



Maha Metro Rail Project



Category 1 Standard Computer Aided Design (CAD) Data

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1 Purpose

- 1.1 The purpose of this standard is to define requirements for data contained within, and Meta-data associated with, Computer Aided Design (CAD) files.

2 Scope

- 2.1 This standard applies to CAD data and meta-data captured, created or generated by MMRCL or on behalf of MMRCL by its Suppliers.

3 Requirements

3.1 General requirements

- 3.1.1 CAD files shall be delivered in Bentley's v8i DGN / DWG (Acad 2014 or Newer) file format.
- 3.1.2 Designs that have been developed using other CAD file formats, shall:
- a) Have layers, line-types, line-weights, fonts and colors mapped to those fully Compatible with Bentley's v8i DGN / DWG (Acad 2014 or Newer) file format; and
- 3.1.3 Ownership of the data contained within CAD files shall be clear. (As per EIR)
- 3.1.4 CAD files meta-data, defined within 3.2.9 shall be displayed in both electronic and printed form.
- 3.1.5 Where CAD layers (see 3.10) are required, but not supplied by MMRCL, these shall be added to the contracted organization's library.
- 3.1.6 Each contracted organization is responsible for the entire content of their CAD files.
- 3.1.7 Each contracted organization is responsible for ensuring their CAD files are compliant with this standard.

3.2 CAD File requirements

- 3.2.1 CAD file requirements shall apply to model files, composite models and drawing Definition files.
- 3.2.2 Document numbers shall be assigned following the CAD file naming convention (see 3.9). (See EIR)
- 3.2.3 CAD files shall carry the meta-data, 'Created', to identify the author at each revision.
- 3.2.4 CAD files shall carry the meta-data, 'Approved', to identify the approver at each revision.
- 3.2.5 CAD files shall carry the meta-data, 'Authorised', to identify who has accepted each revision, on behalf of MMRCL.
- 3.2.6 Custom line styles shall use a scale factor of 1 (one) and be delivered to MMRCL within a



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design library file.

3.2.7 A tag shall be placed in each CAD file containing the following mandatory file meta-data:

| | Field | Clause |
|----|--------------------------------|---------------------------------|
| a) | Project | As per Naming Convention in EIR |
| b) | Owner Organization | As per Naming Convention in EIR |
| c) | Asset Class | As per Naming Convention in EIR |
| d) | Location (LCS Level 1) / Level | As per Naming Convention in EIR |
| e) | Suitability | 3.7.2 |
| f) | Revision | 3.7.3 |
| g) | Drawing Number | 3.2.2 |
| h) | Created (Author) | 3.2.3/4.1 |
| i) | Approved | 3.2.4/4.2 |
| j) | Authorized | 3.2.5/4.3 |
| k) | Title | 3.3.1/3.4.1 |

Notes: Tags containing fields for the mandatory file meta-data will be supplied by the Client.

3.2.8 Additional mandatory meta-data shall be captured against the CAD file (but not placed within the file), as shown in the table below:

| | Field | Clause |
|----|-------------------------------------------|---------------------------------|
| a) | Level | As per Naming Convention in EIR |
| b) | Type (of information) | As per Naming Convention in EIR |
| c) | Organizational Role | As per Naming Convention in EIR |
| d) | Number | As per Naming Convention in EIR |
| e) | Pathway Project Code (supplied by Client) | N/A |
| f) | Lifecycle Stage | 3.6 |

3.2.9 Should CAD files pass through an environment that cannot track meta-data (MS Windows, CD, email etc.) then the mandatory file meta-data shall be delivered with the associated CAD files, within an approved import / export spread sheet.



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3.2.10 CAD files shall have file settings set to the values shown below:

| | Setting | Value |
|----|-------------------------------------------------------------------------------------------|-------------------------------|
| a) | 2D Global Origin offset from Design Plane Centre (excludes Drawing Definition files (DR)) | -214748.3648, -214748.3648 |
| b) | 3D Global Origin offset from Design Plane Centre (excludes Drawing Definition files (DR)) | -214748.3648, -214748.3648, 0 |
| c) | Resolution | 10000 per Distance Meter |
| d) | Working units - Accuracy | 0.1234 |
| | Spatial Data | |
| e) | Working units - Master units | Meters (label m) |
| f) | Working units - Sub units | Millimeters (label mm) |
| | Non-Spatial Data | |
| g) | Working units - Master units | Millimeters (label mm) |

3.3 Model files requirements (Please also see detailed EIR)

- 3.3.1 All model files (including Composite Models) shall be given a title to identify the contents, captured as file meta-data.
- 3.3.2 Model files (including Composite Models) shall contain a single model design only.
- 3.3.3 Elements shall be placed in the model file at a scale of 1:1.
- 3.3.4 All references within Model Files shall have display turned off when issued to MMRCL.

3.4 Drawing definition requirements

- 3.4.1 All drawing definition files shall be given a title to identify the contents, captured as file meta-data.
- 3.4.2 Drawings shall be composed through the use of a 'Drawing Definition File', which contains only the relevant annotation, dimensions etc. with all design information attached as reference file(s), via a composite model (with the exception of schematics and details) (see 7.1).
- 3.4.3 Drawing definition CAD files shall contain a single drawing definition only.
- 3.4.4 Drawing borders shall be referenced in the sheet model at a scale of 1:1.



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- 3.4.5 Annotation, dimensioning etc. shall be placed on presentational CAD layers as defined in 3.13.8.
- 3.4.6 Dimensions shall be associative for all 'drawn to scale'.
- 3.4.7 Non-displaying references shall be detached prior to being issued to MMRCL.

Note: i. Wherever possible (e.g. for 'drawn to scale' design drawings), dimensioning should be associative. Indicative or not to scale dimensions should have, 'NTS' placed next to them

3.5 Presentational requirements

- 3.5.1 Fonts for texts : ISOCP and ARIAL
The texts width factor cannot be changed. Italics not to be used
The texts must be in « TEXT » layer

- 3.5.2 Text shall be written in sentence case.

- 3.5.3 Text height shall conform to BS EN ISO 3098.

- Text heights (For A1 sheet)
2.0mm, 2.5 mm and 3.5 mm: Dimensional text & General text, Notes.

5.0 mm: Normal titles

7.0 mm: Major titles

The recommended minimum text height is 2.5mm or 3.5mm for A1 drawings in case these need to be printed in A3 size also.

- Text heights (For A3 sheet)
1.8mm, Dimensional text & General text, Notes.

2.5 mm: Normal titles

3.5 mm: Major titles

- 3.5.4 All measurements (dimensions, volumes, weights etc.) shall be expressed using units based on the metric system (international system of units, SI).

Dimensions

- All dimensions shall be associative.
- Unit is millimeter
- The styles are the styles defined in the template file and shall not be modified.
- The dimensions must be in layer « DIM »
- The dimensions with forced values are not allowed.

- 3.5.5 Scales used on drawings shall confirm to BS EN ISO 5455, preferred scales shown below:



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| Recommended Metric Scales | | |
|---------------------------|--------|---------|
| 1:2 | 1:5 | 1:10 |
| 1:20 | 1:50 | 1:100 |
| 1:200 | 1:500 | 1:1000 |
| 1:250 | 1:5000 | 1:1250 |
| 1:2000 | | 1:10000 |
| 1:2500 | | |

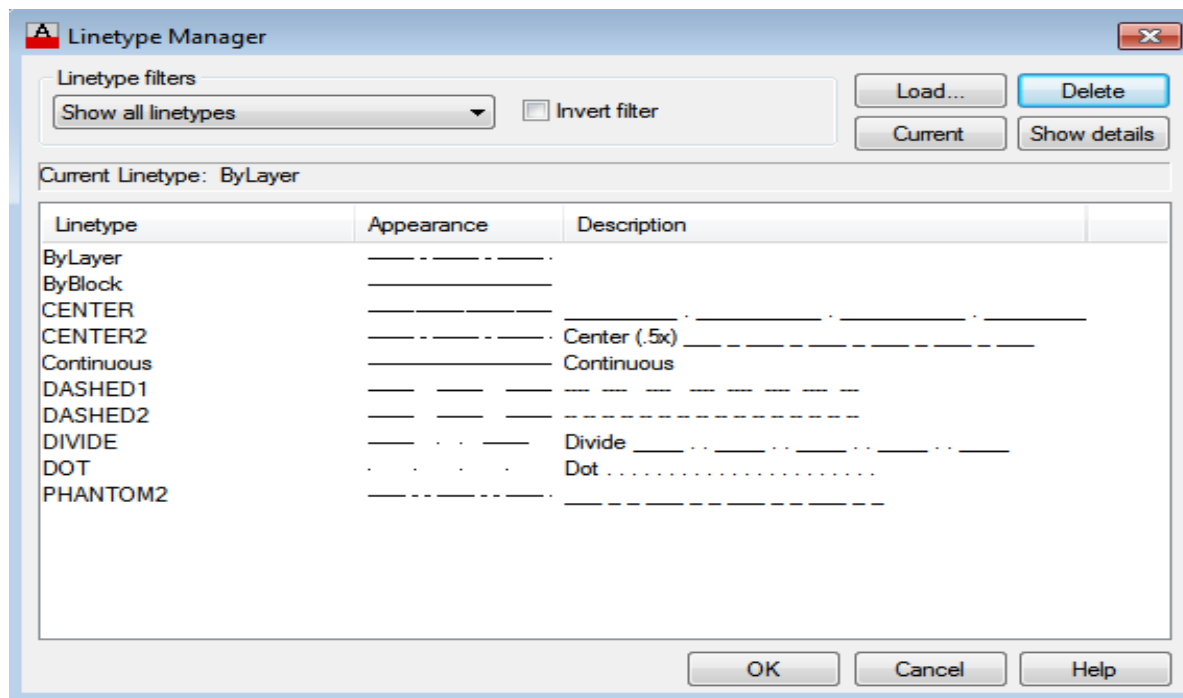


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3.5.6 Terms and abbreviations not defined shall be clearly defined on the associated drawing sheet.

3.5.7 Line types

- They shall conform to the file of line types located in Support directory of the project
- The scale of the line types shall be 1 whatever paper space scale is used
- Line Styles will be accordance with the style defined in the CAD Modele.dwt file.the for example :



3.5.8 Frame and title Block

- Layout will be composed of two parts.

First, a block containing the attributes of the drawing: Titles, numbers, dates ...and a table with the list of all Xref used to produce the drawing.

The second part will be a reference file containing the non-amendable objects of the drawing: Frame, logos, Project name

- These two parts will be set in the paper space, at scale 1=1 mm.
- The block will not be split.
- The reference file of the Title Block will not be merged.
- Only one title block in one file is permitted.
- One File = One Paper space drawing = One Title block



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3.5.9 Drawing sheets shall state clearly the following information:

- | | |
|-------------------------|---------------------|
| a) Asset Classification | g) Purpose of Issue |
| b) Drawing number | h) Revision |
| c) File name | i) Scale(s) |
| d) Location | j) Suitability |
| e) Originator | k) Title |
| f) Project | |

3.5.10 Drawing definitions shall be presented to allow drawing renditions and printed drawings to be derived as an exact copy.

Note: i. If drawing renditions / printed drawings are intended to be displayed as monochrome, the drawing definition shall be presented in monochrome, not color.

3.6 Lifecycle stages

3.6.1 CAD files shall carry the meta-data of 'Lifecycle Stage', to indicate the stage within the Project that the contained information has been approved for use.

3.6.2 One of the following Lifecycle Stages shall be used:

- Initiation
- Concept Stage
- Preliminary Stage
- Detailed Design Stage
- Construction (Installation)
- Handover
- Operations and Maintenance

3.7 Status

3.7.1 CAD files shall be assigned a status, consisting of:

- a) Suitability (see 3.7.2); and
- b) Revision (see 0).



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3.7.2 Suitability Status

3.7.2.1 CAD files shall carry the meta-data of 'suitability', to indicate the approved use of the contained information.

3.7.2.2 Suitability codes shall be one or two alpha-numeric and shall be reserved for use with a specific phase of the collaboration process, as defined in the table below:

| | Code | Description | Model Files | Drawing Renditions |
|-------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------|
| Work in Progress (Non-Contractual) | | | | |
| | S0 | Non Verified Design The File is in Work in Progress, not be shared with others | yes | yes |
| Shared (Non-Contractual) | | | | |
| | S01 | Coordination (for Use) The file is shared and can be used by others for the purpose of design coordination and / or MMRCL acceptance | yes | yes |
| | S02 | For Comment The file is shared and is to only be used, by others, to identify and communicate potential impacts of the change to the design | yes | yes |
| Published (Contractual) | | | | |
| | GFC | Good for Construction The file contents has been accepted and verified by MMRCL for construction purposes. | yes | yes |
| | AB | As Built The file contents have been accepted by MMRCL, as being verified as to what has been built/ installed. | yes | yes |

Note: i. 'As Surveyed' and 'As Designed' are additional to the requirements of BS1192. 'For Information' has been removed to prevent ambiguity around the suitability of use of that data / information.



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3.7.3 Revision

- 3.7.3.1 CAD files shall carry the meta-data of 'revision', indicating the issue sequence of the contained information.
- 3.7.3.2 as with suitability codes, different sets of revision codes shall be reserved for use within each section of the defined Common Data Environment (CDE) process.
- 3.7.3.3 Within 'Work in Progress', preliminary revisions shall be 1.1, 1.2, or 2.1, 2.2, etc. The suffix (.1, .2 etc.) is known as a 'minor version' and shall be used to track the iterative progress of the file prior to being approved for sharing.
- 3.7.3.4 CAD files approved for sharing shall carry a preliminary revision, 1.0, 2.0, 3.0, etc.

3.8 CAD File & layer naming

- 3.8.1 Names assigned with CAD files and layers within the CAD file shall be created by joining together codes in the specified fields, in the specified order, using only the "-" Hyphen character, which is therefore not allowed in any code.
- 3.8.2 The only exceptions to 3.10.1 shall be the codes for 'level' and 'description' which are appended following an underscore "_".
- 3.8.3 Codes shall be selected from field codes (defined within 3.13).
- 3.8.4 Codes shall not imply meaning that may be duplicated in other fields.
- 3.8.5 Characters shall be uppercase.
- 3.8.6 Codes shall be generated and governed by the MMRCL CAD Support Team.

Notes: i. CAD files and layer naming is compliant with BS1192.
See 3.9 and 3.10.

3.8 CAD File naming convention

Please refer to EIR Documents for File Naming Convention.



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3.10 CAD Layer naming convention

- 3.10.1 Layer names within CAD files shall be composed by joining the fields shown in the table below:



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3.10.1 Examples of CAD Layers Discipline-wise (Final shall be as per Project requirement) :- CAD layers (Architecture)

| LAYER NAME | LINE & COLOUR | PEN LINE WEIGHT (CTB) | DESCRIPTION | LAYER NAME | LINE & COLOUR | PEN LINE WEIGHT (CTB) | DESCRIPTION |
|--------------------|---------------|-----------------------|--------------------------|--------------------|---------------|-----------------------|----------------------------------|
| C_SOUTH_X | 7 | 0.1 | | ARC_FLOORING | 50 | 0.13 | flooring |
| ARC_AROVE | 8 | 0.10 | above | ARC_FURNITURE | 152 | 0.09 | furniture |
| ARC_BELOW | 60 | 0.13 | below | ARC_GLASS | 142 | 0.13 | glass |
| ARC_COLUMN | 151 | 0.30 | column | ARC_GRASS | 100 | 0.15 | grass |
| ARC_CON-CH_S | 90 | 0.15 | concrete height | ARC_GRID | 240 | 0.10 | grid |
| ARC_CON-CUT_S | 130 | 0.3 | concrete cut | ARC_GRID 100 | 255 | 0.1 | grid dimensioning in scale 1:100 |
| ARC_CON-VIEW_S | 180 | 0.2 | concrete view | ARC_GRID 200 | 255 | 0.1 | grid dimensioning in scale 1:200 |
| ARC_CUTOUT | 100 | 0.15 | slab cutout | ARC_GRID 25 | 255 | 0.1 | grid dimensioning in scale 1:25 |
| ARC_D-WALL | 4 | 0.30 | wall | ARC_GRID 50 | 255 | 0.1 | grid dimensioning in scale 1:50 |
| ARC_DOOR | 140 | 0.25 | door view | ARC_GRID TAG | 255 | 0.1 | grid tags |
| ARC_DOOR TAG | 255 | 0.1 | door tag | ARC_HIDDEN | 255 | 0.1 | hidden |
| ARC_ELEV 1 | 251 | 0.4 | elevations | ARC_LANDSCAPE | 250 | 0.05 | landscape |
| ARC_ELEV 2 | 131 | 0.35 | elevations | ARC_LEVEL | 255 | 0.1 | level symbol |
| ARC_ELEV 3 | 52 | 0.05 | elevations | ARC_MELT-CUT_S | 42 | 0.3 | metal sectional structure |
| ARC_ELEV 4 | 51 | 0.15 | elevations | ARC_MELT-PROJECT_S | 31 | 0.15 | metal structure projection |
| ARC_ELEV 5 | 53 | 0.13 | elevations | ARC_MELT-VIEW_S | 21 | 0.13 | metal structure with a view |
| ARC_ELEV 6 | 255 | 0.05 | elevations | ARC_PARKING | 9 | 0.13 | parking |
| ARC_ELEVATION | 90 | 0.15 | elevations | ARC_PEDESTRIAN | 91 | 0.15 | pedestrian |
| ARC_ESCALATOR | 1 | 0.25 | escalator equipments | ARC_RAILING | 230 | 0.13 | railing |
| ARC_FINISHES | 201 | 0.13 | finishes | ARC_RAMP | MEGENTA | 0.13 | ramp |
| ARC_FITURES | 152 | 0.05 | fitures | ARC_ROC WALL | 4 | 0.30 | roc wall |
| LAYER NAME | LINE & COLOUR | PEN LINE WEIGHT (CTB) | DESCRIPTION | LAYER NAME | LINE & COLOUR | PEN LINE WEIGHT (CTB) | DESCRIPTION |
| ARC_REVISION CLOUD | 255 | 0.1 | revision cloud | HATCH 3_ARC | 41 | 0.05 | hatching equipment room |
| ARC_ROOF | 90 | 0.15 | roof | INSERT | 5 | 0.01 | insert |
| ARC_ROOM TAG | 255 | 0.1 | tag | MARK1 | 10 | 0.05 | marking |
| ARC_RWP | 153 | 0.13 | rain water pipe | PHOTOWS | 90 | 0.15 | |
| ARC_SERVICES | BLUE | 0.13 | services | TEXT 100_ARC | 255 | 0.1 | text in scale 1:100 |
| ARC_SITE | YELLOW | 0.15 | site | TEXT 200_ARC | 255 | 0.1 | text in scale 1:200 |
| ARC_STAIRCASE | 100 | 0.15 | staircase view | TEXT 25_ARC | 255 | 0.1 | text in scale 1:25 |
| ARC_TAG | 255 | 0.1 | tag | TEXT 50_ARC | 255 | 0.1 | text in scale 1:50 |
| ARC_TREE1 | 100 | 0.15 | trees above 3m. ht. | TEXT 500_ARC | 255 | 0.1 | text in scale 1:500 |
| ARC_TREE2 | 100 | 0.15 | trees below 3m. ht. | TITLE_BLOCK | 7 | 0.35 | title block |
| ARC_WALL | 34 | 0.30 | wall | XREFS | 7 | 0.25 | xrefs |
| ARC_WINDOW TAG | 255 | 0.1 | window tag | ARC_CLNG | 251 | 0.25 | ceiling information |
| ARC_WIND_S | 151 | 0.1 | window | ARC_CLNG_GRID | 255 | 0.1 | ceiling grid |
| DM 100_ARC | 255 | 0.1 | dimension in scale 1:100 | ARC_CLNG_OPEN | 5 | 0.25 | ceiling/roofs penetrations |
| DM 200_ARC | 255 | 0.1 | dimension in scale 1:200 | ARC_CLNG_PATT | 201 | 0.13 | ceiling patterns |
| DM 25_ARC | 255 | 0.1 | dimension in scale 1:25 | ARC_CLNG_LITE | 152 | 0.05 | light fixtures |
| DM 50_ARC | 255 | 0.1 | dimension in scale 1:50 | ARC_CLNG_MECH | 152 | 0.05 | supply/return diffusers |
| DM 500_ARC | 255 | 0.1 | dimension in scale 1:500 | ARC_CLNG_SYMB | 255 | 0.1 | symbols |
| HATCH 1_ARC | 51 | 0.05 | hatching trade zone | | | | |



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3.10.2 CAD layers (Architecture Landscaping)

| LAYER NAME | LINE & COLOUR | PPM LINE WEIGHT (CTR) | LAYER NAME | LINE & COLOUR | PPM LINE WEIGHT (CTR) |
|------------------------|---------------|-----------------------|-------------------|---------------|-----------------------|
| LW_DOLLARD LIGHT-1 | 212 | 0.15 | LW_ARROW-1 | 32 | 0.15 |
| LW_DOLLARD LIGHT-2 | 215 | 0.15 | LW_ARROW-2 | 32 | 0.15 |
| LW_DOLLARD LIGHT-3 | 214 | 0.15 | LW_FAVIR-1 | 30 | 0.15 |
| LW_FLOOD LIGHT-1 | 155 | 0.15 | LW_FAVIR-2 | 40 | 0.15 |
| LW_FLOOD LIGHT-2 | 203 | 0.15 | LW_CONTOUR-1 | 34 | 0.15 |
| LW_FOUNTAIN LIGHTS-1 | 222 | 0.15 | LW_CONTOUR-2 | 34 | 0.15 |
| LW_FOUNTAIN LIGHTS-2 | 224 | 0.15 | LW_FURNITURE-1 | 245 | 0.15 |
| LW_STREET LIGHT-1 | 190 | 0.15 | LW_FURNITURE-2 | 225 | 0.15 |
| LW_STREET LIGHT-2 | 228 | 0.15 | LW_STEP-1 | 30 | 0.15 |
| LW_SHRUB-1 | 82 | 0.05 | LW_STEP-2 | 30 | 0.15 |
| LW_SHRUB-2 | 82 | 0.05 | LW_FEDRUS-1 | 201 | 0.15 |
| LW_SHRUB-3 | 82 | 0.05 | LW_FEDRUS-2 | 201 | 0.15 |
| LW_SHRUB-4 | 82 | 0.05 | LW_VEHICLE-1 | 207 | 0.15 |
| LW_TICTORIAL PLANTS-1 | 80 | 0.05 | LW_VEHICLE-2 | 165 | 0.15 |
| LW_TICTORIAL PLANTS-2 | 80 | 0.05 | LW_FOUNTAIN-1 | 1 | 0.15 |
| LW_WIND BREAK HEDGES-1 | 80 | 0.05 | LW_FOUNTAIN-2 | 180 | 0.15 |
| LW_WIND BREAK HEDGES-2 | 82 | 0.05 | LW_WATER BODY-1 | 180 | 0.15 |
| LW_WIND BREAK HEDGES-3 | 88 | 0.05 | LW_WATER BODY-2 | 180 | 0.15 |
| LW_BUSHES-1 | 82 | 0.05 | LW_ELEV 1 | 201 | 0.25 |
| LW_BUSHES-2 | 82 | 0.05 | LW_ELEV 2 | 1 | 0.25 |
| LW_BUSHES-3 | 82 | 0.05 | LW_ELEV 3 | 1 | 0.25 |
| LW_TREE-1 | 104 | 0.05 | LW_ELEV 4 | 155 | 0.25 |
| LW_TREE-2 | 88 | 0.05 | LW_ELEV 5 | 167 | 0.15 |
| LW_FIXED PLANTERS-1 | 24 | 0.05 | LW_BUILDING BLOCK | 1 | 0.25 |
| LW_FIXED PLANTERS-2 | 20 | 0.05 | LW_SAND FILL-1 | 40 | 0.15 |
| LW_WOOD WORK-1 | 34 | 0.15 | LW_SAND FILL-2 | 44 | 0.15 |
| LW_WOOD WORK-2 | 34 | 0.15 | LW_SAND FILL-3 | 38 | 0.15 |
| LW_WOOD WORK-3 | 28 | 0.15 | LW_GRAVEL FILL-1 | 40 | 0.15 |
| LW_STONE WORK-1 | 14 | 0.15 | LW_GRAVEL FILL-2 | 44 | 0.15 |
| LW_STONE WORK-2 | 18 | 0.15 | LW_TAG-1 | 7 | 0.25 |
| LW_METAL WORK-1 | 181 | 0.15 | LW_TAG-2 | 7 | 0.25 |
| LW_METAL WORK-2 | 200 | 0.15 | LW_TAG-3 | 7 | 0.25 |
| LW_SEATING-1 | 241 | 0.15 | LW_ARE | 1 | 0.25 |
| LW_SEATING-2 | 221 | 0.15 | LW_REVISION CLOUD | 7 | 0.25 |
| LW_SEATING-3 | 181 | 0.15 | LW_LEVEL-1 | 7 | 0.25 |
| LW_PVC WORK | 160 | 0.15 | LW_LEVEL-2 | 7 | 0.25 |
| LW_CURBED BLOCK | 21 | 0.25 | LW_BREAK LINE | 7 | 0.25 |
| LW_PANDOLA | 21 | 0.15 | LW_MATCH LINE | 7 | 0.25 |
| LW_TRELLIS-1 | 213 | 0.05 | LW_SPH LIGHT | 205 | 0.15 |
| LW_CANYONS WORK | 88 | 0.15 | 20515 | 7 | DEFAULT |
| LW_KINGDS UMBRELLA | 18 | 0.15 | LW_DIM 5_ARC | 7 | 0.25 |
| LW_ROC WORK-1 | 171 | 0.25 | LW_DIM 10_ARC | 7 | 0.25 |
| LW_ROC WORK-2 | 175 | 0.25 | LW_DIM 20_ARC | 7 | 0.25 |
| LW_ROC WORK-3 | 196 | 0.25 | LW_DIM 25_ARC | 7 | 0.25 |
| LW_EMBANKMENT WORK_1 | 24 | 0.15 | LW_DIM 30_ARC | 7 | 0.25 |
| LW_EMBANKMENT WORK_2 | 32 | 0.15 | LW_DIM 40_ARC | 7 | 0.25 |
| LW_EMBANKMENT WORK_3 | 14 | 0.15 | LW_DIM 100_ARC | 7 | 0.25 |
| LW_DRAINAGE-1 | 211 | 0.15 | LW_DIM 200_ARC | 7 | 0.25 |
| LW_DRAINAGE-2 | 203 | 0.15 | LW_DIM 300_ARC | 7 | 0.25 |
| LW_VEHICLE GATE | 1 | 0.05 | LW_DIM 300_ARC | 7 | 0.25 |
| LW_FOOTPATH GATE | 1 | 0.05 | LW_DIM 400_ARC | 7 | 0.25 |
| LW_ROAD BARRIERS | 162 | 0.15 | LW_DIM 1000_ARC | 7 | 0.25 |
| LW_BOUNDARY | 12 | 0.35 | LW_DIM 2000_ARC | 7 | 0.25 |
| LW_SIGNAGE-1 | 201 | 0.15 | LW_DIM 5000_ARC | 7 | 0.25 |
| LW_SIGNAGE-2 | 181 | 0.15 | LW_HIDDEN LINE 1 | 201 | 0.25 |
| LW_RAMP | 32 | 0.15 | LW_HIDDEN LINE 2 | 201 | 0.25 |
| LW_WALKWAY-1 | 30 | 0.15 | LW_HATCH-1 | 201 | 0.15 |
| LW_WALKWAY-2 | 30 | 0.15 | LW_HATCH-2 | 200 | 0.15 |
| LW_WALKWAY-3 | 34 | 0.15 | LW_HATCH-3 | 36 | 0.15 |
| LW_AREA1 | 1 | 0.25 | LW_HATCH-4 | 30 | 0.15 |
| LW_AREA2 | 2 | 0.25 | LW_HATCH-5 | 151 | 0.15 |
| LW_AREA3 | 3 | 0.25 | LW_HATCH-6 | 135 | 0.15 |
| LW_GRASS-1 | 82 | 0.15 | LW_HATCH-7 | 151 | 0.15 |
| LW_GRASS-2 | 62 | 0.15 | LW_HATCH-8 | 151 | 0.15 |
| TEXT1_LW | 7 | 0.25 | LW_HATCH-9 | 151 | 0.15 |
| TEXT2_LW | 7 | 0.25 | LW_HATCH-10 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-11 | 151 | 0.15 |
| TEXT350_LW | 7 | 0.25 | LW_HATCH-12 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-13 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-14 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-15 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-16 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-17 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-18 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-19 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-20 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-21 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-22 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-23 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-24 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-25 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-26 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-27 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-28 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-29 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-30 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-31 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-32 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-33 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-34 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-35 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-36 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-37 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-38 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-39 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-40 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-41 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-42 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-43 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-44 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-45 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-46 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-47 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-48 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-49 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-50 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-51 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-52 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-53 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-54 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-55 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-56 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-57 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-58 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-59 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-60 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-61 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-62 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-63 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-64 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-65 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-66 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-67 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-68 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-69 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-70 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-71 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-72 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-73 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-74 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-75 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-76 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-77 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-78 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-79 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-80 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-81 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-82 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-83 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-84 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-85 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-86 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-87 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-88 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-89 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-90 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-91 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-92 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-93 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-94 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-95 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-96 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-97 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-98 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-99 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-100 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-101 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-102 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-103 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-104 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-105 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-106 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-107 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-108 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-109 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-110 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-111 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-112 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-113 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-114 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-115 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-116 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-117 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-118 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-119 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-120 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-121 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-122 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-123 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-124 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-125 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-126 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-127 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-128 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-129 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-130 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-131 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-132 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-133 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-134 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-135 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-136 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-137 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-138 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-139 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-140 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-141 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-142 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-143 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-144 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-145 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-146 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-147 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-148 | 151 | 0.15 |
| TEXT300_LW | 7 | 0.25 | LW_HATCH-149 | 151 | |



Maha Metro Rail Project

3.10.3 CAD layers (Electrical)

| LAYER NAME | LINE & COLOUR | LINE WEIGHT | LAYER NAME | LINE & COLOUR | LINE WEIGHT |
|--------------------|---------------|-------------|-----------------------|---------------|-------------|
| 0_BDORTH0_X | WHITE | 0.15 | EL_S&T TRENCH (2) | 240 | 0.05 |
| DIM_EL | WHITE | 0.15 | EL_SB NO. | 175 | 0.13 |
| EL_ARROW | 9 | 0.13 | EL_SECTION | 252 | 0.05 |
| EL_BMS TRAY | 172 | 0.20 | EL_SKT-E | 80 | 0.13 |
| EL_BMS TRAY HATCH | 172 | 0.20 | EL_SKT H-N | 140 | 0.13 |
| EL_BUS DUCT | RED | 0.20 | EL_SKT L-N | 200 | 0.13 |
| EL_CABLE ROUTE | 226 | 0.13 | EL_SKT M-N | 30 | 0.13 |
| EL_CIRCUIT | 200 | 0.13 | EL_SLD | 80 | 0.13 |
| EL_CIRCUIT-B | BLUE | 0.13 | EL_SLD FEEDER | 10 | 0.15 |
| EL_CIRCUIT-E | 100 | 0.13 | EL_SLD LOAD SHEET | 9 | 0.13 |
| EL_CIRCUIT-R | 20 | 0.13 | EL_SWITCH BOARD | WHITE | 0.15 |
| EL_CIRCUIT-Y | 30 | 0.13 | EL_SYMBOL | 153 | 0.09 |
| EL_CONDUIT | 11 | 0.15 | EL_TRAY DATA | CYAN | 0.20 |
| EL_CONDUIT-E | MEGENTA | 0.18 | EL_TRAY DATA (1) | 150 | 0.20 |
| EL_CUTOUT | 210 | 0.13 | EL_TRAY DATA (2) | 152 | 0.05 |
| EL_EARTH-B | 40 | 0.20 | EL_TRAY LADDER (1) | 42 | 0.05 |
| EL_EARTH-N | BLUE | 0.13 | EL_TRAY LADDER (2) | 43 | 0.05 |
| EL_EARTH-STRIP | 150 | 0.20 | EL_TRAY LAYOUT | RED | 0.20 |
| EL_EARTH MAT | 70 | 0.20 | EL_TRAY LT (1) | 44 | 0.20 |
| EL_EARTH ELECTRODE | 54 | 0.20 | EL_TRAY LT (2) | 42 | 0.05 |
| EL_ECS TRAY | 118 | 0.20 | EL_TRAY S&T POWER (1) | 14 | 0.20 |
| EL_EQUIPMENT | RED | 0.20 | EL_TRAY S&T POWER (2) | 12 | 0.05 |
| EL_EXT-LTG POLE | 180 | 0.15 | EL_TRAY SUPPORT | 45 | 0.13 |
| EL_FUTURE | WHITE | 0.15 | EL_TRENCH | 202 | 0.20 |
| EL_GRID | 8 | 0.05 | EL_TV5 TRAY | 46 | 0.20 |
| EL_HT TRAY | GREEN | 0.20 | HATCH-ECS TRAY_EL | 8 | 0.05 |
| EL_HUME PIPE | 24 | 0.15 | HATCH-HT TRAY_EL | 8 | 0.05 |
| EL_LIGHT-E | GREEN | 0.20 | HATCH-POWER TRAY_EL | 8 | 0.05 |
| EL_LIGHT-N | GREEN | 0.20 | HATCH-S&T TRAY_EL | 8 | 0.05 |
| EL_LIGHT FIXT-E | RED | 0.20 | HATCH-S&T TRAY_EL | 8 | 0.05 |
| EL_LIGHT FIXT-N | BLUE | 0.13 | HATCH BMS TRAY_EL | 8 | 0.05 |
| EL_LIGHT FIXT-U | 70 | 0.20 | HATCH TRAY DATA_EL | 8 | 0.05 |
| EL_LIGHT FIXTURE | 180 | 0.18 | HATCH TV5 TRAY_EL | 8 | 0.05 |
| EL_LTNG ARSTR | 130 | 0.18 | INSERT | 8 | 0.05 |
| EL_N-CIRCUIT | 200 | 0.13 | TEXT-ARCH_EL | 8 | 0.05 |
| EL_N-CONDUIT | 11 | 0.15 | TEXT-TRAY_EL | WHITE | 0.15 |
| EL_N-EXT-CIRCUIT | 200 | 0.13 | TEXT CUTOUT_EL | WHITE | 0.15 |
| EL_NOTE | WHITE | 0.15 | TEXT EARTH STRIP_EL | WHITE | 0.15 |
| EL_PANELS | RED | 0.20 | TEXT EARTH_EL | WHITE | 0.15 |
| EL_POWER TRAY | RED | 0.20 | TEXT EQUIPMENT_EL | WHITE | 0.15 |
| EL_POWER CKT | 140 | 0.13 | TEXT GENERAL_EL | WHITE | 0.15 |
| EL_POWER SOCKET | CYAN | 0.20 | TEXT PANEL_EL | WHITE | 0.15 |
| EL_RACEWAY(1) | 22 | 0.18 | TEXT SLD_EL | WHITE | 0.15 |
| EL_RACEWAY(2) | 21 | 0.05 | TEXT_EL | WHITE | 0.15 |
| EL_S&T TRAY | MAGENTA | 0.18 | TITLE_BLOCK | WHITE | 0.15 |
| EL_S&T TRENCH (1) | 242 | 0.20 | XREFS | WHITE | 0.15 |

Electrical CAD Laying System



Maha Metro Rail Project

3.10.4 CAD layers (Fire Detection)

FIRE-FIGHTING LAYING SYSTEM

| LAYER NAME | LINE & COLOUR | LINE WEIGHT |
|---------------------|---------------|-------------|
| 0_BDORTHO_X | WHITE | default |
| ARCH-XREF_FA | 8 | 0.00 |
| DIM_FA | WHITE | 0.25 |
| DIM_FF | WHITE | 0.25 |
| FA_ALARM CONDUIT | 92 | 0.20 |
| FA_CLOUD | WHITE | 0.25 |
| FA_DETECTOR | 141 | 0.20 |
| FA_EQUIPMENT | 160 | 0.18 |
| FA_HOOTER CABLE | BLUE | 0.20 |
| FA_POWER CABLE | 20 | 0.20 |
| FA_RI | 81 | 0.20 |
| FA_SKETCH | 215 | 0.13 |
| FA_SYMBOL | 173 | 0.15 |
| FA_ZONE | WHITE | 0.25 |
| FF_CENTER LINE | 9 | 0.09 |
| FF_CLOUD | WHITE | 0.25 |
| FF_CUT OUT | 30 | 0.15 |
| FF_GRID | 8 | 0.09 |
| FF_HYDRANT PIPE | 20 | 0.15 |
| FF_HYDRANT PIPE-PD | 142 | 0.15 |
| FF_PUMPS | 173 | 0.20 |
| FF_SKETCH | 215 | 0.15 |
| FF_SRINKLER PIPE | 160 | 0.15 |
| FF_SRINKLER PIPE-PD | 21 | 0.15 |
| HATCH_FA | 160 | 0.09 |
| HATCH_FF | 20 | 0.09 |
| INSERT | 8 | 0.09 |
| TEXT_FA | WHITE | 0.25 |
| TEXT_FF | WHITE | 0.25 |
| TITLE_BLOCK | WHITE | 0.25 |
| XREFS | 255 | 0.09 |

Fire Detection CAD Laying System



Maha Metro Rail Project

3.10.4 CAD layers (HVAC)

| LAYER NAME | LINE & COLOUR | LINE WEIGHT | LAYER NAME | LINE & COLOUR | LINE WEIGHT |
|-------------------|---------------|-------------|------------------------------|---------------|-------------|
| 0_BDORTHO_X | WHITE | 0.2500 | VAC-GRID | 8 | 0.0000 |
| DIM-VAC | 255 | 0.1500 | VAC-PUMP | RED | 0.1500 |
| HATCH-RAD-VAC | 31 | 0.0000 | VAC-RA DIFFUSER | RED | 0.1500 |
| HATCH-SAD-VAC | 70 | 0.0000 | VAC-RA DUCT | 32 | 0.2000 |
| HATCH-SED-VAC | 231 | 0.0000 | VAC-REFRIGERANT PIPE (CKT-1) | 180 | 0.1500 |
| INSERT | 253 | 0.0000 | VAC-REFRIGERANT PIPE (CKT-2) | 210 | 0.1500 |
| TEXT-ARCH-VAC | 252 | 0.0500 | VAC-REFRIGERANT PIPE (CKT-3) | 60 | 0.1500 |
| TEXT-FCU-VAC | WHITE | 0.2500 | VAC-SA DIFFUSER | GREEN | 0.1500 |
| TEXT-GENERAL-VAC | WHITE | 0.2500 | VAC-SA DUCT | GREEN | 0.1500 |
| TEXT-RA-VAC | WHITE | 0.2500 | VAC-SE DUCT | 241 | 0.1500 |
| TEXT-SA-VAC | WHITE | 0.2500 | VAC-SEF-FAN | 241 | 0.1500 |
| TEXT-SE-VAC | WHITE | 0.2500 | VAC-SPLIT UNIT | RED | 0.1500 |
| TEXT-VAC | WHITE | 0.2500 | VAC-VALVE | RED | 0.1500 |
| TEXT-VE-VAC | WHITE | 0.2500 | VAC-VE-FAN | 213 | 0.1300 |
| TEXT-VS-VAC | WHITE | 0.2500 | VAC-VE-DUCT | 213 | 0.1300 |
| TITLE_BLOCK | WHITE | 0.2500 | VAC-VE-FAN | 87 | 0.1300 |
| VAC-AHU | BLUE | 0.1500 | VAC-VS DIFFUSER | 87 | 0.1300 |
| VAC-ARROW | 20 | 0.0000 | VAC-VS DUCT | 87 | 0.1300 |
| VAC-CHILLER | RED | 0.1500 | VAC-WALL-OPENING | BLUE | 0.1500 |
| VAC-CHWR-PIPE | RED | 0.1500 | VS-VE DIFFUSER | 213 | 0.1300 |
| VAC-CHWS-PIPE | GREEN | 0.1500 | | | |
| VAC-COOLING TOWER | RED | 0.1500 | XREFS | 255 | 0.1500 |
| VAC-CUTOUT | BLUE | 0.1500 | | | |
| VAC-CWR-PIPE | MAGENTA | 0.1000 | | | |
| VAC-CWS-PIPE | 142 | 0.1300 | | | |
| VAC-DAMPER | RED | 0.1500 | | | |
| VAC-DRAIN PIPE | 130 | 0.1000 | | | |
| VAC-EQUIPMENT | RED | 0.1500 | | | |
| VAC-FA-FAN | GREEN | 0.1500 | | | |
| VAC-FCU | RED | 0.1500 | | | |
| VAC-FCU DUCT | GREEN | 0.1500 | | | |
| VAC-GENERAL | 116 | 0.1000 | | | |

HVAC CAD Laying System



Maha Metro Rail Project

3.10.5 CAD layers (Plumbing)

PLUMBING LAYING SYSTEM

| LAYER NAME | LINE & COLOUR | LINE WEIGHT | LAYER NAME | LINE & COLOUR | LINE WEIGHT |
|----------------------------|---------------|-------------|-------------|---------------|-------------|
| 0_BDORTHQ_X | WHITE | 0.15 | TEXT | 50 | 0.18 |
| DIM_PHE | WHITE | 0.15 | TEXT DR_PHE | WHITE | 0.15 |
| HATCH | 8 | 0.05 | TEXT WS_PHE | WHITE | 0.15 |
| HATCH_PHE | 8 | 0.05 | TEXT_PHE | WHITE | 0.15 |
| INCH_PT | 200 | 0.05 | TITLE_BLOCK | WHITE | 0.15 |
| PHE_AC CENTRE LINE | 45 | 0.09 | XREFS | WHITE | 0.15 |
| PHE_AC DRAINAGE | 84 | 0.18 | | | |
| PHE_ACCESS | 140 | 0.18 | | | |
| PHE_ARROW | 15 | 0.13 | | | |
| PHE_CLOUD | WHITE | 0.15 | | | |
| PHE_CLOUD REVISION | WHITE | 0.15 | | | |
| PHE_COVERED DRAIN CHANNEL | 160 | 0.18 | | | |
| PHE_CWS | 130 | 0.18 | | | |
| PHE_CWS CENTRE LINE | 45 | 0.09 | | | |
| PHE_DRAIN CHANNEL | 142 | 0.18 | | | |
| PHE_DRAIN PIPE | 170 | 0.18 | | | |
| PHE_DRAIN PIPE CENTRE LINE | 45 | 0.09 | | | |
| PHE_EQUIPMENT | 96 | 0.18 | | | |
| PHE_GI PIPE | WHITE | 0.15 | | | |
| PHE_GRATING | 162 | 0.18 | | | |
| PHE_GUTTER | 210 | 0.18 | | | |
| PHE_HWS | 12 | 0.18 | | | |
| PHE_HWS CENTRE LINE | 45 | 0.09 | | | |
| PHE_PT | 204 | 0.18 | | | |
| PHE_PUMP DR | 30 | 0.18 | | | |
| PHE_PUMP WS | 90 | 0.18 | | | |
| PHE_RWP | 210 | 0.18 | | | |
| PHE_RWP CENTRE LINE | 45 | 0.09 | | | |
| PHE_RWS | 90 | 0.18 | | | |
| PHE_RWS CENTRE LINE | 45 | 0.09 | | | |
| PHE_SAUCER CENTRE LINE | 45 | 0.09 | | | |
| PHE_SAUCER DRAIN | 30 | 0.18 | | | |
| PHE_SAUCER DRAIN PIPE | 30 | 0.18 | | | |
| PHE_SEEPAGE CENTRE LINE | 45 | 0.09 | | | |
| PHE_SEEPAGE PIPE | 180 | 0.18 | | | |
| PHE_SEWAGE CENTRE LINE | 180 | 0.09 | | | |
| PHE_SEWAGE PIPE | 20 | 0.18 | | | |
| PHE_SEWER CENTRE LINE | 45 | 0.09 | | | |
| PHE_SEWER DRAINAGE | 22 | 0.18 | | | |
| PHE_SLEEVE | 132 | 0.18 | | | |
| PHE_SOIL CENTRE LINE | 45 | 0.09 | | | |
| PHE_SOIL PIPE | 45 | 0.18 | | | |
| PHE_STORM CENTRE LINE | 45 | 0.09 | | | |
| PHE_STORM DRAINAGE | 45 | 0.18 | | | |
| PHE_VENT CENTRE LINE | 45 | 0.09 | | | |
| PHE_VENT PIPE | 92 | 0.18 | | | |
| PHE_WASTE CENTRE LINE | 45 | 0.09 | | | |
| PHE_WASTE PIPE | 180 | 0.18 | | | |
| SYMBOL | 153 | 0.18 | | | |

Plumbing CAD Laying System

Maha Metro Rail Project

3.10.6 CAD layers (Highways)

| | SL NO. | LAYER NAME | LINE & COLOUR | LINE WEIGHT | SL NO. | LAYER NAME | LINE & COLOUR | LINE WEIGHT | SL NO. | LAYER NAME | LINE & COLOUR | LINE WEIGHT |
|-----|-----------|------------|---------------|-------------|--------|------------|---------------|-------------|--------|------------|---------------|-------------|
| 1 | 000-00000 | WHITE | 0.5 | 00000000 | 10 | 000-00000 | WHITE | 0.5 | 00 | 000-00000 | WHITE | 0.5 |
| 2 | 000-00000 | WHITE | 0.5 | 00000000 | 11 | 000-00000 | WHITE | 0.5 | 01 | 000-00000 | WHITE | 0.5 |
| 3 | 000-00000 | WHITE | 0.5 | 00000000 | 12 | 000-00000 | WHITE | 0.5 | 02 | 000-00000 | WHITE | 0.5 |
| 4 | 000-00000 | WHITE | 0.5 | 00000000 | 13 | 000-00000 | WHITE | 0.5 | 03 | 000-00000 | WHITE | 0.5 |
| 5 | 000-00000 | WHITE | 0.5 | 00000000 | 14 | 000-00000 | WHITE | 0.5 | 04 | 000-00000 | WHITE | 0.5 |
| 6 | 000-00000 | WHITE | 0.5 | 00000000 | 15 | 000-00000 | WHITE | 0.5 | 05 | 000-00000 | WHITE | 0.5 |
| 7 | 000-00000 | WHITE | 0.5 | 00000000 | 16 | 000-00000 | WHITE | 0.5 | 06 | 000-00000 | WHITE | 0.5 |
| 8 | 000-00000 | WHITE | 0.5 | 00000000 | 17 | 000-00000 | WHITE | 0.5 | 07 | 000-00000 | WHITE | 0.5 |
| 9 | 000-00000 | WHITE | 0.5 | 00000000 | 18 | 000-00000 | WHITE | 0.5 | 08 | 000-00000 | WHITE | 0.5 |
| 10 | 000-00000 | WHITE | 0.5 | 00000000 | 19 | 000-00000 | WHITE | 0.5 | 09 | 000-00000 | WHITE | 0.5 |
| 11 | 000-00000 | WHITE | 0.5 | 00000000 | 20 | 000-00000 | WHITE | 0.5 | 10 | 000-00000 | WHITE | 0.5 |
| 12 | 000-00000 | WHITE | 0.5 | 00000000 | 21 | 000-00000 | WHITE | 0.5 | 11 | 000-00000 | WHITE | 0.5 |
| 13 | 000-00000 | WHITE | 0.5 | 00000000 | 22 | 000-00000 | WHITE | 0.5 | 12 | 000-00000 | WHITE | 0.5 |
| 14 | 000-00000 | WHITE | 0.5 | 00000000 | 23 | 000-00000 | WHITE | 0.5 | 13 | 000-00000 | WHITE | 0.5 |
| 15 | 000-00000 | WHITE | 0.5 | 00000000 | 24 | 000-00000 | WHITE | 0.5 | 14 | 000-00000 | WHITE | 0.5 |
| 16 | 000-00000 | WHITE | 0.5 | 00000000 | 25 | 000-00000 | WHITE | 0.5 | 15 | 000-00000 | WHITE | 0.5 |
| 17 | 000-00000 | WHITE | 0.5 | 00000000 | 26 | 000-00000 | WHITE | 0.5 | 16 | 000-00000 | WHITE | 0.5 |
| 18 | 000-00000 | WHITE | 0.5 | 00000000 | 27 | 000-00000 | WHITE | 0.5 | 17 | 000-00000 | WHITE | 0.5 |
| 19 | 000-00000 | WHITE | 0.5 | 00000000 | 28 | 000-00000 | WHITE | 0.5 | 18 | 000-00000 | WHITE | 0.5 |
| 20 | 000-00000 | WHITE | 0.5 | 00000000 | 29 | 000-00000 | WHITE | 0.5 | 19 | 000-00000 | WHITE | 0.5 |
| 21 | 000-00000 | WHITE | 0.5 | 00000000 | 30 | 000-00000 | WHITE | 0.5 | 20 | 000-00000 | WHITE | 0.5 |
| 22 | 000-00000 | WHITE | 0.5 | 00000000 | 31 | 000-00000 | WHITE | 0.5 | 21 | 000-00000 | WHITE | 0.5 |
| 23 | 000-00000 | WHITE | 0.5 | 00000000 | 32 | 000-00000 | WHITE | 0.5 | 22 | 000-00000 | WHITE | 0.5 |
| 24 | 000-00000 | WHITE | 0.5 | 00000000 | 33 | 000-00000 | WHITE | 0.5 | 23 | 000-00000 | WHITE | 0.5 |
| 25 | 000-00000 | WHITE | 0.5 | 00000000 | 34 | 000-00000 | WHITE | 0.5 | 24 | 000-00000 | WHITE | 0.5 |
| 26 | 000-00000 | WHITE | 0.5 | 00000000 | 35 | 000-00000 | WHITE | 0.5 | 25 | 000-00000 | WHITE | 0.5 |
| 27 | 000-00000 | WHITE | 0.5 | 00000000 | 36 | 000-00000 | WHITE | 0.5 | 26 | 000-00000 | WHITE | 0.5 |
| 28 | 000-00000 | WHITE | 0.5 | 00000000 | 37 | 000-00000 | WHITE | 0.5 | 27 | 000-00000 | WHITE | 0.5 |
| 29 | 000-00000 | WHITE | 0.5 | 00000000 | 38 | 000-00000 | WHITE | 0.5 | 28 | 000-00000 | WHITE | 0.5 |
| 30 | 000-00000 | WHITE | 0.5 | 00000000 | 39 | 000-00000 | WHITE | 0.5 | 29 | 000-00000 | WHITE | 0.5 |
| 31 | 000-00000 | WHITE | 0.5 | 00000000 | 40 | 000-00000 | WHITE | 0.5 | 30 | 000-00000 | WHITE | 0.5 |
| 32 | 000-00000 | WHITE | 0.5 | 00000000 | 41 | 000-00000 | WHITE | 0.5 | 31 | 000-00000 | WHITE | 0.5 |
| 33 | 000-00000 | WHITE | 0.5 | 00000000 | 42 | 000-00000 | WHITE | 0.5 | 32 | 000-00000 | WHITE | 0.5 |
| 34 | 000-00000 | WHITE | 0.5 | 00000000 | 43 | 000-00000 | WHITE | 0.5 | 33 | 000-00000 | WHITE | 0.5 |
| 35 | 000-00000 | WHITE | 0.5 | 00000000 | 44 | 000-00000 | WHITE | 0.5 | 34 | 000-00000 | WHITE | 0.5 |
| 36 | 000-00000 | WHITE | 0.5 | 00000000 | 45 | 000-00000 | WHITE | 0.5 | 35 | 000-00000 | WHITE | 0.5 |
| 37 | 000-00000 | WHITE | 0.5 | 00000000 | 46 | 000-00000 | WHITE | 0.5 | 36 | 000-00000 | WHITE | 0.5 |
| 38 | 000-00000 | WHITE | 0.5 | 00000000 | 47 | 000-00000 | WHITE | 0.5 | 37 | 000-00000 | WHITE | 0.5 |
| 39 | 000-00000 | WHITE | 0.5 | 00000000 | 48 | 000-00000 | WHITE | 0.5 | 38 | 000-00000 | WHITE | 0.5 |
| 40 | 000-00000 | WHITE | 0.5 | 00000000 | 49 | 000-00000 | WHITE | 0.5 | 39 | 000-00000 | WHITE | 0.5 |
| 41 | 000-00000 | WHITE | 0.5 | 00000000 | 50 | 000-00000 | WHITE | 0.5 | 40 | 000-00000 | WHITE | 0.5 |
| 42 | 000-00000 | WHITE | 0.5 | 00000000 | 51 | 000-00000 | WHITE | 0.5 | 41 | 000-00000 | WHITE | 0.5 |
| 43 | 000-00000 | WHITE | 0.5 | 00000000 | 52 | 000-00000 | WHITE | 0.5 | 42 | 000-00000 | WHITE | 0.5 |
| 44 | 000-00000 | WHITE | 0.5 | 00000000 | 53 | 000-00000 | WHITE | 0.5 | 43 | 000-00000 | WHITE | 0.5 |
| 45 | 000-00000 | WHITE | 0.5 | 00000000 | 54 | 000-00000 | WHITE | 0.5 | 44 | 000-00000 | WHITE | 0.5 |
| 46 | 000-00000 | WHITE | 0.5 | 00000000 | 55 | 000-00000 | WHITE | 0.5 | 45 | 000-00000 | WHITE | 0.5 |
| 47 | 000-00000 | WHITE | 0.5 | 00000000 | 56 | 000-00000 | WHITE | 0.5 | 46 | 000-00000 | WHITE | 0.5 |
| 48 | 000-00000 | WHITE | 0.5 | 00000000 | 57 | 000-00000 | WHITE | 0.5 | 47 | 000-00000 | WHITE | 0.5 |
| 49 | 000-00000 | WHITE | 0.5 | 00000000 | 58 | 000-00000 | WHITE | 0.5 | 48 | 000-00000 | WHITE | 0.5 |
| 50 | 000-00000 | WHITE | 0.5 | 00000000 | 59 | 000-00000 | WHITE | 0.5 | 49 | 000-00000 | WHITE | 0.5 |
| 51 | 000-00000 | WHITE | 0.5 | 00000000 | 60 | 000-00000 | WHITE | 0.5 | 50 | 000-00000 | WHITE | 0.5 |
| 52 | 000-00000 | WHITE | 0.5 | 00000000 | 61 | 000-00000 | WHITE | 0.5 | 51 | 000-00000 | WHITE | 0.5 |
| 53 | 000-00000 | WHITE | 0.5 | 00000000 | 62 | 000-00000 | WHITE | 0.5 | 52 | 000-00000 | WHITE | 0.5 |
| 54 | 000-00000 | WHITE | 0.5 | 00000000 | 63 | 000-00000 | WHITE | 0.5 | 53 | 000-00000 | WHITE | 0.5 |
| 55 | 000-00000 | WHITE | 0.5 | 00000000 | 64 | 000-00000 | WHITE | 0.5 | 54 | 000-00000 | WHITE | 0.5 |
| 56 | 000-00000 | WHITE | 0.5 | 00000000 | 65 | 000-00000 | WHITE | 0.5 | 55 | 000-00000 | WHITE | 0.5 |
| 57 | 000-00000 | WHITE | 0.5 | 00000000 | 66 | 000-00000 | WHITE | 0.5 | 56 | 000-00000 | WHITE | 0.5 |
| 58 | 000-00000 | WHITE | 0.5 | 00000000 | 67 | 000-00000 | WHITE | 0.5 | 57 | 000-00000 | WHITE | 0.5 |
| 59 | 000-00000 | WHITE | 0.5 | 00000000 | 68 | 000-00000 | WHITE | 0.5 | 58 | 000-00000 | WHITE | 0.5 |
| 60 | 000-00000 | WHITE | 0.5 | 00000000 | 69 | 000-00000 | WHITE | 0.5 | 59 | 000-00000 | WHITE | 0.5 |
| 61 | 000-00000 | WHITE | 0.5 | 00000000 | 70 | 000-00000 | WHITE | 0.5 | 60 | 000-00000 | WHITE | 0.5 |
| 62 | 000-00000 | WHITE | 0.5 | 00000000 | 71 | 000-00000 | WHITE | 0.5 | 61 | 000-00000 | WHITE | 0.5 |
| 63 | 000-00000 | WHITE | 0.5 | 00000000 | 72 | 000-00000 | WHITE | 0.5 | 62 | 000-00000 | WHITE | 0.5 |
| 64 | 000-00000 | WHITE | 0.5 | 00000000 | 73 | 000-00000 | WHITE | 0.5 | 63 | 000-00000 | WHITE | 0.5 |
| 65 | 000-00000 | WHITE | 0.5 | 00000000 | 74 | 000-00000 | WHITE | 0.5 | 64 | 000-00000 | WHITE | 0.5 |
| 66 | 000-00000 | WHITE | 0.5 | 00000000 | 75 | 000-00000 | WHITE | 0.5 | 65 | 000-00000 | WHITE | 0.5 |
| 67 | 000-00000 | WHITE | 0.5 | 00000000 | 76 | 000-00000 | WHITE | 0.5 | 66 | 000-00000 | WHITE | 0.5 |
| 68 | 000-00000 | WHITE | 0.5 | 00000000 | 77 | 000-00000 | WHITE | 0.5 | 67 | 000-00000 | WHITE | 0.5 |
| 69 | 000-00000 | WHITE | 0.5 | 00000000 | 78 | 000-00000 | WHITE | 0.5 | 68 | 000-00000 | WHITE | 0.5 |
| 70 | 000-00000 | WHITE | 0.5 | 00000000 | 79 | 000-00000 | WHITE | 0.5 | 69 | 000-00000 | WHITE | 0.5 |
| 71 | 000-00000 | WHITE | 0.5 | 00000000 | 80 | 000-00000 | WHITE | 0.5 | 70 | 000-00000 | WHITE | 0.5 |
| 72 | 000-00000 | WHITE | 0.5 | 00000000 | 81 | 000-00000 | WHITE | 0.5 | 71 | 000-00000 | WHITE | 0.5 |
| 73 | 000-00000 | WHITE | 0.5 | 00000000 | 82 | 000-00000 | WHITE | 0.5 | 72 | 000-00000 | WHITE | 0.5 |
| 74 | 000-00000 | WHITE | 0.5 | 00000000 | 83 | 000-00000 | WHITE | 0.5 | 73 | 000-00000 | WHITE | 0.5 |
| 75 | 000-00000 | WHITE | 0.5 | 00000000 | 84 | 000-00000 | WHITE | 0.5 | 74 | 000-00000 | WHITE | 0.5 |
| 76 | 000-00000 | WHITE | 0.5 | 00000000 | 85 | 000-00000 | WHITE | 0.5 | 75 | 000-00000 | WHITE | 0.5 |
| 77 | 000-00000 | WHITE | 0.5 | 00000000 | 86 | 000-00000 | WHITE | 0.5 | 76 | 000-00000 | WHITE | 0.5 |
| 78 | 000-00000 | WHITE | 0.5 | 00000000 | 87 | 000-00000 | WHITE | 0.5 | 77 | 000-00000 | WHITE | 0.5 |
| 79 | 000-00000 | WHITE | 0.5 | 00000000 | 88 | 000-00000 | WHITE | 0.5 | 78 | 000-00000 | WHITE | 0.5 |
| 80 | 000-00000 | WHITE | 0.5 | 00000000 | 89 | 000-00000 | WHITE | 0.5 | 79 | 000-00000 | WHITE | 0.5 |
| 81 | 000-00000 | WHITE | 0.5 | 00000000 | 90 | 000-00000 | WHITE | 0.5 | 80 | 000-00000 | WHITE | 0.5 |
| 82 | 000-00000 | WHITE | 0.5 | 00000000 | 91 | 000-00000 | WHITE | 0.5 | 81 | 000-00000 | WHITE | 0.5 |
| 83 | 000-00000 | WHITE | 0.5 | 00000000 | 92 | 000-00000 | WHITE | 0.5 | 82 | 000-00000 | WHITE | 0.5 |
| 84 | 000-00000 | WHITE | 0.5 | 00000000 | 93 | 000-00000 | WHITE | 0.5 | 83 | 000-00000 | WHITE | 0.5 |
| 85 | 000-00000 | WHITE | 0.5 | 00000000 | 94 | 000-00000 | WHITE | 0.5 | 84 | 000-00000 | WHITE | 0.5 |
| 86 | 000-00000 | WHITE | 0.5 | 00000000 | 95 | 000-00000 | WHITE | 0.5 | 85 | 000-00000 | WHITE | 0.5 |
| 87 | 000-00000 | WHITE | 0.5 | 00000000 | 96 | 000-00000 | WHITE | 0.5 | 86 | 000-00000 | WHITE | 0.5 |
| 88 | 000-00000 | WHITE | 0.5 | 00000000 | 97 | 000-00000 | WHITE | 0.5 | 87 | 000-00000 | WHITE | 0.5 |
| 89 | 000-00000 | WHITE | 0.5 | 00000000 | 98 | 000-00000 | WHITE | 0.5 | 88 | 000-00000 | WHITE | 0.5 |
| 90 | 000-00000 | WHITE | 0.5 | 00000000 | 99 | 000-00000 | WHITE | 0.5 | 89 | 000-00000 | WHITE | 0.5 |
| 91 | 000-00000 | WHITE | 0.5 | 00000000 | 100 | 000-00000 | WHITE | 0.5 | 90 | 000-00000 | WHITE | 0.5 |
| 92 | 000-00000 | WHITE | 0.5 | 00000000 | 101 | 000-00000 | WHITE | 0.5 | 91 | 000-00000 | WHITE | 0.5 |
| 93 | 000-00000 | WHITE | 0.5 | 00000000 | 102 | 000-00000 | WHITE | 0.5 | 92 | 000-00000 | WHITE | 0.5 |
| 94 | 000-00000 | WHITE | 0.5 | 00000000 | 103 | 000-00000 | WHITE | 0.5 | 93 | 000-00000 | WHITE | 0.5 |
| 95 | 000-00000 | WHITE | 0.5 | 00000000 | 104 | 000-00000 | WHITE | 0.5 | 94 | 000-00000 | WHITE | 0.5 |
| 96 | 000-00000 | WHITE | 0.5 | 00000000 | 105 | 000-00000 | WHITE | 0.5 | 95 | 000-00000 | WHITE | 0.5 |
| 97 | 000-00000 | WHITE | 0.5 | 00000000 | 106 | 000-00000 | WHITE | 0.5 | 96 | 000-00000 | WHITE | 0.5 |
| 98 | 000-00000 | WHITE | 0.5 | 00000000 | 107 | 000-00000 | WHITE | 0.5 | 97 | 000-00000 | WHITE | 0.5 |
| 99 | 000-00000 | WHITE | 0.5 | 00000000 | 108 | 000-00000 | WHITE | 0.5 | 98 | 000-00000 | WHITE | 0.5 |
| 100 | 000-00000 | WHITE | 0.5 | 00000000 | 109 | 000-00000 | WHITE | 0.5 | 99 | 000-00000 | WHITE | 0.5 |
| 101 | 000-00000 | WHITE | 0.5 | 00000000 | 110 | 000-00000 | WHITE | | | | | |

Highway CAD Laying System



Maha Metro Rail Project

3.10.7 CAD layers (Structure)

| LAYER NAME | LINE & COLOUR | LINE WEIGHT | LAYER NAME | LINE & COLOUR | LINE WEIGHT |
|--------------------|---------------|-------------|-----------------|---------------|-------------|
| AXIS | 10 | 0.05 | TRACK | | 0.25 |
| BARLIST | 255 | 0.25 | TRACK-AXIS | | 0.09 |
| BEARING | 153 | 0.09 | TRACK-RAILS | | 0.13 |
| BLD | magenta | DEFAULT | UT_DRAIN | | 0.15 |
| CON-CUT | 130 | 0.30 | UT_POWER | | 0.15 |
| CON-HIDE | 50 | 0.20 | UT_SEWER | | 0.15 |
| CON-VIEW | 90 | 0.25 | UT_SUI | | 0.15 |
| CULVERT | 154 | DEFAULT | UT_TELECOM | | 0.15 |
| CURB STONE | 141 | DEFAULT | UT_WATER SUPPLY | | 0.15 |
| | | | WALL | | DEFAULT |
| DIM | 255 | 0.15 | XREF | | DEFAULT |
| EL_TRAY LADDER (1) | 40 | 0.20 | | | |
| EP | blue | DEFAULT | | | |
| FOUNDATION | 52 | DEFAULT | | | |
| GAS_LINE | 45 | DEFAULT | | | |
| GASE POINT | 34 | DEFAULT | | | |
| GATE | 90 | DEFAULT | | | |
| GREEN BELT | 94 | DEFAULT | | | |
| GROUND-BIG | 130 | 0.30 | | | |
| GROUND-HIDE | 50 | 0.15 | | | |
| GROUND-SMALL | 90 | 0.25 | | | |
| HATCH | | 0.09 | | | |
| INSERT | | 0.09 | | | |
| INSERT-HIDE | | 0.09 | | | |
| JACKING | | 0.09 | | | |
| LP | | DEFAULT | | | |
| MARK1 | | 0.09 | | | |
| MARK2 | | 0.25 | | | |
| OIL TANK | | DEFAULT | | | |
| PATROL PUMP | | DEFAULT | | | |
| PNTDES | | DEFAULT | | | |
| PNTLV | | DEFAULT | | | |
| PNTNO | | DEFAULT | | | |
| POINTS | | DEFAULT | | | |
| PRECAST-CUT | | 0.30 | | | |
| PRECAST-HIDE | | 0.15 | | | |
| PRECAST-VIEW | | 0.25 | | | |
| PYLON | | DEFAULT | | | |
| REV | | 0.25 | | | |
| ROAD | | DEFAULT | | | |
| SOLING | | DEFAULT | | | |
| STEEL-CUT | | 0.30 | | | |
| STEEL-HIDE | | 0.18 | | | |
| STEEL-VIEW | | 0.20 | | | |
| SYMBOL | | 0.09 | | | |
| TENDON | | 0.20 | | | |
| TEXT | | 0.15 | | | |
| TITLE_BLOCK | | DEFAULT | | | |
| TOWER | | DEFAULT | | | |
| TP | | DEFAULT | | | |

Structure CAD Laying System



Maha Metro Rail Project

3.11 APPENDIX 1 – CAD Symbols & Blocks

3.11.1 ARCHITECTURE SYMBOLS & ABBREVIATIONS

| ARCHITECTURE SYMBOLS | | | | ARCHITECTURE SYMBOLS | |
|----------------------|------------------------------------------------|--------|--------------------------|----------------------|------------------|
| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
| | COLUMN GRID | | LEVEL | | W.C. |
| | BUILDING SECTION | | FINISH ROAD LVL. | | URNAL |
| | WALL SECTION | | FINISH PAVING LVL. | | URNAL IN SECTION |
| | ELEVATION | | FINISH CEILING LVL. | | WASH BASIN |
| | INTERIOR ELEVATION | | FINISH FLOOR LVL. | | DOOR |
| | CALLOUTS FOR ENLARGED PLAN/ELEVATION / SECTION | | STRUCTURAL SLAB TOP LVL. | | WINDOW |
| | GLASS TYPE | | TOP OF PARAPET | | NORTH ARROW |
| | FALSE CEILING SOFFIT HEIGHT | | RIDGE LVL. | | |
| | MATCH LINE | | EAVES LVL. | | |
| | KEY NOTE | | LEVEL | | |
| | EQUIPMENT REFERENCE | | FLOOR DRAIN | | |
| | REVISION | | FLOOR TRAP | | |
| | WALL PARTITION TYPE | | FLOOR CLEANOUT | | |
| | 230 THK HOLLOW BLOCK WORK WALL | | ALUMINUM | | |
| | 150 THK CONC. FILLED HOLLOW BLOCK WORK WALL | | BRASS/BRONZE | | |
| | 100 THK CONC. FILLED HOLLOW BLOCK WORK WALL | | STEEL | | |
| | R.C.C. WALLS & COL. (IN PLANS AND SECTIONS) | | BLOCKING | | |
| | ACOUSTICAL CEILING PANEL | | CONTINUOUS WOOD | | |
| | GYPSUM BOARD | | PLYWOOD | | |
| | INSULATION (BATT) | | FINISH WOOD | | |
| | INSULATION (RIGID) | | CONCRETE | | |
| | WATER PROOFING | | CRUSHED ROCK/ GRAVEL | | |
| | CERAMIC TILE | | DOOR TAG | | |
| | SAND FILL | | WINDOW TAG | | |

Architecture Symbols & Abbreviation



Maha Metro Rail Project

3.11.2 ELECTRICAL SYMBOLS & ABBREVIATIONS (SH-1)

| ELECTRICAL | | | |
|------------|----------------------------------------------------------|--------|-----------------------------------------|
| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
| | 1A SINGLE POLE SWITCH | | AIR CIRCUIT BREAKER |
| | 15A SINGLE POLE SWITCH | | MOULDED CASE CIRCUIT BREAKER |
| | 2x28W FLUORESCENT FIXTURE RECESS TYPE | | MINIATURE CIRCUIT BREAKER |
| | 2x28W FLUORESCENT FIXTURE SURFACE MOUNTED | | EARTH LEAKAGE CIRCUIT BREAKER |
| | 2x18W LED FLUORESCENT FIXTURE SURFACE | | RESIDUAL CURRENT CIRCUIT BREAKER |
| | 1x10W CFL FIXTURE SURFACE MOUNTED | | CURRENT TRANSFORMER |
| | 1x280W MH FIXTURE SURFACE MOUNTED | | STAR-DELTA STARTER |
| | 1x150W MH FIXTURE SURFACE MOUNTED | | DIGITAL AMMETER |
| | 1x10W MH FIXTURE SURFACE MOUNTED | | DIGITAL VOLTMETER |
| | 4x14W FLUORESCENT FIXTURE RECESS TYPE DIRECT / INDIRECT | | INVERSE TIME OVER CURRENT RELAY |
| | 4x14W FLUORESCENT FIXTURE RECESS TYPE WITH ACRYLIC COVER | | INVERSE TIME EARTH FAULT RELAY |
| | LED FIXTURE RECESS TYPE | | OVER LOAD RELAY |
| | 20x18W FLUORESCENT FIXTURE RECESS TYPE | | AUTOMATIC POWER FACTOR CORRECTION RELAY |
| | 20x28W FLUORESCENT FIXTURE RECESS TYPE | | EARTH BUS |
| | 10x8W FLUORESCENT FIXTURE SURFACE MOUNTED | | INDICATION LIGHT |
| | 1x8W BULK HEAD LIGHT WALL MOUNTED | | ON / OFF / TRIP |
| | BRACKET LIGHT | | START / STOP |
| | MIRROR LIGHT | | AUTOMATIC TRANSFER SWITCH |
| | WALL WASHER | | DO SET |
| | LV DOWNLIGHT | | PIPE EARTH ELECTRODE |
| | PICTURE LIGHT | | G.I. PLATE ELECTRODE |
| | CHANDIELIER | | C/I PLATE ELECTRODE |
| | LIGHTING CONTROL MODULE | | EARTH ELECTRODES |
| | LIGHTING CONTROL PANEL | | SURGE PROTECTION DEVICE |
| | WALL MOUNTED ADJUSTABLE LIGHTING POINT | | LIGHTNING ARRESTOR |
| | OVER DOOR WARNING LIGHT | | EARTH BOND PIT |
| | WALL MOUNTED FLOODLIGHT | | EARTH POINT |
| | POLE MOUNTED FLOODLIGHT | | |
| | ROLLARD LIGHT | | |
| | FIBRE OPTIC PROJECTOR & LENSE | | |
| | LIGHTING TRACK | | |
| | COLD CATHODE OR NEON LIGHTING | | |
| | STRIP LIGHT | | |

| ABBREVIATION | DESCRIPTION |
|--------------|-------------------|
| LTC | LIGHTING |
| PWR | POWER |
| CT | CABLE TRAY |
| ELV | EXTRA LOW VOLTAGE |

Electrical Symbols & Abbreviation (Sh-1)



Maha Metro Rail Project

3.11.3 ELECTRICAL SYMBOLS & ABBREVIATIONS (SH-2)

| SYMBOL | DESCRIPTION |
|--------|--------------------------------------------------|
| | 15A 1W-SWITCHED FUSED CONNECTION UNIT & NEON IND |
| | 20/30A DOUBLE POLE SWITCH |
| | 20/30A DOUBLE POLE SWITCH & NEON INDICATOR |
| | 15A SINGLE SWITCHED SOCKET OUTLET - UPS |
| | 5A,10 240V SWITCHED SOCKET OUTLET |
| | 15/15A 10 240V SOCKET OUTLET WITH SWITCH |
| | 15A,10 240V WEATHER PROOF SOCKET OUTLET |
| | 60A,30 WEATHER PROOF INDUSTRIAL SOCKET OUTLET |
| | ISOLATOR |
| | STARTER SWITCH |
| | CHANGEOVER SWITCH |
| | FAN ISOLATOR SWITCH |
| | FAN STOP/START CONTROLLER |
| | CONTACTOR |
| | BUS BAR TAP OFF UNIT |
| | ELECTRICITY METER |
| | FLOOR BOX |
| | DISTRIBUTION BOARD |
| | SUB MAIN DIST BOARD / MCC |



























| ABBREVIATION | DESCRIPTION |
|--------------|------------------------------|
| ACS | ACCESS CONTROL SYSTEM |
| HV | HIGH VOLTAGE |
| LV | LOW VOLTAGE |
| DB | DISTRIBUTION BOARD |
| SMDB | SUBMAIN DISTRIBUTION BOARD |
| TA | TO ABOVE |
| TB | TO BELOW |
| UPS | UNINTERRUPTIBLE POWER SUPPLY |
| WP | WEATHER PROOF |
| WH | WATER HEATER |
| HD | HAND DRYER |
| VCB | VACUUM CIRCUIT BREAKER |
| ACB | AIR CIRCUIT BREAKER |
| MCCB | MOULDED CASE CIRCUIT BREAKER |
| MCC | MOTOR CONTROL CENTRE |
| MCB | MAIN DISTRIBUTION BOARD |





















| SYMBOL LEGEND | |
|---------------|-------------------------------------------------------------|
| SYMBOL | DESCRIPTION |
| | FOR SYMMETRICAL |
| | FOR SECTION |
| | FOR UCS |
| | FOR TITLE |
| | FOR LEVEL |
| NOTES:- | (1) GENERAL NOTES (2) GENERAL NOTES (3) GENERAL NOTES |
| | NORTH DIRECTION |
| | DETAIL MARK |
| | DETAIL MARK - 1 |
| | FOR DRAFT COPY |

Electrical Symbols & Abbreviation (Sh-2)

Maha Metro Rail Project

3.11.4 FIRE DETECTION AND FIRE FIGHTING SYMBOLS & ABBREVIATIONS (SH-1)

| FIRE-FIGHTING | |
|-------------------------------------------------------------------------------------|----------------------------------------------|
| SYMBOL | DESCRIPTION |
|  | SINGLE HYDRANT VALVE |
|  | BRANCH PIPE WITH NOZZLE |
|  | FIRST AID HOSE REEL (THERMOPLASTIC) |
|  | SYNTHETIC HOSE WITH STAINLESS STEEL COUPLING |
|  | FIRE HOSE CABINET |
|  | FLOW SWITCH |
|  | INSPECTION AND TEST CONTROL VALVE |
|  | SPRINKLER HEAD |
|  | SIDE WALL SPRINKLER HEAD |
|  | UP-RIGHT SPRINKLER HEAD |
|  | GATE VALVE |
|  | BUTTERFLY VALVE |
|  | DOUBLE HYDRANT |
|  | FIRE EXTINGUISHER, DRY CHEMICAL |
|  | FIRE EXTINGUISHER, FOAM TYPE |
|  | PRESSURE SWITCH |
|  | PRESSURE GAUGE |
|  | FOUR WAY FIRE BRIGADE INLET |
|  | DRAWOUT CONNECTION |
|  | EXPANSION BELLOW |
|  | NON-RETURN VALVE |
|  | Y STRAINER |
|  | HYDRANT PIPE |
|  | SPRINKLER PIPE |
|  | FIRE WATER PIPE |
|  | ALARM VALVE |

| FIRE-ALARM SYSTEM | |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| SYMBOL | DESCRIPTION |
|  | MULTI SENSOR OPTICAL SMOKE THERMISTOR BASED CUM HEAT DETECTOR BELOW FALSE CEILING / SLAB |
|  | MULTI SENSOR OPTICAL SMOKE THERMISTOR BASED CUM HEAT DETECTOR ABOVE FALSE CEILING |
|  | MULTI SENSOR OPTICAL SMOKE THERMISTOR BASED CUM HEAT DETECTOR BELOW FALSE FLOOR |
|  | HEAT DETECTOR ABOVE FALSE CEILING |
|  | HEAT DETECTOR BELOW FALSE CEILING |
|  | MANUAL CALL BOX RECESSED IN WALL |
|  | HOOTER CUM STROBE |
|  | RESPONSE INDICATOR WITH TWIN HIGH INTENSITY LEDS MOUNTED ABOVE DOORWAY AT CENTRE |
|  | OUT PUT MODULE |
|  | IN PUT MODULE |
|  | MANUAL GAS ABORT BUTTON |
|  | MANUAL GAS RELEASE BUTTON |
|  | HOOTER CUM SPEAKER |
|  | CONDUIT FOR FIRE ALARM |
|  | CONDUIT FOR STROBE |
|  | CONDUIT FOR HOOTER CUM SPEAKER |
|  | FIRE ALARM PANEL |
|  | REPEATER PANEL |
|  | 1x240 WATT AMPLIFIER & SELECTOR SWITCH FOR PA SYSTEM |
|  | FAULT ISOLATOR |

| FIRE-ALARM SYSTEM | |
|-------------------|--------------------------|
| ABBREVIATIONS | DESCRIPTION |
| FI | FAULT ISOLATOR |
| FACP | FIRE ALARM CONTROL PANEL |
| IM | INPUT MODULE |
| OM | OUTPUT MODULE |
| MC | MANUAL CALL POINT |

Fire Detection & Fire Fighting Symbols & Abbreviation (Sh-1)



Maha Metro Rail Project

3.11.5 FIRE DETECTION AND FIRE FIGHTING SYMBOLS & ABBREVIATIONS (SH-2)

| FIRE-FIGHTING | |
|---------------|------------------|
| ABBREVIATIONS | DESCRIPTION |
| F/A | FROM ABOVE |
| F/B | FROM BELOW |
| T/A | TO ABOVE |
| T/B | TO BELOW |
| UP | PIPE UP |
| DN | DROP DOWN |
| BOP | BOTTOM OF PIPE |
| BOS | BOTTOM OF SLEEVE |
| F/C | FALSE CEILING |
| FWP | FIRE WATER PIPE |

| UNIT ABBREVIATIONS | |
|--------------------|-------------|
| UNIT | DESCRIPTION |
| mm | MILLIMETER |
| Mtr. | METER |
| KL | KILOLITER |
| Ltrs. | LITRE |

| SYMBOL LEGEND | |
|-------------------------|-------------------------------------------------------------|
| SYMBOL | DESCRIPTION |
| | FOR SYMMETRICAL |
| | FOR SECTION |
| | FOR UCS |
| PLAN VIEW SCALE: 1/1 | FOR TITLE |
| 0.000 m ▽ | FOR LEVEL |
| NOTES:- | (1) GENERAL NOTES (2) GENERAL NOTES (3) GENERAL NOTES |
| | NORTH DIRECTION |
| | DETAIL MARK |
| | DETAIL MARK - 1 |
| DRAFT COPY | FOR DRAFT COPY |

Fire Detection & Fire Fighting Symbols & Abbreviation (Sh-2)



Maha Metro Rail Project

3.11.6 HVAC SYMBOLS & ABBREVIATIONS (SH-1)

| LEGEND HVAC | | | |
|-------------|---------------------------------------------------|---------|-------------------------------------------------------------|
| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
| | SUPPLY AIR DIFFUSER | | FOR LWB |
| | RETURN AIR DIFFUSER | | FOR TITLE |
| | SUPPLY AIR GRILLE | | FOR LEVEL |
| | SLOT LINEAR DIFFUSER | NOTES:- | (1) GENERAL NOTES (2) GENERAL NOTES (3) GENERAL NOTES |
| | ISD VALVE SUPPLY | | NORTH DIRECTION |
| | ISD VALVE EXHAUST | | DETAIL MARK |
| | LINEAR BAR GRILLE | | DETAIL MARK - 1 |
| | SQUARE SUPPLY GRILLE | | FOR DRAFT COPY |
| | SQUARE RETURN GRILLE | | FOR SYMMETRICAL |
| | VOLUME CONTROL DAMPER | | FOR SECTION |
| | FIRE DAMPER | | |
| | NON RETURN DAMPER / BACKDRAFT DAMPER | | |
| | SUPPLY AIR DUCT | | |
| | FRESH AIR DUCT | | |
| | KITCHEN EXHAUST DUCT | | |
| | TOILET EXHAUST DUCT | | |
| | VOLUME CONTROL DAMPER (SCHEMATIC) | | |
| | BELL MOUTH WITH WIRE MESH & VOLUME CONTROL DAMPER | | |
| | TURNING VANES | | |
| | FLEXIBLE DUCT | | |
| | DOOR UNDER GLT | | |
| | EXHAUST AIR LOUVERS WITH SAND TRAP | | |
| | EXHAUST LOUVERS | | |
| | GRAVITY LOUVERS | | |
| | SOUND ATTENUATOR | | |
| | ACCESS PANEL | | |
| | SUPPLY / RETURN FAN | | |
| | REF-REFRIGERANT PIPE & CONNECTION | | |
| | DRAIN PIPE | | |
| | REFRACTE BRANCHES | | |
| | DUCTABLE INDOOR UNIT | | |
| | FRESH AIR HANDLING UNIT | | |
| | CASSETTE UNIT | | |
| | PROPELLER FAN | | |
| | VRF / VRF OUT DOOR UNIT | | |
| | AXIAL FLOW FAN | | |
| | DOOR TRANSFER GRILLE | | |

HVAC Symbols & Abbreviation (Sh-1)



Maha Metro Rail Project

3.11.7 HVAC SYMBOLS & ABBREVIATIONS (SH-2)






















| ABBREVIATION | DESCRIPTION |
|-------------------|--------------------------------|
| DV | DISC VALVE |
| SD | SUPPLY DIFFUSER |
| RD | RETURN DIFFUSER |
| SQ | SUPPLY GRILLE |
| RG / EG | RETURN / EXHAUST GRILLE |
| FD | FIRE DAMPER |
| MSFD | MOTORISED SMOKE & FIRE DAMPER |
| MFD | MOTORISED FIRE DAMPER |
| MD | MOTORISED DAMPER |
| NRD | NON RETURN DAMPER |
| VCD | VOLUME CONTROL DAMPER |
| FAD | FRESH AIR DUCT |
| SAD | SUPPLY AIR DUCT |
| RAD | RETURN AIR DUCT |
| TED | TOILET EXTRACT / EXHAUST DUCT |
| KED | KITCHEN EXTRACT / EXHAUST DUCT |
| DUC | DOOR UNDER CUT |
| IL | INTAKE LOUVRE |
| EL | EXHAUST LOUVRE |
| ODU | OUT DOOR UNIT |
| IDU | INDOOR UNIT |
| FAHU | FRESH AIR HANDLING UNIT |
| KEF | KITCHEN EXHAUST FAN |
| TEF | TOILET EXHAUST FAN |
| AP | ACCESS PANEL |
| HL | HIGH LEVEL |
| LL | LOW LEVEL |
| T/A | TO ABOVE |
| T/B | TO BELOW |
| F/A | FROM ABOVE |
| F/B | FROM BELOW |
| L/S | LITER PER SECOND |
| m ³ /s | CUBIC METER PER SECOND |
| m/s | METER PER SECOND |
| Pa/kPa | PASCAL / KILO PASCAL |
| mm | MILLIMETER |
| m | METER |
| °C | DEGREE CELSIUS |
| DB | DRY BULB TEMPERATURE |
| WB | WET BULB TEMPERATURE |
| RH | RELATIVE HUMIDITY |
| NC | NOISE CRITERIA |
| dB | DECIBEL |
| RPM | REVOLUTION PER MINUTE |
| W/kW | WATTS/KILOWATTS |
| L | LITER |
| B.O.D | BOTTOM OF DUCT |
| B.O.U | BOTTOM OF UNIT |
| B.O.F/C | B.O.FALSE CEILING |
| B.O.DRAIN PIPE | BOTTOM OF DRAIN PIPE |

| LEGENDS | ABBREVIATIONS |
|---------|---------------------|
| RWP | RAIN WATER PIPE |
| SWWP | STORM WATER PIPE |
| F.F.L | FINISH FLOOR LEVEL |
| F.G.L | FINISH GROUND LEVEL |
| G.L | GROUND LEVEL |
| I.L | INVERT LEVEL |
| IC | INSPECTION CHAMBER |
| SWMH | STORM WATER MANHOLE |

HVAC Symbols & Abbreviation (Sh-2)

Maha Metro Rail Project

3.11.8 PLUMBING SYMBOLS & ABBREVIATIONS (SH-1)

| PLUMBING | | | | (DRAINAGE) |
|-------------------------------------------------------------------------------------|-----------------------------------|---------------|-----------------------------------|------------|
| SYMBOL | DESCRIPTION | ABBREVIATIONS | DESCRIPTION | |
|  | SOIL PIPE | SP | SOIL PIPE | |
|  | WASTE PIPE | WP | WASTE PIPE | |
|  | VENT PIPE | VP | VENT PIPE | |
|  | RAIN WATER PIPE | RWP | RAIN WATER PIPE | |
|  | SEWERAGE WATER PIPE | SWP | SEWERAGE WATER PIPE | |
|  | STORM WATER PIPE | SWWP | STORM WATER PIPE | |
|  | DROP DOWN | DD | DROP DOWN | |
|  | DIRECTION OF FLOW | | | |
|  | CLEAN OUT | CO | CLEAN OUT | |
|  | FLOOR CLEAN OUT | FCO | FLOOR CLEAN OUT | |
|  | FLOOR TRAP | FT | FLOOR TRAP | |
|  | FLOOR DRAIN | FD | FLOOR DRAIN | |
|  | ROOF DRAIN | RD | ROOF DRAIN | |
|  | URINAL TRAP | UT | URINAL TRAP | |
|  | GULLY TRAP (300x300) | GT | GULLY TRAP | |
|  | INSPECTION CHAMBER (800x800mm) | IC | INSPECTION CHAMBER | |
|  | SEWER MANHOLE | SMH | SEWER MANHOLE | |
|  | SEWER CIRCULAR TYPE MANHOLE | SMHC | SEWER CIRCULAR TYPE MANHOLE | |
|  | STORM WATER MANHOLE | SWMH | STORM WATER MANHOLE | |
|  | STORM WATER CIRCULAR TYPE MANHOLE | SWMHC | STORM WATER CIRCULAR TYPE MANHOLE | |
|  | GREASE TRAP | | | |
| | | SP | SOIL PIPE | |
| | | WP | WASTE PIPE | |
| | | VP | VENT PIPE | |
| | | SVP | SOIL VENT PIPE | |
| | | WVP | WASTE VENT PIPE | |
| | | RWP | RAIN WATER PIPE | |
| | | SWP | SEWERAGE WATER PIPE | |
| | | SWWP | STORM WATER PIPE | |
| | | FA | FROM ABOVE | |
| | | FB | FROM BELOW | |
| | | TA | TO ABOVE | |
| | | TB | TO BELOW | |
| | | H/L | HIGH LEVEL | |
| | | F.F.L | FINISH FLOOR LEVEL | |
| | | F.G.L | FINISH GROUND LEVEL | |
| | | G.L | GROUND LEVEL | |
| | | I/L | INVERT LEVEL | |
| | | FC | FALSE CEILING | |
| | | FD | FLOOR DRAIN | |
| | | FT | FLOOR TRAP | |
| | | UT | URINAL TRAP | |
| | | RD | ROOF DRAIN | |
| | | CO | CLEAN OUT | |
| | | FCO | FLOOR CLEAN OUT | |
| | | WCO | WALL CLEAN OUT | |
| | | DD | DROP DOWN | |
| | | DP | DRAIN POINT | |
| | | GT | GULLY TRAP | |
| | | IC | INSPECTION CHAMBER | |
| | | SMH | SEWER MANHOLE | |
| | | SWMH | STORM WATER MANHOLE | |
| | | ROP | BOTTOM OF PIPE | |
| | | ROS | BOTTOM OF SLEEVE | |
| | | UP | PIPE UP | |
| | | CDP | CONDENSATE DRAIN PIPE | |
| | | Ø | DIA | |

Plumbing Symbols & Abbreviation (Sh-1)



Maha Metro Rail Project

3.11.9 PLUMBING SYMBOLS & ABBREVIATIONS (SH-2)

| PLUMBING | | | | (WATER SUPPLY) |
|----------|-----------------------|---------------|-----------------------|----------------|
| SYMBOL | DESCRIPTION | ABBREVIATIONS | DESCRIPTION | |
| CWS | COLD WATER SUPPLY | CWS | COLD WATER SUPPLY | |
| HWS | HOT WATER SUPPLY | HWS | HOT WATER SUPPLY | |
| DN | DROP DOWN | FA | FROM ABOVE | |
| UP | RISE UP | FB | FROM BELOW | |
| IV | ISOLATING VALVE | TA | TO ABOVE | |
| GV | GATE VALVE | TB | TO BELOW | |
| NRV | NON RETURN VALVE | GV | GATE VALVE | |
| EWB | ELECTRIC WATER HEATER | NRV | NON RETURN VALVE | |
| | | IV | ISOLATING VALVE | |
| | | BV | BALL VALVE | |
| | | FV | FLUSH VALVE | |
| | | FS | HAND SPRAY | |
| | | STR | STRAINER | |
| | | HB | HOSE BIB | |
| | | DN | DROP DOWN | |
| | | EWB | ELECTRIC WATER HEATER | |
| | | WHA | WATER HAMMER ARRESTOR | |
| | | AAV | AUTOMATIC AIR VENT | |
| | | BOP | BOTTOM OF PIPE | |
| | | BOB | BOTTOM OF BLEEVE | |
| | | UP | PIPE UP | |
| | | AV | ANGLE VALVE | |
| | | AT | ABLUTION TAP | |
| | | Ø | DIA | |

| UNIT ABBREVIATIONS | |
|--------------------|-------------|
| UNIT | DESCRIPTION |
| mm | MILLIMETER |
| Mt. | METER |
| KL | KILOLITER |
| Ltr. | LITRE |

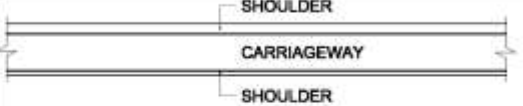










| SYMBOL LEGEND | |
|---------------|-------------------------------------------------------------|
| SYMBOL | DESCRIPTION |
| | FOR SYMMETRICAL |
| | FOR SECTION |
| | FOR UCS |
| | FOR TITLE |
| | FOR LEVEL |
| NOTES:- | (1) GENERAL NOTES (2) GENERAL NOTES (3) GENERAL NOTES |
| | NORTH DIRECTION |
| | DETAIL MARK |
| | DETAIL MARK - 1 |
| | FOR DRAFT COPY |

Plumbing Symbols & Abbreviation (Sh-2)



Maha Metro Rail Project

3.11.10 HIGHWAYS LEGEND & ABBREVIATIONS

| HIGHWAY ABBREVIATIONS | | HIGHWAY LEGEND | |
|-----------------------|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------|
| ABBREVIATIONS | DESCRIPTION | | |
| AC | ASPHALTIC CONCRETE |  | SHOULDER |
| BC | BINDER/BASE COURSE | | CARRIAGEWAY |
| B/L | BASE LINE | | SHOULDER |
| C/C | CENTRE TO CENTRE OR CENTRE OF CIRCLE |  | BASELINE |
| CC | CURVE TO CURVE |  | RETAINING WALL/CONCRETE BARRIER |
| CW | CARRIAGEWAY |  | LANE MARKING |
| CH | CHAINAGE |  | LIMIT OF WORK |
| CL | CENTERLINE |  | EDGE OF RIGHT OF WAY |
| CS | CURVE TO SPIRAL |  | TRAFFIC DIRECTION |
| e | SUPERELEVATION |  | HORIZONTAL CURVE POINT |
| FGL | FINISHED GROUND LEVEL |  | VERTICAL CURVE POINT |
| FRL | FINISHED ROAD LEVEL |  | PROPOSED PIER |
| G | GRADE |  | PIER NUMBER |
| K | K-VALUE | | |
| L | LENGTH | | |
| LOW | LIMIT OF WORK | | |
| LVL | LEVEL | | |
| LM | LIGHTING MAST | | |
| L.m | LINEAR METER | | |
| ML | MAINLINE | | |
| MHHW | MEAN HIGHER HIGH WATER | | |
| MSL | MEAN SEA LEVEL | | |
| N | NORTH/NORTHING | | |
| NA | NOT APPLICABLE | | |
| NB | NORTH BOUND | | |
| NO. | NUMBER | | |
| NTS | NOT TO SCALE | | |
| PGL | PROFILE GRADE LINE | | |
| PC | TANGENT TO CURVE | | |
| PT | CURVE TO TANGENT | | |
| R | RADIUS | | |
| SB | SOUTH BOUND | | |
| SC | SPIRAL TO CURVE | | |
| ST | SPIRAL TO TANGENT | | |
| SS | SPIRAL TO SPIRAL | | |
| SH | SHOULDER | | |
| TS | TANGENT TO SPIRAL | | |
| WC | WEARING COURSE | | |

Highway Symbols & Abbreviation (Sh-1)



Maha Metro Rail Project

3.11.11 CIVIL (STRUCTURE) SYMBOLS

| STRUCTURAL SYMBOLS | | | |
|--------------------|--------------------------|--------|-------------|
| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
| | FOR SYMMETRICAL | | |
| | SLEEVE OR HOLE | | |
| | SLAB THK | | |
| | SUNK SHOWN IN PLAN | | |
| | SUNK THK. SHOWN IN PLAN | | |
| | CUTOUT | | |
| | COLUMN GRID | | |
| | SLAB LEVEL SHOWN IN PLAN | | |
| | CL ALIGNMENT STYLE | | |
| | NORTH DIRECTION | | |
| | SECTION MARKED IN PLAN | | |
| | REVISION | | |
| | LEVEL | | |
| | WATER PROOFING | | |
| | FOR UCS | | |
| | CONTINUE RETAINING WALL | | |
| | CONTINUE COLUMN | | |
| | COMPACTED DESERT SOIL | | |
| | ROCK | | |
| | EARTH/SAND FILLING | | |
| | CONCRETE | | |
| | | | |
| | | | |



Maha Metro Rail Project

4 Responsibilities

4.1 Author

- 4.1.1 Accuracy of graphical and non-graphical elements within a CAD file.
- 4.1.2 Compliance with this standard.

4.2 Approver

- 4.2.1 Approving CAD files to be shared and used for the suitability (see 3.7.2) indicated.
- 4.2.2 Maintaining an audit trail to capture the checks and reviews carried out to gain approvals.

4.3 Authorizer

- 4.3. 1 On behalf of MMRCL, authorizing (accept / reject) CAD files submitted to MMRCL for publishing for the suitability (see 3.7.2) indicated.

4.4 MMRCL CAD Support Team

- 4.4.1 Generation and governance of field codes.
- 4.4.2 Supply and management of MMRCL CAD data, resources and licensed mapping.

4.5 MMRCL Principal Infrastructure Protection Engineer

- 4.5.1 Approving external requests to MMRCL for CAD data, not originating from within an MMRCL project.

4.6 MMRCL Procurement Agent

- 4.6.1 The MMRCL Procurement Agent shall be responsible for incorporating the requirements of this engineering standard in any contract to which it is relevant and shall stipulate that a programme of audits is implemented by the contractor which ensures that these requirements are complied with.

5 Supporting information

5.1 Background

- 5.1.1 The requirements within this document shall be read in conjunction with the reference documents listed in 6.1.1.
- 5.1.2 If you need any technical assistance with any of the requirements within this document, you can contact the MMRCL CAD Support Team at



Maha Metro Rail Project

6 References

6.1 References

6.1. Refer to EIR

6.1.2 Industry standards

| Document no. | Title |
|----------------|-------------------------------------------------------------------|
| BS 1192 | Collaborative production of AEC information |
| BS 8888 | Technical product specification - Specification |
| BS EN ISO 5455 | Technical drawings - Scales |
| EN ISO 3098-5 | CAD lettering of the Latin alphabet, numerals and marks |
| BS ISO 12006-2 | Unified Classification for the construction industry (Uniclass) |
| BS EN ISO 5457 | Sizes and layout of drawing sheets |
| PAS-1192(2) | Collaborative production of AEC information For BIM |
| PAS-1192(3) | Collaborative production of AEC information for Asset Information |



Maha Metro Rail Project

6.2 Abbreviations

The following abbreviations are created:

- a) Within MMRCL Glossary of Terms (a Category 1 Standard);
- b) From published sources that are clearly identified.

| Abbreviation | Definition | Source |
|--------------|---------------------------------------------|--------|
| AEC | Architectural, Engineering and Construction | a |
| CAD | Computer Aided Design | a |
| MMRCL | Maha Metro Rail Corporation Limited | a |
| OS | Ordnance Survey | a |

6.3 Definitions

Topic specific definitions

| Term | Definition |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Asset Class | Highest level of classification of London Underground's Engineering Assets, as defined in CAT 1 Standard S1041 |
| CAD Computer Aided Design) File | Electronic file produced by a CAD application (such as MicroStation or AutoCAD). Examples of CAD files include Drawing Definitions and Model files. |
| Classification | Systematic arrangement of design and construction activities and assets, including construction elements, systems and products |
| Common Data Environment (CDE) | A designated environment with a defined process used to manage all relevant information. A CDE may comprise of one or more systems supporting a consistent collaborative approach. |
| Composite Model | Computer Aided Design (CAD) file that contains one or more Model Files, as references, for the purpose of spatial coordination; there is no 'live' geometry within the file. It may form part of a Drawing Definition. |
| Data | Set of digital values stored, but not yet interpreted or analysed (un-processed), in a form that is convenient to move or process. Data is generally represented in a structured and often tabulated form (rows and columns). 'Raw Data' is a relative term and therefore not used. |
| DGN | Proprietary Bentley Systems file format |
| Document | Information recorded for a specific purpose, providing a means to communicate the briefing, design, construction, operation, maintenance or decommissioning of an asset. This includes, but is not limited to, correspondence, Drawing Renditions, schedules, specifications, calculations, spreadsheets. Note: Documentation must either be in an immutable format or incorporate a means of controlling changes. |



Maha Metro Rail Project

| Term | Definition |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drawing Definition | A CAD file created solely for the purpose of creating a Drawing Rendition or Printed Drawing. The graphical content of the drawing definition is contained in other CAD files (e.g. Model Files and/or Composite Models) which are attached as References. Only annotation and dimensions are 'live' within the Drawing Definition file. Examples may include As-built Drawing Definitions. |
| Drawing Rendition | Electronic file, in an immutable format such as PDF, derived from a Drawing Definition. Examples may include As-built Drawing Renditions. |
| Drawing Sheet | CAD file containing the graphics of a blank drawing border and title block, of Predefined paper sizes. Used as a reference by all drawing definitions. |
| Information | Data which has been interpreted and processed (such as formatting and printing) to take on meaning in some context for its intended receiver. |
| Layer | Synonymous with the level functionality in the DWG File format. |
| Level | Floor level within a building (refer to S0135, Location Coding System) |
| Meta-data | 'Data about the data'. Information about one or more aspects of certain items content. For example: size of document, date created etc. |
| Model File | A Computer Aided Design (CAD) file which consists of geometry that represents the physical characteristics (may also include functional characteristics) of the works, produced at a scale of 1:1. It may form part of the Composite Model and/or Drawing Definition. |
| Model rendition | An immutable file, in a format such as PDF, which is derived from a Model File or Composite Model. |
| Newlyn | Mean sea level (MSL) calculated from observation taken at Newlyn, Cornwall and used as the official basis for height calculation. |
| Printed Drawing | Static, hard-copy document, derived from a Drawing Definition (as an exact copy) or Drawing Rendition. |
| Project | A unique set of co-ordinated activities, with definite starting and finishing points, undertaken by an individual or organization to meet specific objectives within defined schedule, cost and performance parameters. |
| Reference | An Auto Cad/Bentley MicroStation term meaning a CAD file attached to another CAD file such that all or part of its graphical content is visible but not editable in the file to which it is attached. |
| Status | Defines the suitability of information. |
| Spatial Data | Geometry aligned to the physical location of an asset, to a specified grid system. |
| Tag | An Auto Cad /Bentley MicroStation term meaning a non-graphical attribute attached to an element within a CAD file. |



Maha Metro Rail Project

6.4 Technical content manager

| Paragraph number | Technical content manager |
|------------------|---------------------------------|
| All | Head of Engineering Information |

6.5 Document history

| Issue no | Date | Changes | Author |
|----------|--------------|--------------------|--------|
| A1 | October 2016 | Authorised for use | |
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