



**SPECIFICATION NO. 10.0
LANDSCAPING**

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10.1 SCOPE

This specification covers the landscaping of lots and rights -of-way for the purpose of improving drainage, soil stability, and/or aesthetic appearance.

Depending on the individual contract, landscaping may require only site grading, or site grading with the addition of topsoil or it may require all of the above with the addition of seed, sod, trees or shrubs.

GENERAL CONDITIONS

10.2 PROTECTION

- a) The Contractor must prevent damage to survey pins and monuments, fencing, trees, landscaping, natural features, bench marks, existing buildings, existing pavement, surface or underground utility lines which are to remain and make good any damage.
- b) Known underground and surface utility lines and buried objects are indicated on site plan, but the exact location of all utilities is the contractor's responsibility.

10.3 ROUGH GRADING

- a) The Contractor shall obtain approval of excavated or graded material used as fill for grading work, and protect approved material from contamination.
- b) Rough grade to levels, profiles, and contours allowing for surface treatment as indicated by the Engineer or as shown in the Standard Drawings.
- c) Slope rough grade away from buildings at a minimum 2% slope.
- d) Grade ditches to depth, cross-section and longitudinal profile as indicated.
- e) Prior to placing fill over existing ground, scarify surface to depth of 100 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted soil.
- f) Compact filled and disturbed areas to maximum dry density to ASTM D698, method C, D as follows:
 - i. 85% under landscaped areas.
 - ii. 100% under paved and walk areas.
- g) Do not disturb soil within branch spread of trees or shrubs, which will remain.
- h) If the placement of additional topsoil is not required, the Contractor must grade soil to eliminate uneven areas and low spots so as to ensure positive drainage. He will remove soil contaminated with toxic materials, such as oil, which inhibit plant growth. The Contractor must dispose of removed materials as directed by Engineer.
- i) Remove surface debris, roots, vegetation branches and stones in excess of 50 mm diameter.

10.4 TESTING

- a) Inspection and testing of soil compaction will be carried out by designated testing laboratory if requested by the Engineer.
- b) Costs of tests will be paid by Owner.

10.5 REMOVAL OF TOPSOIL

- a) Removal of topsoil from areas to be excavated, paved, regraded or the entire site may be specified in special specifications. The Contractor may strip topsoil only when dry enough

- to prevent contamination with sub-grade material.
- b) The Contractor must not handle topsoil in wet or frozen conditions.
- c) The Contractor shall stockpile topsoil on site where directed. Piles are not to exceed 3 m in height.

10.6 SURPLUS MATERIAL

- a) Remove surplus material from site as directed by Engineer.
- b) Remove material unsuitable for fill, grading or landscaping from site as directed.
- c) The Contractor is responsible for the location, purchase and maintenance of the dumpsite.

10.7 MATERIALS

- a) Topsoil: friable, neither heavy clay nor of very light sandy nature consisting of 45% sand, 25% silt, 20% clay and a minimum of 10% organic matter by volume, pH value of 6 to 7. Free from subsoil, roots, vegetation, debris, toxic materials, stones over 50 mm diameter and all toxic materials.
- b) Planting soil for planting of trees, shrubs, and ground covers: mix 9 parts topsoil with 1 part peat moss. Incorporate bone meal into planting soil at rate of 3 kg/cubic metre of soil mixture.
- c) Peat moss:
 - i. Derived from partially decomposed fibrous or cellular stems and leaves of species of Sphagnum Mosses.
 - ii. Elastic and homogeneous, brown in colour.
 - iii. Free of wood and deleterious material which could prohibit growth.
 - iv. Shredded particle maximum size: 5 mm.
 - v. ASTM D2607
 - vi. Sand: to CSA A82.56, well washed and free of impurities, chemical or organic matter.
- d) Weed Killer
 - i. Type 1: 2, 4-D amine.
 - ii. Type 2: 2, 4-D mecoprop and dicamba.
- e) Pest and disease controls: type and chemical content as required. Use only products registered for use under Federal and Provincial Pesticides Legislation and conform to municipal bylaws.
- f) Water: potable, free of impurities that would inhibit germination applied at a rate sufficient to achieve 100 mm penetration per application. Apply water in a soft spray to avoid "packing" of the soil. Move sprinklers as required to avoid running of water and return to those areas until moisture penetration has been achieved. Do not impede the use of sidewalks and other paved areas.
- g) Limestone:
 - i. Ground agricultural limestone containing minimum 85% of total carbonates.
 - ii. Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

- h) Bonemeal:
 - i. Raw bonemeal, finely ground with minimum analysis of 3% nitrogen and 20% phosphoric acid.
- i) Fertilizer:
 - i. Complete commercial synthetic fertilizer with minimum 65% insoluble nitrogen.
 - ii. Formulation ratio: as specified.
 - iii. Applied at manufacturers recommendations, but at no less than 1 kg nitrogen per 100 square meters. Rectify uneven spreading as soon as the problem is apparent by spreading additional fertilizer.
 - iv. Mix fertilizer thoroughly to full depth of topsoil.
 - v. Apply fertilizer at least one week after limestone application.

10.8 DELIVERY AND STORAGE

The Contractor shall deliver and store fertilizer, lime and bonemeal in waterproof bags showing mass analysis and name of manufacturers.

10.9 GENERAL WORKMANSHIP

- a) Notify Engineer at least 7 days in advance of start of operations.
- b) Store on-site equipment and materials in approved location.
- c) Keep site will drained.
- d) Immediately clean up any topsoil or debris spilled onto pavement.
- e) Collect and dispose of debris, excess or deleterious material on a daily basis.
- f) The Contractor is responsible for immediate replacement or repair of any damage caused by pest, disease, vandalism, or mechanical breakdown.
- g) Restore stockpile sites to a condition acceptable to the Engineer.

NOTE: END-OF-WARRANTY INSPECTION WILL BE CONDUCTED

TOPSOIL AND SITE GRADING

10.10 MATERIALS

See Specification No. 10.7

10.11 SOURCE QUALITY CONTROL

- a) Inspection and testing of topsoil will be carried out by Contractor.
- b) Inform Engineer of proposed source of topsoil to be supplied and provide access for sampling by Engineer or Testing Laboratory personnel. Acceptance of topsoil is subject to inspection and/or soil analysis test results. The Contractor must not commence work until topsoil is accepted by Engineer.
- c) Inspection and testing of topsoil will be carried out by testing laboratory designated by Contractor. The Contractor will pay for the costs of tests.
- d) Topsoil from source must be tested prior to stripping and stockpiling; for clay, sand and silt, NPK, Mg, soluble salt content, pH value, growth inhibitors and soil sterilants. The Contractor shall:
 - i. Use 25 mm diameter sampling tube or spade and in presence of Engineer take 25 samples per hectare to full depth of topsoil at random across entire area to be

stripped. Mix samples together thoroughly before submitting for testing.

- ii. Submit 0.5 kg sample of topsoil to testing laboratory and indicate present use, intended use, type of topsoil and quality of drainage. Prepare and ship sample in accordance with provincial regulations and testing laboratory requirements.
- iii. Determine required limestone treatment to bring pH value of soil to 6 to 7 level.
- iv. Submit two copies of soil analysis and recommendations for corrections to Engineer.
- v. The Contractor shall deliver and store topsoil in areas designated by the Engineer. Piles are not to exceed 3 m in height.

10.12 SCHEDULING OF WORK

The Contractor shall schedule placing of topsoil and finish grading to permit slaying of sod or seeding operations under optimum conditions.

10.13 SPREADING OF TOPSOIL OR PLANTING SOIL

- a) Spread topsoil after Engineer has inspected and approved subgrade.
- b) Spread topsoil with adequate moisture in uniform layers over approved, unfrozen subgrade, where seeding, sodding, planting is indicated.
- c) For sodded areas keep topsoil 15 mm below finished grade.
- d) Apply topsoil as indicated to minimum depth of 100 mm for seeded and sodded areas.
- e) Apply planting soil as indicated to following minimum depths: 300 mm for flower beds 500 mm for shrub beds
- f) Manually spread topsoil/planting soil around trees, shrubs and obstacles.

10.14 SOIL AMENDMENTS

- a) Apply soil amendments at rate as specified and as determined from soil sample test.
- b) Mix soil amendments into full depth of topsoil prior to application of fertilizer.

10.15 FINISH GRADING

- a) Fine grade and loosen topsoil. Eliminate rough spots and low areas to ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
- b) Roll to consolidate topsoil for areas to be seeded or sodded leaving surface smooth, uniform, firm against deep foot printing, and with a fine loose texture to approval of Engineer.

10.16 REPAIR AND RENOVATION

Regrading:

- a) Remove sod and topsoil from areas requiring regrading. Regrade to new elevations with sub grade 100 mm below final grade.
- b) Remove excess material from site or supply and spread fill to bring sub grade to required elevations.
- c) After regrading subgrade, supply and spread topsoil to depth of 100 mm.

SOD

10.17 MATERIALS

- a) Nursery sod: quality and source to comply with standards outlined in "Guide Specification for Nursery Stock", Section 17, 1978 edition, published by Canadian Nursery Trade

Association.

- i. Number one Kentucky Bluegrass sod: grown from minimum mixture of 3 Kentucky Bluegrass cultivars.
 - ii. Number one Kentucky Bluegrass/Fescue sod: sod grown from minimum 40% Kentucky Bluegrass, 30% Creeping Red Fescue.
 - iii. Broken, dry, discoloured pieces will be rejected by Engineer.
- b) 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. Fertilize field sod minimum 2 weeks prior to lifting with 2:1:1 ratio fertilizer at rate of 0.5 kg nitrogen/100 square meters. Mow field sod as directed by Engineer prior to lifting and remove clippings.
- c) Source Quality Control:
- i. Obtain approval from Engineer of sod at source.
 - ii. When proposed source of sod is approved, use no other source without written authorization.
- d) Samples: submit one meter of sod.
- e) Scheduling: schedule laying of sod to coincide with topsoil operations.

10.18 LAYING OF SOD

- a) Prior to laying sod, obtain approval from Engineer that finished grade and depth of topsoil are satisfactory.
- b) Lay sod within 36 hours of being lifted.
- c) Laying sod during excessively wet conditions, at freezing temperatures or over, frozen soil is not acceptable.
- d) Lay sod in rows, perpendicular to slope, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- e) Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.
- f) Water sod immediately after laying to obtain moisture penetration into top 100 mm of topsoil.

10.19 TOP DRESSING OF SOD

- a) Top dress sod areas with dry, friable and clean topsoil having high humus content.
- b) Spread topsoil to thickness of 5 to 10 mm, filling in low and bare spots.
- c) Overseed top dressed area using 1 kg grass seed per 100 m squared with seed mixture of 50% Kentucky Bluegrass and 50% Creeping Red Fescue.
- d) Mix topsoil and seed by means of light raking. Roll with light roller and water, ensuring contact between sod, seed and top dressing.
- e) Water thoroughly and take precautions to prevent erosion of topsoil and seeding.
- f) Reseed at two week intervals where germination has failed.

10.20 RESODDING

Follow spec 10.18

10.21 PROTECTION OF SODDED AREA

Type and extent of barriers to protect sod area from damage, where required, shall be as specified in the contract documents.

10.22 MAINTENANCE

- a) Maintain sod area from start of installation until final acceptance.
- b) Water sod areas in sufficient quantities and at frequency required to maintain soil under sod continuously moist to depth of 75 to 100 mm.
- c) Cut grass to 40 mm when it reaches height of 60 mm. Remove clippings which will smother grassed areas.
- d) Maintain sod areas weed free.
- e) Fertilize sod areas one month after laying of sod with 2:1:1 ratio fertilizer. Spread evenly at rate of 1 kg of nitrogen/ 100 square meters and water in well.

10.23 ACCEPTANCE

- a) Sod areas will be accepted at final inspection provided that:
 - i. sod areas are properly established;
 - ii. sod is free of bare and dead spots and without weeds;
 - iii. no surface soil is visible when grass has been cut to height of 50 mm;
 - iv. sod areas have been cut minimum 2 times.
- b) Lawns sod in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

SEEDING

10.24 MATERIALS

Grass seed: to Federal and Provincial seed laws and having minimum germination of 85% and minimum purity of 97%. Deliver grass seed in original containers showing:

- a) analysis of seed mixture;
- b) percentage of pure seed;
- c) year of production;
- d) net mass;
- e) date when bagged and location;
- f) percentage germination;
- g) name and address of distributor;

10.25 SEED

Grass seed mixture:

- a) In ditch and creek areas the mix shall be:

Timothy	30%
Smooth Brome	20%
Creeping Red Fescue	20%
Intermediate Wheat Grass	15%

Alfalfa	10%
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Alsike	5%
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Sow grass seed at 200 kg/ha, with 350 kg/ha of fertilizer.

- b) In boulevard areas of residential zones the mix shall be:

50% Kentucky Bluegrass	
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50% Creeping Red Fescue	
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Sow grass seed at 200 kg/ha, with 350 kg/ha of fertilizer.

- c) In boulevard areas of commercial zones, large open spaces and general-purpose areas the mix shall be:

Creeping Red Fescue	40%
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Kentucky Bluegrass	30%
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Brome Grass	20%
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Red Top	5%
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White Dutch Clover	5%
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Clover should be double inoculated.

Sow grass seed at 200 kg/ha with 350 kg/ha of fertilizer.

10.26 PREPARATION OF SURFACES

- Cultivate areas to be seeded to 100 mm depth. Fine grade free of humps and hollows and free of deleterious and refuse material.
- Obtain Engineer's approval of topsoil grade and depth before starting seeding.

10.27 SEEDING

- Seed area during early spring; between 15th of August and August 30th; or as directed by the Engineer.
- Laying sod during excessively wet conditions, at freezing temperatures or over, frozen soil is not acceptable.
- Lay sod in rows, perpendicular to slope, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.
- Water sod immediately after laying to obtain moisture penetration into top 100 mm of topsoil.

10.28 TOP DRESSING AND RESEEDING

Follow Spec. 10.19

10.29 MAINTENANCE

- Ensure maintenance equipment is suitable to Engineer.
- Keep soil moist during germination period and adequately water grassed areas until accepted by Engineer.
- Apply water to ensure moisture penetration of 75 to 100 mm. Control watering to prevent washouts.

10.30 ACCEPTANCE

- a) Seeded areas will be accepted at final inspection provided that:
 - i. seeded areas are properly established;
 - ii. seeded area is free of bare and dead spots and without weeds;
 - iii. no surface soil is visible when grass has been cut to height of 50 mm;
 - iv. seeded areas have been cut minimum 2 times.
- b) Lawns seeded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

TREES, SHRUBS, AND GROUND COVER

10.31 SOURCE QUALITY CONTROL

- a) Obtain approval of plant material at source.
- b) Notify Engineer of source of material at least 7 days in advance of shipment. No work under this section is to proceed without approval.
- c) Acceptance of plant material at its source does not prevent rejection on site before or after planting operations.

10.32 SHIPMENT AND PRE-PLANTING CARE

- a) Co-ordinate shipping of plants and excavation of holes to ensure minimum time lapse between lifting and planting.
- b) Tie branches of trees and shrubs securely and protect plant material against abrasion, exposure and extreme temperature change during transit. Avoid binding of planting stock with rope or wire, which would damage bark, break branches or destroy natural shape of plant. Give full support to root ball of large trees during lifting.
- c) Cover plant foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, sawdust or other acceptable material to prevent loss of moisture during transit and storage.
- d) Remove broken and damaged roots with sharp pruning shears. Make clean cut and cover cuts over 100 mm diameter with wound dressing.
- e) Keep roots moist and protected from sun and wind. Heel-in trees and shrubs, which cannot be planted immediately, in shaded areas and water well.

10.33 WARRANTY

- a) The Contractor hereby warrants that plant material as itemized on plant list will remain free of defects in accordance with GC24, except the warranty period shall be 2 full growing seasons.
- b) End-of-warranty inspection will be conducted.
- c) Engineer reserves the right to extend Contractor's warranty responsibilities for an additional one year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

10.34 REPLACEMENT

- a) During warranty period, the Contractor will remove from site any plant material that has died or failed to grow satisfactorily as determined by Engineer.
- b) Replace plant material in the next planting season.
- c) Extend warranty on replacement plant material for a period equal to the original warranty

period.

- d) Continue such replacement and warranty until plant material is acceptable.

10.35 PLANT MATERIAL

- a) Annuals: use only compact, sturdy vegetative plants with well-developed root systems. Plants must not be crowded in flats and be sufficiently large by planting out time. Remove flower blossoms.
- b) Bulbs: plump, sound and free from blemishes and spots and of size as specified in Landscape Canada Guide Specification for Nursery Stock, 1978 edition.
- c) Trees, shrubs and perennials shall be suitable for climatic conditions of -40 degrees Celsius to +35 degrees Celsius as found in Zone #1 and #2 of the Meteorological Data Map of Canada, Department of Agriculture.

10.36 PLANTING OF ANNUAL FLOWERS AND BULBS

- a) Soil preparation: incorporate into topsoil sufficient peat moss and sand to obtain planting soil mixture consisting of: 6 parts loam soil, 3 parts peat moss, 1 part sand.
- b) Mix 15 kg of bone meal per 100 square metres in top 200 mm of flowerbeds and planters and apply 10-6-4 fertilizer at rate of 10 kg/100 square metres.
- c) Plant annuals in spring when danger of night frost has passed. Plant in quantities as indicated on drawings to produce mass of flowers in designated beds and planters.
- d) Water flowerbeds immediately after planting and obtain moisture penetration of 100 mm. During dry weather conditions, water twice more on 3 day intervals.
- e) Replace annuals, which fail to grow.
- f) Plant bulbs in fall at supplier's recommended depth. Provide protective cover of evergreen branches, or deciduous branches combined with leaves.

10.37 MATERIALS

- a) Stakes: wood 38 x 38 x 2400 mm.
- b) Cables and accessories: factory galvanized, cables, wire tighteners, eyebolts and turnbuckles. Use approved horticultural guy wire tightener.
- c) Guy wires: steel wire strand to CSA G4 at following sizes:
 - i. Shrubs and trees under 75 mm caliper use 2.5 mm wire.
 - ii. Trees 75 to 150 mm caliper use 3 mm wire.
 - iii. Trees 150 to 500 mm caliper use 3 strands of 4 mm wire. Twisted together or Grade 110, 8 mm strand cable.
- d) Eyebolts: coarse threaded galvanized steel at following sizes:
 - i. Trees 150-500 mm caliper use 10 mm diameter;
- e) Tree rings: fabricated from 3 mm galvanized wire encased in two ply reinforced 12 mm diameter rubber garden hose or equivalent.
- f) Wire mesh: galvanized, electrically welded.
- g) For tree guards use 1.4 mm wire with 25 x 50 mm mesh.
- h) For gunite reinforcing use 1.4 mm wire with 50 x 50 mm mesh.
- i) Reinforcing rod: 10 mm bars to CSA G30.12.
- j) Gunite concrete: to ACI 506-66.

- k) Fiberglass fabric: tight woven, min. 2.5 kg/m squared mass, 1 m wide.
- l) Root ball burlap: 150 g Hessian burlap.
- m) Tree wrapping material: new, clean, plain burlap strips minimum 2.5 kg/square metre mass and 150 mm wide.
- n) Dead man: old railway ties, or logs, 250 mm diameter by 1200 mm long or length same as diameter of root ball, whichever is greater.
- o) Anchors: wood stakes 38 x 38 x 500 mm long.
- p) Mulch: submit sample prior to shipping to site:
 - i. Peat moss: decomposed plant material, fairly elastic and homogenous, free of decomposed colloidal residue, wood, sulphur and iron containing minimum 60% organic matter by weight and moisture content not exceeding 15%. Shredded particles may not exceed 5 mm in size. Minimum pH value of peat 4.5, maximum 6.0.
 - ii. Bark chip mulch: chips from bark of coniferous trees, varying in size from 25 to 50 mm diameter.
 - iii. Wood chip mulch: chips, free of bark, small branches, leaves and varying in size from 50 to 75 mm and 5 to 20 mm thick.
- q) Anti-desiccant: wax-like emulsion to provide film over plant surfaces reducing evaporation but permeable enough to permit transpiration.
- r) Wound dressing: horticulturally accepted non-toxic, non-hardening emulsion.

10.38 PLANT MATERIAL

- a) Quality and source: comply with Guide Specification for Nursery Stock, 1978 Edition of Canadian Nursery Trades Association referring to size and development of plant material and root ball. Measure plants when branches are in their natural position. Height and spread dimensions refer to main body of plant and not from branch tip to branch tip. Use trees and shrubs of No.1 grade.
- b) Additional plant material qualifications:
 - i. Plant material obtained from areas with milder climatic conditions from those of site acceptable only when moved to site prior to the breaking of buds in their original location and heeled-in, in a protected area until conditions suitable for planting.
 - ii. Use trees and shrubs with strong fibrous root system free of disease, insects, defects or injuries and structurally sound. Use trees with straight trunks, well and characteristically branched for species. Plants must have been root pruned regularly, but not later than one growing season prior to arrival on site.
 - iii. Large trees must have been half root pruned during each of two successive growing seasons, the latter at least one growing season prior to arrival on site.
 - iv. Plant material that has come out of dormant stage and is too far advanced will not be accepted unless prior approval obtained.
- c) Cold storage: approval required for plant material which has been held in cold storage.
- d) Container-grown stock: acceptable if containers large enough for root development. Trees and shrubs must have grown in container for minimum of one growing season but not longer than two. Root system must be able to "hold" soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.
- e) Balled and burlapped: coniferous and broad-leafed evergreens over 500 mm tall must be dug with soil ball. Deciduous trees in excess of 3 m height must have been dug with large firm ball. Root balls must include 75% of fibrous and feeder root system. This excludes

use of native trees grown in light sandy or rocky soil. Secure root balls with burlap, heavy twine and rope. For large trees: wrap ball in double layer of burlap and drum lace with minimum 10 mm diameter rope. Protect root balls against sudden changes in temperature and exposure to heavy rainfall.

- f) Frozen ball for large trees: dig root ball in fall when soil conditions permit good ball formation. Mulch root ball to prevent intermittent freezing. Allow frost penetration of 100 to 150 mm, deeper penetration not permitted.
- g) Collected or native plant material: use only native trees indigenous to area into which they are to be transplanted. Select trees from reasonably open stands. Trees must have well developed crowns and must be characteristically branched. Not more than 40% of overall tree height may be free of branches.
- h) Substitutions to plant material as indicated on planting plan not permitted unless written approval has been obtained as to type, variety and size. Plant substitutions must be of similar species and of equal size as those originally specified.

10.39 WORKMANSHIP

- a) Stake out location of trees and planting beds as per planting plan. Obtain approval prior to excavation.
- b) Apply anti-desiccant in accordance with material manufacturer's instructions.
- c) Co-ordinate operations. Keep site clean and planting holes drained. Immediately remove soil or debris spilled onto pavement.

10.40 PLANTING TIME

- a) Plant deciduous plant material during dormant period before buds have broken. Plant material which is noted for spring planting only, must be planted in dormant period.
- b) Plant material imported from region with warmer climatic conditions may only be planted in early spring.
- c) When permission has been obtained to plant deciduous plant material after buds have broken, spray plants with anti-desiccant to slow down transpiration prior to transplanting.
- d) Plant evergreens in spring before bud break. Planting of such stock with root balls may start after middle of August. Apply anti-desiccant to evergreens before digging.
- e) When permission has been obtained, trees, shrubs and ground covers growing in containers may be planted throughout growing season.
- f) Plant only under conditions that are conducive to health and physical conditions of plants.
- g) Provide planting schedule. Extending planting operations over long period using limited crew will not be accepted.

10.41 EXCAVATION

- a) Shrub beds: excavate to minimum depth of 500 mm.
- b) Individual shrubs: excavate planting holes 500 mm deep and at least 500 mm wide.
- c) Small trees (up to 3.0 m): excavate holes 600 mm deep with diameter of 300 mm greater than root spread or root ball.
- d) Large trees: excavate to depth of at least 200 mm deeper than height of root ball, with width of 750 mm greater than diameter of root ball. In heavy soils, increase planting holes by 50 mm for each 100 mm of root ball diameter.
- e) Provide drainage for planting holes in heavy soil if natural drainage does not exist. Have method approved.

- f) Protect bottom of excavations against freezing.
- g) Remove water which enters excavations prior to planting. Ensure source of water is not ground water.

10.42 PLANTING

- a) Loosen bottom of planting hole to depth of 150 to 200 mm. Cover bottom of each excavation with minimum of 150 mm of topsoil mixture.
- b) Plant trees and shrubs vertically with roots placed straight out in hole. Orient plant material to give best appearance in relation to structure, roads and walks.
- c) Place plant material to depth equal to depth they were originally growing in nursery.
- d) With balled and burlapped root balls, loosen burlap and cut away minimum top 1/3 without disturbing root ball. Do not pull burlap or rope from under root ball. With container stock, remove entire container without disturbing root ball. Non biodegradable wrappings must be removed.
- e) During planting of bare-rooted stock, first shake backfill of planting soil among the roots.
- f) Tamp planting soil around root system in layers of 150 mm eliminating air voids. Frozen or saturated planting soil is unacceptable. When 2/3 of planting soil has been placed, fill hole with water. After water has completely penetrated into soil, complete backfilling.
- g) Build 100 mm deep saucer around outer edge of hole to assist with maintenance watering.
- h) When planting is completed, give surface of planting saucer a dressing of organic 10-6-4 fertilizer at rate of 12 kg/100 square metres for shrub beds or 40 to 50 g/m² of caliper for trees. Mix fertilizer thoroughly with top layer of planting soil and water in well.

10.43 TREE SUPPORT

- a) Tree support is shown on planting details of the standard drawings.
- b) Staking for trees up to 3 m and evergreens up to 2 m in height: backfill planting hole 2/3, drive support stake 900 mm into bottom of pit, taking care not to damage main roots. Place stake or anchor 150 mm away from trunk on side of prevailing wind. Fasten trunk to stake or anchor with tree-ring. Different methods of fastening tree trunk to stake or anchor are acceptable if no damage to bark of tree will occur. Obtain approval prior to using other methods.
- c) Tree stakes and wire mesh: protect trees indicated requiring tree guards. Encircle staked trees with galvanized wire mesh. Leave space of at least 150 mm between tree trunk and wire mesh. Fasten wire mesh to stake at 4 places using 3 mm wire.
- d) Guy wires for trees up to 150 mm caliper:
 - i. For deciduous trees taller than 3 m and evergreens taller than 2 m, fasten three wires to tree where a branch will prevent slipping down. Use tree rings to prevent abrasion of bark.
 - ii. Fasten guy wires to anchors at distance from tree base equal to height of where wire is attached to trunk. Break wires, install wire tighteners and tighten slightly.
 - iii. Where guy wires are used close to pedestrian traffic ways, fasten metal flags to wires to make them clearly visible.
 - iv. Use sufficient number of guy wires to support large shrubs.

10.44 WRAPPING

Wrap deciduous trees, whose caliper is 50 to 150 mm, spirally from ground up, to height of second branches. Treat trunk with paste of long residual insecticide, lindane or equivalent

before applying wrapping. Secure burlap with binder twine in opposite direction to burlap at 100 mm intervals. Place wrapping neatly and snugly with 40 mm overlap.

10.45 PRUNING

- a) Prune in dormant season but not during heavy frost. Prune heavy bleeders such as birch, hard maple when in full leaf. Prune shrubs which flower on the previous year's growth only after flowering.
- b) Employ clean sharp tools. Make cuts flush with main branch, smooth and sloping to prevent accumulation of water on cut. Do not leave little stumps on trunks or main branches. Remove dead and injured branches and branches that rub together causing damage to bark.
- c) Thin out crown of trees and/or shrubs without changing their natural shape or habitat. Do not damage lead branches.
- d) Remove smaller branches at juncture of limb from which they originate or cut at twig or bud pointing outward. Undercut larger branches to prevent tearing of bark.
- e) Give large cuts and damaged parts coating of wound dressing.
- f) Prune trees and shrubs according to accepted horticultural practices as outlined in the Pruning Manual, Publication No.1505 by Agriculture Canada.
- g) Prune trees and shrubs after planting, as indicated, to compensate for loss of roots suffered during transplanting. Postpone pruning of those trees where heavy bleeding may occur until in full leaf. Employ clean sharp tools and make cuts flush with main branch, smooth and sloping as to prevent accumulation of water. Remove projecting stumps on trunks or main branches. Remove dead and injured branches and branches that rub causing damage to bark. Trim out crown of trees and shrubs without changing their natural shape. Do not damage lead branches or remove smaller twigs along main branches. Treat cuts in excess of 20 mm diameter and damaged parts with application of wound dressing.

10.46 MULCHING

Obtain approval of Engineer before mulching material is applied. Loosen soil in planting beds and pits and remove debris and weeds. Spread mulch to minimum thickness of 50 mm. Mulch material susceptible to blowing must be moistened and mixed with topsoil before applying. When mulching is placed in fall, place immediately after planting. When mulch is placed in spring, wait until soil has warmed up.

MAINTENANCE

10.47 MAINTENANCE

Note: Use this section when no separate maintenance contract is let.

- a) Water once a week for first 4 weeks and then sufficiently thereafter to maintain optimum growing conditions. Ensure adequate moisture in root zone at freeze-up.
- b) Keep soil, within confines of planting saucer around trees and planting beds, shallowly cultivated and free from weeds.
- c) Spray plants to combat pests and diseases. Do not use DDT or sprays prohibited by Agriculture Canada.
- d) Keep tree guards and guy wires in proper repair.
- e) Provide adequate protection against winter damage including damage caused by rodents.
- f) Maintain plant material from date of planting up to end of warranty period.
- g) Remove trunk wrapping, tree stakes, guy wires, eyebolts at end of warranty period.

MEASURE AND PAYMENT**10.48 MEASURE AND PAYMENT**

Payment for site grading, laying sod, seeding, and ground cover shall be by unit price bid per square meter. Trees shall be paid for at the unit prices bid per unit (each).

All bid prices shall be payment in full for the supply of material, installation of material, maintenance and all labour, machinery, and tools required to complete the works to specification.

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