

# FEATURE PROJECT SHOWCASING SUSTAINABILITY

STORY BY CHERYL MAH | RENDERING COURTESY  
OF BUNTING COADY ARCHITECTS



**D**iscovery Green is raising the bar for sustainable commercial buildings with its high performance building design.

Located at Gilmore Avenue and Canada Way in Burnaby, the \$47 million project is the final and most prominent addition to Discovery Place, a 15 building business park that was created 30 years ago for high-tech research and development.

Designed by Bunting Coady Architects, the 150,000 square foot facility incorporates a number of innovative sustainable technologies that will no doubt make it a landmark building.

These technologies, many of which are new to B.C., monitor and micro-manage air quality, heating and ventilation, lighting, water usage and storm water recycling. The building is targeting LEED Gold certification but has the potential to receive platinum.

“We would like it to be a pleasant surprise if it hits platinum,” says Teresa Coady, principal at Bunting Coady Architects.

Originally designed in 2001, the project was shelved due to unfavourable market conditions until 2007. The five storey reinforced concrete frame building has three levels of underground parking and amenities include a fitness facility, nature trails and an all weather sports court. HSBC Bank Canada will occupy the entire building.

Discovery Green will be the first LEED certified building in the research park.

“I think it’s a testament to the strength of the design that it’s gone up and it’s still a LEED Gold building. We were already designing at that level in 2001,” says Coady.

She describes Discovery Green as an architecturally dramatic building with an exceptionally high level of performance. “You rarely see [this level of performance] except in a research facility that’s been designed specifically for that.”

General contractors Stuart Olson Constructors broke ground in August 2007 with substantial completion expected this April. Although the project has gone fairly smoothly, the challenging site conditions did cause delays during the initial excavation stages.

The site required an excavation about 40-50 feet deep and although the team was aware of the existing soil conditions, the occurrence of slip planes in the soil could not fully be anticipated.

“It was a very difficult site geotechnically,” says project manager Bob Moore. “We had to use shoring anchors and shotcrete and we did have a few small failures in the ground. We had to do some demolition work and rebuild

because the ground was literally moving.”

The building’s main structural system uses a high fly ash concrete mix. Approximately 14,000 cubic metres of concrete was poured for this project.

“The concrete we used played a considerable part in the LEED certification,” notes Moore. “In order to keep the schedule we had to use a special kind of concrete mix which is Agilia from Lafarge. They’re able to produce a mix that meets the fly ash requirements and also cures quickly enough to keep up with the schedule.”

Through their construction waste management efforts, Moore reports they are successfully achieving the target of salvaging, recycling and reusing 75 per cent of recovered construction materials.

At peak, a crew of 100 was on site. The project was impacted somewhat by a skilled labour shortage.

“There were times when manpower was difficult to find,” says Moore. “About 6-12 months ago when things were moving along in the industry there were still some issues with subtrades not being able to get manpower to site when we needed them. Not such an issue nowadays.”

The contract was originally developed as construction management but was then wrapped up into a lump sum contract.

“We’ve been working with the owner for a good 6-7 years pulling this together,” says Moore. “We’ve really taken the project from an original idea and worked with the team to develop the design so that we ultimately ended up with drawings that can be built efficiently and cost effectively.”

The tight budget was cited as the main challenge by Goran Ostojic, partner at Cobalt Engineering, who provided mechanical and electrical engineering as well as LEED consulting services.

“Definitely the biggest challenge was the cost of the project. It took a lot of team effort to keep the cost under control. Cost was a limitation but at the same time it brought creativity from the team,” says Ostojic. “I think it’s a great example of a sustainable building that’s been done in a cost effective way.”

In order to achieve the sustainable goals for the building, Cobalt incorporated unique mechanical and electrical systems.

“This building is going to be the largest VRF installation in North America,” says Ostojic. “In Japan and Europe this technology’s been used for over 25 years.”

The mechanical system known as VRF (variable refrigerant flow) offers simultaneous heating and cooling, exact temperature control and total heat recovery.

In conventional water-based heating and cooling systems, water is used as the medium to transfer energy throughout the building. With VRF, the refrigerant is the medium.

“The refrigerant moves through the piping and by having refrigerant it eliminates quite a few heat exchangers ...to transfer the energy so you increase the efficiency,” explains Ostojic. “The other thing with VRF, you can vary the flow of the refrigerant so you supply the minimum amount of refrigerant that’s necessary for the proper operation of the system. The sophisticated ability of the system is pretty unique.”

Extensive stormwater management and recycling, bioswale filtration, and low flow plumbing fixtures are all being used for water conservation. Harvested rainwater will be collected in an underground retention tank and used for toilet flushing and irrigation. More than a million litres of water annually is expected to be captured and used for both these purposes.

Water consumption will be reduced by 72 per cent while energy savings will be about 42 per cent less than the national benchmark.

“Lighting is a huge energy consumption so when we looked at different lighting systems, we chose a lighting control system called Encelium. It’s a first in B.C.,” says Ostojic.

The lighting control system offers light dimming, occupancy sensors, daylight harvesting and personal light adjustment options from a personal computer.

The innovative mechanical and electrical systems combined are expected to result in a low energy consumption of 139 kWh per square metre.

“To put that in perspective, the average building across the country is 450-600 kWh. And your normal good building is 200-300 kWh,” says Coady. “The Passive House Standard in Europe — the best standard out there — comes in about 120 kWh.”

The project has already won an award recognizing its energy efficient design, receiving the 2008 BC Hydro Power Smart award for innovative and sustainable building design.

“The project qualified for BC Hydro’s High Performance Building Program and with the energy savings calculated the project received an incentive of \$100,000,” says Ostojic.

Energy efficiency is also aided by the building’s envelope which features a double glazed, thermally-broken, curtainwall system with varied low-e and thermal attributes, to balance heat loss and heat gain according to solar orientation.

“The good thing about this building is it has a lot of north exposure so we were really able to maximize that as well as the views and the natural daylight without the solar gain,” explains Coady.

Locally produced and recycled materials have been used throughout and finishing materials such as carpets, paints and paneling have been carefully selected to minimize off-gassing from volatile organic compounds. The double height glass walls in the lobby create an airy openness while maximizing daylighting. The ceiling features a suspended wood slat system of denim (or Mountain Pine Beetle) wood.

“We’re also using a Dutch product for the cladding on the elevator course so these are all FSC certified woods,” says project architect Jaret Klymchuk.

Much of the natural landscape surrounding the site has been left undisturbed. An impressive vertical green wall is located by the main street entrance.

“This is a landmark building that shows developers that they can build to this very high standard for the budgets they have for Class A buildings,” says Coady. “We think it raises the bar for developer buildings and we also think it sets the bar where it should be for tenant demand. We think this is the type of building or better that we should be building today.”

Collaborative team work was key to the success of this project.

“It’s been a really good example of working as a team and using the integrated design process,” says Klymchuk. “Discovery Parks is a great client. If you have the right developer that wants to do the right thing it makes our job a lot easier.” **CB**

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