

# Getting Ready to Sample

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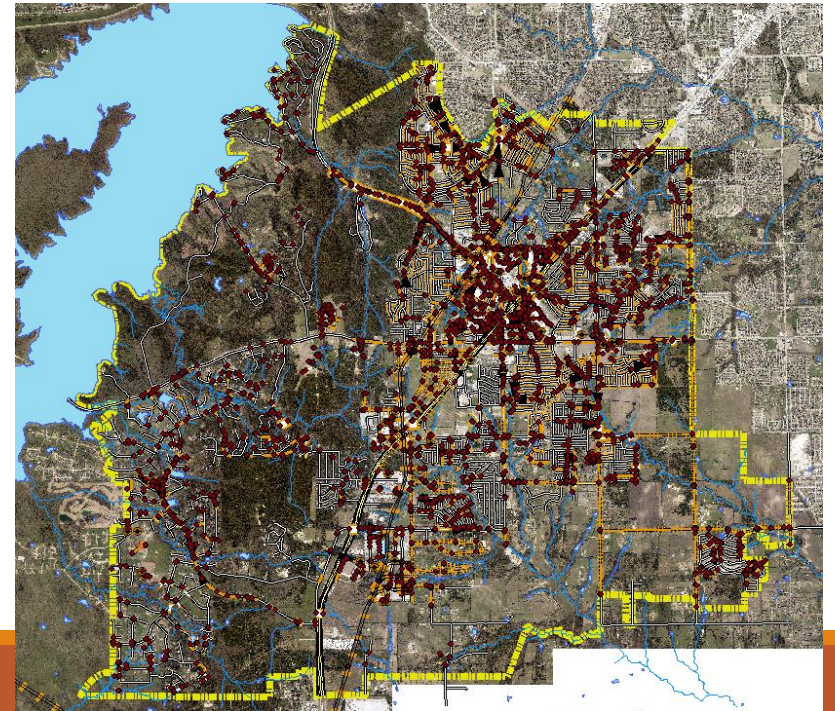
# Finding your outfalls

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All MS4s are required to locate and map all storm sewer outfalls.

## Global Positioning System (GPS) Survey

- Using your GPS, allow it to receive signals for 5-10 minutes when you turn it on to “Update”
- Avoid standing next to anything that could block or bounce the signals
  - Buildings, hills, rock formations, trees, bridges
- Mark your waypoints as close to the outfall as you can SAFELY get
- Download the data when you get back from the field



# What is Outfall Reconnaissance Inventory

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- ❖ Records basic characteristics of individual storm drain outfalls
- ❖ Evaluate suspect outfalls
- ❖ Assesses the severity of illicit discharge problems in a community.

- ❖ Sections of the ORI

- 1) Background information: Where is this outfall located?
- 2) Outfall Description: What type of outfall is it?
- 3, 4, & 5) Outfall characteristics

# Outfall Reconnaissance Inventory (ORI) Field Sheet

## North Central Texas Regional Protocol



### Section 1: Background Data

Date:	Time (Military):	
Jurisdiction:	Subwatershed:	Outfall ID:
Temperature (°C):	Rainfall (in.) Last 24 hrs:	Last 72 hrs:
GPS Unit #:	Latitude:	Longitude:
Camera:	Photo #'s:	
Land Use in Drainage Area (circle all that apply):		
Industrial	Residential	Commercial Institutional Open Space
Other: _____		
Known Industries: _____		
Notes:		

### Section 2: Outfall Description (Circle all that apply)

LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
__ Closed Pipe	RCP-Reinforced Concrete CMP-Corrugated Metal PVC-Polyvinyl Chloride HDPE-High Density Polyethylene Steel Other: _____	Circular Elliptical Box Single Double Triple	Diameter/Dimensions: _____	In Water: No Partially Fully  With Sediment: No Partially Fully
__ Open Drainage	Concrete Earthen Rip-Rap Other: _____	Trapezoid Parabolic Other: _____	Depth: _____ Top Width: _____ Bottom Width: _____	
Flow Description (if present)	None Trickle Moderate Substantial			

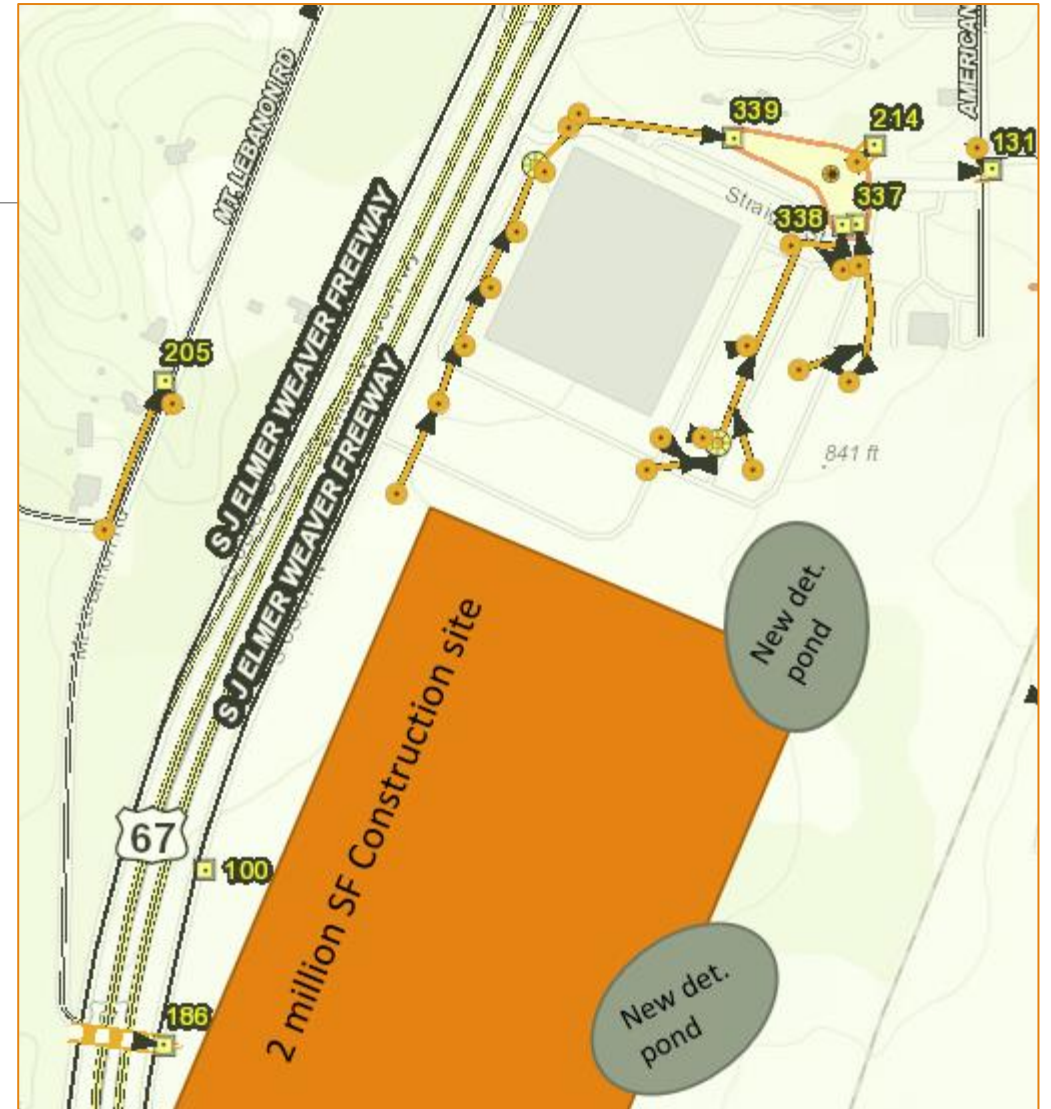
Section 3: Quantitative Characterization for Flowing Outfalls				
PARAMETER		RESULT	UNIT	EQUIPMENT
__Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	Stop Watch
__Flow #2	Flow depth		In	Tape Measure
	Flow width		Ft. In	Tape Measure
	Measured length		Ft. In	Tape Measure
	Time of travel		S	Stop Watch
Temperature			°C	Thermometer
pH			pH units	Test Strip/Meter
Ammonia			Mg/L	Test Strip/Comparator

Section 4: Physical Indicators for Flowing Outfalls (Circle all that apply)					
INDICATOR	CHECK if present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor		Sewage Rancid/sour Sulfide Petroleum/gas Other: _____	1-Faint	2-Easily detected	3-Noticeable from a distance
Color		Clear Brown Gray Yellow Green Orange Red Other: _____	1-Faint colors in sample bottle	1-Clearly visible in sample bottle	3-Clearly visible in outfall flow
Turbidity		See Severity	1-Slight cloudiness	2-Cloudy	3-Opaque
Floatables; Trash not included		Sewage (Toilet Paper, etc.) Suds Petroleum (oil sheen) Other: _____	1-Few/slight; origin not obvious	2-Some; indications of origin (e.g., possible suds or oil sheen)	3-Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

<b>Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls</b> (Circle all that apply)			
<b>INDICATOR</b>	<b>CHECK if Present</b>	<b>DESCRIPTION</b>	<b>COMMENTS</b>
Outfall Damage		Cracking/Chipping   Corrosion   Peeling Paint	
Deposits/Stains		Oily   Flow Line   Paint   Other: _____	
Abnormal Vegetation		Excessive   Inhibited	
Poor Pool Quality		Odors   Colors   Floatables   Oil Sheen   Suds Excessive Algae   Other: _____	
Pipe Benthic Growth		Brown   Orange   Green   Other: _____	

# ORI Data

- ❖ The results of the ORI are then used to **help guide** future outfall monitoring and discharge prevention efforts
  - Building blocks of an outfall tracking system
- ❖ Help create/ update MS4 maps
- ❖ Can help determine the “normal” for that outfall



# Plan Ahead: Weather

- ❖ Know the last rainfall event
  - More or less than 72 hours?
  - [www.weather.gov](http://www.weather.gov)
  - Rain gauge/log @ your location

- ❖ Texas weather: we know her and we *mostly* love her but she can flip a switch for sure!

weather.gov

Weather observations for the past three days

Dallas, Redbird Airport

Enter Your "City, ST" or zip code  Go metric

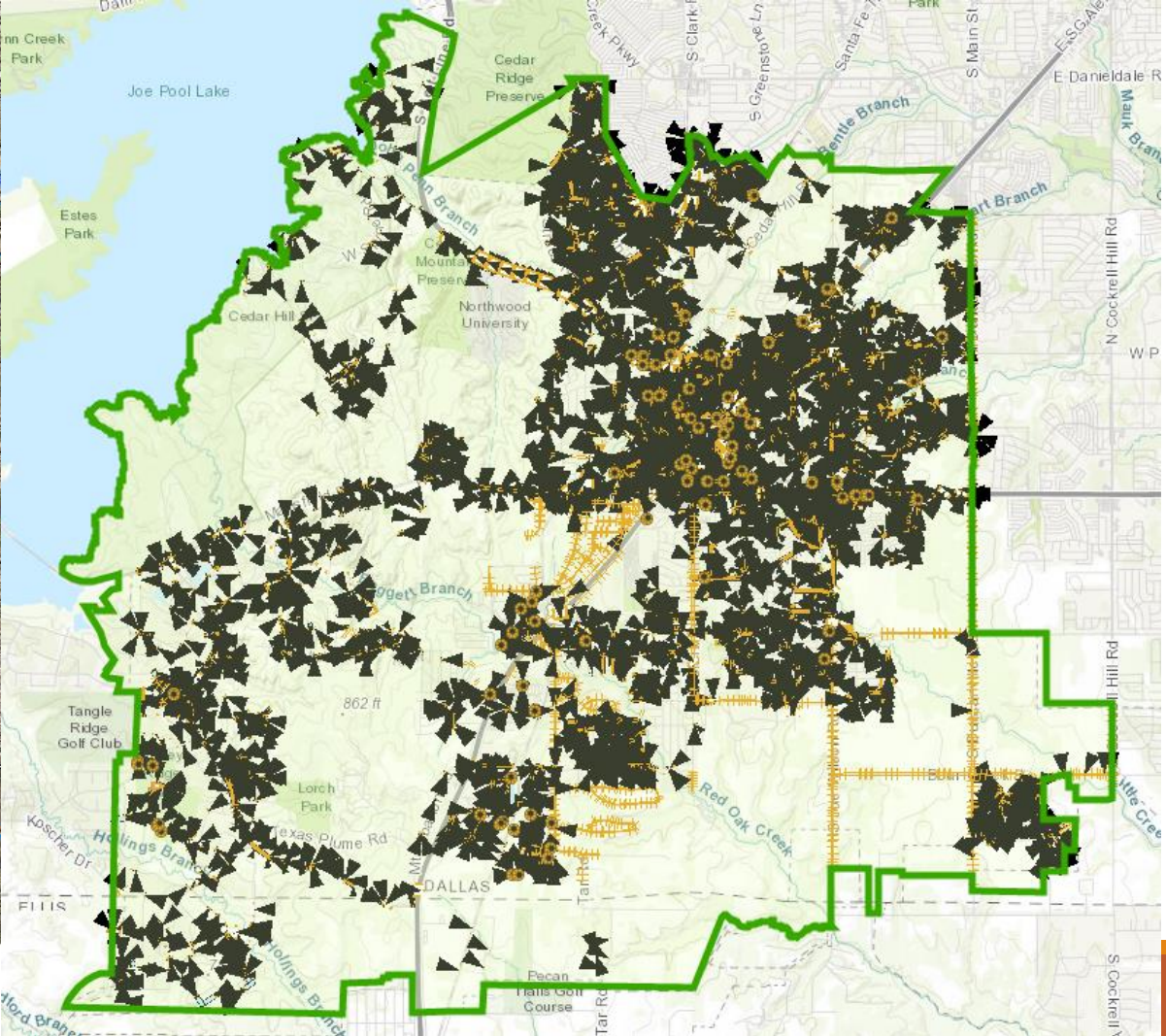
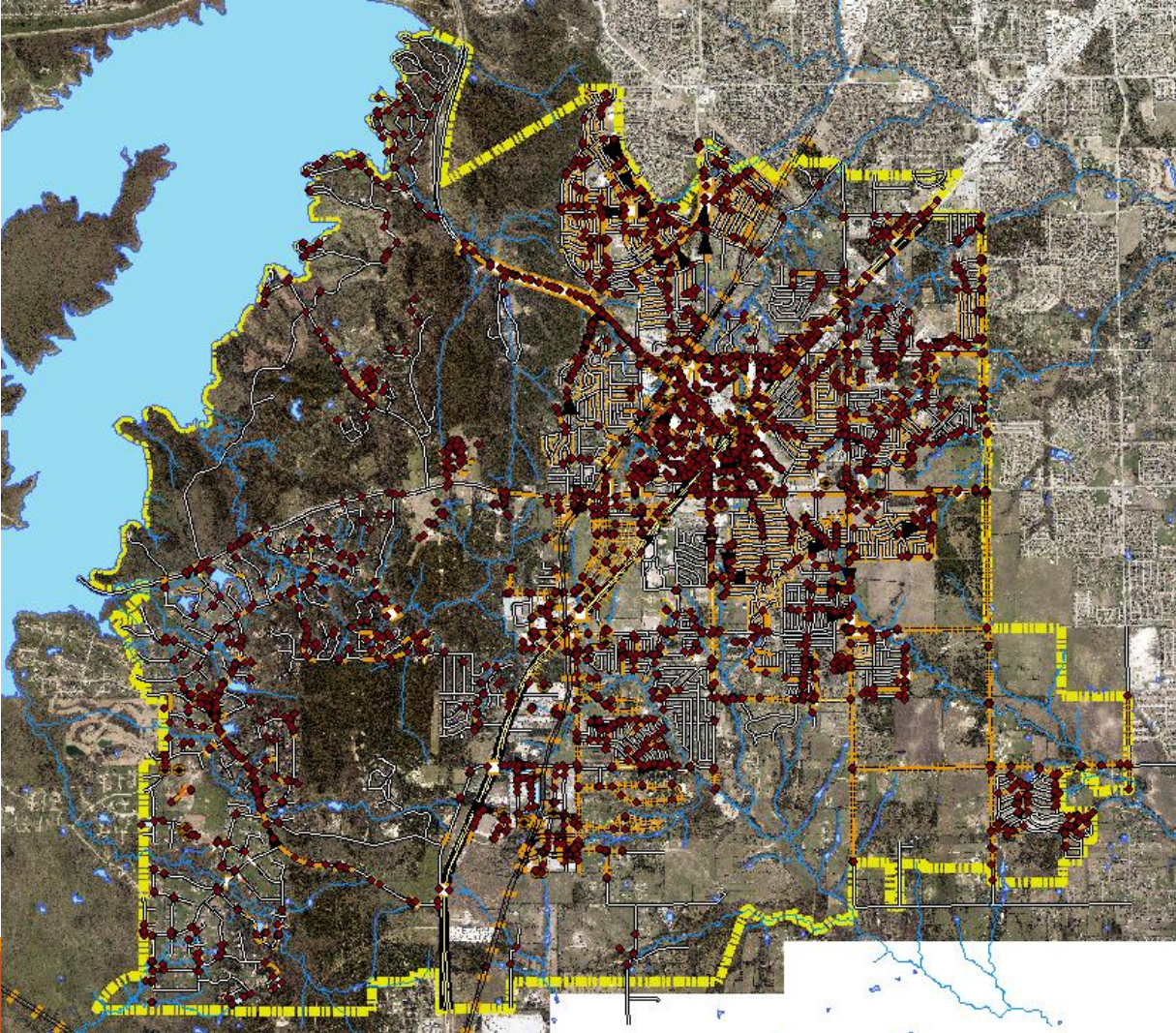
Date	Time (cdt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (°F)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour					altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
								Max.	Min.								
12	08:53	S 17 G 24	9.00	Overcast	BKN018 OVC024	73	66			79%	NA	NA	29.74	1006.			
12	07:53	S 15 G 25	8.00	Overcast	OVC018	72	66			82%	NA	NA	29.74	1006.			
12	06:53	S 17 G 31	9.00	Overcast	BKN020 OVC035	72	66	73	70	82%	NA	NA	29.73	1005.			
12	05:53	S 20 G 30	9.00	Overcast	FEW021 OVC033	73	65			76%	NA	NA	29.72	1005.			
12	04:53	S 17 G 30	9.00	Overcast	BKN023 OVC028	73	65			76%	NA	NA	29.74	1006.			
						73	66			79%	NA	NA	29.73	1006.			
						72	66			82%	NA	NA	29.75	1006.			
						71	64			79%	NA	NA	29.75	1006.			

Rain Log	
Date	Rainfall (in)
7/6/2021	Yes
7/10/2021	1.0
7/12/2021	0.5
7/20/2021	0.25
7/22/2021	0.75
7/28/2021	0.25
8/1/2021	3.5
8/15/2021	0.25
8/18/2021	0.50
8/19/2021	0.50
8/29/2021	0.5
10/10/2021	1.25
10/13/2021	1.5
10/26/2021	0.75
11/2/2021	0.25
11/10/2021	0.25
11/28/2021	0.25

Gauge was placed 7/7/21 and is located @ chain link fence on PD gate at back of Govt Center

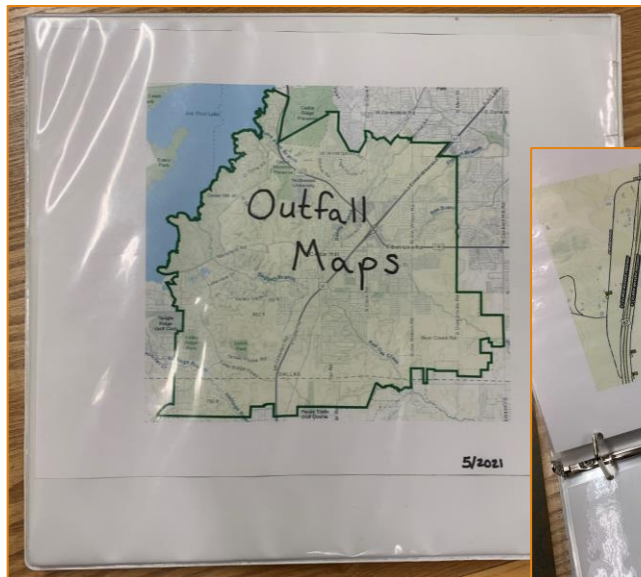


# Plan Ahead: Maps



# Plan Ahead: Maps

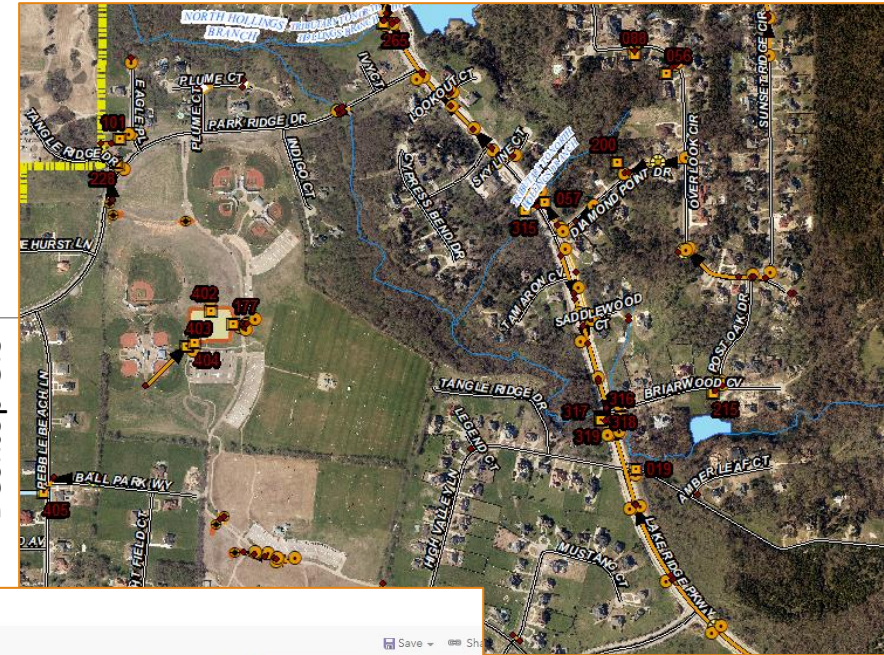
- ❖ Have your map(s) ready
  - Digital or web-based
  - Physical copies



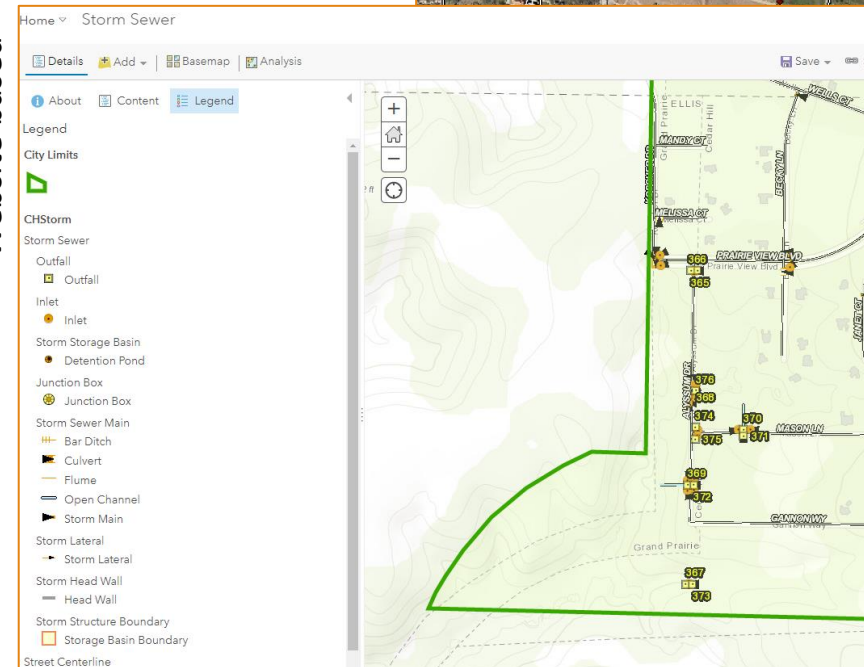
Map binder



Desktop GIS

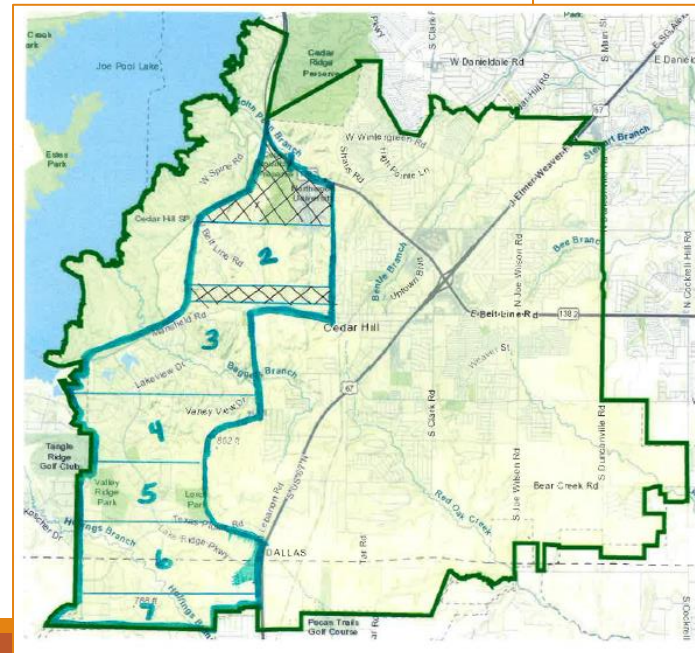
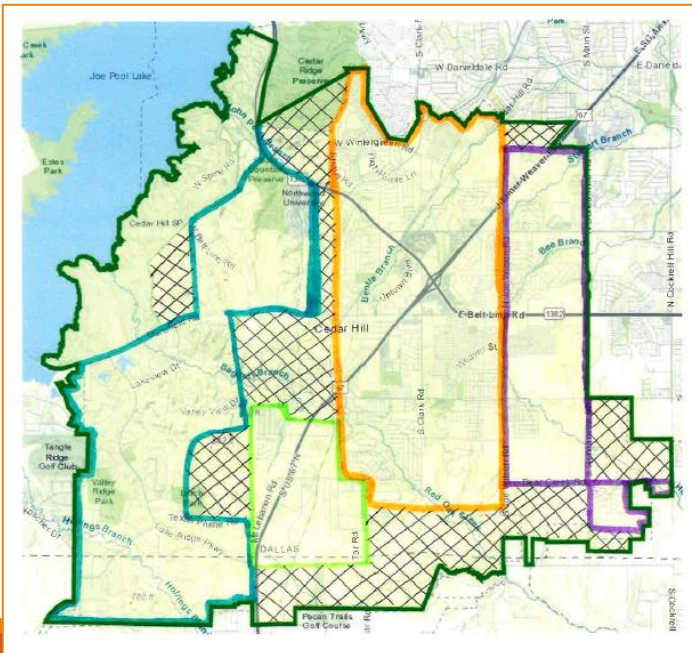
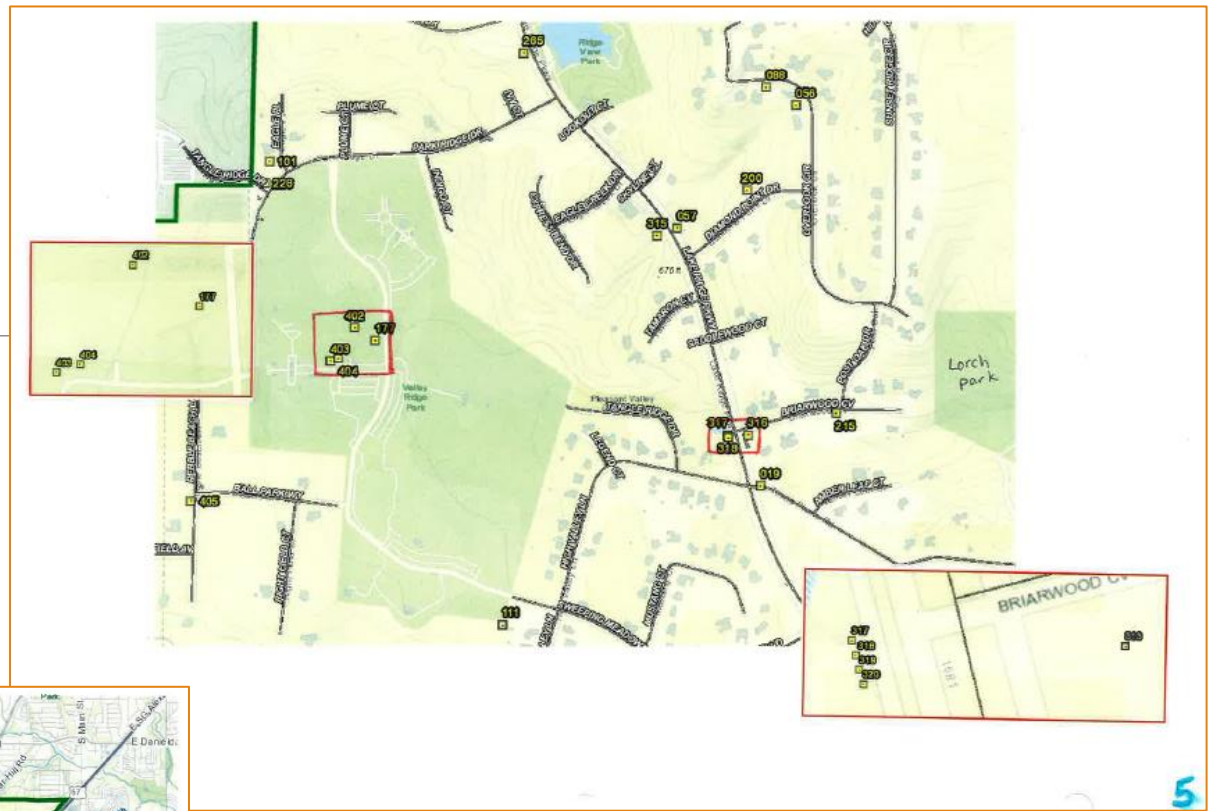


Website based



# Plan Ahead: Maps

- ❖ Plan your route
  - Or select a general area



# Plan Ahead: Access

## ❖ Where are these outfalls located?

- City property
- Private property
  - Requires permission to access
- Open space
  - Is this area maintained or is it a conservation zone?



City park



Private gated community



In open space



Access through private yards

# Plan Ahead: Land Use

Look and see what's nearby

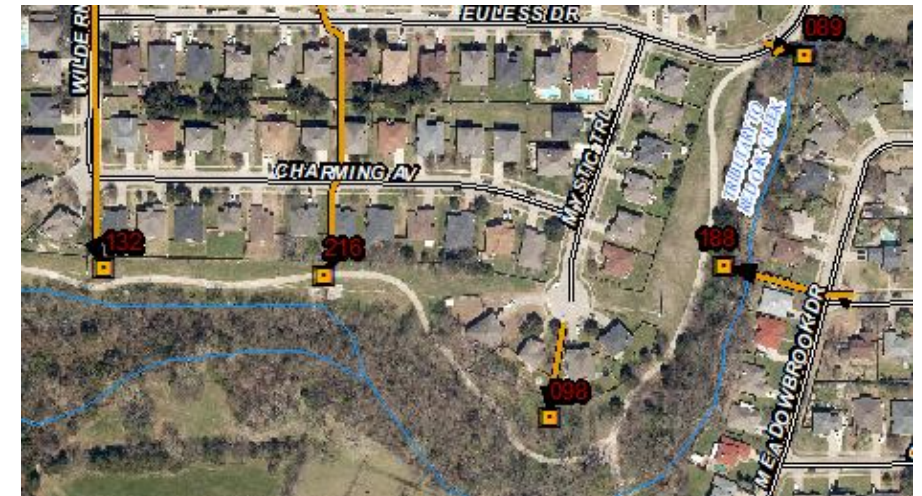
- Residential
- Industrial
- Construction



Nearby construction activities have the potential to impact Outfall 170



Outfalls 124 and 286 serve part of our Industrial sector



Outfalls 132, 216, 98, 188, & 89 all serve a residential area

# Plan Ahead: Land Use

Look and see what's nearby

- Commercial
- Municipal
- Institutional



School activities discharge to detention pond and then into Bee Branch



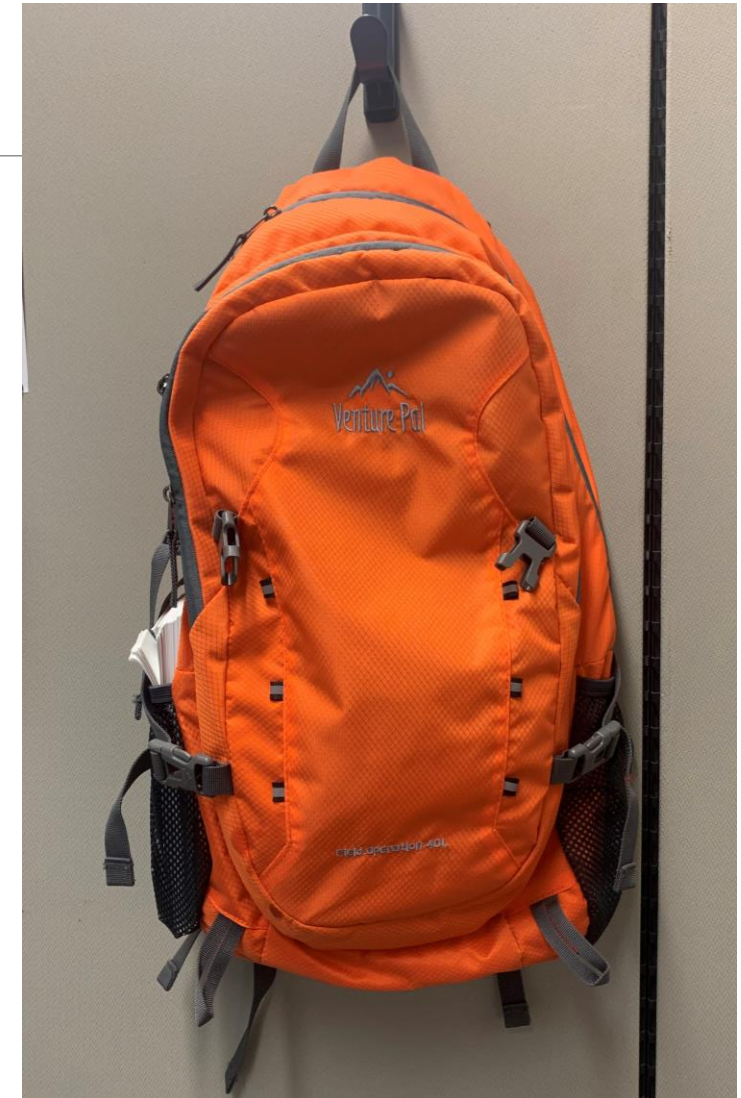
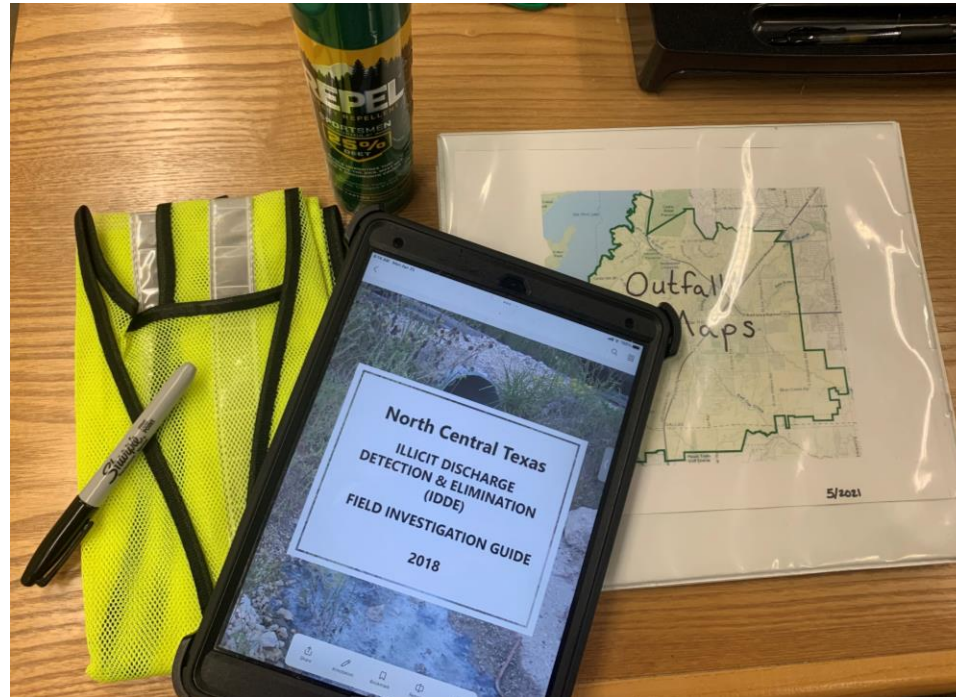
Public Works "Service Center" has open drainage channel that discharges to trib. of Red Oak Creek



Outfalls all serve commercial businesses

# IDDE Backpack

- ❖ IDDE Field Investigation Guide
- ❖ iPad \*\*
- ❖ Map binder
- ❖ Hi-vis vest
- ❖ Bug spray



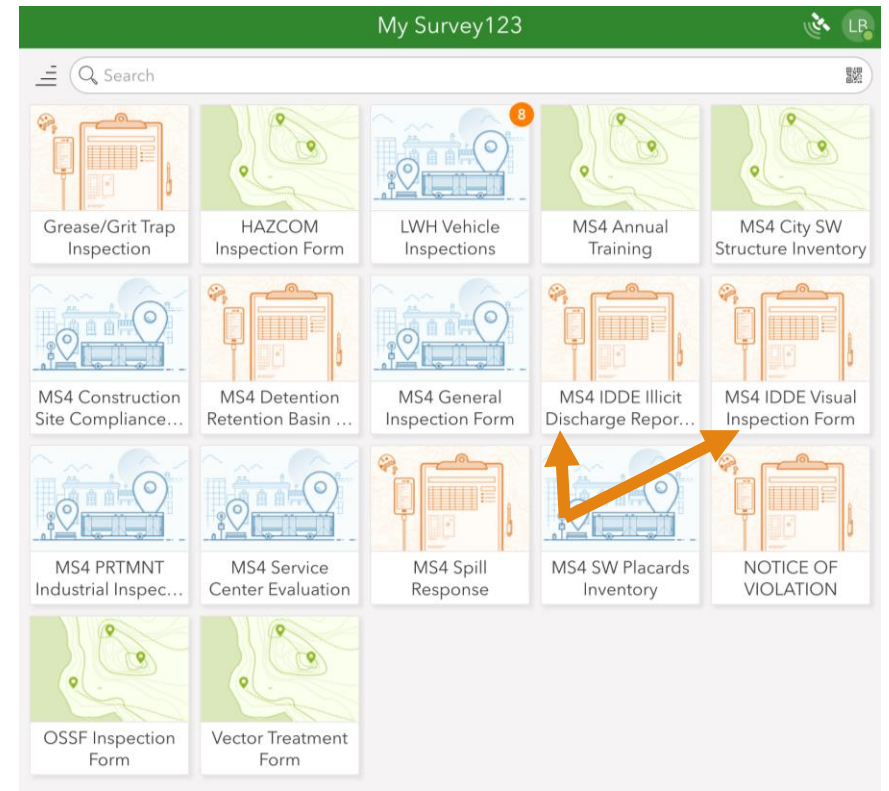
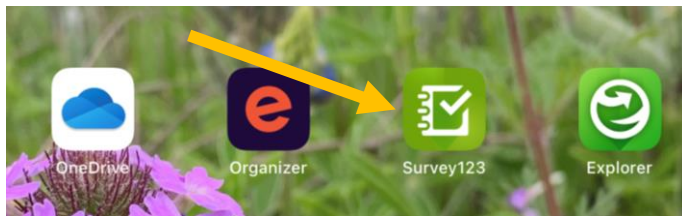
# Inspection Forms

## Digital

- Cedar Hill: App based inspection system on iPad in the field

## Physical

- Grand Prairie: Paper forms in the field that get scanned into the computer





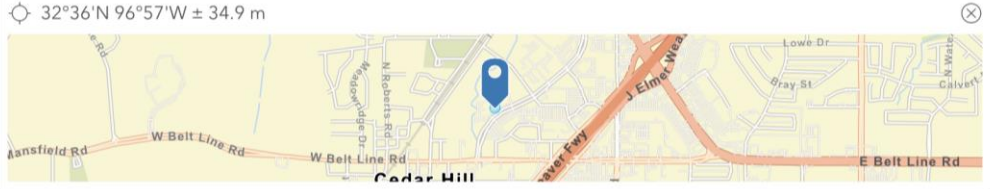
# CH Inspection Form-Outfall Observations

MS4 IDDE Visual Inspection Form

MS4 IDDE Visual Inspection Form

GIS Location

32°36'N 96°57'W ± 34.9 m



Date/Time \*

Tuesday, April 12, 2022 8:02 AM

Outfall \*

Inspection Type \*

Routine  Re-Inspection  Complaint

Last Rainfall \*

Raining now  0-2 days  ≥3 days

End of pipe flows into \*

Lake  Stream/Creek  Ditch  Other

End of pipe submerged? \*

No  Yes, <25%  Yes, ~50%  Yes, >50%

End of pipe crushed? \*

No  Yes, <25%  Yes, ~50%  Yes, almost closed

Grate on end of pipe? \*

No grate  Yes, grate NOT locked  Yes, grate locked

Grate on end of pipe plugged? \*

No grate  Yes, <25%  Yes, ~50%  Yes, >50%

# CH Inspection Form-Outfall Observations

Water flowing from end of pipe? \*

No water flow     Yes, clear     Yes, muddy     Yes, colored (what color?)

Petroleum product present? \*

Not present     Yes, floating globs     Yes, moving sheen

Sediment accumulation in pipe? \*

No     Yes, <25% full     Yes, ~50% full     Yes, >50% full

Debris accumulation in pipe? \*

No     Yes, <25% full     Yes, ~50% full     Yes, >50% full

Is erosion occurring at the end of the outfall pipe? \*

No     Yes (describe erosion)

Comments

Photo 1



# CH Inspection Form- Discharge

MS4 IDDE Illicit Discharge Reporting Form

Date/Time \*

Location \*

Last rainfall \*  
 Raining now    0-2 days    ≥3 days    Unknown

Contact (if applicable)

Contact phone number (if applicable)

Contact email (if applicable)

Responsible Party (if known)

Nature of discharge or flow \*

Solid (continuous)    Intermittent (occasional)    Pulsating (fluctuating)    Transitory (prior spill)

If possible, identify the source \*

Not possible    SSO    OSSF    Spill    Groundwater    Other

Was water flow observed? \*

No    Yes

Describe odor \*

No odor    Rotten eggs    Musty    Rancid (sour milk)    Sewage    Gasoline/Petroleum    Cooking oil    Other

Describe clarity \*

Clear    Cloudy    Opaque    Sheen    Gray

Describe color \*

No color (clear)    Red    Yellow    Brown    Green    Gray    White    Other

Solids/Floatables \*

No solids/floatables    Garbage    Sewage    Tissue    Oil sheen    Scum    Iron sheen    Suds    Unknown

Fish kill? \*

No    Yes

# CH Inspection Form-Discharge

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Total ammonia

pH

Total chlorine

Total copper



Phenols

Dissolved oxygen

Turbidity  
 Low  Medium  High

Detergent surfactants  
 Not present  Present

Comments

Photo 1  
 



IDDE Inspection Form

Inspection Information

Inspection Date 3-25-22  
12:17pm

Inspector JS

Inspector #2 TC

Outfall Id 1239

Days Since Last Rain 4

Current Weather Sunny Clear

Priority No

Description of Discharge

clear, some algae; low flow, moderate velocity

Dry Weather Inspection  Wet Weather Inspection

Discharging  Acceptable  Illicit

Visual Observations/TEST Results

Color Normal  
Clarity Clear  
Odor None  
Foam None  
Sheen None  
Susp. Solids None  
Set. Solids None  
Floating Solids None

PH 6.16  
Temp (C) 23.4  
Temp (F)   
DO (mg/L)   
Turbidity (NTU) very low  
Cond (mOhms)   
DO (%Sat)   
Flowrate (GPM)

Copper (mg/L) 0.0  
Phenols (mg/L) <.5  
Ammonia (mg/L) 0.03  
Detergents (mg/L) <.1  
T.P04 (mg/L)   
Cl2 (mg/L) 0.00  
BOD (mg/L)

COD (mg/L)   
TSS (mg/L)   
NO3 (mg/L)   
Fecal Coliform (col/100ml)   
E.Coli (col/100ml)

Comment



### IDDE Inspection Form

#### Inspection Information

Inspection Date

Inspector

Inspector #2

Outfall id

Days Since Last Rain

Current Weather

Priority No

Description of Discharge

Dry Weather Inspection  Wet Weather Inspection

Discharging  Acceptable  Illicit

#### Visual Observations/Test Results

Color

PH

Copper (mg/L)

COD (mg/L)

Clarity

Temp (C)

Phenols (mg/L)

TSS (mg/L)

Odor

Temp (F)

Ammonia (mg/L)

NO3 (mg/L)

Foam

DO (mg/L)

Detergents (mg/L)

Fecal Coliform (col/100ml)

Sheen

Turbidity (NTU)

T.P04 (mg/L)

E.Coli (col/100ml)

Susp. Solids

Cond (mOhms)

Cl2 (mg/L)

Set. Solids

DO (%Sat)

BOD (mg/L)

Floating Solids

Flowrate (GPM)

Comment

# NCTCOG Inspection Form

## Dry Weather Field Screening Data Form North Central Texas Regional Protocol



Outfall ID: \_\_\_\_\_ MAPSCO No. \_\_\_\_\_ Land Use: \_\_\_\_\_  
 GPS Unit #: \_\_\_\_\_ Resolution: \_\_\_\_\_  
 Lat/Long: \_\_\_\_\_ Current Weather: \_\_\_\_\_  
 Site Location: \_\_\_\_\_ Jurisdiction: \_\_\_\_\_  
 Outfall Dimension(s): \_\_\_\_\_ Sample Site: \_\_\_\_\_ (outfall, surface flow)  
 Receiving Water: \_\_\_\_\_ Flow Direction: \_\_\_\_\_

Calibration (within 24 hours of sampling)	Date	Time	Standard Value	Initial Meter Reading	Meter Adjusted to	Post Calibration

### 1<sup>st</sup> visit

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Precipitation <72 hours yes no

Flow: none low med high

pH \_\_\_\_\_ s.u.  
 Conductivity \_\_\_\_\_  $\mu$ S  
 Detergent \_\_\_\_\_ ppm  
 Chlorine \_\_\_\_\_ ppm  
 Copper \_\_\_\_\_ ppm  
 Phenols \_\_\_\_\_ ppm  
 Ammonia Nitrogen \_\_\_\_\_ ppm  
 Air Temp \_\_\_\_\_ °C  
 Water Temp \_\_\_\_\_ °C  
 Color # \_\_\_\_\_  
 Odor # \_\_\_\_\_  
 Turbidity (meter) \_\_\_\_\_ NTUs

Comparator: Low (0-50)  Med (75-150)  High (200-500)

Sewage Yes No Trash Yes No

Oil Sheen Yes No Surface Scum Yes No

Notes:

### 2<sup>nd</sup> visit

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Precipitation <72 hours yes no

Flow: none low med high

pH \_\_\_\_\_ s.u.  
 Conductivity \_\_\_\_\_  $\mu$ S  
 Detergent \_\_\_\_\_ ppm  
 Chlorine \_\_\_\_\_ ppm  
 Copper \_\_\_\_\_ ppm  
 Phenols \_\_\_\_\_ ppm  
 Ammonia Nitrogen \_\_\_\_\_ ppm  
 Air Temp \_\_\_\_\_ °C  
 Water Temp \_\_\_\_\_ °C  
 Color # \_\_\_\_\_  
 Odor # \_\_\_\_\_  
 Turbidity (meter) \_\_\_\_\_ NTUs

Comparator: Low (0-50)  Med (75-150)  High (200-500)

Sewage Yes No Trash Yes No

Oil Sheen Yes No Surface Scum Yes No

Notes:

# Site Safety

## ❖ PPE

- Steel Toe Boots
- Rubber boots
- Waders
- HI-VIS vest
- SUNSCREEN!

## ❖ First Aid Kit





# Site Safety

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- ❖ Park off road when possible
- ❖ Utilize traffic cones and light bars/hazard lights
- ❖ Use your truck as a barrier
  - ❖ If you take 2 vehicles, use one as a “blocker”
- ❖ Machete and/or clippers
  - High grass
  - Thick vegetation
- ❖ Avoid high water



# You are in THEIR home

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ALWAYS keep an eye out for animals and insects!

- Snakes
- Spiders
- Ticks
- Fire ants
- Wasps & bees
- Stray dogs and cats
- Feral Hogs



No thank you...

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# Even the plants bite back

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Poison Oak



Briars & Thorns



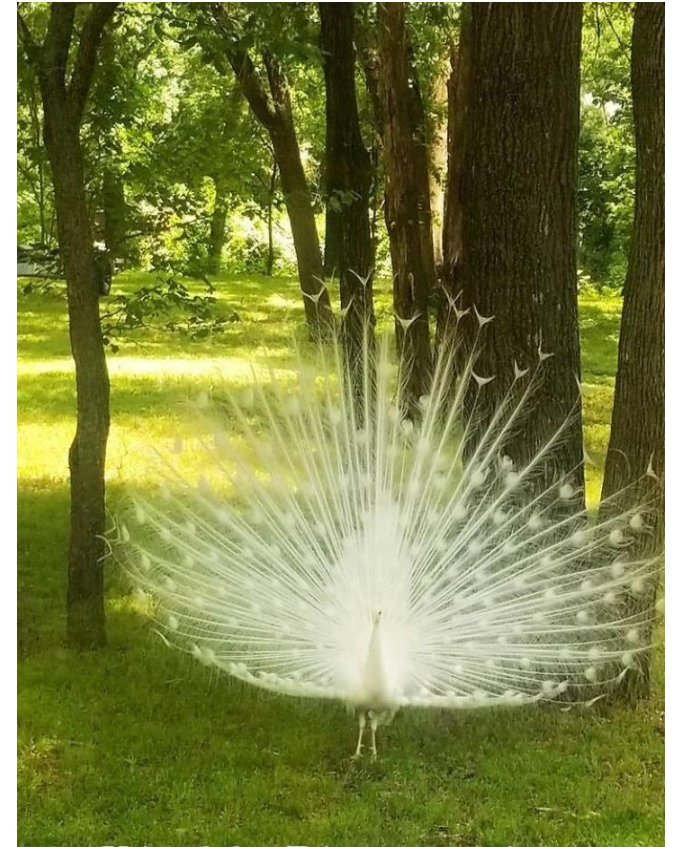
Poison Sumac



Poison Ivy

# You never know what you'll come across!

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# Sampling Safety

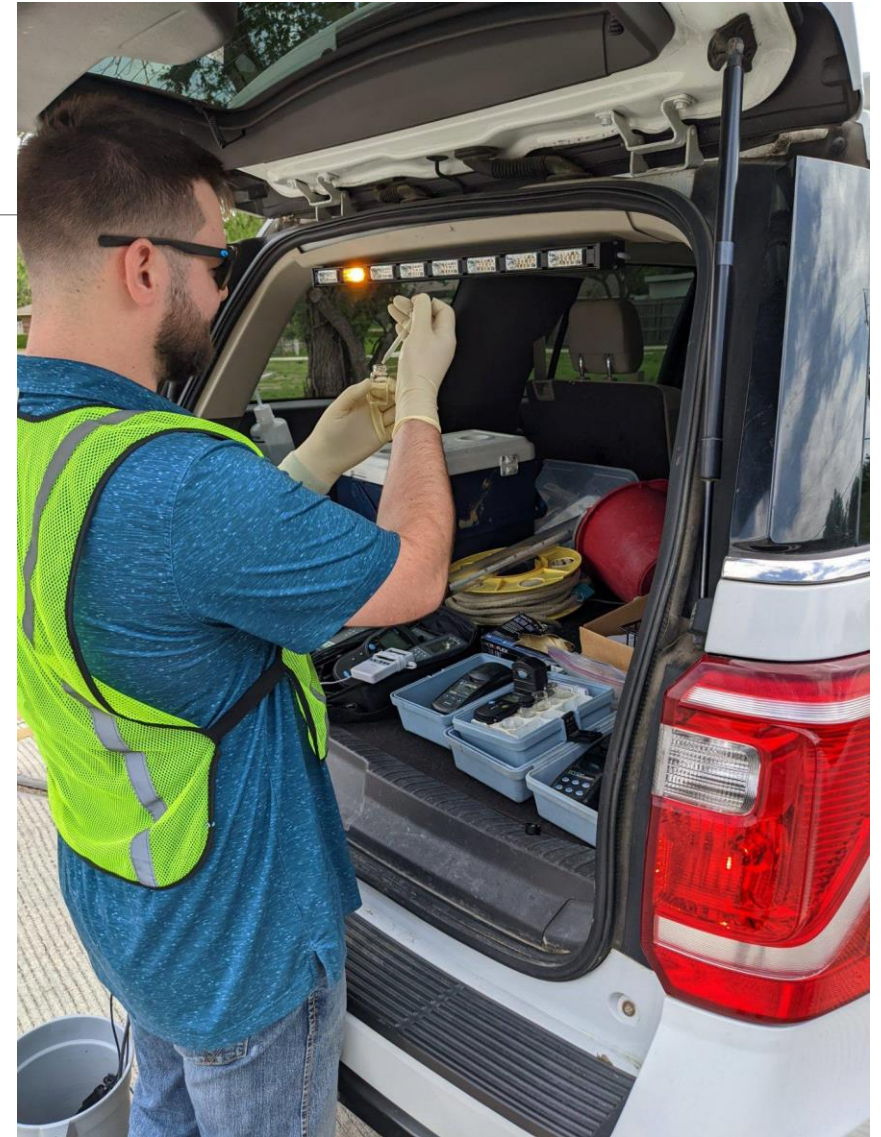
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## ❖ PPE

- Nitrile or latex gloves
- Eye protection
- Avoid contact with eyes, mouth, nose, & skin

## ❖ Make sure staff is familiar with all procedures PRIOR to going out in the field

- Testing procedures
- Sampling procedures



# Sampling Safety

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- ❖ Always rinse sample container at least TWICE
  - Avoid cross contamination
  - Dispose of rinse water DOWNSTREAM
- ❖ Have a labeled waste container to dispose of chemical waste



Sample to be taken upstream. Disposing of rinse water away from location.

# Equipment List

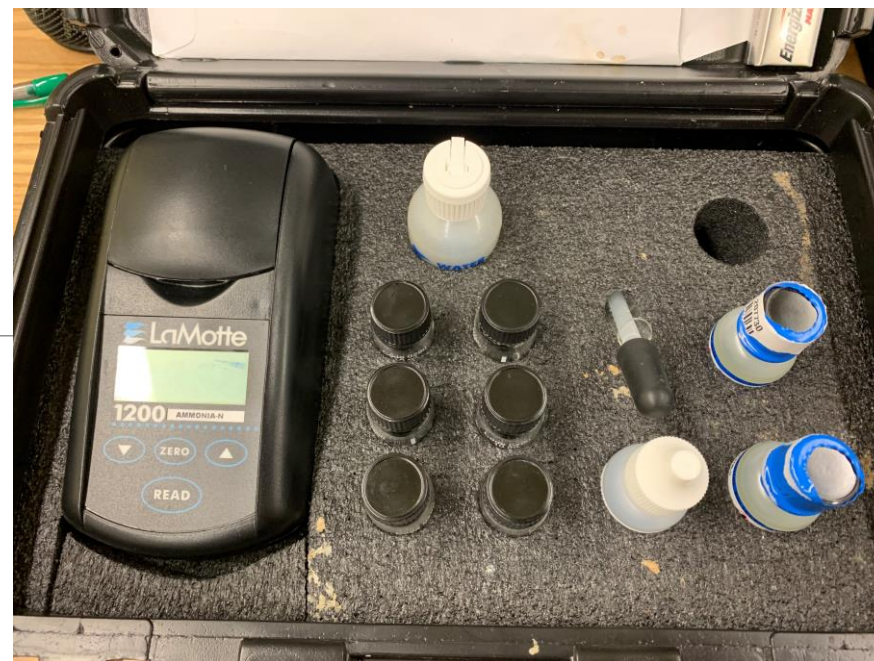
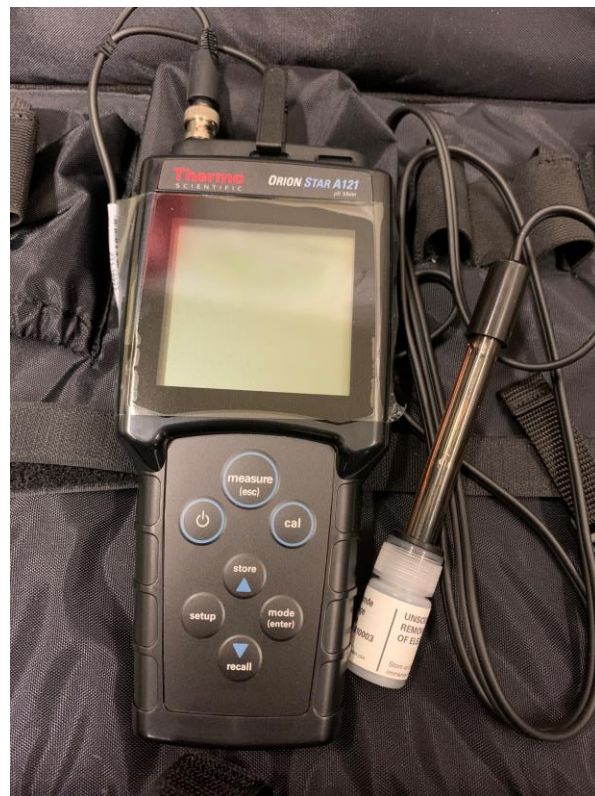
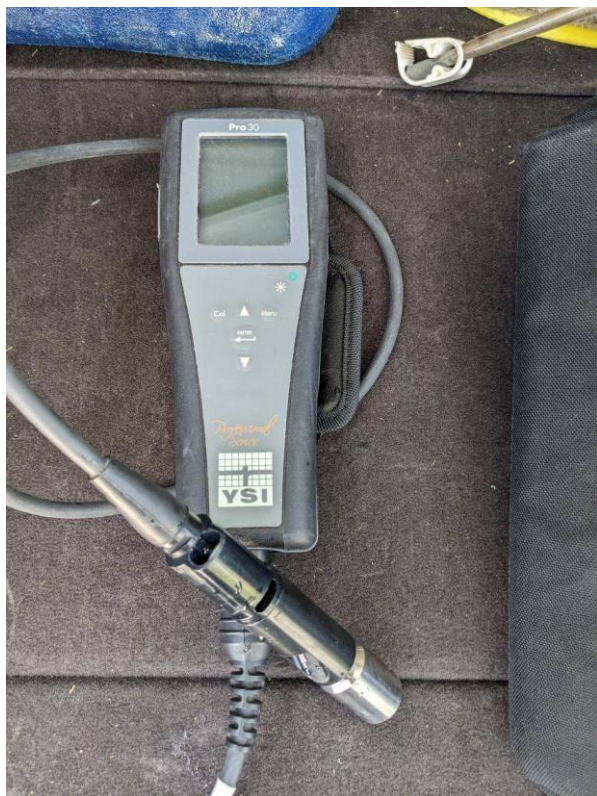
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- Testing Equipment
- PPE
- Sample containers: cups, buckets, etc.
- Waste container
- DI water
- Camera!!\*
- Paper towels/ rags





# Testing Equipment



# Testing Equipment

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# The importance of photos!

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- ❖ Visually see changes over the years
  - Make sure to take photos with a reference point
- ❖ Help determine the outfall or site “normal”
- ❖ They can make for great stories!
  - Especially if you find something crazy or out of the ordinary



“Unique” yard decoration



Creek always flows, there is always high velocity foam at this site

# Let's see your kits and chat!

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❖ What kind of kit do you use?

❖ Pros?

❖ Cons?

❖ Would you recommend your kit?

Questions?

BREAK! (~15 min)