

# Royal BC Museum Modernization

## Royal British Columbia Museum Modernization - Museum Project

### Appendix T – Quantity Surveyor Report

December 2021

**ROYAL BRITISH COLUMBIA MUSEUM  
REDEVELOPMENT PROJECT**

**MUSEUM PROJECT**

**CLASS C ESTIMATE REPORT (Revision 7)  
(OPINION OF PROBABLE COST)**

**October 21, 2021**



**SSA QUANTITY SURVEYORS LTD**

**COST PLANNING | VALUE MANAGEMENT | PROJECT CONTROLS**

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**1. INTRODUCTION**

The Royal British Columbia Museum (RBCM) together with and the Ministry of Tourism Arts, Culture and Sport (TACS) are preparing a Business Case for the replacement of the RBCM in Victoria.

The RBCM and TACS are being assisted by the Transportation Investment Corporation (TIC) and Infrastructure BC (IBC) in developing the Business Case. SSA Quantity Surveyors Ltd. (SSAQS) has been hired by IBC to provide the Cost Consulting and Quantity Surveying work for the project.

HDR has been hired to develop the Indicative Design for the project with an assembled team of engineers and specialist consultants. This team prepared a Design Brief and Indicative Design dated November 27, 2020 which has been subsequently revised and updated to reflect programmed area adjustments and associated Indicative Design adjustments.

Based upon the adjusted information provided to us during May/June 2021, we prepared an update and revised Class C Estimate (Opinion of Probable Costs) Version 4.1 for the Project Dated July 5, 2021.

In the intervening period from July 5, 2021 to October 21, 2021, further updates have been made requiring an update to the Opinion of Probable Cost based on:

- An adjusted project time frame;
- The inclusion of an Alliance Procurement Model;
- The addition of 81 underground parking stalls bringing the total number of underground parking stalls to 135 from 54;
- The requirement for projected cash flows for both the DB/CM and Alliance procurement models;
- The introduction of an analysis of the Community Benefits Agreement (CBA) which, if implemented, will be administered by BC Infrastructure Benefits (BCIB);
- The addition of a 50,000 Gallon underground water storage tank.

The Indicative Design has not been updated. For the addition of the 81 underground parking stalls, we have used a prorated method based on the originally measured and priced 54 parking stalls in the most recent Indicative Design.

**2. GENERAL DESCRIPTION:**

The project generally consists of the vacating of the existing RBCM buildings, followed by removal of hazardous materials from, and demolition of the existing RBCM buildings as well as the removal of underground services and existing tunnels making the site ready for a new building.

The existing Helmcken House and other historic structures will remain on site, be seismically upgraded and be protected during the demolition of the other existing buildings and construction of the new building and associated site development.

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Subsequent to demolition and site preparation, a new museum building will be constructed including associated site development and fitout of the Museum spaces and Imax Theatre.

Please note the Exclusions in Section 10 below.

This Report includes an estimate that assumes:

- 2.1.** A Design Build (DB) form of construction procurement for the main project, with a Construction Managed (CM) form of construction procurement for the hazardous materials abatement and demolition prior to the main building construction and the DB Contractor managing the museum fitout under a Construction Managed (CM) form of Contract arrangement.
- 2.2.** An Alliance based Design Build (DB) form of construction procurement for the entire project including the museum fitout.

There are no premiums included for the Community Benefits Alliance (CBA) application to the project. We have, however, separately, commenced the analysis for the CBA and will report on this separately.

**General Notes:**

This is a Class C Estimate based upon an Indicative Design and subsequent verbal and written information. The quantities measured have been based upon the adjusted Indicative Design Drawings and where information is not available, we have made what we consider to be reasonable assumptions. This is not a detailed Schedule of Quantities. It is an opinion of probable cost and must be viewed as such.

- We have excluded the cost of land.
- We have included a cost for relocating the St. Ann's Schoolhouse.
- We have included a cost for seismically upgrading the St. Ann's Schoolhouse, and the Mungo Martin and Helmcken House buildings.
- We have been provided with limited information regarding existing underground services and structures that will have to be removed.
- We have been provided with information regarding hazardous materials in the existing buildings based upon visual inspections. Some destructive testing has been carried out and the results have informed the estimate in this report.
- We have used pricing based upon current information and our benchmarked assumptions and allowances for a project of this size and type.
- We have had limited discussions with design consultants regarding the building architecture.
- We have had limited discussions with design consultants regarding building structure, systems, civil and site.
- We have not included any allowances for providing the ability for systems in the facility to expand in the future.
- We have included allowances for Municipal Building Permit Costs, Development Cost Charges and other Municipal costs as published by the City of Victoria.
- We have included an allowance for Legal Fees that may be required by a Contractor associated with the

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project.

- We have included an allowance for loose Furniture, Furnishings and Equipment (FF&E) that we believe is reasonable for the project.
- We have included an allowance for IMIT that we believe is reasonable for the project.
- We have included an allowance for insurance as provided by IBC. This is calculated on the assumption that the building structure will be a hybrid of mass timber and structural steel. It is critical that this insurance value be verified by an expert in the field of construction insurance.
- We have excluded any forward escalation allowances. We have, however, included our opinion of escalation projected forward to 2029.
- We have excluded any allowances for a general project reserve.
- Assumptions and allowances are identified in this report.
- We have been provided with a separate estimate for the fitout of the exhibition spaces by the RBCM. We have used this estimate as the basis for the fitout estimate. The value provided has been used “as is” and to this we have added items that were not included in the fitout estimate including:
  - Construction Management General Expenses and Fee.
  - Construction contingency;
  - Owner’s administrative costs associated with its planning and execution;
  - Insurance (assuming the same rate of insurance as the base build);
  - Building permit;
  - GST.



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**3. EXECUTIVE SUMMARY:**

The following summarises the Estimated Project Budget for a DB Form of Procurement as noted in 2.1 above. Please refer to the exclusions detailed in this report. A Summary for the Alliance procurement model as noted in 2.2 above is provided later in this report.

MUSEUM BUILDING, FITOUT AND SITE	Museum	Fitout including CM GE and Fee	Parkade	Total
PARKING STALLS			135	
GROSS FLOOR AREAS	22,091		9,203	31,294
DEVELOPED UNIT RATE - TOTAL/m <sup>2</sup>				
DEVELOPED UNIT RATE - CONSTRUCTION/m <sup>2</sup>				
Construction				
Construction Contingency				
Fees & Other Soft Costs				
Administrative Costs				
Insurance				
Building Permit				
IMIT.				
Furniture, Furnishings and Equipment.				
Offsite				
GST				
<b>TOTAL ANTICIPATED BUDGET SUBJECT TO EXCLUSIONS &amp; LIMITING CONDITIONS</b>				

Stated separately:

COMPONENT	Excluding GST	GST	TOTAL
Hazmat Abatement - Pre-Construction			
Demolition Subsequent to Hazmat Abatement			
Gallery and Parkade			
Fitout			
<b>TOTAL ANTICIPATED BUDGET SUBJECT TO EXCLUSIONS &amp; LIMITING CONDITIONS</b>			

Note that minor differences are due to rounding.

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**4. NOTES:**

This Class C Estimate (Opinion of Probable Costs) which carries a risk of  $\pm 15\%$ , 18 times out of 20, is based upon the information described above. Our knowledge of the project is limited to the information provided to us.

Pricing is based upon **late 2<sup>nd</sup> Quarter 2021** pricing that we consider reasonable, but competitive, for the size, type and complexity of project, and its location in Victoria.

The estimated construction costs reflect our opinion of the current construction industry market conditions for the size and type of project. It has been assumed that the Work will be tendered on a Design Build (DB) basis for the New Museum Building and on a Construction Managed (CM) basis for the hazardous materials abatement and demolition prior to the main building construction, competitively tendered to a minimum of 3 contractors, where each trade contract is bid on a competitive stipulated price basis. The pricing in this estimate is predicated upon a minimum of three qualified trade contractors for each significant trade, bidding for the work on a competitive basis and there will be no sole source non-competitive trade contracts.

Alternatively, an Alliance based Design Build (DB) form of construction procurement for the entire project including the museum fitout may be used.

It is also predicated upon the assumption that the project will be bid with normal and reasonable market conditions and that any unforeseen, aberrant or abnormal market conditions are not contemplated in the estimate.

Pricing also reflects our opinion of the current labour market situation in BC and does not take into account any form of restriction(s) that may be imposed through government mandated labour agreements or requirements that may be imposed that have the potential to curtail labour competitiveness, labour availability and the potential for these imposed agreements to add cost and/or extend the project construction time schedule.

Provincial Sales Tax is included.

The Goods and Services Tax (GST) has been included at the full value of 5%.

The estimate is our opinion of fair market value for the construction of the project, and is not an attempt to predict a low bid value.

**Design-Build Efficiency Factor:** It is our opinion that for a project of this size and type, a ■ DB Efficiency Factor is appropriate in the current market. This factor is included in this estimate.

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**5. SCHEDULE AND PROJECTED CASH FLOW**

We have been advised by IBC that the following projected master schedule is currently being applied.

	DB-CM		Alliance	
	Start	Duration (months)	Start	Duration (months)
<b>Business Case approval</b>	Feb 2022	1	Feb 2022	1
<b>Exhibition Hall Abatement &amp; Deconstruction</b>	Nov 2023	18	Mar 2024	18
<b>Archives Abatement &amp; Deconstruction</b>	Apr 2025	6	Apr 2025	6
<b>Fannin Building Abatement &amp; Deconstruction</b>	Jul 2025	12	Jul 2025	12
<b>Procurement</b>	Mar 2022	20	Mar 2022	24
<b>Design</b>	Nov 2023	18	Mar 2024	18
<b>Construction</b>	Mar 2025	48	Jul 2025	48
<b>Exhibition Fit Out</b>				
<b>Design Integration</b>	Nov 2023	34	Mar 2024	34
<b>Fit Out Design &amp; Off Site Work</b>	Sept 2026	18	Jan 2027	18
<b>Fit Out Construction</b>	Mar 2028	18	Jul 2028	18

We have prepared projected cash flows based upon this master schedule assumption.

**6. GROSS FLOOR AREA**

The Gross Floor Area of the project is indicated in 3 above.

**7. LEVEL OF RISK**

It is our opinion that the risk associated with this Opinion of Probable Costs is  $\pm 15\%$ , 18 times out of 20.

**8. ESCALATION**

Escalation has been excluded. We have, however, included our opinion of forward escalation in this report.

Please refer to Section 18 in this report.

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**Escalation:** Based upon the current market, it is our opinion that escalation for a project of this size and type and its location should likely be at least 7% to 8% for the remainder of 2021, followed by about 10% for 2022, and then reducing after that. Please refer to the escalation projection included in this report. Our opinion is based on the current information at our disposal that includes the new projects that are currently planned for Vancouver Island including the Royal BC Museum’s Collections and Research Building, the new Cowichan District Hospital, the new Cowichan Secondary School Replacement project, the Nanaimo Correctional Centre and work at the Nanaimo General Hospital. Furthermore, there are substantial large projects in the Lower Mainland including the new St. Paul’s Hospital Replacement Project, the Royal Columbian Hospital New Acute Care Tower, Burnaby Hospital Phases 1 and 2 with a Cancer Centre and the proposed new Surrey Hospital and Cancer Centre. In addition, there are large projects in the Northern areas of BC including the LNG project in Kitimat, the new Mills Memorial Hospital in Terrace, Stuart Lake Hospital Replacement project in Fort St. James, The Cariboo Hospital Replacement Project in Williams Lake, and the Dawson Creek Hospital Replacement Project. These projects together with new school construction and a continuing robust private sector will, we believe continue to drive prices upwards over the next few years.

**Mass Timber:** With the strong emphasis on mass timber construction in BC, the local manufacturers have been stretched to their maximum capacity and this is driving prices up. Additionally, the cost of raw lumber has increased significantly in the recent past and is expected to stay above previous levels for some time due to the high local and US demand for BC lumber. There is a possibility for mass timber to be sourced from other countries, and specifically from Europe. There is also the possibility that local contractors have existing relationships with the European mass timber manufacturers which they may leverage for this project. However, importation from Europe poses the additional problem of transportation and the associated carbon emissions related to that transportation.

In addition, the current US Federal Government has approved a massive infrastructure program which will require large material and labour resources that we believe will have a ripple effect in Canada as a whole, including BC. The Canadian Federal Government is also planning large infrastructure spending which will, we believe, exacerbate escalation.

With the reduction in immigration into Canada due to the Covid pandemic, skilled labour resources which were already stretched thin have been reduced and there will be a lag before the immigrant skilled labour force returns to pre Covid levels.

## **9. BASIS OF THE ESTIMATE**

### **9.1. Cost Base**

Pricing shown reflects our opinion of probable construction costs obtainable in the late **2<sup>nd</sup> Quarter of 2021** on the effective date of this report.

### **9.2. Contingencies**

**9.2.1. Design Contingency** – An allowance of 15% has been included. This allowance, when included, is a

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reserve of funds included in the estimate and which is allocated to cover pricing adjustments resulting from incomplete design information and design detailing that is not currently available.

**9.2.2. Escalation Contingency** – No allowances have been included. This allowance, when included, is a reserve of funds to cover possible price increases from the time that the estimate is prepared to the time that the project is tendered.

**9.2.3. Phasing Allowance** – No allowances have been included. This allowance, when included, is for any work required to maintain the operation of the facility while construction proceeds.

**9.2.4. Construction Contingency** – An Allowance of 5% has been included. The construction contingency is a reserve of funds which is allocated to cover change orders that are required during the course of construction, and is not intended to be a scope change contingency.

**9.2.5. General Project Contingency** – No allowances have been included. This is a general project reserve.

## **10. EXCLUSIONS**

The following items are specifically excluded from this estimate:

- 10.1.** Forward Escalation.
- 10.2.** General Project Contingency.
- 10.3.** Design Competition Costs.
- 10.4.** Removal and decanting of exhibits and other archival material, transport to a storage facility, rental of storage facility for the duration of the construction period, and transport back to the new facility. Removal of hazardous materials is, however, included in the Hazmat and Demolition budget.
- 10.5.** Unknown adverse environmental conditions.
- 10.6.** Unknown adverse archaeological conditions.
- 10.7.** Adverse soil and/or subsoil conditions.
- 10.8.** Project Procurement Costs and Compliance Team Costs.
- 10.9.** Land Acquisition Costs.
- 10.10.** Project Financing Costs.
- 10.11.** Major Utility Upgrades.

## **11. EXPLANATION OF TERMS**

- **Hard Costs:** Construction Costs including all construction costs for the building, site, demolition, Design Contingency, General Contractor's or Construction Manager's Overhead and Profit.
- **Construction Contingency:** A reserve of funds which is allocated to cover change orders that are required during the course of construction, and is not intended to be a scope change contingency.

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- **Design Fees:** Fees for Design Consultants based upon fee guidelines published by the various governing bodies or calculated based upon prevailing market knowledge.
- **Commissioning:** Funds allocated to cover the cost of ensuring that the facility is fully commissioned as a working facility and that all systems are working as specified both on an individual basis and on a whole facility basis.
- **Testing and Inspections:** Funds allocated to cover testing of items such as soils, materials etc. during design and construction.
- **Administrative Costs:** Funds to cover the management of the overall project from the Client’s perspective. These funds can be allocated for in-house or contracted resources.
- **Off-Site Services:** Funds allocated to cover possible charges by the local authority and other service providers for items such as road and sidewalk upgrades, underground service upgrades etc.

**12. 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.

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**13. MAIN SUMMARY DESIGN-BUILD/CM.**

PROJECT BUDGET SHEET - DESIGN BUILD - CM					
		ESTIMATED VALUE (Values rounded to closest thousand \$)	REIMBURSABLE EXPENSES	GST	TOTALS
1	Land				
2	Construction - Demolition, Building and Site Development excluding Gallery Fitout				
3	Design Contingency				
4	Construction - Added 81 Underground Parking Stalls				
5	Construction - Gallery Fitout including Design Fees and Design Contingency (separately estimated by others)				
6	Construction Contingency (5% of Lines 2, 3, 4, 5)				
7	Architect (excludes Gallery Fitout)				
8	Structural Engineer (excludes Gallery Fitout)				
9	Mechanical Engineer (excludes Gallery Fitout)				
10	Electrical Engineer (excludes Gallery Fitout)				
11	Quantity Surveyor (excludes Gallery Fitout)				
12	Facility Programmer				
13	IMIT Consultant				
14	Gallery Fitout Consultant (included in Line 4)				
15	Landscape Consultant				
16	Security Consultant				
17	Environmental Consultant				
18	Other Consultants				
19	Surveys				
20	Civil Engineer				
21	Commissioning				
22	Testing & Inspections				
23	Legal (Contractor)				
24	Fire Safety Plan				
25	Owner's Administrative Costs (5% of Lines 2, 3, 4, 5)				
26	Insurance (Assumed \$22.00 per thousand \$)				
27	Development Cost Charges (Victoria By-Law 20-013)				
28	Building Permit (Victoria By-Law 17-113)				
29	Off-Site Services - Allowance only				
30	IMIT.				
31	Furniture, Furnishings and Equipment.				
32	Escalation Contingency				
33	General Project Contingency				
34	<b>SUB-TOTAL</b>				
35	<b>GST Rebate</b>				
36	<b>TOTAL ANTICIPATED BUDGET SUBJECT TO EXCLUSIONS &amp; LIMITING CONDITIONS</b>				

Value included for Hazmat Removal (Construction, Soft Costs, GST)	
Value included for Demolition (Construction, Soft Costs, GST)	

**Note:**  
This sheet is subject to limiting conditions contained in the accompanying report.



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**14. MAIN SUMMARY ALLIANCE PROCUREMENT MODEL**

PROJECT BUDGET SHEET - ALLIANCE					
		ESTIMATED VALUE (Values rounded to closest thousand \$)	REIMBURSABLE EXPENSES	GST	TOTALS
1	Land				
2	Construction - Demolition, Building and Site Development excluding Gallery Fitout				
3	Design Contingency				
4	Construction - Added 81 Underground Parking Stalls				
5	Construction - Gallery Fitout including Design Fees and Design Contingency (separately estimated by others)				
6	Construction Contingency (5% of Lines 2, 3, 4, 5)				
7	Architect (excludes Gallery Fitout)				
8	Structural Engineer (excludes Gallery Fitout)				
9	Mechanical Engineer (excludes Gallery Fitout)				
10	Electrical Engineer (excludes Gallery Fitout)				
11	Quantity Surveyor (excludes Gallery Fitout)				
12	Facility Programmer				
13	IMIT Consultant				
14	Gallery Fitout Consultant (included in Line 4)				
15	Landscape Consultant				
16	Security Consultant				
17	Environmental Consultant				
18	Other Consultants				
19	Surveys				
20	Civil Engineer				
21	Commissioning				
22	Testing & Inspections				
23	Legal (Contractor)				
24	Fire Safety Plan				
25	Owner's Administrative Costs (5% of Lines 2, 3, 4, 5)				
26	Insurance (Assumed \$22.00 per thousand \$)				
27	Development Cost Charges (Victoria By-Law 20-013)				
28	Building Permit (Victoria By-Law 17-113)				
29	Off-Site Services - Allowance only				
30	IMIT.				
31	Furniture, Furnishings and Equipment.				
32	Escalation Contingency				
33	General Project Contingency				
34	<b>SUB-TOTAL</b>				
35	<b>GST Rebate</b>				
36	<b>TOTAL ANTICIPATED BUDGET SUBJECT TO EXCLUSIONS &amp; LIMITING CONDITIONS</b>				

Value included for Hazmat Removal (Construction, Soft Costs, GST)

Value included for Demolition (Construction, Soft Costs, GST)

**Note:**

This sheet is subject to limiting conditions contained in the accompanying report.

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**15. CONSTRUCTION COST ESTIMATE.**

ELEMENTAL SUMMARY SHEET - CONSTRUCTION COSTS						GFA = 25,772.0 m2	
ELEMENT/SUB-ELEMENT	Quantity	Unit Rate	Sub-Element	Element	\$/m2	\$/m2	%
<b>01 SUBSTRUCTURE</b>							
011 Normal Foundations							
012 Site Clearance							
013 Special Conditions							
<b>02 STRUCTURE</b>							
021 Lowest Floor Construction							
022 Upper Floor Construction							
023 Roof Construction							
<b>03 EXTERIOR CLADDING</b>							
031 Roof Finish							
032 Walls Below Ground Floor							
033 Walls Above Ground Floor							
034 Windows							
035 Exterior Doors and Screens							
036 Balconies & Projections							
<b>04 INTERIOR PARTITIONS</b>							
041 Permanent Partitions							
042 Movable Partitions							
043 Doors							
<b>05 VERTICAL MOVEMENT</b>							
051 Stairs							
052 Elevators & Escalators							
<b>06 INTERIOR FINISHES</b>							
061 Floor Finishes							
062 Ceiling Finishes							
063 Wall Finishes							
<b>07 FITTINGS AND EQUIPMENT</b>							
071 Fittings & Fixtures							
072 Equipment							
<b>08 ELECTRICAL</b>							
081 Service & Distribution							
082 Lighting & Power							
083 Systems							
<b>09 MECHANICAL</b>							
091 Plumbing and Drainage							
092 Fire Protection							
093 HVAC							
<b>10 OVERHEAD AND PROFIT</b>							
<b>Sub-Total</b>							
Design Contingency - Building							
Escalation Contingency - Building							
Construction Contingency - Building							
<b>Sub-Total</b>							
GST on Building							
<b>ESTIMATED NET BUILDING COST</b>							
<b>11 SITE DEVELOPMENT</b>							
111 General							
112 M & E Site Services							
113 Alterations							
114 Demolition							
115 Overhead and Profit							
116 Design Contingency - Site							
117 Escalation Contingency - Site							
118 Construction Contingency - Site							
<b>Sub-Total</b>							
GST on Site Development							
<b>ESTIMATED SITE DEVELOPMENT</b>							
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>							

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 01 - SUBSTRUCTURE</u></b></p> <p><b><u>SUB-ELEMENT 011 - NORMAL FOUNDATIONS</u></b></p> <p><b>Strip foundation size 460mm wide x 305mm deep comprising:</b>                      Excavation                      Concrete - supply and place                      Formwork to sides                      Reinforcement                      Backfill with imported material                      Disposal</p> <p><b>Pad foundation size 2,130mm x 2,130mm x 1,220mm deep comprising:</b>                      Excavation                      Concrete - supply and place                      Formwork to sides                      Reinforcement                      Backfill with imported material                      Disposal</p> <p><b>Foundation walls comprising:</b>                      Concrete - supply and place                      Formwork                      Reinforcement                      Insulation                      Waterproofing</p> <p><b>Foundation columns size 760mm x 760mm comprising:</b>                      Concrete - supply and place                      Formwork                      Reinforcement</p> <p><b>Foundation sundries comprising:</b>                      Elevator pads and pits                      Perimeter footing drainage</p>			
<p><b><u>TOTAL SUB-ELEMENT 011 - NORMAL FOUNDATIONS</u></b></p>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 01 - SUBSTRUCTURE</u></b>			
<b><u>SUB-ELEMENT 012 - SITE CLEARANCE</u></b>			
Allowance for general site clearance (Footprint Area plus 10%)			
<b><u>TOTAL SUB-ELEMENT 012 - SITE CLEARANCE</u></b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 01 - SUBSTRUCTURE</u></b>			
<b><u>SUB-ELEMENT 013 - SPECIAL CONDITIONS</u></b>			
Bulk Excavation, Allowance only			
Cart excavated soils off site within 15km			
Bulk Backfill with site excavated soil, Allowance only			
Bulk Backfill with imported material, Allowance only			
Shoring / Shotcrete against open excavation			
Allowance for piling			
Allowance for dewatering			
<b><u>TOTAL SUB-ELEMENT 013 - SPECIAL CONDITIONS</u></b>			



Description	Quantity	Rate	Amount
<b><u>ELEMENT 02 - STRUCTURE</u></b>			
<b><u>SUB-ELEMENT 021 - LOWEST FLOOR CONSTRUCTION</u></b>			
<b>150mm Thick slab on grade comprising:</b> Concrete - supply and place Formwork to edges Reinforcement Granular fill layer, compacted Vapour barrier Insulation  Allowance for miscellaneous in-slab items			
<b><u>TOTAL SUB-ELEMENT 021 - LOWEST FLOOR CONSTRUCTION</u></b>			





Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 02 - STRUCTURE</u></b></p> <p><b><u>SUB-ELEMENT 022 - UPPER FLOOR CONSTRUCTION</u></b></p> <p><b>Level 1 Structure Comprising:</b>  <b>Concrete columns size 760mm x 760mm comprising:</b>                      Concrete - supply and place                      Formwork to sides                      Reinforcement</p> <p><b>Concrete walls comprising:</b>                      Concrete - supply and place                      Formwork to sides                      Reinforcement</p> <p><b>Concrete upper floor slab comprising:</b>                      Concrete - supply and place                      Formwork to sides and soffit                      Reinforcement</p> <p><b>Level 2 Structure Comprising:</b>  <b>Concrete columns size 760mm x 760mm comprising:</b>                      Concrete - supply and place                      Formwork to sides                      Reinforcement</p> <p><b>Steel columns, beams &amp; bracing comprising:</b>                      W360x509                      W310x179                      HSS 305x305x13mm                      HSS 102x102x6.4mm</p> <p><b>Wood columns and beams comprising:</b>                      Glulam column 457x489mm                      Glulam girder beams 365x1254mm                      Glulam beams 265x874mm</p> <p><b>Concrete walls comprising:</b>                      Concrete - supply and place                      Formwork to sides                      Reinforcement</p> <p><b>Concrete upper floor slab comprising:</b>                      Concrete - supply and place                      Formwork to sides and soffit                      Reinforcement</p>			

Description	Quantity	Rate	Amount
<p><b>CLT upper floor slab comprising:</b>                      CLT panel 175 floors (5-ply - engineer, supply, transport, crane, install and connections)                      Concrete topping, 50mm</p> <p><b>Level 3 Structure Comprising:</b>  <b>Wood columns and beams comprising:</b>                      Glulam column 457x489mm                      Glulam girder beams 365x1254mm                      Glulam beams 265x874mm</p> <p><b>CLT Shear walls comprising:</b>                      CLT panel 191 walls (5-ply - engineer, supply, transport, crane, install and connections)</p> <p><b>CLT upper floor slab comprising:</b>                      CLT panel 175 floors (5-ply - engineer, supply, transport, crane, install and connections)                      Concrete topping, 50mm</p> <p><b>Level 4 Structure Comprising:</b>  <b>Steel columns, beams &amp; bracing comprising:</b>                      W360x509                      W310x179                      HSS 305x305x13mm</p> <p><b>Wood columns and beams comprising:</b>                      Glulam column 457x489mm                      Glulam girder beams 365x1254mm                      Glulam beams 265x874mm</p> <p><b>CLT Shear walls comprising:</b>                      CLT panel 191 walls (5-ply - engineer, supply, transport, crane, install and connections)</p> <p>CLT upper floor slab comprising:                      CLT panel 175 floors (5-ply - engineer, supply, transport, crane, install and connections)                      Concrete topping, 50mm</p> <p><b>Mechanical Penthouse Structure Comprising:</b>  <b>Wood columns and beams comprising:</b>                      Glulam column 457x489mm                      Glulam girder beams 365x1254mm                      Glulam beams 265x874mm</p> <p><b>CLT Shear walls comprising:</b>                      CLT panel 191 walls (5-ply - engineer, supply, transport, crane, install and connections)</p> <p><b>CLT upper floor slab comprising:</b></p>			

Description	Quantity	Rate	Amount
<p>CLT panel 175 floors (5-ply - engineer, supply, transport, crane, install and connections) Concrete topping, 50mm</p> <p><b>Level 5 Structure Comprising:</b> <b>Steel columns, beams &amp; bracing comprising:</b> W360x509 W310x179 HSS 305x305x13mm</p> <p><b>Wood columns and beams comprising:</b> Glulam column 457x489mm Glulam girder beams 365x1254mm Glulam beams 265x874mm</p> <p><b>CLT Shear walls comprising:</b> CLT panel 191 walls (5-ply - engineer, supply, transport, crane, install and connections)</p> <p><b>CLT upper floor slab comprising:</b> CLT panel 175 floors (5-ply - engineer, supply, transport, crane, install and connections) Concrete topping, 50mm</p> <p>Allowance for unanticipated load transfer requirements</p> <p>Allowance for miscellaneous items</p>			
<p><b>TOTAL SUB-ELEMENT 022 - UPPER FLOOR CONSTRUCTION</b></p>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 02 - STRUCTURE</u></b></p> <p><b><u>SUB-ELEMENT 023 - ROOF CONSTRUCTION</u></b></p> <p><b>Level 2 Roof Structure Comprising:</b>  <b>Wood columns and beams comprising:</b>                      Glulam column 457x489mm                      Glulam girder beams 365x1254mm</p> <p><b>Concrete columns size 760mm x 760mm comprising:</b>                      Concrete - supply and place                      Formwork to sides                      Reinforcement</p> <p><b>Concrete walls comprising:</b>                      Concrete - supply and place                      Formwork to sides                      Reinforcement</p> <p><b>CLT roof slab comprising:</b>                      CLT panel 87 roof (3-ply - engineer, supply, transport, crane, install and connections)</p> <p><b>Concrete roof slab comprising:</b>                      Concrete - supply and place                      Formwork to sides and soffit                      Reinforcement</p> <p><b>Level 3 Pavilion &amp; Link Roof Structure Comprising:</b>  <b>Wood columns and beams comprising:</b>                      Glulam column 365x456mm                      Glulam column 457x489mm                      Glulam column 365x456mm                      Glulam girder beams 365x1520mm                      Glulam beams 265x1520mm                      Glulam beams 365x1634mm</p> <p><b>Steel Beams comprising:</b>                      W310x158                      W310x86</p> <p><b>Concrete walls comprising:</b>                      Concrete - supply and place                      Formwork to sides                      Reinforcement</p> <p><b>CLT roof slab comprising:</b>                      CLT panel 87 roof (3-ply - engineer, supply, transport, crane, install and connections)</p>			

Description	Quantity	Rate	Amount
<p><b>Lower Roof Structure Comprising:</b>  <b>Wood columns and beams comprising:</b>                      Glulam column 457x489mm                      Glulam girder beams 365x1254mm                      Glulam beams 265x874mm</p> <p><b>CLT Shear walls comprising:</b>                      CLT panel 191 walls (5-ply - engineer, supply, transport, crane, install and connections)</p> <p><b>CLT roof slab comprising:</b>                      CLT panel 87 roof (3-ply - engineer, supply, transport, crane, install and connections)</p> <p><b>IMAX Roof Structure Comprising:</b>                      Wood open-web trusses, 1,52m DP                      38mm Steel roof deck</p> <p><b>Mechanical Penthouse Roof Structure Comprising:</b>  <b>Wood columns and beams comprising:</b>                      Glulam column 457x489mm                      Glulam girder beams 365x1254mm                      Glulam beams 265x874mm</p> <p><b>CLT Shear walls comprising:</b>                      CLT panel 191 walls (5-ply - engineer, supply, transport, crane, install and connections)</p> <p><b>CLT roof slab comprising:</b>                      CLT panel 87 roof (3-ply - engineer, supply, transport, crane, install and connections)</p> <p><b>Upper Roof Structure Comprising:</b>  <b>Wood columns and beams comprising:</b>                      Glulam column 457x489mm                      Glulam girder beams 365x1254mm                      Glulam beams 265x874mm</p> <p><b>CLT Shear walls comprising:</b>                      CLT panel 191 walls (5-ply - engineer, supply, transport, crane, install and connections)</p> <p><b>CLT upper floor slab comprising:</b>                      CLT panel 87 roof (3-ply - engineer, supply, transport, crane, install and connections)</p> <p>Allowance for miscellaneous items</p>			
<p><b>TOTAL SUB-ELEMENT 023 - ROOF CONSTRUCTION</b></p>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 03 - EXTERIOR CLADDING</u></b>			
<b><u>SUB-ELEMENT 031 - ROOF FINISHES</u></b>			
<p><b>Roof - Adhered system comprising:</b>                      2-Ply SBS roofing membrane                      12mm Overlay protection                      152mm Fully adhered insulation                      Sloped insulation                      Self-adhered air/vapour barrier</p> <p><b>Roof - Plaza area comprising:</b>                      Drainage mat with filter fabric                      Root barrier                      Expanded polystyrene void form                      2-layer high load bearing drawing mat                      Root barrier                      2-Ply SBS roofing membrane</p> <p><b>Roof sundries comprising:</b>                      Skylight</p> <p>Allowance for miscellaneous roofing items</p>			
<b><u>TOTAL SUB-ELEMENT 031 - ROOF FINISHES</u></b>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 03 - EXTERIOR CLADDING</u></b></p>			
<p><b><u>SUB-ELEMENT 032 - WALLS BELOW GROUND FLOOR</u></b></p>			
<p><b>Basement concrete retaining walls comprising:</b>                      Concrete - supply and place                      Formwork to sides                      Reinforcement                      Insulation                      Waterproofing</p>			
<p><b><u>TOTAL SUB-ELEMENT 032 - WALLS BELOW GROUND FLOOR</u></b></p>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 03 - EXTERIOR CLADDING</u></b></p>			
<p><b><u>SUB-ELEMENT 033 - WALLS ABOVE GROUND FLOOR</u></b></p>			
<p><b>Exterior wall with metal studs comprising:</b>                      16mm Gypsum board                      152mm Metal studs @ 400 O.C.                      16mm Exterior sheathing                      Self-adhered air/vapour barrier                      102mm Rigid mineral fiber insulation board                      Phenolic Cladding Panels</p> <p><b>Exterior wall with concrete structure comprising:</b>                      16mm Gypsum board                      Concrete walls                      16mm Exterior sheathing                      Self-adhered air/vapour barrier                      102mm Rigid mineral fiber insulation board                      Phenolic Cladding Panels</p> <p><b>Exterior wall with CLT structure comprising:</b>                      16mm Gypsum board                      CLT panel 191 walls (5-ply - engineer, supply, transport, crane, install and connections)                      16mm Exterior sheathing                      Self-adhered air/vapour barrier                      102mm Rigid mineral fiber insulation board                      Phenolic Cladding Panels</p> <p>Allowance for Special Features</p>			
<p><b><u>TOTAL SUB-ELEMENT 033 - WALLS ABOVE GROUND FLOOR</u></b></p>			



Description	Quantity	Rate	Amount
<b><u>ELEMENT 03 - EXTERIOR CLADDING</u></b>			
<b><u>SUB-ELEMENT 034 - WINDOWS</u></b>			
Aluminium curtain wall comprising: Double glazed, black-anodized aluminium  Allowance for Special Features			
<b><u>TOTAL SUB-ELEMENT 034 - WINDOWS</u></b>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 03 - EXTERIOR CLADDING</u></b></p>			
<p><b><u>SUB-ELEMENT 035 - EXTERIOR DOORS AND SCREENS</u></b></p>			
<p><b>Exterior doors comprising:</b>                      Double glazed entrance doors including automatic hardware                      Insulated metal single door including metal frame, hardware and finish                      Insulated metal double door including metal frame, hardware and finish                      Allowance for Overhead doors at loading bay</p>			
<p><b><u>TOTAL SUB-ELEMENT 035 - EXTERIOR DOORS AND SCREENS</u></b></p>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 03 - EXTERIOR CLADDING</u></b></p> <p><b><u>SUB-ELEMENT 036 - BALCONIES AND PROJECTIONS</u></b></p>			
<p>76mm x 457mm Engineered wood slats @ 305mm O.C.</p> <p>Exterior glass guard</p> <p>Allowance for exterior canopies and sun control devices</p> <p>Allowance for soffit and parapet finishes.</p>			
<p><b><u>TOTAL SUB-ELEMENT 036 - BALCONIES AND PROJECTIONS</u></b></p>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 04 - INTERIOR PARTITIONS</u></b>			
<b><u>SUB-ELEMENT 041 - PERMANENT PARTITIONS</u></b>			
<p><b>Interior Partitions comprising:</b>                      Interior partitions comprising gypsum board, studs and batt insulation</p> <p>Concrete Block partitions, 10% of internal partition area</p> <p>Allowance for Glazed internal partitions, 25% of internal partition area</p> <p>Interior glass guard</p> <p>Allowance for sound isolation for IMAX</p> <p>Allowance for Special Features</p>			
<b><u>TOTAL SUB-ELEMENT 041 - PERMANENT PARTITIONS</u></b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 04 - INTERIOR PARTITIONS</u></b>			
<b><u>SUB-ELEMENT 042 - MOVABLE PARTITIONS</u></b>			
<b>Movable Partitions comprising:</b>			
Allowance for Movable partitions			
Security closure at IMAX			
Allowance for miscellaneous items			
<b><u>TOTAL SUB-ELEMENT 042 - MOVABLE PARTITIONS</u></b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 04 - INTERIOR PARTITIONS</u></b>			
<b><u>SUB-ELEMENT 043 - DOORS</u></b>			
<p><b>Interior doors comprising:</b>                      Metal single door including metal frame, hardware and finish                      Metal double door including metal frame, hardware and finish                      Wood single door including metal frame, hardware and finish                      Wood double door including metal frame, hardware and finish                      Glazed interior double doors including automatic hardware</p> <p>Allowance for miscellaneous items including special door seals</p>			
<b><u>TOTAL SUB-ELEMENT 043 - DOORS</u></b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 05 - VERTICAL MOVEMENT</u></b>			
<b><u>SUB-ELEMENT 051 - STAIRS</u></b>			
<p><b>Building vertical movement comprising:</b>                      Elevator pit access ladder                      Roof access stair complete, including finish, handrail, etc.                      Concrete stairs complete, including finish, handrails, etc.                      Lobby/Pavilion feature stair complete, including finish, handrails, etc.                      Public Access Stair Levels L2/L3/L4                       Allowance for Special Features</p>			
<b><u>TOTAL SUB-ELEMENT 051 - STAIRS</u></b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 05 - VERTICAL MOVEMENT</u></b>			
<b><u>SUB-ELEMENT 052 - ELEVATORS AND ESCALATORS</u></b>			
Freight elevator Elevators - 2 stop Elevators - 6 stop			
<b><u>TOTAL SUB-ELEMENT 052 - ELEVATORS AND ESCALATORS</u></b>			



Description	Quantity	Rate	Amount
<b><u>ELEMENT 06 - INTERIOR FINISHES</u></b>			
<b><u>SUB-ELEMENT 061 - FLOOR FINISHES</u></b>			
<b>Floor finishes comprising:</b> Sealed concrete flooring Carpet / Resilient vinyl sheet flooring Porcelain tile / terrazzo / hardwood flooring Recessed walk-off entrance mats  Allowance for Special Features			
<b>IMAX</b> Theatre flooring Platform edge trim allowance  Allowance for Acoustical sealants and Special Features			
<b><u>TOTAL SUB-ELEMENT 061 - FLOOR FINISHES</u></b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 06 - INTERIOR FINISHES</u></b>			
<b><u>SUB-ELEMENT 062 - CEILING FINISHES</u></b>			
<p><b>Building ceiling finishes comprising:</b>                      16mm Gypsum board ceilings, suspended                      Paint to structure and gypsum board ceilings                      Spray foam underside of concrete parkade                      Gypsum board bulkheads allowance</p> <p>Allowance for Special Features</p> <p><b>IMAX</b>                      Suspended acoustic tile ceilings</p> <p>Allowance for Acoustical sealants and Special Features</p>			
<b><u>TOTAL SUB-ELEMENT 062 - CEILING FINISHES</u></b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 06 - INTERIOR FINISHES</u></b>			
<b><u>SUB-ELEMENT 063 - WALL FINISHES</u></b>			
<b>Building wall finishes comprising:</b> Painted walls Plywood lined walls allowance Wall protection allowance Wall tiles allowance  Allowance for Special Features  <b>IMAX</b> Acoustical wall panels  Allowance for Acoustical sealants and Special Features			
<b><u>TOTAL SUB-ELEMENT 063 - WALL FINISHES</u></b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 07 - FITTINGS AND EQUIPMENT</u></b>			
<b><u>SUB-ELEMENT 071 - FITTINGS AND FIXTURES</u></b>			
<p><b>Millwork and general fixture allowance comprising:</b>                      Base building millwork</p> <p>Miscellaneous Metals Allowance</p> <p>Miscellaneous Rough Carpentry Allowance</p> <p>Signage Allowance</p> <p>Allowance for Indigenous Artifacts</p> <p><b>IMAX</b>                      Theatre chairs                      Railings allowance</p> <p><b>General allowances comprising:</b>                      Allowance for builders work associated with mechanical and electrical installation                      Allowance for fire stopping, coring, etc.                      Allowance for miscellaneous rough carpentry                      Allowance for miscellaneous metals</p>			
<b><u>TOTAL SUB-ELEMENT 071 - FITTINGS AND FIXTURES</u></b>			

Description	Quantity	Rate	Amount
<u>ELEMENT 07 - FITTINGS AND EQUIPMENT</u>			
<u>SUB-ELEMENT 072 - EQUIPMENT</u>			
Excluded			
<u>TOTAL SUB-ELEMENT 072 - EQUIPMENT</u>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 08 - ELECTRICAL</u></b></p>			
<p><b><u>SUB-ELEMENT 081 - SERVICE &amp; DISTRIBUTION</u></b></p>			
<p><b>Service and distribution comprising:</b>                      Permit &amp; site set-up - allowance                      Owner's Commissioning Agent including arc-flash study - allowance                      12.5/25kV main incoming (Vista) switches - by B.C. Hydro                      3,000kVA/12.5kV/25kV indoor transformer / unit sub-station - allowance                      2,500kVA/12.5kV/25kV out-door transformer / unit sub-station - allowance                      12.5/25kV main switches                      Load-break switches                      5,000Amp/600Volt main panels (switch-gear) c/w main circuit / tie-breakers - MDP                      2,000Amp/600Volt main panels c/w main circuit breakers                      1,200Amp/600Volt main panels c/w main circuit breakers                      800Amp/600Volt main panels c/w main circuit breakers                      400Amp/600Volt main panels c/w main circuit breakers                      600Amp/600Volt secondary panels                      400Amp/600Volt secondary panels                      200Amp/600Volt secondary panels                      100Amp/600Volt secondary panels                      800Amp/120/208Volt secondary power panels                      600Amp/120/208Volt secondary power panels                      Transformer 300kVA harmonic / shielded wire                      Transformer 225kVA harmonic / shielded wire                      Transformer 150kVA harmonic / shielded wire                      Transformer 112.5kVA harmonic / shielded wire                      Transformer 45kVA harmonic / shielded wire                      250Amp/120/208Volt secondary panels                      200Amp/120/208Volt secondary panels                      125Amp/120/208Volt secondary panels                      100Amp/120/208Volt secondary panels                      New feeders cables (to indoor transformers / sub-stations)                      New feeders cables (to switchgear / main panels, etc.)                      New feeders cables (to secondary panels, etc.)                      800Amp/347/600Volt (emergency gen-set switchgear)                      750kW/938kVA emergency gen-set (fixed internal unit)(incl. commissioning)                      Generator start signals &amp; monitoring                      Enclosure (walk-in type) - allowance                      Emergency gen-set catalytic silencers - allowance                      600Amp transfer (open-transition) dual-sided by-pass switch                      400Amp transfer (open-transition) dual-sided by-pass switch                      Load-bank requirement(s) - allowance                      Provide controls interfacing / programming associated with emergency power system (gen-sets &amp; transfer switches) - allowance                      Emergency gen-set monitoring, fuel shut-down modules - allowance                      Fire alarm interfacing &amp; associated annunciator - allowance                      Emergency generator &amp; transfer switch feeder cables - allowance</p>			

Description	Quantity	Rate	Amount
Fuel storage tanks (2no. double-wall) & fuel pipework delivery, fuel-pumps, monitoring, etc. - allowance			
Fuel polishing & flash recovery vessels - allowance			
Testing & commissioning, etc. (co-ordinate with BC Hydro as applicable) - allowance			
Fire pump controller (1no.feeders) & transfer switch feeder cables only - allowance			
UPS requirements - Cash Allowance			
Grounding & bonding			
Lightning protection			
Surge suppression / TVSS - allowance			
Digital / miscellaneous utility metering			
Craneage & hoisting			
Miscellaneous service distribution			
<b>TOTAL SUB-ELEMENT 081 - SERVICE &amp; DISTRIBUTION</b>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 08 - ELECTRICAL</u></b></p> <p><b><u>SUB-ELEMENT 082 - LIGHTING &amp; POWER</u></b></p> <p><b>Lighting comprising:</b>                      Provide general circulation light fixtures (majority LED types), including emergency &amp; exit lighting (cost per m2)                      Parkade                      Provide display light &amp; exhibition fixtures (majority LED types)                      Lighting installation, conduit &amp; wiring systems                      Central lighting control, switching, occupancy, day-light sensor control systems</p> <p><b>Power comprising:</b>                      Provide power outlets, devices, (service, floor boxes, power-grids, display power connections, shop power supplies, clocks, etc.)                      Parkade                      Provide power mechanical wiring (HVAC, etc.)</p> <hr/> <p><b><u>TOTAL SUB-ELEMENT 082 - LIGHTING &amp; POWER</u></b></p>			



Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 08 - ELECTRICAL</u></b></p>			
<p><b><u>SUB-ELEMENT 083 - SYSTEMS</u></b></p>			
<p><b>Fire alarm comprising:</b> Provide addressable (fully supervised fire alarm system &amp; devices, etc. Parkade</p> <p><b>Telephone &amp; Data comprising:</b> Telephone &amp; data systems / communication racks, servers, patch-panel, horizontal cabling connections ONLY, etc. - allowance Conduit rough-in, back-boxes, cable &amp; basket tray systems (for communication &amp; A/V systems, etc.) Parkade</p> <p><b>Security comprising:</b> Conduit rough-in, back-boxes, cable &amp; basket tray systems (for CCTV, card- access &amp; security systems, etc.) including security system Parkade</p> <p><b>Public address comprising:</b> Conduit rough-in, back-boxes, cable &amp; basket tray systems (for public address systems, etc.) including PA System Parkade</p> <p><b>Allowances comprising:</b> Voice &amp; data / back-bone / fibre-optic / CAT 6A cabling systems Wireless access points, A/V projectors &amp; phone switches rough-in</p>			
<p><b><u>TOTAL SUB-ELEMENT 083 - SYSTEMS</u></b></p>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 09 - MECHANICAL</u></b></p> <p><b><u>SUB-ELEMENT 091 - PLUMBING AND DRAINAGE</u></b></p> <p><b>Equipment comprising:</b>                      (2no.) PRV back-flow station / parallel assemblies - allowance                      (2no.) domestic water pressure booster pumps c/w VFD's - 10hp                      individual PRV back-flow assemblies (lab / irrigation / mech requirements) - allowance                      (3no.x75kW) electric DHW heaters (250 US gallons each), (2no.) storage tank (240 US gallons), (2no.) heat-exchangers, (3no.) circulation pumps, expansion tanks, etc. - allowance                      instantaneous (local at source) electric DHW heaters - allowance                      lab (research &amp; collections) reverse osmosis (RO) water filtration &amp; softener dedicated system - allowance                      commercial kitchen grease interceptor                      lab (research &amp; collections) acid neutralization tank                      elevator drain pumping station (2no.) circulation pumps                      footing / sediment drain sumps                      lab (research &amp; collections) / exhibit air-compressor (duplex 2no.x 10hp) &amp; (1no.x15hp) vacuum skid - allowance                      exhib / work-shop air-compressor (small unit) - allowance                      trap-primers - allowance                      domestic shut-off valves</p> <p><b>Piping comprising:</b>                      domestic hot, cold &amp; recirculation, sanitary, vent &amp; irrigation pipework systems                      Research / collections &amp; exhibit sanitary acid waste, vent, natural-gas, compressed-air &amp; vacuum pipework systems                      storm &amp; RWL drainage systems                      miscellaneous mechanical room DHW pipework, valves, etc. - allowance                      miscellaneous commercial kitchen plumbing pipework connections, etc. - allowance</p> <p><b>Fixtures comprising:</b>                      floor drains                      hub drains                      area / trench drains                      water closet                      water closet - H/C                      lavatory                      lavatory - H/C                      urinal                      individual / staff shower                      individual shower - H/C                      mixing valve                      emergency shower with mixing valve                      emergency eye-wash stations</p>			

Description	Quantity	Rate	Amount
sink - health / first-aid			
sinks - miscellaneous lab (research & collections)			
sinks - miscellaneous work-shop / construction			
janitor / mechanical sink			
dish-washer / dryer / laundry connections			
drinking fountain			
hose-bibs - interior			
hose-bibs - exterior			
roof drains			
miscellaneous plumbing fixtures (speciality types)			
Filtration system for incoming water supply			
<b>TOTAL SUB-ELEMENT 091 - PLUMBING AND DRAINAGE</b>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 09 - MECHANICAL</u></b></p>			
<p><b><u>SUB-ELEMENT 092 - FIRE PROTECTION</u></b></p>			
<p><b>Sprinklers &amp; Fire Protection comprising:</b>                      sprinkler valve station - allowance                      air-compressor (small unit) - allowance                      fire &amp; jockey pump (duplex) system (2no.x50hp) - allowance                      stairwell stand-pipe connection                      Siamese connection                      fire suppression to kitchen hood(s) - connection only (hoods - by others)                      water curtain sprinkler system (as applicable) - allowance                      sprinkler coverage (conventional coverage)                      sprinkler coverage (pre-action coverage)                      sprinkler coverage (dry coverage)                      sprinkler coverage (high-pressure misting systems)                      sprinkler coverage (clean-agent systems)                      fire extinguishers                      test &amp; commission sprinkler system</p>			
<p><b><u>TOTAL SUB-ELEMENT 092 - FIRE PROTECTION</u></b></p>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 09 - MECHANICAL</u></b></p>			
<p><b><u>SUB-ELEMENT 093 - HVAC</u></b></p>			
<p><b>Air Handling comprising:</b>                      custom central (DOAS) dedicated AHU c/w heating, cooling, c/w heat-recovery, supply &amp; return fans &amp; VFD's - 50,000cfm                      custom central (DOAS) dedicated AHU c/w heating, cooling, c/w heat-recovery, supply &amp; return fans &amp; VFD's - 15,000cfm                      custom central AHU's c/w heating, cooling, heat-recovery, humidification, supply &amp; return fans &amp; VFD's - 150,000cfm                      custom central AHU's c/w heating, cooling, heat-recovery, humidification, supply &amp; return fans &amp; VFD's - 120,000cfm                      custom central AHU's c/w heating, cooling, heat-recovery, humidification, supply &amp; return fans &amp; VFD's - 60,000cfm                      custom central AHU's c/w heating, cooling, heat-recovery, humidification, supply &amp; return fans &amp; VFD's - 55,000cfm                      custom central AHU's c/w heating, cooling, heat-recovery, humidification, supply &amp; return fans &amp; VFD's - 20,000cfm                      custom central AHU's c/w heating, cooling, heat-recovery, humidification, supply &amp; return fans &amp; VFD's - 10,000cfm                      custom central AHU's c/w heating, cooling, heat-recovery, humidification, supply &amp; return fans &amp; VFD's - 5,000cfm                      make-up air-handling unit (direct gas-fired) - 6,000cfm                      make-up air-handling unit (direct gas-fired) - 5,000cfm                      associated VFD's                      associated circulation pumps                      craneage / hoisting - allowance                      miscellaneous supplemental fan-coil / air-conditioning requirements (19no. - 65tons total) - allowance                      exhibit shop dust collector - 5,000cfm                      miscellaneous supply &amp; exhaust fans (10no. - 21,450cfm total) (fume-hoods - by others) - allowance                      smoke control exhaust fan / damper systems (2no. - 35,000cfm total) - allowance</p> <p>Allowance for specialised humidification</p> <p><b>Heating &amp; Cooling Plant comprising:</b>                      (2no.x3,844mbh &amp; 2no.x2,883mbh) gas-fired hot-water heating boilers, associated circulation pumps c/w VFD's, heat-exchangers, expansion tanks, valves, flues, etc. (boiler breaching is excluded) - allowance                      (4no.x150kW / 512mbh) electric steam heating boilers, steam PRV station, (condensate receivers, accumulators &amp; feedwater package), associated circulation pumps c/w VFD's, heat-exchangers, valves, expansion tanks, (boiler breaching is excluded), etc. - allowance, water softener, dealkaliser plant &amp; equipment, etc. - allowance                      glycol fill station, chemical treatment &amp; pot-feeders, etc.</p>			

Description	Quantity	Rate	Amount
<p>(2no.x550tons &amp; 2no.x350tons each) primary screw-type chiller units, (2no.x850tons &amp; 2no.x650tons each) cooling towers, associated circulation pumps, c/w VFD's, heat-exchangers, buffer storage tanks, expansion tanks, air-separators, valves, etc., glycol tank &amp; chemical treatment, etc. - allowance</p> <p>(1no.x850tons) air-source heat-recovery unit, (1no.x500tons) heat-recovery chiller unit, associated circulation pumps c/w VFD's, heat-exchangers, buffer storage tanks, expansion tanks, air-separators, valves, etc. - allowance</p> <p>glycol fill station, chemical treatment &amp; pot-feeders, etc.</p> <p><b>Piping comprising:</b>                      miscellaneous (branch distribution) heating supply &amp; return heating &amp; chilled water pipework systems (cost per m2)                      miscellaneous mechanical room natural-gas, steam, heating &amp; chilled water pipework systems, valves, etc. - allowance                      miscellaneous refrigerant &amp; condensate pipework systems, etc. - allowance</p> <p><b>Ductwork comprising:</b>                      miscellaneous ductwork, sheet-metal (including lab stainless steel), grilles, louvre requirements, etc. (cost per m2)                      Parkade                      snorkels / hose-reels, etc. - allowance                      fume-hood connections, etc. - allowance                      fume-hoods / welding hoods / safety cabinets - excluded                      paint / spray booth packages - allowance</p> <p><b>Heating comprising:</b>                      miscellaneous zoning control / VAV boxes, re-heat coils, Phoenix air-valves, perimeter radiation, entrance unit-heaters, etc. (cost per m2)                      Parkade</p> <p><b>Miscellaneous:</b>                      site set-up/test &amp; commission/balancing, manuals, etc. - allowance</p> <p><b>Controls comprising:</b>                      computer hardware &amp; software, miscellaneous controllers, etc. - allowance                      air-handling units (heating, cooling &amp; re-heat &amp; de-humidification)                      make-up / air-handling units                      fan-coil units                      VAV boxes c/w re-heat coils, individual re-heat coils                      dust collector                      smoke exhaust fans                      fans, etc.                      heating &amp; cooling plant, etc. - allowance                      DHW heating plant &amp; equipment - allowance                      pumps, etc.                      pumps, etc. - VSD's                      domestic water booster pump control &amp; monitoring - allowance</p>			

Description	Quantity	Rate	Amount
fire pump control & monitoring - allowance hot-water force-flow unit heaters / entrance heaters / convectors, etc. CO2 detection thermostats / temperature sensors / switches motorized dampers occupancy sensors miscellaneous controls, monitoring (compressed-air, vacuum & (RO) water plant & equipment, etc.) - allowance thermostats - perimeter radiation zoning / other zones, etc. miscellaneous sensors, alarm monitoring, etc. - allowance LEED measurement / metering & verification - allowance			
<b>TOTAL SUB-ELEMENT 093 - HVAC</b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 10 - GENERAL REQUIREMENTS AND FEE</u></b>			
<b>General Requirements</b>			
Mobilization			
Project Closeout			
<b>Project Staff</b>			
Project Director			
Project Manager			
Project Co-ordinator			
BIM Co-ordinator			
M&E System Co-ordinator			
Design Manager			
Estimator			
Admin Assistant			
General Superintendent			
Assistant Superintendent			
Foreman			
CSO			
Miscellaneous Allowance			
Staff Travel			
Security Procedures			
<b>Temp Construction Facilities</b>			
Offices			
Washcars			
Storage			
Office Supplies			
Temporary Power			
Temporary Heat			
Temporary Water			
Temporary Controls (Air Quality / Humidity)			
IT & Temporary Communications			
Temporary Road			
Temporary Laydown Area			
Temporary Barricades & Enclosures			
Safety & Environmental			
Cleaning & Waste Management			
Trucking & Courier			
Traffic Control			
Surveying			
Snow Removal			
Temporary Enclosures			
Temporary Partitions			
Temporary Stairs			
Fire Protection			
Project Identification Sign			
Project Signage			
Professional Engineering Services			
As-Built Documentation			
Construction Project Documentation			
Protection of Completed Construction			



Description	Quantity	Rate	Amount
Partnering Peer Reviews Labour Premiums Quality Control Escalation on General Conditions Financing Costs related to Holdbacks Construction Equipment Tower Cranes (Post Structure) Mobile Cranes Man/Material Hoists Miscellaneous Small Equipment & Tools Testing & Inspections Mock ups Permits and Fees Bonding and Security Insurance  <b>Fee</b>			
<b>TOTAL ELEMENT 10 - GENERAL REQUIREMENTS AND FEE</b>			

Description	Quantity	Rate	Amount
<p><b><u>ELEMENT 11 - SITE DEVELOPMENT</u></b></p>			
<p><b><u>SUB-ELEMENT 111 - GENERAL SITE DEVELOPMENT</u></b></p>			
<p><b><u>On Site Development</u></b></p>			
<p>Site clearance and preparation - landscape area                      Bulk earthworks, cart off site, cut and fill to ramp                      Topsoil                      Concrete retaining wall                      Exterior glass guard                      Cast in place concrete                      Unit pavers on grade                      Unit pavers on slab                      Wood decking                      Feature rockwalls                      Planting on grade                      Planting on slab                      Feature wall planting                      Park Restoration - soft and hardscapes                      Precast concrete sitting steps and ramp to accommodate grade change at Mungo Martin House                      Large canopy trees                      Medium Deciduous trees                      Medium Coniferous trees                      Tree grates                      Guardrail                      Bench seating                      Bollards                      Bike Racks                      Waste receptacles                      Movable seating (table and chairs)                      Tree and grassland protection                      Irrigation                      Seating steps/ramp at arrival plaza (Coastal Bluff)                      Water Features - allowance                      Exterior signage                      Sediment and Erosion control</p> <p>Removal, storage and care for existing on site feature BC Native Garden plantings (1,200m<sup>2</sup>)                      Salvage symbolic and or memorial exterior artifacts for re-use                      St Ann's School. Assumed that seismic upgrade is required. Estimated value as per Advicas Estimate dated March 20, 2018 included in WSP Report March 2018, escalated to June 2021.                      St. Ann's Schoolhouse protection during construction                      Mungo Martin House protection during construction                      Mungo Martin House Seismic Upgrade. Estimated value as per Advicas Estimate dated March 20, 2018 included in WSP Report March 2018, escalated to June 2021.</p>			

Description	Quantity	Rate	Amount
New Burial House Helmcken House Protection during construction Helmcken House Seismic Upgrade. Estimated value as per Advicas Estimate dated March 20, 2018 included in WSP Report March 2018, escalated to June 2021. Removal of Carillon Tower Bells and associated support equipment, refurbishment and reinstallation in the new building. Allowance for seismic upgrade to Totem Poles  Offsite Work - See Summary  Allowance for Indigenous Artifacts (commissioning & installation)			
<b><u>TOTAL SUB-ELEMENT 111 - GENERAL SITE DEVELOPMENT</u></b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 11 - SITE DEVELOPMENT</u></b>			
<b><u>SUB-ELEMENT 112 - MECHANICAL &amp; ELECTRICAL SITE SERVICES</u></b>			
<b><u>Electrical Site Services</u></b>			
Incoming Electrical Service			
Provide site lighting (landscaping, etc.) & miscellaneous exterior power (EV charging stations) - allowance			
<b><u>Mechanical Site Services</u></b>			
Building Services; on-site mechanical site services (water, fire, sanitary, storm & natural-gas pipework services & connections) - allowance			
Underground water storage tank - 50,000 Gallon			
<b><u>Builders Work in Connection of Site Services</u></b>			
Excavation/backfill, ductbanks, connections and making good at building/site interfaces			
<b><u>TOTAL SUB-ELEMENT 112 - MECHANICAL &amp; ELECTRICAL SITE SERVICES</u></b>			

Description	Quantity	Rate	Amount
<u>ELEMENT 11 - SITE DEVELOPMENT</u>			
<u>SUB-ELEMENT 113 - ALTERATIONS</u>			
Nil			\$0
<u>TOTAL SUB-ELEMENT 113 - ALTERATIONS</u>			\$0

Description	Quantity	Rate	Amount
<b><u>ELEMENT 11 - SITE DEVELOPMENT</u></b>			
<b><u>SUB-ELEMENT 114 - DEMOLITION</u></b>			
<p><b>Archives Building:</b>                      Hazmat Abatement                      Demolish Existing Building</p> <p><b>Fannin Tower:</b>                      Hazmat Abatement                      Demolish Existing Building</p> <p><b>Exhibit Building:</b>                      Hazmat Abatement                      Demolish Existing Building</p> <p><b>Imax Building:</b>                      Hazmat Abatement                      Demolish Existing Building</p> <p>Hazmat removal of Museum contaminated exhibits</p> <p>Demolish Carillon Tower</p> <p><b>Site Services:</b>  <b>B10082-044-G-SP--6602-</b>                      Tunnel                      Sewage pump/lift</p> <p><b>B10082-045-G-SP--6502-</b>                      Tunnel                      Wall on top</p> <p><b>B10082-046-G-SP--6603-</b>                      Manhole #1                      Manhole #2, 3, 4, 5</p> <p><b>B10082-066-G-SP--6606-</b>                      Electric vault                      Sanitary sewer                      Storm sewer                      Water</p> <p><b>B10082-067-G-SP--6606-</b>                      Extra heavy soil pipe 6"                      6" Agtile                      Storm drain</p> <p><b>B10082-077-G-SP--6606-</b>                      Picked up on other dwgs</p>			

Description	Quantity	Rate	Amount
<b>B10082-078-G-SP--6609-</b> Paving Stairs and ramps Sidewalks Sea water tank			
<b>B10082-080-G-SP--6606-</b> Water cast iron Sewer concrete manhole Water copper			
<b>B10082-166-G-SP--7311-</b> Planters Electrical ducts Water Storm Sanitary Catch basin			
Allowance for site hazmat			
<b>TOTAL SUB-ELEMENT 114 - DEMOLITION</b>			

Description	Quantity	Rate	Amount
<b><u>ELEMENT 11 - SITE DEVELOPMENT</u></b>			
<b><u>SUB-ELEMENT 115 - GENERAL REQUIREMENTS AND FEE</u></b>  General requirements and fee for Element 11			
<b><u>TOTAL SUB-ELEMENT 115 - GENERAL REQUIREMENTS AND FEE</u></b>			



Description	Quantity	Rate	Amount
<p><u>OFFSITE</u></p> <p>See Summary</p>			
<u>TOTAL OFF-SITE</u>			<b>\$0</b>

**ROYAL BRITISH COLUMBIA MUSEUM REDEVELOPMENT PROJECT – MUSEUM PROJECT  
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**16. PROJECTED CASH FLOW DESIGN-BUILD/CM.**



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**17. PROJECTED CASH FLOW ALLIANCE PROCUREMENT MODEL.**

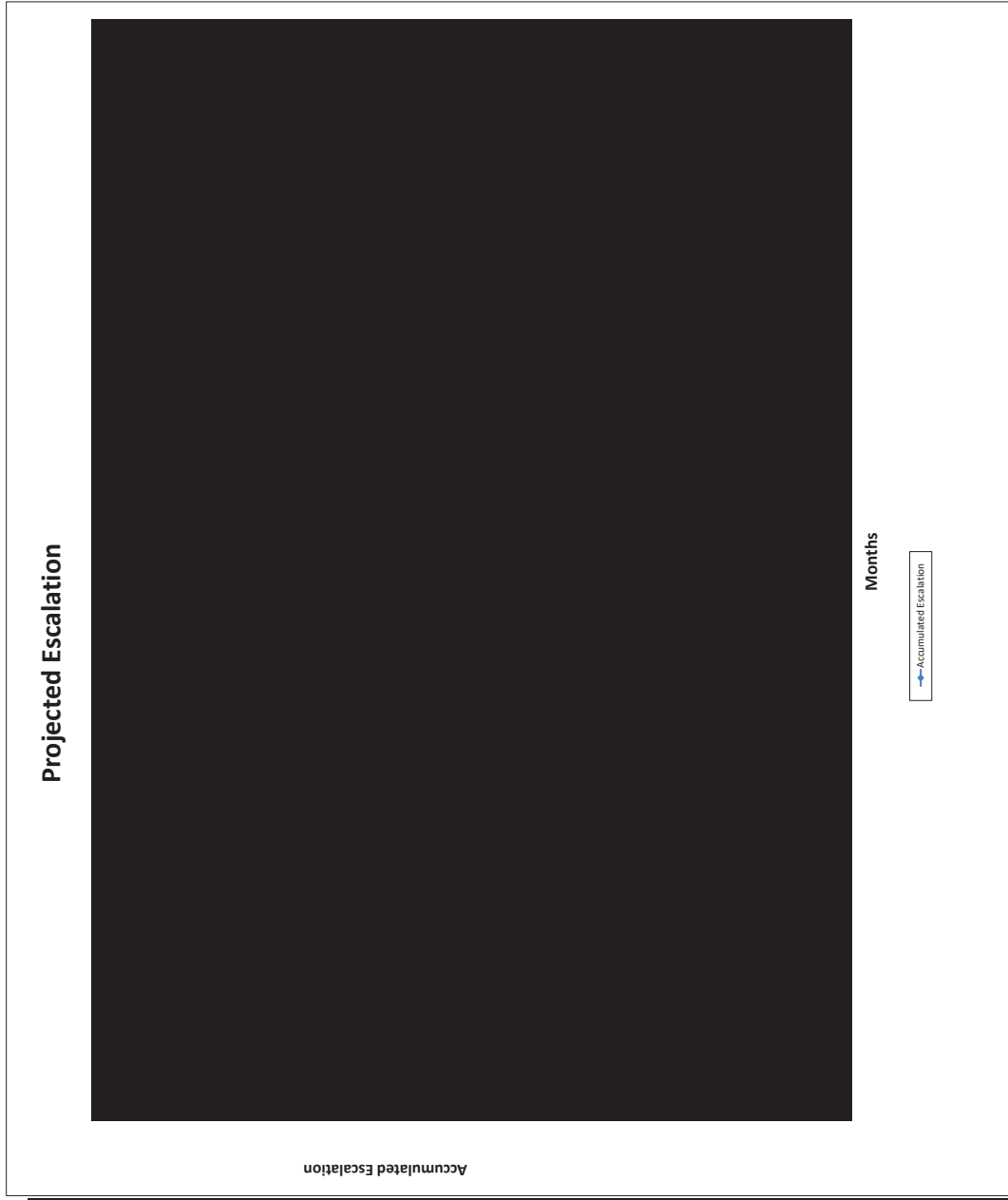


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CLASS C ESTIMATE REPORT (Revision 7)  
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October 21, 2021**

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**18. ESCALATION PROJECTION.**

Month	Monthly Escalation	Accumulated Escalation
Jul-21		
Aug-21		
Sep-21		
Oct-21		
Nov-21		
Dec-21		
Jan-22		
Feb-22		
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Nov-28		
Dec-28		



Annual Rates (Projected):	2021	2022	2023	2024	2025	2026	2027	2028	2029 Cumulative
%	8.00%	10.00%	9.00%	6.00%	4.00%	4.00%	4.00%	4.00%	49.00%