

Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises the following:
 - .1 Scanning of the existing slab-on-grade to identify potential embedded electrical/mechanical lines.
 - .2 Demolition of the existing slab-on-grade at repair areas identified on the drawings.
 - .3 Re-establishment or replacement of fill.
 - .4 Installation of new slab-on-grade.
 - .5 Repair of steel columns as identified on drawings.
 - .6 Localized vertical form and pour repairs of concrete columns identified on drawings.
- .2 The area of work is located at 1520 Main Street, Winnipeg, Manitoba.

1.2 CONTRACT METHOD

- .1 Refer to City of Winnipeg Bid Opportunity document 524-2023

1.3 REFERENCES AND CODES

- .1 Perform Work in accordance with the National Building Code of Canada (NBC) including all amendments up to tender 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 contract documents, specifications, as specified standards, codes and referenced documents, latest editions.

1.4 WORK SEQUENCE

- .1 Construct Work in stages to accommodate the City's continued use of premises during construction.
- .2 Co-ordinate Progress Schedule and co-ordinate with the City's Occupancy during construction.
- .3 Contractor is to allow for time in his schedule for the City to vacate areas adjacent to construction, areas affected by construction activities.

1.5 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 The City's occupancy.
 - .2 Work by other contractors.
- .2 Co-ordinate use of premises under direction of Contract Administrator.

- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Contract Administrator.
- .6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.6 OCCUPANCY

- .1 The City will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with the City in scheduling operations to minimize conflict and to facilitate the City's usage.

1.7 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations, occupants and normal use of premises. Arrange with Contract Administrator to facilitate execution of work.

1.8 EXISTING SERVICES

- .1 Notify the City and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves connecting to existing services, give the City minimum 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions.
- .3 Where unknown services are encountered, immediately advise Contract Administrator and confirm findings in writing.
- .4 Protect, relocate or maintain existing active services.

1.9 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders.
 - .5 Other Modifications to Contract.
 - .6 Field Test Reports.
 - .7 Copy of Approved Work Schedule.
 - .8 Health and Safety Plan and Other Safety Related Documents including:

- .1 Material data sheets (MSDS) on all products used in Project.
- .9 Other documents as specified.

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 11 00 – Summary of Work.

1.2 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, in accordance with relevant municipal, provincial and other regulations.

1.3 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Contract Administrator to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .5 Keep within limits of work and avenues of ingress and egress.

1.4 WORKING HOURS

- .1 Working hours are to be coordinated with the City.
- .2 Working hours for work processes deemed to be disruptive will be limited to between 7 a.m. and 3 p.m. Monday through Friday.
- .3 The City requires 48 hours notice of all closures for the duration of the project.
- .4 Notwithstanding the above, all Work shall be completed in conformance with City of Winnipeg Neighbourhood Liveability By-Law No. 1/2008.

1.5 SPECIAL REQUIREMENTS

- .1 Construct Work to provide for continuous usage. Do not close off public access to facilities until proper notification has been provided to both the Contract Administrator and the City and use of completed phases will provide alternate usage if necessary.
- .2 All work which interferes with the normal operation of the facility and/or require closures of parking areas will have to be precisely coordinated with the City.
- .3 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.

Bid Opp: 524-2023 CKP File No. 2023-0111

October 2023

Page 2 of 2

1.6 BUILDING SMOKING ENVIRONMENT

.1 Smoking is not allowed.

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 CASH ALLOWANCES FOR TESTING, EXAMINATION

- .1 Include in Contract Price, allowances to cover costs of site and laboratory testing and examination listed.
- .2 Tests and testing requirements, as specified shall be carried out by independent examining, testing companies, as appointed by the Contractor and acceptable to the Contract Administrator.
- .3 Obtain quotations from examining and testing companies and submit to Contract Administrator for review.
- .4 Pay all costs for specified examination, testing work performed by independent examining and testing companies, from cash allowance specified.
- .5 The invoices for work performed by the specialist examining and testing companies shall be directed to the Contractor, and forwarded with monthly request for payment. Invoices will be processed onto a Change Order periodically to formalize an expenditure from the Cash Allowance.
- .6 Cash Allowance is for payment of examining, testing company invoices only. Contractor costs for site supervision and coordination is deemed to be part of overhead included in the Total Estimated Contract Price.
- .7 Specific testing requirements are outlined in respective technical Sections. Materials failing to meet specified requirements shall be replaced or repaired and retested as directed by Contract Administrator, with all costs involved in retesting borne by the Contractor.
- .8 Include testing/examination allowances for:
 - .1 Material testing cash allowance: lump sum of \$2,000.00.

1.2 CASH ALLOWANCES FOR PRODUCTS, LABOUR, MATERIAL

- .1 Include in Contract Price, allowances to cover Work specified in respective Sections or as otherwise listed below.
- .2 Work may be carried out by sub-contractors already employed on site, or by sub-contractors brought in for the Cash Allowance work.
- .3 Obtain quotations from for the work and submit to Contract Administrator for review.
- .4 Pay all costs for work performed from cash allowance specified.
- .5 The invoices for work performed shall be directed to the Contractor, and forwarded with monthly request for payment. The invoices will be processed onto a Change Order periodically to formalize an expenditure from the Cash Allowance.
- .6 Cash Allowance is for payment of invoices from companies carrying out the Work.

- .7 Include cash allowances for:
 - .1 Removal/relocation of existing mechanical and electrical items and services required to complete slab-on-grade concrete repairs: \$2,000.00.

1.3 ADJUSTMENTS OF CASH ALLOWANCES

- .1 Contractor shall not exceed Cash Allowances without authority from Contract Administrator. Contractor will not be allowed expenses or profit on overage unless authority for over expenditure is obtained. Over expenditure of Cash Allowances may, at Contract Administrator's discretion, be deducted from sums of money due Contractor, should Contractor exceed allowance without authority from the Contract Administrator.
- .2 Adjustments to the Cash Allowances will be made by a written Change Order, signed by the City, or as amendments to the Contract at the time of final payment, on the basis of submitted net cost invoices.

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 promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 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 considered rejected.
- .4 Notify Contract Administrator, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .5 Verify field measurements and affected adjacent Work are co-ordinated.
- .6 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
- .7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator review.
- .8 Keep one reviewed copy of each submission on site.

1.2 MOCK-UPS

- .1 Upon request erect mock-ups in accordance with Section 01 45 00 - Quality Control.

1.3 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

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

- .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 The Workers Compensation Act RSM 1987 - Updated 2006.
 - .2 Manitoba Regulation 217/2006 – Workplace Safety and Health Regulation.

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit copies of incident and accident reports.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets on all products used in conjunction with the Work.
- .4 W.H.I.M.I.S. Training: Provide copies of valid certification/training for all employees (regular or temporary) including all subcontractors.
 - .1 All individuals involved in the application of any product shall meet all WHMIS/provincial standards safety/protection requirements at all times.
- .5 Upon request submit Letter of Good Standing or C.O.R. Certificate.

1.3 GENERAL REQUIREMENTS

- .1 Contractors to be C.O.R. Certified.
- .2 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.
- .3 Contractor to ensure dust control, silica, and fume release requirements are satisfied in accordance with Manitoba Regulation 217/2006. Contractor is responsible for the control and monitoring of dust and toxic gasses. Contractor to ensure dust and toxic gas levels are below the provincial regulation limits.

1.4 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.

1.5 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- .1 All employees (regular or temporary) of contractor and subcontractors shall wear PPE in accordance with Manitoba Regulation 217/2006.
- .2 Fall Protection: Provide fall protection in accordance with Manitoba Regulation 217/2006.

1.6 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 RELATED SECTIONS

- .1 Section 01 21 00 – Allowances.

1.2 INSPECTION

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

1.3 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged for purpose of inspecting and/or testing portions of Work. Cost of such services will be paid by the Contractor via the testing cash allowance.
- .2 Allocated costs: to Section 01 21 00 - Allowances.
- .3 Provide equipment required for executing inspection and testing by appointed agencies.
- .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 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 the City. Pay costs for retesting and reinspection.

1.4 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work.
- .2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

- .1 Notify appropriate agency in advance of requirement for tests, in order that attendance arrangements can be made.

- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.6 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by 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 the Contract Administrator it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the City will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Contract Administrator.

1.7 REPORTS

- .1 Submit copies of inspection and test reports to City and Contract Administrator.
- .2 Provide copies of concrete test results to Concrete Supplier.

1.8 TESTS AND MIX DESIGNS

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

1.9 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Contract Administrator and as specified in specific Section.
- .3 Prepare mock-ups for Contract Administrator 's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Remove mock-up at conclusion of Work or when acceptable to Contract Administrator.

1.10 MILL TESTS

.1 Submit mill test certificates as requested.

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 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.
- .2 The Contractor shall provide all necessary hoses, lines, connections, and other ancillary hardware which may be required. The contractor is to coordinate the location/orientation of their water lines with the City to ensure that vehicular traffic is not disturbed.
- .3 The services are to be returned to their original condition at the temporary locations, or left in an altered condition only as approved by the City.

1.3 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be 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 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
- .5 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.
 - .6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with 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.
 - .7 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.
- 1.4 TEMPORARY POWER AND LIGHT**
- .1 Connect to existing power supply in accordance with Canadian Electrical Code.
 - .2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.
 - .3 Temporary power for equipment requiring in excess of that available on-site is responsibility of the Contractor.
 - .4 Provide and maintain temporary lighting throughout project.
- 1.5 TEMPORARY COMMUNICATION FACILITIES**
- .1 Provide and pay for cellular telephone for site superintendent and use of Contract Administrator.
- 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.
 - .2 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 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA S269.2-16, Access scaffolding for construction purposes.
 - .2 Z91-17, Health and safety code for suspended equipment operations.
 - .3 CSA Z271:20, Design of suspended access equipment.

1.2 SUBMITTALS

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

1.3 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.4 CONSTRUCTION PARKING

- .1 The Contractor will be provided stalls at at-grade parking lot. Maintain such areas for duration of Contract and make good of damage resulting from Contractors' use.

1.5 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in 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 manner to cause least interference with work activities.

1.6 SANITARY FACILITIES

- .1 The Contractor may use on-site facilities for the duration of the project. The facilities must be maintained in a neat condition or use will be revoked.

1.7 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

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 controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.2 HOARDING

- .1 Barricade area under construction to prevent the general public from improper access.
 - .1 Erect temporary site enclosure around site using pre-fabricated welded galvanized steel tube and wire mesh fence panels.
 - .2 Provide metal bottom brackets with weights or other means to secure in place.
 - .3 Provide locking top pins to secure fence sections together.
 - .4 Secure fencing to adjacent structure for continuity of compound.
- .2 Cover all surface patches not able to be completed prior to days end with 3/4" plywood.
- .3 Provide adequate signage, fencing, etc. to inform the public of the work being undertaken.

1.3 DUST TIGHT SCREENS

- .1 Provide dust tight screens 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.

1.4 FIRE ROUTES

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

1.5 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.

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

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

- .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 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Contract Administrator reserves right to have such products or systems tested to prove or disprove conformance.
- .4 The Cost for such testing will be borne by the Contractor or Supplier.

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 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.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Contract Administrator based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 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 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 Contract Administrator will establish course of action. Where conflicts exist, the more stringent instruction will be enforced.
- .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 co-operation 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 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate 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.

1.10 PROTECTION OF WORK IN PROGRESS

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

1.11 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.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

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 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 from site at daily regularly scheduled times. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Dispose of waste materials and debris off site.
- .6 Clean interior areas prior to start of finishing work and 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.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by the City or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times. 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 Remove stains, spots, marks and dirt from existing surfaces, fixtures, and finishes within the work area or affected by the affected by the Work.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Sweep and power wash clean all work areas.

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 REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct 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 submit verification that corrections have been made.
 - .2 Request Contract Administrator s inspection.
 - .2 Contract Administrator's Inspection:
 - .1 Contract Administrator and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Contract Administrator, and Contractor.
 - .2 When Work incomplete according to Contract Administrator, complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Contract Administrator considers deficiencies and defects corrected and requirements of Contract 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 to 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:
 - .1 When Contract Administrator considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
 - .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.2 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

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 Samples and specifications.
- .2 Product data, materials and finishes, and related information.
- .3 Record documents.
- .4 Warranties and bonds.

1.2 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
- .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.

1.3 STORAGE, HANDLING AND PROTECTION

- .1 Store maintenance materials and special tools in manner to prevent damage or deterioration.
- .2 Store components subject to damage from weather in weatherproof enclosures.
- .3 Store freezable materials in a heated and ventilated room.
- .4 Remove and replace damaged Products at own expense and to satisfaction of Contract Administrator.

1.4 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.

END OF SECTION

Part 1 General

- .1 This section specifies requirements for demolishing, salvaging and removing wholly or in part, various items designated to be removed or partially removed to facilitate repairs to the north garage. Disposal of debris generated from the work as well as protection of items designated to remain are also covered under this section

1.2 SECTION INCLUDES

- .1 Methods and procedures for deconstruction of structures and parts of structures.

1.3 REFERENCES

- .1 Reference Standards:
 - .1 Canadian Standards Association (CSA International)
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
 - .2 National Building Code 2010, Part 8 - Safety Measures at Construction and Demolition Sites

1.4 MEASUREMENT PROCEDURE

- .1 No measurement will be made under this section. Include costs in item of work for which demolishing is required.

1.5 SUBMITTALS

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

1.6 SITE CONDITIONS

- .1 Existing Conditions:
 - .1 Vehicle and barrier free access to the building entrances and exits must be maintained at all times during the course of the work.
 - .2 The City must be given a minimum 48 hours advance notice prior to commencement of repairs.
- .2 Protection:
 - .1 Protect existing structures and services designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Contract Administrator and at no cost to the City.
 - .2 In all circumstances ensure that demolition work does not adversely affect adjacent areas and operations below the parking deck.
 - .3 Do not dispose of waste of volatile materials such as, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout the project.

- .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
- .6 Prevent movement, settlement or damage of adjacent structures, services. Provide bracing, shoring as required. Repair damage caused by deconstruction as directed by Contract Administrator.
- .7 Support affected structures and, if safety of structure being deconstructed or adjacent structures appears to be endangered, take preventative measures. Cease operations and immediately notify Contract Administrator.
- .8 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems.

Part 2 Products

2.1 EQUIPMENT

- .1 Leave equipment and machinery running only while in use.
- .2 Use water efficient wetting equipment/attachments to minimize dust.
- .3 Protect existing items designated to remain and materials designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Contract Administrator and at no cost to the City.
- .4 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.
- .5 Locate and protect any utility lines which may be affected by the work and if necessary, notify utility companies before starting demolition.

2.2 DISASSEMBLY

- .1 Conduct demolition to minimize interference with adjacent areas.
- .2 All debris created by the execution of the work shall be removed progressively from the site to appropriate disposal grounds. Do not damage adjacent finishes or surfaces.
- .3 Do not disturb adjacent items designated to remain in place.
- .4 Carefully remove and store reusable site materials and dismantle items containing materials for salvage and stockpile salvaged materials at locations as approved by the Contract Administrator.
- .5 Ensure workers and subcontractors are briefed and trained to carry out work in accordance with appropriate deconstruction techniques.
- .6 Project supervisor with previous deconstruction experience must be present on site throughout project.
- .7 Deconstruct in accordance with CSA S350 and other applicable safety standards.

2.3 REMOVAL FROM SITE

- .1 Transport material designated for disposal to approved facilities in accordance with applicable regulations.
- .2 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

2.4 CLEANING AND RESTORATION

- .1 Keep site clean and organized throughout deconstruction.
- .2 Upon completion of project, remove debris, trim surfaces and leave work site clean.
- .3 Upon completion of project, reinstate parking surfaces, walkways, affected by Work to condition which existed prior to beginning of Work and match condition of adjacent, undisturbed areas.
- .4 In addition to the progressive removal of waste materials and debris from building and site, leave the site clean, perform the following before final inspection by the Contract Administrator.
 - .1 spray-wash all building finishes in construction area and any adjacent building areas soiled by the construction processes.
 - .2 Broom clean and wash walks, steps and platforms soiled from delivery or removal materials.
 - .3 Sweep clean all paved areas.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 20 00 – Concrete Reinforcing.
- .2 Section 03 30 00 – Cast-in-Place Concrete.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1-09 Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA O121-08, Douglas Fir Plywood.
 - .4 CSA O151-09, Canadian Softwood Plywood.
 - .5 CSA O153-M1980(R2008), Poplar Plywood.
 - .6 CAN/CSA-O325-07, Construction Sheathing.
 - .7 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.
 - .8 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
 - .9 CAN/CSA-S269.3-M92(R2008), Concrete Formwork, National Standard of Canada

1.3 MEASUREMENT PROCEDURES

- .1 No measurement will be made under this Section. Include costs in items of work for which concrete formwork and falsework is required.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials: use wood and wood product formwork materials to CSA-O121, CAN/CSA-O86, CSA O437 Series, and CSA-O153.
- .2 Form ties: use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 1 inch diameter in concrete surface.
- .3 Form release agent: non-toxic, biodegradable, low VOC.
- .4 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene.
- .5 Falsework materials: to CSA-S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Fabricate and erect falsework in accordance with CSA S269.1.
- .2 Align form joints and make watertight. Keep form joints to minimum.
- .3 Use 1 inch chamfer strips on external corners and/or 1 inch fillets at interior corners, joints, or to match existing.
- .4 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .5 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .6 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM A82-02, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .2 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .2 CSA International
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
 - .3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .3 Reinforcing Steel Institute of Canada (RSIC)
- .4 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.2 MEASUREMENT PROCEDURES

- .1 The Contract Administrator and the Contractor will count and agree upon the numbers and lengths of bars as well as the number of bar embedment's. These agreed upon number will form the basis for payment.
- .2 No measurement will be made under this Section for sections where reinforcing steel is shown on drawings.

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Contract Administrator.
- .2 Reinforcing steel: All reinforcing steel to be CAN/CSA-G30.18M grade 400R deformed bars except column ties and beam stirrups which shall be grade 400W.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.
- .5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2. All accessories to be non-corroding.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Contract Administrator's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Contract Administrator, weld reinforcement in accordance with CSA W186.

Part 3 Execution

3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Contract Administrator.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on drawings and in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Contract Administrator's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.

3.3 DOWELING PROCEDURES

- .1 For bars that are indicated as being dowelled, drill in and grout bars into slab as follows:
 - .1 10M bars - 6 inches.
 - .2 15M bars - 8 inches.
- .2 Use only approved adhesive to manufacturer's instructions. Acceptable product:
 - .1 Hilti HIT RE-500 by Hilti Canada.
- .3 Clean hole thoroughly prior to application of adhesive. Use injection or caulking gun to ensure that the adhesive fills the bottom of the hole prior to embedment of bar.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 20 00 – Concrete Reinforcing.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005)
 - .3 CSA A283-06, Qualification Code for Concrete Testing Laboratories.
- .2 American Concrete Institute (ACI)
 - .1 ACI 309R-96, Guide for the Consolidation of Concrete.
- .3 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C260/C260M-10a, Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C494/C494M-10a Standard Specification for Chemical Admixtures for Concrete.
 - .3 ASTM E1155-14, Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.

1.3 MEASUREMENT PROCEDURES

- .1 Concrete repairs will be measured on a unit price basis as indicated in the appropriate specification sections.
- .2 Include all costs for concrete required for concrete repairs in appropriate unit prices.

1.4 CERTIFICATES

- .1 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CSA-A23.1. Certification letter to be sealed by an engineer registered in the Province of Manitoba.
- .2 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1. Certification letter to be sealed by an engineer registered in the Province of Manitoba.

1.5 QUALITY ASSURANCE

- .1 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures for review by Contract Administrator on following items:
 - .1 Falsework erection.
 - .2 Curing.

- .3 Finishes.
- .4 Formwork removal.
- .5 Joints.

1.6 ABBREVIATIONS

- .1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).
 - .1 Type GU or GUb - General use cement.
 - .2 Type CI - with CaO content ranging from 8 to 20%.
- .2 SCM – Supplemental cementing materials.
- .3 SSD - Saturated surface dry.
- .4 WRA – Water reducing agent.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.
 - .1 Modifications to maximum time limit must be agreed to Contract Administrator and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Contract Administrator.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

Part 2 Products

2.1 MATERIALS

- .1 The concrete constituents shall comply with the following standards:
 - .1 Cement: to CAN/CSA-A3001.
 - .2 Blended Hydraulic cement: to CAN/CSA-A3001.
 - .3 Supplementary cementing materials: to CAN/CSA-A3001.
 - .4 Water: To CSA-A23.1.
 - .5 Aggregates: to CSA-A23.1. Coarse aggregates to be normal density.
 - .6 Air entraining admixture: ASTM C260.
 - .7 Chemical admixtures: ASTM C494/C494M. Contract Administrator to approve accelerating or set retarding admixtures during cold and hot weather.

2.2 MIX REQUIREMENTS

- .1 Refer to General Notes on Drawings for mix requirements.

2.3 BONDING SLURRY

- .1 The bonding slurry shall consist of a cement/sand grout mixed in a 1:1 ratio by weight to a maximum water/cement ratio of 0.40 in accordance with CSA-A23.1 and as follows:

- .1 1.0 kg Type GUBSF to CSA A3001.
- .2 1.0 kg SSD concrete sand to CSA A23.1.
- .3 0.40 kg Water to CSA A23.1.
- .4 High range water reducing agent to ASTM C494/C494M as required and approved by Contract Administrator.
- .5 Volume batching will be permitted provided the volumes are calibrated by weight prior to batching. The measuring containers shall be clearly labelled, indicating material type, calibrated weight of material, and calibrated volume. The Contract Administrator reserves the right to randomly check batch weights.
- .6 Shovel batching is strictly prohibited.

2.4 ACCESSORIES

- .1 Evaporation retardant: Acceptable Product:
 - .1 MasterKure ER 50, by BASF Building Systems at a minimum application rate of 4.9 m²/L.

Part 3 Execution

3.1 PREPARATION

- .1 Protect adjacent Work areas and finish surfaces from damage during concrete placement.
- .2 Prior to placing of concrete obtain Contract Administrator's approval of proposed method for protection of concrete during placing and in adverse weather.
- .3 Provide temporary bridging as required to permit access to all areas during placement, finishing and curing.
- .4 Obtain Contract Administrator's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.
- .5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

3.2 MIX PRODUCTION

- .1 Concrete to be mixed, delivered and placed in accordance with CSA A23.1.
- .2 Concrete to be batched and mixed at a ready mix plant and delivered to site in ready to place form.
- .3 Control of slump on the job site to be in accordance with CSA-A23.1.
- .4 The addition of water to increase slump is strictly prohibited.
- .5 Site addition of plasticizers will be the responsibility of the concrete supplier.
- .6 Slump and air must be measured both before and after addition of plasticizers.

3.3 PLACEMENT

- .1 Place concrete work in accordance with CSA-A23.1.
- .2 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .3 Place concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur. Install a construction dam or bulkhead in case of a delay longer than 60 minutes. During delays between 5 and 60 minutes, protect the end of the placement with damp burlap.
- .4 When concrete is placed by pump, the initial slurry used to prime the pump shall not be incorporated into the topping. The slurry shall be trapped and disposed off-site.
- .5 Ensure high points and slopes to drains as shown on drawings are maintained.
- .6 Do not place concrete until screed rails for hand operated strike-off devices are in place and firmly secured.
 - .1 Rails to be of type, and so installed, that no springing or deflection will occur due to weight of finishing equipment.
 - .2 Set rails or headers to elevations to produce deck true to required grade and cross section.
 - .3 Use polyethylene film or plastic coated tape if necessary to prevent concrete from bonding to rails.
 - .4 Do not treat rails with release agents or parting compounds.
 - .5 Subject to approval of the Contract Administrator, screed rail anchors which remain in the concrete may be used provided they are non-corroding and sit a minimum of 30 mm below the finished surface of the concrete.
- .7 Protect freshly placed concrete from exposure to dust, debris and precipitation.
- .8 Do not place load upon new concrete until authorized by Contract Administrator.

3.4 FINISHING

- .1 Finish concrete in accordance with CSA-A23.1/A23.2.
- .2 Flatwork:
 - .1 Continuously consolidate and finish to specified elevations, ensuring thickness and required elevations are maintained.
 - .2 Use of hand trowels will be required to hand finish areas of work.
 - .3 Surface free of all trowel marks and ridges.
 - .1 Finish Tolerance to ASTM E1155: FF: Minimum 20
 - .4 Immediately after final finishing apply approved evaporation retardant at indicated coverage rate. Evaporation retardant is not to be applied during finishing operations nor should it be worked into the surface.
- .3 Vertical Formed Surface
 - .1 Where applicable finishing of formed surfaces shall commence immediately after stripping the forms.
 - .2 Patch surface defects as directed by Contract Administrator.

- .3 Unless otherwise indicated in the Schedule of Finishes all formed surfaces shall receive a smooth-form finish in accordance with CSA-A23.1.
- .4 Vertical surfaces of curbs, walls, upstands, etc. shall receive a smooth-rubbed finish in accordance with CSA A23.1.
- .5 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.

3.5 JOINTS

- .1 Install control joints at locations shown on the drawings.

3.6 CURING

- .1 Cure and protect concrete in accordance with requirements CSA A23.1.
- .2 Concrete surfaces to be cured at a minimum temperature of 10°C for the entire curing period.
- .3 Curing methods shall be in accordance with CSA A23.1 unless otherwise indicated on Drawings.
 - .1 Requirements for wet-curing:
 - .1 Immediately after final finishing, protect exposed surface against plastic shrinkage by means of a fog spray and/or evaporation reducer, until the concrete has enough strength to support the placement of the wetted burlap. When an evaporation reducer is used, intermittent reapplication may be required if the film evaporates before initiation of the wet cure.
 - .2 Burlap to be thoroughly presoaked by immersing it in water for a period of at least 24 hours immediately prior to placement.
 - .3 Commence wet curing with burlap and water as soon as the surface will support the weight of the wetted burlap without deformation. Burlap to be applied in one layer with strips overlapping at least 3 inches and be securely held in place without marring the concrete surface.
 - .4 Wet curing with burlap and water must be maintained for the periods indicated. Periodic rewetting by means of a soaker hoses, sprinklers, or other suitable methods approved by the Contract Administrator may be necessary.
 - .4 Curing Schedule: Refer to General Notes on Drawings.

3.7 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Contract Administrator in accordance with CSA-A23.1 and Section 01450 - Quality Control and as described herein.
 - .1 Testing laboratory to be certified in accordance with CSA A283.
- .2 The Contractor will pay for costs of tests via the testing cash allowance as per Section 01210 - Allowances.
- .3 Frequency and Number of Tests:
 - .1 Not less than one test for each class of concrete placed on any one day.

- .2 Slump and air measurements will be completed on the initial load of concrete per day of casting to ensure satisfactory control of the air content is established. If adequate control of air content is not established within the first 3 loads of concrete or if a test falls outside the specified limits, the testing frequency shall revert to one test per load until satisfactory control is re-established. Costs for additional testing will be the responsibility of the concrete supplier.
- .4 Contract Administrator may take additional test cylinders during cold weather concreting or when concrete quality is suspect. Cure cylinders on job site under same conditions as concrete which they represent.
- .5 Non-destructive Methods for Testing Concrete shall be in accordance with CSA-A23.2.
- .6 Inspection or testing by Contract Administrator will not augment or replace Contractor quality control nor relieve contractual responsibility.

3.8 DEFECTIVE CONCRETE

- .1 Defective concrete: cracking, spalling, scaling and concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements.
- .2 Repair or replacement of defective concrete will be determined by the Contract Administrator, based on the specifications and the above guidelines.
- .3 Do not patch, fill, touch-up, repair or replace exposed concrete except upon express direction of Contract Administrator for each individual use.
- .4 Modify or replace concrete not conforming to lines, detail and elevations indicated on drawings.
- .5 Repair or replace concrete not properly placed, resulting in excessive honeycombing and other defects in critical areas of stress.
- .6 Notify Contract Administrator of proposed methods of repairing or replacing defective concrete. Methods of repairing or replacing defective concrete shall be acceptable to the Contract Administrator.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 This Section covers the removal of deteriorated concrete and surface preparation for the repair of deteriorated concrete resulting from reinforcing steel corrosion and is applicable to horizontal, vertical, and overhead repairs. Work in this Section includes:
 - .1 Removal geometry and configuration.
 - .2 Removal process.
 - .3 Edge preparation.
 - .4 Reinforcement repair.
 - .5 Surface preparation of the removal cavity prior to placing a repair material.

1.2 RELATED SECTIONS

- .1 Section 03 20 00 – Concrete Reinforcing.
- .2 Section 03 92 10 – Top Surface Concrete Repairs.
- .3 Section 03 93 30 – Form and Pour.

1.3 REFERENCES

- .1 American Concrete Institute (ACI)
 - .1 ACI RAP-4, Surface Repair Using Form-and-Pour Techniques.
 - .2 ACI RAP-5, Surface Repair Using Form-and-Pump Techniques.
 - .3 ACI RAP-6, Vertical and Overhead Spall Repair by Hand Application.
 - .4 ACI RAP-7, Spall Repair of Horizontal Concrete Surfaces.
- .2 International Concrete Repair Institute (ICRI)
 - .1 ICRI concrete Repair Terminology (2010 Edition).
 - .2 ICRI Guideline No. 120.1–2009, Guidelines and Recommendations for Safety in the Concrete Repair Industry.
 - .3 ICRI Guideline No. 310.1R–2008, Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.
 - .4 ICRI Guideline No. 310.2R–2013, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.4 MEASUREMENT PROCEDURES

- .1 No measurement will be made for work covered under this section. Include in the appropriate unit price component for all labour, materials, supervision, and equipment as required to complete the work required under this Section and as shown on the Drawings.
- .2 Refer to applicable Sections for measurement procedures.

1.5 QUALITY ASSURANCE

- .1 Concrete Repair Contractor Qualifications:
 - .1 Minimum of 5 years experience in the repair and restoration of concrete structures.
 - .2 Upon request, Provide the following:
 - .1 Minimum 5 examples of local projects demonstrating successful performance concrete repairs of similar size and complexity to specified Work within the last 3 years.
 - .2 Minimum 3 references exhibiting successful performance concrete repairs within the last 3 years.
 - .3 Site Superintendent:
 - .1 Minimum of 5 years experience exhibiting successful performance in concrete restoration projects. Provide references upon request.
 - .2 Upon request, Provide the following:
 - .1 Minimum 3 references exhibiting successful performance in concrete repairs within the last 3 years.
 - .2 Successful completion of the Concrete Surface Repair Technician (CSRT) Education course.
 - .4 Ensure all personnel involved with concrete restoration is adequately trained and familiar with the requirements of this Section.
- .2 Field Mock-ups:
 - .1 Upon request, complete a field mock-up for each type of repair. Locations to be site determined.
 - .2 Field mock-up shall be a first placement and incorporate all aspects of the concrete surface preparation described in this Section. Trial repairs areas shall be chosen to include exposure of embedded reinforcing steel.
 - .3 Field mock-up areas will be used as a standard against which subsequent work shall be judged.

Part 2 Products

2.1 EQUIPMENT

- .1 Electric or pneumatic chipping hammers are to be used for demolition within the following limits:
 - .1 Initial bulk removal of delaminated concrete above corroded reinforcing steel: maximum 30 lb. electric or pneumatic chipping hammers.
 - .2 Final removal and undercutting of reinforcing steel: maximum 15 lb. electric chipping hammers.
 - .3 Bulk removal of full depth repairs: electric or pneumatic jack hammers with weight ratings above 30 lbs. may be used upon approval by Contract Administrator.
 - .4 Chisel-type blades are to be used for removal only. Do not use pointed chisels for removal.
- .2 Sandblast equipment shall consist of:

- .1 Air compressor of sufficient capacity to drive the equipment and blast media selected.
- .2 Blast media hopper (meters the media into the air stream passing through the hose and nozzle).
- .3 Moisture and oil separators to insure clean, dry air supply.
- .4 Blast nozzle and hose.
- .5 Materials. The blast medium consistent with equipment, site conditions, and capable of obtaining specified surface profile.
 - .1 Media to be non-silica based.
- .3 Low pressure waterblast for final cleaning: capable of maintaining a sustained pressure of not less than 3,000 psi.

Part 3 Execution

3.1 EXAMINATION

- .1 The location number and extent of repairs shown on Drawings are indicative only. Repair areas will be identified on-site by the Contract Administrator in the presence of and with the assistance of the Contractor. The approximate periphery of the repair will be marked on the surface of the member.
- .2 Right-angle geometry avoiding re-entrant corners and obtain uniformity of depth.
- .3 Provide minimum 48 hours notice. Allow time in the Schedule for survey and inspection work carried out by the Contract Administrator ahead of repairs. Provide sufficient safe access to enable review of all areas designated for repairs.
- .4 Make available as required throughout the Contract labour to carry out the following under the direction of Contract Administrator:
 - .1 Identification of repairs.
 - .2 Sample chipping and/or drilling.
 - .3 Operators for access equipment.
- .5 Make available as required throughout the Contract equipment for the use of the Contract Administrator:
 - .1 Marking paint and chalk.
 - .2 Hammer and chain for sounding surveys.
 - .3 Tape measure.

3.2 PREPARATION

- .1 Take precautions to protect the public, occupants of the building.
- .2 Remove or protect all surface attachments (e.g. signs, notices, electrical fittings) from the areas to be repaired or from positions that obstruct access or which may be damaged from Work.
- .3 Carefully store items removed during the course of the works. Reinstall when restoration work is complete.

- .4 Restore to existing condition or better, any damage caused as a result of insufficient protection.
- .5 Provide temporary access required to facilitate Work.
- .6 The Contractor is responsible for confirmation of shoring requirements prior to commencement of, and during demolition.

3.3 CONCRETE DELAMINATION REMOVAL

- .1 Remove all loose and or delaminated concrete above corroded reinforcing steel.
- .2 Do not operate hammers or mechanical chipping tools at an angle in excess of 45° measured from the surface of the slab.
- .3 Use chipping to extend concrete removal along reinforcing bars and ensure bars are completely free of corrosion and well bonded to the surrounding concrete. Notify Contract Administrator of increases in areas.
- .4 Where the bond between existing concrete and reinforcing steel or mesh has been compromised (either by the concrete's deterioration or corrosion of the reinforcing steel) or if the chipping operation has caused more than 1/2 the periphery of a bar to be exposed for a distance of 6 inches or more, remove concrete around the periphery of the bar using maximum 15 lb. electric chipping hammers to provide sufficient clearance between the reinforcement and concrete.
 - .1 Provide a minimum 3/4 inches clearance, or 1/4 inch larger than the largest aggregate in the repair material, whichever is greater.
- .5 If non-corroded reinforcing steel is exposed, do not damage the bar's bond to the surrounding concrete. If bond between the bar and concrete is compromised, exposing the bar will be required.
- .6 Confirm depth of reinforcing steel prior to sawcutting.
- .7 The perimeter of the areas marked as delaminated are to be saw cut to a depth of 1/2 inch. Feather edging is not permitted.
- .8 Do not cut reinforcing steel. If reinforcing steel is encountered, the saw depth must be immediately reduced as required. Check depth of the cut regularly.
 - .1 Damage to reinforcing steel caused by the Contractor's negligence will be repaired at no additional cost to the Contract.
- .9 Ensure sawcut encompasses the boundaries of corrosion that have been established.
- .10 Ensure the entire area within the sawcut is removed to a depth consistent with the type of repair and repair material specified in other Sections.
- .11 Chip patch edges to provide a clean vertical edge along the patch perimeter to the required minimum depth.
- .12 Conduct soundings to determine if any further unsound or delaminated concrete is present, which must be removed.

- .13 After all delaminated, unsound, or loose material is removed, request field review from the Contract Administrator. This field review is to be completed in the presence of the Contractor and if any further Work is required, the Contractor is to complete it immediately. The purpose of this field review is to provide assurance to the Contract Administrator that all loose material has been removed and the substrate is sound.
- .14 Care chipping around existing epoxy coated reinforcing, touch up chipped epoxy covering reinforcing steel. Remove bond inhibiting overspray onto adjacent concrete.

3.4 SURFACE PREPARATION OF CONCRETE AND REINFORCING STEEL

- .1 Within 24 hours prior to infilling, wire brush and vacuum the substrate to remove loose and deteriorated concrete, laitance, dust, dirt, oil, and any other material that could interfere with the bond of the new concrete. Provide a uniform surface profile of ICRI-CSP-6. Sample surfaces are available for inspection in the Contract Administrator's office. These samples will be used as the standard of acceptance.
- .2 Surface preparation applies equally to any horizontal or vertical concrete surfaces to which the concrete is to bond.
- .3 Exposed reinforcing steel to be cleaned to near white metal and totally free of rust for the full circumference of the bar. SSPC-CSP-6
- .4 Secure any reinforcement which is loose by tying to other secured bars.
- .5 Vacuum clean surface and/or air blast with oil free compressed air to remove residue and spent media created by surface preparation.
- .6 Maintain substrate in a clean condition using polyethylene film, or similar, until the patch material is ready to be placed.
- .7 After all surface preparation is complete request a field review from the Contract Administrator to review the existing reinforcing steel.
- .8 The Contract Administrator will identify locations for supplemental reinforcing steel. Provide supplemental reinforcing steel to Section 03 20 00.
- .9 Final cleaning of the concrete substrate to consist of a low-pressure waterblast substrate at minimum 3,000 psi to remove any residual dust and dirt.
- .10 Maintain substrate in a saturated condition for at least 2 hours prior to infilling.
- .11 Do not allow the concrete surface to dry. If the concrete surface becomes wet and subsequently dries, the surface preparation and cleaning procedure must be repeated.

3.5 FIELD QUALITY CONTROL

- .1 Coordinate site work and inspections with Contract Administrator. Provide minimum 48 hours notice prior to each phase of the work.
- .2 Contract Administrator field reviews will be completed at the following times:
 - .1 Prior to demolition to identify and quantify repair locations and types.

- .2 Following initial demolition to confirm all loose, deteriorated, or unsound concrete has been removed from the substrate.
- .3 Following concrete substrate preparation to review concrete surface profile and condition of reinforcing steel.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Columns exhibiting extensive spalling and/or delamination are to be repaired by mechanical removal of the deteriorated concrete and replacement using the form and pour method.
- .2 All spalling and/or delaminated concrete must be removed down to sound concrete in accordance with Section 03 91 10.

1.2 RELATED SECTIONS

- .1 Section 03 20 00 – Concrete Reinforcing.
- .2 Section 03 91 10 – Surface Preparation for Concrete Delamination Repairs.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C109/C109M-08, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens).
 - .1 ASTM C309-03, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

1.4 MEASUREMENT PROCEDURES

- .1 The areas of repair will be identified and quantified via hammer soundings by the Contract Administrator in the presence of and with the assistance of the Contractor. The areas will then be measured and agreed upon by the Contractor and Contract Administrator prior to commencement of work.
- .2 Unit prices must include all supervision, labour and materials, and equipment.
- .3 The unit price submitted will apply to removal depths of up to a 3 inches and at no point less than 1 inches in depth. A second unit price must also be submitted which will apply to removal depths of up to a 6 inch depth and at no point less than 3 inches in depth.
- .4 The minimum area of payment will be one (1) square foot.
- .5 The Contractor is to note that if the area of the repair is increased over that originally measured without consultation with the Contract Administrator, then the Contractor will not be paid for the increased area.

1.5 QUALITY ASSURANCE

- .1 Contractor Qualifications:
 - .1 Minimum of 5 years experience in application of specified (or similar) products on projects of similar size and scope.

- .2 Successful completion of a minimum of 5 projects of similar size and complexity to specified Work within the last 3 years.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Comply with Section 01 61 00.
- .2 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .3 Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.
- .4 Keep materials in manufacturer's original, unopened containers and packaging until installation.
- .5 Protect materials during storage, handling, and application to prevent contamination or damage.

Part 2 Products

2.1 MATERIALS

- .1 The repair mortar shall cement-based, one-component, self-consolidating with the following properties:
 - .1 Drying shrinkage to ASTM C157:
 - .1 less than 0.10% at 28 days.
 - .2 Compressive Strength, ASTM C109:
 - .1 1 day: minimum 10.0 MPa.
 - .2 7 days: minimum 28.0 MPa.
 - .3 28 days: minimum 35.0 MPa.
 - .3 Freeze/Thaw Resistance, ASTM C666 at 300 cycles:
 - .1 minimum 98% relative dynamic modulus.
 - .4 Coefficient of Thermal Expansion, ASTM C531:
 - .1 28 days: $10 \pm 1.0 \times 10^{-6}$ cm/cm per degree C.
- .2 Acceptable product is:
 - .1 Sikacrete-08 SCC by Sika Canada.

2.2 ACCESSORIES

- .1 Cure and sealing compound: to ASTM C309, Type 1. Acceptable product(s):
 - .1 Florseal WB by Sika Canada Inc. at a minimum application rate of 4.9 m²/L.
 - .2 MasterKure CC 160 WB, formerly (Kure-N-Seal WB) by BASF Building Systems at a

Part 3 Execution

3.1 PREPARATION

- .1 Protection: Protect adjacent Work areas and finish surfaces from damage during repair mortar application.
- .2 Surface Preparation:
 - .1 Complete concrete delamination repairs to 03 91 10 – Surface Preparation for Concrete Delamination Repairs.
- .3 The repair area must be thoroughly cleaned and well soaked prior to infilling. The surface should be thoroughly wetted for a period of not less than two (2) hours. The repair areas shall be kept continuously wet until just before infilling. Any standing water must be removed prior to grouting.
- .4 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.
- .5 Forming:
 - .1 Unless otherwise indicated provide plywood formwork to match existing profiles.
 - .2 Install chamfers at outside corners and filets at inside corners in accordance with Section 03 10 00 or to match existing profiles.
 - .3 Design formwork to accommodate the mass and pressure of the repair material.
 - .4 Securely anchor formwork to substrate. Anchors to be sized and space to prevent deflection of the forms placement and curing.
 - .5 Construct forms to fit tightly against existing concrete surfaces. Seal around edge of formwork with sealant to prevent leakage during grouting.
 - .6 Anchors shall be completely removable. All anchor holes shall be patched with grout mixed to dry pack consistency. Completely fill all anchor holes.
 - .7 Placement openings or chutes are required to place the repair material behind vertical forms. Chutes should be constructed to permit development of a hydraulic head above the prepared upper edges of the concrete surface. This will provide for repair material supply into these upper horizontal zones after concrete is consolidated.
 - .8 Formwork for overhead surfaces does not require openings for placement of repair materials. Place repair materials through openings in the slab from above. Size and location of openings to be approved by Contract Administrator. Do not remove or cause damage to existing reinforcing steel.
 - .9 A minimum of 1.25 inches concrete cover over the primary reinforcing steel will be required, thus, an adjustment of the formwork such as a notch may be required to ensure sufficient cover.
 - .10 Provide drainage outlets in formwork for presoaking and, if beneath a soffit, provide air venting. Provide suitable access points to pour mixed repair mortar into place.
 - .11 Use form-release agent to facilitate removal of forms from cast material.
 - .12 Within two (2) hours immediately prior to placement of repair material, test formwork to determine watertightness. Completely fill formwork with clean water and let stand for not less than 15 minutes. Any areas of leakage are to be sealed prior to placement of repair material. Re-test as required.

3.2 INFILLING PROCEDURES

- .1 Obtain Contract Administrator's approval before placing repair material. Provide minimum 24 hours notice.
- .2 Maintain the substrate in a saturated, surface-dry (SSD) condition with no surface water, and concrete that is turning from dark to light.
- .3 Mixing:
 - .1 Mix materials in accordance with manufacturer's instructions.
 - .2 Ensure repair mortar is thoroughly mixed.
 - .3 Do not use free-fall mixers.
 - .4 Never mix partial bags.
- .4 Within 15 minutes of mixing, pour repair material into the prepared form. Work in a manner to avoid air entrapment with a variable pressure pump.
- .5 Vibrate the form while pumping, as required, to achieve flow and compaction.
- .6 Ensure that the uppermost surfaces are filled adjacent to the chute or opening where placement occurs. Rod or tamp material to ensure proper filling.

3.3 CURING

- .1 Concrete repairs to be cured for a minimum of 3 days at 10°C.
- .2 Leave formwork in place until repair mortar reaches compressive strength of 20 MPa.

3.4 FINISHING

- .1 After stripping of formwork, any spaces not filled should be trimmed, cleaned, and dry-packed with grout to the desired profile. Do not proceed with repairs without Contract Administrator's written approval.

3.5 DEFECTIVE CONCRETE

- .1 Defective concrete: bond strengths below minimum specified value, cracking, spalling, scaling and concrete not conforming to required lines, details, dimensions, tolerances, finishes or specified requirements.
- .2 Repair or replacement of defective concrete will be determined by the Contract Administrator, based on the specifications and the above guidelines.
- .3 Do not patch, fill, touch up, repair or replace exposed concrete except upon express direction of Contract Administrator for each individual use.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 20 00 – Concrete Reinforcing.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA-A3000-03, Cementitious Materials Compendium
 - .2 CSA-A3001-03, Cementitious Materials for Use in Concrete
 - .3 CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction.
 - .4 CSA-A23.2-04, Methods of Test for Concrete.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM C260-01, Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-03, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-05, Standard Specification for Chemical Admixtures for Concrete.
- .3 International Concrete Repair Institute
 - .1 Guideline No. 03732, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .5 City of Winnipeg Standard Construction Specifications
 - .1 CW 3110 – Sub-Grade, Sub-Base and Base Course Construction.

1.3 MEASUREMENT PROCEDURES

- .1 In the areas specifically shown on drawings no measurement will be made under this Section for slab-on-grade replacement.
- .2 In areas beyond the extents shown on the drawings, the repair areas will be identified by the Contract Administrator on-site by a chain drag sounding survey which will be completed in the presence of, and with the assistance of the Contractor. The areas will then be measured and agreed upon by the Contractor and Contract Administrator prior to commencement of work. These measurements will form the basis of payment for the area.
- .3 Unit prices must include all supervision, labour and materials, and equipment. The unit price submitted will apply to full depth removal and replacement. The minimum payment for repair areas will be 1 square foot. The Contractor is to note that if the area of the

repair increases over that originally measured without consultation with the Contract Administrator, the Contractor will not be paid for the increased area.

Part 2 Products

2.1 MATERIALS

- .1 Concrete materials: to Section 03 30 00 – Cast-in-Place Concrete.
- .2 Reinforcing bars: to Section 03 20 00 – Concrete Reinforcing.
- .1 Concrete materials: to CSA-A23.1/A23.2.
- .2 Cement: to CAN/CSA-A3001, Type GU.
- .3 Blended hydraulic cement: Type GUb to CAN/CSA-A3001.
- .4 Supplementary cementing materials: with maximum 30 % Type CI fly ash replacement, by mass of total cementitious materials to CAN/CSA A3001.
- .5 Water: to CSA-A23.1/A23.2.
- .6 Reinforcing bars: to CAN/CSA-G30.18, Grade 400W.
- .7 Welded steel wire fabric: to ASTM A185.
- .8 Epoxy Joint sealer/filler: to ASTM C881 CAN/CGSB-19.24, Type 1, Class B.
- .9 Vapour Barrier: 10 mil polyethylene film to CAN/CGSB-51.34.

2.2 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet performance criteria in accordance with CAN/CSA-A23.1/A23.2.
- .2 Refer to General Notes

2.3 GRANULAR BASE

- .1 Granular base material must conform to Government of Manitoba Department of Highways A base designation. Material must be free from clay clumps, cementitious or organic material, frozen material, and other deleterious materials.

2.4 ACCESSORIES

- .1 Cure and sealing compound: Water based and conforming to the latest editions of CSA A23.1 and ASTM C 309. Approved products:
 - .1 Florseal WB by Sika Canada.

Part 3 Execution

3.1 DEMOLITION AND REMOVAL

- .1 Demolition and removal of the slab-on-grade at the parking garage must be completed by non-percussive methods. Acceptable demolition procedures consist of full depth wet sawcutting to permit removal of the concrete in larger sections without the use of chipping hammers. All slurry and water from the cutting process must be vacuumed. Slurry must not be allowed to flow to adjacent areas or to space below.
- .2 The use of gas or diesel powered equipment for sawcutting and demolition within the parking garage is strictly prohibited.
- .3 **Prior to concrete demolition scan floor slabs for embedded electrical/mechanical conduit.** Where conduit is identified within a repair area, do not commence with demolition until the power supply is turned off and temporary/permanent rerouting of embedded conduit(s) completed by the City. Costs of scanning to be included in lump sum cost.
- .4 The existing slabs-on-grade is conventionally reinforced. The extent of slab-on-grade replacement at the parking garage are shown on the drawings. Site confirm exact locations with Contract Administrator.
- .5 Except where full depth sawcutting is required, the perimeter of localized removal areas are to be sawcut to a depth of 1 inch. If reinforcing steel is encountered, the saw depth must be immediately reduced as required. The depth of the cut shall be checked on a regular basis. Wet cutting is the only acceptable method. All slurry and water from the cutting process must be vacuumed. Slurry must not be allowed to flow to adjacent areas or to space below.
- .6 Salvage existing vapour barrier if possible, otherwise lay new 10 mil poly sheeting, with sealed edges over compacted granular. Re-use existing steel as dowels and/or provide new 15M dowels at 12" on-centre into the existing slab. Place new 10M steel at top and bottom of of slab, at 12" on-centre, both directions. Costs associated with the supply and placement are to be included in the unit prices for slab-on-grade removal and replacement.
- .7 Remove excessive subbase and subgrade material as required to meet required grades. Install new compacted granular fill.

3.2 INSTALLATION OF GRANULAR BASE

- .1 Do not place granular base until finished surface is inspected and approved by Contract Administrator.
- .2 Place using methods which do not lead to segregation or degradation of aggregate.
- .3 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .4 Compaction equipment must be capable of obtaining required densities in materials on project.
- .5 Compact to density not less than 95% maximum dry density in accordance with Standard Proctor Density procedures.

- .6 Apply water as necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .7 In area not accessible to rolling equipment, compact to specified density with mechanical compaction equipment approved by Contract Administrator.
- .8 Finished base surface to be within plus or minus ½ inch of established grade and cross section but not uniformly high or low.
- .9 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .10 Install polyethylene vapour barrier over compacted granular. Lap minimum 6" with existing.

3.3 CONCRETE REINFORCEMENT

- .1 Provide concrete reinforcement to: Section 03 20 00.
- .2 Provide 15M dowels drilled into the existing slab-on-grade at 12" on-centre all around the perimeter.
- .3 Reinforce slab with: 10M at 12" on-centre each way top and bottom unless otherwise noted.

3.4 PENETRATIONS

- .1 Wrap all new or existing penetration such as drain stacks and conduit, full depth of pour with ethafoam strip.
- .2 Upon minimum 28 day cure, seal around all penetrations with a 20 mm fillet of sealant.

3.5 CONSTRUCTION

- .1 Perform cast-in-place concrete work to Section 03 30 00 and in accordance with CSA-A23.1/A23.2.
- .2 Provide minimum 24 hours notice prior to placing of concrete.
- .3 Contract Administrator to review prepared excavation before placing concrete.
- .4 Concrete to be batched and mixed at a ready-mix plant and delivered to site in ready to place form.
- .5 Use of a water reducing admixture may be required to obtain specified slump. Admixture addition shall occur at the batch plant in carefully controlled dosages. Slump must be measured before and after admixture addition.
- .6 The addition of water to the concrete to increase slump or aid in pumping is strictly forbidden unless written permission is provided by the Contract Administrator.

- .7 Concrete to be transported to placement location by pump or trolley. If a pump is used, the initial slurry used to prime the pump when pumping the concrete shall not be incorporated into the topping. The slurry must be trapped and disposed of off-site.
- .8 Installation of temporary bridging may be required to allow access to all areas of the slab to permit placement, finishing and curing procedures to be completed.
- .9 Continuously consolidate concrete with standard immersion "pencil" vibrators. Alternatively, for larger areas use floating vibratory screed.
- .10 Following consolidation the surface shall be immediately bull-floated to close and smooth the surface.
- .11 Finish concrete to: CSA A23.1 to match existing elevations and ensuring required slopes are maintained.
- .12 Protect freshly placed concrete from exposure to dust, debris and precipitation. Remove damaged overlay areas.
- .13 Joints:
 - .1 Install control joints at locations to match existing.
 - .1 Control joints to be formed while concrete is still plastic or alternatively saw cut via specialized dry-process cutting (e.g. "Soff Cut") to a minimum of one 1 inch or one-third the depth of the slab, whichever is greater. Timing of the dry-process saw cutting will vary with weather conditions however are typically completed within 1 to 4 hours after final finishing. Timing of the saw cutting will be the responsibility of the Contractor.
 - .2 Saw cutting 24 hours following placement will not be permitted.
 - .3 Following a minimum 28 day cure, re cut joints to 3/8" wide x 3/8" deep. Clean joints, install bond breaker tape, and infill joints with approved sealant in accordance with manufacturer's recommendations.
 - .2 Where paving abuts walls, form in a 1/2" wide x 3/8" deep reglet. Upon minimum 28 day cure, prepare joint surface, install bond breaker, and infill joints with approved sealant in accordance with manufacturer's recommendations.
 - .3 Form in or rout a 3 mm x 3 mm reglet along all the patch perimeter. Upon minimum 28 day cure infill with Sikadur 55 SLV epoxy. Costs associated with the epoxy sealing are to be included in the lump sump price for slab-on-grade repairs.
- .14 Curing:
 - .1 Upon completion of final finishing apply two coats of approved curing compound in accordance with manufacturers specifications. Apply the first coat immediately after completing finishing operations. Apply the second coat about 24 hours later.
 - .2 Immediately after final finishing, protect exposed surface against plastic shrinkage by means of a fog spray, or evaporation reducer. When an evaporation reducer is used, intermittent reapplication may be required if the film evaporates before initiation of the wet cure.
 - .3 Burlap to be thoroughly presoaked by immersing it in water for a period of at least 24 hours immediately prior to placement.
 - .4 Commence wet curing with burlap and water as soon as the surface will support the weight of the wetted burlap without deformation. Burlap to be applied in one

layer with strips overlapping at least 3" and be securely held in place without marring the concrete surface.

- .5 Wet curing with burlap and water must be maintained for a minimum period of 3 days.
- .15 Workers shall not be allowed on the repair areas for 12 hours after placement.
- .16 Do not place load upon new concrete until authorized by Contract Administrator.

3.6 FIELD QUALITY CONTROL

- .1 Testing will be performed in accordance with the requirements of CSA-A23.1.
- .2 Conduct compaction testing to ensure Standard Proctor Density requirements are satisfied. Costs of compaction testing to be paid for out of the testing Cash Allowance.
- .3 Slump and air measurements shall be obtained at point of discharge for initial load. Concrete from initial load shall not be used for test cylinders.
- .4 One concrete test cylinders will be taken for every phase of concrete placed and at least one test for each day of concrete placement.

3.7 CLEANING

- .1 Use trigger operated spray nozzles for water hoses.
- .2 Designate cleaning area for tools to limit water use and runoff.
- .3 Ensure concrete slurry does not enter drainage system.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 This section specifies and includes supplying all materials, labour, supervision, equipment, and ancillary requirements to complete the installation of a flexible, cold fluid-applied waterproofing membrane system. This specification shall be read in conjunction with the contract drawings.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C836-06 – Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
 - .2 ASTM D412-06a – Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
 - .3 ASTM D5034-95(2001) – Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).

1.3 MEASUREMENT PROCEDURES

- .1 No measurement will be made under this section. The Contractor shall include in the appropriate unit price component all labour, materials, supervision, and equipment as required to complete the work required under this Section and as shown on the Drawings.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Upon request, manufacturer to submit independent laboratory certification attesting that the materials conforms to the latest edition of ASTM C957. Complete documentation, including a referenced method, the material specification limits, and typical test results to be included.

1.5 QUALITY ASSURANCE

- .1 Contractor Qualifications:
 - .1 Minimum of 5 years experience in application of specified (or similar) products on projects of similar size and scope.
 - .2 Successful completion of a minimum of 5 projects of similar size and complexity to specified Work within the last 3 years.
- .2 Field Mock-up:
 - .1 Install field mock-up at location approved by Contract Administrator. Install material in accordance with this Section.
 - .2 Field mock-up will be standard for judging workmanship on remainder of Project.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Comply with Section 01 61 00.
- .2 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .3 Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.
- .4 Keep materials in manufacturer's original, unopened containers and packaging until installation.
- .5 Protect materials during storage, handling, and application to prevent contamination or damage.

Part 2 Products

2.1 MATERIALS

- .1 One-component, moisture-curing, bitumen-modified polyurethane, elastomeric, cold liquid applied waterproofing membrane complying with ASTM C836.
- .2 Performance Requirements: The following properties are based on product's standard system.
 - .1 Minimum Recovery: 90 percent.
 - .2 Swelling in Water (3 days at room temperature): None.
 - .3 Service Temperature Range:
 - .1 Minimum: Minus 40 degrees F (Minus 40 degrees C).
 - .2 Maximum: 120 degrees F (49 degrees C).
 - .4 Hardness, Shore OO to ASTM C836: 85.
 - .5 Tensile Strength to ASTM D412: 1.0 MPa (150 psi).
 - .6 Average Elongation to ASTM D412: 600 percent.
 - .7 100 Modulus to ASTM D412: 0.6 MPa (80 psi).
 - .8 Moisture-Vapor Permeability (dry perms) to ASTM E96: 0.1.
 - .9 Crack Bridging Test to ASTM C836: Passed 2 mm (1/16 inch).
 - .10 Extensibility After Heat Aging to ASTM C836: No cracking.
 - .11 Weight Loss (20 percent maximum) to ASTM C836: 16 percent.
- .3 Acceptable Product:
 - .1 Masterseal HLM 5000 by Sika.

Part 3 Execution

3.1 PROTECTION

- .1 Protect adjacent surfaces against any damage that could result from the waterproofing installation.

3.2 SURFACE PREPARATION

- .1 Substrates must be sound and free of dust, dirt, laitance, paints, oils, grease, curing compounds, or any other contaminants.
- .2 Surface Preparation of Metals:
 - .1 Sandblast or wire brush all incidental metal to bright metal. Prime surfaces according to manufacturer's recommendations.

3.3 APPLICATION

- .1 The cold fluid-applied waterproofing membrane must be installed in strict accordance with the system manufacturer's recommendations, by a certified installer with proven experience with the specified systems. Where discrepancies exist between the manufacturer's specifications, project specifications and drawings, the more stringent will govern.

3.4 INSTALLATION

- .1 Complete all preparatory work before installation begins.
- .2 Waterproofing work shall be performed on a continuous basis as surface allows.
- .3 Install waterproofing elements on clean and dry surfaces.

3.5 CLEAN UP

- .1 Clean site of refuse of this work, including adjacent areas or fixtures. Use of manufacturers applied solvent will be required. Use caution as solvents are extremely flammable.

END OF SECTION