

1 General

1.1 **SUMMARY**

.1 Section Includes

- .1 Labour, Products, equipment and services necessary to complete the work of this Section.

1.2 **REFERENCES**

.1 Conform to the latest edition of the following:

- .1 ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
- .2 ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact With Earth or Granular Fill Under Concrete Slabs
- .3 ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact With Soil or Granular Fill Under Concrete Slabs
- .4 CSA-A23.1 - Concrete Materials and Methods of Concrete Construction
- .5 CAN/ULC-S701 - Thermal Insulation, Polystyrene, Boards and Pipe Covering
- .6 OPSS 1010 - Ontario Provincial Standard Specification, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
- .7 MOE - Ministry of the Environment of Ontario

1.3 **LINES AND LEVELS**

.1 Establish lines and elevations based on geodetic benchmarks as shown on Drawings.

OR

- .2 Establish lines and elevations from existing lines and elevations shown on Drawings.
- .3 Have necessary lines and levels established by a registered Ontario land surveyor or a qualified registered Civil Engineer.
- .4 Indicate location of building walls relative to property lines on survey plan.
- .5 Protect and maintain the lines and benchmarks as long as they are required.

1.4 **ACCESS ROAD CLEANING**

- .1 Keep access roads clear of mud, debris and dirt resulting from Work of this section.

1.5 **SUBMITTALS**

- .1 Submit a certificate issued by fill Supplier to substantiate that fill materials are free of contaminants.
- .2 If well pointing is required, submit, in accordance with Section 01 33 00, location of piping layout and depth of penetration below water table, for Consultant's review.

- .3 Submit manufacturer's Product data and mix design information of unshrinkable fill to confirm Product conformance to Specifications.

## 1.6 **GEOTECHNICAL INVESTIGATION**

- .1 Geotechnical investigation of the Site was carried out for the Owner as a guide in design and construction by Forward Engineering & Associates entitled Floor Slab Assessment, City of Toronto King Street Yard, 1116 King Street West, Buildings 8 & 9, Toronto, Ontario dated October 17, 2025, Ref No. G7591. A report and borehole logs on the investigation were prepared and are available in Appendix B1.
- .2 No responsibility is assumed by the Owner or Consultant for the scope, accuracy, or interpretation of the geotechnical investigation report. Soil conditions between boreholes may be at variance with the information shown on the geotechnical investigation report.
- .3 Additional Geotechnical Investigation
  - .1 If any variations or unforeseen subsurface conditions are encountered during construction, the General Contractor shall:
    - .1 Engage an independent geotechnical firm (approved by the Owner) to perform additional investigation and testing as deemed necessary.
    - .2 Bear all costs associated with such investigation and testing.
    - .3 Submit a detailed scope of work for Owner approval, including:
      - .1 Purpose of the investigation
      - .2 Proposed methodology
      - .3 Types of tests to be performed
    - .4 Provide a comprehensive report of findings to the Consultant and Owner for review prior to proceeding with related work.
  - .4 Contaminated Soil and Groundwater: If contaminated or potentially contaminated soil is encountered during excavation, work shall stop immediately, and the Contractor shall notify the Owner and relevant authorities. The Contractor must engage a Qualified Professional to conduct site assessment in accordance with CSA Z768 (Phase I ESA) and CSA Z769 (Phase II ESA) standards, and follow applicable provincial and federal regulations, including CCME Canadian Soil Quality Guidelines. Any required remediation or disposal in accordance with Ontario Regulation 347/558 ,shall be performed by an approved facility or method, with all costs borne by the Contractor. Health and safety measures, including dust control and PPE, must be implemented throughout the process. Additional environmental study and investigation (i.e., Phase I and Phase II Environmental Site Assessments) would generally be required to address these issues. However the finding of a potential issue, if identified by the geotechnical investigation, should be discussed in the report.
  - .5 Be responsible for including in the Work, costs for all conditions identified or inferred in the report, including disposal of contaminated materials, if any, in accordance with MOE regulations.

## 1.7 **QUALITY ASSURANCE**

.1 Testing and Inspection

- .1 Be responsible for granular/soil materials, placing and compaction throughout the Work of this Contract as it progresses and on completion to ensure specified materials, placing and required compaction densities are obtained.
- .2 Provide the following and pay for all associated costs as part of the Contract:
  - .1 Retain an independent, well established and qualified commercial testing agency to,
    - .1 maintain field quality control operations such as compaction tests,
    - .2 perform material testing in the laboratory and prepare test reports and other submittals.
    - .3 check and approval of the Contractor's material placing and compaction Work.
  - .2 Testing agency shall have enough personnel and resources to perform testing in a timely manner.
  - .3 The testing agency personnel shall be qualified and have had experience on projects equal to the complexity of this Project. Upon request from the Owner, submit qualifications of the testing agencies and include their personnel for approval prior to retaining either one of the agencies.
  - .4 The Owner reserves the right to request change in personnel or testing agency at any time.
  - .5 Submit proposed material, including off-site borrow material, to the testing agency for its analysis and report, in sufficient time so as not to delay the progress of the Work. The testing agency shall approve all fill material prior to placement and shall observe placement to ensure lift thickness is as specified.
  - .6 Testing agency shall submit, in duplicate, test report which includes tests, investigations, findings and recommendations to the Contractor and to the Owner, within twenty-four hours of the tests.
  - .7 For field quality control of operations, testing agency shall determine the compaction of material placed and shall conduct the following minimum number of in-place density tests after monitoring the placing and compacting of each lift.
    - .1 For mass filling: One test per lift of fill for each one hundred square metres.
    - .2 Floor subgrade: One test per final lift (subgrade) or fill or backfill within building wall lines, for each five hundred square metres, both after compaction and before slab construction.
    - .3 For trenches: Three tests per lift of trench backfill for each one hundred fifty linear metres.
  - .8 If compaction tests indicate that a layer has not been brought to the required compaction, re-compact the area, prior to placement of additional material, until the required compaction is obtained. If the layer has been covered by a subsequent operation, remove such material before re-compacting the defective layer.

- .3 Submit a testing and inspection program to account for all the items specified above. Submit to the Consultant at pre-construction meeting or prior to start of construction.
- .2 Cementitious backfill materials will be tested for conformance to the Specifications by an independent inspection company selected and paid for by Owner. Tests include the following:
  - .1 Obtaining certification of cements.
  - .2 Cylinder test. Three test cylinders will be taken from initial pour.
- .3 Cooperate with and assist Owner's inspection/testing company's personnel during inspections and tests.
- .4 Remove defective materials and completed work which fails tests and replace as directed by Consultant.
- .5 Where work or materials fail to meet strength requirements as indicated by test results, pay costs of additional inspection and testing required for new replacement work or materials.

1.8 **PROJECT CONDITIONS**

- .1 Cultural Heritage Resources
  - .1 If cultural heritage resources (such as archaeological sites, artifacts, building and structural remains, and/or human burials) are encountered during performance of Work, contact Consultant immediately and suspend Work in immediate area until assessment has been completed by Ministry of Culture, Tourism and Recreation. Perform required measures to mitigate negative impacts on found resources to acceptance of Consultant.
- .2 Protection
  - .1 Existing buried utilities and structures:
    - .1 Prior to commencing excavation, establish locations of existing buried service installations in the construction area. Notify service owners and obtain their approval to work in such areas. Place adequate markers and take protective measures to ensure that no damage is caused under the work of this section. Repair damaged Work as required at no change in Contract Price.
    - .2 Temporarily cover local existing catchbasins and manholes exposed to construction traffic to prevent entry of earth or debris.
  - .2 Excavations:
    - .1 Erect necessary hoardings, guardrails, markers; place temporary warning lights; take all other measures required to ensure that no damage or injury is caused to persons, or damage to property resulting from this Work.
    - .2 Protect excavations and maintain warning devices during construction and during time when Work is closed down for any cause.

.3 Other contracts, existing buildings and surface features:

.1 Protect work of other trades or of other contracts in progress or completed and protect Owner's existing properties, stored Products, services and utilities from damage.

2 Products

2.1 **MATERIALS**

.1 Granular materials - general: New materials conforming to OPSS 1010, free of organic matter, imported from off-site, and sourced from a member of the Aggregate Producers Association of Ontario. Note: The use of slag and recycled aggregates is prohibited.

.1 Backfill: OPSS Granular "B Type I"

.2 Sub-base: OPSS Granular "B Type I"

.3 Base: OPSS Granular "A"

.4 Base under oil impregnated sand: Granular "A"

.5 Underfloor base: OPSS Granular "A" crushed limestone

.2 Select fill: Native excavated site material approved by Consultant and capable of being compacted to required density and free of:

.1 Any vegetable or organic matter and roots

.2 Cinders or ashes

.3 Building debris

.4 Rocks and stones larger than 75 mm

.3 Impervious fill: Fine grain material such as clay.

.4 Drainage channel panels: "Miradrain 6000" by Mirafi or equivalent by Terrafix.

.5 Oil Impregnated Sand Bed

.1 Sand: Imported natural concrete sand having clean, hard, strong, durable uncoated grains free from lumps, soft or flaking particles, shale, clay, organic matter and other deleterious substances.

.2 Oil: Petroleum based (engine) oil, to provide corrosion protection to steel tank bottom.

.6 Drainage weepers, bedding and surround: Plastic pipe by Big-O or approved equivalent, Type 2 - perforated nominal inside diameter, and complete with a seamless and knitted polyester filter fabric sleeve, non-perforated pipe sections as required for collectors, and all fittings required for the work. Clean coarse aggregate conforming to CSA-A23.1, Table 3, Group 1 (20 to 5 mm).

.7 Perimeter foundation insulation: Styrofoam "SM" by Dow Chemical Co. or "Celfort 300" by Owens Corning conforming to CAN/ULC-S701. Use Lepage "PL Premium" adhesive for use in conjunction with installation of perimeter insulation.

- .8 Unshrinkable fill: Ready mixed Product consisting of CSA-A5, Type 10 portland cement, CSA-A363 cementitious hydraulic slag, sand and water proportioned and mixed to produce a stable, self-levelling, controlled density fill with a compressive strength of 0.7 MPa at twenty-eight days. Cement content to be at 50 kg/m<sup>3</sup> of mix.
- .9 Vapour retarder: Minimum 0.25 mm (10 mils) thick sheet membrane conforming to ASTM E1745; Perminator by W.R. Meadows, Stego Wrap Vapor Barrier by Stego Industries or accepted equal.
- .1 Lap tape: 100 mm wide Perminator Tape by W.R. Meadows, Stego Wrap Red Polyethylene Tape or accepted equal.

## 2.2 **STOCKPILING OF GRANULAR MATERIALS**

- .1 Stockpile materials in a manner to prevent segregation.
- .2 Protect materials from contamination.
- .3 Separate different aggregates by strong, full-depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .4 Do not use intermixed or contaminated materials. Remove and dispose of materials rejected by Consultant within forty-eight hours of rejection.
- .5 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

## 3 Execution

### 3.1 **EXCAVATION**

- .1 Remove obstructions (ice and snow) from surfaces to be excavated.
- .2 Perform excavation with proper allowance for subsequent work including shoring, bracing and formwork (sheet piling and underpinning). Excavation shall be clean and clear of loose material and true to size. Underpin as shown on Drawings. Also, refer to geotechnical report.
- .3 Securely shore and brace sides of trenches and excavation exceeding 1.2 m in depth with shoring and bracing extending at least 300 mm above the top of trenches or excavation.
- .4 Do not obstruct flow of surface drainage or natural watercourses.
- .5 Excavate to undisturbed soil, level, free from loose, soft or organic matter, and of design bearing strength.
- .6 Perform excavation at or adjacent to existing structures or foundations in such a way that structures and foundations are not weakened or endangered in any way. Where it is required to excavate adjacent to an existing building, all fill under existing floor slabs must be contained.
- .7 If undisturbed soil or bedrock having the required bearing capacity is not encountered at footing depths indicated, determine the possible additional volume of excavation that will be required and obtain Consultant's instructions in writing to excavate to additional required depth.
- .8 Do not expose shale to weather in excavations and in any case, following inspection, cover with 50 mm of 15 MPa concrete within twelve hours after exposure.

- .9 Fill excavations for building foundations which are, through error, carried below the elevation shown or approved depth, with 15 MPa concrete, or as directed by Consultant, at no increase in Contract Price.
- .10 Notify Geotechnical Engineer when bottom of excavation is reached, and have same inspect excavation prior to resumption of Work.

### 3.2 **DEWATERING**

- .1 Keep excavated areas free from standing water using power operated mechanical equipment.
- .2 Protect open excavations against flooding and damage due to surface run-off.
- .3 Obtain letter of conditional approval from authorities having jurisdiction to dispose of groundwater into sewer drainage system. Apply for water disposal permit.
- .4 Keep excavations and trenches free of water throughout construction period.
- .5 Groundwater removal:
  - .1 Lower groundwater level and maintain at depth below lowest point of excavation to ensure a dry stable surface.
  - .2 Dewater to prevent loss of soil and maintain stability of sides and bottom of excavation and of adjacent structures.
  - .3 Dispose of water in conformance with applicable by-laws and in a manner not detrimental to public and private property, or portion of Work completed, or under construction.
  - .4 Supply and install flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to sewers, water courses or drainage areas in accordance with authorities having jurisdiction. Perform testing on settlement tank discharge to confirm that effluent meets sewer bylaw requirements. Locate tanks to acceptable area determined by Consultant.
- .6 Surface water removal:
  - .1 Remove surface run-off in a manner that will prevent loss of soil and maintain stability of sides and bottom of excavation. Obtain Consultant's approval of dewatering method to be used.
  - .2 Discharge surface water into existing storm drainage system to acceptance of Consultant and local authorities.

### 3.3 **PERIMETER INSULATION**

- .1 Install insulation with spot daub application of adhesive to ensure tight contact to substrate and to prevent displacement during backfilling. Butt joints tight between boards.

### 3.4 **DRAINAGE CHANNEL PANELS**

- .1 Secure channel panels with galvanized stick clips with lock washers in accordance with drainage channel manufacturer's directions. Set clips with adhesive compatible with clip-receiving substrate.
- .2 Trim panels and overlap and interlock same. Cover joints and edges with fabric flap.

**3.5 DRAINAGE WEEPERS**

- .1 Place 100 mm minimum thick granular bedding and tamp to grade.
- .2 Ensure pipe interior and coupling surfaces are clean before laying. Lay pipe with perforations downward. Do not use shims to establish pipe slope. Protect pipe ends from damage and ingress of foreign materials.
- .3 Have Consultant approve installed pipe before placing backfill.
- .4 Place granular surround after pipe installation, 150 mm thick each side and 300 mm minimum over pipe. Place granular material by hand. Consolidate by hand tamping slightly to prevent pipe displacement.
- .5 Backfill balance of excavation with specified granular backfill.

**3.6 BACKFILLING**

- .1 Prior to backfilling, remove loose materials, debris, etc., from excavated areas. Do not place backfill on contaminated (or frozen) ground.
- .2 Do not use backfill material which (is frozen or which) contains ice, snow or debris.
- .3 Place granular material, grade and compact to levels which provide for superimposed work at levels shown.
- .4 Notify Consultant for inspection when backfill is complete to compacted levels indicated on Drawings.
- .5 Place granular backfill in layers not exceeding 200 mm in depth and thoroughly compact. Each layer shall be compacted and accepted before next layer is placed.
- .6 Backfill simultaneously on both sides of walls. Do not backfill until walls have reached their design strength.
- .7 Take necessary precautionary measures during compaction of fill adjacent to foundations, walls, drains, etc., that such items are not displaced from their proper location or damaged by compacting equipment. In the event damage or displacement occurs during filling or resulting from compaction of fill, correct same, to approval of Consultant, and at no increase in Contract Price.
- .8 Place select fill for backfill where shown in layers not exceeding 200 mm, with each layer thoroughly compacted.

**3.7 UNDERFLOOR GRANULAR SUB-BASE**

- .1 Prior to filling, remove loose materials, debris, etc., from areas to be filled. Do not place fill on contaminated (or frozen) ground.
- .2 Do not use fill material which (is frozen or) contains ice, snow or debris.
- .3 Proof roll existing earth sub-grade in order to identify inconsistencies or soft areas.
  - .1 If a soft area is encountered, promptly notify the Consultant and obtain his instructions in writing to rectify the soft area.
  - .2 Proceed with filling operations only after inconsistencies or soft areas have been rectified.

- .4 Place Granular "B" sub-base in loose layers not exceeding 200 mm to a compacted depth of 150 mm terminating as follows except where shown otherwise:
  - .1 For facilities with permanent, watertight enclosure installed prior to placing concrete:
    - .1 Terminate compacted granular sub-base 200 mm below underside of slab. This allows for 150 mm granular base plus 50 mm cushion to absorb bleed water from concrete allowing concrete to dry evenly on both sides.
  - .2 For facilities that are not permanently enclosed with a watertight enclosure prior to pouring concrete:
    - .1 Terminate compacted granular sub-base 150 mm below underside of floor slab.

### 3.8 UNDERFLOOR GRANULAR BASE

- .1 Prior to filling, remove loose materials, debris, etc. from areas to be filled. Do not place fill on contaminated (or frozen) ground.
- .2 Do not use fill material which (is frozen or) contains ice, snow or debris.
- .3 Proof roll granular sub-base in order to identify inconsistencies or soft areas.
  - .1 If a soft area is encountered, promptly notify the Consultant and obtain his instructions in writing to rectify the soft area.
  - .2 Proceed with filling operations only after inconsistencies or soft areas have been rectified.
  - .3 Place Granular "A" crushed limestone base to a compacted thickness of 150 mm in loose layers not exceeding 200 mm.

### 3.9 VAPOUR RETARDER

- .1 Ensure that granular surface is smooth and free of sharp projections that could puncture vapour retarder.
- .2 Place vapour retarder under floor slabs to receive epoxy, urethane and floor finishes installed with adhesive and thin set mortar:
  - .1 Install vapour retarder in accordance with ASTM E1643 and as specified.
  - .2 Ensure there are no discontinuities in vapour retarder at seams and penetrations.
  - .3 Unroll with the longest dimensions parallel with the direction of concrete placement.
  - .4 Join sections of vapour retarder and seal penetrations in vapour retarder with mastic tape. Ensure vapour retarder surfaces to receive mastic tape are clean and dry.
  - .5 Ensure there is no moisture entrapment by vapour retarder due to rainfall or ground water intrusion.
  - .6 Immediately repair holes in vapour retarder with self-adhesive repair tape.
  - .7 Seal around pipes and other penetrations in vapour retarder with pipe boots in accordance with manufacturer's instructions.

- .8 Protect vapour retarder from damage during installation of reinforcing steel and utilities and during placement of concrete slab or granular materials.
- .9 Immediately repair damaged vapour retarder in accordance with manufacturer's instructions.
- .3 Vapour Retarder Location
  - .1 If the structure is enclosed with a permanent, watertight enclosure prior to concrete placing, place a 50 mm compacted thickness of granular limestone screenings cushion on top of vapour retarder to underside of floor slab.
  - .2 If the structure is not enclosed with a permanent, watertight enclosure prior to concrete placing, place the vapour retarder directly under the floor slab. Do not use cushion method.
  - .3 In any case, extend vapour retarder 1 m into areas without vapour retarder.

3.10 **UNSHRINKABLE FILL**

- .1 Use at locations indicated (or where work area is too limited to permit proper granular material placing and compaction operations.)
- .2 Discharge fluid backfill directly from ready mix truck to points of usage. Place in uniform lifts and simultaneously on both sides of members being backfilled to equalize loading.
- .3 Consolidate fill with vibrators.
- .4 If piping occurs in area being backfilled, coordinate with pipe installer to ensure disturbance of pipe alignment during backfilling is prevented.
- .5 Use temporary plates to support traffic loads over cementitious fill.

3.11 **COMPACTION**

- .1 Use compaction equipment capable of obtaining required material densities.
- .2 Compaction Densities
  - .1 Granular materials: To 98% Standard Proctor Maximum Dry Density (SPMDD) in accordance with ASTM D698.
  - .2 Earth fill and earth subgrade: To 95% Standard Proctor Maximum Dry Density (SPMDD) in accordance with ASTM D698.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 In areas not accessible to rolling equipment, compact to specified density with power operated portable plate compactors.
- .6 Depth and layers specified are minimum dimensions of fill after compaction, except where loose layer is specified.
- .7 Ensure compaction operations do not cause vibration and noise levels exceeding acceptable limits established by authorities having jurisdiction.

3.12 **PROTECTION OF FILL AND BACKFILL**

- .1 Protect filled and backfilled areas against damage from any cause.

3.13      **DISPOSAL OF SURPLUS MATERIALS**

**.1      *Ensure environmental tracking requirements and fill is disposed of legally and in accordance with City's environmental requirements and regulations.***

.2      Remove from the site and legally dispose of excess excavated material, waste material, trash, debris and rubble.

.3      Obtain and pay for all necessary regulatory approvals, consents and permits for disposal of surplus material.

OR

.4      Deposit and spread excess excavated material on site where shown on Drawings.

End of Section

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