

1 General

**1.1 ADMINISTRATIVE**

- .1 Schedule and administer meetings every 2 weeks (or more frequently as required) with the Consultant throughout the progress of the Work. Schedules to be updated with the Consultant every 2 weeks for distribution at each meeting.
- .2 Prepare agenda for such meetings.
- .3 The Contractor shall chair such meetings. The Contractor shall administer such meetings and prepare minutes within three (3) days after the meeting date for distribution to the Owner and the Consultant.
- .4 Distribute written notice of each meeting four (4) days in advance of meeting date to the Consultant and the Owner and other affected parties.
- .5 Representatives of parties attending meetings shall be authorized to act on behalf of the parties they represent. Subcontractors and Suppliers do not attend meetings unless authorized by the Consultant and the Owner.
- .6 Prepare and distribute monthly progress reports in accordance with Section 01 32 16 – Construction Progress Schedule, and containing updated schedules, construction photos in accordance with Section 01 33 00 – Submittal Procedures, shop drawing logs, requests for interpretation logs, submittals and budget.

**1.2 CONTRACT START-UP MEETING**

- .1 Within five (5) days after award of Contract, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities prior to the commencement of the Work.
- .2 The Owner, the Consultant, the Contractor, site superintendent(s), inspection and testing company, and authorities having jurisdiction, as applicable and at their discretion, will be in attendance.
- .3 Agenda to include the following:
  - .1 Appointment of official representative of participants in the Project.
  - .2 Status of permits, fees and requirement of authorities having jurisdiction. Action required.
  - .3 Review of standard project forms.
  - .4 Requirements for Contract modification and interpretation procedures, including, but not limited to: requests for interpretation, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .5 Requirements for notification for reviews. Allow a minimum of two (2) Working Days notice to Consultant for review of the Work.
  - .6 Review of schedules and scheduling procedures and requirements in accordance with Section 01 31 13 – Project Coordination.
  - .7 Review of work restrictions, environmental requirements, restrictions, and procedures, and sustainable requirements. Refer to Section 01 14 00 – Work Restrictions.
  - .8 Appointment of inspection and testing agencies or firms, Section 01 40 00 – Quality Requirements.
  - .9 Requirements for temporary facilities, signs, offices, storage sheds, utilities; Section 01 50 00 – Temporary Facilities and Controls.

- .10 Security requirements at and for the Place of the Work, Section 01 50 00 – Temporary Facilities and Controls.
  - .11 Record drawings, Section 01 33 00 – Submittal Procedures.
  - .12 Maintenance manuals, Section 01 33 00 – Submittal Procedures.
  - .13 Progress claims, administrative procedures, holdbacks.
  - .14 Insurances, transcripts of policies.
  - .15 Contractor's safety procedures.
  - .16 Cleaning/staging area for vehicles.
  - .17 Workplace Safety and Insurance Board Certificate.
- .4 The Contractor shall organize and chair the contract start-up meeting. Contractor will provide meeting agenda to Owner and Consultant five (5) days prior to meeting for review. Contractor shall record minutes of the contract start-up meeting and distribute a copy to each participant within ten (10) days of meeting.

### 1.3 PRE-INSTALLATION MEETINGS

- .1 During the course of the Work prior to Substantial Performance of the Work, schedule pre-installation meetings as required by the Contract Documents and coordinated with the Consultant.
- .2 As far as possible, pre-installation meetings shall be scheduled to take place on the same day as regularly scheduled progress meetings.
- .3 Agenda to include the following:
  - .1 Appointment of official representatives of participants in the Project.
  - .2 Review of existing conditions and affected work, and testing thereof as required.
  - .3 Review of installation procedures and requirements.
  - .4 Review of environmental and site condition requirements.
  - .5 Review of schedules and scheduling procedures and requirements of the applicable portions of the Work in accordance with Section 01 32 16 – Construction Progress Schedule, in particular:
    - .1 Schedule of submission of samples, mock-ups, and items for Consultant's consideration.
    - .2 Delivery schedule of specified equipment.
    - .3 Requirements for notification for reviews. Allow a minimum of two (2) Working Days notice to Consultant for review of the Work.
  - .6 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences, Section 01 50 00 – Temporary Facilities and Controls.
  - .7 Requirements for inspections and tests, as applicable.
    - .1 Schedule and undertake inspections and tests in accordance with Section 01 32 16 – Construction Progress Schedule and Section 01 40 00 – Quality Requirements.
  - .8 Special safety requirements and procedures.
- .4 The following shall be in attendance:
  - .1 Contractor.
  - .2 Subcontractors affected by the work for which the pre-installation meeting is being conducted.

- .3 Consultant.
- .4 Manufacturer's representatives, as applicable.
- .5 Inspection and testing company, as applicable.

#### 1.4 PROGRESS MEETINGS

- .1 During the course of the Work prior to Substantial Performance of the Work, schedule progress meetings every two (2) weeks.
- .2 In advance of progress meetings, Contractor shall submit to the Consultant a two week look ahead schedule of items of work to be undertaken in the two weeks subsequent to the progress meeting. Two week look ahead schedule will be reviewed at the meeting and recorded in the minutes of the meeting. Refer to Section 01 32 16 – Construction Progress Schedule for requirements for look ahead schedule.
- .3 Attendees at progress meetings shall include the following:
  - .1 Contractor.
  - .2 Contractor's site superintendent(s).
  - .3 Consultant.
  - .4 Owner.
- .4 Agenda to include the following:
  - .1 Review, approval of proceedings of previous meeting.
  - .2 Review of items arising from proceedings.
  - .3 Review of progress of the Work since previous meetings.
  - .4 Review of schedules in accordance with Section 01 32 16 – Construction Progress Schedule, including:
    - .1 Revisions to construction schedule.
    - .2 Progress and schedule for subsequent period of the Work: Two (2) week look-ahead.
    - .3 Problems that impede compliance with construction schedule.
    - .4 Review of off-site fabrication delivery schedules.
    - .5 Review of material delivery dates/schedule.
    - .6 Corrective measures and procedures to regain construction schedule.
    - .7 Review of submittal schedules: expedite as required.
  - .5 Field observations, problems, conflicts.
  - .6 Review status of submittals.
  - .7 Maintenance of quality standards.
  - .8 Pending changes and substitutions.
  - .9 Review of Contract modifications and interpretations including, but not limited to: requests for interpretation and log, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, for effect on construction schedule and on Contract Time.
  - .10 Review of status of as-built documents.
  - .11 Other business.

#### 1.5 PRE-TAKEOVER MEETING

- .1 Prior to application for Substantial Performance of the Work, schedule a pre-takeover meeting.
- .2 Agenda to include the following:
  - .1 Review, approval of proceedings of previous meeting.
  - .2 Review of items arising from proceedings.
  - .3 Review of procedures for Substantial Performance of the Work, completion of the Contract, and handover of the Work.
  - .4 Field observations, problems, conflicts.
  - .5 Review of outstanding Contract modifications and interpretations including, but not limited to: requests for interpretation and log, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, for effect on construction schedule and on Contract Time.
  - .6 Problems which impede Substantial Performance of the Work.
  - .7 Review of procedures for deficiency review. Corrective measures required.
  - .8 Progress, schedule, during succeeding period of the Work.
  - .9 Review submittal requirements for warranties, manuals, and all demonstrations and documentation required for Substantial Performance of the Work.
  - .10 Review of status of as-built documents and record drawings.
  - .11 Other business.

#### 1.6 POST-CONSTRUCTION MEETING

- .1 Prior to application for completion of Contract, schedule a post-construction meeting. Four days prior to date for meeting, Consultant shall confirm a date for meeting based on evaluation of completion requirements.
- .2 Agenda to include the following:
  - .1 Review, approval of proceedings of previous meeting.
  - .2 Confirmation that no business is arising from proceedings.
  - .3 Confirmation of completion of the Contract, and handover of reviewed documentation from the Consultant to the Owner.
  - .4 Confirmation of completion of proposed Change Orders, Change Orders, Change Directives, and Supplemental Instructions.
  - .5 Problems that impede Contract completion.
  - .6 Identify unresolved issues or potential warranty problems.
  - .7 Confirmation of completion of deficiencies.
  - .8 Corrective measures required.
  - .9 Confirm submittal requirements for warranties, manuals, and demonstrations and documentation for Contract completion are in order.
  - .10 Review of procedures for communication during post-construction period.
  - .11 Handover of reviewed record documents by the Consultant to the Owner.
  - .12 Handover of Contract completion insurance policy transcripts by Contractor.
  - .13 Submission of final application for payment.
  - .14 Review and finalize outstanding claims, pricing, and allowance amounts.
  - .15 Status of commissioning and training.

- .16 Demobilization and the Place of the Work restoration.
- .17 Review of requests for interpretation log.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 LAYOUT AND SURVEY**

- .1 Lines, Levels and Locations for Building:
  - .1 Existing grades, lines, and site conditions shown on drawings were taken from survey information established by persons engaged directly by Owner. The accuracy of survey information is not the Consultant's responsibility.
  - .2 The Owner will establish location of property lines. The Contractor shall establish necessary lines and levels, and provide batter boards and other means to control the accurate positioning of all building elements.
- .2 Work Adjacent to Public Property:
  - .1 Verify before commencing work at adjacent public property, that no plans for altering clearances, set-backs, easements, grades, or otherwise have been made by local authorities having jurisdiction, subsequent to their approval of Contract Documents, and which would affect the original intent.

**1.2 SUBMITTALS**

- .1 Submit qualification data for land surveyor to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- .2 Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- .3 Submit two (2) copies of certified survey signed by registered land surveyor.
- .4 Submit two (2) copies of final property survey showing the Work performed and record survey data.
- .5 Submit a Certificate of Compliance at completion of site grading stating the "As Constructed" grading elevations, and whether or not they differ from design grades.

**1.3 DRAINAGE**

- .1 Ensure that positive drainage is provided to roof, floor and site drains and catch basins, as set in their final positions. Provide constant slopes for drained surfaces to drains and drainage courses.
- .2 Ensure that allowable construction tolerances and structural tolerances do not permit ponding of water.
- .3 Verify the extent of each area served by a drain, or drainage course, to eliminate possible undrained surfaces. Coordinate the work of involved Sections before each proceeds.

**1.4 RECORD DRAWINGS**

- .1 Prepare interference and equipment placing drawings to scale to ensure that all components will be properly accommodated within the spaces provided.
- .2 Ensure that clearances required by authorities having jurisdiction and/or for easy maintenance of equipment will be shown on the above drawings.
- .3 Interference drawings shall be prepared before any orders for equipment and/or materials are released to suppliers.

**1.5 SURVEY REFERENCE POINTS AND LEGAL SURVEY MARKERS**

- .1 Verify existing base horizontal and vertical control points designated on drawings.
- .2 Locate, confirm and protect control points and legal survey markers prior to starting site work; preserve permanent reference points during construction.

- .3 Make no changes or relocations without prior written notice to Consultant.
- .4 Report to Consultant when a reference point or legal survey marker is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Replace control points in accordance with original survey control.
- .6 Replace legal survey markers lost or destroyed as a result of construction activities.

#### 1.6 SURVEY LAYOUT

- .1 Coordinate with Contractor for layout and protection of grade controls.
- .2 Establish permanent bench mark(s) as required, referred to established bench marks by survey control points; record locations, with horizontal and vertical data.
- .3 Establish lines and levels, locate and layout, by instrumentation.
- .4 Stake for grading, cuts and fills, slopes.
- .5 Replace grade controls lost or destroyed as a result of construction activities.

#### 1.7 CONSTRUCTION LAYOUT

- .1 Verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. Notify Consultant promptly if discrepancies are discovered.
- .2 Engage a land surveyor to lay out the Work using accepted surveying practices:
  - .1 Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - .2 Establish dimensions within tolerances indicated; do not scale Drawings to obtain required dimensions.
  - .3 Inform installers of lines and levels to which they must comply.
  - .4 Check the location, level and plumb, of every major element as the Work progresses.
  - .5 Notify Consultant when deviations from required lines and levels exceed allowable tolerances.
  - .6 Verify accuracy of site dimensions shown on drawings.
  - .7 Verify that present, or known future restrictions, are not violated by construction on the site or lines of traverse to all public utilities.
  - .8 Verify accurately the final underground location on site of all buried storm, sanitary, water and electrical duct banks, when applicable.
  - .9 Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- .3 Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- .4 Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Consultant when requested.

#### 1.8 FIELD ENGINEERING

- .1 Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations:

- .1 Do not change or relocate existing benchmarks or control points without prior written approval of Consultant.
  - .2 Report lost or destroyed permanent benchmarks or control points promptly.
  - .3 Report the need to relocate permanent benchmarks or control points to Consultant before proceeding.
  - .4 Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
  - .5 Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - .6 Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - .7 Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
  - .2 Provide as-built site survey information after completion of demolition and excavation operations ready for construction.
    - .1 Survey grade elevations shall be on a 9 m grid or as required to locate property lines and new building structural grid lines.
- 2 Products
- Not Used**
- 3 Execution
- Not Used**
- END OF SECTION**



1 General

**1.1 PLANNING, SCHEDULING AND MONITORING - GENERAL**

- .1 This section includes requirements for the preparation, monitoring and revision of construction schedules.
- .2 The purpose of the schedules and reports mandated in this section is to:
  - .1 Ensure adequate planning and execution of the Work by the Contractor;
  - .2 Establish the standard against which satisfactory completion of the project will be judged;
  - .3 Assist the Owner and the Consultant in monitoring progress;
  - .4 Assess the impact of changes to the Work.
- .3 The Contractor has the obligation and responsibility at all times to plan and monitor all of its activities, anticipating and scheduling its staff, materials, plant and work methods in a manner that is likely to ensure completion of the Work in accordance with the terms and conditions of the Contract and at a rate that will allow the Work to be completed on time.

**1.2 CPM SCHEDULING REQUIREMENTS**

- .1 The schedules required by this section shall take the form of time-scaled diagrams prepared using a computerized scheduling system, capable of producing resource-and/or cost-loaded Critical Path Method (CPM) schedules.
- .2 General requirements applicable to all schedules include the ability to:
  - .1 Easily summarize, group, sort and filter activities by area, phase or other categorization as applicable, or any combination thereof;
  - .2 Electronically compare any given schedule with any previous or subsequent update;
  - .3 Generate monthly progress claims and cash flow projections through resource and cost loading activities;
  - .4 Show schedules in bar chart, network diagram and time scaled logic diagram formats;
  - .5 Apply different calendars to applicable activities; and
  - .6 Transmit schedules electronically via e-mail attachments.
- .3 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated and allow coordination and control of project activities. Show continuous flow from left to right.
- .4 Float is defined as the amount of time between the earliest start date and the latest start date of an activity or chain of activities on the CPM schedule. Ensure activities with no float are calculated and clearly indicated on logical CPM construction network system as being, whenever possible, continuous series of activities throughout Contract Time to form "Critical Path".
- .5 Use of float suppression techniques such as software constraints, preferential sequencing, special lead/lag logic restraints, extended activity times, or imposed dates, other than as required by the Contract, shall be cause for the rejection of any schedule submitted by the Contractor.

**1.3 SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Schedules shall be submitted to the Consultant in both PDF format and original software data file format within ten (10) days of Contract Award for Owner/Consultant review.
- .3 Owner and Consultant will review schedule and return review copy within ten (10) days after receipt.

- .4 Resubmit finalized schedule within seven (7) days after return of review copy.
- .5 Electronic schedule submissions shall be in an original scheduling software data file type that permits modification of the layouts and data. In case of a discrepancy between an original software file and PDF schedule, the PDF of the schedule shall govern.
- .6 Include costs for execution, preparation and reproduction of schedule submittals in tendered price.
- .7 Submission of the schedules referred to in this Section shall constitute the Contractor's representation that:
  - .1 Contractor and its Sub-Contractors intend to execute the Work in the sequence indicated on such schedule;
  - .2 Contractor has distributed the proposed schedule to its Sub-Contractors for their review and comment, and has obtained their concurrence;
  - .3 All elements of the Work required for the performance of the Contract are included. Failure to include any such element shall not excuse the Contractor from completing the Work within the Contract Time and within any other constraints specified in the Contract;
  - .4 Seasonal weather conditions have been considered and included in the planning and scheduling of the Work influenced by high and low ambient temperatures and/or precipitation;
  - .5 Contractor has thoroughly inspected the Site and has incorporated any other special conditions in planning the Work such as specified or required non-work periods, etc.
  - .6 Consultant review time of submittals and shop drawings as specified has been accounted for in project schedule.
- .8 Cash flow diagram:
  - .1 Contractor shall submit an updated cash flow diagram quarterly.
  - .2 Cash flow diagram shall be in format acceptable to the Owner.
  - .3 Cash flow diagram shall represent Contractor's anticipated invoicing.

#### 1.4 QUALITY ASSURANCE

- .1 Use experienced personnel, fully qualified in planning and scheduling to provide services from the commencement of the Work through to the issuance of the Completion Payment Certificate.

#### 1.5 PRELIMINARY AS-PLANNED SCHEDULE

- .1 Meet with Owner and Consultant within five (5) working days of Contract award, to discuss proposed approach for undertaking the Work, inclusive of methodology, sequencing, Construction Equipment, and labour resources to be utilized.
- .2 Prepare a detailed CPM schedule (the preliminary as-planned schedule), illustrating the Contractor's plan for executing the Work, indicating the times for starting and completing the various stages of the Work and any applicable constraints. The preliminary as planned schedule should refine and amplify the Contractor's tender schedule and must provide sufficient detail of the critical events and their interrelationship to demonstrate that the Work will be performed within the Contract Time.
- .3 The preliminary as-planned schedule shall cover all phases of the Work, and shall represent a practical plan to complete the Work, considering restrictions of access and availability of Work areas, and availability and use of manpower, materials and equipment. The preliminary as-planned schedule shall show the activity duration, sequencing and interdependencies for the following:
  - .1 Preparation of Shop Drawings and material samples;
  - .2 Review and approval of Shop Drawings and material samples;

- .3 Permitting;
  - .4 Material procurement;
  - .5 Fabrication;
  - .6 Temporary works;
  - .7 Installation;
  - .8 Inspection/testing; and
  - .9 Handover.
- .4 Each activity shall be coded by the performing entity such as a particular Sub-Contractor, supplier, the Consultant, etc.
  - .5 The activities defined in the preliminary as-planned schedule shall represent the planned durations in anticipation of normal manpower and equipment utilization in durations of whole working days. Except for non-construction activities, such as procurement, delivery or submittals, no activity durations shall exceed fifteen (15) working days unless approved by the Consultant. The durations shall be determined based upon resource planning under contractually-defined on-site work conditions. In calculating activity durations, normal inclement weather shall be considered. The Contractor shall schedule the Work to minimize the effect of adverse weather, and to allow for protection of the Site from such effects.
  - .6 The total number of activities and the distribution of activities shall reflect the complexity of the Work and shall be finite, measurable, identify a specific function and identify a trade responsible for its completion.
  - .7 Prepare a narrative to accompany the preliminary as-planned schedule that provides a detailed description of the labour, materials, plant, means and methods that the Contractor intends to utilize in carrying out the Work to achieve the planned rates of production required to support the activity durations shown in the schedule. The narrative shall also provide explanations supporting the use of lead-lag relationships and, where permitted, constrained dates.

#### **1.6 PRELIMINARY AS-PLANNED SCHEDULE SUBMISSION AND REVIEW**

- .1 Within fifteen (15) working days after Contract award, submit to the Consultant:
  - .1 One (1) electronic copy of the preliminary as-planned schedule, clearly labelled with data date, specific update, and person responsible for update.
  - .2 One (1) electronic copy of bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile, current status and budget amounts.
  - .3 One (1) electronic copy of network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status and durations.
  - .4 One (1) electronic copy of written narrative as described in paragraph 1.5.7 above.
- .2 The Owner and the Consultant will review and return the preliminary as-planned schedule within five (5) working days after receipt.
- .3 The preliminary as-planned schedule must be acceptable in principle to the Owner and the Consultant, prior to the release of the first progress payment.

#### **1.7 FINAL AS-PLANNED SCHEDULE AND CASH FLOW**

- .1 The Contractor shall submit all revisions and/or additional information requested by the Owner or the Consultant pursuant to their review of the preliminary as-planned schedule if the Consultant considers that these additions are necessary for the preliminary as-planned schedule to comply with the requirements of this section. The required revisions must be made and the as-planned schedule finalized to the satisfaction of the Owner and the Consultant (whereupon it will become the final as-planned schedule, against which progress will be measured) within thirty (30) working days after Contract Award.

## 1.8 FINAL AS-PLANNED SCHEDULE SUBMISSION, REVIEW AND APPROVAL

- .1 The Consultant will accept the final as-planned schedule if it demonstrates that the Work will be performed in an orderly manner and in conformity with the Contract Time, subject to the constraints set out in the Contract, but such acceptance will neither impose on the Owner or the Consultant responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve the Contractor from the Contractor's full responsibility therefore. Acceptance of the final as-planned schedule or any subsequent update by the Owner shall not be construed as a confirmation that the schedule is a reasonable plan for performing the Work.
- .2 Acceptance of final as-planned schedule showing scheduled Contract duration shorter than specified Contract duration does not constitute change to Contract Time.
- .3 Consider final as-planned schedule showing Work completed in less than specified Contract duration, to have float.

## 1.9 COMPLIANCE WITH CONTRACT SCHEDULE

- .1 The Contractor shall adhere to latest schedule approved by the Consultant.
- .2 The express or implied acceptance by the Owner or the Consultant of the final as-planned schedule and any progress schedules shall not constitute an approval or acceptance of the Contractor's construction means, methods, or sequencing or its ability to complete the work in a timely manner, and shall not place any obligation or responsibility on Owner towards the Contractor nor in any way limit the Contractor's obligations and responsibilities.

## 1.10 PROGRESS MONITORING

- .1 Monitor progress of Work in detail to ensure integrity of critical path, by comparing actual completions of individual activities with their scheduled completions, and reviewing progress of activities that have started but are not yet completed. Monitoring should be undertaken sufficiently often so that causes of delays are immediately identified and removed if possible.
- .2 On an ongoing basis, record "progress to date" on copy of schedule to be available at the Site. Inspect Work with the Owner and the Consultant at least bi-weekly to establish progress on each current activity.

## 1.11 UPDATES AND REVISIONS TO SCHEDULE

- .1 The Contractor's schedule is to be updated and resubmitted to the Consultant as a progress schedule at least once per month, on a date to be mutually agreed by the Contractor and the Consultant, together with the related data and reports required by this Section. Updated schedule is to include a 2 week look-ahead schedule in the form of a bar chart.
- .2 Each progress schedule shall record and report actual completion and/or start dates for each completed or in-progress activity, activity percent complete for in-progress activities and forecast completion dates for all activities that are not yet complete. Do not automatically update actual start and finish dates by using default mechanisms found in scheduling software. The progress schedule will show the projected completion date of the Work based on the progress information inserted into it, without changes to the schedule logic or the original duration of any activity. The Contractor shall use the retained logic option when executing schedule calculations. The final as-planned schedule (or an approved revision thereto) will be shown as a target schedule to indicate whether the current progress schedule remains on target, has slipped or is ahead of schedule.
- .3 The Contractor may then, in a second and subsequent update to the progress schedule, incorporate any logic and duration changes that represent its revised planning, provided all such changes are identified and documented in the schedule narrative required to accompany the progress schedule, and are agreed to by the Consultant.
- .4 If it appears that the progress schedule submitted by the Contractor no longer represents the actual sequencing and progress of the Work, the Consultant may instruct the Contractor to revise the progress schedule.

- .5 In order to improve the schedule, eliminate unforeseen problems or reduce the time required for an activity, modifications to the schedule may be suggested by the Contractor, Sub-Contractors, Owner or Consultant during the execution of the Contract, and such modifications may be implemented by mutual agreement. The Contractor shall submit to the Consultant for acceptance proposed adjustments to the final as-planned schedule or any subsequent updates that will not change the Contract Time.
- .6 If, at any time, the work is behind schedule with respect to the progress schedule currently in force, and if the Consultant believes there is a risk of the Work not being completed within the Contract Time as a result of such delay, the Contractor shall take all necessary measures to make up for such delay either by increasing staff, plant or facilities, or by amending its work methods, whichever is applicable.
- .7 In all cases of delay or potential delay, the Contractor shall keep the Owner and the Consultant informed of its intentions with regard to mitigation of such delay and the Owner's Consultant may, if it is deemed necessary, require the Contractor to revise all or part of its current progress schedule.
- .8 The current Contract Schedule can only be revised as agreed with the Owner and the Consultant by Change Order or an accepted revision to the logical sequence of described construction operations.
- .9 Once accepted, the revised schedule will become the current Contract Schedule against which progress is reported and to which subsequent updates will be compared. The new Contract Schedule will be clearly identified to show it as the current Contract Schedule.
- .10 Where the progress schedule shows completion of the Contract, or of any interim milestone, later than the Contract or milestone completion dates, acceptance of such progress schedules and of the monthly progress report will not constitute acceptance of the delay by the Consultant or the Owner.

#### 1.12 EXTENSIONS OF TIME

- .1 Float shall not be for the exclusive use of either the Contractor or the Owner. Extensions to the Contract Time will be granted only to the extent that appropriate adjustments to the duration of the affected activity exceed the total float time along the affected paths of the progress schedule in force at the time a Change Order or Change Directive is issued.
- .2 Submit to the Consultant, justification, project schedule data and supporting evidence for approval of extension to the Contract Time or interim milestone date when required. Include as part of supporting evidence:
  - .1 Written submission of proof of delay based on revised activity logic, duration and costs, showing time impact analysis illustrating influence of each change or delay relative to approved Contract Schedule.
  - .2 Prepared schedule indicating how change will be incorporated into the overall logic diagram. Demonstrate perceived impact based on date of occurrence of change and include status of construction at that time.
  - .3 Other supporting evidence requested by the Consultant.

#### 1.13 PROGRESS REPORTS

- .1 Monthly progress reports shall be prepared by the Contractor and submitted to the Consultant in the form of one (1) electronic copy of the relevant schedule files, to demonstrate how the Work is actually progressing and the planned and detailed sequencing of the Work at the time of the report. The cut-off date for the monthly progress report shall be as instructed by the Consultant and the report shall be submitted no later than ten (10) Working Days after the cut-off date and accompanying the monthly progress draw.
- .2 Each monthly progress report shall be in a format acceptable to the Owner, and shall be arranged according to the following headings and sub-headings:

- .1 Executive Summary.
  - .1 Activity to (date).
  - .2 Forecast activity to (date).
- .2 Project Cost Information:
  - .1 Budget Summary.
  - .2 Cash Allowance Log.
  - .3 Change Order Log.
- .3 Project Data:
  - .1 Project Schedule.
  - .2 Shop Drawing Log.
  - .3 Site Inspection Log.
  - .4 Site Testing Log.
- .4 Critical Issues Log.
- .5 Site Photos.
- .3 Each monthly progress report shall include:
  - .1 An updated progress schedule, comparing actual and target progress for all milestones and activities. Sort activities by activity identification number and accompany with descriptions. List early and late start and finish dates together with durations, codes and float.
  - .2 Criticality report listing activities and milestones with up to five (5) days of total float used as first sort for ready identification of near critical paths through entire project. List early and late starts and finishes dates, together with durations, codes and float for critical activities.
  - .3 Progress report in early start sequence, listing for each trade, activities due to start, to be underway, or finished within two months from monthly update date. List activity identification number, description and duration. Provide columns for entry of actual start and finish dates, duration remaining and remarks concerning action required.
  - .4 A schedule narrative, including:
    - .1 Detailed descriptions of progress, including each stage of procurement, fabrication, delivery to site, construction, installation, and testing;
    - .2 Discussion of the basis for any work sequencing, logic, interdependencies or original activity duration revisions incorporated into an updated progress schedule; and
    - .3 Comparisons of actual and planned progress, with a brief commentary on any actual or forecast delays or problems that might have an impact on the completion. date of the Work, and a discussion of the measures being (or to be) adopted to overcome these.
  - .5 Charts showing the status of submittals, permits and approvals, utility relocations, purchase orders, manufacturing/fabrication and construction.
  - .6 For each fabricated item, the name and location of the fabricator, percentage progress, and the actual or expected dates of commencement of fabrication, Contractor's inspections, tests and delivery.
  - .7 Progress photographs taken, prepared, and submitted in formats specified, all in accordance with Section 01 33 00 – Submittal Procedures.

.8 RFI log.

.4 Timely submission of updates is of significant and crucial importance to the management of this project. Lack of or late receipt of updates diminishes their value to the Owner and the Consultant. Therefore, if the Contractor fails to submit any progress schedule or required revision to a progress schedule within the prescribed time period, the Owner, in its sole discretion, may hold back subsequent progress payments until the updated schedule is submitted or the revision is accepted.

#### 1.14 REVIEW OF MONTHLY PROGRESS REPORTS

.1 The monthly progress reports and progress schedules will be used by the Owner and the Consultant to monitor the Contractor's performance against the current Contract Schedule.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

1.1 ADMINISTRATIVE

- .1 Make submissions reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by submittal shall not proceed until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .6 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .10 Keep one reviewed copy of each submission on site.
- .11 Submit all submittals other than samples as one (1) single electronic PDF file.
  - .1 Name Submittal PDF files as follows:
    - .1 Submittal #\_Spec.Section#\_Revision#\_Descriptor\_Type of Submission
      - .1 Example: Submittal 001\_092116\_R3\_Gypsum Wallboard Product Data
    - .2 Revision number within file name is to reflect the number of submissions with zero indicating the first submission.
    - .3 Submittals returned to the Contractor will have added text to the end of the file name indicating the review status of the Submittal. If the Submittal is to be resubmitted, maintain the original file name revising only the revision number.

1.2 SUBMISSIONS SCHEDULE

- .1 Within four (4) weeks after award of Contract submit a submittal schedule itemizing submittal for review by Consultant.
- .2 If either the contractor or the consultant so requests, they shall jointly prepare a schedule fixing the dates for submission and return of submittals.
- .3 Allow fourteen (14) days for Consultant's review of each submission.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term shop drawings means drawings, diagrams, illustrations, schedules, performance charts, product data, brochures and other data which are to be provided by the contractor to illustrate details of a portion of the work.
- .2 Arrange for the preparation of clearly identified shop drawings as the consultant may reasonably request.



- .3 Prior to submission to the consultant, review all shop drawings. By this review the contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalogue numbers and similar data or will do so and that he has checked and coordinated each shop drawing with the requirements of the work and of the contract documents. Indicate the contractor's review of each shop drawing by stamp, date and signature of an authorized person.
- .4 Submit shop drawings to the consultant for his review with reasonable promptness and in orderly sequence so as to cause no delay in the work or in the work of other contractors.
- .5 Make changes in shop drawings which the consultant may require consistent with the contract documents and resubmit unless otherwise directed by the consultant. When resubmitting, notify the consultant in writing of any revision other than those requested by the consultant.
- .6 Make shop drawings accurately to a scale sufficiently large to show pertinent features of the Work. Define the division of responsibility between different trades in the shop drawings.
- .7 Show materials, methods of construction and attachment or anchorage, erection diagrams, connections and other details necessary to complete the work. Cross reference shop drawings to drawings and specifications.
- .8 The review by the consultant is for the sole purpose of ascertaining conformance with the general design concept. The review shall not mean that the consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the contractor, and such review shall not relieve the contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the contract documents. The contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all subtrades and work of other contractors.
- .9 Any adjustments made on the shop drawings by the consultant are not intended to change the contract price. If the contractor deems that such adjustments effect the value of the work, he shall so state in writing before proceeding with the fabrication and installation of the work.

## 2 Products

### 2.1 TRANSMITTAL LETTER

- .1 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Identification for initial submission or resubmission.
  - .6 Other pertinent data.

### 2.2 SHOP DRAWINGS

- .1 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.

- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.
- .2 Shop Drawings: Submit one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as consultant may reasonably request.
- .3 Product Data: Submit one (1) electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .4 Delete information not applicable to project.
- .5 Supplement standard information to provide details applicable to project.
- .6 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .7 Shop drawings will be returned to the Contractor with one of the following notations:
  - .1 When stamped "REVIEWED", distribute additional copies as required for execution of the Work.
  - .2 When stamped "REVIEWED AS NOTED", ensure that all copies for use are modified and distributed, same as specified for "REVIEWED".
  - .3 When stamped "REVISE AND RE-SUBMIT", make the necessary revisions, consistent with the Contract Documents and submit again for review.
- .8 Only use shop drawings bearing "REVIEWED" or "REVIEWED AS NOTED" on the Work unless otherwise authorized by the Consultant.
- .9 Further revisions by Contractor on submittals bearing "REVIEWED" or "REVIEWED AS NOTED" are not permitted.
- .10 Shop Drawings Indicating Engineering and Design to be Provided by the Contractor: Include seal and signature of a Professional Engineer registered in the Province of the Work.

### 2.3 SAMPLES

- .1 At each major milestone stage, assemble and submit all relevant samples in context, at one time, in the following groups:

- .1 Exterior Materials and Finishes
- .2 Interior Materials and Finishes
- .3 Ceiling Systems and Light Fixtures.
- .4 Door Hardware
- .5 Cover plates, grilles, etc., of Mechanical and Electrical Sections.
- .2 Submit for review samples in triplicate as requested in respective specification Sections and as Consultant may reasonably request. Label samples with origin and intended use.
  - .1 Technical specifications section.
  - .2 Product manufacturer's name and address.
  - .3 Product supplier's name and address.
- .3 Deliver samples prepaid to Consultant's business address.
- .4 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .5 Unless custom or precise colour and pattern is specifically described in the Contract Documents, whenever a choice of colour or pattern is available in a product, submit accurate colour charts from the manufacturer's standard range of colour and pattern charts to the Consultant for selection.
  - .1 Unless all available colours and patterns have identical costs and identical wearing capabilities and are identically suited for the installation, completely describe the relative costs and capabilities of each.
- .6 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .7 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .8 Reviewed and accepted samples will become standard of quality of work and material against which installed Work will be verified.

## 2.4 PRE-CONSTRUCTION CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract and prior to commencing work, submit the following:
  - .1 Workplace Safety and Insurance Board status.
  - .2 Certified true copy of insurance.

## 2.5 TEST REPORTS

- .1 Clearly show on each test reports or certification, the name and location of the Work, name and address of Contractor, quantity and date of shipment and delivery, and name of manufacturer or fabricating company. Ensure certificates are signed by an authorized representative of the manufacturing or fabricating company.
- .2 Submit four (4) hard copies, or one (1) electronic copy of all test reports submitted with certificates of compliance showing date or dates of testing, the specified requirements for which the testing was performed and results of the test or tests.

## 2.6 CERTIFICATION OF PERSONNEL

- .1 Provide certificates to establish qualifications of personnel employed on the Work where such certification is required by authorities having jurisdiction, by the Consultant or by the Contract Documents.

## 3 Execution

**3.1 SUBMISSION**

- .1 Make submittals well in advance of schedule dates for fabrication, manufacture, erection and installation to provide adequate time for reviews, securing necessary approvals, possible revisions and resubmittals, placing orders, securing delivery and to avoid construction delays.

**END OF SECTION**

1 General

**1.1 REFERENCE STANDARDS**

- .1 Uniform Traffic Control Devices (UTCD):
  - .1 Latest edition of the Manual on Uniform Traffic Control Devices

**1.2 PROTECTION OF PUBLIC TRAFFIC**

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out the Work or haul materials or equipment.
- .2 Road closure permits:
  - .1 Do not close any lanes of road without prior approval of Owner and authorities having jurisdiction. Submit written request to Owner, including relevant information and details of closure requirements, a minimum of seven (7) days in advance of the date when road closure is required.
  - .2 Responsible for applying for and obtaining Temporary Street Occupation Permit sufficiently in advance of the required road closures so as to cause no delay in the progress of the Work.
  - .3 Costs for any delays in the Work caused as a result of failure to obtain the necessary road closure permits shall be borne by the Contractor at no increase in either the Contract Price or the Contract Time.
- .3 When working on travelled way:
  - .1 Place equipment in position to present minimum of interference and hazard to traveling public.
  - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
  - .3 Do not leave equipment on travelled way overnight.
- .4 Before re-routing traffic erect suitable signs and devices in accordance with Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways.
- .5 Keep travelled way graded, free of pot holes and of sufficient width for required number of lanes of traffic.
  - .1 Provide minimum 7620mm (25') wide temporary roadway for traffic in two-way sections through areas affected by the Work and on detours.
  - .2 Provide minimum 5486mm (18') wide temporary roadway for traffic in one-way sections through areas affected by the Work and on detours.
- .6 Provide and maintain road access and egress to property fronting along the Place of the Work and in other areas as indicated, unless other means of road access exist that meet approval of the Owner.

**1.3 INFORMATIONAL AND WARNING DEVICES**

- .1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from the Work which requires road user response.
- .2 Provide signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of UTCD manual.
- .3 Place signs and other devices in locations recommended in UTCD manual.

- .4 Meet with Owner and Consultant prior to commencement of the Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Owner and Consultant.
- .5 Continually maintain traffic control devices in use by:
  - .1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
  - .2 Removing or covering signs which do not apply to conditions existing from day to day.

**1.4 CONTROL OF PUBLIC TRAFFIC**

- .1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in, UTCD manual in following situations:
  - .1 When public traffic is required to pass working vehicles or equipment which block all or part of travelled roadway.
  - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
  - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
  - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
  - .5 For emergency protection when other traffic control devices are not readily available.
  - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
  - .7 Delays to public traffic due to contractor's operators: maximum 15 minutes.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

1.1 GENERAL REQUIREMENTS

- .1 Testing and inspecting services are required to verify compliance with specified requirements. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - .1 Specific quality assurance and quality control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of products.
  - .2 Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality control procedures that facilitate compliance with the Contract Document requirements.
  - .3 Requirements for Contractor to provide quality assurance and quality control services required by Consultant, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- .2 Travel Expenses: Where it is necessary for the Consultant and Owner to visit places away from the Place of the Work in order to supervise, inspect or witness testing activities of items of the Work, for compliance with the Contract Documents, the Contractor shall pay the travelling, lodging and food expenses of Consultant and Owner.
- .3 Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Consultant for a decision before proceeding.

1.2 DEFINITIONS

- .1 Quality Assurance: Activities, actions, and procedures performed before execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- .2 Quality Control: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Consultant.
- .3 Sample Installations: Full-size, physical assemblies that are constructed on-site. Sample installations are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved sample installations establish the standard by which the Work will be judged.
- .4 Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- .5 Testing Agency: An independent agency engaged to perform specific tests, inspections, or both.
- .6 Experienced: An entity having successfully completed previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 QUALITY ASSURANCE

- .1 General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

- .2 Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- .3 Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- .4 Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- .5 Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- .6 Specialists: Contract Documents may require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated. Requirement for specialists shall not supersede requirements of authorities having jurisdiction.
- .7 Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated, and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
- .8 Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- .9 Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - .1 Contractor responsibilities include the following:
    - .1 Provide test specimens representative of proposed products and construction.
    - .2 Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - .3 Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - .4 Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - .5 Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - .6 When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
  - .2 Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Consultant with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

#### 1.4 QUALITY CONTROL – OWNER'S TESTING

- .1 General: The Owner may require, during progress of the Work, testing and inspection by an independent testing company as directed by the Consultant, or as required in Contract Documents, to determine if Work meets the specified requirements.



- .1 Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
- .2 If upon examination work is found in non-conformance to Contract Documents, Contractor shall correct such Work and pay cost of retesting and reinspection.
- .3 If such Work is found in conformance to Contract Documents, Owner shall pay cost of examination and replacement.

**SPEC NOTE: Use the following paragraph if cost of testing is paid through cash allowance.**

- .4 Cost of services will be paid out of cash allowance. Pay testing agency charges authorized by the Consultant from the cash allowance included for these services.
  - .5 Retesting and Reinspection: When initial tests indicate non-compliance with the Contract Documents, costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be the responsibility of the Contractor. Re-testing and re-inspection shall be performed by the same testing agency as the initial tests.
  - .6 If Contractor covers or permits to be covered Work that has been designated for tests, inspections, or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .2 Testing Agency Responsibilities
    - .1 Cooperate with Consultant and Contractor in performance of duties. Provide qualified personnel and equipment to perform required tests and inspections.
    - .2 Notify Consultant and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
    - .3 Determine the location from which test samples will be taken and in which in-situ tests are conducted.
    - .4 Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
    - .5 Submit certified written report, in triplicate, of each test, inspection, and similar quality-control service to the Consultant.
    - .6 Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
    - .7 Do not perform any duties of Contractor.
  - .3 Contractor Responsibilities
    - .1 Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
      - .1 Access to the Work.
      - .2 Incidental labour and facilities necessary to facilitate tests and inspections.
      - .3 Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
      - .4 Facilities for storage and field curing of test samples.
      - .5 Delivery of samples to testing agencies.
      - .6 Preliminary design mix proposed for use for material mixes that require control by testing agency.

- .7 Security and protection for samples and for testing and inspecting equipment at Project site.
- .2 Coordination: Coordinate sequence of activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - .1 Schedule times for tests, inspections, obtaining samples, and similar activities.
- .3 Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality assurance and quality control services required. Submit schedule within [30] days of date established for commencement of the Work.
  - .1 Distribution: Distribute schedule to Owner, Consultant, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
  - .2 Establishing Schedule: Determine the time required for the agencies to perform their duties and the time required for the issuance of resulting reports. Allow for the times in the construction schedule.
  - .3 Schedule Revisions: Co-ordinate revisions with the testing and inspection agencies when changes to the construction schedule are necessary.
  - .4 Schedule Adherence: Provide advance notice to the testing laboratory and to the inspection company of when testing of the Work is required. If the testing laboratory is ready to perform its functions according to the schedule and is prevented from doing so due to incompleteness of the work, extra costs for testing attributable to the delay will be back charged to the Contractor.

## 1.5 QUALITY CONTROL

- .1 Code Compliance Testing:
  - .1 Inspection and tests required by codes or ordinances, or by an authority having jurisdiction shall be the responsibility of the Contractor and shall be paid for by the Contractor.
- .2 Contract Compliance Testing:
  - .1 Inspection and tests required by Contract Documents shall be the responsibility of the Contractor and shall be paid for by the Contractor. These services include and not limited to the following:
    - .1 Mill Tests.
    - .2 Mix Designs.
    - .3 Building Systems Performance, Adjustments and Balancing Reports.
- .3 Contractor's Convenience Testing:
  - .1 Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor and paid for by Contractor as part of the Contractor.
- .4 Engage a qualified testing agency to perform these quality-control services. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
- .5 Submit a certified written report, in triplicate, of each quality-control service.
- .6 Submit additional copies of each written code compliance report directly to authorities having jurisdiction, when they so direct.
- .7 Retesting/Reinspecting: Provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with code requirements and Contract Documents. Re-testing and re-inspection shall be performed by the same testing agency as the initial tests.

- .8 Manufacturer's Field Services: Where indicated, engage a factory authorized service representative to inspect field-assembled components and equipment installation, including service connections.

## 1.6 SAMPLE INSTALLATIONS

- .1 Construct sample installations for Work specifically requested in specifications. Include for Work of all Sections required to provide sample, installations. Obtain Consultant's approval of sample installations before starting work, fabrication, or construction.
- .2 Construct in locations acceptable to Consultant with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .3 Failure to construct sample installations in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .4 If requested, Consultant will assist in preparing a schedule fixing dates for sample installation construction.
- .5 Maintain sample installations during construction in an undisturbed condition as a standard for judging the completed Work.
- .6 Specification Sections identify whether sample installations may remain as part of Work or to be removed.

## 2 Products

### 2.1 TEST AND INSPECTION LOG

- .1 Prepare a record of tests and inspections. Include the following:
  - .1 Date test or inspection was conducted.
  - .2 Description of the Work tested or inspected.
  - .3 Date test or inspection results were transmitted to Consultant.
  - .4 Identification of testing agency or special inspector conducting test or inspection.
- .2 Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Consultant's reference during normal working hours.

## 3 Execution

### 3.1 REPAIR AND PROTECTION

- .1 On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- .2 Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
- .3 Protect construction exposed by or for quality-control service activities.
- .4 Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

### 3.2 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 Consultant as failing to conform to Contract Documents. Replace in accordance with Contract Documents.
- .2 Make good other contractor's work damaged by such removals or replacements promptly.

- .3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Consultant.

**END OF SECTION**

1 General

1.1 **INSTALLATION AND REMOVAL**

- .1 Permits: Be responsible for arranging, obtaining and paying for any permit necessary for temporary facilities and controls.
- .2 Provide, maintain and pay for all temporary facilities and controls. Remove them when directed or when no longer required.

1.2 **EXISTING FACILITIES**

- .1 Existing permanent services are available for use of Contractor and Sub-Contractors employed on this Project.
- .2 Contractor may use existing facilities without cost for use of all trades. Make connections at own expense. Obtain Owner's written permission prior to connection.
  - .1 Water: Extend supply pipe or pipes from nearest available sources and maintain in good condition until permanent system is installed and ready for use.
  - .2 Power: Furnish electrical connection from nearest available sources and maintain in good condition until permanent system is installed and ready for use.
  - .3 Heat: Provide and pay for supplemental heating plants if existing facility is insufficient for execution of Work.
- .3 Be responsible for delays or damage resulting due to failure or interruption of such services irrespective of cause.

1.3 **SAFETY PROGRAM**

- .1 Be responsible to provide full safety program for workers including management, labour, delivery drivers, service personnel and others involved for services on site. Arrange for pre-project meeting related to safety, joint safety inspections, site safety training and safety committees complete with accident investigation procedures.
- .2 Prior to commencement of execution of Work, design fire safety plan in conjunction with local Fire Chief. Post fire plan throughout the Work. Do not allow accumulation of waste that may constitute fire hazard.
- .3 Comply with requirements of Acts and Regulations with respect to health and safety. Before commencement of Work, and throughout Contract, maintain on site, and readily accessible to all those who may be exposed to hazardous materials, list of hazardous materials proposed for use on Site or Workplace together with current Materials Safety Data Sheet (MSDS).
- .4 Ensure hazardous materials used and/or supplied on site are labelled in accordance with WHMIS requirements. Provide detailed written procedures for safe handling, storage and use of such hazardous materials including special precautions, safe clean up and disposal procedures. Conform to Environmental Protection Act for disposal requirements.
- .5 Ensure that those who handle, and/or are exposed to, or are likely to handle or be exposed to, hazardous materials are fully instructed and trained in accordance with WHMIS requirements.
- .6 Watch work area for minimum of 30 minutes after hot work is completed. Provide Site fire security when required by local building department and/or municipal fire department. Ensure that water supply is adequate for firefighting.
- .7 Provide and maintain in working order, suitable Underwriters' labelled fire extinguishers and locate in suitable positions, to approval of authorities having jurisdiction. Such extinguishers shall be maintained to requirements of ULC.
- .8 Store all rags and waste containing oil, grease or other flammable materials in an approved metal container and remove from Site at end of each working day.

- .9 Only fire-resistant tarpaulins are permitted on Site.
- .10 Notify Fire Department and Consultant immediately should a fire of any nature occur whether fire has been extinguished or not.
- .11 If any claim is made by anyone against Contractor or any Subcontractor on account of any accident or damage, promptly report facts in writing to Owner, giving full details of claim.

#### 1.4 SECURITY

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

### 2 Products

#### 2.1 TEMPORARY FIELD OFFICES AND STORAGE SHEDS

- .1 Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
  - .1 Electrical Power Service: Provide 120V AC duplex receptacles, with not less than one receptacle on each wall of offices and meeting rooms.
  - .2 Electronic Communication Service: Provide DSL line and temporary electronic communication service, including electronic mail, in each field office.
  - .3 Telephone and Facsimile Services: Provide and maintain one telephone and one facsimile machine in each field office. Long distance charges shall be paid by those making calls and using facsimile machine.
    - .1 At each telephone, post a list of important telephone numbers such as Owner's and municipality's emergency services, and the police and fire departments.
    - .2 Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
  - .4 Cleaning Services: Employ professional cleaning services to maintain offices in sanitary conditions.
- .2 Common Use Field Office: Of sufficient size to accommodate needs of workers. Keep office clean and orderly. Furnish and equip offices as follows:
  - .1 Furniture required for Project site documents including file cabinets, plan tables, plan racks, and bookcases.
  - .2 Conference room of sufficient size to accommodate meetings of 10 individuals. Furnish room with conference table, chairs, and 1200 mm (48") square tack board.
  - .3 Private washroom with continuous sanitary supplies.
  - .4 Coffee machine and supplies.
  - .5 Heating and cooling equipment necessary to maintain a uniform indoor temperature of 20 to 22 deg C.
  - .6 Lighting fixtures capable of maintaining average illumination of 215 lx (20 fc) at desk height.
- .3 When directed by the Consultant, remove field office and provide similar offices and facilities within the building. Move all equipment and contents of the site office into the building office.
- .4 Storage Sheds: Lockable weather tight storage sheds with floors raised above ground, for storage of materials, tools, equipment, which may be damaged by weather. Provide separate shed for paints and volatile materials. Provide fire extinguisher in each location and do not store combustible or hazardous materials in Building.

#### 2.2 CONSTRUCTION AIDS

- .1 Construction Hoists: Provide, install, maintain, locate where directed and pay costs for hoisting equipment if required. Equipment shall be positioned so as not to interfere with Work. Operate equipment by qualified hoist operator along with well-trained flag and signal persons. Be responsible for necessary permits and inspection fees. Trade Sections shall make their own financial and schedule arrangements with Contractor for use thereof. Provide concrete pads for hoisting equipment.
- .2 Scaffolding: Erect fixed or mobile scaffolding as applicable independent of walls. Use it in manner as to interfere as little as possible with other Sections. When not in use, move it as necessary to permit installation of other work. Construct and maintain scaffolding in rigid, secure and safe manner. Remove it promptly when no longer required.

### 2.3 CONSTRUCTION SIGNAGE

- .1 Provide and erect, within three weeks of signing Contract, a project sign in a location designated by Consultant.
- .2 Construct project identification site sign comprising foundation, framing, and one 1200 mm x 2400 mm signboard painted with exhibit lettering produced by a professional sign painter.
  - .1 Foundations: 15 MPa concrete to CAN/CSA-A23.1 minimum 200 mm x 900 mm deep.
  - .2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.
  - .3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.
  - .4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CGSB 1-GP-189.
  - .5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
  - .6 Indicate on sign, name of Owner, Consultant and Contractor, of a design style established by Consultant.
  - .7 Paint all surfaces of signboard and framing with one coat primer and two coats enamel.
- .3 Maintain approved signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier if directed by Consultant.
- .4 No other signs or advertisements, other than warning signs, are permitted on site.

## 3 Execution

### 3.1 TEMPORARY LIGHT, POWER AND WATER

- .1 Coordinate with the Owner if existing light, power, and water can be provided for use during construction work.
- .2 Provide and maintain adequate temporary light, power and water as required by all trades for work to proceed without delay at all times of year.
- .3 Provide continuous temporary electric power required during execution of Work for temporary lighting, operating of electric pumps, motors, vibrators, power tools, electric cranes, hoists, other equipment and as required.
- .4 Maintain illumination on all floors and stairs of minimum 161 lux (15 foot-candles). When finishing trades are performing work, provide illumination comparable to final illumination. Extension cords, lamps and hoses shall be provided by those using them in accordance with governing regulations and ordinances.
- .5 Provide a continuous supply of potable water for execution of Work. Ensure adequate pressure at each floor. Provide and maintain temporary water lines, extensions, hoses, and pumps as required.
- .6 Be responsible for materials, plant, tools or equipment on Site.

- .7 Do not use any of permanent facilities and controls without obtaining written permission from Consultant.

### 3.2 TEMPORARY HEATING AND VENTILATION

- .1 Coordinate with the Owner if existing heating, and ventilation can be provided for use during construction work.
- .2 Provide temporary heating required during execution of Work, including attendance, maintenance and fuel.
- .3 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .4 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.
- .5 Maintain temperatures of minimum 10 degrees C in areas where Work is in progress.
- .6 Ventilating:
  - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during execution of Work.
  - .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.
- .7 Permanent heating system of building may be used when available. Be responsible for damage to heating system if use is permitted.
- .8 On completion of Work for which permanent heating system is used, replace filters and bearings.
- .9 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
- .10 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.
- .11 Be responsible for damage to Work due to failure in providing adequate heat and protection during execution of Work.



### 3.3 TEMPORARY DRAINAGE

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.
- .2 Keep site properly and efficiently drained during execution of Work and until completion of Work. Be responsible for disturbances, dirt and damage which may be caused by or result from water backing up or flowing over, through, from, or along any part of Work or due to operations, which may cause water to flow elsewhere. Drain water away from Site without causing any danger to public health.

### 3.4 SANITARY FACILITIES

- .1 Provide and maintain temporary facilities in compliance with The Occupational Health and Safety Act, applicable codes and by-laws, sanitary facilities for use of workers. Provide portable, weatherproof toilets, serviced at least weekly, which may be replaced by adequate, permanent or temporary water closets, urinals and basins when plumbing system has been installed, tested and approved.
- .2 When water and drain connections within building are completed, provide temporary water closets, urinals and flushing devices complete with temporary screens and partitions and temporary wood washroom entrance doors. Install units in acceptable locations throughout building, convenient to workers.

### 3.5 VEHICULAR ACCESS AND PARKING

- .1 Access Road, Parking and Traffic Control
  - .1 Provide access roads as may be necessary to provide safe and adequate access for materials, products and other supplies. Provide and maintain access sidewalks, roadways, and similar facilities as may be required for access to the Work.
  - .2 Do not block public roads or impede traffic during work of this Project and if required to temporarily block traffic then provide flag person to direct traffic acceptable to Municipal authorities. Remove accumulations of ice and snow from areas providing access to Site. Ensure that access is available for emergency vehicles. Comply with fire plan for vehicular traffic.
  - .3 Provide roads, walks, ramps, stairs and other such means of access as necessary. Maintain temporary entrances to building(s) including enclosed hoarding as required. Maintain access to existing service entrance(s) at all times, including ready access for fuel oil trucks and delivery vehicles. Bridge excavations with construction to safely support any load that could be imposed or provide personnel to assist in deliveries to building(s) as required.
  - .4 Do not be nuisance to public traffic any time. Manage construction traffic by using designated roads and by providing trained flag persons to direct public traffic as appropriate.
- .2 Construction Parking: Parking on site is limited to the space available. Owner will not be responsible for parking fines incurred by Contractor, Sub-Contractors or their employees.

### 3.6 TREE AND SHRUB PROTECTION

- .1 Protect trees and shrubs existing on Site and on adjacent properties, which are to be retained, except where otherwise required by Contract Documents. Do not remove interfering branches adjacent to excavation without obtaining prior approval from Consultant. Do not injure tree trunks.
- .2 Protect roots against damage due to compaction of soil, excavating, backfilling and rough grading, and against oil, gasoline and other chemicals due to spillage and for seepage. Keep disturbance of root system to absolute minimum and promptly protect and cover exposed roots. Replace damaged trees as directed without any expense to Owner.
- .3 Fence off existing trees at drip line to protect root system.

- .4 Carefully wrap trees adjacent to the Work, material storage areas and trucking lanes in burlap to height of 2400 mm (8') and encase with protective framework from grade to height of 2400 mm (8') consisting of 38 mm x 89 mm (2" x 4") lumber around tree at 150 mm (6") oc. Hold framework in place with minimum of 3 suitable wire bands.

### 3.7 POLLUTION CONTROL

- .1 Take appropriate dust control measures to avoid contamination of adjacent areas near Site from dust. Respond immediately to complaints of dust received from public, authorities, or Consultant. Obtain approval from authorities having jurisdiction before employing chemicals for dust control measures. Haul dusty materials by covered vehicles. Transport wet materials in watertight vehicles. Keep public and private roads free of dust, mud and construction debris resulting from trucks employed on this Project.

### 3.8 NOISE AND VIBRATION CONTROL

- .1 Control noise and vibration generated by Work. Respond immediately to complaints of noise and vibration received from public, authorities, or Consultant.

### 3.9 SNOW REMOVAL

- .1 Remove ice and snow from site and from roof deck when roofing operations are in session.
- .2 Be responsible to keep access road and circulation paths accessible during snowfall. Remove snow as necessary to prevent interruption to work in progress.

**END OF SECTION**

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 ACCESS TO SITE**

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

**1.3 PUBLIC TRAFFIC FLOW**

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

**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 Confirm with Consultant locations and installation schedule seven days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

2 Products

**(Not Used)**

3 Execution

**3.1 TEMPORARY FENCED ENCLOSURES**

- .1 Erect temporary site enclosure using new 1200 mm (48") high snow fence wired to rolled steel "T" bar fence posts spaced at 2400 mm(96") oc. Provide [one] lockable truck gate. Maintain fence in good repair.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

**3.2 GUARD RAILS AND BARRICADES**

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide as required by governing authorities having jurisdiction.

**3.3 WEATHER ENCLOSURES**

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

- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3 Design enclosures to withstand wind pressure and snow loading.

**3.4 DUST TIGHT SCREENS**

- .1 Provide dust tight screens to localize dust generating activities, and for protection of workers, finished areas of Work and public. Maintain and relocate protection until such work is complete.

**END OF SECTION**

1 General

**1.1 GENERAL – CLEANING AND WASTE MANAGEMENT**

- .1 Conduct work of this section in accordance with general requirements of the contract.
- .2 Conduct cleaning and disposal operations to comply with local ordinances and environmental protection legislation.
- .3 Store volatile wastes in covered metal containers, and remove from premises at end of each working day.
- .4 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

**1.2 CLEANING DURING CONSTRUCTION**

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other Contractors.
- .2 Remove waste material and debris from the work areas and deposit in waste container at the end of each working day.
- .3 Vacuum clean interior areas prior to start of finishing work. Maintain areas free of dust and other contaminants during finishing operations.
- .4 Individual Subcontractors are responsible for the daily clean-up and removal of debris related to, or generated by, their own work. The overall responsibility for project cleanliness rests with the Contractor.

**1.3 WASTE MANAGEMENT**

- .1 Audit, separate and dispose of construction waste generated by new construction or by demolition of existing structures in whole or in part, in accordance with local laws and ordinances in place of Work.
- .2 Fires, and burning of rubbish or waste on site is prohibited.
- .3 Burying of rubbish or waste materials, except as specified herein, is prohibited.
- .4 Disposal of waste or volatile materials such as mineral spirits, oil, gasoline or paint thinner into ground, waterways, or sewer systems is prohibited.
- .5 Empty waste containers on a regular basis to prevent contamination of site and adjacent properties by wind-blown dust or debris.

**1.4 FINAL CLEANING OPERATIONS**

- .1 Immediately following Date of Substantial Performance, and prior to Owner occupancy of the building or portion of the building affected by the Work, conduct full and complete final cleaning operations.
- .2 Final cleaning operations shall be performed by an experienced professional cleaning company, possessing equipment and personnel sufficient to perform full building cleaning operations.
- .3 Remove all surplus products, tools, construction machinery and equipment not required for the performance of remaining work, and thereafter remove any remaining materials, equipment, waste and debris.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

- .6 Cleaning operations shall include the removal of all stains, spots, scuff marks, dirt, dust, remaining labels, adhesives or other surface imperfections.
- .7 Remove all paint spots or overspray from all affected surfaces.
- .8 Clean and polish all glass and mirrors. Replace broken, scratched or disfigured glazing. Remove remaining manufacturer's and safety "X" labels.
- .9 Clean and polish all finished metal surfaces such as enamelled or stainless steel, chrome, aluminum, brass, and bronze.
- .10 Clean and polish all vitreous surfaces such as plumbing fixtures, ceramic tile, porcelain enamel, or other such materials.
- .11 Clean all ceramic tile surfaces in accordance with the manufacturer's instructions, and apply final coat of sealer where specified.
- .12 Clean inside of all millwork and cabinetry.
- .13 Vacuum, clean and dust behind grilles, louvers and screens.
- .14 Seal and wax all resilient floor surfaces as specified, and as recommended by the manufacturer.
- .15 Steam clean all carpets immediately prior occupancy by Owner.
- .16 Broom clean and spray wash all exterior paved surfaces.
- .17 Remove dirt and other disfiguration from exterior surfaces.
- .18 Clean all roofs, gutters, downspouts, areaways, drywells, and drainage systems.
- .19 Clean all equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 This Section is for building demolition work of the Accessory Shop #2; Mechanical Shop #1 and Paint & Body Shop buildings as indicated in the drawings.
- .2 This Section includes the following:
  - .1 Demolition and removal of buildings and structures.
  - .2 Demolition and removal of site improvements adjacent to a building or structure being demolished.
  - .3 Demolition and removal of concrete foundations.
  - .4 Removing below-grade construction.
  - .5 Disconnecting, capping or sealing, and removing site utilities.
- .3 Drawings contain details that suggest directions for solving some of the major demolition and removal requirements for this project; Contractor is required to develop these details further by submitting a demolition plan prepared by a professional engineer employed by the Contractor.

**1.2 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI):
  - .1 ANSI A10.8, Scaffolding Safety Requirements
- .2 Canadian Federal Legislation:
  - .1 Canadian Environmental Protection Act (CEPA)
  - .2 Canadian Environmental Assessment Act (CEAA)
  - .3 Transportation of Dangerous Goods Act (TDGA)
  - .4 Motor Vehicle Safety Act (MVSA)
  - .5 Hazardous Materials Information Review Act
- .3 Canadian Standards Association (CSA):
  - .1 CSA S350, Code of Practice for Safety in Demolition of Structures.
- .4 National Fire Protection Association (NFPA):
  - .1 NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .5 Provincial Legislation:
  - .1 Legislation specific to Authority Having Jurisdiction for work governed by this Section

**1.3 DEFINITIONS**

- .1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .3 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.

**1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Materials Ownership:

- .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- .2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property:
  - .1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
  - .2 Coordinate with Owner's historical adviser, who will establish special procedures for removal and salvage.
- .2 Pre-Demolition Meeting: Conduct a pre-demolition meeting at Project site in accordance with requirements listed in Section 01 31 19 – Project Meetings, as follows:
  - .1 Inspect and discuss condition of construction being demolished.
  - .2 Review structural load limitations of existing structures.
  - .3 Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - .4 Review and finalize protection requirements.
- .3 Coordination: Arrange demolition schedule so as not to interfere with Owner's and other tenants on-site operations, at adjacent site.

#### 1.5 SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Schedule of Demolition Activities: Coordinate with Section 01 32 16 – Construction Progress Schedule, and indicate the following:
    - .1 Detailed sequence of demolition and removal work, with starting and ending dates for each activity
    - .2 Interruption of utility services
    - .3 Coordination for shutoff, capping, and continuation of utility services
    - .4 Locations of temporary partitions and means of egress
  - .2 Demolition Plan: Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction, and as follows:
    - .1 Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation.
    - .2 Inventory: Submit a list of items that have been removed and salvaged after demolition is complete.
    - .3 Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- .3 Informational Submittals: Provide the following submittals when requested by the Consultant:
  - .1 Certificates: Submit Statement of Refrigerant Recovery as follows:
    - .1 Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered



and that recovery was performed according to regulations of Authority Having Jurisdiction.

- .2 Include name and address of technician and date refrigerant was recovered.
- .2 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including but not limited to, lists of completed projects with project names and addresses, names and addresses of architects and owners, for work of similar complexity and extent.
- .3 Safety and Fire Safety Procedures:
  - .1 Submit procedures before, during, and after Demolition Work used for protection, and property to be in accordance with CSA S350-M and Sections 01 50 00. In event of conflict, use the most stringent.

## 1.6 QUALITY ASSURANCE

- .1 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- .2 Refrigerant Recovery Technician Qualifications: Certified by Authority Having Jurisdiction.
- .3 Regulatory Requirements: Comply with Authority Having Jurisdiction's regulations before beginning demolition.
- .4 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
- .5 Standards: Comply with ANSI A10.6 and NFPA 241.

## 1.7 SITE CONDITIONS

- .1 Buildings being demolished will be vacated and their use discontinued before start of Work.
- .2 Owner will occupy another building immediately adjacent to demolition area.
- .3 Conduct building demolition so Owner's operations will not be disrupted:
  - .1 Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
  - .2 Maintain access to existing walkways, exits, and other adjacent occupied or used facilities.
  - .3 Do not close or obstruct walkways, exits, or other occupied or used facilities without written permission from Authority Having Jurisdiction.
- .4 Owner assumes no responsibility for buildings and structures being demolished:
  - .1 Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  - .2 Before building demolition, provide minimum one week notice to Owner, to coordinate for item to be removed and salvaged.
  - .3 Place salvage item to location as directed by the Owner.
- .5 Hazardous Materials: Hazardous materials are present in building to be selectively demolished. A report on the presence of hazardous materials is available at the Construction Manager's offices as an information document for review and use:
  - .1 Examine report to become aware of locations where hazardous materials are present.
  - .2 Coordinate with Section 02 81 16 – Hazardous Materials.
  - .3 Do not disturb hazardous materials or items suspected of containing hazardous materials.

- .6 Storage or sale of removed items or materials on site will not be permitted.
- .7 Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
- .8 Maintain fire-protection facilities in service during demolition operations.

## 2 Products

### 2.1 TEMPORARY SUPPORT STRUCTURES

- .1 Design temporary support structures required for demolition work and underpinning, and other foundation supports necessary for the project using a qualified professional engineer registered or licensed in province of the Work.

### 2.2 SOIL MATERIALS

- .1 Satisfactory Soils: Provide soil in accordance with Section 31 23 33 Excavation, Trenching and Backfilling.

## 3 Execution

### 3.1 EXAMINATION

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of building demolition required.
- .2 Owner does not guaranty that existing conditions are the same as those indicated in Project Record Documents.
- .3 Inventory and record the condition of items being removed and salvaged.
- .4 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.
- .5 Promptly submit a written report to Consultant.
- .6 Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- .7 Verify that hazardous materials have been remediated before proceeding with building demolition operations.

### 3.2 PREPARATION

- .1 Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures being demolished:
  - .1 Arrange to shut off indicated utilities with utility companies.
  - .2 If utility services are required being removed, relocated, or abandoned, before proceeding with building demolition provide temporary utilities that bypass buildings and structures being demolished and that maintain continuity of service to other buildings and structures.
  - .3 Cut off pipe or conduit a minimum of 610mm (24") below grade.
  - .4 Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- .2 Existing Utilities: Refer to Mechanical and Electrical Divisions for shutting off, disconnecting, removing, and sealing or capping utilities.
- .3 Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing:

- .1 Remove and recycle refrigerant from air-conditioning equipment before starting demolition.
- .4 Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished:
  - .1 Strengthen or add new supports when required during progress of demolition.
- .5 Removed and Salvaged Items: Comply with the following:
  - .1 Clean salvaged items of dirt and demolition debris.
  - .2 Pack or crate items after cleaning.
  - .3 Identify contents of containers.
  - .4 Store items in a secure area until delivery to Owner.
  - .5 Transport items to Owner's storage area designated by Owner.
  - .6 Protect items from damage during transport and storage.

### 3.3 PROTECTION

- .1 Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations.
- .2 Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition.
- .3 When permitted by Consultant, items may be removed to a suitable, protected storage location during demolition and cleaned and reinstalled in their original locations after demolition operations are complete.
- .4 Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations:
  - .1 Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and Authority Having Jurisdiction.
  - .2 Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to Authority Having Jurisdiction:
    - .1 Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.
- .5 Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by Authority Having Jurisdiction.
- .6 Comply with requirements in Section 01 50 00 – Temporary Facilities and Controls:
  - .1 Protect existing site improvements, appurtenances, and landscaping to remain.
  - .2 Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
  - .3 Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - .4 Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
  - .5 Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
  - .6 Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise from occupied portions of adjacent buildings.

### 3.4 DEMOLITION - GENERAL

- .1 General: Demolish indicated existing buildings and structures completely.
- .2 Use methods required to complete the Work within limitations of governing regulations and as follows:
  - .1 Do not use cutting torches until work area is cleared of flammable materials.
  - .2 Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
  - .3 Maintain adequate ventilation when using cutting torches.
  - .4 Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- .3 Engineering Surveys: Perform surveys as the Work progresses to detect hazards that may result from building demolition activities.
- .4 Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities:
  - .1 Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and Authority Having Jurisdiction.
  - .2 Provide alternate routes around closed or obstructed traffic ways if required by Authority Having Jurisdiction.
  - .3 Use water mist and other suitable methods to limit spread of dust and dirt.
  - .4 Comply with governing environmental-protection regulations.
  - .5 Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

### 3.5 DEMOLITION - ACTUAL

- .1 Remove buildings and structures intact when permitted by Authority Having Jurisdiction.
- .2 Proceed with demolition of structural framing members systematically, from higher to lower level.
- .3 Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- .4 Remove debris from elevated portions by chute, hoist, or other device that will convey debris to grade level in a controlled descent:
  - .1 Remove structural framing members and lower to ground by method suitable to minimize ground impact or dust generation.
- .5 Concrete: Cut concrete full depth at junctures with construction indicated to remain, using power-driven saw, then remove concrete between saw cuts.
- .6 Masonry: Cut masonry at junctures with construction indicated to remain, using power-driven saw, then remove masonry between saw cuts.
- .7 Concrete Slabs-on-Grade: Saw-cut perimeter of area being demolished at junctures with construction indicated to remain, then break up and remove.
- .8 Structural Steel: Dismantle site connections without bending or damaging steel members.
- .9 Do not use flame-cutting torches unless otherwise authorized by Consultant and Authority Having Jurisdiction:
  - .1 Transport steel trusses and joists as whole units without dismantling them further.
- .10 Equipment: Disconnect equipment at nearest fitting connection to services, complete with service valves; Remove as whole units, complete with controls.

- .11 Below Grade Construction - Demolition:
  - .1 Demolish foundation walls and other below-grade construction that is within 1500 mm outside of footprint indicated for new construction.
  - .2 Existing Utilities: Demolish existing utilities and below-grade utility structures that are within 1500 mm outside of footprint indicated for new construction.
    - .1 Piping: Disconnect piping at unions, flanges, valves, or fittings.
    - .2 Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.

### 3.6 EXPLOSIVE DEMOLITION

- .1 Explosives: Use of explosives is not permitted.

### 3.7 SITE RESTORATION

- .1 Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.
- .2 Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes.
- .3 Provide a smooth transition between adjacent existing grades and new grades.

### 3.8 REPAIRS

- .1 General: Promptly repair damage to adjacent construction caused by building demolition operations.
- .2 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- .3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

### 3.9 RECYCLING DEMOLISHED MATERIALS

- .1 General: Separate recyclable demolished materials from other demolished materials to the maximum extent possible.
- .2 Separate recyclable materials by type:
  - .1 Provide containers or other storage method approved by Consultant for controlling recyclable materials until they are removed from Project site.
  - .2 Stockpile processed materials on-site without intermixing with other materials.
  - .3 Place, grade, and shape stockpiles to drain surface water.
  - .4 Cover to prevent windblown dust.
  - .5 Stockpile materials away from demolition area.
  - .6 Do not store within drip line of remaining trees.
  - .7 Store components off the ground and protect from the weather.
  - .8 Transport recyclable materials off Owner's property and legally dispose of them.

### 3.10 DISPOSAL OF DEMOLISHED MATERIALS

- .1 Except for items or materials indicated being recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill:
  - .1 Do not allow demolished materials to accumulate on-site.

- .2 Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- .2 Burning: Do not burn demolished materials.
- .3 Disposal: Transport demolished materials off Owner's property and legally dispose of them.

**3.11 CLEANING**

- .1 Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations.
- .2 Return adjacent areas to condition existing before building demolition operations began.

**END OF SECTION**

1 General

1.1 SUMMARY

- .1 This Section is for selective demolition work not limited to the following list and as indicated to the drawings:
  - .1 Parts Warehouse: Asphalt floor
  - .2 Parts Warehouse: Shed and canopy
  - .3 Parts Warehouse: Overhead door
  - .4 Accessory Shop #1: Man door
  - .5 Concrete pad adjacent to Accessory Shop #1
- .2 Review drawings, site conditions, and other specification sections to ascertain the extent and nature of work of this section.
- .3 The Work of this Section includes the following:
  - .1 Demolish and removal of portions of existing concrete slab, and roofing materials, as indicated on drawings.
  - .2 Disconnect/cap existing service in areas of demolition.
  - .3 Dispose of demolished materials except where required to be salvaged or reused.
  - .4 Refer to demolition notes indicated on drawings.
- .4 Drawings contain details that suggest directions for solving some of the major demolition and removal requirements for this project; Contractor is required to develop these details further by submitting a demolition plan prepared by a professional engineer employed by the Contractor.

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI):
  - .1 ANSI A10.8, Scaffolding Safety Requirements
- .2 Canadian Standards Association (CSA):
  - .1 CSA S350, Code of Practice for Safety in Demolition of Structures.
- .3 National Fire Protection Association (NFPA):
  - .1 NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .4 Provincial Legislation:
  - .1 Legislation specific to Authority Having Jurisdiction for work governed by this Section

1.3 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .3 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .4 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.

- .5 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

#### 1.4 EXAMINATION

- .1 Visit and examine the site and note all characteristics and irregularities affecting Work of this Section. Submit a pre-demolition inspection report. Ensure the Owner of premises being inspected is represented at inspection.
- .2 Where appropriate prepare a photographic or video record of existing conditions, particularly of existing work scheduled to remain.
- .3 Where applicable, examine adjacent tenancies not part of the scope of work. Determine extent of protection required to areas and related components not subject to demolition.
- .4 Stop work and notify the Consultant should suspected hazardous materials are encountered during work of this Section.

#### 1.5 SUBMITTALS

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Prepare schedule in conjunction with overall project schedule and outline proposed methods in writing. Obtain approval before commencing demolition work, and indicate the following:
    - .1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity
    - .2 Interruption of utility services
    - .3 Coordination for shutoff, capping, and continuation of utility services
  - .2 Submit drawings for demolition of structural elements bearing the seal of a professional engineer licensed to design structures and registered in the Province of Ontario.
  - .3 Submit Safety and Fire Safety Procedures:
    - .1 Submit procedures before, during, and after Demolition Work used for protection, and property to be in accordance with CSA S350-M and Sections 01 50 00. In event of conflict, use the most stringent.

#### 1.6 QUALITY ASSURANCE

- .1 Conform to requirements of all authorities having jurisdiction.
- .2 Comply with applicable requirements of CSA S350 Code of Practice for Safety in Demolition of Structures".
- .3 Work of this Contract shall be executed by an approved company having a minimum of five (5) years continuous experience and able to deploy adequate equipment and skilled personnel to complete work expeditiously in an efficient and orderly manner.
- .4 Perform cutting and coring, where applicable, by a firm specializing in this type of work, able to produce evidence of successful completion of similar work over a period of at least five (5) years immediately prior to date of contract.
- .5 Apply for, secure, arrange and pay for all permits, notices and inspections necessary for proper execution and completion of work in this Section.
- .6 Professional Engineer Qualifications: Procure the services of a professional engineer who is experienced in providing relevant engineering services to perform the following:
  - .1 Review portions of the Work requiring structural performance, prepare plan of action, engineer temporary shoring and bracing, and Provide site administration and inspection for work of this Section.



## 1.7 PROTECTION

- .1 Prevent movement or settlement of adjacent work. Provide and place bracing or shoring and be responsible for safety and support of such work. Be liable for any such movement or settlement, and any damage or injury caused.
- .2 Cease operations and notify Consultant if safety of any adjacent work or structure appears to be endangered. Take all precautions to support the structure. Do not resume operations until reviewed with the Consultant.
- .3 Prevailing weather conditions and weather forecasts shall be considered. Demolition work shall not proceed when weather conditions constitute a hazard to the workers and site.
- .4 Prevent damage of surrounding vegetation by construction. Install tree protection barriers to trees that are scheduled to remain.
- .5 Prevent debris from blocking surface drainage inlets and mechanical and electrical systems which remain in operation.
- .6 Temporarily suspended work that is without continuous supervision shall be closed to prevent entrance of unauthorized persons.

## 1.8 REMAINING AND ADJACENT STRUCTURES

- .1 Do not interfere with, encumber, endanger or create nuisance, from any cause due to demolition work, to public property or any adjacent attached and/or detached structures in possession of Owner or others, which are to remain, whether occupied or unoccupied during this work.
- .2 Make good damage to such structures resulting from work under this Section at no cost to Owner. Make good adjacent building surfaces damaged by work of this Section.

## 1.9 PROTECTION OF SERVICES AND STRUCTURES

- .1 Take necessary precautions to guard against movement, settlement or collapse of existing adjacent utility services, public property and/or structures, whether to remain or not. If these or other unforeseen conditions develop, take immediate emergency measures, report to Consultant, confirm in writing, and await instructions before proceeding with any further related demolition work.
- .2 Prior to saw cutting or core drilling of existing concrete slabs, use ground penetrating radar (GPR) to detect utilities and structural reinforcing. Concrete X-Rays can be used when access to both sides of concrete slab is accessible for placement of required x-ray film.

## 1.10 EXISTING SERVICES

- .1 Prior to start of demolition disconnect all electrical and telephone service lines in the areas to be demolished. Post warning signs on all electrical lines and equipment which must remain energized to serve other areas during period of demolition. Disconnect electrical and telephone service lines in demolition areas to the requirements of local authority having jurisdiction.
- .2 In each case, notify the affected utility company in advance and obtain approval where required before commencing with the work on main services.
- .3 Arrange with utility companies for locating of such services and for disconnection of existing services owned by utility companies and which will be disconnected by said utility companies, provided such services do not interfere with adjacent tenancy operators.
- .4 Remove sewer and water lines where required within existing building as deemed necessary, and cap to prevent leakage, in accordance with authorities having jurisdiction.
- .5 Existing services are to be maintained where required for normal tenant operation during regular hours of operation and/or as deemed necessary by Owner.

## 1.11 EXISTING WARRANTIES

- .1 Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

2 Products

**2.1 DEBRIS, SALVAGED MATERIAL AND EQUIPMENT DISPOSAL**

- .1 All materials and or equipment salvaged from demolition work becomes property of demolition Contractor unless designated otherwise.
- .2 At no cost to Owner repair or replace material and/or equipment scheduled to remain which is damaged by demolition work. Do not sell any salvaged material or equipment directly from project site.
- .3 Remove waste debris continually and entirely from project site during demolition work. Do not load vehicles transporting such debris beyond their safe capacity or in a manner which might cause spillage on public or private property. If spillage does occur, clean up immediately to prevent traffic hazards or nuisance.

**2.2 PROTECTION**

- .1 Temporary Protection:
  - .1 Erect temporary hoarding protection, as indicated in Section 01 56 00, to enclose openings in exterior walls, and/or provide security to partially occupied interior spaces.
  - .2 Erect temporary dust screens, as indicated in Section 01 50 00 – Temporary Facilities and Controls, to prevent dust and debris to enter areas of the building which are not scheduled for demolition. Remove temporary dust screens when no longer required.

**2.3 REPAIR MATERIALS**

- .1 Use repair materials identical to existing materials:
  - .1 If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
  - .2 Use a material whose installed performance equals or surpasses that of existing material.
  - .3 Comply with material and installation requirements specified in individual Specification Sections.
- .2 Floor Patching and Levelling Compounds: Cement based, trowelable, self-levelling compounds compatible with specified floor finishes; gypsum-based products are not acceptable for work of this Section.
- .3 Concrete Unit Masonry: Lightweight concrete masonry units, and mortar, cut and trimmed to fit existing opening to be filled. Provide standard hollow core units, square end units and bond beam units as indicated on drawings.
- .4 Brick: Install brick and mortar, cut and trimmed to fit existing opening to be filled, once demolition of hollow metal door and frame is completed. Match brick and mortar to existing adjacent materials as approved by the Consultant. Provide ties and accessories as required to complete the installation.
- .5 Gypsum Board Patching Compounds: Joint compound to ASTM C475, bedding and finishing types thinned to provide skim coat consistency to patch and prepare existing gypsum board walls ready for new finishes in accordance with Section 09 21 16 – Gypsum Wallboard.
- .6 Fireproofing: Patch and repair all fireproofing damaged during demolition of adjacent surfaces with compatible fireproofing materials. Provide test reports from fireproofing manufacture warranting installation, adhesion and compatibility between existing and new fireproofing materials.

**2.4 EXISTING MATERIALS**

- .1 Items to be retained for re-use in new construction include, but are not limited to the following:
  - .1 Lockers and cabinets

- .2 Ceiling components
- .3 Confirm with Consultant any materials that appear to be in re-usable condition prior to disposal.
- .4 Confirm with Consultant any materials scheduled for re-use that are not in re-usable condition prior to installation.

### 3 Execution

#### 3.1 GENERAL

- .1 Exercise caution in dismantling, disconnecting of work adjacent to existing work designated to remain.
- .2 Carry out demolition in a manner to cause as little inconvenience to the adjacent properties as possible.
- .3 Carry out demolition in an orderly and careful manner.
- .4 Demolition by explosives is not permitted.
- .5 Selling or burning of materials on site is not permitted.
- .6 Sprinkle exterior debris with water to prevent dust. Do not cause flooding, contaminated run-off or icing. Do not allow waste material, rubbish, and windblown debris to reach and contaminate adjacent properties.
- .7 Lower waste materials in a controlled manner; do not drop or throw materials from heights.
- .8 At end of each day's work, leave in safe condition so that no part is in danger of toppling or falling.

#### 3.2 SAFETY AND SECURITY

- .1 Maintain security of the building at all times during demolition work.
- .2 Provide and maintain fire prevention equipment and alarms accessible during demolition.

#### 3.3 ACCESS ROUTES

- .1 Restrict operations to designated access routes.
- .2 Do not obstruct roads, parking lots, sidewalks, hydrants and the like.

#### 3.4 SELECTIVE DEMOLITION

- .1 Provide necessary shoring and supports to assure safety of structure prior to cutting and coring.
- .2 Where practical, sawcut and remove material as required.
- .3 Where saw cutting is not appropriate, use suitable hand tools.
- .4 Demolish, cut-out and remove from site all other work noted on drawings or required to permit new construction.
- .5 Do not allow water to accumulate or flow beyond work area. Provide receptacles and mop-up as work proceeds.
- .6 Fill all openings in concrete block walls with concrete masonry units, coursing to match existing, prepare ready to receive new finishes to match existing.
  - .1 Provide bond beams in new openings cut into existing concrete masonry unit walls.
  - .2 Provide finished end masonry units to patch and repair for new jamb sections in existing concrete masonry unit walls.
- .7 Fill all openings in gypsum board walls with gypsum board and steel framing to match existing, skim coat to make wall smooth and even.

- .8 Demolish existing flooring and wall finishes, and adhesive remnants as follows:
  - .1 Floor and wall substrate shall be smooth, free from ridges and depressions, and adhesive remnants that could telegraph through new flooring and wall finishes.
- .9 Demolish completely all ceiling panels and grid as indicated.
- .10 Remove all wall coverings scheduled for demolition. Patch and repair wall surfaces with skim coat of gypsum board joint compound leaving wall surfaces smooth and even ready for new wall finishes.
- .11 Patch and repair all walls, floor and ceilings damaged during demolition with material matching adjacent walls, prepare ready for new finishes.
  - .1 Prepare existing surfaces schedule to receive new finish by grinding, filling, over-coating, stripping, washing, etching, shot blasting or other chemical or mechanical means, as required to ensure satisfactory installation of new finish.

### 3.5 PATCHING AND REPAIRING

- .1 Floors and Walls:
  - .1 Where walls or partitions that are demolished extend from one finished area into another, patch and repair floor and wall surfaces in the new space.
  - .2 Provide an level and smooth surface having uniform finish colour, texture, and appearance.
  - .3 Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.
  - .4 Patch with durable seams that are as invisible as possible.
  - .5 Provide materials and comply with installation requirements specified in other Sections of these Specifications.
  - .6 Patch any existing areas adjoining / adjacent to new construction in good workmanship, filling and finishing gaps between finishes to allow new work to blend seamlessly with existing work.
  - .7 Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
  - .8 Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
- .2 Ceilings: patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
- .3 Exterior Walls: Where existing doors and/or windows are schedule to be removed during demolition, patch and repair exterior walls using similar wall construction techniques as adjacent wall construction. Ensure compatibility between insulation, air barrier and vapour retarder, providing continuous air and vapour control and wall R-Value between existing and new construction. Provide exterior and interior finish materials, matching existing adjacent materials, to provide an even-plane surface of uniform appearance.

### 3.6 EXCESSIVE DEMOLITION

- .1 Where excessive demolition occurs, be responsible for cost of replacing such work.
- .2 Consultant shall determine extent of such 'over-demolition' and method of rectification.

### 3.7 COMPLETION

- .1 Leave project site as directed, reasonably clean and presentable, free from above grade debris, any salvaged material and/or equipment except those designated to remain.

- .2 Maintain access to exits clean and free of obstruction during removal of debris.

**END OF SECTION**

1 General

1.1 SUMMARY

- .1 Hazardous materials have been identified as being present in the building; abatement and removal form a part of the Work of the Project.

1.2 REFERENCE STANDARDS

- .1 Environment Canada:
  - .1 Canadian Environmental Protection Act (CEPA)
  - .2 Export and Import of Hazardous Waste Regulations, including amendments
- .2 Health Canada:
  - .1 Material Safety Data Sheets (MSDS)
  - .2 Workplace Hazardous Materials Information System (WHMIS)
- .3 Transport Canada:
  - .1 Transportation of Dangerous Goods Act (TDG)
  - .2 Transportation of Dangerous Goods Regulations, including amendments

1.3 DEFINITIONS

- .1 Dangerous Goods: Product, substance, or organism that is specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4 Workplace Hazardous Materials Information System (WHMIS): Canada wide system designed to give employers and workers information about Hazardous Materials used in workplace. Under WHMIS, information on Hazardous Materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Construction Meeting: Conduct a meeting at Project site, to confirm extent of Hazardous Materials abatement and removal to review Contractor's project requirements, site safety concerns and scheduling requirements and to establish procedures for the following and as listed in the Hazardous Building Materials Inspection and Risk Assessment Report:
  - .1 Asbestos Abatement, Removal and Disposal
  - .2 Lead Removal and Disposal Specification
  - .3 Mercury Removal and Disposal Specification
  - .4 Ozone Depleting Substances Removal and Disposal Specification
  - .5 Polyvinyl-Biphenyl Ballast Removal and Disposal Specification
- .2 Coordination: Coordinate Hazardous Materials work so that work of this Section adheres to criteria indicated in the Hazardous Materials Report prepared by a specialist consultant retained by the Owner and as referenced in the Contract Document.

1.5 EXAMINATION

- .1 Visit and examine the site and note all characteristics and irregularities affecting Work of this Section. Submit a pre-demolition inspection report. Ensure the Owner of premises being inspected is represented at inspection.
- .2 Where appropriate prepare a photographic or video record of existing conditions, particularly of existing work scheduled to remain.
- .3 Where applicable, examine adjacent tenancies not part of the scope of work. Determine extent of protection required to areas and related components not subject to demolition.

#### 1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work of this section in accordance with environmental, fire, health and safety acts, codes and regulations as established by the Authority Having Jurisdiction.
- .2 Qualifications: Provide proof of qualifications when requested by Consultant:
  - .1 Abatement and Removal Personnel: Use contractors, subcontractors or personnel who have specific training and experience with the abatement and removal of Hazardous Materials identified as being present at the project site; train personnel in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
  - .2 Insurance: Use a hazardous materials abatement company that has adequate insurance for performing work of this Section.
  - .3 Equipment: Use equipment, storage containers and other temporary facilities appropriate to the level of risk presented by the Hazardous Materials identified as being present at the project site and that are acceptable to the Authority Having Jurisdiction.

#### 1.7 SITE CONDITIONS

- .1 Hazardous materials identified in the Hazardous Building Materials Inspection and Risk Assessment Report and other related information referenced are for the Contractor's information only and does not represent a warranty by the Consultant of actual site conditions; use of this information is at Contractor's own risk.
- .2 Visit site to become acquainted with site conditions before submitting Bids to derive an opinion on the results of the information presented by the Hazardous Materials Report and the extent of work required to complete the requirements of this Section.
- .3 The Consultant and Owner recognize that conditions indicated in the Hazardous Materials Report actually encountered during construction may differ from the information presented in the Hazardous Materials Report; where this occurs the changed conditions will be administered as a change in accordance with the Contract.

#### 1.8 DELIVERY, STORAGE AND HANDLING

- .1 Storage and Handling Requirements: Store and handle Hazardous Materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines and as follows:
  - .1 Store and handle flammable and combustible materials in accordance with current Fire Code requirements
  - .2 Store Hazardous Materials and wastes in closed and sealed containers
  - .3 Label containers of Hazardous Materials and wastes in accordance with WHMIS
  - .4 Store Hazardous Materials and wastes in containers compatible with that material or waste
  - .5 Segregate incompatible materials and wastes
  - .6 Ensure that different Hazardous Materials or hazardous wastes are not mixed
  - .7 Store Hazardous Materials and wastes in secure storage area with controlled access

- .8 Maintain clear egress from storage area
  - .9 Store Hazardous Materials and wastes in location that will prevent them from spilling into environment
  - .10 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment
  - .11 Maintain inventory of Hazardous Materials and wastes, including product name, quantity, and date when storage began
  - .12 Report spills or accidents immediately to Consultant and submit a written spill report within 24 hours of incident.
- .2 Transportation: Transport Hazardous Materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations and as follows:
- .1 Comply with federal Export and Import of Hazardous Waste Regulations where it is necessary to export hazardous waste to another country
  - .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste
  - .3 Use licensed carrier authorized by provincial authorities to accept subject material
  - .4 Obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material prior to shipping hazardous waste
  - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations
  - .6 Use trained personnel to handle, offer for transport, or transport dangerous goods
  - .7 Provide photocopy of shipping documents and waste manifests to Consultant.
  - .8 Track receipt of completed manifest from consignee after shipping dangerous goods; provide a photocopy of completed manifest to Consultant.
  - .9 Report discharge, emission, or escape of Hazardous Materials immediately to Authority Having Jurisdiction and Consultant; take reasonable measures to control release.
- 2 Products
- 2.1 MATERIALS**
- .1 Provide all temporary facilities, equipment, containers and spill remediation kits required by Authority Having Jurisdiction and as necessary to complete the work of this Section.
  - .2 Provide MSDS in proximity to where materials are being stored; communicate this location to personnel who may have contact with hazardous waste materials.
- 3 Execution
- 3.1 PREPARATION AND REMOVAL**
- .1 Prepare and control hazardous materials removal in accordance with applicable federal and provincial acts, regulations, and guidelines. Have following completed prior to removal:
    - .1 Ensure existing property, including non-removable equipment and furnishings, surfaces and finishes have been protected.
    - .2 Ensure HVAC system is isolated, de-activated and sealed.
    - .3 Electrical system is isolated.



- .4 Place barriers are sealed.
- .2 Remove hazardous materials removal in accordance with applicable federal and provincial acts, regulations, and guidelines.

### 3.2 DISPOSAL

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes where there is approved, cost effective recycling process available.
- .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of Hazardous Materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
- .7 Take necessary precautions to avoid mixing clean and contaminated wastes.
- .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
  - .1 Hazardous wastes recycled in manner constituting disposal
  - .2 Hazardous waste burned for energy recovery
  - .3 Lead acid battery recycling
  - .4 Hazardous wastes with economically recoverable precious metals
  - .5 Additional items identified during the course of the work
- .9 Sequence abatement and removal of Hazardous Materials with [selective] demolition work; complete removal of Hazardous Materials and make areas clean before actual start of demolition activities.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Provide provision of all labour, materials, equipment and incidental services necessary to provide excavating, trenching, backfill and compaction

**1.2 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Coordinate work with utilities Sections for clearances and profiles of trenches for utilities.

**1.3 SUBMITTALS FOR INFORMATION**

- .1 Product Data: For foundation drainage piping and accessories, and for protection sheets.
- .2 Material Test Reports: For each on-site and imported soil material proposed for fill and backfill as follows:
  - .1 Classification according to ASTM D2487.
  - .2 Laboratory compaction curve according to ASTM D1557.
- .3 Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by excavating and backfilling operations. Submit before earth moving begins.
- .4 Qualifications Data: Installer.

**1.4 QUALITY ASSURANCE**

- .1 Installer Qualifications: Company specializing in performing the work of this section with minimum five years continuous documented experience on projects of similar scope and size.
- .2 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 401, Construction Specification for Trenching, Backfilling, and Compacting.
  - .2 OPSS 1004, Material Specification for Aggregates - Miscellaneous
  - .3 OPSS 1010, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

**1.5 REGULATORY REQUIREMENTS**

- .1 Excavation must be carried out in accordance with the Occupational Health and Safety Act and Regulations for Construction Projects
- .2 Perform excavation work to in accordance with local authorities having jurisdiction.
- .3 Conform to Ministry of Environment and Municipal regulations for removal and disposal of excavated materials off site. Apply, pay for and obtain permits, pay fees and submit declarations associated with disposal of excavated materials.

**1.6 SITE CONDITIONS**

- .1 Location Of Existing Buried Utilities
  - .1 Existing utilities and structures indicated on the drawings are schematic only. Actual size, depth, and location must be determined by site locates and test excavation.
- .2 Prior to commencing any excavation work, notify applicable authorities, and establish location and status of use of buried utilities and structures. Engage authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.
- .3 Confirm locations of buried utilities by careful test excavations.

- .4 Conduct, with Consultant, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey benchmarks and monuments which may be affected by work.

## 1.7 GEOTECHNICAL SITE INVESTIGATION REPORT

- .1 Review in detail geotechnical site investigation report. Information given in Geotechnical Site Investigation Report was obtained for use of Owner in execution of design. It is presented in good faith to assist Contractor. No guarantee is made as to its detailed accuracy.

## 1.8 STORAGE, DELIVERY, HANDLING AND PROTECTION

- .1 Stockpile materials in designated areas. Stockpile topsoil and each type of fill material separately to prevent integration. Stockpile granular materials so as to prevent segregation.
- .2 Keep surrounding roads free of soil deposits from material hauling trucks. Load trucks carefully to prevent spillage and wind drift.
- .3 To protect neighbourhood from wind-blown sand and dust, sprinkle with water entire excavated area and stockpiled excavated materials when required.
- .4 Protect adjacent property from damage which may occur from any cause in the performance of the work of this Section.
- .5 Do not interfere with use of adjacent buildings.
- .6 Take precautions against movement, settlement or collapse of sidewalks, public services adjoining property and be liable for all damage to same.
- .7 Before commencing work verify location of survey monuments in the areas in which the work is to be executed. Should any of the monuments be disturbed due to the work be responsible for the expenditures incurred in restoring the monuments.
- .8 Take precautions against movement or settlement of existing building. Provide and place bracing and shoring necessary for the safety and support of the structure and execute the work in a manner to prevent movement, settlement, damage or injury caused thereby or resulting therefrom.
- .9 Shoring and Trench Timbering:
  - .1 In addition to requirements of local authorities, carry out in accordance with requirements of the Occupational Health and Safety Act, RSO 1990 C.0.1 and regulations for construction projects, and all other applicable regulations of the Ontario Ministry of Labour. In addition, follow recommendations of the Construction Safety Association brochure, "Shoring and Timbering in Trenches, latest edition", wherever applicable.
- .10 Shoring and Bracing:
  - .1 Erect and maintain necessary shoring and bracing for excavations in a manner that will properly retain banks of excavations and prevent cave-in. Shoring to be erected in a manner that will allow all other work to be carried out while shoring is still in place. Shoring installation shall be entirely clear of footings, foundations, walls or other such work so that it may be removed entirely or in sections when it is no longer required or when directed without causing any damage or injury to structural work that has been completed.

## 2 Products

### 2.1 FILL MATERIAL

- .1 Type 1: Granular A, to OPSS 1010.
- .2 Type 2: Granular B, Type 1, (Engineered Fill), to OPSS 1010.

- .3 Type 3: selected native material from excavation, having moisture content within 3% of optimum value, approved by Consultant for use intended, unfrozen, free from roots, rocks larger than 75mm cinders, ashes, sods, refuse, or other deleterious materials.
- .4 Type 4: clean, coarse concrete sand to CSA A23.1, free from clay, shale, and organic matter.
- .5 Type 5: 20mm, clear crushed stone, to CSA A23.1 (rounded aggregate will not be acceptable).

## 2.2 ACCESSORIES

- .1 Protection Sheets: Filter fabric, water-permeable woven fabric of polypropylene or polyolefin, type acceptable to Consultant.
  - .1 270R by Terrafix Geosynthetics Inc, or approved equivalent.

## 3 Execution

### 3.1 EXAMINATION

- .1 Verify existing conditions before starting work.
- .2 Do not commence excavating and backfilling operations until temporary erosion and sedimentation control measures are in place.
- .3 Do not commence excavating and backfilling operations until preceding surface or layer is approved by geotechnical consultant.
- .4 Excavating:
  - .1 Verify that survey bench mark and intended elevations for the Work are as indicated.
- .5 Backfilling:
  - .1 Verify subdrainage and work to foundation walls has been inspected.
  - .2 Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.
  - .3 Verify structural ability of unsupported walls to support imposed loads by the fill.

### 3.2 PROTECTION

- .1 Provide acceptable temporary protection to structures, utilities, sidewalks, pavements, adjacent natural growth, landscaping, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by excavating and backfilling operations.
- .2 Existing buried utilities and structures:
  - .1 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
  - .2 Where utility lines or structures exist in area of excavation, obtain direction of Consultant before removing or re-routing. Pay costs of such work.
  - .3 Record location of maintained, re-routed and abandoned underground lines.
- .3 Existing buildings and surface features:
  - .1 Protect existing buildings and surface features which may be affected by work from damage while work is in progress. In event of damage, immediately make repair to approval of Consultant.
  - .2 Where excavation necessitates root or branch cutting, do so only as approved by Consultant.
- .4 Excavations
  - .1 Protect bottoms of excavations from softening or freezing.

- .2 Construct banks in accordance with local bylaws.
- .3 Provide adequate protection around bench markers, layout markers, survey markers, and geodetic monuments.
- .4 Effect approved measures to minimize dust as result of this work.
- .5 Do not stockpile excavated material to interfere with site operation or drainage.

### 3.3 SHORING AND BRACING

- .1 Protect excavations to provide safe working conditions, prevent cave-ins and falling loose soil, by shoring, bracing, sheet piling, under pinning or method acceptable Geotechnical Consultant. Design and install protection in accordance with requirements of the Occupational Health and Safety Act and the authority having jurisdiction.
- .2 Underpin adjacent buildings, structures, utilities damaged by excavation work.
- .3 Remove shoring as backfilling operations progress.

### 3.4 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree or plant protection zones.
- .3 Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.5 DE-WATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while work is in progress.
- .2 Submit, for Consultant's review, details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.
- .6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

### 3.6 PREPARATION

- .1 Lines and Levels:
  - .1 Establish property lines, bench marks, main lines, levels and grid lines for the Project. Establish, provide, maintain and protect survey markers and geodetic monuments.
  - .2 Provide, verify, maintain and protect lines, layouts and grades required for excavating and backfilling work.
- .2 Excavating: Notify utility company to remove and relocate utilities.
- .3 Backfilling: Conform to OPSS 401 specifications.
  - .1 Compact subgrade to density requirements for subsequent backfill materials.

- .2 Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural fill and compact to density equal to or greater than requirements for subsequent fill material.
- .3 Scarify and proof roll subgrade surface to a depth of 150 mm to identify soft spots and facilitate bonding of subsequent materials; fill and compact to density equal to or greater than requirements for subsequent fill material.
- .4 Do not commence backfilling until work on foundation walls, drainage and other utilities have been installed, tested and approved.

### 3.7 EXCAVATING

- .1 Excavate subsoil to accommodate building foundations, slabs-on-grade, paving and other items specified or indicated.
- .2 Limit damage to existing grade levels to greatest extent possible.
- .3 Excavate to lines, grades, elevations, dimensions required with sufficient space to permit erection of formwork, shoring, and installation of materials, piping and similar items. Contour subgrade to provide drainage from entire excavated area when possible.
- .4 Extend footings on grade to an elevation capable of sustaining imposed loads of bearing capacity indicated on the Structural Drawings; to a minimum of 1400 mm below final exterior grade, for frost protection, unless otherwise indicated; or unless otherwise to a depth directed by Geotechnical Consultant.
- .5 Excavate to bearing depths required without interfering with 45 degree bearing splay of foundations.
- .6 Unless otherwise directed by Geotechnical Consultant, limit permanent cut and fill slopes to a slope ratio of 1 horizontal to 1 vertical. Use flatter slopes for permanent slopes containing organic or silty soils.
- .7 Subject to requirements of authorities having jurisdiction, provide the following minimum clear working spaces on each side of formwork, unless otherwise pre-approved by the Consultant.
  - .1 150 mm for footings under 300 mm in height.
  - .2 300 mm for walls under 900 mm in height.
  - .3 600 mm for walls over 900 mm in height.
- .8 Trench Excavation: Excavate trenches only as far in advance of pipe laying operations and as safety, traffic and weather conditions permit, and in no case exceeding 30 m. Prior to stopping work on last day of work week, backfill trenches completely; protect trenches and excavations that cannot be backfilled with approved fencing or barricades and flashing lights.
- .9 Grade top perimeter of excavations to prevent surface water from draining into excavation.
- .10 Hand trim excavations free of loose materials and debris.
- .11 Remove lumped subsoil, boulders, and rock up to 0.25 cu m.
- .12 Remove all existing tree roots and stumps.
- .13 Do not disturb soil within branch spread of trees or shrubs designated to remain. Excavating through roots by hand. Cut roots using a sharp axe or saw.
- .14 Notify Consultant of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- .15 Correct areas over excavated areas with fill material and compaction acceptable to Geotechnical Consultant.
- .16 Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity.
- .17 Where required due to unauthorized over-excavation, correct as follows:

- .1 Fill under bearing surfaces and footings with concrete specified for footings.
- .2 Fill under other areas with Type 2 fill, compacted to not less than 100% Standard Proctor Maximum Dry Density (SPMDD).

### 3.8 DISPOSAL OFF SITE

- .1 Dispose of existing fill and till not suitable for backfilling and compaction and as required to accommodate final site configuration; building foundations, slabs-on-grade, paving and other items specified or indicated.

### 3.9 PROOF ROLLING

- .1 Proof roll subgrade soils with a heavy roller; allow for 2 passes in perpendicular directions for a total of a minimum of 4 passes.
- .2 Geotechnical Consultant will review results; proof roll for the Consultant review.
- .3 Soft areas detected/identified by the Geotechnical Consultant will be replaced by approved material compacted to 100% standard Proctor maximum dry density.

### 3.10 BACKFILLING

- .1 Backfilling operations: Conform to OPSS 401 specifications.
- .2 Do not proceed with backfill operations until Consultant has inspected and approved installations.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.
- .5 Prior to placing fill under slabs on grade, compact existing subgrade to obtain same compaction as specified for fill. Remove "soft" material and fill with approved material.
- .6 Prior to installation of foundations, compact existing subgrade to obtain required bearing capacity. Remove "soft" material and fill footing concrete.
- .7 Place backfill material in uniform layers not exceeding 152mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .8 Backfill around services:
  - .1 Place bedding and surround material as specified in fill and compaction schedule.
  - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
  - .3 Place layers simultaneously on both sides of installed work to equalize loading.
  - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
    - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure, and approval is obtained from Consultant.
    - .2 If approved by Consultant, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Consultant.
  - .5 Place material by hand under, around and over installations until 600mm of cover is provided. Dumping material directly on installations will not be permitted.

### 3.11 SITE QUALITY CONTROL

- .1 Testing of materials and compaction will be carried out by testing laboratory designated by the Consultant.
- .2 Frequency of Tests

- .1 Excavated surfaces: when undisturbed excavated surface is being prepared, make a series of 3 tests of surface for each 500m<sup>2</sup> area.
- .2 Fill under floor or other slabs on grade: make 3 tests for every 2 lifts of compacted fill for each 500m<sup>2</sup> area.
- .3 Backfill structural walls: test each different material for approximately each 50m of wall being backfilled, at depth increments of 600mm.
- .4 If, during progress of work, tests indicate fills do not meet specified requirements, remove defective fills, replace and retest at no extra cost.

### 3.12 PROTECTION OF FINISHED WORK

- .1 Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- .2 Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  - .1 Scarify or remove and replace soil material to depth as directed by Consultant; reshape and recompact.

### 3.13 FILL AND COMPACTION SCHEDULE

- .1 Exterior side of perimeter foundation walls: Type 2 fill to subgrade level. Compact to 95% SPMDD in accordance with ASTM D698.
- .2 Under asphalt and concrete paving: Type 2 fill to underside of base course. Compact to 98% SPMDD in accordance with ASTM D698.
- .3 Sub-Base Courses for concrete slabs-on-grade
  - .1 Engineered Fill: Type 2 fill to underside of base course for floor slabs. Compact to 100% SPMDD in accordance with ASTM D698. Refer to Structural Drawings for location and depth.
  - .2 Other sub-base within building area: Type 2 to underside of base course for floor slabs. Compact to 98% SPMDD.
- .4 Base Course for concrete slabs-on-grade
  - .1 Within building area: 152mm Type 1 fill provided by Section 03 30 00 – Cast-in-Place Concrete. Compact to 100% SPMDD.
  - .2 Exterior concrete paving: 152mm Type 1 fill provided by Section 03 30 00 – Cast-in-Place Concrete. Compact to 98% SPMDD.
  - .3 Moisture Barrier: provide 200 mm type 5 clear crushed stone directly below slab on grade vapor barrier.
- .5 Landscape Retaining walls: provide 152mm Type 1 fill below retaining wall, compact to 100% SPMDD. Provide Type 5 fill to subgrade level on high side for minimum 300mm from wall, well compacted. For remainder, use Type 3 fill compacted to 95% SPMDD.
- .6 Underground services:
  - .1 Sanitary and storm sewer pipe, water pipe, and conduit protective cover: cradle half diameter of pipe or conduit using 150mm depth of Type 4 fill. After pipe or conduit is in place, cover with 300mm depth of Type 1 fill.
  - .2 Cable and cable duct bedding and immediate protective cover: cover bottom of trench with 150mm of Type 4 fill. After cables and ducts are in place, side fill ducts with sand up to top of ducts. Tamp around ducts with hand tampers and cover with 150mm of same material.



- .3 Fill above protective cover: in areas within buildings and where paving and walks occur, fill remainder of trench with Type 2 fill. In other areas, fill to subgrade level using Type 3 fill.
- .4 Compaction: compact bedding and immediate protective cover to 100% SPMDD. In areas within buildings and where paving and walks occur, compact remainder of fill to at least 100% SPMDD. In other areas compact remainder of fill to 95% SPMDD.
- .5 Notify Consultant 3 days prior to backfilling of trenches for electrical services.

**END OF SECTION**