Part 1 General

1.1 REFERENCES

.1 Canadian Standard Association (CSA)

.1 CAN/CSA-A23.1-09, Concrete Materials and Methods of Concrete Construction.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM D 698-07el, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

1.2 SUBSURFACE INVESTIGATION REPORT

.1 Subsurface investigation report is included in the specification following this section.

1.3 REGULATIONS

.1 Shore and brace excavations, protect slopes and banks and perform all work in accordance with Provincial and Municipal regulations whichever is more stringent.

1.4 TESTS AND INSPECTIONS

.1 Testing of materials and compaction of backfill and fill will be carried out by testing laboratory designated by Departmental Representative.

.2 Not later than one week before backfilling or filling, provide to designated testing agency, 23 kg sample of backfill for fill material proposed for use.

.3 Do not begin backfilling or filling operations until material has been approved for use by Departmental Representative.

.4 Not later than 48 hours before backfilling or filling with approved material, notify Departmental Representative so that compaction tests can be carried out by designated testing agency.

.5 Before commencing work, conduct, with Departmental Representative, condition survey of existing structures, trees and other plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.

1.5 BURIED SERVICES

.1 Before commencing work establish the location of all buried services on and adjacent to the site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations. Cap cut-offs.

1.6 PROTECTION

.1 Protect excavations from freezing.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

Part 2 Products

2.1 MATERIALS

.1 Gravel: mixture of natural gravel, crushed gravel or crushed stone, and natural or crushed sand, meeting the gradation limits specified below for each type.

Fill Type	Sieve Size	% Passing By Weight
150 mm Gravel	150	100
	50	50 - 85
	5	30 - 50
	0.8	20 - 30
	0.063	2 - 9
80 mm Gravel	80	100
	50	78 - 95
	20	42 - 82
	10	31 - 70
	5	22 - 60
	2	15 - 47
	0.4	9 - 28
	0.16	5 - 16
	0.063	2 - 9
Pit Run Gravel	200	100
	10	40 - 100
	0.063	0 - 5

.2 Crushed Gravel: mixture of crushed gravel or stone and natural or crushed sand, meeting the gradation limits specified below for each type and meeting following requirements:

.1 Liquid limit of material passing 0.4 mm sieve shall not exceed 25%.

.2 Plasticity index of material passing 0.4 mm sieve shall not exceed 6%.

.3 Minimum of 50%, by weight, of material retained on 5 mm sieve shall have at least one face resulting from fracture.

Fill Type	Sieve Size	% Passing By Weight
25 mm Crushed Gravel	25	100
	10	57 - 79
	5	38 - 63
	0.8	14 - 37
	0.4	9 - 28
	0.16	6 - 19
	0.063	2 - 7
20 mm Crushed Gravel	20	100
	10	64 - 86
	5	42 - 69
	2	24 - 45
	0.8	17 - 37
	0.4	10 - 29
	0.16	5 - 20
	0.063	2 - 8

.3 Sand: natural or crushed sand, meeting the gradation limits specified below for each type.

Fill Type	Sieve Size	% Passing By Weight
Coarse Sand	5	100
	2	80 - 90
	0.4	40 - 55
	0.063	2 - 10

.4 Native Excavated Material: Clean, low plastic, native excavated soil, free from organic matter, frozen materials, stones larger than 75 mm, building debris and other foreign substances.

.5 Imported Clay: inorganic fine grained soil, low plastic, free from organic matter, stones larger than 50 mm, building debris, and other foreign substances.

Part 3 Execution

3.1 CLEARING AND GRUBBING

.1 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.

.2 Remove stumps and tree roots below footings, slabs, and paving, and to 600 mm below finished grade elsewhere.

.3 Dispose of cleared and grubbed material off site daily to disposal areas acceptable to authority having jurisdiction.

3.2 EXCAVATION

.1 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil. Stockpile topsoil on site for later use.

.2 Excavate as required to carry out work, in all materials met. Do not disturb soil or rock below bearing surfaces. Notify Departmental Representative when excavations are complete. If bearing surfaces are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work. Excavation taken below depths shown without Departmental Representative's written authorization to be filled with concrete of same strength as for footings at Contractor's expense.

.3 Excavate for slabs and paving to subgrade levels. In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.

3.3 BACKFILLING

.1 Inspection: do not commence backfilling until fill material and spaces to be filled have been inspected and approved by Departmental Representative.

.2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.

.3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.

.4 Compaction of subgrade: compact existing subgrade under walks, paving, and slabs on grade, to same compaction as specified for fill. Fill excavated areas with selected subgrade material compacted as specified for fill. Moisture condition as required.

.5 Placing:

.1 Place backfill, fill and basecourse material in 150 mm lifts. Add water as required to achieve specified density.

.6 Compaction: compact each layer of material to following densities for material to ASTM D 698:

.1 To underside of basecourses of slabs-on-grade: 98%.

.2 Basecourse of slabs-on-grade: 100%.

.3 Elsewhere: 95%.

.7 Under floor slabs: minimum 150 mm thick layer of 20 mm thick crushed gravel.

.8 Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.

.9 Against foundations (except as applicable to trenches and under slabs and paving): excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.

.10 Underground tanks: use sand to bottom of granular basecourses or to bottom of topsoil, as applicable.

3.4 GRADING

.1 Grade so that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by the Departmental Representative. Grade to be gradual between finished spot elevations shown on drawings.

3.5 SHORTAGE AND SURPLUS

.1 Supply all necessary fill to meet backfilling and grading requirements and with minimum and maximum rough grade variance.

.2 Dispose of surplus material off site.

END OF SECTION