QUALITY ASSURANCE PROJECT PLAN

Dry and Wet Weather Agricultural BMP Efficiency and TMDL Compliance Monitoring

Rhode Island Department of Environmental Management

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Attachments

List of Tables

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2.0 Document Format

A copy of the completed EPA Worksheet No. 2 is provided in Attachment A. The worksheets and/or required information that are not applicable or are in a format other than an EPA worksheet are summarized in Table 1 with a brief explanation.

Table 1 Required QAPP elements checklist.

EPA Worksheet	Section	Location	Comments
1	1.0	Cover Page	
2	2.0	Attachment A	
3	3.0	Section 3.0	Table 2
4	3.0	Section 3.0	Narrative
5a	4.0	Section 4.1	Narrative
5b	4.0	Section 4.2	Narrative
6	4.0	Section 4.3	Narrative
7	4.0	Section 4.2	Narrative
8a	5.0	Attachment A	
8b	5.0	Section 5.2	Narrative
9a	6.0	Section 5.0	Narrative
9b	6.0	Attachment A	
9c	6.0	Attachment A	
9d	6.0	Attachment A	
10	6.0	Section 6.2	Table 3
11a	7.0	Sections 7.1 & 7.2	Narrative
11b	7.0	Attachment A	
12a	8.0	Section 8.1	Narrative and Table 4 and 5
12b	8.0	Attachment A	
13	9.0	Section 9.1	Table 6
14	9.0	Section 9.3	Table 7
15	9.0	Section 9.3	Table 8
16	10.0	Section 10.2	Table 9
17	11.0	Not Attached	No field analysis
18	11.0	Not Attached	No field analysis
19	11.0	Not Attached	No field analysis
20	12.0	Section 12.1	Table 10
21	12.0	Not Attached	See lab SOPs Table 10
22a	13.0	Attachment A	
22b	13.0	Not Attached	Refer to EPA Worksheet 22a
23a	13.0	Not Attached	No field analysis
23b	13.0	Not Attached	No field analysis
24a	13.0	Attachment A	
24b	13.0	Section 13	Narrative
25	14.0	Section 14.0	Table 11
26	15.0	Section 15.0	Table 12
27a	16.0	Section 16.0	Narrative
27b	16.0	Section 16.0	Table 13
27c	16.0	NA	Project Assessment Plan
28	17.0	Section 17.0	Table 14
29a	19.0	Section 19.0	Table 15
29b	19.0	Attachment A	EPA Worksheets 11b, 22a, and 24a
29c	19.0	NA	Data validation Modifications
30	20.0	Attachment A	EPA Worksheets 11b, 22a, and 24a

3.0 Distribution List and Project Personnel Sign-Off Sheet

The distribution list documents to whom copies of the approved QAPP and any subsequent revisions will be sent. The distribution list is provided in Table 2.

Table 2 Distribution List

QAPP Recipient	Title	Organization	Telephone Number
Steve DiMattei	Quality Assurance Chemist	USEPA, NE Region I	(617) 918-8369
Ken Ayars	Chief	RIDEM, Division of Agriculture	(401) 222-2781 x 4500
Eugene Pepper	Principal Environmental Planner	RIDEM, Division of Agriculture	(401) 222-2781 x 4512
Wayne Jenkins	Principal Sanitary Engineer	RIDEM, Office of Water Resources	(401) 222-4700 x 7272
Elisabeth Peterman	Senior Environmental Planner	RIDEM, Division of Agriculture	(401) 222-2781 x 7261
Claude Masse	RIDEM QA Officer	RIDEM, Office of Water Resources	(401) 222-4700 x 7244
Linda Green	Program Director	URI Watershed Watch Program	(401) 874-2905

4.0 Project Organization

The project organization chart is provided below. This chart identifies reporting relationships between the Lead Organization and other organizations, including contractors and sub-contractors and their contact information.

4.1 Project Organizational Chart

Figure 1 Organizational Chart

4.2 Communication Pathways

It is anticipated that RIDEM personnel will conduct all sampling activities for this project. The Project Manager will contact all potential sampling personnel via email when the survey season begins. The Project Manager will be responsible for contacting URI Watershed Watch Program to order all necessary sampling containers and to alert the laboratory to incoming samples. The Project Manager and the QA Officer will coordinate to determine when sampling climatic criteria (i.e. dry weather surveys conducted when an antecedent dry period of 3 days with rainfall <0.03 inches and wet weather surveys conducted when a 24-hour period with rainfall >0.5 inches) have been or are likely to be achieved.

It is possible that changes to the sampling plan may occur during the course of sampling due to safety considerations after dark or during storm flows. Decisions to alter the sampling plan will be made jointly by the Project Manager and QA Officer and all changes made in the field will be documented in the field notes. All changes to the QAPP will be reported in each Status Report and the Final Report.

4.3 Personnel Responsibilities and Qualifications

RIDEM personnel with surface water quality sampling experience will conduct all sampling. Resumes of RIDEM personnel are on file at the RIDEM office in Providence, Rhode Island. Linda Green, Director of the URI Watershed Watch Program, will be responsible for the laboratory analysis of the surface water samples for total phosphorus. Her resume is on file at the URI Watershed Watch laboratory in Kingston, Rhode Island.

5.0 Project Planning/Problem Definition

TMDLs are required under Section 303 (d) of the Clean Water Act and USEPA's Water Quality Planning and Management Regulations (40 CFR Part 130). The goal of the TMDL study was to quantify the existing phosphorus loadings from sources into Stafford Pond. The pond has experienced frequent algal blooms, leading to taste and odor problems, high phosphorus concentrations and low dissolved oxygen levels. Total phosphorus was chosen as the pollutant of concern for which the TMDL was developed, due to the fact that reducing phosphorus is the most effective way to control algal abundance, which would lead to improved dissolved oxygen levels (RIDEM, 1998). At the completion of the study, the necessary load reductions needed to achieve water quality standards were established.

In an effort to follow up on the load allocation for the Arruda Dairy Farm, RIDEM's Division of Agriculture and Office of Water Resources staff are working together to measure the efficiency of the best management practices (BMPs) that were implemented on the farm and to estimate annual phosphorus loads to the pond to judge compliance with the TMDL limits

5.1 Project Planning Meetings

Project scoping meetings were held to define the purpose and expected results of the project, the environmental decisions that need to be made, the sampling, analytical, and data assessment activities that will be performed, and the format, content, and timetable for the project. Each of the project scoping meetings are documented in EPA Worksheet No. 8a in Attachment A.

5.2 Problem Definition/Site History and Background

Stafford Pond is located in the northeast corner of Tiverton, Rhode Island and lies within the Narragansett Bay Drainage Basin (refer to Figure 2). The pond is approximately 487 acres in size with a watershed of approximately 947 acres. The watershed:lake ratio is small (less than 2:1), indicating a high potential for successful management.

Stafford Pond is designated as a source of public drinking water supply, and the Stone

Bridge Fire District (SBFD) of Tiverton maintains a water treatment facility on the southwest shore of the pond. The SBFD supplies drinking water to the Town of Portsmouth, the Stone Bridge section of Tiverton, the Tiverton Water Authority, and the North Tiverton Water Authority. The pond supports a viable trout fishery and a self-sustaining warmwater fishery, including one of the State's few remaining populations of smallmouth bass. A public boat launch is located on the eastern shoreline.

In 1995, RIDEM contracted with an environmental consulting firm, Fugro, which later became ENSR, to conduct an in-depth limnological study of the pond. The goals of the study were to assess the water quality of the pond and its tributaries, identify pollution sources, and develop cost-effective solutions for controlling pollution problems. The study was completed in 1996 and the final report was submitted to RIDEM in the summer of 1997 (ENSR, 1997). The results clearly indicate that algal blooms are a result of high phosphorus loadings coming principally from the Arruda Dairy Farm. Additional sources include residential land uses and storm drains. Stafford Pond was placed on the State of Rhode Island 1998 303(d) List of Impaired Waters for hypoxia, nutrients, and excess algal growth.

The Arruda Dairy Farm has approximately 45 heifers. The feed bunks and watering devices are located on a concrete pad, which drains toward the stream leading to Stafford Pond. The cows spend a high percentage of time near food and water, thus, a high percentage of manure is deposited in this area. The manure in the barnyard area is constantly exposed to rainfall events, resulting in polluted runoff entering the stream untreated.

The water quality improvement project was designed to filter out suspended solids using vegetated treatment cells consisting of two concrete settling basins and an enhanced vegetative filter area. Additionally, fencing was erected to exclude livestock from the filter areas and both sides of the stream and storm water structural measures (grassed waterway and diversion) were installed to redirect field runoff from passing through the barnyard.

The vegetative filter area is projected to provide up to 65 percent nutrient utilization during the growing season, in addition to the settling of suspended solids. The water quality certificate issued by RIDEM states that continued water quality monitoring will take place, and additional measures may be needed to treat the runoff if these planned practices do not meet the water quality criteria for the designated use of the pond.

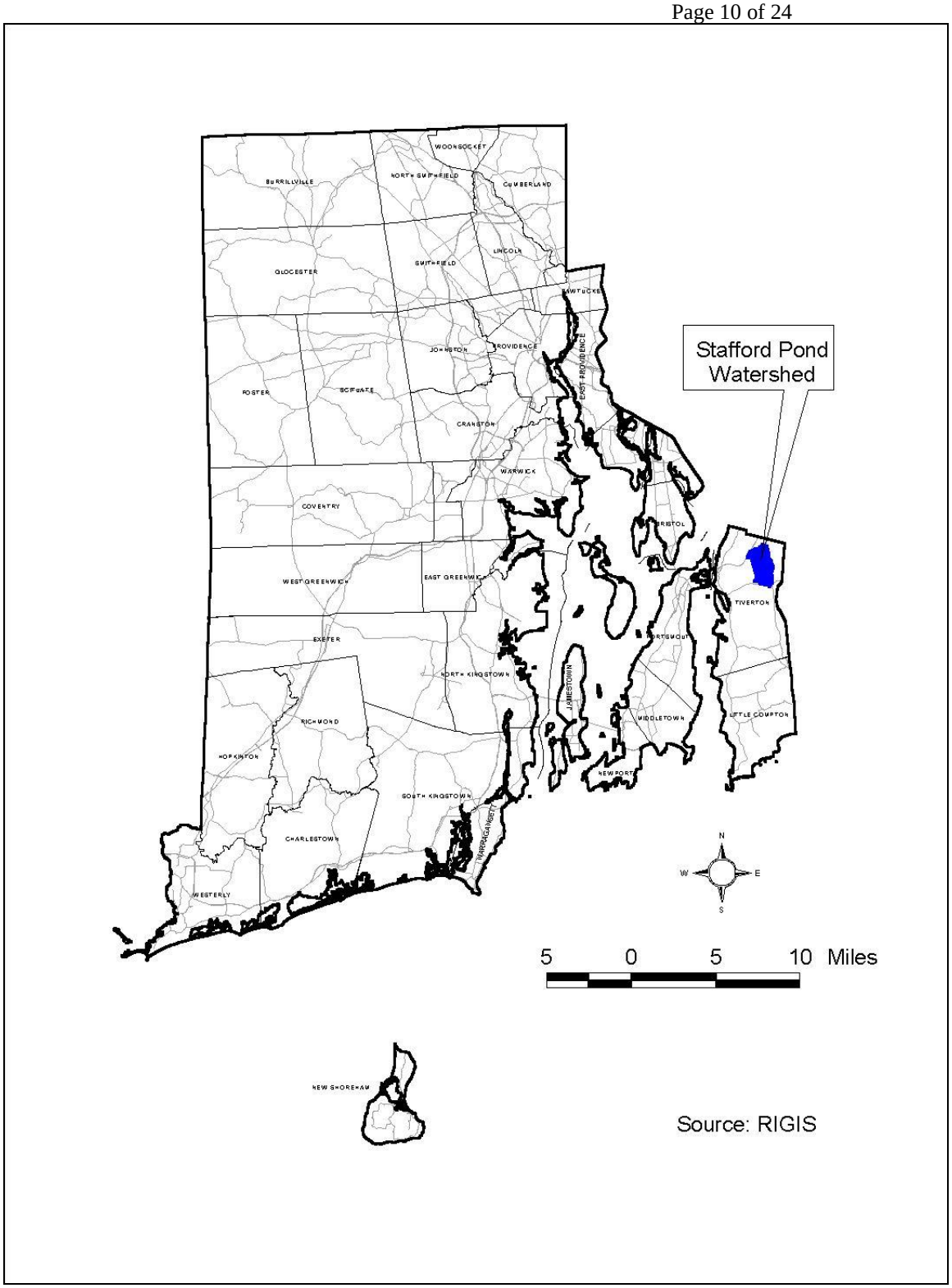

Figure 2 Stafford Pond Watershed

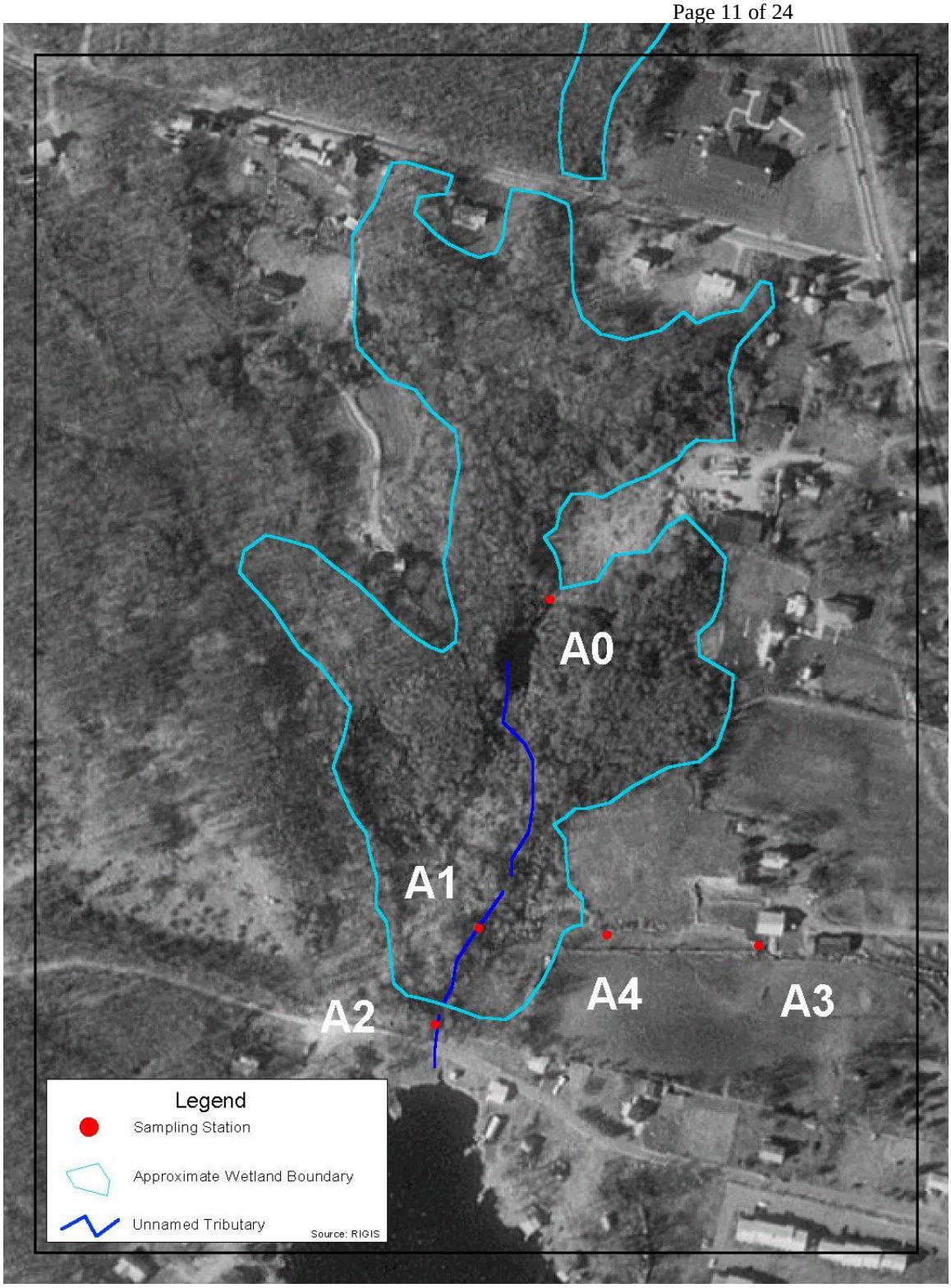

Figure 3 Sampling station locations for the Arruda Dairy Farm.

6.0 Project Description and Schedule

A TMDL report is required by the Clean Water Act for all waterbodies that exceed water quality criteria. Stafford Pond exceeds RIDEM water quality criteria for excess algal growth, hypoxia, and nutrients. The TMDL quantified the loads that the pond can receive during dry and wet weather events and still meet water quality standards.

The requirements of the TMDL help determine the scope of the Stafford Pond monitoring project. RIDEM will quantify the effectiveness of the implemented BMPs and estimate annual loads to the pond to judge compliance with TMDL limits. RIDEM anticipates beginning the sampling portion of the study during the fall of 2001.

6.1 Project Overview

RIDEM anticipates a two-year project that will include dry and wet weather water quality sampling. Dry weather sampling will be conducted by the Division of Agriculture every other month. Wet weather sampling events will be conducted twice a year, once in the spring and once in the late summer/fall by the Division of Agriculture and the Office of Water Resources.

6.2 Project Schedule

Table 3 Proposed project schedule.

Task	Deliverable	2001					2002												2003									
		A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O
QAPP Preparation	QAPP Document																											
Sample Collection	NA																											
Laboratory Analysis	Laboratory Report																											
Final Data Report	Final Data Report																											

7.0 Project Quality Objectives and Measurement Performance Criteria

7.1 Project Quality Objectives

The data generated from this project will be used by RIDEM to measure the efficiency of the BMPs on the farm and to estimate annual phosphorus loads to the pond to judge compliance with the TMDL limits. All the data quality objectives will be met if the data collected is sufficient to complete the project.

7.2 Measurement Performance Criteria

Collecting high quality data is one of the most important goals of this project. Specific data quality objectives include precision, accuracy, representativeness, comparability, and completeness. Measurement performance criteria are briefly presented below and are also found on EPA Worksheet No. 11b in Attachment A.

Precision
Precision is the degree of agreement among repeated measurements of the same characteristic under the same or similar conditions. The QC sample used to measure overall precision will consist of field duplicates. Duplicate precision is evaluated by calculating the Relative Percent Difference (RPD) and will considered precise if the RPD is less than 20 percent. The QC sample used to measure laboratory precision will consist of laboratory duplicates. Laboratory analysis will be considered precise if the RPD is less than 20 percent.

Accuracy/Bias
Accuracy is the extent of agreement between an observed value (sample result) and the true value of the parameter being measured. Bias describes the systematic or persistent error associated with a measurement process. These terms are used interchangeably in this document. Accuracy in the laboratory will be measured using a laboratory control standard and will be considered accurate if the recovery is within 15% covariance (cv). Accuracy in the field will be measured using field duplicates and will considered accurate if the recovery is within 20% relative percent difference (RPD).

Representiveness
The selected stations and sampling frequency were chosen for their representativeness of conditions in the Arruda Farm subwatershed. The extent to which the measurements represent actual environmental conditions will be somewhat restricted by the time of year the samples are collected and the overall weather conditions of that year (i.e. dry versus wet year).

Comparability
To maximize the quality of the data collected, and to collect data that is comparable with other studies, accepted sampling procedures will be used during this study. All samples collected will be sent to laboratories that use standard methods.

Completeness
If the data collected is sufficient to complete the monitoring report, then the data is considered to be complete. Measurement performance criteria help determine the completeness of a data set.

Measurement performance criteria is summarized in EPA Worksheets No. 11b, provided in Attachment A.

8.0 Sampling Process Design

This section describes the sampling system in terms of what media/matrices will be sampled, where the samples will be taken, the number of samples to be taken and the sampling frequency.

8.1 Sampling Design Rationale

The media to be sampled will consist of surface water from an unnamed tributary of Stafford Pond that flows through the Arruda Dairy Farm. The objectives of the field portion of the project are to:

1. Collect representative surface water samples during dry weather and wet weather event for the analysis of total phosphorus;
2. To measure the effectiveness of the implemented BMPs; and
3. To measure compliance with the TMDL load allocation.

The field portion of this study is anticipated to last two years. Dry weather surveys will be conducted every other month for the duration of the project and two wet weather surveys will be conducted each year. The wet weather surveys are expected to occur in the spring and late summer/early fall. Approximately 60 dry weather and 24 wet weather samples will be collected over the course of the study that will be analyzed for total phosphorus. A brief description of sampling activities is presented below. A more detailed sampling standard operating procedure (SOP) is presented in Attachment B and is entitled, *Field Sampling SOP (FSOP 1) Total Phosphorus Sampling*. Sample station locations, purpose/justification of locations, and parameters, are listed in Table 4.

Table 4 Arruda Dairy Farm sampling station information.

Station ID	Description	Survey Type	Purpose
A0	Instream: upstream of dairy farm	Dry and Wet Weather	To monitor water quality conditions upstream of dairy farm
A1	In-Stream: newly installed culvert under access road	Dry and Wet Weather	To monitor water quality conditions at the newly installed culvert
A2	In-stream: upstream side of Pelletier Lane	Dry and Wet Weather	Replicate ENSR sampling station SP5b
A3	Stormwater inflow to initial vegetated treatment cell	Wet Weather	To monitor raw stormwater as it enters series of vegetated treatment cells
A4	Stormwater outflow of final vegetated treatment cell	Wet Weather	To monitor treatment cell phosphorus removal rates

A summary of the number of field and QC samples that will be collected is provided in EPA Worksheet No. 9c in Attachment A.

To determine antecedent dry periods and wet weather sampling criteria, RIDEM will use data collected at the Tiverton Middle School and is maintained by the WJAR-10 website (http://www.instaweather.com/wjar/default.asp?cid=90&id=TVRTN) and is further described in Section 14.0, Data Acquisition Requirements.

URI Watershed Watch will provide all sample containers. The sample parameters and characteristics are summarized in Table 5. URI Watershed Watch, following the SOPs presented in Attachment C, will conduct all laboratory analytical tasks.

Table 5 Sample parameters and characteristics.

Parameter	Matrix	Sample Volume (container)	Preservation	Maximum Holding Time	Method
Total Phosphorus	Surface Water	250 ml brown glass bottle	Stored on ice (4°C)	48 hours prior to filtration	EPA Method 365.1/SOP 1

9.0 Sampling Procedures and Requirements

9.1 Sampling Procedures

Standard operating procedures for field sampling are located in Attachment B.

Table 6 Project sampling SOP References.

Reference Number/Title	Originating Organization	Equipment Identification	Modified for Work Project
Field Sampling SOP 1 (FSOP 1) Total Phosphorus Sampling	RIDEM	Sample bottles	No

9.2 Equipment Cleaning

Samples will be collected using the pre-cleaned bottles provided by the analytical laboratory, and as such, sampling equipment cleaning is not anticipated.

9.3 Field Equipment Calibration and Maintenance

No field analysis is anticipated for the project.

10.0 Sample Handling, Tracking, and Custody Requirements

10.1 Sample Collection Documentation

This section describes field documentation procedures that will be followed for the project.

10.1.1 Field Notes

Sample teams will utilize either field notebooks or field log sheets to record relevant information prior to and during sampling events to include the following minimum information: Time of arrival at site, time storm began (wet weather sampling only), related site sketches, and general observations/comments. A copy of a blank field sheet is presented in Attachment E. Field notebooks will contain the same information as the field log sheets.

10.2 Sample Handling and Tracking System

Immediately prior to collecting each sample, the sample label will be filled out

completely using a permanent marker. All samples will be placed in a cooler with ice immediately after the sample is collected.

Samples will be delivered to the laboratory the same day they are collected. All samples will be transported to the laboratory under proper chain-of-custody protocol. A copy of a blank URI Watershed Watch chain-of-custody is presented in Appendix C.

The flow of samples from the time of collection, to laboratory delivery, to final sample disposal is summarized in Table 9.

Table 7 Sample handling system

Action	Responsible Party
Sample Collection	RIDEM
Sample Delivery	RIDEM
Sample Analysis	URI Watershed Watch
Sample Archival	Not Applicable
Sample Disposal	URI Watershed Watch

11.0 Field Analytical Method Requirements

During sampling, no field analysis will occur.

12.0 Fixed Laboratory Analytical Method Requirements

12.1 Fixed Laboratory Analytical

All samples will be taken to URI Watershed Watch, of Kingston, Rhode Island. Table 10 summarizes the laboratory SOPs presented in Attachment C.

Table 8 URI Watershed Watch Laboratory SOPs

Reference Number	Title	Definitive or Screening Data	Analytical Parameter	Instrument	Modified for Project
SOP 1	Total Phosphorus and Total Nitrogen	Definitive	Total Phosphorus	Alpkem Model 300 Autoanalyzer	No

13.0 Quality Control Requirements

Quality control (QC) is the system of technical activities that measures the performance of a process. Field sampling and laboratory QC protocols are presented in this section.

13.1 Field Quality Control Samples

The types and quantities of field QC samples are summarized in EPA Worksheet No. 22a

provided in Attachment A.

13.2 Fixed Laboratory Analytical Quality Control Samples

The types and quantities of fixed laboratory QC samples are summarized in EPA Worksheet No. 24a provided in Attachment A.

14.0 Data Acquisition Requirements

To determine antecedent dry periods (ADPs) and wet weather sampling criteria, RIDEM will use rainfall data collected by the Tiverton Middle School and maintained by the WJAR-10 website. Table 11 summarizes non-direct measurements used in the development of the Indian Run Brook study.

Table 9 Non-direct measurements criteria and limitations.

Non-direct Measurement	Data Source	Data Generator	How Data Will Be Used	Limitations on Data Use
Rainfall	Tiverton Middle School	WJAR-10 Website (http://www.instaweather.com/wjar/default.asp?cid=90&id=TVRTN)	Quantify amount of rainfall in watershed	None

15.0 Documentation, Records, and Data Management

All samplers will be given either a field notebook or log sheets. The QAPP/monitoring plan will be given to each sampler and includes specific information on what needs to be recorded on these sheets. Initials on these sheets will identify the sampler. The Project Manager will review the sheets within three days to identify any possible errors or omissions. The Project manager will try to contact all samplers to identify any problems or additional feedback that would make any future sampling easier.

The sampler will be responsible for filling out the chain-of-custody sheets. The samples and chain of custody forms will also be checked at the laboratory during sample check in. A copy of the chain of custody form will be retained by RIDEM when the samples are dropped off at the laboratory. After analysis is complete, the analytical results will be forwarded to RIDEM.

After each sampling event, a brief Status Report will be written to document any changes to the Monitoring Plan. All information collected throughout the project will be

summarized in the Final Data Report. Information included in the Final Data Report is described in Section 17.0. Table 12 summarizes the records that will be generated and maintained throughout this project.

Table 10 Project documentation and records.

Sample Collection Records	Fixed Laboratory Records	Data Assessment Records
Field Notes/Log Sheets	Chain of Custody Records	Status Reports
Chain of Custody Records	Tabulated Data Summary Forms: draft and final	Final Data Report

16.0 Assessments and Response Actions

The Project Manager or designee will be responsible for each of the project tasks and their associated quality assurance and quality control procedures. The Project Manager will provide consistency between sampling events and sampling teams. Continual reports to the QA Officer concerning the status of sampling, quality assurance, and quality control will highlight any problems that are encountered during sampling. If needed, the QA Officer and Project Manager will halt sampling until problems are remedied.

Table 11 Project assessment table.

Assessment Type	Frequency	Internal or External	Person Responsible for Performing Assessment and Implementing Corrective Actions	Person Responsible for Monitoring the Effectiveness of the Corrective Action
Field Sampling Technical Systems Audit	Start of Sampling	I	Eugene Pepper RIDEM	Wayne Jenkins RIDEM
URI Watershed Watch Technical Systems Audit	Prior to Sample Receipt	E	Linda Green	Claude Masse RIDEM

17.0 QA Management Reports

Table 12 lists the QA Management Reports that will be generated throughout this study.

As needed during this project, the Project Manager and the QA Officer will meet to discuss any issues related to sampling. These meetings will be verbal status reports. Problems encountered in the field will be discussed and any appropriate actions

determined and implemented. Any changes and/or problems will be included in the final report.

After each sampling event, the Project Manager will generate a Status Report. This Status Report will be the written record of any changes to the QA Plan. If a station was not sampled, it will be documented here. Issues discussed during the Verbal Status Report can also be included.

At the completion of all surveys, the Project Manager will write a final report summarizing the sampling events. Information in this final report will include the following information:

- Brief description of each sampling event;
- Data tables of all data collected during the sampling event (including rainfall); and
- Attachments
  - Status Reports
  - Sampling Logs
  - Chain of Custody forms
  - Laboratory data sheets provided by the labs

Table 12 QA management reports.

Type of Report	Frequency	Person(s) Responsible for Report Preparation	Report Recipient
Verbal Status Report	As needed	Eugene Pepper RIDEM	Wayne Jenkins RIDEM
Written Status Report	After each survey	Claude Masse RIDEM	Wayne Jenkins RIDEM
Final Report	Completion of sampling	Claude Masse RIDEM	Wayne Jenkins RIDEM

18.0 Verification and Validation Requirements

Both the Project Manager and the QA Officer will review all data collected during this study to determine if the data meets QAPP Objectives. Decisions to qualify or reject data will be made by the Project Manager and QA Officer. All data collected will be included in the Final Report. To ensure correct interpretation of the data, all problems encountered in the field will be included in an Appendix to the report and discussed in the general text

of the report. Problems will also be documented in each survey's written Status Report. To assist in data interpretation, statistical information on sampling events, including sampling size, sample mean, and sample variance, will be reported, where applicable. A discussion on duplicate precision and accuracy criteria and results will also be discussed in the Final Report.

19.0 Verification and Validation Procedures

All data collected during the study will be included in the appendix of the report. Once the data has been collected, it will be entered into Microsoft Excel files. The Project Manager will proofread the data entry for errors and any discrepancies will be corrected. Outliers and inconsistencies will be flagged for further review with the QA Officer. The decision to discard data will be made by the Project manager and QA Officer. Problems will be discussed in the Final Report. Table 15 discusses the data verification process.

Table 13 Data verification process.

Verification Task	Description	I/E	Responsible for Verification
Field Notes	Field notes will be collected at the end of each day and reviewed. Any required corrective actions will be addressed with the field samplers prior to further sampling. After the field notes will be entered into Excel, the data will be proofread for any data entry errors. Copies of the field notes will be maintained in the project file.	I	Eugene Pepper/RIDEM
Chain of Custody Forms	Chain of custody forms will be reviewed when samples are collected for delivery to the laboratory in the field and at the laboratory. The forms will be maintained in the project file.	I/E	Eugene Pepper /RIDEM Linda Green/ URI Watershed Watch
Laboratory Data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness prior to submittal. The data packages will be also reviewed by the sampling organization.	I/E	Claude Masse /RIDEM Linda Green/ URI Watershed Watch

I=Internal, E=External

Data validation will utilize the measurement performance criteria documented in EPA Worksheets 11b, 22a, and 24a of this report.

20.0 Data Usability/Reconciliation with Project Quality Objectives

As soon as possible after each sampling event, calculations and determinations for precision, completeness, and accuracy will be made and corrective action implemented if

needed. If data quality indicators meet those measurement performance criteria documented throughout this QA Plan, the project will be considered a success. If there are data that do not meet the measurement performance criteria established in this QA Plan, the data may be discarded and sampled again or the data may be used with stipulations written about its accuracy in the Final Report. The cause of the error will be evaluated. If the cause is equipment failure, calibration/maintenance techniques will be reassessed and improved. If the problem is sampling team error, retraining will occur. Any limitations with the data will be documented in the Status Reports and the Final Report.

References

ENSR (1997). *Limnological Investigation of Stafford Pond*

RIDEM. Office of Water Resources. August 6, 1997. *Water Quality Regulations*.

RIDEM. Office of Water Resources. December 1998. *Total Maximum Daily Load for Total Phosphorus Loads to Stafford Pond*.

United States Geologic Survey, Fall River Quadrangle Massachusetts-Rhode Island, 7.5 minute Series (topographic), photo revised 1979.

Attachment A – EPA Worksheets

Attachment B – Field Sampling SOPs

Attachment C – Laboratory Analytical SOPs

Attachment D – Blank Field Data Sheet