Estate Management

GIS Standards

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1. Background

All spatial data and 'As-Built' plans dealing with architectural and site works submitted to the University of New South Wales (UNSW) must comply with this set of GIS Standards. These standards establish a consistent approach to preparing UNSW's interactive campus maps.

UNSW's CAD Drawing Standards had remained relatively unchanged since 2012. In contrast, technology in digital data structure and maintenance significantly advanced. Computer hardware improvements combined with GIS software enhancements have changed spatial data management from static paper maps into rich, live and dynamic digital maps.

UNSW's campus map system is now maintained in ESRI ArcGIS format, so campus maps in the CAD drawing standard format, which outputs to PDF format, are no longer required.

2. Objective

The Spatial Information team (EMSI), which forms part of Estate Management (EM) at UNSW, aim to simplify the spatial data flow without losing accuracy and completeness from stakeholders. In this way they can update UNSW's space data register (ARCHIBUS) and campus map data (ESRI ArcGIS) using new received As-Builts for campus maps, or data collected in other ways such as GPS or digitisation.

The flowchart in **Figure 1** illustrates the data processing flow from when architectural spatial data is requested on a subject through to the documentation in CAD and ARCHIBUS, and preparation of feature classes for digital maps in GIS format.

Figure 1: Architectural As-Built data process flow chart
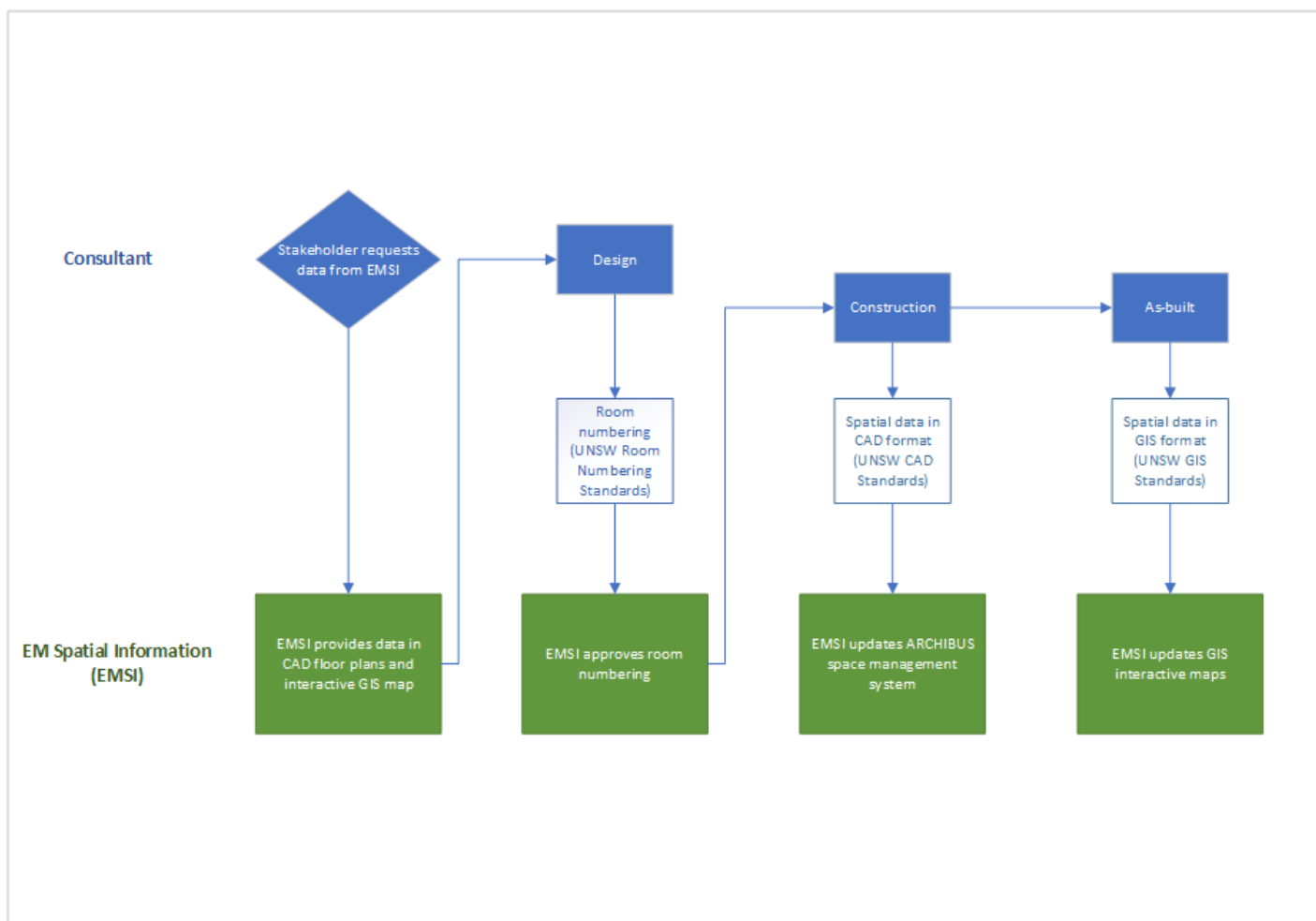
3. Scope

These GIS Standards explain how to submit spatial data to EMSI.

Stakeholders must submit:
1. Spatial data and feature layers in GIS Standards.

2. A set of architectural design and As-Built plans of the same in CAD format, including a PDF, following the UNSW CAD Standards document.

4. Data specification

4.1 Coordinate Systems

All GIS data submitted must be in The World Geographic System 1984 (WGS84)
Height must be based on Australian Height Datum (AHD).

4.2 Data source

Only GPS data collection can be submitted in its original tabular format or in spatial format. Civil infrastructure and future survey projects must be converted to the GIS Standards.

4.2.1 Civil infrastructure and Underground services projects

For civil infrastructure projects, GIS data is extracted accurately from As-Built plans (CAD) without generalisation. Each asset is plotted in its accurate position as built. As-Built plans must be an actual survey of a completed project.

4.2.2 GPS data collection

GPS data collection must be post-processed to horizontal accuracy of plus or minus 0.10 metres and vertical accuracy of plus or minus 0.05 metres. This collection system is for point data only.

4.2.3 Feature survey

Invert levels of infrastructures such as drainage pipe, pits, service conduits, kerbs and channels must be collected and presented as per GIS standards.
A survey of existing features must be performed using the accuracies required for a feature survey.

4.4 Data provided by Estate Management

EMSI will provide existing spatial information of a subject area including:

• Buildings (Property information)
• Roads
• Green Areas
• Courtyards (Surface details)
• Point Assets, such as points of interest
• Linear Assets such as underground services lines

4.5 Consultant data presentation

Consultants must provide:

1. As-Built spatial data that meets the requirements of these GIS Standards on a CD, DVD or memory stick, or via cloud storage.
2. Complete As-Built plans of the same project in CAD format and PDF format.

The following must be observed during data collection and processing:

• All data must be submitted in the coordinate system set out in Section 4.1.
• Spatial accuracy set out in Section 4.2 must be maintained.
• Each surface asset feature must be depicted by a discrete polygon with no overlapping or gaps.
• Polygons must be split with any change of material in the same class feature. For example, a footpath must be split into two polygons when it features different materials such as asphalt and concrete.
• Consultants may be asked to supply a sample data set early in the contract period to confirm the product meets UNSW requirements.

5. Technical specification

Regardless of the type of software a consultant is using to design a project, the As-Built spatial data must be presented in UNSW's CAD and GIS formats, which are ESRI's ArcGIS suite (shape, geodatabase) and AutoCAD (dwg) respectively. Data up to a size of 10MB must be submitted in digital format via email. If it exceeds this size, data must be submitted on a CD, DVD or memory stick, or shared via cloud storage.

5.1 Building, road and park surfaces

Polygons will completely cover building, road area and green area. EMSI will provide current road and building data as the base map for a subject area.

5.2 Line and point features

Line and point features must be presented in their standard native symbols and sizes. EMSI will provide symbology for existing features.

6. List of layers

Layers and their attributes are categorised according to their functions to ensure a uniform data structure. Assets that are above ground in nature are displayed using polygons and points, underground assets such are displayed as lines.
If a layer or layers are not shown below, request direction from EMSI.

6.1 Map Layers

6.1.1 Campus Base map

- Base
- Building
- Internal Road
- Green Area
- Courtyard
- Parking Space

6.1.2 Feature Layers

- Accessible Path
- Accessible Toilet
- Baby Change Table
- Bike Rack
- Bubbler
- Building Access
- Bus Stop
- Construction Zone
- Defibrillator
- Directory
- Food and retail
- Gate
- Help Point
- Lift
- Light Rail Station
- Parking Space
- Parking Zone
- Property Details
- Regions
- Road External
- Room
- Shower
- Slope
- Stairs
- Student and Staff Services
- Theatres
- Trees

6.1.3 Underground Services

- Electrical

7. Attributes specification

So that consultants apply an exact attribute structure and fields and to avoid spelling errors, UNSW will provide a standard GIS data sample of the subject area. Consultants must resubmit information in the same data structure with all attributes completed and no blank fields.

In each layer there will be a field 'Change' which consultants should populate with either 'New', 'Modify' or 'Delete' for any asset or feature that is new, modified or removed.

Appendix

8.1 Sample ESRI (Geodatabase, Shape)

Buildings.zip

8.2 Sample AutoCAD (DWG)

A-E8-G.zip

8.3 Attribute Table (CSV)

BuildingsFEB19.csv

8.4 UNSW CAD Standards

UNSW Architectural
CAD Standards.pdf