



# Public Works and Government Services Canada

Requisition No. EZ899-173256 /B

**SPECIFICATIONS**

For  
Esquimalt Veteran Cemetery - Columbaria  
Veteran Dr. (Gorge Vale)  
Victoria, B.C.  
V9A 4P7

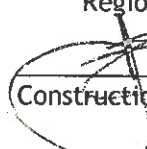
Project No. R.080256.003

March, 2017

**APPROVED BY:**

  
\_\_\_\_\_  
Regional Manager, AES

2017-03-20  
Date

  
\_\_\_\_\_  
Construction Safety Coordinator

2017-03-20  
Date

**TENDER:**

  
\_\_\_\_\_  
Project Manager

Mar 9, 2017  
Date

Public Works and Government Services Canada  
**ESQUIMALT VETERANS CEMETERY - COLUMBARIA**

Project No. R.080256.003

**PROJECT MANUAL**



March 16<sup>th</sup> 2017

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**END OF SECTION**

## 1.1 CODES

- .1 Perform work to current Codes, Construction Standards and Bylaws, including Amendments up to the tender closing date.

## 1.2 DESCRIPTION OF WORK

- .1 Work under this Contract covers the expansion of the existing God's Acre (Esquimalt) Veterans Cemetery, located within Gorge Vale Golf Course, 1005 Craigflower Rd, Victoria, BC V9A 2X9.
  - .1 Supply, delivery and installation of a total of seven (7) columbaria units:
    - Four (4) - 80 niche columbaria,
    - One (1) - 64 niche columbarium,
    - Two (2) - 40 niche columbaria
  - .2 As an option provide Supply, delivery and installation of up to 14 additional units ( 6 x 80 niches columbaria and 8 x 40 niches columbaria) within one year of delivery of the initial units, at the same price for each respective unit. Maximum total of additional optional units are as follows: 6 x 80 niche units and 8 x 40 niche units.
  - .3 Columbaria to be stone clad as indicated.
  - .4 Columbaria to be installed on engineered concrete footings provided by others;
  - .5 Columbaria niche sizes as indicated.
  - .6 Columbaria niches shall be constructed of aluminum or synthetic polymer.
  - .7 Columbaria shutters are to sit in ledges without the use of rosettes.
  - .8 Columbaria to be constructed from approved shop drawings stamped by a Professional Engineer licensed to practice in the Province of BC.
  - .9 Adherence to waste reduction requirement for reuse or recycling of waste materials, thus diverting materials from landfill.

## 1.3 CONTRACT DOCUMENTS

- .1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.
- .2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.

## 1.4 DIVISION OF SPECIFICATIONS

- .1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.
- .2 A division may consist of the work of more than one subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.
- .3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

## 1.5 TIME OF COMPLETION

- .1 Complete the project in one continuous operation within 98 days (14 weeks) after Contract Award and the site is ready for columbaria installation.

## **1.6 HOURS OF WORK**

- .1 Restrictive as follows:
  - .1 Schedule deconstruction, removal and construction work during normal working hours. Normal weekday working hours are Monday to Friday 7:00 am to 5:00 pm. Weekend work may also be permitted with advance notice.
  - .2 Notify Departmental Representative of all after hours work, including weekends and holidays.

## **1.7 WORK SCHEDULE**

- .1 Carry on work as per indicated “PHASES” and as follows:
  - .1 Within 10 working days after Contract award, provide a “phasing bar chart” and a schedule showing anticipated progress stages and final completion of the work within the time period required by the Contract documents. Indicate the following:
    - .1 Submission of shop drawings, product data, MSDS sheets and samples.
    - .2 Commencement and completion of work of each section of the specifications or trade for each phase as outlined.
    - .3 Final completion date within the time period required by the Contract documents.
  - .2 Do not change approved Schedule – without notifying Departmental Representative.
  - .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

## **1.8 COST BREAKDOWN**

- .1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Departmental Representative and aggregating Contract price.

## **1.9 CODES, BYLAWS, STANDARDS**

- .1 Perform work in accordance with the National Building Code of Canada (NBC) 2010, and other indicated Codes, Construction Standards and/or any other Code or Bylaw of local application.
- .2 Comply with applicable local bylaws, rules and regulations enforced at the location concerned.
- .3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.
- .4 In any case of conflict or discrepancy, the most stringent requirements shall apply.

## **1.10 DOCUMENTS REQUIRED**

- .1 Maintain 1 copy each of the following at the job site:
  - .1 Contract drawings.
  - .2 Contract specifications.
  - .3 Addenda to Contract documents.

- .4 Copy of approved work schedule.
- .5 Reviewed/approved, stamped shop drawings.
- .6 Change orders.
- .7 Other modifications to Contract.
- .8 Field test reports.
- .9 Reviewed/approved samples.
- .10 Manufacturers' installation and application instructions.
- .11 One set of record drawings and specifications for "as-built" purposes.
- .12 National Building Code of Canada 2010.
- .13 Current construction standards of workmanship listed in technical Sections.
- .14 Building Safety Plan.

### **1.11 CONTRACTOR'S USE OF SITE**

- .1 Use of site:
  - .1 Exclusive and complete for execution of work.
  - .2 Assume responsibility for assigned premises for performance of this work.
  - .3 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative.
- .2 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.
- .3 Do not unreasonably encumber site with material or equipment.
- .4 Use only the access route indicated for moving workers and material.
  - .1 Protect existing structures to remain, such as walls, fencing and cemetery monuments.
  - .2 Protect new work by the general contractor, such as walls, paving or related elements of the project that may be under construction.
  - .3 Accept liability for damage, safety of equipment and overloading of equipment.

### **1.12 EXAMINATION**

- .1 Examine site and be familiar and conversant with existing conditions likely to affect work
- .2 Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.

### **1.13 SETTING OUT OF WORK**

- .1 Assume full responsibility for approval of the layout of work to the locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and install work.
- .3 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.

**1.14 ACCEPTANCE OF SUBSTRATES**

- .1 Each trade shall examine surfaces prepared by others and job conditions which may affect his work, and shall report defects to the Departmental Representative. Commencement of work shall imply acceptance of prepared work or substrate surfaces.

**1.15 QUALITY OF WORK**

- .1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.
- .2 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code of Canada 2010 and BC Building Code 2012 Construction Standards.
- .3 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative whose decision is final.

**1.16 WORKS COORDINATION**

- .1 Coordinate work.
  - .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
- .2 Convene meetings between the contractors whose work interfaces and ensure awareness of areas and extent of interface required.
  - .1 Provide each contractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.
  - .2 Develop coordination drawings when required, illustrating potential interference between the work of various trades and distribute to affected parties.
    - .1 Pay particular close attention to work and within or near to structural elements, including on the surrounding golf course property.
    - .2 Identify on coordination drawings service lines and indicate location of entrances and access routes into the site.
  - .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
  - .4 Prepare and distribute minutes of each meeting.
  - .5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submit shop drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.
- .4 Work coordination:
  - .1 Ensure cooperation between trades to facilitate general progress of work and avoid situations of spatial interference.
  - .2 Ensure that each contractor provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed work.
  - .3 Ensure disputes between contractors are resolved.



- .5 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate work.

**1.17 APPROVAL OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

- .1 In accordance with Section 013300, submit the requested shop drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.
- .2 **Allow sufficient time for the following:**
  - .1 Review of product data.
  - .2 Approval of shop drawings.
  - .3 Review of re-submission.
  - .4 Ordering of approved material and/or products.

**1.18 PROJECT MEETINGS**

- .1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

**1.19 TESTING AND INSPECTION**

- .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative.
- .2 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified.
- .3 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require to verify acceptability of correct work.
- .4 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .5 Provide Departmental Representative with 2 copies of testing laboratory reports as soon as they are available.

**1.20 AS-BUILT DOCUMENTS**

- .1 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.

**1.21 CLEANING**

- .1 Daily conduct cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.
- .2 **Ensure cleanup of the work areas each day after completion of work.**
- .3 In preparation for interim and final inspections:
  - .1 Examine all visible surfaces.

- .2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed exterior finished surfaces.
- .4 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.

**1.22 DUST CONTROL**

- .1 Provide temporary dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of work and public.

**1.23 ENVIRONMENTAL PROTECTION**

- .1 Prevent extraneous materials from contaminating air beyond construction area, by providing temporary enclosures during work.
- .2 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.
- .3 Ensure proper disposal procedures in accordance with all applicable territorial regulations.

**1.24 ADDITIONAL DRAWINGS**

- .1 The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.
- .2 Upon request, Departmental Representative may furnish up to a maximum of 6 sets of Contract documents for use by the Contractor at no additional cost. Should more than 6 sets of documents be required the Departmental Representative will provide them at additional cost.

**1.25 SMOKING ENVIRONMENT**

- .1 Smoking within the vicinity of the work site is not permitted.

**1.26 SYSTEM OF MEASUREMENT**

- .1 The metric system of measurement (SI) will be employed on this Contract.

**1.27 FAMILIARIZATION WITH SITE**

- .1 Before submitting tender, visit site – as indicated in tender documents and become familiar with all **conditions likely to affect the cost of the work.**

**1.28 SUBMISSION OF TENDER**

- .1 Refer to AIO1 of the bid documents

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 Precedence**

- .1 For Federal Government projects, Division I Sections take precedence over technical Specifications sections in other Divisions of this Project Manual.

### **1.2 Measurement Procedures**

- .1 Cost of providing Construction Progress Schedules will be considered incidental to the work and no additional payment will be made.

### **1.3 Definitions**

- .1 **Activity:** An element of Work performed during course of Project. An activity normally has an expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 **Bar Chart (GANTT Chart):** A graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Bar Chart should be derived from MS Project or compatible software.
- .3 **Baseline:** Original approved plan for Project, plus or minus approved scope changes.
- .4 **Construction Work Week:** Monday to Friday, inclusive, will provide five days' work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 **Duration:** Number of work periods (not including holidays or other nonworking periods) required to complete an activity or other Project element. Usually expressed as workdays or workweeks.
- .6 **Work Plan:** A summary-level schedule that identifies major activities and key milestones.
- .7 **Milestone:** A significant event in Project, usually completion of major deliverable.
- .8 **Project Schedule:** The planned dates for performing activities and the planned dates for meeting milestones. A dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 **Project Planning, Monitoring and Control System:** Overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.
- .10 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.

### **1.4 Requirements**

- .1 Ensure Work Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 20 working days, to allow for progress reporting.

- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Substantial Completion Certificate and Final Certificate as defined times of completion are of essence to this contract.
- .5 Include the requirements of Section 01 11 55, General Instructions.

### **1.5 Submittals**

- .1 Submit to Departmental Representative within seven (7) working days of Award of Contract, a Bar (GANNT) Chart for planning, monitoring and reporting of project progress.
- .2 Submit Project Schedule to Departmental Representative within ten (10) working days of receipt of acceptance of Work Plan. Within seven (7) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

### **1.6 Project Milestones**

- .1 Project milestones form interim targets for Project Schedule:
  - .1 Substantial Completion 14 weeks after award contract and availability of the prepared site..

#### **Work Plan**

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANNT).
- .2 Departmental Representative will review and return revised schedules within five (5) working days.
- .3 .Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become part of the work plan and be used as the baseline for updates.

### **1.8 Project Schedule**

- .1 Develop detailed Project Schedule derived from the Work Plan
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Submission of Shop Drawings.
- .3 Mobilization and preparation of staging area(s).
- .4 Site Clean-up and demobilization:

### **1.9 Project Schedule Reporting**

- .1 Update Project Schedule on monthly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

**1.10 Project Meetings**

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

**Part 2 PRODUCTS**

**2.1 Not used**

- .1 Not used

**Part 3 EXECUTION**

**3.1 Not used**

- .1 Not used

**END OF SECTION**

## 1.1 APPROVALS

- .1 Approval of shop drawings and samples: refer to Section 01 11 55.

## 1.2 GENERAL

- .1 This Section specifies general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and other requested submittals to Departmental Representative for review. Additional specific requirements for submissions are specified in individual technical sections.
- .2 Present shop drawings, product data and samples in SI Metric units.
- .3 Where items or information is not produced in SI Metric units, converted values are acceptable.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submissions.
- .5 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract documents and stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Departmental Representative's review of submission unless Departmental Representative gives written acceptance of specific deviations.
- .7 Make any changes in submissions which Departmental Representative may require consistent with Contract documents and resubmit as directed by Departmental Representative.
- .8 Notify Departmental Representative in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.
- .9 **Do not proceed with work until relevant submissions are reviewed and approved by the Departmental Representative.**

## 1.3 SUBMISSION REQUIREMENTS

- .1 Coordinate each submission with the requirements of the work and the Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .2 Allow (5) five days for Departmental Representative's review of each submission, unless noted otherwise.
- .3 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .4 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:

- .1 Subcontractor.
- .2 Supplier.
- .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative, certifying approval of submissions, verification of field measurements and compliance with Contract documents.
- .5 Details of appropriate portions of work as applicable.
  - .1 Fabrication.
  - .2 Layout, showing dimensions (including identified field dimensions: and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Relationship to adjacent work.
- .6 After Departmental Representative's review, distribute copies.

#### **1.4 SHOP DRAWINGS**

- .1 Shop drawings: original drawings or modified standard drawings provided by Contractor to illustrate details of portion of work which are specific to project requirements.
- .2 Maximum sheet size: 850 x 1050mm.
- .3 Submit 6 prints of shop drawings for each requirement requested in the specification sections and/or as requested by the Departmental Representative.
- .4 Cross-reference shop drawing information to applicable portions of the Contract documents.  
Submit drawings stamped and signed by professional engineer or licenced in BC, Canada

#### **1.5 SHOP DRAWINGS REVIEW**

- .1 Review of shop drawings by Public Works and Government Services Canada is for the sole purpose of ascertaining conformance with the general concept.
- .2 This review shall not mean that Public Works and Government Services Canada approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same.
- .3 This review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and Contract documents.
- .4 Without restricting the generality of the foregoing, the Contractor is responsible for:
  - .1 Dimensions to be confirmed and correlated at the job site.
  - .2 Information that pertains solely to fabrication processes or to techniques of construction and installation.
  - .3 Coordination of the work of all sub-trades.

**1.6 PRODUCT DATA**

- .1 Product data: manufacturers' catalogue sheets, MSDS sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products or any other specified information.
- .2 Delete information not applicable to project.
- .3 Supplement standard information to provide details applicable to project.
- .4 Cross-reference product data information to applicable portions of Contract documents.
- .5 Submit 6 copies of product data.

**1.7 SAMPLES**

- .1 Samples: examples of materials, equipment, quality, finishes and workmanship.
- .2 Where colour, pattern or texture is a criterion, submit a full range of samples.
- .3 **Reviewed and accepted samples will become the standard of workmanship and material against which installed work will be verified.**

**1.8 PROGRESS SCHEDULE**

- .1 Submit work schedule and cost breakdown as required in Section 01 11 55 General Instructions.

**1.9 TEST RESULTS AND INSPECTION REPORTS**

Submit in duplicate test results and inspection reports as required.

**END OF SECTION**



## 1. REFERENCES

- .1 Government of Canada:
  - .1 Canada Labour Code – Part II
  - .2 Canada Occupational Health and Safety Regulations.
- .2 National Building Code of Canada (NBC):
  - .1 Part 8, Safety Measures at Construction and Demolition Sites.
- .3 Canadian Standards Association (CSA): as amended:
  - .1 CSA Z797-2009 Code of Practice for Access Scaffold.
  - .2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes.
  - .3 CSA-S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .4 Fire Protection Engineering Services, HRSDC:
  - .1 FCC No. 301, Standard for Construction Operations.
  - .2 FCC No. 302, Standard for Welding and Cutting.
- .5 American National Standards Institute (ANSI):
  - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
- .6 Province of British Columbia:
  - .1 Workers Compensation Act Part 3 - Occupational Health and Safety.
  - .2 Occupational Health and Safety Regulation.
- .7 Yukon Territory:
  - .1 Occupational Health and Safety Act, R.S.Y.

## 2. RELATED SECTIONS

- .1 Refer to the following current NMS sections as required:
  - .1 Submittals procedures: Section 013300
  - .2 Temporary utilities: Section 015100
  - .3 Construction facilities: Section 015200
  - .4 Temporary barriers and enclosures: Section 015600

## 3. WORKERS' COMPENSATION BOARD COVERAGE

- .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

## 4. COMPLIANCE WITH REGULATIONS

- .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

- .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations

## **5. SUBMITTALS**

- .1 Submit to Departmental Representative submittals listed for review in accordance with Section 01 33 00.
- .2 Work effected by submittal shall not proceed until review is complete.
- .3 Submit the following:
  - .1 Health and Safety Plan.
  - .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
  - .3 Copies of incident and accident reports.
  - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
  - .5 Emergency Procedures.
- .4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within five days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.
- .5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.
- .6 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
  - .1 Be construed to imply approval by the Departmental Representative.
  - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
  - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

## **6. RESPONSIBILITY**

- .1 Assume responsibility as the Prime Contractor for work under this contract.
- .2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan

**7. GENERAL CONDITIONS**

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
  - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
  - .2 Secure site at night time as deemed necessary to protect site against entry.

**8. REGULATORY REQUIREMENTS**

- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.
- .2 In event of conflict between any provisions of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be taken.

**9. HEALTH AND SAFETY PLAN**

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
  - .1 Primary requirements:
    - .1 Contractor's safety policy.
    - .2 Identification of applicable compliance obligations.
    - .3 Definition of responsibilities for project safety/organization chart for project.
    - .4 General safety rules for project.
    - .5 Job-specific safe work, procedures.
    - .6 Inspection policy and procedures.
    - .7 Incident reporting and investigation policy and procedures.
  - .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
  - .3 List hazardous materials to be brought on site as required by work.
  - .4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
  - .5 Identify personal protective equipment (PPE) to be used by workers.
  - .6 Identify personnel and alternates responsible for site safety and health.
  - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

- .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
- .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

## **10. EMERGENCY PROCEDURES**

- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
  - .1 Designated personnel from own company.
  - .2 Regulatory agencies applicable to work and as per legislated regulations.
  - .3 Local emergency resources.
  - .4 Departmental Representative.
- .2 Include the following provisions in the emergency procedures:
  - .1 Notify workers and first-aid attendant of the nature and location of emergency.
  - .2 Evacuate all workers safely.
  - .3 Check and confirm the safe evacuation of all workers.
  - .4 Notify the fire department or other emergency responders.
  - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
  - .6 Notify Departmental Representative.
- .3 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

## **11. HAZARDOUS PRODUCTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
  - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 33 00.

## **12. FIRE SAFETY AND HOT WORK**

- .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch or other open flame devices and grinding with equipment which produces sparks.

## **13. FIRE SAFETY REQUIREMENTS**

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

**14. UNFORESEEN HAZARDS**

- .1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

**15. POSTED DOCUMENTS**

- .1 Post legible versions of the following documents on site:
  - .1 Health and Safety Plan.
  - .2 Sequence of work.
  - .3 Emergency procedures.
  - .4 Site drawing showing project layout, locations of first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
  - .5 Notice of Project.
  - .6 Site plans.
  - .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
  - .8 Workplace Hazardous Materials Information System (WHMIS) documents.
  - .9 Material Safety Data Sheets (MSDS).
  - .10 List of names of the qualified coordinator responsible for the coordination of health and safety activities" in accordance with Section 118 of the Workers' Compensation Act.
- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

**16. MEETINGS**

- .1 **Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.**

**17. CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
- .3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 04 43 26 Dimension Stone Veneer Cladding

**1.2                REFERENCE STANDARDS**

- .1            Canadian Construction Documents Committee (CCDC)
  - .1            CCDC 2-94, Stipulated Price Contract.

**1.3                INSPECTION**

- .1            Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2            Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3            If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4            Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

**1.4                ACCESS TO WORK**

- .1            Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2            Co-operate to provide reasonable facilities for such access.

**1.5                PROCEDURES**

- .1            Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2            Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3            Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

**1.6                REJECTED WORK**

- .1            Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by

Departmental Representative as failing to conform to Contract Documents. Replace or re- execute in accordance with Contract Documents.

- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

## **1.7 REPORTS**

- .1 Submit 2 copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to manufacturer or subcontractor of work being inspected or tested.

## **1.8 TESTS AND MIX DESIGNS**

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

## **1.9 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Departmental Representative.
- .3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, Departmental Representative will assist in preparing schedule fixing dates for preparation.
- .6 Remove mock-up at conclusion of Work or when acceptable to Departmental Representative.
- .7 Mock-ups may remain as part of Work.
- .8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**



### **1.1 ACCESS AND DELIVERY**

- .1 Only the designated entry and access routes as indicated may be used to enter the site.
  - .1 Make good any damage resulting from Contractor's use.
- .2 Use of the Gorge Vale Golf Course property will be granted to the Contractor through the Departmental Representative.
  - .1 CFB Esquimalt Department of Defence property is to be used for loading and unloading purposes.
  - .2 The storage or stockpiling of materials is permitted only within the area "Existing Parking Lot Designated for Laydown/Staging Area – A" as shown on the plans.
  - .3 Parking is not permitted on Gorge Vale Golf Course property. Security has been instructed to have unauthorized vehicles towed at the Contractor's expense.

### **1.2 STORAGE FACILITIES**

- .1 Storage space will be limited to the area of construction.
- .2 Coordinate with other prime contractor (site infrastructure) for delivery and material storage.

### **1.3 POWER**

- .1 Electrical power and lighting at the existing God's Acre Veterans Cemetery chapel building may be used for construction purposes at no extra cost, provided that warranties are not affected thereby and electrical components used for temporary power are replaced when damaged. Do not use emergency power or UPS panels for this purpose.

#### **WATER SUPPLY**

- .1 Water supply is available at existing building and may be used for construction purposes at no cost.

### **1.5 SANITARY FACILITIES**

- .1 Existing designated washroom facilities at the existing God's Acre Veterans Cemetery may be used on approval of Departmental Representative. Clean and stock washroom as needed before final completion.

### **1.6 REMOVAL OF TEMPORARY FACILITIES**

- .1 Remove temporary facilities from site when directed by the Departmental Representative.

### **1.7 SIGNS AND NOTICES**

- .1 Signs and notices for safety and instruction shall be in either official languages or graphic symbols conforming to CAN/CSA-Z321.
- .2 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or when directed by Departmental Representative.

**END OF SECTION**

## **1.1 PRODUCTS/MATERIAL AND EQUIPMENT**

- .1 Use NEW products/material and equipment unless otherwise specified. The term “products” is referred to throughout the specifications.
- .2 Use products of 1 manufacturer for material and equipment of the same type or classification unless otherwise specified.
- .3 Unless otherwise specified, comply with manufacturer’s latest printed instructions for materials and installation methods.
- .4 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer’s instructions. Departmental Representative will designate which document is to be followed.
- .5 Provide metal fastenings and accessories in the same texture, colour and finish as base metal in which they occur.
  - .1 Prevent electrolytic action between dissimilar metals.
  - .2 Use non-corrosive fasteners, anchors and spacers for securing exterior work.
- .6 Fastenings which cause spalling or cracking are not acceptable.
- .7 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .8 Coordinate with the other prime contractor (site infrastructure) for materials delivery schedule.
- .9 Deliver, store and maintain packaged material and equipment with manufacturer’s seals and labels intact.
- .10 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.
- .11 Store products in accordance with suppliers’ instructions.
- .12 Deliver for storage and future use by Owner 6 extra basalt columbaria shutters (3 honed and three flamed), as specified.
- .13 At completion of the project, provide one shutter lifting and mounting device (for future use) to owner.
- .14 Touch up damaged factory finished surfaces to Departmental Representative’s satisfaction.

## **1.2 QUALITY OF PRODUCTS**

- .1 Products, materials and equipment (referred to as products) incorporated into work shall be new, not damaged or defective, and of the best quality (compatible with the specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of the products provided.
- .2 Defective products will be rejected regardless of previous inspections.
  - .1 Inspection does not relieve responsibility but is precaution against oversight or error.
  - .2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

- .3 Retain purchase orders, invoices and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.
- .4 Should any dispute arise as to quality or fitness of products, the decision rests strictly with the Departmental Representative based upon the requirements of the Contract Documents.
- .5 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout the project.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions.

### **1.3 AVAILABILITY OF PRODUCTS**

- .1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items.
- .2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.
- .3 In event of failure to notify Departmental Representative at the start of work and should it subsequently appear that the work may be delayed for such reason, the Departmental Representative reserves the right to substitute more readily available products of similar character, at no increase in either the Contract price or the Contract time.

### **1.4 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in the specifications, install or erect products in accordance with the manufacturer's instructions.
  - .1 Do not rely on labels or enclosures provided with products.
  - .2 Obtain written instructions directly from the manufacturer.
- .2 Notify Departmental Representative in writing of conflicts between the specifications and the manufacturer's instructions so that the Departmental Representative may establish the course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Departmental Representative to require removal and re-installation at no increase in either the Contract price or the Contract time.

### **1.5 CONTRACTOR'S OPTIONS FOR SELECTION OF PRODUCTS FOR TENDERING**

- .1 Products are specified by "**Prescriptive**" specifications: select any product meeting or exceeding specifications.
- .2 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.
- .3 Products specified to meet particular design requirements or to match existing materials: use only material specified Approved Product. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with "Special Instructions to Tenderers".

- .4 When products are specified by a referenced standard or by Performance specifications, upon request of Departmental Representative obtain from manufacturer and independent laboratory report showing that the product meets or exceeds the specified requirements.

#### **1.6 SUBSTITUTION AFTER CONTRACT AWARD**

- .1 No substitutions are permitted without prior written approval of the Departmental Representative.
- .2 **Proposals for substitution may only be submitted after Contract award.** Such request must include statements of respective costs of items originally specified and the proposed substitution.
- .3 Proposals will be considered by the Departmental Representative if:
  - .1 Products selected by tenderer from those specified are not available;
  - .2 Delivery date of products selected from those specified would unduly delay completion of Contract, or
  - .3 Alternative product to that specified, which is brought to the attention of considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.
- .4 **Should the proposed substitution be accepted either in part or in whole, assume the full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.**
- .5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCE STANDARDS**

- .1            Canadian Construction Documents Committee (CCDC)
  - .1            CCDC 2- 94, Stipulated Price Contract.

**1.2                PROJECT CLEANLINESS**

- .1            Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2            Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3            Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4            Provide and use marked separate bins for recycling. Refer to Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
- .5            Dispose of waste materials and debris off-site.
- .6            Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

**1.3                FINAL CLEANING**

- .1            Refer to CCDC 2, GC 3.14.
- .2            When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3            Remove waste products and debris other than that caused by others, and leave Work, including all finished surfaces clean and in a conditions suitable for use.
- .4            Prior to final review remove surplus products, tools, construction machinery and equipment.
- .5            Remove waste products and debris including that caused by Owner or other Contractors.
- .6            Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .7            Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .8            Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9            Remove dirt and other disfiguration from exterior surfaces.
- .10          Sweep and wash clean paved areas.
- .11          Remove debris and surplus materials from all accessible concealed spaces.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**1.1 RELATED WORK**

- .1 Refer to every technical section for waste management and disposal.

**1.2 DEFINITIONS**

- .1 Waste Audit (WA): relates to projected waste generation. Involves controlled separation of waste.
- .2 Waste Reduction Workplan (WRW): a written report which addresses opportunities for reduction, re-use or recycling of materials.
- .3 Materials Source Separation Program (MSSP): consists of a series of ongoing activities to separate re-usable and recyclable waste material into material categories from other types of waste at point of generation.

**1.3 MATERIALS SOURCE SEPARATION**

- .1 Before project start-up, prepare Materials Source Separation Program. Provide separate containers for re-usable and/or recyclable materials of the following:
  - .1 Metals.
  - .2 Wood.
  - .3 Plastics
  - .4 Other materials as indicated in technical sections.
- .2 Implement Materials Source Separation Program for waste generated on project in compliance with approved methods and as approved by Departmental Representative.
- .3 Locate containers in location facilitating deposit of materials without hindering daily operations.
- .4 Locate separated materials in areas which minimize material damage.

**1.4 DIVERSION OF MATERIALS**

- .1 Create a list of materials to be separated from the general waste stream and stockpiled in separate containers, to the approval of the Departmental Representative and consistent with applicable fire regulations.
  - .1 Mark containers.
  - .2 Provide instruction on disposal practices.

**1.5 STORAGE, HANDLING AND APPLICATION**

- .1 Do work in compliance with Waste Reduction Workplan.
- .2 Handle waste materials not re-used, salvaged, or recycled in accordance with appropriate regulations and codes.
- .3 Materials in separated condition: collect, handle, store on site, and transport off-site to an approved and authorized recycling facility.
- .4 Materials must be immediately separated into required categories for re-use or recycling.
- .5 Unless specified otherwise, materials for removal become the Contractor's property.
- .6 On-site sale of salvaged/recyclable material is not permitted.

- .7 **Provide Departmental Representative with receipts** indicating quantity of material delivered to landfill.
- .8 **Provide Departmental Representative with receipts** indicating quantity and type of materials sent for recycling.

**END OF SECTION**



## **1.1 SUBMISSION**

- .1 Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- .2 Revise content of documents as required before final submittal.
- .3 Phasing of submission:
  - .1 2 weeks before substantial performance of the work, submit to Departmental Representative 2 final copies of operation and maintenance manuals.
- .4 Ensure spare parts, maintenance materials and special tools provided are new, neither damaged nor defective, and of same quality and manufacture as products provided in work.
- .5 If requested, furnish evidence as to type, source and quality of products provided.
- .6 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

## **1.2 FORMAT**

- .1 Organize data in the form of an instructional manual.
- .2 Binder: vinyl, hard covered, 3 “D” ring, loose leaf 219x279 mm with spine and face pockets.
- .3 Identify binder with typed or printed title “Project Record Documents;” list title of project and identify subject matter of contents.
- .4 Arrange content by section numbers and sequence of Table of Contents.
- .5 Provide tabbed divider for each separate product/system, with typed description of product and parts of equipment.
- .6 Text: manufacturer’s printed data, or typewritten data.
- .7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

## **1.3 CONTENTS, EACH VOLUME**

- .1 Table of contents – provide the following:
  - .1 Title of project.  
Date of submission.
  - .2 Names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product data: mark each sheet to clearly identify products and component parts, and data applicable to installation. Delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems.

#### **1.4 AS-BUILT DOCUMENTS**

- .1 **Contract drawings** and shop drawings: legibly mark each item to record actual construction, including:
  - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .2 Field changes of dimension and detail.
  - .3 Changes made by change orders.
  - .4 Details not on original Contract drawings.
  - .5 References to related shop drawings and modifications.
- .2 **Contract Specifications:** legibly mark each item to record actual “Workmanship of Construction”, including:
  - .1 Manufacturer, trade name, and catalogue number of each “Product/Material” actually installed, particularly optional items and substitute items.
  - .2 Changes made by addenda and change orders.
- .3 As-built information:
  - .1 Record changes in red ink.
  - .2 Mark on 1 set of drawings, specifications and shop drawings at completion of project and, before final inspection, neatly transfer notations to second set.
  - .3 Provide 1 set of CDs in AutoCAD .dwg file format with all as-built information on the CDs.
  - .4 Submit all sets for the Departmental Representative.

#### **1.5 EQUIPMENT AND SYSTEMS**

- .1 Operating procedures – include the following:
  - .1 Start-up and routine normal operating instructions.
  - .2 Summer, winter, and any special operating instructions.
- .2 Additional requirements: as specified in individual specification Sections.

#### **1.6 MANUFACTURER’S DOCUMENTATION REPORTS**

- .1 Departmental Representative will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

#### **1.7 SPARE PARTS**

- .1 Provide spare parts in quantities specified in individual specification Sections.
- .2 Provide items of same manufacture and quality as items in work.
- .3 Deliver to on-site location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to the Departmental Representative. Include approved listings in maintenance manual.
- .5 Obtain receipt for delivered products and submit to Departmental Representative.

**1.8 MAINTENANCE MATERIALS**

- .1 Provide maintenance and extra materials in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in work.
- .3 Deliver to on-site location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to the Departmental Representative. Include approved listings in maintenance manual.
- .5 Obtain receipt for delivered products and submit to Departmental Representative.

**1.9 SPECIAL TOOLS**

- .1 Provide one new Manual Lifting and Mounting Suction Cups for removal of stone shutters.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to location as directed by Departmental Representative.
- .4 Receive and catalogue all items:
  - .1 Submit inventory listing to the Departmental Representative.
  - .2 Include approved listings in maintenance manual.

**1.10 WARRANTIES, BONDS, TEST REPORTS, INSPECTION REPORTS**

- .1 Separate each Document with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier and manufacturer with name, address, and telephone number of responsible principal.
- .3 Provide written lifetime warranty for all stone and 25 year warranty for workmanship of metal components within 10 days of completion of the work.
- .4 Except for items put into use with the Departmental Representative's permission, leave date of beginning of time of warranty until the date of substantial performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

**1.11 COMPLETION**

- .1 Submit a written certificate that the following have been performed:
  - .1 Work has been completed and inspected for compliance with the Contract documents.
  - .2 Defects have been corrected and deficiencies have been completed.
  - .3 Operation of systems has been demonstrated to the personnel indicated by the Departmental Representative.
  - .4 Work is complete and ready for final inspection.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 04 05 12 Masonry Mortar and Grout
- .2        Section Dimension Stone Veneer Cladding

**1.2                REFERENCE STANDARDS**

- .1        CSA Group
  - .1        CAN/CSA-A179- 04(R2009), Mortar and Grout for Unit Masonry.
  - .2        CAN/CSA-A371-04(R2009), Masonry Construction for Buildings.
- .2        International Masonry Industry All-Weather Council (IMIAC)
  - .1        Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

**1.3                ADMINISTRATIVE REQUIREMENTS**

- .1        Conduct pre-installation meeting one week prior to on-site installations to:
  - .1        Verify access to all areas of work site.
  - .2        Verify project requirements, including concrete footings provided by others.
  - .3        Verify substrate conditions.
  - .4        Co-ordinate products, installation methods and techniques.
  - .5        Sequence work of related sections.
  - .6        Co-ordinate with other building subtrades.
  - .7        Review manufacturer's installation instructions.
  - .8        Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
  - .9        Review warranty requirements.
- .2        Scheduling: sequence with other work in accordance with Contractor's Construction Progress Schedule.

**1.4                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 04 05 12 Dimension Stone Veneer Cladding.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for mortar and grout and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2        Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 33.10 - Health and Safety Requirements.
- .3        Shop Drawings:

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in BC, Canada.
- .2 Submit shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.
- .4 Samples:
  - .1 Provide samples as follows:
    - .1 2 cured, coloured samples of grout and mortar, illustrating colour range, supplemented with specific requirements in Section 04 05 12- Masonry Mortar and Grout.
    - .2 2 of each type of masonry anchorage, reinforcement and connector accessory specified.
    - .3 Samples: used for testing and when accepted become standard for material used.
- .5 Certificates: submit manufacturer's product certificates certifying materials comply with specified requirements.
- .6 Test and Evaluation Reports:
  - .1 Test reports to certify compliance of masonry units and mortar ingredients with specified performance characteristics and physical properties.
  - .2 Submit data for masonry units, in addition to requirements set out in referenced CSA and ASTM Standards, indicating initial rates of absorption.
- .7 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, and safety and cleaning.
- .8 Manufacturer's Reports: provide written reports prepared by manufacturer's on-site personnel to include:
  - .1 Verification of compliance of work with Contract.
  - .2 Site visit reports providing detailed review of installation of work, and installed work.
- .9 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
  - .2 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer content, and total cost of materials for project.

### **1.5 CLOSEOUT SUBMITTALS**

- .1 Submit manufacturer's instructions for care, cleaning and maintenance of prefaced masonry units for incorporation into manual specified in Section 01 78 30 - Closeout Submittals.

### **1.6 EXTRA MATERIALS**

- .1 Submit manufacturer's instructions in accordance with Section 01 78 00 - Closeout Submittals covering maintenance requirements and parts catalogue, with cuts and identifying numbers, including for Shutter lifting and mounting device (“manual lifting and mounting suction cups”).

### **1.7 QUALITY ASSURANCE**

- .1 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00- Quality Control.
  - .2 Construct mock-up panel of exterior masonry wall construction min. 1200mm x 1800 mm showing masonry colours and textures, use of reinforcement, ties, weep holes, jointing, pointing, coursing, mortar and quality of work.
  - .3 Mock-up used:
    - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
  - .4 Construct mock-up where directed by Departmental Representative.
  - .5 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with work.
  - .6 When accepted by Departmental Representative, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
  - .7 Start work only upon receipt of written approval of mock-up by Departmental Representative.

### **1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect material from nicks, scratches, and blemishes.
  - .3 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
  - .4 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management and Disposal Plan.

- .5 Packaging Waste Management: remove for reuse or return of packaging materials, pallets, and padding, as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

## **1.9 SITE CONDITIONS**

- .1 Ambient Conditions: assemble and erect components when temperatures are above 4 degrees C.
- .2 Weather Requirements: to CAN/CSA-A371.
- .3 Cold weather requirements:
  - .1 To CAN/CSA-A371 with following requirements.
    - .1 Maintain temperature of mortar between 5 degrees C and 50 degrees C until batch is used or becomes stable.
    - .2 Maintain ambient temperature of masonry work and its constituent materials between 5 degrees C and 50 degrees C and protect site from wind chill.
    - .3 Maintain temperature of masonry above 0 degrees C for minimum of 28 days, after mortar is installed.
    - .4 Preheat unheated wall sections in enclosure for minimum 72 hours above 10 degrees C, before applying mortar.
  - .2 Hot weather requirements:
    - .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
    - .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
  - .3 Spray mortar surface at intervals and keep moist for maximum of 3 days after installation.

## **1.10 WARRANTY**

- .1 For Work in this Section 04 05 00 - Common Work Results for Masonry, 12 months warranty period is extended to 24 months.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Masonry materials are specified elsewhere in related Sections:
  - .1 Section 04 04 12 Masonry Mortar and Grout
  - .2 Section 04 43 36 Dimension Stone Veneer Cladding

**Part 3 Execution**

**3.1 INSTALLERS**

- .1 Experienced and qualified masons to carry out erection, assembly and installation of masonry work.

**3.2 EXAMINATION**

- .1 Examine conditions, substrates and work to receive work of this Section.
- .2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.
  - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Departmental Representative.
- .3 Verification of Conditions:
  - .1 Verify that:
    - .1 Substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of stone work.
    - .2 Site conditions are acceptable and are ready to receive work.
    - .3 Built-in items are in proper location, and ready for roughing into masonry work.
  - .2 Commencing installation means acceptance of existing substrates.

**3.3 PREPARATION**

- .1 Establish and protect lines, levels, and coursing.
- .2 Protect adjacent materials from damage and disfiguration.

**3.4 INSTALLATION**

- .1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CAN/CSA-A371.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

**3.5 CONSTRUCTION**

- .1 Exposed masonry:
  - .1 Remove chipped, cracked, and otherwise damaged units, in accordance with CAN/CSA-A165, in exposed masonry and replace with undamaged units.
- .2 Jointing:



- .1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated.
- .2 Allow joints to set just enough to remove excess water, then rake joints uniformly to 6 mm depth and compress with square tool to provide smooth, compressed, raked joints of uniform depth where raked joints are indicated.
- .3 Strike flush joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material, except paint or similar thin finish coating.
- .3 Cutting:
  - .1 Make cuts straight, clean, and free from uneven edges.
- .4 Building-In:
  - .1 Build in items required to be built into masonry.
  - .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .5 Provision for movement:
  - .1 Leave 3 mm space below shelf angles.
  - .2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
  - .3 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .6 Interface with other work:
  - .1 Make good existing work. Use materials to match existing.

### **3.6 SITE TOLERANCES**

- .1 Tolerances in notes to CAN/CSA-A371 apply.

### **3.7 SITE QUALITY CONTROL**

- .1 Site Tests, Inspection:
  - .1 Perform site inspection and testing in accordance with Section 01 45 00- Quality Control.

### **3.8 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 7419 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.9 PROTECTION**

- .1 Temporary Bracing:

- .1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.
  - .2 Bracing approved by Departmental Representative.
  - .3 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.
- .2 Moisture Protection:
- .1 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until completed and protected by flashing or other permanent construction.
  - .2 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 45 00 Quality Control
- .2        Section 03 3000 Cast-in-place Concrete
- .3        Section 04 43 26 Dimension Stone Veneer Cladding

**1.2                REFERENCE STANDARDS**

- .1        CSA Group
  - .1        CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2        CAN/CSA-A179, Mortar and Grout for Unit Masonry.
  - .3        CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .2        International Masonry Industry All-Weather Council (IMIAC)
  - .1        Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Shop drawings, Product Data and Samples.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for masonry mortar and grout and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2        Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 33.10 Health and Safety Requirements. Indicate VOC's mortar, grout, colour additives and admixtures. Expressed as grams per litre (g/L).
- .3        Samples:
  - .1        Submit confirmation of source or product data sheet, prior to mixing or preparation of mortars, to Departmental Representative of:
    - .1        Aggregate: sand.
    - .2        Cement.
    - .3        Lime.
    - .4        Colour pigment samples.
  - .2        Construction Waste Management:
    - .1        Submit project Waste Management Plan highlighting recycling and salvage requirements.

#### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports including sand gradation tests in accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect masonry mortar and grout from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse by manufacturer and return] of pallets, and packaging materials as specified in Construction Waste Management Plan.

#### **1.6 SITE CONDITIONS**

- .1 Ambient Conditions: maintain materials and surrounding air temperature to:
  - .1 Minimum 10 degrees C prior to, during, and 48 hours after completion of masonry work.
  - .2 Maximum 32 degrees C prior to, during, and 48 hours after completion of masonry work.
- .2 Weather Requirements: CAN/CSA-A371 International Masonry Industry All-Weather Council (IMIAC) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Cement:
  - .1 Portland Cement: to CAN/CSA-A3000, HE - High-early-strength hydraulic cement (Type 30) white.
  - .2 Masonry Cement: to CAN/CSA-A3002 and CAN/CSA-A179, Type N.

- .3 Mortar Cement: to CAN/CSA-A3002 and CAN/CSA-A179, Type N, WITH integral water repellents.
  - .1 Use low VOC products.
- .4 Packaged Dry Combined Materials for mortar: to CAN/CSA-A179, Type N, using white colour cement.
- .3 Aggregate: supplied by one supplier.
  - .1 Fine Aggregate: to CAN/CSA-A179, natural sand.
  - .2 Coarse Aggregate: to CAN/CSA-A179.
- .4 Water: clean and potable.
- .5 Lime:
  - .1 Quick Lime: to CAN/CSA-A179, Type N.
  - .2 Hydrated Lime: to CAN/CSA-A179, Type S.
- .6 Bonding Agent: latex type.
- .7 Polymer Latex: organic polymer latex admixture of butadiene-styrene type non-emulsifiable bonding admixture.

## **2.2 COLOUR ADDITIVES**

- .1 Use colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match approved sample. Admixtures to be approved prior to use. Use in accordance with the specific manufacturer's recommendations.

## **2.3 MORTAR MIXES**

- .1 Mortar for exterior masonry above grade:
  - .1 Non-Load Bearing: N.
- .2 Stain Resistant Pointing Mortar: one part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate to 2 percent of Portland cement by weight.
- .3 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: type M.
- .4 Following applies regardless of mortar types and uses specified above:
  - .1 Mortar for stonework: type N.

## **2.4 MORTAR MIXING**

- .1 Use pre-blended, pre-coloured mortar prepackaged under controlled factory conditions. Ingredients batching limitations to be within 1% accuracy.
- .2 Mix mortar ingredients in accordance with CAN/CSA-A179 in quantities needed for immediate use.
- .3 Maintain sand uniformly damp immediately before mixing process.

- .4 Add mortar colour in accordance with manufacturer's instructions. Provide uniformity of mix and colouration.
- .5 Do not use anti-freeze compounds including calcium chloride or chloride based compounds.
- .6 Do not add air entraining admixture to mortar mix.
- .7 Use a batch type mixer in accordance with CAN/CSA-A179.
- .8 Pointing mortar: prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour no more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.
- .9 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.
- .10 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 10 degrees C.

## **2.5 GROUT MIXES**

- .1 Grout: Minimum compressive strength of 12.5 MPa at 28 days. Maximum aggregate size and grout slump: CAN/CSA-A179.

## **2.6 GROUT MIXING**

- .1 Mix batched and delivered grout in accordance with CSA A23.1/A23.2 transit mixed.
- .2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA- A179 fine grout.
- .3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- .4 Do not use calcium chloride or chloride based admixtures.

## **2.7 MIX TESTS**

- .1 Testing Mortar Mix:
  - .1 Test mortar to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA-A179, for mortar based on property specification. Test prior to construction for:
    - .1 Compressive strength.
    - .2 Consistency.
    - .3 Mortar aggregate ratio.
    - .4 Sand/cement ratio.
    - .5 Water content and water/cement ratio.
    - .6 Air content.
    - .7 Splitting tensile strength.
- .2 Testing Grout Mix:
  - .1 Test grout to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA-A179, for proportion specification. Test prior to construction for:

- .1 Compressive strength.
- .2 Sand/cement ratio.
- .3 Water content and water/cement ratio.
- .4 Slump.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for masonry installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 PREPARATION**

- .1 Apply bonding agent to existing concrete surfaces.
- .2 Plug clean-out holes with masonry units. Brace masonry for wet grout pressure.

#### **3.3 CONSTRUCTION**

- .1 Do masonry mortar and grout work in accordance with CAN/CSA-A179 except where specified otherwise.

#### **3.4 MIXING**

- .1 All pointing mortar can be mixed using a regular paddle mixer. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes. Mixing by hand must be pre-approved by the Departmental Representative.
- .2 Clean all mixing boards and mechanical mixing machine between batches.
- .3 Mortar must be weaker than the units it is binding.
- .4 Contractor to appoint one individual to mix mortar, for duration of project. In the event that this individual must be changed, mortar mixing must cease until the new individual is trained, and mortar mix is tested.

#### **3.5 MORTAR PLACEMENT**

- .1 Install mortar to manufacturer's instructions.
- .2 Install mortar to requirements of CAN/CSA-A179.
- .3 Remove excess mortar from grout spaces.

**3.6 GROUT PLACEMENT**

- .1 Install grout in accordance with manufacturer's instructions.
- .2 Install grout in accordance with CAN/CSA-A179.
- .3 Work grout into masonry cores and cavities to eliminate voids.
- .4 Do not install grout in lifts greater than 400 mm, without consolidating grout by rodding.
- .5 Do not displace reinforcement while placing grout.

**3.7 FIELD QUALITY CONTROL**

- .1 Site Tests, Inspection:
  - .1 Test and evaluate mortar prior to construction in accordance with CAN/CSA- A179.
  - .2 Test and evaluate grout prior to construction to CAN/CSA-A179; test in conjunction with masonry unit sections specified.

**3.8 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Remove droppings and splashes using clean sponge and water.
- .3 Clean masonry with low pressure clean water and soft natural bristle brush.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .5 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.9 PROTECTION**

- .1 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

**END OF SECTION**



**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1     Section 01 45 00 Quality Control
- .2     Section 05 50 00 Metal Fabrications
- .3     Section 04 05 12 Masonry Mortar and Grout

**1.2                REFERENCE STANDARDS**

- .1     American Concrete Institute (ACI)
  - .1     ACI 530/530.1-11, Building Code Requirements and Specifications for Masonry Structures and Related Commentaries.
- .2     ASTM International
  - .1     ASTM C97/C97M- 09, Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
  - .2     ASTM C99/C99M- 09, Standard Test Method for Modulus of Rupture of Dimension Stone.
  - .3     ASTM C119- 11, Standard Terminology Relating to Dimension Stone.
  - .4     ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.
  - .5     ASTM C150/C150M-12, Standard Specification for Portland Cement.
  - .6     ASTM C170/C170M- 09, Standard Test Method for Compressive Strength of Dimension Stone.
  - .7     ASTM C207- 06 (2011), Standard Specification for Hydrated Lime for Masonry.
  - .8     ASTM C270-12a, Standard Specification for Mortar for Unit Masonry.
  - .9     ASTM C880/C880M-09, Standard Test Method for Flexural Strength of Dimension Stone.
  - .10    ASTM C1242-12ae1, Standard Guide for Design, Selection, and Installation of Stone Anchors and Anchoring Systems.
- .3     CSA Group
  - .1     CAN/CSA-A179- 04(R2009), Mortar and Grout for Unit Masonry.
  - .2     CAN/CSA-A370- 04(R2009), Connectors for Masonry.
  - .3     CAN/CSA-A371- 04(R2009), Masonry Construction for Buildings.
  - .4     CAN/CSA-A3000 - 08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .4     International Masonry Industry All-Weather Council (IMIAC)
  - .1     Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- .5     South Coast Air Quality Management District (SCAQMD)
  - .1     SCAQMD Rule 1168- 05, Adhesive and Sealant Applications.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for dimensional stone veneer cladding and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in BC, Canada.
  - .2 Indicate sizes and sections of stone, arrangements of joints and bonding, anchoring, dowelling and cramping.
  - .3 Each stone indicated on shop drawings must bear corresponding number marked on its back or bed.
- .4 Samples:
  - .1 Submit sample for each finish product specified, 2 complete sets representing manufacturer's full range of available colours, textures, and patterns.
    - .1 G633 Granite – rock pitch finish;
    - .2 Black Tusk Basalt - flamed finish, and
    - .3 Black Tusk Basalt - honed finish.

### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports including sand gradation tests in accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00- Common Work Results for Masonry.
- .2 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00- Quality Control.
    - .1 Construct mock-up panel of exterior dimension stone veneer construction minimum 1200 x 1800 mm, showing colours and textures, use of reinforcement, ties, through wall flashing, weep holes, jointing, coursing, mortar and quality of work.
    - .2 Mock-up used:
      - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
    - .3 Perform test cleaning on mock-up to ensure desired result.

### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
  - .1 Store materials off ground.
  - .2 Store and protect dimension stone veneer cladding from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Develop Waste Reduction Workplan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return of packaging materials, crates, pallets, as specified in Construction Waste Management Plan 01 74 19- Construction/Demolition Waste Management and Disposal.

## **1.6 SITE CONDITIONS**

- .1 Ambient Conditions:
  - .1 Do not install at temperatures below 12 degrees C or above 38degrees C.
  - .2 Maintain temperatures at or above 12 degrees C until cementitious materials have fully cured.
  - .3 Cold Weather Requirements: IMIAC - Recommended Practices and Specifications for Cold Weather Masonry Construction.
  - .4 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.
- .2 Field Measurements:
  - .1 Make field measurements necessary to ensure the proper fit of all members.

## **Part 2 Products**

### **2.1 DESIGN CRITERIA**

- .1 General: design, fabricate and install stonework to withstand normal loads from wind, gravity, movement of building structure, seismic forces and thermally induced movement, as well as to resist deterioration under conditions of normal use including exposure to weather, without failure.
- .2 Retain services of cladding engineer, as described below, to design the cladding support and retention system. Cladding engineer will prepare engineering calculations for justification of principal stonework, units, fasteners, and anchorage components for compliance with performance criteria.
- .3 Engineering Calculations: base calculations on design loads, material properties, and applicable safety factors, in compliance with applicable codes and Building Standards. Include following information as part of calculations:
  - .1 Stone loads and allowable loads,
  - .2 Stone thicknesses,
  - .3 Support and anchorage loads, stresses, safety factors, design loads, and allowable loads,
  - .4 Support and anchorage sizes.

- .4 Design connections and attachments for to CAN/CSA-A370.
- .5 Design, detail and fabricate connections to provide allowance for fabrication tolerances, erection tolerances and structural deflections.
- .6 Control of Corrosion: prevent galvanic and other forms of corrosion by insulating metals and other materials from direct contact with non-compatible materials, or by suitable coating.

## 2.2 MORTAR MATERIALS

- .1 Portland Cement: to ASTM C150/C150M, Type I, colour as selected by Consultant.
- .2 Hydrated Lime: to ASTM C207.
- .3 Mortar Aggregate: to ASTM C144, standard masonry type; clean, dry, protected against dampness, freezing, and foreign matter.
- .4 Colour Pigment, natural oxide.
- .5 Water: potable, clean and free of deleterious amounts of acids, alkalis or organic materials.

## 2.3 STONE MATERIALS

- .1 G633 Grey Granite
  - .1 Density: 2.65 g/cm<sup>3</sup>
  - .2 Absorption: 0.33%
  - .3 Compressive: 156.60 MPa
  - .4 Transverse: 15.00 MPa
- .2 Black Tusk Basalt
  - .1 Density: 2953 kg/m<sup>3</sup> - 190 lbs/ft<sup>3</sup> (approx. 10.53 ft<sup>3</sup> / ton)
  - .2 Absorption: 0.31%
  - .3 Compressive: 341 MPa
  - .4 Transverse: 10.01 MPa

## 2.4 MANUFACTURED UNITS

- .1 Stone Panels (Shutters): Black Tusk Basalt:
  - .1 Sizes: as indicated on Stone Schedule on drawings (Sheet L3.4).
  - .2 Finish: exposed, top surface to be flamed or honed, as indicated on drawings. Unexposed surfaces to be sawn;
  - .3 Colour: uniform dark charcoal grey, free of inclusions or imperfections.
- .2 Coursed End wall blocks: G633 Granite:
  - .1 Sizes: as indicated on Stone Schedule on drawings (Sheet L3.4).
  - .2 Finish: exposed, top surface to be rock pitched, as indicated on drawings. Unexposed surfaces to be sawn;
  - .3 Colour and Pattern of all G633 Granite: finely grained salt and pepper grey, consistent grain and colour, to match approved sample range.

- .3 Stone bases: G633 Granite
  - .1 Sizes: as indicated on Stone Schedule on drawings (Sheet L3.4).
  - .2 Finish: honed or rock pitched, as indicated on drawings. Unexposed surfaces to be sawn;
  - .3 Colour and Pattern of all G633 Granite: finely grained salt and pepper grey, consistent grain and colour, to match approved sample range.
- .4 Stone caps: G633 Granite
  - .1 Sizes: as indicated on Stone Schedule on drawings (Sheet L3.4).
  - .2 Finish: honed; Unexposed surfaces to be sawn;
  - .3 Colour and Pattern of all G633 Granite: finely grained salt and pepper grey, consistent grain and colour, to match approved sample range.

## **2.5 REINFORCEMENT AND ANCHORAGES**

- .1 Anchors, Cramps, Dowels: stainless steel, Type 316.
- .2 Wall Ties: to corrugated strap.
- .3 Fasteners: Stainless steel anchors shall be used meeting CSA A370-94 requirements. Final design and specifications of anchors shall be the responsibility of the contractor, and shall appear on the engineered shop drawing to be submitted for review.
- .4 Positive Pressure Spacers: expandable Neoprene spacers, designed to be placed immediately behind each shutter (between the back surface of shutter and the inside trough/mounting flange of the support ledge), are intended to apply positive pressure to shutter, keeping it firmly against the outside edge of the support ledge in which the shutter is positioned.
- .5 Shop Finishing:
  - .1 Stainless Steel: to ASTM A508/A508M, Type 316.

## **2.6 ACCESSORIES**

- .1 Mortar: Use mortar type required for type of stone and in accordance with Section 04 05 12 - Masonry Mortar and Grout.
- .2 Setting Buttons: resilient plastic; non-staining; sized to suit joint thicknesses and bed depths without intruding into required depths of joint sealants or causing third-side adhesion between sealant and setting button.

## **2.7 MORTAR MIXING**

- .1 Thoroughly mix mortar ingredients in proper quantities needed for immediate use to requirements of ASTM C270.
- .2 Add mortar colour and admixtures to requirements of manufacturer's instructions.
- .3 Provide uniformity of mix and colouration.
- .4 Start masonry work after mortar is tested and approved by Departmental Representative.
- .5 Take representative samples for testing consistency of strength and colour according to ASTM C780/C780M.

- .6 Use mortar within 2 hours after mixing at temperatures of 26degrees C, or 2-1/2 hours at temperatures under 10 degrees C.

## **2.8 FABRICATION**

- .1 Cut stone to shape and dimensions and full to square with joints as indicated.
  - .1 Dress exposed faces true.
  - .2 Cut stone for caps, bases to lay on its natural quarry bed.
- .2 Execute profiled work from full size details and templates.
  - .1 Make exposed arises in true alignment and ease slightly to prevent snipping.
- .3 Back-check stone contacting structural members as indicated.
  - .1 Allow minimum of 25 mm clearance between back of stone and aluminum structural members.
  - .2 Shape beds of stone resting on structural work to fit supports.
- .4 Finish exposed faces and edges of stones to comply with requirements indicated for finish and to match approved samples and field-constructed mock-up.

## **2.9 GROUT**

- .1 In accordance with Section 04 05 00.

## **2.10 JOINT SEALANTS AND BACKER RODS**

- .1 Non-staining type.

## **2.11 FABRICATION TOLERANCES**

- .1 Fabricate dimension stone to the following tolerances:
  - .1 Unit Length: plus or minus 3mm.
  - .2 Unit Height: plus or minus 3mm.
  - .3 Deviation from Square: plus or minus 3mm, with measurement taken using the longest edge as the base.
  - .4 Bed Depth: plus or minus 3mm.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for dimensional stone veneer cladding installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 PREPARATION**

- .1 Clean stone surfaces by washing with stiff fibre brush and water.

### **3.3 INSTALLATION/TOLERANCES**

- .1 Variation from Plumb: plus or minus 6 mm per 3 metres maximum.
- .2 Variation from Level: plus or minus 13 mm per 6 metres maximum.
- .3 Variation from Linear Building Line: plus or minus 13 mm per 6 metres maximum.
- .4 Variation in Cross-Sectional Dimensions: plus 13mm or minus 6mm.

### **3.4 SETTING STONE - GENERAL**

- .1 Construction in accordance with CAN/CSA-A371.
- .2 Set stones plumb, true, and level, to requirements as indicated and approved shop drawings.
- .3 Align stone edges and faces according to established relationships and indicated tolerances.
- .4 Provide movement joints of widths and at locations indicated.

### **3.5 SETTING STONE WITH MORTAR**

- .1 Set stones in full bed of mortar with vertical joints buttered and placed full, except where otherwise specified.
  - .1 Completely fill anchor, dowel and lifting holes.
- .2 Lay stone veneer in coursed ashlar bond.
  - .1 Connect stone veneer to structural back-up with approved wall ties, spaced not more than 405 mm horizontally and 610 mm vertically.
- .3 Lay stone panel cladding to patterns indicated on drawings.
  - .1 Install anchors, dowels and cramps.
  - .2 Shim and adjust supports to set stones accurately in locations indicated with uniform joints of widths indicated.
- .4 Make joints 6 mm thick.
- .5 Place setting buttons stones to maintain joint thickness.
  - .1 Set heavy stones and projecting courses after mortar in courses below has hardened sufficiently to support weight.
- .6 Brace and anchor projecting stones until wall above is set.
- .7 Use soaked softwood wedges to support stone in proper alignment until mortar has set.
  - .1 Remove wedges when dry and without breaking them off, fill voids with pointing mortar.

- .8 Tool joints after initial set has occurred.
- .9 Rake out joints to 25mm depth and make ready for pointing with pointing mortar.
  - .1 Sponge stone face along joints and remove droppings/splashed mortar immediately.
- .10 Set caps with unfilled vertical joints.
- .11 Grouting: pack ends of exposed joints with plastic foam joint filler and after wetting ends of stone, fill joint with grouting mortar to within 19 mm of top.
  - .1 Grout vertical joints of bases.
  - .2 After grout has set, remove packing for pointing.
- .12 Pointing: remove dirt and loose mortar from joints.
  - .1 Wet joints for mortar pointing. Dry joints for sealant pointing.
  - .2 Point joints with pointing mortar in stages. Rub smooth with appropriate tool to slightly concave joint.
  - .3 At completion of work, all holes or defective mortar shall be pointed or replaced as directed.

### 3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Clean stone as work progresses.
  - .1 Allow mortar droppings on stone to partially dry then remove by means of brushing with a stiff fibre brush.
- .3 Post-Construction: clean mock-up panel as designated by Departmental Representative as directed below and leave for one week. If no harmful effects appear and after mortar has set and cured, clean masonry as follows:
  - .1 Protect work of other sections from damage resulting from work in this section.
  - .2 Remove large particles with stiff fibre brushes without damaging surface.
    - Saturate masonry with clean water and flush off loose mortar and dirt.
  - .3 Scrub with solution of 25 ml trisodium phosphate and 25 ml household detergent dissolved in 1 litre of clean water using stiff fibre brushes, then clean off immediately with clean water using hose.
  - .4 Repeat cleaning process as often as necessary to remove mortar and other stains.
- .4 Use alternative cleaning solutions and methods for difficult to clean stone only after consultation with masonry unit manufacturer.
- .5 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.



**3.7 PROTECTION**

- .1 Protect stone from damage resulting from subsequent construction operations.
- .2 Use protection materials and methods which will not stain or damage stone.
- .3 Remove protection materials upon Substantial Performance of Work, or when risk of damage is no longer present.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 05 50 00 Metal Fabrications
- .2        Section 04 43 26 Dimension Stone Veneer Cladding
- .3        Section 01 33 00 Shop Drawings, Product Data and Samples

**1.2                REFERENCE STANDARDS**

- .1        Environmental Choice Program
  - .1            CCD-047-98(R2005), Architectural Surface Coatings.
- .2        Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1            Material Safety Data Sheets (MSDS).

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Product Data:
  - .1            Submit manufacturer's instructions, printed product literature and data sheets for sections, bolts, tubing, plates and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2            Submit two copies of WHMIS MSDS in accordance with Section 01 35 33.10 - Health and Safety Requirements.
    - .1            For finishes, coatings, primers, and paints applied on site: indicate VOC Concentration in g/L.
- .2        Shop Drawings:
  - .1            Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia, Canada.
  - .2            Indicate materials, core thicknesses, finishes, connections, and joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
  - .3            Clearly indicate shop and erection details, including cuts, copes, holes, bolts, and welds.

**1.4                QUALITY ASSURANCE**

- .1        Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2        Submit certified copies of mill or manufacturers test reports covering chemical and physical properties of aluminum used in this work, confirming that materials comply with specified performance characteristics and criteria and physical requirements.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of padding, crates, pallets, and packaging materials as specified in Waste Reduction Workplan in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Welding materials: to CSA W59.
- .2 Aluminium bar, rod, wire, and extruded shapes: to Grade 6061-T6.
- .3 Aluminum sheet or plate: plain: Grade 5052-H32.
- .4 Aluminum bolts: to CSA HA.6061-T6.
- .5 Aluminum welding wire: to Grade 5356.
- .6 Steel anchor bolts: to be Stainless Steel Finish.
- .7 Bituminous paint: to CGSB a-GP-108M type 1.

### **2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

### **2.3 FINISHES**

- .1 Only the aluminium Shutter Support Ledges, Shutter Support ledge Connectors and the Shutter Support Ledge Corners shall have clear anodized finishes generally meeting the requirements of MIL A-8625F: ANODIC COATINGS FOR ALUMINUM AND ALUMINUM ALLOYS standard.
- .2 All other structural aluminium shall have a natural (un-anodized) mill finish.

## **2.4 ISOLATION COATING**

- .1 Isolate aluminum from following components, by means of bituminous paint:
  - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  - .2 Concrete, mortar and masonry.

## **2.5 ALUMINUM FRAMEWORK**

- .1 Fabricate framework from aluminum tubing.
- .2 Welded or bolted mechanical connections to form continuous frame, sizes as indicated.
- .3 Aluminum framework to provide level of internal support as specified by structural engineer.
- .4 Interior aluminum components of frame to have regular mill finish.

## **2.6 ALUMINUM EXTRUSIONS**

- .1 Interior aluminum extrusions Types 1, 2 and 3: regular mill finish, sizes indicated for openings.
- .2 Exterior aluminum extrusions Types 1A, 2A and 3A: anodized finish, sizes indicated for openings.
- .3 Weld or bolt back-to-back angles to profiles as indicated.

## **2.7 CAST ALUMINUM**

- .1 Exterior cast aluminum corners: Types 1, 2, 3 and 4 as indicated.
- .2 All cast aluminum to be manually finished to visibly smooth surface with no significant irregularities.
- .3 Finish to be clear anodized.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 ERECTION**

- .1 Complete structural aluminium work in accordance with CAN3-S157.

- .2 Complete welding in accordance with CSA W59.2.
- .3 Use qualified fabricators in accordance with CSA W47.2.
- .4 Verify dimensions and condition of existing work before commencing fabrication and report any discrepancies and potential problem areas to the Consultant and await instructions.
- .5 Erect structural aluminum as indicated and in accordance with CAN3-S157 and approved shop drawings.
- .6 Obtain written permission from the Consultant prior to field cutting or altering of field members.
- .7 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .8 All field connections to be bolted with aluminium bolts to CSA S16.
- .9 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .10 Surface preparation of aluminum in contact with or embedded in dissimilar materials to be in accordance with CAN3-S157. All locations to be treated as if they were in the presence of moisture.
- .11 Supply components for work by other trades in accordance with shop drawings and schedule.

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .3 Waste Management: separate waste materials for recycling or reuse in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 05 14 11 Structural Aluminum
- .2            Section 04 43 26 Dimension Stone Veneer Cladding

**1.2                REFERENCE STANDARDS**

- .1            Environmental Choice Program
  - .1            CCD-047-98(R2005), Architectural Surface Coatings.
- .2            Green Seal Environmental Standards (GS)
  - .1            GS-11- 2008, 2nd Edition, Paints and Coatings.
- .3            Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1            Material Safety Data Sheets (MSDS).

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2            Product Data:
  - .1            Submit manufacturer's instructions, printed product literature and data sheets for sections, bolts, tubing, plates and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2            Submit two copies of WHMIS MSDS in accordance with Section 01 35 33.10 - Health and Safety Requirements.
    - .1            For finishes, coatings, primers, and paints applied on site: indicate VOC Concentration in g/L.
- .3            Shop Drawings:
  - .1            Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia, Canada.
  - .2            Indicate materials, core thicknesses, finishes, connections, and joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

**1.4                QUALITY ASSURANCE**

- .1            Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2            Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

**1.5                DELIVERY, STORAGE AND HANDLING**

- .1            Deliver, store and handle materials in accordance with Section 01 61 00 Product Requirements.

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of padding, crates, pallets, and packaging materials as specified in Waste Reduction Workplan in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Welding materials: to CSA W59.
- .2 Welding electrodes: to CSA W48 Series.
- .3 Bolts and anchor bolts: to ASTM A307.
- .4 Aluminum plate: plain: 5052 or better.
- .5 Aluminum tubing: 5052 or better.
- .6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

### **2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

### **2.3 FINISHES**

- .1 Clear anodized - all exposed aluminum components.

### **2.4 ISOLATION COATING**

- .1 Isolate aluminum from following components, by means of bituminous paint:
  - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  - .2 Concrete, mortar and masonry.

### **2.5 ALUMINUM FRAMEWORK**

- .1 Fabricate framework from aluminum tubing.

- .2 Welded or bolted mechanical connections to form continuous frame, sizes as indicated.
- .3 Aluminum framework to provide level of internal support as specified by structural engineer.
- .4 Interior aluminum components of frame to have regular mill finish.

## **2.6 ALUMINUM EXTRUSIONS**

- .1 Interior aluminum extrusions Types 1, 2 and 3: regular mill finish, sizes indicated for openings.
- .2 Exterior aluminum extrusions Types 1A, 2A and 3A: anodized finish, sizes indicated for openings.
- .3 Weld or bolt back-to-back angles to profiles as indicated.

## **2.7 CAST ALUMINUM**

- .1 Exterior cast aluminum corners: Types 1, 2, 3 and 4 as indicated.
- .2 All cast aluminum to be manually finished to visibly smooth surface with no significant irregularities.
- .3 Finish to be clear anodized.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 ERECTION**

- .1 Do welding work in accordance with CSA W59, unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Departmental Representative such as rods, dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA S16, or using threaded rods and epoxy.

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
  - .1 Leave Work area clean at end of each day.



- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .3 Waste Management: separate waste materials for recycling or reuse in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation.

**END OF SECTION**

**Esquimalt Veterans Cemetery Expansion - Columbaria BID FORM**

|   |                     |                         |   |
|---|---------------------|-------------------------|---|
| <b>1. 80 niche double-sided "Plaza" columbaria (Type A units)</b>                               | <b>Unit</b>         | <b># of niches/unit</b> | <b>Price incl. honed basalt shutters</b>  |
|   | 1                   | 80                      |   |
|   | 2                   | 80                      |   |
|   | 3                   | 80                      |   |
|   | 4                   | 80                      |   |
|   | Total Niches        | <b>320</b>              |   |
| <b>Subtotal</b>   |                     |                         | <b>\$</b>                                 |
| <b>2. 64 niche double-sided "Plaza" columbarium (Type B unit)</b>                               | <b>Unit</b>         | <b># of niches/unit</b> | <b>Price incl. honed basalt shutters</b>  |
|   | 5                   | 64                      |   |
|   | Total Niches        | <b>64</b>               |   |
|   | <b>Subtotal</b>     |                         |   |
| <b>3. 40 niche double-sided "Woodland" columbaria (Type C units)</b>                            | <b>Unit</b>         | <b># of niches/unit</b> | <b>Price incl. flamed basalt shutters</b> |
|   | 6                   | 40                      |   |
|   | 7                   | 40                      |   |
|   | Total Niches        | <b>80</b>               |   |
|   | <b>Subtotal</b>     |                         |   |
| <b>Total niches (Items 1 -3)</b>  |                     | <b>464</b>              |   |
| <b>4. Extra honed basalt shutters</b>   |                     | 3                       |   |
| <b>5. Extra flamed basalt shutters</b>  |                     | 3                       |   |
| <b>6. Shutter lifting &amp; mounting device</b>   |                     | 1                       |   |
| <b>Subtotal (Items 1 - 6)</b>   |                     |                         | <b>\$</b>                                 |
| <b>Optional - additional columbaria units to be installed within one year of initial units:</b> |                     |                         |   |
| <b>7. 80 niche double-sided "Plaza" columbaria (Type A units)</b>                               | <b>Number units</b> | <b>Price/unit</b>       | <b>Price incl. basalt shutters</b>        |
|   | 6 units             |                         |   |
|   | Total Niches        | <b>480</b>              | <b>\$</b>                                 |
| <b>8. 40 niche double-sided "Woodland" columbaria (Type C units)</b>                            | <b>Number units</b> | <b>Price/unit</b>       | <b>Price incl. basalt shutters</b>        |
|   | 8 units             |                         |   |
|   | Total Niches        | <b>320</b>              | <b>\$</b>                                 |
| <b>TOTAL number of niches (incl'd Optional units)</b>   |                     | <b>1264</b>             |   |
| <b>TOTAL (Items 1 - 8)</b>  |                     |                         | <b>\$</b>                                 |