RCAP

Rural Community Assistance Partnership

Geographic Information Systems for Asset Management

RCAP 2024 Onsite Training Series

RCAC

www.rcac.org

RCAC, the western RCAP, is an equal opportunity provider and employer.

Funder Acknowledgement

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USDA Rural Development

Presenters

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- Small Utility Consultant
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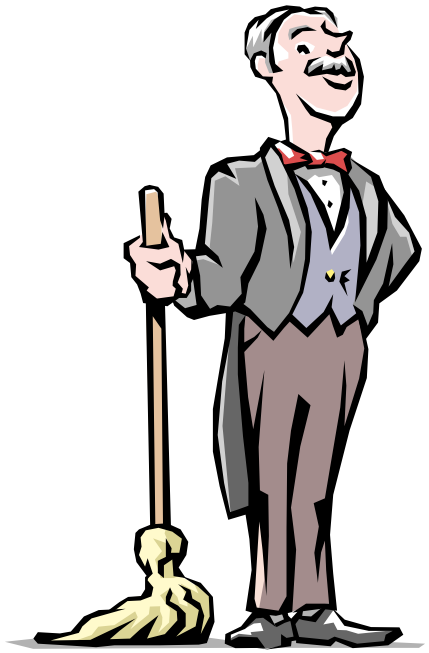
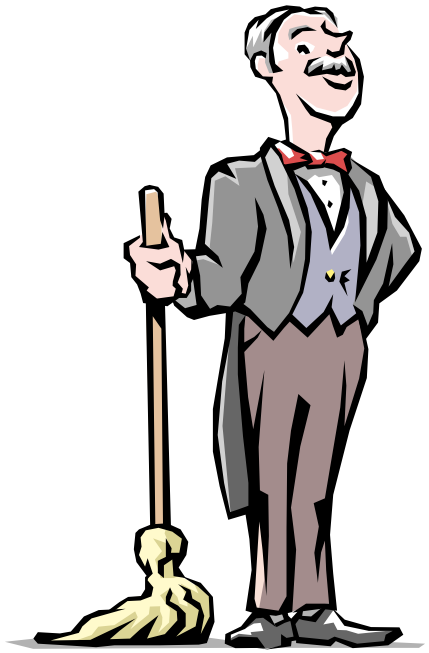
- Jack.rosenblit@rcac.org

Housekeeping

- Cell phones = set to SILENT
- Participation = encouraged
- Restrooms
- Evaluations



Please fill out this Survey



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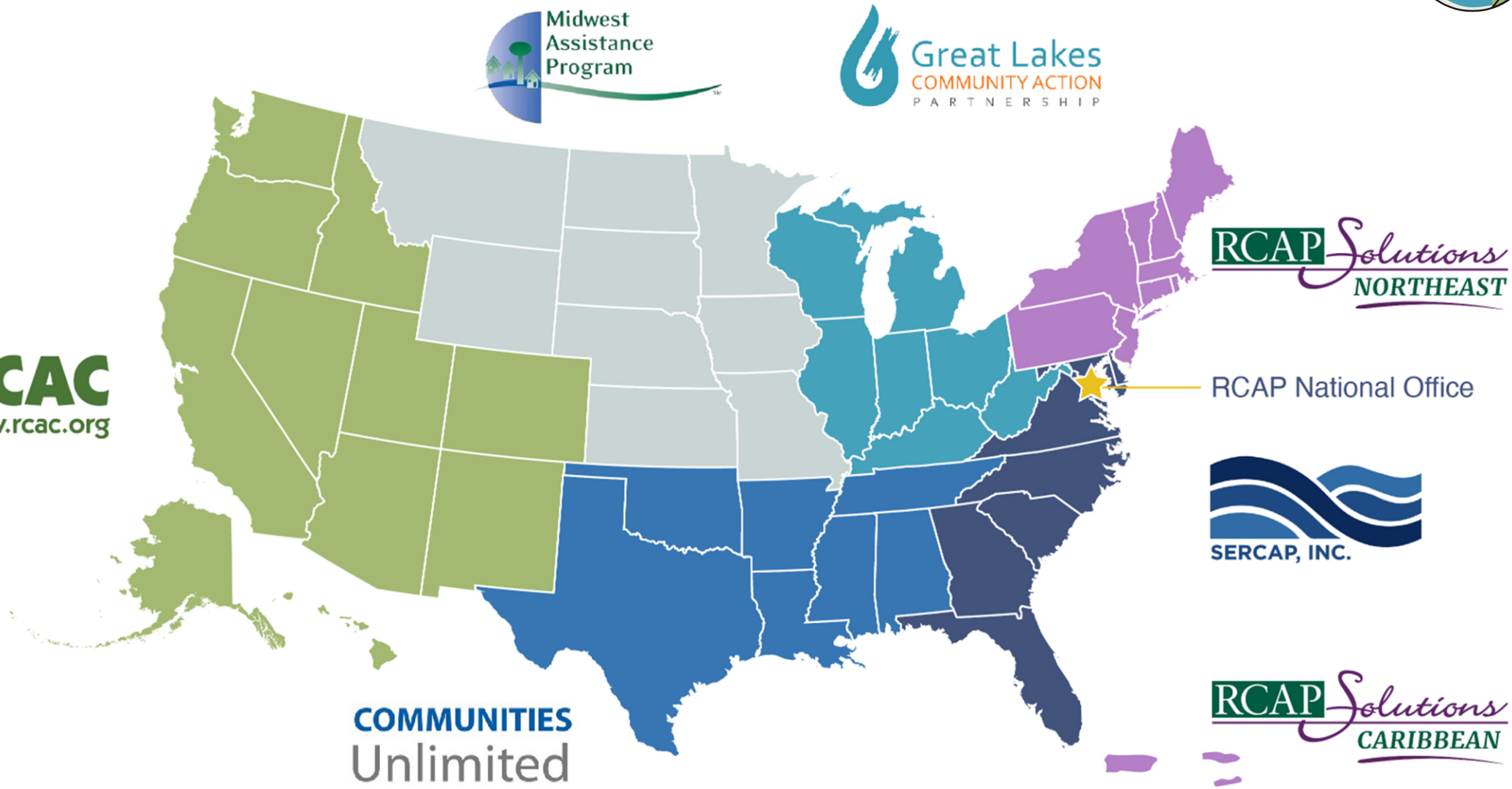

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RCAC Programs

- Affordable Housing
- Community Facilities
- Water and Wastewater Infrastructure Financing (Loan Fund)
- Classroom and Online Training
- On-site Technical Assistance
- Median Household Income (MHI) Surveys

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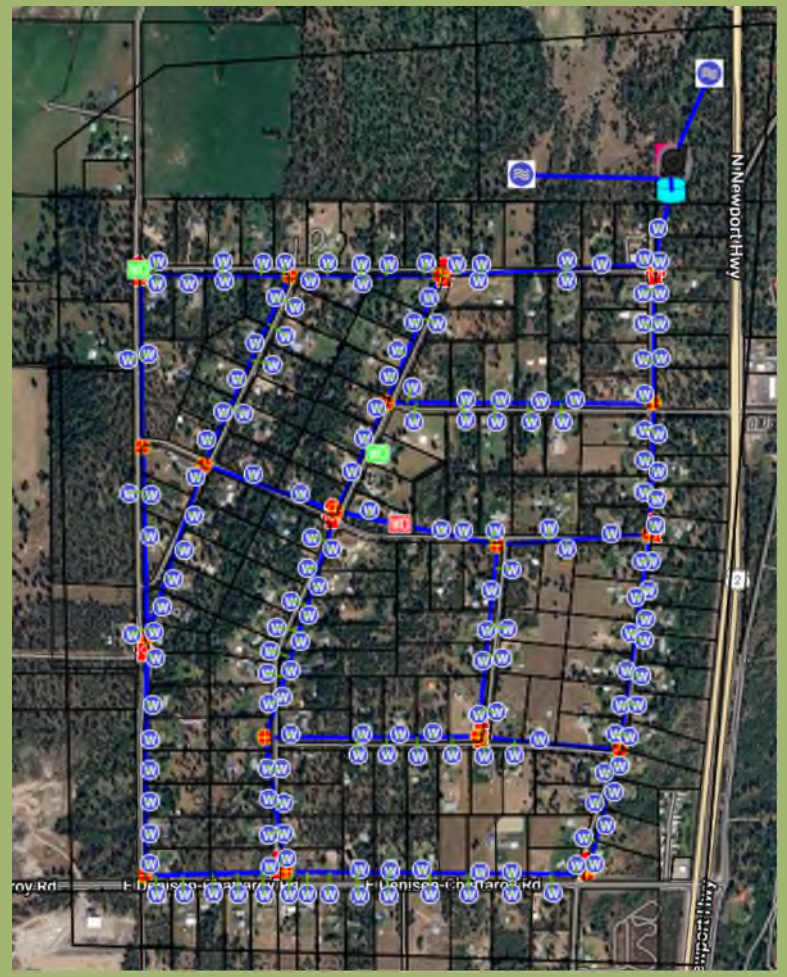
What is GIS

Geographic Information Systems (GIS)

Computerized mapping that is more than just a map.



What is GIS

- A GIS map is broken down into layers and there are two layers types.
  - Vector Layers: Points, Lines, and Polygons
    - These layers are attached to tables in a database and can be quarried.
  - Raster Layers: Images
    - Individual cells of with their sizes based on their resolution.
    - These cells contain cell values, as a value for Red, Green, Blue.
  - GIS maps are not static, any time you make a modification to your system, this GIS should also get updated

GIS and Asset Management

- GIS can be used as an asset management tool.
- You can use GIS to tract the location of your assets.
- It be used to tract condition and install dates of your assets.
  - Fields on the data table can list install date, condition, date inspected, and any other information that is relevant to your system.
  - The data in the table can be exported as a .csv file to be used in programs like Microsoft Excel.
  - Update your GIS every time you modify an asset.

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Asset Management

Asset Management Definitions:

A **long-term** program to attain and sustain the **chosen** level of service for the life of the asset in the **most cost-effective** manner.

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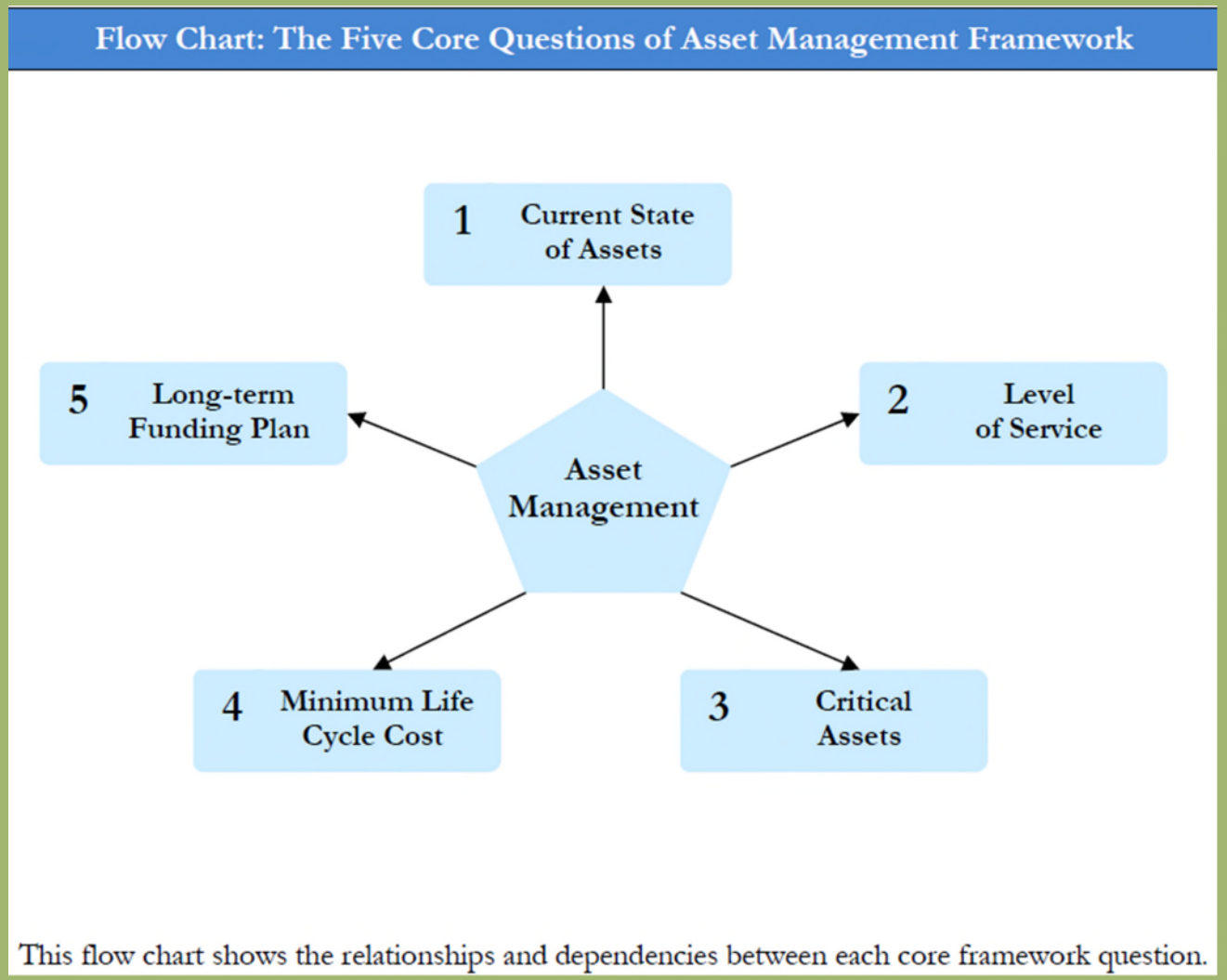
Five Components of an Asset Management Plan



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AM = Risk Based Planning Process

Risk = f (Criticality x Condition)

Risk = f (Consequence of Failure x Likelihood of Failure)

Multiplied		Consequence (Cost) of Failure				
		1	**2**	**3**	**4**	**5**
Probability of Failure	**1**	*1*	*2*	*3*	*4*	*5*
	2	*2*	*4*	*6*	*8*	*10*
	3	*3*	*6*	*9*	*12*	*15*
	4	*4*	*8*	*12*	*16*	*20*
	5	*5*	*10*	*15*	*20*	*25*

1	Very Low	4	High
2	Low	5	Very High
3	Moderate		

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Diamond Maps

- Diamond Maps is a GIS solution created for municipalities and rural utilities
- An easy-to-use low-cost GIS that require no programing or software to use
- Fully online with support of an offline field application

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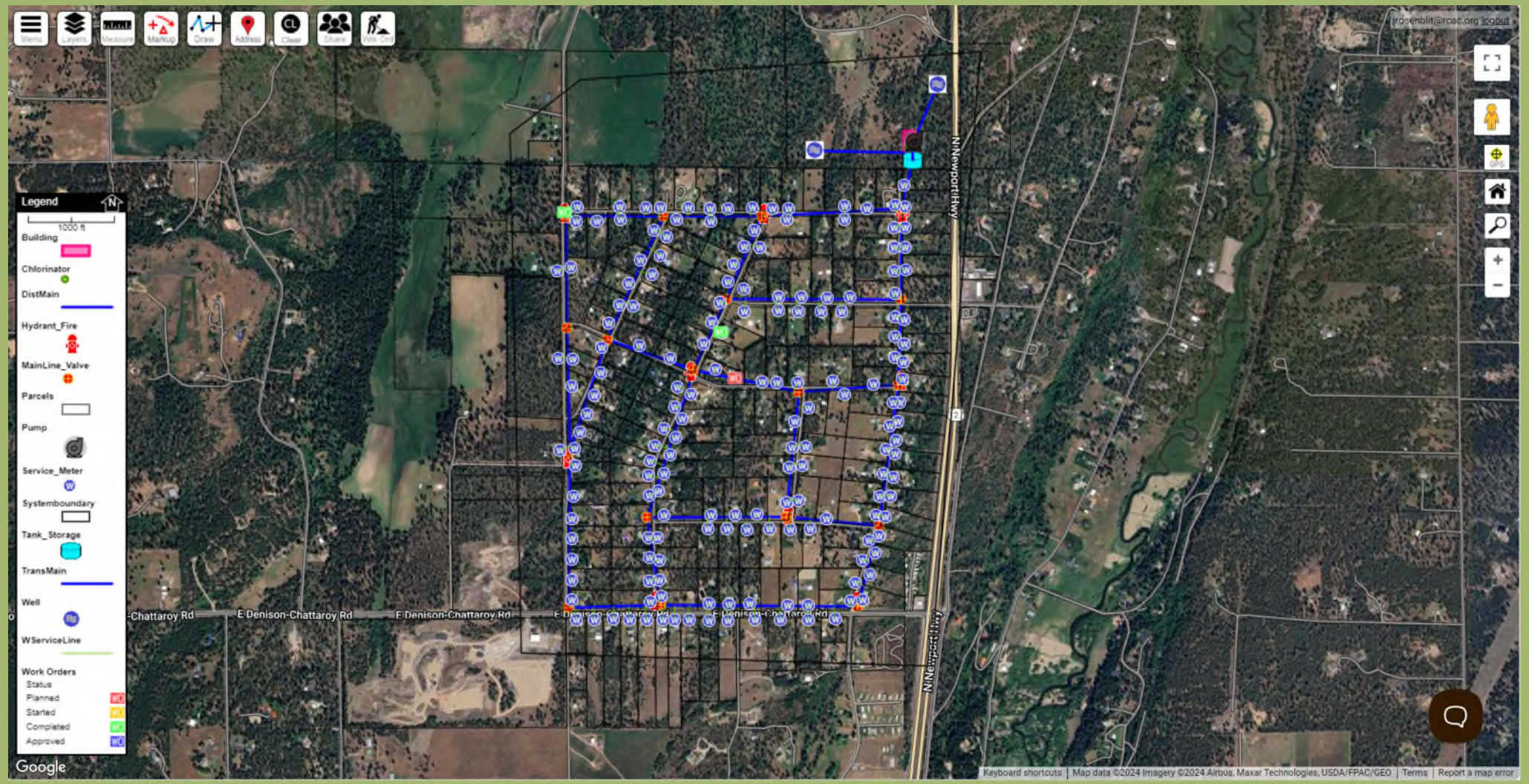
Diamond Maps



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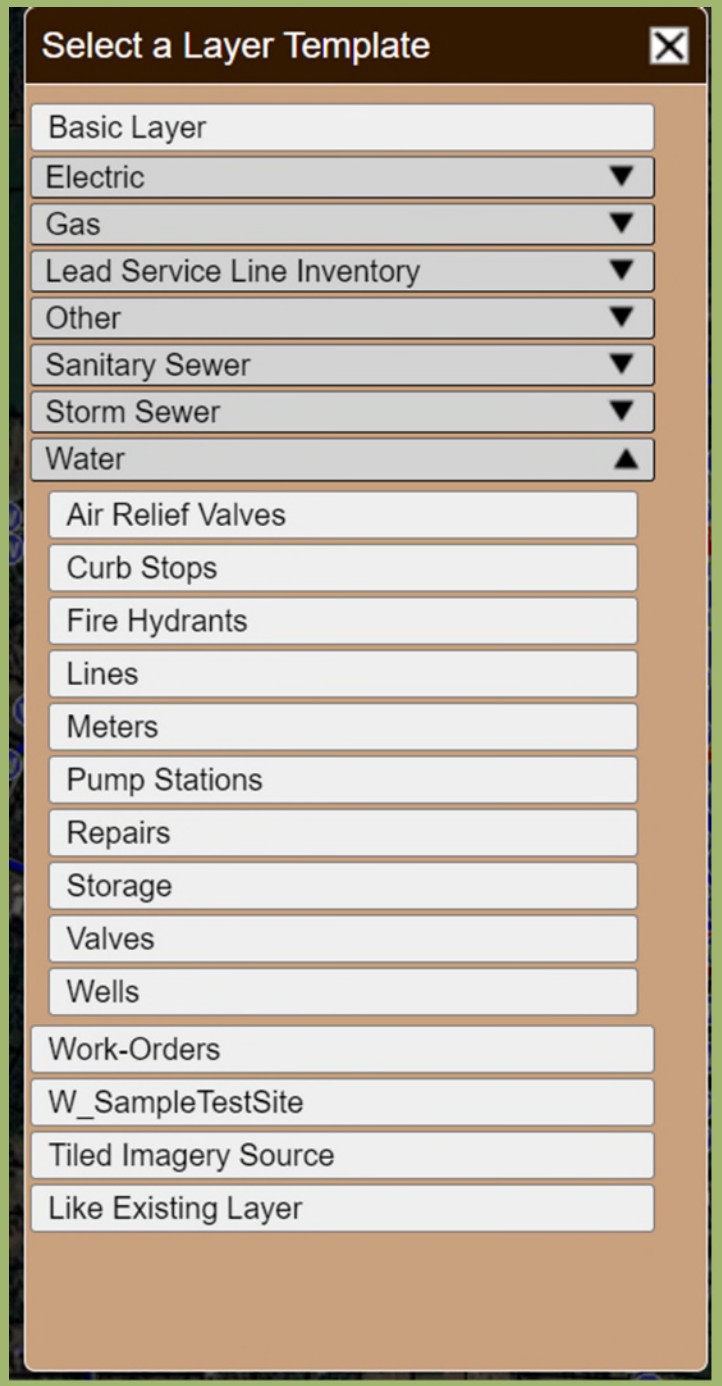
Diamond Maps Layers

- Diamond Maps has many built in layers that cover most assets
- Custom layers not on this list can be added.



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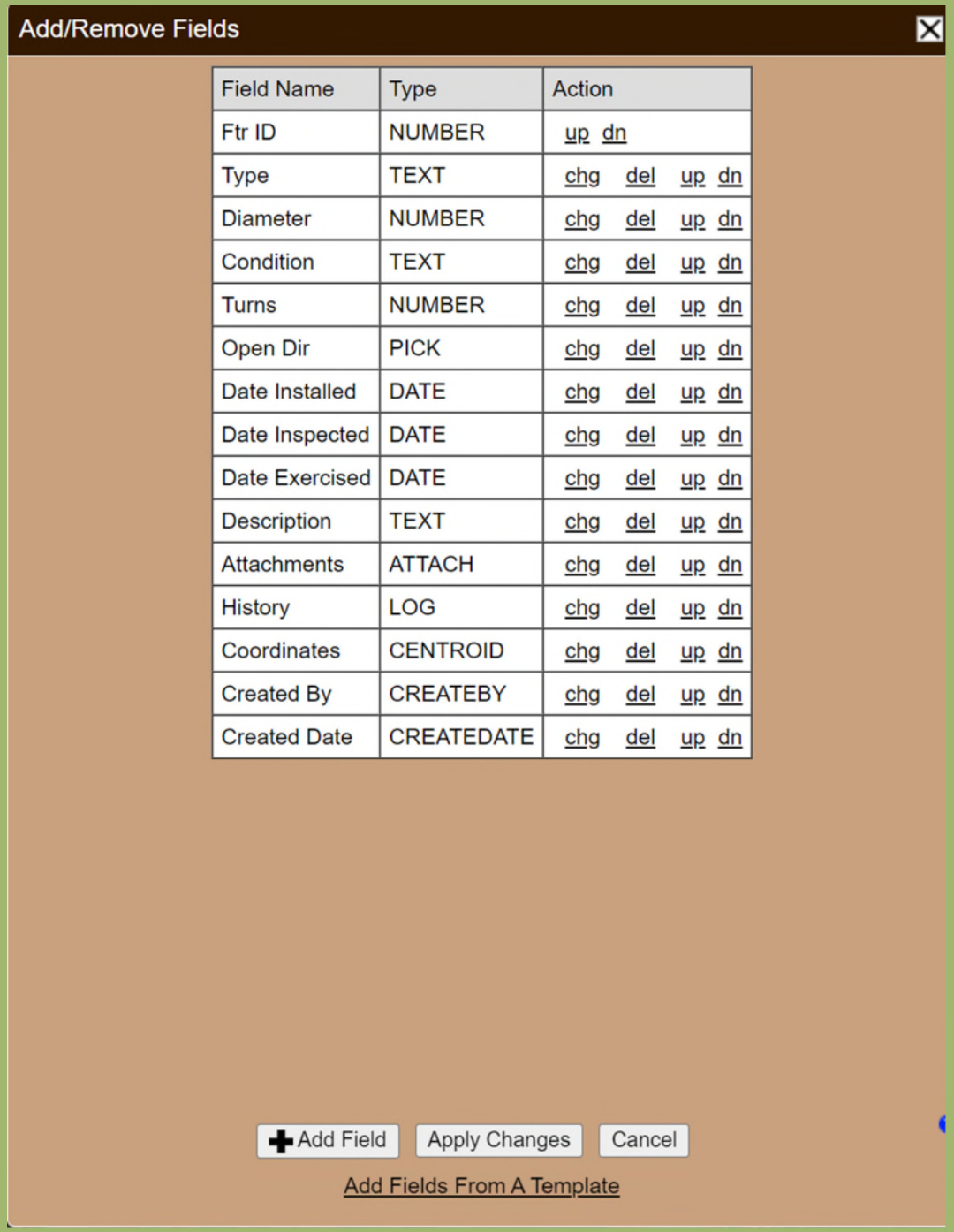
Diamond Maps Layers

- The premade layers have many of the fields needed for asset management
- There can be other useful fields needed.
  - Criticality, Probability of Failure, Consequence of Failure, Redundancy, Cost, and Expected Useful Life
  - You can add any additional field as needed.



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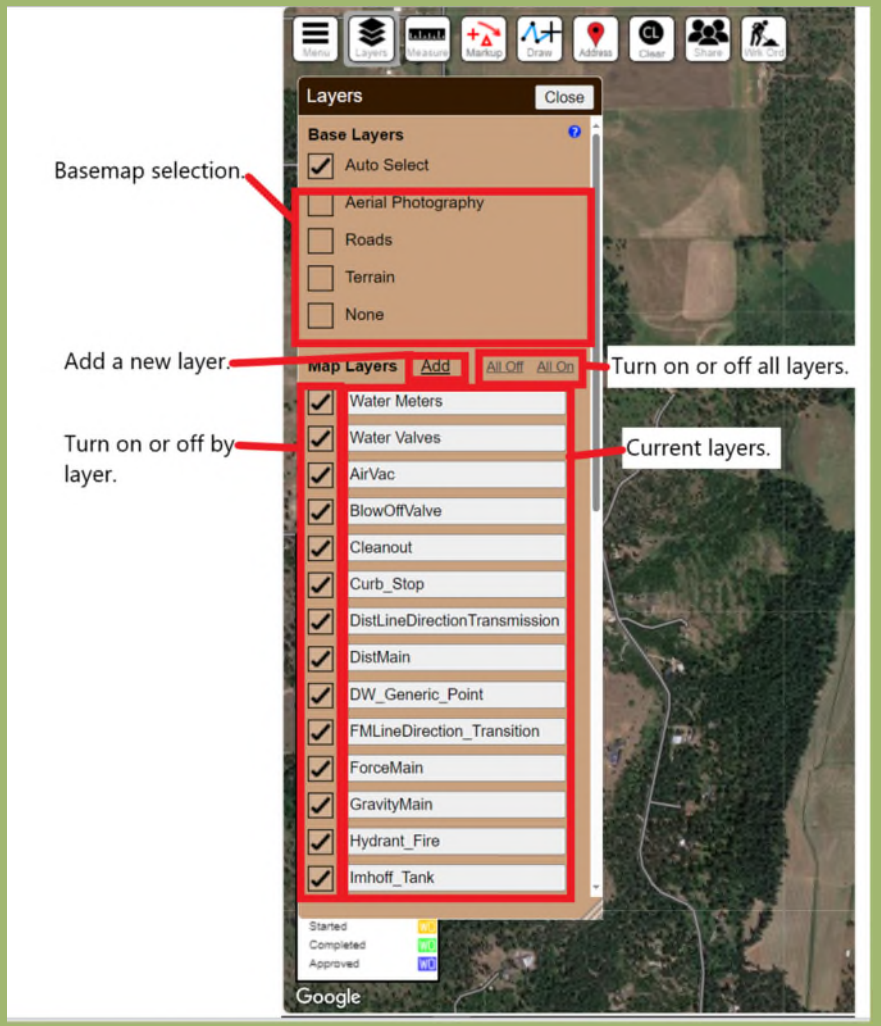
Diamond Maps Layers

- This is the layer tool
- You can change the desired basemap
- Turn on and off layers
- Add new layers
- Edit layers



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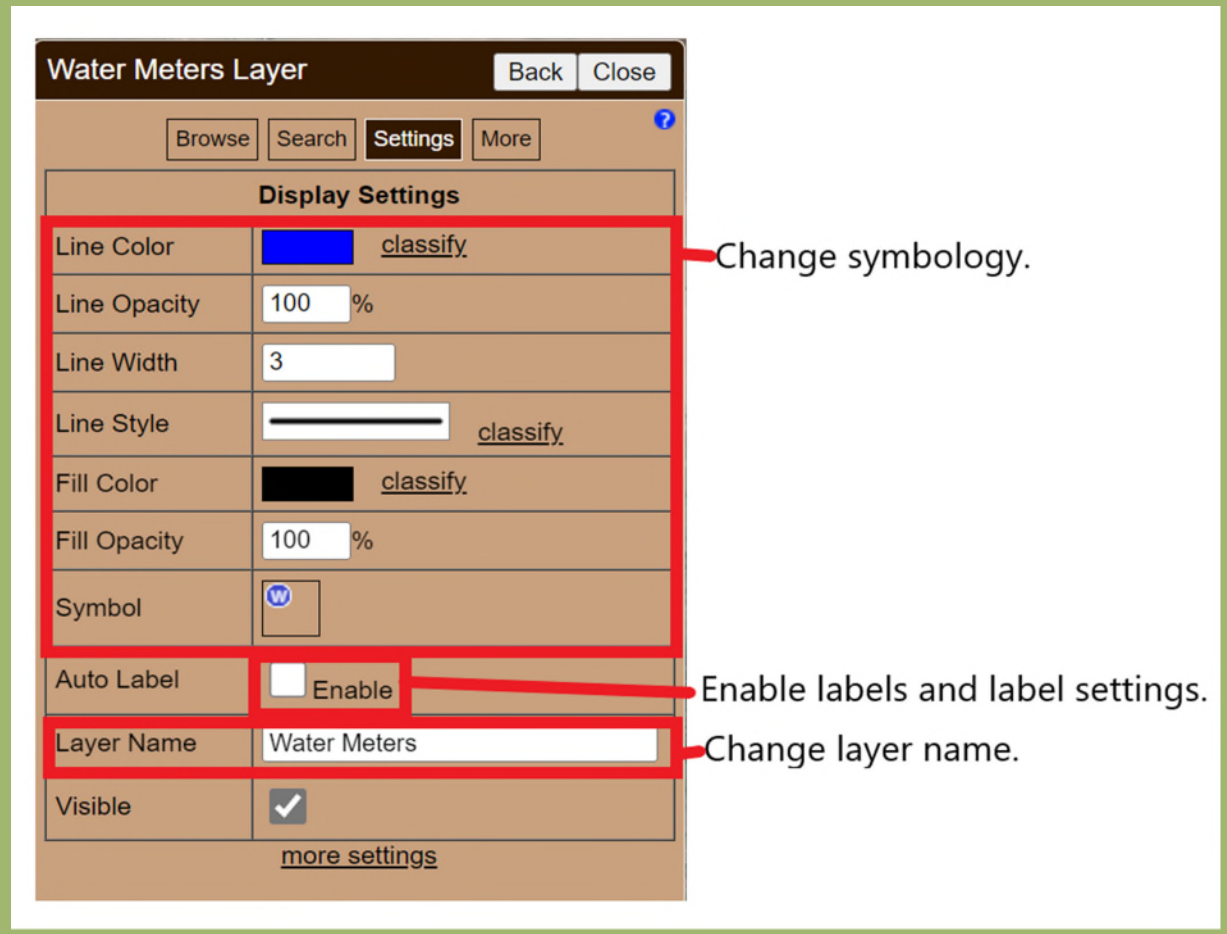
Diamond Maps Layers

- This is the layer settings
- Layers in Diamond Maps can be points, lines, and polygons, so you have options to change symbology for all
- Labeling can be added, and this will bring up label settings
- The layer name can be changed.
- After any changes are done the save changes option will be at the bottom



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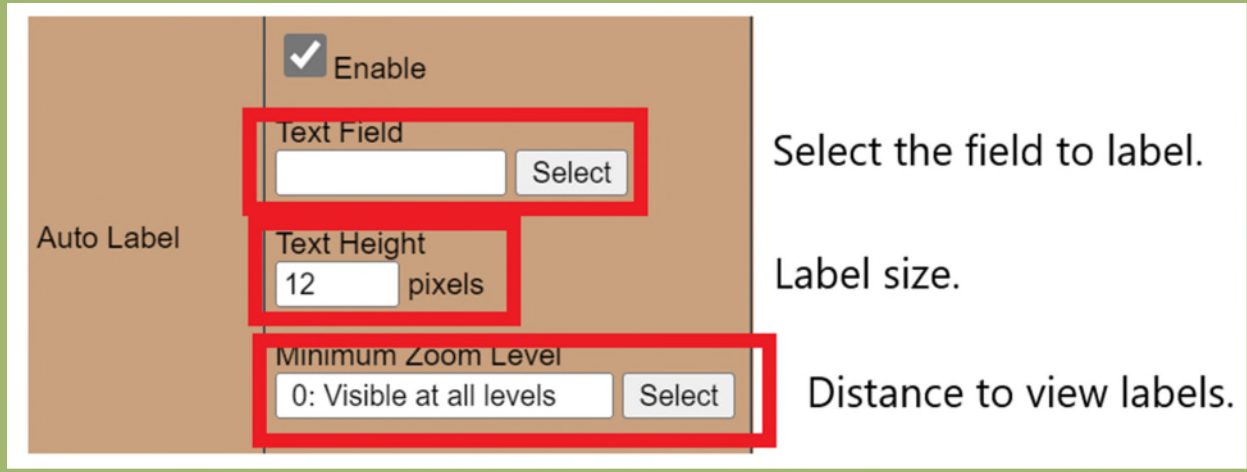
Diamond Maps Layers

- Here is where you can change your label settings
- Select a field you want to base you labels on
- Select the size of the label.
- Select at what zoom level you want to view the labels



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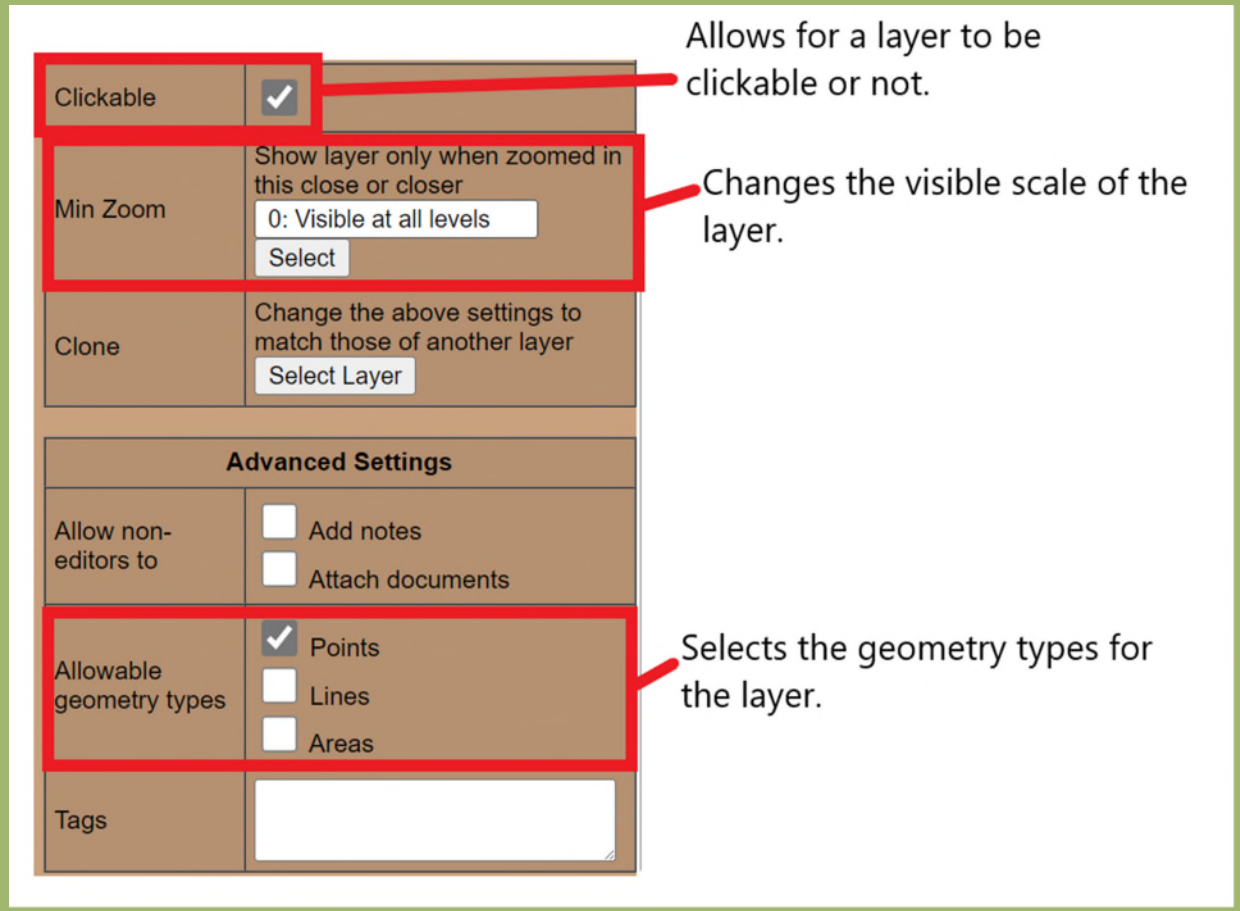
Diamond Maps Layers

- These additional settings let you make a layer clickable or not
- Change the max visible scale.
- Set the allowable geometry types



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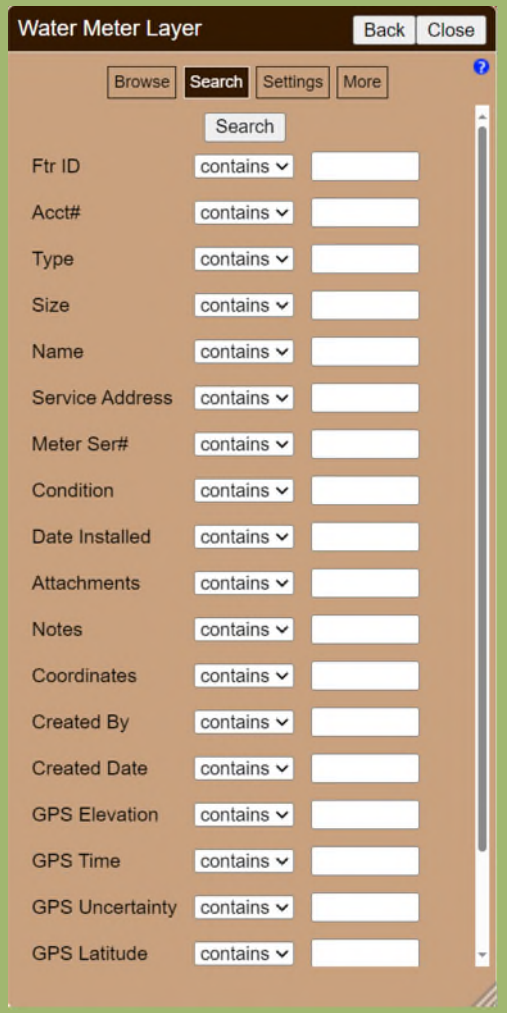
Diamond Maps Layers

- Search will allow you to search all fields or by each field
- The contains can be change to =,<,>,=>,=<, to help define your search



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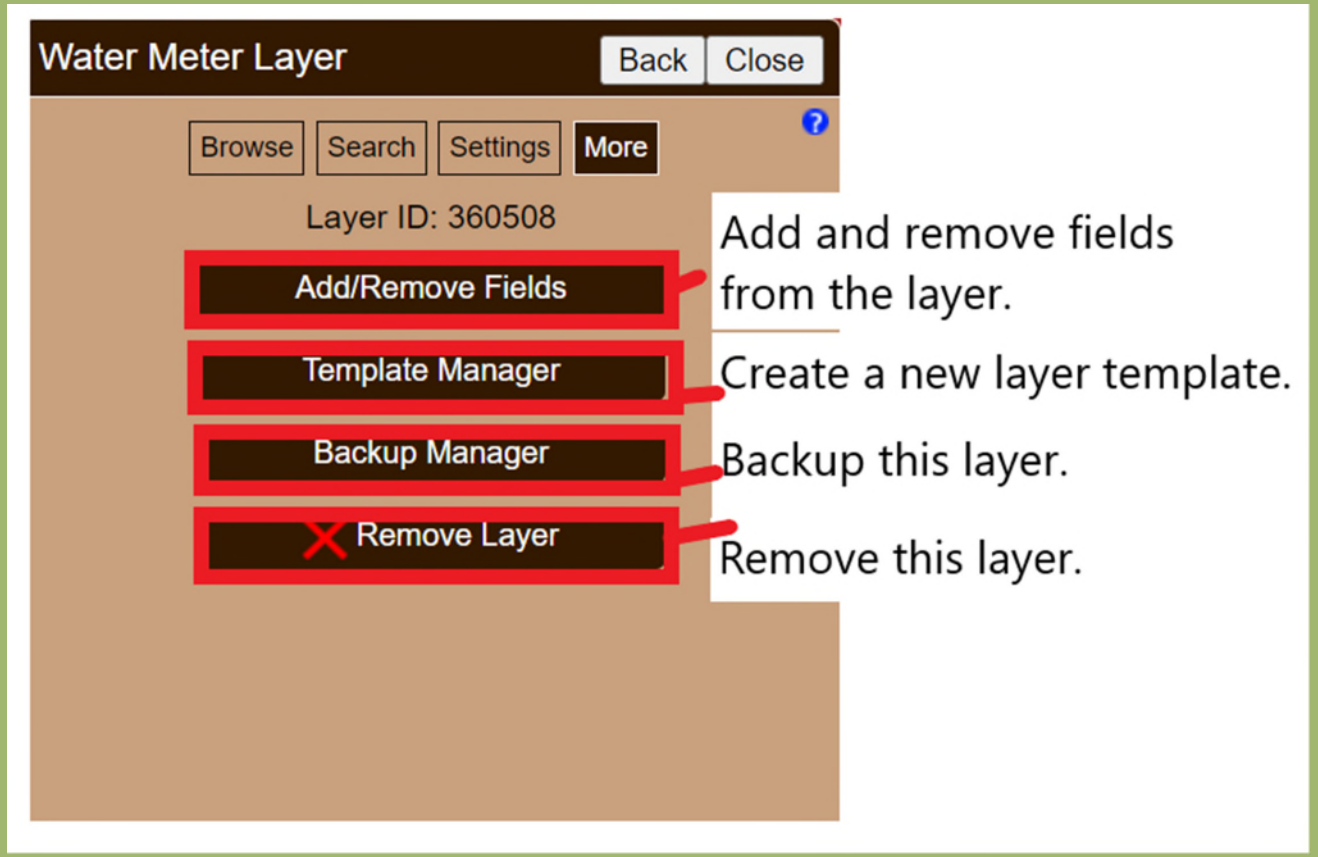
Diamond Maps Layers

- Add and remove fields from this layer
- Create a new template that can be used in layer creation
- Backup this layer, there is a 24-hour backup feature
- Remove the layer



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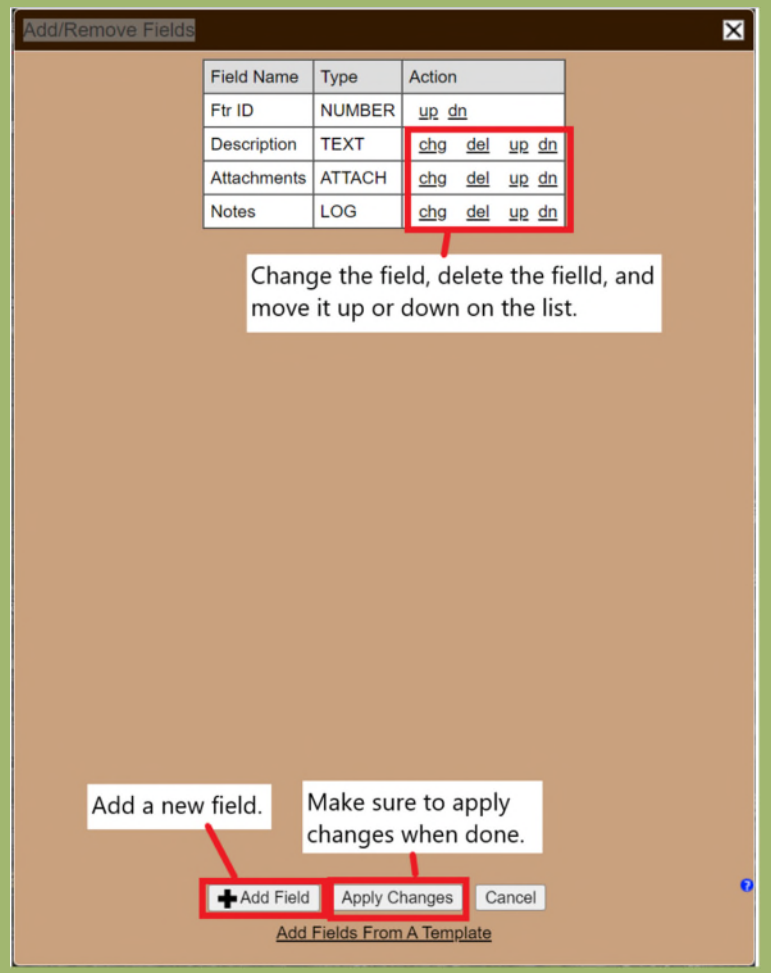
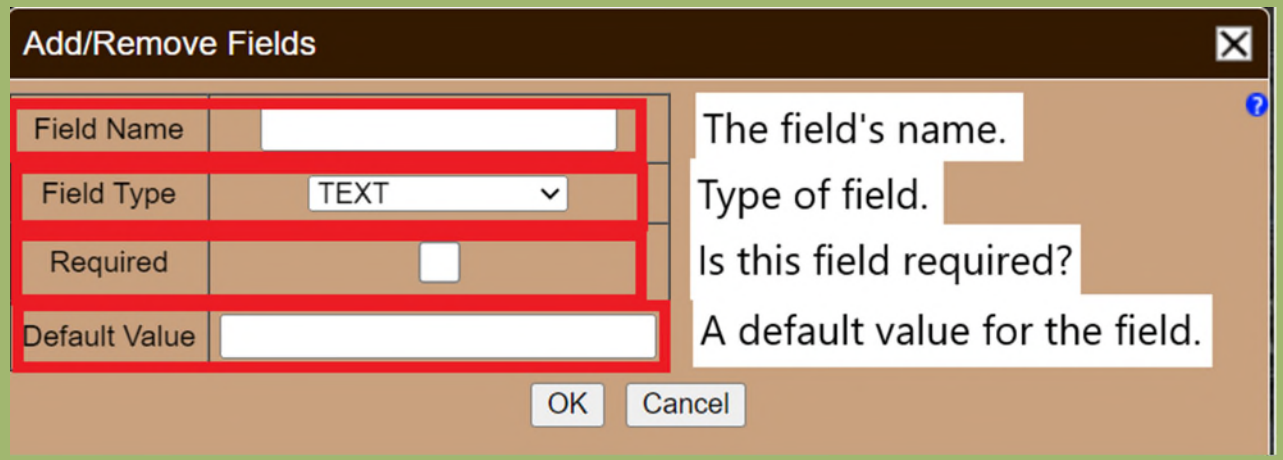
Diamond Maps Layers

- Here is where you can modify, add, and delete fields
- Make sure to apply changes after doing any edits to the fields



Diamond Maps Layers

- Here is where you put in the information for the new field
- Field type can b many different options from text, to numbers, and even a check box
- You can choose if this field is required or not
- A default value can be set for this field



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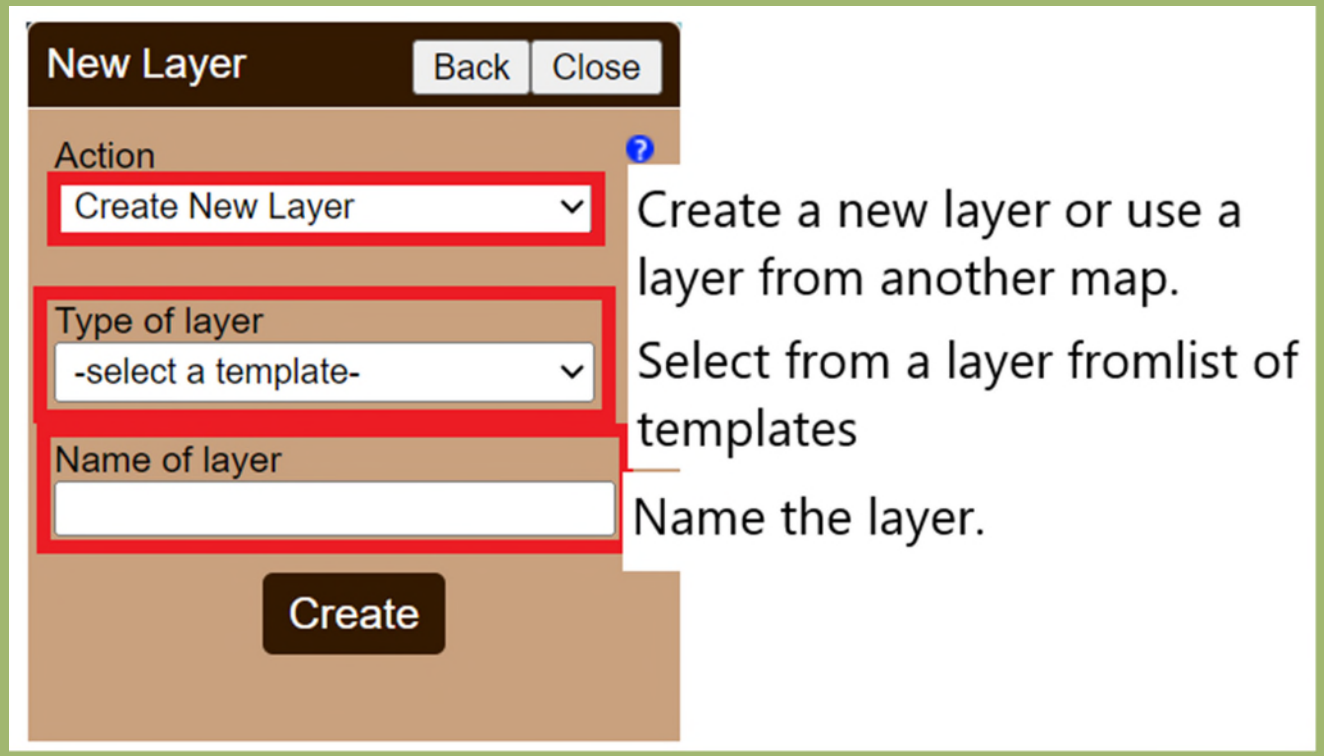
Diamond Maps Layers

- This is the new layer menu
- You can create a new layer or use one from another map
- Diamond Maps has many templates made for utilities to select from or you can make your own



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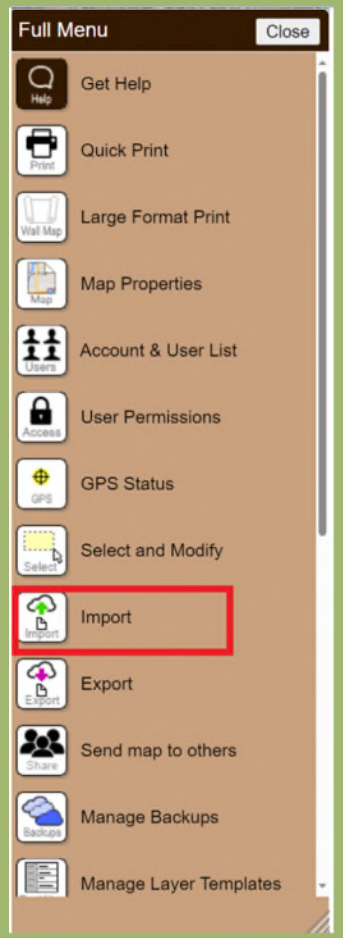
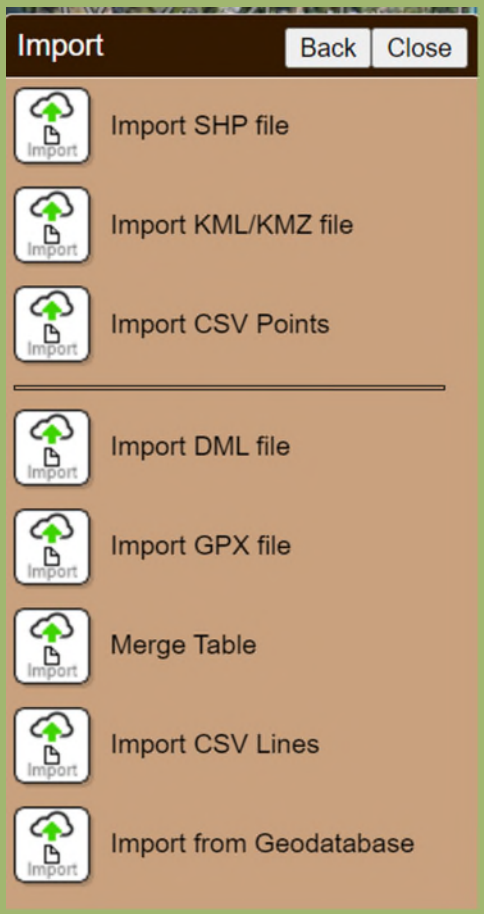
Diamond Maps Layers

- Under the menu button there is an import option
- You can bring in data from other sources into your map. If you are coming from a ESRI product can import a zip file of shape files or a geodatabase right into Diamond Maps





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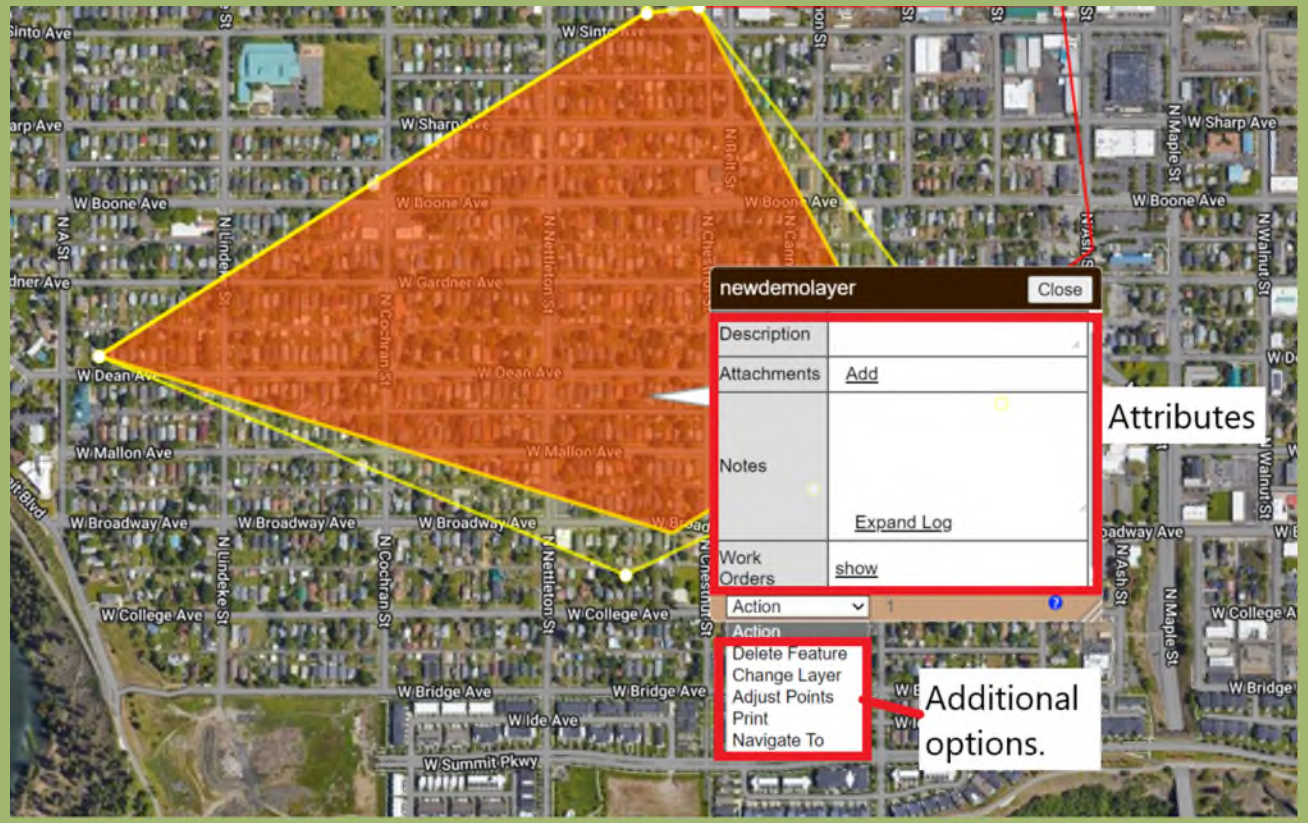
Diamond Maps Editing

- Clicking on a feature will bring up the attributes of that feature
- Edit the attributes by typing or changing anything in the table.
- Add attachments
- The add attachments will also bring up the option to take a photo with your device. Editing any information will bring up a Apply option on the top left
- Clicking on Action will bring up additional options



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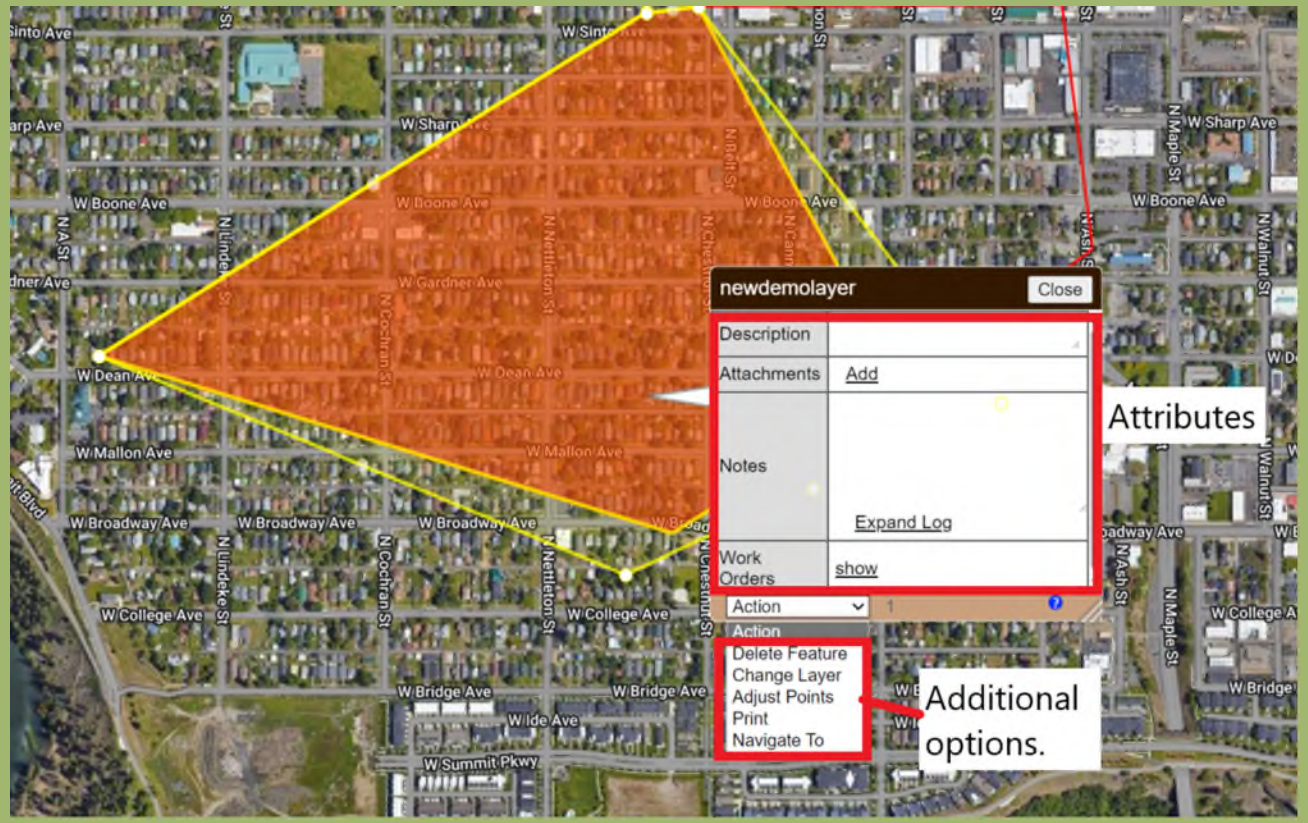
- In the action menu you can delete the feature
- Change the feature to a different layer type
- Adjust the vertices
- Put the attribute table into a printer friendly page
- Navigate To will bring up Google Maps and set the feature as the location to navigate to



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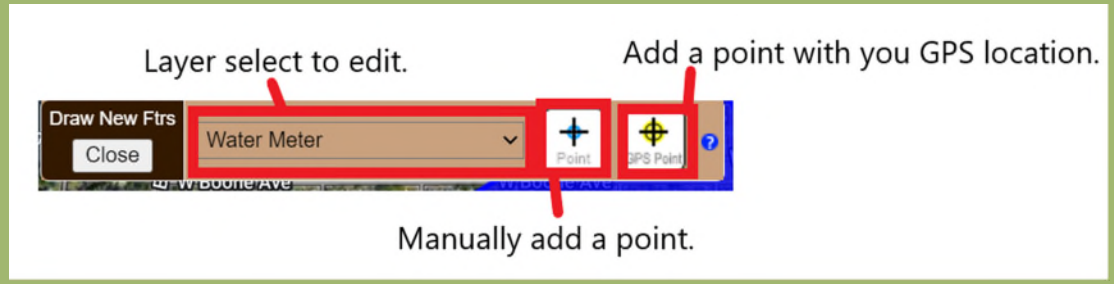

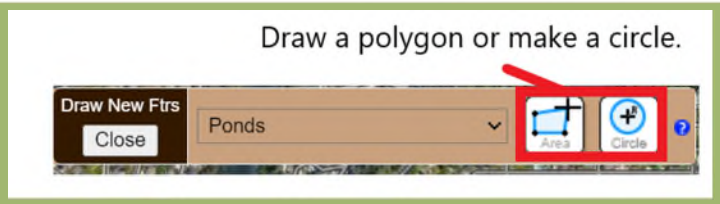

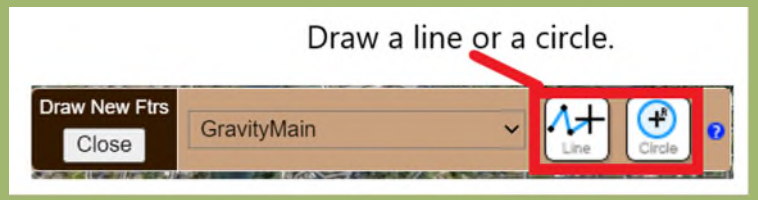

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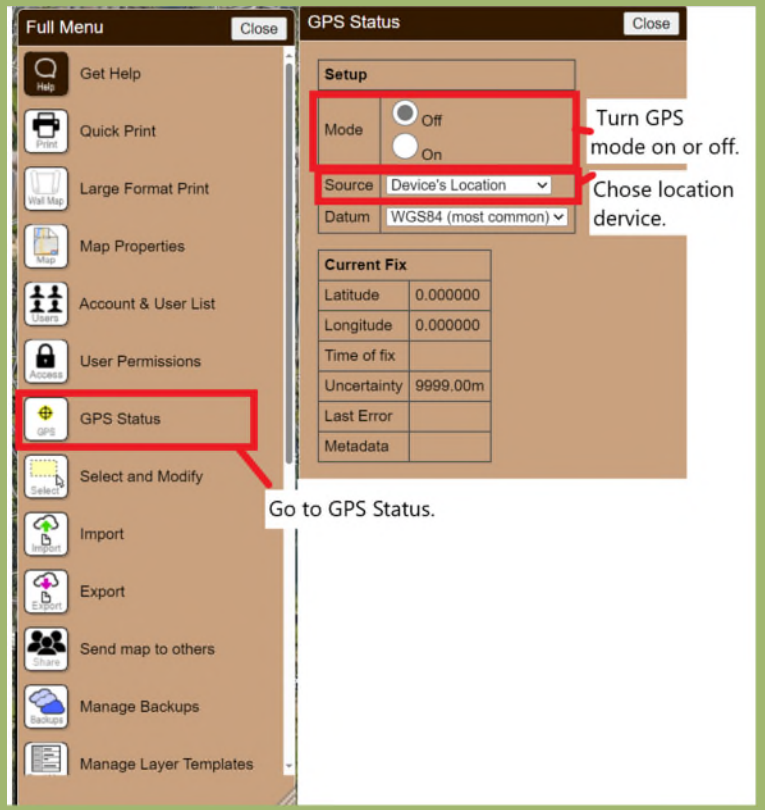

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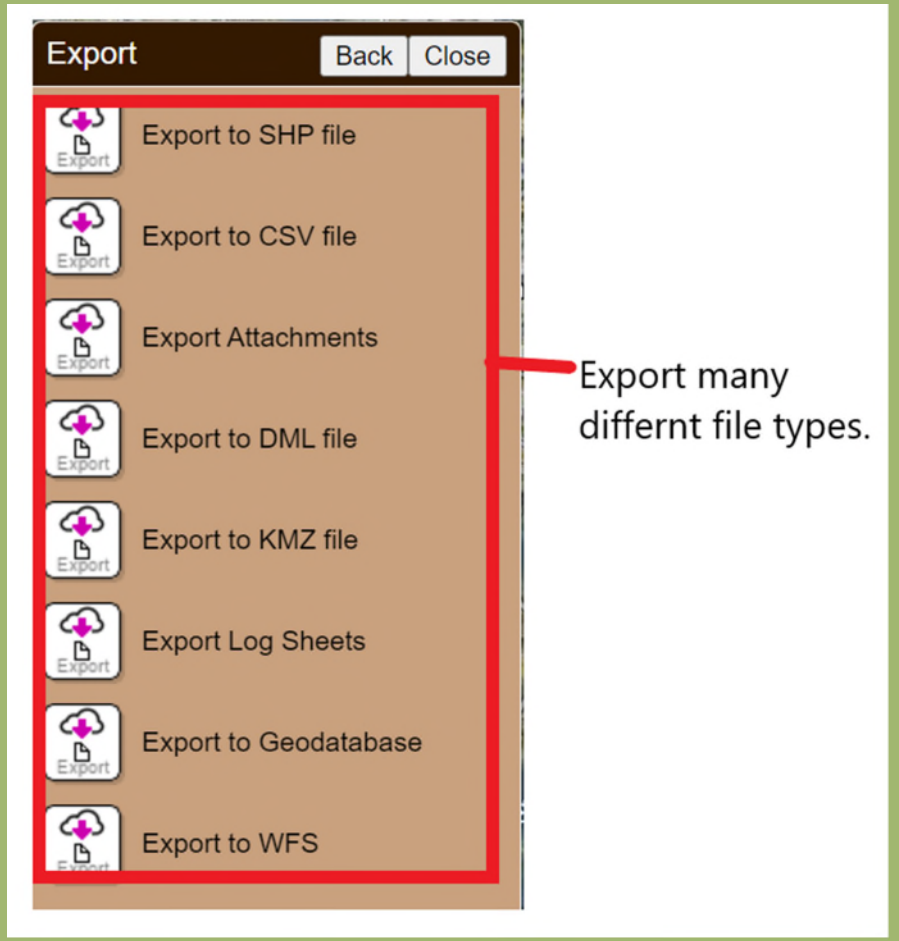

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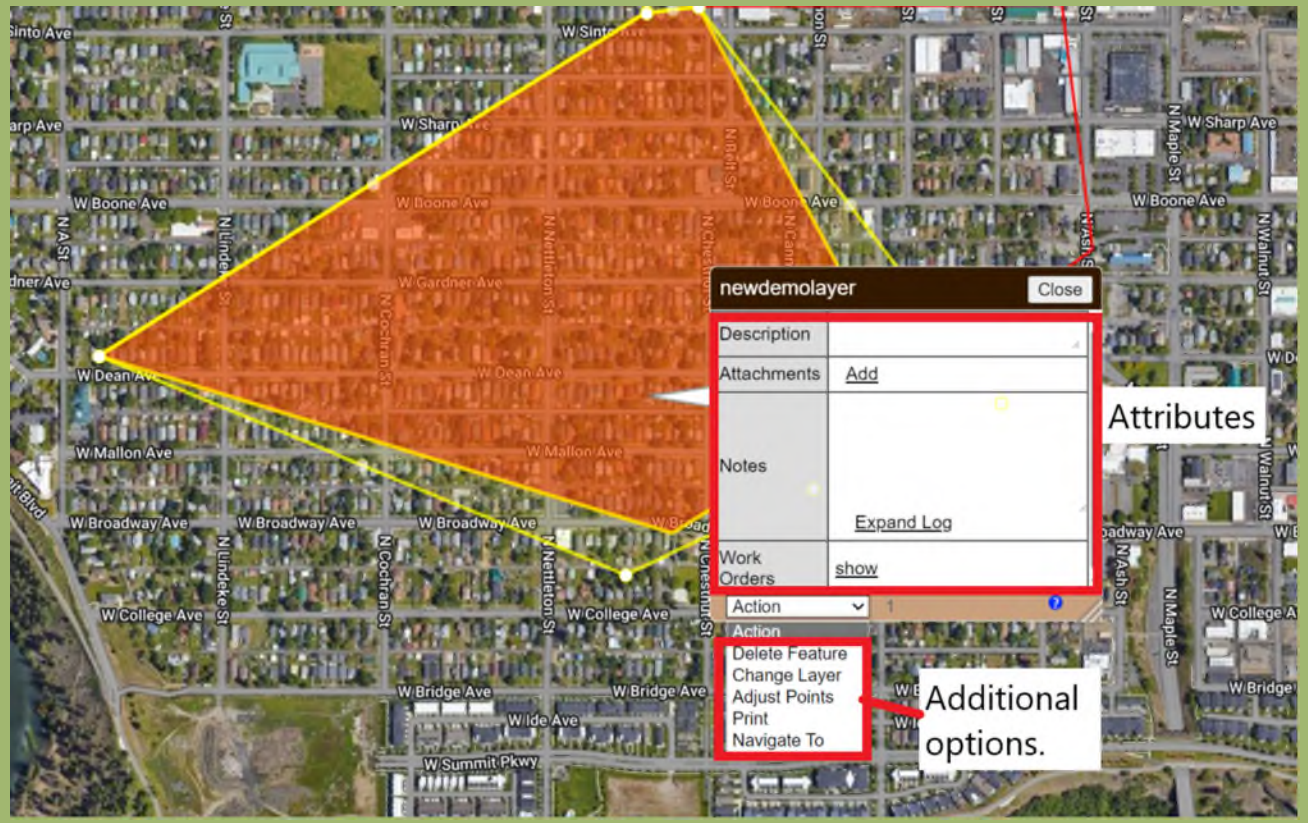

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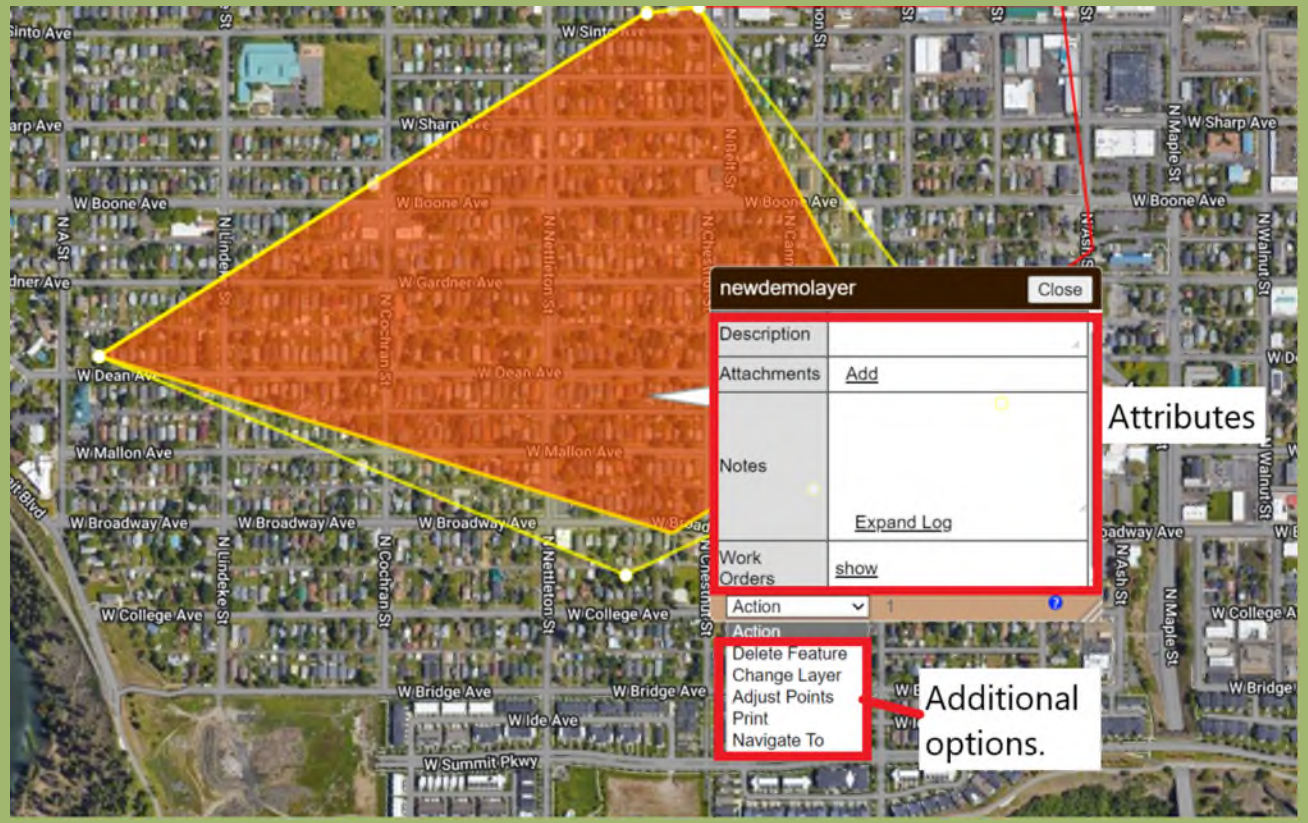

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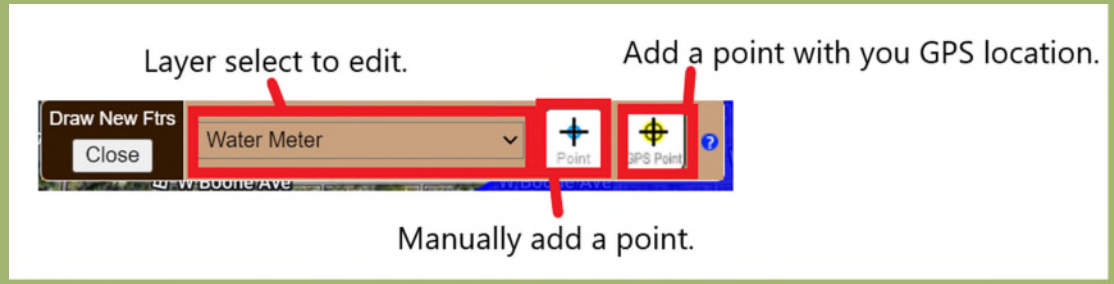

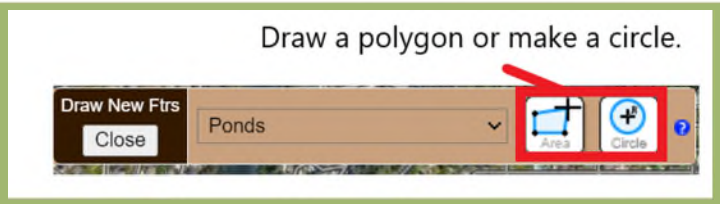

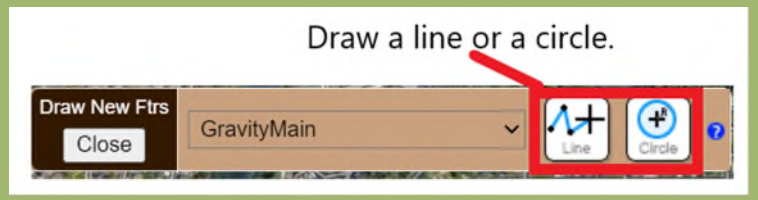

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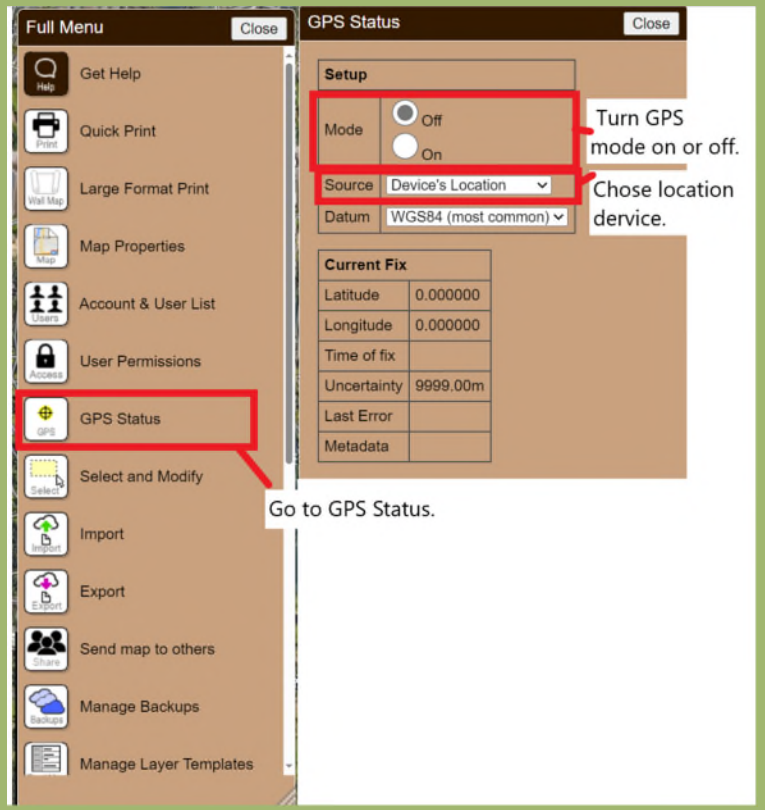

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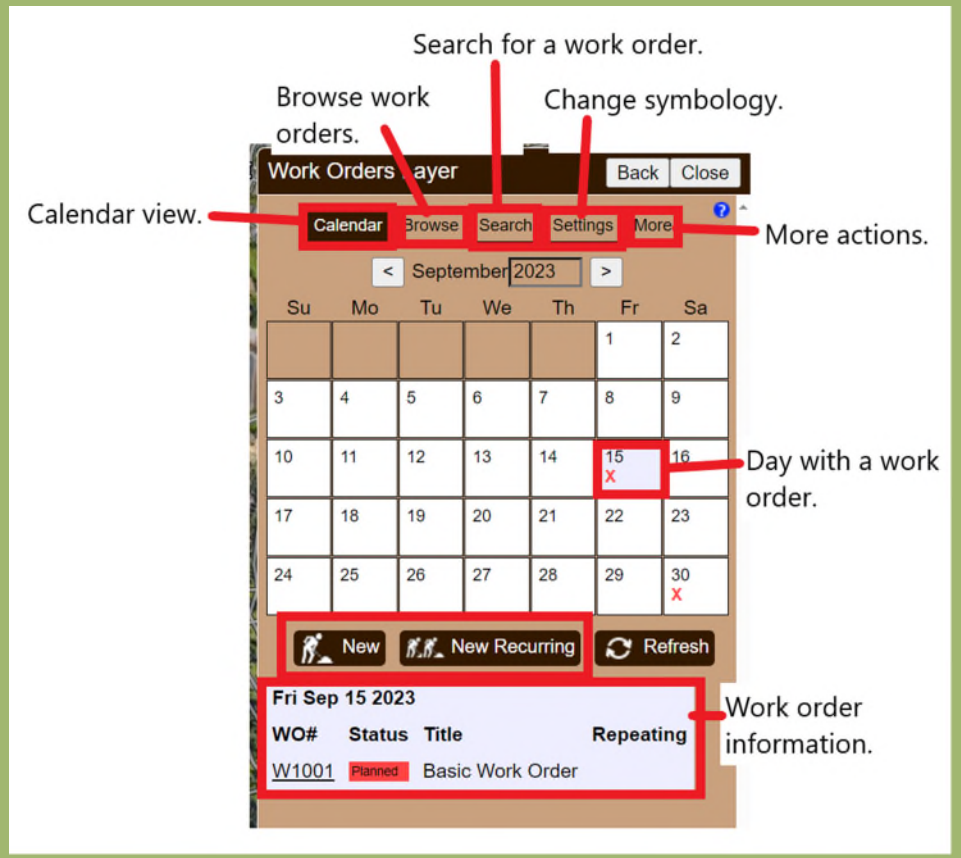
Diamond Maps Work Orders

- Diamond maps has a built-in work order system.
- Click on a date on the calendar and create a new work order.
- Delect a feature on your map to assign the work order to a feature or click an open area.
- Browse work orders in your system.
- The “More” tab will allow you to change the fields for the work order layer.



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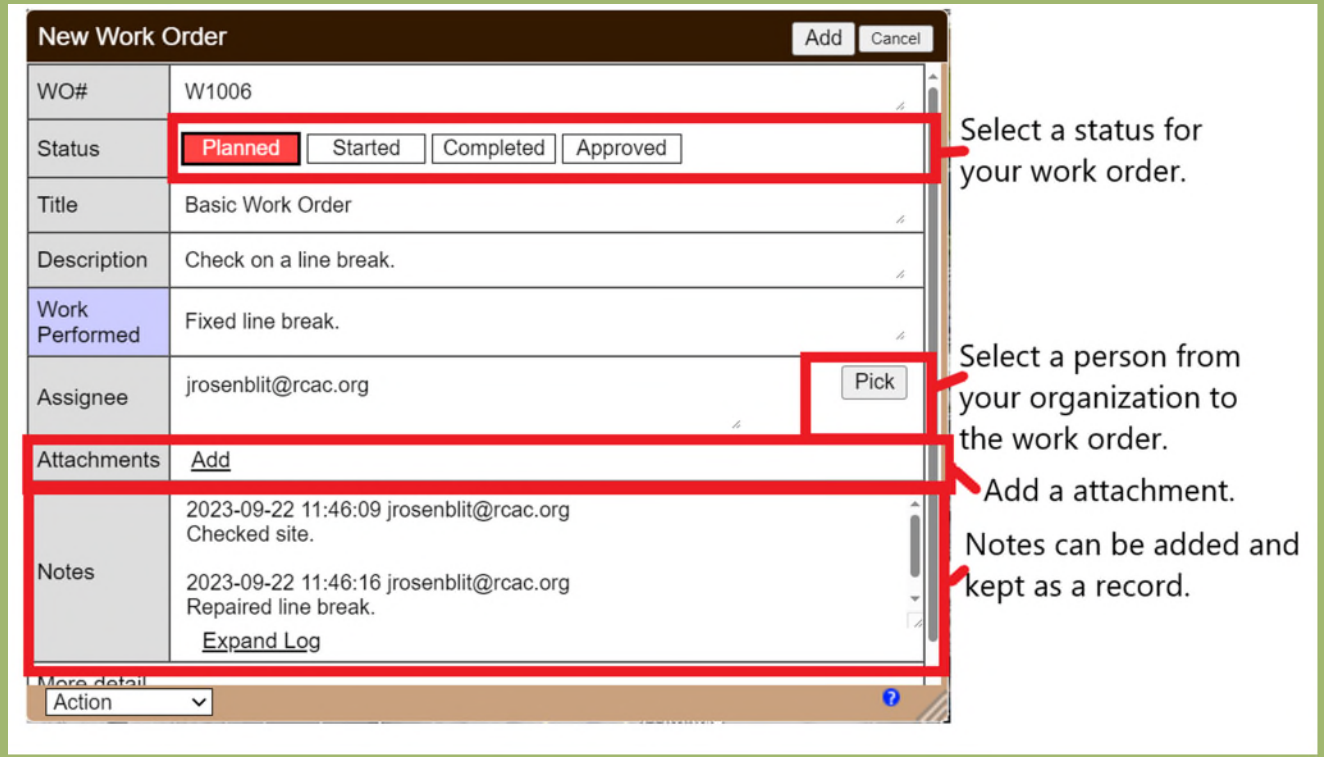
Diamond Maps Work Orders

- New Work Order menu allows you to add and modify a work order.
- If you click on a work order on the map it will bring up this window.
- Can add notes to the work order, and it will record who and at what time it was recorded.
- You can pick a person within your organization to assign the work order to.
- You can select a status of the work order.



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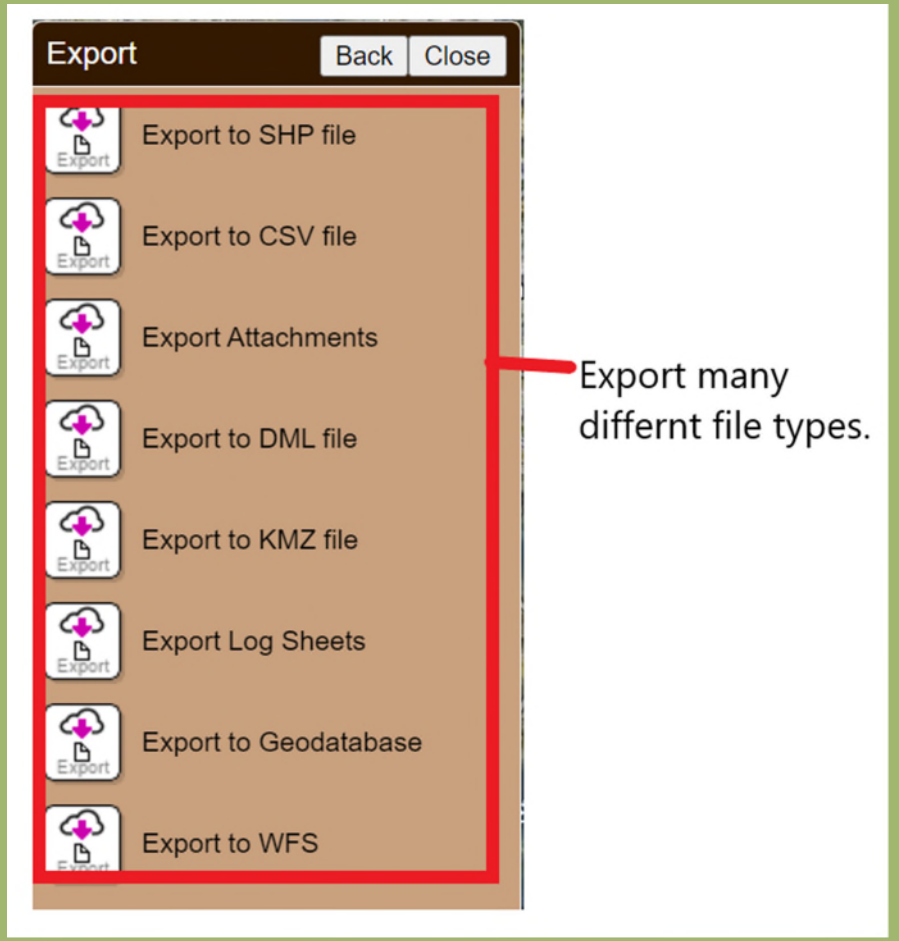
Diamond Maps Export

- You can export your data from Diamond Maps.
- Export to CSV is great for assets management, as you can get a table of all your assets.
- You can also export the data to be used in other GIS systems and Google Earth.
- When you export data you export it one layer at a time



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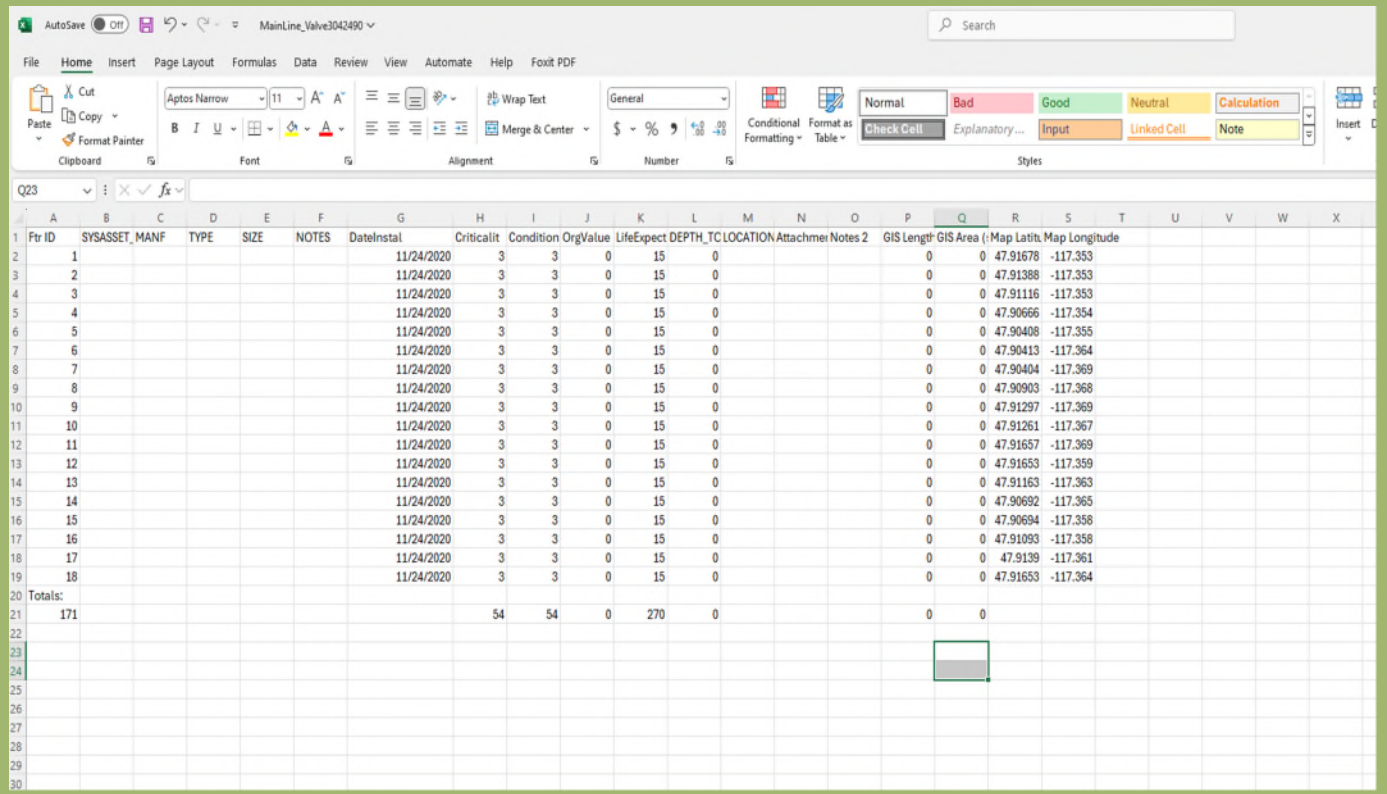
Diamond Maps Export

- This is an example of an export of the main line valves
- This data can be copied and entered an asset management plan



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2						11/24/2020	3	3	0	15	0				0	0	47.91388	-117.353
3						11/24/2020	3	3	0	15	0				0	0	47.91116	-117.353
4						11/24/2020	3	3	0	15	0				0	0	47.90666	-117.354
5						11/24/2020	3	3	0	15	0				0	0	47.90408	-117.355
6						11/24/2020	3	3	0	15	0				0	0	47.90413	-117.364
7						11/24/2020	3	3	0	15	0				0	0	47.90404	-117.369
8						11/24/2020	3	3	0	15	0				0	0	47.90903	-117.368
9						11/24/2020	3	3	0	15	0				0	0	47.91297	-117.369
10						11/24/2020	3	3	0	15	0				0	0	47.91261	-117.367
11						11/24/2020	3	3	0	15	0				0	0	47.91657	-117.369
12						11/24/2020	3	3	0	15	0				0	0	47.91653	-117.359
13						11/24/2020	3	3	0	15	0				0	0	47.91163	-117.363
14						11/24/2020	3	3	0	15	0				0	0	47.90692	-117.365
15						11/24/2020	3	3	0	15	0				0	0	47.90694	-117.358
16						11/24/2020	3	3	0	15	0				0	0	47.91093	-117.358
17						11/24/2020	3	3	0	15	0				0	0	47.9139	-117.361
18						11/24/2020	3	3	0	15	0				0	0	47.91653	-117.364
Totals:																		
171							54	54	0	270	0				0	0		

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Asset Management

Quantity	Asset	Year Acquired	Unit Cost (Historic, Current or Future)	Cost Type (H, C, F)	% Belonging to Water	Estimated Historic Cost (Water only)	Normal Estimated Life	Current Age	Estimated Current Cost	Standard Remaining Life	Priority (From AM Sheet)	Estimated Remaining Life	Estimated Future Cost	Fund with Cash	Fund with Grant	Fund with Loan	Existing Reserves	Annual Reserve Required
	Replacement of Existing Capital Assets																	
1	**Cibcrete Headwakk Diversion with Slow Rate SaND Filter**	2009	25,000	C	100%	$18,184	50	15	25,000	35	4	33	66,308		0%	100%	0	0
1	Steel Reservoir 312000 Gal	2009	817,700	C	100%	$594,750	75	15	817,700	60	4	60	4,817,564		0%	100%	0	0
1	SKID with 3 Harmsco cartirdge filters model HUR170HP	2009	50,000	C	100%	$36,367	50	15	50,000	35	4	35	140,693	25%	25%	50%	0	922
1	SKID with 10 Strainrite bag filters SRS series	2009	50,000	C	100%	$36,367	50	15	50,000	35	4	35	140,693	25%	25%	50%	0	922
1	LMI metering pump injecting liquid chlorine	2021	1,400	C	100%	$1,314	10	3	1,400	7	4	7	1,722	100%	0%	0%	0	Not Cap.
1	6" Steel 6613 LF	1960	1,064,693	C	100%	$273,726	40	64	1,064,693	-24	1	0	1,064,693	0%	25%	75%	0	0
1	8" PVC 1964 LF	2012	363,340	C	100%	$281,647	40	12	363,340	28	3	26	783,576	0%	25%	75%	0	0
1	10" Steel 4482 LF	1960	829,170	C	100%	$213,175	40	64	829,170	-24	1	0	829,170	0%	25%	75%	0	0
1	Water Treamnt PLant	2009	429,350	C	100%	$312,286	50	15	429,350	35	4	35	1,208,132	0%	25%	75%	0	0
1	Generatorat treamtnet plant	2009	26,000	C	100%	$18,911	20	15	26,000	5	4	5	30,141	100%	0%	0%	0	5,968
1	17 Fire Hyrdrants	1970	100,504	C	100%	$31,948	50	54	100,504	-4	15	0	100,504	0%	25%	75%	0	0
1	2 1.5 HP booster pumps	2022	2,400	C	100%	$2,300	15	2	2,400	13	4	12	3,422	100%	0%	0%	0	277
1	85 Meters	2009	10,625	C	100%	$7,728	10	15	10,625	-5	15	0	10,625	75%	0%	25%	0	0
1	International Tract/Backhoe	1980	13,500	C	100%	$5,306	30	44	13,500	-14	17	0	13,500	75%	0%	25%	0	0
1	Chevy K1PU GK1	1993	12,000	C	100%	$6,215	30	31	12,000	-1	18	0	12,000	75%	0%	25%	0	0
1	15 Distribution Valves	1974	57,000	C	100%	$19,725	50	50	57,000	0	14	0	57,000	75%	25%	0%	0	0
1	Auto dailer for water plant	2023	600	C	100%	$587	1	1	600	0	4	5	696	100%	0%	0%	0	Not Cap.
1	Data logger center	2009	13,000	C	100%	$9,455	20	15	13,000	5	4	4	14,632	75%	0%	25%	0	2,723
					100%									0%	0%	100%	0	0
					100%									0%	0%	100%	0	0
					100%									0%	0%	100%	0	0
					100%									0%	0%	100%	0	0
					100%									0%	0%	100%	0	0

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Asset Management

Required Fields											
Asset ID (Unique)	Existing Assets	Install Date (From Reserves Sheet)	Asset Condition (See Table)	Probability of Failure (PoF) [See Table]	Consequence of Failure (CoF) [See Table]	Redundancy Multiplier [See Table]	Criticality (PoF)x(CoF)x(Redundancy)	Estimated Remaining Useful Life	Priority	Location	Serial Number
	Cibcrete Headwakk Diversion with Slow Rate SaND Filter		Good	2	5	1	10	33	4		
	Steel Reservoir 312000 Gal		*Good*	2	5	1	10	60	4		
	SKID with 3 Harmsco cartirdge filters model HUR170HP		*Good*	2	5	1	10	35	4		
	SKID with 10 Strainrite bag filters SRS series		*Good*	2	5	1	10	35	4		
	LMI metering pump injecting liquid chlorine		Good	2	5	1	10	7	4		
	6" Steel 6613 LF		Poor	5	5	1	25	0	1		
	8" PVC 1964 LF		Fair	3	5	1	15	26	3		
	10" Steel 4482 LF		Poor	5	5	1	25	0	1		
	Water Treamnt PLant		Good	2	5	1	10	35	4		
	Generatorat treamtnet plant		Good	2	5	1	10	5	4		
	17 Fire Hyrdrants		Poor	3	4	0.5	6	0	15		
	2 1.5 HP booster pumps		Good	2	5	1	10	12	4		
	85 Meters		Good	2	3	1	6	0	15		
	International Tract/Backhoe		Poor	3	5	0.1	1.5	0	17		
	Chevy K1PU GK1		Fair	3	3	0.1	0.9	0	18		
	15 Distribution Valves		Fair	3	3	1	9	0	14		
	Auto dailer for water plant		Good	2	5	1	10	5	4		
	Data logger center		Good	2	5	1	10	4	4		
							0				
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Thank You!

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