

351 Water Street

2016 Canadian Consulting Engineering Awards



Creating
healthy,
sustainable
spaces



What's inside

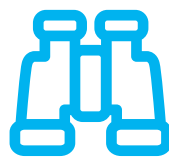
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View of revitalized West end
of downtown St. John's taken from 351



View of historic East end
of downtown St. John's taken from 351





360

degree views are maintained around the building through a centrally located floorplate.

Introduction

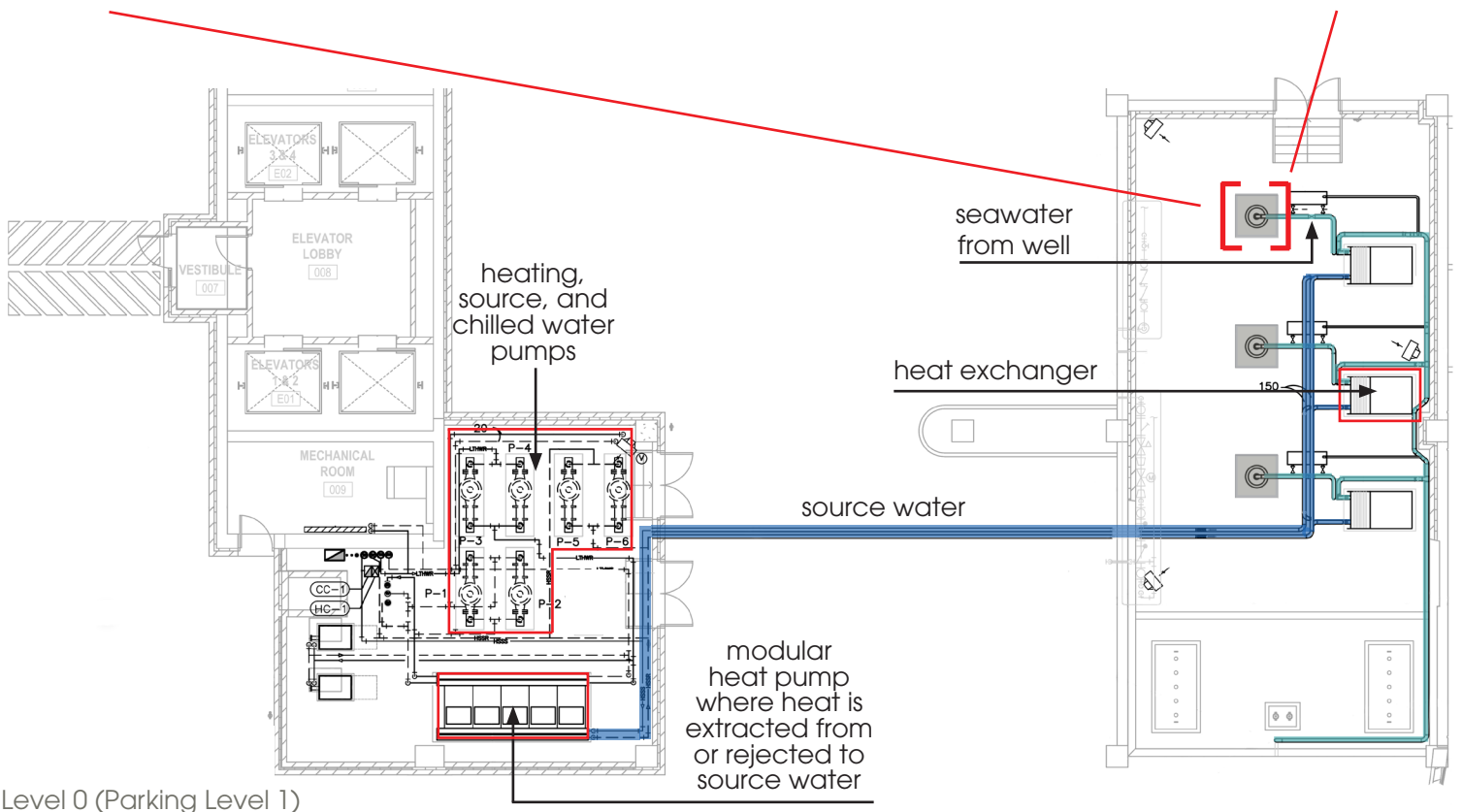
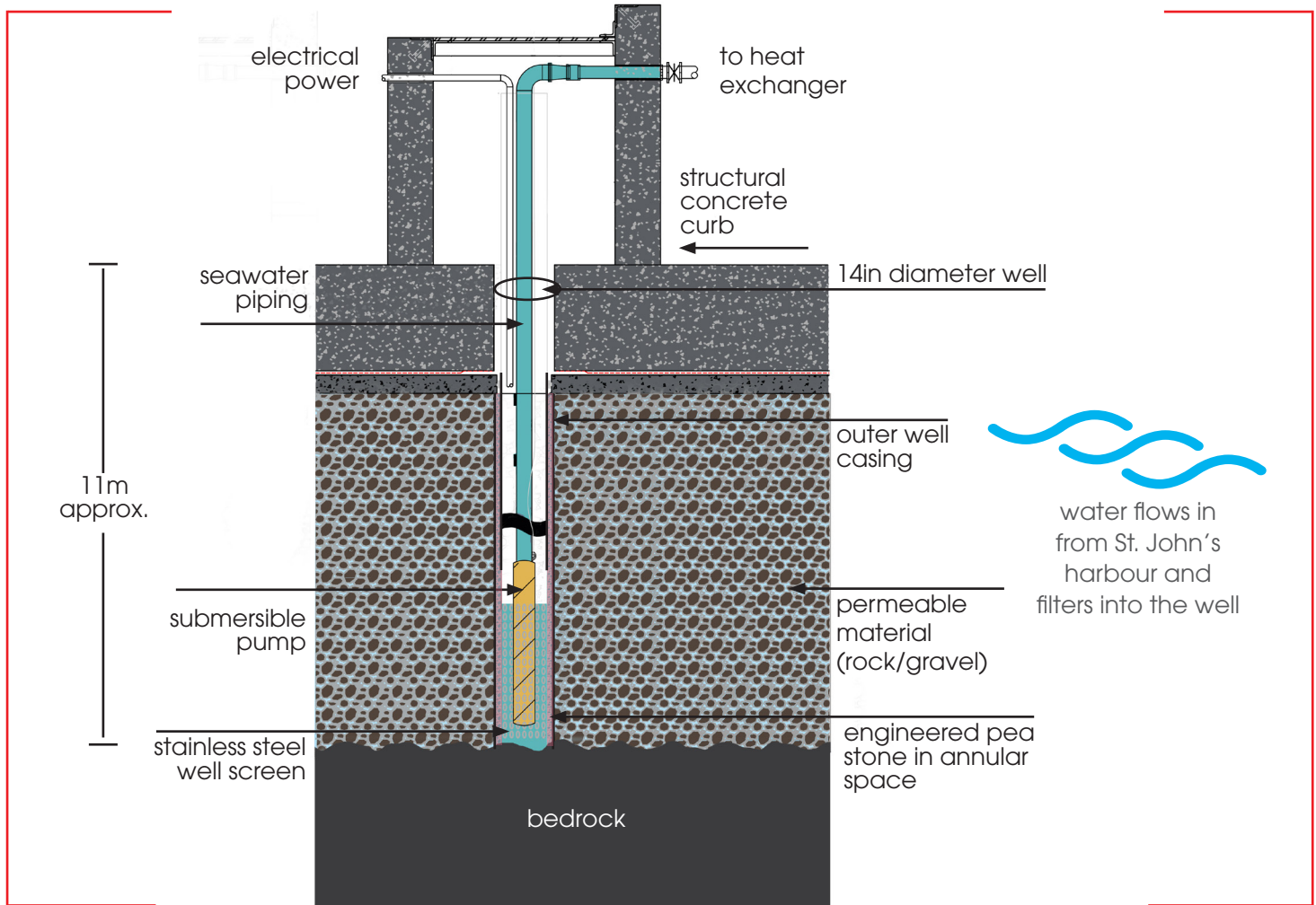
East Port Properties wanted to provide the healthiest most human environment possible for people working in downtown St. John's by creating a sustainable, innovative office building. Stantec designed a 15,000 SM office tower standing above a 6 level parkade, and prime retail and commercial space. It is the first building in Newfoundland and Labrador to be heated and cooled using seawater, resulting in 35% less energy usage. 351 Water Street is targeting LEED® Gold certification.

A major development in support of revitalizing the West end of downtown St. John's, 351 Water Street displays a balance of modern sophistication while taking inspiration from its historic surroundings. The site also borders on the industrial port on the waterfront. The design vision was to respect the older historic scale on the Water Street side and celebrate the modern industrial setting of the waterfront.

Tenants on all 6 floors benefit from views of St. John's harbour, colorful Downtown, and scenic Waterford River Valley. The floor plate of the building is centrally located so that the 360 degree views are maintained around the building.

Work station layout and neutral interior colours focus views to the outside such that background 'live pictures' of the harbour and city are prominent. On the east side of the site, circulation through the retail and restaurant public spaces maintains the historic public circulation lanes between Water Street and Harbour Drive. This old lane referred to as Duder's Lane, has building signage to signify the access points. The layout enhances the important connection between the mercantile commercial activity of Water Street and marine industrial activity of the waterfront which were historically reliant.

Geo-exchange Seawater Well





building in Newfoundland and Labrador to be heated and cooled using seawater, resulting in 35% less energy usage.

Q.1 Innovation

351 Water Street was the City's first major development to be constructed in 25 years when it was completed two years ago. East Port Properties, the building owner, has a reputation for being a leader in the development of sustainable buildings and saw the advantages of using the renewable energy source at its doorstep – the St. John's harbor.

The building sits on low lying, manmade land that consists of highly permeable geological material and fill. We decided to see if it were possible to extract or discharge energy from the seawater that permeates the underground soils below the building.

Our team investigated published and posted literature, but could find no similar instance of this type of energy interface having been attempted. We completed hydrogeological testing at the site to confirm whether vertically-drilled water wells could produce the required volume of water for heating and cooling the building. A test well was drilled in order to carry out aquifer testing, water quality analysis, and to determine the long term sustainable yield of the well. The results of our study confirmed the suitability of the site for use with this unique open loop system concept.

Seawater serves as both the main source of heat and heat sink for the building's heating and cooling systems. Stainless steel torpedo pumps and stainless steel piping were used to limit corrosion in high saline conditions. Employed on smaller Stantec projects and tested for applicability in St. John's, we used an innovative process for raw water filtering below the parking structure to reduce suspended solids and improve performance of the energy exchangers. This involved drilling a large hole about 11 metres deep with a casing, inserting a smaller pipe with a well screen, and then filling the annular space with an engineered pea stone. The outer sleeve is then partly pulled up. The system tests positively to 500 U.S. GPM and the water is very clear. Two wide mouth plate and frame heat exchangers isolate the chiller/heat pump water from the raw water. The entire system is charged with 35 percent propylene glycol.

Depending on the season, the HVAC system's heat recovery chiller absorbs heat from, or rejects heat to, the harbour through heat exchange with three seawater wells. This "seawater geo-exchange" system is extremely cost-effective when compared to alternate systems based on life cycle cost, and requires a relatively minor amount of additional infrastructure beyond conventional systems.



Q.2 Complexity

Heating and Cooling

The use of water from natural water bodies, such as large lakes, rivers and coastal waters, as a source of energy to heat and cool buildings is an established engineering practice. Heating and cooling 351 Water Street using seawater posed a unique challenge for Stantec. The building sits approximately 20 metres from the St. John's harbour and the land in between is crowded with utilities and other infrastructure. This meant using a conventional intake and discharge structure to the harbour was not an option. The site also sits on an area of highly permeable geological material and fill, which gave us a unique opportunity to experiment with the development of a tidally flushing heat exchange system.

Our technological objective in carrying out this work was to determine if it would be possible to utilize the natural movement and flushing delivered by the tides from St. John's Harbour in order to extract or discharge energy that we could use to heat and cool the building. As detailed in question 1, this was successfully achieved.

Building Envelope

The decision early in the design process to use precast concrete involved significant challenges. The footprint of the building was restricted by parking garage circulation, zoning height regulations, and structural limitations. The final design required tight coordination of precast elements, overhead steel tower, sprinkler system, and building envelope detailing. High wind and significant precipitation in the St. John's region required extensive building envelope durability analysis including third party review and quality assurance review for targeted LEED® Gold certification.



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supporting the revitalization of the
West end of downtown St. John's



Q.3 Social and Economic Benefit

351 Water Street displays a balance of modern sophistication while taking inspiration from its historic surroundings. Supporting the revitalization of the West end of downtown St. John's, the social and economic benefits of the new development include:

- 168,000SF, 6-floor office tower standing above prime retail and commercial space promotes a vibrant atmosphere by bringing over 400 people to the downtown core to work on a daily basis.
- Serves to stimulate commerce in the area. Situated within walking distance of many local restaurants, boutique stores, and major conference and events venues, employees can walk to lunch with a friend, go to the gym or run errands. The popular restaurant and coffee shop in the building bring even more foot traffic to the area.
- Parking constraints in downtown St. John's have often made it difficult for residences to frequent local businesses in the area, especially during the winter months. The addition of the 445-car parking garage which includes 245 public parking spaces makes it much easier to support local.
- Encourages increased activity and interest in developing the West end of Water Street, seen through a recently-opened restaurant next door.
- Support of local artists through the first private sector juried art commission in Newfoundland and Labrador. Will Gill created a significant cultural piece which is on permanent display in the lobby of 351.
- By using local consulting and construction companies, East Port Properties created positive direct, indirect, and induced economic impact for the Newfoundland & Labrador economy.
- LEED® registered building targeting Gold certification promoting the importance of environmental sustainability.



Q.4 Environmental Benefits

In addition to the seawater heating and cooling system, the building's HVAC systems recover energy from waste heat sources whenever possible including the building general exhaust and tenant server rooms. This minimizes the use of non-renewable energy as much as possible. When supplemental heating is required – generally only on the coldest winter days – two 400 kW electric boilers provide additional heating capacity to the heat pump system.

351 Water Street also has superior indoor environmental quality. Each floor is equipped with two variable air volume (VAV) air handling units; one for perimeter zones and the other for interior zones. Spaces such as meeting rooms and boardrooms are provided with demand controlled ventilation using CO2 sensors where fresh air delivery is controlled.

During construction, a waste reduction program was implemented to reduce waste and increase diversion including corrugated cardboard, clean wood, glass, metals, gypsum board, concrete block, plastic, and carpet. Post construction, the facility features a comprehensive recycling program including office paper, glass, cardboard, plastic, newspaper, cans, and organics.

351 Water Street makes it easier for employees to use of more sustainable forms of transportation, including public transit, bicycles, walking, or carpooling. The facility is located next to public transit lines, includes bike racks and storage, shower facilities, and reserved parking for carpooling. The parking garage also has two Electric Vehicle charging stations on each level. These features reduce the release of air and water pollutants through vehicle exhaust which contribute substantially to global warming.

Q.5 Client's Needs

Bordering on St. John's harbour - one of the leading ports on the east coast of North America, East Port Properties had a prime location to make a positive impact for the City of St. John's and its residents. East Port's main goal was to create a facility that was innovative, sustainable, healthy to work in, and respectful of its surroundings. Here's how we did it.

- We helped East Port Properties to develop the first seawater heated and cooled building in Newfoundland and Labrador yielding significant environmental and economic benefits.
- The proportions and geometry of the precast were designed to mimic the scale of the more historical buildings downtown. The colour and scale of reveals take inspiration from the limestone in older downtown masonry structures. The corners of 351

are broken to create corner offices in the floor plate and also reduce the scale of the building on the site. Reflective glass for the project was selected to meet high performance LEED® requirements but also takes on the colours of the sky.

- Tenants on all 6 office floors benefit from views of St. John's harbour, colorful downtown, and scenic Waterford River Valley. We created office spaces that take advantage of natural daylight and at the same time promote collaboration and increased interaction.
- Occupants benefit from a common usable lobby with furnishings and Wi-Fi access, as well as locker rooms and shower facilities.
- Members of the public can experience an elevated view of the harbour when driving up the parking garage which is not the norm when developments are put in place.