

City of Barrie

G203 Digital Information Standard (DIS)

Last Revised: June 17, 2024

1 INTRODUCTION

1.1 PURPOSE OF THE DIGITAL INFORMATION STANDARD (DIS)

The City of Barrie's (City) Digital Information Standard (DIS) will create a common approach for submission of all digital information as it relates to infrastructure systems within the City and outline the shared responsibilities between all involved parties.

This document outlines the current minimum content and formatting requirements needed to meet the DIS.

The DIS requirements have been developed to accomplish the following objectives:

- Ensure information submitted to and managed by the City is accurate and current.
- Ensure information is complete.
- Ensure digital data flow is as seamless as possible.
- Improve the efficiency and timeliness of drawing review and approval.

The City has strived to offer a set of predefined digital deliverables based on submission requirements. Each template has been designed to maximize the ease of data extraction. All associated templates and supporting information for a DIS Submission are available on the City's website under [Digital Information Standard](#).

1.1.1 Benefits to the Submitter

The use of this DIS standard will have benefits to both the City and the submitting party.

The submitting party will benefit from:

- Rapid acceptance of submissions
- Immediate feedback of the submission specifically outlining details on the aspects of the submission which do not conform to the DIS

1.1.2 Benefits to the City

The City will benefit from:

- Acceptable design software will be used, therefore making it easier for the city to extract and import data into the GIS system.
- Will receive complete packages only, in a timely manner.
- Accurate information received in submission which will make it easier for the city to extract and import data into the GIS system without modification being required.

1.2 DISCLAIMERS

Rights of the City

- The city reserves the right to amend, alter or to accept revisions to this document at any time.

Users Responsibilities

- It is the user's responsibility to check the City's website for the current revision of this document.
- To ensure that they follow the adequate submission procedure and requirements for their project.

1.3 DEFINITIONS

As-Constructed (as per the "Use of the Professional Engineer's Seal Guideline"): is documentation created by or based solely on information provided by a third party that reflects the installed constructed, or commissioned conditions of a device, machine, equipment, apparatus, structure, system, or other outcome of an engineering project. Since the engineer has not verified that the information is complete or accurate, As-Constructed drawing must not be sealed.

AutoCAD: Software developed and marketed by Autodesk. Within this document where the name AutoCAD is used, it refers to specifically to Autodesk's AutoCAD software.

City: The Corporation of the City of Barrie.

Civil 3D: Software developed and marketed by Autodesk. Within this document where the name Civil 3D is used, it refers specifically to Autodesk's Civil 3D software.

Contributor: Any individual or business contributing to a project under City of Barrie jurisdiction.

Digital Deliverable: Any data submitted to the City or created by the City for the purposes of submission under the Digital Information Standard.

Geo-referencing: To associate something with locations in physical space.

Metadata: Metadata describes other data and is often tagged (Metatag) to the primary data elements to make functions like database searches more efficient and accurate.

Partial Submission: Partial submission refers to the practice of sending a single or multiple drawing revision as an update to a previous submission rather than creating a whole complete package. Only complete packages will be accepted by the City of Barrie.

As-Recorded (as per the "Use of the Professional Engineer's Seal Guideline"): is a document created to accurately reflect the as-constructed, as-built or as-fabricated conditions and that has been sealed by a professional engineering after verifying that the document is accurate. (Otherwise known as Red Line or As-Built Drawings).

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3 CONTENT OF DIS

This section defines the individual elements that make up part of a submission set out in the DIS. The elements required vary based on the submission stage of the project.

3.1 PROJECT INFO FORM

A [project info form](#) (G210) will accompany all submissions to assist the City in assigning accurate metadata to all elements submitted. The data on this form is also used to identify the staff who require notification of submission for review and approval process to begin.

3.2 DATA CHECKLIST FORM

A [data checklist](#) (G210) will accompany all submissions to assist the City in identifying the object data included in the submission.

3.3 TEXT/VECTOR PDF

The Text/Vector PDF requirements apply to both the drawing set as well as any accompanying documents (reports, letters, etc.). Drawing sets are to be plotted to PDF using the Autodesk print driver with layer information included.

The requirements outlined in the Text/Vector PDF section ensures all submissions retain the maximum value for future data usage. These requirements allow near zero loss of data, allowing the submission set to be viewable & searchable via computer, mobile devices, etc. and maintains the ability to easily reproduce hard copies if required.

Text/Vector PDF must meet the following minimum requirements:

- All PDF file securities are to be removed.
- PDFs that have been printed to image-only non-searchable PDFs will not be accepted.
- Drawing set PDFs must be plotted or published using the Autodesk print driver with the setting 'Layer Information' enabled.
- Accompanying documents or reports can be plotted or saved to PDF.
- The City's laying standard and associated plot style must be used for all drawing PDF and drawing set PDFs must be in black and white.
- PDFs are to be plotted to scale.
- For any revisions arising from the review process that require a resubmission, a complete revised version must be submitted noting the date and revision.

3.4 SEALED PDF

Sealed PDFs will follow all the requirements of the Text/Vector PDF however, must include a signed (blue ink) engineer's seal applied where required.

To meet the requirements of a Text/Vector PDF, the seal applied to the plan set must be applied digitally.

A sealed PDF document (letter, report, etc.) can include a scanned signature/seal page. This page would then be inserted into a PDF file that meets the requirements of a Text/Vector PDF (not scanned).

Adding a digital seal is common industry practice, and acceptable in accordance with the Professional Engineers of Ontario (PEO) guideline 'Use of the Professional Engineer's Seal'.

3.5 OBJECT DATA EXTRACTION

To support the integration of data into the City's corporate systems, the required content must be submitted in the format specified.

Object data elements to be extracted are to include all works constructed and existing features remaining after construction, except for a preliminary submission of drawings containing Object Data which are submitted before final approval. Preliminary data simply includes all works expected to be constructed and existing features expected to remain. Preliminary data for each phase of a development shall be submitted separately.

Object Data which is specifically required by the City, requires the use of the supplied Civil 3D template, available from the [City's website](#). The City's template is to be used to include the project specific Object Data that will be extracted following validation by the automated submission process.

All submissions for data extraction must be submitted within the City's provided templates. A Data Checklist will accompany all submissions to assist the City in locating the required submission data within the data extraction format. A Data Checklist template is available on the [City's website](#).

The Object Data submission drawings shall contain all relevant design elements and meet all requirements as outlined in this manual.

3.6 SOURCE FILES

Source Files are the primary file(s) where the design of the project has been completed regardless of the software being used.

The submission of Source Files in their original format will provide flexibility for any potential future use of the data contained within. The Source files will be treated as confidential and only data that can be extracted out related to the design will be used.

The City will review Source File submissions for the appearance of an acceptable submission. Any submissions that appear incomplete will be questioned and could be rejected and/or delay the review process.

Source Files can be purged of all unused styles, settings, and layers at the contributor's discretion as long as it does not affect the integrity of the file (i.e. data must remain in its originally designed state and functionality).

3.7 AS-CONSTRUCTED DRAWINGS (REDLINES)

These requirements are to be read alongside the City's current [Engineering Records Submission Requirements](#).

3.7.1 As-Constructed Digital Copy

Submission of a digital copy (design DWG) that matches the As Recorded Drawings (sealed As-Constructed Drawings) are required as described on the City's current [Engineering Records Submissions](#).

It is recommended that all deviations recorded be transferred to the Text/Vector PDF using a PDF markup tool which allows the deviations to be applied to the PDF with the ability to edit any errors and generate a report on all deviations within the document.

4 REQUIREMENTS

4.1 MAKING A SUBMISSION

All submissions are to be made through the City's [online portal](#). First time users will be required to obtain log in for the portal. This submission process applies to all digital information submitted to or created by the City of Barrie related to Infrastructure, Planning and Development.

4.2 SUBMISSION SETS

This section outlines the specific elements that are required for each type of submission as well as stage of submission, some basic accept/reject criteria has also been provided.

Refer to [Section 3.0](#) of this document and [DIS Supporting Information \(G214\)](#) document for a detailed explanation of all elements requested.

Any element submitted that does not conform to the requirements outlined in the DIS will cause the entire package to be rejected. IF the submission is rejected then a complete package must be resubmitted; partial submissions will not be accepted.

Subdivision Developments					
	Requirements for Design below 90% Completion	Required Prior to Final Approval	Required After Final Approval*	As-Built Data & Record Drawing Submission (Partial Works)	As-Built Data & Record Drawing Submission (Final As-Built)
Project Info Form	X	X	X	X	X
Text/Vector PDF	X	X	X		
Data Checklist Form		X		X	X
Sealed PDF		X			
Preliminary Object Data		X			
Source Files		X			
As-Built PDF				X	X
As-Built Data				X	X

*Issued for Construction, Addendums etc.

Road Construction, Road Reconstruction and Road Rehabilitation					
	Requirements for Design below 90% Completion	Required Prior to Final Approval	Required After Final Approval*	As-Built Data & Record Drawing Submission (Partial Works)	As-Built Data & Record Drawing Submission (Final As-Built)
Project Info Form	X	X	X	X	X
Text/Vector PDF	X	X	X		
Data Checklist Form		X		X	X
Sealed PDF		X	X		
Object Data		X			
Source Files		X			
As-Built PDF				X	X
As-Built Data				X	X

*Issued for Construction, Addendums etc.

4.2.1 Accepted File Formats

File formats represent a small portion of the submission requirements. Refer to specific submission requirements for specific content and format requirements. The table below outlines the required file formats as it relates to DIS Submissions.

Table 3.1 – Submission Formats

Submission Type	Description	Format
Project Info		Submission Portal
Project Info (sealed)		Scanned PDF accompanied by Excel (XLS) (based on DIS template)
Data Checklist		Scanned PDF

Submission Type	Description	Format
Text/Vector PDF	Plotted drawing set to be submitted	Plotted Autodesk PDF
Text-based documents	Any documentation included in the submission	Plotted PDF
Sealed PDF	Plotted drawing set to be submitted	Plotted Autodesk PDF with digital seal
	Any documentation included in the submission	Plotted PDF (With exception for 1pg sealed & scanned)
Object Data Submission (AutoCAD)	Data elements as listed on the Data Checklist presented in CAD	AutoCAD 2018-2023(DWG) (Based on DIS AutoCAD template)
Object Data Submission (Civil 3D)	Data elements as listed on the Data Checklist presented in CAD	Civil 3D 2018-2023 (DWG) (Based on the City of Barrie Civil 3D template)
Source Files	Source files for all engineering drawings within the submission set	[Varies, original format files required] - AutoCAD Civil 3D 2018-2023, AutoCAD 2018-2023, (.DWG), Data Shortcuts (.xml), etc.
As-Constructed Drawing	As-Constructed Drawing pending engineers seal	PDF
Record Drawing	As-Recorded PDF with deviations sealed by engineer	PDF with digital markups, digitally sealed, or Hardcopy markups Sealed & Scanned to PDF (minimum 300dpi)
As-Constructed Data (DWG)	Object Data submission (AutoCAD or Civil 3D)	AutoCAD 2018-2023 (DWG) (Based on DIS AutoCAD template)
		Civil 3D 2018-2023 (DWG) (Based on the City's Civil 3D template)

4.3 GEO-REFERENCING AND SPATIAL ACCURACY

The requirements described below shall be used for all digital data under the jurisdiction of the City of Barrie.

The standard coordinate system for the City is the Universal Transverse Mercator (UTM) Zone 17 North with the North American Datum 1983 “NAD83 (Original)”. All digital submissions must be geo-referenced (either with actual coordinates or a .wld file)

Projected Coordinate System:	UTM NAD 1983 Zone 17N (Original)
Projection:	Transverse Mercator
Geographic Coordinate System:	GCS North American 1983
Datum:	North American 1983
Linear Unit:	Meter

The benchmark number, location, and full description with respect to the project specific control monuments shall be indicated on all drawings as well as the benchmark number and location of ALL control monument within the project limits. Refer to the [MNR COSINE Database](#) to retrieve the monument values.

4.4 AS CONSTRUCTED DRAWING REQUIREMENTS

The requirements for the As-Constructed Drawings are:

- Submitted as two (2) general submission stages, Partial As-Constructed (underground and/or above grade based on work completed to date) and Final As-Constructed (underground and above grade in their final state)
- Drawings for submission are to be clearly labelled as “Partial As-Constructed” or “Final As-Constructed” in the revisions section of the title block with a submission date.
- As-Constructed drawings must be submitted at the end of each year or construction season.
- As-Constructed drawings shall be based on the unstamped Text/Vector PDF of the most current design drawings. Deviations (redlines) can only be applied to unstamped drawings and will be applied to the latest approved, issued for construction, or addendum drawings.
- As-Constructed Drawings will not include a stamp until reviewed and approved by an engineer prior to submission as an As-Recorded Drawing. If submitting a Partial As-Constructed the stamp should be applied digitally to the scanned As-Constructed Drawing; this ensures future deviations can be added to the unstamped As-Constructed allowing the future submission of the Final As-Constructed Drawing.
- All deviations (redlines) must be recorded as the work is performed.
- All deviations must be recorded clearly & legibly in red (ink or digital markup). Anything other than red will cause the As-Constructed Drawing to be rejected. Highlighters, thick markers, scribbled out markups or design data, etc. will cause the As-Constructed Drawings to be rejected.
- All incorrect information must be crossed out and replaced with the correct information.
- All deviations related to constructed works shall be included on the Partial As-Constructed or Final As-Constructed for the appropriate year/construction season.
- The Engineering Development Manual outlines specific record requirements related to As-Constructed Drawings.
- As-Recorded Drawing sets that are based on re-scanned “Partial As-Constructed” drawings, or if they are dog eared, folded, ripped, muddy, dirty, stained, etc. are not acceptable.

- After all deviations (redlines) for the required stage (“Partial As-Constructed” or “Final As-Constructed”) are recorded on a single drawing set they will be reviewed by the engineer to create an As-Recorded Drawing. The engineer’s seal, dated for the As-Recorded submission, is required on every sheet in the set.

4.5 OPEN DATA EXTRACTION REQUIREMENTS

The specific data requirements for an Object Data submission are outlined in the following sections, details of the required data can also be found in the Data Checklist.

For the Object Data, a CAD or Civil 3D based .DWG file can be stripped of all non-essential and duplicated information. All required information is within model space, all drawing layouts have been removed, and no external references are present. The basic CAD requirements for Object Data & detail required is limited to the Data Checklist.

The Object Data Requirements are:

- Will only include features that would be present after project completion and/or existing features not removed during construction. If the specific object was ‘removed’ in the field, it will not be provided in the Object Data Submission as it has been removed. Alternatively, if it was ‘to be abandoned’ then it is still existing in the field, therefore it will need to be provided in the Object Data submission.
- Drawings are to be georeferenced.
- Only data requested in the Data Checklist is to be included.
- All drawing objects (lines, polylines & blocks) properties are to be set to ‘By Layer’ and meet layering requirements.
- External references shall be ‘Inserted’ into the drawing not referenced.

Object Data tables can be found in the DIS Supporting Information (G214) document found on the City’s external webpage.

4.6 AUTOCAD OBJECT DATA LAYER REQUIREMENTS

AutoCAD with the MAP 3D Toolset can be utilized in the attachment of object data to AutoCAD drawing entities as the City’s required Object Data Tables are included in the template.

The Civil 3D and AutoCAD template file that maintains the City’s layer structure can be accessed on the [City’s Website](#).

4.6.1 Overall Layering Convention

Each type of project (buildings, roads, parcel, pipe etc.) will have a unique layer and be prefixed or suffixed appropriately. The AutoCAD template file includes all the required Object Data Tables and Layers.

Any additional layers added must be listed on the Data Checklist and follow the intent of the layering convention described below. Layers listed will be considered for inclusion to the standard. Additional layers duplicating an already defined City layer will be rejected.

4.6.2 General Prefix/Suffix Layer

The examples provided below to describe the general concept required for the layering convention. Labelling for the Object Data submission is not required in the typical sense and therefore no layers are required for these elements. Object Data Tables are not associated with predefined layers.

Not using the Object Data Tables and opting for text labelling will be ignored by the system and will cause your submission to be rejected.

It is required that **Existing Elements** in drawing shall be prefixed with 'X'. This is typically information collected prior to the start of construction from a variety of sources like topographic surveys, tree inventories, and city records. Information collected or converted from subsurface utility engineering (SUE) data are separate from these Existing Elements (see Subsurface Utility Engineering below). For the purposes of this standard, constructed elements surveyed after construction are not considered Existing elements. Any existing elements that have been modified or abandoned during construction are now considered Constructed. Existing elements removed during construction shall not be present in the Object Data Tables. (eg. Existing Sanitary Maintenance Hole (Topographic) – XSANMH)

Subsurface Utility Engineering (SUE) data collected through project investigations fall into the existing elements category if they have not been removed, replaced, or modified during construction. These layers shall include a prefix 'SUE' and a suffix denoting the quality level (QLC A, B, C or D). Existing elements are often recreated based on the SUE and within the design software of choice. In these cases, the SUE elements should either remain alongside the recreated existing elements or the recreated existing element layer can be suffix with the appropriate quality level. (eg. Underground Bell (SEU, Quality Level C) – SUE-BE-QLC)

Constructed Elements (proposed or modified elements) shall conform to the City standards and shall have no prefix. (eg. Constructed (proposed) stormwater Maintenance Hole – STMMH)

Legal Plan submissions are currently not outlined in this document apart from the required survey control. The legal plan shall not be included in the Object Data submission as the submission of these files is currently covered under the City's Integrated Control Survey Specification.

For data extraction layer requirements, please refer to the City's [DIS Supporting Information Document](#).

4.7 CIVIL 3D OBJECT DATA REQUIREMENTS

Civil 3D design drawings that take advantage of the available Civil 3D features may still require the attachment of Object Data Tables to AutoCAD elements.

The Civil 3D Pipe Network Catalogue provided with the City's Civil 3D standard includes all data requirements as listed on the Data Tables for sanitary Devices/Pipes and Storm Devices/Pipes. Using this customized Pipe Network Catalogs will allow users to add the required data during design.

The use of the City's Civil 3D template is mandatory and submissions that do not meet the requirement will not be accepted.

4.7.1 Preparation for a Civil 3D Pipe Network

Submission of a Civil 3D pipe network can be achieved using the following steps:

- Create a Civil 3D drawing based on the City's Civil 3D template Standard.
 - Create data shortcuts as required.
 - Develop the design.
 - Add the required Object Data to the AutoCAD lines/polylines/blocks by completing and attaching the appropriate Object Data Table.
 - Save the original drawing for submission with Data Shortcuts intact for future update during the As-Constructed Data creation stage.
 - Save the drawing with the submission name.
 - The Civil 3D Pipe Networks portion of the data is already in suitable format for submission.
 - Use the promote command to create a local copy of each element.
 - Insert any external references.
 - Save the file for Object Data Submission.

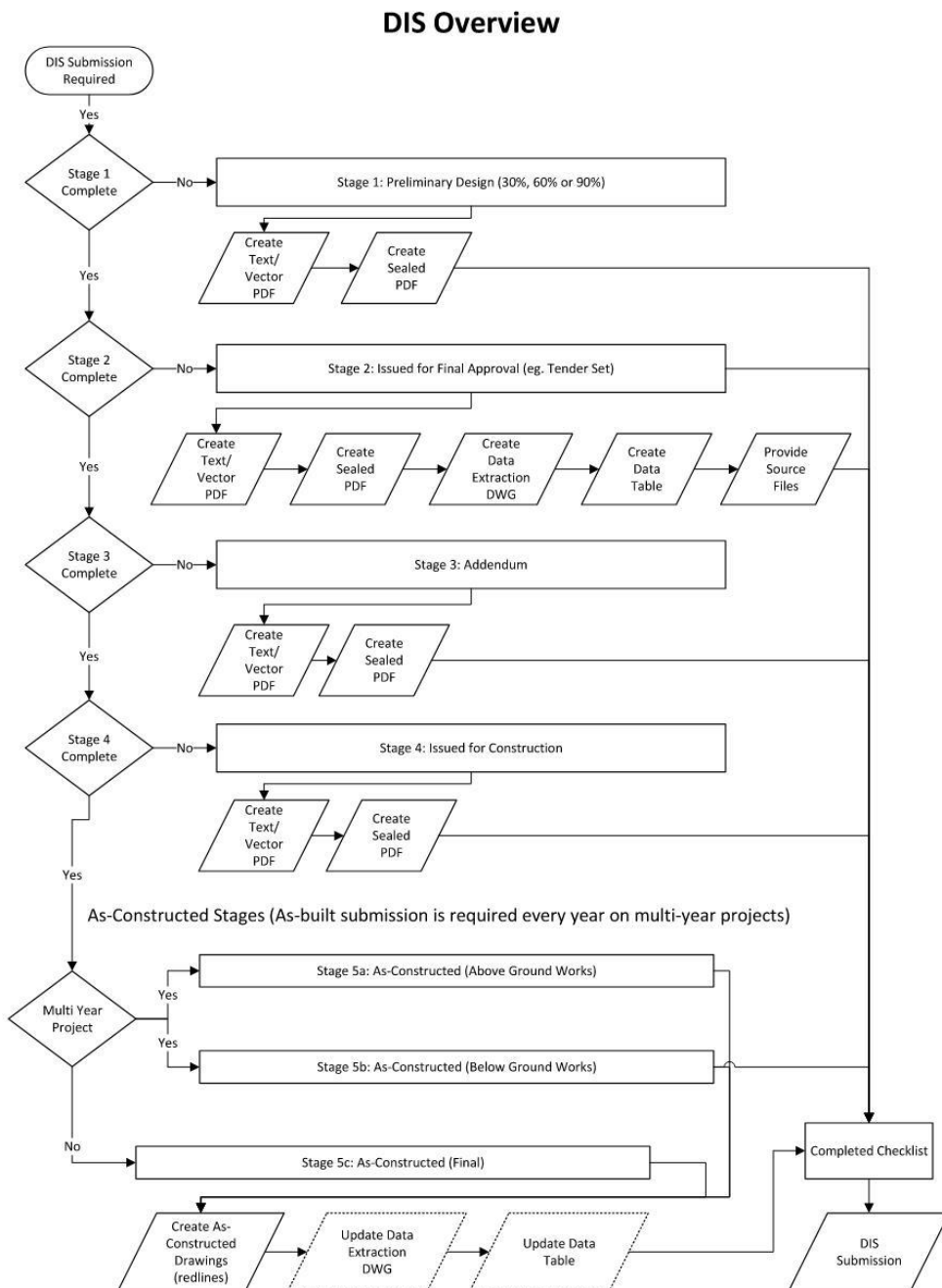
[Important Note – Modelling in Civil 3D]

It is well known that Civil 3D has a phenomenal amount of flexibility built in; this has led to the rise of Drafting in Civil 3D vs. Modelling in Civil 3D. Drafting in Civil 3D relates to a template setup to allow the user to represent design elements through more typical drafting practices; for example a Civil 3D 1200mm circular maintenance hole can be represented through styles as a catchbasin, or a concrete pipe can be labelled as a PVC pipe. This is all based around how the Civil 3D template is created. Modelling in Civil 3D means the template is setup to use the proper structure & pipe definitions from a part catalog.

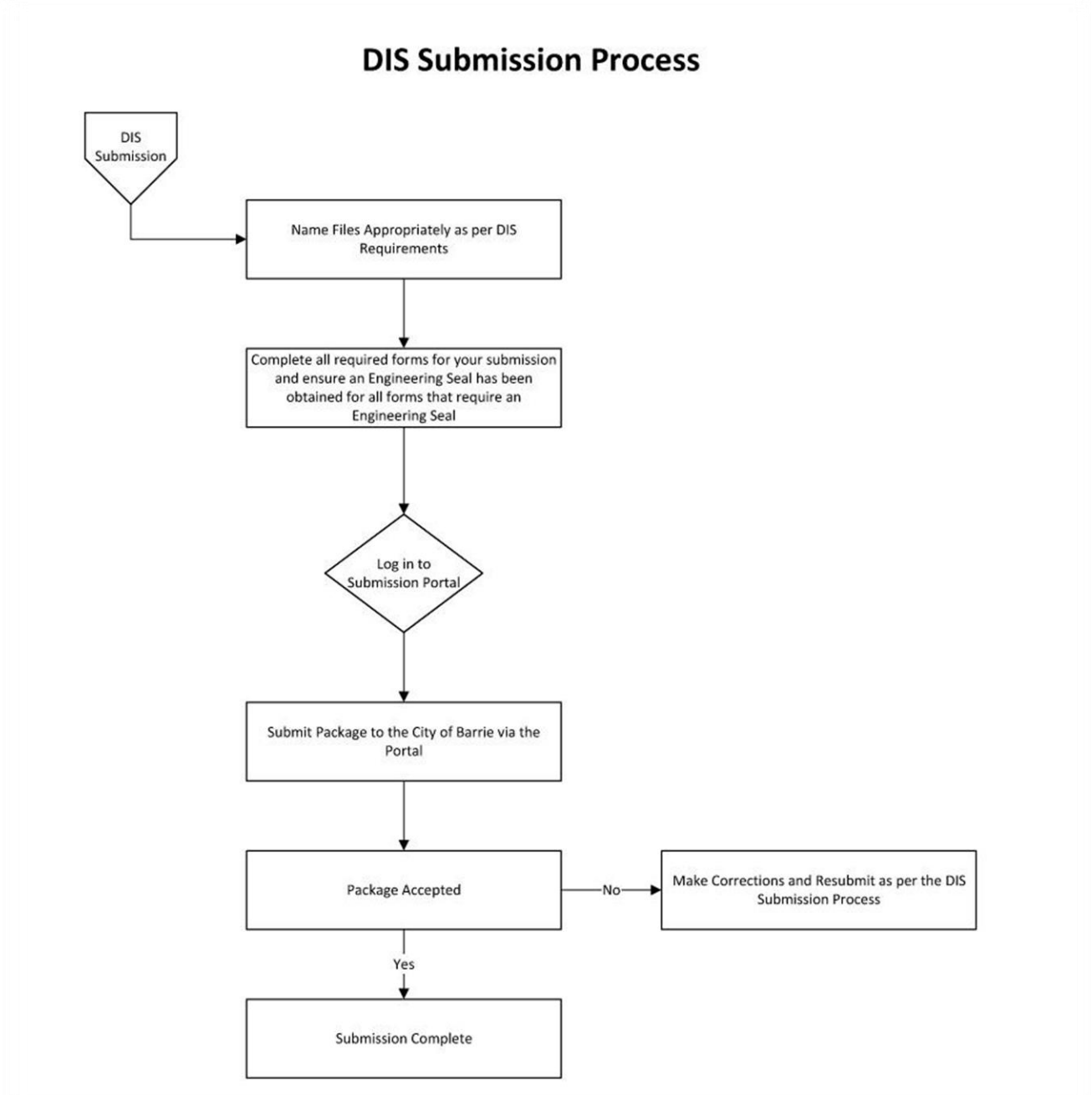
The process used to extract object data will only see data located in the two areas shown below (Structure & Pipe Properties). Any data not listed here must be provided in a Data Table otherwise your submission will be rejected. **The City of Barrie Civil 3D part catalog has been modified to include all DIS required data elements within Storm & Sanitary pipes and structures.**

5 TYPICAL PROCESS FLOW

5.1 DIS OVERVIEW FLOWCHART



5.2 DIS SUBMISSION PROCESS



6 APPENDICES

6.1 APPENDIX 1 – DIS DOCUMENTS

G201	City of Barrie SD-1 (PDF)
G202	City of Barrie SD-2 (PDF)
G203	Digital Information Standard
G209	Digital Stamp Tracking Form (DOCX)
G210	Project Info – Data Table – Data Checklist (XLSX)
G211	2023 Civil 3D Template (zipped file)*
G212	Digital Information Standard Attribute Cheat Sheet (XLSX)
G213	Digital Submission Plug-In (zipped file)
G214	Digital Information Standard Supporting Information

*The mandatory requirement to use the City’s new G211 – 2023 Civil 3D Template will come with the launch of the new Automated Submission and Data Validation Tool.

6.2 APPENDIX 2 – DOCUMENT STATUS AND CHANGE LOG

Over time it will be necessary for the City of Barrie to update this standard as the regulations, design practices and technologies continue to evolve and change.

It is the user’s responsibility to check the City’s [website](#) for the status and revisions of this standard. Standard Owners should immediately discard superseded and cancelled standards.

Revision No.	Date	Status (Under Review/ Document Change)	Comment
1	June 12, 2024	New Document	New Digital Information Standard and DIS Supporting Information Document