Memo

Date: April 21, 2010

File: 1310-30

To: City Manager

From: Randy Cleveland, Director Infrastructure Planning

Subject: Energy Efficient Upgrades - Family Y & Enterprise Way Fire Hall

Report Prepared by: Terry Barton, Manager, Parks & Public Places
Kristine Bouw, Planner, Architecture

Recommendation:

THAT Council receive for information, the Report dated April 21, 2010 from the Director of Infrastructure Planning regarding the Family Y Building Expansion - Energy Efficient Upgrades.

AND THAT Council consider a budget of $475,000 for energy upgrades to the Family Y Building Expansion to include the addition of a dehumidification system.

AND FURTHER THAT Council direct staff to develop a business case for the feasibility of a solar demonstration project as part of the City's Solar BC commitment for the Enterprise Way Fire Hall and direct staff to return to Council with a report for consideration.

Purpose:

The purpose of this report is to outline energy efficient options and receive direction from Council on mechanical upgrades as part of the Family Y Building Expansion in order to reduce greenhouse gases and energy costs.

Background:

On March 31, 2008, Council endorsed an Energy/Carbon Management Plan directed at reducing both (a) energy consumption and (b) the environmental and climate change impacts of civic facility operations.

On March 8, 2010 Council approved a sustainable infrastructure policy with targets for achieving corporate carbon neutrality by 2012 and reducing greenhouse gas (GHG) emissions by 33% by 2020. This reduction is based on a 2008 baseline and must be achieved irregardless of the expansion of infrastructure assets. An additional policy target was to achieve desired levels of service at the least life-cycle cost.

As part of the recently completed schematic design phase for the Family Y Building Expansion, a detailed study was conducted that describe options and costs for energy efficient mechanical system upgrades to achieve these goals. Potential energy efficient upgrades include:

- **Solar-thermal panels** -for direct and indirect heating of domestic water used for showers and the water for the pool.
- **Change to a combination of high/mid-efficiency boilers and heat exchangers** - for water and space heating.
- **Dehumidification** -heat recovery from pool exhaust air.

- **Heat recovery pump system** - (includes plumbing, lighting and HVAC upgrades) for reduction of GHGs and capacity to be expanded in the future for further GHG reduction.

The carbon footprint of the existing YMCA building is 303 tonnes of carbon and the proposed building expansion will add an additional 160 tonnes (a 53% increase). An assessment of the various mechanical system upgrades was completed following schematic design of the building addition that analyzed the cost of the upgrade, together with the reduction in GHGs and the estimated number of years for payback.

Kelowna Family YMCA-YWCA Mechanical Upgrades

Upgrade	GHG Reduction (metric tonnes)	Cost of Upgrade	Cost Per Tonne	Pay-back
Solar-Thermal Panels	57	$405,000	$7,105	30 plus years
Mid Efficiency boilers	15	$30,000	$2,000	9 years
Dehumidification	200	$620,000	$3,100	9 years
Heat Recovery Heat Pump System	30	$175,000	$5,833	14 years
	302	**$1,230,000**		

The full package of upgrades would reduce carbon emissions of the entire building by 47% net (GHG savings of 302 metric tons) and reduce energy consumption by 30%. The full cost of the upgrades is estimated at $1,230,000. With $350,000 previously approved by Council from the City's Major Facilities Reserve, this would add $880,000 to the overall project cost. However, staff propose to remove the Solar Thermal Panels due to the following cost-benefit reasons:

1. **High Cost:** The original estimate in 2008 for the Solar Thermal Panels was $120,000. Upon more recent detail analysis, the cost estimate has been revised to $405,000 escalating more than 3 times. This is a high life-cycle cost in this specific application and there may be more appropriate locations for the use of solar-thermal in other municipal buildings.

2. **Limited Benefit:** The pay-back (e.g. the reduction of on-going operating costs to justify the initial capital expenditure) is in excess of 30 years with a minimal GHG reduction component of 57 tonnes.

3. **Time Implications:** The City has a commitment to Solar BC to provide a solar demonstration in a municipal building project by December 31, 2010. The proposed schedule and timeline for the Family Y Building expansion cannot meet this deadline. The completion of the building expansion was delayed in order to secure the RInC infrastructure stimulus funding in 2009.

The installation of the Solar-Thermal Panels is not a cost effective carbon reduction strategy on this project. All upgrades except solar, achieve a net reduction of 28% which approximates the 2020 corporate carbon target (the target reduction is 203 tonnes, a shortfall of 15 tonnes), while compensating for the 18,386 sq.ft., 2 storey expansion of the facility. Staff recommend proceeding with the three (3) other energy upgrades: high/mid-efficiency boilers, dehumidification, and hydronic heat pump recovery system. The combination of these upgrades will result in an estimated reduction of 245 tonnes and reduce GHGs by 28%. These energy upgrades have higher cost-benefits, lower payback times and overall represent a more responsible expenditure of public funds. The overall cost of these energy upgrades is estimated at

$880,000, with $350,000 previously approved by Council from the City's Major Facilities Reserve. Therefore an additional $475,000 will be needed for the upgrades to proceed.

Solar Thermal Demonstration Project

The City has a commitment under the Solar BC Program to deliver a solar hot water demonstration project in 2010. Given the considerable escalation in pricing on the YMCA project, staff recommend choosing another location that has high public visibility, provides a reasonable business case for reducing GHGs and is less expensive. Staff propose to install a solar thermal system on the Enterprise Fire Hall to provide hot water for the showers for the central fire-fighting crews. There is room in the existing building to install storage tanks, and the load is large enough to document the success of the system as a precedent for future installations. Staff will return to Council with a business case and a budget request as soon as possible.

Considerations not applicable to this report:
Internal Circulation:
Legal/Statutory Authority:
Legal/Statutory Procedural Requirements:
Existing Policy:
Financial/Budgetary Considerations:
Personnel Implications:
External Agency/Public Comments:
Community & Media Relations Comments:
Alternate Recommendation:

Submitted by:

R. Cleveland, Director, Infrastructure Planning

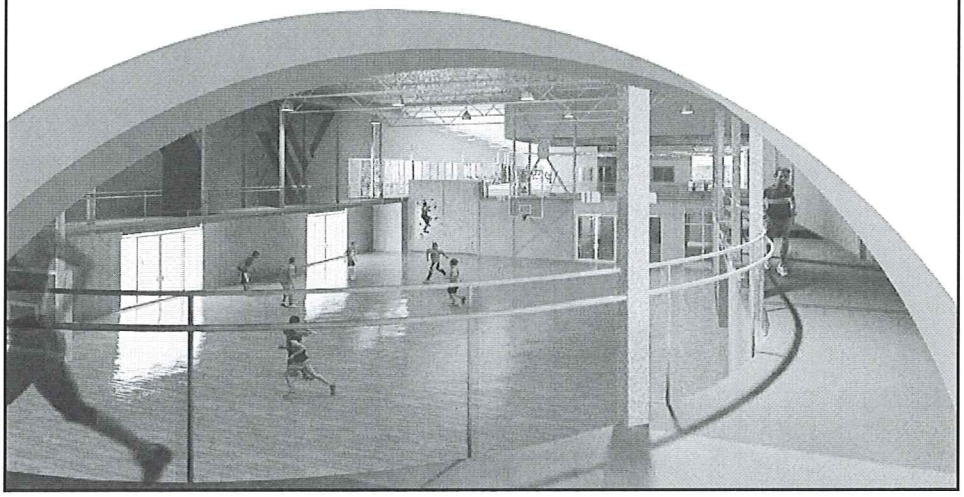
Approved for inclusion: J. Paterson, General Manager Community Sustainability

CC: K. Grayston, Director of Financial Services
M. Johansen, Manager of Building Services
J. Shaw, Project Engineer, Utility & Buildings Project Management

City of Kelowna

KELOWNA FAMILY YMCA-YWCA

Energy Efficient Mechanical Upgrades



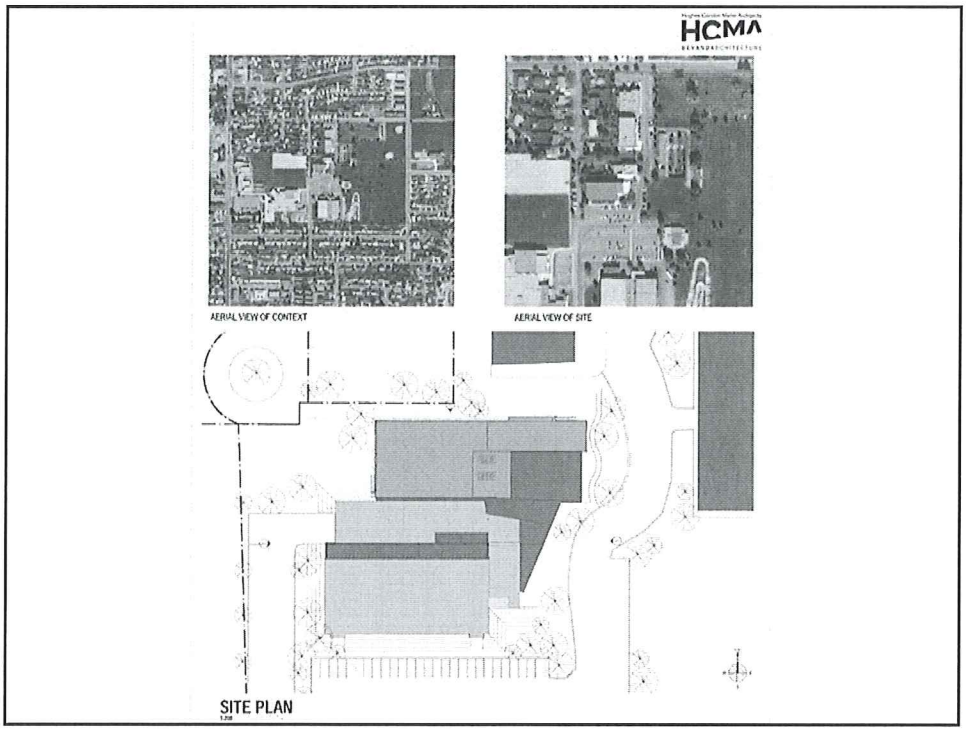
HCMA

KELOWNA FAMILY Y EXPANSION OPEN HOUSE, WELCOME

imagine building a place where everyone belongs

Funding Sources
- Project costs: $ 5.1 million
- Kelowna Family Y Capital Expansion Campaign: $2.4 million
- City of Kelowna: $1.7 million
- Recreation Infrastucture Canada Program: $1 million

Lifelong Learning & Healthy Activity Spaces
- Child and Family Resource Centre
- Youth Zone
- 100 Metre suspended run/walking track open to individuals of all ages and abilities
- Gymnasium and Indoor Playground
- Preventative Health & Learning Spaces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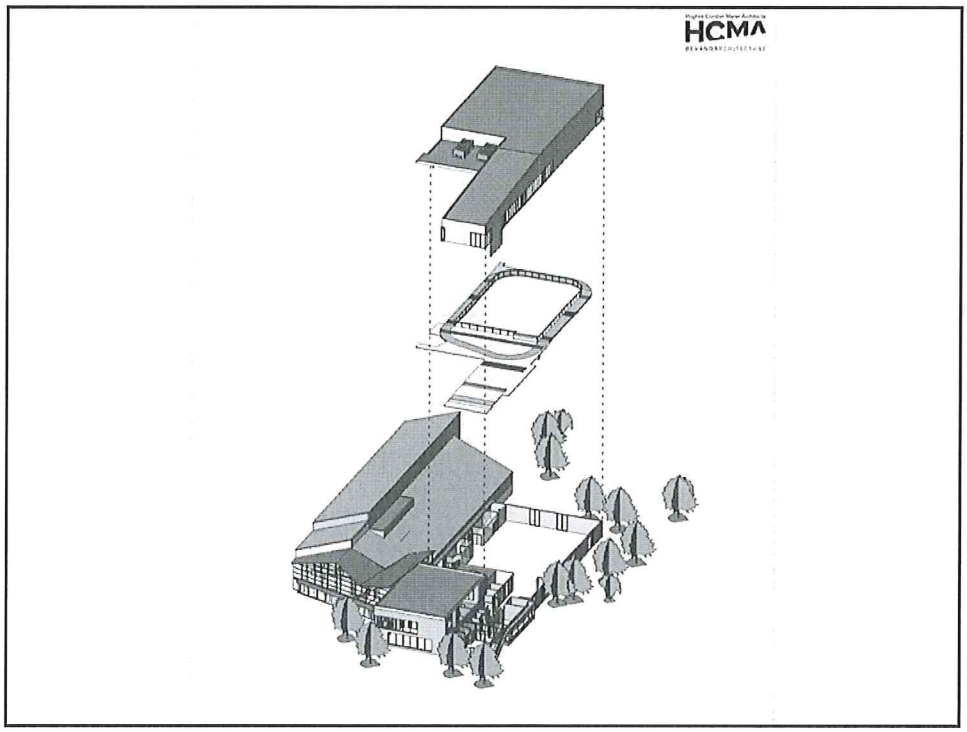
AERIAL VIEW OF CONTEXT
AERIAL VIEW OF SITE
SITE PLAN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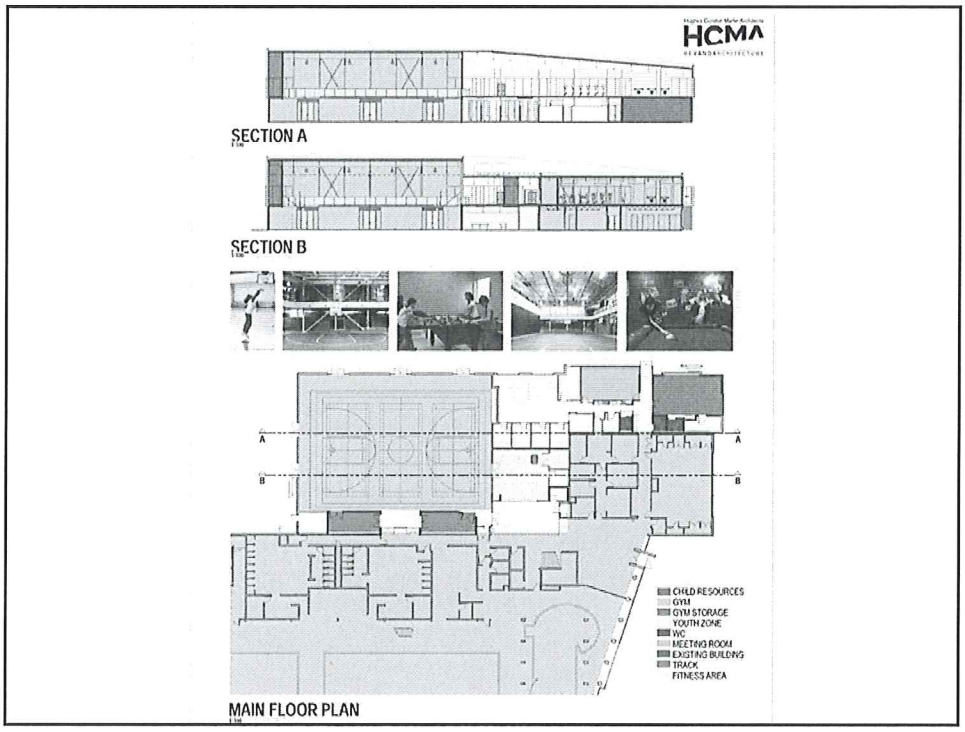
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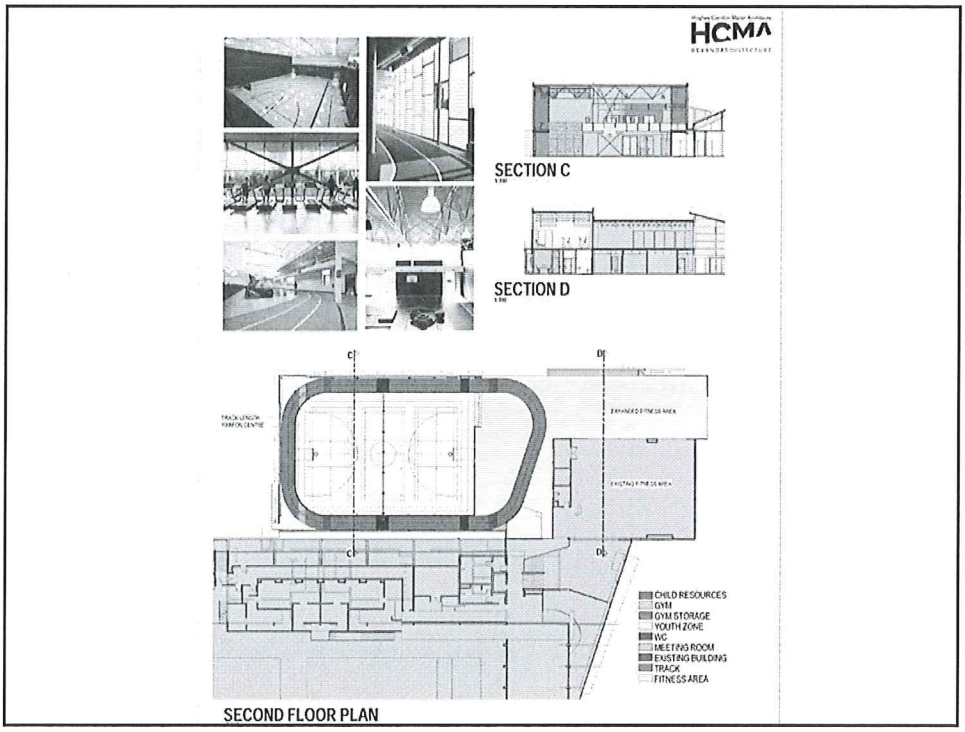
SECTION A
SECTION B
A
A
B
B
CHILD RESOURCES
GYM
GYM STORAGE
YOUTH ZONE
WC
MEETING ROOM
EXISTING BUILDING
TRACK
FITNESS AREA
MAIN FLOOR PLAN


HCMA
SECTION C
SECTION D
C
C
D
D
CHILD RESOURCES
GYM
GYM STORAGE
YOUTH ZONE
WC
MEETING ROOM
EXISTING BUILDING
TRACK
FITNESS AREA
SECOND FLOOR PLAN

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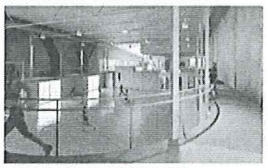
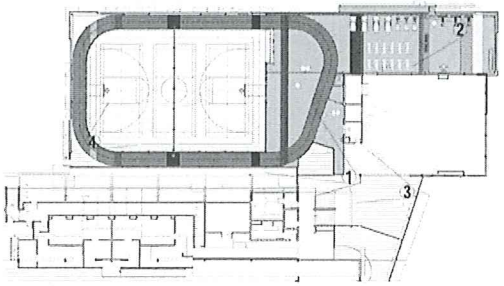
1. VIEW INTO STRETCHING AREA

2. WEIGHT AND STRETCHING AREA

3. VIEW FROM ENTRANCE

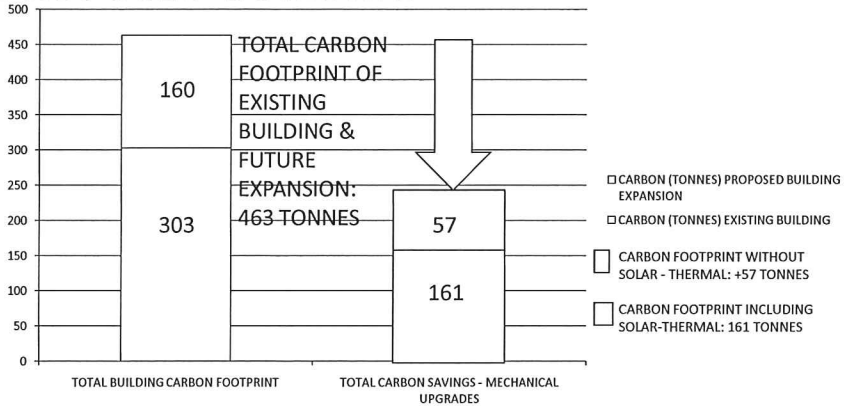


4. TRACK OVER LOOKING GYM



COLOUR CONCEPT PLAN

CARBON FOOTPRINT OF EXISTING & PROPOSED BUILDING



PROPOSED ENERGY EFFICIENT MECHANICAL UPGRADES