Quality Assurance Project Plans

Purpose

- Who? Introductions
- What? QAPP Requirement and QA/QC
- Why? Purpose
- What? QAPP Overview
- How? QAPP Development
- What? QAPP Resources
- Questions? Comments?

Speakers

Sarah Von Raesfeld
Project Chemist
Stantec Consulting

Kelly Shugart, PG
Geologist
Stantec Consulting

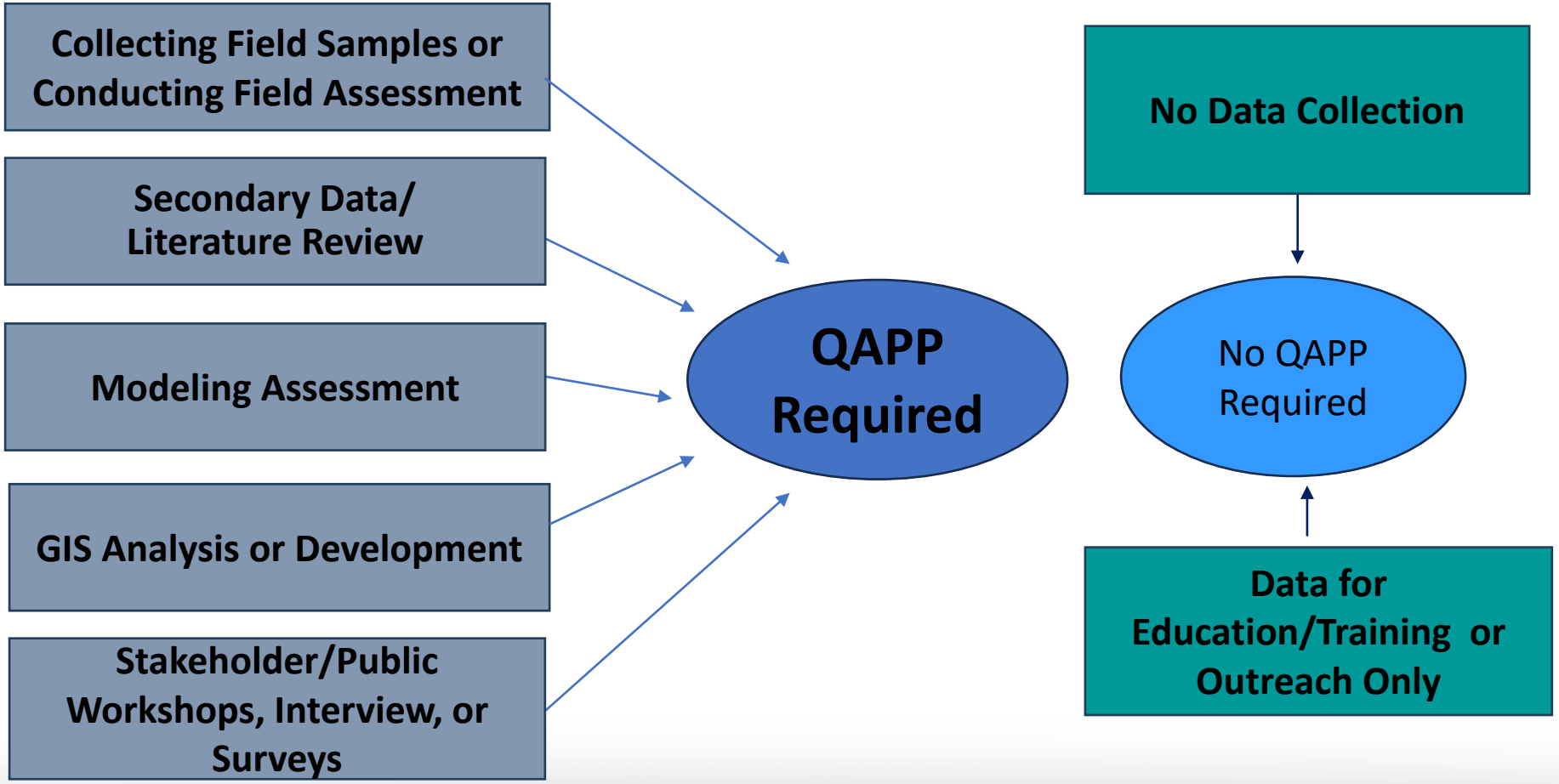
What is a QAPP?

A Quality Assurance Project Plan (QAPP) is a written document that describes your plan for collecting and using environmental information and data.

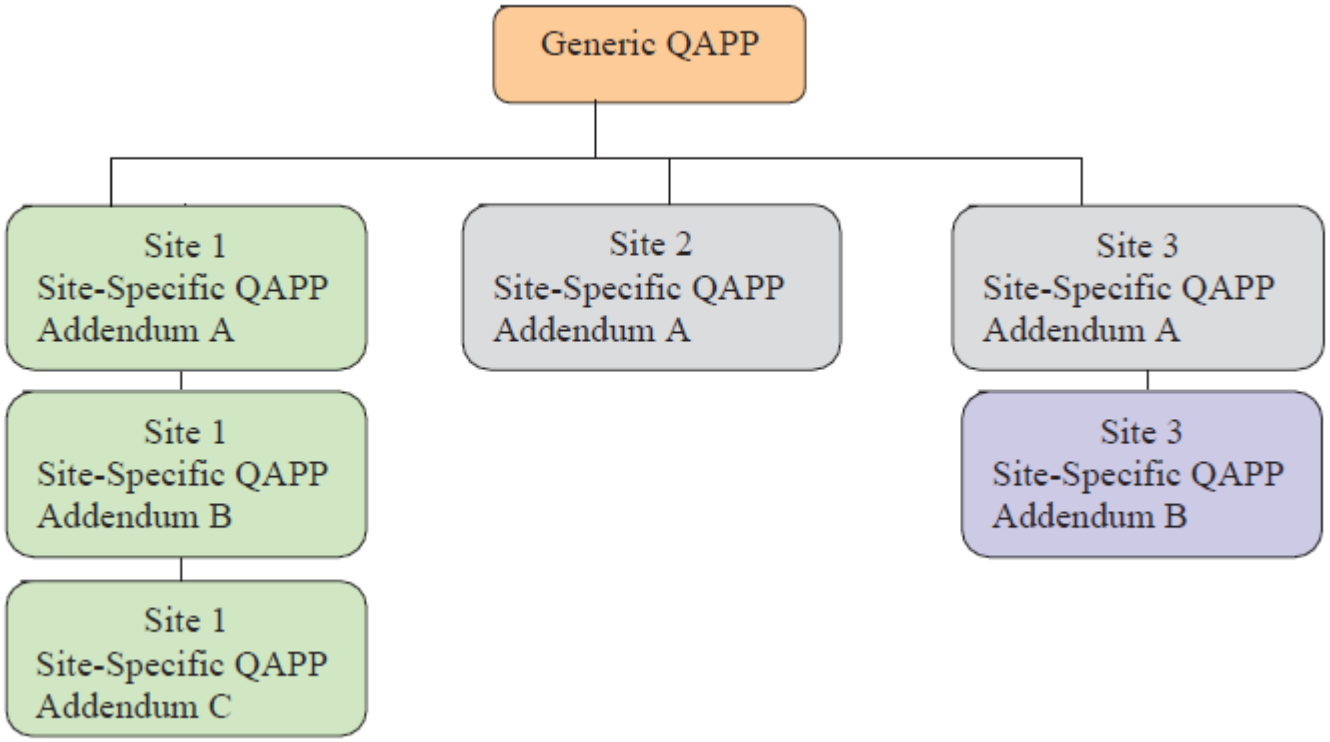
Why do I need to write a QAPP?

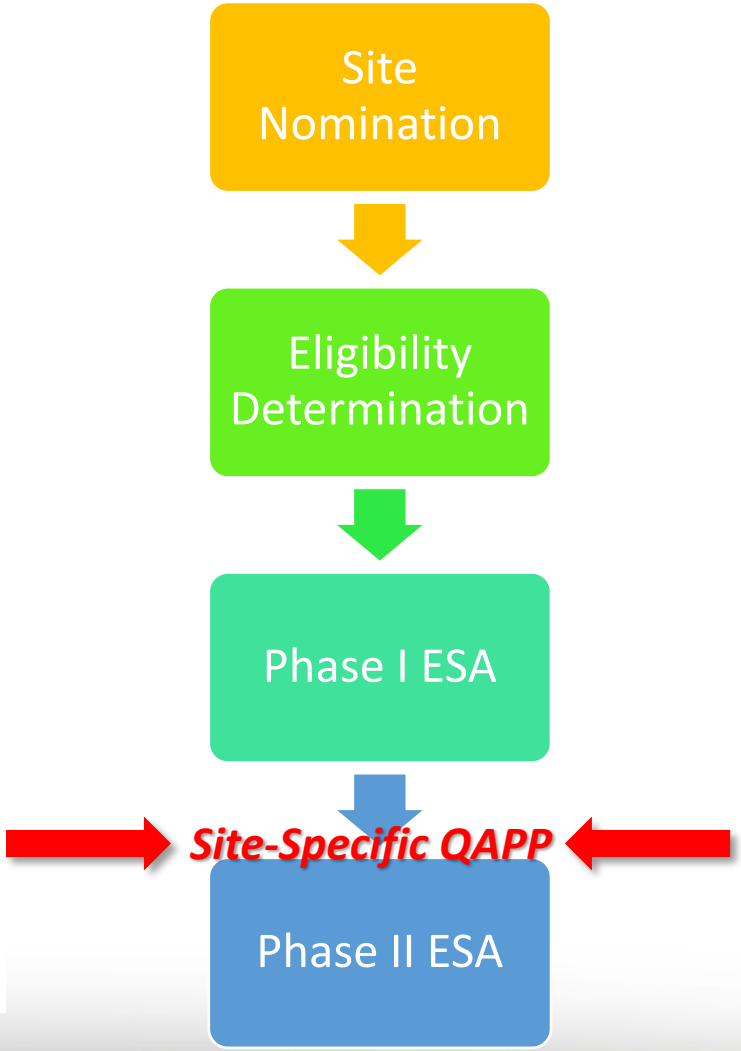
- Required for EPA-funded projects
- Ensures data quality and usability
- Structured plan

When is a QAPP Required?



When is a Site-Specific QAPP (SSQAPP) Required?





Key Differences SSQAPP

- Provides detailed instructions for field personnel on how to collect quality data at the site
- Identifies project objectives and site assessment goals
- Conceptual Site Model*

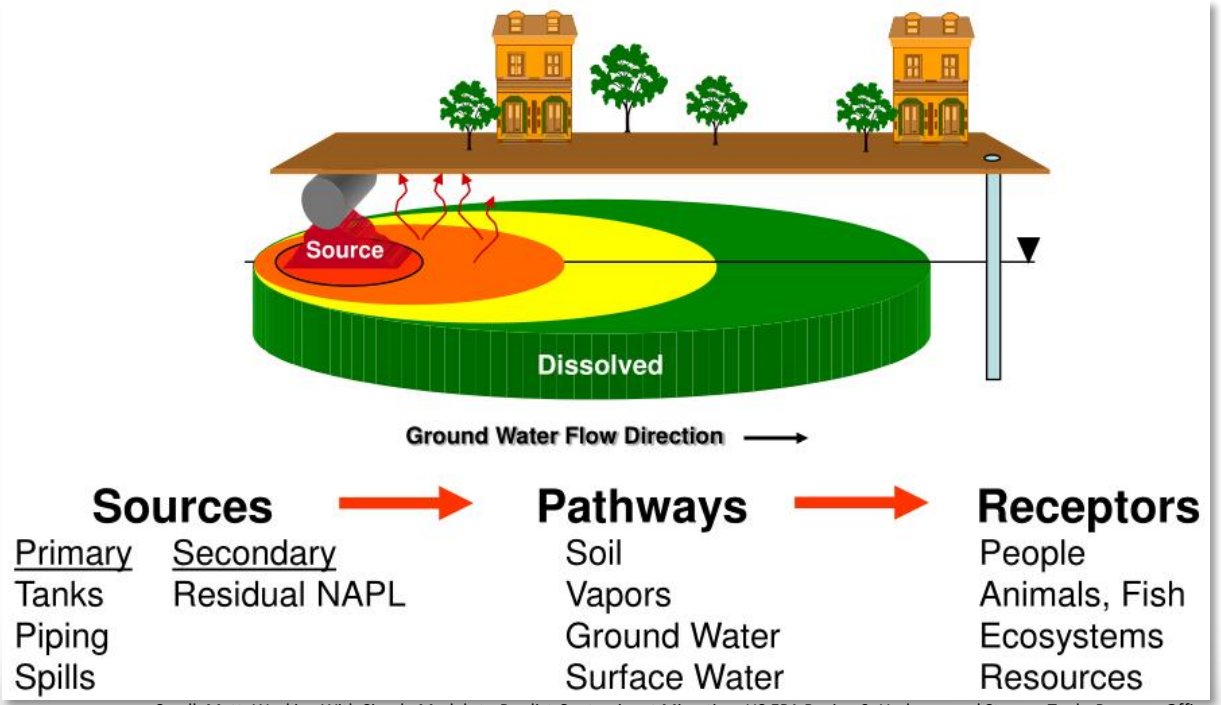
Conceptual Site Model (CSM)

- Visual or written representation that summarizes the *current* understanding of a contaminated or potentially contaminated site
- Helps you see the big picture and prioritize your investigation
- Will change as you gather more data

A CSM is a critical project quality planning tool and should be developed for every Brownfield site assessment project.

Conceptual Site Model

- Illustrates how contaminants may move through the environment and impact human health and ecological receptors
- Potential sources of contamination, pathways, and receptors
- *Consider the future use of the site*



Small, Matt. Working With Simple Models to Predict Contaminant Migration. US EPA Region 9, Underground Storage Tanks Program Office.

Example Site – CSM

Known:

- Gas station from 1960s to 1980s
- North-adjoining site was drycleaner in 1970s and 1980s
- Fuel underground storage tank (UST) may still be in place
- Groundwater estimated at 8 feet bgs, flow to the southeast
- Future use is commercial redevelopment

Example Site – CSM

Suspected:

- Possible historical release of petroleum products to soil, groundwater, soil vapor
- Possible historical release of drycleaning chemicals to soil and/or groundwater
- UST may be in place east of the building

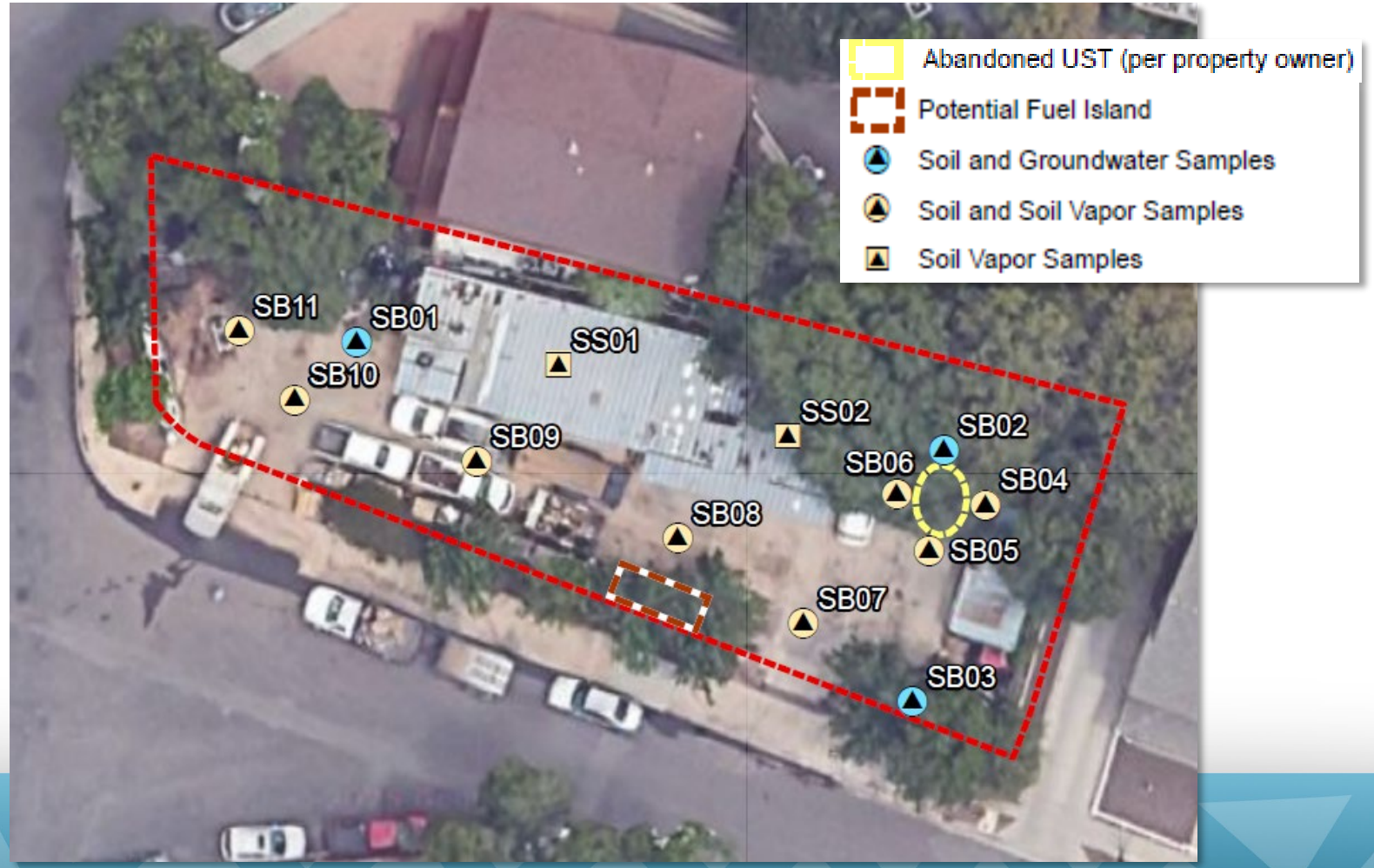
Example Site – CSM

Unknown:

- Are there impacts to soil, groundwater, and/or soil vapor related to gas station operations that could affect human health during redevelopment or affect future use of the site?
- Are there impacts to soil and/or groundwater related to former drycleaning operations on the north-adjoining site?
- Is the UST still in place?

Example Site – Sample Design

- CSM informs the sampling plan in a Site-Specific QAPP



Example Site – Sample Design

- Sample design tables
- Boring ID, depth, sample ID, rationale, laboratory analytical methods

Soil Vapor

Boring ID	Boring Depth (feet)	Sample ID	Rationale	Laboratory Analysis	
				VOCs (TO-15)	1,1_Difluoroethane (TO-15)
Soil Vapor					
BEN-SB04	5	BEN-SB04SG	Assess closed UST	1	1
BEN-SB05	5	BEN-SB05SG	Assess closed UST	1	1
BEN-SB06	5	BEN-SB06SG	Assess closed UST	1	1
[illegible]				1	1
				1	1
				1	1
				1	1
				1	1
				1	1

Soil

Boring ID	Boring Depth (feet)	Sample ID	Sample Depth (feet)[1]	Rationale	Laboratory Analysis					
					RCRA 8 METALS (6010D/ 7471B)	GRO (8015D)	DRO/ORO 8015D)	PAHs (8270E-SIM)	Perchlorate (314)	VOCs (8260C)
BEN-SB01	20	BEN-SB01(x-x)SO	1-2	Assess former USTs and historical dry cleaner	1	1	1	1	1	1
		BEN-SB01(x-x)SO	4-5	Assess former USTs and historical dry cleaner	1	1	1	1	1	1
		BEN-SB01(x-x)SO	19-20[2]	Assess former USTs and historical dry cleaner	1	1	1	1	1	1
BEN-SB02	20	BEN-SB02(x-x)SO	1-2	Assess closed UST and historical dry cleaner	1	1	1			
		BEN-SB02(x-x)SO	4-5	Assess closed UST and historical dry cleaner	1	1	1			
		BEN-SB02(x-x)SO	19-20[2]	Assess closed UST and historical dry cleaner	1	1	1			
BEN-SB03	20	BEN-SB03(x-x)SO	1-2	Assess closed UST and historical dry cleaner	1	1	1			
		BEN-SB03(x-x)SO	4-5	Assess closed UST and historical dry cleaner	1	1	1			
		BEN-SB03(x-x)SO	19-20[2]	Assess closed UST and historical dry cleaner	1	1	1			
BEN-SB04	10	BEN-SB04(x-x)SO	1-2	Assess closed UST	1	1	1			
		BEN-SB04(x-x)SO	4-5	Assess closed UST	1	1	1			
BEN-SB05										
BEN-SB06										
BEN-SB07										
BEN-SB08										

Groundwater

Boring ID	Boring Depth (feet)[1]	Sample ID	Rationale	Laboratory Analysis					
				RCRA 8 Metals (6010B/7471A)	GRO (8015B)	DRO/ORO (8015B)	PAHs (8270D-SIM)	Perchlorate (314)	
BEN-SB01	20	BEN-SB01WG	Assess groundwater downgradient of former dry cleaner	1	1	1	1	1	
BEN-SB02	20	BEN-SB02WG	Assess groundwater downgradient of former dry cleaner and adjacent to closed UST	1	1	1	1	1	1
BEN-SB03	20	BEN-SB03WG	Assess groundwater downgradient of closed UST and form	1	1	1	1	1	1

How do I prepare a QAPP?

- Identify the purpose and objectives of the study
- Design an experimental approach
- Determine the environmental parameters to be measured (chemical, physical, radiological or biological)
- Select a laboratory and measurement methods
- Determine appropriate QA/QC activities
- Determine how data will be recorded, reviewed and reported

What's included in a QAPP?

Group B
Implementing Environmental Information Operations

Group C
Assessment and Oversight

Group A
Project Management and Information/ Data Quality Objectives

Group D
Environmental Information Review and Usability Determination

Group A Project Management and Information/Data Quality Objectives

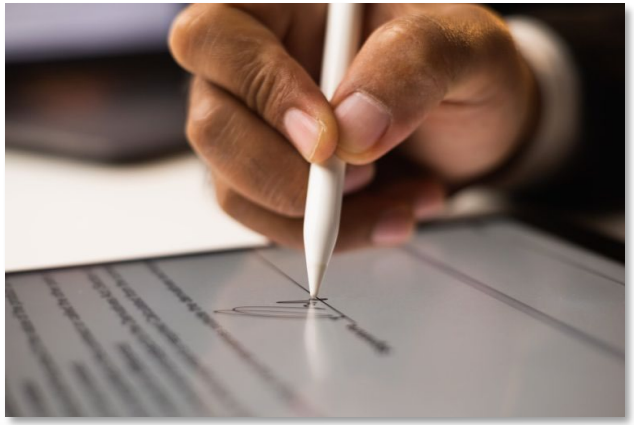
Element	Description
A1	Title Page
A2	Approval Page
A3	Table of Contents, Document Format, and Document Control
A4	Project Purpose, Problem Definition, and Background
A5	Project Task Description
A6	Information/Data Quality Objectives and Performance/Acceptance Criteria
A7	Distribution List
A8	Project Organization
A9	Project QAM Independence
A10	Project Organizational Chart and Communications
A11	Personnel Training/Certification
A12	Documents and Records

A1. Title Page

- Title of the project
- Brownfield Cooperative Agreement number
- Date prepared
- Grantee Name
- Name of person or organization that prepared the QAPP
- Effective date of the QAPP
- Revision number

A2. Approval Page

- EPA Project Officer
- EPA QA Officer
- Brownfields' State Coordinators or Project Manager
- Your organization's Project Manager
- Your organization's QA/QC Manager



A3. Table of Contents, Document Format, and Document Control

- Document title
- Version number
- Version date
- Page number
- Total number of pages

A4. Project Purpose, Problem Definition, and Background

- Purpose of data collection activities
- Describe data collection activities
- Proposed future reuse/development plans for the site
- Site history
- Potential chemicals/contaminants of concern

A5. Project Task Description

- Type of task
- Schedule for accomplishing task
- Description of work to be performed
- Products to be produced

A6. Information/Data Quality Objectives and Performance / Acceptance Criteria

Data Quality Objectives

Designed to answer:

- What do you need?
- Why do you need it?
- How will you use it?
- What is your tolerance for errors?

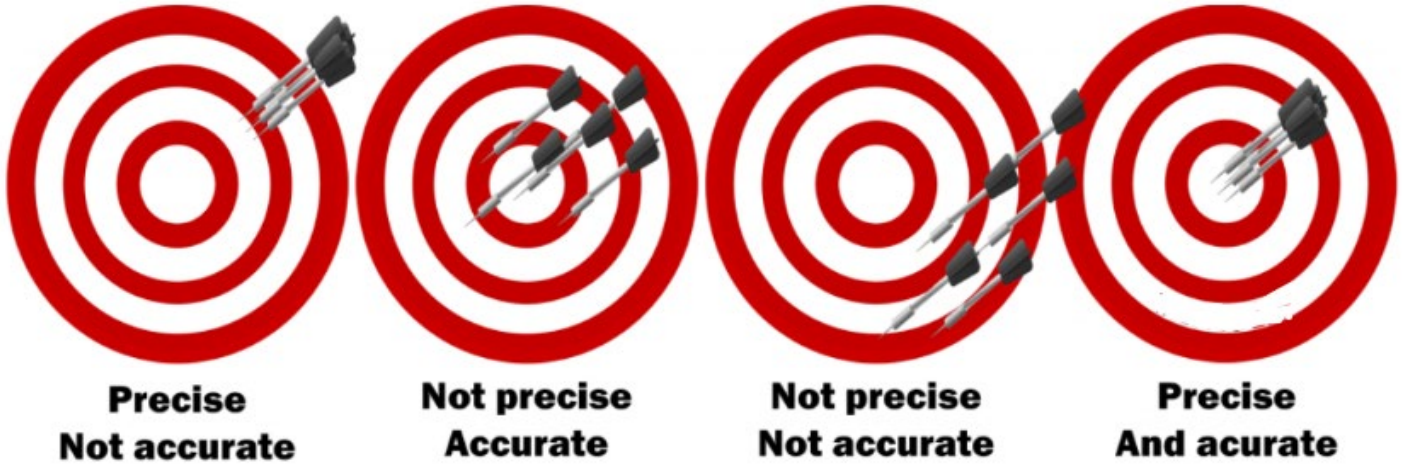
A6. Data Quality Objectives, continued

1. State the Problem
2. Identify the Study Goals
3. Identify Information Inputs
4. Define the Study Boundaries
5. Develop the Analytic Approach
6. Specify Performance and Acceptance Criteria
7. Develop Plan for Obtaining Data

A6. Data Quality Indicators and Performance/Acceptance Criteria

The six data quality indicators (DQIs) are also referred to by the acronym PARCCS:

- Precision
- Accuracy (bias)
- Representativeness
- Comparability
- Completeness
- Sensitivity



A6. Data Quality Indicators, continued

Data Quality Indicators (DQIs)	Quality Control Activities and Checks	DQI goals
Precision	Field and lab replicates	≤20% RPD
Bias	Calibration, blanks, sample spikes	Data are not biased
Accuracy	Calibration standards, blanks, control samples	No blanks contaminated; 80-120 %R
Representativeness	Evaluate whether the data accurately represents the system, population, place, time, and/or situation	Data are representative and are not biased
Comparability	Compare to existing data or datasets	Data collected are sufficiently similar in methodology to permit a meaningful analysis
Completeness	Compare to intended sampling goals to meet the project purpose	95% of samples collected are usable
Sensitivity	Compare to reporting or detection limits from existing data or for decision-making	State the sensitivity needed for the methods, used for the project to obtain meaningful data.

A7. Distribution List

- EPA project officer
- EPA QA office
- Laboratory project manager
- Field team leader
- Data reviewers
- Subcontractors

Name	Title	Organization	Phone Number and Email Address
Jane Smith	Operations Manager	XYZ Company	jane.smith@xyzcompany.moc (303) 765-4321
John Doe	Project QA Officer	XYZ Company	john.doe@xyzcompany.moc (303) 123-4567

A8. Project Organization

- EPA Project Officer
- Brownfields Program Coordinator / Project Manager
- Grantee Project Manager
- Grantee / Contractor Project Manager
- Grantee / Contractor QA Manager
- Grantee / Contractor Field Team Leader
- Technical Staff
- Laboratory Project Manager

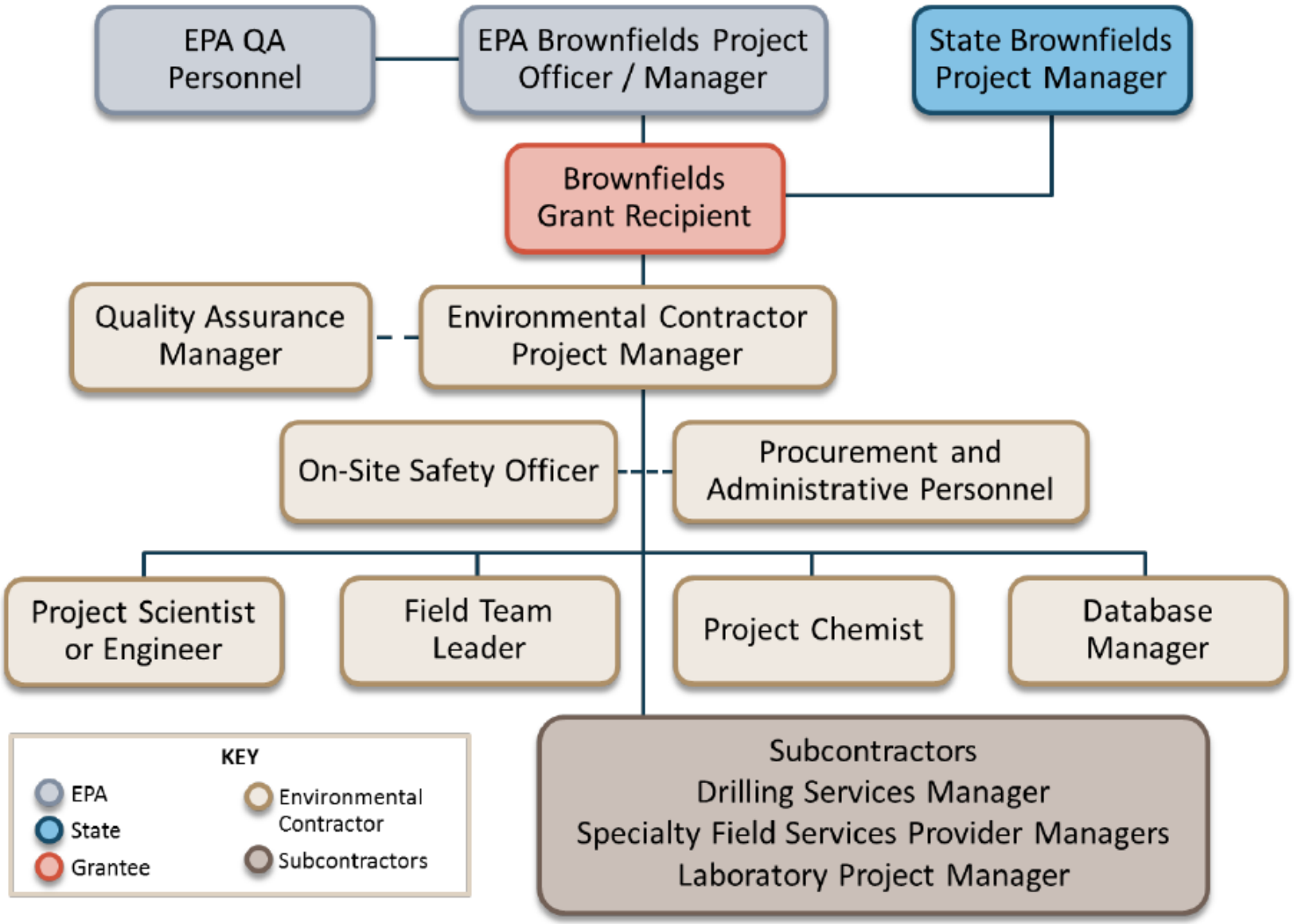
A9. Project Quality Assurance Manager Independence

The Project QA Manager (QAM) is independent and not directly involved in the environmental information operations.

The Project QAM serves as the program's point of contact on all QA issues, provides QA/QC information, and informs the Department QA Manager of all program QA needs, problems, and status.

The Operations Manager or designee will not have authority to sign QAPPs for the QAM or designee, nor will the QAM or designee have authority to sign QAPPs for the Operations Manager or designee.

A10. Project Organizational Chart and Communications



A11. Personnel Training/Certification

- Identify training needed
- Discuss how such training will be provided
- Training record documentation
- Are professional certifications required?

A12. Documents and Records

- Summarize the type of information necessary to be included in laboratory data report packages.
- Discuss any other project records to be maintained.
- State where all project documents and records will be stored
- Describe plans or requirements for reporting data
- Identify what final reports will be generated

Group B

Implementing Environmental Information Operations

Element	Description
B1	Identification of Project Environmental Information Operations
B2	Methods for Environmental Information Acquisition
B3	Integrity of Environmental Information
B4	Quality Control
B5	Instruments/Equipment Calibration, Testing, Inspection, and Maintenance
B6	Inspection/Acceptance of Supplies and Services
B7	Environmental Information Management

B1. Identification of Project Environmental Information Operations

- Sampling Location
- Sample ID Number
- Sample Matrix
- Analytical Parameter
- Sampling SOPs
- Rationale
- Comments

Sample Location	Sample ID Number	Sample Matrix	Analytical Parameter/ Group	Sampling SOP	Rationale
Soil Boring 1	SB01	Soil	Metals	SOP #456	Determine metals concentrations
Soil Boring 2	SB02	Soil	Metals	SOP #456	Determine metals concentrations

B2. Methods for Environmental Information Acquisition

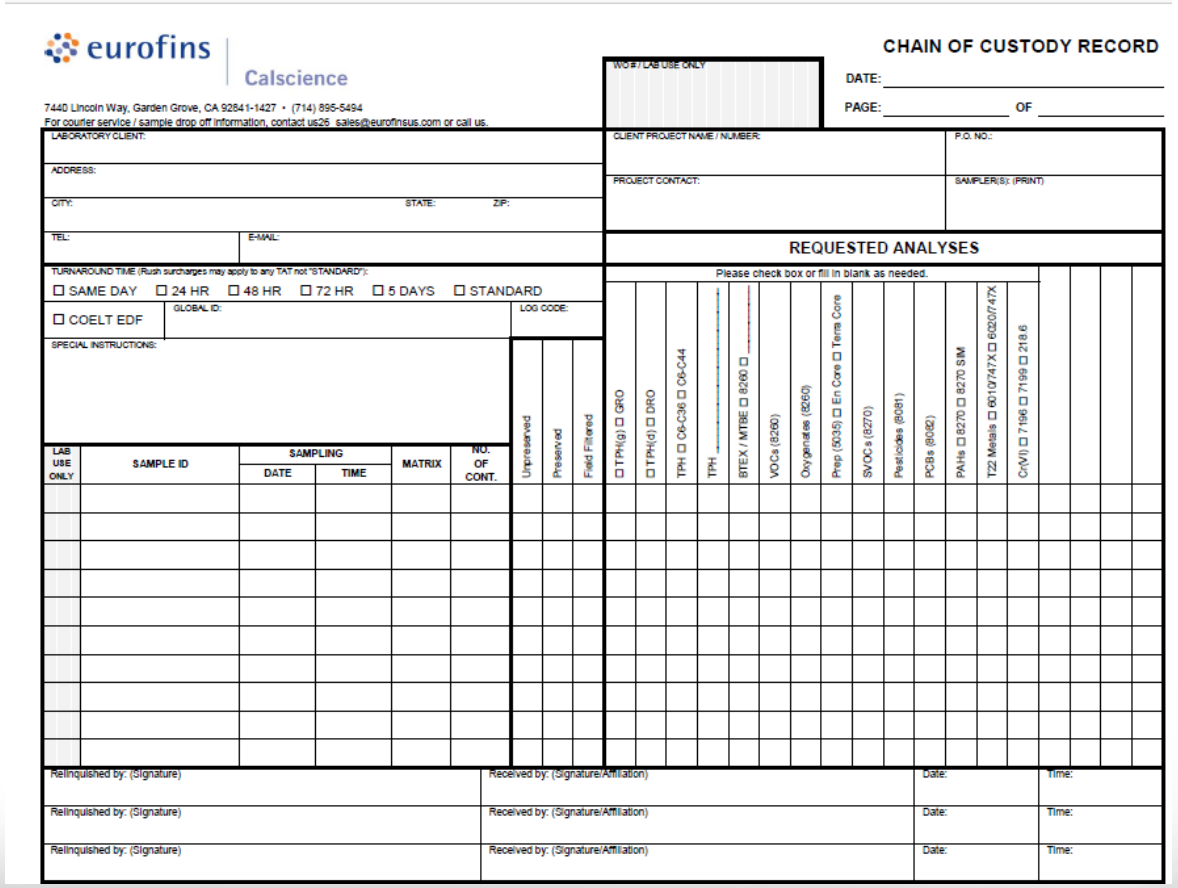
- Field Activities Environmental Measurements
- Laboratory Analyses
- Existing Information

B3. Integrity of Environmental Information

- Field Methods and Sampling Procedures
- Sample Custody Procedures
- Shipping Requirements

Project Code: **# or Name**
Station No.: **SITEID**
Location or Site Name: _____
Designate: ☒ Grab-1L Sampler: _____
Analyses: **☒ METALS, HARDNESS**
Preservative: **☒ HNO_3**

Date (YYYY/MM/DD): _____ Time: _____



eurofins | Calscience

7440 Lincoln Way, Garden Grove, CA 92841-1427 • (714) 895-5494
For courier service / sample drop off information, contact us25_sales@eurofinsus.com or call us.

CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY

DATE: _____

PAGE: _____ OF _____

LABORATORY CLIENT:
ADDRESS:
CITY: STATE: ZIP:
TEL: E-MAIL:

CLIENT PROJECT NAME / NUMBER:
PROJECT CONTACT:
P.O. NO.:
SAMPLER(S): (PRINT)

REQUESTED ANALYSES

Please check box or fill in blank as needed.

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☐ STANDARD

☐ COELT EDF GLOBAL ID: LOG CODE:

SPECIAL INSTRUCTIONS:

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered

☐ TPH(g) ☐ GRO | ☐ TPH(d) ☐ DRO | TPH ☐ C6-C36 ☐ C6-C44 | TPH _____ | BTEX / MTBE ☐ 8260 ☐ _____ | VOCs (8260) | Oxygenates (8260) | Prep (5035) ☐ En Core ☐ Terra Core | SVOCs (8270) | Pesticides (8081) | PCBs (8082) | PAHs ☐ 8270 ☐ 8270 SIM | TZ Metals ☐ 6010/747X ☐ 6020/747X | Cr(VI) ☐ 7196 ☐ 7199 ☐ 218.6

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

B4. Quality Control

Sample Matrix	Soil		
Analytical Parameter and Method	**Metals by SW846 Method 6020B**		
QC Sample	Frequency	QC Acceptance Limits	Data Quality Indicator
Field Duplicate	1 per 10 field samples	RPD <50%	Precision - overall
Method Blank	1 per preparatory batch	No target analytes ≥ laboratory reporting limit	Accuracy/bias
Field Blank (trip blanks and equipment blanks)	1 per day, as needed	No target analytes ≥ laboratory reporting limit	Accuracy/bias
Laboratory Control Sample	1 per preparatory batch	Laboratory in-house control limits	Accuracy/bias
Matrix Spike/ Matrix Spike Duplicate	1 per preparatory batch	Laboratory in-house control limits	Accuracy/bias Precision

B4. Quality Control, continued

Calculation	Formula	Abbreviations
Duplicate Precision	$RPD = \frac{(D_L - D_S)}{(D_L + D_S)/2} \times 100$	D_L and D_S = results for the duplicate values with D_L = larger of two values D_S = smaller of two values
Completeness	$\%C = \frac{V}{N} \times 100$	%C=percent completeness V =number of measurements judged valid N=target number of measurements necessary to achieve a specific statistical level of confidence in decision making
Laboratory Control Samples (accuracy)	$\%R = \frac{M}{T} \times 100$	%R=percent recovery M=measured concentration T=true spiked concentration
Matrix Spike (accuracy)	$\%R = \frac{(S-U)}{T} \times 100$	%R=percent recovery S=measured concentration of spiked sample U=measured concentration of unspiked sample T=true spiked concentration

B5. Instrument/Equipment Calibration, Testing, Inspection, and Maintenance

Instrument or Equipment	SOP Reference or Procedures	Individual Responsible	Calibration Activities and Frequency	Testing, Inspection, Maintenance Activities and Frequency	Acceptance Criteria	Corrective Action	Documentation and Traceability
Multi-Meter	SOP #FS-233.A1	Field Team Leader	Prior to and at the end of each sampling event	per SOP #FS-233.A1	SOP #FS-233.A1	SOP #FS-233.A1	Recorded in equipment logbook

B6. Inspection/Acceptance of Supplies and Services

- Detail the process for inspecting supplies and consumables and determining their acceptability for use during the project.
- State acceptance criteria for such supplies and consumables.
- Indicate the required frequency for inspecting supplies and consumables.
- Identify the person responsible for performing inspections of supplies and consumables.
- Describe how supplies and consumables should be handled and stored.

B7. Environmental Information Management

Upon return to the office, the datasheets are scanned and submitted to the Project Manager by the scientists weekly and inspected. Hard copies of the original data sheets are kept on file in the Project Manager's office. Data generated by the Laboratory is sent via email to the Project Manager. As needed, the Project Manager will provide the field and/or laboratory data to the scientists for digital data entry.

Microsoft Access is used to record and organize all data. Once all data are entered, the Program Manager inspects the data for accuracy and corrects any errors, cross checking with calibration and QC logs to confirm successful sampling and data management."

Group C

Assessment, Response Actions and Oversight

Element	Description
C1	Assessments and Response Actions
C2	Oversight and Reports to Management

C1. Assessments and Corrective Actions

Assessment Type	Responsible for Conducting Assessment	Number/ Frequency	Estimated Dates	Assessment Deliverable	Deliverable Due Date	Responsible for Responding to Assessment Findings	Timeframe for Response	Responsible for Implementing Corrective Action	Responsible for Monitoring Corrective Action Effectiveness
Field sampling assessment	Operations Manager	Once on the first day of sampling	[fill in planned dates]	Field sampling assessment memo and checklist	24 hours following assessment	Organization Field Team Leader	24 hours following receipt of memo and checklist	Organization Field Team Leader	Organization Project QA Officer
Data entry peer level review	To be assigned by the Organization Operations Manager	Weekly	Every Friday during data entry	List of data entry errors	Same day of the data entry peer level review	Individual who performed the original data entry	24 hours following the receipt of the list of data entry errors	Individual who performed the original data entry	Individual assigned to perform the data entry peer level review

C2. Oversight and Reports to Management

- Field reports
- Project status or progress reports
- Assessment reports (assessment memo and checklist and corrective action reports)
- Data verification reports
- Data validation reports
- Data usability report
- Final project report

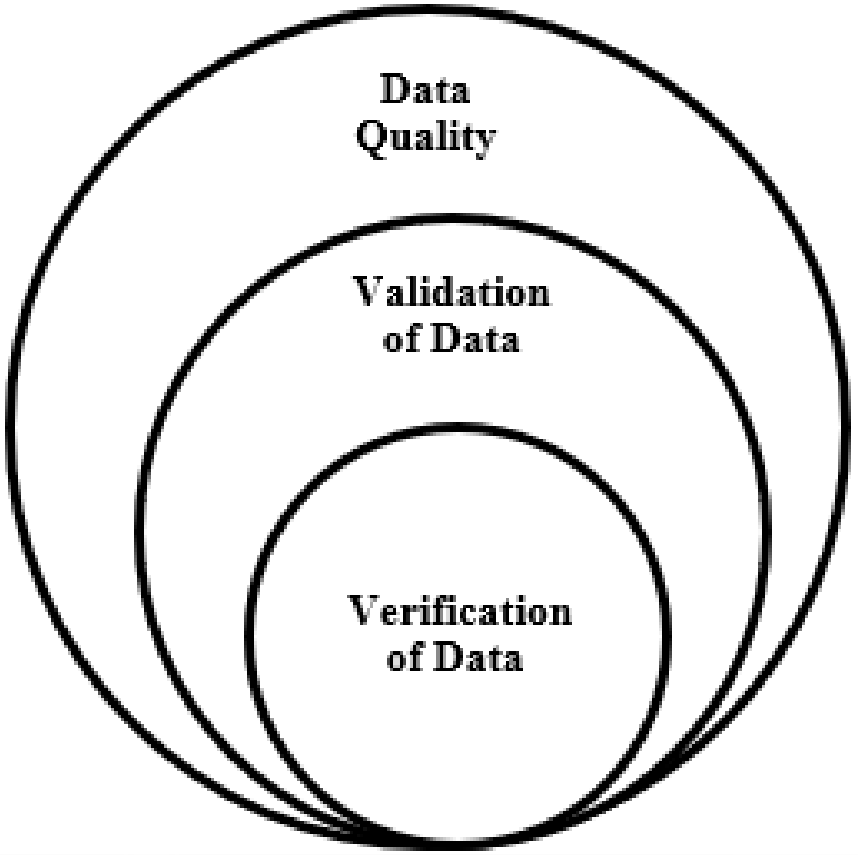
Group D

Environmental Information Review and Usability Determination

Element	Description
D1	Environmental Information Review
D2	Useability Determination

D1. Environmental Information Review

- Data Verification
- Data Validation
- Data Quality Assessment



D2. Useability Determination

- Determine the impact of deviations on the usability of data.
- Determine if changes to planned sample locations still satisfy the project objectives
- Establish that any problems with documentation or custody procedures do not prevent the data from being used for the intended purpose.
- Determine the acceptability of data associated with quality control non-conformances.
- Evaluate the impact of deviations from SOPs and specified methods on data quality.
- Evaluate matrix effects (interference or bias).
- Evaluate completeness
- Determine if the data can be used to make a specific decision considering the implications of all deviations and corrective actions

Tips For Getting Your QAPP Approved

- Informal or simple project actions need to be described (e.g., taking photos to document site conditions) in addition to defined methods.
- If using a template, revise boilerplate or example text that is not relevant to your project.
- Do not remove sections from a template or leave them blank. If a section or subsection is not applicable to your project, explain why in 2-3 short sentences.
- Make sure information presented in tables and text are consistent
- Include field forms (sample labels, chain-of custody forms) in an Appendix

Resources

EPA Region 7 Quality Assurance Program
EPA Region 7 Training Page: R7 QA Training for Region 7 staff and grantees | US EPA
How to Write and Review QAPPs video: QA Training How to Prepare and Review QAPPs

EPA Region 8 Quality Assurance Program
Region 8 QAPP Template: tools_qapptemplate-instructions_grdapp_r8dcn00002_r0_qab_f_20250513.docx

EPA G5: Guidance for Quality Assurance Project Plans
EPA QAPP Standard: https://www.epa.gov/quality/quality-program-directives

Guidance on Systematic Planning Using the Data Quality Objectives Process (QA/G-4):
https://www.epa.gov/sites/production/files/2015-06/documents/g4-final.pdf


QUIZ TIME

What is the primary purpose of a QAPP?

A. To secure funding for environmental projects

B. To outline procedures for collecting and using environmental data

C. To train field personnel

D. To summarize historical site use

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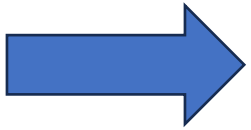

B. To outline procedures for collecting and using environmental data

C. To train field personnel

D. To summarize historical site use

Which of the following projects requires a QAPP?

A. Educational outreach with no data collection

B. Literature review only

C. EPA-funded water sampling project

D. GIS mapping for internal use only

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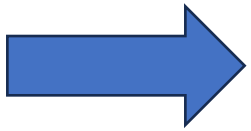

C. EPA-funded water sampling project

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What is a Conceptual Site Model (CSM)?

A. A list of contaminants found at a site

B. A visual or written summary of site understanding

C. A map of sampling locations

D. A laboratory report

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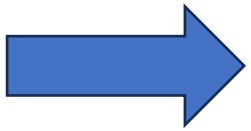

B. A visual or written summary of site understanding

C. A map of sampling locations

D. A laboratory report

Which group in a QAPP addresses project management and data quality objectives?

A. Group A

B. Group B

C. Group C

D. Group D

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A. Group A

B. Group B

C. Group C

D. Group D

What does the acronym PARCCS stand for in data quality indicators?

A. Precision, Accuracy, Reliability, Completeness, Comparability, Sensitivity

B. Performance, Accuracy, Representativeness, Comparability, Completeness, Sensitivity

C. Performance, Accuracy, Reproducibility, Completeness, Comparability, Sensitivity

D. Precision, Analysis, Representativeness, Completeness, Comparability, Sensitivity

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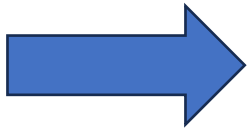

C. Performance, Accuracy, Reproducibility, Completeness, Comparability, Sensitivity

D. Precision, Analysis, Representativeness, Completeness, Comparability, Sensitivity

True or False?

A Site-Specific QAPP is always attached to a Generic QAPP.

True or False?

FALSE

A Site-Specific QAPP can be a standalone document, especially when the project is limited to one site.

True or False?

The QAPP must include a title page, approval page, and distribution list.

True or False?

TRUE

These components are required to ensure proper documentation, accountability, and communication among stakeholders.

True or False?

Data Quality Objectives (DQOs) are the same as Data Quality Indicators (DQIs).

True or False?

FALSE

DQOs define the planning framework for data collection; DQIs (like PARCCS) are used to evaluate the quality of the data collected.

True or False?

Completeness refers to how well the data represents actual site conditions.

True or False?

FALSE

Completeness refers to the proportion of valid data collected compared to what was planned—not how representative the data is.

True or False?

Field duplicates are a form of quality control.

True or False?

TRUE

Field duplicates can be an indicator of field sampling precision.

Questions? Feedback?

- What topics about QAPPs and Site-Specific QAPPs do you feel you now understand the best?
- What topics do you not understand or think you could use more training or information to master?
- What topics did we miss where you need assistance, information or training?

Thank You

For joining us for this webinar. Please get in touch if you have any questions or comments: sarah.vonraesfeld@stantec.com or kelly.shugart@stantec.com

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