Sustainability in action:

**Little Mountain Reservoir Reconstruction**

**Project name:** Little Mountain Reservoir Reconstruction  
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**The team:** Greater Vancouver Regional District (GVRD)  
Vancouver Board of Parks and Recreation (VPB)  
City of Vancouver (CoV)  

**Prime consultants:** Sandwell Engineering Inc. & Associated Engineering Ltd.  
**Subconsultants:**  
Golder Associates  
Colborne Architectural Group  
BKl Consultants in Acoustics  
Catherine Berris & Associates  
Economic and Engineering Services, Ltd., Bellevue, Washington  
Tetra Tech/KCM Inc., Seattle, Washington  

**General contractor:** Graham Industrial Services Ltd.

Reconstruction of the Little Mountain Reservoir in Queen Elizabeth Park is now 90% complete. Cell 1 of the reservoir and the valve chamber were completed as scheduled and were returned to service in June 2003. Demolition of the existing reservoir began in September 2002 and construction of the new facility is scheduled to be substantially complete in November 2003. The VPB will commence work on rooftop enhancement after GVRD completes the reservoir construction.

**The Project — Infrastructure Renewal**  
The Greater Vancouver Regional District owns and operates the Little Mountain Reservoir and the Vancouver Board of Parks and Recreation owns and operates the various facilities in the surrounding Queen Elizabeth Park. Built in 1911, the reservoir is a crucial link in the region’s drinking water supply. The natural beauty and recreation opportunities of the area draw both tourists and locals, who use the reservoir roof for parking and as an extension of the park. Because of seismic and structural deficiencies of the reservoir structure, it was decided to demolish the reservoir and reconstruct a new one on the same site with increased capacity and enhanced operational flexibility.

**The Mission — Sustainable Development**  
Right from the conceptual stage of the Little Mountain Reservoir Reconstruction (LMRR), the project team sought technologies that would address environmental, social and economic issues in a balanced manner. Carefully crafted mitigation plans were developed and implemented to ensure that social and environmental impacts are minimized during construction.
Planning for the reservoir upgrade was undertaken with a long-term view and the reservoir's capacity was increased by approximately 25%. Economic analysis indicated that this was the optimum capacity that could be achieved within the footprint of the existing reservoir.

The Partners — Public
Extensive public consultation was undertaken in 2001 to address the needs of affected parties, and consultation continued through the demolition of the existing reservoir and construction of the new facility. The partnership-driven consultation approach was designed to minimize social and environmental impacts, and it involved the following:

- Holding individual meetings with major stakeholders including Tai Chi groups, tour bus operators, Seasons in the Park Restaurant, Bloedel Conservatory, and the Lawn Bowling Club to understand their concerns and to develop mitigation strategies.
- Hosting many open houses in 2001–2003 to reveal ideas and draft plans for the reservoir and rooftop enhancement. Public open houses were well-attended (500 people attended the first open house).
- Distributing project updates in the surrounding community through fact sheets and mails.
- Constructing a wheelchair-accessible viewing platform for safe viewing of construction.

The Strategy — Sustainability in Action
Consultants, contractors and subcontractors understand the sensitive nature of the park environment and together, they created a Project Charter that commits them to safety, environmental stewardship, responsiveness to public concerns, effective communication and timeliness. The ‘partnering’ approach resulted in finishing the critical milestone of completing the Cell 1 construction as scheduled, before the peak water demand period in summer 2003. Strategies that contribute to this sustainable project include considering and resolving social, economic and environmental impacts in a balanced manner (see inset box, right).

The Result — A Sustainable Facility
Regional sustainability and environmental stewardship principles have been incorporated into the project design as exemplified by the use of significant flyash in the large volumes of concrete that will be used on this project, stringent environmental controls, multiple use of the project site for regional utility and public recreation and park purposes, and the social/environmental benefits arising from additional green space to be created on the reservoir rooftop. The project clearly demonstrates that such diverse functions can co-exist and, in fact, add to the overall public benefits provided by the site.

Little Mountain Reservoir has been integrated into the park environment, and forms the foundation for a centrepiece addition to the public recreation facilities of the Queen Elizabeth Park, aimed at long-term sustainability for the benefit of future generations. This was achieved by actively seeking public involvement, interaction and input in the design and construction. Partnership of agencies with diverse public mandates was achieved by communicating and sharing a vision of an integrated facility and the project was implemented by a partnering approach between the staff, consultants and contractors.

Strategies that contributed to the sustainable development of the project include:

- Partnership of City of Vancouver, Vancouver Board of Parks and Recreation & Greater Vancouver Regional District for Development
- Partnering approach between GVRD, VPB, CoV, consultants & contractors for construction
- Input from public and stakeholders: open houses, viewing platform during construction
- Impact mitigation program for all affected parties
- Recycling the demolished concrete and rebar
- Use of EcoSmart™ concrete helps reduce green house gas emissions
- Environmental and noise monitoring during construction
- No disruption to water supply during construction
- Tree protection and replanting / replacement program
- Optimized water storage capacity and cost, without encroaching upon park areas
- State of the art earthquake resistance design
- Facility integrates enhanced public safety, reliability and increased capacity of water infrastructure, parking & recreation
- The design and construction achieved triple bottom line balance.

Salient features of the reservoir are:

- Earthquake resistance – maximum credible earthquake (1/10,000 year) level design.
- Future demand – 25% increase in capacity (175 million litres)
- Operational improvements – state-of-the-art valve chamber & inlet/outlet system
- Two independent reservoir cells for operational flexibility
- Built within the footprint of old reservoir
- No expansion joints
- Double roofing membrane
- Project budget: $37.6 million Cdn.