

The background is a collage of three photographs. The left photo shows three people in safety gear inspecting a large pipe in a grassy area. The top right photo shows a person with long hair looking out over a body of water with reeds. The bottom right photo shows a small pond or stream in a natural setting.

Using GIS Tools to Facilitate MS4 Inspections and Maintenance

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Annual Stormwater Control Measure (SCM) Inspection Report
WET POND

Project Name: Inspection Date:
SCM Location: SCM ID Number:
(If applicable and as labeled on Town-approved Construction Plans)

Code Key:
N/A = Not Applicable M = Monitor (potential for future problem)
NP = Not a Problem WN = Work Needed (not consistent with approved plans)



Assessment	Code	Comments
Obstruction: vegetation/debris/sediment		
Structural condition		
Erosion/undercutting		
Dissipater pad condition		
Other (describe)		

Assessment	Code	Comments
Sediment/debris accumulation		
Side slope erosion		
Invasive vegetation		
Other (describe)		

Assessment	Code	Comments
Visible pollution/muddiness		
Sediment/debris accumulation		
Plants are dead, diseased, or dying (Replace such plants as necessary per original approved construction plans.)		
Vegetation length (too short/too long)		
Bare soil/erosive gullies		
Invasive vegetation (estimate a %)		
Algae cover (estimate a %)		
Other (describe)		

Wet Pond Inspection Report

A	B	C	D	E	F	G	H	I	J	K
Month Due (2022)	SCM Site	SCM(s)	30-day test	Report Received	Result	Re-test due	Re-test passed	Inspection Company	Routine Maintenance	Notes
JANUARY	Apex Fire Storage	1 wet pond	12/20/2021	1/24/2022	FAIL	4/24/2022		Harris Engineering	Ducks Ponds	Maintenance records available
	Apex Funeral Home	1 dry pond, 1 HOS	12/20/2021	1/11/2022	PASS	N/A	N/A	G2	In House	Maintenance records available
	Bristol Walk	1 wet pond, 2 bio cells	12/20/2021	2/2/2022	PASS	N/A	N/A	G2	Triangle Pond Mgmt.	Maintenance records available
	Children's Lighthouse Daycare (Peakway)	1 sand filter, 1 level spreader	12/20/2021	1/26/2022	PASS	N/A	N/A	The Site Group	In House	Maintenance records available
	Control	1 wet pond, 1 sand filter	12/20/2021	2/2/2022	PASS	N/A	N/A	G2	Dragonfly	Maintenance records available
	Eastern Services	2 wet ponds	12/20/2021	1/13/2022	PASS	N/A	N/A	Boss Environmental	Dragonfly	Maintenance records available
	Haddon Hall Commons	1 wet pond	12/20/2021	1/7/2022	PASS	N/A	N/A	Giles Flythe Engineers	In House	Maintenance records available
	Publica Pointe	1 wet pond, 1 bio cell	12/20/2021	2/23/2022	PASS	4/23/2022	4/1/2022	Kris Bass Engineering	Greenscapes/ Dragonfly	Maintenance records available
	Salem Baptist Church	1 wet pond	12/20/2021	2/4/2022	PASS	N/A	N/A	Infocus Engineering	Foster Lake & Pond	Maintenance records available
	Trout Center Commons	1 wet pond	12/20/2021	2/2/2022	PASS	N/A	N/A	G2	Clear Nursery	Maintenance records available
FEBRUARY	Boulangers	1 UOL, 1 HOS	1/19/2022	1/24/2022	PASS	N/A	N/A	Harris Engineering	Stormworks, Inc	Maintenance records available
	Bradley Commons	2 bio cell	1/19/2022	2/4/2022	PASS	N/A	N/A	Jones & Crossen	York	Maintenance records available
	BSI	1 wet pond	1/19/2022	2/24/2022	PASS	N/A	N/A	Jones & Crossen	In House	Maintenance records available
	Church Drive Village	1 wet pond	1/19/2022	3/14/2022	PASS	5/14/2022	4/7/2022	Kris Bass Engineering	Limfless Leams	Maintenance records available
	Sci	1 UOL, 1 bay filter, 1 wet pond	1/19/2022	4/7/2022	FAIL	6/7/2022		Kris Bass Engineering	Aqualis	Maintenance records available
	McDonalds (880 S. Williams St.)	1 UOL, 1 Storm filter	1/19/2022	4/5/2022	PASS	N/A	N/A	Jones & Crossen	N/A	Maintenance records not available. Owner advised of equipment.
<div> <div> <div>2014</div> <div>2015</div> <div>2016</div> <div>2017</div> <div>2018</div> <div>2019</div> <div>2020</div> <div>2021</div> <div>2022</div> <div>2023</div> <div>Q1</div> </div> <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>5</div> <div>6</div> <div>7</div> <div>8</div> <div>9</div> <div>10</div> <div>11</div> <div>12</div> </div> </div>										

Traditional Inspection Workflow

- Hard-copy inspection forms
- Photos using phone or separate camera
- Prepare final report in office
- Data maintained on spreadsheet



GIS Inspection Workflow/ Efficiencies

- Perform inspection using app in phone or tablet
- Photos and text are incorporated into report automatically
- Allows for automatic population of certain fields
- Inspection report can be generated on demand
- Entries are saved to a database and can be referenced in the future
- Sustainable (decrease in paper)
- Decrease in time spent in potentially hazardous conditions

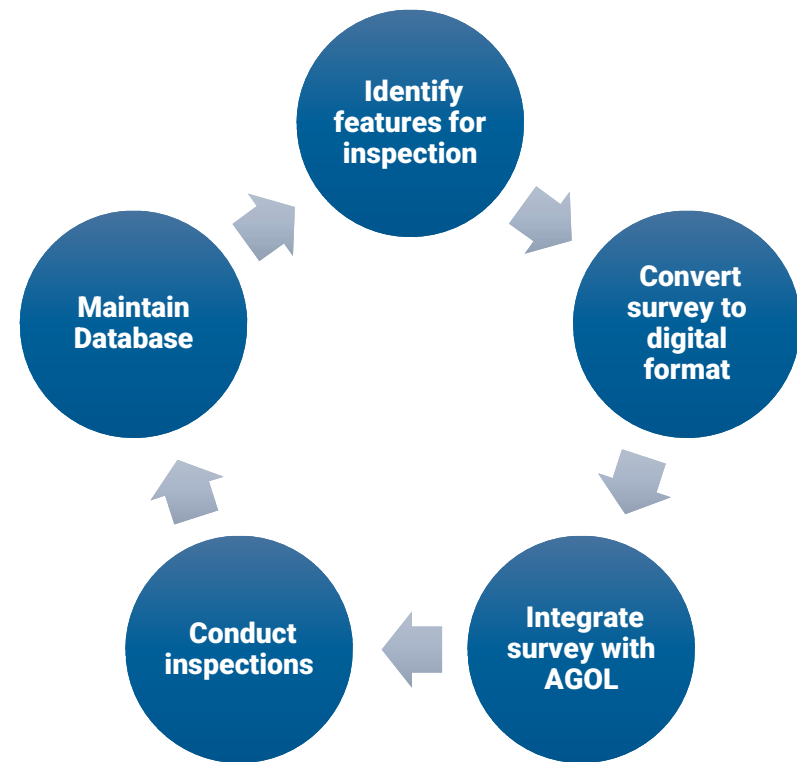


Geographic Information Systems (GIS)

- GIS is a powerful tool for **capturing**, **storing**, **analyzing**, and **managing** spatial and geographic data.
- ESRI has robust tools for integrating GIS into projects
 - AGOL
 - Field Maps w/ Smart Forms
 - Survey123
 - Dashboards

Current and Future Data Needs for Building a GIS Application

- Discuss what data is needed to build a database and app
 - GIS file with features to be inspected
 - KMZ, shapefile, CAD file
 - Tabular data
 - Inspection form template
 - What questions do inspectors need to answer to determine if the feature is being adequately maintained?



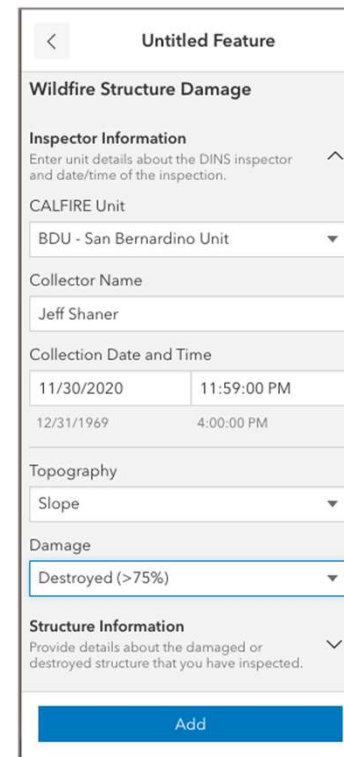


GIS Application Best Practices

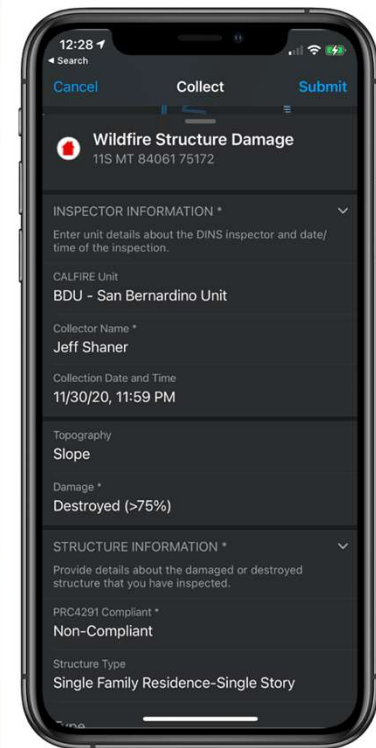
- Identify what data needs to be collected and what platform will be most efficient
- Spend extra time on the front end and coordinate with stakeholders for input before developing the app
- Utilize visuals and mockups
- Target incremental gains
- Make sure all users have their own license
- Archive data regularly

ESRI Platform: ArcGIS Field Maps (Smart Forms)

- Give brief overview of ArcGIS Field Maps
- Discuss situations when Field Maps would be useful



The screenshot shows a web-based form titled 'Untitled Feature' for 'Wildfire Structure Damage'. The form includes sections for 'Inspector Information' (with a dropdown for 'CALFIRE Unit' set to 'BDU - San Bernardino Unit' and a text field for 'Collector Name' set to 'Jeff Shaner'), 'Collection Date and Time' (with date '11/30/2020' and time '11:59:00 PM'), 'Topography' (dropdown set to 'Slope'), and 'Damage' (dropdown set to 'Destroyed (>75%)'). A 'Structure Information' section is partially visible at the bottom. A blue 'Add' button is at the bottom right.

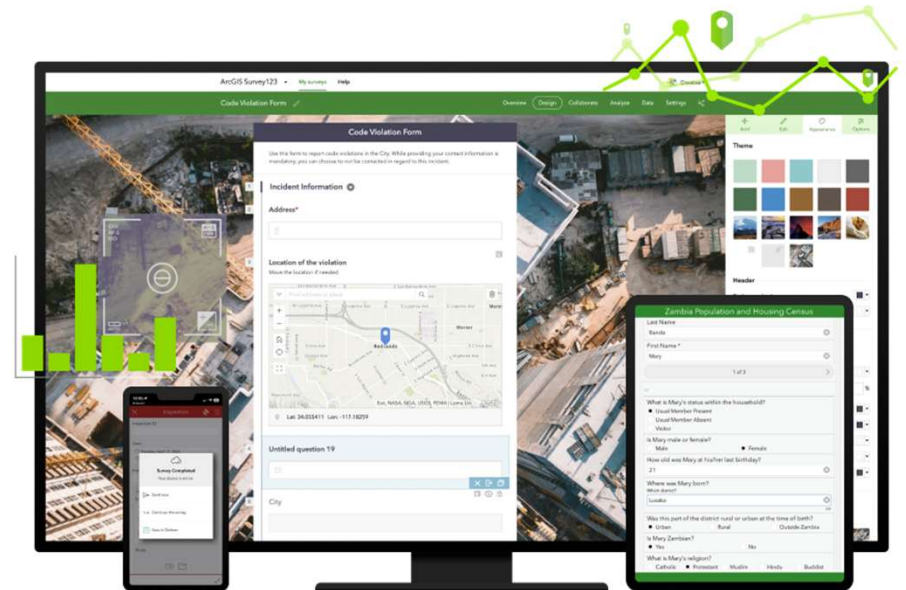


The screenshot shows the mobile app version of the 'Wildfire Structure Damage' form. It features a 'Collect' button at the top and a 'Submit' button at the top right. The form fields are identical to the web version, including 'Inspector Information', 'Collection Date and Time', 'Topography', and 'Damage'. The 'Structure Information' section is also visible at the bottom.

PLACEHOLDER IMAGE

ESRI Platform: Survey123

- Give brief overview of ArcGIS Survey123
- Discuss differences between ArcGIS Survey123 and Field Maps Smart Forms
- Discuss situations when Survey123 would be useful (instead of field maps)



ArcGIS Survey123 Connect

Dry Detention Basin Inspection Form

Inflow Points Assessment

(Where the inflow into the pond originates)

Satisfactory

Unsatisfactory

N/A

Notes:

Corrective Actions:

Erosion/undercutting

Satisfactory

Unsatisfactory

N/A

Notes:

Corrective Actions:

Displacement of filter fabric or rip rap

Satisfactory

Unsatisfactory

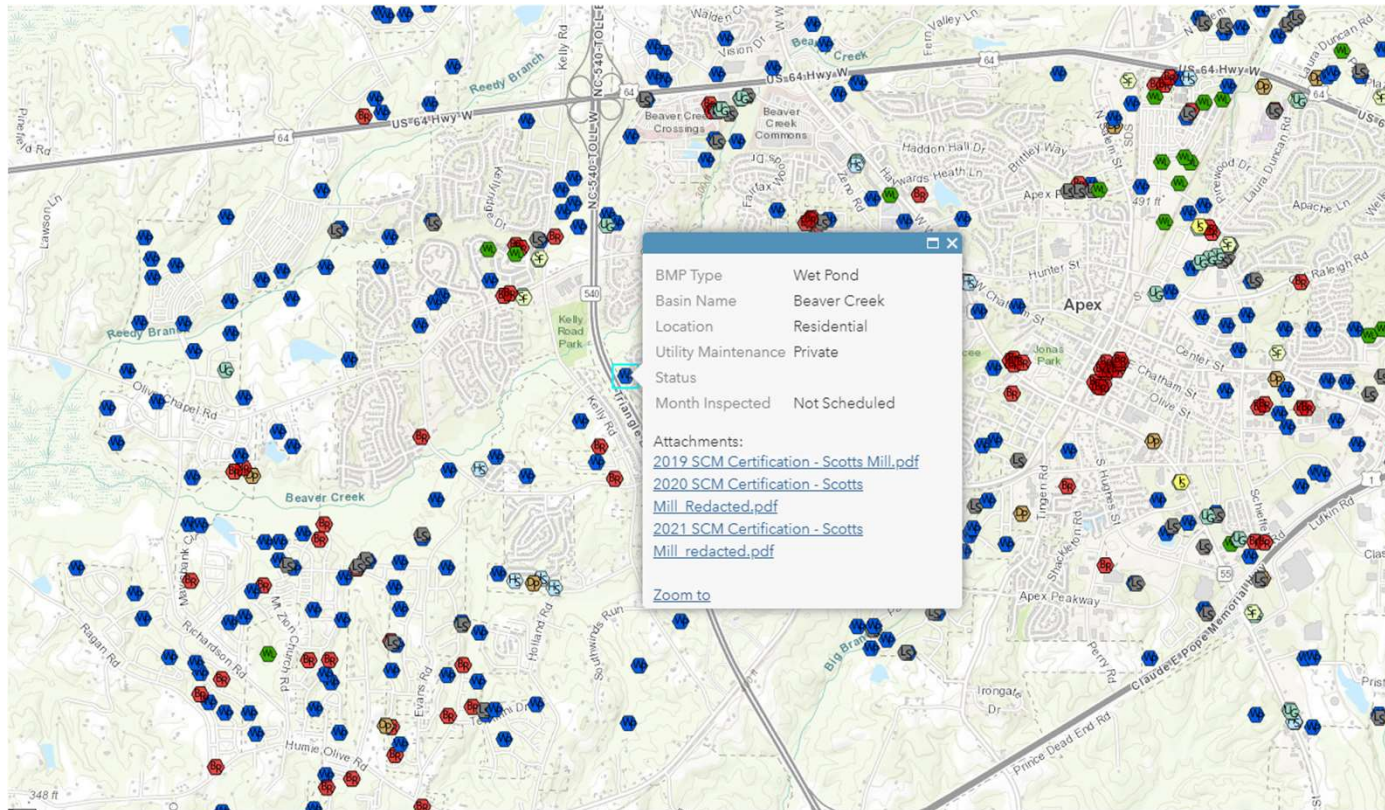
N/A

Notes:

Corrective Actions:

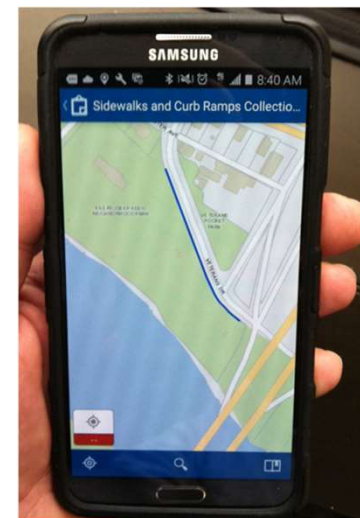
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Case Study: SCM Inspections



Case Study: SCM Inspections

Apex_SCM_Inspection_WFL1	
Project Name	
Inspection Date	
SCM Location	
SCM Unique ID	SWSCM748
Additional Comments	
▶ INFLOW POINTS	
▶ FOREBAY	
▶ VEGETATED SHELF AND MAIN TREATMENT AREA	
▶ EMBANKMENT	



Case Study: SCM Inspections

New SCMsAnnual InspectionsNPDES Permit

Annual SCM Inspections

30-day Reminder Letters

Annual SCM Inspections
(days since 30-day notice sent)

Annual SCM Inspections
(days since NOV letter received)

Sent Last Month: 23

30 - 60 Days: 13

2 - 4 Weeks: 13

To Send This Month: 40

> 60 Days: 20

> 4 Weeks: 20

To Send Next Month: 25

< 30 Days: 45

< 2 Weeks: 45

Project Site	Number of	30-day Letter Sent	Report Received	Result	Re-test Due	Re-test Result	Inspection Company
Costco	2	December 21, 2020	January 28, 2021	Fail	March 28, 2021	Pass	G2
Deer Creek		November 5, 2020	November 12, 2020*	Fail			
Regency at White Oak		July 1, 2021*	N/A	Fail			
Salem Creek Townhomes		Not Submitted	N/A	Pass			

Company: Costco Wholesale Corp.

Address: 1021 Pine Plaza Dr.

City, State, ZIP: Apex, NC, 27523

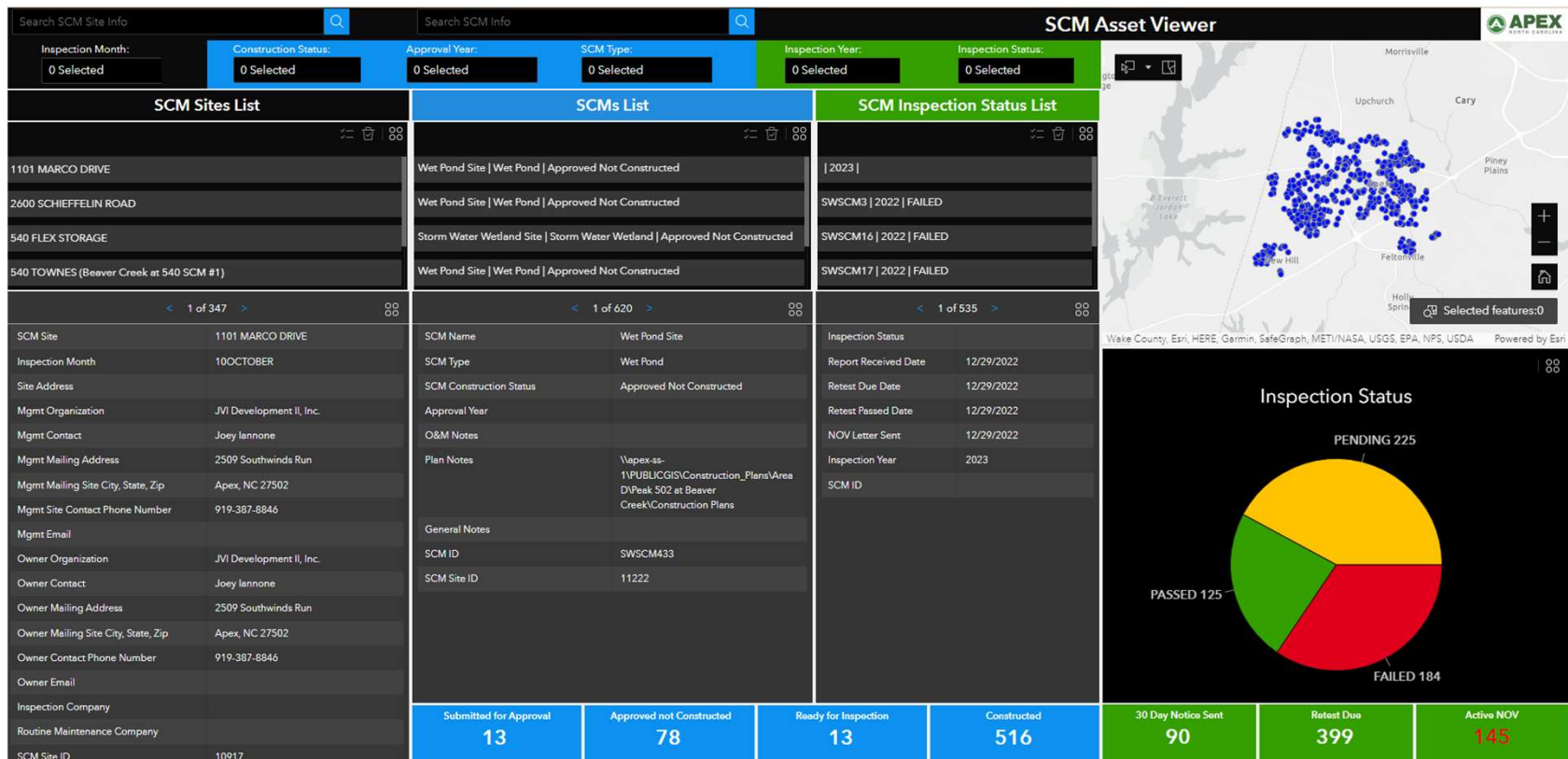
Contact: Lanny Staples

Phone #: (919)-XXX-XXXX

Email: lstaples@costco.com*

O&M: Recorded

Case Study: SCM Inspections

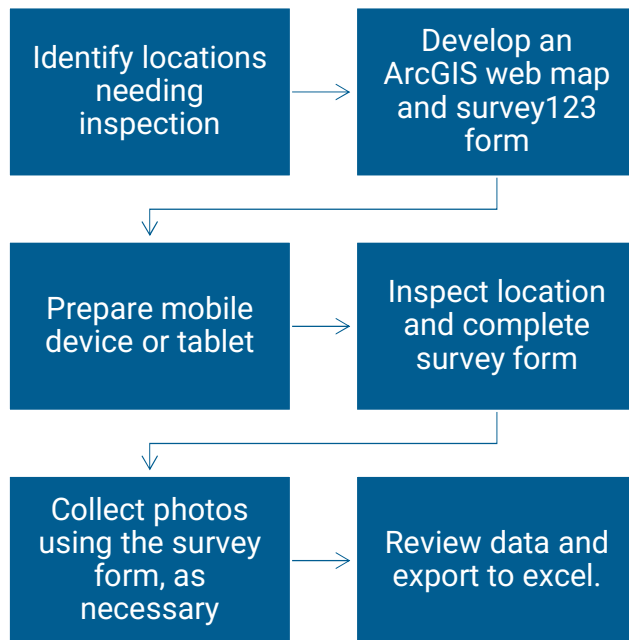


Case Study: MS4 Compliance Inspections



Case Study: MS4 Compliance Inspections

General Workflow



Example Survey

The Example Survey form is titled "2024 Annual Stormwater Inspection - Site Visit & Documentaion Review". It contains the following sections and fields:

- 1. Facility Information**
 - Inspection Name:
 - Tenant Name:
 - Tenant Address:
 - Tenant Building No.:
 - Contact Name (PPT):
 - Contact Phone Number:
 - Contact Email:

The form is displayed on a mobile device screen, with a status bar at the bottom showing "1 of 22" and a back arrow icon.

Thank you

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