

ANNEXURE - X

SOIL CHARACTERISTICS

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Soil Group	Permeability (k) cm/sec	Unit Dry Weight g/cm ³ (lb/cft)	Value of Embankment	Value of foundation	Requirement per Seepage Control	Compaction Characteristics
1	2	3	4	5	6	7
GW	K >10⁻²	2.00-2.16 (125-135)	Very stable pervious shells of dikes and dams	Good bearing value	Positive cut off	Good; tractor, rubber tyred, steel-wheeler roller
GP	K >10⁻²	1.84-2.08 (115-130)	Reasonably stable; pervious shells of dikes and dams	Good bearing value	Positive cut of	----do----
GM	K >10⁻³ to 10⁻⁶	1.92-2.16 (120-135)	Reasonably stable; not particularly suited to shells, but may be used for impervious cores of blankets	Good bearing value	Toe trench to	Good with closed control, rubber tyred sheeps foot roller
GC	K >10⁻⁶ to 10⁻³	1.81-2.08 (115-130)	Fairly stable; may be used for impervious core.	Good bearing value	None	Fair; rubber tyred, sheep foot roller
SW	K >10⁻³	1.76-2.08 (110-130)	Very stably, pervious sections, slope protection required	Good bearing value	Upstream blanket and	Good; tractor

Soil Group	Permeability (k) cm/sec	Unit Dry Weight g/cm ³ (lb/cft)	Value of Embankment	Value of foundation	Requirement per Seepage Control	Compaction Characteristics
SP	K >10⁻³	1.60-1.92 (100-120)	Reasonably stable; may be used in dike section with flat slopes	Good to poor bearing value depending on density	Upstream blanket and	Good; tractor
SM	K >10⁻³ to 10⁻⁶	1.76-2.00 (110-125)	Fairly stable; not particularly suited to sheels, but may be used for impervious cores or dikes.	Good to poor bearing value depending on density	Upstream blanket and	Good; with close control, rubber tyred, sheeps foot roller.
SC	K >10⁻⁶ to 10⁻⁸	1.68-2.00 (105-125)	Fairly stable; used for impervious core for flood control structures.	Good to poor bearing value	None	Rear; rubber tyred, sheep foot roller.
ML.MI	K >10⁻³ to 10⁻⁶	1.52-1.92 (95-120)	Poor stability may be used for embankment with proper control	Very poor; susceptible to liquefaction	Toe trench to none	Good to poor, close control essential; rubber tyred, sheep foot roller
CL.CI	K >10⁻³ to 10⁻⁶	1.52-1.92 (95-120)	Stable; impervious cores and blankets	Good to poor	None	Fair to good; sheep foot roller, rubber tyred
OL.OI	K >10⁻⁴ to 10⁻⁶	1.28-1.60 (80-100)	No suitable for embankment	Fair to poor bearing may have excessive settlement	None	Fair to poor, sheep foot roller
MH	K >10⁻⁴ to 10⁻⁶	1.12-1.52 (70-95)	Poor stability; core of hydraulic fill dams not desirable in rolled fill	Poor bearing	None	Por to very poor, sheep foot roller

Soil Group	Permeability (k) cm/sec	Unit Dry Weight g/cm ³ (lb/cft)	Value of Embankment	Value of foundation	Requirement per Seepage Control	Compaction Characteristics
			construction			
CH	K >10⁻⁶ to 10⁻⁸	1.20-1.68 (75-105)	Fair stability with flat slopes; thin cores blanket and dike section	Fair to poor bearing	None	Poor to poor; sheep foot roller
OH	K = 10⁻⁶	1.04-1.60 (110-125)	Not suitable for embankment	Very poor bearing	None	Poor to poor; sheep foot roller
P _t		-	Not used for construction	Remove from foundation	None	Compaction not practical

NOTE:-

1. Value in column 4 and 6 are for guidance only. Design will be based on test result.
2. The equipment listed in column 7 will usually produce densities with resonable number of passes when moisture conditions and thickness of lift are properly controlled.

Soil Classification and Identification of soil for General Engineering Purposes.

S. No	Division and sub division		Soil group description	Symbols
1	Gravelly soils of which more than half of the coarse grains are larger than IS sieve 480 (IS 480 Sieve corresponds to BS sieve 3/16)	(1)	Well graded gravels or gravel sand mixture with clay binder.	GB
		(2)	Well graded gravel or gravel sand mixture, little or no fines.	GW
		(3)	Clayey gravel poorly graded or gravel sand clay mixtures.	GC
		(4)	Silty gravel or poorly graded gravel sand silt mixture.	G
		(5)	Poorly graded gravel or gravel sand mixtures. Little or no fines.	GP
2	Sandy soils (more than half of the coarse grains are smaller than IS sieve 480)	(1)	Well graded sands or gravelly sands with clay binder.	SB
		(2)	Well graded sands or gravelly sands little or no fines.	SW
		(3)	Clayey sands or poorly graded sand clay mixtures.	SC
		(4)	Silty sands or poorly graded sand silt mixtures.	SM
		(5)	Poorly graded sands or gravelly sands, little or no fines.	SP
3	Fine grained inorganic soils (more than half of the total material is smaller than IS sieve 10.8, which corresponds to BS sieve No. 200. (a) Inorganic silts and clays with low to medium compressibility.	(1)	Silt and very fine sand, rock flour, silty to clays of low plasticity.	ML
		(2)	Gravelly clays, sand, silty lean clays of low plasticity.	CL
		(3)	Clays of medium plasticity.	CI

	(b) Same as (a) but with high compressibility.	(4)	Very compressible micaceous or diatomaceous fine silty soils silts.	HM
		(5)	Clays of high plasticity.	CH
4	Silt and clay with high organic contents	(1)	Silt and silt clays of low plasticity	OL
		(2)	Clays of medium to high plasticity, very compressible.	OH
5	Peat		Peat and other highly organic swamp soils	P