CITY OF MELBOURNE

As-Built Spatial Standards

City Infrastructure Branch

Parks and City Greening Branch

September 2023

Contents

1. Background

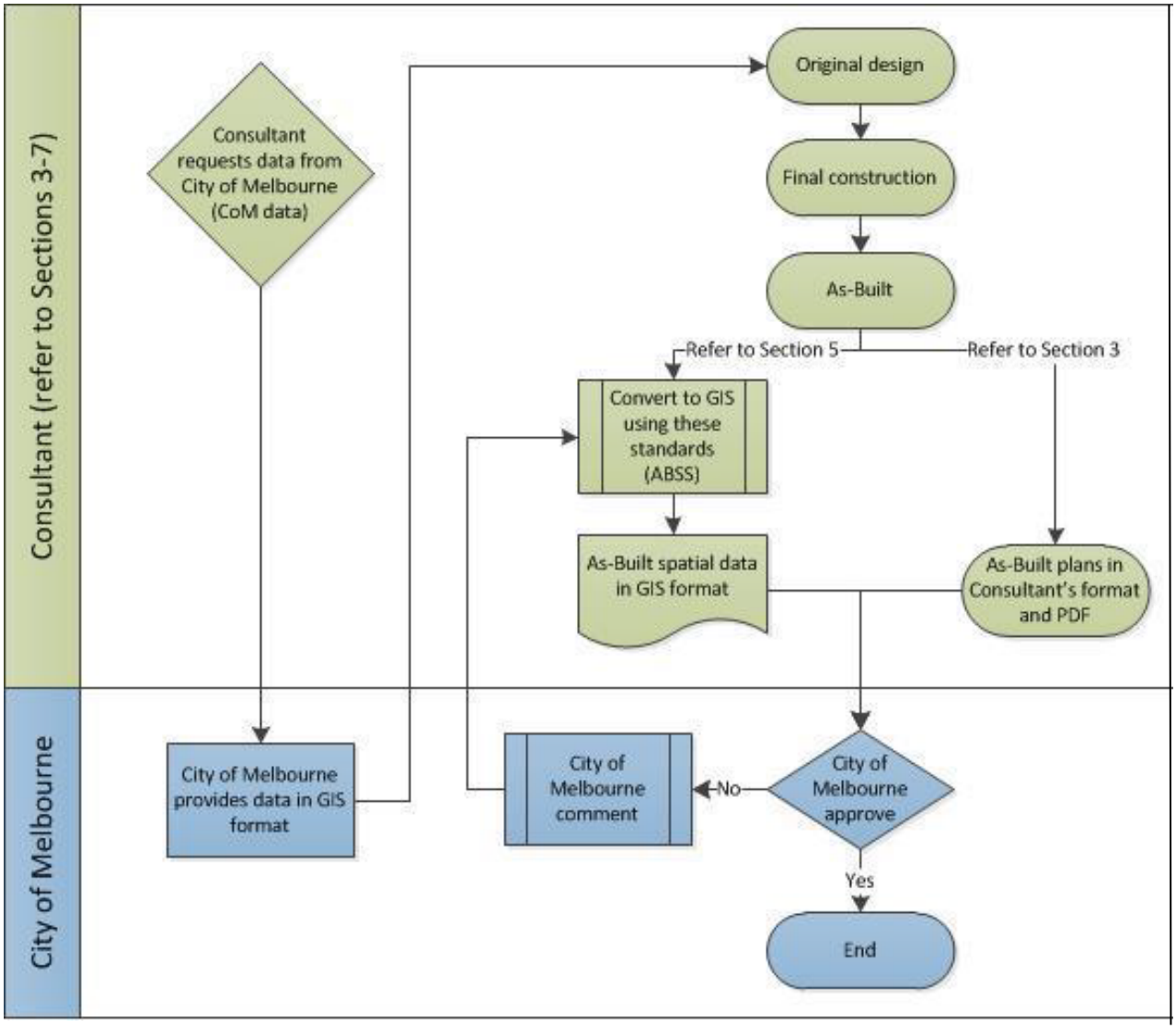
All ‘As-Built’ plans dealing with civil works submitted to the City of Melbourne must comply with this set of As-Built Spatial Standards. These standards establish a consistent approach to preparing engineering drawings.

2. Objective

We aim to simplify spatial data flow without losing accuracy and completeness from consultants. In this way we can update the City of Melbourne’s asset register (AssetMaster) and spatial data (ESRI suite) using new received As-Built for civil design projects, or data collected in other ways such as GPS data capture or digitisation.

The flowchart in Figure 1 illustrates the data processing flow from when data is requested on a particular subject through to the design, construction and preparation of As-Built in GIS format. Only basic steps are shown such as Original Design, Final Construction and As-Built. Different consultants may have different steps of civil design project presentations.

Figure 1: As-Built data process flow chart



3. Scope

These As-Built Spatial Standards explain how to submit spatial data to the City of Melbourne's City Infrastructure Branch and Park and City Greening Branch.

Consultants must submit:

1. As-Built in As-Built Spatial Standards.
2. A set of engineering design and As-Constructed plans of the same, in the format of the contractor's CAD design software, including a PDF.

   See **Appendix 8.5** for guidelines on design and drafting.

See Section 4.5 for more detailed requirements.

4. Data specification

4.1 Datum

All GIS data submitted must be in Map Grid Australia Zone 55 projection and referenced to Geocentric Datum of Australia (GDA) 2020.

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 As-Built Spatial Standards.

4.2.1 Civil infrastructure 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 the As-Built Spatial Standards.

A survey of existing features must be performed using the accuracies required for a feature survey listed in Table 1.

Table 1: Accuracy required for feature survey

Asset type	Horizontal	Vertical (where applicable)
All ground level or sub-ground level linear features excluding drainage lines and kerb lines. These include but are not limited to line marking, cables and conduits for underground or overhead, irrigation and water supply lines.	± 0.1 m or better	± 0.05 m or better
Kerb lines	± 0.02 m or better	± 0.01 m or better
Drainage lines	± 0.02 m or better	± 0.02 m or better
Single point features such as trees, poles, and sockets.	± 0.1 m or better	± 0.05 m or better
Multi-point features such as pits, tree surrounds and seats.	± 0.1 m or better	± 0.05 m or better

4.2.4 Digitisation

Data from a digitisation process is accepted only when a feature survey is not possible to the accuracy required. Prior approval by the City of Melbourne's Team Manager Park Assets or Team Leader of Asset Management is required before digital data is submitted. This depends on the project location (open space or a road reserve).

4.3 Data structure

Data to be presented must be vector data—a polygon, point or line.

4.3.1 Polygon

All surfaces in the public realm including road reserves, parks and reserves must be depicted as descript polygons. For example, Carriageway, Footpath, Cycle Lane, Kerb, Channel, Median, Bridge, Nature Strip, Playground Surface, Recreation Surface, Retaining Wall, Shrub Bed, Tramway, Tree Plot, Turf, Water Feature, or Parking Bay.

4.3.2 Point

Each outdoor furniture, recreation and playground asset must have an accurate pair of grid coordinates in the correct datum set out in Section 4.1 above. Coordinates must be picked at the approximate centre for large assets. Examples of point data are Banner Pole, Barbeque, Bike Rail, Bin, Bollard, Drinking Fountain, Floral Crate, Hoop, Horse Trough, Information Pillar, Picnic Setting, Recreation Equipment, Seat, Sign, Structure Support, Syringe Bin, Stormwater Pit, Litter Trap, Tree, or Drip Line Pit.

4.3.3 Line

Storm water drainage pipes, irrigation lines and conduits for assets including electrical and optic fibre must be depicted by lines drawn between the pits or nodes, depending on the type of line asset. See Section 6 for categories of layers.

4.4 Data provided by City of Melbourne

The City of Melbourne will provide spatial information of a subject area including:

- Cadastral (Property)
- Road Segment
- Park Area
- Surface Polygon Asset
- Point Asset, such as Outdoor Furniture
- Linear Asset such as Drainage, Conduit or Irrigation Line.

4.5 Consultant data presentation

Consultants must provide:

1. As-Built spatial data that meets the requirements of these As-Built Spatial Standards in digital format.
2. Complete As-Built plans of the same project in the consultant's original format and PDF.

The following must be observed during data collection and processing:

- All data must be submitted in the datum 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. See Section 5 for more information on surface asset features.
- 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, concrete or HMA-Porous. Figure 3 shows a typical road surface polygon composition.
- Kerb and channel polygons must be in appropriate widths as shown in Figure 3.
- Consultants may be asked to supply a sample data set early in the contract period to confirm the product meets City of Melbourne requirements.

5. Technical specification

Regardless of the type of software a consultant is using to design a civil project, the As-Built spatial data must be presented in any of the available GIS formats. These include but are not limited to ESRI suite (shape, geodatabase), AutoCAD Map 3D (object data) or MapInfo (Mif, MITAB). Data up to a size of 16MB must be submitted in digital format via email. If it exceeds this size, data must be submitted on a CD, DVD or memory stick.

5.1 Road and park surfaces

Surface polygons will completely cover road reserve area, park and reserve areas as shown in Figure 2. The City of Melbourne will provide road segment and cadastral data as the base map for a subject area.

Figure 2: Road segment and cadastre

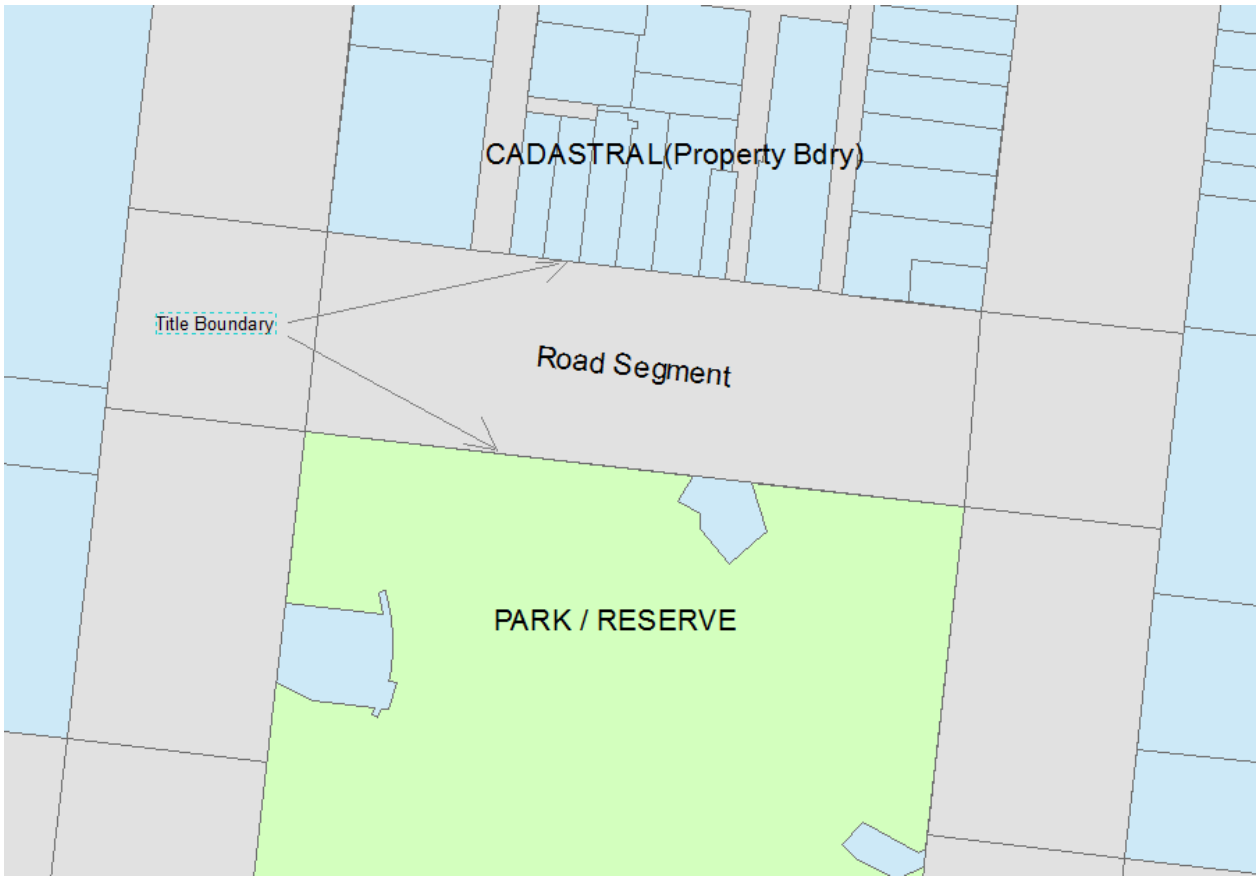
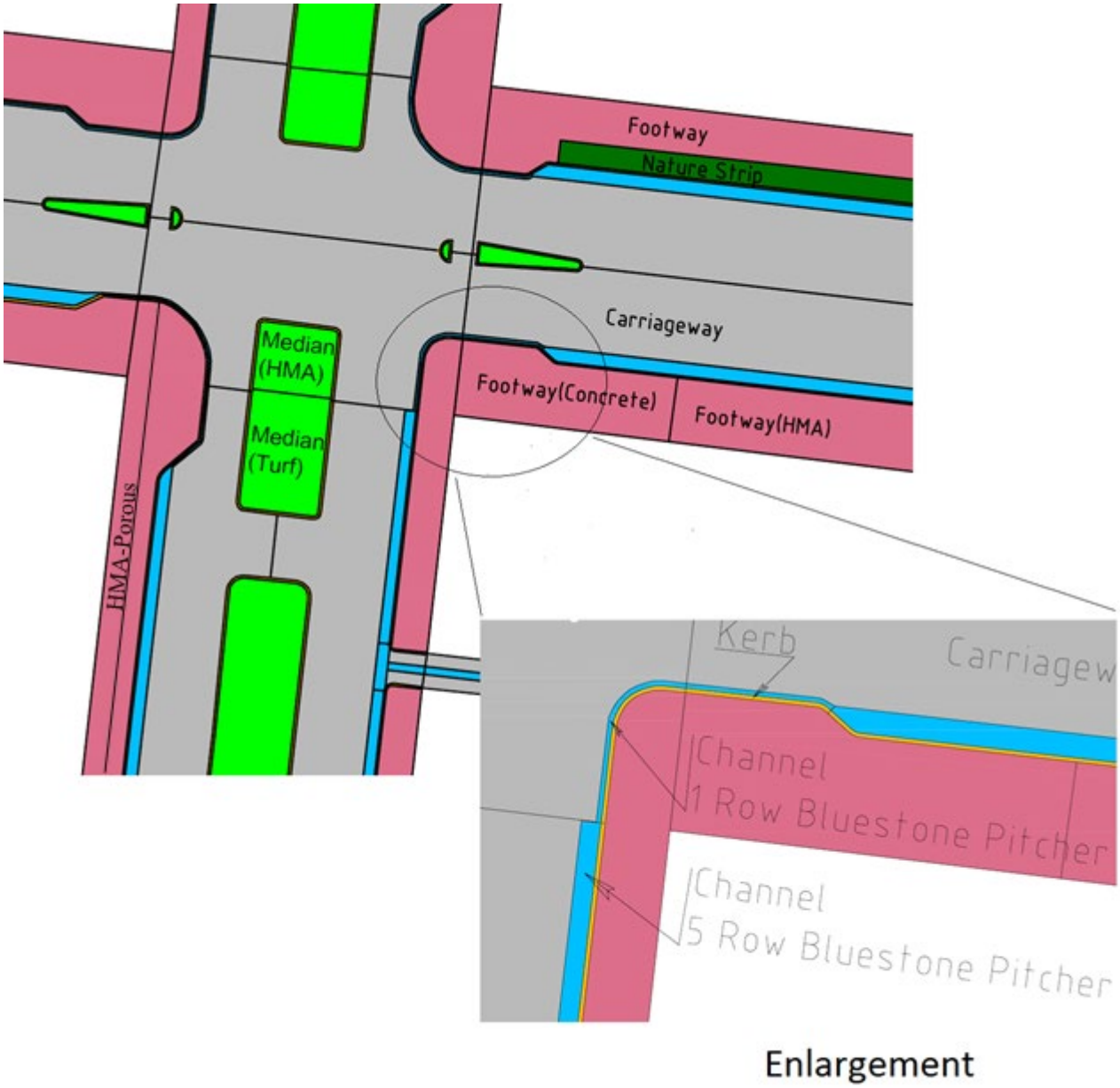


Figure 3 and Figure 4 show surface polygons within road segment and park areas. Typical sections of polygon for road and park areas are shown in Figure 5 and Figure 6.

Figure 3: Typical road surface polygons composition



Appendices 8.1, **8.2, 8.3** and **8.4** contains sample data in ESRI shape file, AutoCAD Map 3D and MapInfo MITAB format with corresponding attributes data.

Figure 4: Park surface polygons composition

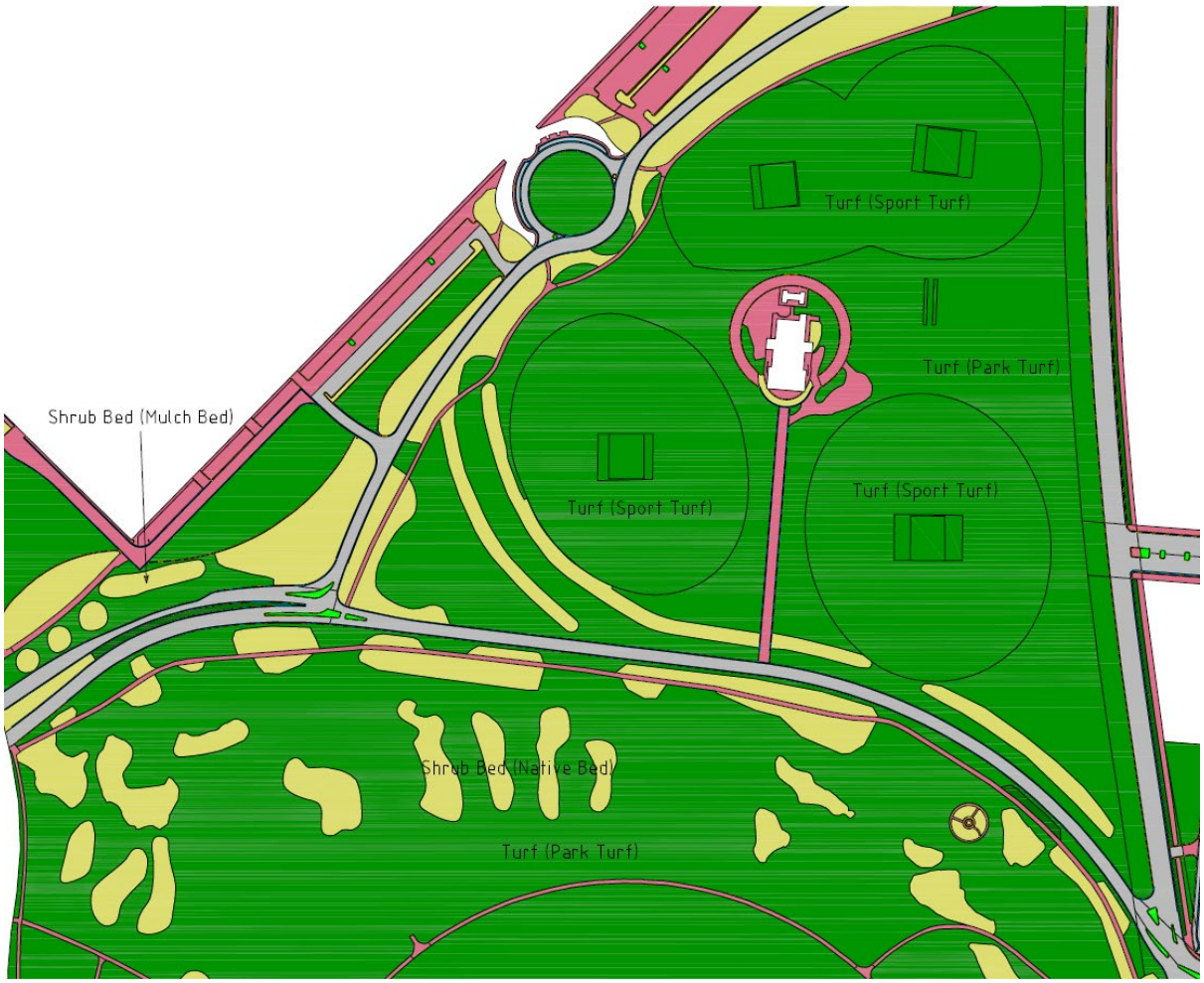
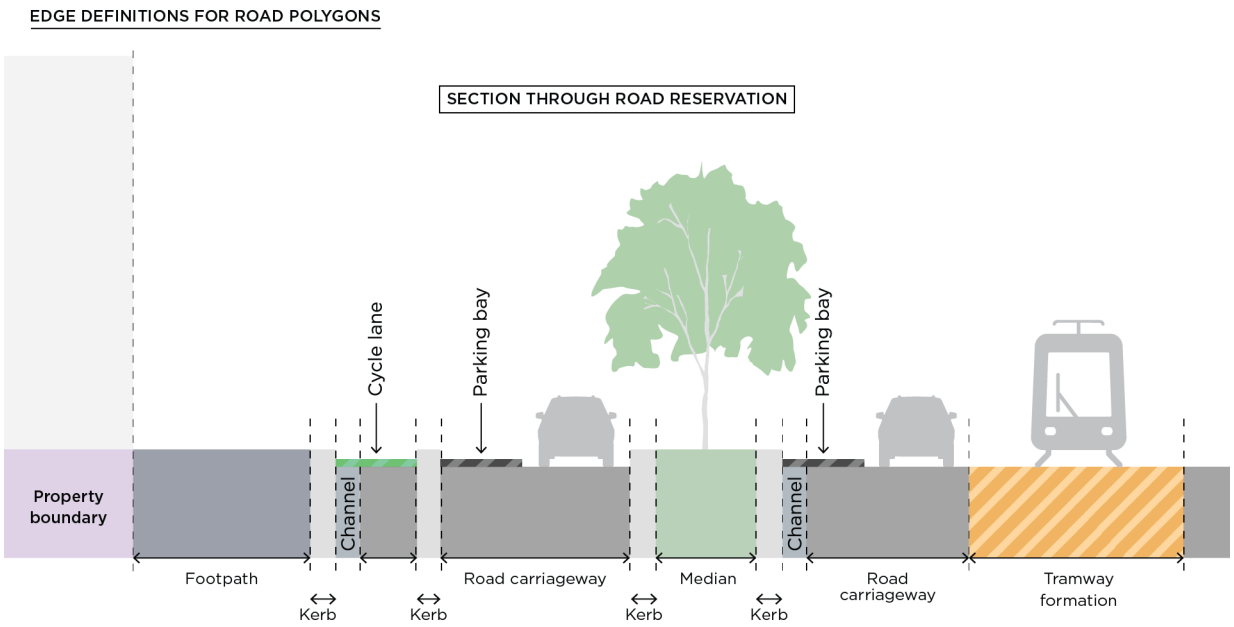
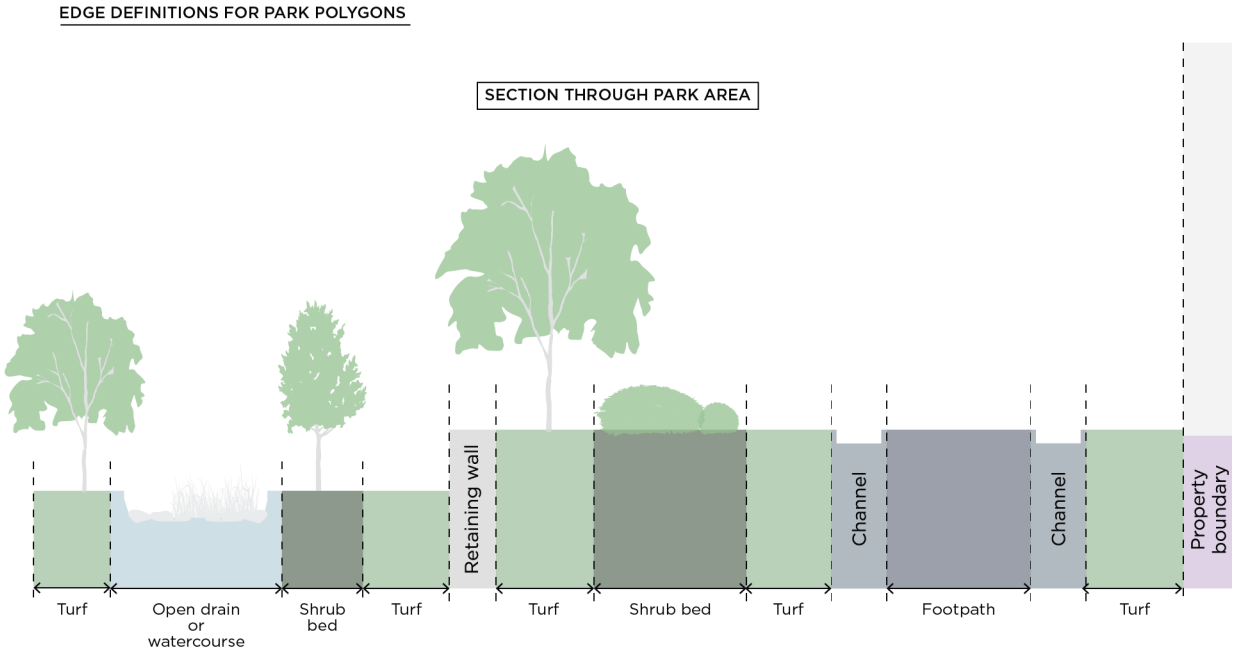


Figure 5: Typical road polygon section



Note: The Roadside may comprise both Footpath and Nature Strip polygons

Figure 6: Typical parks polygon section

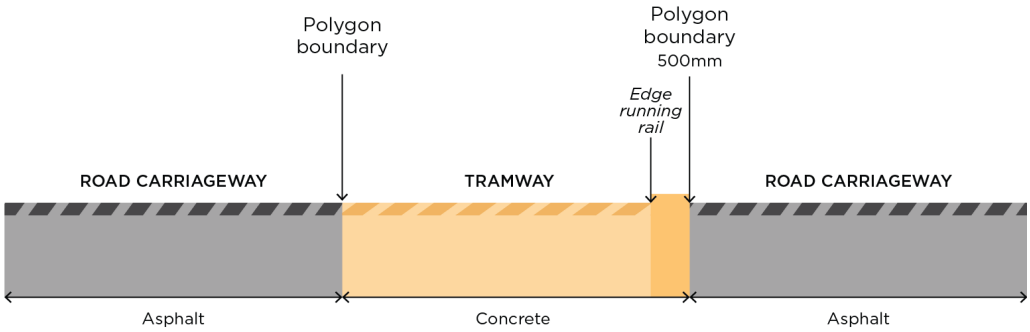


5.2 Tramways

Boundaries of tramway polygons must generally accord with the extents of the concrete tramway formation.

However, as shown in Figure 7, when the road pavement asphalt extends to the edge of the outermost tram rail, the boundaries of any tramway polygons must be created by offsetting the polygon boundary 500 mm from the running edge of the tram track nearest to the relevant roadway pavement.

Figure 7: Tramway edge definition



5.3 Railways

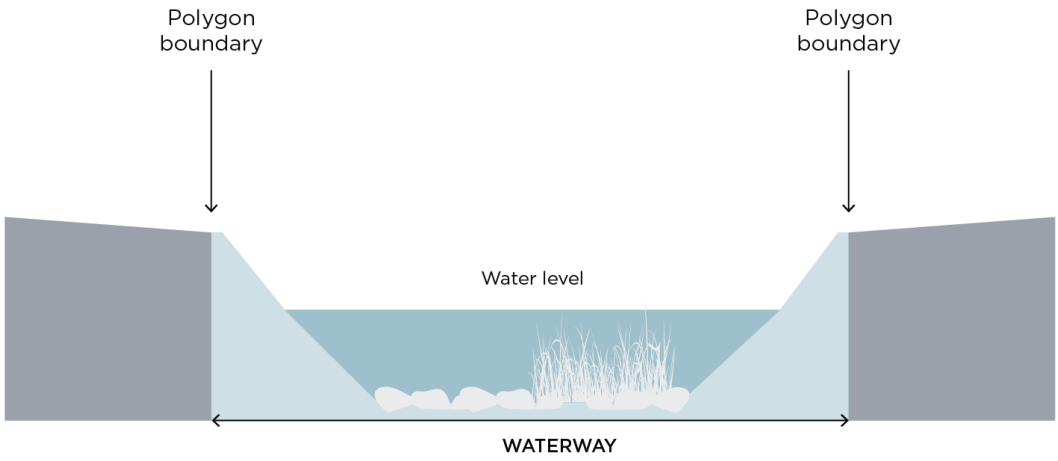
Where boundaries of railway polygons intersect road pavement polygons, the polygon intersection boundary must be created at an offset of 2,135 mm from the running edge of the outermost rail nearest to the relevant roadway pavement.

Where railway embankments abut road or park areas, the boundary of the railway polygon must coincide with either an appropriate fence or retaining wall or in their absence, with the top or toe of the embankment.

5.4 Waterways and watercourses

Polygon boundaries must accord with the edge of the embankment forming the waterway or watercourse as shown in Figure 8.

Figure 8: Waterways and watercourses



5.5 Line and point feature

Line and point features must be presented in their standard native symbols and sizes—dot and line for point and linear features respectively.

6. List of layers

Layers and their attributes are categorised according to their functions to ensure uniform data structure. Assets that are surface in nature are displayed using polygons, while smaller and singular assets such as outdoor furniture are drawn as points, and linear assets as lines.

If a layer or layers are not shown below, request direction from the Manager Park Assets or Team Leader Asset Management, depending on the project area.

6.1 Layer list

6.1.1 Surface layer

- Barrier
- Bridge
- Building
- Carriageway
- Channel
- Footpath
- Cycle Lane
- Kerb
- Median
- Nature Strip
- Parking Bay
- Playground
- Recreational
- Retaining Wall
- Shrub Bed
- Tramway
- Tree Plot
- Turf
- Water Feature
- Wharf

6.1.2 Point layer

- Banner Pole
- Barbeque
- Bicycle Rail
- Bin
- Bollard
- CCTV Camera
- Drinking Fountain
- Electrical Meter
- Electrical Pillar
- Feature Light

- Floral Crate
- Information Pillar
- Irrigation
- Litter Trap
- Parking Meter
- Pole
- Playground Equipment
- Public Light
- Pumping Station
- Recreation Equipment
- Seat
- Sign
- Stormwater Pit
- Tree
- Water Meter

6.1.3 Line layer

- Electrical Conduit
- Fence
- Gas Main
- Irrigation Line
- Optic Fibre
- Stormwater Pipe
- Sewerage Main
- Water Main

7. Attributes specification

So that consultants apply an exact attribute structure and fields and to avoid spelling errors, the City of Melbourne will provide a standard GIS data sample of the particular subject area in the format requested by consultants. 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 8.4 shows table of lookup for ***pavement makeup*** field. Consultants must use the texts with correct spelling provided in the lookup for a description of an asset material (pavement makeup). In case of texts not in the lookup, seek further instructions from the Manager Park Assets or Team Leader Asset Management.

8. Appendix

8.1 Sample ESRI (Geodatabase, Shape)

Download the ESRI shape sample area (ZIP 1.86MB)

8.2 Sample AutoCAD MAP 3D (Object Data)

Download the AutoCAD object data sample area (ZIP 630KB)

8.3 Sample MapInfo (MITAB)

Download the Map info tab sample area (ZIP 856KB)

8.4 Attribute Lookup Table

Download the Attribute Lookup Table (ZIP 8KB)

8.5 Design and Drafting Guidelines

Download the:

Design and Drafting Guidelines (PDF 122KB)

Design and Drafting Guidelines (WORD 63KB)