

Part 1 General

1.1 PRODUCTS IMPLEMENTED ONLY UNDER THE TERMS OF THIS SECTION

- .1 This section treats relative requirements of the construction of aggregate base courses layer.

1.2 RELATED SECTIONS

- .1 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Section 31 05 16 - Aggregate Materials.
- .3 Section 31 22 14 – Airfield grading.
- .4 Section Asphalt paving.

1.3 MEASUREMENT PROCEDURES

- .1 Measure granular base materials in metric tons of material, incorporated to the works and accepted by the departmental representative. The price must included supply, loading and transportation to the works, installation, water and compaction of the aggregate base courses material.

1.4 REFERENCES

- .1 LC testing method of Transport Quebec laboratory.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Delivering aggregates as and when they are needed in order to avoid creating piles on site.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert unused granular material as approved by the departmental representative.

Part 2 Products

2.1 MATERIALS

- .1 Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and following requirements:

- .1 Crushed stone or gravel.
- .2 Gradations to be within limits specified when tested to LC 21-040. Gradation curve plotted on a semi-logarithmic diagram must be progressive and continue.
 - .1 Gradation to:

Sieve	% Passing
Designation	
	MG 20 (MTQ)

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	Sieve Designation	% Passing
	31,5 mm	100
	20 mm	90 – 100
	14 mm	68 – 93
	5 mm	35 – 60
	1,25 mm	19 – 38
	0,315 mm	9 – 17
	0,080 mm	2 – 7
.3	Intrinsic characteristic to following test :	
.1	* Methylene blue (LC 21-255) : $\leq 0,20$	
.2	Los Angeles (LC 21-400) : ≤ 50	
.3	Micro-Deval (LC 21-070) : ≤ 35	
.4	MD + LA : ≤ 80	
.5	*Organic material (LC 31-228) : $\leq 0,8$	
	*for aggregates from sand or gravel pit.	

Part 3 Execution

3.1 SEQUENCE OF OPERATION

- .1 Place granular base after sub-base surface is inspected and approved by the departmental representative.
- .2 Placing
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Begin spreading base material on crown line or on high side of one-way slope.
 - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
 - .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. The departmental representative may authorize thicker lifts (layers) if specified compaction can be achieved.
 - .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .9 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment
 - .1 Compaction equipment to be capable of obtaining required material densities.
- .4 Compacting
 - .1 Compact to density not less than 100% corrected maximum dry density in accordance with section 31 05 10 - Corrected Maximum Dry Density.

- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density.
- .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by the departmental representative.
- .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.2 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.3 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by the departmental representative

3.4 MATCHING.

- .1 The matching between finished base surface and adjacent pavement will not exceed 5% on 20 meters.

3.5 SHOULDER RESHAPING WITH GRANULAR

- .1 Once the paving works was completed, perform the shoulder reshaping with aggregate base course material.
 - .1 The aggregate base course material must be spread on the edge of the pavement only when the temperature of the installed bituminous mix is under 50C.
 - .2 The aggregate base course material must be spread, levelled and compacted in a manner to shape the shoulder at the specified transverse slope.
 - .3 The aggregate base course material left in the pavement must be removed.
 - .4 The shoulder reshaping works must be finished inside the following delay:
 - .1 For the 3m wide strip adjacent to movement area; before any period of operation.
 - .2 For the access road; at least 48 hour after paving works.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and application of asphalt tack coat to an existing asphalt or concrete surface prior to asphalt paving.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 74 11 – Cleaning.
- .3 Section 32 11 23 - Aggregate base courses.
- .4 Section 32 12 16 – Asphalt Paving.

1.3 REFERENCES

- .1 Specification 4105 (2004-12-15) of MTQ (Ministère des transports du Québec).

1.4 MEASUREMENT PROCEDURES

- .1 Tack coat will not be measured. The coast for this section must be included in section 32 12 16 – Asphalt paving.

1.5 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two - 4 L samples of asphalt Tack coat material proposed for use in clean, airtight, plastic cans to the departmental representative, at least 2 weeks prior to beginning Work.
- .3 Provide access on tank truck for departmental representative to sample asphalt material to be incorporated into Work, in accordance with ASTM D140-00.

1.6 QUALITY ASSURANCE

- .1 Submit manufacturer's test data and certification that bitumen emulsion material meets requirements of this section.

Part 2 Products

2.1 MATERIALS

- .1 Bitumen emulsion : to spec 4105 of Ministère des Transports du Québec. Binder type RS-1, SS-1 or CSS-1, as per the recommendations of CCDG.

2.2 EQUIPMENT

- .1 Pressure distributor to be:
 - .1 Designed, equipped, maintained and operated so that asphalt material can be:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 5 m.
 - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and with an allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distributed in uniform spray without atomization at temperature required.
 - .2 Equipped with meter, registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
 - .3 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
 - .4 Equipped with an easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
 - .5 Equipped with accurate volume measuring device or calibrated tank.
 - .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
 - .7 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution

3.1 APPLICATION

- .1 Obtain departmental representative approval of surface before applying asphalt prime coat.
- .2 Bitumen emulsion:
 - Tack coat layer: application ratio of 0.2L/m² max.
 - Prime coat layer: application ratio of 1.5L/m² max.
 - .1 Apply asphalt tack coat evenly to pavement surface as directed by departmental representative.
 - .1 Spread a thin coat of tack coat between the different lifts and on old pavement during construction and as directed by departmental representative.
 - .2 Only if as directed by departmental representative, apply asphalt tack coat only on clean and dry surface.
 - .3 Apply asphalt tack coat only on unfrozen surface.
- .3 Do not apply asphalt tack coat when air temperature is less than 10°C or when rain is forecast within 2 hours of application.

- .4 Where traffic is to be maintained, treat no more than one half of width of surface in one application.
- .5 Avoid overlap on joints.
- .6 Do not apply tack coat on surface that will be visible after paving.
- .7 Keep traffic off tacked areas until asphalt tack coat has set.
- .8 Re-tack contaminated or disturbed areas as directed by departmental representative.
- .9 Permit asphalt tack coat to set before placing asphalt pavement.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 These sections cover the requirements about the fabrication and the installation of hot asphalt concrete paving.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 74 11 – Cleaning.
- .3 Section 02 41 13.14 – Removal of Existing Asphalt Pavement.
- .4 Section 31 05 16 – Aggregate Materials.
- .5 Section 32 11 23 – Aggregate base courses.
- .6 Section 32 12 13.15 – Asphalt Tack and prime Coat.

1.3 RÉFÉRENCE

- .1 Specification from MTQ ((Ministère des transports du Québec).
 - .1 Specification 4101 - Asphalt binder (Liants bitumineux).
 - .2 Specification 4202 – Hot mix LC method (Méthode LC).
 - .3 Specification 2101 – Aggregates (granulates).
- .2 CCDG, Cahier des charges et devis généraux du MTQ (Ministère des transports du Québec).

1.4 MEASUREMENT PROCEDURES

- .1 The asphalt pavement will be measured in metric tons of material incorporated to the works and accepted by the departmental representative. The price must included the supply and installation of the asphalt tack coat and the supply and installation of new bituminous pavement with a thickness of 65mm or 100mm as describe on drawings.

1.5 PRODUCT DATA

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit asphalt concrete mix design and trial mix test results to departmental representative for approval at least 4 weeks prior to commencing work.
- .3 Submit calibration charts for each cold and hot aggregates bins.
- .4 Asphalt Binder:
 - .1 While buying the Asphalt Binder and before sending it to the site, Contractor will provide to departmental representative, all tests results done on each batch.

- .2 All batches will be rejected and will not be sent to the site if they do not comply with this section.
- .3 Before sending any batch to the site, Contractor will submit:
 - .1 Minimal and maximal storage temperature.
 - .2 Minimal and maximal mixing temperature.
 - .3 Minimal and maximal paving temperature.
 - .4 Minimal and maximal compacting temperature (Minimal temperature will not be lower than 100°C).
 - .5 All other helpful information.
- .4 At least 3 weeks prior to commencing work, submit viscosity temperature chart for asphalt binder to be supplied showing either Saybolt-Furol viscosity in seconds or kinematic viscosity in centistokes, temperature range 105° to 175°C.
- .5 Submit manufacturer's test data and certification that asphalt binder meets requirements of this section and to specification 4104 – Binders (Bitumes) from MTQ.

1.6 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Inform departmental representative of proposed source of aggregates at least 4 weeks prior to beginning Work and provide access for sampling.
- .3 During the production of aggregates, Contractor will have to submit, daily, all his testing results proving the crushing consistency (sieve analysis) and all other tests results proving that aggregates are in accordance with this section (Los Angeles, soundness, sand equivalent etc.) to the departmental representative.
- .4 Asphalt Binder:
 - .1 While producing Asphalt Binder, submit typical samples from each batch produce for this contract.
 - .2 In any time, Contractor will give departmental representative free access to production, quality control, storage and loading facilities.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles.
- .2 Stockpile fine aggregate separately from coarse aggregate, although separate stockpiles for more than two mix components are permitted.
- .3 Provide approved storage, heating tanks and pumping facilities for asphalt cement.
- .4 Asphalt Binder:
 - .1 Submit to departmental representative copies of freight and waybills for asphalt cement as shipments are received.
 - .2 All Asphalt Binder containers will be identified as per:
 - .1 The Asphalt Binder Performance Grade
 - .2 The Batch Number

- .3 The Production Date
- .4 The Producer Identification
- .5 The Distributor Identification
- .3 Provide approved storage, heating and pre-heating tanks with agitator and pumping facilities for Asphalt Binder.
- .4 Contractor will be careful not to mix the different types of Asphalt binders.
- .5 Contractor will use a full batch before using another one.

Part 2 Products

2.1 MATERIALS

- .1 Asphalt Binder: to MTQ specifications number 4101, grade PG 58-34.
- .2 Asphalt concrete mix conform to specification 4202 – Hot mix formulated according to LC method of MTQ:
 - .1 For new bituminous pavement of 100mm thick :
 - .1 Surface coarse: type ESG-10, thickness of 40mm.
 - .2 Base coarse: type ESG-14, thickness of 60m.
 - .2 For new single layer bituminous pavement:
 - .1 Surface coarse: type ESG-10, thickness of 65mm.
- .3 Do not use aggregates having known polishing characteristics in mixes for surface courses.
- .4 Aggregates Categories for hot mix :
 - .1 Coarse aggregates:
 - .1 Intrinsic categories: cat. 3.
 - .2 Fabrication categories: cat. b.
 - .2 Fine aggregates
 - .1 Intrinsic and fabrication categories: cat. 2
- .5 Complementary characteristic of aggregates for hot mix:

Loss by washing
 (Particles <0,080 mm)
 A23.2-5A (Grav. & sand) 1,0

Loss by washing
 (Particles <0,080 mm)
 A23.2-5A(Quarry) 1,5

Polishing
 Coefficient by 0,45

Projection(LC21-102)

Fine aggregates

Clay lumps

And friable

Particles

(NQ2560-250)% max. 2,0

2.2 EQUIPMENT

- .1 Pavers: mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- .2 Joint Heater equipment: « Poweray Infrared » type or equivalent.
- .3 Rollers: sufficient number of type and weight to obtain specified density of compacted mix.
- .4 Haul trucks: sufficient number and of 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.
 - .4 Use only trucks which can be weighed in single operation on scales supplied.
- .5 Hand tools:
 - .1 Lutes or rakes with covered teeth for spreading and finishing operations.
 - .2 Tamping irons having mass not less than 12 kg and bearing area not exceeding 310 cm² for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Departmental representative, may be used instead of tamping irons.
 - .3 Straight edges, 4.5 m in length, to test finished surface and one will be supplied to departmental representative.

2.3 MIX DESIGN

- .1 As per specification,
 - .1 4202 - Hot mix formulated according to LC method of MTQ.

Part 3 Execution

3.1 PREPARATION

- .1 As per CCDG and as per indications on drawings.

3.2 TRANSPORTATION OF MIX

- .1 Transport mix to job site in clean vehicles free of foreign material.

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- .2 Paint or spray truck beds with limewater, soap or detergent solution, or non petroleum based commercial product, at least daily or as required. Elevate truck bed and thoroughly drain. No excess solution to remain in truck bed.
- .3 Deliver material to paver at uniform rate and in an amount within capacity of paving and compacting equipment.
- .4 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at temperature within range as directed by the departmental representative, but not less than the one supplied by the asphalt cement producer.
- .5 Hot mix to transported on long distance must be transported as following:
 - .1 Use only trucks equipped with heated box and covered with insulated liner.
 - .2 At loading point, loaded mix temperature must not be under 15 degrees of the mixing temperature.
 - .3 Do not overheat the mix above the maximal temperature specified by the binder manufacturer.

3.3 PLACING CONDITION AND COMPACTION

- .1 As per CCDG exigencies and as per following exigencies:
- .2 When using an extension for a longitudinal joint, the extension will be equipped with heat, vibratory and an endless screw (auger) extension.
- .3 While paving, Contractor will use a joint heater approved by Engineer before laying new pavement. The equipment used to heat asphalt concrete will be designed specifically for those works and its efficacy will be recognized. And this equipment will be attached to the paver.
- .4 A tack coat binder must be applied to the pavement uniformly and progressively and let it cure. Avoid passage of vehicles on fresh installed binder coat. The surface covered with tack coat must be covered inside the same day.
- .5 The bituminous mix must be compacted as soon as possible after installation, begin by joints and edge of pavement, and from bottom of the slope to the high point. That operation must continue until satisfactory compactness.

3.4 FINISH TOLERANCES

- .1 Finished asphalt surface to be within 5mm of design elevation but not uniformly high or low.
- .2 Finished asphalt surface not to have irregularities exceeding 5mm when checked with 4.5 m straight edge placed in any direction.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 01 35 29.06 – Health And Safety Requirements.
- .4 Section 32 12 16 – Asphalt paving.

1.2 MEASUREMENT FOR PAYMENT

- .1 Pavement marking will be paid as a lump sum. The price must include the supply and installation of the paint and the removal of the planned marking, the setting out of the new marks and the repaint of all the marking of the apron as indicated on drawings.

1.3 REFERENCES

- .1 American Society for Testing and Material (ASTM)
 - .1 D562, Standard test method for consistency of paints using the Stormer Viscometer.
 - .2 D711, Standard test method for No-Pick-UP Time of traffic paint.
 - .3 D1210, Standard test method for Fineness of pigment-Vehicle Systems by Hegman-type cage.
 - .4 D1475, Standard test method for Density of liquid coating, inks and related products.
 - .5 D2244, Standard test method for calculation of color differences from instrumentally measured color coordinates.
 - .6 D2369, Standard test method for volatile content of coatings
 - .7 D2371, Standard test method for pigment content of solvent-reducible paints.
 - .8 D4017, Standard test method for water in paints and paints materials by Carl Fisher method.
 - .9 E1347, Standard test method for color and color difference measurement by tristimulus (filter) colorimetry.
- .2 Ministère des Transports du Québec (MTQ), Laboratoire des chaussées (LC)
 - .1 LC 34-301, Peinture – Détermination du bioxide de titane.
 - .2 LC 34-505, Peinture – Détermination de la consistance à 5 °C.
 - .3 LC 34-506, Peinture – Détermination du degré de sédimentation par la méthode Patton.
 - .4 LC 34-507, Peinture – Détermination de la teneur en chromate de plomb.
 - .5 LC 34-508, Peinture – Détermination de la teneur en anhydride phthalique.

- .3 Ministère des Transports du Québec (MTQ), normes 10201; Peinture alkyde pour le marquage des routes.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit [two] copies of WHMIS MSDS in accordance with Section [01 35 29.06 - Health and Safety Requirements] [01 35 43 - Environmental Procedures].
- .3 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Low-Emitting Materials: submit listing of paints and coatings to comply with VOC and chemical component limits or restrictions requirements.

1.5 CLOSEOUT SUBMITTALS

- .1 Operations and Maintenance Data: submit information on materials relative to work of this Section for inclusion in operations and maintenance manual and as follows:
 - .1 Technical data sheet of paint and product utilised.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Paint as per the following specifications:

Physical and chemical characteristic	Testing method	Requirements	
		Max.	Min.
Consistency (KU)			
at 24 °C	ASTM D562	75	85
at 5 °C	LC34-505	-	135
Drying (min.)	ASTM D711	7	20
Fineness of grind (µm)	ASTM D1210	80	-
Bleeding	ASTM D969	-	4
White paint		4	-
Yellow paint		6	
Volatile organic contents (COV) (% weight)	ASTM D2369		
White paint		28	32
Yellow paint		26	31
Red paint		-	-
Water content (% weight)	ASTM D4017	1	-
Powdery content (% weight)	ASTM D2371		
White paint		51	55
Yellow paint		52	57
Phthalic anhydride (%weight) of non volatil binder	LC 34-508	32	37
Density (kg/l)	ASTM D1475		
White paint, Yellow paint		Value at approval	
Black pigment		Value at approval	

- .1 The paint must satisfy all requirements of the MTQ in matter of pavement markings.
 - .1 White color: MTQ HOM 8010-201-08 Alkyde 462-742.
 - .2 Yellow color: MTQ HOM 8010-201-07 lead free 462-784.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation .
 - .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions have been rectified.

3.2 EQUIPMENT REQUIREMENTS

- .1 Paint applicator: approved pressure type with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.

3.3 APPLICATION

- .1 Pavement markings: lay out pavement markings as indicated on drawings.
- .2 Unless otherwise approved by Departmental Representative, apply paint only when air temperature is above 10 degrees C, wind speed is less than 50 km/h and no rain is forecast within next 6 hours.
- .3 Apply traffic paint evenly at rate of 2.5 m²/L.
- .4 Do not thin paint unless approved by Departmental Representative.
- .5 Symbols and letters to dimensions indicated.
- .6 Paint lines: of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.

3.4 TOLERANCE

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION OF COMPLETED WORK

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 32 91 19.13 – Topsoil placement and grading.

1.2 MEASUREMENT AND PAYMENT

- .1 Preparation of sub-grade for placing of topsoil and the installation of topsoil and testing will not be measured separately but will be part of this section.
- .2 Payment for seeding will be made at unit price bid per square metre of actual surface measurements taken and computed by Departmental Representative. Areas of blending into existing turf grass will not be measured for payment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for seed, and fertilizer.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.
- .3 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL
- .4 Samples:
 - .1 Submit 0.5 kg container of each type of fertilizer used.
- .5 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .6 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
 - .2 Fertilizer must be dry.
- .3 Storage and Handling Requirements:
 - .1 Store fertilizer off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

- .4 Packaging Waste Management: as specified in Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 WARRANTY

- .1 For seeding, 12 months warranty period is extended to 1 full growing season.
- .2 Contractor hereby warrants that seeding will remain free of defects in accordance with General Conditions, but for 1 full growing season.
- .3 End-of-warranty inspection will be conducted by Departmental Representative.

Part 2 Products

2.1 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
 - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
 - .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
 - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
 - .6 Ph value: 6.5 to 8.0.
- .2 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded particle minimum size: 5 mm.
- .3 Sand: washed coarse silica sand, medium to coarse textured.
- .4 Organic matter: compost Category A in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
- .5 Limestone:
 - .1 Ground agricultural limestone.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .6 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.2 GRASS SEED

- .1 Canada "Certified" seed, "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
 - .1 Grass seed mixture.

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- .1 Mixture composition:
 - .2 Fescue, creeping red 30%
 - .3 Fescue, Duquette 20%
 - .4 Fléode des Prés 20%
 - .5 Canada bluegrass 20%
 - .6 Bentgrass 5%
- .2 In packages individually labelled in accordance with "Seeds Regulations" and indicating name of supplier.

2.3 WATER

- .1 Free of impurities that would inhibit germination and growth.
- .2 Supplied by Departmental Representative at designated source.
- .3 Water for required irrigation will be supplied via hydrant or hose bib.

2.4 FERTILIZER

- .1 To Canada "Fertilizers Act" and Regulations.
- .2 Complete synthetic fertilizer with guaranteed minimum analysis as specified.

Part 3 Execution

3.1 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental representative.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 75 mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.2 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Spread topsoil to following minimum depths after settlement.

- .1 150 mm for seeded areas.

3.3 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.4 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for mechanical seeding installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.5 INSTALLERS

- .1 Use installers members in Good Standing of Horticultural Trades Association.

3.6 SEED BED PREPARATION

- .1 Do not perform work under adverse field conditions as determined by Departmental Representative.
- .2 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and commence work when instructed by Departmental Representative.
- .4 Fine grade surface free of humps and hollows to smooth, even grade, to contours to tolerance of plus or minus 15 mm, surface draining naturally.
- .5 Cultivate fine graded surface approved by Departmental Representative to 25 mm depth immediately prior to seeding.

3.7 SEED PLACEMENT

- .1 Ensure seed is placed under supervision of certified Landscape Planting Supervisor.
- .2 For mechanical seeding:
 - .1 Mechanical landscape drill seeder ("Brillion" type or equivalent) which accurately places seed at specified depth and rate and rolls in single operation.
 - .2 Use equipment and method acceptable to Departmental Representative.

- .3 On cultivated surfaces, sow seed uniformly at rate of:
 - .1 200 kg/hectare lawn grass mixture.
- .4 Blend applications 150 mm into adjacent grass areas to form uniform surfaces.
- .5 Sow half of required amount of seed in one direction and remainder at right angles as applicable.
- .6 Incorporate seed by light raking in cross directions.
- .7 Consolidate mechanically seeded areas by rolling area if soil conditions warrant or if directed by Departmental Representative with equipment approved by Departmental Representative immediately after seeding.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean and reinstate areas affected by Work.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Divert unused fertilizer from landfill to official hazardous material collections site approved by competent authority.

3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of seed application until acceptance by Departmental Representative:
 - .1 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .3 Cut grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass.

3.10 FINAL ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
 - .1 Areas are uniformly established free of rutted, eroded, bare or dead spots and extent of weeds apparent in grass is acceptable.
 - .2 Areas have been cut at least twice.
 - .3 Areas have been fertilized.

- .2 Areas seeded in fall will be accepted in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

END OF SECTION