

TRANSNET GROUP CAPITAL – ENGINEERING & DESIGN SERVICES CENTRE OF EXCELLENCE

CAD STANDARDS

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Note: Only latest amendments and/or additions are reflected in italics in the body of the document.



DOCUMENTATION SIGN-OFF SHEET

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I, the undersigned hereby approve this procedure.

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1 PURPOSE

- 1.1 The purpose of this standard is to ensure that all CAD files and drawings are created in a logical and consistent format, and in a manner reflecting consistent design practice during the execution of the projects within Transnet Group Capital.

2 APPLICABILITY

- 2.1 This standard applies to all personnel within the Engineering and Design Services department of Transnet Group Capital, as well as external contractors and consultants appointed by Transnet Group Capital (TGC), whom are responsible for developing, creating and issuing drawings.

3 SCOPE

- 3.1 All engineering staff, contractors and consultants that are involved in the production of drawings for TGC, will be issued with this standard and must ensure compliance. It is noted that where fabrication shop details are required, it is not necessary for the contractor to comply with these standards and their own CAD packages may be used.
- 3.2 General drawing practice shall comply with current discipline-specific South African Standards.
- 3.3 In certain cases clients may prescribe standards different from this document.

4 REFERENCE DOCUMENTS

Item	Document Number	Description
[1]	ISO 9001	Quality management systems-Requirements
[2]	SANS 10144	Detailing of steel reinforcement for concrete
[3]	SANS 10143	Building Drawing Practice
[4]	SANS 1044-2	Welding Part II: Symbols

[5]	SANS 10111	Engineering Drawing Part 1,2 and 3
[6]	SANS 282	Bending dimensions of bars for concrete reinforcement
[7]	SYS-P-0001	Transnet Programme Numbering/Codification Procedure
[8]	BS 3939	Graphical symbols for electrical power, telecommunications and electronic diagrams
[9]	BBB0041	Preparation of Drawings for Transnet Freight Rail
[10]	BBB4354	Preparation of Signal Drawings
[11]	BBD 5371	CAD Standard for technical Documentation
[12]	CSE Z 148	Symbols for Signalling
[13]	ENG-P-0105	Engineering Drawings
[14]	ENG-GL-0103	Revision of Technical Documents
[15]	SANS NRS 1002	Graphical symbols for Electrical Diagrams
[16]	South African Institute of Steel Construction (SAISC) Standard	South African Institute of Steel Construction (SAISC) Standard
[17]	Transnet Bridge Code 1983	Transnet Bridge Code 1983

5 DEFINITIONS

Asset: Refers to physical assets such as structures, production and service plant, power, water and waste treatment facilities, distribution networks, transport systems, buildings and other physical assets that a company owns in order to generate revenue.

Infrastructure: Refers to assets that are developed for public sector, utilities, property and transport systems.

Client: Any Transnet body requesting project services from TGC. Any Operating Division of Transnet including TGC RME Department. Any external commercial interest that interfaces with Transnet.

Engineering Manager: The Engineering resource responsible for management and coordination of engineering and design activities on a project.

Discipline Engineering Lead: The Engineer appointed to ensure the quality and compliance to regulations and performance within a discipline for any given project.

Project: Is a temporary endeavor undertaken to create a unique product, service or result (Project Management Institute).

Project Lifecycle Process: The Project Lifecycle Process (PLP) is a project development framework and methodology based on a stage-gate approach of delivering projects, which is used worldwide to mitigate risks of project overruns and failures.

Owner Requirement Specification: Verifiable requirements that define what the asset / infra-structure will do but not how the asset will do it. These requirement are viewed from the owner's perspective (in cases where the user is different from the owner).

User Requirements Specification: Verifiable requirements that define what the asset / infra-structure will do but not how the asset will do it. These requirement are viewed from the user's perspective (in cases where the user is different from the owner).

Deliverable: Is a product or service that a project produces for its customer, client, or project sponsor. It can be tangible or intangible.

Deliverable Status Matrix: This is a matrix that assigns different status on a deliverable based on its status on the workflow. Each status is also assigned certain percentage that represent the completeness of the deliverable from the beginning of the workflow.

Milestone: It is any threshold, or defined state during which a project transitions to another phase.

Technical Design Review: An event is a forum in which questions pertaining to the infra-structure or project to be designed can be answered, assumptions clarified and advice sought.

Verification: The evaluation of whether or not a product, service, or system complies with a high-level requirement, specification, or imposed condition, or regulation. It is often an internal process.

Gate Reviews: Are a critical element of the PLP Methodology in that they provide assurance at specific review points that the project under consideration is being

developed or implemented in accordance with the requirements of the methodology and its viability supports approval to proceed to the ensuing phase.

Validation: The assurance that a product, service, or system meets the needs of the customer and other identified stakeholders. It often involves acceptance testing with external customers.

6 ABBREVIATIONS

TGC:	Transnet Group Capital
SI units:	System International units
CAD:	Computer Aided Design
Eng. CoE:	Engineering Centre of Excellence
E&DS:	Engineering and Design Services
2D:	Two Dimensional
3D:	Three Dimensional
DGN:	MicroStation format graphics files and suffix
DWG:	AutoCAD format graphics files and suffix
NTS:	Not to scale

7 ACCOUNTABILITY, RESPONSIBILITY AND AUTHORITY

- 7.1 Administrators of the Drawing Standards are responsible for monitoring the implementation of the Standards and ensuring adherence to the Standards.
- 7.2 Any proposed changes to the Drawing Standards must be reviewed by the Engineering and Design Services Centre of Excellence Committee, as constituted from time to time by the General Manager, Engineering and Design Services.
- 7.3 Final approval vests with the General Manager E&DS.

8 PROCEDURE

8.1 This standard should be read together with Engineering Procedure ENG-P-0105: Engineering drawings.

8.2 Drawing Standard

8.2.1 Software - only the most current versions of AutoCad and Microstation are to be used.

8.2.2 Units - all drawings will conform to SI units (Systems International).

8.2.3 Language - all notes, comments and text shall be in the English language (UK Standard). All instructions on a drawing shall be in the imperative tense i.e.: "Pipe to be cut", "connection to be welded".

8.3 Templates

8.3.1 A template with all title blocks, text attributes, layer or level controls must be used when starting a new drawing. Templates are set up for each specific discipline i.e. Civil must use their specific templates, Architects their specific template etc. These discipline specific templates contain the discipline specific layer or level control.

8.3.2 Drawings/models must be done in model space. Viewports must then be created in the paper space at the required scale.

8.3.3 Notes must be done in paper space i.e. on the actual drawing sheet.

8.4 Drawing sizes

8.4.1 Long drawings, where necessary for wiring/circuit diagrams, cable run diagrams, track layouts etc. shall be prepared with widths equal to the widths of "A" series sheets, as required.

Table 1 reflects the different drawings sizes per "A" description.

Table 1: Drawing Sizes

Designation	Trimmed Sizes (mm)
A0	841 x 1189
A1	594 x 841
A2	420 x 594
A3	297 x 420
A4	210 x 297

8.5 Scales

The requirements of scale settings are as follows:

8.5.1 When using model space, the design must always be full size, i.e. active scale = 1:1.

8.5.2 The title block shall not be scaled.

8.5.3 The viewport will be created on the drawing sheet (in paper space) and scaled to the required scale, rather than trying to scale the drawing sheet to a scale.

8.5.4 In the case of non-dimensional drawings such as diagrammatic drawings, the viewport must be scaled to suit the drawing sheet.

8.5.5 Different vertical and horizontal scales may be chosen in order to exaggerate a profile or to clarify thin layers of a section.

Table 2 reflects the preferred scales.

Table 2: Preferred Scales

1:1	1:2	1:5
1:10	1:25	1:50
1:100	1:20	1:500
1:1000	1:200	1:5000
1:10000	1:2000	1:50000
1:100000	1:20000	

8.6 Text Attributes

8.6.1 All text shall be in Arial font, with a width factor of 0.7mm. Table 3 reflects the different text attributes per layer.

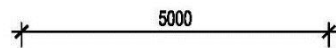
Table 3: Text Attributes

Layer	Colour	Line type	Line weight	Plot style	Use/description
T2	WHITE	CONT	0.25	MONO	General text 2.5mm
T3	YELLOW	CONT	0.35	MONO	General text 3.5mm
T5	RED	CONT	0.50	MONO	General text 5.0mm
T7	GREEN	CONT	0.70	MONO	General text 7.0mm

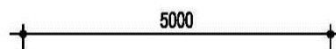
8.7 Dimensioning

- 8.7.1 All detailed dimensions shall be in millimetres.
- 8.7.2 All elevations shall be in metres up to 3 decimal places, and clearly indicated, i.e.:
EL 23.000 m.
- 8.7.3 Co-ordinates shall be stated in metres to 3 decimal places.
- 8.7.4 Dimensioning must be done whilst in paper space, in an active viewport.
- 8.7.5 This is done so that the dimension size will always be consistent in scale i.e. it will be relative in scale to the scale that the viewport is set at.
- 8.7.6 Dimensions are not to be exploded.

Examples:



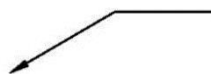
Dimension with oblique line



Dimension with dot



Dimension with arrow



Leader

8.8 Hatching

8.8.1 All hatching to be done in accordance with SANS 10143.

8.9 Layer Control

8.9.1 Standard layers with their own identities will be used in all drawings. The following categories apply:

- | | |
|---------------------------------------|-----------------------------|
| 1. Common layers | (without discipline prefix) |
| 2. Architectural layers | (A_) |
| 3. Civil layers | (C_) |
| 4. Structural layers | (S_) |
| 5. Electrical, light and power layers | (E_) |
| 6. Mechanical layers | (M_) |
| 7. Overhead Track Equipment layers | (O_) |
| 8. Signal layers | (N_) |
| 9. Telecommunications layers | (V_) |
| 10. Bridge layers | (B_) |
| 11. Water layers | (W_) |
| 12. Perway layers | (P_) |
| 13. G.I.S. / Land surveying layers | |

8.9.2 There are no specific layers set out in this document, save to say that text and all different objects and features must be named in its own layer.

8.9.3 Should further Layers or Levels be required the discipline specific prefix should be used.

Table 4: Common Layer Category

COMMON LAYERS						
LAYER NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
0	STANDARD LAYER	WHITE	CONT	0.25	MONO	YES
DIMS	DIMENSIONS (PER SCALE)	WHITE	CONT	0.25	MONO	YES
HATCH	GENERAL HATCHING	11	CONT	0.18	MONO	YES
HATCH-252	HATCHING IN COLOUR 252	252	CONT	DEFAULT	COLOUR	YES
HATCH-254	HATCHING IN COLOUR 254	254	CONT	DEFAULT	COLOUR	YES
T2	GENERAL TEXT 2.5mm	WHITE	CONT	0.25	MONO	YES
T3	GENERAL TEXT 3.5mm	YELLOW	CONT	0.35	MONO	YES
T5	GENERAL TEXT 5.0mm	RED	CONT	0.50	MONO	YES
T7	GENERAL TEXT 7.0mm	GREEN	CONT	0.70	MONO	YES
VPORT	VIEWPORTS IN LAYOUTS	254	CONT	DEFAULT	NORMAL	NO
FRAME	TITLE BLOCK FRAME	WHITE	CONT	0.25	MONO	YES
LOGOS	LOGO LAYER	WHITE	CONT	0.25	MONO	YES

Table 5: Architectural Layer Category

ARCHITECTURE						
LAYER NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
A_BR-N	NEW BRICKWALLS	RED	CONT	0.5	MONO	YES
A_BR-X	EXTG BRICKWALLS	YELLOW	CONT	0.35	MONO	YES
A_CONC-N	NEW CONCRETE	GREEN	CONT	0.7	MONO	YES
A_CONC-X	EXTG CONCRETE	YELLOW	CONT	0.35	MONO	YES
A_DOOR	DOORS	MAGENTA	CONT	0.18	MONO	YES
A_FIT	FITTINGS	CYAN	CONT	0.18	MONO	YES
A_FLFIN	FLOOR FINISH	8	CONT	0.13	MONO	YES
A_GRID	GRIDLINES	9	CENTRE	0.18	MONO	YES
A_HIDE	HIDDEN LINES	CYAN	HIDDEN	0.18	MONO	YES
A_PART-N	NEW PARTITIONS	BLUE	CONT	0.7	MONO	YES
A_PART-X	EXTG PARTITIONS	YELLOW	CONT	0.35	MONO	YES
A_REM	DEMOLISH/REMOVE	9	DASHED	0.18	MONO	YES
A_WIN	WINDOWS	MAGENTA	CONT	0.18	MONO	YES
G1	GENERAL 0.18	11	CONT	0.18	MONO	YES
G2	GENERAL 0.25	WHITE	CONT	0.25	MONO	YES
G3	GENERAL 0.35	YELLOW	CONT	0.35	MONO	YES
G5	GENERAL 0.5	RED	CONT	0.5	MONO	YES
G7	GENERAL 0.7	BLUE	CONT	0.7	MONO	YES
H	HATCH	11	CONT	0.18	MONO	YES

ARCHITECTURE						
LAYER NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
H-252	SOLID HATCH/INFILL	252	CONT	0.25	COLOUR	YES
H-254	SOLID HATCH/INFILL	254	CONT	0.25	COLOUR	YES
A_SITE	SITE AND LOCALITY PLANS	RED	CONT	0.18	MONO	YES
A_DIM	DIMENSIONS	RED	CONT	0.18	MONO	YES
A_BR-N2	CAVITIES	RED	CONT	0.18	MONO	YES
A_SEW	DRAINAGE PLAN	GREEN	CONT	0.40	MONO	YES
A_SW	STORMWATER PLAN &	RED	CONT	0.18	MONO	YES
A_BL	BUILDING LINE	8	HIDDEN	0.13	MONO	YES

Table 6: Civil Layer Category

CIVIL						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
C_BENCH	BENCH MARKS	WHITE	CONT	0.25	MONO	YES
C_BLD-N	PROPOSED BUILDINGS	GREEN	CONT	0.35	MONO	YES
C_BLD-X	EXISTING BUILDINGS	RED	CONT	0.18	MONO	YES
C_BRG-N	PROPOSED BRIDGES	GREEN	CONT	0.35	MONO	YES
C_BRG-X	EXISTING BRIDGES	RED	CONT	0.18	MONO	YES
C_CHAIN	CHAINAGE	MAGENTA	CONT	0.15	MONO	YES
C_CONC	CONCRETE SURFACING	GREEN	CONT	0.35	MONO	YES
C_CONC-B	CONCRETE BELOW GROUND	YELLOW	DASH	0.25	MONO	YES
C_CRANE	CRANE RAILS & EQUIPMENT	YELLOW	CONT	0.25	MONO	YES
C_CULV-N	PROPOSED CULVERTS	GREEN	CONT	0.35	MONO	YES
C_CULV-X	EXISTING CULVERTS	MAGENTA	CONT	0.15	MONO	YES
C_FNC-PA-X	EXISTING FENCING- PALISADE	MAGENTA	FENCE2	0.15	MONO	YES
C_FNC-PC-X	EXISTING FENCING- PRECAST	MAGENTA	DIVIDE	0.15	MONO	YES
C_FNC-ST-X	EXISTING FENCING-	CYAN	FENCE3	0.25	MONO	YES
C_FNC-PA-N	FENCING-PALISADE	YELLOW	FENCE2	0.25	MONO	YES
C_FNC-PC-N	FENCING-PRECAST CONCRETE	YELLOW	DIVIDE	0.25	MONO	YES
C_FNC-ST-N	FENCING-STEEL/WIRE	YELLOW	FENCE3	0.25	MONO	YES
C_FORM-N	PROPOSED FORMATION	4	CONT	0.70	MONO	YES
C_FORM-X	EXISTING FORMATION	41	CONT	0.25	MONO	YES
C_GRID	GRID LINES	251	CONT	0.01	MONO	YES
C_GR-LN	GROUND LINE	MAGENTA	DASH	0.15	MONO	YES
C_KERB-N	PROPOSED KERBING	GREEN	CONT	0.35	MONO	YES
C_KERB-X	EXISTING KERBING	MAGENTA	CONT	0.15	MONO	YES
C_PAV	PAVING	WHITE	CONT	0.25	MONO	YES
C_PREM	PREMIX SURFACING	YELLOW	CONT	0.25	MONO	YES
C_RD-M	PROPOSED ROAD MARKINGS	WHITE	CONT	0.25	MONO	YES

CIVIL						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
C_RD-N	EXISTING ROAD MARKINGS	251	CONT	0.01	MONO	YES
C_REM	REMOVED/DEMOLISHED CIVIL	251	HIDDEN	0.01	MONO	YES
C_RES	RESERVOIRS	YELLOW	CONT	0.25	MONO	YES
C_RET	RETAINING STRUCTURES	GREEN	CONT	0.35	MONO	YES
C_SERV	SERVITUDES	93	DASHED2	0.25	MONO	YES
C_SEW-N	PROPOSED SEWER	40	DASH/DOT	0.50	MONO	YES
C_SEW-X	EXISTING SEWER	41	DASH/DOT	0.25	MONO	YES
C_SHORE	SHORE LINE, QUAY WALLS	CYAN	CONT	0.25	MONO	YES
C_SIGN-N	PROPOSED SIGNAGE	WHITE	CONT	0.25	MONO	YES
C_SIGN-X	EXISTING SIGNAGE	251	CONT	0.01	MONO	YES
C_SW-N	PROPOSED STORMWATER	150	DIVIDE	0.50	MONO	YES
C_SW-TXT-	PROPOSED STORMWATER	2	CONT	0.25	MONO	YES
C_SW-X	EXISTING STORMWATER	151	DIVIDE	0.25	MONO	YES
C_SW-TXT-	EXISTING STORMWATER TEXT	MAGENTA	CONT	0.15	MONO	YES
C_STEEL	STEEL STRUCTURES	YELLOW	CONT	0.25	MONO	YES
C_SLEV	SLEEVE PIPES	WHITE	DASH	0.25	MONO	YES
C_TR-CUR	CURVE DATA	WHITE	CONT	0.25	MONO	YES
C_TR-N	PROPOSED RAIL TRACKS	CYAN	CONT	0.50	MONO	YES
C_TR-X	EXISTING RAIL TRACKS	251	CONT	0.01	MONO	YES
C_TR-T	TEMPORARY RAIL TRACKS	YELLOW	CONT	0.25	MONO	YES
C_TUN-N	PROPOSED TUNNELS	102	DASH	0.70	MONO	YES
C_TUN-X	EXISTING TUNNELS	101	DASH	0.25	MONO	YES
C_WR-N	PROPOSED WATER	80	BORDER	0.50	MONO	YES
C_WR-X	EXISTING WATER	81	BORDER	0.25	MONO	YES
C_BB	BANK BOTTOM EXISTING	35	HIDDEN	0.25	MONO	YES
C_BT	BANK TOP EXISTING	35	DASHED	0.25	MONO	YES
C_BA	BANK BATTER EXISTING	35	CONT	0.25	MONO	YES
C_BB-N	BANK BOTTOM NEW	41	HIDDEN	0.25	MONO	YES
C_BT-N	BANK TOP NEW	41	DASHED	0.25	MONO	YES
C_BA-N	BANK BATTER NEW	41	CONT	0.25	MONO	YES
C_SHORE	SHORE LINE	CYAN	CONT	0.25	MONO	YES
C_QUAY	QUAY WALL	GREEN	CONT	0.25	MONO	YES
C_FIRE-E	FIRE EQUIPMENT	RED	CONT	0.25	MONO	YES
C_FIRE-P	FIRE SUPPLY PIPING	RED	DASHDOT	0.25	MONO	YES

Table 7: Structures Layer Category

STRUCTURES						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
S_STEEL1	DETAIL1:5/1:10	GREEN	CONT	0.7	MONO	YES
S_STEEL2	PLAN/SECT/ELEV	WHITE	CONT	0.5	MONO	YES
S_STEEL3	DET/PLAN/SECT	YELLOW	DASHED	0.25	MONO	YES
S_STEEL4	DETAIL1:2	CYAN	CONT	1.2	MONO	YES
S_STEEL5	PLAN/SECT/ELEV	RED	CONT	0.18	MONO	YES
S_STEEL6	PLAN/SECT/ELEV	RED	DASHED	0.18	MONO	YES
S_STEEL7	PLAN/SECT/ELEV	RED	CENTRE	0.18	MONO	YES
S_STEEL8	DETAILS	YELLOW	DASHED	0.25	MONO	YES
S_STEEL9	EXISTING	RED	DASH/DOT	0.18	MONO	YES
S_STEEL10	EXISTING	YELLOW	DASH/DOT	0.25	MONO	YES
S_STEEL11	PLAN/SECT/ELEV	YELLOW	CONT	0.25	MONO	YES
S_STEEL12	PLAN/SECT/ELEV	YELLOW	CENTRE	0.18	MONO	YES
S_STEEL13	DETAILS	WHITE	DASHED	0.05	MONO	YES
S_CONC1	FOUND/PLAN	GREEN	CONT	0.7	MONO	YES
S_CONC2	REBAR DETAIL	GREEN	CONT	0.7	MONO	YES
S_CONC3	REBAR FOUND	YELLOW	CONT	0.25	MONO	YES
S_CONC4	REBAR FOUND	YELLOW	DASHED	0.25	MONO	YES
S_CONC5	REBAR FOUND	WHITE	CONT	0.5	MONO	YES
S_CONC6	REBAR FOUND	WHITE	DASHED	0.5	MONO	YES
S_CONC7	REBAR FOUND	RED	CENTRE	0.18	MONO	YES
S_CONC8	REBAR FOUND	BLUE	CONT	1.0	MONO	YES
S_WALLS	WALLS	RED	CONT	0.18	MONO	YES
S_HATCH	PROPOSED HATCH	8	CONT	0.01	MONO	YES
S_HATCH EX	EXISTING HATCH	15	Cont	0.065	MONO	YES
S_SLABLINE	SLAB LINE	MAGENTA	Cont	0.18	MOMO	YES
S_REBAR	REBAR	CYAN	CONT	0.50	MONO	YES
S_COLUMN	COLUMN PLAN	GREEN	CONT	0.35	MONO	YES
S_CONC	CONCRETE SECTION	CYAN	CONT	0.5	MONO	YES
S_CONC	CONCRETE SECTION HATCH	8	CONT	0.01	MONO	YES
S_REBAR	REBAR SECTION	RED	CONT	0.18	MONO	YES
S_DIMENSIO	DIMENSION	RED	CONT	0.18	MONO	YES
S_BEAM_DS	BEAM DS	BLUE	CONT	0.7	MONO	YES
S_BEAM_US	BEAM US	BLUE	CONT	0.7	MONO	YES

Table 8: Electrical, Lighting and Power Layer Category

ELECTRICAL, LIGHTING AND POWER						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
E_CABLE	ELECTRICAL CABLES BELOW SURFACE	222	ELEC-1	0.35	MONO	YES
E_CDUCT	DOWN CONDUCTORS	BLUE	CONT	0.70	MONO	YES
E_COND	CONDUITS	WHITE	DASH	0.25	MONO	YES
E_DBOARD	DISTRIBUTION BOARDS	YELLOW	CONT	0.35	MONO	YES
E_EARTH	EARTH SPIKE	RED	CONT	0.50	MONO	YES
E_EX	EXISTING ELECTRICAL	9	CONT	0.18	SCREEN60	YES
E_LUM	LUMINAIRES	RED	CONT	0.50	MONO	YES
E_PSKIRT	POWER SKIRTING	245	DASH	2.00	MONO	YES
E_REM	REMOVED/OBSOLETE ELEC ITEMS	CYAN	DASH	0.25	MONO	YES
E_SW-SOC	LIGHT SWITCHES, SOCKET OUTLETS	WHITE	CONT	0.25	MONO	YES
E_WIRE	ELECTRICAL WIRING	YELLOW	CONT	0.35	MONO	YES
E_ELP	ELECTRICAL LIGHT POLE	RED	CONT	0.25	MONO	YES
E_HLM	HIGH LIGHT MAST	RED	CONT	0.25	MONO	YES

Table 9: Mechanical Layer Category

MECHANICAL						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
M_AIRCON	AIRCONDITIONERS	MAGENTA	CONT	0.25	MONO	YES
M_DUCT	AIRCON DUCTING	WHITE	CONT	0.25	MONO	YES
M_FANS	EXTRACTOR & CEILING FANS	CYAN	CONT	0.25	MONO	YES

Table 10: Overhead Track Equipment Layer Category

OVERHEAD TRACK EQUIPMENT						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
O_STRC-X	EXISTING STRUCTURES	WHITE	CONT	0.25	MONO	YES
O_STRC-N	PROP. STRUCTURES	RED	CONT	0.50	MONO	YES
O_MOFF-X	EXISTING MAKE OFF WIRES	WHITE	CONT	0.70	MONO	YES
O_MOFF-N	PROP MAKE OFF WIRES	RED	CONT	0.50	MONO	YES
O-EARTH-X	EXISTING EARTH WIRE	WHITE	CONT	0.18	MONO	YES
O-EARTH-N	PROP EARTH WIRE	BLUE	DASH	0.30	MONO	YES
O-TLINE-X	EXISTING TRANS -MISSION LINE	WHITE	CONT	0.50	MONO	YES
O-TLINE-N	PROP TRANS -MISSION LINE	GREEN	CONT	0.35	MONO	YES
O_NEG RET-	EXISTING NEG. RETURN	WHITE	C-DOT	0.35	MONO	YES
O_NEG RET-	PROP NEG. RETURN	BLUE	C-DOT	0.50	MONO	YES

Table 11: Signals Layer Category

SIGNALS (Refer to Specification for Preparation of Signal Drawings – BBB4354)

Table 12: Telecommunications Layer Category

TELECOMMUNICATIONS						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
V_CBL-N	PROPOSED COMMS CABLES	202	PHANTOM	0.70	MONO	YES
V_CBL-X	EXISTING COMMS CABLES	201	PHANTOM	0.25	MONO	YES
V_NAV	NAVIGATION EQUIPMENT	214	CONT	0.25	MONO	YES
V_OPTIC-N	PROPOSED FIBER OPTIC CABLE	192	PHANT2	0.70	MONO	YES
V_OPTIC-X	EXISTING FIBRE OPTIC CABLE	191	PHANT2	0.25	MONO	YES
V_PNT-N	PROPOSED VOICE/DATA POINT	YELLOW	CONT	0.35	MONO	YES
V_PNT-X	EXISTING VOICE/DATA POINT	9	CONT	0.18	MONO	YES
V_REM	REMOVED/OBSOLETE COMMS ITEMS	CYAN	DASH	0.25	MONO	YES

Table 13: Bridge and Marine Layer Category

BRIDGE/MARINE						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
B_ABUT	ABUTMENT	GREEN	CONT	0.5	MONO	YES
B_BOL	BOLLARD	GREEN	CONT	0.5	MONO	YES
B_BORE	BOREHOLES	YELLOW	CONT	0.25	MONO	YES
B_CENT	CENTRE LINE	RED	CENTRE	0.18	MONO	YES
B_CONC	CONCRETE	GREEN	CONT	0.5	MONO	YES
B_CONTH	CONCRETE THIN	RED	CONT	0.18	MONO	YES
B_CONTHK	CONCRETE THIC	GREEN	CONT	0.5	MONO	YES
B_CONMED	CONCRETE MED	YELLOW	CONT	0.25	MONO	YES
B_CONHIDTH	CONC HIDE THIN	RED	DASHED	0.18	MONO	YES
B_CONHIDTH	CONC HIDE THIC	YELLOW	DASHED	0.25	MONO	YES
B_CONCHIDM	CONC HIDE MED	WHITE	DASHED	0.35	MONO	YES
B_CONCHAT	CONC HATCH	RED	CONT	0.18	MONO	YES
B_CONCSHAD	CONC SHADE	11	GREYSCAL		GREY	YES
B_CONCSHAD	CONC SHADE	12	GREYSCAL		GREY	YES
B_CONCSHAD	CONC SHADE	13	GREYSCAL		GREY	YES
B_CONCPIPE	CONC PIPES	WHITE	CONT	0.35	MONO	YES
B_CONTT	CONTOUR INTER	RED	CONT	0.18	MONO	YES
B_CONTMN	CONTOUR MAIN	YELLOW	CONT	0.25	MONO	YES
B_CADAS	CADASTRALS	RED	CONT	0.18	MONO	YES

BRIDGE/MARINE						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
B_CAISS	CAISSONS	WHITE	CONT	0.35	MONO	YES
B_COORD	COORDINATES	YELLOW	CONT	0.25	MONO	YES
B_DECK	DECK SLAB	WHITE	CONT	0.35	MONO	YES
B_EXIST	EXISTING	RED	CONT	0.18	MONO	YES
B-FEND	FENDERS	WHITE	CONT	0.35	MONO	YES
B_FIREHYD	FIRE HYDRANT	WHITE	CONT	0.35	MONO	YES
B_GRID	GRID LINES	RED	CENTRE	0.18	MONO	YES
B_HAND	HANDRAILING	WHITE	CONT	0.35	MONO	YES
B_KEYPL	KEY PLAN	YELLOW	CONT	0.25	MONO	YES
B_LOGRID	LO GRIDLINES	RED	CONT	0.18	MONO	YES
B_MANH	MANHOLES	WHITE	CONT	0.35	MONO	YES
B_MASCAP	MASS CAPPING	WHITE	CONT	0.35	MONO	YES
B_PAVE	PAVING	WHITE	CONT	0.35	MONO	YES
B_PARA	PARAPETS	WHITE	CONT	0.35	MONO	YES
B_PCBEAM	PC BEAMS	WHITE	CONT	0.35	MONO	YES
B_PIER	PIERS	WHITE	CONT	0.35	MONO	YES
B_REINFTHN	REBAR THIN	RED	CONT	0.18	MONO	YES
B_REINFTHC	REBAR THICK	GREEN	CONT	0.5	MONO	YES
B_REINFMED	REBAR MEDIUM	WHITE	CONT	0.35	MONO	YES
B_REINFHIDT	REBAR HIDE THN	RED	DASHED	0.18	MONO	YES
B_REINFHIDM	REBAR HIDE MED	YELLOW	DASHED	0.25	MONO	YES
B_REINFDIM	REBAR DIMENS	RED	CONT	0.18	MONO	YES
B_STEEL	STEEL WORKS	WHITE	CONT	0.35	MONO	YES
B_SLTDRAIN	SLOT DRAIN	WHITE	CONT	0.35	MONO	YES
B_WGS	WGS84 GRID	RED	CONT	0.18	MONO	YES
B_WWALL	WING WALLS	WHITE	CONT	0.35	MONO	YES
B_RETWALL	RETAIN WALL	WHITE	CONT	0.35	MONO	YES
B_GEN1	GENERAL 0.18	RED	CONT	0.18	MONO	YES
B_GEN2	GENERAL 0.25	YELLOW	CONT	0.25	MONO	YES
B_GEN3	GENERAL 0.35	WHITE	CONT	0.35	MONO	YES
B_GEN4	GENERAL 0.5	GREEN	CONT	0.5	MONO	YES
B_GEN5	GENERAL 0.7	CYAN	CONT	0.7	MONO	YES

Table 14: Water Layer Category

WATER (CIVIL)						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
W_PROP1	OIL SEP/BLDGS	GREEN	CONT	0.5	MONO	YES
W_PROP2	STRUCTURES	GREEN	DASHED	0.5	MONO	YES
W_PROP3	PIPES	WHITE	CENTRE	0.5	MONO	YES
W_REBAR1	LAYOUT	WHITE	CONT	0.7	MONO	YES
W_REBAR2	REINFORCING	BLUE	CONT	0.7	MONO	YES
W_REBAR3	REINFORCING	BLUE	DASHED	0.7	MONO	YES
W_REBAR4	LAYOUT	WHITE	DASHED	0.7	MONO	YES

Table 15: Perway Layer Category

PERWAY LAYERS						
NAME	DESCRIPTION	COLOUR	LINE TYPE	LINE WEIGHT	PLOT STYLE	PLOT
P_CAT-G	CATTLE GRID	GREEN	CONT	0.25	MONO	YES
P_GEOT	GEOTECHNICAL DATA	WHITE	CONT	0.25	MONO	YES
P_GR-LAY	LAYERWORKS	35	CONT	0.25	MONO	YES
P_TACHY-T	TACHY TEXT	WHITE	CONT	0.25	MONO	YES
P_TACHY-L	TACHY LEVEL	WHITE	CONT	0.25	MONO	YES
P_TACHY-L	TACHY POINTS	WHITE	CONT	0.25	MONO	YES
P_RD-G	ROAD GRAVEL	41	DASHED	0.25	MONO	YES
P_RD-M	ROAD MAIN	WHITE	CONT	0.25	MONO	YES
P_RD-S	ROAD SIGNS	WHITE	CONT	0.25	MONO	YES
P_TR-DES	TRACK DESIGN	RED	CONT	0.25	MONO	YES
P_TR-CO	TRACK CO-ORDS	WHITE	CONT	0.25	MONO	YES
P_TR-F	TRACK FUTURE	ORANGE	CONT	0.25	MONO	YES
P_TR-C	TRACK CENTRE LINE	WHITE	CENTER	0.25	MONO	YES
P_TR-TO	TRACK TURNOUTS	WHITE	CONT	0.25	MONO	YES
P_TR-UP	TRACK UPLIFT	252	HIDDEN	0.25	MONO	YES
P_TR-S	TRACK SLEEPERS	WHITE	CONT	0.25	MONO	YES
P_TR-R	TRACK RAILS	WHITE	CONT	0.25	MONO	YES
P_TR-EQ	TRACK EQUIPMENT	WHITE	CONT	0.25	MONO	YES
P_TR-SUR	TRACK SURVEYED	WHITE	CONT	0.25	MONO	YES
P_TEL-T	CABLE ROUTE TELCOM	201	PHANTOM	0.25	MONO	YES
P_TEL-N	CABLE ROUTE NEOTEL	201	DIVIDE	0.25	MONO	YES
P_TEL-TR	CABLE ROUTE TRANSNET	201	DASHDOT	0.25	MONO	YES
P_SUBS-D	SUBSOIL DRAIN, GEOFABRIC,	111	CONT	0.25	MONO	YES

8.10 Section Lines

8.10.1 Section lines are to be as below. They are to be inserted as a block from the symbols library.



8.11 North Point

8.11.1 The North Point below is to be used. It is to be inserted as a block from the symbols library.



8.12 The Title Block

8.12.1 The Title Block must reflect the following information:

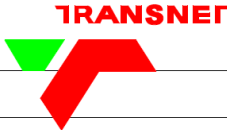
Transnet SOC Ltd <small>REG. NO. 1990/000900/30 (c/o Transnet Group Capital)</small> 237 MAHATMA GANDHI ROAD DURBAN P.O. BOX 1073, DURBAN																			
										TEL: 031 3611696 FAX: 0866 770815									
PORT OF DURBAN																			
PIER 2: PORT OF DURBAN																			
CONTAINER TERMINAL																			
CVR WORKSHOP																			
GROUND FLOOR PLAN																			
PROJECT NUMBER					OD	FBS	DIS	TYPE	DRAWING NO.					SHEET		REV	ID		
.					TD		
7 digit sequential number					Operating Division	Facility Breakdown Structure: sometimes referred to as WBS (Work Breakdown Structure)	Discipline	Document type	Sequential drawing number					Sheet number		Total number of sheets	Revision number	Originator of the drawing	
These will be supplied by Document Control																			

Figure 1: Title Block Format

8.13 Fields in the Signature Block

The Fields in the title block must reflect the following:

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
.	.	.	.	DRAWN	.	.	.
.	.	.	.	CHECKED	.	.	.
.	.	.	.	DESIGNED	.	.	.
.	.	.	.	CHECKED	.	.	.
.
OPERATING DIVISIONS				PR.ENG. / PR.TECH. / PR.ARCH			
TITLE	NAME	SIGN	DATE	NAME	DATE		
.	.	.	.	SIGNATURE	.		
.	.	.	.	REG. NUMBER	.		
.	.	.	.	SCALE :	A0		
Enter as Required				Signed by registered Professional			
Enter as Required				As Shown			

Figure 2: Fields in the Signature Block

8.14 Revised Drawings

8.14.1 All amendments to drawings must be clearly referenced and indicated on the original drawing together with the draughtperson's name and date.

8.14.2 The amendment block has provision for a checker's signature, an approval signature and a date.

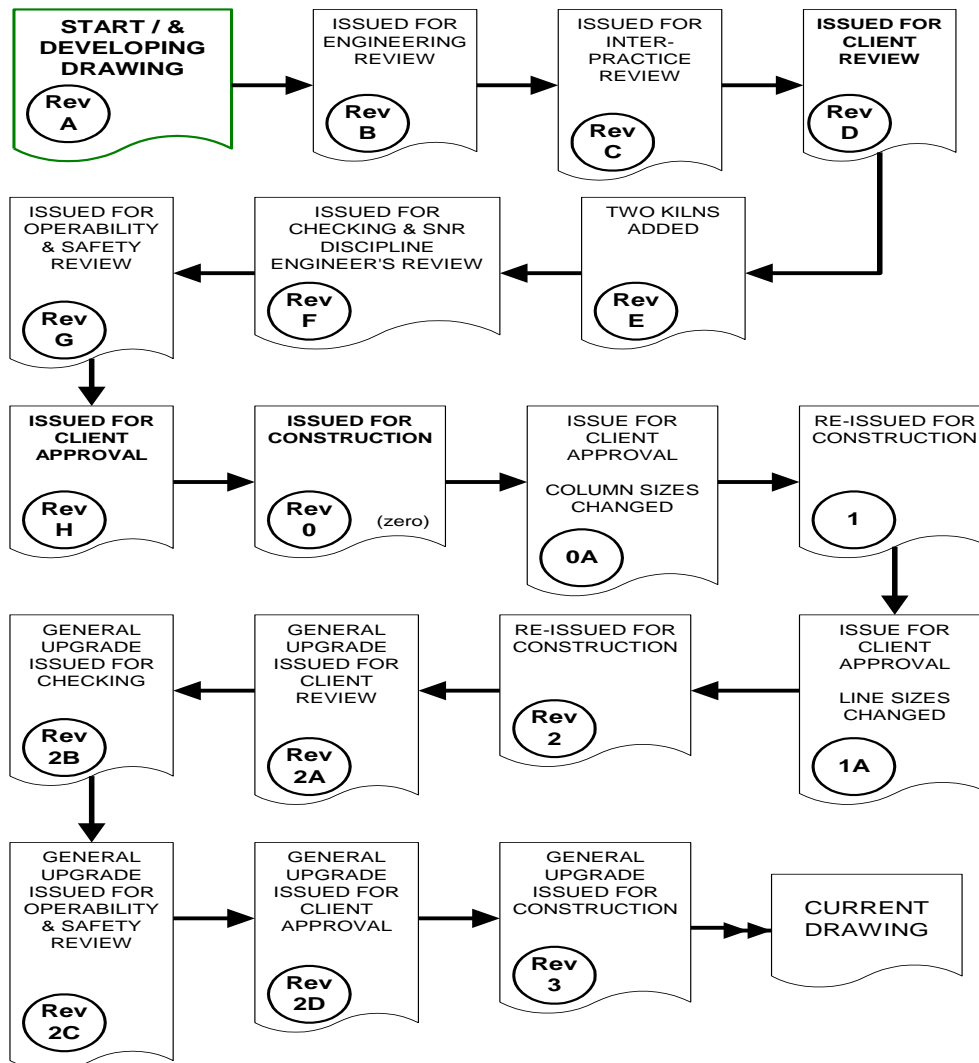


Fig 3: Drawing Numbering Sequence

Drawings and amendments to drawings shall be indexed as follows and as reflected in Fig. 3 above:

- 8.14.3 Internal TGC and Client issue (Squad Checks, Client Approval/s, Gate Review) and Issued for Tender shall be in alphabetical sequence marked with the applicable review description.
- 8.14.4 Construction drawings: No. to be numerical ie.: 0, 1, 2, 3 etc.
- 8.14.5 As built drawings: ZZ
- 8.14.6 All drawings shall have the revision raised to the next applicable revision reference (as stated above) which shall be inserted in the revision box of the drawing title block before any drafting is started.
- 8.14.7 Previously revised drawings to be saved as and re-named to reflect the current revision number. Revisions to be noted from bottom to top and previous revision clouds to be removed from drawings.

[illegible]

Figure 4: Revisions in the Title Block

8.15 Revision & Hold Clouds

8.15.1 All revised aspects on a drawing must be annotated by means of a "Revision" cloud wherever practical and a triangle with the revision number therein.

8.15.2 "Hold" clouds should be used wherever applicable and practical to indicate hold status within the drawing.

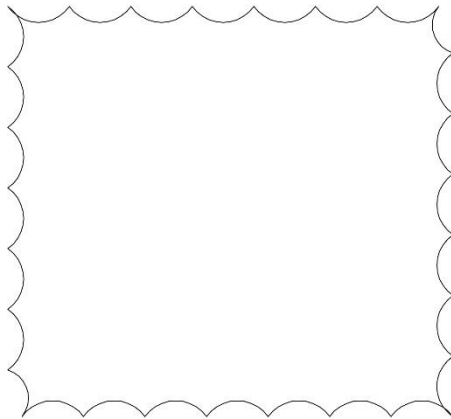


Figure 5: "Hold" Cloud

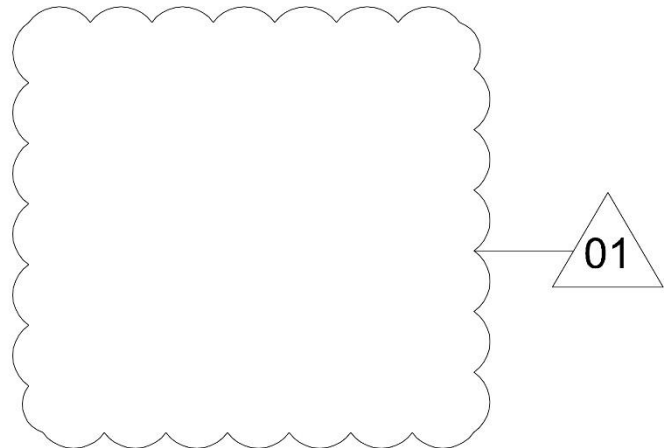


Figure 6: "Revision" Cloud

8.16 Reference Drawings

Drawing number as reflected in drawing title.

Drawing description as per general drawing description in title block.

<p>As per general drawing description in title block</p> <p>As reflected in drawing title</p>	<table border="1"> <tr> <td data-bbox="351 1462 510 1762">DRAWING NO.</td> <td data-bbox="510 1462 917 1762">DRAWING DESCRIPTION</td> </tr> <tr> <td colspan="2" data-bbox="351 1762 917 1762">REFERENCE DRAWINGS</td> </tr> </table>	DRAWING NO.	DRAWING DESCRIPTION	REFERENCE DRAWINGS		<p>NOTES</p> <p>1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.</p> <p>2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.</p> <p>Consultant's logo and information if required</p>
	DRAWING NO.	DRAWING DESCRIPTION				
REFERENCE DRAWINGS						

Figure 7: Reference Drawings

8.17 Key Plan usage

8.17.1 Key plans for different areas in the project are provided and should be referenced in. This approach allows any changes to the key plan to appear immediately on all drawings plotted from that point on.

Note: The drawing subject area is to be hatched on the current drawing.

8.18 Symbols and abbreviations

8.18.1 For Standard symbols Refer to:

- SANS 10143: Building drawing practice
- BBB0041: Preparation of drawings for Transnet Freight Rail
- SANS 1044: Welding Part II: Symbols
- BS 3939: Graphical symbols for electrical power, telecommunications and electronic diagrams
- Z148: Symbols for Signalling

8.18.2 If it is necessary to use symbols which are not standard national symbols, or located on the Transnet template, a new symbol may be created with its description tabled on the applicable drawing.

8.19 Identification of Views

All views shall be identified in the following format:

8.19.1 The two main forms of projection shall be used namely third and first angle projection.

8.19.2 Indicate scale only if scale varies from title block scale.

8.19.3 Reference to a drawing where a section or a detail was taken is required if the view is shown on another drawing.

8.19.4 Letters shall be used for details. Numbers shall be used for elevations and sections. Do not use letters "I" and "O"

Table 16: Identification of Views

Type	Format	Example
Details	Alpha	DETAIL A
Section	Numeric	SECTION 1
View	Alpha	VIEW X
Items	Alpha	ITEM A – TROLLEY FRAME

9 RECORDS

- 9.1 All documents generated under this procedure, shall be retained in terms of the Document Management Procedure for Records Retention Archiving of Hard Copy Documents – DOC-P-0013.

10 REVIEW CYCLE

This document to be reviewed within:

6 months

1 year

2 years

3 years

X

11 ANNEXURES

Not Applicable.