एन एच पी सी लिमिटेड
(भारत सरकार का एक नवरत्न उद्यम)
NHPC Limited
(A Government of India Navratna Enterprise)

CIN: L40101HR1975GOI032564

Regd. Office: NHPC Office Complex, Sector-33, Faridabad-121003(Haryana)

Dated: 09-08-2025

Corrigendum -1

Name of the Work: - "Lot-3: Main Dam including Coffer Dam and HM works of Dibang Multipurpose Project", Arunachal Pradesh, India"

Tender ID.: 2025_NHPC_868854_1

Sl. No	Clause No./ Ref.	Existing Bid Conditions/ Description	Amended Bid Conditions/Description
VOLUME-1: Information for Bidders (IFB):			
1.	Vol.1, Sec.1, IFB, Table-8.1, Pg no. 86	Table-8.1 Details of shortlisted Borrow Areas/ Rock Quarries	Table-8.1 Details of shortlisted Borrow Areas/ Rock Quarries alongwith the Gradation Curve (Annexure-1B) is placed as **Annexure-1**
2.	Vol.1, Sec.1, IFB Cl. 7.2.1 4th Para, Pg no. 62	In order to approach to the Project site a ± 2.0 km project road shall be constructed by Lot-3 Contractor to reach Dam Top at EL 540 m on left bank.	In order to approach to the Project site a ± 2.0 km project road shall be constructed by Lot-3 Contractor to reach Dam Top at EL 540 m on left bank. A project road from Ashupani Nallah Bridge to Dam Left abutment (at EL ±330 m) -approx. 1.85 Km shall also be constructed by Lot-3 Contractor to suit the work activities
3.	Vol.1, Sec.1, IFB Cl. 9.4, 2nd Para, Pg no. 70	Further, NHPC intends to obtain 50 MW Grid Power Connection at Construction site. The location of proposed Substation at Construction site will be decided by Department of Power, GoAP. On readiness of 50 MW Grid Power Connection at Construction site, NHPC will convey it to the contractor. Subsequently, contractor has to apply and obtain the Grid Connection within 3 months of intimation by NHPC & will have to compulsorily utilize the all available Grid Power. All the expenses related to obtaining 50 MW construction power connection & expenses incurred beyond the connection point at Substation, like installation of Energy Meter, Transformer, Distribution network etc. will be borne by contractor. Timely payment of Electricity bills & any other charges etc. to Department of Power, GoAP will be sole responsibility of the contractor. In case of delay/ default by the contractor towards payment of	Further, NHPC intends to obtain 50 MW Grid Power Connection at Construction site. ~~The location of proposed Substation at Construction site will be decided by Department of Power, GoAP~~. The sub-station is being proposed on right bank near Pothead yard area. Power shall be made available at 33 KV voltage level. Contractor shall make all the arrangements for evacuation of power from sub-station. On readiness of 50 MW Grid Power Connection at Construction site, NHPC will convey it to the contractor. Subsequently, contractor has to apply and obtain the Grid Connection within 3 months of intimation by NHPC & will have to compulsorily utilize the all available Grid Power. All the expenses related to

		Department of Power, GoAP, Engineer-in-charge will pay these charges to Department of Power, GoAP & will make recovery from contractor's bills along with interest rates as applicable for Mobilization Advance mentioned in PCC clause 14.2.	obtaining 50 MW construction power connection & expenses incurred beyond the connection point at Substation, like installation of Energy Meter, Transformer, Distribution network etc. will be borne by contractor. Timely payment of Electricity bills & any other charges etc. to Department of Power, GoAP will be sole responsibility of the contractor. In case of delay/ default by the contractor towards payment of Department of Power, GoAP, Engineer-in-charge will pay these charges to Department of Power, GoAP & will make recovery from contractor's bills along with interest rates as applicable for Mobilization Advance mentioned in PCC clause 14.2.
VOLUME-2: GCC, PCC & FORMS AND PROCEDURE:			
4.	Vol.2, Sec.3, PCC Clause 14.7	…….. Escrow Mechanism shall also apply to the sub-contractors/sub-vendors for works or any part thereof having substantial value of works say 10% of the Contract Price or Rs. 25.0 crore whichever is less. …….	…….. Escrow Mechanism shall also apply to the sub-contractors/sub-vendors for works or any part thereof having substantial value of works say 10% of the Contract Price or Rs. ~~25~~100.0 crore whichever is less. …….
5.	Vol.2, Sec.3, PCC Attachment-14 (List of Approved Subcontractors/ Sub-Vendors) Pg. no. 231, Last Para	Name of the foreign brand, foreign Sub-Contractor / vendor appearing against any item in Attachment-5 - List of approved subcontractor/ vendor except who are eligible under the "Make in India Policy" stands deleted.	Name of the foreign brand, foreign Sub-Contractor / vendor appearing against any item in ~~Attachment-5~~Attachment-14 - List of approved subcontractor/ vendor except who are eligible under the "Make in India Policy" stands deleted.
VOLUME-3: BILL OF QUANTITIES:			
6.	Vol.3, Sec.5, Price Schedule-6: Civil Works (Road Works), Sl. No. 53, Pg.30	Planning, Investigation, Design, Construction, Testing and commissioning of 70R double lane Bridge Having 7.5m carriageway width and 0.9m footpath on either side for approximate 768 m length at different locations with design and construction of suitable abutments/ I Pier/ well foundation/ Pile foundation, dirt wall, return wall, approach slab, etc. complete in all respect.	Planning, Investigation, Design, Construction, Testing and commissioning of 70R double lane Bridge Having 7.5m carriageway width and 0.9m footpath on either side ~~for approximate 768 m length at different locations~~ with design and construction of suitable abutments/ ~~I~~ Pier/ well foundation/ Pile foundation, dirt wall, return wall, approach slab, etc. complete in all respect.
VOLUME-4: TECHNICAL SPECIFICATIONS FOR WORKS, MODEL QUALITY ASSURANCE PLAN AND SAFETY MANUAL:			
7.	Vol.4, Sec. 6, TS for Work, Section-B.2 Cl. 2.10.4 (3), Page 84-85	**3)** In addition to material actually removed under this title the following shall also be classified as "Rock Excavation by Blasting", and shall be measured and paid for under this item:	**3)** In addition to material actually removed under this title the following shall also be classified as "Rock Excavation by Blasting", and shall be measured and paid for under this item:

		a) Large boulders and detached pieces of rock that cannot be removed by ripping or by excavation machinery used for common excavation. b) Rock removed by drilling, wedging or barring, or other approved methods in areas where blasting would be required but not possible or permitted for whatever reason.	a) Large boulders and detached pieces of rock that cannot be removed by ripping or by excavation machinery used for common excavation. b) Rock removed by drilling, wedging or barring, or other approved methods in areas where blasting would be required but not possible or permitted for whatever reason. c) Removal of existing concrete structures such as Colcrete cofferdam etc.
8.	Vol.4, Sec. 6, TS for Work, Section B.22 Roller Compacted Concrete, Cl. 22.5. Materials, Sub Cl. 22.5.1. General, Sl.(2), Page 659	Main stock of cement (located in the aggregate treatment plant area) must guarantee at least 10-days of peak RCC production to complete the placement without hindrance due to lack of it. Adequate Surge stocks of cement close to the batching & mixing plants shall be maintained all the time. As far as the aggregate is concerned, it is required a stock for 7-days of peak RCC production for all the aggregate classes in the aggregate treatment plant area. Adequate Surge stocks for each aggregate class shall be maintained close to the batching & mixing plants.	Main stock of cement (located in the aggregate treatment plant area) must guarantee at least 10-days of peak RCC production to complete the placement without hindrance due to lack of it. Adequate Surge stocks of cement close to the batching & mixing plants shall be maintained all the time. As far as the aggregate is concerned, it is required a stock for ~~7 days~~10 days of peak RCC production for all the aggregate classes in the aggregate treatment plant area. Adequate Surge stocks for each aggregate class shall be maintained close to the batching & mixing plants.
9.	Vol.4, Sec. 6, GTS for HM Works for Dam, Cl. 2.3.2, 1st Para, Page 757	The bidder shall include details of proposed sub-contractors including vendors for items of supply or services, if he proposes to sublet or procure bought out items. The capabilities of sub-contractors and vendors shall be evaluated for acceptability based on previous references/ experience / credentials etc. to be furnished by the bidder along with tender. A list of approved vendors' alongwith qualification criteria is given as Attachment-5.	The bidder shall include details of proposed sub-contractors including vendors for items of supply or services, if he proposes to sublet or procure bought out items. The capabilities of sub-contractors and vendors shall be evaluated for acceptability based on previous references/ experience / credentials etc. to be furnished by the bidder along with tender. A list of approved vendors' alongwith qualification criteria is given as ~~Attachment-5~~Attachment-14.
10.	Vol.4, Sec. 6, PTS for HM Works for Dam, Cl. 3.6, 1st Para, Page 857	**Steel liner in Spillway Glacis, Piers and Breast wall for Lower-Level spillways** To safeguard the lower-level spillways from damage due to high velocities, the steel liners in all six Nos. lower-level spillways shall be designed, fabricated and installed as per general layout drawing Nos. NHDB-2DT3-45-GA-01-00 and NHDB-T3-45-GA-05. However, the final layout and details shall be decided at the time of detail design. There exists a possibility of change in the layout of lower-level spillways during detailed civil design/ model studies, provision for which may be kept in the bid. The various items involved in the scope of work mentioned herein shall generally consist of the following but not necessarily be restricted to:….	**Steel liner in Spillway Glacis, Piers and Breast wall for Lower-Level spillways** To safeguard the lower-level spillways from damage due to high velocities, the steel liners in all six Nos. lower-level spillways shall be designed, fabricated and installed as per general layout drawing Nos. NHDB-2DT3-45-GA-01- 00 and NHDB-T3-45-GA-05. However, the final layout and details shall be decided at the time of detail design. There exists a possibility of change in the layout of lower-level spillways during detailed civil design/ model studies, provision for which may be kept in the bid. For any increase or decrease in length/width of steel liner, payment shall be regulated on

			pro-rata basis. The various items involved in the scope of work mentioned herein shall generally consist of the following but not necessarily be restricted to:……
11.	Vol.4, Sec. 6, Civil Works QAP, Page 945-986	Civil Works QAP for Main Dam including Coffer Dam of Dibang Multipurpose Project (LOT-3)	Modified QAP for Civil Works of 2880 MW Dibang Multipurpose Project (LOT-3) is placed as **Annexure-2**
VOLUME-6: DATA SHEET			
12.	Volume_6_Section_8 Data Sheet Data Sheet – 4A, Page no. 17	**Data Sheet-4A** Proposed Specialized Agencies	Revised **Data Sheet-4A** Proposed Specialized Agencies is placed as **Annexure-3**
13.	Volume_6_Section_8 Data Sheet, Data Sheet – 6, Annex. To Data sheet-6, Cl. 4.1 C, Page no. 65	In additional, in order to guarantee a continuous RCC production, the following mitigation measures were taken in account: - 10 days of peak production storage of cement - 3 days of peak production of aggregate stockpiles - Double conveyor, instead that one, for the aggregate transportation from borrow area to dam site.	In additional, in order to guarantee a continuous RCC production, the following mitigation measures were taken in account: - 10 days of peak production storage of cement - ~~3 days~~10 days of peak production of aggregate stockpiles - Double conveyor, instead that one, for the aggregate transportation from borrow area to dam site.

All other terms & conditions of the tender document shall remain unchanged.

General Manager (CC-I)
E-mail: contcivil1-co@nhpc.nic.in

Table-8.1 Details of shortlisted Borrow Areas/ Rock Quarries

Sl. No.	Description of Borrow Areas & Index No	Distance from Dam (Km.)	Total Qty Required for Project (lakh. $m^{3)}$	Required Qty. for Lot III works (lakh. $m^{3)}$	Available Qty. (lakh m^3)	Allocation Qty. (lakh m^3)	Suitability	Potential Reactivity (AAR)	Remarks
	Concrete Aggregate								
1	Aya Korong river fan deposit (DBG-1)	8.5	Coarse Aggregate-228.0 Fine Aggregate-114.0 After adding 38% of aggregate quantity is **472.0**	CA =198.0 FA = 99.0 After adding 38% of aggregate quantity is CA=273.0 FA=137.0 **Total=410.0**	417	CA=282.0 FA=135.0 (72 by crushed from CA + 63 by Natural Sand)	Suitable for both wearing as well as non-wearing surface concrete	Innocuous	Provided to be quarried
2	Eme river fan deposit (DBG-2)	10.5			123	CA= 99 FA= 24	Suitable for non-wearing surface concrete only	Innocuous	Provided to be quarried
3	Nizam ghat & Sirki river shoal/ fan deposit (DBG-3)	13.5			105	CA=105	Suitable for both wearing as well as non-wearing surface concrete	Reactive	Provided to be quarried for Coarse Aggregate only. Natural fine aggregate is not suitable
4	Excavated material of power house cavern (DBR-3)	0.5			5.0	CA: 4.25 FA: 0.75	Suitable for non-wearing surface concrete only	Reactive	Provided to be quarried
5	Excavated material from right side Dam abutment (DBR-6)	0.5			16.0	CA: 13.60 FA: 2.40	Suitable for non-wearing surface concrete only	Reactive	Provided to be quarried
Impervious Soil									
6	Munli Camp Impervious Soil Deposit	1.0	0.05	0.05	0.28	-	Suitable	-	

DIBANG MULTIPURPOSE PROJECT
Construction Materials

Gradation analysis of pit run material from DBG- & DBG-2 has been conducted in the month of October 2023. Following details are as under.

Aya Korong Fan Deposit (DBG-1)

This deposit is situated at about 8.5 km downstream of dam site on right bank of Dibang river. This deposit comprises mostly of homogeneous mixture of angular to sub-rounded boulders, cobbles, pebbles, gravel and sand.

Addition six pits were explored from various location of this deposit for gradation analysis and collection of samples for soundness test for their suitability. The gradation analysis in tabular form given in table 1 to 6. The gradation analysis of pit run material indicates 90.70% coarse aggregate (300mm to 4.75mm) and 9.30% natural sand. The gradation analysis curves of all in aggregate in each pit are given as figure 1 to 6.

EME River Shoal Deposit (DBG-2)

This deposit is situated at about 10.5 km downstream of dam site on right bank of Dibang river. This deposit comprises mostly of homogeneous mixture of angular to sub-rounded boulders, cobbles, pebbles, gravel and sand.

Addition three pits were explored from various location of this deposit for gradation analysis and collection of samples for soundness test of their suitability. The gradation analysis in tabular form given in table 7 to 9. The gradation analysis of pit run material indicates 91.6% coarse aggregate (300mm to 4.75mm) and 8.4% natural sand. The gradation analysis curves of all in aggregate in each pit are given as figure 7 to 9.

DIBANG MULTIPURPOSE PROJECT

Location of Deposit**: Aya Korong Fan Deposit** Test of Pit**: 13.10.2023**

Test Pit No**: DBG1-9** Pit Size**: 2.0X 2.0m**

Table 1 – GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

Material Represented	**Screen Opening (mm)**	**Screen Analysis (Percent) Depth of Slab (m)**			
		0.0-1.5m		**1.5-3.0m**	
Weight of Sample (Kg)		1448kg		1590kg	
		Retained %	Passing %	Retained %	Passing %
AGGREGATE	**300.00**	15.6	84.4	8.4	91.6
	150.00	14.5	69.9	14.1	77.5
	80.00	7.4	62.6	6.9	70.7
	63.00	5.6	56.9	5.3	65.4
	50.00	5.8	51.1	5.9	59.5
	40.00	5.6	45.7	5.8	50.7
	31.50	5.6	39.9	5.5	48.1
	25.00	5.3	34.7	5.7	42.4
	20.00	5.0	29.7	5.2	37.2
	16.00	4.4	25.2	4.3	32.8
	12.50	4.7	20.5	4.7	28.2
	10.00	3.8	16.7	5.4	22.8
	6.30	4.7	12.0	4.5	18.2
	4.75	3.8	8.2	3.7	14.5
Percent of Gravel		**91.8**		**85.4**	
Sample No.	**Sieve Size (mm)**	**(1)**	**(2)**	**(1)**	**(2)**
SAND	**4.75**	0.0	0.0	0.0	0.0
	2.36	18.2	16.8	16.5	15.5
	1.18	15.2	17.9	14.2	13.0
	0.60	13.7	13.5	14.9	16.0
	0.30	10.0	14.4	10.8	18.5
	0.15	19.6	23.9	19.8	22.2
	0.075	14.9	10.7	14.0	9.9
	Pan	8.4	2.8	9.8	4.9
	F. M.	**2.33**	**2.49**	**2.25**	**2.37**
Percent of Sand		**8.2**		**14.5**	

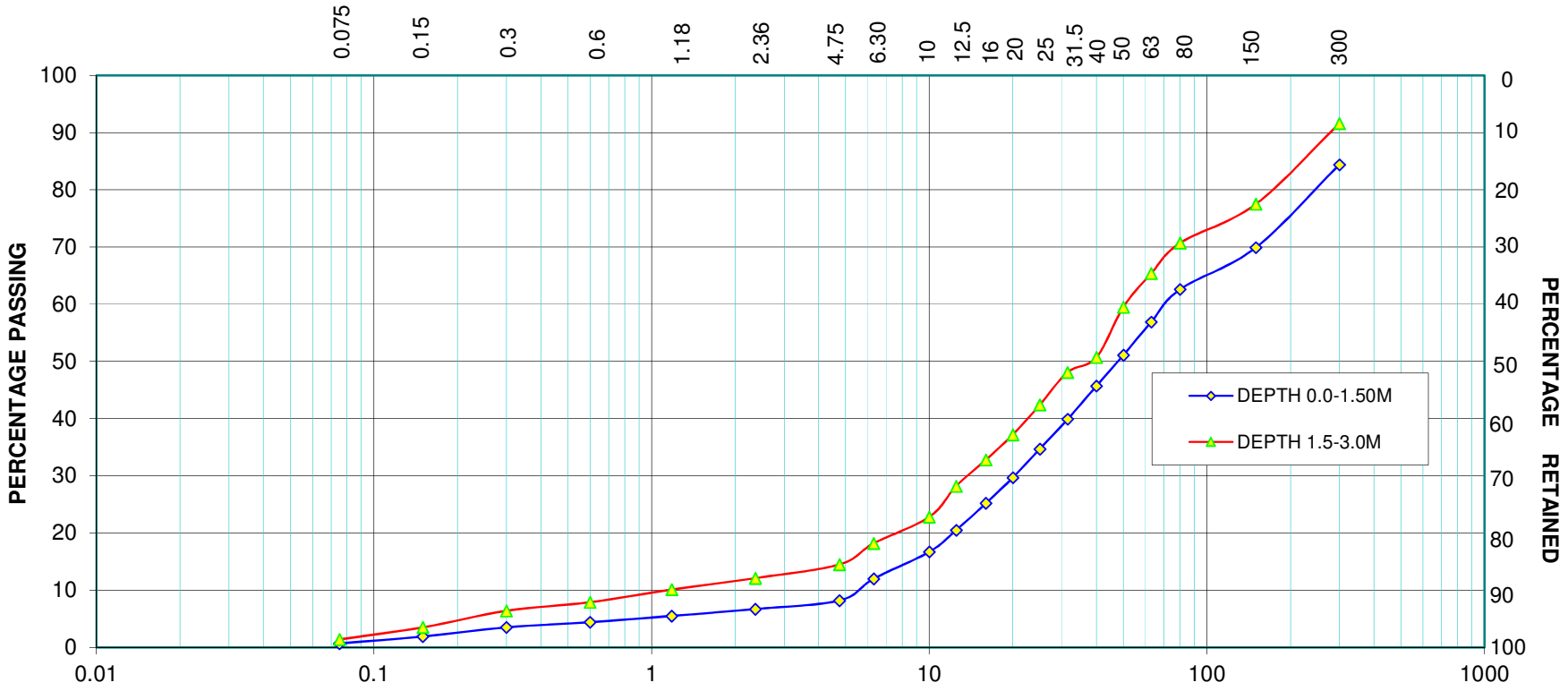
Note: Sample No. (1) is Unwashed & Sample No. (2) is Washed

GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

FEATURE: DIBANG MULTIPURPOE PROJECT **DEPOSIT :** FAN DEPOSIT **DATE 13.10.2023**

PIT NO. : DBG 1-9 **PIT DEPTH :** 3.00m **LOCATION :** AYA KORONG FAN DEPOSIT

IS STANDARD SIEVES **DIMENSIONS IN mm**



CLAY TO SILT	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLES	BOULDERS
	SAND			GRAVEL			

Fig.1

DIBANG MULTIPURPOSE PROJECT

Location of Deposit**: Aya Korong Fan Deposit** Test of Pit**: 14.10.2023**

Test Pit No**: DBG1-10** Pit Size**: 2.0X 2.0m**

Table 2 – GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

Material Represented	**Screen Opening (mm)**	**Screen Analysis (Percent) Depth of Slab (m)**			
		0.0-1.5m		**1.5-3.0m**	
Weight of Sample (Kg)		1831kg		2130kg	
		Retained %	Passing %	Retained %	Passing %
AGGREGATE	**300.00**	19.1	80.9	26.1	73.9
	150.00	11.3	69.6	11.2	62.8
	80.00	9.6	60.0	8.7	54.1
	63.00	6.6	53.4	6.1	48.0
	50.00	5.6	47.8	5.4	42.6
	40.00	5.2	42.6	4.7	37.9
	31.50	5.2	37.4	4.7	33.1
	25.00	4.6	32.8	4.3	28.8
	20.00	4.5	28.2	4.7	24.1
	16.00	3.7	24.5	3.4	20.7
	12.50	3.9	20.6	3.2	17.5
	10.00	4.5	16.1	4.0	13.5
	6.30	4.9	11.2	4.6	8.9
	4.75	4.4	6.8	2.7	6.2
Percent of Gravel		**93.2**		**93.8**	
Sample No.	**Sieve Size (mm)**	**(1)**	**(2)**	**(1)**	**(2)**
SAND	**10.0**	0.0	0.0	0.0	0.0
	4.75	0.0	0.0	0.0	0.0
	2.36	12.8	11.5	14.0	13.0
	1.18	19.1	18.9	18.0	17.1
	0.60	13.6	19.1	13.4	15.9
	0.30	22.0	24.5	24.2	25.0
	0.15	16.8	17.5	14.0	19.1
	0.075	6.8	4.7	7.9	6.8
	Pan	8.9	3.8	8.5	3.1
	F. M.	**2.42**	**2.58**	**2.47**	**2.50**
Percent of Sand		**6.8**		**6.2**	

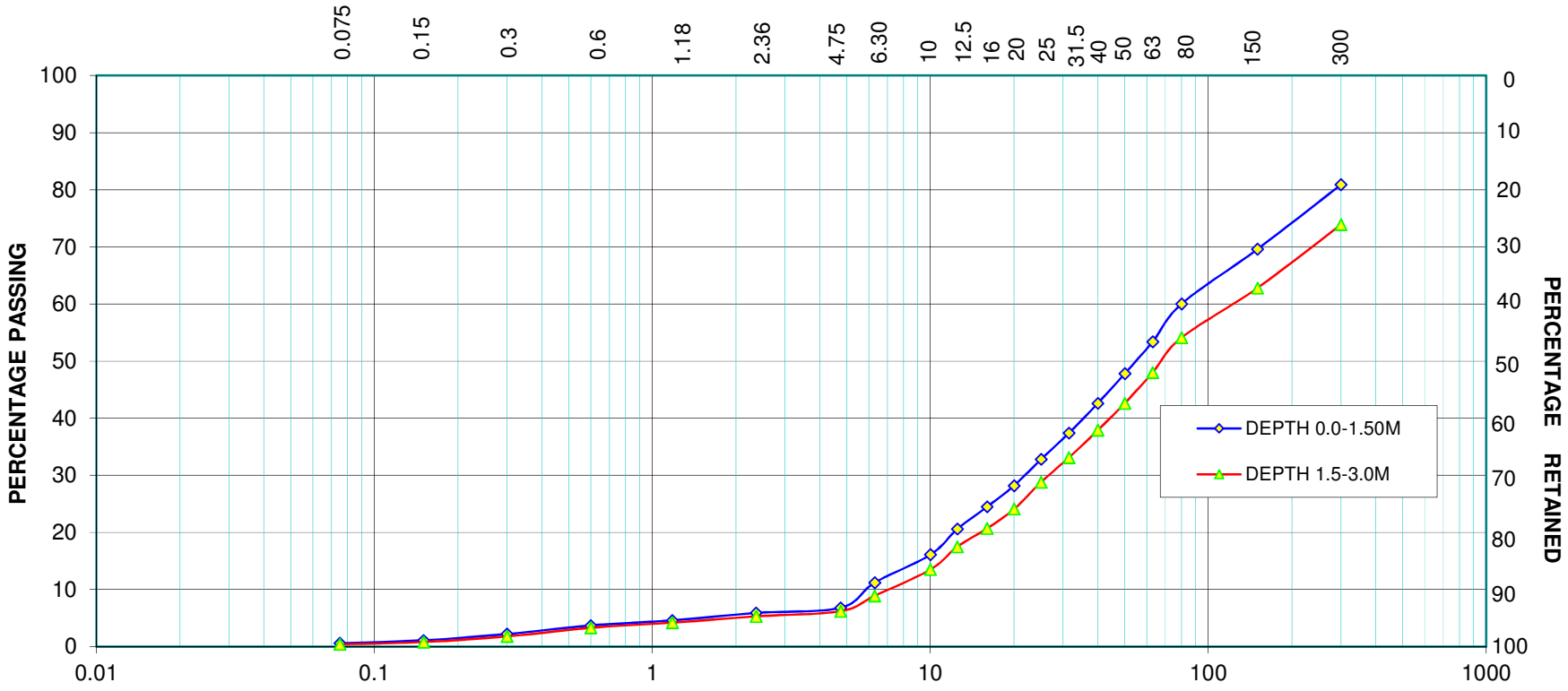
Note: Sample No. (1) is unwashed & Sample No. (2) is washed

GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

FEATURE: DIBANG MULTIPURPOE PROJECT **DEPOSIT :** FAN DEPOSIT **DATE 14.10.2023**

PIT NO. : DBG 1-10 **PIT DEPTH :** 3.00m **LOCATION :** AYA KORONG FAN DEPOSIT

IS STANDARD SIEVES **DIMENSIONS IN mm**



CLAY TO SILT	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLES	BOULDERS
	SAND			GRAVEL			

Fig.2

DIBANG MULTIPURPOSE PROJECT

Location of Deposit**: Aya Korong Fan Deposit** Test of Pit**: 15.10.2023**

Test Pit No**: DBG1-11** Pit Size**: 2.0X 2.0m**

Table 3 – GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

Material Represented	**Screen Opening (mm)**	**Screen Analysis (Percent) Depth of Slab (m)**			
		0.0-1.5m		**1.5-3.0m**	
Weight of Sample (Kg)		1448kg		1590kg	
		Retained %	Passing %	Retained %	Passing %
AGGREGATE	**300.00**	3.9	96.1	14.3	85.7
	150.00	12.5	83.6	11.4	74.3
	80.00	8.6	75.0	7.3	66.9
	63.00	6.0	69.0	5.5	61.5
	50.00	6.6	62.4	5.3	56.2
	40.00	6.3	56.1	5.5	50.7
	31.50	6.8	49.3	6.1	44.6
	25.00	6.8	42.5	5.9	38.7
	20.00	6.3	36.2	5.5	33.1
	16.00	4.9	31.3	4.2	29.0
	12.50	5.6	25.7	4.6	24.3
	10.00	6.2	19.5	5.3	19.1
	6.30	7.0	12.6	6.2	12.9
	4.75	3.6	8.9	4.4	8.5
Percent of Gravel		**91.1**		**91.5**	
Sample No.	**Sieve Size (mm)**	**(1)**	**(2)**	**(1)**	**(2)**
SAND	**4.75**	0.0	0.0	0.0	0.0
	2.36	16.2	14.9	15.7	15.1
	1.18	15.9	16.1	17.4	15.9
	0.60	16.5	19.5	16.0	15.8
	0.30	14.9	19.5	13.4	16.9
	0.15	20.1	20.9	19.1	24.8
	0.075	8.8	5.2	9.0	6.8
	Pan	7.6	3.9	9.4	4.7
	F. M.	**2.33**	**2.49**	**2.25**	**2.37**
Percent of Sand		**8.9**		**8.5**	

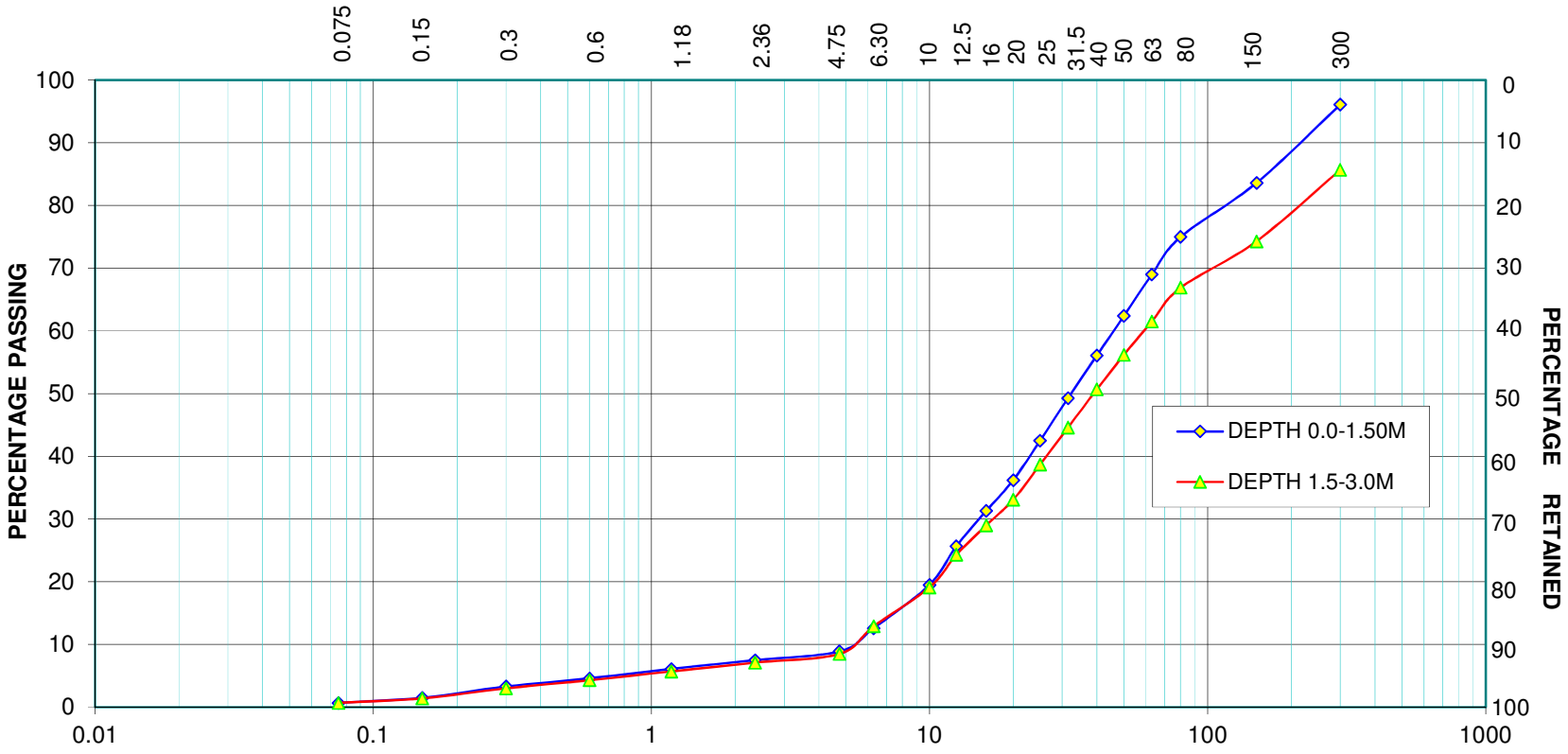
Note: Sample No. (1) is Unwashed & Sample No. (2) is Washed

GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

FEATURE: DIBANG MULTIPURPOE PROJECT **DEPOSIT :** FAN DEPOSIT **DATE 14.10.2023**

PIT NO. : DBG1-11 **PIT DEPTH :** 3.00m **LOCATION :** AYA KORONG FAN DEPOSIT

IS STANDARD SIEVES **DIMENSIONS IN mm**



CLAY TO SILT	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLES	BOULDERS
	SAND			GRAVEL			

Fig.3

DIBANG MULTIPURPOSE PROJECT

Location of Deposit**: Aya Korong Fan Deposit** Test of Pit**: 15.10.2023**

Test Pit No**: DBG1-12** Pit Size**: 2.0X 2.0m**

Table 4– GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

Material Represented	**Screen Opening (mm)**	**Screen Analysis (Percent) Depth of Slab (m)**			
		0.0-1.5m		**1.5-3.0m**	
Weight of Sample (Kg)		1448kg		1590kg	
		Retained %	Passing %	Retained %	Passing %
AGGREGATE	**300.00**	6.8	93.2	16.3	83.7
	150.00	15.8	77.4	11.6	72.0
	80.00	7.7	69.7	9.2	62.8
	63.00	4.9	64.9	5.2	57.6
	50.00	5.2	59.7	4.9	52.7
	40.00	5.8	53.9	5.3	47.4
	31.50	5.9	48.0	5.6	41.7
	25.00	5.8	42.2	5.4	36.3
	20.00	5.2	36.9	5.8	30.6
	16.00	4.0	32.9	4.1	26.5
	12.50	4.5	28.4	4.2	22.3
	10.00	5.5	22.9	5.4	16.9
	6.30	5.8	17.1	5.8	11.1
	4.75	4.3	12.9	4.4	6.7
Percent of Gravel		**87.2**		**93.2**	
Sample No.	**Sieve Size (mm)**	**(1)**	**(2)**	**(1)**	**(2)**
SAND	**4.75**	0.0	0.0	0.0	0.0
	2.36	13.3	12.5	13.5	13.0
	1.18	16.4	15.8	18.6	16.8
	0.60	12.4	13.5	13.0	18.6
	0.30	13.1	18.8	13.1	19.7
	0.15	20.4	21.0	20.1	20.6
	0.075	16.5	15.2	15.2	8.0
	Pan	7.9	3.2	6.5	3.3
	F. M.	2.16	2.25	2.27	2.48
Percent of Sand		**12.8**		**6.8**	

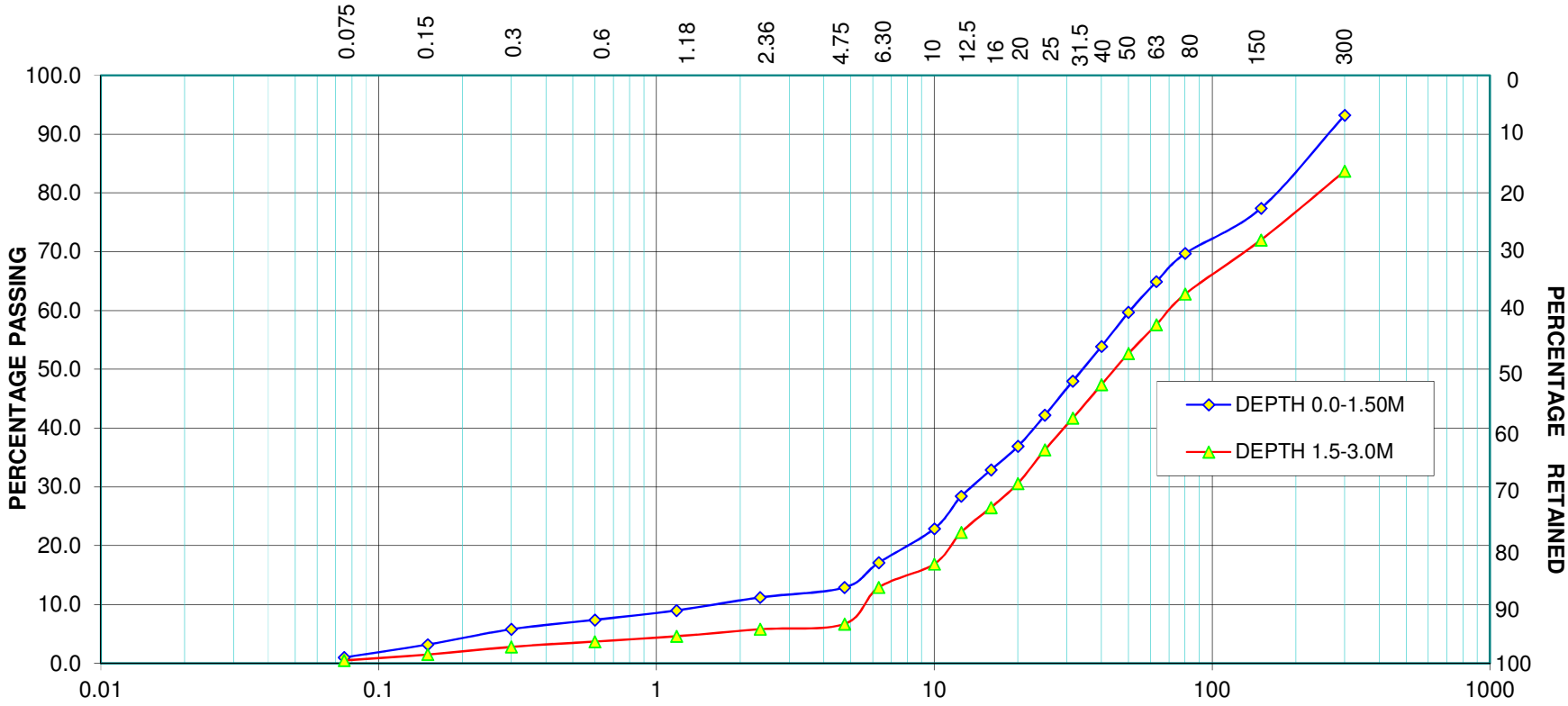
Note: Sample No. (1) is Unwashed & Sample No. (2) is Washed

GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

FEATURE: DIBANG MULTIPURPOE PROJECT **DEPOSIT :** FAN DEPOSIT **DATE 14.10.2023**

PIT NO. : DBG1-12 **PIT DEPTH :** 3.00m **LOCATION :** AYA KORONG FAN DEPOSIT

IS STANDARD SIEVES **DIMENSIONS IN mm**



CLAY TO SILT	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

Fig.4

DIBANG MULTIPURPOSE PROJECT

Location of Deposit**: Aya Korong Fan Deposit** Test of Pit**: 16.10.2023**

Test Pit No**: DBG1-13** Pit Size**: 2.0X 2.0m**

Table 5– GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

Material Represented	**Screen Opening (mm)**	**Screen Analysis (Percent) Depth of Slab (m)**			
		0.0-1.5m		**1.5-3.0m**	
Weight of Sample (Kg)		1695kg		1835kg	
		Retained %	Passing %	Retained %	Passing %
AGGREGATE	**300.00**	13.9	86.1	16.2	83.8
	150.00	11.4	74.6	11.8	72.0
	80.00	10.5	64.1	8.1	63.9
	63.00	5.8	58.3	5.9	57.9
	50.00	5.7	52.6	5.1	52.8
	40.00	5.7	46.9	5.9	46.9
	31.50	6.1	40.9	6.0	40.9
	25.00	5.8	35.1	5.5	35.4
	20.00	5.1	30.0	4.8	30.6
	16.00	4.2	25.8	4.4	26.2
	12.50	4.4	21.4	4.3	21.9
	10.00	5.1	16.3	4.6	17.2
	6.30	5.1	11.2	5.0	12.2
	4.75	4.1	7.1	3.9	8.3
Percent of Gravel		**92.9**		**91.7**	
Sample No.	**Sieve Size (mm)**	**(1)**	**(2)**	**(1)**	**(2)**
SAND	**4.75**	0.0	0.0	0.0	0.0
	2.36	19.7	19.0	18.7	16.9
	1.18	21.0	20.1	20.1	18.9
	0.60	17.0	16.9	16.9	19.8
	0.30	16.0	18.0	14.4	19.9
	0.15	11.2	19.0	13.1	15.9
	0.075	7.2	4.1	9.0	4.5
	Pan	7.9	2.9	7.8	4.1
	F. M.	**2.77**	**2.81**	**2.66**	**2.75**
Percent of Sand		**7.1**		**8.3**	

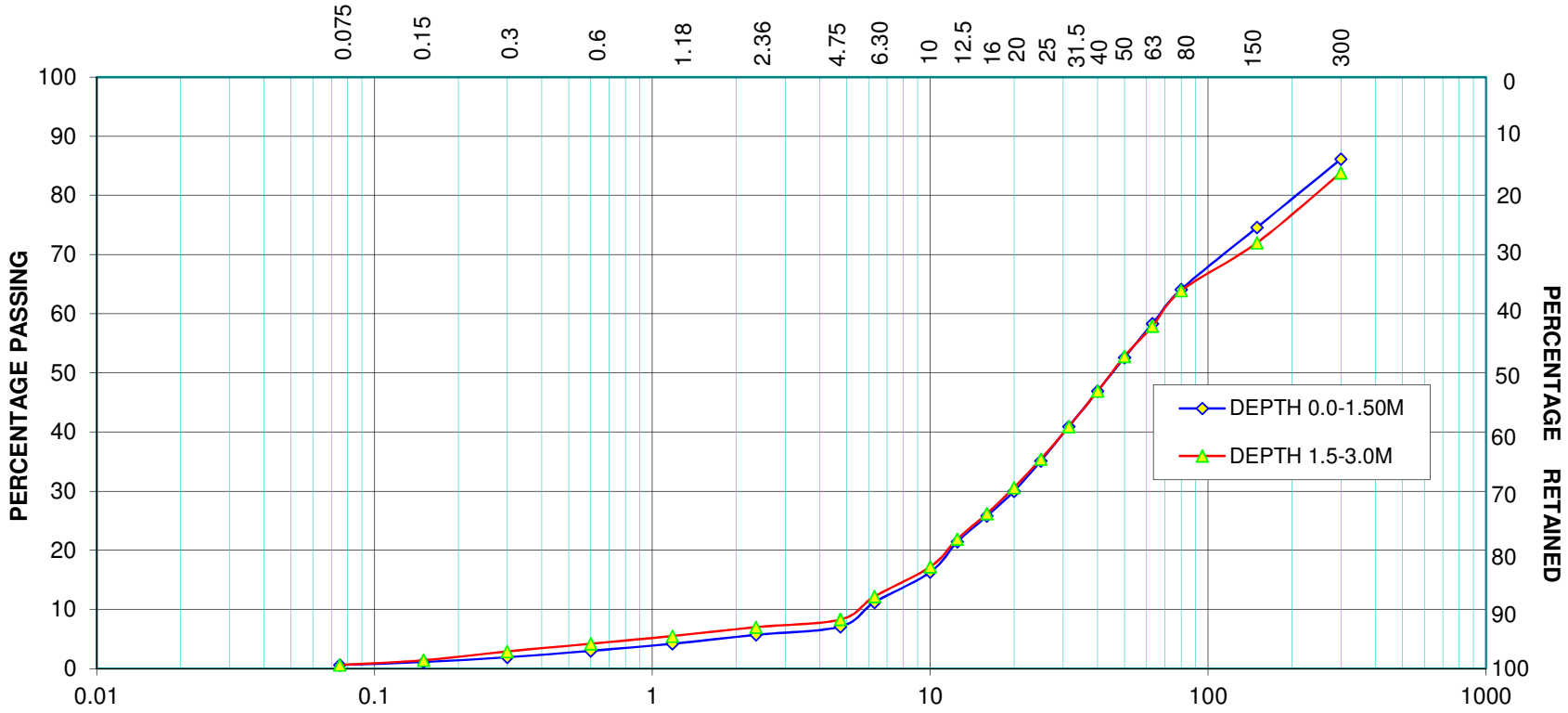
Note: Sample No. (1) is Unwashed & Sample No. (2) is Washed

GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

FEATURE: DIBANG MULTIPURPOE PROJECT **DEPOSIT :** FAN DEPOSIT **DATE 15.10.2023**

PIT NO. : DBG1-13 **PIT DEPTH :** 3.00m **LOCATION :** AYA KORONG FAN DEPOSIT

IS STANDARD SIEVES **DIMENSIONS IN mm**



CLAY TO SILT	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLES	BOULDERS
	SAND			GRAVEL			

Fig.5

DIBANG MULTIPURPOSE PROJECT

Location of Deposit**: Aya Korong Fan Deposit** Test of Pit**: 16.10.2023**

Test Pit No**: DBG1-14** Pit Size**: 2.0X 2.0m**

Table 6– GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

Material Represented	**Screen Opening (mm)**	**Screen Analysis (Percent) Depth of Slab (m)**			
		0.0-1.5m		**1.5-3.0m**	
Weight of Sample (Kg)		1551kg		1667kg	
		Retained %	Passing %	Retained %	Passing %
AGGREGATE	**300.00**	0.0	100.0	13.6	86.4
	150.00	17.6	82.4	13.0	73.4
	80.00	8.8	73.6	8.5	65.0
	63.00	7.7	65.9	7.7	57.3
	50.00	7.0	54.9	6.2	51.0
	40.00	5.7	53.3	5.9	45.2
	31.50	5.6	47.6	4.8	40.4
	25.00	5.2	42.5	4.9	35.5
	20.00	4.8	37.7	4.7	30.8
	16.00	4.4	33.3	3.8	27.0
	12.50	4.2	29.1	4.1	22.9
	10.00	4.8	24.3	4.7	18.1
	6.30	5.5	18.8	5.3	12.8
	4.75	4.4	14.4	3.8	9.0
Percent of Gravel		**85.6**		**91.0**	
Sample No.	**Sieve Size (mm)**	**(1)**	**(2)**	**(1)**	**(2)**
SAND	**4.75**	0.0	0.0	0.0	0.0
	2.36	13.0	12.8	14.1	13.1
	1.18	18.0	16.9	17.2	15.9
	0.60	14.5	19.8	15.1	19.9
	0.30	14.9	18.0	14.2	17.1
	0.15	18.4	19.9	19.1	19.4
	0.075	12.2	8.1	13.4	10.3
	Pan	9.0	4.5	6.9	4.3
	F. M.	2.29	2.47	2.32	2.48
Percent of Sand		**14.4**		**9.0**	

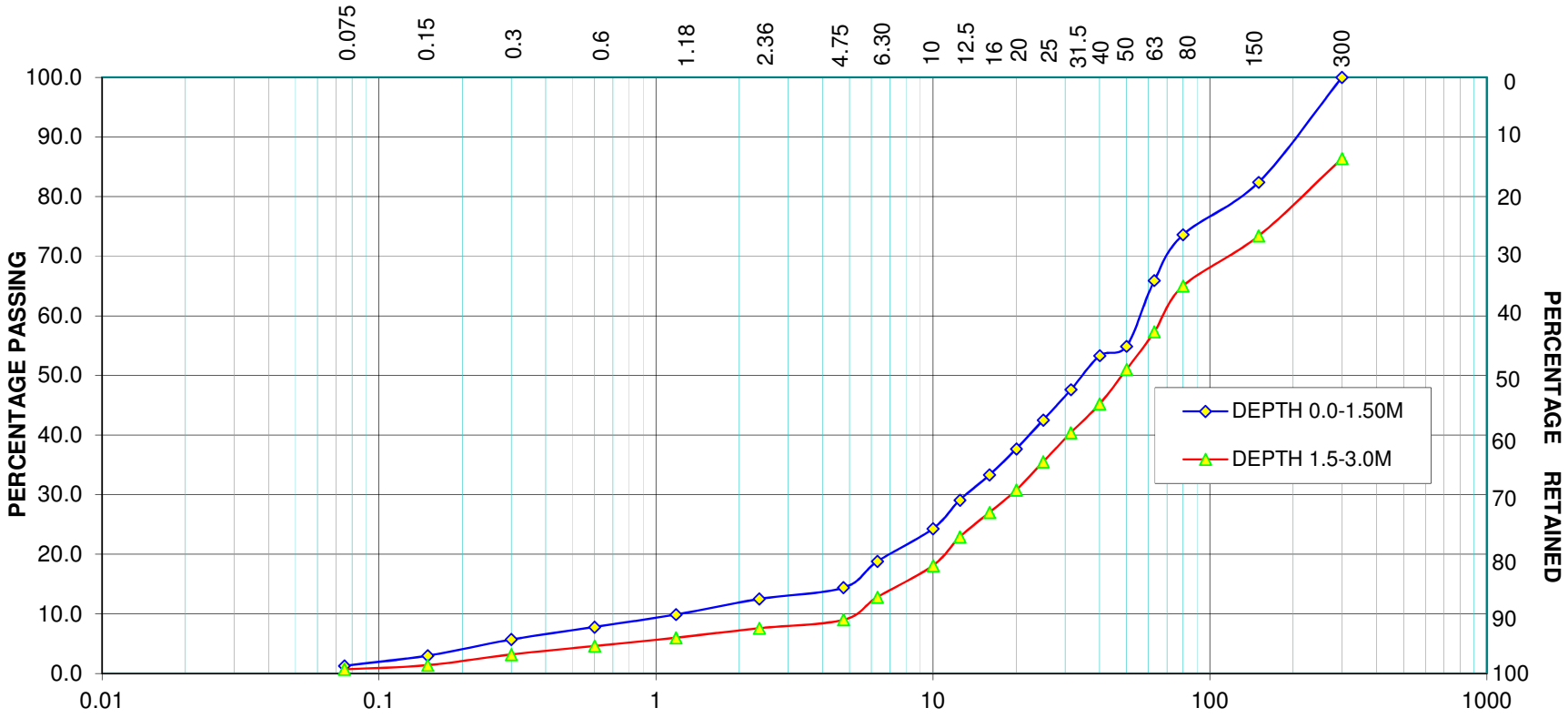
Note: Sample No. (1) is Unwashed & Sample No. (2) is Washed

GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

FEATURE: DIBANG MULTIPURPOE PROJECT **DEPOSIT :** FAN DEPOSIT **DATE 16.10.2023**

PIT NO. : DBG1-14 **PIT DEPTH :** 3.00m **LOCATION :** AYA KORONG FAN DEPOSIT

IS STANDARD SIEVES **DIMENSIONS IN mm**



CLAY TO SILT	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLES	BOULDERS
	SAND			GRAVEL			

Fig.6

DIBANG MULTIPURPOSE PROJECT

Location of Deposit**: EME River Shoal Deposit** Test of Pit**: 17.10.2023**

Test Pit No**: DBG2-12** Pit Size**: 2.0X 2.0m**

Table 7 – GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

Material Represented	**Screen Opening (mm)**	**Screen Analysis (Percent) Depth of Slab (m)**			
		0.0-1.5m		**1.5-3.0m**	
Weight of Sample (Kg)		1448kg		1590kg	
		Retained %	Passing %	Retained %	Passing %
AGGREGATE	**300.00**	5.5	94.5	11.5	88.5
	150.00	19.3	75.2	13.2	75.4
	80.00	8.0	67.2	7.6	67.8
	63.00	8.7	58.5	7.8	60.0
	50.00	6.7	51.8	7.0	53.0
	40.00	5.6	46.1	6.0	47.0
	31.50	5.0	41.2	5.0	42.1
	25.00	4.9	36.3	4.6	37.5
	20.00	4.2	32.1	4.2	33.3
	16.00	4.3	27.8	4.4	28.9
	12.50	4.2	23.6	3.9	25.0
	10.00	5.0	18.6	4.8	20.2
	6.30	5.4	13.3	5.6	14.6
	4.75	5.0	8.2	5.4	9.2
Percent of Gravel		**91.8**		**90.8**	
Sample No.	**Sieve Size (mm)**	**(1)**	**(2)**	**(1)**	**(2)**
SAND	**4.75**	0.0	0.0	0.0	0.0
	2.36	18.8	18.1	18.0	17.1
	1.18	19.8	18.8	20.6	19.8
	0.60	14.9	16.9	15.0	16.4
	0.30	18.9	21.0	18.0	19.6
	0.15	14.0	15.7	13.6	17.9
	0.075	8.0	7.0	9.1	72.0
	Pan	5.6	2.5	5.7	5.7
	F. M.	2.69	2.74	2.67	2.71
Percent of Sand		**8.2**		**9.2**	

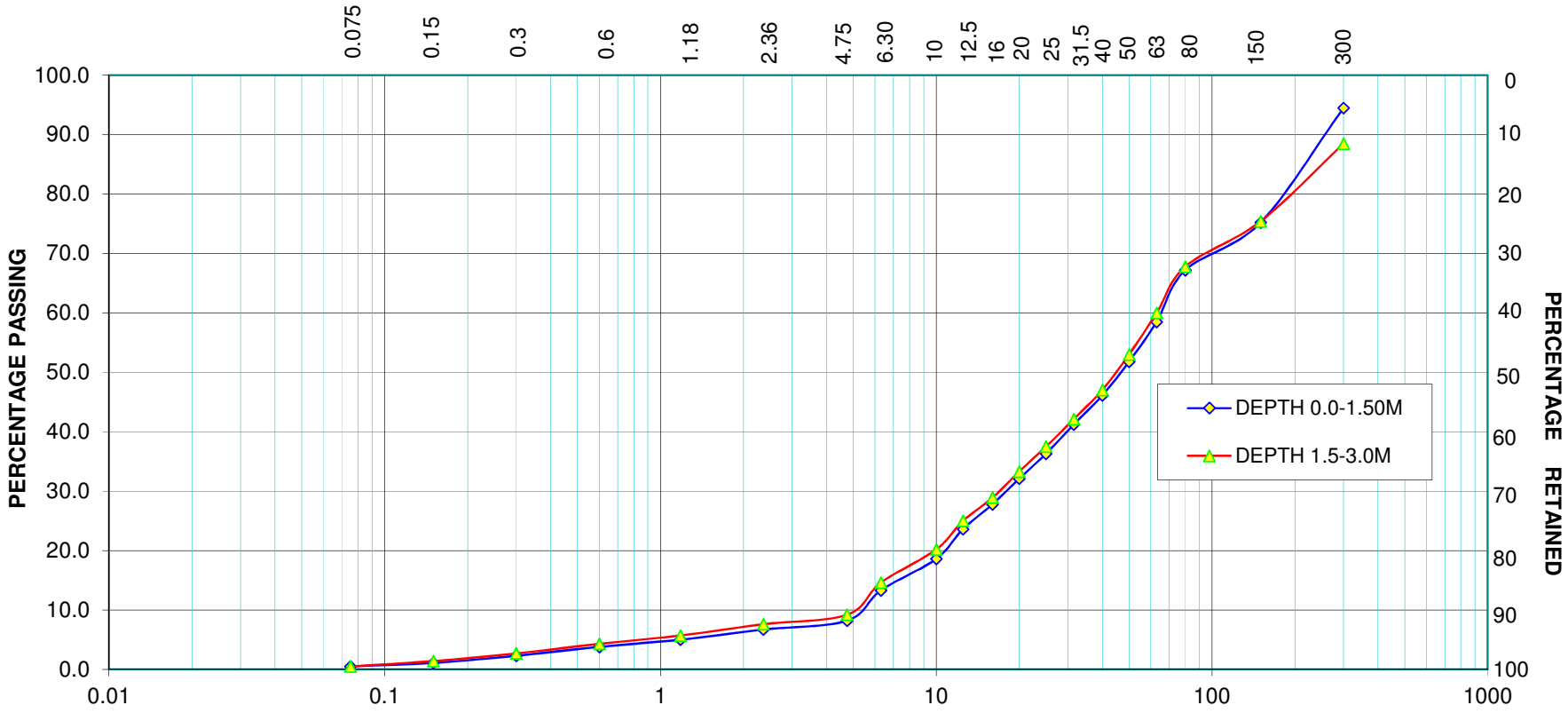
Note: Sample No. (1) is Unwashed & Sample No. (2) is Washed

GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

FEATURE: DIBANG MULTIPURPOE PROJECT **DEPOSIT :** FAN DEPOSIT **DATE 16.10.2023**

PIT NO. : DBG2-12 **PIT DEPTH :** 3.00m **LOCATION :** EME RIVER SHOAL DEPOSIT

IS STANDARD SIEVES **DIMENSIONS IN mm**



CLAY TO SILT	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLES	BOULDERS
	SAND			GRAVEL			

Fig.7

DIBANG MULTIPURPOSE PROJECT

Location of Deposit**: EME River Shoal Deposit** Test of Pit**: 17.10.2023**

Test Pit No**: DBG2-13** Pit Size**: 2.0X 2.0m**

Table 8– GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

Material Represented	**Screen Opening (mm)**	**Screen Analysis (Percent) Depth of Slab (m)**			
		0.0-1.5m		**1.5-3.0m**	
Weight of Sample (Kg)		1695kg		1835kg	
		Retained %	Passing %	Retained %	Passing %
AGGREGATE	**300.00**	7.1	92.9	13.0	87.0
	150.00	19.9	73.0	12.0	75.1
	80.00	8.2	64.8	9.5	65.6
	63.00	5.9	59.0	6.4	59.1
	50.00	5.9	53.0	6.4	52.8
	40.00	5.8	47.2	5.9	46.9
	31.50	5.8	41.3	5.6	41.3
	25.00	5.3	36.0	5.9	35.4
	20.00	5.1	30.9	4.9	30.5
	16.00	4.7	26.2	4.3	26.2
	12.50	4.4	21.9	4.2	22.0
	10.00	4.3	17.5	4.4	17.5
	6.30	5.3	12.3	5.4	12.2
	4.75	4.4	7.9	4.2	7.9
Percent of Gravel		**92.1**		**92.1**	
Sample No.	**Sieve Size (mm)**	**(1)**	**(2)**	**(1)**	**(2)**
SAND	**4.75**	0.0	0.0	0.0	0.0
	2.36	19.3	18.1	19.1	18.8
	1.18	18.8	19.9	13.1	13.5
	0.60	19.4	19.8	19.7	19.1
	0.30	21.9	22.1	20.5	23.5
	0.15	10.9	14.2	14.2	18.9
	0.075	5.9	4.0	8.8	4.2
	Pan	3.8	1.9	4.6	2.0
	F. M.	**2.84**	**2.88**	**2.62**	**2.71**
Percent of Sand		**7.9**		**7.9**	

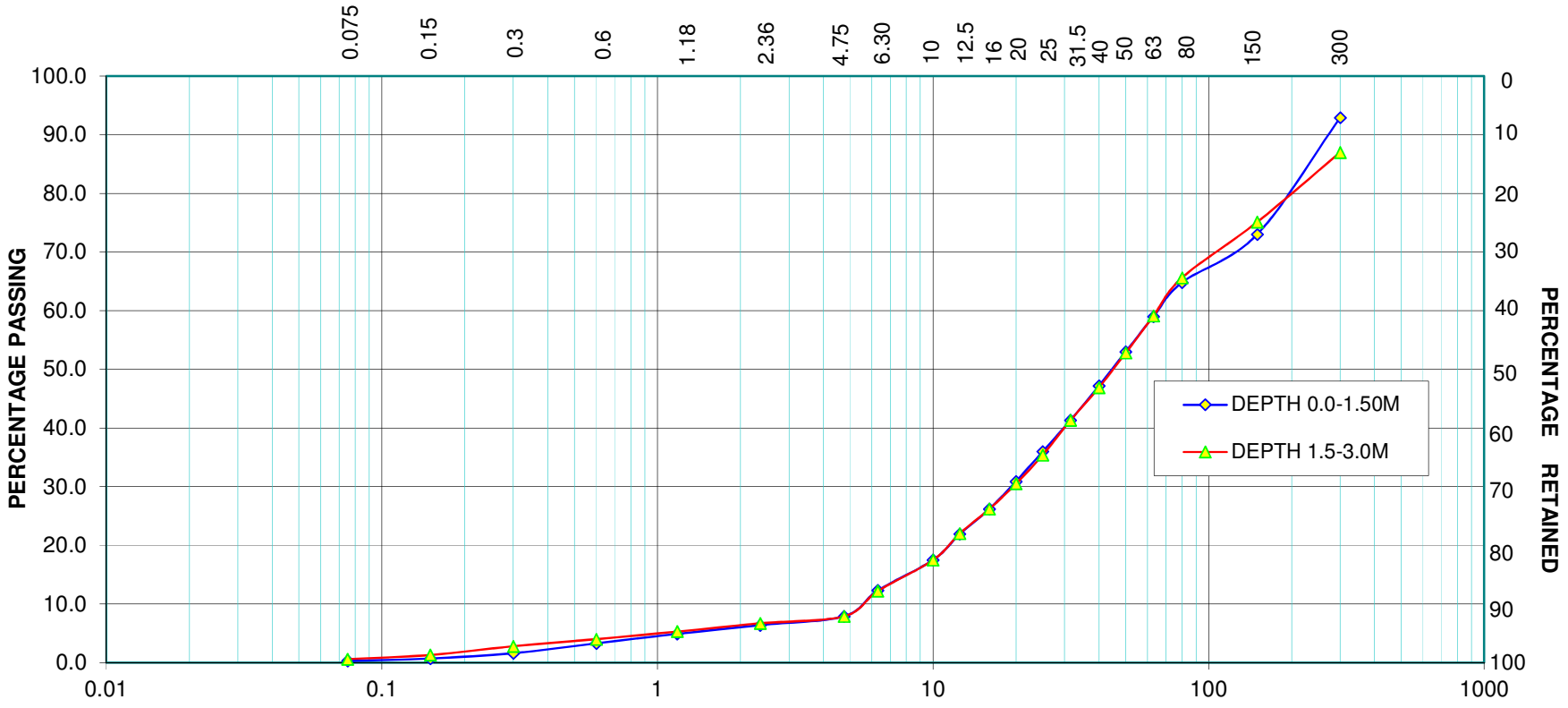
Note: Sample No. (1) is Unwashed & Sample No. (2) is Washed

GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

FEATURE: DIBANG MULTIPURPOE PROJECT **DEPOSIT :** SHOAL DEPOSIT **DATE 17.10.2023**

PIT NO. : DBG2-13 **PIT DEPTH :** 3.00m **LOCATION :** EME RIVER SHOAL DEPOSIT

IS STANDARD SIEVES **DIMENSIONS IN mm**



CLAY TO SILT	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

Fig.8

DIBANG MULTIPURPOSE PROJECT

Location of Deposit**: Aya Korong Fan Deposit** Test of Pit**: 18.10.2023**

Test Pit No**: DBG2-14** Pit Size**: 2.0X 2.0m**

Table 9 – GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

Material Represented	**Screen Opening (mm)**	**Screen Analysis (Percent) Depth of Slab (m)**			
		0.0-1.5m		**1.5-3.0m**	
Weight of Sample (Kg)		1551kg		1667kg	
		Retained %	Passing %	Retained %	Passing %
AGGREGATE	**300.00**	3.5	96.5	16.0	84.0
	150.00	19.5	77.0	13.2	70.8
	80.00	8.7	68.3	8.1	62.7
	63.00	7.0	61.3	6.8	56.0
	50.00	6.4	54.9	5.6	50.3
	40.00	6.4	48.5	5.7	44.7
	31.50	5.2	43.4	5.1	39.5
	25.00	5.1	38.3	4.5	35.0
	20.00	4.6	33.7	4.2	30.7
	16.00	4.6	27.1	4.3	26.4
	12.50	4.8	22.6	4.4	22.0
	10.00	4.6	19.7	4.5	18.0
	6.30	5.4	14.2	5.2	12.3
	4.75	4.9	9.3	4.6	7.8
Percent of Gravel		**90.7**		**92.2**	
Sample No.	**Sieve Size (mm)**	**(1)**	**(2)**	**(1)**	**(2)**
SAND	**4.75**	0.0	0.0	0.0	0.0
	2.36	11.8	11.8	12.0	11.7
	1.18	14.8	13.8	14.5	13.5
	0.60	22.9	22.7	23.0	25.8
	0.30	29.0	28.8	28.0	26.1
	0.15	10.7	19.6	11.0	18.9
	0.075	6.0	4.2	6.5	2.0
	Pan	4.9	1.1	5.0	2.4
	F. M.	2.55	2.60	2.54	2.59
Percent of Sand		**9.3**		**7.8**	

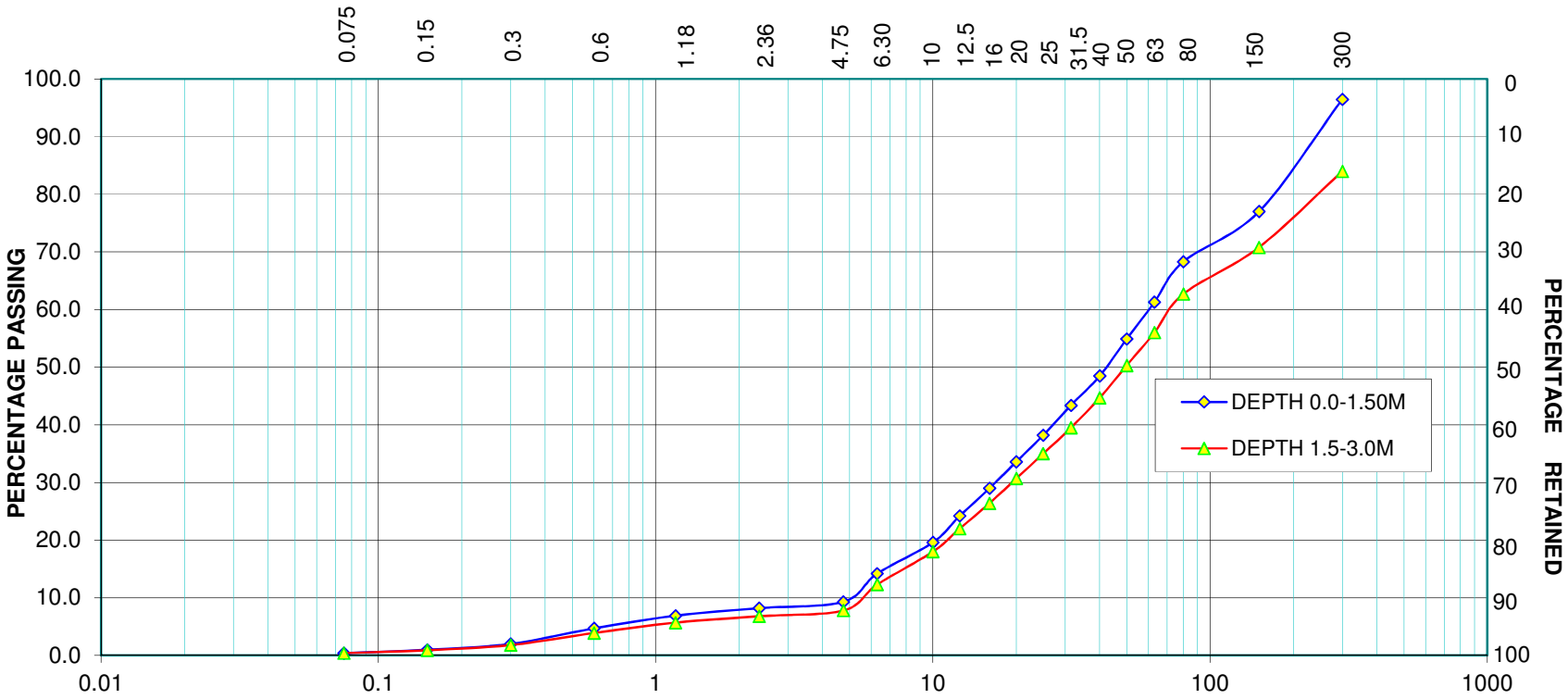
Note: Sample No. (1) is Unwashed & Sample No. (2) is Washed

GRADING ANALYSIS OF AGGREGATE FROM TEST PIT

FEATURE: DIBANG MULTIPURPOE PROJECT **DEPOSIT :** FAN DEPOSIT **DATE 18.10.2023**

PIT NO. : DBG2-14 **PIT DEPTH :** 3.00m **LOCATION :** EME RIVER SHOAL DEPOSIT

IS STANDARD SIEVES **DIMENSIONS IN mm**



CLAY TO SILT	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLES	BOULDERS
	SAND			GRAVEL			

Fig.9

ANNEXURE-2

QAP FOR CIVIL WORKS OF 2880 MW DIBANG MULTIPURPOSE PROJECT

(LOT-3)

ANNEXURE-I

QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : **Dibang Multipurpose Project(Lot-3)** CLIENT : **NHPC Limited**
NAME OF MATERIAL : **Cement (43 Grade, Ordinary Portland Cement)** VENDOR :
NIT/P.O. REFERENCE :

Sl. No.	**ITEM/COMPONENTS & CHARACTERISTICS**	**NATURE OF CHECKS**	**QUANTUM OF CHECKS/FREQUENCY**	**REF. DOCUMENTS/ ACCEPTANCE NORMS**	**REF. CLAUSE OF TS/ IS**	**LIMIT VALUE (WHERE NOT PROVIDED IN TS)**
1	Chemical Properties (% of Different Oxides and their ratios, % Insoluble residue, % Magnesia, % loss on ignition, % Total Sulphur content)	Test	Sample per lot (Within 3 weeks of the delivery and all test shall be commenced within one week of sampling)	IS 269:2015, IS4032	Clause 6.1 of IS:269 :2015	As per Table-2 of IS 269:2015
2	% Alkali Content	Test				
3	% Chloride content	Test				
4	Physical properties: (Specific Temperature for test is 27°±2°C)					
i	Fineness (Blaine's air permeability test)	Test	TS	IS 269:2015, 4031(Part-2)	Clause 7 of IS:269 :2015 Table - 3	Min. Specific Surface of cement- 225 m²/kg
ii	Soundness Test (Le-Chatelier Test/Autoclave Test)	Test	TS	IS 269:2015, 4031(Part-3)		By Le-Chatelier Method- max. Expansion 10mm, By Autoclave test- max. expansion 0.8%
iii	Setting Time (Initial Setting & Final Setting Time)	Test	TS	IS 269:2015, 4031(Part-5)		Initial Setting Time- min. 30 minutes, Final Setting Time- max. 600 minutes
iv	Specific Mortar Compressive Strength Test (At 3rd, 7th & 28th Days)	Test	TS	IS 269:2015, 4031 (Part-6)		* At 72 Hr (3rd day)±1 Hr.- min. 23 Mpa, *At 168 Hr (7th Day)±2Hr.-min. 33 Mpa, *At 672 Hr(28th day) ±4Hr.- min.43 Mpa, Max=58Mpa
5	Packaging	IR by Manufacturer	100%	IS 269:2015	IS 269:2015	As per clause 10 of IS 269:2015

Note : The latest revision of IS code shall be followed

Signature
NHPC (QA&I Deptt.)

Signature & seal
(Venders QC Deptt. or Representative)

QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : **Dibang Multipurpose Project(Lot-3)** CLIENT : **NHPC Limited**
NAME OF MATERIAL : **Cement (53 Grade, Ordinary Portland Cement)** VENDOR :
NIT/P.O. REFERENCE :

Sl. No.	**ITEM/COMPONENTS & CHARACTERISTICS**	**NATURE OF CHECKS**	**QUANTUM OF CHECKS**	**REF. DOCUMENTS/ ACCEPTANCE NORMS**	**REF. CLAUSE OF TS/ IS**	**LIMIT VALUE (WHERE NOT PROVIDED IN TS)**
1	Chemical Properties (% of Different Oxides and their ratios, % Insoluble residue, % Magnesia, % loss on ignition, % Total Sulphur content)	Test	Sample per lot (Within 3 weeks of the delivery and all test shall be commenced within one week of sampling)	IS 269:2015, IS4032	Clause 6.1 of IS:269 :2015	As per Table-2 of IS 269:2015
2	% Alkali Content	Test				
3	% Chloride content	Test				
4	Physical properties: (Specific Temperature for test is 27°±2°C)					
i	Fineness (Blaine's air permeability test)	Test	TS	IS 269:2015, 4031 (Part-2)	Clause 7 of IS:269 :2015 Table- 3	Min. Specific Surface of cement- 225 m²/kg
ii	Soundness Test (Le Chatelier Test/Autoclave Test)	Test	TS	IS 269:2015, 4031 (Part-3)		By Le Chatelier Method- max. Expansion 10mm, By Autoclave test- max. expansion 0.8%
iii	Setting Time (Initial Setting & Final Setting Time)	Test	TS	IS 269:2015, 4031 (Part-5)		Initial Setting Time- min. 30 minutes, Final Setting Time- max. 600 minutes
iv	Specific Mortar Compressive Strength Test (At 3rd, 7th & 28th Days)	Test	TS	IS 269:2015, 4031 (Part-6)		* At 72 Hr (3rd day)±1 Hr.- min. 27 Mpa, *At 168 Hr (7th Day)±2Hr.-min. 37 Mpa, *At672 Hr(28th day) ±4Hr.- min.53 Mpa
5	Packaging	IR by Manufacturer	100%	IS 269:2015	IS 269:2015	As per clause 10 of IS 269:2015

Note : The latest revision of IS code shall be followed

Signature
NHPC (QA&I Deptt.)

Signature & seal
(Venders QC Deptt. or Representative)

QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : Dibang Multipurpose Project(Lot-3) **CLIENT : NHPC Limited**
NAME OF MATERIAL : Cement (Portland Pozzolana Cement) **VENDOR :**
NIT/P.O. REFERENCE :

Sl. No.	ITEM/COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REF. DOCUMENTS/ ACCEPTANCE NORMS	REF. CLAUSE OF TS/ IS	LIMIT VALUE (WHERE NOT PROVIDED IN TS)
1	FLY ASH **BASED**					-
i	% of Fly Ash	IR by Manufacturer	-do-	IS 1489 (Part 1) :2015	Clause 5 of IS 1489 (Part 1):2015	15%- 35% (Max.)
ii	Chemical Properties (% Loss on ignition, % Magnesia, Total Sulphur Content calculated as sulphuric anhydride, % Insoluble residue)	Test	Sample Per Lot	IS:1489 (Part 1) : 2015, IS 4032	Clause 6 of IS:1489 (Part 1) : 2015	As per Table-1 of IS 1489(Part 1):2015
iii	% Alkali Content	Test	-do-			
iv	% Chloride content	Test	-do-			
v	Physical properties:					
a	Fineness	Test	TS	IS:1489 (Part 1) : 2015/IS:4031 (Part2)	Table 2 (Clause 7) of IS 1489 (Part 1):2015	Min 300 m^2/kg
b	Soundness Test (Le Chatelier Test/Autoclave Test)	Test	TS	IS:1489 (Part 1) : 2015/IS:4031 (Part3)		By Le Chatelier Method- max. Expansion 10mm, By Autoclave test- max. expansion 0.8%
c	Setting Time (Initial Setting & Final Setting Time)	Test	TS	IS:1489 (Part 1) : 2015/IS:4031 (Part5)		Initial Setting Time- min. 30 minutes, Final Setting Time- max. 600 minutes
d	Specific Mortar Compressive Strength Test (At 3rd, 7th & 28th Days)	Test	TS	IS:1489 (Part 1) : 2015/IS:4031 (Part6)	Table 2 (Clause 7) of IS 1489 (Part 1):2015	* At 72hrs(3rd day)±1 Hr.- min. 16 Mpa, *At 168 hrs.(7th Day)±2Hr.-min. 22 Mpa, *At 672hrs.(28th day) ±4Hr.- min.33 Mpa
e	Drying Shrinkage Test	Test	TS	IS:1489 (Part 1) : 2015/IS:4031(Part10)		max. 0.15%
vi	Packaging	IR by Manufacturer		IS:2580:1982	Clause 10.1 of IS: 1489 (Part1) :2015	-

Note : The latest revision of IS code shall be followed

Signature
NHPC (QA&I Deptt.)

Signature & seal
(Venders QC Deptt. or Representative)

QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : Dibang Multipurpose Project(Lot-3)
NAME OF MATERIAL : Composite Cement

CLIENT : NHPC Limited
VENDOR :
NIT/P.O. REFERENCE :

Sl. No.	ITEM/COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REF. DOCUMENTS/ ACCEPTANCE NORMS	REF. CLAUSE OF TS/ IS	LIMIT VALUE (WHERE NOT PROVIDED IN TS)
1	FLY ASH **BASED**					-
i	% of Fly Ash	IR by Manufacturer	-do-	IS:16415: 2015	Table 1(Clause 5.1 of IS:16415: 2015)(AMENDMENT NO. 1 February 2023)	10 - 25 (Max.)
ii	Chemical Properties (% Loss on ignition, % Magnesia, Total Sulphur Content calculated as sulphuric anhydride, % Insoluble residue)	Test	Sample Per Lot	IS:16415: 2015	Table-2 (Clause 6.1) of IS:16415 : 2015	
iii	% Alkali Content	Test	-do-			
iv	% Chloride content	Test	-do-			
v	Physical properties:					
a	Fineness	Test	TS	IS:16415:2015/IS:4031 (Part 2)	Table 3 (Clause 7) of IS IS:16415 : 2015	Min 300 m²/kg
b	Soundness Test (Le Chatelier Test/Autoclave Test)	Test	TS	IS:16415:2015/IS:4031 (Part 3)		By Le Chatelier Method- max. Expansion 10mm, By Autoclave test- max. expansion 0.8%
c	Setting Time (Initial Setting & Final Setting Time)	Test	TS	IS:16415:2015/IS:4031 (Part 5)		Initial Setting Time- min. 30 minutes, Final Setting Time- max. 600 minutes
d	Specific Mortar Compressive Strength Test (At 3rd, 7th & 28th Days)	Test	TS	IS:16415:2015/IS:4031 (Part6)	Table 3 (Clause 7) of IS IS:16415 : 2015	* At 72hrs(3rd day)±1 Hr.- min. 16 Mpa, *At 168 hrs.(7th Day)±2Hr.-min. 22 Mpa, *At 672hrs.(28th day) ±4Hr.- min.33 Mpa
e	Drying Shrinkage Test	Test	TS	IS:16415:2015/IS:4031(Part 10)		max. 0.15%
vi	Packaging	IR by Manufacturer		IS:2580:1982	Clause 10.1 of IS:16415 : 2015	-

Note : The latest revision of IS code shall be followed

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QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : **Dibang Multipurpose Project(Lot-3)** CLIENT : **NHPC Limited**

NAME OF MATERIAL : **Aggregates (Fine Aggregates & Coarse Aggregates)** VENDOR :

NIT/P.O. REFERENCE :

Sl. No.	ITEM/COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS/FREQUENCY	REF. DOCUMENTS/ ACCEPTANCE NORMS	REF. CLAUSE OF TS/ IS	LIMIT VALUE (WHERE NOT PROVIDED IN TS)
1	Particle Size: Sieve Analysis	Test	Sample Clause 2.3 of IS:2386 (Part-I)/TS	IS:383:2016/ IS:2386 (Part-I)	Clause 2.4 & 2.5 of IS:2386 (Part-I)	As per Table 7,8,9,10 of IS383:2016
2	Determination of materials finer than 75 µ: Sand Equivalent	Test	Sample Clause 3.3 of IS:2386 (Part-I)/TS	IS:2386 (Part-I)	Clause 3 of IS:2386 (Part-I)	<15%
3	Flakiness Index	Test	Sample Clause 4.3	IS:2386 (Part-I)	Clause 4 of IS:2386 (Part-I)	As per Clause 5.3 of IS 383:2016, Combined Flakiness and Elongation Index should not exceed 40%
4	Elongation Index	Test	Sample clause 5.3	IS:2386 (Part-I)	Clause 5 of IS:2386 (Part-I)	
5	% of Deleterious Material	Test	TS	IS:383:2016/ IS:2386 (Part-II)	Clause2,3,4 & 5 of IS:2386 (Part-II)	As per Table 2 of clause 5.2.1 of IS:383:2016
6	Determination of Specific Gravity & Water Absorption	Test	Sample Clause /2.3.2/2.4.2.1 of IS:2386 (Part-III)	IS:2386 (Part-III)	Clause2 of IS:2386 (Part-III)	In case of C.A., Water absorption < 3% Specific gravity >2.5 In case of F.A., Water absorption < 6% Specific gravity > 2.6
7	Mechanical Properties:					
i	Test for Crushing Value	Test	Sample Plan/TS	IS:383:2016/ IS:2386 (Part-IV)	,Clause 2 of IS:2386 (Part-IV)/ As per clause 5.4.1 of is 383	30% by wt. of aggregate- for concrete used in wearing surfaces If exceeds 30% then ten percent fines should be conducted and the minimum load for the ten percent fines should be 50 KN- for other concretes, For grade M65 and above crushing value shall not exceed 22%
ii	Test for Impact Value	Test	Sample Plan /TS	IS:383:2016/ IS:2386 (Part-IV)	Clause 4 of IS:2386(Part-IV) /As per clause 5.4.2 of is 383	30% by wt. of aggregate- for concrete used in wearing surfaces, 45%by wt. of aggregate- for other concretes, for grade M65 and above impact value shall not exceed 22%

iii	Test for Abrasion Value (Los Angeles)	Test	Sample Clause 5.3.3 of IS:2386 (Part-IV) /TS	IS:383:2016/ IS:2386 (Part-IV)	Clause 5 of IS:2386(Part -IV)/ As per clause 5.4.3 of is 383	30% by wt. of aggregate- for concrete used in wearing surfaces, 50%by wt. of aggregate- for other concretes
iv	Crushing Strength	Test	Sample Plan/TS	IS:2386 (Part-IV)	Clause 7 of IS:2386(Part -IV)	
V	Soundness of aggregate	Test	Sample Plan/TS	IS2386(Part-V), 383:2016	IS2386(Part-V)	As per clause 5.5.1 Note of IS383:2016

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QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT: **Dibang Multipurpose Project(Lot-3)**
NAME OF MATERIAL : **Reinforcement Steel**

CLIENT : **NHPC Limited**
VENDOR :
NIT/P.O. REFERENCE :

Sl. No.	ITEM/COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS/FREQUENCY	REF. DOCUMENTS/ ACCEPTANCE NORMS	REF. CLAUSE OF TS/ IS	LIMIT VALUE (WHERE NOT PROVIDED IN TS)
1	Deformed Steel Bars: (Fe-500)					
i	Chemical Composition	Test	Sample per lot	IS:1786:2008	Clause 4.2 & 4.2.1 of IS:1786	As per Ref. clause of IS:1786 :2008
ii	Mechanical Properties:					
a	0.2% proof stress/ yield stress	Test	Sample per lot	IS:1786:2008	Table 3 of Clause 8.1 of IS:1786/ IS 1608	Min.500 N/mm²-Fe500,
b	% Elongation	Test	Sample per lot	IS:1786:2008		min.12%
c	Tensile Strength	Test	Sample per lot	IS:1786:2008		TS/YS ratio is ≥ 1.08 but TS not less than 545.0N/mm²
iii	Bend Test	Test	Sample per lot	IS:1786:2008/ IS:1599	Clause 9.3 of IS 1786 / IS 1599	No rupture or cracks visible on the bent portion.
iv	Rebend Test	Test	Sample per lot	IS:1786:2008	Clause 9.4& 9.4.1 of IS:1786	No rupture or cracks visible On the rebent portion.
v	Dimensions:					
a	Nominal Size/ Effective Cross Sectional Area	Measurement	Sample per lot	IS:1786:2008	Clause 6.1 & 6.3 of IS:1786	As per Ref. clause IS:1786:2008
b	Specified Length	Measurement	Sample per lot	IS:1786:2008	Clause 7.1 of IS:1786:2008	Tolerance-+75mm, -25mm, In Case of min. lengths (Tolerance- +50, Min.-0)
2	Mild Steel/Medium Tensile Steel					
i	Chemical Properties	Test	Sample per lot	IS:432 (Part-I)	Clause 4 of IS:432 (Part-I)	E250/E410 of is 2062
ii	Mechanical Properties:					
a	Ultimate Tensile Stress	Test	Sample per lot	IS:432 (Part-I)	Clause 8.1 of IS:432 (Part-I) / IS 226/ IS 1608	As per Table-I of clause 8.1 of IS 432(PART-1)
b	Yield Stress	Test	Sample per lot	IS:432 (Part-I)		
c	% Elongation (on a Gauge length of 5.65√A)	Test	Sample per lot	IS:432 (Part-I)		Mild Steel-23%, Medium Tensile Steel-20%

iii	Bend Test	Test	Sample per lot	IS:432 (Part-I)	Clause 9.3 of IS:432 (Part-I)/ IS:1599 /IS:226	As per Ref. clause of IS:432 (Part-I)
iv	Dimensions (Dia.& length)	Measurement	Sample per lot	IS:432 (Part-I)	As per requirement	

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QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : **Dibang Multipurpose Project(Lot-3)**
CLIENT : **NHPC Limited**
NAME OF MATERIAL : **Miscellaneous Steel items (First stage embedded Parts- U-bolt, J-bolt, corner angles, cover plates, Hand rails, ladders, Bungs, walkways, groove covers, Chequered plate, flats etc.)**
VENDOR :

NIT/P.O. REFERENCE :

Sl. No.	ITEM/COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS/ FREQUENCY	REF. DOCUMENTS/ ACCEPTANCE NORMS	REF. CLAUSE OF TS/ IS	LIMIT VALUE (WHERE NOT PROVIDED IN TS)
1	Chemical Composition (Fe 410 A/ Fe410B/ Fe410C)					
i	Ladle Analysis	Test	Sample Plan as in IS:228	IS:2062:2011/ IS:228	Clause 8.1 of IS:2062:2011	As per Table-1 of clause 8.1 of IS:2062 :2011
ii	Permissible Variations for Product Analysis	Test	Sample Plan as in IS:228	IS:3589/ IS:228	Clause 8.2 of IS:2062:2011	As per Table-3 of clause 8.2 of IS:2062 :2011
2	Mechanical Properties (At room temperature)					
i	Tensile Strength	Test	Sample per lot	IS:2062:2011/ IS:1608	Clause 10 of IS:2062:2011	As per Table-2 of IS:2062:2011
ii	Yield Stress	Test	Sample per lot	IS:2062:2011/ IS:1608	Clause 10 of IS: 2062:2011	As per Table-2 of IS:2062:2011
iii	% Elongation (on a Gauge length of $5.65\sqrt{A}$)	Test	Sample per lot	IS:2062:2011/ IS:1608	Clause 10 of IS:2062:2011	As per Table-2 of IS:2062:2011
iv	Bend Test	Test	Sample per lot	IS:2062:2011/ / IS 1599	Clause 11 of IS:2062:2011	No crack should appear
v	Impact Test (for products having thickness/ diameter greater than or equal to 12 mm)	Test	Sample per lot	IS:2062:2011/ IS 1757	Clause 12 of IS:2062:2011	As per Ref. Table-2 of IS:2062:2011
vi	Y- groove Crack ability Test (for products having thickness/ diameter greater than or equal to 12 mm)	Test	Sample per lot	IS:2062:2011/ IS:10842	Clause 13 of IS:2062:2011	

3	Dimensions	Measurement	Sample per lot	IS:2062:2011	Clause 15 of IS:2062:2011	As per Ref. Table-4, Clause-15 of IS:2062:2011
4	Marking	Visual	100%	IS:2062:2011	Clause 20 of IS:2062:2011	

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QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT **: Dibang Multipurpose Project(Lot-3)**

CLIENT: **NHPC Limited**

VENDOR

NAME OF MATERIAL: **Steel Mesh Reinforcement** (**Wire Mesh & Chain Link Fabric**)

NIT/P.O. REFERENCE :

SR. NO.	ITEM /COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REF. DOCUMENTS/ ACCEPTANCE NORMS	REF. CLAUSE OF TS/ IS	LIMIT VALUE (WHERE NOT PROVIDED IN TS)
1	**Wire Mesh**					
i	Chemical Properties of Material; Mild Steel Wire /Stainless steel wire (X04Cr17Ni12Mo2 / X04 Cr18Ni10)	Test	Sample Plan as in IS:280/ IS:7887/ IS-6528	IS:4948/ IS:280/IS:7887/ IS: 6528	Clause 4.1 & 4.2 of IS:4948	For Stainless Steel wire:- As per Table-1 & Table-2 of clause 7 of IS:6528 For Mild Steel Wire:-Table-1 & Table-2 of clause 6 of IS:7887
ii	Mechanical Properties: Tensile Strength, Yield Strength (min.275 Mpa), % Elongation, % Reduction, Reverse Bend test, Torsion Test, wrapping test etc.	Test	Sample Plan as in IS:280/ IS:7887/ IS-6528	IS:4948/ IS:280/IS:7887/ IS: 6528	Clause 10.1 of IS 6528	For Stainless Steel wire:- As per clause 10 Table-7 and clause 12.2 of IS:6528 , For Mild Steel Wire:-Clause 9 of IS:280
iii	Dimensions					
a	Dia of wires	Measurement	Sample Plan as in IS:280/ IS:7887/ IS-6528	IS:4948/ IS:280/IS:7887/ IS: 6528	Clause 9 of IS:6528 Clause 7 of IS:280	For Stainless Steel wire:- As per clause 9 of IS:6528 For Mild Steel Wire:-Clause 7 of IS:280
b	Spacing of Longitudinal and Transverse Wires & Tolerance	Measurement	As per sample plan	IS:4948	Clause 5.4 of IS:4948	Max. variation between two members c/c - 5%
iv	Test for welding	Test	As per sample plan	IS:4948	Clause 6 of IS:4948	Min avg. value of weld=21kg/mm^2
v	Bundling	Visual	-do-	-do-	Clause 8 of IS:4948	As per clause 8 of IS: 4948
vi	Marking	Visual	-do-	-do-	Clause 9 of IS:4948	As per clause 9 of IS: 4948
vii	Finish	Visual	-do-	-do-	Clause 10 of IS:4948	As per clause 10 of IS: 4948
2	**Chain Link Fabric**					
i	Chemical Properties of Material; Galvanized Mild Steel Wire	Test	Sample Plan as in IS:280/ IS:7887/ IS-2721	IS:2721/ IS:280/IS:7887	Clause 5 of IS:2721	As per Table-1 & Table-2 of clause 6 of IS:7887

ii	Mechanical Properties: Tensile Strength (between 400 MPa to 550 MPa), Yield Strength , % Elongation, % Reduction, Reverse Bend test, Torsion Test, wrapping test etc.	Test	Sample Plan as in IS:280/ IS:7887/ IS-2721	IS:2721/ IS:280/IS:7887	Clause 9 of IS:2721	For Stainless Steel wire:- As per clause 10 Table-7 and clause 12.2 of IS:6528 , For Mild Steel Wire:-Clause 9 of IS:280
iii	Dimensions					
a	Dia of wires	Measurement	Sample Plan as in IS:280/ IS:7887/ IS-2721	IS:2721	Clause 6.5 of IS:2721	As per Table-1 of clause 7.1 of IS:280
b	Spacing of Longitudinal and Transverse Wires & Tolerance	Measurement	As per sample plan	IS:2721	Clause 6.2 of IS:2721	As per Table-1 of clause 6.2 of IS:2721
iv	Galvanizing Test on Complete Fabric	Test	As per sample plan	IS:2721	Clause 9.2 of IS:2721 IS: 4826,12753	As per clause 8 & 9.2 of IS: 2721 (Zinc Coating: Type heavy)
v	Packing	Visual	100%	IS:2721	Clause 11 of IS:2721	As per clause 11 of IS:2721
vi	Marking	Visual	-do-	-do-	Clause 13 of IS:2721	As per clause 13 of IS:2721
vii	Finish	Visual	-do-	-do-	Clause 7 of IS:2721	As per clause 7 of IS:2721

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QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : **Dibang Multipurpose Project(Lot-3)**
NAME OF MATERIAL : **Admixtures (Super Plasticizers/Accelerators)**

CLIENT : **NHPC Limited**
VENDOR :
NIT/P.O. REFERENCE :

Sl. No.	**ITEM/COMPONENTS & CHARACTERISTICS**	**NATURE OF CHECKS**	**QUANTUM OF CHECKS/FREQUENCY**	**REF. DOCUMENTS/ ACCEPTANCE NORMS**	**REF. CLAUSE OF TS/ IS**	**LIMIT VALUE (WHERE NOT PROVIDED IN TS)**
1	Requirements for Admixtures (Cement with Admixtures)					
i	Water Content (% of Control sample)	Test	Sample Plan as in IS:9103/TS	IS:9103, 2386, 1199	Clause 7.2.5 of IS:9103	As per Ref. Table 1A of Clause 4 of IS:9103
ii	Slump	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 7.2.1 of IS:9103	As per Ref. Table 1A of Clause 4 of IS:9103
iii	Setting Time (Initial setting time, Final setting time): Allowable deviation from control sample hours	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 7.2.3 of IS:9103	As per Ref. Table 1A of Clause 4 of IS:9103
iv	Compressive Strength at 1st, 3rd, 7th, 28th days, 6 months & 1 Yr. (% of control sample, min.)	Test	Sample Plan as in IS:9103/TS	IS:9103, 516	Clause 8.2.1 of IS:9103	As per Ref. Table 1A of Clause 4 of IS:9103
v	Flexural Strength at 3rd, 7th & 28th days (% of control sample, min.)	Test	Sample Plan as in IS:9103/TS	IS:9103,516	Clause 8.2.2 of IS:9103	As per Ref. Table 1A of Clause 4 of IS:9103
vi	Length Change at 28th days, 6th months & 1yr. (% increase over control sample, max.)	Test	Sample Plan as in IS:9103/TS	IS:9103, 1199	Clause 8.2.3 of IS:9103	As per Ref. Table 1A of Clause 4 of IS:9103
vii	Bleeding (% increase over control sample, max.)	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 7.2.4 of IS:9103	As per Ref. Table 1A of Clause 4 of IS:9103
viii	Loss of workability (for super plasticizing admixture)	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 7.2.1.2 of IS:9103	As per Ref. Table 1A & Table 1B of Clause 4 of IS:9103
ix	Air content (% over control sample, max.)	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 7.2.2 of IS:9103	As per Ref. Table 1A of Clause 4 of IS:9103
x	Flow (for super plasticizing admixture)	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 7.2.1.1 of IS:9103	As per Ref. Table 1B of Clause 4 of IS:9103
xi	Min. Compressive Strength at 7th, 28th days, 6 months & 1 Yr. (% of control mix concrete, for super plasticizing admixture)	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 8.2.1 of IS:9103	As per Ref. Table 1B of Clause 4 of IS:9103
2	Dry Material Content (Liquid/solid Admixture)	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 9 of IS:9103	As per Ref. Table 2 clause 9 of IS:9103
3	Ash Content	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 9 of IS:9103	As per Ref. Table 2 clause 9 of IS:9103
4	Relative Density	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 9 of IS:9103	As per Ref. Table 2 clause 9 of IS:9103
5	Chloride ion content	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 9 of IS:9103	As per Ref. Table 2 clause 9 of IS:9103

6	pH	Test	Sample Plan as in IS:9103/TS	IS:9103	Clause 9 of IS:9103	As per Ref. Table 2 clause 9 of IS:9103
7	Marking	Visual	100%/TS	IS:9103	Clause 10 of IS 9103	As per Clause 10 of IS 9103

Note : The latest revision of IS code shall be followed

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QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : **Dibang Multipurpose Project(Lot-3)**
NAME OF MATERIAL : **Bentonite**

CLIENT : **NHPC Limited**
VENDOR :
NIT/P.O. REFERENCE :

Sl. No.	**ITEM/COMPONENTS & CHARACTERISTICS**	**NATURE OF CHECKS**	**QUANTUM OF CHECKS/FREQUENCY**	**REF. DOCCUMENTS/ACCEPTANCE NORMS**	**REF. CLAUSE OF TS/IS**	**LIMIT VALUE (WHERE NOT PROVIDED IN TS)**
1	pH	Test	Sample Clause 8 of IS:12584, Annex-A/TS	IS:12584/ IS:2720 (Part-26)	Clause 5.2 of IS:12584 (Table-1)	High Grade- 8.0 to 10.5, Low Grade- min.7.5
2	Liquid Limit	Test	Sample Clause 8 of IS:12584, Annex-A/TS	IS:12584/ IS:2720 (Part-5)	Clause 5.2 of IS:12584 (Table-1)	High Grade- min. 300% Low Grade- min. 100%
3	Swelling by Volume	Test	Sample Clause 8 of IS:12584, Annex-A/TS	IS:12584/ IS:2720 (Part-40)	Clause 5.2 of IS:12584 (Table-1)	High Grade- 10 to 12 times original volume, Low Grade- 4 to 6 times original volume
4	Fineness (By wet sieving and wet mechanical analysis); Cumulative % by wt. of all particles finer than particular size	Test	Sample Clause 8 of IS:12584, Annex-A/TS	IS:12584/ IS:2720 (Part-4)	Clause 5.2 of IS:12584 (Table-1)	High Grade- for grain size; 0.002mm- min.85%, for 0.2mm- min.99.9% & for 2.0mm- 100%, Low Grade-for grain size 0.002mm- min.60%
5	Packing	Visual	100% /TS	IS:12584	Clause 6 of IS:12584	
6	Marking	Visual	100% /TS	IS:12584	Clause 7 of IS:12584	

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QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT: **Dibang Multipurpose Project(Lot-3)**

CLIENT: NHPC Limited

VENDOR :

NAME OF MATERIAL: **Water Stops (PVC Water Stops)/ Bituminous Impregnated Fiber/ One part gun Polysulphide based Joint Sealant**

NIT/P.O. REFERENCE

No.	ITEM/COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCCUMENTS/ ACCEPTANCE NORMS	REFERENCE CLAUSE OF TS/IS	LIMIT VALUE (WHERE NOT PROVIDED IN TS)
1.	**PVC Water Stops**					
i)	Physical properties					
a	Tensile Strength	Test	Sample per lot	IS:15058/ IS: 8543(Part-4)	Clause 3.2, Table-I of IS:15058/ IS 8543 (Part-4, Sec.1)	Min. 13.8 MPa
b	% elongation	Test	-do-	IS:15058/ IS : 8543(Part-4)	Clause 3.2, Table-I of IS:15058/ IS 8543 (Part-4 Sec.1)	Min.285%
c	Hardness (Shore A)	Test	-do-	IS:15058/ IS:13360(Part-5)	Clause 3.2, Table-I of IS:15058/ IS 13360 (Part-5, Sec.11)	Min. 65
d	Water Absorption (% by mass)	Test	-do-	IS:15058	Clause 3.2, Table-I of IS:15058(Annex.-A)	Max.0.6% by mass
e	Cold bend Temperature at which samples does not crack	Test	-do-	IS:15058	Clause 3.2, Table-I of IS:15058 (Annex.-G) of IS 9766	Min. -25°C
f	Accelerated Extraction Test	Test	-do-	IS:15058	Clause 3.2, Table-I of IS:15058 (Annex.-B)	Tensile Strength-Min 10.3 Mpa, Elongation-Min. 280%
g	Stability in effect of Alkalies Test	Test	-do-	IS:15058	Clause 3.2, Table-I of IS:15058 (Annex.-C)	Wt. increase at 7 days-Max.0.25% by wt., Wt. decrease at 7 days-Max.0.10% by wt., Change in Hardness at 7 days (Shore A)- ±5, Wt. increase at 28 days- Max. 0.40%, Wt. decrease at 28 days- Max. 0.30% by wt, Dimension Change-±1%
ii)	Shape & Dimension	Measurement	-do-	IS:15058	Clause 4 of IS:15058	Tolerance Width-±10mm, Thickness- ±2mm/-0
iii)	Make of Water Stop	Visual	-do-	IS:15058	Clause 8 of IS:15058	-
iv)	Packing	Visual	-do-	IS:15058	Clause 7 of IS:15058	Inside dia of packed coils –min 300 mm
2.	**Bituminous Impregnated Fiber**					
I	Material Constituent	Test	Sample plan	IS: 1838 (Part-1)	Clause 2.1 & 2.2 of IS: 1838 (Part-1)/IS:10566	As per ref clause of IS: 1838 (Part-1)

ii)	Physical Requirement					
a	Resistance to handling	Visual	-do-	IS: 1838 (Part-1)	Clause 5.1 of IS: 1838 (Part-1)/ IS:10566	As per ref clause of IS: 1838 (Part-1)
b	Recovery	Measurement	-do-	IS: 1838 (Part-1)	Clause 5.1 of IS: 1838 (Part-1)/ IS:10566	As per ref clause of IS: 1838 (Part-1)
c	Compression	Test	-do-	IS: 1838 (Part-1)	Clause 5.1 of IS: 1838 (Part-1)/ IS:10566	As per ref clause of IS: 1838 (Part-1)
d	Extrusion	Measurement	-do-	IS: 1838 (Part-1)	Clause 5.1 of IS: 1838 (Part-1)/ IS:10566	As per ref clause of IS: 1838 (Part-1)
e	Water Absorption	Test	-do-	IS: 1838 (Part-1)	Clause 5.1 of IS: 1838 (Part-1)/ IS:10566	Max. 20%
f	Density	Test	-do-	IS: 1838 (Part-1)	Clause 5.1 of IS: 1838 (Part-1)/ IS:10566	Min 300 Kg/m3
g	Bitumen Content	Test	-do-	IS: 1838 (Part-1)	Clause 5.1 of IS: 1838 (Part-1)/ IS:10566	Min 35 % by Wt.
h	Weathering	Test	-do-	IS: 1838 (Part-1)	Clause 5.1 of IS: 1838 (Part-1)/ IS:10566	As per ref clause of IS: 1838 (Part-1)
i	Penetration of recovered Bitumen	Test	-do-	IS: 1838 (Part-1)	Clause 5.1 of IS: 1838 (Part-1)/ IS:10566	Shall be between 25 to 100 at 25 ^{0}C
iii)	Dimensions and Tolerance	Measurement	-do-	IS: 1838 (Part-1)	Clause 4.1 & 4.2 of IS: 1838 (Part-1)	Tolerance Length -±5mm Width-±3mm, Thickness- ±1.5mm
iv)	Packing & Marking	Visual	-do-	IS: 1838 (Part-1)	Clause 6 & 7 of IS: 1838 (Part-1)	As per ref clause of IS: 1838 (Part-1)
3.	**One part gun Polysulphide based Joint Sealant**					
i	Material Constituent		Appendix A of IS 11433(Part-1)	IS: 11433 (Part-1)	Clause 2 of IS: 11433 (Part-1)	As per ref clause of IS: 11433
ii)	Rheological Properties	Test	-do-	IS: 11433 (Part-1)/ IS: 11433 (Part-2)	Clause 4.1.1 of IS: 11433 (Part-1)	Shall not slump or sag in Vertical or Horiz. Displacement or slip from the channel
iii)	Recovery	Test	-do-	IS: 11433 (Part-1)/ IS: 11433 (Part-2)	Clause 4.1.2 of IS: 11433 (Part-1)	recovery- min. 75%, Tensile force required to extend the specimen-not less than 25N or greater than 300N
iv)	Mass loss after heat ageing	Test	-do-	IS: 11433 (Part-1)/ IS: 11433 (Part-2)	Clause 4.1.3 of IS: 11433 (Part-1)	max. 10%
v)	Staining	Test	-do-	IS: 11433 (Part-1)/ IS: 11433 (Part-2)	Clause 4.1.4 of IS: 11433 (Part-1)	No staining should appear
vi)	Test for Cyclic Adhesion	Test	-do-	IS: 11433 (Part-1/ IS: 11433 (Part-2))	Clause 4.1.5 of IS: 11433 (Part-1)	After three cycles total area of failure max. 100 mm^2 per specimen
vii)	Test for adhesion in peel					
a	Adhesion to Aluminum, Stainless Steel and Cement Mortar	Test	Appendix A of IS 11433(Part-1)	IS: 11433 (Part-1)/ IS: 11433 (Part-2)	Clause 4.1.6.1 of IS: 11433 (Part-1)	For each of surface Average Peel Strength-min.25N, Failure area of the test surface- max.25%

b	Adhesion to glass after sunlamp exposure through glass	Test	-do-	IS: 11433 (Part-1)/ IS: 11433 (Part-2)	Clause 4.1.6.2 of IS: 11433 (Part-1)	For each of test strips Average Peel Strength-min.25N, Failure area of the test surface- max.25%
c	Adhesion after Heat Ageing	Test	-do-	IS: 11433 (Part-1)/ IS: 11433 (Part-2)	Clause 4.1.7 of IS: 11433 (Part-1)	Total Failure area of the test specimen-100 mm^2 per specimen, Tensile force for extend the specimen- not less than 25 N or greater than 300 N
viii)	Marking & Packing	IR	-do-	IS: 11433 (Part-1)	Clause 5 & 6 of IS: 11433 (Part-1)	As per ref. clause of IS 11433 (Part-1)

Note : The latest revision of IS code shall be followed

Signature
NHPC (QA&I Deptt.)

Signature & seal
(Venders QC Deptt. or Representative)

QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : **Dibang Multipurpose Project(Lot-3).**

CLIENT: **NHPC Limited**

VENDOR :

NAME OF MATERIAL: **Rock Anchors**

NIT/P.O. REFERENCE :

Sl. NO.	**ITEM /COMPONENTS & CHARACTERISTICS**	**NATURE OF CHECKS**	**QUANTUM OF CHECKS/ FREQUENCY**	**REF. DOCUMENTS/ ACCEPTANCE NORMS**	**REF. CLAUSE OF TS/ IS**	**LIMIT VALUE (WHERE NOT PROVIDED IN TS)**
1	Dimension check					
i	Anchor Size (Dia. & Length)	Measurement	TS	TS		Dia.: 25mm, 32mm or 36mm, Length may varies (Spacers shall be used for rock anchors longer than 4m)
ii	Bearing Plates (shall be flat or dished steel plates): Minimum Dimensions	-do-	TS	TS	IS:2062	▪ For 36mm dia. Rock anchor- 1 no. 200x200x16mm plate ▪ For 32mm dia. Rock anchor- 1 no. 200x200x12mm plate ▪ For 25mm dia. Rock anchor- 1 no. 150x150x10mm plate
iii	Dia. of the hole drilled for installation of rock anchor	-do-	TS	TS		For rock anchors the diameter of the hole shall be 1.5 times the dia of the bar
iv	Length of drill hole for rock anchor	-do-	TS	TS		Shall extend 150 to 200mm beyond the length of the rock anchor.
2	Material property for Anchor bars	Test	TS	TS	IS:1786	YS≥ 500N/mm². In case of Coupler being used: Coupler should be able to transfer at least 125% of the yield load of bar.
3	Grout Mix for rock anchor	Test	TS	TS		Water cement ratio: 0.25-0.28 Strength development: minimum 25 MPa at 24 hours
4	Pull out Test on rock anchors (in the presence of Engineer-in-charge)	Test	2 per 100 rock anchors installed/As per TS	TS	IS:11309: 1985	As per TS (In case of failure, additional testing shall be performed on selected rock anchors on near vicinity)

Note : The latest revision of IS codes shall be followed

Signature
NHPC (QA&I Deptt.)

Signature & Seal
(Venders QC Deptt. or Representative)

QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : **: Dibang Multipurpose Project(Lot-3).** CLIENT: NHPC LTD.

VENDOR :

NAME OF MATERIAL: **Tendons** NIT/P.O. REFERENCE :

Sl. NO.	ITEM /COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENTS/ ACCEPTANCE NORMS	Ref. Clause of TS/ IS	Limit Value (where not provided in TS).
1	**Dimension check**					
i)	Dia of central wire	Measurement	Cut from one end of a coil selected at random from a group of every 5 numbers of coils.	IS 14268:2017	IS 14268:2017 clause 4.2	1.5% greater than dia of surrounding wire
ii)	Nominal diameter, tolerance , nominal cross sectional area and nominal mass per unit length				IS 14268:2017 clause 6.1	As per IS 14268:2017, table-2
iii)	Length of lay				IS 14268:2017 clause 4.2	12 to 16 times of the nominal dia of the strand
2	**Material property**					
i)	Base material a) Sulphur content b) Phosphorus content	Test		IS 228 (part 3) : 1987 and IS 228 (Part 9): 1989	IS 14268:2017 clause 4.1.2	not more than 0.040% sulphur and not more than 0.040% phosphorus
ii)	Class of strand		Cut from one end of a coil selected at random from a group of every 5 numbers of coils.	IS 14268:2017	IS 14268:2017 clause 5	
iii)	Breaking strength and 0.2% proof load	Test			IS 14268:2017 clause 6.2.2	As per IS 14268:2017, table-1
iv)	Elongation %	Test			IS 14268:2017 clause 6.2.3	not less than 3.5% on a minimum gauge length of 600mm
Note: The latest revision of IS codes shall be followed.						

Signature
NHPC (QA&I Deptt.)

Signature & Seal
(Venders QC Deptt. or Representative)

QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT: **Dibang Multipurpose Project(Lot-3)**

CLIENT: **NHPC Limited**

VENDOR:

NAME OF MATERIAL: **Water**

NIT/P.O. REFERENCE:

Sl. No.	**ITEM/COMPONENTS & CHARACTERISTICS**	**NATURE OF CHECKS**	**QUANTUM OF CHECKS/FREQUENCY**	**REF. DOCUMENTS/ ACCEPTANCE NORMS**	**REF. CLAUSE OF TS/ IS**	**LIMIT VALUE (WHERE NOT PROVIDED IN TS)**
1	Requirements for Water (Washing of Aggregates, Manufacturing and curing of concrete)					
i	pH Value	Test	Sample Plan as in IS code/TS	IS:3025/ 5.4 of IS:456	Clause 5.4 of IS :456 and IS:3025 (Part-11)	pH Value shall be not less than 6 as per clause 5.4.2 of IS:456
ii	Suspended matter (Solids)	Test	Sample Plan as in IS code/TS	IS:3025/ 5.4 of IS :456	Clause 5.4 of IS :456 and IS:3025 (Part-17)	As per clause 5.4 of IS 456
iii	Chlorides	Test	Sample Plan as in IS code/TS	IS:3025/ 5.4 of IS :456	Clause 5.4 of IS :456 and IS:3025 (Part-32)	As per clause 5.4 of IS 456
iv	Sulphates	Test	Sample Plan as in IS code/TS	IS:3025/ 5.4 of IS :456	Clause 5.4 of IS :456 and IS:3025 (Part-24)	As per clause 5.4 of IS 456
V	Organic	Test	Sample Plan as in IS code/TS	IS:3025/ 5.4 of IS :456	IS: 3025 (Part-18)	As per clause 5.4 of IS 456
Vi	Inorganic	Test	Sample Plan as in IS code/TS	IS:3025/ 5.4 of IS :456	IS: 3025 (Part-18)	As per clause 5.4 of IS 456

The latest revision of IS code shall be followed

Signature
NHPC (QA&I Deptt.)

Signature & seal
(Venders QC Deptt. or Representative)

QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT : **Dibang Multipurpose Project(Lot-3)**
NAME OF MATERIAL : **Micro Silica**

CLIENT: **NHPC Limited**
VENDOR :
NIT/P.O. REFERENCE :

SR. NO.	ITEM /COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REF. DOCUMENTS/ ACCEPTANCE NORMS	REF. CLAUSE OF TS/ IS	LIMIT VALUE (WHERE NOT PROVIDED IN TS)
1	**Physical Properties**					
i	Oversize percent retained on 45 micron IS Sieve	Test	Sample Plan as in IS code	IS:15388:2003 & ASTM C1240-03a	Clause 5 of IS:15388:2003 & ASTM C1240-03a	Max. 10
ii	Oversize percent retained on 45 micron IS Sieve, variation from average percent	Test	Sample Plan as in IS code	IS:15388:2003 & ASTM C1240-03a	Clause 5 of IS:15388:2003 & ASTM C1240-03a	Max. 5
iii	Compressive strength at 7 days as percent of control sample	Test	Sample Plan as in IS code	IS:15388:2003 & ASTM C1240-03a	Clause 5 of IS:15388:2003 & ASTM C1240-03a	Min. 85
iv	Specific Surface, m^2/kg	Test	Sample Plan as in IS code	IS:15388:2003 & ASTM C1240-03a	Clause 5 of IS:15388:2003 & ASTM C1240-03a	Min. 15
2	**Chemical Properties**					
i	SiO_2, percent by mass	Test	Sample Plan as in IS code	IS:15388:2003 & ASTM C1240-03a, IS1722	Clause 4 of IS:15388:2003 & ASTM C1240-03a	Min. 85
ii	Moisture Content, Percent by mass	Test	Sample Plan as in IS code	IS:15388:2003 & ASTM C1240-03a	Clause 4 of IS:15388:2003 & ASTM C1240-03a	Max. 3
iii	Loss on ignition, Percent by mass	Test	Sample Plan as in IS code	IS:15388:2003 & ASTM C1240-03a,IS1727	Clause 4 of IS:15388:2003 & ASTM C1240-03a	Max. 4
iv	Alkalies as Na_2O, percent	Test	Sample Plan as in IS code	IS:15388:2003 & ASTM C1240-03a	Clause 4 of IS:15388:2003 & ASTM C1240-03a	Max. 1.5

Note : The latest revision of IS code shall be followed

Signature
NHPC (QA&I Deptt.)

Signature & seal
(Venders QC Deptt. or Representative)

QUALITY ASSURANCE PLAN OF CONSTRUCTION MATERIAL

PROJECT: Dibang Multipurpose Project(Lot-3)

CLIENT: **NHPC Limited**

VENDOR:

NAME OF MATERIAL: Bituminous Pavement

NIT/P.O. REFERENCE:

Sl. No.	ITEM/COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS/FREQUENCY	REF. DOCUMENTS/ ACCEPTANCE NORMS	REF. CLAUSE OF TS/ IS	LIMIT VALUE (WHERE NOT PROVIDED IN TS)
1	Requirements for Bituminous Pavement					
i	Penetration at 25°C, 100 g, 5 s, 0.1 mm, Min	Test	Sample Plan as in IS code/TS	As per IS code/TS	As per IS code/TS	As per ref. Table-1 (clause 6.2) of IS 73:2013
ii	Absolute viscosity at 60°C, Poises	Test	Sample Plan as in IS code/TS	As per IS code/TS	As per IS code/TS	As per ref. Table-1 (clause 6.2) of IS 73:2013
iii	Kinematic viscosity at 135°C, cSt, Min	Test	Sample Plan as in IS code/TS	As per IS code/TS	As per IS code/TS	As per ref. Table-1 (clause 6.2) of IS 73:2013
iv	Flash point (Cleveland open cup), °C, Min	Test	Sample Plan as in IS code/TS	As per IS code/TS	As per IS code/TS	As per ref. Table-1 (clause 6.2) of IS 73:2013
v	Solubility in trichloroethylene, percent, Min	Test	Sample Plan as in IS code/TS	As per IS code/TS	As per IS code/TS	As per ref. Table-1 (clause 6.2) of IS 73:2013
vi	Softening point (R&B), °C, Min	Test	Sample Plan as in IS code/TS	As per IS code/TS	As per IS code/TS	As per ref. Table-1 (clause 6.2) of IS 73:2013
vii	Tests on residue from rolling thin film oven test:	Test	Sample Plan as in IS code/TS	As per IS code/TS	As per IS code/TS	As per ref. Table-1 (clause 6.2) of IS 73:2013
	a) Viscosity ratio at 60°C, Max	Test	Sample Plan as in IS code/TS	As per IS code/TS	As per IS code/TS	As per ref. Table-1 (clause 6.2) of IS 73:2013
	b) Ductility at 25°C, cm, Min	Test	Sample Plan as in IS code/TS	As per IS code/TS	As per IS code/TS	As per ref. Table-1 (clause 6.2) of IS 73:2013

The latest revision of IS code shall be followed

Signature
NHPC (QA&I Deptt.)

Signature & seal
(Venders QC Deptt. or Representative)

Annexure-I

Equipment Required at Site Laboratory

Sl. No.	Item	Equipment to carry out the tests indicated below:
1	**Aggregate**	For Sieve analysis
		For Compressive Strength
		For Specific Gravity
		For Water Absorption
		For Flakiness
		For soundness and Organic matter
		Los Angeles abrasion test
		For Impact Test
		For any other test specified in TS
2	**Cement**	For Equivalent alkali content
		For Specific Blaine Surface
		For Standard Mortar Compressive Strength
		Shrinkage
		Heat of Hydration
		For Setting Time
		Expansion
		For any other test specified in TS
3	**Fresh Concrete**	For consistency through slump test
		For Workability
		For Temperature
		For Air Content
4	**Hardened Concrete**	For Compressive strength
		For Shrinkage
		For any other test specified in TS
5	**Admixture**	For PH Value
		For Density
		For Dry material content
6	**General equipment**	For Humidity measurement
		Multispeed laboratory Mixer
		Marsh Test Cone
		Mould for pressure testing
		Thermometers
		Atterberg's limits measuring cups
		Barroied scale type mud density meter
		Core cutting machine
		Vernier Caliper and Screw Gauge
7	Any addition equipments as per site requirements shall also be provided	

Annexure-II

INTERNAL QUALITY INSPECTION PLANS

For Site Works:

Sl. No.	Item	Frequency	Test Results	Remarks	Signature of responsible authority
1.	**Aggregate**				
	• Sieve analysis • Compressive Strength • Specific Gravity • Water Absorption • Flakiness • Soundness and Organic matter • Los Angeles abrasion test • Impact Test • Any other test specified in TS	Once in 1000m³ of produced concrete or once a week/ TS			
2.	**Cement**				
	• Equivalent alkali content • Specific Blaine Surface • Standard Mortar Compressive Strength • Shrinkage • Heat of Hydration • Setting Time • Expansion • Any other test specified in TS	Each week/Per Lot/TS			
3.	**Admixtures**				
	• For PH Value • For Density • For Dry material content	Each shipment/ TS			
	• Deterioration (Older than 12 months)	Before using			
4.	**Water**				
	• Chemical Analysis	Every Three months			
5.	**Fresh Concrete**				
	• Consistency • Workability	• Beginning of manufacturing of concrete for each work			

	• Air Content				
	• Temperature	• Once every 100m³			
6.	**Hardened Concrete**				
	• Compressive Strength	• Set of 6 samples for each part of the work or the volume poured in one concreting operation • Set of 6 samples for every 200m³			
	• Consistency Test	On that portion of the total sample which passes a 40mm size			
	• Shrinkage Test	As per established standard			
	• Any other test specified in TS	As per TS			
7.	**Rock Supports**				
	• Pull out Test	As per TS			
	• Suitability Test for Rock bolts	2% of total rock bolts to be installed, but minimum 3 pieces.			
	• Acceptance Test (simple stressing test)	• 5% of the total no. of Rock bolts installed • Test load should be 80% of Guaranteed Ultimate Tensile Strength. • Loss in stress< 2% of the lock off load.			
	• Monitoring	• Lift of Test immediately after stressing & again 3 to 5 days • Measuring interval as per international practice:			
		1st week	Daily		
		Upto 3 weeks	Each 3rd day		
		Upto 6 weeks	weekly		
		After 6 weeks to 6 months	Each 2nd week		
8.	**Shotcrete Mix**	• 3 nos.(One shot downward onto a horizontal surface, one shot onto an inclined or vertical surface and one shot overhead onto a horizontal surface) for every 50m³ of shotcrete • Cube compressive Strength as per relevant clause of TS			

	• Analysis of results of Compressive Strength	Average of any six consecutive tests > specified crushing strength			
9.	**Analysis of Results**	Weekly & monthly Reports			
10.	**Batching Plant**				
	• Weight Batching accuracy, Admixture dispenser,	Monthly checks			
	• Tests of equipments used for measuring water, cement aggregate and admixtures	Every week			
	• Recording of ingredients	By Computer Printouts for each batch is necessary			
	• Calibration of Batching Report	On monthly basis			
11.	**Reinforcement Steel**				
	• Physical &Chemical Properties (As per IS:1786) • Tensile Strength • Bend Test	Once every Lot			
12.	Calibration of site lab equipment	As per Schedule			

Annexure-III

FREQUENCY OF QUALITY ASSURANCE AUDIT

Sl. No	Items	Frequency of inspection by the Quality Assurance Manager from Project	Frequency of inspection by the rep. of the Region responsible for Quality Assurance	Frequency of inspection by the rep. of the QA&I Div., Corporate Office
1.	Lab Equipment's	As per Technical Specifications of the Contract Document	Monthly	Quarterly
2.	Materials		Monthly	Quarterly
3.	Mix Designs		Monthly	
4.	Crushing plant		Monthly	Quarterly
5.	Batching Plant		Monthly	Quarterly
6.	Fresh Concrete		Monthly	Quarterly
7.	Hardened Concrete		Monthly	Quarterly
8.	Test Results		Monthly	Quarterly
9.	Analysis of results		Monthly	Quarterly
10	Continuous inspection with contractor's representative		Monthly	Quarterly
11	Non conformities and corrective action		Monthly	Quarterly

FORMATS

FOR

OK CARDS

Format-A

		NHPC Limited (A Government of India Enterprise)						Card No.-
		Project Name: **Dibang Multipurpose Project(Lot-3)**						
		O.K. Card for Concrete for Linings of Tunnel, Shafts						
Name of Work	:			Grade of Concrete	:			
Location/structure Date	: :			Estimated Quantity to be poured	:			
RD/Chainage : From.....To.....				Lift Elevation From.....To.....				
Ref. Drawing No.	:							

Sl. No.	**Description**		**O.K./Not O.K. by Rep. of Contractor**	**O.K./Not O.K. by Rep. of NHPC**	**Remarks**
A)	**Pre Pour Checks**				
1.	**General**				
	a)	Survey line/Centre line position/Grades/excavation cross section profile			
	b)	Surface/ Joints/Base Preparation (inclusive of any treatment necessary)/use of compressed air/removal of all used rock/timber support/wooden wedges etc.			
	c)	Adequacy of construction aids/ tools/arrangements/access etc.			
	d)	Geological Mapping (If applicable) and rock classification			
	e)	Arrangement for draining of seepage water			
	f)	Condition of transport & placing equipments			
	g)	No. of Vibrators and their condition with standby provisions (Do they confirm the specification of TS)			
	h)	Status of lighting and ventilation system			
	i)	Cleanness of Invert			
	j)	Priming of pump and pump lines			
2.	**Form Work**				
	a)	Alignment, Centering			
	b)	Level			
	c)	Vertically/ Slope Check			
	d)	Support/ Stability			
	e)	Cleaning & applying release agents			
3.	**Reinforcement (as per approved drawing no.)**				
	a)	Type/ diameter of bar			
	b)	Spacing/No. of bars			
	c)	Cover			
	d)	Extra reinforcement			
	e)	Deviation from drawing(if any)			
	f)	Placement/Alignment			
	g)	Clean up			
	h)	Welding/Binding/Lapping/Coupling			
4.	**Embedded Parts (as per approved drawing no.)**				
	a)	Embedded parts i) Civil (water stop, pipes, dowel, ribs etc.) ii) Monitoring instruments iii) HM iv) E&M			
	b)	Position of Embedded Part			
	c)	Arrangement for protection during concrete			
			(Signature) Name:	**(Signature) Name: Designation:**	

			Designation:		
Cleared/ Not Cleared for Concreting **(Rep. of NHPC)** **Name:** **Designation:**					

Format-B

	NHPC Limited (A Government of India Enterprise)			Card No.-
	Project Name: **Dibang Multipurpose Project(Lot-3)**			
	OK card for Quality Checks During Concrete lining			
Name of Work	:	Date of Pouring	:	
Location/structure	:	Grade of Concrete	:	
RD/Chainage	: From.....To.....	Actual Quantity Poured	: From.....To.....	
Ref. Drawing No.	:	Lift Elevation	: From.....To.....	
Time of Start	:			
Time of Completion	:			

Sl. No.		**Description**	**Quantity/ Measurement**	**Remarks**
B)		**Check During Concreting**		
	a)	Slump achieved (in mm)		
	b)	Mode of Concrete Placement/pouring		
	c)	Height of free fall of concrete		
	d)	Duration of pour (From.....To.....)		
	e)	Compaction of Concrete as per TS		
	f)	No. of samples/ cubes taken		
	g)	Temperature of Air		
	h)	Temperature of Concrete		
	i)	Meteorological Condition		
	j)	Humidity in Air		
	k)	Thickness of layer poured		
	l)	Time interval between successive layer		
	m)	Initial setting time of cement		
	n)	Any other information		
		(Rep. of Contractor) **Name:** **Designation:**	**(Rep. of NHPC)** **Name:** **Designation:**	

Format-C

		NHPC Limited (A Government of India Enterprise)				Card No.-	
		Project Name: **Dibang Multipurpose Project(Lot-3)**					
		O.K. Card for Concrete					
Name of Work	:			Grade of Concrete	:		
Location/structure Date	: :			Estimated Quantity to be poured	:		
RD/Chainage : From.....To.....				Lift Elevation From.....To.....			
Ref. Drawing No.	:						

Sl. No.		**Description**	**O.K./Not O.K. by Rep. of Contractor**	**O.K./Not O.K. by Rep. of NHPC**	**Remarks**
A)		**<u>Pre Pour Checks</u>**			
1.		**General**			
	a)	Survey line/Centre line Position/Grades			
	b)	Surface/ Joints/Base Preparation (inclusive of any treatment necessary)			
	c)	Adequacy of construction aids/ tools/arrangements/access etc.			
	d)	Geological Mapping (If applicable)			
2.		**Form Work**			
	a)	Alignment, Centering			
	b)	Level			
	c)	Vertically/ Slope Check			
	d)	Support/ Stability			
	e)	Cleaning & applying release agents			
3.		**Reinforcement (as per approved drawing no.)**			
	a)	Type/ diameter of bar			
	b)	Spacing/No. of bars			
	c)	Cover			
	d)	Extra reinforcement			
	e)	Deviation from drawing(if any)			
	f)	Placement/Alignment			
	g)	Clean up			
	h)	Welding/Binding/Lapping/Coupling			
4.		**Embedded Parts (as per approved drawing no.)**			
	a)	Embedded parts i) Civil (water stop etc.) ii) Monitoring instruments iii) HM iv) E&M			
	b)	Position of Embedded Part			
	c)	Arrangement for protection during concrete			
			(Signature) **Name:** **Designation:**	**(Signature)** **Name:** **Designation:**	

Cleared/ Not Cleared for Concreting **(Rep. of NHPC)** **Name:** **Designation:**	

Format-D

		NHPC Limited (A Government of India Enterprise)				Card No.-	
		Project Name: **Dibang Multipurpose Project(Lot-3)**					
		O.K. Card for Dam Spillway Concrete					
Name of Work	:			Grade of Concrete	:		
Location/structure Date	: :			Estimated Quantity to be poured	:		
RD/Chainage : From.....To.....				Lift Elevation From.....To.....			
Ref. Drawing No.	:						

Sl. No.		**Description**	**O.K./Not O.K. by Rep. of Contractor**	**O.K./Not O.K. by Rep. of NHPC**	**Remarks**
A)		**Pre Pour Checks**			
1.		**General**			
	a)	Survey line/Centre line Position/Grades			
	b)	Surface/ Joints/Base Preparation (inclusive of any treatment necessary)			
	c)	Adequacy of construction aids/ tools/arrangements/access etc.			
	d)	Geological Mapping (If applicable)			
2.		**Form Work**			
	a)	Alignment, Centering			
	b)	Level			
	c)	Vertically/ Slope Check			
	d)	Support/ Stability			
	e)	Cleaning & applying release agents			
3.		**Reinforcement (as per approved drawing no.)**			
	a)	Type/ diameter of bar			
	b)	Spacing/No. of bars			
	c)	Cover			
	d)	Extra reinforcement			
	e)	Deviation from drawing(if any)			
	f)	Placement/Alignment			
	g)	Clean up			
	h)	Welding/Binding/Lapping/Coupling			
4.		**Embedded Parts (as per approved drawing no.)**			
	a)	Embedded parts i) Civil (water stop etc.) ii) Monitoring instruments iii) HM iv) E&M			
	b)	Position of Embedded Part			
	c)	Arrangement for protection during concrete			
5		**Concrete cut-off wall (as per approved drawing no.)**			
	a)	Alignment			
	b)	Level			
	c)	Guide wall			
	d)	Reinforcement			
	e)	Cut-off gallery/Access gallery			
	f)	Drainage etc.			
			(Signature) **Name:** **Designation:**	**(Signature)** **Name:** **Designation:**	

Cleared/ Not Cleared for Concreting **(Rep. of NHPC)** **Name:** **Designation:**					

Format-E

	NHPC Limited (A Government of India Enterprise)		Card No.-	
	Project Name: **Dibang Multipurpose Project(Lot-3)**			
	Quality Checks During Concreting			
Name of Work	:	Date of Pouring	:	
Location/structure	:	Grade of Concrete	:	
RD/Chainage	: From.....To.....	Actual Quantity Poured	:	
Ref. Drawing No.	:	Lift Elevation	: From.....To.....	
Time of Start	:			
Time of Completion	:			

Sl. No.		**Description**	**Quantity/ Measurement**	**Remarks**
B)		**Check During Concreting**		
	a)	Slump achieved (in mm)		
	b)	Mode of Concrete Placement		
	c)	Duration of pour (From.....To.....)		
	d)	Compaction of Concrete		
	e)	No. of samples/ cubes taken		
	f)	Temperature of Air		
	g)	Temperature of Concrete		
	h)	Meteorological Condition		
	i)	Humidity in Air		
	j)	Any other information		
		(Rep. of Contractor) **Name:** **Designation:**	**(Rep. of NHPC)** **Name:** **Designation:**	

Format-F

		NHPC Limited (A Government of India Enterprise)					Card No.-
		Project Name: **Dibang Multipurpose Project(Lot-3)**					
		OK Cards for Construction Joints					
Name of Work	:			Grade of Concrete	:		
Location/structure Date & Time	: :			Estimated Quantity to be poured	:		
RD/Chainage From.....To.....				Lift Elevation From.....To.....			
Ref. Drawing No.	:						

Sl. No.	**Description**	**O.K./Not O.K. by Rep. of Contractor**	**O.K./Not O.K. by Rep. of NHPC**	**Remarks**
1	Location of Construction joints RD wise			
2	Are they as per approved drawing or as per EIC instruction?			
3	Location of Horizontal joints EL			
4	Has the front surface cleaned by wet sand blasting and by roughened by brush hammering and washed by air water jets			
5	Air Pressure of wet sand blasting equipment or pressure of high pressure water blasting			
6	Is the water used is safe for cutting, washing and rinsing			
7	Has starter mix of approved mix and slump placed			
8	On completion what type of treatment carried out (Epoxy or any special treatment)			
		(Signature) **Name:** **Designation:**	**(Signature)** **Name:** **Designation:**	

Cleared/ Not Cleared for Concreting **(Rep. of NHPC)** **Name:** **Designation:**	

Format-G

NHPC Limited
(A Government of India Enterprise)

Card No.-

Project Name: Dibang Multipurpose Project(Lot-3)
Observation Record of Concrete after removal of Formwork

Name of Work :
Location/structure: Type of structure(as per TS);
RD/Chainage : From……. To …….. Date
Concrete poured on:

Sl. No.	Description	Yes	No	Remarks
c)	Check after removal of formwork			
1)	Any honeycombed area observed			
2)	Any bulging observed			
3)	Any surface undulation/finish observed which is beyond tolerance limit			
4)	Surface etching ,slurry loss, slurry streak etc. observed			
5)	Protection of exposed surface of concrete			
6)	Curing arrangement made			
7)	Surface finish acceptable			

(Rep. of Contractor) (Rep. of NHPC)
Name : Name:
Designation: Designation :

(Rep. of NHPC)
Acceptance with Remarks **Name:**
Details of follow up action if any: **Designation:**

Format-H

	NHPC Limited (A Government of India Enterprise)			Card No.-
	Project Name: **Dibang Multipurpose Project(Lot-3)**			
	Check for Curing			
Name of Work	:	Date &Time	:	
Location/structure	:	Date of Concrete pouring	:	

Sl. No.		**Description**	**Remarks**
a)		Type of curing arrangement	
b)		Curing done (From.....To.....)	
c)		Temp. of water for curing	
d)		Water test conducted & is it safe for curing work	
	i)	Any membrane forming compound used for curing	
	ii)	If yes, has it been approved by EIC	

(Rep. of Contractor) **Name:** **Designation:**	**(Rep. of NHPC)** **Name:** **Designation:**

Format-I

		NHPC Limited (A Government of India Enterprise)				Card No.-
		Project Name: **Dibang Multipurpose Project(Lot-3)**				
		OK Cards for drilling, grouting (Contact & Consolidation)				
Name of Work	:		Range of Grout mixture		:	
Location/structure Date & Time	: :		Amount of bentonite added		: :	
RD/ Chainage From.....To.....			Admixtures used		:	
Ref. Drawing No.	:					

Sl. No.	**Description**	**O.K./Not O.K. by Rep. of Contractor**	**O.K./Not O.K. by Rep. of NHPC**	**Remarks**
1	Has holes being drilled at locations, in the sequence, orientation, inclination and to the depths as per approved drawings or as required by EIC			
2	Type of drilling done			
3	Has any artesian conditions or water loss condition encountered during delay			
4	On completion of drilling, washing has been conducted and the holes have been capped with proper plugs			
5	Pressure test has been conducted as per IS 6066			
6	Has grouting being done in stages, depths to be mentioned			
7	On completion of grouting what was the absorption of grout for a specified time as per TS			
8	Was the grouting done in a continuous flow with the required pressure			
9	Has the grout holes been backfilled with the approved grout mix			
10	The pressure of grouting for contact grouting			
11	Vent pipes for release of air and water has been suitably provided			
12	On completion of grouting was the requisite pressure maintained for the requisite time as per TS without further grouting take			
13	Has the grout holes being properly washed with water under the requisite pressure and the returning water is clear			
14	Has consolidation grouting done in single stage or in multi stage (by ascending or descending arrangement)			
15	When was consolidation grouting commenced with date of concrete placement and the completion date of contact grouting			
16	The number of holes drilled with their depth and spacing			
17	Was the grouting done in a continuous operation and at what pressure			
18	Was there any sudden of pressure or a sudden increase in grout intake. If yes, has the crack or opening been located and caulked			
19	What is the fineness of cement			
20	After completion of grouting the packers and the pressure had been maintained after the grout has attained its initial set-up			
21	The completion of grouting has been done after the requirement of TS has been met.			
		(Signature) **Name:** **Designation:**	**(Signature)** **Name:** **Designation :**	

Cleared/ Not Cleared **(Rep. of NHPC)** **Name:** **Designation:**	

		NHPC Limited (A Government of India Enterprise)			Card No.-
		Project Name: **Dibang Multipurpose Project(Lot-3)**			
		O.K. Card for Rock Bolts/ Rock Anchors/ Tendons			
Location	:		Date	:	
Ref. Drawing No.	:		Chainage	: From.....To.....	
Dia of Rock Bolt/ Anchor	:		No. of Rock Bolt/ Anchor	:	

Sl. No.	**Check Items**	**O.K./Not O.K. by Rep. of Contractor**	**O.K./Not O.K. by Rep. of NHPC**	**Remarks**
1.	Marking the bolting pattern			
2.	Measurement of Drilled holes /Inclination done			
a.	Diameter of the Drill hole (As per approved drawing/Technical Specifications)			
b.	Length of the Drill hole(As per approved drawing/Technical Specifications)			
3.	Washing and cleaning/ Checking for water tightness (If required) done for drill holes			
4.	Preparation done of the Rock surface around the drill hole for bearing plate.			
5.	Type of Rock Bolt/ Rock Anchor/ Tendon (As per approved drawing)			
6.	Water/cement ratio of grout and its composition			
7.	Method used for driving the rock bolt/ rock anchor			
8.	Stressing done of rock bolts to the extent specified (Only in case of Rock Bolt).			
9.	Plugging/ caulking of cracks and fissures adjacent to the rock bolt			
10.	Pull out test as per T.S.			
11.	Additional test done in case of failure of any rock bolt during pull out test.			
		(Rep. of Contractor) **Name:** **Designation:**	**(Rep. of NHPC)** **Name:** **Designation:**	
Accepted/ Not Accepted **(Rep. of NHPC)** **Name:** **Designation:**				

ANNEXURE-3

DATA SHEET – 4A

PROPOSED SPECIALIZED AGENCIES

Name of Bidder

Section of work	Reference to Technical specification	Name(s) and Address	Description and location of similar works previously executed.
a. Permeation Grouting,	B.8.4		
b. Post Tensioned Rock Bolts (Tendons)	B.4.6		
c. Curtain grouting	B.7.8.4.6		
d. Monitoring instruments	B.18		
e. Application of Polyurea Membrane on dam face/Concrete Surface of tall structures like shaft/chimney/ power plant cooling tower(s)	B.22.17		

Note: The Bidders shall propose Specialized agency (at least three for each) section of works through which they propose to execute the above works.