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NCD/G/SGT/013/2023

3rd July 2023

SPACE GEO TECH

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Bangalore - 560010

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Sub : Clarifications for the observations / comments and additional requirements for our report
G(D)4527

Ref : Our report no. G(D)4527, March 2023 and G(D)4548, May 2023 for the Proposed Factory
of Pepsico India Holdings Pvt Ltd., at Village Nalbari, Assam

Dear Sir,

This is in reference to the above mentioned subject and your email dated 30th June 2023 regarding
some clarifications and additional requirements.

As given to understand the observations/comments on our geotechnical report, point wise reply have
been made in the excel sheet attached herewith. Also, for additional requirements, annexure sheets
have been attached.

We hope you find this in order.

Regards

Y.S. Rana

Executive Consultant

encl.

Excel Sheet for Comments and Reply

Modified Liquefaction Tables for G(D)4527 & G(D)4548

Comments and Clarifications for Nalbari Project

Sr. No.	Client Comments	Nagadi Clarifications (23.06.2023)	Client Comments (29.6.23)	Nagadi Clarifications (3.07.2023)
1	As per liquefaction analysis, the soil seems to be liquefiable for complete depth of borehole with factor of safety less than 1	Beyond 15m depth down to deeper depths, subsoil is generally low plastic to medium plastic. Such soils with significant plasticity, that too at deeper depths are not considered to be susceptible to liquefaction, even when the factor of safety is less than 1.	There is no codal guidelines for stating the liquefaction will not happen below 15m depth. Any kind of statement shall be proved by the calculations or codal guidelines on the required allowable range of parameters. Please check and revise the tables.	As stated earlier, the subsoil strata beyond 15m depth generally consists of clayey silty soils with significant percentages of clay and significant plasticity. Notably, as clearly stated in various technical literature, soils with significant clay content and significant plasticity are considered to be not susceptible to liquefaction. Giving due consideration to the above, the soil beyond 15m depth has not been considered to be susceptible to liquefaction.
2	As the liquefaction sandy soil layer is sandwiched between clayey silty soil layers, vibrocompaction method may not be feasible to improve the layer as the behaviour of upper clayey silt layer will not be uniform during /after vibro compaction.	Under the prevailing subsoil condition, vibro compaction method appears to be most suitable to densify the sandwiched layer of sandy soils as the upper layer of silty soils may also be densified accordingly and may not show any adverse behaviour.	For your kind info, As per all specialized/reputed ground improvement vendor technical proposals, vibro compaction is not a suitable ground improvement method due to sandwich layer.	Please note that results of various research reported in the literature have shown that the improvement in ground conditions is minimal when ground improvement by stone columns is carried out in clayey silty soils under submerged conditions (i.e. soils with significant percentages of clay) which has been encountered down to about 10m depth at the present site. Further, the settlement reduction achieved by ground improvement by stone columns will generally be in the range of about 25% to 35% which implies that the allowable bearing pressures will not increase by more than about 35%. Hence, at the present site, Shallow foundations will still not be feasible even after ground improvement is carried out by stone columns. Notably, the recommendations for ground improvement by vibro compaction method have been provided only to densify the sandwiched layer of loose sandy stratum to eliminate the susceptibility to liquefaction so that pile foundations can be safely adopted with adequate pile capacities.
3	1. Hope the recommended pile capacities are considering the ground improvement by Vibrocompaction. As given comment in earlier section on feasibility of the method. Pile capacities to be proposed without considering skin friction upto liquefiable depth. May be for higher depths to 30m. 2. Also include capacities for piles with diameter 450, 500, 750 and 1000mm. 3. Lateral capacities of the piles are very less when compared to vertical capacities, even after considering the ground improvement. Basis of considering the parameters for calculations	1. Yes, pile capacities have been evaluated considering the subsoil conditions after ground improvement. 2. ok. shall be included. 3. As the observed N values are low down to the depth of fixity or even down to 10m depth and also the subsoil is under submerged conditions, low modulus of horizontal subgrade reaction has been considered. Hence, low lateral pile capacities have been evaluated. However, recommended ground improvement (i.e. for sandy soil between 10m and 15m depth below the existing ground level) will not significantly improve the subsoil overlying the liquefiable sandy soil stratum.		

Comments and Clarifications for Nalbari Project

Sr. No.	Client Comments	Nagadi Clarifications (23.06.2023)	Client Comments (29.6.23)	Nagadi Clarifications (3.07.2023)
4	Hope the allowable bearing capacities are worked out considering no liquefaction in any soil layer. The capacities are very less comparing to SPT N values. Please check and confirm. If any critical boreholes with very less N values in top layers, can calculate separately and report. It is always suggested to take field parameters (SPT) for calculations.	Yes. Allowable bearing pressure for Isolated / Strip footings have been calculated considering no liquefaction condition. Considering the subsoil strata is in a loose to medium dense state below the influence zone of the foundations, low N values, water table at shallow depth and type of subsoil (i.e. low to medium plastic sandy clayey silty soils), Low allowable bearing pressures have been evaluated in the settlement calculations. Referring to our report G(D)4527, allowable bearing pressures have been given separately for critical boreholes. For the analysis of allowable bearing pressures, field parameters have only considered.		
5	As per section 12 of RFQ document, all requested recommendations to be include like : 1. SBC for raft foundation, settlement analysis, co-efficient of subgrade reaction. 2. If piles with lesser diameter and intended to propose along with structure slab for slab on grades (5t/m ²) and lightly loaded ground supported structures(10t/m ²) to address the liquefaction issue. 3. Magnitude of negative skin friction due to liquefiable soil, 4. Suitability of existing soil. 5. Effect of ground water table including recommendations regarding any excavation and dewatering problem expected at the site. 6. Based on seismic cross hole test results, Seismic and dynamic parameters of the soil shall be recommended like coefficient of uniform compression, coefficient of elastic non uniform, compression, Coefficient of elastic uniform compression shear, Damping Coefficient, Shear wave velocity, Dynamic shear modulus, young's modulus and poisson's ratio	1. Allowable bearing pressure for raft shall be provided including modulus of subgrade reaction. 2. Ok, pile of 450mm diameter and 10m length can be provided. 3. Liquefiable sandy soils between 10m and 15m, is not in very loose conditions. Hence there may not be any negative skin friction. 4. Please elaborate this point. 5. Excavations down to the shallow depths for shallow foundations, can be carried out by ordinary methods by providing necessary side slopes. However, as the ground water table level had been observed to be almost near the EGL during some of the field investigations, the water table level, if encountered during excavation, has to be maintained below the maximum required depth of excavation, during the excavations of the foundations pit. 6. All the parameters such as dynamic poisson's ratio, dynamic shear modulus, dynamic elastic modulus, shear wave velocity and compression wave velocity which could be derived from CHST have already been provided in our report G(D)4527	3. We may go with Stone Column of 16m to 18m depth, Hence it is not only improve sandy soil layer from 10m to 15m depth but also top 10m depth 4. Recommendation on suitability of existing excavated soil for backfill purposes to be included 6. Coefficient of uniform compression, Coefficient of elastic non uniform compression values are missing	3. Refer point no. 2. 4. Subsoil strata can be used for backfilling purposes as subsoil has nil free swelling index. 6. The required parameters can not be derived/calculated from the results of crosshole test result as no provision has been given in the relevant codes of crosshole seismic test. However, the required parameters can be provided by conducting Dynamic Block Vibration Test as the coefficient of elastic uniform compression 'Cu' is determined directly from this test and the other coefficients are derived from the 'Cu' as given in BIS code IS:5429.

Comments and Clarifications for Nalbari Project

Sr. No.	Client Comments	Nagadi Clarifications (23.06.2023)	Client Comments (29.6.23)	Nagadi Clarifications (3.07.2023)
6	Recommendation for construction cut and fill and slope protection	We do not undertake designing/ recommendations of cut & fill and slope protection which has to be separate scope. However, we can provide the parameters required for the design for the same as per the requirements of the designer.	Recommended minimum excavation slope with respect to depth of excavation to be included	Considering that the ground water table is present at shallow depth which may rise even upto existing ground level as per experience at this site during several field investigations and also the fact that the subsoil at shallow depths is a clayey soil in a soft/loose state, properly designed shoring system has to be necessarily adopted for excavations as cut slopes will not be stable under such unfavorable soil conditions.
7	Evaluation of high ground water problem and recommendations for surface drainage	We regret that any specific requirement in this regard may not be provided. However, as per the investigations the site being located in a low line area, the ground water table level may be considered as 0.0m. Considering this the levels of the site may be raised accordingly as per the topography of the site and structural requirement. A proper drainage system has to be designed by the structural designer so that water is not accumulated.		
8	Relook into the recommendation considering the feasibility of placing gravel and compaction at 20m depth and higher number of pile	The basic purpose of this clause is to ensure the firm and clear pile bore bottom. If it can be ensured without any precautions or with any other methodology, the same may be adhered to as this clause is not mandatory		
9	As requested in RFQ document, shear parameters are not provided at all proposed depths, please check and provide for all the boreholes.	Shear parameters have been provided only at depths where samples could be extruded properly to conduct triaxial tests. However in sandy soil stratum below the ground water table level, proper undisturbed samples could not be obtained. Hence the shear parameters in this stratum can not be provided.		
10	Legend missing for this strata symbol : 	As a general practice, we present combine legend for sandy clayey silt and clayey sandy silt as the both soil category belongs to single stratum category. However separate legend will like as given below : 1. Clayey sandy silt  2. Sandy clayey silt 		

Comments and Clarifications for Nalbari Project

Sr. No.	Client Comments	Nagadi Clarifications (23.06.2023)	Client Comments (29.6.23)	Nagadi Clarifications (3.07.2023)
11	1. As per the Liquefaction analysis the soil seems to be liquefiable for complete depth of borehole with factor of safety less than 1 for all the boreholes. Recheck and confirm. Revise the recommendations in earlier sections or revise the calculations. 2. Please confirm whether overburden pressure is considered from the proposed soil fill as per provided grading drawing.	1. Refer point no. 1. 2. Proposed soil fill over burden has not been considered for evaluating the liquefaction analysis as there is no such clause is given in IS 1893 regarding same and also we feel that the overburden pressure cannot diminish the susceptibility of liquefaction of sandy stratum encountered at such deeper depths i.e. between 10m and 15m depths below EGL as sandy soils densify only by vibrocompaction not by static overburden pressures.	1. There is no codal guidelines for stating the liquefaction will not happen below 15m depth. Any Kind of statement shall be proved by calculations or codal guidelines on the required allowable range of parameters. Please check and revise the table 2. The statement is incorrect, as overburden pressure increases with respect to depth, the factor of safety will increase. Hence overburden pressure of 36 kPa will give an advantage for liquefaction analysis. Please go through calculations again for better understanding.	1. Refer point no. 1. 2a. There is no codal guidelines to consider the surcharge pressure in the calculations for determination of susceptibility to liquefaction of the subsoil. 2b. As per the given drawing, the site has been divided into five zones based on different thicknesses of proposed filling which varies from minimum 0.0 m to maximum about 3m. Therefore, a uniform surcharge pressure of 36 kPa cannot be considered for the entire site. 2c. In any case, for the better understanding, we have modified the liquefaction tables considering a surcharge pressure of 36 kPa which does not show any significant reduction in cyclic stress ratio under the existing subsoil conditions. Hence, the subsoil will still be considered to be susceptible to liquefaction down to about 15m depth.
12	As SPT N-values are in range of 4 to 10, k shall be considered as 0.8×10^3 kN/m³ and revise the recommended capacities	Ranges of N values is typically varying between 2 and 10. However, the general trend of N-values is inclined towards N=4 except occasional N-values near to 10. Hence, considering the same for N=4, modulus of subgrade reaction of 0.2×10^3 has been considered for lateral pile capacities which appears to be appropriate under the prevailing subsoil conditions where in loose silty soils have been encountered under submerged conditions.		
13	It is always suggested to consider the field parameters (SPT) for calculating the SBC. Please recheck and revise.	As per IS codal provisions, allowable bearing pressure should be calculated based on SPT values (settlement criteria) as well as based on shear parameters (shear criteria). Calculated lower values out of both the analysis have been recommended in our report G(D)4527		

Analysis of Susceptibility to Liquefaction for Borehole BH1

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	$(N)_{60}$	FC (%)	α	β	$(N)_{60CR}$	CRR	FOS
0.9	0.36	0.93	0.999	0.217	4	1.70	1	1	0.75	1	5	97	5.00	1.200	11	0.122	0.56
2.4	0.36	1.15	0.998	0.270	8	1.52	1	1	0.8	1	10	78	5.00	1.200	17	0.181	0.67
3.9	0.36	1.30	0.997	0.304	2	1.31	1	1	0.85	1	2	98	5.00	1.200	7	0.088	0.29
5.4	0.36	1.41	0.996	0.328	5	1.17	1	1	0.95	1	6	92	5.00	1.200	12	0.131	0.40
6.9	0.36	1.48	0.995	0.345	9	1.06	1	1	0.95	1	9	85	5.00	1.200	16	0.170	0.49
8.4	0.36	1.54	0.994	0.358	9	0.98	1	1	0.95	1	8	32	4.83	1.171	14	0.150	0.42
9.9	0.36	1.59	0.910	0.338	18	0.92	1	1	1	1	17	23	4.06	1.100	23	0.257	0.76
11.4	0.36	1.63	0.870	0.331	23	0.87	1	1	1	1	20	7	0.12	1.009	20	0.215	0.65
12.9	0.36	1.66	0.830	0.322	24	0.82	1	1	1	1	20	4	0.00	1.000	20	0.215	0.67
14.4	0.36	1.69	0.790	0.311	16	0.78	1	1	1	1	13	3	0.00	1.000	13	0.141	0.45
15.9	0.36	1.71	0.749	0.300	11	0.75	1	1	1	1	8	72	5.00	1.200	15	0.160	0.53
17.4	0.36	1.73	0.709	0.287	9	0.72	1	1	1	1	6	85	5.00	1.200	12	0.131	0.46
20	0.36	1.76	0.640	0.263	8	0.67	1	1	1	1	5	95	5.00	1.200	11	0.122	0.46

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 2.3

Depth of water table for CSR calculation (m) = 1.3

Analysis of Susceptibility to Liquefaction for Borehole BH2

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	$(N)_{60}$	FC (%)	α	β	$(N)_{60CR}$	CRR	FOS
1.5	0.36	0.98	0.999	0.230	5	1.70	1	1	0.8	1	7	89	5.00	1.200	13	0.141	0.61
3	0.36	1.18	0.998	0.275	14	1.39	1	1	0.85	1	16	33	4.88	1.180	24	0.273	1.00
4.5	0.36	1.31	0.997	0.305	6	1.22	1	1	0.95	1	7	90	5.00	1.200	13	0.141	0.46
6	0.36	1.40	0.995	0.326	4	1.10	1	1	0.95	1	4	70	5.00	1.200	10	0.113	0.35
7.5	0.36	1.47	0.994	0.343	7	1.01	1	1	0.95	1	7	47	5.00	1.200	13	0.141	0.41
9	0.36	1.53	0.993	0.356	10	0.94	1	1	1	1	9	78	5.00	1.200	16	0.170	0.48
10.5	0.36	1.58	0.894	0.329	16	0.89	1	1	1	1	14	9	0.56	1.017	15	0.160	0.49
12	0.36	1.61	0.854	0.322	14	0.84	1	1	1	1	12	4	0.00	1.000	12	0.131	0.41
13.5	0.36	1.64	0.814	0.313	17	0.80	1	1	1	1	14	6	0.03	1.005	14	0.150	0.48
15	0.36	1.67	0.774	0.303	10	0.76	1	1	1	1	8	3	0.00	1.000	8	0.096	0.32
16.5	0.36	1.69	0.733	0.291	6	0.73	1	1	1	1	4	85	5.00	1.200	10	0.113	0.39
18	0.36	1.71	0.693	0.278	34	0.70	1	1	1	1	24	42	5.00	1.200	34	0.500	1.80

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 2.6

Depth of water table for CSR calculation (m) = 1.6

Analysis of Susceptibility to Liquefaction for Borehole BH3

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	$(N)_{60}$	FC (%)	α	β	$(N)_{60CR}$	CRR	FOS
0.9	0.36	0.87	0.999	0.202	10	1.70	1	1	0.75	1	13	79	5.00	1.200	21	0.228	1.13
2.4	0.36	1.09	0.998	0.256	11	1.50	1	1	0.8	1	13	74	5.00	1.200	21	0.228	0.89
3.9	0.36	1.25	0.997	0.291	3	1.27	1	1	0.85	1	3	98	5.00	1.200	9	0.104	0.36
5.4	0.36	1.35	0.996	0.316	7	1.14	1	1	0.95	1	8	92	5.00	1.200	15	0.160	0.51
6.9	0.36	1.44	0.995	0.334	7	1.04	1	1	0.95	1	7	67	5.00	1.200	13	0.141	0.42
8.4	0.36	1.50	0.994	0.348	9	0.97	1	1	0.95	1	8	62	5.00	1.200	15	0.160	0.46
9.9	0.36	1.55	0.910	0.330	11	0.91	1	1	1	1	10	6	0.03	1.005	10	0.113	0.34
11.4	0.36	1.59	0.870	0.324	15	0.85	1	1	1	1	13	5	0.00	1.000	13	0.141	0.43
12.9	0.36	1.62	0.830	0.315	12	0.81	1	1	1	1	10	3	0.00	1.000	10	0.113	0.36
14.4	0.36	1.65	0.790	0.305	14	0.77	1	1	1	1	11	7	0.12	1.009	11	0.122	0.40
15.9	0.36	1.68	0.749	0.294	3	0.74	1	1	1	1	2	88	5.00	1.200	7	0.088	0.30
17.4	0.36	1.70	0.709	0.282	21	0.71	1	1	1	1	15	79	5.00	1.200	23	0.257	0.91
20	0.36	1.73	0.640	0.259	30	0.67	1	1	1	1	20	61	5.00	1.200	29	0.410	1.58

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 2.7

Depth of water table for CSR calculation (m) = 1.7

Analysis of Susceptibility to Liquefaction for Borehole BH4

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	(N) ₆₀	FC (%)	α	β	(N) _{60CR}	CRR	FOS
1.5	0.36	1.05	0.999	0.245	8	1.70	1	1	0.8	1	11	80	5.00	1.200	18	0.192	0.78
3	0.36	1.24	0.998	0.289	9	1.43	1	1	0.85	1	11	92	5.00	1.200	18	0.192	0.66
4.5	0.36	1.36	0.997	0.318	6	1.25	1	1	0.95	1	7	95	5.00	1.200	13	0.141	0.44
6	0.36	1.45	0.995	0.338	7	1.13	1	1	0.95	1	7	91	5.00	1.200	13	0.141	0.42
7.5	0.36	1.52	0.994	0.354	7	1.03	1	1	0.95	1	7	95	5.00	1.200	13	0.141	0.40
9	0.36	1.57	0.993	0.365	18	0.96	1	1	1	1	17	29	4.64	1.146	24	0.273	0.75
10.5	0.36	1.62	0.894	0.338	13	0.90	1	1	1	1	12	5	0.00	1.000	12	0.131	0.39
12	0.36	1.65	0.854	0.330	22	0.85	1	1	1	1	19	2	0.00	1.000	19	0.203	0.62
13.5	0.36	1.68	0.814	0.320	22	0.81	1	1	1	1	18	2	0.00	1.000	18	0.192	0.60
15	0.36	1.70	0.774	0.308	8	0.77	1	1	1	1	6	86	5.00	1.200	12	0.131	0.43
16.5	0.36	1.72	0.733	0.296	10	0.74	1	1	1	1	7	82	5.00	1.200	13	0.141	0.47
18	0.36	1.74	0.693	0.283	15	0.71	1	1	1	1	11	91	5.00	1.200	18	0.192	0.68

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 2.2

Depth of water table for CSR calculation (m) = 1.2

Analysis of Susceptibility to Liquefaction for Borehole BH5

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	$(N)_{60}$	FC (%)	α	β	$(N)_{60CR}$	CRR	FOS
0.9	0.36	0.90	0.999	0.210	7	1.70	1	1	0.75	1	9	63	5.00	1.200	16	0.170	0.81
2.4	0.36	1.12	0.998	0.262	8	1.50	1	1	0.8	1	10	60	5.00	1.200	17	0.181	0.69
3.9	0.36	1.27	0.997	0.297	4	1.29	1	1	0.85	1	4	95	5.00	1.200	10	0.113	0.38
5.4	0.36	1.38	0.996	0.321	8	1.15	1	1	0.95	1	9	80	5.00	1.200	16	0.170	0.53
6.9	0.36	1.46	0.995	0.340	7	1.05	1	1	0.95	1	7	94	5.00	1.200	13	0.141	0.41
8.4	0.36	1.52	0.994	0.353	14	0.97	1	1	0.95	1	13	65	5.00	1.200	21	0.228	0.65
9.9	0.36	1.57	0.910	0.334	16	0.91	1	1	1	1	15	3	0.00	1.000	15	0.160	0.48
11.4	0.36	1.61	0.870	0.327	8	0.86	1	1	1	1	7	3	0.00	1.000	7	0.088	0.27
12.9	0.36	1.64	0.830	0.319	10	0.82	1	1	1	1	8	3	0.00	1.000	8	0.096	0.30
14.4	0.36	1.67	0.790	0.308	24	0.78	1	1	1	1	19	2	0.00	1.000	19	0.203	0.66
15.9	0.36	1.69	0.749	0.297	6	0.74	1	1	1	1	4	75	5.00	1.200	10	0.113	0.38
17.4	0.36	1.71	0.709	0.284	16	0.72	1	1	1	1	11	24	4.18	1.108	16	0.170	0.60
20	0.36	1.74	0.640	0.261	35	0.67	1	1	1	1	24	7	0.12	1.009	24	0.273	1.05

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 2.5

Depth of water table for CSR calculation (m) = 1.5

Analysis of Susceptibility to Liquefaction for Borehole BH6

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	(N) ₆₀	FC (%)	α	β	(N) _{60CR}	CRR	FOS
1.5	0.36	1.14	0.999	0.267	6	1.70	1	1	0.8	1	8	85	5.00	1.200	15	0.160	0.60
3	0.36	1.32	0.998	0.308	13	1.50	1	1	0.85	1	17	71	5.00	1.200	25	0.292	0.95
4.5	0.36	1.44	0.997	0.335	4	1.30	1	1	0.95	1	5	96	5.00	1.200	11	0.122	0.36
6	0.36	1.52	0.995	0.354	10	1.16	1	1	0.95	1	11	85	5.00	1.200	18	0.192	0.54
7.5	0.36	1.58	0.994	0.368	10	1.06	1	1	0.95	1	10	95	5.00	1.200	17	0.181	0.49
9	0.36	1.63	0.993	0.379	11	0.98	1	1	1	1	11	96	5.00	1.200	18	0.192	0.51
10.5	0.36	1.67	0.894	0.349	17	0.91	1	1	1	1	16	70	5.00	1.200	24	0.273	0.78
12	0.36	1.70	0.854	0.339	20	0.86	1	1	1	1	17	11	1.21	1.026	19	0.203	0.60
13.5	0.36	1.72	0.814	0.328	19	0.82	1	1	1	1	16	4	0.00	1.000	16	0.170	0.52
15	0.36	1.74	0.774	0.316	15	0.78	1	1	1	1	12	4	0.00	1.000	12	0.131	0.42
16.5	0.36	1.76	0.733	0.303	17	0.75	1	1	1	1	13	84	5.00	1.200	21	0.228	0.75
18	0.36	1.78	0.693	0.289	17	0.72	1	1	1	1	12	83	5.00	1.200	19	0.203	0.70

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85 Surcharge Load (SL), If any (t/m^2) = 3.6
 Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2
 Depth of water table for CRR calculation (m) = 1.7
 Depth of water table for CSR calculation (m) = 0.7

Analysis of Susceptibility to Liquefaction for Borehole BH7

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	(N) ₆₀	FC (%)	α	β	(N) _{60CR}	CRR	FOS
0.9	0.36	0.93	0.999	0.217	11	1.70	1	1	0.75	1	14	64	5.00	1.200	22	0.242	1.11
2.4	0.36	1.15	0.998	0.270	8	1.52	1	1	0.8	1	10	74	5.00	1.200	17	0.181	0.67
3.9	0.36	1.30	0.997	0.304	4	1.31	1	1	0.85	1	4	96	5.00	1.200	10	0.113	0.37
5.4	0.36	1.41	0.996	0.328	5	1.17	1	1	0.95	1	6	85	5.00	1.200	12	0.131	0.40
6.9	0.36	1.48	0.995	0.345	6	1.06	1	1	0.95	1	6	88	5.00	1.200	12	0.131	0.38
8.4	0.36	1.54	0.994	0.358	15	0.98	1	1	0.95	1	14	43	5.00	1.200	22	0.242	0.68
9.9	0.36	1.59	0.910	0.338	16	0.92	1	1	1	1	15	4	0.00	1.000	15	0.160	0.47
11.4	0.36	1.63	0.870	0.331	13	0.87	1	1	1	1	11	3	0.00	1.000	11	0.122	0.37
12.9	0.36	1.66	0.830	0.322	16	0.82	1	1	1	1	13	3	0.00	1.000	13	0.141	0.44
14.4	0.36	1.69	0.790	0.311	15	0.78	1	1	1	1	12	3	0.00	1.000	12	0.131	0.42
15.9	0.36	1.71	0.749	0.300	5	0.75	1	1	1	1	4	56	5.00	1.200	10	0.113	0.38
17.4	0.36	1.73	0.709	0.287	37	0.72	1	1	1	1	27	30	4.71	1.154	36	0.500	1.74
20	0.36	1.76	0.640	0.263	40	0.67	1	1	1	1	27	4	0.00	1.000	27	0.338	1.29

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 2.3

Depth of water table for CSR calculation (m) = 1.3

Analysis of Susceptibility to Liquefaction for Borehole BH8

Depth (m)	$a_{\max}/g$	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	(N) ₆₀	FC (%)	α	β	(N) _{60CR}	CRR	FOS
1.5	0.36	1.02	0.999	0.237	6	1.70	1	1	0.8	1	8	79	5.00	1.200	15	0.160	0.67
3	0.36	1.21	0.998	0.281	11	1.41	1	1	0.85	1	13	75	5.00	1.200	21	0.228	0.81
4.5	0.36	1.33	0.997	0.311	4	1.24	1	1	0.95	1	5	96	5.00	1.200	11	0.122	0.39
6	0.36	1.43	0.995	0.332	5	1.12	1	1	0.95	1	5	81	5.00	1.200	11	0.122	0.37
7.5	0.36	1.50	0.994	0.348	8	1.02	1	1	0.95	1	8	80	5.00	1.200	15	0.160	0.46
9	0.36	1.55	0.993	0.360	14	0.95	1	1	1	1	13	91	5.00	1.200	21	0.228	0.63
10.5	0.36	1.60	0.894	0.334	14	0.89	1	1	1	1	13	5	0.00	1.000	13	0.141	0.42
12	0.36	1.63	0.854	0.326	23	0.84	1	1	1	1	19	6	0.03	1.005	19	0.203	0.62
13.5	0.36	1.66	0.814	0.316	14	0.80	1	1	1	1	11	3	0.00	1.000	11	0.122	0.39
15	0.36	1.69	0.774	0.305	2	0.77	1	1	1	1	2	83	5.00	1.200	7	0.088	0.29
16.5	0.36	1.71	0.733	0.293	8	0.73	1	1	1	1	6	86	5.00	1.200	12	0.131	0.45
18	0.36	1.73	0.693	0.280	17	0.71	1	1	1	1	12	15	2.50	1.048	15	0.160	0.57

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 2.4

Depth of water table for CSR calculation (m) = 1.4

Analysis of Susceptibility to Liquefaction for Borehole BH9

Depth (m)	$a_{\max}/g$	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	$(N)_{60}$	FC (%)	α	β	$(N)_{60CR}$	CRR	FOS
0.9	0.36	0.95	0.999	0.221	7	1.70	1	1	0.75	1	9	44	5.00	1.200	16	0.170	0.77
2.4	0.36	1.17	0.998	0.273	4	1.53	1	1	0.8	1	5	83	5.00	1.200	11	0.122	0.45
3.9	0.36	1.32	0.997	0.307	2	1.32	1	1	0.85	1	2	96	5.00	1.200	7	0.088	0.29
5.4	0.36	1.42	0.996	0.331	4	1.17	1	1	0.95	1	4	91	5.00	1.200	10	0.113	0.34
6.9	0.36	1.49	0.995	0.348	6	1.07	1	1	0.95	1	6	86	5.00	1.200	12	0.131	0.38
8.4	0.36	1.55	0.994	0.361	12	0.99	1	1	0.95	1	11	96	5.00	1.200	18	0.192	0.53
9.9	0.36	1.60	0.910	0.340	6	0.92	1	1	1	1	6	97	5.00	1.200	12	0.131	0.39
11.4	0.36	1.64	0.870	0.333	16	0.87	1	1	1	1	14	41	5.00	1.200	22	0.242	0.73
12.9	0.36	1.67	0.830	0.324	23	0.82	1	1	1	1	19	7	0.12	1.009	19	0.203	0.63
14.4	0.36	1.69	0.790	0.313	18	0.78	1	1	1	1	14	2	0.00	1.000	14	0.150	0.48
15.9	0.36	1.72	0.749	0.301	11	0.75	1	1	1	1	8	87	5.00	1.200	15	0.160	0.53
17.4	0.36	1.74	0.709	0.288	14	0.72	1	1	1	1	10	78	5.00	1.200	17	0.181	0.63
20	0.36	1.76	0.640	0.264	24	0.68	1	1	1	1	16	61	5.00	1.200	24	0.273	1.04

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 2.2

Depth of water table for CSR calculation (m) = 1.2

Analysis of Susceptibility to Liquefaction for Borehole BH10

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	$(N)_{60}$	FC (%)	α	β	$(N)_{60CR}$	CRR	FOS
1.5	0.36	1.00	0.999	0.234	9	1.70	1	1	0.8	1	12	73	5.00	1.200	19	0.203	0.87
3	0.36	1.19	0.998	0.278	3	1.40	1	1	0.85	1	4	91	5.00	1.200	10	0.113	0.41
4.5	0.36	1.32	0.997	0.308	7	1.23	1	1	0.95	1	8	97	5.00	1.200	15	0.160	0.52
6	0.36	1.41	0.995	0.329	8	1.11	1	1	0.95	1	8	95	5.00	1.200	15	0.160	0.49
7.5	0.36	1.48	0.994	0.345	13	1.02	1	1	0.95	1	13	91	5.00	1.200	21	0.228	0.66
9	0.36	1.54	0.993	0.358	17	0.95	1	1	1	1	16	63	5.00	1.200	24	0.273	0.76
10.5	0.36	1.59	0.894	0.332	13	0.89	1	1	1	1	12	3	0.00	1.000	12	0.131	0.40
12	0.36	1.62	0.854	0.324	19	0.84	1	1	1	1	16	2	0.00	1.000	16	0.170	0.53
13.5	0.36	1.65	0.814	0.315	20	0.80	1	1	1	1	16	3	0.00	1.000	16	0.170	0.54
15	0.36	1.68	0.774	0.304	15	0.76	1	1	1	1	11	5	0.00	1.000	11	0.122	0.40
16.5	0.36	1.70	0.733	0.292	14	0.73	1	1	1	1	10	86	5.00	1.200	17	0.181	0.62
18	0.36	1.72	0.693	0.279	29	0.70	1	1	1	1	20	52	5.00	1.200	29	0.410	1.47

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 2.5

Depth of water table for CSR calculation (m) = 1.5

Analysis of Susceptibility to Liquefaction for Borehole BH11

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	(N) ₆₀	FC (%)	α	β	(N) _{60CR}	CRR	FOS
0.9	0.36	1.08	0.999	0.253	7	1.70	1	1	0.75	1	9	71	5.00	1.200	16	0.170	0.67
2.4	0.36	1.30	0.998	0.303	4	1.65	1	1	0.8	1	5	93	5.00	1.200	11	0.122	0.40
3.9	0.36	1.43	0.997	0.333	4	1.39	1	1	0.85	1	5	91	5.00	1.200	11	0.122	0.37
5.4	0.36	1.52	0.996	0.354	7	1.22	1	1	0.95	1	8	95	5.00	1.200	15	0.160	0.45
6.9	0.36	1.59	0.995	0.369	8	1.11	1	1	0.95	1	8	88	5.00	1.200	15	0.160	0.43
8.4	0.36	1.64	0.994	0.380	14	1.02	1	1	0.95	1	14	64	5.00	1.200	22	0.242	0.64
9.9	0.36	1.68	0.910	0.357	23	0.95	1	1	1	1	22	4	0.00	1.000	22	0.242	0.68
11.4	0.36	1.71	0.870	0.347	17	0.89	1	1	1	1	15	2	0.00	1.000	15	0.160	0.46
12.9	0.36	1.73	0.830	0.336	23	0.84	1	1	1	1	19	5	0.00	1.000	19	0.203	0.60
14.4	0.36	1.75	0.790	0.324	18	0.80	1	1	1	1	14	2	0.00	1.000	14	0.150	0.46
15.9	0.36	1.77	0.749	0.311	9	0.76	1	1	1	1	7	91	5.00	1.200	13	0.141	0.45
17.4	0.36	1.79	0.709	0.297	14	0.73	1	1	1	1	10	76	5.00	1.200	17	0.181	0.61
20	0.36	1.81	0.640	0.271	7	0.69	1	1	1	1	5	71	5.00	1.200	11	0.122	0.45

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 1.5

Depth of water table for CSR calculation (m) = 0.5

Analysis of Susceptibility to Liquefaction for Borehole BH1 (Revised Scope)

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	(N) ₆₀	FC (%)	α	β	(N) _{60CR}	CRR	FOS
0.9	0.36	1.20	0.999	0.281	3	1.70	1	1	0.75	1	4	90	5.00	1.200	10	0.113	0.40
2.4	0.36	1.40	0.998	0.327	12	1.70	1	1	0.8	1	16	32	4.83	1.171	24	0.273	0.84
3.9	0.36	1.52	0.997	0.355	4	1.52	1	1	0.85	1	5	97	5.00	1.200	11	0.122	0.34
5.4	0.36	1.60	0.996	0.373	5	1.31	1	1	0.95	1	6	96	5.00	1.200	12	0.131	0.35
6.9	0.36	1.66	0.995	0.386	7	1.17	1	1	0.95	1	8	91	5.00	1.200	15	0.160	0.41
8.4	0.36	1.70	0.994	0.395	10	1.06	1	1	0.95	1	10	65	5.00	1.200	17	0.181	0.46
9.9	0.36	1.73	0.910	0.369	20	0.98	1	1	1	1	20	7	0.12	1.009	20	0.215	0.58
11.4	0.36	1.76	0.870	0.358	23	0.92	1	1	1	1	21	7	0.12	1.009	21	0.228	0.64
12.9	0.36	1.78	0.830	0.346	28	0.87	1	1	1	1	24	9	0.56	1.017	25	0.292	0.84
14.4	0.36	1.80	0.790	0.333	34	0.82	1	1	1	1	28	3	0.00	1.000	28	0.370	1.11
15.9	0.36	1.82	0.749	0.318	12	0.78	1	1	1	1	9	88	5.00	1.200	16	0.170	0.53
17.4	0.36	1.83	0.709	0.304	6	0.75	1	1	1	1	4	77	5.00	1.200	10	0.113	0.37
20.4	0.36	1.85	0.629	0.272	8	0.69	1	1	1	1	6	73	5.00	1.200	12	0.131	0.48
23.4	0.36	1.87	0.549	0.240	35	0.65	1	1	1	1	23	7	0.12	1.009	23	0.257	1.07
26.4	0.36	1.88	0.469	0.206	40	0.61	1	1	1	1	24	2	0.00	1.000	24	0.273	1.32
29.4	0.36	1.89	0.389	0.172	25	0.58	1	1	1	1	14	75	5.00	1.200	22	0.242	1.41
32.4	0.36	1.90	0.309	0.137	24	0.55	1	1	1	1	13	86	5.00	1.200	21	0.228	1.66
35.4	0.36	1.91	0.229	0.102	38	0.53	1	1	1	1	20	91	5.00	1.200	29	0.410	4.02
38.4	0.36	1.91	0.149	0.067	45	0.51	1	1	1	1	23	2	0.00	1.000	23	0.257	3.86
40	0.36	1.92	0.106	0.048	53	0.50	1	1	1	1	26	3	0.00	1.000	26	0.313	6.58

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 0.5

Depth of water table for CSR calculation (m) = 0

Analysis of Susceptibility to Liquefaction for Borehole BH2 (Revised Scope)

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	$(N)_{60}$	FC (%)	α	β	$(N)_{60CR}$	CRR	FOS
1.5	0.36	1.29	0.999	0.302	3	1.70	1	1	0.8	1	4	92	5.00	1.200	10	0.113	0.37
3	0.36	1.45	0.998	0.340	12	1.65	1	1	0.85	1	17	57	5.00	1.200	25	0.292	0.86
4.5	0.36	1.56	0.997	0.363	4	1.39	1	1	0.95	1	5	96	5.00	1.200	11	0.122	0.34
6	0.36	1.63	0.995	0.379	5	1.22	1	1	0.95	1	6	95	5.00	1.200	12	0.131	0.35
7.5	0.36	1.68	0.994	0.390	7	1.11	1	1	0.95	1	7	90	5.00	1.200	13	0.141	0.36
9	0.36	1.71	0.993	0.398	10	1.02	1	1	1	1	10	11	1.21	1.026	11	0.122	0.31
10.5	0.36	1.74	0.894	0.365	20	0.95	1	1	1	1	19	3	0.00	1.000	19	0.203	0.56
12	0.36	1.77	0.854	0.353	23	0.89	1	1	1	1	20	4	0.00	1.000	20	0.215	0.61
13.5	0.36	1.79	0.814	0.341	28	0.84	1	1	1	1	24	3	0.00	1.000	24	0.273	0.80
15	0.36	1.81	0.774	0.327	34	0.80	1	1	1	1	27	85	5.00	1.200	37	0.500	1.53
16.5	0.36	1.82	0.733	0.313	12	0.76	1	1	1	1	9	75	5.00	1.200	16	0.170	0.54
18	0.36	1.83	0.693	0.297	6	0.73	1	1	1	1	4	79	5.00	1.200	10	0.113	0.38
21	0.36	1.85	0.613	0.266	8	0.68	1	1	1	1	5	65	5.00	1.200	11	0.122	0.46
24	0.36	1.87	0.533	0.233	35	0.64	1	1	1	1	22	7	0.12	1.009	22	0.242	1.04
27	0.36	1.88	0.453	0.200	40	0.60	1	1	1	1	24	79	5.00	1.200	34	0.500	2.51
30	0.36	1.89	0.373	0.165	25	0.57	1	1	1	1	14	94	5.00	1.200	22	0.242	1.46
33	0.36	1.90	0.293	0.130	24	0.54	1	1	1	1	13	68	5.00	1.200	21	0.228	1.75
36	0.36	1.91	0.213	0.095	38	0.52	1	1	1	1	20	22	3.93	1.093	26	0.313	3.29
39	0.36	1.92	0.133	0.059	45	0.50	1	1	1	1	23	14	2.20	1.042	26	0.313	5.26

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 0.8

Depth of water table for CSR calculation (m) = 0

Analysis of Susceptibility to Liquefaction for Borehole BH3 (Revised Scope)

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	(N) ₆₀	FC (%)	α	β	(N) _{60CR}	CRR	FOS
0.9	0.36	1.20	0.999	0.281	4	1.70	1	1	0.75	1	5	90	5.00	1.200	11	0.122	0.43
2.4	0.36	1.40	0.998	0.327	11	1.70	1	1	0.8	1	15	80	5.00	1.200	23	0.257	0.79
3.9	0.36	1.52	0.997	0.355	4	1.49	1	1	0.85	1	5	97	5.00	1.200	11	0.122	0.34
5.4	0.36	1.60	0.996	0.373	9	1.29	1	1	0.95	1	11	80	5.00	1.200	18	0.192	0.51
6.9	0.36	1.66	0.995	0.386	8	1.16	1	1	0.95	1	9	96	5.00	1.200	16	0.170	0.44
8.4	0.36	1.70	0.994	0.395	11	1.05	1	1	0.95	1	11	97	5.00	1.200	18	0.192	0.49
9.9	0.36	1.73	0.910	0.369	4	0.98	1	1	1	1	4	96	5.00	1.200	10	0.113	0.31
11.4	0.36	1.76	0.870	0.358	20	0.91	1	1	1	1	18	49	5.00	1.200	27	0.338	0.94
12.9	0.36	1.78	0.830	0.346	33	0.86	1	1	1	1	28	7	0.12	1.009	28	0.370	1.07
14.4	0.36	1.80	0.790	0.333	29	0.82	1	1	1	1	24	3	0.00	1.000	24	0.273	0.82
15.9	0.36	1.82	0.749	0.318	8	0.78	1	1	1	1	6	76	5.00	1.200	12	0.131	0.41
17.4	0.36	1.83	0.709	0.304	12	0.75	1	1	1	1	9	91	5.00	1.200	16	0.170	0.56
20.4	0.36	1.85	0.629	0.272	10	0.69	1	1	1	1	7	97	5.00	1.200	13	0.141	0.52
23.4	0.36	1.87	0.549	0.240	17	0.65	1	1	1	1	11	96	5.00	1.200	18	0.192	0.80
26.4	0.36	1.88	0.469	0.206	9	0.61	1	1	1	1	5	86	5.00	1.200	11	0.122	0.59
29.4	0.36	1.89	0.389	0.172	31	0.58	1	1	1	1	18	85	5.00	1.200	27	0.338	1.97
32.4	0.36	1.90	0.309	0.137	17	0.55	1	1	1	1	9	81	5.00	1.200	16	0.170	1.24
35.4	0.36	1.91	0.229	0.102	11	0.53	1	1	1	1	6	89	5.00	1.200	12	0.131	1.28
38.4	0.36	1.91	0.149	0.067	37	0.51	1	1	1	1	19	13	1.89	1.037	22	0.242	3.63
40	0.36	1.92	0.106	0.048	36	0.50	1	1	1	1	18	17	3.01	1.060	22	0.242	5.09

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 0.7

Depth of water table for CSR calculation (m) = 0

Analysis of Susceptibility to Liquefaction for Borehole BH4 (Revised Scope)

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	(N) ₆₀	FC (%)	α	β	(N) _{60CR}	CRR	FOS
1.5	0.36	1.29	0.999	0.302	4	1.70	1	1	0.8	1	5	80	5.00	1.200	11	0.122	0.40
3	0.36	1.45	0.998	0.340	5	1.67	1	1	0.85	1	7	67	5.00	1.200	13	0.141	0.41
4.5	0.36	1.56	0.997	0.363	4	1.40	1	1	0.95	1	5	96	5.00	1.200	11	0.122	0.34
6	0.36	1.63	0.995	0.379	6	1.23	1	1	0.95	1	7	90	5.00	1.200	13	0.141	0.37
7.5	0.36	1.68	0.994	0.390	9	1.11	1	1	0.95	1	10	93	5.00	1.200	17	0.181	0.46
9	0.36	1.71	0.993	0.398	25	1.02	1	1	1	1	26	15	2.50	1.048	30	0.468	1.17
10.5	0.36	1.74	0.894	0.365	13	0.95	1	1	1	1	12	3	0.00	1.000	12	0.131	0.36
12	0.36	1.77	0.854	0.353	26	0.89	1	1	1	1	23	2	0.00	1.000	23	0.257	0.73
13.5	0.36	1.79	0.814	0.341	29	0.84	1	1	1	1	24	2	0.00	1.000	24	0.273	0.80
15	0.36	1.81	0.774	0.327	4	0.80	1	1	1	1	3	91	5.00	1.200	9	0.104	0.32
16.5	0.36	1.82	0.733	0.313	5	0.76	1	1	1	1	4	83	5.00	1.200	10	0.113	0.36
18	0.36	1.83	0.693	0.297	16	0.73	1	1	1	1	12	5	0.00	1.000	12	0.131	0.44
21	0.36	1.85	0.613	0.266	22	0.68	1	1	1	1	15	2	0.00	1.000	15	0.160	0.60
24	0.36	1.87	0.533	0.233	22	0.64	1	1	1	1	14	82	5.00	1.200	22	0.242	1.04
27	0.36	1.88	0.453	0.200	16	0.60	1	1	1	1	10	96	5.00	1.200	17	0.181	0.91
30	0.36	1.89	0.373	0.165	31	0.57	1	1	1	1	18	8	0.30	1.013	19	0.203	1.23
33	0.36	1.90	0.293	0.130	21	0.55	1	1	1	1	11	86	5.00	1.200	18	0.192	1.47
36	0.36	1.91	0.213	0.095	31	0.52	1	1	1	1	16	95	5.00	1.200	24	0.273	2.88
39	0.36	1.92	0.133	0.059	27	0.50	1	1	1	1	14	3	0.00	1.000	14	0.150	2.52

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 0.7

Depth of water table for CSR calculation (m) = 0

Analysis of Susceptibility to Liquefaction for Borehole BH5 (Revised Scope)

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	$(N)_{60}$	FC (%)	α	β	$(N)_{60CR}$	CRR	FOS
0.9	0.36	1.20	0.999	0.281	8	1.70	1	1	0.75	1	10	61	5.00	1.200	17	0.181	0.64
2.4	0.36	1.40	0.998	0.327	4	1.70	1	1	0.8	1	5	97	5.00	1.200	11	0.122	0.37
3.9	0.36	1.52	0.997	0.355	3	1.46	1	1	0.85	1	4	96	5.00	1.200	10	0.113	0.32
5.4	0.36	1.60	0.996	0.373	6	1.27	1	1	0.95	1	7	82	5.00	1.200	13	0.141	0.38
6.9	0.36	1.66	0.995	0.386	15	1.14	1	1	0.95	1	16	92	5.00	1.200	24	0.273	0.71
8.4	0.36	1.70	0.994	0.395	11	1.04	1	1	0.95	1	11	91	5.00	1.200	18	0.192	0.49
9.9	0.36	1.73	0.910	0.369	20	0.97	1	1	1	1	19	3	0.00	1.000	19	0.203	0.55
11.4	0.36	1.76	0.870	0.358	26	0.91	1	1	1	1	24	3	0.00	1.000	24	0.273	0.76
12.9	0.36	1.78	0.830	0.346	38	0.86	1	1	1	1	33	2	0.00	1.000	33	0.500	1.45
14.4	0.36	1.80	0.790	0.333	38	0.81	1	1	1	1	31	3	0.00	1.000	31	0.500	1.50
15.9	0.36	1.82	0.749	0.318	9	0.77	1	1	1	1	7	83	5.00	1.200	13	0.141	0.44
17.4	0.36	1.83	0.709	0.304	13	0.74	1	1	1	1	10	78	5.00	1.200	17	0.181	0.60
20.4	0.36	1.85	0.629	0.272	18	0.69	1	1	1	1	12	29	4.64	1.146	18	0.192	0.70
23.4	0.36	1.87	0.549	0.240	40	0.64	1	1	1	1	26	11	1.21	1.026	28	0.370	1.54
26.4	0.36	1.88	0.469	0.206	39	0.61	1	1	1	1	24	7	0.12	1.009	24	0.273	1.32
29.4	0.36	1.89	0.389	0.172	48	0.58	1	1	1	1	28	7	0.12	1.009	28	0.370	2.15
32.4	0.36	1.90	0.309	0.137	26	0.55	1	1	1	1	14	83	5.00	1.200	22	0.242	1.76
35.4	0.36	1.91	0.229	0.102	31	0.53	1	1	1	1	16	89	5.00	1.200	24	0.273	2.68
38.4	0.36	1.91	0.149	0.067	65	0.51	1	1	1	1	33	15	2.50	1.048	37	0.500	7.51
40	0.36	1.92	0.106	0.048	55	0.50	1	1	1	1	27	5	0.00	1.000	27	0.338	7.11

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 0.9

Depth of water table for CSR calculation (m) = 0

Analysis of Susceptibility to Liquefaction for Borehole BH6 (Revised Scope)

Depth (m)	a_{max}/g	σ_{vo}/σ'_{vo} with SL	r_d	CSR	N_{obs}	C_N	C_E	C_B	C_R	C_S	$(N)_{60}$	FC (%)	α	β	$(N)_{60CR}$	CRR	FOS
1.5	0.36	1.29	0.999	0.302	9	1.70	1	1	0.8	1	12	86	5.00	1.200	19	0.203	0.67
3	0.36	1.45	0.998	0.340	8	1.70	1	1	0.85	1	12	77	5.00	1.200	19	0.203	0.60
4.5	0.36	1.56	0.997	0.363	6	1.42	1	1	0.95	1	8	96	5.00	1.200	15	0.160	0.44
6	0.36	1.63	0.995	0.379	6	1.25	1	1	0.95	1	7	91	5.00	1.200	13	0.141	0.37
7.5	0.36	1.68	0.994	0.390	10	1.12	1	1	0.95	1	11	77	5.00	1.200	18	0.192	0.49
9	0.36	1.71	0.993	0.398	23	1.03	1	1	1	1	24	8	0.30	1.013	25	0.292	0.73
10.5	0.36	1.74	0.894	0.365	36	0.96	1	1	1	1	34	9	0.56	1.017	35	0.500	1.37
12	0.36	1.77	0.854	0.353	36	0.90	1	1	1	1	32	9	0.56	1.017	33	0.500	1.41
13.5	0.36	1.79	0.814	0.341	33	0.85	1	1	1	1	28	2	0.00	1.000	28	0.370	1.08
15	0.36	1.81	0.774	0.327	18	0.81	1	1	1	1	14	2	0.00	1.000	14	0.150	0.46
16.5	0.36	1.82	0.733	0.313	9	0.77	1	1	1	1	7	88	5.00	1.200	13	0.141	0.45
18	0.36	1.83	0.693	0.297	13	0.74	1	1	1	1	10	89	5.00	1.200	17	0.181	0.61
21	0.36	1.85	0.613	0.266	10	0.68	1	1	1	1	7	57	5.00	1.200	13	0.141	0.53
24	0.36	1.87	0.533	0.233	29	0.64	1	1	1	1	19	11	1.21	1.026	21	0.228	0.98
27	0.36	1.88	0.453	0.200	33	0.60	1	1	1	1	20	19	3.43	1.073	25	0.292	1.46
30	0.36	1.89	0.373	0.165	21	0.57	1	1	1	1	12	24	4.18	1.108	17	0.181	1.09
33	0.36	1.90	0.293	0.130	23	0.55	1	1	1	1	13	90	5.00	1.200	21	0.228	1.75
36	0.36	1.91	0.213	0.095	21	0.52	1	1	1	1	11	87	5.00	1.200	18	0.192	2.02
39	0.36	1.92	0.133	0.059	41	0.50	1	1	1	1	21	3	0.00	1.000	21	0.228	3.84

Bulk Unit Weight the of Soil above Water Table (g/cm^3) = 1.85

Surcharge Load (SL), If any (t/m^2) = 3.6

Bulk Unit Weight the of Soil below Water Table (g/cm^3) = 2

Depth of water table for CRR calculation (m) = 0.5

Depth of water table for CSR calculation (m) = 0