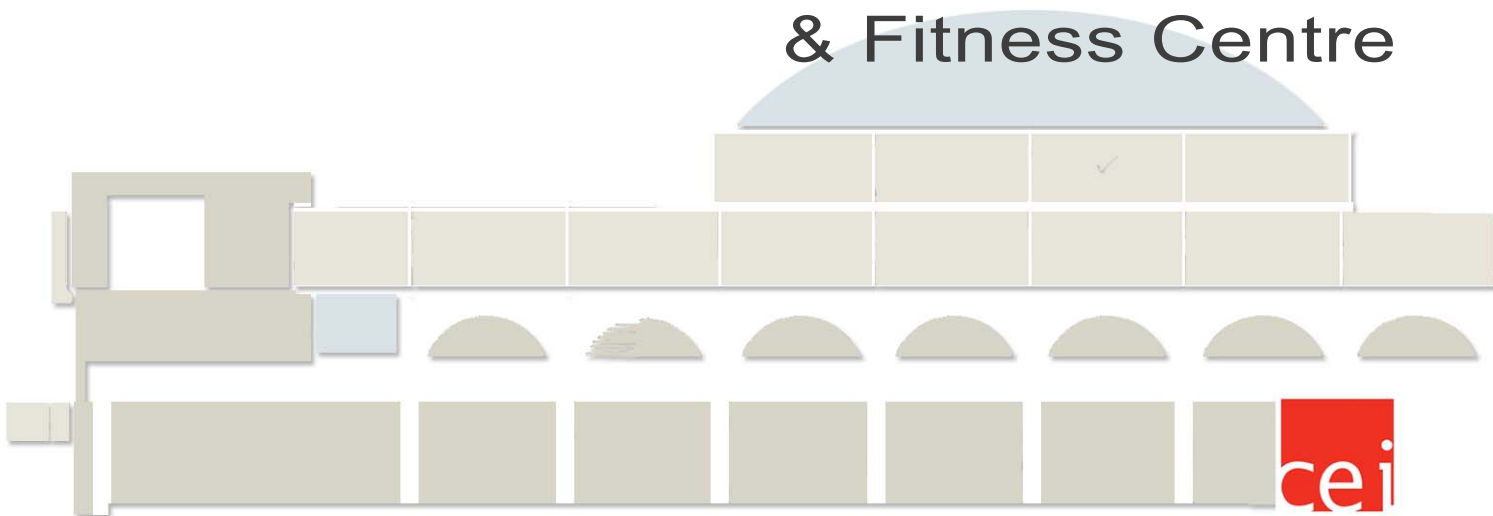


Evaluation Report

Crystal Pool & Fitness Centre



FINAL REPORT JULY 14, 2011



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1.0 INTRODUCTION

At the request of "The City of Victoria", CEI Architecture conducted a "Facility Assessment Study for the "Crystal Pool and Fitness Centre", located at 2275 Quadra Street, Victoria, B.C. The intent of the assessment report was to review and assess the present condition of the facility. This report focuses on problematic areas which relate to the integrity of the building.

A brief description of the work undertaken:

- i. Visual review of building envelope components (wall, window, door components)
- ii. Review of available original drawings to become familiar with the design concepts and details pertaining to the facility
- iii. Building review questionnaire in which staff were asked to complete a questionnaire noting any irregularities in the building
- iv. Examination of exploratory recesses cut through the exterior stucco and brick locations to visually review the exterior wall assemblies and perform moisture testing of the exterior materials

The dates and weather conditions at the time of our visits were as follows:

- | | | | |
|------------|----------------------|------------------------------|--------|
| ➤ Interior | September 21st, 2010 | Clear, | 16.5°C |
| ➤ Interior | September 23rd, 2010 | Cloudy with light rain, | 14°C |
| ➤ Interior | October 4th, 2010 | Cloudy with periods of rain, | 15°C |
| ➤ Exterior | September 8, 2010 | Sunny with cloudy periods, | 12°C |

No other warranties, either expressed or implied, are made as to the professional services provided under the terms of our scope of work and included in this report.

Services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structure. CEI's opinion cannot be extended to portions of the building that were not reviewed due to inaccessibility.

All directional references made in this report are based on Quadra Street running in a north/south direction.

2.0 EXECUTIVE SUMMARY

Constructed in 1971, the Community Aquatic Complex (now known as the Crystal Pool and Fitness Centre) has served the community exceptionally well for forty years. Credit is due to the staff for excellent work done to maintain the facility, and also from a programming perspective to move from a competitive aquatics facility into a “general use” facility.

As with many older aquatic facilities, however, the Crystal Pool and Fitness Centre has an aging infrastructure requiring a substantial amount of increased maintenance. The City of Victoria is faced with ongoing decisions about whether to maintain (extend the life), upgrade or decommission the 40-year-old complex.

It is important to note that present-day needs for aquatic and fitness centres have changed dramatically, regardless of geographic location. The traditional “clinical” and “institutional” approach to the design of community and recreation centres is, in these days of increased leisure time, inadequate. Gone are the days when these facilities catered only to the serious athlete or specific user. Too many municipal recreation buildings have become a major burden on the taxpayer as a result of this approach. Today’s use is geared toward the complete family unit; all elements of “fun”, “relaxation” and “pleasure” are being emphasized as a standard. Subsequently Crystal Pool likely does not meet the current programming requirements of modern aquatic centres.

The mechanical and electrical systems are not only unable to keep up with these changing needs, but have effectively reached the point of failure. The normal lifespan of an aquatic and fitness facility is approximately 20 years, so none of the above is unusual for an aging facility that has continued without any major upgrades for double that time period. Having completed this Building Assessment, it is the opinion of the Consulting Team that the Crystal Pool and Fitness Centre is at the end of its effective life and in need of serious attention.

Numerous assessments and recommendations have been made in recent years concerning the Crystal Pool, but if the facility is to continue operating in its present condition and/or extend its lifespan, the City of Victoria is assuming risk. It is also important to note that any upgrades or plans to extend the life of the facility does not add value or return to the facility in terms of programming. Presently the facility is at “risk” from the time the doors open in the morning to the time they close at night. These “risk” items are noted in Action Category 1A in the report. A major failure could be expected at any given time, with possible results being immediate shutdown, interruptions to programming, and liability (lawsuit). Cost control also falls into the “risk” category. A major failure, such as a pump replacement, may trigger additional upgrades, such as seismic. This is known as “trickle effect”, and it becomes difficult to draw the line with regard to where the work stops.

From a sustainability point of view, the City of Victoria's benchmark for renovation projects is LEED Silver. As part of this Building Assessment, a Sustainable Project Analysis (SPA) was completed for the Crystal Pool and Fitness Centre. The Sustainable Project Analysis provides a brief outline of the prerequisites and credits needed to achieve various levels of LEED building certification. While it is not possible at this stage to determine with absolute certainty whether a renovation to the Crystal Pool could, in fact, achieve a Silver level of certification, it can be noted that achieving LEED Silver would likely be very challenging. Two credits in LEED address building reuse; however, the points available through these two credits are minimal in comparison to the points (and ultimately, operational cost savings) that can be achieved through the energy efficiency of a new building.

From a structural point of view, the existing Crystal Pool building continues to adequately support the gravity and wind loads imposed on it, although it does not meet current Building Code requirements. Where renovation plans include the addition of new mechanical equipment to existing roof areas, localized structural upgrades would be required to accommodate the weight of the new equipment, as well as the local build-up of snow adjacent to such equipment.

The existing seismic capacity is well below current Code requirements. Should major renovations be undertaken, the Authority Having Jurisdiction will require a seismic upgrade. The scope and nature of modifications required to increase the seismic capacity of the complex will be somewhat dependant on the level of upgrade mandated (60% to 70% of current Code level forces would be anticipated) and to what extent such upgrades may be installed without significant impact to the current programming requirements of the facility.

In general, the exposed structure appears in reasonably good condition for its age, but some areas require attention in the next twelve months. The concrete delaminations noted in the walls adjacent to the tot's pool pose a falling hazard which is of greater concern than the possible reduction of concrete capacity. These areas should be repaired to reduce the potential for pieces of concrete to break loose and fall.

The secondary supports for the rock dash stucco that are secured with corroding tie-wires should be addressed in the next 1 to 5 years. While there is a certain amount of redundancy available due to multiple tie-wires and multiple wraps, the corrosion observed is significant, and on-going corrosion could lead to a failure. This could represent a falling hazard to areas below the stucco.

From a mechanical point of view, the mechanical systems in general are dated, in poor or very poor condition, and are not considered to have any remaining serviceable life or value. In addition, a number of the systems or components

appear to be unused, un-repairable or abandoned. We anticipate that, for the greatest portion of the building's life, maintenance requirements have been deferred or completed only on an "as failed" basis. The result is that the majority of the systems are either in immediate need of replacement, or are expected to require major repairs and/or complete replacement in the near future. We anticipate that any renovation of the facility will also require significant mechanical system repair/replacement. Further, if renovations are to be undertaken, it is our recommendation that all of the existing mechanical system be removed and replaced with new systems that conform to current codes and standards and which include energy recovery strategies.

In recent months there has been a recall of pool drain covers that enable finger entrapment. The drain cover recall is the largest in industry history. The main pool tank (lap pool) has 2 of these drain covers. This item has been identified in the mechanical portion of the report/spreadsheet. It would be in the City's best interest to either replace the cover only (if possible) or the entire drain assembly. This has been tagged as a "life safety" issue and CEI's recommendation is for the City to address it immediately.

Electrical systems in the facility have mostly surpassed their life expectancy and are in poor condition, with the exception of some light fixture that have been replaced in recent years. The primary voltage unit substation is located in the main electrical room on the basement level. The main electrical room is a dry and fairly clean space, therefore the unit substation and its secondary distribution equipment is in relatively good condition. Power distribution panels located in mechanical rooms are corroded, in very poor condition and present a safety hazard to building operators and the public. In addition to panelboards, motor control centres inside mechanical rooms are also corroded and in need of replacement. Inside the main electrical room, other systems such as data racks and switches, sound system head end and telephone switching have been added over the years, however, this contravenes with present electrical code because the room contains high voltage equipment. The main electrical room should only be accessed by a qualified FSR-A electrician and all other low-voltage systems should be located in a dedicated communications room. The existing fire alarm system consists of an old style relay system and has been obsolete for many years. In addition, the fire alarm system is not compliant with current codes and standards. The fire alarm system should be replaced in its entirety. Overall, the electrical systems in the facility are in need of replacement due to age and safety concerns. Finally, if the facility undergoes major seismic upgrades, it is our experience that the majority of electrical systems will be affected and cut by seismic work, necessitating the replacement of most systems. Our recommendations for the electrical systems is to replace all electrical systems with the exception of the main unit substation.

Indoor air quality assessment was conducted with the collection of IAQ comfort parameters (i.e. carbon dioxide, relative humidity & temperature) and

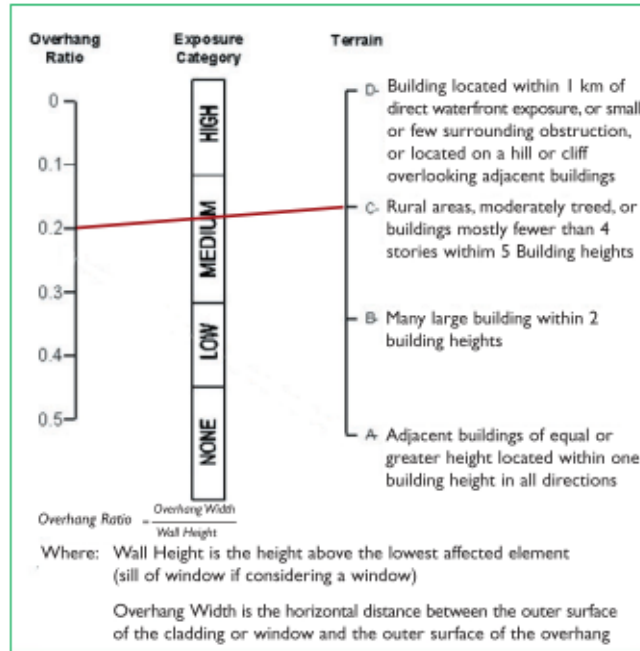
also a collection of ozone and chlorine concentrations throughout the building. Temperatures, carbon dioxide, chlorine gas & ozone readings were all consistently within the recommended range. Relative humidity levels exceed the upper limit of the recommended comfort zone.

Lead based paint & asbestos-containing material locations were identified in parts of the facility. It can be presumed that these hazardous materials will be found in similar materials throughout the building.

The roofing on the facility, as noted in the report, appears to be in good condition. The facility has multiple levels of roof that have been re-roofed over different periods of time. The stairwell roofs and the storage roof area require immediate attention.

3.0 DESCRIPTION OF BUILDING

The Crystal Pool and Fitness Centre was designed by John Di Castri in 1969/70 and was constructed in 1971. The facility is set in an urban location more than 1km distance from direct waterfront exposure. This places it on the mid point of “medium” in the exposure category shown on the following Nomograph Chart. The facility has several overhang widths, with the typical overhang ratio being 0.2 with a class “C” terrain. This particular “nomograph” has been developed for the severe climate of British Columbia.



The building construction is comprised of two levels of cast-in-place concrete floors and columns. Pool tanks, service areas below the pool deck, floor areas around the pool, bleachers surrounding the pool and second level spaces are also constructed utilizing reinforced concrete.

Exterior walls, which are supported on concrete foundation walls and are constructed utilizing giant brick masonry, support various roof levels at certain locations. Large fascias with crushed rock stucco are also incorporated into the design around the full perimeter of the building.

The multi-level roof of the facility is constructed utilizing steel deck, bearing on open web steel joists that are supported either on deep steel trusses spanning over the pool area, or on beams and columns in areas that surround the pool. The pool roof contains three large circular domes that are glazed with translucent acrylic panels.

Window and door systems are typically constructed of aluminum framing with fixed and operable glazed sections. The windows drain to the exterior and are provided with a drainage channel along the inside track.

4.0 EVALUATION PROCEDURES

4.1 Questionnaire Review

A building review questionnaire was circulated to staff members. The purpose of the questionnaire was to gather information regarding staff perception of the performance of the building envelope and building as a whole.

4.2 Visual Review

A visual review of the exterior walls of the building was carried out from ground level. The purpose of this visual review was to note abnormalities on the exterior finishes that may relate to leakage or moisture problems with the enclosure. Evidence of moisture problems can include excessive staining or damage to wall finishes, condensation on wall assembly components, mould and mildew, etc.

4.3 Exploratory Recesses

Moisture tests were carried out at various locations on surfaces of building components. Moisture tests are intended to locate areas of dampness not visible by other means, and are used as a tool to locate areas which have a high probability of underlying rot.

Probe moisture measurements were taken using an electronic moisture meter made by Delmhorst. This is a penetrating moisture meter with probes that are inserted into the building component to check the moisture content of underlying materials. Refer to Appendix G for results of moisture testing.

4.4 Roof Condition Assessment

The report provides information, opinions and recommendations with respect to the general conditions of the existing roof. Refer to Appendix D.

4.5 Environmental Reports

North West Environmental Group Ltd. conducted an indoor air quality assessment, plus an additional assessment to identify lead based paint locations throughout the Crystal Pool and Fitness Centre. Refer to Appendix E.

4.6 Arc Flash Study

Prime Engineering conducted an Arc Flash Hazard Analysis that provided general information pertaining to Arc Flash hazards, as well as an in-depth analysis of the site using computer modelling. Refer to Appendix F.

4.7 Grounding & Bonding Study

Prime Engineering was also contracted to provide a Grounding and Bonding Report that tested the existing metal structures in the pool area for bonding to the current ground grid. Refer also to Appendix F.

5.0 DETERIORATION OF BUILDING MATERIALS

All building components can be subject to deterioration if exposed to less than optimal conditions during service. Included for reference is a brief description of the deterioration process of Brick Veneer Concrete Masonry Unit Backing, which is the major structural building component used at 2275 Quadra Street. Brick veneer/concrete block back-up cavity walls require very little maintenance if properly designed and constructed; however, maintenance is required for many of the components of the wall assembly that have shorter life expectancies and maintenance cycles than brick and masonry block.

Estimated life expectancies (in years) of materials exposed to normal weathering:

1) Wall Masonry	-	100 or more
2) Exterior sealants	-	5 -10
3) Mortar	-	25 or more
4) Flashings	-	20 – 40
5) Windows	-	25 or more
6) Mech. Louvers	-	20 – 30
7) Air barrier sealants	-	15 – 25
8) Brick sills	-	5 – 15

The exterior crushed rock stucco cladding system was observed to be in fair to poor condition. The walls above the second floor ceiling form the fascia of the building and enclose the roof framing, as well as enclosing the upper fan rooms. These walls are un-insulated, wood frame construction with paper-backed, welded wire lath and crushed rock stucco cladding. No wall sheathing was incorporated into the crushed rock stucco wall assemblies.

Unfortunately, some wall systems manage to collect and store water for considerable periods of time, which can allow rapid and extensive deterioration of building components to take place.

For the purpose of this report, we have classified moisture content readings into three categories:

1. Less than 19%
2. Between 19% and 28%
3. Greater than 28%

Wood elements with a moisture content of less than 19% may be considered immune to fungal growth. Between 19% and 28%, fungal growth may be sustained. At approximately 28%, germination and growth of fungal spores can be expected. Above 28%, a substantial increase in fungal growth and associated wood rot can be expected. The moisture content readings should be interpreted in combination with all other factors.

Fungi are microscopic organisms that feed on organic matter and can develop on wood if conditions conducive to growth of the fungi persist. Among the factors

required for growth of wood-rotting fungi, moisture content of the host wood is the most easily, and often the only factor that can be controlled. The fungi develop from minute airborne spores that germinate when they land on a suitable substrate, and they use various parts of the wood's cellular structure, both for sustenance and as a colony. The consumption of nutrients and spread of the colony in the wood continues, as long as the appropriate environmental conditions are available, principally warm temperatures and a supply of suitably wet wood. Destruction of the wood cells reduces a timber's ability to resist structural stresses, and ultimately leads to a loss of structural capacity.

6.0 BACKGROUND INFORMATION

6.1 Visual Review and Site Investigation

Based on visual review and site investigation, and referencing original 1969 Architectural drawings, the typical building envelope construction employed at the Crystal Pool and Fitness Centre is comprised of the following assemblies:

Wall Assemblies

Wall Type # (this number assigned by CEI)	Description	1969 Architectural Sheet Reference
W1	12" Concrete foundation wall	2/A11
W2	10" Concrete foundation wall Damp-proofing	A/A2
W3	4" Giant brick Vapour barrier 6" Concrete block	A/A2
W4	8" Giant brick Painted waterproof compound 8" Concrete block	N/A2
W5	8"x8"x16" standard concrete block	R/A2
W6	4" Concrete block Fire brick	1/A2
W7	4" Giant brick 1" Air gap 1" Rigid insulation Vapour barrier 10" Concrete	K/A2
W8	4" Giant brick 1" Air gap 1" Rigid insulation Vapour barrier 8" Concrete block	E/A2

W9	4" Giant brick 1" Air gap 1" Rigid insulation 4" Concrete block	B/A2
W10	4" giant brick 6" concrete wall	P/A2
W11	Stucco Metal lath Building paper 2x6" Wood studs @ 16" o.c.	1/A11
W12	Stucco Metal lath 2x4" Wood studs @ 16" o.c.	2/A11
W13	Stucco Metal lath ¾" Furring channels with tie wire 1 ½" Furring channels with tie wire	2/A11 5/A11

Floor Assemblies

Floor Type # (this number assigned by CEI)	Description	Location
F1	6" Concrete slab-on-grade	Basement
F2	6" (min.) cast-in-place reinforced concrete slab (Thickness varies to accommodate drainage slopes)	Pool deck & bleachers
F3	Raised floor: Rubber sport flooring Plywood sheathing overlay 1 ½" metal decking Steel light-gauge joists	Fitness Deck 203 (West mezzanine)

Roof Assemblies

Roof Type # (this number assigned by CEI)	Description	Location
Rf1	2-ply SBS modified bitumen: Mechanically attached Densdek over steel deck Mopped vapour barrier Mopped, tapered and flat Poly-Isocyanurate insulation Mopped fibreboard overlay Mopped SBS 180-gram polyester base sheet Torchd SBS 250-gram polyester cap sheet	Typical all locations, unless noted below
Rf2	5-ply built up tar & gravel	Southeast corner, low roof
Rf3	Single-ply bituminous roofing system	Sloped stairwell roofs

6.2 Previous Repairs, Alterations and Reports

Numerous reports and surveys have been completed on the Crystal Pool facility in recent years, the recommendations of which, in some cases, have been implemented (see Appendix K for List of Previous Reports and Drawing Files Received from City of Victoria).

Included in this group of documents received were a Three-Year Shutdown Project List for 2008-2010, and a Shutdown Project List for 2010. It is assumed for the purposes of this *Building Assessment* that all repair and maintenance items noted in the Shutdown Lists have been completed (some of the items in the 2010 list were visually noted by CEI Architecture as ongoing during the course of this *Building Assessment*).

Also included in the group of documents received was a copy of a Risk Control Survey, prepared in November 2009 by Risk Management Services, Inc., and a Staff list of repairs and alterations completed as a result of this survey, to minimize risk to pool patrons. It is noted that the majority of the "hazard" items listed in the survey have been addressed by Pool Staff.

A report that is of particular note is the Facility Management Life Cycle Report, completed by BKG Consulting Group Ltd in July, 2000. BKG addresses four options for the Crystal Pool's future: A. Do nothing; B. Carry out essential work; C. Improve and enlarge; and D. Replace the facility.

In Option A, BKG notes that "doing nothing" will cause the building to deteriorate to unacceptable levels within the next ten years (2010). Option B indicates that carrying out

essential work will extend the life of the facility by 10-15 years, but will not address issues surrounding the pool layout and life safety. Option C, improving and enlarging the facility, will provide a further 25 years of life. Option D is in two parts: either replace the facility (not warranted in their opinion at that time) or convert its function to a multi-purpose, non-swimming facility.

It is imperative to note that this report was completed ten years ago, and knowing that Options C and D were not carried out, we have now reached the point at which this report has indicated failure. Some of the recommendations in Option B have been implemented; regardless of that fact, however, we are still at the point of imminent failure based on BKG's opinion that such work would extend the life of the building by only 10-15 years.

The City of Victoria also prepared two versions of an Asset Detail Report in 2007: one addressing repairs and maintenance items with sustainable solutions; and one addressing the same repairs and maintenance items with solutions that are not geared towards sustainability. Action dates have been provided for each of the items, along with a priority code (recommended, necessary, critical, etc.).

Confirmation was received from Building Maintenance Staff, and in previous reports/documentation, of other action taken in previous years. These include, but are not limited to, the following:

- i. Alterations made in 1979 to accommodate a Childminding Room (Room 145)
- ii. Alterations made in 1983 to accommodate a Hot Tub (swirl pool)
- iii. Alterations made in 1986-87 to Room 207 to become the Weight Room
- iv. Alterations made in 1993 to accommodate a Waterslide in the northwest corner of the facility
- v. Alterations, approx. 5 years ago (exact year unknown), to Room B119, now the Lower Fitness Area
- vi. Alterations, approx. 5 years ago (exact year unknown), to the bleachers at the west end of the facility to accommodate what is now referred to as the Fitness Deck, accessed from the Mezzanine Level
- vii. Repairs made approx. 8 years ago to Waterslide stairs and landings: stairs and landings replaced with fibreglass reinforced panels
- viii. 5m diving tower removed in approx. 1996
- ix. Sauna and Steam Room altered in 2008
- x. Steam generator is re-built every 2 years (shipped to Vancouver for re-building)
- xi. Twelve (12) security cameras were installed approx. 5 years ago, both inside and outside
- xii. Roof Areas 3, 4, & 5 (exact locations unidentified in documentation) were re-roofed in 2002
- xiii. Roof Areas 1 & 6 (identified as west entrance canopy & north side low roof) were re-roofed in 2004

The Crystal Pool and Fitness Centre has undergone numerous repairs and alterations, in order to provide Victoria residents with up-to-date programming in an out-of-date facility. Building Maintenance Staff has done a notable job with respect to the continued operation of this almost 40-year-old building.

7.0 CONDITION SURVEY AND COMMENTS

7.1 Questionnaire Responses

A total of twenty (20) *Building Envelope Questionnaires* were circulated to Crystal Pool Staff through Sean Beatty, Building Maintenance, and Sandy Clarke, Manager Programs & Services. The document requested information on the performance of the roofing, walls and window/door systems, from the Staff point of view.

Responses were received from 12 of the 20 surveys circulated (60%). We include a summary table below of the findings:

<u>DESCRIPTION</u>	<u>TOTAL</u>	<u>% of RESPONDENTS</u>
Water Leaks	4	33%
Cold Walls	4	33%
Areas of Black Mildew	2	17%
Window Problems	4	33%
Exterior Door Problems	4	33%
Air Leaks	7	58%
Odours	5	42%
Cracks in Walls, Floors, Ceilings	1	8%
Exterior Problems	2	17%

Note: the quantities identified in the second and third columns reflect the number of responses received that identified concerns/problems related to the deficiencies described in the first column of the table.

Following is a list of points of interest when reviewing the questionnaires:

- i. One third (33%) of respondents reported that the HVAC system is unreliable, and that the temperature is either too cold or too hot.

The following “Code Numbers” identify the individual areas of the building.

Basement Level	Main Level 1		Upper Level 2	Upper Level 3
B100 - Corridor	100 - Foyer	126 – North Pool Deck	200 – Fitness Loft	300 – South Fan Room
B101 – Electrical Rm	101 - Lobby	127 – East Pool Deck	201 - Office	301 – North Fan Room
B102 – Lower Auditorium	102 – General Office	128 – South Pool Deck	202 – Janitor’s Rm	302 – Open to below
B103 - Storage	103 – Manager’s Office	129 – West Pool Deck	203 – Fitness Deck	
B104 – Ozone Room	104 - Office	130 - Sauna	204 - Corridor	
B105 - Foyer	105 - Office	131 - Steam	205 - Terrace	
B106 – Chemical Storage	106 – Janitor Room	132 – Hot Tub	206 - Terrace	
B107 - Corridor	107 – Drying Room	133 – Mechanical Rm	207 – Weight Training	

B109 - Summer	108 - Office	134 - South Fan Room	208 - Cardio Training	
B110 - Rec.	109 - Office	135 - South Vestibule	209 - Terrace	
B111 - Storage	110 - Women's Locker Rm	136 - Storage	210 - Terrace	
B112 - Water Slide	111 - Women's Lifeguard	137 - Showers	211 - Corridor	
B113 - Storage	112 - Utilities Room	138 - Storage	212 - Women's Water Closet	
B114 - Wood Shop	113 - Women's Water Closet	139 - Drying Area	213 - Men's Water Closet	
B115 - Filter Room	114 - Utilities Room	140 - Men's Lifeguard	214 - Corridor	
B116 - Workshop	115 - Chlorine Storage	141 - Men's Water Closet		
B117 - Boiler Room	116 - Chlorine Mixing	142 - Men's Locker Rm		
B118 - Crawl Space	117 - Storage	143 - Janitor's Rm		
B119 - Lower Fitness Area	118 - Showers	144 - Hallway		
	119 - North Vestibule	145 - Childminding		
	120 - Storage	146 - Staff Room		
	121 - North Fan Room	147 - Kitchen		
	122 - Storage	148 - Storage		
	123 - First Aid Room	149 - Conference Rm		
	124 - Lifeguard's Office			
	125 - Training Pool			

1. Do you have water leaks in any of the following areas?

	Basement Level	Main Level 1	Upper Level 2	Upper Level 3
Walls	B111; B112; B113; B114; B115; B116; B117	One unidentified area	One unidentified area	
Ceiling	B102; B119; other unidentified area	103; domes	211	
Floors	Nothing identified	113	212; 213	

Comments received:

- i. Where block wall contacts outer wall of pool rim flow, below grade
- ii. When concrete floor above is very wet, water leaks through the toilet drains
- iii. Leaks observed at stairwell windows and mezzanine windows (condensation)
- iv. Roof drain near waterslide leaks
- v. Floor drain piping on upper level 3 deteriorated

2. Do any of the leaks previously identified in Question 1 appear only when it rains?

YES 2 Respondents
 NO 1 Respondent
 NO ANSWER 10 Respondents

3. Are there any walls that are usually cold to touch during periods of cold weather?

Basement Level	Main Level	Upper Level
Door Frames	Door frames on west side; 103; 123; 142	Mezzanine window frames; 208; 211; 212; void spaces in Fan Rooms

4. Are there any areas of black mildew?

Basement Level	Main Level	Upper Level
	On caulking around california drains, Room 118 @ carpet edge ??	

5. Are you experiencing any problems with windows?

	Basement Level	Main Level	Upper Level
5.1 Water leaks	No	No; 126-129	No
5.2 Air leaks (drafts	Yes	Yes	No; Yes
5.3 Condensation	No	Yes; 126-129	Yes
5.4 Icing	No	Yes	Yes
5.5 Sealant squeeze out	No	Yes	Yes
5.6 Broken Glass	No	No; 100	No
5.7 Difficulty in operation	No	Yes; 100	No
5.8 Misalignment	No	Yes; 100	No
5.9 Frame finish	No	No	No
5.10 Wind noise/rattles	No	Yes	No
5.11 Unsealed gaps around the frame	No	Yes; 128	No
5.12 Other	No	No	No

6. Do any of the leaks previously identified in 5.1 occur only when it rains?

NO

7. Are you experiencing any problems with exterior doors?

	Basement Level	Main Level	Upper Level
7.1 Water leaks	No	No; 101	No
7.2 Air leaks (drafts)	Yes	Yes; pool deck and sun patio	N/A
7.3 Condensation	No	Yes	N/A
7.4 Icing	No	Yes	N/A
7.5 Sealant squeeze out	No	No	N/A
7.6 Broken Glass	No	No	N/A
7.7 Difficulty in operation	No	Yes, 100	N/A
7.8 Misalignment	No	Yes	N/A
7.9 Frame finish	No	No	N/A
7.10 Wind noise/rattles	No	Yes	N/A
7.11 Unsealed gaps around the frame	No	No	N/A
7.12 Other			

Comments received: Main doors are heavy and auto door opener shuts on people; Lobby exit doors experience water leaks occasionally when power washing is done outside;

8. Do any of the leaks previously identified in question 7.1 occur only when it rains?

NO

9. Does cold air penetrate into the building?

Basement Level	Main Level 1	Upper Level 2	Upper Level 3
Yes	Yes; 100; 101	Yes; 208	Yes

10. Does the building have dehumidifiers? If so, where are they located?

Basement Level	Main Level 1	Upper Level 2	Upper Level 3
No	No	207	No

11. Does the building have humidifiers? If so, where are they located?

Basement Level	Main Level 1	Upper Level 2	Upper Level 3
Yes	Yes; 123; 124; 125; 126; 127; 128; 129; 130; 131; 132	Yes; 200; 203; 204; 205; 206; 207; 208; 209; 210; 211; 212; 213; 214	Yes

12. Does the building have any unusual odour? (i.e. paint, smoke, acid smells...etc.)

Comments received:

- i. chlorine smell everywhere
- ii. Rim flow: sewer gas smell when drains are pressurized and blow gases out
- iii. Filter Room sump: sewer gas smell when drains are pressurized and blow gases out
- iv. Pool Deck: musty air smell
- v. smell of gas or exhaust occasionally in 100, 101 & 149
- vi. Storage Rooms have a stale smell
- vii. Changerooms & Upper Level 2 (Mezzanine) smell like algae when temperature reaches beyond 25 degrees
- viii. Changerooms smell like urine & bleach on hot days; smell musty and damp

13. Have any cracks appeared in the walls, floors or ceilings?

Comments received:

- i. Basement storage area under stairwell: credit card width
- ii. Mezzanine block wall (weight room side): hair line width
- iii. Back ramp (concrete falling away from building): "wider" width

14. Are there any problems with the exterior of the building?

Here are a few suggested items to look for:

14.1	Black mould growth to walls
14.2	Peeling wall and finishes.
14.3	Ponding of rainwater
14.4	Water staining to walls
14.5	Any other problems you may have noticed

YES	NO
	√
	√
√	√
	√
√	√

Comments received:

- i. Some concrete spalling (some has been repaired)
- ii. Areas of loose metal tracking (too high up to address)
- iii. Window flashing deteriorated (some replaced, some refastened)
- iv. Roof under Crystal Pool sign has been replaced
- v. Dirty re-circulated air causes staining at air returns

7.2 Interior Observations

The original objective of the “Crystal Pool Aquatic Complex” was to provide an attractive and functional year round aquatic facility for the people of the Greater Victoria area.

At present, usable space has been maximized, some functions have inadequate area and are poorly located, and circulation is inadequate. The functions within the building have grown over the years, utilizing interior space wherever possible. New programs that have been added over the years include cardio, weight training, aerobics and other miscellaneous courses. These additional, unforeseen programs have resulted in a facility with scattered functional locations and a lack of direction for circulation. This has also introduced a “subsidiary occupancy classification” to the existing major occupancy classification of Group A, Division 3, Indoor Swimming Pools w/spectator seating. The subsidiary occupancy classification would fall under Group A, Division 2, Gymnasia.

Location of the cardio areas within the natatorium environment are a concern. Several highly publicized studies have recently been released providing insight on “disinfection byproducts” and their potentially harmful effects (refer to Appendix M for reference materials). The studies present a comprehensive analysis of disinfection byproducts and provide more findings that correlate certain byproducts of chlorine sanitizers with respiratory problems and bladder cancer, particularly in indoor aquatic environments. *North West Environmental Group Ltd.* conducted an “Indoor Air Quality Assessment” to measure quality comfort parameters, refer to Appendix E. Oxidization stress (during exercise) will cause damage to certain lung cells. Relative humidity levels also exceed ASHRAE recommended guidelines in all locations.

The facility has male and female changerooms that are accessible; however, the design/layout is outdated. More recently built facilities have provided family change rooms with accessible washrooms and showers, and staff change rooms that lead directly to the pool control room. Refer to the Building Assessment Spreadsheet for further details on interior observations.

7.3 Exterior Observations

Refer to Appendix G for exploratory recess observations.

8.0 BUILDING ASSESSMENT SPREADSHEET

See following pages.

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***ACTION CATEGORIES**

In order to provide assistance in prioritizing action items, the following categories describe the condition of the item in question:

1A - Priority "life safety" issues that are non-compliant with applicable codes, standards, or regulations

1B - Involves health or accessibility issues that are not priority "life safety", but are non-compliant with applicable codes, standards, or regulations

1C - Involves issues that were compliant with previous codes, standards, regulations, or building practices and are now "grandfathered"

2 - Involves issues that, if not attended to in the near future, will result in increasing deterioration to infrastructure and cost of eventual repair

3 - Involves issues of a mainly cosmetic nature which, while detrimental to the appearance of the facility, does not affect health or safety

*Definition Division Number - one of 50 major divisions used in specifying and categorizing construction data. Developed by Construction Specifications Canada and Construction Specifications Institute.

BUILDING SYSTEM	BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER*	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS	
1.0 GENERAL						
1.1	Property Name/Address	Crystal Pool - 2275 Quadra Street, Victoria, BC V8T 4C4	N/A	N/A	N/A	N/A
	Size	5992m ² (64,500ft ²)	N/A	N/A	N/A	N/A
	Gross Floor Area	Basement: 993m ² (10,688ft ²) Level One: 3797m ² (40,869ft ²) Level Two: 1202 m ² (12,938ft ²)	N/A	N/A	N/A	N/A
2.0 BUILDING CODE COMPLIANCE						
2.1	Building Classification	Primary occupancy classification: BCBC 3.2.2.31. Group A, Div 3, up to 2 storeys, sprinklered (Indoor Swimming Pools w/ Spectator Seating)	N/A	3	Action Category 1C	While the building likely met code requirements at the time of construction, it does not meet the requirements based on BC Building Code 2006, currently in use.
		Subsidiary occupancy classification: BCBC Group A, Div 2 (Gymnasia)	N/A	3	Satisfactory	This classification now applies due to the fact that the facility now supports fitness rooms and associated equipment, in addition to its original function as a swimming pool. This subsidiary classification, occupying less than 10% of the building footprint, is not required to be considered a Major Occupancy, but nonetheless requires suitable fire separations between the occupancies. (Refer to Section 2.4, Continuity of Fire Separations.)
2.2	Construction Requirements	Non-combustible construction and sprinklers required. Portions of the facility meet the non-combustible requirement using concrete block wall and/or giant brick; however, upper portions of the wall construction and basement partition walls do not meet this requirement as they are of wood stud construction. The facility is not sprinklered; therefore, does not meet this requirement.	N/A	7, 8, 9, 10	Action Category 1C	Building should be sprinklered throughout. Remove all combustible material, replacing with painted gypsum wallboard on steel stud framing with acoustic batt insulation.
2.3	Fire Resistance Ratings & Integrity of Exits	All floor assemblies and supporting structures to be 1hr fire resistance rated. All floors, columns and load-bearing walls appear to be of concrete block construction, which meets the 1hr fire resistance rating.	N/A	4, 7, 9	Satisfactory	Fire stopping required. Refer to item 2.4
		Service Rooms are required to be separated from the remainder of the building by a fire separation with a 1hr fire resistance rating (including walls, floors and ceilings). Exit doors from these rooms require a 45min fire resistance rating. Some service rooms meet both the required wall and door ratings; other rooms only partially meet required wall and door ratings (see also Section 2.7 Service Rooms and Spaces).	046 045 047 066 067	7, 8, 9, 10	Action Category 1B	Wall and door ratings for several service rooms are not compliant with fire resistance ratings.
		Stairs 1 & 2 are considered exit stairs, but are non-compliant with code requirements which prohibit exits leading through lobbies.	039 040 062	7, 8, 9, 10	Action Category 1C	Recommend that a fire-rated wall be constructed, enclosing each of the two exit stairs in a protected vestibule that leads directly to the exterior.

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BUILDING SYSTEM	BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS	
2.4	Continuity of Fire Separations	FIRESTOPPING: Majority of penetrations in fire separations do not have any appropriate firestopping. Cored holes in the floor of Mezzanine Level (Level 2) require 1hr fire rated ULC firestopping. INTERCONNECTED FLOOR SPACES: Mezzanine and bleachers open directly onto Level 1 Pool area. This is permitted in Group A, Division 3 without special protection. SERVICE SPACES: At least one vertical service space, opening into B108 Storage Room, appears to be non-compliant with the required 1hr fire resistance rating. Occupancy Group A, Division 2, Gymnasia requires a 1hr fire separation from Occupancy Group A, Division 3 Swimming Pool. The Cardio area, Fitness Loft, and equipment in the mezzanine passageways do not comply.	023, 024, 025, 026, 027, 028, 029, 030, 031, 032, 033 034 99 035 072	7, 15, 16 7, 15, 16 3 3, 7 3, 7, 8, 9, 10, 15, 16	Action Category 1A Action Category 1A Satisfactory Action Category 1B Action Category 1B	All gaps around services penetrating fire rated walls and floors require proper 1hr rated ULC firestopping. Ensure firestopping is installed at this location. 1hr fire rated wall is required to separate vertical service space from Room B108 and adjacent public corridor. A 1hr fire rated wall is required to separate the various fitness areas from the swimming pool.
2.5	Spatial Separation	No spatial separation issues were noted.	N/A	3	N/A	N/A
2.6	Sprinkler & Standpipes	Building is not sprinklered, and thus, non-conforming.	ALL	15	Action Category 1B	The building likely met code requirements at the time of construction, but does not meet the sprinkler requirements based on current BC Building Code 2006.
2.7	Service Rooms & Spaces	ROOM B101 ELECTRICAL: required fire separation is 1hr, and appears to be met by concrete block walls; door is adequately fire rated and smoke sealed. Firestopping and smoke seals required at all penetrations ROOM B104 OZONE ROOM: required fire separation is 1hr. It is unclear whether the stud wall with gypsum wallboard on two sides meets the required fire separation. Gypsum wallboard must be Type 'X' fire rated to provide 1hr fire separation. Door is not fire rated or smoke sealed. Seal between 1hr fire rated block wall and concrete floor above is failing. ROOM B106 CHEMICAL STORAGE: required fire separation is 1hr, which is met on three sides by concrete block walls, but is lacking a wall separating it from the corridor. Spillage was observed on the concrete slab. (Calcium Chloride). ROOM B115 POOL SYSTEMS (FILTER ROOM): required fire separation is 1hr, and appears to be met by concrete block walls; however, door is not fire rated or smoke sealed. ROOM B117 BOILER ROOM: required fire separation is 1hr, and appears to be met by concrete block walls; door is adequately fire rated and smoke sealed. Room B117 Boiler Room: Vertical cracking observed in the masonry chimney stack. ROOM 133 MECHANICAL (HOT TUB): required fire separation is 1hr, and appears to be met by concrete block ROOMS 300 and 301: fire rated separations required between these rooms and exit stairs, including doors and frames.	025 026 33 036, 036a 066, 067 100 49 130 102	8, 7, 16 5, 7, 8, 9 7, 8, 9, 10, 15, 16 7, 8, 9 4, 7, 8, 9, 10 4, 9 7, 8, 9, 10 5, 7, 8, 9, 10	Action Category 1A Action Category 1C Action Category 1B Action Category 1C Satisfactory Action Category 2 Action Category 1B Action Category 1C	All gaps around services penetrating fire rated walls and floors require proper 1 hr. Rates ULC firestopping. Confirmation required that gypsum wallboard is Type 'X' fire rated. Door requires 45min. fire rating and smoke seal. Joint between 1hr fire rated wall and concrete floor above requires sealing. One hour fire rated wall, with 45min fire rated door, required to separate chemical storage from corridor. Door and frame require 45min. fire rating and smoke seal. Satisfactory Remove and replace split/broken concrete masonry to locks. Door and frame require 45min. fire rating and smoke seal. Provide necessary fire rated separation.
2.8	Emergency Power & Lighting	Emergency lighting was observed throughout.	038	16	Action Category 2	Emergency lighting was observed to be in a severely deteriorated state in many locations. (See also Electrical Report.)
2.9	Exit Signage	Exit signage (both illuminated and otherwise) observed throughout the building.	103	10	Satisfactory	Satisfactory

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BUILDING SYSTEM	BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS	
2.10	Life Safety	Guard rails at mezzanine level are non-compliant due to horizontal bars that facilitate climbing.	037	3, 5, 9	Action Category 1C	Horizontal bars located between 140mm and 900mm above the mezzanine floor should be removed and replaced with an element that does not facilitate climbing. Guard rail design should be such that no opening is greater than 100mm.
		Tactile warning strips have not been provided at the top of all stairs, rendering exit stairs non-compliant.	039	3, 9	Action Category 1C	Tactile warning strips should be provided that are: a) 725-775mm deep by the full width of the stair; b) one tread width back from the top riser; c) slip-resistant and durable; d) of a different material from the surrounding flooring; and e) in a contrasting colour to the surrounding flooring.
		Stair handrails are non-compliant due to a) insufficient clearance between the handrail and the wall; b) handrail is non-continuous throughout the length of the stairway, including landings; c) graspable portion of the handrail does not meet the required dimensions; d) handrail does not extend 300mm beyond top and bottom of the stairway; and e) height of handrails (660mm) is below required height of 865-965mm.	40	3, 5, 9	Action Category 1C	Stair handrails were observed to have a clearance of 45mm from the wall; this should be increased to 50mm. At least one handrail in a stairway needs to be continuous throughout the length of the stairway, including the landings. Handrails should be modified to meet the required dimensions for the graspable portion. At least one handrail in a stairway should be extended 300mm beyond top and bottom of stairway. Handrails should be raised to between 865-965mm, as per code.
		Stairs: exterior stairs on north side of building are non-conforming due to a plaster protruding into them, and no handrails.	041	3, 7, 8, 9, 10	Action Category 1C	Objects may not project into stair width by more than 100mm as per code.
		Exit stairs from Mezzanine Level (Level 2) are non-conforming due to the fact that the leading edge of the treads do not have a contrasting colour and slip-resistant texture.	042	3, 9	Action Category 1C	Leading edge of stair treads should have a contrasting colour and slip-resistant texture, as per code.
		Pool deck exit stairs are non-compliant due to the fact that they have no closed risers on them, and do not meet the required exit width of 3'-0" (900mm). The non-circular cross section of the graspable portion of handrail is too large. Handrails are not continuous.	043	3, 5, 9, 10	Action Category 1A	Stairs require closed risers, and should be 3'-0" (900mm) wide, handrails should be modified to meet the requirements for the graspable portion, and should be continuous.
2.11	Provisions for Disabilities	<u>Parking</u> : one (1) accessible parking stall is required; three (3) have been provided, and are duly marked as such. However, accessible parking stalls do not meet required width of 3.7m (See also 6.2 Parking.)	N/A	9	Action Category 1C	Width of accessible parking stalls should be 3.7m.
		<u>Ramps</u> : Exterior ramp from accessible parking to building entrance exceeds the required width of 1.5m, and meets and/or exceeds the required slope. However, the ramp has not been provided with handrails on both sides.	044	5, 9	Action Category 1C	Handrails should be installed on both sides of ramp, as per code.
		<u>Entrance/Exit</u> : Entry/exit doors meet the required door width minimum of 915mm, and have been provided with automatic door openers.	098	8, 9, 10	Satisfactory	Satisfactory
		<u>Paths of Travel</u> : a) While there is no elevator or ramp access to the pool changerooms, access has been provided through the use of garavanta lifts.	104	14	Satisfactory	Satisfactory
		b) There is no wheelchair access to the Lower Auditorium and the Lower Fitness Area opposite Reception. Access to the south side of the Mezzanine Level (Level 2) is possible, but not practical with the Fitness Deck equipment in the way.	039	5, 14	Action Category 1B	Access to these areas should be provided with accessible lift.
c) Pool changerooms are equipped with wheelchair accessible toilet stalls and sinks, and grab bars have been installed in numerous locations.	Satisfactory	10	Satisfactory	Satisfactory		

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BUILDING SYSTEM		BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
		d) Washrooms on the Mezzanine Level (Level 2) have insufficient exit width to allow for wheelchair access; do not have wheelchair accessible counters; do not have grab bars; do not have tilt mirrors.	105	6, 7, 8, 9, 10, 15, 16	Action Category 1C	Entry/exit width should be widened in these locations; counters should be modified to allow for wheelchair access; grab bars should be installed; at least one tilt mirror should be installed in each of the washrooms.
2.12	Fire Department Access	Building has fire department access from Quadra St to the principal building entrance, as well access along Queen Street, and via fire access lane on the east side of the building.	106	3	Satisfactory	Satisfactory
3.0 BUILDING ENVELOPE						
3.1	Building Envelope - Roofing					<i>Note:</i> these roof type numbers are assigned by CEI for the purpose of this spreadsheet and are not to be confused with Roof Type numbers assigned by the Roofing Consultant in the Roofing Report.
3.1.1	Roof Type Rf1	Mechanically attached Densdek over steel deck Mopped vapour barrier Mopped, tapered and flat Poly-Isocyanurate insulation Mopped fibreboard overlay Mopped SBS 180-gram polyester base sheet Torched SBS 250-gram polyester cap sheet	See photos in Appendix D, Roofing Report	7	Action Category 2	Typical all locations unless otherwise noted. Significant ponding and blistering, as well as build-up of organic material noted in some locations. Minor cleaning required in other locations. Refer to Appendix D, Roofing report.
3.1.2	Roof Type Rf2	5-ply built-up tar & gravel	107	5, 10	Action Category 2	Southeast corner, low storage roof. Roof is beyond its life expectancy. Refer to Appendix D, Roofing report. Remove existing & replace with new 2 ply roofing.
3.1.3	Roof Type Rf3	Single-ply bituminous roofing system	refer to roofing report	7, 9, 10	Action Category 2	Sloped stairwell roofs. Reflective coating is non-performing. Refer to Appendix D, Roofing report.
3.1.4	General	Four metal roof hatches are rusting and corroded (Refer also to Appendix D, Roofing Report). Roof ladders are difficult to climb.	085	5, 7, 9, 10	Action Category 1B	Replace roof hatches.
			085	5, 7, 9, 10	Action Category 2	Replace ladders.
3.2	Building Envelope - Walls below grade	There is evidence of efflorescence in some locations, both interior and exterior.	045, 047, 085	3, 4	Satisfactory	Refer to Appendix A, Structural report.
3.3	Building Envelope - Walls above grade	Membranes are leaching out at brick veneer/concrete foundation wall interface locations throughout. Leaching occurs at weep holes, possibly due to the corrosive environment of an aquatic facility.	108	3, 4	Action Category 2	Power wash areas of leaching at concrete foundation walls.
		The concrete block and fire brick wall, located in Room B117 Boiler Room and extending vertically through all levels of the building, shows evidence of peeling and bubbling paint at its base, likely due to environment. There is also evidence of vertical cracking in the concrete block and within the mortar joint. This form of staggered cracking at the grout joints is typically related to foundation issues.	048, 049	3, 4, 9	Action Category 2	Replace cracked/broken CMU - (approximately 4 in total). Re-point CMU - approximate area = 600m x 1500mm.
		There is evidence of moisture ingress at all locations with stucco on metal lath (similar to a faced, sealed wall assembly), including water stains seen from the interior, and furring channels and tie wires that are badly rusted (see also Appendix F, Exploratory Recess Locations)	006-016, 086, 087	5, 9	Action Category 2	Remove existing and provide new stucco cladding on new non-combustible substrate.
		There is evidence of minor efflorescence on the giant brick walls in some locations around the building. Chlorine lines that vent the regulators to the outside are too accessible to the public.	109 110	3, 4 7, 10	Action Category 2 Action Category 2	Recommend cleaning efflorescence off the brick. Re-locate the lines from a publicly accessible location to a higher, non-accessible location.
3.4	Building Envelope - Doors & Windows					

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BUILDING SYSTEM		BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
3.4.1	Exterior Doors	<p>The main entrance doors, and associated emergency exit doors located off the main lobby, are of aluminum storefront glazing and appear to be in good condition.</p> <p>Aluminum storefront glazing is also used in Room 145 Childminding and appears to be in good condition.</p> <p>Aluminum exit doors at Sun Patio (off 133 East Pool Deck) show heavy build-up of moisture at the head of the frame and also at the brick veneer shelf angle, due to air movement from wall cavity.</p>	101	5, 6, 7, 8, 9	Satisfactory	Satisfactory
			102	5, 6, 7, 8, 9	Satisfactory	Satisfactory
			103	4, 5, 6, 7, 8, 9, 16	Action Category 2	Remove exterior doors. Seal wall cavity at header location. Re-install doors.
		<p>Other exterior metal doors appear to have suffered some minor damage (vandalism?) and while they will require regular repainting to ensure continued longevity, they are generally in acceptable condition to serve their required purpose. It is noted that heavily damaged or corroded doors were in the process of being replaced during the course of this study; e.g. metal doors in 119 North Vestibule.</p>	typical	8, 9	Action Category 2	Recommend removing rust...etc. and repaint.
		<p>Exterior wood doors (Chlorinator Room and Chlorine Gas Room) have deteriorated over time.</p> <p>It was noted by Staff that door frames are uninsulated.</p>	104, 129	5, 6, 7, 8, 9, 10	Action Category 2	Recommend replacement with new exterior metal, insulated doors and hardware.
			info	7	Action Category 2	Recommend injecting medium density polyurethane spray foam into window and door frames.
3.4.2	Windows	<p>It was noted by Staff that window frames are uninsulated.</p> <p>There are aluminum framed, single pane glazing units at the northwest and southwest corners of the Mezzanine level, in Room B102, and at Stairs 3 & 5. These are showing evidence of moisture ingress.</p> <p>There are aluminum framed, double pane glazing units at the northwest corner of the Main Level and in the Weight Training Room 207.</p>	088 089 088	7	Action Category 2	Recommend injecting medium density polyurethane spray foam into window and door frames.
			022		Action Category 2	Recommend replacing all window assembly components.
					Action Category 2	Recommend replacing all window assembly components.
3.4.3	Skylights	<p>Custom-designed acrylic roof domes in three locations: all domes are considered to be in poor condition. Sealants and caulking on the exterior are failing; condensation is evident on the interior of the domes; the original acrylic panels are discoloured (three panels have been replaced with flat, lexan panels) and possibly separating; the steel rings supporting the domes are severely corroded.</p>	089, 090, 091	5, 7, 8	Action Category 1B	When pool is next drained, these panels should be inspected for possible separation issues. Recommendation is to remove acrylic roof dome assemblies (three in total) and replace with HSS supports and curtain wall assembly.
3.4.4	Sill flashings	<p>Existing sill flashings do not have end dams.</p>	022	5, 7, 8, 9	Action Category 2	Recommend providing end dams.
3.5	General	<p>Exterior building signage on west wall does not reflect the true activity of the facility.</p>	101	5, 7, 9, 10	Action Category 2	Provide new signage to read: Crystal Pool and Fitness Centre.

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BUILDING SYSTEM	BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS	
4.0	BUILDING INTERIOR					
	NOTE: Refer to Appendix E, Environmental Reports including Lead Paint Survey and Asbestos Report.					
4.1	General areas					
4.1.1	Flooring	Flooring in the public, common areas is typically 12"x12" VCT tile containing asbestos. In some cases, the existing VCT tile has been left undisturbed and covered with sheet vinyl, which appears to be in good condition. Flooring in the offices is carpet and appears to be in good condition and has been recently replaced. Flooring in the fitness areas is typically rubber matting laid over sheet vinyl or VCT, and appears to be in good condition. Flooring in the service spaces (various mechanical, storage or other rooms) is typically concrete, which, while appearing to be in good condition, does show evidence of efflorescence in some locations.	113, 034 111 112 045	9 9 9 9	Action Category 2 Satisfactory Satisfactory Action Category 2	Recommend applying sheet vinyl over existing, exposed VCT tile. Satisfactory Satisfactory Recommend cleaning efflorescence, and continue to monitor condition of walls/floors to determine cause.
4.1.2	Walls	Most walls in the public, common areas are painted concrete block or brick, and are generally in good condition. The north wall in the basement public corridor is constructed of vinyl-covered plywood, and appears to be in acceptable condition. Demising walls between offices are either structural concrete block or gypsum wallboard, and appear to be in good condition. Walls in services spaces (various mechanical, storage or other) are a combination of unpainted poured concrete, painted or unpainted concrete block, or wood stud and gypsum wallboard. Unpainted concrete walls show evidence of efflorescence in many locations. Painted block walls in various locations show evidence of peeling and bubbling.	113 053 046, 047, 048	4, 9 4, 9 3, 4, 9	Satisfactory Satisfactory Action Category 3	Satisfactory Satisfactory Clean areas of staining throughout. Continue to monitor areas to ensure staining and previous water ingress has stopped.
4.1.3	Ceilings	Ceilings in public, common areas and offices are a combination of acoustic ceiling tiles and gypsum wallboard. While most ceiling tiles appear to be in good condition, some tiles are showing evidence of water leakage. T-bar frame appears to be in good condition, as do gypsum wallboard ceilings. Ceilings on the Mezzanine Level (Level 2) are a combination of gypsum wallboard and acoustic tile in suspended t-bar framing. There is evidence of efflorescence on the gypsum wallboard ceilings, and metal access panels are rusted, likely due to environment. Steel t-bar framing that is directly exposed to the pool environment shows evidence of rusting, and the gypsum wallboard ceiling on the North Mezzanine Level shows evidence of moisture ingress. Ceilings in services spaces (various mechanical, storage and other) are typically concrete, and in some cases, painted. While many of the ceilings appear to be in good condition, some show evidence of past water leakage.	052, 053 081, 082, 083, 084 050, 051	7, 9 7, 9 3, 9	Action Category 2 Action Category 2 Action Category 2	Replace damaged ceiling tiles. Replace steel t-bar framing with plastic framing. Replace acoustic ceiling tile panels with moisture-resistant panels. Clean areas of staining throughout. Continue to monitor areas to ensure staining and previous water ingress has stopped.
4.2	Elevator	There is no elevator in this building, but wheelchair access to some areas has been provided by Garavanta Lift. The lifts themselves appear to be in good operating condition, though they were not specifically tested.	104	5, 14	Satisfactory	Regular inspection of the Garavanta lifts is to be maintained to ensure good operating conditions.
4.3	Public Washrooms					
4.3.1	Flooring	Flooring and tile base in both the men's and women's washrooms is mosaic tile and is generally in poor condition.	055, 056, 057	9	Action Category 2	Recommend immediate replacement due to potential tripping hazard.

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BUILDING SYSTEM		BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
4.3.2	Walls	Walls are poured concrete or concrete block, painted, with 4"x4" tile overlay up to approximately half the wall height, generally in good condition.	128	3, 4, 9	Satisfactory	Satisfactory
4.3.3	Ceilings	Ceilings are typically t-bar framing with acoustic panels, all of which are in poor condition.	052	5, 9	Action Category 2	Recommend replacement of ceiling system with painted gypsum wallboard.
4.4	Changerooms					
4.4.1	Flooring	Flooring in the men's and women's changerooms is mosaic tiles, and is generally in poor condition.	054, 055	3, 9	Action Category 2	Recommend replacement of tile floor with thin set, unglazed mosaic ceramic tile.
4.4.2	Walls	Walls in the changerooms consist primarily of painted concrete block, with a tile overlay in wet areas. The tile varies in size depending upon location: 4"x4", 12"x12", and mosaic tile as wall base. Wall tile, other than wall base, appears to be in good condition.	055 061	9	Satisfactory	Satisfactory
		Mosaic tile wall base, like the mosaic tile floor, is generally in poor condition.	056, 057	9	Action Category 2	Recommend replacement of tile wall base, concurrent with replacement of tile floor.
4.4.3	Ceilings	Changeroom ceilings are typically acoustic tile in suspended t-bar framing. The acoustic tile is generally in good condition and appears to have been replaced on an as-needed basis. There is some indication of water ingress from above, as evidenced by water stains on the ceiling tiles.	058	3, 9	Action Category 2	Scheduled monitoring is required to confirm the cause of moisture ingress from above.
		The t-bar framing is painted steel and appears to be in fair condition; however, standard ceiling requirements for changerooms is moisture-resistant gypsum wallboard, epoxy-painted.	058	5, 9	Action Category 1C	Remove existing ceiling systems and replace with moisture-resistant gypsum wallboard, epoxy-painted.
4.4.4	Other	Lockers are exhibiting signs of corrosion.	059	10	Action Category 3	HVAC system is incapable of removing sufficient moisture from the air. See Mechanical Report for recommendations on HVAC system.
		Some millwork has been damaged and requires repair.	061	6	Action Category 3	Re-laminate counter top
		Toilet partitions in all locations are in poor condition.	060	10	Action Category 2	Replace all toilet partitions with baked enamel on metal, overhead-braced, floor-mounted systems.
4.5	Interior Doors and Frames					
4.5.1	Office doors	Office doors are primarily wood with large glass inserts, and appear to be in good condition. Hardware and frames also appear to be in good condition.	111	6, 8, 9	Satisfactory	Satisfactory
		Door to reception area is aluminum frame with glass, and appears to be in good condition.	103	8	Satisfactory	Satisfactory
4.5.2	Exit doors at stairs	Exit doors at stairs are primarily wood doors with small glass inserts. Doors appear to be in good condition, though metal hardware is exhibiting signs of corrosion in locations that are directly exposed to the pool environment.	062, 063	8	Action Category 3	Replace door hardware at exit doors.
4.5.3	Doors in changerooms	Doors in changerooms are primarily wood doors, and appear to have sustained minor damage in some locations.	064	8	Action Category 3	Patch damaged areas, as required.
		Metal hardware on changeroom doors exhibit signs of corrosion due to the high moisture content in the room.	065	8	Action Category 3	Replace damaged door hardware. Remove rust on hardware that is still in operation.
4.5.4	Basement doors	Basement doors are either wood or metal, depending upon location and fire rating.	113	8	Satisfactory	Satisfactory
		Doors located in the public corridor are typically in good condition.	114	8	Satisfactory	Satisfactory
		Doors located within the "Mechanical" area of the basement show various signs of deterioration, the worst of which is the door to the Filter Room (Pool Systems) which exhibits signs of corrosion due to chemical spills.	066, 067	8	Action Category 2	Recommend containment of chemicals in an enclosed, fire-rated room.

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BUILDING SYSTEM	BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
4.5.5	Building Maintenance Interior, public areas appear to be very well maintained by Maintenance Staff, based on our visual inspection. Interior, non-public areas (including mechanical rooms, janitor rooms, etc) appear to be reasonably well maintained by Maintenance Staff, based on our visual inspection. Exterior maintenance appears to be very good, based on our visual inspection.	114	All Divisions	Satisfactory	Satisfactory
		113	All Divisions	Satisfactory	Satisfactory
		101	3, 4, 5, 7, 8, 9, 10	Satisfactory	Satisfactory
4.6	Communication Service	Sound system is obsolete (Refer also to Appendix C, Electrical Report).	106		Action Category 2 Replace sound system.

5.0 AQUATICS						
5.1	Natatorium General Items	<p>Acrylic-domed ceiling areas experiencing continued condensation problems on the panels & frames. All three domes, two above the competition pool and one above tot's pool have very low insulating values. Refer to "Building Envelope" portion of spreadsheet.</p> <p>Diving boards (1 metre & 3 metre): non-slip surface on boards is wearing off. "Fulcrum assembly" has a fair amount of surface rust. Surface rust at base of structural steel support posts directly above pool deck.</p> <p>Diving Boards (1 metre & 3 metre): rear entry steps leading to the diving boards are not in conformance with current guidelines.</p> <p>Pool Control Room - Portions of the competition & tot's pool are not visible. Water feature controls and switching station covers are rusting and outdated.</p> <p>Steel t-bar framing is rusted throughout the natatorium.</p> <p>Frames on exterior & interior doors are typically rusted and worn.</p> <p>Efflorescence is evident on interior masonry walls.</p> <p>No overhead depth markers @ competition pool.</p> <p>Entire natatorium space is in need of re-painting</p> <p>Acid & Bleach Mechanical Room fans do not work.</p> <p>T-bar panel infills (2'x2') above spectator seating have been replaced by standard acoustic panels.</p> <p>Surface mounted conduit is exposed to the pool environment.</p>	089 093, 094, 095 093 092 082, 083, 084 104 081 N/A 077, 078, 083, 084 072 115	5, 7, 8 9, 10 9, 10 5, 8, 9 3, 4, 9 5, 9 9 9 6, 9	Action Category 2 Action Category 2 Action Category 2 Action Category 2 Action Category 1B Action Category 2 Action Category 2 Action Category 1B Action Category 1B Action Category 1B	See recommendation for Item 3.4.3 Skylights. Netting wrapped around guardrails eliminating openings between guardrails. Replace fulcrum assembly & provide four bladed foot wheel. Remove rust and repaint with epoxy paint. Guidelines require steps to be mounted on the side rather than from behind. Extend front portion of control room out to accomodate adequate views. Replace controls & switches with new. Replace steel t-bar with plastic t-bar framing. Replace tiles in natatorium and male & female changerooms. Replace all frames (exterior and interior). Remove efflorescence. Hang depth markers located above every deck depth marker around edge of 25m pool. Re-paint with epoxy paint. Remove existing fans and replace with new. Replace acoustic panels with moisture-resistant panels. Enclose conduit in moisture-resistant, non-combustible gypsum wallboard bulkheads.
5.1.2	50m Competition Pool Deck & Inserts	<p>General item: due to the corrosive/harsh environment of the natatorium, numerous items are experiencing oxidation (rusting).</p> <p>Gutter system is a "rimflow system". Gutter drain surface at deck shows signs of wear and 40 years of use, and is not in conformance with the current code. Gutter system also shows a fair amount of water ingress and staining at the basement level.</p> <p>Pool deck is cluttered with equipment (ie. Tables, chairs, exercise mats, whiteboards, cones, stainless steel storage reels, rope floats, netting for water sports...etc.).</p> <p>South/West corner of competition tank: strip drain top grating is damaged and is a potential tripping hazard.</p>	075 037, 043 116	3, 4, 5, 9 6, 8, 9, 10 6, 10	Action Category 2 Action Category 1B Action Category 2 Action Category 1B	HVAC system is incapable of removing sufficient moisture from the air. See Mechanical Report for recommendations on HVAC system. Repair leaks in the gutter system. Fully ventilated Pool Deck storage system should be installed complete with full height locking door, self draining shelves, non-rusting hardware, and trolley & casters for ease of movement on deck. Replace top grating on strip drain at damaged locations.

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BUILDING SYSTEM	BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS	
	<p>Gaps observed between strip drain channel and edge of bullnose tile.</p> <p>Competition pool stairs located at the southeast corner of the tank require foam protection.</p> <p>Lane markers are in poor condition and grouting has deteriorated.</p> <p>Non-slip ceramic tile (unglazed) appears to be in fair condition.</p> <p>Sloping of the pool deck is inadequate and does not appear to drain as necessary to the strip sanitary drains.</p> <p>"No Diving" signs on deck level are illegible.</p> <p>Flag line located at the deep end, and similar lines in other locations, is extending over the deck area and has low headroom (6'-2" approx.). Flag line stanchion posts are in the wrong locations.</p> <p>Deck inserts for cup anchors, stanchion posts, etc. are in poor condition. Many are not in use and require cover plates to avoid being a tripping hazard.</p> <p>Sealants located in the pool deck appear to be beyond their life expectancy (i.e. strip drains locations, glazing seals)</p>	075 117 068 79 118 071 072 073, 074 075, 076	6, 10 10 9 3, 9 9 9, 10 9., 10 9	Action Category 2 Action Category 1B Action Category 2 Satisfactory Action Category 1B Action Category 1B Action Category 1A Action Category 1B Action Category 2	Provide foam rod & sealant. Provide corner foam protection. Remove existing tile, replace with new. Re-slope pool decking with adequate drainage. Additional strip drains and spot drains required. New tile required. Re-paint signs on deck. Remove existing posts & replace with new stanchion posts. Provide new deck inserts. Re-seal throughout.	
5.2.1	Pool tank items	<p>Marcite finish and tiled lane markers are in poor condition and are at the end of their expected 10 year life span. Previous reports note that the marcite in the pool tank was replaced in 1988.</p> <p>Underwater lights were removed in 1988.</p> <p>Observation windows located at the deep end of the 25m course are displaying signs of rusting around the perimeter of the windows.</p>	068 N/A 069, 070	3, 9 9, 16 9	Action Category 3 Information Only Action Category 2	Replace marcite in pool tank with a tiled finish. Replace lane markers and rest ledge at 25m course with a tiled finish. Remove all surface rust. Prime and paint with epoxy.
5.2.2	Water Slide	<p>Steel bar located above the slide entry is a potential hazard (low headroom). Steel handrailing shows surface rust and paint chipping in various areas.</p> <p>Flume fasteners are rusting.</p> <p>Concrete pad at waterslide shutdown lane is a tripping hazard.</p> <p>Intermediate landing handrail is non-conforming.</p> <p>Approximately 25% of the steel stringers guardrails, vertical posts, pickets, fasteners show rusting and corrosion.</p> <p>Concrete parging has been applied to the concrete bleachers. To provide drainage from water run off of the waterslide. Algae has formed as a result.</p> <p>Guardrails required at end of spectator seating. This will eliminate the possibility of patrons walking on wet, sloped concrete parging</p> <p>Damaged t-bar panel sections observed at waterslide stairs upper level. T-bar rusting.</p>	077 078 079 119 120 096 120 121	9 10 9 5, 9 9 3, 9 5 9	Action Category 1A Action Category 2 Action Category 1A Action Category 1B Action Category 2 Action Category 2 Action Category 1A Action Category 2	Paint (epoxy) steel bar (yellow). Replace fasteners. Paint (epoxy) concrete pad. Handrail to be continuously graspable at landing. Install handrail at landing only, paint. Remove surface rust and apply epoxy paint. Remove existing algae; treat w/ borate cleaning. Remove spalled parging and re-parge. Install guardrails. Remove t-bar & panels apply epoxy paint to existing underlying surface.
5.3	Tot's Pool	<p>General item: Due to the corrosive/harsh environment of the natatorium, numerous items are experiencing oxidation (rusting).</p> <p>Concrete water features do not have slip resistant surface.</p> <p>DE filter media was observed at several locations in the tank floor.</p> <p>Surface at the edge of the tank has worn off.</p>	122 097	9, 10 10, 15	Action Category 2 Action Category 1A Action Category 1B Action Category 1A	HVAC system is incapable of removing sufficient moisture from the air. See Mechanical Report for recommendations on HVAC system. Remove existing paint and replace with non-slip tile. Replace filter elements. Refer to Mech. Report. Non-slip edge required.

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5.4	Swirl Pool (Hot Tub)	Staining in the tiles & grout. Waste builds up quickly in the tub's small volume of water. High water temperature causes bathers waste to be released into the water as bathers sweat; this allows other organics that were dissolved in the water to remain in the tub and accumulate. Leaving these compounds in the hot tub water will encourage the growth of potentially harmful bacteria.	123	10, 15, 16	Action Category 2	Ensure water temperature maintained to a temperture not above 40 degrees celcius.
		Staining and discolouration of cedar ceiling above hot tub, as well as cedar enclosure.	124	6, 9	Action Category 2	Refinish ceiling and enclosure, remove cedar (wood) material and replace with tile on cementitious board. Epoxy paint.
		No handicapped seating provided for possible viewing	099	5, 6, 8, 9	Action Category 2	Provide appropriate signage and location for handicap seat in swirl pool.
		Ponding of water at floor drain.	126	9	Action Category 2	Remove and replace tile, and re-slope floor.
5.5	Steam Room	Steam vent cover is a material that will conduct heat.	125	6, 9, 10	Action Category 1A	Replace existing cover with 15mm plexi-glass protection. Fasten with stainless steel bolts.

6.0 SITE & LANDSCAPING						
6.1	Exterior pathways	Inadequate drainage at the exterior of the entrance to the facility.	044	3	Action Category 2	Improve drainage as necessary.
		Accessible ramp at the northwest corner of the entrance requires handrails as per BCBC 3.8.3.3 (See also 2.11 Provisions for Disabilities in this document.)	044	3, 5, 9	Action Category 1C	Provide handrails as required by code. See also 2.11 Provisions for Disabilities in this document.
6.2	Parking	Access to motorcycle parking, which is adjacent to the main entry doors, is via the pedestrian/wheelchair access ramp, which is an inappropriate use of the ramp.	098	9	Action Category 1B	Relocate motorcycle parking.
		Parking: one (1) accessible parking stall is required; three (3) have been provided, and are duly marked as such. However, accessible parking stalls do not meet required width of 3.7m (See also 2.11 Provisions for Disabilities.)	106	9	Action Category 1C	Width of accessible parking stalls should be 3.7m. See also 2.11 Provisions for Disabilities in this document.
6.3	Landscaping	Existing grade is covering weep holes at certain locations of the brick veneer walls.	102, 109	1	Action Category 2	Re-work grade at covered weep holes.
6.4	Loading	Loading area at exterior stair on north face does not have a lift.	127	5, 14	Action Category 1C	Install lift to facilitate easier handling of pool chemicals.

7.0 STRUCTURAL The following was prepared by Read Jones Christoffersen Ltd. and is intended to be read in conjunction with their main report.						
7.1	General	The Crystal Pool structure was designed in 1969 and built in 1971. There is a main pool tank surrounded on three sides by bleachers, with a smaller tot's pool at one end of the facility. Minor additions and upgrades to pool equipment have occurred, as well as some minor structural renovations.	Inform Only	Information Only	Information Only	Information only
7.2	Roof	Main roof construction consists of metal roof deck supported by open web steel joists, steel trusses and wide flange steel support beams. Custom designed and fabricated acrylic domes are located above the main and tot's pools. Lower roof sections utilize precast concrete planks for structure.		5, 8	Action Category 2	Further investigation is required at the dome supports to determine if connections are experiencing corrosion. Consider capacity upgrade.
7.3	Bleachers	Bleachers are constructed from reinforced cast-in-place suspended concrete slabs. Vertical support is provided by reinforced concrete beams and columns in most cases, and in some areas by reinforced concrete block walls.		9	Action Category 1C	Lead-based paint identified on the painted portions of concrete. Refer to "Lead Paint Survey" .
7.4	Pools	Pool tanks have reinforced concrete walls and bottom slabs-on-grade, with adjacent pool deck areas consisting of 6" thick, reinforced suspended concrete slabs.		Information Only	Action Category 2	Dry side of tank is inaccessible.
7.5	Slab-on-Grade	Basement area slabs-on-grade are 6" thick reinforced concrete.		Information Only	Information Only	Information Only
7.6	Foundations	The structure is supported on conventional reinforced pad and strip footings. There were no notes on the original structural drawings to provide the design bearing pressure for the foundations.		Information Only	Satisfactory for gravity loads	Information Only

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BUILDING SYSTEM		BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
7.7	Lateral Load Resisting System	Lateral resistance is provided by steel bracing within the roof and exterior giant brick shear walls.		3, 4, 5	Action Category 2	Consider capacity upgrade.
7.8	Design Load vs. Current Load					
7.8.1	Gravity	The design snow loads for the roof have increased by roughly 50% compared with those shown on the drawings (20 psf). Currently, Victoria basic design snow load for roofs is 1.5 kPa (31 psf).		5, 7	Action Category 2	Upgrading roof systems for higher design snow loads should be considered where practical, although this may be difficult and / or cost prohibitive in many areas. New equipment placed on the roof will require localized structural upgrades.
7.8.2	Seismic	Due to significant changes to seismic design and detailing requirements in the Current Building Code compared with the Code in effect at the time of construction, the ability of the facility to resist seismic forces may only be in the order of approximately 20% of current Code prescribed forces.		3, 4, 5, 9	Action Category 1C	Existing seismic capacity is well below current standards. Upgrades to achieve resistance levels to a minimum of 60% of current Code level forces should be included with a renovation program. New upgrades may include such items as: <ul style="list-style-type: none"> • Upgraded connections of the structural steel bracing and roof truss members. • Upgrades to member sizes in the roof bracing and roof trusses transferring lateral loads. • Upgrades to existing giant brick walls, possibly with the installation of new reinforcing steel and grout within the existing brick, or with the addition of new concrete shear walls or other similar lateral resisting elements. • Potential upgrades to foundations at new (or existing) lateral resisting elements.
7.8.3	Non-structural Seismic Restraint	Non-structural operating and functional components (OFC's) such as mechanical equipment (boilers, sprinklers, pipes, etc.), suspended ceilings, light fixtures and other electrical equipment should be seismically restrained. In many cases existing equipment is not restrained, and should be addressed.		5, 15, 16	Action Category 1C	Retrofitting existing equipment with new seismic restraints should be included with a renovation program.
8.0	MECHANICAL	The following was prepared by AME Consulting Group Ltd. and is intended to be read in conjunction with their main report.				
8.1	PLUMBING SYSTEMS					
8.1.1	General	Plumbing systems are general in good condition, as building maintenance has been good.		10, 15	Satisfactory	Satisfactory
8.1.2	Storm Drainage	Roof drains capture storm water and an internal cast iron drainage pipe system collects all storm water and discharges to the municipal storm drainage system.		7, 10, 15	Satisfactory	Satisfactory
8.1.3	Sanitary Drainage	A cast iron piping system collects waste water from all Main and Mezzanine floor plumbing fixtures and discharges to the municipal sanitary drainage system.		15	1C	The mandatory upgrade of this system will likely be triggered by any significant building renovation/upgrade.
		A mechanical room sump and associated pump collect all water from the underslab drainage system (pool tank and basement floor) and waste water from the Basement floor drains, and discharges to the municipal sanitary drainage system. This combining of storm and sanitary drains does not conform to current code requirements. This pump was replaced less that one (1) year ago and is in new condition.		15	1C	
8.1.4	Domestic Cold Water	A 4" municipal water service enters the building at the North wall and provided DCW for the entire building. This service was upgraded to meet the current code requirements, including new BFP's and is new.		15	Satisfactory	No action is required at this time.

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BUILDING SYSTEM	BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
8.1.5	Domestic Hot Water		10, 15	2	Replace heat exchangers with plate-and-frame type of equivalent capacity.
8.1.6	Natural Gas		15	Satisfactory	No action is required at this time.
8.1.7	Plumbing Fixtures		15	Satisfactory	No action is required at this time.
8.2	AQUATIC SYSTEMS				
8.2.1	General		10, 15	1B	Replace the pool disinfection and filtration systems in their entirety. 3-5 years
			5, 15	1C	in case of moderate earthquake, pipe breakage and total basement flooding anticipated. Provide seismic restraints
8.2.2	Filtration		10, 15	2	Address insufficient flowrate only as part of total pool system replacement.
8.2.3	Drains & Piping		15		None
			3, 4, 7, 9, 10, 15	2	Address undersized piping only as part of total pool system replacement
			15	2	Replumb to basement sump
			10	1A	Replace drain covers with non-finger-entrapment covers
			10	1B	Replace drain cover with unblockable (domed) cover
			10, 15, 16	2	Turn hydro-therapy jets into inlet system and increase size of filtration/heating system
8.2.4	Chemical Treatment		10, 15, 16	1B	Replace all soda ash feed components
			10, 15, 16	1B	Relocate all chlorine gas feed components into chlorine gas room to minimize risk of gas leak
			10, 15, 16	1B	Ensure automatic shut down of chlorine gas feed in case of chlorine gas leak
	Secondary Disinfection Systems		10, 15, 16	3	These systems are not mandatory and no action is required at this time. Consider reinstating the Tots Pool System.
	Chemical Storage		8, 9, 10	1A	Ensure storage of chemicals in accordance with current regulations.
8.2.5	Pool Heating		10, 15, 16	2	Monitor condition of plates
			Satisfactory	Satisfactory	All acceptable
8.3	FIRE PROTECTION SYSTEMS				

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BUILDING SYSTEM	BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
8.3.1	General		7, 9, 15	1A	Install fire sprinkler system to NFPA 13 requirements throughout the building.
8.3.2	Fire Hose Cabinets		15	1A	Remove fire hose cabinets PROVIDED the fire sprinkler system is installed.
8.3.3	Portable Fire Extinguishers		Information Only	Satisfactory	No action required at this time
8.4	HEATING SYSTEMS				
8.4.1	General		Information Only	Information only	Information only
8.4.2	Boilers		15, 16	2	Provide new, high efficiency hot water boilers.
8.4.3	Reheat Coils		5, 9, 15	2	Provide access to reheat coils in building finishes and ductwork. Steam clean all reheat coils and duct interior surfaces.
8.4.4	In-Floor Heating		3, 9	3	No action is required at this time
8.4.5	Terminal Units		15	3	No action is required at this time
8.5	VENTILATION SYSTEMS				
8.5.1	General		15, 16	Information Only	Information Only
8.5.2	Pool AHU's		7, 10, 15, 16	1B	Replace with roof mounted air handling units complete with supply and return fans, heat recovery section, filter sections, variable speed drives, hot water heating coils and DDC controls. North Unit: 22,000 cfm, 50 Hp South Unit: 22,000 cfm, 50 Hp
8.5.3	Change Room AHU's		7, 9, 10, 15, 16	1C	Replace with packaged, roof mounted air handling units, complete with supply and exhaust fans, heat recovery section, filter sections, variable speed drives, hot water supplemental heating coil and DDC controls. New AHU's North West Unit: 10,000 cfm, 15 Hp South West Unit: 10,000 cfm, 15 Hp
8.5.4	Washroom & Shower Room Exhaust Systems		7, 9, 10, 15, 16	2	Replace with the Change Room AHU's described above.

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BUILDING SYSTEM	BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
8.5.5	Miscellaneous Exhaust Systems		5, 7, 15, 16	2	Replace with equivalent exhaust fans.
8.5.6	Air Balancing		15	2	Retain an air balancing contractor to provide existing air flow recordings, make recommendations on adjustments and re-balance all systems.
8.6	AIR CONDITIONING SYSTEMS			3	No action at this time
8.6.1	General		15	3	Proposed building upgrades will trigger replacement of this system
8.6.2	Mezzanine Fitness		7, 15, 16	3	Proposed building upgrades will trigger replacement of this system
8.6.3	Administration		7, 15, 16	3	This project should be cancelled if major renovations are undertaken
8.6.4	Spin Room		15, 16	3	Proposed building upgrades will trigger replacement of this system
8.7	CONTROL SYSTEMS				
8.7.1	General		10, 15, 16	2	Install new DDC control systems throughout.
9.0	ELECTRICAL	The following was prepared by Applied Engineering Solutions Ltd. and is intended to be read in conjunction with their main report.			
9.1	Main Electrical Distribution				
9.1.1	Underground Utility		7, 16	Action Category 1C	Needs testing and checking by an electrician
9.1.2	Electrical Distribution Equipment		5, 6, 7, 8, 9, 16	Action Category 1A	Replacement and installation in dry positive pressured spaced
9.1.3	High Voltage Equipment		16	Action Category 1C	Unit should be cleaned, tested
9.1.4	CDP Breakers		16	Action Category 1C	Older breakers should be replaced
9.1.5	Arc Flash Study		16	Information only	Arc flash analysis has been completed. Decals have been installed on distribution equipment
9.1.6	Main Distribution		16	Action Category 1A	A remote push button is recommended.
9.1.7	High Voltage Vault		6, 7, 8, 9, 16	Action Category 1A	Non-power distribution electrical equipment should be moved to a dry space that is separate from the main electrical room

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BUILDING SYSTEM		BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
9.1.8		The use of the high voltage vault for other systems has created a problem with clear working space around the electrical equipment.		6, 7, 8, 9, 16	Action Category 1A	All of the other systems equipment need to be relocated to meet current standards.
9.1.9		Fire stopping in the high voltage vault is non existent. This would be beneficial for its intended purpose of preventing the spread of smoke and fire and would reduce the mount of corrosive vapour in the electrical service room.		5, 7	Action Category 1A	Install fire stopping
9.1.10	Seismic Restraint	- This distribution equipment and transformer have not been fastened to meeting existing standards. All distribution equipment would have to be certified and fastening methods engineered to meet current standards.		5	Action Category 1A	Proper fastening should be installed
9.1.11	General Observations in the High Voltage Vault	- Data cables have been suspended from electrical conduit racks. - Grounding conductors run across conduit racks without proper support. - PA wiring is tie wrapped to conduits and mechanical piping. - BX cables have been tie wrapped in temporary fashion to conduit racks. - Subsequent installations have not maintained the original neat and tidy workmanship of the original plant.		5, 7, 16	Action Category 1C	Replacement should be made for these
9.1.12	Fire Sprinklers	Fire sprinklers may have to be installed to meet new building standards. If sprinklers are installed, the main distribution and all other major electrical distribution panels and MCC's would have to be made sprinkler proof.		5, 7, 9, 15, 16	Action Category 1A	Sprinkler proofing needed for all existing equipment that remains and new equipment
9.2	Branch Power Distribution					
9.2.1	Conduits	Conduits in some areas have corroded completely at the floor line. Many of the conduits in the slab may be partially or completely corroded. This presents a problem with grounding and bonding paths, conductor insulation degradation and loss of conductor mechanical protection. Many conduit runs would have to be replaced by new surface conduits or cables.		5, 7, 16	Action Category 1A	This should be replaced so that potential hazards are mitigated.
9.2.2	Cab Tire Cable	Cab tire cable has been used for the connection of mechanical equipment. This would need to be replaced.		5, 16	Action Category 1A	Replace cabtire with code compliant cable such as TECK.
9.2.3	Panels in Corrosive Atmospheres	Some of the panels metal enclosures interiors are rusting very badly. The aluminum lugs with steel set screws are corroding. The breakers in these panels cannot be guaranteed to operate as designed due to corrosion and contamination. Panel cover fasteners are the clamping type and many of them are stripped.		16	Action Category 1A	New cover fasteners need to be installed. Corroded panels need to be replaced and relocated outside of corrosive atmosphere.
9.2.4	Panel 'C'	Panel 'C' is located in a Janitor's Closet. Panels are not permitted in Janitor's Closets.		5, 7, 9, 16	Action Category 1A	Code violation - provide new panel in a suitable space
9.2.5	GFI Receptacles	GFI receptacles were being installed in Change Room areas at the time of inspection. All GFI installations throughout the complex will have to be reviewed to see that ground wires have been pulled back to the supply panels and that monthly test and verification of GFI operation is properly logged.		16	Action Category 1B	All receptacles should be tested and replaced as necessary.
9.2.6	Ground Fault Panel	FPE Lifeguard™ ground fault panel is in service without any record of testing and calibration of the panel. This equipment is 40 years old and should be tested on a regular basis.		16	Action Category 1C	This unit needs to be replaced and all of the branch wiring needs to be tested or re-pulled to bring the system up to standard.
9.3	Motor Control					

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BUILDING SYSTEM		BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
9.3.1	MCC	The motor control centres are very old and have been modified extensively. Starters and overload blocks from all manufacturers can be found in the MCC's throughout the building. Building management control systems and control wiring can be found tied in multiples under one terminal screw. Safety lock off devices on some starters are not functioning properly. All 6 MCC units would need to be replaced.		16	Action Category 1A	Units in poor condition and require replacement
9.3.2		One motor control centre is located at the top of a stair in the Attic space.		5, 7, 9, 16	Action Category 1C	This MCC needs to be relocated.
9.4	Grounding and Bonding					
9.4.1		Pool deck and metallic equipment bonding is a very important component of the pool structure. This pool grounding continuity would have to be tested and verified.		16	Action Category 2	Grounding and bonding testing has been completed. Refer to Appendix F.
9.4.2	Rigid Steel Conduit	Today's Code requires that conduits be of corrosion resistant metal or rigid PVC type. Rigid steel conduit was used extensively for conduits concealed in the slabs. Many of the rigid conduits in corrosive areas are already completely corroded away.		3, 4, 7, 16	Action Category 1A	Metal conduits were the intended ground return path and would need to be replaced.
9.4.3	Corroded Conduits	Very few of the in slab conduits have ground wires pulled in with the branch circuit and feeder conductors. Bond conductors would be required for any upgrade. This would mean re-pulling many of the branch circuits.		16	Action Category 2	For all systems that are upgraded, provide new PVC conduit and proper wiring
9.4.4	Bonding Paths	The bonding path for the existing rigid steel conduits relies on the metal locknuts as part of the contact and conductor circuit. Corrosion of the locknuts, conduit and the panel enclosure degrades the bonding path.		16	Action Category 1A	New circuit wiring with a green insulated ground wire should be provided.
9.5	Emergency Lighting					
9.5.1	Existing Emergency Lighting	The existing emergency lighting system is located in the main vault. The unit is composed of a large battery bank, retrofitted charger (due to parts availability) analog instruments for unit testing and a circuit breaker panel to each remote location. This unit would need to be replaced during any upgrade of the facility.		16	Action Category 1A	A new code compliant central inverter should be provided complete with battery backup
9.5.2	Quantity of Emergency Heads	Our inspection found that there was approximately one half the required emergency lighting in the public areas, change rooms, and stairwells. Existing heads would be replaced and additional heads would need to be installed.		16	Action Category 1A	Additional emergency heads are needed.
9.5.3	Combination Battery Pack Remote Heads	Combination emergency lighting units have been added to service and mechanical rooms.		16	Action Category 1C	Consolidate to larger units for ease of testing and longer battery life.
9.5.4	Test Records	No test record has been attached to each combination emergency lighting unit.		16	Action Category 1A	Attach unit testing results records to each unit.
9.6	Exit Signs	The exit signage in the building has been recently upgraded. The quantity and locations of these signs is adequate.		16	Satisfactory	No action required.
9.6.1	Existing Exit Signs	Some exit signs are required to suit new DC supply requirements.		7, 10, 16	Action Category 1C	Some exit signs should be added.
9.7	Lighting Equipment					
9.7.1	Existing Lighting Equipment	All of the fluorescent fixtures have been retrofitted with T8 lamps.		16	Action Category 2	No action required.
9.7.2	Metal Halide	The metal halide fixtures above the pool are relatively new and would have to be assessed as to replacement or keeping and relamping.		5, 16	Action Category 1C	Ongoing maintenance item. Seismic cables should be checked for corrosion.

CEI ARCHITECTURE PLANNING INTERIORS
BUILDING ASSESSMENT SPREADSHEET



BUILDING SYSTEM		BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
9.7.3	Vapour Tight	The vapour tight fixtures in the change rooms and damp locations need cleaning and relamping. These units are relatively new		16	Action Category 1C	Clean, relamp and reballast fixtures
9.7.4	Pot Lights	Pot lights and decorative lighting has inefficient incandescent lamps.		16	Action Category 1C	Replace with energy efficient LED type fixtures.
9.7.5	Wire Guards	Fixtures in some of the mechanical rooms require wire guards.		16	Action Category 1C	Add wireguards
9.7.6	Seismic Control of Lighting Fixtures	Existing needs to be evaluated. Particularly those fixtures over the pool and pool deck regarding cables and crimps and their compatibility with corrosive environments. Because of height, high areas could not be inspected		9, 16	Action Category 1C	Ongoing maintenance item. These should continue to be monitored.
9.8	Low Voltage Lighting Control					
9.8.1		The low voltage lighting relay in the cardio area needs to be replaced. The enclosure, the relays and the transformer are badly corroded.		16	Action Category 2	Replace low voltage relay system.
		The Owner may choose to upgrade the entire lighting control system and integrate it with an energy management system.		16	Action Category 1C	Complete building low voltage control system should be provided and integrated with the building energy management system.
9.9	Fire Alarm System					
9.9.1	Existing Fire Alarm System	The existing Notifier fire alarm system is original equipment and would need to be replaced if any upgrade was to go ahead in this building.		15, 16	Action Category 1A	Replace fire alarm system in its entirety.
9.9.2	Quantities	Present quantities and types of detectors and their locations would have to be re-evaluated depending on the extent of fire sprinkler installation. Three quarters of all detector raceways would have to be re-configured.		5, 7, 9, 15, 16	Action Category 1A	Add and replace all detectors with addressable detectors.
9.9.3	Existing Pull Stations	Existing pull stations do not meet new Code standards. All pull stations would require new raceways and conductors. Additional pull stations would be required at all building exits.		15, 16	Action Category 1A	Provide new addressable pull stations.
9.9.4	Existing Detectors	One of the existing detectors in the Janitor's Room is fastened to a wooden header that is tie wired to the mechanical piping overhead.		16	Action Category 1A	Replace detector and mount to ceiling or structure.
9.10	Tel/Data Communications					
9.10.1	Hub	The hub for the tel/data communications system is currently located in the high voltage vault. Ugrading the building would require removal or segregation of these systems from the high voltage vault.		5, 7, 8, 9, 10, 16	Action Category 2	Provide new communication closet mionimum 2'-6" deep by 6'-6" width internal dimension with double doors that open outwards. Install all new racks, patch panels and switches in closet.
9.10.2	Data Cabling	Currently data cabling is bundled and suspended from the electrical vault conduit racks by tie wraps. All cables transiting this room should be in metal raceways.		5, 7, 16	Action Category 1A	New cable, conduit should be provided throughout.
9.10.3	Firestopping	Firestopping has not been used on any of the data cables. Sleeves should have been installed and bonded then firestopped.		5, 7, 16	Action Category 1A	Further investigation would be required since there is likely many locations needing fire stopping.
9.10.4	T-Bar Ceilings	Data cables above t-bar ceilings need to be independently suspended on j hooks or laid in cable trays.		5, 16	Action Category 2	Provide suitable mounting as recommended.
9.11	Sound System					
9.11.1	Amplifiers and Racks	The sound system amplifiers and rack is currently located in the high voltage vault. Upgrading the building would require the removal (replacement ?) and relocation of the sound system and rack.		16	Action Category 1A	Replace sound system and place new system in administration area. A suitable location is an office or the reception area.
9.11.2	Speaker System	Speaker system wiring has been run throughout the building tied to electrical and mechanical piping. Upgrading the sound system should include adequate raceways for speaker wiring.		5, 9, 16	Action Category 1A	New conduit, wiring and speakers should be provided.
9.11.3	Firestopping	Firestopping has not been used on any speaker wiring. Sleeves need to be installed bonded and firestopped.		5, 7, 16	Action Category 1A	Remove old conduit, seal with fire stopping product.
9.12	Security System					

CEI ARCHITECTURE PLANNING INTERIORS
BUILDING ASSESSMENT SPREADSHEET



BUILDING SYSTEM		BUILDING SYSTEM ASSESMENT	PHOTO #	DIVISION NUMBER	CONDITION / ACTION CATEGORY*	NOTES/RECOMMENDATIONS
9.12.1	Security Camera	Security cameras have been installed in the public areas of the pool complex. Camera wiring has been tie wrapped to any convenient conduit or pipe. These systems should be installed in conduits to make future additions to the security system possible.		7, 16	Action Category 2	Provide new conduit and wiring.

TOTALS



9.0 OPINION OF PROBABLE COSTS
See following pages

1. Method

The estimate is based on the building assessment spreadsheet prepared by CEI Architecture and their consultant team. We worked with TASK Construction Management Inc. in the development of the estimate; they provided input on construction strategies and other contractor issues that affect cost. The estimated costs reflect the level of design information at a building assessment stage. They are "order-of-magnitude" costs and will need to be refined as the scope of planned renovations is developed.

2. Scope

The estimate covers all work which normally forms part of a construction contract. The estimate excludes:

Furniture, furnishings and equipment

Administration costs

Legal fees and expenses

Rezoning cost (if applicable)

Permits and development cost charges

Scope contingency for changes to the scope of the project

User's equipment

Removal of hazardous materials

Any costs from a geotechnical investigation (none completed at this stage)

GST/HST payable

3. Pricing and Escalation

The estimate is priced at current market rates using a construction management procurement system with a minimum of three bids for all trades. No allowance has been included for future escalation in construction costs beyond 2011. We recommend that you include an allowance of 3% per year (compounded) for anticipated escalation beyond 2011.

4. Contingencies

The estimate includes a 10% Design Contingency to cover changes during the design stage of the project.

The estimate includes a 15% Construction Contingency to cover changes during the construction stage of the project.

Crystal Pool
Order-of-Magnitude Cost Estimate 17-Jun-11

There is significant risk of cost increases as the work is defined in detail from this level of information. Items that are estimated as repairs may end up being replaced. We have included contingencies to deal with some of these uncertainties. The project will need on-going cost management due to the nature of the work.

Because this is a public facility that will remain operational during any construction work, we recommend that you develop a construction implementation plan and schedule so that the work can be properly costed and cost managed.

5. Order-of-Magnitude Cost Estimate

The estimate is included in the following pages.

Crystal Pool			
Order-of-Magnitude Cost Estimate for Option 2			17-Jun-11
	<u>Trade</u>	<u>\$</u>	<u>\$</u>
Division 1	General Requirements, site overhead and construction management fees		792,882
Division 2	General's Work for M & E Alterations		8,000
Division 4	Masonry		65,000
Division 5	Metals: structural steel, metal deck, misc metals		83,000
Division 7	Roofing		85,000
	Firestopping & Smoke Seals		35,500
Division 8	Metal Doors		22,000
	Skylights Curtain Wall, Windows & Glazed Doors		10,000
	Finish Hardware		10,500
Division 9	Gypsum Wallboard		94,000
	Steel Studs		11,000
	T-bar Ceilings		98,580
	Ceramic Tile		132,440
	Pool Tiling		430,000
	Resilient Flooring		1,500
	Painting & Other Finishes		7,564
Division 10	Specialties: pool equipment		28,000
	Specialties: Foam protection		2,000
	Specialties: WC cubicles		5,000
	Signage		1,500
	Roof Access Ladders, Hatch		10,000
Division 14	Lifts		12,000
Division 15	Mechanical		450,900
	Sprinkler entire building	309,600	
	Modify washrooms on the Mezzanine Level for wheelchair accessibility	15,000	
	Replace acid and bleach mechanical room fans	24,000	
	Replace steam vent cover	300	

Crystal Pool			
Order-of-Magnitude Cost Estimate for Option 2			17-Jun-11
	<u>Trade</u>	\$	\$
	<u>Aquatic Systems</u>		
	Provide seismic restraints to pool piping	12,000	
	The following items are first action priority:	90,000	
	Replace drain covers with non-finger-entrapment covers		
	Replace all soda ash feed components		
	Relocate all chlorine gas feed components into chlorine gas room to minimize risk of gas leak		
	Ensure automatic shut down of chlorine gas feed in case of chlorine gas leak		
Division 16	Electrical		2,085,925
	<u>Main Electrical Distribution</u>		
	Replace electrical distribution equipment and installation in dry positive pressured space	815,925	
	Perform arc flash analysis and install decals on distribution equipment	11,000	
	Install fire stopping in high voltage vault	5,500	
	Install seismic restraints on electrical equipment	16,500	
	Electrical for new sprinkler system	27,500	
	<u>Branch Power Distribution</u>		
	Replace panels in corrosive atmosphere, replace and relocate panel in janitor's closet and provide new GFI outlets where needed.	275,000	
	<u>Motor Control</u>		
	Replace motor control centres	330,000	
	<u>Emergency Lighting</u>		
	Provide a new code compliant central inverter complete with battery backup	27,500	
	Provide additional emergency heads	11,000	
	<u>Lighting Equipment</u>		
	Replace lighting with new fixtures equipped with T8 or T5 fluorescent lamps	330,000	
	<u>Low Voltage Lighting Control</u>		

Crystal Pool			
Order-of-Magnitude Cost Estimate for Option 2			17-Jun-11
	<u>Trade</u>	<u>\$</u>	<u>\$</u>
	Replace low voltage relay system in the cardio area	27,500	
	<u>Fire Alarm System</u>		
	Replace fire alarm system	90,000	
	<u>Tel/Data Communications</u>		
	Install all new racks, patch panels and switches in a new communications closet	8,000	
	<u>Sound System</u>		
	Replace sound system	83,000	
	<u>Security System</u>		
	Provide new conduit and wiring	27,500	
	Sub-total		4,482,291
	Design Contingency: 10%		448,229
	Construction Contingency: 15%		739,578
	Current Construction Cost of Option 2		5,670,098
	Soft Costs: 20%		1,134,020
	<u>Current Project Cost of Option 2</u>		<u>6,804,118</u>

Crystal Pool			
Order-of-Magnitude Cost Estimate for Option 3			17-Jun-11
	Trade	€	\$
Division 1	General Requirements, site overhead and construction manager's fee		2,515,764
Division 2	General's Work for M & E Alterations		263,000
Division 3	Concrete		1,433,000
Division 4	Masonry		83,000
Division 5	Metals: structural steel, metal deck, misc metals		1,088,000
Division 6	Finish Carpentry		10,000
Division 7	Roofing		85,000
	Firestopping & Smoke Seals		35,500
	Spray Foam		11,000
Division 8	Metal Doors		34,000
	Skylights Curtain Wall, Windows & Glazed Doors		310,000
	Finish Hardware		35,200
Division 9	Stucco		202,800
	Gypsum Wallboard		294,000
	Steel Studs		211,000
	T-bar Ceilings		366,692
	Ceramic Tile		162,440
	Pool Tiling		491,000
	Resilient Flooring		91,500
	Concrete Sealing		20,000
	Painting & Other Finishes		287,564
Division 10	Specialties: pool equipment		50,000
	Specialties: Foam protection		2,000
	Specialties: lockers		40,000
	Specialties: WC cubicles		30,000
	Roof Access Ladders, Hatch		10,000
	Signage		6,700
Division 14	Lifts		12,000

Crystal Pool			
Order-of-Magnitude Cost Estimate for Option 3			17-Jun-11
	<u>Trade</u>	\$	\$
Division 15	Mechanical		4,009,200
	<u>Fire Protection System</u>		
	Sprinkler entire building	309,600	
	<u>Alterations</u>		
	Modify washrooms on the Mezzanine Level for wheelchair accessibility	15,000	
	Replace acid and bleach mechanical room fans	24,000	
	Replace steam vent cover	300	
	Replace hose bib at south wall	300	
	Removal and replacement of mechanical components to accommodate seismic upgrade	240,000	
	<u>Plumbing Systems</u>		
	Replace heat exchangers with plate-and -frame type of equivalent capacity to existing	24,000	
	<u>Aquatic Systems</u>		
	Total pool system replacement	1,800,000	
	Provide seismic restraints to pool piping	12,000	
	The following is a priority:	90,000	
	Replace drain covers with non-finger-entrapment covers		
	Replace all soda ash feed components		
	Relocate all chlorine gas feed components into chlorine chlorine gas room to minimize risk of gas leak		
	Ensure automatic shut down of chlorine gas feed in case of chlorine gas leak		
	<u>Heating Systems</u>		
	Provide new high efficiency hot water boilers	240,000	
	Provide access to reheat coils in building finishes and ductwork. Steam clean all reheat coils and duct interior surfaces	24,000	
	<u>Ventilation Systems</u>		

Crystal Pool			
Order-of-Magnitude Cost Estimate for Option 3			17-Jun-11
	Trade	\$	\$
	Replace existing ventilation units with roof mounted air handling units complete with supply and return fans, heat recovery section, filter sections, variable speed drives, hot water heating coils and DDC controls	420,000	
	Replace changeroom air handling units with packaged roof mounted units complete with supply and exhaust fans, heat recovery section, filter sections, variable speed drives, hot water supplemental heating coil and DDC controls	180,000	
	Replace smaller exhaust systems located throughout the building	120,000	
	Retain an air balancing contractor to provide existing air flow recordings, make recommendations on adjustments and re-balance all systems	30,000	
	<u>Air Conditioning Systems</u>		
	Install new DDC control systems throughout	480,000	
Division 16	Electrical		2,629,225
	Removal and replacement of mechanical components to accommodate seismic upgrade	200,000	
	<u>Main Electrical Distribution</u>		
	Testing and checking of underground utility	8,800	
	Clean and test high voltage equipment	5,500	
	Improve the support and organization of equipment in the high voltage vault	22,000	
	Replace electrical distribution equipment and installation in dry positive pressured space	815,925	
	Perform arc flash analysis and install decals on distribution equipment	11,000	
	Install fire stopping in high voltage vault	5,500	
	Install seismic restraints on electrical equipment	16,500	
	Electrical for new sprinkler system	27,500	
	<u>Branch Power Distribution</u>		
	Replace panels in corrosive atmosphere, replace and relocate panel in janitor's closet and provide new GFI outlets where needed.	275,000	
	Replace ground fault panel	55,000	

Crystal Pool			
Order-of-Magnitude Cost Estimate for Option 3			17-Jun-11
	<u>Trade</u>	\$	\$
Division 16	<u>Motor Control</u>		
	Replace motor control centres	330,000	
	<u>Emergency Lighting & Exit Signs</u>		
	Provide combination battery pack remote heads in service and mechanical rooms, attach test records, new exit signs to suit new DC requirements	22,000	
	Provide a new code compliant central inverter complete with battery backup	27,500	
	Provide additional emergency heads	11,000	
	<u>Lighting Equipment</u>		
	The following changes are recommended:	110,000	
	Consider replacement or relamping of the metal halide fixtures above the pool		
	Clean, relamp and reballast vapour tight fixtures in the changerooms		
	Replace pot lights with energy efficient LED type fixtures		
	Add wireguards to the mechanical room fixtures that require them		
	Add seismic control to light fixtures in the pool area		
	Replace lighting with new fixtures equipped with T8 or T5 fluorescent lamps	330,000	
	<u>Low Voltage Lighting Control</u>		
	Upgrade the low voltage control system and integrate with the building energy management system	55,000	
	Replace low voltage relay system in the cardio area	27,500	
Division 16	<u>Fire Alarm System</u>		
	Replace fire alarm system	90,000	
	<u>Tel/Data Communications</u>		
	Provide new data cabling and conduit throughout	55,000	
	Install all new racks, patch panels and switches in a new communications closet	8,000	
	<u>Sound System</u>		
	Replace sound system	83,000	
	<u>Security System</u>		
	Provide new conduit and wiring	27,500	

Crystal Pool			
Order-of-Magnitude Cost Estimate for Option 3			17-Jun-11
	<u>Trade</u>	£	£
	<u>Handicapped Elevator</u>		
	Provide new elevator wiring and distribution	10,000	
	Sub-total		14,819,585
	Design Contingency: 10%		1,481,959
	Construction Contingency: 15%		2,445,232
	Current Construction Cost of Option 3		18,746,775
	Soft Costs: 20%		3,749,355
	<u>Current Project Cost of Option 3</u>		<u>22,496,130</u>

10.0 CONCLUSIONS & CLOSING COMMENTS

In general, the building is in a condition commensurate with its age. General renewal of windows and observed doors are required and specific areas of the building envelope are experiencing distress. Our evaluation revealed that underlying areas of deterioration were occurring at the secondary supports at the rock dash stucco locations. Remedial building envelope repair work has been recommended and presented with opinions of probable cost to address the ongoing deterioration of the building.

The typical lifespan of an aquatic facility is 20 to 25 years, typically after this stage, a fair amount remediation / upgrade work is required. The Crystal Pool is a 40 year old facility, well past it's life span. With all of our findings and information gathered from previous reports, the consultants and CEI have 3 options, in review with the city:

Option 1 – Decommission:

This option entails a 12 to 18 month targeted decommission of the facility and manage the facility within the present annual operations costs of \$450,000. This will provide opportunity for the city to develop an action plan for helping the facility and programs.

Option 2 – 3-5 Year Extension

This option would be extend the life of the facility with a 3 to 5 year expectancy at a budget of \$6.8 million. This option does not address all "life/safety" issues and also raises "risk" concerns of liability or immediate shutdown. An additional "risk" factor would fall under cost control, in order for the facility to do any upgrades or repairs, it becomes very difficult to draw the line with regard to where the work starts and stops. A "trickle effect" with repairs or replacement could cause interruptions with programming (ie: equipment replacement could trigger seismic work...etc.)

Option 3 – Full Upgrade

Option 3 - \$22.5 million upgrade and alterations within the existing footprint in a phased approach, maintaining the existing "look" of the building. Some programming could continue with considerable interruptions. This would provide an operational facility but based on a 40 year old approach to program delivery. Considering value for money, a replacement facility would serve the city and its residents better.

If work on the building envelope, structural components, and site grading is deferred beyond the period of the winter months, the present conditions will only become more severe and more costly to repair.

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