SECTION 204

GRADING OF FILL

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204.01 FILL MATERIALS

All material from cuts, excavation for foundation and ditch excavation shall be used in fill construction, provided the material is required to complete fills and the material is suitable for this purpose.

All materials proposed to be incorporated into fills shall be subject to testing by the Owner's Representative to determine their suitability for the portions of the fill in which it is proposed that they be placed.

Only materials approved by the Owner's Representative shall be placed in fills.

Fill material shall not contain frozen lumps, weeds, sod, roots, logs, stumps or any other objectionable matter.

Material from rock cuts and quarries shall be thoroughly fragmented, well graded with fragments of greatest dimension not exceeding 500 millimetres.

Surface boulders and stones larger than 150 millimetres present in Other Material may be placed in fills provided they are placed in accordance with the requirements of this specification.

204.02 PLACING OF FILL

The Contractor shall remove such grubbing and unsuitable material, as the Owner's Representative requires, from the area on which the fill is to be placed. The Owner's Representative shall stake the limits of the toe of the fill. All culverts and drainage structures shall be constructed and no fill material shall be placed in the area until the ground has been inspected and approved by the Owner's Representative.

The Contractor shall construct fills to the lines, grades and cross sections required by the Owner's Representative.

The Contractor shall maintain a minimum 15 metre undisturbed buffer zone between the fill area and watercourses to be crossed until such time that the crossing structure is ready for installation. The Owner's Representative shall determine the width of the buffer strip.

Fill construction shall not be performed when the ground is frozen or when the fill material is frozen or when a blanket of snow prevents proper compaction.

On no account will the Contractor be permitted to construct a core through the fill and complete the fill by side dumping.

Fill material shall be placed and spread in layers of a loose thickness, before compaction, not exceeding 500 millimetres for the full width of the fill. If, in the opinion of the Owner's Representative, this thickness does not respond to compaction methods, the Owner's Representative may order this thickness reduced. The thickness of each successive layer shall be maintained uniform for the full width of the fill. The top surface of each layer shall be suitably sloped with a cross-fall not to exceed 5% in order to shed surplus rainwater. Each layer of the section of the fill under construction at the time shall be brought up to its required grade and properly compacted as herein specified before the succeeding layer is applied.

204.02.01 Construction of Fill Adjacent to Steep Slopes

Where fill is to be placed on a side hill, sloping area, against an existing or new embankment or where fill is to be built one half width at a time, then the slopes, as the case may be, shall be benched in accordance with Form 1206 or as directed by the Owner's Representative. Benches are to be excavated one level at a time and the compacted fill brought up before the next benching level is excavated.

This procedure shall be followed throughout the entire construction of the fill. All suitable material excavated for the benches shall be incorporated and compacted with the new fill material.

204.02.02 Construction of Fill by the Sandwich Method

Embankments may, at the discretion of the Owner's Representative, be constructed by the "sandwich" method. Under this system, alternate layers of materials from Other Material and Rock sources shall be spread and compacted. The Contractor shall direct and organize their excavation forces so that an adequate supply of both materials are available at all times during construction. The upper 500 millimetres of subgrade shall consist of rock fill and all stones larger than 150 millimetres shall be removed from the material comprising the top 300 millimetres of the subgrade.

204.02.03 Special Requirements for Placing Other Material Fill Containing Large Rocks

Surface boulders, removed during grubbing operations or stones larger than 150 millimetres present in Other Material may be used in Other Material fill provided that:

i.) All boulders or stones larger than 500 millimetres are placed such that there will be at least 2 metres of cover on all sides.

ii.) All stones larger than 150 millimetres, but less than 500 millimetres in size, shall be kept at least 300 millimetres below subgrade.

iii.) No two boulders or stones larger than 500 millimetres shall be in contact with each other. All boulders and stones larger than 150 millimetres must be of such shape and placed in such position within the fill that compaction equipment may operate efficiently between the rocks, and close up to all faces of each of the rocks, while successive layers of fill are being placed.

iv.) The position of each boulder in the embankment shall be such that when resting on a horizontal surface, each boulder shall be in a stable position with the centre of gravity as low as possible.

204.03 FILL COMPACTION

Fill consisting of Other Material shall be compacted to at least 95% of the Standard Proctor Density (ASTM D698) by using approved compaction equipment.

In Rockfill material where Standard Proctor tests cannot be carried out, compaction shall be continued until there is no visible movement of the fill under an approved vibratory compactor which is vibrating. The vibratory compactor shall be of a type designed for fill compaction, weigh at least 9 tonnes and exert a load when vibrating of at least 4.5 tonnes per metre of wheel width.

204.04 FILL CLASSIFICATION

Where materials placed in the fill are from excavations within the highway right of way, or from borrow sources provided by the Department, then the fill materials will be classified as excavation in accordance with Section 205.

However, where the fill is supplied by the Contractor, the material will be classified as either "Rock Fill in Place" or "Other Material Fill in Place". Rock Fill in Place and Other Material Fill in Place shall conform to the physical and other requirements given in Section 310.

204.05 MEASUREMENT FOR PAYMENT

Where materials placed in the fill are from excavations within the highway right of way, or from borrow sources provided by the Department, then measurement for payment will be based on measurements of either volume of excavation or on weight, as given in other sections of this book.

However, for the fill materials supplied by the Contractor; "Rock Fill in Place" and "Other Material Fill in Place", the measurement for payment will be made by either the volume of fill placed, or the weight of fill placed, depending on whether the unit price is given in cubic metres or tonnes.

204.05.01 Volume Measurement for Payment for Fill in Place

The quantity to be measured shall be the number of cubic metres, rounded to the nearest whole number, of fill as shown on the cross section sheets between the position of the ground lines as cross sectioned before the "Fill in Place" material was placed, and the completed and accepted fill lines. Material placed outside of the required chainage limits, shoulders and/or toes of slopes will not be included in the calculations.

The volume of the fill shall be computed by the average end area method of computation or as wedges or pyramids, as the case may be, when terminating at grade points.

During fill operations, whenever the fill material as classified in Section 204.04, changes from one type to another, the Contractor shall notify the Owner's Representative so that proper measurements or cross sections may be made.

204.05.02 Weight Measurement for Payment for Fill in Place

Where "Rock Fill in Place" or "Other Material Fill in Place" is to be paid for by the number of tonnes, then such materials shall be weighed on scales. The weighing of materials shall be in accordance with the requirements of Section 501. Only loads certified by the Department personnel as being placed in the works shall be included in the measurement for payment. The weight shall be computed in tonnes, rounded to one decimal place.

Materials placed outside of the required chainage limits, shoulders and toes of slopes will be excluded in computations for quantities.

204.06 BASIS OF PAYMENT

The basis of payment will depend on whether the fill material is from sources provided by the Department or from sources provided by the Contractor.

Where benching of slopes is required as part of the grading of fill operation, no payment shall be made in respect of quantities excavated to form the benches.

204.06.01 Basis of Payment for Grading of Fill where Materials are from Sources provided by the Department

Where the materials placed in the fill are from excavations within the highway right of way or from borrow sources provided by the Department, then no separate payment will be made for the grading of fill. The grading of fill is part of the operation of excavating the material used as fill, and payment at the appropriate contract price for the excavation material, depending on the source and type of material, shall be compensation in full for all labour, materials and equipment use for; excavating, handling, and hauling the excavated material up to 1 kilometre, excavating such slope benches as may be required and placing and compacting both the excavated material and the material excavated from any slope benches in a fill in accordance with the specification for grading of fill.

Excavated material hauled in excess of 1 kilometre before being placed in a fill, at the Owner's Representative instruction, will be compensated for in accordance with Section 215.

204.06.02 Basis of Payment for Grading of Fill where the Materials are from Sources provided by the Contractor

Where the materials placed in the fill are from borrow sources provided by the Contractor, payment shall be at the contract unit price per cubic metre, or per tonne, for either "Supply Rock Fill in Place", or "Supply Other Material Fill in Place", as appropriate. Such payment shall be compensation in full for all labour, materials, equipment use and any other expenses to; provide a pit or quarry, obtain all required permits and approvals, clear, grub, and strip the pit or quarry, excavate the material, handle the material, provide all haulage of the material from the source to the fill, provide provision for weighing (if appropriate), place and compact the fill to the lines, grades and cross sections required, pay any royalties for the material, clean up and provide such other restoration to the pit or quarry as may be required, together with any other work necessary to complete the contract item.