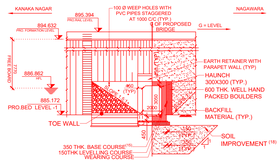
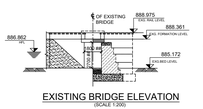
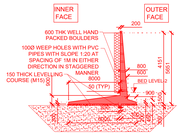


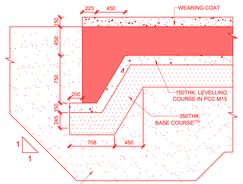
HALF ELEVATION & HALF SECTION



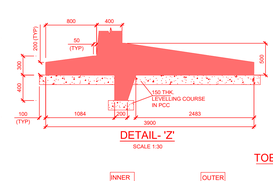
EXISTING BRIDGE ELEVATION
(SCALE 1:2000)



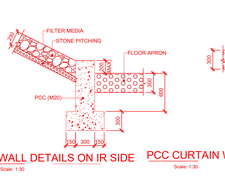
RCC RETURN WALL DETAILS - (D/S)
(SCALE 1:200)



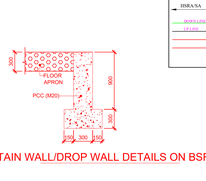
DETAIL-'X'
SCALE 1:30



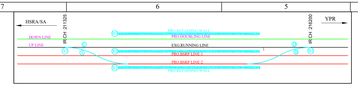
DETAIL- 'Z'
SCALE 1:30



TOE WALL DETAILS ON IR SIDE
Scale: 1:30



PCC CURTAIN WALL/DROP WALL DETAILS ON BSRP SIDE
Scale: 1:30



KEY PLAN SHOWING THE PROJECT, ENGINEERING INDICATORS
(NOT TO SCALE)

KEY PLAN
(NOT TO SCALE)

ABBREVIATIONS :

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

DETAILS OF EXISTING STRUCTURE SHOWN ARE AS PER JSVR / COMPLETION PLAN

* THE GAP TO BE FILLED WITH SUITABLE SEALANT MATERIAL

LEGENDS:

= COLOUR CODE BLACK = EXISTING WORKS

= COLOUR CODE RED = PROPOSED RLY WORKS

= COLOUR CODE YELLOW = TO BE DISMANTLED

BRIDGE DETAILS

DESCRIPTION	EXISTING IR BRIDGE : 551	PROPOSED BSRP BRIDGE : 551
CHAINAGE AT CENTER OF BRIDGE (km)	212/860	7+210.897
RAIL LEVEL AT CENTER OF BRIDGE (m)	888.975	895.394
FORMATION LEVEL AT CENTRE OF BRIDGE (m)	888.361	894.632
DIMENSIONS (Nos x SPAN(m) x HEIGHT(m))	1 x 1.8 x 2.701 ##	1 x 2 x 3.05
STRUCTURE CONFIGURATION	RCC SLAB	RCC BOX RECONSTRUCTION

DEPTH OF CONSTRUCTION FOR 1 x 2.0 x 3.2 m RCC BOX

RAIL 60 kg	:	172 mm
GR PAD	:	6 mm
PSC BLEEPER	:	210 mm
BALLAST CUSHION	:	350 mm
EARTH CUSHION	:	5960 mm
TOP SLAB	:	500 mm
TOTAL	=	7196 mm

TRACK DETAILS (PRO.BRIDGE)

LOADING	:	25 T-AXLE LOAD 2008-STD
ALIGNMENT	:	STRAIGHT
GRADE	:	LEVEL
RAIL LEVEL	:	895.394m
FORMATION LEVEL	:	894.632m

TRACK DETAILS (EXG.BRIDGE)

LOADING	:	MBG-1987
ALIGNMENT	:	STRAIGHT
GRADE/RISE	:	LEVEL
RAIL LEVEL	:	888.975 m
FORMATION LEVEL	:	888.361 m

GRADE OF CONCRETE

GRADE	
i. RCC BOX	M30
ii. WEARING COURSE	M25
iii. LEVELLING COURSE (PCC)	M20
iv. RETAINING/RETURN WALLS	M35

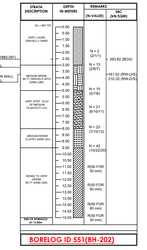
WATERWAY PARTICULARS

CATCHMENT AREA	0.005 SQKM
LATITUDE	13° 1' 31.252" N
LONGITUDE	77° 37' 4.991" E
TOPOSHEET NO	043.I/9.12
GSI/ DISCHARGE	0.17 CUMSEC
VELOCITY	1.88 M/S
DEPTH OF FLOW	1.150 M
OHFL	888.862 M
GSI/HFL (DESIGN HFL)	888.862 M

	REQUIRED	PROVIDED
WATERWAY AREA, Sqm	3.5	6.1
FREE BOARD, m	1.000	0.702
VERTICAL CLEARANCE, m	0.600	1.51
SCOUR DEPTH		
From GI HFL, m		0.511
Scour Level		890.321
From B.L, m		1.2

EXISTING WATERWAY PARTICULARS

	PROVIDED
WATERWAY AREA, Sqm	4.861
FREE BOARD, m	1.499
VERTICAL CLEARANCE, m	1.011



BOREHOLE ID SS1(BH-202)

MODUS OPERANDI :

PRELIMINARY WORKS

1. IMPOSE SPEED RESTRICTIONS FOR EXISTING MAIN LINE AT BRIDGE LOCATION BY INSTALLING, NECESSARY TEMPORARY ENGINEERING SPEED INDICATOR AS PER WPWM AND ALLOW TRAFFIC AS RESTRICTED SPEED.
2. CONSTRUCTION OF RETAINING WALL PART OF BSRP LINE-2
3. 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 EXECUTED WITH ALL SAFETY MEASURES EXCEPT AT STRUCTURE PORTION.
7. CONSTRUCTION OF RETAINING WALL 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. CARRYOUT 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 55.0M.
14. AFTER CUT AND CONNECTION, INDIAN RAILWAY TRAFFIC WILL BE DIVERTED TO PROPOSED BSRP LINE-2.
15. EXISTING TRACK ENDUNDANT 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 DEMOLISHED AND REMOVED FULLY.
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 EXECUTED WITH ALL SAFETY MEASURES EXCEPT AT BOX PORTION.
21. CONSTRUCTION OF 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 5.03 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.

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(b) REVISED).
   d. IRS BRIDGE RULES 2014(REPRINT).
2. WING WALL/RETURN WALL :- 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 2/3).
4. RCC WORK :- REINFORCED CEMENT CONCRETE M35 GRADE USING 20MM MAXIMUM SIZE GRADED HARD STONE AGGREGATE OF APPROVED QUALITY.
5. LEVELING COURSE :- 150 MM THICK M20 CONCRETE.
6. WEEP HOLES :- WEEP HOLES TO BE PROVIDED AS PARA 7.6 OF SUB STRUCTURE CODE & WEEP HOLES SHALL BE OF 100 DIA AC PIPES STAGGERED AT 1000 C/C ABOVE LOW WATER LEVEL IN BOTH WING WALL/RETURN WALL & EARTH RETAINER OF BOX.
7. LOADING STANDARD :- 25 T - 2008 AXLE LOAD.
8. TOE WALL :- GRADE M35 WITH DESIGN MIX.
9. GRADE OF STEEL FOR RCC IS TMT-500D CONFORMING TO IS 1786-2008.
10. MASS CONCRETE TO BE OF M35 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. APRON :- APRON SHALL BE OF STONE PITCHING WITH CM 1:3.
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 CONSTRUCTION PRACTICE, THIS LAYER SHOULD FULLFIL THE CRITERIA OF SINKING 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 RETURN STRUCTURE, SEPERATE STRUCTURE DRAWING WILL BE SUBMITTED.
19. THE DIMENSION OF INTEGRATED RETURN WALL AND SACRIFICIAL RETURN WALL SHOWN IN GAD ARE ONLY INDICATIVE AND TO FOLLOW AS PER APPROVED DESIGN AND DRAWINGS.

REFERENCE:

1. RCC BOX (CA/S1-R1-STD) : DRG NO. RDSO/B-10155 & 10155/7
2. NUMERATION & RC DETAIL OF BOX - 22077-BSRP-CR2-C-NB-0-20-1095
3. NUMERATION & RC DETAIL OF RETURN WALL - O22077-BSRP-CR2-C-NB-0-20-1096
4. WEEP HOLES AS PER PARA 7.4 OF SUB-STRUCTURE CODE.
5. BALLAST RETAINER AS PER DESIGN,MONOLITHIC WITH BOX
6. CURTAIN WALL AND TOE WALL AS PER DESIGN
7. BACKFILL MATERIALS BEHIND RCC BOX TO PROVIDE AS PER PARA 7.5 OF IRS BRIDGE SUBSTRUCTURE AND FOUNDATION CODE.
8. SHORING ARRANGEMENTS AS PER DESIGN.
9. GAI DOCUMENT NO.DOC-BSRP-CR2-AO-GCH-GB-20-1126

BRIDGE STRENGTH CERTIFICATE

CERTIFIED THAT THE PRO RCC BOX BRIDGE,SR.NO.551 OF 1x2.0x3.2m AT BSRP-CH-7+210.897, IR KM 212/860 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.

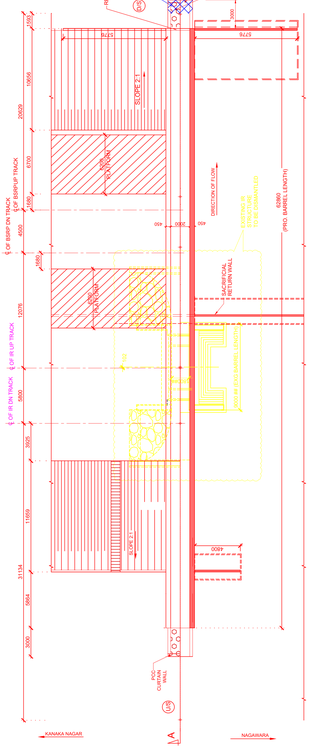
L&T	GC	KRIDE

NOTES:

1. ALL LEVELS ARE W.R.T TO MSL.
2. ALL DIMENSIONS ARE IN MILLIMETERS. REDUCED LEVELS ARE IN METRES AND CHAINAGE ARE IN KILOMETERS, UNLESS STATED OTHERWISE.
3. DO NOT SCALE THE DRAWING,FOLLOW FIGURED DIMENSIONS ONLY.
4. THE TYPE,DESIGN & DEPTH OF FOUNDATION IN GAD ARE INDICATIVE ONLY. THE ACTUAL TYPE & DEPTH OF FOUNDATION WILL BE DECIDED BY THE ENGINEER-IN-CHARGE AS PER ACTUAL SOIL ENCOUNTERED AT SITE DURING EXECUTION.
5. SAFE BEARING CAPACITY OF SOIL IS 293.82 KN/m²
6. LENGTH OF PITCHING FOR APPROACHES SHALL BE DECIDED BY THE ENGINEER-IN-CHARGE OF THE WORK TO SUIT SITE CONDITIONS.
7. PRO.BRIDGE U/S OF L/R & DN LINE ON THE UP STREAM SIDE OF THE EXISTING BRIDGE.
8. FOR DETAILS OF CLUSTER BORE HOLES AS PER THE SITE DETAILS PROVIDED.
9. SCOUR PROTECTION WORK,DRAINAGE AND PROTECTIVE/PITCHING SHOULD BE DONE AS PER SITE CONDITION.
10. A) ON THE TOP SURFACE OF CONCRETE AT THE END OF EACH DAYS WORK A CONSTRUCTION PATTERN TO BE FORMED BY EMBEDDING WOODEN SCANTLINGS OR SLEEPERS TO FORM KEY FOR ADEQUATE BOND FOR THE NEXT DAYS CONCRETING.
    B) ON THE NEXT WORKING DAY ALL THE LAITANCE SHALL BE REMOVED BY SCRUBBING THE SURFACE WITH WIRE BRUSH WITHOUT DISLODGING THE PARTICLES OF AGGREGATE, THE SURFACE SHALL BE THOROUGHLY WETTED & CAN BE COATED WITH NEAT CEMENT GROUT BEFORE FIRST LAYER OF CONCRETE IS LAID.
11. THE BOULDER FILLING SHALL CONSISTS OF WELL HAND PACKED BOULDERS & COBBLES TO THICKNESS NOT LESS THAN 600 mm BEHIND THE BACKFILLING MATERIALS SHALL CONSIST OF GRANULAR MATERIALS OF GW, GP, SW CORRECT AS PER IS 1498 - 1970.
12. NO CONSTRUCTION JOINTS ARE PERMITTED.
13. CONTROLLED CONCRETE AS PER DESIGN MIX TO BE USED AND MIXED BY WEIGH BATCHING.
14. DISMANTLING ELEMENTS ARE SHOWN IN DOTTED LINE.
15. WHILE EXECUTION OF PRO. BRIDGE FOR STAGE-1, EXISTING FLOOR PROTECTIVE WORKS MAY GET DAMAGED, SO TO PROTECT THE EXG.BRIDGE FROM SCOURING EFFECT FLOORING PROTECTIVE WORKS WILL BE PROVIDED.
16. SUITABLE SPEED RESTRICTIONS MAY BE IMPOSED BASED ON SITE CONDITIONS WHENEVER & WHEREVER IF IS NEEDED TO ENSURE SAFETY OF RUNNING LINE.
17. SUITABLE PROTECTIVE MEASURES SHOULD BE PUT IN PLACE WHILE CARRYING OUT THE WORK IN CONSULTATION WITH KRIDE & GENERAL CONSULTANT THIS SHALL INCLUDE NECESSARY SHORING ARRANGEMENTS TO BE PROVIDED FOR THE PROTECTION OF EXG.TRACK & FORMATION.
18. INSTRUCTIONS CONVEYED VIDE PCE'S CIRCULAR NO 01 2015 DATED: 09.03.2015 REGARDING" WORK DISPLINE AT SITE" AND AS PER PCE CIRCULAR NO.01/2021 DATED: 22.06.2021 REGARDING "ENSURING SAFETY OF WORK AND MAINTAINING SITE RECORDS IN WORKS CONTRACTS" TO BE STRICTLY FOLLOWED.
19. IT IS TO ENSURED BY KRIDE/BSRP-CORZ GM/CIVIL/PROJECTS BEFORE EXECUTION, THAT THE MAXIMUM BASE PRESSURE AT THE FOUNDATION LEVEL FOR EACH ELEMENT OF BRIDGE IS LESS THAN THE SAFE BEARING CAPACITY OF THE SOIL AT THAT LOCATION.
20. 20MM THK THERMOCOL SHEETS TO BE PROVIDED BETWEEN FACE WALL OF EXG.BRIDGE & PRO.RCC BOX & IF REQUIRED DOWEL BARS TO BE FIXED.
21. ENGINEER-IN-CHARGE SHALL ENSURE THAT LEVEL OF FOUNDATION OF DROP WALL, CURTAIN WALL AND RETURN WALL SHALL BE SUFFICIENTLY LOWER LEVEL THAN THE REQUIRED CALCULATED SCOUR LEVEL.
22. FEASIBILITY OF THIS BOX STRUCTURE AT SITE SHOULD BE ENSURED BY GM/KRIDE/BSRP-CORR/DORC
23. THIS DRAWING IS PREPARED BASED ON RDSO STANDARD DRG. NO. RDSO/B/10155 & 10155/7. AS PER BOX SIZE 1x2.0x3.5 m

LOADING STANDARD

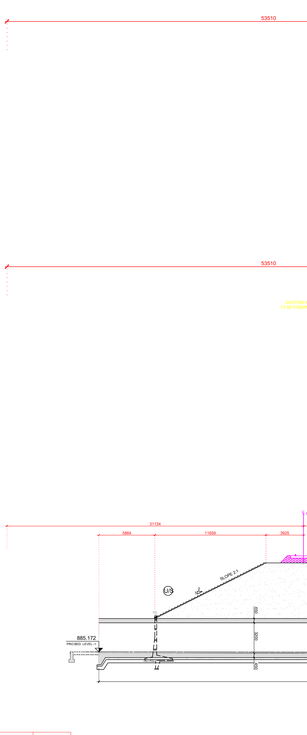
A) PRO.BRIDGE:25T-AXLE LOAD 2008 STD
B) EXG.BRIDGE:MBG OF 1987



HALF PLAN AT TOP

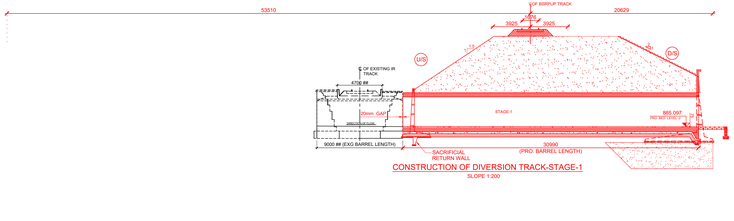
HALF PLAN AT BOTTOM

SECTION A-A

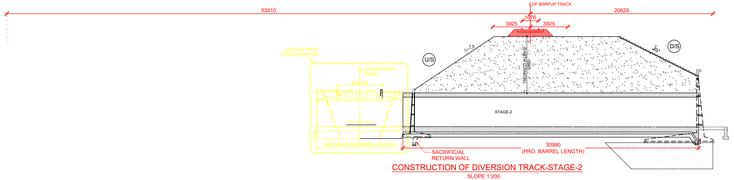


DEPTH OF SOIL IMPROVEMENT (mm)	WIDTH OF SOIL IMPROVEMENT (mm)	LENGTH OF SOIL IMPROVEMENT (mm)
3000	6150	67000

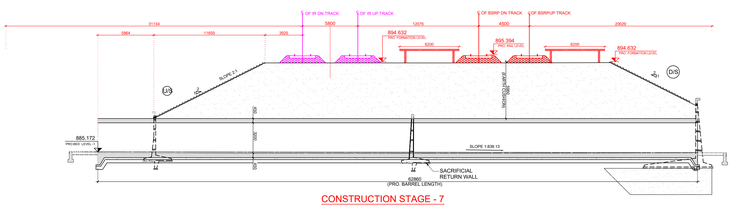
HFL	FREE BOARD (mm)	BED LEVEL-1	BED LEVEL-2
886.562	7700	885.172	885.097



CONSTRUCTION OF DIVERSION TRACK-STAGE-1
SLOPE 1:200



CONSTRUCTION OF DIVERSION TRACK-STAGE-2
SLOPE 1:200



CONSTRUCTION STAGE - 7
SCALE: 1:200

LEGENDS:

Total Barrel length of M/B 551 = 62.860m.
Completed Barrel length = 17m(BSRP Side).
Remaining Barrel length 45.860m is yet to be Constructed.

MODUS OPERANDI :

1. IMPOSE 20KPH 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.

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

GENERAL CONSULTANTS:

egis AECOM WSP MOTT MACDONALD-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. 551 AT BSRP CH: 7+208 OF 1X2.0X3.2m (CLEAR HEIGHT - 3.05m) RCC BOX(CAST-IN-SITU) IN LIEU OF THE EXG. BRIDGE OF 1 X 1.8 x 2.701m RCC SLAB AT IR KM 212/861.090 BETWEEN NAGAWARA AND KANAKA NAGAR STATIONS.

KRIDE.DRG.NO:

HQ.DRG.NO:

SCALE - 1 : 100 (UNLESS SPECIFIED OTHERWISE)

O22077-BSRP-CR2-C-NB-0-20-1079 (Rev 0)