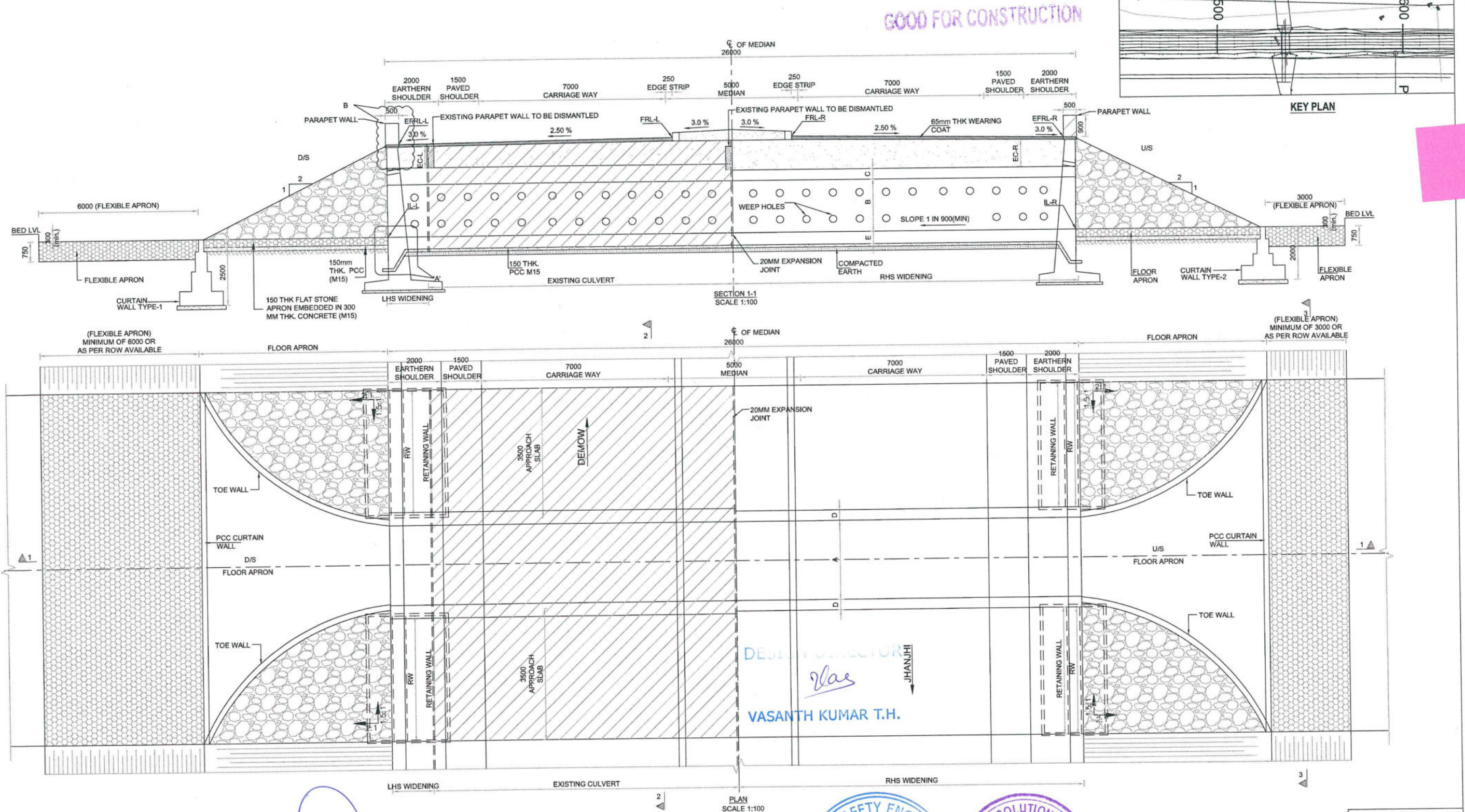


# Details Of Box culvert:

EXISTING CHAINAGE	DESIGN CHAINAGE	SPAN	FRL-L	FRL-R	EFRL-L	EFRL-R	EC-L	EC-R	IL-L	IL-R	CLEAR WIDTH (A)	CLEAR HEIGHT (B)	TOP SLAB THICKNESS (C)	WALL THICKNESS (D)	BOTTOM RAFT THICKNESS (E)	RW	FLOW DIRECTION	LHS WIDENING	RHS WIDENING
529+930	529+536	1X4.4X2.407	94.219	93.969	94.744	93.444	0.442	0.442	90.756	90.786	4.400	2.407	0.40	0.40	0.40	6.0	R-L	1.552	13.000

STRUCTURE NO:	38
DESCRIPTION	EXISTING PROPOSED
CHAINAGE	529930 529536
SPAN	1X4.4X2.407 1X4.40X2.407
TYPE	BOX BOX
PROPOSAL	WIDENING

Design Speed (V)	1.336
Lc(m)	51.313
Ts(m)	25.658
Es(m)	0.150



**PROJECT**  
FOUR LANING OF JHANJHI TO DEMOW  
SECTION OF NH-37 FROM EXISTING CH. Km  
491+050 TO Km 535+250 (DESIGN CH. Km  
490+800 TO Km 534+800) IN THE STATE OF  
ASSAM UNDER EPC MODE.

**CLIENT**  
National Highways Infrastructure  
Development Corporation Ltd.  
Ministry of Road Transport &  
Highways, Government of India  
Branch office : House No.1, Panipath,  
Ambikagiri Nagar, Zoo road,  
Guwahati-24

**CONTRACTOR**  
Gannon Dunkerley & Co. Ltd.  
86A, TOPSIA ROAD (SOUTH),  
HALHE STREET, 7TH FLOOR  
KOLKATA - 700046

**DESIGN CONSULTANT**  
PROFESSIONAL CIVIL INFRA PVT. LTD.  
# 1838, GROUND FLOOR,  
SIR. M VISVESWARAYA LAYOUT,  
NAGADEVANAHALLI,  
BANGALORE - 560 066

**PROOF CONSULTANT**  
CHETAN INFRATECH  
CONSULTANTS (P) LTD.  
7/11, 1ST FLOOR,  
10TH MAIN, SRINAGAR,  
OM PLES COLLEGE,  
BENGALURU-560050

**SAFETY CONSULTANT**  
SMART SAFETY SERVICES  
# 5-6 & 7, HARI HARA NIVAS,  
GUMMAKONDA COLONY,  
HYDERGUDA,  
HYDERABAD - 500048

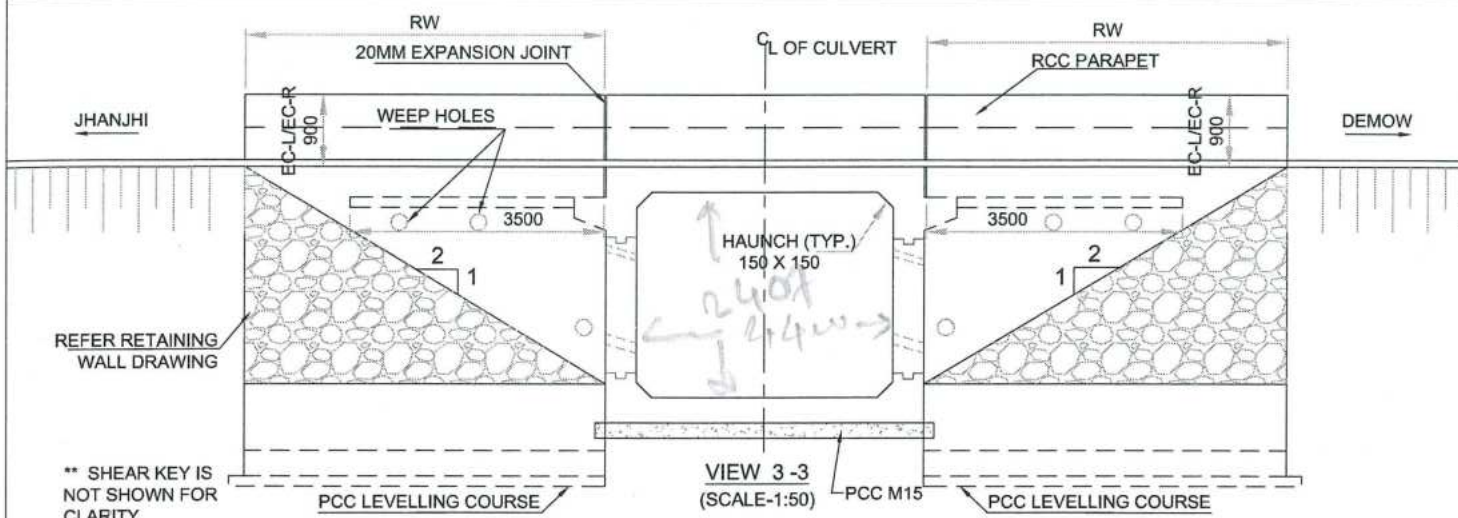
**AUTHORITY ENGINEER**  
VOYANTIS SOLUTIONS PVT. LTD.  
403, 4th Floor, BPT Park  
Centre, Block A, Sal Vayu  
Vihar, Sector 35,  
Gurgaon, Haryana - 122001

NAME	SHEET SIZE
DESIGN DIRECTOR	A2
PROOF CONSULTANT	SCALE
SAFETY CONSULTANT	AS SHOWN
AUTHORITY CONSULTANT	SHEET No.
	01 OF 02

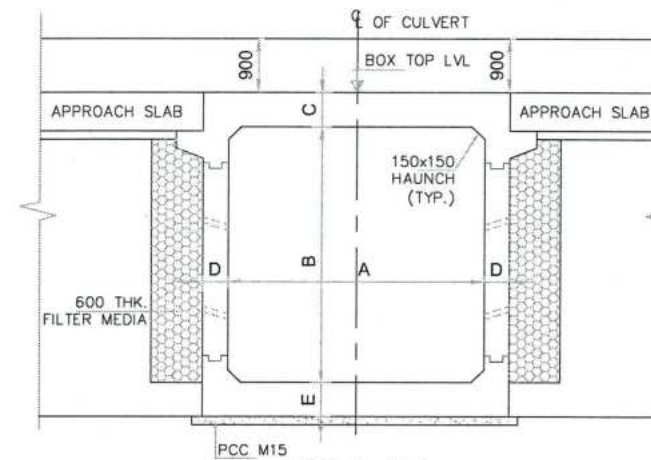
TITLE: GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (WIDENING) AT DESIGN CH 529+536 (EXISTING CH 529+930)	
DRAWING No.	RECIPL/NH-37/J-D/STR/BC/22
REV.	00



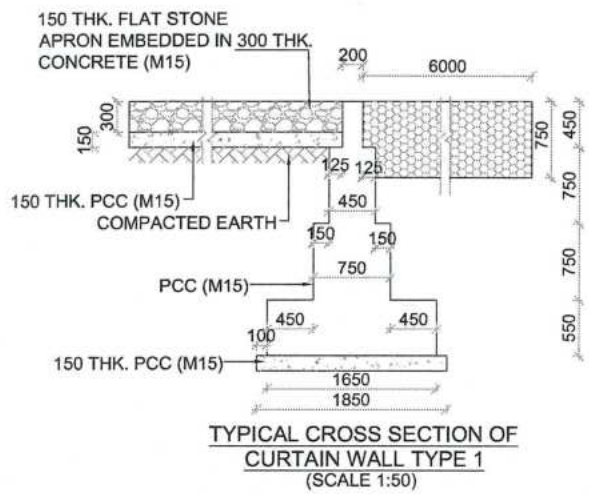
GOOD FOR CONSTRUCTION



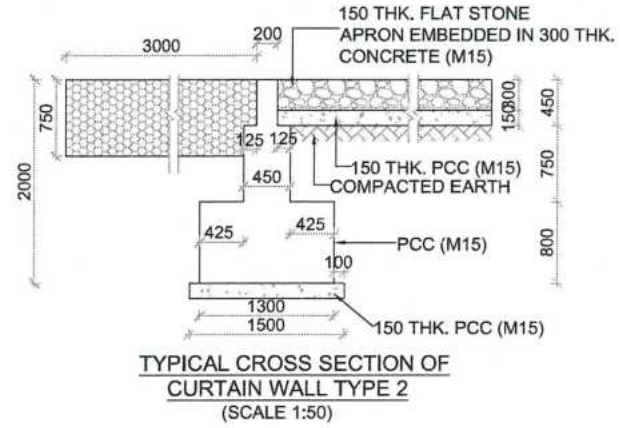
VIEW 3-3  
(SCALE-1:50)



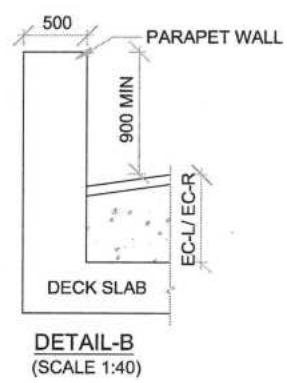
SECTION 2-2  
SCALE-1:50



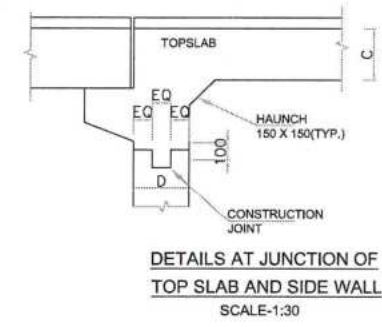
TYPICAL CROSS SECTION OF  
CURTAIN WALL TYPE 1  
(SCALE 1:50)



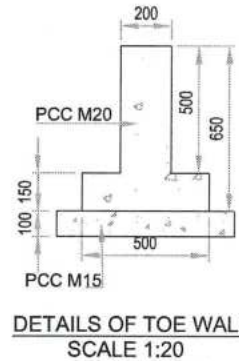
TYPICAL CROSS SECTION OF  
CURTAIN WALL TYPE 2  
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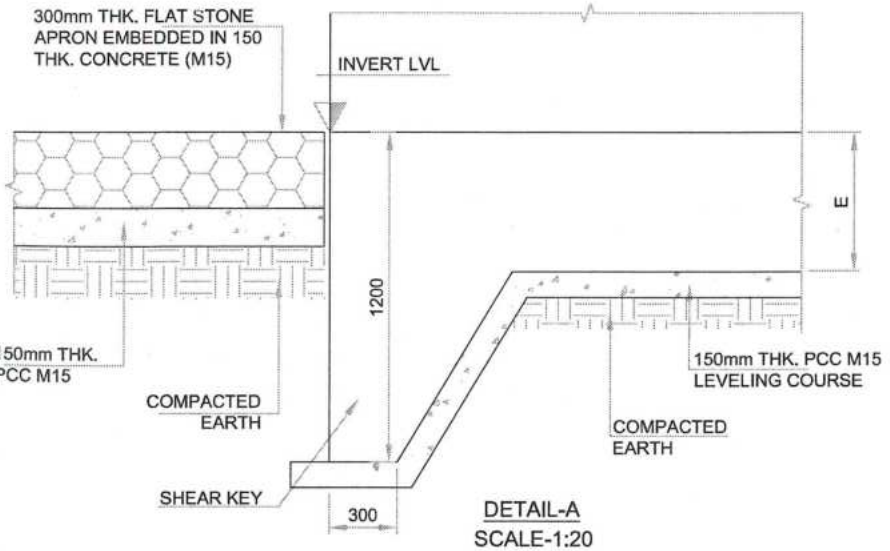
DETAIL-B  
(SCALE 1:40)



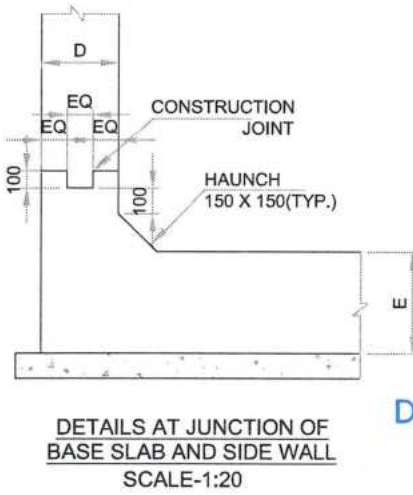
DETAILS AT JUNCTION OF  
TOP SLAB AND SIDE WALL  
SCALE-1:30



DETAILS OF TOE WALL  
SCALE 1:20

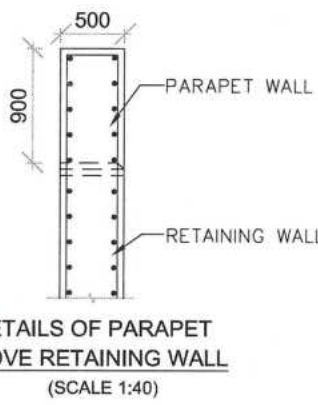


DETAIL-A  
SCALE-1:20

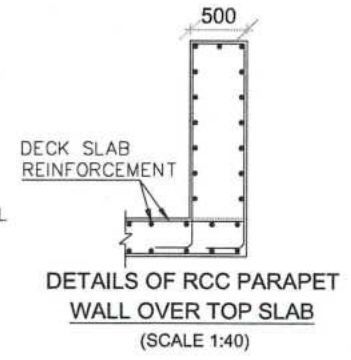


DETAILS AT JUNCTION OF  
BASE SLAB AND SIDE WALL  
SCALE-1:20

DESIGN DIRECTOR  
*Vasanth*  
VASANTH KUMAR T.H.



DETAILS OF PARAPET  
ABOVE RETAINING WALL  
(SCALE 1:40)



DETAILS OF RCC PARAPET  
WALL OVER TOP SLAB  
(SCALE 1:40)

(REFER MISCELLANEOUS DRAWINGS)

- PROPOSED SEQUENCE OF CONSTRUCTION:-**
1. EARTH WORK EXCAVATION
  2. CONFIRMATION OF FOUNDING LEVEL AS MENTIONED IN GFC DRAWING
  3. LAYING OF PCC LEVELLING COURSE
  4. CONSTRUCTION OF BOTTOM SLAB WITH A PORTION OF WEB
  5. CONSTRUCTION OF WEB
  6. CONSTRUCTION OF TOP SLAB WITH A PORTION OF TOP WEB
  7. BACK FILLING BEHIND THE SIDE WALL
  8. LAYING OF WEARING COAT
  9. PLACING OF SIDL

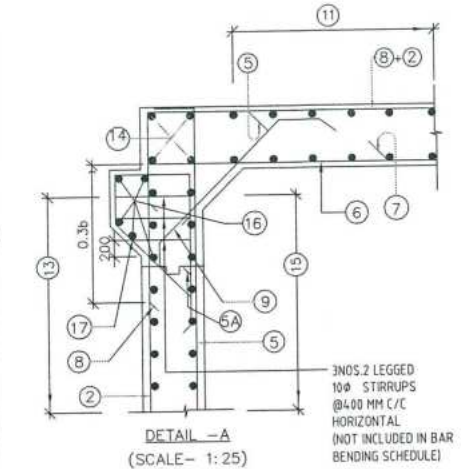
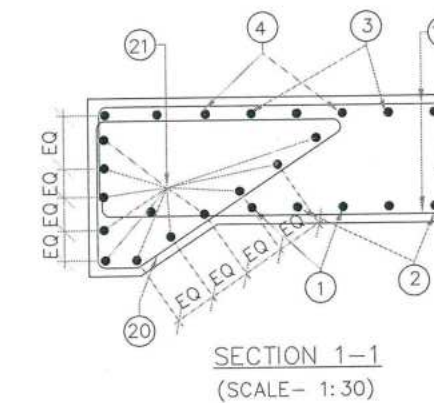
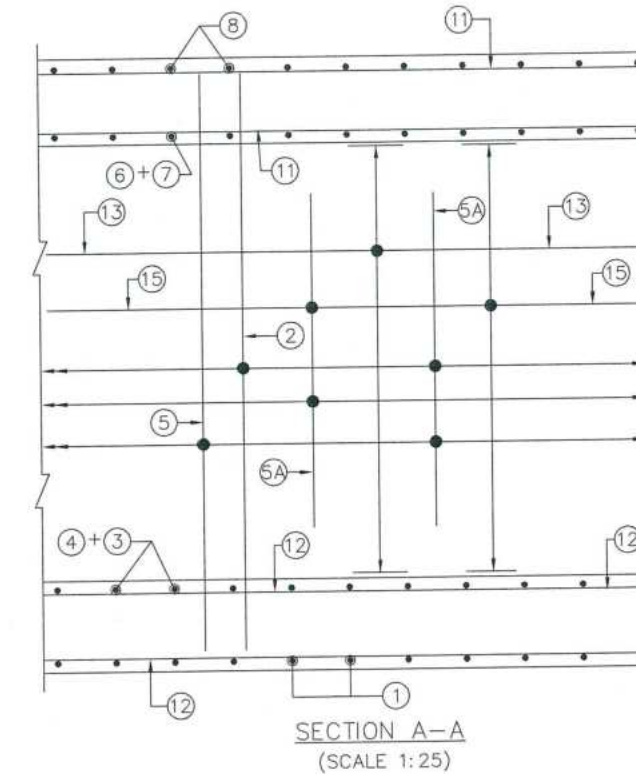
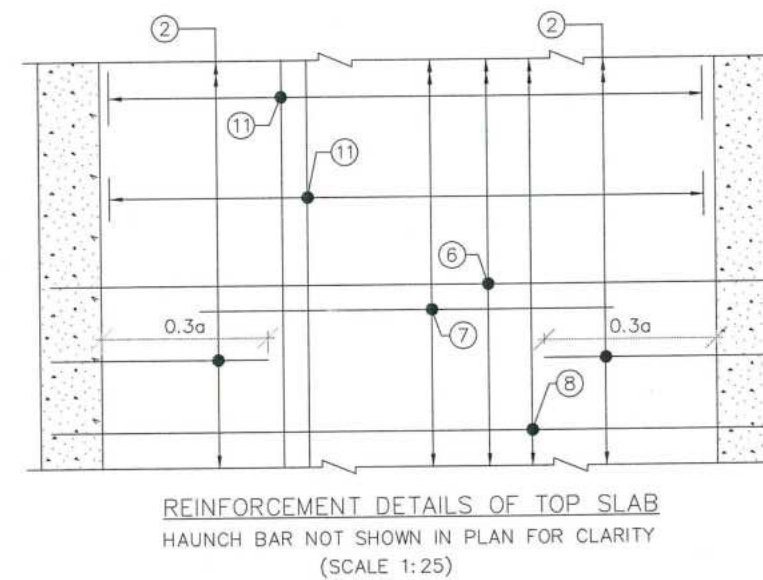
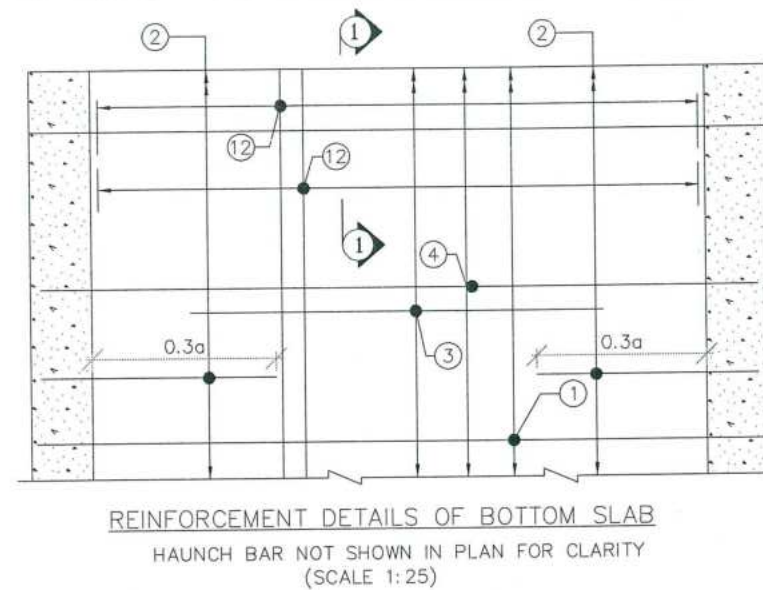
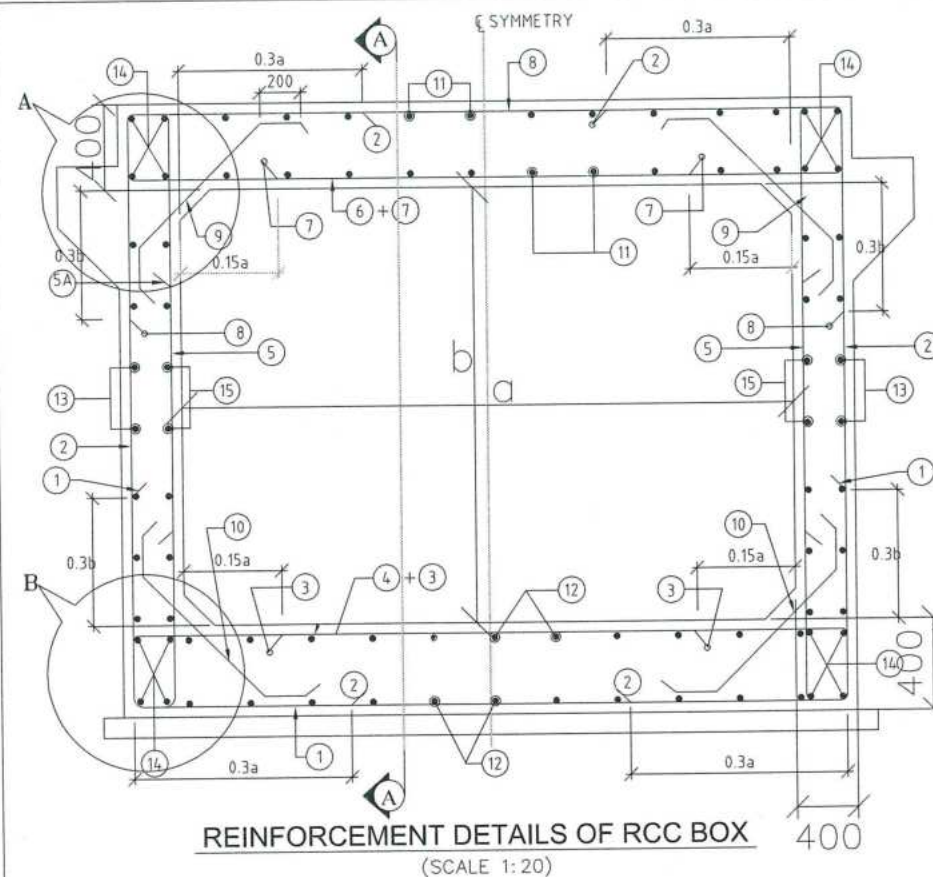
- LEGEND:**
- IL - INVERT LEVEL
  - EC - EARTH CUSHION
  - FRL - FINISHED ROAD LEVEL
  - EFRL - FINISHED ROAD LEVEL AT EDGE
  - A - CLEAR WIDTH OF BOX
  - B - CLEAR HEIGHT OF BOX
  - C - TOP SLAB THICKNESS
  - D - SIDE WALL THICKNESS
  - E - BOTTOM RAFT THICKNESS
  - RW - RETAINING WALL

- NOTES:**
01. ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METERS, UNLESS MENTIONED OTHERWISE.
  02. DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
  03. CONCRETE MIX SHALL BE DESIGN MIX AND SHALL HAVE MAXIMUM 28 DAYS CHARACTERISTIC CUBE STRENGTH AS FOLLOWS:
    - (i) BOX.....M30
    - (ii) PARAPET.....M40
    - (iii) RETURN WALL.....M30
    - (iv) LEVELING COURSE.....M15
    - (v) CURTAIN WALL.....M20
    - (vi) TOE WALL.....M20
    - (vii) GUARD STONE.....M20
  04. GRADE OF UNTENSIONED STEEL SHALL BE Fe 500D, CONFORMING TO IS: 1786.
  05. 600mm FILTER MEDIA SHALL BE PROVIDED BEHIND RCC BOX AND RETURN WALL.
  06. THE BACK FILL MATERIAL BEHIND RCC BOX / RETAINING WALL SHALL HAVE FOLLOWING PROPERTIES  $\phi 30^\circ$ ,  $\gamma=2.0$  T/Cum.
  07. SEISMIC ZONE - V.
  08. SAFE BEARING CAPACITY AT FOUNDING LEVEL IS  $12\text{N/m}^2$ , THE SAME SHALL BE VERIFIED AT SITE BEFORE STARTING OF WORK.
  09. FLOW DIRECTION SHOWN IN THE PLAN IS INDICATIVE ONLY, BED PROTECTION FOR UPSTREAM AND DOWN STREAM SHALL BE BASED ON THE FLOW DIRECTION THE SITE.
  10. FLEXIBLE APRON SHALL BE PROVIDED BASED ON SITE CONDITION & SHALL BE DECIDED BY ENGINEER-IN-CHARGE WHEREVER ROCK IS AVAILABLE AT TOP LEVEL FLEXIBLE APRON SHALL BE DISPENSED.
  11. BACK FILLING SHALL BE DONE SIMULTANEOUSLY ON BOTH SIDE OF BOX.
  12. DRAWING SHALL BE READ IN CONJUNCTION WITH RELEVANT APPROVED HIGHWAY DRAWING FOR FRL, INVERT LEVEL, GL, CROSS SLOPE, LONGITUDINAL GRADIENT, ROAD WAY DETAILS ETC
  13. PITCHING / REVETMENT ON SLOPES TO BE PROVIDED AS PER MORTH SPECIFICATION.
  14. IF BC/CLAYEY SOIL ENCOUNTERED AS FOUNDING SOIL, THEN 900mm. DEPTH OF SOIL BELOW FOUNDATION TO BE REMOVED & FILLED BY METAL / BOULDRES WITH SAND AS PER SP-13.
  15. THE CLEAR OPENING SIZE AND EARTH CUSHION MENTIONED SHALL BE VERIFIED WITH EXISTING STRUCTURE / APPROVED PPD AND IN CASE OF ANY DESCREPCANCY. IT SHOULD BE IMMEDIATELY REPORTED FOR SUITABLE ACTION PRIOR TO COMMENCEMENT OF THE WORK.
  16. SOFT AND LOOSE PATCHES IN THE BEARING AREA SHALL BE REPLACED BY COMPACTED GRANULAR FILLS AND SHALL BE PROPERLY COMPACTED WITH LAYERS NOT EXCEEDING 200mm BEFORE LAYING PCC OVER IT.
  17. PCC LEVELLING COURSE:
    - BELOW BOX STRUCTURE & TOE WALL - 150 THK.
    - BELOW FLOOR APRON - 150 THK.
  18. STRUCTURE HAS BEEN DESIGNED FOR
    - i) ONE LANE, TWO LANE AND THREE LANES OF CLASS A
    - ii) ONE LANE OF CLASS 70R + ONE LANE OF CLASS A
    - iii) ONE LANE OF 40R BOGIE + ONE LANE OF CLASS A.
  19. CONSTRUCTION JOINTS:-
    - i) THE LOCATION AND PROVISION OF CONSTRUCTION JOINTS SHALL BE AS PER THE DRAWING AND THE SAME SHALL BE APPROVED BY THE ENGINEER-IN-CHARGE.
    - ii) THE CONCRETE SURFACE AT THE JOINT SHALL BE BRUSHED WITH A STIFF BRUSH AFTER CASTING WHILE THE CONCRETE IS STILL FRESH AND IT HAS ONLY SLIGHTLY HARDENED.
    - iii) BEFORE NEW CONCRETE IS POURED THE SURFACE OF OLD CONCRETE SHALL BE PREPARED AS UNDER:
      - (a) FOR HARDENED CONCRETE, THE SURFACE SHALL BE THOROUGHLY CLEANED TO REMOVE DEBRIS / LAITANCE & MADE ROUGH SO THAT  $\frac{1}{4}$  OF THE SIZE OF THE AGGREGATE IS EXPOSED
      - (b) FOR PARTIALLY HARDENED CONCRETE, THE SURFACE SHALL BE TREATED BY WIRE BRUSH FOLLOWED BY AN AIR JET
      - (c) THE OLD SURFACE SHALL BE SOAKED WITH WATER WITHOUT LEAVING PUDDLES IMMEDIATELY, BEFORE STARTING CONCRETING TO PREVENT THE ABSORPTION OF WATER FROM NEW CONCRETE
    - iv) NEW JOINT SHALL BE THOROUGHLY COMPACTED IN THE REGION OF THE JOINT
  20. REFER TCS TYPE: TCS-1C

FOR APPROVAL

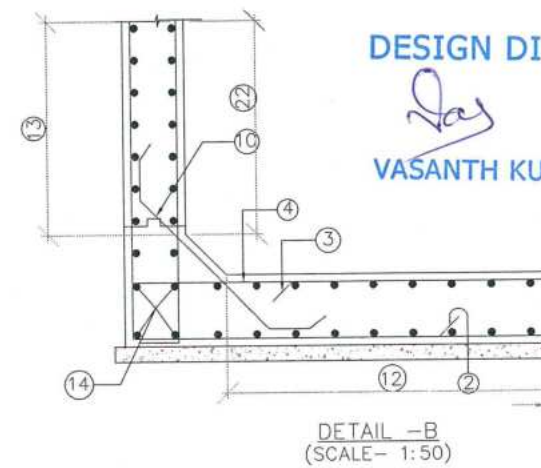
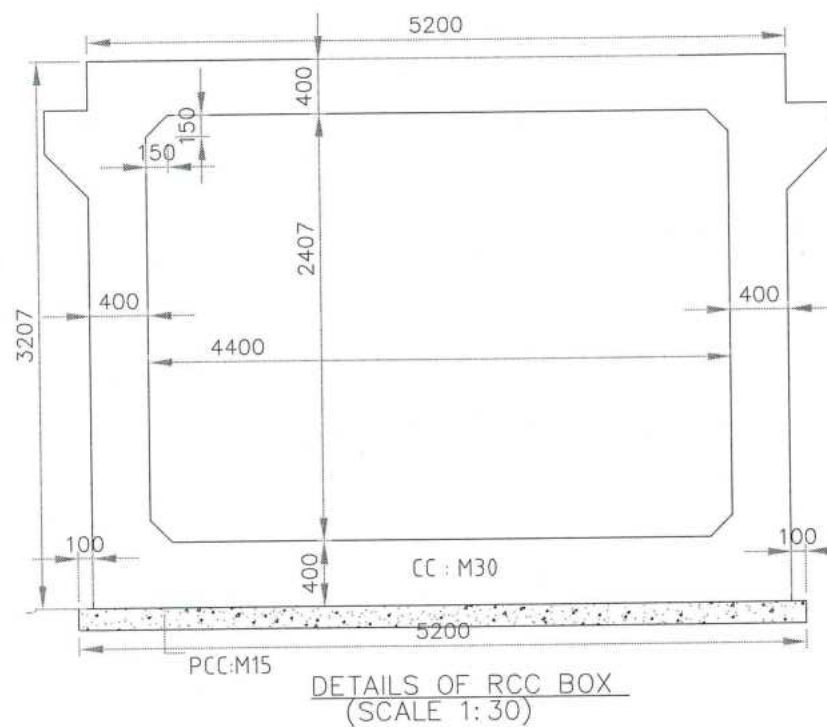
PROJECT	CLIENT	CONTRACTOR	DESIGN CONSULTANT	PROOF CONSULTANT	SAFETY CONSULTANT	AUTHORITY ENGINEER	NAME	SHEET SIZE	TITLE	DESIGN DIRECTOR	PROOF CONSULTANT	SAFETY CONSULTANT	AUTHORITY CONSULTANT	DRAWING No.	REV.
FOUR LANING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM EXISTING CH. Km 491+050 TO Km 535+250 (DESIGN CH. Km 490+800 TO Km 534+800) IN THE STATE OF ASSAM UNDER EPC MODE.	National Highways Infrastructure Development Corporation Ltd. Ministry of Road Transport & Highways, Government of India Branch office : House No.1, Panipath, Ambikagiri Nagar, Zoo road, Guwahati-24	Ganesh Dhanraj & Co. Ltd. 35A, TOPSH ROAD (SOUTH), HARI STREET, 7TH FLOOR, KOLKATA - 700046	PROFESSIONAL CIVIL INFRA PVT. LTD. # 1838, GROUND FLOOR, SIR. M VISVESWARAYA LAYOUT, NAGADEVANAHALLI, BANGALORE - 560 056	CHETAN INFRA TECH CONSULTANTS (P) LTD. 7/11, 1ST FLOOR, 13TH MAIN STREET, AGAR, ORR PES COLLEGE, BENGALURU-560040	SMART SAFETY SERVICES # 3-5-6 & 7, HARI HARA NIVAS, GUMMAKONDA COLONY, HYDERGUDA, HYDERABAD - 500048	VOYANTS SOLUTIONS PVT. LTD. 203, 4th Floor, BPTP Park Centre, Block A, Jal Vayu Vihar, Sector 30, Gurgaon, Haryana 122001		A2	GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (WIDENING) AT DESIGN CH 529+536 (EXISTING CH 529+930)					PC IPL/NH-37/J-D/STR/BC/22	00
								AS SHOWN							
								02 OF 02							





DESIGN CH: 529+536  
SCHEDULE OF REINFORCEMENT

BAR MARK	SHAPE OF BARS (NOT TO SCALE)	BAR DIA IN mm	SPACING OR NO. OF BAR
1		12	175 C/C
2		12	175 C/C
3		12	200 C/C
4		12	175 C/C
5		12	200 C/C
5A		10	200 C/C
6		12	200 C/C
7		12	200 C/C
8		12	175 C/C
9		10	200 C/C
10		10	200 C/C
11		10	200 C/C
12		10	200 C/C
13		10	200 C/C
14		10	16 NOS.
15		10	200 C/C
16		10	10 NOS.
17		10	250 C/C
18			NOT USED
19			NOT USED
20		10	150 C/C
21		10	20 NOS.



**DESIGN DIRECTOR**  
  
**VASANTH KUMAR T.H.**

**NOTES:**

- ALL DIMENSIONS ARE IN MILLIMETERS & LEVELS ARE IN METERS.
- DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS TO BE FOLLOWED.
- GRADE OF CONCRETE : M30 FOR BOX.
- GRADE OF STEEL : Fe500.
- CLEAR COVER TO REINFORCEMENT SHALL BE AS FOLLOWS.  
TOP SLAB = 75mm (TOP FACE); 50mm (BOTTOM FACE)  
BOTTOM SLAB = 50mm (TOP FACE); 75mm (BOTTOM FACE)  
OUTER WALL = 75mm (EARTH FACE); 50mm (WATER FACE).
- ANCHORAGE LENGTH SHALL BE 40x BAR DIA (φ)
- LAP LENGTH OF THE STEEL SHALL BE PROVIDED AS BELOW.  
LAP LENGTH = K x l  
K = 1.00 (<25% LAPPED BAR RELATIVE TO TOTAL CROSS SECTIONAL AREA.)  
K = 1.15 (33% LAPPED BAR RELATIVE TO TOTAL CROSS SECTIONAL AREA.)  
K = 1.40 (50% LAPPED BAR RELATIVE TO TOTAL CROSS SECTIONAL AREA.)  
ALTERNATIVELY BAR SPLICE COUPLER CAN BE USED FOR REBAR LAPPING AND SPLICING.
- NOT MORE THAN 50% OF BARS CAN BE LAPPED AT A SECTION AND LAPS SHALL BE STAGGERED.
- FOR DETAILS OF APPROACH SLAB, HAND RAILING RETAINING WALL, REFER SEPARATE MISCELLANEOUS DRAWINGS.
- SBC OF SOIL BELOW THE BOX STRUCTURE SHALL NOT BE LESS THAN 12.0 T/Sq.m

**FOR APPROVAL**

<b>PROJECT</b> FOUR LANING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM EXISTING CH. Km 491+050 TO Km 535+250 (DESIGN CH. Km 490+800 TO Km 534+800) IN THE STATE OF ASSAM UNDER EPC MODE.	<b>CLIENT</b> National Highways Infrastructure Development Corporation Ltd. Ministry of Road Transport & Highways, Government of India Branch office : House No.1, Panipath, Ambikagiri Nagar, Zoo road, Guwahati-24	<b>CONTRACTOR</b> Sankar Dunderley & Co. Ltd. 8th FLOOR, SOUTH BRIDGE STREET, 7th FLOOR, KOLKATA - 700005	<b>DESIGN CONSULTANT</b> PROFESSIONAL CIVIL INFRA PVT. LTD. # 1839, GROUND FLOOR, SIR M VISVESWARAYALAY OUT, NAGADEVANAHALLI, BANGALORE - 560056	<b>PROOF CONSULTANT</b> CHETAN INFRA TECH CONSULTANTS (P) LTD. 7/11, 1ST FLOOR, 10TH MAIN, SRINAGAR, OPP RES COLLEGE, BENGALURU - 560056	<b>SAFETY CONSULTANT</b> SMART SAFETY SERVICES PRABHAKAR RAGANIVAS, GUMMAKONDA COLONY, HYDERABAD - 500048	<b>AUTHORITY ENGINEER</b> MOYANTS SOLUTIONS PVT. LTD. Nos. 405, PLOT, BRT Park Centre, Block A, Jal Yau Vihar, Sector 36, Gurgaon, Haryana - 122001	<b>DESIGN DIRECTOR</b> NAME SCALE AS SHOWN SHEET No. 01 OF 01	<b>TITLE</b> REINFORCEMENT DETAILS OF BOX CULVERT (1X4.4X2.407) AT DESIGN CHAINAGE 529+536 (EXISTING CHAINAGE 529+930) DRAWING No. PCIP/LN-37/JD/BC/STR/REIN/22 REV. 00
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