DEPARTMENT OF MUNICIPAL AFFAIRS

ASSET MANAGEMENT DATA COLLECTION PILOT PROJECT

DATA COLLECTION STANDARD OPERATING PROCEDURE

VERSION 1: NOVEMBER 2018

NOVA SCOTIA

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1.0 INTRODUCTION

The purpose of Data Collection is to generate a list of all assets owned and maintained by your municipality. Knowing what you have is the first big step towards effective infrastructure management. Once collected in the data collection tool, the built-in Preliminary State of Infrastructure Reporting (SOIR) will allow you to see a snap shot of your infrastructure and a preliminary 20-year outlook so you can begin to target critical areas and take action cost-effectively.

This Standard Operating Procedure (SOP) is intended to be a guide in collecting the data in a standardized way. The main questions that this process will answer are:

a) What do we own?
b) Where is it located?
c) What is its current condition?

The first installment of Asset Inventory Spreadsheets will document the infrastructure included in Table 5-3: Feature Codes.

To integrate with the provincial data storage system, it is essential that municipalities complete a digital inventory using these tools, and municipal administrations must have access to Microsoft Office to do this. Please advise the Department of Municipal Affairs if your Municipality does not have MS Office. The inventory forms are created using Microsoft Excel and the format has been designed to be compatible with the Department of Municipal Affairs Asset Registry Project.

**** Data displayed within this document is not representative of any municipalities infrastructure. Asset details and conditions have been altered and are meant for demonstration purposes only. ****

2.0 GETTING STARTED

The Asset Inventory Spreadsheet requires macro-enabled Microsoft Excel to take advantage of full functionality.

It is strongly suggested that each municipality develop a written responsibility matrix which identifies personnel responsible for updating, maintaining, and reviewing the Asset Inventory Spreadsheet.

Once the Asset Inventory Spreadsheet has been updated and reviewed, it should be saved and backed up according to the file naming convention outlined in Section 9.2.

2.1 QUICK TOUR OF THE ASSET INVENTORY TOOL

The Asset Inventory Spreadsheet is a standardized tool that will help Municipalities catalogue and assess all their owned assets. The Asset Inventory Spreadsheet has eight worksheets:

Sheet	Description	Section Reference
"SURVEY INPUT"	The starting point for entering new information. This worksheet is where either survey data or GIS exports can be entered into the database.	Section 4.5
"GENERAL ASSET INFORMATION"	This worksheet contains all the general information for each Asset and is where all the data from the "SURVEY INPUT" sheet is collated and stored. Information calculated in the spreadsheet can be exported to Geographic Information Systems (GIS) compatible file or a PDF of the State of Infrastructure Report (SOIR).	Section 4.6
"ASSET DETAILS"	Where all coordinate information is stored.	Section 4.7
"SOIR-PREVIEW"	Where a preview of the SOIR can be viewed	Section 4.8
"BACKGROUND"	Datasets used by the tool to build the "GENERAL ASSET INFORMATION" sheet.	Section 4.9

"UNIT COST"	User-defined costing information. Current values provided as a base line. Municipalities are encouraged to edit these costs to better suit their region.	Section 4.9.2
"DELETE LOG"	A historical record of all assets deleted from the data base.	Section 4.11

2.2 BEFORE YOU BEGIN

There are a few simple criteria that are vital to the proper operation of the spreadsheet. **Ensure that you adhere to these processes** for ease of use and to get full functionality from the tool**:**

2.2.1 IMPORTANT DATA STRUCTURE AND PROCEDURES

- **Folder structure** is vital to the automatic file backup and storage. Do not relocate, delete, or rename objects within the main folder. For easier access from your desktop, create a shortcut and place where you wish. See Section 4.1.
- **Data format and structure** is vital to calculations performed in the spreadsheet. Please adhere to Section 3.1.
- Ensure **Macros** are enabled. A yellow bar may appear at the top of the worksheet when opened giving you the option to enable macros. **Click "Enable Content"**
- If you are using **MS Excel 2003** or earlier, refer to Section 4.2.1 and contact your Department of Municipal Affairs (DMA) representative for support.
- **Importing Data** must be performed with the "Import TXT File" button in the "SURVEY INPUT" sheet, using Excel based text files (XLS, CSV, TXT, etc.). See Section 4.5
- **Edit and Delete** assets from the table using the "Edit Asset" Button functionality. See Section 4.6.2 and Section 4.7.

2.2.2 HELPFUL HINTS

Throughout the document you will find hints on ease of working with the Asset Inventory Spreadsheet or making it more compatible with future upgrades. These hints are identified by a red "thumbs up" like this:

HINT: When surveying **linear assets as identified in** Table 5-3 for input into the spreadsheet using GPS survey equipment, you can make it GIS ready by following these steps:

HINT: When surveying **treatment facilities, lift stations, booster stations, or pump stations** insert the name of the facility in the location description. Ensure the name is entered the same for all assets in the building. If you know what the unique asset code will be once calculated in the spreadsheet, use the code instead of the given name of the building.

3.0 PART 1: COLLECT YOUR DATA

- Data can be collected for import using three different methods described in Section 3.3 (Survey Pick-Up; GIS Entry and Pick-Up; and Direct Entry into the Asset Inventory Spreadsheet), all of which will result in a populated inventory database used to produce reports and track the state of inventory. Regardless of the method used, please review Table 3-1 for Data Structure Requirements before starting.

HINT: Collection to be performed in UTM NAD83 (CSRS) 2010 for horizontal datum and CGVD2013 for vertical datum.

HINT: Collection of road centrelines is no longer required. The authorities source for road centrelines are collected and maintained by the Province of Nova Scotia using Provincial Standards and Guidelines through the Civic Addressing Group (NSCAF). The Nova Scotia Road Network (NSRN) is now the default layer for road centrelines.

3.1 REQUIRED FIELDS FOR BULK IMPORT

When importing large amounts of data from survey or from a file exported from your GIS software, some fields are required for the data transfer to work. The error checking fields (Section 4.) assists in flagging errors prior to updating the spreadsheet.

Table 3-1 outlines required input fields for each bulk import method and their requirements:

Table 3-1: Data Structure Requirements

Field	Required with Survey Method	Required with GIS Method	Comments
Mun ID	Yes	Yes	For unique asset code generation. Code must be present in "BACKGROUND" sheet, see Section 5. This is the same as your existing GEONOVA municipal ID
FeatureCode	Yes	Yes	For all spreadsheet calculations. Code must be present in "BACKGROUND" sheet, see Section 5.
Northing	Yes	No	For future development of GIS data and length calculations. Align with table 6-1
Easting	Yes	No	For future development of GIS data and length calculations. Align with table 6-1
Elevation	Yes	No	For future development of GIS data. Align with table 6-1
Condition	Yes	Yes	Required for remaining life calculations and reporting. Align with table 6-1
Material	No	No	For users desired level of detail.
Install yr	No	No	Must be a whole number. For users desired level of detail. To be used in future spreadsheet development with costing and useful life calculations.
Locdesc	No	No	For users desired level of detail. Not format dependent,
Cost Factor	No	No	To refine detail on replacement cost. Ensure that the combination of cost factor and feature code be stored in "UNIT COST" sheet. Not format dependent. See Section 4.9.
Width	No	No	For cost calculation on items which are calculated using area (roads). This width will apply to all assets despite what is entered in the "UNIT COST" sheet. Ensure width is appropriate for costing before entering or left blank.

Field	Required with Survey Method	Required with GIS Method	Comments
Comments	No	No	For users desired level of detail. Not format dependent.
Quantity	No	Yes	The length of quantity of asset stored in GIS. Will override all length calculations done in spreadsheet. Must be a numerical value
Status	No	No	For users desired level of detail. Not format dependent. Recommend text stating “active” or “inactive”.
GIS Link	No	Yes	The unique identifier stored in GIS. This will link all calculated information in the spreadsheet to GIS.

3.2 STEP 1: PREPARING FOR COLLECTION

Data collection is a labour-intensive process and can be overwhelming if not approached in a systematic and orderly fashion. Begin with a plan based on these simple steps to minimize the time and resources required for data collection:

- Make a list of the linear assets you own. Use the asset classes, subclasses and feature codes discussed in Section 5 as a guide. It is good to know what you are looking for!
- Collect and organize any record drawings you have available for these assets. This will assist in locating the assets and identifying key information such as age and approximate location of underground infrastructure.

HINT: If picking up using GIS collection (see Section 3.3.2 below), you can import record drawing CAD files or PDF files into the GIS shape files used for data collection. This lets you generate lines and points for the assets before leaving the office!

- Consult with your public works staff. They are your greatest resource in determining gaps in data, flagging incorrect data and identifying operational inputs for the condition assessment.
- Create a map. This can be anything from a hand drawn sketch to a digital GIS map on a tablet. The important thing is to have something to guide you to where you are going and what you are looking for.

- Review the condition assessment sheets. Appendix A contains the condition rating guides. Section 8 discusses the Condition Assessment in detail. Being familiar with the objective ratings before going in the field will speed up the process and allow you to have the right tools on hand.
- Plan on where linear assets will be split into separate assets. Split points should consider such aspects as different install years, sections where roads have been upgraded or repaired with asphalt overlay, civic street intersections, changes in pipe diameter, etc.
- Have a plan. Determine how you are going to collect the information. For example, are you going to collect all the water lines at once before other assets or collect all assets together street by street? Being organized will reduce errors and make data validation easier.
- Mark collected assets as complete. Using your maps, mark assets as complete once they have been collected for the database. This reduces the risk of duplication and will make validation easier.
- QA/QC data. Assign someone to QA/QC the data following completion. This should be someone with knowledge of the infrastructure or knowledge of asset inventory and management. This person may be internal staff or an external resource retained to facilitate the collection process. It is important that there is a single point of responsibility for the quality and completeness of the data.

3.3 STEP 2: COLLECTING THE DATA

Data can be collected using any of the following methods.

3.3.1 OPTION 1: SURVEY PICK-UP

This option is best if there is no existing GIS or CAD database of infrastructure and no desire to generate one. If you plan on using or creating a GIS database with the data, please refer to Section 3.3.2.

Data can be picked up using GPS survey equipment which will collect the coordinates of the infrastructure, as well as field notes about the infrastructure being surveyed. The survey file can be exported from the survey equipment into an Excel compatible CSV file. Data can be cleaned and edited if required in this CSV file prior to import into the Asset Inventory Spreadsheet.

HINT: When surveying **linear assets as identified in** Table 5-3 for input into the spreadsheet using GPS survey equipment, you can make it GIS ready by following these steps:

- Begin with the start identifier feature code, i.e., “RRGR-S”

- Continue taking the assets points with the regular feature code. i.e. “RRGR”
- Points must be taken in order, for example, the user cannot pick up the start point, end point, then a bend in the middle.

3.3.2 OPTION 2: GIS ENTRY AND PICK-UP

If you have an existing GIS dataset there is no need to collect the information again. The Asset Inventory Spreadsheet is GIS compatible and can import data from your existing GIS shape files. If your GIS dataset does not have all the required fields in Table 3-1, you may need to add those fields prior to import or map them to different field names. Refer to Section 7 for a full “how to” guide to import GIS data.

Whether you are adding to an existing GIS dataset or intending to start building one with your initial asset inventory, you may collect the data using a GIS enabled tablet. This method has the advantage of being able to set up GIS mapping from existing CAD information or paper record drawings prior to the field data pick up. These maps can be used on tablets during the rest of the data pick up.

HINT: for field GIS data pick up, you will need a **GIS field collection tool** to enter the data into shape files. There are a number of commercial and free open source options available to do this.

There are two further constraints with GIS data to be imported into the Asset Inventory Spreadsheet.

- Linear assets held within GIS must not contain the start identifier, “-s” as a suffix on their feature code for input into the spreadsheet.
- GIS data must have a unique ID for each asset to import data calculated in the spreadsheet. This unique code must be unique to your entire inventory, not just the individual shape file.

3.3.3 OPTION 3: DIRECT ENTRY INTO THE ASSET INVENTORY SPREADSHEET

Individual assets can also be added, edited and deleted within the Asset Inventory Spreadsheet. This is most effective for adding individual assets that may have been missed in the initial data pick-up or cleaning up data during quality checks of the information. See Sections 4.6.1 and 4.6.2 for the “how to” guide on manipulating assets.

HINT: Building a full asset inventory database using this method is ***not recommended*** as it will be time consuming and prone to error. For bulk pick up of large amounts of data, either Survey or GIS pickup should be used.

4.0 PART 2: USING THE ASSET INVENTORY SPREADSHEET

The following section will provide a detailed overview of how to use the spreadsheet and the different functions within each form.

4.1 FOLDER STRUCTURE

The structure, layout and format of the folders is key to the operation of the spreadsheet. The top-level folder can be placed anywhere on your server that you wish. However, subfolder names and locations should not be edited. If you wish to have easier access to any of the contents you may create a shortcut to place at a location of your choosing.

4.2 SYSTEM REQUIREMENTS

To use the spreadsheet, it should be opened using Microsoft Excel with macros enabled. Click “Enable Content” at the top of the worksheet upon opening to activate macros. See Figure 4.0 below.

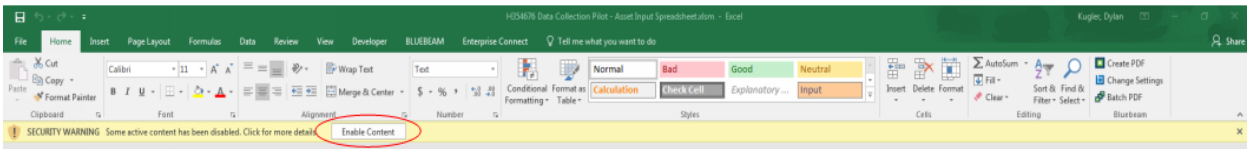


Figure 4.0 - Enable Marcos

4.2.1 COMPATIBILITY VERSION

If you are operating on a version of Excel 2003 or older the spreadsheet will have limited functionality. Data storage is still functional however SOIR is not functional. Contact your DMA representative for assistance if you require this.

HINT: You may consider upgrading to a newer version of MS Excel as the compatibility version has reduced functionality. It does not support SOIR Exports or Previews

4.3 SECURITY

To protect your data and the spreadsheet functionality, sections have been locked from editing. Users are not able to edit aspects of the spreadsheet including column order, filters, content, cell format, hide/unhide aspect or background processes.

Further, the user is not able to select, copy and paste data. This is to prevent the user of editing any information accidently outside of the button controls which could render the data incompatible with reports and the Provincial data registry.

HINT: If you wish to view and manipulate calculated data for reporting or other purposes, the data can be exported to CSV format with the "GIS Export" Button. See Section 7 for instructions.

4.4 ERROR CHECKING

The bulk of error handling is in the "SURVEY INPUT" sheet. Columns "U" through "AC" will flag common causes of errors which result from improper source data. Table 4-1 outlines the meanings and common solution to each of the error flags. If your municipality has a GIS database, ensure you address any errors in your source shape file as well. Refer to Section 3.1 for data structure and correct field inputs to address potential errors prior to importing.

If an error is encountered when the user attempts to update the table a message will appear, shown in Figure 4-1. When the error message is closed, the user will be taken to the first error encountered, shown in Figure 4-2

Table 4-1: Error Checking

Error Flag	Description	Common Source	Potential Solution
Duplicate Error	Multiple copies of the same asset have been found within the "SURVEY INPUT" sheet based on Feature Code and coordinates.	Importing the same "SURVEY INPUT" sheet twice. Unknown asset locations assigned the same default coordinates	Data that has not been updated can be edited from within the "SURVEY INPUT" sheet. Delete or edit asset.
Missing Cost	Flags assets lacking a cost in the "UNIT COST" sheet. This is required for inventory value and future cost calculations.	Costs are dependent on combination of feature code and "Cost Factor "field.	Add the item to the "UNIT COST" sheet. Refer to Section 4.9.2 for instructions.

Error Flag	Description	Common Source	Potential Solution
Unknown FC	Feature Code in input data is not present within the "BACKGROUND" sheet.	Typo in the survey input. Asset not within scope of original pilot project.	Edit feature code to correct code within your input. Add an asset to the "BACKGROUND" sheet. See Section 4.6.1 for instructions.
Unknown Mun_ID	Municipal ID code is not in the "BACKGROUND" sheet	Typo in input data.	Edit municipal ID to correct code in your input.
Invalid Coordinates Input	Input in Northing, Easting, and/or Elevation are not valid. This is ignored when GIS_Link is not null. This is required for future development of GIS data, which is a strongly encouraged practice.	Location of asset was not known so coordinates left blank. Coordinate data is not in the correct format.	Add coordinate information of unknown at a central point in the municipality. Revise coordinate data to the correct format. Error can be overridden by editing contents of error field.
Invalid condition input	Condition score must be the value 0, 1, 2, 3, 4, 5 or left blank. Remaining useful life and reporting is dependent on this entry.	Different condition formatting entered with pickup.	Convert conditions to the correct format.
Invalid Install YR input	Install year must be a whole number or blank value	Text was input into the field	Delete any text in field. Make appropriate comments.
Invalid Material input	Material in survey input must be blank or match an item in material list within background sheet.	Unknown or type in field material	Review material list to ensure proper input
Invalid width input	Width must be a whole number or blank value. Cost estimation is dependent on this value.	Text was input into the field	Delete any text in field. Make appropriate comments.

HINT: If you are still receiving an error after checking proper input, make sure there is no space at the end of your entry, this cannot be seen visually but does affect processes

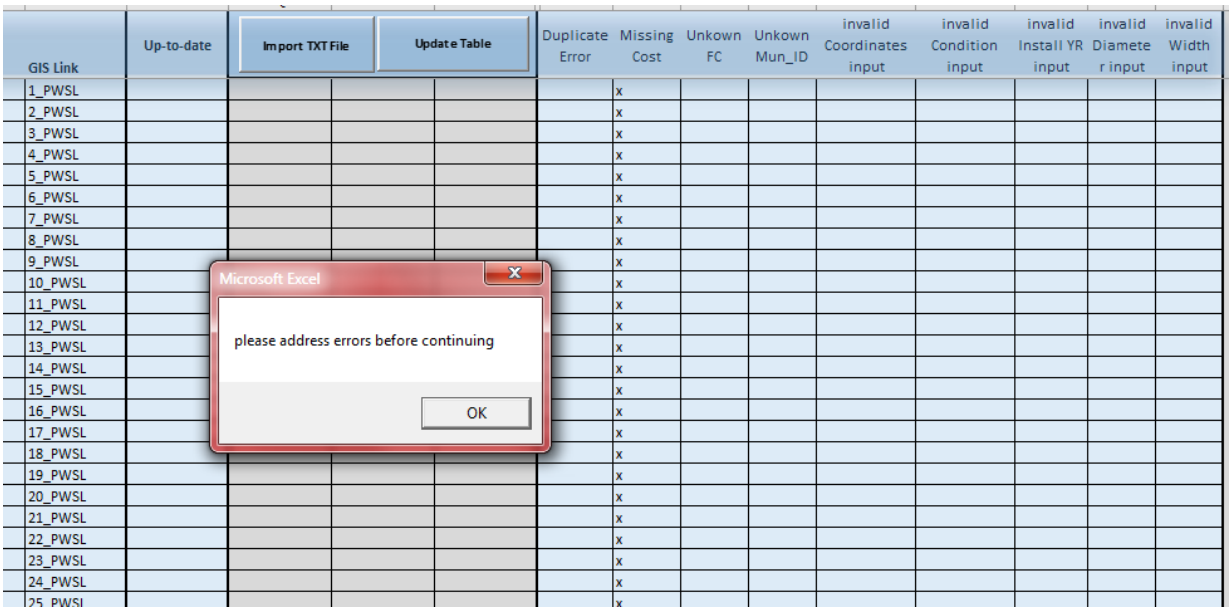


Figure 4.1 – Error Message

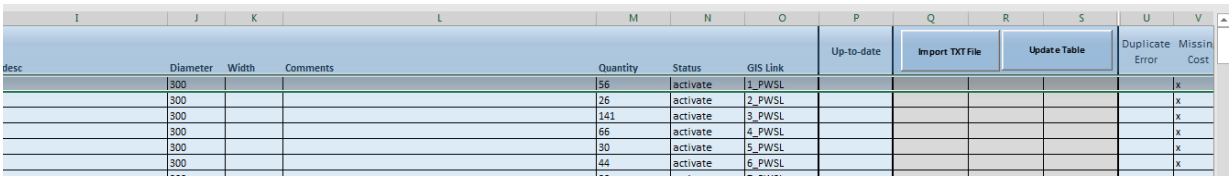


Figure 4.2 – Error Location

Unexpected errors can still be encountered. If you encounter any errors outside the error handling routines, please contact DMA so the error may be investigated and corrected in a future release of the Asset Inventory Spreadsheet.

4.5 ADDING INFORMATION TO THE DATABASE

The “SURVEY INPUT” sheet is the starting point for entering new information. This worksheet is where either survey data or GIS exports can be imported into the “GENERAL ASSET INFORMATION” sheet.

4.5.1 STEP 1: IMPORT YOUR SURVEY OR GIS INFORMATION

Populate the “SURVEY INPUT” sheet using the “Import TXT File” button.

This will take you to a file explorer for you to select a CSV or other text file to import. See Figures 4.3 through 4.5. The “SURVEY INPUT” sheet is left unlocked so that errors can be quickly addressed during updating. Error checking and handling is discussed in Section 4.4.

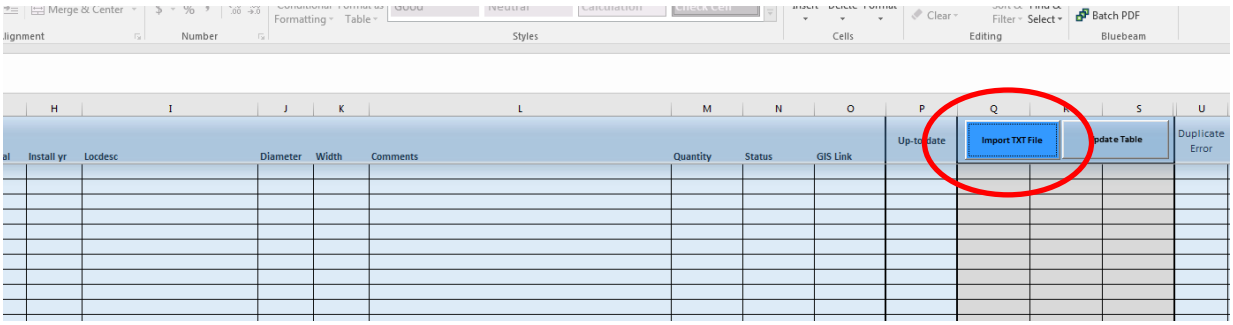


Figure 4.3 – “Import Text” Button

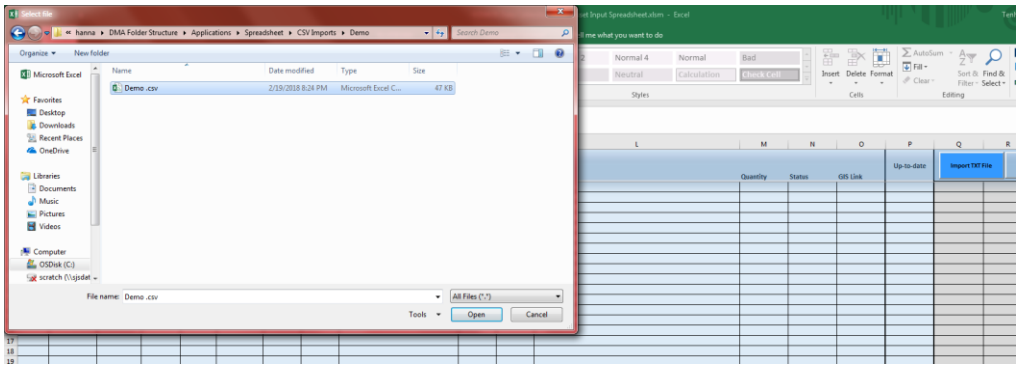


Figure 4.4 – Import File Explorer

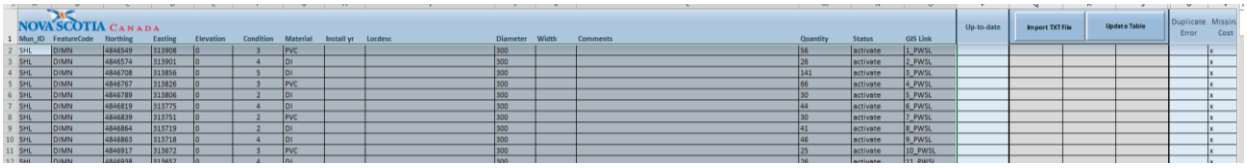


Figure 4.5 – Imported Data

HINT: Do not manually enter data into the "SURVEY INPUT" sheet as you will lose the benefit of the error checking processes built into the import function.

4.5.2 STEP 2: ADD THE SURVEY INFORMATION TO THE DATABASE

Select the "Update Table" button to enter all items into the "GENERAL ASSET INFORMATION" sheet.

A message will appear once the process is completed shown in Figure 4.6. If an error is present the process will stop, a message will appear, and you will be taken to the first error in the data. Depending on amount and type of data this can take several minutes. Data sets from a survey file with many survey points to develop line has the largest impact on processing time. If process time is an issue, reduce the level of detail on linear assets by deleting bend points if possible.

HINT: Process time can be reduced by minimizing the number of points used to define curved or bent linear elements like streets or watermains.

During the table updating process a backup saved to the "Backup Folder". If critical errors are encountered, you can revert to these backup files. Also, we recommend you keep a set of backup files saved in the folder as a record of your data and data changes.

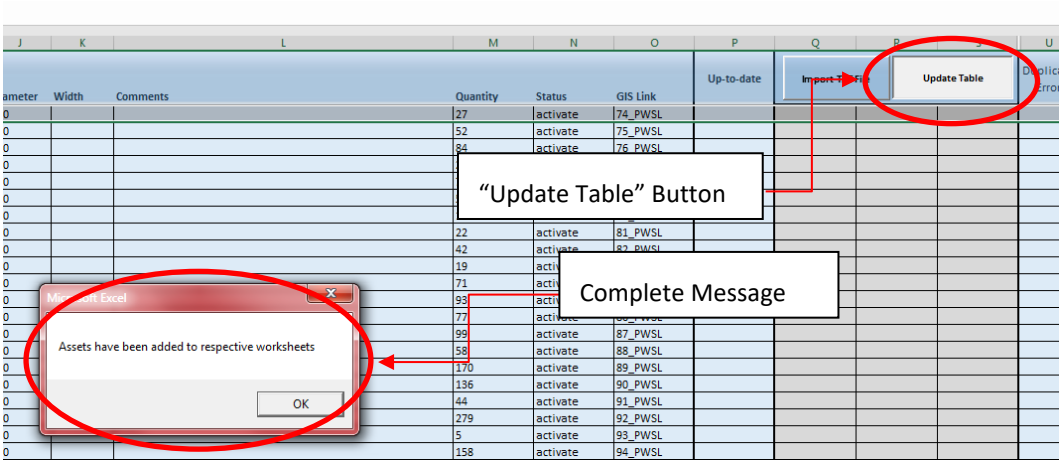


Figure 4.6 – Update Table Function

HINT: During the table update process, a backup is saved to the "Backup Folder". If critical errors are encountered, you can use the backups to recover data. Also, we recommend you keep backup files saved in the folder as a historical record of your inventory and changes.

4.6 GENERAL ASSET INFORMATION

The "GENERAL ASSET INFORMATION" sheet acts as the main database of asset information. This is also where cost and useful life estimates are stored. You are not able to edit any information in this sheet. With reference to Section 4.4, if you encounter unreconcilable errors please contact your DMA representative for technical support.

4.6.1 STEP 3: ADDING A NEW ASSET

If you wish to add a new asset to the data base, by passing the "SURVEY INPUT" sheet, use the "Add New Asset" button. A form will appear, you must enter valid information, aligning with Section 3 for all required fields. See Figure 4.7.

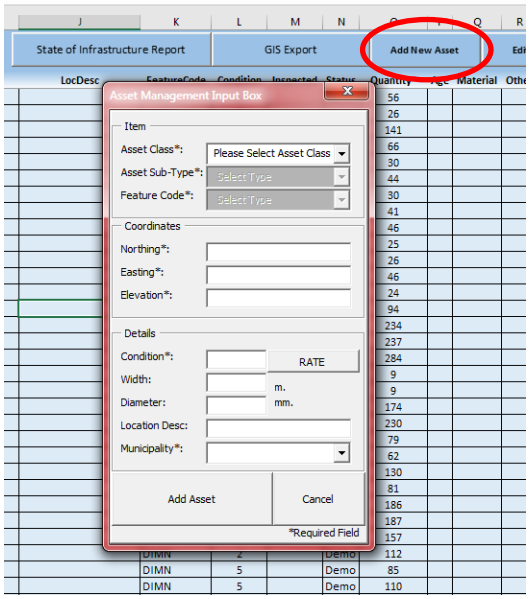


Figure 4.7 – Add New Asset Function

4.6.2 STEP 4: EDITING AND DELETING INFORMATION

If you wish to edit or delete any assets, do so through the "Edit Asset" Button. First select the asset you wish to edit within the spreadsheet and then click the "Edit Asset" Button. See Figure 4.8. Deleting an asset through this form will delete all information related to that asset. A backup of deleted asset information is stored in the "DELETE LOG" sheet

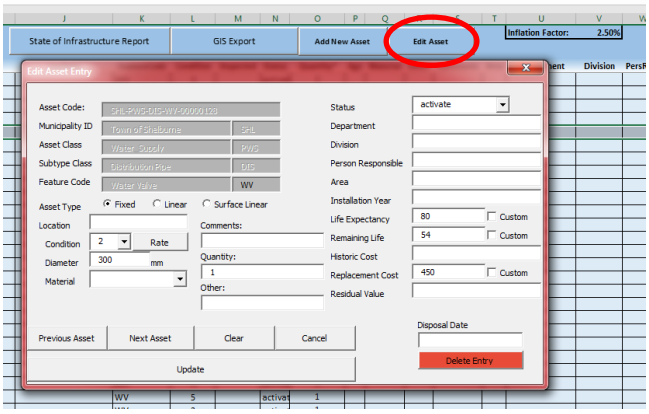


Figure 4.8 – Edit Asset Functionality

4.6.3 STEP 5: EDITING OR ASSIGNING CONDITION RATINGS

The "Edit Asset" and "Add New Asset" buttons allow the user to enter Condition Ratings in the dialogue. This must be done using the "Rate" button in the form, which opens a form. The user must select whether they wish to rate based on age, or a detailed inspection. The user then selects a condition using the drop-down boxes for each field and select "Finish" to complete the process. Refer to Figure 4.9. A record of these entries is stored in the "CONDITION RATING HISTORY" sheet.

HINT: Age should only be used if no other visual or operational information is available for the initial condition assessment.

HINT: Condition ratings may also be updated following detailed engineering assessments of the infrastructure. However, we suggest it is most cost effective to limit detailed assessments to infrastructure identified as critical by a **risk assessment** following the high-level condition ratings conducted at this stage.

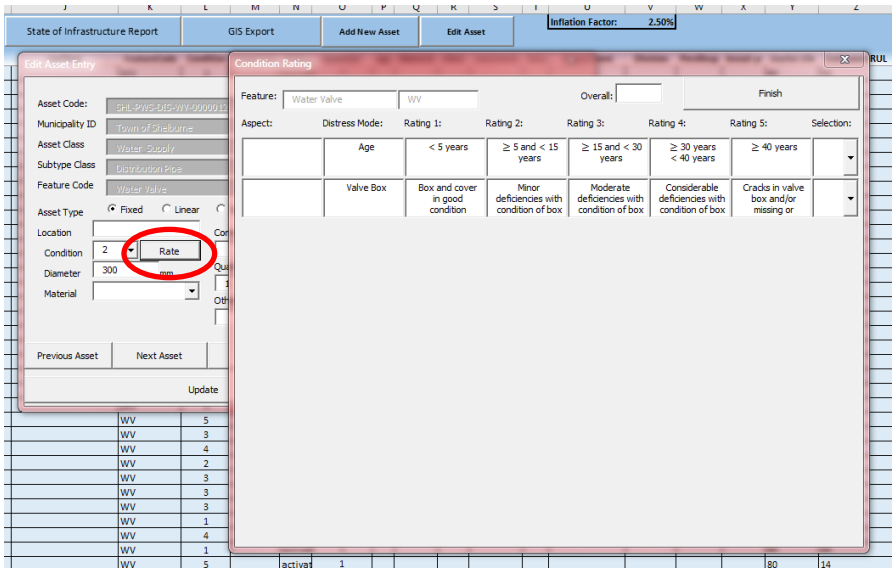


Figure 4.9 Condition Rating Form

4.6.4 STEP 6: PRELIMINARY STATE OF INFRASTRUCTURE REPORTING

The spreadsheet is equipped with reporting functionality. This provides a snap shot of the current state of your infrastructure as well as a high-level 20-year outlook. Refer to Section 4.8 for further details on reports available. The “State of Infrastructure Report” (SOIR) button allows you to select any of the available reports show in the “SOIR-PREVIEW” sheet. This button will create a PDF of the reports you selected. The user must select at least one asset type and report type, as well title the file and select a path through the form. See Figure 4.10.

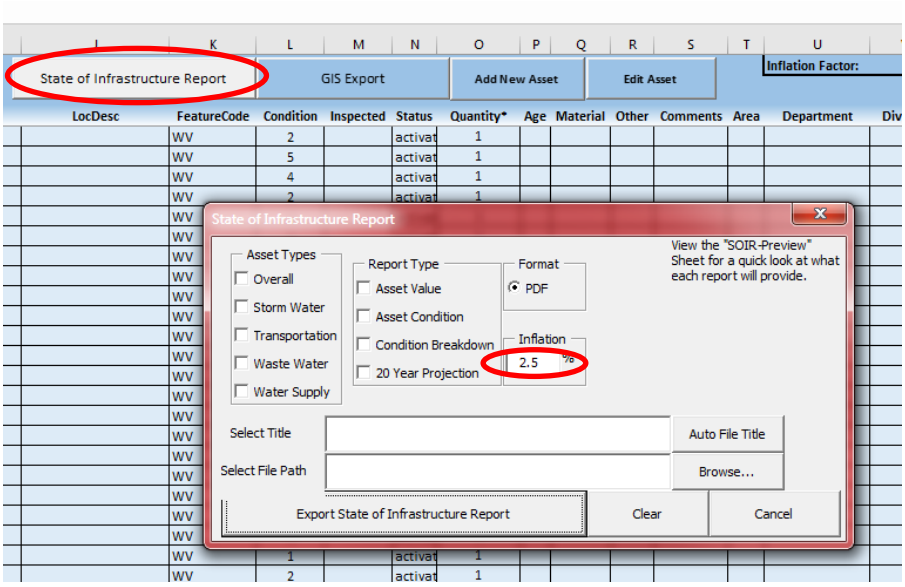


Figure 4.10 – State of Infrastructure Report Button

4.6.4.1 ADJUSTING THE INFLATION FACTOR

The inflation factor displayed in cell “Q2” on the “Unit Cost” sheet is applied to the 20-year projection report. The inflation is adjusted in the “State of Infrastructure Report” form and the report must be exported to apply the change. See Figure 4.10. The inflation can also be adjusted in the “Unit Cost” sheet.

4.7 ASSET DETAILS

The “ASSET DETAILS” sheet contains all coordinate information. If data was not imported through GIS this sheet also show the calculated length between points on linear assets. The user may edit or delete data within this sheet

using the “Edit Asset” button, refer to Figure 4.11. Deleting an asset through this form will delete all information related to that asset. Information of Deleted assets can be found in the “DELETE LOG” sheet.

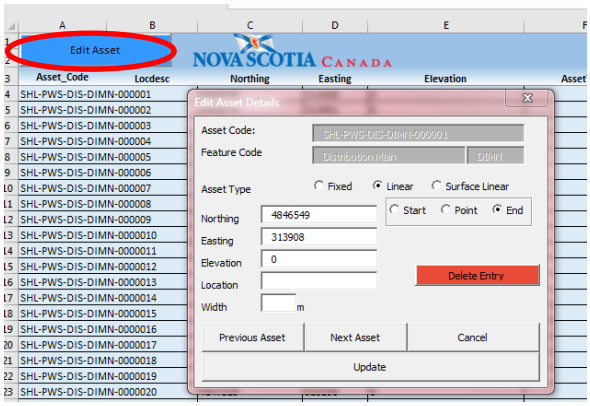


Figure 4.11 – Edit Asset Details Functionality

4.8 PRELIMINARY STATE OF INFRASTRUCTURE REPORTS (SOIR)

The “SOIR-PREVIEW” Sheet contains all reports which can be exported. Refer to Section 4.6.4 for the process to export these reports for presentation. There are four reports available for each asset class as well as an overall report for all asset classes.

HINT: If you wish to create you own custom reports you can do so by exporting data to another workbook using the “GIS Export” button on the “GENERAL ASSET INFORMATION” sheet.

4.8.1 STEP 7: VIEW ASSET VALUE BY CLASS

Displays a table and pie chart showing asset replacement cost by Asset Class and Subtype. This assists in seeing how much potential cost is in each Asset Class. See Figure 4.12.

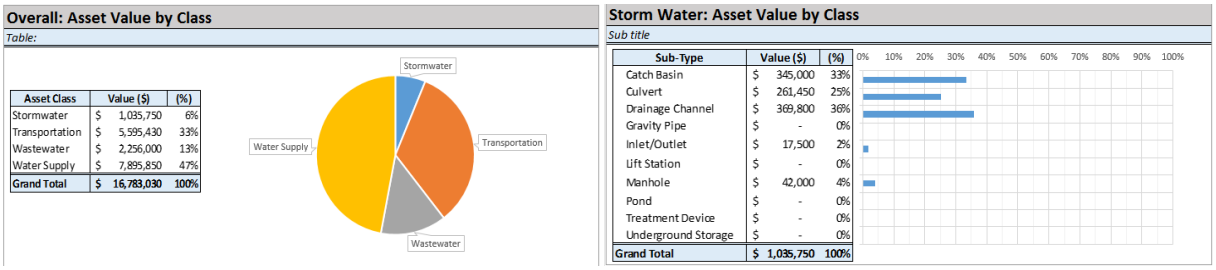


Figure 4.12 – Asset Value by Class

4.8.2 STEP 8: VIEW ASSET VALUE BY CONDITION

Displays a table and pie chart showing asset replacement cost by condition rating. This can assist in determining which types of infrastructure are at risk and warrant more detailed risk assessment and more detailed condition investigations. See Figure 4.13.

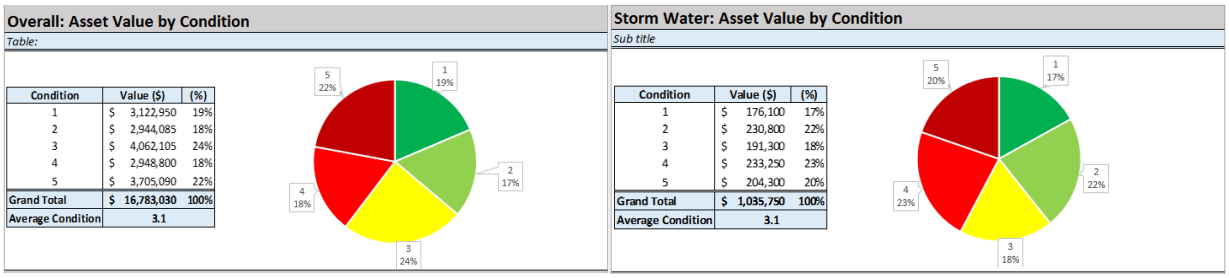
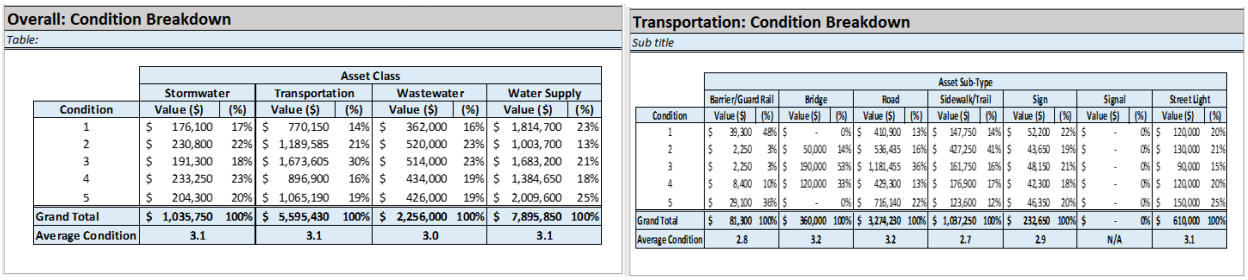


Figure 4.13 – Asset Value by Condition

4.8.3 STEP 9: VIEW CONDITION BREAKDOWN

Displays a cost matrix of each Asset Class and Subtype by condition. See Figure 4.14.



Overall: Condition Breakdown

Table:

	Asset Class							
	Stormwater		Transportation		Wastewater		Water Supply	
Condition	Value ($)	(%)	Value ($)	(%)	Value ($)	(%)	Value ($)	(%)
1	$ 176,100	17%	$ 770,150	14%	$ 362,000	16%	$ 1,814,700	23%
2	$ 230,800	22%	$ 1,189,585	21%	$ 520,000	23%	$ 1,003,700	13%
3	$ 191,300	18%	$ 1,673,605	30%	$ 514,000	23%	$ 1,683,200	21%
4	$ 233,250	23%	$ 896,900	16%	$ 434,000	19%	$ 1,384,650	18%
5	$ 204,300	20%	$ 1,065,190	19%	$ 426,000	19%	$ 2,009,600	25%
Grand Total	**$ 1,035,750**	**100%**	**$ 5,595,430**	**100%**	**$ 2,256,000**	**100%**	**$ 7,895,850**	**100%**
Average Condition	**3.1**		**3.1**		**3.0**		**3.1**	

Transportation: Condition Breakdown

Sub title

	Asset Sub-Type													
	Barrier/Guard Rail		Bridge		Road		Sidewalk/Trail		Sign		Signal		Street Light	
Condition	Value ($)	(%)	Value ($)	(%)	Value ($)	(%)	Value ($)	(%)	Value ($)	(%)	Value ($)	(%)	Value ($)	(%)
1	$ 39,300	48%	$ -	0%	$ 410,900	13%	$ 147,750	14%	$ 52,200	22%	$ -	0%	$ 120,000	20%
2	$ 2,250	3%	$ 50,000	14%	$ 536,435	16%	$ 427,250	41%	$ 43,650	19%	$ -	0%	$ 130,000	21%
3	$ 2,250	3%	$ 190,000	53%	$ 1,181,455	36%	$ 161,750	16%	$ 48,150	21%	$ -	0%	$ 90,000	15%
4	$ 8,400	10%	$ 120,000	33%	$ 429,300	13%	$ 176,900	17%	$ 42,300	18%	$ -	0%	$ 120,000	20%
5	$ 29,100	36%	$ -	0%	$ 716,140	22%	$ 123,600	12%	$ 46,350	20%	$ -	0%	$ 150,000	25%
Grand Total	**$ 81,300**	**100%**	**$ 360,000**	**100%**	**$ 3,274,230**	**100%**	**$ 1,087,250**	**100%**	**$ 232,650**	**100%**	**$ -**	**0%**	**$ 610,000**	**100%**
Average Condition	**2.8**		**3.2**		**3.2**		**2.7**		**2.9**		**N/A**		**3.1**	

Figure 4.14 – Condition Breakdown Example

4.8.4 STEP 10: VIEW 20 YEAR PROJECTED COSTS

Provides a bar graph depicting the total value of assets which will **theoretically** reach end of their useful life over a 20-year window. End-of-life is based on common degradation curves, the theoretical life of the asset and the assessed condition. See Figure 4.15.

20-year projected costs take into consideration an inflation rate. See Section 4.6.4.1 for instructions on how to change the inflation factor.

HINT: This should not be used for capital planning as-is without further consideration. It does not consider level of service or consequence of failure which will have significant impacts on planning.

HINT: When an asset reaches end of life, it is completely unusable. Many municipal residents and officials wish infrastructure to be upgraded before this point. It may be much more cost effective to replace or repair earlier in some circumstances.

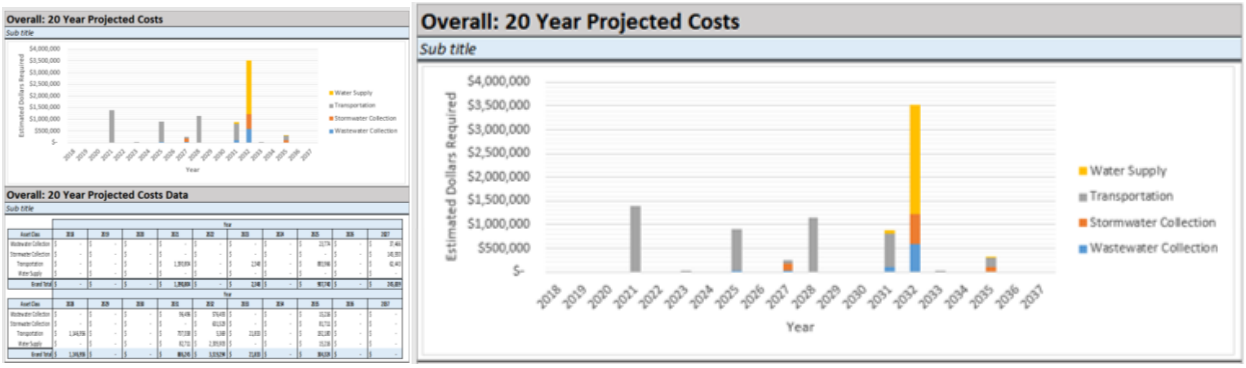


Figure 4.15 – 20 Year Projected Costs Example

4.9 REVISING THE BACKGROUND DATA

The "BACKGROUND" sheet contains all Reference tables for Asset Code generation and remaining useful life estimation (RUL). Refer to Section 5 for all items included in the original release. See Section 4.9.1 for instructions on adding new Classes, Subtypes or Feature Codes.

To ensure your submitted data aligns with the Provincial Standard, please contact your DMA representative to confirm format of any additions.

4.9.1 STEP 11: ADD NEW DATA

The user has the option of adding a new feature code, asset class, asset subtype, or municipal ID to the background information by selecting the "Add" button. Select the item you wish to add and fill all information possible into the form. See Figure 4.16.

If you are submitting your information to the Province, contact your DMA representative to ensure that the new information to be added aligns with the Provincial registry data structure.

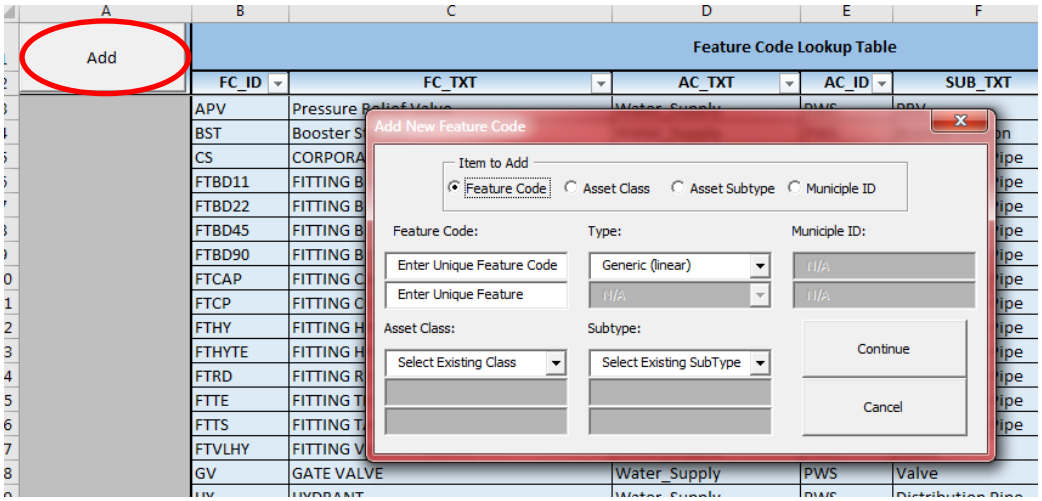


Figure 4.16 – Add New Feature Code Form

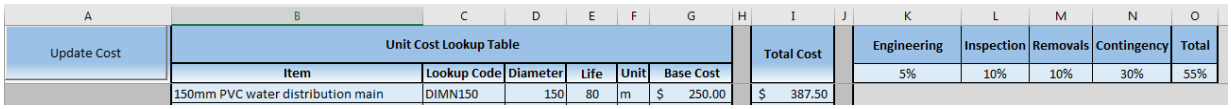
4.9.2 STEP 12: ADJUSTING UNIT COST

The "UNIT COST" sheet contains all costing information.

HINT: The cost information is always unlocked for user editing. Municipalities are encouraged to update these baseline costs to costs more accurate for their region.

HINT: Several items such as Water Sources, Ponds and Treatment facility items can vary greatly in cost. We strongly recommend that the user overrides the automatically entered value of these assets by editing the individual asset. See Section 4.6.2 for the editing process.

In the "UNIT COST" sheet, the user has the option of adding additional cost factors for engineering, inspection, removals, and contingency. These factors will apply to all unit cost items. See Figure 4.17.



Update Cost	Unit Cost Lookup Table							Total Cost		Engineering	Inspection	Removals	Contingency	Total
	Item	Lookup Code	Diameter	Life	Unit	Base Cost				5%	10%	10%	30%	55%
	150mm PVC water distribution main	DIMN150	150	80	m	$ 250.00		$ 387.50						

Figure 4.17 – "UNIT COST" Sheet

4.10 CONDITION RATING HISTORY

The "CONDITION RATING HISTORY" sheet stores a history of condition ratings performed by the user using the spreadsheet. See Section 4.6.3 for asset condition rating process.

4.11 DELETE LOG

The "DELETE LOG" sheet contains a timestamped record of all assets deleted in the spreadsheet. Refer to Section 4.6.2 for instructions on deleting assets.

5.0 BACKGROUND INFORMATION

Each asset is assigned a unique code comprising the Municipality ID, the Asset Class, the Subtype Class, the Feature Code and an automatically generated sequential number. This process will result in a unique code for every asset in the province. The following tables provide descriptions for the short codes contained in the Asset Inventory Spreadsheet.

5.1 ASSET CLASSES

Table 5-1: Asset Class

ID	Class	ID	Class
PWS	Water Supply	SWC	Stormwater Collection
WWC	Wastewater Collection	TRN	Transportation

5.2 ASSET SUBTYPES

Table 5-2: Subtype Class

Water Supply			
ID	**Class**	**ID**	**Class**
BST	Booster Station	DIS	Distribution Pipe
MTS	Metering System	TRFWS	Potable Treatment Facility
PRV	Pressure Relief Valve	STO	Storage Tank
TRN	Transmission Pipe	VLV	Valve
PWS	Water Source		
Wastewater Collection			
ID	**Class**	**ID**	**Class**
GSP	Gravity Pipe	LPS	Lift/Pump Station
MHWW	Manhole Sanitary	PSP	Pressure Sewer Pipe
SEP	Septic Field	TRFWW	Wastewater Treatment Facility
Stormwater Collection			
ID	**Class**	**ID**	**Class**
CBN	Catch Basin	CUL	Culvert
DRC	Drainage Channel	GPSW	Gravity Pipe Storm
INO	Inlet/Outlet	LFS	Lift Station
MHSW	Manhole Storm	PND	Pond
TRD	Treatment Device	UST	Underground Storage
PRP	Pressure Storm Pipe		
Transportation			
ID	**Class**	**ID**	**Class**
BAR	Barrier / Guard Rail	BRG	Bridge

RDS	Roads	SWT	Sidewalk / Trail
SGN	Sign	SIG	Signal
STL	Street Light		

5.3 FEATURE CODES

Table 5-3: Feature Codes

FC_ID	FC_TXT	AC_ID	SUB_ID	Asset Type	Start ID
BST	Booster Station	PWS	BST	Fixed	
CS	CORPORATION STOP	PWS	DIS	Fixed	
DIMN	Distribution Main	PWS	DIS	linear	
DIMN-S	Distribution Main	PWS	DIS	linear	Start
FTBD11	FITTING BEND 11.25	PWS	DIS	Fixed	
FTBD22	FITTING BEND 22.5	PWS	DIS	Fixed	
FTBD45	FITTING BEND 45	PWS	DIS	Fixed	
FTBD90	FITTING BEND 90	PWS	DIS	Fixed	
FTCAP	FITTING CAP	PWS	DIS	Fixed	
FTCP	FITTING COUPLING	PWS	DIS	Fixed	
FTHY	FITTING HYDRANT	PWS	DIS	Fixed	
FTHYTE	FITTING HYDRANT TEE	PWS	DIS	Fixed	
FTRD	FITTING REDUCER	PWS	DIS	Fixed	
FTTE	FITTING TEE	PWS	DIS	Fixed	
FTTS	FITTING TAPPING SLEEVE	PWS	DIS	Fixed	
HY	HYDRANT	PWS	DIS	Fixed	
WV	Water Valve	PWS	DIS	Fixed	
METER	Metering System	PWS	MTS	Fixed	

FC_ID	FC_TXT	AC_ID	SUB_ID	Asset Type	Start ID
WSCCSYS	Chemical Feed System	PWS	TRFWS	Fixed	
WSCLAR	Clarifier	PWS	TRFWS	Fixed	
WSCLLD	Chlorine Leak Detector	PWS	TRFWS	Fixed	
WSCOMP	Computer	PWS	TRFWS	Fixed	
WSCPMP	Conventional Pump	PWS	TRFWS	Fixed	
WSDAFS	DAF Skimmer	PWS	TRFWS	Fixed	
WSDAFT	DAF Tank OR Saturation Vessel	PWS	TRFWS	Fixed	
WSELECM	Electric Motor	PWS	TRFWS	Fixed	
WSFLME	Flow Meter	PWS	TRFWS	Fixed	
WSGDTP	Gasoline Driven Trash Pump	PWS	TRFWS	Fixed	
WSISV	Intake Structure and Valves	PWS	TRFWS	Fixed	
WSLAB	Lab Equipment	PWS	TRFWS	Fixed	
WSMFS	Membrane Filter System	PWS	TRFWS	Fixed	
WSMMF	Mixed Media Filter	PWS	TRFWS	Fixed	
WSOFS	Office Furniture and Supplies	PWS	TRFWS	Fixed	
WSPTNK	Pre-sedimentation Tank	PWS	TRFWS	Fixed	
WSSCM	Streaming Current Monitor	PWS	TRFWS	Fixed	
WSSPMP	Submersible Pump	PWS	TRFWS	Fixed	
WSTP	Treatment Pond	PWS	TRFWS	Fixed	
WSTFAC	Air Compressor	PWS	TRFWS	Fixed	
WSTFBLD	Building	PWS	TRFWS	Fixed	
WSTFGEN	Generator	PWS	TRFWS	Fixed	
WSTLEM	Telemetry	PWS	TRFWS	Fixed	
WSUV	UV Light	PWS	TRFWS	Fixed	
WSVACCL	Vacuum Chlorinator	PWS	TRFWS	Fixed	
WSTF	Water Supply Treatment Facility	PWS	TRFWS	Fixed	

FC_ID	FC_TXT	AC_ID	SUB_ID	Asset Type	Start ID
APV	Pressure Relief Valve	PWS	PRV	Fixed	
PRV	Pressure Reducing Valve	PWS	PRV	Fixed	
WSST	Water Supply Storage Tank	PWS	STO	Fixed	
TRNS	Transmission Pipe	PWS	TRN	linear	
TRNS-S	Transmission Pipe Start	PWS	TRN	linear	Start
FTVLHY	FITTING VALVE HYDRANT	PWS	VLV	Fixed	
GV	GATE VALVE	PWS	VLV	Fixed	
WS	Water Source	PWS	PWS	Fixed	
CB	CATCH BASIN	SWC	CBN	Fixed	
CLVT	Culvert	SWC	CUL	linear	
CLVT-S	Culvert Start	SWC	CUL	linear	Start
DRCH	Drainage Channel	SWC	DRC	linear	
DRCH-S	Drainage Channel Start	SWC	DRC	linear	Start
RRGT	Gutter	SWC	DRC	linear	
RRGT-S	Gutter Start	SWC	DRC	linear	Start
GRVPST	Gravity Pipe	SWC	GPSW	linear	
GRVPST-S	Gravity Pipe Start	SWC	GPSW	linear	Start
IO	Inlet/Outlet	SWC	INO	linear	
IO-S	Inlet/Outlet Start	SWC	INO	linear	Start
LIFT	Lift Station	SWC	LPS	Fixed	
MHST	MANHOLE STORM	SWC	MHSW	Fixed	
PND	Pond	SWC	PND	Fixed	
SWFRCM	Stormwater Force Main	SWC	PRP	linear	
SWFRCM-S	Stormwater Force Main	SWC	PRP	linear	Start
TRMTD	Treatment Device	SWC	TRD	Fixed	
UGS	Underground Storage	SWC	UST	Fixed	

FC_ID	FC_TXT	AC_ID	SUB_ID	Asset Type	Start ID
FL	Fence Line	TRN	BAR	surface linear	
FL-S	Fence Line Start	TRN	BAR	surface linear	Start
SB	Side Bar	TRN	BAR	surface linear	
SB-S	Side Bar Start	TRN	BAR	surface linear	Start
STGR	Guiderail	TRN	BAR	surface linear	
STGR-S	Guiderail Start	TRN	BAR	surface linear	Start
STPR	Pier (Bridge Support)	TRN	BRG	Fixed	
RRCB-A	Curbed Road Asphalt	TRN	RDS	surface linear	
RRCB-A-S	Curbed Road Asphalt Start	TRN	RDS	surface linear	Start
RRCB-C	Curbed Road Concrete	TRN	RDS	surface linear	
RRCB-C-S	Curbed Road Concrete Start	TRN	RDS	surface linear	Start
RRGR	Road Gravel	TRN	RDS	surface linear	
RRGR-S	Road Gravel Start	TRN	RDS	surface linear	Start
RRRD-A	Edge of Road - Asphalt	TRN	RDS	surface linear	
RRRD-A-S	Edge of Road - Asphalt Start	TRN	RDS	surface linear	Start
RRBW-W	Boardwalk Wood	TRN	SWT	surface linear	
RRBW-W-S	Boardwalk Wood	TRN	SWT	surface linear	Start
RRDR-A	Driveway Asphalt	TRN	SWT	surface linear	
RRDR-A-S	Driveway Asphalt Start	TRN	SWT	surface linear	Start
RRPW	Pathway	TRN	SWT	surface linear	
RRPW-S	Pathway Start	TRN	SWT	surface linear	Start
RRSW	Side Walk	TRN	SWT	surface linear	
RRSW-A	Sidewalk Asphalt	TRN	SWT	surface linear	
RRSW-A-S	Sidewalk Asphalt Start	TRN	SWT	surface linear	Start
RRSW-B	Sidewalk Brick	TRN	SWT	surface linear	
RRSW-B-S	Sidewalk Brick Start	TRN	SWT	surface linear	Start

FC_ID	FC_TXT	AC_ID	SUB_ID	Asset Type	Start ID
RRSW-C	Sidewalk - Concrete	TRN	SWT	surface linear	
RRSW-C-S	Sidewalk - Concrete Start	TRN	SWT	surface linear	Start
RRSW-S	Side Walk Start	TRN	SWT	surface linear	Start
RRTR	Trail	TRN	SWT	surface linear	
RRTR-S	Trail	TRN	SWT	surface linear	Start
TFSP	Sign Post	TRN	SGN	Fixed	
TFTL	Traffic Light Standard	TRN	SIG	Fixed	
TFSL	Street Light Standard	TRN	STL	Fixed	
TFSLOR	Ornamental Street Light Standard	TRN	STL	Fixed	
TSIG	Traffic Signal (Flashing Red on Stop sign)	TRN	STL	Fixed	
UTPO	Utility Pole	TRN	STL	Fixed	
FTTESAN	FITTING TEE SANITARY	WWC	GPWW	Fixed	
GRVPCO	Gravity Pipe Combined	WWC	GPWW	linear	
GRVPCO-S	Gravity Pipe Combined Start	WWC	GPWW	linear	Start
GRVPSA	Gravity Pipe	WWC	GPWW	linear	
GRVPSA-S	Gravity Pipe Start	WWC	GPWW	linear	Start
PMPS	Pump Station	WWC	LPS	Fixed	
MHCO	MANHOLE COMBINED	WWC	MHWW	Fixed	
MHSA	MANHOLE SANITARY	WWC	MHWW	Fixed	
WWST	Septic Tank	WWC	TRFWS	Fixed	
WWFRCM	Wastewater Forcemain	WWC	PSP	linear	
WWFRCM-S	Wastewater Forcemain Start	WWC	PSP	linear	Start
SEPT	Septic Field	WWC	SEP	Fixed	
WWBLWR	Blower	WWC	TRFWW	Fixed	
WWBSC	Bar Screen Chamber	WWC	TRFWW	Fixed	
WWCCSYS	Chemical Feed System	WWC	TRFWW	Fixed	

FC_ID	FC_TXT	AC_ID	SUB_ID	Asset Type	Start ID
WWCLAR	Clarifier	WWC	TRFWW	Fixed	
WWCLCC	Chlorine Contact Chamber	WWC	TRFWW	Fixed	
WWCOMP	Computer	WWC	TRFWW	Fixed	
WWCPMP	Wa Pump	WWC	TRFWW	Fixed	
WWDAFS	DAF Skimmer	WWC	TRFWW	Fixed	
WWDAFT	DAF Tank OR Saturation Vessel	WWC	TRFWW	Fixed	
WWELECM	Electric Motor	WWC	TRFWW	Fixed	
WWFFT	Filter Feed Tank	WWC	TRFWW	Fixed	
WWFLME	Flow Meter	WWC	TRFWW	Fixed	
WWGDTP	Gasoline Driven Trash Pump	WWC	TRFWW	Fixed	
WWISV	Intake Structure and Valves	WWC	TRFWW	Fixed	
WWLAB	Lab Equipment	WWC	TRFWW	Fixed	
WWLAG	Lagoon	WWC	TRFWW	Fixed	
WWOFS	Office Furniture and Supplies	WWC	TRFWW	Fixed	
WWOXDI	Oxidation Ditch	WWC	TRFWW	Fixed	
WWPADAE	Paddle Aerators	WWC	TRFWW	Fixed	
WWPTNK	Pre-Sedimentation Tank	WWC	TRFWW	Fixed	
WWSBRT	SBR Tank	WWC	TRFWW	Fixed	
WWSCM	Streaming Current Monitor	WWC	TRFWW	Fixed	
WWSCRC	Screen Chamber	WWC	TRFWW	Fixed	
WWSDB	Sludge Drying Bed	WWC	TRFWW	Fixed	
WWSPMP	Submersible Pump	WWC	TRFWW	Fixed	
WWTFAC	Air Compressor	WWC	TRFWW	Fixed	
WWTFBLD	Building	WWC	TRFWW	Fixed	
WWTFGEN	Generator	WWC	TRFWW	Fixed	
WWTLEM	Telemetry	WWC	TRFWW	Fixed	

FC_ID	FC_TXT	AC_ID	SUB_ID	Asset Type	Start ID
WWCTF	Wastewater Treatment Facility	WWC	TRFWW	Fixed	
NSACS	NOVA SCOTIA ACTIVE CONTROL STATION			Fixed	
NSCM	NOVA SCOTIA CONTROL MONUMENT			Fixed	
SM	SURVEY MARKER			Fixed	

5.4 MUNICIPALITY ID

Table 5-4: Municipal ID

Municipal ID			
ID	**Municipality/County**	**ID**	**Town**
AP	Municipality of the County of Annapolis	AM	Town of Amherst
AT	Municipality of the County of Antigonish	AR	Town of Annapolis Royal
AY	Municipality of the District of Argyle	AS	Town of Antigonish
BA	Municipality of the District of Barrington	BE	Town of Berwick
CB	Cape Breton Regional Municipality	BW	Town of Bridgewater
CL	Municipality of the District of Clare	CH	Town of Clark's Harbour
CO	Municipality of the County of Colchester	DG	Town of Digby
CT	Municipality of the District of Chester	KE	Town of Kentville
CU	Municipality of the County of Cumberland	LN	Town of Lunenburg
DI	Municipality of the District of Digby	LO	Town of Lockeport
EH	Municipality of the District of East Hants	MB	Town of Mahone Bay
GU	Municipality of the District of Guysborough	MI	Town of Middleton
HX	Halifax Regional Municipality	MU	Town of Mulgrave
IN	Municipality of the County of Inverness	NG	Town of New Glasgow

Municipal ID			
KI	Municipality of the County of Kings	OX	Town of Oxford
LU	Municipality of the District of Lunenburg	PC	Town of Pictou
PI	Municipality of the County of Pictou	PH	Town of Port Hawkesbury
QU	Region of Queens Municipality	SB	Town of Shelburne
RI	Municipality of the County of Richmond	SL	Town of Stellarton
SH	Municipality of the District of Shelburne	SW	Town of Stewiacke
SM	Municipality of the District of St. Mary's	TN	Town of Trenton
VI	Municipality of the County of Victoria	TU	Town of Truro
WH	Municipality of the District of West Hants	WE	Town of Westville
YA	Municipality of the District of Yarmouth	WI	Town of Windsor
		WO	Town of Wolfville
		YM	Town of Yarmouth

Municipal ID			
ID	**Village**	FN	First Nations
VAY	Village of Aylesford		
VBD	Village of Baddeck		
VBH	Village of Bible Hill		
VCN	Village of Canning		
VCH	Village of Chester		
VCS	Village of Cornwallis Square		
VFP	Village of Freeport		
VGW	Village of Greenwood		

Municipal ID	
VHB	Village of Havre Boucher
VHE	Village of Hebbville
VKI	Village of Kingston
VLW	Village of Lawrencetown
VNM	Village of New Minas
VPW	Village of Port Williams
VPG	Village of Pugwash
VRH	Village of River Hebert
VSP	Village of St. Peter's
VTM	Village of Tatamagouche
VTI	Village of Tiverton
VWP	Village of Westport
VWM	Village of Weymouth

5.5 MATERIAL LIST

Table 5-5: Material List

Material	
Asbestos Cement	Polypropylene
Asphalt	PVC
Brick	Reinforced HDPE
Cast Iron (CI)	Steel
Cobble	Structural Plate Corrugated Steel

Concrete	Vitrified Clay
Copper	Wood
Corrugated Steel	Wood c/w Halogen
Ductile Iron (DI)	Wood c/w LED
Gravel	Steel c/w Halogen
HDPE	Steel c/w LED
Pavement	Mixed
Perforated PVC / HDPE	Other
PEX	Unknown

6.0 FIELD DESCRIPTIONS

The following subsections provide a brief description of the various worksheets and corresponding Asset Attribute fields. These fields will be used to generate reports on asset conditions for responsible parties.

Table 6-1: SURVEY INPUT

Column	Title	Description	Format
A	Mun_ID	Municipality code.	General
B	FeatureCode	Feature Code present within “BACKGROUND” Sheet.	General
C	Northing	Y-Coordinate of the asset, provided in UTM NAD83 (CSRS) 2010 coordinate system.	Coordinate

Column	Title	Description	Format
D	Easting	X-Coordinate of the asset, provided in UTM NAD83 (CSRS) 2010 coordinate system.	Coordinate
E	Elevation	Elevation of the Asset data point. To be provided in Canadian Geodetic Vertical Datum 2013 (CGVD2013).	Number
F	Condition	Numeric value from 1 to 5 which identifies the condition of the Asset.	Integer
G	Material	Material of the asset.	General
H	Install Yr	The year which the asset was first installed.	Integer
I	Locdesc	Location description of the asset.	General
J	Cost Factor	Acts as a factor to further refine unit cost estimating.	General
K	Width	Width of the asset. Used when estimating the cost of the asset based on area when required.	Number
L	Comments	Any comments input by user	General
M	Quantity	Quantity of asset stored in GIS.	Number
N	Status	Current status of the asset, active or inactive.	text
O	GIS Link	If GIS enabled, the unique identifier for the asset within GIS to link data calculated in spread sheer to GIS.	General
P	Up-to-date	Identifies that the asset in the sheet has been input into the main spreadsheet via the “Update Table” Button.	Text
U:AC	Error Checking	Refer to Section 4.4	N/A

Table 6-2: GENERAL ASSET INFORMATION

Column	Title	Description	Format
H	Asset_Code	Auto-generated unique identifier for the asset.	General
I	Descr	Auto-generated explanation of feature code as define in “BACKGROUND” sheet.	General
J	LocDesc	Location description input by user.	General
K	FeatureCode	Feature Code present within “BACKGROUND” Sheet.	General
L	Condition	Numeric value from 1 to 5 which identifies the condition of the Asset	Integer
N	Status	Current status of the asset, active or inactive.	Text
O	Quantity	Calculated length or amount of the asset. If GIS integrated is the quantity stored in GIS.	Number
P	Age	Age of the asset based on install year.	Integer
Q	Material	The asset’s material	General
R	Other	Any other relevant information of the asset input by the user.	General
S	Comments	Any comments relevant to the asset, input by the user.	General
T	Area	Manual entry which identifies a region within a municipality.	General
U	Department	Municipal department responsible for the asset, e.g. Public Works.	General
V	Division	Subdivision responsible for the asset, e.g. Wastewater.	General

Column	Title	Description	Format
W	PersResp	Person responsible for the Asset from the subdivision	General
X	Install Yr	The year the asset was installed	Integer
Y	Useful Life	The overall estimate useful life of the asset.	Integer
Z	Estimated RUL	The estimated remaining useful life of the asset base on condition, degradation curve, and overall useful life.	Integer
AA	RplmtCst	The estimated replacement cost of the asset	Number
AB	ConditionBasis	Identify if asset inspection type is; unknown, age, detailed	General
AC	ResidValue	Residual Value of Asset	General
AD	DispDate	Date of asset disposal	General
AG	DatLastAs	Date of last inspection	General
AI	Edit Tag	Time stamp of last edit made in spreadsheet	General
AK	Replacement Year	Estimated year which the asset will reach the end of it's useful life according to condition, degradation curve and overall useful life.	Integer
AL	CostLookup	Lookup code to find unit cost and useful life.	General
AM	Replace1	Estimated year where the asset will first reach the end of its useful life.	Integer
AN	Replace2	Estimated year where the asset will first reach the end of its useful life after being repaired in Replace1 year.	Integer
AO	Replace3	Estimated year where the asset will first reach the end of its useful life after being repaired in Replace2 year.	Integer

Column	Title	Description	Format
AP	Replace4	Estimated year where the asset will first reach the end of its useful life after being repaired in Replace3 year.	Integer
AQ	Cost Factor	This field is used to further refine unit costs.	General
AR	Unit Cost	Unit cost auto-generated by CostLookup code.	Number
AS	Edit Tag	Time stamp of when the asset was last edited within the spreadsheet.	Date

Table 6-3: Asset Details

Column	Title	Description	Format
A	Asset_Code	Auto-generated unique identifier for the asset.	General
B	Locdesc	Location description input by user.	General
C	Northing	Coordinate of the asset, provided in UTM NAD83 (CSRS) 2010 coordinate system.	Coordinate
D	Easting	Coordinate of the asset, provided in UTM NAD83 (CSRS) 2010 coordinate system.	Coordinate
E	Elevation	Elevation of the Asset data point. To be provided in Canadian Geodetic Vertical Datum of 2013 (CGVD2013).	Integer
F	AssetType	Defines the asset as fixed, linear or surface linear.	General
G	Sub_Length	For linear assets, the length between the point and prior point.	Number

Column	Title	Description	Format
I	Width	Width of asset. Used when calculated unit costs based on area.	Integer
J	FC	Feature Code present within “BACKGROUND” Sheet.	General
K	Edit Tag	Time stamp of when the asset was last edited within the spreadsheet.	Date

Table 6-4: BACKGROUND

Feature Code Lookup Table			
Column	**Title**	**Description**	**Format**
B	FC_ID	Feature Code.	General
C	FC_TXT	Feature description.	General
D	AC_TXT	Asset class name.	General
E	AC_ID	Asset class code.	General
F	SUB_TXT	Asset sub-type name.	General
G	SUB_ID	Asset sub-type code.	General
H	Asset Type	Defines the asset as fixed, linear or surface linear.	General
I	Start ID	Identifies if entry is the start point a linear asset.	Text

Asset Class			
Column	**Title**	**Description**	**Format**
K	AC_TXT	Asset class name	General
L	AC_ID	Asset class code.	General
Asset Subtype			
Column	**Title**	**Description**	**Format**
N	SUB_TXT	Asset sub-type name.	General
O	SUB_ID	Asset sub-type code.	General
P	AC_ID	Asset class code.	General
Municipality ID's			
Column	**Title**	**Description**	**Format**
R	MUN_ID	Municipality code.	General
S	MUN_TXT	Municipality name.	General

Degradation Curves			
Column	**Title**	**Description**	**Format**
U	Curve_ID	Name of degradation curve.	General
V	RUL% at Condition: 1	Estimated percent of remaining useful life of asset at condition 1	Percentage
W	RUL% at Condition: 2	Estimated percent of remaining useful life of asset at condition 2	Percentage
X	RUL% at Condition: 3	Estimated percent of remaining useful life of asset at condition 3	Percentage
Y	RUL% at Condition: 4	Estimated percent of remaining useful life of asset at condition 4	Percentage
Z	RUL% at Condition: 5	Estimated percent of remaining useful life of asset at condition 5	Percentage
Degradation Mapping			
Column	**Title**	**Description**	**Format**
AB	FC_ID	Feature Code.	General
AC	Degradation Curve	Name of degradation curve applied to related feature code.	General
Material List			
Column	**Title**	**Description**	**Format**
AF	Description	Material name	General

Table 6-5: Unit Cost

Column	Title	Description	Format
B	Item	Item description as stated by user for costing	General
C	Lookup Code	Unique cost lookup code	General
D	Cost Factor	Acts as a costing factor to further refine cost.	General
E	Life	Estimated useful life of the asset.	Integer
F	Unit	Unit cost measure, such as; meter, area, lump etc.	General
G	Base Cost	The base cost of replacing the asset	Integer
I	Total Cost	Total estimated cost of replacing the asset with factors defined in columns “K:N”	Integer
K	Engineering	Estimated percentage of engineering fees for all rehabilitation practices.	Percentage
L	Inspection	Estimated percentage of inspection fees for all rehabilitation practices.	Percentage
M	Removals	Estimated percentage of removal fees for all rehabilitation practices.	Percentage
N	Contingency	Estimated percentage of contingency for all rehabilitation practices.	Percentage
O	Total	Total costing factors define in columns “K:N”	Percentage

Table 6-6: DELETE LOG

Column	Title	Description	Format
A	Time Stamp	Time which the asset was deleted within the spreadsheet	Date
I	Asset_Code	The unique identifier of deleted asset.	General
J	Descr	Feature code description of deleted asset.	General
K	LocDesc	Location description of deleted asset.	General
L	FeatureCode	Feature code of deleted asset.	General
AY	Locdesc	Location of deleted asset.	General
AZ	Northing	Northing of deleted asset.	Coordinate
BA	Easting	Easting of deleted asset.	Coordinate
BB	Elevation	Elevation of deleted asset.	Integer
BF	Width	Width of deleted asset.	Integer

7.0 OPTIONAL GIS FUNCTIONALITY

7.1 EXPORT GIS DATA TO SPREADSHEET

The spreadsheet is integrated with GIS to enable smooth data transfer between the two software platforms.

Take the following steps to export your data from GIS. Refer to Figures 7.1 and 7.2:

1. Ensure that your GIS data follows the structure of Section 3.1.
2. If you do not have it, install the MMGIS Plugin. Using MMQGIS, export attributes to CSV File.
3. Select the Layer to export.
4. Confirm that exported Attributes follow the data structure of Section 3.1.
5. Set Line Terminator to “LF”
6. Select the file path and name to export.
7. Click “OK”

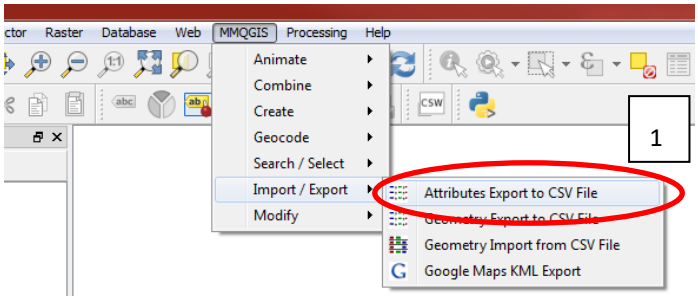


Figure 7.1 – GIS Export, Step 2

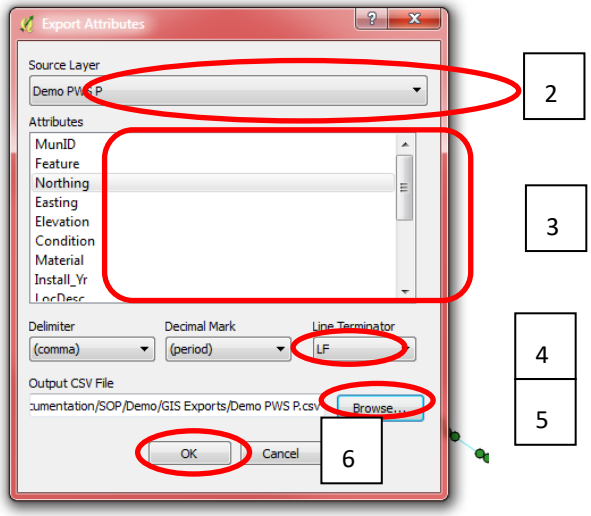


Figure 7.2 – GIS Export, Steps 3-7

7.2 EXPORT SPREADSHEET DATA TO GIS

To import data calculated in the spreadsheet to a GIS database the user must have first exported a CSV file using the "GIS Export" button. See Figure 7.3.

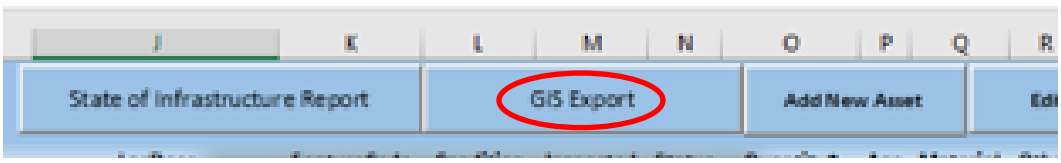


Figure 7.3 – GIS Export Button

7.3 IMPORT SPREADSHEET DATA TO GIS

This process only has to be completed once. Once the spreadsheet export has been uploaded to GIS it will automatically update each time a new GIS export is performed.

Take the following steps to import the CSV file from Section 7.2. Refer to Figures 7.4 through 7.6:

1. Import the CSV as a delimited text layer.
2. Select the spreadsheet date file
3. Set to “No geometry”
4. Click “OK”
5. For Each layer
    a. Double click the layer
    b. Go to “Joins”
    c. Click the plus sign
    d. Select the spreadsheet data as the Join Layer
    e. Set GIS_Link to join fields
    f. Click “OK”

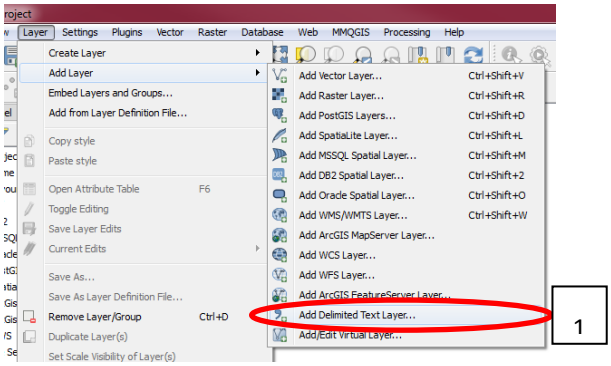


Figure 7.4 – Spreadsheet Import, Step 1

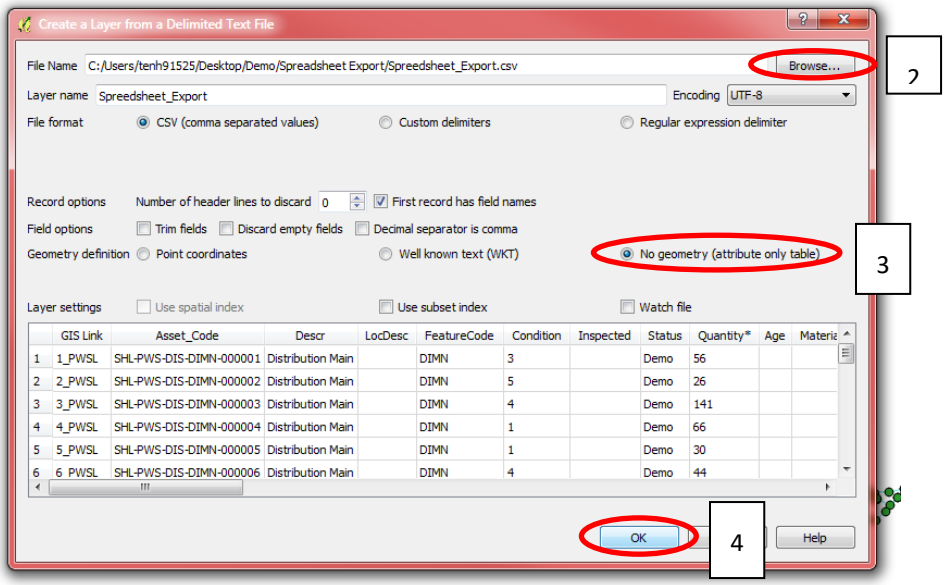


Figure 7.5 – Spreadsheet Import, Steps 2-4

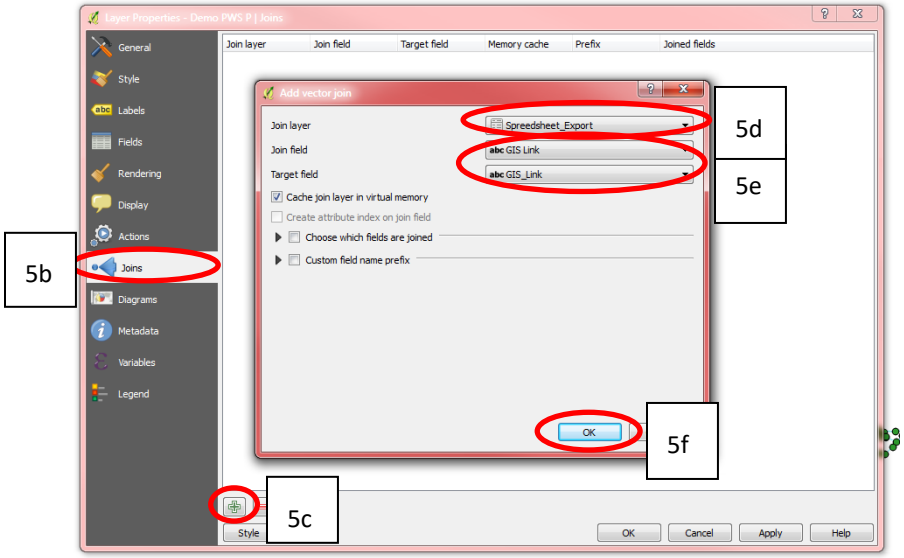


Figure 7.6 – Spreadsheet Import, Step 5

8.0 CONDITION ASSESSMENT

8.1 NOTICE REGARDING CONDITION RATINGS

The Condition Guides with this SOP are not intended to replace engineering assessments or forego the need for detailed performance assessments by trained professionals. They are intended to provide a high-level picture of infrastructure condition to allow municipalities to more cost effectively identify and focus expenditures on older, poorer condition and at-risk infrastructure. The information developed with this SOP should not be used as capital planning data without incorporating risk assessment, consequence of failure considerations, integration with other infrastructure and detailed engineering assessments where required by law or standard of care.

8.2 ASSIGNING CONDITION RATINGS

Condition rating guides are included in Appendix A. Assigned ratings will be based upon visual observations in the field or historical operations information according to the descriptions provided for each attribute. Where practical, photos have been included as a general visual guide to different ratings.

Except for Asphalt Road Condition Assessments, each asset contains several attributes which must be assigned a rating between 1 and 5 to determine the overall condition of the Asset. These can be entered during field pick up or with the Condition Rating function within the spreadsheet discussed in Section 4.6.3. When unsure of a rating, assign the poorer rating (higher number).

8.2.1 BASIS OF CONDITION RATING

Condition ratings should be assigned either by the age, if no other information is available, or by objective condition ratings. If visual or operational indicators are used, age does not need to be considered. For underground infrastructure with no operational data to indicate condition, age may be used to estimate condition.

8.2.2 ENTERING THE CONDITION USING THE SPREADSHEET FORM

If using the spreadsheet form to enter condition data, the condition rating of the asset will automatically be calculated as an average of all condition ratings entered. Averages are not weighted, but the user can apply more weight to rating criteria by choosing which criteria to enter.

8.2.3 ASPHALT ROAD CONDITION RATINGS

For asphalt roads, condition shall be rated based on procedures developed by the United States Army Corps of Engineers for asphalt distress. The method requires assessing the level of asphalt distress at random sampling points along the roadway. Once the number of sampling points has been selected, the types and level of distress at each section are logged in the condition forms included with the condition rating guide. Distress codes and assessment of severity can be taken from the "*Paver Distress Identification Manual*", available at no cost from:

https://www.faa.gov/documentLibrary/media/Advisory_Circular/Asphalt-Surfaced-Airfields-Distress-Manual.pdf

Once the condition forms have been collated, the condition rating for each street section can be used in either of the following ways:

a) A simple 1 to 5 rating may be applied by averaging the distress codes, where High = 5, Medium = 3 and Low = 1;

b) The distress codes can be used in commercial software to develop Pavement Condition Index (PCI) values and integrated with capital planning models.

Option b) will be of more interest to municipalities that have significant amounts of road infrastructure. Commercial software can assist in life cycle planning and assessing the relative benefits of maintenance dollars versus replacement dollars within a limited budget.

A simplified method for selecting the number of sampling points, based on two lane roads of approximately 7 metre width is shown in Table 7-1.

Table 7-1: Asphalt Road Sampling Sections

Road Length (m)	No. of Sampling Sections	Road Length (m)	No. of Sampling Sections
100	1	1601-2000	8
101-300	2	2001-2600	10
301-700	3	2601-2800	11
701-1300	5	2801-3000	12
1301-1400	6	3001-3400	13
1401-1600	7	3401-3500	15

If a section of road has been upgraded (re-paved, overlaid or reconstructed), it should be treated as a separate road section with its own sampling frequency.

9.0 DOCUMENT CONTROL PROCESSES

This section provides guidance on save locations, file naming, document formatting, and document security. Key pitfalls to avoid will be:

1. Non-standard data locations (e.g. someone's personal drive) make it easy to lose data.
2. Non-standard file naming conventions make it difficult to track current versions.
3. Non-standard document formats are incompatible with provincial database system and processing of data by the database registry.
4. Unauthorized/untrained personnel changing the asset management document.

9.1 SAVE LOCATION

The master working file must be saved in the location assigned with the data structure for proper functionality. We encourage you to periodically save backup copies of the spreadsheet in accordance with sound data management processes.

9.2 FILE NAMING CONVENTION

Each Municipality will have a unique file name for their respective Asset Management Spreadsheets. The naming convention shall identify two key components of the Asset Management sheet in the file name.

The main spreadsheet is the only item in the file structure which may be renamed.

The format for file naming is as follows: XXX–yyyymmdd.xlsx

The first three characters in the file name are for the Municipality ID, as listed in Table 5-4.

The last eight digits of the file name are to identify the last revision date. The format of the last eight digits are to be yyyymmdd to allow for ease of sorting. This method will generate several files of the Asset Management spreadsheet which will provide back-up versions, should errors occur within the spreadsheet.

Below are a few examples of some potential file names.

- **WOL-20200912.xlsm -** Town of Wolfville Asset Management spreadsheet, revised on September 12, 2020.
- **ANT-03-20180415.xlsm -** Town of Antigonish Asset Management spreadsheet, revised on April 15, 2018.

9.3 DOCUMENT FORMAT

All Asset Inventory Spreadsheets submitted to the province shall be Microsoft Excel in the same format as provided. Alterations to the format of the spreadsheet will affect how the province intends to merge the collective data from each Municipality. If Municipalities are not equipped with Microsoft Office and are unable to comply with this request, please contact the Department of Municipal Affairs for assistance.

APPENDIX A
CONDITION ASSESSMENT GUIDE

(See Attached File)