



GEORGE MASSEY CROSSING PHASE 1

STEVESTON INTERCHANGE

Richmond/Delta, BC

Project Cost Assessment

April 8, 2021

Rev. F



PURPOSE OF THIS REPORT

As part of Charter Project Delivery Inc.'s role as Cost Consultant for the George Massey Crossing Project, analyses were conducted to identify a cost budget for the George Massey Crossing Phase Steveston Interchange Project (the Project). The results of this work are provided in this report. The contents of this document reflect the opinions and experience of Charter Project Delivery Inc. based on the project information known at the time. Future events may impact these opinions and conclusions.

Control Sheet

| | | |
|-----------------|----------------------------------|-------|
| Document | PROJECT COST ASSESSMENT – Report | Rev F |
|-----------------|----------------------------------|-------|

| Revision Record | | | | | |
|-----------------|------------------------------------|-------------|-------------|---------------|--------------------|
| Rev | Description | Originator | Checker | Approver | Date |
| A | Draft Report | Ben Park | Ed Green | Joost Meyboom | September 23, 2020 |
| B | Report | Ben Park | Devin Jones | Joost Meyboom | November 5, 2020 |
| C | Updated IDC | Ben Park | Devin Jones | Joost Meyboom | November 9, 2020 |
| D | Escalation | Ben Park | Devin Jones | Joost Meyboom | November 20, 2020 |
| E | Updated cost allocations | Ben Park | Devin Jones | Joost Meyboom | December 10, 2020 |
| F | New Procurement Steveston I/C only | Devin Jones | Ed Green | Joost Meyboom | April 8, 2021 |

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1 EXECUTIVE SUMMARY

Charter Project Delivery Inc. (CHARTER) completed an overall Project Cost Assessment for the George Massey Crossing Phase 1 Project (the Project) based on information provided to CHARTER prior to March 29, 2021. The work comprised of a two-bridge solution for the Steveston Interchange with bottom-up construction cost estimates and Owner's project cost estimates to arrive at a recommended overall project budget for the Steveston Interchange.

The Highway No. 99 corridor between Delta, Richmond, and Vancouver is a major commuter route and is one of the most congested traffic routes in the Lower Mainland, with large queues during peak times. It also connects the Canada and US border to Metro Vancouver, as well as the Tsawwassen ferry terminal, and industrial lands. The objectives of the Project are to improve connectivity of Highway No. 99, and to alleviate traffic areas along Steveston Highway and its off-ramps, with a focus on public transit, by providing increased general-purpose capacity and bus/HOV improvements. The Project is also the first phase of construction for the overall George Massey Crossing Project and will assist in mitigating traffic issues during future construction phases.

The Steveston Highway Interchange, which will replace the existing highway overpass that is not designed to current seismic code and is under-capacity, with two larger overpasses, to accommodate current and future traffic expansion. Steveston Interchange will be delivered via a design-build (DB) method. The Project will be delivered by the Transportation Investment Corporation (TIC), and the Project may be built under the Government of BC's recently introduced Community Benefits Agreement (CBA), and thus this estimate includes allowances and budget for the applicable agreement framework and operating costs.

CHARTER follows estimating procedures of the civil construction industry to better align the construction budget with the anticipated tender bids. CHARTER developed the construction costs by considering labour, materials, subcontractors, equipment operating expenses, local market trends, and productivity using bid development methods and resources consistent to the civil and transportation sectors in British Columbia. The estimate is based on the Project scope as defined by the design drawings, project schedules, quantities, and other project documents provided to CHARTER prior to the development of this report.

Given the scope, assumptions and exclusions noted herein, CHARTER's overall project cost estimate for the **GEORGE MASSEY CROSSING PHASE 1 PROJECT STEVESTON SEGMENT** in as spent Canadian dollars, including escalation and contingency, is as follows:

Overall Project Cost Estimate: \$87,484,870

****Includes █% Contingency.**

The construction cost estimate was developed independently without any reliance on other project estimates. Some Owner's costs were not estimated by CHARTER, and were taken from information provided to CHARTER by the Project Team. Please note, the cost estimate includes an overall █% project contingency that applies to both the construction and Owner's costs. A basic overview of the Project costs can be found in **Table A** below.

- A project overview can be found in **Section 3**.
- An explanation on CHARTER's costing methodology can be found in **Section 4**.
- A breakdown of the Owner's cost estimates with assumptions can be found in **Section 5**.
- A breakdown of the construction cost estimates with assumptions can be found in **Sections 6**.

In addition to assumptions noted elsewhere in this report, the following need to be considered together with this estimate:

- **Schedule** – Schedule dates and assumptions as per the provided schedule. See **Section 3.1, Table B**.
- **Procurement** – The Project is being delivered using Design Build (DB) method.

- **Competing Projects** – The cost impact of competing projects is outside of the scope of this construction cost estimate and should be considered further when finalizing and performing a re-costed baseline estimate before RFP release.
- **Bidder Motivation** – It is assumed there will be a suitable number of qualified and motivated bidders responding to the bid requests. Motivation will stem from confidence in the procurement process and the project delivery agency.
- **Escalation** – Escalation continues as it has over the past five to ten years. The recent COVID-19 pandemic and subsequent monetary supply inflation’s impacts on escalation of labour and materials is not quantifiable at this time and has not been considered in this cost estimate and report.
- **Tariffs** – All current tariffs known to date are included. Impacts of future tariffs is unknown and consequently, are not included.
- **Industry Conditions** – It is assumed that conditions regarding the supply of materials, including fabricated components, will be similar to those seen in the past five to ten years. The backlog of industrial and transit infrastructure projects’ impact on the construction industry is evolving and is not quantifiable at this time and has not been considered as part of this cost estimate or report.
- **Contingency** – Currently the cost estimate includes an overall Project contingency of █%. The Construction (DB) cost estimate of \$█ includes construction.
- **Site Office** – Site office requirements will be the responsibility of the Contractor and are carried in the construction budget. Contractor is also responsible for providing 1200 square feet of office space for TIC.
- **Access** – Project to provide unfettered access to working easements, local roadways and right of ways when and where necessary.

| STEVESTON OVERPASS REPLACEMENT (TWO BRIDGE) | | |
|--|---|----------------------|
| 1.01 | Construction (DB) | \$ |
| 1.02 | Community Benefits (By TIC) | \$ |
| 1.03 | Project Management (By TIC) | \$ |
| 1.04 | Property Acquisition (By TIC) | \$ |
| 1.05 | Indigenous Engagement, Capacity Funding & Accommodation | \$ |
| 1.06 | OE Engineering (By TIC) | \$ |
| 1.07 | Communications (By TIC) | \$ |
| 1.08 | Procurment Support (By TIC) | \$ |
| 1.09 | Legal Support (By TIC) | \$ |
| 1.1 | TIC Framework (By TIC) | \$ |
| 1.11 | Engineering and Technical Supervision (By TIC) | \$ |
| 1.12 | Environmental (By TIC) | \$ |
| 1.13 | Traffic Enforcement | \$ |
| 1.14 | Project Contingency (20% of Soft Costs) | \$ |
| 1.15 | Interest During Construction | \$ |
| TOTAL PROJECT COST INCLUDING ESCALATION | | \$ 87,484,870 |

Table A – Project Cost Overview - Escalated

2 REFERENCES

CHARTER developed the cost estimate using all available references provided, with special consideration to the following documents:

| Reference Document No. | Document Title – Steveston Highway Interchange | Type |
|------------------------|---|-------------------------|
| 1 | Highway No. 99 – Steveston Interchange Improvements Preliminary Design Estimate – 100% Preliminary Design - Schedule 7 – Binnie, dated August 17 th , 2020 | PDF Document (4 pages) |
| 2 | Highway No. 99 - Steveston Highway Interchange – 100% Preliminary Design – Civil Construction Drawings – Binnie, dated June 4 th , 2020 | PDF Document (50 pages) |
| 3 | Steveston Highway at Highway 99 Interchange – Preliminary Geotechnical Design Rev. 2 – DRAFT Memo – Klohn Crippen Berger, dated June 3 rd , 2020 | PDF Document (10 pages) |
| 4 | Steveston Highway at Highway 99 Interchange – Preliminary Structural Design Rev. 1 – DRAFT Memo – Klohn Crippen Berger, dated May 25 th , 2020 | PDF Document 13 (pages) |
| 5 | SIP-SCH-Work Schedule-IMPS-Mar16Rev | MS Project Document |
| 6 | 19-1169 - E-Option 3 | PDF Document (1 page) |

3 PROJECT OVERVIEW

The below is a general overview of the Project including anticipated key milestone dates and scope of work.

3.1 Project Schedule

Based on the Project schedules provided to CHARTER, the following dates were used to develop construction and projects costs, but by shifting the contract award date to the Spring of 2022 as directed by the project team.

Steveston Interchange Timelines

| Timeline | Activities |
|-------------|------------------------|
| Q3 2021 | Issue RFP |
| Q4 2021 | Technical Submission |
| Q1 2022 | Financial Submission |
| Q1 2022 | Contract Award |
| Summer 2025 | Substantial Completion |

Table B – GMCP1 Anticipated Project Schedule

These dates formed the basis of contractor staffing costs, quality management, traffic management costs, mobilization costs and site running costs. CHARTER developed independent high-level construction schedules for each project to validate the construction durations provided, and to assist with our cash-flow modeling. It is worth noting that CHARTER assumed the preload duration on the Steveston Interchange westbound overpass as 12 months from the provided range of between 6 months and 12 months, as noted in the preliminary geotechnical memo provided by Klohn Crippen Berger (KCB). The project cash-flow, not inclusive of interest during construction, was generated by CHARTER and has been provided separately.

It should be noted that the construction schedule was based on the assumption of a 6-day work week for this Interchange project.

3.2 Scope of Work

The general scope of work for the Steveston Interchange as defined in the provided documents, Schedule 7s, and detailed design drawings are summarized below.

STEVESTON HIGHWAY INTERCHANGE AT HIGHWAY NO. 99:

Below is a high-level overview of the scope for the Hwy 99/Steveston Hwy Interchange project:

- Preload approaches and abutments for both the new westbound and eastbound overpasses;
- Install piles and perform vibro-stone column ground improvements for both overpasses;
- Relocate the City of Richmond’s 300mm watermain onto the new westbound overpass;
- Install a new deep soil-mix wall between the BC Hydro station and westbound bridge structure;
- Install soil-anchors and shotcrete walls under the existing overpass when the sloped abutments are excavated;
- Construct two new detour lanes on Hwy 99, one in the northbound and southbound directions;
- Modify the ITS system and counterflow lanes to create construction work areas in the center of Hwy 99;
- Install new MSE walls around the new overpass abutments and approaches;
- Build the overpasses using concrete filled piles, concrete piers, steel I-girders and a concrete deck;
- Construct the overpass decks using partial depth pre-cast panels and cast-in-place concrete;
- Demolish the existing overpass to build a new overpass in the same location;
- Install temporary and permanent ITS and counterflow systems for Hwy 99 lanes;
- Install a new retaining wall along the southbound off-ramp;
- Modify the east intersection on Steveston highway by adding new lanes, adding a new northbound on-ramp alignment on newly purchased property, building new medians and curbing, and building a new bus stop;
- Construct a new MUP from the east intersection, across the westbound overpass and into the west intersection;
- 3.5m MUP on both overpasses;
- 4.0m MUP on the northbound Highway 99 off-ramp;
- New alignment for the northbound on-ramp;
- Bus-island median and dedicated HOV bus-lane on the northbound Highway 99 off-ramp;
- Drainage replacements and upgrades in required areas; and,
- Electrical replacements and upgrades for the Project alignment.

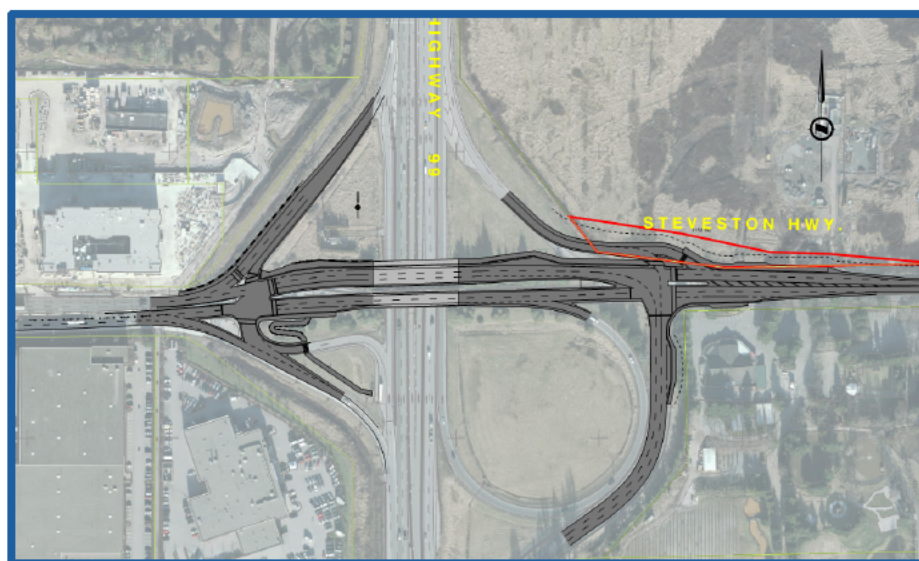


Figure 1.1 – Steveston Highway Interchange Project Overview

4 COSTING METHODOLOGY

CHARTER uses a cost-based approach or “bottom-up” method of estimating to determine the overall construction costs specific to the Project. This method of estimating is based on determining the Contractor’s cost for labour, equipment, materials, and any specialty subcontractor effort for each item needed to complete the work. In order to accomplish this, CHARTER divided the estimate into direct, indirect and markup components.

For construction, the direct, indirect, and markup costs were assessed separately as discussed below. The indirect and markup costs were then evenly distributed into the direct costs to arrive at the final unit rates, which make up the section totals reported on the construction cost breakdown in **Section 6**. The rates have not been redistributed to create a ‘front end loaded bid’ as is often the approach used by contractors to achieve a positive cash flow earlier in the Project. As a result, a rate for rate comparison with the Project Team’s unit rates may require interpretation to get a meaningful result.

Once the construction cost and overall project schedule has been determined, CHARTER assesses the Owner’s costs over and above the cost of construction to establish an overall project budget. To determine the Owner’s costs, CHARTER uses a ‘Level of Effort’ assessment for each work discipline together with our internal knowledge and past experience on comparable projects to arrive at the budget proposed.

4.1 Direct Costs

Direct costs are those associated with directly producing the permanent construction works included within each specific bid item.

These costs were determined by conducting a detailed assessment of all labour, equipment, materials, and specialty subcontractors required for each specific bid item and their associated costs. Once each bid item was broken down into these cost elements, base unit rates for the specific labor, equipment, materials, and subcontractors required were used to develop the overall unit rate for the bid item. This method ensures the specific intricacies of each task are fully explored and encapsulated including productivity and temporary work requirements.

The labour, equipment, materials, and productivity rates used to develop the overall unit rates are based on the CBA Lower Mainland Labour Rates, feedback received from our recent involvement in similar projects, past contracting experience, and market sounding with local material suppliers and subcontractors.

4.2 Indirect Costs

Indirect costs are those that are required to facilitate the works at a project-level as opposed to a specific bid item level. These costs are comprised of items including project staff, management oversight, support staff, site office provisions, support equipment, and other project-wide contractor expenses.

4.3 Markup Costs

Like indirect costs, markup costs were estimated separately and distributed proportionally throughout the bid items. Markup costs include profit, overhead, bonding, insurance, contractor risk, and escalation.

4.4 Owner’s Costs

Owner’s costs are the costs incurred by the Owner to deliver the Project such as land acquisition, stakeholder consultation & engagement, environmental certification, capacity funding, and project supervision & administration on the Owner’s side during construction. These costs are not the responsibility of the Contractor and are therefore over and above the construction cost.

5 OWNER’S COSTS AND PROJECT BUDGET

Charter established the construction budget for this project and was provided the Owner’s costs by TIC as an input to the overall project budget as noted in the breakdown below in Table C.

| STEVESTON OVERPASS REPLACEMENT (TWO BRIDGE) | | |
|--|---|----------------------|
| 1.01 | Construction (DB) | \$ |
| 1.02 | Community Benefits (By TIC) | \$ |
| 1.03 | Project Management (By TIC) | \$ |
| 1.04 | Property Acquisition (By TIC) | \$ |
| 1.05 | Indigenous Engagement, Capacity Funding & Accommodation | \$ |
| 1.06 | OE Engineering (By TIC) | \$ |
| 1.07 | Communications (By TIC) | \$ |
| 1.08 | Procurement Support (By TIC) | \$ |
| 1.09 | Legal Support (By TIC) | \$ |
| 1.1 | TIC Framework (By TIC) | \$ |
| 1.11 | Engineering and Technical Supervision (By TIC) | \$ |
| 1.12 | Environmental (By TIC) | \$ |
| 1.13 | Traffic Enforcement | \$ |
| 1.14 | Project Contingency (20% of Soft Costs) | \$ |
| 1.15 | Interest During Construction | \$ |
| TOTAL PROJECT COST INCLUDING ESCALATION | | \$ 87,484,870 |

Table C – Overall Project Cost Breakdown – Escalated

5.1 Owner’s Costs - Escalated

Property Acquisition – \$ [REDACTED] – The budget for the Steveston Interchange property was provided to the CHARTER team by the Project Team, with \$ [REDACTED] for property acquisition and \$ [REDACTED] for property management costs.

Construction (DB) – \$ [REDACTED] – This is an independent cost estimate of all project construction costs, which also includes contractor’s mobilization, quality management, supervision, traffic management, office overheads, bonding, insurance and profit, escalation and construction contingency. See **Section 6** below for a more detailed breakdown of the Project construction costs.

Community Benefits – \$ [REDACTED] – This represents the framework costs payable by the Owner to cover the operating costs of community benefits associated with administering these projects.

OE Engineering – \$ [REDACTED] – This represents the total reasonable engineering costs to support the Owner, for external consultants. These costs were provided by TIC in the document “SIP Owner’s Budget 2021-03-26 Version For Charter.”

Project Management – \$ [REDACTED] - The reasonable cost for project oversight and management for the duration of the Project, from procurement to completion. These costs were provided by TIC in the document “SIP Owner’s Budget 2021-03-26 Version For Charter.”

Communications - \$ [REDACTED] – The costs for public consultations, coordination and communications from procurement through construction. These costs were provided by TIC in the document “SIP Owner’s Budget 2021-03-26 Version For Charter.”

Procurement Support - \$ [REDACTED] – This is the cost of establishing, tendering and evaluating the procurement of the project through a qualification process, request for proposal, technical and financial evaluation. These costs were provided by TIC in the document “SIP Owner’s Budget 2021-03-26 Version For Charter.”

Legal Support - \$ [REDACTED] – This is the cost of legal input and review for establishing the Project Agreement contract that will govern the delivery of the project for the Design Build contractor. These costs were provided by TIC in the document “SIP Owner’s Budget 2021-03-26 Version For Charter.”

TIC Framework - \$ [REDACTED] – This represents the framework costs payable by the Owner to TIC to cover the operating costs of TIC associated with administering this project. These costs were provided by TIC in the document “SIP Owner’s Budget 2021-03-26 Version For Charter” and include items such as office rent and expenses, and governance related costs.

Engineering and Technical Supervision - \$ [REDACTED] – This is the cost of internal engineering resources to establish the RCD, participate in the vetting of the proposed design solution, and monitor construction throughout the life of the project. These costs were provided by TIC in the document “SIP Owner’s Budget 2021-03-26 Version For Charter.”

Indigenous Engagement, Capacity Funding & Accommodation – \$ [REDACTED] – These costs were provided by TIC in the document “SIP Owner’s Budget 2021-03-26 Version For Charter” and includes the cost of Indigenous relations project team resources.

Environmental – \$ [REDACTED] – These costs were provided by TIC in the document “SIP Owner’s Budget 2021-03-26 Version For Charter” and include environmental planning and permitting, as well as oversight over the contractor’s construction environmental management activities. These costs are higher than for a typical project since this project will be held to the EAC of the major George Massey Crossing Project.

Traffic Enforcement - \$ [REDACTED] – These costs were provided by TIC for traffic management enforcement.

Escalation (Construction) – \$ [REDACTED] (included in DB Construction) - Escalation on construction was calculated based on CHARTER’s anticipated cash flow for the Project using [REDACTED]% for year 1 (2021), [REDACTED]% for year 2, [REDACTED]% for year 3, [REDACTED]% for year 4 and [REDACTED]% for year 5. This escalation will be the responsibility of the contractor and included in the tendered price. Escalation has been included in the construction cost estimate line item.

Contingencies – \$ [REDACTED] – The project contingency represents a [REDACTED]% contingency on all soft costs, with the exception of IDC.

Interest During Construction – \$ [REDACTED] – IDC has been provided by TIC and may be updated.

6 CONSTRUCTION COSTS

A breakdown of the construction costs can be found in the table below. Please note the construction costs below are in as-spent dollars and includes Contractor’s Escalation.

| STEVESTON INTERCHANGE TWO BRIDGE | |
|---|----------------------|
| Construction Cost Estimate | |
| SECTION | COST |
| Section 1 - General | \$ [REDACTED] |
| Section 2 - Site Preparation & Grading | \$ [REDACTED] |
| Section 3 - Drainage | \$ [REDACTED] |
| Section 4 - Paving Construction | \$ [REDACTED] |
| Section 5 - Utility Relocations | \$ [REDACTED] |
| Section 6 - Signing & Pavement Markings | \$ [REDACTED] |
| Section 7 - Electrical | \$ [REDACTED] |
| Section 8 - Environmental | \$ [REDACTED] |
| Section 9 - Structure | \$ [REDACTED] |
| Section 10 - Provisional Sum Items | \$ [REDACTED] |
| Section 11 - Work by Others | \$ [REDACTED] |
| Option 3 - Construction Cost | \$ [REDACTED] |
| CONSTRUCTION TOTAL | \$ [REDACTED] |

Table D – Construction Cost Breakdown – Escalated

6.1 Markup Costs

Based on our CHARTER's knowledge from previous project experience and from observations of recent market trends, we applied the below markups to the direct and indirect construction costs determined in the estimate:

Profit – [REDACTED] - The percentage adopted reflects an observed trend toward a somewhat competitive and hungry civil construction market. Specifically, [REDACTED]% profit has been applied to the Steveston Highway Interchange project.

Overhead – [REDACTED]% - The percentage adopted reflects the expected office overhead costs associated with the type of contractor expected to bid on a project of this size.

Bonding – [REDACTED]% - This percentage refers to the cost for contractor to acquire a [REDACTED]% Labour & Material Bond, and [REDACTED]% Performance Bond generally required for a project of this scope and size.

Insurance – [REDACTED]% - This percentage refers to the cost of the contractor to acquire a All Risk Insurance generally obtained for a project of this scope and size.

Escalation (on construction) – Escalation on construction was calculated based on CHARTER's anticipated cash flow for the Projects using the 2020 Historical Cost Index. [REDACTED]% for year 1, [REDACTED]% for year 2, and [REDACTED]% for year 3.

6.2 Indirect Costs

The indirect costs for TIC Projects are typically allocated in the General section of the Schedule 7. These indirect costs are those that are required to facilitate the works at a project-level as opposed to a specific bid item level. These costs are comprised of items including project staff, management oversight, support staff, site office provisions, support equipment, protection of the environment, and other project-wide contractor expenses.

Unlike other cost consultants, CHARTER does not simply apply an expected percentage of construction costs to guesstimate the indirect costs. Each indirect items' cost is individually calculated based on all expenses required for completion of construction that are not directly attributable to one particular pay item but included in the applicable indirect item. A basis for CHARTER's estimate for indirect items for each segment of the Project are outlined below.

Mobilization – This item comprises typical costs incurred by the contractor to manage the works including laydown, storage and staging areas, and general operations for the anticipated schedule. The costs for delivery and demobilization of construction equipment is within this item. Mobilization also includes telecommunication services, temporary site utilities, computer equipment, surveying equipment, hoarding, crew transportation, site safety, consumable supplies, nonproduction labour, plant equipment, security personnel, permitting, and temporary construction fencing.

Traffic Management – This item comprises costs for all associated work required to develop and implement an approved Traffic Management Plan for the Project sites. Maintaining constant traffic through the Project work zones with minimal disruption will be challenging for the contractor, in particular on Highway No. 99. The cost for Traffic Management includes dynamic messaging boards, construction signage, flagging labour and equipment, temporary line painting services, and construction roadside barrier placement and relocations.

Quality Management – This item includes costs incurred by the Contractor for nonproduction staff and quality control for the duration of the Project schedules. This includes full-time and part-time staff to cover construction management, construction supervision, administration, survey, quality management, indigenous contracting and employment coordinator, and communication manager for the duration of the Project. Note that CHARTER has observed a recent upward trend in Quality Management costs in the construction industry due to higher wages and increased demand for skilled individuals in the BC market.

Protection of the Environment / Environmental Management – This item consists of costs incurred by the contractor for environmental mitigation efforts that are not directly associated to any one particular pay item. This includes all associated costs of developing, implementing, and maintaining a Construction Environmental Management Plan for the duration of construction. This consists of overall project erosion & sediment control, water detention & treatment, waste management, environmental restorations, ancillary protective measures for environmentally sensitive areas, and protection of archaeological resources. It also includes allowances for bird surveys and invasive plant management. This project is being held to the terms, conditions and constraints of the George Massey Crossing EAC permit, so the environmental costs for this project and associated budget is higher than it would be for a similar project not held to the higher environmental standards of the George Massey EAC.

Contractor’s Design – The Steveston Highway Interchange Project will be delivered via DB method and thus the contractor will be required to develop their own approved design and execute construction based on the design. This item is the cost for the successful proponent to execute and deliver the Project design, including internal quality management and quality control measures.

6.3 Direct Costs

Direct costs are those associated with directly producing the permanent construction works included within each specific bid item.

These costs were determined by conducting a detailed assessment of all labour, equipment, materials, and specialty subcontractors required for each specific bid item and their associated costs. Once each bid item was broken down into these cost elements, base unit rates for the specific labor, equipment, materials, and subcontractors required were used to develop the overall unit rate for the bid item. This method ensures the specific intricacies of each task are fully explored and encapsulated including productivity and temporary work requirements.

The labour, equipment, materials, and productivity rates used to develop the overall unit rates are based on feedback received from our recent involvement in similar projects, past contracting experience, and market sounding with local material suppliers and subcontractors.

6.4 CBA Labour Rates

For the construction cost estimate, CHARTER has applied the Labour Rates from the CBA (including erratum #1-3) for work in the Lower Mainland. Greater Vancouver has a large working-class population skilled in civil construction and thus it is assumed that the entire workforce can be supplied from residents within the region.

As Room and Board, Living Out Allowance, and Camp Establishment are not applicable to CBA projects within the Lower Mainland and Fraser Valley, no associated costs for these articles have been included in the estimate. It is assumed BCIB will have the capacity to supply the workforce required to complete the project if the CBA applies to this project.

7 RISKS & CONSTRAINTS

The risk register for the project was provided to CHARTER by the Project Teams. Key risks identified in the registers include:

- [REDACTED]
- [REDACTED]

8 ASSUMPTIONS & EXCLUSIONS

The major assumptions and exclusions to CHARTER's cost estimate are outlined below:

The CHARTER estimate is based on the following assumptions:

- Project schedule is as noted above and is based on a 6-day work week.
- A suitable number of qualified bidders are available to respond to the Request for Proposal;
- The quantities used for the estimate were provided by the Project Teams and reflect the 100% preliminary design for the Steveston Interchange Project;
- The cost impact of competing projects is outside of the scope of this construction cost estimate, however, considerations made in this regard are provided in **Section 9**.
- The engineering design and construction methodologies proposed for the area adjacent to the BC Hydro transmission tower in the NW quadrant of the project beside the southbound highway 99 off-ramp will be carried out in such a way as to not disturb or settle the earth or equipment beyond acceptable BC Hydro tolerances, and that construction and permanent bridge infrastructure will not encroach any limits of approach of BC Hydro's transmission tower, plant, equipment or access.
- Backfill for retaining walls is included in fill sections of other line items;
- There are no known archaeological concerns that would affect the scope, schedule or cost of the projects;
- Escalation will continue as it has over the past five to ten years;
- All current tariffs known to date are included. Impacts of future tariffs is unknown and consequently, are not included;
- Industry conditions with regard to the supply of materials, including fabricated components, will be similar to those seen in the past five to ten years; and,
- The Steveston improvements project will be delivered using a DB approach.
- There will be sufficient flexibility in the Project Agreement for the Steveston project to allow innovative solutions to be brought forward by proponents to reduce costs and to help manage Project risks;
- The existing bridge must remain fully operational during the day throughout construction including peak hours;
- The Steveston bridge can be closed or partially closed during off-peak hours;
- Periodic closures of either the southbound or northbound lanes has been assumed for the construction of the new Steveston Interchange structures (girder erection);
- Work over Highway 99 and intersection work at the Steveston highway intersections must occur at night to avoid traffic delays and congestion;
- The lane control and counterflow systems along Highway 99 must remain fully operational throughout construction, through temporary and permanent systems;
- Preloading for the new westbound bridge approaches and embankments will take a minimum of 6 months and up to 12 months, and 6 months for the eastbound bridge approaches and embankments;
- The City of Richmond buried water utilities must be relocated prior to approach and bridge construction; and,
- There will be adequate space to perform the center pier construction and abutment ground improvements once the detour lanes are built and the sloped abutments are removed.

The major exclusions to CHARTER's cost estimate are outlined below:

- Cost considerations due to third-party agreements;
- Property acquisition costs (permanent and/or temporary) beyond the budget value listed above;
- Construction delays or liquidated damages; and,
- Allowance for scope creep and/or adjustments to quantities.

9 MARKET TRENDS

Prior to the COVID-19 situation CHARTER noted that the trend in market conditions was showing an overall increase in contractor bids by approximately █%. This was generally reflected in an increase to the profit margins contractors believed they could successfully tender, as well as an overall increase in construction costs in the local market. However, considering the current health situation CHARTER believes that the market may correct this increase and the Project could experience some quiet aggressive pricing. Consequently, CHARTER has not considered this potential price fluctuation to the overall markup (bonding, insurance, administrative overhead, and profit) for the Project; however, due to recent tender feedback we have flagged this trend to be considered by the Project Team. This market condition is above and beyond the escalation assumption noted in **Section 6.1** of this report. CHARTER has also noted that recent 2021 bid tenders and feedback from suppliers indicate **significant** increases in material costs ranging from structural steel to PVC which should be monitored and tracked as a project risk outside of expected inflation.

The project will be of interest to small to medium local contractors. Some of these have business models that may be incompatible with the requirements of the CBA/BCIB. This could limit the number of bidders.

10 CLOSURE

We trust this work meets your expectations, however, should you have any questions or require further clarifications, please contact the undersigned and we will be happy to discuss further.

Yours truly,



Devin Jones, P.Eng.
Estimator
CHARTER Project Delivery Inc.