Central Park New Arena Options

August 2012

New Build Design Options

Three site plan design options have been prepared. Option 1 places a new structure at the NE corner of Central Park. The additional parking required for the new facility is approximately 250. This would be in addition to the existing 260 cars, resulting in a total count of 410. This scheme would also result in the relocation of Ball Diamond No. 2. With a new arena at this location the car traffic is mainly off of Hume Street as it presently exists.

Option 2 places the new arena at the SE corner of the site. As with Option 1, 150 new cars are added in a separate parking lot that serves only the rink and the baseball diamonds in the summer. Access to this parking lot would be off of Lome Avenue.

Option 3 locates the arena adjacent to the existing outdoor ice pad. Access for this site is off of Paterson Street. The placement of the new build at this location would allow for the integration of the building into a integrated recreation complex should it materialize.

1.0 Preliminary Building Program – New Arena

No.	Component	Net Area	Comments
1.	**Public & Support Facilities**		
1.1	Vestibule	200	Sliding entrance door system
1.2	Lobby	1,500	
1.3	Seating Area	200	Viewing to ice surface
1.4	Vending Alcove	50	
1.5	Concession/Storage	400	
1.6	Pro-Shop	500	
1.7	Administration Office	150	
1.8	Private Offices	240	2@120 sf
1.9	Storage	100	
1.10	Public Washroom Male	250	
1.11	Public Washroom Female	350	
	Sub-total	**3,940**	
2.	**Program Room**		
2.1	Program Room	300	
2.2	Kitchen/Bar	100	
2.3	Storage	50	
	Sub-total	**450**	
3.	**Rink**		
3.1	Ice Pad	17,000	85'x200' NHL size

3.2	Player Benches, Boxes, Timer	350	
3.3	Spectator Seating for 200	1,200	6 sf/person
	Sub-total	**18,550**	
4.	**Dressing Rooms**		
4.1	Team Rooms 6 @ 525	3,150	2 HC dressing rooms
4.2	Hockey Office	100	
4.3	Figure Skating Office	100	
4.4	Girl's Hockey office	100	
4.5	Referee Room	300	2@150 sf. Shower, sink, WC
4.6	First Aid Room	150	Sink, WC
4.7	Music Room	150	10'x15'
4.8	Program Storage	500	
	Sub-total	**4,550**	
5.	**Service and Maintenance**		
5.1	Ice Resurfacer/Flood Room	500	
5.2	Refrigeration	700	
5.3	Work Shop and Maintenance	200	
5.4	Store Room	500	
5.5	Staff Room/Lunch Room	150	
	Sub-total	**2,050**	
	Net Assigned Area (75%)	29,540	
	Gross Floor Area (100%)	**39,600**	Corridors, walls, mech. etc.

2.0 Green Initiatives in New Arena

Introduction:

The design of the New Arena will respond to climatic and environmental conditions taking into consideration natural resources, energy conservation and preservation of the global environment through the use of sustainable products. LEED Certification exemplifies these principles of conservation and sustainability and should be an integral part of the design and operation of the new arena facility. The new arena is proposed to be designed to LEED Silver Certification Levels.

Green Roof:

The roof system of the new arena could consider employing green roof technologies which will reduce the urban heat island effect and assist in storm water management. The flat roof areas could incorporate a vegetative roof system and the sloped pre-eng roof system would incorporate a reflective white metal cladding.

Cost: The cost for this option would be in the range of $80,000-$100,000.

Heat Recovery on Exhaust:

Heat recovery of energy leaving the arena in the exhausted air by pre-heating the outside air being introduced for ventilation.

Cost: This is included in the Base Building Cost.

Sub-floor Heating Using Heat Recovery:

Heating of the arena sub-floor to eliminate the possibility of freezing the subsoil by using the heat rejection of the condenser of the refrigeration equipment.

Cost: The cost for this option would be in the range $50,000.

DHW and Surfacing Water Requirements:

Domestic Hot Water and water used by the ice-resurfacer is pre-heated by the refrigeration gas superheat from the compressor, is stored and used for daily operation. A non-softened water system will be provided for making ice. This system will utilize heat reclaim from the ice plant and complete the heating up to the desired operators temperature with a high efficiency gas fired water heater.

Cost: This is included in the Base Building Cost

Heat Recovery for Heating:

The use of rejected heat from the refrigeration equipment to heat spaces and the outside air for ventilation purposes. This usually through radiant tubes within the concrete flooring and provides an in floor heating system. Heating will be provided by gas fired high efficiency condensing boilers circulating water via pumps throughout the building to the in floor heating. The boilers will be backup after the energy is recovered from the CIMCO Eco-Chill refrigeration system.

Cost: A radiant floor system and Eco-Chill refrigeration system would be in the range of an additional $500,000-$600,000 above base building cost.

Low-e Ceiling:

Radiation from the ice sheet has a major impact on the refrigeration load. A high reflection (low-e) ceiling will be installed to lower the radiation exchange and provide a savings on the refrigeration equipment.

Cost: This is included in the Base Building Cost

Efficient Lighting System:

Efficient lighting such as T-5's or T-8's will be used to lower the energy use of the arena by modulating the lighting level to activities taking place on the ice and to provide maximum energy savings.

Cost: This is included in the Base Building Cost

Lighting Sensors:

Light fixtures will be controlled by occupancy sensors and daylight sensors. These fixtures will be provided with dimming ballast to gain maximum energy savings. Exit lighting will be L.E.D. fixtures.

Cost: This is included in the Base Building Cost.

Efficient Refrigeration Equipment:

The proposed refrigeration system is conventional ammonia (R717) by CIMCO and has been used to make ice for rinks over the past decades with some compressor heat energy recovery to pre-heat domestic hot water, ice resurfacer water and under slab heating systems. Initial cost per ice surface is in the $450,000 range.

Cost: This is intended to be included in the Base Building Cost. An Eco-Chill plant is in the range of an additional $500,000-$600,000 with a radiant floor system above a base refrigeration plant.

Dehumidification:

The arena will require dehumidification which will be integrated with the CIMCO refrigeration plant utilizing a roof top dessicant dryer. The dessicant dryer will also provide ventilation air to the seating/viewing area.

Cost: This is included in the Base Building Cost

Building Utilities:

The use of low volume flush valves on the water closets, low flush urinals and low flow sensor plumbing faucets will be utilized for the entire building to reduce water usage. A central tempered shower water system will be utilized for the change rooms with push button operators. A rainwater recovery system could be explored to provide irrigation to the site and for building services. The structure of the roof could be designed to accommodate the loading of a solar photovoltaic panel system for consideration.

Cost: Additional cost for a cistern and dual plumbing system is in the range of $80,000-$100,000. The increased cost of the structure to support photo-voltaic units is in the range of $100,000. Sensors (hands free) and low flow fixtures/dual flush are part of the base building contract. Irrigation will be dependent on the requirements of the Town, but native, and adaptive landscaping is preferable.

Systems Control:

A central DDC Building Automation System will be provided to control mechanical systems including heating plants, packaged HVAC units, make-up air, room temperatures, C02 ventilation and domestic hot water systems.

Cost: Building Automation System (BAS) and monitoring is cost in the range of $175,000 - $200,000.

Architectural Building Systems:

The building will be designed and constructed with best practices as an objective, incorporating effective energy conservation strategies where possible.

Flat area roofing systems will consist of a TPO mechanically fastened single ply energy star system with an R20 insulation value for all conventional roofs. Pre-engineered with consist of a metal sandwich panel with a standing seam and minimum R19 insulation value.

Wall systems will consist of metal pre-engineered panels, pre-cast panels and conventional block cavity walls. All walls will have a minimum R19 insulation value. Exterior will be architectural brick masonry or architectural block.

Window systems will consist of anodized frames similar to a Kawneer 600 series with tinted or clear low-e glazing. Interior windows will consist of a combination of tempered glass and a Kawneer 600 series window separating the Rink from warm viewing areas.

Interior partitions will be steel stud and drywall in administrative and other low intensity use areas with a STC rating of between 45-50 where specified, and painted block in high intensity use areas. A portion of the interior will be architectural block in the lobby areas.

Ceilings in administrative areas and the multi-purpose room and other areas requiring a ceiling will have acoustic tile ceilings with a STC rating 0f 45-50 where required. All other ceilings will be exposed painted metal deck with a decorative suspended wood panel features.

All materials in the new arena will be local, have low VOC's, recycled and certified wood depending on location, use and function.

The following items could be considered subject to cost. Some of these items are part of the LEED certification process but are well considered at this time:

- Review of storm drainage in parking areas. Use of bioswales and SWM monitoring of rate and flow, storage etc.
- Trees to shade the building (future growth of plant material to be considered)
- Street furniture and bike racks
- Recycling systems/pollutant controls
- Daylight into arena subject to glare on the ice.
- Light pollution reduction with interior and exterior light fixtures.
- Regional materials and recycled materials**.**

3.0 Preliminary Outline Specifications

1. Exterior Walls

- Lower Portion: Architectural masonry/architectural block
- Cavity wall with R12 rigid insulation.
- Upper Portion: Pre-finished metal siding/insulated panels
- Solera type windows in thermally broken aluminum frames

2. Structure and Roof

- Pre-engineered steel frames.
- Pre-finished metal roof, R-19 Rigid Insulation.

3. Entrance Canopy

- Pre-formed aluminum panels
- 2-ply modified bituminous roof, metal deck with R-20 insulation.
- Pre-finished flashing

4. Arena Lobby

- Exterior: Patterned architectural concrete block and Pre-formed aluminum panels
- Curtain wall window/store front/thermally broken aluminum sections
- Porcelain tile floor
- Painted concrete block/drywall/wood panels
- Ceiling: open structure and acoustical baffle combination
- Surface mounted decorative light fixtures/suspended light fixtures

5. Concession

- Porcelain tile floor
- Concrete block walls painted
- Drywall ceiling painted
- Plastic laminate cabinets and counter top
- Folding closure wall

- Painted hollow metal doors and frame.

6. Ice Pad (85' X 200')

- Ceiling: exposed steel structure painted and pre-finished metal deck (24 ft clear to underside of structure)
- Walls: painted concrete blocks and precast concrete
- Exposed steel structure and steel pan above
- Low emissivity ceiling
- High density polyethylene dasher boards with tempered plate glass shields and two-piece aluminum glazing system. De-mountable.
- Dasher boards by Sport Systems/Athletica – CrystaPlex Ice Rink Systems

7. Benches, Penalty Boxes

- Sports flooring/Tuflex or Rubberflex floor (Recycled Rubber)
- Safety glass from 2m AFF and up
- De-mountable benches. Vision panels for sledge hockey
- Benches etc by Sport Systems/Athletica – CrystaPlex Ice Rink Systems

8. Spectator Seating Area

- Sealed concrete floor
- Concrete block walls painted
- Wood bench seats (no arm-rests) 12" deep at 26" row width

9. Dressing Rooms

- Tuflex or Rubberflex floor (Recycled Rubber)
- Concrete block walls painted
- Exposed concrete slab ceiling painted
- Hollow metal doors and frames painted/piano hinges/SS kick-plates
- Wood benches 18" deep, unpainted
- Steel coat hooks anchored through blocks
- Ceramic tile floor and wall in shower
- Urinal, water closet, sink with floor bracket support, vandal-proof mirror.
- 6" block wall painted toilet partitions
- Vandal-proof fluorescent lights.
- Chalkboard or white board

10. Referee Room, First Aid Room

- Same as dressing rooms

- Telephone in 1st Aid Room

11. Community Offices

- Sheet flooring (Marmoleum)
- Concrete block/drywall painted
- Exposed structure painted
- Tempered plate glass in aluminum frame
- Plastic laminate counter and millwork

12. Service Rooms

- Sealed concrete floor
- Concrete block walls painted
- Ceiling: exposed structure painted

13. General Offices

- Carpet with carpet base
- Concrete block walls painted
- Acoustical tile ceiling
- Recessed light fixtures
- Plastic laminate counter and millwork
- Folding closure wall around reception desk

14. Corridors

- Concrete block walls painted
- Sealed concrete floor
- Exposed structure painted

15. Program Room

- Painted Concrete Block walls -epoxy paint
- Sheet flooring (Marmoleum)
- Drywall/ acoustic ceiling tiles
- Recessed light fixtures
- Plastic laminate counter and millwork in kitchen/bar

16. Pro-Shop

- Sheet flooring (Marmoleum)

- Concrete block/drywall painted
- Acoustic tile ceiling with integrated lighting
- Tempered plate glass in aluminum frame
- Plastic laminate counter and millwork

Pre Engineered Structure vs Membrane Structure Comparison

Energy Use / Thermal Performance

The normal insulation value for a Pre Engineered Structure with a sandwich panel is R-19 for roofs and R-12 for walls. However greater R values can be achieved with insulated panels and roofs. By increasing the thickness and providing more insulation, values as high as R30 are achievable. Membrane Structures by their nature have no inherent thermal resistant R value, however by creating a cavity higher R values can be obtained. With a 6" cavity and thermoplastic or similar insulation R30 is achievable.

Actual energy usage can be calculated based upon a developed envelope design and usage assumptions. At this point of time there is insufficient detail available do accurate modeling. For both systems with equivalent amount of insulation applied in a continuous fashion with no framing breaks, the performance would be expected to be the same. Cladding a Pre-Engineered Structure with a continuous insulation layer protecting the structure from the outside temperature is achievable. While the avoidance of thermal breaks is not possible with a Membrane Structure as the aluminum frame that supports an interior and exterior membrane encapsulating the insulation has direct contact with both the inside and outside resulting in thermal bridging. For this reason the performance of a Pre Engineered Structure with an equivalent amount of insulation to that of a Membrane structure would be expected to be superior.

Enclosure Durability

Insulated metal panels typical for a Pre Engineered building system come with a variety of finishes and coating systems. Modern coating systems for panels include coatings which are durable contain synthetic resins, ceramic and other inorganic pigments. They have a chemical bond which provides resistance to ultraviolet radiation resulting in good color retention and resistance to chemical degradation. Still even as coatings have improved, it is expected that at some point repainting may be required. The expected life span of panel coatings is dependent upon the environment but warrantied for 20 to 40 years. On a Pre Engineered Structure typically the roofing is TPO or PVC, and is warrantied for 20 years.

Membrane Structures have an integral roof and wall system, with an aluminum reinforced layer at the bottom of the envelope. As the main part of the enclosure is a membrane, it is expected that it's life expectancy before replacement would be in the range of 20 years as with PVC roofing. The product often comes with pro- rated guarantees for approximately that time.

Mechanical and Electrical Systems

It is not expected that there would be any difference between mechanical systems including dehumidifiers, the ice plant and air handling units. Electrically and lighting systems would also be similar, as lighting is always directed at work and playing surfaces and indirect bounce lighting is not normally used as it is less efficient.

Constructability

The project development time for both systems would be similar, as the time for design, approvals, site services, plumbing, ice plant installation, rink and other slab construction, electrical, block work and finishes are the same for both systems. As for the erection time of a super structure, it is expected that there would be no difference, leaving only a small advantage to a Membrane Structure in the enclosure of the superstructure.

Job Creation Benefits

The creation of new construction jobs is a boost to the local economy. In the case of a new build $7.5 million facility the benefit would be approximately 50,000 man hours over a 10 to 12 month period. For a smaller renovation project, such as contemplated at Eddie Bush, with a construction value of $2.0 million, 15,000 man hours could be generated, over a 3 to 4 month period.

Baseball Diamond Relocation

It is estimated that the creation or relocation of a ball diamond is in the range of $30,000-$45,000. This cost would not include the creation of any new parking that may be associated with a particular location.

Project Cost

	Item Cost	Sub total
Site Costs Common to Building Types		**$1,164,281.00**
Site Demolition	$ 35,000.00	
Cut & Patch	$ 2,560.00	
Site Excavation	$ 50,995.00	
Building Backfille	$ 79,546.00	
Electrical Site Services	$178,000.00	
Mechanical Site Services	$100,000.00	
Asphalt Paving	$473,000.00	
Concrete Curbs	$ 77,350.00	
Concrete Sidewalks	$ 74,800.00	
Fencing and Gates	$ 5,600.00	
Seeding / Sodding	$ 87,430.00	
Building Costs - Pre-Eng. Building Option A		**$7,632,124.29**
Building Costs - Fabric Structure Option B		**$7,132,124.29**