

GIS Drainage Database Maintenance Guide

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION



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1. Overview

The intent of this guide is to assist Department of Transportation (CTDOT) and their consultants in the inventory and upkeep of the CTDOT drainage infrastructure (stormwater asset) mapping. This guide provides information on the interface(s), approaches, and best practices for mapping stormwater assets in the CTDOT geodatabase.

As of July 1, 2019, the Connecticut Department of Transportation (CTDOT) has been required to comply with the requirements of the Environmental Protection Agency (EPA's) National Pollution Discharge Elimination System (NPDES) permit program. This permit aims to reduce the amount of pollution discharged to surface waters and wetlands. The permit contains many specific requirements for CTDOT, including mapping drainage infrastructure network, conducting outfall screening and sampling, installing water quality treatment systems, and enhancing good housekeeping practices.

The CTDOT owns and maintains a drainage infrastructure network throughout the State which falls under the jurisdiction of the NPDES permit. This drainage system, the Department of Transportation's Municipal Separate Storm Sewer System (MS4), is commonly referred to as the DOT MS4 and generally consists of a network of catch basins, manholes, pipes, and outfalls.

To comply with CTDOT's MS4 permit, a stormwater asset mapping program has been initiated using ArcGIS. Comprehensive stormwater asset mapping will allow CTDOT to:

- ✓ Maintain a digital record of the DOT MS4;
- ✓ Track the long-term maintenance and condition of stormwater assets;
- ✓ Identify sources of pollution entering the CTDOT drainage system and eventually natural waterbodies; and
- ✓ Assist in future survey and design efforts of road and bridge projects.

This guide provides the following content in the proceeding sections:

- **Section 2:** A detailed description of the **stormwater asset database design**, including specific feature classes and how they are defined.
- **Section 3:** An overview of the **approach to statewide mapping**, both for office and field operators, including the applications and methods being used and data sources.
- **Section 4:** A step-by-step guide to the **desktop mapping approach**, including digitizing existing plans and methods for mapping in the office.
- **Section 5:** Guidance for **field mapping and inspection**, including applications to use and best practices.
- **Section 6:** An overview of how to **query data** within the database

2. Stormwater Asset Database Design

This section provides an overview of the CTDOT stormwater asset database design. Each feature class is described for the user to gain a better understanding of how to populate the database, where specific information should be stored, and the source of that information.

2.1 Stormwater Asset Database

CTDOT has developed a Stormwater Asset Database where all information on stormwater assets are stored. The database is a geospatial database built in ArcGIS and published to ArcGIS Online. The data is managed and maintained by the CTDOT GIS Unit. All data is accessed by ESRI ArcGIS applications, described further in **Section 3**. This section describes in further detail the components of the database.

An example of a drainage network mapped in the Stormwater Asset Database is shown in Figure 1, below.

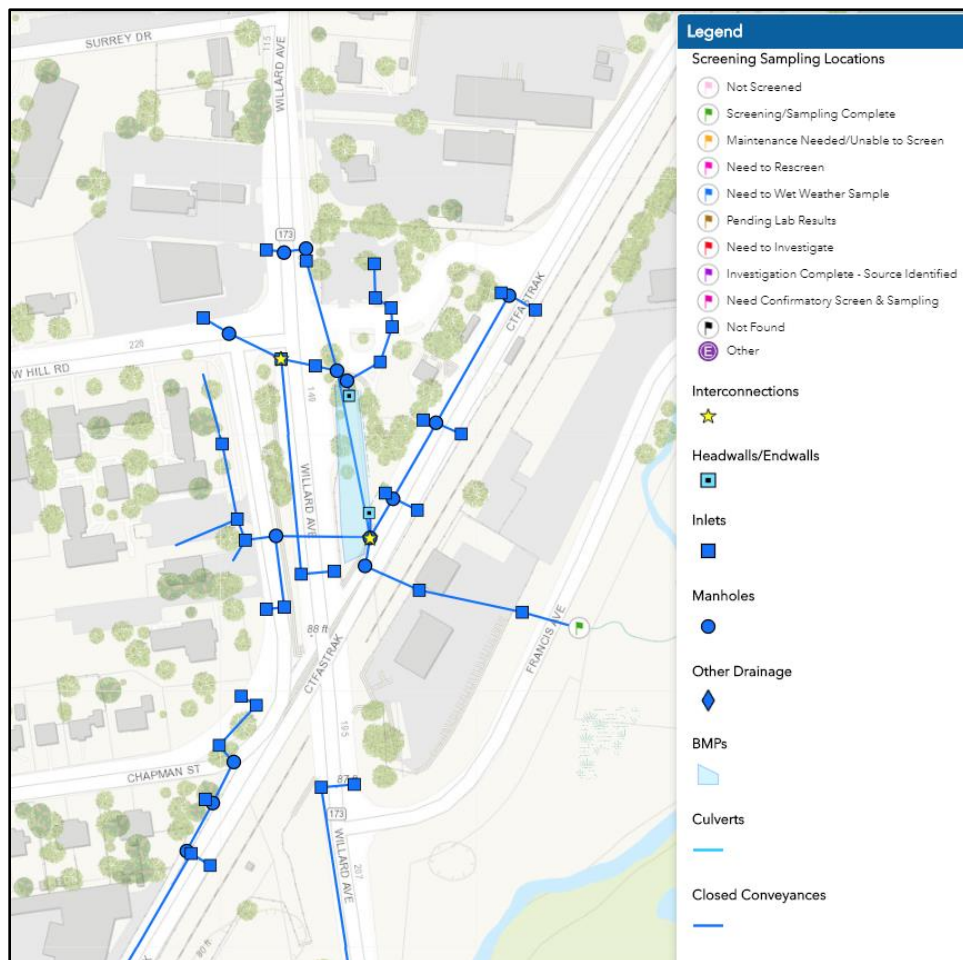


Figure 1. Mapped drainage network.

2.2 Data Types

There are two main types of data in the CTDOT stormwater asset database: feature classes and inspection forms. Feature classes consist of geometry (i.e., polygons, points or lines) and attributes for each asset. Feature attributes are data about the asset that won't change, such as material, size, and year installed. Feature data will usually be input during desktop mapping in the office but may need to be verified or updated in the field. Inspection forms on the other hand, should only be completed in the field and contains information that captures a moment in time that is subject to change such as a feature's condition, sampling results, and maintenance actions performed. Inspection forms are related records associated with a specific asset. An asset will only have one set of feature attributes but can have multiple associated inspection forms, one for each inspection completed.

The Stormwater Asset Database contains the following layers or "feature classes":

- Headwall/Endwalls
- Inlets
- Manholes
- Culverts
- Closed Conveyances
- Open Conveyances
- BMPs
- Potential BMPs
- Virtual Drain Lines
- Screening/Sampling Locations
- Interconnections
- Blind Ties
- Other Drainage
- Catchment Areas

For a definition and further information about each of these feature classes see Table 1 below.

Associated with the feature classes listed above, the Stormwater Asset Database contains the following inspection forms or "related records":

- Headwall/Endwall Inspections
- Inlet Inspections
- Manhole Inspections
- Culvert Inspections
- Closed Conveyance Inspections
- Open Conveyance Inspections
- BMP Inspections
- Other Drainage Inspections
- Screening/Sampling Inspections

2.3 Metadata

The background information that describes a database and its components in ArcGIS is called metadata. An item's metadata can record the information that is important to know about that item. This might include information about how accurate and recent the item is, restrictions associated with using and sharing the item, key metrics, and the person who created or recorded the record.

The CTDOT has established standard metadata to be used in drainage network mapping. Though in most cases metadata has already been established, if creating a new feature class or inspection form for use in GIS, it will be

important to follow the established metadata structure used as the CTDOT standard. This section describes the standard metadata set forth by CTDOT for MS4 infrastructure, and sampling activities required under the NPDES permit.

2.3.1 Metadata for Stormwater Asset Network Map

Tags: Municipal Stormwater System Asset Data

Summary: Municipal Stormwater Assets

Description: Stormwater asset data. Contains points, polylines and polygons displaying infrastructure that collects, conveys and/or manages stormwater runoff and/or conveys watercourses. The source of the data displayed could come from multiple sources including digitization of construction plans, field collection of assets and/or CAD (computer aided drafting) data being directly converted into GIS data. Inspection forms enable condition ratings and field evaluation of feature classes. Inspection forms were constructed as related tables to enable a running history of inspections to be kept for each feature class.

Credits: The schema for this map was developed by CTDOT in collaboration with the Statewide Stormwater GIS Standards Committee. The source of the stormwater data in this map comes from the map user.

Use Limitations: The data presented here is for planning purposes only. The data is not to be used to prepare engineering level plans or construction documents. The data should not be used in legal documents or proceedings.

Extent: There is no extent for this item

Scale Range: There is no scale range for this item

General Notes on Schema: The schema for this map was developed by CTDOT in collaboration with the Statewide Stormwater GIS Standards Committee. The schema consists of the following 14 feature classes (as listed below in Table 1).

Table 1: Stormwater Asset Feature Classes

Screening/Sampling Locations ¹		Description:	Notes:
Abbrev. for ID: SS	Symbology:	This feature class identifies locations where discharges from the MS4 need to be screened and/or sampled to meet MS4 permit requirements. The schema was primarily developed to meet illicit discharge detection and elimination requirements, but it can also be used to document information on impaired waters inspections and sampling data.	<ul style="list-style-type: none"> Discharge locations to be screened or sampled per MS4 Permit Requirements Includes inspection forms tailored for screening / sampling activities
Feature Type: Point	<p>Screening Sampling Locations</p> <ul style="list-style-type: none"> Not Screened Screening/Sampling Complete Maintenance Needed/Unable to Screen Need to Rescreen Need to Wet Weather Sample Pending Lab Results Need to Investigate Investigation Complete - Source Identified Need Confirmatory Screen & Sampling Not Found Excluded 		
Inspection Screening Inspections	Form: Sampling		

¹ The *Screening/Sampling Date* and *Screening/Sampling Phase* attribution fields are intended to document the most recent field/inspection date and if screening the outfall for potential illicit discharges, the status of the outfall within the dry weather and/or wet weather program. The status / flag colors within the *Screening Sampling Locations* feature class are intended to provide a quick visual reference as to the IDDE status of individual outfalls. All other temporal (snapshot in time) data is intended to be placed in the accompanying related table (*Screening/Sampling Inspection Form*).

Interconnections

Abbrev. for ID: IC



Feature Type: Point

Inspection Form: N/A

Description: This feature class identifies locations where one MS4 system discharges into another. Attribution allows for the user to select the stormwater owner from whom stormwater discharges from, and who is receiving the stormwater and the structure where the interconnection occurs.

Notes:

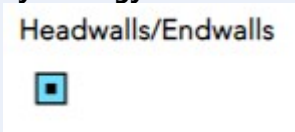
- May overlap with a Screening/Sampling Locations point

Headwall / Endwall

Abbrev. for ID: HE

Symbology:

Headwalls/Endwalls



Feature Type: Point

Inspection Form:
Headwall/ Endwall
Inspections

Description: This feature class identifies locations where watercourses or stormwater enter or exit stormwater assets. These points are typically found at the end of closed conveyances and on both the upstream and downstream sides of culverts. Attribution choices allows the user to select the type of asset (aka, headwall, endwall, flared end, etc.) and whether an asset should be considered an MS4 System Outfall.

Notes:

- Examples include Headwall, Endwall, Pipe End, Wingwall, Flared End, Other
- Includes inspection forms for condition assessments
- May overlap with a Screening/Sampling Locations point

Inlet

Abbrev. for ID: IN



Feature Type: Point

Inspection Form: Inlet
Inspections

Description: This feature class identifies locations where stormwater runoff enters a stormwater conveyance system. Attribution choices allows the user to select the type of inlet, the material and any vertical information needed to define the depth of sump (if present).

Notes:

- Where surface runoff is collected
- Examples include catch basins (type C, CL, etc.), Drop Inlet, Gutter Inlet, Yard Drain, Circle Grate, Other
- Includes inspection forms for condition assessments and sediment level documentation

Manhole

Abbrev. for ID: MH

Feature Type: Point

Inspection Form:
Manhole Inspections

Symbology:



Description: This feature class identifies locations where different underground closed conveyance piping systems come together or a closed conveyance system changes direction. Attribution choices allow the user to select the type of manhole including a general manhole or a more specific type including a diversion manhole, a BMP access manhole or a junction box.

Notes:

- Examples include Manhole, Junction Box, Other
- Includes inspection forms for condition assessments

Blind Ties

Abbrev. for ID: BT

Feature Type: Point

Inspection Form: N/A

Symbology:



Description: This feature class identifies locations where different underground closed conveyance piping systems come together directly, without a manhole or inlet structure. Although blind ties are generally not good engineering practice there are a significant number of them into or out of the CTDOT MS4 system.

Notes:

- Where a connection is made into the stormwater system without a structure, aka, one pipe discharges directly into another pipe with no indication of the connection at the surface

Other Drainage

Abbrev. for ID: OD

Feature Type: Point

Inspection Form: Other
Drainage Inspections

Symbology:

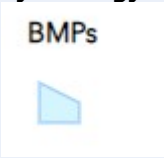


Description: This feature class identifies miscellaneous stormwater assets that otherwise are difficult to categorize within the other feature classes. Examples include gabions, level spreader, emergency overflow, tide gate, weir, orifice, etc.

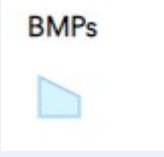
Notes:

- Includes inspection forms for condition assessments


BMPs

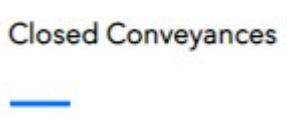
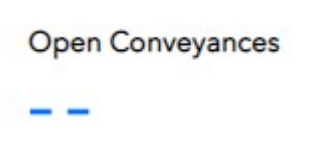
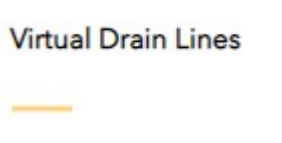
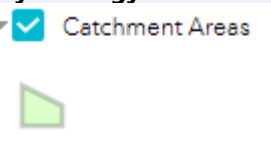
<p>Abbrev. for ID: BP</p> <p>Feature Type: Polygon</p> <p>Inspection Form: BMP Inspections</p>	<p>Symbology:</p> 	<p>Description: This feature class identifies any practice or facility that improves, retains or otherwise manages stormwater. Examples include detention basin, rain garden, stormwater wetland, wet basin, infiltration system, permeable pavement, dry well, sand filter, vegetative filter strip, other, etc.</p>	<p>Notes:</p> <ul style="list-style-type: none"> • Water Quality Best Management Practices that improve, retain or otherwise manage stormwater • Includes inspection forms for condition assessments
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Potential BMPs

<p>Abbrev. for ID: PB</p> <p>Feature Type: Polygon</p> <p>Inspection Form: N/A</p>	<p>Symbology:</p> 	<p>Description: Potential locations for Water Quality Best Management Practices that improve, retain, or otherwise manage stormwater.</p>	<p>Notes:</p> <ul style="list-style-type: none"> • Design Notes: intended for seeing items through Design Process either 30, 60, 90% or final development plan (FDP). Can aid in the Departments Retrofit Program to be developed down the road. Once a Potential BMP is built it will be removed from this layer and placed in the BMP feature class.
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Culverts

<p>Abbrev. for ID: CV</p> <p>Feature Type: Polyline</p> <p>Inspection Form: Culvert Inspections</p>	<p>Symbology:</p> 	<p>Description: This feature class generally identifies the conveyance of watercourses under roadways or other surface improvements. A structure that daylight on both sides of a roadway. Attribution choices include the material, the size of the asset and if the asset conveys stormwater, a watercourse or both.</p>	<p>Notes:</p> <ul style="list-style-type: none"> • Primarily (although not exclusively) conveys watercourses under roadways • Includes inspection forms for condition assessments • Culverts greater than 72" in diameter or clear span should be in the bridge inventory and do NOT appear within the Culvert feature class
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Closed Conveyance			
Abbrev. for ID: CC	Symbology: 	Description: This feature class generally identifies the underground conveyance of stormwater in pipes. Typically connecting inlets, manholes and endwalls. Attribution choices include the material, the size of the asset and if the asset conveys stormwater, a watercourse or both.	Notes: <ul style="list-style-type: none"> Underground piping system to convey stormwater runoff Includes inspection forms for condition assessments Pipes greater than 72" in diameter or clear span should be in the bridge inventory and do NOT appear within the Closed Conveyance feature class
Feature Type: Polyline			
Inspection Form: Closed Conveyance Inspections			
Open Conveyance			
Abbrev. for ID: OC	Symbology: 	Description: This feature class identifies the above ground conveyance of stormwater, generally in ditches or channels. Attribution choices include the cover type, the size of the asset and if the asset conveys stormwater, a watercourse or both. Note: any open conveyance that is designed to provide a water quality benefit (aka, a water quality swale) is intended to be placed under the BMP feature class.	Notes: <ul style="list-style-type: none"> At grade conveyance of stormwater runoff Examples include ditches and channels Includes inspection forms for condition assessments
Feature Type: Polyline			
Inspection Form: Open Conveyance Inspections			
Virtual Drain Lines			
Abbrev. for ID: VD	Symbology: 	Description: This feature class allows the GIS application to "connect" the flow of stormwater through different feature class or watercourses. An example would be connecting an endwall to a waterbody.	Notes: <ul style="list-style-type: none"> A polyline used to connect features within the GIS map and track flow
Feature Type: Polyline			
Inspection Form: N/A			
Catchment Areas			
Abbrev. for ID: CA	Symbology: 	Description: The drainage area from which rainfall flows to a stormwater outfall point (aka, an endwall) and/or surface water body	Notes:
Feature Type: Polygon			
Inspection Form: N/A			

2.3.2 Attributes

Each feature class has been built to include specific attributes (i.e., information about the assets). Many of these attributes will be populated based on record plans or field investigation. Examples of attributes include year installed, project number, material, structure type, elevation of invert, and asset owner. There are also many attributes which can be automatically populated based on other data sources, such as town, route number, and maintenance garage.

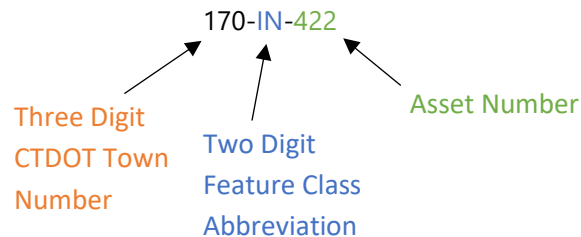
See Appendix A for a record of all attributes for each feature class.

Attribute Assistant

Depending on the application being used to input new stormwater asset data, some attributes maybe automatically populated, either upon entry in ArcGIS or populated on a set schedule, such as each night. For the attributes that are auto-populated, data entry is not required by the user. Generally, auto-populated data should not be overwritten during the stormwater asset mapping process. and editing may be disabled for those attributes.

Unique Identification Number for Individual Stormwater Assets

Each asset is assigned a unique identification number in the database. ESRI assigns each asset a Global ID and this is used to link assets to their associated inspection form. Additionally, the CTDOT has created a stormwater asset identification format to more easily identify ownership and the number of assets owned within each Feature Class. The format of the unique identification number is shown below. This identification number is automatically populated in the database and generally should not be entered by the user to avoid any chance of duplicate ID numbers.



Three Digit Town Number: Note that the Town Number is based on the number DOT uses to identify individual Towns NOT the Office of Policy and Management (OPM) number. Also note that number 170 isn't at Town number but the number used to represent CTDOT asset ownership. Use the following link to identify the town number:

<https://portal.ct.gov/-/media/DOT/documents/dpolicy/policymaps/ref/TRUNumbersbyTown.pdf?la=en>

Two Digit Feature Class Abbreviation: Abbreviations included in Table 1 above

Asset Number: Sequential, starting at 1 for each feature class

3. Approach to Statewide Mapping

CTDOT is mapping stormwater assets town-by-town throughout the state, with the goal of having complete mapping for all CTDOT stormwater assets by 2029. ESRI software, specifically ArcGIS Pro, ArcGIS Online, and Collector for ArcGIS are being used to complete this effort.

As specified in CTDOT's MS4 permit, the schedule for mapping the stormwater system requires 50% to be completed by June 30, 2024 and 100% of the system to be mapped by June 30, 2029. To organize the mapping effort, stormwater assets on all CTDOT owned and maintained roads, railways, and facilities are being mapped on a town-by-town basis with a focus on priority areas and the 121 MS4 communities in the State of Connecticut. In order to meet the mapping schedule, CTDOT's goal is to complete mapping of its stormwater assets in at least 12 Towns per year. Once mapping is completed in the 121 MS4 communities, CTDOT will continue mapping its stormwater assets in the remaining 48 non-MS4 communities statewide.

The Office of Environmental Planning is responsible for orchestrating the mapping effort of CTDOT's stormwater assets and Environmental Compliance is responsible for overall compliance with the MS4 permit. In addition to MS4 compliance, the data collected as part of this mapping effort will be used by the Engineering and Maintenance Departments as a planning tool for design projects and maintenance activities. The Surveying Department may also use this information to scope the extents of the existing drainage infrastructure prior to performing a survey.

The existing effort involves digitizing stormwater assets from available record plans and field data collection into a centralized geospatial database. It should be noted that the process for mapping stormwater assets will be evolving over the years to come as new technology and new data sources are identified. Efforts are underway to facilitate pulling drainage information from newly designed projects into the database.

This section provides an overview of the overall process for mapping assets, applications used to collect stormwater asset data, and data sources being used to locate assets. **Sections 4 and 5** of this Guide provide step-by-step instructions for mapping stormwater assets, a series of screenshots intended to aid in implementation, for both in the office and the field.

3.1 Overall Workflow

The CTDOT is systematically mapping drainage assets town-by-town. One person will be responsible for mapping an assigned town. The first priority is to identify sampling locations (outfalls) and the second is to map the drainage infrastructure. This Guide provides an outline of what is expected and how mapping

a town is completed. The workflow for mapping a town includes both tasks completed in the office and in the field, as shown below in Figure 2.

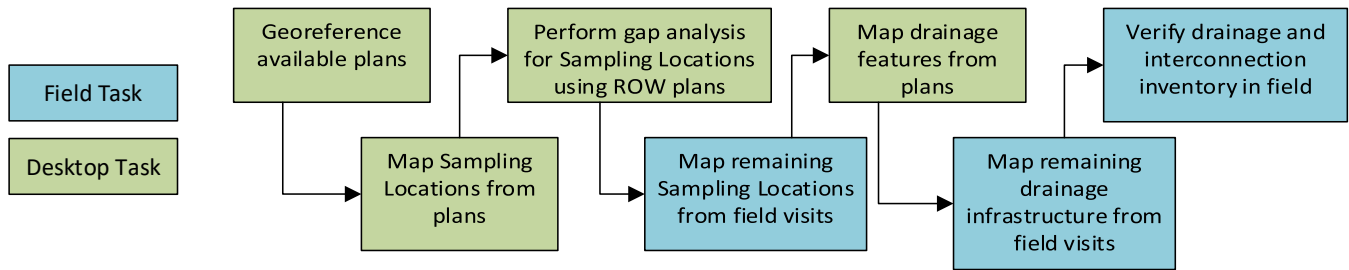


Figure 2. CTDOT Mapping Workflow.

The specific steps to accomplishing this workflow are detailed in **Section 4 and 5**. Applications used for mapping as well as data sources for the mapping effort are described below.

3.2 ESRI Platform

The geographic information system (GIS) mapping applications created by ESRI provide platforms to collect, organize, and share drainage infrastructure data to support its intended uses. ESRI applications allow for desktop and field data collection, data analysis, and reporting. The CTDOT uses ArcGIS Pro, Collector for ArcGIS, and ArcGIS Online for data collection and sharing. Below is a brief overview of each platform.

3.2.1 ArcGIS Pro

ArcGIS Pro is ESRI's desktop GIS application used to view and edit data and perform geoprocessing. ArcGIS Pro is tightly coupled with the ArcGIS platform, which allows for data sharing across ArcGIS Online and ArcGIS Collector. ArcGIS Pro allows more flexibility and functionality for editing and manipulating maps than ArcGIS Online allows and can also be used to create layout pages to be printed as figures or map packages.

For the stormwater asset mapping effort, ArcGIS Pro will be used to georeference record plans and digitize stormwater assets in the office.

In order to begin using ArcGIS Pro, follow the steps below:

Download ArcGIS Pro software to desktop computer. CTDOT employees should contact the Enterprise GIS team if ArcGIS Pro is needed to be installed and licensed on a CTDOT computer.

1. Check out an advanced license (Figure 3, below).

Under "Setting" click on "Licensing"

- Click on "Configure you licensing options" and click on "ArcGIS Pro Advanced"

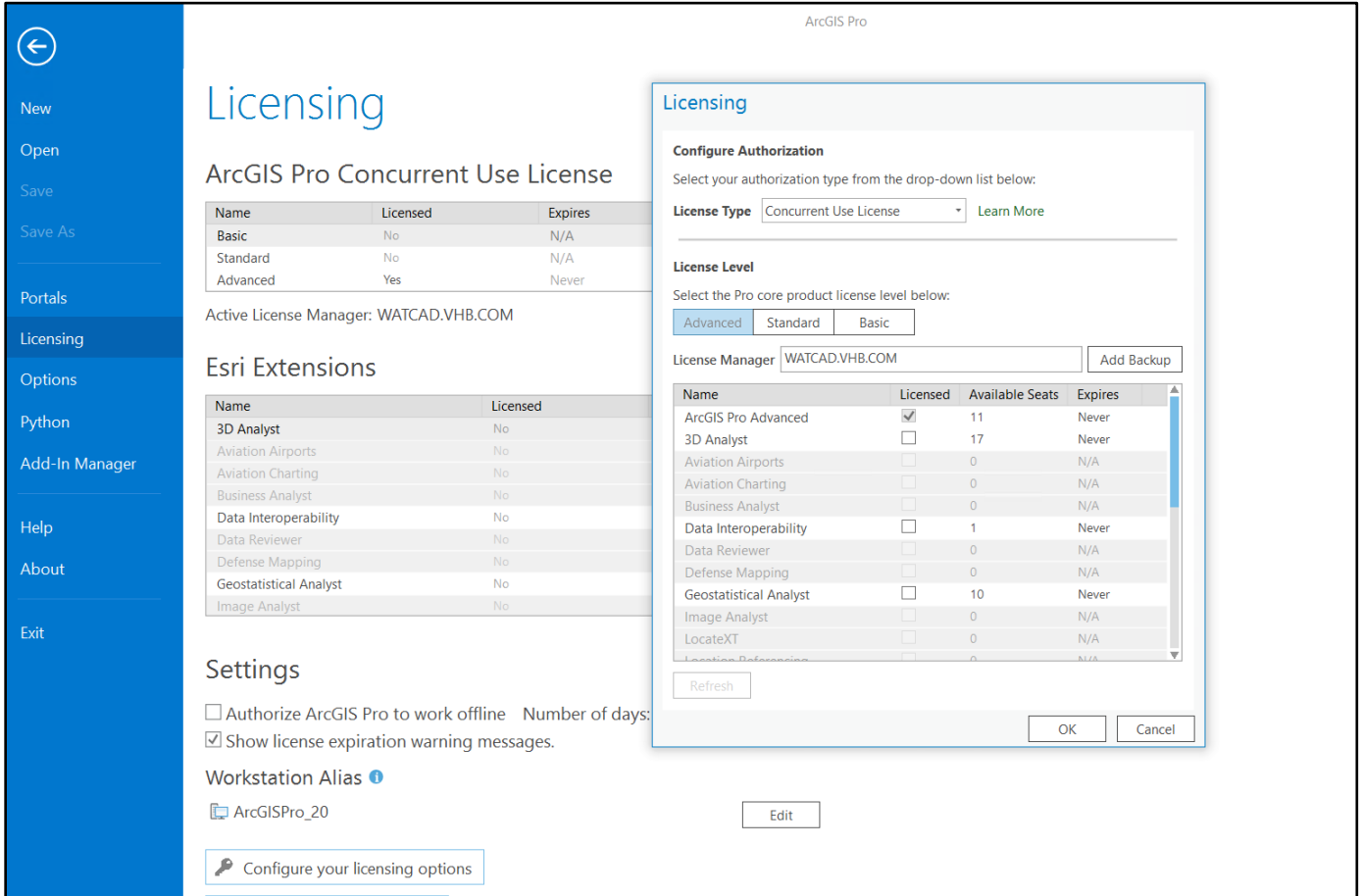


Figure 3. ArGIS Pro advanced license check-out.

- Open ArcGIS Pro and sign in using your ArcGIS Online account information. Open a Map from the Blank Template (Figure 4, below). Give your project a name, such as YourNameDrainageNetwork and click "OK"

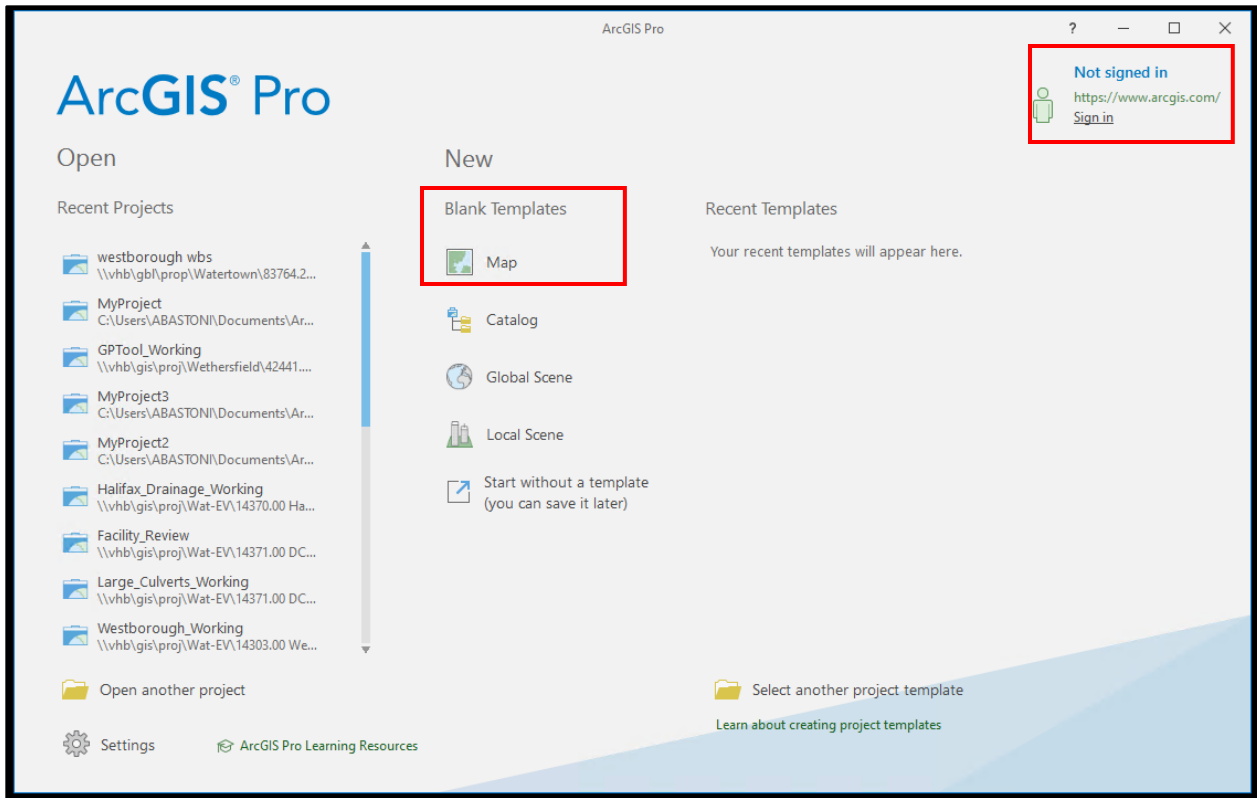


Figure 4. Opening a blank map in ArcGIS Pro.

- In the View pane, click on Catalog Pane (Figure 5, below).

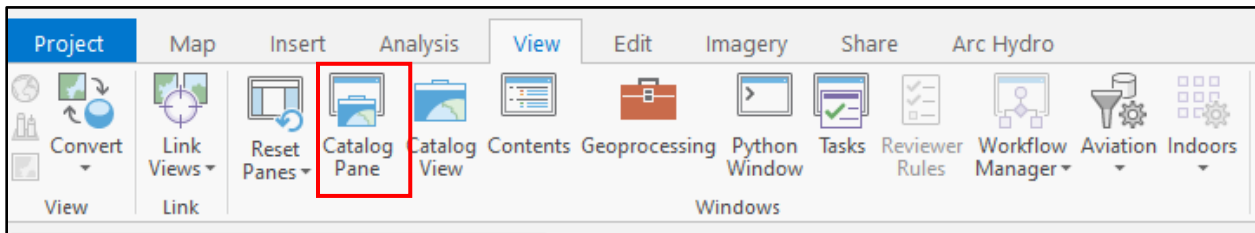


Figure 5. View pane in ArcGIS Pro.

In the Catalog Pane, click on Portal, then Groups. The select “CTDOT Drainage Network – Office Editors” Map (Figure 6, below). Right click on the item and select “Add to Map”. It may take a few minutes to load.

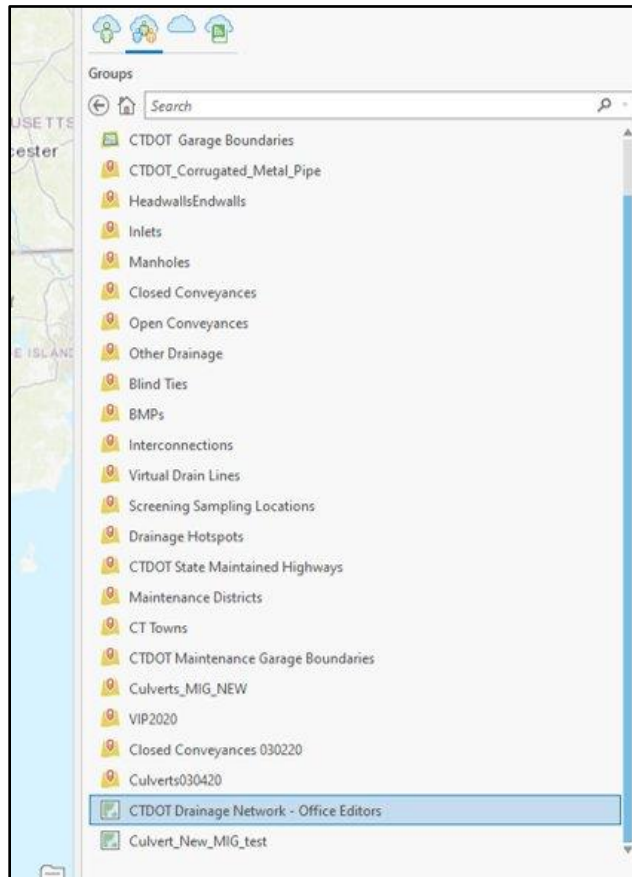


Figure 6. Catalog pane in ArcGIS Pro.

- In the Contents Pane right click the map and choose Properties – Coordinate Systems and select NAD 1983 (2011) StatePlane Connecticut FIPS 0600 (US Feet) (Figure 7, below). Click OK and save your map.

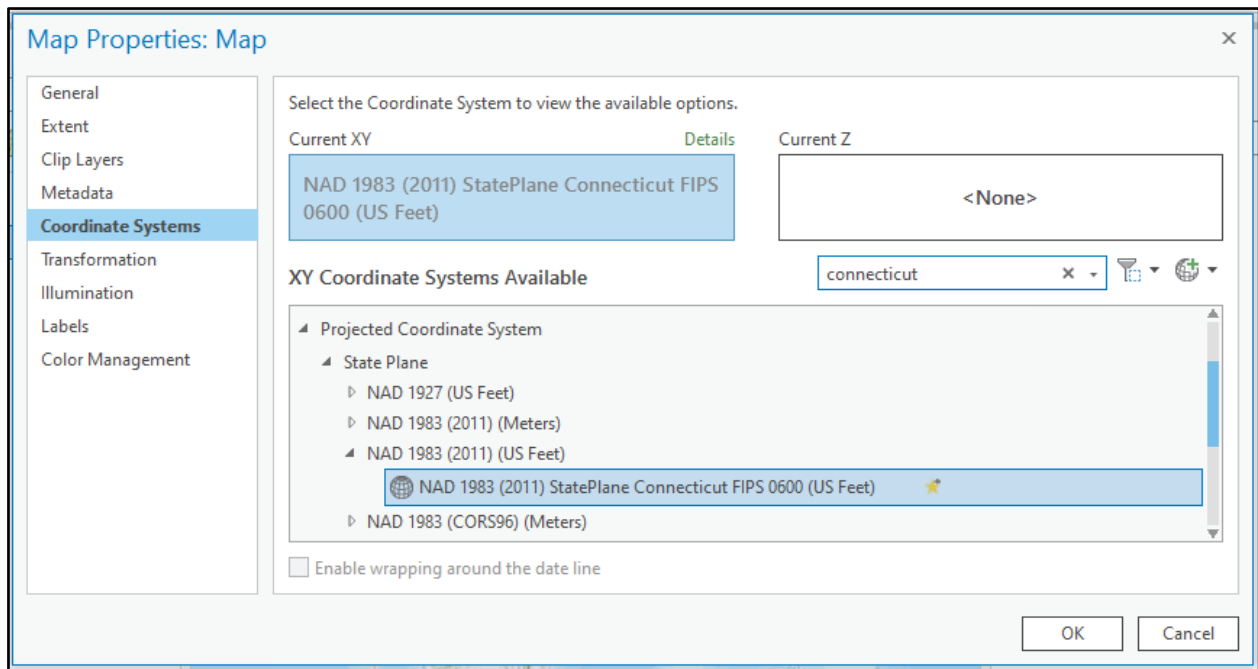


Figure 7. Coordinate system selection in ArcGIS Pro.

3.2.2 ArcGIS Online

ArcGIS Online (AGOL) is a cloud-based mapping platform which is used for sharing and collaboration of maps and data. AGOL is used internally at CTDOT as well as for sharing maps with external organizations. Data and maps can be created in AGOL or uploaded to AGOL from a project established in ArcGIS Pro. Data can also be added to an AGOL map from Collector for ArcGIS. The maps created in AGOL are used as the base for the Collector app which references these maps from the cloud.

For the stormwater asset mapping effort, the CTDOT has developed a Web Application (Web App) in AGOL to view and edit the stormwater asset database. The AGOL Web App can be used for quick edits in the office, to clean up field data collection records, and to view asset information. While AGOL response speeds are faster than ArcGIS Pro, ArcGIS Pro should be used for digitizing and creating new stormwater assets in the database.

In order to begin using ArcGIS Online, follow the steps below:

- To connect to CTDOT's AGOL portal, a user account is needed.

Contact the Enterprise GIS Unit

Consultants should use their organization's account and may request access to the CTDOT group by providing ESRI usernames to the GIS Unit. Any changes to staff with access to CTDOT's AGOL portal should be reported to CTDOT immediately.

2. Sign into ArcGIS Online (Figure 8, below): <http://ctdot.maps.arcgis.com/home/index.html>.

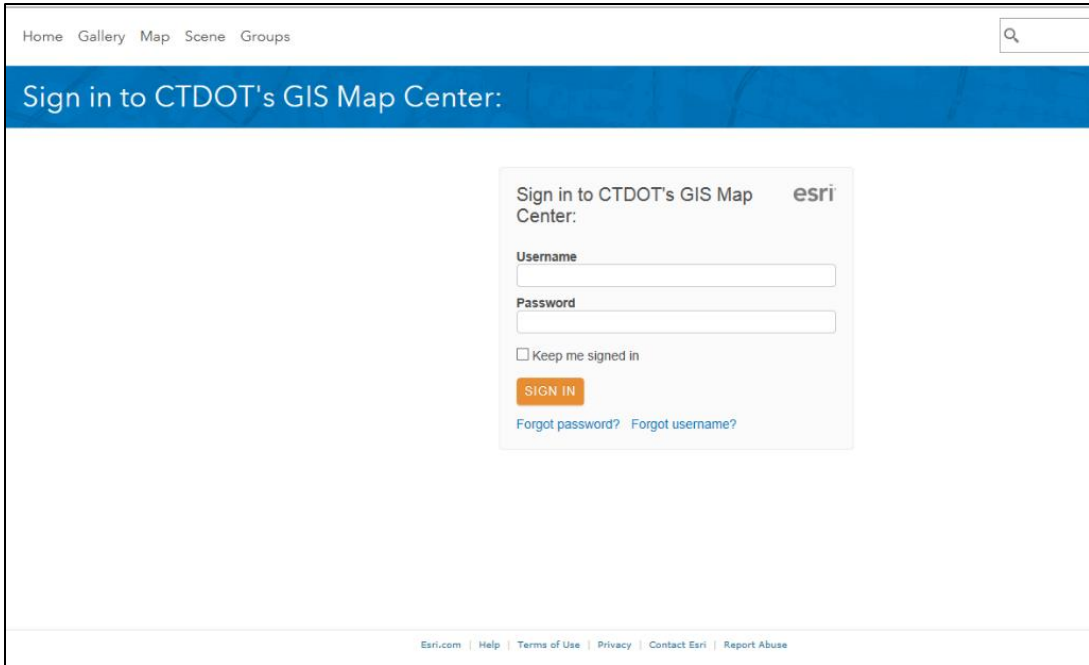


Figure 8. ArcGIS Log-in page for CTDOT.

Go to Groups tab and select Drainage Network Editors (Figure 9, below).

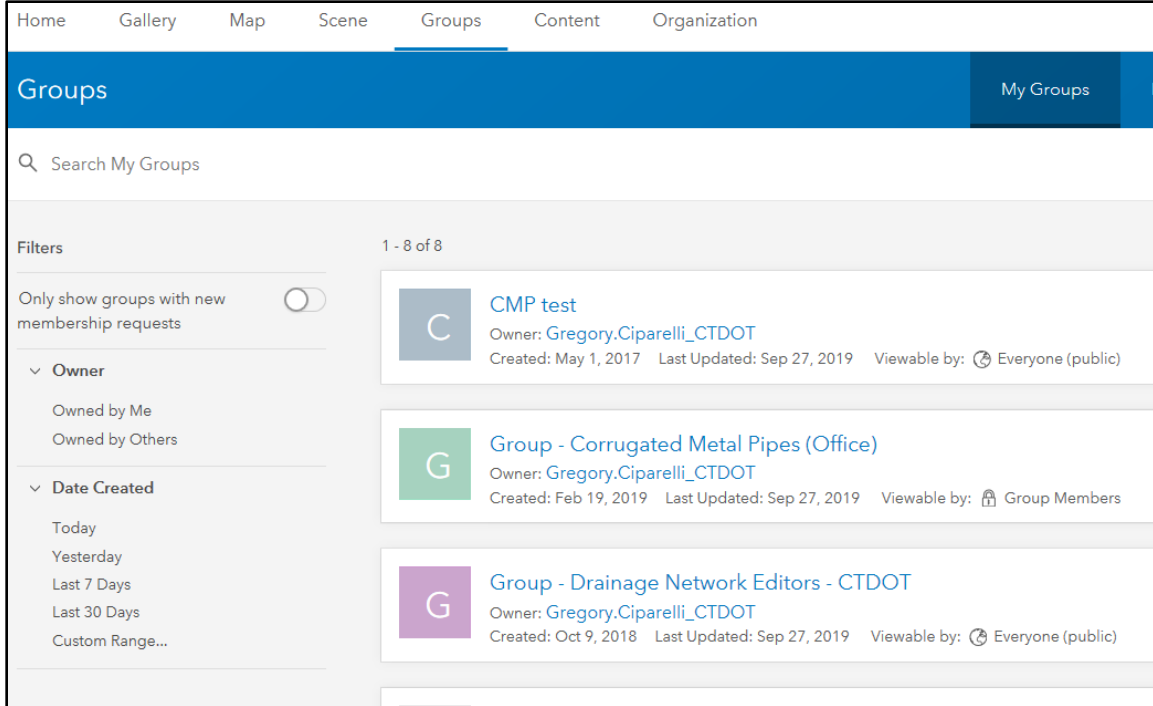


Figure 9. Drainage Network Editors group in ArcGIS Online.

3.2.3 Collector for ArcGIS

Collector for ArcGIS (Collector app), is a mobile data collection app, which allows users to capture data in the field or remotely. Users in the field utilize web maps on mobile devices through the Collector app to capture and edit data. The Collector app will work even when it is disconnected from the Internet and integrates back into ArcGIS Online and ArcGIS Pro desktop maps. When used it will display a map of the data (as established in AGOL) and uses previously created forms to record and store data collected in the field.

For the stormwater asset mapping effort, Collector will be used for field data collection. This includes mapping drainage assets where no records plans are available and collecting inspection data.

In order to begin using ArcGIS Collector, follow the steps below:

1. Download the Free ESRI ArcGIS Collector App (Figure 10, below). The App can be found within the App Store on all mobile devices. An ArcGIS Online account will be needed to use with the App.



Figure 10. ArcGIS Collector app icon.

2. Sign-in to Collector App using your AGOL username and password and select the Drainage Network Editor map (Figure 11, below).

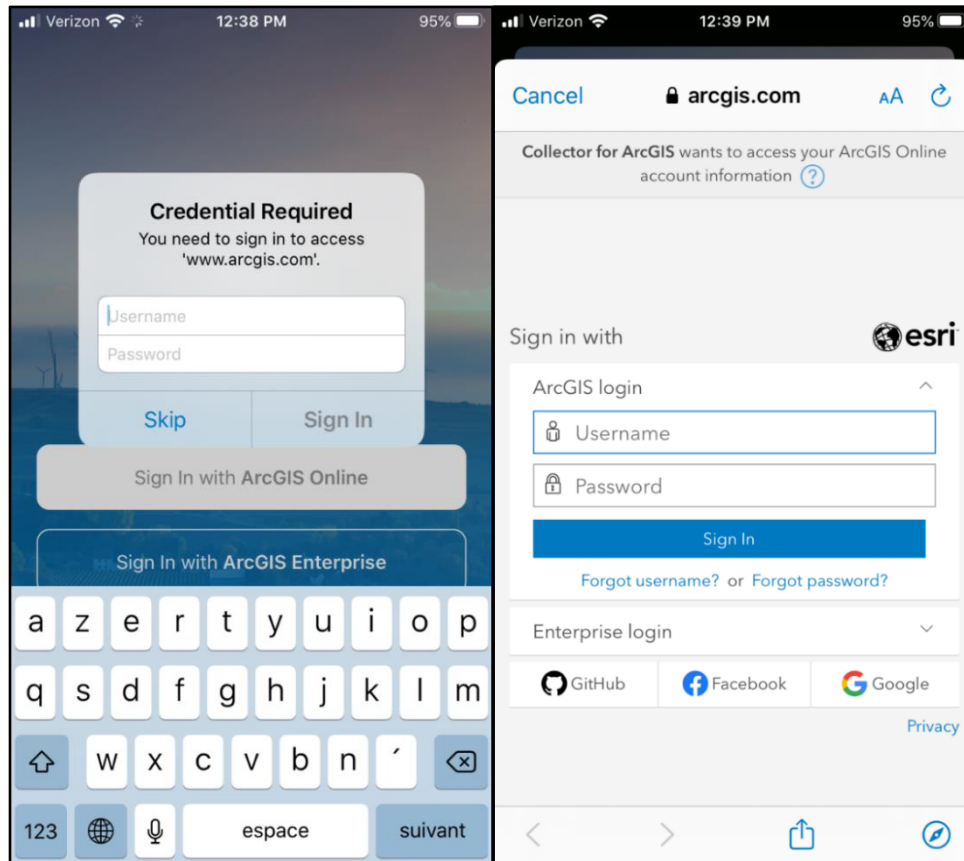


Figure 11. ArcGIS Collector Log-in page.

3.3 Data Sources

Mapping of the CTDOT stormwater assets in the office is done by collecting information from various sources, including record plans, imagery, and map data. CTDOT uses ProjectWise and Image Records Management System (IRMS) to host data in the cloud. These cloud servers are used to locate and map drainage infrastructure in GIS (as explained in the sections to follow).

3.3.1 ProjectWise

ProjectWise (PW) Online is the document management system that CTDOT uses for all capital project contract documents (plans, specifications and other contract documents). PW Online is a cloud-based database which can be accessed through CTDOT desktop computers as well as by external users and consultant engineers (Figure 12, below). Along with current design and construction plans, specifications and other contract documents there is a large data set of as-built recorded legacy project plans. These as-built plans can be downloaded and georeferenced to aid in the mapping of MS4 infrastructure as detailed in **Section 4** of this document.

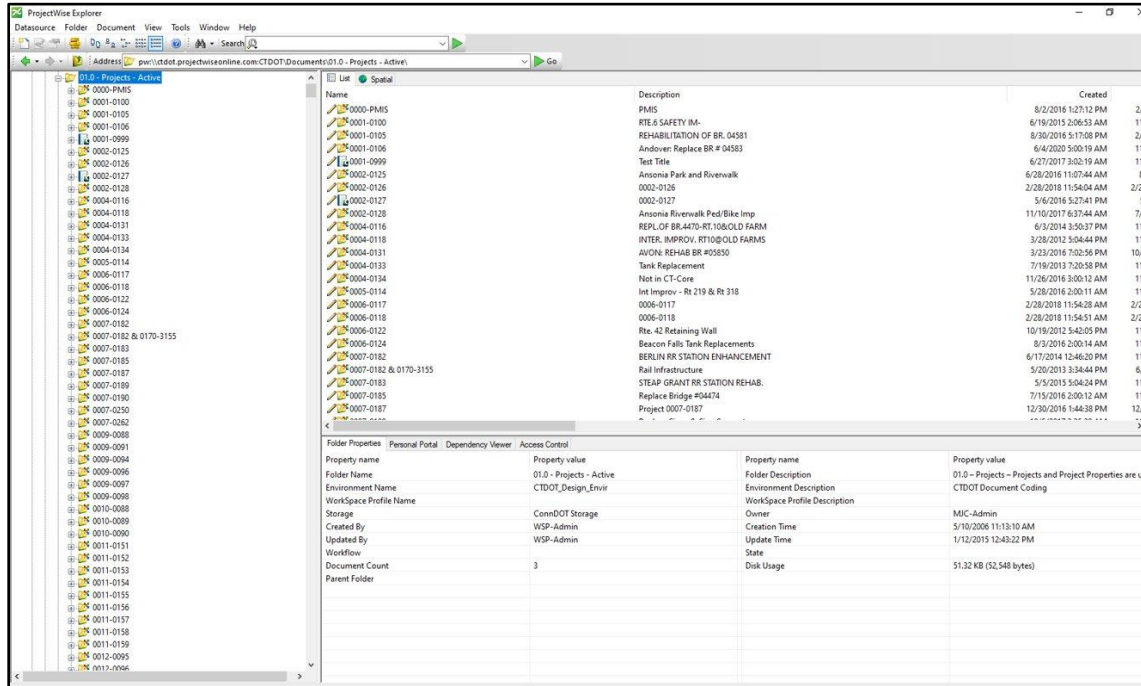


Figure 12. ProjectWise interface.

3.3.2 IRMS- Image Records Management System

Like ProjectWise, IRMS is a cloud-based data management system. IRMS is used to host CTDOT's image files and is used for document scanning and indexing (Figure 13, below). These images can be downloaded and georeferenced to aid in the mapping of drainage infrastructure as described in **Section 4**.

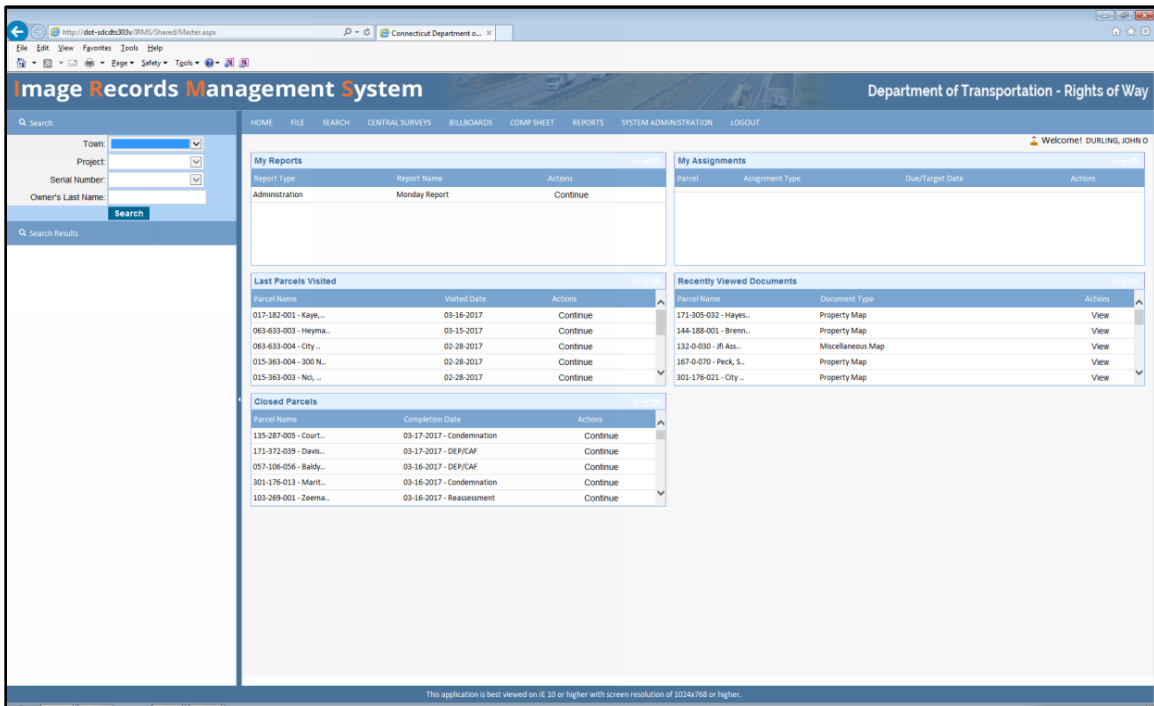


Figure 13. IRMS interface.

3.3.3 AssetWise

AssetWise is an interactive map CTDOT uses to view various department layers. Users can view a location on the map and identify CTDOT projects (Figure 14, below). AssetWise will then link to ProjectWise where the user can obtain project contract documents and plans. AssetWise can be accessed using Google Chrome at: <https://ctdot-aw-prd.bentley.com/CTDOT2/#/>

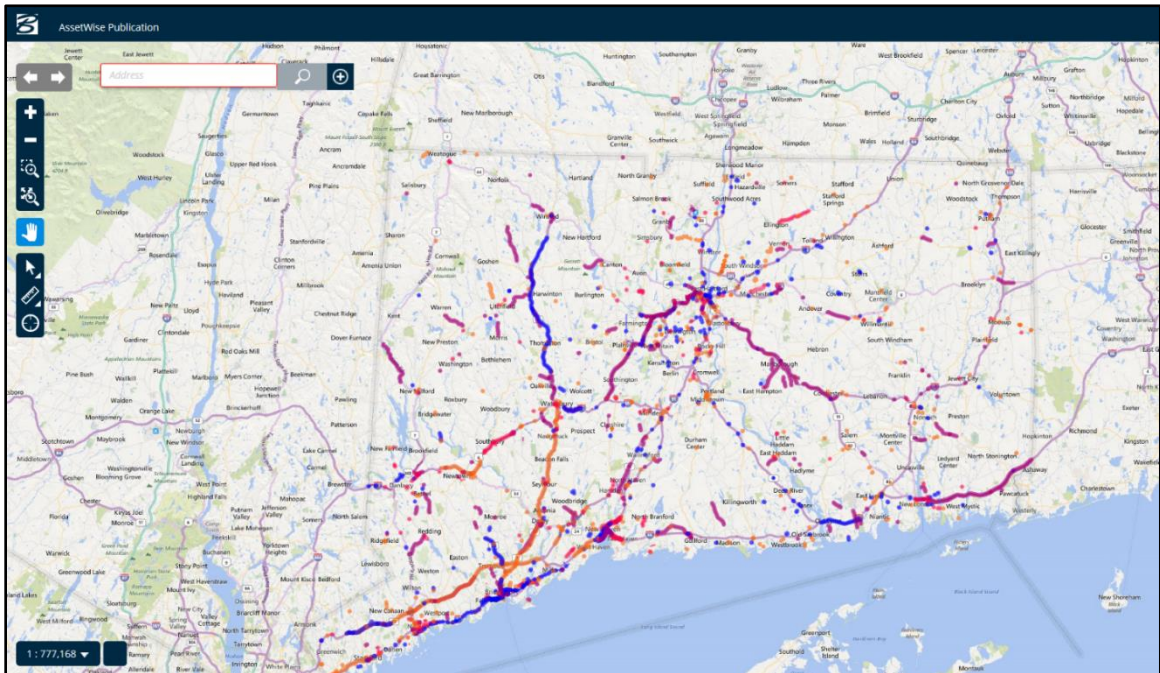


Figure 14. AssetWise interface.

3.3.4 Mapillary

Mapillary is a website that offers high quality street view imagery (Figure 15, below). This allows for a virtual field visit to locate or confirm structures on CTDOT roads during the desktop review.

Mapillary can be accessed at this site: <https://www.mapillary.com/app/?lat=41.578568533568586&lng=-72.71857180230535&z=8.829326278837655>

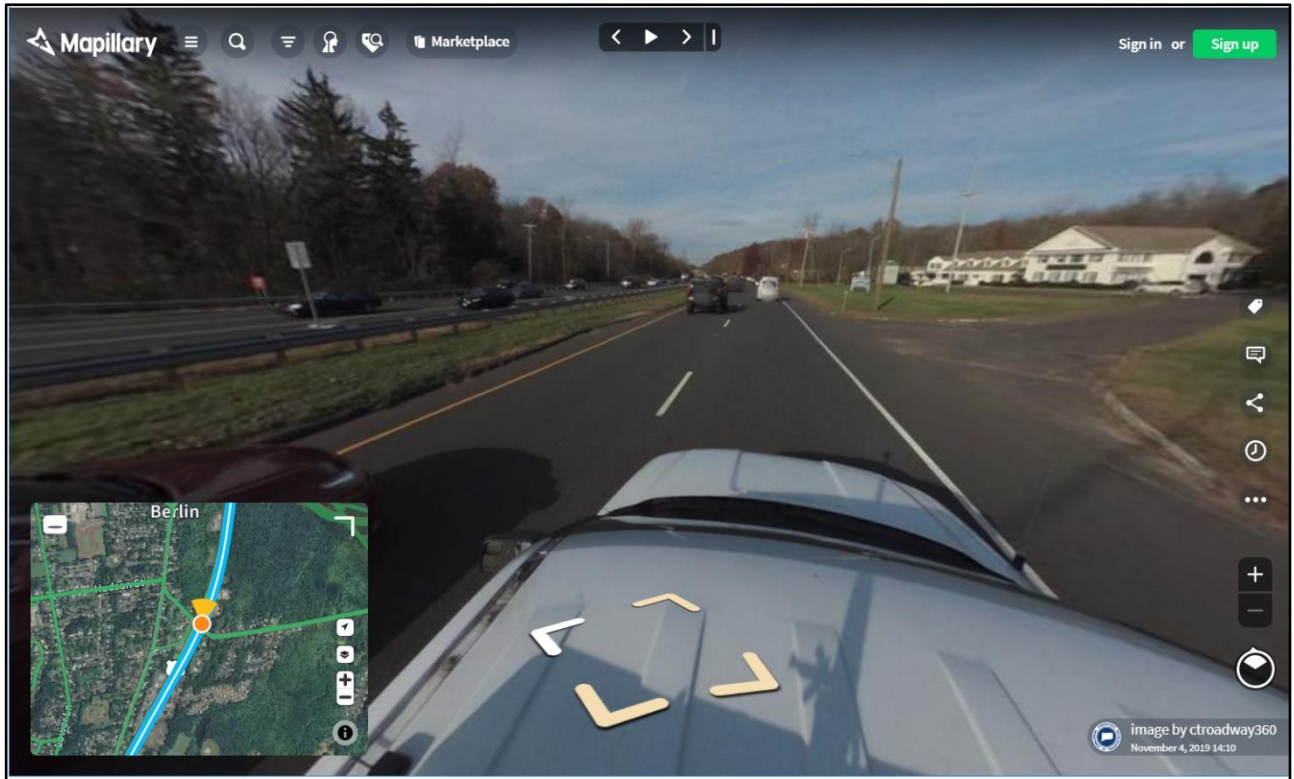


Figure 15. Mapillary interface.

4. Desktop Mapping Approach

CTDOT is using a combination of available information, aerial images, and field investigations to collect stormwater asset data statewide. Desktop mapping in the office is the first step to completing the CTDOT drainage infrastructure mapping for a town.

This section outlines the steps to take to begin stormwater asset mapping in the office. Desktop tasks from Figure 16 (below) are covered in this section:

- georeferencing plans,
- mapping (“digitizing”) drainage features from plans, and
- performing a gap analysis.

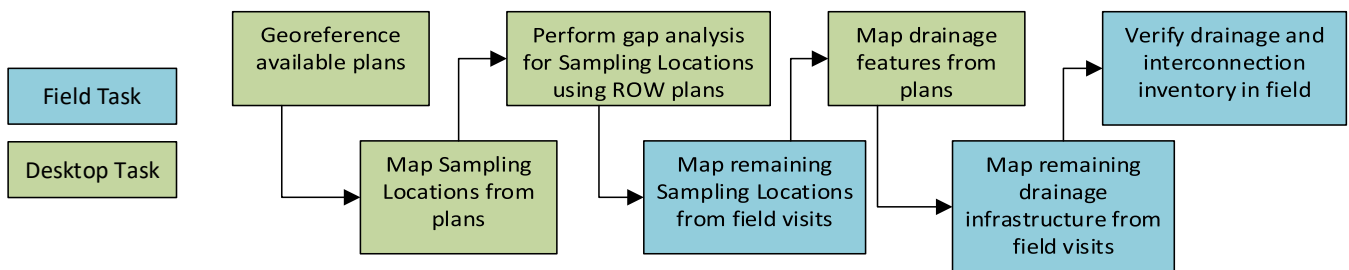


Figure 16. CTDOT Mapping Workflow.

Always remember, the first priority is to identify sampling locations (outfalls) and the second is to map the remaining drainage infrastructure. Tasks performed in the field are covered in **Section 5**.

As discussed in **Section 2**, the data is being stored in an ArcGIS geodatabase hosted and managed by CTDOT’s GIS Unit. Prior to beginning asset mapping, the proper programs, licenses, and accounts must be created to give access to the stormwater asset data and the ability to edit through both desktop and mobile devices. See **Section 3** for more information on how to access the geodatabase and other information sources.

4.1 Georeference Available Plans As Needed

Desktop mapping in the office is the first step to completing the CTDOT drainage infrastructure mapping for a town. Extracting available construction plans and aerial imagery for drainage infrastructure data is the most efficient approach to begin drainage mapping.

- All DOT construction plans are scanned and on ProjectWise or on the X drive.
- Use AssetWise to locate recently completed projects in a specific area.
- Original construction plans often have the most drainage information.

- Start by reviewing all Construction plans that have the town's number and query for projects that contain the town name. Projects that have drainage information are to be georeferenced.
- Review town maps available on ProjectWise referring to project numbers and check they have been georeferenced.

4.1.1 Locate and Download Record Plans

All DOT construction plans are scanned and housed on CTDOT's ProjectWise or on the X:drive. Plans should be reviewed for relevance. Any plans with drainage information should be extracted and placed on the L:Drive.

The following steps outline the process for downloading a scanned construction plan, viewing in Bluebeam, and extracting to the L:drive.

In ProjectWise, navigate to the Legacy Folder (Figure 17, below):

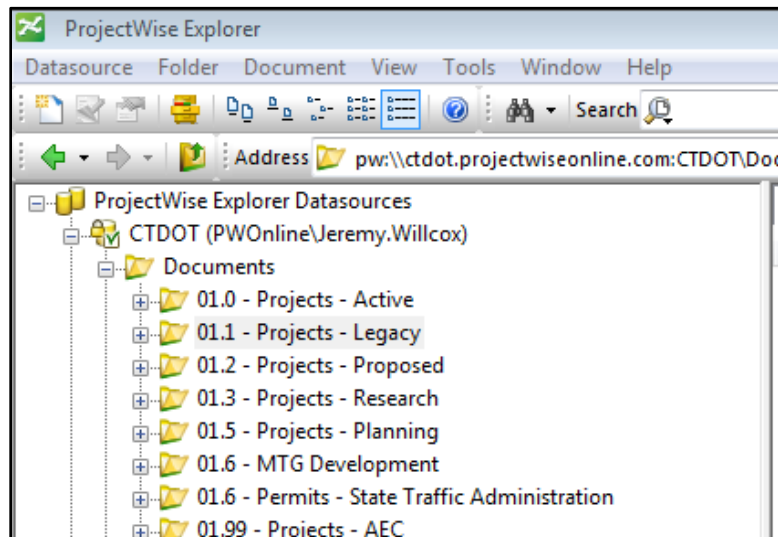


Figure 17. ProjectWise legacy folder.

1. Navigate to plans within the Town assigned to you using the Town Number (Figure 18, below):

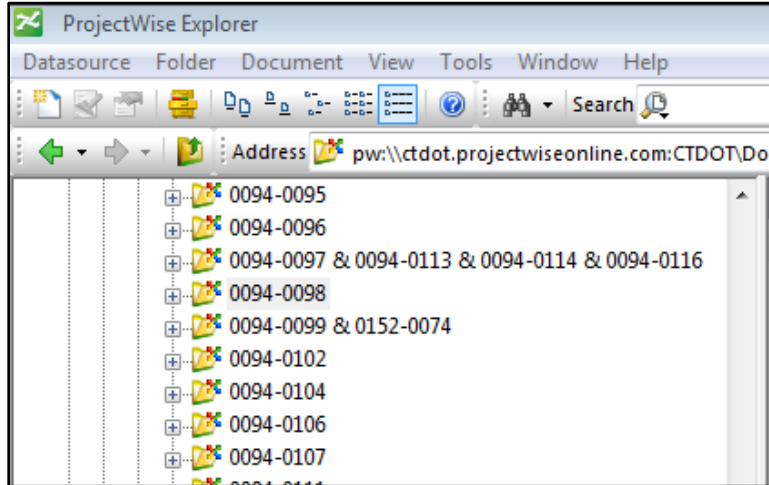


Figure 18. ProjectWise plans by town number.

2. Go through all projects. Open each plan in Bluebeam and review for relevance. Open the thumbnail viewer on side toolbar. Any plans with drainage information should be extracted.
3. Go to File > New. Select OK (show in Figure 19, below) and a new Document1 tab will open under the top toolbar.

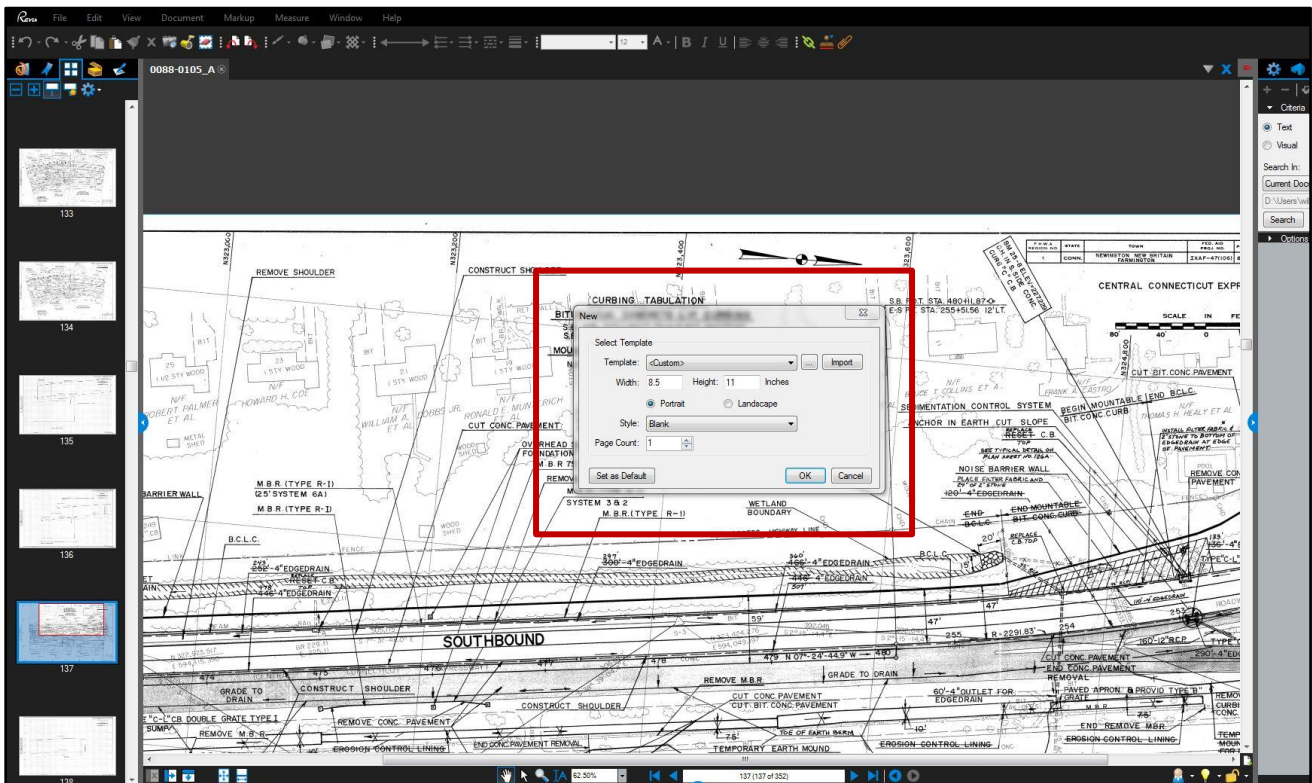


Figure 19. Viewing record plans in Bluebeam.

4. Go to the Thumbnail viewer (shown in Figure 20, below) in the project plans document and right click the plan you would like to extract and select "copy pages".

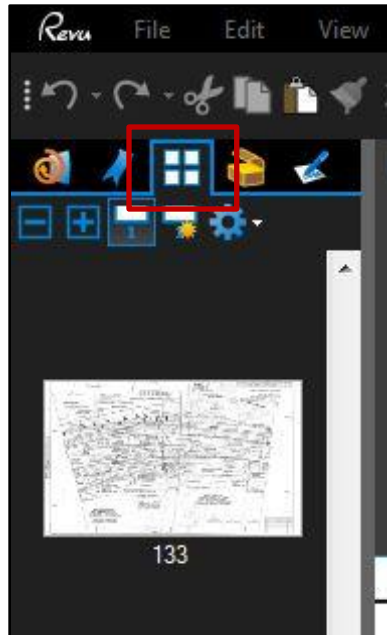


Figure 20. Thumbnail viewer in Bluebeam.

5. Go to the Document1 Tab (shown in Figure 21, below) and go to the thumbnail viewer and select "paste pages". Right click the blank page and select "delete".

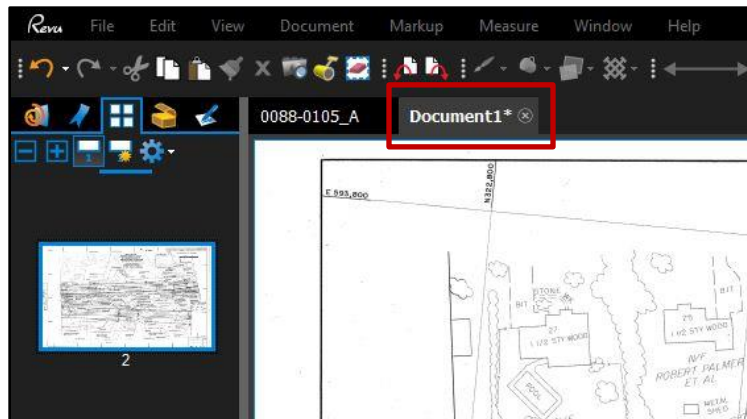


Figure 21. Document1 Tab in Bluebeam.

- Then go to File → Save as a TIFF. Save in the L: Drive under the GeoreferencedConstructionPlans folder (shown in Figure 22, below).

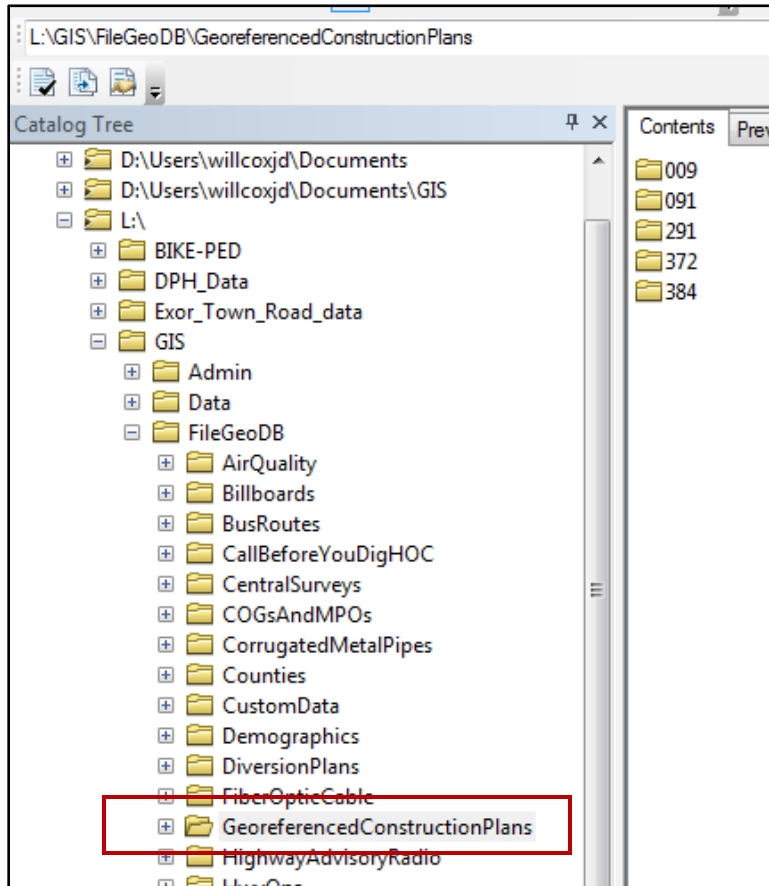


Figure 22. Georeferenced Construction Plan folder on L:Drive.

- Save relevant plans using the following nomenclature of “CON-8 Digit Project Number-4 Digit Sheet #” (e.g., CON-0088-0105-0120A, shown in Figure 23, below).

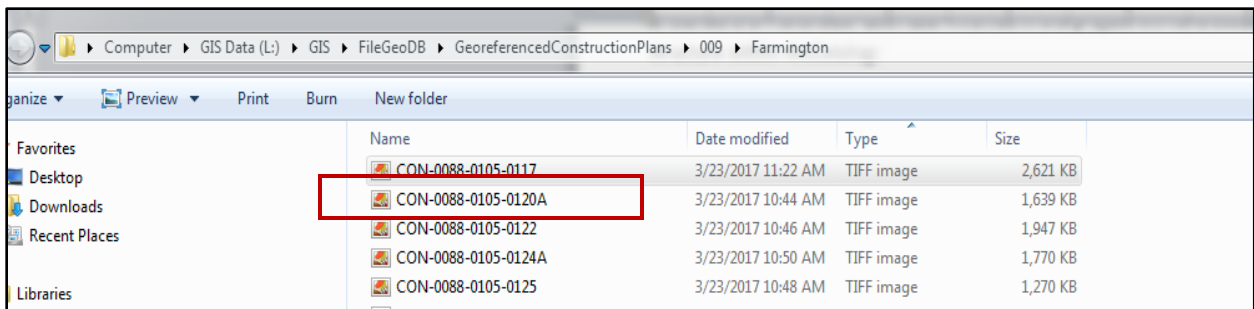


Figure 23. Nomenclature for extracted plans.

- Once extraction is complete for Legacy Projects, utilize a Query in ProjectWise and the X:Drive (X:\Engr_Records_Legacy_Plans_Temp\To_Uploaded) to identify potential projects that were missed. If any were missed, complete the previous steps to extract relevant plans onto the L: Drive.

Check the Town Maps on ProjectWise (pw:\ctdot.projectwiseonline.com:CTDOT\Documents\01.1 - Projects - Legacy\Project Maps) to see if any projects were missed (shown in

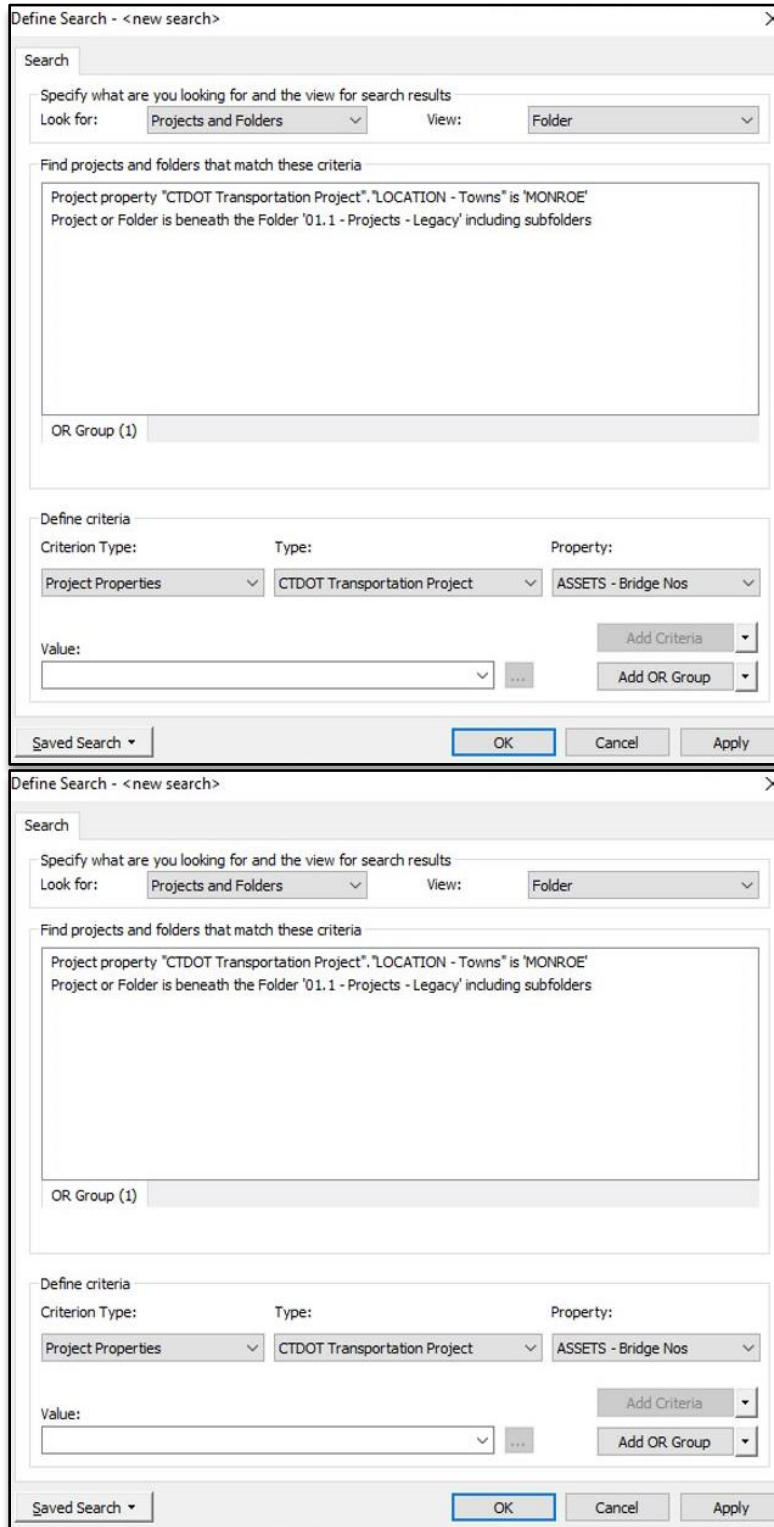


Figure 24, below).

Figure 24. ProjectWise search for project maps.

4.1.2 Georeference Extracted Plans in ArcGIS Pro

Once a plan is located and downloaded, it can be georeferenced in ArcGIS Pro. This process allows the user to locate the plan spatially so that features from the plan can be digitized within the coordinate system.

1. Open ArcGIS Pro, utilizing your template (which is in State Plan NAD 83 (2011)).
 - Check coordinate system of template by checking map properties (right click on Map in table of contents and select properties), as shown in Figure 25 below.
 - Under the coordinate systems tab, check the current coordinate system is listed as **NAD 1983 (2011) State Plane Connecticut** (shown in Figure 26, below).

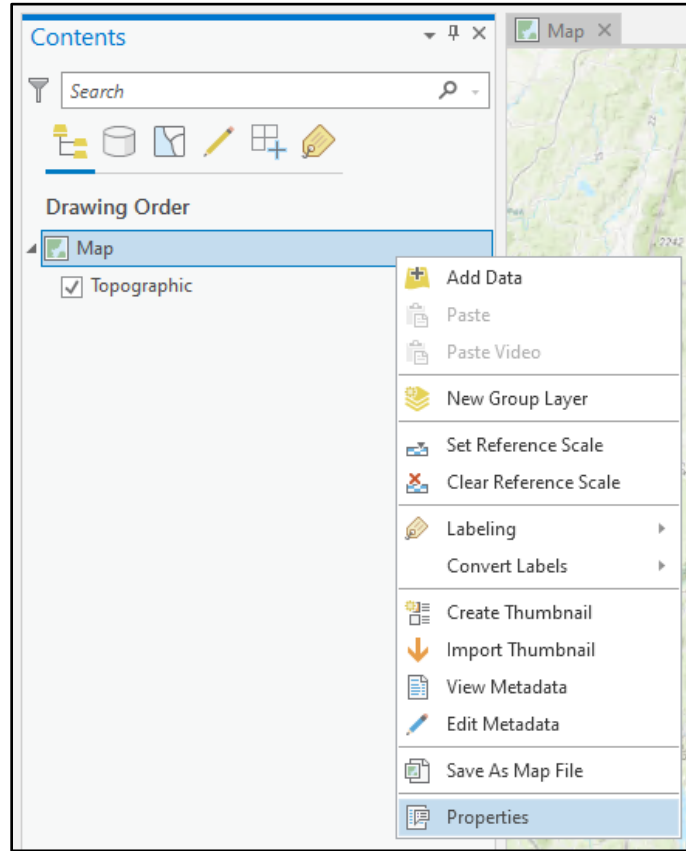


Figure 25. Map properties in ArcGIS Pro.

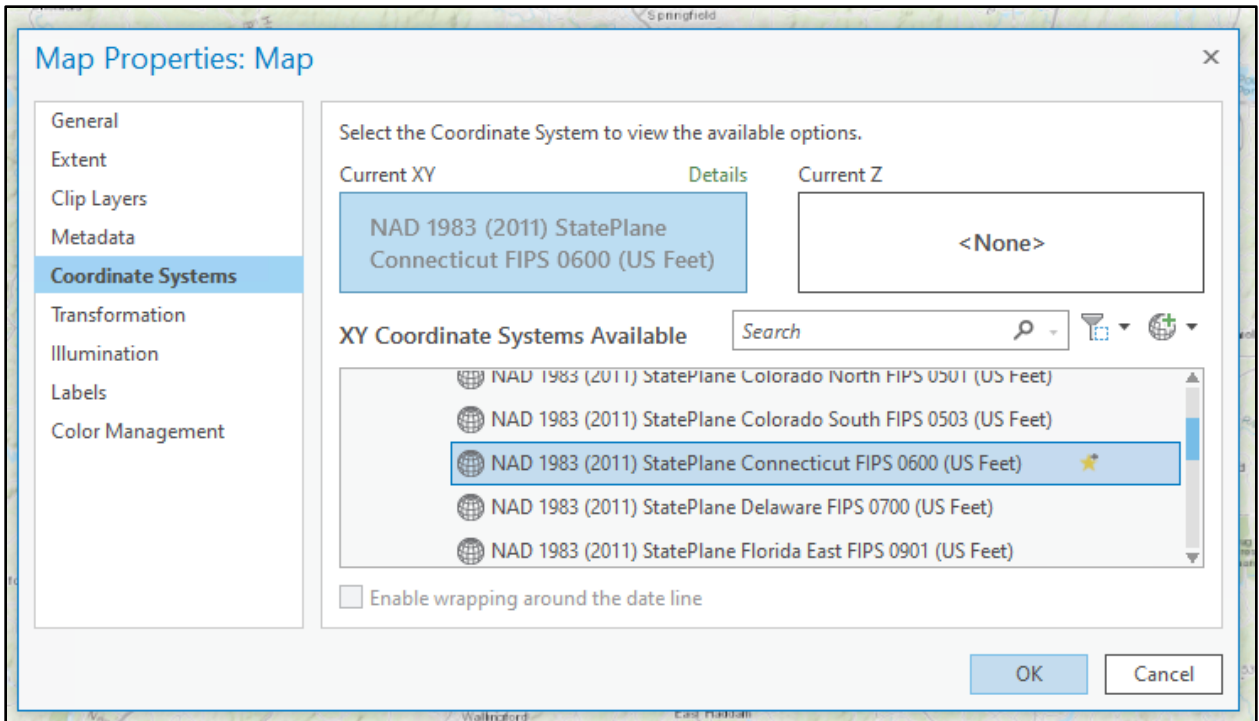


Figure 26. Coordinate system in ArcGIS Pro.

- To georeference a plan in ArcGIS Pro, it must be saved as a TIFF file (.tif). Files saved as a PDF can be opened in a program such as Adobe or Bluebeam and “saved as” a TIFF file. Then in ArcGIS Pro, select “Add Data” under the Map tab (Figure 27, below) and navigate to the TIFF file.

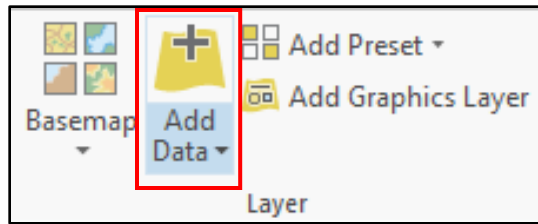


Figure 27. Add Data button in ArcGIS Pro.

- If a pop-up screen appears suggesting to “build pyramids,” you can select “No” (Figure 28, below).

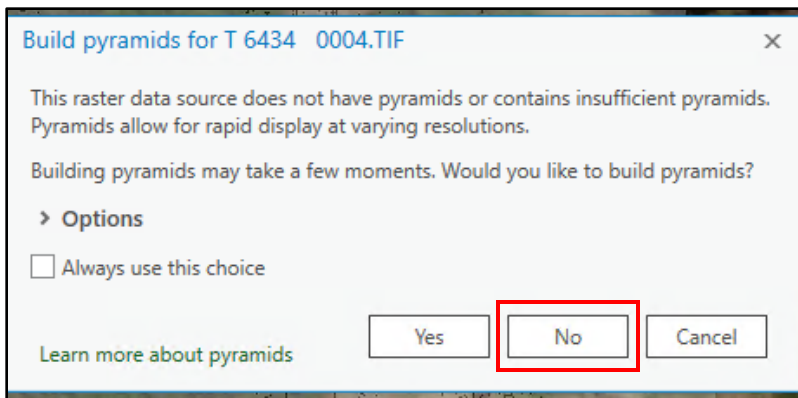


Figure 28. Option to build pyramids in ArcGIS Pro.

- Zoom to the area the plan is and click in the Georeferencing toolbar "Fit to Display" (Figure 29, below). The Georeferencing toolbar can be found in the Imagery Tab (Figure 30, below). Once the plan is in the right general area, use other tools to rotate or move the image.

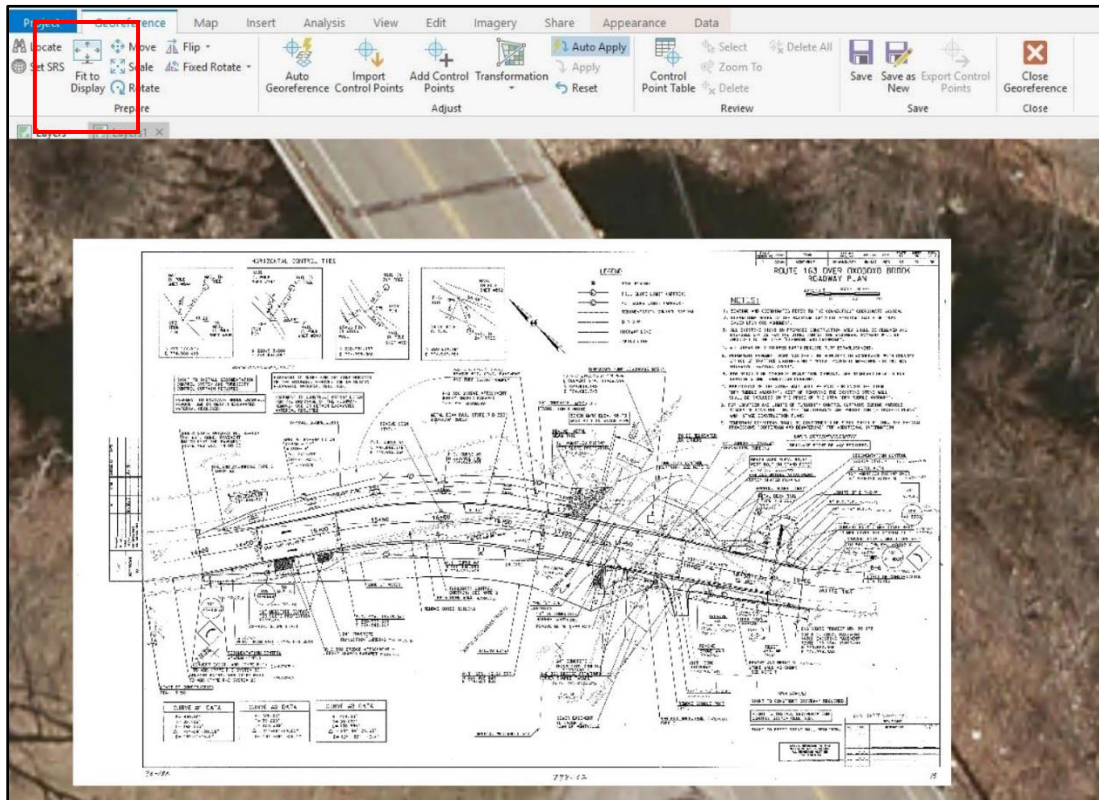


Figure 29. Fit to Display in ArcGIS Pro.

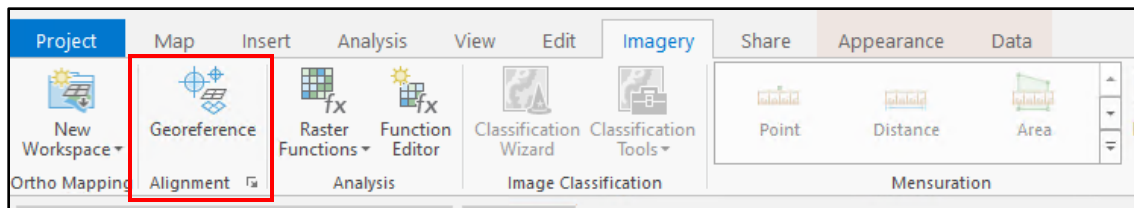


Figure 30. Georeferencing toolbar in ArcGIS Pro.

- With the TIFF selected in the Contents pane, adjust the appearance of the TIFF to be transparent (at least 60%) in the Appearance Tab so the aerial map can be seen through the plan (Figure 31, below). This allows you to identify reference points that match on the aerial and plan (step 6).

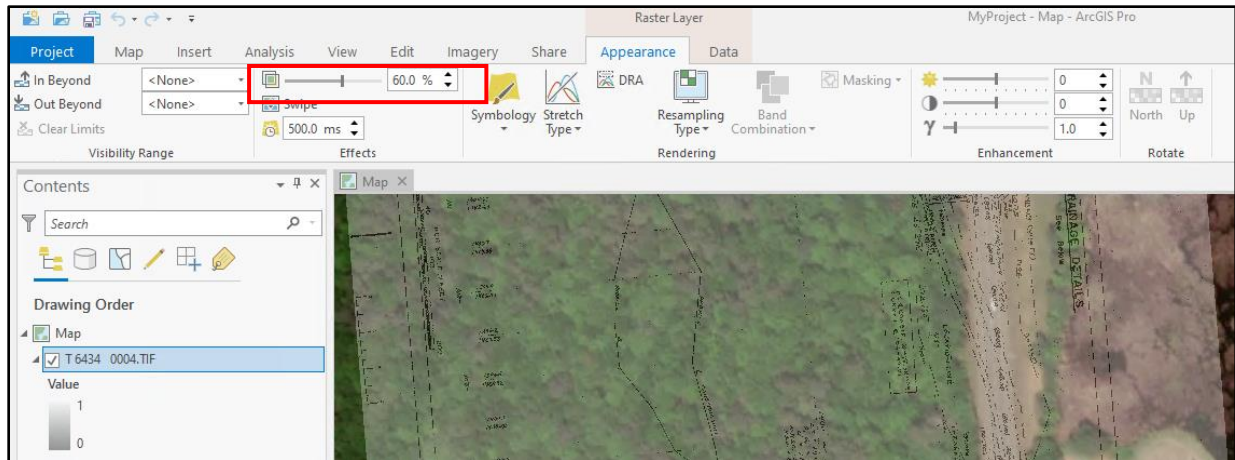


Figure 31. Adjust transparency in ArcGIS Pro.

- Find a point that can be located on the aerial map and in the plans, typically you will only need two points if the points are far enough apart, but may need three or four points. This can be drainage structures, intersection corners, or other features that are clearly matching. In this case, two catch basins were chosen. Click Add Control Points in the Georeference Tab and start to align the TIFF to the basemap, then repeat (Figure 32, below). First click a location on the TIFF, then match the location on the basemap.



Figure 32. Adding control points in ArcGIS Pro.

- Once complete aligning control points and satisfied with location, click "Save" in the Georeferencing toolbar and it will save the spatial information with the TIFF (Figure 33, below).

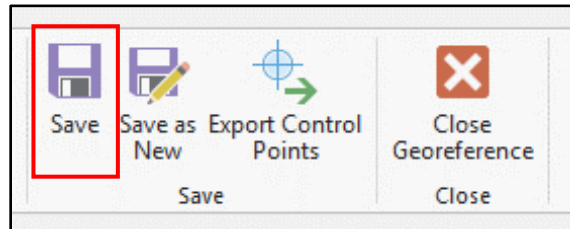


Figure 33. Saving georeferenced TIFF in ArcGIS Pro.

Move on to the next plan. Close the Georeference tab and ensure the correct plan is selected in the Contents pane. Click "Georeference" in the Imagery tab and continue.

- Certain Georeferencing of plans requires utilizing the measuring tool off of construction stationing along the centerline of roadways, this process is a bit more in-depth and will require a sit down or additional training to obtain the skill, but once learned is easily repeated.

4.2 Map Drainage Features from Plans

After all available plans have been georeferenced, the next step is to begin digitizing the stormwater assets shown on the plans. Sampling locations in a town should be mapped first. This will allow outfall field work to be assigned to a consultant in a timely manner. Sampling locations are any location where stormwater leaves the CTDOT drainage system. This could be an outfall or interconnection point.

Once Sampling locations have been digitized, the next priority is to begin digitizing the rest of the drainage infrastructure. Remember to take your time digitizing! The biggest issue is not having good data in the map; the map is only as good as the information in it. Take the time to fill out attributes and review your work.

4.2.1 Digitize Drainage Features from Georeferenced Plans in ArcGIS Pro

- Bring the plans that were georeferenced for the town into your map. Connect to the CTDOT Stormwater Asset Database and bring them into your map.
- Ensure snapping is enabled within ArcPro. This can be done by toggling the CTRL + F5 key, or by clicking "Snapping" on the Edit tab (Figure 34, below).

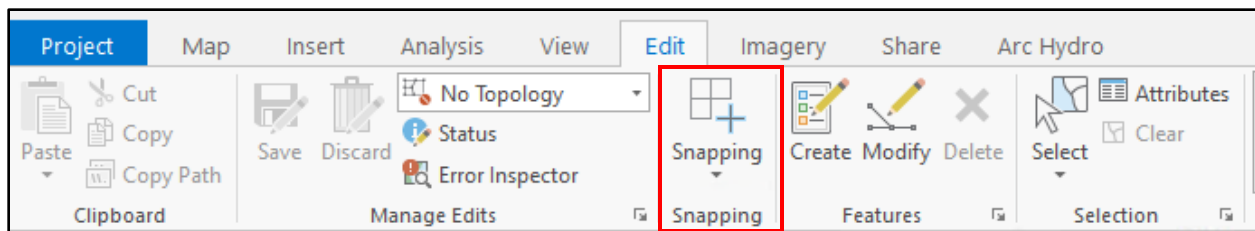


Figure 34. Enabling snapping in ArcGIS Pro.

3. Select the "Edit" Tab then click "Create" (Figure 35, below).

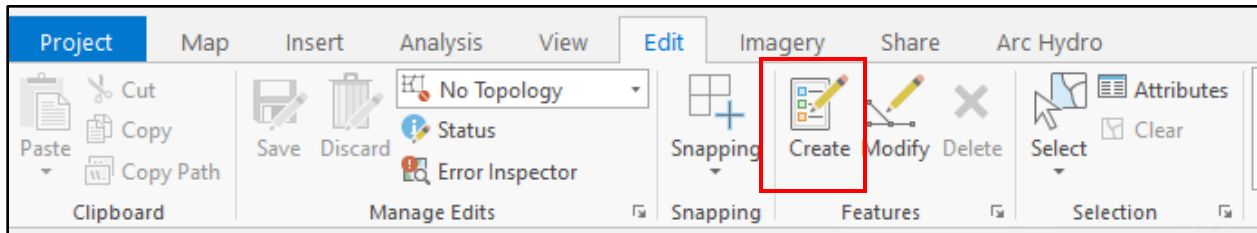


Figure 35. Create features button in ArcGIS Pro.

4. In the Create Features Pane, click the layer that the new feature will be added to. Only layers that are checked in the Contents Pane will display in the Create Features Pane.
5. Before drawing the feature, populate attributes via the Active Template Pane. Click the arrow on the right-hand side of the box for the selected Feature Class to open the Active Template Pane (Figure 36, below).

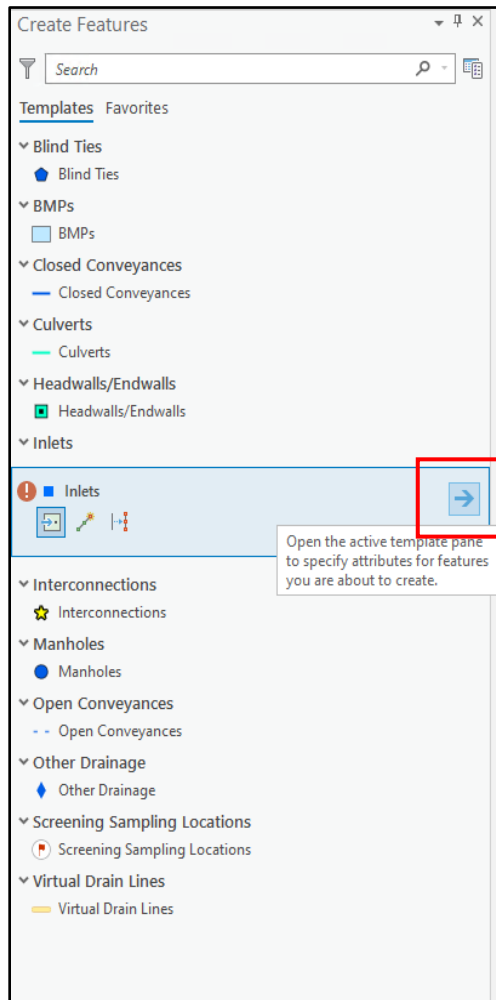


Figure 36. Open Active Template Pane in ArcGIS Pro.

6. In the Active Template Pane, populate the appropriate attributes. In this example, red attributes are required to be entered before creating a feature (Figure 37, below). Many attributes have dropdown lists to facilitate editing and ensure quality data.

Active Template	
Enter attributes for features you are about to create.	
ID	<Null>
Project Number	<Null>
Year Installed	<Null>
Data Source	State - Construction Plans
Owned By	CTDOT
Maintained By	CTDOT
Type	
Material	
Top Of Frame To Bottom Of Structure (feet)	Brick
Top Of Frame To Lowest Invert Out (feet)	Block
Sump (feet)	Concrete (Cast in Place)
Datum Of Plans	Concrete (Precast)
Top Of Frame Elevation	Metal
Lowest Invert Out Elevation	Plastic
Bottom Of Structure Elevation	Stone
	Other
	Unknown
	<Null>
Town	
LRS ID	<Null>
Location	Highway
Highway	
Local Road Name	<Null>
Maintenance Garage	
Maintenance Districts	
Status	Inspection Not Completed
Archive Status	Active
Archive Year	<Null>

Figure 37. Active template pane in ArcGIS Pro.

7. If creating a screening and sampling point, be sure to select the right status. Status definitions are below and examples of each are shown in Figure 38:
 - A Not Screened Point (symbolized as a Pink Flag) is any outfall that is within an industrial, commercial, or residential area where the development has the chance to either be interconnected or is within a reasonable distance to the MS4 outfalls drainage system for a potential connection.
 - An excluded status (symbolized as a Capital E) is a point in which the drainage system for an outfall is within an area in which there is no development, has no potential interconnection points, does

not cross or is not immediately adjacent to a sanitary sewer line, or is a reasonable distance away from any potential septic system impacts.

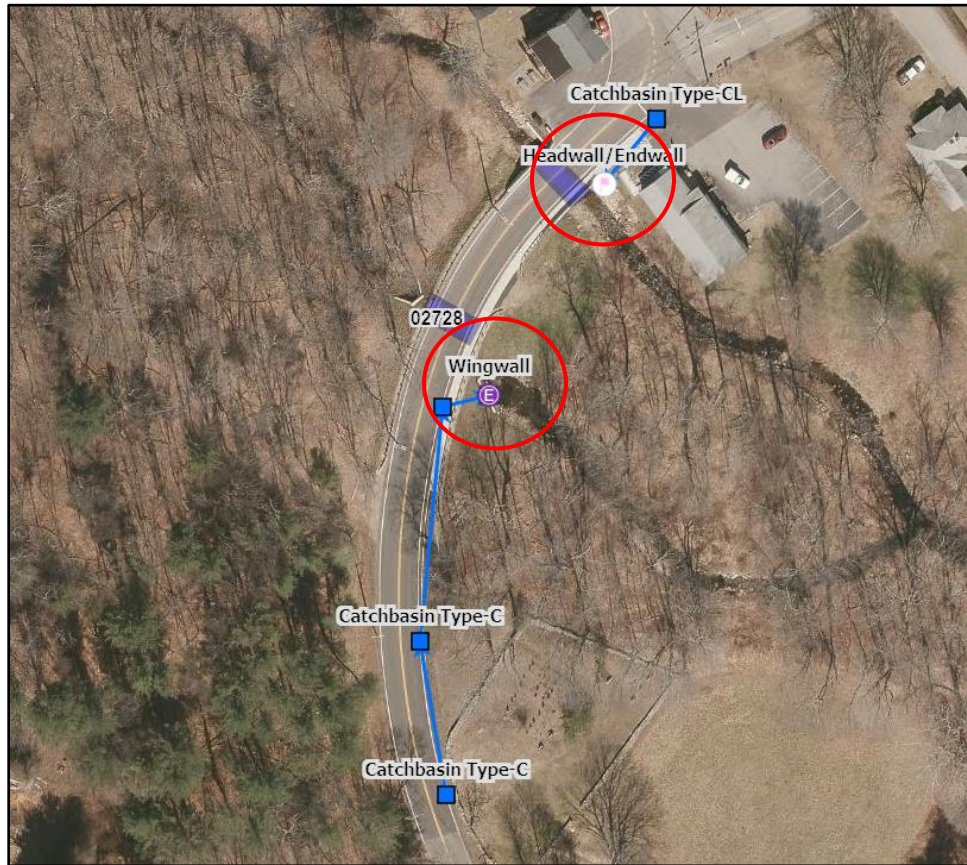


Figure 38. Example screening/sampling point statuses.

8. Next, draw the feature in the map window (Figure 39, below). Trace the features from the georeferenced plans, as appropriate. **Always check the aerial imagery and digitize to the ortho imagery over the plans, as the georeferenced plans may not be exact.**

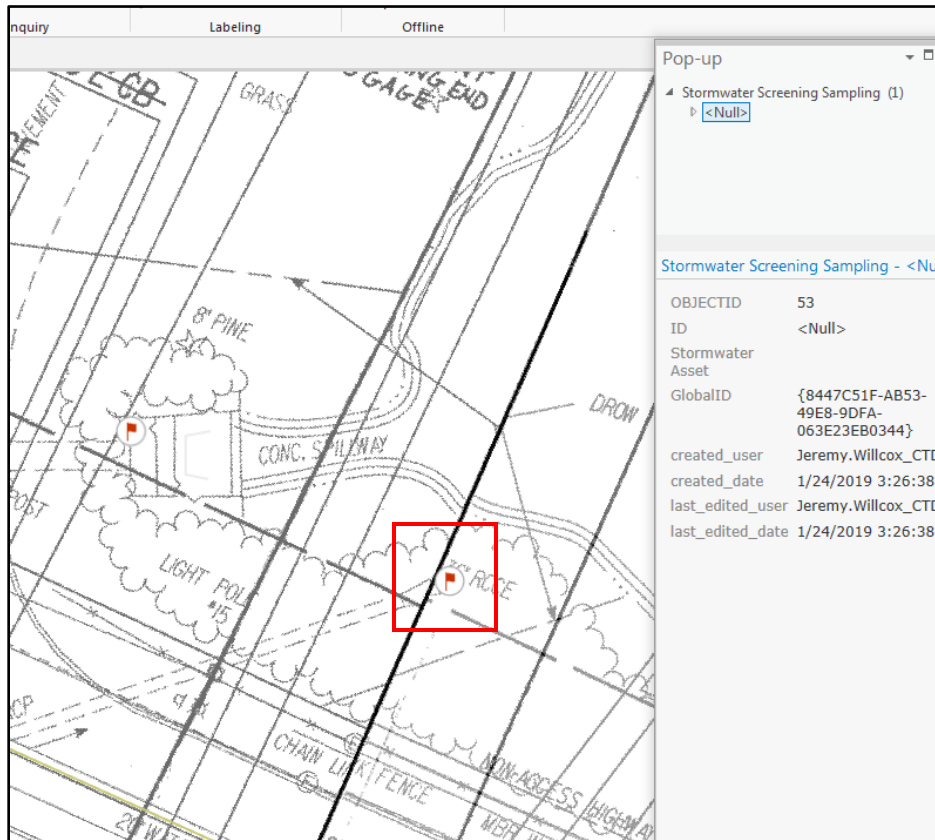


Figure 39. Drawing new features in ArcGIS Pro.

9. Once the feature has been drawn, click the Edit Tab and then click "Save" (Figure 40, below).

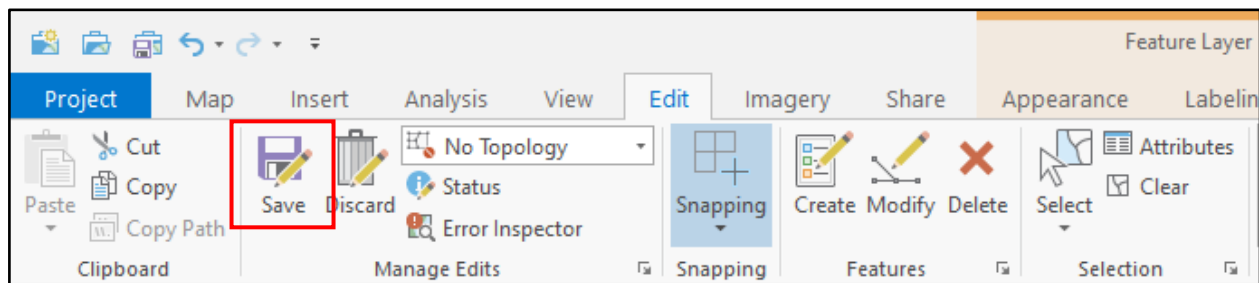


Figure 40. Saving a new feature in ArcGIS Pro.

4.2.2 Helpful Tips

- Always digitize to the ortho imagery
- Always draw pipes and swales in the direction of flow (upstream to downstream)
- Add all relevant information that can be obtained within the plans, in some cases you may have to go back to ProjectWise to obtain standard details (i.e. Inlet structure type Block vs. Precast). Enter in the

attributes that can be found on the plans, you will notice certain attributes will auto populate such as Maintenance District, Town, Maintenance Garage, Highway Number and Waterbody Name.

4.3 Perform Gap Analysis for Mapping Locations

In areas where constructions plans are not available, other sources of data such as IRMS (Rights of Way Mapping) and Mapillary are reviewed to find additional sampling points and stormwater assets. If additional points are located, digitize in ArcGIS Pro. If no additional information can be found, field mapping of areas should be performed.

1. Use IRMS for areas where construction plans could not be found (see where plans are not overlapping on the yellow state roads on Route 213 and Route 1 in New London in Figure 41, below). If any DROWs or outfalls can be found, then digitize them into program.

<http://dot-sdcmts303v/IRMS/Shared/Master.aspx>



Figure 41. Example gap in available plans.

Use Mapillary in Google Chrome to “Drive” roads and see if any outfalls can be visually identified.

- <https://www.mapillary.com/app/?lat=41.578568533568586&lng=-72.71857180230535&z=8.829326278837655>

5. Field Mapping and Inspection Approach

Where gaps are found in drainage mapping and no construction plans exist, a field walk should be conducted to identify sampling locations and complete stormwater asset mapping. Inspections conducted in the field on stormwater assets (e.g., outfall screening and sampling, condition assessments, etc.) will be collected in the Stormwater Asset Database and associated with each asset. This allows the CTDOT to keep a log of all inspections performed on an asset over its lifetime.

This section provides an overview of field data collection, including how to access the Stormwater Asset Database in the field using ArcGIS Collector, how to add/edit stormwater assets, and how to perform inspections. Refer to **Section 3** for instructions on how to gain access to ArcGIS Collector. Note: the ArcGIS Collector App is available on Android, iOS, or Windows devices. This section includes screen shots on iOS devices (both iPhone and iPad). While similar, the layout and use of the App in other devices may vary slightly.

Illicit Discharge Screening and Sampling

CTDOT is working with Consultants to complete illicit discharge screening and sampling of outfalls and interconnection points across the State. Consultants should use the Collector application to complete inspections in the field. Dedicated Screening/Sampling Groups have been set up for individual Consultants. Contact Environmental Compliance staff to request access to a Group.

While consultants are performing their screening and/or sampling work, they are also expected to complete visual condition assessments on the assets at which the screening and/or sampling is occurring. It is worth noting that the screening/sampling point will often overlay one or more stormwater asset points within the GIS map.

Following the guidance on how to create and edit a new inspection record provided in the sections below, the Consultant is responsible for working with/editing multiple feature classes to create separate inspection records for:

- Illicit discharge screening and/or sampling information for the outfall or interconnection point
- A condition assessment for one or more stormwater assets where the discharge is occurring
 - This could require completing multiple condition assessments such as on a flared end (headwall/endwall) and separately, the pipe (closed conveyance).

Initial assignments are provided to Consultants by Environmental Compliance staff. Assignments are given on a Town by Town basis with all locations to be screened or sampled identified. Locations are also provided to consultants in a spreadsheet format and with a screen shot of their locations. Dry weather assignments are given first followed by wet weather assignments. Wet weather assignments can only be completed between March 1 and June 30 each year.

Appendix B includes additional information to Consultants completing IDDE work for CTDOT, including flow charts for dry weather and wet weather screening and sampling.

5.1 Field Tips

Before going in the field, field personnel should prepare and keep the following tips in mind:

- Make sure the latest version of ArcGIS Collector is downloaded and up to date on your mobile device.
- Make sure location services are turned on in ArcGIS Collector.
- Be conscious of the battery life of the device and plan for a battery backup, power charger, or backup mobile device with ArcGIS Collector loaded where field data collection is expected to be lengthy.
- Be conscious of the weather and plan accordingly to protect the mobile device from precipitation or with a shade on high sun days, as needed. For more information on specific safety precautions, required equipment, and other project related details, refer to the respective task guide.
- Always be careful of traffic and moving vehicles. Plan to have appropriate personal protective equipment (PPE) and traffic controls, as necessary.

In the field, look for low points in the roadway and water crossings where outfalls may be located or locations where CTDOT drainage enters another system. Outfalls are demarked by yellow delineators. When an outfall is found in the field, add a new sampling location feature using the Collector App.

Dry Weather Screening and Sampling Information

- Proceed if no more than 0.1 inches of rain within previous 24 hours
- Visually screen discharge point for signs of an illicit discharge
- If flow is observed take a field sample
- If field sample results are above action level, take a laboratory sample (see **Appendix B**)
- Identify the receiving waterbody to determine if an E Coli (fresh water) or an Enterococci (salt water) sample should be taken

Wet Weather Sampling Information

- Must be conducted in the spring (March 1 to June 30)
- Proceed during or after a rain event sufficient to produce a discharge from the outfall
- Field sample flow from discharge point
- If field sample results are above action level, take a laboratory sample (see **Appendix B**)
- Identify the receiving waterbody to determine if an E Coli (fresh water) or an Enterococci (salt water) sample should be taken

5.2 Adding/Editing a Feature using Collector App

Once you have connected to the Collector App in the field and have turned on location services with the map centered on your location, you can start adding or editing features on the map.

- 1.** To add a feature, be sure to center yourself on the feature with the mobile device in your hands (you can confirm your position is shown accurately in the map).

2. Click on the blue plus “+” sign and select the feature you’d like to add from the list that pops up (Figure 42, below).
 - If collecting a point feature, the new feature will be centered on your current location. You can adjust the location to collect the point if the GPS is not accurate or you are not standing directly on the point.
 - If collecting a line or polygon feature, the location you start on will be the start of the line or polygon. You can either add multiple points along the feature or have the App collect points along a line you walk. When you’re ready to walk along the line or perimeter, click the three dots of a new features and select “Start Streaming”, which will record the path you walk. You may pause if needed by clicking “Pause Streaming”. When finished walking the path of the feature you’re recording, select “Submit” to record the shape.

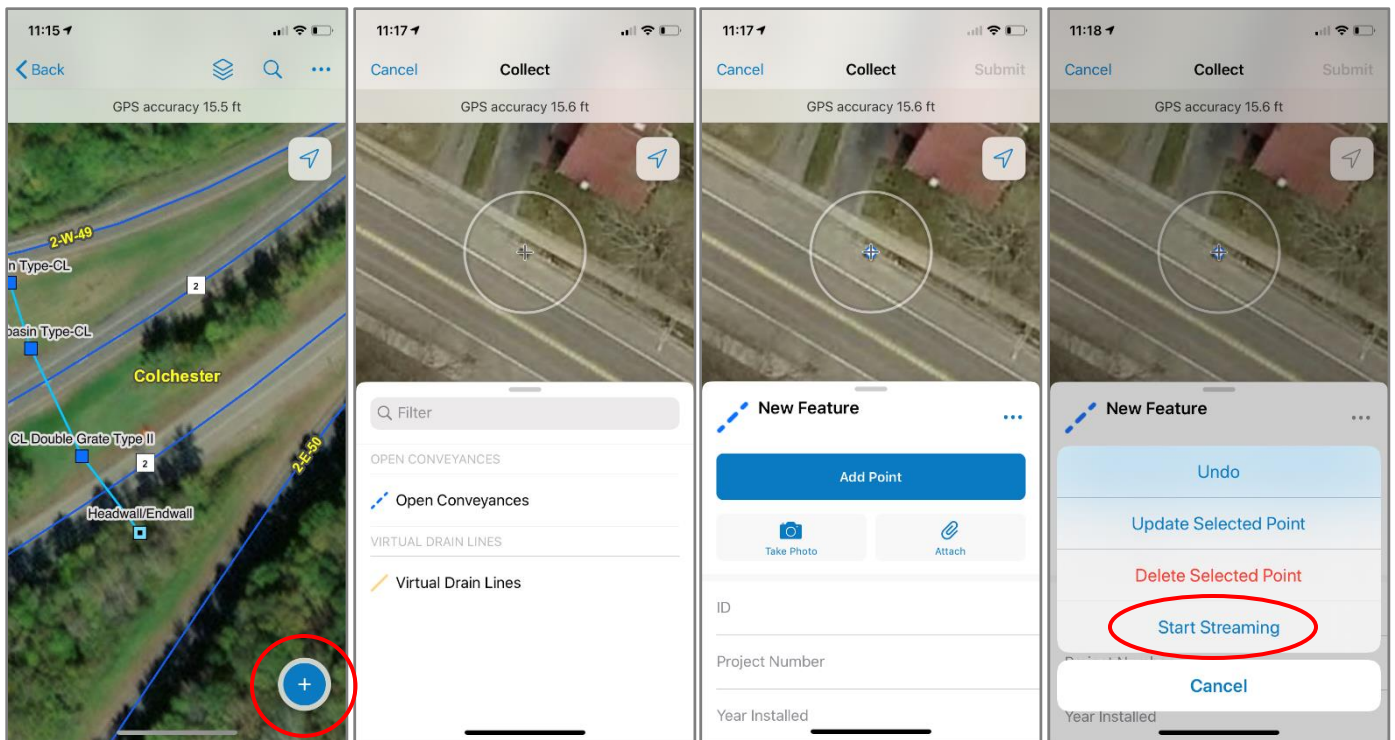


Figure 42. Adding a new feature in the ArcCollector app.

3. You can then add attribute data, filling out the fields for each of the feature’s attributes. Some fields will be automatically populated but can be overridden. Many fields have a dropdown list, allowing you to select an option from the list. After adding attribute data, you should also add photos of the feature which can be taken straight from the Collector App.
4. To save the new feature click “Submit” and the changes will be committed to the map (Figure 43, below).
 - Note: fields with an asterisk (*) are required and the Submit button will not be enabled until those fields are populated.

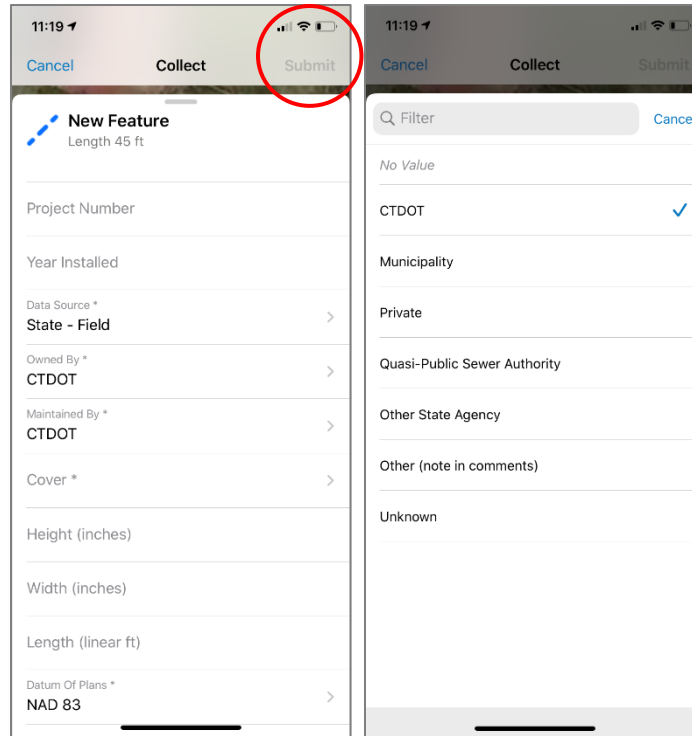


Figure 43. Saving a new feature in the ArcCollector app.

5. Perform post-processing of data collected in the field in ArcGIS Pro to populate all attributes, snap features, and confirm accuracy.
6. If an asset is added in the field **do NOT enter an ID number** for the new asset. An ID number will be automatically assigned by the CTDOT GIS Group. If an ID number is needed immediately, contact Environmental Compliance or Office of Environmental Planning Staff. If a unique identifier is absolutely needed at the time the asset is added, add notes to the comment field.

5.3 Editing Existing Features using Collector App

Mapping may need to be field verified to confirm accuracy and evaluate interconnections. The initial thought is this process will organically happen through outfall screening, maintenance reporting requirements, culvert inspections and by way of District Drainage Engineers reviewing the mapped drainage during field scoping for VIP Paving projects.

Data collected either in the office or in the field is stored in CTDOT's Stormwater Asset Database. This data can be accessed in the ArcGIS Collector App, CTDOT's ArcGIS Online Drainage Infrastructure Map, or in ArcGIS Pro. When field verifying mapped stormwater assets, edits to the mapping made in the field will be reflected in the Stormwater Asset Database.

1. To edit an existing feature, use your finger to select the target feature. A list of items will pop up (Figure 44, below). Click on the correct item.

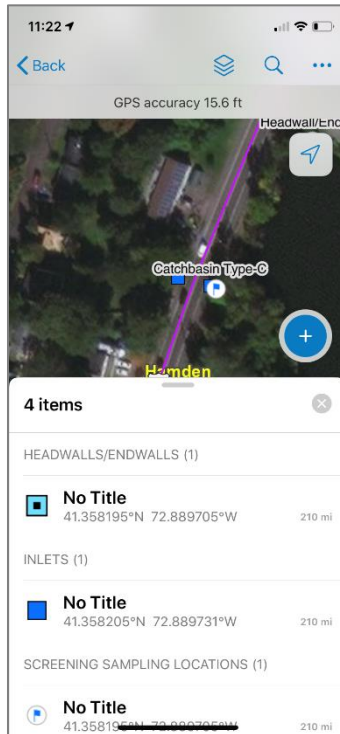


Figure 44. Select an existing feature in the ArcCollector app.

- The attribute list of that feature will appear. Click on the Pen Icon to edit the attributes and the geometry (Figure 45, below). Press "Submit" once edits are complete.

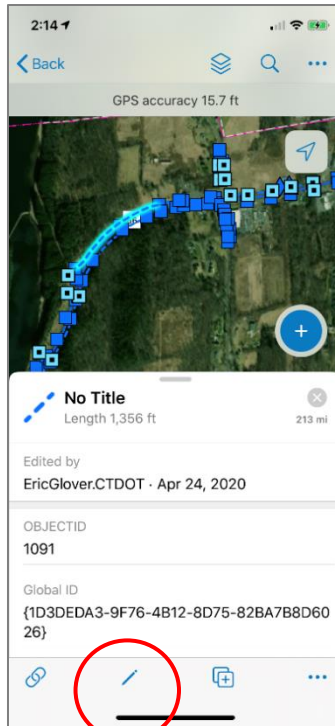


Figure 45. Edit an existing feature in the ArcCollector app.

- Click on the three dots or scroll to the bottom of the attributes to access more features (Figure 46).

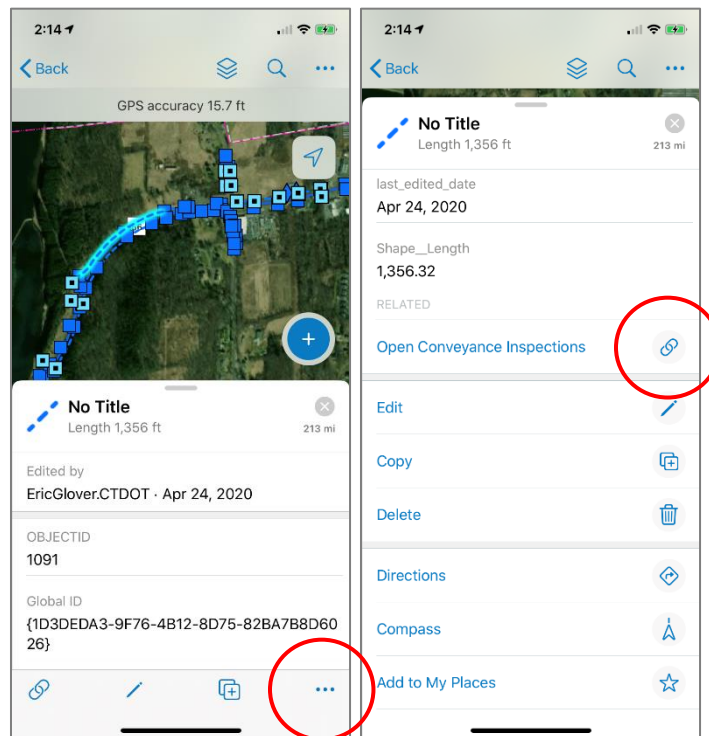


Figure 46. Access feature options in the ArcCollector app.

- Directions will direct you to another mapping app and give you turn by turn directions to the selected feature.

Compass will give you an approximate distance and direction from you to the feature.

- The Link will bring up the related inspections for the feature and allow a new inspection to be created.

5.4 Complete an Inspection in the Field

Features are preloaded into the Collector App which references the ArcGIS Online map of CTDOT’s drainage infrastructure. Once a feature has been located, the Inspection form can be completed using the below procedure for the Collector App. The Inspection form is a related table to the feature, with a one to many relationship. This means, every time an inspection is conducted, a new record is added, allowing a historic log of condition and maintenance records over time for a specific feature. The examples shown in this section show Culvert and Headwall/Endwall inspections, but this process could be completed for any feature with an associated inspection form. Refer to **Section 2** for a list of features and their associated inspection forms.

This process outlines the method for Field Inspection for Drainage Infrastructure. The goals of this program are to verify the location of infrastructure in the field, to assess the condition of stormwater assets, and to track and record sampling for the MS4 program.

Structures have a Status Attribute as either; Inspection Not Completed, Inspection Completed or Inspection Attempted (Figure 47, below). Assets are symbolized based on the inspection Status attribute. For Screening Sampling Locations, this list is much longer (Figure 48, below).

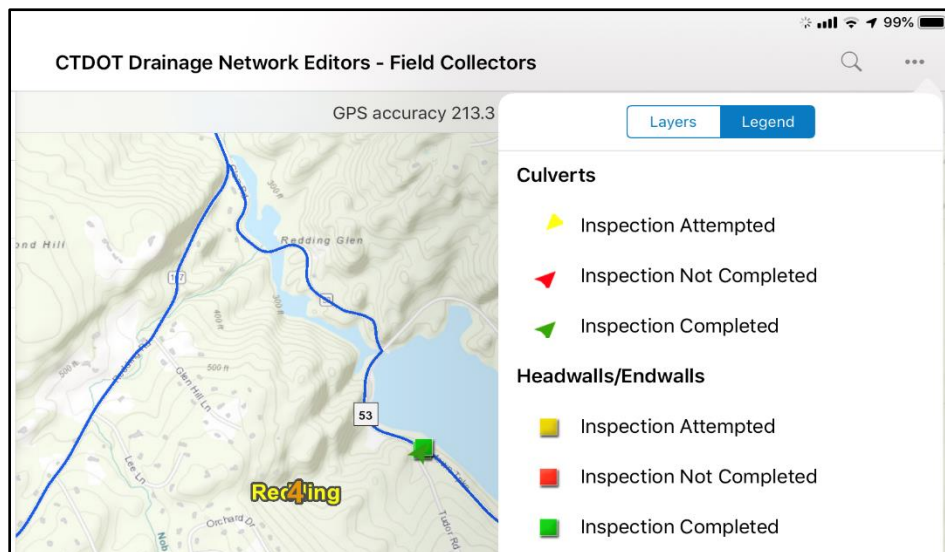


Figure 47. Structure inspection statuses.

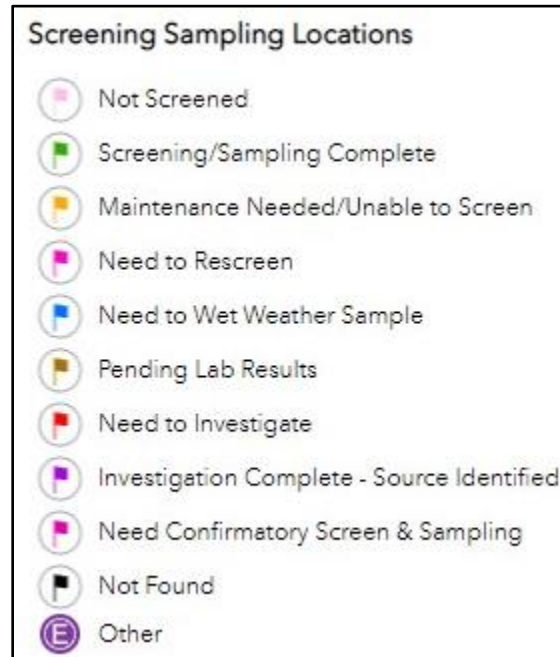


Figure 48. Screening/Sampling location inspection statuses.

Adding a new Screening / Sampling Point in the Field

If the originally designated location to perform a screening and/or sampling is not able to be screened but an upstream/upgradient location is available, the following procedures should be followed:

- Do **not** move the original screening / sampling point. Instead, update the feature class attribution to reflect its status, aka, maintenance needed / unable to screen. An inspection report must also be completed under the related stormwater asset feature class, aka, headwall/endwall.
- Create a new screening /sampling point at the upgradient location. Do not enter an identification number. CTDOT staff will provide one at a later time. If a unique identifier is needed immediately, add notes to the comment field. Update the feature class attribution and complete a related inspection report as normal.

To complete an inspection in the field, follow the steps below:

1. To complete an inspection in the field, select the asset that you are assigned to inspect. In Figure 49 below, all red assets need inspection.



Figure 49. Example assets needing inspection.

Attributes for the selected asset will appear. Scroll all the way to the bottom of the attribute list and click on the inspections link (Figure 50, below).

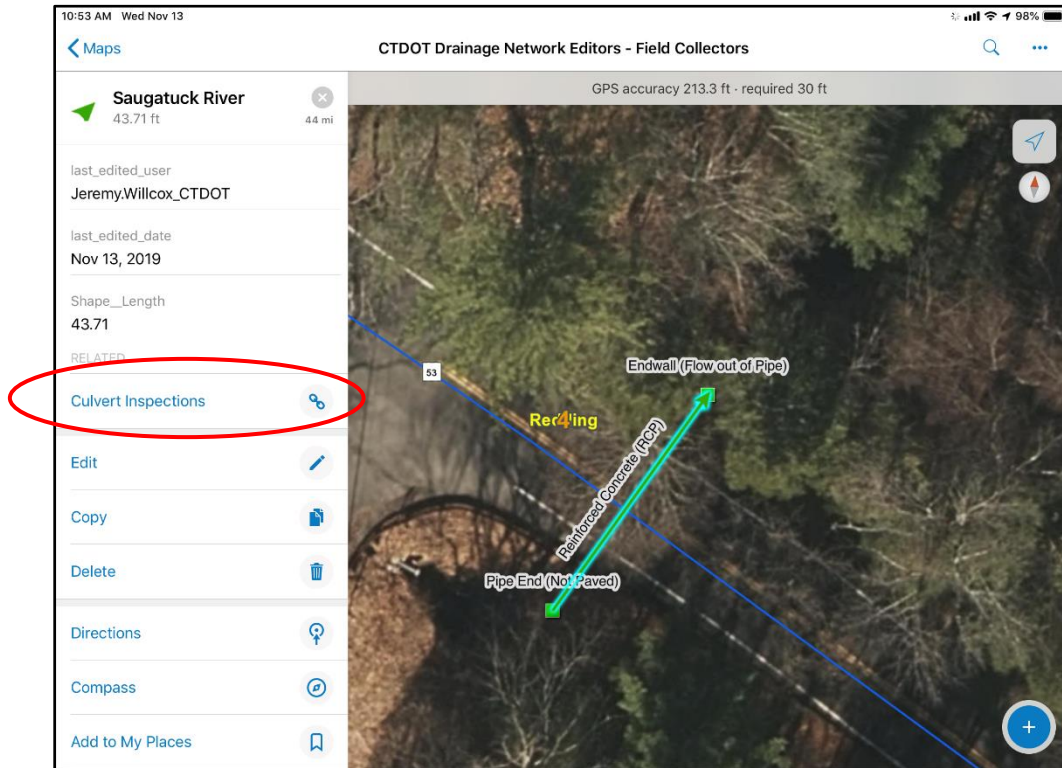


Figure 50. Link to inspection records in ArcCollector app.

2. All previous inspections on that asset will be available to review. Click "Add" to create a new inspection record (Figure 51, below).

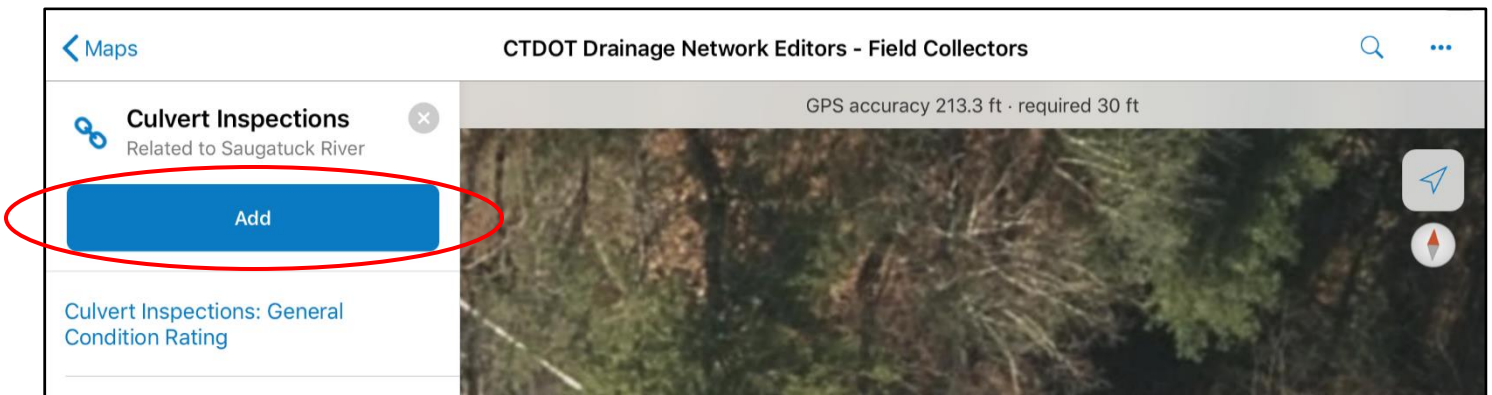


Figure 51. Adding a new inspection record in ArcCollector app.

3. Fill out attributes in the Inspection form. If a structure is deemed to be in either Poor, Failed or Obstructed condition, the field collector must make sure to provide comments as to why it was determined to give the asset that particular rating.

- For any asset requiring cleaning or repair, the field collector should complete the Maintenance Needed field highlighted in Figure 52 below. The choices are Clean or Repair.

(1 of 3) Headwall Endwall Inspections: Condition Rating	
Waterway Adequacy *	N/A
Condition *	Failed
Maintenance Needed	Repair
Maintenance Performed	

Figure 52. Flagging maintenance needed in an inspection form.

- Take photos of the feature to include with the assessment. Photos are very important for building the inventory and must be uploaded when performing the field survey.
- If doing IDDE, follow the flow charts in Appendix B for dry or wet weather flow. Collect the appropriate samples based on the water quality classification. Use the reference layer in the Stormwater Map titled "Surface_Water_Quality_Classifications – Surface Water Quality Lines" (Figure 53, below).

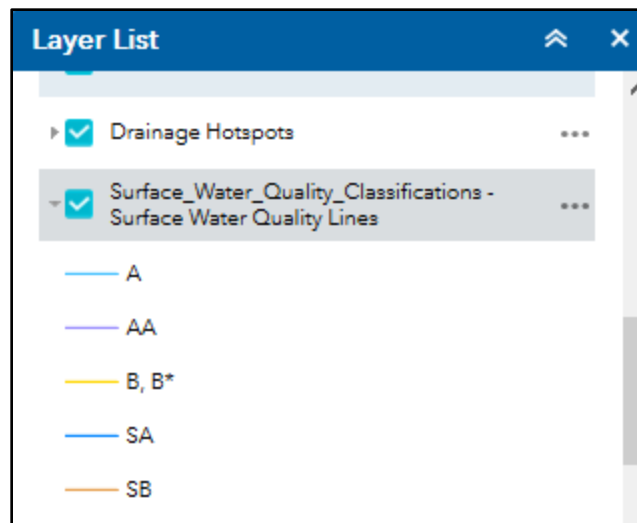


Figure 53. Surface Water Quality Classification Reference Layer.

7. Once complete hit "Submit" (Figure 54, below). Repeat this process for all features within the survey area.

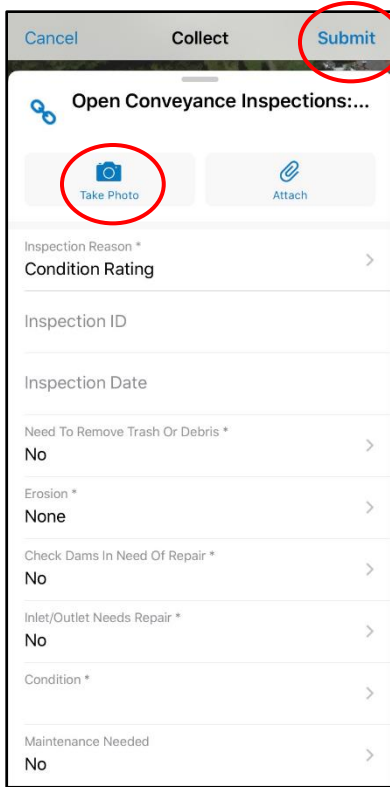


Figure 54. Taking photos and submitting an inspection form in ArcCollector app.

8. Once the inspection Form is submitted, go the feature attributes and make sure that all of the other attributes are correct (i.e., material, size, etc. are all correct).
9. **In the feature attributes, change the Inspection Status or Screening/Sampling Phase and Date (if applicable) to reflect the correct status.** This field is important as it allows the current status of an asset to be queried. If this field is incorrect the outdated status will show in a query and will lead to a duplicate or incorrect field inspection.

Example of Inspection Status for physical assets (aka, Culvert, Inlets, Closed Conveyance, etc.):

- If an evaluation was able to take place change the "Status" attribute to "Inspection Complete".
- If the structure was Not Found, Inaccessible, Submerged, Obstructed or Required Traffic Control input a status on the structure of "Inspection Attempted".

Screening/Sampling Location Phase

A screening/sampling location should be designated as "Need to investigate" when it meets any of the following criteria:

- Any detection above action levels for ammonia, surfactants, chlorine **or** bacteria (any one of the four) trigger a "Need to Investigate" status within the screening sampling feature class.

- Regardless of the analytical results, the field inspector can deem any location as needing an investigation based on olfactory or visual evidence at the time of the inspection.

Finally add in the inspection or screening/sampling date and add any relevant notes on the status or follow up needed (Figure 55, below).

Screening/Sampling Date	10/14/2019, 10:48 AM
Screening/Sampling Phase	Maintenance Needed/Unable to Screen
Town	Norwich
LRS ID	
Location	Highway
Highway	97
Local Road Name	
Maintenance Garage	East Great Plain
Maintenance District	2
Comments	Could not find buried on river bank

Figure 55. Updating screening/sampling phase and notes from inspection.

Upon concluding the field inspections, the data will sync with the AGOL map in real time as long as the mobile device is connected to a network (Figure 56, below). The final product will show on the AGOL map where inspections have taken place, and the data collected during the process.

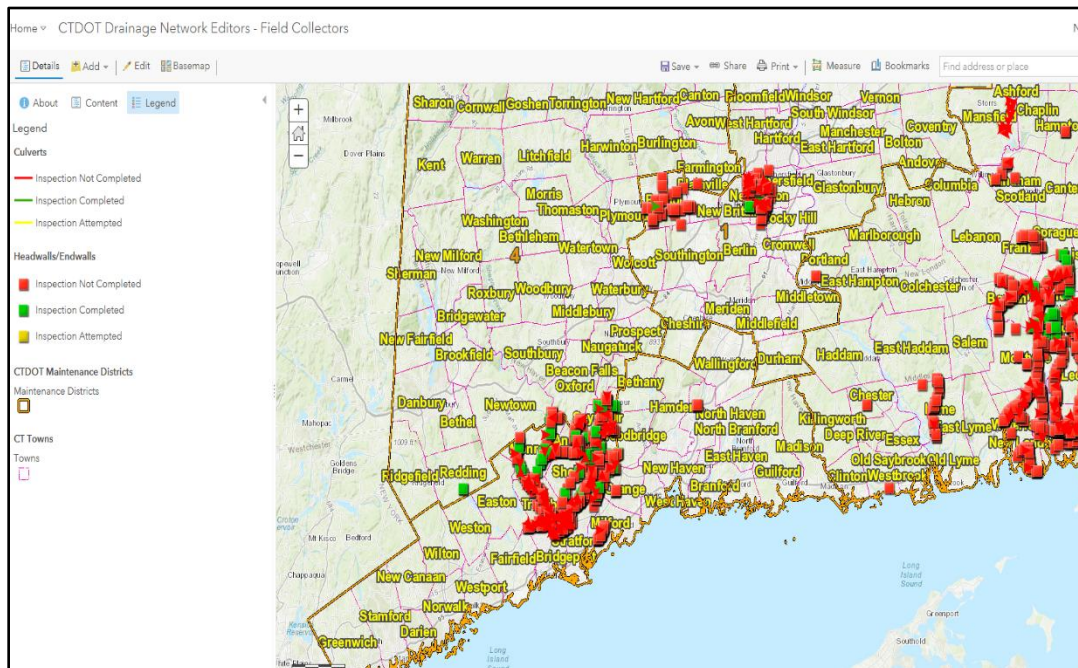


Figure 56. Example AGOL map of inspection statuses.

- 10.** Every time an asset is inspected a new inspection record should be added, either for initial inspection or follow-up work. **NEVER delete or overwrite an existing inspection record**, even if the work that needed to be done has been completed and the information contained in the original inspection is now outdated. Instead add a new inspection record, as specified below.

Follow up on Inspection Records (Closing Out an Inspection Record)

An *inspection record* captures an asset's condition at the time of the inspection, any maintenance needs, and/or any follow up actions taken. If an initial inspection indicates work is needed, a second inspection record should be added to indicate the work has been completed. This is done by adding a new inspection record and updating the field entitled "Maintenance Performed" (Figure 57, below). The choices under this field are "Cleaned" or "Repaired". The "Maintenance Needed" field should indicate that no further maintenance is needed. The inspector can add notes to the comment field for additional details. The original inspection record should also be updated to indicate that Maintenance has been performed.

Remember, changing the attribution in the feature class from "Inspection Not Completed" to "Inspection Completed" has nothing to do with closing out an inspection record. A new inspection record must be completed.

The screenshot shows a mobile application interface for 'Headwall Endwall Inspections: Condition Rating'. It features three dropdown menus. The first is 'Condition *' with 'Obstructed' selected. The second is 'Maintenance Needed' with 'No' selected. The third is 'Maintenance Performed' with 'Cleaned' selected. A red circle is drawn around the 'Maintenance Performed' field and its dropdown menu.

Figure 57. Closing an inspection record.

6. Querying Information from the Database

This section provides a brief introduction/overview into how to query data using Arc GIS On-Line. The database can be queried by one or more attributes in the feature class **or** related tables (inspection results). To view feature class and inspection data together, the GIS Unit has set up dedicated application to be used by specific users. The Drainage Network Inspection Viewers Application combines condition inspection information with feature class data. The Illicit Discharge Detection and Elimination "Screening/Sampling Inspection Viewer" combines Screening/Sampling inspection data with feature class data. Please contact the CTDOT GIS Unit to request access to either of these applications. Otherwise the basics on how to query the database using the standard Drainage Network Office Editors application is provided below.

1. Click on the layer list icon in the upper righthand corner and click on the three dots next to the feature class you are interested in querying.

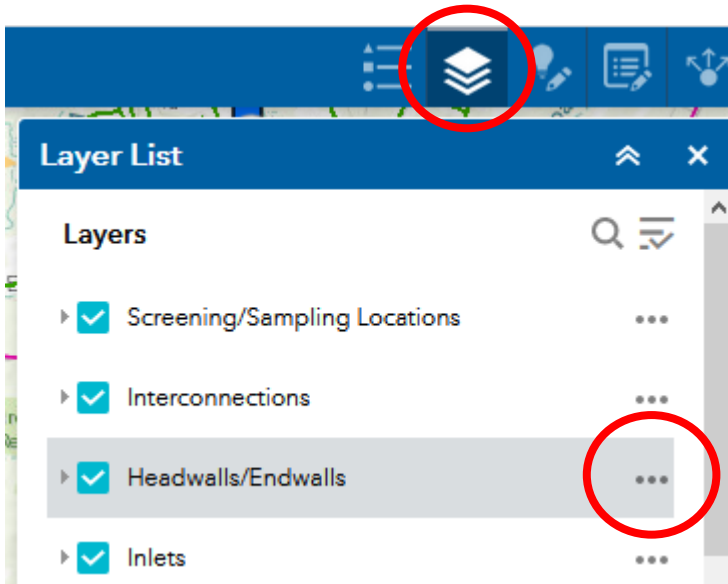


Figure 58. Querying the Database Screen Shot 1

2. Select "view in attribution table".

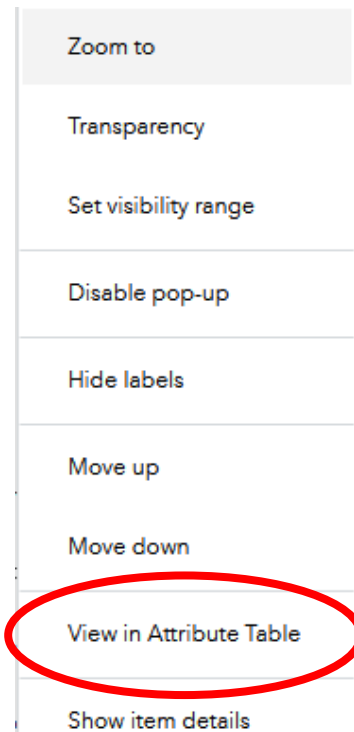


Figure 59. Querying the Database Screen Shot 2

3. Select the "Options" tab in the upper left-hand corner of the attribution table

OBJECTID	ID	Catchment ID	Project Number	Year Installed	Data Source	Owned By	M
2	170-HE-2				State - Field	CTDOT	C
3	170-HE-3				State - Construction Plans	CTDOT	C

Figure 60. Querying the Database Screen Shot 3

4. Select "Filter" from the dropdown menu
5. Select "Add Expression" at the top of the pop up. Multiple expressions can be added to query multiple attributes at once. In the example below, the query provides the number of Headwall/Endwalls on Route 8 in the Town of Ansonia that are in the database (21 as of 12/1/2020).

Filter ×

+ Add expression + Add set

Display features in the layer that match the following expression

Without filter expressions defined, this query task will list all features in the specified data source.

OK Cancel

Figure 61. Querying the Database Screen Shot 4

Filter ✕

[+ Add expression](#) [+ Add set](#)

Display features in the layer that match all of the following expressions ▼

Town (String) ▼ is ▼ Ansonia ▼ ⚙️ ✕

Case sensitive

Highway (String) ▼ is ▼ 8 ▼ ⚙️ ✕

Case sensitive

OK Cancel

Figure 62. Querying the Database Screen Shot 5

OBJECTID	ID	Catchment ID	Project Number	Year Installed	Data Source
671	170-HE-671		0036-0073	1956	State - Constr Plans
672	170-HE-672		0036-0073	1956	State - Constr Plans
673	170-HE-673		0036-0073	1956	State - Constr Plans
674	170-HE-674		0036-0073	1956	State - Constr Plans

.21 features 0 selected

Figure 63. Querying the Database Screen Shot 6

Appendix A

Stormwater Asset Database Attributes

Headwalls/Endwalls					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID	text				
ID	text				Length 14
Catchment ID	text				Length 14
Project Number	short integer	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	drop down	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Type	drop down	Allow Null - No	Default - no default	Domain - swHEType	Length 30
Flow Direction	drop down				
Material	drop down	Allow Null - No	Default - Concrete	Domain - swHEMaterial	Length 30
Outlet Protection	drop down	Allow Null - No	Default - None	Domain - swHEOutletProtection	Length 40
MS4 System Outfall	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Outfall Directly Connected	drop down				
Town	text	Allow Null - No	Default - No Default	Domain - genTowns	Length 35
LRS ID	drop down	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	text	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	drop down	Allow Null - Yes	Default - No default	Domain - No domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Requires Traffic Control	drop down				

Status	drop down	Allow Null - No	Default - Inspection Not Completed	Domain - swStatus	Length 30
Archive Status	short integer	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15
Archive Year	Text	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Comments		Allow Null - Yes	Default - No default		Length 255

Headwall/Endwall Inspection Form					
Field Name	Type	Allow Null	Default	Domain	Length
Inspection Reason	drop down	Allow Null - No	Default - Condition Rating	Domain - swInspectionReason	Length 30
Inspection ID	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 30
Inspection Date	date	Allow Null - Yes			
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Erosion	drop down	Allow Null - No	Default - None	Domain - swSeverity	Length 12
Outlet Protection	drop down	Allow Null - No	Default - None	Domain - swOutletProtection	Length 10
Scour	drop down	Allow Null - No	Default - None	Domain - swSeverity	Length 12
Perched Outlet	drop down	Allow Null - No	Default - No	Domain - swHEPerchedOutlet	Length 10
Waterway Adequacy	drop down	Allow Null - No	Default - N/A	Domain - swHEWaterwayAdequacy	Length 10
Condition	drop down	Allow Null - No	Default - No Default	Domain - swCondition	Length 20
Maintenance Needed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Maintenance Performed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Cost of Work Performed	double	Allow Null - Yes	Default - No default	Domain - swCostOfWork	double
Comments	text	Allow Null - Yes	Default - No default		

Inlets					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	text				Length 14
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	YYYY	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Type	drop down	Allow Null - No	Default - No default	Domain - swInletType	Length 30
Material	drop down	Allow Null - No	Default - no default	Domain - swInletMaterial	Length 30
Top Of Frame To Bottom Of Structure (feet)	float - HIDE	Allow Null - Yes	Default - No default	Domain - swRange0to30	float
Top Of Frame To Lowest Invert Out (feet)	float - HIDE	Allow Null - Yes	Default - No default	Domain - swRange0to30	float
Sump (feet)	float	Allow Null - Yes	Default - No default	Domain - swRange0to30	float
Datum of Plans	drop down	Allow Null - No	Default - NAD 83	Domain - swPlanDatums	Length 15
Top of Frame Elevation	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Lowest Invert Out Elevation	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Bottom of Structure Elevation	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Town	drop down	Allow Null - No	Default - No Default	Domain - bndTowns	Length 35
LRS ID	text - HIDE	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - Yes	Default - No Default	Domain - no domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No Default	Domain - bndMaintenanceGarages	Length 35

Maintenance District	drop down	Allow Null - No	Default - No Default	Domain - bndMaintenanceDistricts	Length 1
Requires Traffic Control	drop down				
Status	drop down	Allow Null - No	Default - Inspection Not Completed	Domain - swStatus	Length 30
Archive Status	drop down	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15
Archive Year	short integer	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Comments	Text	Allow Null - Yes	Default - No default		Length 255

Inlet Inspection Form					
Field Name	Type	Allow Null	Default	Domain	Length
Inspection Reason	drop down	Allow Null - No	Default - Condition Rating	Domain - swInspectionReason	Length 30
Inspection ID	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 30
Inspection Date	date	Allow Null - Yes			
Inspection Type	drop down	Allow Null - Yes	Default - no default	Domain - swInletInspectionType	Length 40
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Erosion	drop down	Allow Null - No	Default - None	Domain - swSeverity	Length 12
Siltation	drop down	Allow Null - No	Default - None	Domain - swSeverity	Length 12
Grate/Cover Condition	drop down	Allow Null - No	Default - no default	Domain - swGrate	Length 10
Top Resetting	drop down	Allow Null - No	Default - No	Domain - swInletTopResetting	Length 25
Condition	drop down	Allow Null - No	Default - No Default	Domain - swCondition	Length 20
Maintenance Needed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Maintenance Performed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Cost of Work Performed	long integer	Allow Null - Yes	Default - No default	Domain - swCostOfWork	long integer
Comments	text	Allow Null - Yes	Default - No default	Length 255	
Depth TOF To Bottom Of Structure (feet)	float - HIDE	Allow Null - No	Default - no default	Domain - swRange0to30	float
Depth TOF To Top Of Sediment (feet)	float - HIDE	Allow Null - No	Default - no default	Domain - swRange0to30	float
Depth of Sediment (feet)	float	Allow Null - Yes	Default - no default	Domain - swRange0to30	float
Depth TOF To Invert Out (feet)	float - HIDE	Allow Null - No	Default - no default	Domain - swRange0to30	float
Depth of Sump (feet)	float	Allow Null - Yes	Default - no default	Domain - swRange0to30	float
Sediment Level In Sump (%)	float - HIDE	Allow Null -Yes	Default - No default	Domain - swRange0to100	float
Cleaning Completed	drop down	Allow Null - Yes	Default - No	Domain - genYesNo	Length 3
Sediment Removed (cubic ft)	short integer	Allow Null - Yes	Default - No default	Domain - swRange0to300	short integer

Manholes					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	text				Length 14
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	YYYY	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Type	drop down	Allow Null - No	Default - no default	Domain - swMHType	Length 25
Key Junction	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Structure Cover	drop down	Allow Null - No	Default - Metal	Domain - MHStructureCover	Length 10
Top Of Frame To Bottom Of Structure (feet)	float - HIDE	Allow Null - Yes	Default - No default	Domain - swFloatRange0to30	float
Top Of Frame To Lowest Invert Out (feet)	float - HIDE	Allow Null - Yes	Default - No default	Domain - swRange0to30	float
Sump (feet)	float	Allow Null - Yes	Default - No default	Domain - swRange0to30	float
Datum of Plans	drop down	Allow Null - No	Default - NAD 83	Domain - swPlanDatums	Length 10
Top of Frame Elevation	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Lowest Invert Out Elevation	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Bottom of Structure Elevation	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Town	drop down	Allow Null - No	Default - No Default	Domain - bndTowns	Length 35
LRS ID	text - HIDE	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30

Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - Yes	Default - No Default	Domain - no domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No Default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No Default	Domain - bndMaintenanceDistricts	Length 1
Requires Traffic Control	drop down				
Status	drop down	Allow Null - No	Default - Inspection Not Completed	Domain - swStatus	Length 30
Archive Status	drop down	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15
Archive Year	short integer	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Comments	Text	Allow Null - Yes	Default - No default	Length 255	

Manhole Inspection Form					
Field Name	Type	Allow Null	Default	Domain	Length
Inspection Reason	drop down	Allow Null - No	Default - Condition Rating	Domain - swInspectionReason	Length 30
Inspection ID	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 30
Inspection Date	date	Allow Null - Yes			
Inspection Type	drop down	Allow Null - Yes	Default - no default	Domain - swMHInspectionType	Length 40
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Grate/Cover Condition	drop down	Allow Null - No	Default - no default	Domain - swGrate	Length 10
Condition	drop down	Allow Null - No	Default - No Default	Domain - swCondition	Length 20
Maintenance Needed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Maintenance Performed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Cost of Work Performed	long integer	Allow Null - Yes	Default - No default	Domain - swCostOfWork	long integer
Comments	text	Allow Null - Yes	Default - No default		Length 255
Depth TOF to Bottom of Structure (feet)	float - HIDE	Allow Null - No	Default - no default	Domain - swRange0to30	float
Depth TOF to Top of Sediment (feet)	float - HIDE	Allow Null - No	Default - no default	Domain - swRange0to30	float
Depth of Sediment (feet)	float	Allow Null - Yes	Default - no default	Domain - swRange0to30	float
Depth TOF to Invert Out (feet)	float - HIDE	Allow Null - No	Default - no default	Domain - swRange0to30	float
Depth of Sump (feet)	float	Allow Null - Yes	Default - no default	Domain - swRange0to30	float
Sediment Level In Sump (%)	float - HIDE	Allow Null -Yes	Default - No default	Domain - swRange0to100	float
Cleaning Completed	drop down	Allow Null - Yes	Default - No	Domain - genYesNo	Length 3
Sediment Removed (cubic ft)	short integer	Allow Null - Yes	Default - No default	Domain - swRange0to300	short integer

Closed Conveyance					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	text				Length 14
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	YYYY	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Water Type	drop down	Allow Null - No	Default - Stormwater only	Domain - swWaterType	Length 35
Material	drop down	Allow Null - No	Default - no default	Domain - swCCMaterial	Length 50
Conveyance Type	drop down	Allow Null - No	Default - Round	Domain - swCCType	Length 35
Diameter (inches)	short integer	Allow Null - Yes	Default - no default	Domain - swRange0To250	short integer
Height (inches)	short integer	Allow Null - Yes	Default - no default	Domain - swRange0To250	short integer
Width (inches)	short integer	Allow Null - Yes	Default - no default	Domain - swRange0To250	short integer
Length (linear ft)	float	Allow Null - Yes	Default - no default	Domain - No default	float
Datum of Plans	drop down	Allow Null - No	Default - NAD 83	Domain - swPlanDatums	Length 10
Elevation In	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Elevation Out	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Town	drop down	Allow Null - No	Default - No Default	Domain - bndTowns	Length 35
LRS ID	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35

Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Requires Traffic Control	drop down				
Status	drop down	Allow Null - No	Default - Inspection Not Completed	Domain - swStatus	Length 30
Archive Status	drop down	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15
Archive Year	short integer	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Comments	Text	Allow Null - Yes	Default - No default	Length 255	

Closed Conveyance Inspection Form					
Field Name	Type	Allow Null	Default	Domain	Length
Inspection Reason	drop down	Allow Null - No	Default - General Condition Rating	Domain - swDetailedInspectionReason	Length 40
Inspection ID	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 30
Inspection Date	date	Allow Null - Yes			
Inspection Type	drop down	Allow Null - Yes	Default - no default	Domain - swCCInspectionType	Length 40
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Road Abnormalities	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Road Abnormalities Comments	text	Allow Null - Yes	Default - No default	Domain - no domain	Length 175
Silt % Full	drop down				
Road Abnormalities	drop down				
Condition	drop down	Allow Null - No	Default - No Default	Domain - swCondition	Length 20
Maintenance Needed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Maintenance Performed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Sediment Removed (cubic ft)	short integer	Allow Null - Yes	Default - No default	Domain - swRange0To300	short integer
Cost of Work Performed	long integer	Allow Null - Yes	Default - No default	Domain - swCostOfWork	long integer
Comments	text	Allow Null - Yes	Default - No default	Domain - no domain	Length 255
Siltation/Debris	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swSeverityDetailedInspection	length 40
Visible Waterline	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swSeverityDetailedInspection	length 40
Water Leakage	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swSeverityDetailedInspection	length 40
Alignment	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Joints	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Concrete	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40

CC Shape	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Horizontal Diameter	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Seams	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Corrosion And Rust	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Detailed Inspection Comments	text	Allow Null - Yes	Default - No default		Length 255

Open Conveyance					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	text				Length 14
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	YYYY	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Cover	drop down	Allow Null - No	Default - no default	Domain - swCover	Length 10
Height (inches)	short integer	Allow Null - Yes	Default - no default	Domain - swRange0To250	short integer
Width (inches)	short integer	Allow Null - Yes	Default - no default	Domain - swRange0To250	short integer
Length (linear ft)	float	Allow Null - Yes	Default - no default	Domain - no domain	float
Datum of Plans	drop down	Allow Null - No	Default - NAD 83	Domain - swPlanDatums	Length 10
Elevation In	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Elevation Out	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Town	drop down	Allow Null - No	Default - No Default	Domain - genTowns	Length 35
LRS ID	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - No	Default - No Default	Domain - no domain	Length 40
Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Requires Traffic Control	drop down				
Status	drop down	Allow Null - No	Default - Inspection Not Completed	Domain - swStatus	Length 30
Archive Status	drop down	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15

Archive Year	short integer	Allow Null - Yes	Default - no default	Domain - Range 1790 - 2100	short integer
Comments	Text	Allow Null - Yes	Default - No default		Length 255

Open Conveyance Inspection Form					
Field Name	Type	Allow Null	Default	Domain	Length
Inspection Reason	drop down	Allow Null - No	Default - Condition Rating	Domain - swInspectionReason	Length 30
Inspection ID	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 30
Inspection Date	date	Allow Null - Yes			
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Need To Remove Trash Or Debris	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Erosion	drop down	Allow Null - No	Default - None	Domain - swSeverity	Length 12
Check Dams In Need Of Repair	drop down	Allow Null - No	Default - No	Domain - genYesNoNA	Length 3
Inlet/Outlet Needs Repair	drop down	Allow Null - No	Default - No	Domain - swInletsOutlets	Length 10
Condition	drop down	Allow Null - No	Default - No Default	Domain - swCondition	Length 20
Maintenance Needed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Maintenance Performed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Sediment Removed (cubic yards)	short integer	Allow Null - Yes	Default - No default	Domain - swRange0To300	short integer
Cost of Work Performed	long integer	Allow Null - Yes	Default - No default	Domain - swCostOfWork	long integer
Comments	text	Allow Null - Yes	Default - No default		Length 255

Culvert					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	text				Length 14
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	YYYY	Allow Null - Yes	Default - no default	Domain - range 1790 - 2100	short integer
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Material	drop down	Allow Null - No	Default - no default	Domain - swCCMaterial	Length 50
Conveyance Type	drop down	Allow Null - No	Default - Round	Domain - swConveyanceTypeCulvert	Length 35
Bridge ID	text	Allow Null - Yes	Default - no default	Domain - no domain	Length 10
Diameter (inches)	Short Integer	Allow Null - Yes	Default - no default	Domain - swRange0to250	Short Integer
Height (inches)	Short Integer	Allow Null - Yes	Default - no default	Domain - swRange0to250	Short Integer
Width (inches)	Short Integer	Allow Null - Yes	Default - no default	Domain - swRange0to250	Short Integer
Length (linear ft)	float	Allow Null - Yes	Default - no default	Domain - No domain	float
Datum of Plans	drop down	Allow Null - No	Default - NAD 83	Domain - swPlanDatums	Length 10
Elevation In	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Elevation Out	float	Allow Null - Yes	Default - No default	Domain - swRangeNeg30To2300	float
Percent Slope	float	Allow Null - Yes	Default - no default	Domain - swRange0to50	float
Water Type	drop down	Allow Null - No	Default - Stormwater Only	Domain - swWaterType	Length 35
Watercourse Name	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 75
Town	dropdown	Allow Null - No	Default - No Default	Domain - bndTowns	Length 35
LRS ID	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 50

Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Requires Traffic Control	drop down				
Status	drop down	Allow Null - No	Default - Inspection Not Completed	Domain - swStatus	Length 30
Archive Status	drop down	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15
Archive Year	short integer	Allow Null - Yes	Default - no default	Domain - Range 1790 - 2100	short integer
Comments	Text	Allow Null - Yes	Default - No default		Length 255

Culvert Inspection Form					
Field Name	Type	Allow Null	Default	Domain	Length
Inspection Reason	drop down	Allow Null - No	Default - General Condition Rating	Domain - swDetailedInspectionReason	Length 40
Inspection ID	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 30
Inspection Date	date	Allow Null - Yes			
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Inspection Type	drop down	Allow Null - No	Default - no default	Domain - swCVInspectionType	Length 40
Silt % Full	drop down				
Cover (ft)	drop down	Allow Null - No	Default - No default	Domain - swRange0to100	short integer
Road Abnormalities	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Road Abnormalities Comments	text	Allow Null - Yes	Default - No default	Length 175	
Road Abnormalities	drop down				
Condition	drop down	Allow Null - No	Default - No Default	Domain - swCondition	Length 20
Maintenance Needed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Maintenance Performed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Sediment Removed (cubic ft)	short integer	Allow Null - Yes	Default - No	Domain - swRange0to300	short integer
Cost of Work Performed	long integer	Allow Null - Yes	Default - No default	Domain - swCostOfWork	long integer
Comments	text	Allow Null - Yes	Default - No default		Length 255
Siltation Debris	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swSeverityDetailedInspection	length 40
Visible Waterline	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swSeverityDetailedInspection	length 40
Water Leakage	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swSeverityDetailedInspection	length 40
Alignment	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Joints	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40

Concrete	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Culvert Shape	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Horizontal Diameter	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Seams	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Corrosion And Rust	drop down	Allow Null - No	Default - Detailed Inspection Required	Domain - swDetailedInspection	length 40
Detailed Inspection Comments	text	Allow Null - Yes	Default - No default		Length 255

BMP					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	text				Length 14
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	YYYY	Allow Null - Yes	Default - no default	Domain - range 1790 - 2100	short integer
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
BMP Type	drop down	Allow Null - No	Default - no default	Domain - swBMPTType	Length 40
WQV Requirement	drop down				
DCIA Captured (acres)	float	Allow Null - Yes	Default - no default	Domain - Range0to200	float
BMP Disconnection Credit (%)	float	Allow Null - Yes	Default - no default	Domain - Range0to100	float
BMP DCIA Disconnection Credit (ac)	float	Allow Null - Yes	Default - no default	Domain - Range0to200	float
Design WQV Retained (acre-feet)	float	Allow Null - Yes	Default - no default	Domain - Range0to200	float
Design WQV Treated (acre-feet)	float	Allow Null - Yes	Default - no default	Domain - Range0to200	float
Design Infiltration Rate (in/hr)	float	Allow Null - Yes	Default - no default	Domain -Range0to10	float
Constructed WQV Retained (acre-feet)	float	Allow Null - Yes	Default - no default	Domain - Range0to200	float
Constructed WQV Treated (acre-feet)	float	Allow Null - Yes	Default - no default	Domain - Range0to200	float
Forebay	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Underdrain	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Town	drop down	Allow Null - No	Default - No Default	Domain - genTowns	Length 35

LRS ID	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Requires Traffic Control	drop down				
Status	drop down	Allow Null - No	Default - Inspection Not Completed	Domain - swStatus	Length 30
Archive Status	drop down	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15
Archive Year	short integer	Allow Null - Yes	Default - no default	Domain - Range 1790 - 2100	short integer
Access Notes	Text	Allow Null - Yes	Default - No default		Length 255
Comments	Text	Allow Null - Yes	Default - No default		Length 255

BMP Inspection Form					
Field Name	Type	Allow Null	Default	Domain	Length
Inspection Reason	drop down	Allow Null - No	Default - Condition Rating	Domain - swInspectionReason	Length 30
Inspection ID	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 30
Inspection Date	date	Allow Null - No			
Inspection Type	drop down	Allow Null - Yes	Default - no default	Domain - swBMPInspectionType	Length 40
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Siltation/Debris	drop down	Allow Null - No	Default - None	Domain - swSeverity	Length 12
Vegetation/Planting Work Needed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Erosion	drop down	Allow Null - No	Default - None	Domain - swSeverity	Length 12
Infiltration Practice	drop down	Allow Null - No	Default - N/A	Domain - genYesNoNA	Length 3
Filtration Practice	drop down	Allow Null - No	Default - No	Domain - genYesNoNA	Length 3
Components In Need of Repair	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Inlet/Outlet Needs Repair	drop down	Allow Null - No	Default - No	Domain - swInletsOutlets	Length 10
Condition	drop down	Allow Null - No	Default - No Default	Domain - swCondition	Length 20
Maintenance Needed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Maintenance Performed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Sediment Removed (cubic yards)	short integer	Allow Null - Yes	Default - No default	Domain - swRange0to300	short integer
Cost of Work Performed	long integer	Allow Null - Yes	Default - No default	Domain - swCostOfWork	long integer
Comments	text	Allow Null - Yes	Default - No default		Length 255

Other Drainage					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	<i>text</i>				
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	YYYY	Allow Null - Yes	Default - no default	Domain - Range 1790 - 2100	short integer
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Other Stormwater Infrastructure	drop down	Allow Null - No	Default - No default	Domain - swODInfrastructure	Length 20
Town	drop down	Allow Null - No	Default - No Default	Domain - genTowns	Length 35
LRS ID	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - No	Default - No Default	Domain - no domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Status	drop down	Allow Null - No	Default - Inspection Not Completed	Domain - swStatus	Length 30
Archive Status	drop down	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15
Archive Year	short integer	Allow Null - Yes	Default - no default	Domain - Range 1790 - 2100	short integer
Comments	Text	Allow Null - Yes	Default - No default		Length 255

Other Drainage Inspection Form					
Field Name	Type	Allow Null	Default	Domain	Length
Inspection Reason	drop down	Allow Null - No	Default - Condition Rating	Domain - swInspectionReason	Length 30
Inspection ID	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 30
Inspection Date	date	Allow Null - Yes			
Inspection Type	drop down	Allow Null - Yes	Default - no default	Domain - swODInspectionType	Length 40
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Siltation/Debris	drop down	Allow Null - No	Default - None	Domain - swSeverity	Length 12
Erosion	drop down	Allow Null - No	Default - None	Domain - swSeverity	Length 12
Any Components in Need of Repair or Replacement	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Condition	drop down	Allow Null - No	Default - No Default	Domain - swCondition	Length 20
Maintenance Needed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Maintenance Performed	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Cost of Work Performed	long integer	Allow Null - Yes	Default - No default	Domain - swCostOfWork	long integer
Comments	text	Allow Null - Yes	Default - No default		Length 255

Blind Ties					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	<i>text</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	YYYY	Allow Null - Yes	Default - no default	Domain - swYears	short integer
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Town	drop down	Allow Null - No	Default - No Default	Domain - bndTowns	Length 35
LRS ID	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighways	Length 4
Local Road Name	text	Allow Null - Yes	Default - No Default	Domain - no domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No Default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No Default	Domain - bndMaintenanceDistricts	Length 1
Archive Status	drop down	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15
Archive Year	short integer	Allow Null - Yes	Default - no default	Domain - swYears	short integer 1790 - 2100
Comments	Text	Allow Null - Yes	Default - No default		Length 255

Interconnections					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	<i>text</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Year Installed	YYYY	Allow Null - Yes	Default - no default	Domain - range 1790 - 2100	short integer
Data Source	drop down	Allow Null - No	Default - State - Construction Plans	Domain - swDataSource	Length 30
Owned By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Owner Confirmed	drop down	Allow Null - No	Default - No	Domain - genYesNo	length 3
Maintained By	drop down	Allow Null - No	Default - CTDOT	Domain - swOwnedByMaintainedBy	Length 35
Interconnection Structure	drop down	Allow Null - No	Default - No default	Domain - swICStructure	Length 20
Entering From	drop down	Allow Null - No	Default - No default	Domain - swICEnteringFrom	Length 40
Exiting To	drop down	Allow Null - No	Default - No default	Domain - swICExitingTo	Length 40
Connection Agreement	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Agreement Date	date	Allow Null - Yes			
Town	drop down	Allow Null - No	Default - No Default	Domain - bndTowns	Length 35
LRS ID	text	Allow Null - Yes	Default - No default	Domain -No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Location Description	<i>text</i>	Allow Null - Yes	Default - No default		Length 75
Archive Status	drop down	Allow Null - No	Default - Active	Domain - swArchiveStatus	Length 15
Archive Year	short integer	Allow Null - Yes	Default - no default	Domain - Range 1790 - 2100	short integer
Comments	<i>text</i>	Allow Null - Yes	Default - No default		Length 255

Virtual Drain Lines					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length14
Catchment ID	<i>text</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Water Type	drop down	Allow Null - No	Default - Stormwater Only	Domain - swWaterType	Length 35
Watercourse Name	text	Allow Null - Yes	Default - no default	Domain - No domain	Length 75
Town	drop down	Allow Null - No	Default - No Default	Domain - bndTowns	Length 35
LRS ID	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Comments	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 255

Screening Sampling Locations					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
Screening / Sampling ID	text				Length 14
Catchment ID	text	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
IDDE Priority	drop down				
Asset Type	text	Allow Nulls - No	Default - Outfall	Domain - swSSAssetType	Length 20
Priority Category	text				
Associated Asset ID	text	Allow Nulls - No	Default - No Default	Domain - No Domain	Length 14
Screening/Sampling Date	Date	Allow Nulls - Yes			
Screening/Sampling Phase	Drop down	Allow Nulls - No	Default - Not Screened	Domain - swSSPhase	Length 55
Town	drop down	Allow Null - No	Default - No Default	Domain - genTowns	Length 35
LRS ID	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4
Local Road Name	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Comments	text	Allow Null - Yes	Default - No default		Length 255
Regional Drainage Basin	string				Length 30
Subregional Drainage Basin	string				Length 30
Subregional Drainage Basin Number	small integer				width 4
Directly Connected To Waterway	drop down				
Directly Connected To Stormwater Impaired Waterway	drop down				
Stormwater Impairment Cause	text				Length 255

Screening Sampling Inspection Form					
Field Name	Type	Allow Null	Default	Domain	Length
Type	drop down	Allow Null - No	Default - No default	Domain - swSSType	Length 30
Screening/Sampling Inspection ID	text	Allow Null - Yes	Default - no default	Domain - No domain	Length - 30
Inspection Date	date	Allow Null - Yes			
Air Temperature (Fahrenheit)	short integer	Allow Null - No	Default - No default	Domain - swRange0To100short	short integer
Inspection Type	drop down	Allow Null - Yes	Default - no default	Domain - swSSInspectionType	Length 20
Requires Traffic Control	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Flow Present During Dry Weather	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Olfactory Evidence Of Illicit Discharge	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Visual Evidence Of Illicit Discharge	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Comments	text	Allow Null - Yes	Default - No default	Length 255	
Ammonia (mg/l)	float	Allow Null - Yes	Default - No default	Domain Range 0.00 - 100.00	float
Chlorine (mg/l)	float	Allow Null - Yes	Default - No default	Domain Range 0.00 - 100.00	float
Conductivity (mg/l)	float	Allow Null - Yes	Default - No default	Domain Range 0.00 - 500.00	float
Salinity (mg/l)	float	Allow Null - Yes	Default - No default	Domain Range 0.00 - 100.00	float
Surfactants (mg/l)	float	Allow Null - Yes	Default - No default	Domain Range 0.00 - 100.00	float
Water Temperature (Fahrenheit)	short integer	Allow Null - Yes	Default - No default	Domain - swTemperature	range 32 - 100
Other Field Results	float	Allow Null - Yes	Default - No default	Domain Range 0 - 10000	float
E Coli (cols/100mls)	short integer	Allow Null - Yes	Default - No default	Domain Range 0 - 10000	short integer
Total Coliform (col/100mls)	short integer	Allow Null - Yes	Default - No default	Domain Range 0 - 10000	short integer

Enterococci (cols/100mls)	short integer	Allow Null - Yes	Default - No default	Domain Range 0 - 10000	short integer
Fecal Coliform (col/100mls)	short integer	Allow Null - Yes	Default - No default	Domain Range 0 - 10000	short integer
Nitrogen (mg/l)	float	Allow Null - Yes	Default - No default	Domain Range 0.00 - 1000.00	float
Phosphorus (mg/l)	float	Allow Null - Yes	Default - No default	Domain Range 0.00 - 1000.00	float
Mercury (mg/l)	float	Allow Null - Yes	Default - No default	Domain Range 0 - 10000	float
Other Lab Results	float	Allow Null - Yes	Default - No default	Domain Range 0 - 10000	float
Turbidity In Stream (NTUs)	float	Allow Null - Yes	Default - No default	Domain Range 0 - 10000	float
Turbidity At Outfall (NTUs)	float	Allow Null - Yes	Default - No default	Domain Range 0 - 10000	float
Turbidity Difference Greater Than 5 NTUS	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3

Potential BMPs					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
ID					Length 14
Catchment ID	text				Length 14
Project Number	<i>String</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Owned By	drop down				
Maintained By	drop down				
BMP Design Status	drop down				
BMP Type	drop down	Allow Null - No	Default - no default	Domain - swBMPTYPE	Length 40
Site Constraints	drop down				
WQV Requirement	drop down				
DCIA Captured (acres)	float	Allow Null - Yes	Default - no default	Domain - Range 0to500	float
BMP Disconnection Credit (%)	float				
BMP DCIA Disconnection Credit (ac)	float				
Design WQV Retained (acre-feet)	float	Allow Null - Yes	Default - no default	Domain - Range0to200	float
Design WQV Treated (acre-feet)	float	Allow Null - Yes	Default - no default	Domain - Range0to200	float
Design Infiltration Rate (in/hr)	float	Allow Null - Yes	Default - no default	Domain -Range0to10	float
Nitrogen Reduction (lbs/yr)	float	Allow Null - Yes	Default - no default	Domain -Range0to100	float
Nitrogen Reduction %	float	Allow Null - Yes	Default - no default	Domain -Range0to100	float
Phosphorus Reduction (lbs/yr)	float	Allow Null - Yes	Default - no default	Domain -Range0to100	float
Phosphorus Reduction %	float	Allow Null - Yes	Default - no default	Domain -Range0to100	float
Forebay	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Underdrain	drop down	Allow Null - No	Default - No	Domain - genYesNo	Length 3
Town	drop down	Allow Null - No	Default - No Default	Domain - genTowns	Length 35
LRS ID	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 20
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Highway	text	Allow Null - No	Default - No Default	Domain - hwyHighwaysNA	Length 4

Local Road Name	text	Allow Null - Yes	Default - No default	Domain - No domain	Length 50
Maintenance Garage	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceGarages	Length 35
Maintenance District	drop down	Allow Null - No	Default - No default	Domain - bndMaintenanceDistricts	Length 1
Requires Traffic Control	drop down				
Comments	Text	Allow Null - Yes	Default - No default		Length 255

Catchment					
Field Name	Type	Allow Null	Default	Domain	Length
Global ID					
Catchment ID	<i>text</i>	Length 14			
DEEP Basin ID	<i>text</i>				
Associated HE ID	<i>text</i>				
Associated BMP ID	<i>text</i>				
Associated Screening / Sampling ID	<i>text</i>				
Source of Catchment Area	drop down				
IDDE Priority	drop down				
SVF Notes	Text	Allow Null - Yes	Default - No default	Length 255	
Treatment Status	drop down				
Disconnection Status	drop down				
Project Number	<i>text</i>	Allow Null - Yes	Default - no default	Domain - no domain	Length 12
Total Drainage Area (Square Feet)	<i>number</i>				
Total Impervious Area (Square Feet)					
Total Directly Connected Impervious Area (Square Feet)	number				
CTDOT Drainage Area (Square Feet)	<i>number</i>				
CTDOT Impervious Area (Square Feet)					
CTDOT Directly Connected Impervious Area (Square Feet)	number				
Location	drop down	Allow Null - No	Default - Highway	Domain - swLocation	Length 30
Comments	Text	Allow Null - Yes	Default - No default		Length 255

Appendix B

Additional Information for Consultants Completing Illicit Discharge Screening or Sampling Work

Analytical Action Levels that Require an Investigation

The permit specifies the following action or trigger levels for analytical results from field test:

- Ammonia ≥ 0.5 mg/l
- Surfactants ≥ 0.25 mg/l
- Chlorine – Any detectable level

Bacteria action levels vary based on the type of receiving water body (see Figure 64 below). Note that if ammonia or surfactants or chlorine (ANY of the three) is detected at or above action levels, then a bacteria sample should be collected and sent to a laboratory. Conversely, if field sampling does not detect any of these analytes above their respective action levels, then a bacteria sample does **NOT** need to be collected.

Water Quality Targets for Waters for Which Bacteria is a Stormwater Pollutant of Concern				
Water Quality Classification	E. Coli (Freshwater Rec) (cols/100mls)	Enterococci (Marine Rec) (cols/100mls)	Fecal Coliform (Marine Shellfishing) (cols/100mls)	Total Coliform (Freshwater Drinking) (cols/100mls)
AA	Instantaneous designated swimming 235 / Non designated Swimming 410 / All other Recreation 576 Geomean 126	N/A	N/A	Monthly Moving average <100 / Single Sample Maximum 500
A	Same as AA	N/A	N/A	N/A
B	Same as AA	N/A	N/A	N/A
SA (Direct Consumption)	N/A	Instantaneous Designated Swimming 104 / Instantaneous All other Uses 500 / Geomean 35	Geomean 14 / 90% of samples <31	N/A
SB (Indirect Consumption)	N/A	Same as SA waters	Geomean 88 / 90% of samples < 260	N/A

Figure 64. Water Quality Targets for Waters for Which Bacteria is a Stormwater Pollutant of Concern.

Dry Weather S/S Flow Chart



- Drawing Order**
- Map
 - WWD Boundaries and Plots
 - Screening Sampling Locations
 - Not Screened
 - Screening/Sampling Complete
 - Maintenance Needed/Unable to Screen
 - Need to Rescreen
 - Need to Wet Weather Sample
 - Pending Lab Results
 - Need to Investigate
 - Investigation Complete - Source Identified
 - Need Confirmatory Screen & Sampling
 - Not Found

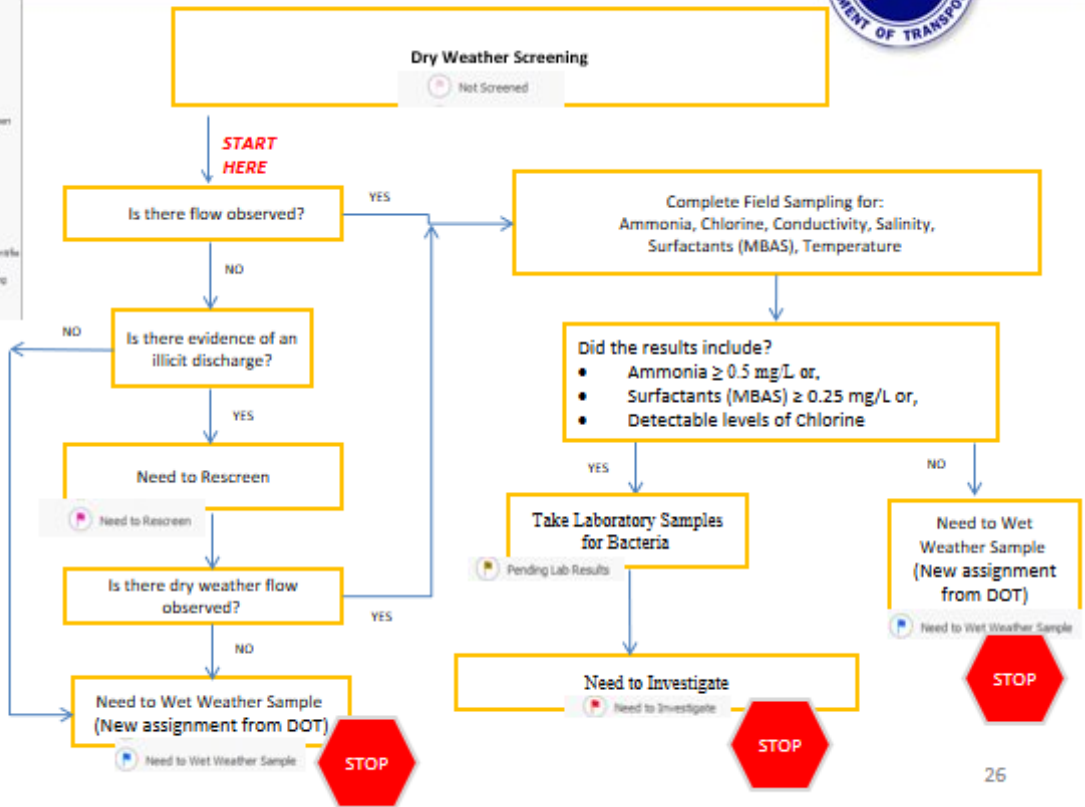


Figure 65. Dry Weather Screening/Sampling Flow Chart.

Wet Weather S/S Flow Chart

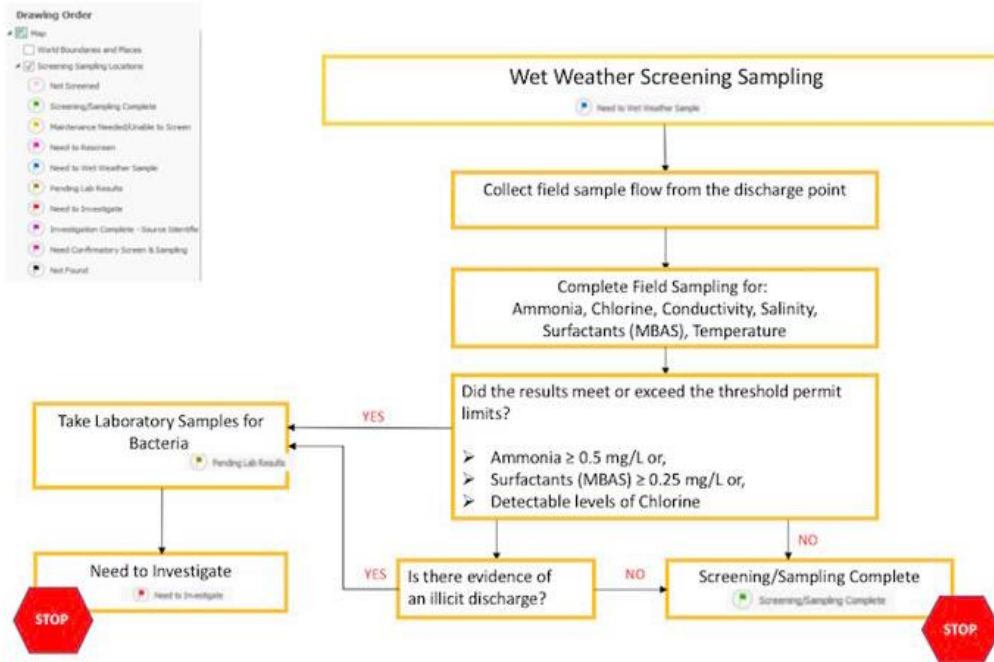


Figure 66. Wet Weather Screening/Sampling Flow Chart.