



9th ANNUAL
**Sustainable
Building**
SYMPOSIUM

Calgary May 30 – 31

Edmonton May 31 – June 1

2006



Sustainable Public Buildings

Council Policy

- CityPlan (1995)
- Kyoto Commitments
- Sustainable Design & Construction
- LEED™ Gold for new construction
- Water conservation





Sustainable Public Buildings

LEED™ Criteria

- Site
- Water
- Energy
- Materials
- Indoor

CoV Additional

- Program for needs
- Maximize Usage
- Accessible
- Operate sustainably
- Expectations education



The Beginning: Site Selection

CityPlan

1995

- Strengthen neighbourhood centres
- Improve safety and better target community services
- Reduce reliance on the car
- Improve the environment
- Increase the variety and affordability of housing
- Define neighbourhood character
- Diversify parks and public places
- Involve people and redirect resources



Mt Pleasant Civic Centre at 1 Kingsway



- 30,750 SQ FT Community Centre
- 12,000 SQ FT Library
- 6,800 SQ FT Child Care
- 98 units Rental Housing
- Underground Parking 186 cars

Construction Budget

\$36M



MANDATE

- \$\$\$\$
- Program
- Sustainable design
- Unified service
- Neighbourhood needs
 - Social context
 - Historical
 - Zoning
 - Preferences





MANDATE

- \$\$\$\$
- Program
- Sustainable design
- Unified service
- Neighbourhood needs
 - Social context
 - Historical
 - Zoning
 - Preferences





TEAM GOALS

- Minimize energy use
 - Operational efficiency
 - Well-designed DDC integrating lights & HVAC
- Reduce use of potable water
 - Irrigate with storm water
- Indoor air quality
- Green & occupied roofs



PROJECT DELIVERY

- Green mandate established at start
- Select experienced design team, include QS
 - Basic service to include LEED™
 - Require modeling & payback review
- Use industry tools
 - CBIP
 - Power Smart
- Integrate LEED™ requirements into spec.
- Select experienced contractor
 - Monthly submittals



SITE

- Brownfield
- Connected
 - Bike route
 - Pedestrians
 - Wellness Walkway
 - 5 buses
- Reduced/shared parking
- Cistern for stormwater
- Landscaped & reflective roofs
- Light control





WATER

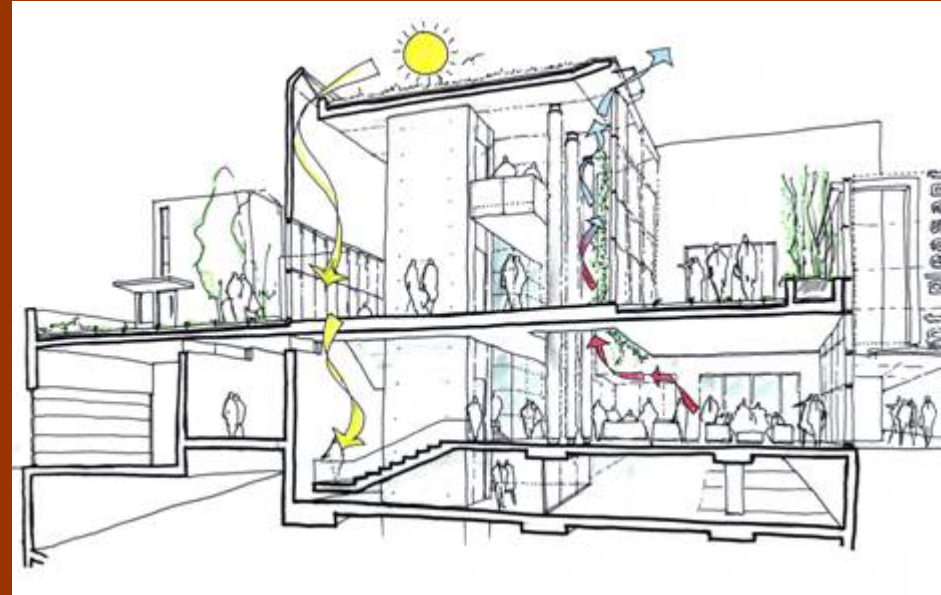
- Landscaping irrigation
 - Cistern distributes stormwater for all watering needs
 - Drought tolerant plants
- Water use reduction – 30%
 - Dual-flush toilets
 - Low flow showers/sinks
 - Appliance selection





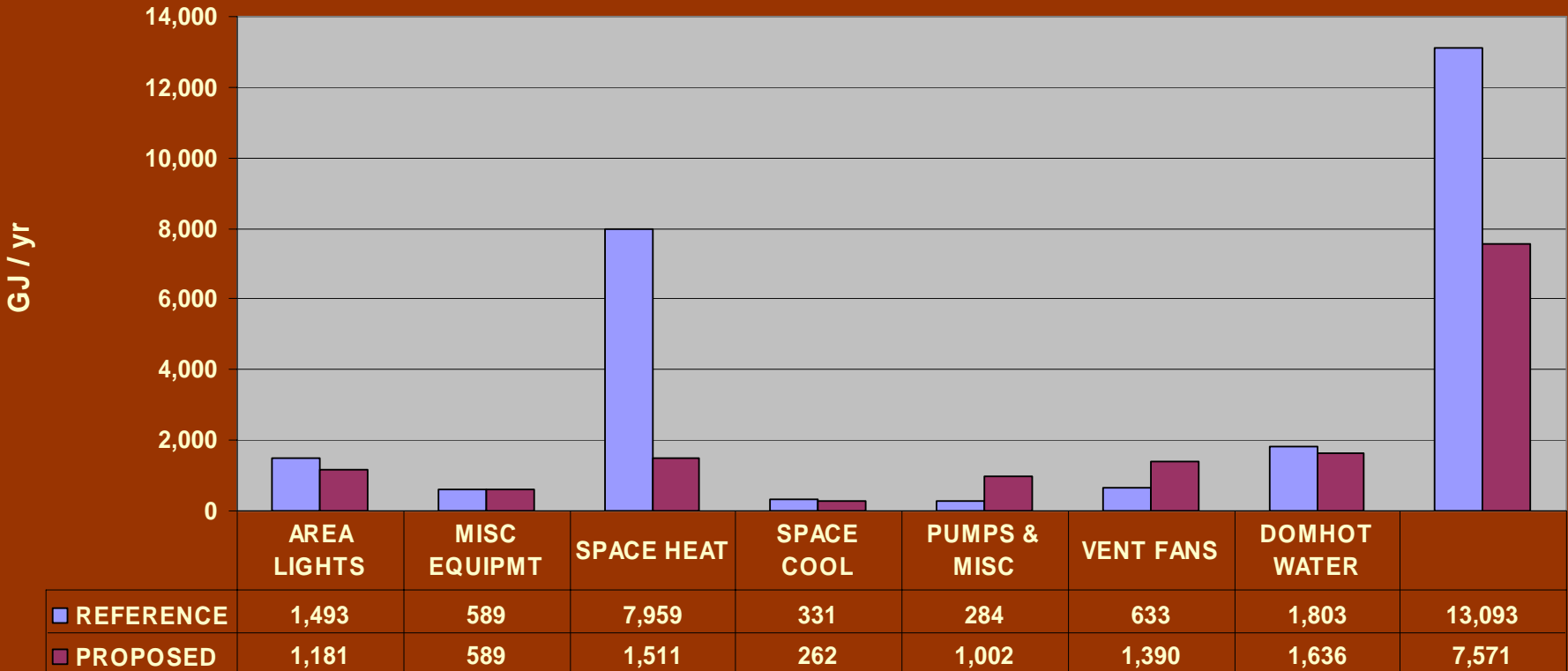
ENERGY

- Reduce energy use
 - Geothermal
 - Heat pumps
 - Earth duct
 - Equipment selection
 - Occupant sensors
 - Intelligent zoning
- Additional commissioning
- Ozone depletion
- Measurement & verification



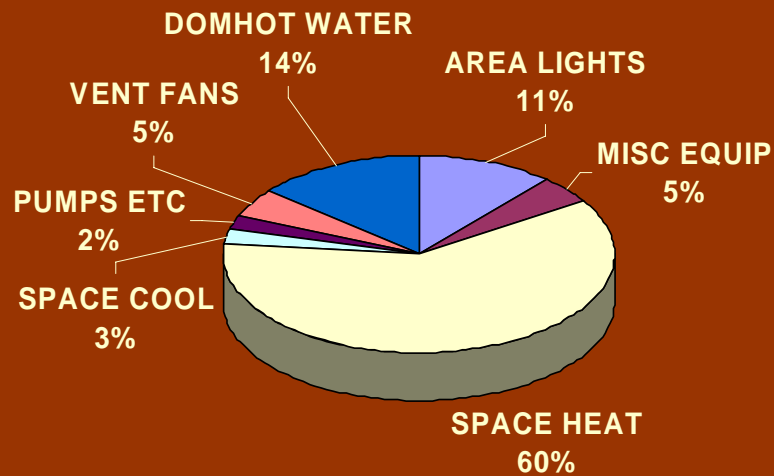


Building's Annual Energy

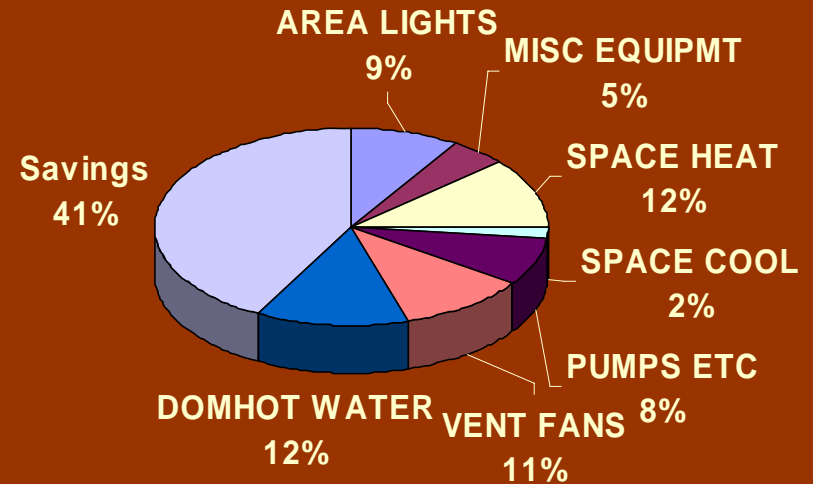




REFERENCE BUILDING (MNECB)



1 Kingsway





HVAC ENERGY STRATEGIES



- Geothermal Heating & Cooling
- Earth duct for fresh air
- Atrium relief (stack effect)
- Building envelope
- Demand ventilation control (occupancy)
- Occupant education



ELEC ENERGY STRATEGIES



- Light selection/design
- Daylighting
- Occupancy sensors
- Occupant education
- Elevator selection
- Vending machine misers



MATERIALS

- Construction waste management
- Recycled content
- Materials manufactured locally
- Materials harvested locally





INDOOR ENVIRONMENT

- Construction phase cleanliness
- Low VOC paints
- Low VOC adhesives
- Low VOC carpets
- Operable windows
- Daylight & views for 90% of area
- 100% fresh air





INNOVATION



- Parking reductions
- Public education
- Power Smart study
- Lifecycle Cost Analysis
- Equipment procurement



BEYOND

- Universal design
 - Scooter accessible
 - Accessible children's playground
 - Residential to enhanced standards
- Ongoing Consultation with users
 - Build what is needed, where it is needed
 - Maximize use
- Sustainable practices in operations





UNIVERSAL DESIGN

- Scooter accessible
- Accessible child care playground
- Residential built to enhanced standards





CONSULTATION

- Ongoing consultation with users
- Build what you need
- Build where it is needed
- Maximize use





SUSTAINABLE OPERATIONS

- Fine-tune DDC
- Recommission regularly
- Environmentally friendly cleaning
- Ongoing consultation on programs





LEED™ Point Plan

• Sustainable Sites	9	(13)
• Water Efficiency	4	(5)
• Energy & Atmosphere	13	(17)
• Materials & Resources	5	(13)
• Indoor Env. Quality	8	(15)
• Innovation	5	(5)
TOTAL	44	(69)



LEED™ Point Cost Analysis

	<u>Points</u>	<u>\$ per point</u>	<u>Premium</u>
Basic	26	\$0	
Silver	11	\$57K	1.8%
Gold	7	\$29K	.6%
TOTAL	44	\$19K	2.4%



LEED™ GOAL:

GOLD 44 points

9	1	4		Sustainable Sites	Strategy and Comments
Y				Credit 1 Site Selection	Credit requirements met with the purchase of 1 Kingsway site.
Y				Credit 2 Development Density	Credit requirements met with the purchase of 1 Kingsway site.
Y				Credit 3 Redevelopment of Contaminated Site	Credit requirements met with the purchase of 1 Kingsway site.
Y				Credit 4.1 Alternative Transportation, Public Transportation Access	Credit requirements met with the purchase of 1 Kingsway site.
Y				Credit 4.2 Alternative Transportation, Bicycle Storage & Changing Rooms	Vancouver Building By-law requirements are more stringent than LEED.
		N		Credit 4.3 Alternative Transportation, Alternative Fuel Refueling Stations	
Y				Credit 4.4 Alternative Transportation, Parking Capacity	Parking capacity does not exceed VBBL but was reduced based on car usage patterns and the proximity of many bus lines.
		N		Credit 5.1 Reduced Site Disturbance, Protect or Restore Open Space	
	?			Credit 5.2 Reduced Site Disturbance, Development Footprint	Credit interpretation ruling required. A green space has been provided at the south end of the site which exceeds the zoning by-law requirements of C3-A (which has no requirement).
Y				Credit 6.1 Stormwater Management, Rate and Quantity	Net decrease in storm water run off due to the grass joints in pavers, and the storm water storage - cost carried in WE Cr 1.2.
		N		Credit 6.2 Stormwater Management, Treatment	
Y				Credit 7.1 Landscape & Ext Design to Reduce Heat Islands, Non-Roof	All parking is underground which is typical for an urban site.
		N		Credit 7.2 Landscape & Ext Design to Reduce Heat Islands, Roof	Occupied/landscaped roof will not qualify for this point as there is insufficient planting and the paving will not be a light enough colour. It does meet the program needs of the daycare and community Centre. Inaccessible roofs will be either plated or reflective.
Y				Credit 8 Light Pollution Reduction	Light fixtures with cut-off angles provided to eliminate light pollution from site.



4 0 1			Water Efficiency		Strategy and Comments
Y			Credit 1.1	Water Efficient Landscaping , Reduce by 50%	This credit can be attained by using high efficiency irrigation and controls, which would normally be provided for this type of facility.
Y			Credit 1.2	Water Efficient Landscaping , No Potable Use or No Irrigation	The size of the underground storm water cistern has been sized to meet the LEED requirements for 100% non potable irrigation.
		N	Credit 2	Innovative Wastewater Technologies	
Y			Credit 3.1	Water Use Reduction , 20% Reduction	Efficient fixtures are used in conjunction with sensors on civic fixtures + 6l. toilets& low flow shower heads in civic & residential
Y			Credit 3.2	Water Use Reduction , 30% Reduction	See water strategies described in Keen's Energy Study



13 0 3			Energy & Atmosphere	Strategy and Comments
Y			Credit 1.1 Optimize Energy Performance, 15% New / 5% Existing	Ground source heating system combined with good design practices is good for 6 energy credits (1.1 through 1.6)
Y			Credit 1.2 Optimize Energy Performance, 20% New / 10% Existing	
Y			Credit 1.3 Optimize Energy Performance, 25% New / 15% Existing	
Y			Credit 1.4 Optimize Energy Performance, 30% New / 20% Existing	
Y			Credit 1.5 Optimize Energy Performance, 35% New / 25% Existing	
Y			Credit 1.6 Optimize Energy Performance, 40% New / 30% Existing	
Y			Credit 1.7 Optimize Energy Performance, 45% New / 35% Existing	Implement Energy and Water conservation measures as described in Keen's Power Smart Study good for four credits
Y			Credit 1.8 Optimize Energy Performance, 50% New / 40% Existing	
Y			Credit 1.9 Optimize Energy Performance, 55% New / 45% Existing	
Y			Credit 1.10 Optimize Energy Performance, 60% New / 50% Existing	
		N	Credit 2.1 Renewable Energy, 5%	
		N	Credit 2.2 Renewable Energy, 10%	
		N	Credit 2.3 Renewable Energy, 20%	
Y			Credit 3 Additional Commissioning	Commissioning authority has been retained.
Y			Credit 4 Ozone Depletion	Diligent specifying.
Y			Credit 5 Measurement & Verification	Additional metering provided above and beyond normal practice.
		N	Credit 6 Green Power	



5	1	7	Materials & Resources		Strategy and Comments
Y			Prereq 1	Storage & Collection of Recyclables	Standard practice
		N	Credit 1.1	Building Reuse, Maintain 75% of Existing Shell	
		N	Credit 1.2	Building Reuse, Maintain 100% of Existing Shell	
		N	Credit 1.3	Building Reuse, Maintain 100% Shell & 50% Non-Shell	
Y			Credit 2.1	Construction Waste Management, Divert 50%	Work with contractor to recycle as much construction waste as possible.
Y			Credit 2.2	Construction Waste Management, Divert 75%	Work with contractor to recycle as much construction waste as possible.
		N	Credit 3.1	Resource Reuse, Specify 5% Salvaged	
		N	Credit 3.2	Resource Reuse, Specify 10% Salvaged	
Y			Credit 4.1	Recycled Content, Specify 5%	More products available with recycled content - drywall, carpeting, brick etc.
	?		Credit 4.2	Recycled Content, Specify 10%	
Y			Credit 5.1	Local/Regional Materials, 20% Manufactured Locally	Diligent specifying.
Y			Credit 5.2	Local/Regional Materials, of 20% Above, 50% Harvested Locally	Diligent specifying.
		N	Credit 6	Rapidly Renewable Materials	
		N	Credit 7	Certified Wood	



8	1	6		Indoor Environmental Quality	Strategy and Comments
Y				Credit 1 Carbon Dioxide (CO₂) Monitoring	CO ₂ sensors to be installed in the return air paths. These sensors will be monitored by the building BMS system and will increase outdoor air content if needed. Standard Practice for CoV.
		N		Credit 2 Increase Ventilation Effectiveness	
Y				Credit 3.1 Construction IAQ Management Plan, During Construction	Covering ductwork and equipment. Providing dust control and ventilation.
Y				Credit 3.2 Construction IAQ Management Plan, Before Occupancy	IAQ testing or a two week air flush out of the building.
Y				Credit 4.1 Low-Emitting Materials, Adhesives & Sealants	Diligent specifying by designers and oversight by contractor.
Y				Credit 4.2 Low-Emitting Materials, Paints	Diligent specifying by designers and oversight by contractor.
Y				Credit 4.3 Low-Emitting Materials, Carpet	Diligent specifying by designers and oversight by contractor.
		N		Credit 4.4 Low-Emitting Materials, Composite Wood	
		N		Credit 5 Indoor Chemical & Pollutant Source Control	Ventilation premium, walk off mats. Difficult and functionally undesirable to allocate separate room space for copiers, local exhaust will be provided near copiers, as well, building air is not recirculated.
	?			Credit 6.1 Controllability of Systems, Perimeter	Additional operable windows, switching and photosensors required.
		N		Credit 6.2 Controllability of Systems, Non-Perimeter	
		N		Credit 7.1 Thermal Comfort, Comply with ASHRAE 55-1992	
		N		Credit 7.2 Thermal Comfort, Permanent Monitoring System	
Y				Credit 8.1 Daylight & Views, Daylight 75%	Good design practice.
Y				Credit 8.2 Daylight & Views, Views for 90%	Good design practice. Additional glazing was not required to meet this credit, it was achieved by meeting the client's goals.



5 0 0			Innovation & Design Process	Strategy and Comments
Y			Credit 1.1 Innovation in Design:	Parking Reductions. A study of existing civic parking lots was conducted to determine actual use versus the city parking requirements. From this study significant parking stall reductions were realized.
Y			Credit 1.2 Innovation in Design:	Public Education. There will be a permanent public display showing the buildings <i>measured</i> environmental performance.
Y			Credit 1.3 Innovation in Design:	Power Smart Study. A complete energy analysis was conducted to determine the most cost effective sustainable measures above and beyond base building.
Y			Credit 1.4 Innovation in Design:	Equipment Procurement. Credit requested for the procurement of appliances and fixtures that perform better than the base building norm. These appliances and fixtures are typically un-regulated.
			Credit 1.4 Innovation in Design (alternate):	Useable Roofs. All available roof surfaces contribute to the urban, social and environmental agendas for the project.
			Credit 1.4 Innovation in Design (alternate):	Life Cycle Analysis. A life cycle study and charrette was conducted with Athena Sustainable Institute. The current design was measured against a base case building to determine the savings in green house gas emissions, toxic air emissions, water pollutants, and solid waste.
Y			Credit 2 LEED™ Accredited Professional	



1 KINGSWAY

... in the Heart of Mount Pleasant

CITY OF VANCOUVER

Facility Design & Management



Architect:

Busby Perkins & Will

Structural Engineers: **C.Y. Loh Associates**

Mechanical Engineers: **Stantec Inc.**

Electrical Engineers: **Schenke/Bawol Engineering**



1 KINGSWAY

... in the Heart of Mount Pleasant

CITY OF VANCOUVER

Facility Design & Management



FOR MORE INFO:

www.1Kingsway.ca