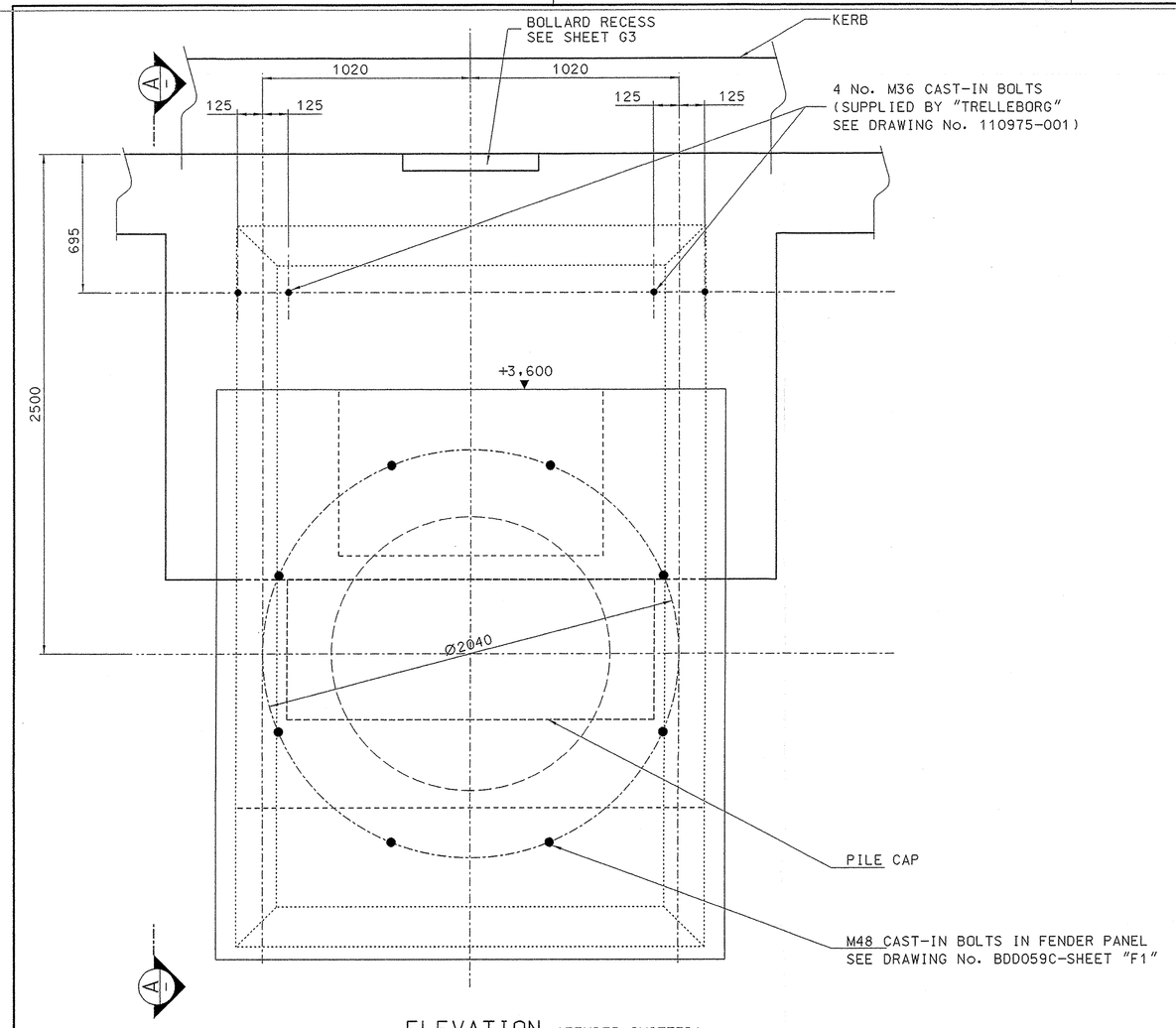
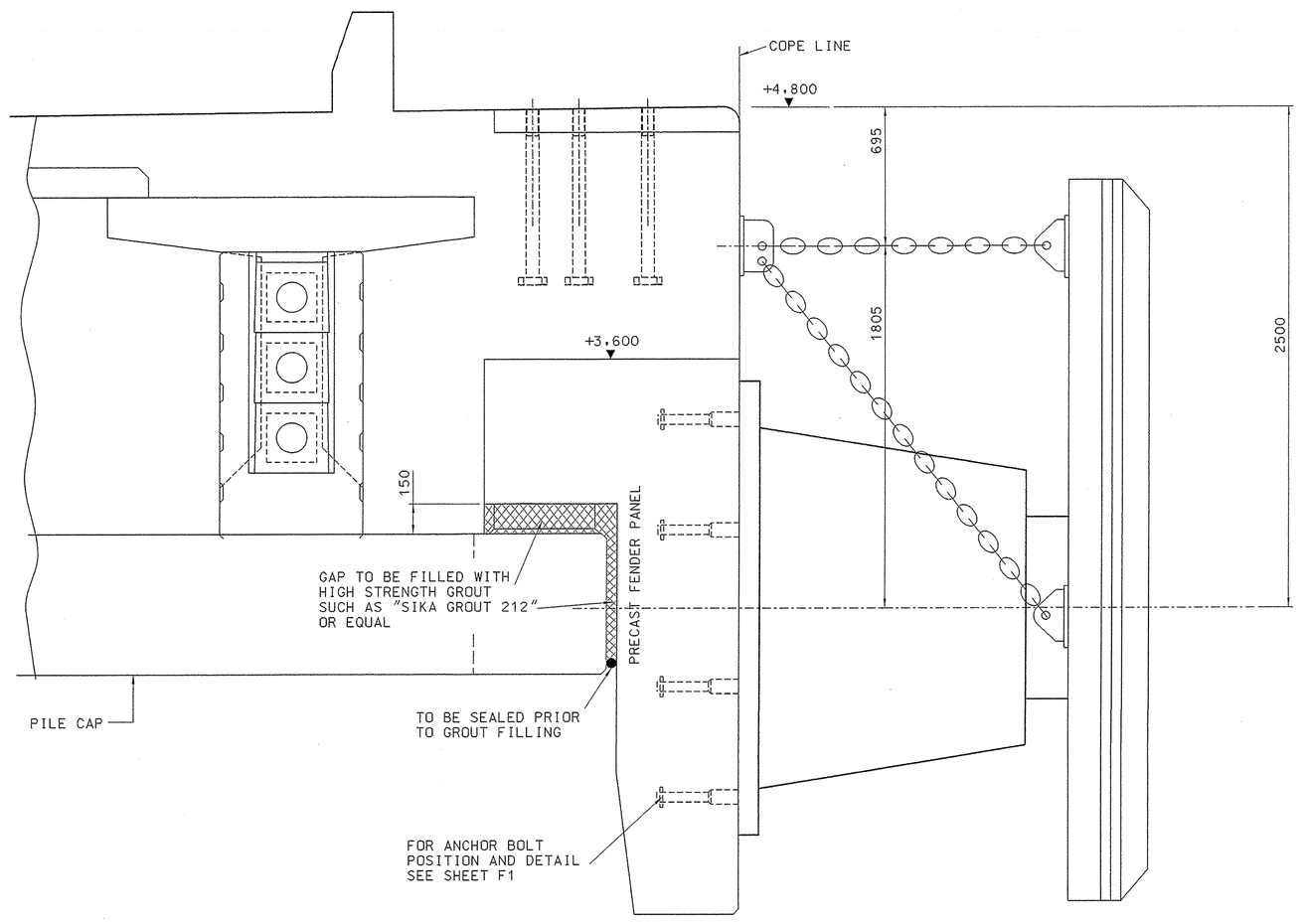
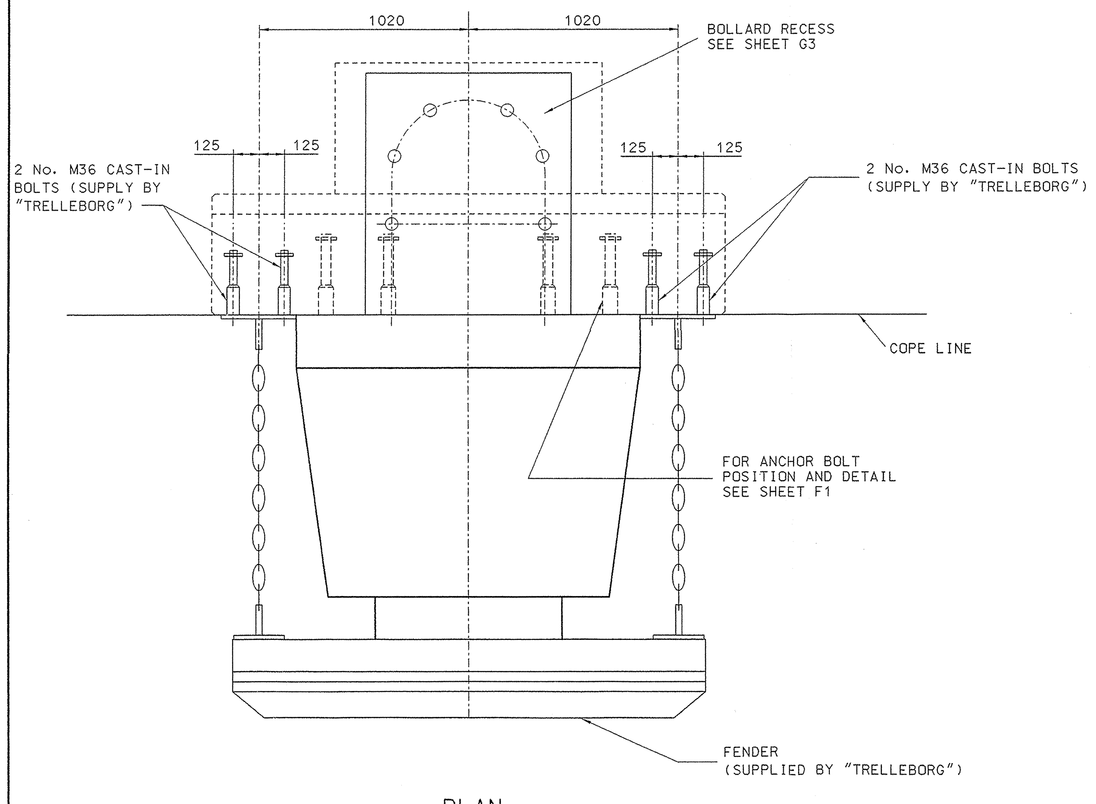


ELEVATION (FENDER OMITTED)
1 : 15



ELEVATION (A)
1 : 15



PLAN
1 : 15

1 : 15

0 10 20 30 40 50
ON ORIGINAL (mm)

NOTES

1. GENERAL

DESIGN CRITERIA:

1.1 DESIGN SHIP : CHEMICAL TANKER
- # DWT : 50 000
- # OVERALL LENGTH : 250m
- # BEAM : 32m
- # DRAFT : 13m

1.2 MAXIMUM DESIGN BERTHING ANGLE: $\alpha = 10°$

1.3 TIDAL LEVELS:

- * LOWEST = 0.37 CD
- * HIGHEST = 2.1 CD
- * HIGHEST ASTRONOMIC TIDE (HAT) = 2.47 CD

1.4 MAXIMUM FENDER PROJECTION = 2000mm

1.5 QUAY TYPE: PILED, REINFORCED CONCRETE STRUCTURE

1.6 MAXIMUM QUAY REACTION LIMIT = 220t (ABNORMAL BERTHING)

2. TRELLEBORG FENDER

2.1. TRELLEBORG SUPER CONE FENDERS TO BE TYPE SCN 1400 (E2.7).
NUMBER REQUIRED = 8 INSTALLED
1 SPARE COMPLETE (SUPPLY ONLY)

3. FENDER SUPPLIER

3.1 FENDERS COMPLETE WITH PANELS SHALL BE SUPPLIED BY A REPUTABLE SUPPLIER WHO IS ABLE TO DEMONSTRATE A SATISFACTORY SUPPLY RECORD OVER A NUMBER OF YEARS FOR THE TYPE OF FENDER BEING OFFERED, TOGETHER WITH A RECORD OF SUCCESSFUL APPLICATIONS. THE FENDER MANUFACTURER IS REQUIRED TO HAVE "TYPE APPROVAL" CERTIFICATION, 3RD PARTY WITNESSED, TO DEMONSTRATE COMPLIANCE WITH PIANC 2002 GUIDELINES. THE CERTIFICATE MUST BE SUBMITTED WITH THE TENDER.

3.2 FENDERS SHALL BE IN COMPLIANCE WITH THE PIANC GUIDELINES FOR THE DESIGN OF FENDER SYSTEMS: REPORT OF WORKING GROUP 33: 2002, HEREINAFTER REFERRED TO AS "WG 33", AND AS FURTHER MODIFIED IN THIS SPECIFICATION.

4. FENDER PERFROMANCE

4.1 THE SPECIFIED FENDER IS DESIGNED FOR QUARTER POINT BERTHING OF A 50 000 DWT CHEMICAL TANKER, BERTHING AT 0.15m/s WITH A SAFETY FACTOR OF 2.0 FOR ABNORMAL BERTHING. THE ENGERY ABSORPTION OF THE FENDER IS 1554kNm, AND THE REACTION FORCE IS 2141kN. THE FENDER PANEL IS DIMENSIONED TO LIMIT THE HULL PRESSURE TO 300kPa

5. REQUIREMENTS

5.1 RUBBER FENDER UNITS SHALL BE COMPRESSION MOULDED FROM NATURAL OR SYNTHETIC OR BOTH RUBBER COMPOUNDS IN COMPLIANCE WITH APPENDIX A OF WG33. THE RUBBER SHALL BE FULLY VULCANISED AND HOMOGENEOUS WITH NO FOREIGN PARTICLES, AND FREE FROM VOIDS, CRACKS AND CUTS. STEEL PLATES SHALL BE FULLY EMBEDDED AND FULLY BONBED TO THE RUBBER DURING THE VULCANISATION PROCESS TO AVOID SEPARATION BETWEEN THE RUBBER AND THE STEEL.

5.2 THE STEEL FENDER PANELS SHALL BE STIFFENED CLOSED BOX PANELS, STRUCTURALLY DESIGNED BY APPROPRIATELY QUALIFIED STRUCTURAL ENGINEERS TO WITHSTAND THE APPLIED LOADING. THE PANELS SHALL BE DESIGNED TO RESIST THE REACTION FORCES IMPOSED BY THE FENDER AND ITS SUPPORTING CHAINS TO KEEP IN EQUILIBRIUM WITH THE VESSEL BERTHING FORCE. STEEL PANELS SHALL BE FABRICATED USING GRADE 350WA STRUCTURAL STEEL COMPLYING WITH SANS 1431

THE STEEL PANELS ARE SIZED TO EXERT A HULL PRESSURE OF NOT MORE THAN 300 kPa. PANELS SHALL HAVE A MINIMUM OVERALL DEPTH OF NOT LESS THAN 300MM AND SHALL BE SEALED AND PRESSURE TESTED. PLATE THICKNESS SHALL BE NOT LESS THAN 10mm FOR ALL EXTERNAL PLATES, AND 8mm FOR INTERNAL STIFFENING PLATES. ALL PANEL EDGES SHALL BE CHAMFERED.

PROTECTIVE TREATMENT OF THE STEEL PANELS SHALL BE IN ACCORDANCE WITH THE COATING REQUIREMENTS OF THE STEEL PILE CASTINGS, AS SET OUT IN THE PROJECT SPECIFICATION FOR PILING.

ALTERNATIVE PROTECTIVE TREATMENTS MAY BE OFFERED SUBJECT TO THE CORROSION PROTECTION ALTERNATIVE BEING SPECIFIED IN FULL.

5.3 PANEL FACINGS SHALL BE FABRICATED USING DOUBLE SINTERED ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE, HAVING A THICKNESS OF AT LEAST 50mm. EDGE PADS SHALL BE CHAMFERED TO MATCH THE CHAMFERED PANELS, AND PADS PLANED TO ENSURE THAT THERE ARE NO STEPS IN EXCESS OF 1mm BETWEEN PADS. PANEL FACINGS ARE TO BE FIXED TO THE STEEL PANELS USING GRADE 8.8 STUDS OR BOLTS OF AT LEAST 20mm DIAMETER.

5.4 ALL ANCHOR SOCKETS, BOLTS, NUTS, WASHERS AND OTHER METALLIC COMPONENTS SHALL BE STAINLESS STEEL GRADE 316. THREAD CLEARANCES AND LUBRICATION SHALL BE SUCH AS TO AVOID GALLING OF THE FIXINGS.

5.5 FENDER RESTRAINT CHAINS SHALL BE PROVIDED FOR VERTICAL AND LATERAL RESTRAINT FOR FENDER PANELS. CHAINS SHALL BE GALVANIZED IN GRADE 350WA OR HIGHER AND SHALL HAVE A FACTOR OF SAFETY 2.0.

5.6 RUBBER FENDERS SHALL BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF APPENDIX A OF "PROCEDURE TO DETERMINE AND REPORT THE PERFORMANCE OF MARINE FENDERS" OF WORKING GROUP 33.
VERIFICATION TESTING OF FENDER PERFORMANCE AND RUBBER MATERIAL PROPERTIES ARE TO BE 3RD PARTY WITNESSED. THE COSTS OF TESTING AND WITNESSING ARE TO BE BORNE BY THE MANUFACTURER AND INCLUDED IN THE TENDERED RATES.

6. QUALITY CONTROL

6.1 THE FENDER MANUFACTURER SHALL SUPPLY:

TO BE SUPPLIED BY TENDERERS AT THE TIME OF TENDERING
- # QUALITY CERTIFICATE IN ACCORDANCE WITH ISO 9002 OR EQUIVALENT.
- # SUPPLY HISTORY OF THE OFFERED FENDERS.
- # PRODUCT LITERATURE AT THE TIME OF TENDERING.

TO BE SUPPLIED AT THE TIME OF DELIVERY
- # TEST REPORTS WITH FENDER PERFORMANCE CURVES, CLEARLY SPECIFYING THE RATED PERFORMANCE DATA (RPD), SHALL BE SUPPLIED AT THE TIME OF DELIVERY IN ACCORDANCE WITH APPENDIX A OF WORKING GROUP 33.
- # PHYSICAL PROPERTIES OF RUBBER CERTIFICATE SHALL BE SUPPLIED AT THE TIME OF DELIVERY IN ACCORDANCE WITH APPENDIX A OF WORKING GROUP 33. VERIFICATION TESTING CERTIFICATES MUST BE SUPPLIED AT THIS TIME.
- # MILL CERTIFICATES FOR STEEL PANELS, CHAINS AND BOLTS SHALL BE SUPPLIED AT THE TIME OF DELIVERY.

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2009 -07- 09
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DOCUMENT CONTROL: RICHARDSBAY
FOR CONSTRUCTION

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TRELLEBORG FENDER

NOTES:
a. THIS DRAWING IS THE PROPERTY OF TRANSNET. COPYRIGHT, PATENTS AND ALL INDUSTRIAL PROPERTY RIGHTS RESERVED.
b. MEASUREMENTS ARE BASED ON METRIC SYSTEM.
c. ALL LEVELS ARE IN METRES TO CHART DATUM (PORT) WHICH IS 0.9m BELOW MEAN SEA LEVEL (MSL).
d. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
e. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS ON THE SITE AND NOTIFY THE ENGINEER OF ANY VARIATIONS FROM DIMENSIONS BEFORE CONSTRUCTION.

REV.	DATE	DESCRIPTION	INIT	CHKD	APPR
00	08-09-05	ISSUED FOR CONSTRUCTION	JPS	JPS	JM
01	09-07-06	FENDER REVISED	JPS	JPS	

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Sgn. J.MUGGLESTONE
DATE 2008-09-08

PROJECT No. 4121011
DRAWING No. BDD059C | SH. G4 | REV. 01
DRAWN
CHECKED Sgn. J.P.STRAUSS
DESIGNED Sgn. J.LA GRANGE
CHECKED Sgn. J.MUGGLESTONE

Client:
National Ports Authority of South Africa
PORT ENGINEER RICHARDS BAY

Project:
PORT OF RICHARDS BAY
CHEMICAL BERTH 208

Title:
FITTINGS
FENDER DETAILS

BDD059C SH. G4

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Koos.Schroeder