

Manual

**Building Information Modelling (BIM) for Intelligent
Transport Systems (ITS) Manual**

June 2025



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1 Introduction

1.1 Purpose of this manual

The Department of Transport and Main Roads (the department) has implemented Digital Engineering processes, specifically relating to Building Information Modelling (BIM) methodologies. This manual complements the existing suite of BIM documents published by the department and outlines the typical asset dataset for the department's Intelligent Transport Systems (ITS) infrastructure. This document is intended to be integral in the BIM activities that complement the *Building Information Modelling (BIM) Exchange Information Requirements* (EIR) document for asset description and information collected for major projects across Queensland. To ensure compliance, download the latest version of the EIR and associated templates and manuals.

The purpose of this manual is to ensure a standard process, notation, and level of detail is established and executed for all asset types within the context of this manual's discipline (ITS). This manual is one of a series of manuals covering multiple disciplines. If your project includes works outside of ITS, you should also use the relevant guides for those areas in the project contract documentation.

The purpose of the ITS model is to provide an asset model containing relevant information and data captured throughout the delivery stages, allowing the department to manage the asset efficiently and effectively. The preparation of the ITS model will also assist the department in construction planning, design verification and coordination, throughout delivery of the project. The ITS model aids in the collaboration and interface management between the road design, and other technical disciplines.

The ITS model shall encompass the design of the asset, in a complete three-dimensional (3D) electronic model, that is progressively developed through the design stages, inclusive of project attributes, and suitable for construction coordination and field set out.

This manual applies to the design development, construction, and presentation of As Constructed information of departmental ITS assets following the completion of the project.

This document must be read in conjunction with the *Building Information Modelling (BIM) for Transport and Main Roads Guideline* and the *Building Information Modelling (BIM) Exchange Information Requirements* included in the contract documentation.

Technical Support

The content of this manual has been developed by the Transport and Main Roads BIM team.

Technical support is available for application of the content of this manual at:

TMR_BIM_Team@tmr.qld.gov.au

1.2 Principles and objectives for Operations and Maintenance

The information collected throughout any project serves a greater purpose after the project is completed, supporting financial administration and the operations and maintenance (O&M) functions within the department. The asset attributes and their specific datasets originate from the department's recognised ITS asset management system, Road Operations Asset Register (ROAR). However, specific delivery areas may require additional information. It is recommended to consult your O&M representative for their advice when preparing the EIR and the asset requirements documentation. Project managers should be responsible for sourcing the latest ROAR Asset Data Format (ADF) template files and providing them to the relevant engineers for collecting site and asset data related to

the infrastructure being constructed. They should work closely with the district asset owners to ensure data accuracy and to resolve any queries.

2 Definition of terms

The following is a definition of terms used in this manual.

Table 2 – Definition of terms

| Term | Definition |
|-----------|---|
| 3D model | Three-dimensional digital model made of surfaces, solids and/or features representing project objects. |
| ADF | Asset Data Format (ADF) Files are Excel-formatted files for Site and Asset data entry into ROAR, following the ACH-approved nomenclature (31 October 2022). They enable rapid, automated data loading, reducing manual entry time. ADF files use a standardised format and include a user guide for support. |
| ACH | Asset Clarification Hierarchy is a formative data framework across the asset lifecycle is required to develop the maturity of the road infrastructure ITS asset management ecosystem. The Strategic Asset Management team has developed the asset classification hierarchy for ITS assets |
| Asset | An item or entity with potential or actual value to an organisation. Assets can be grouped into hierarchies for classification based on function. |
| Attribute | Data or information associated to an object, such as its name, unique identifier or material. |
| BEP | <i>BIM Execution Plan</i> (BEP). A document that outlines how a construction project will use Building Information Modelling. It includes the project's goals, team roles, data management strategies, standards, schedules, and technology requirements. |
| BIM | Building Information Model (BIM). BIM is a process for creating and managing information of a built asset throughout its whole life cycle from planning, design, construction, operations, maintenance through to demolition. Information containers may take the form of 2D, 3D, or other structured or unstructured data sources. The effective and efficient use of BIM for decision support and achievement of desired project outcomes is impacted by "when" and "why" information is used and shared. |
| BIM model | Building Information Modelling model. A 3D digital model made of surfaces, solids and/or features representing project objects carrying attribute data. |
| Component | The physical, tangible object that is a part of the ITS object, such as ITS enclosure, field processor or camera. |
| GIS | Geographic Information System (GIS). A system that integrates hardware, software, and data for capturing, managing, analysing, and displaying all forms of geographically referenced information. |
| .ifc | Industry Foundation Classes (.ifc). An open source, international standard (ISO 16739-1), which is vendor-neutral and usable across a wide range of hardware devices and software platforms. |

| Term | Definition |
|--------------------|---|
| ITS asset | An asset classified at Level 7 of the International Organisation for Standardization (ISO) asset hierarchy (ISO 55000) that provides benefits to the department in terms of economic, safety, or environmental outcomes. |
| PTU | Permission To Use (PTU) model. This can be granted pending or granted unconditional. |
| ROAR | Road Operations Asset Register (ROAR). The department's recognised asset management system for ITS assets. |
| Site | A location where assets are installed or managed, including details such as coordinates, district, type, and description. |
| Unique object code | The ITS objects in the BIM model are to be named and identified using a unique object code that contains several parts. This object code can be used to display and share important information about the asset throughout the asset's lifecycle. |

3 Referenced documents

The following is a list of documents referenced in this manual.

Table 3 – Referenced documents

| Reference | Title |
|---|---|
| Exchange Information Requirements (EIR) | Transport and Main Roads <i>Building Information Modelling (BIM) Exchange Information Requirements</i> |
| ISO 19650-1 | <i>Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) – Information management using building information modelling</i> |
| MRTS50 | <i>Specific Quality System Requirements</i> |
| MRTS56 | <i>Construction Surveying</i> |
| TMR Surveying Standards | <i>TMR Surveying Standards Part 1 – General Information</i> |
| - | <i>Building Information Modelling (BIM) for Transport and Main Roads Guideline</i> |
| - | <i>Transport and Main Roads object attributes for ITS</i> |

4 How to use this manual

This manual serves as a resource to manage the ITS elements within a project. It provides an overview of the required ITS infrastructure assets along with their respective attributes, which will make up the final project completion documentation. The creation of the 3D model is a fundamental element of the project design process. The data behind the 3D model is equal to if not more important than the model itself. This manual outlines the information requirements at each stage of the project throughout the project life.

5 ITS model preparation

The major deliverable is a complete component-based 3D model which is adequately attributed and outlines the final design geometry. The design consultant or contractor shall progressively develop the BIM model throughout the design and construction stages for the department's review at each of the

specific checkpoints (submission gates) in the project as outlined and agreed to in either the Design or Construction BIM Execution Plan (BEP).

5.1 TMR file naming convention

The department has developed a system for naming and organising information. More information on this system can be found in the *Building Information Modelling (BIM) for Transport and Main Roads Guideline*, Section 6.3 and Section 6.4 for the department's unique object coding naming convention.

5.2 ITS BIM model software

The department does not dictate the design software to be used to develop the BIM model, thereby allowing flexibility in efficiencies with already established work practices. The design consultant shall provide the model in the following formats:

- Industry Foundation Class files (IFC)
- Navisworks file (NWD)
- Navisworks Cache file (NWC), and
- Native files in the software package used to develop the model.

The design consultant may choose to use alternative software to streamline the design process. The design consultant shall provide all native modelling files used to produce the design model to the department at each submission gate.

5.3 Model geographical location

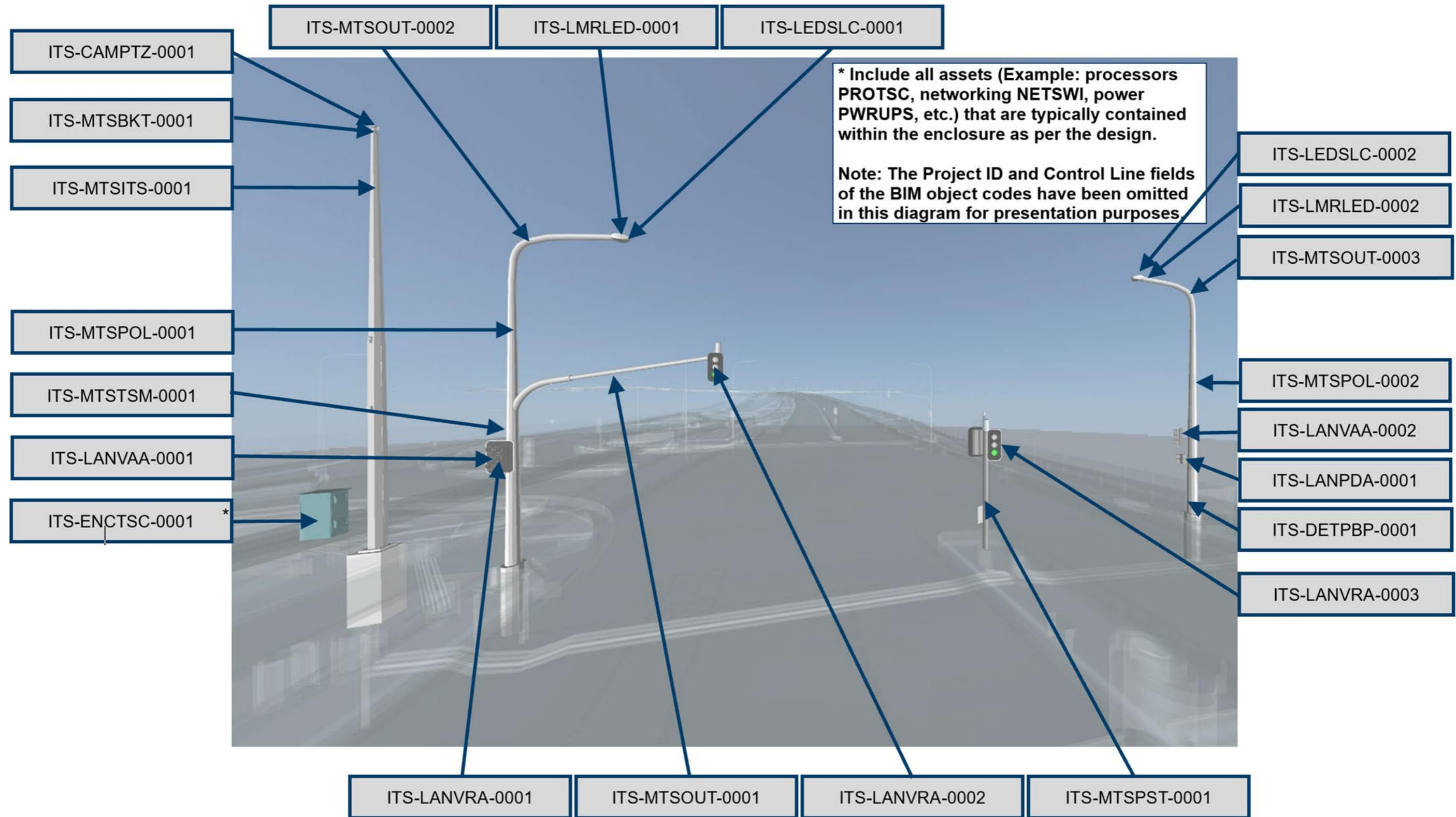
Geographic location is to conform to the requirements for Survey Datum as outlined in *TMR Surveying Standards*.

6 ITS BIM model objects

The ITS model shall encompass all elements necessary to outline the complete design and functionality of the system (refer to Figure 6.2) interface with other technical disciplines such as road design and facilitate the implementation of the project works. The components to be included in the ITS model are outlined in Appendix A.

The department will integrate the ITS model with GIS project systems, cost estimating, scheduling, component tracking, and asset management systems. To achieve this integration with a wide range of departmental systems, the objects within the ITS model shall be developed and modelled as closed surfaces and solids. Each object shall be uniquely identified (Figure 6) and organised into a logical system representing the ITS components.

Figure 6 – Object naming convention of a typical model of an intersection (Note: not all objects are labelled in this figure)



6.1 ROAR captured assets

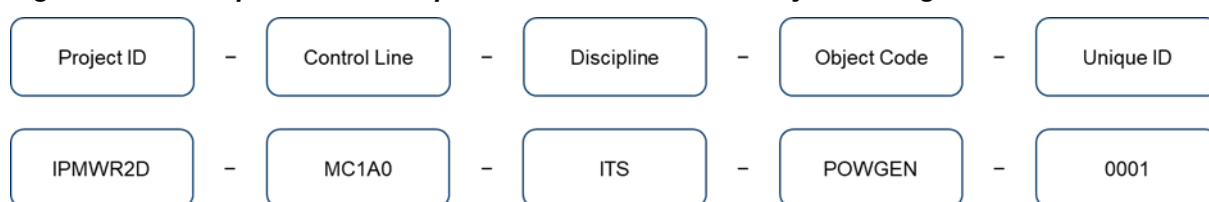
The full list of assets to be captured in the ROAR database are listed in Appendix A, to align with the ITS asset classification hierarchy depicted in Appendix B. It is expected that for asset management purposes, all asset attribute data (refer to *Transport and Main Roads object attributes for ITS*) is collected and included within the model for each asset under the ACH.

6.2 TMR Unique object code

As explained in *Building Information Modelling (BIM) for Transport and Main Roads Guideline*, components within specific discipline model files should be clearly identified by the use of a unique object code, as outlined below in Figure 6.2.

Refer to Appendix A for a detailed breakdown and example ITS unique object codes.

Figure 6.2 – Example of the Transport and Main Roads BIM object coding for civil infrastructure



Project ID = Ipswich Motorway Rocklea 2 Darra (IPMWR2D)

Control Line = MC1A0

Discipline = ITS (ITS)

Object Code = POWGEN (Power Generator)

Unique ID = 0001

Notes and string part definitions

1. The full unique object code shall be a continuous string with no spaces.
2. The full unique object code parts shall be combined using hyphens (-) to form the continuous string.

The objects in ITS model shall be numbered such that the first instance of an object along the gazettal is identified as unique number 0001. The same object shall be numbered sequentially along the gazettal. For example, the first mounting structure along the gazettal will have the unique object code: IPMWR2D-MC1A0-ITS-MTSPOL-0001, the second IPMWR2D-MC1A0-ITS-MTSPOL-0002 and so on.

The luminaire installed in the first mounting structure will have the unique object code: IPMWR2D-MC1A0-ITS-LMRLED-0001, the second IPMWR2D-MC1A0-ITS-LMRLED-0002 and so on, continuing in this sequential manner.

7 ITS BIM model attributes

The ITS model shall be developed to allow the incorporation and attachment of Project Level, Design, Construction, Manufacturer and Asset information and records to each ITS object. The minimum information required to be attributed to an ITS object is outlined within this section. The design consultant or Contractor shall prepare procedures and demonstrate the capability to attach the relevant design, construction, manufacturer and asset management information to the ITS model in the BEP. The design consultant or Contractor shall prepare procedures and demonstrate the capability to attach the relevant As Constructed (Construction) information to the ITS model in the Contractor's BEP.

7.1 Transport and Main Roads' ITS object property sets

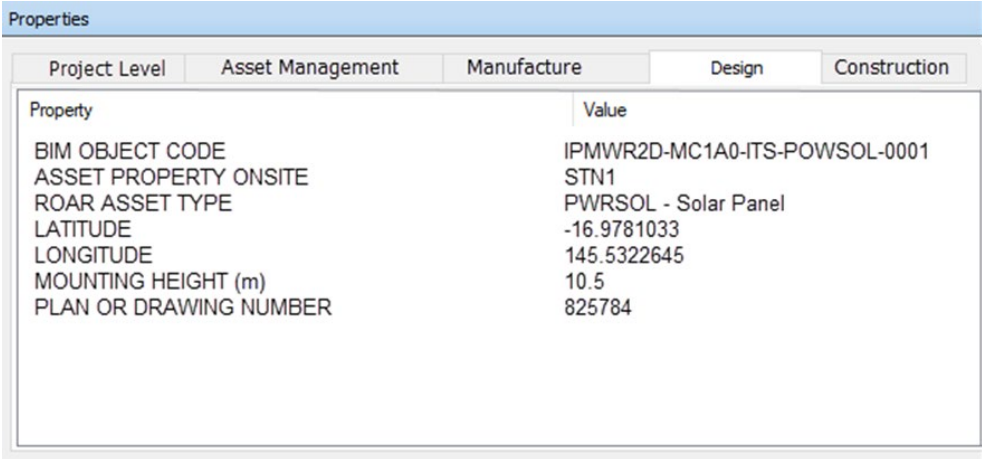
All ITS assets modelled shall include custom TMR .ifc property sets, which can be displayed in the properties window within an IFC model file viewer (refer to *Transport and Main Roads object attributes for ITS*). The attributes to be contained within the property set are defined for each object in the *Transport and Main Roads object attributes for ITS*, published on the department's website. The *Transport and Main Roads object attributes for ITS* outlines the data requirements throughout the Design, Construction, and Asset information phases. It is preferred that all construction and manufacturer attributes be included as placeholders through the design submissions and all design attributes are carried over into the As Constructed (Construction) model.

Objects within the ITS model shall be developed to have the following property sets:

- Project Level
- Design
- Construction
- Manufacture, and
- Asset Management.

The property sets shall be created and displayed as separate tabs in the properties window within an IFC model file viewer for selected objects, see Figure 7.1. The property sets are defined in the *Transport and Main Roads object attributes for ITS*, published on the departmental BIM website. For objects not listed in the *Transport and Main Roads object attributes for ITS*, the design consultant or Contractor shall prepare and submit attribute schedules for these objects to suit the needs of the project, as part of their BIM execution plan.

Figure 7.1 – Example property set tabs in an ITS model



The screenshot shows a software window titled "Properties" with five tabs: "Project Level", "Asset Management", "Manufacture", "Design", and "Construction". The "Design" tab is selected. Below the tabs is a table with two columns: "Property" and "Value".

| Property | Value |
|------------------------|-------------------------------|
| BIM OBJECT CODE | IPMWR2D-MC1A0-ITS-POWSOL-0001 |
| ASSET PROPERTY ONSITE | STN1 |
| ROAR ASSET TYPE | PWRSOL - Solar Panel |
| LATITUDE | -16.9781033 |
| LONGITUDE | 145.5322645 |
| MOUNTING HEIGHT (m) | 10.5 |
| PLAN OR DRAWING NUMBER | 825784 |

7.2 Multiple assets in one location

For instances where there may be multiple assets in one location, such as a traffic signal controller within an enclosure, it is not expected that both assets be modelled as separate objects. It is, however, required that the attribute data still be captured for each asset within the model. This shall be represented by additional property sets for a single object, with the asset type included in the property set name as outlined in Figure 7.2(a) to Figure 7.2(c).

Each object will have varying asset data requirements as per the *Transport and Main Roads object attributes for ITS*. Any deviation or variation of this process would need to be clearly outlined in the BEP so it can be assessed by the department.

Figure 7.2(a) – Object naming convention for mounting structures and luminaires

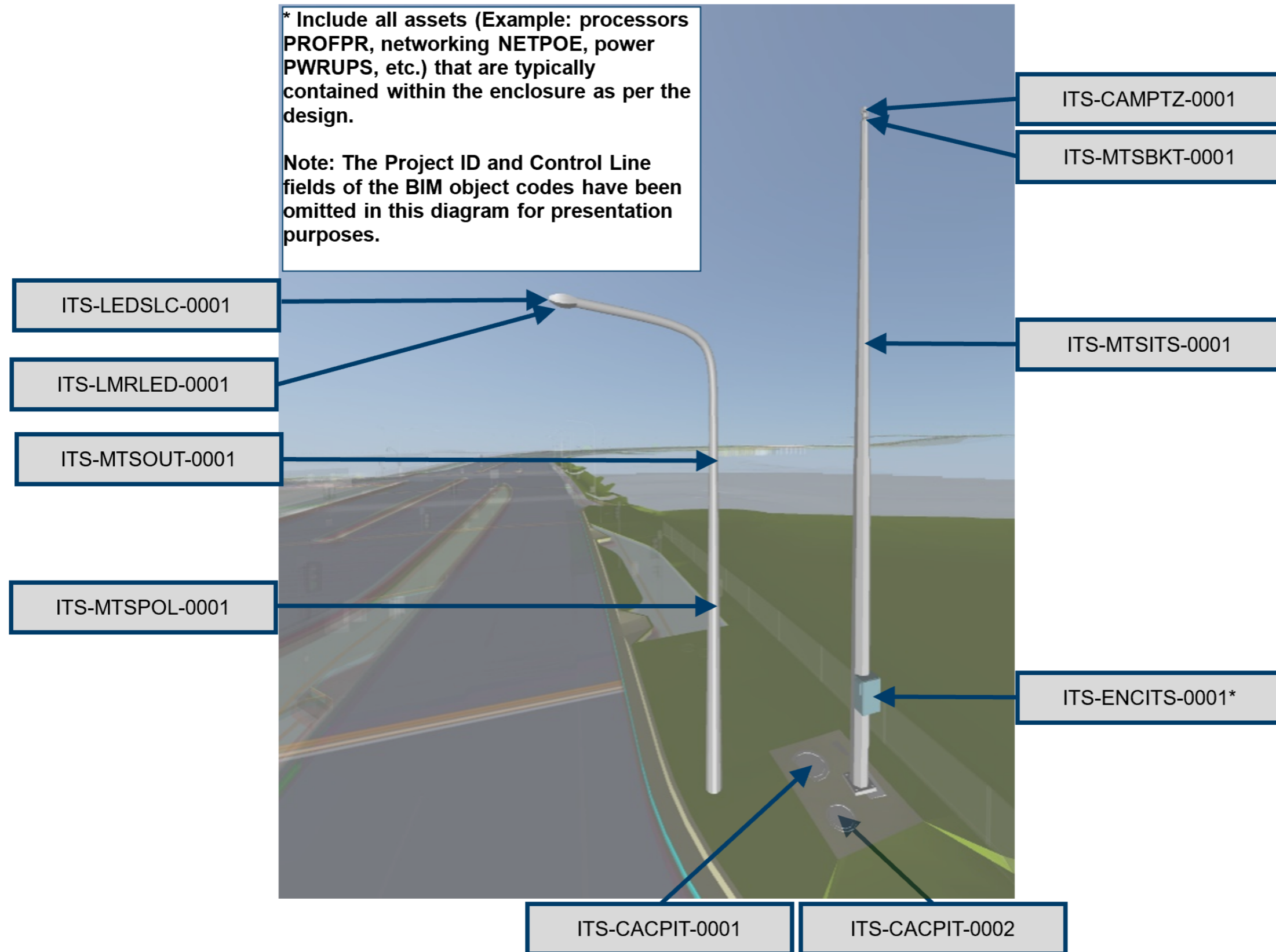


Figure 7.2(b) – Object naming convention for lighting site indicating ITS assets

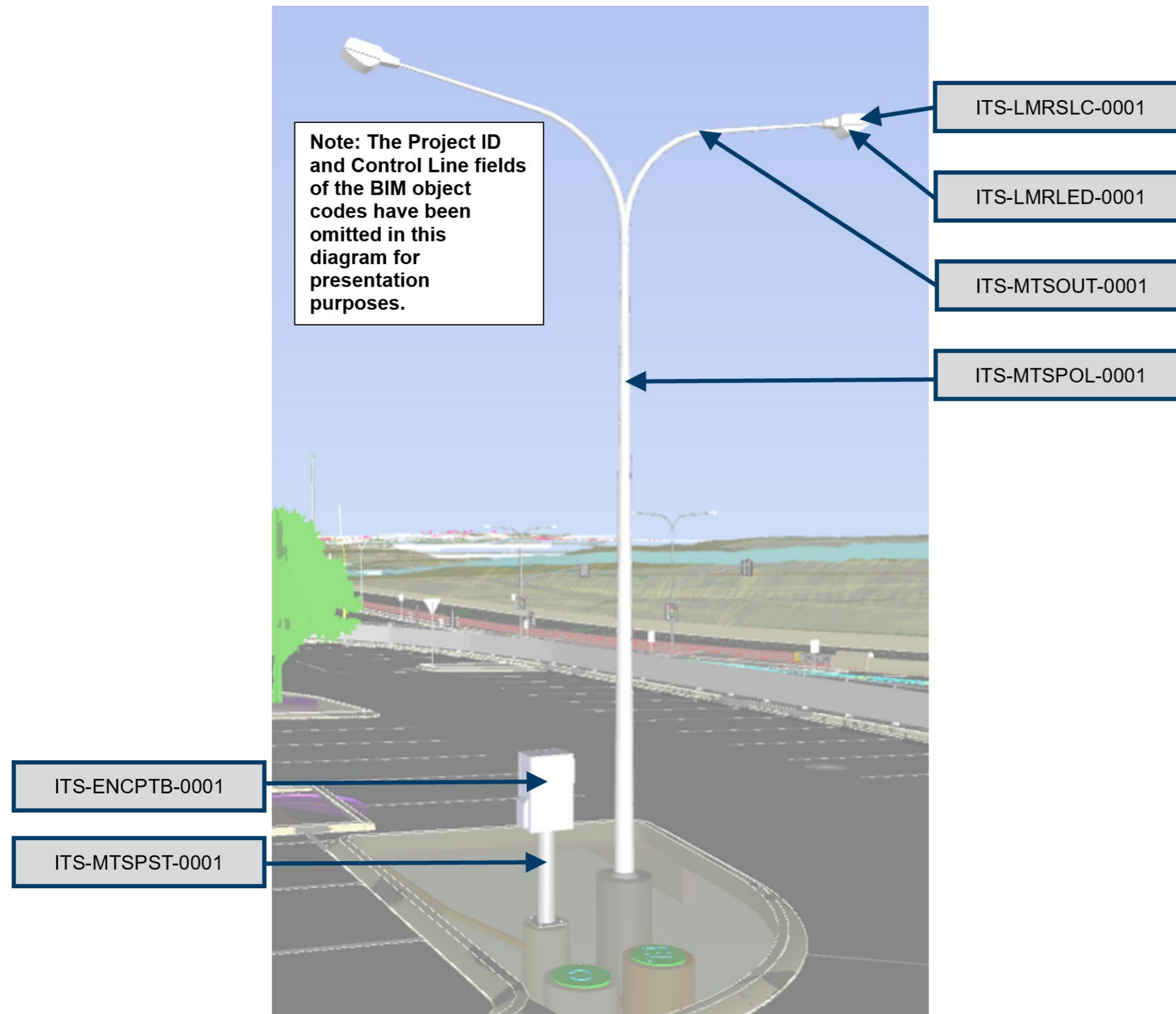
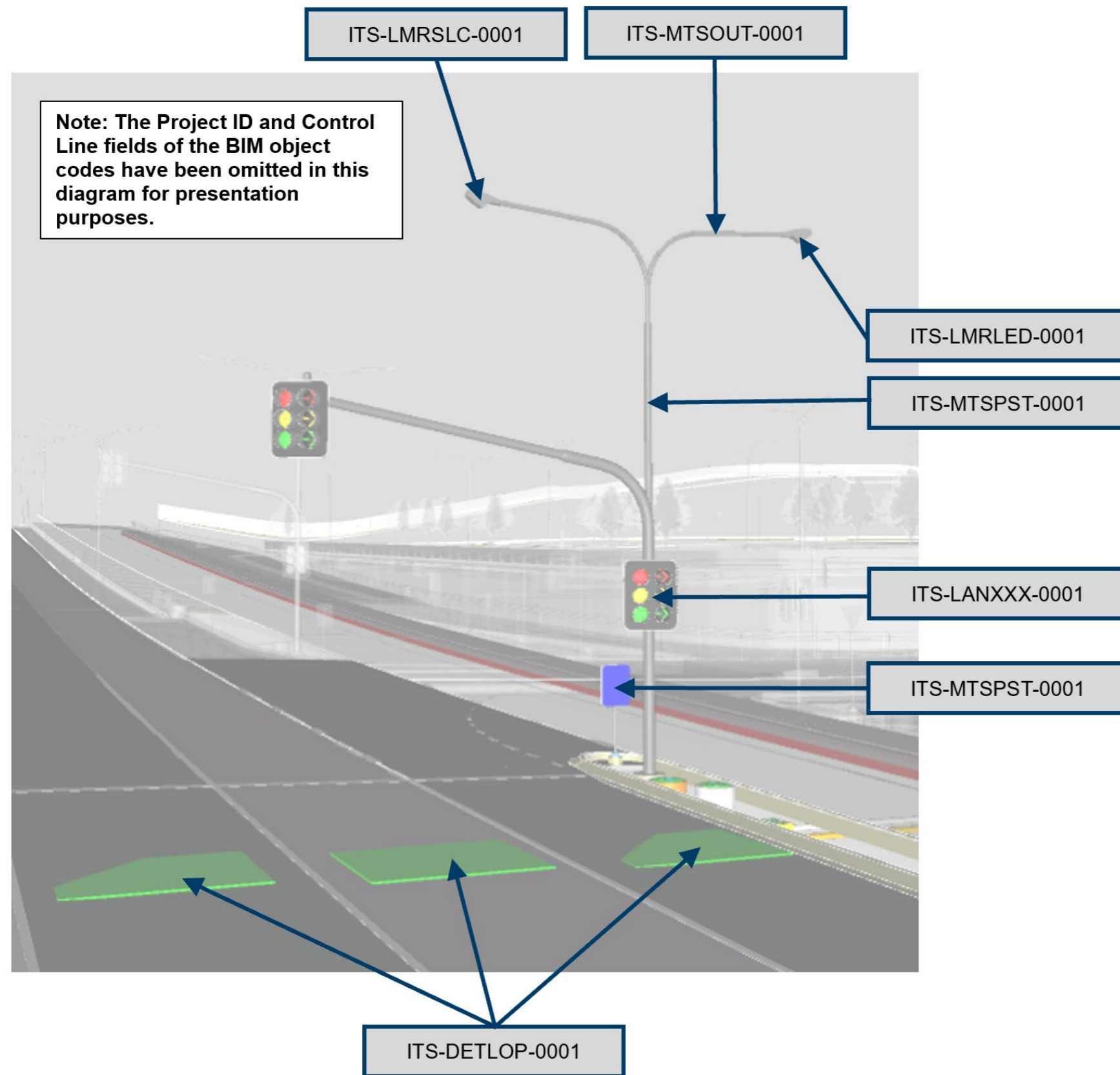


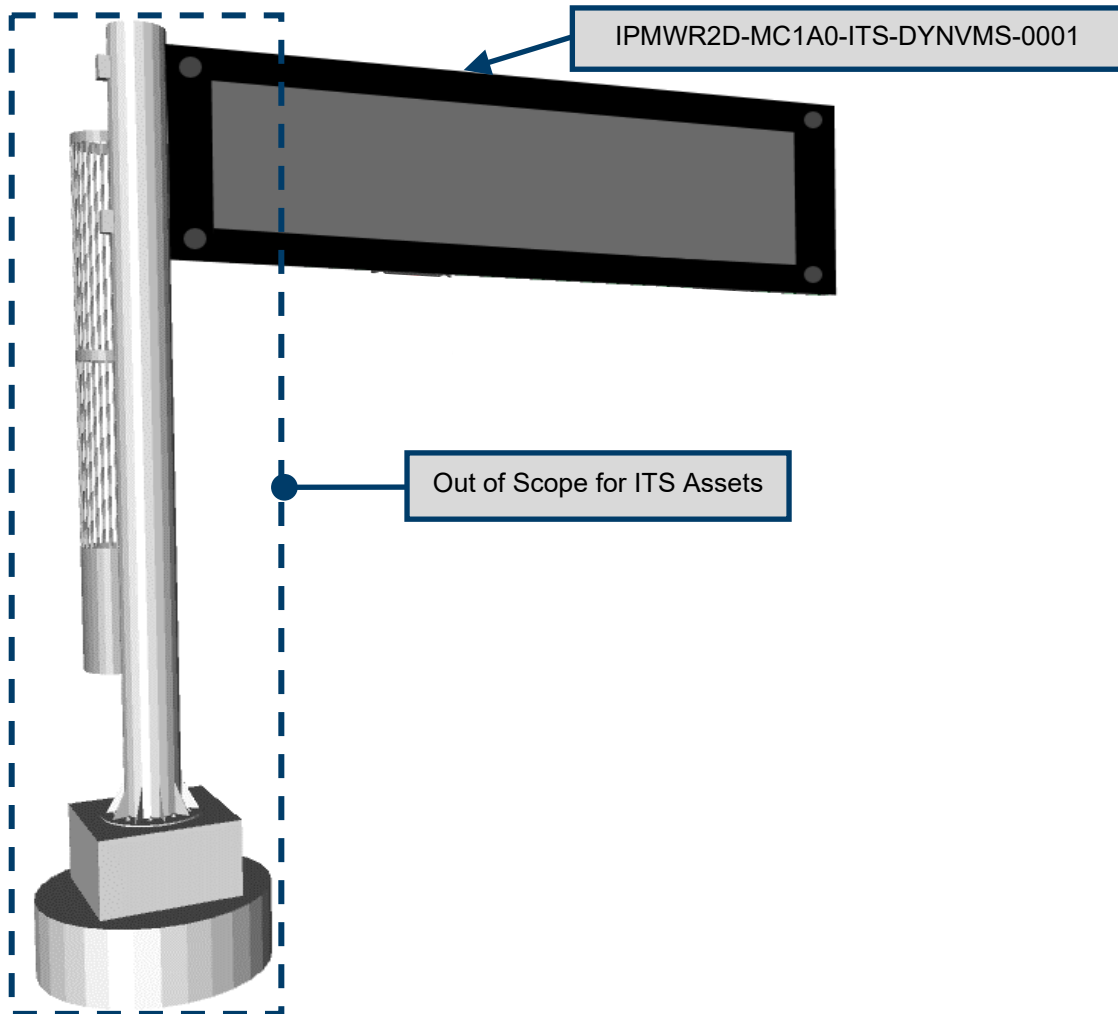
Figure 7.2(c) – Object naming convention for roundel aspect traffic signal, pedestrian aspect and lantern on post with traffic signal controller in an enclosure



7.3 Multiple disciplines in one model

For instances where an ITS model includes another discipline asset, such as a structural gantry supporting a Variable Message Sign, modelling of that asset is necessary. While this structural asset falls outside the scope of the ITS model and does not require asset data, it should still be modelled to ensure the Variable Message Sign appears complete (see Figure 7.3). However, as the gantry is a structural asset, data for the ITS model will not be required.

Figure 7.3 – Gantry Supporting a Variable Message Sign – Scope Overview



8 ITS BIM model interface with ROAR

The department intends to utilise the ITS model data to improve the efficiency of managing the state's ITS assets. ITS objects in the BIM model shall contain asset management data that aligns with the *Transport and Main Roads object attributes for ITS*. This data will be extracted from the As Constructed models and drawings and uploaded into the ROAR database.

The ROAR district user is responsible for the data within the asset management system and should be included in the delivery process of the ITS models to facilitate the data upload.

In order to facilitate this integration with the department's ROAR, objects of the ITS model shall be assigned to .ifc class `IfcDistributionControlElement`.

Any deviation or variation of this process would need to be clearly outlined in the BEP so that it can be assessed by the department.

9 ITS BIM model Level of Development

Table 9 – Level of model per development stage

| Development Stage | Required BIM Model Level of Development |
|--------------------------|---|
| Preliminary Design | <p>Initial inclusion of ITS design elements within object model.</p> <p>Unique object code assigned to all objects.</p> <p>Demonstration of development of TMR custom property sets as per <i>Transport and Main Roads object attributes for ITS</i>.</p> <p>Project Level property set and attributes applied to all ITS objects as per <i>Transport and Main Roads object attributes for ITS</i>.</p> |
| Detailed Design | <p>Finalisation of all ITS models and drawings.</p> <p>Unique object code assigned to all ITS objects.</p> <p>Design property set and attributes applied to all ITS objects as per <i>Transport and Main Roads object attributes for ITS</i>.</p> |
| Issued for Construction | <p>Resolution and close-out of any modelling, drawing, documentation issues raised in the detailed design submission that are required to undertake the final set-out, construction, and information exchange requirements under the contract.</p> <p>Model is certified Issued for Construction.</p> <p>RPEQ Certification Statement that the design model is produced accurately and is ready for handover for survey set-out. The data contained in the model is to be read in conjunction with the information supplied on the design drawings.</p> <p>RPEQ Certification attribute value completed as per <i>Transport and Main Roads object attributes for ITS</i>.</p> |
| Certified As Constructed | <p>Object based model that presents all ITS assets constructed and adheres to MRTS56 <i>Construction Surveying</i>.</p> <p>Delivered in .ifc format containing construction, manufacturer, and asset management property sets as per <i>Transport and Main Roads object attributes for ITS</i>.</p> <p>All commissioning attributes in the construction property set fully populated.</p> <p>The contractor shall provide certification that the ITS model is an accurate representation of the constructed ITS assets, in accordance with the As Constructed drawing requirements of MRTS50 <i>Specific Quality System Requirements</i>.</p> |

Appendix A: Unique object code breakdown

| Object Category | Design Object | Discipline | Object Code | Unique Object Code Example |
|-----------------------------------|-------------------------------|------------|-------------|-------------------------------|
| Power POW | Point of Supply | ITS | PWRPOS | IPMWR2D-MC1A0-ITS-PWRPOS-0001 |
| | Generator | ITS | PWRGEN | IPMWR2D-MC1A0-ITS-PWRGEN-0001 |
| | Uninterruptible Power Supply | ITS | PWRUPS | IPMWR2D-MC1A0-ITS-PWRUPS-0001 |
| | Battery | ITS | PWRBAT | IPMWR2D-MC1A0-ITS-PWRBAT-0001 |
| | Solar Panel | ITS | PWRSOL | IPMWR2D-MC1A0-ITS-PWRSOL-0001 |
| | Solar Regulator | ITS | PWRREG | IPMWR2D-MC1A0-ITS-PWRREG-0001 |
| Networking NET | Network Server | ITS | NETSER | IPMWR2D-MC1A0-ITS-NETSER-0001 |
| | Network Switch | ITS | NETSWI | IPMWR2D-MC1A0-ITS-NETSWI-0001 |
| | Network Line Card | ITS | NETLIN | IPMWR2D-MC1A0-ITS-NETLIN-0001 |
| | Ethernet Extender | ITS | NETEXT | IPMWR2D-MC1A0-ITS-NETEXT-0001 |
| | Network Media Converter | ITS | NETNMC | IPMWR2D-MC1A0-ITS-NETNMC-0001 |
| | Network Firewall | ITS | NETFIR | IPMWR2D-MC1A0-ITS-NETFIR-0001 |
| | Power over Ethernet Injector | ITS | NETPOE | IPMWR2D-MC1A0-ITS-NETPOE-0001 |
| | Network Modem | ITS | NETMOD | IPMWR2D-MC1A0-ITS-NETMOD-0001 |
| | Network Router | ITS | NETROU | IPMWR2D-MC1A0-ITS-NETROU-0001 |
| | Fibre Optic Breakout Terminal | ITS | NETFOB | IPMWR2D-MC1A0-ITS-NETFOB-0001 |
| | Fixed Wireless Device | ITS | NETFWD | IPMWR2D-MC1A0-ITS-NETFWD-0001 |
| Cabling and Containment CAC | Pits | ITS | CACPIT | IPMWR2D-MC1A0-ITS-CACPIT-0001 |
| | Conduits | ITS | CACCON | IPMWR2D-MC1A0-ITS-CACCON-0001 |
| | Cables | ITS | CACCAB | IPMWR2D-MC1A0-ITS-CACCAB-0001 |

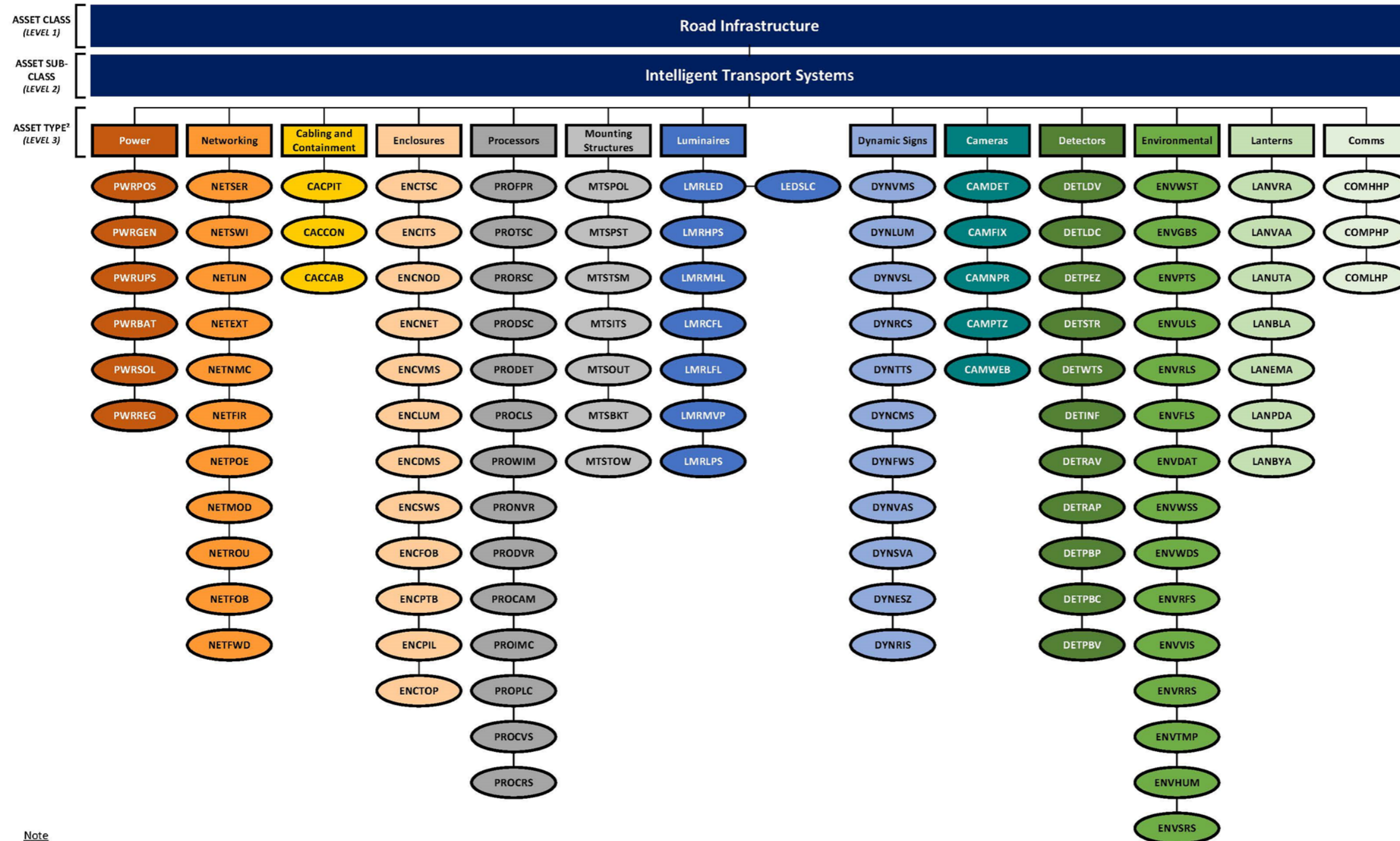
| Object Category | Design Object | Discipline | Object Code | Unique Object Code Example |
|-------------------|--|------------|-------------|--------------------------------|
| Enclosures ENC | Traffic Signal Controller Enclosure | ITS | ENCTSC | IPMWR2D-MC1A0-ITS-ENCTSC-0001 |
| | Intelligent Transport System Enclosure | ITS | ENCITS | IPMWR2D-MC1A0-ITS-ENCITS-0001 |
| | Network Node Enclosure | ITS | ENCNOD | IPMWR2D-MC1A0-ITS-ENCNOD-0001 |
| | Enclosure Containing Network Assets | ITS | ENCNET | IPMWR2D-MC1A0-ITS-ENCNET-0001 |
| | Enclosure for Variable Message Sign | ITS | ENCVMS | IPMWR2D-MC1A0-ITS-ENCVMS-0001 |
| | Enclosure for Lane Use Management Sign | ITS | ENCLUM | IPMWR2D-MC1A0-ITS-ENCLUM-0001 |
| | Enclosure for Dynamic Message Sign | ITS | ENCDMS | IPMWR2D-MC1A0-ITS-ENCDMS-0001 |
| | Enclosure for Speed Warning Sign | ITS | ENCSSWS | IPMWR2D-MC1A0-ITS-ENCSSWS-0001 |
| | Enclosure for Fibre Optic Breakout | ITS | ENCFOB | IPMWR2D-MC1A0-ITS-ENCFOB-0001 |
| | Post Top Box Enclosure for Switchboard | ITS | ENCPTB | IPMWR2D-MC1A0-ITS-ENCPTB-0001 |
| | Pillar Box Enclosure for Switchboard | ITS | ENCPIB | IPMWR2D-MC1A0-ITS-ENCPIB-0001 |
| | Top Hat Enclosure | ITS | ENCTOP | IPMWR2D-MC1A0-ITS-ENCTOP-0001 |
| Processors PRO | Field Processor | ITS | PROFPR | IPMWR2D-MC1A0-ITS-PROFPR-0001 |
| | Traffic Signal Controller | ITS | PROTSC | IPMWR2D-MC1A0-ITS-PROTSC-0001 |
| | Ramp Signal Controller | ITS | PRORSC | IPMWR2D-MC1A0-ITS-PRORSC-0001 |
| | Dynamic Sign Controller | ITS | PRODSC | IPMWR2D-MC1A0-ITS-PRODSC-0001 |
| | Detector Unit | ITS | PRODET | IPMWR2D-MC1A0-ITS-PRODET-0001 |
| | Classifier Unit | ITS | PROCLS | IPMWR2D-MC1A0-ITS-PROCLS-0001 |
| | Weigh in Motion Unit | ITS | PROWIM | IPMWR2D-MC1A0-ITS-PROWIM-0001 |
| | Network Video Recorder | ITS | PRONVR | IPMWR2D-MC1A0-ITS-PRONVR-0001 |
| | Digital Video Recorder | ITS | PRODVR | IPMWR2D-MC1A0-ITS-PRODVR-0001 |
| | Camera Encoder | ITS | PROCAM | IPMWR2D-MC1A0-ITS-PROCAM-0001 |
| | Industrial Media Converter | ITS | PROIMC | IPMWR2D-MC1A0-ITS-PROIMC-0001 |
| | Programmable Logic Controller | ITS | PROPLC | IPMWR2D-MC1A0-ITS-PROPLC-0001 |
| | Cooperative-ITS Vehicle Station | ITS | PROCVS | IPMWR2D-MC1A0-ITS-PROCVS-0001 |
| | Cooperative-ITS Roadside Station | ITS | PROCRS | IPMWR2D-MC1A0-ITS-PROCRS-0001 |

| Object Category | Design Object | Discipline | Object Code | Unique Object Code Example |
|----------------------------|---|------------|-------------------------------|-------------------------------|
| Mounting Structures MTS | Pole | ITS | MTSPOL | IPMWR2D-MC1A0-ITS-MTSPOL-0001 |
| | Post | ITS | MTSPST | IPMWR2D-MC1A0-ITS-MTSPST-0001 |
| | Traffic Signal Mast Arm | ITS | MTSTSM | IPMWR2D-MC1A0-ITS-MTSTSM-0001 |
| | Intelligent Transport System Pole | ITS | MTSITS | IPMWR2D-MC1A0-ITS-MTSITS-0001 |
| | Outreach Arm | ITS | MTSOUT | IPMWR2D-MC1A0-ITS-MTSOUT-0001 |
| | Bracket | ITS | MTSBKT | IPMWR2D-MC1A0-ITS-MTSBKT-0001 |
| | Tower | ITS | MTSTOW | IPMWR2D-MC1A0-ITS-MTSTOW-0001 |
| Luminaires LMR | Light Emitting Diode | ITS | LMRLED | IPMWR2D-MC1A0-ITS-LMRLED-0001 |
| | High Pressure Sodium | ITS | LMRHPS | IPMWR2D-MC1A0-ITS-LMRHPS-0001 |
| | Metal Halide | ITS | LMRMHL | IPMWR2D-MC1A0-ITS-LMRMHL-0001 |
| | Compact Fluorescent | ITS | LMRCFL | IPMWR2D-MC1A0-ITS-LMRCFL-0001 |
| | Linear Fluorescent | ITS | LMRLFL | IPMWR2D-MC1A0-ITS-LMRLFL-0001 |
| | Mercury Vapour | ITS | LMRMVP | IPMWR2D-MC1A0-ITS-LMRMVP-0001 |
| | Low Pressure Sodium | ITS | LMRLPS | IPMWR2D-MC1A0-ITS-LMRLPS-0001 |
| | Smart Lighting Controller | ITS | LEDSLC | IPMWR2D-MC1A0-ITS-LEDSLC-0001 |
| Dynamic Signs DYN | Variable Message Sign | ITS | DYNVMS | IPMWR2D-MC1A0-ITS-DYNVMS-0001 |
| | Lane Use Management Sign | ITS | DYNLUM | IPMWR2D-MC1A0-ITS-DYNLUM-0001 |
| | Variable Speed Limit Sign | ITS | DYNVSL | IPMWR2D-MC1A0-ITS-DYNVSL-0001 |
| | Road Condition Information Sign | ITS | DYNRCS | IPMWR2D-MC1A0-ITS-DYNRCS-0001 |
| | Travel Time Sign | ITS | DYNTTS | IPMWR2D-MC1A0-ITS-DYNTTS-0001 |
| | Changeable Message Sign | ITS | DYNCMS | IPMWR2D-MC1A0-ITS-DYNCMS-0001 |
| | Flashing Warning Sign | ITS | DYNFWS | IPMWR2D-MC1A0-ITS-DYNFWS-0001 |
| | Vehicle Activated Sign | ITS | DYNVAS | IPMWR2D-MC1A0-ITS-DYNVAS-0001 |
| | Enhanced School Zone Vehicle Activated Sign | ITS | DYNSVA | IPMWR2D-MC1A0-ITS-DYNSVA-0001 |
| | Enhanced School Zone Speed Limit Sign | ITS | DYNESZ | IPMWR2D-MC1A0-ITS-DYNESZ-0001 |
| Ramp Information Sign | ITS | DYNRIS | IPMWR2D-MC1A0-ITS-DYNRIS-0001 | |

| Object Category | Design Object | Discipline | Object Code | Unique Object Code Example |
|------------------|---|------------|-------------|---------------------------------|
| Cameras CAM | Detection Camera | ITS | CAMDET | IPMWR2D-MC1A0-ITS-CAMDET-0001 |
| | Fixed Camera (Non-Web) | ITS | CAMFIX | IPMWR2D-MC1A0-ITS-CAMFIX-0001 |
| | Automatic Number Plate Recognition Camera | ITS | CAMNPR | IPMWR2D-MC1A0-ITS-CAMNPR-0001 |
| | Pan, Tilt and Zoom Camera | ITS | CAMP TZ | IPMWR2D-MC1A0-ITS-CAMP TZ-0001 |
| | Fixed Web Camera | ITS | CAMWEB | IPMWR2D-MC1A0-ITS-CAMWEB-0001 |
| Detectors DET | Loop Detector for Vehicles | ITS | DETL DV | IPMWR2D-MC1A0-ITS-DETL DV-0001 |
| | Loop Detector for Cyclists | ITS | DETL DC | IPMWR2D-MC1A0-ITS-DETL DC-0001 |
| | Piezoelectric Detector | ITS | DETP EZ | IPMWR2D-MC1A0-ITS-DETP EZ-0001 |
| | Strain Gauge Detector | ITS | DETP STR | IPMWR2D-MC1A0-ITS-DETP STR-0001 |
| | Wireless Traffic Sensor | ITS | DETP WTS | IPMWR2D-MC1A0-ITS-DETP WTS-0001 |
| | Infrared Detector | ITS | DETP INF | IPMWR2D-MC1A0-ITS-DETP INF-0001 |
| | Radar Detector for Vehicles | ITS | DETP RAV | IPMWR2D-MC1A0-ITS-DETP RAV-0001 |
| | Radar Detector for Pedestrians | ITS | DETP RAP | IPMWR2D-MC1A0-ITS-DETP RAP-0001 |
| | Push Button Detector for Pedestrians | ITS | DETP BPB | IPMWR2D-MC1A0-ITS-DETP BPB-0001 |
| | Push Button Detector for Cyclists | ITS | DETP PBC | IPMWR2D-MC1A0-ITS-DETP PBC-0001 |
| | Push Button Detector for Vehicle Access | ITS | DETP BV | IPMWR2D-MC1A0-ITS-DETP BV-0001 |

| Object Category | Design Object | Discipline | Object Code | Unique Object Code Example |
|-----------------------|----------------------------|------------|-------------|-------------------------------|
| Environmental ENV | Weather Station | ITS | ENVWTS | IPMWR2D-MC1A0-ITS-ENVWTS-0001 |
| | Gas Bubbler Station | ITS | ENVGBS | IPMWR2D-MC1A0-ITS-ENVGBS-0001 |
| | Pressure Transducer Sensor | ITS | ENVPTS | IPMWR2D-MC1A0-ITS-ENVPTS-0001 |
| | Ultrasonic Level Sensor | ITS | ENVULS | IPMWR2D-MC1A0-ITS-ENVULS-0001 |
| | Radar Level Sensor | ITS | ENVRLS | IPMWR2D-MC1A0-ITS-ENVRLS-0001 |
| | Float Level Sensor | ITS | ENVFLS | IPMWR2D-MC1A0-ITS-ENVFLS-0001 |
| | Data Logger | ITS | ENVDAT | IPMWR2D-MC1A0-ITS-ENVDAT-0001 |
| | Wind Speed Sensor | ITS | ENVWSS | IPMWR2D-MC1A0-ITS-ENVWSS-0001 |
| | Wind Direction Sensor | ITS | ENVWDS | IPMWR2D-MC1A0-ITS-ENVWDS-0001 |
| | Rainfall Sensor | ITS | ENVRFS | IPMWR2D-MC1A0-ITS-ENVRFS-0001 |
| | Visibility Sensor | ITS | ENVVIS | IPMWR2D-MC1A0-ITS-ENVVIS-0001 |
| | Remote Road Sensor | ITS | ENVRRS | IPMWR2D-MC1A0-ITS-ENVRRS-0001 |
| | Temperature Sensor | ITS | ENVTMP | IPMWR2D-MC1A0-ITS-ENVTMP-0001 |
| | Humidity Sensor | ITS | ENVHUM | IPMWR2D-MC1A0-ITS-ENVHUM-0001 |
| | Solar Radiation Sensor | ITS | ENVSRS | IPMWR2D-MC1A0-ITS-ENVSRS-0001 |
| Lanterns LAN | Vehicle Roundel Aspect | ITS | LANVRA | IPMWR2D-MC1A0-ITS-LANVRA-0001 |
| | Vehicle Arrow Aspect | ITS | LANVAA | IPMWR2D-MC1A0-ITS-LANVAA-0001 |
| | U-Turn Aspect | ITS | LANUTA | IPMWR2D-MC1A0-ITS-LANUTA-0001 |
| | Bus Lane Aspect | ITS | LANBLA | IPMWR2D-MC1A0-ITS-LANBLA-0001 |
| | Emergency Aspect | ITS | LANEMA | IPMWR2D-MC1A0-ITS-LANEMA-0001 |
| | Pedestrian Aspect | ITS | LANPDA | IPMWR2D-MC1A0-ITS-LANPDA-0001 |
| | Bicycle Aspect | ITS | LANBYA | IPMWR2D-MC1A0-ITS-LANBYA-0001 |
| Communications COM | Handset Help Phone | ITS | COMHHP | IPMWR2D-MC1A0-ITS-COMHHP-0001 |
| | Push-to-Talk Help Phone | ITS | COMPHP | IPMWR2D-MC1A0-ITS-COMPHP-0001 |
| | Loud Speaking Help Phone | ITS | COMLHP | IPMWR2D-MC1A0-ITS-COMLHP-0001 |

Appendix B: Road infrastructure ITS asset classification hierarchy



Note
 1. This Asset Classification Hierarchy aligns with Table 1 from the Transport Infrastructure Asset Management Policy (TIAMP). This hierarchy forms part of the Mechanical & Electrical Asset Sub-Class as per the TIAMP.
 2. The Asset Type(s) listed represent the ITS Assets as per the TIAMP.
 3. Level 1, Level 2 and Level 3 are defined as per Austroads document AP-R577-18, Figure 2.1.

