Owners Technical Requirements (OTR)

Infrastructure Asset Data
Submission Specifications and
Procedures

SFU Facilities Services

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## Contents

1. Introduction and Overview ................................................................. 3  
2. Technical Background ........................................................................ 3  
   2.1. Infrastructure Project Data .............................................................. 3  
3. Asset Data Submission Standards ....................................................... 4  
   3.1. Project Data Overview ................................................................. 4  
   3.2. Data Provided by SFU at Project Start ........................................... 4  
   3.3. Object Data Tables ...................................................................... 5  
      3.3.1. Object Data Table CBAS ......................................................... 6  
      3.3.2. Object Data Table FITT ......................................................... 6  
      3.3.3. Object Data Table HYDR ....................................................... 7  
      3.3.4. Object Data Table ILLM ........................................................ 7  
      3.3.5. Object Data Table MHOL ....................................................... 7  
      3.3.6. Object Data Table PAVE ......................................................... 8  
      3.3.7. Object Data Table PIPE ......................................................... 8  
      3.3.8. Object Data Table SRVC ......................................................... 8  
      3.3.9. Object Data Table VALV ......................................................... 9  
      3.3.10. Object Data Table WALK .................................................... 9  
   3.4. Existing Recorded Assets ......................................................... 9  
   3.5. Design Recorded Assets ............................................................ 10  
   3.6. Construction Recorded Assets ................................................... 10  
      3.6.1. Sanitary Sewer Naming Conventions ..................................... 10  
      3.6.2. Storm Drainage ................................................................. 11  
      3.6.3. Water ............................................................................ 11  
4. Infrastructure Project Data Structure and Deliverable Requirements .......... 11  
   4.1. Existing Recorded Asset Drawing ............................................... 12  
   4.2. Survey Recorded Assets ............................................................ 12  
   4.3. Design Recorded Assets Drawing ................................................. 13  
   4.4. Construction Recorded Assets Drawing ....................................... 13  
   4.5. Recommended Drawing Structure .............................................. 14
1. Introduction and Overview

This document describes Owners Technical Requirements (OTR) and procedures for providing SFU Facilities Services with data representing existing and new infrastructure assets upon construction completion of infrastructure design and construction projects.

Asset data required by SFU Facilities Services to enable efficient lifecycle management practices for infrastructure and to meet TCA requirements by accounting for infrastructure on financial statements.

2. Technical Background

SFU Facilities Services infrastructure asset data submission standards and procedures outlined in this document were developed to facilitate the transfer of infrastructure data to SFU Facilities Services upon the completion of construction of infrastructure projects. Data is not only required for newly constructed infrastructure assets, but also for existing infrastructure that has been affected by the project.

SFU Facilities Services has adopted the MMCD Municipal CAD Standard and will require consultants to use this standard when working on infrastructure design projects. The standard makes use of AutoCAD Map 3D object data to accommodate asset attribution. Consultants engaged with infrastructure design and construction projects must obtain SFU Facilities Services CAD Standard files directly from SFU Facilities Services and not from MMCD, as they have been amended with SFU specific items.

AutoCAD Civil 3D can be used to design sanitary sewer, storm drainage and watermain pipe networks but is not required. The benefit in using AutoCAD Civil 3D is reduced physical property and material data entry in the AutoCAD Map 3D object data tables.

2.1. Infrastructure Project Data

The 4 sets of data created for each infrastructure project upon construction completion are summarized in the following bullets:

1. **Existing Recorded Assets – (by SFU and Consultant)** – existing infrastructure data sourced from SFU GIS in an AutoCAD drawing for the project area using R-* layers in the SFU MMCD C3D drawing template.

2. **Survey Recorded Assets (by Consultant)** – surveyed infrastructure asset data sourced from consultants pre-engineering topographic surveys in AutoCAD Civil 3D drawing using V-* layers in SFU MMCD C3D drawing template.

3. **Design Recorded Assets (by Consultant)** – proposed infrastructure design data created by consultants in AutoCAD Civil 3D drawing using C-* layers in SFU Facilities Services MMCD C3D drawing template.

4. **Construction Recorded Assets (by Consultant)** – asset data representative of as constructed conditions created by consultants in AutoCAD Civil 3D drawing using C-* layers in SFU Facilities Services MMCD C3D drawing template.

The Construction Recorded Assets drawing is created by updating a renamed copy of the Design Recorded Assets drawing. These updates include i) addition of new assets not accounted for during the design ii) updating design asset data to reflect constructed conditions iii) removal of asset data identified in the design but not constructed and iv) attachment of Map 3D object data tables with attribution to constructed assets.
3. Asset Data Submission Standards

The following sections summarize SFU Facilities Services asset data submission standards.

3.1. Project Data Overview

This section summarizes the specific items that constitute an infrastructure design and construction package created with SFU MMCD Municipal CAD Standard.

The benefit to consultants using AutoCAD Civil 3D pipe networks (pipe and structure objects) to model sanitary, storm and watermain infrastructure is that the physical properties of pipes and structures are extracted from the LandXML file created from AutoCAD Civil 3D pipe networks. Using AutoCAD Civil 3D objects means that consultants are not required to enter physical properties in the AutoCAD Map 3D object data tables.

Sanitary, storm and watermain designs represented with AutoCAD polylines and blocks require consultants to enter physical properties for pipes and structures in the AutoCAD Map 3D object data tables.

The following list of deliverables is to be provided by the consultant to SFU Facilities Services once construction is complete:

1. **Existing Recorded Assets Drawing** – this AutoCAD drawing contains information on existing assets and is modified by the consultant to indicate the assets that have been affected (improved, removed, abandoned) by the project.

2. **Survey Recorded Assets Drawing** – this AutoCAD Civil 3D drawing created from the SFU MMCD Civil 3D drawing template contains the pre-engineering base plan and existing ground surface model, and is used by SFU Facilities Services to validate the location of existing assets in the GIS that are not affected by the project.

3. **Design Recorded Assets Drawing** – the AutoCAD Civil 3D design model drawing created from the SFU MMCD Civil 3D drawing template containing proposed sanitary sewer, storm drain, watermain and road design.

4. **Construction Recorded Drawing** – a copy of the original design recorded drawing is used to record details of newly constructed infrastructure assets. Attribution of new assets is completed using AutoCAD Map 3D object data tables.

5. **LandXML File for Pipe Networks** – a LandXML containing pipe network data is required to provide physical properties for sanitary, storm and watermain modeled using AutoCAD Civil 3D pipe networks. Using AutoCAD Civil 3D to design pipe networks means that consultants are not required to enter pipe and structure physical properties in the AutoCAD Map 3D object data tables.

6. **Production Drawings** – production drawings source data from the design model drawings and are representative of the final plans that make up a design and construction drawing set.

All drawings are to be provided in AutoCAD or AutoCAD Civil 3D release 2016.

3.2. Data Provided by SFU at Project Start

At the beginning of the infrastructure design project, SFU Facilities Services will provide consultants with a pre-design data package containing information on existing recorded assets. In addition to a high
resolution aerial photograph for the project area, SFU will provide an existing recorded assets drawing with underground, road and property features represented using AutoCAD polylines and blocks.

The existing recorded assets drawing is created using MMCD layering standards. Layers in the existing recorded assets drawing reference the same NCS (National CAD Standard) layer structure used for design, however a R-* prefix modifier is used to identify layers containing existing recorded data. All record R-* layers are assigned colour grey (8) and reference the same linetypes used by the existing survey layers V-*. The block names in the existing recorded assets drawing reference the same blocks used for existing survey assets.

The existing recorded assets drawing does not contain AutoCAD Civil 3D or Map 3D object data. Some of the record data layer names and block names are shown in the following illustration.

Note: Existing recorded infrastructure data provided by SFU Facilities Services at project initiation is not reliable for detailed design project activity. Consultants, therefore, are required to supplement pre-engineering existing recorded asset data with field data collected using topographic survey data collection and reduction practices.

The existing recorded assets drawing is created to reference the NAD83 Zone 10N grid coordinate zone. Consultants shall apply a grid to ground scale factor (X,Y only) about 0,0 when attaching the existing recorded assets drawing as an AutoCAD external reference to the design drawings created at a ground level coordinate system.

3.3. Object Data Tables

AutoCAD Map 3D object data tables are defined in SFU MMCD drawing template, and are used to attribute design and construction recorded assets. The following sections describe the object data tables for SFU Facilities Services assets.
3.3.1. Object Data Table CBAS

Use AutoCAD Map 3D object data table CBAS to assign attributes to design and construction recorded drainage catch basins represented AutoCAD blocks or Civil 3D structures.

Catch basin block and layer names are shown in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Block Name</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Storm Catchbasin Double</td>
<td>C-DRAN-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Storm Catchbasin Manhole</td>
<td>C-DRAN-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Storm Catchbasin Side Inlet</td>
<td>C-DRAN-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Storm Catchbasin Top Inlet</td>
<td>C-DRAN-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Storm Lawn Drain</td>
<td>C-DRAN-STRC</td>
</tr>
</tbody>
</table>

Refer to the object data table CBAS in the Appendices for a complete list of attributes and their allowable values.

3.3.2. Object Data Table FITT

Use AutoCAD Map 3D object data table FITT to assign attributes to design and construction recorded water fittings represented with AutoCAD blocks.

Fitting block and layer names are show in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Block Name</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Air Valve</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Bends</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Blowoff</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Cap</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Cross</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Flush</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Hub Flange</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Hydrant</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Manhole</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Meter</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Reducer</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Robar</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Service</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Tee</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Thrust Block</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Valve</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Valve Air</td>
<td>C-WATR-STRC</td>
</tr>
</tbody>
</table>
Refer to the object data table FITT in the Appendices for a complete list of attributes and their allowable values.

### 3.3.3. Object Data Table HYDR

Use AutoCAD Map 3D object data table HYDR to assign attributes to design and construction recorded fire hydrants represented with AutoCAD blocks.

The fire hydrant block and layer names are shown in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Block Name</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>EX Water Hydrant</td>
<td>R-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>EX Water Vent</td>
<td>R-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Hydrant</td>
<td>C-WATR-STRC</td>
</tr>
</tbody>
</table>

Refer to the object data table HYDR in the Appendices for a complete list of attributes and their allowable values.

### 3.3.4. Object Data Table ILLM

Use AutoCAD Map 3D object data table ILLM to assign attributes to design and construction recorded luminaire fixtures represented with AutoCAD blocks.

The luminaire block and layer names are shown in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Block Name</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Recorded Assets</td>
<td>PR Utility Lighting Davit Luminaire Pole</td>
<td>C-UTIL-ELEC-MUNI</td>
</tr>
<tr>
<td>Construction Recorded Assets</td>
<td>PR Utility Lighting Post Top Luminaire Pole</td>
<td>C-UTIL-ELEC-MUNI</td>
</tr>
</tbody>
</table>

Refer to the object data table ILLM in the Appendices for a complete list of attributes and their allowable values.

### 3.3.5. Object Data Table MHOL

Use the AutoCAD Map 3D object data table MHOL to assign attributes to design and construction recorded sanitary and storm manholes represented with AutoCAD blocks or AutoCAD Civil 3D structure objects.

AutoCAD Civil 3D object data for constructed manholes is sourced from the LandXML file for physical property data. If AutoCAD Civil 3D is not used to represented constructed manholes, then AutoCAD Map 3D object data tables must be populated with the required physical properties.

Manhole layer names for AutoCAD block and AutoCAD Civil 3D object placement are shown in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Block Name</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Sanitary Manhole</td>
<td>C-SSWR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Storm Manhole</td>
<td>C-DRAN-STRC</td>
</tr>
</tbody>
</table>

Refer to the object data table MHOL in the Appendices for a complete list of attributes and their allowable values.
3.3.6. Object Data Table PAVE

Use AutoCAD Map 3D object data table PAVE to assign attributes to design and construction recorded pavement areas represented with closed AutoCAD polylines. For design and construction recorded pavement areas, polygons are drawn to the pavement limits and attributed accordingly.

Layers for pavement polylines are shown in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-ROAD-EDGE</td>
</tr>
</tbody>
</table>

Refer to the object data table PAVE in the Appendices for a complete list of attributes and their allowable values.

3.3.7. Object Data Table PIPE

Use the AutoCAD Map 3D object data table PIPE to assign attributes to design and construction recorded sanitary, storm and water pipe represented with AutoCAD polylines or AutoCAD Civil 3D pipe objects.

If AutoCAD Civil 3D is not used to represented design and constructed pipes then AutoCAD Map 3D object data tables must be populated with the required physical properties.

Pipe layer names for polyline placement are shown in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-DRAN-PIPE</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-SSWR-PIPE</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-SSWR-FORC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-WATR-PIPE</td>
</tr>
</tbody>
</table>

Refer to the object data table PIPE in the Appendices for a complete list of attributes and their allowable values.

3.3.8. Object Data Table SRVC

Use the AutoCAD Map 3D object data table SRVC to assign attributes to design and construction recorded sanitary, storm and water pipe service lines represented with AutoCAD polylines or Civil 3D pipe objects. Note that the service attributes are attached to the service polyline and not the service block.

Service layer names for polyline and pipe objects are shown in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-DRAN-SRVC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-SSWR-SRVC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-WATR-SRVC</td>
</tr>
</tbody>
</table>

Refer to the object data table SRVC in the Appendices for a complete list of attributes and their allowable values.
3.3.9. Object Data Table VALV

Use AutoCAD Map 3D object data table VALV to assign attributes to design and construction recorded sanitary and water valves represented with AutoCAD blocks or Civil 3D objects.

Valve blocks and layer names are show in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Block Name</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Water Valve</td>
<td>C-WATR-STRC</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>PR Sanitary Valve</td>
<td>C-WATR-STRC</td>
</tr>
</tbody>
</table>

Refer to the object data table VALV in the Appendices for a complete list of attributes and their allowable values.

3.3.10. Object Data Table WALK

Use AutoCAD Map 3D object data table WALK to assign attributes to design and construction recorded walkway / sidewalk and path polylines. Walkways and sidewalks are shown as closed polylines representing the exterior limits and paths are drawn as centrelines.

Walkway and path layer names for polyline placement are shown in the following table.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Layer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-ROAD-WALK</td>
</tr>
<tr>
<td>Design and Construction Recorded Assets</td>
<td>C-ROAD-PATH</td>
</tr>
</tbody>
</table>

Refer to the object data table WALK in the Appendices for a complete list of attributes and their allowable values.

3.4. Existing Recorded Assets

SFU Facilities Services must capture the lifecycle status change of existing assets affected by the infrastructure project for financial accounting and asset management practices.

The existing recorded assets drawing is provided by SFU Facilities Services to consultants at project initiation, and shows graphical infrastructure data in the project area and is sourced from SFU GIS. Existing assets are represented with AutoCAD polylines and block definitions.

The SFU existing recorded assets drawing for the project area contains no attribution, however consultants are required to indicate the new lifecycle status of existing infrastructure assets by changing the colour of the AutoCAD entities in the drawing using the following colours:

- Replacement (Colour 1, Red)
- Betterment (Colour 2, Yellow)
- Abandoned (Colour 3, Green)
- Removed (Colour 4, Cyan)

Blocks representing manholes, catchbasins and other non-linear features can be exploded prior to changing the colour. These colour changes are finalized in the existing recorded assets drawing upon construction completion.
3.5. Design Recorded Assets

Design recorded assets represent newly designed assets that SFU Facilities Services will track for both financial accounting and asset management purposes.

Design recorded assets are represented in the design recorded assets drawing, which is created using ground level coordinates to facilitate the generation of construction staking data.

AutoCAD Civil 3D provides an advantage to consultants using pipe networks to model sanitary, storm and water infrastructure. When using AutoCAD Civil 3D, physical properties for pipes and structures (manholes) are extracted from the LandXML file, which means physical property and material attributes in AutoCAD Map 3D object data tables for pipes and structures (manholes only) are not required. If sanitary, storm and water infrastructure is represented with AutoCAD polylines and blocks, physical properties must be assigned in the AutoCAD Map 3D PIPE and MHOL object data tables.

AutoCAD Civil 3D objects are only recognized for the following types of infrastructure:
- Sanitary – pipes and manholes only
- Storm – pipes and manholes only
- Watermain – pipes only

Use AutoCAD Civil 3D pipe networks to model sanitary, storm and water infrastructure. Pressure pipe networks are currently not supported.

3.6. Construction Recorded Assets

Construction recorded assets reflect the as constructed conditions. The design recorded assets drawing is copied and renamed and is updated to represent the following construction activity:
- Updates to design recorded assets based on as construction conditions such as changed manhole / Catchbasin locations and pipe invert elevations
- Addition of new assets not initially accounted for in the design recorded assets drawing
- Removal of assets reflected in the design recorded drawing but not actually constructed

Methodologies for the creation and attribution of construction recorded assets are the same as those for design recorded assets.

3.6.1. Sanitary Sewer Naming Conventions

AutoCAD Civil 3D pipe networks (pipes and structures) or AutoCAD entities (blocks and polylines) can be used for sanitary sewer designs. A single entity or pipe object is required to represent a sanitary sewer pipe between manholes.

Use the following naming convention for AutoCAD Civil 3D sanitary sewer pipe networks:

PRSSWR<#>

The number sign # is used incrementally when assigning names to multiple sanitary sewer pipe networks.
3.6.2. Storm Drainage

AutoCAD Civil 3D pipe networks (pipes and structures) or AutoCAD entities (blocks and polylines) can be used for storm drainage designs. A single entity or pipe object is required to represent a storm drainage pipe between manholes.

Use the following naming convention for AutoCAD Civil 3D storm drainage pipe networks:

PRDRAN<#>

The number sign # is used incrementally when assigning names to multiple storm drainage pipe networks.

3.6.3. Water

AutoCAD Civil 3D pipe networks (pipes only and blocks) or AutoCAD entities (polylines and blocks) can be used for watermain designs.

A single entity / object is required to represent watermain pipe between fittings. Use the following naming convention for AutoCAD Civil 3D watermain pipe networks:

PRWATR<#>

The number sign # is used incrementally when assigning names to multiple watermain pipe networks. AutoCAD Civil 3D should only be used to model the pipes in a watermain network. All fittings are to be represented using AutoCAD blocks.

4. Infrastructure Project Data Structure and Deliverable Requirements

This section provides guidelines for engineering and construction project data structure required for SFU Facilities Services infrastructure data submissions. The intent of standardized digital submissions is to improve the process for updating SFU Facilities Services infrastructure asset database records. This means that the emphasis for the digital submission is on the model drawings and not the sheets themselves.

An infrastructure design and construction project archive consists of the following data:

1) Design Model Data
   a) Existing Recorded Assets Drawing
   b) Survey Recorded Assets drawing
   c) Design Recorded Assets drawing
   d) Construction Recorded Assets drawing

2) Drawing Production Data
   a) Design and Construction drawings

3) AutoCAD Sheet Set Manager DST file

All drawings are produced to ground level coordinates. These drawings are discussed in the following sections.
4.1. Existing Recorded Asset Drawing

The only changes made to the existing recorded assets drawing are the colour changes to reflect the new lifecycle state of infrastructure assets affected by the project. AutoCAD entities, layouts and AutoCAD Civil 3D objects should not be added to the existing recorded drawing. AutoCAD entities representing existing assets should not be removed from the existing recorded data drawing.

The naming standard for the existing recorded asset drawing is as follows:

- `<ProjectNumber>_ExistingRecorded.dwg`

The existing recorded drawing references UTM NAD83 Zone 10N grid coordinate system and can be attached as an AutoCAD external reference to the design drawing to facilitate updates to existing asset data. The grid to ground scale factor can be applied to the X and Y insertion scales in the Attach External Reference dialog box.

This is shown in the following illustration.

Use the AutoCAD `refedit` command to update AutoCAD Map 3D object data in the existing recorded assets drawing. Consultant may also choose to not attach the existing recorded assets drawing and open the drawing directly to update attributes on existing assets, however attaching and editing through the Xref will make it easier to identify existing assets that have changed as a result of the project.

4.2. Survey Recorded Assets

The survey recorded assets drawing contains the pre-engineering base plan and the existing ground surface model for the project, and should be created using SFU Facilities Services MMCD Civil 3D drawing template file.

Base plan linework is created using of AutoCAD Civil 3D figures. Symbols are represented using AutoCAD Civil 3D point objects. The project ground to grid factor shall be clearly identified in model space in the existing survey drawing.
The survey recorded assets drawing shall clearly display the list of survey control monuments used to coordinate the survey. Details for grid to ground level scaling including the scale factor are to be clearly indicated. Scaling shall be done around 0,0.

The naming standard for the submitted existing survey drawing is as follows:

4) `<ProjectNumber>_Survey.dwg`

The survey recorded assets drawing is submitted to SFU Facilities Services for the sole purpose of validating asset location for existing infrastructure assets not affected by the project.

### 4.3. Design Recorded Assets Drawing

Design recorded assets drawings must not be spatially fragmented and should contain all design data and attribution for the project. Design model drawing to ground level coordinates to facilitate construction layout.

Infrastructure design data is represented in a single or several design model drawings depending on the size of the project. For instance, sanitary, storm and water can be represented in 1, 2 or 3 design model drawings. Production drawings are created as independent drawings that reference data from design model drawings using AutoCAD external references and AutoCAD Civil 3D reference objects.

Design model drawings are required at the project IFC (Issued for Construction) phase. The naming standard for design model drawing(s) is as follows:

- `<ProjectNumber>_Design<#>.dwg`
- `<ProjectNumber>_SanStmWat<#>.dwg`
- `<ProjectNumber>_Roads<#>.dwg`

If multiple design model drawings are provided use the `<#>` in the file name to increment them accordingly.

In addition to the design model drawings, a LandXML file is required for sanitary, storm and water utility data designed using AutoCAD Civil 3D pipe networks. The file naming standard for the LandXML file is the same as for the design model drawing.

The design model drawings are copied to create construction recorded drawings. These copied drawings are updated to reflect as constructed locations and attributes.

### 4.4. Construction Recorded Assets Drawing

The constructed recorded assets drawing(s) is created by copying the design recorded assets drawing(s). These drawings are updated during and after construction to reflect the following:

- Adjusted asset location based on as-constructed conditions
- Data attachment using object data tables

The naming standard for constructed recorded drawing(s) is as follows:

- `<ProjectNumber>_ConstructionRecorded<#>_GroundtoGridScaleFactor>.dwg`

For example, if the project number is 82180, all design data is in a single drawing, and the ground to grid scale factor is 0.99959 then the file name is as follows:
If multiple construction recorded drawings are provided use the <#> in the file name to increment them accordingly. The scale factor is required in the drawing name to facilitate the conversion of ground based design and construction data to the NAD 83 Zone 10N coordinate system used by SFU Facilities Services GIS. In circumstances where consultants design is created using grid level coordinates, the ground to grid scale factor referenced in the drawing name is 1.

In addition to the constructed recorded drawings, a LandXML file is required for sanitary, storm and water utility data designed using AutoCAD Civil 3D pipe networks. The file naming standard for the LandXML file is the same as for the constructed recorded drawing.

4.5. Recommended Drawing Structure

The emphasis for submissions is on the data in the design and construction recorded drawings. SFU recommends the use of AutoCAD external references and Civil 3D data shortcuts to share data among design model and production drawings.

A summary of recommended data sharing mechanisms is summarized in the following bullets:

1) Existing Recorded Drawing
   a) Attached to Design drawing as AutoCAD Xref to facilitate updates to lifecycle status of existing recorded assets

2) Survey Drawing
   a) Attached to Design drawing as AutoCAD Xref to show existing conditions and to facilitate design tie ins
   b) Attached to Production drawings to show existing conditions
   c) Create Civil 3D data shortcut to share existing surface(s) with design drawings

3) Design and Construction
   a) Attaches Survey drawing as AutoCAD Xref to show existing conditions and design tie ins
   b) Creates Civil 3D reference object for existing surface(s) from survey drawing data shortcut for existing surface profile creation and corridor / grading object daylighting
   c) Create Civil 3D data shortcuts to share alignments, profiles and pipe networks with production drawings and other design model drawings
   d) Attaches to Sections production drawing as AutoCAD Xref for generation of section data

4) Production Drawings (Plan and Profile)
   a) Attaches Survey drawing as AutoCAD Xref to show existing conditions
   b) Create Civil 3D reference objects from design drawing data shortcuts for proposed alignments, profiles and pipe networks

5) Production Drawings (Section)
   a) Attaches alignment as Civil 3D reference object from design drawing data shortcut
   b) Attaches design drawing as AutoCAD external reference for the generation of section data

AutoCAD external references should be created using relative paths, so they can resolve properly when transferred between PC’s. All drawings can be in a single project folder.

Please review the Appendix B for a data sharing diagram that graphically displays the data.
Appendix A – Asset Types and Attributes
### Object Data Table – PAVE (Pavement)

**ASSET_KEY**
- SFU Unique Identifier
  - Do not add, delete or modify

**SERVICE_STATUS** *SEE ATTRIBUTE SHEET*
- Financial transaction
  - I = In service
  - NETN = Net New (Acquisition)
  - REPL = Replacement (Acquisition)
  - BETT = Betterment (Acquisition)
  - ABND = Abandoned (Disposal)
  - RMVD = Removed (Disposal)

**OWNER** *SEE ATTRIBUTE SHEET*
- Ownership of assets
  - SFU = University owned asset
  - SFUCT = SFU Community asset
  - PRVT = Privately owned asset
  - CITY = City of Burnaby

**PROJECT_ID**
- Installing or Existing Project Id
  - PB1000 = Sample project ID

**Layer**
- C-LANE-EDGE
- C-ROAD-EDGE

**Entity Type**
- Closed Polyline

**Entity**
- ASSET_KEY
- OWNER
- PROJECT_ID
- SERVICE_STATUS
- UNIT_TYPE
- LENGTH
- WIDTH
- THICK
- MATERIAL
- CONDITION
- EXP_LIFE
- CONST_COST
- INSTALL_DATE
- RETIRED_DATE
- RETIRED_PROJECT_ID

**Unit Type**
- Subordinate type
  - TOP = Top (0-75mm depth)
  - FULL = Full (0-200mm depth)
  - SLOT = SLOT (76-200mm depth)

**Length**
- Length of the base
  - 120.15 = Sample value (m)

**Width**
- Average Width of materials
  - 10.15 = Sample value (m)

**Thickness**
- Average Thickness of materials
  - 100 = Sample value (mm)

**Material**
- Material type
  - ASPH = Asphalt
  - CONC = Concrete

**Condition, Exp_Life, Const_Cost**

**Install_Date**
- Date asset was installed
  - 2013-DEC-03 = Sample Value

**Retired_Date**
- Date asset was retired
  - 2013-DEC-03 = Sample Value

**Retired_Project_Id**
- Project Id retiring asset
  - PB1000 = Sample project ID
# Object Data Table – BASE (Structure Granular)

**SUBJECT:** CAD/C3D Object to Object Data Table & Field Descriptions  
**SOURCE:** MMCDA – Master Municipal Construction Documents Association  
**REVISION DATE:** November 2, 2017

### ASSET_KEY
- **SFU Unique Identifier**
- **Do not add, delete or modify**

### SERVICE_STATUS * SEE ATTIRBUTE SHEET *
- **Financial transaction**
  - I = In service
  - NETN = Net New (Acquisition)
  - REPL = Replacement (Acquisition)
  - BETT = Betterment (Acquisition)
  - ABND = Abandoned (Disposal)
  - RMVD = Removed (Disposal)

### OWNER * SEE ATTRIBUTE SHEET *
- **Ownership of assets**
  - SFU = University owned asset
  - SFUCT = SFU Community asset
  - PRVT = Privately owned asset
  - CITY = City of Burnaby

### PROJECT_ID
- **Installing or Existing Project Id**
- **P81000 = Sample project ID**

### Layer | Entity Type
--- | ---
C-LANE-BASE | Closed Polyline
C-ROAD-BASE | Closed Polyline

### UNIT_TYPE
- **Subordinate type**
  - REPR = Repair
  - FULL = Full

### LENGTH
- **Length of materials**
  - 120.25 = Sample value (m)

### WIDTH
- **Average Width of materials**
  - 15.75 = Sample value (m)

### THICK
- **Average Thickness of materials**
  - 100 = Sample value (mm)

### MATERIAL
- **Material type**
  - BG = Base Gravels
  - PM = Pumice

### CONDITION, EXP_LIFE, CONST_COST
- **Future Uses**

### INSTALL_DATE
- **Date asset was installed**
  - 2013-DEC-03 = Sample Value

### RETIRE_DATE
- **Date asset was retired**
  - 2013-DEC-03 = Sample Value

### RETIRED_PROJECT_ID
- **Project Id retiring asset**
- **P81000 = Sample project ID**
Object Data Table – CBAS (Catch Basin, Inlet Structures)

**SERVICE_STATUS**

*SEE ATTRIBUTE SHEET*

- **Financial transaction**
  - **I** = In service
  - **NETN** = Net New (Acquisition)
  - **REPL** = Replacement (Acquisition)
  - **BETT** = Betterment (Acquisition)
  - **ABND** = Abandoned (Disposal)
  - **RMVD** = Removed (Disposal)

**OWNER**

*SEE ATTRIBUTE SHEET*

- **Ownership of assets**
  - **SFU** = University owned asset
  - **SFUCT** = SFU Community asset
  - **PRVT** = Privately owned asset
  - **CITY** = City of Burnaby

**PROJECT_ID**

- **Installing or Existing Project Id**
  - **P81000** = Sample project ID

**FACILITY_ID**

- **Facility ID provided by SFU**
  - **1234** = Sample Facility ID

**UNIT_TYPE**

*Subordinate type*
- **CB** = Curb Catch Basin
- **CBI** = Catch Basin Type I
- **CBII** = Catch Basin Type II
- **CBIII** = Catch Basin Type III
- **CBV** = Catch Basin Type V
- **CBVA** = Catch Basin Type V-A
- **CBVII** = Catch Basin Type VII
- **CI** = Curb Inlet
- **CO** = Clean Out
- **DM** = Diversion Manhole
- **GB** = Grate Catch Basin
- **GI** = Grate Inlet
- **LAWNBN** = Lawn Basin
- **MB** = Manhole Basin
- **MH** = Manhole
- **SB** = Sand Box

**CONDITION, EXP_LIFE, CONST_COST**

Future Uses

**INSTALL_DATE**

- **Date asset was installed**
  - **2013-DEC-03** = Sample Value

**RETIRED_DATE**

- **Date asset was retired**
  - **2013-DEC-03** = Sample Value

**RETIRED_PROJECT_ID**

- **Project Id retiring asset**
  - **P81000** = Sample project ID

**ASSET_KEY**

- **SFU Unique Identifier**
  - Do not add, delete or modify

**ENTITY_TYPE**

- **Layer**
  - C-DRAN-CBAS
- **Entity Type**
  - C3D or Block
# Object Data Table – FITT (Water Fitting)

**ASSET_KEY**
- SFU Unique Identifier
- Do not add, delete or modify

**SERVICE_STATUS** *SEE ATTRIBUTE SHEET*
- Financial transaction
  - **I**: In service
  - **NETN**: Net New (Acquisition)
  - **REPL**: Replacement (Acquisition)
  - **BETT**: Betterment (Acquisition)
  - **ABND**: Abandoned (Disposal)
  - **RMVD**: Removed (Disposal)

**OWNER** *SEE ATTRIBUTE SHEET*
- Ownership of assets
  - **SFU**: University owned asset
  - **SFUCT**: SFU Community asset
  - **PRVT**: Privately owned asset
  - **CITY**: City of Burnaby

**PROJECT_ID**
- Installing or Existing Project Id
  - **81000**: Sample project ID

**UNIT_TYPE**
- Subordinate type
  - **11 ¼**: Bend 11 ¼ Degree
  - **22 ½**: Bend 22 ½ Degree
  - **45**: Bend 45 Degree
  - **90**: Bend 90 Degree
  - **SPECL**: Bend Special
  - **TEE**: Tee Fitting
  - **CROSS**: Cross Fitting
  - **REDUCE**: Reducer
  - **COUPLN**: Coupling (Robar)
  - **FABSTF**: Fabricated Stub and Flange
  - **FABX**: Fabricated Cross
  - **FABT**: Fabricated Tee
  - **FABBND**: Fabricated Bend
  - **CAPEND**: Capped End
  - **TAPPNG**: Tapping
  - **INCoup**: Insulated Coupling (Robar)
  - **VICTCU**: Victaulic Coupling (Robar)
  - **SLEEVE**: Sleeve
  - **TEESPL**: Split Tee
  - **ADAPRT**: Adaptor
  - **CHANEL**: Drain Channel
  - **DECHMH**: De-Chlorination Manhole

**Layer**
- **C-WATR-STRC**: C3D or Block

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<th>OWNER</th>
<th>PROJECT_ID</th>
<th>SERVICE_STATUS</th>
<th>UNIT_TYPE</th>
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<th>CONDITION, EXP_LIFE, CONST_COST</th>
<th>INSTALL_DATE</th>
<th>RETIRED_DATE</th>
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**INSTALL_DATE**
- Date asset was installed
  - **2013-DEC-03**: Sample Value

**RETIRRED_DATE**
- Date asset was retired
  - **2013-DEC-03**: Sample Value

**RETIRRED_PROJECT_ID**
- Project Id retiring asset
  - **81000**: Sample project ID
### CAD/C3D Object to Object Data Table & Field Descriptions

#### Subject: MMCDA – Master Municipal Construction Documents Association

#### Source: November 2, 2017

#### Object Data Table – **ILLM** (Illumination)

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<tr>
<td>REPL</td>
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</tr>
<tr>
<td>BETT</td>
<td>Betterment (Acquisition)</td>
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#### Layer: C-ILLM-STRC

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#### **UNIT_TYPE** | *SEE ATTRIBUTE SHEET*

**Subordinate type**
- LS = Lamp Standard
- LSPP = Lease Light on Power Pole
- LSPD = Pedestrian Only
- LSPE = LS & Pedestrian
- LSTS = LS & Traffic Signal
- LSSBPc = LS & Service Base & Photo Cell

#### **MFG_NAME**

Future Uses – Manufacture Name

#### **POLE_OFFSET**

Offset ABC from curb or distance from PL
- A = Offset Class A
- B = Offset Class B
- C = Offset Class C
- 5.55 = Sample value (m)

#### **POLE_SHAPE**

Pole Shape
- CIRC = Circular
- CSTN = Custom
- OCTGN = Octagon
- SQUARE = Square

#### **POLE_HEIGHT**

Height of pole
- 10.92 = Sample value (m)

#### **POLE_COLOUR** | *SEE ATTRIBUTE SHEET*

Pole Colour
- BLACK = Black
- GREEN = Green
- GALVAN = Galvanized

#### **PAINT_TYPE**

Paint Type
- GAL = Galvanized
- GALPAINT = Galvanized and Painted
- PRIPAINT = Primed and Painted

#### **LUMINAIRES BALAST**

Luminaries Ballast
- HPS = High Pressure Sodium
- LED = Light Emitting Diode
- MH = Metal Halide
- MV = Mercury Vapor

#### **LUMINAIRES WATTAGE**

Luminaires Wattage
- 150 = Sample value (watts)

#### **LUMINAIRES HOUSING**

Luminaries Housing
- COBRA = Cobra
- DECORT = Decorative
- LED = Light Emitting Diode
- POSTOP = Post Top
- OTHER = Other
- SHOEBX = Show Box
- SPECIAL = Special
- SQUARE = Square
## Object Data Table – MHOL (Manhole)

### SUBJECT:
CAD/C3D Object to Object Data Table & Field Descriptions

### SOURCE:
MMCDA – Master Municipal Construction Documents Association

### REVISION DATE:
November 2, 2017

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<td>RMVD = Removed (Disposal)</td>
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<tr>
<td>SFU = University owned asset</td>
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<td>SFUCT = SFU Community asset</td>
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<td>PRVT = Privately owned asset</td>
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<td>CITY = City of Burnaby</td>
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### UNIT_TYPE

**Subordinate type**

<table>
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<th>Subordinate type</th>
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<tbody>
<tr>
<td>ACAV = Combination Air Valve</td>
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<tr>
<td>ADAV = Double Acting Air Valve</td>
</tr>
<tr>
<td>AMH = Air Release Valve</td>
</tr>
<tr>
<td>CB = Catch Basin</td>
</tr>
<tr>
<td>CBM = Catch Basin Manhole</td>
</tr>
<tr>
<td>CO = Clean Out Or Flusher</td>
</tr>
<tr>
<td>DE = Dead End (No MH)</td>
</tr>
<tr>
<td>DIV = Flow Diversion Manhole</td>
</tr>
<tr>
<td>DMI = Drop Manhole Inside</td>
</tr>
<tr>
<td>DMO = Drop Manhole Outside</td>
</tr>
<tr>
<td>FMTR = Flow Meter MH</td>
</tr>
<tr>
<td>FRP = Fiber Reinforced Plastic MH</td>
</tr>
<tr>
<td>INLET = Inlet End - No MH</td>
</tr>
<tr>
<td>OCS = Outlet Control Structure</td>
</tr>
<tr>
<td>OIUN = Oil Interceptor Manhole</td>
</tr>
<tr>
<td>OUTFAL = Outfall - Outlet End Of Pipe</td>
</tr>
<tr>
<td>PRS = Pressure Manhole</td>
</tr>
<tr>
<td>PTRANS = Pipe Transition (No MH)</td>
</tr>
<tr>
<td>SPS = Sewer Pump Station</td>
</tr>
<tr>
<td>STD = Standard</td>
</tr>
<tr>
<td>SUM = Sump MH (Storm-No Channel)</td>
</tr>
<tr>
<td>SV = Sewer Valve (No MH)</td>
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<tr>
<td>SWMOI = Storm Water Mgmt/Oil Int</td>
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<td>TRP = Trap Manhole (Gas)</td>
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### COVER_TYPE

**Manhole Cover Type**

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<tr>
<th>Burnaby Combined Standard</th>
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<tbody>
<tr>
<td>Burnaby Drainage Standard</td>
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<tr>
<td>Burnaby Sanitary Standard</td>
</tr>
<tr>
<td>Metro Vancouver</td>
</tr>
<tr>
<td>Locked / Secured</td>
</tr>
<tr>
<td>Non Standard</td>
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<tr>
<td>Solid</td>
</tr>
<tr>
<td>Standard Two Hole</td>
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<td>Watertight</td>
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**Manhole Rim Elevation**

*Not required when using Civil 3D structure*

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<th>Sample value (m)</th>
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### DIA

**Manhole Barrel Diameter**

*Not required when using Civil 3D structure*

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<th>Sample value (mm)</th>
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</tbody>
</table>

### DEPTH

**Manhole Depth Rim to Sump (bench)**

*Not required when using Civil 3D structure*

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<th>Sample value (m)</th>
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<tbody>
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<td>2.15</td>
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</table>
## Object Data Table – PIPE (Pipe Main, Conduit, Culvert)

### ASSET_KEY
- **SFU Unique Identifier**
  - Do not add, delete or modify

### SERVICE_STATUS * SEE ATTRIBUTE SHEET *
- **Financial transaction**
  - I = In service
  - NETN = Net New (Acquisition)
  - REPL = Replacement (Acquisition)
  - ABND = Abandoned (Disposal)
  - RMVD = Removed (Disposal)

### OWNER * SEE ATTRIBUTE SHEET *
- **Ownership of assets**
  - SFU = University owned asset
  - SFUCT = SFU Community asset
  - PRVT = Privately owned asset
  - CITY = City of Burnaby

### PROJECT_ID
- **Installing or Existing Project Id**
  - P81000 = Sample project ID

### ENTITY_TYPE
- **Entity Type**
  - C3D or Polyline

### UNIT_TYPE * SEE ATTRIBUTE SHEET *
- **Subordinate type**
  - STD = Sanitary Sewer
  - F = Forced
  - CP = Cathodic Protection

### LENGTH
- **Pipe Length**
  - Not required when using Civil 3D pipe
  - 25.55 = Sample value (m)

### SLOPE
- **Pipe Slope**
  - Not required when using Civil 3D pipe
  - 1.55 = Sample value (%)

### DIA
- **Pipe Diameter**
  - Not required when using Civil 3D structure
  - 250 = Sample value (mm)

### MATERIAL * SEE ATTRIBUTE SHEET *
- **Pipe Material**
  - Not required when using Civil 3D pipe
  - CONC = Concrete Pipe
  - CU = Copper
  - DI = Ductile Iron
  - PVC = Polyvinyl Chloride
  - HDPE = HD Polyethylene Chloride

### SHP * SEE ATTRIBUTE SHEET *
- **Pipe Shape**
  - CIRC = CIRCULAR

### CONDITION, EXP_LIFE, CONST_COST
- **Future Uses**

### INSTALL_DATE
- **Date asset was installed**
  - 2013-Dec-03 = Sample Value

### RETIRED_DATE
- **Date asset was retired**
  - 2013-Dec-03 = Sample Value

### RETIRED_PROJECT_ID
- **Project Id retiring asset**
  - P81000 = Sample project ID
# Object Data Table – SRVC (Service Lines, Leads)

**SUBJECT:** CAD/C3D Object to Object Data Table & Field Descriptions  
**SOURCE:** MMCDA – Master Municipal Construction Documents Association  
**REVISION DATE:** November 2, 2017

## Layer Entity Type
- C-DRAN-CBAS-LEAD: C3D or Polyline
- C-DRAN-SRVC: C3D or Polyline
- C-SSWR-SRVC: C3D or Polyline
- C-WATR-HYDR-LEAD: C3D or Polyline
- C-WATR-SRVC: C3D or Polyline

## ASSET_KEY
- SFU Unique Identifier
- Do not add, delete or modify

## SERVICE_STATUS * SEE ATTRIBUTE SHEET *
- Financial transaction
  - I = In service
  - NETN = Net New (Acquisition)
  - REPL = Replacement (Acquisition)
  - BETT = Betterment (Acquisition)
  - ABND = Abandoned (Disposal)
  - RMVD = Removed (Disposal)

## OWNER * SEE ATTRIBUTE SHEET *
- Ownership of assets
  - SFU = University owned asset
  - SFUCT = SFU Community asset
  - PRVT = Privately owned asset
  - CITY = City of Burnaby

## PROJECT_ID
- Installing or Existing Project Id
- P81000 = Sample project ID

## INSTALL_DATE
- Date asset was installed
- 2013-DEC-03 = Sample Value

## RETIRED_DATE
- Date asset was retired
- 2013-DEC-03 = Sample Value

## RETIRED_PROJECT_ID
- Project Id retiring asset
- P81000 = Sample project ID

## UNIT_TYPE * SEE ATTRIBUTE SHEET *
- Subordinate type
  - D = Drainage
  - S = Sanitary

## SERVICE_TYPE * SEE ATTRIBUTE SHEET *
- Service Type
  - DOM = DOMESTIC SERVICE
  - FRE = FIRE SERVICE
  - NS = NO SERVICE

## BACKFLOW_PREVENTOR
- Backflow Preventor
  - Y = Yes
  - N = No

## INSPECT_CHAMBER
- Inspection Chamber
  - Y = Yes
  - N = No

## LENGTH
- Pipe Length
  - 5.52 = Sample value (m)

## DIA
- Pipe Diameter
  - 100 = Sample value (mm)

## MATERIAL * SEE ATTRIBUTE SHEET *
- Pipe Material
  - CU = Copper
  - PVC = Polyvinyl Chloride
**Object Data Table – VALV (Valve)**

<table>
<thead>
<tr>
<th>Layer</th>
<th>Entity Type</th>
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<tr>
<td>C-SWWR-VALV</td>
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<tr>
<td>C-WATR-VALV</td>
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**ASSET_KEY**
SFU Unique Identifier
Do not add, delete or modify

**SERVICE_STATUS * SEE ATTRIBUTE SHEET *
Financial transaction
I = In service
NETN = Net New (Acquisition)
REPL = Replacement (Acquisition)
BETT = Betterment (Acquisition)
ABND = Abandoned (Disposal)
RMVD = Removed (Disposal)

**OWNER * SEE ATTRIBUTE SHEET *
Ownership of assets
SFU = University owned asset
SFUCT = SFU Community asset
PRVT = Privately owned asset
CITY = City of Burnaby

**PROJECT_ID**
Installing or Existing Project Id
P81000 = Sample project ID

**CONDITION, EXP_LIFE, CONST_COST**
Future Uses

**INSTALL_DATE**
Date asset was installed
2013-DEC-03 = Sample Value

**RETIRED_DATE**
Date asset was retired
2013-DEC-03 = Sample Value

**RETIRED_PROJECT_ID**
Project Id retiring asset
P81000 = Sample project ID

**UNIT_TYPE**
Subordinate type
ACAV = Combination Air Valve
ADAV = Double Acting Air Valve
ARV = Air Release Valve
BTRV = Butterfly Valve
BTVG = Butterfly Valve Geared
CBSTOP = Curb Stop
DDGV = Double Disk Gate Valve
DSCV = Double Disc Swing Check Valve
GVG = Gate Valve Geared
GVW = Gate Valve Wheeled
PLGV = Plug Valve
PRV = Pressure Reducing Valve
RSGV = Resilient Seat Gate Valve
SCV = Swing Check Valve
SDV = Self Draining Standpipe
SWGV = Solid Wedge Gate Valve
UNKNOWN = Unknown

**MFG_NAME**
Manufacture Name
CLOW = Clow
MUELLR = Mueller
TERMIN = Terminal City

**DIA**
Valve Diameter Size
200 = Sample value (mm)

**NORM_STATUS**
Valve Status
C = Closed
O = Open
P = Partial Closure
# Object Data Table – WALK (Sidewalk, Trail)

## Subject:
CAD/C3D Object to Object Data Table & Field Descriptions

## Source:
MMCDA – Master Municipal Construction Documents Association

## Revision Date:
November 2, 2017

<table>
<thead>
<tr>
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<td>I = In service</td>
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<td></td>
<td>NETN = Net New (Acquisition)</td>
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<td>REPL = Replacement (Acquisition)</td>
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<td>ABND = Abandoned (Disposal)</td>
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<td>Ownership of assets</td>
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<td>PRVT = Privately owned asset</td>
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<td>CITY = City of Burnaby</td>
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<td>UNIT_TYPE</td>
<td>Future uses - Subordinate type</td>
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<tr>
<td>LENGTH</td>
<td>Length of walk</td>
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<td>WIDTH</td>
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<td>THICK</td>
<td>Thickness of material</td>
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<td>MATERIAL</td>
<td>Material of walk</td>
<td>ASPH = Asphalt</td>
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<td></td>
<td></td>
<td>BWLK = Boardwalk</td>
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<td></td>
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<td>CONC = Concrete</td>
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<td></td>
<td></td>
<td>GRVL = Gravel</td>
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<tr>
<td></td>
<td></td>
<td>PAVR = Pavers</td>
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<td></td>
<td></td>
<td>MLCH = Mulch</td>
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<td>NAME</td>
<td>Name of walk</td>
<td>MMCD TRAIL</td>
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### ASSET_KEY Operations
- Do not add, delete or modify

### OWNER
- SFU = University owned asset
- SFUCT = SFU Community asset
- PRVT = Privately owned asset
- CITY = City of Burnaby

### SERVICE_STATUS
- I = In service
- NETN = Net New (Acquisition)
- REPL = Replacement (Acquisition)
- BETT = Betterment (Acquisition)
- ABND = Abandoned (Disposal)
- RMVD = Removed (Disposal)

### PROJECT_ID
- P81000 = Sample project ID

### INSTALL_DATE
- Date asset was installed
- 2013-DEC-03 = Sample Value

### RETIRED_DATE
- Date asset was retired
- 2013-DEC-03 = Sample Value

### RETIRED_PROJECT_ID
- Project Id retiring asset
- P81000 = Sample project ID

---

### Layer
- C-ROAD-TRAL-BIKE: Polyline
- C-ROAD-TRAL-URBN: Polyline
- C-ROAD-WALK: Polyline

### Entity Type
- Future Uses
- Subordinate type

---

### Future Uses
- LENGTH
- WIDTH
- THICK
- MATERIAL
- NAME
- CONDITION
- EXP_LIFE
- CONST_COST
- INSTALL_DATE
- RETIRED_DATE
- RETIRED_PROJECT_ID
Expanded Attribute Values and Descriptions

**Attribute – (OWNER, SERVICE_STATUS)**

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<th>Layer</th>
<th>Entity Type</th>
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<tr>
<td>OWNER</td>
<td>Ownership of assets</td>
</tr>
<tr>
<td>SERVICE_STATUS</td>
<td>Financial transaction</td>
</tr>
</tbody>
</table>

**OWNER**

- **BDT** = Burnaby Or Development Tree
- **BFAC** = Burnaby Facility
- **BINF** = Burnaby Infrastructure
- **BPUR** = Burnaby Purchasing
- **CITY** = City Of Burnaby
- **CMED** = C Media Outdoors
- **COQ** = Coquitlam
- **FIRE** = Burnaby Fire Department
- **GVRD** = Gvr Owned
- **HYDR** = BC Hydro
- **LIB** = Burnaby Library
- **MOT** = Ministry Of Transportation
- **NLBA** = No Longer Burnaby Client
- **NPP** = Native Or Public Planted
- **NW** = New Westminster
- **PARK** = Parks
- **POMO** = Port Moody
- **PRVT** = Private
- **RIC** = Richmond
- **SCHL** = School Board
- **SFU** = Simon Fraser University
- **TRNL** = Translink
- **VAN** = Vancouver

**SERVICE_STATUS**

- **ABND** = Abandoned (Disposal)
- **AUCT** = Auctioned
- **BETT** = Betterment (Acquisition)
- **CXRD** = Complex Road Segment
- **D** = Decommissioned
- **DRMV** = Duplicate Removed
- **FLAT** = Meter On Flat Rate
- **GISX** = GIS Expired
- **I** = In Service
- **ISLT** = In Service Long Term
- **ISSP** = In Service Special Use
- **ISST** = In Service Short Term
- **LOST** = Lost
- **MOD** = Asset Changed New
- **NETN** = Net New (Acquisition)
- **NI** = Not In Use
- **NLBC** = No Longer Burnaby Client
- **NS** = No Service
- **O** = Out Of Service
- **PDEM** = Vacant Pending Demolition
- **PEND** = Pending
- **REPL** = Replacement (Acquisition)
- **REVW** = Under Review
- **RMVD** = Removed (Disposal)
- **RNAM** = Renamed
- **SAPM** = Now In SAP
- **SCRP** = Scrapped
- **SPLT** = Split Mainline
- **SS** = Substandard Service
- **STLN** = Stolen
- **STOK** = In Stock
- **T** = Temporarily Out Of Service
- **U** = Not Constructed/Undeveloped
- **VAC** = Vacant
- **VACL** = Vacant Long Term
**Attribute – ILLM (UNIT_TYPE, POLE_COLOUR)**

**Source:** MMCDA – Master Municipal Construction Documents Association

**Revision Date:** November 2, 2017

### UNIT_TYPE

**Subordinate type**
- LIGHTF = Light Sportsfield
- LIGHTL = Light Parking Lot
- LIGHTP = Light Park
- LS = Lamp Standard Single Head
- LS2 = Lamp Standard Double Head
- LS3 = Lamp Standard Triple Head
- LSDECO = Decorative Light
- LSDR = L W. Duplex Receptacle
- LSOH = Lit Overhead Crossing
- LSOHS = Lit Overhead Crossing Special
- LSPC = Lampstand With Photocell
- LSPD = Pedestrian Light
- LSPED = Lamp Standard & Pedestrian Lgt
- LSPP = Lamp Standard Power Pole
- LSSBPC = LS Servicebase.Photocel
- LSSPC = Special Light Type
- LSTS = Lamp Standard Traffic Signal
- OH = Overhead Crossing
- OHS = Overhead Crossing Special
- PED = Pedestrian Street Light
- SRVPNL = Service Panel

### POLE_COLOUR

**Pole Colour**
- BLACK = Black
- BLUE = Blue
- BRONZE = Bronze
- CHARCOAL = Charcoal
- GALVAN = Galvanized
- GREEN = Green
- GREY = Grey
- ORANGE = Orange
- RED = Red
- RED/BL = Red/Blue
- RED/GR = Red/Green
- RED/YEL = Red/Yellow
- SILVER = Silver
- WHI/BL = White/Blue
- WHI/GR = White/Green
- WHI/GR/RED = White/Green/Red
- WHI/RED = White/Red
- WHITE = White
- YELLOW = Yellow
**UNIT_TYPE**

*Subordinate type*

<table>
<thead>
<tr>
<th>2#6</th>
<th>3#6 RW90 Feeders &amp; 1#8 RW90</th>
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<tbody>
<tr>
<td>3#6</td>
<td>3#6 RW90 Feeders &amp; 1#8 RW90</td>
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<tr>
<td>A</td>
<td>Interceptor</td>
</tr>
<tr>
<td>C</td>
<td>Combined Drainage/Sanitary</td>
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<td>COND</td>
<td>Conduit Only</td>
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<td>CBLEAD</td>
<td>CB Lead</td>
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<td>MetroVan Trunk Main</td>
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<tr>
<td>H</td>
<td>Open Channel/Ditch</td>
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<td>I</td>
<td>Siphon</td>
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<td>Clean Out/Flusher</td>
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<td>P</td>
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<td>Service Conduit &amp; 3#6 Feeders</td>
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<td>S</td>
<td>Sanitary Sewer</td>
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<tr>
<td>T</td>
<td>Stub</td>
</tr>
<tr>
<td>V</td>
<td>Culvert</td>
</tr>
<tr>
<td>W</td>
<td>Water</td>
</tr>
<tr>
<td>VRX</td>
<td>Culvert Large Crossing Road</td>
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**MATERIAL**

*Pipe Material*

<table>
<thead>
<tr>
<th>ABS</th>
<th>Acrylonitrile Butadiene Styr.</th>
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<tbody>
<tr>
<td>ACC</td>
<td>American Concrete Cylinder</td>
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<tr>
<td>ACMP</td>
<td>Asphalt Corrugated Steel Pipe</td>
</tr>
<tr>
<td>ACP</td>
<td>Asbestos Cement Pipe</td>
</tr>
<tr>
<td>ACPPVC</td>
<td>Asbestos Cement With PVC Liner</td>
</tr>
<tr>
<td>BRK</td>
<td>Brick</td>
</tr>
<tr>
<td>CI</td>
<td>Cast Iron</td>
</tr>
<tr>
<td>CIC</td>
<td>Cast Iron Cement Lined</td>
</tr>
<tr>
<td>CMP</td>
<td>Corrugated Steel Pipe</td>
</tr>
<tr>
<td>CO</td>
<td>Concrete</td>
</tr>
<tr>
<td>CON</td>
<td>Poured-In-Place Concrete</td>
</tr>
<tr>
<td>CONC</td>
<td>Concrete Pipe</td>
</tr>
<tr>
<td>CONPVC</td>
<td>Concrete Pipe With PVC Liner</td>
</tr>
<tr>
<td>CU</td>
<td>Copper</td>
</tr>
<tr>
<td>CUAS</td>
<td>Copper Assumed</td>
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<tr>
<td>CUPB</td>
<td>Copper Polybutylene Combo</td>
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<td>Ductile Iron Pipe</td>
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<td>FRP</td>
<td>Fiberglass Reinforced Pipe</td>
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<td>Galvanized And Copper</td>
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<td>Galvanized Pipe</td>
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<td>Non-Reinforced Concrete Pipe</td>
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<td>Orangeberg</td>
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<td>PBAS</td>
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<td>Polyethylene Pipe</td>
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<td>Plastic Lined Pipe</td>
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<tr>
<td>PVC</td>
<td>Polyvinyl Chloride Pipe</td>
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<td>RCB</td>
<td>Reinforced Concrete Box</td>
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<tr>
<td>RCKCHN</td>
<td>Rock Channel</td>
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<tr>
<td>RCP</td>
<td>Reinforced Concrete Pipe</td>
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<tr>
<td>RPM</td>
<td>Reinforced Plastic Mortar Pipe</td>
</tr>
<tr>
<td>STL</td>
<td>Steel Pipe</td>
</tr>
<tr>
<td>T</td>
<td>Asbestos Cement (Transite)</td>
</tr>
<tr>
<td>URC</td>
<td>Unreinforced Concrete</td>
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<tr>
<td>VCP</td>
<td>Vitrified Clay Pipe</td>
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<td>VCPPVC</td>
<td>Vcpipe With PVC Liner</td>
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<td>VSG</td>
<td>Vitrified Segment Duct</td>
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<td>WOD</td>
<td>Wooden Pipe</td>
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<tr>
<td>XXX</td>
<td>Other</td>
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<tr>
<td>ZZZ</td>
<td>Not Known</td>
</tr>
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</table>

**SHP**

*Pipe Shape*

| ARCH         | Arched Pipe                  |
| CIRC         | Circular                     |
| CURV         | Curve Designation For Mapping|
| DITCH        | Ditch                        |
| EGG          | Egg Shape                    |
| HRSH         | Horseshoe Shape              |
| NCHN         | Natural Channel              |
| OVAL         | Oval                         |
| RCHN         | Rectangular Channel          |
| RECT         | Rectangular Box              |
| SEMI         | Semi-Elliptical              |
| TCHN         | Trapezoidal Channel          |
| VAR          | Variable Shape               |
| VEE          | Vee Shaped                   |
Attribute – **SRVC (UNIT_TYPE, SERVICE_TYPE, MATERIAL)**

SUBJECT: Expanded Attribute Values and Descriptions

SOURCE: MMCDA – Master Municipal Construction Documents Association

REVISION DATE: November 2, 2017

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<td>DIA</td>
<td>MATERIAL</td>
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**UNIT_TYPE**

*Subordinate type*

- **D** = Drainage
- **IRRVT** = Irrigation Vault
- **LPSFM** = Low Pressure San Forcemain
- **S** = Sanitary
- **W** = Water
- **WQ_D** = Water Quality Test - Standpipe
- **WQ_K** = Water Quality Test - Kiosk
- **WQ_S** = Water Quality Test - Service

**SERVICE_TYPE**

*Service Type*

- **COM** = Combined Service
- **D** = Service To Culvert
- **DOM** = Domestic Service
- **FRE** = Fire Service
- **IRR** = Irrigation
- **NS** = No Service
- **NSEP** = No Service - Septic
- **SLCO** = Service Line To Clean Out
- **SLPH** = Service Line Place Holder
- **SS** = Sub Standard Service
- **STCM** = Service To Combined Main
- **STIS** = Service Intersects Service
- **STWW** = Service To Waterway
- **TCB** = Service To Catch Basin

**MATERIAL**

*Pipe Material*

- **ABS** = Acrylonitrile Butadiene Sty.
- **ACC** = American Concrete Cylinder
- **ACMP** = Asphalt Corrugated Steel Pipe
- **ACP** = Asbestos Cement Pipe
- **ACPPVC** = Asbestos Cement With Pvc Liner
- **BRK** = Brick
- **CI** = Cast Iron
- **CIC** = Cast Iron Cement Lined
- **CMP** = Corrugated Steel Pipe
- **CO** = Concrete Pipe
- **CON** = Poured-In-Place Concrete
- **CONC** = Concrete Pipe
- **CONPVC** = Concrete Pipe With Pvc Liner
- **CU** = Copper
- **CUAS** = Copper Assumed
- **CUPB** = Copper Polybutylene Combo
- **DI** = Ductile Iron Pipe
- **FRP** = Fiberglass Reinforced Pipe
- **GA-CU** = Galvanized And Copper
- **GALV** = Galvanized Pipe
- **GALVAS** = Galvanized Pipe Assumed
- **HDPE** = High Density Polyethylene
- **NCP** = Non-Reinforced Concrete Pipe
- **ORG** = Orangeberg
- **PB** = Polybutylene
- **PBAS** = Polybutylene Assumed
- **PEP** = Polyethylene Pipe
- **PLP** = Plastic Lined Pipe
- **PVC** = Polyvinyl Chloride Pipe
- **RP** = Reinforced Concrete Box
- **RCKCHN** = Rock Channel
- **RCPP** = Reinforced Concrete Pipe
- **RPM** = Reinforced Plastic Mortar Pipe
- **STL** = Steel Pipe
- **T** = Asbestos Cement (Transite)
- **URC** = Unreinforced Concrete
- **VCP** = Vitrified Clay Pipe
- **VCPPVC** = Vcpipe With Pvc Liner
- **VSG** = Vitrified Segmented Duct
- **WOD** = Wooden Pipe
- **XXX** = Other
- **ZZZ** = Not Known
Appendix B – Recommended Data Sharing
Design Model Drawings

- **<ProjectNumber>_ExistingRecorded**
  - Existing Recorded Assets from SFU GIS

- **<ProjectNumber>_Survey**
  - Existing Points, OG Surface, Existing Pipe Networks and Base Plan Features

- **<ProjectNumber>_Design_0.9995883**
  - Corridor, OG/FG Combined Surface, Sanitary, Storm, Water Design Objects

- **<ProjectNumber>_ConstrutionRecorded_0.9995883**
  - Corridor, OG/FG Combined Surface, Sanitary, Storm, Water Design Objects

Production Drawings

- **<ProjectNumber>_ProductionCover**
  - Cover Page, Key Plan, Legend, Notes

- **<ProjectNumber>_ProductionRoads**
  - Road Production Drawings

- **<ProjectNumber>_ProductionSanitary**
  - Sanitary Production Drawings

- **<ProjectNumber>_ProductionStorm**
  - Storm Production Drawings

- **<ProjectNumber>_ProductionWater**
  - Water Production Drawings

- **<ProjectNumber>_ProductionSections**
  - Design Cross Sections

References

1. OG Surface and Existing Pipe Networks
2. Existing Pipe Networks
3. Proposed Alignment/Profile, OG/FG Combined Surface, Proposed Pipe Networks

AutoCAD External Reference
Appendix C – Technical Procedures
This section outlines technical procedures in AutoCAD Civil 3D required to facilitate the post construction asset data submission for SFU Facilities Services.

**Installation and Usage of SFU Standards Files**

This section provides instructions for the installation of SFU Facilities Services MMCD Municipal CAD Standards drawing template and supporting files.

1. Copy **SFU MMCD Municipal CAD Standard** folder structure to Network Location

2. Start AutoCAD Civil 3D 2016

3. Create SFU Facilities Services AutoCAD profile and make it current
   a. Right click in the drawing area and select Options...
   b. Click the Profiles tab
   c. Click Add to List...
   d. In the Add Profile dialogue box, for Profile name type SFU Facilities Services
      
      ![Add Profile Dialogue Box]

   e. Click Apply & Close
   f. In the Available profiles list, click SFU Facilities Services and click Set Current
The current profile is set to SFU Facilities Services. The next step is to set the paths for the template files, SHX files and plotting CTB files.

4. Set paths for drawing template, SHX and plotting CTB files
   a. In AutoCAD Options click the Files tab
   b. Expand Support File Search Path
   c. Click Add... and then Browse...
   d. In the Browse to Folder dialog box browse to \1_SFU MMCD Civil 3D 2016 folder and select the Linetype and SHX folder
   e. Click OK
   f. Collapse the Support File Search Path
   g. Expand Printer Support File Path
   h. Click Plot Style Table Search Path
   i. Click Add... and then Browse...
j. In the Browse to Folder dialogue box, browse to and select \SFU Municipal CAD Standard\Plot Style CTB folder and click OK

k. Collapse Printer Support File Path

l. Expand Template Settings and click on the path under Drawing Template File Location

m. Click Browse... and in the Browse to Folder dialogue box, browse to and select \SFU Municipal CAD Standard\Drawing Template folder and click OK

n. Click OK to close AutoCAD options

An AutoCAD profile has been created for SFU Facilities Services. When working on SFU Facilities Services infrastructure design and projects set the current profile to SFU Facilities Services in AutoCAD options first. This will ensure the default paths will be set for the drawing template, the plotting CTB files and the SHX files, where are referenced by the custom linetypes.

**Review Data Provided by SFU Facilities Services**

At project initiation you will be provided with an existing recorded assets drawing for the project area. The existing recorded assets drawing references a UTM NAD 83 Zone 10N grid based coordinate system. The data representing the existing assets in this drawing will be updated to reflect how existing assets have been changed as a result of the construction project.

1. From AutoCAD Civil 3D 2016 open 82180_ExistingRecorded.dwg

2. Zoom to the area surrounded by the circle

![](image)

Notice the existing infrastructure data. All data in this drawing is represented with AutoCAD polylines and blocks on R-* layers (R for *Recorded*).

3. Review the various object data tables and the attributes

4. When you are finished close the drawing

SFU Facilities Services MMCD C3D drawing template is used to create the existing recorded assets drawing and the design drawings. The same object data tables are used for existing recorded assets and Construction Recorded Assets.
Create Existing Survey and Surface Model Drawing

The existing survey and surface model drawing is also created from SFU Facilities Services MMCD C3D Drawing template. AutoCAD polylines and blocks, and AutoCAD Civil 3D point objects and figures are used to represent existing surveyed features as per SFU Facilities Services data submission and display requirements.

The existing survey and surface model is ideally created to ground level survey coordinates as design and construction data is based on the information in this drawing. The existing survey and surface model is a standalone drawing and is attached to the design drawing(s) as an AutoCAD external reference. The existing ground surface model is referenced by design drawing(s) using AutoCAD Civil 3D data shortcuts and reference objects. The existing survey and surface model drawing is submitted to SFU Facilities Services at the end of the project.

SFU Facilities Services requires the existing survey and surface model drawing to validate and update the location of existing assets unaffected construction.

Create Design Model Drawings

Design model drawings are used to represent infrastructure design and construction details. Use the following guidelines when creating design model drawings:

1. Create using SFU Facilities Services MMCD C3D drawing template
2. Reference ground level coordinates to facilitate construction staking
3. Do not spatially fragment data across multiple design model drawings. All data for a specific infrastructure type must reside in a single drawing. Multiple infrastructure types can be located in a single or multiple design model drawings (for example, 1 drawing each of sanitary, storm and water design or 1 drawing containing sanitary, storm and water)
4. Drawing production sheets can either be layouts in the design model drawing or in separate standalone drawings. For the latter, use AutoCAD external references and AutoCAD Civil 3D data shortcuts and reference objects to share data with production drawings

Design model drawings are not submitted to SFU Facilities Services. A copy of design model drawings is used to add construction recorded data.

Construction Recorded Assets Drawings and LandXML Data

This section discusses procedures for creating the construction recorded assets drawing

1. Create a copy of your design model drawing(s) and rename them using the following naming convention:
   
   `<ProjectNumber>_ConstructionRecorded<#>_GroundtoGridScaleFactor>.dwg`

2. In the construction recorded drawing, use the following steps to assign attributes to new assets using AutoCAD Map 3D object data. Attaching the object data is a 2 step process. You must first attach the object data tables and then assign the attribute values.
   a. Change to the Planning & Analysis Workspace
   b. On the Create tab, Drawing Object panel, click Attach/Detach object Data
c. In the Attach/Detach Object Data Table dialog box, from the dropdown list, select the appropriate object data table

d. Click Attach to Objects and select the objects in the drawing

Note: You can assign the object data table to multiple objects of the same type by first using the select similar command to select multiple assets and then using the previous selection set option after executing the Attach/Detach Object Data command and clicking the Attach to Objects command.

e. Use AutoCAD Properties window to modify the object data values. Refer to the object data table diagrams for the appropriate values.

Note: To assign the same values for multiple similar assets, use the select similar command and edit the values in the AutoCAD Properties window.

3. Sanitary, storm and water data is required in a LandXML file if these utilities are designed using AutoCAD Civil 3D. Use the following steps to create the LandXML file.

   a. From Toolspace Prospector tab, expand Pipe Networks and Networks

   b. Right click on Networks and click Export LandXML...

   c. In the Export to LandXML dialog box, ensure just the pipe networks are selected, and nothing else
d. Click OK

e. In the Export LandXML dialog box use the following naming convention and enter the file name

<ProjectNumber>_ConstructionRecorded<#>_<GroundtoGridScaleFactor>.xml

f. Click OK

Create a single XML file for every construction recorded drawing you create and assign a number to the file based on the naming convention above.

A LandXML file containing pipe network physical properties and materials has been created. Other attribute data assigned to AutoCAD Civil 3D manhole and pipe objects is aggregated to a single data record when the LandXML file is imported to SFU Facilities Services GIS.

**Prepare Data for Submission to SFU**

The final step is to prepare the data for submission to SFU Facilities Services. The following data files are required:

- Existing recorded assets drawing with updated attributes
• Existing survey assets drawing created using SFU Facilities Services MMCD C3D drawing template
• Design and construction recorded assets drawing(s)

Drawings should be submitted with no references. Promote any AutoCAD Civil 3D reference objects if they exist in the constructed recorded assets drawing.