



Det norske Veritas

Industrial and Offshore Division

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TECHNICAL REPORT

Date 1st December, 1977	
VERITAS Report No. 503080	Subject Group
Department Project No. 503080	
Approved by <i>[Signature]</i>	
Client/Sponsor of project Elf Aquitaine Norge A/S	
Client/Sponsor ref. Eye	
Work carried out by C. Hansvold	
Reporters sign. <i>C. Hansvold</i>	



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Wind

:

Storm conditions. Max. one-minute
sustained wind velocity: 50 m/s
Max. gust velocity: 62,5 m/s

Operating conditions: Max. one-minute
sustained wind: 35 m/s.



1.3 Foundation soils and seabed conditions

The soil conditions at the Frigg TP1 site are favourable for supporting the Sea Tank TP1 structure. The soil strata are not very uniform across the site, however an average soil profile (used for stability calculations) can be described as follows:

- 0 - 6 m below sea floor : dense fine sand
- 6 - 11 m below sea floor : stiff clay
- 11- 15 m below sea floor : dense sand
- 15 - below sea floor : hard, silty clay with interbedded layer of sand, silt and clay

The sea bed is rather even, however with a slope downwards to the north of approximately 1.1 %. This is equal to a level difference across the diagonal (N-S) of the base of 1.15 m.

After final ballasting and underbase grouting the average skirt penetration was approx. 1.8 m and the platform had a tilt towards north of approx. 0,7 %.



1.4 Design criteria

The design of the concrete structure is mainly based on:

- (1) TPl - Design Criteria
STC-Note No. STC.E.03-05-16A
- (2) British Standard Institution:
CP 110, Part 1-3, The structural use of concrete.



1.5 Material specifications

1.5.1 Concrete

The concrete grade is C50 according to CP 110 specifications.

The mix properties are given in "Concrete Specifications for North Sea Platforms, D/JD/SJA, 8th July, 1974" prepared by Sir Robert McApline & Sons, Ltd.

With small modifications, the following mix proportions were used

Mix	Cement	Sand	Coarse Aggregate	Plasticizer by weight of cement	Retarder by weight of cement	W/C Ratio
A	1 (457 kg/m ³)	1.4	2.7	½ %	NIL	0.43
B	1 (428 kg/m ³)	1.6	2.8	½ %	1 %	0.43

The laboratory routine testing show a good and uniform concrete production. The required characteristic cube strength of 50 MPa at 28 days has in general been obtained by an ample margin, and the coefficient of variation has been less than 0.1.

X The content of tricalciumaliminate (C₃A) of the cement was approximately 10 %.

1.5.2 Reinforcement

Normal reinforcement: Hot rolled deformed bars with yield strength 410-425 Mpa.

Prestressing tendons: 7 No. 18 mm Dyform Strands, min breaking load 38 kN/strand.

Anchorage: Type CCL.



1.5.3 Concrete cover

The following values of concrete cover are specified in the design criteria:

	Raft and splash zone	Elsewhere
Normal reinforcement	65	60
Prestressing ducts	100	100

1.6 Structrual analysis

The detailed structural analysis is based on linear theory of elasticity using finite element models. The calculation results are directly used in the design without considering redistribution of forces due to cracking of the concrete. Normally this approach will be on the conservative side with regard to design of reinforcement in areas with pronounced stress peaks.

The analytical calculations have revealed stress concentrations in the following areas:

- intersections cell walls/bottom slab
- intersections cell walls/raft
- intersections between cells
- areas in raft adjacent to columns
- base of columns (fatigue effects)
- top of columns (at transition to steel deck)

In general the results from the analysis are considered to be reliable and have ensured a sound design of the structure.



However, the horizontal reinforcement of the towers (between el. -65 and el. approx. - 29) is not properly designed to meet the full temperature gradient due to hot gas risers in the columns. A water circulation system has therefore been installed to keep the temperature gradient through the wall of the column below the acceptable value of

$$T = 12^{\circ}\text{C}$$

Due to low amount of reinforcement in the hoop direction between el. -65 and el. - 40 it should be looked for vertical cracks in this area.

The fatigue design is based on an approximate assessment of cumulative damage effects, using Miners hypothesis. Especially the base and top of the columns are subjected to predominant fatigue effects.

1.7 Corrosion protection

Evaluation of the corrosion protection on the TPI has been carried out to some detail only on the riser system including J-tubes, supports, tunnel spools, etc. See separate DFI-resume on risers.

The riser system and all other steel items exposed to sea water are designed to be electrically isolated from the concrete reinforcement as described in Secco "Recommendations Concerning the Installation of the Tunnels Spools and J Tubes from the Rebar" dated 8.5.74 and in Corrosion Consulting Services Inc. reports as referred in above mentioned DFI-resume.



The reinforcement is assumed to be protected against corrosion by the concrete cover. The coatings applied to the concrete structure dome roofs and columns in splash zone, see 2.8, are not considered significant as corrosion protection of the reinforcement.

Specifications for coating of steel parts are Elf-Norge Frigg Field "Painting Specification for Steel Structures" D.E.P. 1052 No. 3-169, Rev. 1, March 1974, Elf-R.E. "Standard Specification P7 Coating for Marine Structures" D.G.E.P. 01.E.90 No. 2-530, Rev. 0, Sept. 1972, and Secco "Standard Specification for Application of Coatings on Steel Parts", Secco A 922-HZ/Mg, April 1974.

The consequences of corrosion of built-in steel items for the concrete structure and riser cathodic protection system have been discussed. Temporary embedment plates have not been protected against corrosion, and the possibility of repair work in the future as a result of corrosion attack has been anticipated.

Pump casings are supplied with sacrificial anodes. Further evaluation of sea water piping systems corrosion protection has not been carried out.

The possibility of corrosion attack from sulphate reducing bacteria on steel inside closed cells was discussed. Cleaning of all caissons for detrimental organic material including wooden material before closing of domes was recommended.



2. FABRICATION RESUME

2.1 Construction period

The concrete structure was constructed at Ardyne Point during the period March 74- March 76. In March 76 the structure was towed to Loch Fine for erection of steel deck.

2.2 Concrete quality

The concrete quality has been uniform and good during the whole construction period fulfilling the requirements to CP 110 with a good margin. This apply for the 28 days cube strength as well for the long-term strength. Irregularities in concrete production which might have jeopardized the quality have not been reported.

The C_3A - content of the Ordinary Portland Cement used at Ardyne Point is in the order 9 - 10 %.

In-Situ Strength:

To investigate the in-situ concrete quality a number of cores were taken from cells nos E3 and E5, see Fig. 6.

Some of the test results are shown below.



Compressive Strength										
Concrete grade	Core no.	Length (l) mm	Mean diam. (d) mm	Ratio l/d	Static E up to 25N/mm ²	Max load kN	Area mm ²	Core Strength N/mm ²	Estimated cube str. BS 1881 N/mm ²	Age at test days
RB	C1	309	152	2.03	33.5 45 days	962	18150	53.00	66.25	48
RB	C2	311	152	2.05	33.5 46 days	1040	18150	57.30	71.62	48
RB	F1	310	152	2.04	33.0 46 days	1076	18150	59.28	74.10	48
RB	F2	309	151	2.05	34.0 47 days	1016	17910	56.73	70.91	48
RF	B1	315	151	2.09	31.0 41 days	900	17910	50.25	62.81	44
RF	B2	310	152	2.04	30.0 43 days	1055	18150	58.15	72.65	44



Later core tests taken from the repaired area of the cell walls at elevation 83/84 indicated a coefficient of permeability in the order of 10^{-7} - 10^{-10} .

These core tests are described in report no. 623.7.443-2 from Centre Experimental de Recherches et d'Etudes du Batiment et des Travaux Publies.

2.3 Overall geometry and dimensions

For the caisson maximum deviations from true shape are reported to be as much as 80 - 100 mm. These deviations necessitated air pressurization of the caisson during installation on field, but are not considered to play any important role for the long term strength or durability of the platform. The overall accuracy of the columns is reported to be good. The thickness of concrete sections are in general within given tolerances.

2.4 Concrete cover to reinforcement

The concrete cover to reinforcement is in general acceptable, both for the caisson and the columns with a slight tendency to excess cover.

However, problems arised during the first stage of slipforming resulting in insufficient cover, especially in the outer surfaces of outer cells. Areas of reduced cover, from elevation - 101.0 to approximately - 98.5 are indicated on Figure 7

For column C1, reduced cover are reported at elevation -24,5 to el. -24.0. For column C2 reduced cover is reported at el. -24.5, -24.0, +5.00, +12.00. The areas of reduced cover are more or less randomly distributed around the



circumference of the columns. The inside ring stiffeners at these levels have obviously complicated the placing of reinforcement.

2.5 Construction joints

Horizontal construction joints in caisson walls and towers are located at, see Figure 8.

		- 101.000		
Caisson	{	Approx	- 98.400	(unplanned joint)
			- 90.800	
			- 65.000	
Columns	{		- 46.000	(Column C1) (19.7.75)
			- 41.500	(Column C2) (22.7.75)

The horizontal construction joints in the slipform walls were treated by sandblasting. The joints were sealed by epoxy resins CXL 120 plus CXL 300 (Colebrand). A rubber waterstop was placed in the concrete section, see Figure

Due to irregularities in concrete delivery, a tendency to cold joints may have occurred at level -28.000 (column C1), level -17.000 (column C2).

Other construction joints of importance are located at

- closures of roofs (Fig 8)
- closures of temporary openings in columns (Fig 11 and 14) dwg nos. ND-455 G, ND 469 F
- inlet of risers to columns, Fig. 11 and 14.



2.6 Areas with congested reinforcement

For the upper parts of the columns it is reported that placing of concrete and reinforcement has been difficult in areas around the inner rings at elevation -24,5, -11,0, +5.00 and +12.00.

2.7 Structural repairs

In addition to the repair of cover mentioned in 2.4 major repairs had to be carried out for the caisson walls at level -83, -84. As well cracks as honeycombs occurred in the outer and inner cell walls. It is likely to believe that these major damages occurred due to irregularities in the slipform operations.

The most severe cracking was found in the external walls of cell D4, D3 and D2. Especially cell D4 was bad with one crack penetrating through the cell wall. Smaller cracks were recorded for most cells from el. -77 to el. -84. All of the external cell walls had to be repaired more or less, cell no. D3 having the most serious damages, cell nos E2, E3, E1, B4, B3, B2 and B1 only having small cracks. See Figure 9

The nib walls between cells B3 and B4 and between B2 and B3 showed deep cracks, honeycombs and fall outs of concrete

Repair of internal cell walls had to be carried out for all cells except for cells nos A3, A4, E1, E2, E3 and E4. The caisson walls were repaired using epoxy mortars based on Colebrand products CXL DP86/CXL 500. Finally two coats of CXL 300 was applied to the repaired area.

Extent of damages and repaired procedures are given in "ELF PLATFORM T.P.1. Repairs to concrete caisson base. Report on work carried out to date 24th September, 1975" signed by J. Taylor (Colebrand) and C.K. Wyburn (Mc.Apline)



For the roof several cracks of size $> 0,2$ mm occurred as well on the inside surface as on the outside surface. A typical crack pattern is shown on Figure 10 for roof number 3 (cell A1). The cracks were repaired by injection of the cracks by an epoxy resin (Colebrand products). Finally, to assure watertightness during temporary phases, the whole roof was crated, see section 3.7

For the columns, very few damages are reported, and no damages of serious characteristic.

2.8 Coatings

Roof:

To assure water tightness during temporary phases, i.e. immersion in Lock Fyne for erection of deck and installation on the Frigg Field, the roof was coated with an Epoxy/Polyurethane - Amin material, CXL DP. 130. of thickness 0,5 mm. Inspections of the finished coating revealed areas with almost no bond between the coating and the concrete surface, probably due to unsatisfactory surface preparations. The quality of the roof coating was in general bad. The roof coating was extended to el. -65.5 of the cell walls thus sealing the construction joint between the caisson walls and the roof. Coating was also applied to the base of towers around the whole periphery and to closures of riser inlets into towers, see Figure 11, 14 and 17.

Splash zone:

In the splash zone, from el. - 11.500 m to el. + 16.000 a coating, CXL DP 130, 0,5 mm thick, was applied.



The towers were coated under good weather conditions and the result is reported to be good.

2.9 Steel items fixed to the concrete structure

A considerable number of steel plates of different type and size are fixed to the concrete structure serving as fixing plates for risers, barge bumpers etc. In addition a large number of plates used under construction, towing, installation or plates for back-up purposes exist. Some of these plates are shown on Figures 11-16 and 18-22.

Inspection of fixing plates should be coordinated with the detailed inspection of risers and their supports.

A complete list of outside and inside fixing plates in the columns, is given in attached Appendix A (STC Note No. STC. E.03.05 - ND 468 C).

2.10 Internal concrete faces

The only inside concrete surfaces accessible for inspection are the inside surfaces of the columns. It may be adviseable to inspect certain areas in connection with riser inspection or repairs when the columns have been emptied. Areas of particular interest are:

- construction joint at base of towers (approx. el. -64, see Figure
- rings at levels -90,4, -83,0, -40,0 where the prestressing anchorages are located, see Figure 23.
- fixing plates on internal concrete surfaces



3. INSTALLATION RESUME

The platform was placed within the target area with a good margin to the given tolerances. Penetration of skirts went according to plan. The strain gauges in the bottom slab did not indicate build up of concentrated earth pressure the slab. Due to the slope of seabed in the northern direction, the penetration resistance was considerable larger at the southern part of the platform. Penetration depths obtained are shown on Figure 25. In order to keep the inclination of the platform within the tolerances, ballasting of central and northern compartments were stopped until the underbase grouting was completed.

3.1 Underbase grouting:

The voids between the sea-bed and the bottom slab was filled with a cement-based grout. The w/c ratio was 3.33 and the 28-days compressive strength in range of 1-2 MPa. The grouting operation went according to plans and the final result is considered acceptable.

The following grouting reports are referred to:

- Installation of TP1 Platform at Frigg Field.
Final Report. STC note No. STC. E.03.05.63.
- Elf Norge A/S: Frigg Field Treatment Platform No. 1-TP1
Grout filling report. Paris July 9th, 1976.



3.2 Scour and scour protection

Only few month after platform installation significant signs of scouring were observed, especially at the W- and E- corners. The scour was monitored frequently during the first winter season (1976 - 77) and as the scouring continued to develop and finally reached a depth at the two corners of approx. 1,5 m it was decided to place a temporary scour protection consisting of bags with gravel. This operation was successfully completed in June 1977, covering the critical areas around the W- and E- corners.

As a permanent scour protection it is intended to place a gravel blanket all the way around the baseslab. This installation is scheduled for the spring 1978. In the meantime surveillance of the sea bed will be continued.



4. INSTRUMENTATION

In order to monitor the performance of the foundation it was decided to measure on a long term basis

- platform settlement
- platform dynamic motions
- pore water pressure at four locations under the raft

After installation only one of the pore pressure sensors could be read, and this has later also failed.

Settlements have been measured optically using the OP-platform as reference. These measurements are continued.

In order to measure the dynamic motions of the platform when subject to wave action 2 linear accelerometers were installed in column C1 at caisson roof level. In addition 2 linear and 2 angular accelerometers are planned to be installed in spring 1978.

Finally a system for measuring wave heights and periods will be installed during spring 1978.

Permanently the data will be recorded and stored on magnetic tape by means of an automatically operating data logger. The data will then be processed (onshore) and reported on a monthly basis.

CHan/AHE

1.12.1977

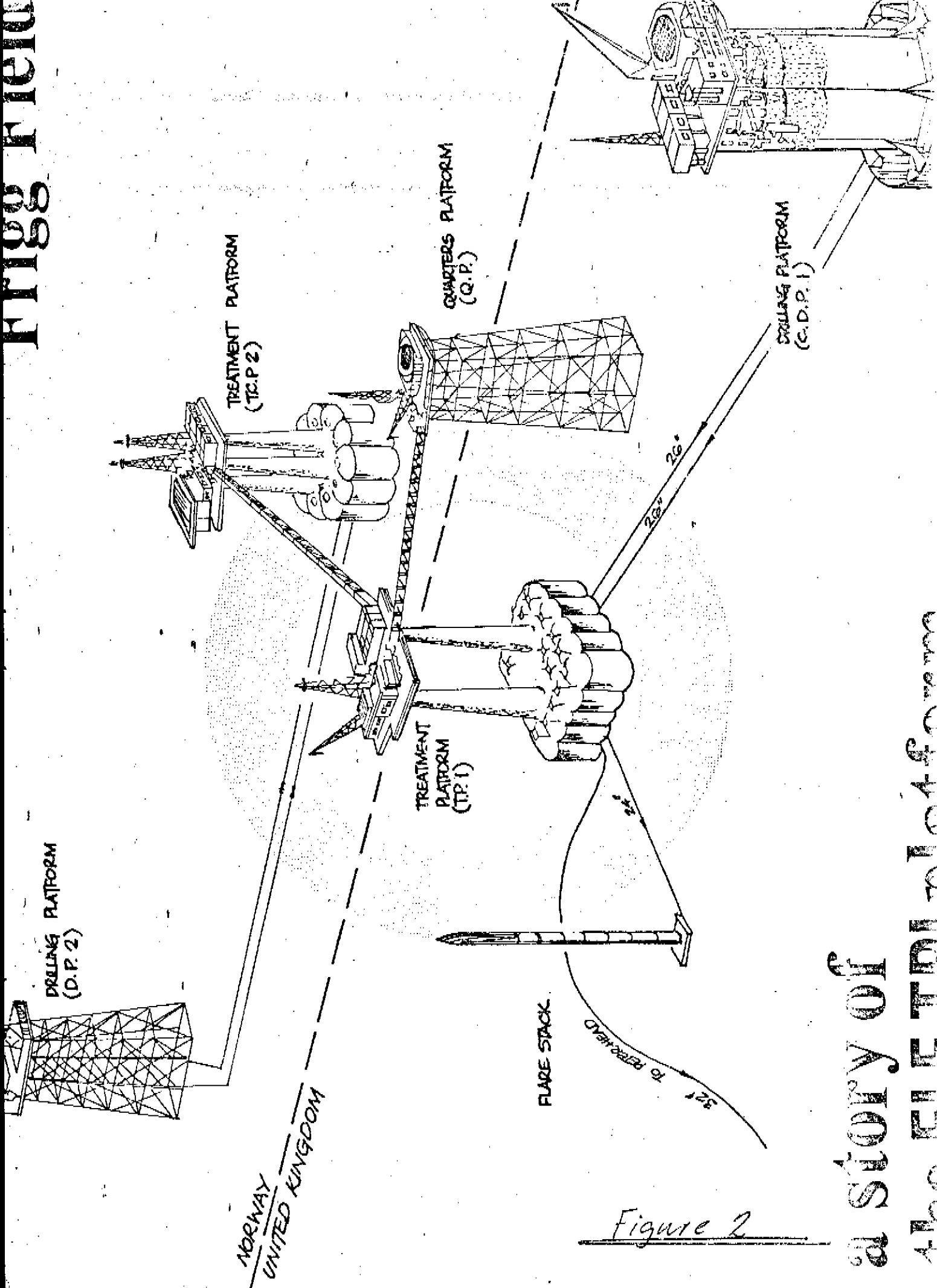
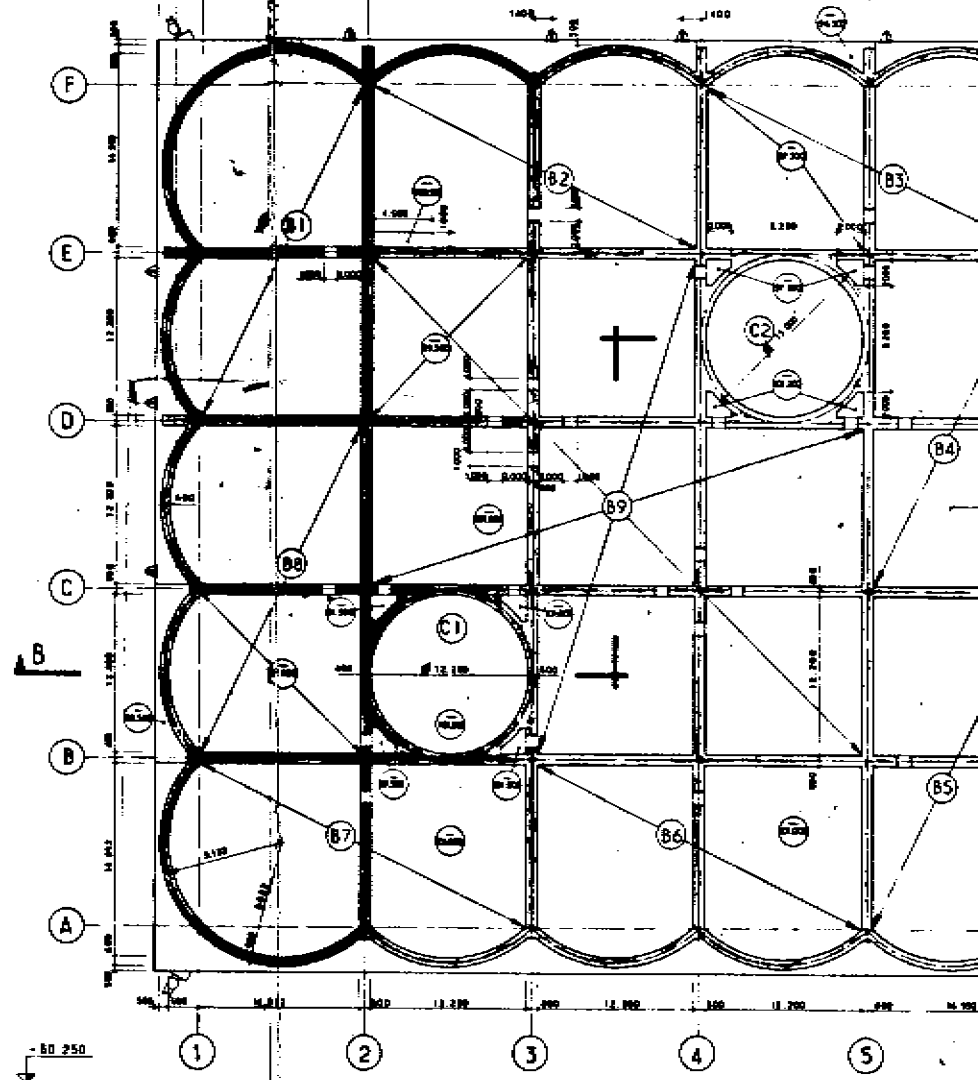
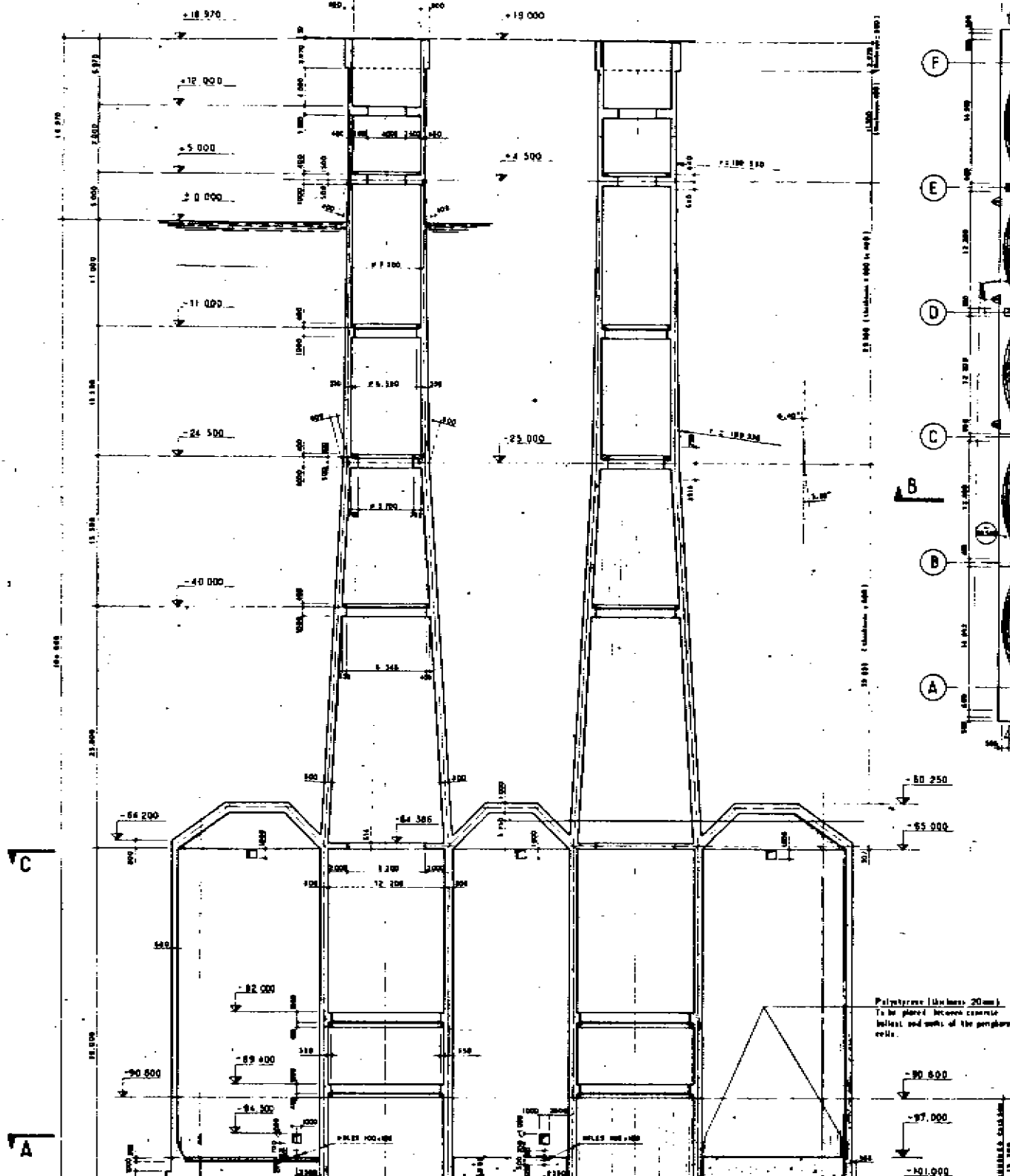


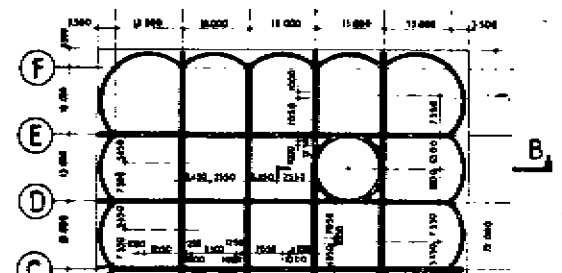
Figure 2

a story of

AN OFFSHORE PLATFORM TO 4500 FEET



SECTION C.C.



Polystyrene (thickness 20mm)
To be placed between concrete
balustrade and walls of the peripheral
cells.

Fig 3

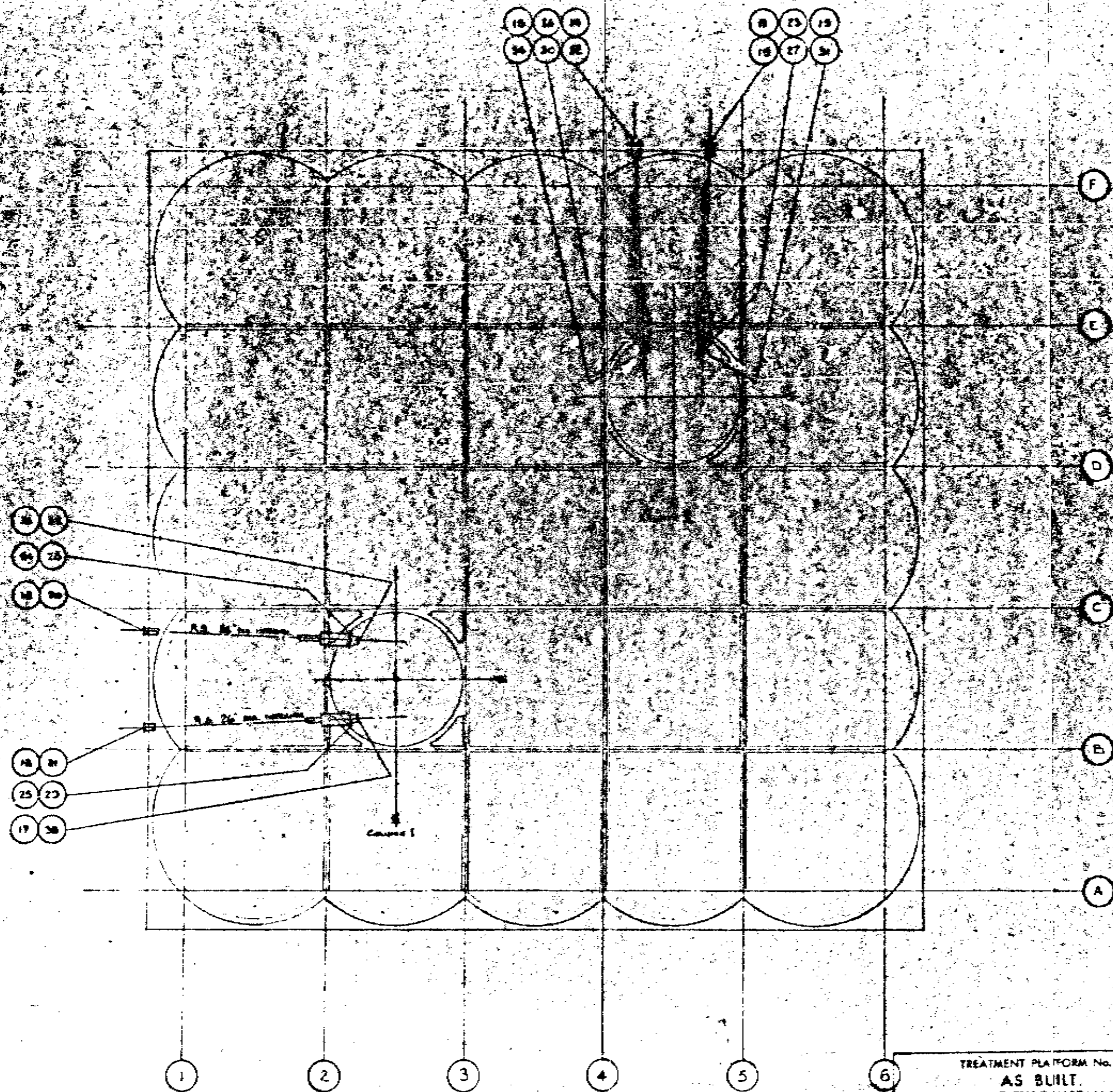


Figure 3

TREATMENT PLATFORM No. 1 AS BUILT. RISER & "J" TUBE INSTALLATION			TREATMENT PLATFORM No. 1 TPI RISER TUNNEL KEY PLAN.		
Brown & Root, (U.K.) Ltd. <i>Engineering Contractors</i> LONDON, ENGLAND.			ELF. NORGE - A/S FRIGS FIELD DEVELOPMENT PROJECT		
REFERENCE DRAWINGS NUMBER TITLE		REVISION A <i>Consolidated and built</i> B ADDED AS BUILT		APPROVED DATE	

Fig 4

RELATED DRG. NO. STC. E 05.05.702.

FOR POSITIONING OF J TUBE CLAMPS
REFER TO DRG. NO. - FOR

- NK. 1 - AI. TP. L173
- NK. 2 - AI. TP. L180
- NK. 3 - AI. TP. L181
- NK. 4 - AI. TP. L182
- NK. 5 - AI. TP. L183

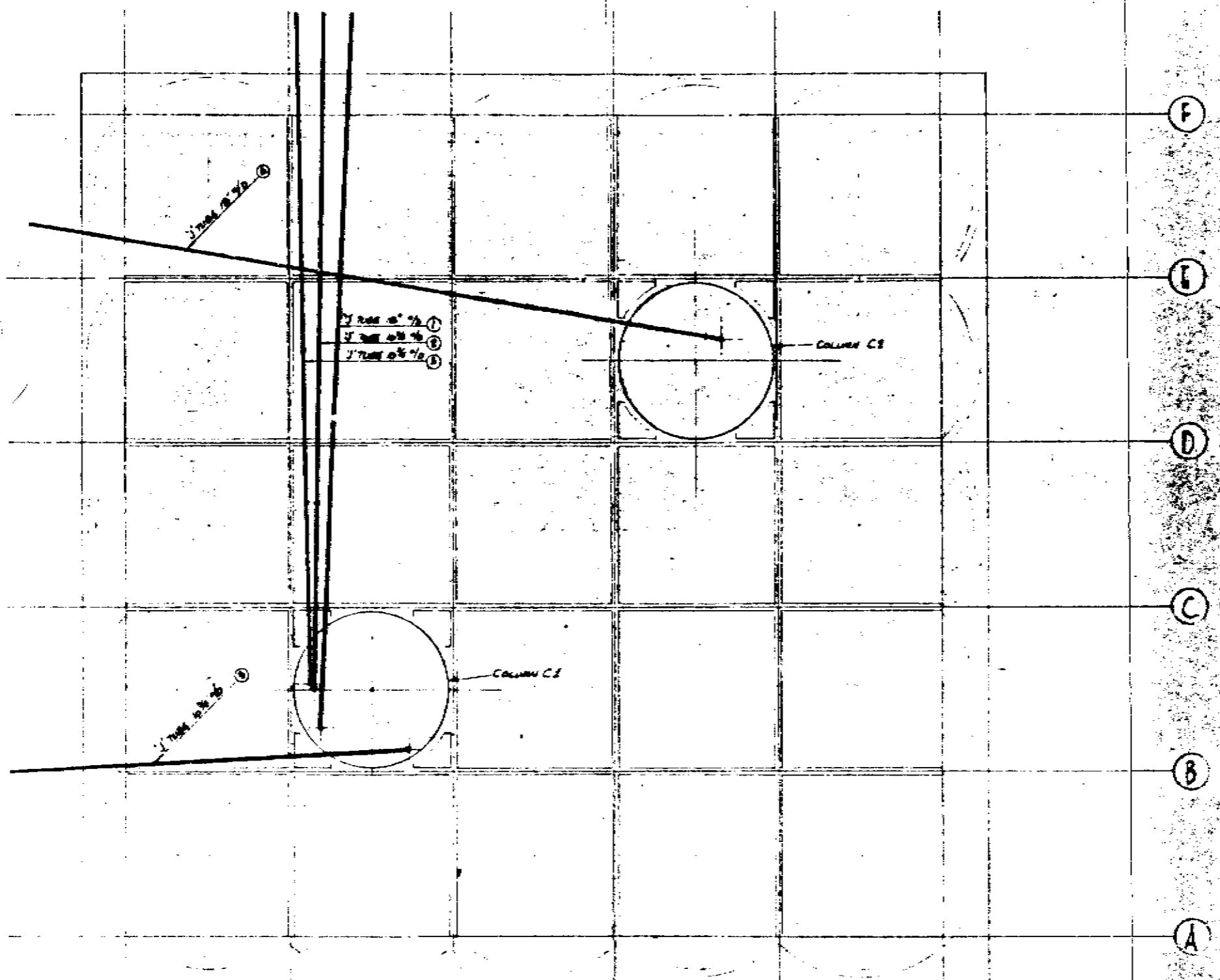


Figure 4

TREATMENT PLATFORM No. 1
AS BUILT
RISER & "J" TUBE INSTALLATION

TREATMENT PLATFORM No. 1
"J" TUBE CLAMP ARRANGEMENT PLAN

NUMBER	REVISION DRAWINGS	TITLE

NO.	REVISION	BY	CHECKED

Brown & Root, (U.K.) Ltd.
Engineers & Constructors
 LONDON, ENGLAND

ELF. NORGE - A/S
 FRIGS FELD DEVELOPMENT PROJECT

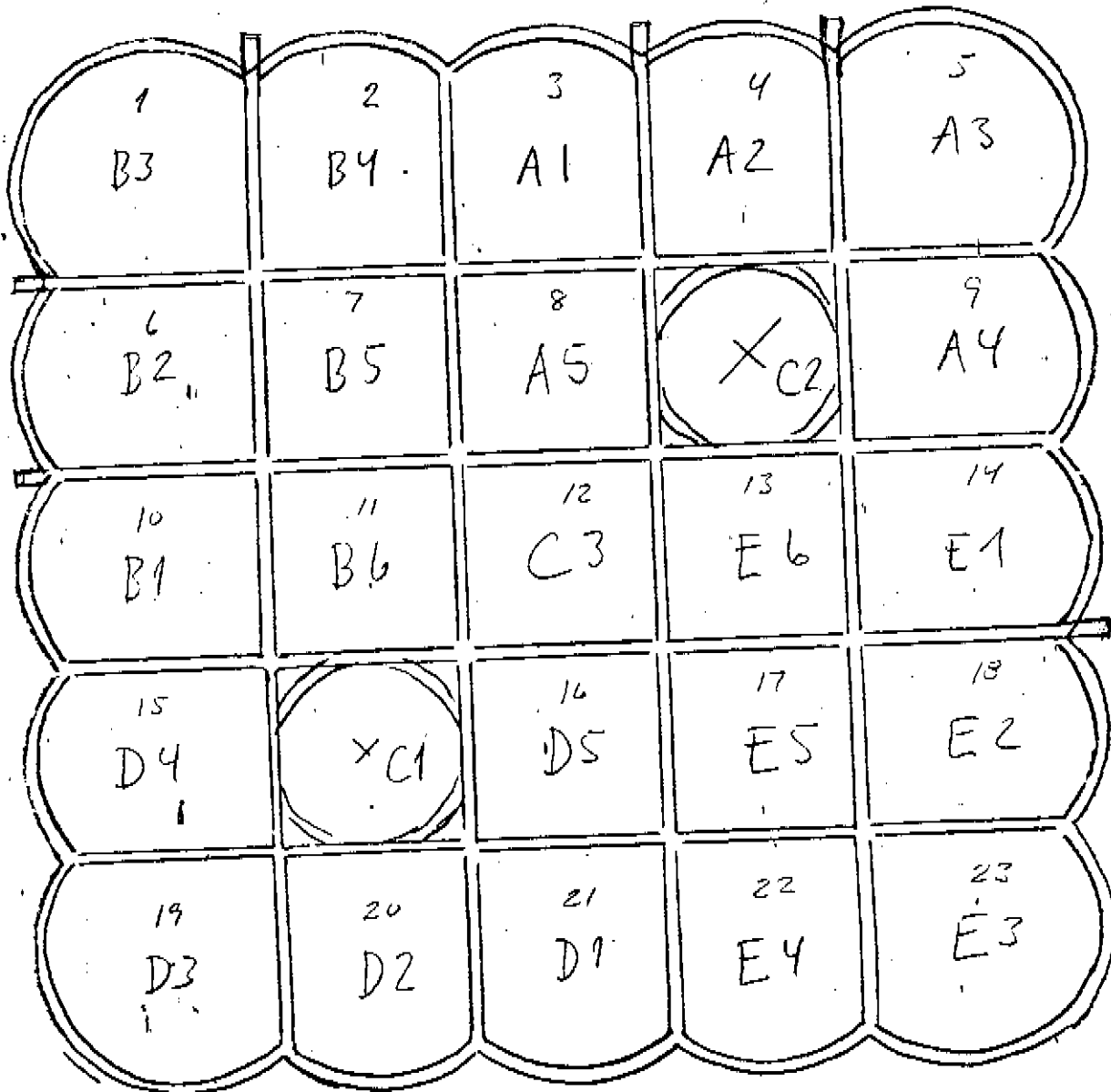



Figure 6

		Proj.No.
		Scale
 DET NORSKE VERITAS	Drawn by	Date
	Approved	Drw.No.

Areas with reduced cover.
Numbers indicate distance
from intersection cell wall/
bottom slab (metres).

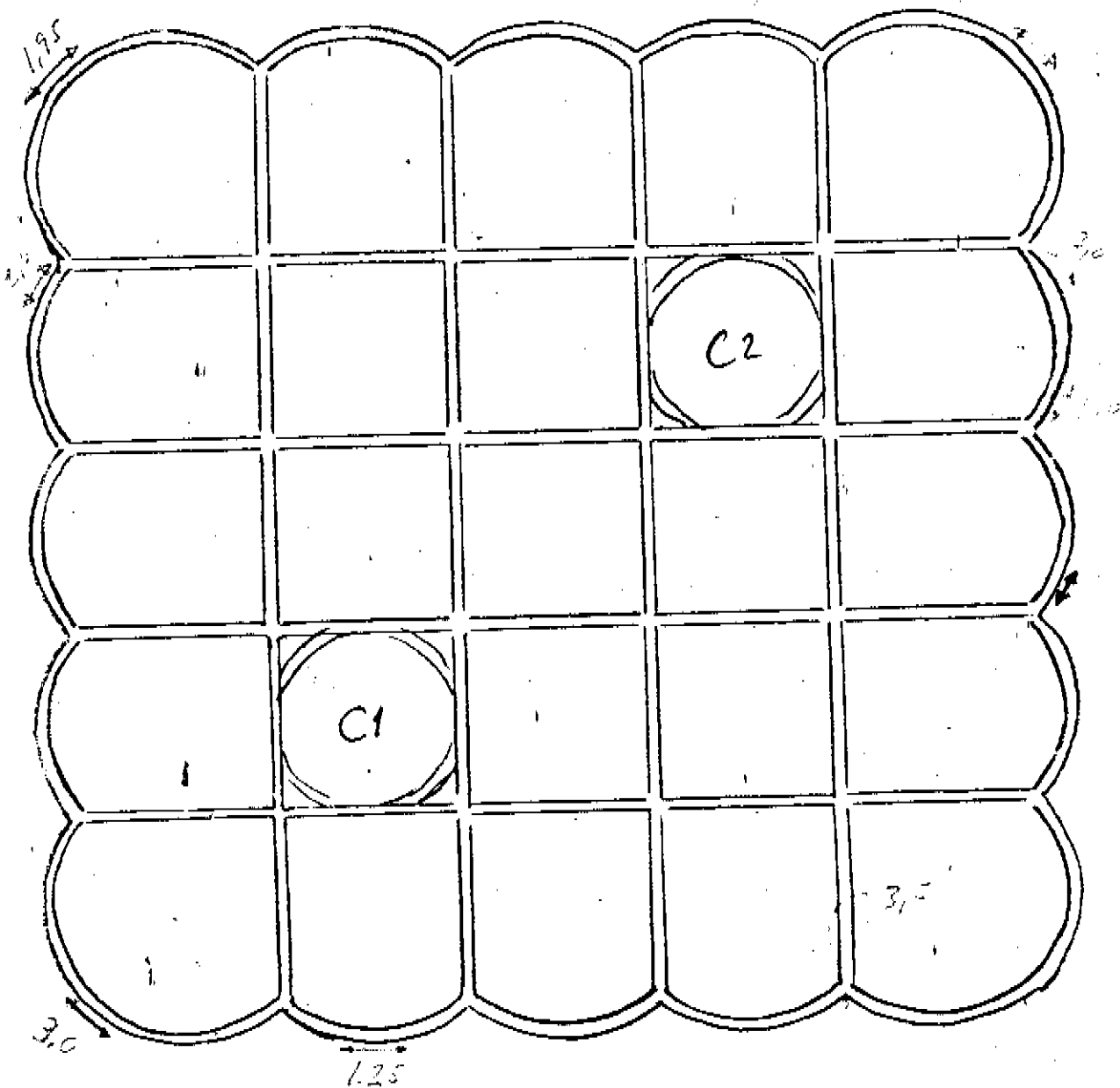

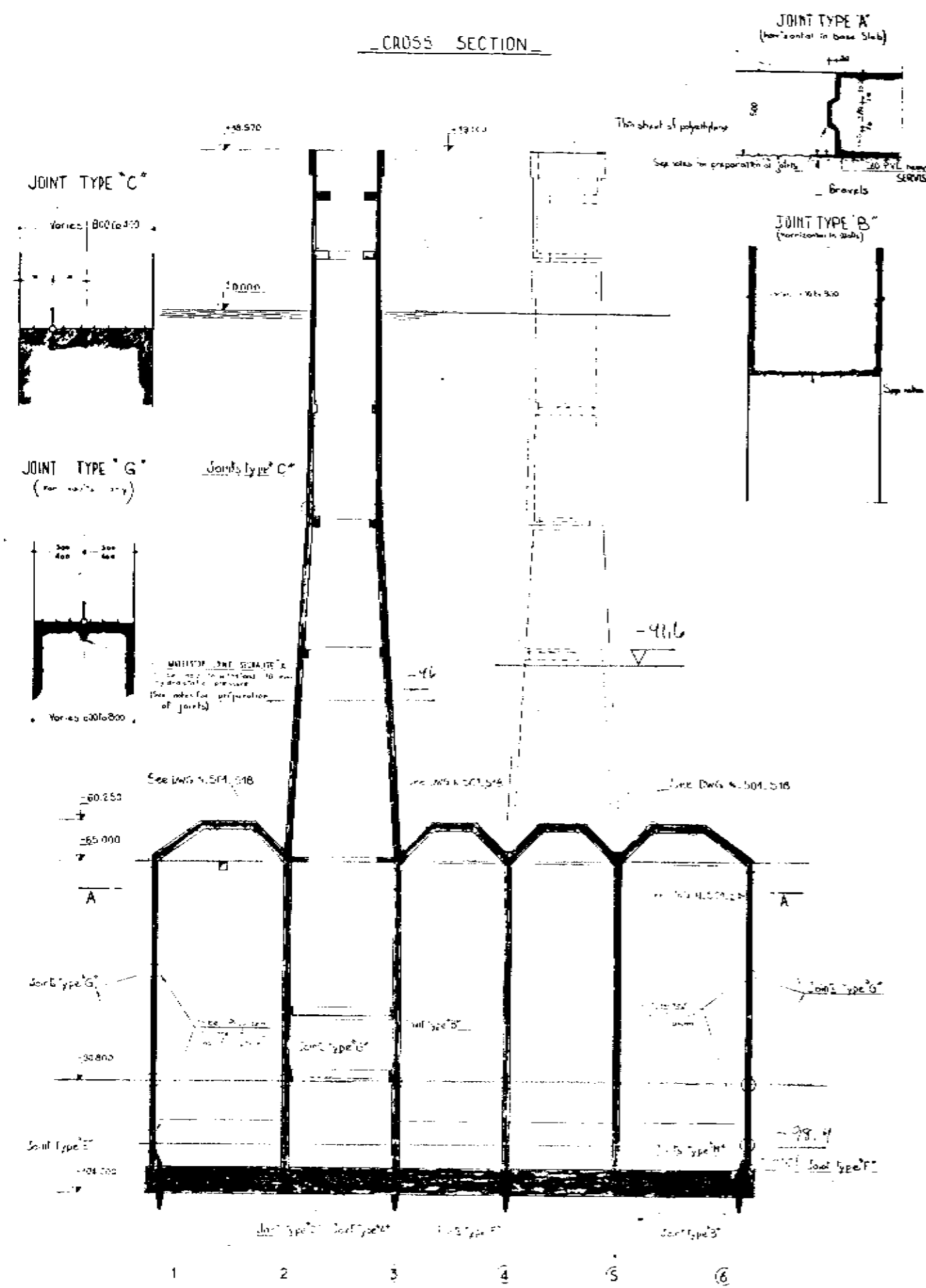


Figure 7.

	DET NORSKE VERITAS	Proj. No.
		Scale
	Drawn by	Date
	Approved	Drw. No.

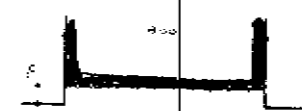
CROSS SECTION



JOINT TYPE 'D'
(All vertical joints between raft 1st Stage and raft 2nd Stage)

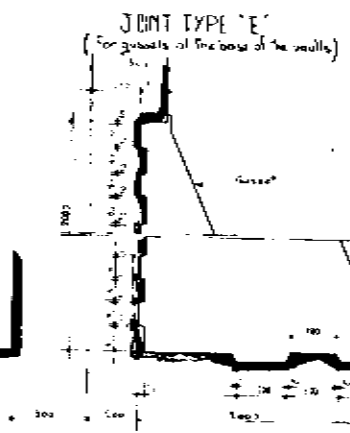
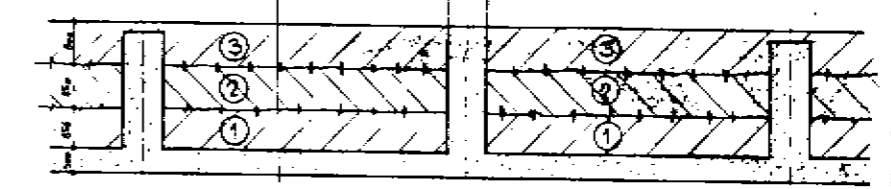


JOINT TYPE 'E'
(For gussets at base of rafts)



JOINT TYPE 'H'
DETAIL
RAFT 2nd STAGE

Thickness of new slab of any cell (mm)	Number of bars	Max. allowable interval (mm)
0-500	0	10 Bar 20 Bar
1-500	1	20 Bar 25 Bar
2-180	2	25 Bar 30 Bar



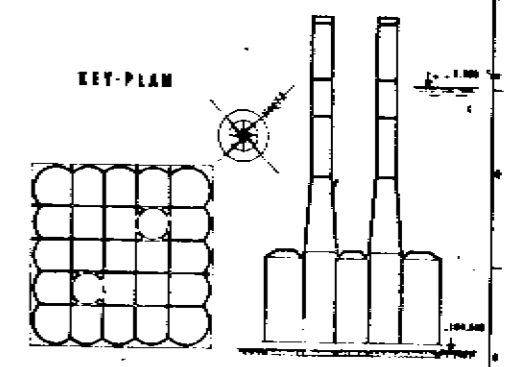
NOTES

1. Variation of the concrete in the first pour should be such as to prevent the formation of voiding.
 2. Should any voids be formed this should be removed by the brushing water jacking or any other means approved by the Engineer. The concrete should not be left to harden to such an extent that mechanical means are required to expose the aggregate.
 3. Before placing the second pour the surface of the first pour should be thoroughly cleaned of any foreign matter. No standing water shall be left on the surface of the first pour when placing the second pour.
 4. Special care shall be taken to avoid segregation along the joint close and to obtain thorough compaction.
- Joint type 'C' if construction method requires joints.

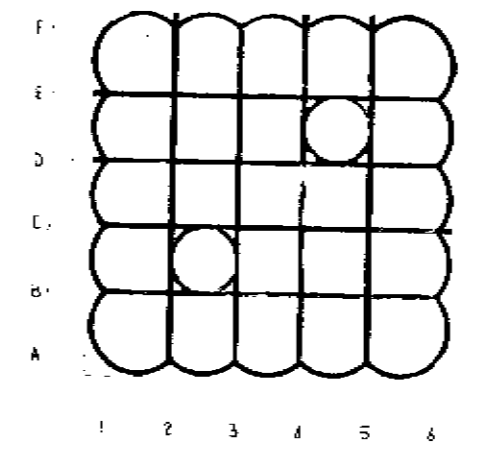
Clear gap between pour of successive layers in any cell.
The surface should be removed by water jacking from the upper surface of the layer before complete set of concrete.
Before placing the following pour the surface of the previous layer should be thoroughly cleaned of any foreign matter. No standing water shall be left on the surface of the previous layer when placing the following pour.

Related DWG N.501.518

KEY PLAN



SECTION AA



ALL DIMENSIONS SHOWN ARE IN MILLIMETRES.

DATE	31
DESCRIPTION OF WORK	
APPROVAL	
ELF - NORGE - A/S	
FRIGG FIELD TREATMENT PLATFORM N°1 - TP1	
CONSTRUCTION JOINTS	
DETAILS	
sea tank co	SIR ROBERT M'ALPINE & SONS LTD
DATE	
CONTRACT E.14	N.W.R. N° 510. E. 03. 05 - M.O. 110

Fig. 1 Construction details

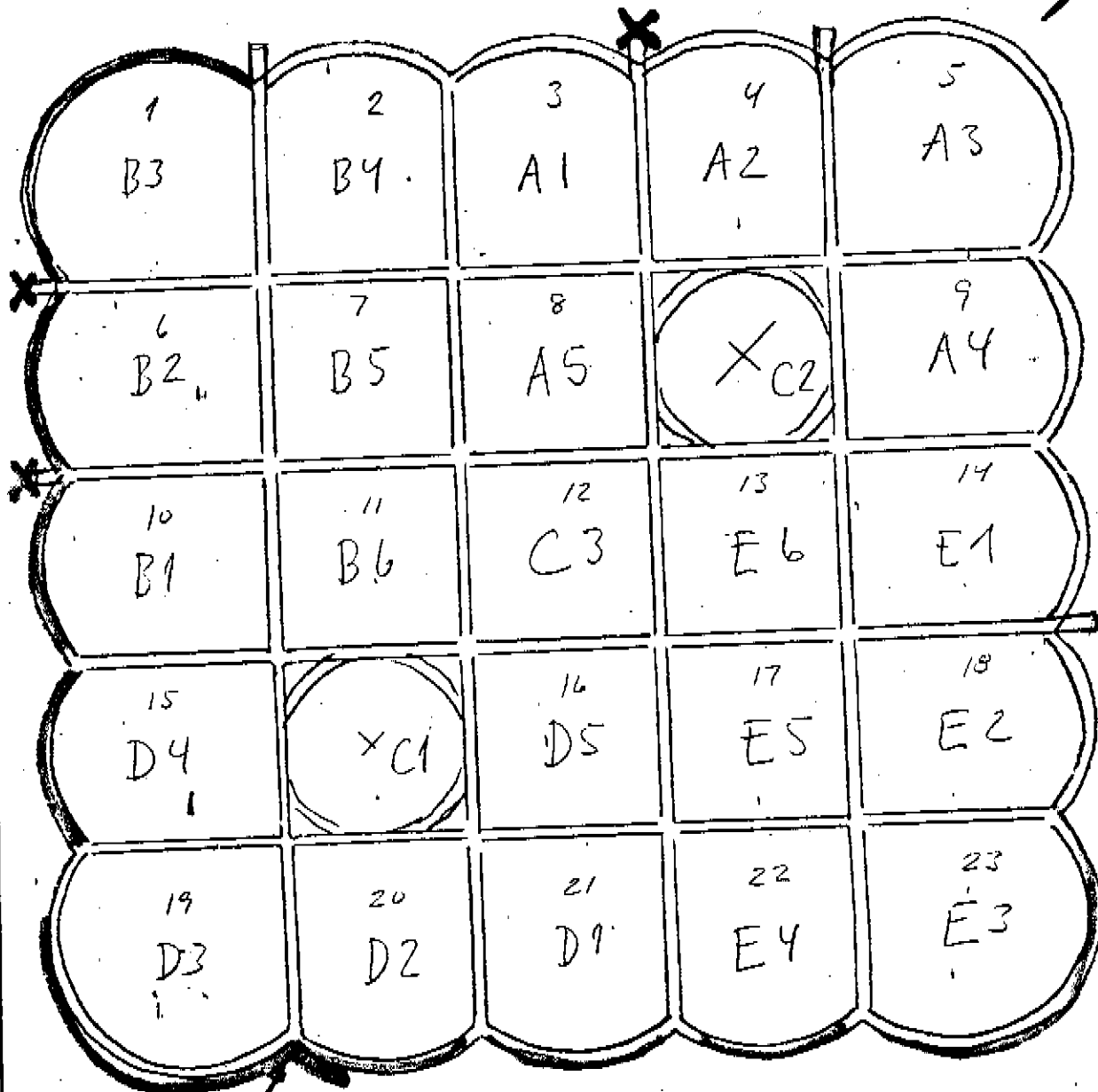
External cell walls: Major cracks at el. -84, -84

NIB-Walls:

A1/A2: Repair at el. -83, -98, -100


B2/B3: — " — -83

B1/B2: — " — -83



Major cracks

Figure 9.

		Proj.No.
		Scale
 DET NORSKE VERITAS	Drawn by	Date
	Approved	Drw.No.

Roof 3 — INTERNAL

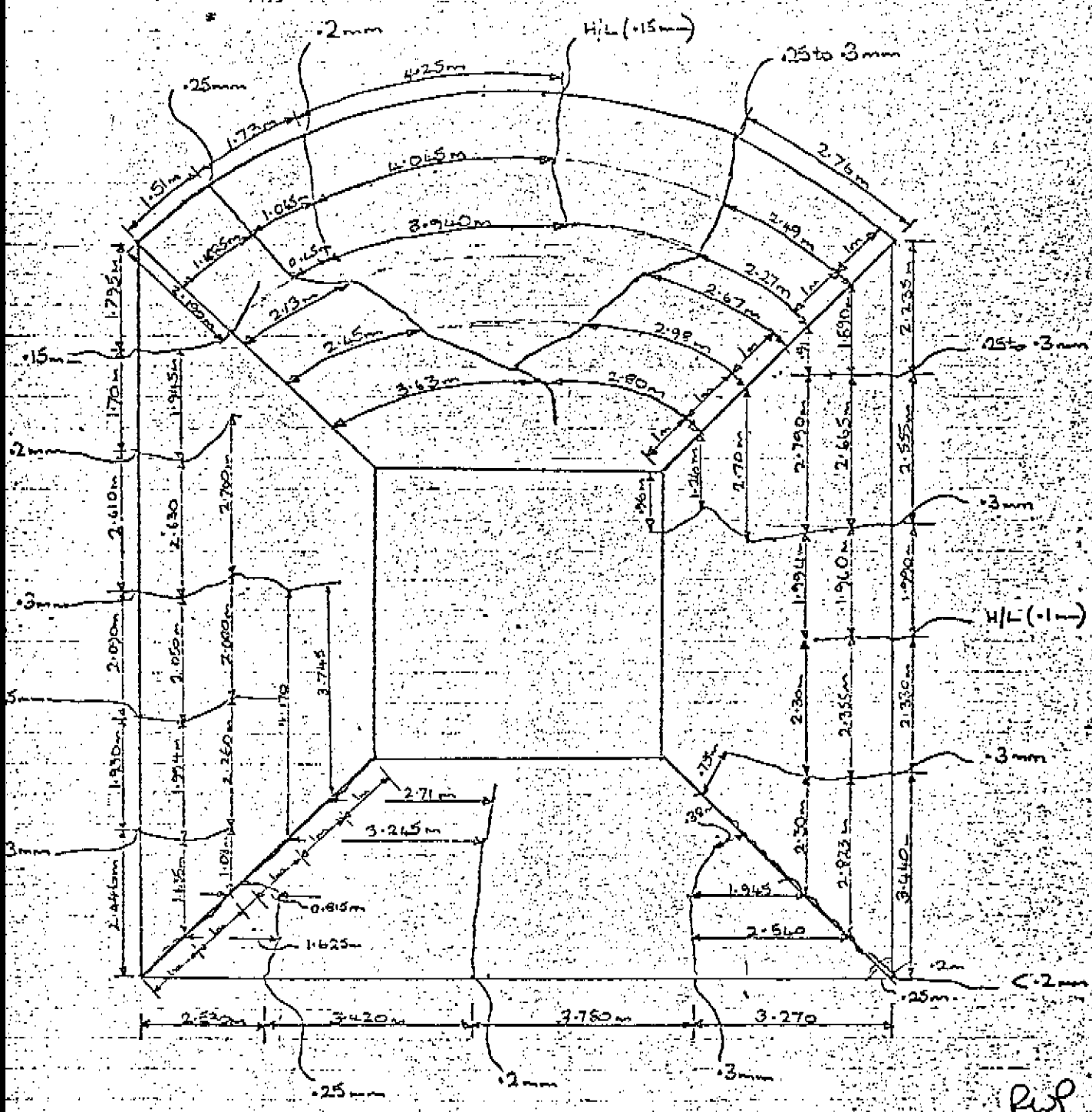
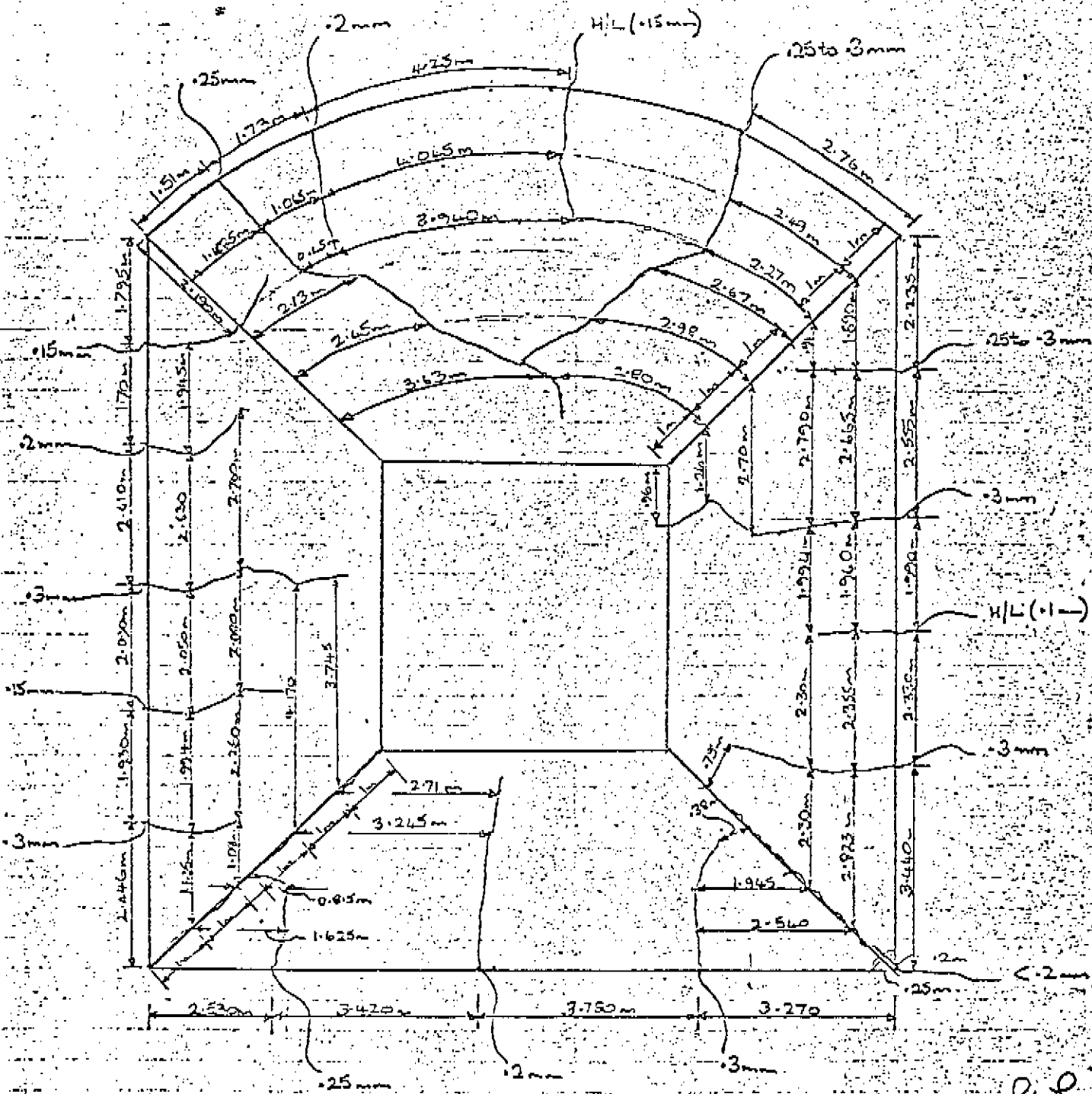


Figure 10

Ref

Koof 3 — INTERNAL



Ref

Figure 10

SEE DWG 495

SOCKET TYPE 7' see pag 428 (32 of this type)
700 x 700

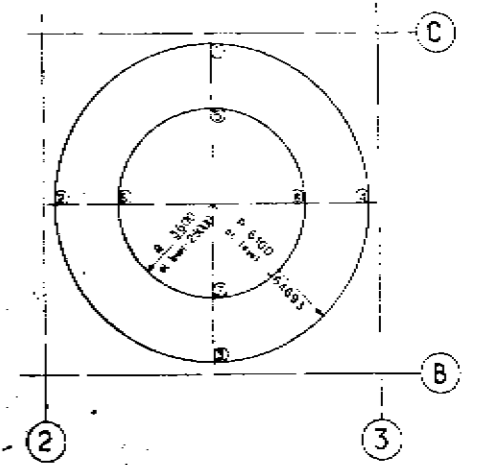
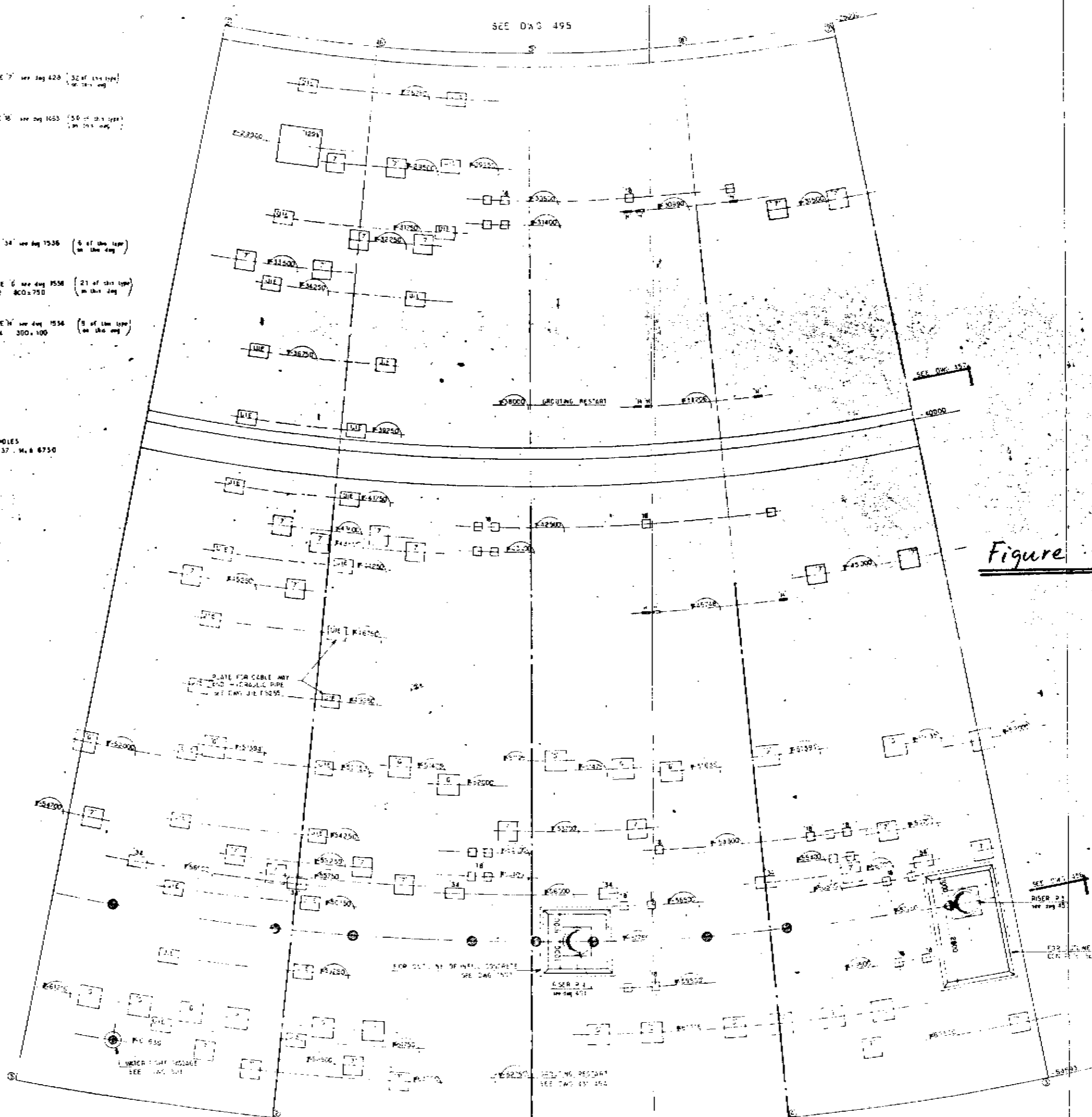
SOCKET TYPE 8' see pag 463 (30 of this type)
305 x 305

SOCKET TYPE 34' see pag 1536 (6 of this type)
700 x 400

SOCKET TYPE 6' see pag 1558 (21 of this type)
M.A. 8742 800 x 700

SOCKET TYPE 4' see pag 1558 (9 of this type)
M.A. 8754 300 x 100

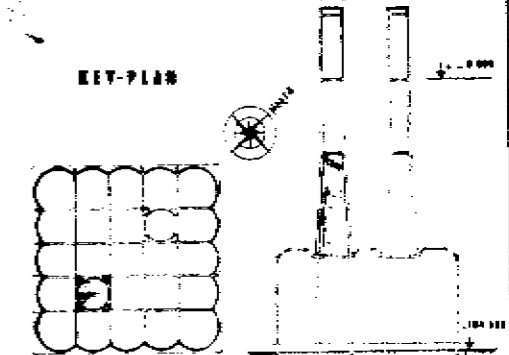
SIGHTING HOLES
SEE DWG 1537 - M.A. 8750




RELATED DWG 456 457 458 468 454 1536 1537
427 428 1463 1474 1500 1501 521
LIE 15255
B&R 1708 L713
M.A. 8742 8730 8734

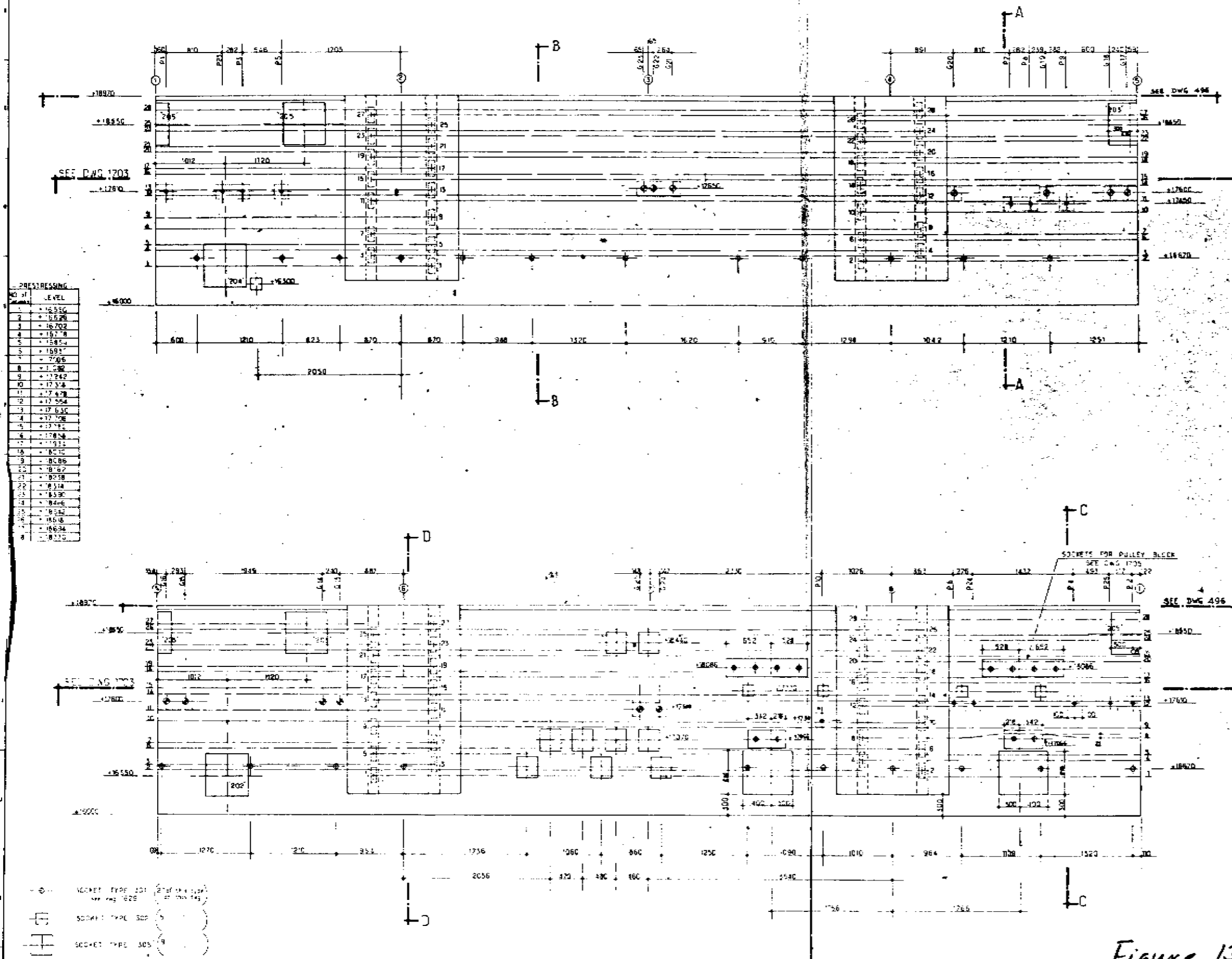
Figure 11

KEY-PLAN



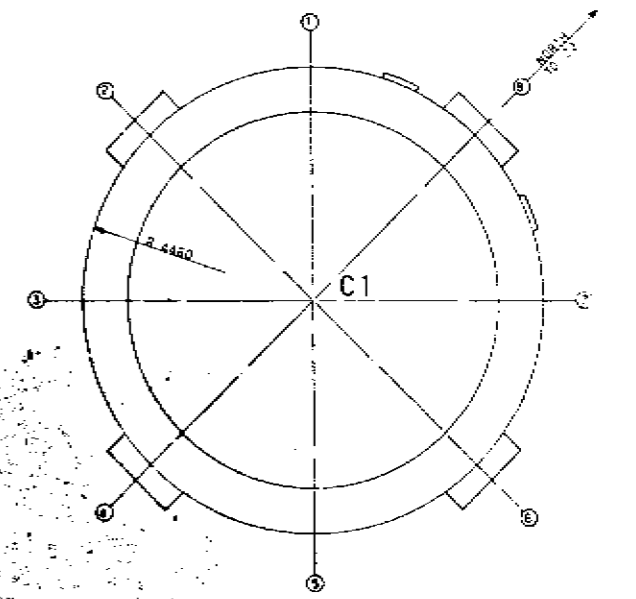
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES

52			
DATE	SIGN	DESCRIPTION OF AMENDMENT	INDEX
APPROVAL	DES. NO. & PROJ. NO.	SIGN	DATE
ELF. NO. 1		SIGN	DATE
 ELF NORGE - A/S JOB NO. 140 01 FRIGG FIELD TREATMENT PLATFORM N°1 - TP1 SOUTH COLUMN DEVELOPMENT -65000 to -25000			
sea tank co		SIR ROBERT M'ALPINE & SONS LTD	
21 Rue de Paris 92010 Nanterre - France			
DATE	SCALE	APPROV.	REVISION
16.12.75	1:50	P.L.	J.C.B.
CONTRACT E. 14 DWG. N° STC. E. 03. 05 - NO. 455			
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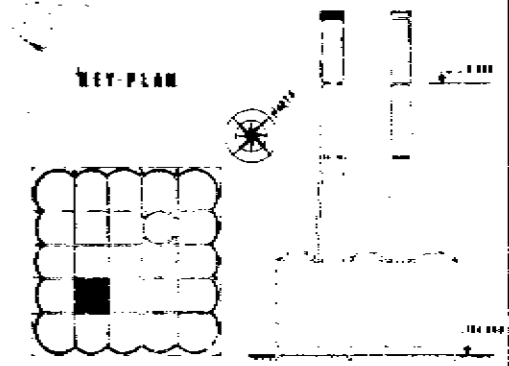


PRESSING LEVEL

1	+16.510
2	+16.525
3	+16.702
4	+16.718
5	+16.851
6	+16.917
7	+17.005
8	+17.082
9	+17.242
10	+17.318
11	+17.478
12	+17.554
13	+17.630
14	+17.706
15	+17.782
16	+17.858
17	+17.934
18	+18.010
19	+18.086
20	+18.162
21	+18.238
22	+18.314
23	+18.390
24	+18.466
25	+18.542
26	+18.618
27	+18.694
28	+18.770



RELATED DWG 1629 1703 1705 1713 496



ALL DIMENSIONS SHOWN ARE IN MILLIMETRES

**FOR APPROVAL
NOT FOR CONSTRUCTION**

ELF. NORGE - A S
308 140 01

**FRIGG FIELD
TREATMENT PLATFORM N°1 - TP1
SOUTH COLUMN
EXTERNAL DEVELOPMENT
LEVEL +16000 to +18970**

sea tank co SIR ROBERT MC ALPINE & SONS LTD

DATE: 8.9.75 SCALE: 1/20 DRAWN: C.L. CHECKED: J.S.

CONTRACT E.14 DWG. NO. STC.E.03.05 - ND 1701

Figure 13

- 18 SOCKET TYPE 'B' see DWG 463 18 of this type on this drawing
- 7 SOCKET TYPE '7' see DWG 428 7 of this type on this drawing
- 14 SOCKET TYPE '14' see DWG 1536 14 of this type on this drawing
- G SOCKET TYPE 'G' see DWG 1536 20 of this type on this drawing
see DWG Mr Alpine 8744, 8748
- W SOCKET TYPE 'W' see DWG 1538 3 of this type on this drawing
see DWG Mr Alpine 8734
- SIGHTING HOLES see DWG 1537 8 of this type on this drawing
see DWG Mr Alpine 8639

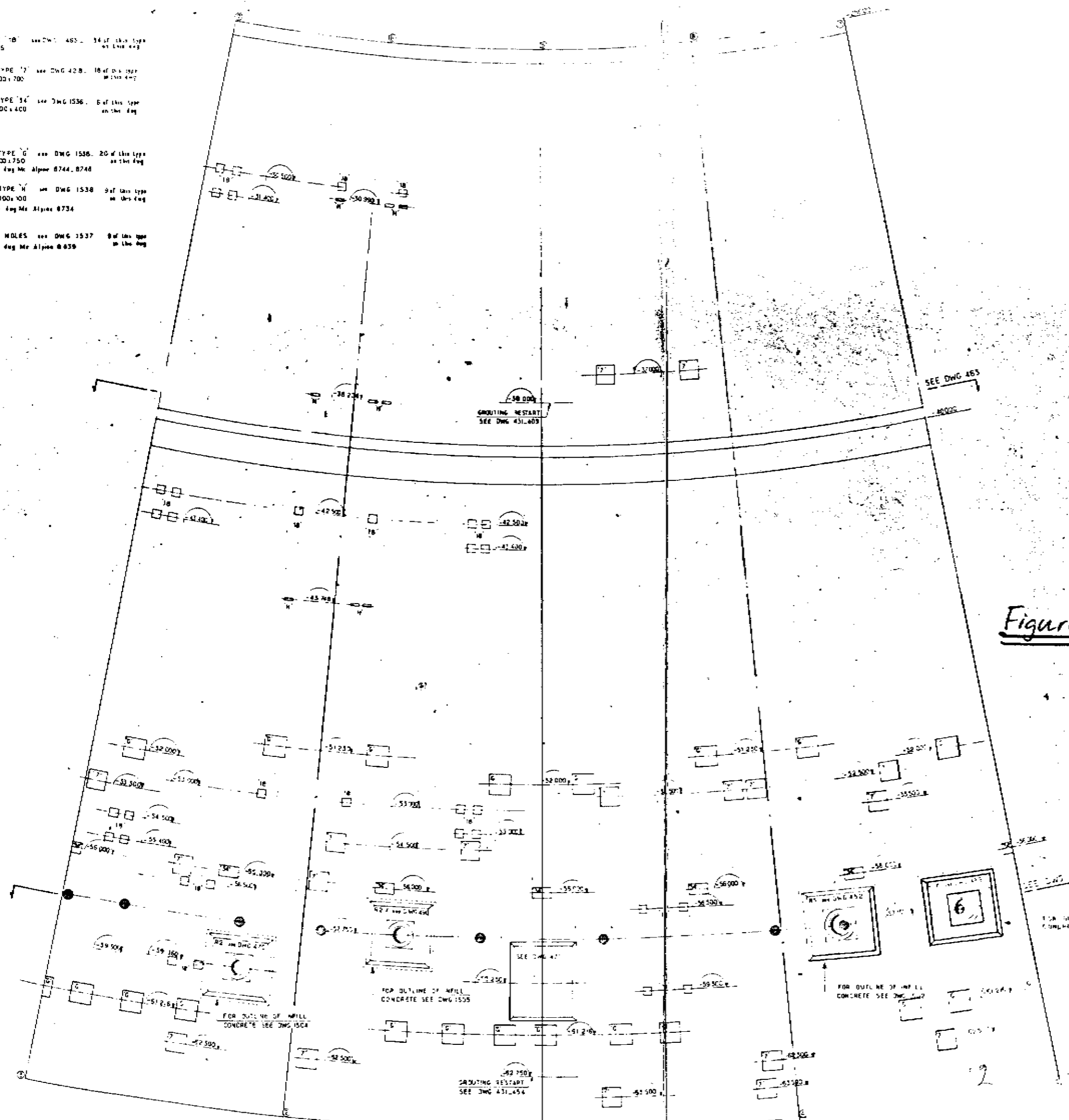
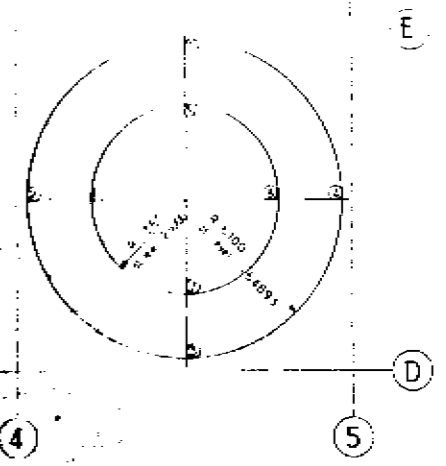
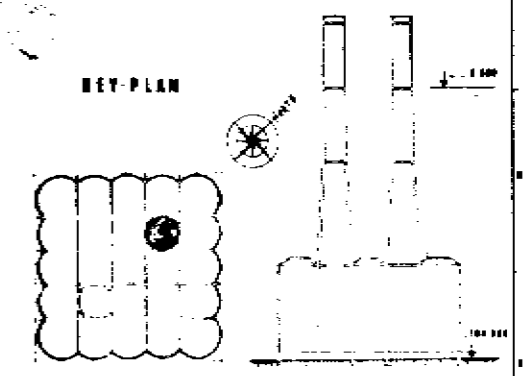


Figure 14



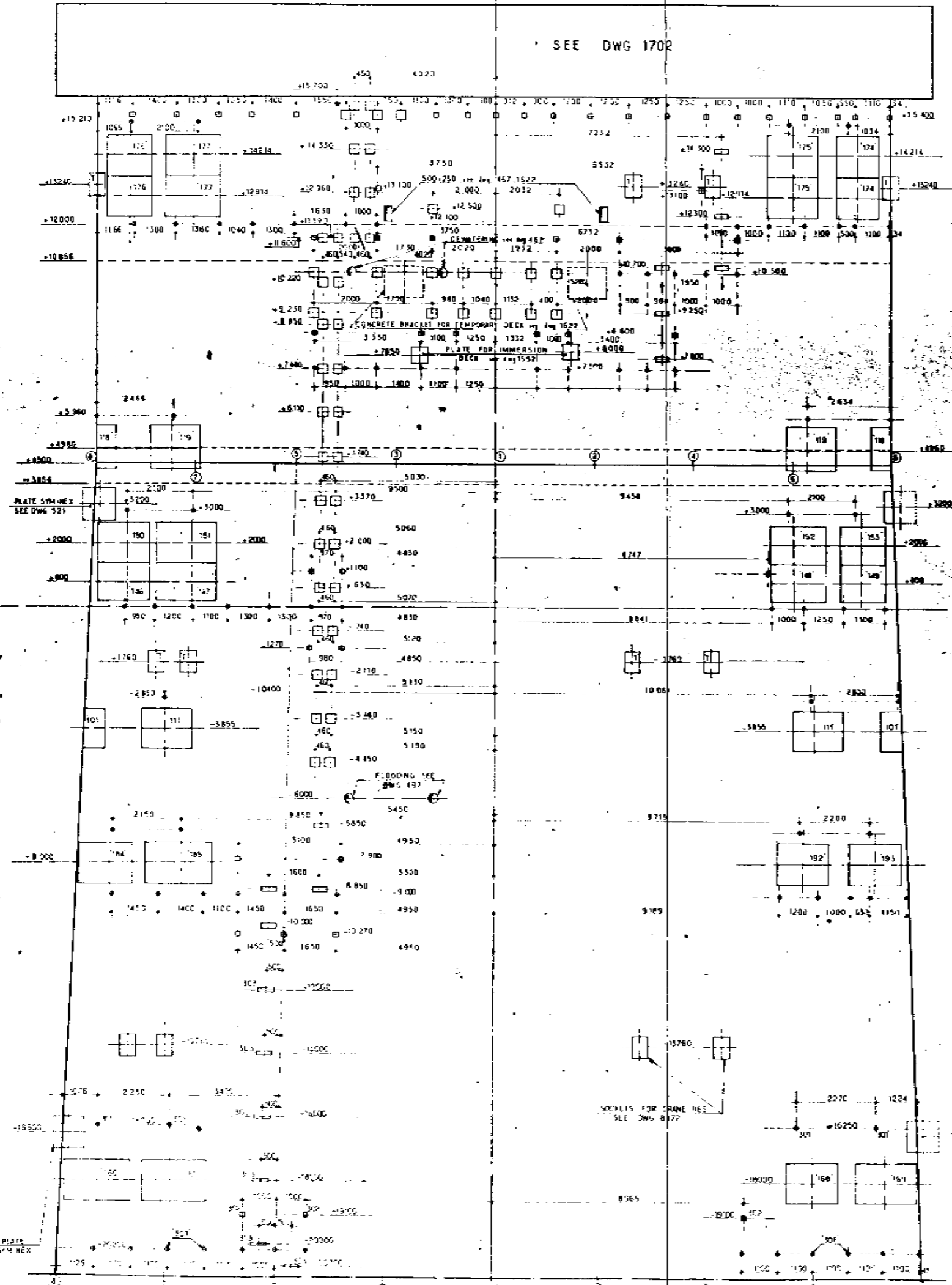
RELATED DWG 462, 463, 464, 428, 1463, 431, 1536, 1537, 1538, 452, 470, 489, 490, 1502, 1503, 1504, 1505, 468
 DWG N & R L 711, L 719, L 737
 DWG Mr ALPINE 8639, 8734, 8744, 8748



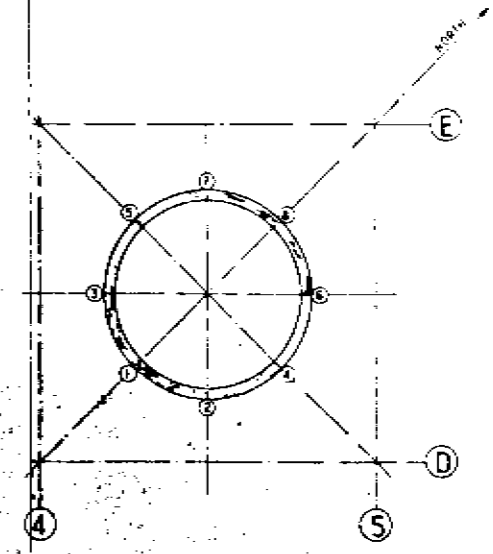
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES

65			
DATE: 1965			
DRAWN BY: [Signature]			
CHECKED BY: [Signature]			
APPROVED BY: [Signature]			
<p>ELF NORGE - A/S</p> <p>FRIGG FIELD</p> <p>TREATMENT PLATFORM N°1 - TP1</p> <p>NORTH COLUMN DEVELOPMENT</p> <p>64 693 to 25 000</p>			
sea tankco		SIR ROBERT McALPINE & SONS LTD	
CONTRACT E.14 DWG N° STC.E.03.05 NO 469			

SEE DWG 1702

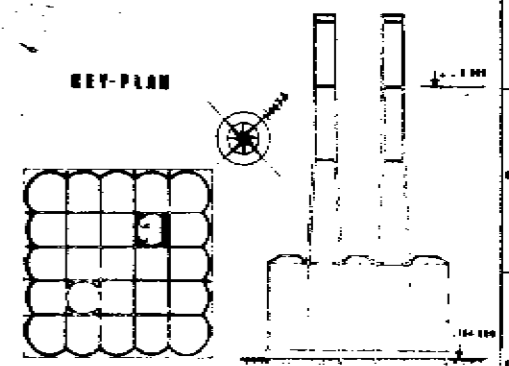


- SOCKET TYPE '305' (55 of this plate see Fig 1629)
- SOCKET TYPE '305' (16 of this plate see Fig 1629)
- SOCKET TYPE '302' (47 of this plate see Fig 1629)
- SOCKET TYPE '301' (86 of this plate see Fig 1629)



RELATED DWG 468 521

KEY-PLAN



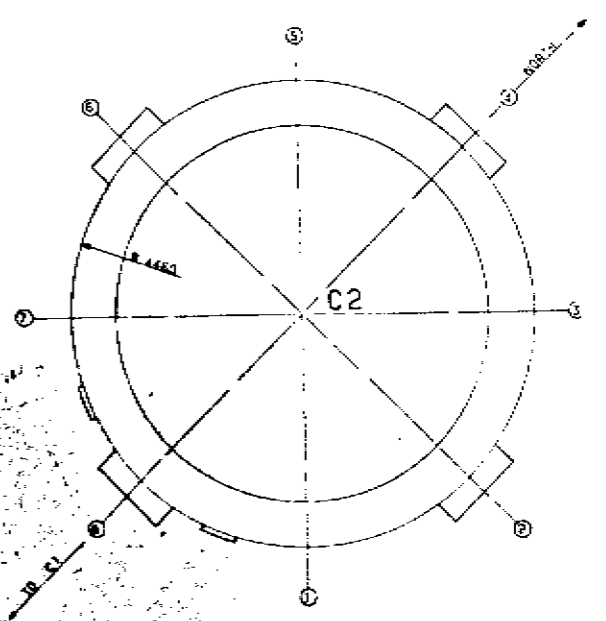
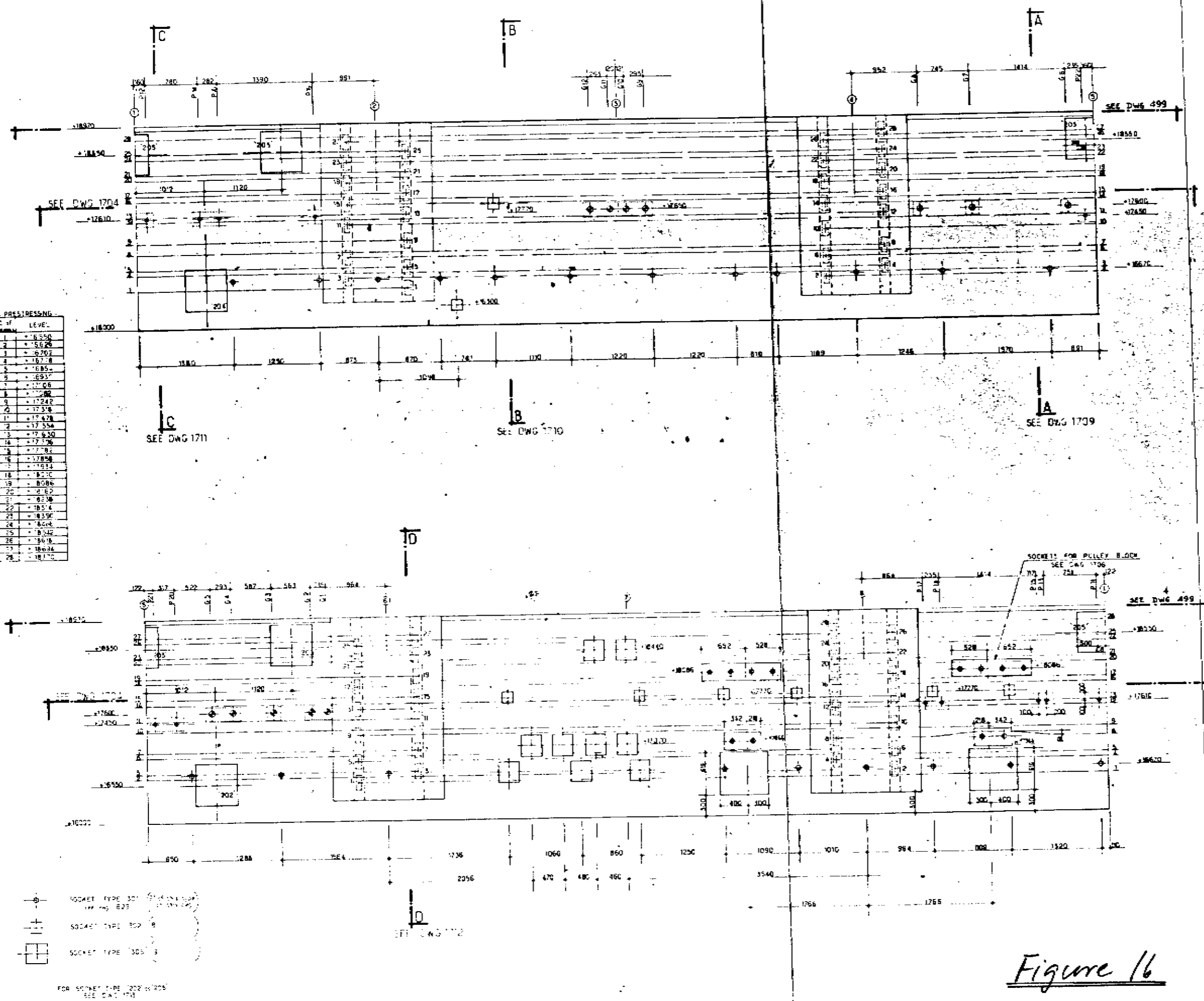
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES

Figure 15

DATE: 4.7.05		SCALE: 1:50		DRAWN: [Signature]		CHECKED: [Signature]	
CONTRACT E.14		DWR NO. STC.E.03.05		ND.493			
<p>THIS DOCUMENT IS THE PROPERTY OF THE TANK CO AND SHOULD NOT BE LOANED, REPRODUCED, COPIED, OR IN ANY MANNER DISSEMINATED TO THIRD PARTIES WITHOUT THE WRITTEN CONSENT OF THE TANK CO.</p>							

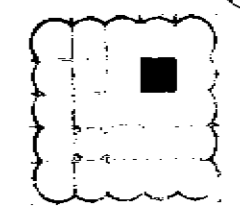
	ELF. NORGE - A/S FOR TOP OF	
FRIGG FIELD TREATMENT PLATFORM N°1 - TP1 NORTH COLUMN EXTERNAL DEVELOPMENT		
	SIR ROBERT McALPINE & SONS LTD 40 SOWERBY STREET, LEEDS LS2 9JF	

NO. OF	LEVEL
1	+18550
2	+18520
3	+18490
4	+18460
5	+18430
6	+18400
7	+18370
8	+18340
9	+18310
10	+18280
11	+18250
12	+18220
13	+18190
14	+18160
15	+18130
16	+18100
17	+18070
18	+18040
19	+18010
20	+17980
21	+17950
22	+17920
23	+17890
24	+17860
25	+17830
26	+17800
27	+17770
28	+17740



RELATED DWG 1629 1704 1706 1709 to 1713 499.

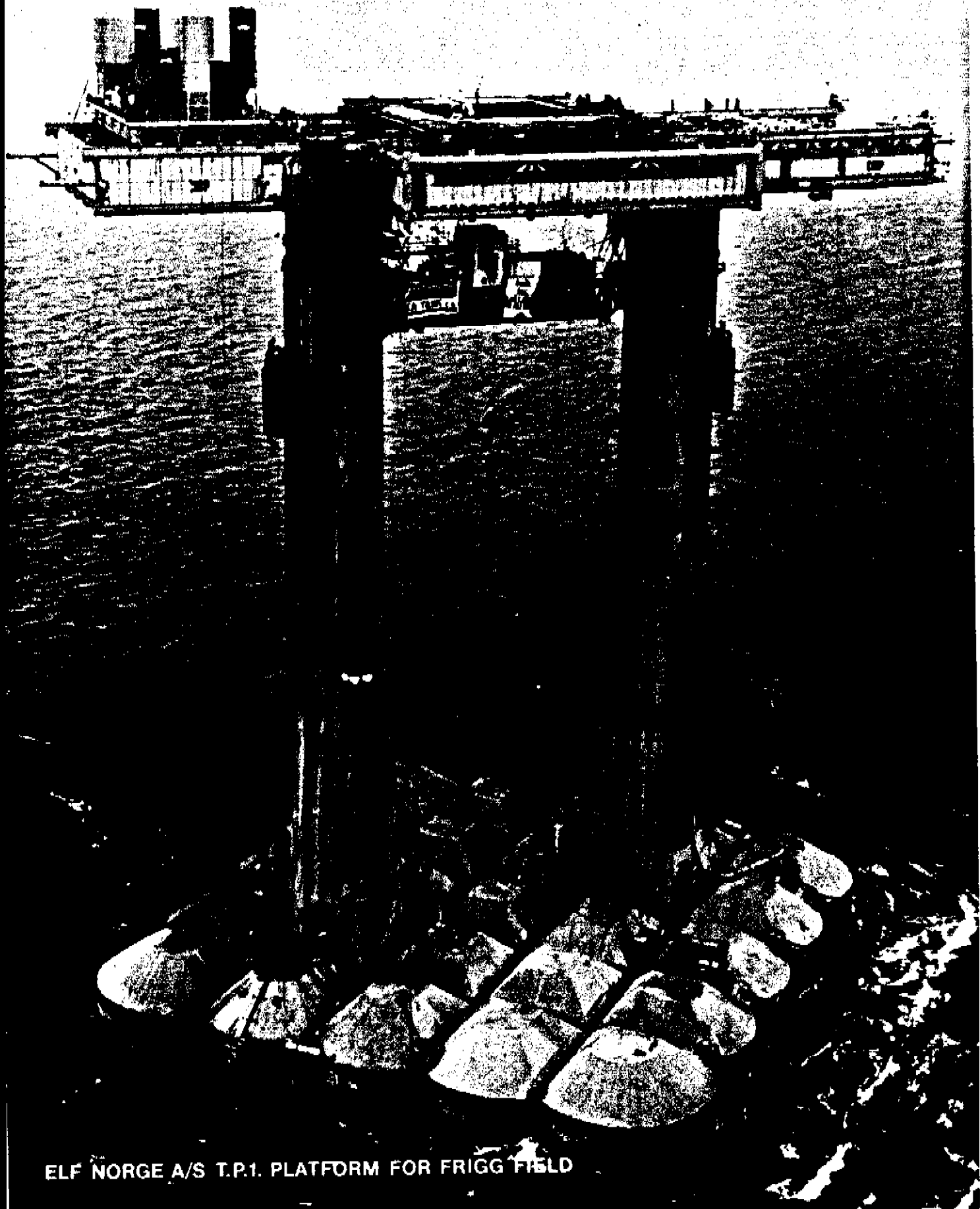
KEY-PLAN



ALL DIMENSIONS SHOWN ARE IN MILLIMETRES

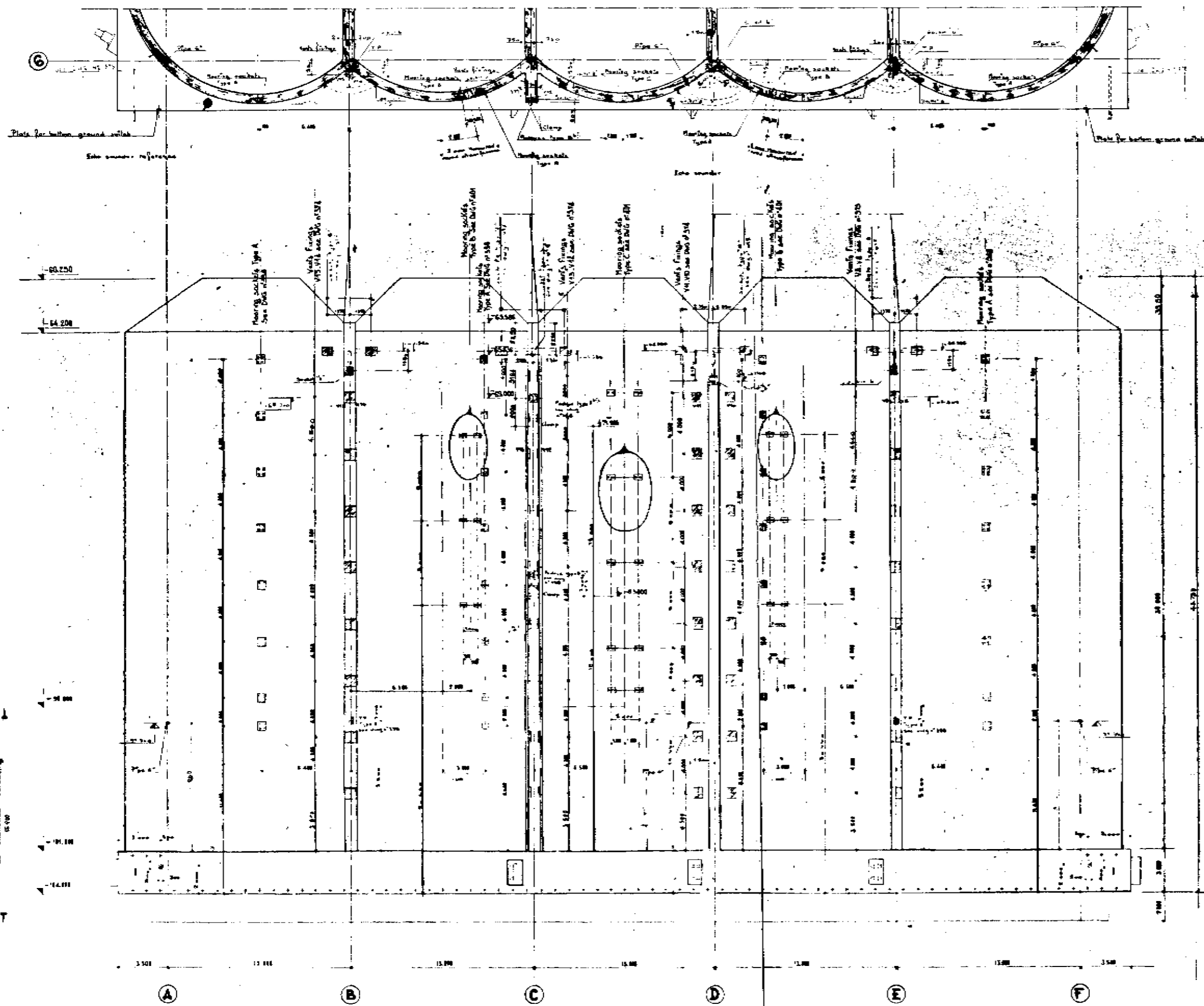
10 x 10 Modified level of socket type 205 and 205 Modified socket type 205 and 205			
NO.	DATE	DESCRIPTION OF WORK	BY
APPROVAL	DATE	BY	DATE
elf ELF NORGE - A/S FRIGG FIELD TREATMENT PLATFORM N°1 - TP1 NORTH COLUMN EXTERNAL DEVELOPMENT LEVEL +16000 to +18970			
sea tank co		SIR ROBERT McALPINE & SONS LTD	
71 Rue de la Mer - 34000 Montpellier - FRANCE		40 Bedford Street - LONDON W.C.1	
DATE	SCALE	DRAWN	CHECKED
17 9 75	1:20	52	53
CONTRACT E.M. BWG N° STC E.03.05 - ND1702			
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Figure 16



ELF NORGE A/S T.P.1. PLATFORM FOR FRIGG FIELD

Figure 17

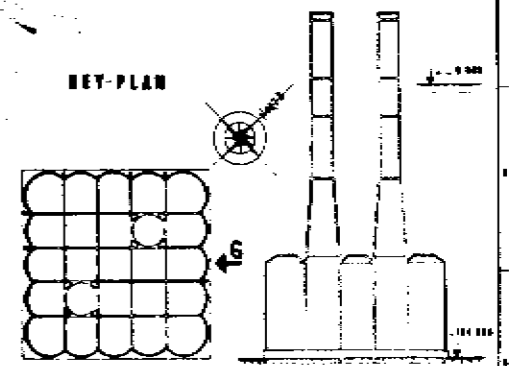


PLAN VIEW

ELEVATION - 6
SEE NET-PLAN

- RELATED DRAWINGS:
- MOORING SOCKETS: M&B 74/8323 and M&B - B-8207
 - VENTS - FIXINGS: 501 and 374 to 377
 - RISERS - FIXINGS: ALTRILIS, L 1150
 - TOWING POINT - MOORING SOCKETS: M&B 4 B320, B385 & B457
 - BROWN & ROOT: ALTRILIS, L505 to L312
- NOMENCLATURE OF PARTS: SEE DWG. NO. 1474

KEY-PLAN



ALL DIMENSIONS SHOWN ARE IN MILLIMETRES

DATE	SIGN	DESCRIPTION OF AMENDMENT	REVISION

APPROVED	BY	DATE	BY	DATE

elf . NORGE - A/S

FRIGG FIELD
TREATMENT PLATFORM N°1 - TP1
VAULTS - ELEVATION 6
LOCATION OF EXTERNAL FIXINGS

sea tank co SIR ROBERT McALPINE & SONS LTD
12 Rue de Valenciennes 75002 PARIS 12 40 Grosvenor Street LONDON W.C.1

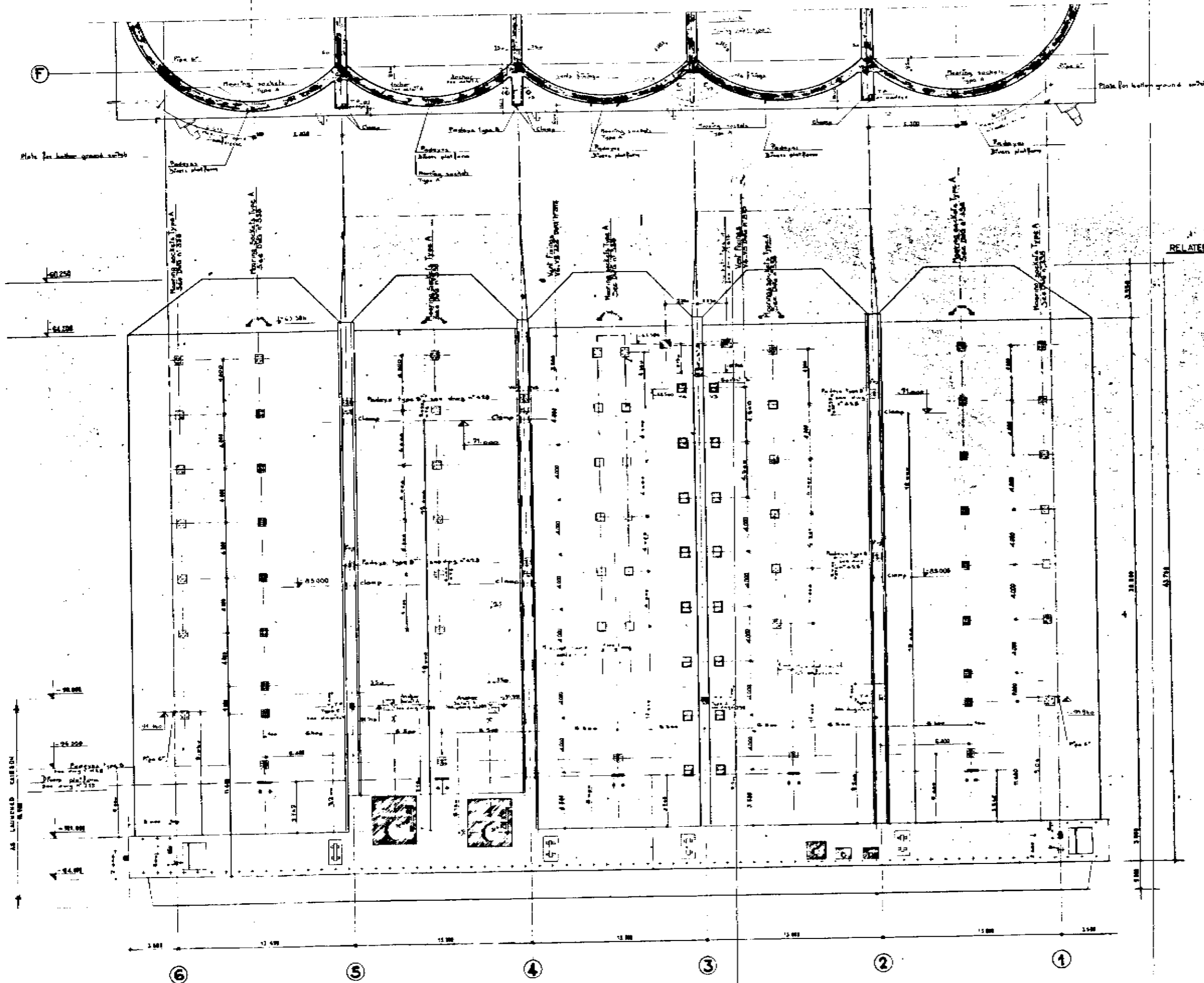
DATE: 12-02-76 SCALE: 1:200 DRAWN: A.S. CHECKED: J.S.R.

CONTRACT E. 14 - DWG. N° STC. E. 03. 05 - 40.372

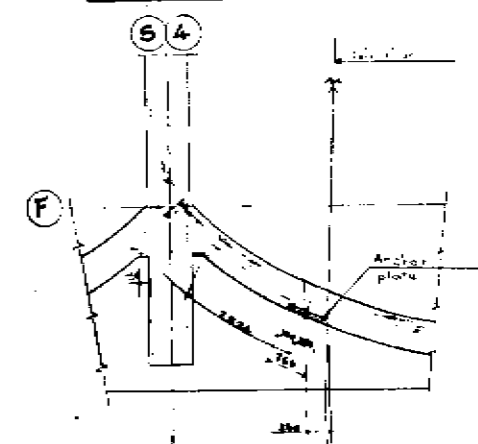
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Figure 18

PLAN VIEW

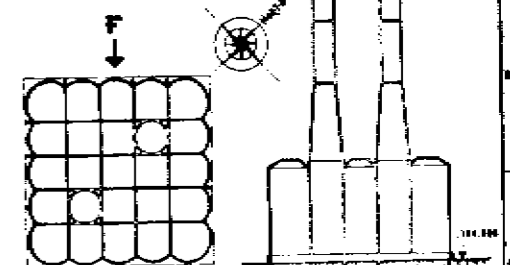


DETAIL A



RELATED DRAWINGS: MOORING SOCKETS: M&A/A 5323, 5350, 5356, 1362, C8461
 VENTS FIXINGS: 601 and 372 to 377, L30
 RISERS FIXINGS: ALTP L143, ALTP L160, ALTP L66
 LHS: L123, L202, L305 to L312
 NOMENCLATURE OF PARTS: TLE DWG NO 1474

KEY-PLAN



ALL DIMENSIONS SHOWN ARE IN MILLIMETRES

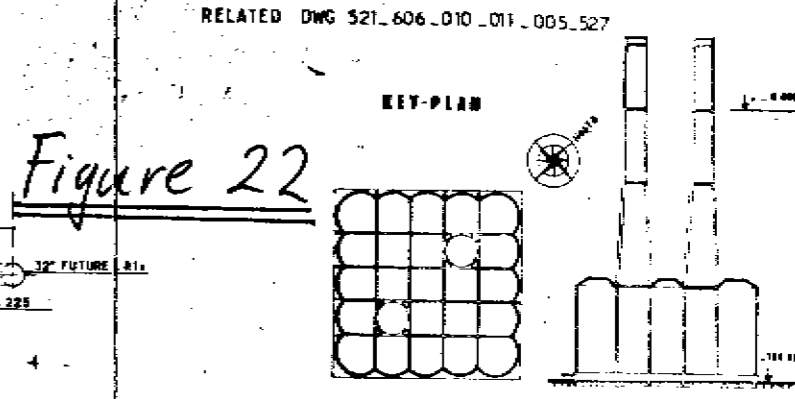
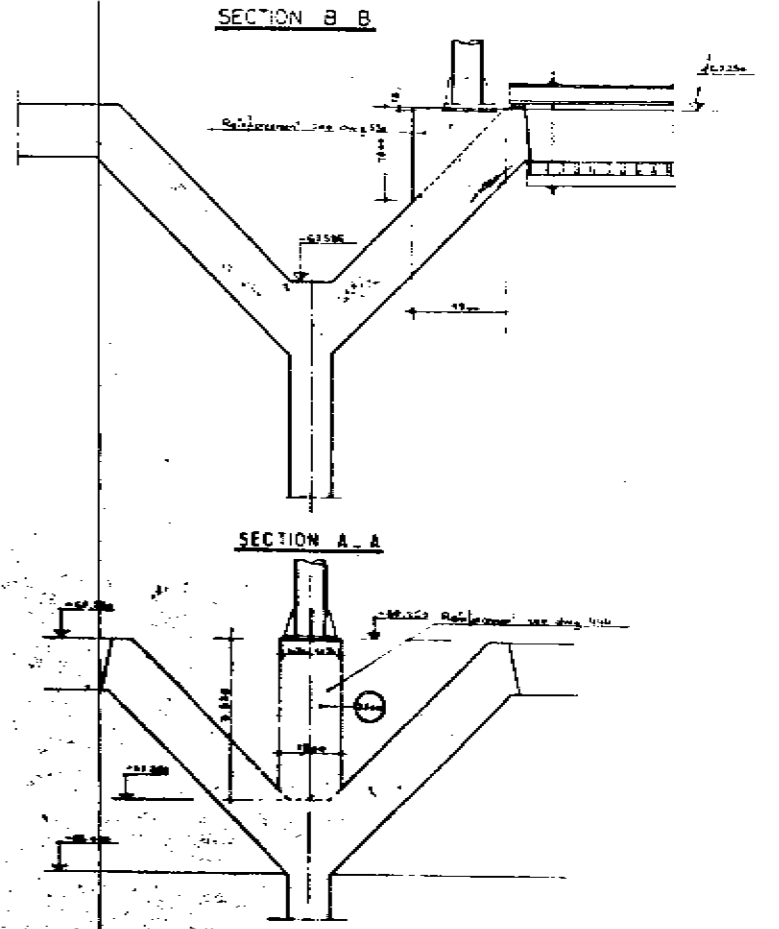
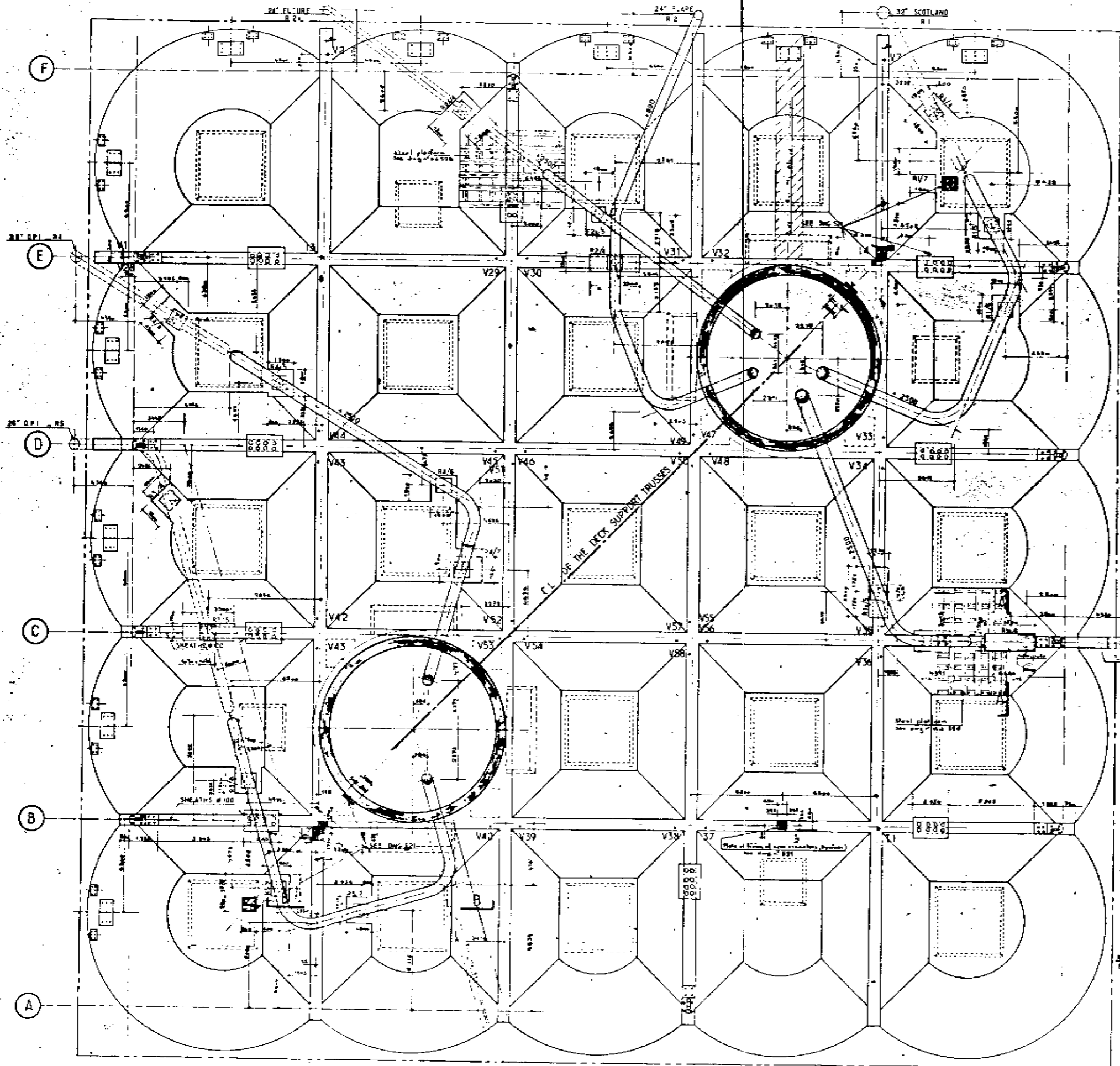
DATE	SIGN	DESCRIPTION OF AMENDMENT	INDEX

ELF. NORGE - A/S
FRIGG FIELD
TREATMENT PLATFORM NO.1 - TP1
VAULTS - ELEVATION F
LOCATION OF EXTERNAL FIXINGS

sea tank co	SIR ROBERT McALPINE & SONS LTD
12 Rue d'Alsace 75008 PARIS	40 Bouverie Street LONDON W.C.1
DATE: 17.12.74	SCALE: 1:50
CONTRACT: E.14	DWG. NO. STC. E.03.05 - MD.371*

ELEVATION F
 See key plan

Figure 19



FASTENERS OF TOWING PLATE
 ANCHORAGES OF PRESTRESSING
 RELATED DRAWINGS: 521.606.010.011.005.527
 521.606.010.011.005.528
 521.606.010.011.005.529
 SOCKET TYPE 17 FOR RISERS
 SOCKET TYPE 18 FOR RISERS

22			
DATE	SIGN	DESCRIPTION OF AMENDMENT	INDEX
APPROVAL	SET	REVISION	DATE
ELF. WORKS	SIGN	DATE	
ELF. NORGE - A/S			
FRIGG FIELD TREATMENT PLATFORM N°1 - TP1 ROOF OF THE CAISSON			
SET OF FIXINGS			
sea tank co		SIR ROBERT MCKEINPINE & SONS LTD	
CONTRACT E.14 DWG. N° STC. E.03.05 - NC.502			

TPI - INSTALLATION

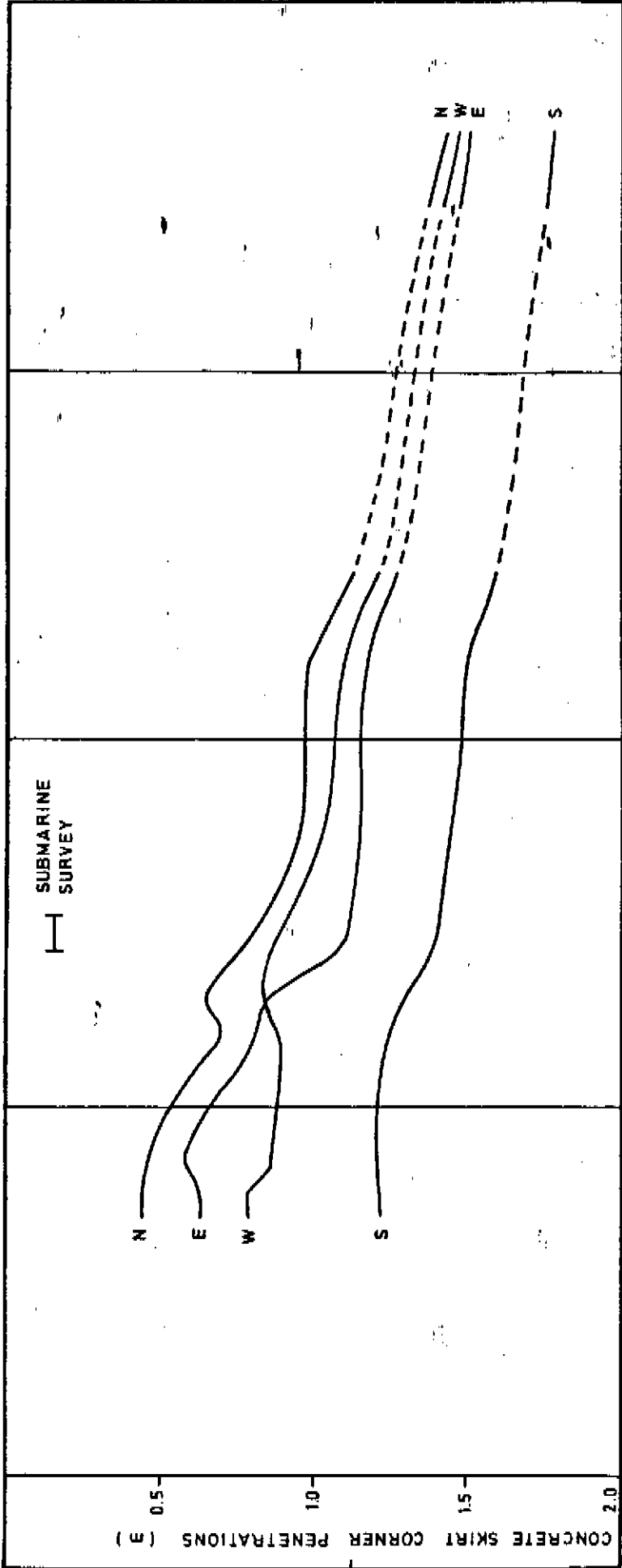
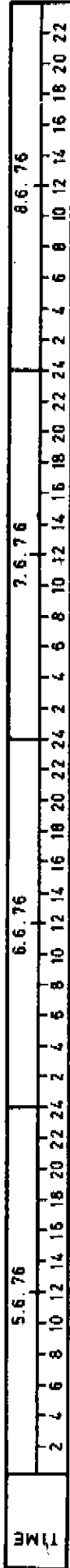


Figure 25

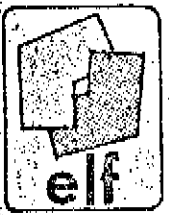
FIG. 4

APPENDIX A: PAGE 1-18

index

8.75	<i>D</i>	Brought up to date	C
7.75	<i>CB</i>	Added sockets Mc DERMOTT	B
7.75	<i>D</i>	Added sockets type '35'-36'-37' and plates U.I.E	A
DATE	SIGN	DESCRIPTION OF AMENDMENT	INDEX

APPROVAL	DET NORSKE VERITAS	SIGN	DATE
	ELF - NORGE	SIGN	DATE



ELF - NORGE - A/S

JOB 140 CT

FRIGG FIELD

TREATMENT PLATFORM N°1 - TP1

**NOMENCLATURE OF PARTS
ON COLUMNS**

-64386 to +19000

sea tank co
12 Rue d'Agoussseau 75000 PARIS

SIR ROBERT McALPINE & SONS LTD
40 Bernard Street LONDON W.C.1

DATE: 16-5-75	PAGES: 1 TO 18	DRAWN: C.L.	CHECKED: D.P.
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CONTRACT E.14 D.W.G. NO. STG. E.03.05 - ND 468^c

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SOCKETS

B & R

N° of STC reference dwg	N° of STC details dwg	TYPE	PLATE SIZE	Number of plate			N° of B&R dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
					C1	C2			
455	427 ✓	5	730 x 500	2	2	/	L 735	50 tons horizontal	J TUBE RESTRAINT
455.469 495.498	428 ✓	7	700 x 700	88	40 12	26 10	L 725	9 tons in any direction	J TUBE AND RISER RESTRAINT
455.469 495.498 472.473	1463 ✓	18	305 x 305	146	38 27 8	38 27 8	L 717 L 737	1 ton in any direction 2 tons " " "	for vent. support for service support for riser stoppage
455	1474 ✓	22	730 x 500	2	2	/	L 729	50 tons horizontal	J TUBE RESTRAINT
455.469	1536	34	700 x 400	12	6	6	L 508	7 tons in any direction	TEMPORARY RESTRAINT.
458	474 ✓	32	1300 x 500	2	2	/	L 994		ROLLER GUIDE at level-25000
464	474 ✓	33	1600 x 500	2	/	2	L 992 L 993		ROLLER GUIDE at level-25000
495.498	1536	35	700 x 700	56	28	28	L 725	9 tons in any direction	J TUBE AND RISER RESTRAINT

SOCKETS

B & R

N° of STC reference dwg	N° of STC details dwg	TYPE	PLATE SIZE	Number of plate			N° of B&R dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
					C1	C2			
495-498	1592	'36'	610 x 380	38	6	8	L735	50 tons in any direction	PLATFORM SUPPORT
472-473					12	12			
498	1592	'37'	300x300	2	2	/	L893	9 tons in any direction	
1534	1592	'38'	610x 550	1	1	/	L449		

SOCKETS

Mc ALPINE

N° of STC reference dwg	N° of STC details dwg	TYPE	PLATE SIZE	Number of plate			N° of Mc A dwg	LOAD breaking loads accuring outside the concrete surface	OBSERVATIONS
					C1	C2			
455.469	1538	'G'	800x750	41	21	20	8750		for beam support bracket
455.469	1538	'H'	300x100	54	9	9	8672	3,8 tons horizontal	TIES
495.498					12	12			
472.473					6	6			

PLATES

UIE

N° of STC reference dwg	N° of STC details dwg	TYPE	PLATE SIZE	Number of plate			N° of UIE dwg	LOAD breaking loads occuring outside the concrete surface	OBSERVATIONS
					C1	C2			
455	/	/	700 x 500	55	29	/	T 5255	/	for cable way and hydraulic pipe
495					22				
472					4				

SOCKETS M_c DERMOTT

a: outside plate. b: inside plate

N ^o of STC reference dwg	N ^o of STC details dwg	TYPE		PLATE SIZE	Nu. of plate		N ^o of M _c D dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
					C1	C2			
492	1540	100	a	1260 x 1260	1	X	147		BARGE BUMPERS
			b	1140 x 1260	1	X			
493	1541	101	a	1260 x 1260	X	1	147		"
			b	1140 x 1260	X	1			
492	1542	102	a	1580 x 1260	2	X	147		"
			b	1420 x 1260	2	X			
492	1543	103	a	1480 x 1200	1	X	142 158		PUMP CASINGS SUPPORT TUBE
			b	1350 x 1200	1	X			
492	1543	104	a	1470 x 1200	1	X	142 158		"
			b	1330 x 1200	1	X			
492	1544	105 ^x	a	900 x 450	1	X	146		BOAT LANDING WALKWAY
			b	800 x 430	1	X			
492	1544	106 ^x	a	450 x 450	1	X	146		"
			b	450 x 450	1	X			
492	1545	107	a	1758 x 1200	1	X	142 158		PUMP CASINGS SUPPORT TUBE
			b	1575 x 1200	1	X			

SOCKETS Mc DERMOTT

a: outside plate. b: inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE	PLATE SIZE	Nu. of plate		N° of McD dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
				C1	C2			
492	1545	108	a	1440 x 1200	1	X	142 158	PUMP CASINGS SUPPORT TUBE
			b	1310 x 1200	1	X		
493	1546	109 ^x	a	800 x 450	X	1	146	BOAT LANDING WALKWAY
			b	730 x 430	X	1		
493	1546	110 ^x	a	450 x 450	X	1	146	" "
			b	450 x 450	X	1		
493	1547	111	a	1580 x 1260	X	2	147	BARGE BUMPERS
			b	1420 x 1260	X	2		
492	1548	112 ^x	a	1420 x 1260	1	X	144	BOAT LANDING FENDER
			b	1300 x 1260	1	X		
492	1548	113 ^x	a	1440 x 1260	1	X	144	" "
			b	1300 x 1260	1	X		
493	1549	114 ^x	a	1420 x 1260	X	1	144	" "
			b	1300 x 1260	X	1		
493	1549	115 ^x	a	1440 x 1260	X	1	144	" "
			b	1300 x 1260	X	1		

SOCKETS M_c DERMOTT

a: outside plate. b: inside plate

N ^o of STC reference dwg	N ^o of STC details dwg	TYPE		PLATE SIZE	Nu. of plate		N ^o of M _c D dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
					C1	C2			
492	1550	116	a	1230 x 1350	1	X	147		BARGE BUMPERS
			b	1140 x 300	1	X			
492	1551	117	a	1544 x 1350	2	X	147		"
			b	1420 x 300	2	X			
493	1552	118	a	1230 x 1350	X	1	147		"
			b	1140 x 300	X	1			
493	1553	119	a	1544 x 1350	X	2	147		"
			b	1420 x 300	X	2			
492	1554	120 ^x	a	1630 x 1260	1	X	144		BOAT LANDING FENDER
			b	1490 x 1260	1	X			
492	1554	121 ^y	a	1650 x 1260	1	X	144		"
			b	1490 x 1260	1	X			
493	1555	122 ^z	a	1630 x 1260	X	1	144		"
			b	1490 x 1260	X	1			
493	1555	123 ^λ	a	1650 x 1260	X	1	144		"
			b	1490 x 1260	X	1			

SOCKETS M_c. DERMOTT

a: outside plate. b: inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE		PLATE SIZE	Nu of plate		N° of M _c D dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
					C1	C2			
492	1556	124	a	1480 x 1200	1	X	142 158		PUMP CASINGS SUPPORT TUBE
			b	1350 x 1200	1	X			
492	1556	125	a	1470 x 1200	1	X	142 158		" "
			b	1330 x 1200	1	X			
492	1557	126	a	1751 x 1200	1	X	142 158		" "
			b	1575 x 1200	1	X			
492	1557	127	a	1430 x 1200	1	X	142 158		" "
			b	1310 x 1200	1	X			
492	1558	X 128	a	1960 x 1410	1	X	142 158	CANCELLED	" "
			b1	1710 x 300	1	X			
			b2	1600 x 300	1	X			
492	1559	129	a	1770 x 1410	1	X	142 158		" "
			b	1520 x 1410	1	X			
492	1560	130 ^y	a	1317 x 1260	1	X	144		BOAT LANDING FENDER
			b	1190 x 1260	1	X			
492	1560	131 ^y	a	1330 x 1260	1	X	144		" "
			b	1190 x 1260	1	X			

SOCKET M_c DERMOTT

a: outside plate. b: inside plate

N ^o of STC reference dwg	N ^o of STC details dwg	TYPE	PLATE SIZE	Nu. of plate		N ^o of M _c D dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS	
				C1	C2				
492	1561	132	a	1300 x 1455	1	X	141 142	CANCELLED	PUMP CASINGS SUPPORT TUBE
			b	1200 x 1070	1	X			
492	1562	133	a	2080 x 1300	1	X	141 142	CANCELLED	" "
			b	1780 x 1300	1	X			
492	1563	134	a	1972 x 1300	1	X	141 142	CANCELLED	" "
			b	1690 x 1300	1	X			
492	1564	135	a	2070 x 1300	1	X	141 142		" "
			b	1780 x 1300	1	X			
492	1565	136	a	1962 x 1300	1	X	141 142		" "
			b	1690 x 1300	1	X			
493	1566	137	a	1289 x 1260	X	1	144		BOAT LANDING WALKWAY
			b	1168 x 1260	X	1			
493	1566	138	a	1305 x 1260	X	1	144		" "
			b	1168 x 1260	X	1			
492	1567	139	a	1425 x 1260	1	X	144		" "
			b	1280 x 1260	1	X			

SOCKET Mc DERMOTT

a: outside plate. b: inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE	PLATE SIZE	Nu. of plate		N° of McD dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
				C1	C2			
492	1567	140	a	1443 x 1260	1	X	144	BOAT LANDING FENDER
			b	1280 x 1260	1	X		
493	1568	141	a	1395 x 1260	X	1	144	" "
			b	1280 x 1260	X	1		
493	1568	142	a	1413 x 1260	X	1	144	" "
			b	1280 x 1260	X	1		
493	1569	X	a	1300 x 1455	X	1	141 142	CANCELLED
			b	1200 x 1070	X	1		
492	1570	X	a	1570 x 1455	1	X	141 142	CANCELLED
			b	1440 x 1070	1	X		
493	1571	X	a	1570 x 1455	X	1	141 142	CANCELLED
			b	1440 x 1070	X	1		
493	1572	146	a	1680 x 1200	X	1	142 158	PUMP CASINGS SUPPORT TUBE
			b	1520 x 1200	X	1		
493	1572	147	a	1944 x 1200	X	1	142 158	" "
			b	1760 x 1200	X	1		

SOCKET M_c DERMOTT

a: outside plate. b: inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE		PLATE SIZE	Nu. of plate		N° of M _c D dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
					C1	C2			
493	1573	148	a	1518 x 1200	X	1	142 158		PUMP CASINGS SUPPORT TUBE
			b	1375 x 1200	X	1			
493	1573	149	a	1360 x 1200	X	1	142 158		" "
			b	1240 x 1200	X	1			
493	1574	150	a	1670 x 1200	X	1	142 158		" "
			b	1520 x 1200	X	1			
493	1574	151	a	1935 x 1200	X	1	142 158		" "
			b	1760 x 1200	X	1			
493	1575	152	a	1511 x 1200	X	1	142 158		" "
			b	1375 x 1200	X	1			
493	1575	153	a	1360 x 1200	X	1	142 158		" "
			b	1240 x 1200	X	1			
492	1576	X 154	a	1480 x 1455	1	X	141 142	CANCELLED	PUMP CASINGS SUPPORT TUBE
			b	1360 x 1070	1	X			
492	1577	X 155	a	2300 x 1455	1	X	141 142	CANCELLED	" "
			b	2100 x 1070	1	X			

SOCKET Mc DERMOTT

a: outside plate. b: inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE		PLATE SIZE	Nu. of plate		N° of McD dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
					C1	C2			
493	1578	156	a	1480 x 1455	X	1	141 142	CANCELLED	PUMP CASINGS SUPPORT TUBE
			b	1360 x 1070	X	1			
493	1579	157	a	2300 x 1455	X	1	141 142	CANCELLED	" "
			b	2100 x 1070	X	1			
493	1580	158	a	1923 x 1300	X	1	141 142	CANCELLED	" "
			b	1650 x 1300	X	1			
493	1581	159	a	1851 x 1300	X	1	141 142	CANCELLED	" "
			b	1590 x 1300	X	1			
493	1582	160	a	1913 x 1300	X	1	141 142	" "	" "
			b	1650 x 1300	X	1			
493	1583	161	a	1842 x 1300	X	1	141 142	" "	" "
			b	1590 x 1300	X	1			
492	1584	162	a	1918 x 1300	1	X	141 142	CANCELLED	" "
			b	1645 x 1300	1	X			
492	1585	163	a	1984 x 1300	1	X	141 142	CANCELLED	" "
			b	1700 x 1300	1	X			

SOCKET Mc DERMOTT

a: outside plate. b: inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE		PLATE SIZE	Nu. of plate		N° of McD dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
					C1	C2			
492	1586	164	a	1908 x 1300	1	X	141 142		PUMP CASINGS SUPPORT TUBE
			b	1645 x 1300	1	X			
492	1587	165	a	1974 x 1300	1	X	141 142		" "
			b	1700 x 1300	1	X			
493	1588	X 166	a	1647 x 1300	X	1	141 142	CANCELLED	" "
			b	1420 x 1300	X	1			
493	1589	X 167	a	1948 x 1300	X	1	141 142	CANCELLED	" "
			b	1670 x 1300	X	1			
493	1590	168	a	1639 x 1300	X	1	141 142		" "
			b	1420 x 1300	X	1			
493	1591	169	a	1938 x 1300	X	1	141 142		" "
			b	1670 x 1300	X	1			
492	1594	170	a	1300 x 1300	2	X	141 142		" "
			b	1200 x 1300	2	X			
492	1595	171	a	1570 x 1300	2	X	141 142		" "
			b	1440 x 1300	2	X			

SOCKET Mc DERMOTT

a: outside plate. b: inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE		PLATE SIZE	Nu. of plate		N° of McD dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
					C1	C2			
492	1596	172	a	1480 x 1300	2	X	141 142		PUMP CASINGS SUPPORT TUBE
			b	1360 x 1300	2	X			
492	1597	173	a	1545 x 1300	2	X	141 142		" "
			b	1420 x 1300	2	X			
493	1598	174	a	1300 x 1300	X	2	141 142		" "
			b	1200 x 1300	X	2			
493	1599	175	a	1570 x 1300	X	2	141 142		" "
			b	1440 x 1300	X	2			
493	1600	176	a	1480 x 1300	X	2	141 142		" "
			b	1360 x 1300	X	2			
493	1601	177	a	1545 x 1300	X	2	141 142		" "
			b	1420 x 1300	X	2			
492	1603	X 178	a	1530 x 1300	1	X	142 158	CANCELLED	" "
			b	1350 x 1300	1	X			
492	1603	X 179	a	1810 x 1300	1	X	142 158	CANCELLED	" "
			b	1590 x 1300	1	X			

SOCKET Mc DERMOTT

a: outside plate. b: inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE	PLATE SIZE	Nu. of plate		N° of McD dwg	LOAD breaking loads occurring outside the concrete surface	OBSERVATIONS
				C1	C2			
492	1604	180	a	1510 x 1300	1	X	142 158	PUMP CASINGS SUPPORT TUBE
			b	1350 x 1300	1	X		
492	1604	181	a	1790 x 1300	1	X	142 158	" "
			b	1590 x 1300	1	X		
493	1605	X 182	a	1720 x 1300	X	1	142 158	CANCELLED
			b	1520 x 1300	X	1		
493	1605	X 183	a	2135 x 1300	X	1	142 158	CANCELLED
			b	1875 x 1300	X	1		
493	1606	184	a	1710 x 1300	X	1	142 158	" "
			b	1520 x 1300	X	1		
493	1606	185	a	2115 x 1300	X	1	142 158	" "
			b	1875 x 1300	X	1		
492	1607	X 186	a	1849 x 1300	1	X	142 158	CANCELLED
			b	1630 x 1300	1	X		
492	1608	X 187	a	1821 x 1300	1	X	142 158	CANCELLED
			b	1605 x 1300	1	X		

SOCKET M_c DERMOTT

a outside plate. b inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE	PLATE SIZE	Nu. of plate		N° of M _c D ₁ dwg	LOAD breaking loads accuring outside the concrete surface	OBSERVATIONS
				C1	C2			
492	1609	188	a	1840 x 1300	1	X	142 158	PUMP CASINGS SUPPORT TUBE
			b	1630 x 1300	1	X		
492	1610	189	a	1812 x 1300	1	X	142 158	" "
			b	1605 x 1300	1	X		
493	1611	X 190	a	1616 x 1300	X	1	142 158	CANCELLED
			b	1430 x 1300	X	1		
493	1612	X 191	a	1640 x 1300	X	1	142 158	CANCELLED
			b	1450 x 1300	X	1		
493	1613	192	a	1610 x 1300	X	1	142 158	" "
			b	1430 x 1300	X	1		
493	1614	193	a	1632 x 1300	X	1	142 158	" "
			b	1450 x 1300	X	1		
493	1568	194	a	1405 x 1260	X	1	144	BOAT LANDING FENDER
			b	1280 x 1260	X	1		
493	1566	195	a	1298 x 1260	X	1	144	" "
			b	1168 x 1260	X	1		

SOCKET Mc DERMOTT

a: outside plate. b: inside plate

N° of STC reference dwg	N° of STC details dwg	TYPE		PLATE SIZE	Nu. of plate		N° of McD dwg	LOAD breaking loads accuring outside the concrete surface	OBSERVATIONS
					C1	C2			
493	1549	196	a	1430 x 1260	X	1	144		BOAT LANDING FENDER
			b	1300 x 1260	X	1			
493	1555	197	a	1640 x 1260	X	1	144		"
			b	1490 x 1260	X	1			
492	1560	198	a	1325 x 1260	1	X	144		"
			b	1190 x 1260	1	X			
492	1548	199	a	1430 x 1260	1	X	144		"
			b	1300 x 1260	1	X			
492	1554	200	a	1640 x 1260	1	X	144		"
			b	1490 x 1260	1	X			
492	1567	201	a	1434 x 1260	1	X	144		"
			b	1280 x 1260	1	X			
			a						
			b						
			a						
			b						

N° of STC reference DWG	Number of plates	SUM MARY OF PLATES		N° DWG details of plates	LAY OUT
		C ₁ =	C ₂ =		
492 493	4	C ₁ = 2	C ₂ = 2	1592	