

MATERIALS SPECIFICATIONS

Approval and Acceptance.

All materials must be approved prior to incorporation in the work. Approval of materials shall be in accordance with the applicable requirements of Subsection 5.03 and Section 6.00, Control of Materials. Materials may be approved at the source of manufacture or at the project site. Information regarding the origin, composition and/or manufacture of any material shall be furnished if requested by the Engineer.

Approval and acceptance of any material intended for use in the work of the Department is contingent upon the particular material conforming to a designated specification. Unless otherwise stipulated, all questions relating to materials will be resolved by the Research and Materials Section of the Department or its duly authorized representative.

Sampling and Testing.

Materials will be sampled and tested in accordance with the designated Standards. The applicable edition of the Standard shall be as stipulated in Subsection 1.33 References.

Sampling of materials will be performed by Department personnel, personnel authorized by the Department or personnel under Department supervision.

Certification.

Materials accepted on certification as stipulated in Subsection 6.01, Source of Supply and Quality, fall into two categories:

1. Those accepted on a particular certification and sampling frequency.
2. Those accepted on certification alone.

A listing of materials falling into one or the other of the above categories will be furnished upon request to the Research and Materials Section of the Department.

SECTION M1

SOILS AND BORROW MATERIALS

M1.00.0 General.

All Soils and borrow materials shall conform to the requirements of the specification as designated hereinafter.

M1.01.0 Ordinary Borrow.

Ordinary Borrow shall consist of a material satisfactory to the Engineer and not specified as gravel borrow, sand borrow, special borrow material or other particular kind of borrow.

This material shall have the physical characteristics of soils designated as group A-1, A-2-4 or A-3 under AASHTO M 145. It shall have properties such that it may be readily spread and compacted for the formation of embankments.

The use of Processed Glass Aggregate (PGA) meeting the requirements of M2.01.8 may be homogeneously blended with the borrow material up to an addition rate of 10% by mass in areas that will not be exposed, providing the AASHTO M 145 physical characteristics are maintained.

M1.02.0 Special Borrow.

Special Borrow shall consist of one of the following:

a) A native in-situ soil that is classified under AASHTO M 145 as A-3, or that portion of A-1 and A-2 with less than 12% passing the 75 µm sieve as determined by AASHTO T 11 and T 27. Maximum size of stone for testing purposes shall be 75 millimeters (nominal). For Muck Backfill only, 15% or less passing the 75 µm sieve will be allowable.

b) A crushed rock, either obtained from ledge excavation on the project or other approved sources, that meets the following requirements:

Percent of wear, L.A. Abrasion Test	50% Maximum
Plasticity Index	6% Maximum

Gradation Requirements

Sieve Designation	Percent Passing
150 mm	100
50 mm	90 - 100
4.75 mm	20 - 65
75 µm	0 - 12

c) The use of Processed Glass Aggregate (PGA) meeting the requirements of M2.01.08 may be blended with either special borrow material outlined above. An addition rate of 10% by mass in areas where the borrow will not be exposed will be allowed, providing the physical characteristics are maintained. The PGA will be blended so as to produce a homogeneous borrow material.

M1.03.0 Gravel Borrow.

Gravel Borrow shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings, and deleterious material.

Gradation requirements for gravel shall be determined by AASHTO T 11 and T 27 and shall conform to the following:

Sieve Designation	Percent Passing
12.5 mm	50 - 85
4.75 mm	40 - 75
300 µm	8 - 28
75 µm	0 - 10

Maximum size of stone in gravel shall be as follows:

M1.03.0 Type a	150 millimeters largest dimension
M1.03.0 Type b	75 millimeters largest dimension
M1.03.0 Type c	50 millimeters largest dimension

The use of Processed Glass Aggregate (PGA) meeting the requirements of M2.01.8 may be homogeneously blended with the processed gravel up to an addition rate of 10% by mass, providing the subbase material will not be

exposed. The resulting blend will meet the physical requirements of gravel borrow types a, b, and c specified above.

M1.03.1 Processed Gravel for Subbase.

This specification covers the quality and gradation for subbase material of crusher run gravel.

Gravel shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials.

The course aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.

The gradation shall meet the following requirements:

Sieve Designation	Percent Passing
75 mm	100
37.5 mm	70 - 100
19.0 mm	50 - 85
4.75 mm	30 - 60
75 µm	0 - 10

The approved source of bank-run gravel material shall be processed by mechanical means. The equipment for producing crushed gravel shall be of adequate size and with sufficient adjustments to produce the desired materials. The processed material shall be stockpiled in such a manner to minimize segregation of particle sizes. All processed gravel shall come from approved stockpiles.

The use of Processed Glass Aggregate (PGA) meeting the requirements of M2.01.8 may be homogeneously blended with the processed gravel up to an addition rate of 10% by mass, providing the subbase material will not be exposed. The resulting blend will meet the physical requirements of processed gravel specified above.

M1.04.0 Sand Borrow.

Sand Borrow shall consist of clean inert, hard, durable grains of quartz or other hard durable rock, free from loam or clay, surface coatings and deleterious materials. The allowable amount of material passing a 75 µm sieve as determined by AASHTO T 11 shall not exceed 10% by mass.

The maximum particle size for Sand Borrow shall be as follows:

M1.04.0 Type a	6.3 mm
M1.04.0 Type b	9.5 mm

The use of Processed Glass Aggregate (PGA) meeting the requirements of M2.01.8 will be allowed at an addition rate of 10% by mass to Type b sand borrow. This addition is allowed providing the material will not be exposed, that the blended material is homogeneous and that the physical requirements specified for Sand Borrow above are maintained.

M1.04.1 Sand Borrow for Subdrains.

Sand for use in subdrain installations shall conform to the requirements of Section M1.04.0 with the following grading limitations, as determined by AASHTO T 11 and T 27:

Sieve Designation	Percent by Mass Passing Through	
	Minimum	Maximum
12.5 mm	100	—
9.5 mm	85	100
4.75 mm	60	100
1.18 mm	35	80

300 μm	10	55
150 μm	2	10

M1.05.0 Loam Borrow.

Loam Borrow shall consist of a fertile, friable, natural topsoil typical of the locality, without admixture of subsoil, refuse or other foreign materials, and shall be obtained from a well-drained arable site. It shall be such a mixture of sand, silt and clay particles as to exhibit sandy and clayey properties in and about equal proportions. It shall be reasonably free from stumps, roots, heavy or stiff clay, stones larger than 25 millimeters in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter.

Prior to stripping, the loam shall have demonstrated by the occurrence upon it of healthy crops, grass or other vegetative growth that is reasonably well drained and that it does not contain toxic amounts of either acid or alkaline elements.

The loam shall contain not less than 4% nor more than 20% organic matter as determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 110 ± 5 °C.

M1.06.0 Peat Borrow.

Peat Borrow shall consist of specified material obtained from the locality of the project or commercially from other sources to be used as detailed or as directed by the Engineer to fit adequately the intended purpose.

Peat Borrow shall conform to the following requirements:

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|-----------------------------|--------------|
| 1. Organic content | 25% minimum |
| 2. Acidity | pH 4.0-7.0 |
| 3. Water absorbing capacity | 250% minimum |
| 4. Soluble salt index | 100% maximum |

M1.06.1 Processed Planting Material.

Processed Planting Material shall consist of suitable organic soil containing a reasonable amount of fibrous material procured from within the project limits or elsewhere and mixed with a suitable type of subsoil, resulting in a homogeneous material free from hard lumps, brush or litter satisfactory as a substitute for natural loam and capable of supporting plant growth.

This material shall conform to the following requirements:

- | | |
|---------------------------------|--------------|
| Soluble salt index ¹ | 100% maximum |
| Acidity | pH 4.0-7.0 |
| Organic content ² | 10-20% |

¹As determined with a type RD15 Solu Bridge electrical conductivity tester at a dilution ratio of 1 part oven-dried material in 5 parts of distilled water (by mass).

²Organic content will be determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 110 ± 5 °C.

Sieve Designation	Percent by Mass Passing Through	
	Minimum	Maximum
12.5 mm	100	

300 μm^3	45	74
75 μm	20	40

³This requirement shall be waived when the amount of fibrous material precludes an acceptable test procedure.

M1.07.0 Topsoil and Plantable Soil Borrow.

Topsoil and Plantable Soil Borrow shall consist of fertile, friable, natural topsoil, reasonably free of stumps, roots, stiff clay, stones larger than 25 millimeter diameter, noxious weeds, sticks, brush or other litter.

Prior to stripping the topsoil from the construction project, it shall have demonstrated by the occurrence upon it of healthy crops, grass or other vegetative growth, that it is reasonably well drained and capable of supporting plant growth. Material classified as Topsoil can only be obtained *within* the project limits.

M1.08.0 Impervious Soil Borrow.

Impervious Soil shall have the physical characteristics of one of the following, under AASHTO M 145:

1. A-4, A-5, A-6, A-7 soils;
2. A-2 soils containing more than 20% by mass passing the 75 micrometer sieve;
3. Peats and other highly organic soils.

The Impervious Soil shall be reasonably free of stumps, brush, and stones larger than 75 millimeters diameter.

Material excavated near salt water to be used as impervious soil will be tested for salt content. The maximum soluble salt index shall be 100.

M1.11.0 Reclaimed Pavement Borrow Material for Base Course.

Reclaimed base borrow material for sub-base course shall consist of crushed asphalt pavement, crushed cement concrete, and gravel borrow (meeting M1.03.0) free from loam, clay and deleterious materials such as brick, reinforcing steel, glass, wood, paper, plaster, lathing, and building rubble, etc.

The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.

The gradation shall meet the following requirements:

Sieve Designation	Percent Passing
75 mm	100
37.5 mm	70 - 100
19.0 mm	50 - 85
4.75 mm	30 - 60
300 μm	8 - 24
75 μm	0 - 10

The approved source of reclaimed pavement borrow material shall be processed by mechanical means. The equipment for producing crushed material shall be of adequate size and with sufficient adjustments to produce the desired materials. The processed material shall be stockpiled in such a manner as to minimize segregation of particle sizes. All reclaimed pavement borrow material shall come from approved stockpiles.