Annexure -I (A)

BUNKER SEGMENT PETAL LOADING AND UNLOADING PROCEDURE

Doc no:66-102-Handling-001 Rev.2 Dt.16-10-25

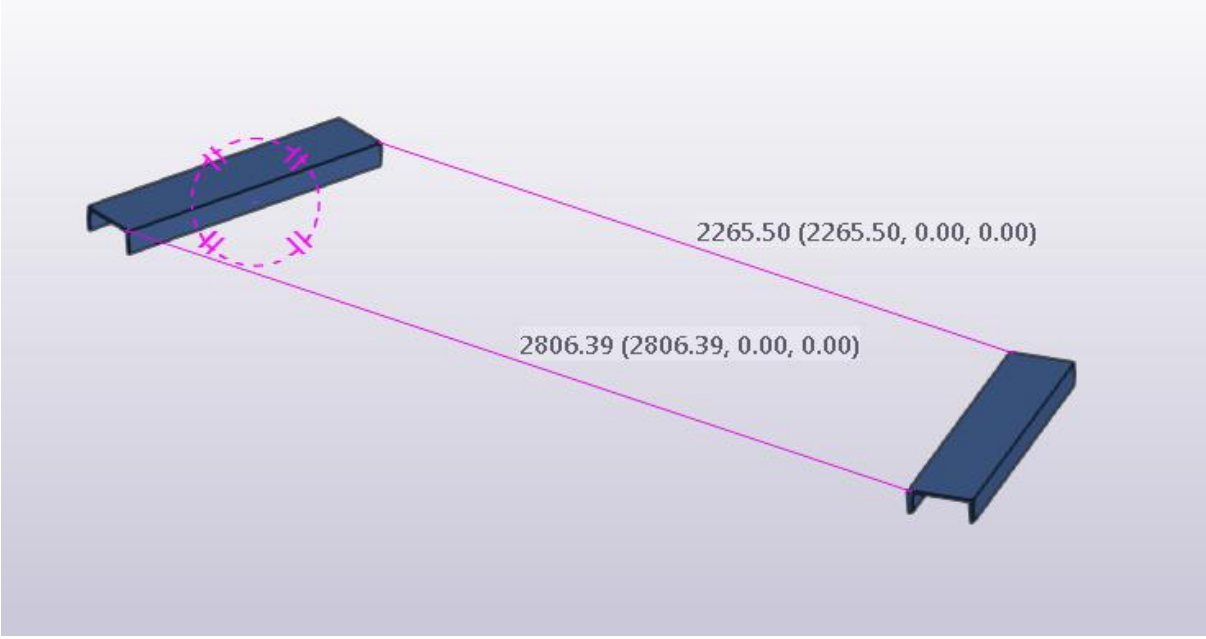
Background:

With a view to accelerate the despatch of bunker items by maximising the loading of vehicles and optimise the handling durations, following procedure has been conceptualised.

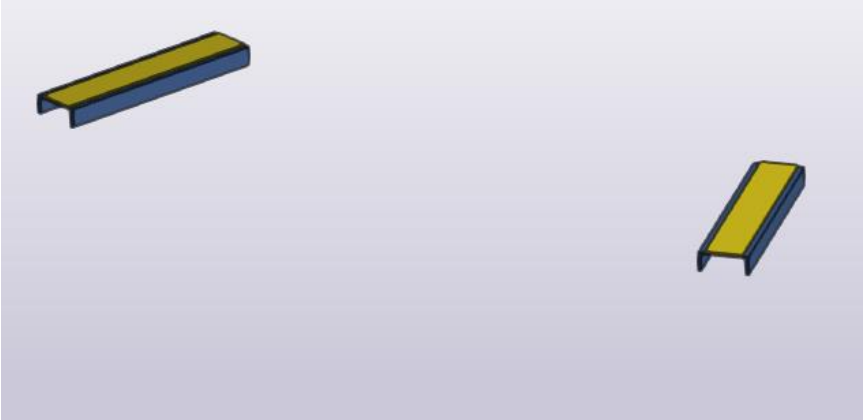
As part of this procedure, It is proposed to stack 4 quadrant petals of bunker cylindrical portion as a stack tying them together to avoid transportation damages:

LOADING PROCEDURE:

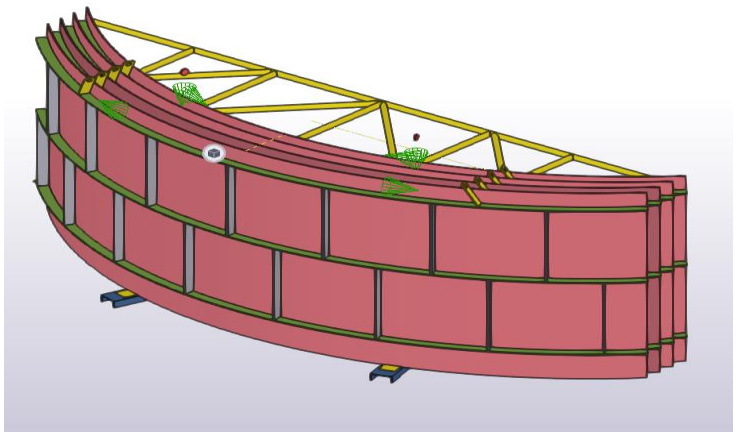
A1) Place the bed support frame channels (2 numbers) on plain ground



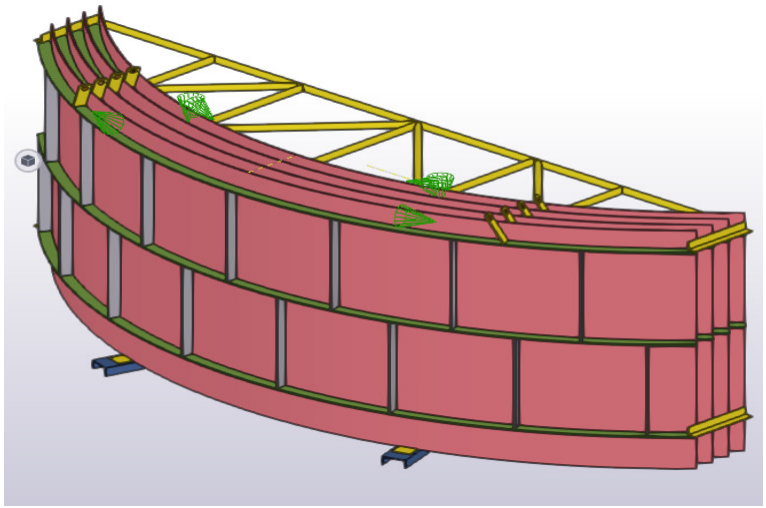
A2) Place rubber pad /wood cushion on top of channels (This is required to avoid damage to petal edges)



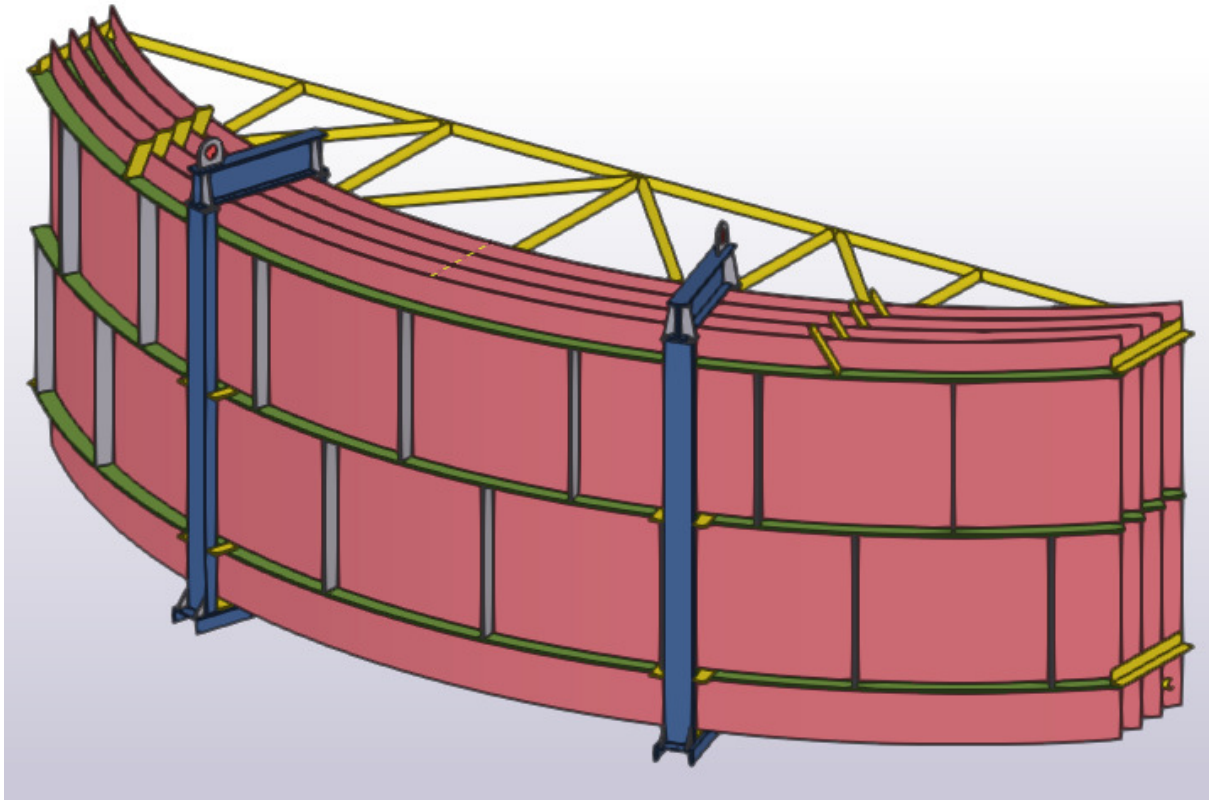
A3) Stack the petals in vertical position on top of structural bed members straddle to centre with wood block in between them to have transport jerk dampening.



A4) Secure the stacked petals with tie angles/lapped tie plates at free edges.

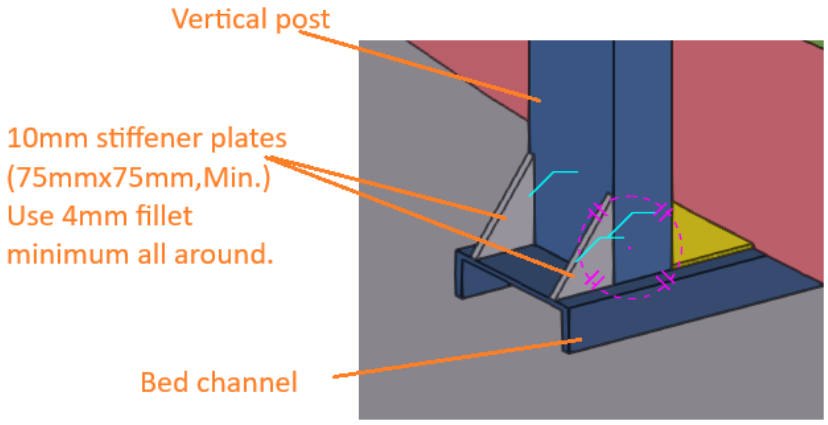


A5) Frame build the petals for lifting (2 numbers at locations of bed channels)

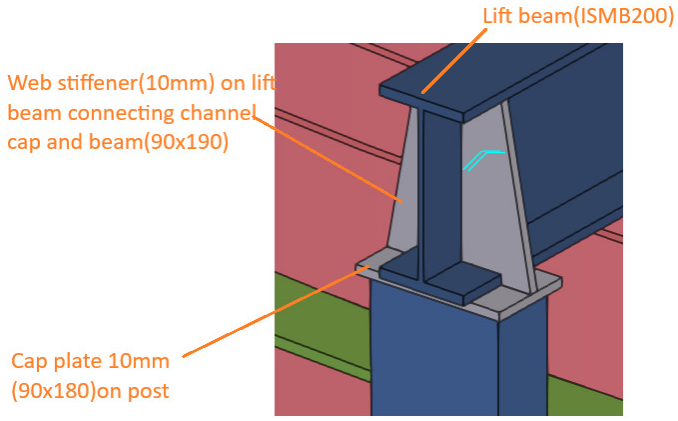


Note that the lug position on top beam matches the CG of the total stacked frame and stopper steel will be envisaged on outer most petal to avoid relative movement of stacked petal with respect to the build frames. Wood chunk to be inserted on web of vertical post to avoid metal to metal contact.

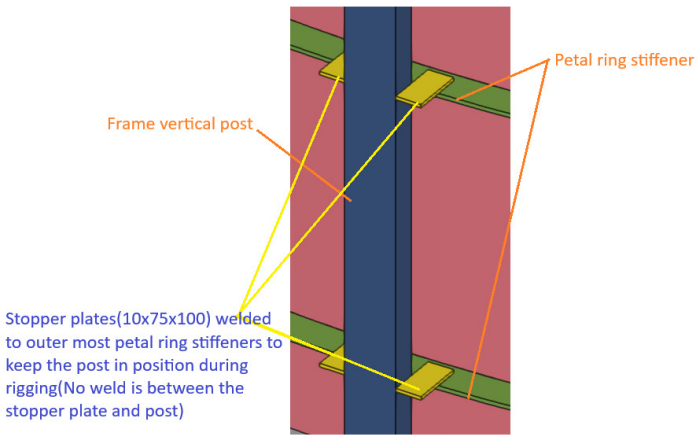
Note1: The connection between post(ISMC150) and bed channel(ISMC200) as follows



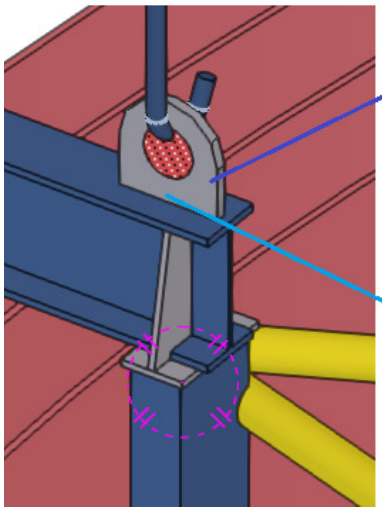
Note 2: The connection between post(ISMC150) and lifting beam (ISMB200) as follows



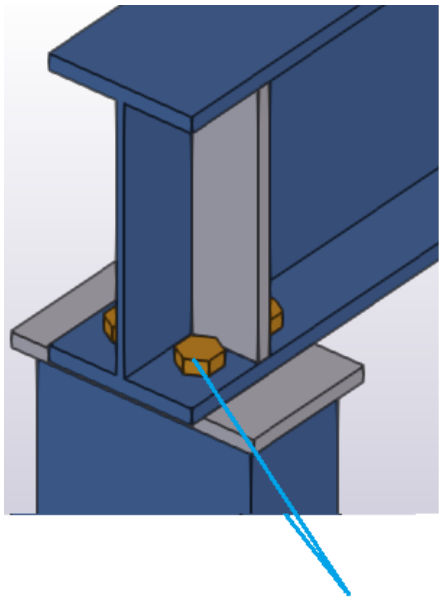
Note3: Stopper plates of vertical post connection as follows:



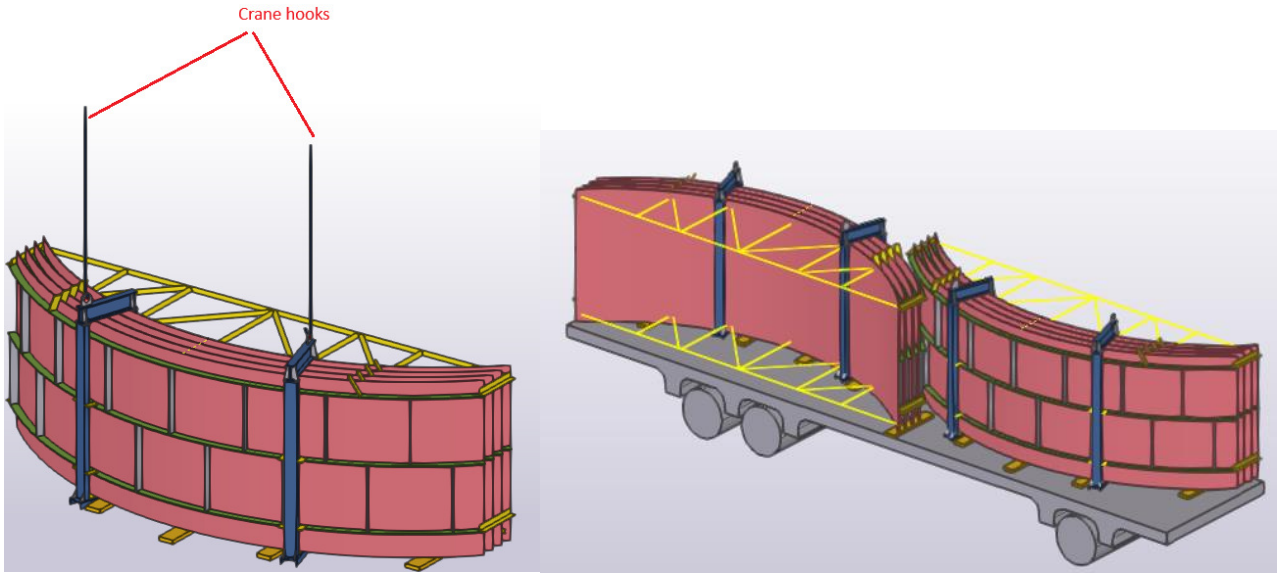
Note4: Lifting lug on top beam (Location matching CG of petal assembly .CG falls near in line with inner vertical post)



Please note that in case of height restriction during transportation, bolting connection can be adopted as follows:



A6) Load the total stacked petal assembly by hooking at two lug positions on to the trailer. (Total weight of stacked petals vary from 6 to 8 tons)



UNLOADING PROCEDURE: (For Information)

B1) Follow Step A5) for unloading the petal stack and place it on relatively plain ground.

B2) Before forming the petal ring for erection, cut the tie angle and frame build.

B3) Make use of lugs which were already welded on individual petals

For handling individual petals.

STACKED PETAL BUNCHING Criterion:

- **While keeping one after another segments as per proposed procedure, care shall be taken to club/bunch the respective and relevant applicable Bunker no, Coarse no with all its respective DUs (Example: Bunker no 1, Course no 1 and respective DU no and description of course petals) which are match marked during trail assy / during fabrication and alignment of 4 segments with fixture and then match marked and dismantled) for ease of fabrication and then erection at site.**

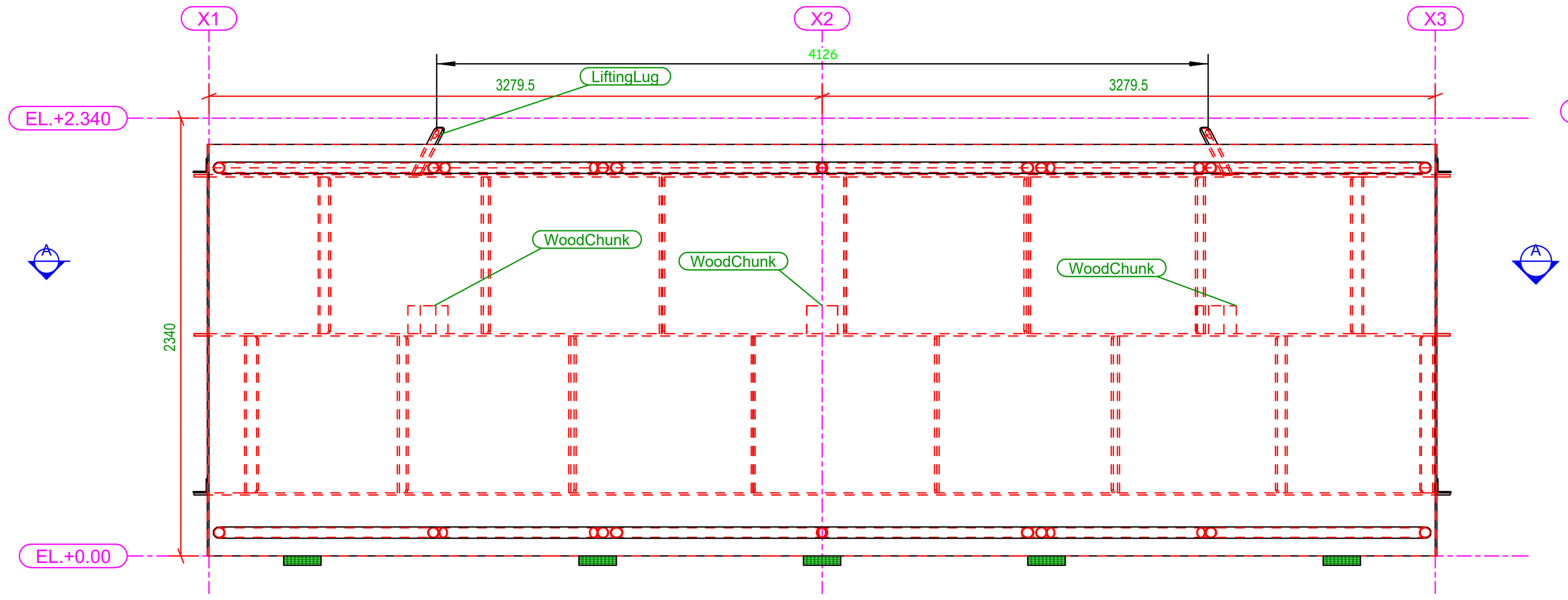
Reference documents:

1.1-66-102-U0038 rev 2→Transport arrangement style-2.

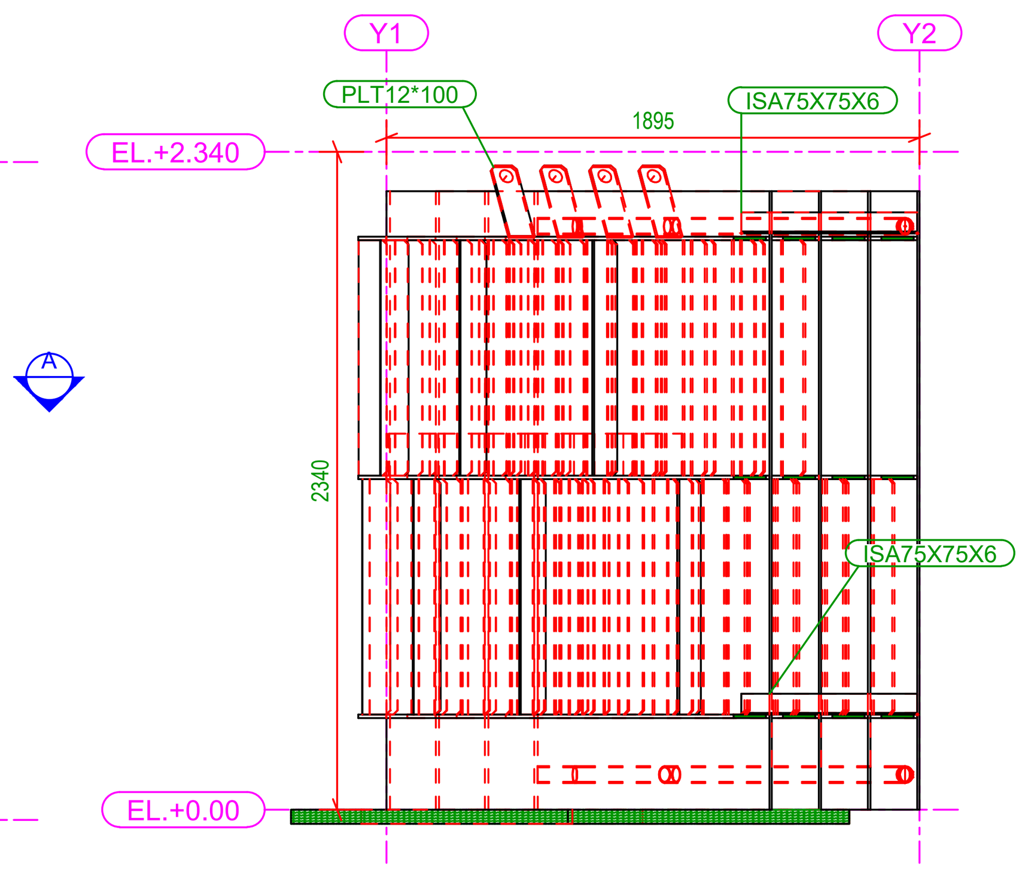
Revision history:

S no	Rev no	Date	Revision summary
1	0	05-08-25	Fresh submission for customer concurrence
2	1	09-08-25	Customer comments incorporated intimated vide email dated 06-08-25
3	2	16-10-25	Lug position is altered

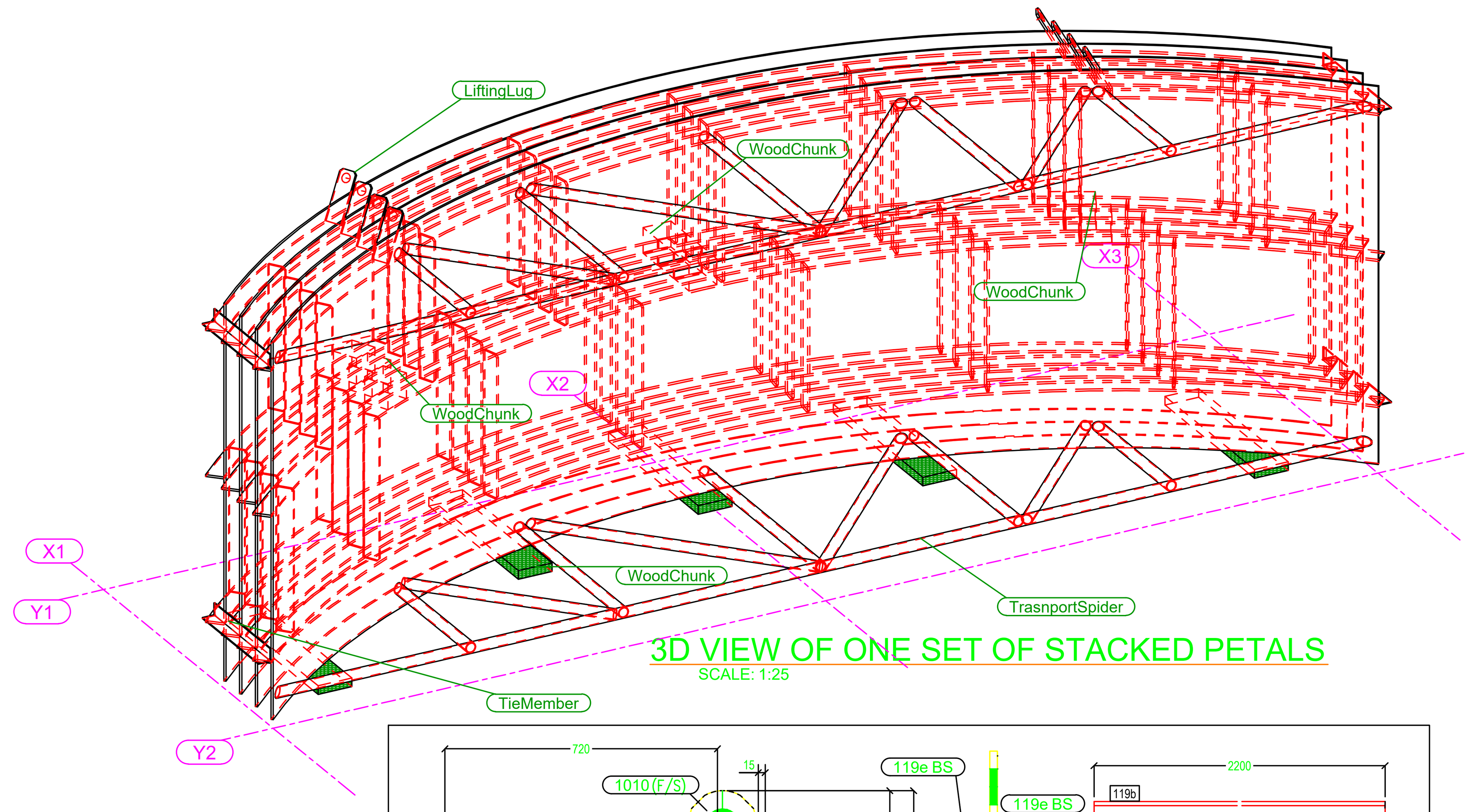
1-66-102-U0038



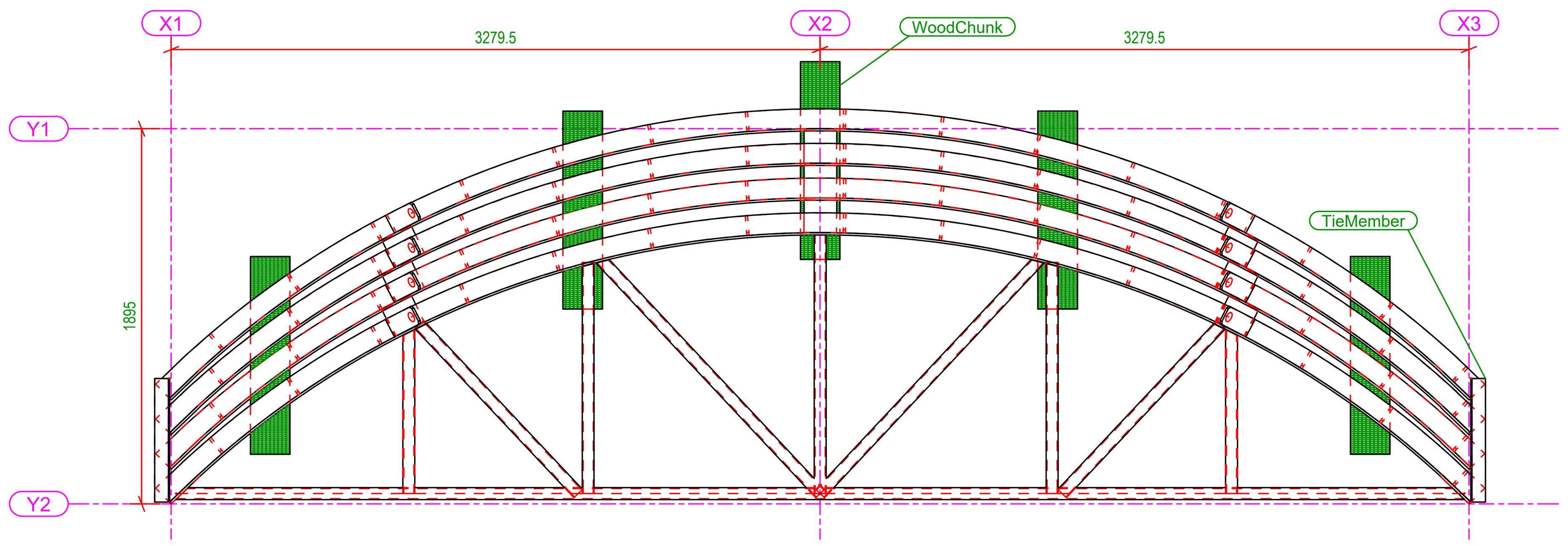
GRID @Y2(ELEVATION)
SCALE: 1:25



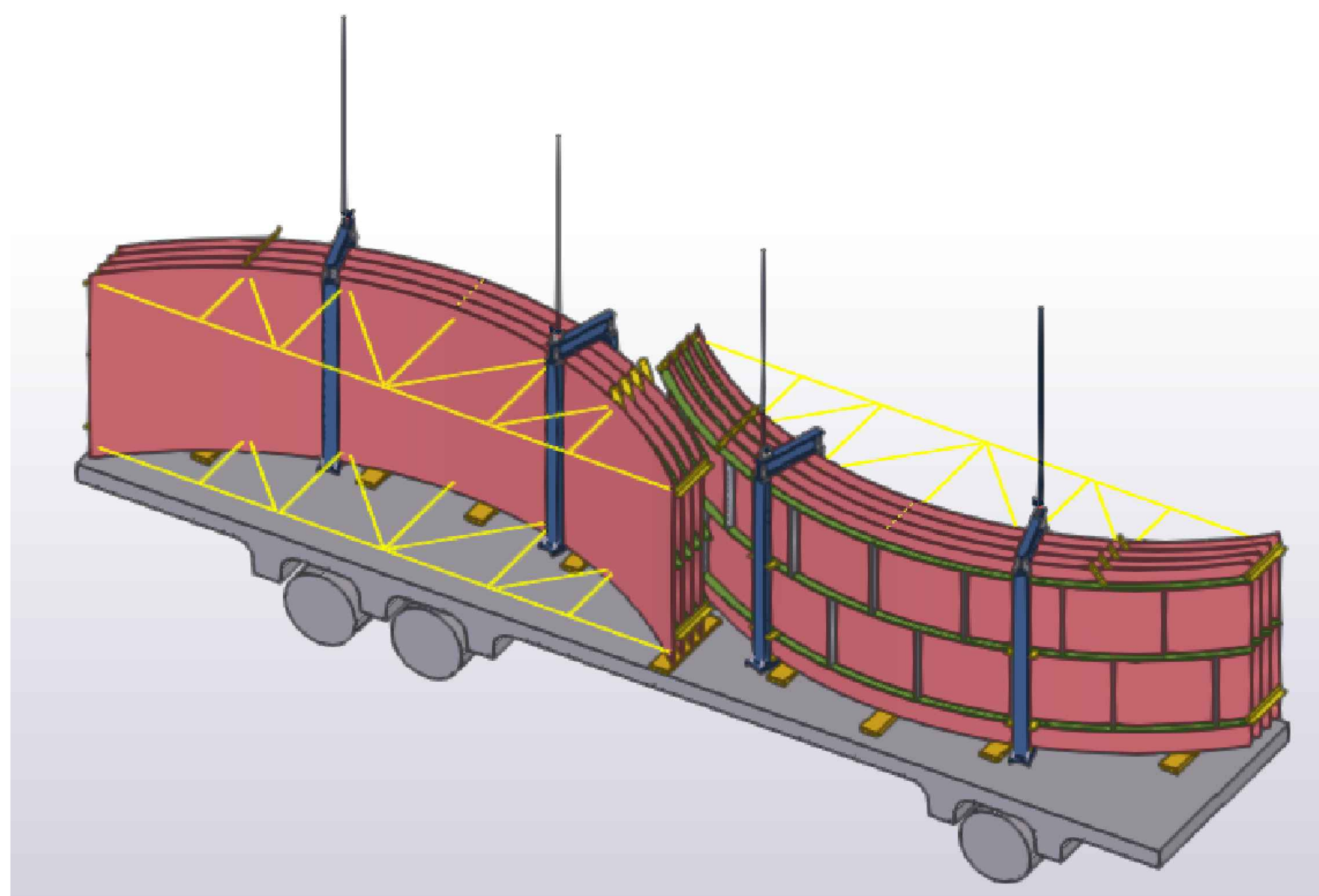
GRID @X2(SIDE VIEW)
SCALE: 1:25

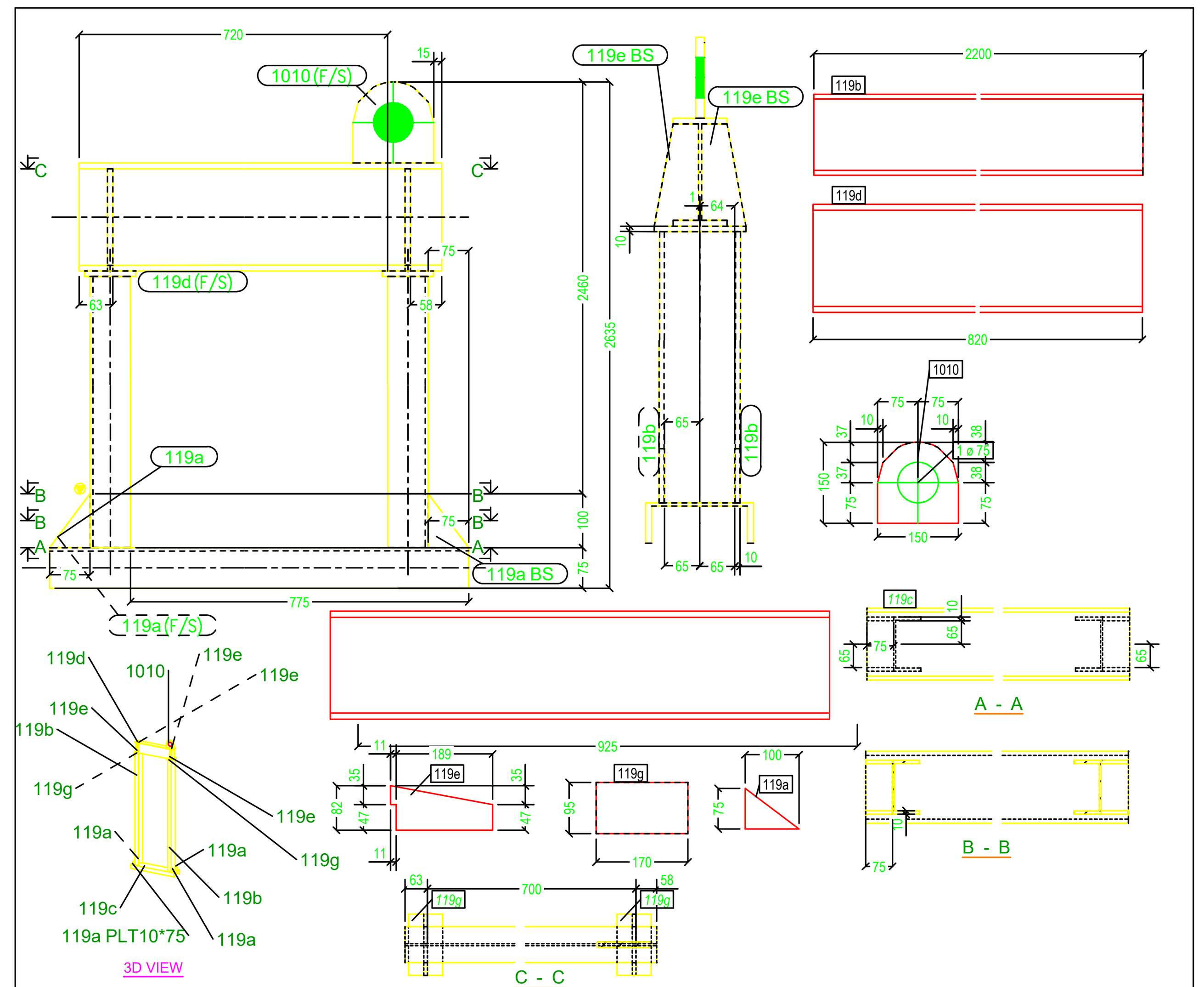


3D VIEW OF ONE SET OF STACKED PETALS
SCALE: 1:25



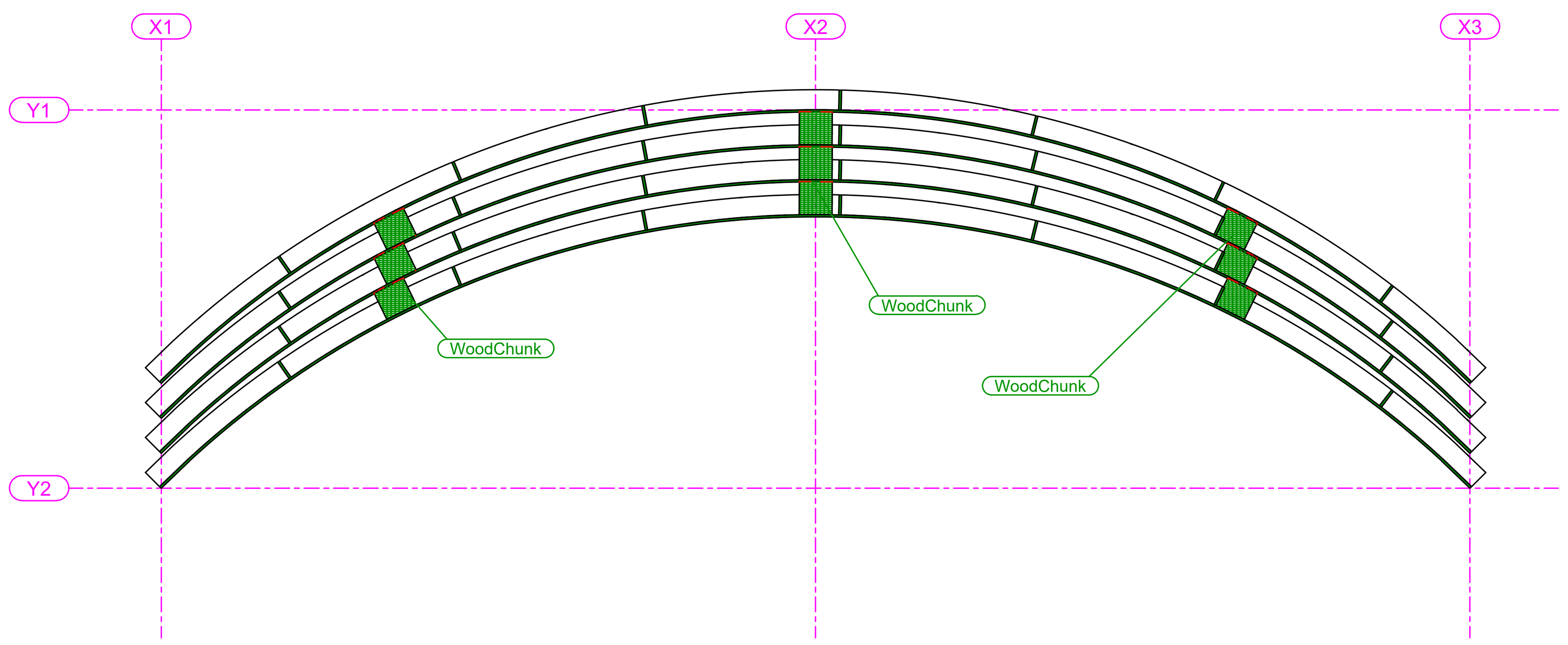
PLAN @0.00(AT TRAIRLER BED LEVEL)
SCALE: 1:25





BILL OF MATERIAL FOR ONE BUILD FRAME OF PETALS

S.No	Item Mark	Qty./ Assembly	Profile Size	Wt./Meter	Length	Wt./Item	Total	Total Wt.	Material
ASSEMBLY MK'D :			119P5 PLT10*75	ASSY QTY : 1				Weight: 121.820	
1	119a	1	PLT10*75	78.50	100	0.3	1	0.29	IS2062
2	119a	3	PLT10*75	78.50	100	0.3	3	0.88	IS2062
3	119b	2	ISMC150	16.80	2200	35.6	2	71.24	IS2062
4	119c	1	ISMC200	22.30	925	20.3	1	20.27	IS2062
5	119d	1	ISMB200	25.40	820	20.4	1	20.45	IS2062
6	119e	4	PLT10*82	78.50	189	0.9	4	3.68	IS2062
7	119g	2	PLT10*95	78.50	170	1.3	2	2.54	IS2062
8	1010	1	PL16*150	125.60	150	2.5	1	2.47	IS2062
							Total All assemblies weight :	121.82	



A - A (SECURE THE WOOD BLOCKS BETWEEB PETALS TO MAKE THE STACK TIGHT AND SOUND)
1:25

PRINCIPLE: Petals with spider arrangement give shape in position for other parallelly placed petals with tie members.

STEPS TO BE FOLLOWED:

1) Prepare one petalwith spider sturdy arrangement .
2) Other petals which will be placed parallel to step-1 petal need not to have spider arrangement.
3) Place bed wood sleppers on trailer for protect the L-seam edge preparation of petals.
4) Load the step-1 petal on trailer in such a way that the ring stiffener is close to bed.
5) Place step-2 petals parallel to step -1 petal & secure the petals with wood chunk in between.
6) Tie the unspider petals with spidered petals with tie members as shown.(2 Locations on each end of petals)
7) Individual petals to have lug arrangement for handling (At least two numbers to match CG of petals).
8) Lash tighten the entire consignment with trailer.

TRANSPORT MATERIAL SUMMARY PER STACK OF CYLINDRICAL PETALS					
S NO	material	Grade	Weight(Kg)/length(m)	PURPOSE	COMMENT
1	ISA75X75X6	IS2062	17/2.5	Petal end ties (4 nos per stack)	Higher size angle is also acceptable
2	PL12/16/20	IS2062/SA516	22/0.5	Lifting lugs(2 nos per petal)	Weight & length of lug varies depending on location of top cuvered stiffener
3	NB50H	IS1161/IS1239/SA106	215/35	Spider for one petal of stacked petals	Min.Dia of 60mm to be ensured
Total weight of transportation steel			254 (Refer note No-08)	Kgs	
NOTE:					
I)	The weights are for cylindrical petals whose radius is between 4.6 to 4.8m and 4 petals are stacked in one set.				
II)	2 SETS OF stacked petals can be shipped in one normal trailer.				
III)	~~Depending on trailer and petal condition, more that 4 petals can be stacked in one set.~~				
IV)	The wood chunk MTO is not included in the above table.However wood chunk is must between trailer bed and petals bottom edges.				
V)	Tie angles to be welded with curved stiffeners without damanging the edge preparation of the petals.				
VI)	All trasnport material to be distinguished with yellow paints/ strips				

NOTE:
1. ALL WELDS ARE 4MM FILLET UNLESS NOTED OTHERWISE.
~~2. REFER DRG NO:1-66-102-U0037 FOR STYLE-1 OF TRANSPORTATION PHILOSOPHY. DEPENDING ON SHOP FEASIBILITY EITHER STYLE-1 OR 2 CAN BE ADOPTED WITH PRIOR INTIMATION TO ENGINEERING~~
3. AVOID METAL TO METAL CONTACT OF THE CONSIGNMENT
  I) WOOD CHUNK CAN BE ADOPTED BETWEEN PETALS
  II) RUBBER SHEET OR ANY PROTECTIVE SHEET TO BE USED BETWEEN PETALS AND LASHING.
4. WOOD BETWEEN THE PETALS TO BE SECURED TIGHTLY TO AVOID ANY LOOSE STACKING.
5. IF STEP 4 IS NOT VIABLE SUITABLE TIGHT PACKING TO BE ENSURED TO AVOID ANY TRANSIT DAMAGES.
6. THE DOCUMENT CAN BE USED FOR OTHER PROJECTS WITH PRIOR INTIMATION TO HPVP-ENGINEERING.
01 7. FOR BUNCH LIFTING OF STACKED PETALS REFER DOCUMENT NO: 66-102-Handling-001 rev 1.
02 8. ADDITIONAL 244 KGS IS TO BE CONSIDERED FOR STACK FRAMES (2 FRAMES PER ONE STACKED PETALS).

REV NO.	DATE	BRIEF RECORD OF REVISIONS		
02	23-09-25	NOTE NO-08 & BUILD FRAME DETAILS ARE ADDED	RAMU	NV REDDY
01	09-08-25	NOTE NO:7 IS ADDED	RAMU	NV REDDY
			CHD.	APPD.

PROJECT: 8032/8043/8044/8045/8047 TO 8050

BHARAT HEAVY ELECTRICALS LTD.,
PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM–530012

DRAWN:
CHECKED:
APPROVED:
DATE: 05.07.2025
ALL DIMENSIONS ARE IN MILLIMETRES
SCALE 1:25 N.T.S.

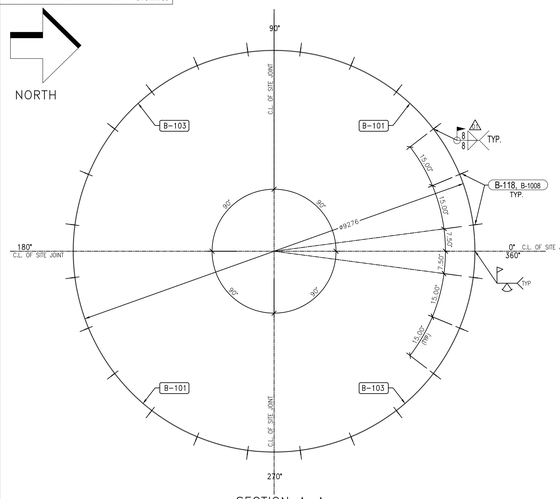
TITLE: COAL BUNKER CYLINDRICAL PORTION TRANSPORT ARANGMENT STYLE-2 FOR ADANI 800MW

DRG No. 1-66-102-U0038
REV. 02

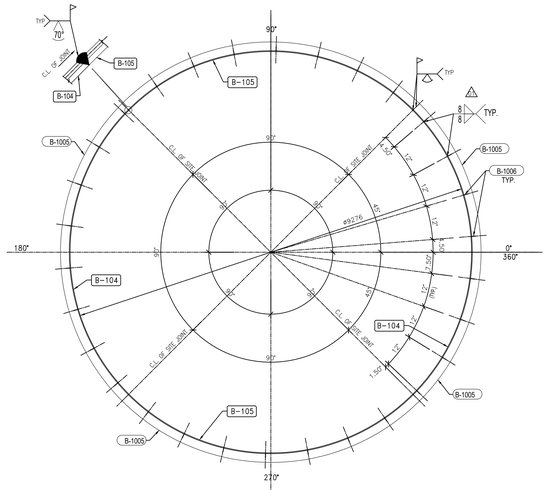
FORM NO. 0425/2
A1 SIZE
Tekla Structures

0-66-102-U0028 ON DWMW0

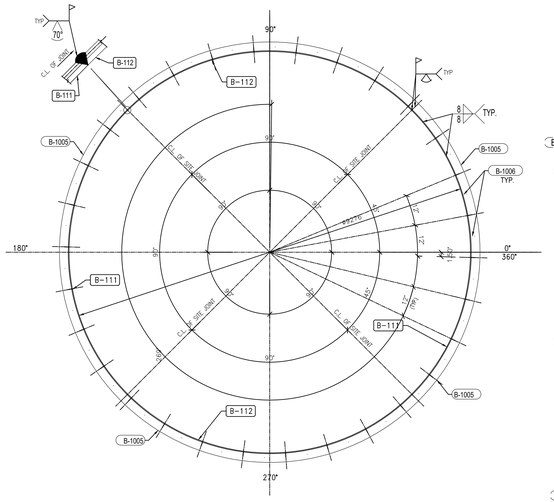
NORTH



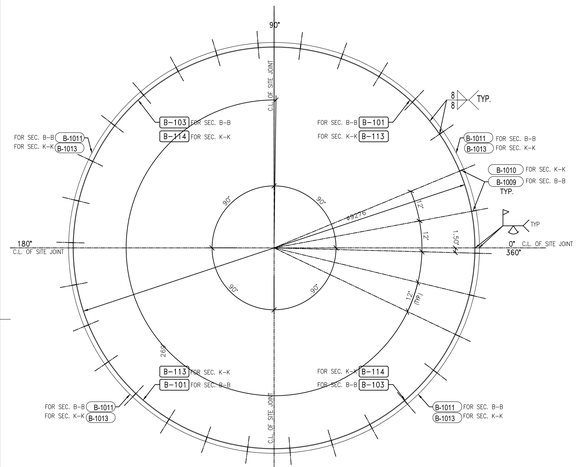
SECTION A–A



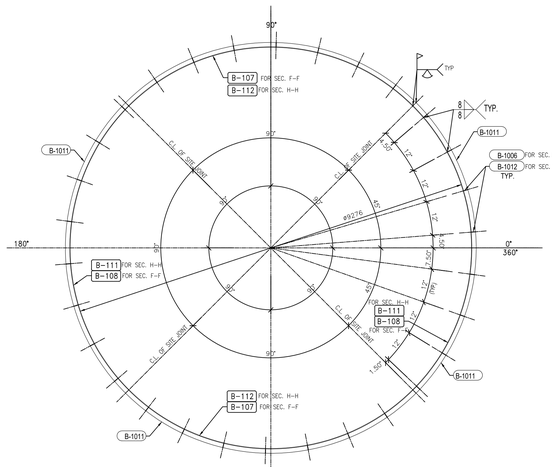
SECTION D–D



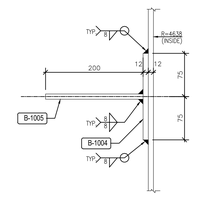
SECTION J–J



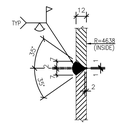
SECTION B–B
SECTION K–K



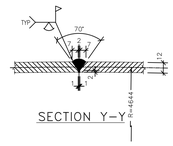
SECTION F–F
SECTION H–H



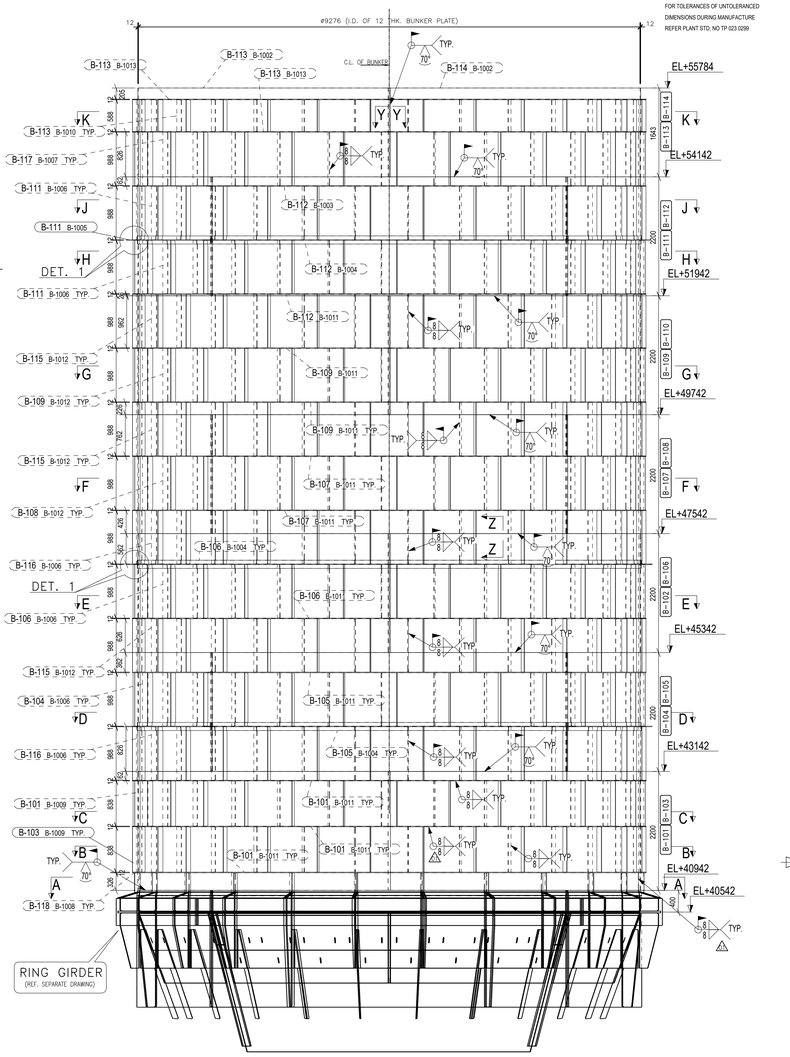
DETAIL 1



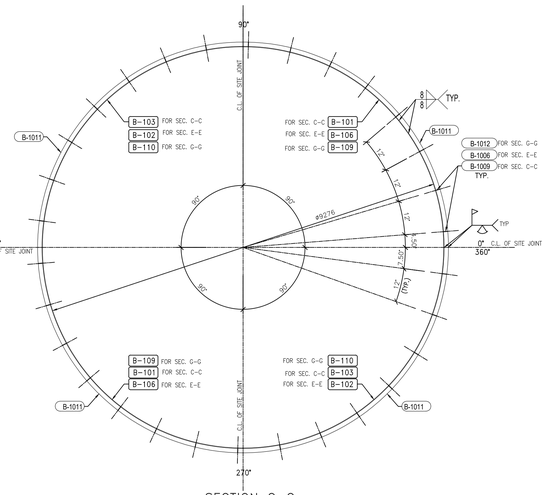
SECTION Z–Z



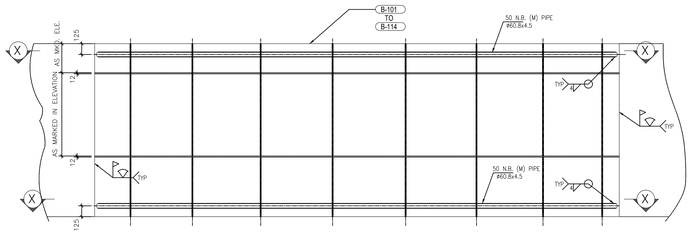
SECTION Y–Y



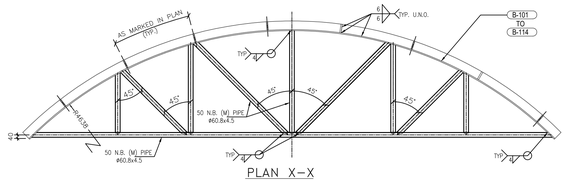
ASSEMBLY GA OF SILO BUNKER SHELL AS MARKED
(ELEVATION)



SECTION C–C
SECTION E–E
SECTION G–G



TYP. TRANSPORT STIFFENER ARRANGEMENT DETAIL OF BUNKER PART



PLAN X–X

GENERAL NOTES:–

1. ALL DIMENSIONS ARE IN MM & ELEVATIONS IN METERS UNLESS STATED OTHERWISE.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH CONTRACT TERMS AND CONDITIONS, TECHNICAL SPECIFICATIONS AND SCHEDULE OF ITEMS.
3. FOR OTHER NOTES AND STD. DETAILS REF. DRG. PE–DG–504–600–C002
4. ALL ELEVATIONS ARE TO THE TOP OF STEEL (U.N.O.)
5. ALL BOLTED FIELD CONNECTIONS ARE TO BE DONE WITH HSFG BOLTS OF PROPERTY CLASS 8.8.(U.N)
6. PROPER CARE SHALL BE TAKEN IN WELDING OF BUNKER PLATES. HORIZONTAL & VERTICAL JOINTS IN BUNKER & HOPPER SHALL BE SUBJECT TO NDT AS PER FQP.
7. VERTICAL JOINTS IN BUNKER PL SHALL BE STAGGERED.
8. PLATE SHALL BE CUT TO MAX WIDTH TO REDUCE NUMBER OF JOINTS.
9. BEFORE COMMENCING REGULAR FABRICATION OF THE BUNKER TRIAL ASSEMBLY AT SHOP OF THE BUNKER INCLUDING HOPPER SHALL BE MADE ATLEAST FOR ONE BUNKER.
10. SIZE OF INCLINED MEMBERS/PLATE TO BE VERIFIED BY FULL SCALE SHOP LAYOUT BEFORE FABRICATION.
11. THIS DRAWING IS NOT BE SCALED, ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
12. STAINLESS STEEL LINER IN THE COAL HOPPER & SILO SHALL BE OF 5.0MM THICKNESS OF GRADE SS 304 AND SHALL BE PROVIDED ON THE INNER FACE OF INCLINED PORTION OF HOPPERS UP TO BOTTOM 300 MM OF VERTICAL PORTION OF SILO, WITHOUT ALLOWING ANY PROJECTIONS IN COAL FLOW PATH.
13. PLUG WELD IN SST LINER PLATE SHALL BE GROUND SMOOTH TO MATCH WITH PLATE PROFILE.
14. ALL BUTT WELD OF BUNKER SUPPORTING STRUCTURE SHALL BE 100% RADIOGRAPHED. ELECTRODE E308L FOR WELD JOINTS BET SST PLATES & E309L FOR WELD JOINTS BETWEEN SST PL & MS PLATE.
15. SPOT RADIOGRAPHY FOR BUTT WELDS SHALL BE CARRIED OUT IN TENSION ZONE AND IN COMPRESSION ZONE AS PER FQP.
16. ALL SITE FILLET WELDS OF BUNKER AND BUNKER SUPPORTING GIRDERS/BEAMS AS PER FQP.
17. ADEQUATE TEMPORARY STIFFENER TO BE PRORATED TO AVOID BUCKLING DISTORTION OF BUNKER STRUCTURE DURING FABRICATION, HANDLING AND ERECTION STAGE.
18. 100% TESTING OF SITE BUTT WELDS REQUIRED .
19. FOR SINGLE V WELDING REFER RELEVANT QUALITY PROCEDURE FOR BACK GOUGING&FINISH WELDING DETAIL.

NOTES FOR TRANSPORT ARRANGEMENT

01. NECESSARY CUTTING AND WELDING ON TRANSPORT STIFFENERS ARE TO BE AT SHOP.
02. THE LOOSE ERECTION MEMBERS ARE TO BE SUPPLIED IN A BUNDLED MANNER. THE NECESSARY BOX ARRANGEMENTS ARE TO BE DONE AT SHOP.
03. LOOSE ITEMS TO BE PROPERLY TIED BEFORE DESPATCH.
04. WHILE SHIPPING, IF REQUIRED ADDITIONAL TRANSPORT STIFFENER / SPIDER SHALL BE PROVIDED.

HIRARCHY NUMBER	ITEM NUMBER	DESCRIPTION	STD	PEM DRAWING NO / HPVP DRAWING NO	ITEM NO	MATERIAL CODE	ASSP	UNIT	UNIT WEIGHT	GS ZONE
					VAR NO	MATERIAL SPECN		DI	QUANTITY	
	18	B-118 PL12*100		3-66-102-A0018 / 3-66-102-U0004				No	3.372 24	
	17	B-117 PL12*100		3-66-102-A0020 / 3-66-102-U0003				No	9.296 30	
	16	B-116 PL12*100		3-66-102-A0019 / 3-66-102-U0002				No	9.202 60	
	15	B-115 PL12*100		3-66-102-A0017 / 3-66-102-U0001				No	9.286 2	
	14	B-114 PL12*1643		2-66-102-A0016 / 2-66-102-U0037				No	1376.872 2	
	13	B-113 PL12*1643		2-66-102-A0015 / 2-66-102-U0036				No	1380.640 2	
	12	B-112 PL12*2200		2-66-102-A0014 / 2-66-102-U0035				No	2032.592 2	
	11	B-111 PL12*2200		2-66-102-A0013 / 2-66-102-U0034				No	2032.592 2	
	10	B-110 PL12*2200		2-66-102-A0012 / 2-66-102-U0033				No	1863.940 2	
	9	B-109 PL12*2200		2-66-102-A0011 / 2-66-102-U0032				No	1854.654 2	
	8	B-108 PL12*2200		2-66-102-A0010 / 2-66-102-U0031				No	1789.067 2	
	7	B-107 PL12*2200		2-66-102-A0009 / 2-66-102-U0030				No	1788.983 2	
	6	B-106 PL12*2200		2-66-102-A0008 / 2-66-102-U0029				No	1963.653 2	
	5	B-105 PL12*2200		2-66-102-A0007 / 2-66-102-U0028				No	1963.066 2	
	4	B-104 PL12*2200		2-66-102-A0006 / 2-66-102-U0027				No	1963.066 2	
	3	B-103 PL12*2200		2-66-102-A0005 / 2-66-102-U0026				No	1858.214 2	
	2	B-102 PL12*2200		2-66-102-A0004 / 2-66-102-U0025				No	1963.737 2	
	1	B-101 PL12*2200		2-66-102-A0003 / 2-66-102-U0024				No	1858.214 2	

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD
1	22-08-24	GOWTHAM	NV REDDY	NV REDDY	2	19-09-2024	PRAVEENA.K	NV REDDY	NV REDDY																			
	FILLET SIZE IS CORRECTED FROM 6MM TO 8MM INLINE WITH DETAIL DRAWING25					SECTION A–A IS CORRECTED																						

CONTRACTOR: **Bharat Heavy Electricals Ltd** POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NEW DELHI

SUB CONTRACTOR: **Bharat Heavy Electricals Ltd** HIGH PRESSURE BOILER PLANT, TRICHY

DETAILER:

CUSTOMER NO : ADANI POWER LIMITED
PROJECT NAME : 2x800MW ULTRA SCTPP-MAHAN (PH-II)

	NAME	SIGNATURE	DATE
DRN	RPC		14.05.2024
CHD	LPPP		14.05.2024
APPD	TMBR		14.05.2024

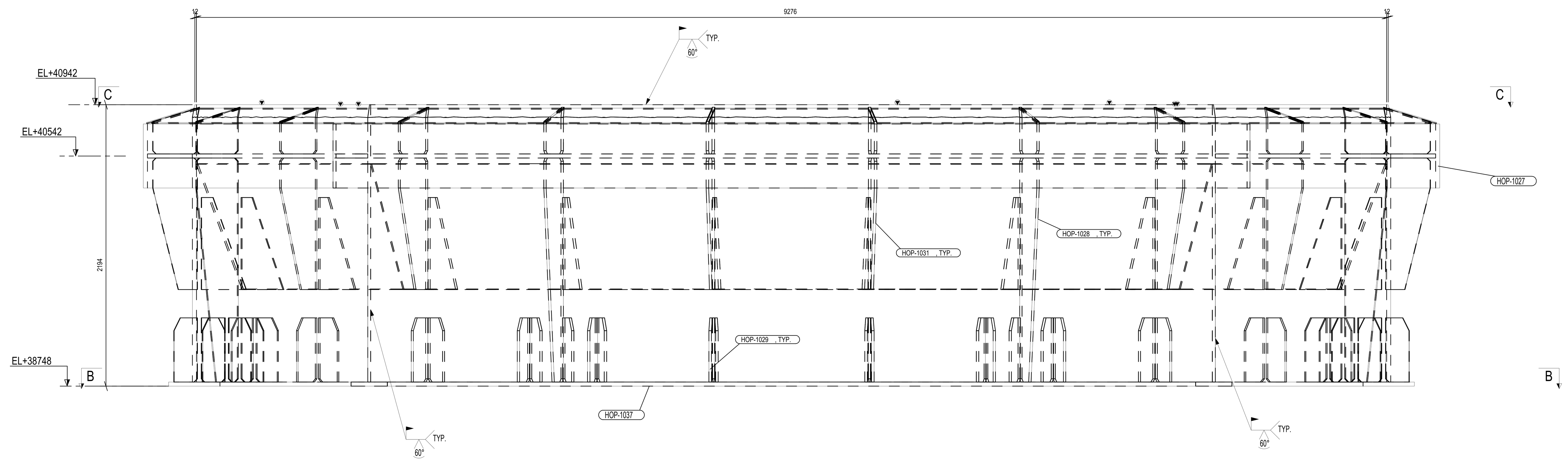
DEPT: ST | CODE: 122 | TITLE: GA OF SILO BUNKER SHELL ABOVE HOPPER

ALL DIMENSIONS ARE IN MM | PROJECTION | SCALE: NTS | WEIGHT (Kg): 51378.579 | REF TO ASSY / OLD DWG

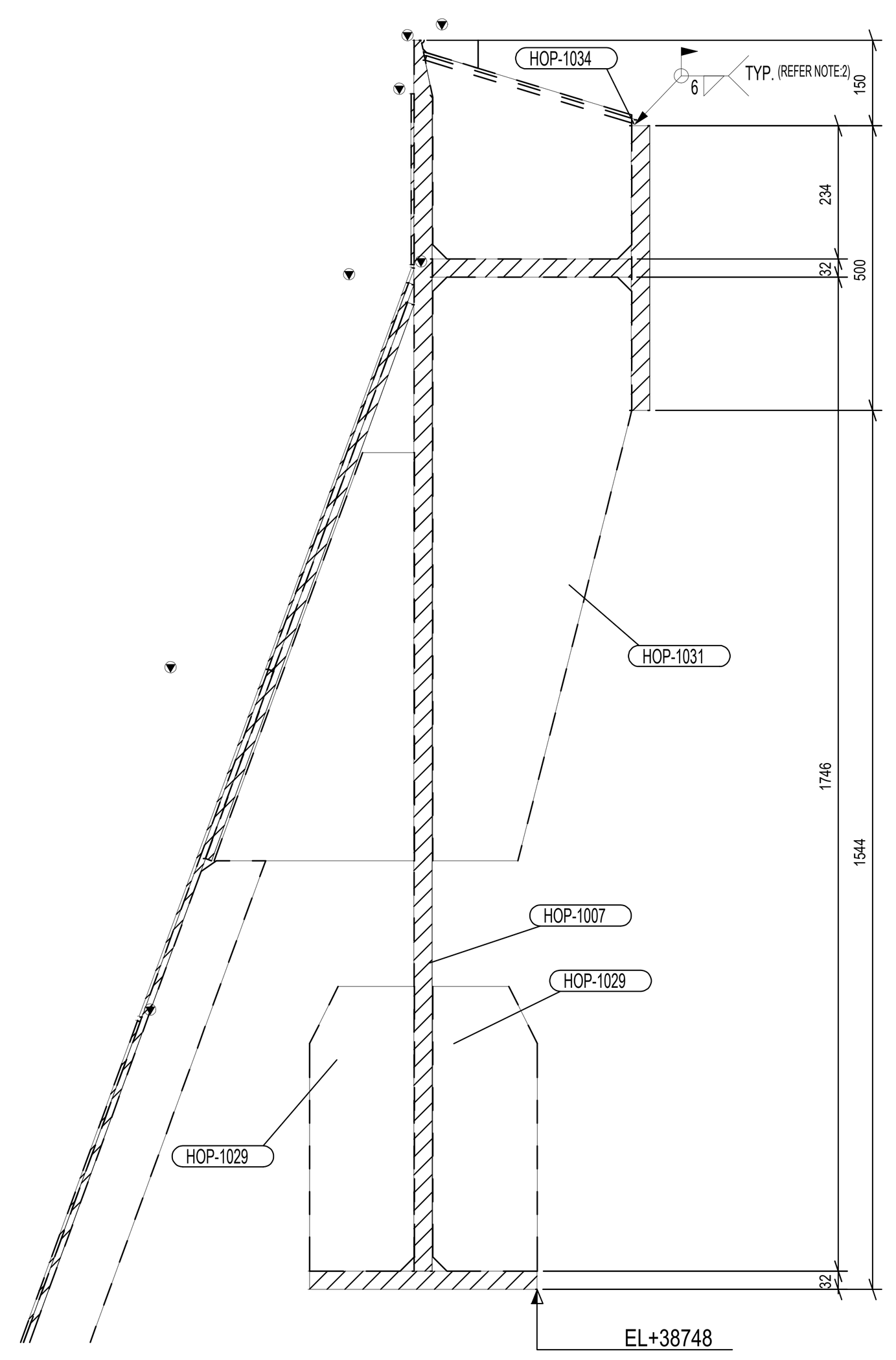
PEM DRAWING NO : 0-66-102-A0002
HPVP DRAWING NO : 0-66-102-U0028
REV. 02

DRAWING NO. 0-66-101-U0042

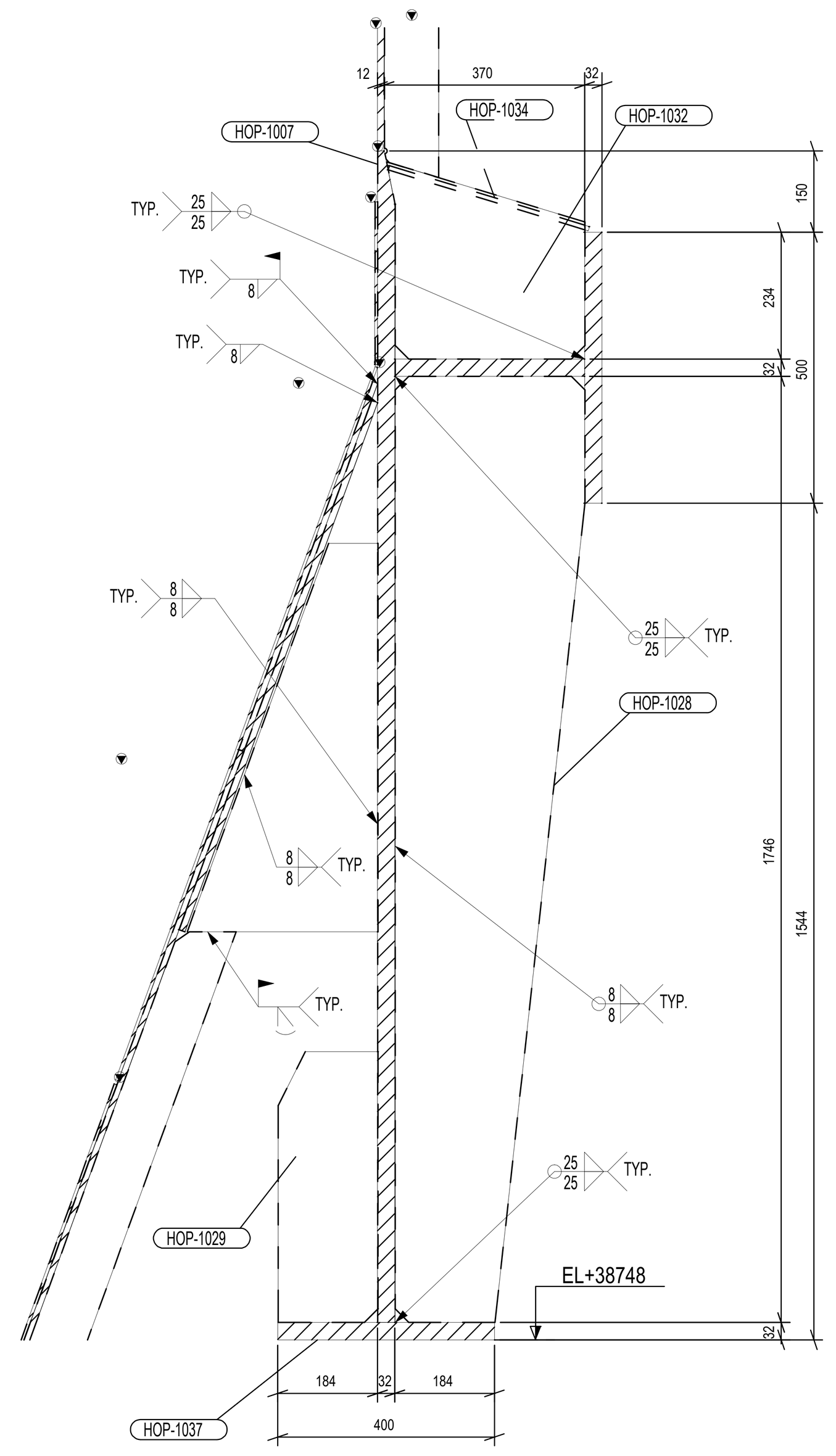
FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD. NO TP 023 0299



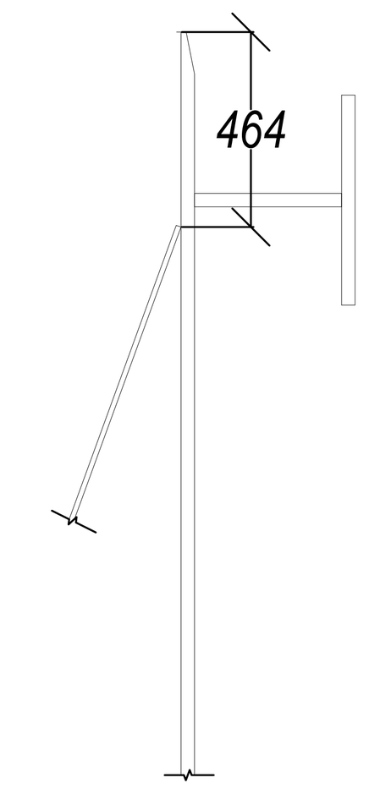
A - A



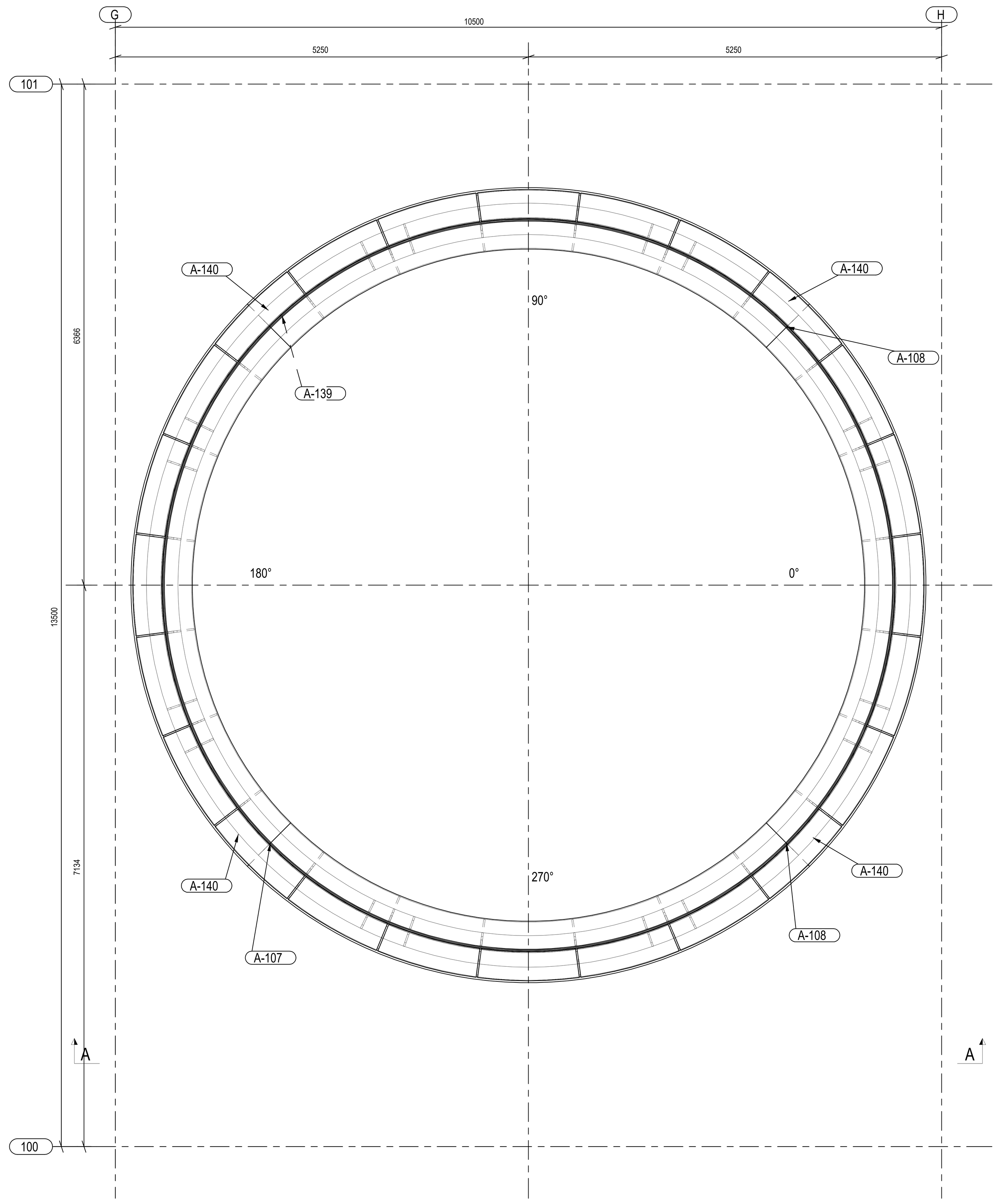
D - D



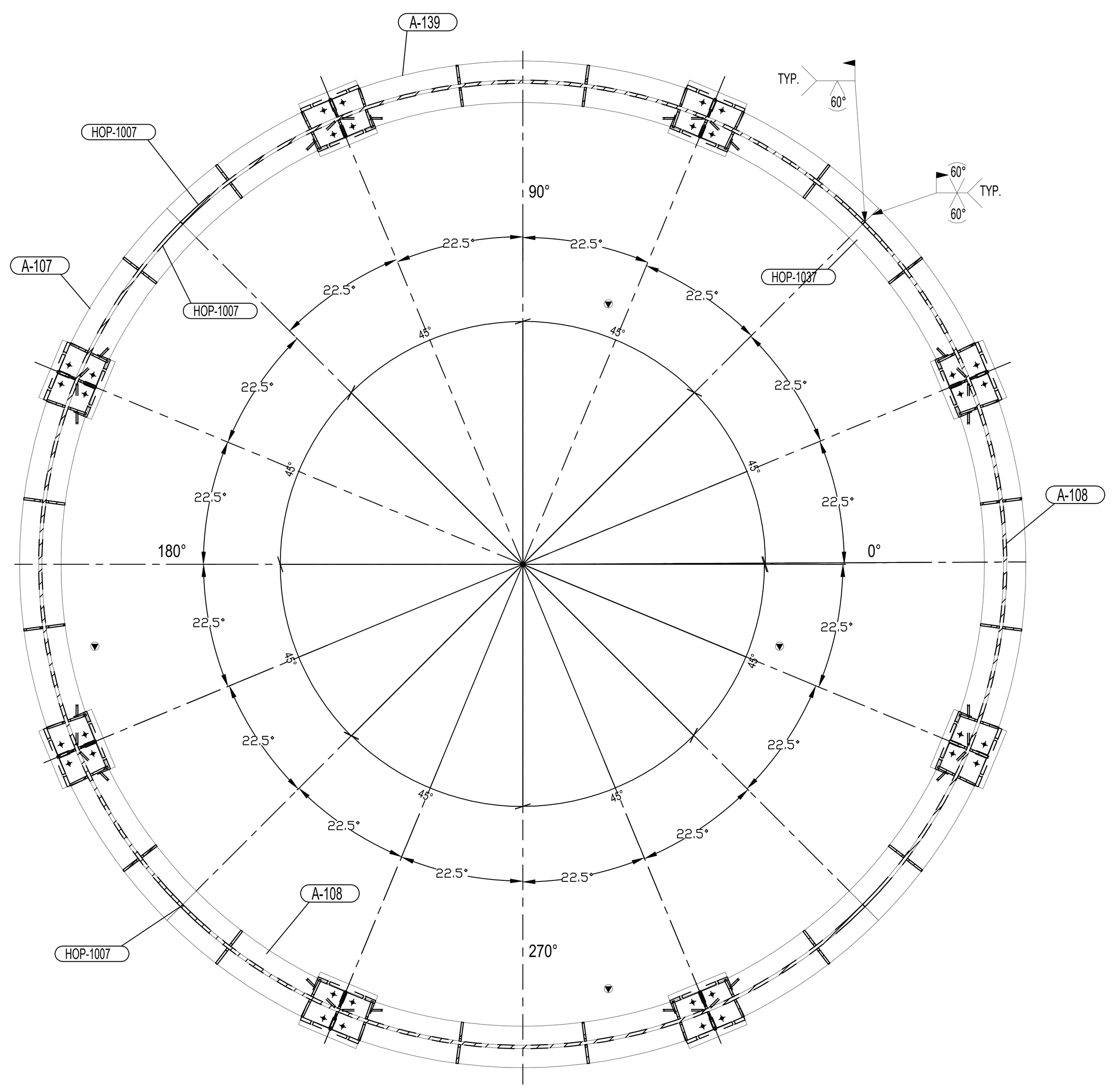
E - E



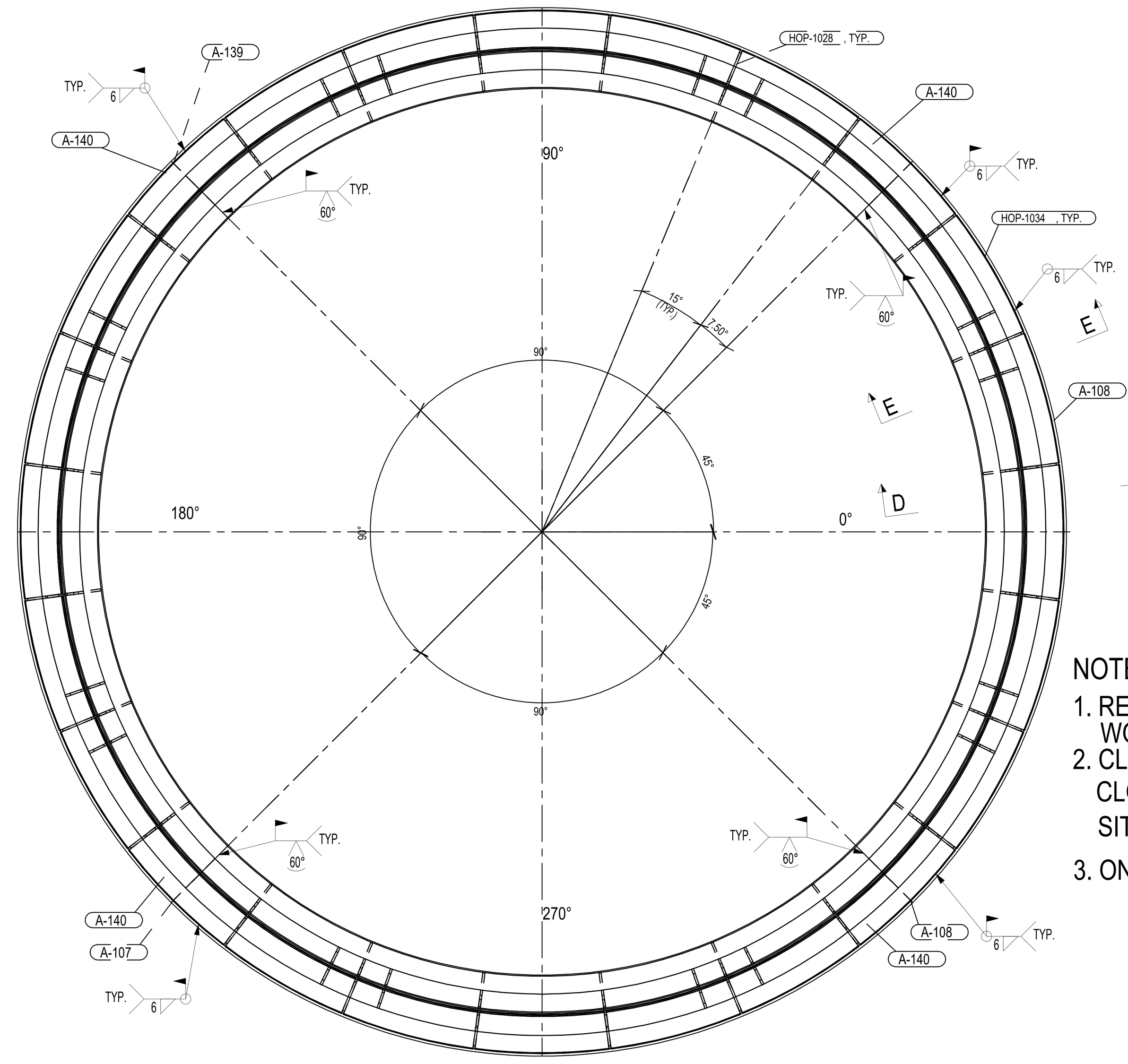
01 LOCATION OF RING FUNNEL FROM RING GIRDER WEB TOP



TOP PLAN



B - B



C - C

NOTES:-

1. REFER DRAWING NO:- PE-DG-504-600-C002 FOR GENERAL NOTES FOR STRUCTURAL STEEL WORKS
2. CLOSING PLATES TO BE WELDED IN SHOP AS SHOWN IN INDIVIDUAL DETAIL DRAWING. CLOSING PLATES BETWEEN ONE RING GIRDER TO ANOTHER ONLY TO BE SENT LOOSE FOR SITE WELDING.
3. ONE COAT OF RED OXIDE CAN BE APPLIED BEFORE WELDING CLOSING PLATE @ SHOP.

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	(PEM DRG NO. / HPVP DRG NO.) DRAWING NUMBER	ITEM NO / VAR NO	MATERIAL CODE / MATERIAL SPECN	A/C/P	UNIT / DI	UNIT WEIGHT / QUANTITY	GS	ZONE
	4	A-140 PL8*536 _ GIRDER COVER PLATE LOOSE		2-66-101-A0001 / 2-66-101-U0049				No	30.211 / 4		
	3	A-139 PL32*2162		1-66-101-A0003 / 1-66-101-U0020				No	7976.600 / 1		
	2	A-108 PL32*2162		1-66-101-A0004 / 1-66-101-U0021				No	7976.600 / 2		
	1	A-107 PL32*2162		1-66-101-A0001 / 1-66-101-U0019				No	7976.600 / 1		

REV NO.	DATE	BRIEF RECORD OF REVISIONS	PPD.	CHD.	APPD.
01	29-10-24	NOTE NO: 02 & 03 ARE ADDED	M.CHAITANYA	NVREDDY	NVREDDY

CONTRACTOR	Bharat Heavy Electricals Ltd POWER SECTOR PROJECT ENGINEERING MANAGEMENT, NEW DELHI	CUSTOMER NO : ADANI POWER LIMITED PROJECT NAME : 2x800MW ULTRA SCTPP-MAHAN (PH-II)
SUB CONTRACTOR	Bharat Heavy Electricals Ltd HIGH PRESSURE BOILER PLANT, TRICHY	
DETAILER		

	NAME	SIGNATURE	DATE
DRN	RPC		29.08.2024
CHD	PP		29.08.2024
APPD	LP		29.08.2024

DEPT	CODE	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG
ST	122			NTS	32027.244	

TITLE: GA OF RING GIRDER

PEM DRG NO: 0-66-101-A0001

HPVP DRG NO: 0-66-101-U0042

REV 01

ANNEXURE –II (A)

Check list to be submitted for every bunching cleared by QC (BHEL) and Engineer-in-charge for processing of bill with reference to the following documents.

1) Drawing Number: 1-66-102-U0038, Rev -02
2) BUNKER SEGMENT PETAL LOADING AND UNLOADING PROCEDURE Doc No: 66-102-Handling-001 Rev.2 Dt 16-10-25

CHECK LIST

SL NO	Activities to be completed	Put tick (✓) mark in the box
1	Bunching of segments having same bunker no, same course no and respective DU no	
2	Placing rubber / Wood cushion on the top of channels	
3	Lifting lugs on top of lifting beam (2 no's) and maintain CG of the total stacked frame	
4	Wood chunk to be inserted on web of vertical post to avoid metal to metal contact	
5	Connection between post (ISMC 150) and lifting beam (ISMB 200)	
6	Stopper plates of vertical post connections	
7	Placing wood block in between petals to have transport jerk dampering	
8	Stacking petals with tie angles / lapped tie plates at free edges	
9	Individual petals with two no of lug arrangements.	
10	Touch up paintings	
11	All welds having 4mm fillet	
12	surface free from tack welds / temporary supports	

Signature of the Contractor / In-charge

Authorized representative

BHEL Engineer

QC (BHEL)