

GENERAL NOTES - UNLESS OTHERWISE STATED

KEY PLAN

GENERAL STEELWORK

- 1. STRUCTURAL STEEL**
  - 1.1 ALL STEELWORK TO BE GRADE S355JR IN ACCORDANCE WITH EN 10025:2 AND FABRICATED IN ACCORDANCE WITH SANS 2001 CS1.
  - 1.2 ALL GUSSET PLATES, STIFFENER PLATES & BRACKETS TO BE 10 THICK PLATE (MIN).
  - 1.3 ALL CLEATS TO BE 8 THICK (MIN).
  - 1.4 ALL COMPONENTS TO BE FREE FROM BURRS & SHARP EDGES.
  - 1.5 STANDARD BACK MARKS & CROSS CENTRES TO BE USED.
  - 1.6 CRAWL BEAM WEB TO BE PAINTED WITH 150mm HIGH TEXT INDICATING SAFE WORKING LOAD (e.g. SWL 2000kg). TEXT TO BE PAINTED FLAG ORANGE (SABS 1091).
  - 1.7 NO DEVIATION FROM MEMBER SIZES, DIMENSIONS OR S.O.P. UNLESS PERMISSION HAS BEEN OBTAINED IN WRITING FROM THE DESIGNATED ENGINEER.
  - 1.8 ALL LOOSE ITEMS, PACKS & BRACKETS ETC. TO BE WIRED ON FOR DELIVERY TO SITE.
  - 1.9 ALL HINGES, ROLLERS, BEARINGS, BUSHES AND MOVING PARTS TO BE GREASED ON ASSEMBLY.
  - 1.10 ASSEMBLIES TO BE INSPECTED PRIOR TO DELIVERY.
  - 1.11 ALL STEELWORK TO BE HARD MARKED BY STAMPING 15mm HIGH NUMBERS ON TOP FLANGE:
    - A) LEVEL IDENTIFICATION
    - B) ITEM MARK
    - C) G.A. DRAWING NUMBER
  - 1.12 STRUCTURAL STEELWORK CONNECTIONS TO CONFORM TO THE RECOMMENDATIONS CONTAINED IN THE SAISC 'YELLOW BOOK' STRUCTURAL STEELWORK DETAILING MANUAL.
  - 1.13 FLAME CUTTING TO BE MACHINED BACK TO BRIGHT METAL.
- 2. FASTENERS**
  - 2.1 ALL BOLTS TO BE HOT DIP GALVANIZED TO SANS 10684 WITH A COATING THICKNESS NOT MORE THAN 65µm AND TO THREAD TOLERANCES IN ACCORDANCE WITH SANS 1700-2-19
  - 2.2 ALL STRUCTURAL BOLTS TO BE M24 OR M20 CLASS 8.8. HOLES FOR M24 BOLTS TO BE 26 DIA. AND HOLES FOR M20 BOLTS TO BE 22 DIA.
    - 2.2.1 FOR COLUMN AND PLATE GIRDER SPLICES AND GIRDER TO GIRDER CONNECTIONS, BOLTS TO BE M24 CLASS 8.8S (HSFG)
    - 2.2.2 ALL OTHER BOLTS TO BE M20 CLASS 8.8 PRECISION BOLTS TO SANS 1700-7-1
  - 2.3 MANUFACTURER TO SUPPLY ALL BOLTS, NUTS, AND WASHERS NECESSARY FOR ERECTION INCLUDING 5% SPARE BAGGED, LABELLED AND DELIVERED TO SITE WITH STEELWORK
  - 2.4 TAPERED WASHERS ARE TO BE USED WHERE SPECIFIED.
  - 2.5 HOLES FOR SUPPORTING SCREENS AND HANDRAILS TO BE Ø18 FOR M16 CLASS 8.8 BOLTS COMPLETE WITH NUTS AND WASHERS, HOT DIP GALVANIZED
  - 2.6 BOLTING OF BEAM AND PLATE GIRDER STRUCTURAL CONNECTIONS - TO ENSURE FULLY TIGHTENED CONNECTIONS, SEQUENTIAL TIGHTENING OF BOLT GROUPS MUST BE APPLIED ESPECIALLY IN LONG BOLT GROUPS SUCH AS PLATE GIRDER CONNECTIONS AND SPLICES
  - 2.7 HOLES FOR FASTENERS SHALL NOT BE FORMED BY FLAME CUTTING PROCESSES AND PUNCHING OF HOLES IN CRITICAL LOAD BEARING MEMBERS IS NOT PERMITTED
- 3. WELDING**
  - 3.1 THE FABRICATOR SHALL REVIEW THE WELDING PROCEDURES AFTER SHOP DETAILING.
  - 3.2 WELDING PROCEDURES AND PRE-QUALIFIED WELDING PROCESSES IN LINE WITH AWS D1.1 AS APPROPRIATE SHALL BE MADE AVAILABLE FOR SCRUTINY BY THE CLIENT'S REPRESENTATIVE.
  - 3.3 THE PREFERRED WELDING PROCESS SHALL BE SMAW AND GMAW USING WELDING CONSUMABLES IN LINE WITH AWS D5.1. PREFERRED CLASS OF FILLER IS ER70-6 FOR GMAW AND THE EQUIVALENT FOR SMAW IN ER 7018 RANGE.
  - 3.4 THE MAXIMUM SIZE OF FILLET WELDS OF CONNECTED PARTS SHALL BE:
    - 3.4.1 ALONG EDGES OF MATERIAL LESS THAN 6mm NOT EXCEEDING THICKNESS OF MATERIAL.
    - 3.4.2 ALONG EDGES OF MATERIAL 6mm OR MORE NOT GREATER THAN THE MATERIAL LESS 2mm.
  - 3.5 MINIMUM WELDS SHALL BE 6mm FOR MATERIALS UP TO 12mm.
  - 3.6 FOR GIRDERS IN CYCLICALLY LOADED STRUCTURES, ALL MILL SCALE SHALL BE REMOVED FROM THE SURFACES ON WHICH FLANGE-TO-WEB WELDS ARE TO BE MADE.
  - 3.7 WELDS ON LOAD BEARING MEMBERS AND GIRDERS SHALL BE COMPLETE JOINT PENETRATION BUTT WELDS AND DISTORTION AND WARPAGE SHALL BE LESS THAN 1%.
  - 3.8 WELDS SHALL BE PRESENTED FOR VISUAL INSPECTION IN LINE WITH AWS D1.1 REQUIREMENTS PRIOR TO FETTLING AND GRINDING.
- 4. FLOORING**
  - 4.1 VASTRAP TO BE MINIMUM 6THK LIP PLATE FLOORING.
  - 4.2 VASTRAP TO BE SECURED TO STEELWORK WITH HILTI X-BT SYSTEM OR EQUIVALENT.
  - 4.3 FLOOR GRATING BEARER BARS TO BE 40x4.5 AT 40 CENTRES.
  - 4.4 GRATING TO BE FULLY BANDED WITH EITHER A KICKFLAT BANDING BAR OR BEARER BAR.
  - 4.5 STAIR TREADS TO HAVE 30x4.5 BEARER BARS AT 40 CENTRES AND NON-SLIP NOSING.
  - 4.6 GRATING TO BE CLAMPED DURING ERECTION WHEN USING THE FASTENING SYSTEM.
  - 4.7 FLOORING TO HAVE 130x6 THK KICK FLATS ALL ROUND AND AT OPENINGS EXCEPT HATCHES.
- 5. CORROSION PROTECTION**
  - 5.1 ALL STEEL SURFACES TO BE ABRASIVE BLASTED TO ISO 8501, SA 2½
  - 5.2 ALL STEELWORK TO BE HOT DIP GALVANIZED TO SANS 121 THICKNESS TABLES U.O.N.
  - 5.3 GALVANIZING OF LONG BEAMS AND PLATE GIRDERS.
    - 5.3.1 BEAMS OR PLATE GIRDERS MAY NEED TO BE CUT INTO SUITABLE LENGTHS TO FIT INTO THE GALVANIZING BATH. COMPONENTS TO BE GALVANIZED IN A 'SINGLE DIP' TO MINIMIZE DISTORTION. THE POSITION OF THESE SPLICES ARE TO BE APPROVED BY M&RC
    - 5.3.2 AFTER GALVANIZING, THE COMPONENT MUST BE RE-JOINED WITH FULL STRENGTH WELDED SPLICES TO AWS 1.1.
    - 5.3.3 THE AREA AROUND THE SPLICE MUST BE ZINC THERMAL SPRAYED TO RESTORE THE CORROSION PROTECTION SYSTEM.
  - 5.4 HARD MARKED AREA TO BE HIGHLIGHTED WITH YELLOW PAINT, AFTER GALVANIZING, FOR EASE OF IDENTIFICATION.
  - 5.5 AREAS OF MINOR DAMAGE TO THE GALVANIZED SURFACE TO BE REPAIRED IN ACCORDANCE WITH CLAUSE 6.3 AND ANNEX C OF SANS 121.
  - 5.6 APPLICATION OF CORROSION PROTECTION TO ONSITE WELDED STEELWORK.
    - 5.6.1 PREPARATION OF STEELWORK - BEFORE GALVANIZING, 'GALVSTOP' IS TO BE APPLIED TO THE BEAM UP TO A MINIMUM OF 25mm AWAY FROM THE EXPECTED HEAT AFFECTED ZONE. WHERE APPLICABLE, AROUND THE WELD.
    - 5.6.2 AFTER GALVANIZING THE COMPONENT, THE CARBONIZED 'GALVSTOP' MUST BE REMOVED BY THOROUGH WIRE BRUSHING AND ABRADING THE BARE STEEL.
    - 5.6.3 AFTER INSTALLING AND WELDING BEAMS TO THE CLEATS ON CAST-IN PLATES, THE AREAS TO BE REPAIRED MUST BE PREPARED AND TREATED WITH A COLD GALVANIZING EPOXY PAINT STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. SUITABLE PRODUCTS ARE 'GALVPATCH' AND 'ZINCFIX'.
  - 5.7 TEMP SINKING STEELWORK - UNLESS CONTRACTED OTHERWISE, STEELWORK SHALL BE DEGREASED AND CLEANED TO A WATER BREAK FREE CONDITION WIRE BRUSHED FOLLOWED BY TWO COATS OF RED OXIDE PRIMER TO A MINIMUM DFT OF 50µm

- 6. HANDRAILING**
  - 6.1 TO BE TUBULAR TYPE & HOT DIP GALVANIZED TO SANS 121 TO A MINIMUM COATING THICKNESS OF 45µm. TOP MOUNTED TO STRUCTURE WITH 2 x M16 BOLTS PER STANCHION EXCEPT FOR SINKING STAGES.
  - 6.3 MAX SPACING OF STANCHIONS TO BE 1.5m
  - 6.4 HANDRAIL TO BE 1.2m ABOVE STEELWORK OR CONCRETE.
  - 6.5 HANDRAILS TO INCLUDE KNEERAILS.
- 7. GATES AND SCREENS**
  - 7.1 SEE DRG. 165-4-107-5300-O-0066\_01

SHAFT STEELWORK

- 1. BUNTONS**
  - 1.1 MAIN BUNTONS - MATERIAL AND DELIVERY TOLERANCES TO CONFORM TO BS EN 10210-1 & 2 : 2006.
  - 1.2 SKIP BUNTONS - MATERIAL AND DELIVERY TOLERANCES TO CONFORM TO BS EN 10210-1 & 2 : 2006.
- 2. GUIDES**
  - 2.1 GUIDES FOR CAGE AND COUNTERWEIGHT TO BE 150 x 150 x 320 TOP HAT SECTION.
  - 2.2 GUIDES FOR SKIPS OUTER BUNTONS TO BE 150 x 150 x 320 TOP HAT SECTION
  - 2.3 GUIDES FOR SKIPS INNER BUNTONS TO BE 150 x 102 x 305 TOP HAT SECTION
  - 2.4 TOP HAT GUIDE MATERIAL TO CONFORM TO EN 10025:2004 S275J0+AR
  - 2.5 DELIVERY TOLERANCES FOR TOP HAT GUIDES TO BE AGREED WITH THE SUPPLIER.
  - 2.6 GUIDES FOR AUXILIARY CAGE TO BE 100 x 100 x 10 RHS TO CONFORM TO BS EN 10210-1: 2006.
  - 2.7 100 x 100 x 10 RHS GUIDES TO BE HOT DIP GALVANIZED TO SANS 121.
- 3. MANUFACTURING & PRE-INSTALLATION JIGS**
  - 5.1 INDIVIDUAL BUNTONS & GUIDES WILL BE FABRICATED & CHECKED IN THE FABRICATORS MANUFACTURING WORKSHOP JIGS WILL BE CHECKED BY THE CLIENTS APPOINTED SURVEYOR.
  - 5.2 ALONG WITH DELIVERY OF THE COMPLETED SHAFT STEELWORK, THE FABRICATOR WILL PROVIDE A PRE-INSTALLATION JIG, WHICH WILL DUPLICATE THE SHAFT GUIDE POSITIONS & PLUMB LINE POSITIONS EXACTLY. AFTER GALVANIZING, EACH BUNTON SET MUST PASS THROUGH THE FABRICATORS PRE-INSTALLATION JIG ON SITE BEFORE BEING INSTALLED IN THE SHAFT.
- 4. INSTALLATION TOLERANCES**
  - 6.1 HORIZONTAL ALIGNMENT AT THE GUIDES TO BE WITHIN +/- 2mm OF REQUIREMENT.
  - 6.2 VERTICAL ALIGNMENT (ELEVATION) OF BUNTON DATUM TO BE WITHIN +/- 2mm OF REQUIREMENT.

PIPING

ON HOLD

LOW PRESSURE PIPING UP TO 20 Bar.

- 1. APPLICATION
- 2. PIPE CONTENTS
- 3. WORKING PRESSURE
- 4. TEMPERATURE RANGE
- 5. PIPE SPECIFICATION
- 6. FITTING SPECIFICATION
- 7. FLANGE SPECIFICATION
- 8. BOLT SPECIFICATION
- 9. GASKET SPECIFICATION
- 10. WELDING SPECIFICATION
- 11. CORROSION PROTECTION
- 12. CLOSERS, MKD THUS \* HAVE 150mm INCLUDED IN THE SCHEDULE LENGTH AND ONE FLANGE LEFT LOOSE FOR SITE ADJUSTMENT.
- 13. ALL FASTENERS TO BE SUPPLIED BY THE CONTRACTOR AND PLACED IN SEALABLE CONTAINERS AND CLEARLY MKD WITH THE INSTALLATION LEVEL, DRG. No. AND ORDER No.
- 14. ALL PIPES TO BE MKD WITH JOB No, DRG. No. AND ITEM No. FOR INSTALLATION PURPOSES.
- 15.

LOW PRESSURE PIPING UP TO 20 Bar.

- 1. APPLICATION
- 2. PIPE CONTENTS
- 3. WORKING PRESSURE
- 4. TEMPERATURE RANGE
- 5. PIPE SPECIFICATION :SANS 62, SANS 719 Gr. 'B' OR ASTM A106 Gr. 'B' SEAMLESS.
- 6. FITTING SPECIFICATION :ANSI B16.9. MATERIAL TO ASTM A234 Gr. 'WPB'
- 7. FLANGE SPECIFICATION :SANS 1123 SLIP ON, FLAT FACED. MATERIAL: S355JR
- 8. BOLT SPECIFICATION :SANS 1700 BOLTS TO CLASS 8.8 AND NUTS TO CLASS 8.
- 9. GASKET SPECIFICATION :3mm THICK MATERIAL - POLYOLEFIN BASED.
- 10. WELDING SPECIFICATION :ASME IX.
- 11. CORROSION PROTECTION :HOT DIP GALVANIZED TO SANS 121 INCLUDING FASTENERS.
- 12. CLOSERS, MKD THUS \* HAVE 150mm INCLUDED IN THE SCHEDULE LENGTH AND ONE FLANGE LEFT LOOSE FOR SITE ADJUSTMENT.
- 13. ALL FASTENERS TO BE SUPPLIED BY THE CONTRACTOR AND PLACED IN SEALABLE CONTAINERS AND CLEARLY MKD WITH THE INSTALLATION LEVEL, DRG. No. AND ORDER No.
- 14. ALL PIPES TO BE MKD WITH JOB No, DRG. No. AND ITEM No. FOR INSTALLATION PURPOSES.
- 15.

CONVEYANCES.

- 1. DESIGN OF SHAFT CONVEYANCES AS PER SANS 10208 PART 3 - AND ALL SPECIFICATIONS AS REFERENCED THEREIN
- 2. ALL BOLTS TO BE 19 DIA. SWAGELOCK BOLTS AND COLLARS TO FACE THE INSIDE OF THE CONVEYANCE WHERE POSSIBLE
- 3. WHERE IT IS NOT POSSIBLE TO USE SWAGELOCK BOLTS, CLASS 8.8 BOLTS MUST BE USED C/W CLEVELOCK NUTS & FLAT WASHERS.
- 4. HOLES TO BE DRILLED, NOT PUNCHED.
- 5. ALL STEEL IN THE LOAD PATH E.G. TOP & BOTTOM TRANSOMS AND BRIDLE PLATE ASSEMBLIES, TO CONFORM TO SANS 10025:2 GRADE S355J0.
- 6. ALL OTHER STEEL WORK TO BE TO SANS 10025:2 GRADE S355JR. NO OTHER GRADE STEEL PERMITTED, EXCEPT FOR VASTRAP FLOORING.
- 7. FABRICATION AND CONSTRUCTION TO BE IN ACCORDANCE WITH SANS 2001 CS1 & SANS 1921-3.
- 8. ALL WELDS TO BE 6mm CFW IN ACCORDANCE WITH AWS D1.1 USING ELECTRODES E70XX.
- 9. N.B. - NO WELDING IS PERMITTED IN ITEMS WITHIN THE LOAD PATH.
- 10. CONVENTIONAL NUTS AND BOLTS CAN BE USED DURING TRIAL ERECTION FOR INSPECTION PURPOSES.
- 11. UNDERSIDE FACES OF TOP TRANSOM TO BE ROUGH MACHINED 6.3/ TO CLEAN FLAT & LEVEL TO ACCOMMODATE DEAD EYES.
- 12. VENTILATION SCREENING TO BE PERFORATED PLATE, WOVEN WIRE MESH OR EXPANDED METAL. APPERTURE SIZE TO PREVENT FINGERS FROM PASSING THROUGH. (PERFORATED PLATE, 3mm THICK WITH 12.7mm DIA. HOLES AT 16,9mm STAGGERED PITCH HORIZONTAL AND VERTICAL.)
- 13. CORROSION PROTECTION.
  - 13.1 ALL STEEL SURFACES TO BE ABRASIVE BLASTED TO SA. 2½ TO ISO 8501
  - 13.2 ALL STEELWORK TO BE HOT DIP GALVANIZED TO SPECIFICATION SANS 121 (ISO 1461) U.O.N.
  - 13.3 SHOP DETAIL DRAWINGS TO INCLUDE HOLES TO FACILITATE DRAINAGE OF EXCESS ZINC DURING GALVANIZING.
  - 13.4 AREAS OF DAMAGE TO THE GALVANIZED SURFACE TO BE REPAIRED IN ACCORDANCE WITH CLAUSE 6.3 AND ANNEX C OF SANS 121.

CIVILS.

- 1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH SANS 10100 - PART 2: 'CONCRETE MATERIALS AND EXECUTION OF WORK' AND SANS 2001-CC1 : 2012 (OR SABS 1200G), DEGREE OF ACCURACY II.
- 2. CONCRETE TO BE 'STRENGTH CONCRETE' AS FOLLOWS:
  - STRUCTURAL CONCRETE GRADE 35/19 (EXCLUDING HITCH FOUNDATION)
  - HITCH FOUNDATION GRADE 25/19 (30MPa AFTER 30 DAYS)
  - MASS CONCRETE GRADE 15/19
  - BLINDING GRADE 15/19
  - SHAFT LINING GRADE 25/10 - MIX DESIGN TO BE APPROVED BY THE CLIENT
- 3. CONCRETE MIX DESIGN AND CURING METHOD TO BE APPROVED BY THE ENGINEER PRIOR TO COMMENCEMENT OF THE WORK.
- 4. EXPOSED CONCRETE ARRISSES (SHARP CORNERS) TO HAVE 25x25 CHAMFER.
- 5. EXPOSED OFF-SHUTTER CONCRETE TO HAVE A 'SMOOTH' CLASS OF FINISH AND EXPOSED HORIZONTAL SURFACES A SMOOTH WOOD FLOAT FINISH.
- 6. REINFORCEMENT APPLICABLE STANDARDS.
  - SANS 282 - BENDING DIMENSIONS
  - SANS 920 - STEEL BARS FOR CONCRETE REINFORCING
  - SANS 1024 - WELDED STEEL FABRIC FOR USE IN REINFORCED CONCRETE
  - SANS ARP 040 - USE OF REINFORCEMENT COVER DEVICES
- 7. MINIMUM LAP OF REINFORCEMENT TO BE 50x SMALLER BAR DIAMETER.
- 8. REINFORCEMENT, WHEN FIXED AND COMPLETE, TO BE INSPECTED AND APPROVED BY THE ENGINEER BEFORE PLACING CONCRETE.
- 9. CONCRETE COVER TO REINFORCEMENT TO BE >50mm.

NOTES

TITLE	DRG No	DESCRIPTION	MARK	DATE	INTLS	APPV'D	DESCRIPTION	MARK	DATE	INTLS	APPV'D
ISSUED FOR CONSTRUCTION				0	20-09-2022	CB					
ISSUED FOR INFORMATION				A	22-06-2022	CB					

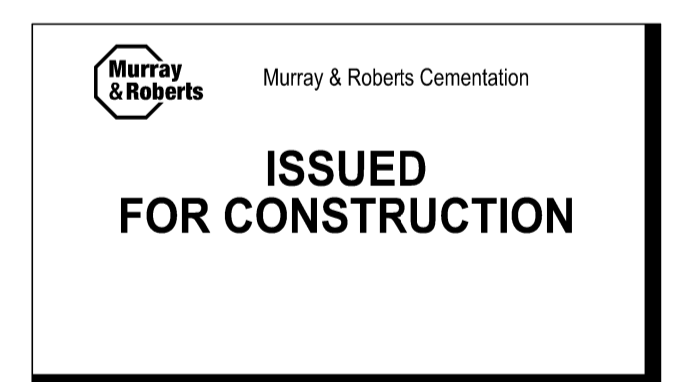
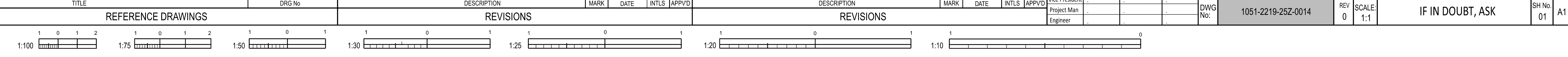
M&RC	NAME	SIGNATURE	DATE
Drawn By	CB		22-06-2022
Checked By	SR		16-09-2022
Sect Leader			
Study Man			
Project Eng			
Mech Design			
IVANPLATS	NAME	SIGNATURE	DATE
Vice President			
Project Man			
Engineer			

NEW M&R CEMENTATION DRG No **165-4-107-5300-O-0014\_01** REV **0**

OLD DRG. No. DO NOT USE **107-5300-O-0014\_01**

**IVANPLATS** SHAFT 2 4 SKIPS RE-DESIGN DRAWINGS PROJECT SETUP GENERAL NOTES

DWG No: **1051-2219-25Z-0014** REV **0** SCALE: **1:1** IF IN DOUBT, ASK SH No. **01** A1



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**Murray & Roberts Cementation**

Pr Eng/Tech :.....  
 Reg. No.: .....  
 Signature:- .....

