Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Refer to City of Winnipeg Bid Opportunity No.748-2013; Section D2 SCOPE OF WORK.

1.2 EXISTING SERVICES

.1 Notify Contract Administrator and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Contract Administrator 48 hours' notice for necessary interruption of mechanical or electrical service throughout course of Work. Minimize duration of interruptions. Carry out Work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic, and tenant operations.

.3 Establish location and extent of service lines in area of Work before starting Work. Notify Contract Administrator of findings.

.4 Submit schedule to and obtain approval from Contract Administrator for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.5 Provide temporary services when directed by Contract Administrator to maintain critical building and tenant systems.

.6 Where unknown services are encountered, immediately advise Contract Administrator and confirm findings in writing.

.7 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.8 Record locations of maintained, re-routed and abandoned service lines.

.9 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 CONTRACTOR USE OF PREMISES

.1 Contractor has use of Site with the following restrictions.

.2 Use Site for Work, for storage, and for access, limited to the areas indicated on the drawings or as directed by Contract Administrator. Co-ordinate use of premises under direction of Contract Administrator. Assume full responsibility for protection and safekeeping of products under this Contract.

.3 Obtain and pay for use of additional storage or Work areas needed for operations under this Contract.

1.4 DOCUMENTS REQUIRED

.1 Maintain at job Site, one copy each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Change Orders and all other Modifications to Contract.
.7 Field Test Reports.
.8 Copy of Approved Work Schedule.
.9 Health and Safety Plan and Other Safety Related Documents.
.10 City of Winnipeg Forestry Guidelines
.11 Other documents as specified.

1.5 CONTRACT DRAWINGS AND SPECIFICATIONS

.1 Drawings and specifications are complementary each to the other, what is called for by one shall be binding as if called for by both.

.2 Should any discrepancy appear between the drawings and specifications, which leave the Contractor in doubt as to the true intent and meaning of the plans, and specifications, the Contractor shall obtain a ruling from the Contract Administrator in writing **before submitting a Bid in accordance with B4.** If this is not done it will be assumed that the most expensive alternative has been included in the Bid price. For any ruling to become binding, the Contract Administrator must issue the new direction in a published addendum.

.3 Examine all Contract Documents, including all drawings, specifications and Work of other trades to ensure that Work is co-ordinated and satisfactorily carried out without changes to the building or Contract value.

.4 Drawings and specifications to be considered as an integral part of Contract Documents and neither drawings nor specifications are to be used alone. Misinterpretation of requirements of plans or specifications shall not relieve Contractor of responsibility of properly completing Work to approval of Contract Administrator.

.5 Examine all Contract drawings to ensure Work can be performed without changes to the building, or Work, as shown on plans. No allowance will be made later for necessary changes, unless notification of interferences has been brought to Contract Administrator's attention, in writing, prior to closing of Bids in accordance with B4.

.6 In case of conflict, codes and regulations take precedence over the Contract Documents. In no instance reduce the standard or scope of Work or intent established by the drawings and specifications by applying any of the codes referred to herein. Any discrepancies must be brought to the Contract Administrator's attention in writing.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Connecting to existing services.

.2 Special scheduling requirements.

1.2 RELATED SECTIONS

.1 Section 01 32 16 – Construction Progress Schedules.

.2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 EXISTING SERVICES

.1 Notify Contract Administrator and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Contract Administrator 72 hours of notice for necessary interruption of mechanical or electrical service throughout course of Work. Keep duration of interruptions minimum. Carry out interruptions after normal Working hours of occupants, preferably on weekends.

.3 Provide for pedestrian and vehicular traffic.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

.1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Contract Administrator are specified under various sections.

1.2 APPOINTMENT AND PAYMENT

.1 Contract Administrator will appoint and pay for services of testing laboratory except follows:

.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

.2 Full time review of pile foundation installation by a qualified Geotechnical Engineer, or their duly appointed representative, registered in the Province of Manitoba.

.3 Inspection and testing performed for the purposes of quality control and as specified under various sections herein.

.4 Inspection and testing performed for the purposes of preparation of concrete substrates prior to installation of resilient flooring products.

.5 Inspection and testing performed exclusively for Contractor's convenience.

.6 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.

.7 Mill tests and certificates of compliance.

.8 Tests specified to be carried out by Contractor under the supervision of Contract Administrator.

.9 Additional tests specified in the following paragraph.

.2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with Contract requirements, pay costs for additional tests or inspections as required by Contract Administrator to verify acceptability of corrected Work.

1.3 CONTRACTOR'S RESPONSIBILITIES

.1 Provide labour, equipment and facilities to:

.1 Provide access to Work to be inspected and tested.

.2 Facilitate inspections and tests.

.3 Make good Work disturbed by inspection and test.

.4 Provide storage on Site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Contract Administrator sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Contract Administrator.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT MEETINGS

.1 Contractor will schedule, administer, record, and distribute minutes of project meetings.

.2 Representatives of the Contractor, major Subcontractors, other Subcontractors involved in Work and others as required and decided upon by the Contractor are to be in attendance.

1.2 CONSTRUCTION ORGANIZATION AND STARTUP

.1 Within 15 Working days after award of Contract, a meeting of parties in Contract will be held to discuss and resolve administrative procedures and responsibilities.

.2 Senior representatives of The City, Contractor, major Subcontractors, field inspectors and supervisors, and Contract Administrator will be in attendance. Ensure project schedule efficiencies through monitoring.

.3 Contractor shall establish time and location of meeting and notify parties concerned minimum 10 Working days before meeting.

.4 Agenda to include following:

- .1 Appointment of official representative of participants in Work.
- .2 Schedule of submission of shop drawings, samples, and colour chips in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Requirements for temporary facilities, Site sign, offices, storage sheds, utilities, fences in accordance with Section 01 51 00 - Temporary Utilities.
- .4 Site security in accordance with Section 01 52 00 - Construction Facilities.
- .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements (GC).
- .6 Record drawings in accordance with Section 01 78 00 - Closeout Submittals.
- .7 Maintenance in accordance with Section 01 78 00 - Closeout Submittals.
- .8 Take-over procedures, acceptance, and warranties in accordance with Section 01 77 00 - Closeout Procedures and 01 78 00 - Closeout Submittals.
- .9 Monthly progress claims, administrative procedures, photographs, and holdbacks (GC).
- .10 Appointment of inspection and testing agencies or firms in accordance with Section 01 45 00 - Quality Control.
- .11 Insurances and transcript of policies (GC).

.5 Comply with Contractor's allocation of mobilization areas of Site; for field offices and sheds, for, access, traffic, and parking facilities.

.6 During construction co-ordinate use of Site and facilities through Contractor's procedures for intra-project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.

.7 Comply with instructions of Contractor for use of temporary utilities and construction facilities.

.8 Coordinate field engineering and layout Work with Contractor.

1.3 SCHEDULES

.1 Submit preliminary construction progress schedule in accordance with Section 01 32 16 – Construction Progress Schedules.

1.4 CONSTRUCTION PROGRESS MEETINGS

.1 During course of Work and up to two weeks prior to project completion Contractor will schedule progress meetings monthly as required.

.2 Contractor, major Subcontractors involved in Work, Contractor, Contract Administrator and The City are to be in attendance. Include costs for execution, preparation and reproduction of schedule submittals in bid documents.

.3 Contractor will notify parties minimum five Working days prior to meetings.

.4 Contractor will record accurate and complete minutes of meetings and circulate to attending parties and affected parties not in attendance within three Working days after meeting.

.5 Agenda to include following:

.1 Review, approval of minutes of previous meeting.
.2 Review of Work progress since previous meeting.
.3 Field observations, problems, conflicts.
.4 Problems which impede construction schedule.
.5 Review of off-Site fabrication delivery schedules.
.6 Corrective measures and procedures to regain projected schedule.
.7 Revision to construction schedule.
.8 Progress schedule, during succeeding Work period.
.9 Review submittal schedules: expedite as required.
.10 Maintenance of quality standards.
.11 Review proposed changes for effect on construction schedule and on completion date.
.12 Other business.

.6 Review of progress and status of Critical Path activities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 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. Generally Bar Charts should be derived from commercially available computerized project management system.

.3 Baseline: Original approved plan (for Project, Work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day 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 Master 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 Contract Administrator to enable monitoring of project Work in relation to established milestones.

1.2 SUBMITTALS

.1 Refer to City of Winnipeg Bid Opportunity No. 748-2013.

1.3 PROJECT SCHEDULE

.1 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Permits.
.4 Mobilization.
.5 Interior Architecture (Walls, Floors and Ceiling).
.6 Fire Stopping Systems.

1.4 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly 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.

1.5 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

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Contract Administrator submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Work affected by submittal shall not proceed until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Contract Administrator. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific Project will be returned without being examined and shall be considered rejected.

.6 Notify Contract Administrator, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work is coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator’s review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator’s review.

.10 Keep one reviewed copy of each submission on Site.

.11 Client will be provided with Request for Information [RFI] for required approvals. Response to be within 5 business days.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.3 Allow 5 Working days for Contract Administrator’s review of each submission.

.4 Adjustments made on shop drawings by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.

.5 Make changes in shop drawings as Contract Administrator may require, consistent with Contract Documents. When resubmitting, notify Contract Administrator in writing of any revisions other than those requested.

.6 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.

.7 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 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent Work.

.8 After Contract Administrator’s review, distribute copies.

.9 Submit 4 prints of shop drawings for each requirement requested in specification Sections and as Contract Administrator may reasonably request.

.10 Submit 4 copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Contract Administrator where shop drawings will not be prepared due to standardized manufacture of product.

.11 Delete information not applicable to project.

.12 Supplement standard information to provide details applicable to project.

.13 If upon review by Contract Administrator, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.14 The review of shop drawings by the Contract Administrator is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Contract Administrator approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job Site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Contract Administrator's Site office.

.3 Notify Contract Administrator in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.

.6 Make changes in samples which Contract Administrator may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of Workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

.1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.5 PROGRESS PHOTOGRAPHS

.1 The Contractor shall photograph and submit daily colour pictures in digital format demonstrating the progress of the Work and at all concealed areas prior to being covered.

.1 Submit two sets: one to the City and one to the Contract Administrator.

.2 Submit 100 mm x 150 mm copies of each, labeled and in protective covers in three-ring binders to The City with the Contract Operation and Maintenance Manuals upon completion of the project.

Part 2 Products

2.1 SUBSTITUTES

.1 Refer to City of Winnipeg Bid Opportunity No.748-2013; Section B7 SUBSTITUTES.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 LEED® relates to ALL Sections

.2 Section 01 35 43 - Environmental Protection

.3 Section 01 56 15 - Temporary Indoor Air Quality

.4 Section 01 57 13 - Temporary Erosion and Sediment Control

.5 Section 01 74 19 - Waste Management and Disposal

.6 Section 03 10 00 Concrete Forming and Accessories

.7 Section 03 20 00 Concrete Reinforcing

.8 Section 03 30 00 Cast-in-Place Concrete

.9 Section 04 04 99 Masonry for Minor Works

.10 Section 04 05 00 Common Work Results for Masonry

.11 Section 04 26 13 Masonry Veneer

.12 Section 05 12 23 Structural Steel

.13 Section 05 21 00 Steel Joists

.14 Section 05 31 00 Steel Decking

.15 Section 07 92 00 - Joint Sealants

.16 Section 09 91 23 - Interior Painting

.17 Division 22 – Plumbing

.18 Section 31 63 23 Bored Piles

1.2 REFERENCES

.1 LEED Canada Reference Guide for Green Building Design and Construction 2009

.2 Credit Interpretation Requests relating to the credits specified in this Section may apply in projects exhibiting exceptional circumstances as deemed necessary by the Contract Administrator.

.3 www.cagbc.org

1.3 INTRODUCTION

.1 The The City and Contract Administrator will be submitting and finalizing the LEED® documentation, with the goal of LEED® Silver.

1.4 REQUIREMENTS

.1 The Contractor shall be responsible for ensuring that the following LEED® credits are achieved:

- .1 SSp1 Erosion and Sedimentation Control
- .2 MRc2.1 and MRc2.2 Construction Waste Management
- .3 EQc3.1 Construction Indoor Air Quality: During Construction
- .4 EQc3.2 Construction Indoor Air Quality: Testing Before Occupancy
- .5 MRc4 Recycled Content
- .6 MRc5 Regional Materials
- .7 MRc7 Certified Wood
- .8 EQc4 Low-Emitting Materials, including:
  - .1 EQc4.1 Adhesives and Sealants
  - .2 EQc4.2 Paints
  - .3 EQc4.3 Carpets
  - .4 EQc4.4 Composite Woods and Laminate Adhesives

.2 The Contractor shall assist with all LEED® credits by helping to gather required information and documentation.

.3 All submittals as required by Article 3.2.

.4 The Contractor shall provide bi-weekly reports, as specified in Article 3.1 LEED® Tracking, to the The City and Contract Administrator on the status and progress of the credits specified in paragraph 1.4.1 and 1.4.2.

- .1 Where required for clarification purposes, dated and labelled digital photographs shall be included.

1.5 ENVIRONMENTAL PERFORMANCE

.1 The following paragraphs apply to adhesives and sealants, paints and coatings, carpet, and composite wood and agrifibre products used within the outermost weather-proofing layer of the wall/roof assembly:

- .1 Adhesives and sealants must conform to following standard:
  - .1 State of California's South Coast Air Quality Management District (SCAQMD) Rule #1168, June 2006.
- .2 The VOC content of the adhesives, sealants, and sealant primers used must be less than the VOC content limits of the State of California's South Coast Air Quality Management District (SCAQMD) Rule #1168 (effective date of January 2007). The following are the VOC limits from Rule 1168:
  - .1 Architectural Sealants – 250 g/L
  - .2 Non-membrane Roof Sealant – 300 g/L
  - .3 Roadway – 250 g/L
  - .4 Other Sealants – 420 g/L

.5 Non-porous Architectural Sealant Primer – 250 g/L
.6 Porous Architectural Sealant Primer – 775 g/L
.7 Modified Bituminous Sealant Primer – 500 g/L
.8 Other Sealant Primer – 750 g/L
.9 Indoor Carpet and Carpet Pad Adhesives – 50 g/L
.10 Wood Flooring Adhesives – 100 g/L
.11 Rubber Floor Adhesives – 60 g/L
.12 Subfloor Adhesives – 50 g/L
.13 Ceramic Tile Adhesives – 65 g/L
.14 VCT and Asphalt Tile Adhesives – 50 g/L
.15 Gypsum Board and Panel Adhesives – 50 g/L
.16 Cove Base Adhesive – 50 g/L
.17 Multipurpose Construction Adhesives – 70 g/L
.18 Structural Glazing Adhesive – 100 g/L
.19 PVC Welding – 510 g/L
.20 CPVC Welding – 490 g/L
.21 ABS Welding – 325 g/L
.22 Plastic Cement Welding – 250 g/L
.23 Adhesive Primer for Plastic – 550 g/L
.24 Contact Adhesive – 80 g/L
.25 Special Purpose Contact Adhesive – 250 g/L
.26 Structural Wood Member Adhesive – 140 g/L
.27 Sheet Applied Rubber Lining Operations – 850 g/L
.28 Top and Trim Adhesive – 250 g/L
.29 Metal to Metal Adhesive – 30 g/L
.30 Plastic Foams Adhesive – 50 g/L
.31 Porous Material Adhesive (except wood) – 50 g/L
.32 Wood Adhesive – 30 g/L
.33 Fiberglass Adhesive – 80 g/L
.34 Duct Sealants – 250 g/L

.3 Laminate Adhesives must contain no urea-formaldehyde.

.4 Paints and Coatings must conform to the following standards in order of descending importance:

.1 Green Seal Standard GS-11 Paints, First Edition, May 20, 1993.

.2 Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997.

.3 South Coast Air Quality Management District (SCAQMD) Rule #1113, Architectural Coatings; rules in effect as of January, 2007.

.4 The following is a list of applicable VOC limits
.1 Interior Flat Coating or Primer – 50 g/L
.2 Interior Non Flat Coating or Primer – 150 g/L
.3 Anti-Corrosive/Anti Rust Paint – 250 g/L

.4 Clear Wood Finishes: Lacquer – 550 g/L
.5 Clear Wood Finishes: Sanding Sealers – 350 g/L
.6 Clear Wood Finishes: Varnishes – 350 g/L
.7 Clear Brushing Lacquer- 680 g/L
.8 Floor coatings – 100 g/L
.9 Sealers and Undercoaters – 200 g/L
.10 Shellac: Clear – 730 g/L
.11 Shellac: Pigmented – 550 g/L
.12 Stain – 250 g/L
.13 Concrete Curing Compounds – 350 g/L
.14 Japans/Faux Finishing Coatings – 350 g/L
.15 Magnesite Cement Coatings – 450 g/L
.16 Pigmented Lacquer – 550 g/L
.17 Waterproofing Sealers – 250 g/L
.18 Waterproofing Concrete/masonry Sealers – 400 g/L
.19 Wood Preservatives – 350 g/L
.20 Low – Solids Coatings – 120 g/L (including water)

.5 All carpet must follow the Carpet and Rug Institute's Green Label Indoor Air Quality Test Program.

.6 All hard surface flooring covered by the FloorScore standard must be certified as compliant with the standard. Flooring products covered by FloorScore include vinyl, linoleum, laminate flooring, engineered wood flooring, ceramic flooring, rubber flooring and wall base.

.7 All Composite Woods and Laminate Adhesives must contain no added urea-formaldehyde.

.2 Trade Contractors shall ensure all products incorporated into the work meet the specified VOC limits as described above.

Part 2 Products

NOT USED

Part 3 Execution

3.1 LEED® TRACKING

.1 Submit bi-weekly reports to the The City and Contract Administrator, including up to date status of the credit progress.

.1 SSc1 Erosion and Sedimentation Control
.1 Details on the status of erosion and sedimentation control.
.2 LEED Silt Fence Check Sheet.
.3 Dated and labelled photos per Section 01 57 13 – Temporary Erosion and Sediment Control.

.2 EQc3.1 Construction Indoor Air Quality: During Construction
.1 Dated and labelled photos per Section 01 56 15 – Temporary Indoor Air Quality

.3 MRc2 Construction Waste Management Tracking Table is to include a minimum of the following information (measurement units are to be metric tonnes):
.1 Material Description

.2 Destination (including company information)
.3 Description (landfill, recycle, crush for rubble, re-use etc.)
.4 Weight Reused
.5 Weight Recycled
.6 Weight Sent to Landfill
.7 Sum of the Total Weight Diverted from the Landfill
.8 Sum of the Total Weight Sent to the Landfill
.9 Percentage of Materials Diverted from the Landfill
.10 Dated and labelled photos per Section 01 74 19 – Waste Management and Disposal

3.2 LEED® SUBMITTALS

.1 Submit technical data sheets and completed LEED Product Check Sheets for:

.1 materials with recycled content
.2 materials with regional content

.2 Submit summary letter containing calculated cost of any supplementary cementitious materials. Cost should be calculated using the CaGBC approved Ready Mixed Concrete Association of Ontario's Portland Cement Reduction Calculator spreadsheet.

.3 Submit MSDS and completed LEED Product Check Sheets for the following products to be approved by the LEED Contract Administrator PRIOR to use on site:

.1 Adhesives and Sealants
.2 Paints and Coatings
.3 Carpet
.4 Hard Surface Flooring
.5 Composite Woods and Laminate Adhesives

.4 Submit technical data sheets, supporting documentation and completed LEED Product Check Sheets for all wood and composite wood products. Information required on the Product Check Sheet includes:

.1 Product Name
.2 Company
.3 Product Cost
.4 Forest Stewardship Council (FSC) Certified Wood %
.5 Invoices showing complete Forest Stewardship Council Chain of Custody for all the vendors and for each step in the supply chain from forest to final product
.6 Total cost of FSC Certified Woods
.7 Total Cost of all Wood Based Products

.5 EQc3.2 Construction Indoor Air Quality: Testing Prior to Occupancy

.1 Indicated compliance path in IAQ Plan: Testing Prior to Occupancy or Building Flush
.2 If testing, submit test results report.

integrated DESIGNS
LEED™ Facilitation

420-70 Arthur St.
Winnipeg, MB R3B 1G7
Tel: 204.669.6818

www.i designs.ca

LEED® 2009 PRODUCT CHECK SHEET

PROJECT NAME:	DATE:

GENERAL INFORMATION: **Note:** each different product requires a new check sheet	
Subtrade/Installer:	Contact Name:
Manufacturer:	Contact Phone Number:
Product Name:	Product Description/Use:
Total Material Cost: **OR** Unit Cost: and Quantity Used:	
RESOURCE REUSE: Has the product been salvaged, refurbished or reused? Yes:☐ No:☐ (If no, skip this section)	
Describe type of information source for proof resource reuse: Attach above information source to this form.	
RECYCLED CONTENT: Does this product contain recycled content? Yes:☐ No:☐ (If no, skip this section)	
Post Consumer Recycled Content (%):	Post Industrial Recycled Content (%):
Describe type of information source for proof recycled content: Attach above information source to this form.	
REGIONAL MATERIALS: Does this product contain regionally sourced materials: Yes:☐ No:☐ (If no skip this section)	
Note: A Regional Material is any building material or product for which at least 80% of the mass is extracted, harvested, recovered and processed within 800 km of the final manufacturing site (when shipped by truck) or 2400 km (when shipped by rail or water) AND the final manufacturing site is within 800 km of the project site (when shipped by truck) or 2400 km (when shipped by rail or water). Distance measured in a straight line from extraction to manufacture or manufacture to project site.	
Final Manufacture Location (city, province/state):	
Distance from Final Manufacture to project site: km	Shipped by: Rail ☐ Truck: ☐ Ship:☐
Extraction Location (city, province/state):	
Distance from Extraction to Final Manufacture: km	Shipped by: Rail☐ Truck:☐ Ship:☐
Describe type of information source for proof regional material: Attach above information source to this form.	
LOW EMITTING MATERIALS: Yes ☐ No:☐ (If no, skip this section) (For all paints, coatings, adhesives, sealants, carpets, composite woods and laminate adhesives)	
VOC Level: g/L	
If composite wood – Does it contain urea formaldehyde?: Yes:☐ No:☐	
If carpet – Is it certified by the Carpet and Rug Institute's Green Label Indoor Air Quality Test Program? : Yes: ☐ No:☐	
If vinyl composite tile/vinyl/linoleum/rubber tile or flooring – Is it certified by the FloorScore, or GreenGuard Programs? Yes: ☐ No: ☐	
Describe type of information source for proof of low-emitting material: Attach above information source to this form.	
FSC CERTIFIED WOOD: Yes:☐ No: ☐ (If no, skip this section)	
Documentation for Chain of Custody is attached: Yes:☐ No:☐	
Note: Invoices must clearly document FSC wood products and include the vendor's FSC number for each step in the supply chain from forest to final product.	

Date Created (yyyy mm dd): 2011 08 10	Date Modified (yyyy mm dd): 2011 08 10

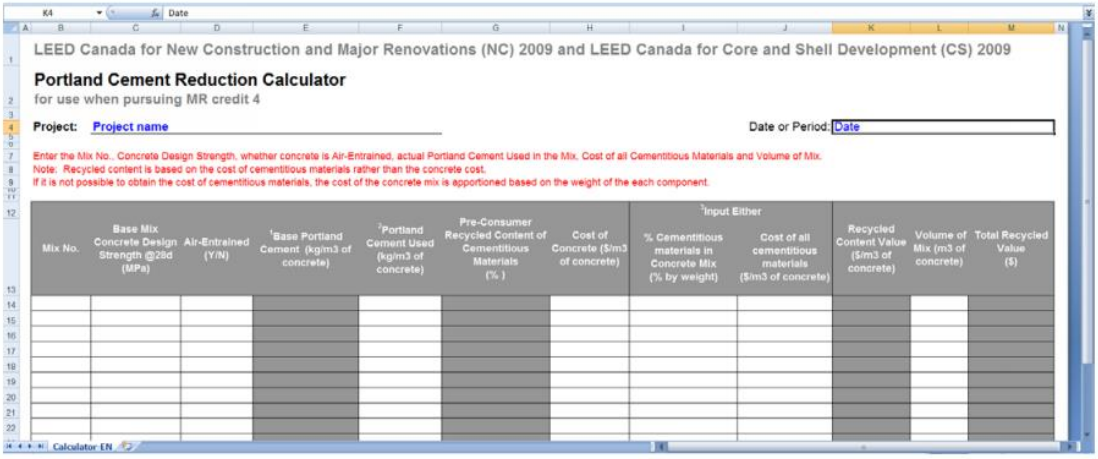
Technical Bulletin

RMCAO

July 30, 2012 **T-054**

Concrete Producer Guidelines to Using the Portland Cement Reduction Calculator for LEED Canada

This Technical Bulletin has been developed for the use of **Concrete Producers** to assist them in correctly utilizing the new Portland Cement Reduction Calculator for use when pursuing MR credit 4 with LEED Canada NC and LEED Canada CS 2009 projects. While anyone can review the contents of this Bulletin, the RMCAO wishes to stress the fact that the calculator contains **privileged and confidential information that will not be distributed to third parties**. The results of this calculator will be distributed to the construction team via a **summary letter only**. **The concrete producer will not supply this calculator to anyone**.



LEED Canada for New Construction and Major Renovations (NC) 2009 and LEED Canada for Core and Shell Development (CS) 2009

Portland Cement Reduction Calculator

for use when pursuing MR credit 4

Project: Project name Date or Period: Date

Enter the Mix No., Concrete Design Strength, whether concrete is Air-Entrained, actual Portland Cement Used in the Mix, Cost of all Cementitious Materials and Volume of Mix.
Note: Recycled content is based on the cost of cementitious materials rather than the concrete cost.
If it is not possible to obtain the cost of cementitious materials, the cost of the concrete mix is apportioned based on the weight of the each component.

Mix No.	Base Mix Concrete Design Strength @28d (MPa)	Air-Entrained (Y/N)	[1]Base Portland Cement (kg/m3 of concrete)	[2]Portland Cement Used (kg/m3 of concrete)	Pre-Consumer Recycled Content of Cementitious Materials (%)	Cost of Concrete ($/m3 of concrete)	[3]Input Either		Recycled Content Value ($/m3 of concrete)	Volume of Mix (m3 of concrete)	Total Recycled Value ($)
							% Cementitious materials in Concrete Mix (% by weight)	Cost of all cementitious materials ($/m3 of concrete)			

Calculator EN

The calculator shown above is used to determine the "**Total Recycled Content Value of the Cementitious Materials**" in a dollar value for the concrete supplied to the project. As will be shown later, the program does this via one of two basic ways:

- Based on cost of the concrete mix and proportioning based on % by weight of the cementing materials (column I in the Excel spreadsheet), or
- Based on the cost of the cementitious material actually used in the concrete (column J in the Excel spreadsheet).

RMCAO recommends calculating the costs based on both methods, since the spreadsheet automatically selects the most beneficial result for determination of the recycled material dollar amount used in the LEED documentation.

To ensure uniform usage of the calculator we will now do a column by column review of the spreadsheet and follow this up with a sample project to demonstrate usage of the program.

Column B – Mix No.

- Simply enter you mix design number in this box (information only).

Column C – Base Concrete Design Strength @ 28 Days

- Indicate the design strength indicated in the contract documents.
- If the design strength isn't based on 28 days (say 7, or 56 days) request written clarification from the project designer as to the equivalent 28 day strength to be used.
- If the governing factor for the concrete mix designs is the specified W/CM ratio and project designers specified 28 day compressive strength doesn't conform to this value (i.e. W/CM ≤ 0.45 but the specified strength is 15 MPa at 28 Days), request written clarification from the project designer as to the appropriate 28 day compressive strength. CSA A23.1 Table 2 may be a useful guide (i.e. Suggest that CSA A23.1 indicates the 28 day strength for air entrained concrete should be 32 MPa @ 28 days rather than the 15 MPa currently indicated).
- Ultimately, it is the value specified by the project designer that must be used in the spreadsheet and you can only suggest clarifications.
- **Note regarding contractor early strength requirements** – Modifications to the 28 day strength values should not be made due to contractor requirements for early form removal. The strength values used in this table are based on the designer's strength requirements for structural adequacy, not the contractor's preferences for constructability.

Column D – Air Entrainment

- "Yes" or "No" based upon the presence of an air entraining admixture in the mix design. Your selection results in the use of the appropriate "Base Portland Cement" curve.

Column E – Base Portland Cement (kg/m^3)

- Automatically calculated by the spreadsheet based on the specified compressive strength of the concrete and the use of an air entraining admixture in the mix design.

Column F – Portland Cement Used (kg/m^3)

- The concrete producer must enter the actual amount of Portland cement used in the mix design. Excluded from this amount are all supplementary cementing materials (recycled cementing materials).
- Based upon Note 2 in the table the concrete producer should modify this value according to the following:
  - For pre-blended cements the concrete producer must remove the supplementary cementing material component. **For example**: if your mix design contains 400 kg/m^3 of GUb-25S then you would enter = 400x(1.0-0.25) = 300 kg/m^3.
  - For Contempra (PLC) cements the concrete producer must remove the limestone component, however since this value varies between 5 to 15% you will have to obtain the replacement value from your cement supplier. **For example**: if your mix design contains 400 kg/m^3 of PLC and the Limestone replacement value is 12%, then you would enter = 400x(1.0-0.12) = 352 kg/m^3.
- *This value is confidential information and is not to be disclosed to third parties at any time.*

Column G – Pre-Consumer Recycled Content of Cementitious Materials (%)

- Automatically calculated by the spreadsheet based upon the difference between the Base Portland Cement (Column E) and the Portland Cement Used (Column F).

Column H – Cost of Concrete ($/m^3)

- Full selling price of the concrete to your customer including all extra charges and fees (e.g. products such as super plasticizer and corrosion inhibitors).
- This price is based upon concrete delivered to the actual jobsite and includes any delivery charges.
- *This value is confidential information and is not to be disclosed to third parties at any time.*

Column I - % Cementitious Materials in Concrete Mix (% by weight)

- The percentage of the mix design that is composed of the cementitious material (base Portland cement plus all

recycled cementitious products).

- The simplest way to calculate this value is to take a basic concrete mix design and add up all the cementitious materials on a per cubic metre basis and divide by the density of the concrete. **For example**: assume a mix design includes 300 kg/m^3 of GU, 75 kg/m^3 of Slag and 50 kg/m^3 of Fly Ash and has a concrete density of 2,350 kg/m^3. The % of cementitious material in the mix design would be = (300+75+50)/2350 = 18.08%.
- *This value is confidential information and is not to be disclosed to third parties at any time.*

Column J – Cost of All Cementitious Materials ($/$m^3$ of concrete)

- This represents the costs of all cementitious (Portland and all supplementary cementing materials) used in the concrete mix design.
- This cost represents the cost of the cementitious materials delivered to the final jobsite. Unfortunately, most concrete producers only know the costs delivered to the concrete plant so we will have to address this fact later in the calculations.
- Most concrete producers are used to describing cement costs based on the cost per metric tonne of cementitious material ($/MT). Please note that the units for this calculation are $/$m^3$ and that you will have to use the conversion factor of 1 Metric Ton = 1,000 kg to convert the units correctly.
    - **Step 1** – Converting cement costs from $/MT to $/$m^3$. For example, if your mix design contains 400 kg/m^3 of GU cement and the cement costs $170/MT then your cost of cementitious materials would be = 400*170/1000 = $68/$m^3$.
    - **Step 2** – Converting plant cement costs to jobsite cement costs. Since the standard cement costs are based upon **transportation to the concrete plant, not the jobsite**, we must now factor in the cement portion of the concrete transportation costs into this value. The suggested industry method is as follows: Jobsite Cement Costs = Plant Cement Costs + Transportation Costs prorated for the cement component only. **For example**: If the cement costs at the plant are $68/$m^3$ (see above) and the shipping costs are $30/$m^3$ and the density of the concrete is 2,350 kg/m3, we are left with the following: = 68 + 30x400/2350 = $73.11/$m^3$ That is $30 x (400/2350) or $5.11 above the cementing material cost to account for the cement delivery to the site.

Column K – Recycled Content Value ($/$m^3$ of concrete)

- Assuming that you have entered both methods of calculation, the spreadsheet will automatically calculate the recycled content value based on:
    - The cost of the concrete delivered to the jobsite (this assumes that all raw materials have an equal value based on weight, which is incorrect and normally not an advantageous assumption)
    - The cost of the cementitious materials actually used in the concrete mix design (this is normally the most advantageous calculation method, however requires significant cost inputs)
- When both calculation methods are used, the program automatically utilizes the most beneficial calculation method (highest $/$m^3$ value).
- If the value is negative due to the fact that the base Portland cement content is exceeded, then the program automatically "zeros" this mix design from the calculations (so you don't need to worry about excluding it from the calculations as was done in the past).

Column L – Volume of Mix (m^3)

- You enter the actual volume of concrete used on the project for each mix design in this box.

Column M – Total Recycled Value ($)

- The program determines the recycled value of each concrete mix design by multiplying the Recycled Content Value (Column K) by the Volume of Mix (Column L) to produce a final dollar value.

This completes a basic overview of the calculator, but the real question is how do we use it! The best way we can demonstrate this is to use an example to show you the type of information that you will required to complete the calculations and then provide you with a link to the sample spreadsheet that shows the actual calculations (just click on

each cell of the spreadsheet to see the actual formulas we used to complete the calculations).

Again we must stress that this example is strictly hypothetical. The numbers used are not intended to represent past, current or future industry values. They are only for the purpose of demonstrating the proper use of the calculator. When completed for an actual project the form includes mix design information and raw material costs that should never be shared with anyone outside your company. The final submission to the project team will consist of the **summary letter only**, **NOT THE ACTUAL CALCULATOR!!!!!**

SAMPLE PROJECT – Stand Alone Parking Garage

Mix #1 – C-1 Concrete for Decks and Columns and Shear Walls

- 35 MPa @ 28 Days
- Air Entrained Concrete
- $250/m^3$ selling price to contractor
- $170/MT Cement Cost FOB Plant
- $30/m^3$ delivery cost to jobsite
- **Concrete Mix Design**:
  - GU Cement = 300 kg/m^3
  - Slag Cement = 125 kg/m^3
  - Stone = 1,060 kg/m^3
  - Sand = 700 kg/m^3
  - Water = 165 kg/m^3
  - Density of mix design = 2,350 kg/m^3 (sum of all ingredients in the mix)
- Actual quantity delivered to project 4,600 m^3

Mix #2 – C-2 Concrete for Curbs, Sidewalks and Interior Slabs on Grade

- 32 MPa @ 28 Days
- Air Entrained Concrete
- $230/m^3$ selling price to contractor
- $170/MT Cement Cost FOB Plant
- $30/m^3$ delivery cost to jobsite
- **Concrete Mix Design**:
  - GU Cement = 295 kg/m^3
  - Slag Cement = 95 kg/m^3
  - Stone = 1,010 kg/m^3
  - Sand = 800 kg/m^3
  - Water = 175 kg/m^3
  - Density of mix design = 2,375 kg/m^3 (sum of all ingredients in the mix)
- Actual quantity delivered to project 385 m^3

Mix #3 – Non-Structural Mud Slab "A"

- 15 MPa @ 28 Days
- Non Air Entrained Concrete
- $185/m^3$ selling price to contractor
- $170/MT Cement Cost FOB Plant
- $30/m^3$ delivery cost to jobsite
- **Concrete Mix Design**:
  - GU Cement = 150 kg/m^3
  - Slag Cement = 50 kg/m^3
  - Stone = 1,075 kg/m^3
  - Sand = 850 kg/m^3

  - Water = 175 kg/m^3
  - Density of mix design = 2,300 kg/m^3 (sum of all ingredients in the mix)
- Actual quantity delivered to project 100 m^3

Mix #4 – Non-Structural Mud Slab "B"

- 15 MPa @ 28 Days
- Non Air Entrained Concrete
- \$200/m^3 selling price to contractor
- \$170/MT Cement Cost FOB Plant
- \$30/m^3 delivery cost to jobsite
- **Concrete Mix Design**:
  - GU Cement = 245 kg/m^3
  - Stone = 1,075 kg/m^3
  - Sand = 850 kg/m^3
  - Water = 175 kg/m^3
  - Density of mix design = 2,345 kg/m^3 (sum of all ingredients in the mix)
- Actual quantity delivered to project 100 m^3

Click "**HERE**" to download the example spreadsheet that has been created for this sample project.

Portland Cement Reduction Calculator

for use when pursuing MR credit 4

Project: Project name

Date or Period: Date

Enter the Mix No., Concrete Design Strength, whether concrete is Air-Entrained, actual Portland Cement Used in the Mix, Cost of all Cementitious Materials and Volume of Mix.
Note: Recycled content is based on the cost of cementitious materials rather than the concrete cost.
If it is not possible to obtain the cost of cementitious materials, the cost of the concrete mix is apportioned based on the weight of the each component.

Mix No.	Base Mix Concrete Design Strength @28d (MPa)	Air-Entrained (Y/N)	[1]Base Portland Cement (kg/m3 of concrete)	[2]Portland Cement Used (kg/m3 of concrete)	Pre-Consumer Recycled Content of Cementitious Materials (%)	Cost of Concrete ($/m3 of concrete)	[3]Input Either		Recycled Content Value ($/m3 of concrete)	Volume of Mix (m3 of concrete)	Total Recycled Value ($)
							% Cementitious materials in Concrete Mix (% by weight)	Cost of all cementitious materials ($/m3 of concrete)			

Footnotes
1: Base Portland Cement calculated from the table found in the CAC & PCA publications EB101.08T, Design & Control of Concrete Mixtures.
2: This column includes any cementitious ingredient not recycled. It should exclude the recycled and limestone component(s) of a blended cement or a PLC.
3: If both values are entered, the calculation method that is most beneficial is used.

Total Recycled Content Value of Cementitious Materials: $0

This calculator is to be completed by the supplier/contractor and the resulting value declared in a signed letter, printed on company letterhead and provided to the party responsible for the certification documentation.
The resulting value will be entered into the cost column of the MR credit 4 letter template. The row will be designated as "SCM Cement," and the % Post-consumer column will be set to 100%.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Province of Manitoba

.1 Workplace Safety and Health Act, R.S.M. 1987.

.4 City of Winnipeg

.1 Contractor Safety – A Shared Responsibility; available on the Information Connection page at the City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/safety/

.2 City of Winnipeg Safe Work Plan; available on the Information Connection page at the City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/safety/

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Contract Administrator and authority having jurisdiction, weekly.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Contractor shall provide the Contract Administrator with one (1) copy of Material Safety Data Sheets (MSDS's) for all products used in the performance of the Work at least two (2) Business Days prior to bringing such materials to Site.

.7 Contract Administrator will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Contract Administrator within 5 days after receipt of comments from Contract Administrator.

.8 Contract Administrator review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.9 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 Contract Administrator.

.10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.4 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.5 MEETINGS

.1 Schedule and administer Health and Safety meeting with Contract Administrator prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.7 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Contract Administrator may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.8 RESPONSIBILITY

.1 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.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 COMPLIANCE REQUIREMENTS:

.1 Comply with Workplace Safety and Health Act, Workplace Safety Regulation, Manitoba Reg. R.S.M 1987.

1.10 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in

accordance with Acts and Regulations of Province having jurisdiction and advise Contract Administrator verbally and in writing.

1.11 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have minimum 2 years' site-related working experience specific to activities associated with health and safety.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work.

1.12 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Contract Administrator.

1.13 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Contract Administrator.

.2 Provide Contract Administrator with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Contract Administrator may stop Work if non-compliance of health and safety regulations is not corrected.

1.14 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Contract Administrator.

1.15 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 FIRES

.1 Fires and burning of rubbish on site not permitted.

1.2 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Wrap in burlap, trees and shrubs adjacent to construction Work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Contract Administrator.

1.5 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material.

.3 Do not dump excavated fill, waste material or debris in waterways.

.4 Design and construct temporary crossings to minimize erosion to waterways.

.5 Do not skid logs or Construction materials across waterways.

.6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

.7 Do not blast under water or within 100 m of indicated spawning beds.

1.6 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment and plant to local authorities emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 NOTIFICATION

.1 Contract Administrator and/or The City will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of environmental protection. Contractor: after receipt of such notice, inform Contract Administrator of proposed corrective action and take such action as approved by Contract Administrator.

.2 Contract Administrator and or The City may issue stop order of work until satisfactory corrective action has been taken.

.3 No time extensions will be granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with the 2010 National Building Code of Canada (NBC 2010) including all amendments up to Bid Submission closing date and other codes of Provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract Documents.

.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: stop Work immediately should materials believed to contain asbestos be encountered in during the execution of the Work and notify the Contract Administrator. Do not proceed until written instructions have been received from the Contract Administrator. Perform asbestos abatement and repair in accordance with the Province of Manitoba asbestos regulations, Latest Edition.

.2 Mould: stop Work immediately should material resembling mould be encountered during the execution of Work and notify Contract Administrator. Do not proceed until written instructions have been received from Contract Administrator.

1.3 NON-SMOKING ENVIRONMENT

.1 Comply with the Non-Smokers Health Protection Act.

1.4 RELICS AND ANTIQUITIES

.1 Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of Work.

.2 Give immediate notice to Contract Administrator and await Contract Administrator‘s written instructions before proceeding with Work in this area.

.3 Relics, antiquities and items of historical or scientific interest remain Her Majesty’s property.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of this Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 INDUSTRY STANDARDS

.1 Unless the Contract Documents include more stringent requirements, applicable Construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made part of the Contract Documents by reference.

.2 All Construction industry standards referenced in this specification to meet the edition of the standard referenced by the National Building Code of Canada (NBC). If the Construction industry standard is not referenced in the NBC, the latest edition of the standard shall apply.

.3 Each entity engaged in Construction on this Project must be familiar with construction industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Construction Documents.

.1 Where copies of Construction industry standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available upon request.

1.3 ABBREVIATIONS AND ACRONYMS FOR INDUSTRY ORGANIZATIONS

.1 Where abbreviations and acronyms are used, they shall mean the recognized name of the entities in the following list. Names are believed to be accurate and up-to-date as of the date of the Contract Documents.

.2 Industry Organizations:

.1 Air Conditioning and Mechanical Contractors Association (AMCA).
.2 Air Conditioning and Refrigeration Institute (ARI).
.3 Americans with Disability Act (ADA).
.4 Air Movement and Control Association (AMCA).
.5 The Aluminum Association, Inc. (AA).
.6 American Contract Administratorural Manufacturers Association (AAMA).
.7 American Association of State Highway and Transportation Officials (AASHTO).
.8 American Association of Textile Chemists and Colourists (AATCC).
.9 American Bearing Manufacturers Association (ABMA).
.10 American Boiler Manufacturer's Association (ABMA).
.11 American Concrete Institute (ACI).
.12 American Industrial Hygiene Association (AIHA).
.13 American Institute of Steel Construction (AISC).
.14 American Iron & Steel Institute (AISI).
.15 American National Standards Institute (ANSI).

.16 American Petroleum Institute (API).
.17 American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
.18 American Society of Mechanical Engineers (ASME).
.19 American Society of Sanitary Engineer's (ASSE).
.20 American Society for Testing and Materials (ASTM).
.21 American Water Works Association (AWWA).
.22 American Welding Society (AWS).
.23 American Wood-Preservers' Association (AWPA).
.24 Contract Administratorural WoodWork Institute (AWI).
.25 Contract Administratorural WoodWork Manufacturers Association of Canada (AWMAC).
.26 Asphalt Institute (AI).
.27 Associated Air Balance Council (AABC).
.28 Association of the Wall and Ceilings Industries International (AWEI).
.29 Atomic Energy Control Board Regulations.
.30 Brick Industry Association (BIA).
.31 Building Industry Consulting Services International (BICSI).
.32 Canada Green Building Council (CaGCB).
.33 Canada Labour Code.
.34 Canadian Council of Ministers of the Environment (CCME).
.35 Canadian Code for Preferred Packaging.
.36 Canadian Construction Materials Centre (CCMC).
.37 Canadian Environmental Protection Act (CEPA).
.38 Canadian Gas Association (CGA).
.39 Canadian General Standards Board (CGSB).
.40 Canadian Institute of Steel Construction (CISC).
.41 Canadian Nursery Landscape Association (CNLA).
.42 Canadian Paint Manufacturer's Association (CPMA).
.43 Canadian Roofing Contractors' Association (CRCA).
.44 Canadian Sheet Steel Building Institute (CSSBI).
.45 Canadian Standards Association (CSA).
.46 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
.47 Canadian Urethane Foam Contractors' Association Inc. (CUFCA).
.48 Carpet and Rug Institute (CRI).
.49 Ceramic Tile Institute (CTI).
.50 Consumer Electronics Association (CEA).
.51 Cooling Technology Institute (CTI).
.52 Department of Justice Canada (Jus).
.53 Electrical and Electronic Manufacturers' Association of Canada (EEMAC).
.54 Electronic Industries Alliance (EIA).
.55 Environment Canada (EC).
.56 The Environmental Choice Program.
.57 Environmental Protection Agency (EPA).

.58 Environmental Protection Services (EPS).
.59 ETL Listing Laboratories (ETL).
.60 Factory Mutual (FM).
.61 Federal Communications Commission (FCC).
.62 Flat Glass Manufacturers Association (FGMA).
.63 Green Seal Environmental Standards.
.64 Health Canada - Workplace Hazardous Materials Information System (WHMIS).
.65 Hydraulics Institute (HI).
.66 Hydronic Institute of Boiler and Radiator Manufacturers (IBR).
.67 Industry Canada - Terminal Attachment Program.
.68 Institute of Electrical and Electronics Engineers (IEEE).
.69 Institute for Research in Construction (IRC).
.70 Insulated Cable Engineers Association (ICEA).
.71 International ElectroTechnical Commission (IEC).
.72 International Masonry Industry All-Weather Council (IMIAC).
.73 International Standards Organization (ISO).
.74 Laminators Safety Glass Association (LSGA).
.75 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
.76 Master Painters Institute (MPI).
.77 Model National Energy Code of Canada for Buildings (MNECB).
.78 National Association of Contract Administratorural Metal Manufactures (NAAMM).
.79 National Association of Corrosion Engineers (NACE).
.80 National Building Code of Canada (NBC).
.81 National Bureau of Standards/Products Standard (NBS/PS).
.82 National Electrical Manufacturers Association (NEMA).
.83 National Environmental Balancing Bureau (NEBB).
.84 National Fire Code of Canada (NFC).
.85 National Fire Protection Association (NFPA).
.86 National Floor Covering Association (NFCA).
.87 National Hardwood Lumber Association (NHLA).
.88 National Lumber Grades Authority (NLGA).
.89 National Plumbing Code of Canada (NPC).
.90 National Research Council Canada (NRC).
.91 National Roofing Contractors Association (NRCA).
.92 National Sanitation Foundation (NSF).
.93 Newfoundland Occupational Health and Safety Act.
.94 Plumbing and Drainage Institute (PDI).
.95 Province of Newfoundland and Labrador Building Accessibility Regulations.
.96 Provincial Boiler, Pressure Vessel and Compressed Gas Regulations.
.97 Scientific Equipment and Furniture Association (SEFA).
.98 Sealant and Waterproofer’s Institute.
.99 Sheet Metal and Air Conditioning Contractors’ National Association (SMACNA).
.100 Society of Automotive Engineers (SAE).
.101 The Society for Protective Coatings (SSPC).

.102 South Coast Air Quality Management District (SCAQMD).
.103 Telecommunications Distribution Methods Manual (TDMM).
.104 Telecommunications Industries Association (TIA).
.105 Terrazzo Tile and Marble Association of Canada (TTMAC).
.106 Thermal Insulation Association of Canada (TIAC).
.107 Transport Canada (TC).
.108 Transport Canada - Marine Safety (TCMS).
.109 Treasury Board of Canada (TB).
.110 Treasury Board Information Technology Standard (TBITS).
.111 Truss Plate Institute of Canada (TPIC).
.112 Underwriters' Laboratories Inc. (UL).
.113 Underwriter's Laboratories of Canada (ULC).
.114 United States Federal Trade Commission (US Federal Trade Commission).
.115 U.S. Coast Guard Equipment List (USCG).
.116 U.S. Department of Transportation (DOT).

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 INSPECTION

.1 Allow Contract Administrator access to Work.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Contract Administrator's instructions, or law of Place of Work. Provide photo documentation where applicable in accordance with Sections 01 11 00 – Summary of Work and 01 33 00 – Submittal Procedures.

.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 Contract Administrator may order any 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, Contract Administrator shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Contract Administrator for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Contractor.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Contract Administrator at no cost to Contract Administrator. Pay costs for retesting and re-inspection.

1.3 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.

1.4 PROCEDURES

.1 Notify appropriate agency and Contract Administrator 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 an orderly sequence so as not to cause delay 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.

1.5 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 Contract Administrator 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 Contract Administrator it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, The City may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Contract Administrator.

1.6 REPORTS

.1 Submit 4 copies of inspection and test reports to Contract Administrator.

.2 Provide copies to Subcontractor of Work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.7 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

.2 Construct in all locations acceptable to Contract Administrator as specified in specific Section.

.3 Prepare mock-ups for Contract Administrator's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Contract Administrator will assist in preparing a schedule fixing dates for preparation.

.6 Remove mock-up at conclusion of Work or when acceptable to Contract Administrator.

.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

Part 1 General

1.1 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute Work expeditiously.

.2 Remove from Site all such Work after use.

1.2 WATER SUPPLY

.1 Provide continuous supply of potable water for Construction use.

.2 Arrange with The City and pay all costs for installation, maintenance and removal.

1.3 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during Construction period, including attendance, maintenance and fuel. Maintain temperatures of minimum 10 degrees C in areas where Construction is in progress.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

- .1 Facilitate progress of Work.
- .2 Protect Work and products against dampness and cold.
- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
- .5 Provide adequate ventilation to meet health regulations for safe Working environment.

.4 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of Work process to assure removal of harmful contaminants.

.5 Permanent heating system of building, may not be used when available.

.6 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Contract Administrator.

.7 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform to applicable codes and standards.
.2 Enforce safe practices.
.3 Prevent abuse of services.
.4 Prevent damage to finishes.
.5 Vent direct-fired combustion units to outside.

.8 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.4 TEMPORARY POWER AND LIGHT

.1 Contractor will provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts 30 amps.

.2 Arrange for connection with appropriate utility company. Pay all costs for installation, maintenance and removal.

.3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.

.4 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162lx.

1.5 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone, fax, data hook up, lines, equipment necessary for own use.

1.6 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction, and governing codes, regulations and bylaws. Burning rubbish and construction waste materials is not permitted on Site.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

.1 Provide construction facilities in order to execute Work expeditiously.

.2 Remove from Site all such Work after use.

1.2 SCAFFOLDING

.1 Provide and maintain scaffolding, ramps, ladders, and platforms.

1.3 SITE STORAGE/LOADING

.1 Confine Work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products. Store materials in areas designated by Contract Administrator.

.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

.3 Restrict equipment, Work, Workers and storage of construction materials, tools, equipment, etc. to designated areas and established routes to and from Work areas. Confirm designated areas and routes with Contract Administrator.

1.4 CONSTRUCTION PARKING

.1 Parking will be permitted on Site. Contractor to submit parking and Site use plan to Contract Administrator for approval.

1.5 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on Site in a manner to cause least interference with Work activities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Barriers.

.2 Environmental Controls.

.3 Traffic Controls.

.4 Fire Routes.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from Site all such Work after use.

1.3 HOARDING

.1 Erect temporary Site enclosures using 38 x 89 mm Construction grade lumber framing at 600 mm centres, installed on 89 x 89 mm wood posts at 2400 mm centres or 50 mm dia. steel posts at 2400 mm centres. Posts to be place in post holes filled with concrete to minimum 900 mm depth. Finish temporary Site enclosures with 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121 or chain link fence fabric to Section 32 31 13 – Chain Link Fences and Gates.

.2 Apply plywood panels or chain link fence fabric vertically flush and butt jointed.

.3 Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.

.4 Paint public side of Site enclosure in selected colours with one coat primer to CGSB 1.189M and one coat exterior paint to CGSB 1.59. Maintain public side of enclosure in clean condition.

.5 Provide barriers around trees and plants designated to remain as per City of Winnipeg Tree Protection Specifications. Protect from damage by equipment and Construction procedures.

1.4 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

1.5 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior Work for temporary heat.

.3 Erect enclosures to allow access for installation of materials and Working inside enclosure.

.4 Design enclosures to withstand wind pressure and snow loading.

1.6 DUST TIGHT SCREENS

.1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of Workers, finished areas of Work and public.

.2 Maintain and relocate protection until such Work is complete.

1.7 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and Construction runways as may be required for access to Work.

.2 Build and maintain temporary roads where indicated or directed and provide snow removal during period on Work.

.3 If authorized to use existing roads for access to project Site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

1.8 PUBLIC TRAFFIC FLOW

.1 Contractor shall allow for continued public access to the Site throughout the Construction period and shall ensure that the Work is maintained to the approval of the Local Authorities having Jurisdiction, local by-laws, and Work Place Safety and Health Policies. This will also be applicable to street accesses.

.2 Contractor shall observe and enforce all Construction safety measures required by the Manitoba Building Code, Worker's Compensation Board, Municipal Statute or By-Laws. In the event of a conflict between any provisions of the above authorities, the most restrictive provision shall apply.

.3 Contractor shall maintain traffic flow around the Work Area. Contractor's operations shall in no way interfere with the safe movement of pedestrian traffic.

1.9 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.10 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.11 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Contract Administrator locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

1.12 PROTECTION OF EXISTING TREES

.1 The Contractor shall take the following precautionary steps to prevent damage from Construction activities to existing boulevard trees within the limits of the Construction area. If you require further information on these specifications, please contact the City of Winnipeg Forestry Branch at 986-2004:

.1 For trees greater than 100 mm in diameter, attach wood strapping material having a minimum thickness of 25 millimetres and minimum length of 2440 millimetres around tree trunks in a manner that will not harm the trees. Do not use nails or other fasteners that penetrate into trees. The width of strapping should suit the size of the tree being protected. Length of strapping may be reduced to suit tree being protected as approved by the Contract Administrator.

.2 For trees less than 100 mm in diameter, install snow fencing around the tree to a 2.0 meter radius complete with installation hardware. The 2.0 meter radius of the snow fencing may be reduced to suit the tree being protected as approved by the Contract Administrator.

.3 Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform Work. Equipment shall not be parked, repaired, refueled; Construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of the trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.

.4 Repair, replace and maintain tree protection material during Construction of the Work.

.5 Remove snow fencing and strapping material without harming trees as soon as the Construction and restoration Work is complete.

.2 Obtain approval from the Contract Administrator to excavate within 2.0 meters of a tree.

.3 Excavate in a manner to minimize damage to root systems. Keep exposed roots in excavations and trenches moist or shaded.

.4 Prune exposed roots with equipment such as trenchers, chain saws, root cutters or other methods acceptable to the Contract Administrator in a manner that will leave a neat, clean root end.

.5 Take precautions to ensure tree limbs overhanging the Site are not damaged by Construction equipment. Contact the Forestry Branch for consultation on pruning of overhanging or damaged limbs and branches and other unanticipated problems with trees during Construction of the Works.

.6 Elm trees are not to be pruned between April 1st and August 1st of any year under provisions of The Dutch Elm Disease Act.

.7 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the Forestry Branch. Damages must be repaired by an individual with a Manitoba Arborist license or by the Forestry Branch.

.8 The Forestry Branch will remove and replace any trees deemed to have died or that are dying due to damage from carelessness during Construction. Removal and replacement costs will be determined by size, market price of the largest transplantable tree of same or different species and may include appraised value of existing tree as determined by current International Society of Arboriculture evaluation procedure presently used by Forestry Branch in conjunction with City Claims Branch. Estimated replacement cost of a 25 and 60 cm diameter American elm on a boulevard based on an appraised value is approximately $4,700.00 and $27,000.00 respectively.

.9 Protection of existing trees, repair of trees and pruning of damaged limbs will not be measured for payment and will be included with Underground or Surface Works. Removal and replacement of existing trees by the Forestry Branch deemed to have died or that are dying due to damage from carelessness during Construction will be at own costs and will be invoiced for or deducted from any payments owing.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 35 20 - Leadership in Energy and Environmental Design Sustainable Requirements

1.2 REFERENCES

.1 LEED Canada Reference Guide for Green Building Design and Construction 2009

.1 Indoor Environmental Quality Credit 3.1 Construction IAQ Management Plan: During Construction.

.2 Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings Under Construction, 2nd Edition Chapter 3 (November 2007).

.3 American Society of Heating, Refrigeration, and Air-Conditioning Engineers Inc. (ASHRAE).

.1 ASHRAE 52.2-1999: Methods of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

.4 Credit Interpretation Requests relating to the credits specified in this Section may apply in projects exhibiting exceptional circumstances as deemed necessary by the Contract Administrator.

.5 www.cagbc.org

1.3 REQUIREMENTS

.1 Integrated Designs Inc. in conjunction with the Contractor shall develop and implement an *Indoor Air Quality (IAQ) Management Plan* for the construction of the project. A preliminary IAQ plan has been appended to section 01 56 15. The *IAQ Management Plan* is to be approved by the The City and Contract Administrator and must include the following:

.1 During construction meet the recommended design approaches of the SMACNA IAQ Guideline for Occupied Buildings Under Construction, Chapter 3 (2007).

.2 Protect stored on-site or installed absorptive materials from moisture damage.

.3 Ensure installation of absorbent materials, such as ceiling tiles, gypsum, carpet etc., are sequenced such that VOC-emitting materials have off-gassed their air contaminants.

.4 If air handlers must be used during construction, filtration media with a minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grille, as determined by ASHRAE 52.2-1999.

.5 Install new air filtration media in regularly occupied areas prior to occupancy for all air handling equipment with a maximum flow rate of more than 283/L/s; these filters must provide a minimum efficiency reporting value (MERV) 8 or higher.

.6 Make provisions for inspections, to be coordinated with the commissioning authority, of building and HVAC systems for deficiencies that could adversely affect the IAQ and correct any of these deficiencies.

.7 Ensure all return and supply grilles are completely sealed off in areas of high dust and pollution activities for the duration of the task.

1.4 SUBMITTALS

.1 Submit the IAQ Management Plan to The City and Contract Administrator for approval.

.2 Submit a list of air filters to be used, include the MERV value, manufacturer name and model number.

.3 Submit at least 6 dated digital photographs on a minimum of 3 different occasions throughout the construction process. Include identification of SMACNA approach featured by each photograph.

Part 2 Products

NOT USED

Part 3 Execution

3.1 IMPLEMENTATION

.1 Implement and follow the *IAQ Management Plans*.

.2 Provide at least 6 digital photographs on a minimum of 3 different occasions (minimum 18 total) throughout the construction process. Include identification of SMACNA approach featured by each photograph.

Construction Indoor Air Quality Management Plan
August 26, 2013

East Elmwood Community Center
Project Location: Winnipeg, Manitoba

Prepared By:
Stephanie Zubriski, LEED® AP BD+C – Integrated Designs Inc. (IDI)
Bobbi MacLennan – Integrated Designs Inc. (IDI)
Contractor –

Responsible Party

Teams and individuals involved in activities pertaining to the policy:

Facility Manager: TBD
Contractor: TBD
Building The City: TBD

Scope

This document has been developed to meet the LEED requirement for an Indoor Air Quality (IAQ) Management Plan during the construction and pre-occupancy phases of the East Elmwood Community Center. The following plan highlights measures that will be implemented to prevent IAQ problems and prevent the potential delays related to IAQ issues by the construction workers and future occupants.

LEED credit EQc3.1 (Construction IAQ Management Plan) requires attention to the following five areas proposed by the SMACNA[1] IAQ Guideline for Occupied Buildings under Construction, second edition, November 2007,Chapter 3:

- Protection of the HVAC System
- Pathway Interruption
- Housekeeping
- Scheduling
- Source Control

The Contractor will employ the following strategies to effectively manage the IAQ throughout the construction process.

1 Sheet Metal and Air Conditioning National Contractors Association

Protection of the HVAC System

These procedures will be used to prevent ductwork and HVAC equipment from being contaminated with dust and debris:

- The return air system will be isolated by closing dampers, installing temporary filters and temporarily sealing air intakes.
- If the HVAC system will be used during construction, each return air grill must be fitted with a MERV 8 filter as per ASHRAE 52.2-1999.
- If the HVAC system is not being used during construction, all air intakes will be temporarily sealed to prevent the accumulation of dust.
- HVAC equipment is to be inspected for dust or other contaminants regularly and is to be cleaned as needed and prior to occupancy. This may include professional cleaning.
- The ceiling plenum will be inspected for dust and debris and cleaned if necessary.
- All leaks will be sealed on the return air system before activation.
- All temporary filters will be replaced prior to occupancy.
- HVAC equipment will be cleaned prior to occupancy.

Pathway Interruption

These procedures will be used to reduce the flow of contaminates through out the buildings:

- 100% outside air will be used for ventilation during drywall sanding, painting, or any tasks producing a high dust or VOC load, to exhaust contamination directly outside.

These procedures will be used to minimize contamination at the source:

- Contractors, Suppliers, and Trades will be asked to clean dirty building supplies and equipment before bringing it into the building.
- Wrapped supplies (i.e. carpet rolls, ceiling tiles, etc.) will not be unwrapped until just prior to installation to prevent dust contamination or adsorption of VOCs.
- Mechanical equipment and building supplies stored in the building will be kept in packaging or wrapped to minimize dust contamination and reduce the need for cleaning.
- Contractor and Trades will construct temporary barriers that contain construction dust and debris.

House Keeping

The following house keeping procedures will be observed to minimize the accumulation of dust and prevent it from becoming airborne:

- Workers engaged in dust generating activities will be asked to clean up as quickly as possible to prevent it from becoming airborne or being tracked throughout the site.
- Workers will be asked to clean areas before they are enclosed. Coring dust, insulation debris, packaging, etc., can provide a medium for mold growth and will be removed.
- The Contractor's Site Supervisor will require immediate clean up of areas that have the potential to create IAQ problems.
- The Contractor will provide and maintain shop vacuums equipped with HEPA filters to facilitate the above procedures.

Scheduling

The following construction sequences will be attempted in order to reduce absorption of VOCs and dust by porous materials. Scheduling constraints may allow for only partial implementation of each point.

- Application of paints, sealants, and coatings will be completed before installation of ceiling tiles, carpets or fabric covered furnishings.
- Carpet will be installed after the bulk of drywall sanding has been completed.
- Carpet will be covered with plastic until the pre-occupancy clean-up.
- Furnishings that are expected to off-gas VOCs (i.e. cubical systems, etc.) will not be stored on site prior to installation. To reduce exposure of site workers these furnishings will be assembled later in the week and allowed to off-gas over the weekend.

Source Control

In addition to the requirements of LEED credit EQc4 (Low Emitting Materials) the following procedure will be implemented.

- To reduce VOC emissions workers will be asked to keep paint, solvent and sealant containers closed when not in use and remove used containers from the site promptly.

Additional Requirements

LEED credit EQc3.1 requires that all stored or installed adsorptive materials be protected from moisture damage. The Contractor will implement the following procedures to prevent IAQ problems relating to moisture-damaged material.

- In addition to being wrapped (see *Pathway Interruption*), building materials stored on site will be located away from areas where they could get wet.
- Any incidents of moisture damage will be reported to the Site Supervisor.
- Moisture damaged materials will not be installed.
- The Contractor will ensure that Contractors, Suppliers, and Trades are aware of this requirement by incorporating IAQ requirements into the mandatory safety training.

Prior to completion of the building, an IAQ inspection of the building and HVAC system will be conducted. Any deficiencies will be corrected before occupancy. The following points will be inspected:

- All HVAC equipment has been properly sealed and cleaned,
- All temporary filters have been replaced,
- All paint, solvent and sealant containers have been removed from the building,
- All construction debris has been removed from the building (including from the ceiling plenum),
- Materials affecting IAQ are not located near air intakes, and
- Any moisture damage will be noted.

Quality Assurance and Quality Control Processes:

During any construction or renovation project the following strategies will be utilized to ensure the implementation of this plan:

a. A list of filtration media utilized, including the manufacturer, model number, MERV rating, date of installation and date of replacement.
b. Bi-weekly date-stamped photographs documenting the IAQ control measures implemented during the project. The photos will be labeled to highlight the approach taken.
c. Provide 18 Photographs-six photographs taken on 3 separate occasions during construction-The photos will be labeled to highlight each of the following approaches taken; protection of the HVAC System, pathway Interruption, housekeeping, scheduling, or source Control.
d. Narrative documenting the flush-out procedure utilized, including airflow and duration.

END OF SECTION

Part 1 General

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

.2 City of Winnipeg Tree Protection Specification

1.2 SUMMARY

.1 Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent Construction. Protect all trees within area of construction.

1.3 TREE PROTECTION DURING CONSTRUCTION

.1 Construction activities near trees may result in injury to the trunk, limbs or roots of trees causing damage or death of the tree. In order to prevent such damage:

.1 Trees within or adjacent to a construction area must be protected during Construction by means of a barrier surrounding a “Tree Protection Zone” (TPZ).

.2 Activities which are likely to injure or destroy the tree are not permitted within the TPZ.

.3 Tree pruning or root pruning of City of Winnipeg owned trees may only be done by a Contractor approved by the project’s Qualified Tree Contract Administrator or Urban Forestry Branch.

.4 No objects may be attached to trees protected by City of Winnipeg by-laws without written authorization by the City of Winnipeg.

.5 No City of Winnipeg tree or tree protected by a City of Winnipeg by-law may be removed without the written permission of the City of Winnipeg.

.2 Tree Protection Zone

.1 The following is a chart showing optimal distances for determining a tree protection zone (The roots of a tree can extend from the trunk to approximately 2-3 times the distance of the drip line). Some Site conditions may dictate the need for a smaller TPZ. The City of Winnipeg Urban Forestry Branch must be notified in these instances. Forestry will determine if the smaller TPZ is acceptable in the specific circumstance and advise of any additional tree protection or removal requirements.

Table 1 – Tree Protection Zones

***Trunk Diameter (DBH)**	****Minimum Protection Distances Required**
<10 cm	2.0m
11-40cm	2.4m
41-50cm	3.0m
51-60cm	3.6m
61-70cm	4.2m
71-80cm	4.8m
81-90cm	5.4m
91-100cm+	6.0m

* Diameter at breast height (DBH) measurement of tree trunk taken at 1.4 metres above ground.

** Tree Protection Zone distances are to be measured from the outside edge of the tree base towards the drip line and may be limited by an existing paved surface, provided the existing paved surface remains intact throughout the construction Work.

.3 Tree Protection Barriers

.1 Trees within tree protection zones shall be protected by means of a “tree protection barrier” meeting the following specifications:

.1 The required barrier is a 1.2 metre (4 ft) high orange plastic web snow fencing on 2” x 4” frame or as directed by the City of Winnipeg Urban Forestry Branch in accordance with City of Winnipeg Protection of Existing Tree Specifications. The barrier can be lowered around branches lower than 1.2 metres (4 ft). The barrier location can be adjusted to align with curbs and edges at clear path of travel zones.

.2 Tree strapping material will be installed on individual trees, in accordance with CW1140, where Work will be completed within the TPZ.

.3 Tree protection barriers are to be erected prior to the commencement of any Construction or grading activities on the Site and are to remain in place throughout the entire duration of the Project. The applicant shall notify the City of Winnipeg prior to

commencing any Construction activities to confirm that the tree protection barriers are in place.

.4 All supports and bracing used to safely secure the barrier should be located outside the TPZ. All supports and bracing should minimize damage to roots.

.5 No grade change, storage of materials or equipment is permitted within this area. The tree protection barrier must not be removed without the written authorization of the City of Winnipeg.

.4 Utility Construction and Engineering and Capital Construction Projects

.1 It is recognized that there are cases where trees are growing overtop existing utilities or beside capital infrastructure. While the guidelines in this section still apply, in these cases some modification to Table 1 in addition to root pruning may be permitted provided non-open trench methods of Construction are employed (refer to City of Winnipeg Standard Construction Specifications CW2110 and CW2130).

.2 Root Pruning will be required to be done under the direction of - and along with - written sign-off by the Project's Qualified Tree Contract Administrator. The objective is to avoid severance of anchor roots, which provide upright support for trees and minimize damage to the tree.

.3 Above ground clearance for overhanging branches in the Work zone must be anticipated. The utility or it's Contract Administrator is required to have a Forestry approved tree service raise the crown of all branches to provide adequate clearance for Construction equipment.

.5 Qualified Tree Contract Administrators

.1 An arborist certified by the International Society of Arboriculture (ISA) who has a diploma (minimum) in arboriculture or urban forestry; and

.2 A landscape architect who is a member in good standing of the Manitoba Association of Landscape Architects

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 35 20 – Leadership in Energy and Environmental Design Sustainable Requirements

.2 Section 01 35 43 – Environmental Protection

.3 Division 31 – Earthwork

.4 Division 32 – Exterior Improvements

.5 Division 33 – Utilities

1.2 REFERENCES

.1 LEED Canada Reference Guide for Green Building Design and Construction 2009

.1 Sustainable Sites Prerequisite 1 Construction Activity Pollution Prevention

.2 www.cagbc.org

.2 2003 United States Environmental Protection Agency Document (EPA) Construction General Permit

.3 Credit Interpretation Requests relating to the credits specified in this Section may apply in projects exhibiting exceptional circumstances as deemed necessary by the Contract Administrator.

1.3 INTRODUCTION

.1 Site clearing and earth moving during construction often results in significant soil erosion if adequate environmental protection strategies are not put into practice. Develop and implement an *Erosion and Sedimentation Control Plan* to prevent these problems from occurring.

1.4 REQUIREMENTS

.1 Integrated Designs Inc in conjunction with the Contractor shall design and implement an Erosion and Sedimentation Control Plan specific to the site that conforms to 2003 EPA General Construction Permit, or local erosion and sedimentation control standards and codes, whichever is more stringent. The preliminary plan has been attached to the spec section 01 57 13; however more measures may be added or removed dependent on changing site conditions. Measures will be reviewed on an on going basis during construction to ensure the plan adequately meets the following objectives in accordance with the 2003 EPA General Construction Permit:

.1 Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.

.2 Prevent sedimentation of storm sewer or receiving streams.

.3 Prevent polluting the air with dust and particulate matter.

Part 2 Products

NOT USED

Part 3 Execution

3.1 IMPLEMENTATION

.1 Implement and follow the *Erosion and Sedimentation Control Plan*.

.2 Provide dated digital photographs of the various erosion and sedimentation control measures implemented biweekly throughout the project.

Erosion and Sedimentation Control Plan
August 26, 2013

East Elmwood Community Center
Project Location: Winnipeg, Manitoba

Prepared By:
Stephanie Zubriski, LEED® AP BD+C – Integrated Designs Inc. (IDI)
Bobbi MacLennan – LEED® Green Associate Integrated Designs Inc. (IDI)
Contractor – X

Summary

The East Elmwood Community Center project, located in Winnipeg, Manitoba, includes the main community club structure (1,032 m^2) and an adjacent ice rink. Remaining on the site is a splash pad, playground, and baseball diamond, which have been integrated into the site design and new Community Center.

According to LEED® 2009 requirements, the Erosion and Sedimentation Plan (ESC Plan) must conform to the erosion and sedimentation requirements of the 2003 US EPA Construction General Permit or local standards and codes, whichever is more stringent.

The plan must describe the measures implemented to accomplish the following objectives:

- To prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for re-use.
- To prevent sedimentation of storm sewer or receiving streams.
- To prevent pollution of the air with dust and particulate matter.

To deal with sedimentation, filters will be placed in all catch basins near the site and silt fencing will be used to on areas where water drains off site. A gravel strip will be used at the site exit to help prevent tracking off of site. If necessary the tires will be cleaned of excessive mud before leaving the site. Rain water that collects in the excavated sight will be pumped and filtered before entering the storm sewer system. Dust is not expected to be an issue, however if it does become a concern the soil will be moistened.

To prevent the loss of topsoil between excavating the site and completion of the project, one of the following stabilization methods will be enforced; short term seeding or mulching.

Routine checks will be done to ensure filters are not damaged or plugged. The trapped sediment will be returned to the site. Gravel will be added to the exit from site and will be added and maintained as needed.

Dated photo documentation and or inspection check sheets of ESC measures will be will be provided to IDI on a bi-weekly basis.

Plan Details-

Silt Fencing
Silt fencing will be used to prevent sedimentation from leaving the site. It is to be installed before any soil disturbing activities have begun. The silt fence will be constructed of fabric material connected to posts and will surround the entire site. Routine checks of the fencing will be made at least every 14 days and prior to any anticipated storm to maintain its effectiveness. When collected sediment is one-third to one-half the height of the fence remove it and properly replace it on site.

If specific areas have greater water flow than anticipated straw bales will be added to increase the effectiveness of the filtration.

Storm Drain Inlet Protection
The construction site and adjacent area catch basins and manholes will have filters put in place to prevent sediment from entering the storm drainage systems. The filter will consist of a geo-textile fabric that will be placed underneath the grate to catch possible sediment from the storm water runoff.

Checks of the sediment level and possible damage to filters will be made at least 14 days. Checks will also be made prior to any anticipated storm. Any visible sediment will be removed and returned to an appropriate place on site.

Dewatering of Site
If dewatering is required of any excavated areas of the site, the water will be pumped through filters prior to entering the water drainage system.

Dust Control
If dust becomes excessive or a concern the problem areas will be moistened to prevent the dust. If topsoil or excavated material has been stockpiled for future use, the materials will be covered or seeded to prevent erosion and excess dust.

Temporary Seeding or Mulching
If large amounts of disturbed soil will be left the site, with construction ceasing for 14 days or more the, soil must be stabilized to reducing erosion potential.

Temporary seeding should be used on areas that have been disturbed and will be disturbed again but not for several weeks. Seeding involves growing short term vegetation on disturbed soil to protect the soil from storm water runoff and wind; seeding also reduces problems associated with dust.

Mulching should be used where temporary seeding cannot because of the climate. If located on a steep slope or near waterways, planted areas shall also be mulched to protect from bad weather. Grass, hay, woodchips, wood fibers, straw, or gravel are acceptable mulching materials that will help stabilize when placed on soil surface.

Construction Exit
A gravel strip will be placed at the exit of the construction site and all vehicles exiting the site will pass over the strip before they enter the public roadway. The gravel strip will help dislodge material from the vehicles to prevent mud from leaving the site. If the vehicles are excessively dirty and the gravel track is not sufficient to remove the mud, the tires and wheel wells will be washed down prior to leaving site.

Daily inspections will be made of the gravel strip and will be maintained as needed.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Within text of each specifications section, reference may be made to reference standards. Conform to these reference standards, in whole or in part as specifically requested in specifications.

.2 If there is question as to whether any product or system is in conformance with applicable standards, Contractor reserves right to have such products or systems tested to prove or disprove conformance.

.3 Cost for such testing will be borne by Contractor in event of conformance with Contract Documents or by Contractor in event of non-conformance.

.4 Conform to latest date of issue of referenced standards in effect on date of submission of Bid, except where specific date or issue is specifically noted.

1.2 QUALITY

.1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Contract Administrator based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Contract Administrator of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Contract Administrator at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Contract Administrator reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from Site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Contract Administrator.

.9 Touch-up damaged factory finished surfaces to Contract Administrator’s satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Contract Administrator in writing, of conflicts between specifications and manufacturer's instructions, so that Contractor may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Contract Administrator to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by Workers experienced and skilled in respective duties for which they are employed. Immediately notify Contract Administrator if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Contract Administrator reserves right to require dismissal from Site, Workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Contract Administrator, whose decision is final.

1.8 CO-ORDINATION

.1 Ensure cooperation of Workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Contract Administrator if there is interference. Install as directed by Contract Administrator.

1.10 REMEDIAL WORK

.1 Perform remedial Work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial Work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Contract Administrator of conflicting installation. Install as directed.

1.12 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior Work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spilling or cracking of material to which anchorage is made are not acceptable.

1.13 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Contract Administrator.

1.15 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Individual product Sections: cutting and patching incidental to Work of section. Advance notification to other sections required.

1.2 SUBMITTALS

.1 Submit written request in advance of cutting or alteration which affects:

- .1 Structural integrity of any element of Project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of The City or separate Contractor.

.2 Include in request:

- .1 Identification of Project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of The City or separate Contractor.
- .7 Written permission of affected separate Contractor.
- .8 Date and time Work will be executed.

1.3 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.4 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of Project from damage.

.5 Provide protection from elements for areas which may be exposed by uncovering Work.

1.5 EXECUTION

.1 Execute cutting, fitting, and patching to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Remove samples of installed Work for testing.

.6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry Work without prior approval.

.10 Restore Work with new products in accordance with requirements of Contract Documents.

.11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.12 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the Construction element.

.13 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

.14 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 GENERAL

.1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

.2 Store volatile waste in covered metal containers and remove from premises at end of each Working day.

.3 Provide adequate ventilation during use of volatile or noxious substances. Use for building ventilation systems is not permitted for this purpose.

1.2 RELATED SECTION

.1 Section 01 77 00 - Closeout Procedures.

1.3 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the City or other Contractors.

.2 Remove waste materials and debris from Site at the end of each Working day. Do not burn waste materials on Site.

.3 Clear snow and ice from access to building.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-Site containers for collection of waste materials and debris.

.6 Clean interior areas prior to start of finish Work, maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each Working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.4 FINAL CLEANING

.1 Refer to General Conditions.

.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 clean and suitable for occupancy.

.4 When the Work is Totally Performed, remove surplus products, tools, Construction machinery and equipment. Remove waste products and debris other than that caused by the City or other Contractors.

.5 Remove waste materials from the Site at regularly scheduled times or dispose of as directed by the the City's Representative. Do not burn waste materials on Site.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Leave the Work broom clean before the inspection process commences.

.8 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.9 Remove stains, spots, marks and dirt from decorative Work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.

.10 Clean lighting reflectors, lenses, and other lighting surfaces.

.11 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.12 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.13 Inspect finishes, fitments and equipment and ensure specified Workmanship and operation.

.14 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.15 Remove dirt and other disfiguration from exterior surfaces.

.16 Clean and sweep roofs.

.17 Sweep and wash clean paved areas.

.18 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.19 Remove snow and ice from access to building.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 19 - Construction 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

Part 1 General

1.1 RELATED SECTIONS

.1 Construction Waste Management - Relates to ALL Sections

.2 Section 01 35 20 - LEED Sustainable Requirements

1.2 REFERENCES

.1 LEED® Canada Reference Guide for Green Building Design and Construction 2009

.1 Materials and Resources Credit 2: Construction Waste Management

.2 Credit Interpretation Requests relating to the credits outlined in 1.2.1 may apply in projects exhibiting exceptional circumstances as deemed necessary by the LEED Contract Adninistrator.

.3 www.cagbc.org

1.3 INTRODUCTION

.1 The Contractor is to divert a minimum of 75% of the demolition and construction waste from the landfill by recycling and salvaging.

1.4 REQUIREMENTS

.1 All sub-trades are to conform to the construction waste management requirements.

.2 The Contractor in conjunction with the LEED Contract Adninistrator is to develop and implement a *Construction Waste Management Plan*. The Contractor shall be responsible for sourcing appropriate recycling and reuse facilities. A draft preliminary plan has been attached to spec 01 74 19 – Waste Management and Disposal.

.3 Weekly construction waste progress reports, as described in Section 01 35 20 – LEED Sustainable Requirements clause 3.1.4, are to be submitted to the LEED® Contract Adninistrator and The City during both demolition and construction.

.4 A consistent method of measurement is to be used; all information is to be provided in metric tonnes.

1.5 INFORMATIONAL SUBMITTALS

.1 Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information on the tracking template:

.1 Date,

.2 Type of waste.

.3 Diversion location or recycler and end use

.4 Total quantity of waste in tonnes.

.5 Quantity of waste salvaged or recycled, in tonnes.

.6 Total quantity of waste recovered as a percentage of total waste.

.2 Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

.3 Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations.

.4 Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

.5 Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.6 STORAGE AND HANDLING

.1 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.

.2 Provide containers to deposit reusable and/or recyclable materials.

.3 Place containers in strategic locations to facilitate deposit of materials without hindering daily operations. Recycle/Salvage containers are to be located closer to the work area and be more readily accessible than waste containers to encourage recycling.

.4 Separate salvaged materials into separate piles or containers on site and protect them from damage. Transport offsite to approved and authorized recycling facility.

.5 Mark containers and/or stockpile areas.

.6 Stockpile areas to be consistent with applicable fire regulations.

.7 Unless otherwise specified, materials for removal become Contractor's property.

.8 On site sale of salvaged, reusable, or recyclable materials is not permitted.

1.7 CLEANING

.1 Remove tools and waste materials upon completion of work and leave work area in a clean, orderly condition.

.2 Maintain a clean and safe work area as work progresses.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 APPLICATION

.1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

.2 Burning and incineration of rubbish and waste cannot be used as an alternative method for diverting waste from the landfill.

.3 Burying of waste and rubbish is prohibited, unless approved by the sustainability Contract Adninistrator.

3.2 DIVERSION OF MATERIALS

.1 Provide instruction regarding disposal practices to all sub-trades.

.2 It is required that every effort be taken to divert 100% of the following materials acquired during construction, from the landfill as long as recycling facilities exist:

.1 Cardboard
.1 Plastic Packaging
.2 Rubble
.3 Steel
.4 Wood (clean)
.5 Wood (used)
.6 Concrete
.7 Other metals
.8 Masonry
.9 Other materials if recycling facilities exist.

3.3 DISPOSAL OF WASTES

.1 Hazardous materials are to be disposed of in accordance with Section 01 35 43 – Environmental Procedures.

.2 Disposal of waste, volatile materials, mineral spirits, oil, and/or paint thinner into waterways, water table, storm, and/or sanitary sewers is prohibited.

integrated DESIGNS

Construction Waste Management Plan
August 26, 2013

East Elmwood Community Center
Project Location: Winnipeg, Manitoba

Prepared By:
Stephanie Zubriski, LEED AP BC+C - Integrated Designs Inc. (IDI)
Bobbi MacLennan - LEED Green Associate - Integrated Designs Inc. (IDI)
Contractor - X

Waste Management Goal

The goal for the East Elmwood Community Center project is to divert a minimum o 50% by weight, of the construction waste from the landfill. This goal will be achieved by reducing the amount of unnecessary material from arriving onsite, recycling, and salvaging for reuse.

Education and Awareness

To ensure that all trades and sub trades are aware of the Construction Waste Management (CWM) requirements for this project,

- CWM training will be incorporated into the mandatory safety training for all workers on site. This will include instruction on appropriate separation, handling, recycling, and salvaging methods during each stage of the work.
- Each sub Contractor will be given a copy of the Construction Waste Management Plan and will be expected to make sure their crews comply with it.
- Bins will be provided for all materials and each bin will be clearly marked for its contents.

Material Waste and End Use

The Contractor will be responsible for sourcing appropriate recyclers to take at minimum the waste listed in the table below. All waste will be stored on site in marked bins and will be collected and taken to the landfill or appropriate recycling facility.

Type of Waste	Recycler – End Use
General Waste	Taken to local landfill
Wood	To be determined
Drywall	To be determined (if facility exists)
Concrete/Brick	To be determined
Metal	To be determined
Plastic	To be determined
Cardboard/ Paper	To be determined
Other	If facility exists, and in consultation with LEED Coordinator

Required Documentation

The Contractor will provide Integrated Designs Inc. with,

- Copies of the waybills with the weight of the waste in metric tonnes and destination for each load hauled.
- Letters from the recycling facilities which indicate the end use of the recycled materials by the end of the project construction.
- A reuse form. Waste that is reused will be weighed and the form will state what the material will be used for and where it's going.

Tracking

CWM will be tracked using a table similar to the one shown below and provided in the specifications.

	Landfill		Clean Wood		Concrete		Metals		Plastics		Cardboard/Paper	
Date	Weight (tonnes)	Location	Weight (tonnes)	Location	Weight (tonnes)	Location	Weight (tonnes)	Location	Weight (tonnes)	Location	Weight (tonnes)	Location

Total Waste =
Total Diverted Materials =
% Diverted =

END OF SECTION

Part 1 General

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Contract Administrator in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Contract Administrator's Inspection.

.2 Contract Administrator's Inspection: Contract Administrator and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.

.4 Operation of systems has been demonstrated to The City’s personnel.

.5 Work is complete and ready for Final Inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by Contract Administrator, and Contractor. If Work is deemed incomplete by Contract Administrator, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Contract Administrator considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of The City’s acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment: When Contract Administrator considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Contract Administrator, complete outstanding items and request re-inspection.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMISSION

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 Copy will be returned after final inspection, with Contract Administrator's comments.

.3 Revise content of documents as required prior to final submittal.

.4 Two weeks prior to Substantial Performance of the Work, submit to the Contract Administrator four final copies of operating and maintenance manuals in English.

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

1.2 FORMAT

.1 Organize data in the form of an instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of Project and identify subject matter of contents.

.5 Arrange content by systems under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: Manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in .dwg format on CD.

1.3 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of Project;

.1 Date of submission; names,

.2 Addresses, and telephone numbers of Contract Administrator and Contractor with name of responsible parties;

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 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 specific 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, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.4 AS-BUILTS AND SAMPLES

.1 In addition to requirements in General Conditions, maintain at the Site for Contract Administrator one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to the Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for Construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Contract Administrator.

1.5 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Contract Administrator.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 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.

.5 Specifications: legibly mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.6 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions.

.2 Include manufacturer's printed operation and maintenance instructions.

.3 Additional requirements: As specified in individual specification sections.

1.7 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.8 WARRANTIES AND BONDS

.1 Separate each warranty or bond 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 Obtain warranties and bonds, executed in duplicate by Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of Work.

.4 Except for items put into use with The City'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.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 General requirements relating to commissioning of project's components and systems, specifying general requirements to performance verification of components, equipment, sub-systems, systems, and integrated systems.

.2 Related Sections:

.1 Section 22 08 00 Commissioning of Plumbing
.2 Section 23 08 00 Commissioning of HVAC
.3 Section 25 08 00 Commissioning of Direct Digital Controls (DDC)
.4 Section 26 08 00 Commissioning of Electrical Systems

.3 Acronyms:

.1 Cx - Commissioning
.2 CxA - Commissioning Authority
.3 EMCS - Energy Monitoring and Control Systems.
.4 O&M - Operation and Maintenance.
.5 CVF - Component Verification Form.
.6 ST - System Test/Functional Test
.7 IST - Integrated System Test/Functional Test
.8 TAB - Testing, Adjusting and Balancing.
.9 DMC - Mechanical Contract Administrator
.10 DEC - Electrical Contract Administrator

1.2 GENERAL

.1 Commissioning is a formal, systematic process of ensuring that all building systems perform interactively according to the design intent and the The City's operational needs. This is achieved starting in the design phase by documenting design intent and continuing through construction, acceptance and the warranty period with the actual verification of performance.

.2 Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:

.1 Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted standards and that they receive adequate operational checkout by installing Contractors.
.2 Verify and document proper performance of equipment and systems.
.3 Verify that O&M documentation left on site is complete.
.4 Verify that the The City's operating personnel are adequately trained.

.3 In cooperation with the CxA, the Contractor is responsible for demonstrating equipment and systems, troubleshooting and making adjustments as required.

.1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively tested with each other as intended in accordance with Contract Documents and design criteria.

.2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

1.3 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, the Contractor shall correct deficiencies, re-verify equipment and components within the non-functional system, including related systems as deemed required by the CxA and/or related design authority, to ensure effective performance.

.2 Contractor costs for corrective work, additional tests, and inspections to ensure proper performance of such items to be borne by Contractor.

1.4 COORDINATION

.1 The following are members of the commissioning team:

.1 The City Representative
.2 Commissioning Authority (CxA)
.3 Project Manager (PM)
.4 Contract Administrator (A/E, DMC, DEC)
.5 General Contractor (Contractor)
.6 Mechanical Contractor (MC)
.7 Electrical Contractor (EC)
.8 TAB representative (TAB)
.9 Controls Contractor (CC)
.10 Any other installing subContractors or suppliers of equipment.

.2 The CxA will provide the General Contractor with Cx schedule input for inclusion in the project schedule.

1.5 COMMISSIONING PROCESS

.1 Commissioning begins with a design phase review. The CxA is responsible for reviewing the following:

.1 Review design intent and basis of design document (prepared by Design Team) to ensure The City's Project Requirements are met.
.2 Review of schematic and design drawings.
.3 Review of construction documents and incorporation of Cx plan into the documents.
.4 Verification of technical data from Contractor submittals (relative to systems being commissioned).

.2 Commissioning during construction begins with a scope meeting conducted by the CxA where the commissioning process is reviewed with the commissioning team members.

.3 Additional meetings will be scheduled by the CxA with necessary parties to coordinate Cx activities and resolve problems.

.4 Equipment documentation is submitted to the CxA during normal submittals, including detailed start-up procedures.

.5 The CxA develops and keeps up-to date a Commissioning Plan throughout all aspects of the design, construction and occupancy phases.

.6 The CxA reviews the Contractor's start-up plans and start-up documentation formats.

.7 The CxA provides CVFs, to be completed by the Contractor.

.8 The Contractors, under their own direction, execute and document the CVF checklists and perform start-up and initial checkout. The CxA documents that the checklists and start-up were completed according to the approved plans. This may include the CxA witnessing start-up of selected equipment.

.9 The CxA, in conjunction with the Contractor, coordinates specific equipment and system functional performance test procedures.

.10 The procedures are executed by the Contractors, and witnessed and documented by the CxA.

.11 The CxA reviews the O&M documentation for completeness.

.12 The CxA will review the training program provided by the Contractors and verifies that it was completed.

.13 Seasonal testing will be deferred as required, and remains the responsibility of Contractor and CxA.

1.6 CONFLICTS (BETWEEN SPECIFICATION SECTIONS)

.1 Report conflicts between requirements of this section and other specification sections to the General Contractor before start-up and obtain clarification.

.2 Failure to report conflict and obtain clarification (through RFI process) will result in application of the design authority's intent on the issue.

1.7 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.1 The CxA shall provide the following prior to start of Cx:

.1 Cx plan, CVFs

.2 Report on the review of schematic design, construction documents and Contractor submittals.

.2 Upon completion of Cx, the CxA shall provide the following documentation:

.1 Systems manual, to enhance O & M manual, including information on system design, operation schedules, training documentation, commissioning results and re-commissioning requirements.

.2 Plan for occupant concern reporting and subsequent investigation process.

.3 Final Cx report.

1.8 COMMISSIONING SCHEDULE

.1 The CxA will provide Cx schedule requirements for inclusion in the construction schedule.

.2 The General Contractor will provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:

.1 Verification of reported results.

.2 Repairs, retesting, re-commissioning, re-verification.

.3 Training.

.3 The CxA will work with the Contractor according to established protocols to schedule the commissioning activities.

.4 All parties are responsible to address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

1.9 SYSTEMS TO BE COMMISSIONED

.1 The following systems will be commissioned for this project (if applicable):

Equipment and System

Electrical
Lighting and Daylighting Control
Plumbing
Hot water tanks
Circulation pumps
Expansion tank
Instant hot water system
HVAC
Air Handlers Units
Condensing units
Fans
Heat Recovery Ventilators
Unit Heaters/Force Flow Units
Variable Frequency Drives
Testing, Adjusting and Balancing Work
Baseboard heaters
Electric Duct heaters
Variable Air Volume boxes
Direct Digital Controls (DDC)
Central Building Automation System

1.10 RESPONSIBILITIES

.1 The responsibilities of various parties in the commissioning process are provided in this section.

.2 It is noted that the services for the The City, Contract Administrator team, and Commissioning Authority are not provided for in this Contract: that is, the Contractor is not responsible for providing their services. Their responsibilities are listed here to clarify the commissioning.

Note: The Contractors are responsible for their part in the commissioning and testing; the The City is not paying as extra.

.3 All parties:

.1 Attend commissioning scope meeting and additional meetings, as necessary.

.4 The City

Construction and Acceptance Phase

.1 Champion and support the commissioning process.

.2 Provide final acceptance of Contractor test results, test and balance work and of the project.

.3 Attend commissioning specific pre-construction, planning and coordination meetings. Work with the Commissioning Agent to review and update, if necessary, the Commissioning Plan.

.4 Work with Contractor and the Commissioning Agent to prepare a comprehensive training program for the systems being commissioned.

.5 Work with Contractor and the Commissioning Agent to schedule each training session with the appropriate O&M personnel.

Warranty Period

.1 Assist the CxA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.

.2 Make O&M personnel available for CxA to assist in reviewing operation of the facility.

.3 Participate in the resolution of issues identified during the commissioning process.

.5 Architect (A/E)

Construction and Acceptance Phase

.1 Review Contractor submittals for compliance with Contract documents and support Commissioning Agent's submittal review for commissioning issues.

.2 Update Design Intent Document to reflect any changes made to the systems being commissioned during the construction phase.

.3 Attend the commissioning scoping meeting and selected commissioning specific pre-construction, planning and coordination meetings.

.4 Provide any design narrative documentation requested by the CxA.

.5 Coordinate resolution of system deficiencies identified during commissioning, according to the Contract documents.

Warranty Period

.1 Coordinate resolution of design non-conformance and design deficiencies identified during warranty-period commissioning.

.6 Mechanical and Electrical Designers/Engineers (DMC, DEC)

Construction and Acceptance Phase

.1 Support Commissioning Authority's submittal review for commissioning issues.

.2 Provide any design narrative and sequences documentation requested by the CxA. The designers shall assist (along with the Contractors) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.

.3 Attend commissioning scope meetings and other selected commissioning team meetings.

.4 Update Design Intent Document to reflect any changes made to the system being commissioned during the construction phase.

.5 Primary responsibility to witness, and to the greatest extent possible, participates in the following Contractor activities:

.1 Initial equipment start up

.2 Testing and Balancing

.3 Contractor's tests, System and Integrated System Tests

.6 Review the Shop Drawings for all equipment for sufficiency prior to their use.

.7 Review System and Integrated System Test procedure forms for major pieces of equipment for sufficiency prior to their use.

.8 Participate in the Functional Operational System Tests as an advisor when issues arise.

Warranty Period

.1 Participate in the resolution of non-compliance, non-conformance and design deficiencies identified during commissioning and warranty-period commissioning.

.7 Commissioning Authority (CxA)

The CxA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving non-conformance or deficiencies, but ultimately that responsibility resides with the Contractor, Designers and the A/E. The primary role of the CxA is to develop and coordinate the execution of a testing plan, observe and document performance and verify that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, checkout and functionally test equipment and systems.

Construction and Acceptance Phase

.1 Coordinates the commissioning activities in a logical, sequential and efficient manner.

.2 Coordinate the commissioning work and with the Contractor, ensure that commissioning activities are being scheduled into the master schedule.

.3 Coordinate, track and archive commissioning Queries, Memos and Reports.

.4 Conduct and document commissioning scoping meeting and commissioning specific pre-construction planning and coordination meetings.

.5 Request and review additional information required to perform commissioning tasks, including O&M materials, Contractor start-up and checkout procedures.

.6 Before start-up, gather and review the current control sequences and work with Contractors and design authority to establish functional testing requirements.

.7 Receive and review construction documentation such as Request for Information, Architectural Supplemental Instructions, Bulletins, Change Orders, etc., for impact on commissioned systems.

.8 Review Contractor submittals applicable to systems being commissioned for compliance with design documents and operational requirements. This Cx review is concurrent with design authority review and does not supercede said review.

.9 Develop and distribute CVFs.

.10 In conjunction with Contractor, ensure adequate System/functional testing and Integrated System testing.

.11 Perform site visits, as necessary, to observe component and system installations.

.12 Attend selected planning and job-site meetings to obtain information on construction progress.

.13 Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.

.14 Review and comment on the test and balance report, Contractor's training plans and test reports for conformance with specification requirements.

.15 Verify, track and log component test completion, with support of Contractor and Sub-Contractors.

.16 Approve CVFs, ST and IST and checklist completion by reviewing the reports and by selected site observation and spot-checking.

.17 Approve systems start-up by reviewing start-up reports and by selected site observation.

.18 Review TAB execution plan.

.19 Ensure complete functional testing of the control system.

.20 In conjunction with Contractor, the CxA will assist in developing comprehensive functional test plan and procedures.

.21 The CxA will witness and document selected construction milestones, such as:

.1 Component testing

.2 Initial equipment start up

.3 Contractor's tests for individual system and integrated tests

.22 The CxA will witness the following Contractor activities:

.1 Integrated System Tests

.2 Functional Operation System Tests

.23 Periodically report on commissioning process status to Project/Construction Manager.

.24 Analyze any functional performance trend logs and monitoring data to verify performance.

.25 Coordinate and document functional performance tests performed by installing Contractors. Coordinate retesting as necessary until satisfactory performance is achieved.

.26 Prepare regular commissioning reports that include noted deficiencies and status of corrective actions.

.27 Update and maintain, in real time, a corrective action log and status.

.28 Support the Contractor to prepare a comprehensive training program for the systems being commissioned.

.29 Witness training of the The City's operating personnel.

.30 Review submitted O&M manuals.

.31 Develop Systems Manual for LEED.

.32 Provide a final commissioning report.

W*arranty Period*

.1 Coordinate required seasonal or deferred testing and deficiency corrections.

.2 Return to the site prior to the end of the 12-month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction Contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

.8 General Contractor:

Construction and Acceptance Phase

.1 Facilitate the coordination of the commissioning work by the CxA.

.2 With the CxA, ensure that commissioning activities are being scheduled into the master schedule.

.3 Include the cost of commissioning in the total Contract price. Ensure Contractor role in Cx is a line item on Contractors cost breakdown and progress claims.

.4 Ensure that all Contractors execute their commissioning responsibilities according to the Contract Documents and schedule.

.5 A representative shall attend a commissioning scoping meeting and other necessary meetings scheduled by the CxA to facilitate the commissioning process.

.6 Ensure Sub-Contractors complete Component Verification Forms (CVFs) and verify completion.

.7 Provide input into the master scheduling process with regards to timing and duration of the commissioning activities.

.8 Develop, coordinate and schedule training plan with The City and CxA.

.9 Facilitate the following Contractor activities:

.1 Component testing

.2 Initial equipment start up testing

.3 System readiness checks

.4 Contractor's tests, System Tests, Integrated System Tests, functional tests.

.5 Testing and Balancing

.6 All regulatory approvals.

.10 Ensure all Contractor-related deficiencies are corrected, that are identified during any stage of the commissioning process.

.11 Facilitate the pre-final and final inspections.

Warranty Period

.1 Ensure that Contractors execute seasonal or deferred functional performance testing, witnessed by the CxA, according to the specifications.

.2 Ensure that Contractors correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

.9 Sub-Contractors (SC)

Construction and Acceptance Phase

.1 Execute and complete CVF checklists for each piece of equipment.

.2 Execute, document and complete System/functional and Integrated System tests for all applicable systems as listed in Section 1.10.

.3 In conjunction with the CxA, develop system test procedures.

.4 Provide list of test instruments that will be used as part of testing activities.

.5 Correct all deficiencies identified during any stage of the commissioning process.

.6 Provide a General Contractor approved start up plan to the CxA.

.7 Provide all pre-test and start up documentation to the CxA.

.8 Provide training plan to General Contractor and CxA for approval.

Warranty Period

.1 Execute seasonal or deferred functional performance testing, witnessed by the CxA, according to the specifications.

Part 2 Products

2.1 Not used.

Part 3 Execution

3.1 MEETINGS

.1 Scoping Meeting. The CxA will schedule, plan and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting minutes will be distributed to all parties by the CxA.

.2 Miscellaneous Meetings. Other meetings will be planned and conducted by the CxA as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with particular Contractors. The CxA will plan these meetings and will minimize unnecessary time being spent by Contractors.

3.2 SUBMITTALS

.1 The CxA requires submittal documentation for facilitating the commissioning work. These requests will be integrated into the normal submittal process and protocol of the construction team. At minimum, the request will include the manufacturer and model number, the manufacturer's printed installation and detailed start-up procedures, full sequences of operation, O&M data, performance data, and any performance test procedures.

.2 The Commissioning Agent will review submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The CxA will notify the Designers as requested, of items missing or areas that are not in conformance with Contract Documents and which require resubmission.

.3 The CxA may request additional design narrative from the Designers and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.

.4 These submittals to the CxA do not constitute compliance for O&M manual documentation. The O&M manuals are the responsibility of the Contractor, though the CxA will review them and provide feedback, where in the opinion of the CxA, correction is required.

3.3 COMPONENT VERIFICATION FORM CHECKLISTS and INITIAL CHECKOUT

.1 The following procedures apply to all equipment to be commissioned (see Section 1.10 for list of equipment and systems). Some systems that are not comprised so much of actual dynamic machinery may not require a CVF.

.2 Component Verification Forms (CVF). CVF checklists are important to ensure that the equipment and systems are installed as intended. It ensures that system performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full system checkout. Component Verification Forms for a given system must be successfully completed prior to formal System Test (ST's) of equipment or subsystems of the given system, leading into final Integrated System Tests (IST's).

.1 CVFs will be developed in an electronic format (Excel) by the CxA and hard copies will be provided to Contractors. Contractors are responsible to execute and document the CVF checklist on site using the hardcopy provided to them by the CxA. The CxA will verify the installation and accuracy of the CVFs.

.2 CVFs are used to track and document that the proper equipment has been specified, submitted and installed. The forms capture typical maintenance information such as tag #, model, service, location, nameplate data, static submittal data, etc.

.3 The "Specified" fields will be completed by the CxA The "Submitted" fields will be completed by the Contractors or Suppliers. The "Installed" fields will be completed by the Contractor. Contractor will verify the data and CxA will approve the CVFs.

.4 CxA will track and report CVF completion status.

.5 A Sample CVF has been attached (Section 3.8) for bid purposes.

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3.6 SAMPLE COMPONENT VERIFICATION FORM

IDI Template - Component Verification *rev 2013-06-25*

Line #	Test	Expectation	First Test Status	Re-Test Status (if required)	Completed By	Date
HP-___.C01	Confirm unit installed	Manufacturer and Model match approved shop drawings				
HP-___.C02	Confirm unit is in good condition	No apparent damage from storage or installation				
HP-___.C03	Confirm silencer installed (if applicable)	Silencer installed in accordance with manufacturer's				
HP-___.C04	Confirm unit duct connections complete	Duct connections are complete, tight, and sealed appropriately.				
HP-___.C05	Confirm unit power installation complete	Wiring to unit run, terminated, appropriately supported, with all access covers/panels closed.				
HP-___.C06	Confirm unit label installed	Permanent lamacoid label affixed to unit				
HP-___.C07	Confirm control cable installed	Cable run, properly supported, wiring terminated.				
HP-___.C08	Confirm unit control cable labelled	Permanent label affixed to control wiring at unit and field controller.				
HP-___.C09	Confirm unit accessible for service and maintenance	Unit can be accessed without removing other equipment, piping, wiring, or conduit. Controller access panel can be easily removed.				
HP-___.C10	Confirm thermostat	Thermostat type matches approved shop drawings				
HP-___.C11	Confirm thermostat location	Thermostat is located as indicated on plans, or on an internal wall out of direct sun.				
HP-___.C12	Thermostat is labelled	Thermostat is permanently labelled to indicate associated heat pump.				
HP-___.C13	Confirm hydronic piping complete	Piping to unit complete, insulated, appropriately supported, with isolation, control and balancing valves installed per contract documents				
HP-___.C14	Confirm filter	Filter is correct type, shipping brackets removed and accessible for replacement				
HP-___.C15	Confirm mounting/ hanging integrity	Appropriate vibration isolation installed (springs are not fully compressed) and hangers are double-nutted.				

Legend	
	Expected Result
X	Re-Test Required
Pass	Complete
n/a	Not Applicable
inc	Incomplete

3.7 START-UP AND TESTING

.1 Start-up and Initial Checkout Plan. The CxA will review the Contractor's start up plans for all commissioned equipment. The primary role of the CxA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed.

.2 Execution of Start-Up

.1 7 days prior to start-up, the Contractor and vendors schedule start-up and checkout with the Contractor and CxA. The performance of the CVF's, start-up and checkout are directed and executed by the Contractor or vendor. When checking off CVF checklists, signatures may be required of other Contractors for verification of completion of their work.

.2 The CxA may attend startups at their discretion to ensure that startup documentation and procedures are being followed as required.

.3 The Contractors and vendors shall execute start-up and provide the CxA with a signed and dated copy of the completed start-up and CVF tests and checklists.

.4 Only individuals that have direct knowledge and witnessed that a line item task on the CVF checklist shall initial or check that item off. It is not acceptable for witnessing supervisors to fill out these forms.

.3 General Acceptance Requirements

.1 Equipment or systems installed per the Contract drawings, Contract specifications, submittals, vendor requirements, standard practices, etc.

.2 Equipment and system documentation provided per specifications.

.3 Equipment and system properly labelled and/or tagged.

.4 Materials used for installation per Contract drawings, Contract specifications, submittals, vendor requirements, standard practices, etc.

.5 All equipment, systems, and ancillary equipment installed with proper support, vibration isolation and seismic constraints.

.6 Equipment, systems and ancillaries, flushed, cleaned and inspected.

.7 Support services and utilities installed and verified

.8 Controls, instrumentation and monitoring installed, calibrated and verified.

3.8 START-UP DOCUMENTATION

.1 Contractor to assemble start-up documentation and submit to Contract Administrator for approval and copy to CxA before commencement of commissioning.

.2 Start-up documentation to include:

.1 Factory and on-site test certificates for specified equipment.

.2 Pre-start-up inspection reports.

.3 Signed installation/start-up check lists.

.4 Start-up reports,

.5 Step-by-step description of complete start-up procedures, to permit Contract Administrator to repeat start-up at any time.

3.9 SYSTEM (FUNCTIONAL) TESTING

.1 The general list of systems to be commissioned is found in Section 1.10.

.2 The objective of functional system performance testing is to demonstrate that each system is operating according to the documented design intent and Contract documents. Functional testing facilitates bringing the systems together from a state of substantial completion to full dynamic operation. During the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems. Each system should be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part and full load) where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze conditions, fire alarm conditions, equipment failure, etc. may also be tested. The CVFs for a given system must be completed prior to the formal System Test.

.3 The Contractors and/or vendors shall execute ST's and provide the CxA with a signed and dated copy of the completed checklists. The Contractor is responsible to ensure that all appropriate parties are included.

.4 In conjunction with the Contractor, the CxA will ensure the execution of planned System Tests is completed.

.5 The Contractors and/or vendors shall execute ST and provide the CxA with a signed and dated copy of the completed checklists.

.6 The Contractors shall clearly list items that were not completed successfully on the form. The installing Sub-Contractors or vendors shall correct these items. The CxA will recommend solutions to problems found; however, the burden of responsibility to solve, correct and retest problems is with the Contractors and/or designers.

.7 General Acceptance requires that the systems operate as intended and that documentation is provided indicating such.

3.10 INTEGRATED SYSTEM TESTING

.1 Integrated System Tests (IST) are to demonstrate that each system is operating in concert with every other system according to the documented design intent and Contract Documents.

.2 In conjunction with the Contractor, the CxA will ensure the execution of planned System Tests is completed.

.3 The Contractors and/or vendors shall execute IST's under the direction of the CxA. The Contractors will provide CxA with a signed and dated copy of the completed checklists. The Contractor is responsible to ensure that all appropriate parties are included.

.4 A Functional Operation 7-Day Test will be completed to ensure proper building performance and operation. An additional test will be completed during seasonal testing.

.5 General Acceptance requires that the systems operate as one entity as intended and that documentation is provided indicating such.

3.11 THE CITY TRAINING

.1 The Contractor is responsible for training of O & M staff to ensure they have all information necessary to operate and maintain commissioned features and systems.

.2 Submit a training plan and schedule to CxA for review and approval.

.3 Training plan will address the following topics (at a minimum)

- .1 Design intent
- .2 Use of Operations and Maintenance (O&M) Manuals
- .3 Control Drawings and Schematics
- .4 Startup and Shutdown
- .5 Unoccupied operations
- .6 Seasonal changeover
- .7 Manual operations
- .8 Alarms
- .9 System interactions
- .10 Energy conservation optimizations
- .11 Health and safety
- .12 Special maintenance or replacement
- .13 Occupant interaction
- .14 Systems response to operating conditions

.4 Recording of training (audio and video) are required unless waived by the The City. The Contractor is responsible for recording of training.

.5 Training verification forms shall be completed during the training sessions and submitted to CxA for review.

.6 A sample training verification form has been attached for bid purposes.

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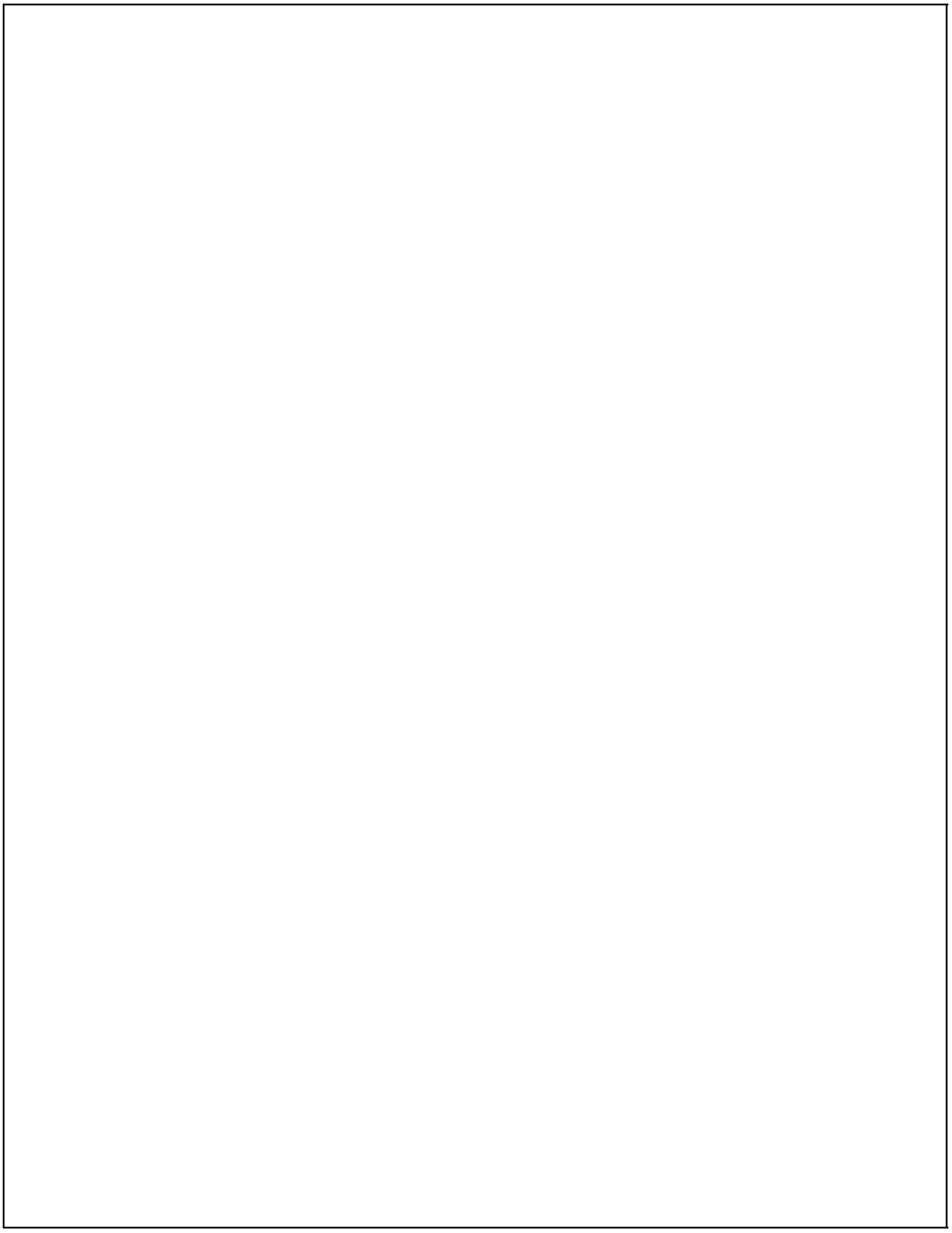
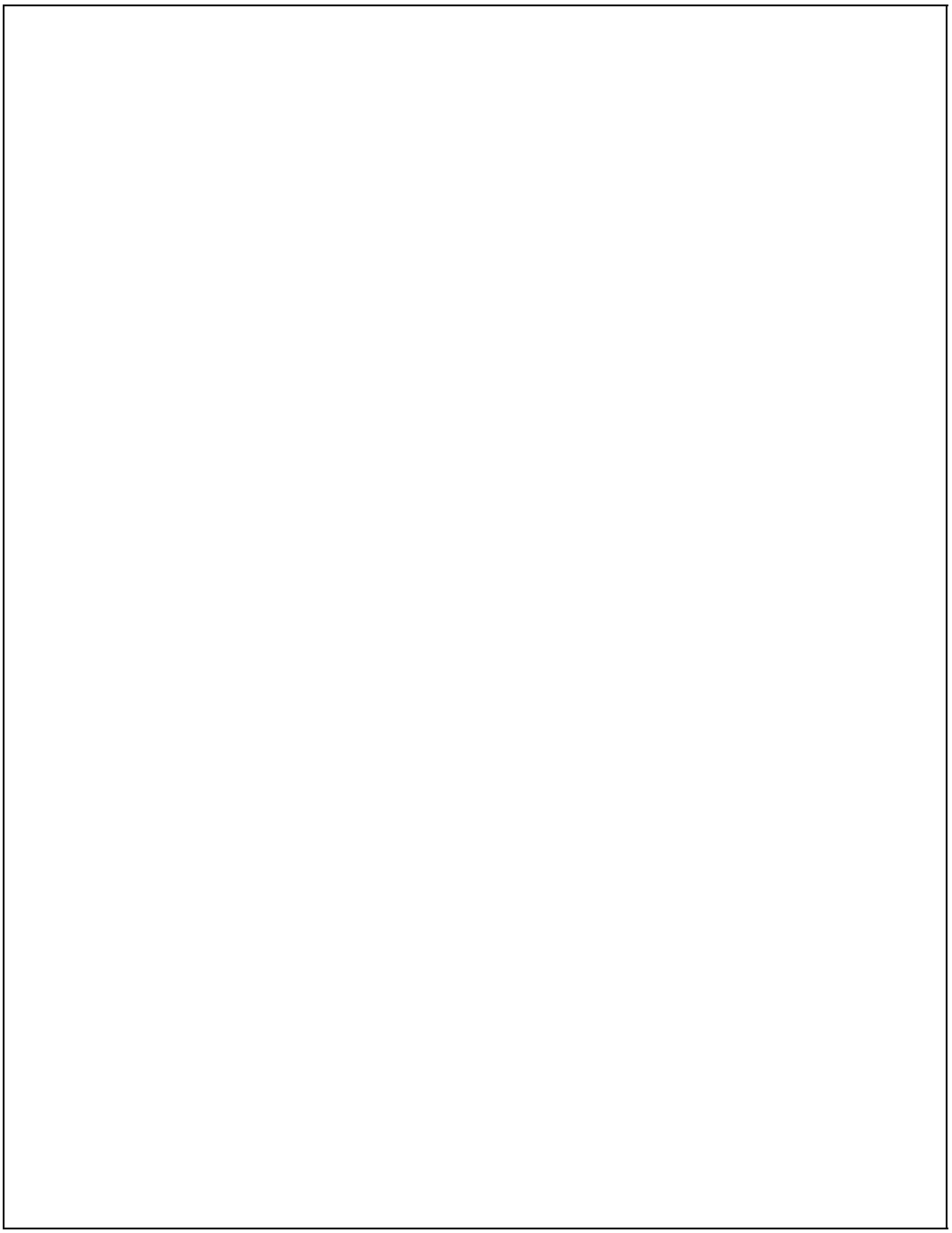
3.12 SAMPLE TRAINING VERIFICATION FORM





3.13 AUTHORITIES HAVING JURISDICTION (I.E. GOVERNMENT AND UTILITY AUTHORITIES)

.1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for CxA to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

.2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

.3 Provide copies to Contract Administrator and CxA within 5 days of test.

END OF SECTION