Sakumoto Fligg Ltd.

While studying history, Borowski realized his real love was architecture, so he enrolled in architecture at UBC. While there, Borowski invited Paul Merrick – an architect he admired – to join his thesis advisory team. To his surprise, Merrick accepted – and then hired him upon graduation.

Borowski has worked on many downtown projects, but is intrigued by the new model presented in the Olympic Village, where he designed Parcel 10. "Rather than simply sticking towers up in the sky, this shows there are ways to densify that are arguably more livable. I've designed a number of downtown high-rises, and I'd prefer to live [in the Olympic Village]; I believe this will be a better model. You get levels of density that are sustainable – they support mass transit – without casting shadows everywhere. The narrower scale of the streets is a more efficient use of land; it lets you have larger courtyards and larger green roofs. I think it's exciting that maybe people who develop land might think this is viable. It will be more sustainable in every sense – not just in terms of energy, but in terms of social mix and the pleasantness of your life."

AN ERICKSON TOUCH – PARCEL 4

PARCEL 4 STATS

Usage: Market housing.
Materials: Alucobond with brushed finish. Clear anodized aluminum frame windows. Glass canopies with painted steel outriggers. Exterior roller blinds in aluminum housings.

West Building

110,600 SF
12 Stories
40 Suites

East Building

57,000 SF
8 Stories
20 Suites

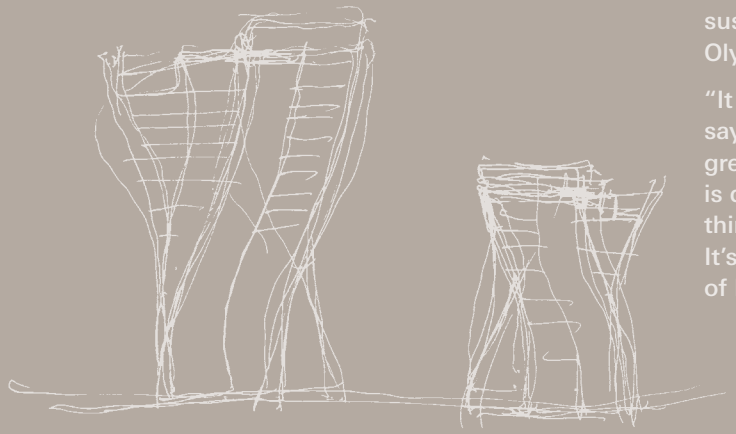
Jutting into False Creek and surrounded by open space on three sides is Parcel 4. Architects Arthur Erickson and Nick Milkovich collaborated on the conceptual design for the parcel. Lawrence Doyle Young + Wright Architects, now known as IBI/HB Architects, carried out subsequent design with architectural services from Milkovich and Doyle during construction. "We were lucky, we got a great site," says Milkovich of the commission. "The challenge was to live up to it."

Originally, there was a U-shaped massing for the building, but the team was unhappy that the configuration produced inside corner suites looking into each other. Erickson argued for removing the centre and shifting the density to two higher buildings flanking a north-south garden. "Arthur said it opened the middle and let the sun through to the waterfront," says Milkovich. "It opened views for Parcel 3, and created a semi-public garden."

Managing the height became a challenge, however, due to a public garden to the west. "We leaned the back end of the west building to avoid shading at certain times of day," says Milkovich. "Then you have to lean the other end to counteract it, for seismic reasons. That's how the form came about."

"What intrigued us was how to clad something like that," he says. "You can't do standard residential tower glazing, so we developed something we called fishscale – a series of metal and glass panels that stepped to follow the shape. It's texture; it articulates the form."

With the death of Arthur Erickson in May 2009, Parcel 4 is the last design by one of Canada's most revered architects.



Design with a Twist

It's described as a deck of cards that are twisted – each floor offset so the shape of the building changes as it rises. But a simple description doesn't translate to simple construction.

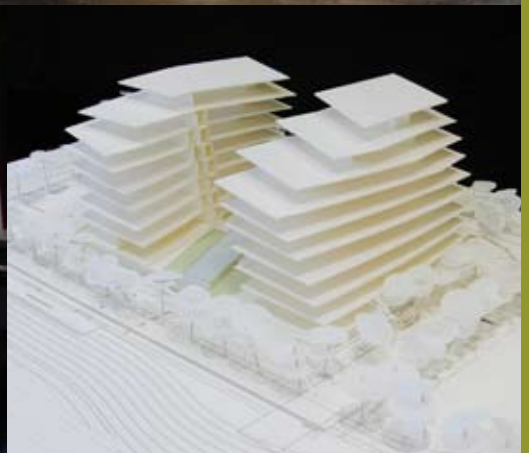
"The design is extremely intricate, extremely complicated," says Doug Dalzell of Keith Panel Systems, the company that engineered the building's cladding. "To comprehend what Erickson was up to takes a lot of time, because it's very subtle. There are over 7,000 panels on the job, and hardly one the same as any other."

"Very little was not challenging," agrees architect Brian Sim of IBI/HB Architects. He gives multiple examples: unstable post-industrial soils, parking below sea level, contractors developing city streets, buildings and waterfront at the same time and the site-wide challenges of implementing sustainability measures against the Olympic deadline.

"It was intriguing, and fulfilling," says Sim. "There's going to be a great sigh of relief when [the Village] is done. But it was one of those things you like to be involved with. It's going to stand out as an example of how progress can be made."

The design is extremely intricate, extremely complicated… to comprehend what Erickson was up to takes a lot of time, because it's very subtle.

At left, a concept sketch of Parcel 4 by Arthur Erickson. Above, Parcel 4 under construction. At right, a paper scale model highlights the unique twisting of the building forms, "like a deck of cards you put your hand on and twisted."



PROFILE

Nick Milkovich

MAIBC, FRAIC
Nick Milkovich Architects Inc.

"Becoming an architect is a long maturing process," says Nick Milkovich, reflecting on a lifetime of craft. "It's a lifelong journey of exploration, and in that is the joy."

Milkovich enjoyed his work on the Olympic Village, particularly the collaborative problem solving with other building professionals as the team brought Erickson's twisting building design to life. "I enjoy the act of building something," says Milkovich. "I had a feeling that in today's world of time and budget concerns the ideal and pride of building exceptionally was slipping away. But there are times when everyone is intrigued by the challenges of a project where the people doing the work get excited and take pride in their efforts. In some respects that was evident on the Olympic Village project. I hope some of that enthusiasm can be built on."

Milkovich says the evolution of architecture towards sustainable design is crucial. "I think [sustainable design] is really common sense. Even if we didn't have to do this because of the abused environment, it's the right thing to do. We've just beaten up on the planet and taken from it, and it's time to get in sync."

ARTHUR ERICKSON, IN MEMORIAM

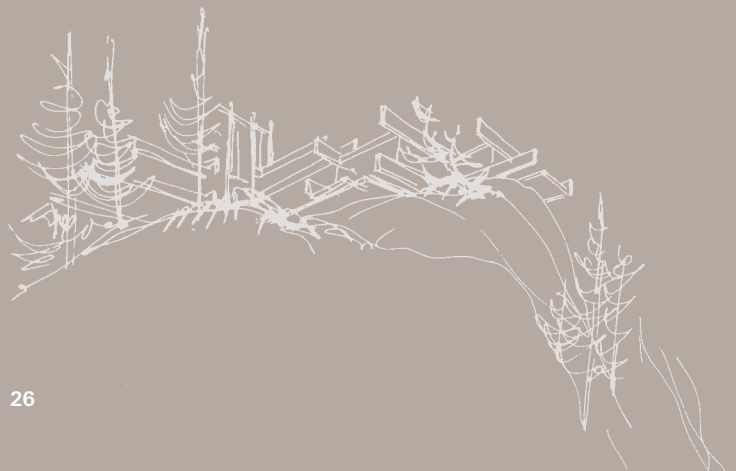
Arthur Erickson, celebrated internationally as Canada's best-known architect, died on May 20, 2009. With his involvement in two of its parcels, the Olympic Village has become the home of his last designs.

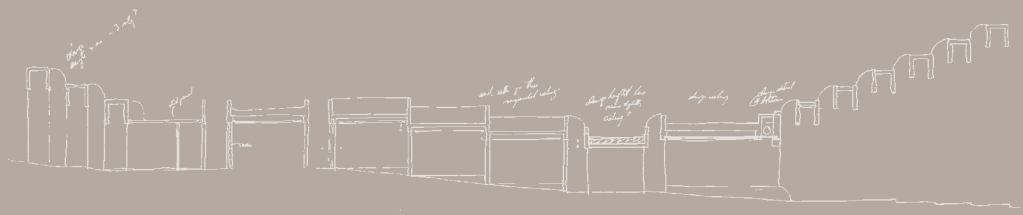
His influence reaches beyond his own work, however. In recognition of his contributions not only as a designer but as a mentor to many in the Vancouver community, *The Challenge Series* invited several of Erickson's colleagues to share their memories of him.

In 1973 I was just out of school and thrilled to get my first job in Arthur's office. What left an impression on me were team meetings. There was equality, in that everyone was there. You were not discouraged from giving your opinion; in his office, it was about developing ideas. The "stramps" [combination stairs and ramp] at the law courts, for example – it got put out there by a young graduate and it stuck, it got built.

The culture allowed everybody to be a part of the process. Both my partner and I worked with Erickson, and we both feel that a studio environment is the way to run a practice, where the best idea is what's important. In terms of the process and the environment, I think we did take away something from Arthur. The way we work here, I'm trying to nurture that.

Russ Chernoff, Chernoff Thompson Architects





Arthur really stayed true to his craft. That was his mentoring, to show people you can stick to a discipline. I don't care if you're building thatched roof cottages; you didn't have to compromise. That strength was also Arthur's weakness, why a lot of people were hesitant to deal with him – he didn't waver, he stayed on message. That's the most important thing he could show young architects: that it's okay to not be everything to everybody.

Whether you're a big fan of Arthur Erickson or not, we Canadians don't celebrate our achievements enough. I thought Arthur was a part of the fabric of Canada, and it was really important to get him down there [to the Olympic Village]. He left Canada's mark on the world, he carried that flag and torch for us. I think we should celebrate the few world citizens we have. Whether controversial or celebrated, he still was doing it.

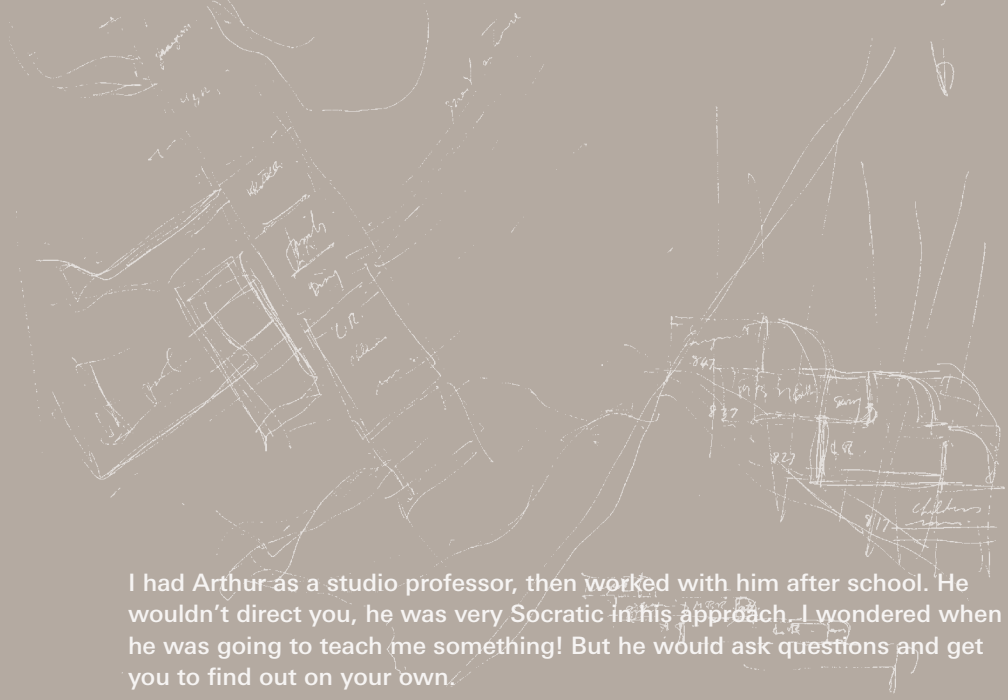
Bob Rennie, Rennie Marketing Systems

I started in 1973 in Arthur's office and was there for nineteen years. It was an incredibly young multicultural office, which was exciting. It was a real adventure.

People often talk about Arthur's office as a learning office. His approach was one of no preconceptions in terms of solution; rather, a profound understanding of program and site. The testing, the searching for solutions was a wonderful experience; the idea would lead you, it was bigger than the participants. The youngest people on staff really got Arthur's ear; he had a talent for including layers of ideas from a wide palette of people.

In addition to the big names, there's a whole generation of architects whose names you may not know, but they talk about how that experience in his office influenced their career and thinking, and the importance of architecture in their lives.

Rainer Fassler, Stantec



I had Arthur as a studio professor, then worked with him after school. He wouldn't direct you, he was very Socratic in his approach. I wondered when he was going to teach me something! But he would ask questions and get you to find out on your own.

There was a variety of opinion about what our role was as his associates. Some thought we were interpreters of Arthur. I didn't buy into that; I thought we were co-explorers with him. He would intimate something, or ask questions, and solutions would come.

That was always the interesting part of his office. He wasn't the autocratic leader of the office, he was the explorer with you. There were many opportunities for people working there to play and to explore. That was the magic and opportunity, and that's why many could confidently go out and start their own practices.

Nick Milkovich, Nick Milkovich Architects

I think Arthur was the first, and maybe only, international architect that Canada has produced; what it taught me as a young architect was to open my eyes to a bigger world beyond Vancouver. In the 1970s he was already doing work in Saudi Arabia, in Japan, in India. He always came back with slides, and when we designed, he talked about other cultures. He showed me images of India he used as inspiration for SFU, for example.

What I got from him is that we're not limited to the spot where we stand on this earth. We should learn from and absorb other cultures and other experiences, expand our horizons beyond what we're working on today.

The other thing I remember from Erickson: he would never accept anything as complete; he would not put his pencil down. He would come back from travelling and make us change it all. Human sacrifices, financial sacrifices, were not the top priority – to him the ultimate goal was the best work he could create.

When I look at the Olympic Village site, there's an idea about trying new things and expanding beyond the norm of what is Vancouver. I think that is in the spirit of what Erickson would want. He wouldn't want to see us repeat.

James Cheng, James K.M. Cheng Architects

Concept sketches by Arthur Erickson for a number of his buildings.

THE COMMUNITY CENTRE – PARCEL 11

PARCEL 11 STATS
Usage: Community Centre/Daycare
Materials: Zinc, glass, concrete.

West Side
2 Stories

Community Centre/Daycare
45,000 SF

East Side
3 Stories

With the construction of a new neighbourhood came the need for new amenities. A community centre was assigned a spot on the waterfront at the northeast corner of the Olympic Village. Architects Nick Milkovich and Walter Francl collaborated on the design, with early ideas contributed by Arthur Erickson.

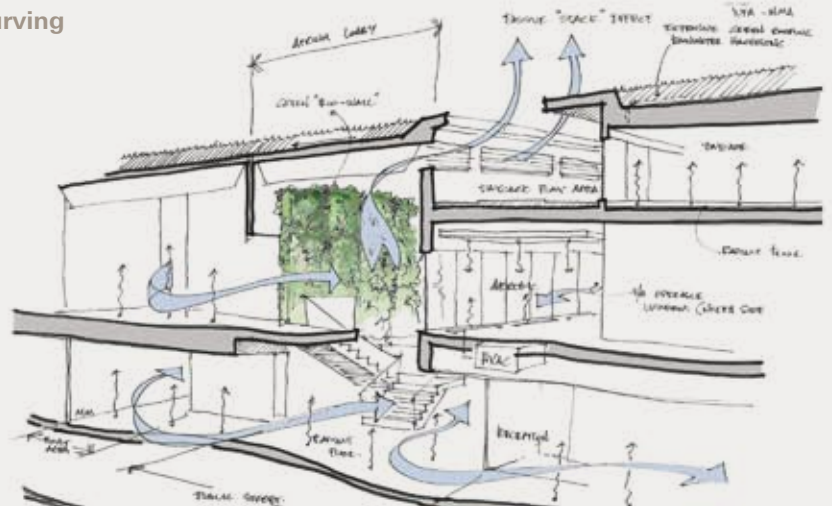
"We were given a fairly complex program," says Francl. "It's not just a community centre; it's a day care and a boating facility, as well as a two-storey restaurant."

The site offered additional challenges. "It's such a long space – 100 feet deep, and it felt like two miles long," says Milkovich. "So shaping it to create a gathering space, and opening it to the street and to the water, those were key." To protect residential views, the community centre was limited to two storeys at the west rising to three at the east.

"What transpired was a building form that presents a strong unified presence yet is as transparent as possible to the street," says Francl. "You can see through the lobby, into the gymnasium, into the various elements of the restaurant. Then its curving form on the north side embraces a plaza, to enclose the space a bit." The building's lobby is broken with a two-storey space that provides walk-through access from the street to the waterfront. With so much glass, extra attention to shading was required to prevent overheating in the sun.

Francl says designing for a community that doesn't yet exist – and has no local residents to speak for it – was unusual. "We tried to respond with a design that has a powerful forward-looking feel," he says. "It's a LEED Platinum building [in the summer it may generate more power than it needs] so we wanted something that really embodied future thought about what a green building would look like. It's futuristic perhaps, but it has a very elemental quality with zinc and concrete and glass; it might have erupted out of the ground itself."

Boating groups will use space on the main floor, while the day care will occupy the top floor of the building, with a large outdoor play space on the roof. Says Francl, "It has a magnificent view out over False Creek. It's going to be the nicest day care in the city."



Above: Parcel 11 elevation drawings from all sides.
At right, a sketch shows relationships between passive design features and mechanical systems.

From early scale models to laying the sod on the green roof, the community centre becomes a reality. The building is aiming for LEED Platinum certification.

PROFILE

Walter Francl

BSc, BArch, MArch, PEng, MAIBC, LEED-AP
Walter Francl Architecture Inc.

Interested in building since he was a child, Walter Francl studied structural engineering and then enrolled in architecture. He worked for James Cheng before pursuing a master's degree at Harvard University. Back in Vancouver, he worked for the firm that would become Stantec, and then launched his own practice.

Francl has worked on a number of projects for the Vancouver Park Board, including the Kitsilano Community Centre, Ray-Cam Cooperative Centre and Trout Lake Arena. He collaborated with Nick Milkovich and Arthur Erickson on the community centre at the Olympic Village.

"It's been a bit of a nail-biter," Francl says of the project's tight timeline. "It's exhilarating and rewarding too. The glaziers and the metal cladding applicators really want to do this job right, they're very committed. I think everybody rises to it for a job that's of this caliber."

Francl says the SEFC project is important in its effort to rethink the urban context. "This is going to be a new typology for North America in terms of building type, and Vancouver has led the way. I think everybody's going to be quite amazed when they start walking around. It's been an inspiration. I'm happy to have been involved."

THE SALT BUILDING – PARCEL 7

PARCEL 7 STATS
Usage: Restaurant and Commercial Facility
Materials: Woodframe

- Woodframe heritage building built on piles on original SEFC shoreline
- Preserved as part of cultural heritage of the site
- Upgraded foundation, new basement at north end of building

The red industrial building at 85 West 1st Avenue has been a familiar Vancouver landmark since it was built in the 1930s. The building originally housed a salt-processing operation, which received salt from the San Francisco area and refined it – by washing, drying, grinding and sifting – for use in the fishery and other food and industrial applications. Later, the building was used for paper recycling.

At one time, only the southwest corner was located on shore; with the balance of the building supported on piles. A complex roof truss system helps create a large open space inside, while a raised monitor roof with clerestory offers light and air to the space below.

Character-defining elements of the Salt Building include:

- A broad building with a medium-sloped roof and gable
- A monitor roof with clerestory containing a row of 15-pane windows and cedar ventilation louvres
- A taller, silo-like, gable-roofed feature at front of monitor
- Wood stud walls, covered externally with diagonal sheathing and horizontal finished siding
- A large, open interior space, interrupted only by a row of columns down the centre
- Elaborate roof truss and knee braces, composed of wood members with metal fastenings and hardware
- A wetland beneath the building

Links to the Past Made New

"It's nice to see a piece of heritage in the middle of this new neighbourhood, to tie it to another time," says Warren Schmidt of Acton Ostry Architects, the firm that redeveloped the Salt Building. "It makes the history much more real."

Acton Ostry worked to preserve heritage details (see list, above) while prepping the building for LEED Gold certification and its new role as home to a brew pub and coffee roaster.

"The interior is retained as a big open space, respecting the form of the building and the mass of it," says Russell Acton, principal. "We cut giant windows in either end so you can see through the building and present that amazing viewport to passersby, to invite them in."

Acton says the building's new usage suits its history. "It's a working use – baking bread, roasting coffee, making beer – producing food for the neighbourhood. It's not too pretty in there; the interior shouldn't be prettified.

"Doing something like the Olympics, it makes you feel good. Beyond that, you feel hopeful for the community. You never know if it will be a success because you never know how people will respond. Yaletown [another Vancouver waterfront development] took off fast. Will Southeast False Creek? We hope so."

There's a sense of craft about this building… it's rough outside, but inside, the beauty that it was constructed with is really quite striking.

Salt Building redevelopment renderings anticipate a highly animated and inviting gathering space for the community. Large windows cut into both ends admit natural light and create interaction with the plaza and street. The building will house a brew pub and coffee roaster.

CHALLENGE

To LEED and heritage conservation experts, to consider ways to ensure LEED certification encompasses heritage preservation, in order that sustainable buildings retain and reflect community cultural heritage while ensuring excellent environmental performance.

The Importance of Envelopes

It's not the first thing people think about when buying or renting a suite in a building. However, the building's envelope – the system of materials and components that separate the interior and exterior environments – is one of the most important elements in ensuring comfort, both in terms of interior comfort and in investment risk as the building ages and is matured by weather over time.

The target set for building longevity in SEFC is a minimum 50-year lifespan. Building design was also expected to target LEED Gold certification, requiring a high degree of performance and energy efficiency. An appropriate envelope design is critical to achieving these goals.

Building envelope knowledge has progressed since a wave of "leaky condos" made headlines in Vancouver throughout the 1980s and 1990s, as new materials and architectural styles were adopted in the city without adequate knowledge of their performance in the local climate. As a result of this experience, Vancouver is now one of the most stringent jurisdictions in North America in terms of rainscreen and envelope design, mandating the involvement of professional building envelope engineers.

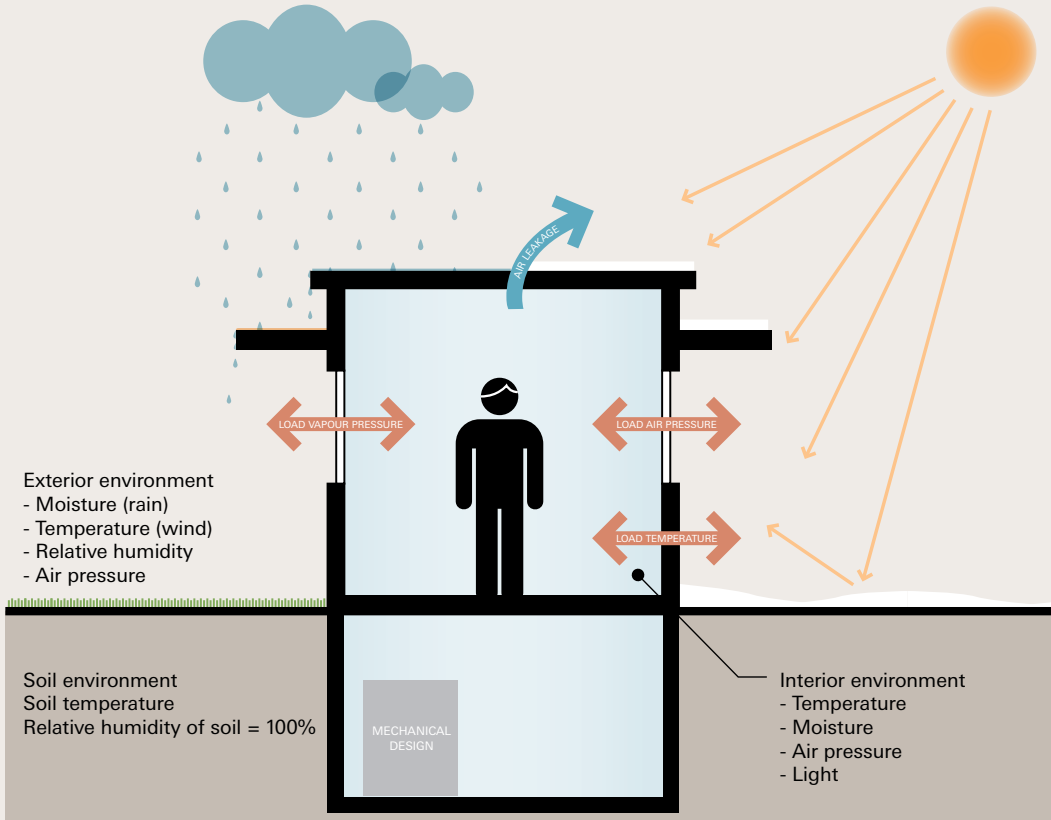
KEY ENVELOPE PRINCIPLES **The main function of the building envelope is to manage the flow of air, moisture and heat between different environments, typically exterior and interior. This helps prevent material deterioration, corrosion, mold growth and heat loss.**

Moisture Control

Especially in a rainforest location, one of the envelope's critical roles is to manage the penetration of rain into the building wall system. There are four key elements to effective moisture control:

- **Deflection:** rain should be deflected so it avoids hitting the wall system, and is effectively shed from the system when it does;
- **Drainage:** walls should incorporate a cavity behind the cladding, with drainage to the exterior in case any water does penetrate the cladding;
- **Drying:** the wall system must anticipate the possibility of moisture being absorbed into the wall, and provide safe storage until this moisture can dry to the exterior. The design must provide a drying time that is less than the safe storage time (the wall must regularly dry out); and
- **Durability:** the materials must be able to endure the safe storage requirements, and must perform their function without excessive maintenance, repair or renewal.

A building's envelope is one of the most important elements in ensuring comfort.



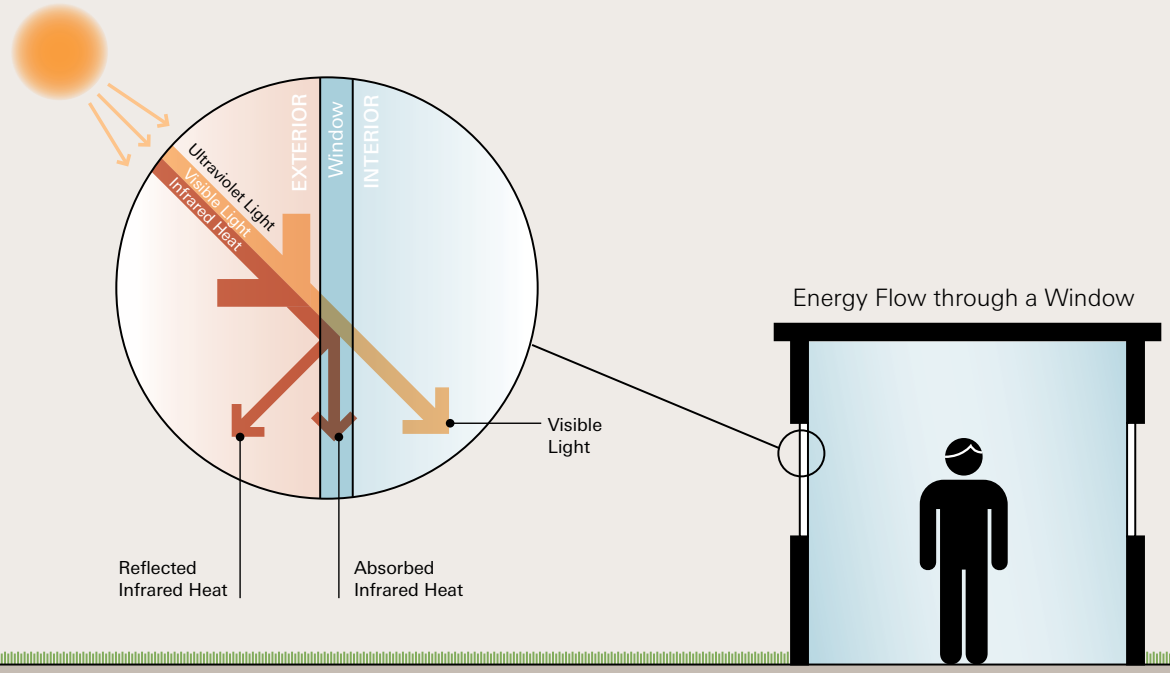
Air Leakage Control

Building envelopes must control the leakage of air between interior and exterior spaces to ensure occupant comfort (loss of heat, prevention of drafts), as well as to resist condensation inside the wall. The envelope must perform consistently through air pressure differentials that can be caused by wind, mechanical pressurization or stack effect (the movement of airin or out of a building due to temperature differences between the interior and exterior). An effective air barrier must consider:

- Continuity
- Structural support (both directions)
- Impermeability to air flow
- Durability
- Constructability/quality assurance.

Thermal Performance

Reducing heat loss directly relates to maintaining energy efficiency. An effective envelope therefore plays an important role in achieving the building's energy performance targets. Buildings at SEFC were expected to achieve thermal performance of R-16 (net) within walls and an R-value of 2.4 (net) for the complete window system. The ratio of wall to window was a consideration in developing good thermal performance, as large windows are valued by tenants but reduce energy efficiency. In addition, placement of the insulation within the wall assembly has a significant impact on its thermal performance, as described on the following pages.



The primary role of the building envelope is to separate different environments.

EXTERIOR INSULATED WALL ASSEMBLIES

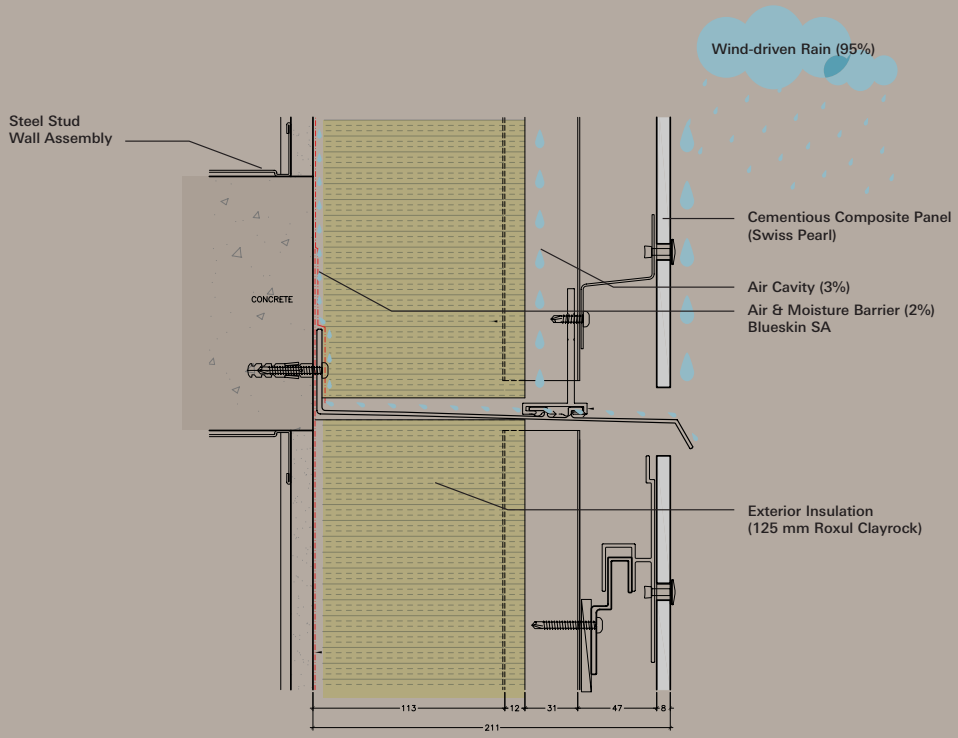
Energy efficiency in the Olympic Village is greatly enhanced by a decision to use an approach to insulating and cladding that is not yet widely adopted in mainstream building. All new buildings in the Village have implemented "exterior insulated wall assemblies" – meaning the insulation is wrapped around the outside of the buildings' moisture barriers.

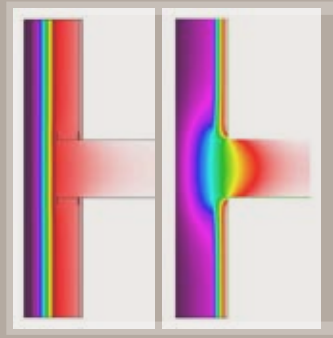
"There's a continuous moisture/vapour membrane around the whole building, and then you have the insulation all on one plane outside that," says Dave Fookes of Morrison Hershfield. Fookes is the envelope engineer for the entire Olympic Village site.

Typical wall assemblies intersperse insulation between a building's steel studs, then wraps the moisture barrier outside this stud-and-insulation layer. This uses the 3.5 inch space occupied by the studs, maximizing the floor space ratio and endearing the system to developers who seek to market the most space possible. However, interior insulation between the studs is not as effective resulting in a building that is less energy efficient - and can have negative impacts on durability.

"Most buildings have three-and-a-half inches of insulation between the studs [the studs themselves are a thermal bridge]," says Fookes. "At the Olympic Village, there is four or five inches of continuous insulation [not interrupted by studs], which will provide better performance." Fookes explains that metal studs that touch the exterior membrane also conduct cold into the warm interior space, creating a risk of condensation inside the wall. "The exterior insulated approach allows you to keep all the interior components of your wall warm and dry – and your living space at a more constant temperature. You reduce the risk of condensation and corrosion of your wall stud fasteners – a potential failure point."

Fookes says exterior insulated wall assembly construction may cost a bit more, primarily due to installation logistics (and contractors unused to the system). Reduced operating costs and reduced risk of wall failure (as happened with many leaky condos) can be expected to more than compensate for any upfront costs over time.





Top: Section of exterior insulated wall assembly shows insulation wrapped around building outside the studs.
Bottom left: Exterior insulation prevents thermal bridging (metal studs becoming cooled and leaking heat to the outside).
Bottom right: Exterior insulated rainscreen wall assembly being installed at Olympic Village.

With so many contractors and sub-trades involved, and with the City's goal of making this a real demonstration project, many people became more familiar with building envelope technologies. Education was definitely part of the project – everyone learned from each other. Dave Fookes

Keith Panel Systems' "System A" rainscreen wall underwent rigorous testing before it was installed, to ensure it will perform as expected. At left, a test section of wall is subjected to hurricane force winds and water from an airplane engine.

"We built several sections of wall at the testing facility in Coquitlam," says Doug Dalzell of KPS (profile, page 37). "The tests included seismic racking, dynamic water penetration, and a rainscreen evaluation. It's very comprehensive." A custom application of System A was installed on the twisting façade of Olympic Village Parcel 4.

CHALLENGE **To municipal planners and developers, to negotiate appropriate adjustments to floor space ratio (FSR) requirements for new developments, to encourage and facilitate the application of exterior insulated wall assemblies (which require a thicker wall), to improve durability, moisture performance and energy efficiency across all new building stock.**

PROFILE

Dave Fookes

Morrison Hershfield

A materials engineer previously employed in construction, Dave Fookes developed an expertise in building envelope materials. This led him to work with Morrison Hershfield, a respected envelope engineering firm.

"I decided rather than be on the contract side, I'd go to the design side," says Fookes. "Contracting is always about money – you might have a better idea but if it costs 10 cents more the other guy will get the contract. I wanted to help solve problems and come up with new solutions instead."

As the envelope engineer of record for the entire Olympic Village, Fookes has had plenty of opportunities to do just that. Multiple contractors had to learn exterior insulated wall assembly while using a variety of claddings and incorporating elements that pierce the membrane, such as sun shades.

"It's been rewarding to work on this project," says Fookes. "The City wanted a high profile project with high levels of performance using newer ideas. So they've been open to trying things, and quick to make decisions.

"I think this project will demonstrate what can be done in terms of building performance and durability – it has helped raise the bar."

A variety of insulation and cladding materials were used throughout the Olympic Village site. These include:

ROCK + SLAG MINERAL WOOL INSULATION (ROXUL)

- Manufactured in BC
- Consists of basalt rock and recycled Steel slag, with a minimum 40% recycled content

GREEN ROOF

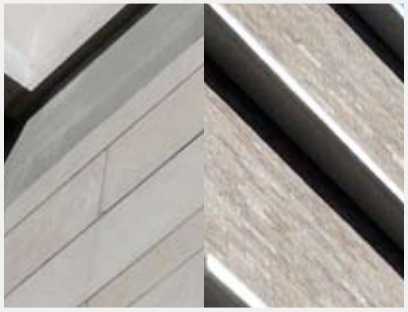
- A growing medium, planted over a waterproofing membrane and structural support.

FRITTED GLASS

- Glass with enamel image fired onto surface
- Allows durable colour options

ALUCOBOND, REYNOBOND

- Metal composite sheet materials with durable finishes
- Can be shaped to suit varied architectural applications
- Low maintenance



MASONRY

- Brick, limestone

SWISSPEARL

- Fibre reinforced cement panel available in wide variety of colours
- Durable, low-maintenance

ZINC

- Known for durability, longevity and low maintenance

"What was the challenge? It was a huge project with strict budget and schedule constraints, but the world was told that these buildings would be 'state of the art' – so we all accepted the challenge to get them to that level."

Doug Dalzell

Choosing Materials for Sustainability

The longevity of building systems and materials is an important element of sustainable building design. Buildings that require substantial maintenance or repair over their lifetime consume more resources than those that endure the elements and manage human activity with little upkeep.

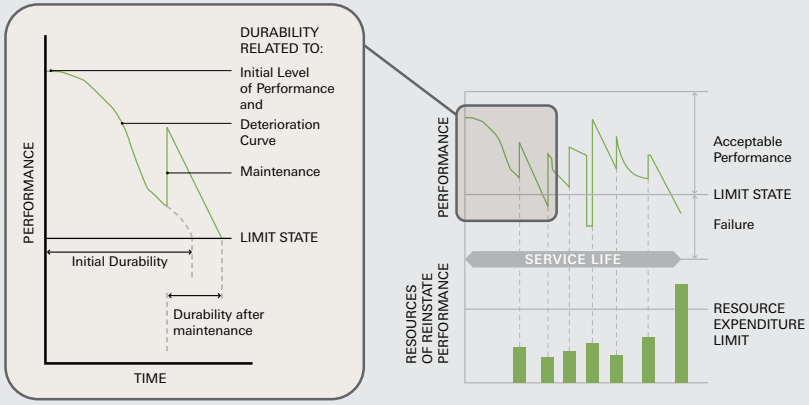
One method of considering the sustainability of building design is to assess the embodied energy in the materials used, factored over the expected lifespan of the building. Embodied energy includes the energy required to extract and transport raw materials, manufacture building materials, transport them to the site and install them – plus the additional "energy expense" of maintenance (i.e. powerwashing, painting), repair (replacing worn materials) and discard (or recycling) of end-of-life materials.

Other key aspects in assessing the sustainability of building materials include:

- Travel method and distance – not just the distance travelled from extraction to installation, but the means (i.e. rail consumes fewer resources than truck);
- Reuse – reusing existing materials decreases resource depletions;
- Recycled vs. virgin – materials with a high percentage of recycled content help reduce the use of virgin resources;
- Adaptability, flexibility, ease of disassembly – materials that are adaptable for future uses, and easy to dismantle for reuse.

LEED Canada (Leadership in Energy and Environmental Design) offers one credit based on the durability of building materials chosen.

Testing



Loss of Performance (Deterioration) over Time – Effects of Maintenance and Renewals

Diagram charts the loss of performance (deterioration) over time and highlights the effects of maintenance and renewals. Durable design can save money over the long term.

FEATURE PROFILE

Keith Panel Systems

Keith Panel Systems (KPS) is a North American leader in the design, manufacture, and installation of rainscreen wall systems. Doug Dalzell and Garry Wong established the company as part of the Keith Group in 1986. KPS now employs 160 people, with the head office and manufacturing facility located in North Vancouver.

"Our business is always challenging," says Dalzell. "We are the last people on the façade, so we have to manage the accumulation of tolerances that occur during the construction process. In the end, our job is to make sure the project ends up looking as it was originally conceived. Sun, wind, and rain beat on the building envelope – these walls must perform on many levels, so they have to be done right."

Architects utilized Alucobond and Swisspearl as their materials of choice for the Olympic Village. These products provide aesthetic value, low maintenance requirements, and high longevity ratings. In addition, the panel systems provided by KPS incorporate pressure equalized rainscreen technology. "Overall, very innovative and properly handled design has been implemented in all aspects of the Olympic Village," he says. "I think at the end of the day everybody is going to be proud of what they've done."

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Millennium Southeast False Creek Properties Ltd.

Millennium Group is an award-winning Vancouver-based team of professionals and the developers of Millennium Water Olympic Village. They are renowned for their disciplined commitment to high quality architecture and luxurious design. At 1.4 million square feet, Millennium Water is the largest single-phase development in Canada. It is designed to be Canada's largest LEED Gold neighbourhood and a leading model of how to build a sustainable residential community.

The City of Vancouver

The City of Vancouver prides itself as being one of the most livable cities in the world. The City has now also adopted the target of being the "Greenest City" in the world by 2020. Vancouver has received several awards for its various services and programs, including a United Nations (UN) award for Innovation in Public Service and being among the four inaugural cities invited to join the UN's Carbon Neutral Network. To further support these goals Vancouver has spent over a decade in conceiving, and now developing, the South East False Creek Olympic Village as a global model for sustainable urban development.

Metro-Can Construction (OV) Ltd.

Metro-Can Construction is among the top 50 general contractors in Canada and the top five in British Columbia. Focusing on turning visions into buildings and delivering value to their clients, Metro-Can has completed over 280 institutional, commercial and multi-family residential projects. Since placing the first foundations on the Millennium Water project in June 2007, Metro-Can has proceeded to construct 10 LEED Gold buildings incorporating 540 condominiums, 250 social housing units, 60,000 square feet of retail space and a LEED Platinum community and boating centre.

ITC Construction Group

ITC Construction Group has proven capabilities in multi-unit residential, commercial and social housing construction projects. Established in 1983, they have successfully completed over 100 projects for private developers and public initiatives in BC and Alberta. ITC is proud to be the General Contractor of the eight luxury waterfront towers at Millennium Water. These LEED Gold certified structures consist of 315 condominiums and will be complemented by 13,619 square feet of commercial/retail space at the ground level. Quality Counts.

Rennie Marketing Systems

Rennie Marketing Systems (RMS) proudly leads the sales and marketing campaign for the residential component of Millennium Water. Led by Bob Rennie, RMS works closely as 'Millennium's representative' to bring to market the most innovative sustainable community in North America. Maintaining the project's identity of environmental awareness, RMS utilizes eco-friendly elements throughout the marketing campaign. RMS marketing objectives extend beyond sales achievements and include increasing global awareness of a new standard of development.

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Durante Kreuk Landscape Architects

Durante Kreuk is an award-winning landscape architectural firm with over thirty years' experience in the private and public realms of design and development. A broad perspective and diverse thinking are the key to creating a wide range of sustainable, people-focused urban places. At Millennium Water, the unique challenge of creating a sustainable neighbourhood through an integrated design process was both complex and rewarding. The result speaks for itself.

Olympic International Inc.

Olympic International creates comfortable, healthy and energy-conscious indoor environments. As a manufacturers' representative, they are committed to bringing the world's most innovative and sustainable technology to local markets. The Millennium Water project utilizes radiant heating and cooling technology, which will substantially reduce energy consumption and system noise, increase available ceiling height and improve overall thermal comfort and indoor air quality.

Enerpro Systems Corp.

Enerpro Systems Corp. are market leaders in intelligent energy management for new construction and infrastructure upgrades to existing buildings. Since 1996, BC's only customizable energy management programs have been providing no-cost, full-service solutions that maximize efficiencies in energy and water use, reduce consumption and provide numerous economic benefits. This groundbreaking innovation has spurred a series of firsts in energy management, such as the ability to view a real-time display of all energy and water consumption within 1,100 housing units at Millennium Water.

Keith Panel Systems

Keith Panel Systems (KPS) is North America's leader in the design, manufacture and installation of rainscreen wall systems. They are proud to be part of constructing Millennium Water. The wall systems installed by KPS will preserve the performance integrity of the exteriors, reduce the heating and cooling loads, provide an extended service life and are virtually maintenance free. Alucobond®, Swisspearl® and specialty glass are the quality exterior finish products featured on proprietary systems by KPS.

Wilco Landscape Westcoast Inc.

Wilco has become expert in the construction and delivery of built landscapes. Offering project management and landscape construction services for civil, parks and development projects, Wilco is a leader in successfully delivering complex projects to its clients. Wilco thrives on diversity and challenges and seeks out projects that require the depth of experience and knowledge that they have accumulated through the vast array of projects the company has built throughout BC and Western Canada.

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Next Chapter: Energy

Chapter Five will demonstrate the project-wide effort to reduce energy consumption. As buildings are a leading source of greenhouse gases in Vancouver, energy conservation is a focal point of the Olympic Village development. This chapter presents the integrated approach to energy systems at the neighbourhood, building and residential unit scale. Topics include sewer heat recovery, solar hot water, Net Zero building, radiant heating and cooling, and in-suite meters that encourage occupants to reduce their energy footprint.

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Information Sources

pages 6-7: City of Vancouver Passive Design Toolkit, http://vancouver.ca/sustainability/building_green.htm, http://vancouver.ca/sustainability/building_green.htm; page 14: Millennium Water website, www.millenniumwater.com

FRONT COVER Architectural photomontage of SEFC in August 2009 shows the complexity and diversity of the buildings that make up the Village.
BACK COVER In the heart of the Village, the construction of buildings and city infrastructure negotiate the narrow roadways as the completion date draws nearer.

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