APPENDIX I OF ADDENDUM NO. 1

SCHEDULE G

The Concessionaire shall furnish the laboratory testing facility with testing equipment, services, supplies, attendants/helper, furniture and its running and maintenance cost for the tests to be conducted. The Concessionaire shall also provide for the laboratory two vehicles with drivers to be approved by the Independent Engineer for the sole use of the laboratory to transport testing equipment, testing samples and laboratory technicians, for carrying out inspection and testing on site throughout the same period.

All tests shall be executed as per the designated standard and all required equipment for facilitation of the tests should be furnished in the lab with two sets of latest editions of prescribed standards (one to be placed in the laboratory and other in the Independent Engineer office).

The Concessionaire should submit the list of tests to be carried out and their sample forms in the proposed methodology.

THE TESTS

A) LABORATORY TESTS

The Laboratory shall be equipped to perform the following tests:

SR. NO.	TESTS	AASHTO DESIGNATION
1	Dry preparation of soil samples	T-87
2	Soil Classification	M-145
3	Determination of Moisture Content	T-265
4	Atterberg Limits	T-89 & 90
5	Moisture density relationship (Modified Method)	T-180
6	C.B.R Test and swelling test	T-193
7	Relative Density Test	ASTM D4253, D4254
8	Sieve Analysis of Soils, aggregate and Mineral Filler	T-88, T-27 & T-37
9	Los Angeles Abrasion test of aggregates	T-96
10	Sand Equivalent	T-176
11	Soundness of aggregates	T-104
12	Asphalt Coating	T-195

13	Coating and stripping of Bitumen Aggregate	T-182
14	Specific Gravity & Absorption of Coarse Aggregate	T-85
15	Specific Gravity and Absorption of Fine Aggregate	T-84
16	Penetration of bitumen material	T-49
17	Amount of Passing No. 200 sieve	T-11
18	Quantitative Extraction of Bitumen from Mixtures	T-164
19	Gradation analysis of bitumen extracted aggregates	T-30
20	Specific gravity of compacted bitumen mixture	T-166
SR. NO.	**TESTS**	**AASHTO DESIGNATION**
21	Marshall test and loss in stability	T-245
22	Maximum specific gravity of bitumen paving mixture	T-209
23	Air voids in compacted paving bitumen mix	T-269
24	Specific gravity of bitumen material	T-228
25	Softening point of bitumen (Ring and Ball method)	T-53
26	Sampling aggregates	T-2
27	Fineness Modulus	T-27
28	Organic impurities	T-21
29	Mortar Strength	T-71
30	Friable particles	T-112
31	Potential reactivity of carbonate rocks for concrete aggregates (Rock-Cylinder method)	ASTM C-586
32	Unit weight of aggregates	T-19
33	Air content of freshly mixed concrete by volumetric method	T-196
34	Making and curing of concrete test specimens	T-126
35	Curing concrete compressive test specimens	T-23
36	Compressive strength of cylinder concrete specimens	T-22
37	Setting time and consistency of cement	T-131
38	Normal consistency of hydraulic cement	T-129

B) FIELD TESTS:

The following tests shall be carried out for field control/spot checking purposes as the Works proceeds: -

SR. NO.	**TEST**	**AASHTO DESIGNATION**

1	In-place density by Sand Cone Method	T-191
2	Sampling fresh concrete	T-141
3	Slump of Portland cement concrete	T-119
4	Sampling bituminous materials	T-40
5	Determining the temp. of bituminous paving mixtures	-
6	Determining Degree of Pavement Compaction by coring	T-230
7	Bulk specific gravity	T-166
8	Density of soil and soil aggregate by Nuclear methods	T-238
9	Moisture content of soil and soil aggregate by Nuclear method	T-239

THE COMPLETION TESTS

Completion Tests shall mean the final inspection and tests of the Concession Assets by the Independent Engineer or by GOS appointed 3rd party Technical Consultant to ensure that the same conforms to the Project Requirements.

The EPC Contractor shall carryout the required tests on completion under the instruction of Independent Engineer or by 3rd party Technical Consultant appointed by GOS. The test on completion listed below shall be perform:

- Checking of Riding Quality by Roughness Index Method.
- Test with Straight Edge.
- Checking Geometric Design as per Survey Control Points.
- Drainage works-carried out as per approved design and outline drawings
- Pavement structure by excavating 1x1 m pit at Random.
- Thickness of Asphalt Base and Asphalt Wearing Course by cutting cores.
- Collection samples to check the quality of materials and road construction.
- Confirm Road X-Section over the length at Random.
- Shoulders Treatment and slopes along with protection works.
- Construction of Median and Median Drainage as per design.
- Road Pavement Marking.
- Check Road Safety Signs and Road Furniture.
- Check already carried out Lab Tests.
- Surface of the Bridge.
- Surface Drainage & Drainage Pipes
- Expansion Joints.
- Source an approval of Bearing Pads.
- Checking of Slope Protection stability and Material Quality.
- Finishing of concrete for different points of structures.

The roughness of the pavement, over any one-kilometer length, shall not exceed a value of 5,000 millimeters per kilometer, as measured using 'Bump Integrator' technique, or an equivalent alternative

standard established through alternative testing methods. Roughness criteria as per Highway Design and Maintenance Standards Model (HDM 1995) are as follows:

Smooth Paved Road	2,000	mm/km
Reasonably Smooth Paved Road	4,000	mm/km
Medium Rough Paved Road	6,000	mm/km
Rough Paved Road	8,000	mm/km
Very Rough Paved Road	10,000	mm/km