

CITY OF WHITEHORSE SERVICING STANDARDS MANUAL
PART 3 - SPECIFICATIONS
SECTION 3.11 - SUBGRADE PREPARATION

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SECTION 3.11 – SUBGRADE PREPARTION

3.11.1 SCOPE

The work described in this sub-section pertains to the preparation and construction of the roadway subgrade.

3.11.2 SUBGRADE

Subgrade for the roadway is the material immediately beneath the compacted granular course and the ditch grade line, as detailed on the standard drawings in Section 4.

3.11.3 BORROW

Selected approved borrow or native material is to be used for the embankment construction. Where sufficient quantity of suitable embankment material is not available from excavation, an approved borrow pit is to be established, by the developer, as a source of imported fill.

3.11.4 COMMON EXCAVATION

Common excavation is to consist of all materials such as earth, muskeg, clay, hardpan, shale, silt, sand, gravel, fractured bedrock, cobbles and frozen material, removed from the roadway. All excavation is to be carried out within the limits of proposed works to depths, grades, and cross-sections as shown on the drawings.

3.11.5 ROCK

Rock is to be defined as any material that cannot be removed without drilling and blasting, or boulders with a volume in excess of 0.75cu.m. Material that can be ripped with an adequate ripping machine will not be considered rock. In addition, cobbles and boulders less than 0.75cu.m encountered during excavation operations will not be considered rock.

3.11.6 METHOD OF CONSTRUCTION IN EXCAVATION AREAS

3.11.6.1 SCARIFY AND COMPACT

In excavation areas, the top 200 mm of the subgrade is to be scarified and compacted to 98% Standard Proctor Density at optimum moisture content.

No stones or boulders larger than 100 mm in diameter are to be left within the top 200 mm of the roadbed subgrade unless otherwise directed by the Consultant and approved by the Engineer.

3.11.6.2 OVER EXCAVATION

Materials, which cannot be compacted to the specified density due to a high or low moisture content, are to be dried or watered by the Developer to their optimum moisture content in order to achieve the specified compaction.

All common excavation materials below design subgrade elevation, which, in the opinion of the Consultant, are considered unsuitable, are to be removed and disposed of in an approved dumpsite.

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3.11.6.3 WIDENING OF CUTS

In the event the Developer desires to excavate beyond the widths specified in the plans or as laid out by the Consultant in the field in order to provide material for use in embankments, he must first obtain the written approval of the Engineer or registered Land Owner.

3.11.6.4 STOCKPILING OF MATERIAL

To facilitate his operation, the Developer may stockpile embankment material. Such material is to be piled in such a manner that it will not endanger persons, the work, or adjacent properties. If the construction site does not facilitate stockpiling, the Developer is to haul material to an approved location.

3.11.6.5 ROCK EXCAVATION

If, during excavation, material appearing to be rock is encountered, the Developer is to notify the Consultant.

Rock encountered in the excavation areas is to be shattered and removed to a point 500 mm below top subgrade and 200 mm below ditch bottom.

All common and rock excavation deemed unsuitable for use in embankments, or in excess of that required for embankment, is to be disposed of.

3.11.6.6 EXCAVATION WASTE

All disposal areas are to be left in a neat and tidy condition satisfactory to the Consultant. Excavation waste is to be bladed flat and smooth by the Developer to blend in with the existing ground to the approval of the Engineer.

3.11.7 METHOD OF CONSTRUCTION IN EMBANKMENT AREAS

3.11.7.1 PREPARATION OF EMBANKMENT FOUNDATION

Unsuitable material, as determined by the Engineer, underlying an embankment area is to be removed and disposed of in an approved dumpsite.

When an embankment is to be constructed on a slope or against an existing embankment, the entire existing surface on which the embankment is to be placed is to be scarified, benched or broken up in such a manner that the new material will bond with the resulting surface.

Embankment is to be constructed to the typical cross-section and grades shown on the plans and as set out by the Consultant, and is to include the formation, compaction and shaping of the embankment.

Sufficient crown is to be maintained at all times during construction to ensure ready run-off of surface water.

3.11.7.2 EMBANKMENT

The suitability of the embankment material will be determined by its gradation and compactive qualities. The full depth of fills is to be constructed of suitable material in layers not exceeding 200 mm compactive depth. Each layer is to be compacted to 98% Standard Proctor Density at optimum moisture content.

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Materials, which cannot be compacted to the specified density due to high or low moisture content, are to be dried or watered by the Developer to their optimum moisture content in order to achieve the specified compaction.

In the top 200 mm of the subgrade, the maximum material size is to be 100 mm; below that, the maximum is to be 150 mm, unless otherwise authorized. All oversized material is to be removed and disposed of by the Developer.

Embankment material other than granular sub-base, base, granular surface course, the top 200 mm of the subgrade and the top meter of embankments is to be compacted to 95% of their Standard Proctor Density at optimum moisture content.

The use of frozen materials within an embankment section is not permitted. Any frozen materials found in an embankment section are to be removed by the Developer. Frozen materials can however be thawed and if suitable, be used within the embankment.

3.11.8 METHOD OF CONSTRUCTION GENERAL

3.11.8.1 SHAPING AND FINISHING

The finished compacted subgrade is to be constructed to within 30mm of the design section with final surfaces smooth, uniform, free of lumps, loose earth and debris. Localized soft spots that develop in the finished subgrade due to poor workmanship are to be corrected by excavating the material to a depth approved by the Engineer, and replacing it with suitable subgrade material compacted in place.

3.11.8.2 CLEANUP

Existing and newly constructed drainage ditches, culverts and other utilities are to be cleaned out to remove any obstruction caused by the construction operation.

Loose rock and boulders larger than 300 mm and debris resulting from the Developer's operations are to be removed and disposed of. Areas outside the actual roadway, but within the right-of-way, are to be graded to conform to the natural ground line.

3.11.8.3 TESTS

The Consultant, in accordance with the following ASTM standards, is to carry out Field density and moisture content tests:

Standard Proctor Compaction Test	ASTM D698 Methods (A) and (B) or ASTM D1556
In-Place Density Test	ASTM D2167 or ASTM D2922 and D3017

The frequency of field density and moisture content tests is to be at minimum 1 test per 100 meters of constructed roadway and at various locations left and right of centerline in accordance with section 3.26 of this Manual, or as directed by the Engineer.

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Before approval by the Engineer, the subgrade is to be true to cross-section. The grade is to conform to the compaction requirements specified and is to show no visible subsidence or deflection under the wheels of a loaded gravel truck.

The Developer will, as the Engineer requires, provide a loaded gravel truck with operator for stated visual checks of the subgrade.