Water Asset Management Program
Carroll County, New Hampshire
June 30, 2024

CARROLL COUNTY
NEW HAMPSHIRE

2824

Prepared by: Underwood Engineers

Table of Contents

List of Tables

List of Figures

Appendices

A. Standard Operating Procedures
B. Survey123 Data Distribution Forms
C. Python Script Tool Print Outs
D. Inventory Field Summary Table
E. ArcGIS Online Story Map
F. Level of Service Matrix and Workshop Minutes
G. Water System Maps
    G-1. Water Distribution System Map Book
    G-2. Water Distribution System by Year Installed
    G-3. Water Distribution System by Impact of Failure
    G-4. Water Distribution System by Probability of Failure
    G-5. Water Distribution System by Criticality
H. Financial Planning Spreadsheet
    H-1. Combined Inventory Table
    H-2. Estimated Replacement Cost
    H-3. Ten Year Look Ahead Summary
    H-4. One Hundred Year Look Ahead
    H-5. One Hundred Year Look Ahead by Facility
    H-6. Additional Summary Tables
I. Carroll County 2024 Approved Budget Breakdown
J. Small Water System Business Plan

1. Asset Management Plan Overview

1.1. Introduction

Carroll County, NH engaged Underwood Engineers (UE) of Concord, NH to develop an Asset Management Program (AMP) for their water system. This water AMP was funded by a $60,000 American Rescue Plan Act (ARPA) grant provided by the New Hampshire Department of Environmental Services (NHDES).

The AMP grant requires the following core components:

- Vision Statement
    - A brief statement which communicates what the County intends to accomplish with this AMP.
- Stakeholder Identification
    - Define community stakeholder groups, both internal and external.
- Level of Service (LOS) Matrix
    - What are the County's goals in operating and maintaining the system?
    - Goals should be Specific, Measurable, Attainable, Realistic, Timely, Evaluated, and Re-adjusted (SMARTER).
- Asset Inventory and Condition Assessment
    - What assets does the County own?
    - Which of these assets are able to serve their purpose? Which are not?
    - What is the condition of each asset?
- Criticality
    - Prioritize assets by their probability of failure versus the impact of failure.
- Financial Overview
    - Minimum Life Cycle Cost (Practices) - Estimate costs needed to properly maintain, inspect, repair and, if necessary, replace assets to maintain the desired LOS.
    - Long-Term Funding Strategy (Budget)
        - Review the current operating budget and rate structure.
        - Schedule estimated replacement costs over the life of the assets.
        - Provide a framework for repair or replace decisions.
- Implementation Plan
    - Standard Operating Procedures (SOPs)
    - Staff roles and training.
- Communication Plan
    - Management reporting
    - Public outreach

The estimated costs presented in this AMP assume the full replacement of the asset at the end of its estimated useful life. These order of magnitude cost estimates, used in conjunction with project prioritization, are a useful financial planning tool which helps to identify assets which should be evaluated for inclusion in a capital improvement plan (CIP). All dollar values contained within this report are in 2024 dollars.

The decision as to whether full replacement of a given asset is required or whether a repair will suffice will be made during the capital planning process. Inflation and borrowing costs, if applicable, should be taken into consideration at that time. This AMP does not address anticipated expansions or upgrades.

The terms 'horizontal' and 'vertical' are used to characterize assets. Vertical assets are those facilities containing multiple components. A booster pump station, for example, typically includes piping, pumps and motors, control panels, and a building, and is considered a vertical asset. Horizontal assets are typically buried infrastructure such as distribution mains or valves.

1.2. Operation and Functioning of ArcGIS and Related Apps

The County purchased a Basic ArcGIS Pro subscription. The first annual payment was reimbursed through the grant. The subscription includes ArcGIS Pro desktop software, an ArcGIS Online (AGOL) account, and the use of ArcGIS apps. Field Maps, Survey123, Story Maps, and Dashboard apps were used to set up this asset management program.

A summary of the system is provided in **paragraphs 1.2.1. through 1.2.4.** Detailed instructions are provided in **Appendix A**.

1.2.1. Inventory Files

Inventory files were developed by UE based on information provided by the County and were uploaded to the County's AGOL account. The files can be viewed by field workers in the Field Maps app from a device, such as a tablet or a cellular phone. They can also be viewed and edited from ArcGIS Pro, the desktop software.

Prior to the current AMP project, the County had already developed water system inventory files with the assistance of the Granite State Rural Water Association (GSRWA). Those files were expanded and updated for use in the AMP.

A full list of files and their current status is provided below.

Table 1-1 Inventory Files and Status

GSRWA File Name	AMP File Name	Status
Abandoned_Asset	N/A	Empty. Saved to archive weblayer.
Abandoned_Line	N/A	Empty. Saved to archive weblayer.
Blow_off_Valve	N/A	Empty. Saved to archive weblayer.
Corporation	N/A	Empty. Saved to archive weblayer.
Curb_Stop	Service_Valves	Replaced. Saved to customer inventory weblayer.
Fittings	N/A	Populated. Saved to archive weblayer.
Gate_Valve	Valves	Replaced. Saved to horizontal inventory weblayer.
Hydrant	Hydrants	Replaced. Saved to horizontal inventory weblayer.
Leak_Investigation	N/A	Empty. Saved to archive weblayer
Network_Structures Structure Type = Other	Meters	Replaced. Saved to customer inventory weblayer.
Network_Structures Structure Type != Other	Vertical assets	Replaced. Saved to vertical inventory weblayer.
Service_Line	Service_Lines	Replaced. Saved to customer inventory weblayer.
Structure	Vertical assets	Replaced. Saved to vertical inventory weblayer.
Swing_Tie	N/A	Empty. Saved to archive weblayer.
Water_Main	Water_Mains	Replaced. Saved to horizontal inventory weblayer

1.2.2. Inspection and Maintenance Records

When a field worker selects a specific asset in Field Maps or AGOL, such as a valve, a pop-up window will show the field values for that asset as well as a link to a Survey123 form. The Survey123 form is used to record inspection and maintenance information about the assets. This information can be used to update the asset inventory. There is typically a one-to-many relationship between the inventory files and the inspection and maintenance files. In other words, over time there will be multiple inspection and maintenance entries for each asset.

When the field worker clicks on the link to the Survey123 form, the form will be automatically populated with the asset's unique asset identification number and location as shown in **Figure 1-1** below.

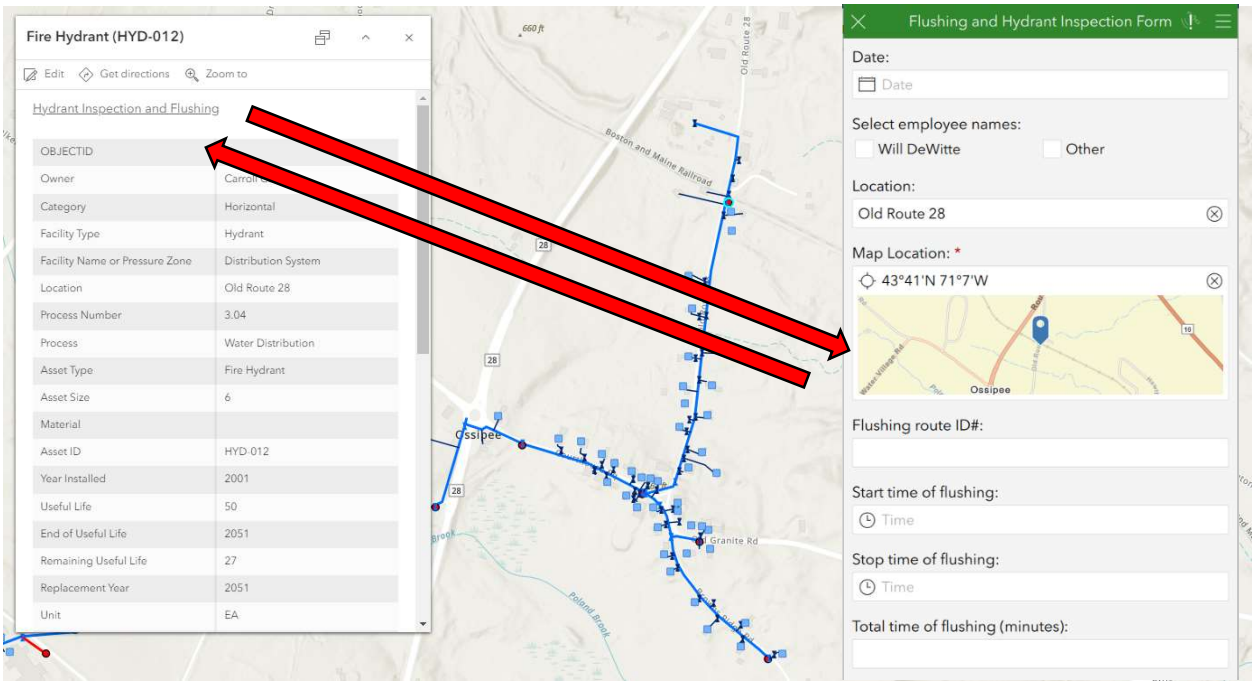
When the survey form is completed, the entry will be stored on a table in the County's AGOL account at survey123.arcgis.com, and the data can be downloaded in a number of formats, including ArcGIS shapefiles and feature classes, or an Excel spreadsheet.

Survey123 results have also been included in the County's Water system map and can be viewed by users in the field.

Sample Survey123 forms have been provided in **Appendix B**, and a list is provided below.

- Meter change out form.
- Hydrant inspection and flushing form.
- Valve exercise form.

Figure 1-1 Pass Parameters from Inventory File to Survey123 Forms



1.2.3. ArcGIS Pro – Inventory File Editing and Financial Planning

While simple edits can be made to the files in AGOL or Field Maps, UE recommends that most editing be done using the desktop software, ArcGIS Pro. ArcGIS Pro has more robust editing capabilities than Field Maps or AGOL. These capabilities can save the user time and eliminate errors.

UE has developed a set of Python tools for the County to use to develop a financial planning spreadsheet using the inventory files. These tools can be run from within ArcGIS Pro. Python has been integrated with ArcGIS software since 2004. The Python tools developed by UE automates repetitive, multi-step tasks related to updating the inventory files and creating the financial planning spreadsheet. Print outs of the Python scripts have been provided in **Appendix C.**

Table 1-2 Python Script Tools

Tool Name	Function
000_Check for duplicate Asset ID's	Creates an Excel file containing duplicate asset identifiers, if any.
001_Calculate_Inventory_Fields	Calculates fields within the inventory tables.
004_Update_Replacement_Costs	Updates replacement cost for all assets of the same 'asset type.'
020_Combine inventory files into one table and	Combines all selected inventory files into one geodatabase table. Schedules estimated replacements each year for the first ten years, and each decade for ten decades. These estimates are added as columns to the combined inventory table.
065_Export_to_XLSX_ArcGISPro	Exports the combined inventory table or other selected files to an Excel table in 'xlsx' format. This can also be done using the built in 'Table to Excel' tool. However, the output will be a simple spreadsheet rather than a sortable table.
070_Export_to_XLSX_with_Pivot _Tables	Exports the combined inventory table to an Excel file, and automatically generates pivot tables and charts. Note that this script includes Python modules which are not

A table detailing each of the fields in the inventory files are provided in **Appendix D**. This table explains the source of the information in each field.

The financial planning spreadsheet is an Excel spreadsheet which includes a combined inventory table of all water system assets, including distribution mains, valves, and components of vertical assets, such as booster pump stations, storage tanks, and treatment facilities. It also includes summary tables and charts, several of which have been included in this report.

1.2.4. Story Maps and Dashboards – Communication and Outreach

As mentioned in **paragraph 1.2.** , the County's ArcGIS subscription also includes access to the Story Map app and the Dashboard app. A Story Map is similar to a PowerPoint presentation. It can be embedded in the County's website and includes interactive elements, such as a map or tables and charts. A Dashboard includes one or more charts or tables, which can be used to summarize information.

The inventory files were used to create Story Maps and dashboards on the County's AGOL account. A 'view' layer was created from the inventory files to provide the public with a simplified and non-editable version of the files in an interactive map. A dashboard, or a set of summary charts and tables was developed as well. The dashboard elements were included in the Story Map.

A screen shot of part of the Story Map is provided in **Appendix E**.

1.3. Vision Statement, Stakeholder Groups, and Level of Service (LOS) Goals

A Level of Service Workshop was held on February 7, 2024. The County's vision statement and stakeholder groups were identified as part of the Level of Service workshop, a set of SMARTER goals were developed. SMARTER goals are defined in **paragraph 1.1.** . See **Appendix F** for the LOS Matrix and Workshop Minutes, and **Section 2** for a more information.

1.4. Criticality and Prioritization

To allocate scarce financial and physical resources in an efficient manner, UE recommends a systematic prioritization of assets. This AMP utilizes two parameters to prioritize assets - probability of failure and impact of failure.

Criticality is defined by the probability of failure versus the impact of failure. For example, the probability of failure for an old, vitrified clay pipe may be high, but its impact of failure on system operation will be low if it affects very few customers or if it is unlikely to cause a health or safety hazard.

Risk score is the probability of failure score multiplied by the impact of failure score. This AMP categorizes assets by their criticality and ranks them by their risk score.

Scoring for water system assets is on a scale from 1 to 5 to align with the American Water Works Association (AWWA).

1.4.1. Probability of Failure and Condition Score

The probability of failure is based on numerous factors including age, material, performance, and most importantly, condition. Condition is usually, but not always, correlated with age. Going forward, the County can use the electronic data distribution form provided to document the condition of its water structures, or it can rely on a specialty contractor to conduct the inspections and incorporate the data provided.

To initiate the process of prioritizing assets for evaluation, probability of failure was initially surmised based on the age of the asset. Age is a contributing factor in most asset failures; however,

it is not always the main factor or the only factor. Therefore, it is important to routinely collect information on asset condition and monitor asset performance and capacity.

Table 1-3 below describes the probability of failure scoring criteria based on the remaining useful life of the asset.

Table 1-3 Probability of Failure Scoring Based on Remaining Useful Life

Probability of Failure Score	Remaining Useful Life
1 – Very Low	>50 years
2 - Low	>20 and <= 50 years
3 - Moderate	>10 and <= 20 years
4 - High	>0 and <= 10 years
5 – Very High	<= 0 years

As more information on the assets is collected, probability of failure scoring will be assigned based on condition, capacity, and performance. Scoring criteria is described in **Table 1-4** below.

Table 1-4 Condition Score

Condition Score	Description
1 – Very Good	Asset is in excellent condition and extremely reliable. No known defects, capacity issues, or recurring maintenance issues.
2 - Good	Asset is in good condition, but sporadic failures are possible. Minor defects or recurring maintenance issues have been noted. There are no known capacity issues.
3 - Moderate	Asset is in fair condition with moderate defects, recurring maintenance issues, or possible capacity issues. More information about the asset is needed. May require more frequent monitoring due to a high impact of failure or recurring operational issues.
4 - Poor	Asset is in poor condition with significant defects or has serious recurring maintenance issues. Capacity and performance issues have been identified. Repair or replacement should be scheduled within one or two years, or as soon as possible.
5 – Very Poor	Asset is likely to fail or has already failed to meet performance requirements. Repair or replacement should be scheduled as soon as possible, preferably within one year.

1.4.2. Impact of Failure

The second parameter to consider in calculating the criticality of an asset is its impact of failure on the system. A failure which could result in an environmental, public health, or safety hazard would have a high impact of failure. On the other hand, a failure which would result in a minor inconvenience to a small number of customers would have a low impact of failure. **Table 1-5** below describes the criteria used in assigning impact of failure scores for each asset.

Table 1-5 Impact of Failure Scoring

Impact of Failure Score	Description	Repair Method and Cost
1 – Very Low Impact of Failure	Affects a small number of customers, little to no risk to health and safety, and little to no risk of environmental damage.	Repair not especially difficult or costly.
2 – Low Impact of Failure	Affects a moderate number of customers, little to no risk to health and safety, and little to no risk of environmental damage.	Repair not especially difficult or costly.
3 – Moderate Impact of Failure	Potential to impact a moderate to large number of customers or a single important customer. Unlikely to affect public health and safety or cause environmental damage.	Moderately difficult and expensive to repair.
4 – High Impact of Failure	Located in a congested area or on a major roadway. Potential to impact a large number of customers. Possible effect on public health and safety and environmental damage.	Difficult and expensive to repair.
5 – Very High Impact of Failure	Potential impact on a large number of customers or an important customer. Probable effect on public health and safety and high potential for environmental damage.	Extremely difficult and expensive to repair.

1.4.3. Criticality and Risk Score

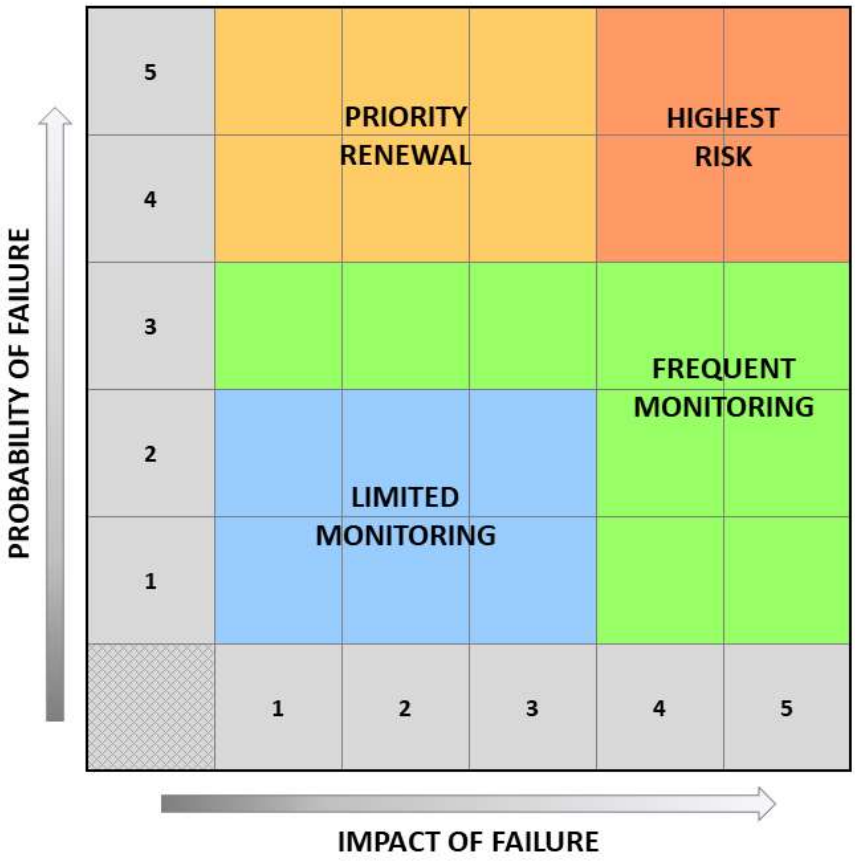
As mentioned in **paragraph 1.4.** , the criticality of an asset is defined as its probability of failure versus its impact of failure. Multiplying the probability of failure by the impact of failure results in a value known as the "risk score." Criticality is a way to categorize the assets, and risk score is way to rank the assets.

For example, an asset with a probability of failure score of 3 and an impact of failure score of 2 results in a risk score of 6 as 3 x 2 =6, and the criticality rating would be "frequent monitoring." However, an asset with an impact of failure score of 3 and probability of failure score of 2 would have the same risk score of 6, but the criticality rating would be "limited monitoring." A brief explanation of the criticality categories is provided in Table 1-6 and the critically matrix is shown in **Figure 1-2**.

Table 1-6 Criticality Descriptions

Criticality Rating	General Description
Highest Risk	High probability of failure and high impact of failure.
Priority Renewal	High probability of failure and low to moderate impact of failure.
Frequent Monitoring	Moderate probability of failure and low to high impact of failure.
Limited Monitoring	Low probability of failure and low to moderate impact of failure.

Figure 1-2 Criticality Matrix



2. Vision Statement, Stakeholder Identification, Level of Service Goals

A Level of Service Workshop was held on February 7, 2024. At that workshop, specific goals for both the Water and stormwater systems were discussed, stakeholders were identified, and a vision statement was developed.

2.1. Vision Statement

The County's overall objective in managing its water assets also serves as its vision statement.

To develop a knowledge base on all existing infrastructure so that in the event of an emergency, the County is prepared on how to best resolve the problem.

The County faces two main challenges in meeting this objective and is currently formulating responses to those challenges.

Challenge 1:

- The County does not have comprehensive record information on the existing water system, including the age and location of the terminal end of the 4-inch PVC main on Old Route 28.

Response 1:

- Plans are being developed to replace the 4-inch PVC main on Old Route 28 with 8-inch DI. UE and the County will work with the contractor to confirm the location of the existing main to be abandoned in place and establish a new terminal cap and hydrant on the new 8-inch line.

2.2. Stakeholders

The following stakeholders were identified in regard to the County's water system.

- Water System
  - County Complex users including the corrections center, nursing home, employees, sheriff, etc.)
  - Ossipee Village resident and property owners wishing to develop parcels and connect to the Water distribution system.
  - Ossipee Corner Fire Department.
  - New Hampshire Department of Transportation has one of their maintenance sheds connected to a water service at the end of the Old Route 28 line.
  - County Delegation and citizen groups.

2.3. Level of Service Goals

The County's LOS goals are detailed in the LOS Matrix provided in **Appendix F**.

2.4. Recommendations and Next Steps

The County should update the LOS Matrix spreadsheet once per year or as needed. The spreadsheet also includes a tab where future goals can be listed and added to the LOS Matrix later if appropriate.

3. Asset Inventory, Condition Assessment, and Asset Prioritization

3.1. Water System Background

The Carroll County water system serves the Carroll County complex and approximately 40 homes in Ossipee Village with a total served population of roughly 260. The system was originally served by a spring system that was later replaced by dug wells and bedrock wells in the late 1970's and early 1980's.

The existing sources of supply include two deep bedrock wells and three dug wells. Two of the wells flow by gravity to the third dug well, where water is pumped to the metering and treatment building. The water from wells W-1, BW-1, and BW-2 are metered and then chlorinated at the meter and treatment building before flowing by gravity to a 200,000-gallon storage tank. Water flows by gravity from the storage tank through a 10-inch ductile iron (DI) main to the county complex, and then into Ossipee Village via County Farm Rd, Route 28, and Route 177. At the village center, an existing 4-inch PVC main branches off to serve Old Route 28 while the 10-inch main reduces to 8-inch DI and extends a short distance down Granite Road, and roughly another 1,000 feet down Browns Bridge Road before terminating.

The horizontal water system assets for each system are summarized in **Table 3-1** below.

Table 3-1 Summary of Horizontal Water Assets by Distribution System

Distribution System	Unit	Grand Total
Water Mains	LF	17,972
Gate Valves	EA	36
Hydrants	EA	12
Hydrant Service Lines	LF	712
Water Services	EA	53

3.2. Vertical Asset Inventory and Condition

3.2.1. Groundwater Source Wells

The Carroll County water system has five groundwater source wells. Underwood Engineers retained Emery and Garrett Groundwater Investigations, a Division of GZA (EGGI-GZA) in the summer of 2023 to evaluate the long-term sustainable yield for each of these wells, as their pumping capacities could only be assumed prior to assessment. Water level transducers were temporarily installed to record the wells' static water levels as well as their change during a 48-hour pump test. Results from the pump test for each well helped determine their estimated sustained yields.

Three of the groundwater wells are dug wells (W-1, W-2, and W-3) that were installed in 1979 to replace a spring system that previously existed. Of these three wells, only W-1 contains a pump and W-2, and W-3 are believed to feed into W-1 by gravity. The sustainable yield of W-1 was estimated to be 12 gpm. It is not understood if W-2 and W-3 are connected to W-1, and it was recommended that further study be conducted to confirm the infrastructure between the dug wells. Additionally, testing of the wells occurred during a fairly wet fall and may behave differently under drought conditions. Additional long-term monitoring of the wells is warranted.

It is unknown when bedrock well BW-1 was installed, although the pump and motor were replaced by Barrie Miller's Well & Pump Company in 2023 prior to the 48-hour pump test. BW-2 was installed during the 2001 system upgrade and has historically been the County system's primary duty pump. Bedrock wells BW-1 and BW-2 have depths of 1,006 ft and 1,100 ft, respectively. Based on drawdown levels of BW-1 and BW-2 observed during their individual pump tests, EGGI-GZA concluded that both bedrock wells are hydraulically connected. Although it was determined that the sustainable yield of BW-1 and BW-2 are 20 gpm and 25 gpm respectively, it was recommended that the wells be alternated, and not operated together, due to the hydraulic connection. For this reason, the total yield of the bedrock wells is equal to the yield of the bedrock well currently in operation.

The total maximum source water capacity of the groundwater wells is equal to 37 gpm (53,280 gpd). Based on water quality summary data from 2011-2021, blended water from the dug wells has historically been of good quality, with a few isolated samples with elevated levels of iron while blended water from the bedrock wells have occasionally contained elevated levels of iron, manganese, and zinc. The majority of historic sampling has had non-detect results for iron, manganese, and zinc. All five wells are located at the same wellfield that sits roughly 120-150 ft higher in elevation above the County complex, allowing the entire system to be gravity fed.

3.2.2. Meter & Chlorination Building Overview

Water is currently disinfected in an existing meter house that was built in 2001 as part of a larger system upgrade. It consists of one 35-gallon storage tank, over a chemical containment pallet, and a wall-mounted LMI positive displacement pump that injects 12.5% sodium hypochlorite into the system.

Chlorine injection occurs where the supply lines from each bedrock well and dug wells converge, each of which is metered, before passing through a combined meter and exiting the building to the storage tank. System chlorine residuals are monitored 2-3 times per week at a sample tap at the maintenance building in the central part of the campus.

The meter and chlorination building is located in the wellfield just downstream of the groundwater wells. There is a gravel access drive that connects the building to Route 171. This access drive also extends to BW-2 but access to BW-1 has overgrown.

3.2.3. Storage Tanks

The water system has one 200,000 in-ground concrete water storage tank that has been in service since its construction in 1987 that replaced a 90,000-gallon tank that was installed around 1900. The storage tank is located in the wellfield just downstream of the meter and chlorination building. Due to the elevation of the wellfield, the distribution system is gravity fed by the storage tank. For this reason, the water system has no pumps.

Float switches in the tank are currently set to trigger BW-2 to pump when the tank level reaches 7.6 ft and subsequently shut off the pump when the level has reached 8.6 ft. If BW-2 does not provide enough flow, the BW-1 and W-1 are called to come on at a tank level of 6.6 ft. All wells will shut off at 8.6 ft.

3.3. Description of Estimated Useful Lives

With the exception of the Old Route 28 water main, the oldest of the horizontal assets were installed during the 2001 water system upgrade. The estimated useful lives and installation dates are summarized in **Table 3-** below.

Table 3-2 Horizontal Assets by Estimated Useful Life and Installation Date

Facility Type	Asset Type	Material	Useful Life	Quantity per Installation Date (LF / EA)				
				1970 - 1979	2000 - 2009	2010 - 2019	Unk	Grand Total
Hydrant	Fire Hydrant		50		11	1		12
	Yard Hydrant		50	1	1			2
Water Pipe	Hydrant Service	DI	85		358	350		708
		Unk	75	4				4
	Water Main	DI	85		11,659	1,147		12,806
		HDPE	75	577	51			628
		PVC	75	2,704	1,122			3,826
Water Valve	Blow-off Valve		50		1			1
	Hydrant Gate Valve		50	1	13	6		20
			50	2	9	1	2	14
	Shutoff Valve		50		6	1		7

Useful lives of selected vertical components are provided in **Table 3-3** below. See **Appendix H-7** for a full list.

Table 3-3 Estimated Useful Lives for Selected Vertical Assets

Facility Type	Asset Type	Useful Life	Remaining Useful Life
Meter & Chlorination Building	Automatic Transfer Switch	40	17
	BRW-1 Flow Meter	25	24
	BRW-2 Flow Meter	25	24
	Building Electrical	40	17
	Chemical Pump Monitor	20	-3
	Combined Flow Meter	25	24
	Exhaust Fan	30	7
	Generator (Propane)	40	17
	SCADA Panel	25	2
	Sodium Hypochlorite Day Tank	15	-8
	Sodium Hypochlorite Feed Pump - Solenoid	20	-3
	Sodium Hypochlorite Piping & Tubing	20	-3
	Sodium Secondary Containment Area	20	-3
	W-1 Flow Meter	25	24
Water Storage Tank	Cast in Place Tank	50	13
	Overflow Pipe	30	-7
	Submersible Level Sensors (Electrical)	20	16
	Tank Rubber Membrane Roof	25	-12

3.4. Prioritization of Assets

3.4.1. Impact of Failure

The impact of failure score was assigned to each vertical asset based on the importance of its role in the overall system, whether redundancy has been built into the system, and the cost or difficulty of an emergency repair, among other factors.

Table 3-4 Impact of Failure Summary – Vertical Assets

Impact of Failure	Asset Type
5 – Very High	Safety-related components, such as gas detectors, platforms, and railings.
4 - High	Control panels and ventilation equipment. Items with no redundancy.
3 - Moderate	Critical components with redundancy such as well pumps.
2 - Low	Structural components with long useful lives. Stand-by generator and related components. Components which are accessible and easily repaired.
1 – Very Low	Components which are peripheral to the functioning of the system, or are very long lived and easily repaired, such as the access drive.

The impact of failure score for horizontal assets was assigned based on the number of people who might be affected by a failure, the potential to negatively affect public health and safety, the potential to impact environmental health, the potential to cause the system to be out of regulatory compliance, or the expense and difficulty of a repair. A map of the Water distribution system by impact of failure is provided in **Appendix G-3**.

3.4.2. Probability of Failure and Condition Assessment

Initially, the probability of failure score was calculated for each asset based on its estimated remaining useful life as discussed in **paragraph 1.4.2.** on **page 11**. If the system operators assign a condition score of 4 or 5 to an asset, meaning that the asset is in poor or very poor condition, the probability of failure score will be populated with the condition score. The 'replacement year' of the asset will be set to the current year if the condition score is 5 (very poor) or the following year if the condition score is 4 (poor).

3.4.3. Criticality and Risk Score

As discussed in **paragraph 1.4.3.** , criticality and risk score are determined by the impact of failure score and the probability of failure score. The highest risk assets are listed, along with their risk scores, in **Table 3-5**. The County's assets are shown in the scatter plot in **Figure 3-1** following the table. The points have been slightly modified so that they do not overlap, making the chart more readable.

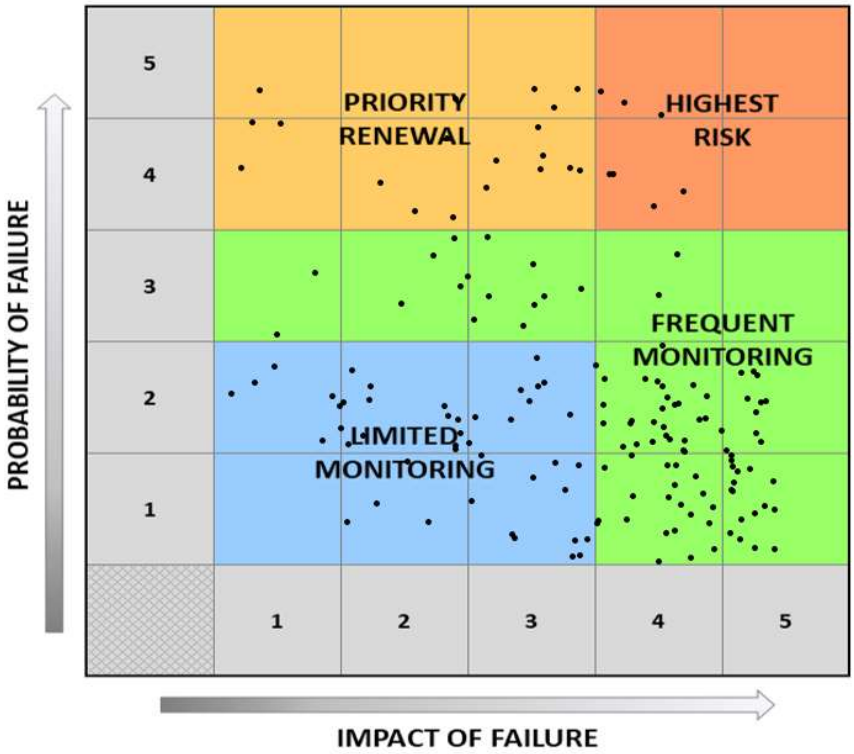
3.5. Recommendations and Next Steps

Carroll County is encouraged to populate condition scores in the inventory files based on their field evaluations and asset performance.

Table 3-5 Highest Risk Assets and Risk Scores

Facility Name or Pressure Zone	Asset Type	Criticality	Risk Score
Water Storage Tank	Overflow Pipe	Highest Risk	20
	Tank Rubber Membrane Roof	Highest Risk	20
Meter & Chlorination Building	Feed Piping, Valves, Appurtenances	Highest Risk	20
	NaOCl Day Tank	Highest Risk	20
	NaOCl Feed Pump - Solenoid	Highest Risk	20
	NaOCl Piping & Tubing	Highest Risk	20
	NaOCl Secondary Containment Area	Highest Risk	20
Distribution System	Wellfield Yard Hydrant	Highest Risk	20
	Hydrant Gate Valve	Highest Risk	20

Figure 3-1 Assets by Impact of Failure and Probability of Failure



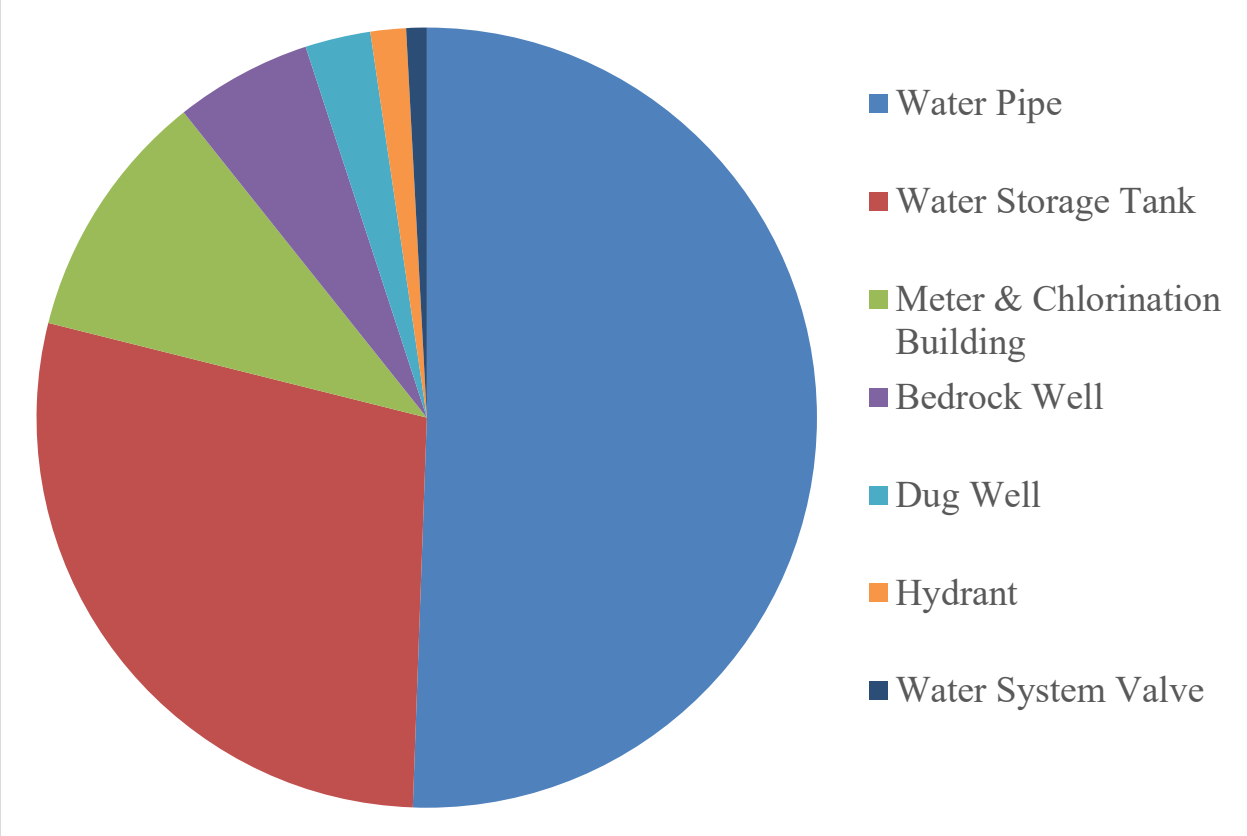
4. Financial Overview

4.1. Current Replacement Value of Assets

Table 4-1 Comprehensive System Estimated Replacement Cost in 2024 Dollars

Facility Type	Total
Water Pipe	$6,290,214
Water Storage Tank	$3,526,000
Meter & Chlorination Building	$1,293,000
Bedrock Well	$706,000
Dug Well	$338,000
Hydrant	$182,000
Water System Valve	$105,005
Grand Total	**$12,440,219**

Figure 4-1 Comprehensive Estimated Replacement Costs of Water Assets (2024 dollars)



4.2. Revenues and Expenses

UE recommends reserves of 3-6 months of operating expenses for the water system. The County has budgeted $365,173.48 in DPW expenses for 2024, which includes the water system, according to the County's approved budget shown in **Appendix I.** Because the County's Department of Public Works (DPW) staff operate the county's water system, there does not appear to be a formal reserve account for the water system. However, the water fund balance was $40,339 at the end of the 2023 fiscal year.

4.3. Capital Projects

The County is currently anticipating two capital projects to be bid before the end of 2024; the first of which pertains to meter/chemical feed building and storage tank improvements. This includes clearing of trees and brush above the existing supply line between the storage tank and county complex, repairs to the three dug wells, installation of new level transducers in W-1, BW-1, and BW-2, re-graveling existing access roads, meter and chlorination building SCADA improvements/interior refurbishment, and rehabilitation of the 200,000-gallon storage tank.

Additional plans are being developed to replace approximately 2,300 linear feet of existing 4-inch PVC water main along Old Route 28 with 8-inch ductile iron. The age of this main is unknown, but it is believed to be over 40 years old, and there are suspected leaks according to the Town of Ossipee. This is the last remaining "old" pipe in the system and there is only one hydrant, which does not permit adequate flushing velocities.

The County has budgeted $2 million of County ARPA funds intended for water system improvements. It is anticipated that these funds will cover the cost of design and construction of the proposed water system improvements. The County ARPA funds may not completely cover the cost of construction for the Old Route 28 water main replacement. UE is working with the County to seek other funding alternatives such as DWSRF loans, as further explained on **pages 27 & 28**.

Although the existing funds may not completely fund the water main replacement, buckets within the grant have been set aside for additional improvements such as replacement of all 12 fire hydrants, residential meter replacements, and upgrading the existing fire pond. It is anticipated that all funds must be encumbered before the end of 2024 and all construction must be paid for before the end of 2026. Since the summer of 2023, the County ARPA funds have already funded meter replacements at the complex buildings and source meter replacements as well as inspection, refurbishment, and evaluation of the existing wells with further financial aid provided via a $50,000 NHDES planning grant.

4.3.1. Ten-Year Look Ahead

The table below shows the full replacement cost of assets coming due for replacement based on their installation date and estimated remaining useful life. This table is not a capital improvement plan, but it does provide a partial basis for one. It does not anticipate future expansions and improvements. It flags existing assets that are reaching the end of their estimated useful life. As the County collects additional information on the condition of the assets, that information will be considered as well.

Table 4-2 Ten Year Look Ahead Summary (2024 dollars)

Risk Score	Highest Risk	Priority Renewal	Limited Monitoring	Grand Total
20	$539,500			$539,500
15		$72,500		$72,500
12		$150,000		$150,000
8		$75,000		$75,000
6			$315,000	$315,000
5		$2,500	$9,000	$11,500
Grand Total	**$539,500**	**$300,000**	**$334,000**	**$1,173,500**

A detailed table of the 'Highest Risk' assets is provided below. A detailed table of all assets which will be reaching the end of their estimated useful life is provided in **Appendix H-4**.

Table 4-3 Value of 'Highest Risk' Assets in 2024 Dollars

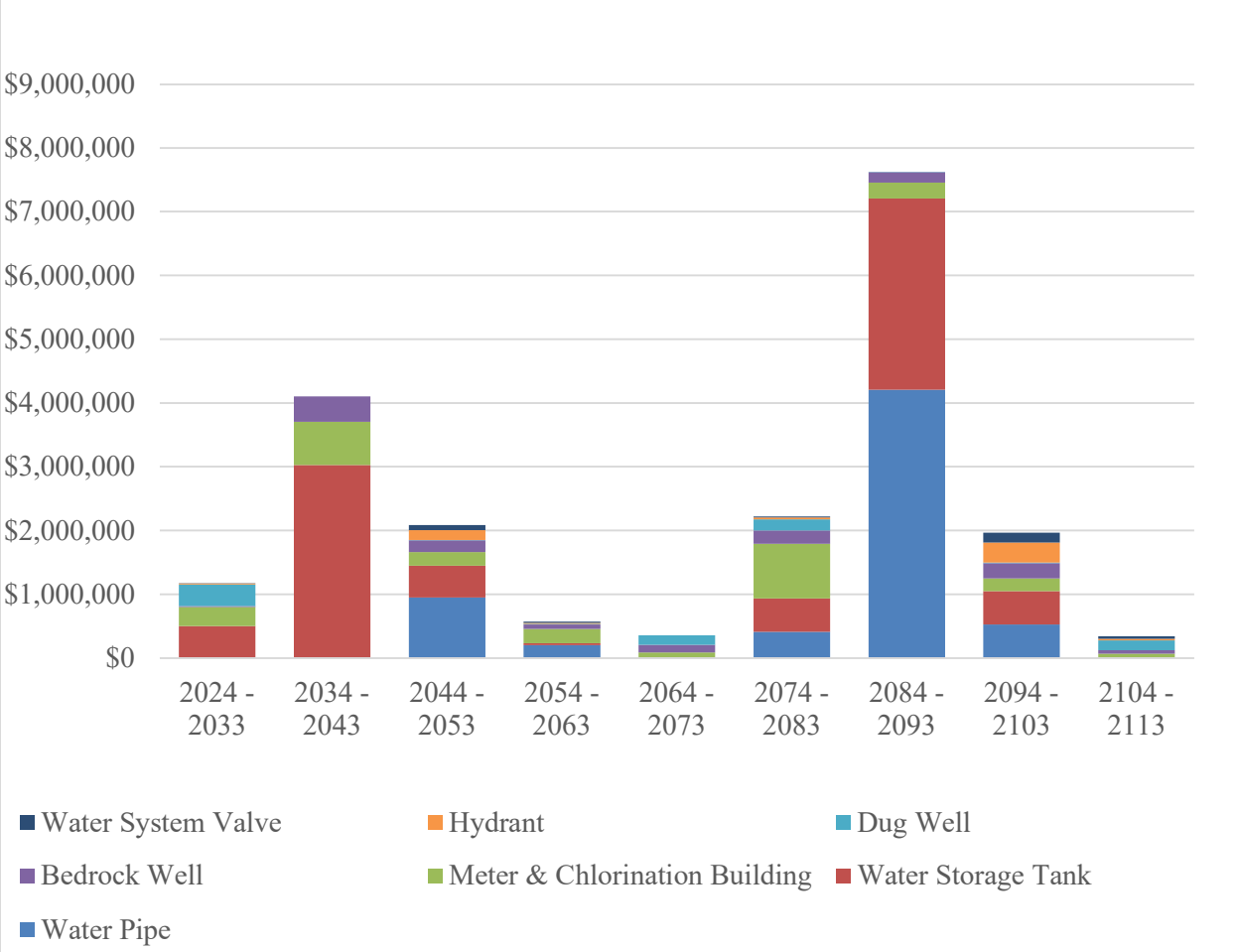
Risk Score	Facility Name or Pressure Zone	Asset Type	Useful Life	Highest Risk
	Water Storage Tank	Overflow Pipe	30	$1,000
		Tank Rubber Membrane Roof	25	$250,000
	Meter & Chlorination Building	Feed Piping, Valves, Appurtenances	20	$4,000
		Chemical Pump Monitor	20	$5,000
		NaOCl Day Tank	15	$3,000
		NaOCl Feed Pump - Solenoid	20	$5,000
		NaOCl Piping & Tubing	20	$1,000
		NaOCl Secondary Containment Area	20	$5,000
	Distribution System	Wellfield Yard Hydrant	50	$13,000
		Hydrant Gate Valve	50	$2,500
Grand Total				**$539,500**

Many of these assets may require a repair or a rebuild to remain in serviceable condition, rather than a full replacement. Some may be in serviceable condition but require increased monitoring due to their age. If that is the case, then the actual cost to renew these assets will be substantially less than full replacement cost.

4.4. One Hundred Year Look Ahead

Water system assets have estimated useful lives ranging from five years for a chemical feed pump up to eighty-five years for a ductile iron gravity main. Because many water system assets are so long-lived, UE has scheduled out replacements over the next one hundred years.

Figure 4-2 One Hundred Year Look Ahead (2024 dollars)



4.4.1. Rates, Affordability, and Project Financing

As the County plans for the future of the water system, additional consideration should be given to water user fees. Communities sometimes keep rates artificially low by funding only basic operating costs. There are risks associated with this approach.

- If maintenance is deferred, the water system may face an emergency repair that it cannot fund with its own resources. In that case, money for the repair often comes out of the County's general fund. Repairs or replacements done on an emergency basis are typically 5 to 10 times more expensive than planned repairs or replacements.
- The County may be missing out on funding incentives, such as DWSRF principal forgiveness based on affordability. This is discussed in more detail below. In addition, the County may also miss out on grant opportunities for capital projects if it is not positioned to take advantage of them when they are available.
- User fees may require a large, sudden increase to fund system needs. It may be difficult for the water customers to absorb the large increase. Affordability includes anticipating rising costs due to inflation and other factors, setting aside money for emergency repairs, and positioning the community to take advantage of principle forgiveness and grants.

Community systems that are County owned may be eligible for forgiveness. Based on the NHDES DWSRF 2023 Intended Use Plan (IUP) the level of subsidy in 2023 would be determined based on the following table. The MHI for Carroll County is $77,049 which is less than the statewide average of $90,845.

Table 4-5 County Owned Community Systems Disadvantage System Assistance

Median Household Income (MHI)	2023 Minimum Amount of Principal Forgiveness
$83,499 – $50,000	30%
Below $50,000	40%

More information on DWSRF loans and principal forgiveness can be found in the 2023 DWSRF Intended Use Plan (IUP). The 2024 IUP is expected to be issued in August of this year. It should be noted that these values change from year-to-year and are currently higher than normal due to additional Federal Bipartisan Infrastructure Law funding, which is currently being administered through the DWSRF program.

The IUP can be found at this link:
https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/r-wd-23-06.pdf

Information on MHI can be found at the link below:
https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/mhi-table.pdf

4.4.2. Small Water System Business Plan

The County provided estimated expenses and revenues to UE for inclusion in its small water system business plan (**Appendix J**). The plan proposes a minimum annual operating rate of $336.19. It should be noted that it is uncertain whether all water expenses were incorporated into this calculation due to challenges in separating water expenses within the Department of Public Works' budget.

The County currently charges a quarterly connection fee of $100 plus $0.40 per 100 gallons used. Based on village meter readings, the average annual rate per connection in the village is estimated to be $522.46; $400 base rate plus 30,616 gal/year/customer 2017-2021 average at $0.40 per 100 gallons ($122.46). Although the business plan's proposed annual rate is lower, it's recommended that the County at least maintain its current rate to compensate for any potentially missed annual expenses of the water system.

4.4.3. Recommendations and Next Steps

UE has noted the following observations during recent site visits to the water system's wellfield. Supply lines from BW-2 and W-1 were observed siphoning for 25 minutes and five minutes, respectively, after the wells shut off. Without wells pumping, the chemical feed pump does not register a flow and ultimately does not chlorinate raw water during the siphoning process. This is worth addressing for two reasons; the first being that some of the raw water stems from the three dug wells that do not have water-tight covers. This increases the probability of contamination reaching the storage tank, especially if chlorine residuals after siphoning are likely lower than desired. For this reason, it is recommended that measures be taken to prevent future siphoning. Likewise, UE recommends ensuring that the three dug wells are water-tight to prevent potential contamination. The wellfield improvement project intends to address both issues; the first by implementing a solenoid valve on the supply header at the meter and chlorination building to prevent siphoning. Additionally, water-tight covers are planned to be installed on each dug well.

Regarding the Old Route 28 water main replacement, it is expected that the existing 4-inch PVC is nearing the end of its useful life. UE recommends that the County continue to pursue funding to complete the planned water main replacement.

UE recommends the County set water rates with the future in mind. This would include building up emergency reserve funds to cover 3-6 months of operating expenses, as well as establishing a capital reserve account to save for future system maintenance and replacements. Consider that 'affordability' means more than keeping rates low. It may also mean incremental increases to keep up with rising costs and the increasing asset renewal needs of an aging system. A large, sudden increase in rates might be more difficult for customers to absorb. Planning may also enable the County to take advantage of funding opportunities, such as principal forgiveness or a grant with a required match.

5. Implementation Plan

5.1. Implementation Plan Description

As discussed, in **paragraph 1.2.** on **page 7**, the AMP consists of the following components.

- Software and equipment.
  - Workstation to run ArcGIS Pro Desktop software.
  - An ArcGIS Online (AGOL) account where inventory and related files are stored and mapped.
  - Tablets to run apps to be used by field personnel.
    - Field Maps to view maps stored on AGOL.
    - Survey123 to document inspection and maintenance information.
  - Story Maps and Dashboard apps.
    - Used to create and share information with stakeholders.
  - ArcGIS Pro Desktop software.
    - Run Python scripts to recalculate fields in inventory files and export results to the financial planning spreadsheet.
    - Make extensive edits to inventory files.
- LOS Matrix in Excel format.

5.2. Standard Operating Procedures (SOPs)

A print-out of the SOPs has been provided in **Appendix A**. This document has also been provided as a bookmarked pdf file so that County personnel may more easily find the instructions for a particular task.

5.3. Staff Positions and Responsibilities for Implementation and use of AMP

The Superintendent is currently responsible for all aspects of the AMP. It is recommended that some of these duties be delegated to an administrative assistant. That staff member would take the responsibility of updating and refining the Story Map and Dashboards, as well as updating the inventory files in ArcGIS Pro and running the tools to create the financial planning spreadsheet. The Superintendent will be collecting information and entering it into Survey123 forms.

5.3.1. Training Completed During AMP Development

UE conducted three staff trainings as part of this asset management program. Each of the trainings is described below.

1. Training Session 1 – Survey123 forms data distribution and retrieval.
2. Training Session 2 – ArcGIS Pro editing inventory files and running tools to create financial planning spreadsheet.

3. Training Session 3 – Story Maps and Dashboards. A Story Map about how to make a Story Map may be accessed at this link: https://Story Maps.arcgis.com/stories/fc8b2f5f80624505be41493f6c8e580a

5.3.2. Additional Training Resources

There are courses offered by the University of New Hampshire's Geospatial Technologies Training Center in all aspects of ArcGIS software used in the AMP. A list of those training courses thought to be the most helpful is provided below:

- Introduction to ArcGIS Pro - https://extension.unh.edu/IntroArcGISPro
- ArcGIS Online Backstage Pass - https://extension.unh.edu/resource/arcgis-online-backstage-pass-online-workshop
- Level Up Your ArcGIS Story Maps - https://extension.unh.edu/resource/level-your-arcgis-Story Maps-online-workshop
- ArcGIS Dashboards Tips and Tricks - https://extension.unh.edu/resource/arcgis-dashboards-tips-tricks-online-workshop

5.4. Recommendations and Next Steps

At present, the County has only one Basic ArcGIS license. As they continue to develop the program, it is recommended that they purchase additional Field Worker licenses to separate the field data distribution function from the administrative function.

The County is also encouraged to develop its own Survey123 forms.

6. Communication Plan

6.1. Communication Plan Description

The primary method of communication will be Story Maps. Story Maps can be created in the Story Map app, which is accessible through AGOL. A Story Maps can be thought of as a PowerPoint presentation, but rather than separate slides it is one continuous online document. Dashboards and interactive maps can also be included in the Story Map.

The information used to develop the dashboards and interactive map comes from a non-editable version of the inventory files. On AGOL, the inventory files are hosted feature layers. Non-editable feature views were created from the feature layers and used to create the dashboards and interactive map in the Story Map.

The Story Map can be shared with the public by selecting the 'share with everyone' setting and embedding it in the Carroll County website.

For those customers who prefer paper media over digital, a flyer can be created using the tables and charts in the financial planning spreadsheet.

6.2. Recommended Communication Method for Stakeholders

The Story Map is the recommended communication method for stakeholders. The dashboards created for the Story Map can also be used in brochures or flyers, which can be included in customer mailings.

6.3. Proposed Frequency for Communication

The Story Map should be updated yearly at a minimum by office administration.

6.4. Example Communication Format for Stakeholders

Screenshots of the Story Map are provided in **Appendix E**.

6.5. Recommendations and Next Steps

A feature layer of inspection and maintenance activities will be populated as staff uses the Survey123 forms. A non-editable feature view can be created from the feature layer and can be added to Story Map, if desired, to share information about what system operators have accomplished throughout the year.

7. Conclusions and Recommendations

7.1. Asset Management Program

This Water AMP has been funded by a $60,000 ARPA grant provided by NHDES. The County purchased a Basic ArcGIS Pro subscription to help manage its Water assets. The subscription includes ArcGIS Pro desktop software, which can be used to update and revise the inventory files and generate the financial planning spreadsheet.

It also includes an AGOL account where maps and inventory files are stored, and access to apps such as Field Maps, Survey123, Story Maps, and Dashboards. Field Maps allows users in the field to view the system maps on their devices. Survey123 allows users to collect and submit inspection and maintenance information about the system. Story Maps and Dashboards provide a way to summarize and share information about the system with stakeholders.

7.2. Level of Service

A workshop was held on February 7, 2024, to develop a vision statement and formulate goals for the Water and stormwater systems with input from stakeholders.

The County's major goals for the water system are gain a holistic knowledge on the system to be best prepared for any future problems that arise. Although knowledge is limited on the existing 4-inch PVC main along Old Route 28, this will change after it is anticipated replacement.

Minutes from the LOS Workshop as well as a LOS Matrix have been provided in **Appendix F**.

7.3. Asset Inventory and Condition Assessment

The County plans to continually improve the water system over the next 50 years by replacing assets at a steady rate. After completion of the County ARPA improvements, it is recommended that the DPW staff begin itemizing potential future high risks.

7.4. Financial Overview

Although not broken down by water, sewer, farm, and road/lawn maintenance, the DPW is provided an annual budget. Based on the 10-year look ahead and 100-year look ahead, the percent allocation towards water should be considered in advance. This will help show whether additional funding will be required and allow for time to consider the alternatives; rate increases or SRF loans.

7.4.1. Operating Costs and Reserves

UE recommends that the County build emergency reserves and capital reserves specifically for the water system.

7.4.2. Capital Project Planning

The County is anticipating two projects to go out to bid before the end of 2024:

1. Meter Building and Storage Improvements intended to be covered by existing County ARPA grant.
2. Old Route 28 Water Main Replacement which may require additional funding for construction beyond current ARPA funds.

7.4.3. Affordability and Rates

Affordability means more than keeping rates low. It may also mean incremental increases to keep up with rising costs and the increasing asset renewal needs of an aging system. A large, sudden increase in rates might be more difficult for customers to absorb. Planning may also enable the County to take advantage of funding opportunities, such as principal forgiveness or a grant with a required match.

7.5. Implementation Plan

The operational components of the AMP include a Basic ArcGIS Pro license, an AGOL account with access to the Survey123 app and the Field Maps app. Python script tools have been provided to streamline inventory file updates and produce a financial planning spreadsheet.

SOPs for the AMP are provided in **Appendix A**.

7.6. Communication Plan

The County's Basic ArcGIS Pro license also includes access to the Story Map app and the Dashboard app. A Story Map can be compared to a PowerPoint presentation. However, in addition to text and images it can also include interactive maps. The Dashboard app can be used to create charts and tables to summarize data. Dashboards can be embedded in the Story Map.

The County identified stakeholders during the LOS Workshop on February 7, 2024.

APPENDIX A

Standard Operating Procedures

Asset Management Program Overview

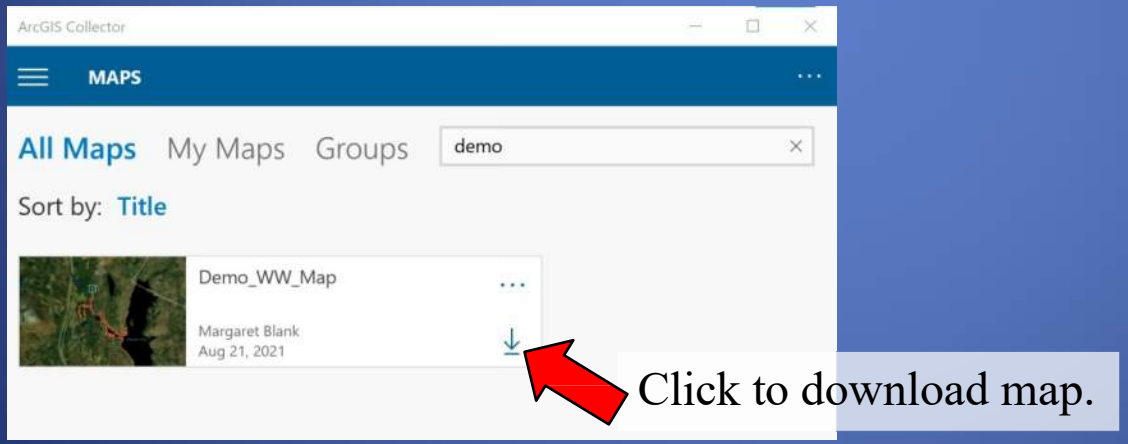
ArcGIS Components:

Field Apps	Web Sites	Desktop
Collector (Field Maps)	Arcgis.com (ArcGIS Online)	ArcGIS Pro
Survey123	Survey123.arcgis.com	Excel (Pivot Tables)
	Storymaps.arcgis.com	

ArcGIS Field Apps

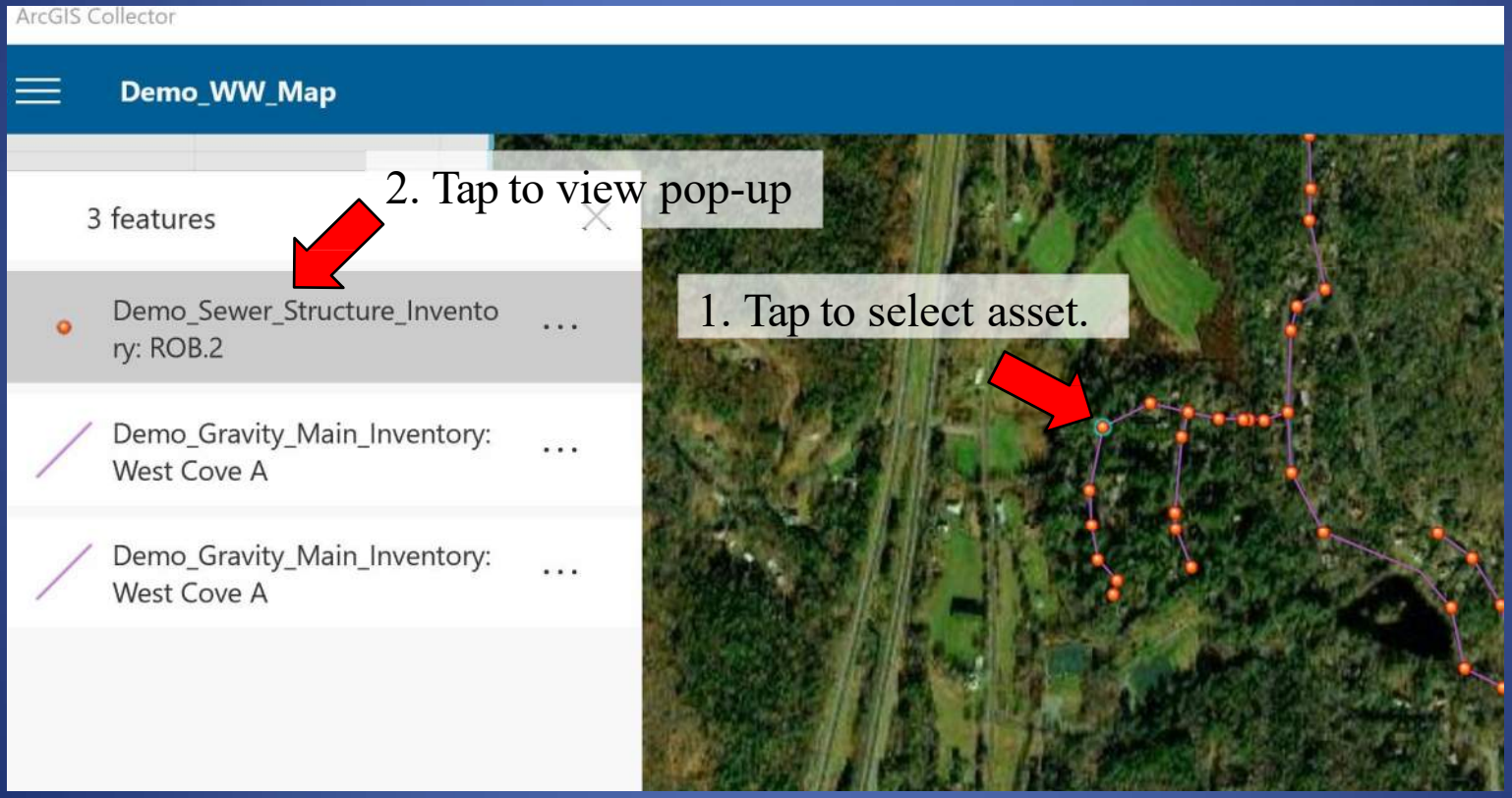
ArcGIS Collector:

- Download to device for free.
- Login.
- Download map to device.



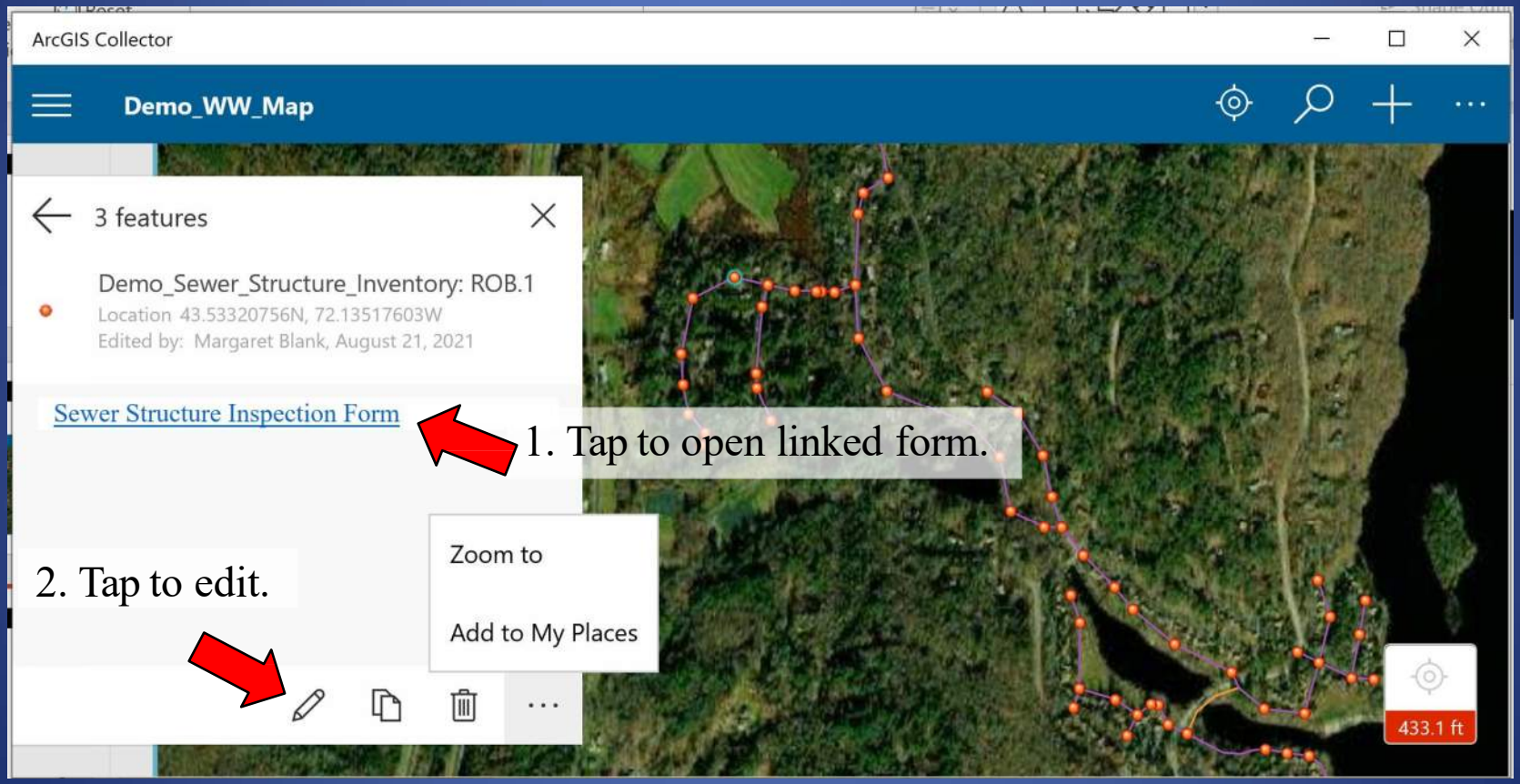
ArcGIS Field Apps

ArcGIS Collector:



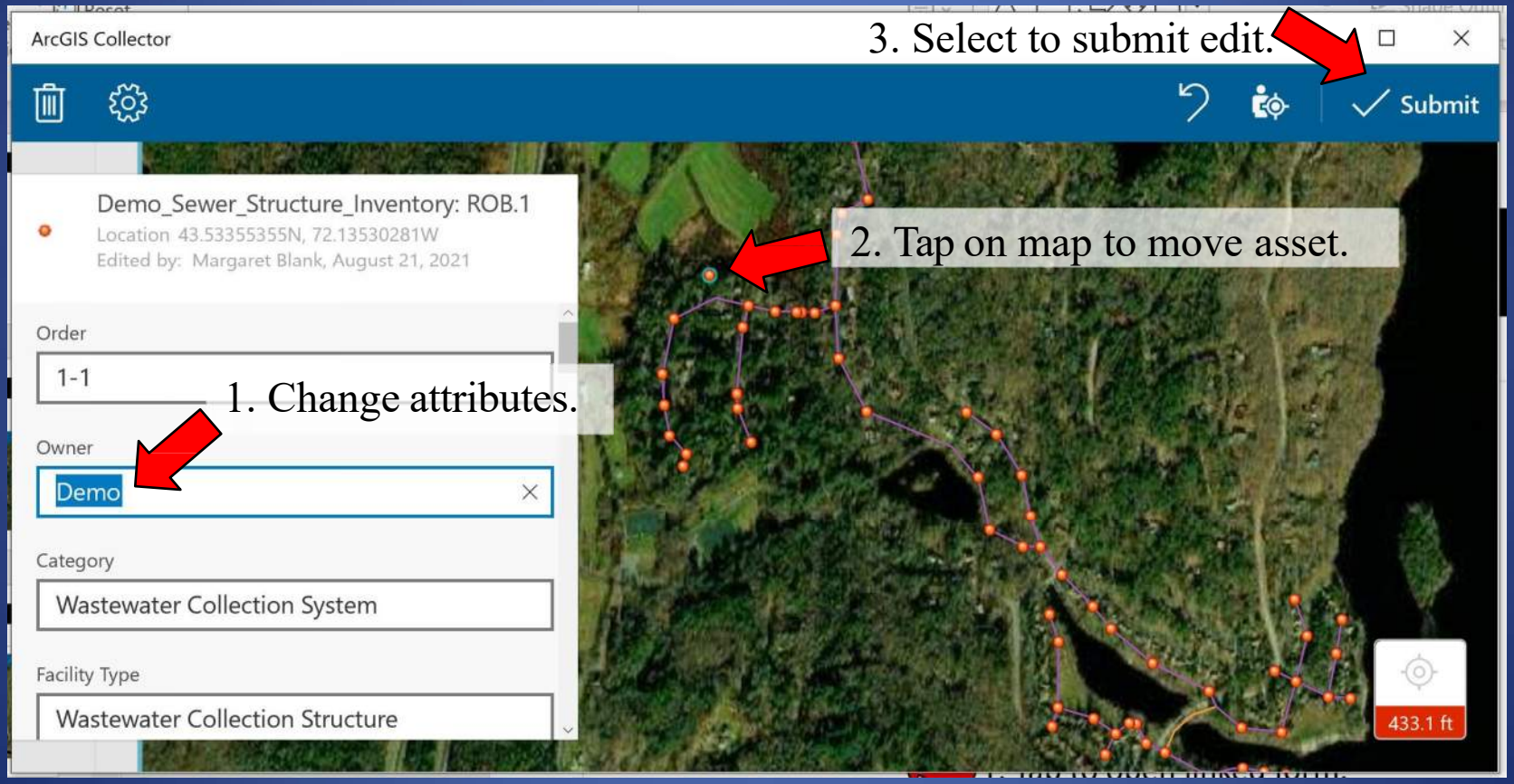
ArcGIS Field Apps

ArcGIS Collector:



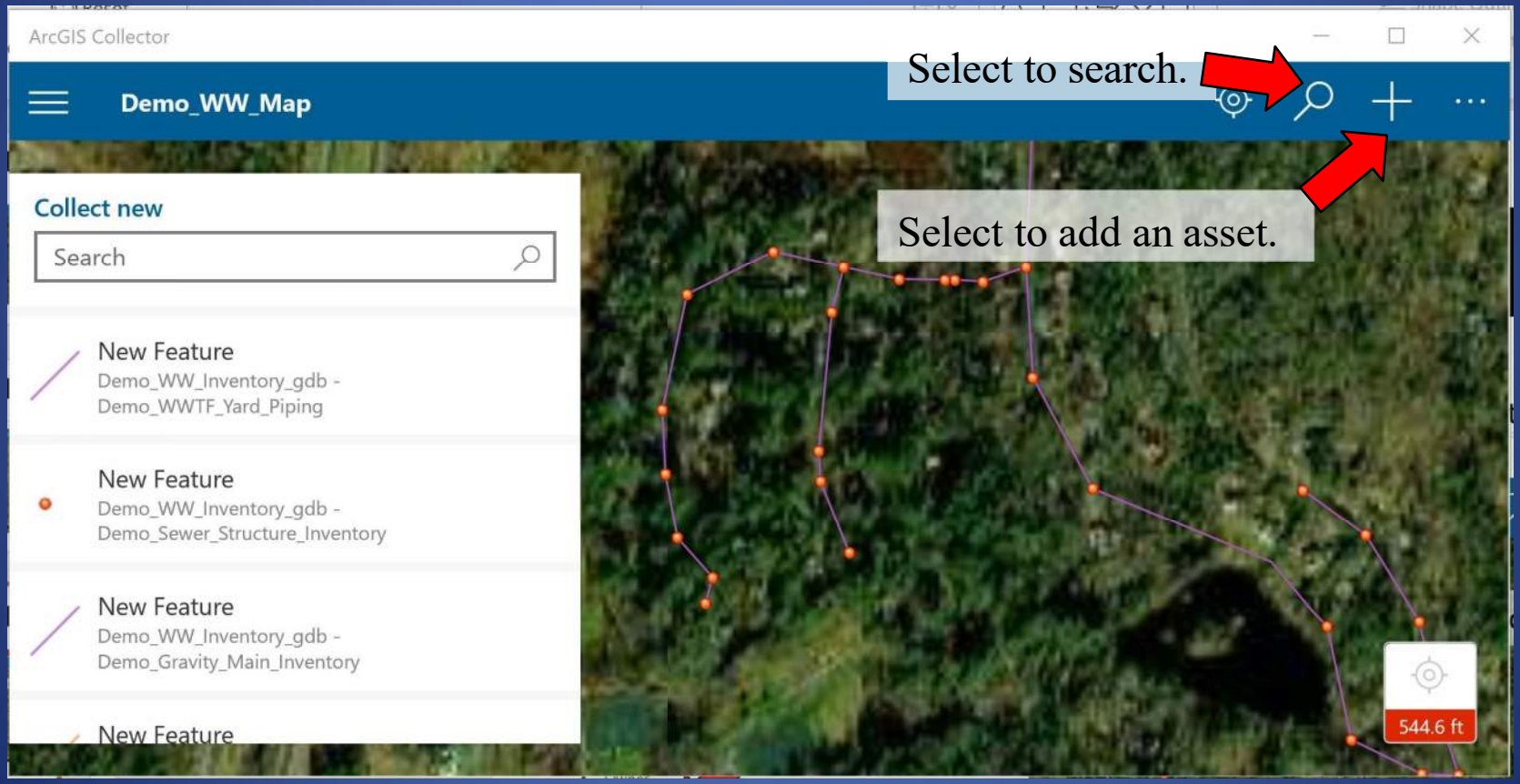
ArcGIS Field Apps

ArcGIS Collector:



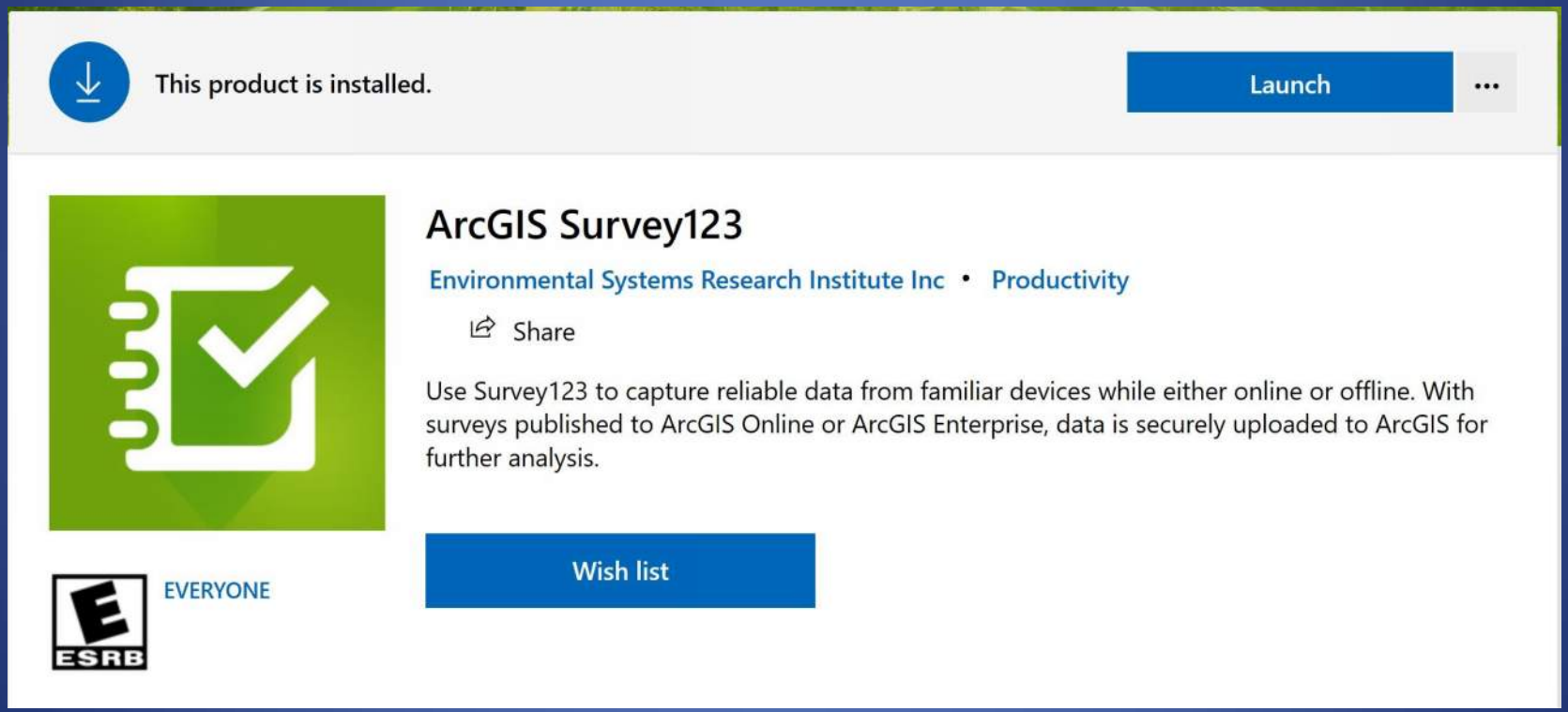
ArcGIS Field Apps

ArcGIS Collector:



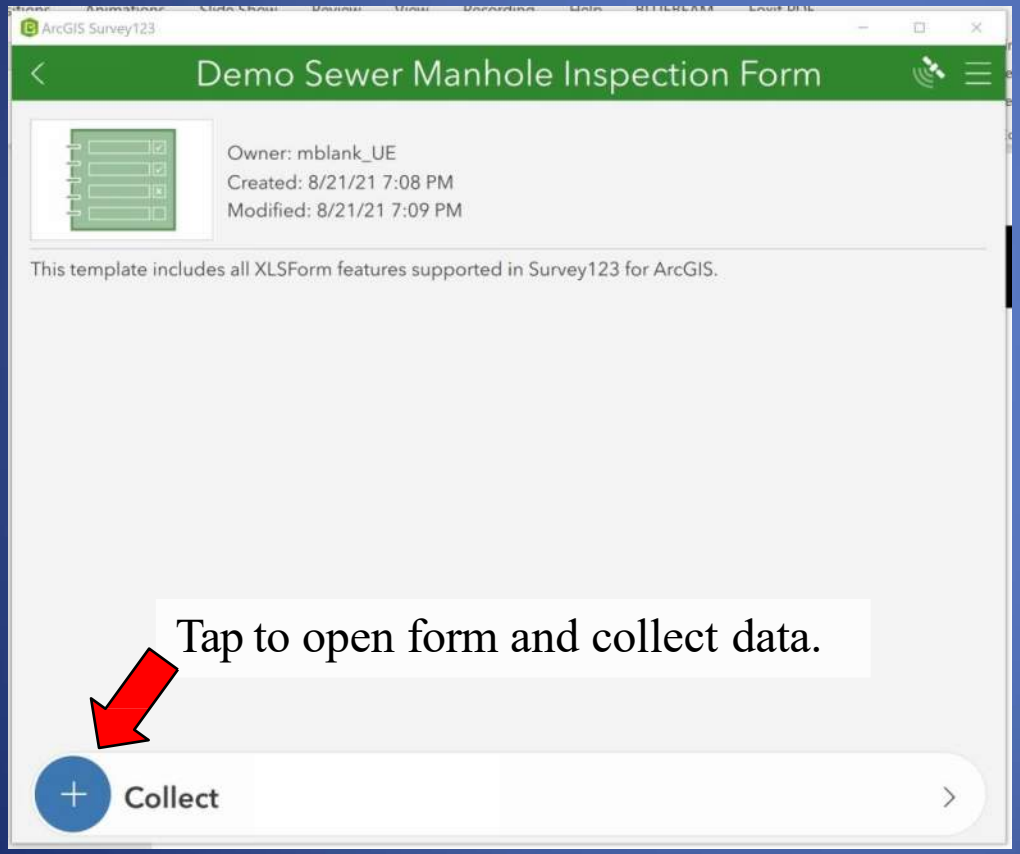
ArcGIS Field Apps

Download and Install ArcGIS Survey123:



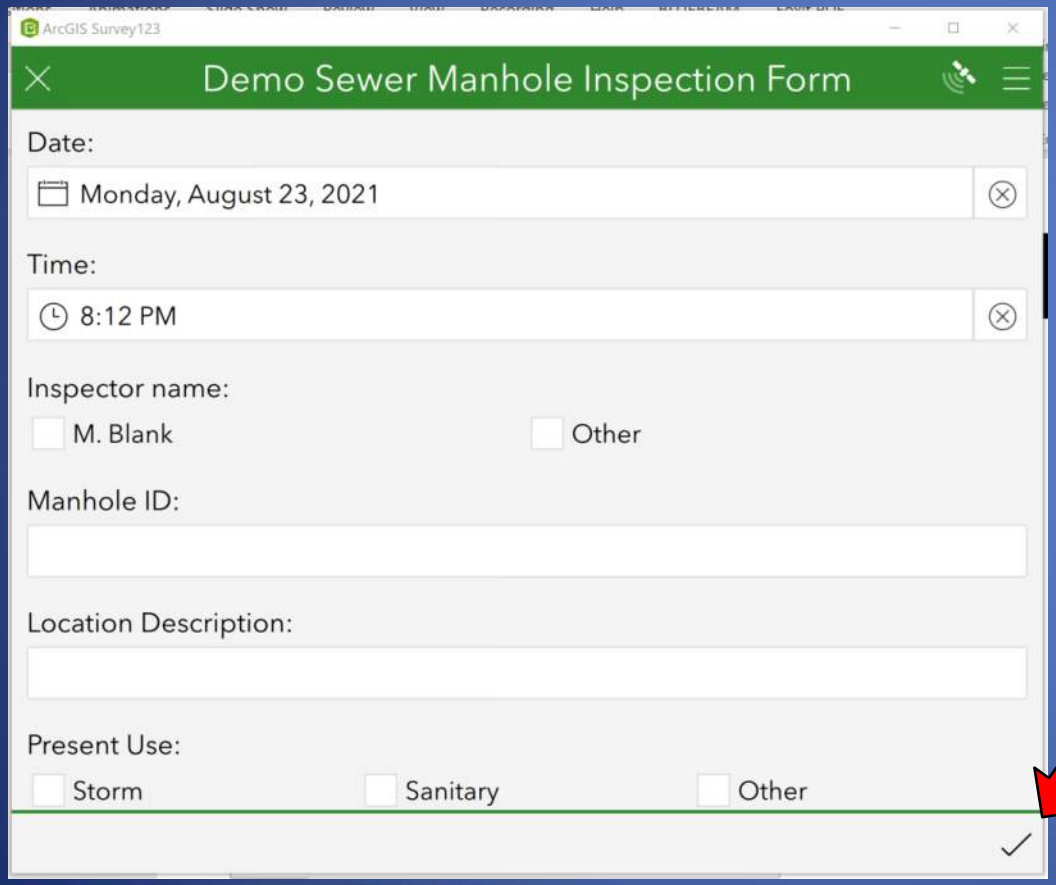
ArcGIS Field Apps

Download form in Survey123 app:



ArcGIS Field Apps

Open, complete and submit form:



Tap check to submit.

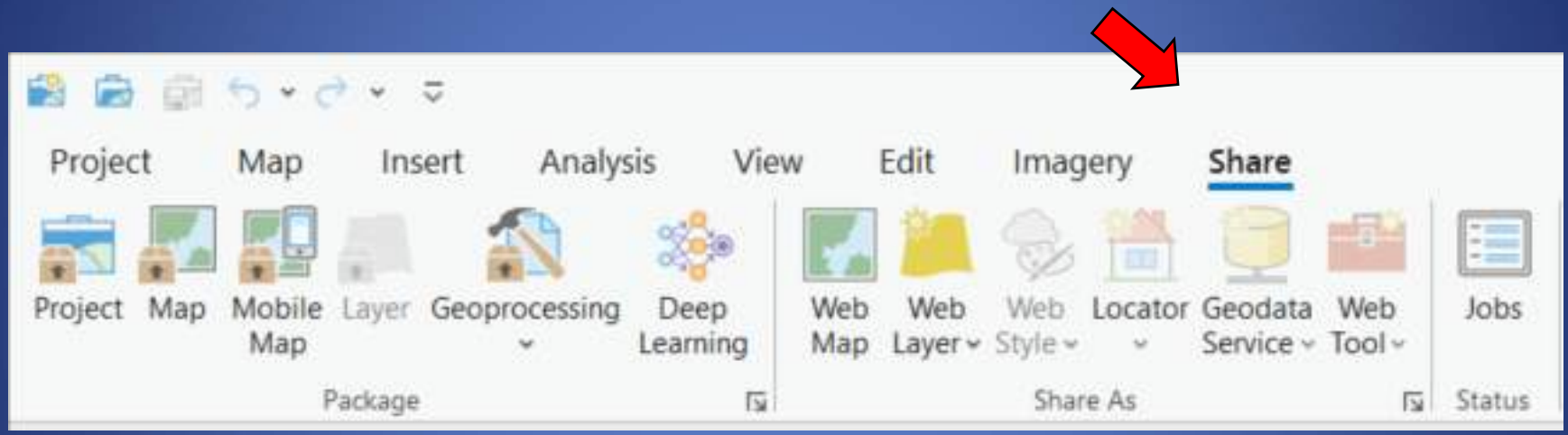
ArcGIS Online

Navigate to ArcGIS Online and log in.

ArcGIS Online

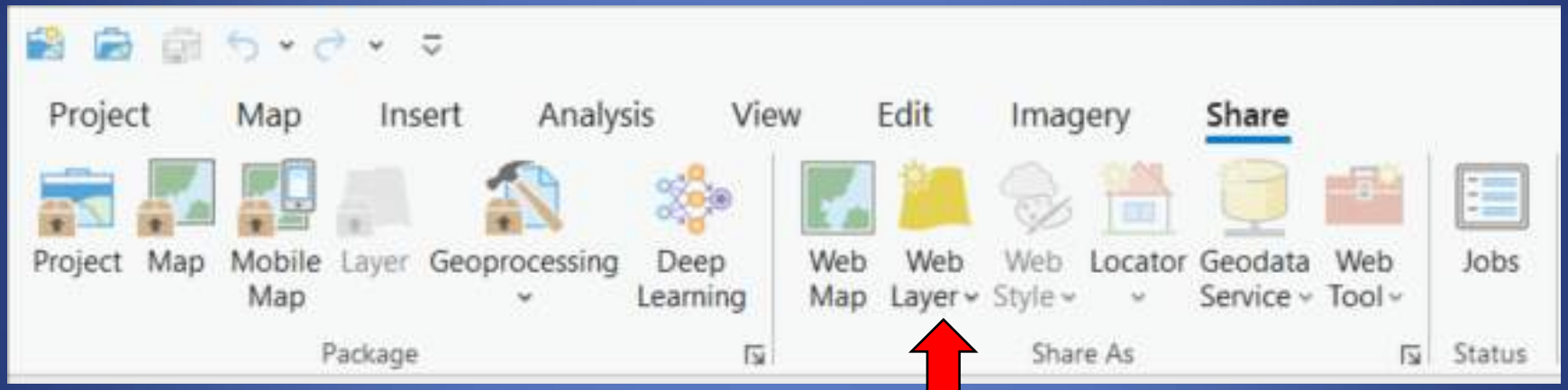
Upload files.

1. Select “Share”.



ArcGIS Online

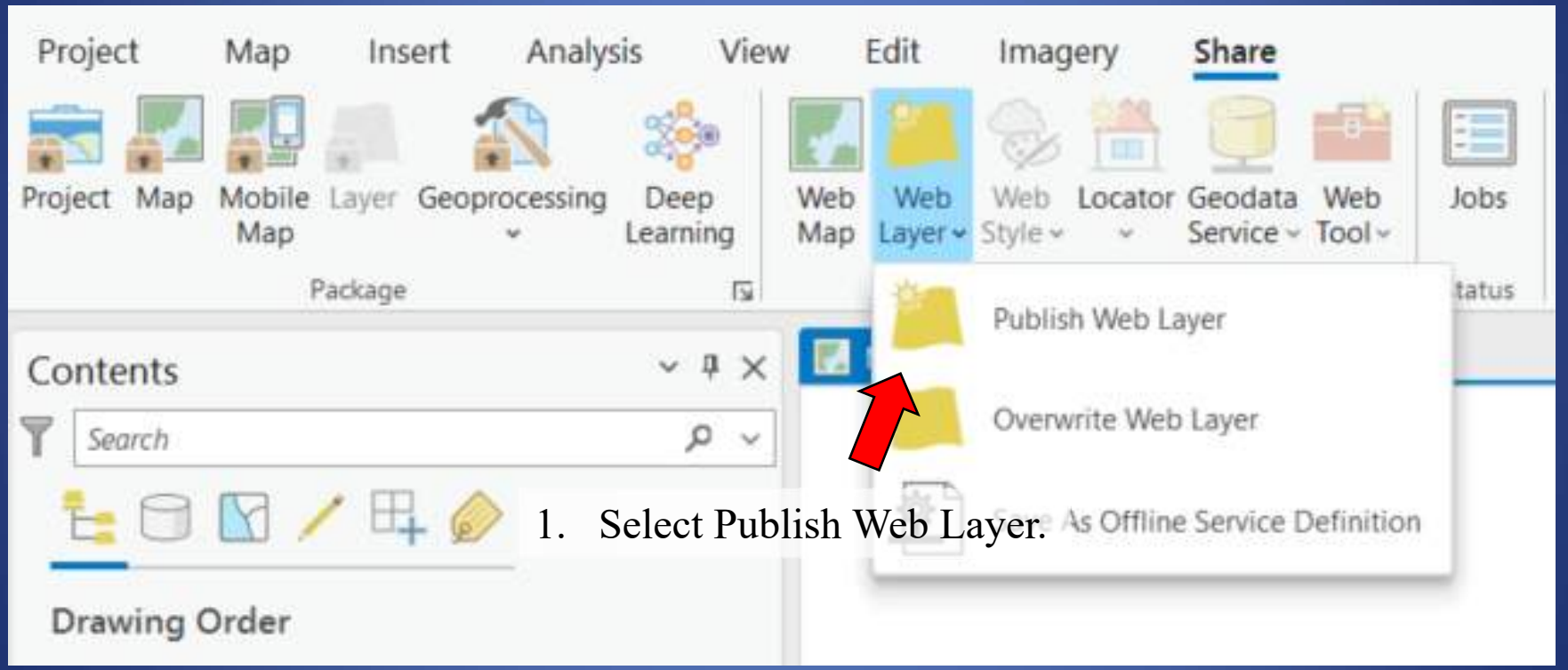
Upload files.



1. Select Web Layer.

ArcGIS Online

Upload files.



1. Select Publish Web Layer.

ArcGIS Online

Upload files.

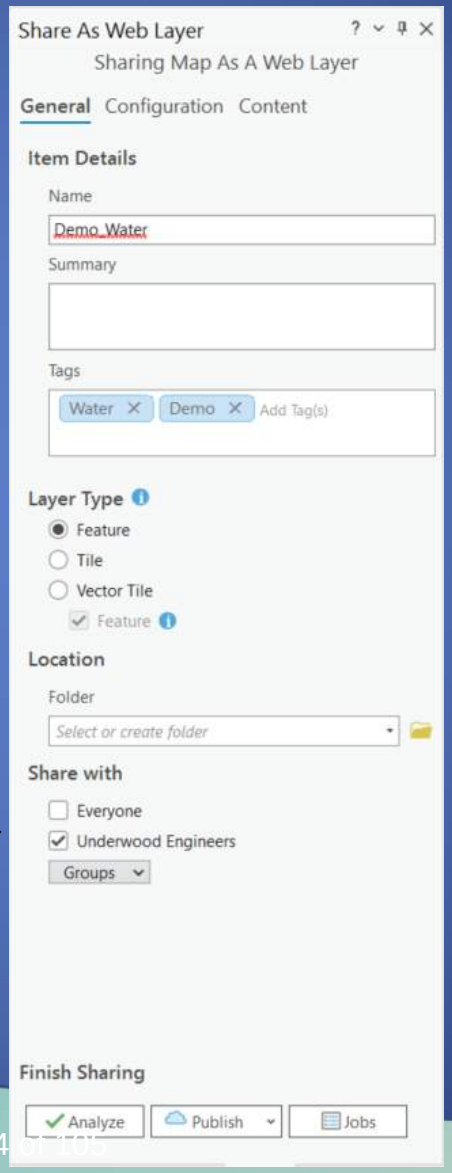
1. Name the layer.

2. Add Tags.

3. Select Feature.

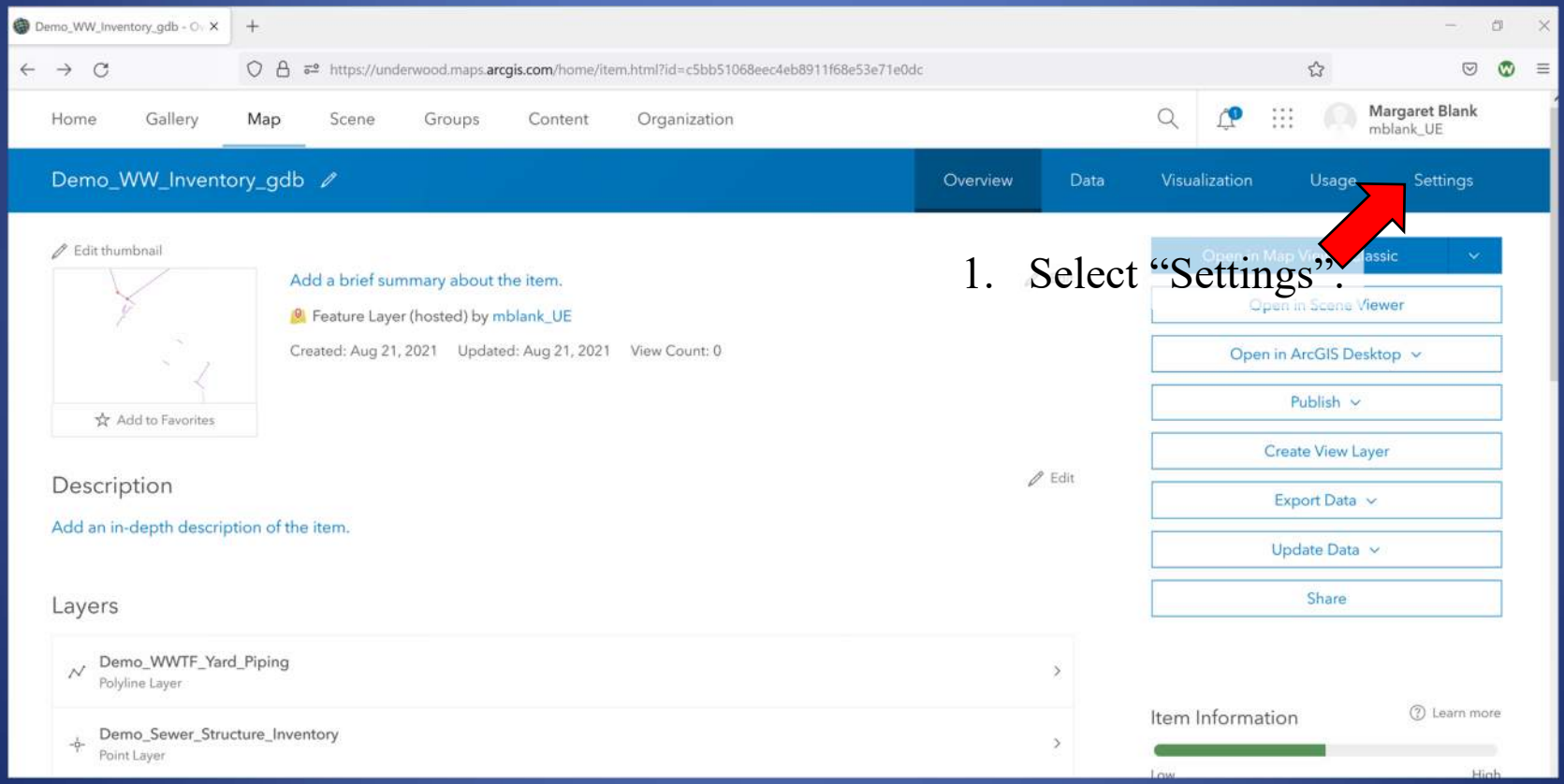
4. Select your organization.

5. Select Analyze, then Publish.



ArcGIS Online

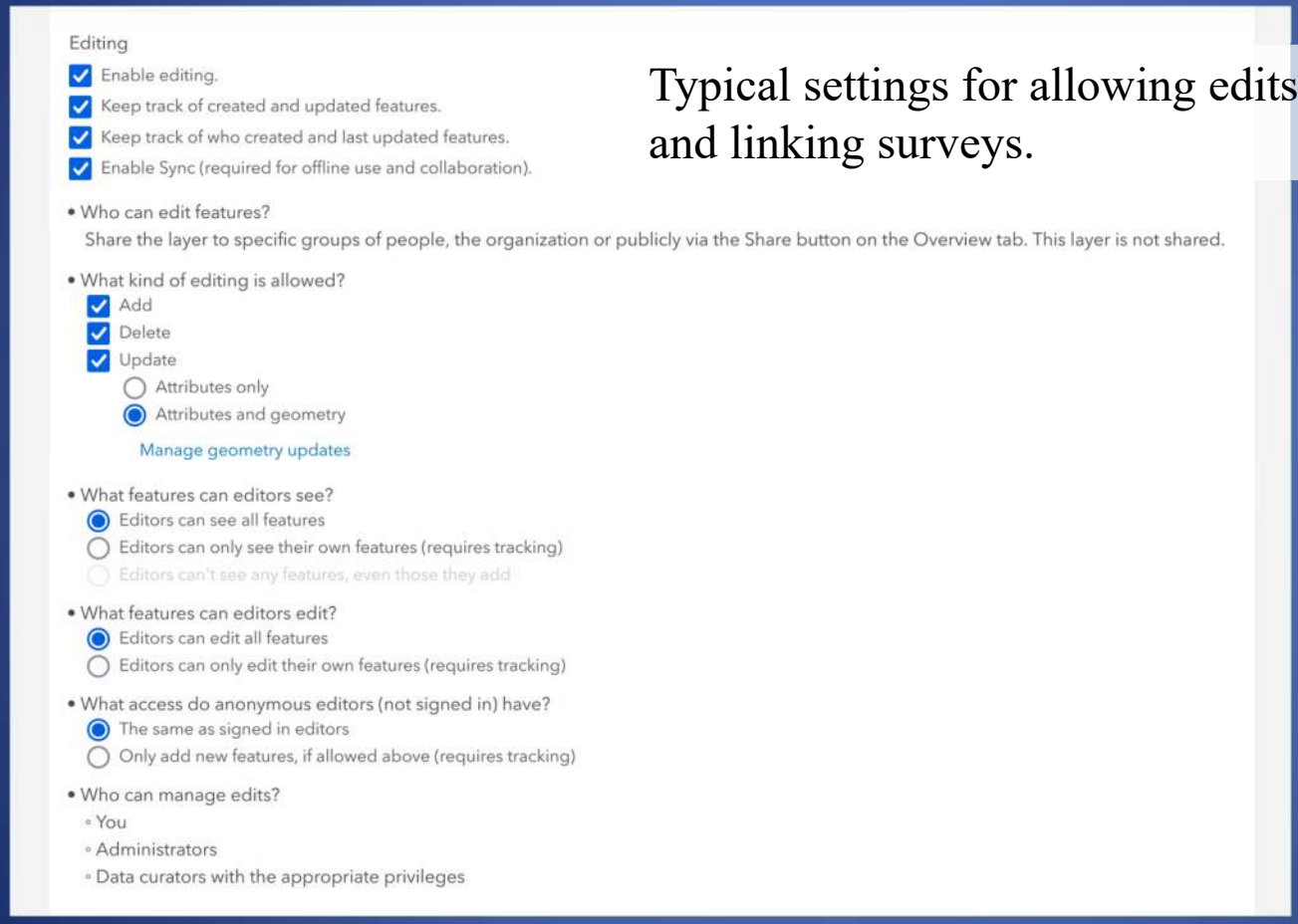
File settings.



1. Select “Settings”.

ArcGIS Online

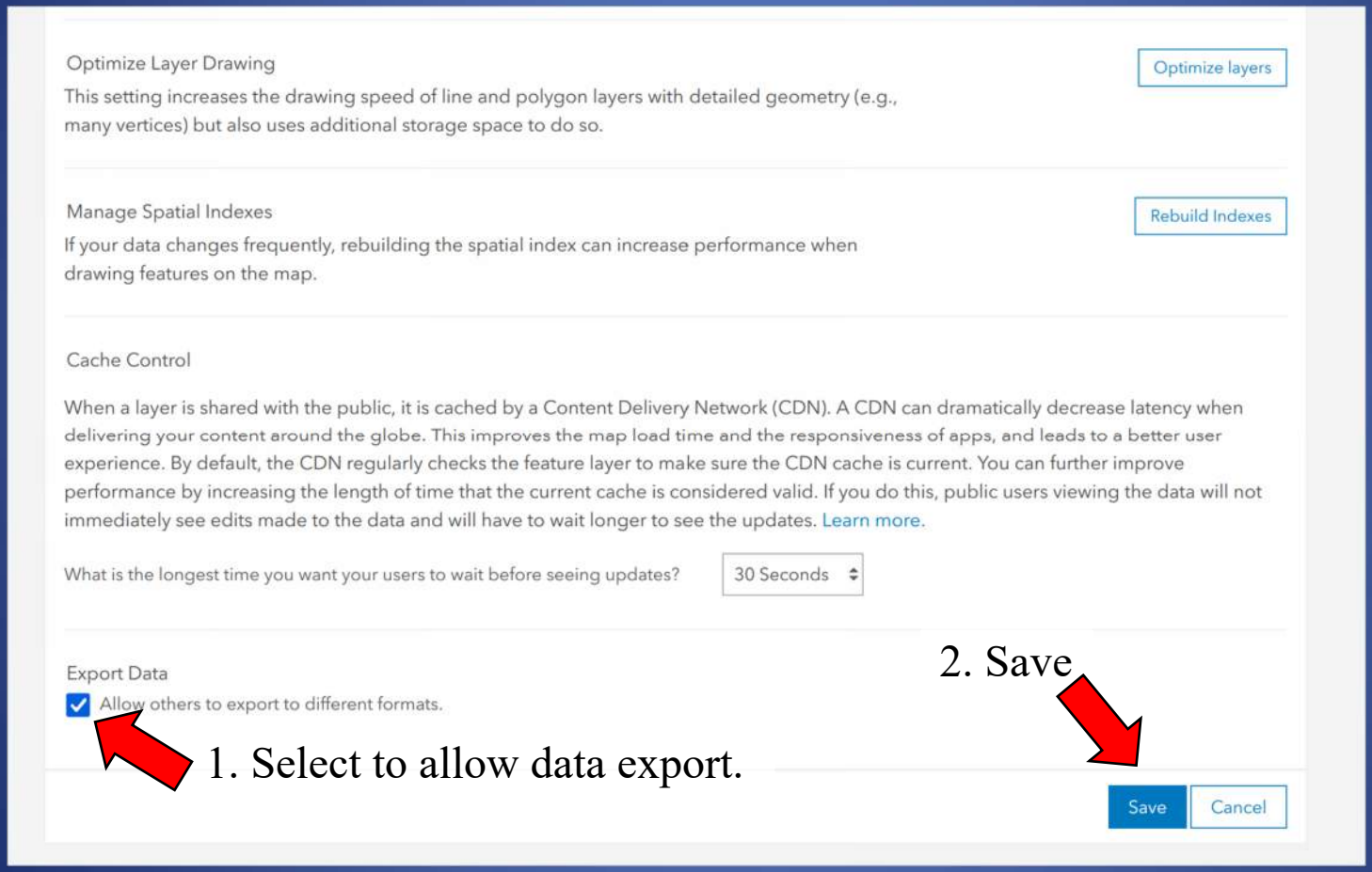
File settings.



Typical settings for allowing edits in the field and linking surveys.

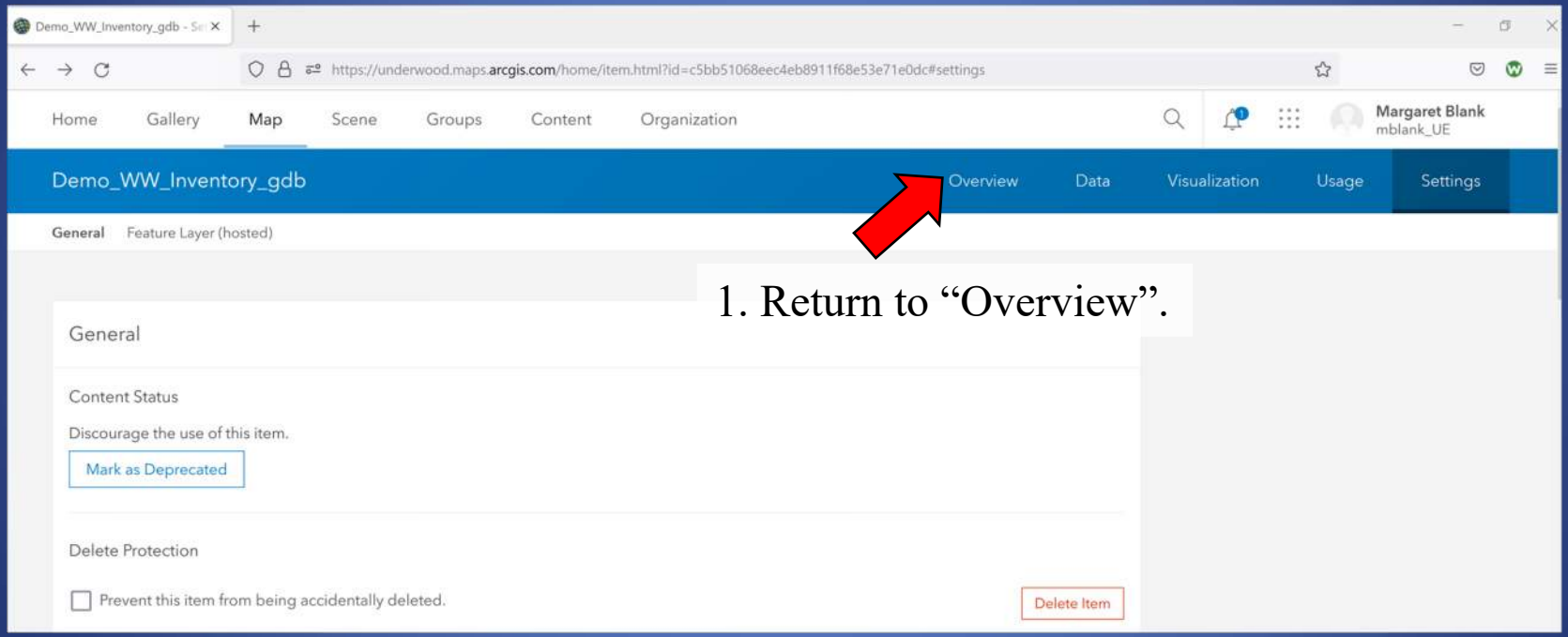
ArcGIS Online

File settings.



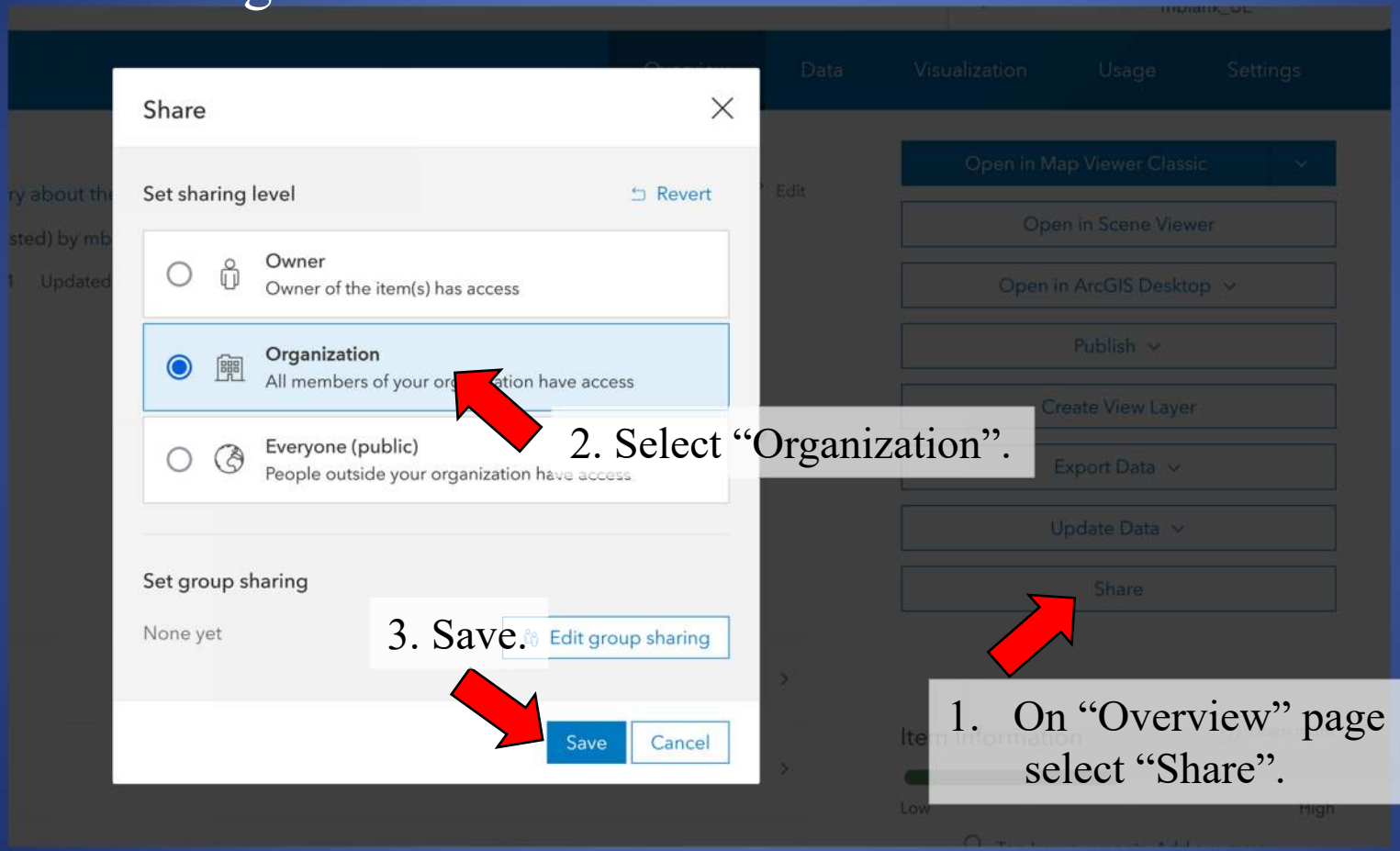
ArcGIS Online

File settings.



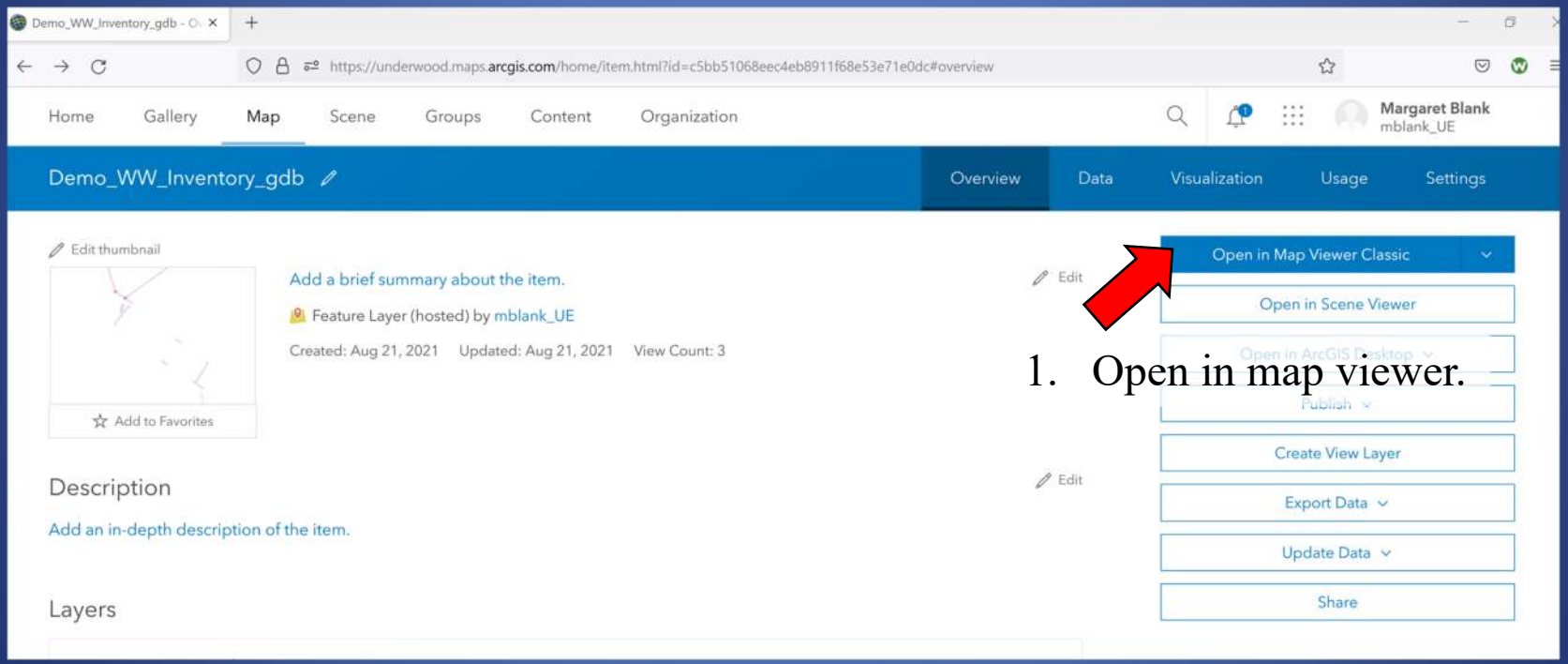
ArcGIS Online

File settings.



ArcGIS Online

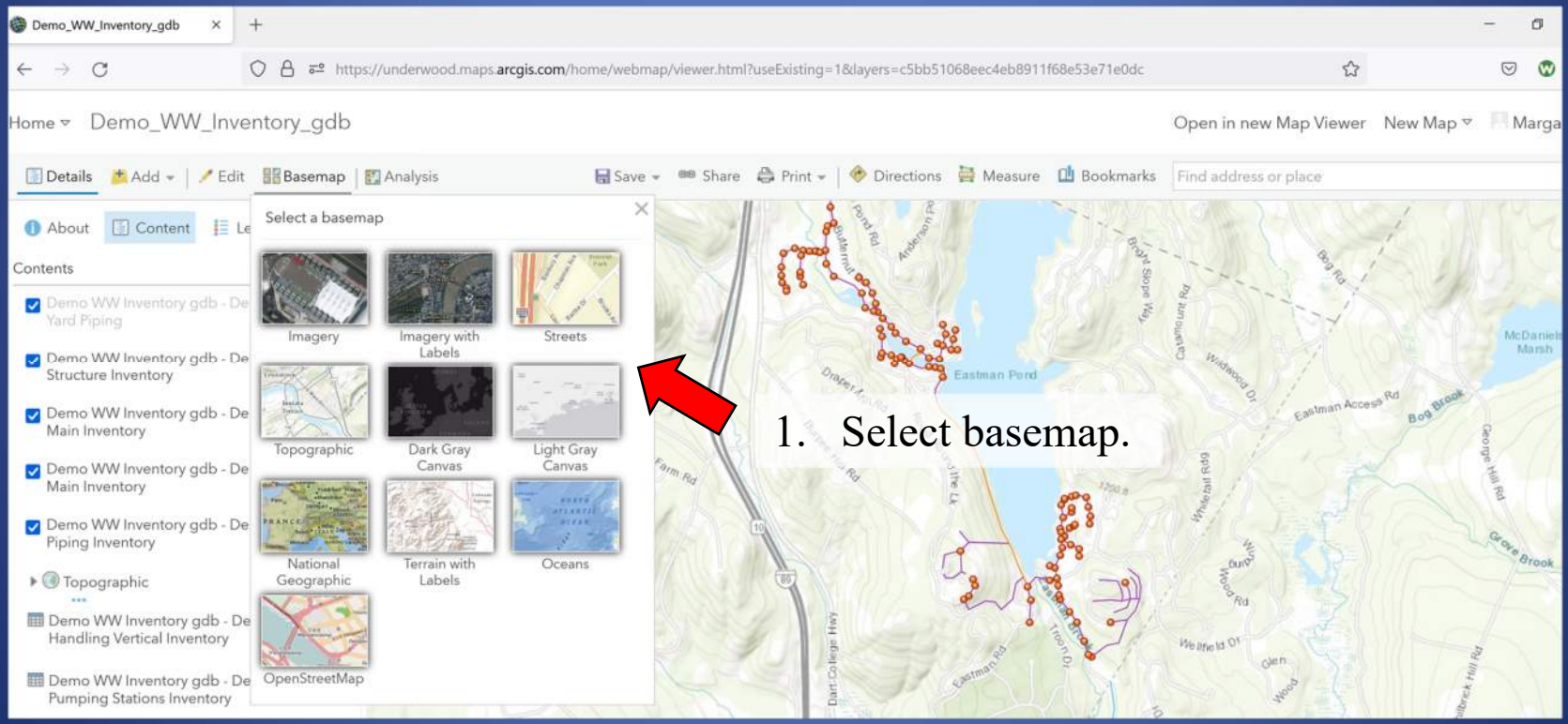
File settings.



1. Open in map viewer.

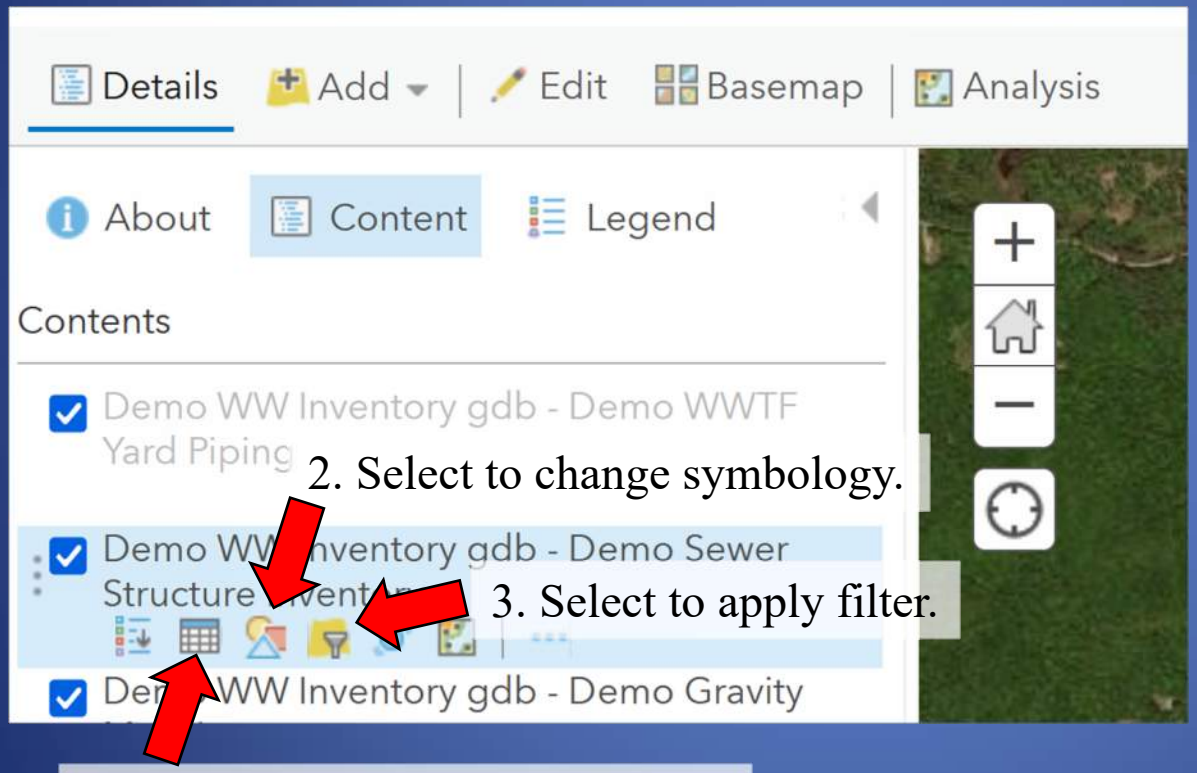
ArcGIS Online

Map set up.



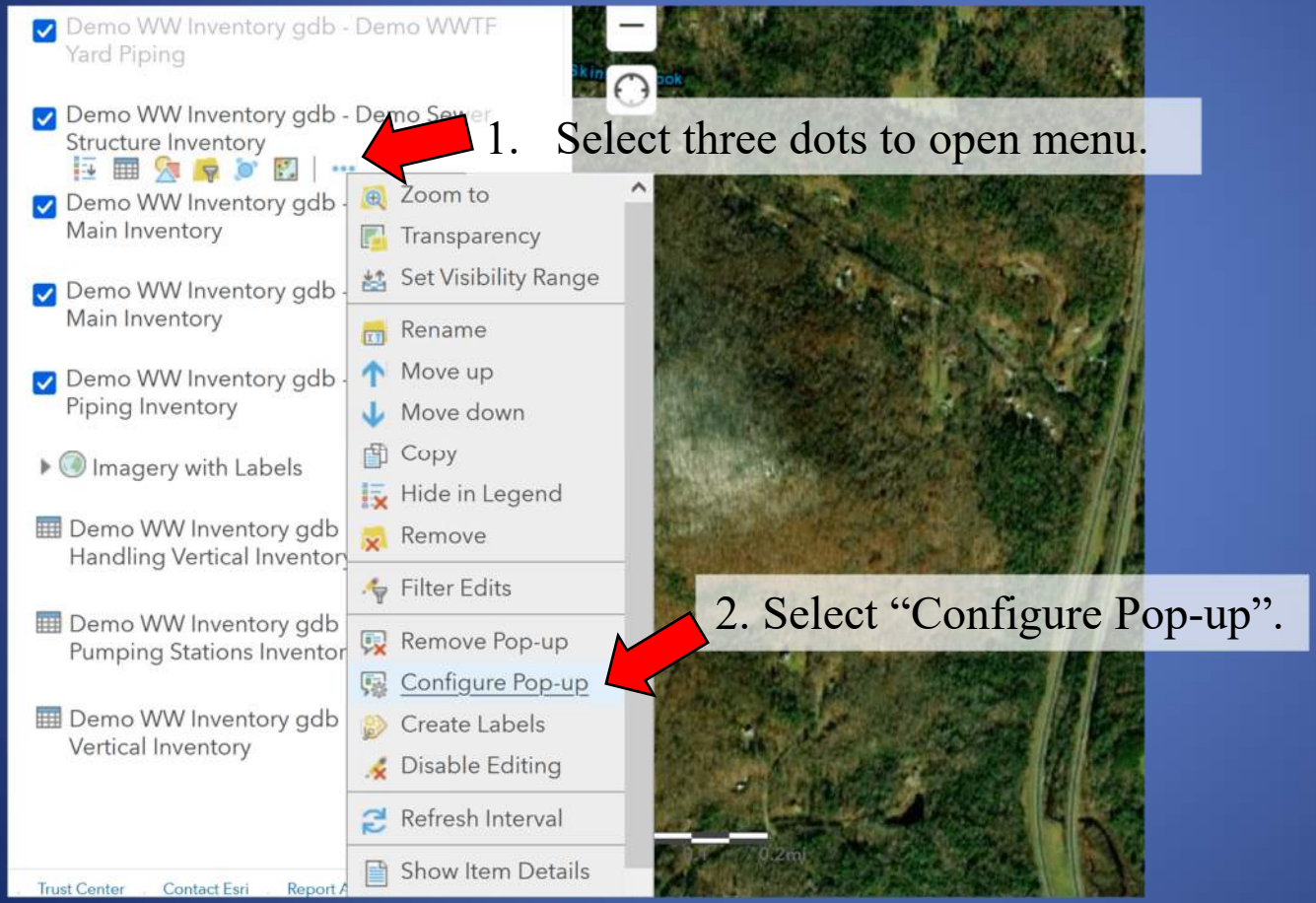
ArcGIS Online

Map setup.



ArcGIS Online

Configure pop-up windows.

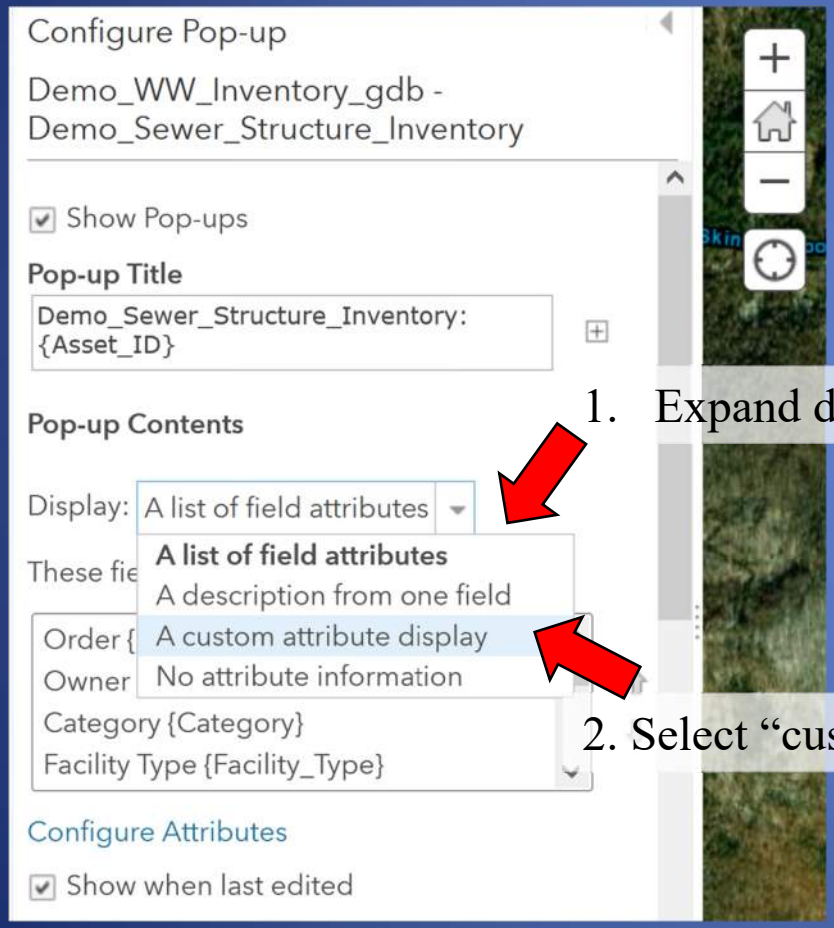


ArcGIS Online

Pop-up title.

ArcGIS Online

Pop-up contents.

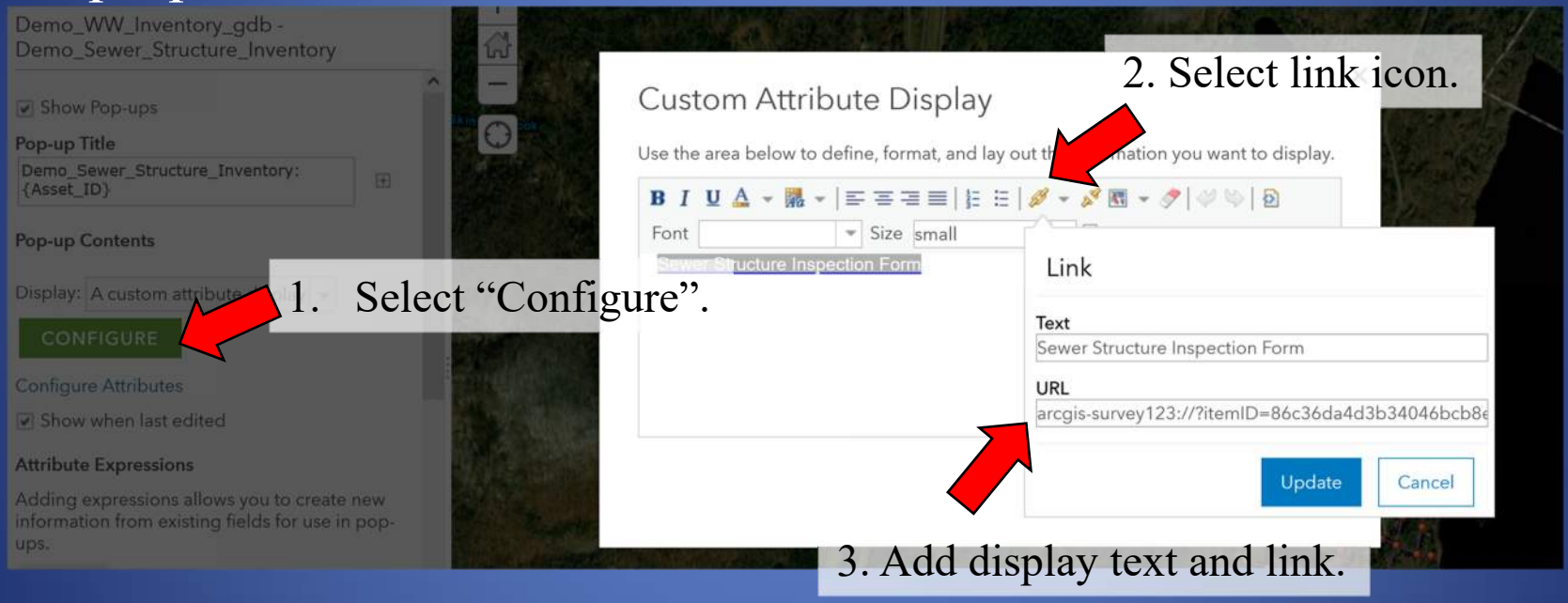


1. Expand display selector.

2. Select “custom attribute display” to create a link to a form.

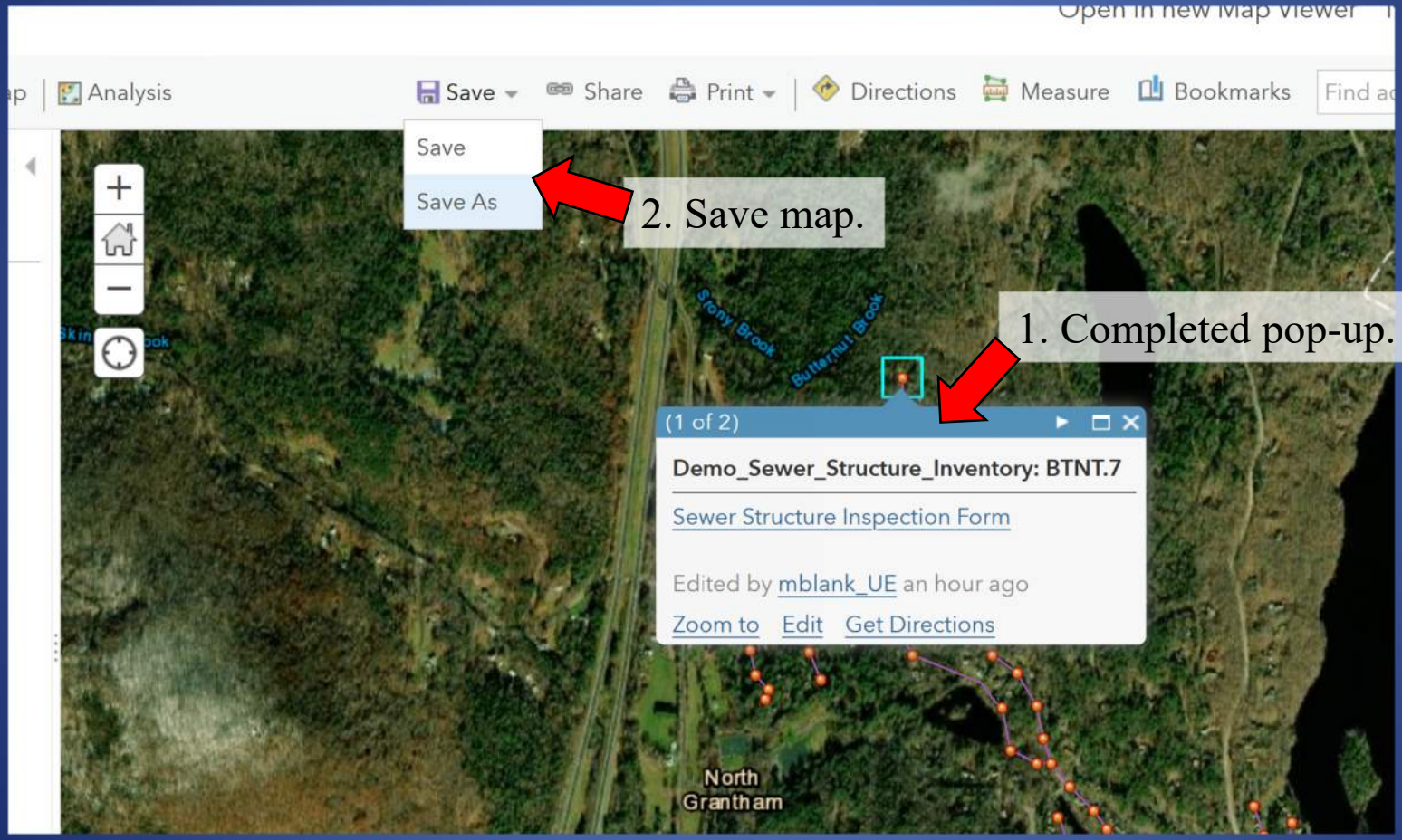
ArcGIS Online

Pop-up contents.



ArcGIS Online

Pop-up contents.



ArcGIS Online

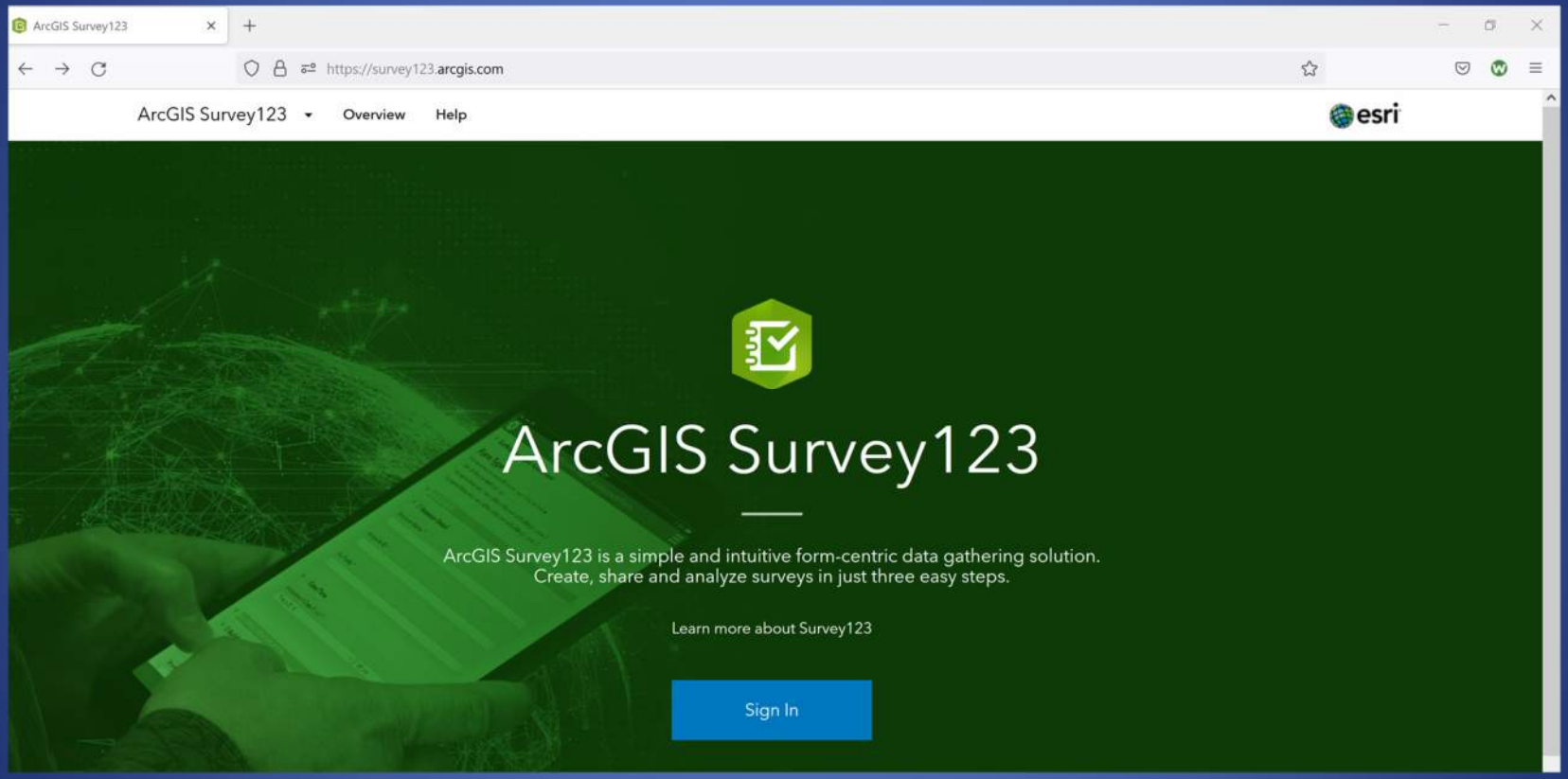
Additional resources.

- ArcGIS Online overview from ESRI Canada: https://www.youtube.com/watch?v=uTwwT86U8bE
- How to make a story map: https://storymaps.arcgis.com/stories/ca65aba2721241a8ab02fee4e3c42e82
- How to create a dashboard:

  https://www.youtube.com/watch?v=8if1f7JHuRM

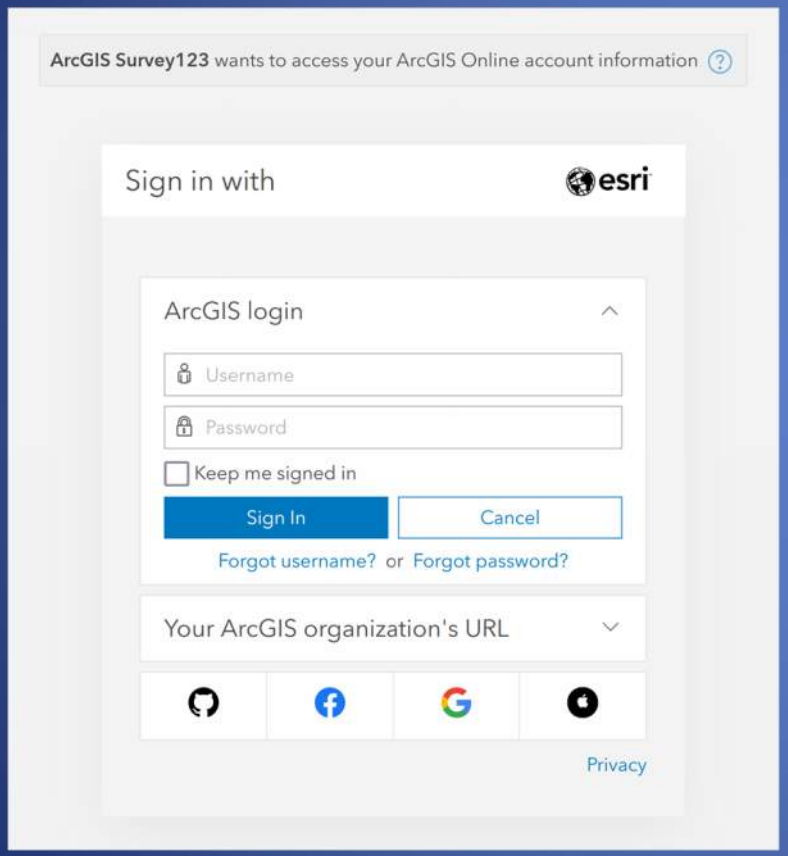
Survey123 Data

Navigate to survey123.arcgis.com and log in.



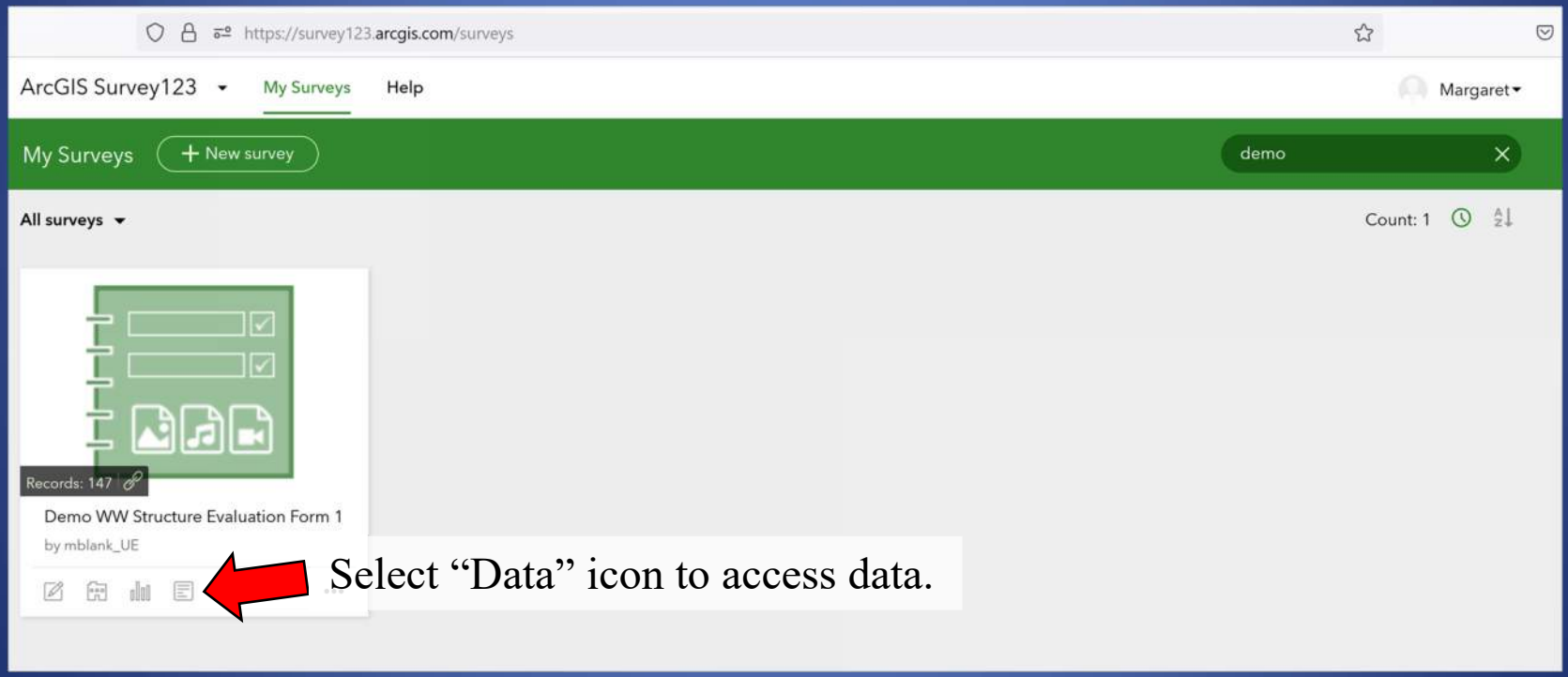
Survey123 Data

Navigate to survey123.arcgis.com and log in.



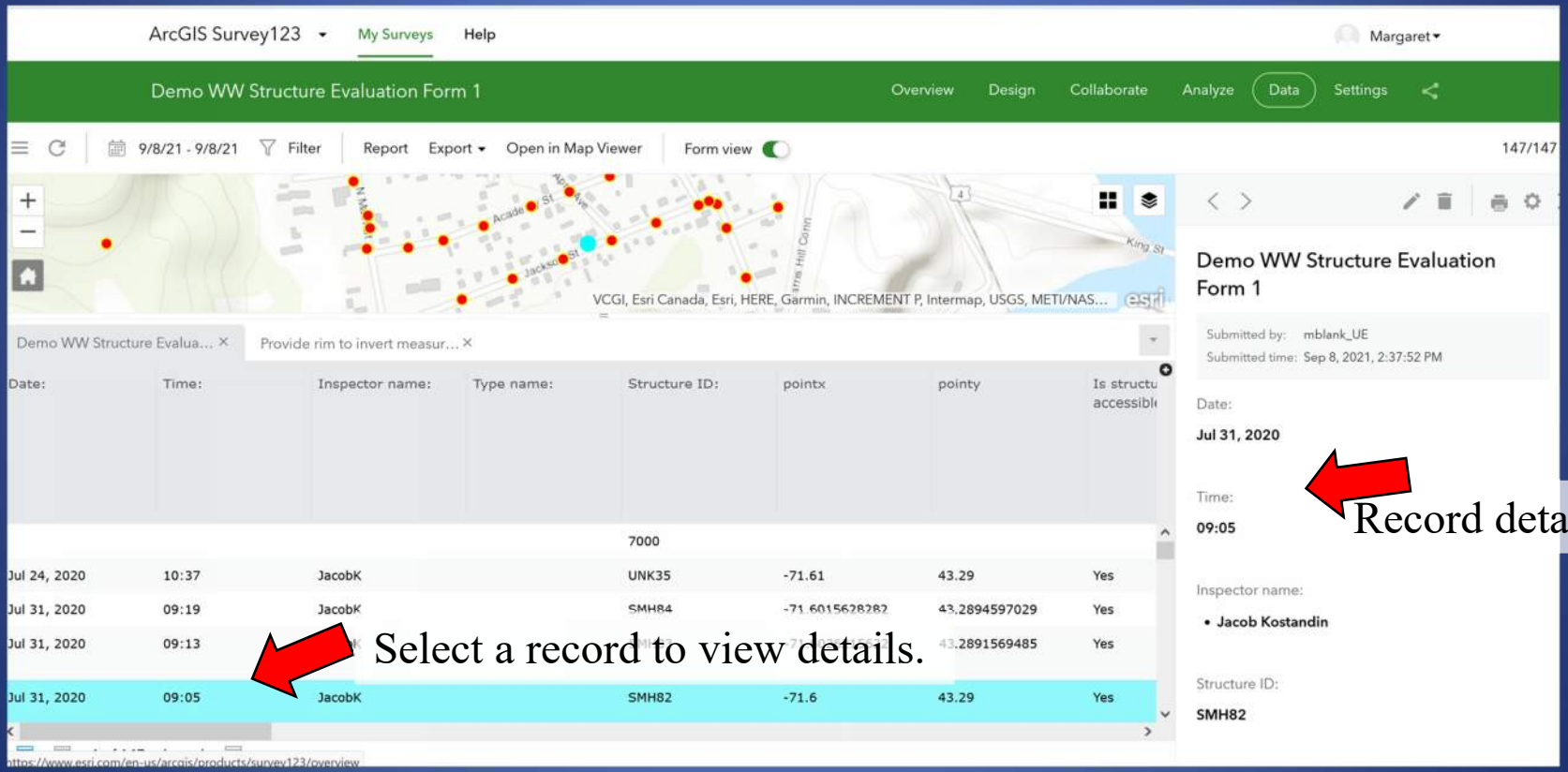
Survey123 Data

Surveys stored on your account will be displayed under the "My Surveys" tab.



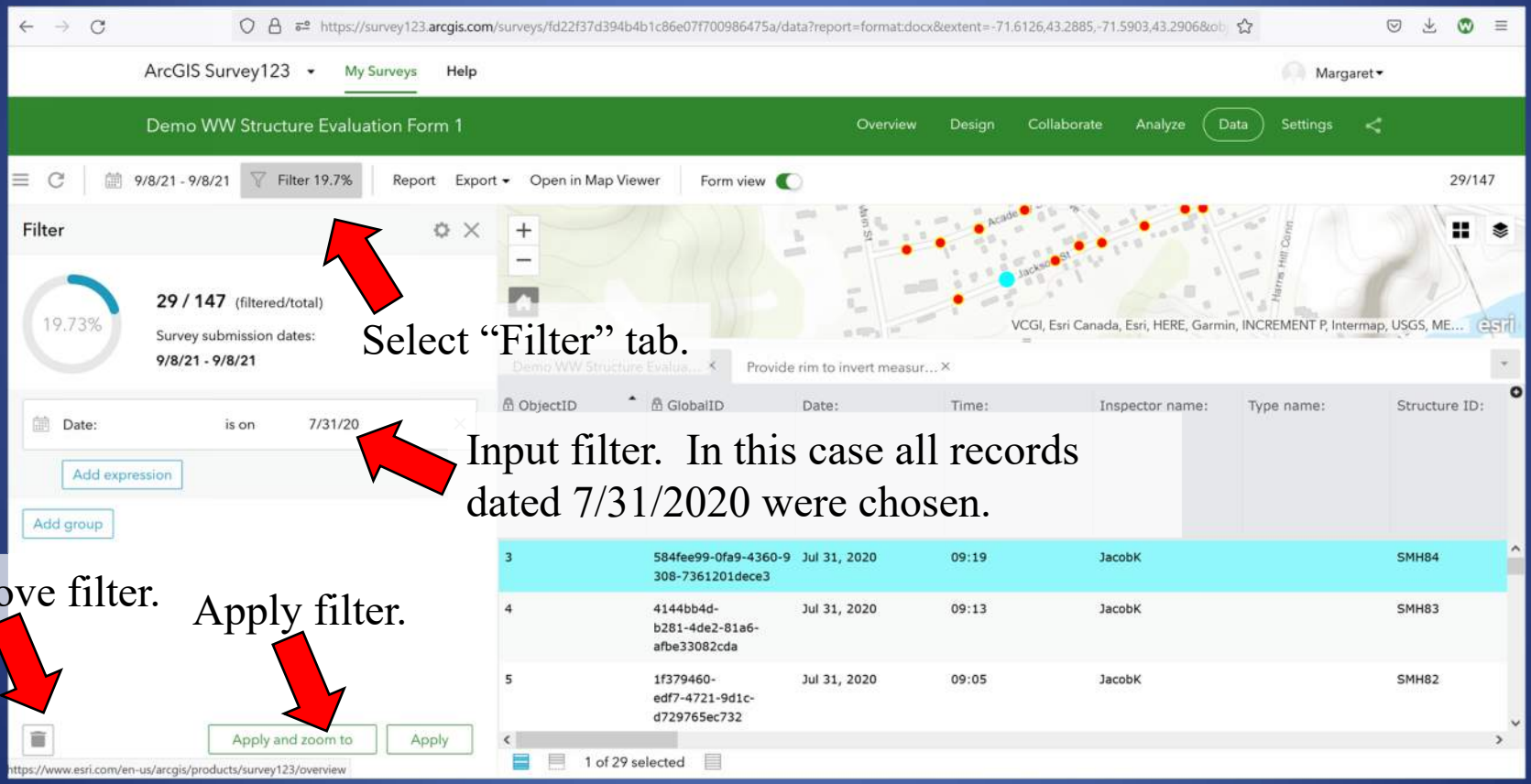
Survey123 Data

Surveys stored on your account will be displayed.



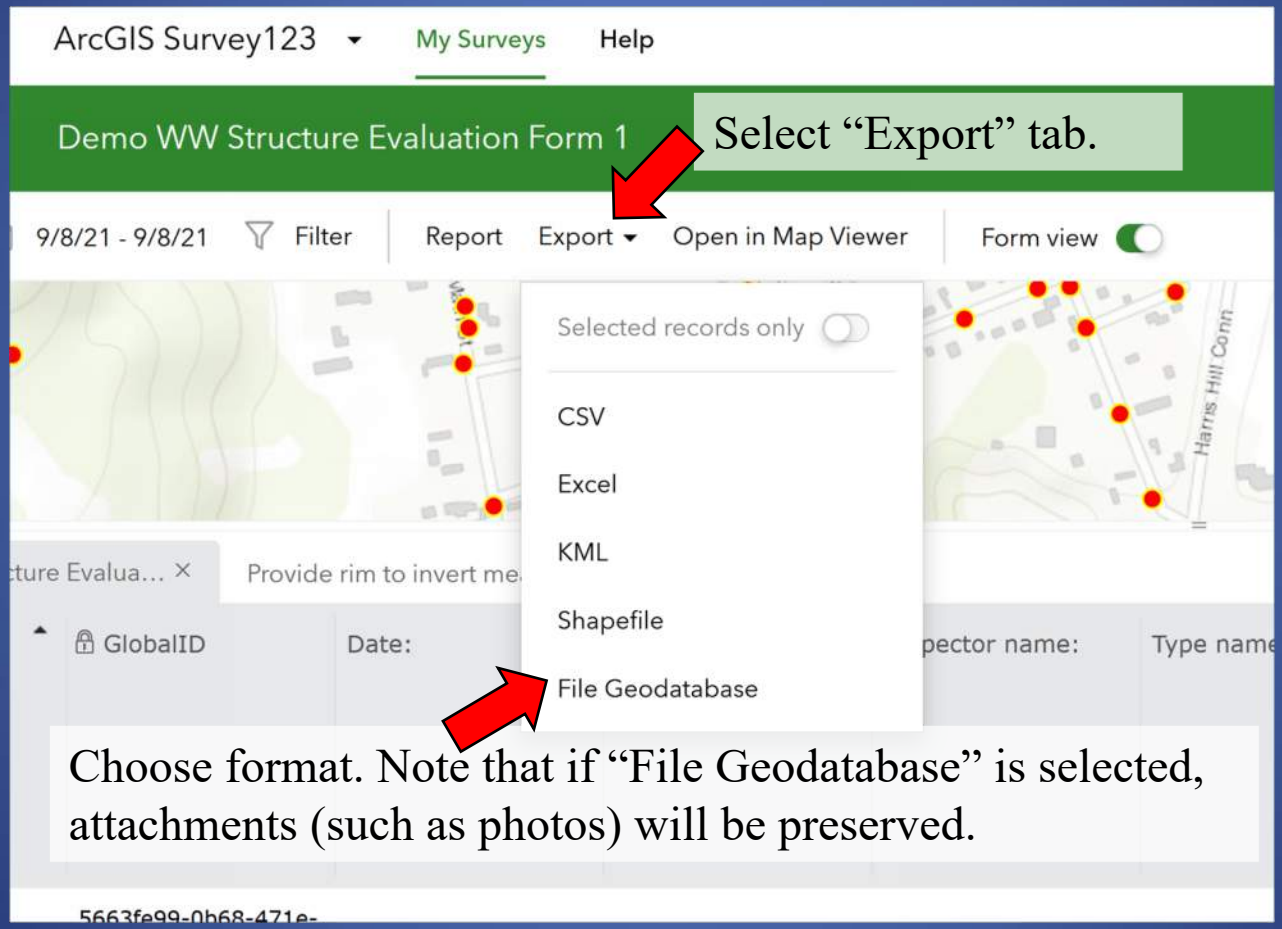
Survey123 Data

To filter data.



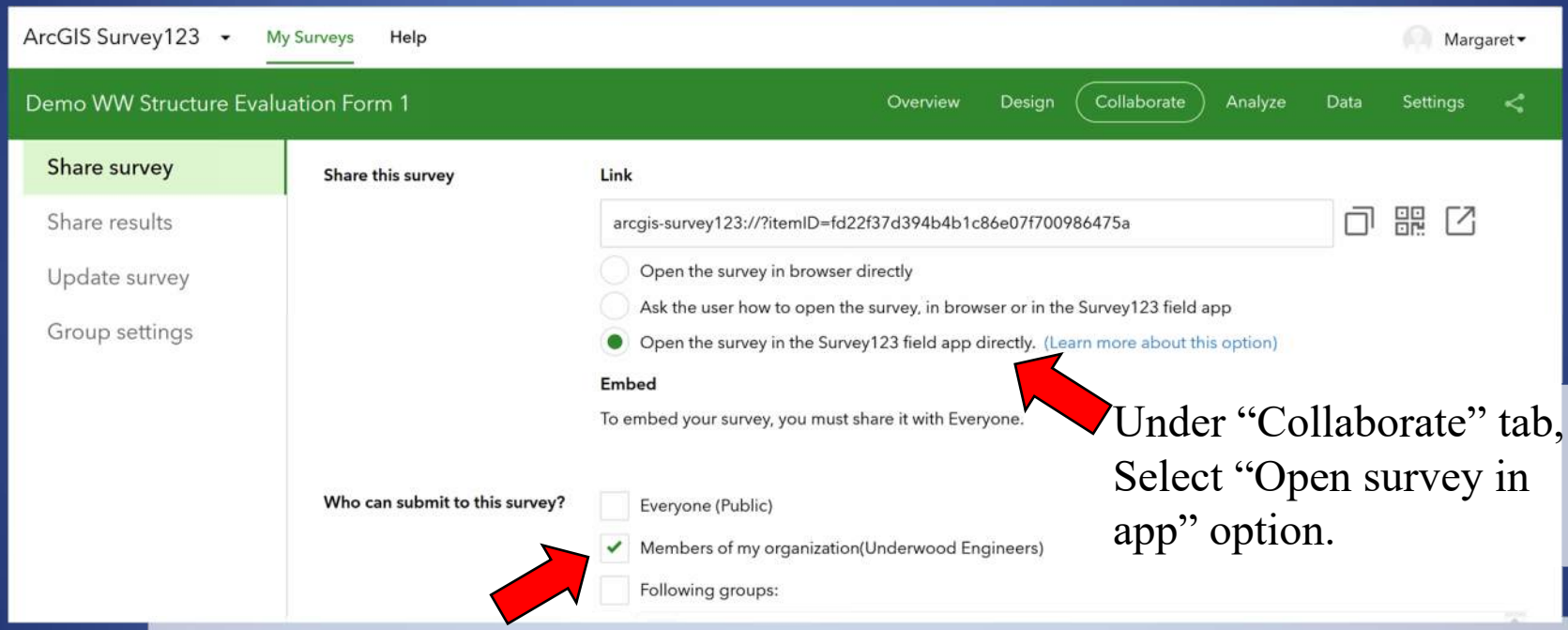
Survey123 Data

To download data.



Survey123 Data

Survey settings.



Under "Collaborate" tab, Select "Open survey in app" option.

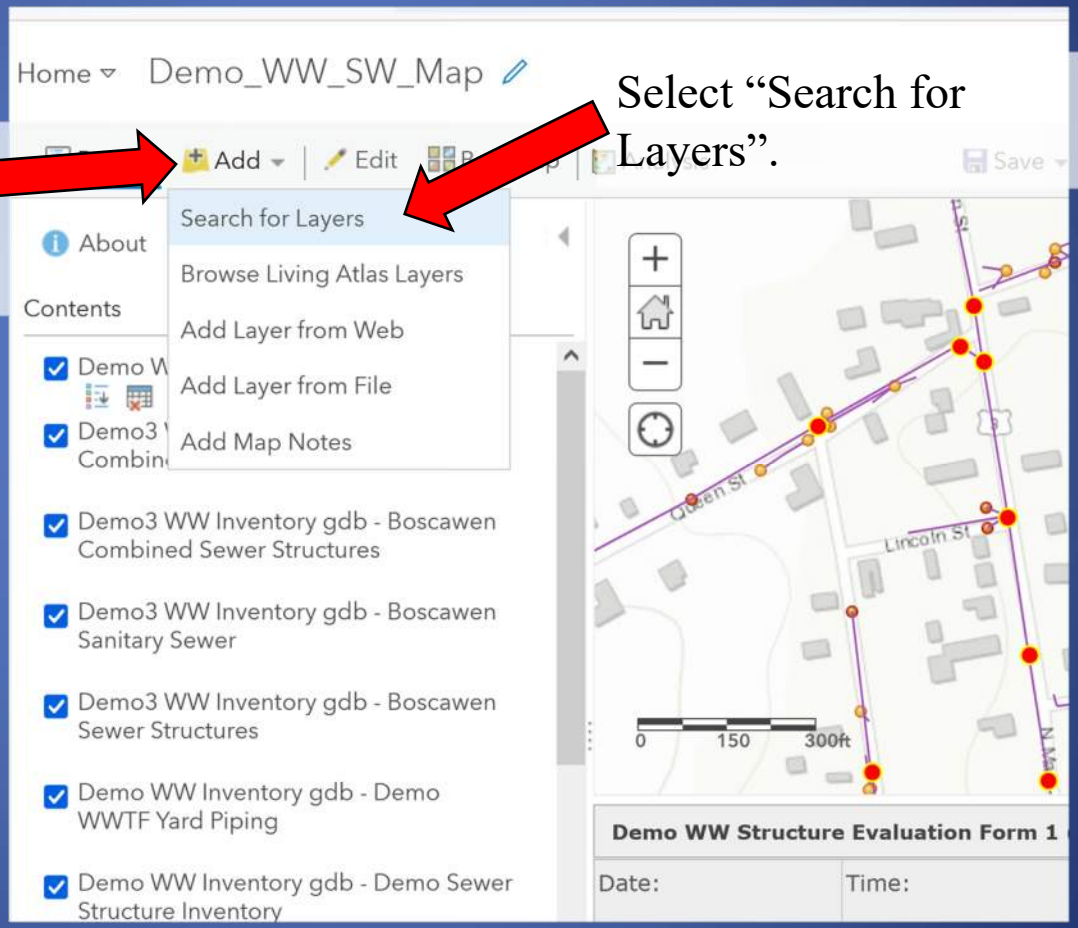
Share with members of your organization. You may also share with groups or with the public, but sharing with organization members is most typical.

Survey123 Data

Add survey to map.

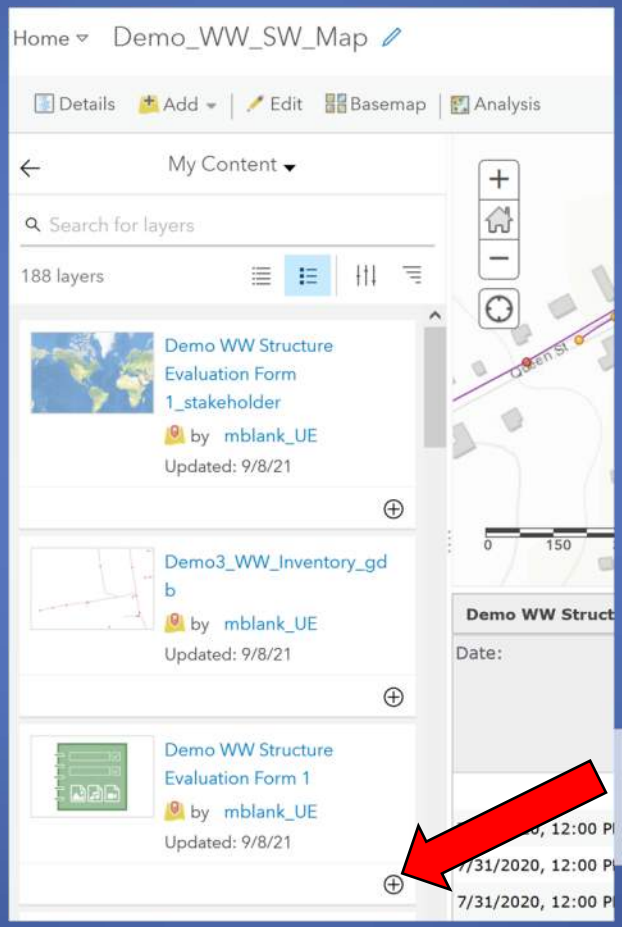
Select map from arcgis.com/My Contents folder. Then select "Add".

Select "Search for Layers".



Survey123 Data

Add survey to map.



Click on + to add item to map.

Survey123 Data

Additional resources.

How to create a survey form using the web designer.

https://www.youtube.com/watch?v=6lKWzCJIs80

How to create a survey form using desktop app (Survey123 Connect).

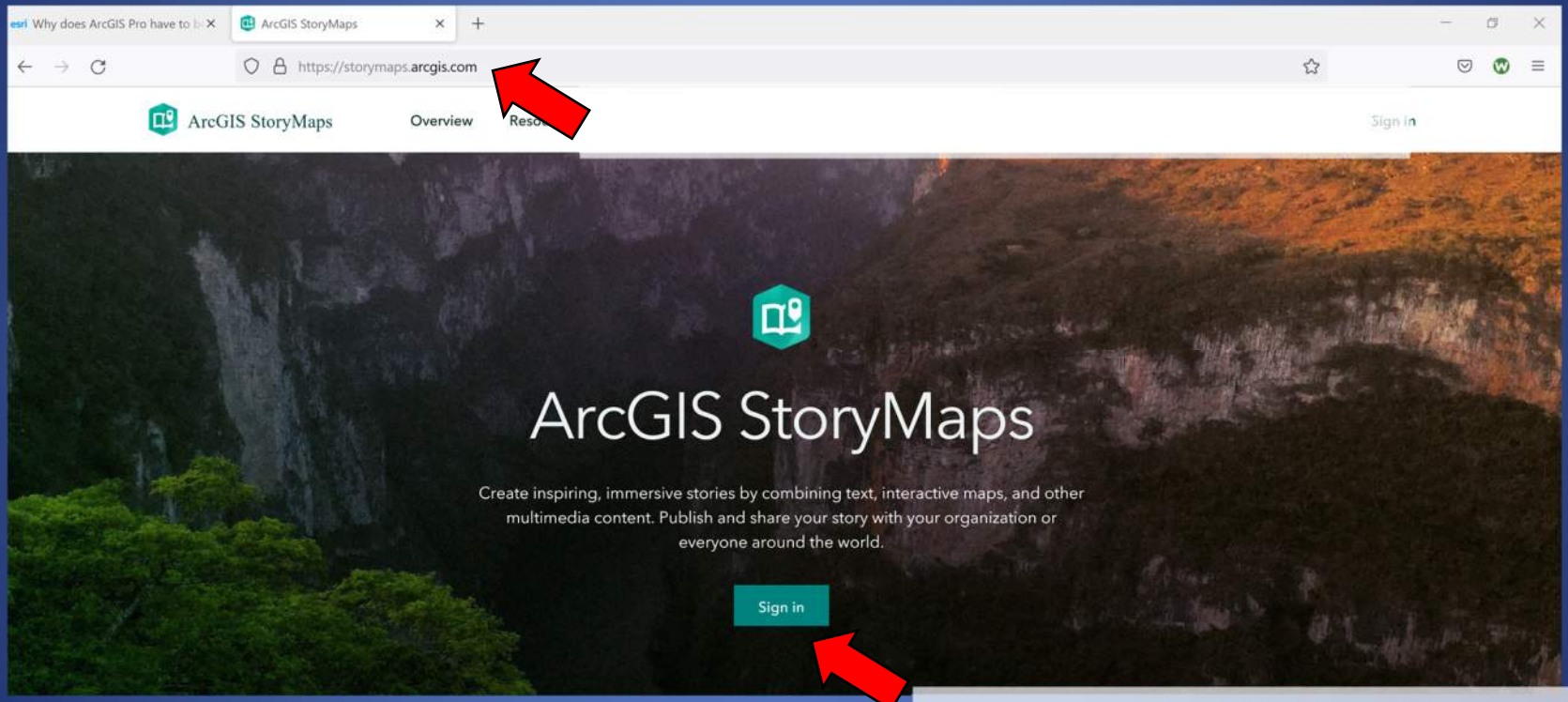
https://www.youtube.com/watch?v=1bCdkDOm7KE

Integrate Survey123 with other apps.

https://doc.arcgis.com/en/survey123/reference/integratewithotherapps.htm

Story Maps

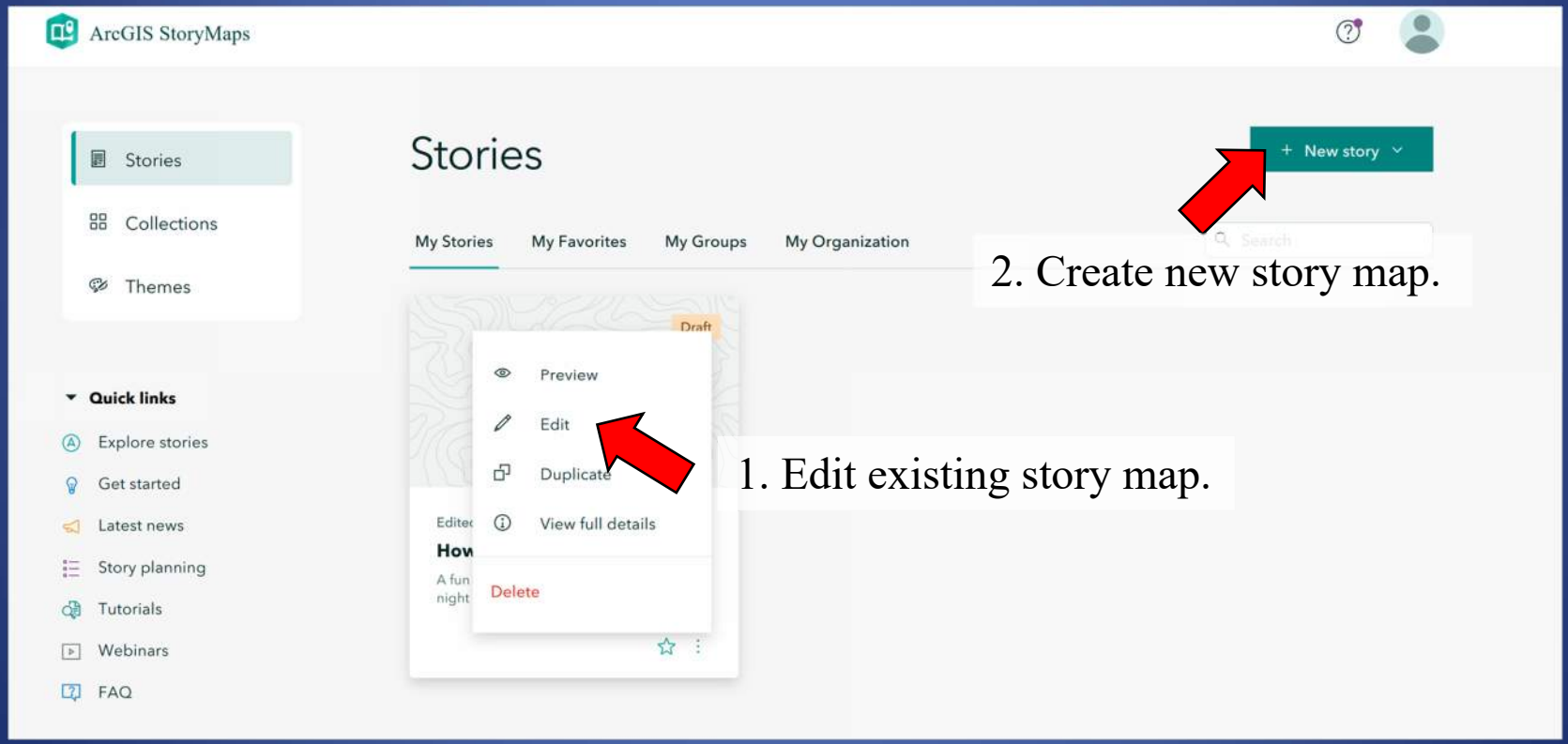
Access story maps.



2. Click “Sign In” and enter username and password.

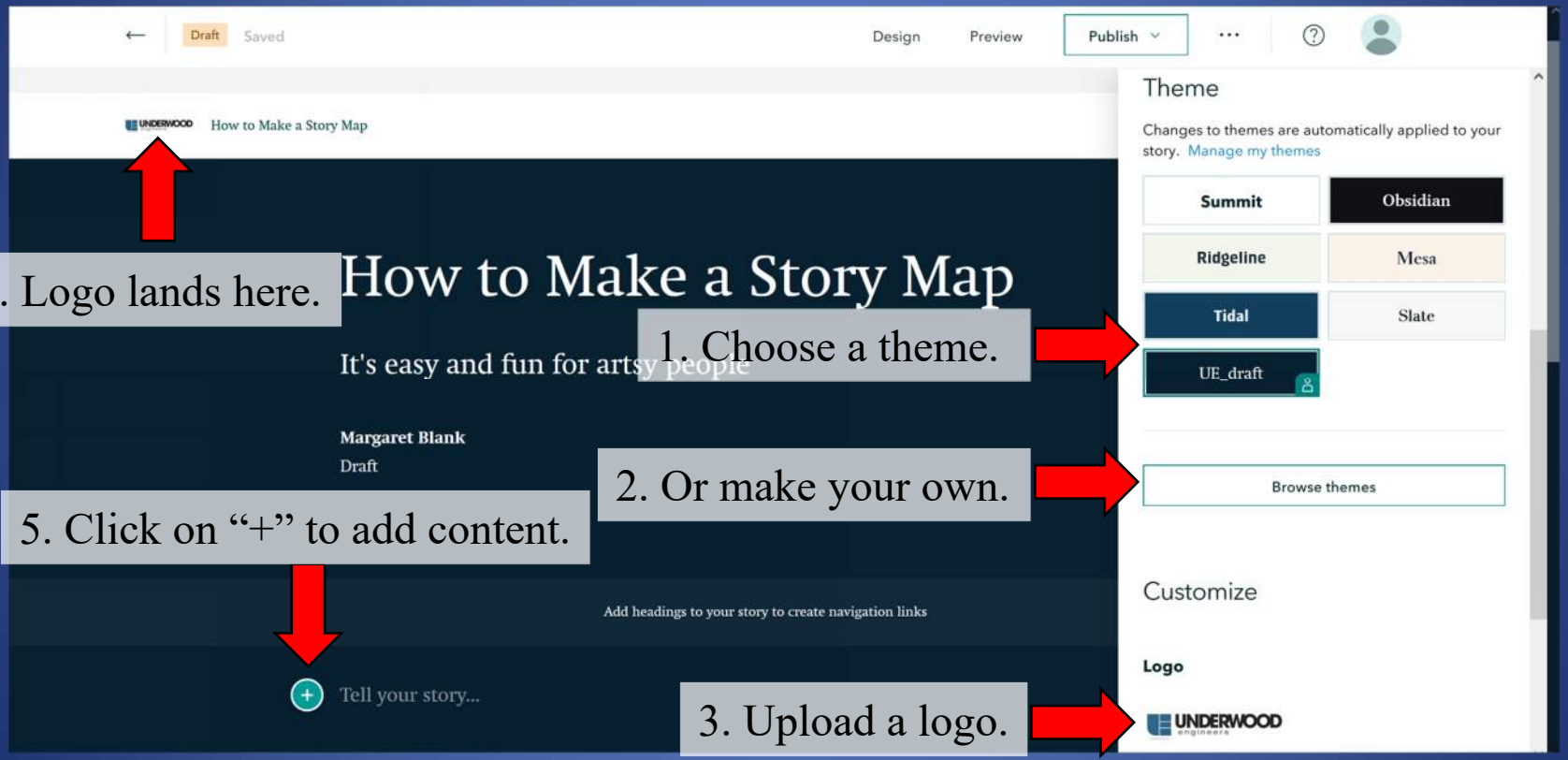
Story Maps

Access story maps.



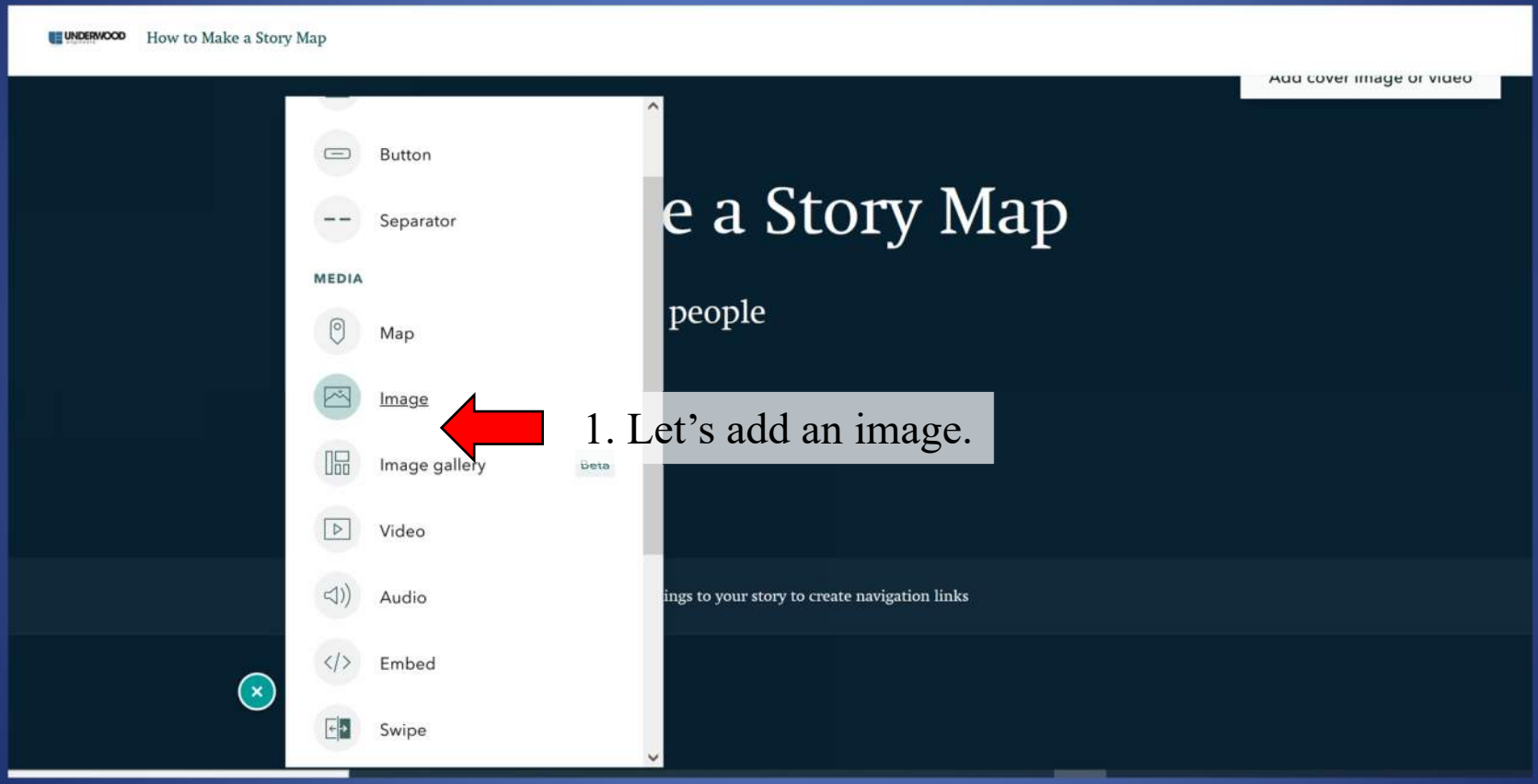
Story Maps

Create new story map.



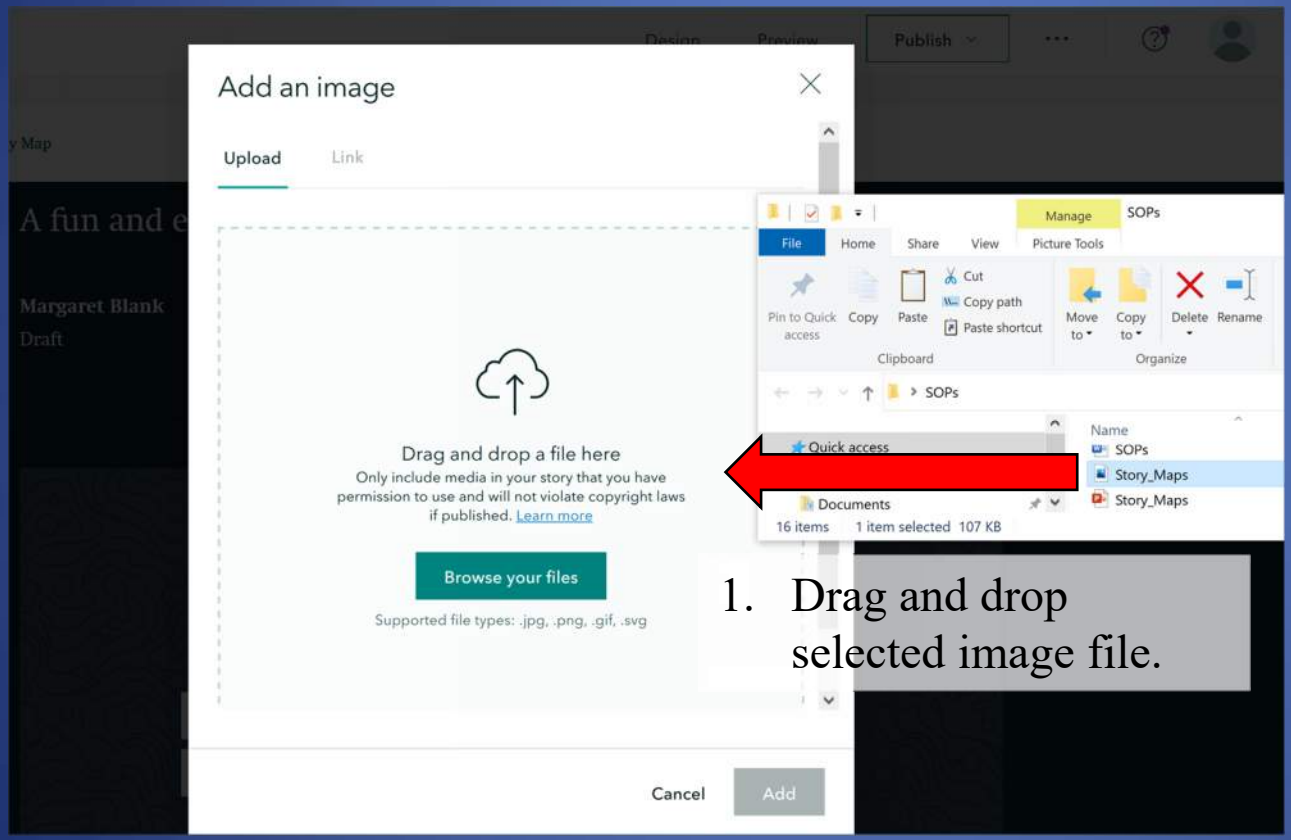
Story Maps

Add content.



Story Maps

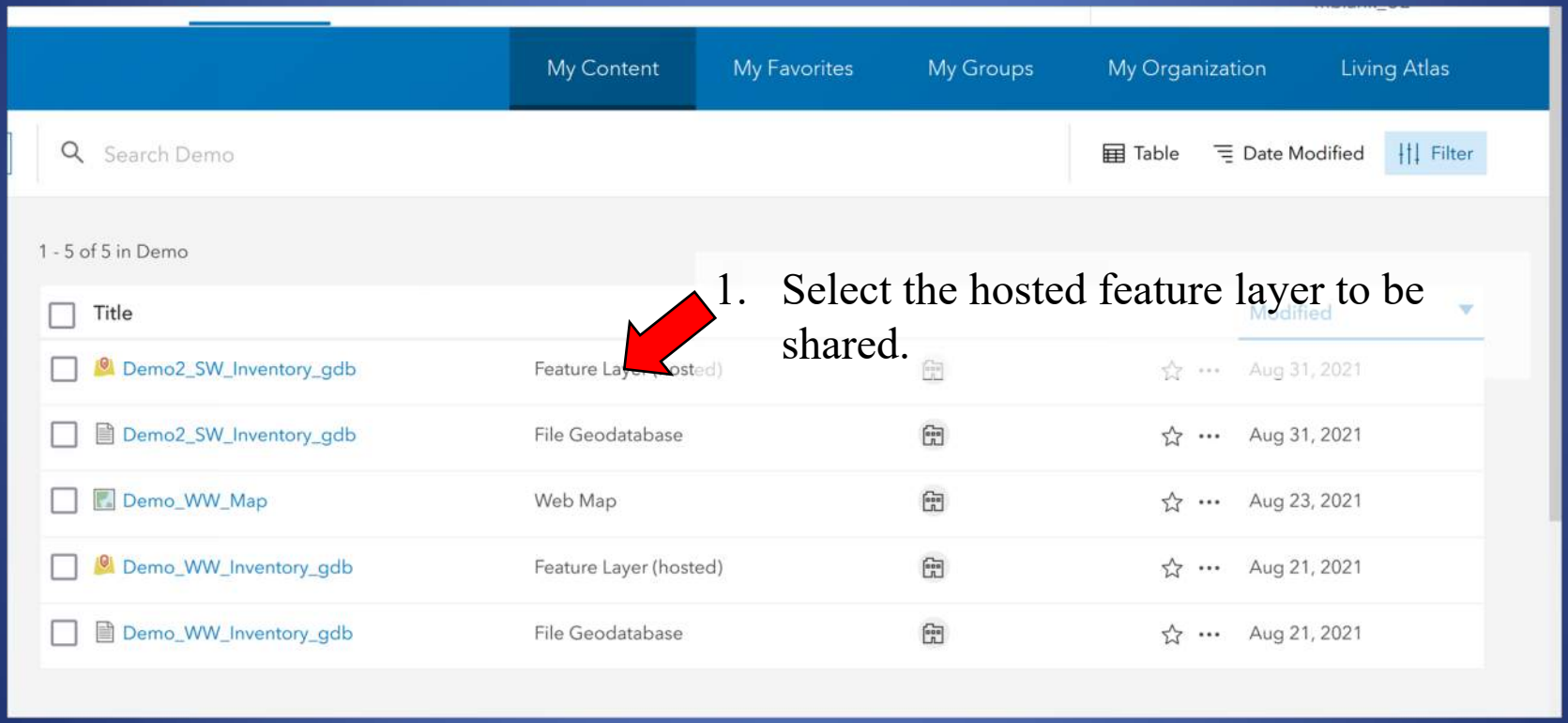
Add image to a story map.



1. Drag and drop selected image file.

Story Maps

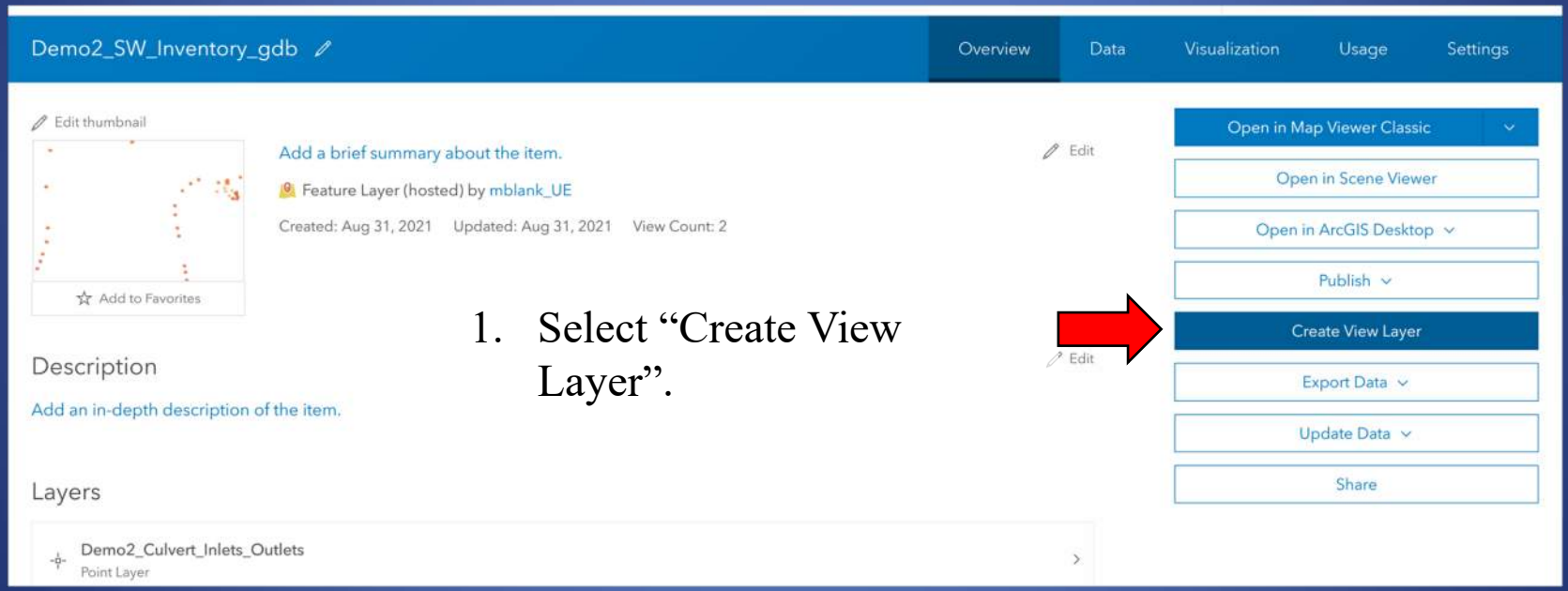
Configure data to share with the public.



1. Select the hosted feature layer to be shared.

Story Maps

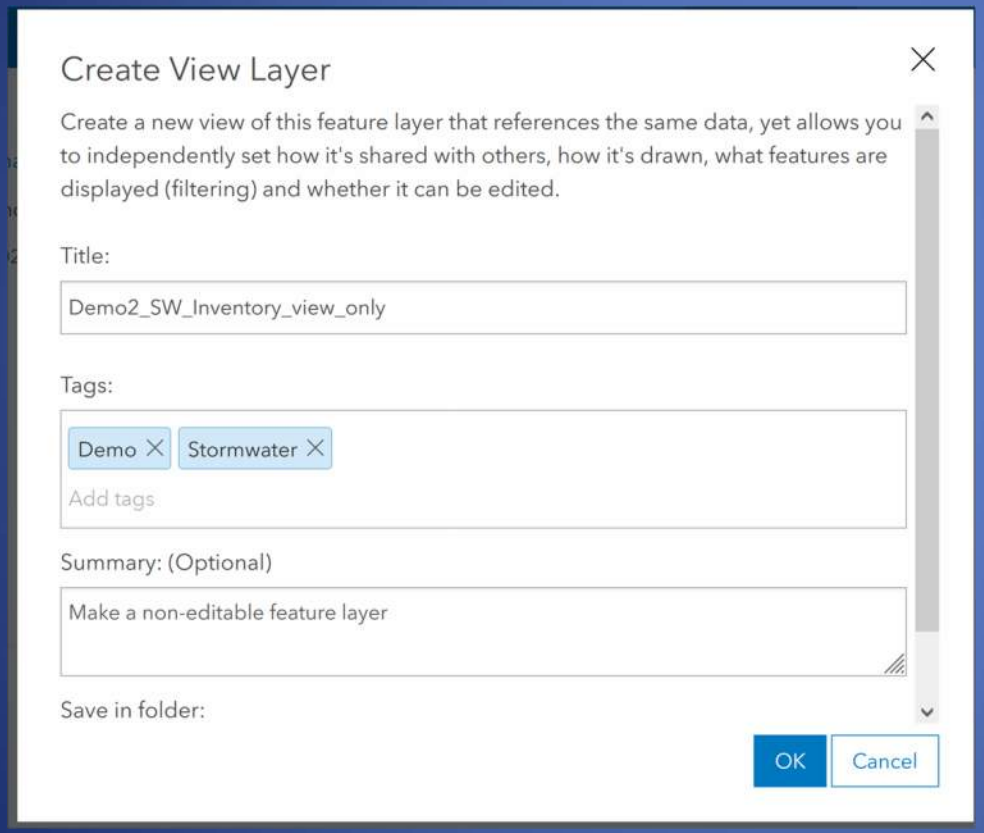
Configure data to share with the public.



1. Select “Create View Layer”.

Story Maps

Configure data to share with the public.

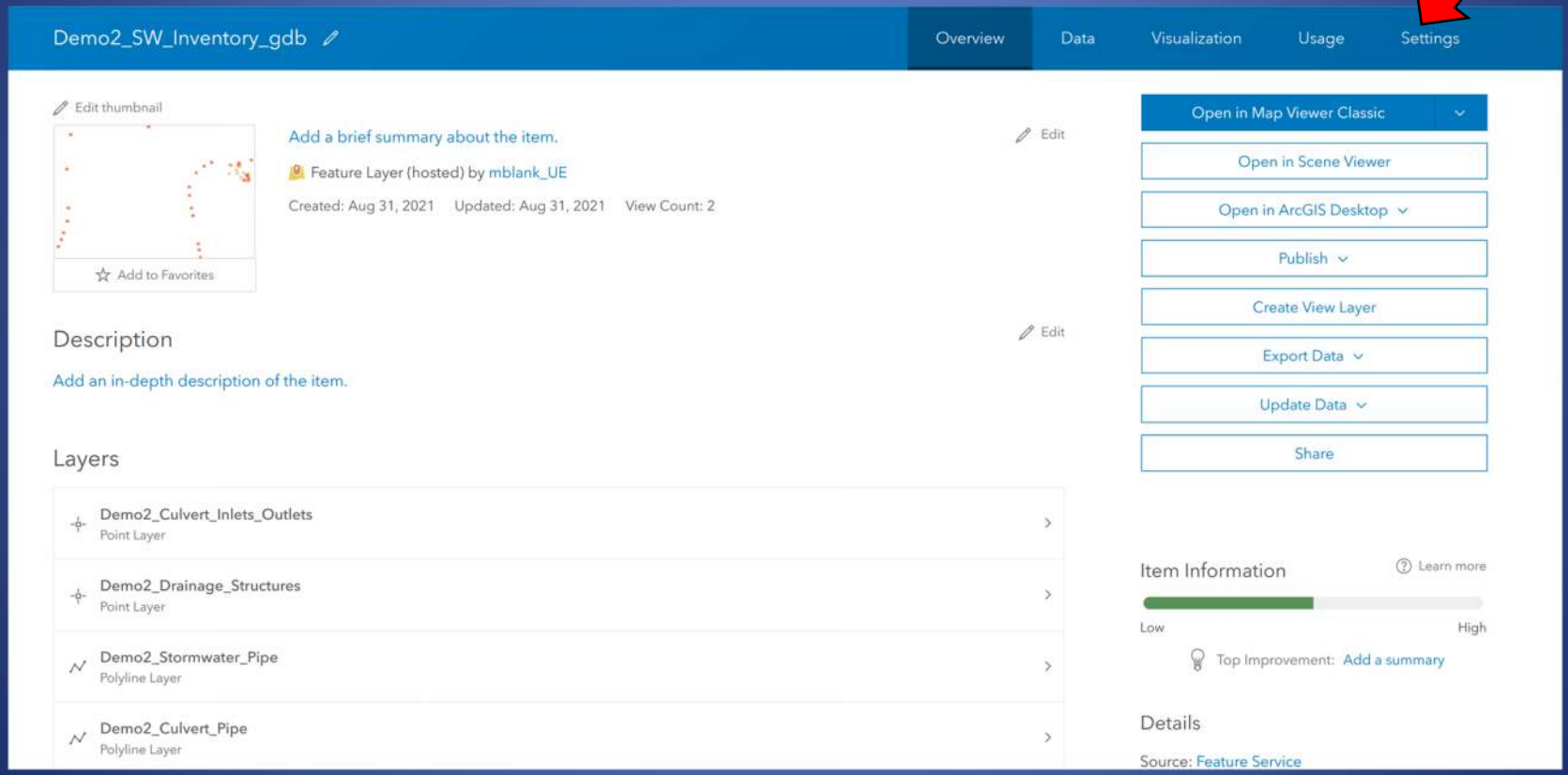


1. Provide a title.
2. Add tags.
3. Include a summary if desired.
4. Select folder.

Story Maps

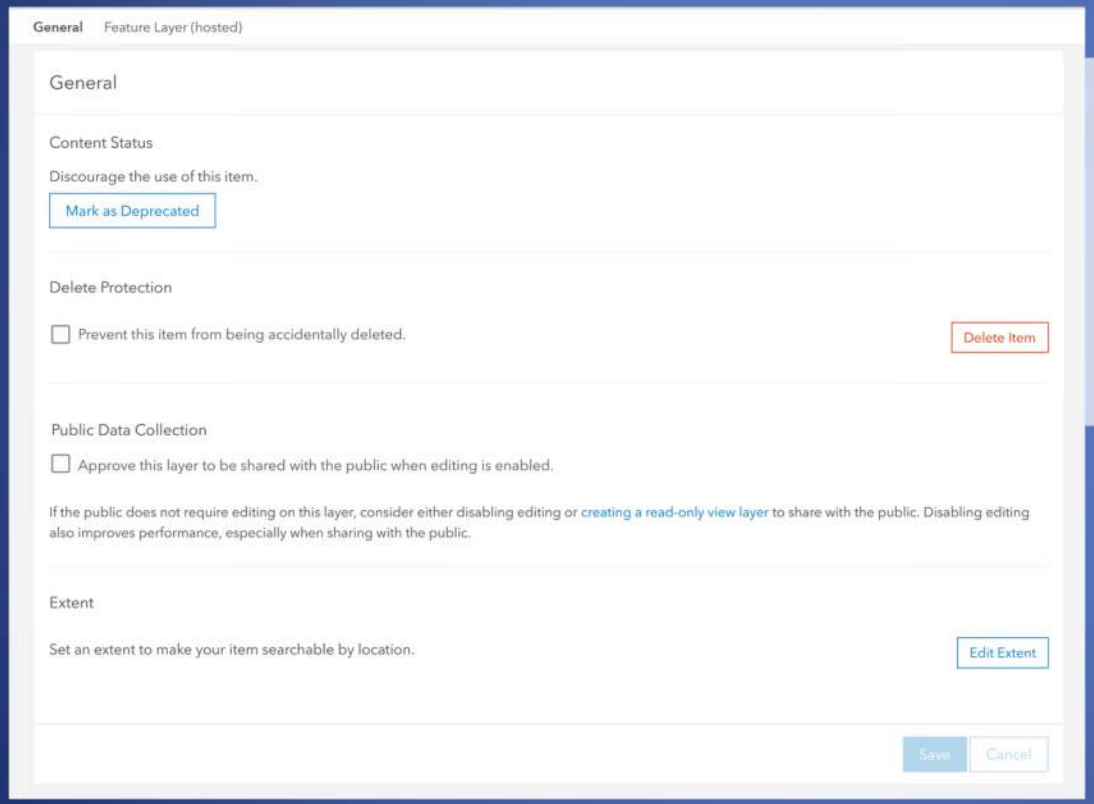
Configure data to share with the public.

1. Select “Settings”.



Story Maps

Configure data to share with the public.

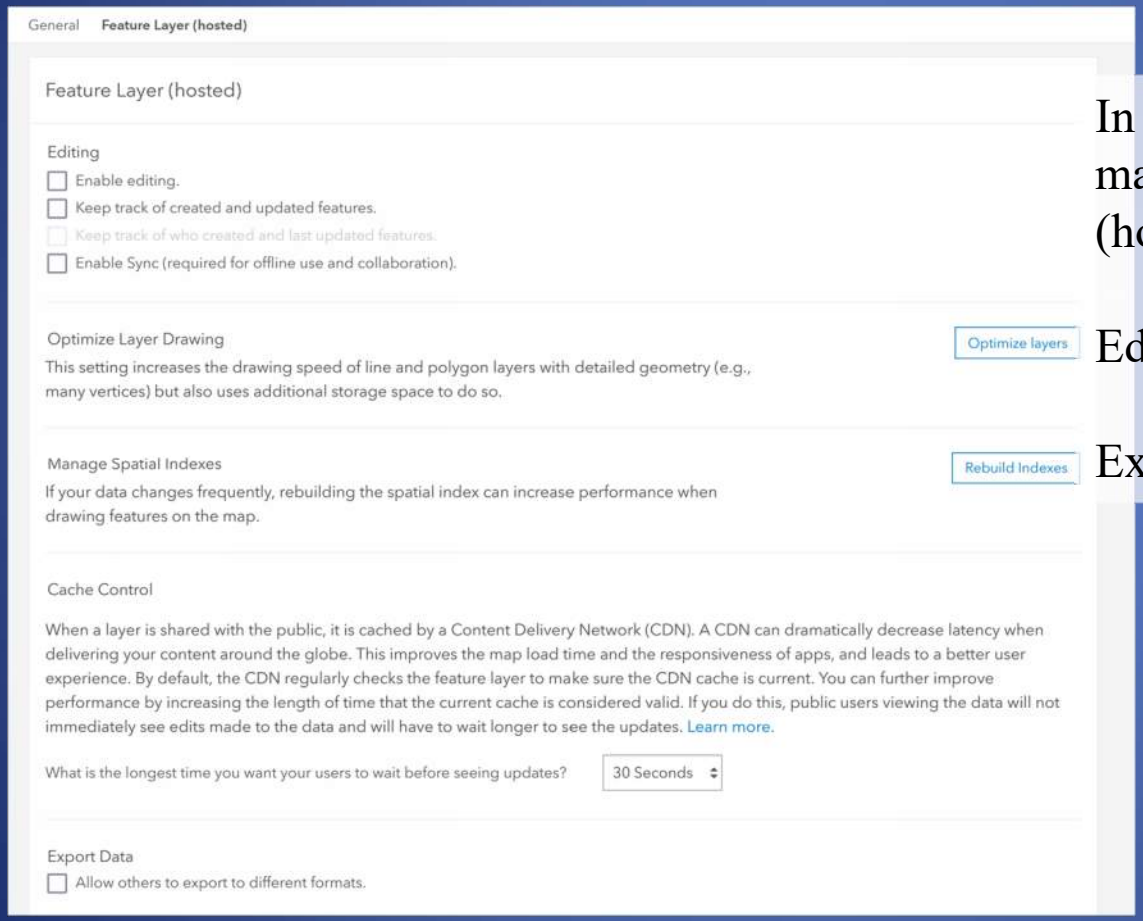


In this case, no changes will be made to "General" default settings.

Layer will not be shared with public when editing is enabled.

Story Maps

Configure data to share with the public.



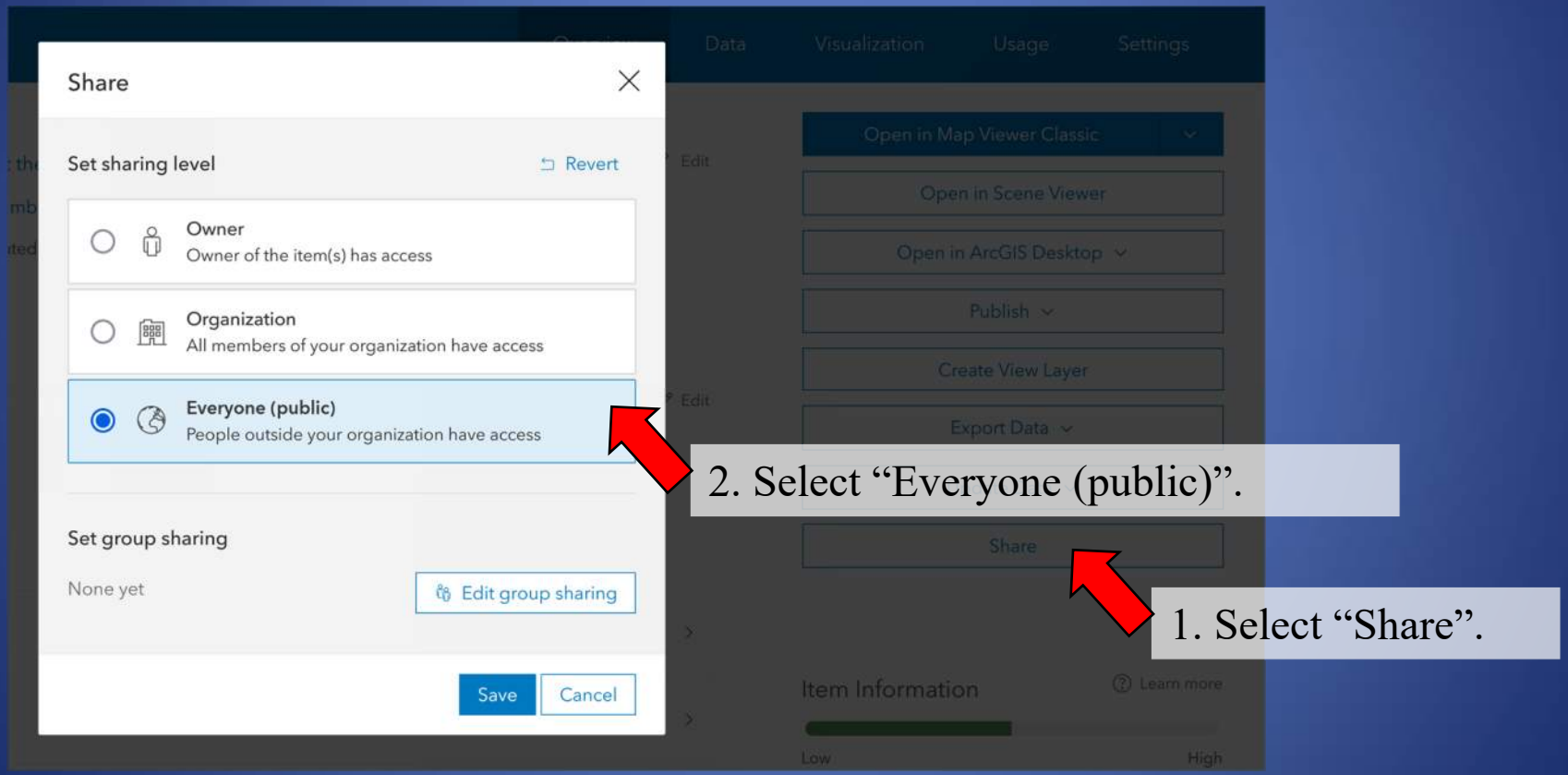
In this case, no changes will be made to “Feature Layer (hosted)” default settings.

Editing is not enabled.

Exporting data is not allowed.

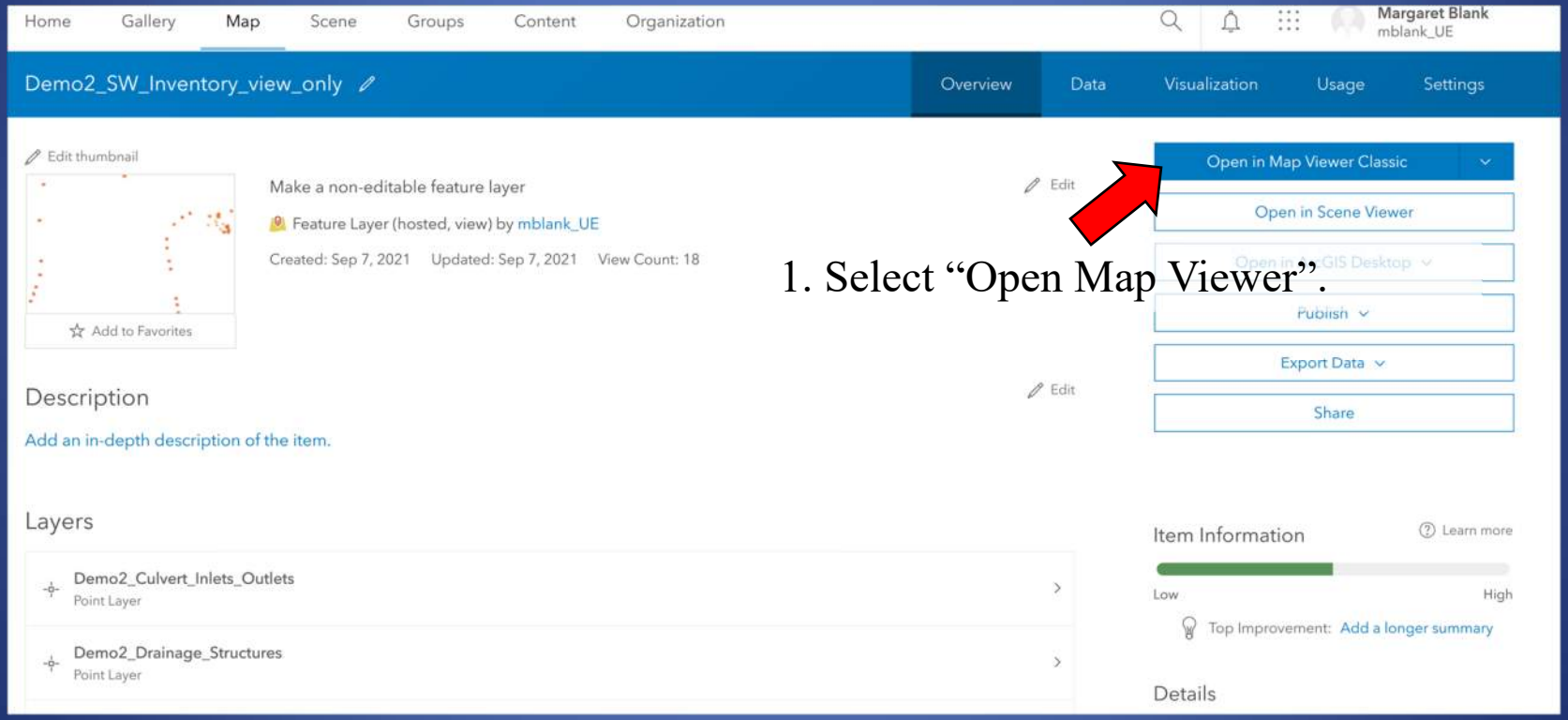
Story Maps

Configure data to share with the public.



Story Maps

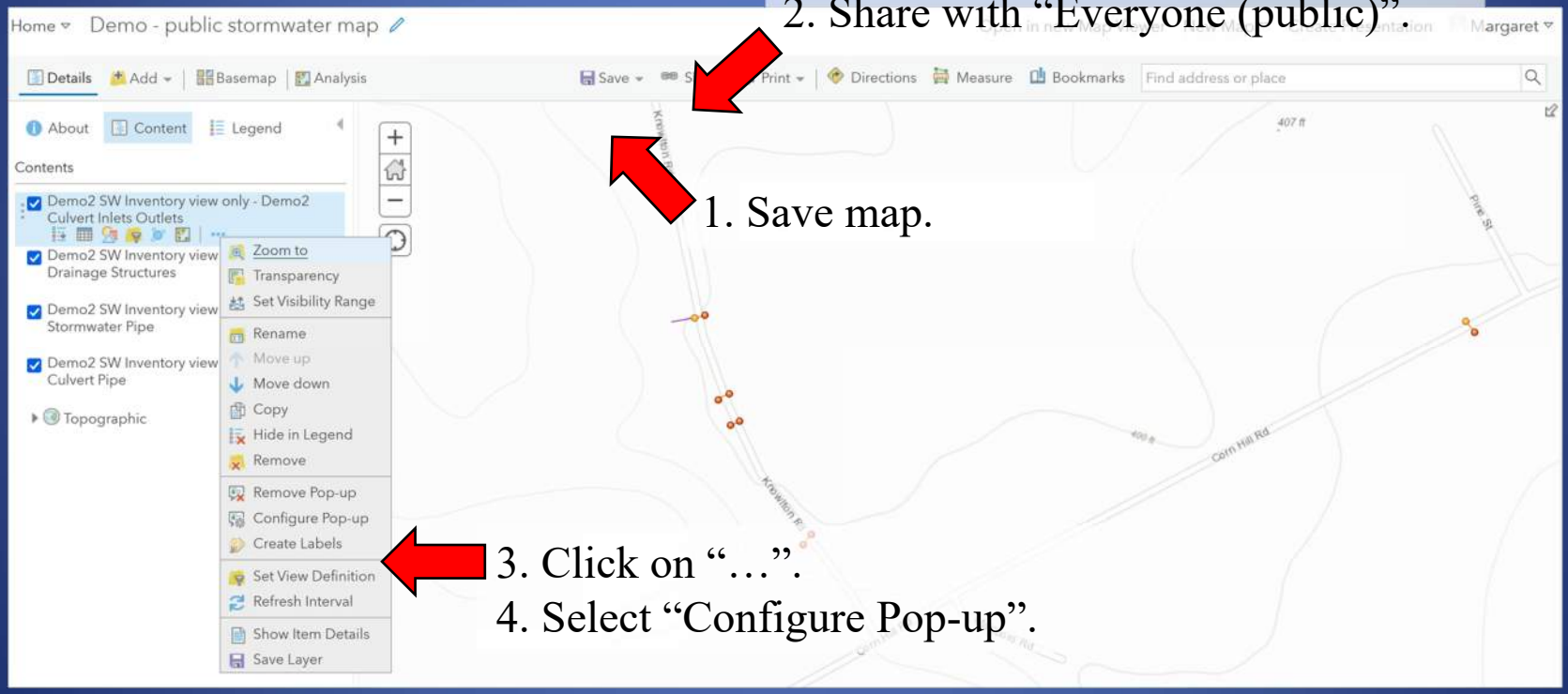
Create a map.



1. Select “Open Map Viewer”.

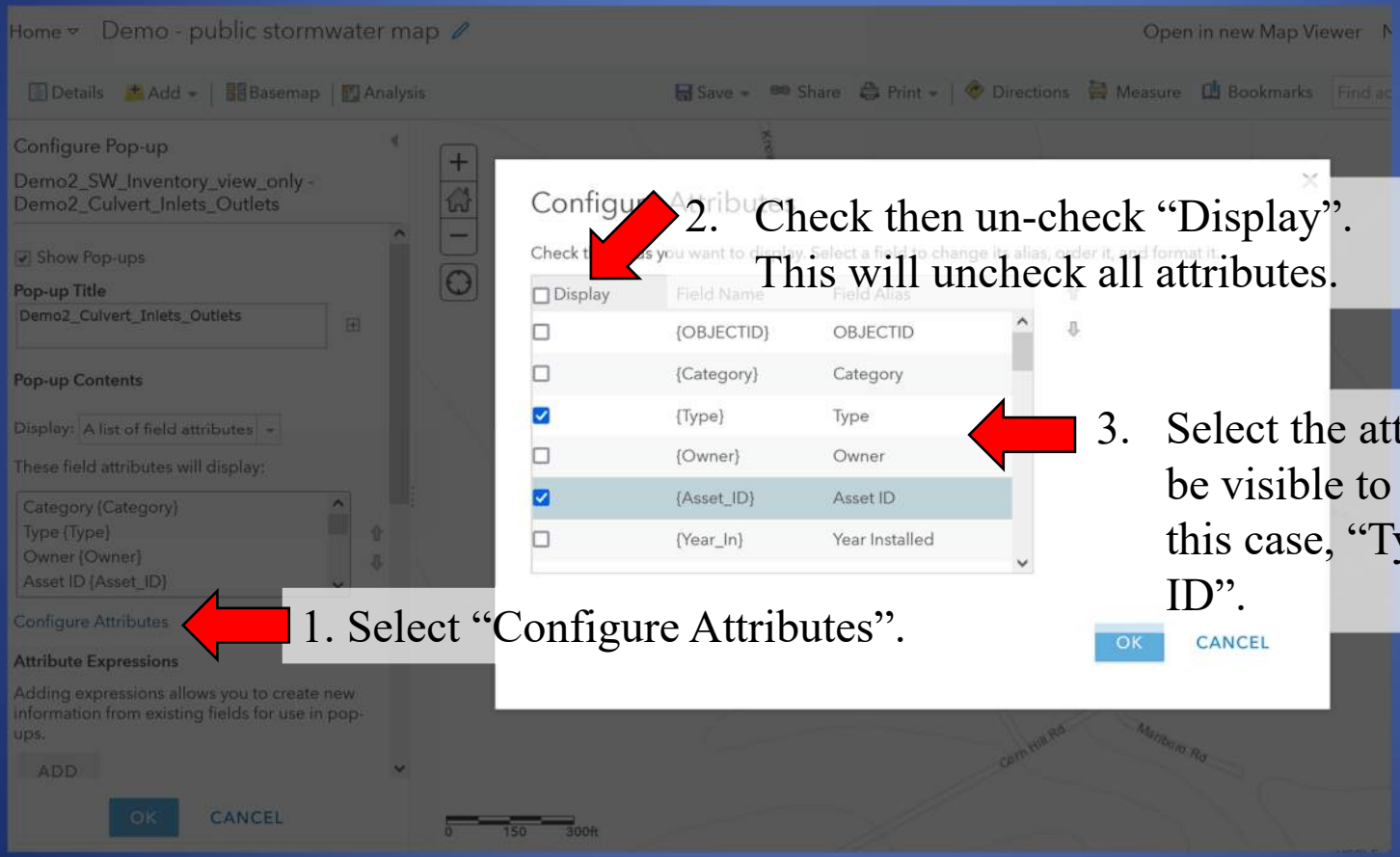
Story Maps

Share map and configure pop-ups.



Story Maps

Share map and configure pop-ups.



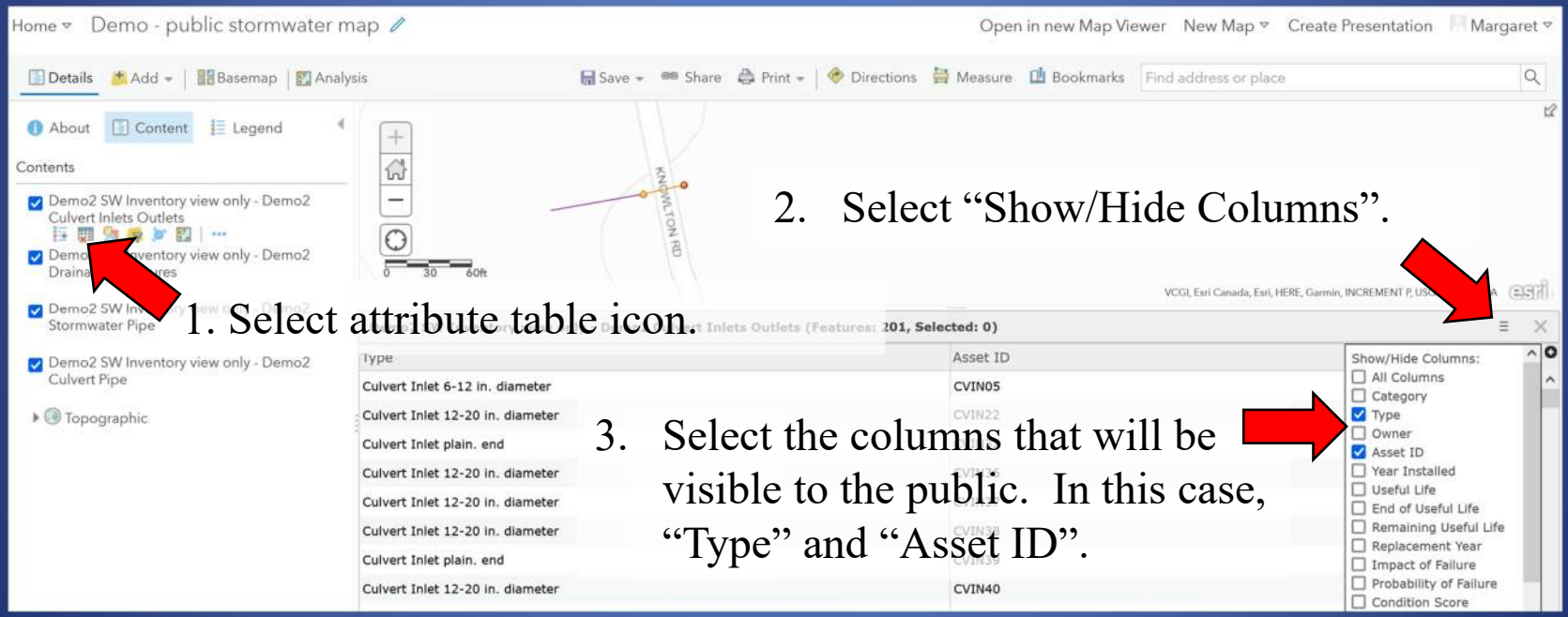
1. Select “Configure Attributes”.

2. Check then un-check “Display”. This will uncheck all attributes.

3. Select the attributes that will be visible to the public. In this case, “Type” and “Asset ID”.

Story Maps

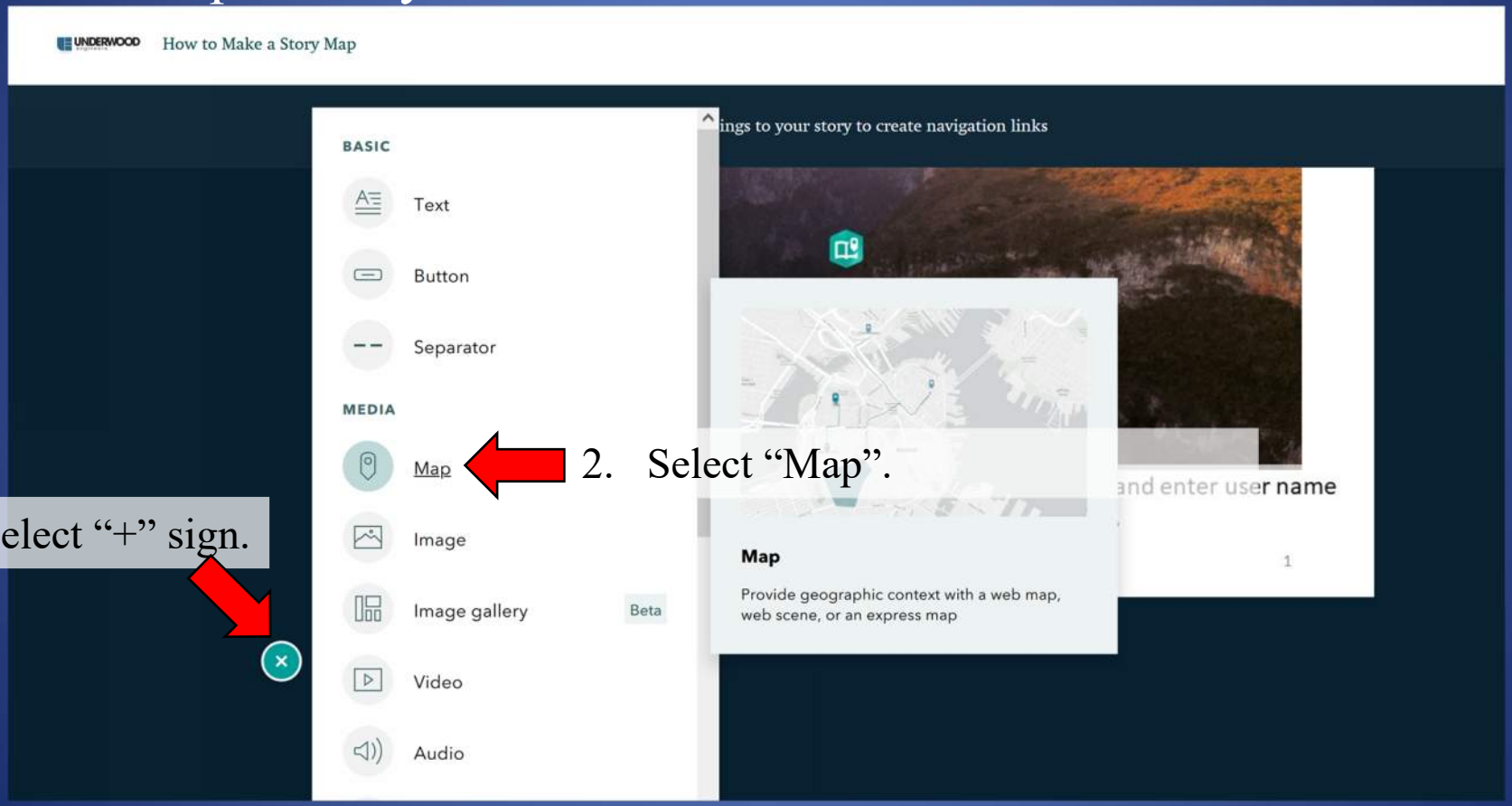
Configure attribute table.



1. Select attribute table icon.
2. Select “Show/Hide Columns”.
3. Select the columns that will be visible to the public. In this case, “Type” and “Asset ID”.

Story Maps

Add map to story.

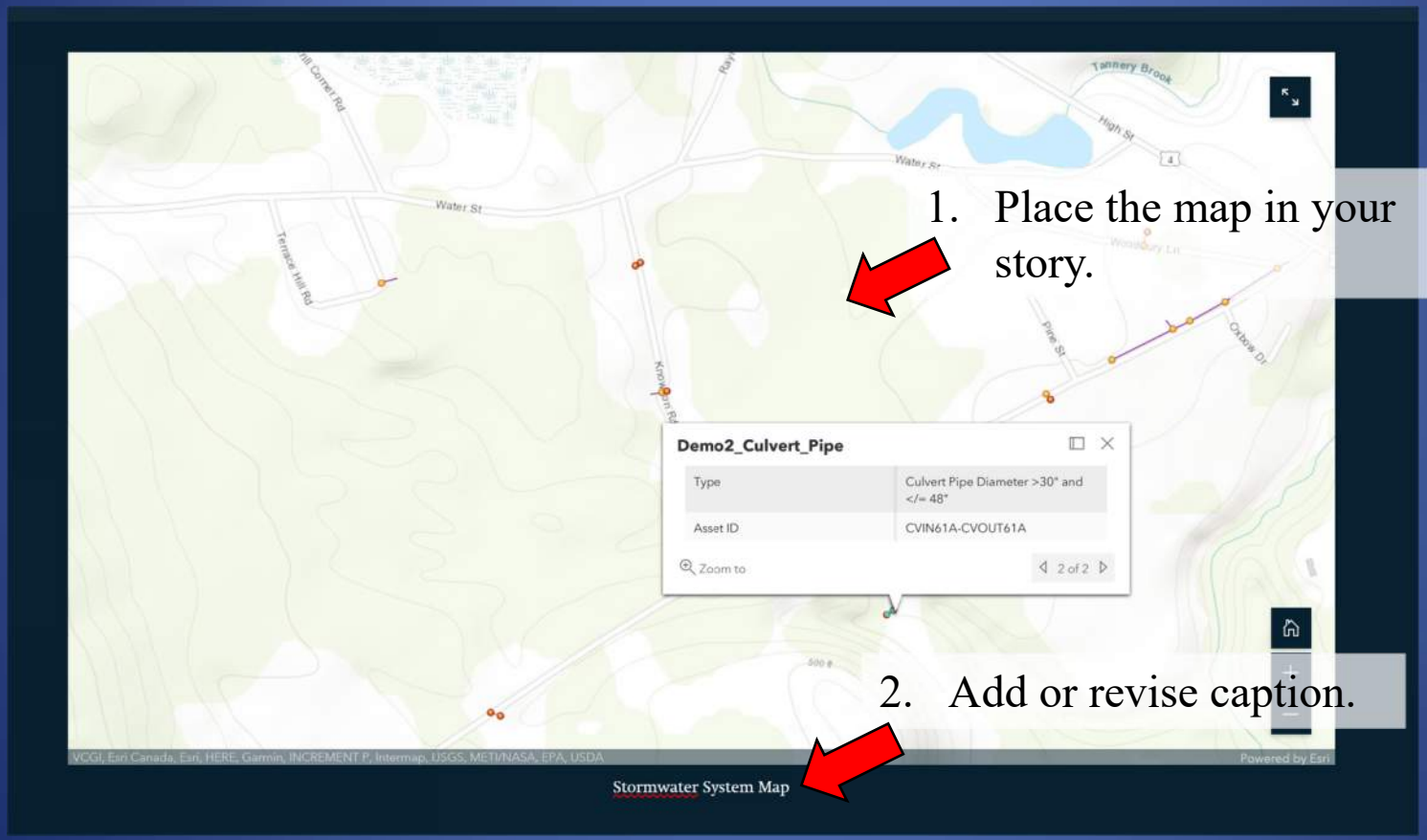


1. Select "+" sign.

2. Select "Map".

Story Maps

Add map to story.



Story Maps

Additional resources.

Ten essential steps for story map success.

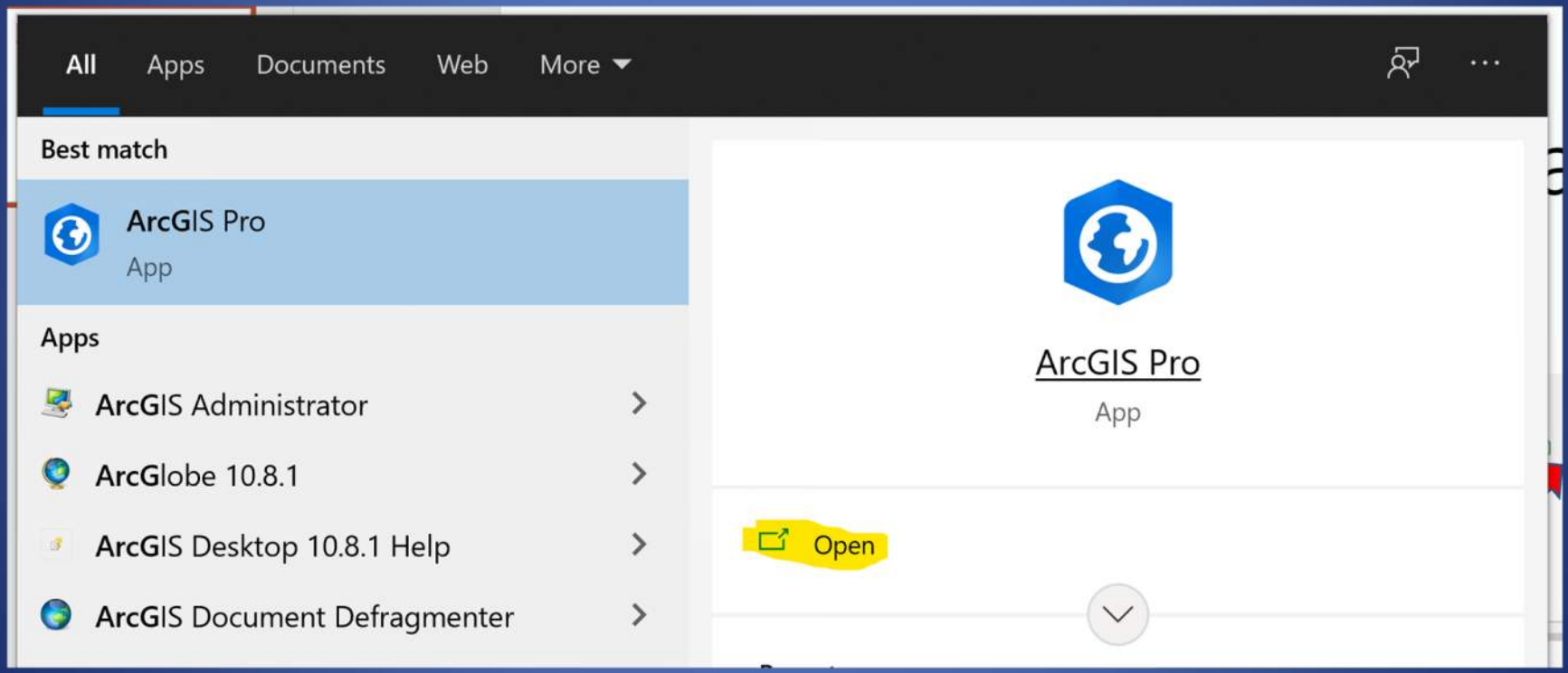
- https://www.esri.com/about/newsroom/arcuser/10-essential-steps-for-story-map-success/

Get started with ArcGIS story maps.

- https://learn.arcgis.com/en/projects/share-the-story-of-an-expedition/

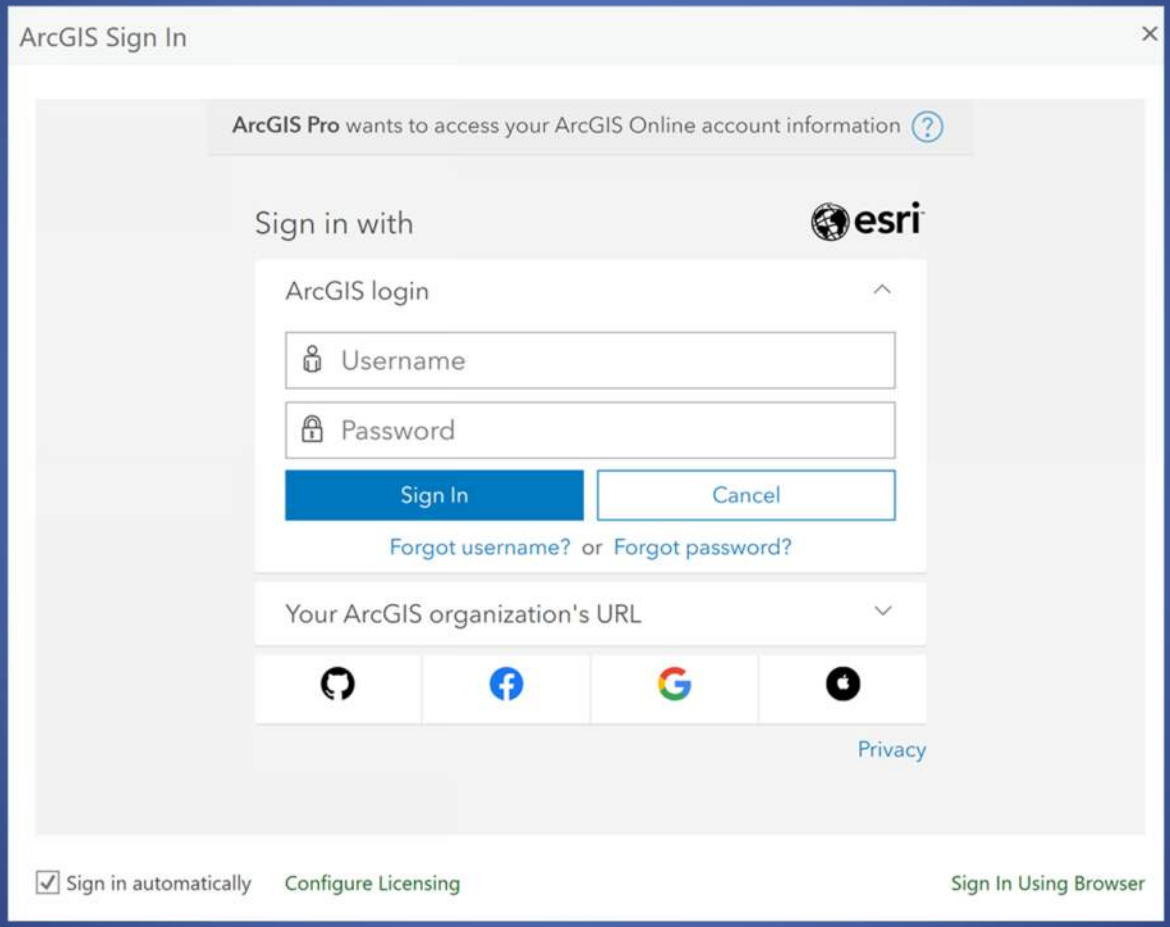
ArcGIS Pro – Getting Started

Type “ArcGIS Pro” in search bar. Select “Open”.



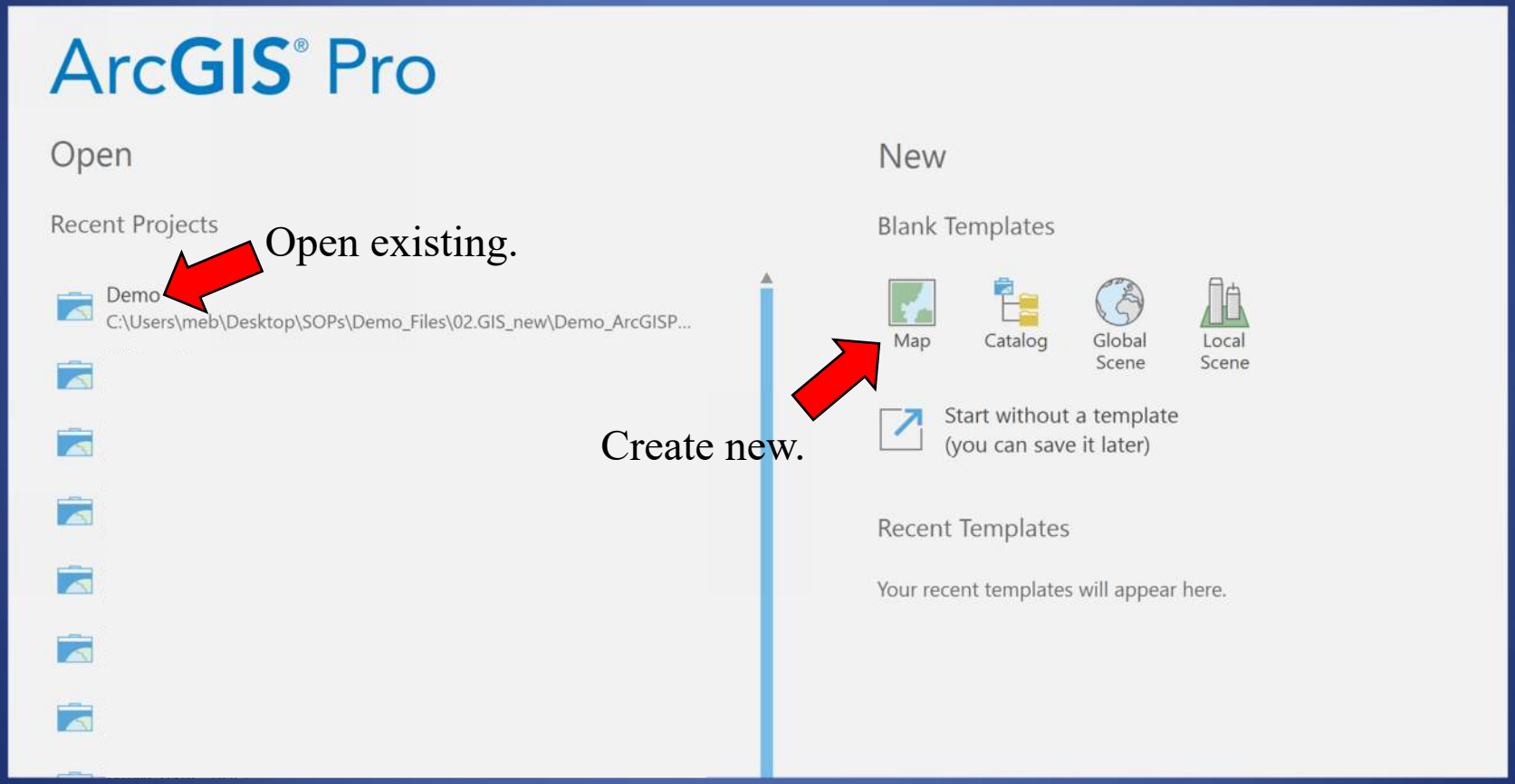
ArcGIS Pro – Getting Started

Log in.



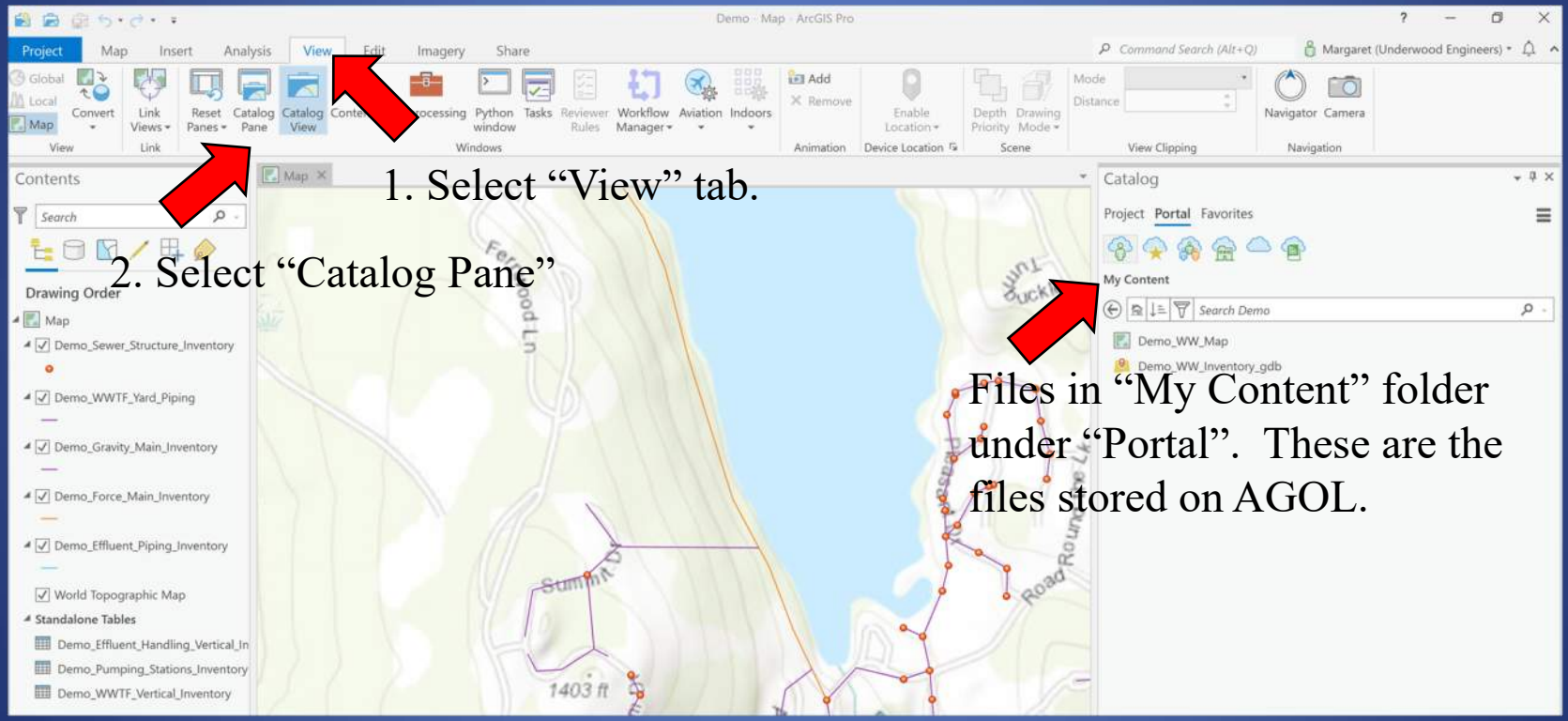
ArcGIS Pro – Getting Started

Open an existing project or create a new one.



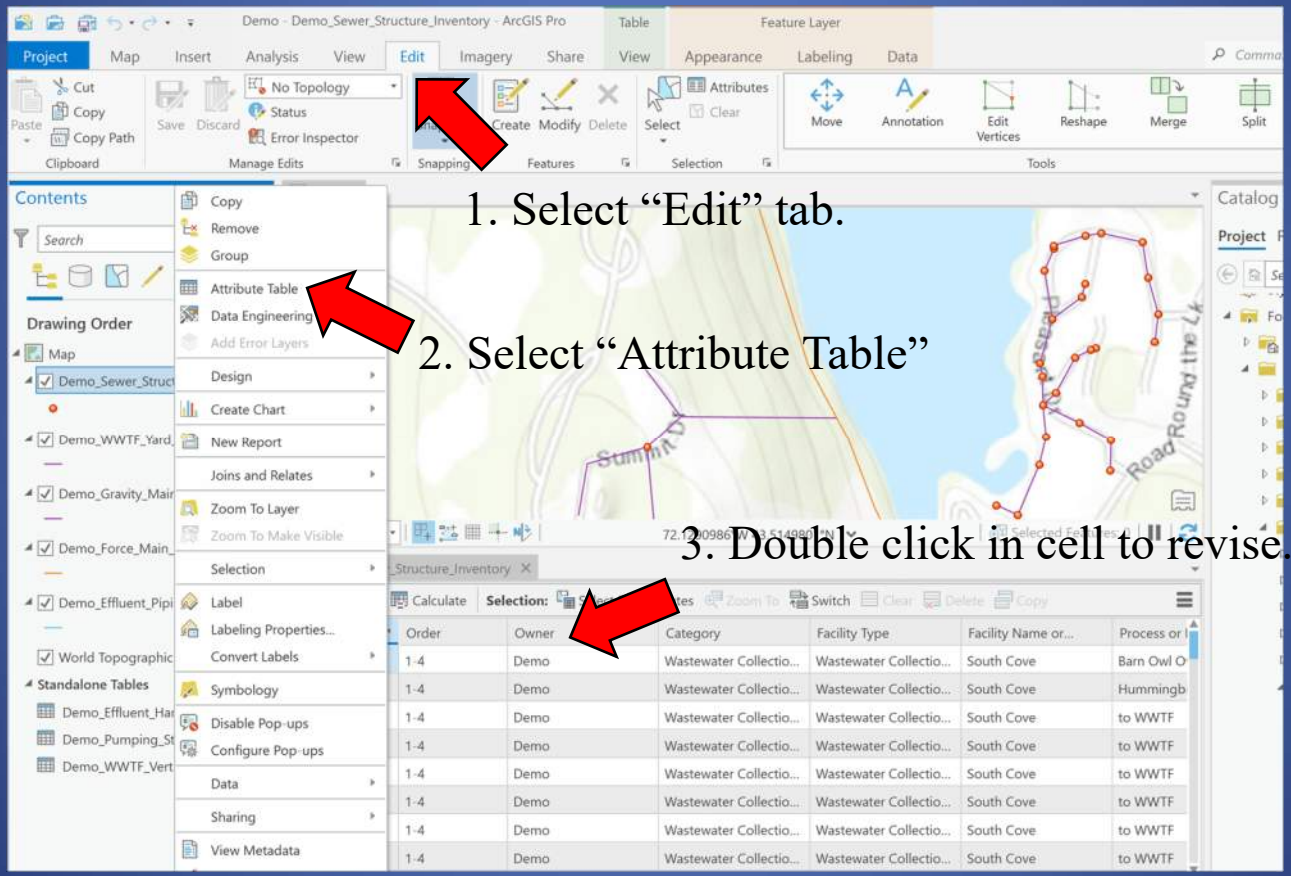
ArcGIS Pro – Getting Started

1. Select “View” tab. 2. Select “Catalog Pane”.



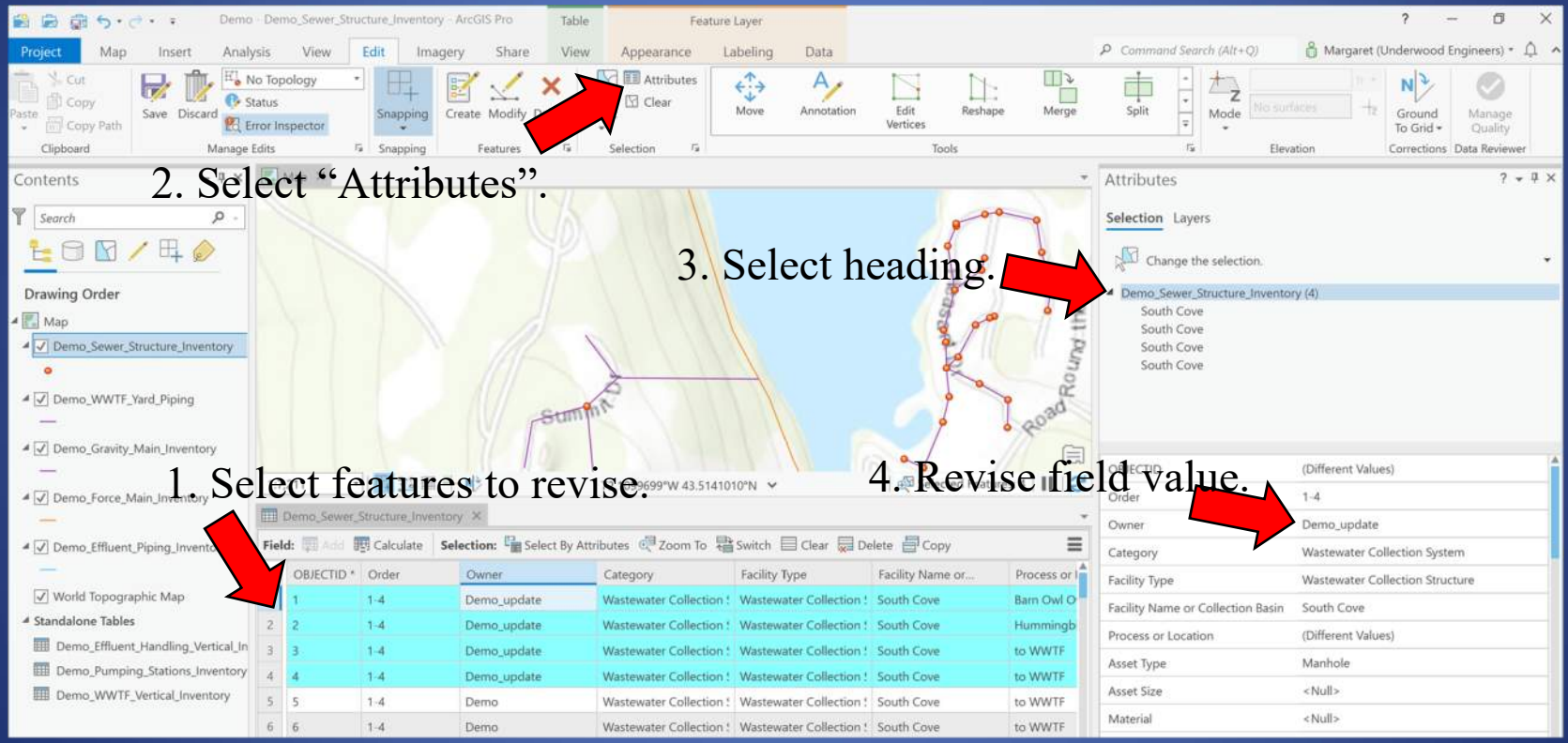
ArcGIS Pro – Getting Started

Edit attributes.



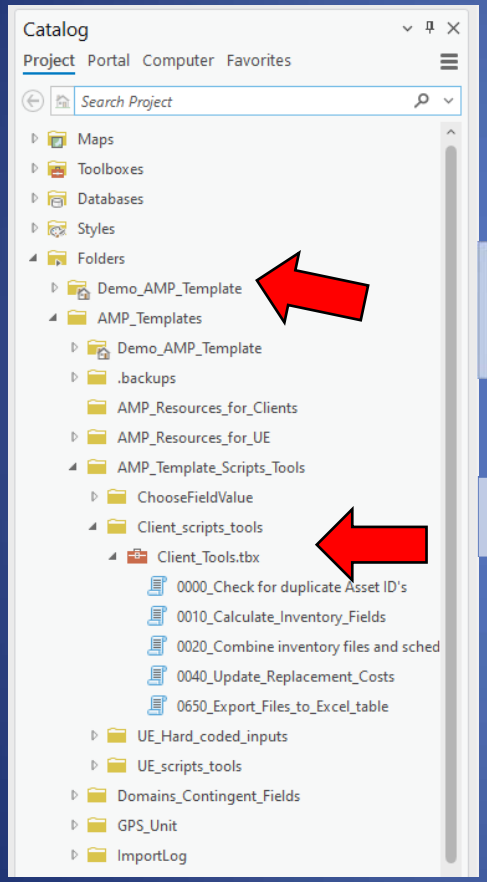
ArcGIS Pro – Getting Started

Edit attributes – same change to multiple records.



ArcGIS Pro – Find Tools

How to Access Python Script Tools

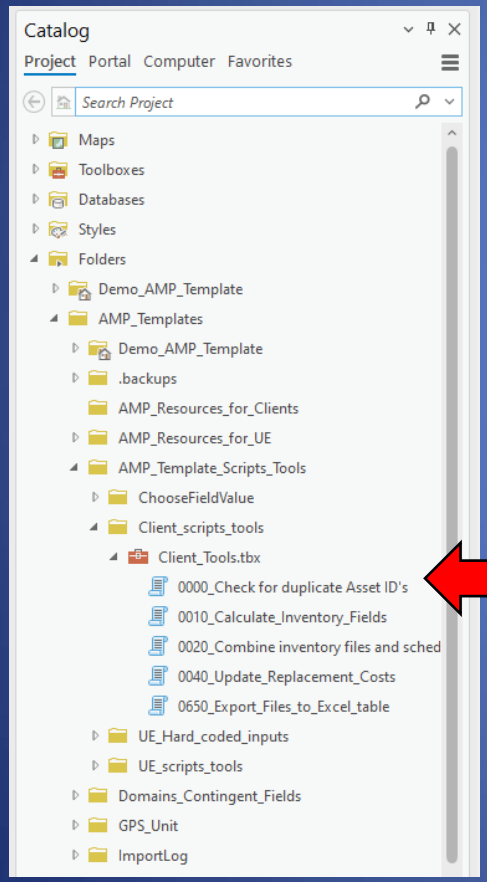


In catalog pane, expand “Folder”, select folder on network or hard drive where tools are stored.

Find and expand toolbox.

ArcGIS Pro – Find Tools

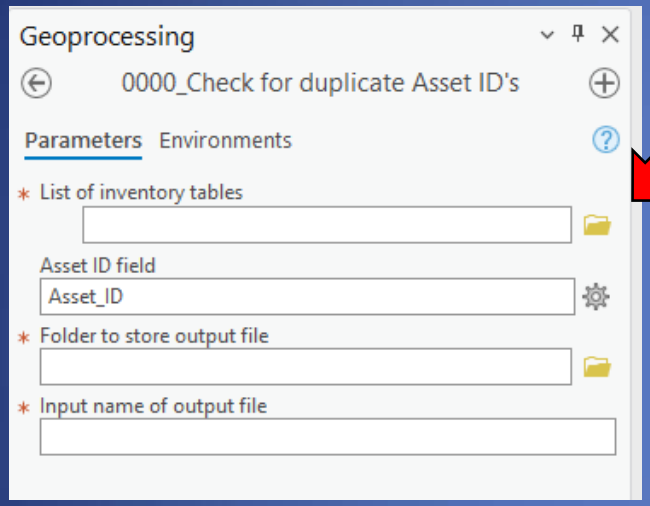
Check for duplicate Asset ID's.



Double click on 0000_Check for duplicate Asset ID's to open the tool

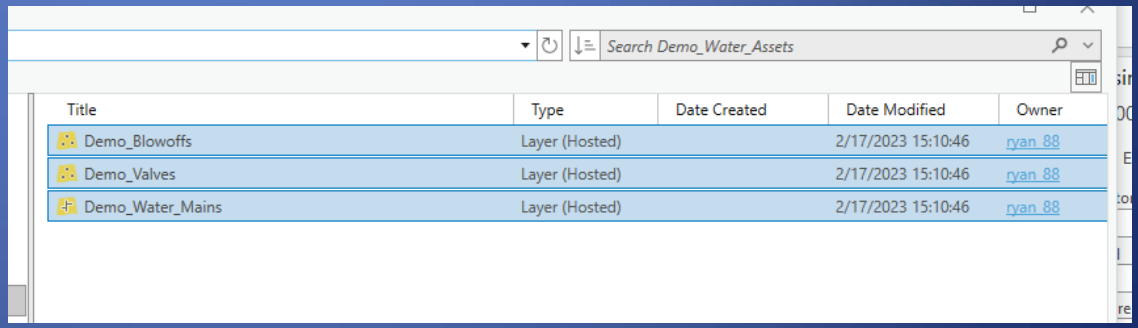
ArcGIS Pro – Run Tools

Check for duplicate Asset ID's.



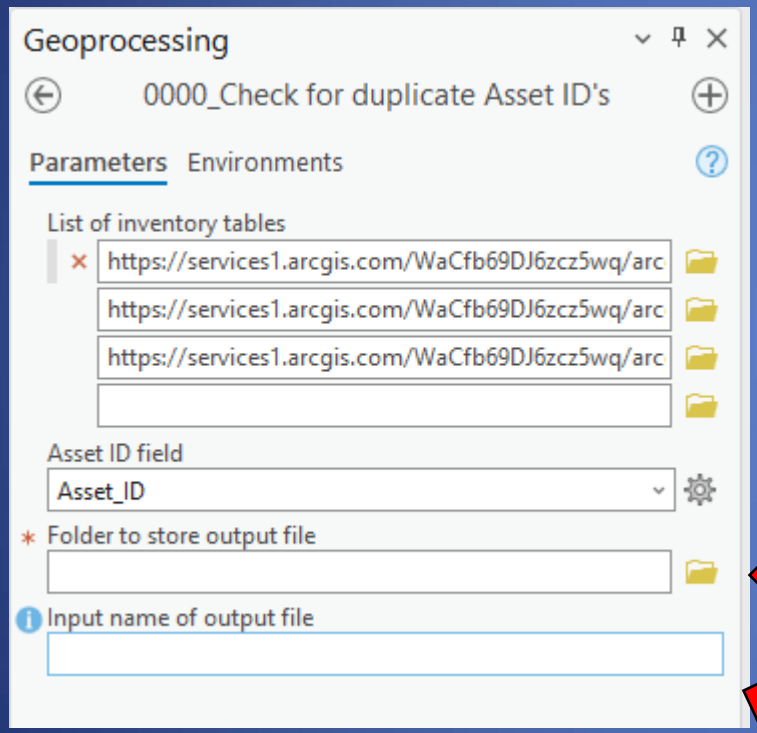
1. Click the folder icon to open the file browser.

2. Navigate to the geodatabase where your inventory files are stored and select all the feature classes. Click "OK" to load them in the tool.



ArcGIS Pro – Run Tools

Check for duplicate Asset ID's.

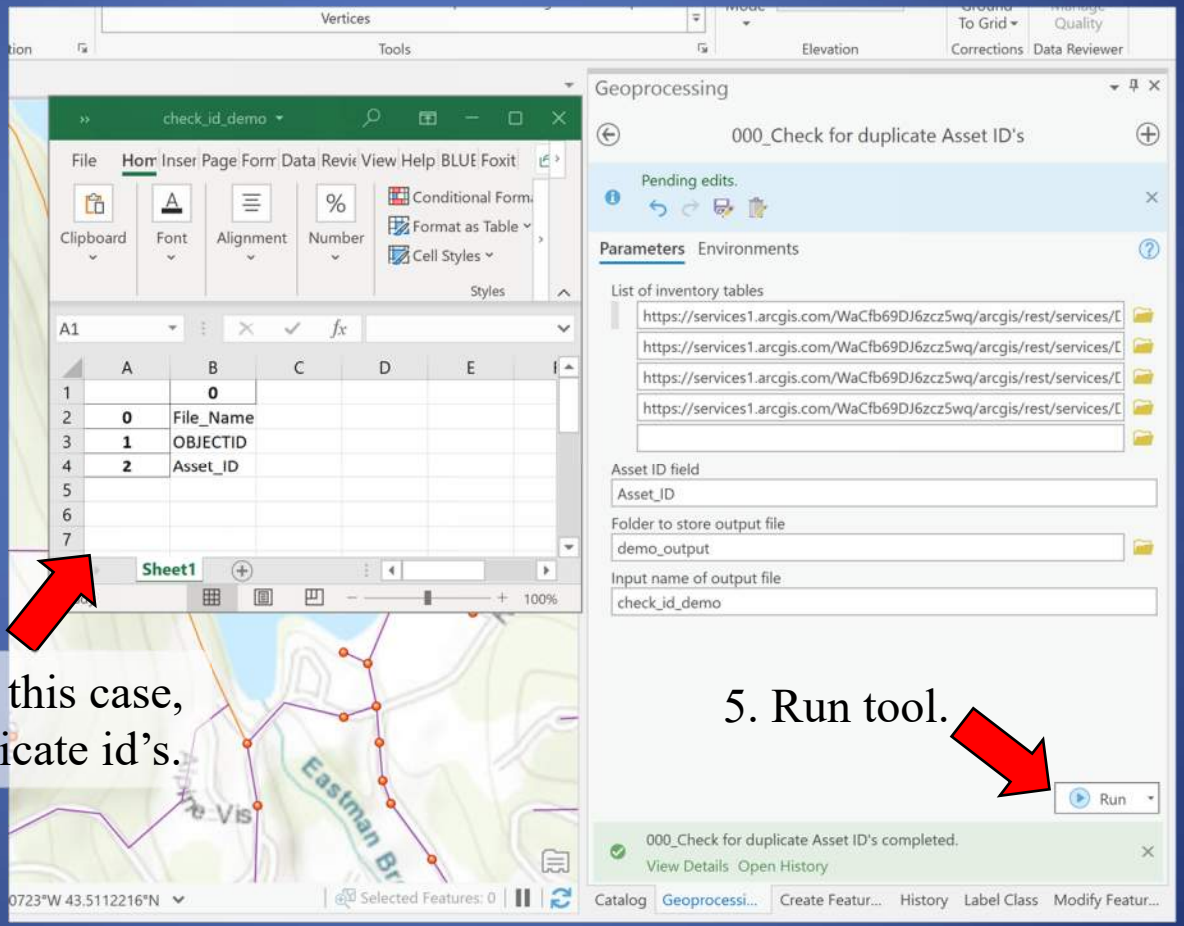


3. Click the folder icon to open the file browser and select a location to store the output excel file.

4. Give the file a name in this box.

ArcGIS Pro – Run Tools

Check for duplicate Asset ID's.



6. Check output. In this case, there are no duplicate id's.

5. Run tool.

ArcGIS Pro – Run Tools

Calculate fields in inventory files.

1. Click the folder icon to open the file browser. Navigate to the geodatabase where all the feature classes are stored and select them.

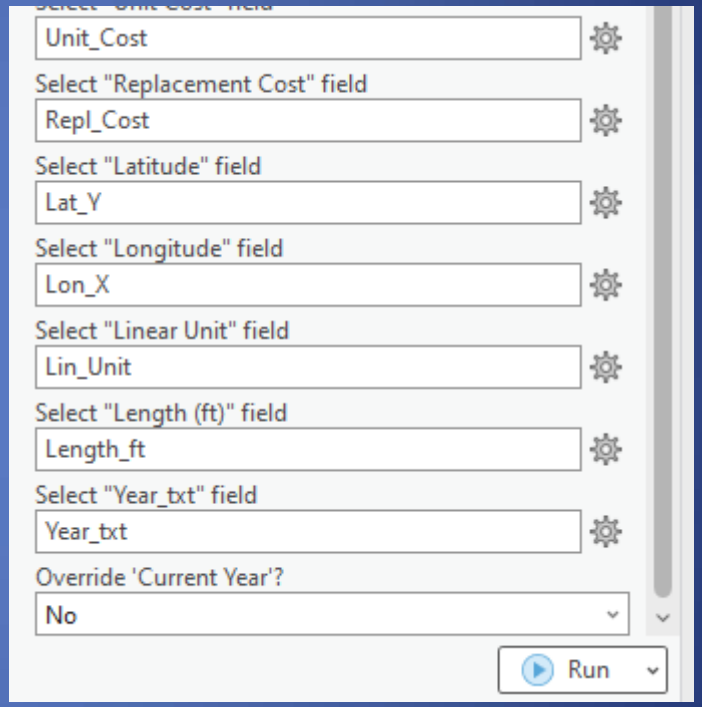
2. These fields will be input automatically when you open the tool. Leave them as the default selection.

Note. See Appendix A-5 of Wastewater and Stormwater Asset Management Program report for detailed explanation of calculations.

ArcGIS Pro – Run Tools

Calculate fields in inventory files.

3. Note that the “current year” used in the calculations is assumed to be the current year. If you want change the year to explore different cost analyses for the system, select “Yes” and input the desired year.



4. Click “Run” to run the tool and perform the calculations.

ArcGIS Pro – Run Tools

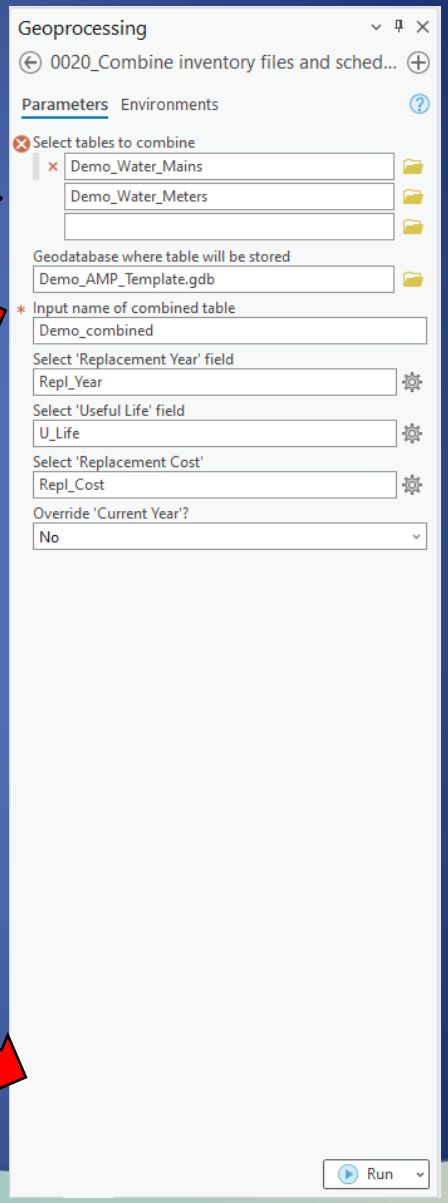
Combine Inventory Files Into One Table.

1. Navigate to the geodatabase with the tables you want to combine and select them.

2. Select a geodatabase to store the combined table in. Enter a name for the table.

3. Note that the "current year" used in the calculations is assumed to be the current year. If you want change the year to explore different cost analyses for the system, select "Yes" and input the desired year.

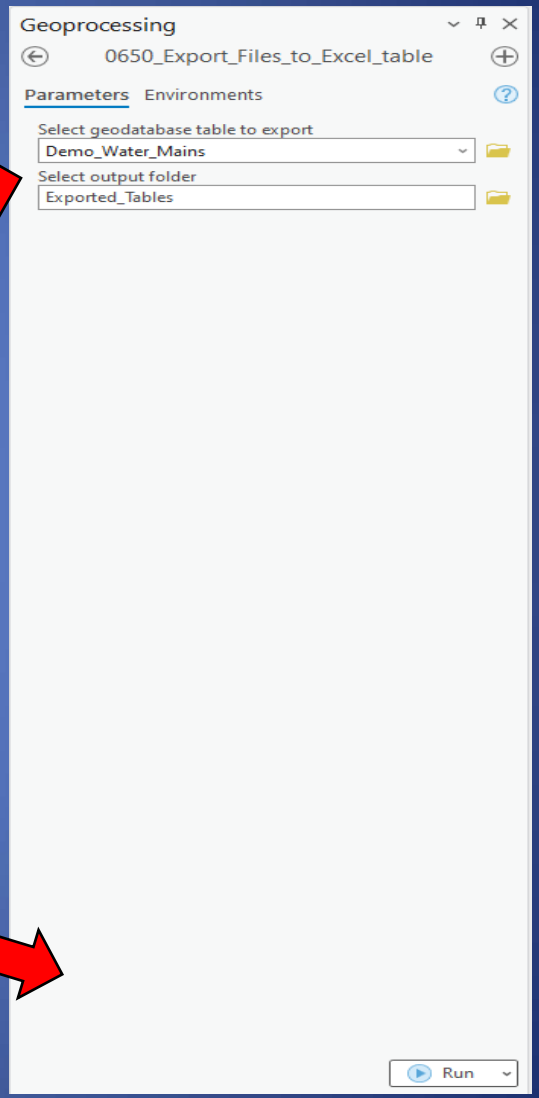
4. Click "Run" to combine the inventory into one table. This tool also calculates replacement costs.



ArcGIS Pro – Run Tools

Export Combined Table to Excel File.

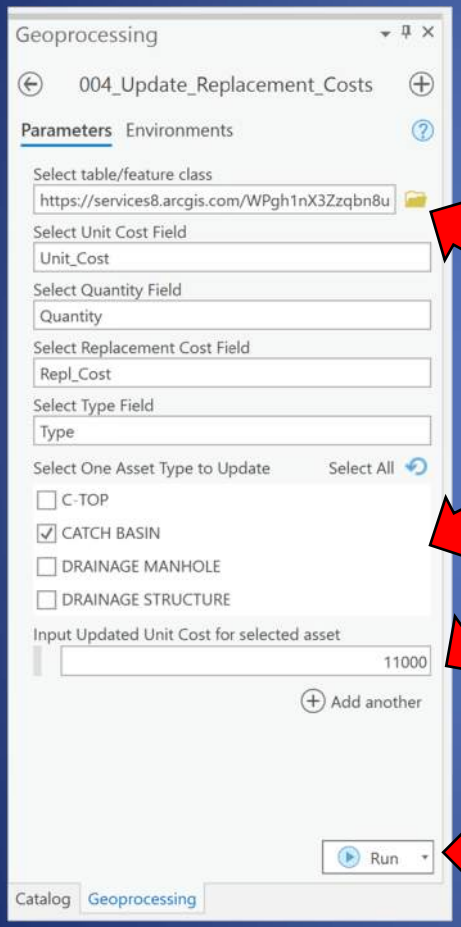
1. Navigate to the geodatabase where you stored the combine inventory table using the previous tool. Select a folder to store the excel file.



2. Click "Run" to export the file. Note that this tool not only converts the table to excel format, but also automatically formats the data in the excel sheet to be in table format. This will allow us to create the Pivot Tables you will see later in this PowerPoint.

ArcGIS Pro – Run Tools

Update Replacement Costs.



If you wish to update the "unit cost" field for a group of assets, you can use this tool to easily enter a new unit cost. This tool also updates the replacement cost at the same time based on the new unit cost.

1. Select the table or feature class containing the asset type you want to update.

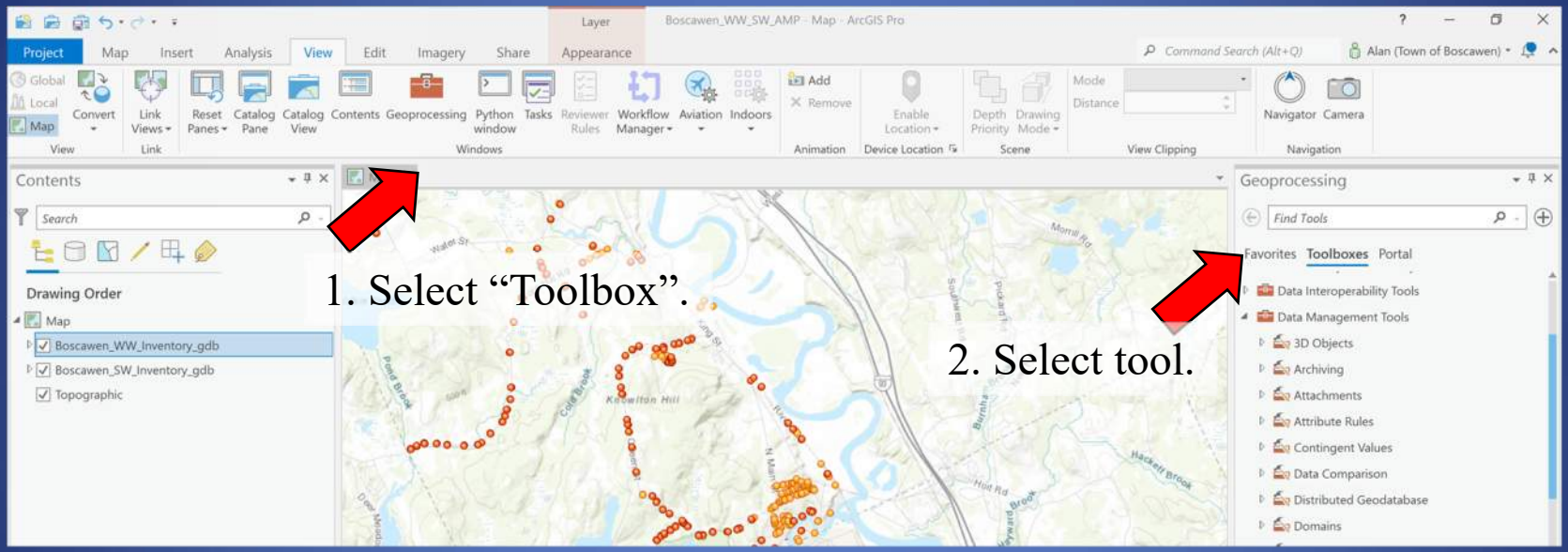
2. Select the asset type you want to update.

3. Enter the new unit cost for the selected asset.

4. Click "Run" to update the table/feature class.

ArcGIS Pro – Find Tools

How to Access Built-in Geoprocessing Tools

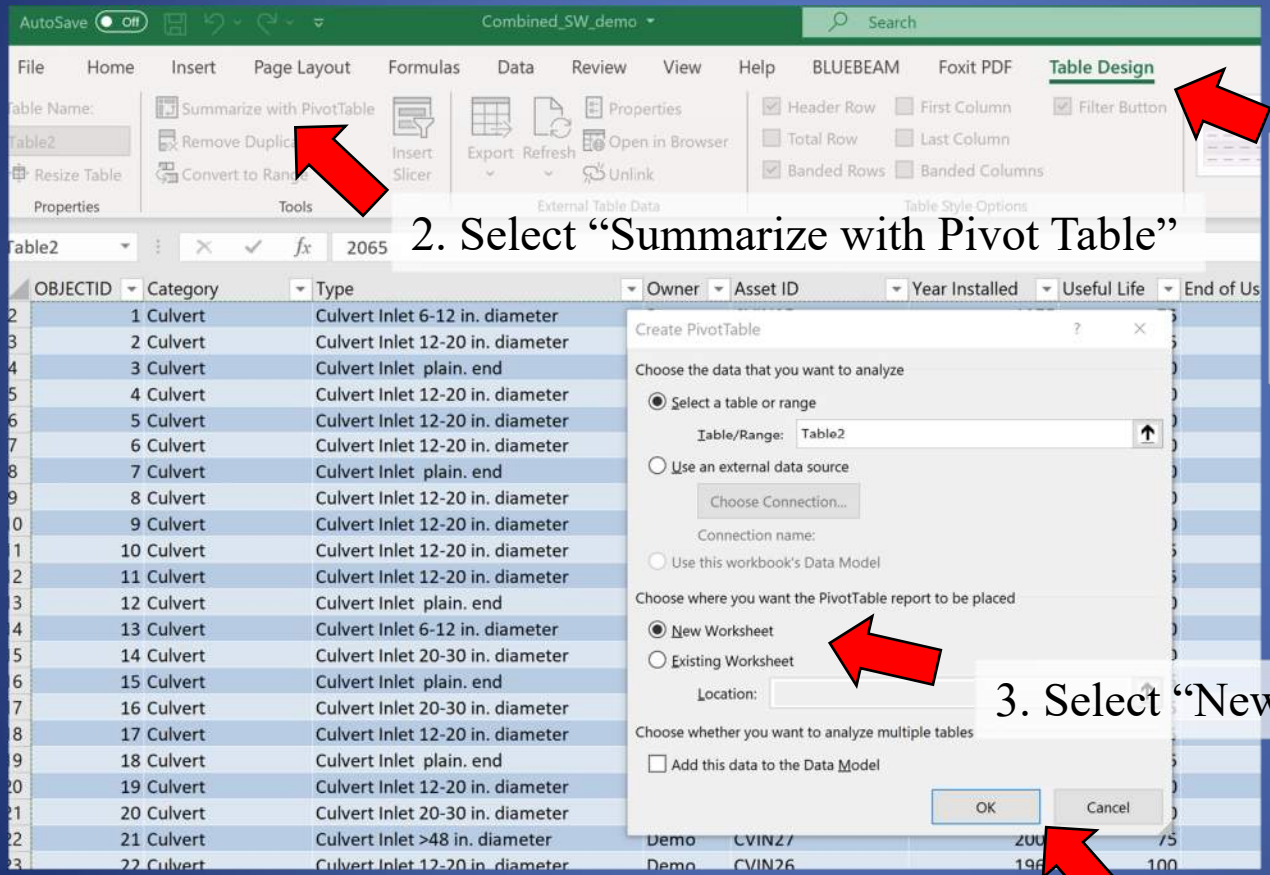


Additional resources on how to use ArcGIS Pro:

- https://www.youtube.com/watch?v=9pbdBOjJaTg
- https://www.youtube.com/watch?v=hjZMFkjuQcc

Excel Pivot Tables

Open the combined table created with the export to excel table tool



2. Select "Summarize with Pivot Table"

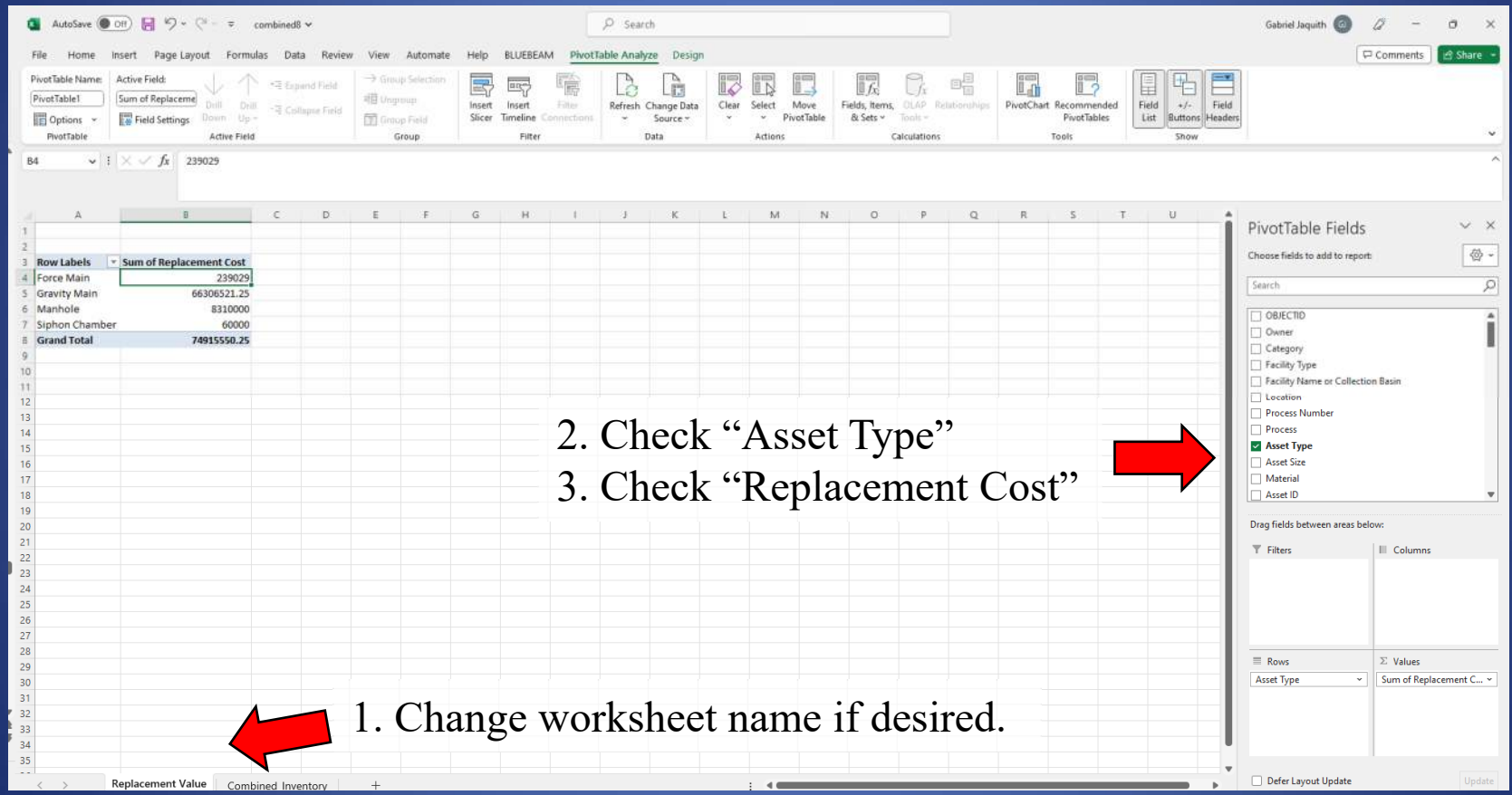
1. Navigate to the "Table Design" tab at the top of the excel sheet

3. Select "New Worksheet"

4. Select "OK"

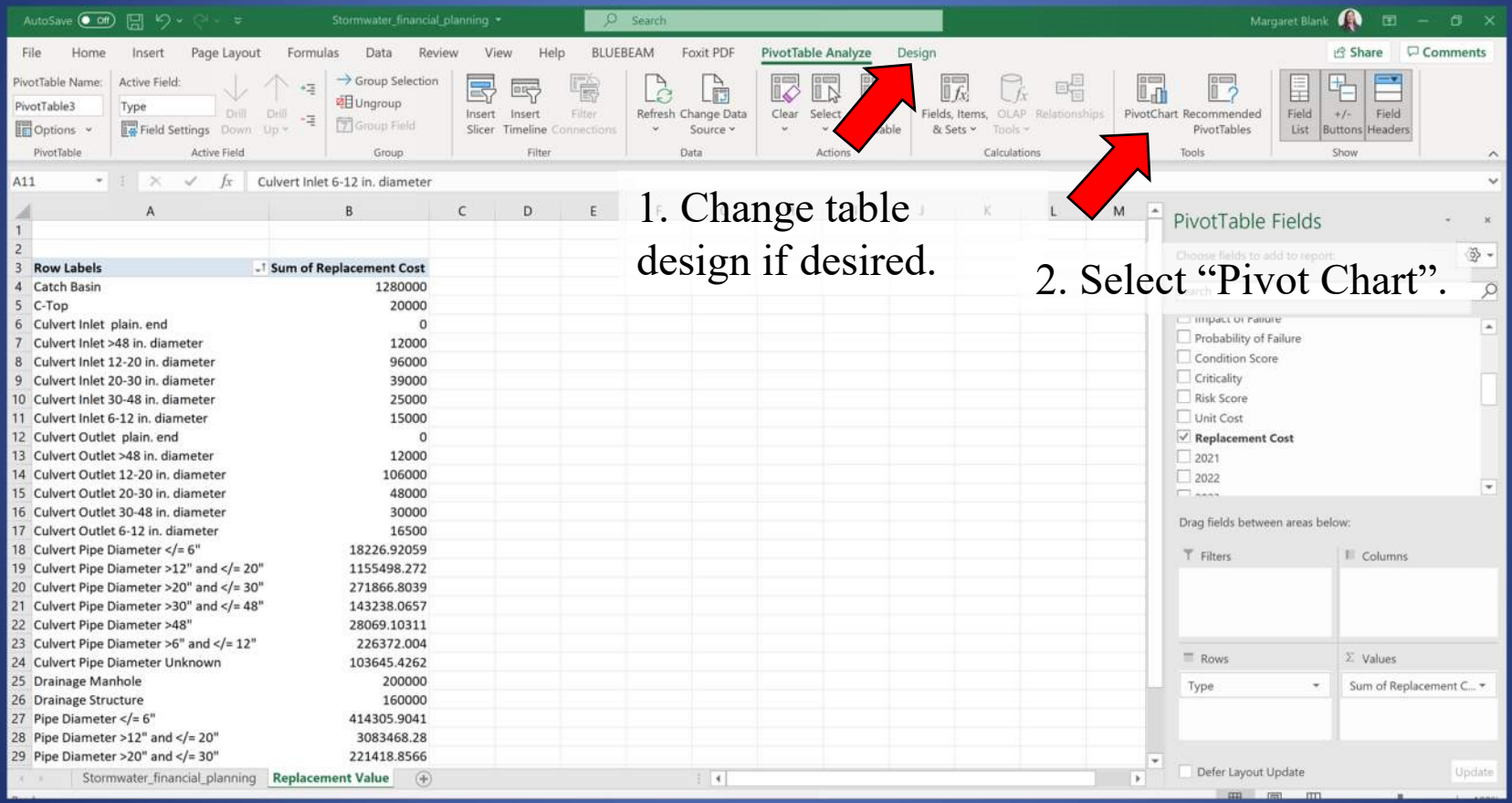
Excel Pivot Tables

Replacement Value and Pie Chart.



Excel Pivot Tables

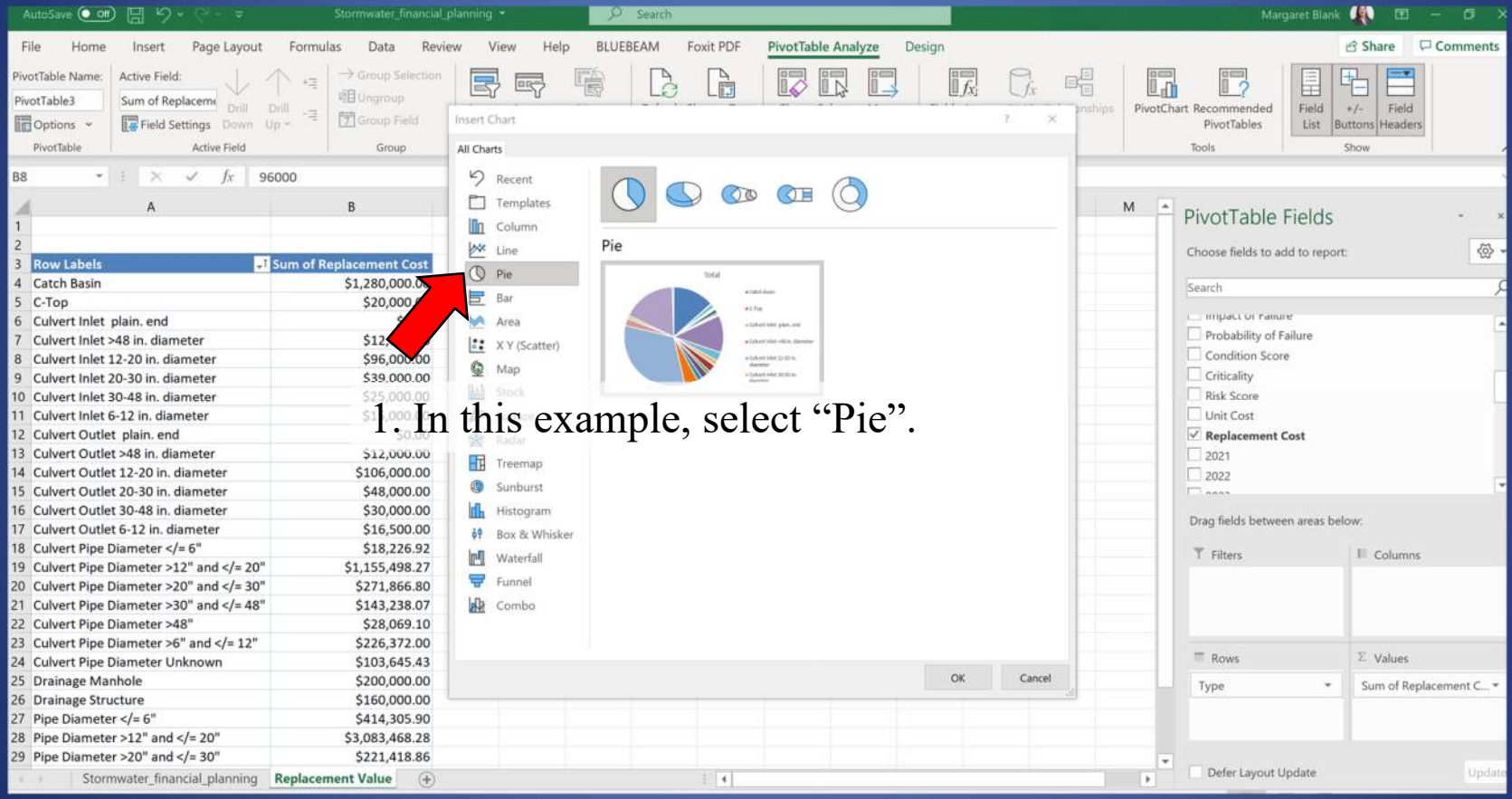
Replacement Value and Pie Chart.



Row Labels	Sum of Replacement Cost
Catch Basin	1280000
C-Top	20000
Culvert Inlet plain. end	0
Culvert Inlet >48 in. diameter	12000
Culvert Inlet 12-20 in. diameter	96000
Culvert Inlet 20-30 in. diameter	39000
Culvert Inlet 30-48 in. diameter	25000
Culvert Inlet 6-12 in. diameter	15000
Culvert Outlet plain. end	0
Culvert Outlet >48 in. diameter	12000
Culvert Outlet 12-20 in. diameter	106000
Culvert Outlet 20-30 in. diameter	48000
Culvert Outlet 30-48 in. diameter	30000
Culvert Outlet 6-12 in. diameter	16500
Culvert Pipe Diameter </= 6"	18226.92059
Culvert Pipe Diameter >12" and </= 20"	1155498.272
Culvert Pipe Diameter >20" and </= 30"	271866.8039
Culvert Pipe Diameter >30" and </= 48"	143238.0657
Culvert Pipe Diameter >48"	28069.10311
Culvert Pipe Diameter >6" and </= 12"	226372.004
Culvert Pipe Diameter Unknown	103645.4262
Drainage Manhole	200000
Drainage Structure	160000
Pipe Diameter </= 6"	414305.9041
Pipe Diameter >12" and </= 20"	3083468.28
Pipe Diameter >20" and </= 30"	221418.8566

Excel Pivot Tables

Replacement Value and Pie Chart.

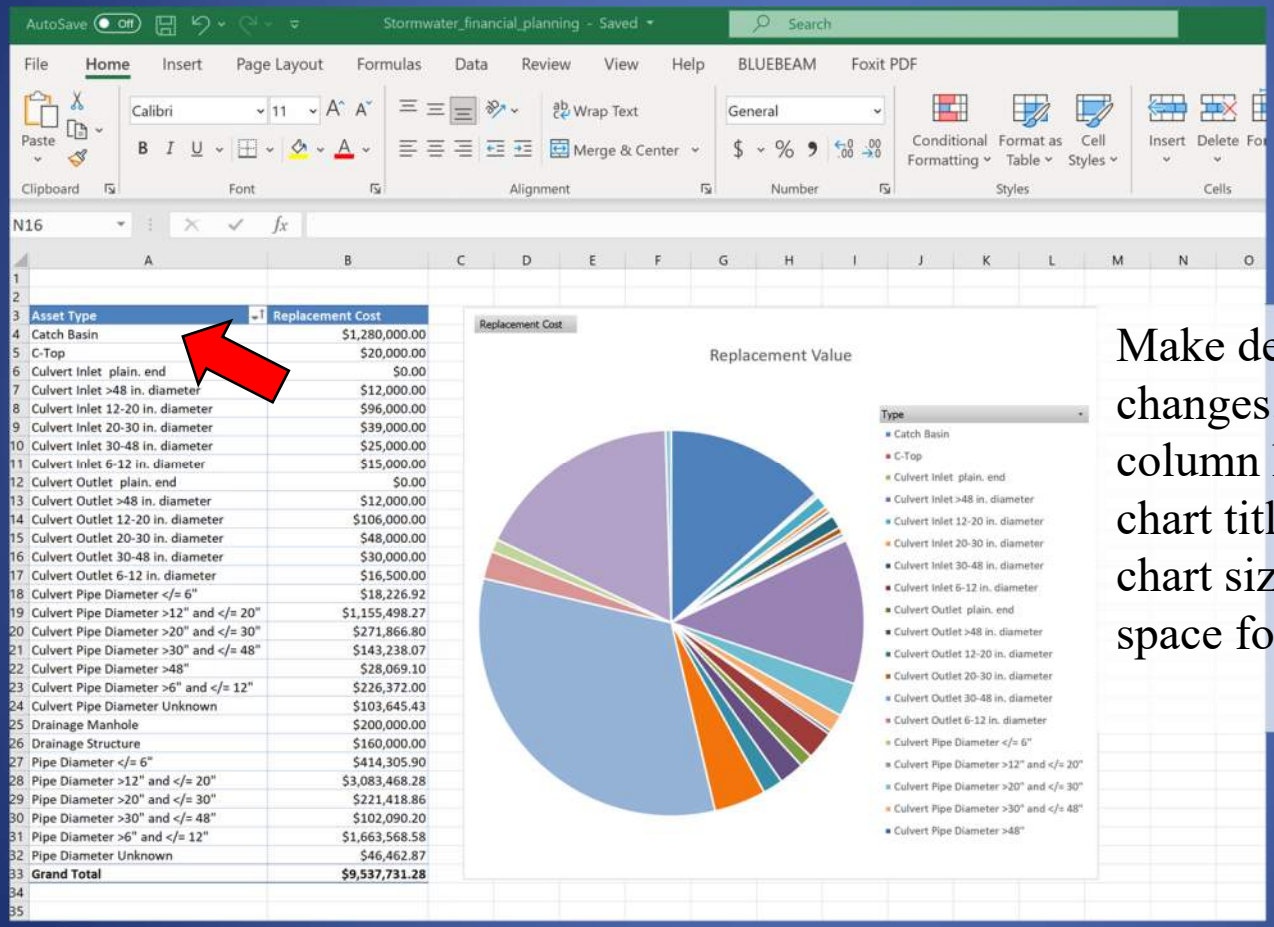


Row Labels	Sum of Replacement Cost
Catch Basin	$1,280,000.00
C-Top	$20,000.00
Culvert Inlet plain. end	
Culvert Inlet >48 in. diameter	$12
Culvert Inlet 12-20 in. diameter	$96,000.00
Culvert Inlet 20-30 in. diameter	$39,000.00
Culvert Inlet 30-48 in. diameter	$25,000.00
Culvert Inlet 6-12 in. diameter	$1,000.00
Culvert Outlet plain. end	$0.00
Culvert Outlet >48 in. diameter	$12,000.00
Culvert Outlet 12-20 in. diameter	$106,000.00
Culvert Outlet 20-30 in. diameter	$48,000.00
Culvert Outlet 30-48 in. diameter	$30,000.00
Culvert Outlet 6-12 in. diameter	$16,500.00
Culvert Pipe Diameter </= 6"	$18,226.92
Culvert Pipe Diameter >12" and </= 20"	$1,155,498.27
Culvert Pipe Diameter >20" and </= 30"	$271,866.80
Culvert Pipe Diameter >30" and </= 48"	$143,238.07
Culvert Pipe Diameter >48"	$28,069.10
Culvert Pipe Diameter >6" and </= 12"	$226,372.00
Culvert Pipe Diameter Unknown	$103,645.43
Drainage Manhole	$200,000.00
Drainage Structure	$160,000.00
Pipe Diameter </= 6"	$414,305.90
Pipe Diameter >12" and </= 20"	$3,083,468.28
Pipe Diameter >20" and </= 30"	$221,418.86

1. In this example, select “Pie”.

Excel Pivot Tables

Replacement Value and Pie Chart.

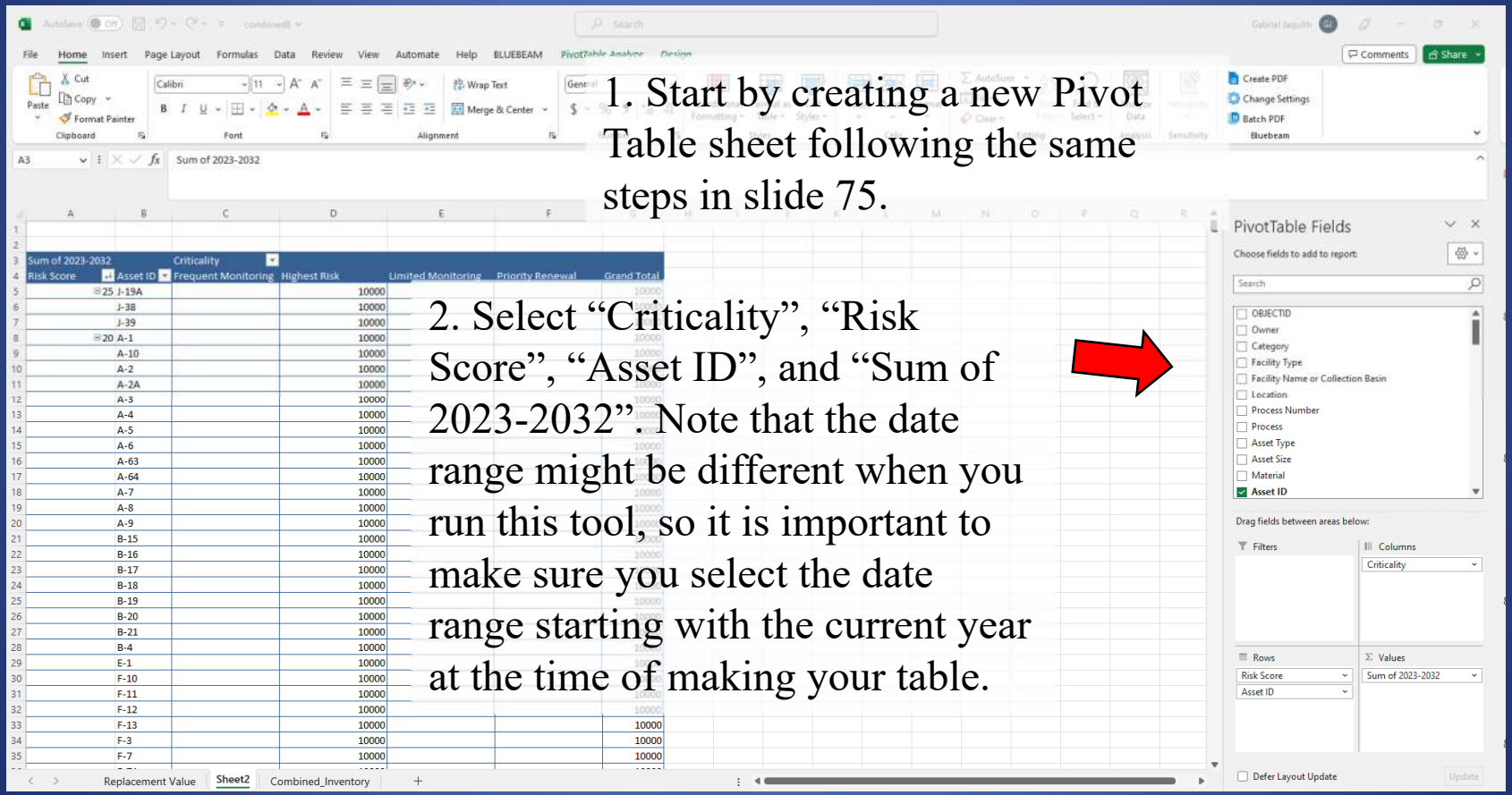


Asset Type	Replacement Cost
Catch Basin	$1,280,000.00
C-Top	$20,000.00
Culvert Inlet plain. end	$0.00
Culvert Inlet >48 in. diameter	$12,000.00
Culvert Inlet 12-20 in. diameter	$96,000.00
Culvert Inlet 20-30 in. diameter	$39,000.00
Culvert Inlet 30-48 in. diameter	$25,000.00
Culvert Inlet 6-12 in. diameter	$15,000.00
Culvert Outlet plain. end	$0.00
Culvert Outlet >48 in. diameter	$12,000.00
Culvert Outlet 12-20 in. diameter	$106,000.00
Culvert Outlet 20-30 in. diameter	$48,000.00
Culvert Outlet 30-48 in. diameter	$30,000.00
Culvert Outlet 6-12 in. diameter	$16,500.00
Culvert Pipe Diameter </= 6"	$18,226.92
Culvert Pipe Diameter >12" and </= 20"	$1,155,498.27
Culvert Pipe Diameter >20" and </= 30"	$271,866.80
Culvert Pipe Diameter >30" and </= 48"	$143,238.07
Culvert Pipe Diameter >48"	$28,069.10
Culvert Pipe Diameter >6" and </= 12"	$226,372.00
Culvert Pipe Diameter Unknown	$103,645.43
Drainage Manhole	$200,000.00
Drainage Structure	$160,000.00
Pipe Diameter </= 6"	$414,305.90
Pipe Diameter >12" and </= 20"	$3,083,468.28
Pipe Diameter >20" and </= 30"	$221,418.86
Pipe Diameter >30" and </= 48"	$102,090.20
Pipe Diameter >6" and </= 12"	$1,663,568.58
Pipe Diameter Unknown	$46,462.87
Grand Total	**$9,537,731.28**

Make desired formatting changes. In this example, column headings were changed, chart title was changed, and chart size was enlarged to make space for legend.

Excel Pivot Tables

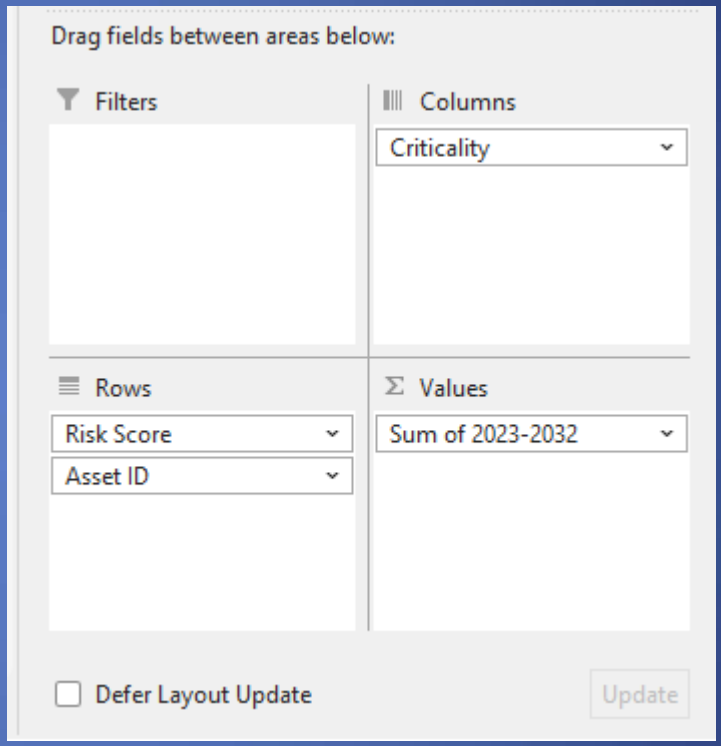
Ten-Year Look Ahead.



Excel Pivot Tables

Ten-Year Look Ahead.

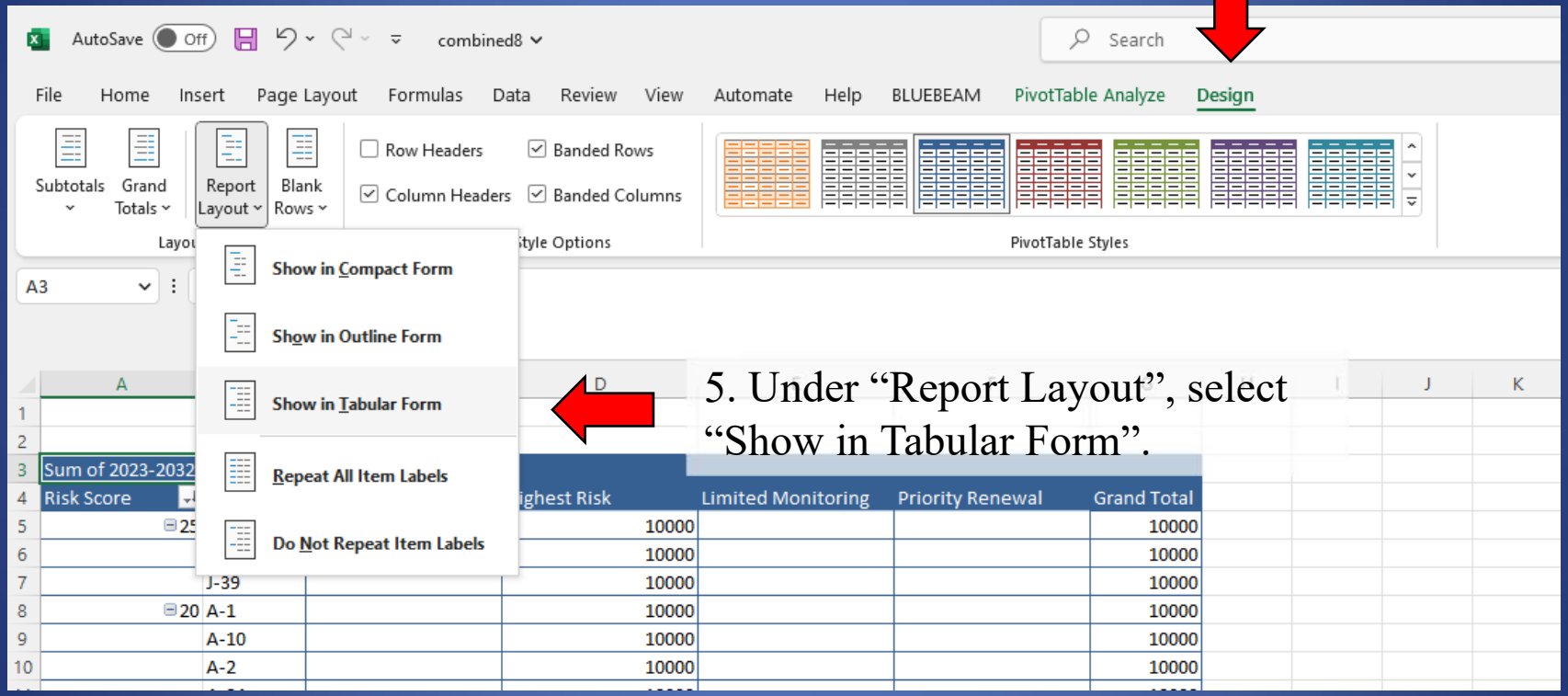
3. In the bottom right-hand side of the excel sheet, you should notice these boxes and they should display all the selections you made in the previous step. You can click and drag each of these selections. Make sure you drag each selection to copy the layout shown in this image.



Excel Pivot Tables

Ten-Year Look Ahead.

4. Navigate to the “Design” tab.

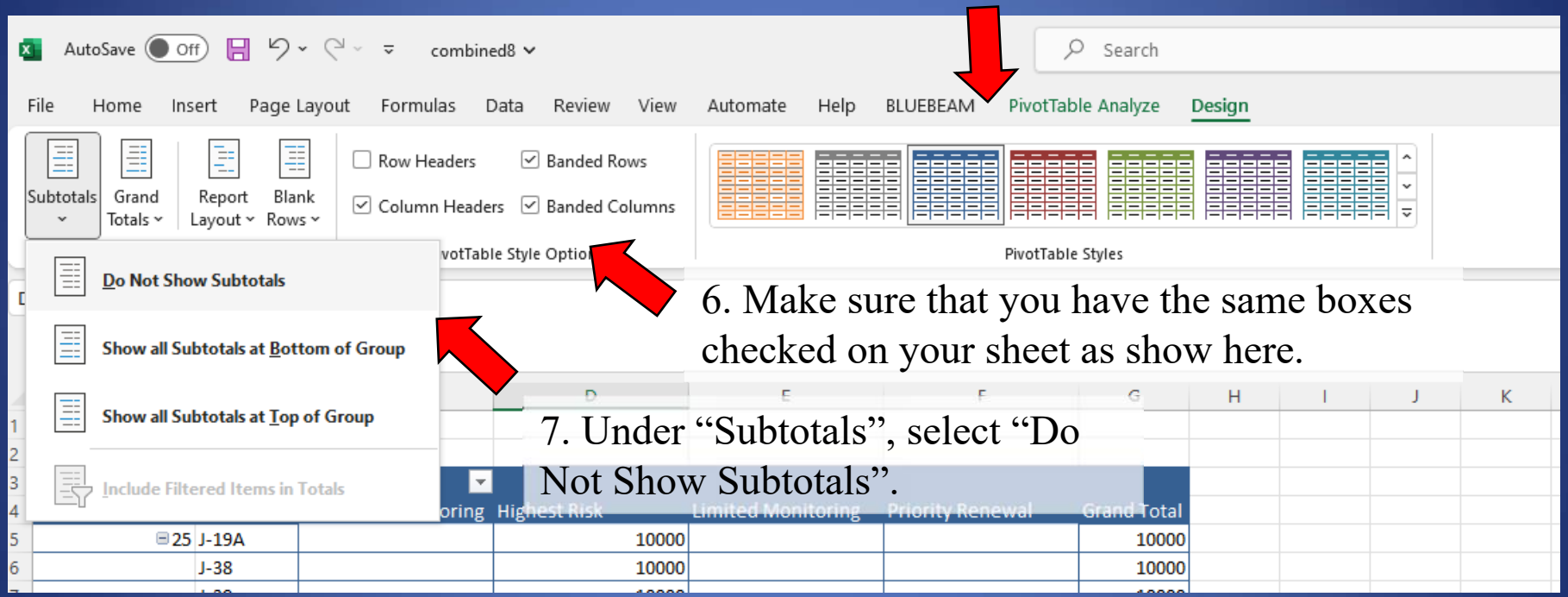


5. Under “Report Layout”, select “Show in Tabular Form”.

Excel Pivot Tables

Ten-Year Look Ahead.

Note that you can select a Pivot Table style here. You may pick whichever style you like best.

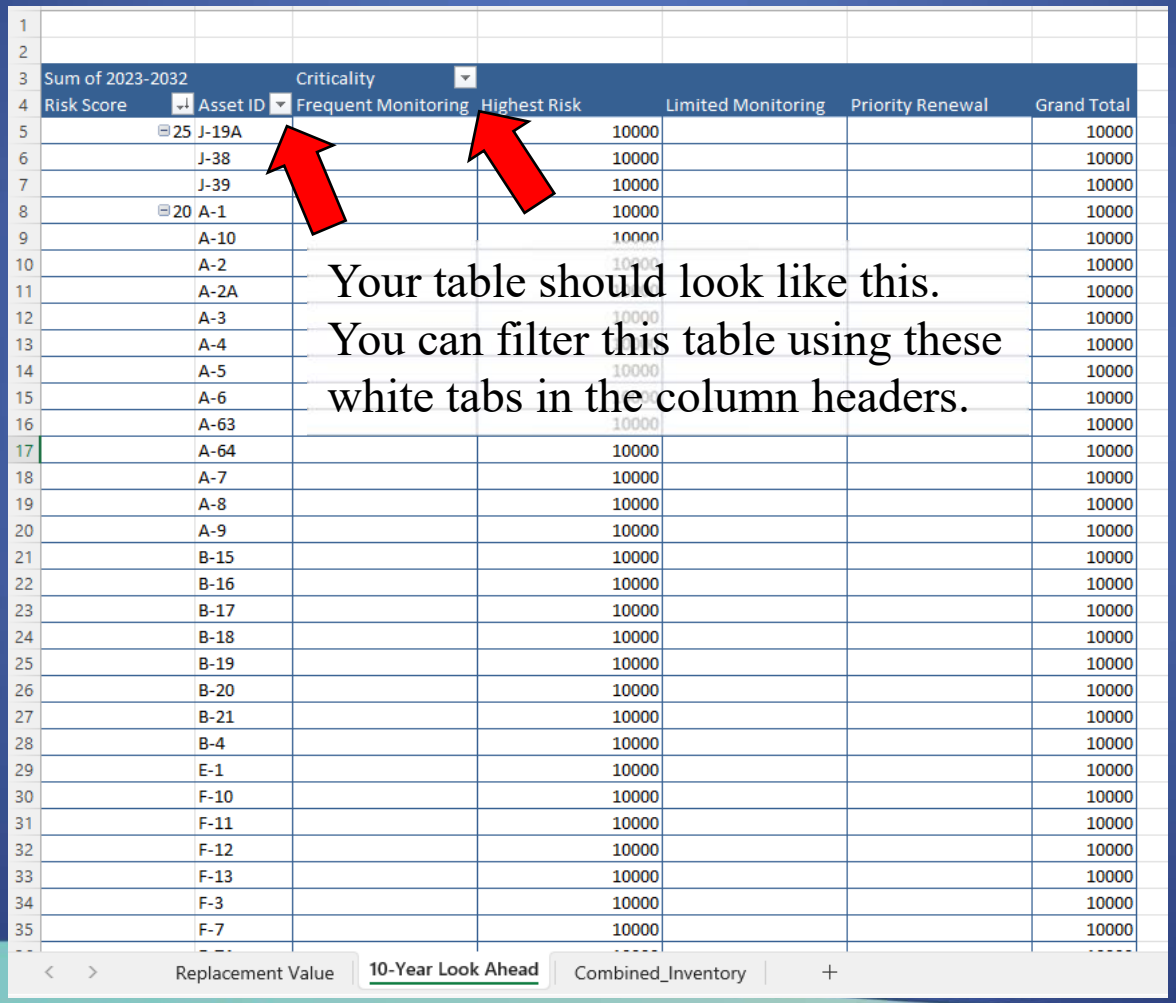


6. Make sure that you have the same boxes checked on your sheet as show here.

7. Under “Subtotals”, select “Do Not Show Subtotals”.

Excel Pivot Tables

Ten-Year Look Ahead.



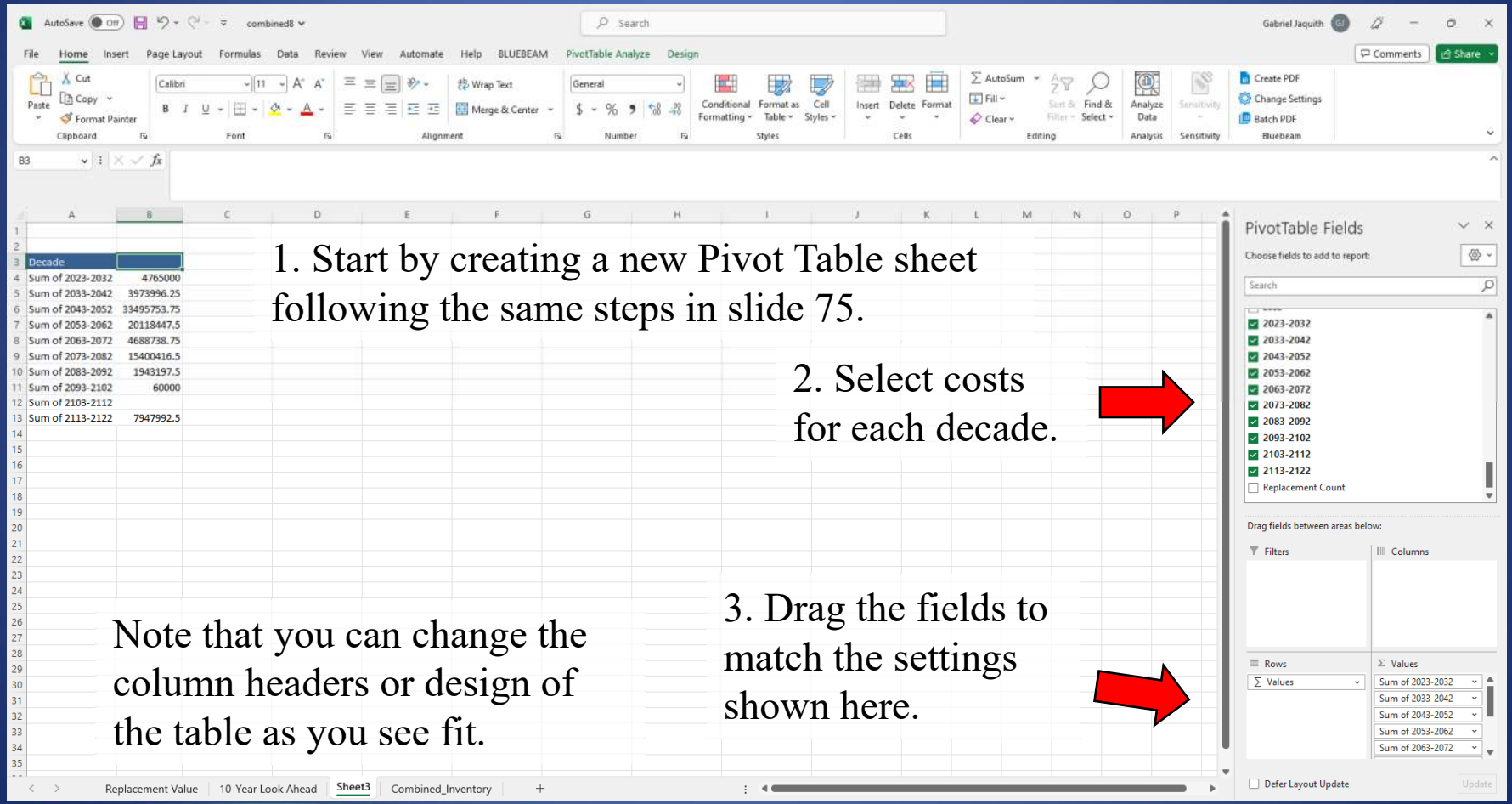
Sum of 2023-2032		Criticality				
Risk Score	Asset ID	Frequent Monitoring	Highest Risk	Limited Monitoring	Priority Renewal	Grand Total
25	J-19A		10000			10000
	J-38		10000			10000
	J-39		10000			10000
20	A-1		10000			10000
	A-10		10000			10000
	A-2					10000
	A-2A					10000
	A-3					10000
	A-4					10000
	A-5					10000
	A-6					10000
	A-63					10000
	A-64		10000			10000
	A-7		10000			10000
	A-8		10000			10000
	A-9		10000			10000
	B-15		10000			10000
	B-16		10000			10000
	B-17		10000			10000
	B-18		10000			10000
	B-19		10000			10000
	B-20		10000			10000
	B-21		10000			10000
	B-4		10000			10000
	E-1		10000			10000
	F-10		10000			10000
	F-11		10000			10000
	F-12		10000			10000
	F-13		10000			10000
	F-3		10000			10000
	F-7		10000			10000

Your table should look like this.
You can filter this table using these white tabs in the column headers.

Replacement Value | 10-Year Look Ahead | Combined_Inventory

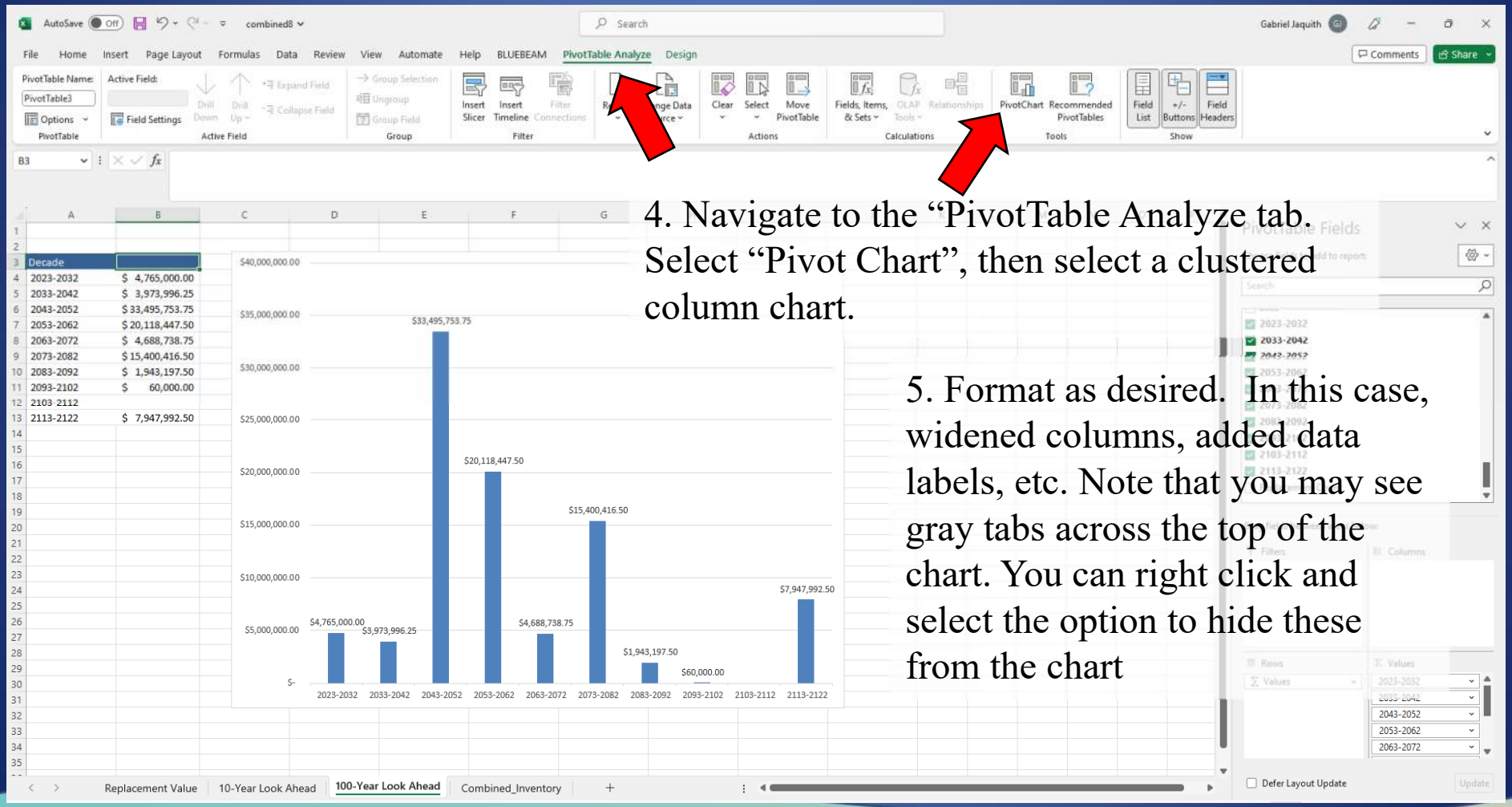
Excel Pivot Tables

One Hundred-Year Look Ahead.



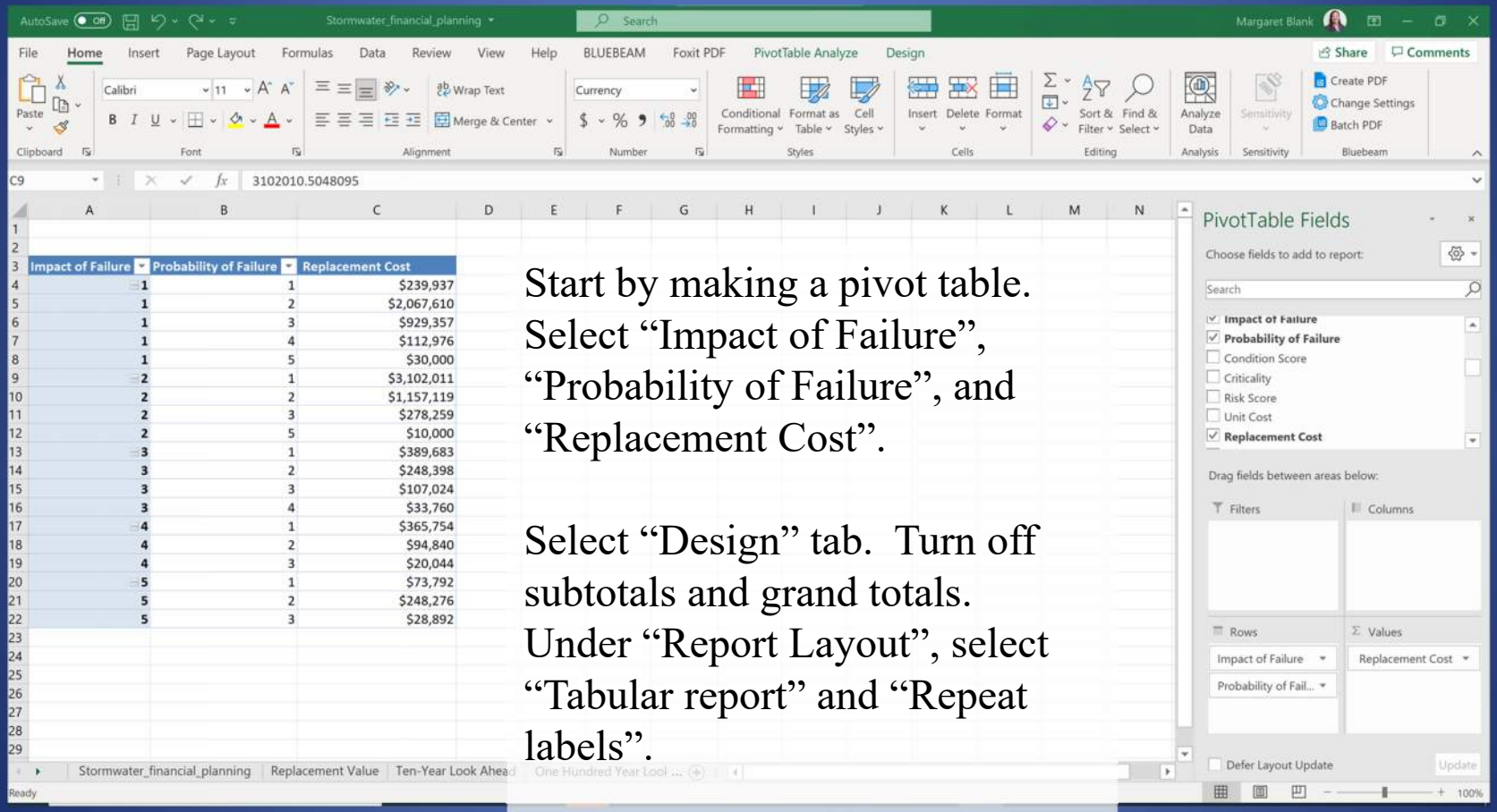
Excel Pivot Tables

One Hundred-Year Look Ahead.



Excel Pivot Tables

Criticality Bubble Chart.



Impact of Failure	Probability of Failure	Replacement Cost
1	1	$239,937
1	2	$2,067,610
1	3	$929,357
1	4	$112,976
1	5	$30,000
2	1	$3,102,011
2	2	$1,157,119
2	3	$278,259
2	5	$10,000
3	1	$389,683
3	2	$248,398
3	3	$107,024
3	4	$33,760
4	1	$365,754
4	2	$94,840
4	3	$20,044
5	1	$73,792
5	2	$248,276
5	3	$28,892

Excel Pivot Tables

Criticality Bubble Chart.

Impact of Failure	Probability of Failure	Replacement Cost
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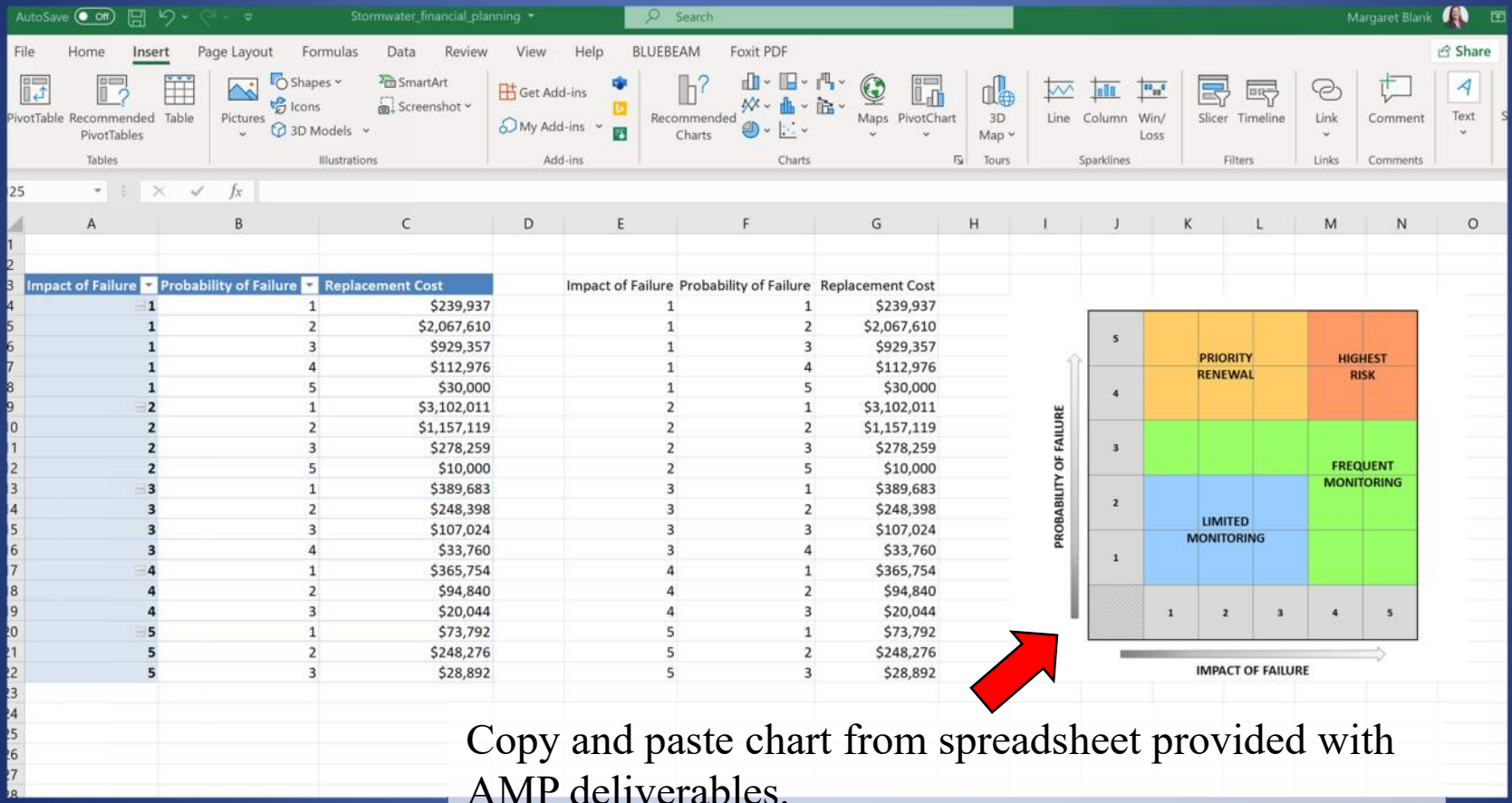
3	3	$107,024
3	4	$33,760
4	1	$365,754
4	2	$94,840
4	3	$20,044
5	1	$73,792
5	2	$248,276
5	3	$28,892

=A3

Use formulas to populate cells outside of pivot table with pivot table values. [Bubble chart is not an option for pivot tables.]

Excel Pivot Tables

Criticality Bubble Chart.



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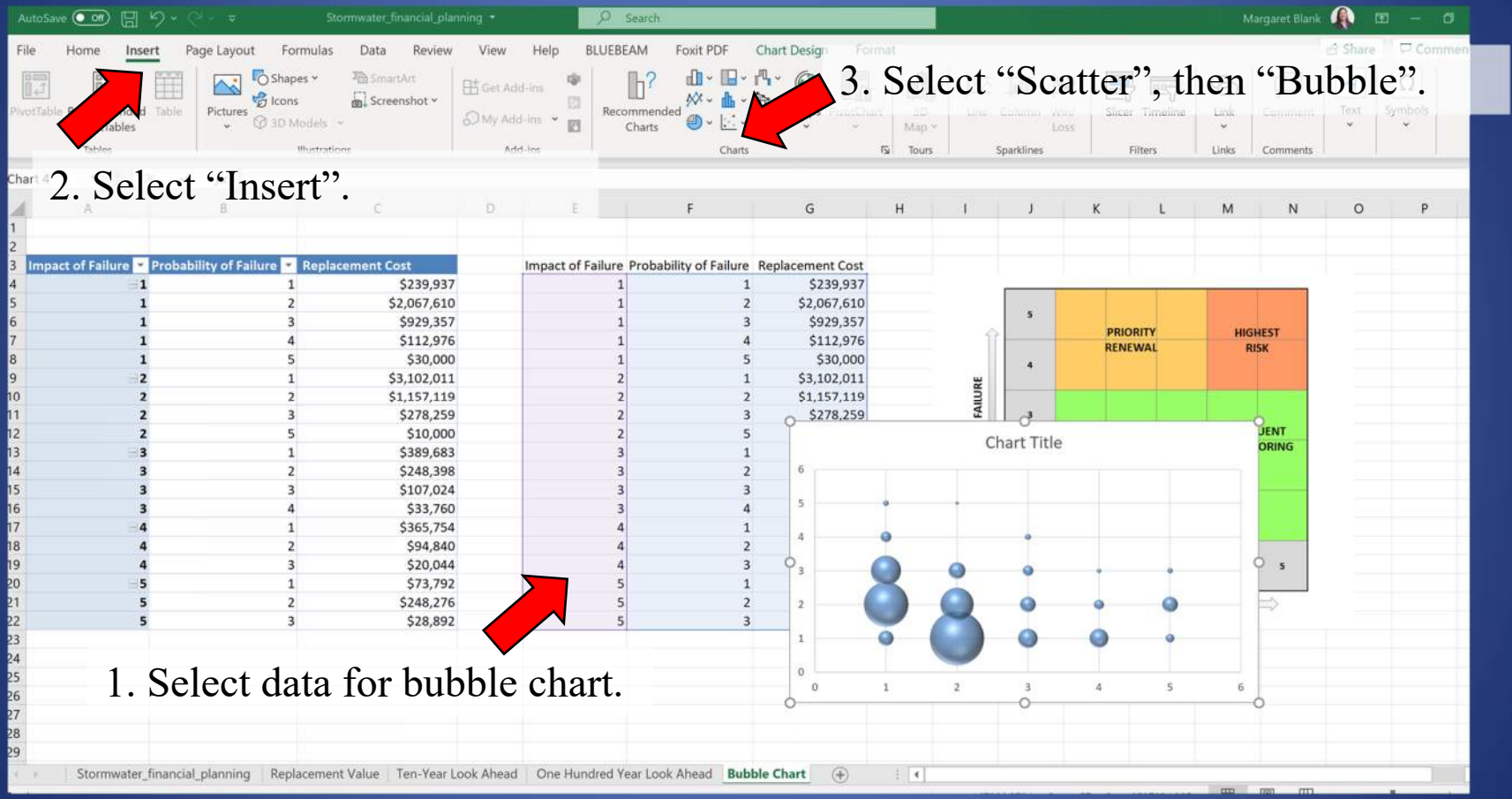
4	2	$94,840
4	3	$20,044
5	1	$73,792
5	2	$248,276
5	3	$28,892

Copy and paste chart from spreadsheet provided with AMP deliverables.

Excel Pivot Tables

Criticality Bubble Chart.



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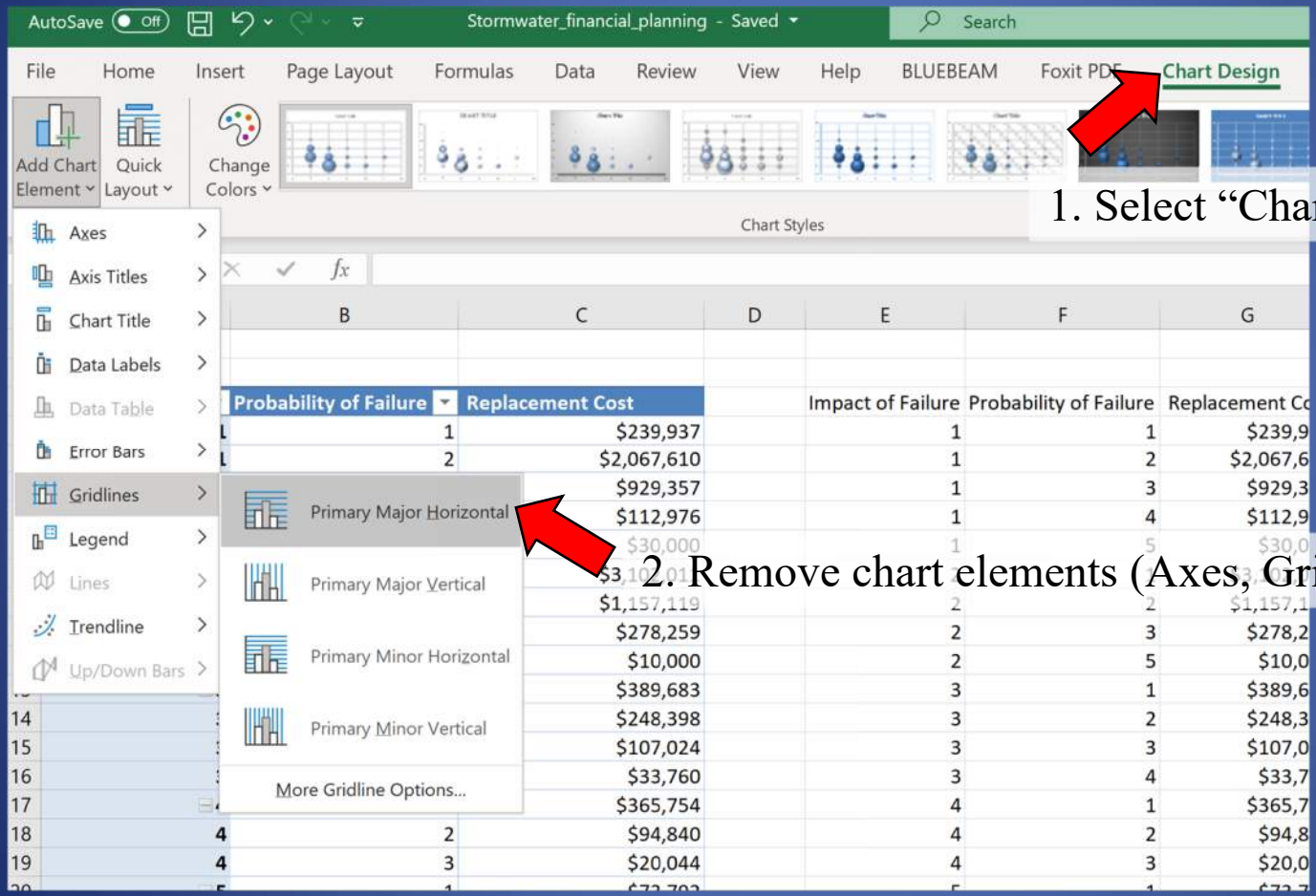
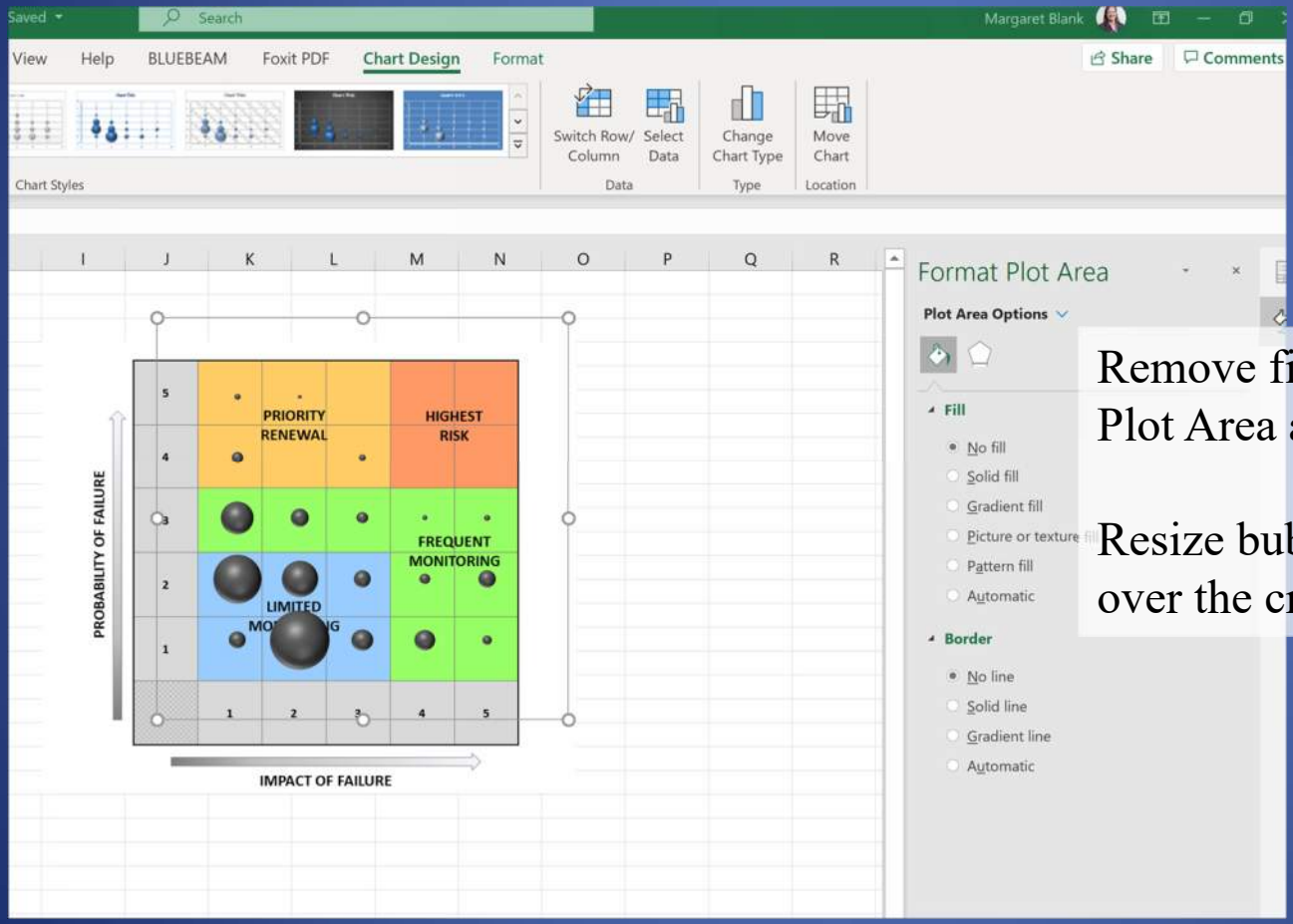
Excel Pivot Tables

Criticality Bubble Chart.



Excel Pivot Tables

Criticality Bubble Chart.

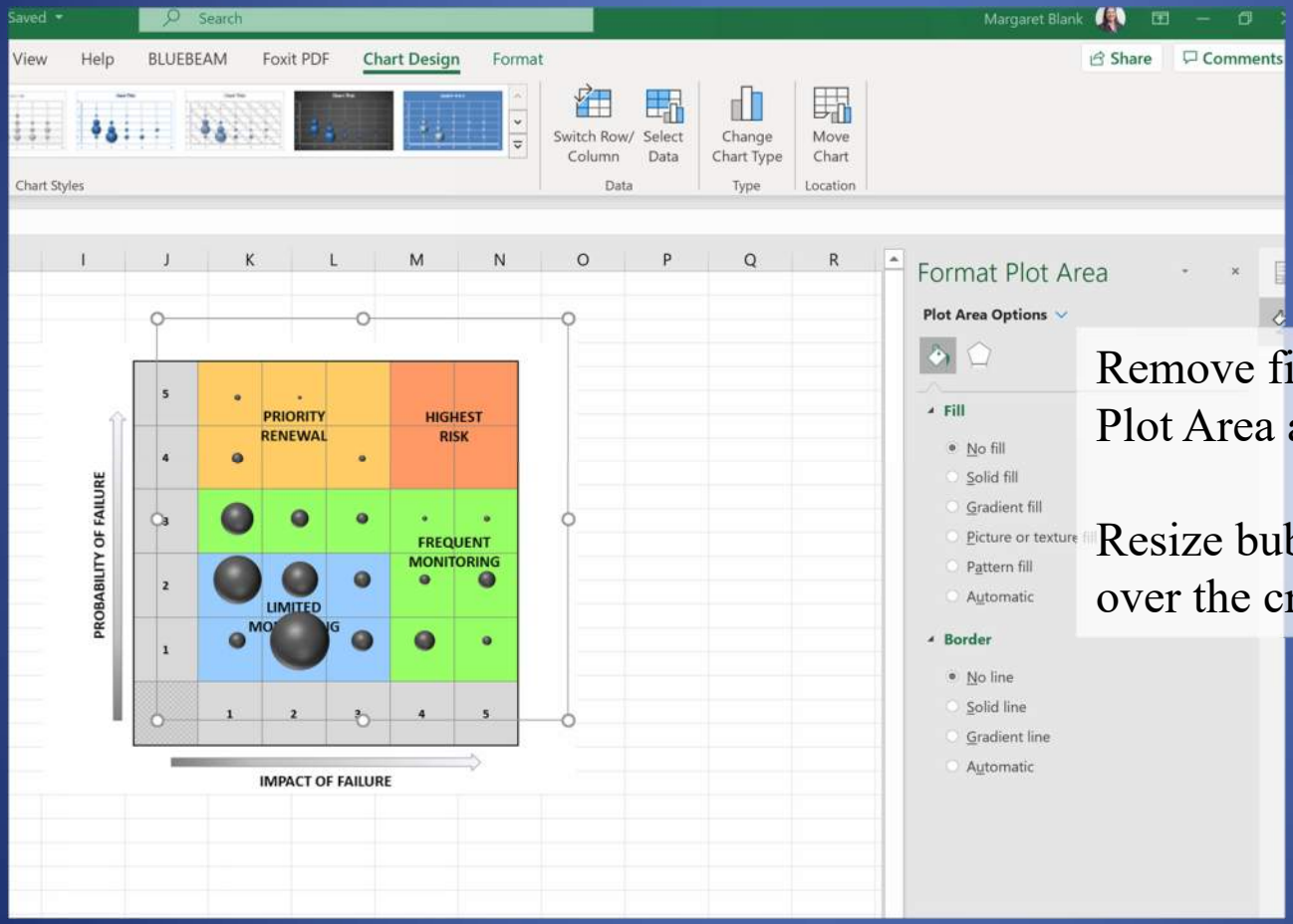


Remove fill and border from Plot Area and Chart Area.

Resize bubble chart so it sits over the criticality graphic.

Excel Pivot Tables

Criticality Bubble Chart.



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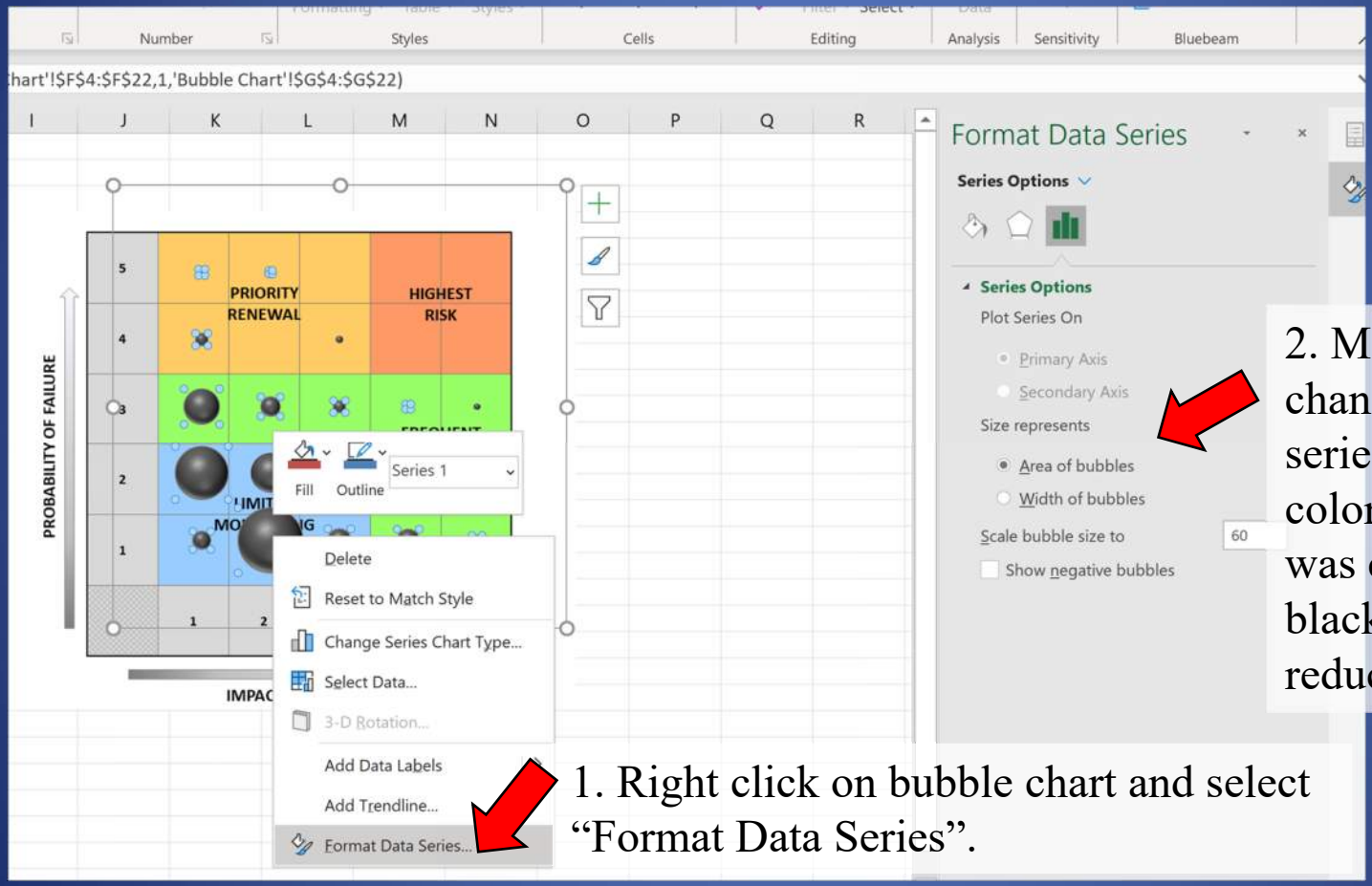
Resize bubble chart so it sits over the criticality graphic.

Excel Pivot Tables

Criticality Bubble Chart.



2. Make desired changes to data series. In this case, color of bubbles was changed to black and size was reduced to 60%.

1. Right click on bubble chart and select "Format Data Series".

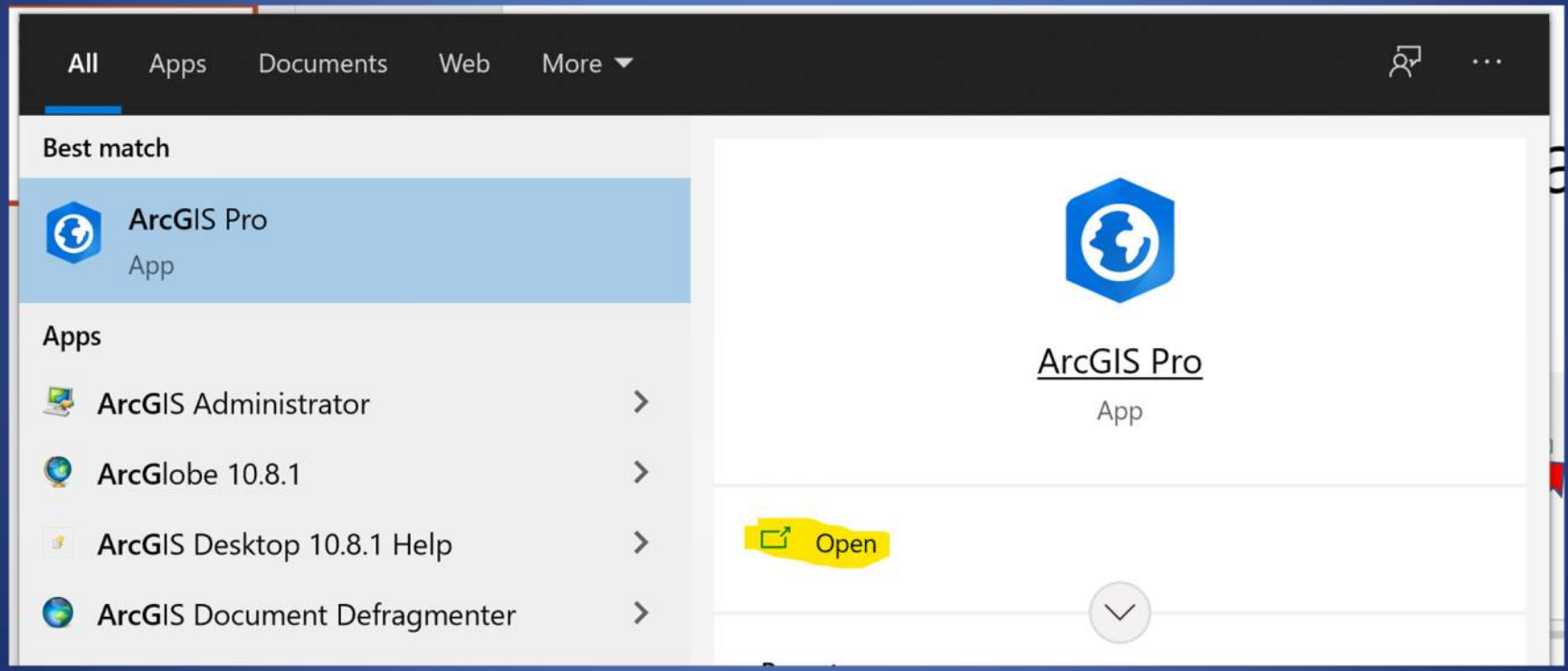
Excel Pivot Tables

Additional Pivot Table Resource

- https://www.youtube.com/watch?v=UsdedFoTA68

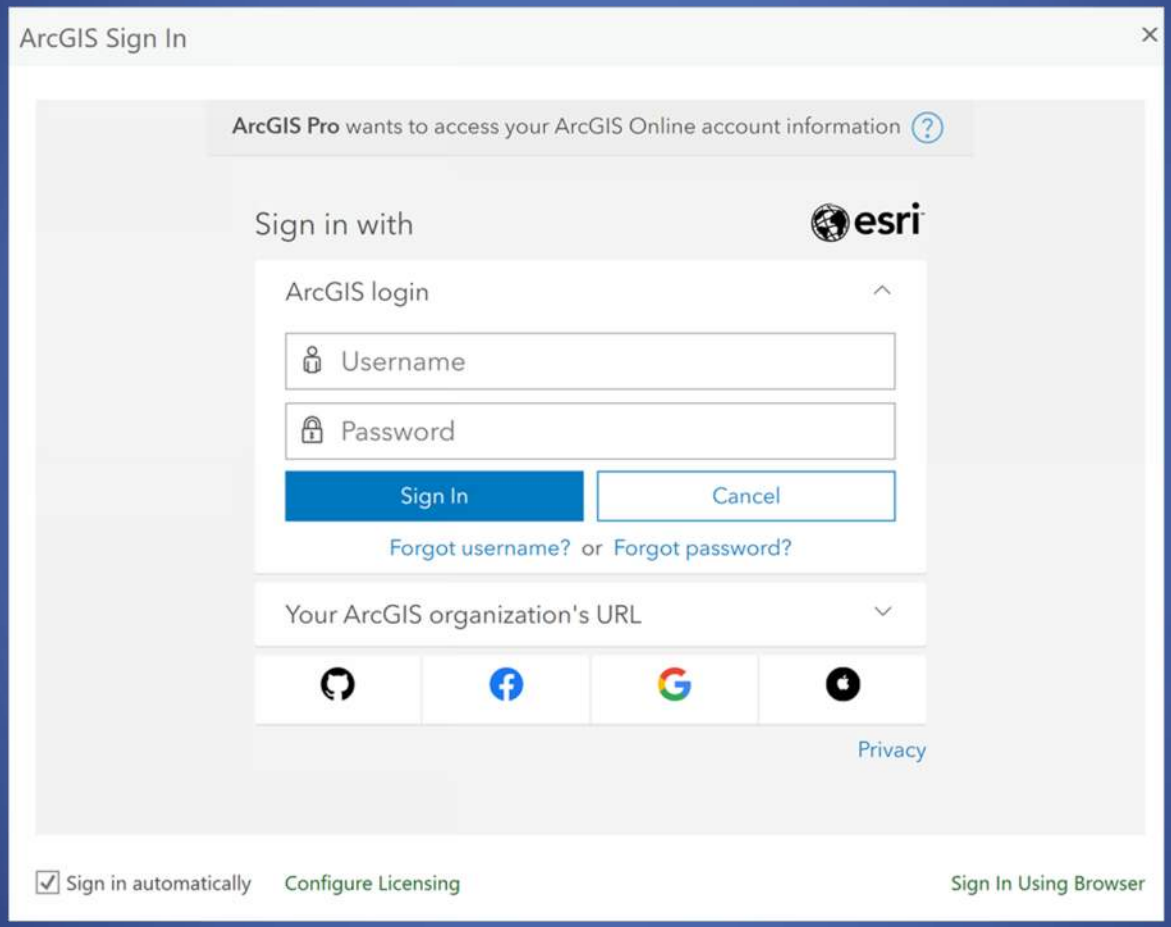
Backup AGOL Files

Type “ArcGIS Pro” in search bar. Select “Open”.



Backup AGOL Files

Log in.

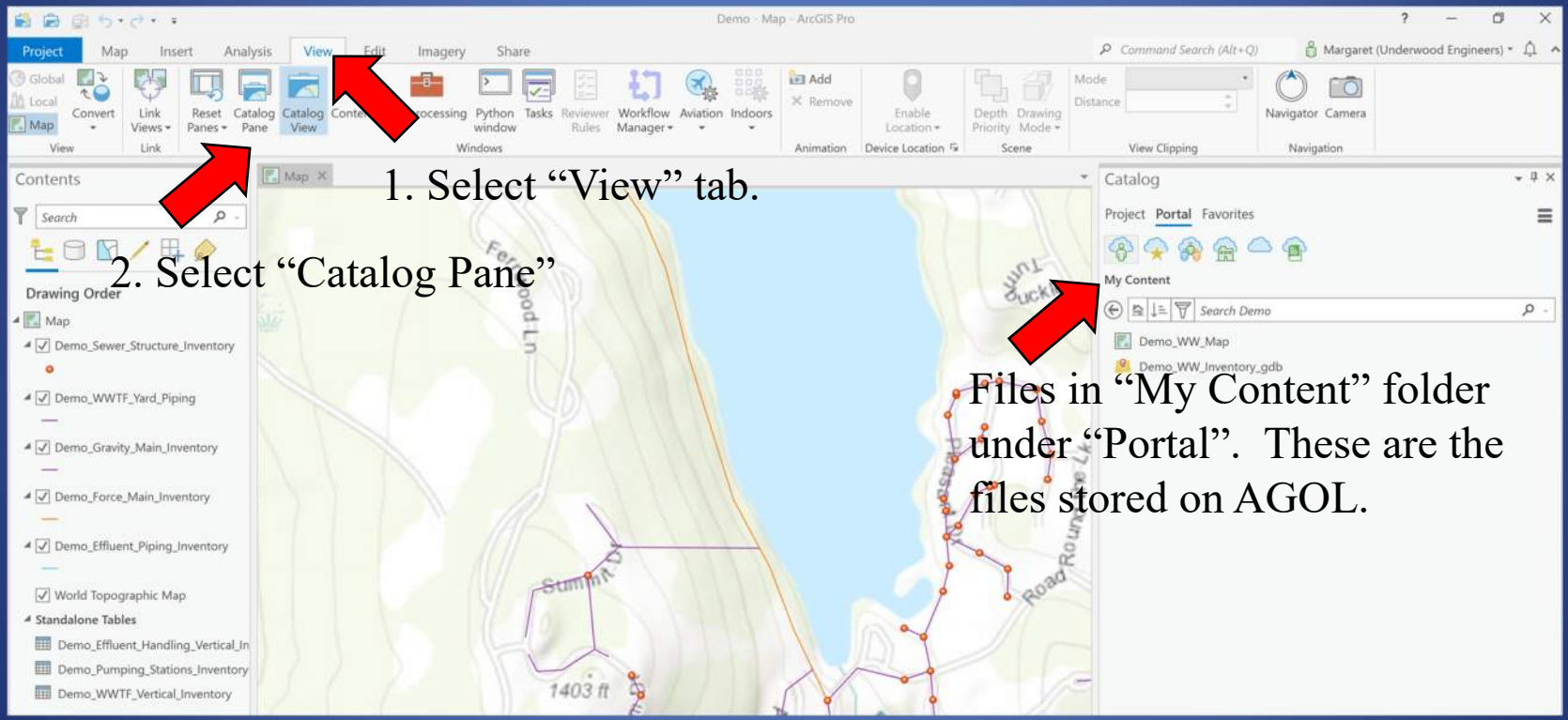


Backup AGOL Files

Open an existing project or create a new one.

Backup AGOL Files

1. Select “View” tab. 2. Select “Catalog Pane”.

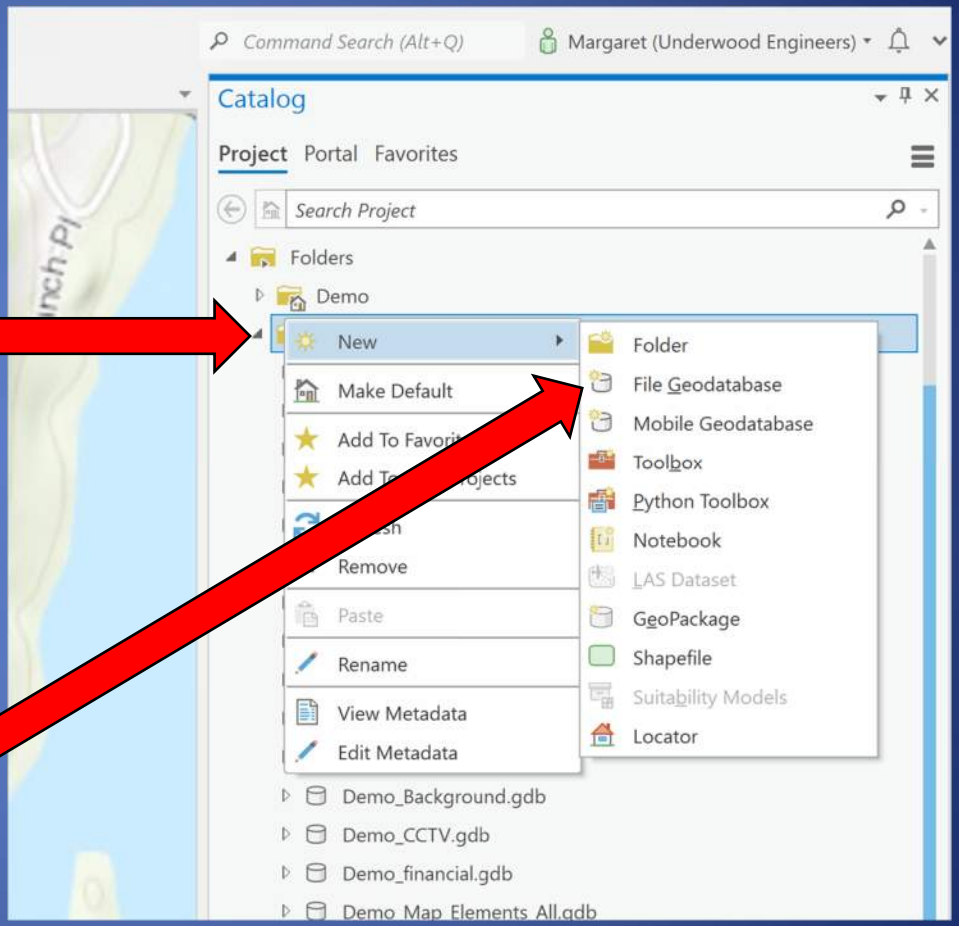


Backup AGOL Files

Select or create a file geodatabase where backups will be stored.

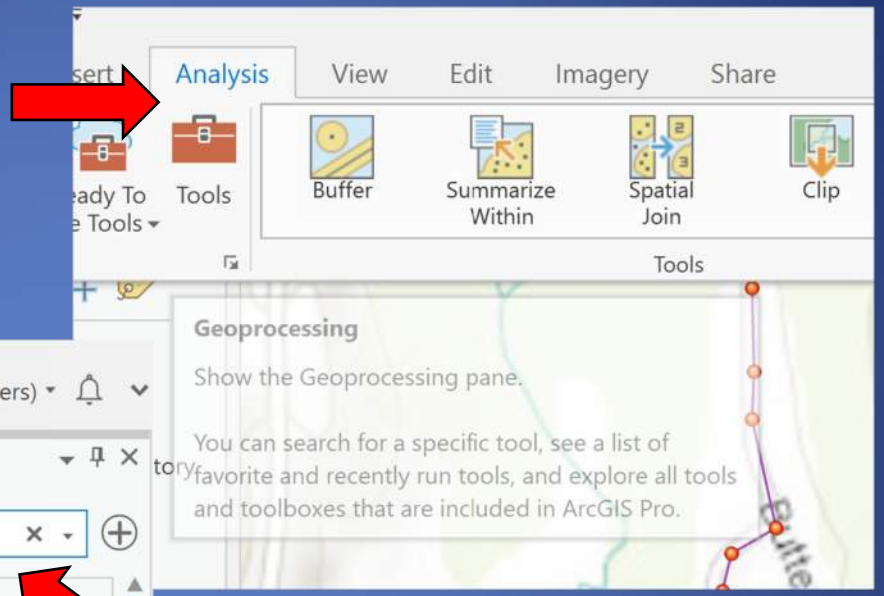
In catalog pane, expand “Folders”, select folder on network
or hard drive where backups will be stored.

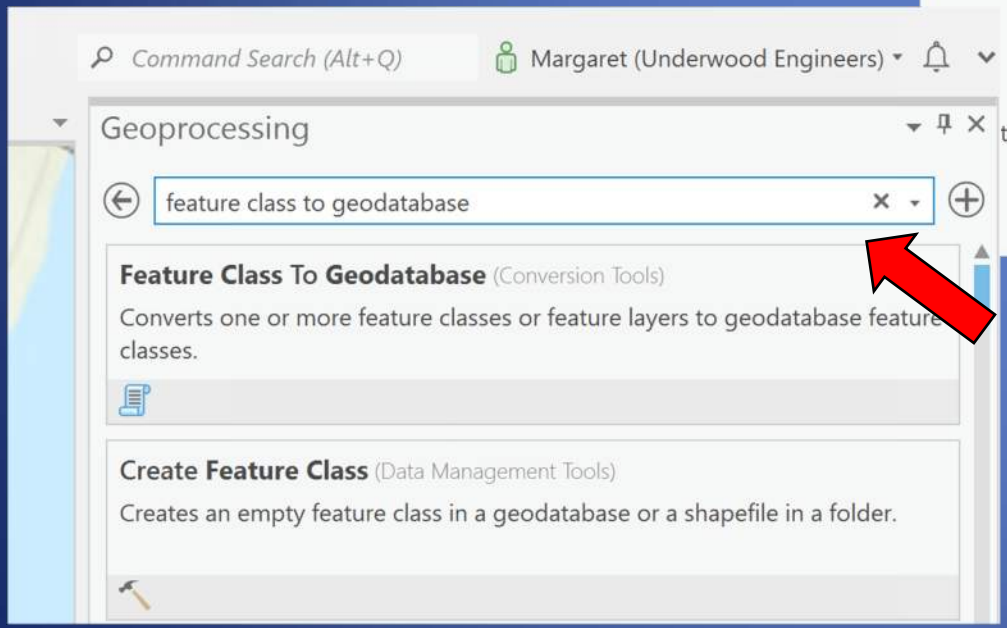
To create a new file geodatabase, right click on the
folder, select “Create New”, select “File geodatabase”,
type name of new database.



Backup AGOL Files

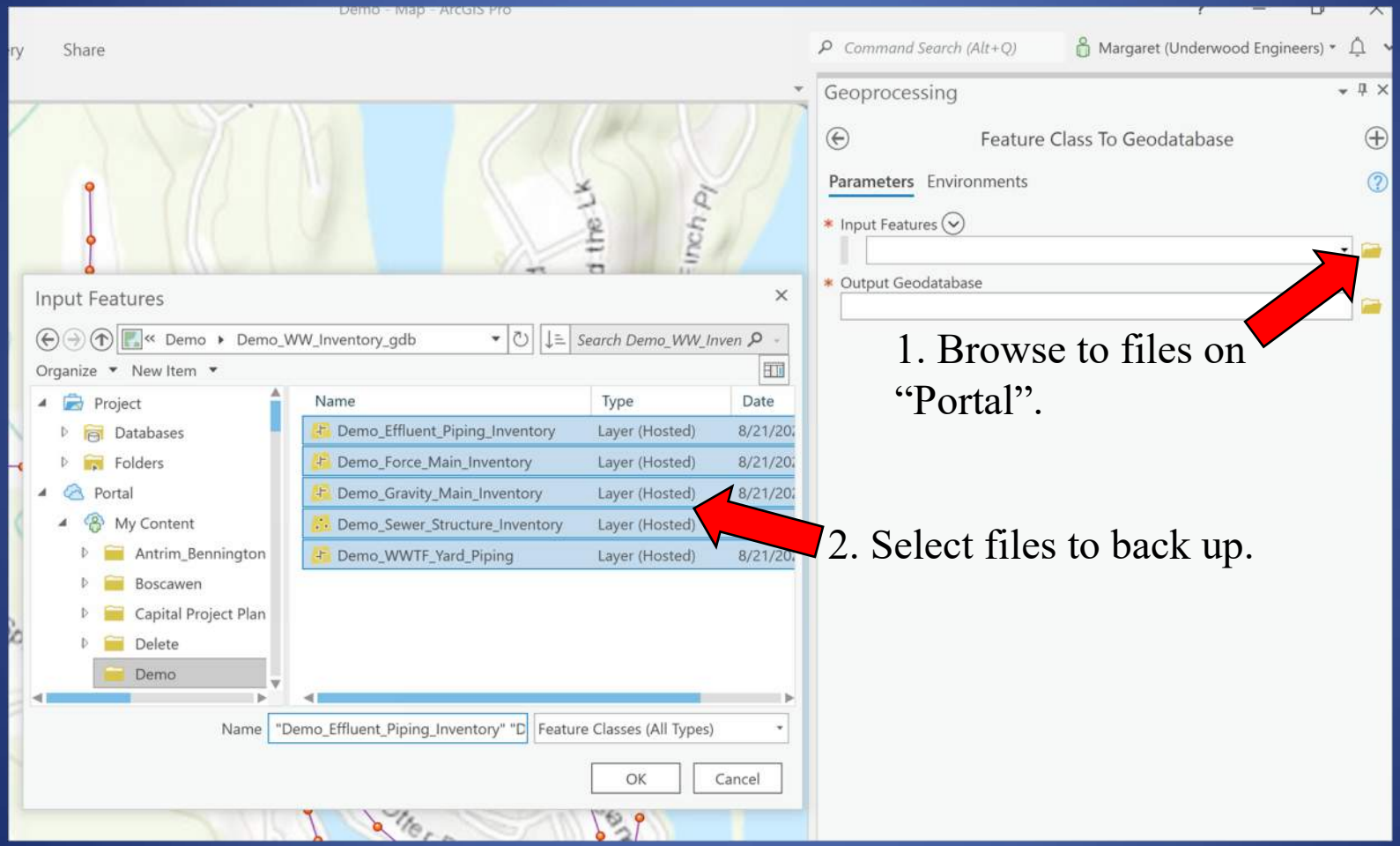
Select “Analysis” tab and then “Tools”.





In geoprocessing pane, search “feature class to geodatabase”. Select “Feature Class to Geodatabase” tool.

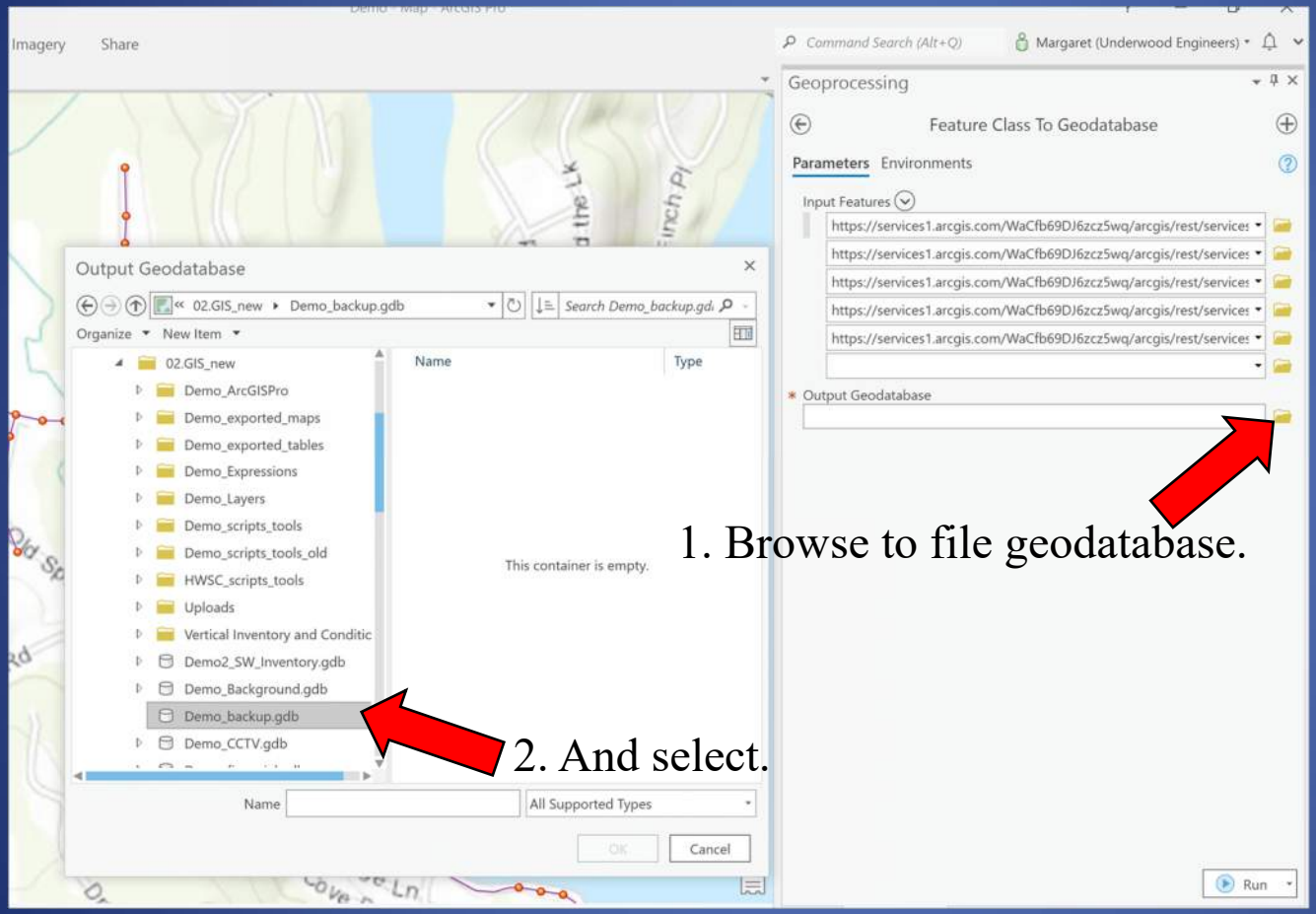
Backup AGOL Files



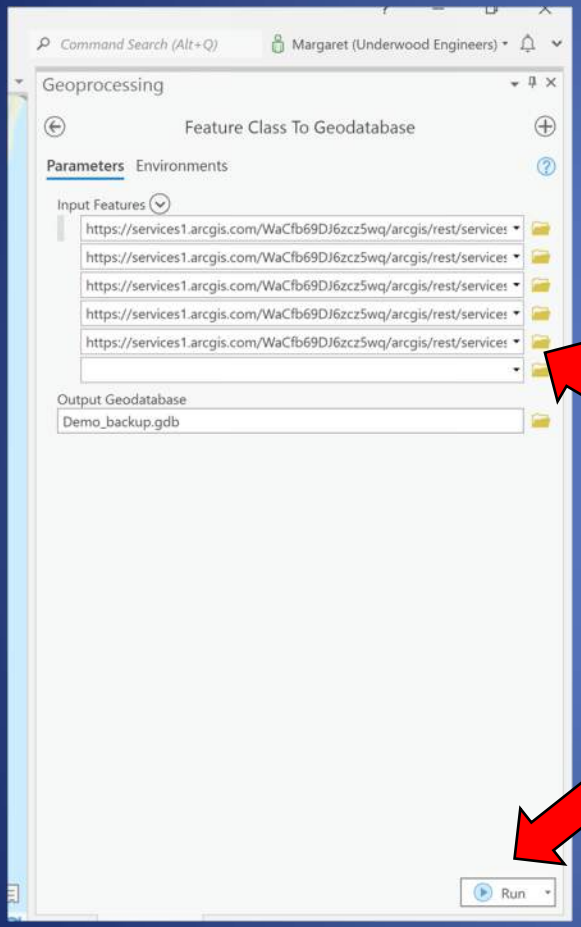
1. Browse to files on "Portal".

2. Select files to back up.

Backup AGOL Files



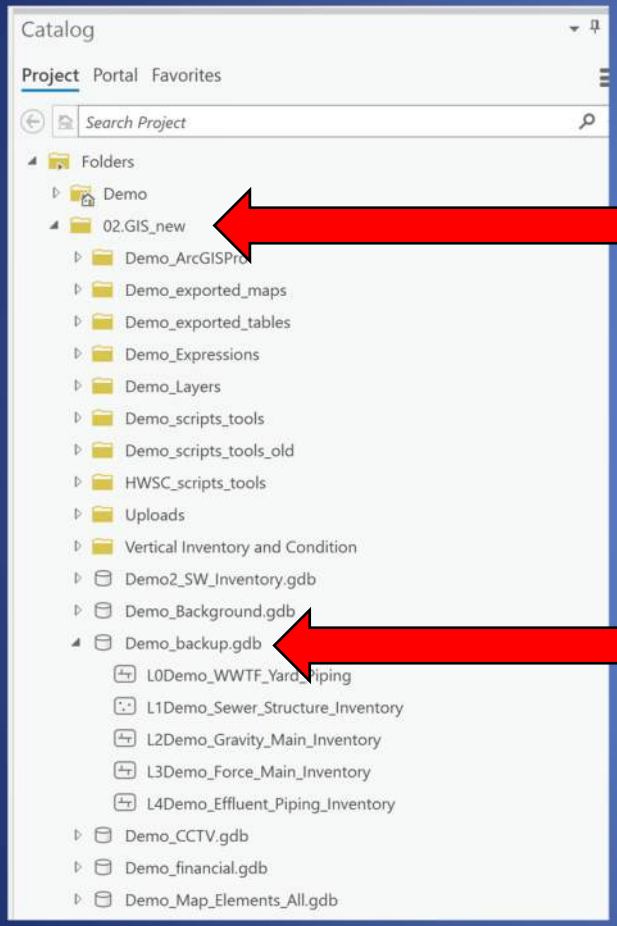
Backup AGOL Files



1. Check to make sure tool is populated correctly.

2. Click run.

Backup AGOL Files



1. Right click on folder where file geodatabase is stored and select “Refresh”.

2. Expand geodatabase to review results.

APPENDIX B

Survey123 Data Collection Forms

ArcGIS Survey123

Flushing and Hydrant Inspection Form

Date:

Date

Select employee names:

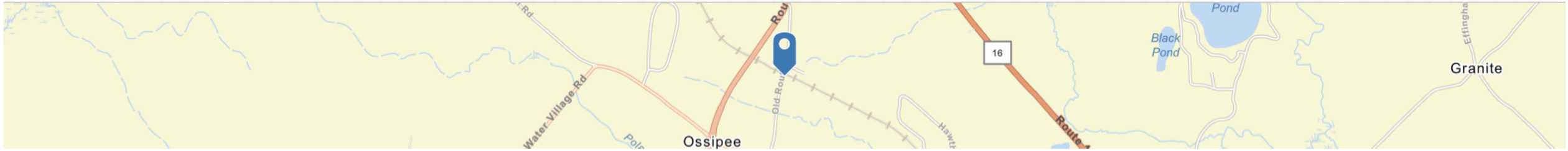
- [ ] Will DeWitte
- [ ] Other

Location:

Old Route 28

Map Location: *

43°41'N 71°7'W



Flushing route ID#:

Start time of flushing:

Time

ArcGIS Survey123

Flushing and Hydrant Inspection Form

Stop time of flushing:

Time

Total time of flushing (minutes):

Total flow (gpm):

Static pressure (psi):

Chlorine residual:

Hydrant ID#:

HYD-012

Installation year:

2001

Purchase year:

ArcGIS Survey123

Flushing and Hydrant Inspection Form

Select hydrant type:

- Fire
- Irrigation
- Other

Easily opened and closed? Nut is in good condition?

- Pass
- Fail

Opened fully and flowed until clear?

- Pass
- Fail

Hydrant barrel is free from cracks, leaks, physical damage, and corrosion?

- Pass
- Fail

Does hydrant barrel drain?

- Pass
- Fail

Accessible for fire department use? (min 3' clearance around hydrant)

- Pass
- Fail

Does hydrant have marker?

- Pass
- Fail

All caps not damaged, rotating smoothly, cap gaskets present and outlet connection threads lubricated and in good condition?

- Pass
- Fail

Tagged OUT OF SERVICE?

- Yes
- No

ArcGIS Survey123

Meter Change Out Form

Date/Time:

Sunday, June 23, 2024

11:42 PM

Inspector: *

- [ ] Will DeWitte
- [ ] Other

Service Address:

Location:

Map Location:

Position source access error

Water Service Information

Service line information

Service Line Type:

- ( ) Seasonal
- ( ) Regular
- ( ) Other

ArcGIS Survey123

Meter Change Out Form

Service Line Material:

- ( ) Lead
- ( ) Copper
- ( ) Galvanized
- ( ) CTS Plastic
- ( ) IPS Plastic
- ( ) Other

Service Line Size:

- ( ) 1/2"
- ( ) 3/4"
- ( ) 1"
- ( ) 2"
- ( ) Other

Is there a PRV?

- ( ) Yes
- ( ) No

Is there a Meter Setter?

- ( ) Yes
- ( ) No

Is there an Expansion Tank?

- ( ) Yes
- ( ) No

Is there a Backflow Preventer?

- ( ) Yes
- ( ) No

Meter information

Are you replacing the meter?

- ( ) Yes
- ( ) No

Meter Number

ArcGIS Survey123

Meter Change Out Form

Meter Radio Number

Meter Size

- [ ] 5/8"
- [ ] 3/4"
- [ ] 1"
- [ ] 1-1/2"
- [ ] 2"
- [ ] Other

Meter Manufacturer:

- ( ) Badger
- ( ) Sensus
- ( ) Other

Meter Model:

Register Model:

Meter Reading:

Number of Dials

9

Sewer Lateral Information

Meter Change Out Form

Sewer Lateral Material

- ( ) PVC
- ( ) Cast Iron
- ( ) Other

Is there a sump pump?

- ( ) Yes
- ( ) No

Add Photos Here

Photo of meter and setup:

Photo of old meter reading:

Photo of new meter reading:

Photo of radio installation:

Photo of radio serial number:

Photo of service entrance:

ArcGIS Survey123

Valve Exercising Form

Date

Sunday, June 23, 2024

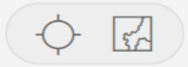
Select inspector:

- [ ] Will DeWitte
- [ ] Other

Valve ID#:

Valve location:

Valve point location:



Installation year:

Purchased year:

Direction to open:

- ( ) Right
- ( ) Left

Valve diameter (in):

For gate valves -- approximate # of turns per AWWA formula:

Does valve require maintenance?

- ( ) Yes
- ( ) No

APPENDIX C

Python Script Tool Print Outs

```
## PURPOSE: Make sure each inventory item has a unique asset id.  Export
list of duplicates to
##                    a csv file.
##
## BY: M. Blank, Underwood Engineers
## DATE: 7/6/2021

import arcpy
import os
import csv
from itertools import groupby
import pandas as pd

tbs = arcpy.GetParameterAsText(0) ## input list of inventory files as
string delimited by ";"
assetid_field = arcpy.GetParameterAsText(1) ## select "Asset_ID" field
out_folder = arcpy.GetParameterAsText(2) ## select folder to store list
of duplicate id's
file_name = arcpy.GetParameterAsText(3) ## input file name as string
file_name = file_name + '.xlsx'

## Convert tbs input string to list of tables
n = tbs.count(";")+1

i = 0
tbs_list = []
if n == 1:
    tbs = tbs.replace("'","")
    tbs = tbs.replace('"','')
    tbs_list = [tbs]
if n > 1:
    while i < n:
        tstr = tbs.split(";")[i]
        tstr = tstr.replace("'","")
        tstr = tstr.replace('"','')
        tbs_list.append(tstr)
        i += 1

## Loop through each table and make a list of all asset id values
assetids = []
fields = ["OBJECTID",assetid_field]
for t in tbs_list:
    desc = arcpy.Describe(t)
    tname = desc.name
    arcpy.AddMessage(tname)

    with arcpy.da.SearchCursor(t,fields) as cursor:
        for row in cursor:
            vals = tname,row[0],row[1]
            assetids.append(vals)

## Make a dictionary by asset id
id_dict = {}
for a in assetids:
```

```
    key = a[2]
    vals = a[0],a[1]
    if key in id_dict:
        id_dict[key].append(vals)
    else:
        id_dict[key] = [vals]

## Use dictionary to make a list of all duplicate id's
dup_list = []
try:
    for k,v in id_dict.iteritems():
        if len(v) > 1:
            for item in v:
                txt = item[0],item[1],k
                dup_list.append(txt)
except:
    for k,v in id_dict.items():
        if len(v) > 1:
            for item in v:
                txt = item[0],item[1],k
                dup_list.append(txt)


if len(dup_list) == 0:
    txt = "No duplicate id's were found. "
    arcpy.AddMessage(txt)
else:
    txt = "The following duplicate id's were found. "
    arcpy.AddMessage(txt)
    for d in dup_list:
        arcpy.AddMessage(d)

    ## Print list of duplicate ids to Excel file
    ## If there are no duplicate ids, the file will only contain headings
    ## Variables
    out_path = os.path.join(out_folder,file_name)
    arcpy.AddMessage(out_path)

    ## Write list to pandas dataframe
    headings = ["File_Name","OBJECTID",assetid_field]
    if len(dup_list) == 0:
        dup_list = [None,None,None]
    df = pd.DataFrame(dup_list,columns=headings)
    print(df)

    ## Write dataframe to Excel file
    df.to_excel(out_path,index=False)
```

000_Check_Asset_IDs

```
##--------------------------------------------------------------------------
----
##  TOOL CALCULATES VARIOUS FIELDS IN PIPE INVENTORY FILES FOR AMP
##
##  This script tool replaces the earlier model builder tool, which used
##  VB expressions.  Can be used in ArcMap and ArcGIS Pro.
##
##  By:  M. Blank, Underwood Engineers
##  Updated by: G. Jaquith, Underwood Engineers
##  Date:  12/4/2020
##  Updated: 1/26/2024
##--------------------------------------------------------------------------
----

##  Import libraries
import arcpy
import os
from datetime import datetime
import smtplib
from email.mime.text import MIMEText
from email.mime.multipart import MIMEMultipart
from email.mime.application import MIMEApplication
import getpass
import traceback
import logging
import sys

##  Get initial parameters
##------------------------------
## Initialize current year parameter
now = datetime.now()
current_yr = now.year

##  User inputs
fc = arcpy.GetParameterAsText(0)  ## select inventory files (any table or
feature class)
item_count = arcpy.GetParameterAsText(1) ## select "Item Count" field
year_in = arcpy.GetParameterAsText(2) ## select "Year In" field
u_life = arcpy.GetParameterAsText(3) ## select "Useful Life" field
eu_life = arcpy.GetParameterAsText(4) ## select "End of Useful Life"
field
ru_life = arcpy.GetParameterAsText(5) ## select "Remaining Useful Life"
field
repl_year = arcpy.GetParameterAsText(6) ## select "Replacement Year"
field
prob = arcpy.GetParameterAsText(7) ## select "Probability of Failure"
field
impact = arcpy.GetParameterAsText(8) ## select "Impact of Failure" field
cond = arcpy.GetParameterAsText(9) ## select "Condition" field
crit = arcpy.GetParameterAsText(10) ## select "Criticality" field
risk_score = arcpy.GetParameterAsText(11) ## select "Risk Score" field
qty = arcpy.GetParameterAsText(12) ## select "Quantity" field
unit_cost = arcpy.GetParameterAsText(13) ## select "Unit Cost" field
```

```
repl_cost = arcpy.GetParameterAsText(14) ## select "Replacement Cost"
field
lat_y = arcpy.GetParameterAsText(15) ## select "Latitude" field
lon_x = arcpy.GetParameterAsText(16) ## select "Longitude" field
lin_unit = arcpy.GetParameterAsText(17) ## select "Linear Unit" field
len_ft = arcpy.GetParameterAsText(18) ## select "Length (ft)" field
year_txt = arcpy.GetParameterAsText(19) ## select "Year_txt" field
override = arcpy.GetParameterAsText(20)  ## selection list = yes or no
[VALIDATION]
input_yr = arcpy.GetParameter(21)  ## user enters a year

from datetime import datetime

# Define your email settings
email_config = {
    "smtp_server": "smtp-mail.outlook.com",
    "smtp_port": 587,  # Modify to your SMTP server's port
    "smtp_username": "ue-gis-smtp@outlook.com",
    "smtp_password": "EgTwcNEtyFUB747",
    "from_email": "ue-gis-smtp@outlook.com",
    "to_email": "UEScriptErrors@underwoodengineers.com",
    "subject_prefix": "Calculate Inventory Fields script error",
}

def send_email(email_config, error_message):
    try:
        # Create an email message
        msg = MIMEMultipart()
        msg["From"] = email_config["from_email"]
        msg["To"] = email_config["to_email"]

        # Add a timestamp or unique identifier to the subject
        timestamp = datetime.now().strftime("%d-%m-%Y_%H:%M:%S")
        subject = f"{email_config['subject_prefix']} - {timestamp}"
        msg["Subject"] = subject

        # Attach the error message to the email
        msg.attach(MIMEText(error_message, "plain"))

        # Set up the SMTP server and send the email
        server = smtplib.SMTP(email_config["smtp_server"],
email_config["smtp_port"])
        server.starttls()
        server.login(email_config["smtp_username"],
email_config["smtp_password"])
        server.sendmail(email_config["from_email"],
email_config["to_email"], msg.as_string())
        server.quit()
    except Exception as e:
        pass


if override == 'Yes':
    current_yr = input_yr
```

```
##  Initial field list (includes fields that are computed the same way
for all file types)
fields_all =
[item_count,year_in,u_life,eu_life,ru_life,repl_year,prob,impact,cond,cri
t,risk_score,'OBJECTID']
##               row[0]        row[1]  row[2] row[3]  row[4]  row[5]
row[6]row[7]row[8]row[9]row[10] row[11]

## Required field list - these fields must be populated so the tool can
run
fields_req = [year_in,u_life,impact,unit_cost]

fields_tb = fields_all + [qty,unit_cost,repl_cost]
##                         row[12],row[13],row[14]

fields_pt = fields_tb + ['SHAPE@',lat_y,lon_x]
            ##           row[15],row[16],row[17]

fields_ln = fields_pt + [lin_unit,len_ft]
            ##            row[18],row[19]

arcpy.AddMessage(fields_all)
arcpy.AddMessage(fields_req)
arcpy.AddMessage(fields_tb)
arcpy.AddMessage(fields_pt)
arcpy.AddMessage(fields_ln)

## Process list of feature classes entered
##----------------------------------------
## First - count how many were entered
##         by counting the number of delimiters (";")

n = fc.count(";")+1 ## number of fc's = number of ; + 1

fc_list = []
if n == 1:
    fcr = fc.replace("'","")
    fc_list.append(fcr)
elif n > 1:
    i = 0
    while i < n:
        fci = fc.split(";")[i]
        fcr = fci.replace("'","")
        fc_list.append(fcr)
        i += 1

error_message = ""
arcgis_username = getpass.getuser()
try:
## Check that required fields are correctly populated
## First get list of tables and message user
    txt_list = []
    for fc in fc_list:
```

```
        desc = arcpy.Describe(fc)
        txt = "Begin computations for " + desc.name + "."
        arcpy.AddMessage(txt)

        # Initialize an error message variable
        error_message = ""

        ##  Loop through and collect NULL values in required fields
        for r in fields_req:
            where_clause = " OR ".join([f"{field} IS NULL" for field in
fields_req])
            chk_fields = [r,'OBJECTID']
            try:
                with arcpy.da.SearchCursor(fc,chk_fields, where_clause)
as cursor:
                    for row in cursor:
                        # If any null values are found, print a message
and break the script
                        arcpy.AddError(f'Null value found in {fc}, OID
{row[1]}.')
                        arcpy.AddError('Please populate null values. Run
the XXXX_Null_Field_Check script to help identify missing values')
                        error_message += f'Null value found in {fc}, OID
{row[1]}.\n'
                        error_message += 'Please populate null values.
Run the XXXX_Null_Field_Check script to help identify missing values\n'
                        if error_message:
                            # Get the current username
                            arcgis_username = getpass.getuser()
                            # Include the ArcGIS account username in the
email message
                            error_message = f"ArcGIS Account Username:
{arcgis_username}\n" + error_message
                            raise arcpy.ExecuteError(error_message)

            except Exception as e:
                # Capture the traceback
                error_message += "\nTraceback:\n" +
traceback.format_exc()
                # send_email(email_config, error_message)
                arcpy.AddError("Script execution failed, an email
contaning this error code was sent to Underwood to help diagonose the
issue")
                raise arcpy.ExecuteError
                sys.exit(0)

        ## Now calculate fields all inventory files have in common and
which are
        ## all calculated the same way in all the files.
        ##----------------------------------------------------------------
----------
        ## Set item count to 1.  There should be one record for each
inventory item.
        with arcpy.da.UpdateCursor(fc, fields_all) as cursor:
```

```
            for row in cursor:
                row[0] = int(1)
                ##  Update end of useful life (year_in + u_life)
                row[3] = row[1] + row[2]
                ## Update remaining useful life (eu_life - current yr)
                row[4] = row[3] - int(current_yr)
                ## Where condition score is NULL, replace with 0.
                if row[8] == None:
                    row[8] = 0
                ## If the "end of useful life" occurs in the past, the
"replacement year" will be moved up to the current year.
                if row[3] < int(current_yr):
                    row[5] = int(current_yr)
                ## If the asset is in very poor condition (ie. Condition
Score =5), the "replacement year" will be moved up the current year.
                if row[3] >= int(current_yr):
                    row[5] = row[3]
                ## If the asset is in poor condition (ie. Condition Score
>= 4 and < 5), the "replacement year" will be moved up to one year from
the current year.
                if row[8] == 5:
                    row[5] = int(current_yr)
                if row[8] < 5 and row[8] >= 4:
                    row[5] = int(current_yr) + 1
                ## if "Condition Score" is 0, NULL, calc "Prob" based on
"RU_Life"
                if row[8] < 1 or row[8] > 5 or row[8] == 0:
                    if row[4] <= 0:
                        row[6] = 5
                    elif row[4] > 0 and row[4] <= 10:
                        row[6] = 4
                    elif row[4] > 10 and row[4] <= 20:
                        row[6] = 3
                    elif row[4] > 20 and row[4] <= 50:
                        row[6] = 2
                    elif row[4] > 50:
                        row[6] = 1
                ## otherwise, set "Prob" equal to "Condition Score"
                else:
                    row[6] = row[8]
                ## Compute "Criticality" based on "Impact of Failure" and
"Probability of Failure"
                if row[6] is None or row[7] is None:
                    oid = str(row[11])
                    mssg = "The 'Probability of Failure' or 'Impact of
Failure' for OBJECTID " + oid + " is NULL. Please enter a value."
                    arcpy.AddError(mssg)
                    raise arcpy.ExecuteError
                if row[6] >= 4 and row[7] >= 4:
                    row[9] = "Highest Risk"
                elif row[6] >= 4 and row[7] < 4:
                    row[9] = "Priority Renewal"
                elif row[6] >= 3 and row[6] < 4:
                    row[9] = "Frequent Monitoring"
```

```
                elif row[6] <= 3 and row[7] >= 4:
                    row[9] = "Frequent Monitoring"
                elif row[6] < 3 and row[7] < 4:
                    row[9] = "Limited Monitoring"
                else:
                    mssg = "Error calculating 'Criticality' field. Check
'Impact of Failure' and 'Probability of Failure' values."
                    arcpy.AddError(mssg)
                    raise arcpy.ExecuteError
                ## Compute "Risk Score" ("Probability of Failure" x
"Impact of Failure")
                row[10] = row[6] * row[7]
                cursor.updateRow(row)

            ## Populate "Year_txt" using "Year_in" to determine decade of
installation for reporting purposes
            yr_fields = [year_in,year_txt]
            arcpy.AddMessage(yr_fields)
            with arcpy.da.UpdateCursor(fc,yr_fields) as cursor:
                for row in cursor:
                    if row[1] == 'Unknown':
                        pass
                    else:
                        if row[0] < 1960:
                            row[1] = '< 1960'
                        if row[0] >= 1960 and row[0] < 1970:
                            row[1] = '1960 - 1969'
                        if row[0] >= 1970 and row[0] < 1980:
                            row[1] = '1970 - 1979'
                        if row[0] >= 1980 and row[0] < 1990:
                            row[1] = '1980 - 1989'
                        if row[0] >= 1990 and row[0] < 2000:
                            row[1] = '1990 - 1999'
                        if row[0] >= 2000 and row[0] < 2010:
                            row[1] = '2000 - 2009'
                        if row[0] >= 2010 and row[0] < 2020:
                            row[1] = '2010 - 2019'
                        if row[0] >= 2020 and row[0] < 2030:
                            row[1] = '2020 - 2029'
                    cursor.updateRow(row)


    ##  Now calculate additional fields which depend on file type
    ##-----------------------------------------------------------------
        desc = arcpy.Describe(fc)
        ## If the file is a table....
        txt = desc.dataType
        arcpy.AddMessage(txt)
        if desc.dataType == "Table" or desc.dataType == "TableView":

            ## First, check to see that the needed fields are present in
all the table files
            fields = [f.name for f in arcpy.ListFields(fc)]
            for t in fields_tb:
```

```
                if t not in fields:
                    arcpy.AddMessage("Field " + t + " not in " + fc +".")

            ## Check 'Quantity' and 'Unit_Cost" fields for NULL values,
and compute 'Replacement Cost'"
            with arcpy.da.UpdateCursor(fc, fields_tb) as cursor:
                for row in cursor:
                    if row[12] == None:
                        mssg = "'Quantity' field contains a NULL value.
Please enter a value."
                        arcpy.AddError(mssg)
                        raise arcpy.ExecuteError
                    if row[13] == None:
                        mssge = "'Unit Cost' field contains a NULL value.
Please enter a value."
                        arcpy.AddError(mssge)
                        raise arcpy.ExecuteError
                    if row[12] != None and row[13] != None:
                        row[14] = row[12]*row[13]
                    cursor.updateRow(row)



        ## Otherwise, if the file is a Feature Class (includes spatial
information), determine shape type
        if desc.dataType == "FeatureClass" or desc.dataType ==
"FeatureLayer":
            descfc = desc.shapeType
            arcpy.AddMessage(descfc)

            ## If the shape type is a "POINT", then add additional fields
to the field list
            if descfc == "Point":

                ## First, check to see that the needed fields are present
in all the point files
                fields = [f.name for f in arcpy.ListFields(fc)]
                for p in fields_pt:
                    if p != 'SHAPE@':
                        if p not in fields:
                            arcpy.AddMessage("Field " + p + " not in " +
fc +".")

                ## Calculations for files of point type
                ##-------------------------------------------------
                ## Set quantity equal to 1.
                ## Quantity is equal to 1 for structures - unit type is
"each".
                ## There should be one record for each structure
                with arcpy.da.UpdateCursor(fc, fields_pt) as cursor:
                    for row in cursor:
                        row[12] = int(1)
                        cursor.updateRow(row)
```

```
                ## Compute "Repl_Cost"
                with
arcpy.da.UpdateCursor(fc,fields_pt,spatial_reference= '4326') as cursor:
                    for row in cursor:
                        if row[13] == None:
                            mssge = "'Unit Cost' field contains a NULL
value.  Please enter a value."
                            arcpy.AddError(mssge)
                            raise arcpy.ExecuteError
                        row[14] = row[12]*row[13]
                        cursor.updateRow(row)

                ## Populate latitude and longitude for each point in
decimal degrees.
                ## This ensures that survey123 records for each asset are
mapped correctly in AGOL.
                with
arcpy.da.UpdateCursor(fc,fields_pt,spatial_reference= '4326') as cursor:
                    for row in cursor:
                        row[16] = row[15].centroid.Y
                        row[17] = row[15].centroid.X
                        cursor.updateRow(row)


            ## If the shape type is "POLYLINE", then add more fields to
the field list
            if descfc == "Polyline":

                ## First, check to see that the needed fields are present
in all the point files
                fields = [f.name for f in arcpy.ListFields(fc)]
                for l in fields_ln:
                    if l != 'SHAPE@':
                        if l not in fields:
                            arcpy.AddMessage("Field " + l + " not in " +
fc +".")

                ## Calculations for files of polyline type
                ##-------------------------------------------------
                ##  Compute length in feet in three steps
                ##  First determine linear units of coordinate system
                spatial_ref = arcpy.Describe(fc).spatialReference
                unit = spatial_ref.linearUnitName

                ##  Second, update linear unit field with coordinate
system units
                with arcpy.da.UpdateCursor(fc, fields_ln) as cursor:
                    for row in cursor:
                        row[18] = unit
                        cursor.updateRow(row)

                ## Third, compute "length" in feet and populate
"Length_ft" field.
```

```
arcpy.CalculateField_management(fc,"Length_ft",'!SHAPE.LENGTH@FEET!',"PYT
HON")

                ## Set "quantity" equal to "length".  When the inventory
tables are combined all the records will have a common "Quantity" field.
                ## For line file type, round "quantity" field to two
decimal places.
                with arcpy.da.UpdateCursor(fc,fields_ln) as cursor:
                    for row in cursor:
                        x = float(row[19])
                        row[12] = round(x,2)
                        cursor.updateRow(row)

            ## Compute "Repl_Cost"
                with
arcpy.da.UpdateCursor(fc,fields_ln,spatial_reference= '4326') as cursor:
                    for row in cursor:
                        if row[13] == None:
                            mssge = "'Unit Cost' field contains a NULL
value.  Please enter a value."
                            arcpy.AddError(mssge)
                            raise arcpy.ExecuteError
                        row[14] = row[12]*row[13]
                        cursor.updateRow(row)

                ## Populate latitude and longitude of line midpoint in
decimal degrees.
                ## This ensures that survey123 records for each asset are
mapped correctly in AGOL.
                with
arcpy.da.UpdateCursor(fc,fields_ln,spatial_reference= '4326') as cursor:
                    for row in cursor:
                        row[16] =
row[15].positionAlongLine(0.50,True).firstPoint.Y
                        row[17] =
row[15].positionAlongLine(0.50,True).firstPoint.X
                        cursor.updateRow(row)

        txt = "Completed computations for " + desc.name + "."
        arcpy.AddMessage(txt)
        arcpy.AddMessage("-----------")

    error_message = f"ArcGIS Account Username: {arcgis_username}\n" +
error_message

except Exception as e:
    # Handle the exception and collect error information
    error_message = "An error occurred:\n" + str(e) + "\n\nTraceback:\n"
+ traceback.format_exc()
    error_message = f"ArcGIS Account Username: {arcgis_username}\n" +
error_message
    send_email(email_config, error_message)
001_Calculate_inventory_fields_WaterWastewater_1_26_24
```

```
##  Get list of asst types to make a table of asset types then populate
table with unit costs
##  Helpful link:
https://gis.stackexchange.com/questions/192731/creating-multi-value-
choice-list-of-field-values-and-using-selected-for-select-i?rq=1

##  Import libraries
import arcpy
import os

##  Get parameters
fc = arcpy.GetParameterAsText(0)  ## select table
unitcost_field = arcpy.GetParameterAsText(1) ## select unit cost field
qty_field = arcpy.GetParameterAsText(2) ## select "Quantity" field
replcost_field = arcpy.GetParameterAsText(3) ## select replacement cost
field
type_field = arcpy.GetParameterAsText(4) ## select "Type" field  ##MEB --
CHANGE COST FOR MULTIPLE FIELDS SELECTED BY USER -- COLUMN 0 IN THE VALUE
TABLE
## MEB -- VALUE TABLE INPUT PARAMETER -- FIELD IN COLUMN 0 AND FIELD
VALUE IN COLUMN 1
field_values = arcpy.GetParameterAsText(5) ## select field value ## MEB -
COLUMN 1 IN THE VALUE TABLE
input_unitcost = arcpy.GetParameterAsText(6) ## input unit cost ## MEB -
COLUMN 2 IN THE VALUE TABLE -- USER INPUT -- TYPE IS DOUBLE

## Convert input field_values from string to list ## MEB - I DON'T THINK
YOU NEED THIS PART - DOING IT IN FIELD VALIDATION
field_values = field_values.replace("'","")  ## remove single quotation
marks
valueList = [x.strip() for x in field_values.split(";")] ## remove spaces
and split at ";" delimiter

## Make a list of unique type field values for selection box ## MEB - I
DON'T THINK YOU NEED THIS PART EITHER
typefield = arcpy.ListFields(fc,type_field)[0]
fieldType = typefield.type
if fieldType == 'String':
    where = "{} IN
('{}')".format(arcpy.AddFieldDelimiters(fc,type_field), "',
'".join(valueList))
else:
    where = "{} IN ({})".format(arcpy.AddFieldDelimiters(fc,type_field),
", ".join(valueList))
vlen = len(valueList)

## Convert input_unitcosts from string to list. MEB -- THIS WILL BECOME
COLUMN 2.
n = input_unitcost.count(";")+1
i = 0
input_list = []
if n == 1:
    input_list = [float(input_unitcost)]
if n > 1:
```

```
    while i < n:
        uc = float(input_unitcost.split(";")[i])
        input_list.append(uc)
        i += 1
ilen = len(input_list)

## len's should be the same size

## Update unit cost for each selected asset type
clist = list(zip(valueList,input_list)) ## MEB - FIELD, FIELD VALUE, UNIT
COST
clen = len(clist)


## Update unit cost for selected asset type
## For line feature classes (ie. pipes)
i = 0
while i < clen:
    fields = [type_field,unitcost_field,qty_field,replcost_field]  ## MEB
-- FIELDS [USED TO BE TYPE-FIELD NOW MULTIPLE], UNIT COST, QTY FIELD,
REPLACEMENT COST FIELD]
    with arcpy.da.UpdateCursor(fc, fields) as cursor:
        for row in cursor:
            if row[0] == clist[i][0]:
                row[1] = clist[i][1]
                row[3] = float(row[1])*float(row[2])
            cursor.updateRow(row)
    i += 1
```

```
## PURPOSE: Combines inventory tables in one giant table, then schedules
out replacements.
##
## DATE: 4/10/2023
## BY: M. Blank, PE, Underwood Engineers
## Updated By GAJ 1/26/24 -- add functionality to notify UE of errors
## Updated By MEB 2/14/2024 --  streamline process, rather than add all
fields, export table with most fields to a new table,
##                              add remaining fields, use insert cursor
to add rows from other input tables

## import libraries
import arcpy
import os
import csv
from datetime import datetime
import time
import smtplib
from email.mime.text import MIMEText
from email.mime.multipart import MIMEMultipart
from email.mime.application import MIMEApplication
import getpass
import traceback
import logging
import sys

## initialize parameters
now = datetime.now()
cur_yr = now.year

## gather user input
tb = arcpy.GetParameterAsText(0) ## list of input tables as string with
";" as delimiter
gdb = arcpy.GetParameterAsText(1) ## geodatabase where combined table
will be stored
ctn = arcpy.GetParameterAsText(2) ## combined table name as string
repl_yr = arcpy.GetParameterAsText(3) ## replacement year field
u_life = arcpy.GetParameterAsText(4) ## useful life field
repl_cost = arcpy.GetParameterAsText(5) ## replacement cost field
override = arcpy.GetParameterAsText(6)  ## selection list = yes or no
[VALIDATION]
input_yr = arcpy.GetParameter(7)  ## user enters a year

# Define your email settings
email_config = {
    "smtp_server": "smtp-mail.outlook.com",
    "smtp_port": 587,  # Modify to your SMTP server's port
    "smtp_username": "ue-gis-smtp@outlook.com",
    "smtp_password": "EgTwcNEtyFUB747",
    "from_email": "ue-gis-smtp@outlook.com",
    "to_email": "UEScriptErrors@underwoodengineers.com",
    "subject_prefix": "Combined Inventory Tables script error",
}
```

```
def send_email(email_config, error_message, username):
    try:
        # Create an email message
        msg = MIMEMultipart()
        msg["From"] = email_config["from_email"]
        msg["To"] = email_config["to_email"]

        # Add a timestamp or unique identifier to the subject
        timestamp = datetime.now().strftime("%d-%m-%Y_%H:%M:%S")
        subject = f"{email_config['subject_prefix']} - {timestamp}"
        msg["Subject"] = subject

        # Include username in the email
        body = f"Username: {username}\n\n{error_message}"

        # Attach the error message to the email
        msg.attach(MIMEText(body, "plain"))

        # Set up the SMTP server and send the email
        server = smtplib.SMTP(email_config["smtp_server"],
email_config["smtp_port"])
        server.starttls()
        server.login(email_config["smtp_username"],
email_config["smtp_password"])
        server.sendmail(email_config["from_email"],
email_config["to_email"], msg.as_string())
        server.quit()
    except Exception as e:
        pass  # Handle additional errors here

try:
    error_message = ""
    ## if user selects folder instead of gdb, add message and break
    if '.gdb' not in gdb:
        arcpy.AddError("You have selected a folder.  Please select a
geodatabase.")
        error_message += "You have selected a folder.  Please select a
geodatabase."
        raise Exception()

    ## reset cur_yr if user wants to override default value
    if override == 'Yes':
        cur_yr = input_yr
    else:
        input_yr = None

    ##-----------------------------------------------------------------
------------
    ##  STEP 1:  PROCESS USER INPUT
    ##-----------------------------------------------------------------
------------

    ## Table list (tb) is in the form of a string delimited by semi-
colons
```

```
    ## Count the number of tables
    fstr = str(tb)
    fn = fstr.count(';')+1

    ## Convert the string to a list
    i = 0
    f_list = []
    if fn == 1:
        fcr = fstr.replace("'","")
        f_list.append(fcr)
    elif fn > 1:
        while i < fn:
            fi = fstr.split(';')[i]
            fcr = fi.replace("'","")
            f_list.append(fcr)
            i += 1


    ##--------------------------------------------------------------------
-------------------
    ##  STEP 2:  FIND THE INVENTORY TABLE WITH THE MOST FIELDS AND EXPORT
IT TO A NEW TABLE
    ##--------------------------------------------------------------------
-------------------
    ## get the table with the most fields and export it to new table
without the Global ID field or Shape field
    max_fields = [0]
    f_longest = ''
    for f in f_list:
        l = len(arcpy.ListFields(f))
        if l > max_fields[0]:
            max_fields[0] = l
            f_longest = f


    ## get a list of fields from f_longest and exlude Global_ID field
    fields = [f.name for f in arcpy.ListFields(f_longest)]
    if "GlobalID" in fields:
        fields.remove("GlobalID")
    if "Shape" in fields:
        fields.remove("Shape")

    ## normalize input path, make table view, set workspace
    norm_path = os.path.normpath(f_longest)
    tv_name = os.path.basename(norm_path)
    table_view = arcpy.management.MakeTableView(norm_path,tv_name)
    arcpy.env.workspace = gdb

    ## export to new table, if table already exists delete it first
    table_path = os.path.join(gdb,ctn)
    table_norm = os.path.normpath(table_path)
    if arcpy.Exists(table_norm):
        arcpy.Delete_management(table_norm)
```

```
    arcpy.conversion.TableToTable(norm_path,gdb,ctn)

    ##--------------------------------------------------------------------
--------------------
    ##  STEP 3:  LOOP THROUGH THE OTHER TABLES AND ANY FIELDS NOT IN THE
TABLE CREATED ABOVE
    ##--------------------------------------------------------------------
--------------------
    ## Get a full list of fields from all the input tables.
    ## Those fields that are not in the f_longest table will be added
    all_names = fields
    all_fields = arcpy.ListFields(f_longest)
    for f in f_list:
        if f == f_longest:
            pass
        else:
            f_names = [fn.name for fn in arcpy.ListFields(f)]
            f_fields = arcpy.ListFields(f)
            l = len(f_names)-1
            for i in range(0,l):
                if f_names[i] in all_names:
                    pass
                else:
                    n = f_names[i]
                    o = f_fields[i]
                    all_names.append(n)
                    all_fields.append(o)
                    arcpy.AddMessage(n)

    ## Remove GlobalId and Shape from field and field name lists; add
field will puke on that
    try:
        all_names.remove("GlobalID")
    except:
        pass
    try:
        all_names.remove("Shape")
    except:
        pass
    ##field_list[:] = [x for x in field_list if "_" in x.name]
    all_fields[:] = [a for a in all_fields if a.name != "GlobalID"]
    all_fields[:] = [a for a in all_fields if a.name != "Shape"]

    ## Correct any duplicate aliases [ie. different field names with the
same alias] or it will mess up when you go to export to Excel
    all_names = [a.name for a in all_fields]
    all_alias = [a.aliasName for a in all_fields]

    l = len(all_fields)
    i = 0
    for i in range(0,l):
        a = all_alias[i]
        c = all_alias.count(a)
        if c > 1:
```

```
            n = all_fields[i].name
            arcpy.management.AlterField(table_norm,n,new_field_alias=n)
            txt = i,a,n
            arcpy.AddMessage(txt)


    table_fields = [t.name for t in arcpy.ListFields(table_norm)]
    for a in all_fields:
        if a.name in table_fields:
            pass
        else:
            if a.type == "String":
                ftype = "TEXT"
            if a.type == "OID":
                ftype = "SHORT"
            if a.type == "Integer":
                ftype = "LONG"
            if a.type == "Double":
                ftype = "DOUBLE"

arcpy.management.AddField(table_norm,a.name,ftype,"","",a.length,a.aliasN
ame)
            txt = a.name + " added"
            arcpy.AddMessage(txt)

    ##-----------------------------------------------------------------------
------------
    ##  STEP 4:  POPULATE THE TABLE WITH ROWS FROM THE OTHER INVENTORY
TABLES
    ##-----------------------------------------------------------------------
------------
    ## Populate combined table with insert cursor [THIS PROCESS IS FAST]
    ## First - get field names from each input table except f_longest
    ## If the field name is in the combined table then add it to a list.
    for f in f_list:
        if f == f_longest:
            pass
        else:
            fnames = [ff.name for ff in arcpy.ListFields(f)]
            cfields = []
            for fn in fnames:
                if fn in table_fields:
                    cfields.append(fn)


            ## Use the list of field names from each table to populate
the combined table
            with arcpy.da.SearchCursor(f,cfields) as sCur:
                try:
                    with arcpy.da.InsertCursor(table_norm,cfields) as
iCur:
                        for row in sCur:
                            iCur.insertRow(row)
                except:
```

```
                    txt = str(row) + " insert row failed"
                    arcpy.AddMessage(txt)



    ##-----------------------------------------------------------------
------------
    ##  STEP 5:  ADD YEAR AND DECADE FIELDS TO FINANCIAL TABLE
    ##-----------------------------------------------------------------
------------
    arcpy.ResetProgressor()
    arcpy.SetProgressor("default","Adding year and decade fields.")

    ##-----------------------------------------------------------------
------------
    ##  ADD FIELDS TO FINANCIAL TABLE - REPLACEMENTS BY YEAR (FOR TEN
YEARS)
    ##-----------------------------------------------------------------
------------
    y = 0
    while y <= 9:
        yr = cur_yr + y
        fieldname = "_"+ str(yr)
        alias = str(yr)
        arcpy.AddField_management(table_norm, fieldname,
"DOUBLE","","","",alias)
        y += 1

    txt = "Year fields added for first ten years."
    arcpy.AddMessage(txt)

    ##-----------------------------------------------------------------
------------
    ##  ADD FIELDS TO FINANCIAL TABLE - REPLACEMENTS BY DECADE (FOR TEN
DECADES)
    ##-----------------------------------------------------------------
------------

    i = 0
    dec_beg = cur_yr
    dec_fields = []
    while i <= 9:
        dec_end = dec_beg + 9
        fieldname = "_"+ str(dec_beg)+"_"+str(dec_end)
        dec_fields.append(fieldname)
        alias = str(dec_beg)+"-"+str(dec_end)
        arcpy.AddField_management(table_norm, fieldname,
"DOUBLE","","","",alias)
        dec_beg = dec_end + 1
        i += 1

    txt = "Decade fields added for ten decades."
    arcpy.AddMessage(txt)
```

```
    ##--------------------------------------------------------------------
--------------------
    ##  STEP 6:  COMPUTE REPLACEMENT COUNT FOR EACH ITEM AND JOIN TO
FINANCIAL PLANNING TABLE
    ##--------------------------------------------------------------------
--------------------
    arcpy.ResetProgressor()
    arcpy.SetProgressor("default","Scheduling replacement costs.")

    beg_yr = cur_yr
    end_yr = cur_yr + 99
    Repl_list = []
    repl_dict = {}

    fld_names = ['OBJECTID',repl_yr,u_life]


    ## Make a dictionary of replacements for each object id [asset]
    ## key = OID
    ## vals = replacement years
    with arcpy.da.SearchCursor(table_norm,fld_names) as cursor:
        for row in cursor:
            inOID = row[0]
            replyr = row[1]
            ulife = row[2]
            if ulife > 0:
                while replyr <= end_yr:
                    Repl_list.append(tuple((inOID,replyr)))       ##
create list of all replacements
                    try:
                        if repl_dict.has_key(inOID):                ##
use list to create a dictionary (Python 2.7)
                            repl_dict[inOID].append(replyr)
                        else:
                            repl_dict[inOID] = [repl]
                        repl = repl + ulife
                    except:
                        if inOID in repl_dict.keys():               ##
use list to create a dictionary (Python 3)
                            repl_dict[inOID].append(replyr)
                        else:
                            repl_dict[inOID] = [replyr]
                        replyr = replyr + ulife
            elif ulife == 0:
                arcpy.AddWarning("ObjectID "+str(row[0])+". Useful life
value is equal to zero.  Please enter a non-zero number.")
                break


    ## Count the number values for each OID in the dictionary
    ## and make a list [OID,repl_cnt]
```

```
    count_list = []
    for key in repl_dict:
        inOID = key
        repl_cnt = len(repl_dict[inOID])
        row = [inOID,repl_cnt]
        count_list.append(row)


    ## add replacement count field to financial table

arcpy.AddField_management(os.path.join(gdb,ctn),"repl_cnt","LONG","","","
","Replacement Count")

    ## populate field with Update Cursor:
    with arcpy.da.UpdateCursor(table_norm,['OBJECTID','repl_cnt']) as
cursor:
        for row in cursor:
            for c in count_list:
                if row[0] == c[0]:
                    row[1] = c[1]
            cursor.updateRow(row)

    ##-----------------------------------------------------------------------
-------------------------------------
    ##  STEP 7:  POPULATE  REPLACEMENT FIELDS FOR TEN YEARS AND THEN TEN
DECADES.
    ##-----------------------------------------------------------------------
-------------------------------------

    arcpy.ResetProgressor()
    arcpy.SetProgressor("default", "Scheduling replacement costs.")

    ## ten years
    yr = cur_yr
    end_yr = yr + 9
    for k,v in repl_dict.items():
        for elem in v:
            if elem >= yr and elem <= end_yr:
                yr_fld = '_' + str(elem)
                with
arcpy.da.UpdateCursor(table_norm,['OBJECTID',yr_fld,repl_cost]) as
cursor:
                    for row in cursor:
                        if row[0] == k:
                            row[1] = row[2]
                        cursor.updateRow(row)
    arcpy.AddMessage('Costs estimated for first ten years.')


    ## ten decades
    dec_list = []
    for d in dec_fields:
        beg_yr = int(d[1:5])
        end_yr = int(d[6:10])
```

```
        txt = beg_yr,end_yr
        dec_list.append(txt)
        arcpy.AddMessage(txt)


    for k,v in repl_dict.items():
        cost = 0
        for elem in v:
            for d in dec_list:
                if int(elem) >= d[0] and int(elem) <= d[1]:
                    dec_fld = '_' + str(d[0]) + '_' + str(d[1])
                    with
arcpy.da.UpdateCursor(table_norm,['OBJECTID',dec_fld,repl_cost]) as
cursor:
                        for row in cursor:
                            if row[0] == k:
                                cost = cost + row[2]
                                row[1] = cost
                            cursor.updateRow(row)
    arcpy.AddMessage('Costs estimated for ten decades.')
    arcpy.AddMessage('All done!!!')

except Exception as e:
    error_message = f"Error occurred:
{str(e)}\n\nTraceback:\n{traceback.format_exc()}" + error_message
    arcpy.AddError(error_message)

    # Retrieve the ArcGIS account username
    username = getpass.getuser()

    # Send an email with the error message and username
    send_email(email_config, error_message, username)
```

```
## PURPOSE:  Exports multiple feature classes and tables to excel
spreadsheets.
##           Exports to xlsx format from ArcGIS Pro.
##
## DATE: 11/15/2020
## BY: M. Blank, P.E. (NH,FL)
## UPDATED: G. Jaquith

## Import modules
import arcpy
import os
import pandas as pd
import xlsxwriter
from openpyxl.chart import Reference
from openpyxl.chart.axis import DateAxis
from openpyxl.chart.label import DataLabelList
from openpyxl.chart.label import DataLabel

## Input parameters
tb = arcpy.GetParameterAsText(0) ## Select tables to export to excel
folder = arcpy.GetParameterAsText(1) ## Select folder where excel files
will be stored

arcpy.AddMessage(tb)

## Create paths to files from input parameters.
## Multiple file inputs are in the form of a string with each
## file separated by a semi-colon.
## Get the length of the file list by counting the number of
## semi-colons and adding 1.  Then separate the string at the semi-colons
## to get lists of files.

## Count the number of files
fstr = str(tb)
fn = fstr.count(';')+1

## Convert the string to a list
i = 0
f_list = []
while i < fn:
    fi = fstr.split(';')[i]
    f_list.append(fi)
    i += 1

## Loop through the list and convert each file to excel
## Use the field aliases for column headers in excel ss
for f in f_list:

    ## make output path
    fname = f.rsplit("\\")[-1]
    out_xlsx = str(os.path.join(folder,fname)) + ".xlsx"

    ## list domains
    gdb = os.path.dirname(f)
```

```
    arcpy.AddMessage(gdb)
    domains = arcpy.da.ListDomains(gdb)
    for d in domains:
        if d.domainType == 'CodedValue':
            coded_values = d.codedValues
            for k,v in coded_values.items():
                txt = k,v
                arcpy.AddMessage(txt)

    ## get field aliases for header row
    fields = arcpy.ListFields(f)
    aliases = []
    names = []
    domains = []
    c = 0
    for i in fields:
        a = i.aliasName
        aliases.append(a)
        n = i.name
        d = i.domain
        names.append(n)
        c += 1

    ## get field values to populate table
    values = []
    with arcpy.da.SearchCursor(f,names) as cursor:
        for row in cursor:
            lst = list(row)
            i = 0
            index = []
            for l in lst:
                if type(l) == tuple:
                    v = str(l)
                    lst[i] = v
                i += 1
            values.append(lst)

## create pandas dataframe and xlsxwriter objects
df = pd.DataFrame(values)
writer = pd.ExcelWriter(out_xlsx, engine="xlsxwriter")
df.to_excel(writer, sheet_name="Combined_Inventory", startrow=1,
header=False, index=False)
wb = writer.book
ws = writer.sheets["Combined_Inventory"]

## get df dimensions
(max_row, max_col) = df.shape

## table headings
column_settings = [{"header":column} for column in aliases]

## add table
ws.add_table(0,0,max_row,max_col-1,{'columns':column_settings,'style':
'Table Style Medium2'})
```

```
## close workbokk
writer.close()
```

```
## PURPOSE:  Exports multiple feature classes and tables to excel
spreadsheets.
##           Exports to xlsx format from ArcGIS Pro.
##
## DATE: 11/15/2022
## BY: G. Jaquith
## REVISED BY: M. Blank, P.E. (added ability to input fields rather than
hardcoding them)

## Import modules
import time
import arcpy
import os
import pandas as pd
import xlsxwriter
import win32com.client as win32 ## make sure pywin32 is installed
import win32api
from openpyxl.chart import Reference
from openpyxl.chart.axis import DateAxis
from openpyxl.chart.label import DataLabelList
from openpyxl.chart.label import DataLabel

## Input parameters
tb = arcpy.GetParameterAsText(0) ## Select tables to export to excel
folder = arcpy.GetParameterAsText(1) ## Select folder where excel files
will be stored

##>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>
## ADDED BY MEB
## Input parameters - fields
asset_type = arcpy.GetParameterAsText(2) ## Select asset type field
repl_cost = arcpy.GetParameterAsText(3) ## Select replacement cost field
risk_score = arcpy.GetParameterAsText(4) ## Select risk score field
asset_id = arcpy.GetParameterAsText(5) ## Select asset id field
crit = arcpy.GetParameterAsText(6) ## Select criticality field
first_ten = arcpy.GetParameterAsText(7) ## Select first decade field

## make a list of fields to appear in pivot tables
pivot_fields = [asset_type, repl_cost, risk_score, asset_id, crit,
first_ten]

## Get remaining decade fields
next_nine = []
beg = first_ten.split("_")[1]
end = first_ten.split("_")[2]
i = 0
l = 9
while i <= l:
    beg = int(beg) + 10
    end = int(end) + 10
    nxt = "_" + str(beg) + "_" + str(end)
    pivot_fields.append(nxt)
    i += 1
```

```
##>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>

## Create paths to files from input parameters.
## Multiple file inputs are in the form of a string with each
## file separated by a semi-colon.
## Get the length of the file list by counting the number of
## semi-colons and adding 1.  Then separate the string at the semi-colons
## to get lists of files.

## Count the number of files
fstr = str(tb)
fn = fstr.count(';')+1

## Convert the string to a list
i = 0
f_list = []
while i < fn:
    fi = fstr.split(';')[i]
    f_list.append(fi)
    i += 1

## Loop through the list and convert each file to excel
## Use the field aliases for column headers in excel ss
for f in f_list:

    ## make output path
    fname = f.rsplit("\\")[-1]
    out_xlsx = str(os.path.join(folder,fname)) + ".xlsx"

    ## get field aliases for header row
    fields = arcpy.ListFields(f)
    aliases = []
    names = []
    pivot_aliases = [] ##ADDED BY MEB
    for i in fields:
        a = i.aliasName
        aliases.append(a)
        n = i.name
        names.append(n)
        if n in pivot_fields:
            row = [n,a]
            pivot_aliases.append(row)

    arcpy.AddMessage(len(aliases))
    ## get field values to populate table
    values = []
    with arcpy.da.SearchCursor(f,names) as cursor:
        for row in cursor:
            values.append(row)


    ## create pandas dataframe and xlsxwriter objects
    df = pd.DataFrame(values,columns=aliases)
```

```
    arcpy.AddMessage(out_xlsx)
    writer = pd.ExcelWriter(out_xlsx,engine='xlsxwriter') ##REVISED BY
MEB TO USE WRITER OBJECT -- WAS GETTING ERROR HERE
    wb = writer.book
    ws = wb.add_worksheet('Combined_Inventory')
    df.to_excel(writer,sheet_name='Combined_Inventory',startrow=1,
header=False, index=False)


    ## get df dimensions
    (max_row, max_col) = df.shape
    txt = max_row,max_col
    arcpy.AddMessage(txt)

    column_settings = [{"header":column} for column in aliases]
    for c in column_settings:
        for k,v in c.items():
            txt = k,v
            arcpy.AddMessage(txt)

    ## add table
    ws.add_table(0,0,max_row,max_col-
1,{'data':values,'columns':column_settings,'style': 'Table Style
Medium2'})

    ## close workbook
    writer.close()

    excel_file = out_xlsx


##############################################################################
#############################################
#    Replacement Cost Table and Pie Chart
#
##############################################################################
#############################################
def create_replacement_cost_pivot_table(workbook, source_range,
destination_sheet, row_fields, column_field, data_field):

    # Create a new worksheet for the pivot table
    pivot_sheet = workbook.Sheets.Add()
    pivot_sheet.Name = destination_sheet

    # Create a PivotTable on the new sheet
    pivot_table = pivot_sheet.PivotTableWizard(
        SourceType=win32.constants.xlDatabase,
        SourceData=source_range,
        TableDestination=pivot_sheet.Range("A3")
    )

    # Set row fields
    for field in row_fields:
```

```
        pivot_table.PivotFields(field).Orientation =
win32.constants.xlRowField

    # Set column field
    if column_field:
        pivot_table.PivotFields(column_field).Orientation =
win32.constants.xlColumnField

    # Set data field
    data_field = pivot_table.PivotFields(data_field)
    data_field.Orientation = win32.constants.xlDataField
    data_field.Function = win32.constants.xlSum
    data_field.NumberFormat = "$#,##0.00"

    # Apply banded rows and columns formatting
    pivot_table.TableStyle2 = "PivotStyleMedium2"
    pivot_table.ShowTableStyleRowStripes = True
    pivot_table.ShowTableStyleColumnStripes = True


    pie_chart = pivot_sheet.Shapes.AddChart2().Chart
    pie_chart.ChartType = win32.constants.xlPie

    # Set the data source for the chart
    pie_chart.SetSourceData(pivot_table.TableRange1)
    pie_chart.ShowAllFieldButtons = False

    # Enable data labels on the chart
    #pie_chart.HasDataLabels = True

    # Customize data labels as needed
    pie_chart.datalabels = DataLabelList()
    pie_chart.datalabels.showVal = True
    #data_labels.Position = win32.constants.xlLabelPositionAbove  # Set
the position of data labels
    #data_labels.ShowValue = True  # Show the values on data labels

    pie_chart.Width = 576  # Width of the chart in points
    pie_chart.Height = 432  # Height of the chart in points


# Open Excel application
excel = win32.gencache.EnsureDispatch("Excel.Application")
excel.Visible = True

# Open workbook
workbook = excel.Workbooks.Open(excel_file)

# Get the table named "Table1"
table = workbook.Sheets("Combined_Inventory").ListObjects("Table1")
worksheet = workbook.Sheets("Combined_Inventory")
source_range = table.Range

# Define destination sheet for each pivot table
```

```
pivot_table1_sheet = "Replacement Cost"


## REVISED BY MEB
# Define fields for pivot table
row_field = []
for p in pivot_aliases:
    if p[0] == asset_type:
        row_field.append(p[1])

value_field = ''
for p in pivot_aliases:
    if p[0] == repl_cost:
        value_field = p[1]


pivot_table1_row_fields = row_field
pivot_table1_column_field = None
pivot_table1_data_field = value_field



##########################################################################
##########################################
#    10 Year Lookahead Table
#
##########################################################################
##########################################
def create_10yr_lookahead_pivot_table(workbook, source_range,
destination_sheet, row_fields, column_field, data_field):

    # Create a new worksheet for the pivot table
    pivot_sheet = workbook.Sheets.Add()
    pivot_sheet.Name = destination_sheet

    # Create a PivotTable on the new sheet
    pivot_table = pivot_sheet.PivotTableWizard(
        SourceType=win32.constants.xlDatabase,
        SourceData=source_range,
        TableDestination=pivot_sheet.Range("A3")
    )

    # Set row fields
    i = 0
    for field in row_fields:
        arcpy.AddMessage(field)
        pivot_table.PivotFields(field).Orientation =
win32.constants.xlRowField
        pivot_table.PivotFields(field).Orientation =
win32.constants.xlTabularRow
        # pivot_table.PivotFields(0).Subtotals = [False]
        # pivot_table.PivotFields(1).Subtotals = [False]
        #field.Subtotals = tuple(False for _ in range(i))
```

```
        #pivot_table.PivotFields(field).Subtotals = tuple(False for _ in
range(i))
        i += 1


    # Set column field
    if column_field:
        pivot_table.PivotFields(column_field).Orientation =
win32.constants.xlColumnField
        #pivot_table.PivotFields(column_field).Orientation =
win32.constants.xlTabularColumn
        #pivot_table.PivotFields(column_field).Subtotals = [False]


    # Set data field
    data_field = pivot_table.PivotFields(data_field)
    data_field.Orientation = win32.constants.xlDataField
    data_field.Function = win32.constants.xlSum
    data_field.NumberFormat = "$#,##0.00"


    # Apply banded rows and columns formatting
    pivot_table.TableStyle2 = "PivotStyleMedium2"
    pivot_table.ShowTableStyleRowStripes = True
    pivot_table.ShowTableStyleColumnStripes = True

    # Hide row headers
    pivot_table.RowAxisLayout(win32.constants.xlTabularRow)

    # Sort data field in descending order
    #data_field.AutoSort(xw.constants.SortOrderDescending, "Total")


# Open Excel application
excel = win32.gencache.EnsureDispatch("Excel.Application")
excel.Visible = True

# Open workbook
workbook = excel.Workbooks.Open(excel_file)

# Get the table named "Table1"
table = workbook.Sheets("Combined_Inventory").ListObjects("Table1")
worksheet = workbook.Sheets("Combined_Inventory")
source_range = table.Range

pivot_table2_sheet = "10-Year Look Ahead"

## REVISED BY MEB
# Define fields for pivot table
row_field = []
for p in pivot_aliases:
    if p[0] == risk_score:
        row_field.append(p[1])
for p in pivot_aliases:
```

```
    if p[0] == asset_id:
        row_field.append(p[1])

col_field = ''
for p in pivot_aliases:
    if p[0] == crit:
        col_field = p[1]

value_field = ''
for p in pivot_aliases:
    if p[0] == first_ten:
        value_field = p[1]


pivot_table2_row_fields = row_field
pivot_table2_column_field = col_field
pivot_table2_data_field = value_field

# pivot_table2_row_fields = ["Risk Score", "Asset ID"]
# pivot_table2_column_field = "Criticality"
# pivot_table2_data_field = "2024-2033"

###############################################################################
#############################################
#    100 Year Lookahead Table and Clustered Chart
#
###############################################################################
#############################################
def create_100yr_lookahead_pivot_table(workbook, source_range,
destination_sheet, data_fields):  #row_fields, #column_field,

    # Create a new worksheet for the pivot table
    pivot_sheet = workbook.Sheets.Add()
    pivot_sheet.Name = destination_sheet

    # Create a PivotTable on the new sheet
    pivot_table = pivot_sheet.PivotTableWizard(
        SourceType=win32.constants.xlDatabase,
        SourceData=source_range,
        TableDestination=pivot_sheet.Range("A3")
    )

    # Set row fields
    #for field in row_fields:
        #pivot_table.PivotFields(field).Orientation =
win32.constants.xlRowField

    # Set column field
    #if column_field:
        #pivot_table.PivotFields(column_field).Orientation =
win32.constants.xlColumnField

    # Set data field
    for field in data_fields:
```

```
        data_field = pivot_table.PivotFields(field)
        data_field.Orientation = win32.constants.xlDataField
        data_field.Function = win32.constants.xlSum
        data_field.NumberFormat = "$#,##0.00"

    # Apply banded rows and columns formatting
    pivot_table.TableStyle2 = "PivotStyleMedium2"
    pivot_table.ShowTableStyleRowStripes = True
    pivot_table.ShowTableStyleColumnStripes = True

    yr_chart = pivot_sheet.Shapes.AddChart2().Chart
    yr_chart.ChartType = win32.constants.xlColumnClustered

    # Set the data source for the chart
    yr_chart.SetSourceData(pivot_table.TableRange1)

    # Hide field buttons
    yr_chart.ShowAllFieldButtons = False


    # Enable data labels on the chart
    yr_chart.HasDataLabels = True

    # Customize data labels as needed
    #yr_chart.DataLabels.ShowValue = True


    yr_chart.Width = 576  # Width of the chart in points
    yr_chart.Height = 432  # Height of the chart in points


# Open Excel application
excel = win32.gencache.EnsureDispatch("Excel.Application")
excel.Visible = True

# Open workbook
workbook = excel.Workbooks.Open(excel_file)

# Get the table named "Table1"
table = workbook.Sheets("Combined_Inventory").ListObjects("Table1")
worksheet = workbook.Sheets("Combined_Inventory")
source_range = table.Range

pivot_table3_sheet = "100-Year Look Ahead"

## REVISED BY MEB
# Define fields for pivot table
value_field = []
i = 0
n = 0
l = len(pivot_aliases)-1
for i in range(0,l):
    if pivot_aliases[i][0] == first_ten:
        value_field.append(pivot_aliases[i][1])
```

```
        n = i

for i in range(n+1,n+9):
    value_field.append(pivot_aliases[i][1])

pivot_table3_row_fields = ["Values"]
pivot_table3_column_field = None
pivot_table3_data_fields = value_field

###############################################################################
###########################################
#    100 Year Lookahead Table and Stacked Chart
#
###############################################################################
###########################################
def create_dupe_100yr_lookahead_pivot_table(workbook, source_range,
destination_sheet, column_field, data_fields):  #row_fields,
#column_field,

    # Create a new worksheet for the pivot table
    pivot_sheet = workbook.Sheets.Add()
    pivot_sheet.Name = destination_sheet

    # Create a PivotTable on the new sheet
    pivot_table = pivot_sheet.PivotTableWizard(
        SourceType=win32.constants.xlDatabase,
        SourceData=source_range,
        TableDestination=pivot_sheet.Range("A3")
    )

    # Set row fields
    #for field in row_fields:
        #pivot_table.PivotFields(field).Orientation =
win32.constants.xlRowField

    # Set column field
    if column_field:
        pivot_table.PivotFields(column_field).Orientation =
win32.constants.xlColumnField

    # Set data field
    for field in data_fields:
        data_field = pivot_table.PivotFields(field)
        data_field.Orientation = win32.constants.xlDataField
        data_field.Function = win32.constants.xlSum
        data_field.NumberFormat = "$#,##0.00"

    # Apply banded rows and columns formatting
    pivot_table.TableStyle2 = "PivotStyleMedium2"
    pivot_table.ShowTableStyleRowStripes = True
    pivot_table.ShowTableStyleColumnStripes = True

    yr_chart = pivot_sheet.Shapes.AddChart2().Chart
    yr_chart.ChartType = win32.constants.xlColumnStacked
```

```
    # Set the data source for the chart
    yr_chart.SetSourceData(pivot_table.TableRange1)

    # Hide field buttons
    yr_chart.ShowAllFieldButtons = False

    # Enable data labels on the chart
    #yr_chart.HasDataLabels = True

    # Customize data labels as needed
    yr_chart.datalabels = DataLabelList()
    yr_chart.datalabels.showVal = True
    #data_labels.Position = win32.constants.xlLabelPositionAbove  # Set
the position of data labels
    #data_labels.ShowValue = True  # Show the values on data labels

    yr_chart.Width = 576  # Width of the chart in points
    yr_chart.Height = 432  # Height of the chart in points

# Open Excel application
excel = win32.gencache.EnsureDispatch("Excel.Application")
excel.Visible = True

# Open workbook
workbook = excel.Workbooks.Open(excel_file)

# Get the table named "Table1"
table = workbook.Sheets("Combined_Inventory").ListObjects("Table1")
worksheet = workbook.Sheets("Combined_Inventory")
source_range = table.Range

pivot_table4_sheet = "100-Year Look Ahead (2)"

## REVISED BY MEB
# Define fields for pivot table
value_field = []
i = 0
n = 0
l = len(pivot_aliases)-1
for i in range(0,l):
    if pivot_aliases[i][0] == first_ten:
        value_field.append(pivot_aliases[i][1])
        n = i

for i in range(n+1,n+9):
    value_field.append(pivot_aliases[i][1])

pivot_table4_row_fields = ["Values"]
pivot_table4_column_field = "Asset Type"
pivot_table4_data_fields = value_field
```

```
##########################################################################
##########################################
#    This section creates all the tables based on the definitions above
#
##########################################################################
##########################################
create_replacement_cost_pivot_table(workbook, source_range,
pivot_table1_sheet, pivot_table1_row_fields,
                    pivot_table1_column_field, pivot_table1_data_field)

create_10yr_lookahead_pivot_table(workbook, source_range,
pivot_table2_sheet, pivot_table2_row_fields,
                    pivot_table2_column_field, pivot_table2_data_field)

create_100yr_lookahead_pivot_table(workbook, source_range,
pivot_table3_sheet, pivot_table3_data_fields) #pivot_table3_row_fields,
                    #pivot_table3_column_field,

create_dupe_100yr_lookahead_pivot_table(workbook, source_range,
pivot_table4_sheet, pivot_table4_column_field, pivot_table4_data_fields)
#pivot_table3_row_fields,
                    #pivot_table3_column_field,



# Save and close the workbook
workbook.Save()
workbook.Close()

# Quit Excel application
#excel.Quit()
```

APPENDIX D

Inventory Field Summary Table

APPENDIX D
Inventory Field Summary Table

Field	Field Alias	Source	Note
Asset_Category	Category	Assigned by UE	Horizontal or Vertical
Asset_ID	Asset ID	Assigned by UE	
Asset_Size	Asset Size	Assigned by UE	
Asset_Type	Asset Type	Assigned by UE	
CondScore	Condition Score	To be Assigned by Owner	
CreationDate	CreationDate	ESRI	
Creator	Creator	ESRI	
Crit	Criticality	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Diameter	Diameter	Assigned by UE	
DS_	DS_	Assigned by UE	
EditDate	EditDate	ESRI	
Editor	Editor	ESRI	
EU_Life	End of Useful Life	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Facility_Name	Facility Name or Collection Basin	Assigned by UE	
Facility_Type	Facility Type	Assigned by UE	
GlobalID	GlobalID	ESRI	
Impact	Impact of Failure	Assigned by UE	Required for '001_Calculate_inventory_fields_WaterWastewater_1_26_24'
Item_Count	Item Count	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Lat_Y	Latitude	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	Required to map locations in Survey123
Length_ft	Length_ft	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Lin_Unit	Lin_Unit	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Location	Location	Assigned by UE	
Lon_X	Longitude	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	Required to map locations in Survey123
Material	Material	Assigned by UE	Required to determine estimated useful life for pipes and structures
Material_Notes	Material_Notes	Assigned by UE	
OBJECTID	OBJECTID	ESRI	
Owner	Owner	Assigned by UE	
Path_Name	Path Name	Assigned by UE	Used to create record drawing file
Prob	Probability of Failure	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Process	Process	Assigned by UE	
Process_Number	Process Number	Assigned by UE	
Quantity	Quantity	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Repl_Cost	Replacement Cost	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Repl_Year	Replacement Year	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Risk_Score	Risk Score	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
RU_Life	Remaining Useful Life	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	
Shape	Shape	ESRI	
Shape_Length	Shape_Length	ESRI	
U_Life	Useful Life	Assigned by UE	Required for '001_Calculate_inventory_fields_WaterWastewater_1_26_24'
UE_Notes	UE_Notes	Assigned by UE	
Unit	Unit	Assigned by UE	
Unit_Cost	Unit Cost	Assigned by UE	Required for '001_Calculate_inventory_fields_WaterWastewater_1_26_24'
US_	US_	Assigned by UE	
Year_In	Year Installed	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	Required for '001_Calculate_inventory_fields_WaterWastewater_1_26_24'
Year_txt	Year_txt	Calculated by Python Script '001_Calculate_inventory_fields_WaterWastewater_1_26_24'	

APPENDIX E

ArcGIS StoryMap Screen Shots

Carroll County Water System StoryMap

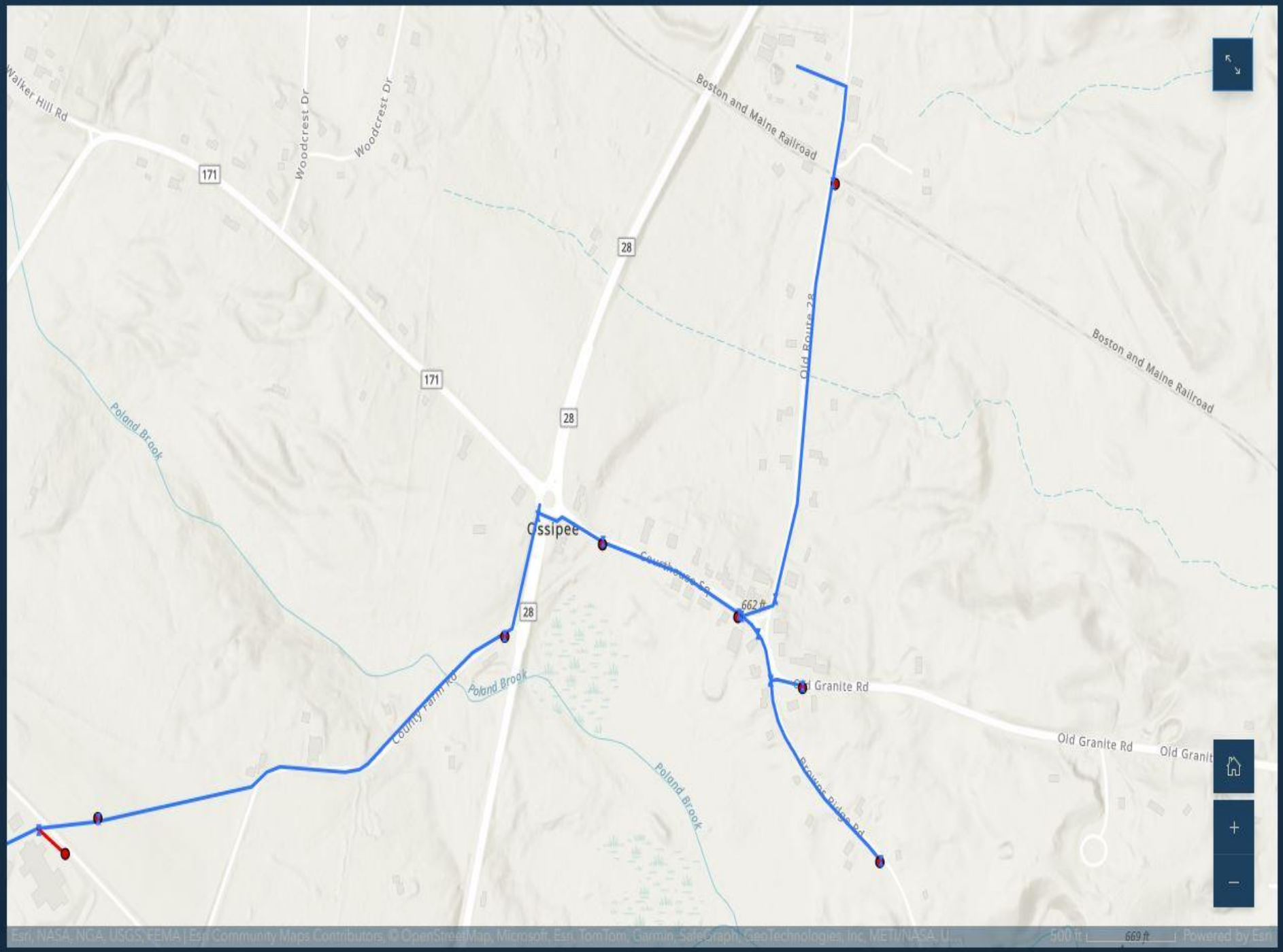
The Carroll County water system serves the County complex and 40 additional homes in Ossipee Village.

Will DeWitte
Draft

The Carroll County water system is curranty operated by the County's Department of Public Works (DPW).

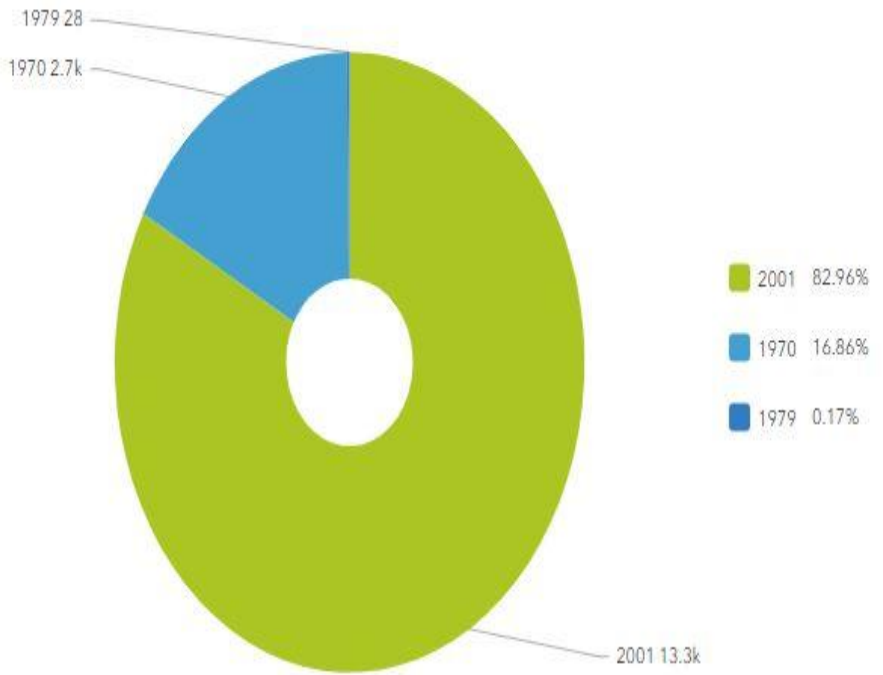
Carroll County, NH seal.

The County's existing sources of supply include two deep bedrock wells and three dug wells. Raw water is pumped from the wells to a meter and chlorination building, then subsequently to an in-ground storage tank. Due to the elevation of the underground storage tank, the entirety of the Carroll County water system is gravity fed.



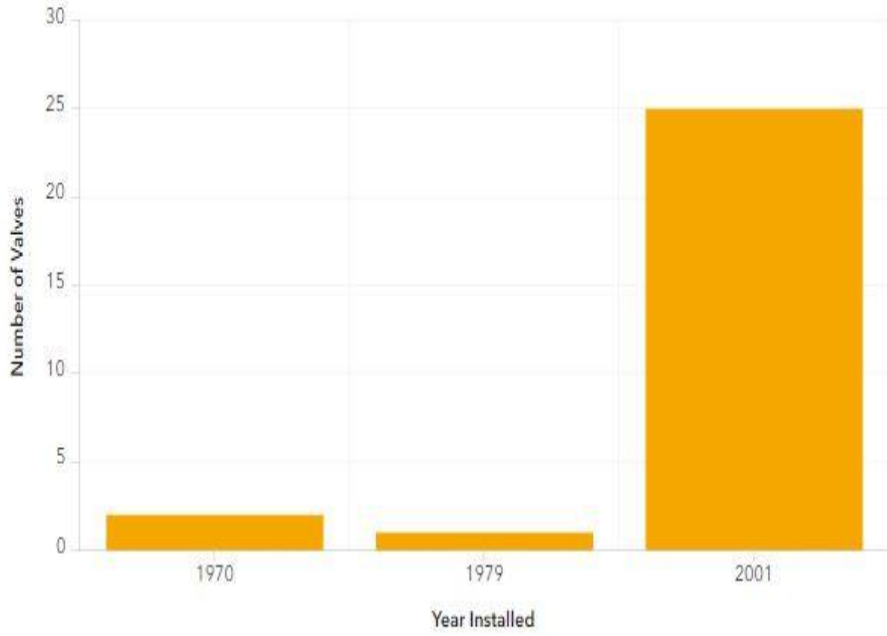
Carroll County water system map.

Water Main Material by Year of Installation



End of Useful Life by Length of Water Main

End of Useful Life	Pipe Length (ft)
2045	2,703.6
2054	28
2076	4,793.2
2086	8,507.9



Carroll County water system dashboard.

APPENDIX F

Level of Service Matrix and Workshop Minutes

Level Of Service WORKSHOP MEETING NOTES

Water Asset Management Program
Carroll County, NH
10:00 AM, Wednesday, February 7, 2024
Carroll County Annex Building

1) **Attendees/Introduction**

Terry McCarthy, Chairman
Chuck McGee, Commissioner
Bill Nelson, Commissioner
Will DeWitte, Director of Public Works
Mellisa Seamans, Executive Coordinator
Adam Riley – Ossipee Corner Fire Department
Kaitlin Curtis – NHDES
Lynnette Carney – Underwood Engineers
Margaret Blank – Underwood Engineers
Jordan Provencher – Underwood Engineers

2) **What is Level of Service (LOS)?:**
   a) LOS seeks to optimize service and cost. LOS goals for water utilities need to be specific, measurable, achievable, relevant, and time-based (SMART). **This is a requirement for the AMP program.**
   b) LOS should also be evaluated and reassessed (SMARTER) annually at minimum. **Balance service and cost.**
   c) Example (water system):
      i) Inspect all hydrants twice annually.
      ii) Visit meter and chlorination building daily.
      iii) Keep records
         (1) Well flowrates
         (2) Total volume pumped from each source
         (3) Chlorine residual
      iv) Find and exercise valves annually **or biannually.**
      v) Inspect and clean storage tank every five years.
      vi) Clear brush from access pathway and from over cross country pipes.
      vii) Maintain O&M manual and record drawings **– update as needed.**

3) **What is a Vision Statement?:**
   a) A Vision Statement describes the aims and values of your system. It should be created to define the overall purpose of your system or department. This will guide your system in determining the services you provide.
   b) Example:
      i) Water: *"We're here to bring water to all and we want to make it safe, accessible and cost-effective." – Water.org*
   c) Carroll County's current situation –
      i) Public Works handles hay farm, water system, sewer system, site maintenance – mowing and plowing, which consumes much of their time.
      ii) Workforce
         (1) Two full-timers
         (2) One part-timers (summer intern)

iii) ArcGIS Online (AGOL) account set up by GSRW – need to upgrade to Basic ArcGIS Pro bundle (AGOL; apps – Survey123, Field Maps, Story Maps, Dashboards; ArcGIS Pro desktop software)

4) Stakeholders and Methods of Communication

a) County Complex users (nursing home, employees, jail, etc.)
b) Ossipee village residents
c) Ossipee Corner Fire Department
d) NHDOT (maintenance shed)
e) County Delegation.
f) Citizen groups.

5) <u>Draft Level of Service Matrix:</u>

a) See attached.

Carroll County Level of Service Matrix

Vision Statement: To develop a knowledge base on all existing infrastructure so that in the event of an emergency, the County is prepared for how to best resolve the problem.

Stakeholders: Commissioners, customers, NHDOT, Ossipee Corner Fire Department, County Delegation.

Category	Overall Objective	Specific Goal	2024 Target	Units/Time	Achieved 2023	Corrective Measures/Comments	2025 Goal
Public Education and Outreach	Communicate the value and importance of water facilities (age, condition, value)	Update county website.	1	Yearly			
		Embed AMP story map and/or dashboards.	1	Yearly			
		Improve communication and outreach with regular posting of meeting minutes.	1	Monthly		The County already does this. Goal will be to continue same practice.	
		Continue distribution of consumer confidence reports.	1	Yearly		County bills its customers quarterly.	
	Customer Service	New tie-ins to the system.				Customer to contact Will. Will receives approval from the BOC. Town of Ossipee pays for curb stop & meter horn.	Not many more tie-ins expected. System is mostly built out.
		Information requests.				Direct customers to the new StoryMap. Some customers are misinformed about addresses so this could help.	
		Response time.				Emergencies can be addressed in 5 minutes.	
		Complaint handling.				Develop an electronic form for complaints.	
Water System (O & M Goals) / Water System	Distribution System	Gate valve maintenance program					
		Hydrant inspection and flushing.	2	Yearly		Fire department currently does this.	
		Water main flushing	2	Yearly		Fire department currently does this. Not as formal as Will would like it.	
	Source and Storage	Cleaning and Inspection of Storage Tank	1	every 5 yrs		First recorded inspection was conducted in 2018. Very little sediment observed.	
		Cleaning Out Fire Pond	1	every 5 yrs		Dry hydrant has broken ~3 times each time pond ices over.	
	Meters and Billing	Residential Meter Change Outs	~50	meters		County has purchased these meters and plans to install in-house spring/summer of 2024. Reference AWWA M6 Schedule. Biggest part of it will be scheduling the appointments.	Change out all meters before LSLI deadline.
		Commercial Meter Change Outs	5	meters		This work has since been completed.	
		Backflow Preventer Testing	1	Yearly		The County has a subcontractor to do this work.	
Regulatory Compliance	LSLI Inventory	Report	~40	Services		Physical verification during meter change outs fro each residential connection. Forms have been created.	Deadline is October 16, 2024
	Emergency Planning	Emergency Response PLan	1	5 years	Next one due 2026		
Regulatory Compliance	Water Quality Standards	Primary Standards	100%				
		Secondary Standards					
Financial	Determine replacement value of water assets and estimate capital needs	Current dollars	1	Yearly		5-year planning horizon	
	Adequate revenue from water user fees for operating and capital needs.	Water rate study	1	3 years		Rates haven't been raised in many years. 2021 study showed that rates are okay.	
Staffing	Training and Certification	Job training	Spring 2024				
		CEU's for licensed operators				Will is the only certified staff person.	Add on at least one additional certified staff person.

APPENDIX G

Water System Maps

Legend

- Map Pages
- Vertical Assets
- Valves
- Hydrants
- Yard Hydrants
- Water Mains
- Fire Protection Services
- Hydrant Services

1

2

Ossipee

Leighton Corner Rd
Walker Hill Rd
Frenchman Brook
NH Route 113
Boston and Maine Railroad
Woodcrest Dr
Old Route 28
Hawthorne Rd
Wellington Ct
County Farm Rd
Poland Brook
Old Granite Rd
Brookwood Dr
Browns Ridge Rd
Cornerstone Dr
16
28
171
803 ft
824 ft
651 ft
841 ft
660 ft
669 ft
665 ft
862 ft
1265 ft
880 ft
982 ft
1124 ft
745 ft
864 ft
843 ft
825 ft

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

Path: M:\GIS\Carroll County, NH\2824_Carroll_County_WaterAMP\2824_Carroll_County_WaterAMP.aprx

Appendix G-1
Carroll County Water Map Book Index

N

0 250 500 1,000 1,500 2,000 Feet
1 in = 500 ft

Underwood Engineers
99 N. State Street
Concord N.H. 03301
Tel. 603-230-9898
Fax. 603 - 230-9899

25 Vaughan Mall
Portsmouth, N.H. 03801
Tel. 603-436-6192
Fax. 603 - 431-4733

CAROLL COUNTY, NEW HAMPSHIRE

WATER ASSET MANAGEMENT PROGRAM

Project No. 2824

Date: 6/30/24

Legend

- Vertical Assets
- Valves
- Hydrants
- Yard Hydrants
- Water Mains
- Fire Protection Services
- Hydrant Services

HV-013
V-018
V-022
V-024
V-014
V-019
V-016
HV-009
V-025
V-010
V-011
HV-011
V-005
HV-014
V-004
V-006
V-007
V-001
V-003
V-002
V-008
V-009
HV-008
V-021
V-020
V-013
HV-010
V-012
HV-012
V-015

Walker Hill Rd
Poland Brook
County Farm Rd
171
820 ft
862 ft
880 ft
982 ft

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

Appendix G-1
Carroll County Water Map Book
Page 1 of 2

N

0 100 200 400 600 800 Feet
1 in = 200 ft

Underwood Engineers

99 N. Slate Street
Concord N.H. 03301
Tel. 603-230-9898
Fax. 603 - 230-9899

25 Vaughan Mall
Portsmouth, N.H. 03801
Tel. 603-436-6192
Fax. 603 - 431-4733

CAROLL COUNTY, NEW HAMPSHIRE

WATER ASSET MANAGEMENT PROGRAM

Date: 6/30/24

Project No. 2824

Legend

- Vertical Assets
- Valves
- Hydrants
- Yard Hydrants
- Water Mains
- Fire Protection Services
- Hydrant Services

HV-007
HV-001
HV-002
HV-003
HV-004
HV-005
HV-006
V-015
V-017
V-023
V-026
V-027
V-028
Ossipee
Boston and Maine Railroad
Old Route 28
Courthouse Sq
Old Granite Rd
Brooms Ridge Rd
County Farm Rd
Poland Brook
Woodcrest Dr
Binghamton Dr
661 ft
660 ft

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

Appendix G-1
Carroll County Water Map Book
Page 2 of 2

N

0 100 200 400 600 800 Feet
1 in = 200 ft

Underwood Engineers
99 N. State Street
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CAROLL COUNTY, NEW HAMPSHIRE
WATER ASSET MANAGEMENT PROGRAM
Project No. 2824
Date: 6/30/24

Legend

- Vertical Assets

Valves by Year of Installation
- Unknown
- 1970 - 1979
- 2000 - 2009
- 2010 - 2019

Hydrants by Year of Installation
- 2000 - 2009
- 2010 - 2019

Yard Hydrants by Year of Installation
- 1970 - 1979
- 2000 - 2009

Water Mains by Year of Installation
- Unknown
- < 1960
- 1970 - 1979
- 1980 - 1989
- 1990 - 1999
- 2000 - 2009
- 2010 - 2019

Hydrant Services by Year of Installation
- Unknown
- < 1960
- 1970 - 1979
- 1980 - 1989
- 1990 - 1999
- 2000 - 2009
- 2010 - 2019

Fire Protection Services by Year of Installation
- 2000 - 2009

820 ft
862 ft
880 ft
982 ft
171
County Farm Rd

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

APPENDIX G-2
Carroll County Water System
by Year of Installation
Page 1 of 2

N

0 100 200 400 600 800 Feet

1 in = 200 ft

Underwood Engineers

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CAROLL COUNTY, NEW HAMPSHIRE

WATER ASSET MANAGEMENT PROGRAM

Project No. 2824

Date: 6/30/24

Legend

- Vertical Assets

Valves by Year of Installation
- Unknown
- 1970 - 1979
- 2000 - 2009
- 2010 - 2019

Hydrants by Year of Installation
- 2000 - 2009
- 2010 - 2019

Yard Hydrants by Year of Installation
- 1970 - 1979
- 2000 - 2009

Water Mains by Year of Installation
- Unknown
- < 1960
- 1970 - 1979
- 1980 - 1989
- 1990 - 1999
- 2000 - 2009
- 2010 - 2019

Hydrant Services by Year of Installation
- Unknown
- < 1960
- 1970 - 1979
- 1980 - 1989
- 1990 - 1999
- 2000 - 2009
- 2010 - 2019

Fire Protection Services by Year of Installation
- 2000 - 2009

Ossipee
Courthouse Sq
Old Granite Rd
Old Route 28
Boston and Maine Railroad
Woodcrest Dr
County Farm Rd
Poland Brook
Benjamin Dr
Bryants Ridge Rd
662 ft
661 ft
660 ft
171
28

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

APPENDIX G-2
Carroll County Water System
by Year of Installation
Page 2 of 2

N

0 100 200 400 600 800 Feet

1 in = 200 ft

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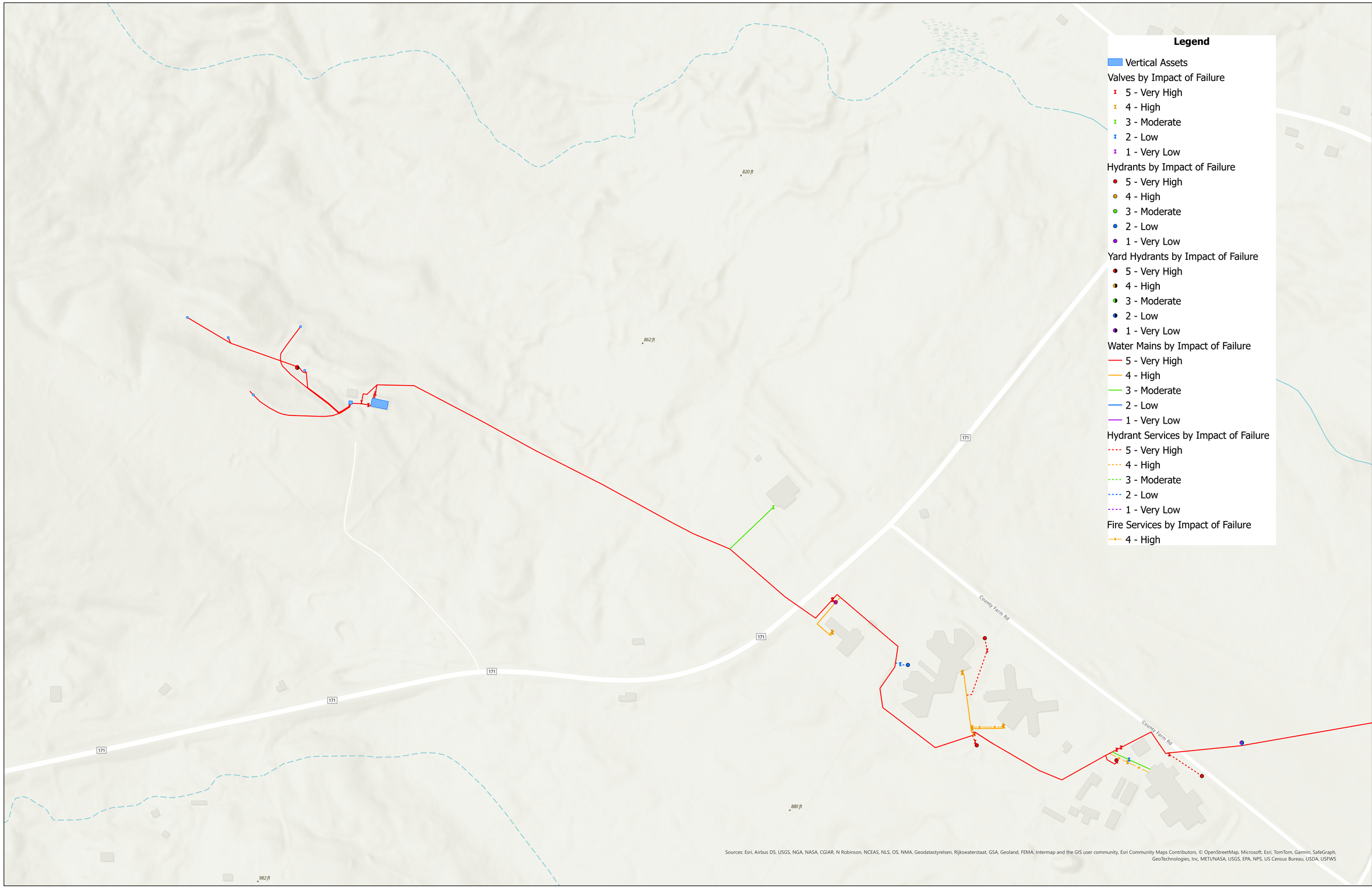
CAROLL COUNTY, NEW HAMPSHIRE

WATER ASSET MANAGEMENT PROGRAM

Project No. 2824

Date: 6/30/24



Legend

- Vertical Assets

Valves by Impact of Failure
- 5 - Very High
- 4 - High
- 3 - Moderate
- 2 - Low
- 1 - Very Low

Hydrants by Impact of Failure
- 5 - Very High
- 4 - High
- 3 - Moderate
- 2 - Low
- 1 - Very Low

Yard Hydrants by Impact of Failure
- 5 - Very High
- 4 - High
- 3 - Moderate
- 2 - Low
- 1 - Very Low

Water Mains by Impact of Failure
- 5 - Very High
- 4 - High
- 3 - Moderate
- 2 - Low
- 1 - Very Low

Hydrant Services by Impact of Failure
- 5 - Very High
- 4 - High
- 3 - Moderate
- 2 - Low
- 1 - Very Low

Fire Services by Impact of Failure
- 4 - High

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

APPENDIX G-3
Carroll County Water System
by Impact of Failure
Page 1 of 2

N

0 100 200 400 600 800 Feet
1 in = 200 ft

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25 Vaughan Mall
Portsmouth, N.H. 03801
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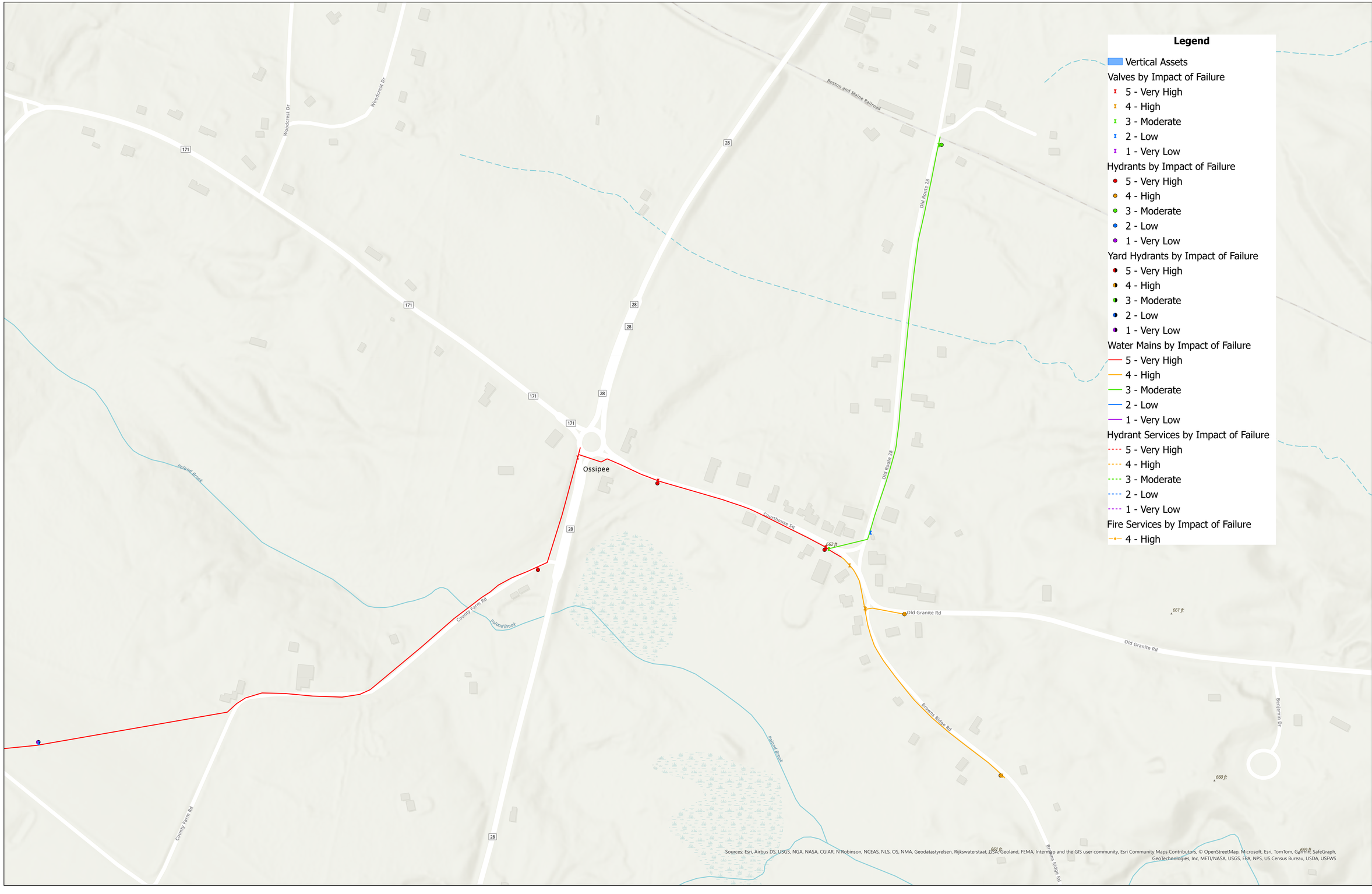
Fax. 603 - 431-4733

CAROLL COUNTY, NEW HAMPSHIRE
WATER ASSET MANAGEMENT PROGRAM

Project No. 2824

Date: 6/30/24



APPENDIX G-3
Carroll County Water System
by Impact of Failure
Page 2 of 2

N

0 100 200 400 600 800 Feet
1 in = 200 ft

Underwood Engineers
99 N. State Street
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25 Vaughan Mall
Portsmouth, N.H. 03801
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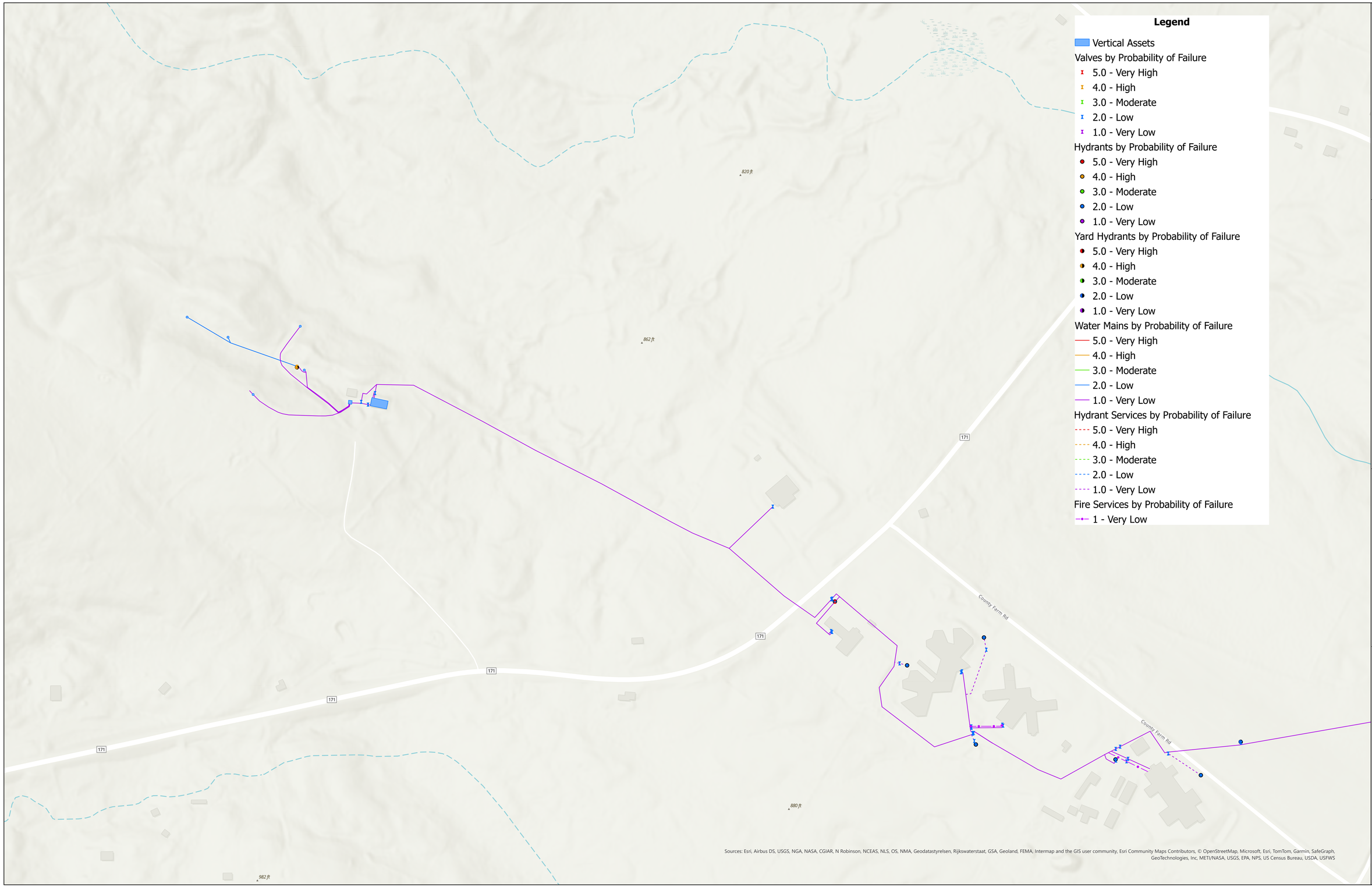
Fax: 603 - 431-4753

CAROLL COUNTY, NEW HAMPSHIRE
WATER ASSET MANAGEMENT PROGRAM

Date: 6/30/24

Project No. 2824



Legend

- Vertical Assets

Valves by Probability of Failure
- 5.0 - Very High
- 4.0 - High
- 3.0 - Moderate
- 2.0 - Low
- 1.0 - Very Low

Hydrants by Probability of Failure
- 5.0 - Very High
- 4.0 - High
- 3.0 - Moderate
- 2.0 - Low
- 1.0 - Very Low

Yard Hydrants by Probability of Failure
- 5.0 - Very High
- 4.0 - High
- 3.0 - Moderate
- 2.0 - Low
- 1.0 - Very Low

Water Mains by Probability of Failure
- 5.0 - Very High
- 4.0 - High
- 3.0 - Moderate
- 2.0 - Low
- 1.0 - Very Low

Hydrant Services by Probability of Failure
- 5.0 - Very High
- 4.0 - High
- 3.0 - Moderate
- 2.0 - Low
- 1.0 - Very Low

Fire Services by Probability of Failure
- 1 - Very Low

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

APPENDIX G-4
Carroll County Water System
by Probability of Failure
Page 1 of 2

N

0 100 200 400 600 800 Feet

1 in = 200 ft

Underwood Engineers

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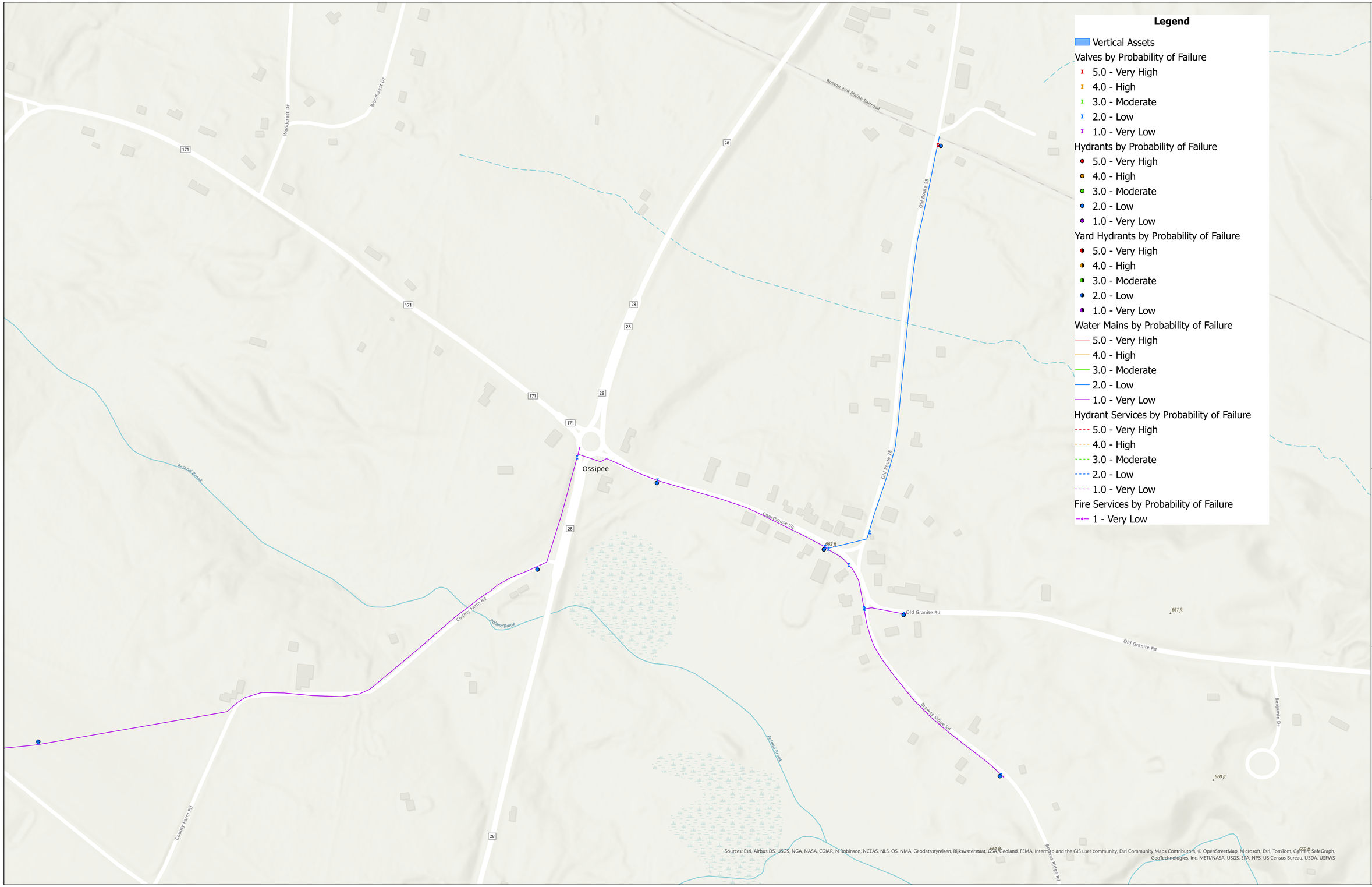
CAROLL COUNTY, NEW HAMPSHIRE

WATER ASSET MANAGEMENT PROGRAM

Date: 6/30/24

Project No. 2824



APPENDIX G-4
Carroll County Water System
by Probability of Failure
Page 2 of 2

N

0 100 200 400 600 800 Feet
1 in = 200 ft

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Portsmouth, N.H. 03801
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Fax. 603 - 431-4733

CAROLL COUNTY, NEW HAMPSHIRE
WATER ASSET MANAGEMENT PROGRAM
Project No. 2824
Date: 6/30/24

Legend

- Vertical Assets

Valves by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Hydrants by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Yard Hydrants by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Water Mains by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Hydrant Services by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Fire Services by Criticality
- Frequent Monitoring

820 ft
862 ft
880 ft
982 ft
171
County Farm Rd

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

APPENDIX G-5
Carroll County Water System by Criticality
Page 1 of 2

N

0 100 200 400 600 800 Feet
1 in = 200 ft

Underwood Engineers

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CAROLL COUNTY, NEW HAMPSHIRE

WATER ASSET MANAGEMENT PROGRAM

Project No. 2824

Date: 6/30/24

Legend

- Vertical Assets

Valves by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Hydrants by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Yard Hydrants by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Water Mains by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Hydrant Services by Criticality
- Highest Risk
- Priority Renewal
- Frequent Monitoring
- Limited Monitoring

Fire Services by Criticality
- Frequent Monitoring

Ossipee
Courthouse Sq
Old Granite Rd
Brown Ridge Rd
Benjamin Dr
County Farm Rd
Poland Brook
Boston and Maine Railroad
Old Route 28
Woodcrest Dr
652 ft
661 ft
660 ft
664 ft
668 ft
171
28

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

APPENDIX G-5
Carroll County Water System by Criticality
Page 2 of 2

N

0 100 200 400 600 800 Feet
1 in = 200 ft

Underwood Engineers

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CAROLL COUNTY, NEW HAMPSHIRE

WATER ASSET MANAGEMENT PROGRAM

Date: 6/30/24

Project No. 2824

APPENDIX H

Financial Planning Spreadsheet

OBJECTID	Owner	Category	Facility Type	Facility Name or Pressure Zone	Location	Process Number	Process
1	Carroll County	Horizontal	Water Pipe	Distribution System	Administration Building	3.04	Water Distribution System - Horizontal
2	Carroll County	Horizontal	Water Pipe	Distribution System	County Farm Rd	3.04	Water Distribution System - Horizontal
3	Carroll County	Horizontal	Water Pipe	Distribution System	Farm Maintenance	3.04	Water Distribution System - Horizontal
4	Carroll County	Horizontal	Water Pipe	Distribution System	County Farm Rd	3.04	Water Distribution System - Horizontal
5	Carroll County	Horizontal	Water Pipe	Distribution System	Courthouse Square	3.04	Water Distribution System - Horizontal
6	Carroll County	Horizontal	Water Pipe	Distribution System	Courthouse Square	3.04	Water Distribution System - Horizontal
7	Carroll County	Horizontal	Water Pipe	Distribution System	Old Granite Rd	3.04	Water Distribution System - Horizontal
8	Carroll County	Horizontal	Water Pipe	Distribution System	Old Rt 28	3.04	Water Distribution System - Horizontal
9	Carroll County	Horizontal	Water Pipe	Distribution System	Browns Ride Rd	3.04	Water Distribution System - Horizontal
10	Carroll County	Horizontal	Water Pipe	Distribution System	County Farm Road	3.04	Water Distribution System - Horizontal
11	Carroll County	Horizontal	Water Pipe	Distribution System	Nursing Home	3.04	Water Distribution System - Horizontal
12	Carroll County	Horizontal	Water Pipe	Distribution System	Corrections Facility	3.04	Water Distribution System - Horizontal
13	Carroll County	Horizontal	Water Pipe	Distribution System	Well Field	3.04	Water Distribution System - Horizontal
14	Carroll County	Horizontal	Water Pipe	Distribution System	County Farm Road	3.04	Water Distribution System - Horizontal
15	Carroll County	Horizontal	Hydrant	Distribution System	Administration Building	3.04	Water Distribution
16	Carroll County	Horizontal	Hydrant	Distribution System	Courthouse Sqaure	3.04	Water Distribution
17	Carroll County	Horizontal	Hydrant	Distribution System	County Farm Road	3.04	Water Distribution
18	Carroll County	Horizontal	Hydrant	Distribution System	County Farm Road	3.04	Water Distribution
19	Carroll County	Horizontal	Hydrant	Distribution System	Browns Bridge Road	3.04	Water Distribution
20	Carroll County	Horizontal	Hydrant	Distribution System	Old Granite Road	3.04	Water Distribution
21	Carroll County	Horizontal	Hydrant	Distribution System	Courthouse Sqaure	3.04	Water Distribution
22	Carroll County	Horizontal	Hydrant	Distribution System	Old Route 28	3.04	Water Distribution
23	Carroll County	Horizontal	Hydrant	Distribution System	County Farm Road	3.04	Water Distribution
24	Carroll County	Horizontal	Hydrant	Distribution System	County Farm Road	3.04	Water Distribution
25	Carroll County	Horizontal	Hydrant	Distribution System	County Farm Road	3.04	Water Distribution
26	Carroll County	Horizontal	Hydrant	Distribution System	County Farm Road	3.04	Water Distribution
27	Carroll County	Horizontal	Water System Valve	Distribution System	Administration Building	3.04	Water Distribution System
28	Carroll County	Horizontal	Water System Valve	Distribution System	Administration Building	3.04	Water Distribution System
29	Carroll County	Horizontal	Water System Valve	Distribution System	Country Farm Road	3.04	Water Distribution System
30	Carroll County	Horizontal	Water System Valve	Distribution System	Courthouse Square	3.04	Water Distribution System
31	Carroll County	Horizontal	Water System Valve	Distribution System	County Farm Road	3.04	Water Distribution System
32	Carroll County	Horizontal	Water System Valve	Distribution System	Reservoir	3.04	Water Distribution System
33	Carroll County	Horizontal	Water System Valve	Distribution System	Browns Bridge Road	3.04	Water Distribution System
34	Carroll County	Horizontal	Water System Valve	Distribution System	Browns Bridge Road	3.04	Water Distribution System
35	Carroll County	Horizontal	Water System Valve	Distribution System	Old Granite Road	3.04	Water Distribution System
36	Carroll County	Horizontal	Water System Valve	Distribution System	Old Granite Road	3.04	Water Distribution System
37	Carroll County	Horizontal	Water System Valve	Distribution System	Courthouse Square	3.04	Water Distribution System
38	Carroll County	Horizontal	Water System Valve	Distribution System	Courthouse Square	3.04	Water Distribution System
39	Carroll County	Horizontal	Water System Valve	Distribution System	Old Route 28	3.04	Water Distribution System
40	Carroll County	Horizontal	Water System Valve	Distribution System	Old Route 28	3.04	Water Distribution System
41	Carroll County	Horizontal	Water System Valve	Distribution System	County Farm Road	3.04	Water Distribution System
42	Carroll County	Horizontal	Water System Valve	Distribution System	Administration Building	3.04	Water Distribution System
43	Carroll County	Horizontal	Water System Valve	Distribution System	Administration Building	3.04	Water Distribution System
44	Carroll County	Horizontal	Water System Valve	Distribution System	County Farm Road	3.04	Water Distribution System
45	Carroll County	Horizontal	Water System Valve	Distribution System	County Farm Road	3.04	Water Distribution System
46	Carroll County	Horizontal	Water System Valve	Distribution System	Country Farm Road	3.04	Water Distribution System
47	Carroll County	Horizontal	Water System Valve	Distribution System	Reservoir	3.04	Water Distribution System
48	Carroll County	Horizontal	Water System Valve	Distribution System	Browns Bridge Road	3.04	Water Distribution System
49	Carroll County	Horizontal	Water System Valve	Distribution System	County Farm Road	3.04	Water Distribution System

OBJECTID	Asset Type	Asset Size	Material	Asset ID	Year Installed	Useful Life	End of Useful Life	Remaining Useful Life
1	Hydrant Service	6	DI	HS-001	2001	85	2086	62
2	Hydrant Service	6	DI	HS-004	2001	85	2086	62
3	Hydrant Service	6	DI	HS-006	2001	85	2086	62
4	Hydrant Service	6	DI	HS-008	2001	85	2086	62
5	Hydrant Service	6	DI	HS-009	2001	85	2086	62
6	Hydrant Service	6	DI	HS-010	2001	85	2086	62
7	Hydrant Service	6	DI	HS-011	2001	85	2086	62
8	Hydrant Service	6	DI	HS-012	2001	85	2086	62
9	Hydrant Service	6	DI	HS-013	2001	85	2086	62
10	Hydrant Service	6	DI	HS-002	2010	85	2095	71
11	Hydrant Service	6	DI	HS-003	2010	85	2095	71
12	Hydrant Service	6	DI	HS-007	2003	85	2088	64
13	Hydrant Service	6	Unk	HS-014	1979	75	2054	30
14	Hydrant Service	6	DI	HS-020	2002	85	2087	63
15	Fire Hydrant	6		HYD-001	2001	50	2051	27
16	Fire Hydrant	6		HYD-009	2001	50	2051	27
17	Fire Hydrant	6		HYD-008	2001	50	2051	27
18	Fire Hydrant	6		HYD-006	2001	50	2051	27
19	Fire Hydrant	6		HYD-013	2001	50	2051	27
20	Fire Hydrant	6		HYD-011	2001	50	2051	27
21	Fire Hydrant	6		HYD-010	2001	50	2051	27
22	Fire Hydrant	6		HYD-012	2001	50	2051	27
23	Fire Hydrant	6		HYD-004	2001	50	2051	27
24	Fire Hydrant	6		HYD-002	2010	50	2060	36
25	Fire Hydrant	6		HYD-005	2001	50	2051	27
26	Fire Hydrant	6		HYD-007	2003	50	2053	29
27	Gate Valve	6		V-025	1970	50	2020	-4
28	Gate Valve	10		V-016	2001	50	2051	27
29	Gate Valve	10		V-017	2001	50	2051	27
30	Hydrant Gate Valve	6		HV-001	2001	50	2051	27
31	Hydrant Gate Valve	6		HV-002	2001	50	2051	27
32	Gate Valve	10		V-018	2001	50	2051	27
33	Gate Valve	8		V-026	2001	50	2051	27
34	Hydrant Gate Valve	6		HV-003	2001	50	2051	27
35	Hydrant Gate Valve	6		HV-004	2001	50	2051	27
36	Gate Valve	8		V-027	2001	50	2051	27
37	Gate Valve	4		V-023	2001	50	2051	27
38	Hydrant Gate Valve	6		HV-005	2001	50	2051	27
39	Hydrant Gate Valve	6		HV-006	2001	50	2051	27
40	Hydrant Gate Valve	6		HV-007	1970	50	2020	-4
41	Hydrant Gate Valve	6		HV-008	2001	50	2051	27
42	Gate Valve	10		V-019	2001	50	2051	27
43	Hydrant Gate Valve	6		HV-009	2001	50	2051	27
44	Hydrant Gate Valve	6		HV-010	2001	50	2051	27
45	Blow-off Valve			V-015	2001	50	2051	27
46	Hydrant Gate Valve	6		HV-011	2010	50	2060	36
47	Gate Valve	4		V-024	2001	50	2051	27
48	Gate Valve	8		V-028	2001	50	2051	27
49	Hydrant Gate Valve	6		HV-012	2003	50	2053	29

OBJECTID	Replacement Year	Unit	Unit Cost	Quantity	Replacement Cost	Impact of Failure	Probability of Failure	Condition Score	Criticality
1	2086	LF	350	18.26	6391	5	1	0	Frequent Monitoring
2	2086	LF	350	49.18	17213	5	1	0	Frequent Monitoring
3	2086	LF	350	21.12	7392	5	1	0	Frequent Monitoring
4	2086	LF	350	13.01	4553.5	5	1	0	Frequent Monitoring
5	2086	LF	350	12.25	4287.5	5	1	0	Frequent Monitoring
6	2086	LF	350	13.01	4553.5	5	1	0	Frequent Monitoring
7	2086	LF	350	6.45	2257.5	4	1	0	Frequent Monitoring
8	2086	LF	350	14.62	5117	3	1	0	Limited Monitoring
9	2086	LF	350	9.16	3206	4	1	0	Frequent Monitoring
10	2095	LF	350	58.59	20506.5	2	1	0	Limited Monitoring
11	2095	LF	350	291.3	101955	5	1	0	Frequent Monitoring
12	2088	LF	350	187.64	65674	5	1	0	Frequent Monitoring
13	2054	LF	350	4.45	1557.5	5	2	0	Frequent Monitoring
14	2087	LF	350	13.51	4728.5	3	1	0	Limited Monitoring
15	2051	EA	13000	1	13000	5	2	0	Frequent Monitoring
16	2051	EA	13000	1	13000	5	2	0	Frequent Monitoring
17	2051	EA	13000	1	13000	5	2	0	Frequent Monitoring
18	2051	EA	13000	1	13000	5	2	0	Frequent Monitoring
19	2051	EA	13000	1	13000	4	2	0	Frequent Monitoring
20	2051	EA	13000	1	13000	4	2	0	Frequent Monitoring
21	2051	EA	13000	1	13000	5	2	0	Frequent Monitoring
22	2051	EA	13000	1	13000	3	2	0	Limited Monitoring
23	2051	EA	13000	1	13000	5	2	0	Frequent Monitoring
24	2060	EA	13000	1	13000	2	2	0	Limited Monitoring
25	2051	EA	13000	1	13000	5	2	0	Frequent Monitoring
26	2053	EA	13000	1	13000	5	2	0	Frequent Monitoring
27	2024	EA	2500	1	2500	1	5	0	Priority Renewal
28	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
29	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
30	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
31	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
32	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
33	2051	EA	2500	1	2500	4	2	0	Frequent Monitoring
34	2051	EA	2500	1	2500	4	2	0	Frequent Monitoring
35	2051	EA	2500	1	2500	4	2	0	Frequent Monitoring
36	2051	EA	2500	1	2500	4	2	0	Frequent Monitoring
37	2051	EA	2500	1	2500	3	2	0	Limited Monitoring
38	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
39	2051	EA	2500	1	2500	2	2	0	Limited Monitoring
40	2024	EA	2500	1	2500	3	5	0	Priority Renewal
41	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
42	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
43	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
44	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
45	2051	EA	2500	1	2500	2	2	0	Limited Monitoring
46	2060	EA	2500	1	2500	2	2	0	Limited Monitoring
47	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
48	2051	EA	2500	1	2500	4	2	0	Frequent Monitoring
49	2053	EA	2500	1	2500	5	2	0	Frequent Monitoring

OBJECTID	Risk Score	Item Count	Latitude	Longitude	Record Drawing	UE_Notes	Length_ft	Lin_Unit	Material_Notes	Diameter	Year_txt
1	5	1	43.68477703	-71.13764507			18.2614507937332	Foot_US		6	2000 - 2009
2	5	1	43.68303266	-71.13525512			49.178756839444	Foot_US		6	2000 - 2009
3	5	1	43.68274844	-71.13282946			21.1203690301331	Foot_US		6	2000 - 2009
4	5	1	43.68509905	-71.12211076			13.0097101467943	Foot_US		6	2000 - 2009
5	5	1	43.68616438	-71.12003816			12.2483280632122	Foot_US		6	2000 - 2009
6	5	1	43.68532438	-71.11717685			13.0130008408252	Foot_US		6	2000 - 2009
7	4	1	43.68449711	-71.11582542			6.45078959749725	Foot_US		6	2000 - 2009
8	3	1	43.6903221	-71.11516486			14.6246986792714	Foot_US		6	2000 - 2009
9	4	1	43.68248354	-71.11418479			9.15940319246111	Foot_US		6	2000 - 2009
10	2	1	43.68398182	-71.1364948			58.587871601285	Foot_US			2010 - 2019
11	5	1	43.683907	-71.13514724			291.301424713115	Foot_US			2010 - 2019
12	5	1	43.68271486	-71.13165828			187.642003908465	Foot_US			2000 - 2009
13	10	1	43.68772312	-71.14681473			4.45296727197921	Foot_US			1970 - 1979
14	3	1	43.6829672	-71.13066665			13.512944156253	Foot_US			2000 - 2009
15	10	1	43.68476141	-71.13761808						6	2000 - 2009
16	10	1	43.68614819	-71.12004434						6	2000 - 2009
17	10	1	43.6850829	-71.12210026						6	2000 - 2009
18	10	1	43.68277377	-71.1328254						6	2000 - 2009
19	8	1	43.68247599	-71.11419865						6	2000 - 2009
20	8	1	43.68448837	-71.1158274						6	2000 - 2009
21	10	1	43.68530869	-71.11718857						6	2000 - 2009
22	6	1	43.69031714	-71.11513808						6	2000 - 2009
23	10	1	43.68297106	-71.13521746						6	2000 - 2009
24	4	1	43.68396111	-71.13638773						6	2010 - 2019
25	10	1	43.68430146	-71.13506724						6	2000 - 2009
26	10	1	43.68257117	-71.13136426						6	2000 - 2009
27	5	1	43.68475783	-71.1376177						6	1970 - 1979
28	10	1	43.68478758	-71.13767875						10	2000 - 2009
29	10	1	43.68647554	-71.12140691						10	2000 - 2009
30	10	1	43.68618058	-71.12003198						6	2000 - 2009
31	10	1	43.68508861	-71.12210394						6	2000 - 2009
32	10	1	43.68739065	-71.14547895						10	2000 - 2009
33	8	1	43.68457865	-71.11650756						8	2000 - 2009
34	8	1	43.68248831	-71.11417606						6	2000 - 2009
35	8	1	43.68450584	-71.11582344						6	2000 - 2009
36	8	1	43.6845664	-71.11649345						8	2000 - 2009
37	6	1	43.68531776	-71.11711272						4	2000 - 2009
38	10	1	43.68534008	-71.11716513						6	2000 - 2009
39	4	1	43.68551797	-71.11639788						6	2000 - 2009
40	15	1	43.69032628	-71.11518747						6	1970 - 1979
41	10	1	43.68301447	-71.13524418						6	2000 - 2009
42	10	1	43.68479781	-71.1376653						10	2000 - 2009
43	10	1	43.68479206	-71.13767102						6	2000 - 2009
44	10	1	43.68275959	-71.13281725						6	2000 - 2009
45	4	1	43.68297358	-71.13066898						6	2000 - 2009
46	4	1	43.68398591	-71.13651596						6	2010 - 2019
47	10	1	43.68724768	-71.14560055						4	2000 - 2009
48	8	1	43.68511313	-71.11676172						8	2000 - 2009
49	10	1	43.6828435	-71.13192148						6	Unknown

OBJECTID	CreationDate	Creator	EditDate	Editor	Path_Name	Shape_Length	_2024	_2025	_2026	_2027	_2028	_2029
1	2023-02-03 00:00:00	Jordan Brock	2023-02-03 00:00:00	Jordan Brock		18.26145079						
2	2023-02-03 00:00:00	Jordan Brock	2023-02-03 00:00:00	Jordan Brock		49.17875684						
3	2023-02-03 00:00:00	Jordan Brock	2023-02-03 00:00:00	Jordan Brock		21.12036903						
4	2023-02-03 00:00:00	Jordan Brock	2023-02-03 00:00:00	Jordan Brock		13.00971015						
5	2023-02-03 00:00:00	Jordan Brock	2023-02-03 00:00:00	Jordan Brock		12.24832806						
6	2023-02-03 00:00:00	Jordan Brock	2023-02-03 00:00:00	Jordan Brock		13.01300084						
7	2023-02-03 00:00:00	Jordan Brock	2023-02-03 00:00:00	Jordan Brock		6.450789597						
8	2023-02-03 00:00:00	Jordan Brock	2023-02-03 00:00:00	Jordan Brock		14.62469868						
9	2023-02-03 00:00:00	Jordan Brock	2023-02-03 00:00:00	Jordan Brock		9.159403192						
10	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		58.5878716						
11						291.3014247						
12	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		187.6420039						
13	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		4.452967272						
14	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		13.51294416						
15	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
16	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
17	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
18	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
19	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
20	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
21	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
22	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
23	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
24	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
25	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
26	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
27	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock			2500					
28	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
29	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
30	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
31	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
32	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
33	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
34	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
35	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
36	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
37	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
38	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
39	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
40	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock			2500					
41	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
42	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
43	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
44	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
45	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock								
46	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
47	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
48	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
49	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								

OBJECTID	_2030	_2031	_2032	_2033	_2024_2033	_2034_2043	_2044_2053	_2054_2063	_2064_2073	_2074_2083	_2084_2093	_2094_2103
1											6391	
2											17213	
3											7392	
4											4553.5	
5											4287.5	
6											4553.5	
7											2257.5	
8											5117	
9											3206	
10												20506.5
11												101955
12											65674	
13								1557.5				
14											4728.5	
15							13000					13000
16							13000					13000
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25							13000					13000
26							13000					13000
27				2500						2500		
28							2500					2500
29							2500					2500
30							2500					2500
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32							2500					2500
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34							2500					2500
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37							2500					2500
38							2500					2500
39							2500					2500
40				2500						2500		
41							2500					2500
42							2500					2500
43							2500					2500
44							2500					2500
45							2500					2500
46								2500				
47							2500					2500
48							2500					2500
49							2500					2500

OBJECTID	_2104_2113	_2114_2123	Replacement Count
1			1
2			1
3			1
4			1
5			1
6			1
7			1
8			1
9			1
10			1
11			1
12			1
13			1
14			1
15			2
16			2
17			2
18			2
19			2
20			2
21			2
22			2
23			2
24	13000		2
25			2
26			2
27			2
28			2
29			2
30			2
31			2
32			2
33			2
34			2
35			2
36			2
37			2
38			2
39			2
40			2
41			2
42			2
43			2
44			2
45			2
46	2500		2
47			2
48			2
49			2

OBJECTID	Owner	Category	Facility Type	Facility Name or Pressure Zone	Location	Process Number	Process
50	Carroll County	Horizontal	Water System Valve	Distribution System	Well Field	3.04	Water Distribution System
51	Carroll County	Horizontal	Water System Valve	Distribution System	County Farm Road	3.04	Water Distribution System
52	Carroll County	Horizontal	Water System Valve	Distribution System	County Farm Road	3.04	Water Distribution System
53	Carroll County	Horizontal	Water System Valve	Distribution System	Nursing Home	3.04	Water Distribution System
54	Carroll County	Horizontal	Water System Valve	Distribution System	Reservoir	3.04	Water Distribution System
55	Carroll County	Horizontal	Water System Valve	Distribution System	Annex Building	3.04	Water Distribution System
56	Carroll County	Horizontal	Water System Valve	Distribution System	Annex Building	3.04	Water Distribution System
57	Carroll County	Horizontal	Water System Valve	Distribution System	Annex Building	3.04	Water Distribution System
58	Carroll County	Horizontal	Water System Valve	Distribution System	Nursing Home	3.04	Water Distribution System
59	Carroll County	Horizontal	Water System Valve	Distribution System	Nursing Home	3.04	Water Distribution System
60	Carroll County	Horizontal	Water System Valve	Distribution System	Annex Building	3.04	Water Distribution System
61	Carroll County	Horizontal	Water System Valve	Distribution System	Annex Building	3.04	Water Distribution System
62	Carroll County	Horizontal	Water System Valve	Distribution System	Annex Building	3.04	Water Distribution System
63	Carroll County	Horizontal	Water System Valve	Distribution System	Annex Building	3.04	Water Distribution System
64	Carroll County	Horizontal	Water System Valve	Distribution System	Administrations Building	3.04	Water Distribution System
65	Carroll County	Horizontal	Water System Valve	Distribution System	Administrations Building	3.04	Water Distribution System
66	Carroll County	Horizontal	Water System Valve	Distribution System	Corrections Center	3.04	Water Distribution System
67	Carroll County	Horizontal	Water System Valve	Distribution System	Maintenance Shed	3.04	Water Distribution System
68	Carroll County	Horizontal	Water System Valve	Distribution System	Court House	3.04	Water Distribution System
69	Caroll County	Horizontal	Water Pipe	Distribution System	Country Farm Road	3.04	Water Distribution System - Horizontal
70	Caroll County	Horizontal	Water Pipe	Distribution System	Water Village Road	3.04	Water Distribution System - Horizontal
71	Caroll County	Horizontal	Water Pipe	Distribution System	Reservoir	3.04	Water Distribution System - Horizontal
72	Caroll County	Horizontal	Water Pipe	Distribution System	Reservoir	3.04	Water Distribution System - Horizontal
73	Caroll County	Horizontal	Water Pipe	Distribution System	Reservoir	3.04	Water Distribution System - Horizontal
74	Caroll County	Horizontal	Water Pipe	Distribution System	Reservoir	3.04	Water Distribution System - Horizontal
75	Caroll County	Horizontal	Water Pipe	Distribution System	Reservoir	3.04	Water Distribution System - Horizontal
76	Caroll County	Horizontal	Water Pipe	Distribution System	Reservoir	3.04	Water Distribution System - Horizontal
77	Caroll County	Horizontal	Water Pipe	Distribution System	Browns Bridge Road	3.04	Water Distribution System - Horizontal
78	Caroll County	Horizontal	Water Pipe	Distribution System	Old Granite Road	3.04	Water Distribution System - Horizontal
79	Caroll County	Horizontal	Water Pipe	Distribution System	Browns Bridge Road	3.04	Water Distribution System - Horizontal
80	Caroll County	Horizontal	Water Pipe	Distribution System	Courthouse Square	3.04	Water Distribution System - Horizontal
81	Caroll County	Horizontal	Water Pipe	Distribution System	Courthouse Square	3.04	Water Distribution System - Horizontal
82	Caroll County	Horizontal	Water Pipe	Distribution System	Old Route 28	3.04	Water Distribution System - Horizontal
83	Caroll County	Horizontal	Water Pipe	Distribution System	Old Route 28	3.04	Water Distribution System - Horizontal
84	Caroll County	Horizontal	Water Pipe	Distribution System	Old Route 28	3.04	Water Distribution System - Horizontal
85	Caroll County	Horizontal	Water Pipe	Distribution System	County Farm Road	3.04	Water Distribution System - Horizontal
86	Caroll County	Horizontal	Water Pipe	Distribution System	County Farm Road	3.04	Water Distribution System - Horizontal
87	Caroll County	Horizontal	Water Pipe	Distribution System	Reservoir	3.04	Water Distribution System - Horizontal
88	Caroll County	Horizontal	Water Pipe	Distribution System	Reservoir	3.04	Water Distribution System - Horizontal
89	Caroll County	Horizontal	Water Pipe	Distribution System	Reservoir	3.04	Water Distribution System - Horizontal
90	Caroll County	Horizontal	Water Pipe	Distribution System	Well Field	3.04	Water Distribution System - Horizontal
91	Carroll County	Horizontal	Water Pipe	Distribution System	Well Field	3.04	Water Distribution System - Horizontal
98	Caroll County	Horizontal	Water Pipe	Distribution System	County Farm Road	3.04	Water Distribution System - Horizontal
99	Caroll County	Horizontal	Water Pipe	Distribution System	County Farm Road	3.04	Water Distribution System - Horizontal
100	Caroll County	Horizontal	Water Pipe	Distribution System	County Farm Road	3.04	Water Distribution System - Horizontal
92	Carroll County	Horizontal	Water Pipe	Distribution System	Nursing Home	3.04	Water Distribution System - Horizontal
93	Carroll County	Horizontal	Water Pipe	Distribution System	Annex Building	3.04	Water Distribution System - Horizontal
94	Carroll County	Horizontal	Water Pipe	Distribution System	Admin Building	3.04	Water Distribution System - Horizontal
95	Carroll County	Horizontal	Water Pipe	Distribution System	Admin Building	3.04	Water Distribution System - Horizontal

OBJECTID	Asset Type	Asset Size	Material	Asset ID	Year Installed	Useful Life	End of Useful Life	Remaining Useful Life
50	Hydrant Gate Valve	6		HV-013	1979	50	2029	5
51	Gate Valve	10		V-020	2001	50	2051	27
52	Gate Valve	10		V-021	2001	50	2051	27
53	Hydrant Gate Valve	6		HV-014	2001	50	2051	27
54	Gate Valve	10		V-022	2001	50	2051	27
55	Gate Valve	10		V-001	2010	50	2060	36
56	Gate Valve	6		V-002	2010	50	2060	36
57	Gate Valve	10		V-003	2010	50	2060	36
58	Gate Valve	6		V-004	2010	50	2060	36
59	Shutoff Valve	6		V-005	2010	50	2060	36
60	Gate Valve	6		V-006	2010	50	2060	36
61	Gate Valve	4		V-007	2010	50	2060	36
62	Gate Valve	6		V-008	2001	50	2051	27
63	Shutoff Valve	4		V-009	2001	50	2051	27
64	Shutoff Valve	6		V-010	2001	50	2051	27
65	Shutoff Valve	6		V-011	2001	50	2051	27
66	Shutoff Valve	6		V-012	2003	50	2053	29
67	Shutoff Valve	6		V-013	2001	50	2051	27
68	Shutoff Valve	6		V-014	2001	50	2051	27
69	Water Main	10	DI	WM-14	2001	85	2086	62
70	Water Main	10	DI	WM-15	2001	85	2086	62
71	Water Main	4	DI	WM-16	2001	85	2086	62
72	Water Main	10	DI	WM-17	2001	85	2086	62
73	Water Main	2	HDPE	WM-18	2001	75	2076	52
74	Water Main	4	DI	WM-19	2001	85	2086	62
75	Water Main	2	PVC	WM-20	2001	75	2076	52
76	Water Main	2	PVC	WM-21	2001	75	2076	52
77	Water Main	8	DI	WM-22	2001	85	2086	62
78	Water Main	8	DI	WM-23	2001	85	2086	62
79	Water Main	8	DI	WM-24	2001	85	2086	62
80	Water Main	10	DI	WM-25	2001	85	2086	62
81	Water Main	10	DI	WM-26	2001	85	2086	62
82	Water Main	4	PVC	WM-08	1970	75	2045	21
83	Water Main	4	PVC	WM-09	1970	75	2045	21
84	Water Main	4	PVC	WM-10	1970	75	2045	21
85	Water Main	10	DI	WM-27	2001	85	2086	62
86	Water Main	10	DI	WM-29	2010	85	2095	71
87	Water Main	10	DI	WM-30	2001	85	2086	62
88	Water Main	2	HDPE	WM-12	1979	75	2054	30
89	Water Main	2	HDPE	WM-13	1979	75	2054	30
90	Water Main	4	DI	WM-32	2001	85	2086	62
91	Water Main	10	DI	WM-33	2001	85	2086	62
98	Water Main	10	DI	WM-34	2001	85	2086	62
99	Water Main	10	Unk	WM-28.1	2001	75	2076	52
100	Water Main	10	Unk	WM-28.2	2001	75	2076	52
92	Water Main	6	DI	WM-00	2010	85	2095	71
93	Water Main	4	DI	WM-01	2001	85	2086	62
94	Water Main	6	DI	WM-03	2001	85	2086	62
95	Water Main	6	AC	WM-04	2001	85	2086	62

OBJECTID	Replacement Year	Unit	Unit Cost	Quantity	Replacement Cost	Impact of Failure	Probability of Failure	Condition Score	Criticality
50	2029	EA	2500	1	2500	5	4	0	Highest Risk
51	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
52	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
53	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
54	2051	EA	2500	1	2500	5	2	0	Frequent Monitoring
55	2060	EA	2500	1	2500	4	2	0	Frequent Monitoring
56	2060	EA	2500	1	2500	5	2	0	Frequent Monitoring
57	2060	EA	2500	1	2500	5	2	0	Frequent Monitoring
58	2060	EA	2500	1	2500	4	2	0	Frequent Monitoring
59	2060	EA	2500	1	2500	4	2	0	Frequent Monitoring
60	2060	EA	2500	1	2500	4	2	0	Frequent Monitoring
61	2060	EA	2505	1	2505	4	2	0	Frequent Monitoring
62	2051	EA	2500	1	2500	4	2	0	Frequent Monitoring
63	2051	EA	2500	1	2500	4	2	0	Frequent Monitoring
64	2051	EA	2500	1	2500	4	2	0	Frequent Monitoring
65	2051	EA	2500	1	2500	4	2	0	Frequent Monitoring
66	2053	EA	2500	1	2500	4	2	0	Frequent Monitoring
67	2051	EA	2500	1	2500	2	2	0	Limited Monitoring
68	2051	EA	2500	1	2500	3	2	0	Limited Monitoring
69	2086	LF	350	3044.38	1065533	5	1	0	Frequent Monitoring
70	2086	LF	350	47.25	16537.5	5	1	0	Frequent Monitoring
71	2086	LF	350	84.84	29694	5	1	0	Frequent Monitoring
72	2086	LF	350	23.83	8340.5	5	1	0	Frequent Monitoring
73	2076	LF	350	51.26	17941	5	1	0	Frequent Monitoring
74	2086	LF	350	326.73	114355.5	5	1	0	Frequent Monitoring
75	2076	LF	350	610.5	213675	5	1	0	Frequent Monitoring
76	2076	LF	350	511.72	179102	5	1	0	Frequent Monitoring
77	2086	LF	350	1023.54	358239	4	1	0	Frequent Monitoring
78	2086	LF	350	194.71	68148.5	4	1	0	Frequent Monitoring
79	2086	LF	350	262.36	91826	4	1	0	Frequent Monitoring
80	2086	LF	350	1087.23	380530.5	5	1	0	Frequent Monitoring
81	2086	LF	350	207.6	72660	5	1	0	Frequent Monitoring
82	2045	LF	350	215.96	75586	3	2	0	Limited Monitoring
83	2045	LF	350	1776.99	621946.5	3	2	0	Limited Monitoring
84	2045	LF	350	49.43	17300.5	3	2	0	Limited Monitoring
85	2086	LF	350	772.36	270326	5	1	0	Frequent Monitoring
86	2095	LF	350	851.4	297990	5	1	0	Frequent Monitoring
87	2086	LF	350	2511.98	879193	5	1	0	Frequent Monitoring
88	2054	LF	350	548.79	192076.5	5	2	0	Frequent Monitoring
89	2054	LF	350	28.02	9807	5	2	0	Frequent Monitoring
90	2086	LF	350	45.88	16058	5	1	0	Frequent Monitoring
91	2086	LF	350	80.06	28021	5	1	0	Frequent Monitoring
98	2086	LF	350	282.74	98959	5	1	0	Frequent Monitoring
99	2076	LF	350	340.03	119010.5	5	1	0	Frequent Monitoring
100	2076	LF	350	62.48	21868	5	1	0	Frequent Monitoring
92	2095	LF	350	295.1	103285	4	1	0	Frequent Monitoring
93	2086	LF	350	154.01	53903.5	4	1	0	Frequent Monitoring
94	2086	LF	350	257.31	90058.5	4	1	0	Frequent Monitoring
95	2086	LF	350	17.08	5978	4	1	0	Frequent Monitoring

OBJECTID	Risk Score	Item Count	Latitude	Longitude	Record Drawing	UE_Notes	Length_ft	Lin_Unit	Material_Notes	Diameter	Year_txt
50	20	1	43.68772454	-71.1468147						6	1970 - 1979
51	10	1	43.68290518	-71.13281976						10	2000 - 2009
52	10	1	43.68293258	-71.13274513						10	2000 - 2009
53	10	1	43.68414862	-71.13502812						6	Unknown
54	10	1	43.68728195	-71.14571736						10	2000 - 2009
55	8	1	43.68310644	-71.13526855							2010 - 2019
56	10	1	43.6831152	-71.13527059							2010 - 2019
57	10	1	43.68311505	-71.1352548							2010 - 2019
58	8	1	43.6838836	-71.13544823							2010 - 2019
59	8	1	43.68387052	-71.1354639							2010 - 2019
60	8	1	43.68319717	-71.13529468							2010 - 2019
61	8	1	43.68317808	-71.13529174							2010 - 2019
62	8	1	43.68321568	-71.13476252							2000 - 2009
63	8	1	43.68320318	-71.13474847							2000 - 2009
64	8	1	43.68438224	-71.13767014							2000 - 2009
65	8	1	43.68439402	-71.13768674							2000 - 2009
66	8	1	43.68274933	-71.13263701							2000 - 2009
67	4	1	43.68278115	-71.13261027							2000 - 2009
68	6	1	43.68594636	-71.1386724							2000 - 2009
69	5	1	43.68351923	-71.12545398			3044.37662793744	Foot_US		10	2000 - 2009
70	5	1	43.68653801	-71.12138324			47.249471892833	Foot_US		10	2000 - 2009
71	5	1	43.68726419	-71.14571749			84.8355574726051	Foot_US	4" DI assumed	0	2000 - 2009
72	5	1	43.68736439	-71.14550637			23.8319167928629	Foot_US	10" DI assumed	0	2000 - 2009
73	5	1	43.6876808	-71.1467412			51.2587587593898	Foot_US	4" DI assumed	0	2000 - 2009
74	5	1	43.6873231	-71.14637121			326.728603699572	Foot_US		4	2000 - 2009
75	5	1	43.68753881	-71.14676946			610.500090184786	Foot_US		2	2000 - 2009
76	5	1	43.68712032	-71.14678426			511.720136409121	Foot_US		2	2000 - 2009
77	4	1	43.68332325	-71.1155199			1023.54094861105	Foot_US		8	2000 - 2009
78	4	1	43.68454678	-71.11614236			194.710598039642	Foot_US		8	2000 - 2009
79	4	1	43.6849513	-71.11661753			262.360702005807	Foot_US		8	2000 - 2009
80	5	1	43.68589602	-71.11875132			1087.22627335333	Foot_US		10	2000 - 2009
81	5	1	43.68642262	-71.1210241			207.603946717406	Foot_US		10	2000 - 2009
82	6	1	43.68538616	-71.11673976			215.958236106472	Foot_US		6	1970 - 1979
83	6	1	43.68788977	-71.11575789			1776.99209343291	Foot_US		0	1970 - 1979
84	6	1	43.6903663	-71.1151805			49.4348155503112	Foot_US	4" HDPE assumed	0	1970 - 1979
85	5	1	43.68271379	-71.13429583			772.360971977125	Foot_US		10	2000 - 2009
86	5	1	43.68327928	-71.13652333			851.396593553186	Foot_US		10	2010 - 2019
87	5	1	43.6861817	-71.14145197			2511.98391938018	Foot_US		10	2000 - 2009
88	10	1	43.68797986	-71.14777402			548.791694366678	Foot_US		2	1970 - 1979
89	10	1	43.68806149	-71.1479728			28.0207102977196	Foot_US			1970 - 1979
90	5	1	43.68732651	-71.14570512			45.8801073415448	Foot_US		4	2000 - 2009
91	5	1	43.68742105	-71.14556446			80.058443894734	Foot_US		10	2000 - 2009
98	5	1	43.6845582	-71.13711859			282.737068159554	Foot_US		10	2000 - 2009
99	5	1	43.68290063	-71.13134134			340.034867484506	Foot_US		10	2000 - 2009
100	5	1	43.68276393	-71.13294488			62.4793030816254	Foot_US		10	2000 - 2009
92	4	1	43.68349957	-71.13536874			295.097766223447	Foot_US			2010 - 2019
93	4	1	43.68317841	-71.13502543			154.01465867309	Foot_US			2000 - 2009
94	4	1	43.68455402	-71.13786377			257.311292008849	Foot_US			2000 - 2009
95	4	1	43.6843761	-71.13770755			17.0835278886037	Foot_US			2000 - 2009

OBJECTID	CreationDate	Creator	EditDate	Editor	Path_Name	Shape_Length	_2024	_2025	_2026	_2027	_2028	_2029
50	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								2500
51	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
52	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
53	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
54	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
55	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
56	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
57	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
58	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
59	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
60	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
61	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
62	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
63	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
64	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
65	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
66	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
67	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
68	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
69	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		3044.376628						
70	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		47.24947189						
71	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		84.83555747						
72	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		23.83191679						
73	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		51.25875876						
74	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		326.7286037						
75	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		610.5000902						
76	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		511.7201364						
77	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		1023.540949						
78	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		194.710598						
79	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		262.360702						
80	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		1087.226273						
81	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		207.6039467						
82	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		215.9582361						
83	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		1776.992093						
84	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		49.43481555						
85	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		772.360972						
86	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		851.3965936						
87	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		2511.983919						
88	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		548.7916944						
89	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		28.0207103						
90	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		45.88010734						
91	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		80.05844389						
98	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		282.7370682						
99	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		340.0348675						
100	2023-02-01 00:00:00	Jordan Brock	2023-02-01 00:00:00	Jordan Brock		62.47930308						
92	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		295.0977662						
93	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		154.0146587						
94	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		257.311292						
95	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		17.08352789						

OBJECTID	_2030	_2031	_2032	_2033	_2024_2033	_2034_2043	_2044_2053	_2054_2063	_2064_2073	_2074_2083	_2084_2093	_2094_2103
50					2500						2500	
51							2500					2500
52							2500					2500
53							2500					2500
54							2500					2500
55								2500				
56								2500				
57								2500				
58								2500				
59								2500				
60								2500				
61								2505				
62							2500					2500
63							2500					2500
64							2500					2500
65							2500					2500
66							2500					2500
67							2500					2500
68							2500					2500
69											1065533	
70											16537.5	
71											29694	
72											8340.5	
73										17941		
74											114355.5	
75									213675			
76									179102			
77											358239	
78											68148.5	
79											91826	
80											380530.5	
81											72660	
82								75586				
83								621946.5				
84								17300.5				
85											270326	
86												297990
87											879193	
88								192076.5				
89								9807				
90											16058	
91											28021	
98											98959	
99										119010.5		
100										21868		
92												103285
93											53903.5	
94											90058.5	
95											5978	

OBJECTID	_2104_2113	_2114_2123	Replacement Count
50			2
51			2
52			2
53			2
54			2
55	2500		2
56	2500		2
57	2500		2
58	2500		2
59	2500		2
60	2500		2
61	2505		2
62			2
63			2
64			2
65			2
66			2
67			2
68			2
69			1
70			1
71			1
72			1
73			1
74			1
75			1
76			1
77			1
78			1
79			1
80			1
81			1
82		75586	2
83		621946.5	2
84		17300.5	2
85			1
86			1
87			1
88			1
89			1
90			1
91			1
98			1
99			1
100			1
92			1
93			1
94			1
95			1

OBJECTID	Owner	Category	Facility Type	Facility Name or Pressure Zone	Location	Process Number	Process
96	Carroll County	Horizontal	Water Pipe	Distribution System	Corrections Center	3.04	Water Distribution System - Horizontal
97	Carroll County	Horizontal	Water Pipe	Distribution System	Court House	3.04	Water Distribution System - Horizontal
101		Horizontal	Water Pipe	Distribution System	Country Farm Road	3.04	Water Distribution System - Horizontal
102	Carroll County	Vertical	Bedrock Well	BRW-1	Danfield Rd	6.01	Site - Access and Security
103	Carroll County	Vertical	Bedrock Well	BRW-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
104	Carroll County	Vertical	Bedrock Well	BRW-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
105	Carroll County	Vertical	Bedrock Well	BRW-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
106	Carroll County	Vertical	Bedrock Well	BRW-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
107	Carroll County	Vertical	Bedrock Well	BRW-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
108	Carroll County	Vertical	Bedrock Well	BRW-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
109	Carroll County	Vertical	Bedrock Well	BRW-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
110	Carroll County	Vertical	Bedrock Well	BRW-2	Danfield Rd	6.01	Site - Access and Security
111	Carroll County	Vertical	Bedrock Well	BRW-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
112	Carroll County	Vertical	Bedrock Well	BRW-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
113	Carroll County	Vertical	Bedrock Well	BRW-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
114	Carroll County	Vertical	Bedrock Well	BRW-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
115	Carroll County	Vertical	Bedrock Well	BRW-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
116	Carroll County	Vertical	Bedrock Well	BRW-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
117	Carroll County	Vertical	Bedrock Well	BRW-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
118	Carroll County	Vertical	Dug Well	W-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
119	Carroll County	Vertical	Dug Well	W-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
120	Carroll County	Vertical	Dug Well	W-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
121	Carroll County	Vertical	Dug Well	W-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
122	Carroll County	Vertical	Dug Well	W-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
123	Carroll County	Vertical	Dug Well	W-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
124	Carroll County	Vertical	Dug Well	W-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
125	Carroll County	Vertical	Dug Well	W-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
126	Carroll County	Vertical	Dug Well	W-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
127	Carroll County	Vertical	Dug Well	W-3	Danfield Rd	1.01	Raw Water Supply - Groundwater
128	Carroll County	Vertical	Dug Well	W-3	Danfield Rd	1.01	Raw Water Supply - Groundwater
129	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.01	Building - Structure
130	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.01	Building - Structure
131	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.01	Building - Structure
132	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.01	Building - Structure
133	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.01	Building - Structure
134	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.02	Building - Electrical
135	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.03	Building - HVAC & Plumbing
136	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.03	Building - HVAC & Plumbing
137	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	6.05	Site - Fuel Supply
138	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.08	Building - Process
139	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.08	Building - Process
140	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.08	Building - Process
141	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.08	Building - Process
142	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	2.05	Water Treatment - Disinfection
143	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	2.05	Water Treatment - Disinfection
144	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	2.05	Water Treatment - Disinfection
145	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	2.05	Water Treatment - Disinfection
146	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	2.05	Water Treatment - Disinfection
147	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	2.05	Water Treatment - Disinfection

OBJECTID	Asset Type	Asset Size	Material	Asset ID	Year Installed	Useful Life	End of Useful Life	Remaining Useful Life
96	Water Main	4	DI	WM-06	2003	85	2088	64
97	Water Main	6	DI	WM-07	2001	85	2086	62
101	Water Main	10	DI	WM-35	2001	85	2086	62
102	Gravel Access Drive			BW-002	2001	35	2036	12
103	Galvanized Drop Pipe	2" dia		BW-003	2001	35	2036	12
104	Pump Cable	2 AWG		BW-004	2001	20	2021	-3
105	Stilling Tube	1.25" dia		BW-005	2001	50	2051	27
106	Level Transducer			BW-006	2001	20	2021	-3
107	Electrical Conduit Wire			BW-007	2001	40	2041	17
108	Building Process Piping & Valves			BW-008	2023	50	2073	49
109	Submersible Pump and Motor	5 Hp, 35 gpm		BW-009	2023	40	2063	39
110	Gravel Access Drive			BW-011	2000	35	2035	11
111	Galvanized Drop Pipe	2" dia		BW-012	2001	35	2036	12
112	Pump Cable	2 AWG		BW-013	2023	20	2043	19
113	HDPE Stilling Tube	1.25" dia		BW-014	2001	50	2051	27
114	Level Transducer			BW-015	2001	20	2021	-3
115	Electrical Conduit Wire			BW-016	2000	40	2040	16
116	Building Process Piping & Valves			BW-017	2023	50	2073	49
117	Submersible Pump and Motor	5 Hp, 30 gpm		BW-018	2023	40	2063	39
118	Dug Well w/ Pitless Adaptor and Cover	12 gpm		W-001	1979	50	2029	5
119	PVC Stilling Tube	1-1/4"		W-002	1979	50	2029	5
120	Drop Pipe			W-003	1979	35	2014	-10
121	Level Transducer			W-004	1979	20	1999	-25
122	Electrical Conduit Wire			W-005	1979	40	2019	-5
123	Process Piping & Valves			W-006	1979	50	2029	5
124	Submersible Pump and Motor	1/2 Hp, 12 gpm		W-007	1979	40	2019	-5
125	Process Piping & Valves			W-008	1979	50	2029	5
126	Precast Structure & Metal Plate Cover			W-009	1979	40	2019	-5
127	Building Process Piping & Valves			W-010	1979	50	2029	5
128	Precast Structure & Metal Plate Cover			W-011	1979	40	2019	-5
129	Standing Seam Metal Roof			BLDG-001	2001	35	2036	12
130	Plywood Walls			BLDG-002	2001	75	2076	52
131	Concrete Floor Slab	14' x 14'		BLDG-003	2001	50	2051	27
132	Concrete Foundation			BLDG-004	2001	75	2076	52
133	Wood Roof Trusses			BLDG-005	2001	50	2051	27
134	Building Electrical			BLDG-006	2001	40	2041	17
135	Exhaust Fan			BLDG-007	2001	30	2031	7
136	Unit Heater (Propane)			BLDG-008	2001	30	2031	7
137	Propane Tank & Supply Piping	1000 gal		BLDG-009	2001	30	2031	7
138	BRW-1 Flow Meter			BLDG-010	2023	25	2048	24
139	BRW-2 Flow Meter			BLDG-011	2023	25	2048	24
140	W-1 Flow Meter			BLDG-012	2023	25	2048	24
141	Combined Flow Meter			BLDG-013	2023	25	2048	24
142	Sodium Hypochlorite Day Tank	35 gal		BLDG-014	2001	15	2016	-8
143	Sodium Hypochlorite Feed Pump - Solenoid			BLDG-015	2001	20	2021	-3
144	Sodium Hypochlorite Piping & Tubing			BLDG-016	2001	20	2021	-3
145	Sodium Secondary Containment Area			BLDG-017	2001	20	2021	-3
146	Chemical Pump Monitor			BLDG-018	2001	20	2021	-3
147	Feed Piping, Valves, & Appur.			BLDG-019	2024	20	2044	20

OBJECTID	Replacement Year	Unit	Unit Cost	Quantity	Replacement Cost	Impact of Failure	Probability of Failure	Condition Score	Criticality
96	2088	LF	350	191.56	67046	3	1	0	Limited Monitoring
97	2086	LF	350	273.9	95865	3	1	0	Limited Monitoring
101	2086	LF	350	350.18	122563	5	1	0	Frequent Monitoring
102	2036	LS	10000	1	10000	1	3	0	Frequent Monitoring
103	2036	LS	10000	1	10000	3	3	0	Frequent Monitoring
104	2024	LS	10000	1	10000	3	5	0	Priority Renewal
105	2051	LS	10000	1	10000	1	2	0	Limited Monitoring
106	2024	EA	3000	1	3000	1	5	0	Priority Renewal
107	2041	LS	100000	1	100000	3	3	0	Frequent Monitoring
108	2073	LS	30000	1	30000	3	2	0	Limited Monitoring
109	2063	EA	30000	1	30000	3	2	0	Limited Monitoring
110	2035	LS	10000	1	10000	3	3	0	Frequent Monitoring
111	2036	LS	10000	1	10000	3	3	0	Frequent Monitoring
112	2043	LS	10000	1	10000	3	3	0	Frequent Monitoring
113	2051	LS	10000	1	10000	1	2	0	Limited Monitoring
114	2024	EA	3000	1	3000	1	5	0	Priority Renewal
115	2040	LS	100000	1	100000	3	3	0	Frequent Monitoring
116	2073	LS	30000	1	30000	3	2	0	Limited Monitoring
117	2063	EA	30000	1	30000	3	2	0	Limited Monitoring
118	2029	LS	75000	1	75000	3	4	0	Priority Renewal
119	2029	LS	10000	1	10000	1	4	0	Priority Renewal
120	2024	LS	10000	1	10000	3	5	0	Priority Renewal
121	2024	EA	3000	1	3000	1	5	0	Priority Renewal
122	2024	LS	100000	1	100000	3	5	0	Priority Renewal
123	2029	LS	30000	1	30000	3	4	0	Priority Renewal
124	2024	EA	30000	1	30000	3	5	0	Priority Renewal
125	2029	LS	30000	1	30000	3	4	0	Priority Renewal
126	2024	EA	10000	1	10000	3	5	0	Priority Renewal
127	2029	LS	30000	1	30000	3	4	0	Priority Renewal
128	2024	EA	10000	1	10000	3	5	0	Priority Renewal
129	2036	LS	35000	1	35000	2	3	0	Frequent Monitoring
130	2076	LS	75000	1	75000	2	1	0	Limited Monitoring
131	2051	LS	75000	1	75000	2	2	0	Limited Monitoring
132	2076	LS	100000	1	100000	2	1	0	Limited Monitoring
133	2051	LS	50000	1	50000	2	2	0	Limited Monitoring
134	2041	LS	100000	1	100000	3	3	0	Frequent Monitoring
135	2031	LS	20000	1	20000	2	4	0	Priority Renewal
136	2031	EA	25000	1	25000	2	4	0	Priority Renewal
137	2031	LS	30000	1	30000	2	4	0	Priority Renewal
138	2048	EA	5000	1	5000	3	2	0	Limited Monitoring
139	2048	EA	5000	1	5000	3	2	0	Limited Monitoring
140	2048	EA	5000	1	5000	3	2	0	Limited Monitoring
141	2048	EA	5000	1	5000	2	2	0	Limited Monitoring
142	2024	EA	3000	1	3000	4	5	0	Highest Risk
143	2024	EA	5000	1	5000	4	5	0	Highest Risk
144	2024	LS	1000	1	1000	4	5	0	Highest Risk
145	2024	LS	5000	1	5000	4	5	0	Highest Risk
146	2024	EA	5000	1	5000	4	5	0	Highest Risk
147	2044	LS	4000	1	4000	4	3	0	Frequent Monitoring

OBJECTID	Risk Score	Item Count	Latitude	Longitude	Record Drawing	UE_Notes	Length_ft	Lin_Unit	Material_Notes	Diameter	Year_txt
96	3	1	43.68276609	-71.13256894			191.562521304817	Foot_US			2000 - 2009
97	3	1	43.68568851	-71.13904894			273.896005934631	Foot_US			2000 - 2009
101	5	1	43.68304178	-71.13244775			350.175553773395	Foot_US		10	2000 - 2009
102	3	1									2000 - 2009
103	9	1									2000 - 2009
104	15	1									2000 - 2009
105	2	1									2000 - 2009
106	5	1									2000 - 2009
107	9	1									2000 - 2009
108	6	1									2020 - 2029
109	6	1									2020 - 2029
110	9	1									2000 - 2009
111	9	1									2000 - 2009
112	9	1									2020 - 2029
113	2	1									2000 - 2009
114	5	1									2000 - 2009
115	9	1									2000 - 2009
116	6	1									2020 - 2029
117	6	1									2020 - 2029
118	12	1									1970 - 1979
119	4	1									1970 - 1979
120	15	1									1970 - 1979
121	5	1									1970 - 1979
122	15	1									1970 - 1979
123	12	1									1970 - 1979
124	15	1									1970 - 1979
125	12	1									1970 - 1979
126	15	1									1970 - 1979
127	12	1									1970 - 1979
128	15	1									1970 - 1979
129	6	1									2000 - 2009
130	2	1									2000 - 2009
131	4	1									2000 - 2009
132	2	1									2000 - 2009
133	4	1									2000 - 2009
134	9	1									2000 - 2009
135	8	1									2000 - 2009
136	8	1									2000 - 2009
137	8	1									2000 - 2009
138	6	1									2020 - 2029
139	6	1									2020 - 2029
140	6	1									2020 - 2029
141	4	1									2020 - 2029
142	20	1									2000 - 2009
143	20	1									2000 - 2009
144	20	1									2000 - 2009
145	20	1									2000 - 2009
146	20	1									2000 - 2009
147	12	1									2020 - 2029

OBJECTID	CreationDate	Creator	EditDate	Editor	Path_Name	Shape_Length	_2024	_2025	_2026	_2027	_2028	_2029
96	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		191.5625213						
97	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher		273.8960059						
101						350.1755538						
102	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
103	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
104	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			10000					
105	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
106	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			3000					
107	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
108	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
109	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
110	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
111	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
112	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
113	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
114	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			3000					
115	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
116	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
117	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
118	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								75000
119	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								10000
120	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			10000					
121	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			3000					
122	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			100000					
123	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								30000
124	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			30000					
125	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								30000
126	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			10000					
127	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								30000
128	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			10000					
129	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
130	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
131	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
132	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
133	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
134	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
135	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
136	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
137	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
138	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
139	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
140	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
141	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
142	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			3000					
143	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			5000					
144	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			1000					
145	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			5000					
146	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			5000					
147	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								

OBJECTID	_2030	_2031	_2032	_2033	_2024_2033	_2034_2043	_2044_2053	_2054_2063	_2064_2073	_2074_2083	_2084_2093	_2094_2103
96												67046
97												95865
101												122563
102						10000			10000			
103						10000			10000			
104					10000		10000		10000		10000	
105							10000					10000
106					3000		3000		3000		3000	
107						100000				100000		
108									30000			
109								30000				30000
110						10000			10000			
111						10000			10000			
112						10000		10000		10000		10000
113							10000					10000
114					3000		3000		3000		3000	
115						100000				100000		
116									30000			
117								30000				30000
118					75000					75000		
119					10000					10000		
120					10000			10000				10000
121					3000		3000		3000		3000	
122					100000				100000			
123					30000					30000		
124					30000				30000			
125					30000					30000		
126					10000				10000			
127					30000					30000		
128					10000				10000			
129						35000			35000			
130										75000		
131							75000					75000
132										100000		
133							50000					50000
134						100000				100000		
135		20000			20000			20000			20000	
136		25000			25000			25000			25000	
137		30000			30000			30000			30000	
138							5000		5000			5000
139							5000		5000			5000
140							5000		5000			5000
141							5000		5000			5000
142					3000	3000		3000	3000		3000	3000
143					5000		5000		5000		5000	
144					1000		1000		1000		1000	
145					5000		5000		5000		5000	
146					5000		5000		5000		5000	
147							4000		4000		4000	

OBJECTID	_2104_2113	_2114_2123	Replacement Count
96			1
97			1
101			1
102	10000		3
103	10000		3
104	10000		5
105			2
106	3000		5
107		100000	3
108		30000	2
109			2
110	10000		3
111	10000		3
112		10000	5
113			2
114	3000		5
115		100000	3
116		30000	2
117			2
118			2
119			2
120			3
121	3000		5
122	100000		3
123			2
124	30000		3
125			2
126	10000		3
127			2
128	10000		3
129	35000		3
130			1
131			2
132			1
133			2
134		100000	3
135		20000	4
136		25000	4
137		30000	4
138		5000	4
139		5000	4
140		5000	4
141		5000	4
142		3000	7
143	5000		5
144	1000		5
145	5000		5
146	5000		5
147	4000		4

OBJECTID	Owner	Category	Facility Type	Facility Name or Pressure Zone	Location	Process Number	Process
148	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.02	Building - Electrical
149	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.02	Building - Electrical
150	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	5.02	Building - Electrical
151	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	6.01	Site - Access and Security
152	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	7.01	Standby Power
153	Carroll County	Vertical	Meter & Chlorination Building	Meter & Chlorination Building	Danfield Rd	7.01	Standby Power
154	Carroll County	Vertical	Water Storage Tank	Water Storage Tank	Danfield Rd	3.02	Water Distribution - Storage
155	Carroll County	Vertical	Water Storage Tank	Water Storage Tank	Danfield Rd	3.02	Water Distribution - Storage
156	Carroll County	Vertical	Water Storage Tank	Water Storage Tank	Danfield Rd	3.02	Water Distribution - Storage
157	Carroll County	Vertical	Water Storage Tank	Water Storage Tank	Danfield Rd	3.02	Water Distribution - Storage
158	Carroll County	Vertical	Bedrock Well	BRW-1	Danfield Rd	1.01	Raw Water Supply - Groundwater
159	Carroll County	Vertical	Bedrock Well	BRW-2	Danfield Rd	1.01	Raw Water Supply - Groundwater
160	Carroll County	Horizontal	Hydrant	Distribution System	Well Field	3.04	Water Distribution
161	Carroll County	Horizontal	Hydrant	Distribution System	County Farm Road	3.04	Water Distribution

OBJECTID	Asset Type	Asset Size	Material	Asset ID	Year Installed	Useful Life	End of Useful Life	Remaining Useful Life
148	Instrumentation Devices & Wiring			BLDG-020	2001	30	2031	7
149	SCADA Panel			BLDG-021	2001	25	2026	2
150	Interior lighting			BLDG-022	2001	40	2041	17
151	Gravel Access Drive			BLDG-023	2001	35	2036	12
152	Automatic Transfer Switch			BLDG-024	2001	40	2041	17
153	Generator (Natural Gas)	45 kW		BLDG-025	2001	40	2041	17
154	Cast in Place Tank	200000 gal	Concrete	TNK-001	1987	50	2037	13
155	Tank Rubber Membrane Roof			TNK-002	1987	25	2012	-12
156	Overflow Pipe			TNK-003	1987	30	2017	-7
157	Submersible Level Sensors (Electrical)			TNK-005	2020	20	2040	16
158	Bedrock Well/Pitless Adaptor & Cap (Steel Casing)	10" dia, 20 gpm		BW-001	1985	50	2035	11
159	Bedrock Well/Pitless Adaptor & Cap (Steel Casing)	6" dia, 25 gpm		BW-010	2000	50	2050	26
160	Yard Hydrant	6		HYD-014	1979	50	2029	5
161	Yard Hydrant	6		HYD-015	2001	50	2051	27

OBJECTID	Replacement Year	Unit	Unit Cost	Quantity	Replacement Cost	Impact of Failure	Probability of Failure	Condition Score	Criticality
148	2031	LS	150000	1	150000	3	4	0	Priority Renewal
149	2026	LS	50000	1	50000	4	4	0	Highest Risk
150	2041	LS	50000	1	50000	2	3	0	Frequent Monitoring
151	2036	LS	10000	1	10000	1	3	0	Frequent Monitoring
152	2041	LS	30000	1	30000	4	3	0	Frequent Monitoring
153	2041	LS	450000	1	450000	4	3	0	Frequent Monitoring
154	2037	LS	3000000	1	3000000	4	3	0	Frequent Monitoring
155	2024	LS	250000	1	250000	4	5	0	Highest Risk
156	2024	LS	1000	1	1000	4	5	0	Highest Risk
157	2040	LS	25000	1	25000	4	3	0	Frequent Monitoring
158	2035	LS	150000	1	150000	3	3	0	Frequent Monitoring
159	2050	LS	150000	1	150000	3	2	0	Limited Monitoring
160	2029	EA	13000	1	13000	5	4	0	Highest Risk
161	2051	EA	13000	1	13000	1	2	0	Limited Monitoring

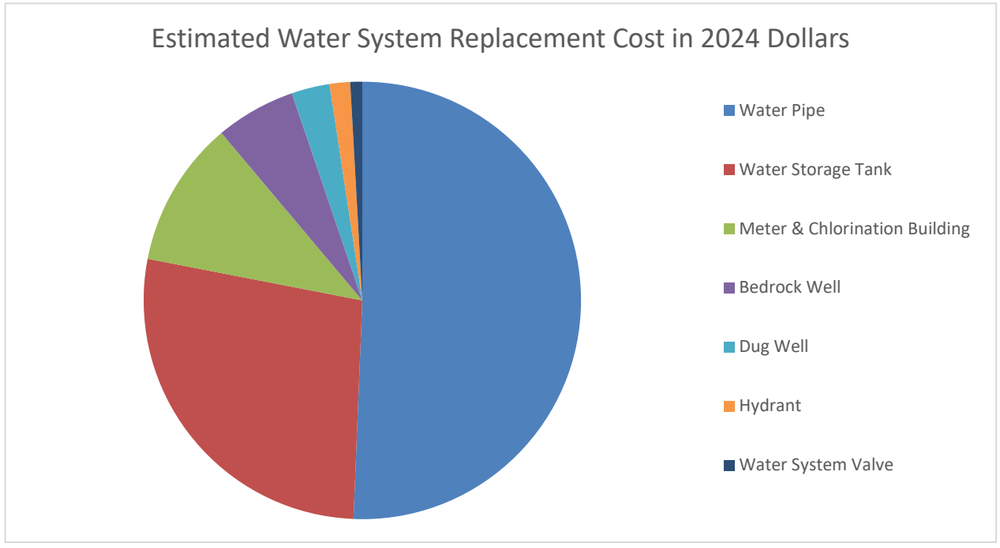
OBJECTID	Risk Score	Item Count	Latitude	Longitude	Record Drawing	UE_Notes	Length_ft	Lin_Unit	Material_Notes	Diameter	Year_txt
148	12	1									2000 - 2009
149	16	1									2000 - 2009
150	6	1									2000 - 2009
151	3	1									2000 - 2009
152	12	1									2000 - 2009
153	12	1									2000 - 2009
154	12	1									1980 - 1989
155	20	1									1980 - 1989
156	20	1									1980 - 1989
157	12	1									2020 - 2029
158	9	1									1980 - 1989
159	6	1									2000 - 2009
160	20	1	43.68771701	-71.14681487							1970 - 1979
161	2	1	43.68298303	-71.1306777							2000 - 2009

OBJECTID	CreationDate	Creator	EditDate	Editor	Path_Name	Shape_Length	_2024	_2025	_2026	_2027	_2028	_2029
148	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
149	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher					50000			
150	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
151	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
152	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
153	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
154	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
155	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			250000					
156	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher			1000					
157	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
158	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
159	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								
160	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								13000
161	2024-06-15 00:00:00	Jordan Provencher	2024-06-15 00:00:00	Jordan Provencher								

OBJECTID	_2030	_2031	_2032	_2033	_2024_2033	_2034_2043	_2044_2053	_2054_2063	_2064_2073	_2074_2083	_2084_2093	_2094_2103
148		150000			150000			150000			150000	
149					50000		50000			50000		50000
150						50000				50000		
151						10000			10000			
152						30000				30000		
153						450000				450000		
154						3000000					3000000	
155					250000		250000			250000		250000
156					1000			1000			1000	
157						25000		25000		25000		25000
158						150000					150000	
159							150000					150000
160					13000					13000		
161							13000					13000

OBJECTID	_2104_2113	_2114_2123	Replacement Count
148		150000	4
149			4
150		50000	3
151	10000		3
152		30000	3
153		450000	3
154			2
155			4
156		1000	4
157		25000	5
158			2
159			2
160			2
161			2

Sum of Replacement Cost	
Facility Type	Total
Water Pipe	$6,052,816.00
Water Storage Tank	$3,276,000.00
Meter & Chlorination Building	$1,293,000.00
Bedrock Well	$706,000.00
Dug Well	$338,000.00
Hydrant	$182,000.00
Water System Valve	$105,005.00
Grand Total	**$11,952,821.00**



_2024_2033	(All)

Sum of _2024_2033	Criticality		
Risk Score	Highest Risk	Priority Renewal	Grand Total
20	$285,500.00		$285,500.00
16	$50,000.00		$50,000.00
15		$172,500.00	$172,500.00
12		$315,000.00	$315,000.00
8		$75,000.00	$75,000.00
5		$11,500.00	$11,500.00
4		$10,000.00	$10,000.00
Grand Total	**$335,500.00**	**$584,000.00**	**$919,500.00**

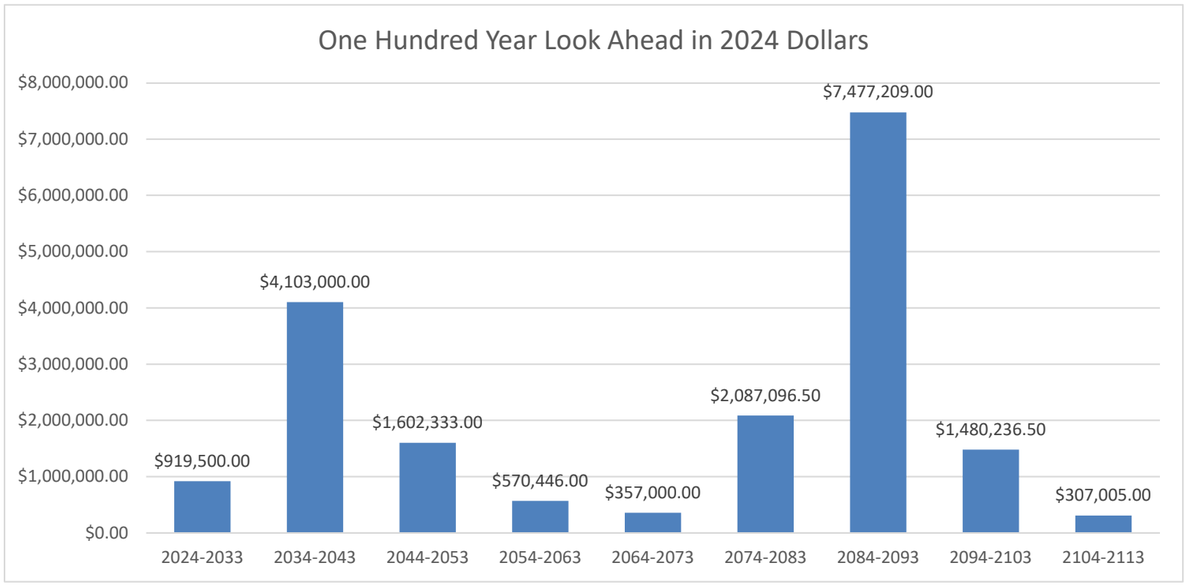
_2024_2033	(All)

Sum of _2024_2033			Criticality
Facility Name or Pressure Zone	Asset Type	Risk Score	Highest Risk
Distribution System	Hydrant Gate Valve	20	$2,500.00
	Yard Hydrant	20	$13,000.00
Distribution System Total			**$15,500.00**
Meter & Chlorination Building	Chemical Pump Monitor	20	$5,000.00
	SCADA Panel	16	$50,000.00
	Sodium Hypochlorite Day Tank	20	$3,000.00
	Sodium Hypochlorite Feed Pump - Solenoid	20	$5,000.00
	Sodium Hypochlorite Piping & Tubing	20	$1,000.00
	Sodium Secondary Containment Area	20	$5,000.00
Meter & Chlorination Building Total			**$69,000.00**
Water Storage Tank	Overflow Pipe	20	$1,000.00
	Tank Rubber Membrane Roof	20	$250,000.00
Water Storage Tank Total			**$251,000.00**
Grand Total			**$335,500.00**

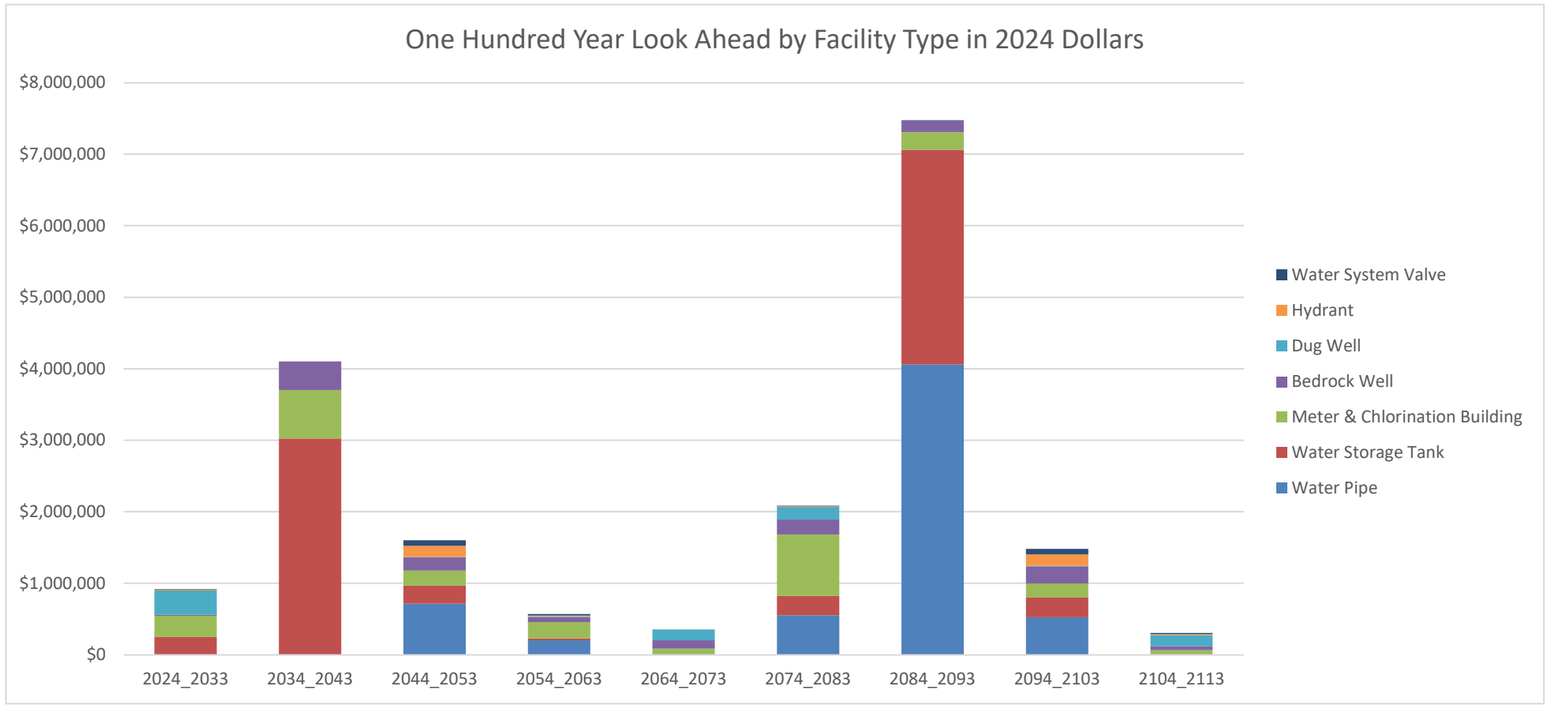
_2024_2033	(All)

Sum of _2024_2033				Criticality		
Facility Name or Pressure Zone	Asset Type	Asset ID	Risk Score	Highest Risk	Priority Renewal	Grand Total
BRW-1	Level Transducer	BW-006	5		$3,000.00	$3,000.00
	Pump Cable	BW-004	15		$10,000.00	$10,000.00
BRW-1 Total					**$13,000.00**	**$13,000.00**
BRW-2	Level Transducer	BW-015	5		$3,000.00	$3,000.00
BRW-2 Total					**$3,000.00**	**$3,000.00**
Distribution System	Gate Valve	V-025	5		$2,500.00	$2,500.00
	Hydrant Gate Valve	HV-007	15		$2,500.00	$2,500.00
		HV-013	20	$2,500.00		$2,500.00
	Yard Hydrant	HYD-014	20	$13,000.00		$13,000.00
Distribution System Total				**$15,500.00**	**$5,000.00**	**$20,500.00**
Meter & Chlorination Building	Chemical Pump Monitor	BLDG-018	20	$5,000.00		$5,000.00
	Exhaust Fan	BLDG-007	8		$20,000.00	$20,000.00
	Instrumentation Devices & Wiring	BLDG-020	12		$150,000.00	$150,000.00
	Propane Tank & Supply Piping	BLDG-009	8		$30,000.00	$30,000.00
	SCADA Panel	BLDG-021	16	$50,000.00		$50,000.00
	Sodium Hypochlorite Day Tank	BLDG-014	20	$3,000.00		$3,000.00
	Sodium Hypochlorite Feed Pump - Solenoid	BLDG-015	20	$5,000.00		$5,000.00
	Sodium Hypochlorite Piping & Tubing	BLDG-016	20	$1,000.00		$1,000.00
	Sodium Secondary Containment Area	BLDG-017	20	$5,000.00		$5,000.00
	Unit Heater (Propane)	BLDG-008	8		$25,000.00	$25,000.00
Meter & Chlorination Building Total				**$69,000.00**	**$225,000.00**	**$294,000.00**
W-1	Drop Pipe	W-003	15		$10,000.00	$10,000.00
	Dug Well w/ Pitless Adaptor and Cover	W-001	12		$75,000.00	$75,000.00
	Electrical Conduit Wire	W-005	15		$100,000.00	$100,000.00
	Level Transducer	W-004	5		$3,000.00	$3,000.00
	Process Piping & Valves	W-006	12		$30,000.00	$30,000.00
	PVC Stilling Tube	W-002	4		$10,000.00	$10,000.00
	Submersible Pump and Motor	W-007	15		$30,000.00	$30,000.00
W-1 Total					**$258,000.00**	**$258,000.00**
W-2	Precast Structure & Metal Plate Cover	W-009	15		$10,000.00	$10,000.00
	Process Piping & Valves	W-008	12		$30,000.00	$30,000.00
W-2 Total					**$40,000.00**	**$40,000.00**
W-3	Building Process Piping & Valves	W-010	12		$30,000.00	$30,000.00
	Precast Structure & Metal Plate Cover	W-011	15		$10,000.00	$10,000.00
W-3 Total					**$40,000.00**	**$40,000.00**
Water Storage Tank	Overflow Pipe	TNK-003	20	$1,000.00		$1,000.00
	Tank Rubber Membrane Roof	TNK-002	20	$250,000.00		$250,000.00
Water Storage Tank Total				**$251,000.00**		**$251,000.00**
Grand Total				**$335,500.00**	**$584,000.00**	**$919,500.00**

Data	Total
2024-2033	$919,500.00
2034-2043	$4,103,000.00
2044-2053	$1,602,333.00
2054-2063	$570,446.00
2064-2073	$357,000.00
2074-2083	$2,087,096.50
2084-2093	$7,477,209.00
2094-2103	$1,480,236.50
2104-2113	$307,005.00



Data	Facility Type Water Pipe	Water Storage Tank	Meter & Chlorination Building	Bedrock Well	Dug Well	Hydrant	Water System Valve	Grand Total
2024_2033		$251,000	$294,000	$16,000	$338,000	$13,000	$7,500	$919,500
2034_2043		$3,025,000	$678,000	$400,000				$4,103,000
2044_2053	$714,833	$250,000	$215,000	$186,000	$3,000	$156,000	$77,500	$1,602,333
2054_2063	$203,441	$26,000	$228,000	$70,000	$10,000	$13,000	$20,005	$570,446
2064_2073			$88,000	$116,000	$153,000			$357,000
2074_2083	$551,597	$275,000	$855,000	$210,000	$175,000	$13,000	$7,500	$2,087,097
2084_2093	$4,059,209	$3,001,000	$248,000	$166,000	$3,000			$7,477,209
2094_2103	$523,737	$275,000	$198,000	$240,000	$10,000	$156,000	$77,500	$1,480,237
2104_2113			$65,000	$56,000	$153,000	$13,000	$20,005	$307,005



Category	Horizontal

Asset Type	Unit	Sum of Quantity
Blow-off Valve	EA	1
Fire Hydrant	EA	12
Gate Valve	EA	20
Hydrant Gate Valve	EA	14
Hydrant Service	LF	713
Shutoff Valve	EA	7
Water Main	LF	16,581
Yard Hydrant	EA	2

Category	Horizontal

Sum of Quantity				Year_txt				
Facility Type	Asset Type	Material	Useful Life	1970 - 1979	2000 - 2009	2010 - 2019	Unknown	Grand Total
Hydrant	Fire Hydrant		50		11	1		12
	Yard Hydrant		50	1	1			2
Water Pipe	Hydrant Service	DI	85		358	350		708
		Unk	75	4				4
	Water Main	DI	85		11,222	1,147		12,369
		HDPE	75	577	51			628
		PVC	75	2,042	1,122			3,165
		Unk	75		403			403
		AC	85		17			17
Water System Valve	Blow-off Valve		50		1			1
	Gate Valve		50	1	13	6		20
	Hydrant Gate Valve		50	2	9	1	2	14
	Shutoff Valve		50		6	1		7

Category	(All)

Facility Name or Pressure Zone	Asset Type	Criticality	Risk Score
Distribution System	Hydrant Gate Valve	Highest Risk	20
	Yard Hydrant	Highest Risk	20
Meter & Chlorination Building	Chemical Pump Monitor	Highest Risk	20
	SCADA Panel	Highest Risk	16
	Sodium Hypochlorite Day Tank	Highest Risk	20
	Sodium Hypochlorite Feed Pump - Solenoid	Highest Risk	20
	Sodium Hypochlorite Piping & Tubing	Highest Risk	20
	Sodium Secondary Containment Area	Highest Risk	20
Water Storage Tank	Overflow Pipe	Highest Risk	20
	Tank Rubber Membrane Roof	Highest Risk	20

Category	Vertical

Facility Type	Asset Type	Useful Life	Remaining Useful Life
Bedrock Well	Building Process Piping & Valves	50	49
Bedrock Well	Electrical Conduit Wire	40	16
Bedrock Well	Electrical Conduit Wire	40	17
Bedrock Well	Galvanized Drop Pipe	35	12
Bedrock Well	Gravel Access Drive	35	11
Bedrock Well	Gravel Access Drive	35	12
Bedrock Well	HDPE Stilling Tube	50	27
Bedrock Well	Level Transducer	20	-3
Bedrock Well	Pump Cable	20	-3
Bedrock Well	Pump Cable	20	19
Bedrock Well	Stilling Tube	50	27
Bedrock Well	Submersible Pump and Motor	40	39
Bedrock Well	Bedrock Well/Pitless Adaptor & Cap (Steel Casing)	50	11
Bedrock Well	Bedrock Well/Pitless Adaptor & Cap (Steel Casing)	50	26
Dug Well	Building Process Piping & Valves	50	5
Dug Well	Drop Pipe	35	-10
Dug Well	Dug Well w/ Pitless Adaptor and Cover	50	5
Dug Well	Electrical Conduit Wire	40	-5
Dug Well	Level Transducer	20	-25
Dug Well	Precast Structure & Metal Plate Cover	40	-5
Dug Well	Process Piping & Valves	50	5
Dug Well	PVC Stilling Tube	50	5
Dug Well	Submersible Pump and Motor	40	-5
Meter & Chlorination Building	Automatic Transfer Switch	40	17
Meter & Chlorination Building	BRW-1 Flow Meter	25	24
Meter & Chlorination Building	BRW-2 Flow Meter	25	24
Meter & Chlorination Building	Building Electrical	40	17
Meter & Chlorination Building	Chemical Pump Monitor	20	-3
Meter & Chlorination Building	Combined Flow Meter	25	24
Meter & Chlorination Building	Concrete Floor Slab	50	27
Meter & Chlorination Building	Concrete Foundation	75	52
Meter & Chlorination Building	Exhaust Fan	30	7
Meter & Chlorination Building	Feed Piping, Valves, & Appur.	20	20
Meter & Chlorination Building	Generator (Natural Gas)	40	17
Meter & Chlorination Building	Gravel Access Drive	35	12
Meter & Chlorination Building	Instrumentation Devices & Wiring	30	7
Meter & Chlorination Building	Interior lighting	40	17
Meter & Chlorination Building	Plywood Walls	75	52
Meter & Chlorination Building	Propane Tank & Supply Piping	30	7
Meter & Chlorination Building	SCADA Panel	25	2
Meter & Chlorination Building	Sodium Hypochlorite Day Tank	15	-8
Meter & Chlorination Building	Sodium Hypochlorite Feed Pump - Solenoid	20	-3
Meter & Chlorination Building	Sodium Hypochlorite Piping & Tubing	20	-3
Meter & Chlorination Building	Sodium Secondary Containment Area	20	-3
Meter & Chlorination Building	Standing Seam Metal Roof	35	12
Meter & Chlorination Building	Unit Heater (Propane)	30	7
Meter & Chlorination Building	W-1 Flow Meter	25	24
Meter & Chlorination Building	Wood Roof Trusses	50	27
Water Storage Tank	Cast in Place Tank	50	13
Water Storage Tank	Overflow Pipe	30	-7
Water Storage Tank	Submersible Level Sensors (Electrical)	20	16
Water Storage Tank	Tank Rubber Membrane Roof	25	-12

APPENDIX I

Carroll County 2024 Approved Budget

County of Carroll, NH
FY24 Proposed Budget

	DESCRIPTION	2023 Budget	Actual October 31, 2023	Actual December 31, 2023	% Spent	Remaining	Department Request	Voted and Approved by Commissioners 11/2/2023	Voted and Approved by Delegation 2/19/24	Net % Increase (Decrease)	
Departmental - Summarized Revenue Budget											
	County Taxes	$ 21,386,113.00	$ 21,386,113.00	$ 21,386,113.00	100%	$ -	$ 22,000,000.00	$ 22,000,000.00	$ 21,386,113.00	0.00%	
	County General	$ 260,612.00	$ 1,334,419.00	$ 2,015,867.00	774%	$ (1,755,255.00)	$ 86,000.00	$ 86,000.00	$ 86,000.00	-67.00%	
	Sheriff's Income	$ 313,300.00	$ 281,835.00	$ 424,372.00	135%	$ (111,072.00)	$ 341,084.00	$ 341,084.00	$ 341,084.00	8.87%	
	Registry	$ 892,489.00	$ 858,885.00	$ 1,016,559.00	114%	$ (124,070.00)	$ 744,208.00	$ 744,208.00	$ 744,208.00	-16.61%	
	Corrections	$ 150,000.00	$ 214,048.00	$ 272,527.00	182%	$ (122,527.00)	$ 181,000.00	$ 181,000.00	$ 216,000.00	44.00%	
	Farm	$ 30,000.00	$ 8,047.00	$ 30,991.00	103%	$ (991.00)	$ 30,000.00	$ 30,000.00	$ 30,000.00	0.00%	
	Interest	$ 6,500.00	$ 36,427.00	$ 72,110.00	1109%	$ (65,610.00)	$ 10,000.00	$ 10,000.00	$ 120,000.00	1746.15%	
	Mountain View Nursing Home	$ 12,282,588.00	$ 13,216,785.00	$ 15,491,126.00	126%	$ (3,208,538.00)	$ 12,708,548.29	$ 12,708,548.29	$ 12,708,548.29	3.47%	
		$ 13,935,489.00	$ 15,950,446.00	$ 19,323,552.00	139%	$ (5,388,063.00)	$ 14,100,840.29	$ 14,100,840.29	$ 14,245,840.29	2.23%	
	Use of Fund Balance	$ 2,000,000.00	$ -	$ -	$ -	$ 2,000,000.00	$ 3,700,000.00	$ 3,700,000.00	$ 4,001,675.81	100.08%	
	TOTAL COUNTY REVENUE	**$ 37,321,602.00**	**$ 37,336,559.00**	**$ 40,709,665.00**	109%	**$ (3,388,063.00)**	**$ 39,800,840.29**	**$ 39,800,840.29**	**$ 39,633,629.10**	**6.19%**	
Departmental - Summarized Expense Budget											
4110	Convention	$ 24,919.00	$ 7,102.00	$ 8,485.00	34%	$ 16,434.00	$ 23,680.00	$ 23,680.00	$ 8,681.00	-4.97%	
4123	County Attorney	$ 1,236,590.00	$ 914,654.00	$ 1,105,982.00	89%	$ 130,608.00	$ 1,391,342.39	$ 1,391,342.39	$ 1,391,342.39	12.51%	
4124	Victim Services	$ 158,375.00	$ 101,001.00	$ 127,842.00	81%	$ 30,533.00	$ 166,995.80	$ 166,995.80	$ 166,995.80	5.44%	
4130	Commissioners	$ 241,170.00	$ 197,179.00	$ 234,687.00	97%	$ 6,483.00	$ 243,071.41	$ 243,071.41	$ 324,531.82	0.79%	
4150	Finance	$ 457,060.00	$ 418,870.00	$ 505,669.00	111%	$ (48,609.00)	$ 489,024.36	$ 489,024.36	$ 489,024.36	6.99%	
4151	Treasurer	$ 12,703.00	$ 9,783.00	$ 11,898.00	94%	$ 805.00	$ 11,291.16	$ 11,291.16	$ 12,297.56	-11.11%	
4199	Special Fees & Services	$ -	$ 24,809.00	$ 24,809.00	0%	$ (24,809.00)	$ -	$ -	$ -	0.00%	*
4155	Human Resources	$ 365,375.00	$ 291,744.00	$ 359,520.00	98%	$ 5,855.00	$ 389,441.77	$ 389,441.77	$ 389,441.77	6.59%	
4193	Registry of Deeds	$ 511,342.00	$ 720,179.00	$ 1,216,323.00	238%	$ (704,981.00)	$ 528,693.39	$ 528,693.39	$ 528,693.39	3.39%	
4195	County Buildings & Facilities	$ 227,630.00	$ 158,923.00	$ 200,495.00	88%	$ 27,135.00	$ 253,650.41	$ 253,650.41	$ 253,650.41	11.43%	
4200	Information Technology	$ 469,262.00	$ 200,836.00	$ 282,321.00	60%	$ 186,941.00	$ 461,084.93	$ 461,084.93	$ 461,084.93	-1.74%	
4211	Sheriff	$ 2,087,035.00	$ 1,669,663.00	$ 2,115,984.00	101%	$ (28,949.00)			$ 2,222,213.16	6.41%	
4214	Dispatch	$ 1,051,979.00	$ 674,503.00	$ 863,420.00	82%	$ 188,559.00			$ 1,108,988.65	5.42%	
4230	Corrections	$ 5,223,150.00	$ 3,717,798.00	$ 4,684,146.00	90%	$ 539,004.00	$ 5,537,707.68	$ 5,537,707.68	$ 5,555,907.68	6.02%	
4302	DPW	$ 356,010.00	$ 232,649.00	$ 315,671.00	89%	$ 40,339.00	$ 365,173.48	$ 365,173.48	$ 365,173.48	2.57%	
4449	BEAS	$ 5,726,700.00	$ 4,517,322.00	$ 5,477,878.00	96%	$ 248,822.00	$ 5,829,397.02	$ 5,829,397.02	$ 5,829,397.02	1.79%	
4611	County Mandated Appropriations	$ 295,627.00	$ 246,356.00	$ 295,627.00	100%	$ -	$ 332,125.00	$ 313,627.00	$ 370,267.00	6.09%	
4659	Regional Appropriations	$ 440,000.00	$ 355,417.00	$ 440,000.00	100%	$ -	$ 674,275.00	$ 427,000.00	$ 457,000.00	-2.95%	
4711	Long Term Debt	$ 559,111.00	$ 441,924.00	$ 492,632.00	88%	$ 66,479.00	$ 645,777.00	$ 645,777.00	$ 551,655.00	15.50%	
'21-23	Interest Expense	$ 458,084.00	$ 215,639.00	$ 384,041.00	84%	$ 74,043.00	$ 489,721.00	$ 489,721.00	$ 419,159.00	6.91%	
4901	Capital Expenditures	$ 208,870.00	$ 243,542.00	$ 340,334.00	163%	$ (131,464.00)	$ 489,099.00	$ 489,099.00	$ 362,864.00	134.16%	
	Transfer Expense - Non-Capital Res	$ 40,000.00	$ 40,000.00	$ 40,000.00	0%	$ -	$ 190,000.00	$ 190,000.00	$ 190,000.00	375.00%	
	Transfer to Capital Reserve	$ 1.00					$ 150,000.00	$ 150,000.00	$ 150,000.00	0.00%	
	GENERAL FUND TOTAL	**$ 20,150,993.00**	**$ 15,399,893.00**	**$ 19,527,764.00**	**97%**	**$ 623,228.00**	**$ 21,991,352.61**	**$ 21,725,579.61**	**$ 21,608,368.42**	**7.23%**	
4411	Administration	$ 3,588,915.00	$ 2,563,553.00	$ 3,181,856.00	89%	$ 407,059.00	$ 3,479,191.70	$ 3,479,191.70	$ 3,489,191.70	-3.06%	
4412	Dietary	$ 2,121,607.00	$ 1,596,818.00	$ 2,042,718.00	96%	$ 78,889.00	$ 2,281,190.40	$ 2,281,190.40	$ 2,281,190.40	7.52%	
4413	Nursing	$ 7,126,179.00	$ 6,225,123.00	$ 7,871,278.00	110%	$ (745,099.00)	$ 7,936,016.75	$ 7,936,016.75	$ 7,926,016.75	11.36%	
4414	Environmental Services	$ 1,733,131.00	$ 1,134,543.00	$ 1,452,988.00	84%	$ 280,143.00	$ 1,724,981.58	$ 1,724,981.58	$ 1,724,981.58	-0.47%	
4415	Physician & Pharmacy	$ 95,500.00	$ 81,373.00	$ 116,426.00	122%	$ (20,926.00)	$ 100,500.00	$ 100,500.00	$ 100,500.00	5.24%	
4416	Physical Therapy	$ 195,750.00	$ 139,447.00	$ 184,304.00	94%	$ 11,446.00	$ 172,000.00	$ 172,000.00	$ 172,000.00	-12.13%	
4417	Recreation	$ 499,046.00	$ 386,386.00	$ 483,312.00	97%	$ 15,734.00	$ 607,791.34	$ 607,791.34	$ 607,791.34	21.79%	
4418	Social Services	$ 183,238.00	$ 146,750.00	$ 181,451.00	99%	$ 1,787.00	$ 188,948.91	$ 188,948.91	$ 188,948.91	3.12%	
4419	Special Services	$ 214,070.00	$ 162,977.00	$ 200,061.00	93%	$ 14,009.00	$ 206,000.00	$ 206,000.00	$ 206,000.00	-3.77%	
4721	Interest	$ 388,875.00	$ 388,875.00	$ 388,875.00	100%	$ -	$ 338,640.00	$ 338,640.00	$ 338,640.00	-12.92%	
4711	Long-Term Debt	$ 980,000.00	$ 980,000.00	$ 980,000.00	100%	$ -	$ 990,000.00	$ 990,000.00	$ 990,000.00	1.02%	
	MOUNTAIN VIEW TOTAL	**$ 17,126,311.00**	**$ 13,805,845.00**	**$ 17,083,269.00**	**100%**	**$ 43,042.00**	**$ 18,025,260.68**	**$ 18,025,260.68**	**$ 18,025,260.68**	**5.25%**	
	TOTAL GENERAL AND MVC	**$ 37,277,304.00**	**$ 29,205,738.00**	**$ 36,611,033.00**	**98%**	**$ 666,270.00**	**$ 40,016,613.29**	**$ 39,750,840.29**	**$ 39,633,629.10**	**6.32%**	
	REVENUES LESS EXPENSES	**$ 44,298.00**	**$ 8,130,821.00**	**$ 4,098,632.00**			**$ (215,773.00)**	**$ 50,000.00**	**$ -**	**$ (0.00)**	
	*	Pass-through Income and Expenses; Expenses are offset by Revenue									
	***	Restricted Funds Used Outside of the General Fund									

County DPW Budget

APPENDIX J

Small Water System Business Plan

SMALL PUBLIC WATER SYSTEM
ASSET MANAGEMENT/BUSINESS PLAN
WATER DIVISION
DRINKING WATER AND GROUNDWATER BUREAU
CAPACITY DEVELOPMENT PROGRAM

Pursuant to:
Safe Drinking Water Act (SDWA) Section 1420 (C) and New Hampshire RSA 485:3, XII
Env-Dw 600, Capacity Assurance for New and Existing Public Water Systems

This Plan is submitted to address the following requirement (check one):

_____	**Preliminary** (w/Technical Design Approval)
_____	**Final** (w/Approval to Operate)
X	**Funding Improvements** (w/State Loan or Grant)

PWS Name Carroll County Complex

PWS ID or DR# 1844010

Prepared Date: 6/28/2024

Submit to:
Shelley.Frost@des.nh.gov
Small Systems Capacity Development Manager
Drinking Water and Groundwater Bureau
New Hampshire Department of Environmental Services
29 Hazen Drive, P.O. Box 95
Concord, New Hampshire 03302-0095
Telephone: (603) 271-2513 Fax: (603) 271-5171
DWGBinfo@des.nh.gov
www.des.nh.gov/dwgb/capacity/

Prepared by (name and organization):
Lynnette Carney, Underwood Engineers

PWS ID: 1844010

PART A: TECHNICAL SUMMARY

Data Description	Current		Build-out
Number of Service Connections	53		
Population Served	258		
Water System Design Flow (gpd)	53,280 gpd		
Water System Average Daily Demand (gpd)	19,000 gpd		
Water System Maximum Daily Flow(gpd)	26,000 gpd		
Source Capacity / Pumping rate (gpm) *Enter the length of the yield test, in hours (enter "0" if no yield test was conducted - drillers test during well installation is not applicable).*	Well #	Flow Rate in GPM	Yield test (length in hrs.)
	BRW 1	25*	48 hrs
	BRW 2	25*	48 hrs
	W-1	12	48 hrs
Maximum Irrigation Use, if any, note dedicated source if applicable (gallons per day)			

NOTE: Wells BRW 1&2 are hydraulically connected. Max recommended withdrawal from 1&2 is 25gpm.

Type of water system (check all that apply):

Residential	X
Commercial	
Industrial	
School/Daycare	
Other	X Institutional

Water Treatment - describe type(s) and targeted contaminant(s): None - chlorination only

Domestic Disposal (select one):

Local, regional or municipal sanitary sewer system	
Individual unit septic systems with subsurface tanks and leachfields	X
Communal or shared septic system(s)	X County Complex

For either individual or community septic, does any part of the system require pumping (Y/N)? Yes

DWGBInfo@des.nh.gov or (603) 271-2513
PO Box 95, Concord, NH 03302-0095
www.des.nh.gov

Population/no. service connections: **53**

Service Connections at buildout: _____

Discount Rate (Interest* - Inflation): _____

* Based on 30-year U.S. treasury notes and bonds; see real interest rate in U.S. OMB Circular A-94 Appendix-C-revised.pdf

Prepared By (Name and Org.): **Jordan Provencher**

Underwood Engineers, Inc.

See Condition Rating Guidance Tab A.1

PART B: VERTICAL INVENTORY OF SMALL WATER SYSTEM ASSETS AND USEFUL LIFE

Facility Type	Asset Type	Capacity or Size	Material	Year Installed	Estimated Useful Life (yrs)	End of Useful Life	Remaining Useful Life (yrs)	Replacement Year	Estimated Replacement Cost, Including Installation Labor & Permitting[1] Unit	Unit Cost	Quantity	Replacement Cost	Impact (1-5)	Probability of Failure (1-5)	Condition Score[2] (1-5)	Criticality Score (1-25)	Annual Reserve[4] ($)	Equipment Make/ Model	Discounted Annual Reserve ($)
BRW-1	Galvanized Drop Pipe	2" dia		2001	35	2036	12	2036	LS	$10,000	1	$10,000.00	3	3	0	9	NA		
BRW-2	Galvanized Drop Pipe	2" dia		2001	35	2036	12	2036	LS	$10,000	1	$10,000.00	3	3	0	9	NA		
BRW-1	Gravel Access Drive			2001	35	2036	12	2036	LS	$10,000	1	$10,000.00	1	3	0	3	NA		
BRW-2	Gravel Access Drive			2000	35	2035	11	2035	LS	$10,000	1	$10,000.00	3	3	0	9	NA		
BRW-1	Bedrock Well w/ Pitless Adaptor and Cap (Steel Casing)	10" dia, 20		1985	50	2035	11	2035	LS	$150,000	1	$150,000.00	3	3	0	9	NA		
BRW-1	Level Transducer			2001	20	2021	-3	2024	EA	$3,000	1	$3,000.00	1	5	0	5	NA		
BRW-2	Level Transducer			2001	20	2021	-3	2024	EA	$3,000	1	$3,000.00	1	5	0	5	NA		
BRW-1	Pump Cable	2 AWG		2001	20	2021	-3	2024	LS	$10,000	1	$10,000.00	3	5	0	15	NA		
BRW-2	Bedrock Well w/ Pitless Adaptor and Cap (Steel Casing)	6" dia, 25 gpm		2000	50	2050	26	2050	LS	$150,000	1	$150,000.00	3	2	0	6	NA		
BRW-1	Building Process Piping & Valves			2023	50	2073	49	2073	LS	$30,000	1	$30,000.00	3	2	0	6	NA		
BRW-2	Building Process Piping & Valves			2023	50	2073	49	2073	LS	$30,000	1	$30,000.00	3	2	0	6	NA		
BRW-2	HDPE Stilling Tube	1.25" dia		2001	50	2051	27	2051	LS	$10,000	1	$10,000.00	1	2	0	2	NA		
BRW-1	Stilling Tube	1.25" dia		2001	50	2051	27	2051	LS	$10,000	1	$10,000.00	1	2	0	2	NA		
BRW-1	Submersible Pump and Motor	5 Hp, 35 gpm		2023	40	2063	39	2063	EA	$30,000	1	$30,000.00	3	2	0	6	NA		
BRW-2	Submersible Pump and Motor	5 Hp, 30 gpm		2023	40	2063	39	2063	EA	$30,000	1	$30,000.00	3	2	0	6	NA		
BRW-1	Electrical Conduit Wire			2001	40	2041	17	2041	LS	$100,000	1	$100,000.00	3	3	0	9	NA		
BRW-2	Electrical Conduit Wire			2000	40	2040	16	2040	LS	$100,000	1	$100,000.00	3	3	0	9	NA		
BRW-2	Pump Cable	2 AWG		2023	20	2043	19	2043	LS	$10,000	1	$10,000.00	3	3	0	9	NA		
W-1	Level Transducer			1979	20	1999	-25	2024	EA	$3,000	1	$3,000.00	1	5	0	5	NA		
W-1	Drop Pipe			1979	35	2014	-10	2024	LS	$10,000	1	$10,000.00	3	5	0	15	NA		
W-2	Precast Structure & Metal Plate Cover			1979	40	2019	-5	2024	EA	$10,000	1	$10,000.00	3	5	0	15	NA		
W-3	Precast Structure & Metal Plate Cover			1979	40	2019	-5	2024	EA	$10,000	1	$10,000.00	3	5	0	15	NA		
W-1	Submersible Pump and Motor	1/2 Hp, 12		1979	40	2019	-5	2024	EA	$30,000	1	$30,000.00	3	5	0	15	NA		
W-1	Electrical Conduit Wire			1979	40	2019	-5	2024	LS	$100,000	1	$100,000.00	3	5	0	15	NA		
W-1	Dug Well w/ Pitless Adaptor and Cover	12 gpm		1979	50	2029	5	2029	LS	$75,000	1	$75,000.00	3	4	0	12	NA		
W-3	Building Process Piping & Valves			1979	50	2029	5	2029	LS	$30,000	1	$30,000.00	3	4	0	12	NA		
W-1	Process Piping & Valves			1979	50	2029	5	2029	LS	$30,000	1	$30,000.00	3	4	0	12	NA		
W-2	Process Piping & Valves			1979	50	2029	5	2029	LS	$30,000	1	$30,000.00	3	4	0	12	NA		
W-1	PVC Stilling Tube	1-1/4"		1979	50	2029	5	2029	LS	$10,000	1	$10,000.00	1	4	0	4	NA		
Meter & Chlorination Building	Sodium Hypochlorite Day Tank	35 gal		2001	15	2016	-8	2024	EA	$3,000	1	$3,000.00	4	5	0	20	NA		
Meter & Chlorination Building	Gravel Access Drive			2001	35	2036	12	2036	LS	$10,000	1	$10,000.00	1	3	0	3	NA		
Meter & Chlorination Building	Standing Seam Metal Roof			2001	35	2036	12	2036	LS	$35,000	1	$35,000.00	2	3	0	6	NA		
Meter & Chlorination Building	Sodium Hypochlorite Piping & Tubing			2001	20	2021	-3	2024	LS	$1,000	1	$1,000.00	4	5	0	20	NA		
Meter & Chlorination Building	Feed Piping, Valves, & Appur.			2001	20	2021	-3	2024	LS	$4,000	1	$4,000.00	4	5	0	20	NA		
Meter & Chlorination Building	Chemical Pump Monitor			2001	20	2021	-3	2024	EA	$5,000	1	$5,000.00	4	5	0	20	NA		
Meter & Chlorination Building	Sodium Hypochlorite Feed Pump - Solenoid			2001	20	2021	-3	2024	EA	$5,000	1	$5,000.00	4	5	0	20	NA		
Meter & Chlorination Building	Sodium Secondary Containment Area			2001	20	2021	-3	2024	LS	$5,000	1	$5,000.00	4	5	0	20	NA		
Meter & Chlorination Building	Exhaust Fan			2001	30	2031	7	2031	LS	$20,000	1	$20,000.00	2	4	0	8	NA		
Meter & Chlorination Building	Unit Heater (Propane)			2001	30	2031	7	2031	EA	$25,000	1	$25,000.00	2	4	0	8	NA		
Meter & Chlorination Building	Propane Tank & Supply Piping	1000 gal		2001	30	2031	7	2031	LS	$30,000	1	$30,000.00	2	4	0	8	NA		
Meter & Chlorination Building	Instrumentation Devices & Wiring			2001	30	2031	7	2031	LS	$150,000	1	$150,000.00	3	4	0	12	NA		
Meter & Chlorination Building	BRW-1 Flow Meter			2023	25	2048	24	2048	EA	$5,000	1	$5,000.00	3	2	0	6	NA		
Meter & Chlorination Building	BRW-2 Flow Meter			2023	25	2048	24	2048	EA	$5,000	1	$5,000.00	3	2	0	6	NA		
Meter & Chlorination Building	Combined Flow Meter			2023	25	2048	24	2048	EA	$5,000	1	$5,000.00	2	2	0	4	NA		
Meter & Chlorination Building	Concrete Floor Slab	14' x 14'		2001	50	2051	27	2051	LS	$75,000	1	$75,000.00	2	2	0	4	NA		
Meter & Chlorination Building	W-1 Flow Meter			2023	25	2048	24	2048	EA	$5,000	1	$5,000.00	3	2	0	6	NA		
Meter & Chlorination Building	Wood Roof Trusses			2001	50	2051	27	2051	LS	$50,000	1	$50,000.00	2	2	0	4	NA		
Meter & Chlorination Building	Generator (Propane)	45 kW		2001	40	2041	17	2041	LS	$450,000	1	$450,000.00	4	3	0	12	NA		
Meter & Chlorination Building	Building Electrical			2001	40	2041	17	2041	LS	$100,000	1	$100,000.00	3	3	0	9	NA		
Meter & Chlorination Building	Concrete Foundation			2001	75	2076	52	2076	LS	$100,000	1	$100,000.00	2	1	0	2	NA		
Meter & Chlorination Building	Plywood Walls			2001	75	2076	52	2076	LS	$75,000	1	$75,000.00	2	1	0	2	NA		
Meter & Chlorination Building	Interior lighting			2001	40	2041	17	2041	LS	$50,000	1	$50,000.00	2	3	0	6	NA		
Meter & Chlorination Building	SCADA Panel			2001	25	2026	2	2026	LS	$50,000	1	$50,000.00	4	4	0	16	NA		
Meter & Chlorination Building	Automatic Transfer Switch			2001	40	2041	17	2041	LS	$30,000	1	$30,000.00	4	3	0	12	NA		
Water Storage Tank	Cast in Place Tank	200000 gal	Concrete	1987	50	2037	13	2037	LS	$3,000,000	1	$3,000,000.00	4	3	0	12	NA		
Water Storage Tank	Overflow Pipe			1987	30	2017	-7	2024	LS	$1,000	1	$1,000.00	4	5	0	20	NA		
Water Storage Tank	Baffle Walls			1987	25	2012	-12	2024	LS	$250,000	1	$250,000.00	4	5	0	20	NA		
Water Storage Tank	Tank Rubber Membrane Roof			1987	25	2012	-12	2024	LS	$250,000	1	$250,000.00	4	5	0	20	NA		
Water Storage Tank	Submersible Level Sensors (Electrical)			2020	20	2040	16	2040	LS	$25,000	1	$25,000.00	4	3	0	12	NA		
Total												$5,863,000					**$ -**		

Notes

[1] Costs for replacing a community well include some or all of the following: (pump, hydrofrack, elec svc, well controls & wiring, pump house plumbing modifications, treatment modifications, pipe to pump house, site restoration, erosion control, & mob/demob, drilling access. 24 to 72-hr. pump test, well permitting, and water quality testing. Replacement wells likely require a 24-hour pump test, water quality testing, and possibly well abandonment.

[2] **Condition Score**: 1. Excellent 2. Good 3. Fair 4. Poor 5. Very bad **Probability of Failure** (5) Imminent; (4)Probable; (3) Occasional; (2) Remote; (1) Improbable [3] **Impact Score**: (5) Catastrophic; (4) Major; (3) Moderate; (2) Minor; (1) Insignificant.

[3] See Carroll County water system horizontal inventory in AMP report.

[4] The annual reserve for the next 10 years is assumed to be equal to the grand total of Table 4-2 in the AMP report divided by 10.

Prepared By	Organization of Preparer	Date

PART C: FUNDING STRATEGY*

Annual Operational Expenses

Subtotal of Annual Expenses from Part F Lines 13 + 28:	
Annual Reserves Deposit from Part F	**75830**

Current Reserves/ Capital Improvement Plan Account Value:

Long-Term Expenses (Capital Investment)

List the items with the three highest criticality scores from Part B Asset Inventory, followed by three highest cost items.

Item	Criticality Score	Annual Reserve (Table 4-2 of Report)	Alternate Annual Reserve Used to fund item	Anticipated Loan Amount	Anticipated Loan Date	Date of Water Rate /Rent Increase	Comment No.s

Refer to Section 4 of the report for 10-year and 100-year look aheads for long-term investments.

Increase required in annual reser 75,830.00)

Comments

1
2
3
4
5
6

*A funding strategy is a plan to fund long-term water system maintenance as necessary to consistently provide safe and sufficient drinking water quality and quantity throughout the lifetime of the water system. It is based on the estimated functional lifetime of equipment and pipes; therefore, update this forecast annually to use in annual budget preparation.

PART D: MANAGERIAL SUMMARY

Owner or Representative Name: Terry McCarthy, Chair, Board of Commissioners
Mailing Address: Carroll County Complex, 95 Water Village Road, Ossipee
Phone No. 603-832-3239 E-mail: tmccarthy@carrollcountynh.net

Type of Ownership (check all that apply)

X Public (village district, water precinct)
____ Non-profit Cooperative or Association
____ For-profit, subject to regulation by Public Utilities Commission (PUC)
____ Private

Other (describe) ____

Governing Body

Name of Governing Body: Carroll County Board of Commissioners
Meeting Frequency: Weekly
Members X Elected or ____ Appointed
Terms: 2 yrs Chair 2 yrs Vice Chair 4 yrs Clerk/Treasurer ____ Secretary

Other Members (specify as needed)

____

____

____

Is the governing body listed with the NH Secretary of State as an active business entity (Y/N)? No

Do you have documented bylaws or water system organizational rules (Y?N)? No

Have Record (As-Built) Drawings been turned over to the PWS Association and the State? Some - 2000 project only
Do they show the locations of the distribution system and its valves, hydrants, service connections, etc.? Some

Organization Chart (see tab titled "Part E Org Chart")

1. Management officials such as board members, commissioners, owner.
2. Certified Primary Operator and Backup or Associated Operator(s).
3. Individual(s) in charge of billing and debt collection, issuing SDWA public notices and Consumer Confidence reports, and similar customer interactions.
4. Individual(s) in charge of general budgeting and bookkeeping.
5. Individual(s) in charge of reading service meters (community systems w/service meters).
6. Individual(s) in charge of PWS record keeping.
7. Any subcontracted services.

PART E: ORGANIZATION CHART

Board Member/Owner Responsible for Drinking Water Compliance

Name: Will Dewitte

Phone No. 603-539-5125 Email Address wdewitte@cchoc.org

Owner Representative/Contact Person:

Name	Terry McCarthy, Chair - BOC
Phone No.	603-832-3239
Email	tmccarthy@carrollcountynh.net

Primary Certified Operator:

Name	Will Dewitte
Phone No.	603-539-5125
Email	wdewitte@cchoc.org

Treasurer:

Name	
Phone No.	
Email	

Facility Manager:

Name	Will Dewtte
Phone No.	603-539-5125
Email	wdewitte@cchoc.org

Backup/Secondary Certified Operator:

Name	Mark Ayers
Phone No.	603-986-1480
Email	

Bookkeeper:

Name	Bonnie Batchelder
Phone No.	
Email	bbatchelder@carrollcountynh.net

Subcontractors:

Electrician Co.	
Elect. Name	
Electrican Phone	
Plumbing Co.	
Plumber Name	
Plumber Phone	

DWGBInfo@des.nh.gov or (603) 271-2513
PO Box 95, Concord, NH 03302-0095

Persons Responsible for:

Public Notices/CCRs	Will Dewitte
Emergency Plan Updates	Will Dewitte
Billing/Debt Collection	Bonnie Batchelder
Other	
Other	
Other	

PART F: EXPENSES

Line No.	Operations & Maintenance Expenses	Expended[1] Last Fiscal Year	Budgeted Next FY
1	Water System Operation & Testing	$ 6,000	$ 6,000
2	Water System Repairs + Maintenance	$ 4,000	$ 4,000
3	NHDES Permit to Operate (PTO) fee ($10/home/yr)	$ 530	$ 530
4	Annual Leak Survey	$ -	$ -
5	Tank Inspection (recommended every 5 yrs)	$ -	$ 5,000
6	Annual Water System Flushing	$ -	$ -
7	Electricity and Heating costs (use half of annual costs).	$ 8,000	$ 8,000
8	SCADA or other controls	$ 500	$ 500
9	Meter Calibration (recommended every 5 yrs)	$ -	$ -
10	Bulk Water Delivery fees	$ -	$ -
11	Chemicals	$ 1,200	$ 1,200
12			
13	**Total O&M Expenses**	$ 20,230	$ 25,230

	Water System General & Administrative Expenses[2]	Expended Last Fiscal Year	Budgeted Next FY
14	Bookeeping and Accounting	**$ -**	**$ -**
15	Legal	$ -	**$ -**
16	Engineering	$ -	**$ -**
17	Other Professional Services	$ -	**$ -**
18	General Management (wages)	$ 40,000	**$ 40,000**
19	Insurance	$ -	**$ -**
20	Real Estate Taxes	$ 5,000	**$ 5,000**
21	Bad Debt	$ -	**$ -**
22	Federal Taxes	$ -	**$ -**
23	Office and Administrative	$ 4,000	**$ 4,000**
24	Depreciation	$ -	**$ -**
25	Debt Service #1	$ -	**$ -**
26	Debt Service #2	$ -	**$ -**
27	15% of Selected General & Administrative Expenses, including taxes[2]	$ 6,600	**$ 6,600**
28		**$ 55,600**	**$ 55,600**

SUBTOTAL EXPENSES (Lines 13 + 28)	**$ 75,830**	**$ 80,830**
RESERVE FUNDS DEPOSITS (recommend 27% of fixed expenditures, 90 days working capital, 1 debt payment).		**$ 20,000**
TOTAL EXPENSES	**$ 75,830**	**$ 100,830**

3. **WATER RATE PROJECTION**

	Expended Last Fiscal Year	Budgeted Next FY
TOTAL EXPENSES	$ 75,830	$ 100,830
# CONNECTIONS [HOUSEHOLDS]	50	53
EXPENSES PER YEAR PER USER	$ 1,517	**$ 1,902**
PER MONTH	**$ 126**	**$ 159**
% increase from previous year		25%

NOTES

1. Submit general ledger for most recent completed financial year.
2. If lacking specific data, calculate expenses as a percentage of total G&A expenses. Note the percentage used and the basis of the percentage.
3. These rates aren't applicable for this system because the County Complex only has 6 connections but they use about 78% of the system's water.

PWS ID: 1844010

PART G: REVENUES

REVENUES SECTION 1		Earnings	Budgeted	
Line No.	**Operating Revenues**	**Last Fiscal Yr.**	**Next FY**	
1	User Charges (use expenses if not billed separately)	$ -	$ -	
2	Hook-up Fees	$ -	$ -	
3	Disconnect/Reconnect Fees ($25 per)	$ 50	$ 100	
4	Bulk Water Fees Charged	$ -	$ -	
5	Surcharges	$ -	$ -	
	Other Revenues			
6	Interest Earned on Deposits	$ -	$ -	
7	Late Payments ($10/Quarter)	$ 490	$ 500	
8	Other (describe)			
9	Other (describe)			
10	Other (describe)			
11	Other (describe)			
12	**Total Operating Revenues**	$ 540	$ 600	

REVENUES SECTION 2 - Water Charges and Use per Billing Period (APPLICABLE ONLY IF SERVICE METERS ARE USED)

	Description	Average No. of Customers	Quarterly Minimum Charge	Gallons Included in Minimum Charge	Cost per 1000 Gallons	Total Revenues	Notes
13	Flat Fee, Monthly						
14	Residential	40	$ 100.00	0	$ 4.00	$ 21,297.00	+1 not billed
15	Commercial	9	$ 100.00	0	$ 4.00	$ 4,262.00	+1 not billed
16	Church	1				$ 17.00	Charged usage only
17	**Total Revenues Section 2**	**50**				**$ 25,576.00**	

	TOTAL REVENUES (Lines 12 + 17)					**$ 26,116.00**	

PART H: DEBT SUMMARY

Lender	Date of Loan	Original Amount	Interest Rate (%)	Term (years)	Current Balance

References:

There is no existing summary of debt for the Carroll County water system.

PART I: WATER RATE FOR SYSTEMS WITH SERVICE METERS

LINE NO.	Water Balance Questions	WATER VOL. (GAL)	NOTES
1	What was the system input volume (the amount of water distributed into the water system)? **Based on 2017-2021 meter data, average daily volume of water pumped was 18,920 gpd.**	6,905,800	Use sum of source meters or master meter. Subtract beginning of year reading from end of year reading for each meter. Replace value of 1 in column to left with metered volume. (Remember to have meters calibrated every 5 years.)
2	**Based on 2017-2021 meter data, the Complex used an average daily volume of 14,804 gpd (unbilled) while the billed (metered) connections in the village used an average daily volume of 4,194 gpd.**	1,530,810	Volume of water billed per year (sum of annual volume of all service meters, if service meters are present)
3	What is the water balance (Line 1 - Line 2)?	5,374,990	
4	What is the total percent of water being distributed into the water system which is not billed or metered? **County Complex water is not billed.**	78%	(Formula in cell divides Row 3 by Row 1, then multiplies by 100)

BW-1 Meter Reading Dates	Meter Readings (gallons) Well 1	Difference	Days in Period	BW-2 Meter Reading Dates	Meter Readings (gallons) Well 2	Difference	Days in Period	
Enter Date 1 Here				Enter Date 1 Here				
Enter Date 2 Here		0	#VALUE!	Enter Date 2 Here		0	#VALUE!	
Tot. Annual Gallons Used (Well 1, 365 days) =			#VALUE!		Tot. Annual Gallons Used (Well 2, 365 days) =			#VALUE!

Combined Annual Water Use (gallons)	* Daily Demand (gallons)	Design Flow (gallons)
1,530,810	**4,194**	**8,388**

* Data collected from 2017-2021 meter readings.

Annual Water Use (by billed customers)	**1,530,810**	gallons	
Number of Connections (customers) in current year	50	customers	
Annual Water Use Per Connection (cxn)	30,616	gal/year/customer	
Annual Water system expenses (22% proportioned to billed customers)	$ 16,809	From Part F Total Expense for current year budget	**Use prior year data**
Water Rate = annual system expenses/# connections	**$ 336.19**	**Annual rate/connection**	
Cost of water per gallon	$ 0.011	Annual rate/gal/yr/hh	**Doesn't account for the flat $100 quarterly charge imposed by the County.**

Notes:

1. $552.46 avg. annual water rate in 2018 for NH **large** water systems, se NH Water and Wastewater Rates Dashboard
2. Statewide median annual bill for 57,673 gallons: Water is $679.88 (Updated July 2019 by the NH Public Utilities Commission)
3. PUC-regulated system rates: https://www.puc.nh.gov/Water-Sewer/Water%20Company%20Annual%20Rates.pdf
4. County's current rate is $100 per quarter plus $0.40 per 100 gal used. At an avg. 30,616 gal/yr/customer, this equates to an avg. annual rate of $522.46 per connection.