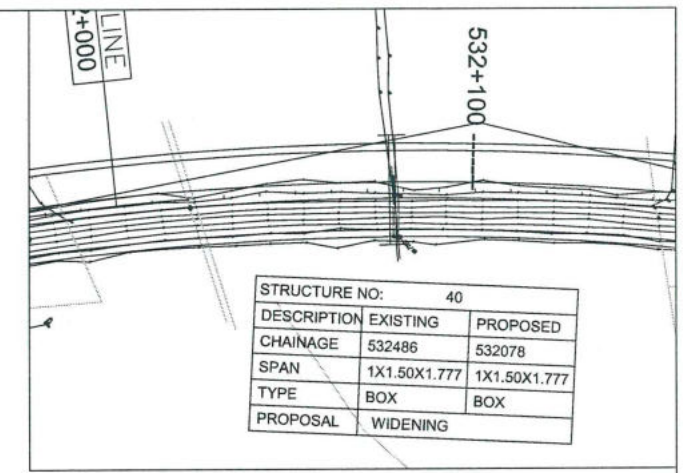
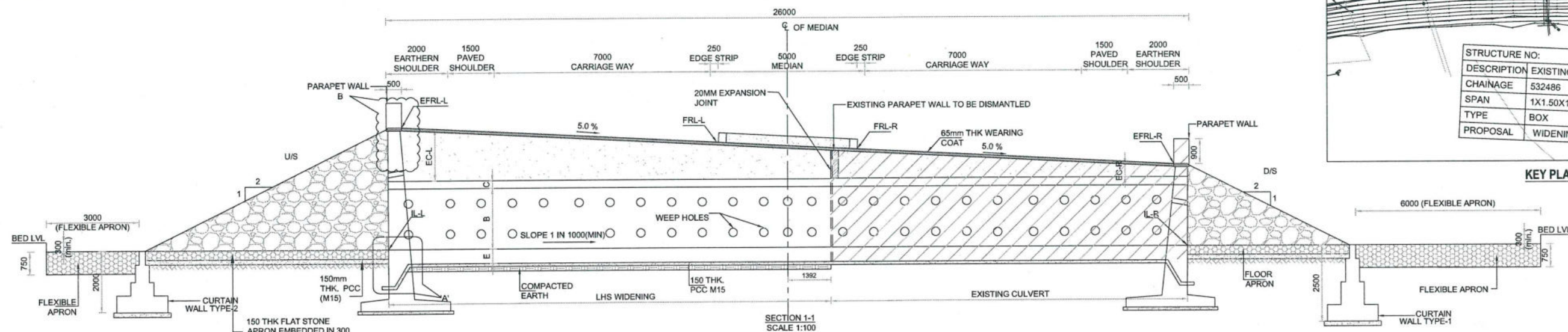


# Details Of Box culvert:

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
532+486	532+078	1X1.5X1.777	93.780	93.530	94.305	93.005	1.564	0.264	90.640	90.614	1.500	1.777	0.25	0.25	0.25	5.5	L-R	14.392

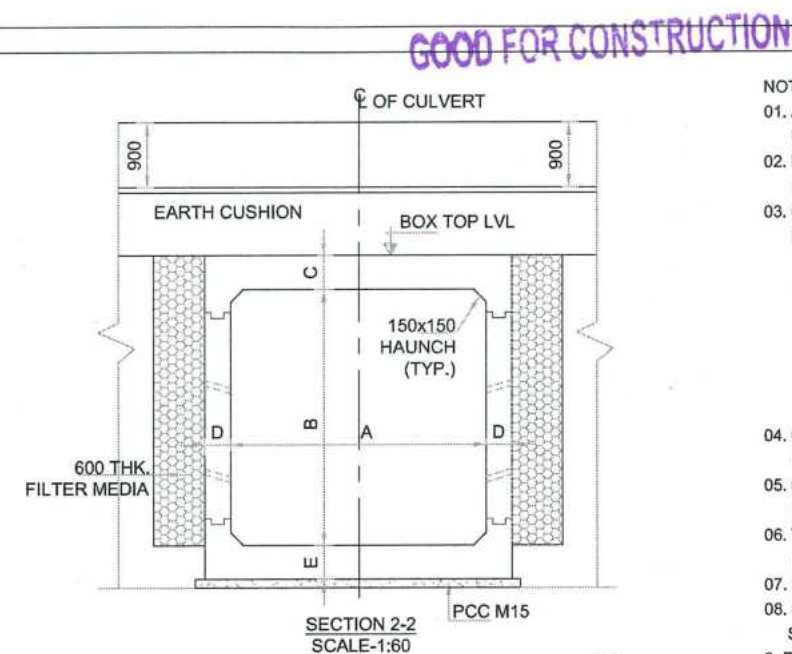


KEY PLAN

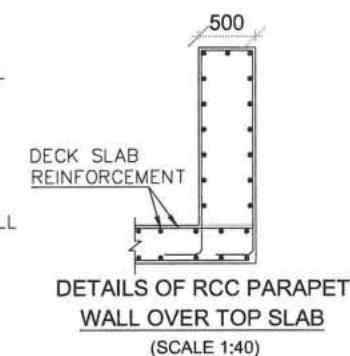
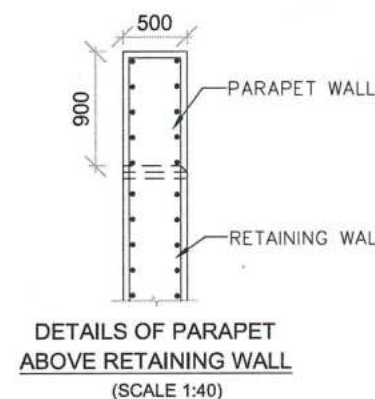
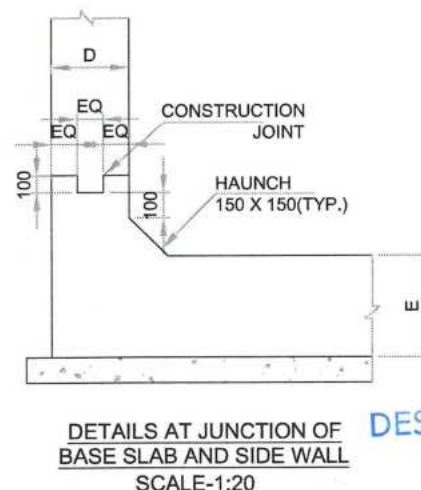
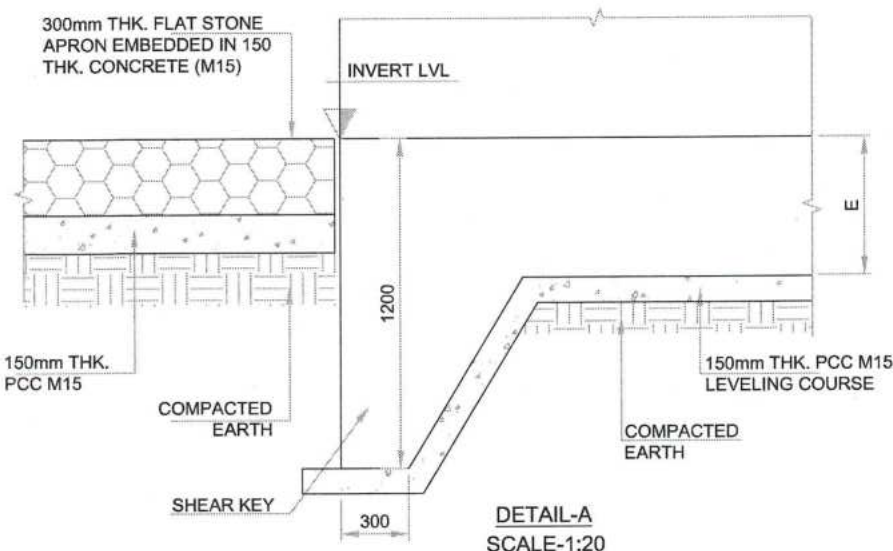
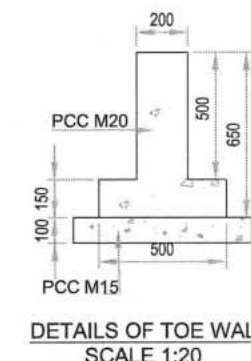
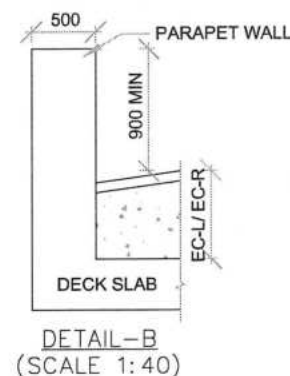
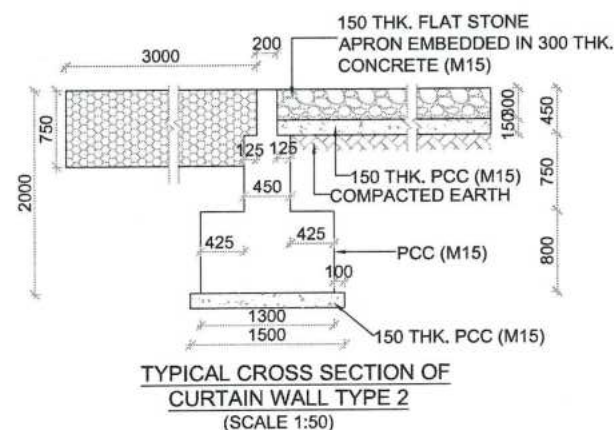
VASANTH KUMAR T.H.

<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> Cannon Dunkerley & Co. Ltd. 86A TOPSIA ROAD (SOUTH), HAUTE STREET, 7th FLOOR, KOLKATA - 700046	<b>DESIGN CONSULTANT</b> PROFESSIONAL CIVIL INFRA PVT. LTD. # 1838, GROUND FLOOR, SIR. M VISVESWARAYA LAYOUT, NAGADEVANAHALLI, BANGALORE - 560 056	<b>PROOF CONSULTANT</b> CHETAN INFRATECH CONSULTANTS (P) LTD. 7/11, 1ST FLOOR, 13TH MAIN, SRINAGAR, 2ND PES COMPLEX, BENGALURU-560050	<b>SAFETY CONSULTANT</b> SMART SAFETY SERVICES # 35-6 & 7, HARI HARA NIVAS, GUMMAKONDA COLONY, HYDERGUDA, HYDERABAD - 500048	<b>AUTHORITY ENGINEER</b> VOYANTS SOLUTIONS PVT. LTD. 403, 4th Floor, BPT Park Centre, Block 2, Ural Vayu Vihar, Sector 30, Gurgaon, Haryana 122001	NAME	SHEET SIZE	<b>TITLE:</b> GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (WIDENING) AT DESIGN CH 532+078 (EXISTING CH 532+486)	<b>REV.</b> 00
							DESIGN DIRECTOR	A2		
							PROOF CONSULTANT	SCALE		
							SAFETY CONSULTANT	AS SHOWN		
							AUTHORITY CONSULTANT	SHEET No.		
								01 OF 02		





20. REFER TCS TYPE: TCS-1B



(REFER MISCELLANEOUS DRAWINGS

DESIGN DIRECTOR  
Vas  
VASANTH KUMAR T.H.

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

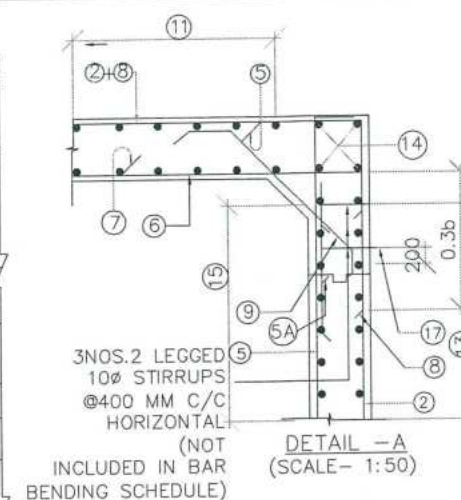
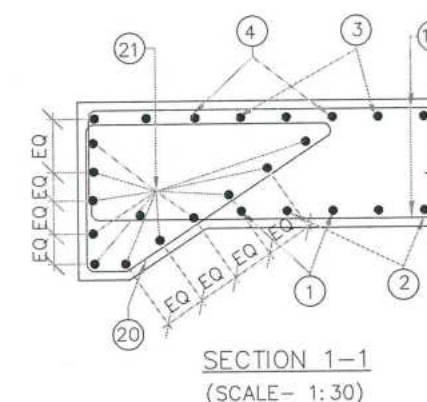
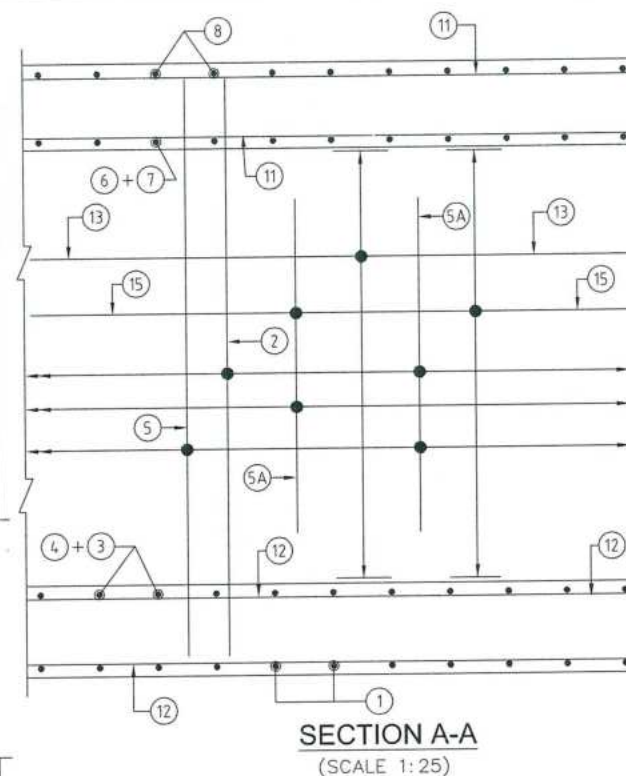
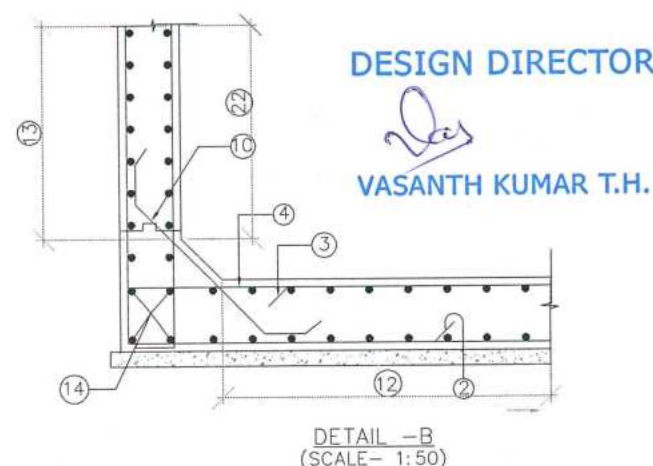
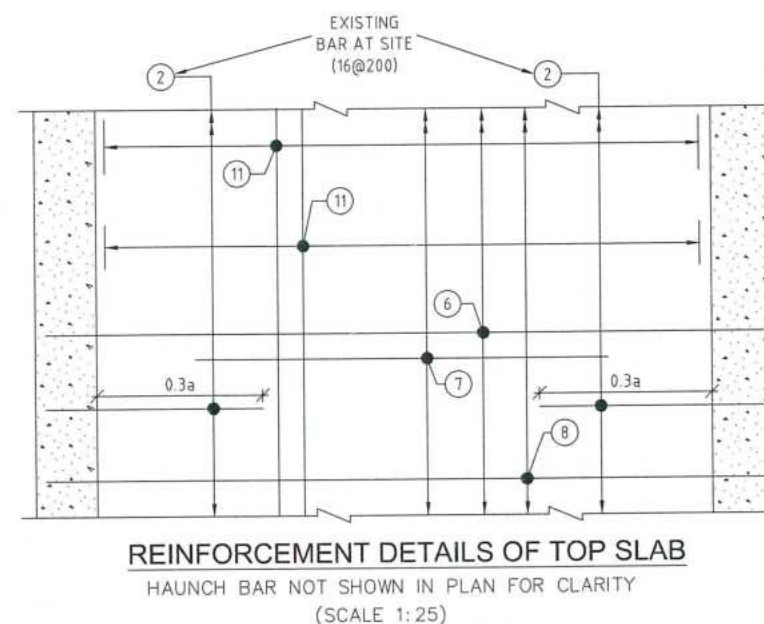
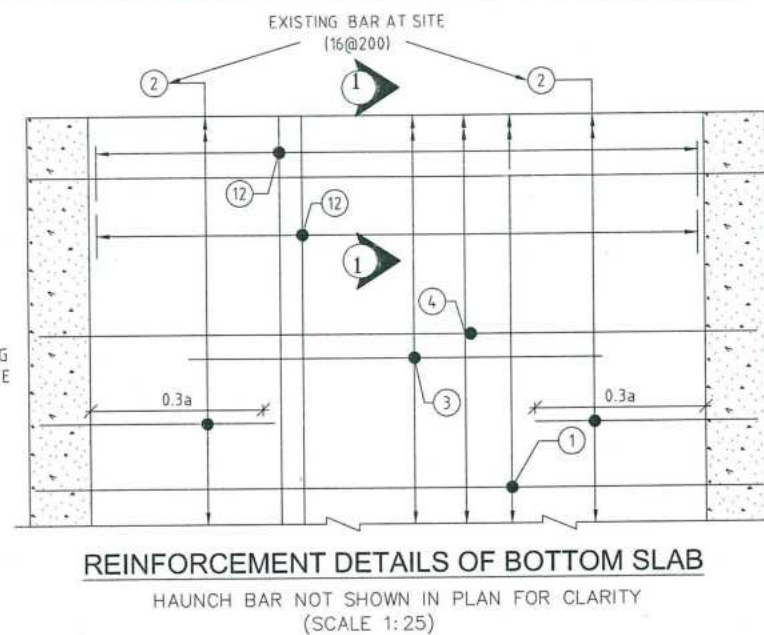
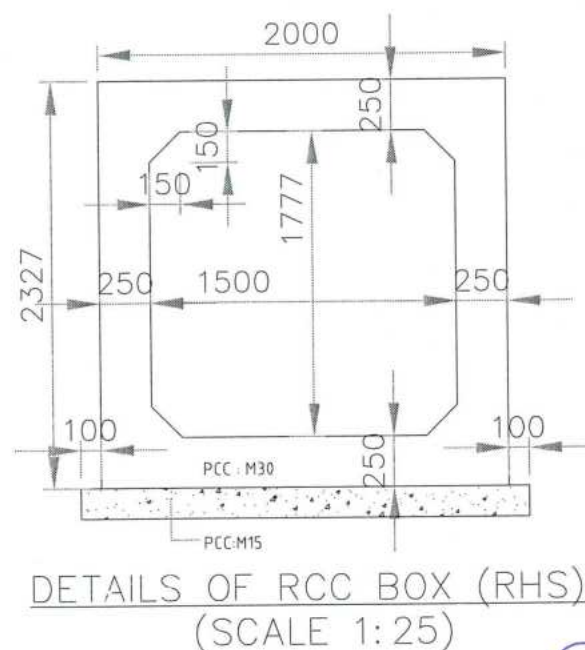
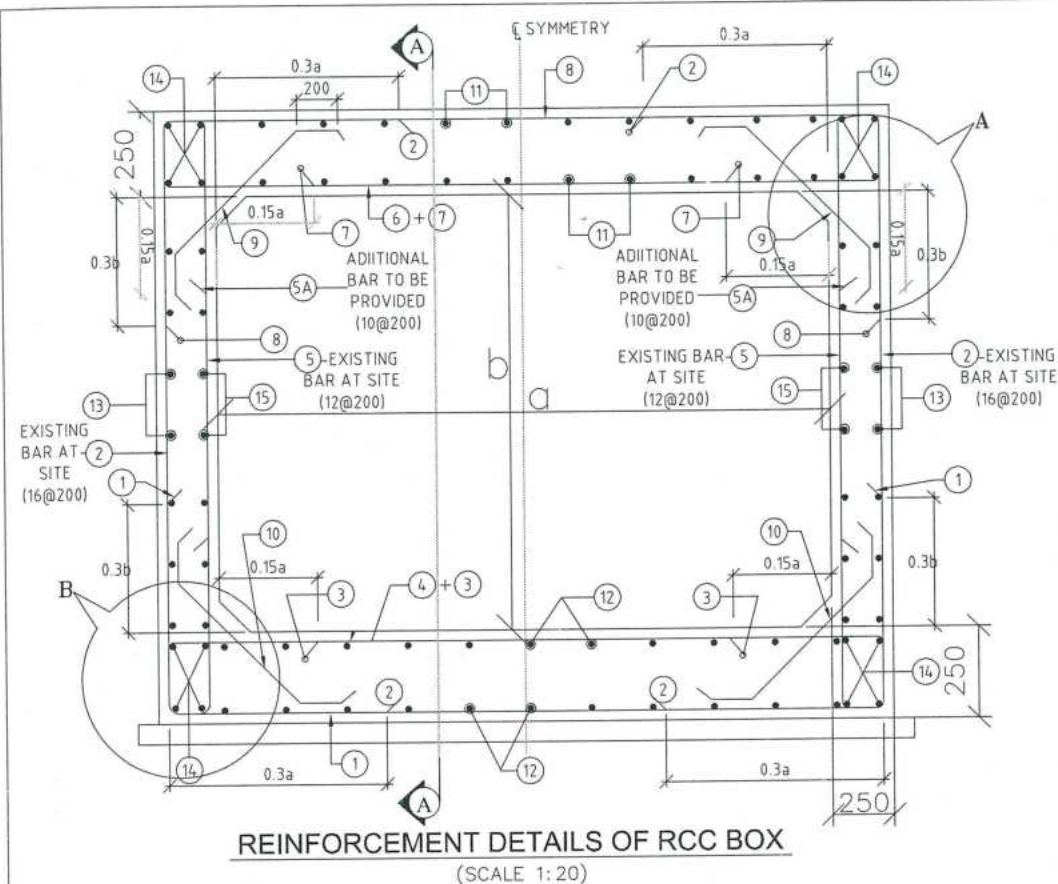
LEGEND:

- 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

REFERENCE DRAWINGS:	
DETAILS OF RCC BOX	PCIPL/NH-37/JD/BC/STR/REIN/24
MISCELLANEOUS DETAILS	PCIPL/NH-37/JD/STR/RCC-MIS/01
DETAILS OF RETAINING WALL	PCIPL/NH-37/JD/STR/RW/01

<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, Giribati-24.	<b>CONTRACTOR</b>  Gannon Dunkerley & Co. Ltd. 86A, TOPSIA ROAD (SOUTH) HAUTE STREET, 7th FLOOR KOLKATA - 700046	<b>DESIGN CONSULTANT</b>  PROFESSIONAL CIVIL INFRA PVT. LTD. # 1836, GROUND FLOOR, SIR. M VISVESWARAYA LAYOUT, NAGADEVANAHALLI, BANGALORE - 560 056	<b>PROOF CONSULTANT</b>  CHETAN INFRA TECH CONSULTANTS (P) LTD. 7/11, 1ST FLOOR 13TH MAIN, SENNAGAR, SPICES COURAGE, BANGALURU-560050	<b>SAFETY CONSULTANT</b>  SMART SAFETY SERVICES # 5-5 & 7, HARI HARA NIVAS, GUMMAKONDA COLONY, HYDERGUDA, HYDERABAD - 500048	<b>AUTHORITY ENGINEER</b>  VOYANTS SOLUTIONS PVT. LTD. 403/4th Floor, BPTP Park Centre, Block - 2, Jai Vayu Vihar, Sector-3, Gurgaon, Haryana 122001	<table><tr><td></td><td>NAME</td><td>SHEET SIZE</td><td rowspan="2">TITLE: GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (WIDENING) AT DESIGN CH 532+078 (EXISTING CH 532+486 )</td><td rowspan="2">DRAWING No.  PC IPL/NH-37/J-D/STR/BC/24</td><td rowspan="2">REV.  00</td></tr><tr><td>DESIGN DIRECTOR</td><td></td><td>A2</td></tr><tr><td>PROOF CONSULTANT</td><td></td><td>SCALE</td><td></td><td></td><td></td></tr><tr><td>SAFETY CONSULTANT</td><td></td><td>AS SHOWN</td><td></td><td></td><td></td></tr><tr><td>AUTHORITY CONSULTANT</td><td></td><td>SHEET No. 02 OF 02</td><td></td><td></td><td></td></tr></table>		NAME	SHEET SIZE	TITLE: GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (WIDENING) AT DESIGN CH 532+078 (EXISTING CH 532+486 )	DRAWING No.  PC IPL/NH-37/J-D/STR/BC/24	REV.  00	DESIGN DIRECTOR		A2	PROOF CONSULTANT		SCALE				SAFETY CONSULTANT		AS SHOWN				AUTHORITY CONSULTANT		SHEET No. 02 OF 02			
	NAME	SHEET SIZE	TITLE: GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (WIDENING) AT DESIGN CH 532+078 (EXISTING CH 532+486 )	DRAWING No.  PC IPL/NH-37/J-D/STR/BC/24	REV.  00																													
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AUTHORITY CONSULTANT		SHEET No. 02 OF 02																																





DESIGN CH: 532+078  
SCHEDULE OF REINFORCEMENT

BAR MARK	SHAPE OF BARS (NOT TO SCALE)	BAR DIA IN mm	SPACING OR NO. OF BAR
1		12	200 C/C
2	EXISTING BAR AT SITE	16	200 C/C
3		12	200 C/C
4		12	200 C/C
5	EXISTING BAR AT SITE	12	200 C/C
5A	ADDITIONAL BAR TO BE PROVIDED	10	200 C/C
6		12	200 C/C
7		10	200 C/C
8		12	100 C/C
9		10	200
10		10	200
11		10	200
12		10	200
13		10	200
14		10	16 NOS.
15		10	200
16			NOT USED
17		10	250
18			NOT USED
19			NOT USED
20		10	150
21		10	20 NOS.

## 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  $40 \times \text{BAR DIA } (\phi)$
- LAP LENGTH OF THE STEEL SHALL BE PROVIDED AS BELOW.  
LAP LENGTH =  $K \times l$   
 $K = 1.00$  (<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

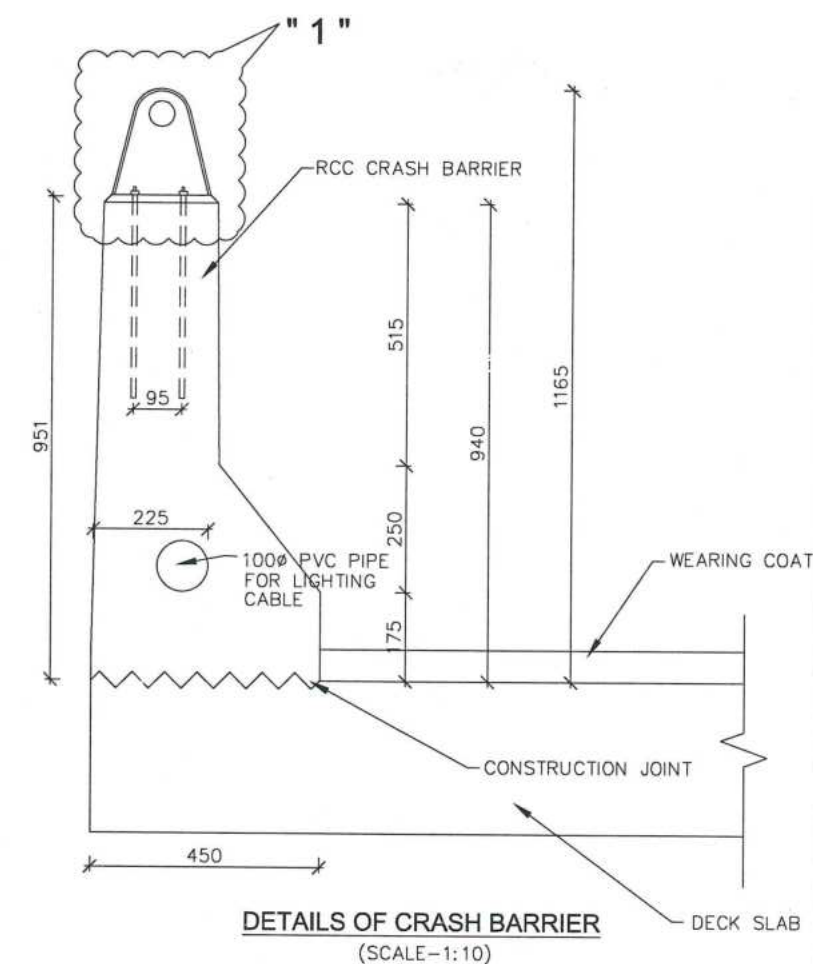
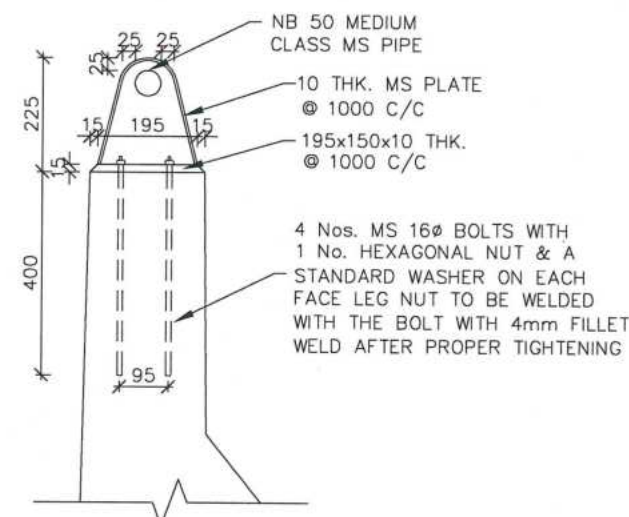
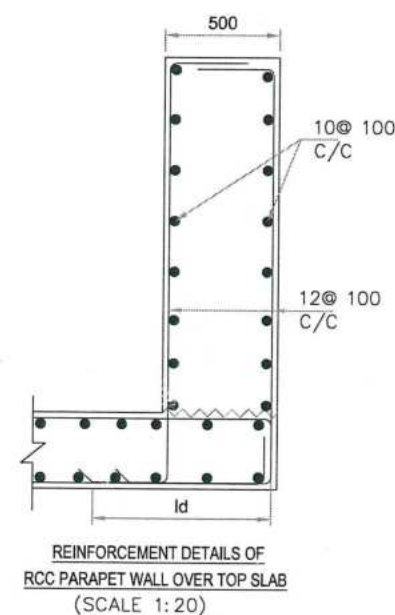
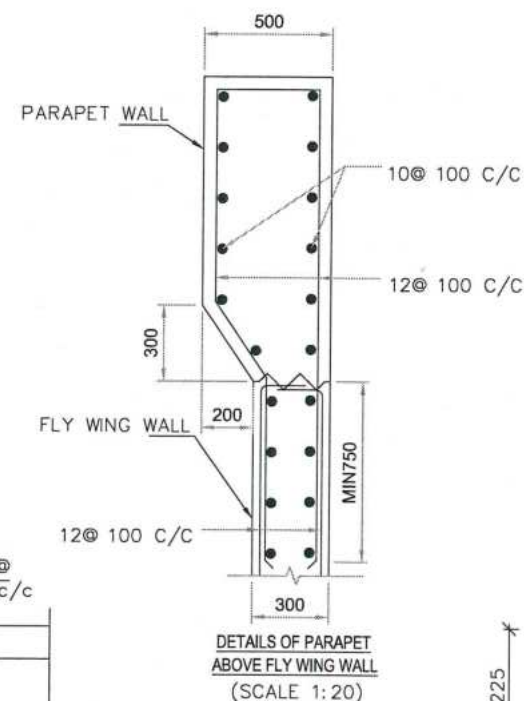
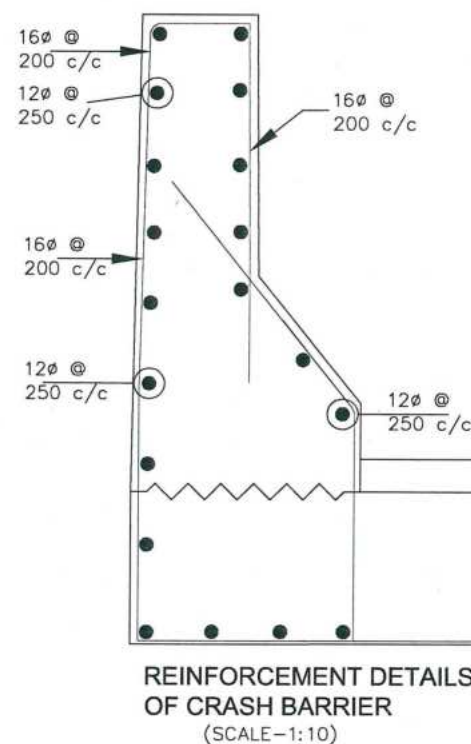
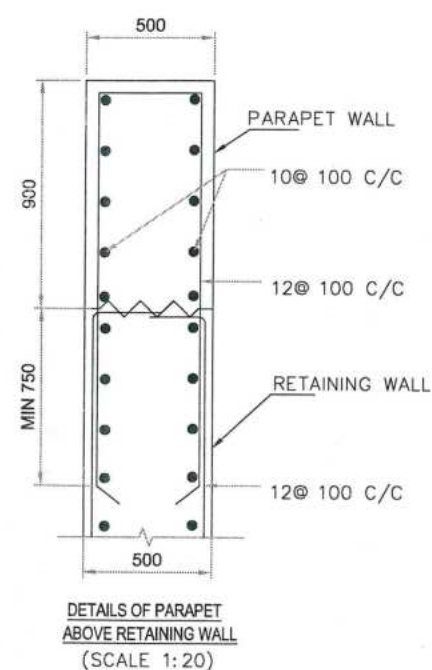
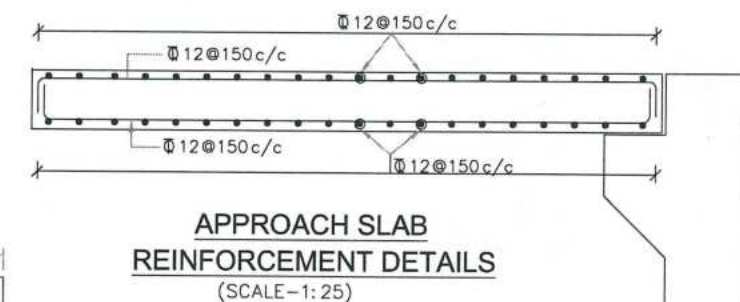
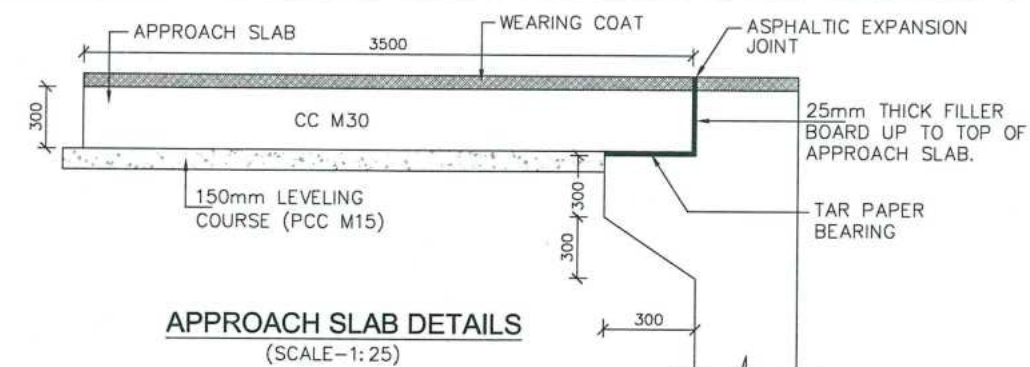
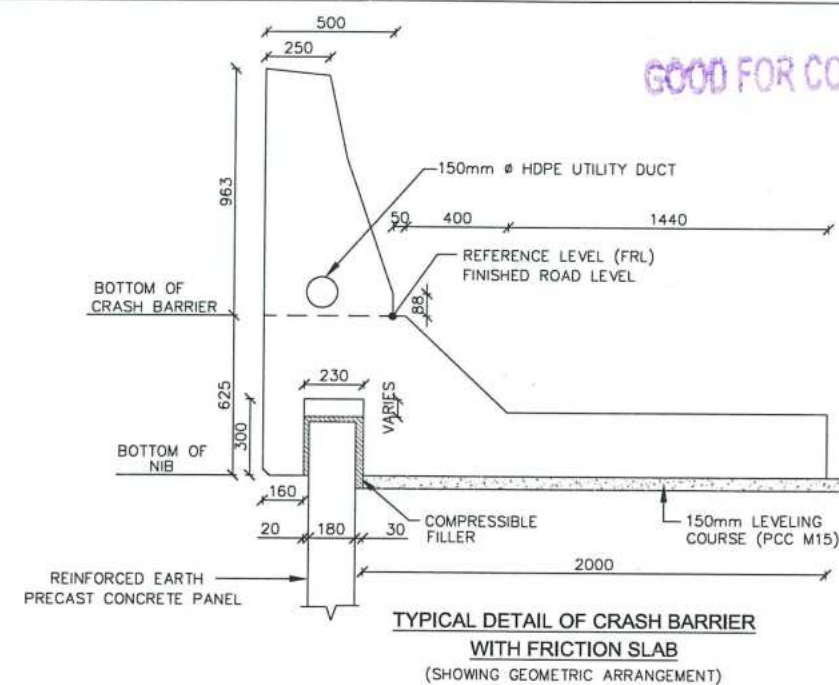
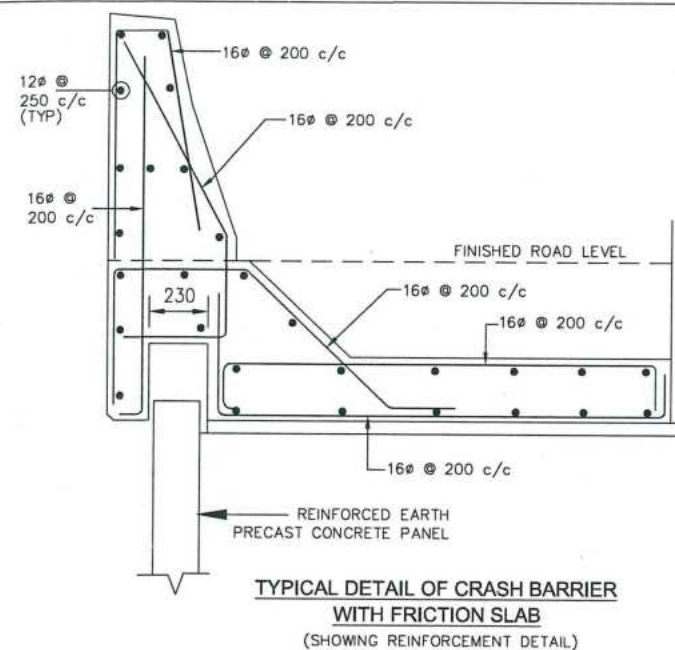
DESIGN DIRECTOR

VASANTH KUMAR T.H.

FOR APPROVAL

PROJECT	CLIENT	CONTRACTOR	DESIGN CONSULTANT	PROOF CONSULTANT	SAFETY CONSULTANT	AUTHORITY ENGINEER	NAME	SHEET SIZE	TITLE: REINFORCEMENT DETAILS OF BOX CULVERT (1X1.5X1.777) AT DESIGN CHAINAGE 532+078 (EXISTING CHAINAGE 532+486)
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 Dunkerley & Co. Ltd. 30A, TOPRA ROAD (SOUTH), HATE STREET, 2ND FLOOR, KOKIMTA-796046	PROFESSIONAL CIVIL INFRA PVT. LTD. #1838, GROUND FLOOR, SIR. M VISVESWARAYA LAYOUT, NAGADEVANAHALLI, BANGALORE - 560 098	CHETAN INFRA TECH CONSULTANTS (P) LTD. 7th, 1st FLOOR, 1st MAIN, SRINAGAR, OPP. PES COLLEGE, BANGALURU-560002	SMART SAFETY SERVICES #35-5 & 7, HARI HARA NIVAS, SRINAGAR COLONY, HYDERABAD-500044 CR99/2016/11	VOYANTS SOLUTIONS PVT. LTD. 403, 4th Floor, BPTP Park Centre, Block A, Jai Vayu Vihar, Sector 30, Gurgaon, Haryana 122001	DESIGN DIRECTOR PROOF CONSULTANT SAFETY CONSULTANT AUTHORITY CONSULTANT	A2 SCALE AS SHOWN SHEET No. 01 OF 01	DRAWING No. PCIP/NH-37/JD/BC/STR/REIN/24 REV. 00





GOOD FOR CONSTRUCTION

DESIGN DIRECTOR

VASANTH KUMAR T.H.  
CIVIL

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

85A, TOPSIA ROAD (SOUTH)  
HAUTE STREET, 7th FLOOR  
KOLKATA - 700046

DESIGN CONSULTANT

DESIGN CONSULTANT  
BANGALORE  
PROFESSIONAL CIVIL ENGINEER PVT. LTD.

 # 1838, GROUND FLOOR,  
SIR. M VISVESWARAYA LAYOUT  
NAGADEVANAHALLI,  
BANGALORE - 560 056

PROOF CONSULTANT

CHETAN INFRA-TECH  
CONSULTANTS (P) LTD.



SAFETY CONSULTANT

SAFETY CONSULTANT  
SMART SAFETY SERVICES

# 3-5-6 & 7. HAR  
GUMMAKONDA  
HYDERGUDA,  
HYDERABAD - 5

10/10/2019 11:10:10 AM

MOYANTS SOLUTIONS BY

AS, **VOYANT'S SOLUTIONS**  
Date... 18/11/2019  
405, 4th Floor, 1  
Centra, Block A  
Vihar Sector 30

[illegible]

DESIGN DIRECTOR
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PROOF  
CONSULTANT

SAFETY
CONSULTANT
AUTHORITY

CONSULTANT
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TITLE:	
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E	TITLE:
	MISCELLANEOUS DRAWING DETAIL

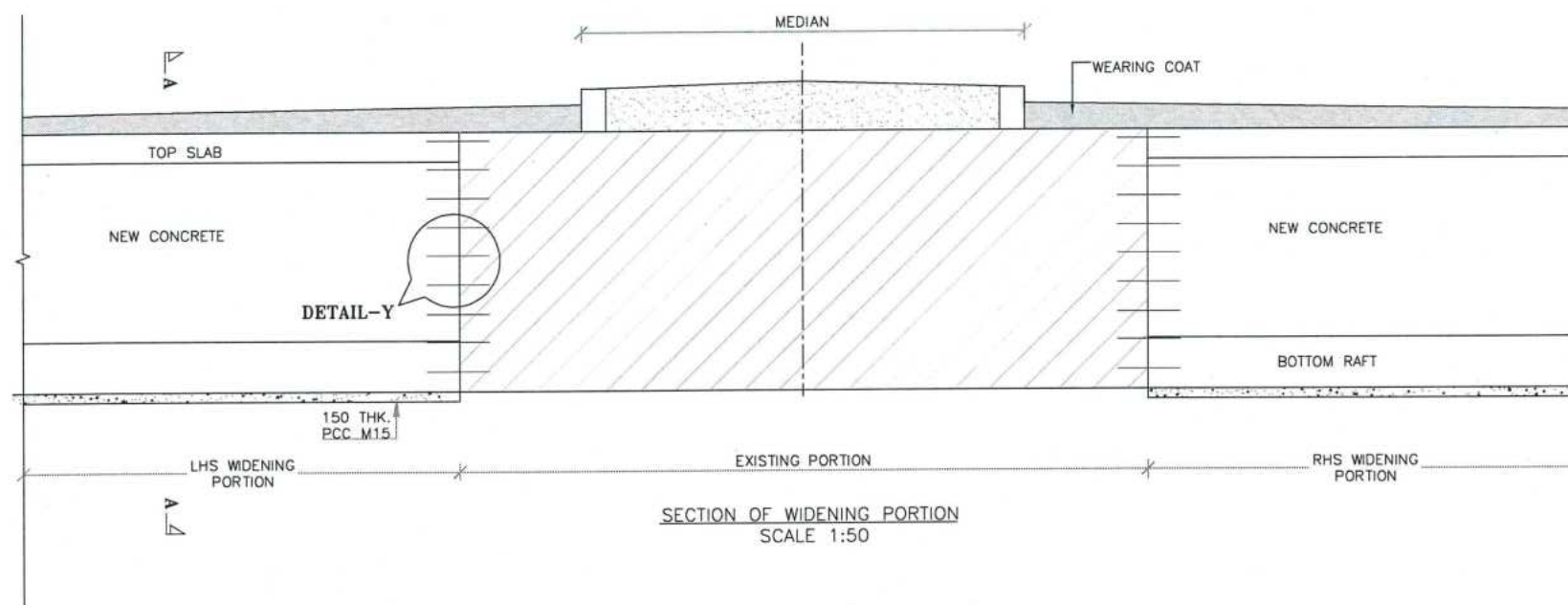
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REV.
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FOR APPROVAL

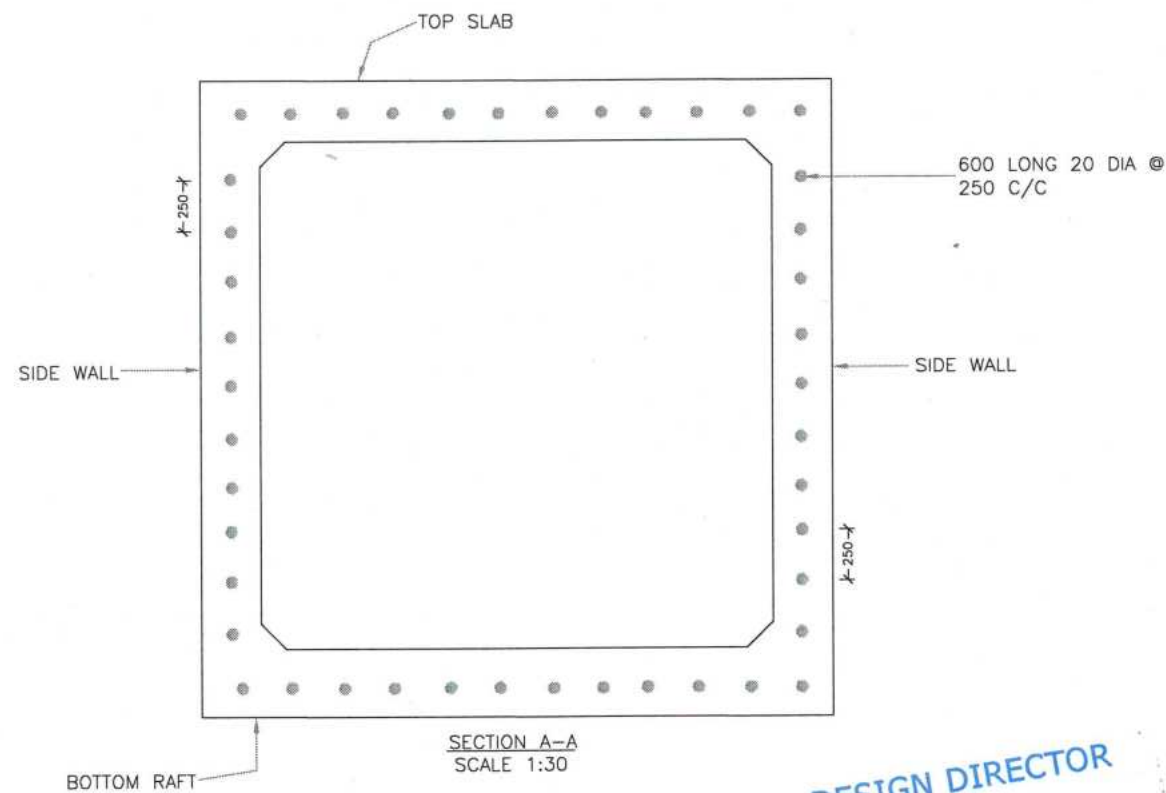


GOOD FOR CONSTRUCTION

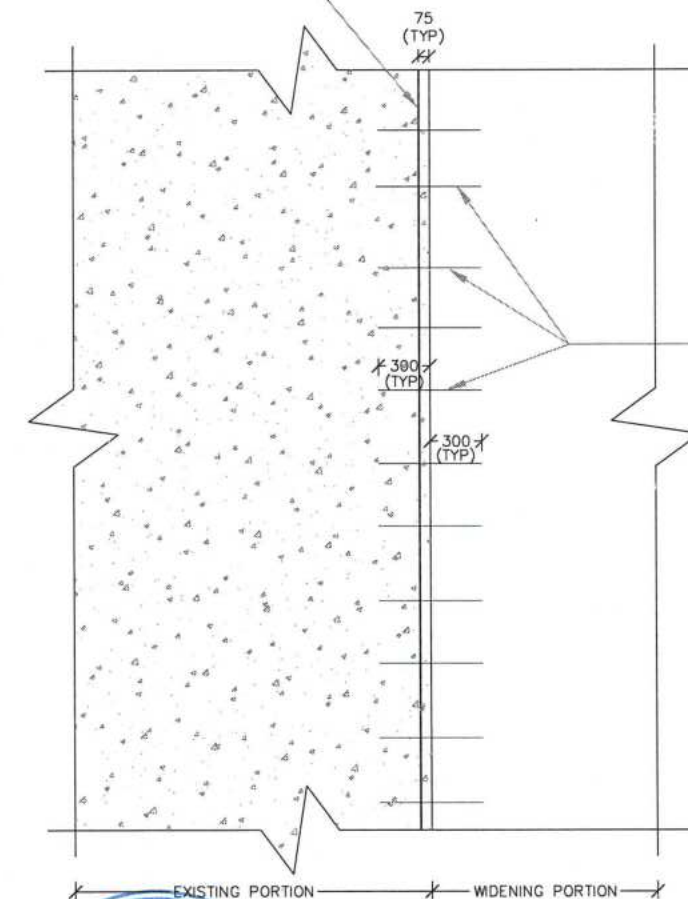


### WIDENING METHODOLOGY

- \* DISMANTLE THE PARAPET/ RAILING ON THE PROPOSED SIDE OF WIDENING
- \* THE SURFACE OF THE EXISTING BOX STRUCTURE ON THE WIDENING SIDE SHALL BE CHIPPED OFF TO THE DEPTH OF 75mm.
- \* 600mm LONG 20 DIA BARS FOR THE DEPTH OF 300mm SHALL BE DRIVEN INTO THE SURFACE OF BOX STRUCTURE ON WIDENING SIDE.
- \* EXCAVATE THE SIDE OF BOX STRUCTURE UP TO THE FOUNDING DEPTH TO EXPOSE THE FOUNDATION FACE ON WIDENED SIDE.
- \* REPEAT THE CHIPPING PROCESS & DRIVE THE 20 DIA BAR IN THE FOUNDATION PORTION OF BOTTOM SLAB OF BOX STRUCTURE.
- \* REINFORCEMENT BAR FOR WIDENING PORTION SHALL BE PLACED AND FRESH CONCRETE SHALL BE POURED FOR THE DESIRED WIDENING LENGTH
- \* CLEAN & APPLY EPOXY COAT OVER THE CHIPPED SURFACE OF THE BOX
- \* THE BOX STRUCTURE SHALL BE WIDENED WITH RCC CONCRETE TO THE REQUIRED WIDTH.



EXISTING ABUTMENT/FACE OF BOX SURFACE ON THE WIDENING SIDE SHALL BE CHIPPED OFF TO THE DEPTH OF 75mm.



NOTE: THIS DRAWING IS APPLICABLE FOR THE BOX LENGTH WIDENING LESS THAN 3.0m

DESIGN DIRECTOR  
VASANTH KUMAR T.H.

PROJECT		CLIENT	CONTRACTOR	DESIGN CONSULTANT	PROOF CONSULTANT	SAFETY CONSULTANT	AUTHORITY ENGINEER	FOR APPROVAL	
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	Gannon Dunkerley & Co. Ltd. 188A, TOPSIA ROAD (SOUTH) HAUTE STREET, 7TH FLOOR KOLKATA - 700046	PROFESSIONAL CIVIL INFRA PVT. LTD. # 1832, GROUND FLOOR, SIR. M VISVESWARAYA LAYOUT, NAGADEVANAHALLI, BANGALORE - 560 056	CHETAN INFRA-TECH CONSULTANTS (P) LTD. 7/13, 1ST FLOOR, 13TH MAIN, SRINAGAR, OPP PES COLLEGE, BENGALURU-560050	SMART SAFETY SERVICES PRAHARAJI & HARI HARA NIVAS, GUMMAKONDA COLONY, HYDERABAD - 500048	VOYANTS SOLUTIONS PVT. LTD. 403, 4th Floor, BPTP Park Centra, Block A, Jal Vayu Vihar, Sector 30, Gurgaon, Haryana 122001	NAME	SHEET SIZE
								DESIGN DIRECTOR	A2
								PROOF CONSULTANT	SCALE
								SAFETY CONSULTANT	AS SHOWN
								AUTHORITY CONSULTANT	SHEET No.
									02 OF 02
								TITLE:	
								CONSTRUCTION METHODOLOGY FOR WIDENING OF BOX CULVERT	
								DRAWING No.	REV.
								PCIPL/NH-37/JD/STR/RCC-MIS/01	