

TABLE OF CONTENTS

List of Specifications

00 01 10 – Table of Contents 1

Division 01 – General Requirements

01 00 00 – General Requirements 10
01 11 00 – Summary of Work..... 8

Division 32 – Exterior Improvement

32 12 16 – Asphalt Paving 7
32 12 18 – Pavement Line Marking..... 2
32 16 00 – Concrete Curbs, Gutters, and Sidewalks 5
32 18 23.01 – Artificial Turf – Playground 13
32 18 23.02 – Artificial Turf – Kindergarten Area 12
32 31 00 – Chain Link Fence and Gate 5
32 92 00 – Sodding 7

Drawings Drawing Title

D1 – 2024 Pavement Rehabilitation and Site Improvement Site Plan 1
D2 – 2024 Pavement Rehabilitation and Site Improvement Site Plan 1
D3 – Chain Link Fence Layout Detail 1
D4 – Concrete Turf Anchor Curb Layout Detail 1
D5 – Artificial Turf Layout and Drainage Details 1
D6 – Concrete curb and Artificial Turf Granular Structure detail 1
D7 – Chain Link Fence Detail 1
2AC09 – Sub Drain Detail 1
2AC10 – Catch Basin Frost Treatment Detail..... 1
2AC13B – Steel Bollard Detail..... 1
2CR05 – New Sidewalk/Slab Details 1
OPSD 400-020 – Catch Basin Frame and Grate Detail 1
OPSD 401-010 – Manhole Cover Detail 1

Appendix

Kindergarten Play Area Pictures 2

END OF SECTION 00 01 10

PART 1 - GENERAL

1.01 DEFINITIONS

- .1 "Contract" means the Contract Documents referred to in the Articles of Agreement.
- .2 "Contractor", or pronoun in place thereof, means the individual, group, or company identified in the Agreement that has undertaken to perform the Work of the Contract.
- .3 "Consultant" means Rimkus Consulting Group Canada Inc., entity engaged by Owner to prepare the Contract Documents and provide administration of Contract.
- .4 "Day" means calendar day. "Working day" means days other than Sundays and holidays which are observed by the construction industry at the Place of the Work.
- .5 "Other Contractor" means any person or firm or corporation employed by or having a Contract directly or indirectly with the Owner other than through the Contractor.
- .6 "Owner" means Hamilton-Wentworth District School Board.
- .7 "Subcontractor" includes any individual, group, or company having a contract for performance of a part or parts of the Work included in the Contract, or an individual, group, or company furnishing Product called for in the Contract and worked to special design according to the Contract Documents, but does not include one who merely supplies materials not so worked.
- .8 "Work" includes, subject only to expressed stipulations in the Contract to the contrary, everything that is necessary to be done, furnished, or delivered by the Contractor and by those for whom he is responsible, to perform the Work of the Contract.
- .9 "Drawings" includes all design drawings and shop drawings.
- .10 "Shop Drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the work.

1.02 DOCUMENTS REQUIRED

- .1 Maintain and keep at least one copy of current Contract Documents in good order at Place of the Work, available to Owner and Consultant, including:
 - .1 Issued Specifications and Drawings.
 - .2 Issued Addenda.
 - .3 Shop Drawings.
 - .4 Approved Work Schedule.
 - .5 Applicable Construction Permits.
 - .6 Change Orders and Change Directives.
 - .7 Supplemental Instructions or Field Orders.

- .8 Other modifications to Contract.
- .9 Field Observations and Testing Reports.

1.03 OWNERSHIP OF DRAWINGS AND MODELS

- .1 All Drawings, Specifications, and copies thereof and all models furnished by the Consultant are and shall remain his property, and are not to be used on other work. If the Consultant so requests, all such Drawings, Specifications, and models, except for the signed Contract set of Drawings and Specifications, shall be returned upon completion of the Work.

1.04 FEES, TAXES, PERMITS AND CERTIFICATES

- .1 Pay applicable Federal, Provincial and Municipal taxes.
- .2 Provide authorities having jurisdiction with information when requested.
- .3 Pay fees and obtain certificates and permits.
- .4 Furnish certificates and permits when requested.

1.05 SAMPLES

- .1 Submit for review, samples in duplicate, unless otherwise specified, as requested in respective specification Sections.
- .2 Identify manufacturer's name and product.
- .3 Deliver samples pre-paid to Consultant's business address.
- .4 Notify Consultant in writing at the time of submission of deviations in samples from the requirements of the Contract Documents.
- .5 Adjustments made of samples by the Consultant are not intended to change the Contract Price. If adjustments affect the value of work, state in writing to Consultant prior to proceeding with the work.
- .6 Make changes in the samples which the Consultant may require, consistent with Contract Documents.
- .7 Installed work shall match reviewed and approved samples.

1.06 WORK SCHEDULE

- .1 Provide project schedule within 10 business days after award of Contract, showing anticipated dates for progress stages and final completion of the Work.
- .2 Interim review of work progress based on work schedule will be conducted as decided by the Consultant and schedule updated by Contractor in conjunction with and to approval of the Consultant.
- .3 Coordinate all schedules with Owner and/or Consultant to suit Owner's occupancy and usage requirements.

1.07 CONTRACTOR'S USE OF SITE

- .1 Work to be carried out Monday through , 8:00 a.m. until 6:00 p.m – as per Hamilton Bylaw regulations., unless otherwise approved by Owner.
- .2 This is an occupied site and normal operations must be maintained during the work. Take proper care to avoid unnecessary noise, clatter or obstruction in the walkways, sidewalks, and roadways. Do not interfere with the use or safe passage to and from the building and adjacent public sidewalks and roads. Do not unreasonably encumber site with materials or equipment. Where excessive noise or obstruction is in certain instances unavoidable, advise Owner and Consultant ahead of time and make suitable arrangements.
- .3 Site office and Parking is allowed on site during July and August. If the project extends parking would need to be coordinated by the contractor. HWDSB will not pay for parking. Provide and pay for additional parking, if required.
- .4 Ensure that privileges presently accruing to adjacent properties are maintained.
- .5 Access and egress from site to be as per prescribed routes only. Provide and arrange for traffic control where necessary for delivery of materials, removal of garbage, etc. as required by Owner and Consultant and as required by the laws, ordinances, rules and regulations relating to the Work.
- .6 Storage:
 - .1 Use of site for storage of materials and equipment will be at a location acceptable to the Owner. Location of site storage provision for removal of debris must be coordinated with Owner and Consultant. Obtain and pay for use of additional storage of work areas needed for operations.
 - .2 Do not store materials or use trucks, cranes, hoists, or other equipment in a manner which would load the existing building structure beyond its design capacity.
 - .3 Provide adequate weather tight sheds or trailers for storage of materials, tools and equipment which are subject to damage by weather.
 - .4 Move stored products or equipment which interfere with operations of Owner or other Contractors.
- .7 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 project work which may require road user response.
- .8 Sanitary Facilities:
 - .1 Provide on-site washroom facilities on ground level only. Contractor will not have access to building washrooms.
 - .2 Maintain facilities in clean condition.
 - .3 Workers will not be permitted to use any other sanitary facilities, intended for use of public or building personnel.

- .4 On-site washroom facilities should be locked when contractor is not on site to prevent vandalism.
- .9 No signs or advertisements other than warning signs are permitted on site unless approved in advance by Owner or Consultant.

1.08 COORDINATION AND COOPERATION

- .1 Coordinate all construction work with Owner and Consultant to obtain access to work areas.
- .2 Coordinate all construction work with Sub-Contractor when work is related.
- .3 Adhere to approved schedule as closely as possible so that proper pre-arranged access can be arranged.
- .4 Execute work with minimum disturbance to occupants, public, and normal use of site and building.
- .5 Maintain access and exits.
- .6 Where security has been reduced by work of Contract, provide temporary means to maintain security.

1.09 PROJECT MEETINGS

- .1 Hold bi-weekly project meetings as requested by Owner and/or Consultant.
- .2 Notify all concerned parties of meetings.
- .3 Additional meetings may be held at various intervals during course of the Work. Contractor and Subcontractors concerned to be present at these meetings.
- .4 Record meetings and distribute to all parties within 3 days of meeting. Include in minutes all significant proceedings, decisions and identify action by appropriate party.

1.10 SETTING OUT OF WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines, and elevations indicated.
- .2 Provide devices needed to layout and construct work.
- .3 Supply such devices as straight edges and templates required to facilitate Consultant's inspection of the Work.

1.11 EXISTING SERVICES

- .1 Prior to commencing any excavation work, notify Owner and utility authorities, establish location, and state of use of buried services. Clearly mark such locations to prevent disturbance during work.
- .2 Provide 72 hours notice and submit schedule to, and obtain approval from, Owner and Consultant for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.

- .3 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities encountered. Where unknown services are encountered, immediately advise Owner and Consultant, and confirm findings in writing.
- .4 Record locations of maintained, re-routed, and abandoned service lines.

1.12 EXECUTION OF WORK

- .1 Execute work with least possible interference or disturbance to occupants, public and normal use of premises, roadways, parking areas, sidewalks, alleys, or passageways. Arrange with Consultant to facilitate execution of the Work.
- .2 Contractor to maintain heavy vehicle construction traffic control during period of Contract. All heavy vehicles will be restricted to heavy duty roadways surrounding site and to be brought onto light duty parking area pavements only when absolutely necessary. Heavy vehicles to proceed onto light duty pavement taking shortest route possible to their destination and leave by same general route. All turning by heavy vehicles will be done so at maximum possible turning radius.
- .3 Provide all protection necessary or as required by local by-laws, including but not limited to, hoarding, covered walkways, guard rails, barriers, night lights, sidewalk or curb protection, and warning notices in locations where renovation and alteration work is adjacent to areas used by building occupants or public.
- .4 Take all necessary precautions to keep dust, and dirt to an acceptable level as directed by Owner and Consultant. Contractor shall also comply with laws, ordinances, rules, and regulations relating to the Work in connection with above.
- .5 Where work is performed adjacent to air intakes, Owner and Consultant must be notified so that appropriate measures can be taken.
- .6 Protect exterior surfaces of building and grounds from debris and damage.
- .7 Protect adjacent property and buildings against damage which may occur as a result of the Work. Make good, to satisfaction of the Owner and Consultant, any damage resulting from the Work of this Contract.

1.13 ADDITIONAL DRAWINGS

- .1 Consultant may furnish additional drawings to assist proper execution of work. These drawings will be issued for clarification only. Such drawings shall have same meaning and intent as if they were included with plans referred to in Contract Documents.
- .2 Perform the Work in accordance with such additional instructions. Contractor shall do no additional work without written instructions from Consultant.

1.14 WASTE DISPOSAL

- .1 Provide for storage and removal of garbage as a result of work and obtain approval of storage location(s) from Owner and Consultant prior to commencement of the Work.
- .2 Disposal of debris and garbage daily with minimum disturbance to Owner and occupants.

1.15 QUALITY CONTROL

- .1 Provide Consultant with date each phase of work will begin, 48 hours before commencing work.
- .2 Inspections shall be performed by Rimkus. Provide assistance required for execution of inspection and testing.
- .3 Copies of inspection and testing reports to be issued to prime Contractor and Owner.
- .4 Contractor to cooperate with Consultant to facilitate inspection and documentation of existing substrate and details throughout demolition work.
- .5 Correct defects and irregularities at no additional cost to Owner.
- .6 When initial tests and inspections reveal work not to Contract Requirements, pay for tests and inspections required by Consultant on corrected work.

1.16 PROTECTION AND RESTITUTION

- .1 Provide all required hoisting equipment for removal of debris and for movement and placing of materials and equipment during construction. Debris chutes shall be totally enclosed and inclined, with watering down facilities as necessary to control dust, fire hazards, and nuisance factors. Exercise extreme care in disposal of wash water. Contractor will protect all work from damage from any cause. Contractor responsible for damage caused to Others or their equipment.
- .2 Contractor to replace damaged work at no additional cost to Owner. Any damage caused by hoisting equipment or operator to be made good to satisfaction of Owner and Consultant.
- .3 Contractor will protect all underground services on this site as well as curbing, grass, trees, landscaping and poles or wires located on this or adjoining properties. Contractor is solely responsible for obtaining all service clearances prior to any excavation. Construction drawings and specifications for site must not be used for locating any services. Provide and maintain temporary ladders required to perform the Work. Ladders to be strongly constructed and to comply with all requirements of safety authorities having jurisdiction over the Work. All ladders to be secured and used only by methods approved by Authorities.
- .4 Contractor to make good at his own expense any damage to items identified in Section .3 to satisfaction of Owner.
- .5 Contractor will repair all damage immediately. If repairs are not completed within a reasonable length of time, Owner may, at his discretion, serve Contractor with written notice to complete repairs. If repairs have not been completed within 24 hours of delivery of the written notice Owner may engage an outside contractor to complete repairs. Contractor will allow repairs to damage and will not interfere in any manner with repairs. Contractor will be responsible for cost of all damage repairs including cost and overhead of Consultant related to rectification of damage.
- .6 It must be noted that construction equipment will likely be heaviest loading that existing pavement will be subjected to, and therefore, caution must be taken to prevent damage to existing pavement during all rehabilitation operations.

- .7 If at any time, in opinion of Owner or Consultant, damage is being done or is likely to be done to any roadway or other pavement structures at site, including such sections which are part of the rehabilitation work, by Contractor's vehicles or other equipment, whether licensed or unlicensed, Contractor to at direction of Owner and at Contractor's expense, make immediate changes in or substitutions for such vehicles or other equipment in order to remove cause of such damage to satisfaction of Owner or Appointed Representative, and at no additional cost to Owner.

1.17 ON-SITE CONSTRUCTION FOREMAN OR SUPERINTENDENT

- .1 Contractor to have on-site a full-time construction foreman or superintendent to direct and supervise the Work, arrange traffic control, and ensure compliance with Contract.
- .2 Position of site superintendent or construction foreman may not be delegated to a subcontractor without prior consent of Owner. Work may be halted, and contractor will be liable for any extra site review and testing costs, if delays occur because of insufficient supervision.
- .3 If site superintendent or foreman is changed, written confirmation is to be sent to consultant and owner.

1.18 TEMPORARY FACILITIES AND SERVICES

- .1 Provide and maintain temporary facilities to carry out the Work.
- .2 Provide and maintain sanitary facilities to be used by Contractor's forces.
- .3 Remove temporary facilities and services on completion of the Work.

1.19 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures, and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures, and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access, and maintenance.
- .3 Inform Consultant of impeding installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

1.20 FIRE PREVENTION

- .1 No open burning to be permitted within any construction at the site.
- .2 Provide and maintain temporary fire protection equipment during performance of the Work required by insurance companies having jurisdiction and governing codes, regulations, and bylaws. Provide a 20 lb. dry chemical fire extinguisher fully charged and in operable condition at all locations where open flames are used.
- .3 Keep site free of waste materials, rubbish, and debris.

1.21 SMOKING ENVIRONMENT

- .1 Smoking, vaping, drugs, and alcohol usage are not permitted on site. Anyone seen doing this will be removed from the property and not allowed back.

1.22 OCCUPATIONAL HEALTH AND SAFETY

- .1 Conform to safe work practices in accordance with regulations and authorities having jurisdiction.
- .2 Promptly report to Owner and Consultant all accidents or if any claim is made against Contractor or Subcontractor on account of accident.
- .3 Provide at site, equipment to supply first aid.
- .4 Enforce proper work methods and act immediately on directions regarding safety and work practices given by authorities having jurisdiction or Owner, at no additional cost to Owner.
- .5 Maintain on-site a copy of latest edition of Occupational Health and Safety Act (OHSA) and Regulations for Construction Projects.
- .6 Failure of Contractor to comply with verbal or written instructions or orders from Ministry of Labour inspector or other authorities as well as Owner or Consultant regarding safe work practices or provision of specified requirements under OHSA to be considered non-compliance with Contract.
- .7 Ensure that all personnel are adequately equipped to comply with safety regulations and that sufficient safety equipment is available.

1.23 TEMPORARY POWER AND WATER

- .1 Coordinate with Consultant and Owner for use of temporary power and water supply.
- .2 Provide any necessary special wiring for lights, equipment, etc.
- .3 Owner will pay for all utility charges.
- .4 Temporary power distribution wiring to comply with Ontario Hydro Electrical Safety Code and local authorities. Obtain inspection certificates for temporary electrical work.

1.24 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

- .1 Contractor to be familiar with WHMIS regulations and be responsible for compliance.
- .2 Controlled products to be properly labelled.
- .3 Provide proper warning labels and training at workplace.
- .4 Provide copies of Safety Data Sheets (SDS) for any controlled Product in workplace.
- .5 Be responsible for all other requirements of regulations as applicable to Owner.
- .6 Contractor to, before commencing work, provide Owner with a proposal on how hazardous materials will be stored and dispensed on-site. Specifically outline measures to be taken to prevent damage or injury in event of an accidental spill.

1.25 CLEANING

- .1 Maintain project free of accumulated waste and rubbish. Disposal of debris and garbage to be on a shift basis with minimum disturbance to Owner and tenants. Under no circumstances shall debris be allowed to accumulate on-site. All debris and construction waste should be removed by end of each working day.
- .2 Final cleaning:
 - .1 Remove temporary protection.
 - .2 Remove dust, dirt, and foreign matter from surfaces.
 - .3 Broom clean paved exterior surfaces.
- .3 Contractor's parking areas, storage areas, and access routes between work areas and aforementioned areas to be as defined by Owner and be strictly adhered to.
- .4 At end of project, landscaping to be restored to match pre-existing conditions.

1.26 MATERIALS SPECIFICATIONS

- .1 All materials will be supplied and placed in accordance with applicable sections of Specifications.

1.27 INSPECTION TESTING AND MIX DESIGNS

- .1 Contractor will employ services of testing company during entire construction period, and testing is to be carried under the cash allowance of the contractor. Contractor will co-operate with Consultant on site and provide any data or information requested by Consultant.
- .2 Where required by Owner, Contractor to supply copies of tests of all materials to be used in performance of the Work, indicating that Products conform to Specifications. Testing to be conducted by a Canadian Testing Association approved testing company at Contractor's expense.
- .3 Upon request a copy of proposed Portland Cement concrete and Asphalt Concrete mix design(s) to be supplied to Consultant prior to start of placement. Under no circumstances will any Portland cement concrete or Asphalt concrete be placed until proposed mix design(s) are reviewed and accepted for use.
- .4 Quality control tests on works, such as concrete and compaction tests, asphalt extraction tests, etc., to be carried out by testing company representative. Any retesting to verify quality of work or previous test results to be carried out at Contractor's expense. Contractor to co-operate with Consultant on site and provide access to shop, plant, or site areas where the Work is to be inspected.

1.28 LINES LEVELS AND GRADES

- .1 Contractor to employ at his own expense a qualified person or persons who shall establish all necessary lines, elevations, and grades, and shall erect required batter boards and sight lines. Latter shall be placed so as to be undisturbed during excavation operations, and subsequent construction.

- .2 Contractor to be responsible for accuracy of all lines and levels of the Work, as built and in accordance therewith. For further certainty, Contractor must ensure that all new paved areas are positively drained and that no excessive ponds form.
- .3 Consultant may at any time, check lines, elevations, grades, and reference marks, batter boards, etc., set by person employed by Contractor, and Contractor shall correct any errors in lines, elevations, grades, reference marks, batter boards, etc. Such a check shall not be construed to be an approval of Contractor's work and shall not relieve Contractor of responsibility for accurate construction of entire work. Contractor's surveyor to provide grade sheets to Consultant on site during construction upon request.

END OF SECTION 01 00 00

PART 1 - GENERAL

1.01 SECTION INCLUDES

- .1 Contractor's use of premises.
- .2 Owner occupancy.
- .3 Scope of Work.
- .4 Contractor submissions prior to construction for approval

1.02 CONTRACTOR'S USE OF PREMISES

- .1 Contractor to limit use of premises for work, for storage, and access.
- .2 Coordinate use of premises under direction of Owner and Consultant.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

1.03 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.04 CONTRACTOR SUBMISSIONS PRIOR TO CONSTRUCTION FOR APPROVAL:

- .1 Phasing plan for the rehabilitation work.
- .2 Itemized project schedule (Gantt chart) coinciding with the phasing plan.

1.05 SCOPE OF WORK:

- .1 **Construction field testing Allowance:**
 - .1 An allowance is provided for obtaining third-party quality assurance testing and inspections of all materials placed on site. Allowance is to include for preparation of a report detailing testing and results, which will be submitted to consultant. The contractor is responsible for coordinating and scheduling testing company to do all necessary asphalt, concrete, compaction, and proof roll testing as per standard requirements. Work performed under this item will be paid upon submission of testing company invoice, no over heads will be paid on top of the invoice amount. Refer #D1.
- .2 **General Items (Mobilization/demobilization & Fencing):**
 - .1 Mobilization and demobilization of all tools, materials, and labour required to perform the Work as outlined in Specifications. Refer #D1. Specifically, it is expected that Contractor will:

- .1 Go beyond the minimum to ensure safe and proper execution of public routing, including ensuring temporary access to fire exits if and when affected as part of the Work.
- .2 All materials/equipment stored on site to be in a secured area with construction fence. Owner/consultant will not be responsible for any damage, theft or vandalism of contractors property.
- .3 Coordinate all trades to ensure the Work is completed as soon as possible.
- .4 Perform all work in accordance with all Ministry of Labour requirements.
- .5 Install temporary protection at all locations of the Work as required to ensure safe, clean, orderly removal and disposal work, and to provide protection for all property, building components, vehicles, pedestrians, and occupants.
- .6 Apply and pay for all construction permits required to perform and completed the Work.
- .7 Obtain all service and utility locates for private and public services prior to any excavations.
- .8 Dispose of all materials at landfill site authorized by authorities having jurisdiction.
- .9 Accept that weather conditions are considered incidental to the Work and will not be considered additional cost to Bid Price.
- .10 Maintain safe access to city sidewalk at all times with necessary signage to divert pedestrian traffic as per the city requirements.
- .11 Provide all flagman, barriers, and pylons as required to secure work areas and to provide safe access for patrons and pedestrians.
- .12 Perform daily and final clean-up of work areas and surrounding areas of site.
- .13 Include for re-instating site to its original condition or better with the approval of Owner prior to demobilization.
- .2 Installation of temporary free standing metallic fence of minimum 2.0 meter high to enclose the construction area in every phase to protect the safety of pedestrians and property. Refer #D1.
 - .1 No construction work will be allowed to be performed without providing temporary construction fence.
 - .2 All construction fences should be secured in place to withstand localized shocks, winds and other factors.

.3 Asphalt Work (Refer #D1):

- .1 Remove and dispose off site existing asphalt pavement, concrete pad, interlock, base/subbase granular, earth, topsoil, sod in accordance with Section 32 12 16, in the area of rehabilitation and as delineated in #D1 (Approx. 3700 m²). Specifically:
 - .1 Saw cut/mill/excavate/remove 230mm to 250mm thickness of the existing asphalt pavement, base/subbase granular, earth, topsoil, sod and dispose it off-site at an approved location. Site measure and confirm the area to be removed prior to starting work with the Consultant.
 - .2 Dress the existing surface, proof-roll, re-grade, and compact granular material, as directed by the Consultant.
 - .3 It is the responsibility of the contractor to dispose all excavated materials in appropriate locations as per O.Reg 406/19 soil management requirements. Refer to attached soil characteristics and chemical testing.
- .2 Excavate and properly dispose of contaminated or inadequate base and/or subbase and/or subgrade, and to supply and reinstate with new granular material in accordance with Section 32 12 16 (Approx. 1250 m²) (Refer #D1). Specifically:
 - .1 Once the asphalt has been removed and the base material exposed, all areas are to be proof roll under the supervision of an experienced geotechnical engineer. Any visibly soft areas would be considered contaminated or of inadequate base, subbase, and/or subgrade.
 - .2 Remove 300 mm of granular subbase and/or subgrade is to be removed from these areas and properly disposed of off-site.
 - .3 Once areas of full-depth removal are completed, the geotechnical engineer and consultant will review excavated areas to determine if additional removal of contaminated subbase and/or subgrade is required.
 - .4 Supply new 300 mm compacted depth of new Crusher Run Limestone (19mm) consolidated to meet specified densities
- .3 Supply, place and compact 150mm of Crusher Run Limestone (19mm) as base granular and grading in the area of rehabilitation and perform fine grading (Refer #D1). The work should be completed as per OPSS 301 (Approx. 1225 M.T).The contractor has to ensure that:
 - .1 All areas should be re-graded to minimize the necessity for underground drainage system(s), and allow surface water to flow naturally to roads or drainage inlets without excessive concentration.
 - .2 The contractor should always ensure that all areas exhibit positive slope to allow storm water to flow naturally towards the catch basins to minimize puddling/ponding issues.
 - .3 The finished level of any building area shall be designed to ensure a desirable surface grading of 1.5% (1% minimum) oriented in the direction of the drainage system designed to cater for its catchment.

- .4 Remove and dispose off site existing earth, topsoil, sod, base/subbase granular in accordance with Section 32 12 16, in the area of rehabilitation and as delineated in #D1 (Approx. 25 m²). Specifically:
 - .1 Saw cut/mill/excavate/remove existing granular, earth, topsoil, sod, base/subbase and dispose it off-site at an approved location. Site measure and confirm the area to be removed prior to starting work with the Consultant.
 - .2 Dress the existing surface, proof-roll, re-grade, and compact granular material, as directed by the Consultant.
 - .3 It is the responsibility of the contractor to dispose all excavated materials in appropriate locations as per O.Reg 406/19 soil management requirements. Refer to attached soil characteristics and chemical testing.
- .5 Supply, place and compact 100mm of Crusher Run Limestone (19mm) as base granular and grading in the area of rehabilitation and perform fine grading (Refer #D1). The work should be completed as per OPSS 301 (Approx. 8 M.T).The contractor has to ensure that:
 - .1 All areas should be re-graded to minimize the necessity for underground drainage system(s) and allow surface water to flow naturally to roads or drainage inlets without excessive concentration.
 - .2 The contractor should always ensure that all areas exhibit positive slope to allow storm water to flow naturally towards the catch basins to minimize puddling/ponding issues.
 - .3 The finished level of any building area shall be designed to ensure a desirable surface grading of 1.5% (1% minimum) oriented in the direction of the drainage system designed to cater for its catchment.
- .6 Supply, place and compact Binder Course Asphalt, by machine to 50 mm HL8 (light-duty pavement) compacted thickness in accordance with Section 32 12 16 (Refer #D1). The cost should include ramping up the asphalt levels to match existing as needed (Approx. 3725 m²).
- .7 Apply undiluted SS-1 emulsion (tack coat) to all of the surfaces at a rate of 0.5 L/m². Allow the tack coat to dry and place asphalt against the emulsion while it remains "tacky" (Refer #D1). Tack coat to be applied in accordance with Section 32 12 16 (Approx. 3725 m²).
- .8 Supply, place, and compact Surface Course Asphalt, by machine to 40 mm HL3 compacted thickness in accordance with Section 32 12 16 (Approx. 3725 m²). The height of the finished surface course of HL3 asphaltic concrete should be flush with the curb at all curb cuts and surrounding pavement areas (Refer #D1).
- .9 Reinststate all line-markings, symbols, arrows, dividers, and signage in accordance with Section 32 12 18 or according to local bylaw requirements or site-specific variances. The line painting layout will be provided to the contractor during the time of construction (Refer #D1).

.4 Concrete Work (Refer #D1):

- .1 Remove and dispose off the existing concrete pad/sidewalk/structure along with interlock strip and install 150mm thick concrete pad/sidewalk/structure using CSA 32 Mpa (C-2) high early concrete with welded metallic wire mesh as reinforcement placed on 200mm thick compacted granular A. The height of the new concrete pad should match existing. Refer to drawing D1, 2CR05. The cost should also include sodd restoration. The work should be performed as per the direction of the Engineer/Consultant and in accordance with Section 32 16 00.

.5 Asphalt Area Drainage Work (Refer #D5):

- .1 Apply frost treatment of each single catch basin/manhole (6 units) as delineated in Drawing 2AC10, #D5, and as per the item description.
 - .1 The cost to remove and dispose off site existing frame and grate and supply and install new frame and grate as per the provincial standards OPSD 400.020. The cost to Perform Frost Treatment on each new Catch Basin as per Drawing 2AC10.
 - .2 The work for this item will include all labour, equipment and material necessary to raise or lower manhole and/or catch basin frames and covers where required to meet the finished pavement grade. The work will also include the saw cutting, coring, parging and removal and reinstating of the adjacent pavement structure including granular and asphalt along with line paintings around the catch basin/manhole to a distance of 1.2 m away and install sub-drains ringed around and connected to existing catch basins as detailed in Drawing 2AC09 in accordance with Section 32 01 21.
 - .3 The work and cost for this item will also include the replacement of damaged and the installation of new moduloc structures and parging as necessary.
- .2 Adjust the height of the water valve in the area of work to match the new asphalt level. The cost should include all necessary fitting, connections, and replacement of damaged valves as necessary (Refer #D5).
- .3 Raise or lower existing manhole covers and to remove and dispose off-site existing damaged manhole/storm sewer frame and grate and replace it with a new frame and grate as per OPSD 401.010 (to match existing) as necessary. The cost should include adjustment of all moduloc or replacement of damaged to match the new asphalt height including saw-cutting and parging of existing/new moduloc (Refer #D5).

.6 Chain Link Fence Work (Refer #D3):

- .1 Remove and dispose off site existing chain link fence along with foundation and install new 5' fence to match existing layout in accordance with Section 32 31 00. The cost should include supply and installing all necessary line, terminal, corner and gate posts with foundations and fitting, fastens and mesh OPSS Standards. See attached drawing #D3 and #D7. Approx. Length of fence – 215 meters.
- .2 Remove and dispose off site existing chain link fence along with foundation and install new 5' fence to match existing layout in accordance with Section 32 31 00.

The cost should include supply and installing all necessary line, terminal, corner and gate posts with foundations and fitting, fastens and mesh, and OPSS Standards. See attached drawing #D3 and #D7. Approx. Length of fence – 60 meters.

- .3 Remove and dispose off site existing chain link fence gates and replace with new 5' high fence gates in accordance with Section 32 31 00. Total of 4 - 4' wide person gate and 1 - 12' wide maintenance gate (2 x 6' sections). The cost should include all necessary post with foundation, fitting, fasteners, mesh, etc. as per local and OPSS standards. See attached drawing #D3 and #D7.

.7 Playground Artificial Turf Work:

- .1 Sawcut, excavate, and dispose off site existing asphalt pavement and granular to the required depth and supply and install base granular and drainage systems as per drawing D5, D6 & 2AT01. The cost should include supply and installation of all necessary drainpipes, geotextile fabric and other connections as required. The contractor is responsible for calculating the quantities required to complete the work (Approx. 720 m²).
- .2 Install new 150mm wide concrete curb flushed to the surrounding new asphalt/artificial turf level using CSA 32MPa (C-2) concrete with reference to drawing D4, D6 & 2AC07- A. The cost should include installing Nailer boards for turf installation and all necessary excavation, backfilling and curb cuts as required. Approx. 100 meters.
- .3 Install new 300mm wide concrete curb below the fence line flushed to the surrounding sod / artificial turf level using CSA 32MPa (C-2) concrete with reference to drawing D4, D6 & 2AC07- B. The cost should include installing Nailer boards for turf installation and all necessary excavation, backfilling and curb cuts as required. Approx. 20 meters.
- .4 Supply and install playground artificial turf and infill in accordance to section 32 18 23.01. The cost should include supply of all necessary materials, turf structure as per D6-2AT01, and installation as per industry standards. Refer to drawing #D5, D6 & D1. The contractor should make sure not to use discontinued or end of the line products and submit all necessary samples and documents as per Section 32 18 23.01. (Approx. 720 m²)

Note: The contractor is responsible for providing an 8-year warranty period for all work related to Turf Installation including workmanship.

.8 Kindergarten Artificial Turf Work:

- .1 Sawcut, excavate, and dispose off site existing asphalt pavement, granular. Mulch, top soil, sod, bushes, shrubs, subdrains, etc. to the required depth and supply and install base granular and drainage systems as per drawing D5, D6, 2AC07-C, 2AC07-D & 2AT01. The cost should include supply and installation of all necessary drainpipes, geotextile filter fabric and other connections as required. The contractor is responsible for calculating the quantities required to complete the work. The drain layout can be modified to avoid damaging the existing tree root system with prior approval from consultant. (Approx. 300 m²)

- .2 Install new 150mm wide barrier concrete curb below the fence line flushed with new artificial turf level using CSA 32MPa (C-2) concrete with reference to drawing D4, D6 & 2AC07-C. The cost should include all necessary excavation and backfilling and curb cuts as required. Approx. 50 meters.
- .3 Install new 300mm wide barrier concrete curb flushed with new artificial turf level using CSA 32MPa (C-2) concrete with reference to drawing D4, D6 & 2AC07- D. The cost should include installing Nailer boards for turf installation and all necessary excavation and backfilling as required. Approx. 60 meters.
- .4 Supply and install playground artificial turf and shock pad in accordance to section 32 18 23.02. The cost should include supply of all necessary materials, turf structure as per D5, D6, D1, 2AC07-C, 2AC07-D, and necessary installation. The contractor is responsible to install bender boards to secure the turf around existing tree trunks and installation of wooden Nailer board along the perimeter where the turf meets the building. The contractor should make sure not to use discontinued or end of the line products and submit all necessary samples and documents as per Section 32 18 23.02. (Approx. 300 m²)

Note:

1. The contractor is responsible for providing an 8-year warranty period for all work related to Turf Installation including workmanship.
2. Contractor is responsible for taking all measures to avoid any damaged to existing trees and tree root system.

.9 Other Work (Refer #D2):

- .1 Remove and store on site existing blackboard and play structure. Reinstall in the exact same location or at a new location as per the directions of owner after completion of work. Refer #D2.
- .2 Remove and dispose off site existing wooden structure in the kindergarten play area. Refer #D2.
- .3 Remove and dispose off site existing wooden deck, timber curbs, timber logs, and all other items in the kindergarten area as per the directions of the consultant and owner. Refer #D2.
- .4 Remove and reinstall existing bench at a new location as directed by the consultant and owner. The cost should include saw cutting, welding, existing foundation removal, backfill excavated areas with un-shrinkable fill, installing new foundation and all necessary connections. All damaged caused by the contractor during the relocation process should be fixed by the contractor at their own cost. The height of the bench installed should match existing. Refer #D2.
- .5 Remove, store on site existing sign post and signage and install in the exact same location after completion of rehabilitation work. The cost should include all necessary labour, materials and connections required to secure the post in place. Refer #D2.

- .6 Clear all debris and settlement from the existing catch basin in the kindergarten play area using vac-truck. This work should be performed in the presence of consultant before starting any asphalt and turf related work in kindergarten area. Refer #D2.
- .7 Clear all debris and settlement from all existing catch basin in the rehabilitation area using vac-truck. This work should be performed after completion of all asphalt work in the presence of consultant. The cost also includes supplying and placing clear stone for gravity drain catch basin which will be determined after clearing the catch basins. Refer #D2.
- .8 Supply and restore topsoil 300mm and install new sodd all around the rehabilitation area as necessary in accordance to section 32 92 00. The cost should include all excavation, grading, and compaction as necessary to complete the work. Refer #D2.
- .9 Remove and dispose off-site existing steel bollards and install new 8" steel bollards in the exact same location. The cost should include all necessary excavation, foundation, and installation and securing yellow reflective sleeve cover on top of newly installed bollards. See Attached Drawing #D2, #2AC13B.

END OF SECTION 01 11 00

PART 1 - GENERAL

1.01 RELATED SECTIONS

- .1 Not used.

1.02 REFERENCES

- .1 Except where specified otherwise herein, most recent revision of Ontario Provincial Standard Specifications (OPSS) as follows:
 - .1 OPSS 310: Construction Specification for Hot Mix Asphalt.
 - .2 OPSS 341: Construction Specification for Routing and Sealing Cracks in Hot Mix Asphalt Pavement.
 - .3 OPSS 501: Construction Specification For Compacting.
 - .4 OPSS 1010 & OPSS MUNI 1010: Material Specification for Aggregates – Base, Subbase, Select Subgrade, and Backfill Material.
 - .5 OPSS 1103: Material Specification for Emulsified Asphalt.
 - .6 OPSS 1150: Material Specification for Hot Mix Asphalt.
 - .7 OPSS 1212: Material Specification for Hot Poured Rubberized Asphalt Joint Sealing Compound.
- .2 Except where specified otherwise herein, most recent revision of Ministry of Transportation (MTO) test specifications as follows:
 - .1 MTO Standard Test No. LS-602: Sieve Analysis of Aggregates.
 - .2 MTO Standard Test No. LS-264: Theoretical Maximum Relative Density of Bituminous Paving Mixtures.

1.03 PRODUCT DATA

- .1 Submit asphalt concrete mix design to Consultant for review at least 2 weeks in advance.
- .2 Materials to be tested by independent testing laboratory when requested by Consultant or Owner.

1.04 WARRANTY

- .1 Paving work covered by this section must be repaired at no additional cost to Owner for a warranty period of not less than 2 years. Warranty will cover any defects related to material failure or deficient installation procedures, including but not limited to, debonding materials, settlement, and cracking.

PART 2 - PRODUCTS

2.01 MATERIALS

.1 Asphalt cement: Unless otherwise specified, asphalt cement to be PG 58-28.

.2 Granular base and subbase material:

.1 Granular (see table for designation gradations)

.1 New crushed limestone.

.2 To OPSS 1010.

.1 Granular B for subbase.

.2 Granular A (OPSS.MUNI 1010) for base.

.3 Granular M for base dressing prior to asphaltting.

Gradation Requirements Percentage Passing by Mass			
MTO Sieve Designation	Granular A	Granular B Type II	Granular M
150 mm	n/a	100	n/a
37.5 mm	n/a	n/a	n/a
26.5 mm	100	50-100	n/a
19 mm	85-100	n/a	100
13.2 mm	65-90	n/a	75-95
9.5 mm	50-73	n/a	55-80
4.75 mm	35-55	20-55	35-55
1.18 mm	15-40	10-40	15-40
300 um	5-22	5-22	5-22
150 um	n/a	n/a	n/a
75 um	2-8	0-10	2-8

.4 Modifications to percentage passing shall be incorporated for aggregate obtained from an iron blast furnace or from a quarry.

.3 Asphalt cement to OPSS 310.

.4 Sand blotter: Clean granular material passing 4.75 mm sieve and free from organic matter or other deleterious materials.

.1 Asphalt tack coat to OPSS 310, grade SS-1.

.2 Crack Sealant to be hot poured Rubberized Asphalt Joint Sealant compound conforming to OPSS 1212.

.5 All dirt, loose asphalt, and other foreign materials to be removed from cracks using a compressed air lance.

- .6 HMA to meet the Minimum Marshal Stability at 60°C, with an assumed AADT (Annual Average Daily Traffic) greater than 5000 for a:
 - .1 Surface Course: HS (High Stability) – 12,000 N
 - .2 Base Course: 8,000 N

PART 3 - EXECUTION

3.01 PREPARATION

- .1 Verify grades of paving area for conformity with elevations and sections before placing granular base and subbase material.
- .2 Where areas are removed and will tie into existing, provide sawcut full depth of existing, see Joints.
- .3 Immediately following excavation, proof roll exposed subgrade using suitable compaction equipment and place granular materials immediately following compaction of subgrade.

3.02 PROTECTION

- .1 Provide access to buildings as required. Arrange paving schedule so as not to interfere with normal use of premises.
- .2 Protect pedestrians from excavations with appropriate signage.
- .3 Protect bottoms of excavations from softening or freezing. Should softening occur, remove softened soil and replace with Granular B at no additional cost to Owner.
- .4 Promptly remove all excavated material from site. Do not stockpile excavated materials to interfere with traffic flow at the site.
- .5 Take all measures necessary to control dust.
- .6 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38°C. Do not permit stationary loads on pavement until 24 hours after placement.

3.03 SUB- BASE AND GRANULAR BASE

- .1 Excavating:
 - .1 Inform Consultant in advance of excavation operations.
 - .2 Notify Consultant whenever unsuitable materials are encountered in cut sections and remove unsuitable materials to depth and extend directed.
 - .3 Maintain crowns and cross slopes to provide good surface drainage.
 - .4 Where subgrade is on transition from excavation to embankment treat ground slopes as directed by Consultant.
 - .5 Dispose of waste material off project limits at appropriate or approved sites as per O.Reg 406/19.

- .2 Subgrade Fill:
 - .1 Place granular base and sub-base material on clean unfrozen surface, free from snow and ice.
 - .2 Place granular base and sub-base to compacted thicknesses as indicated. Do not place frozen material.
 - .3 Place and compact to full width in uniform layers not exceeding 200 mm loose thickness using OPSS 501 - Construction Specification For Compacting.

3.04 EQUIPMENT

- .1 Pavers: Mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- .2 Rollers: Sufficient number of rollers of type and weight to obtain specified density of compacted mix.
- .3 Vibratory rollers for parking lots and driveways:
 - .1 Minimum drum diameter: 750 mm.
 - .2 Frequency of vibrations of the vibratory roller: Greater than 2,200 vibrations per minute.
 - .3 Equipped with provision for automatic shutoff of vibrations before coming to a stop.
 - .4 Operating speed of steel-drum rollers: Not to exceed 5 km/h and be operated in a manner to avoid undue displacement of mix.
- .4 Haul Trucks: Of sufficient number and adequate size, speed, and condition to ensure orderly and continuous operation and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
 - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
- .5 Suitable hand tools.

3.05 ASPHALT CONCRETE PAVING

- .1 OPSS 310 governs laying of surface course and padding.
- .2 Obtain approval of base and primer from Consultant before placing asphalt mix.
- .3 Place asphalt mix only when base or previous course is dry and air temperature is above 5°C.
- .4 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.

- .5 Do not place hot mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
- .6 Minimum 135°C mix temperature required when spreading.
- .7 Maximum 160°C mix temperature permitted at any time.
- .8 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.
- .9 Compact HMA to density between 92.0 and 97.5 % of maximum relative density (MRD) obtained with specimens prepared in accordance with MTO LS-264. Roll until roller marks are eliminated.
- .10 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.
- .11 Moisten roller wheels with water to prevent pick up of material.
- .12 Compact mix with hot tampers or other equipment approved by Consultant, in areas inaccessible to roller, with sufficient effort to obtain required density.
- .13 Prior to placing any HMA, all HMA and concrete surfaces shall be clean of all loose, broken, and foreign materials. Milled surfaces to be swept with a power broom. Surface of pavement upon which HMA is to be placed to be dry at the time of HMA placement.
 - .1 An HMA course to not be placed on a previously laid course until a minimum 4 hours have elapsed, following final compaction of previous course, and temperature of previous course is 50°C or less.
- .14 Apply undiluted SS-1 emulsion (tack coat) to all prepared milled surfaces at a rate of 0.5 L/m². Allow tack coat to dry and place asphalt against emulsion while it remains “tacky”.
- .15 Spread and strike off mixture with self-propelled mechanical finisher.
 - .1 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.
 - .2 Correct irregularities in alignment left by paver by trimming directly behind machine.
 - .3 Correct irregularities in surface of pavement course directly behind paver. Remove by shovel or lute excess material forming high spots. Fill and smooth indented areas with hot mix. Do not broadcast material over such areas.

3.06 JOINTS

- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.
- .2 Paint contact surfaces of existing structures such as manholes, curbs, or gutters with bituminous material prior to placing adjacent pavement.
- .3 For cold joints, cut back to full depth vertical face and tack face with hot asphalt.

- .4 For multiple lifts of HMA, width of subsequent courses shall be staggered to an offset of 150 to 300 mm so that longitudinal joints do not coincide.
- .5 When resurfacing against a rigid object, a butt joint to be constructed by milling existing pavement to provide an exposed vertical surface of at least 25 mm at face of rigid object. Milling to be feathered out to zero over a minimum length of 1.25 m from and parallel to exposed face of rigid object providing a minimum of 40 mm of resurfacing material over area of removal.
- .6 Joints between HMA pavement laid under this Contract and existing HMA courses not laid under this Contract to be constructed as follows:
 - .1 Where a binder course is placed flush against an existing HMA pavement and a butt joint is to be made, existing pavement to be trimmed back to form a straight vertical surface.
 - .2 Where a surface course is placed flush against an existing HMA pavement, a stepped joint to be prepared by removing the existing surface course to its full depth for a minimum length of 0.5 m and remaining face to be trimmed to form a straight vertical surface.
 - .3 Where a binder course and surface course are not placed flush against an existing HMA pavement, binder course to be feathered out and surface course to be butt jointed by removing existing surface course to a minimum depth of 40 mm and for a longitudinal distance not less than 3 m.

3.07 TOLERANCES AND APPEARANCE

- .1 After final compaction, each course shall be smooth and true to the established crown and grade. HMA binder and surface courses to be free from deviations exceeding 6 and 3 mm, respectively, as measured in any direction with a 3 m long straight edge.
- .2 Each course after final compaction to be of uniform texture and to be free of defects such as segregation, fat spots, oil spills, roller marks, and any other defects. Defective areas to be removed and replaced with HMA of same type and compacted to satisfaction of Consultant.

3.08 INSPECTION AND TESTING

- .1 Inspection and testing of asphalt pavement will be carried out by independent testing laboratory as approved by Consultant or Owner.
- .2 Costs of tests will be paid under testing allowance by Lump sum. Testing invoices to be attached at invoicing with out mark-up. In event of extra site visits and hours of working by testing company to justify with proof of work performed. Any delays, cancellations, and waits to occur due to Contractor change in schedule will be paid by Contractor.
- .3 Asphalt pavement (Binder and Surface Course) to be tested regularly during paving operation for compaction. Testing company to provide compaction test points using site drawing or hand made sketch on company letterhead.
- .4 Testing company site visit dates to match with Contractor schedule or in case of change in schedule a proof of 48 hours notice required by Contractor.

- .5 Testing company days of work to reflect hours on site and millage from office to site.
- .6 Cooperate with Consultant and testing company by scheduling placing and compacting of backfill so tests can be progressively taken. Notice of any required inspection must be given 48 hours in advance.
- .7 Base and subbase course testing to include standard sieve analysis for gradation for each type placed. Random sampling of compacted layers of base courses to be completed using a Nuclear Density Gauge.
- .8 Asphalt laboratory testing to include a standard set of Marshall Property tests for each type of asphaltic concrete placed at site, including one standard sieve analysis for gradation for each Marshall test.
- .9 Field testing of asphalt to include random sampling of compaction using a Nuclear Radiation Backscatter Gauge.
 - .1 If any daily average of compaction test is below specified density, or if any single test falls below 92% of that specified, Contractor must at their own expense have an independent testing agency extract cores for laboratory testing.
 - .2 If tests yield data confirming that compaction did not meet specified densities, deficient asphalt pavement must be replaced at Contractor's expense.
- .10 Obtain approval of subgrade by Consultant before placing granular subbase and base.

3.09 CLEAN UP

- .1 At completion of Work, remove any excess materials, debris, and equipment from site.
- .2 Where perimeter landscaping has been disturbed as a result of asphalt paving work, make good and restore to existing condition.
- .3 All spatter or staining on existing elements as result of asphalt paving work to be removed at Contractor's expense.
 - .1 Contractor to assume responsibility for existing elements and new asphalt where solvents, required to remove spatter and staining, adversely affect elements to be cleaned.

END OF SECTION 32 12 16

PART 1 - GENERAL

1.01 DESCRIPTION

- .1 Work under this section includes all labour, equipment, and material necessary to layout and paint pavement markings.

PART 2 - PRODUCT DATA

2.01 MATERIALS

- .1 Provide written confirmation that materials as installed shall be guaranteed to remain in place for a period of 2 years, while being subjected to traffic and normal summer and winter pavement maintenance procedures.
- .2 Paint: Types as indicated in Master Painters Institute (MPI) Architectural Painting Specification Manual (Code – EXT 2.1A) Latex Zone/Traffic Marking, for painting system specified. All paints to be VOC compliant type paint having Eco Logo certification.

PART 3 - EXECUTION

3.01 EQUIPMENT REQUIREMENTS

- .1 Paint applicator of an approved pressure type distributor capable of applying paint in single and dashed lines and that will ensure uniform application and a positive means of shut-off.

3.02 CONDITION OF SURFACE

- .1 Pavement surface to be free from surface water, frost, ice, dust, oil, grease, and other foreign materials.

3.03 APPLICATION

- .1 Pavement line markings to be laid out by Contractor and approved by Consultant and/or Owner.
- .2 Unless otherwise approved by Consultant apply paint only when air temperature is above 10°C and no rain is forecast. Surface of pavement must be dry and free of dirt, dust, grease, and other contaminants which could be detrimental to bond.
- .3 Apply traffic paint evenly to achieve a dry thickness of 10 to 12 mils. Paint marking shall be fast-dry and not track 10 minutes after application.
- .4 Symbols and letters to conform to dimensions indicated in Uniform Traffic Control Devices of Canada.
- .5 Do not use thinner unless approved by Consultant.
- .6 Unless otherwise directed by consultant, paint lines must be of a uniform line width of 100 mm and of uniform colour and density with sharp edges.

3.04 TOLERANCE / PROTECTION

- .1 Paint markings to be within ± 12 mm of dimensions specified.
- .2 Protect pavement markings until dry.

END OF SECTION 32 12 18

PART 1 - GENERAL

1.01 RELATED SECTIONS

- .1 Section 32 12 16 – Asphalt Paving.

1.02 APPLICABLE PUBLICATIONS

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM D698-12(2021): Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).
- .2 Canadian Standards Association (CSA), most current revision of:
 - .1 CAN/CSA-A23.1: Concrete Materials and Methods of Concrete Construction.
 - .2 CAN/CSA-A23.2: Methods of Test and Standard Practices for Concrete.

1.03 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with local municipal and provincial requirements.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely.

1.04 MATERIAL CERTIFICATION

- .1 Submit to Consultant at least one week prior to concrete placement, concrete mix design data, and certification that materials meet requirements of this section.

PART 2 - PRODUCTS

2.01 MATERIALS

- .1 Concrete for Sidewalks, Curbs, and Paving Slabs:
 - .1 32MPa, 40 +/-20 mm slump, C-2 exposure class, max w/c 0.45, 5-8% air.
- .2 Reinforcing Steel:
 - .1 Deformed “Hi-Bond” grade 400 conforming to CAN/CSA-G30.18, unless indicated otherwise. All bars to have Typical Identification Patterns of Canadian Producers and standard identification requirements as shown in RSIC Manual of Standard Practice.
- .3 Granular Material:
 - .1 Granular “A” conforming to OPSS 314, OPSS 1010 and OPSS MUNI 1010, nominal 20 mm crushed limestone meeting gradation limits of Granular “A”. Reclaimed materials will not be acceptable unless specified otherwise.

- .2 Granular "B" conforming to OPSS 314, OPSS 1010 and OPSS MUNI 1010 nominal 50 mm crushed limestone meeting gradation limits of Granular "B". Reclaimed materials will not be acceptable unless specified otherwise.
- .4 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.

PART 3 - EXECUTION

3.01 GRANULAR BASE

- .1 Obtain Consultant's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated or to match existing.
- .3 Compact granular base to at least 98% of maximum density to ASTM D698.

3.02 PREPARATION

- .1 Obtain Consultant's approval before placing concrete. Provide 48 hours notice prior to placing of concrete.
- .2 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy anchorage; hold dowels in positions until set time has elapsed in accordance with the epoxy manufacturer's specification.
- .3 Equipment and materials capable of maintaining adequate temperature, humidity, and protection to be available on site and be ready for operation when any concrete is placed.
- .4 All dirt, chips, sawdust, water, snow, ice, and other foreign matter must be removed from formed area.
- .5 Prior to placing of concrete obtain Consultant's approval of proposed method for protection of concrete during placing and curing.
- .6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature, and test samples taken.
- .7 Do not place load upon new concrete until authorized by Consultant.

3.03 FORMWORK

- .1 Fabricate and install formwork to provide straight lines and levels, consistent curves, and radii of new concrete.
- .2 Forms to be aligned and fitted to enable new area to match lines and levels of existing adjacent concrete.
- .3 Coat forms with non-staining mineral type form release agent.
- .4 Obtain approval of forms before placing concrete.
- .5 Slip forming may be approved subject to evaluation of mechanical equipment proposed for use.

3.04 CONSTRUCTION

- .1 Perform cast-in-place concrete work in accordance with CAN/CSA-A23.1.
- .2 Placing Concrete:
 - .1 Notify Consultant at least 48 hours before any concreting operation is to proceed, for a review of the preparations.
 - .2 Concrete shall be conveyed to site by methods which will prevent segregation or loss of material. Maximum time between adding mix water and complete discharge into the forms shall be 120 minutes. Exemptions to this time frame shall only be permitted with the approval by Consultant when previously approved chemical additives are used.
 - .3 Conveying and placement equipment to be such that when concreting has started, depositing of concrete shall be at such a rate and of such sequence that concrete is at all times sufficiently plastic to ensure proper bonding of successive batches.
 - .4 Internal vibrators to be applied at point of deposit in areas of freshly placed concrete, allowed to sink by their own weight in concrete until they penetrate into previous layer of concrete. They shall be withdrawn immediately at same rate at which they sank, moved about 300 mm (12") to a new location and repeat process. Extreme care to be taken to ensure that internal type vibrators do not disturb reinforcing steel or forms.
 - .5 Plastic coated vibrators shall be used to consolidate concrete reinforced with epoxy coated bars.
 - .6 Do not place concrete when it is raining or likely to rain. If rain begins after concrete is placed and before it is set, protect with waterproof covers until set.
- .3 Cold Weather Conditions:
 - .1 When air temperature is at or below or forecast to be at or below 5°C, conform to requirements of CAN/CSA A23.1 including, but not limited to following:
 - .1 Job Preparation.
 - .2 Concrete temperature.
 - .3 Concrete Placing.
 - .4 Protection Requirements and Methods.
 - .5 Heated Enclosures.
 - .6 Protective Covers and Insulation.
 - .7 Cooling after protection.
 - .8 Cold-Weather Curing.
 - .2 All materials and equipment needed for adequate protection and curing to be on hand and ready for use before concrete placement has started.

.4 Hot Weather Protection:

- .1 Conform to requirements of CAN/CSA A23.1 and recommendations of ACI Standard 305, Hot Weather Concreting.

3.05 FINISHING

- .1 Finish surfaces to within 3 mm in 3 m as measured with 3 m long straightedge placed on surface.
- .2 Immediately after floating, give sidewalk and patio area surfaces a uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to center line.
- .3 Install sidewalk with panels that create a 1:1 aspect ratio with width. Panels other than Expansion/Contraction and Isolation joints to be created using radius edging tool and a straight edge. Sidewalk panels not to exceed 1500 mm.
- .4 All edges of curbs, sidewalks, and gutters with monolithic curb to receive edging with a 10 mm radius edging tool.
- .5 If ponding occurs after completion, location to be replaced at no additional cost to Owner.
- .6 Follow manufacturer's instructions for coloured and patterned concrete.

3.06 EXPANSION/CONTRACTION AND ISOLATION JOINTS

- .1 Expansion/Contraction and Isolation joints to be constructed by using a single layer of 12 mm asphalt-impregnated fibre board.
- .2 In sidewalks install Expansion/Contraction joint at intervals of 4000 mm. This to occur at location of a sidewalk panel.
- .3 Install isolation joints around manholes, catch basins, and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.

3.07 SAWCUTTING

- .1 Install in curbs and gutters 50 mm deep sawcuts a maximum of 24 hours after placement to mitigate shrinkage cracking.
- .2 Where concrete paving is required to create a patio area, sawcut a square pattern, with a maximum single dimension of 2400 mm. Maintain a 1:1 aspect ratio through field and make up differences at perimeter panels. If perimeter abuts entrances or patio area requires a detailed pattern appearance, request direction from Consultant.
- .3 At all Curbs and Gutters and where a sidewalk is to be sawcut, install sawcut at intervals no greater than 2400 mm
- .4 When sidewalk or patio area is adjacent to curb, make joints of curb, gutters, and sidewalk coincide.

3.08 CURING

- .1 Cure concrete by adding moisture continuously in accordance with CAN/CSA-A23.1 to exposed finished surfaces for at least 72 hours after placing, or sealing moisture in by a curing compound.
- .2 Where burlap is used for moist curing, place two pre-wetted layers on concrete surface and keep continuously wet during curing period.
- .3 Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.

3.09 MATCHING EXISTING

- .1 Where new elements tie into existing ensure levels and lines are maintained.
- .2 If new joint does not act as an Expansion/Contraction or Isolation joint, roughen surface of existing to amplitude of 6 mm.
- .3 Where existing has not been terminated at a location that will be aesthetically acceptable or provide for proper matching, request direction from Consultant.

3.10 BACKFILL

- .1 Allow concrete to cure for a minimum of 3 days prior to backfilling.
- .2 Backfill to designated elevations with suitable material, compact and shape to required contours as indicated or directed.

3.11 INSPECTION AND TESTING

- .1 Inspection and testing of materials will be carried out by independent testing laboratory as approved by Consultant or Owner.
- .2 Notice of any required inspection must be given 48 hours in advance.
- .3 Costs of tests will be paid under testing allowance. Testing invoices to be attached at invoicing with out mark-up.
- .4 Base and subbase material testing will include standard sieve analysis for gradation for each type placed. Random sampling of compacted layers of base courses will be completed using a Nuclear Density Gauge.
- .5 Concrete laboratory testing will include a set of 3 cylinders for strength for each batch of concrete placed at site. Field testing will also include slump and air content for each batch placed.
- .6 Field testing of base materials will include random sampling of compaction using a Nuclear Radiation Gauge.

END OF SECTION 32 16 00

PART 1 - GENERAL

1.01 GENERAL

- .1 All conditions of the Contract and Division 1, General Requirements apply to this section.
- .2 All Product to be new and in perfect condition, free from defects which may impair strength, durability, or appearance.
- .3 Installation of turf should be completed in summer within in the work period. Any delays in turf installation due to long lead time should be coordinated with the consultant and owner.
- .4 Work shall be executed to highest standards of workmanship in industry, by fully trained applicators in strict accordance with printed directions of manufacturer of repair mortars to be used.

1.02 SUMMARY

- .1 Supply and installation of a slit film fiber artificial turf field with a SBR rubber and sand infill,
- .2 Furnish all labour, materials, tools and equipment necessary to install in place all material as indicated on the drawings and as specified. The installation of all new materials shall be performed in strict accordance with the manufacturer's written instruction, and in accordance with all approved shop drawings.
- .3 The contractor shall be fully acquainted with the existing site and shall fully understand the difficulties and restrictions attending the execution of the work under this contract. The contractor shall advise at the time of the bid, any restrictions or anticipated difficulties. Prior to submitting a price for the work, the contractor must seek clarification for any items within the drawings and specifications that may appear to be unclear or conflicting.
- .4 The field to be installed under the Contract shall be used by the Owner for programmed and permitted recreational purposes. Permitting will include recreational leagues, municipal programs, training, practice and teaching schools associated with the use and sport identified for the field.
- .5 The uses and sports will include but not be limited to:
 - .1 Soccer
 - .2 Other general uses such as:
 - .1 Training and exercise
 - .2 Camps or assemblies involving user groups gathered for a programmed and permitted activity.
- .6 In accordance with the unlimited use requirements for the field, the field will be used on a year-round basis.

1.03 APPLICABLE PUBLICATIONS

- .1 Comply with requirements of provincial building code and all local municipal building by-laws and ordinances at Place of the Work.
- .2 Comply with Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 ASTM – American Society for Testing and Materials
- .4 DIN – National Standards in Germany
- .5 CEN (EN) – European Committee for Standardization
- .6 SDS – Safety Data Sheet
- .7 OPSS – Ontario Provincial Standard Specification
- .8 STC – Synthetic Turf Council
- .9 FIFA (2009) – Federation International Football Association Laws of the Game
- .10 CS – Canada Soccer
- .11 OSA – Ontario Soccer Association
- .12 CFL – Canadian Football League
- .13 IRB – International Rugby

1.04 SUBMITTALS FOR REVIEW

- .1 The following may be requested to be submitted prior to award of contract for review.
- .2 Bidder's will be notified during the tender process if these submissions are required.
 - .1 Synthetic Turf:
 - .1 Submit one (1) 300 mm x 300 mm sample without infill properly labelled with turf name and fiber length.
 - .2 Submit one (1) of primary backing complete with specifications (see data sheet at the end of this specification) including construction, elongation at break and percentage of shrinkage.
 - .2 Seam:
 - .1 Submit one (1) sample seam length of 300 mm – sewn or glued.
 - .3 Infill:
 - .1 Submit a 1kg bag of SBR infill including product data sheet and sieve analysis.
 - .2 Submit a 1kg bag of sand infill including product data sheet and sieve analysis.

1.05 SUBMITTALS FOR INFORMATION

- .1 Provide submittals as per Section 01 33 00 – Submittal Procedures
- .2 The following information is to be submitted prior to construction:
 - .1 Provide technical data sheets of the turf system and completed data sheet (available at the end of this specification).
 - .2 Provide a letter certifying that the products that you are offering meet or exceed specified requirements.
 - .3 Provide a resume of the installation supervisor who will be on site during the installation.
 - .4 The manufacturer shall specify in writing that their turf system does not violate any other manufacturer's patents, patents allowed or patents pending.
 - .5 Provide certification that all products and components used for the construction of the artificial infill turf field meets all current Canadian Federal, Provincial and Municipal public health and safety requirements, and that all products and components comply with all current Canadian Federal, Provincial and Municipal environmental legislation, and regulations, and that all material used in the construction of the field are non toxic for the intended uses.
 - .6 Provide a copy of the eight (8) year warranty
- .3 The following information is to be submitted prior to construction:
 - .1 Shop drawings for the turf roll, seam layout, and methods of attachment to the perimeter curb.
 - .2 Laboratory and field testing reports prepared by third party testing agency.
 - .3 A signed letter stating that the planarity of the field is acceptable and that provided field test results relative to the base compaction are acceptable to be provided. (a visual inspection is mandatory by an experienced and qualified artificial turf technician.)
 - .4 Submit to the consultant a report from an independent testing agency stating the lead content, if any, of the synthetic turf fibres.
 - .5 SDS sheets on all individual components of the artificial turf system.

1.06 CLOSEOUT SUBMITTALS

- .1 The Contractor shall provide the following:
 - .1 Three (3) maintenance manuals, including detailed recommended maintenance methods, recommended maintenance schedules, product repair materials, methods of repair and any equipment required to carry out maintenance and repairs. The recommended maintenance methods must describe how to maintain the turf as to ensure that over the lifetime of the warranty any G-Max testing on the field to ASTM F355 procedure A requirements will yield results that will not exceed the requirements noted herein.

- .2 Maintenance instructions to include at minimum, cleaning, paint removal, minor seam repair, dragging or redistribution of any infill materials and management of infill compaction.
- .3 One copy of the eight (8) year manufacturer's warranty covering products and installation. All turf warranties shall be non-prorated, limited to repair or replacement of the affected areas, at the option of the Manufacturer, and shall include all necessary materials, labour, transportation costs, etc. to complete said repairs. The artificial field must maintain an ASTM 355 G-max of between 130 - 160 for the life of the warranty.
- .4 Prior to final acceptance, the Turf Contractor will train the owner's facility maintenance staff in the use of the turf Manufacturer's recommended groomer and maintenance methods required during the warranty. The turf contractor to allow for four (4) hours of training.

1.07 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store products in the original manufacturer's packaging with labels intact.
- .2 Store products where they will be protected from damage.

1.08 QUALITY ASSURANCE

- .1 The Contractor shall employ only qualified, experienced supervisors and technicians skilled in the installation of this system. The Project Superintendent shall have a minimum of five years' experience and ten (10) filled systems.
- .2 The Contractor shall:
 - .1 Shall have demonstrable resources to fully service and warrant the systems installed.
 - .2 Execute work in this Section only by a Contractor who has adequate equipment, skilled tradesmen, and materials to perform it expeditiously and to the specifications and who has at least two similar installations to that specified over the previous three years. Previous installations must have been installed under the same company ownership and with the same skilled workman positions filled with the personnel proposed for this project.

1.09 INSPECTION AND TESTING

- .1 An independent inspection and testing company provided by the Contractor and approved by the Consultant may carry out inspection and testing as required.
- .2 The contractor shall arrange with the inspector and the Consultant for review of construction.
- .3 Prior to delivery of the turf system:
 - .1 The turf product submitted will be tested and evaluated as per the testing data listed in this document. All testing will be provided from an independent testing laboratory. All of the following testing protocols must be done at the source prior artificial turf being shipped.

- .1 ASTM D1335 tuft bind (excluding in-fill).
 - .2 ASTM D1577 method A for min. yarn denier.
 - .3 ASTM D5034 grab tear strength.
 - .4 ASTM D2256 yarn braking strength.
 - .5 ASTM D418 min. pile height
 - .6 ASTM D5848 pile face weight
 - .7 Lisport testing to 50,000 cycles (previous test results acceptable)
 - .8 EN 71-3 toxilogical test results. (previous test results acceptable)
- .4 Prior to the delivery of the infill provide:
- .1 Identification of source of infill.
 - .2 Provide EN 71-3 toxilogical test results. (Previous test results acceptable)
- .5 Prior to installation of the turf system:
- .1 Two (2) samples of the synthetic turf material to be installed by the Contractor shall be removed by the Consultant from randomly selected rolls or sheets of material that has been delivered to the site. This material will be sent to an independent lab to verify that it meets the specifications for the product as prescribed herein. The test results of the samples taken on-site must also meet or exceed the test results that are specified. TO ACCOMMODATE THE REMOVAL OF MATERIAL FOR TESTING, ALL ROLLS DELIVERED MUST BE ABLE TO ACCOMMODATE THE REMOVAL OF TWO SAMPLES 600mm DEEP BY THE WIDTH OF THE ROLL WITHOUT AFFECTING THE INSTALLATION OF THE PRODUCT.
 - .2 The cost for this testing, except for testing done as a result of the initial samples tested failing to meet the specifications herein, will be at the Owner's expense. All subsequent materials, and testing costs to verify if the remedial work is required, are to be at the Contractor's expense. This additional testing, if required, will be contracted by the Owner and back charged to the contractor by change order credit. The Contractor must use the same testing agency as used by the Owner. The Contractor is to allow the Consultant seven (7) working days to complete the testing prior to the installation of the material.
 - .3 Installation can only commence if the material has passed the required testing.
 - .4 The Contractor shall engage the independent testing agency to inspect the sub-grade aggregate base and provide planarity tests, compaction tests and porosity tests. The results must meet or exceed FIFA Quality requirements. All defective portions of the base will be corrected by the sub base contractor. Upon completion of the corrected work, the base shall be re-test at the Contractor's expense until the entire substructure is within the project specifications. A copy of all field tests will be forwarded to the artificial turf installer. The Contractor will be required to review and agree in writing that the base will not affect the installation, quality or warranty of the turf.

- .5 Once the turf contractor has accepted the base, it is the turf contractor's responsibility to keep the base clean and free of contaminants (dirt, mud etc.) until the installation of the artificial turf surface begins. No vehicle traffic shall be allowed on the base until the installation begins.
- .6 At the completion of the installation of the turf system:
 - .1 ASTM F355-01 Standard Test Method for Shock-Absorbing Properties of Playing Surface Systems and Material (Procedure A)
 - .2 ASTM F1936-98 Standard Specification for Shock-Absorbing Properties of North American Football Field Playing Systems as measured in the Field.

For the initial test, the average of test results for G-max shall not exceed a result of more than 125 G and no individual test shall exceed 130 G. At no time during the warranty period shall any testing results average more than 150 G., nor shall any individual result exceed 160 G.
- .7 A copy of all test results are to be forwarded directly to the Consultant by the Inspection and Testing Company
- .8 Materials and workmanship will be subject to the inspection at any time. Co-operate in permitting access for inspection at all places where work is being done or stock is being stored.
- .9 The Contractor shall supply all necessary samples to the Testing Laboratory for testing. Supply additional labour required to assist the Testing Laboratory in making such tests. The costs of this material and labour shall be borne by the Contractor.
- .10 Where Work, in the opinion of the Consultant or independent testing agency, requires re-inspection, or more stringent inspections because of previous requirements of re-inspections of similar work, such re-inspections and certifications shall be at the Contractor's expense.

1.10 WARRANTY

- .1 Eight (8) year warranty against workmanship and materials on the proposed artificial turf system. The contractor shall also provide proof in advance of intent and ability to provide manufacturer's warranty that guarantees the serviceability and playability of the artificial grass system for its intended uses for an eight (8) year period commencing with the date of substantial completion. The warranty shall be for full performance and shall not be prorated. The warranty submitted must have the following characteristics.
 - .1 Must provide full coverage for eight (8) years from the date of Substantial Completion.
 - .2 Must warrant that the materials proposed meet or exceed the product specifications.
 - .3 The turf contractor shall warrant that the artificial turf system offered shall not fade in colour, shrink, wrinkle, show excessive wear or fail. The contractor, at their sole expense and cost, shall replace all areas of the artificial turf system that does not perform to these standards for the life of the warranty. The warranty must be non-

prorated for eight (8) years based on the estimated 2300 hours of programmed usage per year.

.4 Definitions:

- .1 RE: “shall not fade” - No significant loss of colour shall be evidenced during the life of the warranty. The polyethylene materials will maintain a shade of green or white or yellow that is uniform throughout the field
- .2 RE: “shall not show excessive wear or fail” - In the context of this warranty, this shall mean that the face weight of the yarn and the length of the yarn in the artificial turf surface shall not have been decreased by more than 10% per year according to ASTM D418 nor exceed 50% during the warranty period. In the event that the synthetic turf system does not retain it’s height, shock absorbency, or G-max and is consequently no longer serviceable during the warranty period, the contractor shall, at their sole expense, replace such portions of the system that are no longer serviceable.
- .3 RE: “serviceable” - This means that the artificial turf system shall have a maximum G-max value according to ASTM F1936-98 and procedure A, ASTM F355 not to exceed 130 G’s at any location upon the completion of the installation and shall not exceed 160 G’s thereafter throughout the life of the warranty period. This shall be determined by conducting dynamic cushioning tests at the locations designated in ASTM F1936-98 and at the corners of the soccer penalty boxes at opposite sides of the field. Any increase from 130 G’s to the allowable 160 G’s maximum shall be at a relative uniform rate not to exceed 15 G’s in any single year.
- .4 All artificial turf seams shall not separate or become unattached. The Warranty must specifically state that any and all seams that come apart will be repaired within fourteen (14) days upon request from the owner, as time is of the essence. The Contractor is responsible for all costs associated with ensuring a successful repair, even under inclement weather conditions.
- .5 The Contractor shall promptly replace or repair, to the specifications herein, any areas of the synthetic turf playing field system that are not performing to the standards of the warranties at the sole expense of the Contractor.

1.11 QUALITY CONTROL

- .1 All work to be subject to inspection by Owner and Consultant.
- .2 Defective materials or quality of work whenever found at any time shall be rejected, regardless of previous inspection. Inspection is not to relieve the Contractor from responsibility, but is a precaution against oversight and errors. Defective materials shall be removed and replaced by the Contractor at their own expense, and without change to the Contract Time.

1.12 PATENT RIGHTS AND INFRINGEMENT

- .1 There are various established performance criteria throughout this request for products and services. There may exist patent coverage for some means and methods of achieving

those performance criteria. Bidders are responsible for ascertaining that means and methods of the products and services which they are providing are not being provided in violation of any such patent rights. Bidders responsibilities are as follows:

- .1 To hold harmless, the Owner and Consultants as to any violation to include dollar amounts that could be owed as a result of damages for infringement including potential treble damages as provided for under US and Canadian Patent Law.
 - .2 Any and all costs that the Owner and Consultants would incur in replacing materials and services which are determined to infringe patent rights.
 - .3 All administrative, legal and other costs that would be incurred as a result of an infringement.
- .2 If any product or services proposed to be provided by the Bidder are known by the Bidder to be subject to any existing claims of infringement, Bidder shall notify Owner and Consultants of such claim and provide evidence of financial ability to perform on the above hold harmless requirements.

PART 2 - PRODUCTS

2.01 GENERAL

- .1 The artificial turf infill system must be an approved, standard product, manufactured and/or supplied by a manufacturer who has satisfied the terms and conditions of a slit film fibre product meeting or exceeding the project specifications.
- .2 The entire system, including all materials such as turf, scrim, glue, infill rubber, etc. that is employed and becomes a permanent part of the system is to be resistant to weather, insects, rot and mildew, fungus, be non-toxic, and resist ultraviolet degradation.
- .3 The entire artificial turf infill system and all its parts shall be constructed to provide a safe playing surface that will resist damage through normal wear and tear for the stipulated uses as well as movements of maintenance vehicles and emergency services vehicles and will remain dimensionally stable and true to line. The finished surface shall not shift, move, slide or separate from the supporting base and shall remain smooth and consistent. Irregularities in the planarity of the field or the finished surface at any time during the lifespan are unacceptable and the responsibility of the Contractor and Manufacturer issuing the Warranty Certificate and/or Insurance Certificate.

2.02 MATERIALS

- .1 Artificial turf:
 - .1 The Synthetic turf system will consist of slit filament fiber as specified herewithin.
 - .2 The yarn shall be tufted into a triple layer of a primary backing. A secondary backing of polyurethane or latex shall cover the width and length of the primary backing.
 - .3 The turf must meet or exceed the following performance requirements:
 - .1 The fibre shall be tufted to a finished pile height of not less than 45mm.

- .2 Pile face weight shall be a minimum of 52 oz. per sq. yd.
- .3 Tuft bind (excluding in-fill) shall be a minimum of 8 lbs. average
- .4 Yarn denier shall be a minimum of 10,800 Denier (per tuft).
- .5 Grab tear strength shall be a minimum of 200 lbs.
- .6 Yarn breaking strength shall meet a breaking strength of 12 lbs/foot. (per tuft)
- .7 Lisport testing to 50,000 cycles. The sample will be deemed to have failed the test if the fiber lost from the sample, in the opinion of the tester, is too great to continue the test. (Previous test results acceptable)

- .4 The elastomer coatings and primary backing materials shall be perforated to allow for rapid drainage. Drainage rate shall be greater than 500mm per hour.
- .5 There are to be no lines or event markings on this project. Seams may be sewn or glued. Seaming tape and glue method must conform to FIFA requirements.
- .6 Source Limitations: Obtain Infilled Synthetic Turf System including tufted synthetic turf yarn and carpet backings from a single Tufted Synthetic Turf Manufacturer. The center field logo must be manufactured at the factory. Provide additional system components including anchoring materials, seaming products, binders and adhesives, resilient underlayment (where applicable) and infill materials meeting the project specifications.
- .7 The colours for the installation shall be “Collegiate” alternating two colours of green (Field Green, Lime Green) for the body of the field.
- .8 The turf material shall have satisfied the test results related to PILL Flammability – ASTM D2859 and Melting Point Index - ASTM D789 and have flame spread ratings not greater than those required by the Building Code.
- .9 The turf rolls shall be no less than 4.57m (15') wide and must extend the entire width (rolling direction axis) of the large main field from sideline to sideline. Turf rolls beyond the sideline will be run parallel to the field length.
- .10 All rolls not exhibiting uniform colour, width, pile direction and pile height will be rejected by the Consultant as failing to conform to the Contract Documents and shall be immediately removed from the Place of Work by the Contractor and replaced promptly in accordance with the Contract Documents.
- .11 Delivery of the turf must include a Certificate of Compliance from the supplier stating that the materials comply with EN 71-3.

- .2 Infill:
 - .1 The system shall support infilling with SBR and sand combination, to a depth required by the product for the intended uses.
 - .2 Stabilizing Infill - silica-sand, gradation 0.5 - 0.8 mm, min. 80% round of shape. There can be a maximum of 1.5 lbs per square foot installed.

.3 Fasteners:

- .1 All fasteners that are to be employed in fastening the edges of the turf must be suitable for use with the specified concrete curb (and the specified PT Nailer) and be manufactured as to prevent corrosion while in use over the life of the warranty periods

PART 3 - EXECUTION

3.01 EXAMINATION

- .1 Contractor shall verify existing conditions before starting work.
- .2 Verify all dimensions and elevations required on drawings.
- .3 Work is to commence and continue only if the environmental and site conditions are in accordance with the manufacturer's recommendations for product replacement.

3.02 INSTALLATION

- .1 The installation methods and procedures must be in strict accordance with the Manufacturer's specifications and instructions in accordance with the Contract Documents. The finished installation must provide for a high quality, multipurpose facility for the duration of Warranty Period.
- .2 The Contractor shall fine grade the granular base, including proper rolling and compaction, to achieve a tolerance of 6mm in 3m and a consistent slope across the entire surface. The field shall be crowned down the length.
- .3 The finished grade of the granular base shall allow for the depth of the infill material in order to provide a smooth and flush transitions with the top of the concrete turf anchor. Infill shall be flush with the top of concrete turf anchor.
- .4 Playing field rolls shall be laid straight, true and flat and be laid parallel to the width (rolling direction axis) of the main field. Subsequent rolls to be placed straight and true to the preceding roll. Fitted or tapered pieces to true the alignment or infill gaps in seams are not acceptable. Turf rolls beyond the sideline will be run parallel to the field length. Cross seams are not permitted except.
- .5 Tufted Synthetic Turf shall be installed with no wrinkles, ripples or bubbles. Shearing of fibers, slits in the fabric or driven spikes or staples to relieve such defects will not be permitted.
- .6 All seams shall run perpendicularly across the large field. Seams shall be flat, tight, and permanent with no separation or fraying. Tufted Synthetic Turf Yarn pile shall not be trapped between seams. If some fibers are trapped, they shall be freed from the seams by hand or other approved method to an upright position prior to brushing and infilling.
- .7 Turf Vendor/Installer is to accurately survey and layout all line applications in accordance with the approved shop drawings. Construct seams as per approved shop drawing.
- .8 Infill materials shall be properly screened and bagged off site and applied in numerous thin lifts using special broad-casting equipment. The grass fabric shall be brushed or otherwise fibrillated prior to applying the infill mix. The grass shall be raked and brushed

properly as the mixture is applied, and shall be rolled with weighted rollers. The infill material shall be installed to a depth of approximately 1.50 inches. The mixture can only be applied when the field surface is dry. The field shall be fibrillated by means of a nylon rotary brush to 25% of its maximum fibrillation to provide the look, feel and safety of optimally maintained natural grass.

- .9 The infill materials must be installed in sufficient quantities (minimum 3.2 lbs per square foot) as to ensure that the depth of the infill material remains at the level provided in the testing data submitted with the tender documents over the life of the warranty period. Additional in-fill material may be added by the installer after Substantial Completion to ensure that the field continues to perform to the specifications. However, the G-Max specifications must be met prior to Substantial Completion regardless of any future in-fill placement by the installer.

3.03 CLEANING

- .1 Upon completion of the Work of this Section, all surplus material and debris caused by the Work and equipment shall be promptly removed from the site. The building and site must be left in a condition satisfactory to the Consultant.
- .2 Clean turf surface and all loose rubber granules are to be swept and vacuumed and otherwise removed from the site and legally disposed of. Upon completion of the installation, thoroughly clean surfaces, remove and dispose of off-site all infill spills, refuse, debris, surplus materials, containers and packaging.

3.04 THE FOLLOWING TECHNICAL DATA SHEET MUST BE SUBMITTED PRIOR TO CONSTRUCTION

Technical Product Data Sheet

Provide the following technical specification information for each of the infilled synthetic turf products to be submitted. Note that the following information will form the basis for the minimum specification levels for testing should the Owner select the product.

PRODUCT NAME: _____

Property	Minimum Spec.	Units	ASTM.
Pile yarn type			
Minimum yarn denier			D1577
Maximum yarn denier			D1577
Yarn breaking strength		gms./denier	D2256
Yarn melting point		degrees F	D789
Minimum pile height		inches	D418
Maximum pile height		inches	D418
Pile weight		oz./sq.yd.	D418
Primary backing weight		oz./sq.yd.	D418
Secondary backing weight		oz./sq.yd.	D418
Total weight		oz./sq.yd.	D418
No. of stitches		per inch	D418
Gauge		per inch	D418
Tuft bind(without infill)		lbs.	D1335
Grab tear strength		lb.	D1682
Pill burn strength		(Pass/Fail)	D2859
Impact attenuation (max) at end of year 8		G-max	D355
Impact attenuation (max) at end of year 2		G-max	D355
Total depth of infill material		inches	
Weight of SBR		Per square foot	
Weight of Sand Infill		Per square foot	

Granulated SBR size distribution							
	mm -		mm			% -	%
	mm -		mm			% -	%
	mm -		mm			% -	%
	mm -		mm			% -	%
	mm -		mm			% -	%

Signature of Manufacturer _____

Primary Backing Manufacturer:

Full Company Name _____

Country _____

Product Trade Name _____

Product Trade Code _____

Name of Product _____

Primary Backing:

Primary Backing Thickness (mm) _____

Weight per sq.m in grams _____

Secondary Backing (i.e latex) _____

Total Weight (Primary Plus Secondary backing in grams) _____

THIS FORM MUST BE COMPLETED IN FULL

END OF SECTION 32 18 23.01

PART 1 - GENERAL

1.01 GENERAL

- .1 All conditions of the Contract and Division 1, General Requirements apply to this section.
- .2 All Product to be new and in perfect condition, free from defects which may impair strength, durability, or appearance.
- .3 Installation of turf should be completed in summer within in the work period. Any delays in turf installation due to long lead time should be coordinated with the consultant and owner.
- .4 Work shall be executed to highest standards of workmanship in industry, by fully trained applicators in strict accordance with printed directions of manufacturer of repair mortars to be used.

1.02 SUMMARY

- .1 The section applies to the supply and installation of a polyethylene monofilament with polyethylene/polypropylene thatch playground turf and shock pad.
- .2 Furnish all labor, materials, tools and equipment necessary to install in place all material as specified. The installation of all new materials shall be performed in strict accordance with the manufacturer's written instruction, and in accordance with all approved shop drawings.
- .3 The contractor shall be fully acquainted with the existing sites and shall fully understand the difficulties and restrictions attending the execution of the work under this contract. The contractor shall advise at the time of the bid, any restrictions or anticipated difficulties. Prior to submitting a price for the work, the contractor must seek clarification for any items within the specifications that may appear to be unclear or conflicting.

1.03 APPLICABLE PUBLICATIONS

- .1 Comply with requirements of provincial building code and all local municipal building by-laws and ordinances at Place of the Work.
- .2 Comply with Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 ASTM – American Society for Testing and Materials
- .4 DIN – National Standards in Germany
- .5 CEN (EN) – European Committee for Standardization
- .6 SDS – Safety Data Sheet
- .7 OPSS – Ontario Provincial Standard Specifications
- .8 TC – Synthetic Turf Council
- .9 CSA – Canadian Standards Association

1.04 SUBMITTALS FOR REVIEW

- .1 The following may be requested to be submitted prior to award of contract for review.
- .2 Bidder's will be notified during the tender process if these submissions are required.
 - .1 Synthetic Turf:
 - .1 Submit one (1) 300 mm x 300 mm sample without infill properly labelled with turf name and fiber length.
 - .2 Submit one (1) of primary backing complete with specifications (see data sheet at the end of this specification) including construction, elongation at break and percentage of shrinkage.
 - .2 Seam:
 - .1 Submit one (1) sample seam length of 300 mm – glued.
 - .3 Shock pad:
 - .1 Submit one (1) 300mm x 300mm sample including produce data sheet.

1.05 SUBMITTALS FOR INFORMATION

- .1 The following information is to be submitted prior to construction:
 - .1 Provide technical data sheets of the turf system and completed data sheet (available at the end of this specification).
 - .2 Provide a letter certifying that the products that you are offering meet or exceed specified requirements.
 - .3 Turf Manufacturer:
 - .1 Provide all details related to the manufacture of the proposed turf. Clearly identify the source, fiber manufacturer, supply and the specifications related to the turf components of the proposed artificial turf system. Clearly identify the assembly and manufacturing process and the various companies involved. Provide company histories and general information.
 - .4 Artificial Turf Vendor:
 - .1 Provide company history and general information. Provide three (3) illustrative examples that demonstrate your firm's warranty responses related to turf installation and/or turf product issues.
 - .5 Turf Installation Company:
 - .1 Provide company history and specific information related to artificial turf installations.
 - .6 Turf Installation Supervisor:

- .1 Provide a resume of the installation supervisor who will be on site during the installation.
- .7 The manufacturer shall specify in writing that their turf system does not violate any other manufacturer's patents, patents allowed or patents pending.
- .8 Provide certification that all products and components used for the construction of the artificial turf meets all current Canadian Federal, Provincial and Municipal public health and safety requirements, and that all products and components comply with all current Canadian Federal, Provincial and Municipal environmental legislation, and regulations, and that all material used in the construction of the field are non toxic for the intended uses.
- .9 Provide a copy of the manufacturer's warranty.
- .2 The following information is to be submitted prior to construction:
 - .1 Shop drawings for the turf roll, seam layout, and methods of attachment to the perimeter curb.
 - .2 Laboratory and field testing reports prepared by third party testing agency.
 - .3 A signed letter stating that the planarity of the field is acceptable and that provided field test results relative to the base compaction are acceptable to be provided. (a visual inspection is mandatory by an experienced and qualified artificial turf technician.)
 - .4 Submit to the consultant a report from an independent testing agency stating the lead content, if any, of the synthetic turf fibres.
 - .5 SDS sheets on all individual components of the artificial turf system.

1.06 CLOSEOUT SUBMITTALS

- .1 The Contractor shall provide the following:
 - .1 Three (3) maintenance manuals, including detailed recommended maintenance methods, recommended maintenance schedules, product repair materials, methods of repair and any equipment required to carry out maintenance and repairs. The recommended maintenance methods must describe how to maintain the turf as to ensure that over the lifetime of the warranty any G-Max testing on the field to ASTM F355 procedure A requirements will yield results that will not exceed the requirements noted herein.
 - .2 Maintenance instructions to include at minimum, cleaning, paint removal, minor seam repair, dragging or redistribution of any infill materials and management of infill compaction.
 - .3 One copy of the manufacturer's warranty covering products and installation. All turf warranties shall be non-prorated, limited to repair or replacement of the affected areas, at the option of the Manufacturer, and shall include all necessary materials, labour, transportation costs, etc. to complete said repairs. The artificial turf system must maintain an ASTM F-1292-99 G-max of less than 150 G for the life of the warranty.

- .4 Prior to final acceptance, the Turf Contractor will train the owner's facility maintenance staff in the use of the turf Manufacturer's recommended groomer and maintenance methods required during the warranty. The turf contractor to allow for four (8) hours of training.

1.07 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store products in the original manufacturer's packaging with labels intact.
- .2 Store products where they will be protected from damage.

1.08 QUALITY ASSURANCE

- .1 The Contractor shall employ only qualified, experienced supervisors and technicians skilled in the installation of this system. The Project Superintendent shall have a minimum of five years' experience and ten (10) installed systems.
- .2 The Contractor shall:
 - .1 Shall have demonstrable resources to fully service and warrant the systems installed.
 - .2 Execute work in this Section only by a Contractor who has adequate equipment, skilled tradesmen, and materials to perform it expeditiously and to the specifications and who has at least two similar installations to that specified over the previous three years. Previous installations must have been installed under the same company ownership and with the same skilled workman positions filled with the personnel proposed for this project.

1.09 INSPECTION AND TESTING

- .1 An independent inspection and testing company provided by the Contractor and approved by the Consultant may carry out inspection and testing as required.
- .2 The contractor shall arrange with the inspector and the Consultant for review of construction.
- .3 Tests will be carried out under the appropriate CSA Standards.
- .4 Prior to delivery of the turf system:
 - .1 The turf product submitted will be tested and evaluated as per the testing data listed in this document. All testing will be provided from an independent testing laboratory. All of the following testing protocols must be done at the source by an independent 3rd party testing agency prior artificial turf being shipped.
 - .1 ASTM D1335 tuft bind (excluding in-fill).
 - .2 ASTM D1577 method A for min. yarn denier.
 - .3 ASTM D5034 grab tear strength.
 - .4 ASTM D2256 yarn braking strength.
 - .5 ASTM D418 min. pile height

- .6 ASTM D5848 pile face weight
 - .7 EN 71-3 toxicological test results.
- .5 Prior to installation of the turf system:
- .1 Two (2) samples of the synthetic turf material to be installed by the Contractor shall be removed by the Consultant from randomly selected rolls or sheets of material that has been delivered to the site. This material will be sent to an independent lab to verify that it meets the specifications for the product as prescribed herein. The test results of the samples taken on-site must also meet or exceed the test results that are specified. TO ACCOMMODATE THE REMOVAL OF MATERIAL FOR TESTING, ALL ROLLS DELIVERED MUST BE ABLE TO ACCOMMODATE THE REMOVAL OF TWO SAMPLES 600mm DEEP BY THE WIDTH OF THE ROLL WITHOUT AFFECTING THE INSTALLATION OF THE PRODUCT.
 - .2 The cost for this testing, except for testing done as a result of the initial samples tested failing to meet the specifications herein, will be at the Owner's expense. All subsequent materials, and testing costs to verify if the remedial work is required, are to be at the Contractor's expense. This additional testing, if required, will be contracted by the Owner and back charged to the contractor by change order credit. The Contractor must use the same testing agency as used by the Owner. The Contractor is to allow the Consultant seven (7) working days to complete the testing prior to the installation of the material.
 - .3 Once the turf contractor has accepted the base, it is the turf contractor's responsibility to keep the base clean and free of contaminants (dirt, mud etc.) until the installation of the artificial turf surface begins. No vehicle traffic shall be allowed on the base until the installation begins.
- .6 At the completion of the installation of the turf system:
- .1 ASTM F355-01 Standard Test Method for Shock-Absorbing Properties of Playing Surface Systems and Material (Procedure A)
 - .2 The completed installation will be reviewed for porosity. The porosity rate shall be greater than 250mm per hour at all locations.
 - .3 Installation must be in accordance with ASTM F-1292-99 Standards for Impact Attenuation of Surface Systems Under and Around Playground Equipment per G/Max and HIC values, meeting all CAN/CSA-Z614 Standards from a height of 2.4m (8').
- .7 A copy of all test results are to be forwarded directly to the Consultant by the Inspection and Testing Company
- .8 Materials and workmanship will be subject to the inspection at any time. Co-operate in permitting access for inspection at all places where work is being done or stock is being stored.
- .9 The Contractor shall supply all necessary samples to the Testing Laboratory for testing. Supply additional labour required to assist the Testing Laboratory in making such tests. The costs of this material and labour shall be borne by the Contractor.

- .10 Where Work, in the opinion of the Consultant or independent testing agency, requires re-inspection, or more stringent inspections because of previous requirements of re-inspections of similar work, such re-inspections and certifications shall be at the Contractor's expense.

1.10 WARRANTY

- .1 Eight (8) year warranty against workmanship and materials on the proposed artificial turf system. The contractor shall also provide proof in advance of intent and ability to provide manufacturer's warranty that guarantees the serviceability and playability of the artificial grass system for its intended uses for an eight (8) year period commencing with the date of substantial completion. The warranty shall be for full performance and shall not be prorated. The warranty submitted must have the following characteristics.

- .1 Must provide full coverage for eight (8) years from the date of Substantial Completion.
- .2 Must warrant that the materials proposed meet or exceed the product specifications.
- .3 The turf contractor shall warrant that the artificial turf system offered shall not fade in colour, shrink, wrinkle, show excessive wear or fail. The contractor, at their sole expense and cost, shall replace all areas of the artificial turf system that does not perform to these standards for the life of the warranty. The warranty must be non-prorated for eight (8) years based on the estimated 2300 hours of programmed usage per year.
- .4 Definitions:
 - .1 RE: "shall not fade" - No significant loss of colour shall be evidenced during the life of the warranty. The polyethylene materials will maintain a shade of green or white or yellow that is uniform throughout the field
 - .2 RE: "shall not show excessive wear or fail" - In the context of this warranty, this shall mean that the face weight of the yarn and the length of the yarn in the artificial turf surface shall not have been decreased by more than 10% per year according to ASTM D418 nor exceed 50% during the warranty period. In the event that the synthetic turf system does not retain it's height, shock absorbency, or G-max and is consequently no longer serviceable during the warranty period, the contractor shall, at their sole expense, replace such portions of the system that are no longer serviceable.
 - .3 RE: "serviceable" – This means that the artificial turf system and wear mats shall have a maximum G-max value according to ASTM F-1292-99 at any location upon the completion of the installation and shall not exceed ASTM-1292-99 throughout the life of the warranty period. minimum of four (4) locations per playground be tested that includes at least one wear mat at the highest fall height or designated play system for that surface not to exceed 150Gmax for the entire warranty period.
 - .4 All artificial turf seams shall not separate or become unattached. The Warranty must specifically state that any and all seams that come apart will be repaired within fourteen (14) days upon request from the owner, as time

is of the essence. The Contractor is responsible for all costs associated with ensuring a successful repair, even under inclement weather conditions.

- .5 The Contractor shall promptly replace or repair, to the specifications herein, any areas of the synthetic turf playing field system that are not performing to the standards of the warranties at the sole expense of the Contractor.
- .6 The contractor must warrant the backing for turf bind and delamination for the entire eight (8) years warranty period.

1.11 QUALITY CONTROL

- .1 All work to be subject to inspection by Owner and Consultant.
- .2 Defective materials or quality of work whenever found at any time shall be rejected, regardless of previous inspection. Inspection is not to relieve the Contractor from responsibility, but is a precaution against oversight and errors. Defective materials shall be removed and replaced by the Contractor at their own expense, and without change to the Contract Time.

1.12 PATENT RIGHTS AND INFRINGEMENT

- .1 There are various established performance criteria throughout this request for products and services. There may exist patent coverage for some means and methods of achieving those performance criteria. Bidders are responsible for ascertaining that means and methods of the products and services which they are providing are not being provided in violation of any such patent rights. Bidders responsibilities are as follows:
 - .1 To hold harmless, the Owner and Consultants as to any violation to include dollar amounts that could be owed as a result of damages for infringement including potential treble damages as provided for under US and Canadian Patent Law.
 - .2 Any and all costs that the Owner and Consultants would incur in replacing materials and services which are determined to infringe patent rights.
 - .3 All administrative, legal and other costs that would be incurred as a result of an infringement.
- .2 If any product or services proposed to be provided by the Bidder are known by the Bidder to be subject to any existing claims of infringement, Bidder shall notify Owner and Consultants of such claim and provide evidence of financial ability to perform on the above hold harmless requirements.

PART 2 - PRODUCTS

2.01 GENERAL

- .1 The entire system, including all materials such as turf, scrim, glue, etc. that is employed and becomes a permanent part of the system is to be resistant to weather, insects, rot and mildew, fungus, be non-toxic, and resist ultraviolet degradation.

- .2 The entire artificial turf infill system and all its parts shall be constructed to provide a safe playing surface that will resist damage through normal wear and tear for the stipulated uses as well as movements of maintenance vehicles and emergency services vehicles and will remain dimensionally stable and true to line. The finished surface shall not shift, move, slide or separate from the supporting base and shall remain smooth and consistent. Irregularities in the planarity of the field or the finished surface at any time during the lifespan are unacceptable and the responsibility of the Contractor and Manufacturer issuing the Warranty Certificate and/or Insurance Certificate.

2.02 MATERIALS

- .1 Artificial turf:
 - .1 The Synthetic turf system will consist of a polyethylene monofilament fiber with polyethylene thatch meeting the specifications herein.
 - .2 The following synthetic turf systems are pre-approved. Equivalent requests must be provided and approved prior to tender close.
 - .1 Synlawn Play Platinum available from Synlawn Tel: 905-272-9683
 - .2 Saratoga 60 available from AGL Grass, Tel:1-877-884-7277
 - .3 Fresh Grass available from SportTurf, Tel 1-800-798-1056
 - .3 The yarn shall be tufted into a triple layer of a primary backing. A secondary backing of polyurethane or latex shall cover the width and length of the primary backing .
 - .4 The turf must meet or exceed the following performance requirements:
 - .1 The fibre shall be tufted to a finished pile height of not less than 44mm.
 - .2 The monofilament fibre shall be a minimum 150 micron.
 - .3 Pile face weight shall be a minimum of 60 oz. per sq. yd.
 - .4 Tuft bind (excluding in-fill) shall be a minimum of 8 lbs. average
 - .5 Yarn denier shall be a minimum of 10,800 Denier (per tuft).
 - .6 Thatch zone yarn denier shall be a minimum of 4,000 Denier (per tuft).
 - .7 Grab tear strength shall be a minimum of 200 lbs.
 - .8 Yarn breaking strength shall meet a breaking strength of 12 lbs/foot. (per tuft)
 - .5 The elastomer coatings and primary backing materials shall be perforated to allow for rapid drainage. Drainage rate shall be greater than 500mm per hour.
 - .6 Source Limitation: Obtain Synthetic Turf System including tufted synthetic turf yarn and carpet backings from a single Tufted Synthetic Turf Manufacturer. Provide additional system components including anchoring materials, seaming products,

- binders and adhesives, and resilient underlayment materials meeting the criteria of the specifications.
- .7 The colours for the installation shall be a mix of three colours of green (Field Green, Lime Green, Olive Green) resembling natural grass.
 - .8 The turf material shall have satisfied the test results related to PILL Flammability – ASTM D2859 and Melting Point Index - ASTM D789 and have flame spread ratings not greater than those required by the Building Code.
 - .9 The turf rolls shall be no less than 4.57m (15') wide and must extend the entire width (rolling direction axis) of the kindergarten play area.
 - .10 All rolls not exhibiting uniform colour, width, pile direction and pile height will be rejected by the Consultant as failing to conform to the Contract Documents and shall be immediately removed from the Place of Work by the Contractor and replaced promptly in accordance with the Contract Documents.
- .2 Fasteners:
- .1 All fasteners that are to be employed in fastening the edges of the turf must be suitable for use with the specified concrete curb (and the specified PT Nailer) and be manufactured as to prevent corrosion while in use over the life of the warranty periods
- .3 Shock Pad:
- .1 Delivery of the shockpad must include a Certificate of Compliance from the supplier stating that the materials comply with EN 71-3.
 - .2 Shockpad shall be a minimum 4" (100mm) and meet previously stated performance standard of 150 Gmax requirements average for each testing location within the playground area.

PART 3 - EXECUTION

3.01 EXAMINATION

- .1 Contractor shall verify existing conditions before starting work.
- .2 Verify all dimensions and elevations required on drawings.
- .3 Work is to commence and continue only if the environmental and site conditions are in accordance with the manufacturer's recommendations for product replacement.

3.02 INSTALLATION

- .1 The installation methods and procedures must be in strict accordance with the Manufacturer's specifications and instructions in accordance with the Contract Documents. The finished installation must provide for a high quality, multipurpose facility for the duration of Warranty Period.
- .2 The turf supplies shall coordinate the finished grade of the granular base with the General Contractor.

- .3 Rolls shall be laid straight, true and flat and be laid parallel to the width (rolling direction axis) of the playground. Subsequent rolls to be placed straight and true to the preceding roll. Fitted or tapered pieces to true the alignment or infill gaps in seams are not acceptable. Cross seams are not permitted.
- .4 Tufted Synthetic Turf shall be installed with no wrinkles, ripples or bubbles. Shearing of fibers, slits in the fabric or driven spikes or staples to relieve such defects will not be permitted.
- .5 All seams shall run perpendicularly across the large field. Seams shall be flat, tight, and permanent with no separation or fraying. Tufted Synthetic Turf Yarn pile shall not be trapped between seams. If some fibers are trapped, they shall be freed from the seams by hand or other approved method to an upright position prior to brushing and infilling.
- .6 All Tufted Synthetic Turf field markings shall be adhered in accordance with manufacturer specifications. Tufted Synthetic Turf Yarn pile that is trapped or glued between inlay seams shall be freed from the seams by hand or other approved method to an upright position prior to brushing.
- .7 Turf Vendor/Installer is to accurately survey and layout all line applications in accordance with the approved shop drawings. Construct seams as per approved shop drawing.

3.03 CLEANING

- .1 Upon completion of the Work of this Section, all surplus material and debris caused by the Work and equipment shall be promptly removed from the site. The building and site must be left in a condition satisfactory to the Consultant.
- .2 Clean turf surface and all loose rubber granules are to be swept and vacuumed and otherwise removed from the site and legally disposed of. Upon completion of the installation, thoroughly clean surfaces, remove and dispose of off-site all infill spills, refuse, debris, surplus materials, containers and packaging.

3.04 THE FOLLOWING TECHNICAL DATA SHEET MUST BE SUBMITTED PRIOR TO CONSTRUCTION

Technical Product Data Sheet

Provide the following technical specification information for each of the infilled synthetic turf products to be submitted. Note that the following information will form the basis for the minimum specification levels for testing should the Owner select the product.

PRODUCT NAME: _____

Property	Minimum Spec.	Units	ASTM.
Pile yarn type			
Minimum yarn denier (Thatch)			D1577
Maximum yarn denier (Thatch)			D1577
Yarn breaking strength		gms./denier	D2256
Yarn melting point		degrees F	D789
Minimum pile height		inches	D418
Maximum pile height		inches	D418
Pile weight		oz./sq.yd.	D418
Primary backing weight		oz./sq.yd.	D418
Secondary backing weight		oz./sq.yd.	D418
Total weight		oz./sq.yd.	D418
No. of stitches		per inch	D418
Gauge		per inch	D418
Tuft bind(without infill)		lbs.	D1335
Grab tear strength		lb.	D1682
Pill burn strength		(Pass/Fail)	D2859
Impact attenuation (max) at end of year 8		G-max	D355
Impact attenuation (max) at end of year 2		G-max	D355

Signature of Manufacturer _____

Primary Backing Manufacturer:

Full Company Name _____

Country _____

Product Trade Name _____

Product Trade Code _____

Name of Product _____

Primary Backing:

Primary Backing Thickness (mm) _____

Weight per sq.m in grams _____

Secondary Backing (i.e latex) _____

Total Weight (Primary Plus Secondary backing in grams) _____

THIS FORM MUST BE COMPLETED IN FULL

END OF SECTION 32 18 23.02

PART 1 - GENERAL

1.01 GENERAL

- .1 All conditions of the Contract and Division 1, General Requirements apply to this section.
- .2 All Product to be new and in perfect condition, free from defects which may impair strength, durability, or appearance.
- .3 Scheduling of the Work shall be discussed with, and be subject to approval of Owner.
- .4 Work shall be executed to highest standards of workmanship in industry, by fully trained applicators in strict accordance with printed directions of manufacturer of repair mortars to be used.

1.02 APPLICABLE PUBLICATIONS

- .1 Comply with requirements of provincial building code and all local municipal building by-laws and ordinances at Place of the Work.
- .2 Comply with Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 ASTM A116-11 - Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric.
- .4 ASTM A123/A123M-12 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .5 ASTM A153/A153M-09 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .6 [ASTM A392-11a - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.]
- .7 ASTM C94/C94M-13 - Standard Specification for Ready-Mixed Concrete.
- .8 ASTM F567-11a - Standard Practice for Installation of Chain-Link Fence.
- .9 ASTM F1043-12 - Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework.
- .10 ASTM F1083-10 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
- .11 CAN/CGSB 138.1-96 - Fabric for Chain Link Fence.
- .12 CAN/CGSB 138.2-96 - Steel Framework for Chain Link Fence.
- .13 CAN/CGSB 138.3-96 - Installation of Chain Link Fence.
- .14 CAN/CGSB 138.4-96 - Gates for Chain Link Fence.

- .15 CSA-A23.1-09/A23.2-09 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .16 CLFMI (Chain Link Fence Manufacturers Institute) - Product Manual.
- .17 ASTM A123/A123M-12 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

1.03 SUBMITTALS FOR REVIEW

- .1 Product Data: Provide data on fabric, posts, accessories, fittings and hardware.
- .2 Samples: If requested, submit two (2) samples of fence fabric, illustrating construction, finish and top and bottom selvage.

1.04 QUALITY ASSURANCE

- .1 Perform Work in accordance with CAN/CGSB-138.3.
- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this Section with minimum three (3) years documented experience.
- .3 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

- .1 Framing (Steel): CAN/CGSB 138.2, Schedule 40 galvanized steel pipe, welded construction, minimum yield strength of 172 MPa; coating conforming to ASTM F1043, Type A on pipe exterior and interior.
- .2 Fabric Wire (Steel): to CAN/CGSB 138.1, Type 1 (steel), Class B, woven from galvanized wire, medium style (9ga / 3.5mm), ASTM A392 - Grade 1 galvanizing (366g/m²), height(s) as indicated on drawings.
- .3 Concrete: CAN/CSA-A23.1/A23.2; Sulfate Resisting Portland Cement, air entrained, 25 MPa strength at 28 days.

2.02 COMPONENTS

- .1 Line Posts: 60 mm diameter.
- .2 Corner and Terminal Posts: 90 mm.
- .3 Gate Posts: 114 mm diameter.
- .4 Top and Brace Rail: 42 mm diameter, plain end, sleeve coupled.
- .5 Fabric: 51 mm diamond mesh interwoven wire, top selvage knuckle end closed, bottom selvage knuckle end closed. Barbed selvages will be rejected.
- .6 Bottom Tension Wire: to CAN/CGSB-138.1, Table 2, single strand, galvanized wire, 5 mm (thick, single strand.

- .7 Tension bar: to ASTM A-525M, 5 x 20mm minimum galvanized steel.
- .8 Tension bar bands: to CAN/CGSB-138.2, 3 x 20mm galvanized steel or 5x20mm aluminum.
- .9 Tie Wire: to CAN/CGSB-138.1, Table 4, aluminum wire, single strand.
- .10 Gates: CAN/CGSB 138.4.
 - .1 Gate Frame: 60 mm diameter for welded fabrication.

2.03 ACCESSORIES

- .1 Caps: Cast steel galvanized; sized to post diameter to provide waterproof fit, fasten securely over posts, set screw retainer.
- .2 Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel.
- .3 Gate Hardware: Fork latch with gravity drop, two (2) 180 degree, malleable iron gate hinges per leaf and hardware for padlock, chain hook to hold gates in open position and drop bolt for securing in closed position.

2.04 FINISHES

- .1 Components and Fabric: Galvanized to ASTM A123/A123M, 550 g/sq m coating thickness.
- .2 Hardware: Galvanized to ASTM A153/A153M, 550 g/sq m coating.
- .3 Accessories: Same finish as framing.

PART 3 - EXECUTION

3.01 GRADING

- .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts. Provide clearance between bottom of fence and ground surface neither less than 30 mm nor more than 50 mm.

3.02 INSTALLATION

- .1 Erect fence, posts and accessories along lines indicated and in accordance with CAN/CGSB-138.3.
- .2 Install framework, fabric, accessories and gates to manufacturer's written instructions.
- .3 Excavate post holes 1200mm depth (unless otherwise noted) x 250 mm diameter for line posts and 300 mm diameter for terminal posts. Drill holes in existing bedrock or boulders as required.
- .4 Set gate, intermediate, terminal posts plumb, in concrete footings with top of footing 50 mm above. Place concrete in post holes then embed posts into concrete

- to minimum 600 mm depth. Slope top of concrete for water runoff. Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.
- .5 Space line posts 2.8 m apart, measured parallel to ground surface.
 - .6 Install corner post where change in alignment exceeds 10°.
 - .7 Install end posts at end of fence and at buildings. Install gate posts on both sides of openings.
 - .8 Brace each gate and corner post to adjacent line post with horizontal centre brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
 - .9 Provide top rail through line post tops and splice with 150 mm long rail sleeves.
 - .10 Install centre brace rail on corner gate leaves.
 - .11 Place fabric on inside of posts and rails.
 - .12 Do not stretch fabric until concrete foundation has cured seven (7) days.
 - .13 Stretch fabric between terminal posts or at intervals of 30 m maximum, whichever is less.
 - .14 Position bottom of fabric 50 mm above finished grade.
 - .15 Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 380 mm on centres.
 - .16 Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
 - .17 Install bottom tension strap wire stretched taut between terminal posts.
 - .18 Do not attach the hinged side of gate from building wall; provide gate posts.
 - .19 Install gate with fabric to match fence. Install three hinges per leaf, latch, catches, drop bolt and foot bolts and sockets.
 - .20 Provide concrete centre drop to footing depth and drop rod retainers at centre of double gate openings.

3.03 ERECTION TOLERANCES

- .1 Maximum Variation From Plumb: 6 mm.
- .2 Maximum Offset From True Position: 25 mm.
- .3 Components shall not infringe adjacent property lines.

3.04 ACCEPTANCE

- .1 Installed fence will be accepted at final inspection provided that:
 - .1 Fence fabric is properly installed and secured in place.
 - .2 All necessary fasteners and fittings are installed.

- .3 All debris and undulations along the fence is uniformly graded along the posts.
- .2 All fences are tied and secured as per the local povential standards.

3.05 CLEANING

- .1 As work proceeds daily and on completion, remove all surplus materials, and debris resulting from the foregoing work.
- .2 Protect adjacent materials, construction and finished surfaces from damage while cleaning.

END OF SECTION 32 31 00

PART 1 - GENERAL

1.01 GENERAL

- .1 All conditions of the Contract and Division 1, General Requirements apply to this section.
- .2 All Product to be new and in perfect condition, free from defects which may impair strength, durability, or appearance.
- .3 Scheduling of the Work shall be discussed with, and be subject to approval of Owner.
- .4 Work shall be executed to highest standards of workmanship in industry, by fully trained applicators in strict accordance with printed directions of manufacturer of repair mortars to be used.

1.02 APPLICABLE PUBLICATIONS

- .1 Comply with requirements of provincial building code and all local municipal building by-laws and ordinances at Place of the Work.
- .2 Comply with Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 American Society for Testing and Materials (ASTM):
 - .1 ASTM D698-12(2021): Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).

1.03 MEASUREMENT PROCEDURES

- .1 Preparation of sub-grade for placing of topsoil will not be measured for payment but considered incidental to other Work.
- .2 Topsoil stripping will not be measured but considered incidental to other work.
- .3 Supplying, placing, and spreading topsoil and sod will not be measured but considered incidental to other Work.

1.04 DELIVERY, STORAGE AND HANDLING

- .1 Topsoil must not be handled or delivered while in a frozen or near water saturated condition. Schedule placing of topsoil and finish grading to permit immediate sodding operations.
- .2 Schedule deliveries to keep storage at job site to minimum without causing delays.
- .3 Sod shall be rolled or folded prior to lifting. Handling of sod shall be done in such a manner as to prevent tearing or breaking. Consultant will reject damaged pieces.
 - .1 Sod to be fresh and in a healthy condition when arriving on the site and shall be subject to inspection and acceptance prior to installation.
 - .2 Deliver, unload, and store sod on pallets. All sod to be installed within 48 hours of being lifted.

- .4 Do not deliver small, irregular, or broken pieces of sod.
- .5 During wet weather allow sod to dry sufficiently to prevent tearing during lifting and handling.
- .6 During dry weather protect sod from drying and water sod as necessary to ensure its vitality and prevent dropping of soil in handling. Dry sod will be rejected.
- .7 Fertilizer to be delivered to the site mixed as specified, in standard bags, showing weight, analysis and name of manufacturer.
 - .1 Store fertilizer in a weatherproof storage place and in such a manner that it will be kept dry and its effectiveness not impaired.

1.05 QUALITY ASSURANCE

- .1 All work to be subject to inspection by Owner and Consultant.
- .2 Sodding to be guaranteed for 30 days after final inspection and acceptance.
- .3 Grass areas which show deterioration or bare spots to be resodded.

PART 2 - PRODUCTS

2.01 MATERIALS

- .1 Topsoil: Friable loam, neither heavy clay nor of very light sandy nature containing a minimum of 4% organic matter for clay loams and 2% for sandy loams to maximum of 20% volume. Free from subsoil, roots, grass, weeds, toxic materials, stones, foreign objects. Topsoil containing crab grass, couch grass or noxious weeds is not acceptable.
 - .1 Mixing and screening of planting soil to be done on site in an approved area. No mixing to be done on paved areas.
- .2 Peat Moss: Decomposed plant material, fairly elastic and homogeneous, free of decomposed colloidal residue, wood, sulfur and iron containing minimum 60% organic matter by weight and moisture content not exceeding 15%. Shredded particles may not exceed 6 mm in size. Minimum pH value of peat 4.5, maximum 6.0.
- .3 Fertilizer: Complete commercial synthetic slow-release fertilizer with maximum 35% water soluble nitrogen and contain following percentages by weight: 10% Nitrogen, 10% Phosphoric Acid, 10% Potash.
- .4 Sand: Hard, granular sharp sand to CSA A82.56-M1976, well-washed and free of impurities, chemical, or organic matter.
- .5 Water: Potable and free of any material harmful to the sod.
- .6 Sod:
 - .1 Grass Sod: Sod shall be certified No. 1 Kentucky Bluegrass Nursery Sod in accordance with classifications of Nursery Sod Growers Association of Ontario. It shall be two years old from time of original seeding, be well rooted, free from stones and burned or bare spots and shall be fresh at time of laying.

- .2 Nursery Sod: Quality and source to comply with standards outlined in “Guide Specifications for Nursery Stock” Section 17, 1978 edition, published by Canadian Nursery Trades Association.
 - .1 Number one Kentucky Bluegrass/Fescue Sod: sod grown from minimum 40% Kentucky Bluegrass, 30% Creeping Red Fescue, 30% Perennial Rye.
- .3 Field Sod: Not sown or cultivated as turf grass crop but containing good percentage of common turf grasses and free of weeds, mosses, and stones.
 - .1 Fertilize field sod minimum 2 weeks prior to lifting with 2:1:1 ratio fertilizer at rate of 0.5 kg nitrogen/100 m².
 - .2 Mow sod field at least twice prior to lifting and mow to 40 mm (1 5/8”) height within two days prior to lifting and remove clippings.
- .7 Mulch: Coarse mulch with no colour additives, free of plant, or deleterious material.

PART 3 - EXECUTION

3.01 REMOVAL OF EXISTING SHRUBS

- .1 Where existing shrubs are an appropriate size, future transplanting will occur.
- .2 Trench around shrub at drip line to a depth where the roots no longer exist. Excavate under soil ball until it becomes loose.
- .3 Wrap root ball in biodegradable burlap. Transport to storage location without loosening root ball or damaging foliage.

3.02 TEMPORARY SHRUB STORAGE

- .1 Shrubs to be stored on site in a shaded area as follow:
 - .1 Place filter fabric on grade.
 - .2 Place removed shrubs on 150 mm of moist topsoil and as required to stabilize root ball.
 - .3 Surround root ball in topsoil with 50 mm cover over top of root ball with a minimum of 600 mm around perimeter. When multiple shrubs are stored together, provide a minimum of 300 mm between root balls filled with topsoil.
 - .4 Wrap filter fabric over soil mass leaving openings to apply water to shrubs.
 - .5 Maintain topsoil in a moist condition where topsoil is damp but friable.

3.03 PREPARATION OF EXISTING GRADE

- .1 Grade subgrade, eliminating uneven areas and low spots, ensuring positive drainage. Remove debris, roots, branches, stones in excess of 50 mm (2”) diameter and other deleterious materials.
 - .1 Remove subsoil that has been contaminated with oil, gasoline, or calcium chloride. Dispose of removed materials off site as directed by Consultant.

- .2 Compact filled and disturbed areas to Standard Proctor Density to ASTM D698-12 as follows:
 - .1 85% under landscaped areas, Type 3 fill.
- .3 Cultivate existing subgrade that is to receive topsoil to depth of 100 mm. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted subgrade.
- .4 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
- .5 Slope grade away from building 1:50 (2%) minimum.
- .6 Do not disturb soil within branch spread of trees or shrubs to remain.

3.04 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Do not spread topsoil until Consultant has inspected and approved subgrade.
- .2 Spread topsoil with adequate moisture in uniform layers not exceeding 150 mm during dry weather over approved, dry unfrozen subgrade. Apply topsoil up to finished grade.
- .3 Keep topsoil 12 mm below finished grade for sodded areas; elsewhere bring topsoil up to finished grade maintaining consolidated depth requirements.
- .4 Remove stones, roots, grass, weeds, construction materials, debris, and foreign non-organic objects from topsoil.
- .5 Manually spread topsoil/planting soil around trees, shrubs, and obstacles.
- .6 Spread topsoil to following minimum depths after settlement.
 - .1 125 mm for sodded areas.
 - .2 300 mm for flower beds.
 - .3 500 mm for shrub beds.
- .7 Consolidate topsoil to required bulk density using a 45kg (100 lb.) roller, minimum 915 mm (36") wide, to compact and retain surface. Leave surfaces smooth, uniform and firm against deep foot-printing.

3.05 APPLICATION OF FERTILIZER

- .1 For sod applications Spread fertilizer with mechanical spreaders over entire area of topsoil at manufacturer's recommended rate of application or rate determined on basis of soil sample test if performed.
 - .1 Mix fertilizer thoroughly into upper 50 mm (2") of topsoil prior to compaction.
- .2 For Flower beds and Shrub beds mix fertilizer in bulk topsoil in beds before planting.

3.06 PLANTING SHRUBS

- .1 Excavate hole 150 mm deeper and 200 mm wider than root ball. Place in bottom a mix of 35% Topsoil, 35% Compost and 20% Mulch to 150 mm depth and consolidate by stepping on material until it is spongy but has stopped compacting under weight.
- .2 Place shrub in hole and surround with mix as described in .1 to top of original root ball. Consolidate by stepping around root ball until material feels spongy but has stopped compacting under weight.
- .3 Coat bed with 25 mm of topsoil over original root ball.

3.07 FINISHING PLANTING BEDS

- .1 Edges to be cut with consistent lines to a depth of 100 mm. Slope soil back along edge.
- .2 Cover entire bed with 75 mm of mulch in a consistent layer.

3.08 LAYING OF SOD

- .1 Fine grade and loosen topsoil prior to seeding/sodding. Eliminate rough spots and low areas to ensure positive drainage. Prepare loose friable soil bed by means of discing and subsequent raking. Roll lightly and rake wherever topsoil is too loose.
- .2 Prior to sodding, obtain approval from Consultant that finished grade and depth of topsoil are satisfactory. Sod shall be installed in all areas where shown on Drawings unless otherwise indicated.
- .3 Lay sod during growing season. Sodding during dry summer periods, at freezing temperatures or over frozen soil is not acceptable.
- .4 Lay sod within 36 hours of being lifted.
- .5 Lay sod in rows, perpendicular to slope, smooth and even with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .6 Install sod to blend with adjoining grass areas and to be flush with paving, top of curbs etc.
- .7 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.
- .8 On any slopes greater than 1:3, sod shall be laid perpendicular to slope and to be pegged with wooden pegs at intervals of not more than two feet. Pegs shall be driven flush with sod so as not to form a hazard during maintenance operations.

OR

- .9 Place mesh on top of topsoil of slopes steeper than 3:1. Secure mesh in place with wooden pegs at maximum intervals of 1000 mm (3'3"). Cover mesh lightly with topsoil. Lay sod sections perpendicular to slopes and secure with long wooden pegs. Place pegs 1 per 3 sq.ft. (3 per m²) to prevent shifting of sod and drive pegs flush with top of sod soil.

- .10 Water immediately after sod laying to obtain moisture penetration through sod into top 100 mm (4") of topsoil.
- .11 All sodded areas shall be protected from trespassing and other damage by protective barriers where necessary and/or signs.
- .12 Top Dressing (Field Sod):
 - .1 Top dress sodded areas with dry, friable, and clean topsoil having high humus content.
 - .2 Spread topsoil to thickness of 6 to 12 mm (1/4" to 1/2") filling in low and bare spots.
 - .3 Overseed top-dressed area using 1 kg. Grass seed per 100 m² with seed mixture of 50% Kentucky Blue grass and 50% Creeping Red Fescue.
 - .4 Mix topsoil and seed by means of light raking. Roll with light roller and water, ensuring contact between sod, seed, and top dressing.
 - .5 Water thoroughly and take precautions to prevent erosion of topsoil and seeding.

3.09 SOD AND PLANTING BED MAINTENANCE

- .1 Maintain sodded area and plantings from start of installation until final acceptance.
- .2 Water sodded areas in sufficient quantities and at frequency required to maintain soil under sod continuously moist for depth of 75 to 100 mm (3" to 4").
- .3 Water plantings at base of shrubs and trees, allowing water to run over root ball into perimeter soil.
- .4 Cut grass to 40 mm (1 1/2") when it reaches height of 64 mm (2 1/2"). Remove clippings which will smother grassed areas.
- .5 Maintain sodded areas weed-free.
- .6 Fertilize sodded areas one month after sodding with 2:1:1 ratio fertilizer. Spread evenly at recommended rate and water in well.

3.10 ACCEPTANCE

- .1 Sodded areas will be accepted at final inspection provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots and without weeds
 - .3 No surface soil is visible when grass has been cut to height of 40 mm (1 1/2")
- .2 Areas sodded in Fall will be accepted in following Spring one month after start of growing season provided acceptance conditions are fulfilled.

3.11 SURPLUS MATERIAL

- .1 Provide additional material or remove surplus material from the site, as required to achieve finish grades indicated.
- .2 Remove material unsuitable for fill, grading, or landscaping from site.

3.12 CLEANING

- .1 As work proceeds daily and on completion, remove all surplus materials, and debris resulting from the foregoing work.
- .2 Protect adjacent materials, construction and finished surfaces from damage while cleaning.

END OF SECTION 32 92 00

Appendix A

Kindergarten Play Area Pictures



Existing Wooden Structure
To be removed and disposed off-site



Bench be removed and relocated



Blackboard and Play Structure
to be removed and reinstated.