United States Environmental Protection Agency

Office of Transportation and Air Quality
July 2025

QAPP Guide for Environmental Information Related to Activity Data on Vehicles, Other Mobile Equipment, and Related Fueling Infrastructure

Disclaimer

The statements in this document, with the exception of referenced requirements, are intended solely as guidance. This document is not intended, nor can it be relied upon, to create any rights enforceable by any party in litigation with the United States. This guidance may be revised without public notice to reflect changes in the EPA's approach to implementing Quality Assurance Project Plans.

1. Introduction and Instructions

The Quality Assurance Project Plan (QAPP) should substantially comply with the instructions, format, and content described below. Awardees should ensure that their QAPPs are written clearly using understandable terms. Doing so will help ensure that the Environmental Protection Agency's (EPA) Regional Quality Assurance Managers and Project Officers understand the purpose, outputs, and outcomes of the proposed project as well as the type of environmental information being collected. Grantees are not required, but are highly encouraged, to use the QAPP format described below, including the cover page, however, regardless of the preferred format, conformance with the QAPP Standard must be maintained.

This guide covers the required QAPP elements consistent with the current EPA Quality Assurance Project Plan Standard (Directive No: CIO 2105-S-02.1). Each QAPP element is accompanied by a description, basic instructions, and a set of questions to consider when completing each element. This guide also contains examples intended to assist with QAPP development; however, in many cases, the examples are simplified for brevity and may not represent the level of detail your organization may need to include in your QAPP. Language from these examples can be used in your QAPP. Some sections also include template language with places to fill in information.

Following this guidance will not necessarily guarantee that your QAPP will be approved on its first submission to your EPA Quality Assurance Manager, but it should help to ensure that your document covers the required material. This should both reduce the number of review comments and the time it takes to have your plan approved. Lastly, project teams should contact the organization sponsoring the work for region specific QAPP requirements or resources that should be used when writing or submitting their document for review.

2. QAPP Purpose

A Quality Assurance Project Plan (QAPP) is your organization's planning document for conducting a specific project involving environmental information. It is an overview of your organization's specific business rules, policies, and quality assurance/quality control (QA/QC) procedures for conducting the project. The QAPP structure (through its various sections) helps to focus and define some of the key project details and decisions - WHO is doing WHAT, WHERE are they are doing it, WHEN are they doing it, HOW are they are doing it, and WHY are they doing it. The QAPP serves as a place to document those details and associated decisions so that everyone who will be working on the project is clear about the details and understands his or her individual roles in the data generation process. By taking the time to think through your project and make necessary decisions during the planning process, you will be more likely to have a successful project and one that will be more cost effective in the use of your resources.

The QAPP is designed to help your project team produce environmental information consistent with the project's intended purpose in a consistent manner. It is designed to help improve communications with all staff involved with the project, as well as detail their responsibilities such that all parties are aware of their roles. The QAPP also helps participants understand the importance of the specific project and can serve as both a training guide and legacy documentation.

Writing a QAPP requires a good knowledge of the best implementation practices, intended outcomes of the project, and quality assurance (QA) ahead of time. The QAPP writer should have access to EPA QAPP Standard Requirements when preparing a QAPP, in addition to the organization's Quality Management

Plan (QMP) and any other relevant policies and state regulations. References to assist the QAPP writer are provided throughout this guide and at the end of the document in the *References* section.

A QAPP must be written and approved by EPA **before** environmental information data is collected. By establishing the organization's plan and business rules up front, decision-making during the project should be consistent.

3. QAPP Structure

EPA Quality Assurance Project Plan Standard (Directive No: CIO 2105-S-02.1) specifies the required elements within a QAPP. The directive states that the QAPP must be composed of standardized, recognizable elements covering the entire project from planning, through implementation, to assessment. QAPP elements are divided into four groups:

- GROUP A - Project Management and Information/Data Quality Objectives
  - 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
- GROUP B - Implementing Environmental Information Operations
  - 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
- GROUP C - Assessment and Oversight
  - C1 Assessments and Response Actions
  - C2 Oversight and Rep
- GROUP D - Environmental Information Review and Usability Determination.
  - D1 Environmental Information Review
  - D2 Useability Determination

To simplify the QAPP development process, the EPA provides flexibility to grant recipients based on a project's specific objectives, meaning no element should be omitted, but, if an element is not applicable, an explanation as to why it is not applicable shall be provided in the QAPP.

4. Other Tips

Because a QAPP is a plan, written before the project commences, its QA/QC commitments should, ideally, be written in future tense (e.g., "The organization *will* perform…").

Elements of a QAPP may be described or cited. If the designated references are well documented and are readily available to all key personnel, citations may be adequate; however, because weblinks and web addresses may change over time, one official, controlled version (such as a pdf) of the referenced documents should be placed on file with the appropriate EPA office and available for routine referencing when needed.

The use of citations to reduce verbiage and redundancy in writing is encouraged. However**, the use of citations should be specific**, to point the reader to the information that is needed within the referenced material. For example, if citing the CFR, use the specific, complete reference (e.g., 40 CFR 58.16, 40 CFR Part 58, Appendix A, Section 2.3.1, etc.). If citing a local, state, or federal standard operating procedure (SOP), point the reader to the specific section or chapter within the SOP where the necessary information can be found (e.g., "See Data Validation SOP, Revision 1, Section 4.2(b)"). Furthermore, it is necessary to summarize the referenced information in the element. Simply providing the reference is not appropriate nor does it satisfy the element. EPA can only approve the QAPP and does not routinely comment on agency/organization SOPs. For that reason, EPA must be provided with a concept of what is in the SOP as a summary within the element it's being referenced. You can also use citations for specific sections within the QAPP itself, so that information does not have to be repeated verbatim. For example, "See Section 9.4 of this QAPP for more information."

Group A. Project Management and Information/Data Quality Objectives

The following project management elements address the procedural aspects of project development and what to include in the QAPP project background, task description, and quality objectives elements.

A.1 Title Page

Instructions:

- A **Cover Page** is recommended for the QAPP. If used, inclusion of the organization's logo is suggested.
- The **Title Page** contains the following information:
    - the name of the document to include "Quality Assurance Project Plan",
    - date of QAPP preparation,
    - name of the organization conducting the work,
    - name of organization that developed the QAPP (if different from organization conducting the work),
    - period of performance; and
    - the grant name and grant ID number.

In addition to a cover and title page, the following are best practices for document organization:

- Include a **header** which contains the following information:
    - document control number or unique identifier such as a descriptive short title that includes organization or project name,
    - section name
    - the version/revision number,
    - the version/revision date, and
    - page numbering in Page X of Y format is required as the page numbering practice.
    - The header generally is not included on the cover page but will start with the first page following the cover page. However, it is acceptable to include the header on the cover page.
    - For example, an appropriate document header could look like:

QAPP Short Title:	City of ABC Vehicle Activity QAPP
Section:	A.4 Project Purpose, Problem Definition, and Background
Revision No:	Rev. 0 Date: 01/01/2025
Page:	**12** of 44

- An **Acronym Lis**t is recommended for the QAPP. It can be included after the cover page prior to Group A, or it can be included as an appendix at the end of the document. The Acronym List does not have to be long and should only include acronyms used within the QAPP.
- A list of **References** (i.e., bibliography) can be included in the document. If compiled, it is recommended that all references be included at the end of the QAPP, as a final section or appendix.

Example A.1 (Title Page)

Quality Assurance Project Plan for
<add long title of project here line 1>
<add long title of project here line 2>

Grant Name and Grant ID Number:
<add grant number, line 1>

Prepared by:
<add name of grant recipient, line 1>
<add name of grant recipient, line 2>
<add street address, line 1>
<add street address, line 2>
<add city, county, state, zip code>

Prepared for:
US EPA Region <add EPA Region Number>
<add EPA regional office street address, line 1>
<add EPA regional office street address, line 2>
<add EPA RO city, state, and zip code>

Date prepared:

<add date of submission>

Period of Applicability:

<add period of applicability>

Scope:

Per EPA Quality Assurance Project Plan (QAPP) Standard revised April 3, 2024, work products that rely on Environmental Information Operations

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A.2 Approval Page

Instructions:

In this section of the QAPP – which is typically just 1 page – include the following information:

- Placeholders for the signatures of staff members (include position titles) in the chain-of-command who need to review and approve the document, including the project's Quality Assurance Officer/Manager (or equivalent)
- Signature lines for the EPA Designated Approving Officials which include EPA Operations Manager (or designee) and EPA Quality Assurance Officer/Manager (or designee)
- Note, these are the required signatures, but additional signatures may be added based on the authoring organization's internal practices.
- Revision History (if applicable).

A **Revision History** page is required. If desired, a revision history table can be created that will serve as a placeholder for future revisions. For a new QAPP, it is recommended that "0" be used as the revision number. If used, update the Revision History section henceforward, summarizing the changes made on future revisions. Revision Histories do not need to contain lengthy explanations or detail every edit but rather summarize substantive changes so that they can be more easily tracked over time. Revision Histories can be placed at either the beginning or end of the document.

Example:

Revision #	Date	Author	Description of Change
0	1-3-2025	Jane Author	New Document; Initial Release
1	1-8-2025	John Operator	Section A.4: Revised and lowered calibration scale. Added information on automated calibrations. Section 4.2. Changed audit point concentrations.
2	1-4-2026	John Operator	Revised Section B.5: certification frequency; changed to annual.
3	1-8-2027	John Operator	Changes throughout document due to instrument model upgrade; new figures and tables, additional QA/QC, and new maintenance requirements added.
4	4-24-2027	Goldie Quality	Revised specified guidance for baseline and BAU inventory projections to the latest revision published at the following website [link to website] and amended Sections A.4, A.5, A.6, B.2, and B.4 to include requirements to use the most recent version of the guidance and requirements that all baseline emissions estimates (for the last year of operations prior to the project) are consistent with the methods used in the most recent version of the guidance.

Example A.2 (Approval Page)

_____ _____

Signature of Project Manager
(Name and Title: Project Manager)
(Organization)

Date

_____ _____

Signature of Project Quality Assurance Manager
(Name and Title: Project Quality Assurance Manager)
(Organization)

Date

_____ _____

Signature of EPA Regional Project Officer
(Name and Title: EPA Regional Project Officer)
(Organization)

Date

_____ _____

Signature of EPA Regional Quality Assurance Manager or Designee
(Name and Title: EPA Regional Quality Assurance Manager or Designee)
(Organization)

Date

QAPP Revision History

Revision #	Date	Author	Description of Change
##	MM/DD/YYYY	(PRIMARY AUTHOR NAME)	(DESCRIPTION OF CHANGES OR, IF NEW "ORIGINAL VERSION")

A.3 Table of Contents, Document Format, and Document Control

Instructions:

This table of contents includes all the elements specified in the EPA QAPP Standard consistent with EPA Quality Assurance Project Plan Standard (Directive No: CIO 2105-S-02.1). If you determine that one of the listed elements is not required for your implementation grant, please retain the section in your QAPP and provide an explanation as to why you believe your project does not require the associated content specified in the EPA's QAPP Standard.

Include a separate "List of Tables and Figures" that follows the main contents, if applicable. Provide page numbers for all tables and figures. It is recommended that tables be listed first, followed by figures.

Example A.3 (Table of Contents)

A.4 Project Purpose, Problem Definition, and Background

Instructions:

In this section of the QAPP, state the specific environmental problem that is to be investigated, the purpose of the project's collection and use of environmental information, the type of information needed, the problems and questions to be addressed, and decision(s) to be made. For example, if the purpose of the project's collection and use of environmental information is to ensure the data quality of vehicle and equipment activity data collected for project reporting under a specific grant, then this section could discuss the need to provide accurate information on vehicles, equipment, and infrastructure covered under the grant award. Further, this section could briefly discuss the types of questions that would be addressed by collecting data for project reporting, and the acceptance criteria for the data related to vehicles, equipment, and infrastructure. For additional decision points and data needs, please consult your respective grant program's reporting requirements and templates.

Include sufficient background information in this section to provide a historical, scientific, and regulatory perspective for the project. If data has been collected in the past or if this is a revised QAPP, historic information / data should be summarized. Some information can be pulled from the approved workplan. For example: If the project includes vehicle or equipment deployment similar to past fleet upgrades, a discussion of the assumptions and findings of the prior deployment could be included here. Also in this section, identify other QA planning documents (e.g., QMPs) and briefly describe their relation to this QAPP.

Quality Resources: EPA Environmental Information Quality Policy, Procedure, QMP Standard, and QAPP Standard are located at https://www.epa.gov/quality/quality-program-directives.

Regional-specific quality programs are available at https://www.epa.gov/quality/quality-assurance-managers-qams#regions.

When describing the project purpose, problem definition, and background, consider addressing the following questions if applicable to your project type:

- What is the environmental problem / issue to be studied?
- What is the background / history of the project?
    - Is this an update to or expansion of prior work?
- What is the purpose of collecting and using environmental information for the project?
- What are the sources for collecting environmental information?
    - What type, quantity, and quality of information is needed?
- What planned environmental decisions or actions might this work inform?
- What is the geographic extent of the project/data collection?
    - In which counties will vehicles deployed as part of this project operate?
    - Where will the fixed infrastructure components of this project be installed?
- What is the temporal scope of the project/data collection?
    - What is the cadence of reporting?
    - What is the extent or duration of the planned reporting?
- What types of vehicles, equipment, and/or infrastructure are included in the data collection effort?
    - Does it include onroad vehicles such as commercial trucks or buses?

- Does it include nonroad engines and/or other mobile equipment such as rail equipment, vessels, construction equipment, cargo handling equipment, or auxiliary components such as generators, pumps, and compressors?
- Is there charging or other fueling infrastructure such as electric vehicle supply equipment (EVSE) that would also be included in data collection efforts?
- Does this project feature any currently in-use vehicles or mobile equipment which will be scrapped, sold, and/or donated as part of this project?

- Is this a new QAPP or the revision of an existing QAPP? If it is a revision to an existing QAPP, when was the original QAPP developed for this project?
  - Identify other applicable QA planning documents programs and standards.

Example A.4 (Project Purpose, Problem Definition, and Background)

The "City of ABC" (grantee) currently operates a cargo truck fleet comprised of 50 internal combustion engine cargo trucks. The purpose of this project will be to replace 10 older internal combustion engine (ICE) cargo trucks in the fleet with 10 new zero-emission electric cargo trucks and to install 10 chargers (also referred to as EVSE) to support the new trucks utilizing funds from the Clean Heavy-Duty Vehicles (CHDV) grant program. The oldest cargo trucks in the fleet will be retired first. This project will help reduce harmful emissions, improving air quality in the community. A total of 20 trucks (10 ICE trucks being replaced and 10 new ZE trucks) and 10 chargers will be tracked for this project. Replaced trucks will be scrapped by the end of the project period in accordance with the guidelines as delineated in the approved workplan. The period of performance for this project is the 24-month period of January 1, 2025, through December 31, 2026.

In support of this CHDV grant project and to better understand outcomes associated with the project, the "City of ABC's" Primary Technical Team will regularly collect and compile vehicle and EVSE activity data on the 20 trucks and 10 chargers over the life of this project and periodically submit the data to the EPA. These data will be used to fulfill reporting requirements to the EPA established in the final award's terms and conditions. The purpose of this QAPP is to ensure that the quality of the environmental information collected for these reports meets program and project objectives. The Environmental Information Operations (EIOs) are defined as the activities related to the collection and compilation of vehicle and infrastructure data for the grant:

a) ***Collect vehicle and infrastructure activity data.***
The project team will collect activity data for the vehicles and infrastructure involved in this CHDV grant project on a quarterly basis. The data collected will be from the internal combustion engine trucks being replaced, the new zero-emission electric replacement trucks, and the EVSE that will be acquired under this CHDV grant. The program will regularly collect and report the data required in the program's Reporting Template, including but not limited to: Annual miles traveled (miles per vehicle), Annual idling hours (hours per engine), Current odometer (in miles), Annual Amount of Fuel Used (gallons/year per engine), Remaining life of baseline engine/vehicle.

b) ***Submit vehicle and infrastructure activity data.***
The vehicle and infrastructure data collected for this project will be reviewed, compiled, and submitted to EPA on a quarterly basis using the Reporting Template provided by the program.

This document is the first iteration of the "City of ABC's" QAPP. Additionally, a Quality Management Plan (QMP) was established with the EPA as of XX/XX/XXXX.

Two primary sets of environmental activity data and information will be collected and compiled. These data and information are summarized in the **Tables** below. **Table 1** summarizes the specific activity metrics that apply to either existing vehicles or new vehicles (within fleets serving the same function that will be supplemented under the CHDV program). **Table 2** summarizes capacity attributes for the EVSE purchased under the CHDV program.

Table 1. Types of activity data and scopes of vehicles that will be collected and reported.

Vehicle Activity	Scope of Vehicles/Equipment to Collect Data From
Current odometer (in miles)	Existing Vehicles Serving Function of New Vehicles
Annual miles traveled (miles per vehicle)	Existing Vehicles Serving Function of New Vehicles
Annual idling hours (hours per engine)	Existing Vehicles Serving Function of New Vehicles
Annual fuel used (gallons/year per vehicle)	Existing Vehicles Serving Function of New Vehicles
Remaining life of baseline engine/vehicle	Existing Vehicles Serving Function of New Vehicles
Percentage of Time operated in Primary County Place of Performance	Existing Vehicles Serving Function of New Vehicles
Percentage of Time operated in Secondary County Place of Performance	Existing Vehicles Serving Function of New Vehicles
Percentage of time operated in other counties	Existing Vehicles Serving Function of New Vehicles
Annual miles traveled (miles per vehicle)	New Vehicles Purchased with Project Funds
Is vehicle equipped with auxiliary heater (Y/N)	New Vehicles Purchased with Project Funds
Auxiliary heater type (if applicable)	New Vehicles Purchased with Project Funds
Percentage of Time operated in Primary County Place of Performance	New Vehicles Purchased with Project Funds
Percentage of Time operated in Secondary County Place of Performance	New Vehicles Purchased with Project Funds
Percentage of time operated in other counties	New Vehicles Purchased with Project Funds

Table 2. Infrastructure attributes and capacities that will be collected and reported.

Infrastructure Type	Infrastructure Activity	Scope of Infrastructure to Collect Data From
EVSE	Number of EVSE units	New Infrastructure Purchased with Project Funds
EVSE	Number of plugs on EVSE	New Infrastructure Purchased with Project Funds
EVSE	EVSE maximum output power (kW)	New Infrastructure Purchased with Project Funds
EVSE	Is EVSE capable of bidirectional charging?	New Infrastructure Purchased with Project Funds
EVSE	Will vehicle/EVSE support vehicle to grid (V2G)?	New Infrastructure Purchased with Project Funds

EVSE	Generation capacity of system (kW or MW)	New Infrastructure Purchased with Project Funds
EVSE	EVSE Unit Serial Numbers for each unit	New Infrastructure Purchased with Project Funds
EVSE	Annual Total energy dispensed (kWh)	New Infrastructure Purchased with Project Funds
On-Site Power Generation	Generation capacity of the On-Site Power Generation System	New Infrastructure Purchased with Project Funds
On-Site Power Generation	On-Site Power Generation Annual Energy Dispensed (MWh)	New Infrastructure Purchased with Project Funds
On-Site Power Generation	On-Site Power Generation Annual Percentage Uptime (based on days)	New Infrastructure Purchased with Project Funds
BESS	BESS Energy capacity (kWh or MWh)	New Infrastructure Purchased with Project Funds
BESS	Maximum Continuous Discharge AC Power (kW)	New Infrastructure Purchased with Project Funds
BESS	Maximum Continuous Discharge DC Power (kW)	New Infrastructure Purchased with Project Funds
BESS	Battery Chemistry	New Infrastructure Purchased with Project Funds
BESS	BESS Annual Energy Dispensed/Discharged (MWh)	New Infrastructure Purchased with Project Funds
BESS	BESS Annual Energy Received/Charged from the Grid (MWh)	New Infrastructure Purchased with Project Funds
BESS	BESS Annual Percentage Uptime (based on hours)	New Infrastructure Purchased with Project Funds
BESS	Has the BESS Infrastructure ever been charged by an internal combustion generator in the past year?	New Infrastructure Purchased with Project Funds
Shore Power	Typical Auxiliary Engine Tier of Vessels Using Shore Power	New Infrastructure Purchased with Project Funds
Shore Power	Fuel Type of Vessels Using Shore Power	New Infrastructure Purchased with Project Funds
Shore Power	Number of Annual Vessel Calls to Each Berth where Shore Power Installed	New Infrastructure Purchased with Project Funds
Shore Power	Average Hotel Hours per Vessel Call per Berth where Shore Power Installed	New Infrastructure Purchased with Project Funds
Shore Power	Maximum Output Power (kW)	New Infrastructure Purchased with Project Funds
Shore Power	Annual Total Energy Dispersed in MWh	New Infrastructure Purchased with Project Funds
Shore Power	Shore Power Annual Percentage Uptime (based on days in year)	New Infrastructure Purchased with Project Funds

H2 Fueling	Maximum Dispensing Flow Rate per Hose (kg/min)	New Infrastructure Purchased with Project Funds
H2 Fueling	Total Hydrogen Tank Storage Capacity (kg)	New Infrastructure Purchased with Project Funds
H2 Fueling	Annual total H2 dispensed (kg)	New Infrastructure Purchased with Project Funds
H2 Fueling	Total Dispensing Capacity of the Station (kg/min)	New Infrastructure Purchased with Project Funds

A.5 Project Task Description

Instructions:

In this section of the QAPP, describe all project tasks (description of work to be performed and products to be produced). Include a general overview of the pertinent work activities for this project, such as data collection, field activities and sampling, laboratory activities, data review and assessments, and products/reports to be generated. Some information can be pulled from the approved workplan.

Also include a table with the critical documents and records that will be maintained during this project.

Documents listed in this table should be consistent with the documents discussed in more detail in Section A.12 Documents and Records. When summarizing the project, consider the following questions:

- What are the project objectives?
- Does the section summarize the work that is required to **collect**, **document**, and **report** the vehicle and infrastructure data? For example, for a project collecting and compiling vehicle and infrastructure data you will need to: develop procedures; establish QA/QC criteria; perform assessments; organize and store data; validate data; and report the data.
- What products will be produced?

Example A.5 (Project Task Description)

As noted in Section A.4, the project EIOs will be completed through the following tasks:

(1) Collecting the required activity data on a recurring basis, and
(2) Entering the data into forms and submitting on the form-specific schedule.

Each task is further detailed in the following sections.

Task 1*. Collecting the Required Activity Data.*

The primary technical team (Primary Technical Team) will collect the primary EIO activity data, including specific vehicle activity and infrastructure activity data fields (see Section B.1 of this QAPP). Vehicle activity data collection applies to all existing and new vehicles impacted under the project, and infrastructure activity data will be collected for all EVSE, and other eligible supporting infrastructure purchased under the project. Separate totals will be calculated and reported for each appliable vehicle and EVSE.

The Primary Technical Team will collaborate as needed with operations and maintenance staff, fuel purchasing agents, transportation contractors, existing equipment manufacturers, and prospective new equipment manufacturers to periodically gather the vehicle and EVSE activity data.

The schedule for this task will be quarterly beginning in July 2025 through December 2027.

Task 2. *Entering Data into Forms for Submittal.*

On a quarterly basis, a Primary Technical Team member will enter the compiled data into the EPA CHDV Program Project Reporting form (i.e., EPA Form Number 5900-683). The reporting form will be reviewed by a second Primary Technical Team staff member to ensure proper transcription into the reporting form prior to review by the Program Manager for submittal to the EPA on a quarterly basis.

The schedule for this task will be quarterly, with quarterly reports beginning in July 2025 through December 2027, and a final report due April 29, 2028 (120-days after the completion of the grant period). At the timing proposed in the approved workplan, Primary Technical Team members will document the eligibility and scrappage of the vehicles or equipment outlined in the approved workplan and compile the necessary data into the appropriate EPA CHDV Eligibility and Scrappage Statement reporting form (i.e., EPA Form 5900-682). Primary Technical Team members will also photograph each vehicle according to the specifications outlined in the program Eligibility and Scrappage Statement to document the complete scrappage of each vehicle. Primary Technical Team members will compile and organize these digital photographs to prepare for submittal to EPA.

Table 3. Project documents and records.

Document/Record	Description
Project Reporting Template for Reporting Period 1(.xlsx)	Excel file completed with information for first reporting period and submitted at Reporting Period 1 to project officer
Project Reporting Template for Reporting Period 2(.xlsx)	Excel file completed with information for second reporting period and submitted at Reporting Period 2 to project officer
Project Reporting Template for Reporting Period 3(.xlsx)	Excel file completed with information for third reporting period and submitted at Reporting Period 3 to project officer
Project Reporting Template for Reporting Period 4(.xlsx)	Excel file completed with information for fourth reporting period and submitted at Reporting Period 4 to project officer
Final Project Reporting Template (.xlsx)	Excel file completed and submitted at Project Close to project officer, reflecting all interim project reports and final project details, including equipment, vehicle, and budget details.
Eligibility and Scrappage Statement for Vehicle 1 (.pdf) + associated digital photographs (.jpg)	Completed and signed PDF for Vehicle 1 and required 5 photographs to document scrappage
Eligibility and Scrappage Statement for Vehicle 2 (.pdf) + associated digital photographs (.jpg)	Completed and signed PDF for Vehicle 2 and required 5 photographs to document scrappage
Eligibility and Scrappage Statement for Vehicle 3 (.pdf) + associated digital photographs (.jpg)	Completed and signed PDF for Vehicle 3 and required 5 photographs to document scrappage
Utility Partnership Statement	Completed and signed PDF documenting coordination between project and utility provider
Optional Funding Program Recipient Story Collection Form + associated video and photos	Completed and signed PDF documenting project manager's willingness to share experience of participating in EPA funding program; authorizing use of video and photos attached for EPA promotional material.

A.6 Information/Data Quality Objectives and Performance/Acceptance Criteria

Instructions:

In this section of the QAPP, define the data quality objectives (DQOs), the performance and/or acceptance criteria to achieve those objectives, and the related data quality indicators (DQI).

The DQOs define the intended outcomes of the environmental information collection and reporting that will help ensure the project achieves resource-effective acquisition of environmental data.

Performance criteria address the adequacy of *new* information that is to be collected for the project (e.g., data collected for newly deployed vehicles purchased as part of the award). Acceptance criteria address the adequacy of *existing* information to be collected, often drawn from existing sources (e.g., fuel capacity information for legacy vehicles from manufacturers).

DQIs are quantitative and qualitative characteristics associated with the collected data. The standard DQIs for environmental information projects are precision, accuracy (bias), representativeness, comparability, completeness, and sensitivity – other DQIs may be appropriate depending on the type of project. The QAPP should list the relevant DQIs for the project and explain how the DQIs will be determined by the project team. The QAPP should also explain how the DQIs will be measured by both the primary technical team conducting EIOs for draft documents and by the QC team responsible for independent review of draft EI.

When formalizing the data quality objectives and criteria in this section, consider the following questions:

- Does the QAPP describe the Data Quality Objectives (DQOs) for the project's expected activity data collection efforts?
- Does the QAPP define the applicable Data Quality Indicators (DQIs)? Does the QAPP explain how each DQI is related to the project's expected data collection efforts?
- Does the QAPP describe how collected data will be evaluated to determine whether it meets expected DQOs? If data does not meet expectations, does the QAPP describe an action plan to raise and address such issues?

Example A.6 (Information/Data Quality Objectives and Performance/Acceptance Criteria)

The following primary Data Quality Objectives (DQO) of this project are aligned with the requirements of collecting data and populating the data fields in the EPA's CHDV Reporting Form:

DQO 1. The listings of required vehicle and infrastructure activity data are collected for all activities described in the final workplan (see Table 1 and Table 2).

DQO 2. The activity data must be collected from primary or reputable secondary data sources (see below for description and examples of primary and secondary source data). Collaboration with operations and maintenance staff, fuel purchasing agents, transportation contractors, existing equipment manufacturers, and prospective new equipment manufacturers may be required.

DQO 3. The activity data for each discrete, listed equipment or infrastructure must be representative of normal vehicle and infrastructure operations and activities in service during the reporting period.

DQO 4. The activity data must use standardized reporting metrics and reflect the latest data collected during each reporting period to ensure accuracy and comparability of the activity data throughout the project performance.

The Data Quality Indicators (DQIs) that are applicable to this project are completeness, accuracy, precision, representativeness, and comparability.

- *Completeness* will be measured by the amount of valid data collected to ensure that each project activity is sufficiently captured in the required progress reporting. [DQO 1]
- *Accuracy* will be assessed by the overall agreement of a collected measurement to a known or estimated value. For example, ensuring annual fuel consumption of a deployed vehicle measured during real operations (primary source) aligns with estimated fuel consumption/efficiency reported by the vehicle's manufacturer (secondary source). [DQO 2]
- *Precision* will be evaluated by how reproducible a measurement is. For example, each activity data will be collected following the established SOPs (see Group B.2 for further detail) to ensure data is consistently collected using the same methodology. [DQO 2]
- *Representativeness* will be assessed by the degree to which data represent a characteristic of the intended population in a normal operations environment. For example, when measuring annual miles traveled for a vehicle, the team will assess whether that vehicle's activity for a given reporting period is reflective of normal operating conditions and will identify if any special circumstances should be accounted for in that vehicle's measurement. [DQO 3]
- *Comparability* will be evaluated by the degree to which two or more data sets can contribute to a common analysis. Measurements for the required activity data will be collected and recorded using the standardized units described in Tables 1 and 2 to ensure that data generated at different times are comparable throughout the duration of the project performance. [DQO 4]

The compiled mobile equipment and infrastructure activity data will be evaluated using the above DQIs to ensure that each of the intended DQOs are sufficiently met. This evaluation will be applied to all data compiled for the project as described in Tables 1 and 2.

Primary Data Needs

Primary data for the purpose of this project is data that is observed, collected, derived, stored or generated directly by the project team (e.g., odometer readings for annual miles traveled). Primary data related to the listed mobile equipment and/or infrastructure activity described in Tables 1 and 2 is the priority for this work.

Secondary Data Needs

This project may need to collect and use secondary data, which is existing activity data aggregated by outside parties or organizations. The project team will attempt to minimize the use of secondary data sources where possible, however it may be necessary to compile secondary data elements, such as:

- Idling fuel consumption factor (gallon/hr)
- Useful Life Benchmark (ULB) default from the Federal Transit Administration (https://www.transit.dot.gov/TAM/ULBcheatsheet)

Any secondary data used in this study must be from high quality, reputable sources and should be appropriate and representative for analyses, trends, and/or supporting information for the primary data. For example, equipment-specific documentation from the manufacturer may be used to fulfill program reporting requirements.

Approach for Evaluating Project Objectives (Performance/Acceptance Criteria)

During the data gathering, information about how the data were originally identified and collected will be documented, including:

- Source of the data (and whether the source is primary or secondary)
- Whether the activity data are for existing or new vehicles and EVSE (as described in Tables 1 and 2)

Each of the required activity data will be assessed using the above described DQIs to ensure that progress report data meet the project's DQOs. There may be cases where information related to this project's data quality objectives is not available from the data source; these data will be flagged in a separate tracking document maintained by the Technical Team and discussed with the project lead to determine whether the data are acceptable for inclusion in this analysis.

The quality assessment of the compiled data will be recorded by the Technical Team, including comments or issues identified by the project lead. It will also be noted whether the data meets the project's data quality objectives, whether the appropriate data entry and calculation checks have been made, and whether any data entries triggered warnings or errors in the agency's project reporting templates.

Any activity data that is deemed to not meet the applicable DQIs or DQOs will be disclosed to the Project Manager and project QA Manager, and the Project Manager or their delegate must develop a data substitution protocol for review and approval by the project QA Manager.

A.7 Distribution List

Instructions:

For this section of the QAPP, list the names, titles, and organizations of the individuals involved in the project who will be notified of the QAPP and receive a copy. This should include any partnering agencies and contractors/subcontractors who participate in the project. The list should include personnel listed in Sections A.8 and A.10, including the EPA project officer and EPA QA Manager. State where the approved documents will be maintained. Include an address/location for each individual (can also include email addresses and phone numbers). The distribution list can be presented in tabular format, or the information can be detailed in a list. Distribution/Notification can be in hardcopy form, electronic, or both.

The individuals in this list will be notified/receive copies of any QAPP revisions or amendments during the project. Revisions and amendments must be approved prior to implementation and distribution. Please note that if the Primary Quality Assurance Organization PQAO for which the QAPP is being prepared includes multiple organizations, the distribution list for the QAPP may need to be abridged. In this case, include the above information for the key project personnel, including upper management and QA staff, from all organizations within the PQAO. Then, add a disclaimer, such as the following: "*The QAPP will be distributed to other personnel and operators beyond this list, in accordance with the organizational chart(s) presented in A.10 of this QAPP.*"

The location of the official, controlled version of the QAPP should also be identified. This version could be a signed hardcopy located in a centralized records repository, an electronic version maintained on the organization's local area network (LAN), or an electronic version maintained on the organization's website (recommended), among other locations.

Example A.7 (Distribution List)

The original Quality Assurance Project Plan (QAPP), and any subsequent revisions, will be distributed to the personnel presented below. Additionally, this QAPP will be provided to any unlisted staff who are assigned to perform work under this project. A secured copy of this QAPP and any subsequent revisions will be maintained in the project files located at <file location>.

Name	Position and Organization	Division/Office	Email	Address/Location
FIRST_NAME LAST_NAME1	Environmental Manager, City of ABC	Department of Transportation	FIRST_NAME LAST_NAME1@city.gov	123 City St.
FIRST_NAME LAST_NAME2	Quality Assurance Manager, City of ABC	Department of Transportation	FIRST_NAME LAST_NAME2@city.gov	123 City St.
FIRST_NAME LAST_NAME3	Project Officer, Environmental Protection Agency	EPA Region 1	FIRST_NAME LAST_NAME3@epa.gov	456 Main St.
FIRST_NAME LAST_NAME4	QA Manager, Environmental Protection Agency	EPA Region 1	FIRST_NAME LAST_NAME4@epa.gov	456 Main St.

A.8 Project Organization

Instructions:

Discuss key individuals and organizations, roles, and responsibilities. Specifically, identify individuals with the following roles and describe their responsibilities:

- Approval authority for the QAPP
- Senior Manager having executive leadership authority
- Operations Manager,
- Project Quality Assurance Manager (QAM)
- Contractors, Subcontractors, and Sub-grantees
- The individual responsible for maintaining the QAPP
- Those conducting or supporting environmental information operations, data users, and others, as applicable.

This section of the QAPP discusses the roles and responsibilities of all key players in the project, illustrating the chain of command and lines of communication. This section clarifies which positions have been delegated authority to complete particular tasks.

The verbiage in this section should support the organizational chart in Section A.10 and clarify which position(s) serve in a QA oversight role and demonstrate, through the stated duties, the QA function. The terminology that is used to define positions should be used consistently throughout the QAPP.

Include discussion of any contractors/subcontractors or partnering agencies in this section and describe the tasks they perform. Explain the lines of communication with these partners.

This section of the QAPP also identifies the Primary Quality Assurance Organization (PQAO) under which the project team will operate. If multiple organizations will operate under a single PQAO for the project, this section should reflect the reporting relationships for each organization with the lead organization clearly identified.

When describing the responsibilities of the key positions, consider addressing the following questions if applicable to your project:

- Are each of the required roles and associated responsibilities clearly defined?
- Who is ultimately responsible for the quality of the project's data?
- If an assessment shows severe data quality issues, who could issue an order to halt data collection until corrective actions have been implemented?
- Who is responsible for writing the project's QAPP and determining if existing SOPs are consistent with project objectives? Who is responsible for revising and maintaining these documents based on project-specific findings when these documents are applied during primary EIOs for draft documents or applied to QC activities for draft documents submitted by the primary technical team to the QC team? (These may or may not be the same individuals.)
- Who serves as a liaison to the EPA Regional Office and is the primary point of contact?
- Who verifies, validates, and/or certifies collected data?

- Who is the "tie breaker" (i.e., final decision maker) when a disagreement exists? This is especially important with regards to data validation activities. Often, this is the project's assigned QA Officer/Manager (or equivalent).
- Who judges the success of corrective actions, once implemented, to ensure they are appropriate and effective?
- Who is responsible for ensuring QAPP/SOP revisions are communicated and distributed to all parties in the distribution list?
- If utilizing a contractor(s), who within the project team is responsible for contractor oversight and assessment of deliverables?

Example A.8 (Project Organization)

The primary personnel responsible for implementation of this project are the City of ABC's assigned Chief Environmental Officer, Project Manager, the organizationally independent project Quality Assurance Manager, and the assigned Task Leaders for the described tasks. The Chief Environmental Officer will serve as the executive leadership authority and will provide senior-level oversight as needed. The Project Manager leads the Primary Technical Team, and the project QA Manager leads the QC Team responsible for measuring all draft work products (prepared by the Primary Technical Team) versus the acceptance criteria established in this QAPP. Position-specific duties are outlined briefly in this section. For this project, the Project Manager will serve as the Operations Manager for the team conducting the EIOs and is the individual responsible for maintaining the QAPP. The project QA Manager is independent of the Primary Technical Team and is responsible for assigning QC staff that were not involved in generating the data or conducting any EIOs related to the draft work products. Section A.9 further describes how the project's organization ensures independence of the project QA Manager and QC Team.

The Project Manager is responsible for the project's technical and financial performance as well as maintaining communications with the EPA's Project Officer to ensure mutual understanding of grant requirements, EPA expectations, and conformity with EPA quality procedures. The Project Manager will manage oversight and conduct of all primary project activities, including the planning of required training for technical staff; allocation of resources to specific tasks; and ensuring that quality procedures are incorporated into all aspects of the primary work to ensure all draft deliverables conform to acceptance criteria prior to submitting draft work products to the project QA Manager for independent review. The Project Manager is also responsible for developing, conducting, and/or overseeing QA plans and measures integrated into the primary tasks and during the hand-off of work products between the Primary Technical Team and Task Leaders, as necessary. The Project Manager will review any corrective actions identified by Primary Technical Team members or by QC team members, authorize specific Primary Technical Team member(s) to implement the corrective action, and provide direction to the Primary Technical Team member(s) in the approach for the corrective action. The Project Manager is responsible for day-to-day oversight as necessary to ensure project activities are consistent with the approved Quality Assurance Project Plan, and to ensure that all work products under this project are consistent with the specified type, quantity, and quality in the approved work plan. Finally, the Project Manager is responsible for developing a training plan for the Primary Technical Team and QC staff as necessary to ensure assigned staff have the requisite knowledge and skills to implement assigned tasks.

The Project Manager will assign a Task Leader for each technical task with instructions to complete the specific responsibilities for their assigned task. Note that some Task Leaders are contractors or sub awardees. Each Task Leader is responsible for the day-to-day technical activities under their assigned task, including planning, reporting, and controlling of technical and financial resources allocated to the task by the Project Manager. Accordingly, each Task Leader is primarily responsible for implementing the quality measures integral to the primary work and coordinating with other Task Leaders as necessary to ensure the draft work products are consistent and comparable across all tasks as required by this QAPP.

For each major deliverable under each task, the assigned Task Leader will review all QA-related plans and reports and is responsible for transmitting the draft deliverable and the primary QA documentation to the QA Manager (or delegate) for independent QC review and approval. Each Task Leader is responsible for ensuring that the primary quality assurance procedures are implemented at the task level. Task Leaders are also responsible for maintaining the official, approved, task-level QAPP content. Each Task Leader will discuss with the Project Manager any concerns about quality identified during the primary technical activities and during internal reviews among Task Leaders and Primary Technical Team members during development of the draft deliverables.

Every Primary Technical Team member is authorized to propose to the Task Leaders or Project Manager any revisions to task-level QAPP content considered by the Primary Technical Team member as necessary to resolve observed quality issues. However, only the Project Manager is authorized to revise the QAPP. The Project Manager must obtain concurrence from the QA Manager (or delegate) to implement any revisions to the approved QAPP considered necessary by the Primary Technical Team to identify, resolve, or preclude problems or to amend task-level plans, as necessary. In addition, each Task Leader will work with the Project Manager and the QA Manager to identify and implement quality improvements both during the primary work and in response to any findings on draft deliverables reviewed by the QC Team. The Project Manager is responsible for ensuring the consistency of similar or related QA measures across tasks, and the Task Leaders are responsible for overseeing task-level work performed by the Primary Technical Team and for providing assurance that all required QA/QC procedures are being implemented in accordance with the approved QAPP.

The Project Manager will maintain close communications with each Task Leader and ensure any difficulties encountered or proposed changes at the task level are reviewed for implications on other similar or related tasks. The Project Manager is also responsible for communicating progress or difficulties encountered (across all tasks) to the EPA PO, who provides the EPA's primary oversight function for this project at EPA Region <X> and is responsible for review and approval of this QAPP and any future revisions. The Project Manager (with support from Task Leaders and other Primary Technical Team members) will be responsible for consulting with the EPA PO, on planning, scheduling, and implementing the QA/QC for all project deliverables and obtaining required EPA approvals.

The QA Manager role is discussed in Section A.9.

A.9 Project QAM Independence

Instructions:

Describe how the project's Quality Assurance Manager (QAM) is independent of the primary environmental information operations (EIO) completed prior to submitting draft work products to the project QA Manager and Quality Control (QC) Team for review. Note that for small organizations (e.g., small Tribal departments), the project QA Manager and EIO operations may be combined with approval from the EPA QA Manager.

Example A.9 (Project QAM Independence)

The project's QA Manager is responsible for overseeing the quality system, monitoring, and facilitating QA documentation activities on tasks, and helping the Primary Technical Team (PTT) understand and comply with EPA QA requirements. This individual has the authority to access and to discuss quality-related issues with the grantee's senior management team, outside of their direct supervisory chain, as necessary. The project QA Manager will not be involved in data collection or analyses for the primary (draft) work products and is organizationally independent from the primary technical team responsible for developing the draft work products. As noted in Section A.8, the project QA Manager will oversee and direct all QC functions deploying only QC Team members who were not involved in any aspect of the development of draft primary deliverables subject to QC review. The assigned QC staff will review all assigned draft documents in accordance with guidance provided by the project QA Manager. The QC member will document any findings from the review and report those findings only to the project QA Manager in the format specified by the project QA Manager. It is the project QA Manager's responsibility to work with the individual(s) conducting or supporting EIO to confirm the validity of any findings and to confirm that the findings have been resolved prior to approving the release of any final work products on QC forms specified in the approved QAPP.

The specific project QA Manager responsibilities may include, but are not limited to:

- Maintaining oversight of planning, documenting, and implementing the requirements of this QAPP.
- Ensuring that process- and project-specific QA documents are developed; that required or recommended protocols are followed; that data are reduced, validated, and reported according to specific criteria; and that QC assessments are performed.
- Auditing project files to ensure that project staff are using appropriate methodologies to document data quality and that the deliverable review process is documented in the final project report.
- Ensuring that at least five percent of the data included in this analysis have been checked and not less than 10 percent of the calculations have been checked by a knowledgeable member of the QC team as delegated by the project QA Manager. The project QA Manager will document that these checks have been implemented on the QC forms specified in this QAPP.
- Reviewing the documentation to ensure primary and secondary data were evaluated against the project data use requirements. The project QA Manager will document whether these checks have been implemented.

A.10 Project Organizational Chart and Communications

Instructions:

Include organizational chart(s) in this section. Ensure that an independent QA function is clearly demonstrated in the chart(s). The verbiage in Section A.8 should match/clarify what is illustrated in the organizational chart(s). The terminology that is used to define positions should be used consistently throughout the QAPP.

Organizational charts should depict lines of authority and reporting responsibilities. The Project organization chart must also include the following:

- The name of the organization responsible for conducting the environmental information operations.
- Identification of all contractors, subcontractors, and sub-grantees and their reporting relationships to the organization responsible for conducting the environmental information operations.
- The individual in the senior manager role.
- The individual in the project Operations Manager role for the organization conducting the environmental information operations and their reporting relationship to the senior manager.
- The individual in the project QA Manager role for the organization conducting the environmental information operations, their independence from environmental information operations, and their reporting relationship to the senior manager. If the senior manager does not directly supervise the project QA Manager, the project QA Manager must have authority to access and discuss quality related issues with the senior manager outside of their direct supervisory chain as necessary. The latter is demonstrated by a dotted line on the organizational chart.
- Titles, roles, and names (if determined during planning) of operations and quality individuals within the organization conducting or supporting environmental information operations and their reporting relationship.

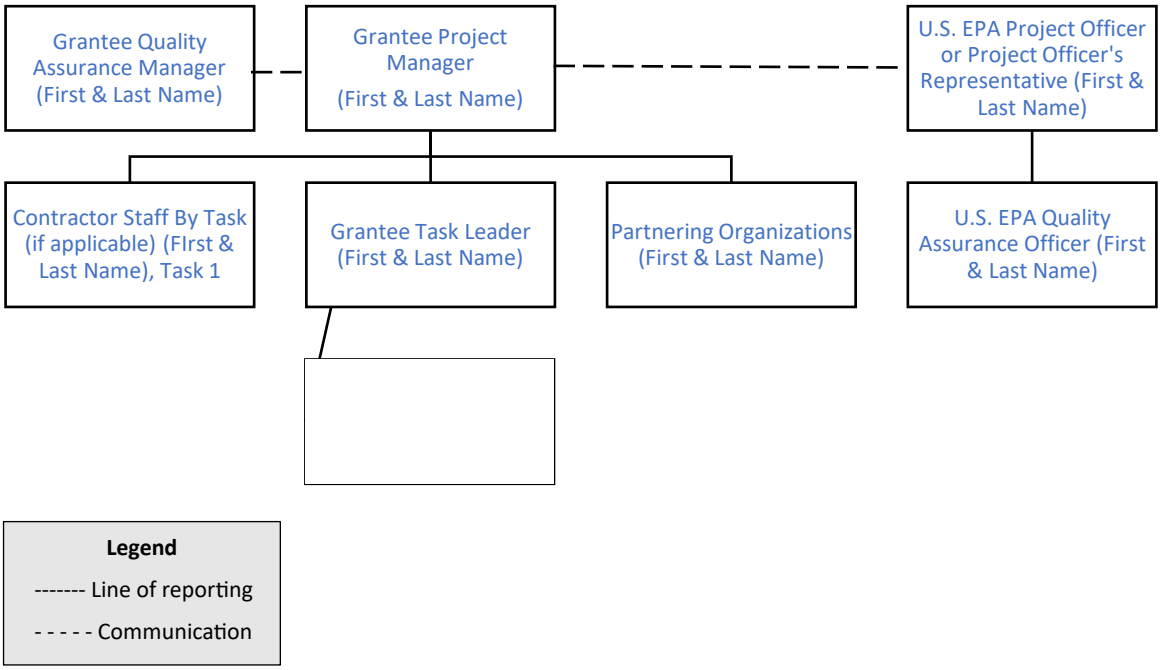
Describe communication procedures to EPA, including elevating discrepancies and QAPP non-conformances, process improvements, seeking approvals between project personnel, timing of communication, and roles and responsibilities associated with the processes.

As an alternative to the template chart below, a grantee could include their organizational chart as well as a second chart showing the organization to EPA and/or contractors. If the organizational chart is included in an appendix, please reference the appendix in this section.

Example A.10 (Project Organizational Chart and Communications)

Note, Figure 1, below, presents a hypothetical organizational chart for the project. The example text also refers to the Project Manager and Task Leaders as the "Primary Technical Team" and refers to the project QA Manager and QC staff as the independent "QC Team." Under the EPA's QAPP Standard, the organization chart must also identify any contractor relationships relevant to environmental information operations (EIOs).

Figure 1. Template Organization Chart



A.11 Personnel Training/Certification

Instructions:

In this section of the QAPP, identify and describe your project team's training and/or certification requirements. Discuss how training will be provided, tracked, and documented. Discuss how proficiency will be assessed, identifying the individual(s) responsible for determining whether project participants can successfully and independently perform the activities. Additionally, the process for ensuring project participants stay current on QA and related competencies should be described in this section. Finally, this section of the QAPP should identify where training records will be maintained and by whom.

When describing your project team's training requirements, consider addressing the following questions, if applicable:

- Do any job title(s)/position(s) have specific training requirements that must be fulfilled that documents the employee can fully execute the responsibilities of the position? If so, describe the requirements.
- Who makes the determination that project staff are sufficiently trained to perform assigned tasks?
- Are certificates of completion issued when the project participants are found to be proficient or have completed a particular training/workshop/exam? Where are these certificates retained and by whom?
- How is the need for refresher training assessed and subsequently provided?
- Is vendor-provided training utilized? When taken, how is the training documented?

Example A.11 (Personnel Training/Certification)

All "ABC City" (grantee) staff assigned to work on this project shall have appropriate technical and QA training to properly perform their assignments. Training records will be documented and maintained by the project QA Manager. "ABC City" (grantee) staff serving in a QA Manager role under this project will have completed a training course on QA/QC activities similar to the course available at https://www.epa.gov/quality/training-courses-quality-assurance-and-quality-control-activities.
No additional technical training is required for the project.

A.12 Documentation and Records

Instructions:

In this section, describe your project team's document control system. In other words, describe the process for distributing the most current approved QAPP, as well as the process for notifying project staff of any revisions/updates to the QAPP, and ensuring that staff utilize only the current version. This description can also be included in Section A.7, Distribution List, if preferred. This section should also describe the document control process for distributing the most current version of SOPs, QA/QC forms, blank data entry forms, and so forth. These controlled documents may be maintained on the lead organization's network or website (recommended), or through other means specified in the QAPP for project teams responsible for particular EIOs that will rely on controlled documents. It is recommended that the QAPP include links to all controlled documents referenced in the QAPP to provide quick access to all project team members.

Also, in this section of the QAPP, identify the project records that will be maintained, how/where the records will be stored, and any record retention requirements. This section should include information about records generated in the field (e.g., data forms, logbooks, chain-of-custody forms), records generated in the laboratory (if applicable), QA reports generated, corrective action reports, and so forth. Emails are also considered records; if the project team will use email as a primary means of communicating procedural updates and/or otherwise significant monitoring information, the process for retaining significant emails should be discussed.

The document review cycle for the QAPP and, ideally, its associated SOPs, should be included here, as well. As a best practice, organizations are required to document the annual review of the QAPP and record the review date and name/signature of the individual completing the review (even if no revisions to the document were required). The method for documenting and tracking the QAPP review cycle is an important part of an organization's quality system.

To reduce verbiage, a table may be included that summarizes the records that will be documented and maintained, including where they can be found within the file system used for the project.

When describing your project team's documentation and recordkeeping requirements, consider addressing the following questions if applicable:

- Does the QAPP describe the management of documents and records that will be produced that involve environmental information operations?
- Does the QAPP distinguish between hardcopy and electronic documentation requirements, if applicable?
- Will the project team utilize any commercial or in-house developed databases where project records, including QAPP records, are stored? If so, describe.
- Who is responsible for maintaining the records and files discussed in this section?
- Is access to any of the records limited? If so, who has access? Please briefly describe the type of access (e.g., "read-only", "edit permissions") granted to project personnel.
- Are electronic records backed up? If so, how and on what frequency?
- While in storage, are records (hardcopy and electronic) protected from damage, loss, and deterioration?
- Where are audit reports (internal and external) filed and maintained?

- Do senior quality officers use email to issue important notifications to staff regarding updates or changes to monitoring policies and procedures, etc.? Are copies of these email records maintained and filed? If so, where?
- For handwritten documentation (if applicable), are best practices listed in the QAPP to guide the reader (e.g., instructions such as use of indelible ink, single-line strikethrough for incorrect data entries with corrections to the side, initialed and dated)?
- Are handwritten records, such as site logbooks, backed up (i.e. scanned)? If so, on what frequency? Where are the scanned copies maintained?

The example text for A.12 (as well as example text in other sections) is a hypothetical example and section numbers and appendices listed are for demonstration purposes and may not reflect a QAPP prepared by an actual project team. Below an example QC Documentation form is also provided to illustrate how the applicable QC process might be tracked and recorded. Note that the specific format of the illustrative form example is not required, however awardees are responsible for retaining QC documentation that can be made available upon request (e.g., in the occurrence of an audit). The exact format and use of this document is ultimately up to the project team; however, the example form provides column fields that may be useful in documenting and maintaining a chain of custody of the work performed.

Example A.12 (Documentation and Records)

The "ABC City" will document in electronic form the QC activities for this project. Each Task Leader is responsible for ensuring that copies of all completed QC forms and other QA records (including this QAPP), will be maintained in the project files located electronically in the ABC City's Environmental Engineer's Office. The files will be made available through internal document access management and will be distributed to the relevant parties, including editing permissions, by the Task Leader. Project files will be retained for at least 3 years after the submission of the Final Project Report which is due at the conclusion of the grant term, unless there is an audit or other official inquiry, in which case records shall be kept as long as auditors need them. The types of QC documentation that will be prepared for this project include:

- Planning documentation, including documentation of methodologies (e.g., QAPP)
- Implementation documentation (e.g., Review/Approval Forms and QC records)
- Assessment documentation (e.g., audit reports).

Detailed documentation of QC activities for a specific task or subtask will be maintained using the QC Documentation Form shown in Attachment [A] (see below illustrative example form). This form will document the completion of the QC techniques planned for use on this project as referenced in Section B.4. One or more completed versions of these forms, as necessary, will be maintained in the project files. The types of documents and activities for which QC will be conducted and documented may include raw data, data from other sources such as databases or literature, and calculations and analyses necessary to determine or evaluate outcomes of measures.

Quality Control Documentation Form (illustrative)

<Grantee Org.>

Documentation of QA Review and Approval of Electronic Deliverables

Approvals on this form verify that all technical and editorial reviews have been completed and the deliverable meets the criteria for scientific defensibility, technical, and editorial accuracy, and presentation clarity as outlined in the Quality Assurance (QA) Project Plan, QA Narrative, Quality Management Plan, and/or according to direction from the EPA PO.

Client:	EPA Region <X>
Grant Number:	<enter grant number>
EPA Project Officer:	<enter EPA PO>
Project Number:	<enter internal Project ID>
Project Name:	<enter internal project name>
Grantee Org. Project Manager:	<enter grantee's project manager>

QA Form Details

Item Number	File Name (Copy the name of the File Reviewed)	Deliverable Description	Date Sent to Client	Deliverable (Draft)	Deliverable (Final)	Document Originator	QA Review Information (Review Type)	(Reviewer Name)	(Date Review was Performed)	(Brief Summary of Review Findings and Other Notes)	QA Review Information (Have all Findings Been	(Originator Signature)	(Reviewer Signature)	(File Location) *Copy Long Folder Path Name*
01				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			
02				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			
03				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			
04				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			
05				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			
06				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			
07				☐	☐		*Technical*				☐ Yes			
							Technical				☐ Yes			

Group B. Implementing Environmental Information Operations

Group B Elements identify and address all aspects of environmental information operations to help to ensure products and services are of known and documented quality and to evaluate the products and services delivered under the project.

This section of the QAPP describes in comprehensive detail the implementation of necessary QA and QC requirements and other technical activities to ensure that the results of the environmental information operations performed will satisfy the intended purpose, and the information/data quality objectives and performance/acceptance criteria in the Group A4 and A6 Elements.

B.1 Identification of Project Environmental Information Operations

Instructions:

This section of the QAPP describes the EIOs to be conducted and how they will satisfy the project purpose, as well as the data quality objectives, and performance and acceptance criteria (defined in the Group A.4 and A.6 Elements). Similarly, any guidance, tools, templates, etc. used should be noted in this section. Environmental Information Operations is a collective term for work performed to collect, produce, evaluate, compile, or use environmental information and the design, construction, operation, or application of environmental technology. Environmental information can be classified as either "primary" or "secondary" data. Primary data refers to environmental data collected directly by the organization whether through field activities or other on-site data gathering activities. Secondary data (also referred to as existing data or non-direct measurements) may come from several sources, including other studies, government databases, etc. Projects may involve one or both types of data and acquisition of data types should be documented in the QAPP.

Under this project, the following types of information are considered environmental information because these data will be evaluated to document the grantee's activities related to vehicles and infrastructure; note that this list is inclusive of multiple project types and not all data fields may be included in one individual project type. As shown in the B.1 Example, only data fields relevant to the project being carried out should be included in the QAPP.

Onroad Vehicle Activity

- Each existing vehicle/engine being replaced:
    - Annual mileage
    - Annual idling hours
    - Current odometer information s
    - Annual amount of fuel used Remaining life of the baseline engine/vehicle
    - Percentage of Time operated in Primary County Place of Performance
    - Percentage of Time operated in Secondary County Place of Performance
    - Percentage of time operated in other counties
    - Annual number of visits to ports included in project (Clean Ports only)
- Each new vehicle being purchased:
    - Annual mileage of the new vehicles
    - If new vehicles are equipped with auxiliary heaters
    - Type of auxiliary heaters the new vehicles are equipped with
    - Percentage of Time operated in County

Nonroad Engines and Other Mobile Equipment Activity (Clean Ports Program only)

- Annual hours of operation
- Powertrain horsepower
- Annual hours of operation
- Share of hours serving ports included in project
- Annual number of visits to ports included in project

EVSE Infrastructure Activity

- Number of EVSE units
- Number of plugs on each EVSE
- Maximum output power of the EVSE
- If EVSE is capable of bidirectional charging
- If the vehicle and EVSE will be used for vehicle to grid (V2G)
- Annual Total Energy Dispensed (kWh)
- EVSE Annual Percentage Uptime (based on hours)
- EVSE Total Annual Number of Charging Sessions Completed
- Has the EVSE Infrastructure ever been powered by an internal combustion generator in the last year?
- EVSE Serial Number for each EVSE Unit

On-Site Power Generation System

- Generation capacity of the On-Site Power Generation System
- On-Site Power Generation Annual Energy Dispensed (MWh)
- On-Site Power Generation Annual Percentage Uptime (based on days)

Battery Energy Storage System (BESS)

- Battery Energy Storage System (BESS) Energy capacity
- Maximum Continuous Discharge AC Power (kW)
- Maximum Continuous Discharge DC Power (kW)
- Battery Chemistry
- BESS Annual Energy Dispensed/Discharged (MWh)
- BESS Annual Energy Received/Charged from the Grid (MWh)
- BESS Annual Percentage Uptime (based on hours)
- Has the BESS Infrastructure ever been charged by an internal combustion generator in the past year?

Shore Power (Clean Ports Program only)

- Typical Auxiliary Engine Tier of Vessels Using Shore Power
- Fuel Type of Vessels Using Shore Power
- Number of Annual Vessel Calls to Each Berth where Shore Power Installed
- Average Hotel Hours per Vessel Call per Berth where Shore Power Installed
- Maximum Output Power (kW)

- Annual Total Energy Dispersed in MWh
- Shore Power Annual Percentage Uptime (based on days in year)

Hydrogen Fueling Station Information (Clean Ports Program only)

- Maximum Dispensing Flow Rate per Hose (kg/min)
- Total Hydrogen Tank Storage Capacity (kg)
- Annual total H2 dispensed (kg)
- Total Dispensing Capacity of the Station (kg/min)

Example B.1 (Identification of Project Environmental Information Operations)

This section of the QAPP describes the EIOs to be conducted and how they will satisfy the project purpose, as well as the data quality objectives, and performance and acceptance criteria in Sections A.4 and A.6.

The EIO under this project is divided into the two tasks presented under Section A.5. Our EIO, consistent with the project purpose, will estimate the City's vehicles and equipment activity. The following detailed steps describe the EIO that will be conducted under this project.

EIOs: Collect, Compile, and Submit Vehicle and Infrastructure Activity Data.

As noted in Section A.5, the project EIOs will be completed under the following two tasks:

(1) Collecting the required field data on a recurring basis, and
(2) Entering the data into forms for submittal on a quarterly basis.

The Primary Technical Team will develop the framework for tracking and recordkeeping for vehicle and EVSE activity data over the life of this project. The following activity data reflect primary data elements that will be collected or determined by the Primary Technical Team for each vehicle and piece of infrastructure involved in the grant project, as required by the program's Progress Reporting Template:

Vehicle Activity

- Existing vehicles:
  - Current odometer information
  - Annual mileage
  - Annual idling hours
  - Annual amount of fuel used
  - Remaining life of the baseline engine/vehicle
  - Percentage of Time operated in Primary County Place of Performance
  - Percentage of Time operated in Secondary County Place of Performance
  - Percentage of time operated in other counties

- New vehicles:
  - Annual mileage
  - If equipped with auxiliary heaters
  - Type of auxiliary heaters
  - Percentage of Time operated in County

Infrastructure Activity

- Number of EVSE units
- Number of plugs on each EVSE
- Maximum output of each EVSE
- If EVSE is capable of bidirectional charging
- If the vehicle and EVSE will be used for vehicle to grid (V2G)
- EVSE Serial Number for each EVSE Unit

How do the Task 1 EIOs satisfy the project purpose under A.4?

The activities will be derived primarily under the EIOs for the vehicles and equipment affected by this grant. These satisfy the project purpose by quantifying and tracking the activity data associated with existing and new equipment purchased with project funds in a manner that is compatible with the approved workplan.

How do the Task 1 EIOs satisfy the acceptance criteria under A.6?

DQOs 1 through 4 that are specified under Section A.6 are in place to ensure that the collected vehicle and infrastructure activity data will be representative of the project.

B.2 Methods for Environmental Information Acquisition

Instructions:

This section of the QAPP should describe the methods and procedures to be used or cite specific Standard Operating Procedures (SOPs) and describe how environmental information will be acquired and implemented (applies to field sampling; laboratory analyses; environmental technology; or existing information obtained from databases, websites, etc.). Data collection should follow the procedures in any applicable guidance as prescribed by your respective grant program.

For primary data involving field sampling, it is important to establish SOPs and include a table listing all field sampling SOPs that will be used (if applicable). Include the title of the SOP, date, revision number and organization that wrote the SOP. Describe any modifications to the SOPs that are necessary for your project. In this QAPP section, detail the analytical methods you will use to analyze the field samples collected, along with the required analytical QC for those methods. (This information can also be provided as a table.) Reference applicable SOPs with hyperlinks or put in attachments/appendices. SOPs shall be available to personnel conducting the environmental information operations. Consider identifying the following methods and parameters, if applicable to the project.

- Field Activities and Environmental Measurements (e.g., information derived from tools, instruments, observational results). Describe methods as applicable, including:
  - Specific procedures
  - Observational methods
  - Documentation review
- Existing Information

- For analyses using existing secondary data (e.g., activity data aggregated and summarized and provided by a manufacturer or third-party data provider), all data received should be reviewed by a technical staff member to assess data quality and completeness before their use. Original sources for all information and data contained in the document should also be included in a list of references with appropriate citations. When using secondary data, the awardee must document information regarding each dataset and the rationale/selection criteria for selecting the data sources used. The awardees will be responsible for overseeing and confirming the selection of the data for the project tasks. See Section D.2 for further information on data usability.

When addressing methods for environmental information acquisition, consider the following questions:

For primary data:

- What primary data will be collected throughout the project period?
- What SOPs will be followed to collect any primary data reported?
- For primary data collected on vehicle/equipment/infrastructure activity, what Quality Control methods will the team use to ensure accurate reporting?
- How will the SOPs be communicated in project documentation?

For secondary data:

- What secondary data will be used for any reporting throughout the project period?
- If the information is to be combined with new environmental information, describe the criteria to ensure compatibility.

Example B.2 (Methods for Environmental Information Acquisition)

The majority of EIOs conducted in this project will involve primary data, as detailed in Section B.1. In limited circumstances, secondary data will be used for the collection of new vehicle activity data for percentage of time operated in the county. The Primary Technical Team will follow EPA best practices collecting data on vehicle and equipment activity data for mobile source grant reporting templates. A copy of EPA guidance on activity data collection standard operating procedures (SOPs) will be included in Primary Technical Team files to ensure availability and familiarity of the applicable SOPs across the Primary Technical Team. In general, primary data will be collected directly from vehicles (e.g., odometer readings) and infrastructure (e.g., number of plugs on the EVSE), or manuals about the vehicles or equipment (e.g., manufacturer documentation on maximum output of EVSE). Secondary data may be collected from a third-party data provider for the amount of time new vehicles operate in the primary and secondary places of performance (percent of time in county).

All existing data received will be reviewed by a technical staff member to assess data quality and completeness before their use. Original sources for all information and data contained in the document will be included in a list of references with appropriate citations. The Task Leaders will document information regarding each dataset and the rationale/selection criteria for selecting the data sources used. The Task Leaders will be responsible for overseeing and confirming the selection of the data for the project tasks. See Section D.2 for further information on data usability.

B.3 Integrity of Environmental Information

Instructions:

Describe or cite the procedures for ensuring the integrity of the environmental information operations. For field sampling (if applicable), describe sample handling requirements and chain-of-custody procedures. For laboratory analyses (if applicable), identify each contracted laboratory and back-up laboratory and the processes for ensuring the laboratories maintain current accreditation and/or certification for applicable analytes and matrices.

Examples include but are not limited to:

- field documentation
- packaging
- transport and/or shipment from the site
- storage at the laboratory
- sample labels
- Chain of Custody (COC) forms
- shipping protocols
- if laboratory involvement, identify each laboratory to be used, and include the laboratory's current accreditation and/or certification for the applicable analytes and matrices.

Example B.3 (Integrity of Environmental Information)

Data collected and used throughout this project will be primary or existing (secondary) data. Any data, formulas, methods, and/or best-practices that are used to inform the uses and calculations of the data will be evaluated in a consistent manner to ensure source integrity. As primary and existing data and sources are identified and evaluated, they will be reviewed by a second technical staff to ensure consensus across the data and sources.

The Primary Technical Team will follow the SOPs described in section B.2 for collecting vehicle activity and infrastructure data. The project is not anticipated to include field sampling or laboratory analyses.

B.4 Quality Control

Instructions:

In this section of the QAPP, describe the frequency of each type of QC activity, corrective actions, and how the effectiveness of the corrective action shall be determined and documented. State who is responsible for verifying the corrective actions have been implemented, and who is responsible for preparing and filing the QC documentation.

When describing quality control, consider addressing the following questions if applicable to your project type:

- How will the project team identify unexpected or incorrect variances in EI results that may warrant further data quality investigation?
- How will QC flags be recorded and communicated to the appropriate teams?
- Who will be responsible for reviewing the QC results and determining the appropriate actions to address them?
- What is the process to track and verify that corrective actions have been addressed?

Example B.4 (Quality Control)

Sections A.6 and B.1 discussed reviewing and assessing the data collected. Field datasheets for collecting activity data will be reviewed on-site before departure to ensure data were collected appropriately and completely, and there are no missing and/or questionable data. Additionally, all data entered into spreadsheets and any calculations completed will be reviewed by a separate technical QC reviewer. The QC reviewer will evaluate the approach to ensure the methods are appropriate and have been applied correctly to the analysis. The QC reviewer will also confirm all data were entered correctly and that any calculations are complete and accurate; one option is by repeating the calculation independently and comparing the results of the two calculations. Any data entry and calculation errors will be identified and corrected. Data tables prepared for draft and final reports will be checked against the spreadsheets used to store the data and complete the analysis.

B.5 Instrument/Equipment Calibration, Testing, Inspection, and Maintenance

Instructions:

The QAPP shall identify instruments/equipment, to include, but not limited to tools and gauges used for environmental information operations. The QAPP shall describe all procedures and documentation activities that will be performed to ensure that the instruments/equipment are available and in working order when needed. The QAPP shall describe or reference procedures and documentation activities on how instruments and equipment will be tested, inspected, and maintained. Applicable SOPs can be referenced in this section.

When describing calibration, testing, inspection, and maintenance, consider addressing the following questions if applicable to your project type:

- How will calibration be conducted, documented, and traceable to the instrument?
- What equipment (field and laboratory) needs periodic maintenance, testing, or inspection?
- How will instruments and equipment be tested, inspected, and maintained?
- How will testing be documented?
- What is the availability of critical spare parts?

Example B.5 (Instrument/Equipment Calibration, Testing, Inspection, and Maintenance)

The project team will regularly track and ensure applicable vehicle meters are accurate using calibration, inspection, and periodic maintenance, in accordance with fleet operations and procedures, and equipment or vehicle manufacturer information.

This project does not involve the use of any laboratory equipment.

B.6 Inspection/Acceptance of Supplies and Services

Instructions:

In this section of the QAPP, describe or reference the procedures for how supplies and services are inspected and accepted.

Identify responsible individuals for inspection and acceptance.

Supplies may include but are not limited to spare parts for instruments/equipment, standard materials and solutions, sample bottles, calibration gases, reagents, hoses, deionized water, potable water, and electronic data storage media. Services provided by vendors to include, but not limited to contractors, sub-contractors, and sub-grantees may include document development, performing environmental information operations.

Note: If the project will not require supplies for collecting samples as noted in Element B.5, and will not utilize services provided by vendors, such as by contractors, sub-contractors, and subrecipients performing environmental information operations, see the example response text for Section B.6.

When describing your project team's procedures for inspection/acceptance of supplies, consider addressing the following questions if applicable to your project:

- Are critical supplies and consumables identified? If not listed within the QAPP, cite where this information can be found.
- Are acceptance criteria stated, if necessary?
- How are use of supplies and consumables tracked?
- Who is responsible for tracking/ordering supplies and consumables?
- Is documentation maintained that demonstrates the supplies/consumables are acceptable for use?
- Are procedures in place (e.g., labeling) to help ensure supplies/consumables are used before their expiration dates?
- Does the organization responsible for particular EIOs have any policies regarding the use of expired materials?

When describing your project team's inspection/acceptance of services, consider the following questions (if applicable):

- Are services provided by vendors identified?
- Who is responsible for oversight of the vendors?

Example B.6 (Inspection/Acceptance of Supplies and Services)

This project does not require supplies for the collection and analysis of samples nor the use of any laboratory equipment. Additionally, this project does not utilize services provided by contractors or sub-grantees. Thus, this section (B.6 - Inspection/Acceptance of Supplies and Services) is not applicable to this project, and this QAPP does not require the content specified in this element of EPA's QAPP Standard.

This project does not require supplies for the collection and analysis of samples nor the use of any laboratory equipment. However, this project does include services provided by contractors or

subrecipients for gathering and analyzing vehicle and EVSE activity data. The Project Manager maintains contractor oversight for the life of this project. Contractor services will be reviewed as outlined in the Statement of Work for Contract #00000. Under this project, the "ABC City's" existing quality management systems will be utilized such that task-level deliverables will be subjected to required, regular reviews (e.g., quarterly) to ensure that technical, financial, and schedule requirements of this project are consistent with the expectations for handling and producing deliverables that reflect high-quality environment data as required by this QAPP. Assessment and oversight are discussed further in Sections C.1 and C.2, respectively.

B.7 Environmental Information Management

Instructions:

In this section of the QAPP, describe how environmental information will be managed, tracing the path of data generation in the field/laboratory to the final data use and end storage.

Identify and describe all data handling equipment and procedures to process, compile, and analyze the data, including any computer hardware and software, or paper-based processes.

Describe or reference the standard record-keeping procedures, the document control system, and the approach used for information storage and retrieval on electronic media. Include any checklists used for data management.

Describe the control mechanism for detecting/correcting errors and ensuring accuracy.

Describe or reference all procedures to process, compile, and analyze the information.

List any required computer hardware/software and describe the procedures to demonstrate hardware/software configuration acceptability and to assure that applicable information resource management requirements are satisfied.

Information security and back-up is also a critical function that should be discussed in this section of the QAPP. Describe the process for ensuring original, unaltered information is retained and never overwritten. Discuss how information is backed up and at what frequency. *Note: Daily back-up is recommended. S*ome file management systems (e.g., SharePoint) automatically save new file versions as documents are modified. Use of these file systems should be noted and explained

When describing your project team's data management system, consider addressing the following questions if applicable to your project:

- How and where are data stored?
- Is data transmitted by hand (e.g., data entry forms) or electronically?
- How is data integrity maintained? Is raw, unaltered data maintained such that the project team can always see or retrieve the original data? If so, where and how is the raw data maintained?

- Are procedures to process, compile, and analyze data included in a specific SOP? If so, which one(s)? Cite any applicable data handling, processing, and/or validation SOPs.
- Are there procedures in place to test or periodically audit the acceptability of the hardware and software configurations? If so, describe.
- Who is responsible for each information management task?
- What security measures are in place to ensure information is not unintentionally modified or deleted?
- How is data backed-up?
- What is the frequency of back-up?
- Are recovery measures tested?
- How is the final information stored and archived?
- How long is information retained?
- When software upgrades occur, are archived data(bases) similarly updated such that data is still accessible during its retention period?

Example B.7 (Environmental Information Management)

Quality Assurance/Quality Control (QA/QC) of data management will begin with the raw data and will end with a report to the EPA. Data management encompasses and traces the path of the data from their source to their final use or storage and includes control mechanisms for detecting and correcting errors. Data management procedures also include file storage and file transfer.

Upon return to the office, field datasheets will be scanned and submitted to the Project Manager and inspected. Hard copies of the original data sheets will be kept on file in the project folders. Microsoft Excel will be used to record and organize all data. Once all data are entered by a Primary Technical Team member, a second Primary Technical Team member will inspect the data for accuracy and corrects any errors, and cross check with calibration and QC logs to confirm successful data management. All data entry and error correction activities are recorded in a set of documents prior to and immediately after any data management activity.

All project and data files will be stored on the "ABC City's" (grantee) project servers. The project server automatically backs up all files each night to avoid loss of data. Data are stored in various formats that correspond to the software being used. As necessary, data will be transferred using various techniques, including email, File Transfer Protocol, or shared drives. Section A.12 provides the record retention timeframe for files generated under this project.

Note that changes made to deliverables will be documented using the software's track changes feature, which allows a user to track and view all changes that are made to the document version. All deliverable reviews will be documented in a QC Documentation Form for the project. This form will be maintained in the project files.

For this project, it is not anticipated that any special hardware or software will be used. General software available through the Microsoft Suite including Excel, Word, Access, and PowerPoint and will be sufficient to perform the tasks for this project.

Group C. Elements for Assessment, Response Actions, and Oversight

The elements in this group address assessment, response actions, and oversight activities. Assessments ensure that the planned project activities in the QAPP are implemented as approved. Assessments can be internal and/or external and should be conducted throughout the project to ensure that usable environmental information are obtained. Response actions address findings, corrective actions and non-conformances identified from the assessments.

Oversight activities ensure that response actions and reporting mechanisms are in place to capture the project status and any QA issues that arise during implementation and through assessments. The elements in this group address the activities for assessing the effectiveness of project implementation and associated QA and QC activities.

C.1 Assessments and Response Actions

Instructions:

This element addresses the activities for assessing the effectiveness of the implementation of the project and associated QA and QC activities. The purpose of an assessment is to ensure that the QAPP is implemented as approved. Assessments are conducted both during and after the environmental information operations identified in the Group B Elements. In this section of the QAPP, describe the assessments your project team performs or participates in, in order to ensure the project activities are being conducted as planned and are generating acceptable data.

You may choose to use a table or chart summarizing the assessments and their required frequencies. Descriptions for this section should:

- Identify the assessments for the project to include the number, frequency, and types of planned assessments.
- Identify the individual(s) responsible for performing the assessments and where the findings and corrective actions will be documented. *Confirm assessors do not have any conflicts of interest.*
- Identify who will receive the assessment document, who will be responsible for implementing response actions, and who will follow up to ensure completion of any response actions.

Assessment activities may include audits, performance evaluations, management reviews, peer reviews, inspections, surveillances, or readiness reviews (including competency assessment, pre-award assessment of proposal, or technical assessment), peer consultations, product reviews (e.g., data inspection, software testing, pre-dissemination reviews, or review of contractor deliverables).

Also, in this section of the QAPP, describe how and to whom the results of the assessments shall be reported. Along those lines, discuss how response actions to non-conforming conditions shall be addressed and by whom. Include a discussion of stop work orders, where appropriate.

When describing your project team's assessments and corrective actions, consider addressing the following questions if applicable to your project:

- How do you ensure the project is conducted as described in the QAPP?
- Do you conduct internal systems audits? If so, please describe. Who conducts them and on what frequency?

- Do you conduct internal performance audits? If so, please describe. Who conducts them and on what frequency?
- Who is responsible for reporting the need for corrective actions?
- Is there a process in place that would allow any project personnel to initiate a corrective action process, if warranted? If so, please describe. If included in an SOP, provide the specific reference.
- How many business days are allowed between the time the need for a corrective action is reported and the time the corrective action measure is completed?
- How are corrective actions tracked and documented?
- Who will assess the effectiveness of a corrective action measure to determine whether it successfully resolved the issue?
- Is there a process in place to communicate when corrective action measures are disputed and/or unresolved? How would such disputes be elevated? For example, would the issue be communicated to the project team's QA Manager or Director for resolution, or to the EPA Regional Office? Describe the mechanism used by the project team to resolve disputes.
- As a part of QA oversight, does the project team have any emergency/contingency plans that should be implemented when certain situations arise or when assessment(s) show that data quality/quantity is in jeopardy?

Note: *Assessors should be free of any conflicts of interest, such as might occur by close association with the environmental information operations being assessed. Independence from the environmental information operations helps to ensure that the assessor has no stake in the outcome of the assessment, other than an interest that the environmental information operations are conducted objectively and in accordance with the approved QAPP.*

Example C.1 (Assessments and Response Actions)

The QA program includes periodic review of data files and all draft deliverables. The essential steps in the QA program are as follows:

1. Identify and define the problem
2. Assign responsibility for investigating the problem
3. Investigate and determine the cause of the problem
4. Assign and accept responsibility for implementing appropriate corrective actions
5. Establish the effectiveness of and implement the corrective action
6. Verify that the corrective action has eliminated the problem.

The Task Leader (TL) of the Primary Technical Team (PTT) will provide day-to-day oversight of the quality system for their task. The Task Leader will meet regularly with project implementation staff to identify emerging or unanticipated problems and be responsible for stop work orders, corrective actions, and follow-up. Periodic project file reviews will be carried out by the project QA Manager at least once per year to verify that required records, documentation, and technical review information are maintained in the files. The project QA Manager will ensure that problems found during the review are brought to the attention of the applicable Task Leader and are corrected immediately. All nonconforming data will be noted, and corrective measures to bring nonconforming data into conformance will be recorded.

The Task Leaders and project QA Manager are responsible for determining if the quality system established for the project is appropriate and functioning in a manner that ensures the integrity of all work products. All technical staff have roles and will participate in the corrective action process. Corrective actions for errors found during QC checks will be determined by the Task Leader and, if necessary, with direction from the project QA Manager or Project Manager, as appropriate. The originator of the work will make the corrections and will note on the QC form that the errors were corrected. A reviewer or Task Leader, not involved in the creation of the work, will review the corrections to ensure the errors were corrected. Any problems noted during audits will be reviewed and corrected by the project QA Manager and discussed with the Task Leader as needed. Depending on the severity of the deficiency, the Task Leader may consult the project QA Manager and stop work until the cited deficiency is resolved. The project QA Manager will produce an assessment report outlining any issues discovered and the corrective actions taken. The assessment reports will be provided to the Project Manager, as applicable. The project QA Manager and Task Leaders will comply and respond to all internal and EPA audits on the project, as needed. The QC forms, assessment reports, and periodic reports will be maintained in project files.

C.2 Oversight and Reports to Management

Instructions:

This section of the QAPP is geared towards illustrating how the results of assessments are communicated up the management chain, so that all parties supporting the project – including the lead organization's final authority – are aware of data quality issues and concerns. With this in mind, in this section of the QAPP, discuss your project team's approach to this communication process. Identify the frequency and distribution of routine reports issued to inform management of the status of the potential issues identified in the assessments, which includes information regarding the results of performance evaluations, systems audits, data audits, and/or any significant quality assurance problems and recommended solutions. Identify the preparer and the recipient(s) of the reports (the Project Operations Manager, Project QA Manager, and EPA organization sponsoring the work should be included), who will transmit the reports and how they will be transmitted, content of the reports, any specific actions management is expected to take as a result of the reports. (This information may also be presented in a table format.). At minimum, distribution shall include the Project Operations Manager, the Project QAM of the organization conducting the work, and the EPA organization sponsoring the work.

Your project team should complete internal reports to management, and possibly external reports that are provided to other data users. When writing this section of the QAPP, think about any internal or external reports you generate to share data results and concerns. Consider the following questions in the QAPP (if applicable):

- Who has responsibilities to make sure oversight activities, response actions, and reporting mechanisms are in place?
- Do project operators compose a routine report to the appropriate QA Manager that summarizes activities and/or highlights specific reasons for data loss? If so, please discuss.

- Are written reports issued that contain the results of in-house performance audits or systems audits? How are these reports disseminated?
- If during a performance or systems audit issues are found that require corrective action, do you generate a separate Corrective Action Report that is geared towards correcting the specific issue? Or is the need for corrective action contained within the body of the main report and not separated out?

Example C.2 (Oversight and Reports to Management)

After completion of each of the following milestones in the project, the project QA Manager is responsible for preparing a report for the Task Leader summarizing the initial findings by the QC team, response actions by the Primary Technical Team, implications for subsequent tasks, and any recommendations for revising this QAPP. If milestones are completed concurrently, a report may include summary information for multiple tasks.

1. The initial training and certification of the Primary Technical Team and QC team members under Section A.11.
2. Quarterly collection and reporting of the required field data under Section A.5.

Additionally, quarterly progress reports (to the EPA PO) required in the grant agreement will describe the status of the project, accomplishments during the reporting period, activities planned for the next period, and any special problems or events including any QA/QC issues. Reports to the EPA will be drafted by the Task Leader or other project staff familiar with project activities during the reporting period. These periodic progress reports will be reviewed by the Project Manager to ensure the project is meeting milestones and objectives for the Clean Heavy-Duty Vehicles Program and that the resources committed to the project are sufficient to meet project objectives within the project performance period.

QC issues impacting the quality of a deliverable, the project budget, or schedule will be identified and promptly discussed with the assigned Task Leader and the Project Manager or project QA Manager as appropriate. Significant findings will be included in the periodic reports with the methods used to resolve the specific QC issue or the recommendations for resolution for consideration by the EPA PO or designee.

Based on the technical work completed during the reporting period, progress reports will be reviewed internally by an independent, qualified technical person (equivalent or senior to the Task Leader), prior to submitting to the Project Manager. The Project Manager will conduct a final review of the report before transmitting the progress report to the EPA PO.

Reports, such as the milestone QC reports and grant progress reports, are maintained in project files.

Group D: Elements for Environmental Information Review and Usability Determination

The elements in this group address the activities associated with environmental information review for the purpose of determining whether the environmental information meets the established environmental/data quality objectives, the performance/acceptance criteria, and are useable for its intended purpose. Information review activities ensure that products and services resulting from the environmental information operations are of known and documented quality for their intended use(s) and that any limitations concerning its intended use is documented and communicated.

Although environmental information review takes place after the environmental information operations have been conducted, determination of the type of information/data verification, information/data validation, and information/data quality assessment activities needed to determine whether the project's environmental information/data quality objectives are met begins during the planning phase of the project and are documented in the QAPP.

D.1 Environmental Information Review

Instructions:

In this section of the QAPP, describe the methods or procedures to be used when verifying and validating data, as well as documenting the process. The QAPP should describe who is responsible for each level of data review and what each level of data review entails. Verification includes both self-review and peer-review of data and records. Validation, on the other hand, should be independent of the data generation process and involve a more in-depth review, ensuring data meets its intended use. This section should:

- Describe the procedures for the information/data verification and validation activities, as they are conducted prior to and may serve to inform information/data quality assessment activities. All three processes (verification, validation, and quality assessment) should be described along with who is responsible for each step.
- Describe the QA activities that will occur after the EIO phase of the project is completed.
- Describe how performance/acceptance criteria and information/data quality indicators identified in Section A.6 will be incorporated in the environmental information/data review process.
- Describe who will conduct these activities and how the activities will be documented and communicated.

When describing your project team's verification/validation methods, consider the following questions:

- Do you have a Data Validation SOP? If so, cite it. Language for this section can be reduced by referencing the SOP, as appropriate.
- Do you identify and flag data that may have been considered an outlier or exceptional event?
- Who verifies the data? On what frequency does it occur and what does it entail?
- Who validates data? On what frequency does it occur and what does it entail?
- Is there a hierarchy in this data review process that ensures multiple sets of eyes review the data? Describe the hierarchy and explain how it provides adequate independence during data validation.

- If your project team does not have a multi-leveled (tiered) data review process because of limited staffing, how will your team maintain adequate independence when validating data? Describe the review structure and explain how independence will be achieved.
- How is the data verification/validation process documented? For example, do site operators complete a monthly report where they have verified, flagged, and/or coded the data sets for which they are responsible, and then submitted those reports to a QA Manager (or equivalent) for additional review and validation? Or does the QA Manager complete a report each month that describes the overall validation of the data set? Describe your process.

Example D.1 (Environmental Information Review)

As a standard operating procedure, each Task Leader is responsible for ensuring all data (retrieved or generated) for this project will be submitted to the project QA Manager for verification, validation, and data quality assessments (as differentiated below with the definitions of these terms).

Work conducted under this project by the Primary Technical Team will be subject to technical and editorial review by independent QC staff. The quality of data used and generated for the project will be formally verified and documented by the QC team when the Primary Technical Team submits each draft deliverable to the project QA Manager. This formal QC verification of EIOs will be conducted by a senior technical reviewer (on the QC team). The QC team is responsible for verifying both the original draft and any modified files prepared by the Primary Technical Team in response to QC team findings. Both original and modified data files will be verified for input, handling, and calculation errors. Additionally, units of measure will be checked for consistency. Potential issues identified through this review process will be evaluated and, if necessary, data will be corrected, and analysis will be revised as necessary, using corrected data. These verification activities will be documented in project records.

Typical data verification reviews may include checks of the following:

- Data sources are clearly documented and will be evaluated to confirm that the data meet quality objectives,
- Calculations are appropriately documented (e.g., factors used to convert the data to the required units will be checked against primary references and will be documented),
- All relevant assumptions are clearly documented,
- Conclusions are relevant and supported by results,
- Text is well-written and easy to understand,

At least 50 percent of the data entered into data tables will be checked and no less than 25 percent of calculations will be checked by a knowledgeable member who did not perform the calculations. The documented review process will be stored with deliverables for the project.

QC objectives include verification that data in tables are stored and transferred correctly, units are internally consistent, and reports pull the required data. These data management measures will be addressed as part of the QC checks of data acquisition and document preparation.

Forms for documenting QC activities and review of deliverables are included in Attachment [A]. Documentation of calculations to support verification will be included in spreadsheet work products and in supporting memoranda, as appropriate.

After completion of verification of the primary calculations by the QC team, the QC team will validate the emissions estimates for conformance with Section A.6 acceptance criteria using independent calculations as directed by the project QA Manager.

For this project, it is not anticipated that any special data validation software will be required. However, where calculations are required to assess the data/datasets, calculations will be performed using computer spreadsheets (like Excel spreadsheets with predefined functions, or formulas) and calculators to reduce typographical or translation errors. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work as described in Section A.5.

The project QA Manager will prepare a formal report of the findings for each cycle of primary work followed by formal independent review. The Task Leaders will review each report with the Project Manager, project QA Manager, and the EPA Project Officer and EPA QA Manager (as directed) to ensure the Primary Technical Team understands the project QA Manager's findings and to ensure the planned corrective actions are fundamentally sound and will meet the project objectives. All documentation developed by the Task Leader to resolve Report findings will be maintained in project files and made available to the project QA manager for final resolution of findings.

Any quality deficiencies detected by reviewer parties will be documented and communicated in writing to the EPA Project Officer and EPA QA Manager. The Task Leaders will be responsible for ensuring that appropriate corrective action is taken and that these actions are reported for final review and concurrence. These corrective actions will also be documented in the final report.

D.2 Usability Determination

Instructions:

Determining usability of the environmental information is the culmination of the entire QA process for the project and involves a retrospective evaluation of the planning process. Not all environmental information may be useable for its intended purpose. The usability of the environmental information is performed at the conclusion of the environmental information operations using the outputs of the environmental information/data verification, validation, and quality assessment activities. This reconciliation phase involves a qualitative and quantitative evaluation of environmental information to determine if the project information is of the right type, quality, and quantity to support its intended use and are suitable for the decisions that will be made.

This section should:

- Describe the overall project evaluation process that will be routinely performed to determine the usability of the data. *For example, the process will include evaluation of observations, trends, anomalies, or data gaps that may exist; assessment of the results to determine if the project information is of the right type, quality, and quantity to support its intended use and are suitable for the decisions that will be made; and evaluation to determine if the objectives of the project have been met. Draw conclusions and recommendations from all the information.*
- Identify who will conduct the determination and where documentation of the determination will be kept.
- Describe communication methods of any known or anticipated limitations on the use of the environmental information, to whom that information will be communicated, and how and where the communication will be documented.

Example D.2 (Usability Determination)

The Task Leaders will document all data sources used and any significant limitations of utilized data or information to ensure that the data are appropriate for their intended use. An internal technical reviewer will review the approach for selecting and compiling data, including examination of the data sources and the intended use of the data. The specific QC techniques used will depend on the technical activity or analysis to which they are applied. The Task Leader is responsible for verifying the usability of data and related information. Not all environmental information will ultimately be useable. All documentation developed by the Task Leader for the usability determinations will be maintained in project files.

The Task Leader will work with the project QA Manager and Project Manager to ensure that all data used for the project are appropriate for their intended use. The main criteria that will be used in the selection of the data are the quality of the data (based on peer review, credible source, and/or QA documentation), availability, and suitability for the intended purpose.

These measures of data quality will be used to judge if the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the Task Leader will document a discussion for review and approval by the Project Manager and project QA Manager explaining how outcomes that relied on such data compare to estimates. We will also consider, for

example, the age (i.e., date of the source dataset) and the representativeness of the data and will include in the outcomes report for review and approval by the Project Manager and project QA Manager any quality concerns or uncertainties introduced with use of these data, such as data gaps or inconsistencies with other sources. Any data source utilized that is older than 10 years will specifically be flagged in the outcomes report.

Representativeness will be evaluated by determining that the emissions or activity data are descriptive of conditions in the United States, that the data are current, and that the data are descriptive of similar processes within the domain. Any incomplete datasets will be identified, and deficiencies will be evaluated to determine if data are missing or confusing and if they meet quality objectives.

Key screening criteria will be used to screen the sources identified. The Task Leader will provide oversight to the screening process to ensure sources collected are the most relevant and meet quality requirements. Available data and information from the selected sources will be compiled and relevant summary information will be extracted from the information sources to develop the required output for each of the project tasks. As noted above, documentation developed by the Task Leader for the usability determinations will be maintained in project files.

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5. Additional Resources

EPA, *Chief Information Officer's Policy Directive on Information Technology / Information Management: Quality Assurance Project Plan (QAPP) Standard*, Directive # CIO 2105-S-02.1, April 2024. Available at https://www.epa.gov/quality/quality-program-directives.

EPA Regional-specific Quality Programs, available at: https://www.epa.gov/quality/regional-offices.

EPA, *Guidance on Systematic Planning Using the DQO Process,* Guidance QA/G-4, Directive # EPA/240/B-06/001, February 2006. Available at https://www.epa.gov/quality/quality-program-directives.

EPA, *Quality Assurance Requirements for Monitors used in Evaluations of National Ambient Air Quality Standards*, 40 CFR Part 58, Appendix A to Part 58. Available at https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-58/appendix-Appendix%20A%20to%20Part%2058