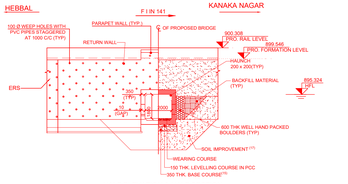
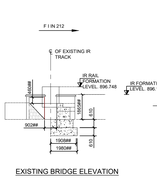
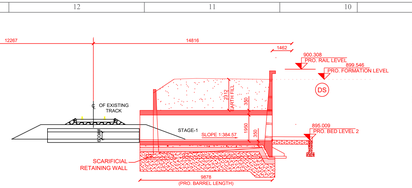


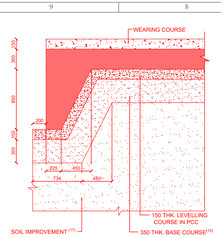
HALF ELEVATION & HALF SECTION



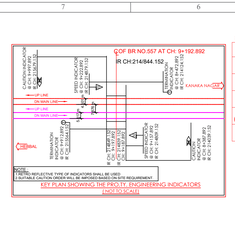
EXISTING BRIDGE ELEVATION



CONSTRUCTION STAGE 1



DETAIL-X
(SCALE 1:20)



BRIDGE DETAILS

DESCRIPTION	EXISTING IR BRIDGE : 557	PROPOSED BSRP BRIDGE : 557
CHAINAGE AT CENTER OF BRIDGE (km)	214/844.152	9+192.892
RAIL LEVEL AT CENTER OF BRIDGE (m)	896.748	900.308
FORMATION LEVEL AT CENTRE OF BRIDGE (m)	896.170	899.546
DIMENSIONS (Nos x SPAN(m) x HEIGHT(m))	1 x 0.902 x 0.6 ##	1 x 2 x 1.95m
STRUCTURE CONFIGURATION	SLAB BRIDGE	RCC BOX

ABBREVIATIONS :

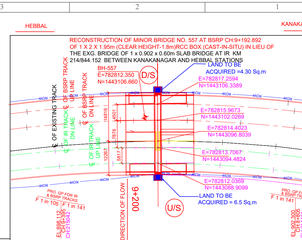
℄	-	CENTER LINE
TYP	-	TYPICAL
THK	-	THICKNESS
U/S	-	UP STREAM SIDE
D/S	-	DOWN STREAM SIDE
DN	-	DOWN
BR	-	BRIDGE
FRL	-	FORMATION LEVEL

LEGENDS:

= COLOUR CODE BLACK = EXISTING WORKS

= COLOUR CODE RED = PROPOSED RLY WORKS

= COLOUR CODE YELLOW = TO BE DISMANTLED



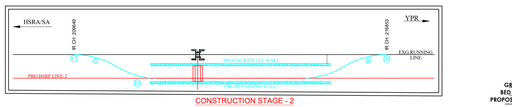
KEY PLAN

SCALE 1:500

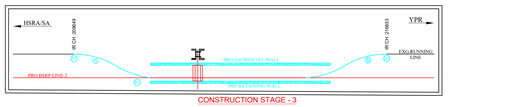
IR TRACK	
SKEW	
GRADIENT	1 IN 212.089
CURVE	R 455 m

BSRP TRACK	
SKEW	
GRADIENT	F I N 141
CURVE	R 455 m

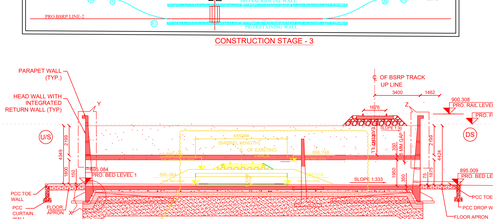
KEY PLAN NOTE:-
1. PROPOSALS ARE SHOWN IN RED.
2. RAILWAY BOUNDARY DISTANCE ARE WITH RESPECT TO CENTRE LINE OF EXG.TRACK.
3. TRACK IS IN CURVED ON BRIDGE LOCATION.

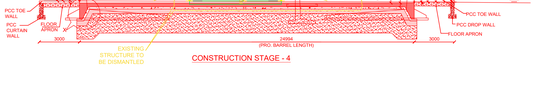


CONSTRUCTION STAGE - 2

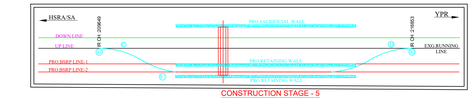


CONSTRUCTION STAGE - 3

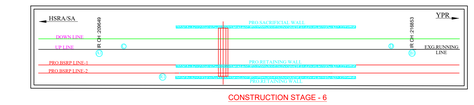




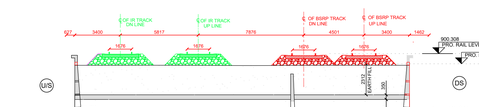
CONSTRUCTION STAGE - 4



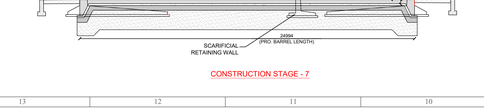
CONSTRUCTION STAGE - 5



CONSTRUCTION STAGE - 6



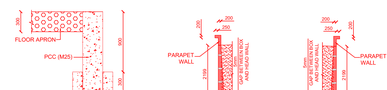
CONSTRUCTION STAGE - 7



HFL	FREE BOARD (mm)	BED LEVEL-1	BED LEVEL-2
895.324	4222	895.084	895.009

HALF PLAN AT TOP

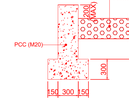
HALF PLAN AT BOTTOM



PCC DROP / CURTAIN WALL DETAILS ON BSRP SIDE
SCALE 1:20

HEAD WALL DETAIL-Y

HEAD WALL DETAIL-Z



TOE WALL DETAILS ON IR SIDE
Scale: 1:30

SPECIFICATION:

1. ALL WORKS ARE TO BE CARRIED OUT AS PER THE FOLLOWING.
   a. INDIAN RAILWAY UNIFIED STANDARD SPECIFICATIONS FOR WORKS AND MATERIALS 2019.
   b. IRS CONCRETE BRIDGE CODE 2014(REPRINT) & RELEVANT I.S SPECIFICATIONS.
   c. IRS BRIDGE SUB - STRUCTURE CODE,2013(& REVISED).
   d. IRS BRIDGE RULES 2014(REPRINT).
2. WING WALL/RETAINING : REINFORCED CEMENT CONCRETE OF GRADE M35 WITH DESIGN MIX.
3. PITCHING :- DRY STONE PITCHING 230MM THICK OVER 150MM THICK SAND MIXED WITH STONE CHIPS (AS PER PARA 205 OF INDIAN RAILWAY BRIDGE MANUAL(ANNEXURE 23).
4. RCC BOX:- REINFORCED CEMENT CONCRETE GRADE USING 20MM MAXIMUM SIZE GRADED HARD STONE AGGREGATE OF APPROVED QUALITY.
5. LEVELING COURSE :- 150 MM THICK M20 DESIGN MIX.
6. WEEP HOLES :- WEEP HOLES TO BE PROVIDED AS PARA 7.6 OF SUB STRUCTURE CODE & WEEP HOLES SHALL BE OF 100 DIA PIPES STAGGERED AT 1000 CC ABOVE LOW WATER LEVEL IN BOTH WING WALL/RETAINING & EARTH RETAINER OF BOX.
7. LOADING STANDARD :- 25 T - 2008 AXLE LOAD.
8. TOE WALL :- GRADE M25 WITH DESIGN MIX.
9. GRADE OF STEEL FOR RCC IS TMT-500D CONFORMING TO IS 1786-2008.
10. MASS CONCRETE TO BE OF M25 WITH 20MM GRADED STONE AGGREGATE FOR WEARING COURSE.
11. CONCRETE SHALL BE MECHANICALLY MIXED,VIBRATED & THOROUGHLY CURED.
12. BAR BENDING SHALL CONFORM TO IS 2502.
13. FLOORING :- ROUGH STONE FLOORING 300MM THICK GROUTED WITH CM:1:3.
14. DROP WALL / CURTAIN WALL :- GRADE M25 WITH DESIGN MIX.
15. BASE COURSE SHALL BE 350MM OF PROPERLY COMPACTED CRUSHED STONE LAYER OF 80MM SIZE AND DOWNGRADED SHALL BE PROVIDED BELOW PCC LEVELING COURSE, AS A COMMON FOUNDATION FOR BOX. THIS LAYER SHOULD FULFILL THE CRITERIA OF BINDING THE BOX CULVERT AND THE UNDERNEATH SOIL.
16. COPING:- CC M25 GRAD USING 20MM MAX SIZE GRADED HARD STONE AGGREGATE OD APP.QUALITY.
17. GROUND IMPROVED SOIL SHALL BE OF SOIL QUALITY CLASS SG2 AND SG3 AS PER RDSO GUIDELINES.
18. FOR RETAINING STRUCTURE, SEPERATE DRAWING WILL BE SUBMITTED.
19. THE DIMENSION OF INTEGRATED RETURN WALL & SACRIFICAL RETURN WALL SHOWN IN GAD ARE ONLY INDICATIVE AND TO FOLLOW AS PER APPROVAL DESIGN AND DRAWING.

REFERENCE:

1. RCC BOX (CAST-IN-SITU) - DRG NO. RDSO/B-10155 & 101554
2. RETURN WALL DESIGN DOCUMENT NO-DOC-BSRP-CR2-AG-DGN-GR-20-1136
3. RETAINING WALL - CI2027-BSRP-CR2-C-NB-0-32-1101
4. WEEP HOLES AS PER PARA 7.6 OF SUB-STRUCTURE CODE
5. CURTAIN WALL AND TOE WALL AS PER DESIGN.
6. BACKFILL MATERIALS BEHIND RCC BOX TO PROVIDE AS PER PARA 7.5 OF IRS BRIDGE SUBSTRUCTURE AFOUNDATION CODE.
7. SHORING ARRANGEMENTS AS PER DESIGN.
8. GIR DOCUMENT NO.
   FOR BOX :DOC:-BSRP-CR2-AG-DGN-GS-20-1136
   FOR RETURN WALL : DOC-BSRP-CR2-AG-DGN-GBRW-20-1136

BRIDGE STRENGTH CERTIFICATE

CERTIFIED THAT THE PRO RCC BOX BRIDGE,BR.NO.557 OF 1x2.0x1.95m AT BSRP CH: 9+192.892.TO BE CONSTRUCTED IS OF SUCH DESIGN, DIMENSIONS AND CONSTRUCTIONS AS WILL ENABLE IT TO CARRY THE DEAD LOAD OF THE STRUCTURE ITSELF (INCLUDING P-WAY COMPLETE) AND IN ADDITION TO THE EQUIVALENT OF 25T - 2008 LOADING PRESCRIBED IN THE BRIDGE RULES CHAPTER VII OF THE RULES FOR THE OPENING OF RAILWAYS AT FULL SPEED.

ALSO CERTIFIED THAT THE HEAVIEST LOADS WHICH THE BRIDGE WILL HAVE TO CARRY WILL NOT BE IN EXCESS OF THE ABOVE STANDARDS OF LOADING AT THE STIPULATED SPEED AND WILL NOT CAUSE ANY STRESS IN ANY MEMBERS OR PORTION OF THE STRUCTURE IN EXCESS OF MAXIMUM PERMISSIBLE STRESSES LAID DOWN IN THE INDIAN RAILWAY STANDARD CODE OF PRACTICES.

L&T	GC	KRIDE

SOIL IMPROVEMENT DETAILS

DEPTH OF GI BELOW BASE COURSE (m)	WIDTH AT BOTTOM OF EXCAVATION (m)	LENGTH AT BOTTOM OF EXCAVATION (m)
1.4	4.150	30.390

BASE PRESSURE AT FOUNDATION LEVEL

STRUCTURE	MAX	MIN
RCC BOX (KN/m²)	210	-
RETAINING WALL (KN/m²)	229.84	-

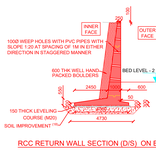
LOADING STANDARD

A) PRO.BRIDGE:25T-AXLE LOAD 2008 STD

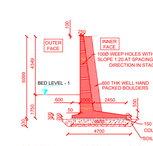
B) EXG.BRIDGE MBG OF 1987

DEPTH OF CONSTRUCTION FOR 1 x 2 x 1.95 m RCC BOX

RAIL 60 kg	:	172 mm
GR PAD	:	6 mm
PSC SLEEPER	:	210 mm
BALLAST CUSHION	:	350 mm
EARTH CUSHION	:	2312 mm
TOP SLAB	:	350 mm
TOTAL	=	3400 mm



RCC RETURN WALL SECTION (D/S) ON BSRP SIDE



RCC RETURN WALL SECTION (U/S) ON IR SIDE

STRUCTURE	DEPTH OF SOIL IMPROVEMENT (mm)	WIDTH OF SOIL IMPROVEMENT (mm)	LENGTH OF SOIL IMPROVEMENT (mm)
RCC BOX	1480	4580	26980
RETURN WALL U/S	530	4730	6173
RETURN WALL D/S	500	4700	6286

GRADE OF CONCRETE

	GRADE	
I.	RCC BOX	M30
II.	WEARING COURSE	M35
III.	LEVELLING COURSE (PCC)	M20
IV.	RETAINING/RETURN WALL	M35

TRACK DETAILS (PRO.BRIDGE)

LOADING	:	25 T-AXLE LOAD 2008-STD
ALIGNMENT	:	CURVE
GRADE	:	F I N 141
RAIL LEVEL	:	900.308 m
FORMATION LEVEL	:	899.546 m

TRACK DETAILS (EXG.BRIDGE)

LOADING	:	MBG-1987
ALIGNMENT	:	CURVE
GRADE	:	FALL I N 212
RAIL LEVEL	:	896.748 m
FORMATION LEVEL	:	896.170 m

WATERWAY PARTICULARS

CATCHMENT AREA	:	0.036 SQKM.
LATITUDE	:	13°27'27.021" N.
LONGITUDE	:	77°36'36.378" E
TOPOSHEET NO	:	D43 /6-12
GW DRGVHANGE	:	1:16 CUMSEC
VELOCITY	:	1.5 M/S
DEPTH OF FLOW	:	0.9 M
OHFL	:	895.324 M
100HFL (DESIGN HFL)	:	895.324 M

	REQUIRED	PROVIDED
WATERWAY AREA, Sqm	0.60	2.700
FREE BOARD, m	1.00	4.222
VERTICAL CLEARANCE, m	0.00	1.100
SCOUR DEPTH		
From OF HFL m		0.951
Bed Level		894.594
From B.L. m	0.300	1.2

EXISTING WATERWAY PARTICULARS

	PROVIDED
WATERWAY AREA, Sqm	0.541
FREE BOARD, m	0.640
VERTICAL CLEARANCE, m	0.300

MODUS OPERANDI :

PRELIMINARY WORKS

1. IMPOSE SPEED RESTRICTIONS FOR EXISTING MAIN LINE AT BRIDGE LOCATION BY ERECTING NECESSARY TEMPORARY ENGINEERING SPEED INDICATOR AS PER RPWM AND ALLOW TRAFFIC AT RESTRICTED SPEED.

STAGE 1: EARTHWORK FOR EMBANKMENT OF BSRP LINE-2

1. EXCAVATE THE EARTH TO THE REQUIRED DEPTH AT THE BOX PORTION.PREPARE THE GROUND WELL BY RAMPING ETC AS NECESSARY AS PER REQUIREMENT.
4. LEVEL THE GROUND SURFACE.
5. BASE COURSE OF 350 mm.
6. FOUNDATION WORK FOR THE RETURN WALLS WILL BE EXCUTED WITH ALL SAFETY MEASURES EXCEPT AT STRUCTURE PORTION.
7. CONSTRUCTION OF PROPOSED STAGE 1 BOX, RETAINING WALL R1 WILL BE DONE EXCEPT AT IR STRUCTURE SIDE.
8. LAY THE BACKFILL MATERIAL.
9. BACKFILLING WILL BE DONE AROUND THE BOX.
10. CARRIOUT THE EARTH FILLING AND BLANKET MATERIAL IN BSRP LINE 2 AT STRUCTURE LOCATION.

STAGE 2: LAYING OF TRACKS FOR BSRP LINE-2 BY K-RIDE.

11. TRACK WILL BE LAID FOR BSRP LINE-2 FROM POINT 'A' TO POINT 'B' (FOR A LENGTH OF 5.0 KM).

STAGE 3: CUT AND CONNECTION DURING TRAFFIC BLOCK BY K-RIDE.

12. CUT & CONNECTION OPERATION WILL BE CARRIED OUT AND POINT 'A1' WILL BE CONNECTED TO POINT 'A' WITH A LENGTH OF 58.5M.
13. SIMULTANEOUSLY DURING TRAFFIC BLOCK, CUT & CONNECTION OPERATION WILL BE CARRIED OUT AND POINT 'B1' WILL BE CONNECTED TO POINT 'B' WITH A LENGTH OF 58.5M.
14. AFTER CUT AND CONNECTION, INDIAN RAILWAY TRAFFIC WILL BE DIVERTED TO PROPOSED BSRP LINE-2.
15. EXISTING TRACK (REDUNDANT LINE BETWEEN POINT 'A1' & POINT 'B1') WILL BE CLEARED FROM THE SITE.

STAGE 4: CONSTRUCTION OF REMAINING BOX PORTIONS

16. AFTER DIVERTING INDIAN RAILWAY TRAFFIC TO BSRP LINE-2, EXISTING IR BOX TO BE DISMANTLED EXCEPT IR RETAINING WALL.
17. EXCAVATE THE EARTH TO THE REQUIRED DEPTH AT THE BOX PORTION.PREPARE THE GROUND WELL BY RAMPING ETC AS NECESSARY AS PER REQUIREMENT.
18. LEVEL THE GROUND SURFACE.
19. BASE COURSE OF 350 mm.
20. FOUNDATION WORK FOR THE RETAINING WALLS WILL BE EXCUTED WITH ALL SAFETY MEASURES EXCEPT AT RUB PORTION.
21. CONSTRUCT THE REMAINING RCC BOX PORTION.
22. LAY THE BACKFILL MATERIAL.
23. BACKFILLING WILL BE DONE AROUND THE BOX.
24. BLANKETING WILL BE DONE FOR BSRP LINE-1,UP & DOWN MAIN LINE.

STAGE 5: LAYING OF TRACKS FOR BSRP LINE-1,UP & DOWN MAIN LINE BY K-RIDE.

25. TRACK WILL BE LAID FOR BSRP LINE-1,UP & DOWN MAIN LINE FROM POINT 'C' TO POINT 'D' (FOR A LENGTH OF 5.01 KM).

STAGE 6: CUT AND CONNECTION DURING TRAFFIC BLOCK BY K-RIDE.

26. DURING TRAFFIC BLOCK CUT & CONNECTION OPERATION WILL BE CARRIED OUT AND POINT 'C' WILL BE CONNECTED TO POINT 'A1' WITH A LENGTH OF 55.0M.
27. SIMULTANEOUSLY CUT & CONNECTION OPERATION WILL BE CARRIED OUT AND POINT 'D' WILL BE CONNECTED TO POINT 'B1' WITH A LENGTH OF 55.0M.
28. FINALLY EXISTING INDIAN RAILWAY TRAFFIC WILL BE RE-DIVERTED TO UP MAIN LINE.

STAGE 7:

29. COMPLETE THE WORK IN ALL RESPECTS SUCH AS CONSTRUCTION OF RETAINING WALL , PARAPET WALLS, SIDE DRAIN ETC,ON BOTH SIDES OF RCC BOX.
30. RESTORE NORMAL SPEED IN STAGES GRADUALLY AS PER PARA 238(G) OF IRPWM. RAILWAY ELECTRIFICATION INSTALLATIONS WILL BE SHIFTED AS PER REQUIREMENT AT SITE, FOR WHICH NECESSARY POWER BLOCK TO BE PROVIDED.

MODUS OPERANDI :

1. IMPOSE 20KM/PH SPEED RESTRICTIONS DURING EXCAVATION WORKS,IF REQUIRED AS PER SITE CONDITION.
2. DIVERT OR RESTRICT THE WATER FLOW BY PROVIDING BUND/TEMPORARY PIPES ON UPSTREAM SIDE OF THE BRIDGE.
3. PORTION OF RETURN WALL/TOE WALL, PITCHING TO BE DISMANTLED TO ACCOMMODATE RCC BOX WITH SUITABLE SHORING CONDITION AS PER SITE CONDITION .
4. EARTH WORK EXCAVATION TO BE DONE FOR PROPOSED BARREL LENGTH WITH 350MM BASE COURSE FILL BENEATH THE BOX BOTTOM RAFT.
5. RETURNS & BRIDGE PROTECTION WORKS TO BE DONE ON IR SIDE.

LEGENDS:

Total Barrel length of MIB 543 = 24.994m.
Completed Barrel length = 0m(BSRP Side).
Remaining Barrel length 24.994m is yet to be Constructed.

LOADING STANDARD
A) PRO.BRIDGE:25T-AXLE LOAD 2008 STD
B) EXG. STD BRIDGE:MGB 1987

GENERAL CONSULTANTS:

EGIS-AECOM-WSP

EMPLOYER :

RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

GENERAL ARRANGEMENT DRAWING

BENGALURU SUBURBAN RAILWAY PROJECT(BSRP)
BETWEEN STATIONS BENNIGANAHALLI AND CHIKKABANAVARA

RECONSTRUCTION OF MINOR BRIDGE NO. 557 AT BSRP CH:9+192.892 OF 1 X 2 X 1.95m (CLEAR HEIGHT-1.8m)RCC BOX (CAST-IN-SITU) IN LIEU OF THE EXG. BRIDGE OF 1 x 0.902 x 0.60m SLAB BRIDGE AT IR KM 214 / 844.152 BETWEEN KANAKANAGAR AND HEBBAL STATIONS

GC/K-RIDE	K-RIDE
FOR GC	FOR K-RIDE

KRIDE.DRG.NO:

HQ.DRG.NO:

SCALE - 1 : 100
(UNLESS SPECIFIED OTHERWISE)

C22077-BSRP-CR2-C-NB-0-30-1109-0