

Addendum # 1

The following supplementary information is provided with regard to the characteristics and technical specifications of the materials for the concrete mix design.

Characteristics of materials/ technical specifications

As per the terms decided between the PHPA-II and Consultant, the following materials have been decided to be used in the Concrete Mix:

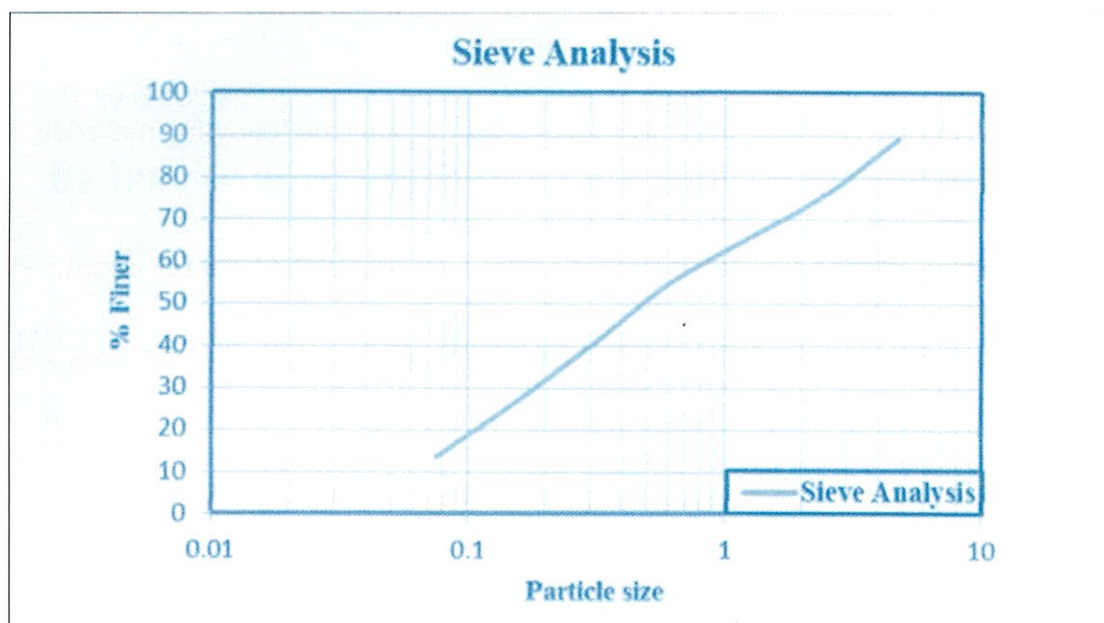
- Locally available coarse aggregates of MSA (Maximum Size of Aggregate) 10mm.
- Crushed sand available at site.
- Portland Pozzolanic cement (PPC) available at site. The fly ash content in the cement is up to 20±3% as a Pozzolanic material.
- Limestone powder with at least 40% CaO content measured using chemical analysis or X-Ray Fluorescence and a D50 of 15 µm measured using laser diffractometry. The limestone may contain Silica and Magnesia as the major impurities and Iron and Aluminum as minor impurities. The main objective of the limestone is to increase the fine content in the concrete and to reduce the cement content.
- Polycarboxylate- ether (PCE) based water-reducing admixture with VMA (Viscosity Modifying Agent) to achieve the flow in the concrete.

The characteristics of coarse and fine aggregates, according to IS 2386:1936, are tabulated below:

Description	Specific gravity	Apparent specific gravity	Water adsorption (%)	Grading Zone	Loose Bulk Density (kg/m ³)	Compacted Bulk Density (kg/m ³)	% Elongation and flakiness
Coarse aggregates (10mm)	2.64	2.75	1.56	-	1270	1417	Less than 15% each and less than 40% combined.
Fine aggregates	2.66	2.74	1.1	Gr. Zone-II	1600	1850	-

Expression of Interest for Cavity filling in DSSG

Particle Size Distribution Curve for Crushed Sand



The specific gravity of binders (cement and limestone) was measured according to IS: 4031 (Part 11) -1988. The particle size distribution of the cement and limestone was measured using a laser diffractometer (Malvern Mastersizer 3000).

The physical properties of binders are as given below:

Description	PPC	Limestone
Specific gravity	2.93	2.81
D ₁₀ (μm)	4.21	1.95
D ₅₀ (μm)	19.6	9.82
D ₉₀ (μm)	62.7	54.9
Specific Surface Area (m^2/Kg)	602.5	1161

