PART 1 - GENERAL

1.1. Description

1. General Requirements:
    1. Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2. Work Included

1. Provide all labour, materials, tools, services and incidentals to do concrete unit paving work required and/or indicated on the Drawings and specified herein.

2. Related Work Specified Elsewhere:

Section 02200	:	Earthworks
Section 03301	:	Concrete Work

1.3. Quality Assurance

1. Subcontractor/Contractor Qualifications: work of this section shall be executed by an installer having at least five (5) years of satisfactory experience in concrete and paving work.

2. Tolerances:

    1. Finished pavement shall be smooth, true to lines and level, and free form depressions grades and cross-sections shown on plans, to ensure positive drainage at all outlets and channels and deviate by more than 6mm from a 3 meter straight edge laid in any direction.

    2. Permissible variation in precast concrete paver thickness (height) 1.5mm. Note that this is a variance from CSA A231.2-95 (R2005).

1.4. Submittals

1. Samples:

    1. Submit samples for consultant's approval.

    2. Submit samples of standard unit pavers for each size of paver and colour. Provide samples until final unconditional Consultant's approval is obtained. Work shall match approved production run samples.

2. Inspection Company Reports: Submit Inspection Company reports specified under Field Quality Control.

    1. Permissible variation in precast concrete paver thickness (height) 1.5mm. Note that this is a variance from CSA A231.2-95 (R2005).

1.5. Testing

1. Arrange for material testing and compaction tests of subgrade and granular base courses.
2. Refer to Section 02200, Earthworks, for extent of testing and inspection of subgrade.

1.6. Inspection

1. Confirm that grade elevations are correct and substrata properly compacted.

2. Arrange for inspection by the Consultant of Granular Base Courses before commencement of Concrete Unit Paving.

3. Obtain confirmation from inspection and testing company specified in Section 01400 Quality Control.

4. Make adjustments where necessary.

1.7. Warranty / Guaranty

1. Correct and repair all defects resulting from faulty materials and/or workmanship, submitting written guaranty and warranty for two-year period from date of substantial performance.

2. Warranty shall be against all defects or failures of Concrete Unit Paving.

3. Warranty shall include an agreement to make good promptly and defects or failures, which occur or become apparent within the warranty period.

1.8. Maintenance

1. Maintain all work until acceptance of all project work.

2. Immediately remedy all defects to completed work, which occur during the maintenance period.

3. Refill joints and re-compact pavers and adjust for level and alignment when necessary.

PART 2 - PRODUCTS

2.1. Granular Base Courses

1. Refer to structural drawings.

2.2. Bedding Sand

1. Sand shall be a clean, well-graded, non-plastic sand with the following grading requirements:

A.S. SIEVE	% PASSING
9.52mm	100
4.75mm	95-100
2.36mm	80-100
1.18mm	50-85
0.6mm	25-60
0.3mm	10-30
0.15mm	5-15
0.075mm	0-10

2.3. Jointing Sand

1. Be a clean sand material passing a 1.18 sieve and contain some 10% of silty material.

2.4. Pavers

1. Pavers shall be supplied complete with normal side and end stones and shall be 80mm thick unless otherwise detailed.

2. Pavers shall be free of efflorescence, have a compressive strength of greater than 8,000 psi, a water absorption maximum of less than 5% and a freeze-thaw resistance equal to CSA A82.2-1967 or Section 8 of ASTM C67-73.

PART 3 - EXECUTION

3.1. Site Preparation

1. After approval of layout excavate to the minimum specified depth as detailed.

2. Compact sub-grade uniformly to minimum 98% Standard Proctor Density.

3. Arrange for inspection of sub-grade to Consultant’s approval.

3.2. Base Courses

1. Refer to and follow the requirements of structural drawings.

2. Install base course to the minimum specified depth obtained after compaction.

3. Compact granular base course to minimum Standard Proctor Density specified.

4. Maintain final level of base course parallel to finished grade of paving.

5. Arrange for consultant's review prior to commencement of unit paving work.

3.3. Setting Bed

1. Install sand uniformly over approved granular base to a depth higher than specified, to allow for compaction after pavers have been installed. The bedding thickness may not exceed the specified depth.

2. The depth, detailed on drawings, shall be obtained after compacting pavers into place.

3. Use a straight edge to obtain a uniform level, parallel to finished grade.

4. Have a uniform moisture content when spread and within a range of 4% to 8%.

5. Protect screened bedding sand from any precompaction, including from rainfall.

6. Reinstall bedding sand that has been precompacted.

3.4. Pavers

1. Install pavers in a 'herringbone' pattern with closely butted joints, at 2mm to 3mm or as detailed, and to the approved pattern. Butt lugs where applicable.

2. Install a sample panel of approximately 10 square meters, as specified, and have this area inspected by the Consultant.

3. Adjust and rectify sample until approved.

4. All work shall conform to approved sample panel.

5. Install pavers true to line and level. Start from edge and do not disturb setting bed. Do not install damaged pavers and immediately remove from site.

6. Abut an edge restraint with the first row. Lay all full units first.

7. Install pavers true to line and grade.

8. When adjustment of paving units is necessary avoid premature compaction of bedding.

9. After installation of pavers, compact with vibrating tamper or roller, until firmly embedded. Compact immediately after laying stones and prior to any traffic.

10. Do not compact within 1 meter of laying face. Continue compaction until lipping has been eliminated between adjoining units.

11. All work within one meter of laying face must be fully compacted at the completion of each day's laying. Remove any unit damaged during compaction.

12. After vibrating fill joints with clean, fine, natural masonry sand.

13. Only full or half pavers (cut across the width) are acceptable.

3.5. Filling Joints

1. Immediately after compaction and prior to termination of work on that day and prior to any traffic, have joints sanded and filled.

2. Spread joint sand on surface and broom to fill in joints.

3. Remove excess sand and compact with no less than two passes with the plate vibrator.

4. Allow traffic on joints after filling of joints.

5. Make up joint sand as it settles within the joint until joint is entirely filled.

3.6. Protection After Completion

1. Protect and maintain completed paving from time of installation until acceptance of work.

2. Keep areas clean and neat at all times.

3. Be responsible for and make good all damages to concrete unit paving.

END OF SECTION 02783

PART 1 - GENERAL

1.1. Description

1. General Requirements:
    1. Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.
2. Work performed by other Sections and which is related to this Section is specified in:
    1. Section 09250: Gypsum Board & Steel Studs
    2. Division 15: Mechanical
    3. Division 16: Electrical

1.2. System Description

1. Tolerances:
    1. Install ceilings within 1/8” of dimensioned height above floor unless approved otherwise, and level within a maximum tolerance of 1/8” in 10’-0”.
    2. Install framing members to ensure that deflection of each member does not exceed 1/360 of its span under dead load and loads imposed by mechanical and electrical equipment and fixtures supported by the ceiling.

1.3. Quality Assurance

1. Subcontractor Qualifications:
    1. Install acoustical ceilings specified in this Section only by a Subcontractor who has adequate equipment and skilled mechanics to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least five years.
    2. Ensure that mechanics have full knowledge of specified systems and requirements of jurisdictional authorities.
2. Requirements of Regulatory Agencies:
    1. Install only materials which have been tested, by testing laboratories acceptable to jurisdictional authorities, to ensure that restrictions imposed by the authorities are met.
    2. Install ceilings that serve as fire protective membranes exactly as specified in Underwriter’s Laboratories test design specification that validates specified rating. Verify, before installation of ceiling, that installations specified in other Sections, as a part of the entire assembly, are installed to meet validating specification for a ceiling-floor or a ceiling-roof assembly, whichever is applicable.

1.4. Submittals

1. Samples:
    1. Submit two samples of each specified acoustical board and exposed grid material.
2. Affidavits:
    1. Submit two copies of affidavits to verify that ceiling meets fire protective requirements.

1.5. Delivery, Storage And Handling

1. Deliver finish materials in unopened packaging provided by manufacturer.
2. Store materials in protected dry area.
3. Ensure that finish metal members are not bent, dented or otherwise deformed.

1.6. Site Conditions

1. Install acoustical ceilings only in areas closed and protected against weather, and maintained at no less than 10 deg. C.
2. Do not install acoustical ceilings in any area unless satisfied that construction in place has dried out, and that no further installation of damp materials is contemplated.

PART 2 - PRODUCTS

2.1. Materials

1. Accessories:
    1. Fabricate miscellaneous clips, splicers, connectors, screws, and other standard accessories of steel, zinc coated or cadmium plated, of strength and design compatible with suspension methods and system specified. Include special accessories required to provide a complete assembly of acoustical ceilings.
2. Hangers:
    1. Galvanized annealed steel wire:
        1. 12 ga. to support a maximum weight of 150 pounds per hanger
        2. #9 ga. to support a maximum weight of 310 pounds per hanger.
    2. Galvanized annealed steel rod: 3/16” dia. to support a maximum weight of 500 pounds per hanger.
3. Hanger Anchoring Devices:
    1. Phillips Red Head by Phillips Drill Company of Canada Limited, Thornhill, Ontario:
        1. SW-3822 wedge anchor with tie wire insert for use in composite concrete and steel deck.
        2. SKI-3822 for use in steel floor deck, with screw eye bolts to suit inserts.
4. Exposed Tee Ceiling Grid System:
    1. Rockfon: Chicago Metallic 200 Snap Grid 15/16” om #01 factory finish.
    2. Two directional, 24” x 48” x 15/16”.
    3. Main Beams: Hot dipped galvanized bulb tees, Intermediate Duty.
    4. Cross Tees: Hot dipped galvanized bulb tees, Intermediate Duty, to interlock with main beams.
    5. Wall Moulding: Angle section to match tees.
    6. Finish: White baked polyester paint.

5. Acoustical Units
    1. Acoustic Units:
        1. Type: Lay-in panels.
        2. Manufacturer: 24”x48”x5/8” Rockfon “Rockfon Education Standard"
        3. LRV=0.86, NRC=0.55
        4. Colour: White
        5. Edge: Square

PART 3 - EXECUTION

3.1. Examination

1. Ensure that environmental conditions and installations preceding that of this Section are satisfactory, and will permit compliance with the quality and dimensions required of acoustical ceilings.
2. Verify that installations by other Sections which are a part of an underwriter specification for a fire rated protective assembly have been done in accordance with that specification.

3.2. Installation

1. Install metal ceiling suspension system to meet specified requirements of ASTM Specification C636.
2. Coordinate installation of acoustical ceiling systems in this Section with that of other Sections. Ensure that adequate preparation is made for attachment of hangers and fasteners. Install framing for support and incorporation of flush-mounted and recessed service components. Ensure adequacy of supports by consultation and verification of methods and locations of installations specified in Divisions 15 and 16.
3. Install hanger anchoring devices in appropriately drilled holes in composite concrete and metal deck.
4. Screw apply hanger anchoring devices to concrete floor deck.
5. Do not use through the roof hangers.
6. Space hangers for supporting grid at 4’-0” maximum centres each way, and to suit structure and ceiling system. Secure hangers to structure by a permanent method as approved. Secure wire hangers to framing by bending sharply upward and wrapping securely with three turns. Install hangers free of kinks and at no more than 5 degrees off vertical. Install extra hangers at each corner of lighting fixtures, and reinforce other ceiling equipment with hangers.
7. Install the entire hanger and suspension grid to adequately support the ceiling assembly, including services incorporated, with a maximum specified deflection for each component member, and free from horizontal movement.
8. Support recessed lighting fixtures independently from ceiling framing system. Install supports in accordance with UL test design specification validating system.

9. Lay out ceilings with acoustic units evenly spaced in each area, with grid lines symmetrical about room axes, columns and service elements, and with maximum border widths of equal dimensions on opposite sides of areas, or as indicated on reflected ceiling plans. Provide angle mouldings to match exposed grid where ceilings abut walls or other vertical surfaces.
10. Frame around recessed fixtures, diffusers, grilles and openings.
11. Maintain true surface planes, and component and joint lines throughout each area.
12. Butt joints between components tightly together.
13. Install grid system ceilings as specified by the manufacturer of the system. Ensure that methods of installation used are acceptable to the manufacturer of each system component and to Consultant.
14. Brace system to maintain alignment of grid.
15. Install acoustical panels in exposed tee system. Cut panels neatly to fit off-module grid and with sufficient clearances to ensure removal without damage.
16. Do not install acoustical units with broken or marred edges exposed to view.
17. Install hold-down clips at each panel. Adapt installation to provide ceiling access where required for services.
18. Mark access panels in unobtrusive manner.
19. Provide expansion joints in ceiling where required.

3.3. Adjustment And Cleaning

1. Clean soiled or discoloured surfaces of exposed ceiling surfaces on completion of ceiling installation.
2. Replace components, which are visibly damaged, marred or uncleanable.
3. Final cleaning is specified in Section 01700.

3.4. Extra Stock

1. Provide four sealed cartons of each specified acoustical board for Owner’s use. Deliver to him as he directs.

END OF SECTION 09510

PART 1 - GENERAL

1.1. Description

1. General Requirements:
    1. Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2. References

1. "ASTM" and ''EN'' (International Standards).
2. ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
3. ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
4. ASTM F2170-11 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes,
5. ISO EN660-2 Abrasion Resistance
6. ASTM F1913 Specification for Sheet Vinyl Floor Covering without Backing (Homogeneous)
7. CSA A126.1-M1984 Vinyl Composition Floor Tile.

1.3. Product Data

1. Submit manufacturer's product literature describing specified products, including their technical and physical properties.

1.4. Samples

1. Submit duplicate samples in accordance with section – Submittal Procedures.
2. Submit full size tiles and 12" lengths of base.

1.5. Quality Assurance

1. Flooring installer shall have five (5) years of documented experience installing resilient tile flooring.
2. Provide proof of experience at request of Consultant.

1.6. Subfloor Conditions

1. Ensure that surfaces to receive tile are flat within the specified tolerance, or if no tolerance specified, within a conventional flatness tolerance of no more than a 12 mm gap when measured with a 3000 mm straightedge.
2. Conduct bond and concrete moisture tests to ensure that substrate moisture content is within the manufacturer's prescribed limits.
3. Moisture content of concrete shall not exceed 8lbs/85% RH by weigh, as determined using the procedures of both ASTM F1869 and ASTM F2170.
4. Test procedures and results shall be recorded and submitted to Consultant prior to commencement of flooring installation.

5. Do not proceed with the work until detrimental conditions have been corrected; test results are consistent with flooring manufacturer's requirements.
6. Commencement of the installation shall be deemed to be acceptance of the conditions. After commencement of the work the Contractor shall be fully responsible for its satisfactory performance in accordance with the specifications.

1.7. Mock-up

1. Provide mock-up of typical room for each floor covering product specified, in accordance with requirements.
2. Include floor pattern as directed by Consultant.
3. Allow 48 hours to review of mock-up by Consultant.
4. Accepted mock-up may form part of finished Work.

1.8. Delivery, Storage And Handling

1. Deliver and store packaged materials in original containers with manufacture's seal and labels intact.
2. Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness. Store rolled goods on end.
3. Maintain temperature of store room at a minimum of 20°C for at least 48 hours immediately before installation.

1.9. Closeout Submittals

1. Provide maintenance data for resilient flooring for incorporation into manual specified in Section – Closeout Submittals.

1.10. Extra Materials

1. Provide extra materials of resilient sheet flooring and adhesives in accordance with Section – Closeout Submittals.
2. Provide a 2% of each colour, pattern and type flooring material required for project for maintenance use.
3. Extra materials to be in one piece and from same production run as installed materials.
4. Clearly identify each roll of sheet flooring and each container of adhesive.
5. Deliver to Consultant, upon completion of the work of this section.
6. Store where directed by Consultant.

1.11. Environmental Requirements

1. Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during and 48 hours after installation.
2. Do not start installation of materials until moisture tests indicate that all surfaces are properly cured and ready for covering.

PART 2 - PRODUCTS

2.1. Indoor Air Quality Requirements

1. Provide resilient sheet flooring products, accessories and adhesives that are certified as meeting the CDHP 01350 (Collaboration High Performance Schools) requirements.

2.2. Vinyl Composite Tile

1. To meet requirements of CSA A126.1, Type A, 3mm thick, 300mm x 300mm, colours selected by H.O.P.A. from manufacturer's standard range; Standard Excelor – Imperial by Armstrong or approved equivalent. Allow for two colours.

2.3. Rubber Base

1. Vinyl Wall Base, 4" Cove, Type TV by Flexco colour selected by H.O.P.A. from standard range.

2. Provide preformed corners at all inside and outside corners.

2.4. Primers, Adhesives, and Fillers

1. As recommended by the manufacturer of each flooring material for each subfloor condition.

PART 3 - EXECUTION

3.1. Examination

1. Test substrate to ensure that moisture level and acid-alkali balance does not exceed limits recommended by adhesive manufacturer.

2. Ensure that environmental conditions have been provided as requested and specified.

3. Clean existing concrete floor. Fill cracks and holes with cementitious grout.

4. Provide new skim coat under all resilient flooring. Material to be suitable for existing conditions.

5. Defective resilient flooring resulting from application to unsatisfactory surfaces will be considered the responsibility of this Section.

3.2. Installation

1. General:
    1. Lay each material in accordance with manufacturer's specification.
    2. Lay flooring with joints closely butted. Scribe, cut and fit around floor outlets and openings, door frames and heavy equipment supports.
    3. Cut flooring and bases to fit within 0.4 mm of abutting surfaces where exposed to view.
    4. Avoid abrupt variations in shades between adjacent flooring material. Do not install units that are off-colour or contain untypical pattern variations.

5. Carry floor patterns through openings.
6. Roll flooring with three sections, 45 kg. roller, in two directions from centre of area.
7. Maintain rollers clean and polished.

2. Adhesive:
    1. Apply adhesive uniformly over surfaces with a notched trowel, at rate recommended by manufacturer.
    2. Cover only an area into which flooring can be set during working time of adhesive: do not lay flooring over hardened adhesive.
    3. Use only waterproof type adhesive in all areas where plumbing fixtures or floor drains are installed.
    4. Protect adjacent surfaces from soil by adhesive.
    5. Clean trowels and maintain profile of notches as installation of flooring progresses to ensure a constant rate of application.
3. Resilient Tile Flooring:
    1. Lay tile with joints on room axes.
    2. Lay tile in square pattern with grain of all units running in same direction.
    3. Lay out tile so that perimeter units are at least one half tile in width except where room irregularities make it impossible.
    4. See Floor Finish Plan for patterns.
    5. Install steel edge strips at junctions of resilient flooring and concrete floors which are to remain exposed. Provide galvanized divider strip along joints of quarry tile.
4. Resilient Bases:
    1. Install bases in lengths as long as possible. Do not make up runs of short lengths.
    2. In areas where bases are indicated, install them on built-in fitments, columns, walls. Include for bases on lab furniture after delivery.
    3. Cut and miter internal corners.
    4. Double cut seams between adjoining lengths.
    5. Apply adhesive to wall, masked to prevent spreading above base, and firmly bed base in place.
    6. Press top set base down to force cove against flooring.
    7. Provide sealant where base adjoins dissimilar materials such as floor, walls, frames, mitres, etc.
5. Reducer Strips:
    1. Install strips at terminations of flooring where edges are exposed to view.
    2. Install strip in straight lines and relate their terminations to significant building features, and within a tolerance of 3 mm in 3 m.
    3. Install strips under doors at openings.
    4. Cut and fit strip terminations to profile of abutting construction.

5. Secure strips to subfloor with contact bond adhesive to ensure complete bond.

3.3. Adjustment, Cleaning, Sealing, and Waxing

1. Replace defective resilient flooring installations so that there is no discernible variation in appearance between installed and replaced materials.
2. Clean off excess adhesive as installation of flooring progresses and before it sets.
3. Clean resilient flooring, but no sooner than 48 hours following installation. Use neutral floor cleaner where required, and proceed as recommended by manufacturer.

3.4. Protection

1. After materials have set, and until Project completion, coordinate with other Section to ensure that floors are not damaged by traffic. Ensure that flooring is not subjected to any static loading during the week following installation.
2. At completion of flooring installation, install floor protection in areas where finishing operations, repairs and installation of equipment, and foot traffic will occur. Lap joints of material by 150 mm and seal with non-asphaltic tape.

3.5. Extra Stock

1. Deliver to Owner on completion of Project construction, and as he directs, 2% of each material and colour, in labelled packages.

END OF SECTION 09650