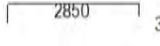
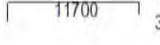
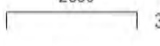
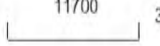
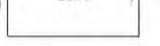
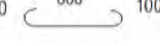
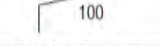
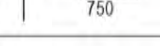
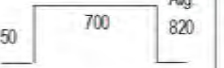
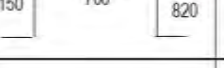
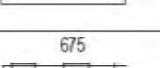
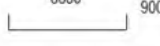
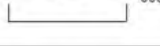
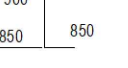
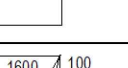
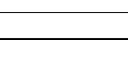


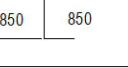
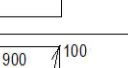
BAR BENDING SCHEDULE OF PIER CAP								
S.No.	BAR MARK	DESCRIPTION OF BAR	BAR DIA.(MM)	SPACING (MM)	BAR LENGTH (M)	No. OF BARS	UNIT WEIGHT (Kg/m)	TOTAL WEIGHT (Kg)
1	CT1	375  375	32		3.600	30	6.321	682.67
2	CT2	375  375	32		12.450	15	6.321	1180.44
3	CT3	375  375	32		3.600	15	6.321	341.33
4	CT4	375  375	25		12.450	15	3.858	720.49
5	CT5	11700  100	16		29.300	5	1.580	231.51
6	CT6	100  100	16	X: 150 Y: 200	0.800	1121	1.580	1417.17
7	CT7	100  600	16		0.800	101	1.580	127.68
8	CT8	2850  @ 200 11700 @ 400	16		343.650	4 Layer	1.580	2172.21
9	CT9	750  750	16		3.750	79	1.580	468.15
10	CT10	100  100	16		11.900	11	1.580	206.85
TOTAL (KG) :								7548.50

BAR BENDING SCHEDULE OF PEDESTAL								
S.No.	BAR MARK	DESCRIPTION OF BAR	BAR DIA.(MM)	SPACING (MM)	BAR LENGTH (M)	No. OF BARS	UNIT WEIGHT (Kg/m)	TOTAL WEIGHT (Kg)
1	TP1	150  Aug. 820	16	150	2.640	6	1.580	25.03
2	TP2	150  Aug. 820	16	150	2.640	6	1.580	25.03
3	TP3	700  100	16	150	3.000	4	1.580	18.96
4	TP4	675  @ 100	10		10.675	2	0.617	13.18
TOTAL (KG) :								82.20

BAR BENDING SCHEDULE PIER PORTAL								
S.No.	BAR MARK	DESCRIPTION OF BAR	BAR DIA.(MM)	SPACING (MM)	BAR LENGTH (M)	No. OF BARS	UNIT WEIGHT (Kg/m)	TOTAL WEIGHT (Kg)
1	ST1	300  8650	32		8.950	64	6.321	3620.66
2	ST2	75  359.374	16	75	359.374	1	1.580	567.90
TOTAL (KG) :								4188.56
No. of Stem in Portal								2.00
TOTAL WEIGHT (KG) :								8377.12

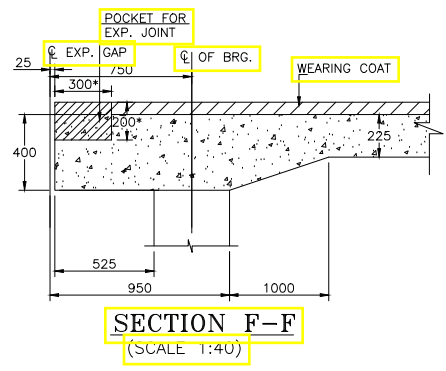
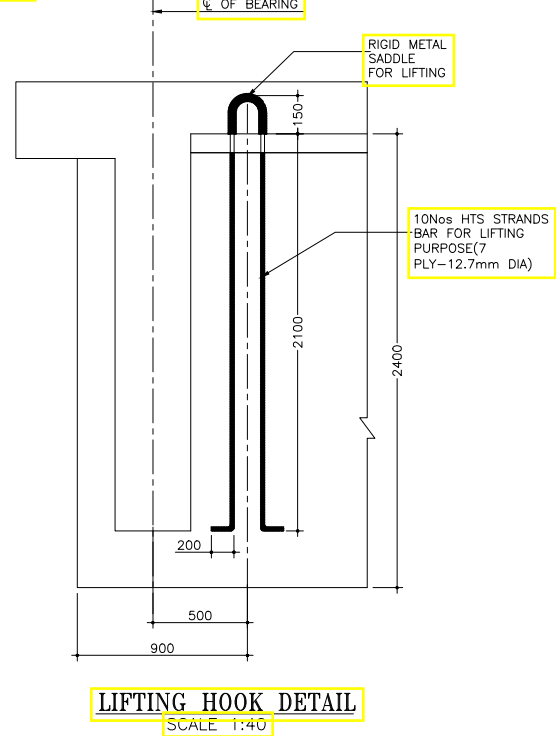
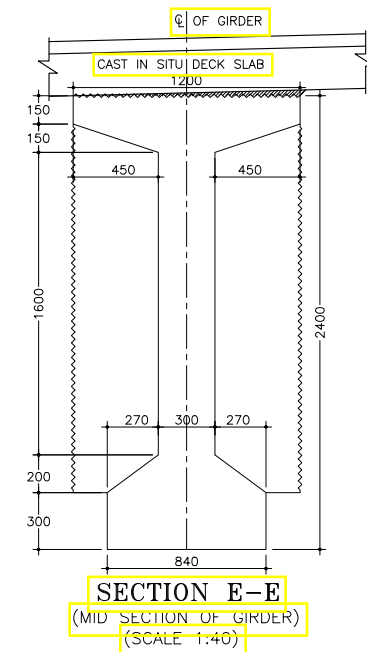
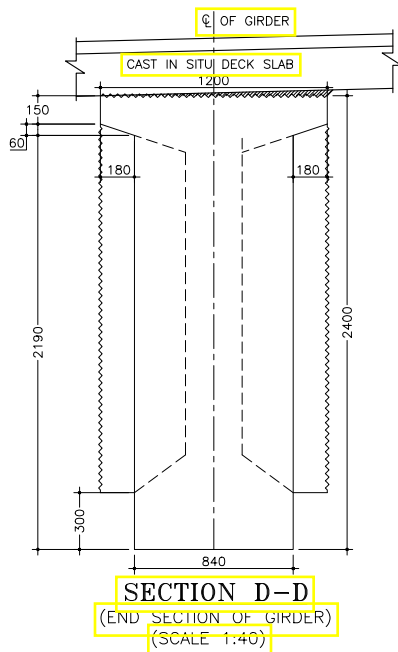
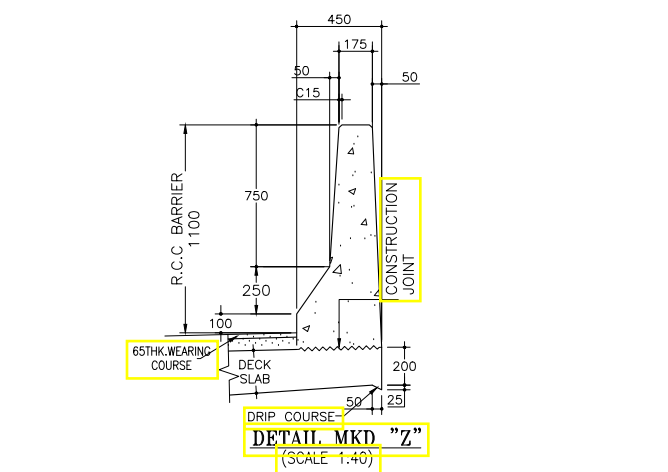
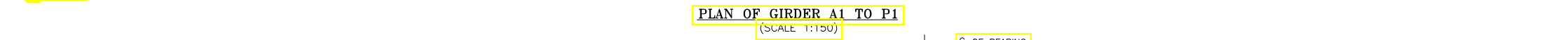
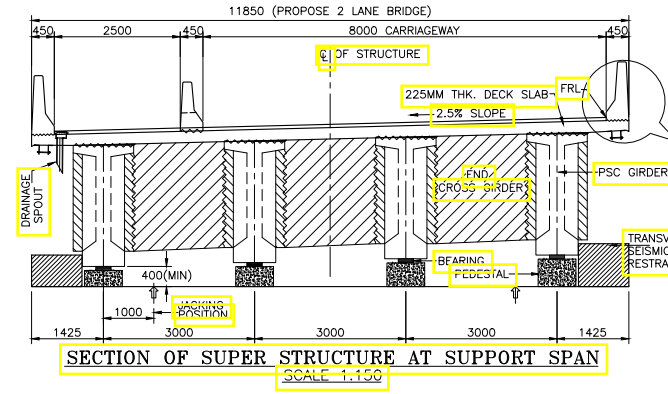
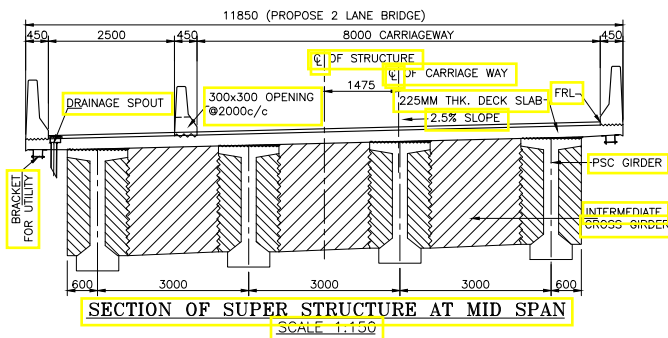
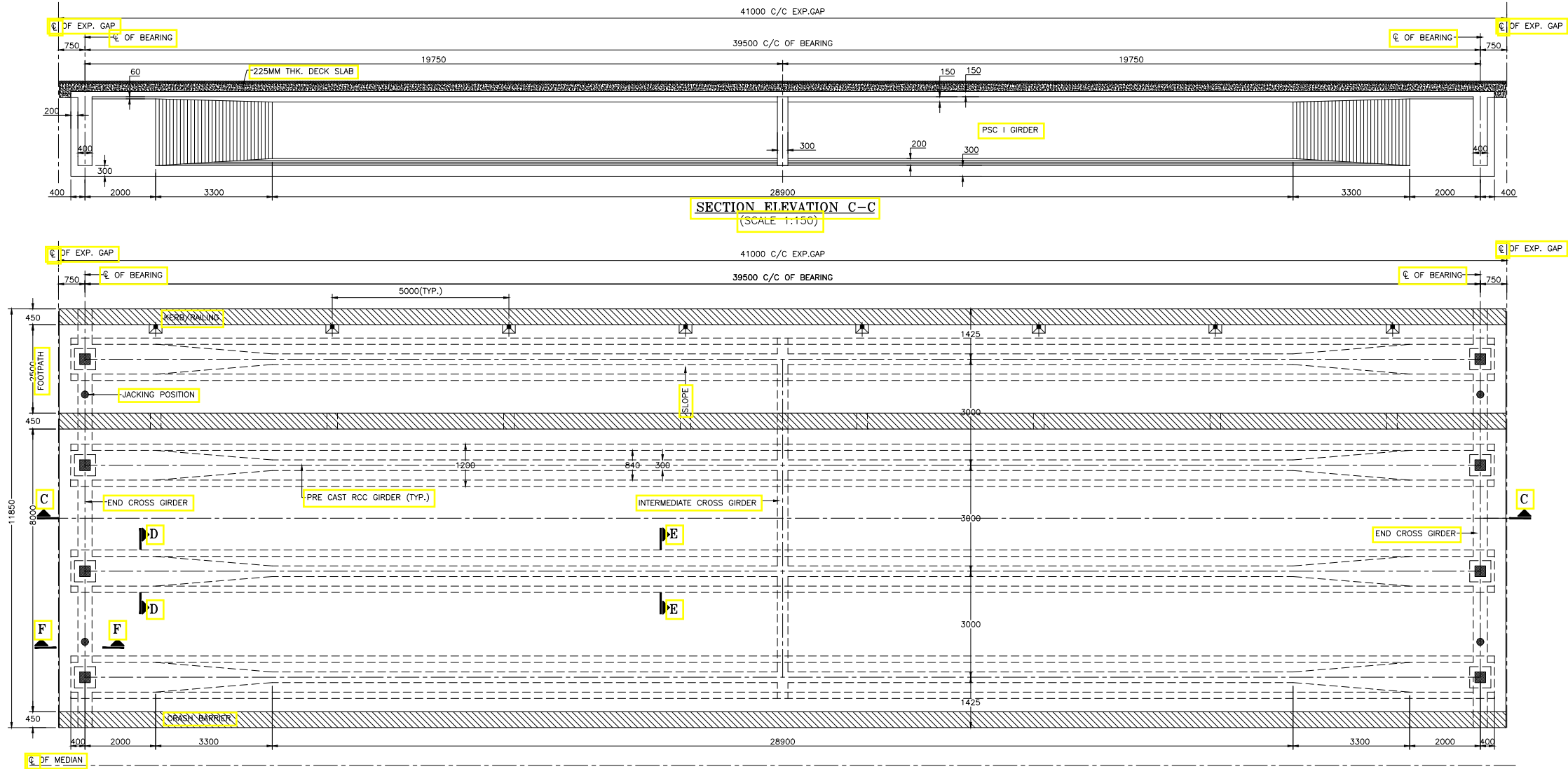
BAR BENDING SCHEDULE OF PILE CAP								
S.No.	BAR MARK	DESCRIPTION OF BAR	BAR DIA.(MM)	SPACING (MM)	BAR LENGTH (M)	No. OF BARS	UNIT WEIGHT (Kg/m)	TOTAL WEIGHT (Kg)
1	FT1	900  900	32	150	10.450	83	6.321	5482.51
2	FT2	900  900	32	150	14.050	59	6.321	5239.78
3	FT3	900  900	20	140	10.450	89	2.469	2296.42
4	FT4	900  900	20	140	14.050	63	2.469	2185.56
5	FT5	100  100	16	Long. 430 Trans. 430	1.85	574	1.580	1678.06
6	FT6	8586  150	12	140	41.844	12	0.889	446.34
TOTAL (KG) :								17328.67

BAR BENDING SCHEDULE OF RCC STOPPER- TRANSVERSE (RIGHT)								
S.No.	BAR MARK	DESCRIPTION OF BAR	BAR DIA.(MM)	SPACING (MM)	BAR LENGTH (M)	No. OF BARS	UNIT WEIGHT (Kg/m)	TOTAL WEIGHT (Kg)
1	TS1-R	1200  850	16	150	5.000	12	1.580	94.81
2	TS2-R	900  100	16	150	5.200	6	1.580	49.30
3	TS3-R	1200  100	16	200	5.800	5	1.580	45.83
TOTAL (KG) :								189.95

BAR BENDING SCHEDULE OF RCC STOPPER - LONGITUDINAL (2 Nos.)								
S.No.	BAR MARK	DESCRIPTION OF BAR	BAR DIA.(MM)	SPACING (MM)	BAR LENGTH (M)	No. OF BARS	UNIT WEIGHT (Kg/m)	TOTAL WEIGHT (Kg)
1	TS1	1350  850	16	150	4.900	7	1.580	54.20
2	TS2	500  100	16	150	3.000	7	1.580	33.19
3	TS3	1350  100	12	150	4.700	4	0.889	16.71
TOTAL (KG) 2 Nos:								208.20

BAR BENDING SCHEDULE OF RCC STOPPER - TRANSVERSE (LEFT)								
S.No.	BAR MARK	DESCRIPTION OF BAR	BAR DIA.(MM)	SPACING (MM)	BAR LENGTH (M)	No. OF BARS	UNIT WEIGHT (Kg/m)	TOTAL WEIGHT (Kg)
1	TS1-L	975  850	16	150	4.550	12	1.580	86.28
2	TS2-L	900  100	16	150	5.200	5	1.580	41.09
3	TS3-L	975  100	16	200	5.350	5	1.580	42.27
TOTAL (KG) :								169.64

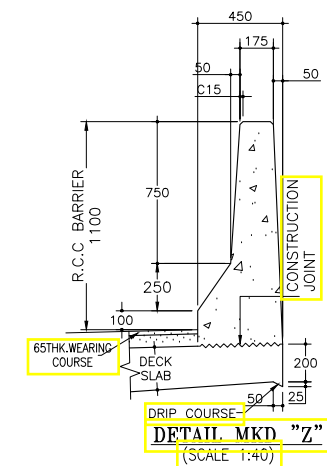
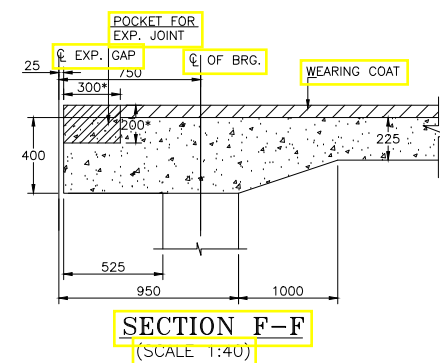
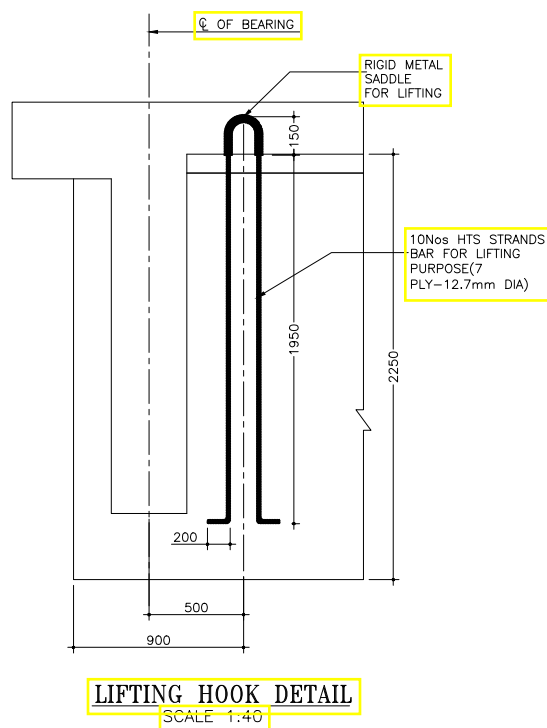
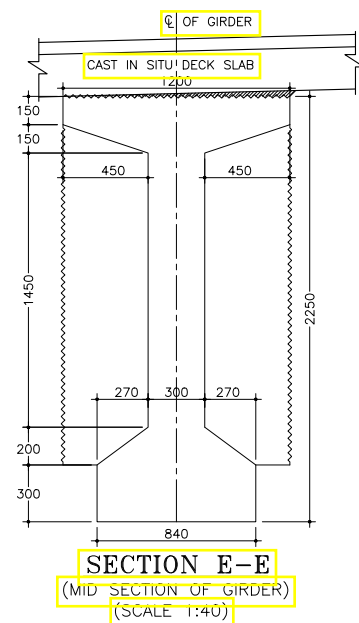
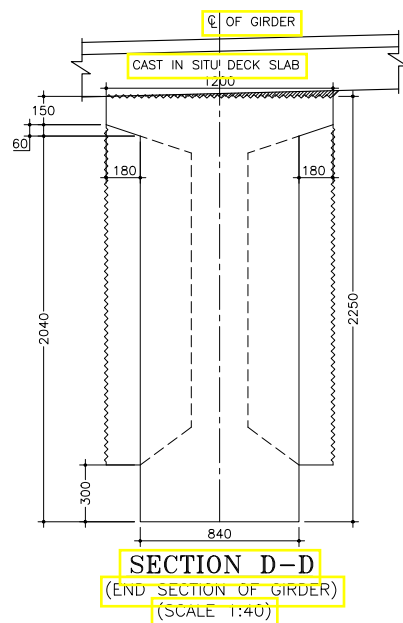
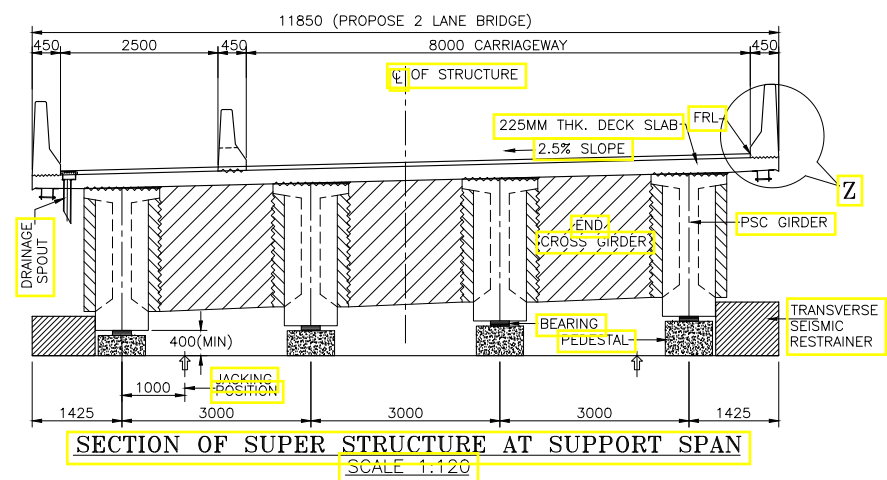
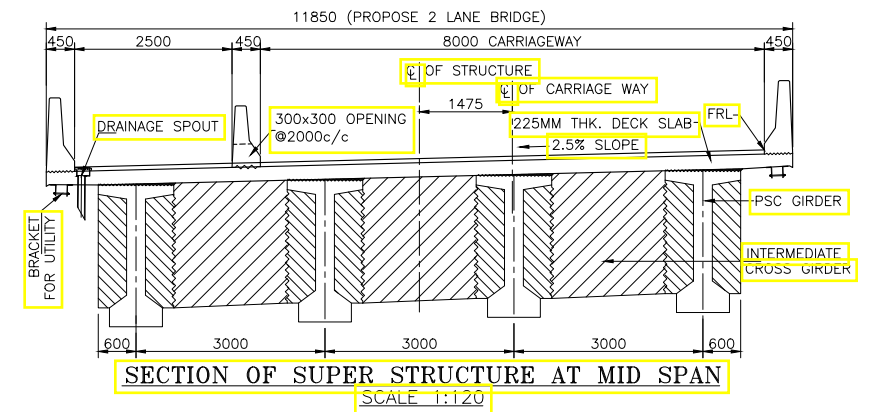
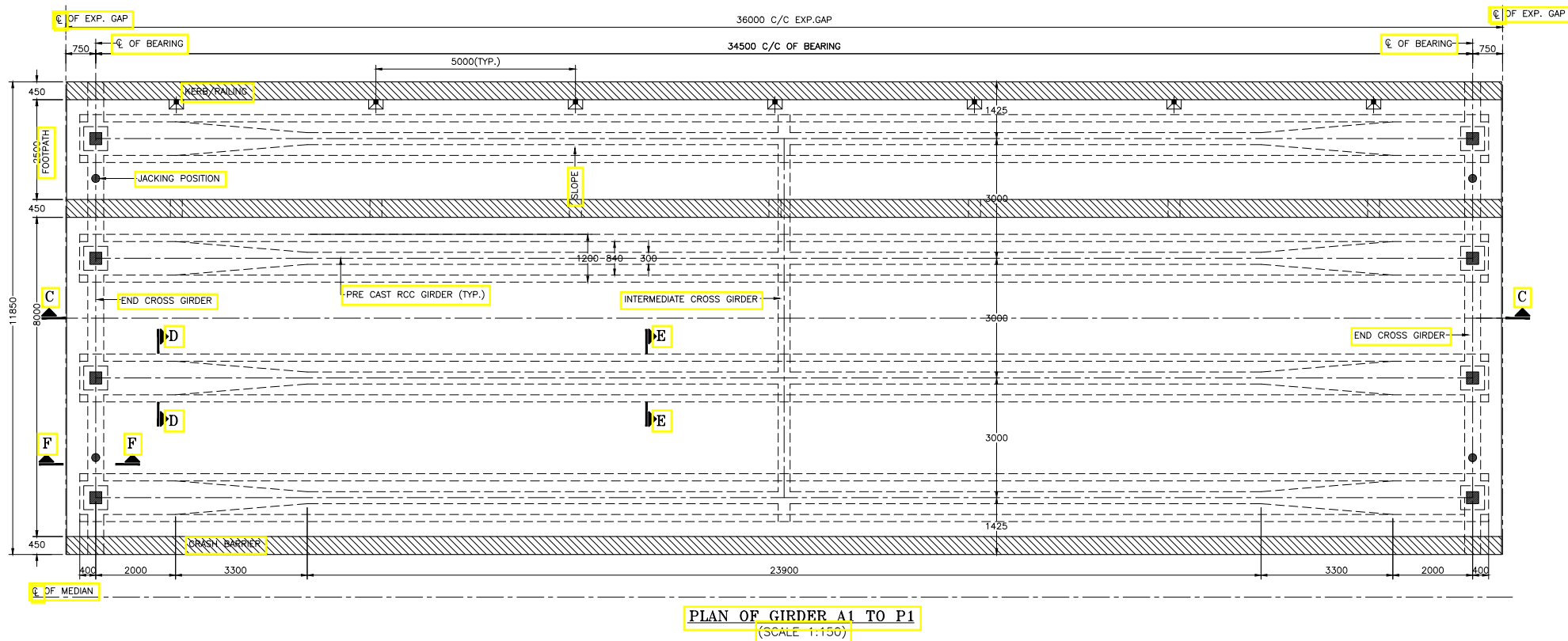
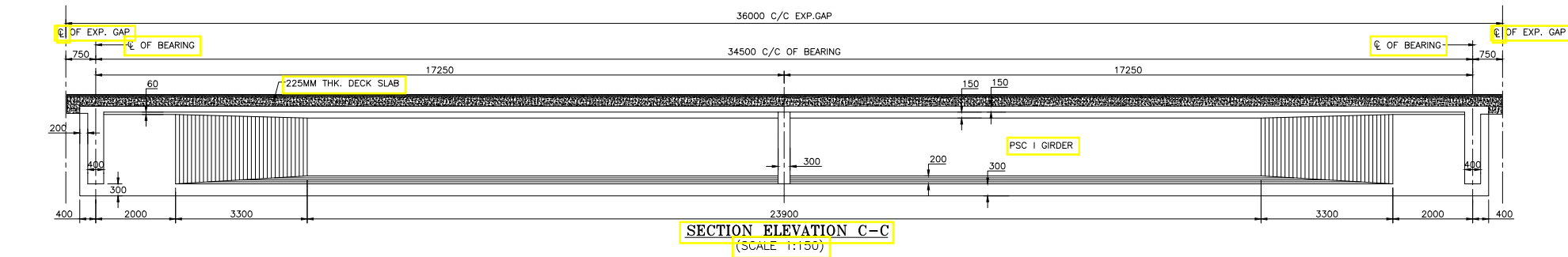
EMPLOYER		PROJECT NAME		DESIGN CONSULTANTS		Drawing Name		Scale:		Date:		
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division		Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of		Designed By	Mr. S.N.R.B Nec.No. 265 Civil "A"	AS SHOWN		JUNE, 2023			
			 EPTISA Servicios De Ingeniera Madrid, Spain	 STUP Consultants Private Limited Kolkata, India	Checked By	Mr. S.M. Nec.No.			Drawing No.-			
					In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited				Approved By	Mr. H.B. Nec.No.	12	
				Reference Drawings		Chainage:			Sheet No. 1/1			
						-			265+345			



- NOTES:**
1. DIMENSIONS ARE IN MILLIMETERS. CHANGES & LEVELS ARE IN METER, UNLESS NOTED OTHERWISE.
 2. CHAINAGE & LEVEL SHALL BE VERIFIED WITH THE RELEVANT PLAN & PROFILE DRAWING VARIATION (IF ANY) SHALL BE REPORTED TO ENGINEER FOR MODIFICATION.
 3. CHAINAGE OF THE STRUCTURE IS AT THE CENTER LINE OF THE PROPOSED STRUCTURE.
 4. EACH PRECAST GIRDER WILL BE LIFTED BY USING LIFTING STRAND AT EITHER END DURING LIFTING GIRDER SHALL BE KEPT PLUMB AND UPRIGHT.

EMPLOYER Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	PROJECT Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	DESIGN CONSULTANT Joint Venture of ep4sa EPTISA Servicios De Ingenieria Madrid, Spain STUP Consultants Private Limited Kolkatta, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Designed By Mr.S.N.R.B <i>Signature</i> Checked By Mr.S.M <i>Signature</i> Approved By Mr.H.B <i>Signature</i>	Drawing Name: SUPER STRUCTURE DETAILS OF BRIDGE OVER RIVER RATU Reference Drawings:	Scale: AS NOTED Chainage: 265+345	Date: JUNE, 2023 Drawing No.: KDP/DPR/STR/BR/RATU /DD -13 Sheet No.: Sheet No. 1/2
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41m Superstructure



NOTES:

- DIMENSIONS ARE IN MILLIMETERS. CHAINAGE & LEVELS ARE IN METER, UNLESS NOTED OTHERWISE.
- CHAINAGE & LEVEL SHALL BE VERIFIED WITH THE RELEVANT PLAN & PROFILE DRAWING VARIATION (IF ANY) SHALL BE REPORTED TO ENGINEER FOR MODIFICATION.
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- EACH PRECAST GIRDER WILL BE LIFTED BY USING LIFTING STRAND AT EITHER END DURING LIFTING GIRDER SHALL BE KEPT PLUMB AND UPRIGHT.

EMPLOYER		PROJECT		DESIGN CONSULTANT		Drawing Name:		Scale:		Date:	
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of		Designed By	Mr.S.N.R.B	 Signature	SUPER STRUCTURE DETAILS OF BRIDGE OVER RIVER RATU	AS NOTED	JUNE, 2023		
		 EPTISA Servicios De Ingenieria Madrid, Spain	 STUP Consultants Private Limited Kolkatta, India	Checked By	Mr.S.M					 Signature	
		In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited		Approved By	Mr.H.B	 Signature					
				Reference Drawings:			Chainage:			265+345	
						Drawing No.:		KDP/DPR/STR/BR/RATU /DD -13			
						Sheet No.:		Sheet No. 2/2			

36m Superstructure

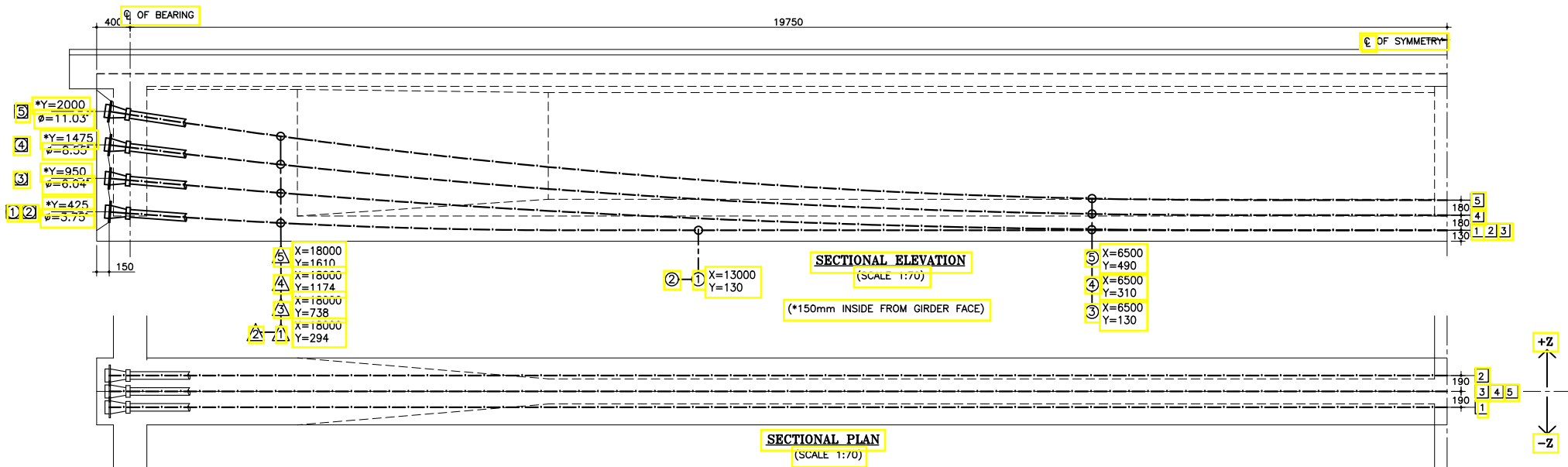


TABLE-1

	at X =	20000		18700		17000		15300		13600		11900		10200		8500		6800		5100		3400		1700		0	
cable no		y	z	y	z	y	z	y	z	y	z	y	z	y	z	y	z	y	z	y	z	y	z	y	z	y	z
C5		2000	0	1747	0	1424	0	1147	0	918	0	738	0	606	0	524	0	491	0	490	0	490	0	490	0	490	0
C4 (Dummy)		1475	0	1280	0	1031	0	817	0	640	0	501	0	400	0	337	0	311	0	310	0	310	0	310	0	310	0
C3		950	0	813	0	638	0	487	0	362	0	265	0	193	0	149	0	131	0	130	0	130	0	130	0	130	0
C2		425	190	340	190	235	190	165	190	133	190	130	190	130	190	130	190	130	190	130	190	130	190	130	190	130	190
C1		425	-190	340	-190	235	-190	165	-190	133	-190	130	-190	130	-190	130	-190	130	-190	130	-190	130	-190	130	-190	130	-190

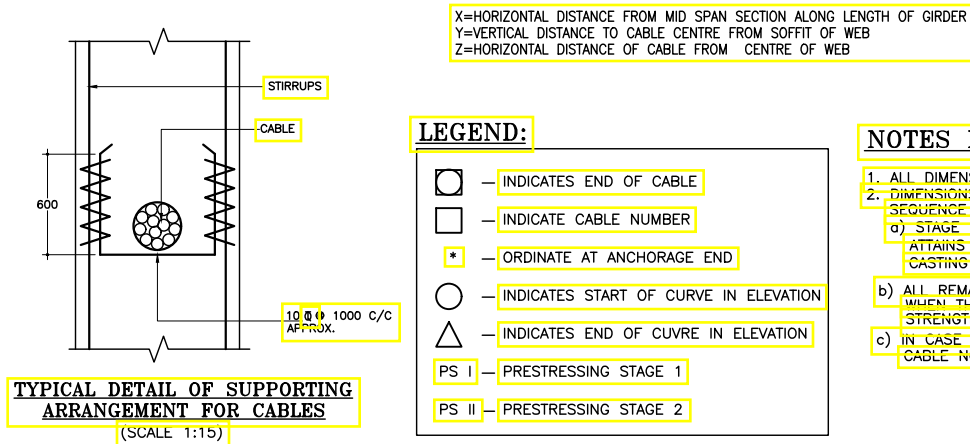
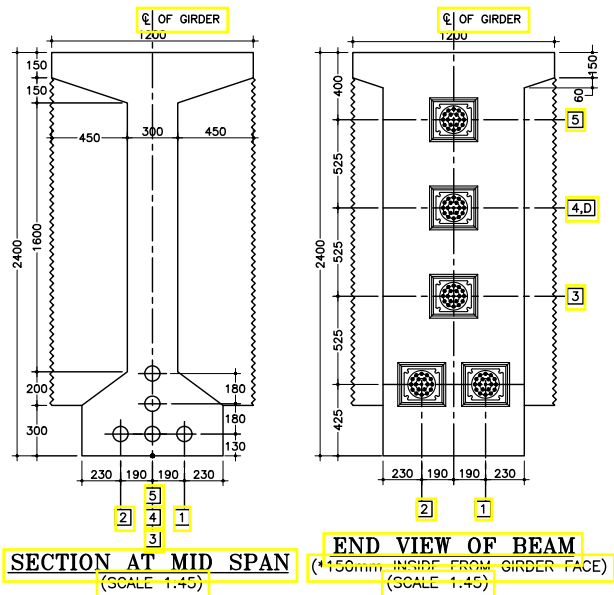


TABLE-1:

CABLE NO.	STAGE OF PRESTR-ESSING	ANCHORAGE TYPE	CABLE LENGTH CONSIDERING GRIP ADDITIONAL CUTTING LENGTH IN M.	CALCULATED ELONGATION CONSIDERING GRIP LENGTH (MM)	JACKING FORCE (KN)	NUMBER OF STRANDS TO BE STRESSED
5	PS II	19 T 15	42.120	142.76	3694	19
3		19 T 15	41.965	143.51	3694	19
2	PS I	17 T 15	41.916	138.14	3178	17
1		17 T 15	41.916	138.14	3178	17

CABLE 4 is dummy cable

TABLE-3 SEQUENCE OF PRESTRESSING

SL. NO.	LOADING CASES	DAY NO.
1.	Casting of Girder	0
2.	1st stage Prestressing	7
3.	2nd stage Prestressing	21
4.	Launching of Girder	24
5.	Casting of Deck slab	28
6.	Removal of Deck shuttering	56
7.	Casting of Crash barrier	56
8.	Laying of Wearing Coat and Allowing Live load	63

3. PRESTRESSING SYSTEM

- ALL PRESTRESSING STRANDS SHALL HAVE 7 PLY UNCOATED STRESS RELIEVED HIGH TENSILE STRANDS OF 15.2mm DIA CONFORMING TO CLASS 2 OF IS 14266-1995.
- HDPE SHEATHING SHALL BE USED.
- THE PARAMETERS ADOPTED FOR DESIGN ARE AS FOLLOWS:
 - ANCHORAGE TYPE.....19 T 15
 - SLIP AT EACH END.....10mm
 - SHEATH DIA100mm.
 - SHEATH THICKNESS.....±3mm
 - CO-EFFICIENT OF FRICTION.....0.17
 - WOBBLE CO-EFFICIENT.....0.002/m
 - NOMINAL AREA OF EACH STRAND.....140 mm²
 - NOMINAL ULTIMATE BREAKING LOAD OF EACH STRAND.....260.7KN
 - MODULUS OF ELASTICITY OF HIGH TENSILE STEEL.....1.95X10⁵ MPa
- ALL THE DESIGN PARAMETERS ADOPTED SHALL BE VERIFIED AT SITE.
- ALL PRESTRESSING ACCESSORIES BEING PATENTED ITEMS SHALL BE OBTAINED FROM AUTHORISED MANUFACTURERS ONLY.

4. PRESTRESSING OPERATIONS

- STRESSING OPERATION SHALL BE DONE AS PER PROCEDURE GIVEN IN MORTH'S SPECIFICATIONS.
 - CABLE LENGTHS MENTIONED IN THE DRAWING ARE INCLUSIVE OF 950 MM. EXTRA AT EACH END. THE TOTAL LENGTH OF CABLE SHALL BE VERIFIED AT SITE.
 - STAGES OF PRESTRESSING SHALL BE AS IN TABLE-1&3.
 - STRESSING OF CABLES SHALL BE CARRIED OUT SIMULTANEOUSLY FROM BOTH ENDS & ALL STRANDS IN A CABLE SHALL BE TENSIONED SIMULTANEOUSLY. ONLY MULTI PULL JACKS SHALL BE USED FOR STRESSING.
 - GROUTING OF CABLES SHALL BE DONE IN SAME SEQUENCE AS STRESSING AND SHALL CONFORM TO IRC:112-2011.
 - ANCHORAGE POCKET SHALL BE FILLED WITH PREPACKED NON-SHRINK MORTAR, END FACES OF GIRDERS TO BE COATED WITH TWO COATS OF EPOXY.
 - EXTENSIONS SHALL BE RECHECKED AT 24 HOURS AFTER ANCHORING TO OBSERVE SLOW SLIPPAGE. THE MATTER SHALL BE REPORTED FOR EXCESSIVE SLIPPAGE IF ANY.
 - INITIAL SLACKNESS IN CABLES SHALL BE REMOVED BY APPLYING SMALL TENSION. THE INITIAL TENSION REQUIRED TO REMOVE SLACKNESS SHALL BE TAKEN AS THE STARTING POINT FOR MEASURING ELONGATION & CORRECTION SHALL BE APPLIED AS PER CL 12.2.1.3 OF IS:1343-198
 - IN CASE THE CALCULATED ELONGATION AND THE JACK PRESSURE ARE NOT ACHIEVED SIMULTANEOUSLY DURING PRESTRESSING OPERATION STRESSING SHALL BE CONTINUED/ DISCONTINUED AS PER NOTE NO. 8 GIVEN BELOW.
5. THE EXTENSIONS GIVEN IN TABLE NO.-1 SHALL BE MODIFIED AT SITE IN CASE ACTUAL VALUE OF AREA OF STRANDS 'A' & MODULUS OF ELASTICITY 'E' VARIES FROM THOSE ASSUMED IN DESIGN, REVISED EXTENSION SHALL BE CALCULATED AS UNDER
- $$\text{REVISED EXTENSION} = \frac{(195 \times 10^{-5}) \times \text{ORIGINAL EXTENSION}}{(\text{NEW MODULUS})} \times \frac{\text{OLD AREA OF STRANDS}}{\text{NEW AREA}}$$

- EXTENSION OF CABLE SHALL BE VERIFIED FOR A FEW CABLES AT SITE. IN CASE OF VALUE OF μ AND k ARE FOUND TO BE DIFFERENT THAN THOSE CONSIDERED FOR DESIGN, EXTENSION SHALL BE SUITABLY MODIFIED AFTER APPROVAL OF DESIGN OFFICE

- THE GRIP LENGTH FROM ANCHORAGE FACE UP TO GRIPPING POINT IN JACK ASSUMED IN EXTENSION IS 75MM & THE ADDITIONAL LENGTH TAKEN FOR CUTTING IS 200MM. IF GRIP LENGTH VARIES THAN THOSE CONSIDERED, THE EXTENSIONS SHALL BE MODIFIED AS UNDER:

$$\text{NEW EXTENSIONS} = \text{EX} + \text{EX} \times (\text{GRIP} - 75) / (\text{LENGTH})$$
 WHERE, EX IS EXTENSION AS SPECIFIED IN RESPECTIVE DRAWING.

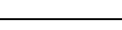
5. SPECIAL NOTE FOR PRESTRESSING

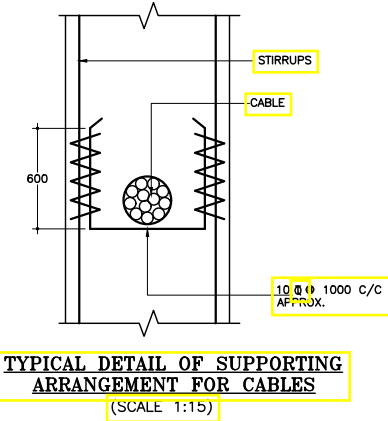
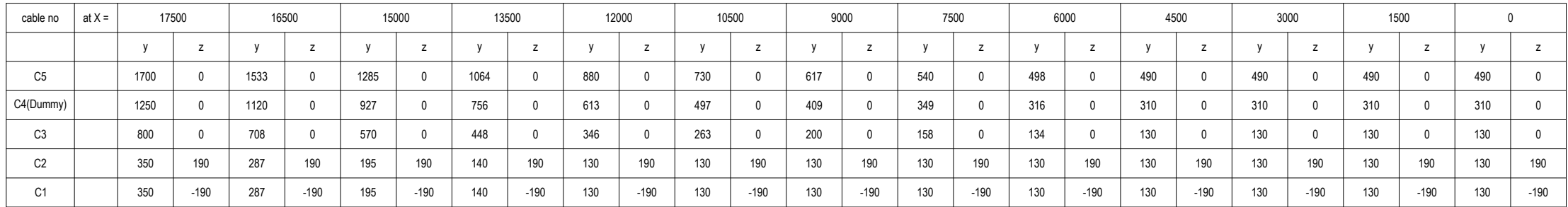
- IF THE CALCULATED ELONGATION IS REACHED BEFORE THE CALCULATED GAUGE PRESSURE IS OBTAINED, CONTINUE TENSIONING TILL ATTAINING, THE CALCULATED GAUGE PRESSURE PROVIDED THE ELONGATION DOES NOT EXCEED 1.05 TIMES THE CALCULATED ELONGATION.
- IF THE CALCULATED ELONGATION HAS NOT BEEN REACHED CONTINUE TENSIONING IN INTERVALS OF 5 kg/sqcm UNTILL THE CALCULATED ELONGATION IS REACHED PROVIDED THE GAUGE PRESSURE DOES NOT EXCEED 1.05 TIMES THE CALCULATED GAUGE PRESSURE.
- IF THE ELONGATION AT 1.05 TIMES THE CALCULATED GAUGE PRESSURE IS LESS THAN 95 TIMES THE CALCULATED ELONGATION THE FOLLOWING MEASURES MUST BE TAKEN:
 - RECALIBRATE THE PRESSURE GAUGE
 - CHECK THE CORRECT FUNCTIONING OF THE JACK PUMP & LEADS
 - DETENSION THE CABLE SLIDE IT IN ITS DUCT TO CHECK THAT IT IS NOT BLOCKED BY MORTAR WHICH HAS ENTERED THROUGH HOLES IN THE SHEATH. RETENSION THE CABLE IF FREE.
- IF THE REQUIRED ELONGATION IS NOT OBTAINED FURTHER FINISHING OPERATION SUCH AS CUTTING OR SEALING SHOULD NOT BE UNDER TAKEN WITHOUT THE APPROVAL OF THE DESIGN OFFICE
- THE GAUGE PRESSURE FOR PRESTRESSING SHALL BE WORKED OUT PRIOR TO ANY STRESSING OPERATION DULY TAKING IN TO ACCOUNT THE RAM AREA OF THE JACK & THE JACK EFFICIENCY. THE STRESSING EQUIPMENTS SHALL BE WELL MAINTAINED AND THE CALIBRATION CHARTS SHALL BE AVAILABLE AT SITE.AFTER APPROVAL OF CLIENT.
- IF CABLE NUMBER 4 (DUMMY CABLE) IS NOT IN USE, IT IS GROUTED BEFORE SLAB CASTING.
- THIS DRAWING IS APPLICABLE FOR BOTH INNER AND OUTER GIRDER.

NOTES:

- DIMENSIONS ARE IN MILLIMETERS. CHANGES & LEVELS ARE IN METER UNLESS NOTED OTHERWISE.
- CHAINAGE & LEVEL SHALL BE VERIFIED WITH THE RELEVANT PLAN & PROFILE DRAWING VARIATION (IF ANY) SHALL BE REPORTED TO ENGINEER FOR MODIFICATION.
- CHAINAGE OF THE STRUCTURE IS AT THE CENTER LINE OF THE PROPOSED STRUCTURE.
- WHERE ABSOLUTELY NECESSARY THE UNTENSIONED REINFORCEMENT BARS/MESH MAY BE SUITABLY REPOSITIONED TO SUIT.

41m Superstructure

EMPLOYER	PROJECT	DESIGN CONSULTANT	Designed By	Drawing Name:	Scale:	Date:
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of	Mr.S.N.R.B. SEC. NO. 285 CIVIL A	MAIN GIRDER DETAILS OF BRIDGE OVER RIVER RATU	AS NOTED	JUNE, 2023
		 EPTISA Servicios De Ingenieria Madrid, Spain  STUP Consultants Private Limited Kolkatta, India	Signature			
		In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Signature	Reference Drawings:	Chainage:	
			265+345			Sheet No.: 1/2



SL. NO.	LOADING CASES	DAY NO.
1.	Casting of Girder	0
2.	1st stage Prestressing	7
3.	2nd stage Prestressing	21
4.	Launching of Girder	24
5.	Casting of Deck slab	28
6.	Removal of Deck shuttering	56
7.	Casting of Crash barrier	56
8.	Laying of Wearing Coat and Allowing Live load	63

CABLE NO.	STAGE OF PRESTR-ESSING	ANCHORAGE TYPE	CABLE LENGTH CONSIDERING GRIP ADDITIONAL CUTTING LENGTH IN M.	CALCULATED ELONGATION CONSIDERING GRIP LENGTH (MM)	JACKING FORCE (KN)	NUMBER OF STRANDS TO BE STRESSED
5	PS II	19 T 15	37.052	120.17	3518	19
3		19 T 15	36.947	120.68	3518	19
2	PS I	19 T 15	36.912	126.67	2722	14
1		19 T 15	36.912	126.67	2722	14
CABLE 4 is dummy cable						

3. PRESTRESSING SYSTEM

- a) ALL PRESTRESSING STRANDS SHALL HAVE 7 PLY UNCOATED STRESS RELIEVED HIGH TENSILE STRANDS OF 15.2mm DIA CONFORMING TO CLASS 2 OF IS 14266-1995.
- b) HDPE SHEATHING SHALL BE USED.
- c) THE PARAMETERS ADOPTED FOR DESIGN ARE AS FOLLOWS:
 - i) ANCHORAGE TYPE.....19 T 15
 - ii) SLIP AT EACH END.....10mm
 - iii) SHEATH DIA100mm.
 - iv) SHEATH THICKNESS.....±3mm
 - v) CO-EFFICIENT OF FRICTION.....0.17
 - vi) WOBBLE CO-EFFICIENT.....0.002/m
 - vii) NOMINAL AREA OF EACH STRAND.....140 mm²
 - viii) NOMINAL ULTIMATE BREAKING LOAD
OF EACH STRAND.....260.7KN
 - ix) MODULUS OF ELASTICITY OF
HIGH TENSILE STEEL.....1.95X10⁵ MPa
- d) ALL THE DESIGN PARAMETERS ADOPTED SHALL BE VERIFIED AT SITE.
- e) ALL PRESTRESSING ACCESSORIES BEING PATENTED ITEMS SHALL BE OBTAINED FROM AUTHORIZED MANUFACTURERS ONLY.

4. PRESTRESSING OPERATIONS

- STRESSING OPERATION SHALL BE DONE AS PER PROCEDURE GIVEN IN MORTH'S SPECIFICATIONS.
- CABLE LENGTHS MENTIONED IN THE DRAWING ARE INCLUSIVE OF 950 MM. EXTRA AT EACH END. THE TOTAL LENGTH OF CABLE SHALL BE VERIFIED AT SITE.
- STAGES OF PRESTRESSING SHALL BE AS IN TABLE-1&3.
- STRESSING OF CABLES SHALL BE CARRIED OUT SIMULTANEOUSLY FROM BOTH ENDS & ALL STRANDS IN A CABLE SHALL BE TENSIONED SIMULTANEOUSLY. ONLY MULTI PULL JACKS SHALL BE USED FOR STRESSING.
- GROUTING OF CABLES SHALL BE DONE IN SAME SEQUENCE AS STRESSING AND SHALL CONFORM TO IRC:112-2011.
- ANCHORAGE POCKET SHALL BE FILLED WITH PREPACKED NON-SHRINK MORTAR. END FACES OF ORDERS TO BE COATED WITH TWO COATS OF EPOXY.
- EXTENSIONS SHALL BE RECHECKED AT 24 HOURS AFTER ANCHORING TO OBSERVE SLOW SLIPPAGE. THE MATTER SHALL BE REPORTED FOR EXCESSIVE SLIPPAGE IF ANY.
- INITIAL SLACKNESS IN CABLES SHALL BE REMOVED BY APPLYING SMALL TENSION. THE INITIAL TENSION REQUIRED TO REMOVE SLACKNESS SHALL BE TAKEN AS THE STARTING POINT FOR MEASURING ELONGATION & CORRECTION SHALL BE APPLIED AS PER CL. 12.2.1.3 OF IS:1343- 198
- IN CASE THE CALCULATED ELONGATION AND THE JACK PRESSURE ARE NOT ACHIEVED SIMULTANEOUSLY DURING PRESTRESSING OPERATION STRESSING SHALL BE CONTINUED/ DISCONTINUED AS PER NOTE NO. 8 GIVEN BELOW.

5. THE EXTENSIONS GIVEN IN TABLE NO.-1 SHALL BE MODIFIED AT SITE IN CASE ACTUAL VALUE OF AREA OF STRANDS 'A' & MODULUS OF ELASTICITY 'E' VARIES FROM THOSE ASSUMED IN DESIGN, REVISED EXTENSION SHALL BE CALCULATED AS UNDER

$$\text{REVISED EXTENSION} = \frac{(195 \times 10^{-5}) \times \text{ORIGINAL EXTENSION}}{(\text{NEW MODULUS})} \times \frac{\text{OLD AREA OF STRANDS}}{\text{NEW AREA}}$$

6. EXTENSION OF CABLE SHALL BE VERIFIED FOR A FEW CABLES AT SITE. IN CASE OF VALUE OF μ AND K ARE FOUND TO BE DIFFERENT THAN THOSE CONSIDERED FOR DESIGN, EXTENSION SHALL BE SUITABLY MODIFIED AFTER APPROVAL OF DESIGN OFFICE

7. THE GRIP LENGTH FROM ANCHORAGE FACE UP TO GRIPPING POINT IN JACK ASSUMED IN EXTENSION IS 750MM & THE ADDITIONAL LENGTH TAKEN FOR CUTTING IS 200MM. IF GRIP LENGTH VARIES THAN THOSE CONSIDERED, THE EXTENSIONS SHALL BE MODIFIED AS UNDER:-
NEW EXTENSIONS=XXXXX (GRIP-750)/(LENGTH)
WHERE, CX IS EXTENSION AS SPECIFIED IN RESPECTIVE DRAWING.

SPECIAL NOTE FOR PRESTRESSING

- a) IF THE CALCULATED ELONGATION IS REACHED BEFORE THE CALCULATED GAUGE PRESSURE IS OBTAINED, CONTINUE TENSIONING TILL ATTAINING, THE CALCULATED GAUGE PRESSURE PROVIDED THE ELONGATION DOES NOT EXCEED 1.05 TIMES THE CALCULATED ELONGATION.
- b) IF THE CALCULATED ELONGATION HAS NOT BEEN REACHED CONTINUE TENSIONING IN INTERVALS OF 5 kg/sqcm UNTILL THE CALCULATED ELONGATION IS REACHED PROVIDED THE GAUGE PRESSURE DOES NOT EXCEED 1.05 TIMES THE CALCULATED GAUGE PRESSURE.
- c) IF THE ELONGATION AT 1.05 TIMES THE CALCULATED GAUGE PRESSURE IS LESS THAN 95 TIMES THE CALCULATED ELONGATION THE FOLLOWING MEASURES MUST BE TAKEN:
 - i) RECALIBRATE THE PRESSURE GAUGE
 - ii) CHECK THE CORRECT FUNCTIONING OF THE JACK PUMP & LEADS
 - iii) DETENSION THE CABLE SLIDE IT IN ITS DUCT TO CHECK THAT IT IS NOT BLOCKED BY MORTAR WHICH HAS ENTERED THROUGH HOLES IN THE SHEATH. RETENSION THE CABLE IF FREE.
- d) IF THE REQUIRED ELONGATION IS NOT OBTAINED FURTHER FINISHING OPERATION SUCH AS CUTTING OR SEALING SHOULD NOT BE UNDER TAKEN WITHOUT THE APPROVAL OF THE DESIGN OFFICE

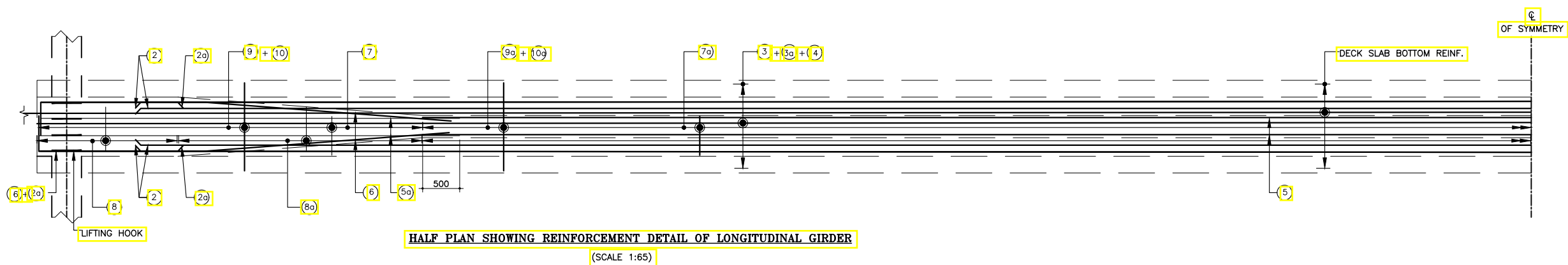
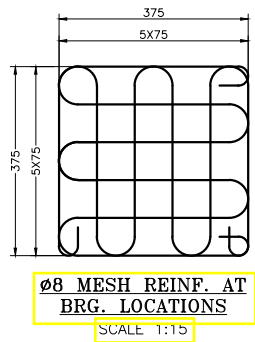
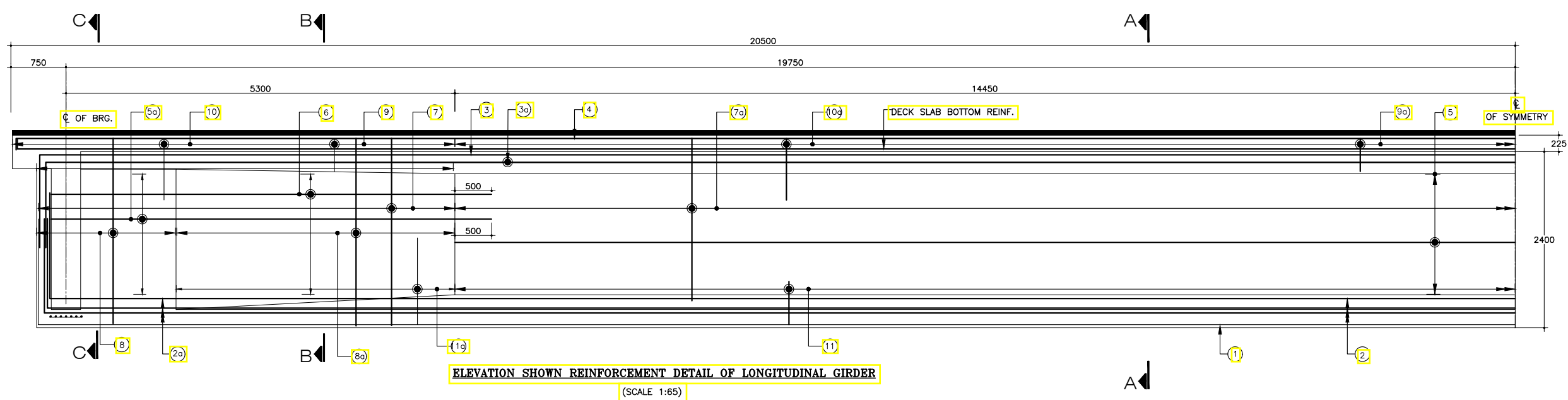
9. THE GAUGE PRESSURE FOR PRESTRESSING SHALL BE WORKED OUT PRIOR TO ANY STRESSING OPERATION DULY TAKING IN TO ACCOUNT THE RAM AREA OF THE JACK & THE JACK EFFICIENCY, THE STRESSING EQUIPMENTS SHALL BE WELL MAINTAINED AND THE CALIBRATION CHARTS SHALL BE AVAILABLE AT SITE.AFTER APPROVAL OF

10. IF CABLE NUMBER 4 (DUMMY CABLE) IS NOT IN USE, IT IS GROUTED BEFORE SLAB CASTING.

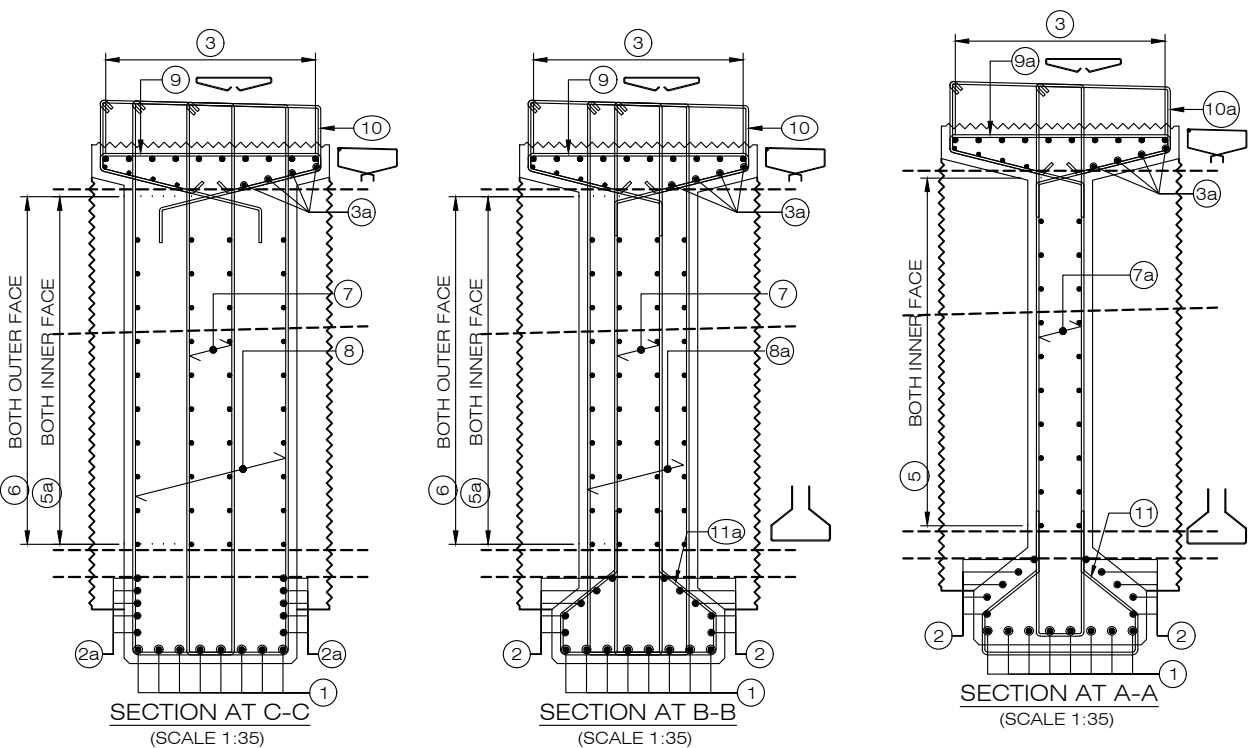
11. THIS DRAWING IS APPLICABLE FOR BOTH INNER AND OUTER GIRDER.

NOTES:

- DIMENSIONS ARE IN MILLIMETERS, CHANGES & LEVELS ARE IN METER, UNLESS NOTED OTHERWISE.
- CHAMBAE & LEVEL SHALL BE VERIFIED WITH THE RELEVANT PLAN & PROFILE DRAWING.
- VARIATION (IF ANY) SHALL BE REPORTED TO ENGINEER FOR MODIFICATION.
- CHAMBAE OF THE STRUCTURE IS AT THE CENTER LINE OF THE PROPOSED STRUCTURE.
- WHERE ABSOLUTELY NECESSARY THE UNTENSIONED REINFORCEMENT BARS/MESH MAY BE SUITABLY REPOSITIONED TO SUIT.



REINFORCEMENT DETAILS		
BAR MKD.	BAR DIA & SPACING/NOS	BAR SHAPE
1	16 Ø 10 Nos.	
2	16 Ø 6 Nos. Each Side	
2a	16 Ø 6 Nos. Each Side	
3	16 Ø 14 Nos.	
3a	16 Ø 12 Nos.	
4	DECK REINFORCEMENT	
5	12 Ø 12 Nos. Each side	
5a	12 Ø 12 Nos. Each Side	
6	12 Ø 12 Nos. Each side	
7	2L-12 Ø @150c/c STIRRUP	
7a	2L-12 Ø @180c/c STIRRUP	
8	2L-12 Ø @150c/c STIRRUP	
8a	2L-12 Ø @150c/c STIRRUP	
9	12 Ø @ 150c/c	
9a	12 Ø @ 150c/c	
10	12 Ø @ 150c/c	
10a	12 Ø @ 180c/c	
11	12 Ø @ 150c/c	
11a	12 Ø @ 150c/c	



NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
- DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
- GRADE OF CONCRETE SHALL BE AS BELOW:
a) CAST-IN-SITU DECK SLAB.....M45
b) PRECAST PSC GIRDER.....M50
c) CROSS GIRDER.....M45
- CLEAR COVER TO OUTERMOST STEEL SHALL BE AS BELOW:
a. CAST-IN-SITU SUPERSTRUCTURE).....45mm
b. PRECAST PSC GIRDER.....40mm
- REINFORCING STEEL SHALL BE HYSD (TMT) BARS (GRADE DESIGNATION Fe 500DD) CONFORMING TO TABLE 18.1 OF IRC: 112-2020.
- SHOWN JACK LOCATION IN PLAN AND SHOWN JACK LOCATION IN ELEVATION OTHERWISE MENTIONED.
- CURING OF THE GIRDERS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE MORTH SPECIFICATIONS.
- GIRDERS SHALL BE SECURELY SUPPORTED AT ALL TIMES BY BRACING TO PREVENT BEAMS TOPPLING OVER.
- EACH GIRDER SHALL BE INDEPENDENTLY BRACED AGAINST OVERTURNING PRIOR TO RELEASE BY THE CRANE OR LIFTING DEVICE.
- LIFTING LOOPS SHALL BE PLACED WITH THE PLANE OF THE LOOP PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE GIRDER.
- SHIFTING THE PSC GIRDERS TO SITE SHALL BE AS PER 1811 OF MORTH & H REV-V, SECTION
- RECESS FOR EXPANSION JOINT SHALL BE LEFT AS PER MANUFACTURER'S SPECIFICATION.

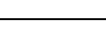
13. LAPPING SHALL BE STAGGERED, BARS SHALL BE LAPPED IN SUCH A WAY THAT NOT MORE THAN 50% OF THE BARS ARE LAPPED AT ANY SECTION, LAP LENGTH SHALL BE PROVIDED AS "X+D" MENTIONED IN THE TABLE BELOW, WHERE 'D' IS THE SMALLER BAR UNLESS OTHERWISE SPECIFIED.

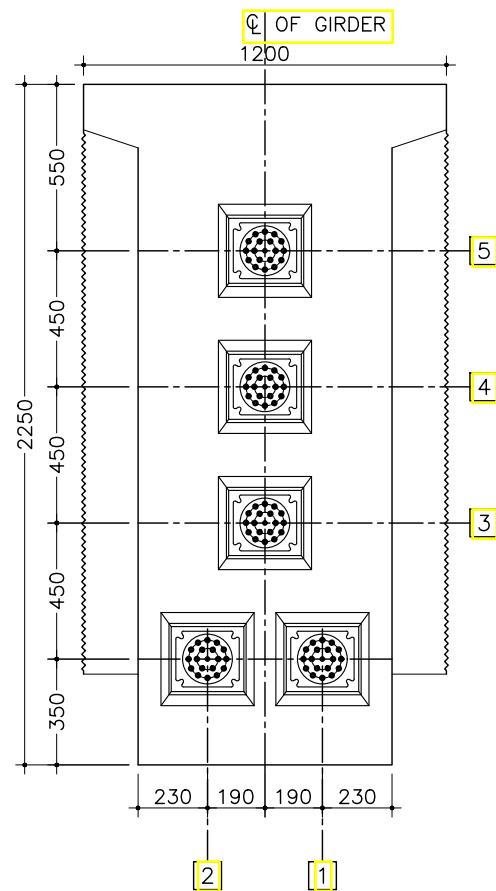
FAVORABLE BOND CONDITION				
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%
M50	X	29	33	41

UNFAVORABLE BOND CONDITION				
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%
M50	X	42	48	59

- FAVORABLE ZONE:
a. RAFT/SLAB BOTTOM MAIN BAR.
UNFAVORABLE ZONE:
a. RAFT/SLAB BOTTOM MAIN BAR.
b. WALL/COLUMN MAIN BAR.

41m Superstructure

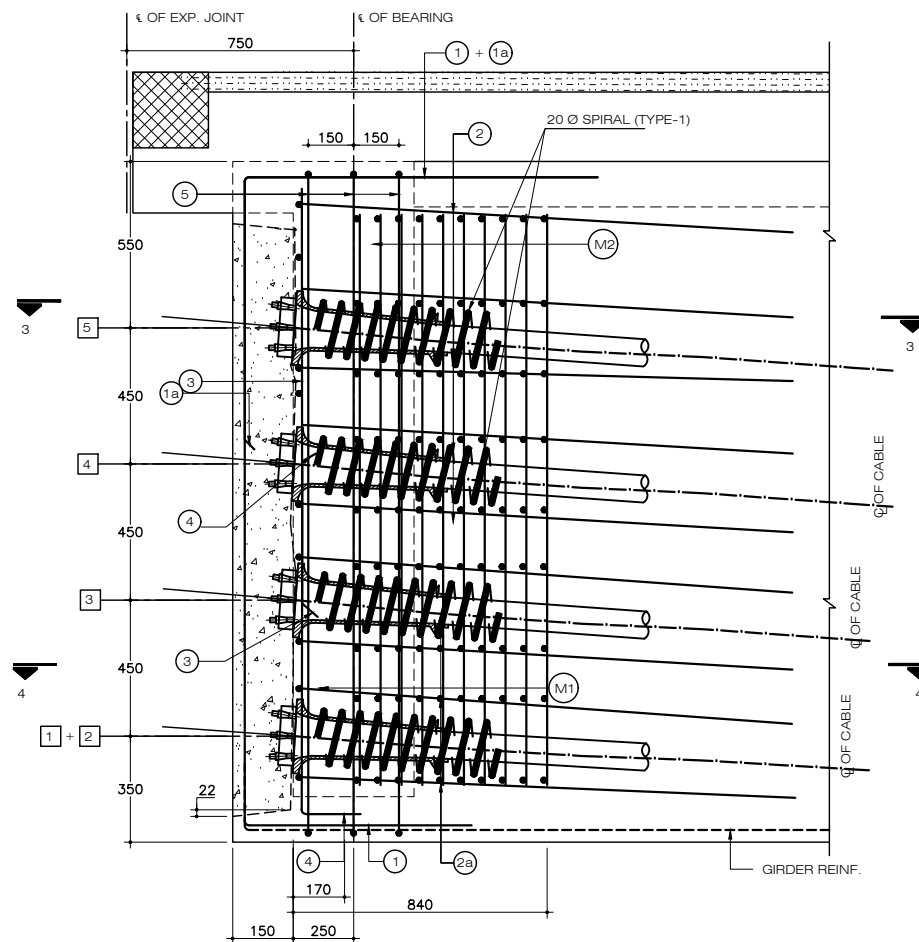
EMPLOYER	PROJECT	DESIGN CONSULTANT	Designed By	Mr.S.N.R.B. NEC NO. 265 CIVIL A	 Signature	Drawing Name:	Scale:	Date:		
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of							MAIN GIRDER REINFORCEMENT DETAILS OF BRIDGE OVER RIVER RATU	AS NOTED
		 EPTISA Servicios De Ingenieria Madrid, Spain				 STUP Consultants Private Limited Kolkatta, India	Checked By	Mr.S.M		
		In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited		Approved By	Mr.H.B	 Signature	KDP/DPR/STR/BR/RATU /DD -18	265+345	KDP/DPR/STR/BR/RATU /DD -15	Sheet No.: Sheet No. 2/4



END VIEW OF BEAM

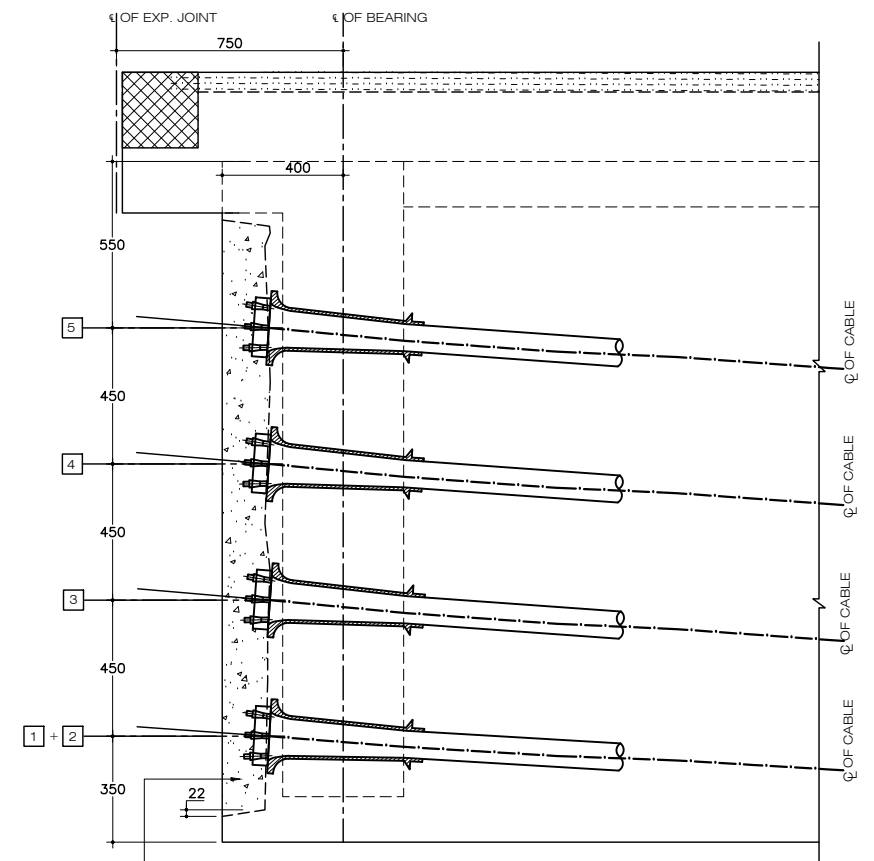
DETAILS OF 16 MESH
TYPE M1 & M2 IN 10 LAYERS
AT EQUAL SPACING

(SCALE 1:20)



(SECTION SHOWING ANCHORAGE REINF. DETAIL)

(SCALE 1:30)



(SECTION SHOWING ANCHORAGE DIMENSION DETAIL)

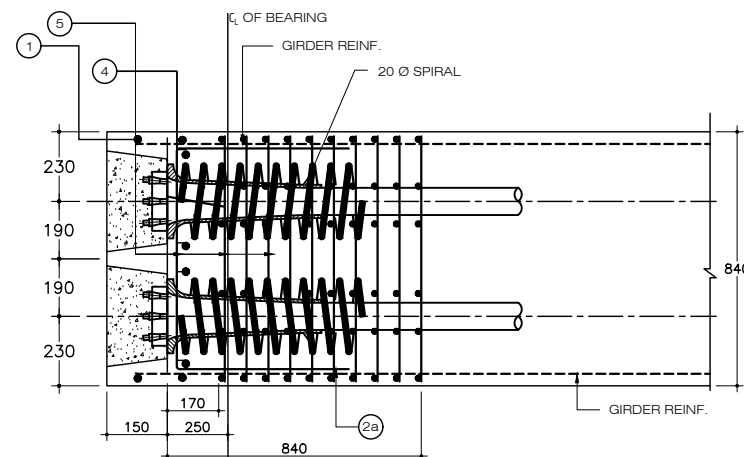
(SCALE 1:30)

ANCHORAGE BLOCK
DIMENSION SHOULD BE AS PER
MANUFACTURING AGENCY

REINFORCEMENT SCHEDULE		
BAR MKD.	BAR DIA & SPACING/NOS.	BAR SHAPE
1	16 Ø 2 Nos.	700
1a	16 Ø 2 Nos.	700
2	20 Ø 4 Nos.	800
2a	20 Ø 3 Nos.	800
3	12 Ø 2 Nos.	800
4	12 Ø 4 Nos.	800
5	2L-20 Ø 6 NOS. STIRRUPS	800

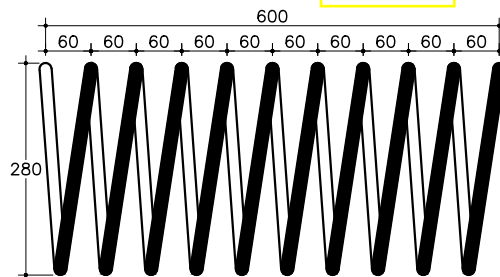
NOTES:

- ALL DIMENSIONS ARE IN MM. UNLESS OTHERWISE SPECIFIED.
- DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
- WHEREVER REINFORCEMENT IS FOUND TO BE FOULING WITH THE PRESTRESSED CABLE ANCHORAGE, LOCAL ADJUSTMENT IN REINFORCEMENT DETAIL CAN BE DONE WITH APPROVAL OF THE ENGINEER. NO CHANGE SHALL BE PERMITTED ON PRESTRESS CABLE ALIGNMENT UNDER ANY CIRCUMSTANCE.
- THIS DRAWING IS APPLICABLE FOR BOTH INNER & OUTER GIRDER.
- FIRST LAYER OF MESH TYPE-A AS SHOWN ABOVE SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE FACE OF ANCHORAGE.
- LAPPING SHALL BE STAGGERED, BARS SHALL BE LAPPED IN SUCH A WAY THAT NOT MORE THAN 50% OF THE BARS ARE LAPPED AT ANY SECTION, LAP LENGTH SHALL BE PROVIDED AS "X*D" MENTIONED IN THE TABLE BELOW, WHERE "D" IS THE SMALLER BAR UNLESS OTHERWISE SPECIFIED.



SECTION AT 4-4

(SCALE 1:30)



*TYPICAL DETAIL OF 20Ø SPIRAL REINFORCEMENT
(To be conformed with supplier specification)

(SCALE 1:10)

FAVORABLE BOND CONDITION					
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M50	X	29	33	41	44
M45	X	33	38	47	50

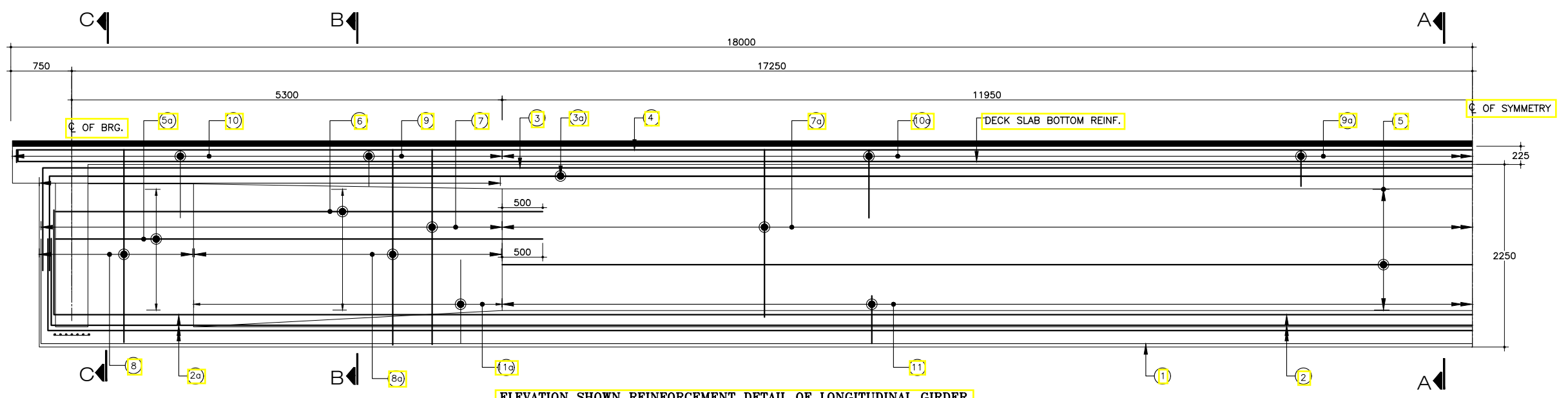
UNFAVORABLE BOND CONDITION					
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M50	X	42	48	59	63
M45	X	45.7	52.6	64	68.6

FAVORABLE ZONE:
a. RAFT/SLAB BOTTOM MAIN BAR.
UNFAVORABLE ZONE:
a. RAFT/SLAB BOTTOM MAIN BAR.
b. WALL/COLUMN MAIN BAR.

MANUFACTURER'S SPECIFICATION.

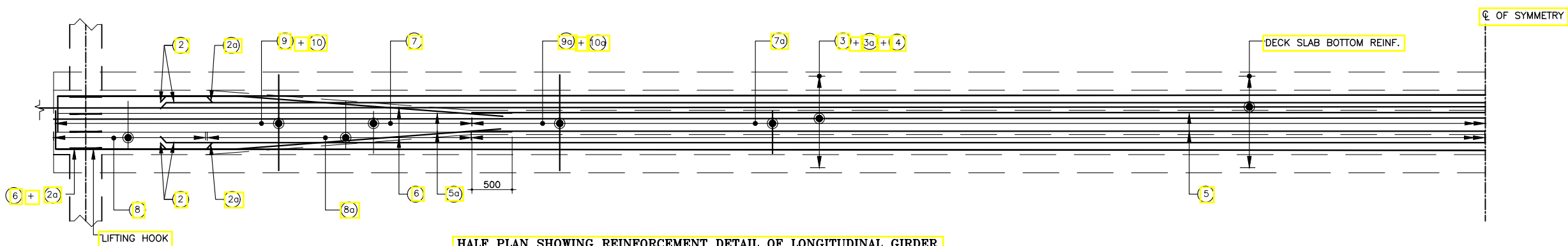
EMPLOYER	PROJECT	DESIGN CONSULTANT	Designed By	Drawing Name:	Scale:	Date:
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of EPTISA Servicios De Ingeniera Madrid, Spain STUP Consultants Private Limited Kolkatta, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Mr.S.N.R.B Signature Checked By Mr.S.M Signature Approved By Mr.H.B Signature	MAIN GIRDER REINFORCEMENT DETAILS OF BRIDGE OVER RIVER RATU Reference Drawings: KDP/DPR/STR/BR/RATU /DD -18	AS NOTED Chainage: 265+345	JUNE, 2023 Drawing No.: KDP/DPR/STR/BR/RATU /DD -15 Sheet No.: Sheet No. 3/4

36m Superstructure



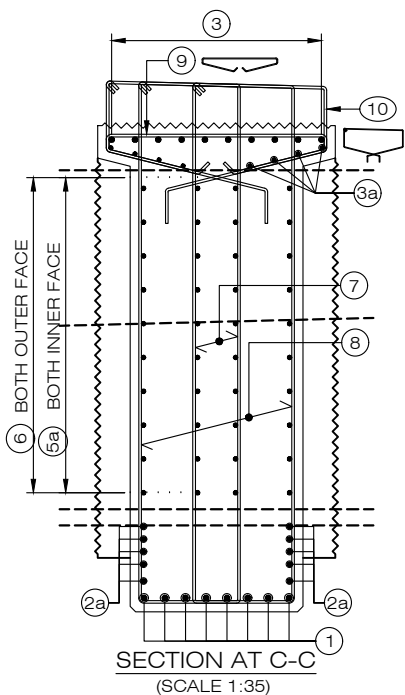
ELEVATION SHOWN REINFORCEMENT DETAIL OF LONGITUDINAL GIRDER

(SCALE 1:60)



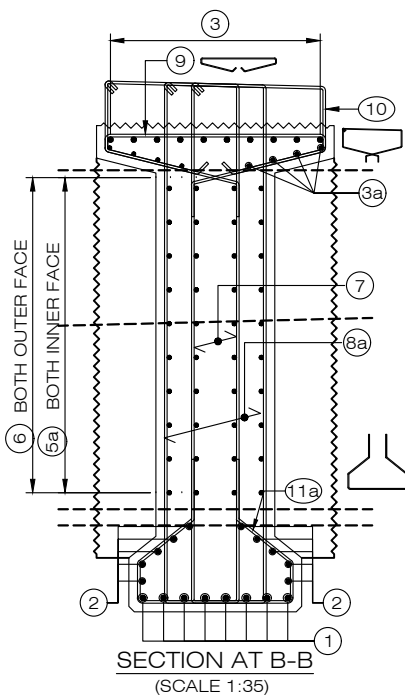
HALF PLAN SHOWING REINFORCEMENT DETAIL OF LONGITUDINAL GIRDER

(SCALE 1:60)



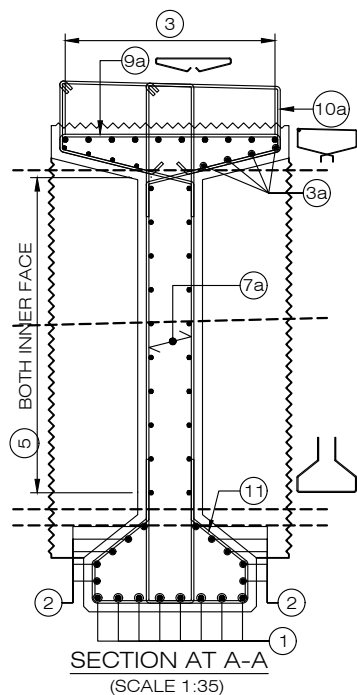
SECTION AT C-C

(SCALE 1:35)



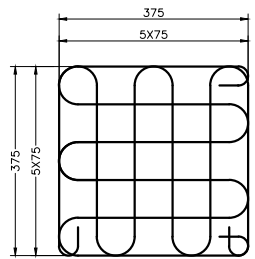
SECTION AT B-B

(SCALE 1:35)



SECTION AT A-A

(SCALE 1:35)



Ø8 MESH REINF. AT BRG. LOCATIONS

SCALE 1:15

REINFORCEMENT DETAILS		
BAR MKD.	BAR DIA & SPACING/NOS	BAR SHAPE
1	16 Ø 10 Nos.	
2	16 Ø 6 Nos. Each Side	
2a	16 Ø 6 Nos. Each Side	
3	16 Ø 14 Nos.	
3a	16 Ø 12 Nos.	
4	DECK REINFORCEMENT	
5	12 Ø 12 Nos. Each side	
5a	12 Ø 12 Nos. Each Side	
6	12 Ø 12 Nos. Each side	
7	2L-12 Ø @150c/c STIRRUP	
7a	2L-12 Ø @200c/c STIRRUP	
8	2L-12 Ø @150c/c STIRRUP	
8a	2L-12 Ø @150c/c STIRRUP	
9	12 Ø @ 150c/c	
9a	12 Ø @ 150c/c	
10	12 Ø @ 150c/c	
10a	12 Ø @ 200c/c	
11	12 Ø @ 150c/c	
11a	12 Ø @ 150c/c	

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
- DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
- GRADE OF CONCRETE SHALL BE AS BELOW:
a) CAST-IN-SITU DECK SLAB.....M45
b) PRECAST PSC GIRDER.....M50
c) CROSS GIRDER.....M45
- CLEAR COVER TO OUTERMOST STEEL SHALL BE AS BELOW:
a. CAST-IN-SITU SUPERSTRUCTURE).....45mm
b. PRECAST PSC GIRDER.....40mm
- REINFORCING STEEL SHALL BE HYSD (TMT) BARS (GRADE DESIGNATION Fe 500DD) CONFORMING TO TABLE 18.1 OF IRC: 112-2020.
- SHOWN JACK LOCATION IN PLAN AND SHOWN JACK LOCATION IN ELEVATION OTHERWISE MENTIONED.
- CURING OF THE GIRDERS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE MORTH SPECIFICATIONS.
- GIRDERS SHALL BE SECURELY SUPPORTED AT ALL TIMES BY BRACING TO PREVENT BEAMS TOPPLING OVER.
- EACH GIRDER SHALL BE INDEPENDENTLY BRACED AGAINST OVERTURNING PRIOR TO RELEASE BY THE CRANE OR LIFTING DEVICE.
- LIFTING LOOPS SHALL BE PLACED WITH THE PLANE OF THE LOOP PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE GIRDER.
- SHIFTING THE PSC GIRDERS TO SITE SHALL BE AS PER 1811 OF MORT & H REV-V, SECTION
- RECESS FOR EXPANSION JOINT SHALL BE LEFT AS PER MANUFACTURER'S SPECIFICATION.
- LAPPING SHALL BE STAGGERED, BARS SHALL BE LAPPED IN SUCH A WAY THAT NOT MORE THAN 50% OF THE BARS ARE LAPPED AT ANY SECTION, LAP LENGTH SHALL BE PROVIDED AS "X*D" MENTIONED IN THE TABLE BELOW, WHERE 'D' IS THE SMALLER BAR UNLESS OTHERWISE SPECIFIED.

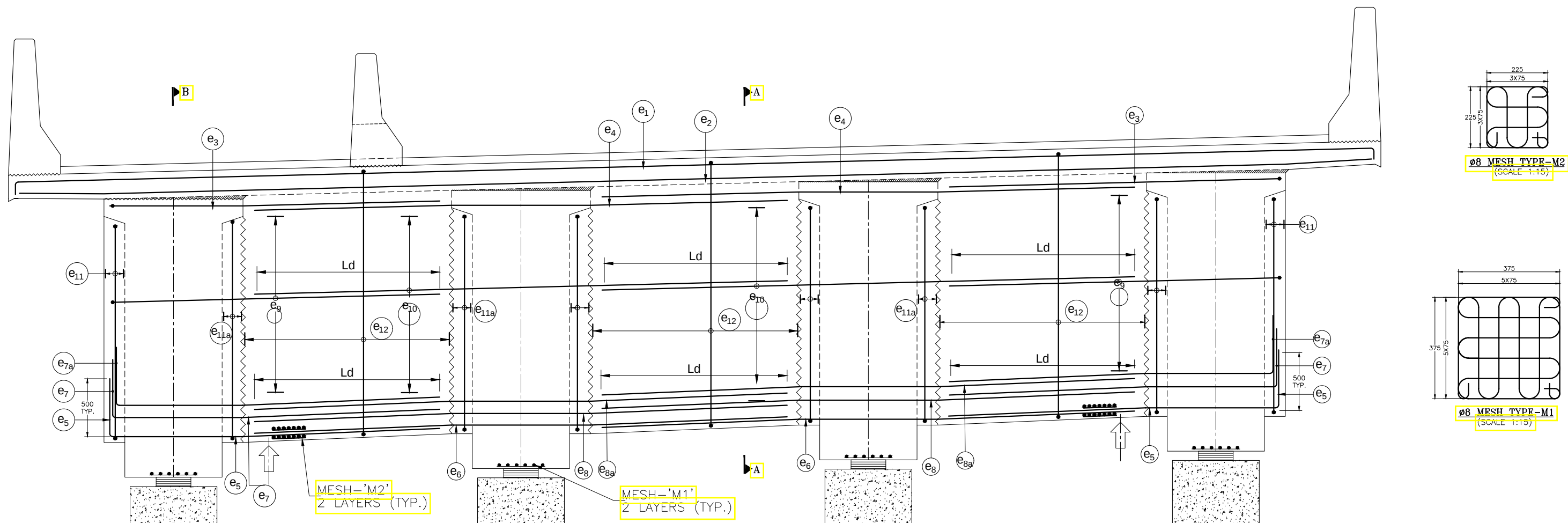
FAVORABLE BOND CONDITION				
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%
M50	X	29	33	41

UNFAVORABLE BOND CONDITION				
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%
M50	X	42	48	59

- FAVORABLE ZONE:
- RAFT/SLAB BOTTOM MAIN BAR.
- UNFAVORABLE ZONE:
- RAFT/SLAB BOTTOM MAIN BAR.
 - WALL/COLUMN MAIN BAR.

36m Superstructure

EMPLOYER	PROJECT	DESIGN CONSULTANT			Designed By	Mr.S.N.R.B Signature	Drawing Name: MAIN GIRDER REINFORCEMENT DETAILS OF BRIDGE OVER RIVER RATU	Scale: AS NOTED	Date: JUNE, 2023
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of		Checked By					
		 EPTISA Servicios De Ingenieria Madrid, Spain	 STUP Consultants Private Limited Kolkatta, India						
		In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited		Approved By	Mr.H.B Signature				



REINFORCEMENT DETAIL OF END CROSS GIRDER
(SCALE 1:35)

NOTES:-

1. ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METER, DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. CONCRETE GRADE FOR CROSS-GIRDER & DECK SLAB M45.
3. SUITABLE HOLES SHALL BE LEFT IN PRECAST GIRDER FOR SUPPORTING THE DECK SLAB SHUTTERING.
4. SUITABLE PROVISION FOR HANDLING & LIFTING HOOKS ETC TO BE PROVIDED.
5. BEAMS SHALL BE KEPT UPRIGHT AT ALL TIMES AND TO BE CLEARLY MARKED INDICATING SPAN LOCATION & RESPECTIVE ENDS BEFORE REMOVAL FROM CASTING BED.
6. TOP SURFACE OF PRECAST BEAM & VERTICAL EDGES OF END TO BE LEFT ROUGHENED FOR EFFECTIVE BONDING.
7. ALL SURFACES, COMING IN CONTACT WITH DECK SLAB/DIAPHRAGM SHALL BE ADEQUATELY PREPARED BY GREEN CUTTING, USING SURFACE RETARDERS OR BY MECHANICAL MEANS(SUCH AS 100% HACKING) TO ENSURE THAT COARSE AGGREGATES ARE JUST EXPOSED.
8. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATE Fe500D) CONFORMING TO IS-1786 STANDARDS.
9. LAPPING SHALL BE STAGGERED, BARS SHALL BE LAPPED IN SUCH A WAY THAT NOT MORE THAN 50% OF THE BARS ARE LAPPED AT ANY SECTION, LAP LENGTH SHALL BE PROVIDED AS "X*U" MENTIONED IN THE TABLE BELOW, WHERE "U" IS THE SMALLER BAR UNLESS OTHERWISE SPECIFIED.

FAVORABLE BOND CONDITION

GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M45	X	33	38	47	50

UNFAVORABLE BOND CONDITION

GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M45	X	45.7	52.6	64	68.6

FAVORABLE ZONE:

a. RAFT/SLAB BOTTOM MAIN BAR.

UNFAVORABLE ZONE:

a. RAFT/SLAB BOTTOM MAIN BAR.

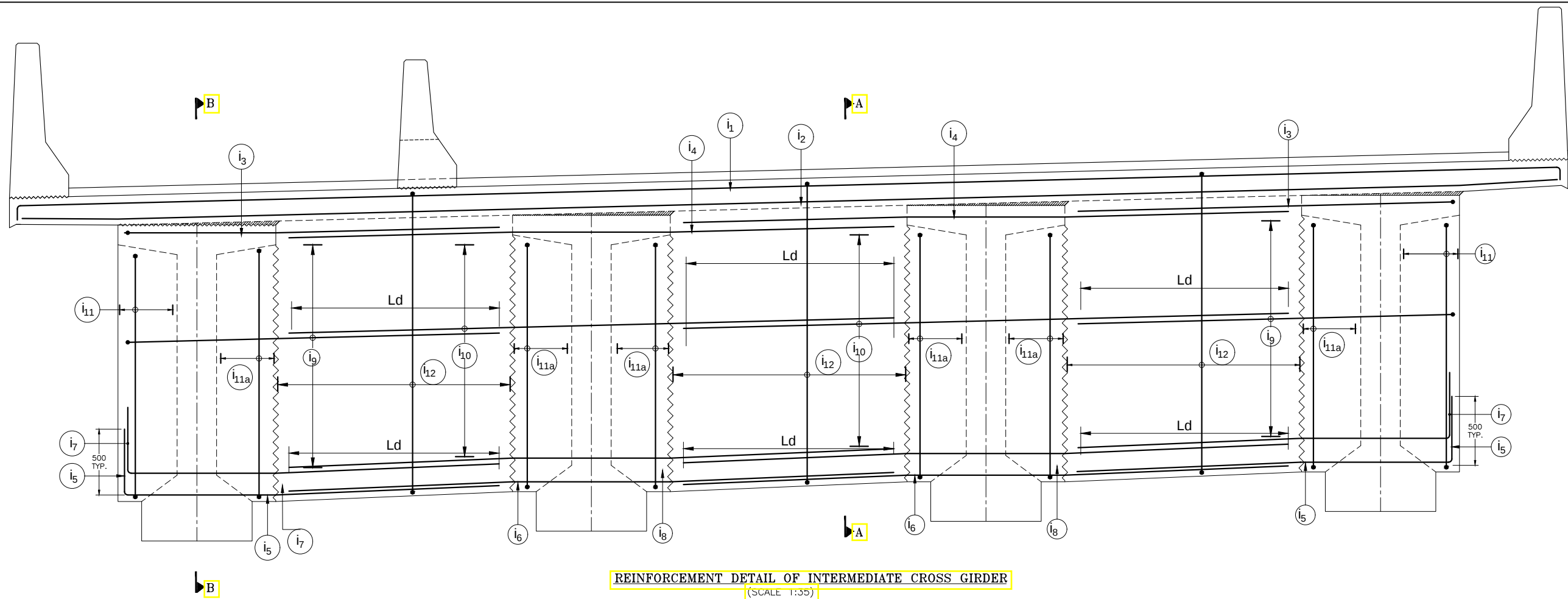
b. WALL/COLUMN MAIN BAR.

SCHEDULE OF REINFORCEMENT
(END CROSS GIRDERS TYP. EACH)

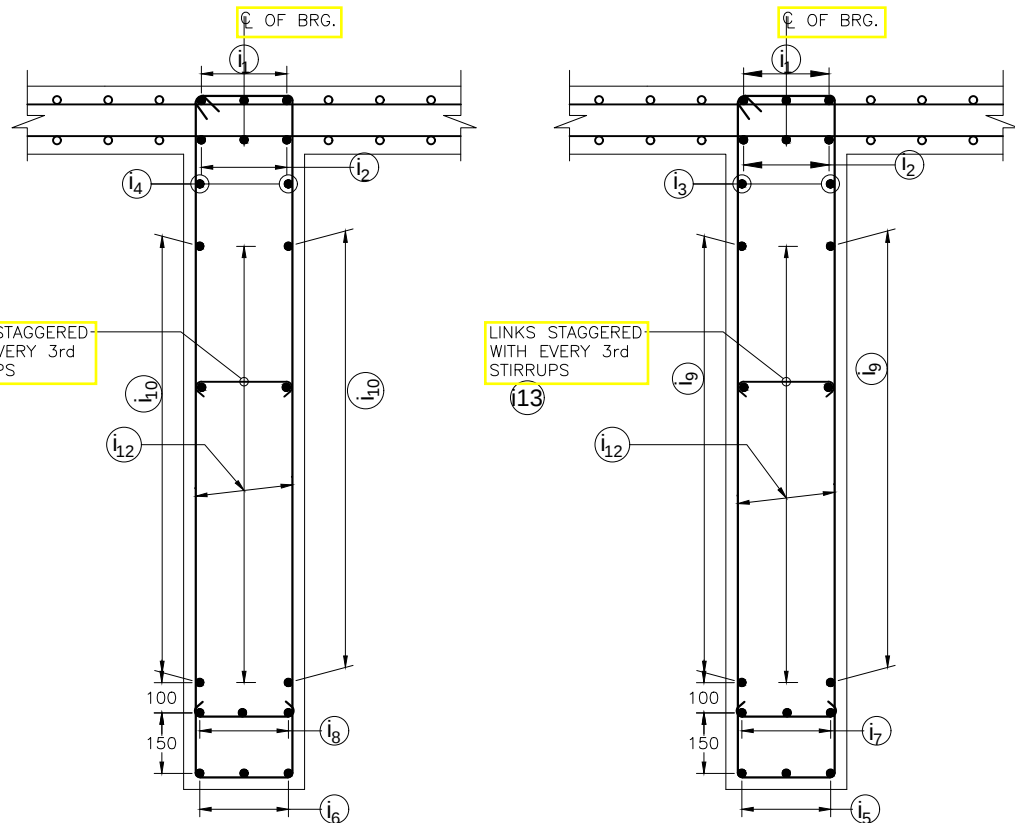
BAR MKD.	DESCRIPTION	SHAPE
e1	20 Ø 4 nos	150
e2	20 Ø 4 nos	150
e3	20 Ø 4x2 Nos	150
e4	20 Ø 4x2 Nos	
e5	20 Ø 4 nos	
e6	20 Ø 4 nos	
e7	20 Ø 4 nos	300
e7a	20 Ø 2 nos	300
e8	20 Ø 4 nos	
e8a	20 Ø 2 nos	
e9	16 Ø 8x2 Nos	150
e10	16 Ø 8x2 Nos	
e11	2L-20 Ø @ 150c/c	
e11a	2L-20 Ø @ 150c/c	
e12	2L-20 Ø @ 150c/c	
e13	12 Ø linked Every 3rd Layer	
MESH-M1	8 Ø @ 75 x 75	
MESH-M2	8 Ø @ 75 x 75	

41m Superstructure

EMPLOYER	PROJECT	DESIGN CONSULTANT	Designed By	Drawing Name:	Scale:	Date:
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of EPTISA Servicios De Ingenieria Madrid, Spain STUP Consultants Private Limited Kolkatta, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Mr.S.N.R.B. Signature Checked By Mr.S.M Signature Approved By Mr.H.B Signature	CROSS GIRDER REINFORCEMENT DETAILS OF BRIDGE OVER RIVER RATU Reference Drawings: KDP/DPR/STR/BR/RATU /DD -18	AS NOTED Chainage: 265+345	JUNE, 2023 Drawing No.: KDP/DPR/STR/BR/RATU /DD -16 Sheet No.: Sheet No. 1/4



REINFORCEMENT DETAIL OF INTERMEDIATE CROSS GIRDER
(SCALE 1:35)



SECTION A-A
(SCALE 1:25)

SECTION B-B
(SCALE 1:25)

SCHEDULE OF REINFORCEMENT
(INTERMEDIATE CROSS GIRDERS TYP. EACH)

BAR MKD.	DESCRIPTION	SHAPE
i1	16 $\varnothing$ 3 nos	150
i2	16 $\varnothing$ 3 nos	150
i3	12 $\varnothing$ 4x2 Nos	150
i4	12 $\varnothing$ 4x2 Nos	
i5	20 $\varnothing$ 3 Nos	
i6	20 $\varnothing$ 3 Nos	
i7	20 $\varnothing$ 3 Nos	300
i8	20 $\varnothing$ 3 Nos	
i9	12 $\varnothing$ 8x2 Nos	150
i10	12 $\varnothing$ 8x2 Nos	
i11	2L-20 $\varnothing$ @ 150c/c	
i11a	2L-20 $\varnothing$ @ 150c/c	
i12	2L-20 $\varnothing$ @ 150c/c	
i13	12 $\varnothing$ linked Every 3rd Layer	

NOTES:-

- ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METER, DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
- CONCRETE GRADE FOR CROSS-GIRDER & DECK SLAB M45.
- SUITABLE HOLES SHALL BE LEFT IN PRECAST GIRDER FOR SUPPORTING THE DECK SLAB SHUTTERING.
- SUITABLE PROVISION FOR HANDLING & LIFTING HOOKS ETC TO BE PROVIDED.
- BEAMS SHALL BE KEPT UPRIGHT AT ALL TIMES AND TO BE CLEARLY MARKED INDICATING SPAN LOCATION & RESPECTIVE ENDS BEFORE REMOVAL FROM CASTING BED.
- TOP SURFACE OF PRECAST BEAM & VERTICAL EDGES OF END TO BE LEFT ROUGHENED FOR EFFECTIVE BONDING.
- ALL SURFACES, COMING IN CONTACT WITH DECK SLAB/DIAPHRAGM SHALL BE ADEQUATELY PREPARED BY GREEN CUTTING, USING SURFACE RETARDERS OR BY MECHANICAL MEANS(SUCH AS 100% HACKING) TO ENSURE THAT COARSE AGGREGATES ARE JUST EXPOSED.
- ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATE Fe500D) CONFORMING TO IS-1786 STANDARDS.
- LAPPING SHALL BE STAGGERED, BARS SHALL BE LAPPED IN SUCH A WAY THAT NOT MORE THAN 50% OF THE BARS ARE LAPPED AT ANY SECTION, LAP LENGTH SHALL BE PROVIDED AS "X*D" MENTIONED IN THE TABLE BELOW, WHERE "D" IS THE SMALLER BAR UNLESS OTHERWISE SPECIFIED:

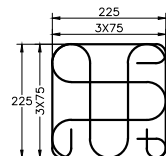
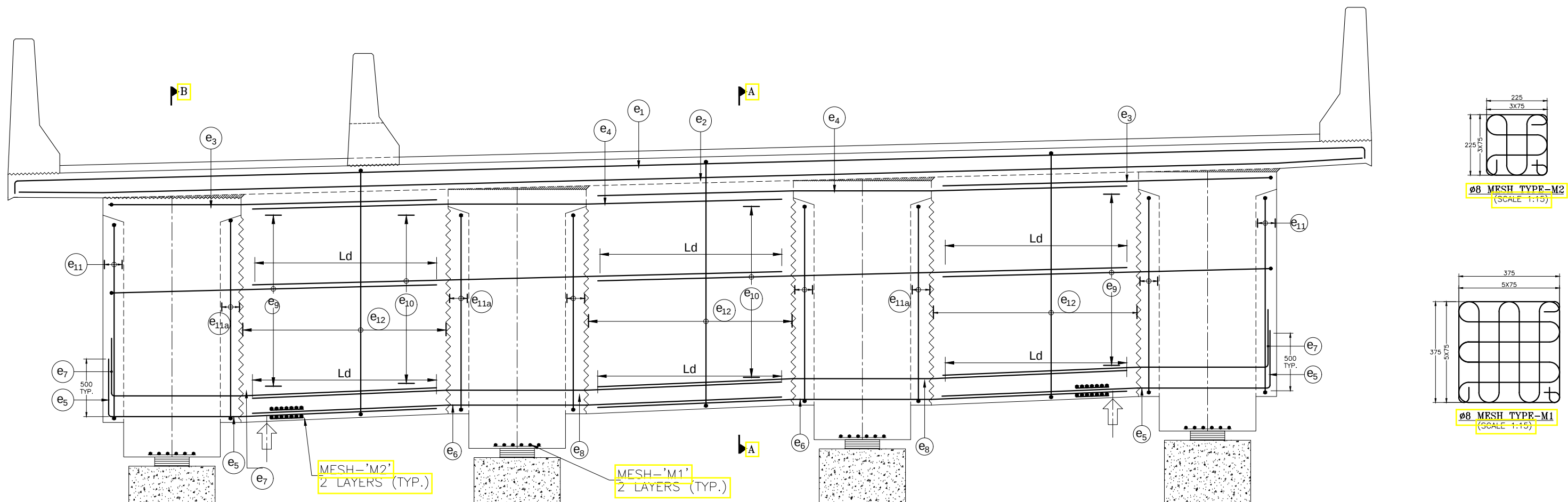
FAVORABLE BOND CONDITION					
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M45	X	33	38	47	50

UNFAVORABLE BOND CONDITION					
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M45	X	45.7	52.6	64	68.6

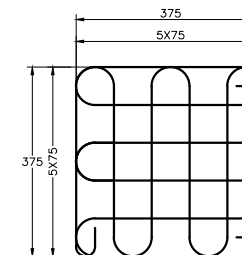
FAVORABLE ZONE:
a. RAFT/SLAB BOTTOM MAIN BAR.
UNFAVORABLE ZONE:
a. RAFT/SLAB BOTTOM MAIN BAR.
b. WALL/COLUMN MAIN BAR.

41m Superstructure

EMPLOYER	PROJECT	DESIGN CONSULTANT	Designed By	Drawing Name:	Scale:	Date:
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of  EPTISA Servicios De Ingeniera Madrid, Spain  STUP Consultants Private Limited Kolkatta, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Mr.S.N.R.B NIC NO. 265 CIVIL A  Signature	CROSS GIRDER REINFORCEMENT DETAILS OF BRIDGE OVER RIVER RATU Reference Drawings: KDP/DPR/STR/BR/RATU /DD -18	AS NOTED Chainage: 265+345	JUNE, 2023 Drawing No.: KDP/DPR/STR/BR/RATU /DD -16 Sheet No.: Sheet No. 2/4
			Checked By Mr.S.M  Signature			
			Approved By Mr.H.B  Signature			



Ø8 MESH TYPE-M2
(SCALE 1:15)



Ø8 MESH TYPE-M1
(SCALE 1:15)

REINFORCEMENT DETAIL OF END CROSS GIRDER
(SCALE 1:35)

NOTES:-

- ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METER, DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
- CONCRETE GRADE FOR CROSS-GIRDER & DECK SLAB M45.
- SUITABLE HOLES SHALL BE LEFT IN PRECAST GIRDER FOR SUPPORTING THE DECK SLAB SHUTTERING.
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- TOP SURFACE OF PRECAST BEAM & VERTICAL EDGES OF END TO BE LEFT ROUGHENED FOR EFFECTIVE BONDING.
- ALL SURFACES, COMING IN CONTACT WITH DECK SLAB/DIAPHRAGM SHALL BE ADEQUATELY PREPARED BY GREEN CUTTING, USING SURFACE RETARDERS OR BY MECHANICAL MEANS(SUCH AS 100% HACKING) TO ENSURE THAT COARSE AGGREGATES ARE JUST EXPOSED.
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FAVORABLE BOND CONDITION

GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M45	X	33	38	47	50

UNFAVORABLE BOND CONDITION

GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M45	X	45.7	52.6	64	68.6

FAVORABLE ZONE:

a. RAFT/SLAB BOTTOM MAIN BAR.

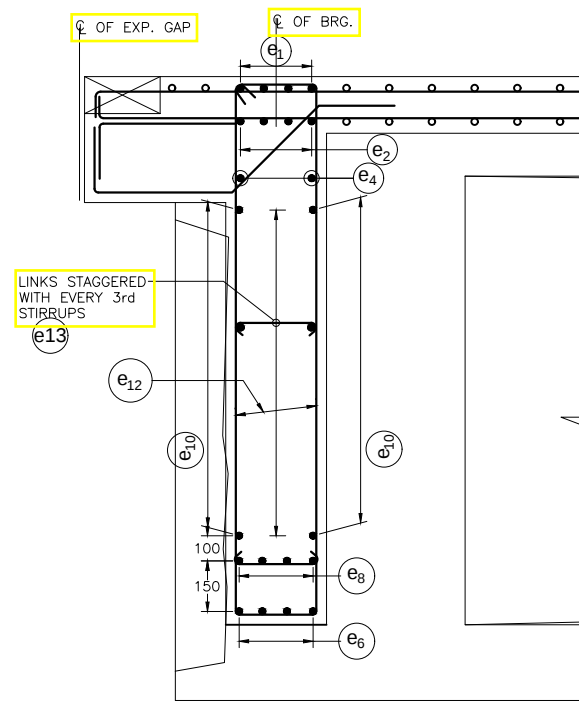
UNFAVORABLE ZONE:

a. RAFT/SLAB BOTTOM MAIN BAR.

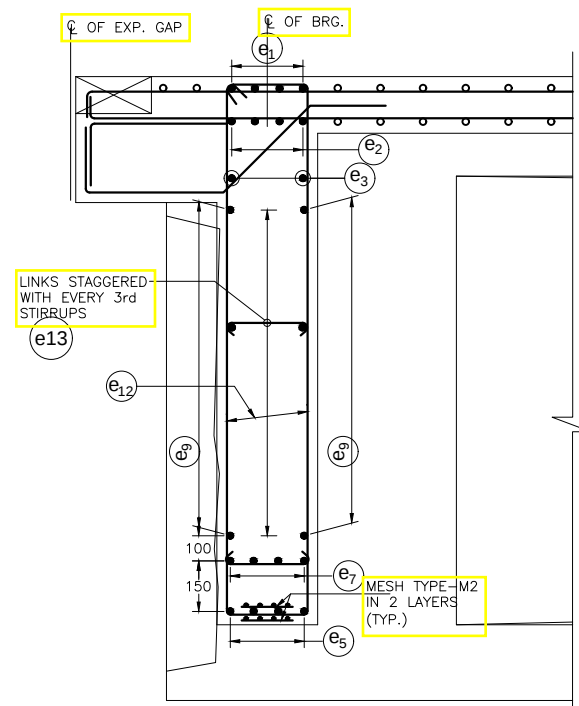
b. WALL/COLUMN MAIN BAR.

SCHEDULE OF REINFORCEMENT
(END CROSS GIRDERS TYP. EACH)

BAR MKD.	DESCRIPTION	SHAPE
e1	20 Ø 4 nos	150
e2	20 Ø 4 nos	150
e3	20 Ø 4x2 Nos	150
e4	20 Ø 4x2 Nos	
e5	20 Ø 4 nos	
e6	20 Ø 4 nos	
e7	20 Ø 4 nos	300
e8	20 Ø 4 nos	
e9	16 Ø 6x2 Nos	150
e10	16 Ø 6x2 Nos	
e11	2L-20 Ø @ 150c/c	
e11a	2L-20 Ø @ 150c/c	
e12	2L-20 Ø @ 150c/c	
e13	12 Ø linked Every 3rd Layer	
MESH-M1	8Ø @ 75 x 75	
MESH-M2	8Ø @ 75 x 75	



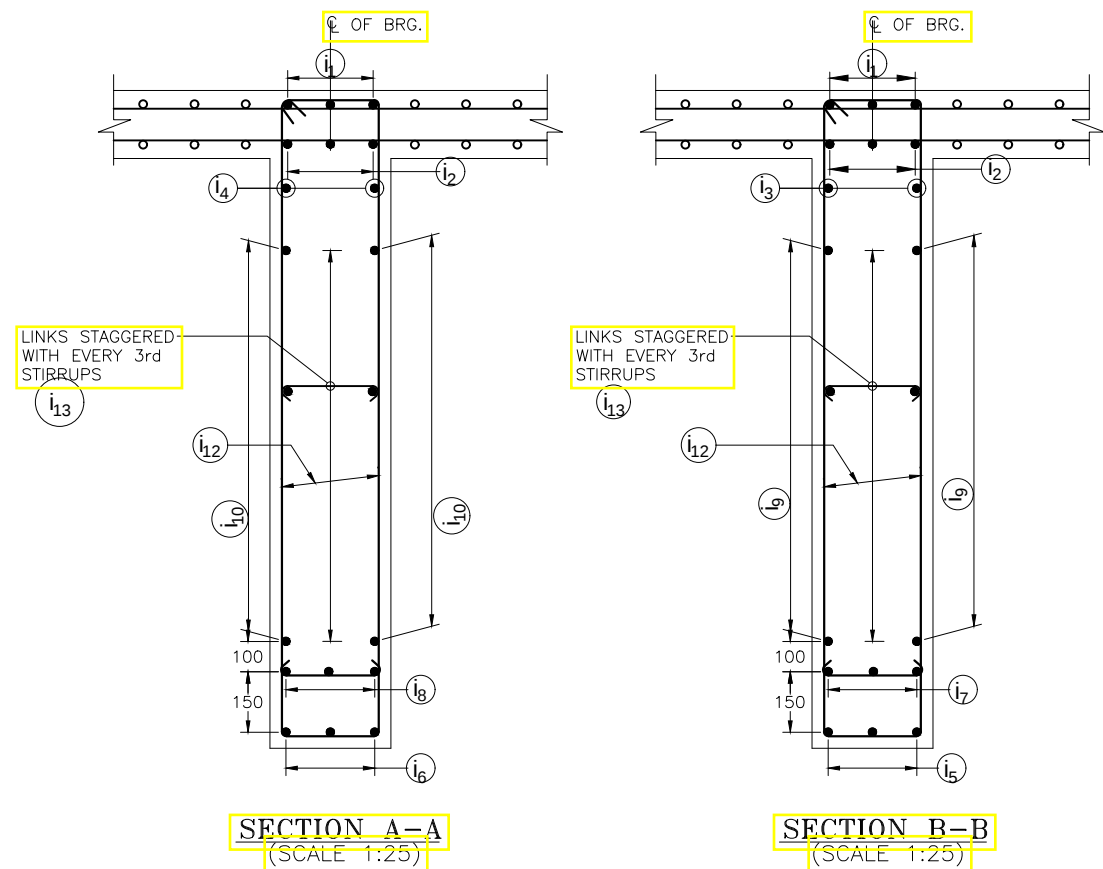
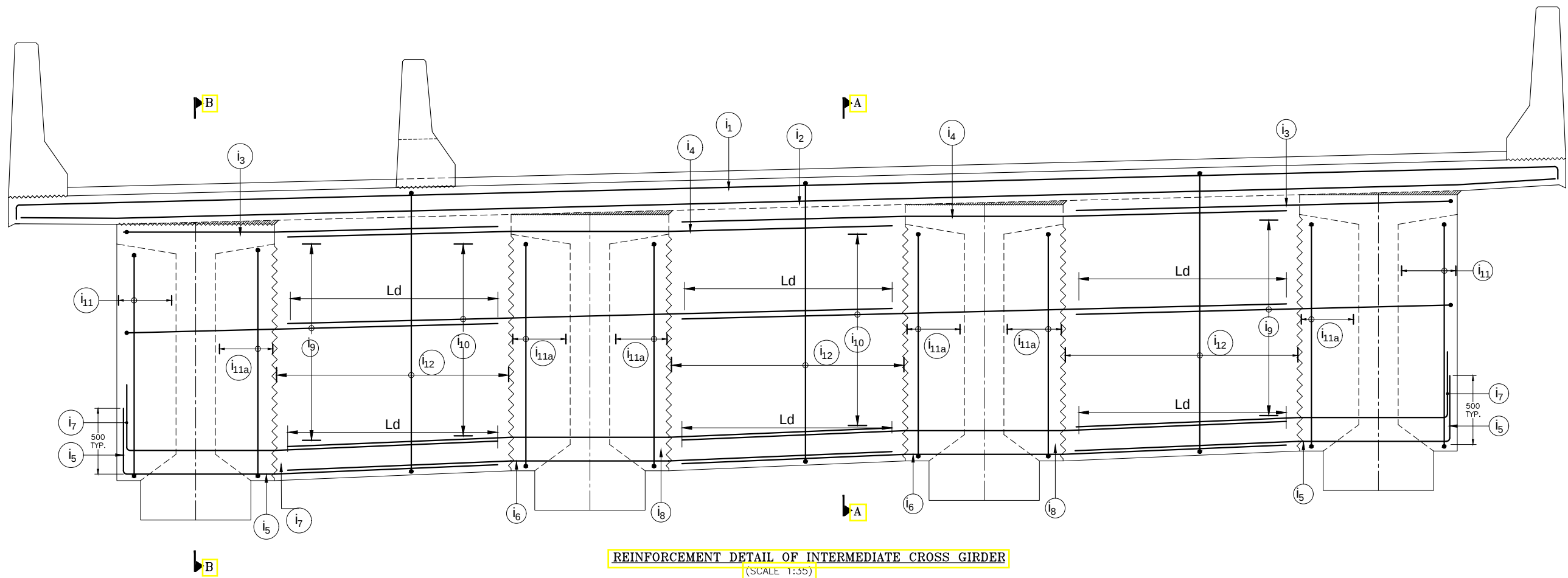
SECTION A-A
(SCALE 1:30)



SECTION B-B
(SCALE 1:30)

36m Superstructure

EMPLOYER	PROJECT	DESIGN CONSULTANT	Designed By	Drawing Name:	Scale:	Date:
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of EPTISA Servicios De Ingenieria Madrid, Spain STUP Consultants Private Limited Kolkatta, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Mr.S.N.R.B Signature Checked By Mr.S.M Signature Approved By Mr.H.B Signature	CROSS GIRDER REINFORCEMENT DETAILS OF BRIDGE OVER RIVER RATU Reference Drawings: KDP/DPR/STR/BR/RATU /DD -18	AS NOTED Chainage: 265+345	JUNE, 2023 Drawing No.: KDP/DPR/STR/BR/RATU /DD -16 Sheet No.: Sheet No. 3/4



SCHEDULE OF REINFORCEMENT
(INTERMEDIATE CROSS GIRDERS TYP. EACH)

BAR MKD.	DESCRIPTION	SHAPE
i ₁	16 $\varnothing$ 3 nos	150
i ₂	16 $\varnothing$ 3 nos	150
i ₃	12 $\varnothing$ 3x2 Nos	150
i ₄	12 $\varnothing$ 3x2 Nos	
i ₅	20 $\varnothing$ 3 Nos	
i ₆	20 $\varnothing$ 3 Nos	
i ₇	20 $\varnothing$ 3 Nos	300
i ₈	20 $\varnothing$ 3 Nos	
i ₉	12 $\varnothing$ 6x2 Nos	150
i ₁₀	12 $\varnothing$ 6x2 Nos	
i ₁₁	2L-20 $\varnothing$ @ 150c/c	
i _{11a}	2L-20 $\varnothing$ @ 150c/c	
i ₁₂	2L-16 $\varnothing$ @ 150c/c	
i ₁₃	12 $\varnothing$ Linked Every 3rd Layer	

NOTES:-

- ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METER, DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
- CONCRETE GRADE FOR CROSS-GIRDER & DECK SLAB M45.
- SUITABLE HOLES SHALL BE LEFT IN PRECAST GIRDER FOR SUPPORTING THE DECK SLAB SHUTTERING.
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- BEAMS SHALL BE KEPT UPRIGHT AT ALL TIMES AND TO BE CLEARLY MARKED INDICATING SPAN LOCATION & RESPECTIVE ENDS BEFORE REMOVAL FROM CASTING BED.
- TOP SURFACE OF PRECAST BEAM & VERTICAL EDGES OF END TO BE LEFT ROUGHENED FOR EFFECTIVE BONDING.
- ALL SURFACES, COMING IN CONTACT WITH DECK SLAB/DIAPHRAGM SHALL BE ADEQUATELY PREPARED BY GREEN CUTTING, USING SURFACE RETARDERS OR BY MECHANICAL MEANS(SUCH AS 100% HACKING) TO ENSURE THAT COARSE AGGREGATES ARE JUST EXPOSED.
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- LAPPING SHALL BE STAGGERED, BARS SHALL BE LAPPED IN SUCH A WAY THAT NOT MORE THAN 50% OF THE BARS ARE LAPPED AT ANY SECTION, LAP LENGTH SHALL BE PROVIDED AS "X*D" MENTIONED IN THE TABLE BELOW, WHERE "D" IS THE SMALLER BAR UNLESS OTHERWISE SPECIFIED:

FAVORABLE BOND CONDITION					
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M45	X	33	38	47	50

UNFAVORABLE BOND CONDITION					
GRADE OF CONCRETE	PERCENTAGE OF LAPPED BARS	<25%	33%	50%	>50%
M45	X	45.7	52.6	64	68.6

FAVORABLE ZONE:

a. RAFT/SLAB BOTTOM MAIN BAR.

UNFAVORABLE ZONE:

a. RAFT/SLAB BOTTOM MAIN BAR.

b. WALL/COLUMN MAIN BAR.

36m Superstructure

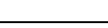
EMPLOYER	PROJECT	DESIGN CONSULTANT	Designed By	Drawing Name:	Scale:	Date:
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of  EPTISA Servicios De Ingenieria Madrid, Spain  STUP Consultants Private Limited Kolkatta, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Mr.S.N.R.B NEC No. 265 CIVIL "A" Signature	CROSS GIRDER REINFORCEMENT DETAILS OF BRIDGE OVER RIVER RATU	AS NOTED	JUNE, 2023
			Checked By Mr.S.M Signature	Reference Drawings: KDP/DPR/STR/BR/RATU /DD -18	Chainage: 265+345	Drawing No.: KDP/DPR/STR/BR/RATU /DD -16
			Approved By Mr.H.B Signature			Sheet No.: Sheet No. 4/4

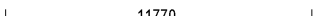
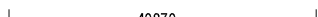


SCALE - 1 : 100



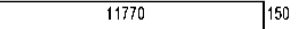
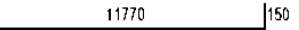
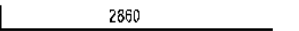
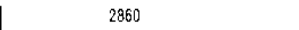
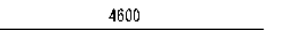
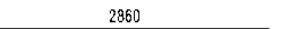
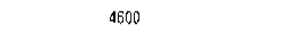
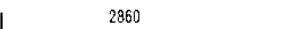
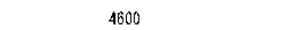
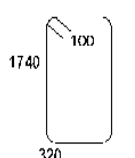
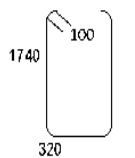
SCALE - 1 : 50

EMPLOYER	PROJECT	DESIGN CONSULTANT			Designed By	Mr.S.N.R.B NEC NO. 268 CIVIL-A	 Signature	Drawing Name:	Scale:	Date: JUNE, 2023
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of								
		 EPTISA Servicios De Ingenieria Madrid, Spain	 STUP Consultants Private Limited Kolkatta, India	In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Approved By	Mr.H.B	 Signature			
		KDP/DPR/STR/BR/RATU /DD -18	265+345					Sheet No.: Sheet No. 1/2		

Bar bending schedule for Deck Slab													
S.N	Bar Label	Bar Shape				Bar Dia (mm)	Bar spacing (mm)	No. of bars	Length (m)	Total Length (m)	Unit Weight (kg/m)	Weight (kg)	
1	DS01	150				150	16	150	275	12.07	3319.25	1.578	5238.89
2	DS02	150				150	12	150	79	41.17	3252.43	0.89	2887.55
3	DS03	150				150	16	150	275	12.07	3319.25	1.578	5238.89
4	DS04	150				150	12	150	79	41.17	3252.43	0.888	2887.55
5	DS05	150				150	16		12	41.17	494.04	1.578	779.76
6	DS06					10	300	274	1.26	345.24	0.617	212.85	
Total Weight of Deck Slab (kg)												17245.51	

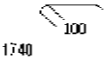
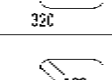
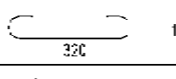
Bar bending schedule for Longitudinal Girder												
S.N	Bar Label	Bar Shape			Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length(m)	Unit Weight (kg/m)	Weight (kg)	
1	1	100			100	16		10	40.42	404.2	1.578	637.96
2	2	100			100	16		12	36.20	434.4	1.578	685.63
3	2a	100			100	16		24	3.10	74.4	1.578	117.43
4	3	100			100	16		14	40.40	565.6	1.578	892.71
5	3a				16		12	40.20	482.4	1.578	761.39	
6	5				12		24	28.90	693.6	0.888	615.79	
7	5a				12		48	6.15	295.2	0.888	262.08	
8	6	100			12		48	6.25	300	0.888	266.34	
9	7a				12	180	161	5.73	922.53	0.888	819.04	
10	7				12	150	78	5.73	446.94	0.888	396.80	
11	8a				12	150	46	Average 6.27	288.42	0.888	256.06	
12	8				12	150	34	6.81	231.54	0.888	205.56	

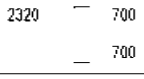
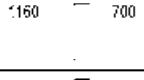
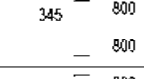
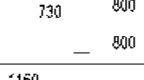
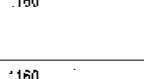
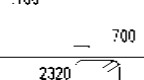
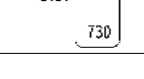
Bar bending schedule for Longitudinal Girder										
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length(m)	Unit Weight (kg/m)	Weight (kg)	
13	9&9a		12	150	269	2.68	720.97	0.89	640.08	
14	10		12	150	78	3.33	259.75	0.89	230.61	
15	10a		12	180	162	3.33	539.49	0.89	478.97	
16	11&11a		12	150	237	2.14	507.18	0.89	450.28	
Total Weight for One Longitudinal Beam (kg)									7716.7	
Total Weight for Four webs (kg) = 7716.7 X 4=									30867.0	

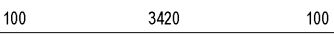
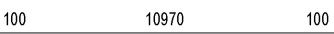
Bar bending schedule for Cross Girder at support											
S.N	Bar Label	Bar Shape			Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length(m)	Unit Weight (kg/m)	Weight (kg)
1	e1	150		150	20		4	12.07	48.28	2.466	119.07
2	e2	150		150	20		4	12.07	48.28	2.466	119.07
3	e3	150			20		16	3.01	48.16	2.466	118.77
4	e4				20		16	4.6	73.6	2.466	181.51
5	e5	500			20		8	3.36	26.88	2.466	66.29
6	e6				20		8	4.6	36.8	2.466	90.75
7	e7	500			20		8	3.36	26.88	2.466	66.29
8	e7a	500			20		4	3.36	13.44	2.466	33.15
9	e8				20		8	4.6	36.8	2.466	90.75
10	e8a				20		4	4.6	18.4	2.466	45.38
11	e9	150			16		32	3.01	96.32	1.578	152.03
12	e10				16		32	4.6	147.2	1.578	232.33
13	e11				20	150	4	4.32	17.28	2.466	42.62
14	e11a				20	150	12	4.32	51.84	2.466	127.85

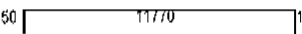
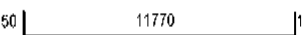
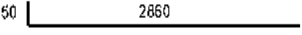
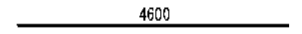
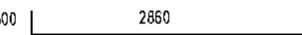
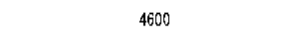
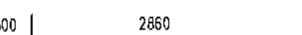
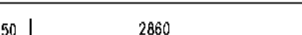
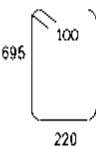
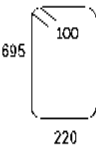
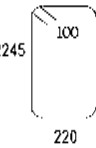
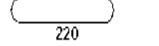
41m Superstructure

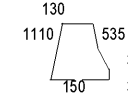
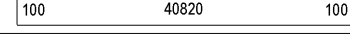
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 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of		Mr.S.N.R.B		Signature		SUPERSTRUCTURE BAR BENDING SCHEDULE OF BRIDGE OVER RIVER RATU	AS NOTED		Drawing No.:		
		ep4sa EPTISA Servicios De Ingeniera Madrid, Spain		STUP Consultants Private Limited Kolkatta, India		Mr.S.M					Signature		KDP/DPR/STR/BR/RATU/DD -18
		In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited		Mr.H.B		Signature		Reference Drawings:		Chainage:		Sheet No.:	
										265+345		Sheet No. 1/4	

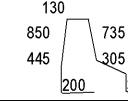
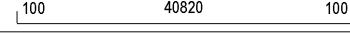
Bar bending schedule for Cross Girder at support									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length(m)	Unit Weight (kg/m)	Weight (kg)
14	e11a		20	150	12	4.32	51.84	2.466	127.85
15	e12		20	150	36	5.33	207.87	2.466	512.64
16	e13		12	300	2	0.52	10.52	0.888	9.69
17	Mesh-M1		8		4	2.17	8.7	0.4	3.5
18	Mesh-M2		8		4	5.24	21.0	0.4	8.5
Total Weight for 1 Cross Girder (kg)									2054.98
Total Weight for 2 Cross Girder (kg)									4109.96

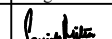
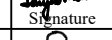
Bar bending schedule for Webs						
S.N	Bar Label	Bar Dia (mm)	No. of bars	Length(m)	Total Length(m)	Unit Weight (kg/m)
1	M1 MESHTYPE M1	16	20	15.556	311.12	1.58
2	M2 MESHTYPE M2	16	20	9.452	189.04	1.58
3	SPIRAL SPIRAL REINFORCEMENT (10 TURNS EACH)	20	8	5.6	44.8	2.47
4	1		16	4	3.72	14.88
5	1a		16	4	1.86	7.44
6	2		20	8	19.45	15.56
7	2a		20	6	2.33	13.98
8	3		12	4	1.16	4.64
9	4		12	8	1.86	14.88
10	5		20	12	6.3	75.6
Sub-Total						1211.75
Total Weight for Four webs (kg) = 1211.7 X 4=						4847.02

Bar bending schedule for Approach Slab									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total length	Unit Weight (kg/m)	Weight (kg)
1	1601		16	150	148	3.62	535.76	1.578	845.61
2	1201		12	150	48	11.17	536.16	0.888	476.01
Total Weight for one approach Slab (Kg)									1,321.62
Total Weight for one Sapn of bridge (Kg)									2,643.24

Bar bending schedule for Cross Girder at Mid									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length(m)	Unit Weight (kg/m)	Weight (kg)
1	i1		16		3	12.07	36.21	1.578	57.15
2	i2		16		3	12.07	36.21	1.578	57.15
3	i3		12		16	3.01	48.16	0.888	42.76
4	i4		12		16	4.6	73.6	0.888	65.34
5	i5		20		6	3.36	20.16	2.466	49.72
6	i6		20		6	4.6	27.6	2.466	68.07
7	i7		20		6	3.36	20.16	2.466	49.72
8	i8		20		6	4.6	27.6	2.466	68.07
9	i9		12		32	3.01	96.32	0.888	85.51
10	i10		12		32	4.6	147.2	0.888	130.69
11	i11		20	150	4	4.03	16.12	2.466	39.75
12	i11a		20	150	12	4.03	48.36	2.466	119.26
13	i12		20	150	39	5.13	200.07	2.466	493.40
14	i13		12	300	21.00	0.42	8.82	0.888	7.83
Total Weight for 1 Cross Girder (kg)									1334.42

BAR BENDING SCHEDULE OF R.C.C SEPARATOR									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total length	Unit Weight (kg/m)	Weight (kg)
1	RS1		16	150	273	2.695	735.735	1.58	1161.24
2	RS2		10	150	17	41.02	697.34	0.62	429.94
Total Weight (Kg)									1,591.17

BAR BENDING SCHEDULE OF R.C.C BARRIER									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total length	Unit Weight (kg/m)	Weight (kg)
1	RC-A1		16	150	273	3.17	865.41	1.58	1365.91
2	RC-A2		10	150	20	41.02	820.4	0.62	505.81
Total Weight (Kg)									1,871.72

EMPLOYER		PROJECT		DESIGN CONSULTANT			Designed By		Drawing Name:		Scale:		Date:	
	Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP)	Joint Venture of			Mr.S.N.R.B.		SUPERSTRUCTURE BAR BENDING SCHEDULE OF BRIDGE OVER RIVER RATU		AS NOTED		JUNE, 2023		
			EPTISA Servicios De Ingeniera Madrid, Spain			Signature						Drawing No.:		
			Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges			STUP Consultants Private Limited Kolkatta, India			Checked By	Mr.S.M		Reference Drawings:	Chainage:	KDP/DPR/STR/BR/RATU/DD -18
			In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited			Approved By	Mr.H.B		265+345	Sheet No. 2/4				

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Bar bending schedule for Deck Slab									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing (mm)	No. of bars	Length (m)	Total Length(m)	Unit Weight (kg/m)	Weight (kg)
1	DS01	150 11770 150	16	150	242	12.07	2920.94	1.578	4610.23
2	DS02	150 35870 150	12	150	79	36.17	2857.43	0.89	2536.87
3	DS03	150 11770 150	16	150	242	12.07	2920.94	1.578	4610.23
4	DS04	150 35870 150	12	150	79	36.17	2857.43	0.888	2536.87
5	DS05	150 35870 150	16		12	36.17	434.04	1.578	685.06
6	DS06	145 410 75	10	300	242	1.26	304.92	0.617	187.99
Total Weight of Deck Slab (kg)									15167.24

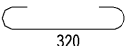
Bar bending schedule for Longitudinal Girder									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length(m)	Unit Weight (kg/m)	Weight (kg)
1	1	100 35220 100	16		10	35.42	354.2	1.578	559.05
2	2	100 31000 100	16		12	31.20	374.4	1.578	590.93
3	2a	100 2900 100	16		24	3.10	74.4	1.578	117.43
4	3	100 35200 100	16		14	35.40	495.6	1.578	782.22
5	3a	35200	16		12	35.20	422.4	1.578	666.69
6	5	23900	12		24	23.90	573.6	0.888	509.25
7	5a	6150	12		48	6.15	295.2	0.888	262.08
8	6	100 6150	12		48	6.25	300	0.888	266.34
9	7a	2395 100 220	12	200	120	5.43	651.6	0.888	578.50
10	7	2395 100 220	12	150	78	5.43	423.54	0.888	376.02
11	8a	2395 100 760 2395 100 220	12	150	46	Average 5.67	274.62	0.888	243.81
12	8	2385 100 760	12	150	34	6.51	221.34	0.888	196.51

Bar bending schedule for Longitudinal Girder									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length(m)	Unit Weight (kg/m)	Weight (kg)
13	9&9a	110 1120 570 100	12	150	236	2.68	632.5214003	0.89	561.56
14	10	335 1120 570 200	12	150	78	3.33	259.7536832	0.89	230.61
15	10a	335 1120 570 200	12	200	121	3.33	402.9512264	0.89	357.75
16	11&11a	150 310 230 760	12	150	204	2.14	436.56	0.89	387.58
Total Weight for One Longitudinal Beam (kg)									6686.3
Total Weight for Four webs (kg) = 6686.3 X 4=									26745.4

Bar bending schedule for Cross Girder at support									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length(m)	Unit Weight (kg/m)	Weight (kg)
1	e1	150 11770 150	20		4	12.07	48.28	2.466	119.07
2	e2	150 11770 150	20		4	12.07	48.28	2.466	119.07
3	e3	150 2860	20		16	3.01	48.16	2.466	118.77
4	e4	4600	20		16	4.6	73.6	2.466	181.51
5	e5	500 2860	20		8	3.36	26.88	2.466	66.29
6	e6	4600	20		8	4.6	36.8	2.466	90.75
7	e7	500 2860	20		8	3.36	26.88	2.466	66.29
8	e8	4600	20		8	4.6	36.8	2.466	90.75
9	e9	150 2860	16		24	3.01	72.24	1.578	114.02
10	e10	4600	16		24	4.6	110.4	1.578	174.25
11	e11	1590 100 320	20	150	4	4.02	16.08	2.466	39.66
12	e11a	1590 100 320	20	150	12	4.02	48.24	2.466	118.97
13	e12	2095 100 320	20	150	39	5.03	196.17	2.466	483.78

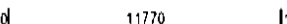
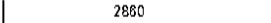
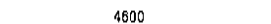
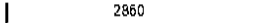
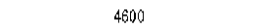
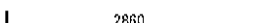
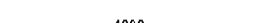
36m Superstructure

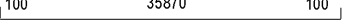
EMPLOYER		PROJECT		DESIGN CONSULTANT		Designed By		Drawing Name:		Scale:		Date:	
	Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges		Joint Venture of		Mr.S.N.R.B		SUPERSTRUCTURE BAR BENDING SCHEDULE OF BRIDGE OVER RIVER RATU		AS NOTED		JUNE, 2023	
				ep4sa EPTISA Servicios De Ingeniera Madrid, Spain		Checked By	Mr.S.M					Drawing No.: KDP/DPR/STR/BR/RATU/DD -18	
				In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited		Approved By	Mr.H.B	Reference Drawings:		Chainage: 265+345		Sheet No.: Sheet No. 3/4	

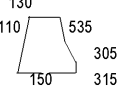
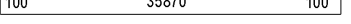
Bar bending schedule for Cross Girder at support										
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length(m)	Unit Weight (kg/m)	Weight (kg)	
14	e13	100  100 320	12	300	18	0.52	9.36	0.888	8.31	
15	Mesh-M1		8		4	2.17	8.7	0.4	13.7	
16	Mesh-M2		8		4	5.24	21.0	0.4	33.1	
Total Weight for 1 Cross Girder (kg)									1838.29	
Total Weight for 2 Cross Girder (kg)									3676.59	

Bar bending schedule for Webs								
S.N	Bar Label	Bar Dia (mm)	No. of bars	Length(m)	Total Length(m)	Unit Weight (kg/m)	Weight (kg)	
1	M1 MESH TYPE M1	16	20	14.632	292.64	1.58	461.88	
2	M2 MESH TYPE M2	16	20	9.452	189.04	1.58	298.37	
3	SPIRAL SPIRAL REINFORCEMENT (10 TURNS EACH)	20	8	5.6	44.8	2.47	110.48	
4	1 2170 	16	4	3.57	14.28	1.58	22.54	
5	1a 1085 	16	4	1.785	7.14	1.58	11.27	
6	2 345 	20	8	1.945	15.56	2.47	38.37	
7	2a 730 	20	6	2.33	13.98	2.47	34.48	
8	3 1085 	12	4	1.085	4.34	0.89	3.85	
9	4 1085 	12	8	1.785	14.28	0.89	12.68	
10	5 2170 	20	12	6	72	2.47	177.56	
Sub-Total							1171.49	
Total Weight for Four webs (kg) = 1171.4 X 4=							4685.95	

Bar bending schedule for Approach Slab									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total length	Unit Weight (kg/m)	Weight (kg)
1	1601	100 3420 100	16	150	148	3.62	535.76	1.578	845.61
2	1201	100 10970 100	12	150	48	11.17	536.16	0.888	476.01
Total Weight for one approach Slab (Kg)									1,321.62
Total Weight for one Sapn of bridge (Kg)									2,643.24

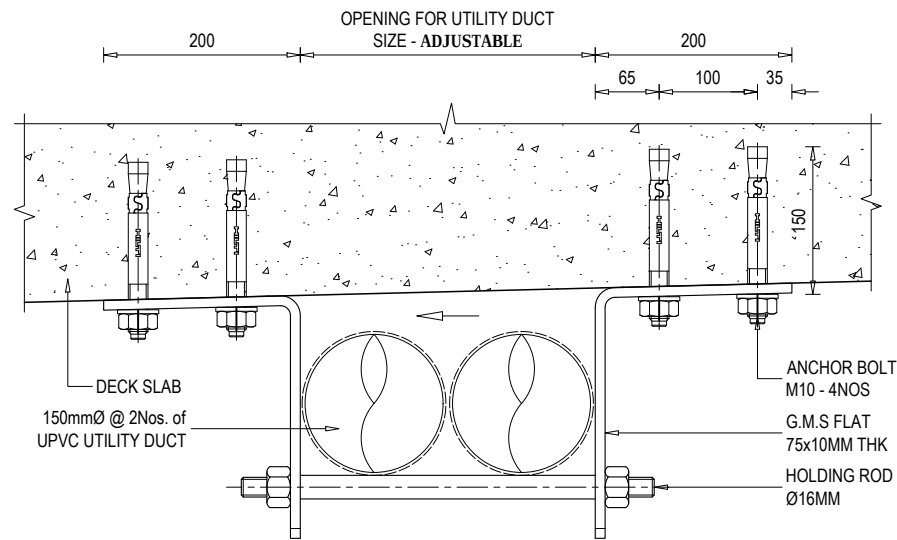
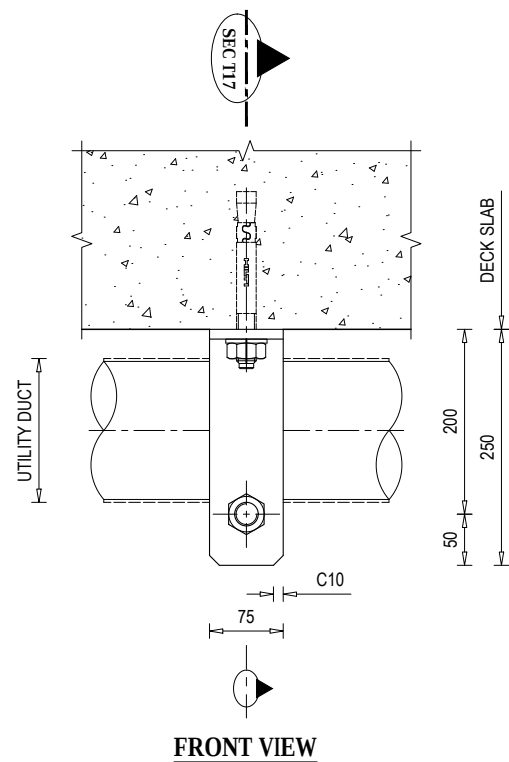
Bar bending schedule for Cross Girder at Mid										
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total Length (m)	Unit Weight (kg/m)	Weight (kg)	
1	i1	150  150 11770	16		3	12.07	36.21	1.578	57.15	
2	i2	150  150 11770	16		3	12.07	36.21	1.578	57.15	
3	i3	150  150	12		12	3.01	36.12	0.888	32.07	
4	i4	 4600	12		12	4.6	55.2	0.888	49.01	
5	i5	500  2860	20		6	3.36	20.16	2.466	49.72	
6	i6	 4600	20		6	4.6	27.6	2.466	68.07	
7	i7	500  2860	20		6	3.36	20.16	2.466	49.72	
8	i8	 4600	20		6	4.6	27.6	2.466	68.07	
9	i9	150  2860	12		24	3.01	72.24	0.888	64.14	
10	i10	 4600	12		24	4.6	110.4	0.888	98.01	
11	i11	1545 	20	150	4	3.73	14.92	2.466	36.79	
12	i11a	1545 	20	150	12	3.73	44.76	2.466	110.38	
13	i12	2095 	16	150	39	4.83	188.37	1.578	297.31	
14	i13	100  100 220	8	300	18.00	0.42	7.56	0.395	2.98	
Total Weight for 1 Cross Girder (kg)									1040.57	

BAR BENDING SCHEDULE OF R.C.C BARRIER									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total length	Unit Weight (kg/m)	Weight (kg)
1	RC-A1	130  735 850 445 200 305 305	16	150	240	3.17	760.8	1.58	1200.80
2	RC-A2	100  100 35870	10	150	20	36.07	721.4	0.62	444.77
Total Weight (Kg)									1,645.57

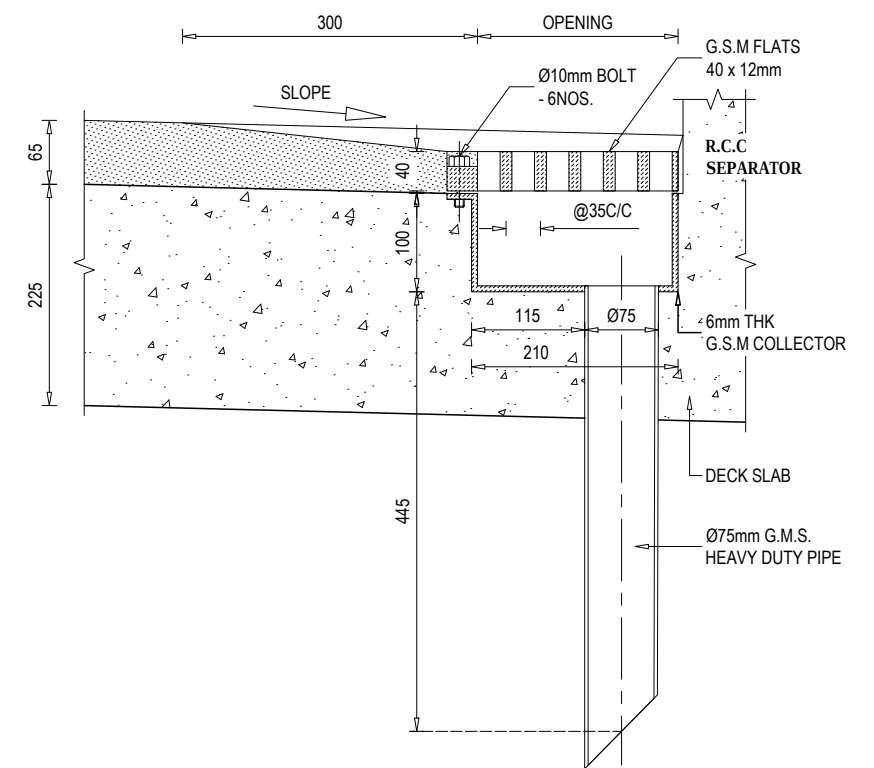
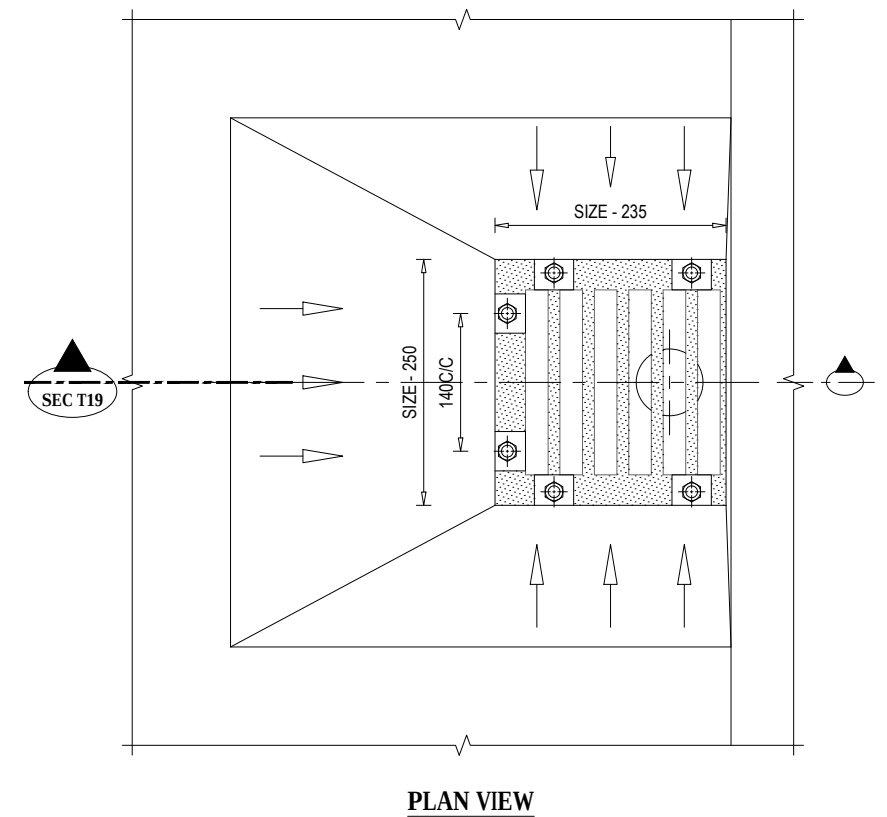
BAR BENDING SCHEDULE OF R.C.C SEPARATOR									
S.N	Bar Label	Bar Shape	Bar Dia (mm)	Bar spacing	No. of bars	Length	Total length	Unit Weight (kg/m)	Weight (kg)
1	RS1	130  535 1110 150 305 315	16	150	240	2.695	646.8	1.58	1020.87
2	RS2	100  100 35870	10	150	17	36.07	613.19	0.62	378.05
Total Weight (Kg)									1,398.92

36m Superstructure

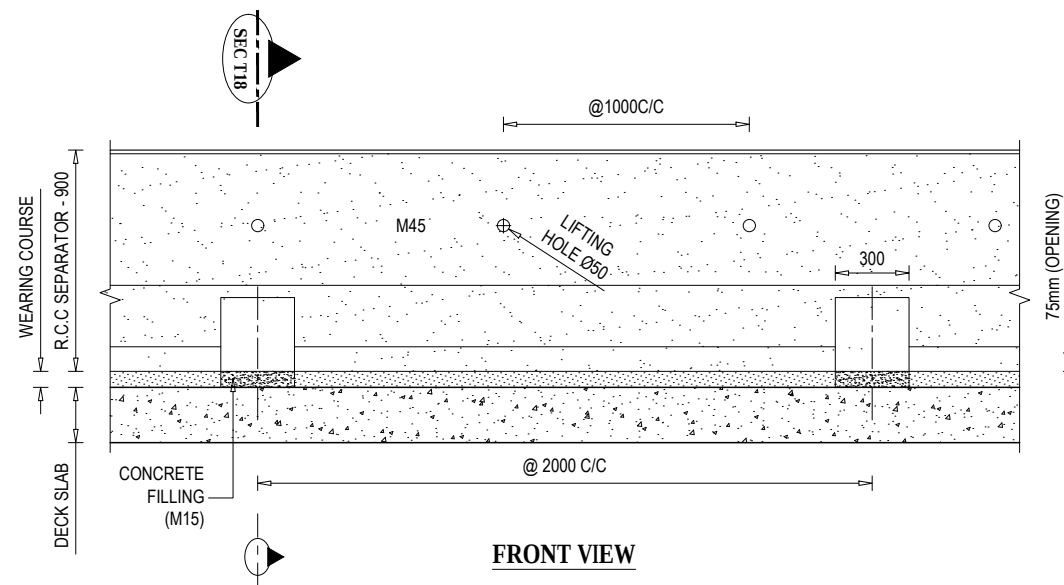
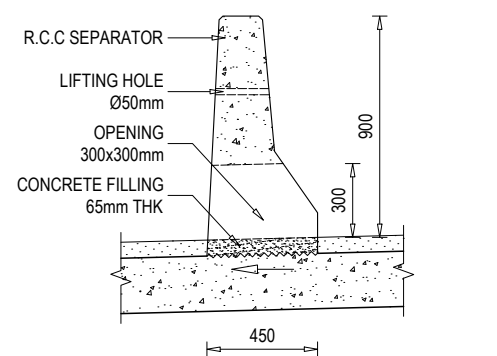
EMPLOYER		PROJECT		DESIGN CONSULTANT		Designed By		Drawing Name:		Scale:		Date:	
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division		Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges		Joint Venture of		Mr.S.N.R.B		SUPERSTRUCTURE BAR BENDING SCHEDULE OF BRIDGE OVER RIVER RATU		AS NOTED		JUNE, 2023	
				 EPTISA Servicios De Ingeniera Madrid, Spain  STUP Consultants Private Limited Kolkatta, India		Mr.S.M						Drawing No.: KDP/DPR/STR/BR/RATU/DD -18	
				In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited		Mr.H.B		Reference Drawings:		Chainage: 265+345		Sheet No.: Sheet No. 4/4	



DETAILS OF GALVANIZED MILD STEEL (G.M.S)
UTILITY DUCT CLAMP
 SCALE - 1 : 10

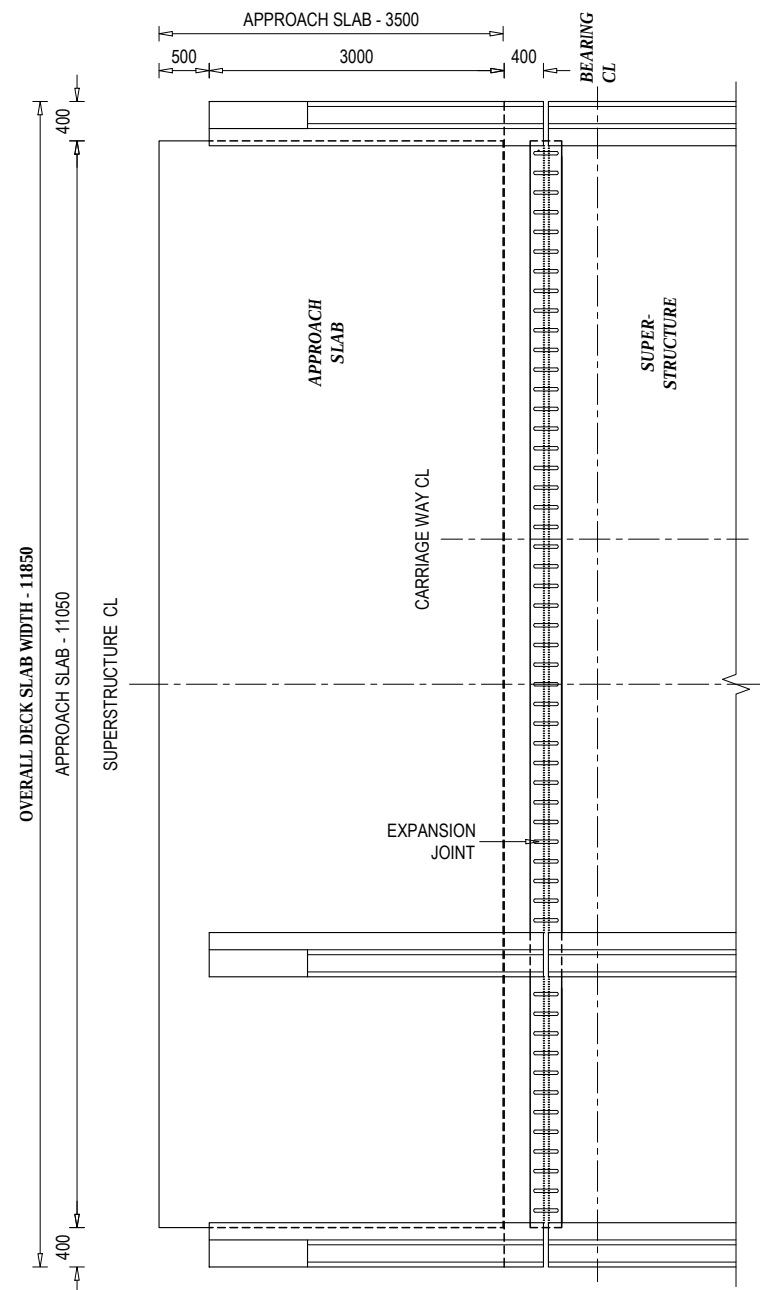


DETAILS OF GALVANIZED MILD STEEL (G.M.S)
DRAINAGE SPOUT
 SCALE - 1 : 10

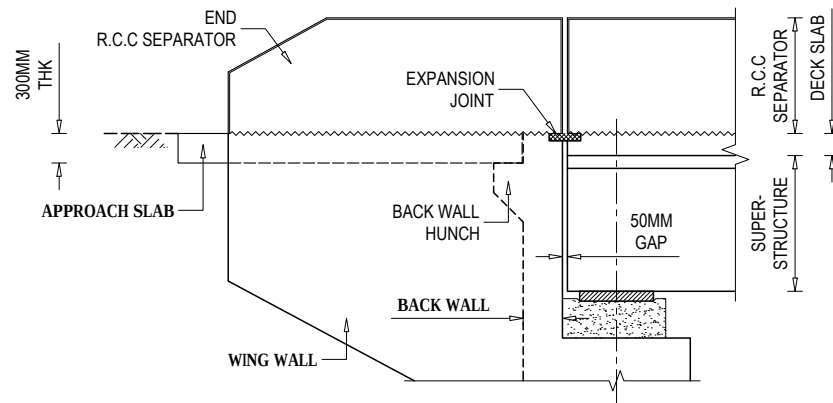


DETAIL ELEVATION VIEW AT R.C.C SEPARATOR
& IT'S DRAIN OPENING
 SCALE - 1 : 40

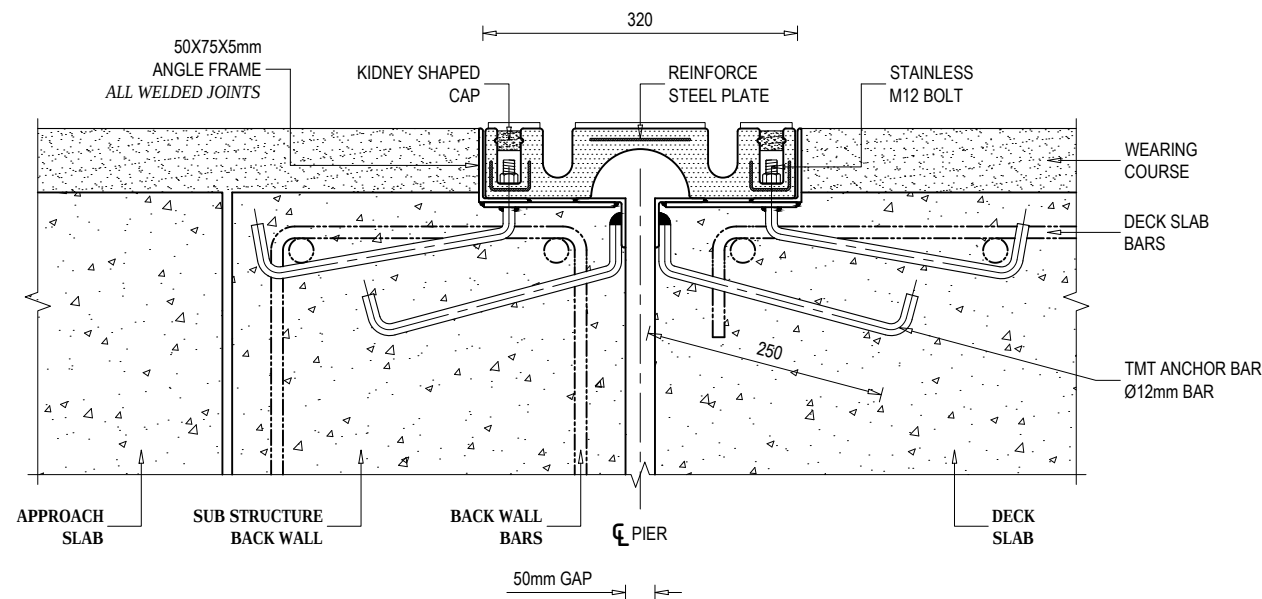
EMPLOYER	PROJECT NAME	DESIGN CONSULTANTS	Designed By	Mr. S.N.R.B.	Drawing Name	Scale:	Date:
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of  EPTISA Servicios De Ingeniera Madrid, Spain  STUP Consultants Private Limited Kolkata, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Signature	Signature	MISCELLANEOUS DETAILS OF BRIDGE OVER RIVER RATU Reference Drawings	AS SHOWN Chainage: 265+345	JUNE, 2023
			Signature	Signature			Drawing No.- KDP/DPR/STR/BR/RATU/DD-19
			Signature	Signature			Sheet No. 1 / 2



**PLAN VIEW AT EXPANSION JOINT, END R.C.C
SEPARATOR & APPROACH SLAB**

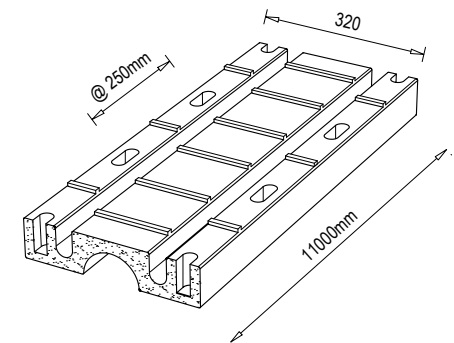


ELEVATION VIEW



SLAB SEAL TYPE EXPANSION JOINTS ARRANGEMENT IN A CARRIAGEWAY

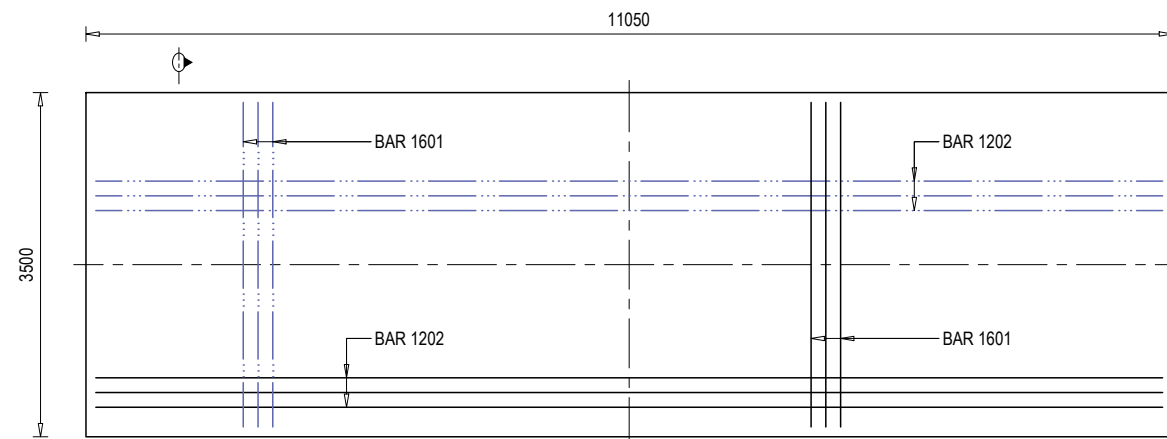
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EXPANSION JOINT ISOMETRIC VIEW

- SEAL TYPE

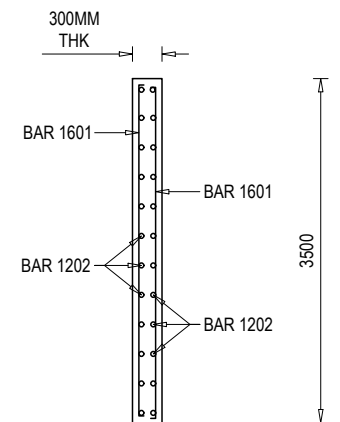
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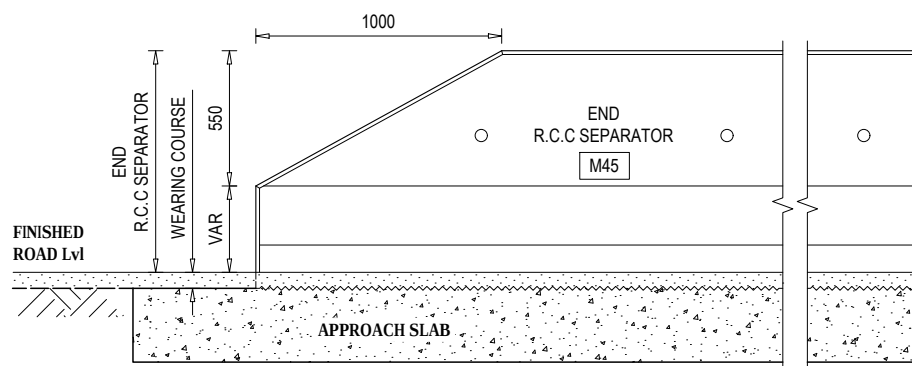
SECTIONAL PLAN VIEW

REINFORCEMENT DETAILS AT APPROACH SLAB

SCALE - 1 : 100 @ A3 PAPER

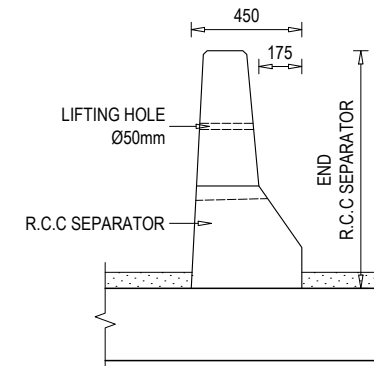


SECTIONAL ELEVATION VIEW AT SEC T20



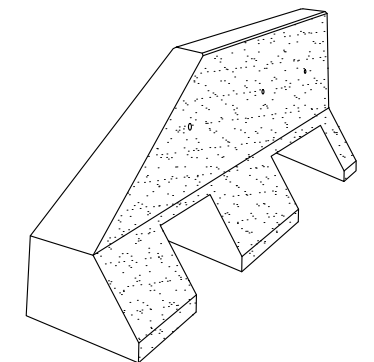
ELEVATION VIEW OF END R.C.C SEPARATOR

SCALE - 1 : 40 @ A3 PAPER



SIDE VIEW

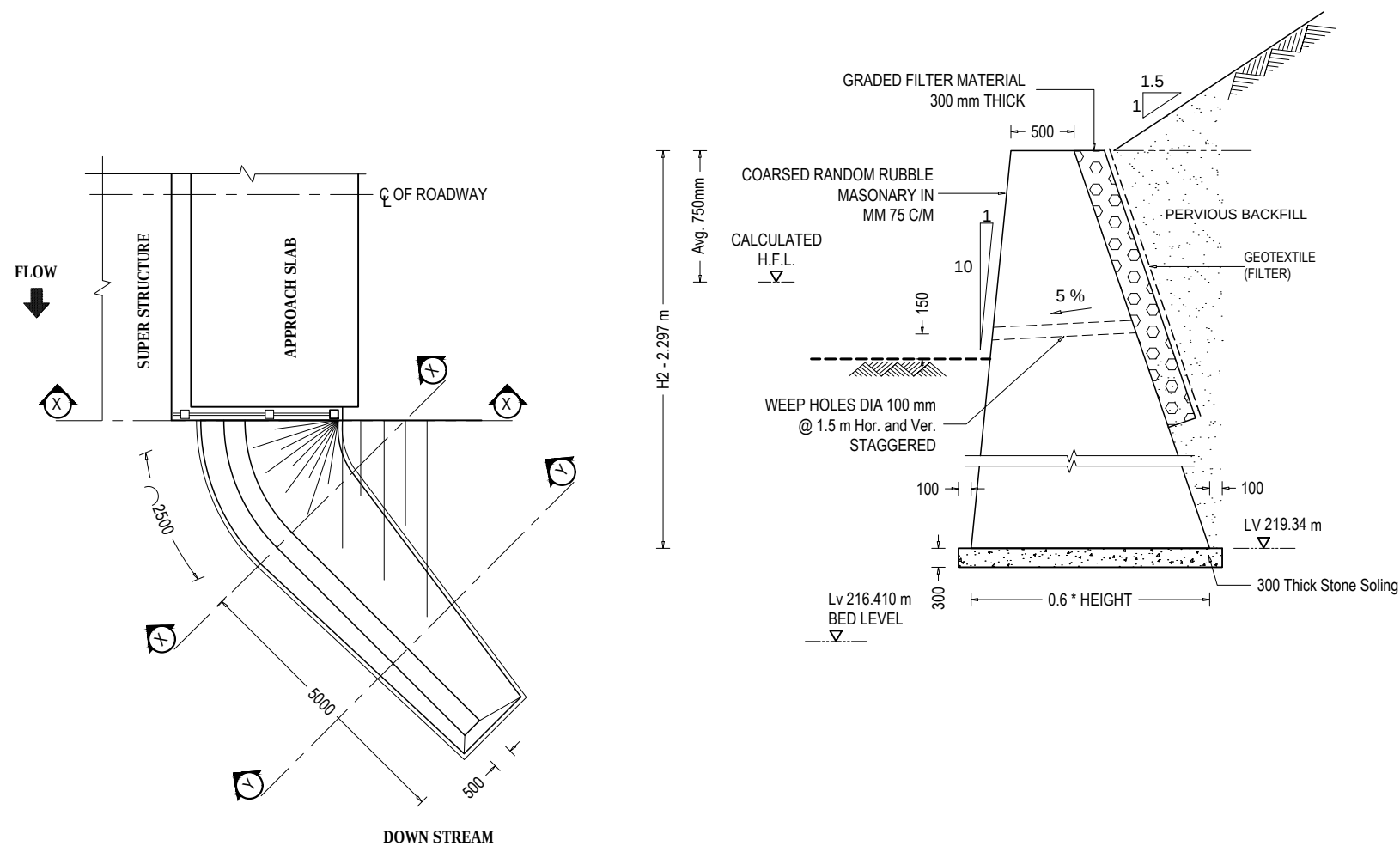
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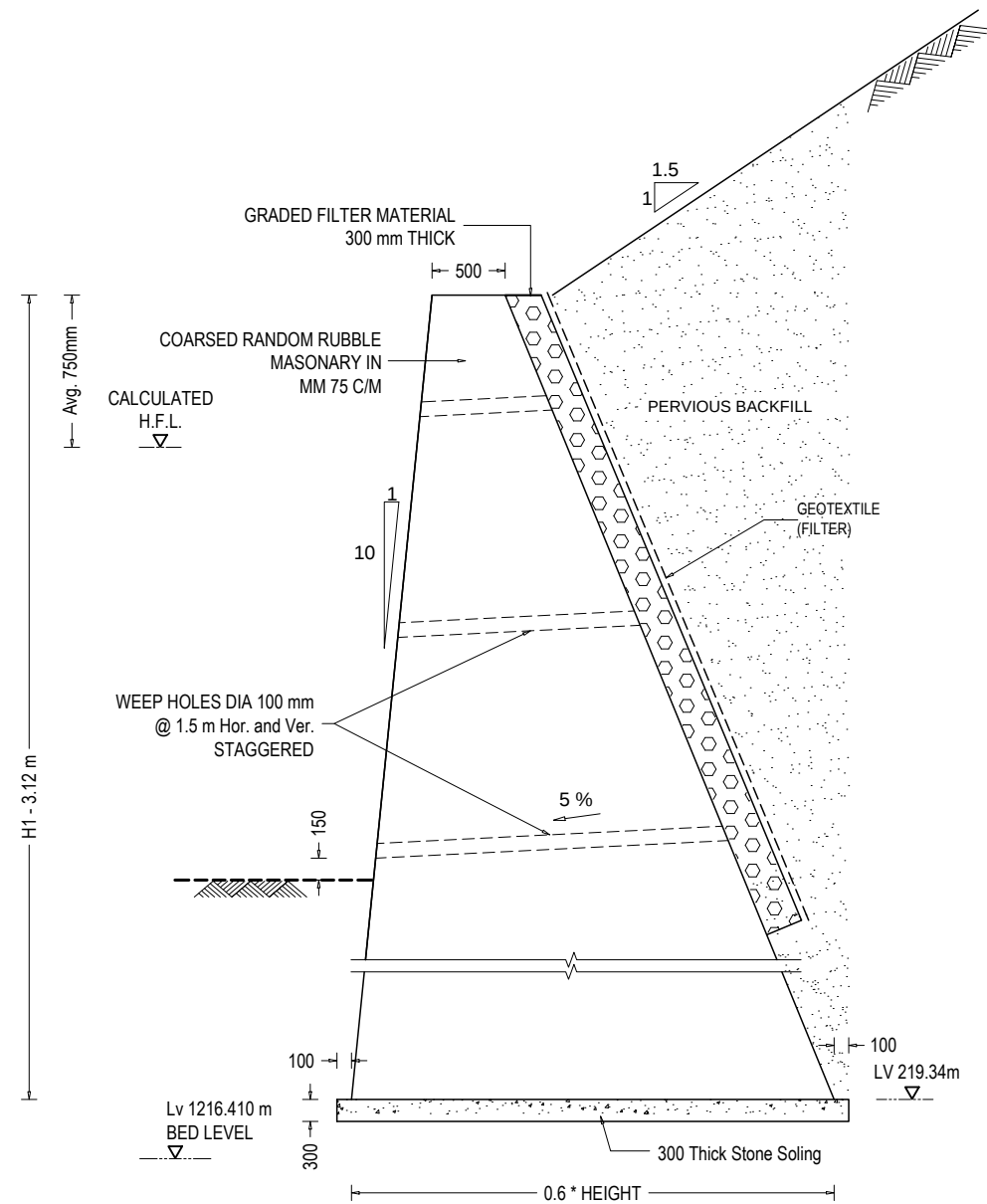
END R.C.C SEPARATOR ISOMETRIC VIEW

SCALE - NONE

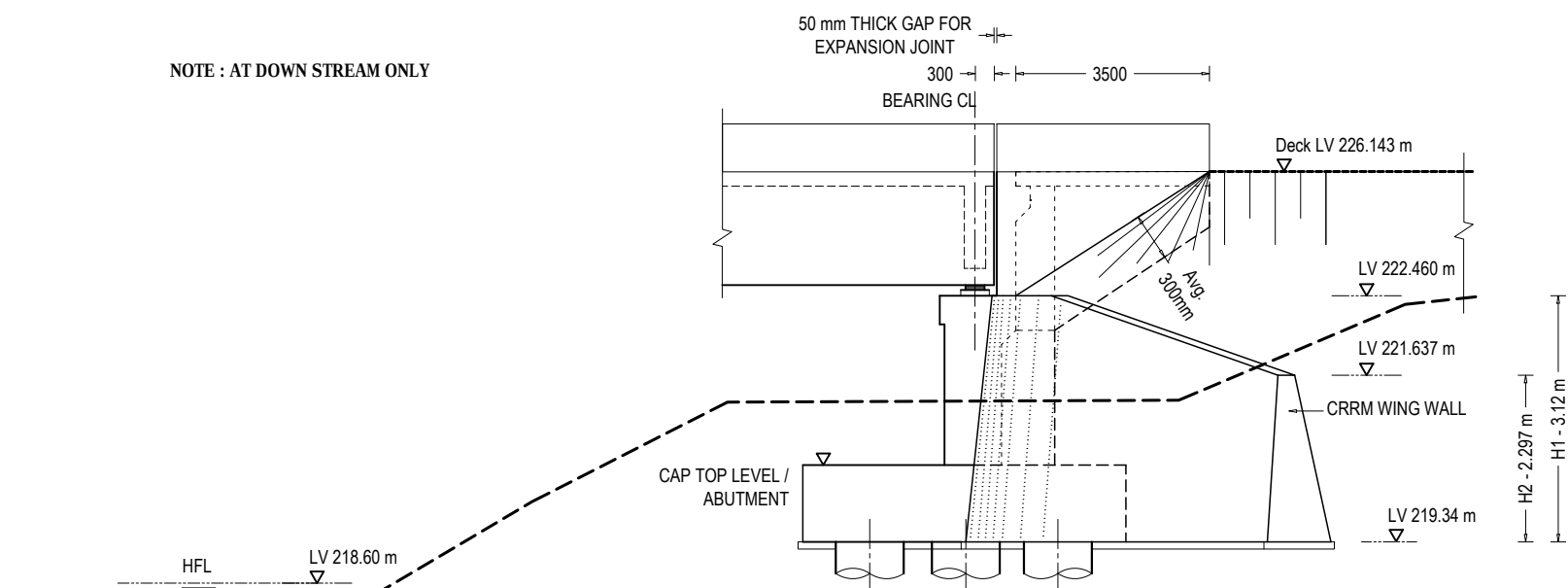
EMPLOYER	PROJECT NAME	DESIGN CONSULTANTS	Designed By	Drawing Name	Scale:	Date:
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of  EPTISA Servicios De Ingenieria Madrid, Spain  STUP Consultants Private Limited Kolkata, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Mr. S.N.R.B. NEC No.265 Civil "A"	MISCELLANEOUS DETAILS OF BRIDGE OVER RIVER RATU	AS SHOWN	JUNE, 2023
			Checked By Mr. S.M.	Reference Drawings	Chainage:	Drawing No.- KDP/DPR/STR/BR/RATU/DD-19
			Approved By Mr. H.B.	KDP/DPR/STR/BR/RATU/DD-18	265+345	Sheet No. 2 / 2



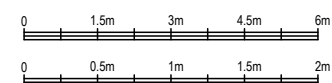
NOTE : AT DOWN STREAM ONLY



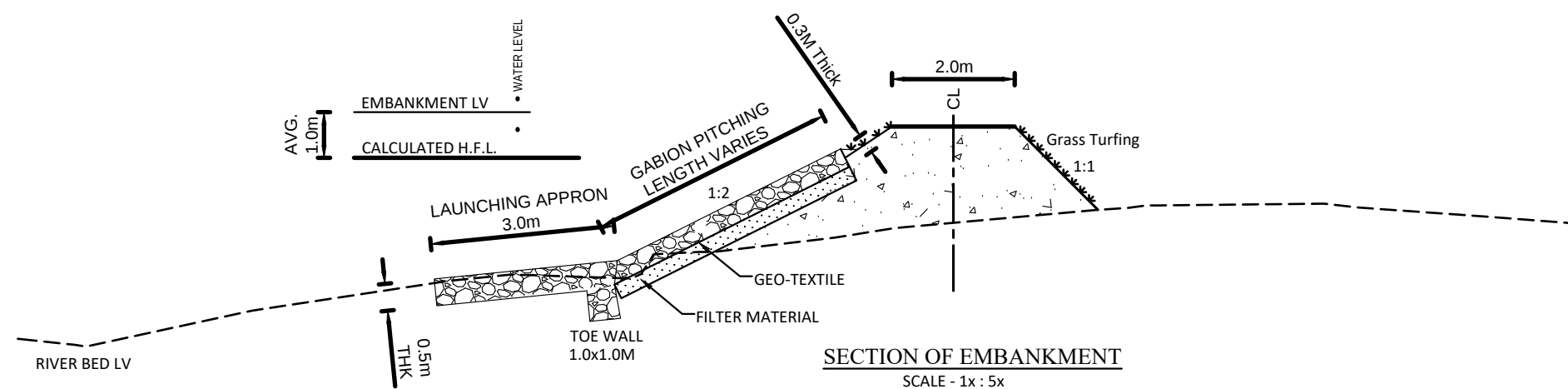
STONE MASONRY WING WALL SECTION X - X



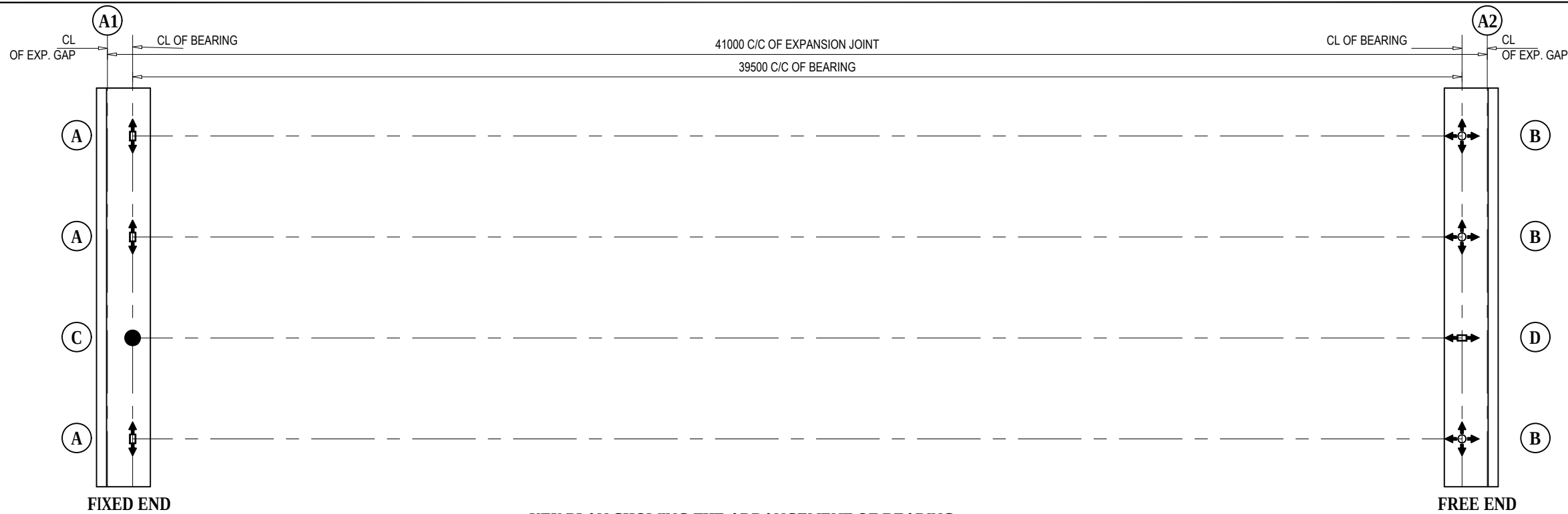
WING WALL ELEVATION



EMPLOYER	PROJECT NAME	DESIGN CONSULTANTS	Designed By	Drawing Name	Scale:	Date:
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of ep4sa EPTISA Servicios De Ingenieria Madrid, Spain cu STUP Consultants Private Limited Kolkatta, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Mr. S.N.R.B.	WING WALL DETAILS OF BRIDGE OVER RIVER RATU Reference Drawings	AS SHOWN Chainage: 265+345	JUNE, 2023
			Checked By			Drawing No. -
			Approved By			KDP/DPR/STR/BR/RATU/DD-20
						Sheet No. 1 / 1



EMPLOYER	PROJECT NAME	DESIGN CONSULTANTS			Designed By	Mr. S.N.R.B	Drawing Name: RIVER TRAINING WORK OF BRIDGE OVER RIVER RATU	Scale:	Date:	
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of			Checked By	Mr. S.M.		1:1000	JUNE,2023	
		 EPTISA Servicios De Ingenieria Madrid, Spain	 STUP Consultants Private Limited Kolkatta, India	In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Approved By	Mr. H.B.			Reference Drawings	Chainage: 265+345
										



KEY PLAN SHOWING THE ARRANGEMENT OF BEARING

SCALE - 1: 150

TABLE SHOWING DATA FOR DESIGN OF BEARINGS

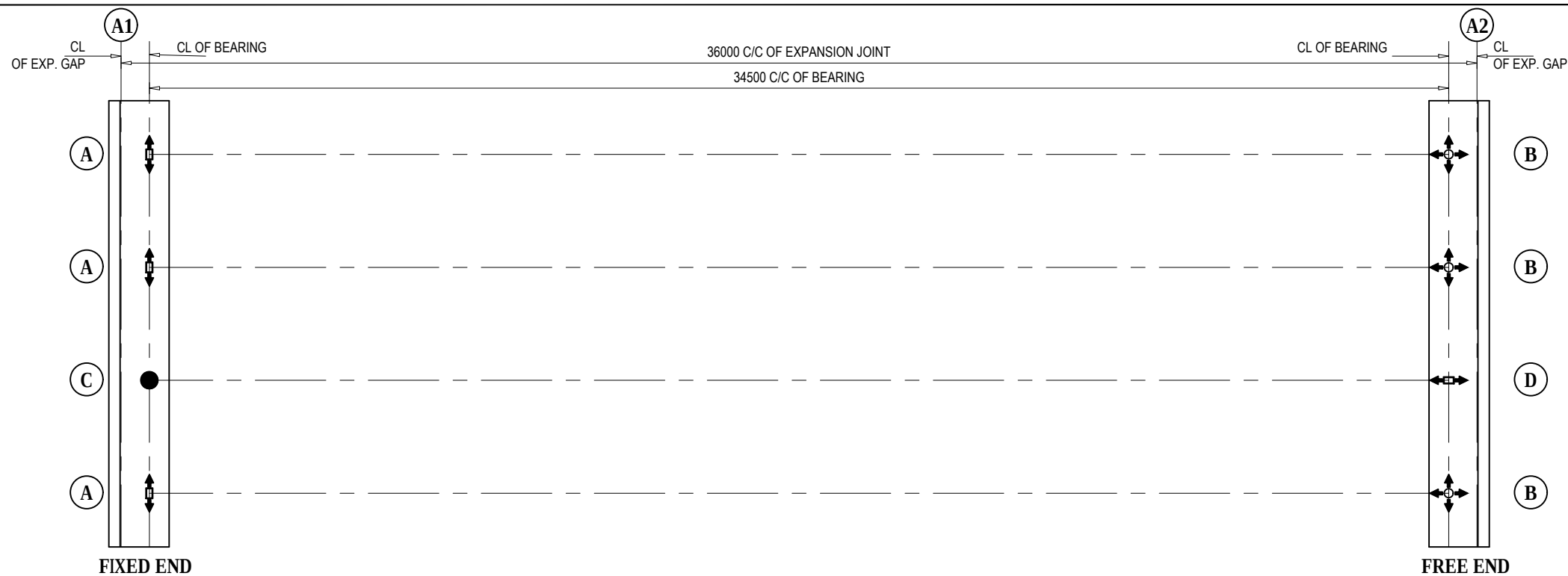
		Structure Reference						
1	Bearing Identification mark				A	B	C	D
	Type of Bearing				Guided Bearing in transverse Direction	Free Bearing	Fixed Bearing	Guided Bearing in Longitudinal Direction
2	Seating Material and characteristic strength	Upper Surface			M35	M35	M35	M35
		Lower Surface			M35	M35	M35	M35
3	Design Load (KN)	Serviceability Limit state (SLS Rare)	Vertical	max (LL)	176.32 T	135.28 T	176.32 T	135.28 T
				min (NO LL)	127.91 T	127.91 T	127.91 T	127.91 T
			Transverse	max (LL)	22.56 T	7.50 T	22.56 T	7.50 T
				min (NO LL)	6.40 T	6.40 T	6.40 T	6.40 T
		Serviceability Limit state (SLS Frequent)	Vertical	max (LL)	164.22 T	133.44 T	164.22 T	133.44 T
				min (NO LL)	127.91 T	127.91 T	127.91 T	127.91 T
			Transverse	max (LL)	17.35 T	7.23 T	17.35 T	7.23 T
				min (NO LL)	6.40 T	6.40 T	6.40 T	6.40 T
		Ultimate Limit state (ULS Basic)	Vertical	max (LL)	246.36 T	184.81 T	246.36 T	184.81 T
				min (NO LL)	173.75 T	173.75 T	173.75 T	173.75 T
			Transverse	max (LL)	34.38 T	10.35 T	34.38 T	10.35 T
				min (NO LL)	8.69 T	8.69 T	8.69 T	8.69 T
		Ultimate Limit state (ULS Seismic)	Vertical	max (LL)	299.24 T	253.55 T	299.24 T	253.55 T
				min (NO LL)	241.93 T	241.93 T	241.93 T	241.93 T
			Transverse	max (LL)	205.36 T	10.21 T	205.36 T	10.21 T
				min (NO LL)	199.33 T	8.69 T	199.33 T	8.69 T
4	Displacement (mm)	SLS		Transverse	3.20 mm	3.20 mm		
				Longitudinal		51.61 mm		51.61 mm
		ULS		Transverse	4.80 mm	4.80 mm		
				Longitudinal		77.42 mm		77.42 mm
5	Rotation (Radians)	SLS	Rare	max (LL)	0.00360 radian			
				min (NO LL)	0.00265 radian			
		ULS	Basic	max (LL)	0.00503 radian			
				min (NO LL)	0.00360 radian			

- NOTE:
- MATERIAL SPECIFICATIONS, DESIGN OF BEARINGS ACCEPTANCE CRITERIA AND INSTALLATION SHALL BE IN ACCORDANCE WITH IRC:83 (PART 3)-2018.
 - BEARINGS SHALL BE OBTAINED FROM MANUFACTURERS.
 - INSTALLATION OF BEARINGS SHALL BE UNDER THE SUPERVISION OF REPRESENTATIVE OF THE MANUFACTURER.
 - FOR DESIGN LOADS AND ROTATIONS REFER TABLE IN THE DRAWING.
 - FOR BEARINGS, DETAILED SHOP DRAWINGS SHALL BE PREPARED BY THE SUPPLIER AND BE DULY APPROVED BEFORE MANUFACTURE AND INSTALLATION.
 - THE GROUT/BEDDING MORTAR SHALL BE HIGH STRENGTH FREE FLOWING NON SHRINK GROUT (80 MPa STRENGTH).
 - ALL BEARING SHALL BE PLACED IN TRULY HORIZONTAL PLANE ONLY.
 - FOR DESIGN OF POT BEARINGS, THE DESIGN HORIZONTAL FORCE SHALL, IN NO CASE BE LESS THAN 10% AND GREATER THAN 25% OF THE DESIGN VERTICAL LOAD.
 - THE CONTRACTOR AND SUPPLIER OF BEARINGS SHALL BE FURNISH A MINIMUM TROUBLE FREE WARRANTY OF 10 YEARS AFTER OPENING OF THE BRIDGE.

LEGEND

	A Guided Bearing in transverse Direction
	B Free Bearing
	C Fixed Bearing
	D Guided Bearing in Longitudinal Direction

EMPLOYER		PROJECT NAME		DESIGN CONSULTANTS		Drawing Name		Scale:		Date:	
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	 EPTISA Servicios De Ingenieria Madrid, Spain	 STUP Consultants Private Limited Kolkatta, India	Designed By	Mr. S.N.R.B Nec.No. 265 Civil "A"	Drawing Name BEARING DATA OF BRIDGE OVER RIVER RATU	AS SHOWN	265+345	JUNE, 2023	Drawing No.- KDP/DPR/STR/BR/RATU/DD -22	
				Checked By	Mr. S.M. Nec.No.					Sheet No. 1 / 2	
				Approved By	Mr. H.B. Nec.No.						



KEY PLAN SHOWING THE ARRANGEMENT OF BEARING
SCALE - 1: 150

TABLE SHOWING DATA FOR DESIGN OF BEARINGS

		Structure Reference							
1	Bearing Identification mark				A	B	C	D	
	Type of Bearing				Guided Bearing in transverse Direction	Free Bearing	Fixed Bearing	Guided Bearing in Longitudinal Direction	
2	Seating Material and characteristic strength	Upper Surface			M35	M35	M35	M35	
		Lower Surface			M35	M35	M35	M35	
3	Design Load (KN)	Serviceability Limit state (SLS Rare)	Vertical	max (LL)	157.40 T	118.50 T	157.40 T	118.50 T	
				min (NO LL)	110.06 T	110.06 T	110.06 T	110.06 T	
			Transverse						
		Serviceability Limit state (SLS Frequent)	Vertical	max (LL)	23.00 T	6.77 T	23.00 T	6.77 T	
				min (NO LL)	5.50 T	5.50 T	5.50 T	5.50 T	
			Longitudinal	max (LL)	145.57 T	116.39 T	145.57 T	116.39 T	
				min (NO LL)	110.06 T	110.06 T	110.06 T	110.06 T	
		Transverse							
			Ultimate Limit state (ULS Basic)	Vertical	max (LL)	16.58 T	6.45 T	16.58 T	6.45 T
					min (NO LL)	5.50 T	5.50 T	5.50 T	5.50 T
		Longitudinal		max (LL)	220.53 T	162.18 T	220.53 T	162.18 T	
				min (NO LL)	149.52 T	149.52 T	149.52 T	149.52 T	
		Transverse							
Ultimate Limit state (ULS Seismic)	Vertical		max (LL)	34.97 T	9.37 T	34.97 T	9.37 T		
			min (NO LL)	7.48 T	7.48 T	7.48 T	7.48 T		
	Longitudinal	max (LL)	264.14 T	221.14 T	264.14 T	221.14 T			
		min (NO LL)	208.17 T	208.17 T	208.17 T	208.17 T			
Transverse									

4	Displacement (mm)	SLS		Transverse	3.20 mm	3.20 mm		45.08 mm
				Longitudinal		45.08 mm		
		ULS		Transverse	4.80 mm	4.80 mm		
				Longitudinal		67.62 mm		67.62 mm

5	Rotation (Radians)	SLS	Rare	max (LL)	0.00289 radian			
				min (NO LL)	0.00205 radian			
		ULS	Basic	max (LL)	0.00404 radian			
				min (NO LL)	0.00279 radian			

- NOTE:
- MATERIAL SPECIFICATIONS, DESIGN OF BEARINGS ACCEPTANCE CRITERIA AND INSTALLATION SHALL BE IN ACCORDANCE WITH IRC:83 (PART 3)-2018.
 - BEARINGS SHALL BE OBTAINED FROM MANUFACTURERS.
 - INSTALLATION OF BEARINGS SHALL BE UNDER THE SUPERVISION OF REPRESENTATIVE OF THE MANUFACTURER.
 - FOR DESIGN LOADS AND ROTATIONS REFER TABLE IN THE DRAWING.
 - FOR BEARINGS, DETAILED SHOP DRAWINGS SHALL BE PREPARED BY THE SUPPLIER AND BE DULY APPROVED BEFORE MANUFACTURE AND INSTALLATION.
 - THE GROUT/BEDDING MORTAR SHALL BE HIGH STRENGTH FREE FLOWING NON SHRINK GROUT (80 MPa STRENGTH).
 - ALL BEARING SHALL BE PLACED IN TRULY HORIZONTAL PLANE ONLY.
 - FOR DESIGN OF POT BEARINGS, THE DESIGN HORIZONTAL FORCE SHALL, IN NO CASE BE LESS THAN 10% AND GREATER THAN 25% OF THE DESIGN VERTICAL LOAD.
 - THE CONTRACTOR AND SUPPLIER OF BEARINGS SHALL BE FURNISH A MINIMUM TROUBLE FREE WARRANTY OF 10 YEARS AFTER OPENING OF THE BRIDGE.

LEGEND

	A Guided Bearing in transverse Direction
	B Free Bearing
	C Fixed Bearing
	D Guided Bearing in Longitudinal Direction

EMPLOYER		PROJECT NAME		DESIGN CONSULTANTS		Drawing Name		Scale:		Date:	
 Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of		Designed By	Mr. S.N.R.B Nec.No. 265 Civil "A"	Drawing Name BEARING DATA OF BRIDGE OVER RIVER RATU	Reference Drawings	AS SHOWN	Chainage: 265+345	JUNE, 2023	
		EPTISA Servicios De Ingeniera Madrid, Spain		Checked By	Mr. S.M. Nec.No.					Drawing No.- KDP/DPR/STR/BR/RATU/DD -22	
		In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited		Approved By	Mr. H.B. Nec.No.					Sheet No. 2 / 2	