External Sources CADD Requirements

DEFINITION

In this CADD Manual for Data Exchange, the acronym QAL means the Queensland Airports Limited.

1.0 DIGITAL DATA SPECIFICS

1.1 Acceptable File Formats

- All CADD data files must be in AutoCAD .dwg or .dxf format.
- A companion PDF file of the drawing.

1.2 File Delivery Media

Files must be delivered on one of the following media:

- CD or DVD disc
- USB thumbdrive
- Email (files less than 7mb)
- QAL Extranet

1.3 Database Information

If any alphanumeric data files have been generated for the project (reports databases, co-ordinate geometry, etc.) these files must be included. Files must be in PDF format.

1.4 Documentation

The following information must be submitted with the electronic media:

- List of computer file names with descriptions;
- Drawing name listing (if different from file name);
- List of reference files used;
- A hard copy or PDF file of each file (to permit checking of data integrity during the transfer process).

1.5 AutoCAD Design Files

1.5.1 File Structure

QAL accepts both 2d and 3d design files depending on the type of data.

However, all surveyed information must be presented in a 3d dwg file.

1.5.2 Global Origin

The global origin for the local plane rectangular grid, is based on MGA94 at the **Aerodrome Reference Point** (ARP). Levels are referred to **Australian Height Datum** (AHD).

The coordinate system used is MGA94 coordinates, based on the ARP.

The ARP is located at:

	Gold Coast	**Longreach**	**Mount Isa**	**Townsville**
UTM Zone	Zone 56 J	Zone 55 K	Zone 54 K	Zone 55 K
GDA 94 /MGA Coordinates	549555.406E 6884478.001N	221927.412E 7405651.358N	342569.026 E 7714312.912 N	475334.6410 E 7871205.7830 N
GDA94 / WGS84 Coordinates	28® 09.9'S 153® 30.3'E	23® 26.1'S 144® 16.8'E	20® 39.8'S 139® 29.3'E	19® 15.2'S 146® 45.9'E
Height (AHD)	4.285m	189.283m	337.018m	3.359m

1.5.3 Working Units

CIVIL

Meters to three decimal places

ARCHITECTURAL/MECHANICAL

Meters to three decimal places

ELECTRICAL

- APL, cabling
- APL, light positions and orientations
- Elect/communications underground reticulation
- APL, surveyed positions
- High/medium voltage distribution

Meters to three decimal places

ELECTRICAL

- Fire alarm files
- Medium voltage installation
- High voltage installations
- Circuit diagrams

Meters to three decimal places

1.5.4 Level Structure

A logical level structure should be used for all drawings. With a separate level for each unique group of features, eg. all external walls should be on the same unique level.

- Group elements together, eg, windows and louvres on the same level; and
- For each element that is grouped, ensure that as much as possible, they have unique symbology.

This enables easier manipulation of elements at a later date.

1.6 Exactly Reproducible

Exactly reproducible; means that the design files are set up in a way that the data, when plotted, reflect the hard copy plans.

- All pertinent files must be attached as reference files and if essential, clipped and rotated to depict all possible composite drawing configurations in that area.
- The file must contain title block information, design and construction notes, dimensioning etc, using separate AutoCAD levels.

1.7 Use of AutoCAD Reference Files

- Elements must be drawn once only and must not be reproduced. Instead, extensive use must be made of reference files.
- When a reference file is attached to a design file more than once, the logical name must be alphanumeric and incremented by one for each attachment.
- The description field must be used extensively for reference files.
- Any rotation of a design file, including reference files must be done around the ADP.
- The rotation angle must be recorded in the file.

1.8 Re-used as Standard (drawings that can be re-used)

- All details which are considered to be standard details should be grouped and drawn in files which are appropriately named.
- The final drawing must be composed as described in sections 1.9 and 1.10 above.
- Any cell libraries, menus, tutorials, user commands, programs, etc, which have been created for use on the project must be documented and handed over to QAL.

1.9 Survey Data

Raw survey data (x, y, z coordinates, etc, and related data, eg, digital terrain models, etc) must be supplied in ASCII format.

The raw survey data must contain :

- Coordinates (Easting, Northing, height);
- Survey codes with description of codes listed separately;
- Point number;
- An indication whether each point is contourable or not; and
- An indication whether each line is a breakline or not.

1.10 Data Integrity

The Surveyor must ensure that all digital data supplied are free from corrupted elements.

1.11 Categories of Digital Data

Survey information must be provided in the format as detailed in Section 3.0, and must conform to the CADD level specification. The drawings listed below will still be required in AutoCAD .dwg format; as they do not fall into the same category as survey information:-

- Manhole details (sewerage, drainage, services, telecom etc)
- Cover sheets
- Long Sections, Cross Sections
- Pit details
- Kerb details

The following rules apply to these drawings:-

- In the CADD file, information must be stored on several layers and documented.
- The categorising of the information across several files must be consistent. For example, if two people are drawing a long section on CADD in two different files, the placement of say, the sections must be on the same layer for both files.
- A level specification must accompany each file.

2.0 As-Built Surveys (work as executed)

2.1 As-Built Surveys

As-Built surveys providing a description (size, number of, and material type) and horizontal and vertical locations of the following services and features must be done in accordance with the following requirements:

2.1.1 Services and Utilities

Prior to any backfilling or covering, information on all underground services must be obtained in situ including:

Hydraulic services:

- Sewer pipes and stormwater pipes - invert and surface levels
- Water mains
- Fuel lines
- Gas lines

Electrical mechanical services:

- Electrical cables
- Telecom cables
- Service duct banks
- Communication cables

Where immediate backfilling is essential, suitable lengths of minimum 50 mm PVC pipes vertically plumbed down must be placed onto the service prior to backfilling. The PVC pipes are to be at least 0.5 m above finished surface level, the frequency of placement to be at 25m intervals and at each change of direction and at existing service crossing. The pipe size and colour must be such as not to conflict with other services e.g. electrical. The Surveyor shall number the pipes and maintain a log or marked up plan detailing the service and the service material type that number refers to.

2.1.2 Surface and Above Ground features

Survey information about the following surface and above ground features must be obtained in situ immediately after each part of the work is complete & with 5m of site boundaries.

Structures - all above/on ground features including (without limitation):

- Buildings, concrete slabs and building detail (roof eves ridges etc)
- Fences and gates incl type & height
- Pits and manholes and the like
- Valves and the like
- Headwalls and drainage structures
- Service markers, poles, etc
- Street furnitre and the like
- Road and site signage

Site works and drainage including (without limitation):

- Finished earthworks surface
- Finished pavement surfaces incl paths (incl edges of conc pads)
- Roads, shoulder edges, kerbs incl surface type
- Open lined and unlined drains
- Line markings
- Extend of vegetation & individual trees above 150mm diameter.

Level Intervals

Levels to be taken at grid intervals dictated by the make up of the site but generally in accordance with:

- On runways, Taxiways, & Aprons 5m, @ 25mm contour intervals.
- On roads 10, @ 250mm contour intervals.
- Open areas 20m @ 250mm contour intervals.

All changes in level, steps, gradients, banks, hollows, depressions etc. to be surveyed, and sufficient levels to be taken to enable contours to be plotted. All surveys to related to AHD datum.

2.1.3 Buildings

Building internal details including (without limitation):

- External/internal walls
- Toilet partitiions
- External/Internal windows
- Doors (external/internal)
- Ramps/Stairs
- Alterations to column facings/columns
- Toilet facilities - W.C, basins, urinals
- Kitchen facilities - sink, hotplate, etc.
- Floor surface, eg, tiles, carpet

2.1.4 Electrical

Electrical details for building works including (without limitation):

- Switchboard/distribution board layouts
- Material lists
- Manufacturing details
- Installation details/layouts
- Location of power outlets, light switches, light fittings, emergency lights, PA system, EWIS (Early Warning Intercommunication System) and any other electrical equipment.
- Location of telephone or video outlets
- Identification of circuits supplying light fittings power outlets etc
- Electrical details for cable reticulation including (without limitation):
- Cable details - size, cores, colour, insulation, route
- Cable identification number
- Cable depth, protection
- Ducting
- Duct numbers and configuration
- Manhole details i.e. conduit entry configuration and manhole numbers
- Cable protection settings i.e. relays, circuit breakers

Any other information not mentioned above which may have a bearing on any future development, even if only hearsay by local residents, is to be surveyed or recorded for inclusion in the final survey drawing.

3.0 PRESENTATION OF DIGITAL DATA

3.1 Presentation of As-Built Survey Data

Survey information must be presented in the following forms:-

- Computer generated (not digitised) or manually enhanced computer plots at scales as per section 5.0 of this document;
- Key plans showing areas covered and services located;
- Field book sketches showing all located points as well as their relationship to relevant features on feature strings and;
- Contours at 50mm intervals on all Runways, Taxiways & Aircraft Aprons. 100mm intervals elsewhere.

3.2 Presentation of Architectural As-Built Drawings.

- Text must be in separate file to Detailed/BOMA information.
- Information must be supplied in a separate file showing new work only.
- Information must be orientated to the ADP.
- Plot scale must be 1:100, with text placed for this scale.
- BOMA areas must be supplied as "shapes" only. "Complex shapes" are unsuitable for the companies purposes and cause file corruptions.

3.3 Drawing Sign Off

Each as-constructed drawing must to be stamped with the Surveyor’s company name, must show it is "As Constructed" and must be signed off by a person who is a licensed surveyor.

5.0 DRAWING STANDARDS

5.1 Relevant Codes and Standards

Where a drawing standard to be followed is not specified elsewhere, the contents of drawings supplied must conform to the standards as stated below.

However, the lettering used must conform to the QAL CADD specification.

- AS1000 The International System of Units (SI) (latest issue)
- AS1100 Technical Drawing (and all associated parts) - latest issue
- AS1102 Graphical Symbols for Electrotechnology (and all associated parts) - latest issue.

5.2 Drawing Sheets

All drawings must be plotted using a drawing sheet. The sheet sizes used must be B1,A1,A3,A4.

All drawings must have an QAL border, an QAL logo, and an QAL copyright notice.

5.3 Drawing Scales

5.3.1 Preferred Scales

The following scales are preferred;

1:1, 1:2, 1:5, 1:10, 1:20, 1:50, 1:100, 1:200, 1:500, 1:1000, 1:250, 1:500, 1:1000

Other scales being multiples of the above (e.g. 1:500 for site plans, 1:2500 for locality plan etc), may be used, provided the written approval of QAL is obtained beforehand.

Text sizes used in drawings that are supplied electronically must be drawn to suit 1:250 scale for civil/electrical drawings and drawn for 1:100 scale for architectural, mechanical and electrical installation drawings.

5.3.2 Specific Scales

Scales for drawings showing the following specific features must be those stated for each feature, below:

- Airport lighting layouts 1:1000
- Airport lighting intersection details 1:500
- Building layouts 1:100
- Underground reticulation 1:250, 1:500

5.4 Layout

Drawings must be laid out to be clear, concise, balanced, well defined, understandable, with minimal duplication of detail and practicable use of reference drawing numbers.

Legends must be located in the bottom right section.

Notes must be placed in bottom right hand corner of drawing, but must not extend closer than 50mm toward title block. For electrical drawings, notes may be placed in any available space on the drawing.

A clear space of 50mm is to be allowed above title block for notations concerning the status of the drawing (e.g. "not for construction", "preliminary", "for tender only", etc).

5.5 Text

- Text must be done using distinct uniform letters and figures which will be clearly legible in reproductions from original drawings.
- All lettering by electronic methods must be to ISO 3098/ B, DIN 6776 standard.
- Vertical characters only must be employed for general use throughout a drawing.
- Character heights must conform to those indicated in the level specifications.
- Red ink must not be used to notate values on as-installed drawings.

5.6 Line Styles

In general, line styles must conform to those indicated in the level specifications. If a reference cannot be found in the level specification for a particular line style, immediate consultation with QAL must take place.

5.7 Section Marks and Titles

Sectional views must be oriented as for normal views for third angle projection. Each sectional view or section must be identified with its appropriate cutting plane, where identified, by inscribing a sub-title below the view or section (e.g. Section 1).

All hidden outlines in the sectional view must be omitted.

All drawings must have the details, sections and elevations indicated using the appropriate symbols.

5.8 Abbreviations

Symbols must be inscribed strictly in accordance with appropriate standards.

Upper case and lower case letters must not be altered in any way as there may then be a significant difference in their meaning.

Abbreviations must only be used when their meanings are unquestionably clear to the intended reader - WHEN IN DOUBT, SPELL IT OUT.

Care must be exercised in the use of abbreviations to avoid the possibility of misinterpretation by others reading the drawing.

Upper case letters must be used except where lower case symbols are used for conventional signs and symbols normally using characters (e.g. mm, kg, kPa, etc).