Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade Street, Providence RI 02908

TITLE AND APPROVAL PAGE

Standard Operating Procedure for the Collection of Ambient Water Samples From Streams

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DISTRIBUTION

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(x) Quality Assurance Manager, RIDEM (Richard Enander) By:_____Date :_____

Standard Operating Procedure for the Collection of Ambient Water Samples From Streams

1.0 APPLICABILITY

1.1 IDENTIFYING THE PROGRAMS AFFECTED BY THIS SOP

This Standard Operating Procedure (SOP) provides basic instructions for the field sampling collection of ambient water from streams. Exemption from the use of this SOP for project work shall be allowed for reasons of inapplicability determined by management discretion.

2.0 PURPOSE

2.1 OBJECTIVE OF THIS SOP

This SOP establishes a standardized method for collection of ambient water for water quality analysis. It sets a consistent protocol to ensure the quality of RIDEM's data collection—resulting in improved uniformity, reproducibility, verifiability, and defensibility of the data, as well as increased program credibility. This SOP advances our ability to attain the highest levels of Quality Assurance, Quality Control and Quality Improvement (QA/QC/QI).

3.0 DEFINITIONS

3.1 RIDEM – Rhode Island Department of Environmental Management
3.2 OWR – RIDEM Office of Water Resources
3.3 SOP – Standard Operating Procedure
3.4 Quality Assurance (QA) refers to a systematic process to ensure RIDEM OWR produces valuable, accurate, reliable, reproducible and defensible environmental data.
3.5 Quality Control (QC) refers to the activities performed to affirm RIDEM OWR produces valuable, accurate, reliable, reproducible and defensible environmental data.
3.6 Quality Improvement (QI) refers to any act or process performed to enhance the value, accuracy, reliability, reproducibility or defensibility of environmental data collected by RIDEM OWR.

4.0 RESPONSIBILITIES

4.1 TRAINING

Anyone collecting ambient water for water quality analyses for a RIDEM/OWR project or program should have completed RIDEM's Quality System Awareness Training Program with appropriate documentation from the Quality Assurance Manager. This training ensures the analyst recognizes the importance of proper data collection and management and he/she comprehends the significance of the environmental decisions that may be made with the data. It is suggested that analysts have also completed the USEPA Water Quality Standards Academy Basic Course and Supplemental Topic Modules online, but this type of sampling does not require any additional special training or certification.

To properly collect ambient water for water quality analyses, the analyst must be familiar with and comply with the techniques stated in this SOP. Any technician not familiar with collecting ambient water for water quality analysis should be assisted by OWR staff who are accustomed to collecting these samples. The Ambient River Monitoring (ARM) program has a training program called the “Training Passport”, which incorporates all of the above training with additional modules.

4.2 RESPONSIBILITIES OF THE ANALYST

The analyst is responsible for verifying that field equipment is in proper operating condition prior to use. The analyst is responsible for bringing the proper equipment to the site where samples are going to be taken. The analyst is accountable for employing proper sampling procedures and data recording (Section 6.0 and 7.0). The analyst must comply with QA/QC requirements (Section 5.0) and verify that the data collected is within acceptance criteria when applicable.

4.3 RESPONSIBILITIES OF THE PROJECT MANAGER

The project manager is responsible for providing the materials, resources, and/or guidance necessary to perform sampling in accordance with this SOP. The project manager is responsible for ensuring that the analyst or technician conducts sampling in accordance with this SOP, and that any additional, project-specific requirements are communicated to the project team. The project manager is responsible for ensuring that necessary equipment is repaired when necessary or if found deficient by the analyst(s) and ensuring that necessary supplies are provided in a timely fashion. Further, the project manager shall ensure annual renewal and periodic revisions to this SOP to reflect current needs and standards and will renew this SOP every five years.

5.0 QUALITY CONTROL

5.1 QUALITY ASSURANCE PLANNING CONSIDERATIONS

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. Unless specified otherwise in a site or project-specific workplan, Quality Assurance Project Plan (QAPP), Quality Assurance Program Plan (QAPP) or laboratory Quality Assurance Manual (QAM), all data collected following the protocols set forth in this document will be collected in accordance with the minimum QA/QC requirements (Section 5.0). Further quality assurance requirements will be defined in project specific work plans and may include duplicate or replicate measurements or confirmatory analyses.

5.2 FIELD PARAMETERS

When collecting water quality samples, it is generally associated with measurement of conventional parameters in the field, including but not limited to: dissolved oxygen, specific conductance, pH, and temperature (Figure 1). Calibration and verification of these parameters will be done according to the procedures in the SOPs for the YSI-85 (SOP-WR-W39), YSI Pro Plus (SOP-WR-W34), or YSI 2030 (WR-W-48). If calibration and verification fails and basic troubleshooting does not rectify the issue, the parameter needs to be flagged on field sheets and will not be included in the RIDEM/OWR water quality database. If temperature verification indicates that the probe is malfunctioning, any samples taken previous to that verification, back to the previous successful verification should be flagged as having a faulty reading of field parameters. Because specific conductance and dissolved oxygen are both temperature compensated, these values are questionable as well, and it is recommended that they not be used in data analysis or reporting. Specific conductance will need to be calibrated at the frequency specified in project documentation. If other guidance is unavailable, once weekly calibration should be sufficient for this parameter. Dissolved oxygen will be different under varying environmental conditions (barometric pressure and temperature) requiring twice daily calibration (before leaving and upon return to RIDEM office) and also requiring that the analyst leave the meter turned on during the entire sampling event. If at the end of the day a dissolved oxygen reading fails verification, values of dissolved oxygen collected during that day are questionable, and field sheets entries should be flagged and will not be included in the RIDEM/OWR water quality database.

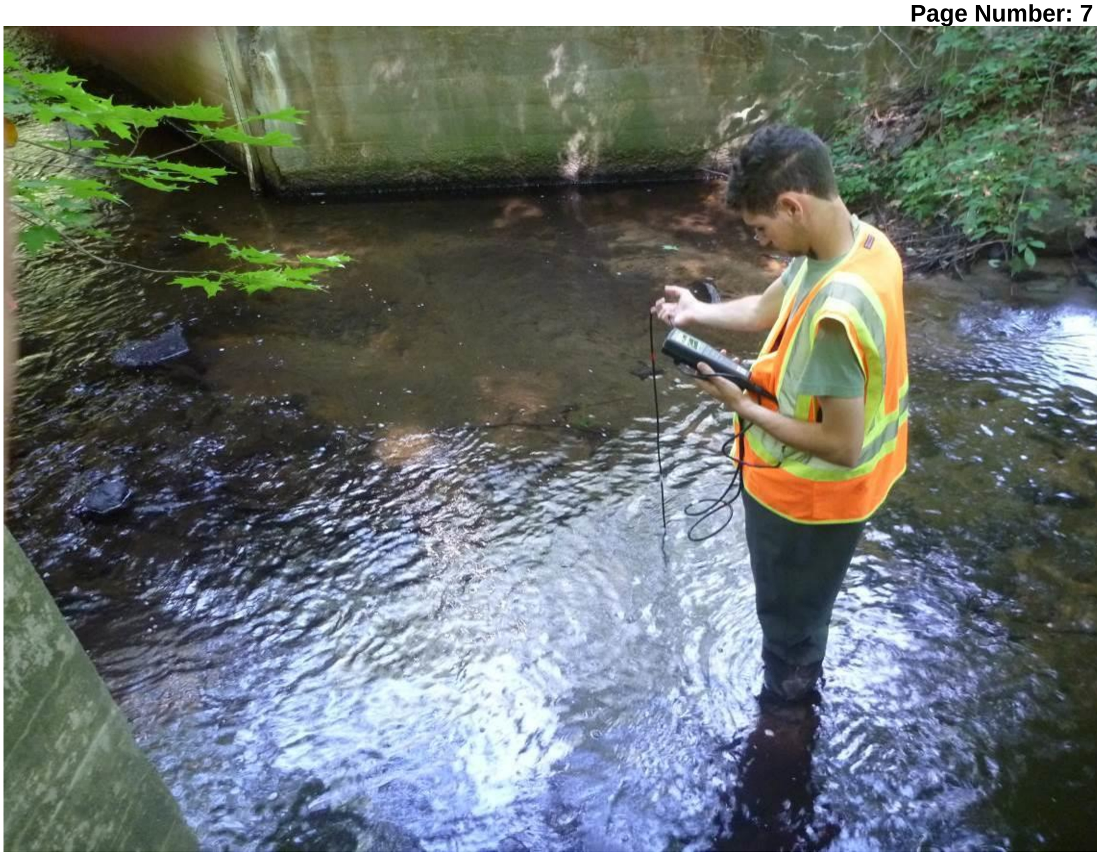

Figure 1 Analyst collecting field parameters in a stream.

5.3 DUPLICATE SAMPLES

Duplicate samples are collected to ensure the reproducibility of results. If two samples are taken of the same water, under the same conditions, the data generated from those two samples should theoretically be the same within a designated margin of error. Duplicates allow the analyst to quantify the error involved in sample collection. Duplicates will be collected at the frequency specified in the project plan. In the absence of project-specific criteria, duplicate analysis of samples should agree within five percent of relative percent difference.

5.3.1 SEQUENTIAL DUPLICATES (REPLICATES)

When a sample is taken and then another is taken from the same water immediately after, the sample is referred to as a sequential duplicate. These samples do not gather data under the exact same sampling conditions; therefore, there may be a difference in the values. Analysis of sequential samples allows the analyst to quantify the error involved in filling bottles one after another from the same source water. A sequential duplicate can also give information on the heterogeneity of the waterbody sampled.

5.4 BLANK SAMPLES

Blank samples are water samples of de-ionized or distilled water that should be free of analyte. Depending on the timing and conditions of when these sample bottles are filled, various parts of the sampling operation can be verified. Blank samples will be collected at the frequency specified in the project plan. In the absence of project-specific criteria, blank water should be free of analyte to the detection limit of the analytical procedure, and all components of the sampling procedures must be verified at least once.

5.4.1 FIELD EQUIPMENT BLANK

Field equipment blank refers to blank water that is processed through specific components of the equipment used for collecting and processing environmental samples. Field equipment blanks refer to blank water that is passed through all the equipment used for collecting and processing samples in the field after samples are collected and the equipment is decontaminated. These samples are to verify that the decontamination of equipment in the field is adequate.

Figure 2. Analyst filling a1 liter bottle with DIW for a field blank sample.

5.4.3 TRIP BLANKS

Trip blanks refer to distilled water poured into sample bottles in the controlled environment of the sampling center or the RIDOH lab. These samples then travel with the field team during data collection. Trip blanks are stored and shipped with environmental samples. These samples verify that there is no contamination during the shipping, storage, or transport of samples.

6.0 GUIDELINES AND PROCEDURES

The sections below describe in detail the procedures for taking a grab sample at a flowing stream. It is generally understood that a grab sample at a single point is sufficient in cases where the stream is determined to be well mixed. Clean-hands protocols are described in addition to sampling that does not require clean hands protocols. Procedures for collecting a sample using a sampling wand are also described.

6.1 REQUIRED MATERIALS

- YSI meter
- Lint-free tissues
- One pair of "powder free" gloves and a sampling bottle in a separate sealed Zip-Lock plastic bag prepared in the sampling center ahead of time by an analyst wearing gloves (for metals samples).
- A box of regular powder-free gloves
- Chest waders with belt or hip boots (if necessary)
- Sampling wand
- Indelible marker
- RIDEM YSI Field Data Collection Sheet (Datasheet 1)
- Waterproof pen or pencil
- Site descriptions
- Other field data sheets
- Chain of custody forms
- Site specific bottle label stickers

6.2 SPECIFIC BOTTLE REQUIREMENTS

Depending on what analysis will be done on the sample, there are different requirements for bottle size and composition. This ensures that there is enough water for analysis, and that the material the bottle is made of such as plastic, clear glass, or amber glass, will protect the sample from degradation or reaction. Specific project documentation should supersede any general guidelines presented in this SOP (Table 1).

6.2.1 BOTTLE PREPARATION

Analytes that require sample preservation are pre-acidified by RIDOH lab personnel. The specific preservative will be marked on the label and detailed extensively by the RIDOH quality assurance plan (RIDOH 2018).

6.2.2 AVOIDING CONTAMINATION

Care should be used when filling bottles that contain preservatives. Bottles should be filled in the proper order to minimize contact with preservatives that may possibly be analytes in bottles filled subsequently.

6.2.3 FILLING THE BOTTLE

Different analytical techniques require filling the bottle to different degrees. Unless otherwise stated, the bottles for most RIDEM programs will be filled to the shoulder by the collection protocol stated in the following sections by analyte and bottle type. This refers to the part of the bottle where it begins to narrow before reaching the neck (Figure 4).

Figure 3 Orange lines are at the shoulder of the various bottles used for the ARM program. Samples should be filled to this level unless program specific instructions are provided.

6.3 ENTERING THE SAMPLING LOCATION

6.3.1 PUTTING ON WADERS

The analyst should put on waders in the vehicle before entering stream. Care should always be taken because there can be a number of hazards associated with stream sampling.

6.3.2 APPROACHING SAMPLING LOCATION

Where there is flow or current, the analyst should always approach the sampling location slowly from the downstream, as long as it is safe to do so. Once the sampling location is reached, the streambed and water will need time to return to a pre-disturbed condition. Bottles should not make contact with the bottom or adjacent rocks and stream debris. If the water depth is less than one foot (30.5 cm), this condition should be recorded and the sample taken at mid depth.

Figure 4 Analyst collecting a sample in shallow water (depth less than 1 foot). This condition should be noted on field sheets.

6.4 SAMPLE COLLECTION PROTOCOLS

The method of collection is dependent upon the analyte and preservation of the bottle. Each section below describes a specific method of removal of a water sample from the stream location. The order of the collection is dependent upon the analyte(s) being sampled that the sampling location. Any sampling event that includes metal sample(s) should collect the metal first due to the high potential for contamination.

6.4.1 COLLECTING A **METALS** SAMPLE USING CLEAN HANDS PROTOCOLS

The following steps describe the procedures for rinsing and filling the non-preserved metals sample bottle with water. This procedure must be done in teams of two people. Clean hands protocols separate field duties and dedicate one individual as the “clean hands” person (CHP) to tasks related to direct contact with the sample. The assistant is designated the "dirty hands" person (DHP). The CHP should not to touch anything but the sample bottle until sampling is complete. The DHP is responsible for all other equipment until sampling is complete. RIDEM ARM program uses clean hands protocols only for metals sampling. The detection limit is very low on this set of tests, so having a clean hands sampler helps to reduce the chances of contamination.

Figure 5 Clean hands person on the left of picture only handles bottles with clean gloves after entering water.

(A) PUTTING ON GLOVES

After the CHP has entered the water, and immediately before collecting the sample, the DHP should put on regular powder-free gloves. Next the DHP should open the bag containing a second set of clean gloves and sample bottle, and hold it open for the CHP to take out and put on the gloves without touching the bag.

(B) FILLING THE BOTTLE WITH WATER

The CHP should remove the sample bottle from the bag and remove the cap. Reaching upstream or up current, the CHP will submerge the container 25 cm into water and allow the container to fill. The analyst should avoid contacting the sample bottle with the bottom or adjacent rocks and stream debris, because this could possibly re-suspend sediment or other bottom materials, biasing the sample. If there is significant residue on the surface, this should be recorded in the field notes.

(C) TRIPLE RINSING THE SAMPLE BOTTLES

The CHP will bring the bottle up and immediately cap the container. Once capped, the bottle is gently shaken and all water is poured out downstream of sampling area or on the riverbank. This is repeated three times to ensure that the bottle contains only an environmental sample with no residue from cleaning or manufacture of the sample bottle.

(D) FILLING THE SAMPLE BOTTLE

The CHP will submerge the container 25 cm into water and allow the container to fill. Unless stated by other project documentation, sample bottle should be filled to the shoulder as described in 6.2.3.

6.4.2 SAMPLE COLLECTION PROCEDURE FOR **NON-PRESERVED AND NON-BACTERIA** WATER QUALITY SAMPLES

The sampling procedure outlined below is for taking samples of water that do not require preservative and are not samples that will be analyzed for bacteria. This method includes rinsing the sample bottle three times with sample water. Because preserved samples are pre-acidified, rinsing the bottle would result in rinsing the preservative away. Bacteria samples are not rinsed, because bacteria can cling to the sides of sample bottles during the rinsing procedure, lending a positive bias to the bacteria sample.

Figure 6 Analyst collecting water using a bottle that is non-preserved, and not a bacteria sample.

(A) PUTTING ON GLOVES
Immediately before collecting the sample, the analyst should put on regular powder-free gloves.

(B) FILLING THE BOTTLE WITH WATER
The analyst should remove the sample bottle cap. Reaching upstream or up current, the analyst will submerge the container 25 cm into water and allow the container to fill. The analyst should avoid contacting the sample bottle with the bottom or adjacent rocks

and stream debris, because this could possibly re-suspend sediment or other bottom materials, biasing the sample. If there is significant residue on the surface, this should be recorded in the field notes.

(C) TRIPLE RINSING THE SAMPLE BOTTLES
The analyst will bring the bottle up and immediately cap the container. Once capped, the bottle is gently shaken and all water is poured out downstream of sampling area or on the riverbank. This is repeated three times to ensure that the bottle contains only an environmental sample with no residue from cleaning or manufacture of the sample bottle.

(D) FILLING THE SAMPLE BOTTLE
The analyst will submerge the container 25 cm into water and allow the container to fill. Unless stated by other project documentation, sample bottle should be filled to the shoulder as described in 6.2.3.

6.4.4 SAMPLE COLLECTION PROCEDURE FOR **BACTERIA** WATER QUALITY SAMPLES
The sampling procedure outlined is the same procedure as that outlined in Section 6.4.2, with the exceptions that bottles are *not* triple rinsed. **Steps 6.3.1 through 6.3.2 must be followed prior to taking the sample.**

(A) PUTTING ON GLOVES
Immediately before collecting the sample, the analyst should put on regular powder-free gloves.

(B) READYING THE SAMPLE BOTTLE
Reaching upstream or up current, the analyst should hold the container with the opening facing directly toward the water, quickly plunging though the water surface to avoid collecting surface residue. If there is significant residue on the surface, this should be recorded in the field notes.

(C) TAKING A SAMPLE
The analyst will submerge the container 25 cm into water and turn the container, allowing it to fill. If the water depth is less than one foot (30.5 cm), it should be recorded and the sample taken at mid depth. The analyst should avoid contacting the sample bottle with the bottom or adjacent rocks and stream debris, because this could possibly re-suspend sediment or other bottom materials, biasing the sample.

(D) FILLING THE BOTTLE

Unless stated by other project documentation, the bottle should be filled to the shoulder as described in 6.2.3.

(E) FINISHING COLLECTION

The analyst will bring the bottle up and immediately cap it. The bottle should be placed in a secure spot and brought to the cooler as soon as possible.

6.5 ALTERNATIVE SAMPLE COLLECTION PROCEDURE FOR **NON-PRESERVED AND NON-BACTERIA** WATER QUALITY SAMPLES TAKEN WITH A SAMPLING WAND FROM THE SHORE OR BRIDGE

The sampling wand is extendable and useful in situations where an extra reach is needed. The necessity of using this altered procedure will be determined by the field analyst based on safety and collection of high quality samples. It enhances the clean hands protocol, by limiting direct contact with the sample bottles. Wand sampling is the preferred method of obtaining a representative sample from larger streams and rivers. This is because the wand method eliminates disturbing the substrate by wading.

Figure 7 Sampling wand with bottle inserted in small clip.

6.7.1 PREPARING TO TAKE A SAMPLING WAND SAMPLE

The analyst should always try to sample where there is flow or current. Typically, the analyst will not need to put on waders, because the wand will provide the extra length needed to reach the ideal sampling spot from the bank or bridge.

Figure 8 Analyst collecting a water sample from the streambank using the sampling wand.

(A) A REPRESENTATIVE SAMPLE

Bottles should not make contact with the bottom or adjacent rocks and stream debris. Water should be flowing, and the sample should be collected close to the center of the stream if depth will allow. Water that is not moving should not be sampled. If the water depth is less than one foot (30.5 cm), it should be recorded and the sample taken at mid depth.

6.7.2 TAKING A **METALS** SAMPLE

The following steps describe the procedures for rinsing and filling the bottle with water. **Step 6.7.1 must be followed prior to taking the sample.**

(A) CLEAN HANDS PROTOCOL

The same analysts' responsibilities that are outlined in Section 6.4.1 apply to this section. The CHP is the "clean-hands" person, and the DHP is the "dirty-hands" person.

(B) PUTTING ON GLOVES

Immediately before collecting the sample, the DHP should put on regular powder-free gloves. Then they should open the sample kit, take out the bag containing gloves, and hold it open for the CHP to take and put on the gloves without touching the bag.

(C) READYING THE SAMPLE BOTTLE

The wand has a large and small clip for holding sample bottles. The CHP should hold the sample bottle in the center of the appropriately sized clip, while the DHP holds the wand steady and secures the clip around the middle of the bottle. The CHP should check that the bottle is in a fixed position before removing the cap. Reaching the wand upstream or up current, the DHP will plunge the wand, with the container opening facing directly toward the water, quickly though the water surface to avoid collecting surface residue. If there is significant residue on the surface, this should be recorded in the field notes.

(D) TAKING A SAMPLE

The DHP will submerge the container 25 cm into water and allow the container to fill. The analyst should avoid contacting the sample bottle with the bottom or adjacent rocks and stream debris, because this could possibly re-suspend sediment or other bottom materials, biasing the sample.

(E) RINSING THE SAMPLE BOTTLES

When the DHP brings the bottle up, the CHP should immediately cap the container. Once the bottle is capped, the wand is gently shaken, the cap removed by the CHP, and all the water in the bottle poured out downstream of sampling area or on the riverbank. This is repeated three times to ensure that the bottle contains only an environmental sample.

(F) FILLING THE BOTTLE

Unless stated by other project documentation, the bottle should be filled to the shoulder as described in 6.2.3.

6.7.3 SAMPLE COLLECTION PROCEDURE FOR **PRESERVED** WATER QUALITY SAMPLES TAKEN WITH A SAMPLING WAND FROM THE SHORE

The sampling procedure outlined is the same procedure as that outlined in Section 6.7, with the exceptions that bottles are *not* triple rinsed or inserted into the water with the opening of the bottle directly towards the water. Because preserved samples are pre-acidified, a clean bottle will be filled, referred to the collection bottle in this section, as directed in sections 6.7.1 through 6.7.2. The pre acidified bottle that will receive sample, referred to in this section as the sample bottle.

(A) FILLING THE BOTTLE

Unless stated by other project documentation, the sample bottle should be filled from the collection bottle to the shoulder as described in 6.2.3.

(B) FINISHING COLLECTION

The analyst will bring the bottle up and will immediately cap it. The bottle should be placed in a secure spot and brought to the cooler as soon as possible.

6.7.4 PROCEDURE FOR COLLECTION OF **BACTERIA** SAMPLES USING A SAMPLING WAND FROM THE SHORE OR BRIDGE

The sampling procedure outlined is the same procedure as that outlined in Section 6.7, with the exceptions that bottles are *not* triple rinsed. **Step 6.7.1 must be followed prior to taking the sample.**

(A) PUTTING ON GLOVES

Immediately before collecting the sample, the analyst should put on regular powder-free gloves.

(B) READYING THE SAMPLE BOTTLE

The wand has a large and small clip for holding sample bottles. The analyst should hold the sample bottle in the center of the appropriately sized clip and secure the clip around the middle of the bottle. Reaching the wand upstream or up current, the analyst should plunge the wand, with the container opening facing directly toward the water, quickly though the water surface to avoid collecting surface residue. If there is significant residue on the surface, this should be recorded in the field notes.

(C) TAKING A SAMPLE

The analyst will submerge the container 25 cm into water and allow the container to fill. If the water depth is less than one foot (30.5 cm), it should be recorded and the sample taken at mid depth. The analyst should avoid contacting the sample bottle with the bottom or adjacent rocks and stream debris, because this could possibly re-suspend sediment or other bottom materials, biasing the sample.

(E) FILLING THE BOTTLE
Unless stated by other project documentation, the bottle should be filled to the shoulder as described in 6.2.3.

(F) FINISHING COLLECTION
The analyst will bring the bottle up and immediately cap it. The bottle should be placed in a secure spot and brought to the cooler as soon as possible.

6.8 ALTERNATIVE FOR CONDITIONS WHERE ATMOSPHERIC DEPOSITION IS A CONCERN

There may be days where conditions cause the analyst to be concerned with the deposition of contaminating materials into the sample container. Conditions would include: very windy days, sites where there is an unusual amount of dust or dirt in the air, or other air quality concerns. In these cases the capped container should be submerged 25 cm into the water and the cap should be removed while in the water. Once the container is filled, the bottle should be recapped under the water. The bottle can then be emptied, refilled, and rinsed as required. In cases of preserved samples, the sample collection bottle can be submerged, uncapped and filled while underwater, then emptied, refilled, and rinsed as required. The preserved sample bottle can be filled either by shielding the bottle from the source of atmospheric deposition or by filling the bottle in a vehicle if necessary.

6.9 HANDLING OF WATER QUALITY SAMPLES AFTER COLLECTION

Depending on the analyses to be conducted on the samples, there are different requirements for storage of the samples (Table 1). Unless project specific guidance is provided, samples should be stored in a cooler with sufficient ice enclosed in a plastic bag to keep the samples cool and dark during the entire sampling day. Bagging the ice helps prevent the outside of the sample container from being contaminated with melted ice water and helps keep bottle labels intact. According to EPA Policy, all drinking water samples must be submitted at 4˚ Celsius. However, due to the small size of Rhode Island, samples that are collected and put on ice are not always in transit long enough to reach the 4˚ Celsius requirement. As noted on the RIDOH laboratory sample submission form, all drinking water samples must be received on ice. If samples are received without ice, the drinking water quality program is notified and samples are flagged. Once received, all samples are immediately stored in a refrigerator at 4˚ Celsius (RIDOH 2010).

6.9.1 SAMPLE HOLDING TIMES

Samples generally need to be brought to the RIDOH lab by 1445 or earlier on the day that they are collected (the lab closes at 1500); however, if the samples cannot be delivered, the appropriate holding time and procedures should be implemented (Table 1). Samples should never be delivered to the lab that cannot be accepted within this period.

7.0 DOCUMENTATION

7.1 FIELD MEASUREMENTS

Unless project specific guidelines direct otherwise, all calibration and field measurements will be recorded on a RIDEM YSI Data Collection Sheet or in the appropriate field notebook (Figure 2).

7.2 CHAIN OF CUSTODY FORMS

Depending upon the lab that is used, each project will have different chain of custody forms. An example of a filled chain of custody form from RIDOH is provided (Figure 8).

7.3 LABELS

Depending upon the lab that is used, each project will have different sets of labels. An example of a filled label form that is acceptable to the RIDOH lab is provided (Figure 9).

8.0 REFERENCES

Franke, O.L. and the Ground Water Focus Group of the Intergovernmental Task Force on Monitoring Water Quality. 1997. Conceptual Frameworks for Groundwater Quality Monitoring. 112 p.

Lurry, D.L. and Kolbe, C.M. 2000. Interagency Field Manual for the Collection of Water-Quality Data. U.S.Geological Survey, Open File Report 00-213. 85 p.

Nimiroski M. 2012. Standard Operating Procedure for the Measurement of Dissolved Oxygen, Temperature, Specific Conductance, pH and Nitrate Using a Handheld YSI Professional Plus Instrument RIDEM SOP, WR-W-34. 44 p.

Nimiroski M. and DeGoosh K. 2011. Standard Operating Procedure for the Measurement of Dissolved Oxygen, Temperature, Specific Conductance, and Salinity Using a Handheld YSI Model 85 Instrument. RIDEM SOP, WR-W-39. 21 p.

Rhode Island Department of Health Laboratory. 2010. Quality Assurance Plan for the Rhode Island Department of Health Laboratories In Support of Drinking Water Quality and Water Pollution Programs, Revision 12.0. Section 4. 110 p.

YSI Model 85: Handheld Oxygen, Conductivity, Salinity, and Temperature System Operations Manual. YSI incorporated. Yellow Springs Ohio, USA.

Field Crew:		**Weather Conditions:**	
YSI Instrument (circle one):	**#1 #2 #3 ProPlus**		

Site ID												
Location Name												
Date												
Time												
Temp (°C)												
B. Pres. (mmHg)												
Saturation (%)												
DO (mg/L)												
SPC (µS/cm)												
pH												
Nitrate (mg/L)												
Photographs												
O.G.												
Flow												
Sample Method												
Comments												

Datasheet 1. RIDEM YSI Field Data Collection Sheet

X **ICED FOR TRANSPORT**

Legal Sample | |

Sample Submission Form/Chain of Custody
Rhode Island Department of Health Laboratories
50 Orms Street, Providence, RI 02904

Sample Submission Number

Client: DEM □ **Collected by DEM**

KEY for PWS Sample Submission
A: Client ID #: DEM WRE ARM
B: Water System Name
C: Station ID
D: Type = Grab / Composite

A. Client ID#: <<DEM>> Run #: <<RUN>>
B. Water System Name:
<<CONTACT>>

Mail Report To: RIDEM-OWR Room 200
Street: 235 Promenade St
City: Providence, RI
Report To (Agency/Person) :Mark Nimiroski x 7545

Collected By: ________ Collected Date: ________ Time: ________ Matrix: Water **X** Other

Source# C. Station ID **PAW01** D. Type Grab

Collection Point Address: **Pawcatuck River at Bridge St.**
Name **Street** **City**

FIELD TESTS:

(Circle One)
Sample Type: (**GRAB** / **COMPOSITE**) Orig#: ________ pH: ________ Temp: ________ CL Residual: ________

Inorganics Lab (DUP)

- Inorganic Tests
- ___WL1 Turbidity
- ___WL4 True Color
- ___WL7 Total Suspended Solids
- ___WL11 Cyanide (335.4)
- ___WL12 Total Phosphorus
- ___WL13 pH
- ___WL16 Nitrate (353.2)
- ___WL17 ortho-phosphate
- ___WL18 Alkalinity (2320B)
- ___WL20 Chloride (300.0)
- ___WL21 Fluoride (300.0)
- ___WL22 Hardness (2340B)
- ___WL41 Specific Conductance
- ___WL56 Nitrite (353.2)
- ___WL Ammonia - N (*NETL)
- ___WL Total Kjeldahl - N (*NETL)
- ___WL41 Specific Conductance
- DEM Total Metals
- ___WL62Al Total Aluminum
- ___WL62Fe Total Iron - DEM
- ___WL62 Total Metals (Cu,Cd,Pb&Zn)
- For individual metals check below
- Total Copper ___WL62 TOT Cu
- Total Cadmium ___WL62 TOT Cd
- Total Lead ___WL62 TOT Pb
- Total Zinc ___WL62 TOT Zn
- DEM Dissolved Metals
- ___WL62Fe Dissolved Iron
- ___WL62Al Dissolved Aluminum
- ___WL62 Metals Diss (Cu,Cd,Pb&Zn)
- For individual metals check below
- Diss Copper ___WL62 DISS Cu
- Diss Cadmium ___WL62DISS Cd
- Diss Lead ___WL62 DISS Pb
- Diss Zinc ___WL62 DISS Zn

Metals and Minerals (DUP)

- Metals for New Systems
- ___WL66 Full Set (200.8)
- ___WL75 Antimony
- ___WL76 Arsenic
- ___WL77 Barium
- ___WL78 Beryllium
- ___WL79 Cadmium
- ___WL81 Chromium
- ___WL64 Copper
- ___WL82 Iron
- ___WL63 Lead
- ___WL83 Manganese
- ___WL84 Nickel
- ___WL85 Selenium
- ___WL86 Silver
- ___WL87 Thallium
- ___WL88 Zinc
- Metals Routine Set
- ___WL68 Full Set (200.8)
- ___WL78 Beryllium
- ___WL81 Chromium
- ___WL84 Nickel
- ___WL76 Arsenic
- ___WL85 Selenium
- ___WL79 Cadmium
- ___WL75 Antimony
- ___WL77 Barium
- ___WL87 Thallium
- ___WL36 Mercury (245.1)
- ___WL65 Lead & Copper(200.8)
- Minerals
- ___WL67 Minerals Full Set(200.8)
- ___WL69 Magnesium
- ___WL70 Potassium
- ___WL71 Sodium
- ___WL72 Calcium
- ___WL73 Sodium Composite(200.8)

Organics Lab (FB)

- ___PE4–CARB (531.1)
- ___PE12–Pest/PCB (608)
- ___PE14–EBD/DBCP (504)
- ___PE21–HERB/ (515.3)
- ___PE22–Pest/PCB+ (508)
- ___PE31–Pest/PCB+ (505)
- ___PE40–Endrin (505)
- ___PE____
- ___TO2–THM (524.2)
- ___TO3–PWVOC (524.2)
- ___TO4–PET HCS & TO3
- ___TO11–UFVOC (624/603)
- ___TO12–WQVOC (524.2)
- ___TO14–USR Fee B/N Ext
- ___TO17–PET HC & TO12
- ___TO19–Total EXTR (625)
- ___TO27–AGR SVOC (525.2)
- ___TO40–WQ SEMI (525.2)
- ___TO____
- ___TO32 Chlorophyll a – (446) DEM

Sanitary Microbiology

- ___SM2 – MF Total Coliform
- ___SM3 – SPC
- ___SM34 – Coliform (TCR)
- **X** SM37 Freshwater-Enterolert
- ___SM37 – Enterolert
- ___SM38 – A-1 MPN
- ___SM43 – Coliphage
- ___SM48 – MTEC
- ___SM1 – MPN
- # of Tubes __ Dil.__ Thru___

Must Be Completed For Legal Sample	Container		Preservative Added		
Test Code	Number	Type	By Lab	By Collector	Special Instructions
					TKN – DEM submit to: New England Testing Laboratory
					Ammonia -N – DEM submit to New England Testing Laboratory

Chain of Custody

Relinquished By	Date	Time	Received By	Date	Time	Comments

Revised: 6/19/2013

Entero Bottle Sterilization Date:__________

Figure 9 Example of chain of custody form used by Rhode Island Department of Health as filled out by Ambient River Monitoring Program.

RI HEALTH MICRO SM37
250ml sterile
LPK01 Spring Brook
DATE: TIME:

RI HEALTH MICRO SM37
250ml sterile
LPK03 Mastuxet Brook
DATE: TIME:

RI HEALTH MICRO SM37
250ml sterile
PAW01 Pawcatuck R. at Bridge St.
DATE: TIME:

RI HEALTH MICRO SM37
250ml sterile
PAW05 Chipuxet at Wolf Rocks Rd.
DATE: TIME:

RI HEALTH MICRO SM37
250ml sterile
PAW09 Chickasheen Brook at Waites Corner Rd.
DATE: TIME:

RI HEALTH MICRO SM37
250ml sterile
PAW11 Mile Brook at Main St.
DATE: TIME:

RI HEALTH MICRO SM37
250ml sterile
PAW12a Ashaway River at Ashaway Rd.
DATE: TIME:

RI HEALTH MICRO SM37
250ml sterile
PAW13 Parmenter Brook at Wich Way
DATE: TIME:

RI HEALTH MICRO SM37
250ml sterile
PAW15 Tomaquag Brook at Collins Rd.
DATE: TIME:

RI HEALTH MICRO SM37
250ml sterile
PAW17 Perry Healy Brook at Klondike Rd.
DATE: TIME:

Figure 10 Example of a sheet of labels to be printed for sample bottles

Table 1. Modified requirements table of the one detailed in Section 4 of the RIDOH QAPP (RIDOH 2010). These are possible parameters sampled for in this program with their corresponding minimum volume, container, preservative, and holding time.

Parameter	**Minimum Volume**	**Container**	**Preservative**	**Holding Time**
Metals (except Hg)	1 L	Plastic or Glass	HNO3 to pH<2	6 months
Mercury	100 mL	Plastic or Glass	HNO3 to pH<2	28 days
Alkalinity	100 mL	Plastic or Glass	Cool, 4°C	14 days
Chloride	50 mL	Plastic or Glass	None	28 days
Color	50 mL	Plastic or Glass	Cool, 4°C	48 hours
Conductivity	100 mL	Plastic or Glass	Cool, 4°C	28 days
Cyanide	1 L	Plastic or Glass	Cool, 4°C, Ascorbic Acid (if chlorinated), NaOH to pH>12	14 days
Fluoride	300 mL	Plastic or Glass	None	28 days
Nitrate/Nitrite	100 mL	Plastic or Glass	Cool, 4°C	48 hrs
Physicals (Odor, Turbidity, Sediment, Foam Screen)	200 mL	Glass or Plastic	Cool, 4°C	24 hrs
pH	25 mL	Plastic or Glass	None	Immediately
Orthophosphate	50 mL	Plastic or Glass	Cool, 4°C	48 hours
Solids (TDS)	100 mL	Plastic or Glass	Cool, 4°C	7 days
Sulfate	50 mL	Plastic or Glass	Cool, 4°C	28 days
Turbidity	100 mL	Plastic or Glass	Cool, 4°C	48 hours
Trihalomethanes	40 mL	Glass, teflon lined septum	Sodium Thiosulfate Cool, 4°C	14 days
Volatile Organics	40 mL	Glass, teflon lined septum	(1) Ascorbic Acid (2) HCl to pH<2 (3) Cool, 4°C	14 days

Volatile Organics	40 mL	Glass, teflon lined septum	(1) Sodium Thiosulfate. (2) HCl to pH<2 (3) Cool, 4°C	14 days
Semivolatiles	1 L	Amber glass, teflon lined septum	Sodium Sulfite if chlorinated HCl to pH<2 Dark, cool, 4°C	14 days
EDB/DBCP	40 mL	Glass, teflon lined septum	Sodium Thiosulfate, Cool, 4°C	14 days
Pesticides	1 L	Amber glass, teflon lined caps	Sodium Thiosulfate, Cool, Dark, 4°C	7 days
Acid Herbicides	60 mL	Amber glass, teflon lined caps	Sodium Thiosulfate, Cool, 4°C	14 days
Carbamates	60 mL	Amber glass, teflon lines caps	Monochloroacetic Acid to pH<3, Cool, 4°C	28 days
Total and Fecal Coliform	100 mL	Glass or plastic, sterile	Sodium Thiosulfate Cool, 4°C	30 hours for potable water (8 hrs in source water); 6 hours for non-potable waters