Case Study: Implementation of a Data Program for 12 Sites and 60+ Users

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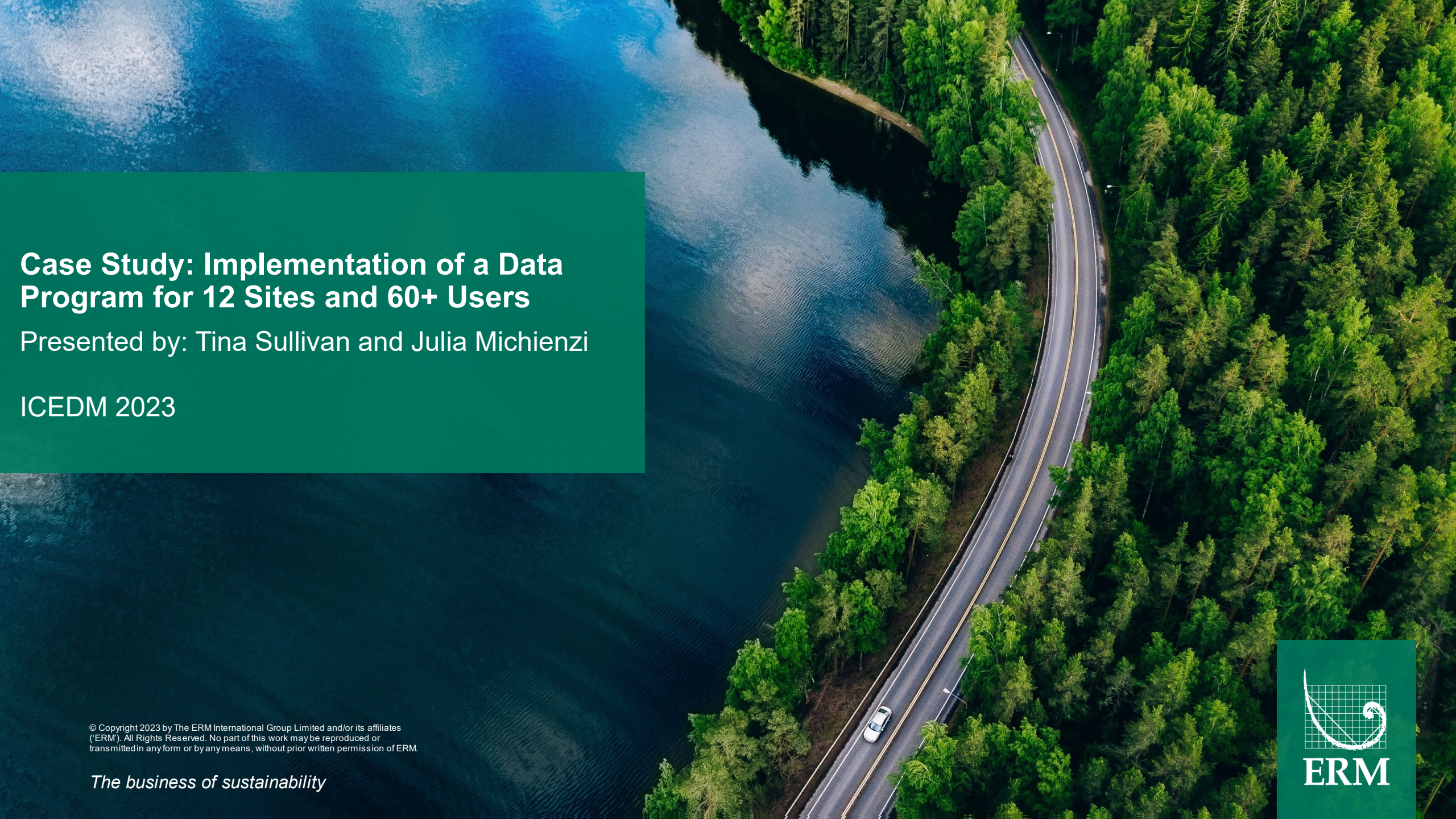
ICEDM 2023



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The business of sustainability

ERM

Agenda

01 Project Goals

02 Overarching Challenges

03 Implementation

04 Governance

05 Data Workflows and Dashboards

06 Program Sustainability

Overall Project Goals

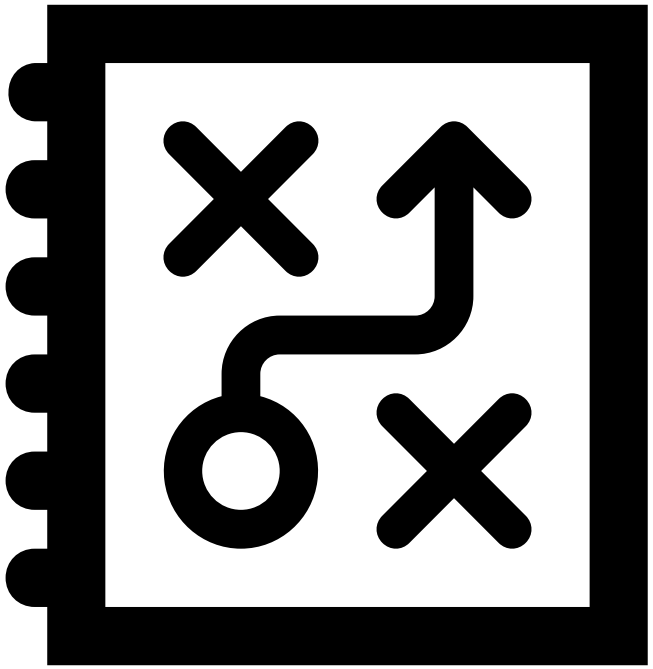
- EQuIS™ implementation
- Unify all data in one database
- Provide a single source of truth for many stakeholders
- Improve data analysis tools
- Automate multiple types of reporting
- Increase overall efficiency and quality

Initial Challenges

- Need for universal governance and workflows
- Many stakeholders involved
- No single entity held all the data
- All sites are in active investigation and remediation involving multiple stakeholders and multiple labs
- Entire system needed to be easy enough for almost anyone to use
- Migration must *follow* the governance

What's Our Game Plan?

- Who are the users?
- Needs assessments
- Regulatory requirements
- What tools and licenses are available?
- Who will run the overall program?
- How to ensure the program is future-proof?

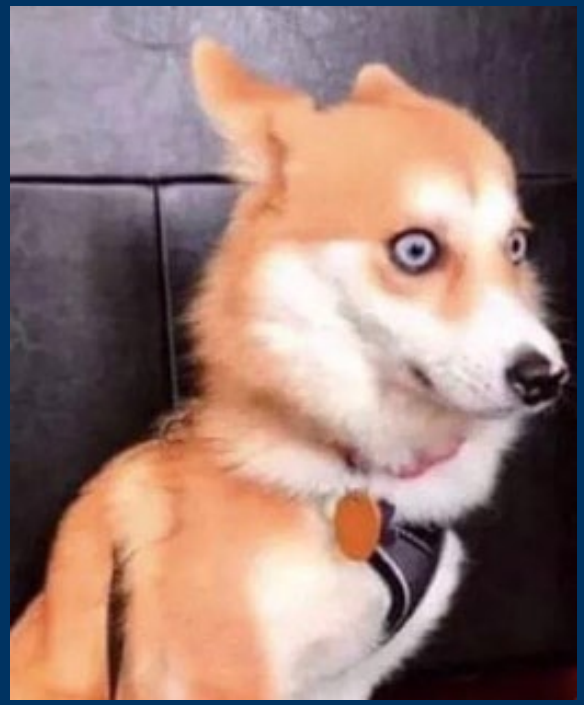


The Implementation Plan:

- Explore software options
- Build robust data governance into the entire process
- Develop workflows for each data process
- Develop Standard Operating Procedures for all stakeholders
- Migrate the data
- Work towards a balance of internal and external database support
- Prioritize automation
- Dashboards for all users

Data Governance

- Understand Client's organizational framework
- Define data roles and responsibilities
- Clear content model to support business goals
- Policies and procedures
- Controlled data imports
- Controlled reporting
- Program sustainability



Migration

Data Importing Workflows

Laboratories

EDDs submitted via email using a custom EDD format and following specific rules

Field Data

EQuIS™ Enterprise dashboards with widgets to download EDDs, complete, and upload.

Processing

Custom apps to create EDDs from disparate data sources

Project Data

Stakeholders create EDDs following SOPs and submit to Data Manager for review and loading

Data Reporting Workflows

Tabular Reports

- Automated, formatted Excel tables for regulatory reporting using EQuIS™ Enterprise and elaborate Excel templates
- Paginated reports from Power BI

Alerts

Environmental Information Agents send emails when analytical results are higher than expected or exceed permit limits

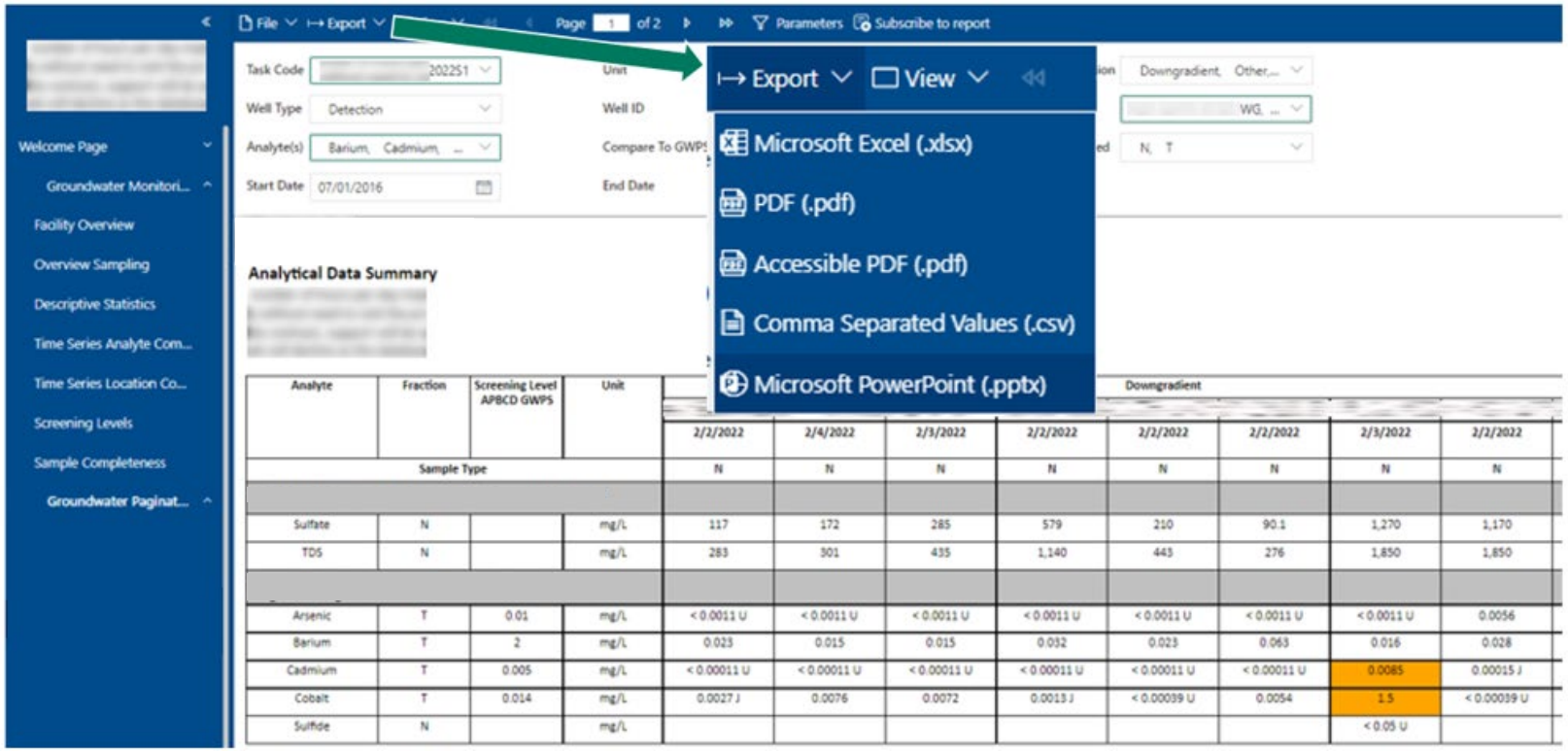
Data Transfer

Data exports for third-party use such as QC review, validation, and data analysis are self-serve on Enterprise dashboards

Annual Groundwater Monitoring Event
Generic Company
Springfield, MA

Sample Location		PZ-1D		PZ-1D		PZ-1D		PZ-1D		PZ-2D		PZ-2D		PZ-2D		PZ-2D		PZ-31	
Sample Date		01/25/2022		02/14/2023		08/24/2022		08/24/2022		01/25/2022		02/14/2023		08/24/2022		10/11/2022		01/26/2022	
ANALYTE	UNITS																		
List III																			
Boron	mg/L	0.01	J	0.011	J	0.011	J	< 0.040		0.013	J	0.010	J	0.012	J	NA		< 0.04	
Calcium	mg/L	53.1		56.2		45.8		46.4		20.7		30.2		27.3		NA		102	
Chloride	mg/L	2.9		3.0		2.6		2.6		2.4		2.6		2.1		NA		3.2	
Fluoride	mg/L	< 0.1		0.063	J	0.080	J	0.076	J	0.071	J	0.076	J	0.088	J	NA		< 0.1	
Sulfate	mg/L	2.4		1.6		2.2		2.2		2.9		2.6		2.0		NA		0.69	J
TDS	mg/L	148		200		139		142		68		140		287	H	75.0		262	
pH, Field	SU	7.51		7.43		7.49		NA		8.4		7.97		8.01		7.94		7.1	
List IV																			
Antimony	mg/L	< 0.003		< 0.0030		< 0.0030		< 0.0030		0.00098	J	0.0015	J	0.0011	J	NA		< 0.003	
Arsenic	mg/L	< 0.005		< 0.0050		< 0.0050		< 0.0050		0.0014	J	< 0.0050		< 0.0050		NA		< 0.005	
Barium	mg/L	0.014		0.020		0.015		0.013		0.0037	J	0.0055		0.010		NA		0.0075	
Beryllium	mg/L	< 0.0005		< 0.00050		< 0.00050		< 0.00050		< 0.0005		< 0.00050		< 0.00050		NA		< 0.0005	
Cadmium	mg/L	< 0.0005		< 0.00050		< 0.00050		< 0.00050		< 0.0005		< 0.00050		< 0.00050		NA		< 0.0005	
Chromium	mg/L	0.0025	J	0.0015	J	0.0025	J	0.0023	J	0.0098		0.0041	J	0.0066		NA		0.0015	J
Cobalt	mg/L	< 0.005		< 0.0050		< 0.0050		< 0.0050		< 0.005		< 0.0050		< 0.0050		NA		< 0.005	
Lead	mg/L	< 0.001		< 0.0010		< 0.0010		< 0.0010		< 0.001		< 0.0010		< 0.0010		NA		< 0.001	
Lithium	mg/L	< 0.03		< 0.030		< 0.030		< 0.030		0.0012	J	0.0010	J	0.0012	J	NA		< 0.03	
Mercury	mg/L	< 0.0002		< 0.00020		< 0.00020		< 0.00020		< 0.0002		< 0.00020		0.00013	J	NA		< 0.0002	
Molybdenum	mg/L	< 0.01		0.0013	J	0.00088	J	0.00085	J	< 0.01		< 0.010		< 0.010		NA		< 0.01	

Power BI Paginated Reports – Create and Export Formatted Tables



Data Analysis and Visualization – Power BI

Audience

- Technical and supervisory staff
- Variety of needs and data literacy

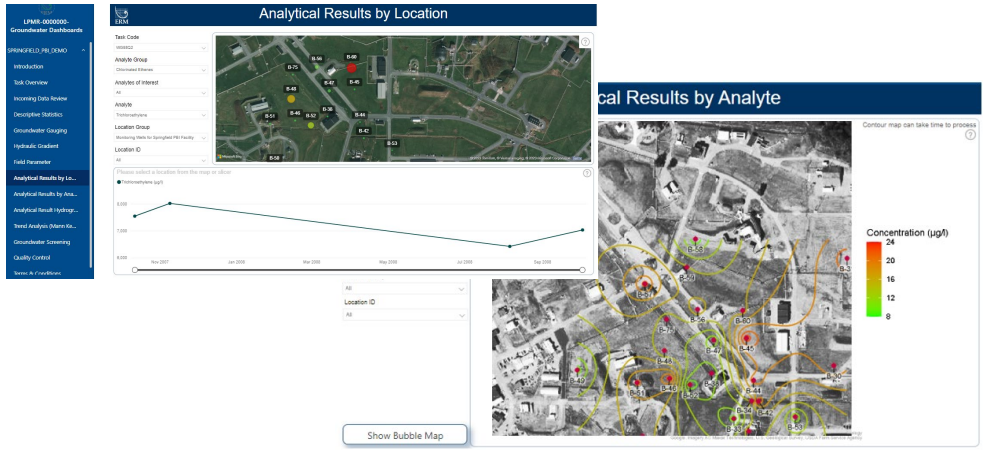
Goals

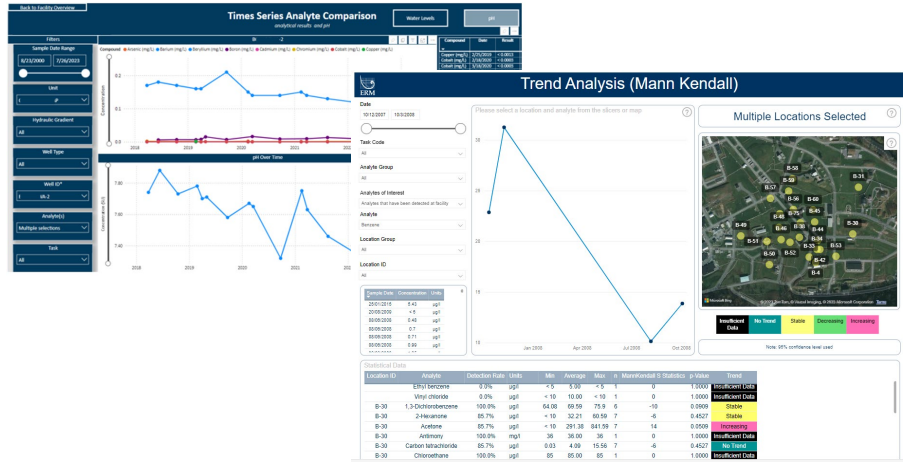
- Provide visualizations to address the most common questions including maps, trends, action level exceedances, statistics, and program progress
- Ensure scalability

Data Source

- EQuIS™ and SPM using the Power BI Connector, the API, and EIAs
- Identify data manager responsible for data source and review

Power BI Dashboards





- Automatic refresh from EQuIS™
- All sites use the same dashboards
- Clearly communicate appropriate use and limitations
- Embed clear directions into dashboard
- Provide documentation of data model and functionality

Transition Planning

What comes after implementation?

Is our job to eliminate our job?

Ongoing Training

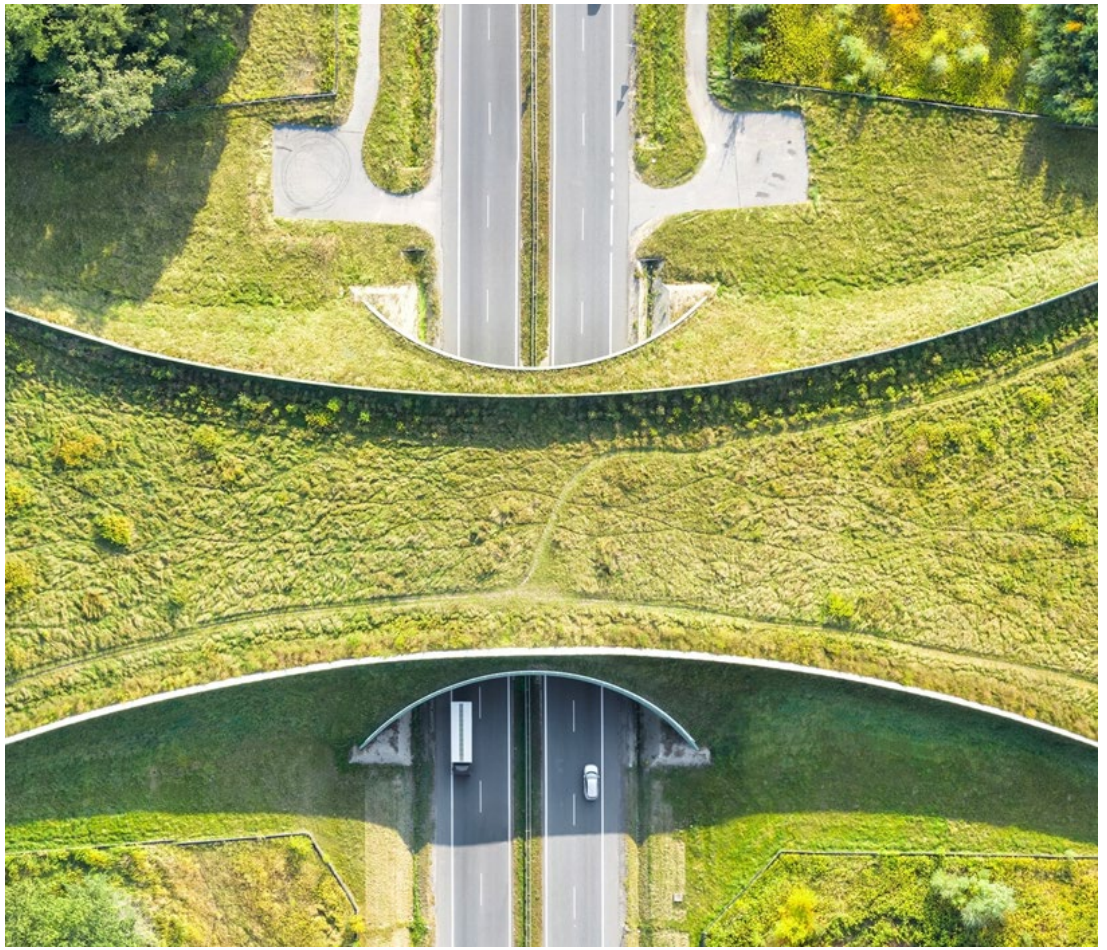
Guidance and support on how to handle any situation that arises for client data managers and stake holders

- Cleaning up data tangles, SPM, updating schemas, rolling back EDDs, laboratory support…etc.
- Providing trainings to all vendors to complete tasks for data transfers

Sustained Support

Supporting the maintenance of the EQuIS Database

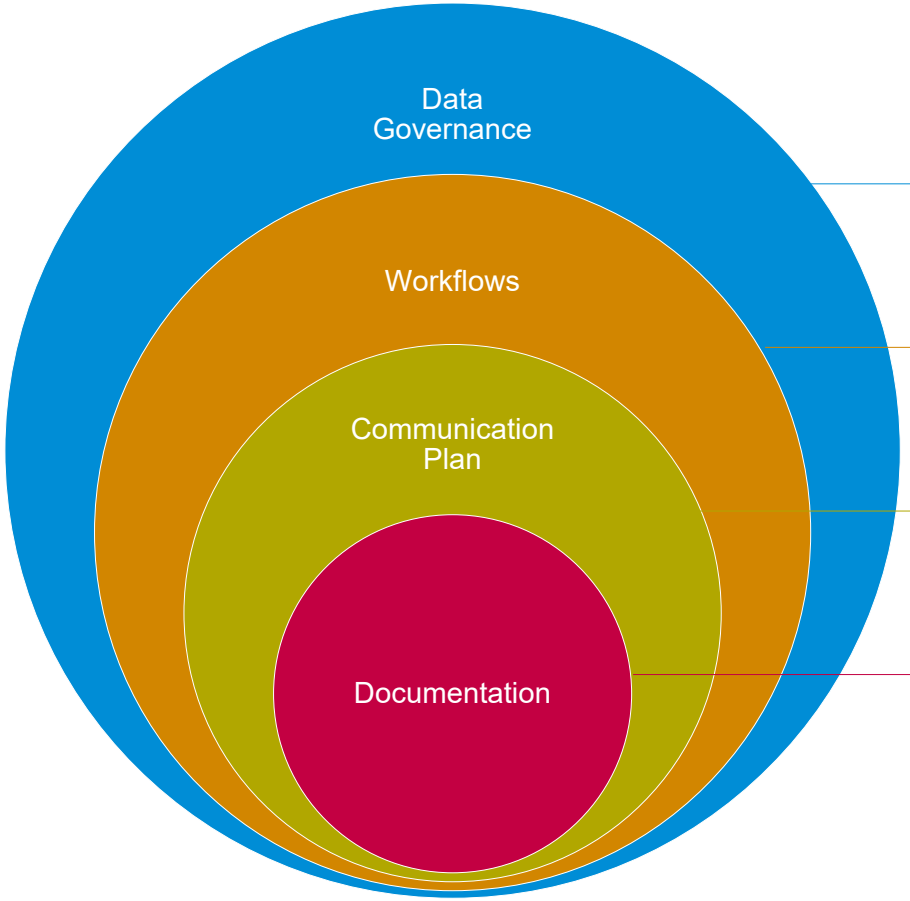
- General support
  - Any tasks that the client data manager needs help with
  - SPM support with updates, changes, and event planning
    - Completeness Checking
  - Importing and monitoring incoming EDDs
  - Identifying and testing new workflows
  - Governance adherence and updates
    - Ensuring SOPs are utilized



Continued Client Connection

- Weekly check- in calls
- Ensure SOPs are being practiced by all parties
- We can quickly identify any potential need for updates
- Continue to better the processes in place
- Identify future work opportunities

Keys to Program Longevity:



Big Picture Planning
Assume growth, high level buy-in

Build and Test
Assume Murphy's Law

Multimedia Communications
Meetings, videos, dashboards

SOPs
Routinely train, encourage feedback

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Dashboard Testing

A software tester walks into a bar.

Runs into a bar.

Rolls into a bar.

Skips into a bar.

And orders:

a beer.

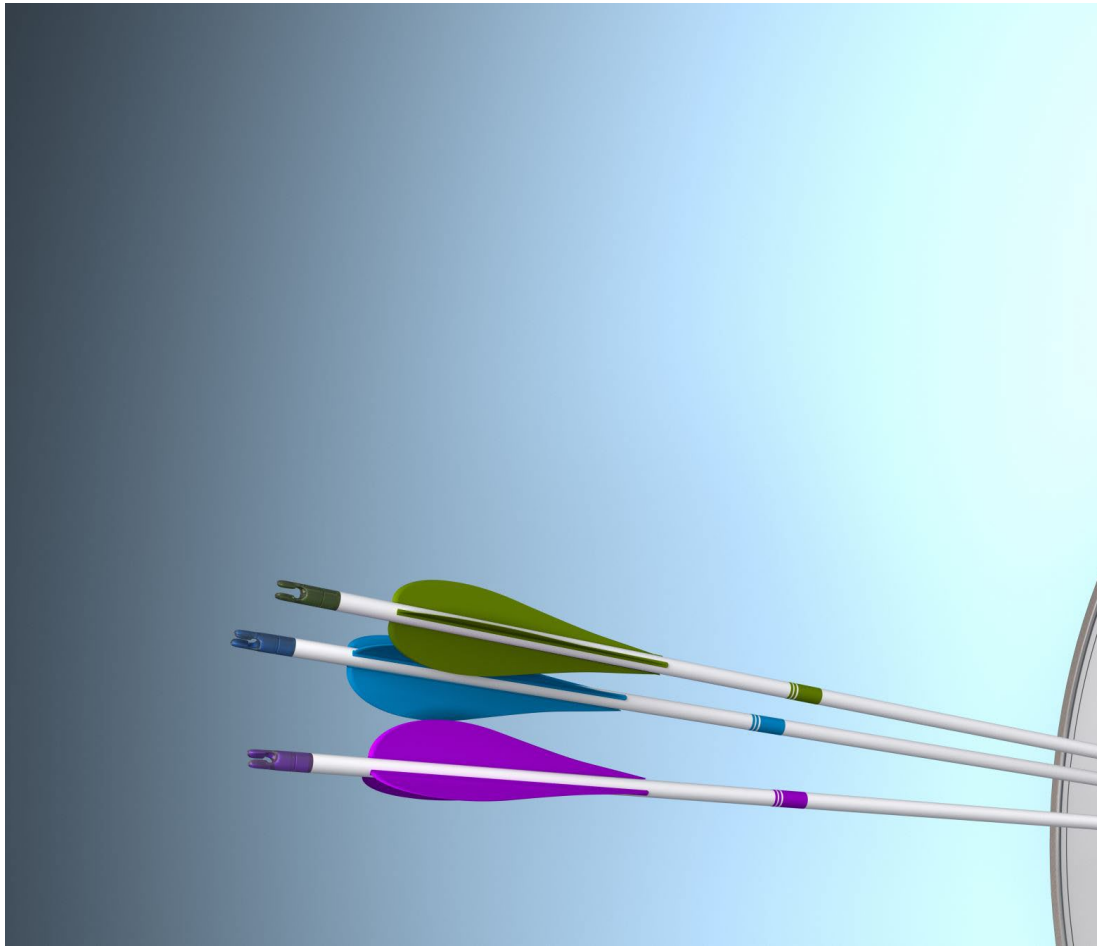
-1 beer.

Null beer.

99999999 beers.

a bear.

Testing Complete.

A regular customer walks into the bar and asks where the bathroom is.

The bar bursts into flames.