



NEW AQUATIC CENTRE STUDY UNIVERSITY OF BRITISH COLUMBIA

August 25, 2011



OVERVIEW

In February 2011, University of British Columbia Properties Trust with the support of the University's Athletics Department and Campus Planning retained CEI Architecture Planning Interiors to conduct a study for a new Aquatics Centre on campus.

PURPOSE OF REPORT

The purpose of the study is to provide fundamental information that will allow UBC to make informed decisions on the following 3 main questions:

1. What are the current needs of key stakeholder groups?
2. Can the existing aquatic centre be renovated and meet the current needs of the campus rather than constructing a new building?
3. If building new, where is the most suitable location for a new aquatic centre on campus?



STAKEHOLDER PROJECT REQUIREMENTS

The construction of a new modern Aquatic Centre allows UBC the opportunity to expand and update its current aquatic program. Alongside the need to ensure a new facility can compete with similar centres in other Post Secondary institutions, a new centre will be able to adequately service the growing residential neighbourhoods on campus. A balance between a competition facility and a neighbourhood leisure facility is a mandate of the final program.

EXISTING AQUATIC CENTRE

The assessment of the existing Aquatic Centre began in December 2009 with a report generated by Shape Architecture Inc. Although not attached to this study, this report was integral in creating the framework for evaluating the appropriateness of re-use of this existing facility.

LOCATION ON CAMPUS

CEI was asked by UBC Properties Trust to look at three possible locations on campus for siting a new Aquatic Centre. The locations are identified on fig. 1 and include:

- 1 East of the Osbourne Centre and west of Thunderbird Arena
- 2 East of the Student Recreation Centre
- 3 South of the Student Recreation Centre on MacInnes Field

The method for evaluating the suitability of each site began with a simple building footprint test. Given a preliminary program to work with, it was immediately obvious that the first option of locating a centre between Osborne Centre and Thunderbird Arena did not yield enough site area to support a new building. Moving forward, only the second and third options were fully investigated and discussed in more detail in later sections of this report.

INTRODUCTION. LOCATION ON CAMPUS



fig. 1 3 Locations on Campus

BASE PROGRAM

A detailed program can be found on page 5 of this report. As a comparison, programs that are currently housed in the existing Aquatic Centre have been identified in italics.

Key considerations made during the compilation of the program are noted as follows:

- UBC provided CEI with 3 facilities to consider as a basis for design. The 3 facilities include the Hillcrest Pool in Vancouver, the Canada Games Pool in Kamloops and the Commonwealth Games Pool in Saanich.
- The decision for the University not to pursue application to the National Collegiate Athletic Association (NCAA) influences the program. Although this decision does not change the fact that the facility will hold competition swim meets at a provincial level and that the lap pools will be designed to FINA standards, it does lower the height of the dive tower from a maximum height of 10m to a dive height of 7.5m.
- It was not a requirement of this report to design a leisure pool and hence only a generic rectangular pool is used as a placeholder in the layout drawings. It is anticipated that there will be a requirement to integrate a lazy river, zero entry, pool sprays and toys into the leisure pool.

PROGRAM OPTIONS

A number of program options were discussed at the start of the study including:

- an Outdoor Deck
- a new Outdoor Pool to replace the existing Empire Pool
- an Upper Level Gym and
- an Upper Level Track.

Although recorded here, these options were not priced in the cost report.

UBC NEW AQUATIC CENTRE STUDY PROGRAM. BASE PROGRAM

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Room Name	QTY.	Uses	Description
<i>50 metre tank</i> ¹	1	Competition Swimming	50m long x 10 lanes x 2.2m continuous depth
<i>Dive tank</i> ¹	1	Competition Diving	25 yards (22.86m) x width of 50m tank x 5.5m continuous depth; separated from 50m tank with bulkhead; 1m 3m 5m 7.5m diving boards and tower
<i>25 metre tank</i> ¹	1	Recreational Swimming; Swimming programs	25m long x 10 lanes; Depth varies in a single plane from 1.1m to 2.13m; Ramp entry; Possible moveable floor
<i>Leisure tank</i> ¹	1	Recreational Swimming; Swimming programs	Free form shape; Depth varies in a single plane from zero entry to 1.5m; Possible moveable floor
<i>Hot tub</i>	1	Recreational and Therapeutic Activity	Ramp entry; seating for 70
<i>Deck Space</i>	1	Circulation	Minimum widths around tanks
<i>Spectator Seating</i>	1	Competition Spectator Viewing	Temporary Seating for 300
<i>Steam</i> ²	1	Recreational and Therapeutic Activity	
<i>Sauna</i> ²	1	Recreational and Therapeutic Activity	
<i>On Deck Control</i>	1	Staff Supervision over Pools	Workstations with viewing through glass
<i>On Deck Storage (separate room)</i>	1	Storage for Swim competition equipment, pool toys, scuba equipment and kayaks	Storage reels can be located on exterior of building with access via overhead doors
<i>Dressing Rooms</i> ³	3	Family change; Women's change, Men's change and shower facilities	Emphasis on Family Change Facility
<i>Wet Multipurpose Classroom</i>	2	Birthday Parties; Scuba lesson dry component; Classes	
<i>Kitchen</i>	1	For use by Swim Teams	Access from Pool Deck
<i>First Aid</i>	1	Staff use	Storage of first aid equipment; use by patrons requiring first aid
<i>Staff Room / Change</i>	1	Staff breaks, staff changing	
<i>Offices/ Reception</i>	1	Combination of Dedicated and Shared Offices	Facility Staff, Swim team Coaches
<i>Meeting Room</i>	1	For use by Swim Meet Judges	Overlook to Competition Pool
<i>Retail Space</i>	1	Sale of Merchandise to the General Public	465 s.m. of Retail Space requested by UBC Athletics
<i>Mechanical</i>	See page 6 for description of this space		
<i>Electrical</i>	See page 6 for description of this space		

table 1 Base Program

¹ UBC currently has a multiuse single tank which serves the 50m, 25m, dive and leisure programs.

² Steam and Sauna rooms in the existing building are located on the lower level, accessed through a dry program space.

³ There are two existing change rooms and no Universal change room.

UBC NEW AQUATIC CENTRE STUDY PROGRAM. BASE PROGRAM

MECHANICAL SPACE

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AME Group provided CEI with some guidelines for sizing the mechanical space for an Aquatic Facility. The guidelines are as follows:

- Three levels of mechanical space required.
- For aquatics the rule of thumb is 10 – 15% of the total building area depending on shape of space. 12% used for costing.
- Space allocation would be as follows:
 - Basement – 6% basement mechanical room for the pool filtration system, heating plant, domestic water entry & sprinkler entry.
 - Main Floor – 1 % for pool chemicals. Possible boiler room & DHW room if space is available.
 - Upper Floor or Roof Penthouse – 5% as a minimum for Aquatic HVAC. Possible DHW & Boilers.

ELECTRICAL SPACE

MCL Engineering provided CEI with some guidelines for sizing the electrical space for an Aquatic Facility. The guidelines are as follows:

- Main Electrical Room for Unit Substation
 - Estimated Main Electrical Room Dimensions: 16m long X 6m wide
- Generator Room
 - Estimated Generator Room Dimensions: 7m long X 4m wide
- 3 Auxiliary Electrical Rooms
 - Estimated Auxiliary Electrical Room Dimensions: 4m long X 2.5m wide each
- Main Telecom Room
 - Estimated Main Telecom Room Dimensions: 5m long X 3m wide
- 3 Auxiliary Telecom Rooms
 - Estimated Auxiliary Telecom Room Dimensions: 4m long X 3m wide each
- Audio Room
 - An audio room will be located near the main reception area.
 - Estimated Audio Room Dimensions: 3m long X 2.5m wide
- Electrical Space within Main Mechanical Room
 - There will be two MCCs in the Main Mechanical Room.
 - Minimum one meter of clearance in front of each MCC.
 - Estimated floor space for one MCC: 0.5m wide X 5m long
 - Estimated floor space for one MCC including clearance area: 1.5M wide X 5m long.



CHANGE FACILITIES

When planning a new Aquatic Centre, the bathing load for the facility is always a consideration. Bathing loads can be based on anticipated user loads or on a maximum load based on pool water surface area, as stipulated by the Health Act. For this study and for the purpose of costing, the starting bathing load is based on the change facilities at Hillcrest Pool.

Existing Hillcrest change rooms total area = 525 s.m.* which is comprised of the following separate change rooms:

- Family = 315 s.m.
- Women = 115 s.m.
- Men = 95 s.m.

A maximum bathing load was also considered. Although not accounted for in the Cost Report, the option to add construction cost can be derived by multiplying the additional required area by a cost of \$2,875/s.m.

CEI calculated a maximum bathing load of 1670 based on the water surface area of the base program. This maximum load can be translated into building area as detailed in Fig 2. The total change area in Hillcrest* is approximately 248 s.m. allowing for 775 persons per new Health Act; where 535 s.m. is required for the maximum water surface area. 13.4 metres of change area length is required, equating to a total of 824 s.m. to support 1670 bathers.

In addition, the total number of plumbing fixtures in Hillcrest is deemed adequate to support the maximum bathing load as allowed by the Health Act.

As a footnote, the existing Aquatic Centre change rooms total 543 s.m. No additional change area is required to support the new program. However because of required phasing, the need to keep the facility open during construction will dictate that a new change facility is required to be completed in the early phases. Upon completion, the renovation of the existing change rooms can follow. Existing building phasing is diagramed on page 17 of this report.

*The Hillcrest Pool floor areas are approximate and were measured from PDF drawings provided to CEI from UBC Properties Trust.

UBC NEW AQUATIC CENTRE STUDY PROGRAM. CHANGE FACILITIES

Pool Type	Depth	Length	Width	Area	Load factor	Bathers per depth	Total
25m - 10 lane	>1500mm	14750mm	25400mm	374.65 s.m.	2.50	149.86	429.81
	<1500	10250	25400	260.35	0.93	279.95	
Leisure Pool	<1500	-	-	400.00	0.93	430.11	430.11
50m - 10 lane	>1500	50000	25400	1270.00	2.50	508.00	508.00
	<1500	0	25400	0.00	0.93	0.00	
Dive Tank	>1500	22860	25400	580.64	2.50	232.26	232.26
Hot Tub							70.00
Total Bathers							1670.17

table 2 Bathing Load Based on Water Surface Area

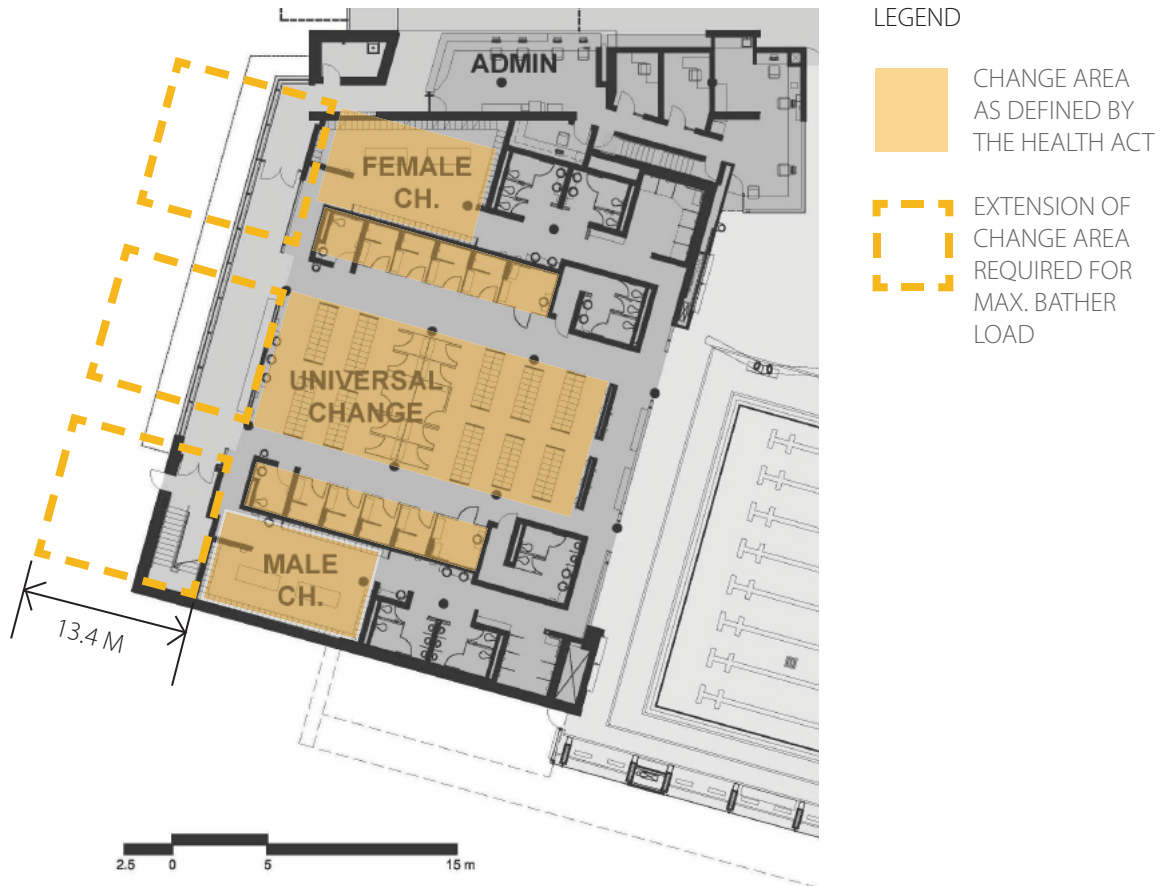


fig. 2 Hillcrest Pool Change Rooms*
* HUGHES CONDON MARLER ARCHITECTS



SITE ANALYSIS

Once the Osborne Centre site (fig 3) was ruled out as a possible location for a new Aquatic Centre, only the MacInnes Field location was further investigated. Two options were considered:

- a new building that wraps around the Student Recreation Centre (fig. 4) and
- a standalone building situated in the middle of MacInnes Field (fig. 5).

In addition to simply looking at building footprint, other site issues were considered:

- transit bus terminal location and relocation
- location of future buildings (SUB)
- desire to maintain an open green area
- grading and impact of a new building on the Wesbrook Mall streetscape.

TRANSIT TERMINAL

During a meeting with UBC and through subsequent correspondence with Campus Planning, the future relocation of the transit bus terminal was deemed to be a separate issue from that considered in this study. The location of the new bus terminal still needs to be determined. The scale and possible location of the Aquatic Centre is required before specific options for the bus terminal can be developed.

FUTURE BUILDINGS

A new Student Union building will be situated on the west side of the existing Aquatic Centre. Although not yet constructed, all drawings in this report show the SUB building in its final location.

UBC NEW AQUATIC CENTRE STUDY
SITE. 3 LOCATIONS

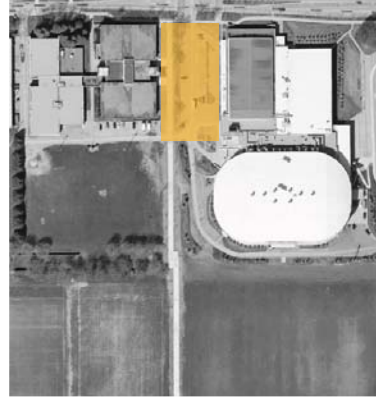


fig. 3 Site 1



fig. 4 Site 2



fig. 5 Site 3

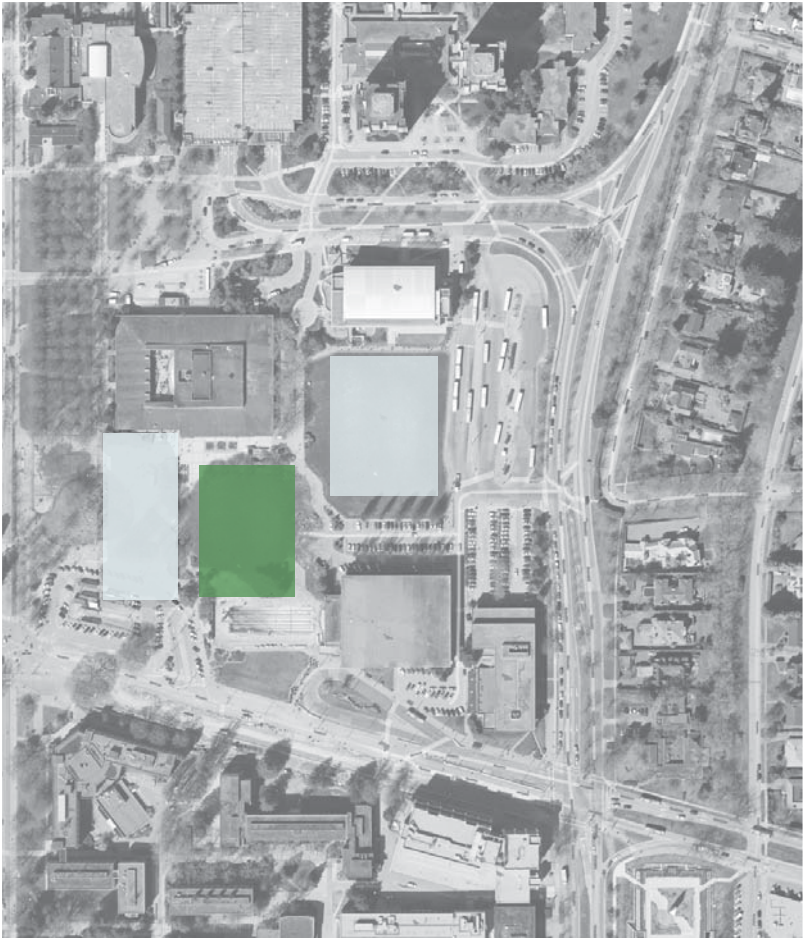


fig. 6 Alternative Green Space

GREEN SPACE

The MacInnes Field although not sacred in location is a significant multipurpose green space. The stakeholders believed that it would be a loss if a new Aquatic Centre consumed this field. In all planning options, the displacement of this field requires that a new field of similar size be built in its place. If a new standalone building is constructed, it is feasible that the existing Aquatic Centre could be demolished and replaced with a green space of comparable size and programmatic functionality as the existing MacInnes Field.

UBC NEW AQUATIC CENTRE STUDY

SITE. MASSING STUDIES



fig. 7 Site 2 Birds Eye View

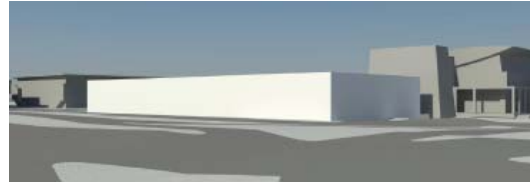


fig. 8 Site 2 Perspective from Wesbrook



fig. 9 SITE 3 Birds Eye View



fig. 10 SITE 3 Perspective from Wesbrook

WESBROOK MALL STREETSCAPE

The massing of a new Aquatic Centre would make a noteworthy impact to the site that it sits on. Of particular interest to UBC is the views of the building from Wesbrook Mall. The desire to create a denser streetscape along Wesbrook Mall, animating the street and providing some interest for the pedestrian was seen as beneficial. The natural height of the building as required for the dive tower and the pool mechanical systems immediately assume a building of significance. An option to sink the building down below grade to reduce building height was reviewed, although this scenario works better when the new building is attached to the student recreation centre and it's lower below-grade floor, it is not realistic for a standalone building in the middle of MacInnes Field when considering the cost to excavate deeper than required for the pool tanks and footings. The scope of this study did not consider architectural approach in detail, however it should be noted that the challenges of this kind of an "urban infill" present strong architectural opportunities.



EXISTING AQUATIC CENTRE

UBC provided a “HIGH LEVEL TBL SCREENING TOOL” to assess the feasibility of retaining a building. Seven separate categories are identified for consideration. The next few pages of this report responds to each category as follows:

HERITAGE VALUE

UBC provides detailed maps in their VCP Policy 43 which identifies if the University considers the building a heritage resource. A heritage resource shall “embody cultural meaning to the campus community and should be retained where viable, as determined by comparing the costs, functionality, campus fit, and ecological and heritage impacts of retention versus replacement; the depth of analysis will be scaled to the significance of the resource. Based on a review of these maps the existing Aquatic Centre is not designated as a heritage resource, the Empire pool however is designated as such. See Appendix V.

CAMPUS FIT

Review of long term plans for the area around the existing Aquatic Centre is not part of the scope of the study. However, the location near the Student Union Building (SUB) and Student Recreation Centre is well suited with respect to grouping of student athletic services. In progress redevelopment include a new SUB building and a future transit terminal. The new SUB building encroaches very close to the west side of the existing centre. Accommodating the existing building in its current location is possible however it is necessary to note that the Aquatic Centre site is situated in the bulls eye of what UBC considers its heart of the campus. It was not know at the time of the study if additional redevelopment of the site is forthcoming and part of a larger plan.

SOCIAL ASPECTS

Used not only for swimming and water sports, the existing building with its upper mezzanine is also used as a gathering and social space. It is known that the building does have significance for the campus in general however it is beyond the scope of this study to research and locate any on-campus groups who are sensitive to the building’s fate, or who will champion the building’s retention.

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EXISTING. BUILDING

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A new building could replicate the social aspects housed in the existing building if defined as a program requirement; especially if the University believes that the same social gathering space cannot be supported in other buildings.

Any renovations should be phased in order to allow the existing pool to be operational for the duration of the project. UBC Athletics have noted that it is not acceptable to displace athletes or recreational users during the construction or renovation of a new building.

FUNCTIONALITY

The existing building does not meet the needs of the University. With a growing residential sector within the campus bringing families looking for on-campus recreation and with an increasing desire to provide adequate training facilities for athletes, the Athletics department is committed to providing a state-of-the-art facility.

The existing building can be modified to meet current and future needs for the user group although a substantial addition is required to meet the program requirements. Also, fitting a new program into an existing building structure will be a challenge. Current aquatic / community centre design standards related to CPTED, circulation efficiency, indoor / outdoor connectivity are additional factors that would be more challenging to design into a renovated facility than a new facility.

If the decision is made to house the aquatics program in a new building, there is still the possibility that the existing building can be renovated. However, because of the specific nature of the aquatic centre with a pool as it's main program, renovations to another use would be costly and a comparison of cost vs. benefit must be made. During the course of this study, it was discussed that the demolition of the existing facility could allow for a replacement green space for the displaced MacInnes Field.

BUILDING CONDITION

The building condition is detailed in the 2009 Shape report. In summary, the report states that although the structure is in good condition, the other building systems must be replaced.

If it were renovated and upgraded, the life of the building can be extended, however with the current pool tanks, it cannot meet the functional requirements of the current program.

Structural Requirements for a new renovated building was not considered in the original 2009 report. Given that more is now known with respect to desired program, Fast + Epp Structural Engineers were retained to provide more structural insight to the existing building with respect to possible renovations. A detailed description of their report can be found in Appendix II.



FINANCIAL ASPECTS

A review of the financial aspects of the existing building is beyond the scope of this study. Issues such as significant upgrades or investments occurring over the past five years, operating and maintenance cost comparison to a newly built facility will not be commented on. The cost of renovating the building has been detailed in the cost report and a comparison can be made between retaining the existing building and building new. The cost of demolishing the existing building has been added to the new construction option in order to allow a more equitable comparison of the two options.

ENVIRONMENTAL ASPECTS & SUSTAINABILITY

The decision to renovate the existing Aquatic Centre rather than build new is more sustainable when considering embodied energy and when compared to minimal to no required renovations to the existing building. Pool tanks are typically constructed with cast-in-place concrete and concrete is high in embodied energy. An alternative Mrytha tank system is not much more sustainable as the laminated steel construction is also high in embodied energy.

As well, the impacts for the existing building have already occurred and new construction will require demolition plus extraction and manufacture of new building materials. Typically if a detailed analysis of the environmental impacts of new construction is required, a Lifecycle Cost Assessment is required. This LCA is beyond the scope of this study.

An existing unrenovated building will expend more operating energy than a new energy efficient building, but this must be compared to the amount of operating energy that is saved in a new building designed to LEED silver or LEED gold standards plus the embodied energy to construct the new building. A life-cycle cost assessment would be able to further determine the actual amount of energy required.

Embodied energy required to construct a new building and energy required to operate the facility must be put into context with factors that would weigh more in favor towards building new. Consideration is given to the fact that:

- all of the mechanical systems in the existing building are recommended to be replaced
- electrical systems in the existing building need replacement to meet current code standards
- the building envelope should be either replaced or upgraded
- the program has increased and the existing building cannot house the new program without an addition

UBC NEW AQUATIC CENTRE STUDY

EXISTING. BUILDING

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- the only system worth saving in the existing building is the structure and a seismic upgrade will be triggered because of the major renovation and addition required to meet the functional requirements.
- a new standalone building can lead to a very economical small footprint building whereas the renovated Aquatic Centre's resultant L-shaped addition is less economical and requires more perimeter envelope construction as well as additional lifeguarding resources to supervise the pools.

ARCHITECTURAL IMPACT

In addition to the TBL review, the architectural impact of the existing building is another factor for consideration. Updating the existing building to modern architectural design standards would benefit the University. For this particular existing building it is recommended that at a minimum, renovations include:

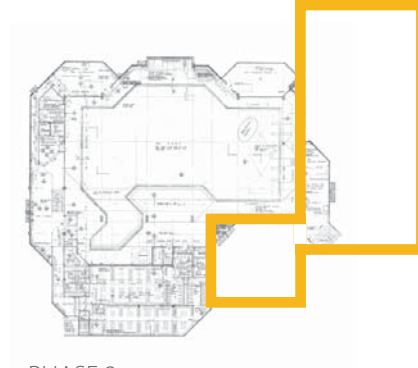
- creating a prominent and identifiable main entrance
- creating a transparency between the building and the surrounding environment that would better connect the facility to the outdoors and highlight and promote fitness and recreation.

UBC NEW AQUATIC CENTRE STUDY
EXISTING. PHASED CONSTRUCTION

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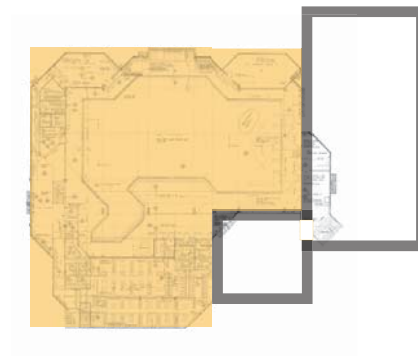
EXISTING BUILDING



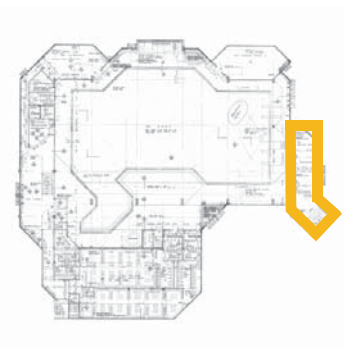
PHASE 3 -
 CONSTRUCT NEW ADDITION
 (50M POOL, DIVE TANK, CHANGE ROOMS
 AND REQUIRED M&E SERVICES)



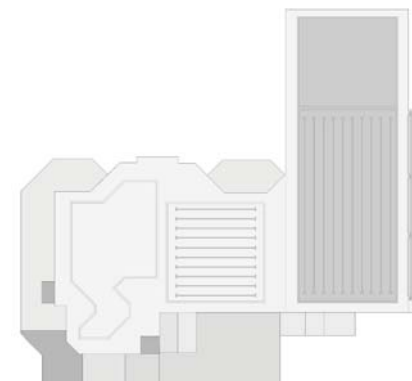
PHASE 1 -
 RELOCATE EQUIPMENT IN EXISTING FAN ROOM



PHASE 4 -
 RENOVATE EXISTING BUILDING



PHASE 2 -
 DEMOLISH EXISTING PORTION OF BUILDING



COMPLETE

fig. 11 Building Phasing

UBC NEW AQUATIC CENTRE STUDY

OPTIONS. 1 & 2

CHOOSING OPTION 1

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Two options were presented for costing. These two were chosen from an original 4 options of which 3 were build-new options around the MacInnes Field and the 4th, an option to renovate and add to the existing Aquatic Centre. The renovate and add option has been named Option 2 for the purposes of this study.

Of the 3 build-new schemes, the standalone building in MacInnes Field was chosen for costing. The reasons for which are described below:

- Building that wraps around the Student Recreation Centre
 - This scheme was considered because it allows for possible sharing of support services, staff and energy with the Student Recreation Centre. Subsequent meetings with the UBC Athletics department and further consideration of the layout revealed the following:
 - it would be unlikely for the two facilities to share staff in one large reception area. The Student Recreation Centre is run by students whereas the Aquatics facility is run by unionized staff.
 - although tying a new wet change facility south of the existing dry change facility in the existing Student Recreation Centre is possible, it is unlikely that the change facilities would be utilized as one change room. Wet and dry change rooms are generally separated because of the desire to create the best user experience.
 - Sharing of energy and other building services is not warranted given the disruption to the existing building and more complicated constructability. The Campus has a district energy facility and linking of a new facility to this campus grid does not require that the new Aquatic Centre be attached to the existing Student Recreation Centre.
- Standalone building on the existing bus loop
 - Through a meeting with UBC, this scheme was discussed as a possibility. The main reasons for considering a new building in this location:
 - Campus Planning views the location of the existing bus terminal as temporary. In support, the residents on the east side of Westbrook Mall would like to see the existing bus terminal moved to another location
 - the location of a new Aquatic Centre on the existing bus loop location ensures that MacInnes Field would remain as a student green space.
 - The costs of relocating the bus terminal complicates and does not present a clear cost analysis for a new building vs. a renovated existing building and as such was not pursued further for costing.
- Standalone building in MacInnes Field
 - This scheme is likely the most economical when considering constructability. It does not directly impact another building and allows for the most economical building footprint. This scheme is used in the cost report as it is the most straightforward for comparison purposes.

OPTIONS. ADVANTAGES & DISADVANTAGES

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OPTION 1

Option 1 - Build new standalone building on MacInnes Field

Advantages include:

- current pool design standards are easy to achieve
- ease of construction - new building with no unknowns
- no disruption to existing swimming programs as the existing aquatic centre will continue to function until the new building is completed
- efficient layout
- allows for a new MacInnes Field to be constructed in the “heart of campus” (old Aquatic Centre location) which embraces also the new SUB building.
- effective program that is easy to achieve
- degree of sustainable design objectives is not limited

Disadvantages

- does not make use of an existing structure that is deemed in good condition
- demolishes existing MacInnes Field
- isolates the Empire Pool if this pool is not demolished

OPTION 2

Option 2 - Renew existing Aquatic Centre through Renovation and Addition

Advantages include:

- makes use of an existing building structure
- maintains the majority of MacInnes Field

Disadvantages

- additional area is inherently built into the program because of unusable left-over space that does not easily lend itself to the base program requirements
- phasing requirements makes construction more complicated than the build-new option
- risks associated with renovating an old building
- new SUB building will obscure the existing Aquatic Centre entrance; the entrance of which is already difficult to locate for new users

UBC NEW AQUATIC CENTRE STUDY
OPTIONS. "1 - BUILD NEW"

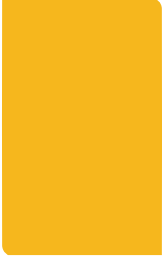


fig. 12 Site Plan

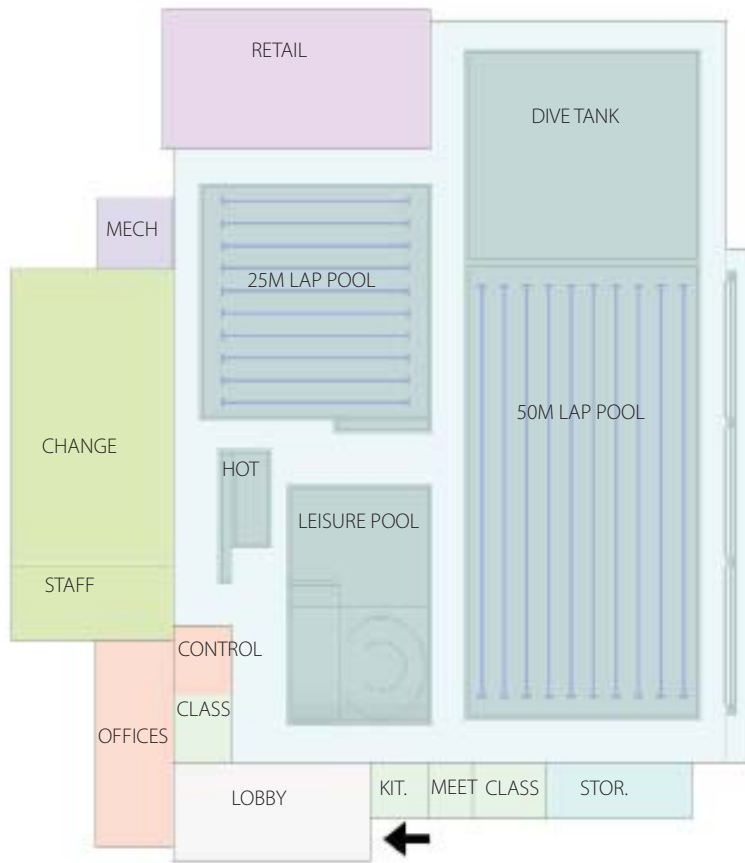


fig. 13 Main Floor Plan

UBC NEW AQUATIC CENTRE STUDY
OPTIONS. "1 - BUILD NEW"

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fig. 14 Birds Eye View

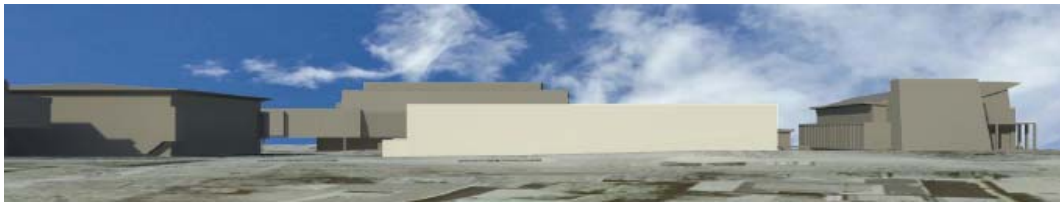


fig. 15 Wesbrook Elevation

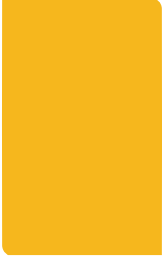


fig. 16 View from Wesbrook Looking North



fig. 17 View from Wesbrook Looking South

UBC NEW AQUATIC CENTRE STUDY
OPTIONS. 2 - "RENEW AND ADD"

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fig. 18 Site Plan

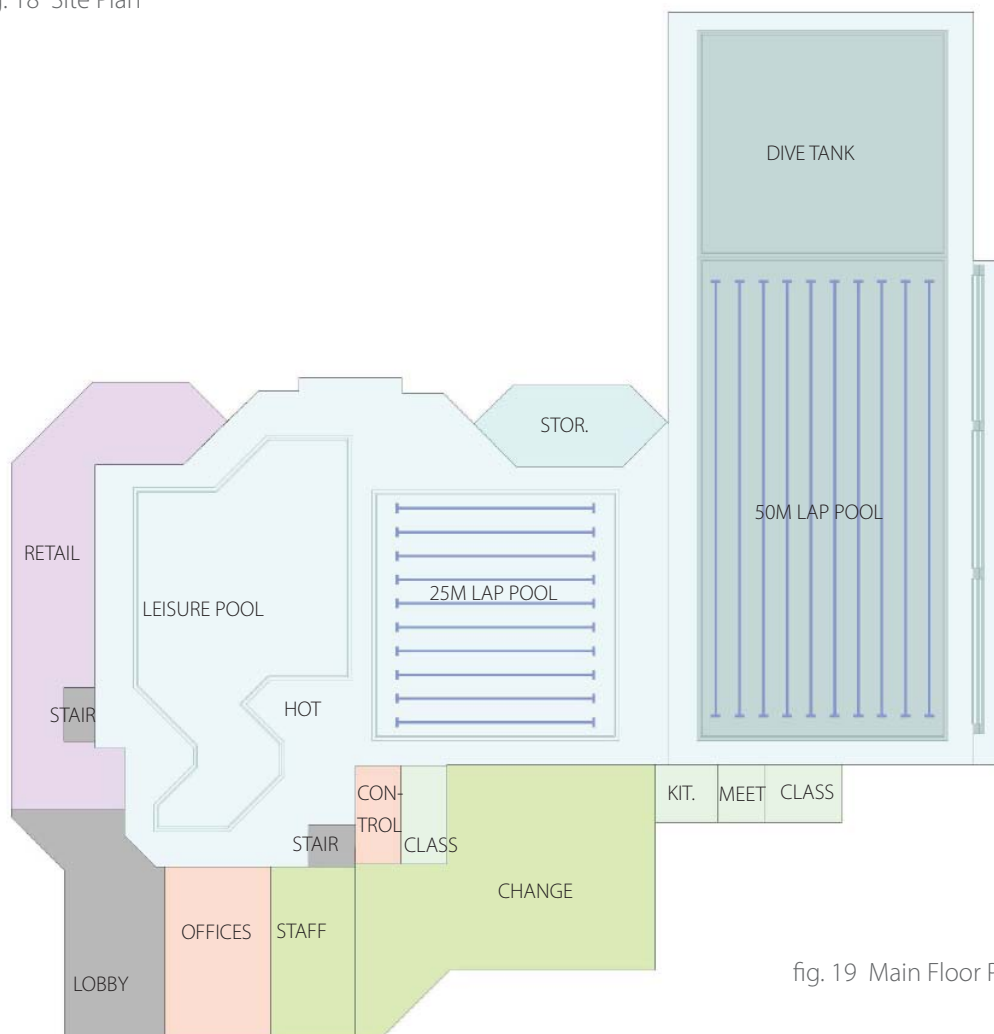


fig. 19 Main Floor Plan



fig. 20 Birds Eye View



fig. 21 Wesbrook Elevation

UBC NEW AQUATIC CENTRE STUDY
OPTIONS. 2 - "RENEW AND ADD"

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fig. 22 View from Wesbrook Looking North



fig. 23 View from Wesbrook Looking South

UBC NEW AQUATIC CENTRE STUDY
COSTING. OPTIONS 1 & 2

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COST ANALYSIS

Spiegel Skillens + Associates costed the 2 Options. A copy of the Cost Report can be found in Appendix VI.

As part of the Cost report the following are included as separate line items:

- Movable Floor to 25m pool
- Remove Empire Pool
- Further additional change room space
- Heavy timber construction (above grade)
- Metal tank system.
- Escalation to September 2012
- Phasing Allowance for Option 2 - Renew



MINIMIZE BUILDING FOOTPRINT

With the planning for the future transit bus terminal and rental housing development moving forward, UBC requested that the future Aquatic Centre be located and designed to ensure adequate adjacent space for the the bus terminal. The desire to reduce footprint yet maintain key Aquatic Centre program elements was reviewed.

The resulting change in program included deleting the dive tank and 10 metre dive tower. In their place a progressive depth tank floor in the 25 metre tank to accommodate a 3 metre springboard at the north end was included.

Consideration for deleting the retail component was also reviewed, however because UBC Athletics currently runs a retail/physiotherapy program in its current spaces, two options were explored:

- delete the retail component in its entirety (fig 24) or,
- move the retail component to the upper floor (fig 25 and Fig 26) and retain a minimal amount of retail for lobby presence on the main floor.



fig. 24 Main Floor Plan

UBC NEW AQUATIC CENTRE STUDY
OPTIONS. "RETAIL ON UPPER FLOOR"

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fig 25 Main Floor Plan

OPTIONS. "RETAIL ON UPPER FLOOR"



fig 26 Upper Floor Plan



- I Program Area - Options 1&2
- II Structural Summary for Existing Aquatic Centre - Option 2
- III Existing Aquatic Centre Plans
- IV Existing Site Services Plan
- V Campus maps
- VI Cost Report
- VII Precedents
 - Hillcrest Pool, Vancouver
 - Canada Games Pool, Kamloops
 - Commonwealth Games Pool, Saanich



APPENDIX I.

PROGRAM AREA - OPTIONS 1&2

DATE: 2-JUNE 2011

PROJECT UBC AQUATIC CENTRE STUDY

PROJECT # 2011-016

FILE # 4.1-1

PROGRAM - OPTION 1 - BUILD NEW

Room Name	Quantity	Uses	Description	TOTAL AREA S.M.	TOTAL AREA S.F.
50 metre tank	1	Competition Swimming	50m long x 10 lanes x 2.2m continuous depth	1270	13670
Dive tank	1	Competition Diving	25 yards (22.86m) x width of 50m tank x 5.5m continuous depth; separated from 50m tank with bulkhead; 1m 3m 5m 7.5m diving boards and tower	580	6243
25 metre tank	1	Recreational Swimming; Swimming programs	25m long x 10 lanes; Depth varies in a single plane from 1.1m to 2.13m; Ramp entry; Possible moveable floor	645	6943
Leisure tank	1	Recreational Swimming; Swimming programs	Free form shape; Depth varies in a single plane from zero entry to 1.5m; Possible moveable floor; Lazy river and Pool toys	400	4306
Hot tub	1	Recreational and Therapeutic Activity	Ramp entry; seating for 70	55	592
Deck Space	1	Circulation	Minimum widths around tanks - included in Natatorium	1805	19429
Spectator Seating	1	Competition Spectator Viewing	Temporary Seating for 300	200	2153
Steam	1	Recreational and Therapeutic Activity		10	108
Sauna	1	Recreational and Therapeutic Activity		10	108
Subtotal Natatorium				4975	53550
On Deck Control	1	Staff Supervision over Pools	Workstations with viewing through glass	50	538
On Deck Storage (separate room)	1	Storage for Swim competition equipment, pool toys, scuba equipment and kayaks	Storage reels can be located on exterior of building with access via overhead doors	100	1076
Dressing Rooms	3	Family change; Women's change, Men's change and shower facilities	Emphasis on Family Change Facility	595	6405
Wet Multipurpose Classroom	2	Birthday Parties; Scuba lesson dry component; Classes		100	1076
Kitchen	1	For use by Swim Teams	Access from Pool Deck	40	431
First Aid	1	Staff use	Storage of first aid equipment; use by patrons requiring first aid; incl in Office		0
Staff Room / Change	1	Staff breaks, staff changing		150	1615
Offices/ Reception	1	Dedicated and Shared Offices	Facility Staff, Swim team Coaches	200	2153
Meeting Room	1	For use by Swim Meet Judges	Overlook to Competition Pool	30	323
Retail Space	1	Sale of merchandise to the general public	Frontage and access from the exterior	465	5005
Entrance / Lobby	1	Gathering and social space	Prominent architecture identifying entry into facility; views into natatorium	240	2583
Mechanical and Electrical	1	Support services for the building	See page 6 of the Study for description of these spaces	1009	10861
Total				7954	85616

DATE: 2-JUNE 2011

PROJECT UBC AQUATIC CENTRE STUDY

PROJECT # 2011-016

FILE # 4.1-1

PROGRAM - OPTION 2 - RENEW AND ADD

Room Name	Quantity	Uses	Description	TOTAL AREA S.M.	TOTAL AREA S.F.
50 metre tank	1	Competition Swimming	50m long x 10 lanes x 2.2m continuous depth	1270	13670
Dive tank	1	Competition Diving	25 yards (22.86m) x width of 50m tank x 5.5m continuous depth; separated from 50m tank with bulkhead; 1m 3m 5m 7.5m diving boards and tower	580	6243
25 metre tank	1	Recreational Swimming; Swimming programs	25m long x 10 lanes; Depth varies in a single plane from 1.1m to 2.13m; Ramp entry; Possible moveable floor	645	6943
Leisure tank	1	Recreational Swimming; Swimming programs	Free form shape; Depth varies in a single plane from zero entry to 1.5m; Possible moveable floor; Lazy river and Pool toys	695	7481
Hot tub	1	Recreational and Therapeutic Activity	Ramp entry; seating for 70	55	592
Deck Space	1	Circulation	Minimum widths around tanks	1935	20828
Spectator Seating	1	Competition Spectator Viewing	Temporary Seating for 300	200	2153
Steam	1	Recreational and Therapeutic Activity		10	108
Sauna	1	Recreational and Therapeutic Activity		10	108
Subtotal Natatorium				5400	58125
On Deck Control	1	Staff Supervision over Pools	Workstations with viewing through glass	50	538
On Deck Storage (separate room)		Storage for Swim competition equipment, pool toys, scuba equipment and kayaks	Storage reels can be located on exterior of building with access via overhead doors	130	1399
Dressing Rooms	3	Family change; Women's change, Men's change and shower facilities	Emphasis on Family Change Facility	595	6405
Wet Multipurpose Classroom	2	Birthday Parties; Scuba lesson dry component; Classes		100	1076
Kitchen	1	For use by Swim Teams	Access from Pool Deck	40	431
First Aid	1	Staff use	Storage of first aid equipment; use by patrons requiring first aid		0
Staff Room / Change	1	Staff breaks, staff changing		150	1615
Office/ Reception		Dedicated and Shared Offices	Facility Staff, Swim team Coaches	200	2153
Meeting Room	1	For use by Swim Meet Judges	Overlook to Competition Pool	30	323
Retail Space	1	Sale of merchandise to the general public	Frontage and access from the exterior	465	5005
Entrance / Lobby and Stair	1	Gathering and social space	Prominent architecture identifying entry into facility; views into natatorium; existing stair to mezzanine may require relocation to be better integrated with lobby	300	3229
Mechanical and Electrical	1	Support services for the building	To fit in existing basement level; See page 6 of the Study for description of these spaces	940	10118
Existing Mezzanine	1	Existing space that includes spectator bleachers, mechanical room, storage and washrooms		585	6297
Total				8985	96714



APPENDIX II.
STRUCTURAL SUMMARY FOR
EXISTING AQUATIC CENTRE - OPTION 2

**UBC AQUATIC CENTRE
PROPOSED EXPANSION AND RENOVATION
Preliminary Structural Feasibility Report
May 12th, 2011**

1.0 INTRODUCTION

The purpose of the preliminary structural feasibility report is to provide a review of the proposed concept for the expansion and renovation of the UBC Aquatic Centre.

This report is based on the following:

- Conceptual layout prepared by CEI Architecture.
- Preliminary Structural Assessment Report prepared by Fast + Epp for SHAPE Architecture on December 1st, 2009.
- Cursory walk-through of the existing building on November 16th, 2009 and April 21st, 2011.
- Review of available archive structural and architectural drawings.
- Telephone conversation November 26th, 2009 with Ray Carter from Robertson Kolbeins Teevan & Gallaher Ltd. (RKTG), the original structural engineers for the Aquatic Centre.

This report does not include:

- Detailed analysis or calculations
- Commentary on the feasibility of demolishing and replacing the existing facility

2.0 GENERAL DESCRIPTION AND CONDITION OF EXISTING STRUCTURE

The UBC Aquatic Centre is a multi-purpose recreational facility which includes an indoor pool, viewing mezzanine, fitness area, steam rooms, saunas, an entrance lobby and staff offices. The building was constructed circa 1978 and generally comprises a mixture of cast-in-place and post-tensioned concrete as the primary structure.

2.1 Main Pool Area:

The roof structure over the main pool area consists of a concrete slab reinforced with a mixture of conventional reinforcement and bonded/unbonded post-tensioning strands. The roof slab is supported by 6 ft. deep x 3 ft. wide (tapering to 2 ft. at the bottom of the beam) concrete moment frames at 38 ft. o.c. and clear spanning 133 ft. across the pool space. It is somewhat unclear from the existing archive drawings which method of reinforcement was used for the moment frames as the drawings indicated a post-tensioned and an alternative conventionally reinforced solution (a subsequent discussion with the original structural engineering firm RTKG suggests that the frames may have indeed been reinforced with conventional reinforcement, based on their recollection). The concrete moment frames support the gravity roof loads and provide lateral resistance in the north-south direction. Lateral loads in the east-west direction are resisted by two end bay shear walls. The foundations in the main area are shallow reinforced concrete pad and strip footings. The concrete roof and moment frames all appeared to be in sound condition with no major cracks or other visible signs of distress noted during the November 16th site review. A cursory review of the HSS skylight support frame at the south end of the mezzanine also appeared in sound condition with no signs of distress or rusting.

2.2 Area South of Main Pool:

The area immediately to the south of the main pool includes a full basement housing the fitness area and mechanical/electrical rooms, change rooms at the main floor level and a viewing mezzanine/ bleacher area at the upper level. The mezzanine floor continues beyond the face of the building to serve as an exterior patio and walkway. The structure for the basement, main and mezzanine areas generally comprises cast-in-place conventionally reinforced concrete beams, slabs and columns. The foundations in the main area are shallow reinforced concrete pad and strip footings.

2.2 Area West of Main Pool:

The area immediately to the west of the main pool includes the entrance lobby and staff offices at the main level and a continuation of the upper level mezzanine from the area south of the pool. There is no basement in this part of the building. Foundations generally comprise a mixture of reinforced concrete pad footings and piles in this area. There were no visible structural signs of distress noted during the November 16th walkthrough based on the areas available for review.

3.0 CODE COMPLIANCE REQUIREMENTS

The current BC Building Code 2006 and Commentary L of National Building Code of Canada 2005 (NBCC) acknowledges that building structures of 30 year vintage and older will be deemed acceptable for current gravity loads provided they comply with the following criteria:

- Demonstrated satisfactory past performance for gravity loads in that time.
- Show no sign of distress or deterioration.
- The structural system is reviewed, including critical details and load transfers.
- There have been no changes within the past 30 years that could significantly increase the loads on the building or affect its durability, and that no such changes are contemplated.

Commentary L of the NBCC also states that a seismic upgrade would be triggered if the existing structure cannot resist 60% of the current code seismic forces. The extent of a full or partial seismic upgrade would then be determined in consultation with the Owner and the Building Officials. Given the age of the building and the fact that the building code seismic requirements have become increasingly stringent over the years, we would anticipate that a seismic upgrade would be required to varying degrees throughout the building.

4.0 PROPOSED EXPANSION AND RENOVATION

The proposed expansion and renovation essentially wraps around the existing building and generally comprises the following:

- West side of building: New retail space within the existing building footprint.
- South side of building: New entrance, offices, staff room, control room and classrooms within the existing building footprint. New change rooms outside the existing building footprint.
- East side of building: New natatorium, kitchen, meeting room and classroom outside the building footprint.

4.1 Impact on existing structural vertical (gravity) support system

For the proposed renovated areas within the existing building footprint on the west and south sides, the degree of potential demolition and upgrade will largely depend on how the existing structure integrates with the new layout. At this stage, allowances should be made for nominal upgrades and reconfigurations of the existing structure as well as possible underpinning at the interface between the new and existing foundations.

The new change rooms outside the building footprint at the southeast corner of the building will most likely require new openings in the existing exterior wall to facilitate user connectivity, the structural impact of which can be determined when the magnitude of the openings is known.

The construction of the new natatorium adjacent to the east side of the building will require a portion of the existing structure to be demolished. As this portion of the building is outside the primary pool area, the demolition can generally be achieved without adversely affecting the overall vertical support of the remaining structure. It is also anticipated that a number of large openings will be required in the existing exterior east wall to facilitate user connectivity between the natatorium and existing pool therefore allowances should be made for potential reinstatement of support structure in this area. Finally, the architectural conceptual drawing suggests that the natatorium roof will most likely exceed the height of the adjacent existing building thereby creating a snow drift condition on the existing roof. If this is the case then a local upgrade of the existing roof structure may be required to support the increased snow loads.

4.2 Impact on existing structural lateral support system

Given the relative proximity and integration of the proposed expansion and renovation, a seismic upgrade of the overall facility will most likely be required.

A seismic upgrade in the north-south direction could be achieved by strengthening the existing concrete moment frame with new external steelwork as required. It is anticipated that the new change rooms at the south east corner will be fully connected to the existing building thereby keeping the lateral systems relatively consistent in this direction as well as avoiding a complicated expansion joint at the interface. Attaching the new change rooms could also potentially assist in buttressing the east portion of the building, particularly in the area where a number of large openings are anticipated in the existing east exterior wall.

A seismic upgrade of the existing structure in the east-west direction would most likely take the form of discrete steel cross bracing or concrete shear walls incorporated into, or adjacent to, the primary walls in this direction. Given that the new natatorium will be a relatively large and open span structure, it would be difficult for this building to provide any effective “buttressing” to the existing building. Further, directly connecting the natatorium in this direction could possibly increase the lateral load on the existing building, depending on the relative stiffness of the competing lateral systems. For these reasons it is recommended that an expansion joint be incorporated to effectively separate the natatorium and existing building.

5.0 CONCLUSION

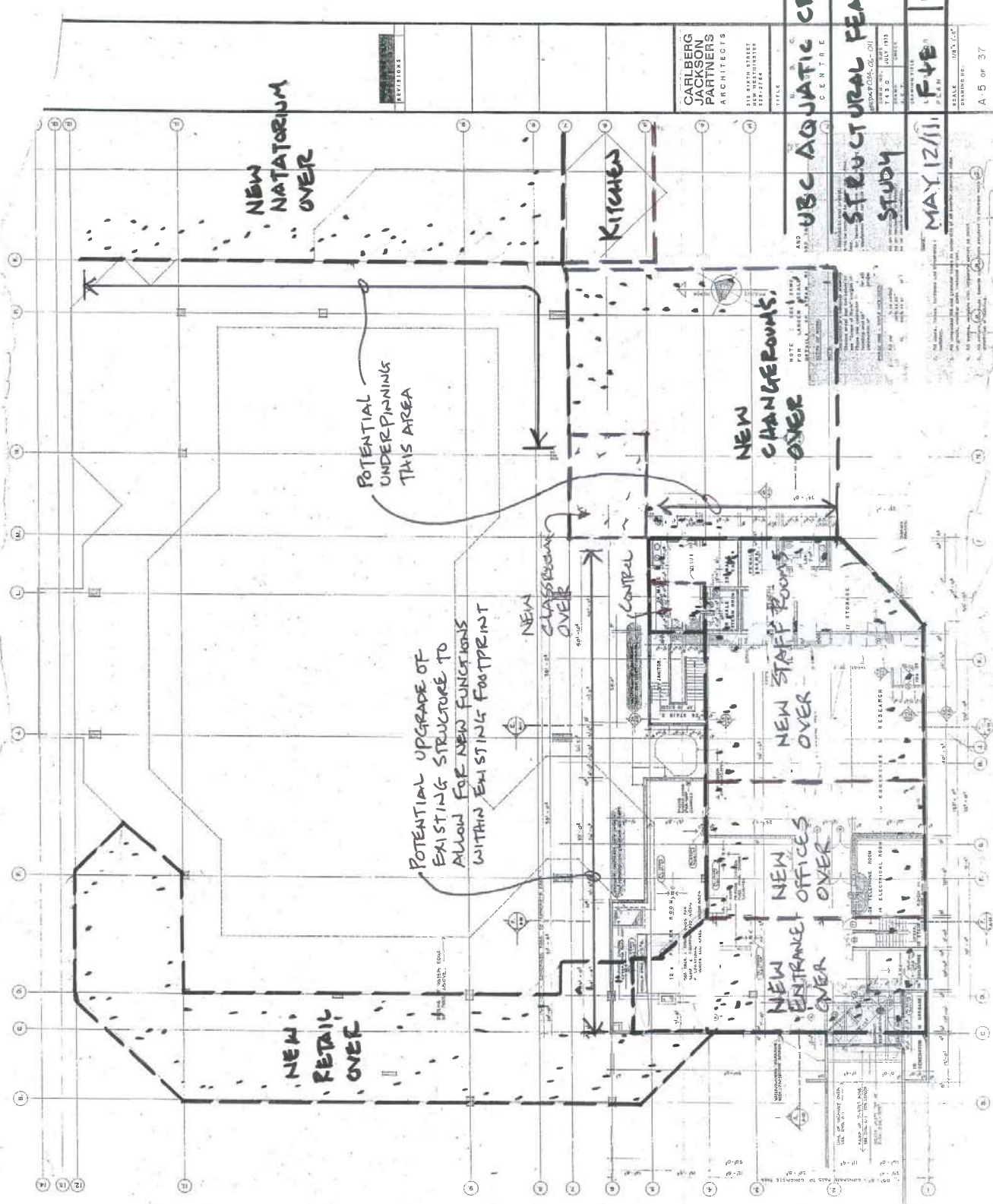
Based on the preliminary structural review of the existing building and a review of the proposed expansion and renovation, it would be feasible to reuse the existing structure provided that an overall seismic upgrade is undertaken. We understand that a full demolition and reconstruction of this building is also being considered therefore the cost/benefit of undertaking such an upgrade should be carefully weighed against this option.

We trust that the information in this report is satisfactory to determine the next step in the future use of the Aquatic Centre. Please contact the undersigned if there are any questions.

Report prepared by:



Duane Palibroda, P.Eng., Struct.Eng., M.I.Struct.E.
Managing Associate



NEW NATATORIUM OVER

KITCHENS

POTENTIAL UPRISING THIS AREA

POTENTIAL UPGRADE OF EXISTING STRUCTURE TO ALLOW FOR NEW FUNCTIONS WITHIN EXISTING FOOTPRINT

NEW CLASSROOM OVER

NEW CHANGE ROOMS OVER

NEW STAFF ROOMS OVER

NEW OFFICES OVER

NEW ENTRANCE OVER

CARLBERG JACKSON PARTNERS ARCHITECTS
 515 BUCHANAN STREET
 VANCOUVER, B.C. V6C 2K4

TITLE
 UBC AQUATIC CENTRE

DATE
 1998.05.01

SCALE
 1/8" = 1'-0"

DATE
 1998.05.01

SCALE
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UBC AQUATIC CENTRE

STRUCTURAL FEASIBILITY STUDY

MAY 12/11

F.T.E.

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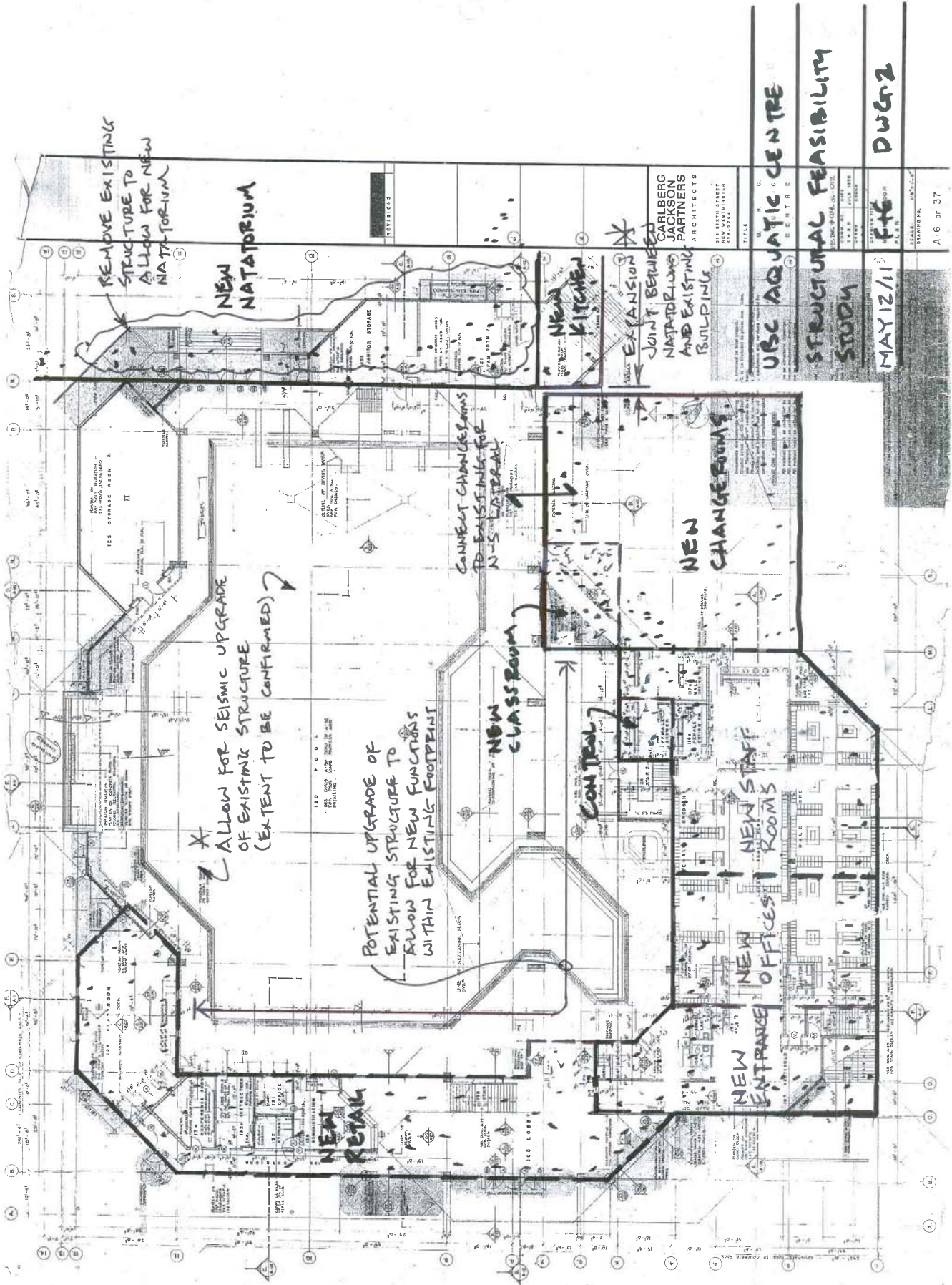
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DATE
 1998.05.01



CARLBERG
JACKSON
PARTNERS
ARCHITECTS
NEW MATERIALS
DESIGN

USC AQUATIC CENTRE

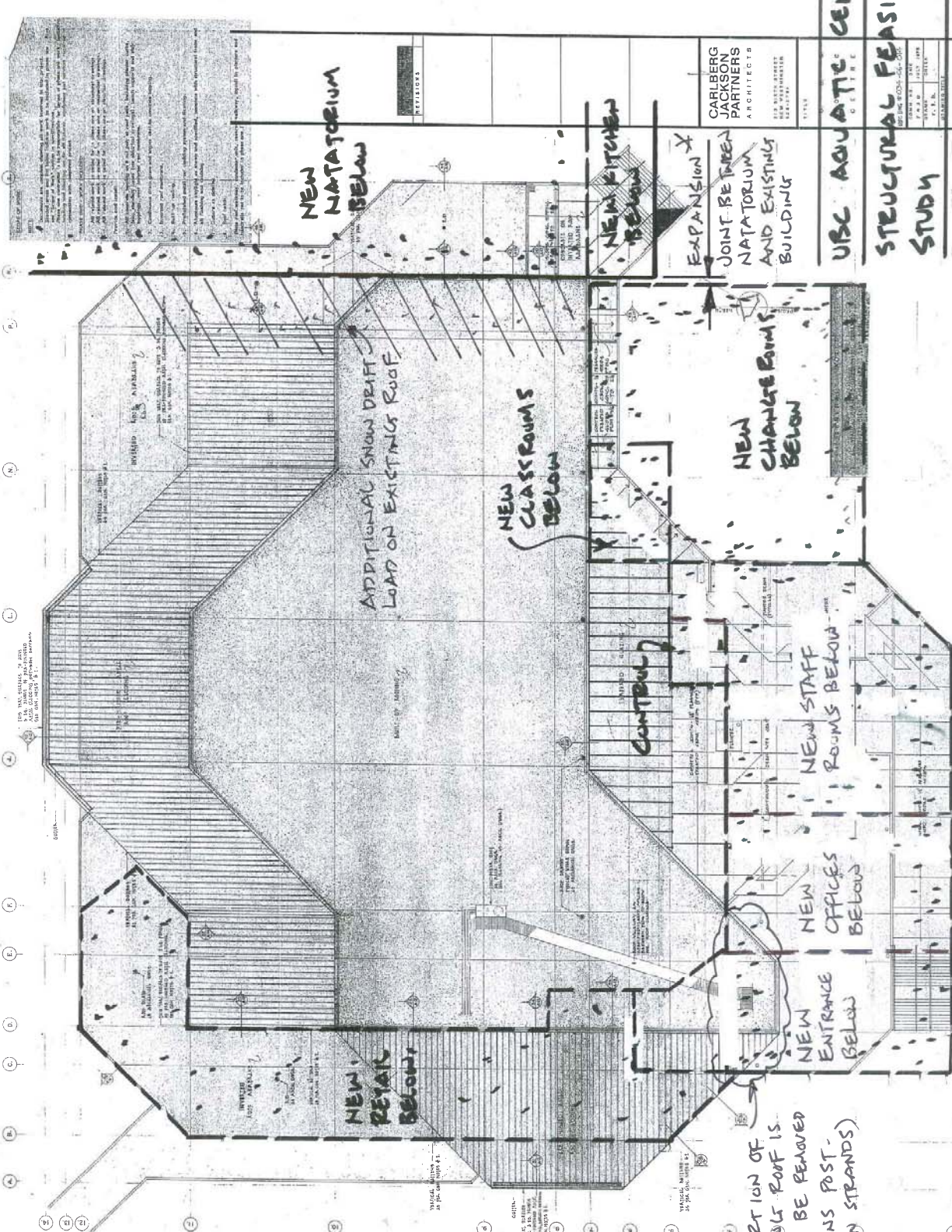
STRUCTURAL FEASIBILITY STUDY

MAY 12/11

F16

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1. THIS PLAN, SPECIFICATIONS, AND SCHEDULES SHALL BE CONSIDERED AS PART OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.

NEW NATORIUM BELOW

NEW KITCHEN BELOW

EXPANSION X
JOINT BETWEEN
NATORIUM
AND EXISTING
BUILDING

NEW CLASSROOMS BELOW

NEW CHANGE ROOMS BELOW

NEW STAFF ROOMS BELOW

NEW OFFICES BELOW

NEW ENTRANCE BELOW

NEW RETAIL BELOW

ADDITIONAL SNOW DRIFT
LOAD ON EXISTING ROOF

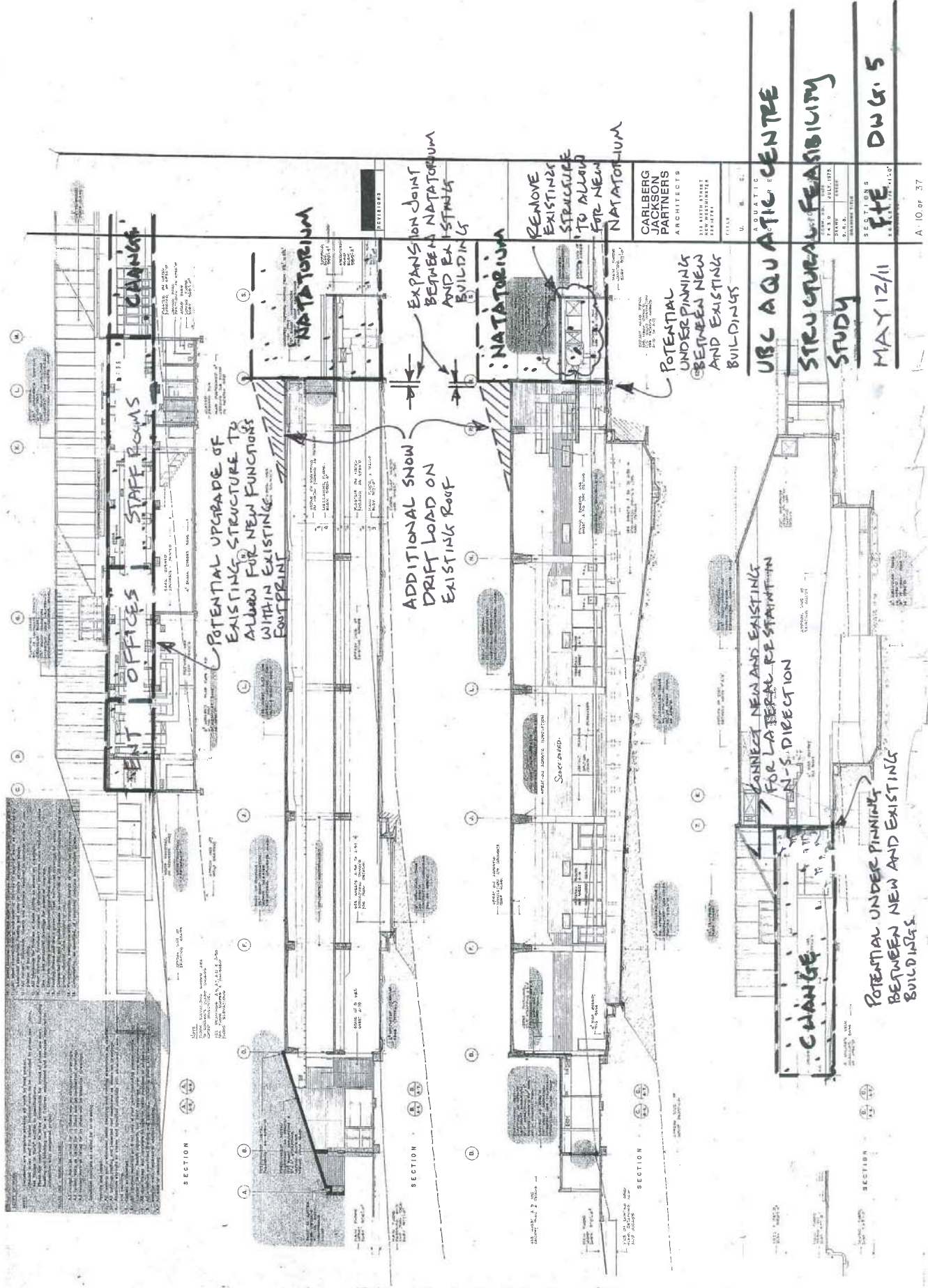
CANTINA

THIS PORTION OF
EXISTING ROOF IS
NOT TO BE REMOVED
(CONTAINS POST-
TENSION STRANDS)

CARLBERG
 JACKSON
 PARTNERS
 ARCHITECTS
 100 SOUTH STREET
 SEATTLE, WA 98101
 TEL: 206.461.1000
 FAX: 206.461.1001
 WWW: CARLBERGJACKSON.COM

USC AQUATIC CENTRE	
STRUCTURAL FEASIBILITY STUDY	
DATE: MAY 12/11	DRAWN BY: FTE
DWG 4	

A-8 of 37



CARLBERG JACKSON PARTNERS ARCHITECTS
 200 WEST HARRIS STREET
 CHICAGO, IL 60610
 U.S.A.

UBC AQUATIC CENTRE
 STRUCTURAL FEASIBILITY STUDY

MAY 12/11
 FFE
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APPENDIX III.

EXISTING AQUATIC CENTRE PLANS



APPENDIX IV. EXISTING SITE SERVICES PLAN
















APPENDIX V. CAMPUS MAPS

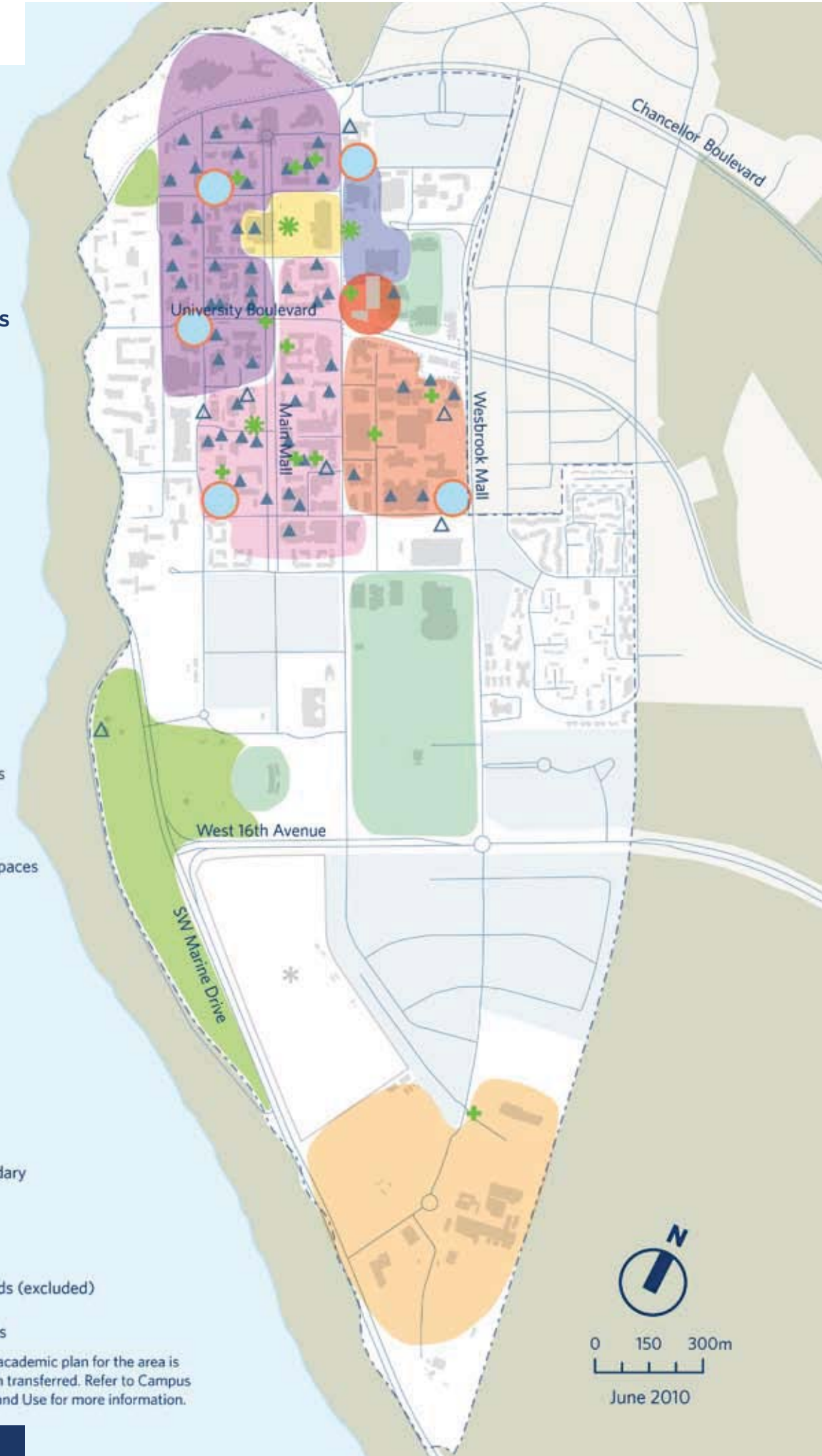
MAP

2-4

Generalized Academic Communities and Social Interaction Opportunities

-  Campus Heart
- Academic Communities**
-  Arts
-  Athletics + Varsity
-  Botanical Gardens
-  Health Sciences
-  Central Libraries
-  Sciences
-  South Campus Research
-  Student Services
- Informal Learning Spaces in Facilities**
-  Existing
-  Future Known Sites
- Future Outdoor Informal Learning Spaces**
-  Small Commons
-  Large Commons
-  Mixed Use Hubs

-  UBC Vancouver Campus Boundary
-  Vancouver Campus Plan Area
-  Neighbourhoods in VCP Area
-  Family Housing Neighbourhoods (excluded)
-  Institutional Building Footprints
-  Current land uses remain until an academic plan for the area is complete and the density has been transferred. Refer to Campus Plan Details, Chapter 3 Campus Land Use for more information.



MAP

2-10

Heritage Resources:
Themes 2 and 3

Theme 2

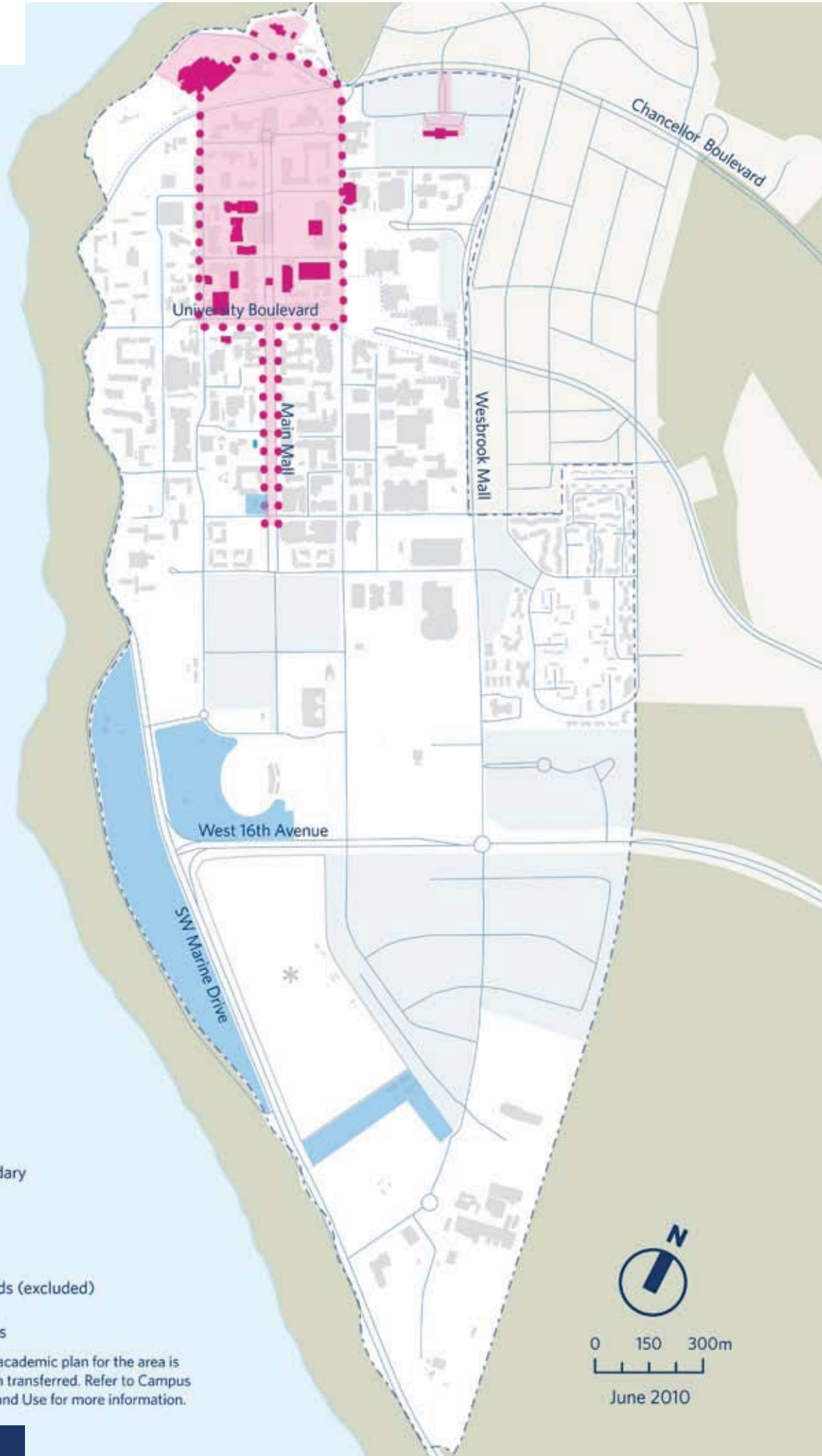
Commanding Position

- Facilities and Buildings
- Landscape
- 1914 Campus Boundary

Theme 3

Room for Research

- Facilities and Buildings
- Landscape



--- UBC Vancouver Campus Boundary

Vancouver Campus Plan Area

..... Neighbourhoods in VCP Area

Family Housing Neighbourhoods (excluded)

Institutional Building Footprints

* Current land uses remain until an academic plan for the area is complete and the density has been transferred. Refer to Campus Plan Details, Chapter 3 Campus Land Use for more information.



0 150 300m

June 2010

MAP 2-11

Heritage Resources: Themes 4 and 5

Theme 4

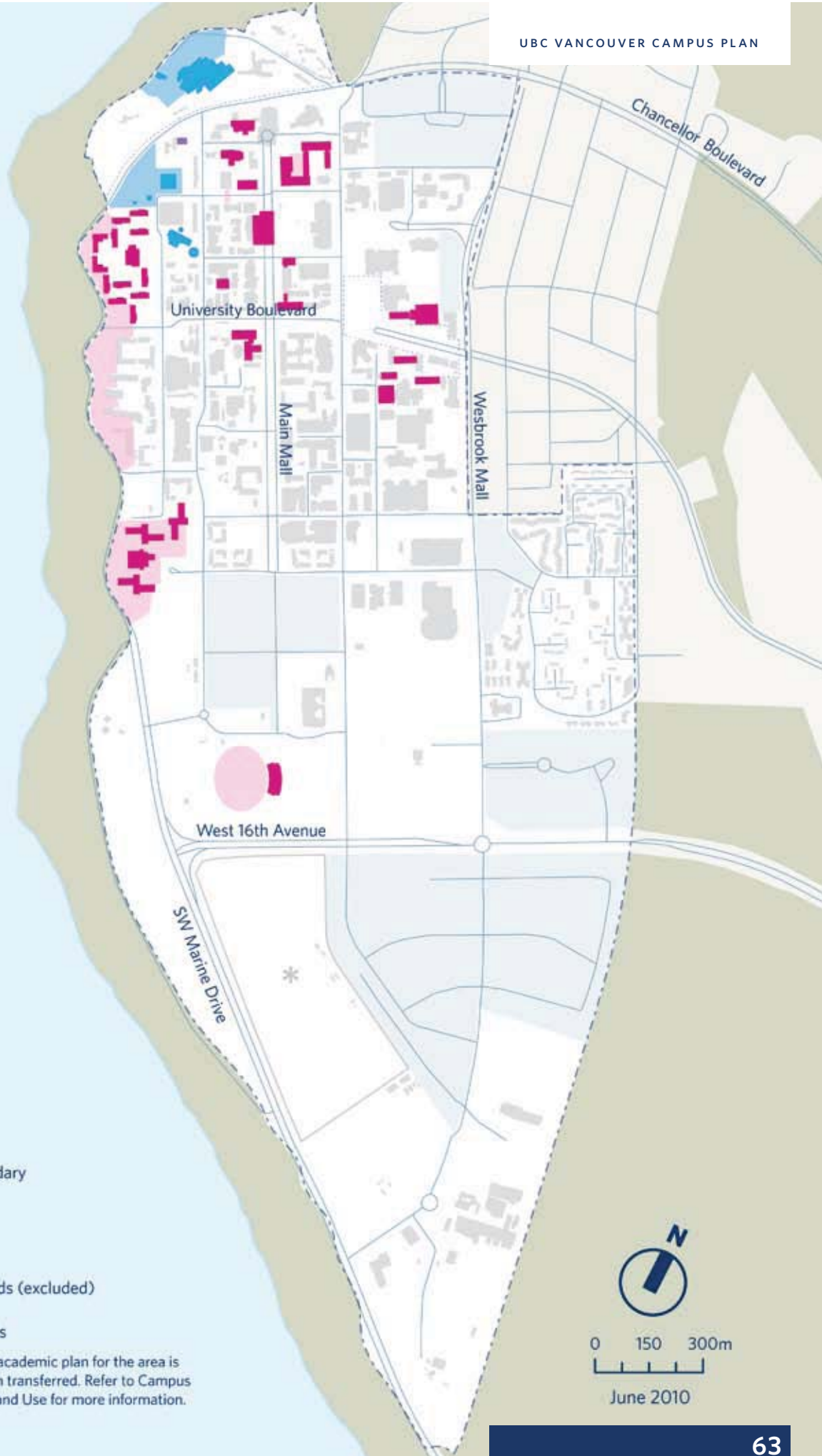
Modern Openness

- Facilities and Buildings
- Landscape

Theme 5

Cultural Expansion and Inclusion

- Facilities and Buildings
- Landscape



--- UBC Vancouver Campus Boundary

Vancouver Campus Plan Area

..... Neighbourhoods in VCP Area

Family Housing Neighbourhoods (excluded)

Institutional Building Footprints

* Current land uses remain until an academic plan for the area is complete and the density has been transferred. Refer to Campus Plan Details, Chapter 3 Campus Land Use for more information.



MAP

2-12

Heritage Resources: Themes 6, 7 and 8

Theme 6

Community Building

- Facilities and Buildings
- ✱ Monuments
- ⬢ Landscape

Theme 7

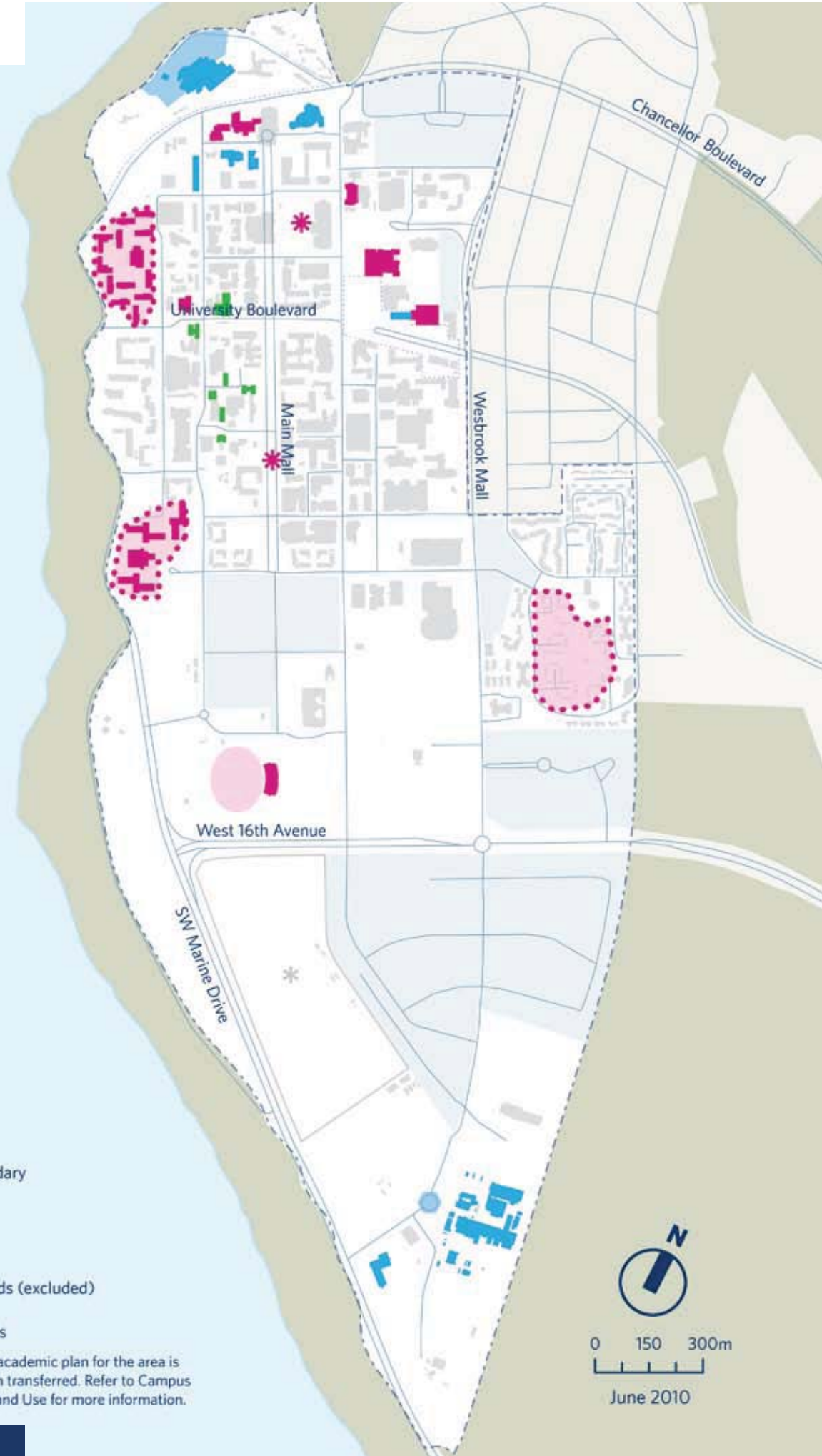
Making an Impact

- Facilities and Buildings
- Landscape

Theme 8

Resourcefulness

- Facilities and Buildings



--- UBC Vancouver Campus Boundary

□ Vancouver Campus Plan Area

⋯ Neighbourhoods in VCP Area

■ Family Housing Neighbourhoods (excluded)

■ Institutional Building Footprints

* Current land uses remain until an academic plan for the area is complete and the density has been transferred. Refer to Campus Plan Details, Chapter 3 Campus Land Use for more information.





APPENDIX VI. COST REPORT

**OPINION OF PROBABLE COSTS (Feasibility Estimates)
for**

**UBC – Aquatic Centre Expansion
Vancouver, BC**

May 16, 2011



Prepared by:

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Kelowna, BC, V1V 2B7
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**OPINION OF PROBABLE COSTS (Feasibility Estimates)
UBC Aquatic Centre Expansion, Vancouver, BC
May 16, 2011**

<u>CONTENTS</u>	<u>PAGE NO.</u>
1. INTRODUCTION.....	2
2. PROJECT SCHEDULE.....	3
3. LEVEL OF RISK	3
4. BASIS OF THE ESTIMATE AND OTHER ASSUMPTIONS.....	4
4.1. Cost Base	4
4.2. Contingencies.....	4
4.3. Exclusions	5
5. GROSS FLOOR AREA.....	5
6. STATEMENT OF PROBABLE COSTS.....	5
7. PROJECT ESTIMATE SUMMARY AND BACKUP	6

OPINION OF PROBABLE COSTS (Feasibility Estimates)
UBC Aquatic Centre Expansion, Vancouver, BC
May 16, 2011

1. INTRODUCTION

The University of British Columbia is in the process of investigating options for the expansion of the existing Aquatic Centre either through demolition of the existing and construction of a new facility (Option 1) or renovating and extending the existing Aquatic Centre (Option 2) in Vancouver, BC. The scope for construction includes:

Option 1 - Build all new facility

- 1 the construction of an entirely new, purpose built facility adjacent to the existing Aquatic Centre on MacInnes Field, maximum height 12m; demolition of the existing facility;
- 2 10 lane 50m pool, diving pool, 10 lane 25m pool, leisure pool;
- 3 change rooms, control room;
- 4 administration and office/teaching space;
- 5 retail space;
- 6 hard and soft landscaping works to the immediate demise of the extension/addition;
- 7 Optional Additional Costs:-

- i. Movable Floor to 25m pool
- ii. Remove Empire Pool
- iii. Further additional change room space
- iv. Heavy timber construction (above grade)
- v. Metal tank system.

Option 2 - Renovate and extend existing facility

- 1 the construction addition of a 10 lane 50m pool, diving pool, change rooms and ancillary space, maximum height 12m;
- 2 renovations of the existing pool to incorporate a 10 lane 25m pool;
- 3 renovations of the existing pool to incorporate a leisure pool;
- 4 change of use of the existing basement areas, renovation for M&E space;
- 5 renovation of existing main floor for retail/entrance/administration areas;
- 6 minor renovation/enhancements to the Mezzanine Floor;
- 7 hard and soft landscaping works to the immediate demise of the extension/addition;
- 8 Energy Upgrades and Maintenance programme of works to existing buildings (services plant replacement, recladding of envelope).
- 9 Seismic upgrades to rc structures;
- 10 Optional Additional Costs:-

- i. Movable Floor to 25m pool
- ii. Remove Empire Pool
- iii. Further additional change room space
- iv. Heavy timber construction (above grade)
- v. Metal tank system.

OPINION OF PROBABLE COSTS (Feasibility Estimates)
UBC Aquatic Centre Expansion, Vancouver, BC
May 16, 2011

CEI Architecture of Vancouver have provided initial schematic program layouts and area information from which we have derived the size, scope and extent of each of the feasibility options proposed. Initial structural commentary from Fast & Epp for Option 2 implications have also been received and accounted for.

We have utilised historical cost data from projects of a similar type and nature recently completed in the BC Lower Mainland and Interior in compiling our estimates. In the absence of information regarding structural, mechanical and electrical systems this historical data forms the basis of our estimates to provide indications of likely outturn costs.

No information pertaining to site/ground conditions, demolition or removal of any existing structures has been made available. We would highlight that we have been requested to include allowances for asbestos removal in both Options and these have been reflected as cash allowances as the extent of work required is unknown at this stage.

We have provided an overall summary of our opinion of the estimated construction hard costs. We have also provided an indication of the anticipated design consultants' fees and other soft costs such as DCC's and Building Permit that could be expected to apply to this development.

HST is excluded from the Estimate.

Pricing for this Opinion of Probable Costs is based upon our opinion of current **2nd Quarter 2011 escalated to September 2012** unit rates that we consider reasonable, for the work envisaged, taking into account the size, type, accessibility and complexity of the work and its location in Vancouver, BC.

This estimate is our opinion of fair market value for the construction of this project and is not a prediction of low bid. It reflects our opinion of the current construction industry market conditions for this size and nature of project in Vancouver, BC.

We have assumed that the Work will be procured on a stipulated sum basis. The pricing in this Estimate is predicated upon a minimum of four qualified sub-contractors/suppliers for all trades and all parts of the work on a competitive basis, with no "sole source" tenders and no sole source labour acquisition.

2. PROJECT SCHEDULE

Although we have not received an overall schedule for comment, we have been advised by CEI that a projected commencement of September 2012 is to be assumed. Our current day construction rates included in the attached backup have been escalated to September 2012 (projected escalation schedule also attached).

3. LEVEL OF RISK

As a preliminary Feasibility Estimate, it is our opinion that the risk associated with this Opinion of Probable Costs is -15% to +10%, 18 times out of 20.

OPINION OF PROBABLE COSTS (Feasibility Estimates)
UBC Aquatic Centre Expansion, Vancouver, BC
May 16, 2011

4. BASIS OF THE ESTIMATE AND OTHER ASSUMPTIONS

4.1. Cost Base

We have undertaken a quantitative measure from the available Drawings (Architectural plans only) to derive the quantities for the various components of each of the development elements. A structured elemental breakdown was then compiled from this base information. In the absence of any structural, mechanical or electrical services information we have made assumptions regarding the quantities of fixtures and types of systems to be incorporated from projects of a similar size and nature, recently completed.

Prices for supply and install of each element were then applied utilising composite unit rates derived from historical project data and the cost analysis calculated and completed.

Pricing reflects our opinion of the current construction industry market conditions for this size and type of development in Vancouver, BC, based upon the project being procured and built on a stipulated sum basis. The pricing in this Estimate is predicated upon a minimum of four qualified sub-contractors/suppliers for all trades and all parts of the work on a competitive basis, with no "sole source" tenders and no sole source labour acquisition.

Pricing shown reflects our opinion of probable outturn construction costs obtainable in the **2nd Quarter of 2011 escalated to September 2012.**

This estimate is our opinion of fair market value for the construction of this project, as currently planned/programmed, and is not a prediction of low bid.

Optional Additional costs pertaining to each scenario have been included as 'below the line' items on the respective summary pages and are 'all-in' i.e. - inclusive of soft costs and professional fees where applicable.

4.2. Contingencies

4.2.1. **Design Contingency** – Option 1 Design Contingency allowance of 10% has been included, Option 2 10% for addition and 12.5% for renovation reflecting the indicative status of the drawn information. This allowance is a reserve of funds included in the construction estimate which is allocated to cover design and pricing adjustments resulting from lack of or incomplete design information and design detailing that is not currently available.

4.2.2. **Escalation Contingency** – an Escalation Contingency has been included at a value of 1.25% at this time assuming the works will be commenced in September 2012. This allowance, when included, is a reserve of funds to cover possible price increases from the time that this estimate is prepared to the time that the project is scheduled to be tendered.

4.2.3. **Phasing Allowance** – Option 1 no specific phasing allowance has been included as we have

OPINION OF PROBABLE COSTS (Feasibility Estimates)
UBC Aquatic Centre Expansion, Vancouver, BC
May 16, 2011

not been made aware of any particular site dependencies. Option 2 the General Conditions allowances have been elevated to allow for the existing facility to function whilst the 50m pool, diving pool and new change rooms are constructed. This allowance, when included, is for the work required to maintain the operational effectiveness of a facility while construction proceeds, recognising the phasing and staging requirements required for construction of a project.

- 4.2.4. **Construction Contingency** – Option 1 a Construction Contingency allowance of 5% has been included, Option 2 5% for addition and 7.5% for renovation. The construction contingency is a reserve of funds included in the construction estimate which is allocated to cover change orders for unforeseen issues that are required during the course of construction. It is not intended to be a scope change contingency.

4.3. Exclusions

The following are specifically **excluded** from this Estimate:

- Preloading of the site;
- Piling and/or ground stabilization works;
- Off site service upgrade costs;
- Parking;
- HST

5. GROSS FLOOR AREA

The Gross Floor Area (GFA) of Option 1 7,954m² and Option 2 8,983m² for the proposed scope of work areas have been derived from the program area requirements supplied by CEI with additional allowances for services plant areas.

6. STATEMENT OF PROBABLE COSTS

Estimates of construction costs prepared by SSA Quantity Surveyors Ltd. represent our best judgement as Professional Cost Consultants/Quantity Surveyors, familiar with the construction industry. It is recognised, however, that we do not have control over the cost of labour, materials or equipment, over architect/engineering design, over a contractor's method of determining prices, or over market or negotiating conditions. Accordingly, we cannot and do not warrant or represent that bids or negotiated prices will not vary from this nor any subsequent estimate of design/construction cost or evaluation prepared by or agreed to by us.

7. PROJECT ESTIMATE SUMMARIES AND BACKUP

MAIN SUMMARY OF ANTICIPATED CONSTRUCTION COSTS		
Description	Gross Floor Area (m2)	7,954
	ESTIMATED COST	ESTIMATED COST PER m ²
ESTIMATED CONSTRUCTION HARD COSTS		
Estimated New Building Cost	\$26,659,011	\$3,352
Hazmat cash allowance	\$1,000,000	\$126
Ground remediation, piling - Excluded	Excluded	Excl
Escalation - to September 2012	\$333,238	\$42
Off Site Services - Excluded	Excluded	Excl
Sub-Total - Estimated Construction Hard Costs	\$27,992,248	\$3,519
ESTIMATED PROJECT SOFT COSTS		
FFE/Client Direct Order items - cash allowance	\$500,000	\$63
Architectural Fees	\$1,399,612	\$176
Structural Engineer	\$421,532	\$53
Mechanical Engineer	\$262,596	\$33
Electrical Engineer	\$237,427	\$30
Civil Engineer	\$75,000	\$9
Building Envelope Consultant	\$50,000	\$6
Geotech	\$25,000	\$3
Acoustic Consultant	\$25,000	\$3
LEED Consultant	\$150,000	\$19
Commissioning Agent/Testing and Inspections	\$100,000	\$13
Building Code Consultant	\$25,000	\$3
Pool Consultant	\$175,000	\$22
Roofing Consultant	\$15,000	\$2
Survey	\$10,000	\$1
Quantity Surveyor	\$75,000	\$9
Equipment Consultant	\$12,000	\$2
Geothermal Investigation	\$15,000	\$2
Landscape Consultant	\$20,000	\$3
Interior Design	\$15,000	\$2
Environmental Consultant	\$25,000	\$3
Consultant Disbursements (5% of Fees)	\$156,658	\$20
Electrical Hook-up	Included	\$0
Gas Connection	Included	\$0
Water and Sewer Connection	Included	\$0
Roads/Lane/Sidewalk	Included	\$0
Legal Fees & Expenses	\$50,000	\$6
Testing and Inspection	\$100,000	\$13
Administration costs	\$100,000	\$13
Permits and DCC's	\$360,000	\$45
Bonding and Insurance	Included	\$0
Soft Costs Contingency	\$50,000	\$6
ESTIMATED TOTAL PROJECT COSTS (Excluding HST)	\$32,442,074	\$4,079
HST	12.00% Excluded	Excl
ESTIMATED TOTAL PROJECT COSTS (Excluding HST) rounded	\$32,443,000	\$4,079

Optional Additional Costs (all-in incl soft costs)

- 1 Movable Floor to 25m pool \$575,000
- 2 Remove Empire Pool; landscape space \$325,000
- 3 Additional Change Room Facility = \$2,875/m2 of additional space
- 4 Heavy Timber construction for all new above grade structure \$925,000
- 5 Myrtha tank system to 50m and diving pools - NFI

Separate Prices (included in estimate)

- 1 Retail Space (all-in incl soft costs) \$885,000

ELEMENTAL SUMMARY SHEET					GFA = 7,954 m ²		
ELEMENT/SUB-ELEMENT	Quantity	Unit Rate	Sub-Element	Element	\$/m ²	\$/m ²	%
01 SUBSTRUCTURE				\$1,061,670		\$133.48	4.3%
011 Normal Foundations	6,945 m ²	\$132.96	\$923,390		\$116.09		
012 Basement Excavation	1,009 m ²	\$137.05	\$138,280		\$17.38		
013 Special Conditions	7,954 m ²	\$0.00	\$0		\$0.00		
02 STRUCTURE				\$2,986,611		\$375.49	12.2%
021 Lowest Floor Construction	6,945 m ²	\$88.94	\$617,677		\$77.66		
022 Upper Floor Construction	1,009 m ²	\$239.97	\$242,134		\$30.44		
023 Roof Construction	6,945 m ²	\$306.23	\$2,126,800		\$267.39		
03 EXTERIOR CLADDING				\$3,887,018		\$488.69	15.9%
031 Roof Finish	6,945 m ²	\$130.00	\$902,850		\$113.51		
032 Walls Below Ground Floor	0 m ²	\$0.00	\$0		\$0.00		
033 Walls Above Ground Floor	2,578 m ²	\$601.25	\$1,550,028		\$194.87		
034 Windows	1,718 m ²	\$730.00	\$1,254,140		\$157.67		
035 Exterior Doors and Screens	9 No	\$5,555.56	\$50,000		\$6.29		
036 Balconies & Projections	1 l/s	\$130,000.00	\$130,000		\$16.34		
04 INTERIOR PARTITIONS				\$523,230		\$65.78	2.1%
041 Permanent Partitions	2,788 m ²	\$151.93	\$423,580		\$53.25		
042 Movable Partitions	1 l/s	\$20,000.00	\$20,000		\$2.51		
043 Doors	49 No	\$1,625.51	\$79,650		\$10.01		
05 VERTICAL MOVEMENT				\$13,000		\$1.63	0.1%
051 Stairs	3 Flts	\$4,333.33	\$13,000		\$1.63		
052 Elevators & Escalators	0 l/s	\$0.00	\$0		\$0.00		
06 INTERIOR FINISHES				\$2,329,634		\$292.89	9.5%
061 Floor Finishes	7,954 m ²	\$152.30	\$1,211,410		\$152.30		
062 Ceiling Finishes	7,954 m ²	\$28.43	\$226,160		\$28.43		
063 Wall Finishes	5,883 m ²	\$151.63	\$892,064		\$112.15		
07 FITTINGS AND EQUIPMENT				\$1,288,000		\$161.93	5.3%
071 Fittings & Fixtures	7,954 m ²	\$48.78	\$388,000		\$48.78		
072 Equipment	7,954 m ²	\$113.15	\$900,000		\$113.15		
08 ELECTRICAL				\$1,582,846		\$199.00	6.5%
081 Service & Distribution	7,954 m ²	\$50.00	\$397,700		\$50.00		
082 Lighting & Power	7,954 m ²	\$100.00	\$795,400		\$100.00		
083 Systems	7,954 m ²	\$49.00	\$389,746		\$49.00		
09 MECHANICAL				\$5,251,916		\$660.29	21.4%
091 Plumbing and Drainage	7,954 m ²	\$249.00	\$1,980,546		\$249.00		
092 Fire Protection	7,954 m ²	\$30.00	\$238,620		\$30.00		
093 HVAC	7,954 m ²	\$381.29	\$3,032,750		\$381.29		
10 GENERAL OVERHEADS				\$2,392,393		\$300.78	9.8%
Sub-Total				\$21,316,318		\$2,679.95	87.0%
Design Contingency - Building	10.00%			\$2,131,632		\$267.99	8.7%
Escalation Contingency - Building	0.00%			\$0		\$0.00	0.0%
Construction Contingency - Building	5.00%			\$1,065,816		\$134.00	4.3%
Sub-Total				\$24,513,765		\$3,081.94	100.0%
HST			See Main Summary	\$0		\$0.00	0.0%
ESTIMATED NET BUILDING COST				\$24,513,765		\$3,081.94	100.0%
11 SITE DEVELOPMENT				\$1,857,356		\$233.51	
111 General			\$500,000		\$62.86		
112 M & E On Site Services			\$325,000		\$40.86		
113 Alterations			\$0		\$0.00		
114 Demolition			\$863,505		\$108.56		
115 Overhead and Profit	10.00%		\$168,851				
116 Design Contingency - Site	10.00%		\$185,736	\$185,736	\$23.35	\$36.19	
117 Escalation Contingency - Site (See Main Summ	0.00%		\$0	\$0	\$0.00		
118 Construction Contingency - Site	5.00%		\$102,155	\$102,155	\$12.84		
Sub-Total				\$2,145,246		\$269.71	
HST on Site Development			See Main Summary	\$0		\$0.00	
ESTIMATED SITE DEVELOPMENT				\$2,145,246		\$269.71	
TOTAL ESTIMATED CONSTRUCTION COST				\$26,659,011		\$3,351.65	

Description	Quantity	Rate	Amount
ELEMENT 01 - SUBSTRUCTURE			
SUB-ELEMENT 011 - NORMAL FOUNDATIONS			
Column base type 1 (18 No) size 4,500mm x 4,500mm x 650mm deep comprising:			
Excavation	463 m3	10.00	\$4,630
25Mpa concrete	237 m3	150.00	\$35,550
Formwork	187 m2	80.00	\$14,960
Reinforcing (40kg/m3)	9,706 kg	2.20	\$21,353
Backfill	221 m3	20.00	\$4,420
Statistics:			
Number of bases	18	No	
Total cost	80,913	\$	
Cost per base	4,495	\$	
Column base type 2 (35 No) size 3,500mm x 3,500mm x 600mm deep comprising:			
Excavation	604 m3	10.00	\$6,040
25Mpa concrete	257 m3	150.00	\$38,550
Formwork	290 m2	80.00	\$23,200
Reinforcing (assumed 40kg/m3)	10,167 kg	2.20	\$22,367
Backfill	350 m3	20.00	\$7,000
Statistics:			
Number of bases	35	No	
Total cost	97,157	\$	
Cost per base	2,776	\$	
Strip footing size 900mm wide x 300mm deep comprising:			
Excavation	85 m3	10.00	\$850
25Mpa concrete	20 m3	150.00	\$3,000
Formwork	45 m2	80.00	\$3,600
Reinforcing (assumed 40kg/m3)	782 kg	2.20	\$1,720
Backfill	66 m3	20.00	\$1,320
Statistics:			
Length of footing	74	m	
Total cost	10,490	\$	
Cost per metre	142	\$	
Strip footing size 600mm wide x 300mm deep comprising:			
Excavation	745 m3	10.00	\$7,450
25Mpa concrete	129 m3	150.00	\$19,350
Formwork	430 m2	80.00	\$34,400
Reinforcing (assumed 40kg/m3)	3,870 kg	2.20	\$8,514
Backfill	616 m3	20.00	\$12,320
Statistics:			

Description	Quantity	Rate	Amount
<i>Length of footing</i>	716 m		
<i>Total cost</i>	82,034 \$		
<i>Cost per metre</i>	115 \$		
Pilaster type 1 (1 No) size 600mm x 600mm x 3,100mm deep comprising:			
25Mpa concrete	1 m3	150.00	\$150
Formwork	7 m2	80.00	\$560
Reinforcing (assumed 50kg/m3)	50 kg	2.20	\$110
<i>Statistics:</i>			
<i>Number of pilasters</i>	1 No		
<i>Total cost</i>	820 \$		
<i>Cost per pilasters</i>	820 \$		
Pilaster type 2 (56 No) size 600mm x 400mm x 3,100mm deep comprising:			
25Mpa concrete	42 m3	150.00	\$6,300
Formwork	350 m2	80.00	\$28,000
Reinforcing (assumed 50kg/m3)	2,070 kg	2.20	\$4,554
<i>Statistics:</i>			
<i>Number of pilasters</i>	56 No		
<i>Total cost</i>	38,854 \$		
<i>Cost per pilasters</i>	694 \$		
External foundation wall 200mm thick comprising:			
25Mpa concrete	186 m3	150.00	\$27,900
Formwork	1,864 m2	100.00	\$186,400
Reinforcing (assumed 60kg/m3)	11,178 kg	2.20	\$24,592
Insulation	932 m2	12.00	\$11,184
Waterproofing	932 m2	18.00	\$16,776
<i>Statistics:</i>			
<i>Area of wall</i>	932 m2		
<i>Total cost</i>	266,852 \$		
<i>Cost per square metre</i>	286 \$		
Internal foundation wall 200mm thick comprising:			
25Mpa concrete	130 m3	150.00	\$19,500
Formwork	1,304 m2	100.00	\$130,400
Reinforcing (assumed 60kg/m3)	7,797 kg	2.20	\$17,153
<i>Statistics:</i>			
<i>Area of wall</i>	652 m2		
<i>Total cost</i>	167,053 \$		
<i>Cost per square metre</i>	256 \$		
Internal pool/foundation wall 300mm thick comprising:			
25Mpa concrete	160 m3	150.00	\$24,000

Description	Quantity		Rate	Amount
Formwork	1,066	m2	100.00	\$106,600
Reinforcing (assumed 90kg/m3)	14,387	kg	2.20	\$31,651
Statistics:				
Area of wall	534	m2		
Total cost	162,251	\$		
Cost per square metre	304	\$		
Perimeter drainage	377	m	45.00	\$16,965
TOTAL SUB-ELEMENT 011 - NORMAL FOUNDATIONS				\$923,390
ELEMENT 01 - SUBSTRUCTURE				
SUB-ELEMENT 012 - BASEMENT EXCAVATION				
Bulk excavation 500mm deep	3,278	m3	10.00	\$32,780
Backfill with structural hardcore; 150mm below slab on grade level	4,025	m3	20.00	\$80,500
Dewatering allowance	1	l/s	25,000.00	\$25,000
TOTAL SUB-ELEMENT 012 - BASEMENT EXCAVATION				\$138,280
ELEMENT 01 - SUBSTRUCTURE				
SUB-ELEMENT 013 - SPECIAL CONDITIONS				
Pre-load/Piling allowance				Excluded
Sediment control				Included
TOTAL SUB-ELEMENT 013 - SPECIAL CONDITIONS				\$0
ELEMENT 02 - STRUCTURE				
SUB-ELEMENT 021 - LOWEST FLOOR CONSTRUCTION				
100mm Thick slab on grade comprising:				
25Mpa concrete	37	m3	150.00	\$5,550
Formwork to sides	15	m2	80.00	\$1,200
Reinforcing (assumed 40kg/m3)	1,472	kg	2.20	\$3,238
Finishing top of concrete and form expansion joints	365	m2	5.00	\$1,825

Description	Quantity	Rate	Amount
150mm Compacted hardcore	55 m3	20.00	\$1,100
Statistics:			
Area of slab on grade	365 m2		
Total cost	12,913 \$		
Cost per square metre	35 \$		
150mm Thick slab on grade comprising:			
25Mpa concrete	341 m3	150.00	\$51,150
Formwork to sides	42 m2	80.00	\$3,360
Reinforcing (assumed 40kg/m3)	13,570 kg	2.20	\$29,854
Finishing top of concrete and form expansion joints	2,271 m2	5.00	\$11,355
150mm Compacted hardcore	339 m3	20.00	\$6,780
Statistics:			
Area of slab on grade	2,271 m2		
Total cost	102,499 \$		
Cost per square metre	45 \$		
200mm Thick slab on grade comprising:			
25Mpa concrete	482 m3	150.00	\$72,300
Formwork to sides	67 m2	80.00	\$5,360
Reinforcing (assumed 40kg/m3)	19,274 kg	2.20	\$42,403
Finishing top of concrete and form expansion joints	2,411 m2	5.00	\$12,055
150mm Compacted hardcore	314 m3	20.00	\$6,280
Statistics:			
Area of slab on grade	2,411 m2		
Total cost	138,398 \$		
Cost per square metre	57 \$		
250mm Thick slab on grade comprising:			
25Mpa concrete	115 m3	150.00	\$17,250
Formwork to sides	23 m2	80.00	\$1,840
Reinforcing (assumed 40kg/m3)	4,600 kg	2.20	\$10,120
Finishing top of concrete and form expansion joints	460 m2	5.00	\$2,300
150mm Compacted hardcore	69 m3	20.00	\$1,380
Statistics:			
Area of slab on grade	460 m2		
Total cost	32,890 \$		
Cost per square metre	72 \$		
300mm Thick slab on grade comprising:			
25Mpa concrete	277 m3	150.00	\$41,550
Formwork to sides	98 m2	80.00	\$7,840
Reinforcing (assumed 40kg/m3)	11,086 kg	2.20	\$24,389
Finishing top of concrete and form expansion joints	923 m2	5.00	\$4,615
150mm Compacted hardcore	138 m3	20.00	\$2,760
Statistics:			

Description	Quantity		Rate	Amount
<i>Area of slab on grade</i>	923	m ²		
<i>Total cost</i>	81,154	\$		
<i>Cost per square metre</i>	88	\$		
400mm (Average) Thick slab on grade comprising:				
25Mpa concrete	51	m ³	150.00	\$7,650
Formwork to sides	21	m ²	80.00	\$1,680
Reinforcing (assumed 40kg/m ³)	2,024	kg	2.20	\$4,453
Finishing top of concrete and form expansion joints	128	m ²	5.00	\$640
150mm Compacted hardcore	20	m ³	20.00	\$400
<i>Statistics:</i>				
<i>Area of slab on grade</i>	128	m ²		
<i>Total cost</i>	14,823	\$		
<i>Cost per square metre</i>	116	\$		
Extra for forming ramps	5	No	5,000.00	\$25,000
Allowance for mechanical pads and bases	1	l/s	10,000.00	\$10,000
Extra for forming lazy river construction	1	l/s	200,000.00	\$200,000
TOTAL SUB-ELEMENT 021 - LOWEST FLOOR CONSTRUCTION				\$617,677
<u>ELEMENT 02 - STRUCTURE</u>				
<u>SUB-ELEMENT 022 - UPPER FLOOR CONSTRUCTION</u>				
Main Floor	1,009	m ²		
Concrete	252	m ³	150.00	\$37,838
Formwork	1,009	m ²	80.00	\$80,720
Reinforcement	25225	Kg	2.20	\$55,495
Power float	1009	m ²	4.00	\$4,036
Surface hardener and sealer	1009	m ²	5.00	\$5,045
Edge formwork	30	m ²	100.00	\$3,000
Concrete columns	20	No	1,800.00	\$36,000
Concrete pilasters	10	No	1,000.00	\$10,000
Extra; forming stairwells, duct risers	1	l/s	10,000.00	\$10,000
TOTAL SUB-ELEMENT 022 - UPPER FLOOR CONSTRUCTION				\$242,134
<u>ELEMENT 02 - STRUCTURE</u>				

Description	Quantity	Rate	Amount
SUB-ELEMENT 023 - ROOF CONSTRUCTION			
Natatorium			
Ply sheathing over wood panelling W610	4,762 m2	60.00	\$285,720
Other support beams/perimeter edge beams allowance	180,000 kg	4.50	\$810,000
Steel Columns allowance	60,000 kg	4.50	\$270,000
Miscellaneous connections, plates, bolts, waste, etc	65,000 kg	4.50	\$292,500
	45,750 kg	4.50	\$205,875
Other roof areas			
W beams	15,000 kg	4.50	\$67,500
OWSJ	13,000 kg	4.50	\$58,500
Angle	2,000 kg	4.50	\$9,000
Perimeter angle	3,000 kg	4.50	\$13,500
Bracing	3,000 kg	4.50	\$13,500
Miscellaneous connections, plates, bolts, waste, etc	5,400 kg	4.50	\$24,300
Metal deck	2,183 m2	35.00	\$76,405
TOTAL SUB-ELEMENT 023 - ROOF CONSTRUCTION			\$2,126,800
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 031 - ROOF FINISHES			
2 ply SBS roof membrane, including insulation to falls and waterproofing; upstands to parapet walls	6,945 m2	130.00	\$902,850
TOTAL SUB-ELEMENT 031 - ROOF FINISHES			\$902,850
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 032 - WALLS BELOW GROUND FLOOR			
Included			Included
TOTAL SUB-ELEMENT 032 - WALLS BELOW GROUND FLOOR			\$0
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 033 - WALLS ABOVE GROUND FLOOR			
Shear wall (Prov) comprising:			

Description	Quantity		Rate	Amount
25Mpa concrete	193	m3	150.00	\$28,950
Formwork	1,288	m2	80.00	\$103,040
Insulation	1,288	m2	15.00	\$19,320
Reinforcing	15,440	kg	2.20	\$33,968
Timber cladding to exposed columns - allowance	1	l/s	75,000.00	\$75,000
Alu insulated panel	348	m2	325.00	\$113,100
Unit masonry	941	m2	425.00	\$399,925
Standing seam/Calzip with support/backing system	1,289	m2	375.00	\$483,375
Feature timber cladding to 'framed' openings - allowance	1	l/s	100,000.00	\$100,000
Miscellaneous supports, bracketry	1	l/s	193,350.00	\$193,350
TOTAL SUB-ELEMENT 033 - WALLS ABOVE GROUND FLOOR				\$1,550,028
ELEMENT 03 - EXTERIOR CLADDING				
SUB-ELEMENT 034 - WINDOWS				
Aluminum/glazed curtain wall system	1,718	m2	700.00	\$1,202,600
Motorized blinds - allowance	515	m2	100.00	\$51,540
TOTAL SUB-ELEMENT 034 - WINDOWS				\$1,254,140
ELEMENT 03 - EXTERIOR CLADDING				
SUB-ELEMENT 035 - EXTERIOR DOORS AND SCREENS				
Aluminum glazed entrance double doors complete with automatic opening hardware	5	No	5,000.00	\$25,000
Extra; glazed vestibules	1	No	12,000.00	\$12,000
Extra; auto opening devices	5	No	1,800.00	\$9,000
Metal insulated single door complete with frame, hardware and finish	4	No	1,000.00	\$4,000

Description	Quantity	Rate	Amount
TOTAL SUB-ELEMENT 035 - EXTERIOR DOORS AND SCREENS			\$50,000
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 036 - BALCONIES AND PROJECTIONS			
Entrance canopies	1 l/s	30,000.00	\$30,000
Exterior sun control devices - fixed	1 l/s	100,000.00	\$100,000
TOTAL SUB-ELEMENT 036 - BALCONIES AND PROJECTIONS			\$130,000
ELEMENT 04 - INTERIOR PARTITIONS			
SUB-ELEMENT 041 - PERMANENT PARTITIONS			
Concrete block	1,538 m2	150.00	\$230,700
16mm Type 'X' Gypsum wallboard	337 m2	30.00	\$10,110
92mm Steel studs @ 400mm O.C.	337 m2	25.00	\$8,425
16mm Type 'X' Gypsum wallboard	337 m2	30.00	\$10,110
16mm Type 'X' Gypsum wallboard	413 m2	30.00	\$12,390
92mm Steel studs @ 400mm O.C.	413 m2	25.00	\$10,325
84mm Sound batts	413 m2	10.00	\$4,130
16mm Type 'X' Gypsum wallboard	413 m2	30.00	\$12,390
Glazing - allowance	500 m2	250.00	\$125,000
TOTAL SUB-ELEMENT 041 - PERMANENT PARTITIONS			\$423,580
ELEMENT 04 - INTERIOR PARTITIONS			
SUB-ELEMENT 042 - MOVABLE PARTITIONS			
Allowance for movable wall at retail area	1 No	20,000.00	\$20,000
TOTAL SUB-ELEMENT 042 - MOVABLE PARTITIONS			\$20,000
ELEMENT 04 - INTERIOR PARTITIONS			

Description	Quantity		Rate	Amount
SUB-ELEMENT 043 - DOORS				
Solid core single wood door including pressed steel frame, finish to door, paint frame and hardware	35	No	1,000.00	\$35,000
Solid core double wood door including pressed steel frame, finish to door, paint frame and hardware	11	No	1,900.00	\$20,900
Glazed partition single door complete	3	No	1,250.00	\$3,750
Security shutters	1	l/s	20,000.00	\$20,000
TOTAL SUB-ELEMENT 043 - DOORS				\$79,650
ELEMENT 05 - VERTICAL MOVEMENT				
SUB-ELEMENT 051 - STAIRS				
Baement access staircases - secondary	2	flts	5,000.00	\$10,000
Roof access hatches/ladders - allowance	1	l/s	3,000.00	\$3,000
TOTAL SUB-ELEMENT 051 - STAIRS				\$13,000
ELEMENT 05 - VERTICAL MOVEMENT				
SUB-ELEMENT 052 - ELEVATORS AND ESCALATORS				
N/A				\$0
TOTAL SUB-ELEMENT 052 - ELEVATORS AND ESCALATORS				\$0
ELEMENT 06 - INTERIOR FINISHES				
SUB-ELEMENT 061 - FLOOR FINISHES				
M&E Rooms	1,222	m2	10.00	\$12,220
Change Rooms	595	m2	80.00	\$47,600
Natatorium	4,762	m2	220.00	\$1,047,640

Description	Quantity	Rate	Amount
Control	50 m2	100.00	\$5,000
Classroom	100 m2	50.00	\$5,000
Entrance	241 m2	100.00	\$24,100
Kitchen	40 m2	50.00	\$2,000
Meeting	30 m2	35.00	\$1,050
Office	200 m2	35.00	\$7,000
Retail space	465 m2	70.00	\$32,550
Staff	150 m2	35.00	\$5,250
Storage	100 m2	220.00	\$22,000
TOTAL SUB-ELEMENT 061 - FLOOR FINISHES			\$1,211,410
ELEMENT 06 - INTERIOR FINISHES			
SUB-ELEMENT 062 - CEILING FINISHES			
Painted concrete/steel soffit	5,771 m2	15.00	\$86,565
Suspended T-bar ceilings	1,548 m2	40.00	\$61,920
Suspended drywall ceilings	635 m2	45.00	\$28,575
Allowance for bulkheads and features	1 l/s	25,000.00	\$25,000
Extra; wood panelled soffits to lobby area	241 m2	100.00	\$24,100
TOTAL SUB-ELEMENT 062 - CEILING FINISHES			\$226,160
ELEMENT 06 - INTERIOR FINISHES			
SUB-ELEMENT 063 - WALL FINISHES			
Paint walls	5,883 m2	8.00	\$47,064
Allowance for special wall features and finishes	1 l/s	25,000.00	\$25,000

Description	Quantity	Rate	Amount
Tiling and tanking	2,480 m2	250.00	\$620,000
Lazy river	1 l/s	200,000.00	\$200,000
TOTAL SUB-ELEMENT 063 - WALL FINISHES			\$892,064
ELEMENT 07 - FITTINGS AND EQUIPMENT			
SUB-ELEMENT 071 - FITTINGS AND FIXTURES			
Millwork allowances:			
Reception counter	1 l/s	20,000.00	\$20,000
Control counter	1 l/s	5,000.00	\$5,000
Concession counter	1 l/s	7,500.00	\$7,500
Base cupboard/sink unit - allowance	1 l/s	25,000.00	\$25,000
Upper cupboard unit - allowance	1 l/s	15,000.00	\$15,000
Shelving/storage	1 l/s	10,000.00	\$10,000
Change room island benches	1 l/s	12,000.00	\$12,000
Change room wall benches	1 l/s	10,000.00	\$10,000
Allowance for miscellaneous millwork	1 l/s	25,000.00	\$25,000
Retail - allowance	1 l/s	50,000.00	\$50,000
Classrooms and Offices	1 l/s	30,000.00	\$30,000
Washroom/locker room accessories comprising:			
Toilet/shower cubicles	1 l/s	25,000.00	\$25,000
Urinal dividers	1 l/s	3,500.00	\$3,500
Lockers	1 l/s	75,000.00	\$75,000
Mirrors	1 l/s	5,000.00	\$5,000
Accessories	1 l/s	30,000.00	\$30,000
Grab bars	1 l/s	5,000.00	\$5,000
General comprising:			
Signage allowance	1 l/s	15,000.00	\$15,000
Miscellaneous rough carpentry	1 l/s	10,000.00	\$10,000
Miscellaneous metals	1 l/s	10,000.00	\$10,000
TOTAL SUB-ELEMENT 071 - FITTINGS AND FIXTURES			\$388,000
ELEMENT 07 - FITTINGS AND EQUIPMENT			
SUB-ELEMENT 072 - EQUIPMENT			

Description	Quantity	Rate	Amount
Bleachers	1 l/s	50,000.00	\$50,000
Pool equipment (incl Lazy River, Leisure Pool toys)	1 l/s	850,000.00	\$850,000
TOTAL SUB-ELEMENT 072 - EQUIPMENT			\$900,000
ELEMENT 08 - ELECTRICAL			
SUB-ELEMENT 081 - SERVICE & DISTRIBUTION			
Service and distribution	7,954 m2	50.00	\$397,700
TOTAL SUB-ELEMENT 081 - SERVICE & DISTRIBUTION			\$397,700
ELEMENT 08 - ELECTRICAL			
SUB-ELEMENT 082 - LIGHTING & POWER			
Lighting			
Fixture installation, conduit and wiring and lighting control	7,954 m2	75.00	\$596,550
Power			
Additional power, devices & mechanical power wiring	7,954 m2	25.00	\$198,850
TOTAL SUB-ELEMENT 082 - LIGHTING & POWER			\$795,400
ELEMENT 08 - ELECTRICAL			
SUB-ELEMENT 083 - SYSTEMS			
Fire alarm			
Fire Alarm system	7,954 m2	10.00	\$79,540
Telephone & data			
Additional telephone/data and cable TV - minimal requirements	7,954 m2	12.00	\$95,448
Security			
Additional security/CCTV system	7,954 m2	12.00	\$95,448
Public address			
Extend existing sound system	7,954 m2	15.00	\$119,310

Description	Quantity	Rate	Amount
TOTAL SUB-ELEMENT 083 - SYSTEMS			\$389,746
ELEMENT 09 - MECHANICAL			
SUB-ELEMENT 091 - PLUMBING AND DRAINAGE			
Equipment			
Plumbing and drainage, pool equipment	7,954 m2	135.00	\$1,073,790
Fixtures			
Plumbing fixtures	7,954 m2	14.00	\$111,356
Piping			
Domestic hot, cold, sanitary, ventilation & storm pipework systems; pool systems	7,954 m2	100.00	\$795,400
TOTAL SUB-ELEMENT 091 - PLUMBING AND DRAINAGE			\$1,980,546
ELEMENT 09 - MECHANICAL			
SUB-ELEMENT 092 - FIRE PROTECTION			
Sprinkler fire protection	7,954 m2	30.00	\$238,620
TOTAL SUB-ELEMENT 092 - FIRE PROTECTION			\$238,620
ELEMENT 09 - MECHANICAL			
SUB-ELEMENT 093 - HVAC			
Air Handling			
HVAC equipment, cooling & chiller plant, heat recovery, humidification equipment, circulation pumps, exhaust fans etc	7,954 m2	150.00	\$1,193,100
Heating Plant			
Additional pool HVAC heating equipment, plant, storage tanks, pumps etc	7,954 m2	25.00	\$198,850
Piping			
Natural gas, heating and chilled water, radiant under-floor heating pipework systems	7,954 m2	35.00	\$278,390

Description	Quantity	Rate	Amount
Ductwork Galvanized steel ductwork, grilles, diffusers etc	7,954 m2	100.00	\$795,400
Heating Fan coil units, VAV boxes, miscellaneous entrance heaters etc	7,954 m2	30.00	\$238,620
Test & commission/balancing, manuals, etc	1 l/s	50,000.00	\$50,000
Control Systems Assume DDC controls on equipment only Computer hardware & software, new control points etc and pool monitoring equipment	7,954 m2	35.00	\$278,390
TOTAL SUB-ELEMENT 093 - HVAC			\$3,032,750
ELEMENT 10 - GENERAL REQUIREMENTS AND FEE			
General requirements including: site access site accommodation site protection temporary utilities clean up equipment supervision winter conditions insurance's bonds permits CM fee miscellaneous	1 l/s	1,892,392.51	\$1,892,393
	1 l/s	500,000.00	\$500,000
TOTAL ELEMENT 10 - GENERAL REQUIREMENTS AND FEE			\$2,392,393
ELEMENT 11 - SITE DEVELOPMENT			
SUB-ELEMENT 111 - GENERAL SITE DEVELOPMENT			
New perimeter hard/soft landscaping; external signage	1 l/s	500,000.00	\$500,000
TOTAL SUB-ELEMENT 111 - GENERAL SITE DEVELOPMENT			\$500,000
ELEMENT 11 - SITE DEVELOPMENT			

Description	Quantity	Rate	Amount
SUB-ELEMENT 112 - MECHANICAL & ELECTRICAL ON SITE SERVICES			
Electrical Site Services			
Incoming services, conduit and connection	1 l/s	100,000.00	\$100,000
Site Lighting	1 l/s	25,000.00	\$25,000
Mechanical Site Services			
Modifications and upgrades allowance	1 l/s	200,000.00	\$200,000
TOTAL SUB-ELEMENT 112 - MECHANICAL & ELECTRICAL SITE SERVICES			\$325,000
ELEMENT 11 - SITE DEVELOPMENT			
SUB-ELEMENT 113 - ALTERATIONS			
N/A			\$0
TOTAL SUB-ELEMENT 113 - ALTERATIONS			\$0
ELEMENT 11 - SITE DEVELOPMENT			
SUB-ELEMENT 114 - DEMOLITION			
Demolish existing Aquatic Centre; backfill to grade	8,673 m2	85.00	\$737,205
New Greenfield treatment	5,052 m2	25.00	\$126,300
TOTAL SUB-ELEMENT 114 - DEMOLITION			\$863,505
ELEMENT 11 - SITE DEVELOPMENT			
SUB-ELEMENT 115 - GENERAL REQUIREMENTS AND FEE			
General requirements for Element 11	Allow l/s		\$168,851
TOTAL SUB-ELEMENT 115 - GENERAL REQUIREMENTS AND FEE			\$168,851

MAIN SUMMARY OF ANTICIPATED CONSTRUCTION COSTS		
Description	Gross Floor Area (m2)	8,983
	ESTIMATED COST	ESTIMATED COST PER m ²
ESTIMATED CONSTRUCTION HARD COSTS		
Estimated Extension/Addition Building Cost	\$12,986,682	\$1,446
Estimated Renovation Building Cost	\$18,305,627	\$2,038
Hazmat cash allowance	\$1,500,000	\$167
Escalation - to September 2012	\$391,154	\$44
Off Site Services - Excluded	Excluded	Excl
Sub-Total - Estimated Construction Hard Costs	\$33,183,463	\$3,694
ESTIMATED PROJECT SOFT COSTS		
FFE/Client Direct Order items - cash allowance	\$600,000	\$67
Architectural Fees	\$2,479,897	\$276
Structural Engineer	\$821,144	\$91
Mechanical Engineer	\$491,013	\$55
Electrical Engineer	\$451,836	\$50
Civil Engineer	\$75,000	\$8
Building Envelope Consultant	\$100,000	\$11
Geotech	\$35,000	\$4
Acoustic Consultant	\$25,000	\$3
LEED Consultant	\$150,000	\$17
Commissioning Agent/Testing and Inspections	\$100,000	\$11
Building Code Consultant	\$75,000	\$8
Pool Consultant	\$200,000	\$22
Roofing Consultant	\$25,000	\$3
Survey	\$25,000	\$3
Quantity Surveyor	\$120,000	\$13
Equipment Consultant	\$12,000	\$1
Geothermal Investigation	\$15,000	\$2
Landscape Consultant	\$40,000	\$4
Interior Design	\$25,000	\$3
Environmental Consultant	\$40,000	\$4
Consultant Disbursements (5% of Fees)	\$265,294	\$30
Electrical Hook-up	Included	\$0
Gas Connection	Included	\$0
Water and Sewer Connection	Included	\$0
Roads/Lane/Sidewalk	Included	\$0
Legal Fees & Expenses	\$50,000	\$6
Testing and Inspection	\$100,000	\$11
Administration costs	\$400,000	\$45
Permits and DCC's	\$450,000	\$50
Bonding and Insurance	Included	\$0
Soft Costs Contingency	\$75,000	\$8
ESTIMATED TOTAL PROJECT COSTS (Excluding HST)	\$40,429,647	\$4,501
HST	12.00% Excluded	Excl
ESTIMATED TOTAL PROJECT COSTS (Excluding HST) rounded	\$40,430,000	\$4,501

Optional Additional Costs (all-in incl soft costs)

- 1 Movable Floor to 25m pool \$600,000
- 2 Remove Empire Pool; landscape space \$325,000
- 3 Additional Change Room Facility = \$2,875/m2 of additional space
- 4 Heavy Timber construction for all new above grade structure \$375,000
- 5 Myrtha tank system to 50m and diving pools - NFI

Separate Prices (included in estimate)

- 1 Retail Space (all-in incl soft costs) \$967,000

ELEMENTAL SUMMARY SHEET					GFA = 8,983.0 m2		
ELEMENT/SUB-ELEMENT	Quantity	Unit Rate	Sub-Element	Element	\$/m2	\$/m2	%
01 SUBSTRUCTURE				\$890,300		\$99.11	6.9%
011 Normal Foundations	3,680 m2	\$135.00	\$496,800		\$55.30		
012 Basement Excavation	220 m2	\$150.00	\$33,000		\$3.67		
013 Special Conditions	3,900 m2	\$92.44	\$360,500		\$40.13		
02 STRUCTURE				\$1,379,800		\$153.60	10.6%
021 Lowest Floor Construction	3,680 m2	\$60.00	\$220,800		\$24.58		
022 Upper Floor Construction	220 m2	\$250.00	\$55,000		\$6.12		
023 Roof Construction	3,680 m2	\$300.00	\$1,104,000		\$122.90		
03 EXTERIOR CLADDING				\$2,535,152		\$282.22	19.5%
031 Roof Finish	3,680 m2	\$130.00	\$478,400		\$53.26		
032 Walls Below Ground Floor	0 m2	\$0.00	\$0		\$0.00		
033 Walls Above Ground Floor	1,930 m2	\$568.16	\$1,096,552		\$122.07		
034 Windows	1,286 m2	\$700.00	\$900,200		\$100.21		
035 Exterior Doors and Screens	1 l/s	\$10,000.00	\$10,000		\$1.11		
036 Balconies & Projections	1 l/s	\$50,000.00	\$50,000		\$5.57		
04 INTERIOR PARTITIONS				\$362,800		\$40.39	2.8%
041 Permanent Partitions	1 l/s	\$307,600.00	\$307,600		\$34.24		
042 Movable Partitions	0 No	\$0.00	\$0		\$0.00		
043 Doors	1 l/s	\$55,200.00	\$55,200		\$6.14		
05 VERTICAL MOVEMENT				\$13,000		\$1.45	0.1%
051 Stairs	3 Flts	\$4,333.33	\$13,000		\$1.45		
052 Elevators & Escalators	0 l/s	\$0.00	\$0		\$0.00		
06 INTERIOR FINISHES				\$1,094,800		\$121.87	8.4%
061 Floor Finishes	3,900 m2	\$169.79	\$662,200		\$73.72		
062 Ceiling Finishes	3,900 m2	\$25.92	\$101,100		\$11.25		
063 Wall Finishes	3,900 m2	\$85.00	\$331,500		\$36.90		
07 FITTINGS AND EQUIPMENT				\$445,000		\$49.54	3.4%
071 Fittings & Fixtures	3,900 m2	\$50.00	\$195,000		\$21.71		
072 Equipment	3,900 m2	\$64.10	\$250,000		\$27.83		
08 ELECTRICAL				\$901,800		\$100.39	6.9%
081 Service & Distribution	3,900 m2	\$94.23	\$367,500		\$40.91		
082 Lighting & Power	3,900 m2	\$90.00	\$351,000		\$39.07		
083 Systems	3,900 m2	\$47.00	\$183,300		\$20.41		
09 MECHANICAL				\$2,643,500		\$294.28	20.4%
091 Plumbing and Drainage	3,900 m2	\$250.00	\$975,000		\$108.54		
092 Fire Protection	3,900 m2	\$30.00	\$117,000		\$13.02		
093 HVAC	3,900 m2	\$397.82	\$1,551,500		\$172.72		
10 GENERAL OVERHEADS/FEE	10.00%			\$1,026,615		\$114.28	7.9%
Sub-Total				\$11,292,767		\$1,257.13	87.0%
Design Contingency - Building	10.00%			\$1,129,277		\$125.71	8.7%
Escalation Contingency - Building	0.00%			\$0		\$0.00	0.0%
Construction Contingency - Building	5.00%			\$564,638		\$62.86	4.3%
Sub-Total				\$12,986,682		\$1,445.70	100.0%
HST			See Main Summary	\$0		\$0.00	0.0%
ESTIMATED NET BUILDING COST				\$12,986,682		\$1,445.70	100.0%
11 SITE DEVELOPMENT				\$15,136,436		\$1,685.01	
111 General			\$213,500		\$23.77		
112 M & E On Site Services			\$200,000		\$22.26		
113 Alterations			\$10,722,675		\$1,193.66		
114 Demolition			\$2,025,943		\$225.53		
115 Overhead and Profit	15.00%		\$1,974,318				
116 Design Contingency - Site	12.50%		\$1,892,054	\$1,892,054	\$210.63	\$352.80	
117 Escalation Contingency - Site (See Main Summ	0.00%		\$0	\$0	\$0.00		
118 Construction Contingency - Site	7.50%		\$1,277,137	\$1,277,137	\$142.17		
Sub-Total				\$18,305,627		\$2,037.81	
HST on Site Development			See Main Summary	\$0		\$0.00	
ESTIMATED SITE DEVELOPMENT				\$18,305,627		\$2,037.81	
TOTAL ESTIMATED CONSTRUCTION COST				\$31,292,309		\$3,483.50	

Description	Quantity	Rate	Amount
ELEMENT 01 - SUBSTRUCTURE			
SUB-ELEMENT 011 - NORMAL FOUNDATIONS			
Extension and Addition allowance (per m2 composite rate)	3,680 m2	135.00	\$496,800
TOTAL SUB-ELEMENT 011 - NORMAL FOUNDATIONS			\$496,800
ELEMENT 01 - SUBSTRUCTURE			
SUB-ELEMENT 012 - BASEMENT EXCAVATION			
Extension and Addition allowance (per m2 composite rate)	220 m2	150.00	\$33,000
TOTAL SUB-ELEMENT 012 - BASEMENT EXCAVATION			\$33,000
ELEMENT 01 - SUBSTRUCTURE			
SUB-ELEMENT 013 - SPECIAL CONDITIONS			
Underpinning existing footing/fondation - Allowance	103 m	3,500.00	\$360,500
TOTAL SUB-ELEMENT 013 - SPECIAL CONDITIONS			\$360,500
ELEMENT 02 - STRUCTURE			
SUB-ELEMENT 021 - LOWEST FLOOR CONSTRUCTION			
Extension and Addition allowance (per m2 composite rate)	3,680 m2	60.00	\$220,800
TOTAL SUB-ELEMENT 021 - LOWEST FLOOR CONSTRUCTION			\$220,800
ELEMENT 02 - STRUCTURE			
SUB-ELEMENT 022 - UPPER FLOOR CONSTRUCTION			
Extension and Addition allowance (per m2 composite rate)	220 m2	250.00	\$55,000
TOTAL SUB-ELEMENT 022 - UPPER FLOOR CONSTRUCTION			\$55,000

Description	Quantity	Rate	Amount
ELEMENT 02 - STRUCTURE			
SUB-ELEMENT 023 - ROOF CONSTRUCTION			
Extension and Addition allowance (per m2 composite rate)	3,680 m2	300.00	\$1,104,000
TOTAL SUB-ELEMENT 023 - ROOF CONSTRUCTION			\$1,104,000
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 031 - ROOF FINISHES			
Extension and Addition allowance (per m2 composite rate)	3,680 m2	130.00	\$478,400
TOTAL SUB-ELEMENT 031 - ROOF FINISHES			\$478,400
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 032 - WALLS BELOW GROUND FLOOR			
Included			Included
TOTAL SUB-ELEMENT 032 - WALLS BELOW GROUND FLOOR			\$0
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 033 - WALLS ABOVE GROUND FLOOR			
Shear wall (Prov) comprising:			
25Mpa concrete	97 m3	150.00	\$14,550
Formwork	644 m2	80.00	\$51,520
Insulation	644 m2	15.00	\$9,660
Reinforcing	7,760 kg	2.20	\$17,072
Timber cladding to exposed columns - allowance	1 l/s	50,000.00	\$50,000
Alu insulated panel	260 m2	325.00	\$84,500
Unit masonry	965 m2	425.00	\$410,125
Standing seam/Calzip with support/backing system	705 m2	375.00	\$264,375

Description	Quantity	Rate	Amount
Feature timber cladding to 'framed' openings - allowance	1 l/s	50,000.00	\$50,000
Miscellaneous supports, bracketry	1 l/s	144,750.00	\$144,750
TOTAL SUB-ELEMENT 033 - WALLS ABOVE GROUND FLOOR			\$1,096,552
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 034 - WINDOWS			
Aluminum/glazed curtain wall system	1,286 m2	700.00	\$900,200
TOTAL SUB-ELEMENT 034 - WINDOWS			\$900,200
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 035 - EXTERIOR DOORS AND SCREENS			
Allowance	1 l/s	10,000.00	\$10,000
TOTAL SUB-ELEMENT 035 - EXTERIOR DOORS AND SCREENS			\$10,000
ELEMENT 03 - EXTERIOR CLADDING			
SUB-ELEMENT 036 - BALCONIES AND PROJECTIONS			
Allowance	1 l/s	50,000.00	\$50,000
TOTAL SUB-ELEMENT 036 - BALCONIES AND PROJECTIONS			\$50,000
ELEMENT 04 - INTERIOR PARTITIONS			
SUB-ELEMENT 041 - PERMANENT PARTITIONS			
Extension and Addition allowance (per m2 composite rate)	3,680 m2	50.00	\$184,000
Extra; division wall to old/new interface	824 m2	150.00	\$123,600
TOTAL SUB-ELEMENT 041 - PERMANENT PARTITIONS			\$307,600

Description	Quantity	Rate	Amount
ELEMENT 04 - INTERIOR PARTITIONS			
SUB-ELEMENT 042 - MOVABLE PARTITIONS			
N/A			\$0
TOTAL SUB-ELEMENT 042 - MOVABLE PARTITIONS			\$0
ELEMENT 04 - INTERIOR PARTITIONS			
SUB-ELEMENT 043 - DOORS			
Extension and Addition allowance (per m2 composite rate)	3,680 m2	15.00	\$55,200
TOTAL SUB-ELEMENT 043 - DOORS			\$55,200
ELEMENT 05 - VERTICAL MOVEMENT			
SUB-ELEMENT 051 - STAIRS			
Baement access staircases - secondary	2 flts	5,000.00	\$10,000
Roof access hatches/ladders - allowance	1 l/s	3,000.00	\$3,000
TOTAL SUB-ELEMENT 051 - STAIRS			\$13,000
ELEMENT 05 - VERTICAL MOVEMENT			
SUB-ELEMENT 052 - ELEVATORS AND ESCALATORS			
N/A			\$0
TOTAL SUB-ELEMENT 052 - ELEVATORS AND ESCALATORS			\$0
ELEMENT 06 - INTERIOR FINISHES			
SUB-ELEMENT 061 - FLOOR FINISHES			
M&E Rooms	220 m2	10.00	\$2,200
Change Rooms	595 m2	80.00	\$47,600

Description	Quantity		Rate	Amount
Natatorium	2,695	m2	220.00	\$592,900
Other	390	m2	50.00	\$19,500
TOTAL SUB-ELEMENT 061 - FLOOR FINISHES				\$662,200
ELEMENT 06 - INTERIOR FINISHES				
SUB-ELEMENT 062 - CEILING FINISHES				
Painted concrete/steel soffit	2,915	m2	15.00	\$43,725
Suspended T-bar ceilings	390	m2	40.00	\$15,600
Suspended drywall ceilings	595	m2	45.00	\$26,775
Allowance for bulkheads and features	1	l/s	15,000.00	\$15,000
TOTAL SUB-ELEMENT 062 - CEILING FINISHES				\$101,100
ELEMENT 06 - INTERIOR FINISHES				
SUB-ELEMENT 063 - WALL FINISHES				
Extension and Addition allowance (per m2 composite rate)	3,900	m2	85.00	\$331,500
TOTAL SUB-ELEMENT 063 - WALL FINISHES				\$331,500
ELEMENT 07 - FITTINGS AND EQUIPMENT				
SUB-ELEMENT 071 - FITTINGS AND FIXTURES				
Millwork comprising:				
Extension and Addition allowance (per m2 composite rate)	3,900	m2	25.00	\$97,500
Washroom/locker room accessories comprising:				
Extension and Addition allowance (per m2 composite rate)	3,900	m2	20.00	\$78,000
General comprising:				
Extension and Addition allowance (per m2 composite rate)	3,900	m2	5.00	\$19,500

Description	Quantity	Rate	Amount
TOTAL SUB-ELEMENT 071 - FITTINGS AND FIXTURES			\$195,000
ELEMENT 07 - FITTINGS AND EQUIPMENT			
SUB-ELEMENT 072 - EQUIPMENT			
Bleachers	1 l/s	50,000.00	\$50,000
Pool equipment (excl Lazy River, Leisure Pool toys)	1 l/s	200,000.00	\$200,000
TOTAL SUB-ELEMENT 072 - EQUIPMENT			\$250,000
ELEMENT 08 - ELECTRICAL			
SUB-ELEMENT 081 - SERVICE & DISTRIBUTION			
Extension and Addition allowance (per m2 composite rate)	3,900 m2	75.00	\$292,500
Incoming services, conduit and connection	1 l/s	75,000.00	\$75,000
TOTAL SUB-ELEMENT 081 - SERVICE & DISTRIBUTION			\$367,500
ELEMENT 08 - ELECTRICAL			
SUB-ELEMENT 082 - LIGHTING & POWER			
Lighting			
Extension and Addition allowance (per m2 composite rate)	3,900 m2	65.00	\$253,500
Power			
Extension and Addition allowance (per m2 composite rate)	3,900 m2	25.00	\$97,500
TOTAL SUB-ELEMENT 082 - LIGHTING & POWER			\$351,000
ELEMENT 08 - ELECTRICAL			
SUB-ELEMENT 083 - SYSTEMS			
Fire alarm			
Extension and Addition allowance (per m2 composite rate)	3,900 m2	10.00	\$39,000

Description	Quantity	Rate	Amount
Telephone & data Extension and Addition allowance (per m2 composite rate)	3,900 m2	10.00	\$39,000
Security Extension and Addition allowance (per m2 composite rate)	3,900 m2	12.00	\$46,800
Public address Extension and Addition allowance (per m2 composite rate)	3,900 m2	15.00	\$58,500
TOTAL SUB-ELEMENT 083 - SYSTEMS			\$183,300
ELEMENT 09 - MECHANICAL			
SUB-ELEMENT 091 - PLUMBING AND DRAINAGE			
Equipment Extension and Addition allowance (per m2 composite rate)	3,900 m2	135.00	\$526,500
Fixtures Extension and Addition allowance (per m2 composite rate)	3,900 m2	15.00	\$58,500
Piping Extension and Addition allowance (per m2 composite rate)	3,900 m2	100.00	\$390,000
TOTAL SUB-ELEMENT 091 - PLUMBING AND DRAINAGE			\$975,000
ELEMENT 09 - MECHANICAL			
SUB-ELEMENT 092 - FIRE PROTECTION			
Extension and Addition allowance (per m2 composite rate)	3,900 m2	30.00	\$117,000
TOTAL SUB-ELEMENT 092 - FIRE PROTECTION			\$117,000
ELEMENT 09 - MECHANICAL			
SUB-ELEMENT 093 - HVAC			
Air Handling Extension and Addition allowance (per m2 composite rate)	3,900 m2	150.00	\$585,000
Heating Plant			

Description	Quantity	Rate	Amount
Extension and Addition allowance (per m2 composite rate)	3,900 m2	25.00	\$97,500
Piping			
Extension and Addition allowance (per m2 composite rate)	3,900 m2	35.00	\$136,500
Ductwork			
Extension and Addition allowance (per m2 composite rate)	3,900 m2	100.00	\$390,000
Heating			
Extension and Addition allowance (per m2 composite rate)	3,900 m2	30.00	\$117,000
Test & commission/balancing, manuals, etc	1 l/s	50,000.00	\$50,000
Control Systems			
Extension and Addition allowance (per m2 composite rate)	3,900 m2	45.00	\$175,500
TOTAL SUB-ELEMENT 093 - HVAC			\$1,551,500
ELEMENT 10 - GENERAL REQUIREMENTS AND FEE			
General requirements including:	Allow l/s		\$1,026,615
<ul style="list-style-type: none"> site access site accommodation site protection temporary utilities clean up equipment supervision winter conditions insurance's bonds permits head office overhead and fee miscellaneous 			
TOTAL ELEMENT 10 - GENERAL REQUIREMENTS AND FEE			\$1,026,615
ELEMENT 11 - SITE DEVELOPMENT			
SUB-ELEMENT 111 - GENERAL SITE DEVELOPMENT			
Hard and soft landscaping to immediate perimeter; entryways, steps, ramps, reconfigure existing parking etc	1 l/s	213,500.00	\$213,500

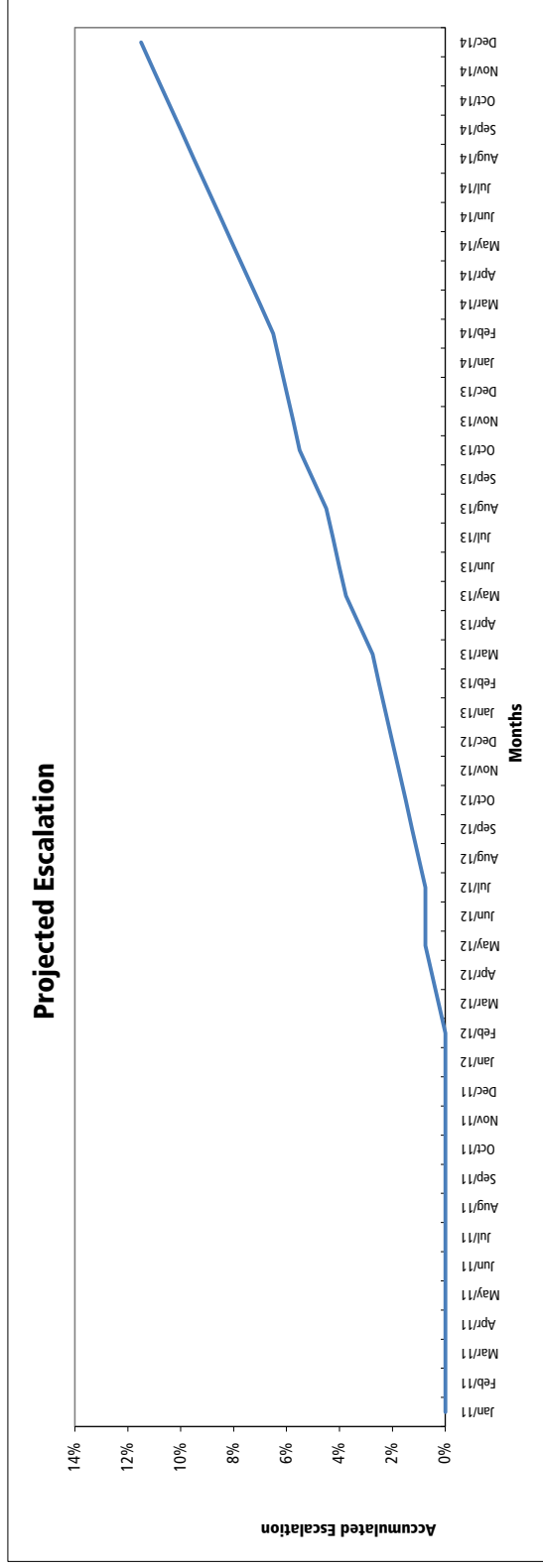
Description	Quantity	Rate	Amount
TOTAL SUB-ELEMENT 111 - GENERAL SITE DEVELOPMENT			\$213,500
ELEMENT 11 - SITE DEVELOPMENT			
SUB-ELEMENT 112 - MECHANICAL & ELECTRICAL ON SITE SERVICES			
Electrical Site Services removals & relocations - allowance	1 l/s	50,000.00	\$50,000
Mechanical Site Services Modifications and upgrades allowance	1 l/s	150,000.00	\$150,000
TOTAL SUB-ELEMENT 112 - MECHANICAL & ELECTRICAL SITE SERVICES			\$200,000
ELEMENT 11 - SITE DEVELOPMENT			
SUB-ELEMENT 113 - ALTERATIONS			
Light renovations allowance to Basement Floor/M&E Room	3,058 ft2	10.00	\$30,580
Major renovations allowance to Basement Floor/M&E Room	7,135 ft2	50.00	\$356,750
Light renovations allowance to side lobby	1,356 ft2	50.00	\$67,800
Medium renovations allowance to proposed Retail space	5,145 ft2	75.00	\$385,875
Major renovations allowance to proposed Entrance/Offices/Staff/Control	7,707 ft2	150.00	\$1,156,050
Light renovations allowance to Mezzanine	9,375 ft2	5.00	\$46,875
Reclad existing building (40% glass)	578 m2	700.00	\$404,600
Reclad existing building (60% solid)	867 m2	400.00	\$346,800
New roof finishes and insulation to existing buildings	4,043 m2	140.00	\$566,020
New entrance doorsets	1 l/s	25,000.00	\$25,000
Envelope finishes integration at interface with new addition/extension	103 m	1,500.00	\$154,500

Description	Quantity		Rate	Amount
Structural loading upgrades to suspended main floor slab	1,818	m2	150.00	\$272,700
New bulkhead wall/causeway construction	27	m	2,500.00	\$67,500
New 25m Pool walls - strip foundations	100	m	250.00	\$25,000
New 25m Pool walls - rc walls	360	m2	300.00	\$108,000
New 25m Pool walls - rc slab	625	m2	120.00	\$75,000
Ceramic tile - floor and immediate surround	725	m2	200.00	\$145,000
Ceramic tile - wall	300	m2	220.00	\$66,000
Pool services; drainage, pipework and adaptations	1	l/s	250,000.00	\$250,000
Allowance for refurbishment of existing pool area surface floor finishes, drainage and falls	21,926	ft	30.00	\$657,780
Allowance for refurbishment of existing pool area soffit finishes	28,653	ft	5.00	\$143,265
Allowance for refurbishment of existing pool wall finishes, incl replacement of glazed sections	1	l/s	214,080.00	\$214,080
Structural integration at interface with new addition/extension	103	m	2,500.00	\$257,500
Seismic upgrades - cash allowance	1	l/s	800,000.00	\$800,000
Other miscellaneous renovations/upgrades to facilitate new works - mechanical, electrical, pool equipment, filtration replacement etc	1	l/s	3,000,000.00	\$3,000,000
Pool equipment (incl Lazy River, Leisure Pool toys)	1	l/s	650,000.00	\$650,000
Forming lazy river construction	1	l/s	250,000.00	\$250,000
Lazy river finishes	1	l/s	200,000.00	\$200,000
TOTAL SUB-ELEMENT 113 - ALTERATIONS				\$10,722,675
ELEMENT 11 - SITE DEVELOPMENT				
SUB-ELEMENT 114 - DEMOLITION				
Site Clearance	4,200	m2	20.00	\$84,000

Description	Quantity		Rate	Amount
Declad existing building	2,303	m2	75.00	\$172,725
Strip roof finishes	4,043	m2	15.00	\$60,645
Demolish and remove exterior ramps, steps and hard standings	550	m2	45.00	\$24,750
Structural Demolition at interface with new structures	736	m2	50.00	\$36,800
Temporary works/supports	1	l/s	150,000.00	\$150,000
Existing basement demolition and removals	7,135	ft2	10.00	\$71,350
Existing basement demolition soft strip out	3,058	ft2	2.00	\$6,116
Existing main floor demolition soft strip for side lobby	1,356	ft2	2.00	\$2,712
Existing main floor demolition and removals for retail	5,145	ft2	10.00	\$51,450
Existing main floor demolition and removals for new entrance/offices/staff/control	7,707	ft2	15.00	\$115,605
Demolish and remove staircase	1	l/s	25,000.00	\$25,000
Removal of existing services installations (phased)	1	l/s	315,450.00	\$315,450
Strip and remove existing pool finishes, glazed partitions etc	28,654	ft2	5.00	\$143,270
Break out and remove part existing leisure pool for 25x25m pool	1	l/s	266,070.00	\$266,070
Break out and remove balance of existing leisure pool; excavate	1	l/s	500,000.00	\$500,000
TOTAL SUB-ELEMENT 114 - DEMOLITION				\$2,025,943
ELEMENT 11 - SITE DEVELOPMENT				
SUB-ELEMENT 115 - GENERAL REQUIREMENTS AND FEE				
General requirements for Element 11 - Phasing	Allow	l/s		\$1,974,318
TOTAL SUB-ELEMENT 115 - GENERAL REQUIREMENTS AND FEE				\$1,974,318

Month	Monthly	Accumulated
Jan-11	0.00%	0.00%
Feb-11	0.00%	0.00%
Mar-11	0.00%	0.00%
Apr-11	0.00%	0.00%
May-11	0.00%	0.00%
Jun-11	0.00%	0.00%
Jul-11	0.00%	0.00%
Aug-11	0.00%	0.00%
Sep-11	0.00%	0.00%
Oct-11	0.00%	0.00%
Nov-11	0.00%	0.00%
Dec-11	0.00%	0.00%
Jan-12	0.00%	0.00%
Feb-12	0.00%	0.00%
Mar-12	0.25%	0.25%
Apr-12	0.25%	0.50%
May-12	0.25%	0.75%
Jun-12	0.00%	0.75%
Jul-12	0.00%	0.75%
Aug-12	0.25%	1.00%
Sep-12	0.25%	1.25%
Oct-12	0.25%	1.50%
Nov-12	0.25%	1.75%
Dec-12	0.25%	2.00%
Jan-13	0.25%	2.25%
Feb-13	0.25%	2.50%
Mar-13	0.25%	2.75%
Apr-13	0.50%	3.25%
May-13	0.50%	3.75%
Jun-13	0.25%	4.00%
Jul-13	0.25%	4.25%
Aug-13	0.25%	4.50%
Sep-13	0.50%	5.00%
Oct-13	0.50%	5.50%
Nov-13	0.25%	5.75%
Dec-13	0.25%	6.00%
Jan-14	0.25%	6.25%
Feb-14	0.25%	6.50%
Mar-14	0.50%	7.00%
Apr-14	0.50%	7.50%
May-14	0.50%	8.00%
Jun-14	0.50%	8.50%
Jul-14	0.50%	9.00%
Aug-14	0.50%	9.50%
Sep-14	0.50%	10.00%
Oct-14	0.50%	10.50%
Nov-14	0.50%	11.00%
Dec-14	0.50%	11.50%

2011 0.00%
2012 2.00%
2013 4.00%
2014 5.00%





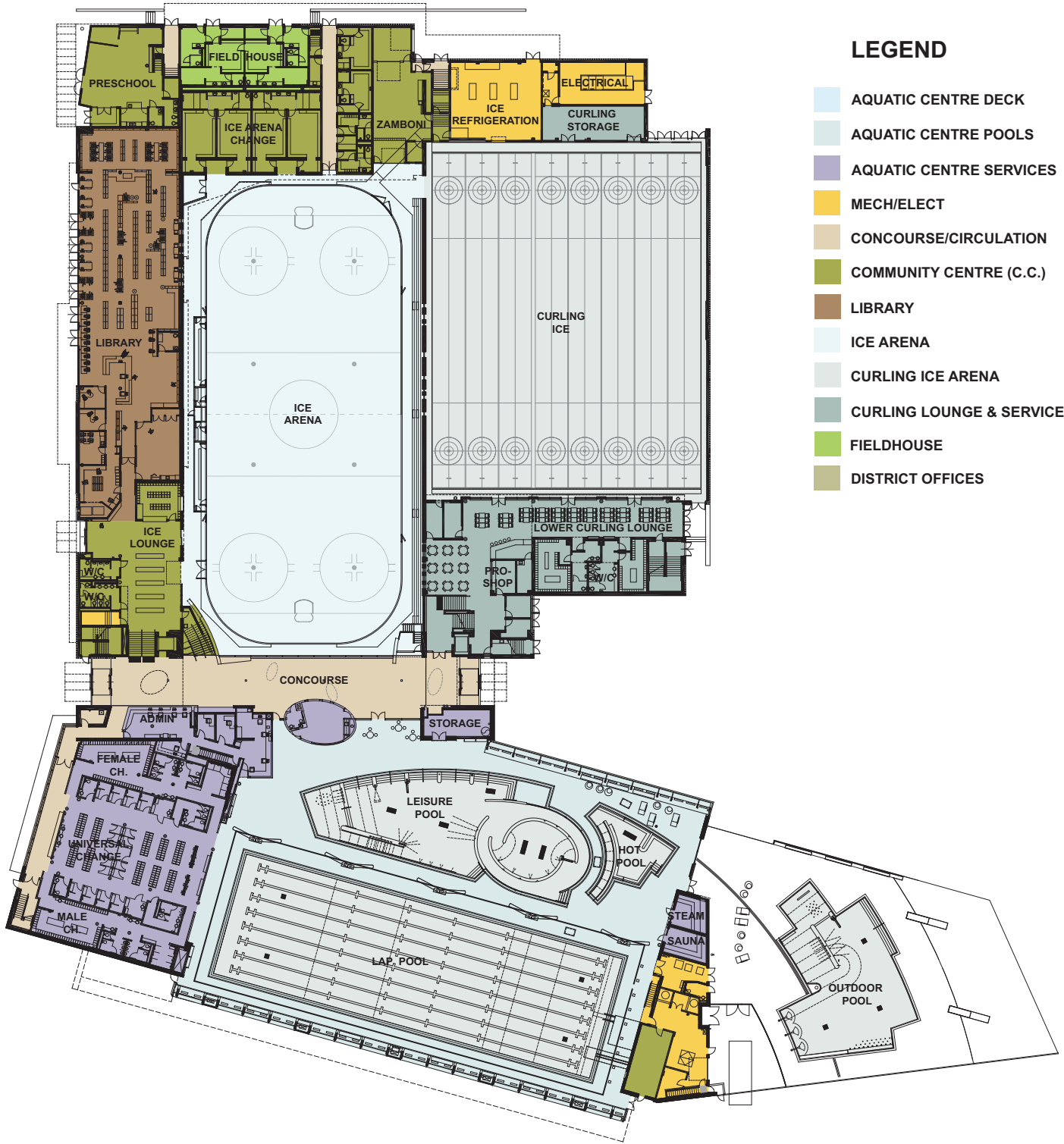
APPENDIX VII.

PRECEDENTS

Hillcrest Pool, Vancouver
Canada Games Pool, Kamloops
Commonwealth Games Pool, Saanich

LEGEND

- AQUATIC CENTRE DECK
- AQUATIC CENTRE POOLS
- AQUATIC CENTRE SERVICES
- MECH/ELECT
- CONCOURSE/CIRCULATION
- COMMUNITY CENTRE (C.C.)
- LIBRARY
- ICE ARENA
- CURLING ICE ARENA
- CURLING LOUNGE & SERVICES
- FIELDHOUSE
- DISTRICT OFFICES

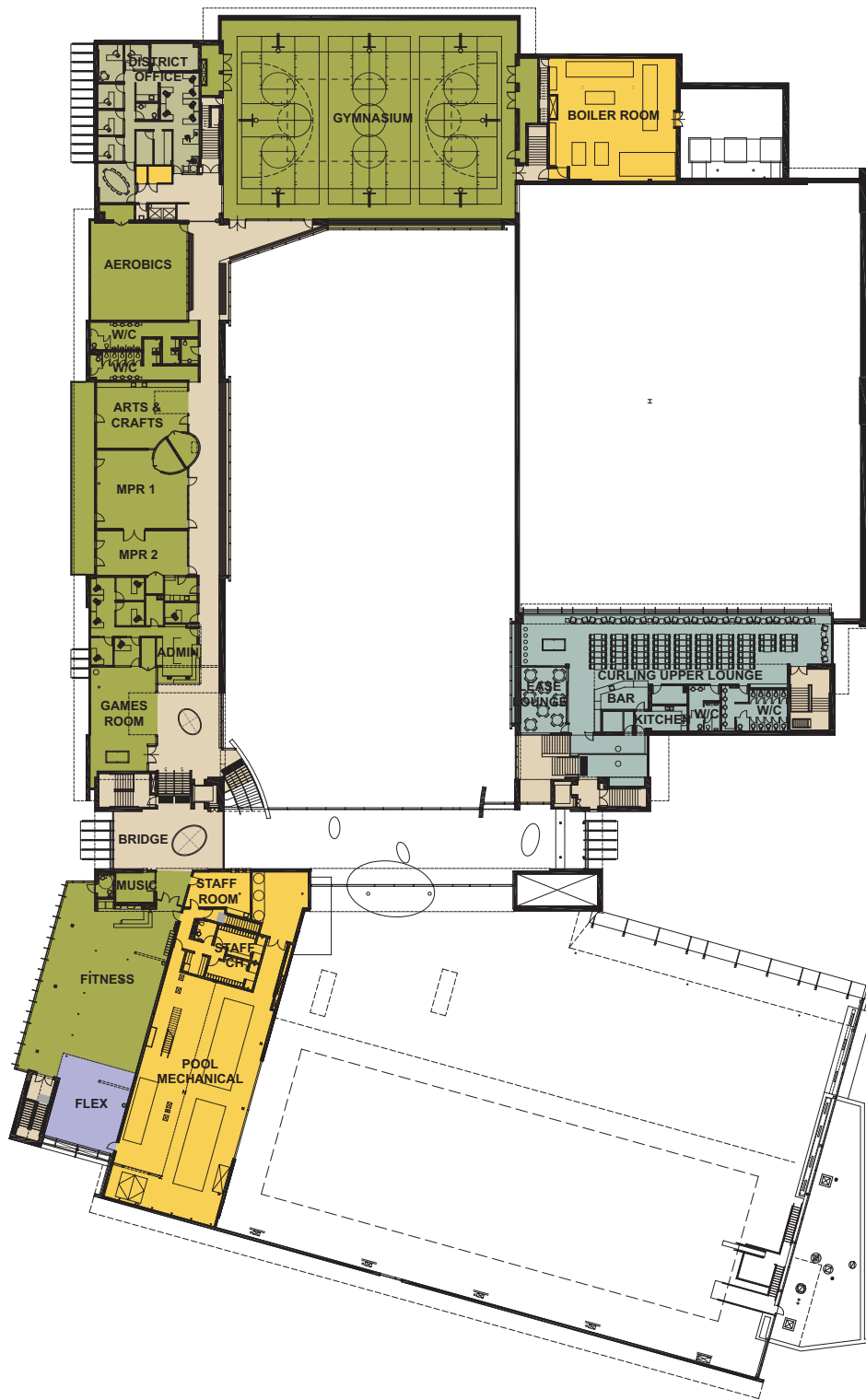


MAIN LEVEL PLAN

VANCOUVER BOARD OF PARKS AND RECREATION UPDATE | FEBRUARY 14, 2008

HILLCREST PARK RECREATION CENTRE
& PERCY NORMAN AQUATIC CENTRE

Hughes Condon Marler : Architects

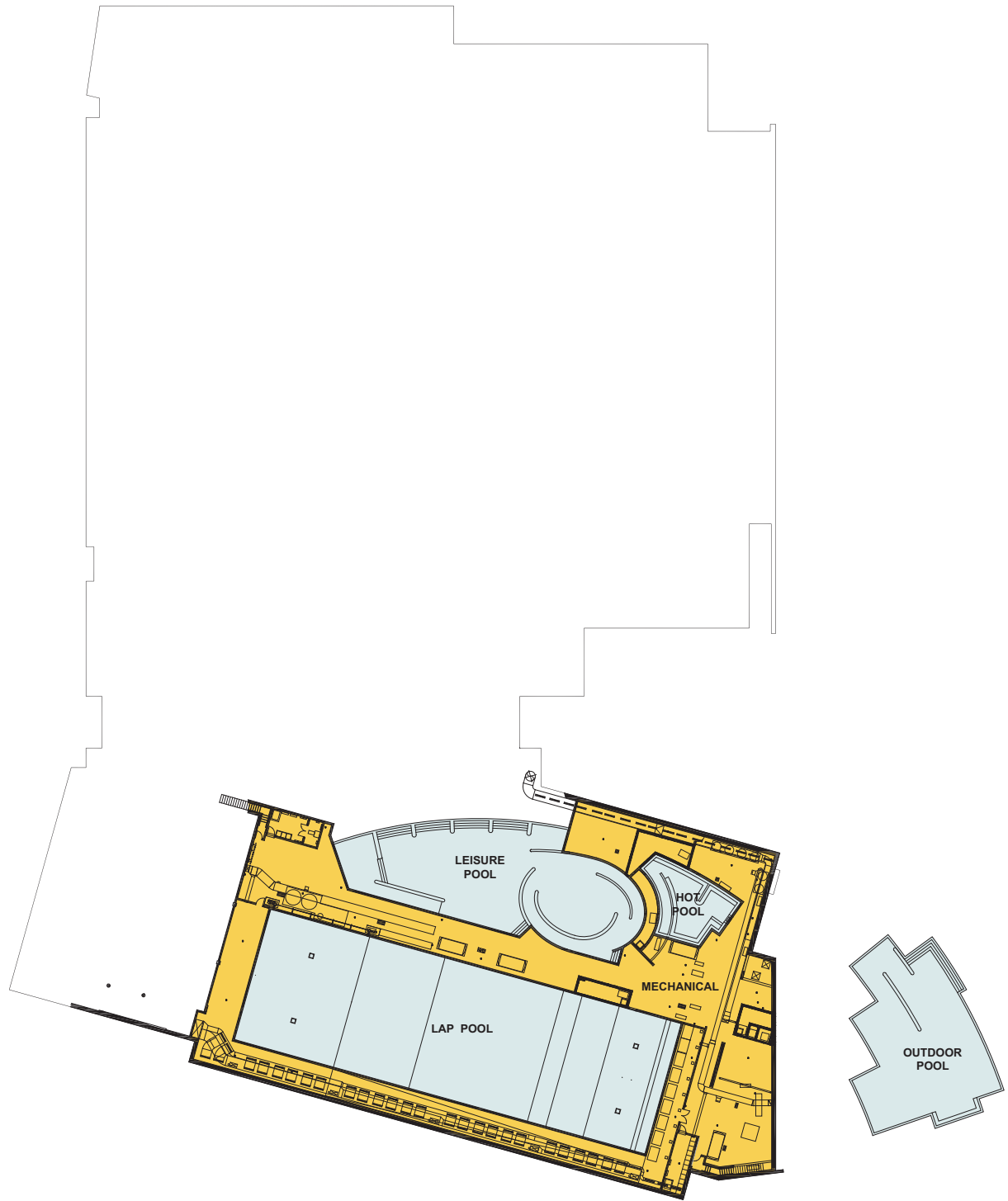


UPPER LEVEL PLAN

VANCOUVER BOARD OF PARKS AND RECREATION UPDATE | FEBRUARY 14, 2008

HILLCREST PARK RECREATION CENTRE
& PERCY NORMAN AQUATIC CENTRE

Hughes Condon Marler : Architects



LOWER LEVEL PLAN

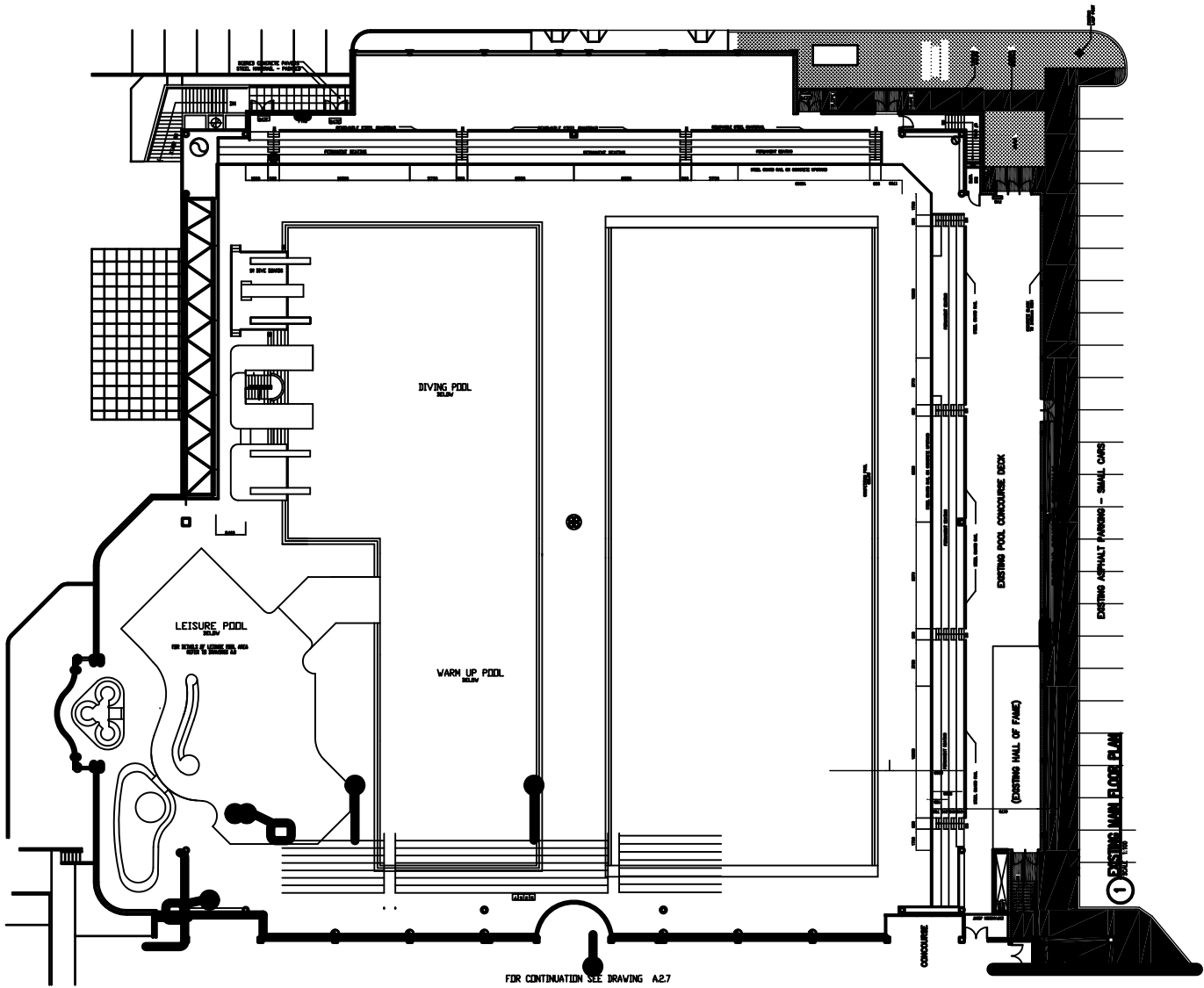
VANCOUVER BOARD OF PARKS AND RECREATION UPDATE | FEBRUARY 14, 2008

HILLCREST PARK RECREATION CENTRE
& PERCY NORMAN AQUATIC CENTRE

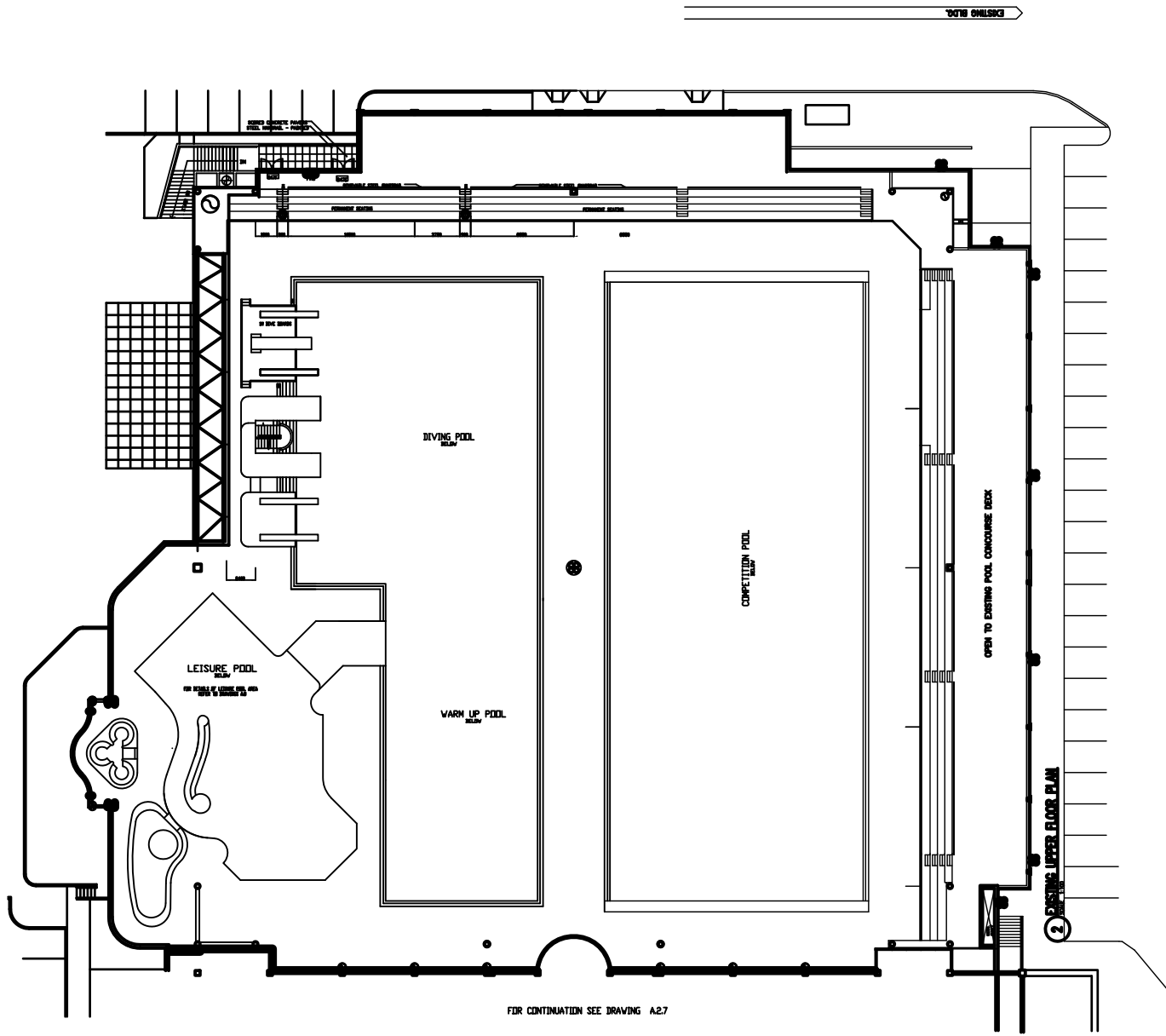
Hughes Condon Marler : Architects



Canada Games Pool, Kamloops



COMMONWEALTH POOL, SAANICH
MAIN LEVEL



FOR CONTINUATION SEE DRAWING A2.7

COMMONWEALTH POOL, SAANICH
UPPER LEVEL

