

2010 Athletes' Village: Energy-Water-Equity

BY BRENDA MARTENS

“The Vancouver Olympic Village will be located in the downtown core within walking distance of the Olympic Stadium and 20km of all competition venues. The Village is located on land historically used for industrial purposes that is being rehabilitated and developed as a model sustainable community.”

From the Vancouver 2010 Olympic Bid



Site of future Olympic Village, 1930 [Vancouver Public Library]

The site of the Athletes' Village for the 2010 Olympics in Vancouver sits within a larger development, a former industrial area known as South East False Creek (SEFC). Being a location where goods could flow easily from water to rail and road, False Creek was established as one of Vancouver's harbours at the end of the 1800s. The industries that located there, including saw mills, warehouses and shipyards, were based on the raw resources of the region. The area was once thick with smoke and the smell of cut wood and sewage. The site, contaminated by these industrial uses (one of the most recent being a racetrack for the Molson Indy), is now being remediated. Streams that flowed to False Creek will be daylight again, and an area of wetland, fed by the stormwater collected on the site, restored. For all of SEFC, and within the Athletes' Village in particular, there is a remarkable story of environmental

stewardship unfolding. Amid the myriad of green building and planning best practices incorporated into the project, there are ideas that deserve further exploration so that they can be adapted and replicated in other municipalities, worldwide. A few of these ideas will be explored here.

WATER

What would it look like if we could follow the path of the rain that falls on the site? A drop that might fall on the street or sidewalk would find its way through the stormwater system to the manmade wetlands. There, before the rain recharges the ground water, the plants and soils would filter and biodegrade the contaminants gathered by the rain, largely mimicking the natural conditions of the site prior to its development. Before its industrial past, SEFC was an estuarine wetlands - the

land underwater, converted by fill over the course of approximately eighty years of the site's history.

.....
“What would it look like if we could follow the path of the rain that falls on the site?”
.....

The rain would, however, be more likely to fall on one of the many roof gardens or urban agriculture plots. Many of the Athletes' Village suites will have their own gardens for food production; of those that do not, almost one third will have access to a private plot in a community garden. The water detained in these roof gardens after evapotranspiration will eventually drain to



© Merrick Architecture - Borowski Lintott Sakumoto Fligg Limited

Rendering of Proposed Development

rain-water cisterns below the ground. After filtration, the water will be stored in the cisterns, waiting transport to one of two possible destinations. During the summer, the stored water will be used for irrigation - although Vancouver receives approximately 1.25m (49") of rainfall annually, 80 percent of this precipitation falls from October to April. In undeveloped conditions, there is sufficient ground water for native plants to draw from during the dryer summer months. In the developed condition of the site, underground parking has displaced the ground water so the cisterns will act as the rain-water storage in its place. During the fall, winter and spring when additional irrigation beyond the normal rainfall is not needed, the water available in the cisterns can be used for flushing (dual flush) toilets replacing 100 percent of the potable water normally required for this use. Now, if we

follow the path of the rain a little bit further, we find the rain-water has one more role to play prior to its return to the ocean.

ENERGY

The energy strategy utilized in SEFC relies on two key components: high performance buildings that minimize energy demand and a district energy system, referred to as the Neighbourhood Energy Utility (NEU) to ensure efficient and sustainable energy supply. District energy systems, on their own, are not that unusual. What makes this one different is the heat source. As we follow the path of the rain-water used for toilet flushing, it joins with other waste water leaving the site. It is this sewage that will provide a renewable, locally available source of heat for the system. When complete in 2009, this project will be the first use of this technology in North America, with

only three similar projects – two in Norway and one in Japan – currently in operation. This system is economically attractive, primarily because the waste heat recovery can be integrated with a new sewage pump station that would need to be constructed to serve SEFC regardless of the existence of the NEU.

.....

“In this case, sewage heat recovery has advantages over geo-thermal...”

.....

With what is essentially the same technology used to extract geo-thermal heat using heat pumps, the sewer heat recovery system captures heat from municipal liquid waste by passing raw sewage through a

heat exchanger where thermal energy is captured. In this case, sewage heat recovery has advantages over geo-thermal because the sewage is warmer than the ground and because heat can be directly transferred from sewage (versus the indirect transfer using a glycol medium for a comparable geo-thermal system). In addition, sewage heat recovery does not require the investment in the expensive sub-ground infrastructure needed for a comparable geo-thermal system. An electrically powered heat pump boosts the temperature from the 10 to 20 degrees Celsius typical of sewage, to the 65 to 90 degrees required for the NEU water distribution system, with one unit of electricity used to produce 3 units of heat energy (300 percent efficiency rating). This heated water will then be transferred to the NEU pipe distribution network, and energy transfer stations in each SEFC building will produce the space heat and domestic hot water (DHW) for residents.

Sewer heat recovery has significantly lower emissions than other options considered and the first phase of SEFC is expected to

reduce direct and indirect Green House Gas (GHG) emissions by 6,000 tonnes annually when compared to conventional heating. Natural gas boilers will augment the systems. However, because the buildings in the Athletes' Village make efficient use of the heat provided by the NEU by utilizing very efficient "capillary" radiant heating and cooling systems as well as exceptionally well designed building envelopes to minimize the amount of annual and peak thermal energy demand, these boilers will likely only be used on the coldest days.

Having performed its last direct service of conveying heat for the site, the rain-water will continue on, to treatment (including methane capture) and finally release, where it can continue the cycle once again. ■



BRENDA MARTENS has 16 years experience in the building design industry, and is one of the founding partners of *Recollective Consulting*, a green building and sustainable community consulting company based in Vancouver, BC, currently working on, amongst other projects, the Athletes' Village. Brenda also serves on the board of the *Cascadia Green Building Council*, a cross border chapter of the US and Canada Green Building Councils. www.recollective.ca



FROM LIVING BUILDINGS TO LIVING COMMUNITIES.
to register and find out more information visit www.cascadiagbc.org



08

APRIL 23-25 2008 VANCOUVER

LIVING FUTURE

The "unconference" for cutting edge leaders in sustainable development.