Receiving Water Quality Sampling Plan

Albany Pool
Part B Long-Term Control Plan

Prepared for:
Capital District Regional Planning Commission (CDRPC)

Prepared by:
Albany Pool Joint Venture Team (APJVT)

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1. Introduction

1.1. Project Background

This Receiving Water Quality Sampling Plan (Plan) describes the approach that will be taken to characterize the receiving water quality of the Hudson and Mohawk Rivers where the Albany Pool Communities combined sewer overflows (CSOs) discharge. The sampling plan was prepared in accordance with the conditionally approved Scope of Work and Combined Sewer System Monitoring and Modeling Plan dated February 2007. This Plan defines the sampling activities to be performed under Task B.2, Receiving Water Conditions Assessment.

The Albany Pool Communities have 92 CSOs that discharge to the Hudson and Mohawk Rivers. To develop a plan for evaluating the impact of these discharges, the City of Troy, City of Albany, City of Cohoes, City of Rensselaer, City of Watervliet and the Village of Green Island (the "*Pool*" communities) have joined in a comprehensive inter-municipal venture, led by the Capital District Regional Planning Commission (CDRPC), to develop a Phase I Long-Term Control Plan (LTCP).

CSOs are point sources subject to National Pollutant Discharge Elimination System (NPDES) permit requirements including both technology-based and water quality based requirements of the Clean Water Act.

The Albany Pool Communities flows are tributary to three wastewater treatment plants (WWTP) including the Rensselaer County Sewer District plant, and two Albany County Sewer District plants (both North and South plants). There are 95 discharge locations (including the three WWTPs) within the combined sewer system (CSS) that are permitted under each community's State Pollution Discharge Elimination System (SPDES) permits. These discharge to the Hudson and Mohawk Rivers and their tributaries.

One of the first steps in planning and developing a LTCP for CSOs is to characterize the receiving water system. As part of the LTCP for the Albany Pool Communities, a monitoring and sampling program will be performed to verify and supplement the available receiving water quality data. The plan consists of dry- and wet-weather discrete sampling and laboratory analyses of receiving water samples.

1.2. The Albany Pool Communities

According to the New York State Department of Environmental Conservation (NYSDEC), CSOs from each of the Albany Pool Communities include:

- City of Albany with eleven (11) CSOs under SPDES Permit No. NY-002 5747;
- City of Rensselaer with eight (8) CSOs under SPDES Permit No. NY-002 6026;
- City of Watervliet with five (5) CSOs under SPDES Permit No. NY-002 0899;
- Village of Green Island with three (3) CSOs under SPDES Permit No. NY-003 3031;
- City of Cohoes with seventeen (17) CSOs under SPDES Permit No. NY-003 1046; and
- City of Troy with forty-eight (48) CSOs under SPDES Permit No. NY-009 9309.

1.3. Scope of This Plan

This Plan describes the locations, equipment, methodologies, and data management protocols that will be used by the Albany Pool Joint Venture Team (APJVT) to gather water quality data for the receiving water bodies and outlines responsibilities of each party, the procedures to be followed, and the timeframe for events.

Water quality data is required for the receiving water bodies during dry weather and during storm events in order to examine the impacts of CSOs on the water bodies. Together with the flow monitoring data, project modeling tools, and historical data, the water quality sampling results will enable the Albany Pool Communities to assess the impacts of CSOs, and help prioritize areas of principal concern with regard to water quality impacts. In addition, the sampling results can also help establish what types of abatement technologies may be applicable to sustain/enhance/upgrade water quality standards and use objectives.

The discussion in this Plan includes:

- The water quality sampling equipment that will be used.
- The frequency and duration of water quality sampling.
- The determination for which storm events should be sampled.
- The water quality parameters to be analyzed.
- Data storage protocols to be followed.

The specifications in this Plan must be followed by all APJVT members and the Pool communities' employees conducting the water quality sampling program. The APJVT is responsible for defining the protocols for implementation of the system-wide water quality sampling program as presented in this Plan. The APJVT members are also responsible for providing system-wide coordination during implementation of the program and are responsible for defining the detailed logistics required to implement the program in the communities and for conforming to the protocols outlined in this Plan. Significant resources will be required by the communities including the commitment of vessels, vehicles, staff, and equipment for sampling activities.

2. Receiving Water Quality Sampling Program

2.1. Water Quality Sampling Locations

Discrete samples of receiving water will be collected for laboratory analyses at 10 transects along the Mohawk and Hudson Rivers, six wastewater treatment plant discharges, six tributaries of these rivers, and two potential new beach sites. The wastewater treatment plants that will be included in the sampling plan are the Rensselaer County Sewer District, Albany County Sewer District (both North and South), the East Greenbush WWTP, the Waterford WWTP, and the Watervliet Arsenal. The dry- and wet-weather water quality sampling locations are listed in Table 2-1 and shown on Figure 2-1. The figure is intended to present the general locations for this document. The sampling locations listed in Table 2-1 will be field investigated by the APJVT and may change based on field conditions. Final sampling locations will be identified and photographs and detailed site sketches, along with the GPS-obtained coordinates, will be available to the team and NYSDEC prior to implementation of the sampling program.

2.2. Program Organization and Communications During Sampling Events

The sampling period will begin in May 2008 and last through September 2008. Fifteen dry-weather events will be sampled at all receiving water body locations during the sampling effort. Four wet-weather events will be sampled at all designated receiving water body locations. Sampling will not be conducted during Memorial Day weekend between Friday, May 23 at 5:00 P.M. and Tuesday, May 27 at 6:00 A.M., or during 4th of July weekend between Thursday, July 3 at 5:00 P.M. and Monday, July 7 at 6:00 A.M.

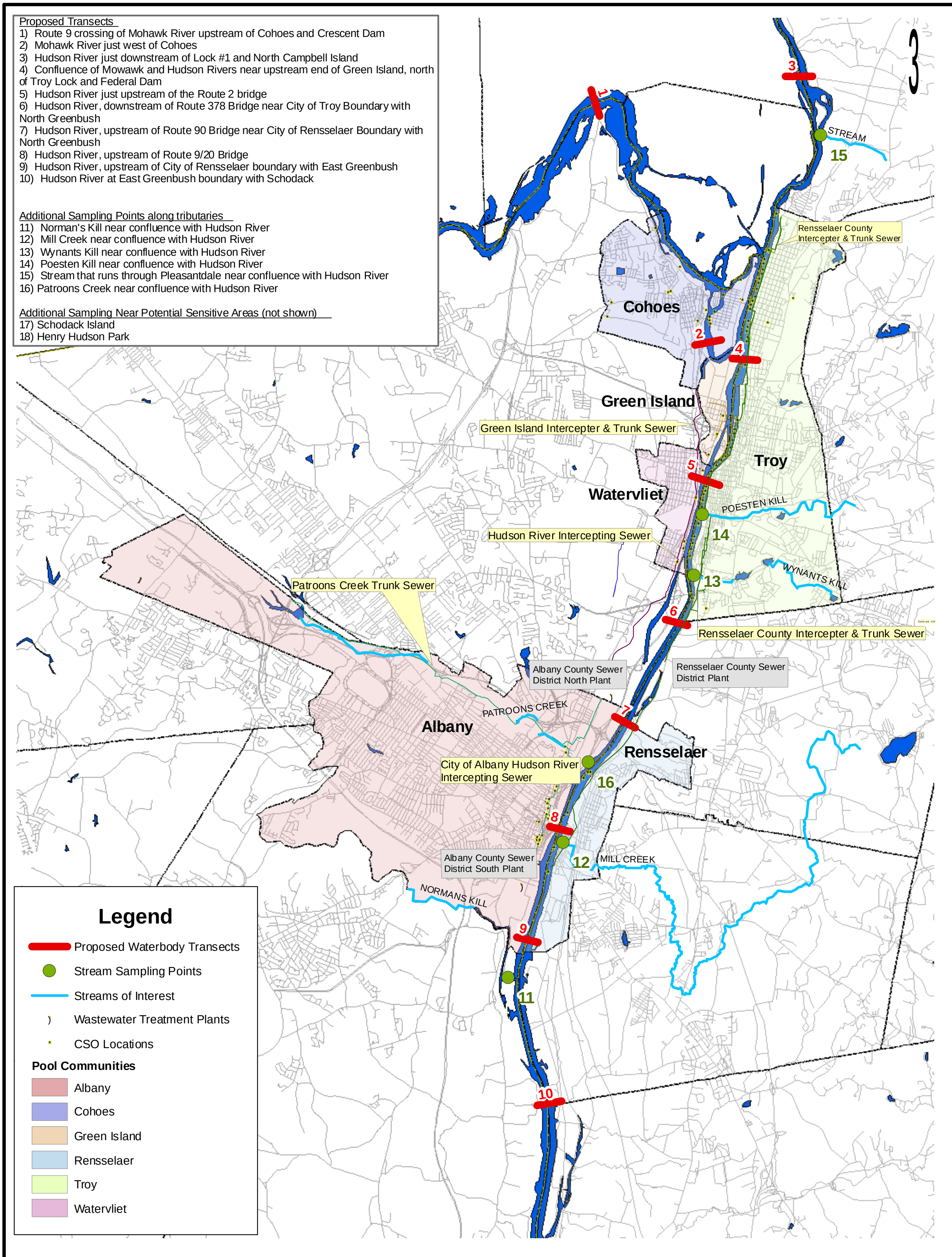
The APJVT will designate a person as the Sampling Coordinator for the sampling program. The Sampling Coordinator will be present in the field during all sampling events. The APJVT will also organize sampling teams to be deployed during dry- and wet-weather events, and designate an APJVT member as a Team Leader for each of the sampling teams. As part of their in-kind services, each of the communities will assist with providing staff and equipment for the sampling crews during dry- and wet-weather conditions. Sampling will be performed at the locations using dedicated teams made up of two to three field personnel. Each sampling team will be responsible for specific sampling locations grouped within close proximity to each other. At some locations where samples are collected on the river in a boat, a third team member may be required.

Table 2-1.
Receiving Water Body Sample Locations

Sampling Location Identification Number	Sample Collection Location	Sample Collection Location	Nearest Access Road or Address
River Transect Locations			
A-RT1-WB A-RT1-RC A-RT1-EB	Route 9 crossing of Mohawk River upstream of Cohoes and Crescent Dam	bridge	New Loudon Road (Route 9 bridge crossing the Mohawk River)
A-RT2-WB A-RT2-RC A-RT2-EB	Mohawk River just west of Cohoes	bridge	Bridge Avenue in Cohoes
A-RT3-WB A-RT3-RC A-RT3-EB	Hudson River just downstream of Lock #1 and North Campbell Island	boat	River Road on the east side of the Hudson River (south of the intersection with Route 122), or Route 32/4 on the west side of the river
A-RT4-WB A-RT4-RC A-RT4-EB	Confluence of Mohawk and Hudson Rivers near upstream end of Green Island, north of Troy Lock and Federal Dam	boat	Route 4 on the east side of the Hudson River in Troy. No bridge at this transect location.
B-RT5-WB B-RT5-RC B-RT5-EB	Hudson River just upstream of the Route 2 bridge	boat	Route 2 bridge in Troy. Bridge is too high to collect samples from.
B-RT6-WB B-RT6-RC B-RT6-EB	Hudson River, downstream of Route 378 bridge near City of Troy boundary with North Greenbush	boat	Route 378 bridge in South Troy. Bride is too high to collect samples from.
B-RT7-WB B-RT7-RC B-RT7-EB	Hudson River, upstream of I--90 Bridge near City of Rensselaer boundary with North Greenbush	boat	I-90 bridge crossing 787 in Albany. Bridge is too high to collect samples from.
B-RT8-WB B-RT8-RC B-RT8-EB	Hudson River, upstream of Route 9/20 bridge	boat	Route 20/9 bridge crossing 787 in Albany. Bridge is too high to collect samples from.
B-RT9-WB B-RT9-RC B-RT9-EB	Hudson River, upstream of city of Rensselaer boundary with East Greenbush	boat	Smith Boulevard and Boat Street off of Route 144 (River Road) south of Albany. No bridge crossing the river at this transect location.

Sampling Location Identification Number	Sample Collection Location	Sample Collection Location	Nearest Access Road or Address
B-RT10-WB B-RT10-RC B-RT10-EB	Hudson River at East Greenbush boundary with Schodack	boat	Van Wies Point Road off of 144 south of Albany. No bridge crossing the river at this transect location.
Tributary Locations			
C-T11-SH	Norman's Kill near confluence with Hudson River	shore	River Road and Normanskill Street south of River Transect 9 (RT9) on the west side of the Hudson River.
C-T12-SH	Mill Creek near confluence with Hudson River	shore	Route 9 ramp off of Route 20/9 bridge just south of River Transect 8 (RT8) on the east side of the Hudson River.
D-T13-SH	Wynants Kill near confluence with Hudson River	shore	Burden Avenue at the crossing of the Wynants Kill just north of River Transect 6 (RT6) on the east side of the Hudson River.
D-T14-SH	Poesten Kill near confluence with Hudson River	shore	Canal Avenue south of River Transect 5 (RT5) on the east side of the Hudson River.
D-T15-SH	Stream that runs through Pleasantdale near confluence with Hudson River	shore	River Road just south of River Transect 3 (RT3) just south of Campbell Island and Lock #1 on the east side of the Hudson River.
C-T16-SH	Patroons Creek near confluence with Hudson River	shore	East of 787, south of River Transect 7 (RT7) on the west side of the Hudson River.
Potential Beach Locations			
E-B17-SH	Schodack Island	shore	1 Schodack Way Schodack Landing, NY 12156
E-B18-SH	Henry Hudson Park	shore	Barent Winnie Road Selkirk, NY 12158 Barent Winnie and Lyons Road

Sampling Location Identification Number	Sample Collection Location	Sample Collection Location	Nearest Access Road or Address
WWTPs			
ACSDN	Albany County Sewer District North Plant	Samples will be collected by WWTP personnel and picked up by designated sampling teams.	1 Canal Road South Menands, NY 12204
ACSDS	Albany County Sewer District South Plant		Church Street Port of Albany Albany, NY 12202
RCSD	Rensselaer County Sewer District Plant		85 Bloomingrove Drive Troy, NY 12180
EGRN	East Greenbush WWTP		80 Columbia Turnpike Rensselaer, NY 12144
WTFD	Waterford WWTP		41 Mohawk Avenue Waterford, NY 12188
WVTA	Watervliet Arsenal Plant		Broadway & Westervelt Avenue Watervliet, NY 12189



CDRPC

ALBANY CSO POOL
LONG TERM CONTROL PLAN

PROPOSED SAMPLING LOCATIONS

MALCOLM PIRNIE, INC.

FEBRUARY 2007

Figure 2-1

Based on the proximity of the sampling locations, it is estimated that there will be five sampling teams required. Each sampling team will be lead by a Team Leader from the APJVT and assisted by personnel from the communities. It is estimated that the sampling teams will require nine employees from the communities, whose roles include two drivers of boats and seven sampling team members. Personnel will be required for a single shift for dry-weather sampling and over multiple shifts to support the wet-weather sampling.

A facility preliminarily identified at the Port of Albany located on Smith Boulevard may be used as the field station and staging area for the dry- and wet-weather sampling events. This location has been preliminarily identified because the APJVT has received a verbal commitment from the Albany Port District Commission (APDC) to utilize a vessel docked at this facility for sampling. Other locations may be designated for staging areas on the west side of the Hudson River as well. Directions to the field station and staging areas and a map showing their locations will be provided prior to the implementation of the sampling program. The APJVT Sampling Coordinator will coordinate the sampling effort from one of these locations. The staging area will also be used for organization, preservation and packaging of samples prior to delivery to the laboratories.

The APJVT Sampling Coordinator is responsible for communication with all field teams throughout the sampling events. Team Leaders are responsible for establishing appropriate lines of communication between their field teams and the Sampling Coordinator, which may include use of cell-phones, two-way radios, or other equipment. The Team Leaders are responsible for relaying important information, problems, and questions from their field teams immediately to the APJVT Sampling Coordinator who will be stationed at the field station and staging area and who will be equipped with a telephone. The APJVT will provide a list of critical phone numbers and contacts to the Sampling Coordinator, prior to the initiation of the sampling program.

2.3. Sampling Equipment Specifications

The water quality sampling program will use the following equipment:

- All receiving water body samples will be collected from shore, a bridge access point or from a boat.
- Boat samples will be collected by a team of 2 to 3 field personnel. Boat samples will be collected with sampling bottles provided by the laboratories.
- For water body sampling from bridge access points, stainless steel buckets or swing-type grab samplers will be used for sample collection as appropriate. Where required, ropes or poles will be used to lower buckets into the flow.
- A Horiba U-10 Water Quality Meter or similar multi-parameter field probe will be used to collect field parameters during sample collection at all sampling locations.

- A GPS locator will be used by each team to ensure consistent sampling locations for dry- and wet-weather events.
- Sampling Event Summary Sheets (see Attachment 1) and pens will be required for each sampling team to record details of sample collection activities.
- Nitrile surgical gloves (disposable) will be worm by sampling personnel at all times during sampling.
- Decontamination supplies will be required for equipment decontamination between sampling events.

2.4. Surface Water Sampling Procedures

Surface water samples will be collected using the direct grab sampling technique outlined in Section 9.10.4 and 9.11.4 of the *New York State Department of Environmental Conservation (NYSDEC) Standard Operating Procedure: Collection of Ambient Water Quality Samples* (SOP) (NYSDEC, 2002) included as Attachment 2 to this document. New, sterile, nitrile powder-free surgical gloves will be worn by sampling personnel at all times during sampling. Sampling gloves will be changed between sampling locations. Samples will be collected in the following order using the procedures outlined below:

1. Fecal coliform
2. E. coli
3. In-situ field measurements (temperature, pH, conductivity, dissolved oxygen)

<u>Procedure:</u>

- Face upstream and into the flow of the River.
- Orient the capped sample container with the opening toward the flow and in front of the sampler.
- Lower the capped sample container to a depth of approximately 6 to 10 inches below the water surface.
- Uncap the container underwater. Avoid touching the inside of the sample bottle and cap.
- Allow the container to fill with water and re-cap the container underwater when it is full.
- Remove the capped sample container from the water, label in accordance with Section 2.7, and place in a cooler with ice. Note sample time in the Sampling Event Summary Sheet (Attachment 1). Repeat the sampling process with the remaining containers.
- When laboratory sample collection is complete, lower the Horiba U-10 water quality meter or similar multi-parameter field probe to the sampling depth. These activities can be done simultaneously should sufficient personnel be available.

- Allow meter readings to stabilize, then record field parameter measurements on the Sampling Event Summary Sheet.

If the exterior of a sample bottle becomes grossly contaminated during sample collection due to highly turbid surface water, the exterior of the bottles will be rinsed with deionized water before placing the sample container in the cooler.

Fecal coliform and E. coli samples must be delivered to the laboratory within approximately five hours of sample collection to meet the six hour holding time for these analyses.

2.5. Sample Collection Methodology

The sampling methodology is similar for all the sampling locations including the list of parameters for which samples will be analyzed. Access to each site may differ. The sections below detail sampling frequencies, durations, and methodologies for both dry- and wet-weather sampling. Necessary containers for each sampling event, with labels and with preservatives, will be coordinated by APJVT through the selected analytical laboratories. The designated field station and staging area will be used for required preservation and packaging of samples after the sampling events.

2.5.1. Dry-Weather Receiving Water Sampling

The goal of the dry-weather sampling is to collect samples five times per month over a three-month period for a total of 15 dry-weather events. The sampling period will begin in May 2008 and last through September 2008 to cover the river recreational season. For each dry-weather event, one analytical sample will be collected at each sampling position for a total of 44 samples per circuit (3 samples at 10 river transects, six tributaries, six treatment plants, and two beach sites). Grab samples will be taken at three laterally-spaced locations along each transect (3 samples per transect) in the Mohawk and Hudson Rivers and single samples will be taken for the tributary streams and potential beach sites during each sampling event.

2.5.1.1. Dry-Weather Laboratory Analysis Sample Collection

Dry-weather sampling will be conducted during business hours (8:00 A.M. – 5:00 P.M.). All dry-weather samples will be collected as discrete samples by grab sampling. The grab sample will be poured or directly collected into the appropriate laboratory bottles in the field, ensuring each bottle is filled to provide enough sample volume for analysis of the required parameters. Laboratory analyses for the samples will be performed for fecal coliform and e-coli. Immediately upon collection, all the samples will be sealed, labeled and packed in coolers with ice, ready for transport to the laboratory. These samples will be taken to the field station and staging area at the completion of the sampling event for transport with the other samples collected. The APJVT will coordinate transportation of samples with the laboratories.

2.5.1.2. Dry-Weather Field Measurements

All sampling location will be verified using a hand-held GPS unit. The field measurements that will be performed at each sampling position are: dissolved oxygen, temperature, conductivity and pH. These measurements will be conducted using the Horiba U-10 Water Quality Meter or similar multi-parameter field probe as described in Section 2.4.

In addition, Secchi depth, which is a measure of water clarity and a NYSDOH criterion for bathing waters, will be measured at the potential beach sites. Water transparency will be measured at the two potential beach locations using a Secchi disk and line graduated to ±0.1 meter. This measurement must be determined in a shady area from the shore during daylight hours, and the sampling personnel should not wear sunglasses while performing the measurement. The disk will be slowly lowered into the water column until it is no longer visible, and the corresponding depth will be recorded. The disk will then be raised until it just becomes visible; this depth will also be noted. These steps should be repeated twice, noting both readings during each step, so that an average Secchi depth can be calculated using six total measurements. If the range of Secchi disk measurements is greater than 0.5 meters, the entire process should be performed again to determine more precise reading.

Field parameters will be logged on field data sheets so that the project team is aware of the ambient conditions under which the water quality samples were collected. In addition to laboratory analyses and field parameters, river flow data, rainfall data, and tide information will also be compiled following each sampling event and maintained in the project database.

2.5.2. Wet-Weather Receiving Water Sampling

The wet-weather sampling will be performed for up to four storm events during the same period as the dry-weather sampling. Ten circuits of sampling will be performed at each of the same locations as the dry-weather sampling events. The goal is to collect samples over a 12- to 48-hour period starting just prior to the commencement of a storm event and finishing after the rain has ended and stormwater runoff has subsided. The individual grab samples analyzed at the receiving water sampling locations provide a detailed record of the time-variation of parameters within a wet-weather event. Up to a total of 1760 discrete grab samples (44 samples per circuit x 10 circuits x 4 sampling events) will be taken during the receiving water wet-weather monitoring period. Grab samples taken at three laterally-spaced locations along each transect (3 samples per transect) in the Mohawk and Hudson Rivers and single samples will be taken for the tributary streams and potential beach sites during each sampling event and each sampling time step.

2.5.2.1. Wet-Weather Laboratory Analysis Sample Collection

Wet-weather sampling will be conducted according to the protocol developed for wet-weather sampling detailed in Section 3.2. All wet-weather samples will be collected as discrete samples by grab sampling. The grab sample will be poured or collected directly into the appropriate laboratory bottles in the field, ensuring each bottle is filled to provide enough sample for analysis of the required parameters. Laboratory analyses for the samples will be performed for fecal coliform and e-coli. Immediately upon sample collection at each location, the samples will be sealed, labeled and packed in coolers with ice. Samples will periodically be taken to the field station and staging area for transport with the other samples collected by the other sampling teams. The APJVT will coordinate transportation of samples with the laboratories.

Laboratory personnel will initiate bacteriological testing of the samples collected within six hours of the samples being collected, due to the six-hour test holding time for fecal coliform. Samples will be collected for 10 circuits for the all the storm stages including pre-storm, first flush, peak flow, recovery (after peak flow), and post-storm. The approximate sample collection schedule is as follows:

- Circuit 1 – pre-storm sample (T-4)
- Circuit 2 – storm event start (T0)
- Circuits 3-6 – four-hour intervals since the storm start (T4 thru T16)
- Circuits 7-10 – eight-hour intervals (T24 and T48)

The exact schedule will be determined during the sampling event based on the discussions between the Sampling Coordinator and Team Leaders. All 48 hours of sampling may not be required based on the duration of the rainfall event.

2.5.2.2. Wet-Weather Field Measurements

All sampling location will be verified using a hand-held GPS unit. The field measurements that will be performed at each sampling position are: dissolved oxygen, temperature, conductivity and pH. These measurements will be conducted using Horiba U-10 Water Quality Meters or similar multi-parameter field probe as described in Section 2.4.

In addition, Secchi depth, which is a measure of water clarity and a NYSDOH criterion for bathing waters, will be measured at the potential beach sites. Water transparency will be measured at the two potential beach locations using a Secchi disk and line graduated to ±0.1 meter. This measurement must be determined in a shady area from the shore during daylight hours, and the sampling personnel should not wear sunglasses while performing the measurement. The disk will be slowly lowered into the water column until it is no longer visible, and the corresponding depth will be recorded. The disk will then be raised until it just becomes visible; this depth will also be noted. These steps should be repeated twice, noting both readings during each step, so that an average Secchi depth can be calculated using six total measurements. If the range of Secchi disk measurements is greater than 0.5 meters, the entire process should be performed again to determine more precise reading. No Secchi depth measurements will be obtained during evening sampling.

Field parameters will be logged on field data sheets so that the project team is aware of the ambient conditions under which the water quality samples were collected. In addition to laboratory analyses and field parameters, river flow data, rainfall data, and tide information will also be compiled following each sampling event and maintained in the project database.

2.6. Field Documentation During Sampling

Sampling Event Summary Sheets (see Attachment 1) will be completed during each sampling event by each sampling team. These will include entry spaces for:

- Time
- Date
- Initials of Recorder
- Weather Conditions
- Ambient Temperature
- Water Quality Readings:
  - DO
  - pH
  - conductivity
  - temperature
- Physical Observations:
  - presence of grease
  - presence and type of floatables
  - presence of atypical smells
- A comment area will be used for any additional observations deemed relevant by the sampling team.

These sheets will be completed by each field team and submitted to the APJVT Sampling Coordinator immediately upon completion of the sampling event.

Each sampling team will also be equipped with a field book to record any additional comments and observations at the time that the samples are taken.

A database will be maintained with the field measurements and laboratory testing results for each dry- and wet-weather sampling event.

2.7. Sample Labeling

All sample containers must be labeled in indelible ink on waterproof labels with:

- Date
- Time of sampling
- Sample number
- Sample location / location identification number
- Team Leaders name and organization

All containers for submission of samples to the laboratory must be labeled with the above plus parameter type and preservative. Attachment 3 contains the Standard Procedure for Sample Labeling that will be followed by all the sampling teams. Sample bottle labels must be filled out by the APJVT members to the extent possible prior to the sampling event. Labels should be wrapped with clear tape after being completely filled out.

2.8. Sample Shipping and Chain-of-Custody

This guideline presents a method for chain-of-custody procedures to track sample shipments, to minimize loss or misidentification of samples, and to ensure that unauthorized persons do not tamper with collected samples.

1. Fill out the Chain-of-Custody form completely (see Attachment 5) with all relevant information (the white original goes with the samples and should be placed in a "Ziploc" plastic bag and taped inside the sample cooler lid; the yellow copy should be retained by the sampler).
2. Mark liquid volume levels on sample bottles with grease pencil.
3. Place about 3 inches of inert cushioning material such as Styrofoam peanuts or bubble pack in bottom of cooler. Place bottles in cooler with VOA vials (in a "Ziploc" bag) in the center of the cooler.
4. Cover pack bottles, especially VOA vials, with ice in plastic bags. Pack cooler with blue ice in "Ziploc" plastic bags and additional cushioning material.
5. Tape drain shut and wrap cooler completely with strapping tape to secure lid.
6. Place lab address on top of cooler. To protect the shipping coolers against tampering during shipment, the cooler lid will be taped to the cooler body. A chain-of-custody seal will be placed over the tape. A broken seal will indicate that the contents may have been tampered with.

7. For out-of-town laboratory shipments, specify that the contents are "Fragile" and place "This Side Up" labels on all four sides of the cooler. "This Side Up" labels are yellow labels with a black arrow with the arrow head pointing toward the cooler lid. "This Side Up" labels should not be affixed to the cooler lid or the cooler bottom.

2.9. Equipment Decontamination

Between sampling events (between the four wet-weather events and fifteen dry-weather events), equipment will be decontaminated by the APJVT and/or Communities by autoclaving at the field station and staging area or following the sampling equipment decontamination protocol in Attachment 4. All liquid waste generated from decontamination must be collected and disposed of appropriately by the APJVT.

No decontamination of grab sample bottles is required since all grab sample bottles used in the field during each event must be provided by the laboratory that will analyze the samples.

During dry- and wet-weather sampling events, each sampling location requiring any additional sampling equipment will have a clean sterile field sampling device dedicated to that location.

2.10. Submission of Samples to Laboratories

The laboratories to be used for water quality analysis will be specified by the APJVT. All laboratories specified will be NYS ELAP certified laboratories. The following key points regarding sample submission will be addressed by all parties:

- All samples will be submitted to the laboratories in laboratory provided bottles. For discrete samples collected at all sampling locations, the Chain-of-Custodies will be completed immediately upon collection of the samples by the APJVT members.
- All coliform samples must arrive at the laboratory for analysis within 5 hours of the sample collection time, with regard to the 6 hour holding time. All other samples must be submitted for analysis within 12 hours of collection.
- All samples must be packed in coolers with ice after collection.
- The APJVT is responsible for coordinating pick-up or delivery of all samples with the laboratories. The APJVT will ensure the laboratories have made appropriate arrangements to receive or take custody of the samples out-of-hours as required by the date and time of occurrence of the storm events. The field teams are responsible for transporting all samples to the field station and staging area, and submitting all samples in appropriate containers with appropriate labeling and Chains-of-Custody to the APJVT Sampling Coordinator immediately after the event.

- The APJVT is responsible for system-wide record keeping and for directing the laboratories in sample analysis.
- Sample results will be forwarded by the laboratories to the APJVT in a format specified by the APJVT.

Section 2.8 contains the Standard Procedure for Sample Shipping that will be followed by the APJVT, and Attachment 5 presents an example Chain-of-Custody form.

2.11. Equipment Calibration and Maintenance Protocols

All equipment will be programmed to the clocks of cellular telephones of the field personnel. As part of the pre-sampling staging before a dry- or wet-weather sampling event, all Horiba U-10 water quality meters or similar multi-parameter field probes carried into the field by sampling crews will be checked for calibration following manufacturer's recommendations.

2.12. Health and Safety

Each Albany Pool Community and APJVT member is solely and completely responsible for conditions of the work sites, including safety of all persons (including employees) and property during performance of the services described in this Plan. Each Albany Pool Community and the APJVT is responsible for developing appropriate Health and Safety Plans for all work involved in project services. Safety and Health provisions shall conform to the U.S. Department of Labor Occupational Safety and Health Act, any equivalent state law, and all other applicable federal, state, county and local laws, ordinances, codes, and regulations.

Each Albany Pool Community and the APJVT shall be solely and completely responsible for ensuring its employees and subcontractors engaged in project activities receive appropriate training prior to the individual's commencement of work on the project.

Health and Safety plans for this project shall be available at all times at all Project Site(s) performed by the Albany Pool Community and APJVT members. Each APJVT member shall ensure that its subcontractor(s) completely comply with the requirements of this Section.

Each Albany Pool Community and APJVT member shall be responsible for conformance with all Federal and New York State Departments of Transportation requirements for work in streets and in traffic controls. Each APJVT member shall coordinate its activities with the local law and traffic enforcement agencies and with local agencies responsible for the operations and maintenance of the affected roads.

3. Determination of When to Sample

3.1. Dry-Weather Sampling

Dry-weather sampling will occur on the third consecutive dry day, five times per month, for three consecutive months during the period from May 2008 to September 2008. If a dry-weather sampling event is completed, and a rainfall event does not occur on the following day, another dry-weather sampling event can be completed as early as the next day if required. Dry-weather sampling events will generally occur during business hours, Monday through Friday. Weekend work may be required if the appropriate number of events were not able to be obtained during business hours. The initiation and termination of dry-weather sampling will be determined by the APJVT who will notify the Albany Pool Communities to mobilize 24 hours in advance of sampling. The APJVT will specify the time at which dry-weather sampling is to commence. The Albany Pool Communities and APJVT members will initiate sampling at the time specified, provided that a rain event does not occur between notification to mobilize and the sampling event commencement.

Based on the proximity of the sampling locations, it is estimated that there will be five sampling teams required. Each sampling team will be lead by a Team Leader from the APJVT and assisted by personnel from the communities. It is estimated that the sampling teams will require nine employees from the communities, whose roles include two drivers of boats and seven sampling team members. Personnel will be required for a single shift for dry-weather sampling and over multiple shifts to support the wet-weather sampling.

3.2. Wet-Weather Sampling

Four wet-weather events will be sampled at all receiving water body locations identified in Table 2-1. The goal for the sampled storms will be to meet the following targets though minor deviations may be required to meet the sampling schedule:

- Be a community-wide storm event. The decision on whether or not an event is “community-wide” will be an ongoing judgment by the APJVT Sampling Coordinator during the sampling event.
- Have a rainfall volume of at least 0.5 inches +/-50% (0.25 to 0.75 inches).
- Have a minimum predicted duration of 6 hours +/- 50% (3 to 9 hours).

There must be a minimum of 72 hours of antecedent dry weather prior to a storm event for the event to be sampled. Interpretation of situations during an initiated event, such as intermittent overflows due to intermittent rainfall, etc., and any subsequent decisions on continuing the sampling event, are the responsibility of the APJVT Sampling Coordinator. The weather conditions will be tracked throughout the monitoring period to identify the appropriate times to mobilize crews for the wet-weather events. Due to the variability of weather patterns, there is the potential for sampling crews to be mobilized and then have to head back due to lack of rain. Alternatively, this sampling effort may replace a planned dry-weather sampling event if appropriate.

The same five sampling teams will be assembled for both dry- and wet-weather sampling events as described above. Based on the proximity of the sampling locations, it is estimated that there will be five sampling teams required. Each sampling team will be lead by a Team Leader from the APJVT and assisted by personnel from the communities. It is estimated that the sampling teams will require nine employees from the communities, whose roles include two drivers of boats and seven sampling team members. Personnel will be required for a single shift for dry-weather sampling and over multiple shifts to support the wet-weather sampling.

In order to initiate a wet-weather sampling, the procedure described below in Section 3.3 will be followed.

3.3. Procedures for Initiation of Wet-Weather Sampling

3.3.1. General

The APJVT Sampling Coordinator will designate a qualified person to review real-time weather information and forecasts through two websites: CBS 6 network (www.cbs6albany.com/albany-weather-forecast), and the National Weather Service Forecast Office for Albany (http://www.erh.noaa.gov/aly/) to determine if a significant storm is forecast for the City of Albany within the next 48 hours and to monitor actual weather patterns. The Channel 6 web site provides real-time data for Doppler radar, temperature, wind speed and direction. The National Weather Center web site contains forecasts for the next three to five days and predicted hydrologic information, e.g., likely rainfall intensities. The National Weather Center web site is updated four times daily at approximately 5:00 A.M., 10:00 A.M., 4:00 P.M. and 10:00 P.M. The forecasting sites will be checked seven days a week at 8:00 A.M., 11:00 A.M. and 5:00 P.M.

The sampling period will begin in May 2008 and last through September 2008 or until four events are completed, whichever comes first. Sampling will not be conducted during Memorial Day weekend between Friday, May 23 at 5:00 P.M. and Tuesday, May 27 at 6:00 A.M., or during 4th of July weekend between Thursday, July 3 at 5:00 P.M. and Monday, July 7 at 6:00 A.M. In addition, during the first three weeks of the sampling period, wet-weather events will only be sampled if storms are initiated on weekdays between 6:00 A.M. on Mondays and 5:00 P.M. on Fridays. Sampling will not be initiated for rain occurring between 5:00 P.M. on Friday and 6:00 A.M. on Monday. Wet-weather sampling teams will therefore be on stand-by at all times except the period between 5:00 P.M. on Friday and 6:00 A.M. on Monday. Should at least one storm event have been captured by the end of the first three weeks, this will continue. If no storm events have been captured, teams will then be on standby to sample 24 hours a day, 7 days a week. If one storm is captured in the first three weeks but after another two weeks (five weeks of sampling in total) a second storm event has not been captured, teams will then be on standby to sample 24 hours a day, 7 days a week.

3.3.2. Stage 1: Preparation

If an appropriate storm is forecast, the APJVT Sampling Coordinator will notify all the Team Leaders from the five sampling teams 12 to 24 hours in advance of the storm's estimated arrival time.

The Team Leaders will then contact their sampling teams, including the staff of the Albany Pool Communities, to be on standby to assemble for wet-weather sampling. Based on the proximity of the sampling locations, it is estimated that there will be five sampling teams required. Each sampling team will be lead by a Team Leader from the APJVT and assisted by personnel from the communities. It is estimated that the sampling teams will require nine employees from the communities, whose roles include two drivers of boats and seven sampling team members.

3.3.3. Stage 2: Assembly of Teams

The APJVT Sampling Coordinator will continue to track the storm and when the storm is predicted to hit the Albany Pool Communities area within two to four hours, the APJVT Sampling Coordinator will immediately contact the Team Leaders and inform them that a sampling event will be initiated.

The APJVT Sampling Coordinator will contact all the Team Leaders who will contact their wet-weather sampling teams and instruct them to assemble at the designated field station and staging area as soon as possible prior to the storms predicted arrival. The APJVT Sampling Coordinator will also go to the wet-weather staging area two hours prior to the storm.

3.3.4. Stage 3: Initiation of Sampling

Once the wet-weather sampling teams have assembled at their designated field station and staging areas at least two hours prior to the storms predicted arrival, the field teams will mobilize and sample collection will be initiated in order to capture a pre-storm sample from each sampling location.

The Sampling Coordinator will then monitor the weather both visually and on-line using the field station's real-time weather network link, and as soon as rainfall starts, the APJVT Sampling Coordinator will record the time and inform the Team Leaders that the event has started. At this stage, all the sampling teams will continue to collect samples throughout the duration of the storm for up to 10 circuits at each sampling location.

The approximate sample collection schedule is as follows:

- Circuit 1 – pre-storm sample (T-4).
- Circuit 2 – storm event start (T0).
- Circuits 3-6 – four-hour intervals since the storm start (T4 thru T16).
- Circuits 7-10 – eight-hour intervals (T24 and T48).

The exact schedule will be determined during the sampling event based on the discussions between the Sampling Coordinator and Team Leaders.

If a pre-storm sample is collected and a storm event does not occur that meets the criteria outlined in Section 3.2, these samples may be submitted for laboratory analysis and used for a dry-weather sampling event if applicable, or will not be submitted for analysis.

4. Laboratory Analysis

4.1. Designated Laboratories

The laboratories to which samples will be submitted for analysis by the APJVT have not yet been selected. However, it is anticipated that multiple labs will be required due to the large quantity of sample analysis required.

4.2. Analytical Methods

Table 4-1 details the parameters that will be sampled for and the analytical methods. Once the laboratories have been selected, the same filter type and manufacturer will be specified following a discussion with the laboratories. Laboratory SOPs will be reviewed and checked for consistency. Each lab should provide sufficient range of sample dilutions to accommodate for a potential range of fecal coliform counts from 10 to 1,000,000.

Table 4-1.
Laboratory Analysis Details

Parameter	Method	Holding Time
Fecal Coliform	Membrane Filtration – Standard Method 9222D	6 hours
E. coli	EPA method 1603	6 hours

Notes: Estimated/anticipated detection limits only – to be confirmed by discussion with selected laboratories.

4.3. Laboratory Quality Assurance/Quality Control (QA/QC)

Quality control sample analyses that will be performed during this project to document the acceptability of the data will include:

- Equipment Blanks
- Method Blanks
- Field Blanks
- Duplicate Samples

- An equipment blank (rinsate blank) will be collected for each type of sampling device used during sample collection at the field station and staging area immediately prior to initiation of a dry- or wet-weather sampling event. This will be conducted by the APJVT Sampling Coordinator and Team Leaders assembled for a sampling event.

Laboratory analyte-free water will be used to prepare an equipment blank by placing the laboratory water into one of each type of sampling device (decontaminated grab sampler, and bucket etc.) and filling one set of sampling bottles per type of sampling device and submitting them for analysis to the laboratory with the other samples.

- The laboratories will prepare and analyze one laboratory reagent blank (method blank) for each set of 20 samples received and whenever samples are processed (extracted, digested etc.) or other appropriate QA/QC as documented in LAB QAPP and SOPs.
- For each wet-weather sampling event, one duplicate sample will be collected for every 10 samples collected in the field by each field team during the event. The sampling teams must ensure they take extra sets of laboratory sample bottles into the field for collection of these duplicate samples during each event.
- For dry-weather sampling events, one duplicate dry-weather sample will be collected by each of the five sampling teams for a total of five duplicate samples. The locations at which these duplicates will be collected will be determined by the APJVT Sampling Coordinator who will inform the Team Leaders prior to the dry-weather sampling event.

All quality control sample analytical results will be reported on standard forms in conjunction with data acceptance criteria. The selected laboratories will submit a detailed Quality Assurance Project Plan for review by the APJVT prior to initiation of the sampling program.

5. Team Quality Assurance Procedures

Several quality assurance procedures will be applied to team activities. These procedures are presented below.

5.1. Field Maintenance Activities and Documentation

Consistent field maintenance activity and documentation is a priority for the team. Prior to the implementation of the sampling program, the following activities will be carried out and documented:

- A site report will be prepared for each sampling location by the APJVT. Each site report will include a map showing the physical location and access if it is a river sampling location and GPS-obtained coordinates. Visual observations of any hydraulic characteristics along with any safety concerns will also be included on the report. A photograph will also be obtained showing the location of each site and submitted to APJVT in electronic format. A template for the site report will be provided by APJVT.
- All sampling teams will be equipped with a field book by the Team Leader and Sampling Event Summary Sheets from APJVT to document comments and observations at the time the samples are taken.

5.2. Team Training

Team training provides an important quality assurance mechanism for a water quality sampling program of this magnitude. A formal training workshop will be held to ensure that field personnel are comfortable with the sampling procedures. The workshop will be conducted by APJVT Sampling Coordinator, supported by the APJVT. All members of the sampling teams will participate in the workshop. Training topics will include:

- Health and Safety
- Sampling Protocols
- Coordination

5.3. Wet-Weather Sampling Test Run

The first dry-weather sampling event will be organized prior to any wet-weather sampling. This dry-weather event will be used as a test run of the wet-weather sampling program:

- Teams will be called to the field station and staging area as per a sampling event. This will test the team's communication and event initiation mechanisms.
- Teams will deploy on their sampling route and schedule. This will test the routing to and between sites.
- Teams will reconvene at the field station and staging area and samples will be prepared for the laboratory. This will test the arrangement of the staging area, chain-of-custody protocols, and the laboratory delivery process.

6. Data Submission and Reporting

6.1. Format for Submission of Data to Sampling Coordinator

The APJVT will coordinate with the analytical laboratories to ensure proper data transfer. Templates will be provided to the laboratories before the first sampling event to facilitate the transfer. The data will be provided to the APJVT as Excel spreadsheets and will include QA/QC results.

6.2. Data Storage

The APJVT is responsible for final storage of system-wide water quality data, made up of the transmittals from the analytical laboratories. The APJVT members are responsible for transmitting copies of all installation reports, maintenance reports, and sampling field logs and summary sheets to Clough Harbour & Associates (CHA) for inclusion in the project master files.

The turnaround time for the data will be specified with the laboratories that are selected to conduct the laboratory analyses.

7. Program Management

7.1. Responsibilities of the Project Team (Project Organization)

The Albany Pool Communities are responsible for:

- Providing staff and equipment for field sampling teams.

The APJVT is responsible for:

- Acquiring all sampling equipment (except as described above under Albany Pool Communities responsibility), including grab samplers, 500 ml grab sampling bottles, buckets, boats, field books etc. Boats have been committed for use during sampling by the Port of Albany and the Albany County Sewer District (ACSD).
- Provision of hand held DO, pH and temperature probes for in system sampling activities.
- Obtaining pre-labeled sample bottles, with preservatives, and shipping materials from laboratories.
- Providing a Sampling Coordinator to coordinate sampling activities from the staging area.
- Sample collection and transport to the wet-weather staging area.
- Sample preservation.
- Equipment decontamination between sampling events.
- Proper labeling of all samples.
- Record keeping for the sampling event and sample submission.
- Maintenance and calibration of equipment.
- Coordinating pickup or delivery of samples with the laboratories.
- Compilation and storage of system-wide water quality analytical data.
- Production of the Water Quality Data Summary Report.
- Retrieval and storage of field data.
- Notification to APJVT Sampling Coordinator should problems arise, field equipment malfunction or other issues arise that may effect the water quality sampling effort.

7.2. Variation from the Plan

During implementation of this Plan, should the location of any sampling point require to be altered due to unanticipated conditions in the field, the APJVT Sampling Coordinator must be notified as soon as practical. All sampling locations must be agreed to by the APJVT members prior to sample collection.

Should any other modifications to this Plan be required through unanticipated field conditions or other events, the APJVT Sampling Coordinator must be notified immediately. Contact details are provided in Attachment 6.

Wet-weather water quality sampling in a system as complex as the Albany Pool Community is an iterative process. If water quality data obtained from one or more completed sampling events suggest a benefit from changing any sampling protocol defined in this Plan, the Albany Pool Communities may choose to make such a change. Similarly, should physical constraints to sampling or constraints in laboratory capabilities for dealing with such a large quantity of samplers be encountered, this Plan may be modified. Any such change will be documented, with justification, in an Addendum to this Plan.

Changes from the protocol described herein will be pre-approved to the extent possible with the NYSDEC.

ATTACHMENT 1

Sampling Event Summary Sheet

Attachment 1 - Sampling Event Summary Sheet

Initials:
Project:
Sampling Team:
Date:
Weather:
Temperature:

Page ___ of ____

Sampling Location	Time	Field Parameter	Measurement	Physical Observations	Comments
		DO		Grease	
		temperature		Floatables	
		conductivity		Odors	
		pH			
		Secchi depth			
		DO		Grease	
		temperature		Floatables	
		conductivity		Odors	
		pH			
		Secchi depth			
		DO		Grease	
		temperature		Floatables	
		conductivity		Odors	
		pH			
		Secchi depth			
		DO		Grease	
		temperature		Floatables	
		conductivity		Odors	
		pH			
		Secchi depth			

ATTACHMENT 2

SOP: Collection of Ambient Water Quality Samples

New York State Department of Environmental Conservation

Division of Water

Standard Operating Procedure: Collection Of Ambient Water Quality Samples

Date: August 8, 2002

Prepared by: ________________________________ **Date:**______________

Reviewed by: ________________________________ **Date:**______________

Approved by:________________________________ **Date:**______________

Table of Contents

1. Scope and Applicability

1.1 This practice covers the collection of representative ambient flowing water column samples for the purpose of chemical and physical analysis in the assessment of water quality. It includes samples collected from streams and rivers of various depths and velocities using depth-integrating samplers, point samplers and both compositing and non-compositing techniques.

1.2 This document does not cover guidelines for planning water quality activities, the design of monitoring programs, sample handling and preservation, data assessment or quality assurance of samples or field measurements.

1.3 This SOP is to be followed unless project objectives or physical conditions make it inappropriate. In such a case, the exact procedures followed, or deviations from the SOP must be documented in the field logbook, and a copy of the log entry submitted to the Division of Water Quality Assurance Officer for possible incorporation into future updates to this SOP.

2. Summary of Method

2.1 Water quality may vary throughout the cross section of a stream due to a number of factors such as groundwater influence, point and non-point discharges, tributary inflows and variations in velocity and channel characteristics. Therefore, a composite sample collected from a cross section of the stream's width and depth is recommended for parameters that are amenable to compositing.

2.2 The collection of water column samples at multiple depths is accomplished through the use of specially designed water collection equipment such as teflon-coated *Kemmerer Water Sampler*, Polypropylene *Polypro Water Sampler* and flow-orienting depth integrating suspended-sediment samplers. The water column samples collected across the stream's depth and width are then composited in a sample splitting churn.

2.3 Collection of water column samples for parameters that by their nature can not be composited and require special handling are achieved using water collection equipment tailored for specific needs.

3. Definitions

3.1 Composite sample: A sample that is made up of smaller samples that are collected from across sections of a stream's width and depth.

3.2 Depth-integrating suspended sampler: A depth-integrating suspended sampler is designed to accumulate a water/suspended sediment sample from a stream vertical at such a rate that the velocity in the nozzle is nearly identical to that of the stream.

3.3 Dip: One complete cycle of the depth-integrating suspended sampler from the water surface to the bottom and back again that fills the sample bottle with the ambient waters.

3.4 Grab sample: A single sample taken directly in the stream.

3.5 Quality Assurance Project Plan (QAPP): A document that describes project-specific information such as the necessary quality assurance, quality control, and other technical activities that are implemented to ensure that the results of the work performed satisfies acceptance criteria.

3.6 Stream depth: The stream depth is the vertical height of the water column from the existing water surface level to the channel bottom.

3.7 Stream width: The stream width is the horizontal distance along a line from shore to shore.

3.8 Transect line: A line determined by two points on opposite streambanks, is useful as the location reference for the measurement of ambient flowing water column samples, and allows for determination of chemical and physical conditions existing at a point within a stream.

3.9 Trip: A unit that refers to the number of times the depth-integrating suspended sampler and sample bottle is brought above the water surface and the sampled ambient waters are emptied into a churn.

3.10 Water column: The vertical location at which the sampler is lowered and raised below the surface water level.

4. Health and Safety Warnings

4.1 This standard does not address all safety concerns associated with conducting field sampling and the handling of chemical reagents. The reader is referred to the Division of Water’s Health and Safety SOP and to follow the appropriate health and safety practices covered therein.

4.2 Safety is more important than the task. If for any reason conditions at the monitoring site are considered unsafe, suspend sampling and leave the site.

4.3 When sampling from a boat, the field team should follow general boating safety procedures.

5. Cautions

5.1 Always work with at least one partner when collecting ambient water quality samples.

5.2 Never wade in swift or high water. Use a walking stick to steady yourself and to test for deep water and muck.

5.3 Know what is upstream of a sampling site before entering the stream. An unexpected dam release could leave a sample collector stranded and in trouble in the stream.

5.4 Wear and maintain assigned personal protective equipment.

5.5 Never eat and drink when collecting and handling samples.

5.6 Always wash hands before and after collecting and handling samples.

5.7 Cover all personal open cuts and abrasions before sampling.

5.8 Protect sampling equipment from blows against rocks, bridge rails and any other objects in the stream or stream bank. *Extra care must be used with teflon samplers because the material is brittle and easily damaged.*

5.9 Wear proper field clothing to prevent hypothermia, heat exhaustion, sunstroke, drowning, or other dangers.

5.10 Be fully aware of all lines of communication that address emergency and safety situations.

5.11 Use caution when working from a bridge or boat.

6. Interferences

6.1 Sample integrity is critical in obtaining meaningful data from water quality samples. Introduction of contaminants into the sample from sampling equipment, sample preparation, sample handling, location of sampling site and improper collection methods can affect the integrity of the sample.

6.2 Following proper collection and handling procedures will ensure a representative (well-mixed) sample is collected.

6.3 Following proper storage, cleaning and handling of all sampling equipment will minimize and possibly eliminate the introduction of contaminants to the sample. Refer to the Division of Water's SOP#101-02 Sample Handling, Transport and Custody and SOP#103-02 Equipment Cleaning.

6.4 A representative stream sample must contain similar proportions of sediment particles that are present in the water column of the stream. Stirring up bottom sediments while collecting water samples may introduce more suspended sediments than is normally found in the stream and must be avoided.

7. Personnel Qualifications

7.1 All staff responsible for collecting water quality samples shall be familiar with the procedures outlined in this standard, the Quality Assurance Plan for the sampling project and the DOW Health and Safety SOP prior to conducting water quality sampling.

8. Equipment and Supplies

8.1 The equipment needed for the collection of ambient water quality samples includes, but is not limited to the following:

8.1.1 Point samplers (Teflon-coated Kemmerer Water Sampler or Polypropylene PolyproWater Sampler 1400 mL size)

8.1.2 Depth-integrating suspended sediment sampler (Flow-orienting US DH –76 or US DH- 81 Adapter)

8.1.3 Sample suspension apparatus (crane)

8.1.4 Wading rods

8.1.5 Sample collection bottles (1 quart and glass)

8.1.6 Nozzles

8.1.7 Line and messengers

8.1.8 Rope

8.1.9 Sample splitting churn

8.1.10 Stainless steel pail

8.1.11 Whirl-Pak sampling bags and poles

8.1.12 Sterile bacteriological bottles (Bac-T bottles)

8.1.13 Teflon or Polyethylene dippers

8.1.14 Maps

8.1.15 Personal protective equipment

8.1.16 Field sheets/log book

8.1.17 Stakes and flagging tape

8.1.18 Camera

8.1.19 Global Positioning System (GPS)

8.1.20 Approved QAPP

8.1.21 Portable multi-parameter meter (pH, dissolved oxygen. conductivity and temperature)

9. Procedures

9.1 The following procedures should allow for the collection of representative samples from the majority of flowing waters (rivers and streams) encountered.

9.2 There must be a Quality Assurance Project Plan (QAPP) approved by the Division of Water's Quality Assurance Officer before collecting any water samples for chemical analysis.

9.3 Sampling personnel should wear new, clean gloves. If gloves become contaminated, they must be replaced.

9.4 During the sample collection and transfer process, one person is responsible for handling the samples and sample bottles ("clean hands") and another person is responsible for all activities that do not involve direct contact with the samples ("dirty hands"). Refer to EPA Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels.

9.5 Sample Collection – General

9.5.1 Determine the appropriate sampling method and device based upon stream type and parameters to be analyzed.The selection of a sampling method is based on minimizing any loss or introduction of the parameter being analyzed and ensuring that the water sample is representative of the chemical, biological and physical characteristics of the stream being studied.

9.5.2 Determine what special collection requirements are needed to maintain integrity of the parameter to be analyzed. For example, a water sample cannot be aerated when collecting for volatile halogenated organics analysis. Check with the analytical laboratory, Standard Methods or Table 1 of this document for verification of parameter specific information.

9.5.3 Determine compatibility of sampling device construction materials with parameters to be analyzed. As an example, when collecting samples for organic analysis, do not use plastic sampling devices.. Check with the analytical laboratory, Standard Methods or Table 1 of this document for verification of appropriate material types for specific parameters.

9.5.4 Determine the quantity/ volume of sample that needs to be collected based on the parameters to be analyzed and quality controls samples that need to be collected. If sample will be partitioned into sub-samples using a sample splitting churn an additional (2) liters of sample is required to allow for proper mixing. Refer to SOP # 101-02 Sample Handling, Transport and Chain-of-Custody for sub-sampling requirements.

9.5.5 Assess the sites physical characteristics such as stream velocity, depth, width, sources of inflows and accessibility.

9.6 Sample Collection – Preparation

9.6.1 Assemble the necessary sampling equipment and set up a clean work space away from automobile and boat emissions.

9.6.2 Prior to sampling, regardless of the method of collection, all sampling equipment employed should be free from contaminants. Refer to SOP#103-02 Equipment Cleaning.

9.6.3 The first water sample collected at a sampling site is used to rinse the samplers and sample splitting churns.

9.6.4 When doing depth-integrating suspended sediment sampling, glass bottle containers should be site-dedicated. If possible, the sampling nozzles should also be site-dedicated. If not, clean the nozzles according to SOP#103-02 Equipment Cleaning.

9.6.5 Point samplers should be rinsed with distilled/deionized water after sample collection is completed and allowed to dry in the “open” position.

9.6.6 The sample splitting churn should be rinsed thoroughly with distilled/deionized water after sample collection is completed. To keep the churn from drying out during short-term storage, add a liter or so of distilled/deionized water.

9.7 Sample Collection – Method Options

9.7.1 Point Samplers

9.7.1.1 Point samplers allow for a water sample to be collected at a discrete point. It is recommended for use where there is limited variation/ stratification in the composition of the stream, the velocity is less than 2 ft/s and for larger, deeper waters (greater than 4 ft.). The Oswego River at Minetto, Upper Hudson River at Waterford or the Buffalo River in Buffalo would be appropriate sampling sites.

9.7.1.2 Point samplers are available in various configurations of shape, closing mechanism, and construction materials. They generally consist of a hollow tube/ cylinder with stoppers at both ends and a weighted base. The sampler is lowered to the desired depth by a rope with a weighted messenger attached. The stoppers are tripped closed with the messenger sealing the bottle contents from any further contact with the stream water.

9.7.1.3 Common point samplers used in ambient water quality sampling are Kemmerer bottle, Van Dorn bottle, and Polypro sampler.

9.7.2 Depth-Integrating Suspended Sediment Samplers

9.7.2.1 A depth-integrating suspended sampler is designed to accumulate a water/suspended sediment sample from a stream vertical at such a rate that the velocity in the nozzle is nearly identical to that of the stream. This results in the collection of a sample that has a water/suspended sediment ratio similar to that of the stream.

9.7.2.2 Since many pollutants adhere to suspended sediment particles in the stream, a representative water column stream sample must contain a representative proportion of sediment particles.

9.7.2.3 This sampling method allows the collection of a water sample to be collected continuously through a vertical column of the stream depth.

9.7.2.4 There are many types of depth-integrating suspended samplers that vary by construction material, weight and manner in which they are lowered or raised through the water column. They may be used in all flowing waters and are designed so the nozzle is facing into the flow and collecting the sample into a collection container.

9.7.3 Special Water Column Samplers

9.7.3.1 When there is incompatibilities between the compositing sample collection techniques and the nature of some stream parameters, an alternative collection method can be tailored to meet the stream parameters. Alternative collection methods include the use of dissolved oxygen samplers, teflon or polyethylene dippers, whirl-pak sampling bags, Bac-T Bottles, poles and stainless steel buckets.

9.8 Sample Collection - Field Parameters

Field parameter measurements are taken directly from the water column to be sampled. All field measurements are recorded on field sheets with the appropriate units.

9.8.1 Dissolved Oxygen (D.O) – Use a multi-parameter probe or an appropriate D.O. meter. Make sure that the equipment has been appropriately calibrated following the manufacturer's specifications. Be sure to record the appropriate units.

9.8.2 Conductivity – Use a multi-parameter probe or an appropriate conductivity meter. Make sure that the equipment has been appropriately calibrated following the manufacturer's specifications. Be sure to record appropriate units.

9.8.3 pH – Use a multi-parameter probe or an appropriate pH meter. When calibrating the meter, select two pH buffers that reflect the expected pH of the stream. Make sure that the equipment has been appropriately calibrated following the manufacturer's specifications.

9.8.4 Water Temperature – Use a multi-parameter probe or mercury-filled thermometer. If using a thermometer, insert the thermometer to the immersion line in a bucket of sample water that has been placed in the shade. Allow the mercury column to stabilize (~ 2 min.), and record the temperature from the immersed thermometer. Be sure to record appropriate units.

9.8.5 Barometric Pressure - Record the barometric pressure for the sampling date from a barometer, local airport or weather station report. Be sure to record appropriate units.

9.9 Sample Collection – Methodology Parameters

9.9.1 Transect

The number and location of sampling transects is a matter of judgement based on stream uniformity of flow (discharge) and field parameters (such as pH, water temperature, and dissolved oxygen). At a minimum, three transects should be collected across the stream width. All transects should be equally spaced. In general, uniform streams require less transects while streams showing wider variations between flow and field parameters require more transects.

9.9.2 Depth

Depth is only a factor when point samplers are used. The number of discrete depths to be sampled in the water column is contingent on the homogeneity of the stream. A general rule is the more homogeneous the stream is the fewer discrete depth samples are needed. At a minimum, three depths (top, middle and bottom) are required at each sampling interval.

9.9.3 Stream Accessibility

Sampling may be conducted from a bridge, boat, or directly from a stream. The latter is the preferred way of sampling because the sample will not be subjected to significant chemical changes (contamination) during the sample collection process. When accessibility to a stream is hindered because of flow rates and water depths, sampling from a bridge or boat is recommended. All sampling methods have inherent dangers, and safeguards should be taken to minimize the risk of falls, slips, drownings, capsizing and so forth.

9.9.3.1 Avoid disturbing the bottom sediment.

9.9.3.2 Avoid sampling along the riverbank, in stagnant water, or from an eddy.

9.9.3.3 Avoid sampling near piers or other man-made obstructions.

9.9.3.4 Avoid banging equipment into structures or the sides of the boat.

9.9.3.5 Avoid sampling near or from power sources such as power lines and boat motors.

9.9.3.6 Avoid contaminating the sample by having one person sample the water and another person run the boat.

9.10 Sample Collection – Sampling Procedures

9.10.1 Sampling from a bridge with a depth-integrating suspended sediment sampler

9.10.1.1 Assemble the sampling crane with the depth-integrating suspended sediment sampler attached to the cable.

9.10.1.2 Secure a collection bottle or bag (designated for the specific site) to the sampler.

9.10.1.3 Choose an appropriate nozzle for the sampler and insert it into the sampler. Small nozzles are appropriate for high stream velocities while large nozzles are recommended for slower moving streams.

9.10.1.4 Select the first transect in the portion of the stream that appears to have the highest flowing volume of water.

9.10.1.5 Lower the sampler until it breaks the water surface.

9.10.1.6 Record start time and set the depth gauge on the crane to zero.

9.10.1.7 Lower the sampler to the bottom of the stream and read and record the depth displayed on the gauge. Track the depth on subsequent descents to prevent the sampler from disturbing the bottom sediments.

9.10.1.8 Raise the sampler to the water surface, keeping it just below the water surface level, and then lower sampler towards the streambed.

9.10.1.8.1 One complete cycle from the water surface to the stream bed and back to the water surface is referred to as a "dip."

9.10.1.8.2 Repeat dips until the collection bottle is about 75% full. When the collection bottle is filled beyond 75% full, it will act as a sediment trap.

9.10.1.8.3 Keep track of the number of dips or cycles on a field sheet.

9.10.1.8.4 The number of dips is dependent on the stream depth and the speed with which the collection bottle fills.

9.10.1.9 Raise the sampler above the water surface level when the collection bottle reaches about 75% full and empty the collected water into a sample splitting churn.

NOTE: The first water collected is used to rinse the sample splitting churn and determine the rate of descent/ascent and the number of dips. A uniform rate of descent/ascent should be maintained while raising and lowering the sampler through the water column. The transit rate is a function of the type of collection bottle or bag, size of sampler nozzle, and the desired sample volume.

9.10.1.9.1 Each time the sampler and collection bottle is brought up and emptied into the sample splitting churn is referred to as a "trip."

9.10.1.9.2 Each transect must have the same number of trips made up of the same number of dips.

9.10.1.9.3 The number of trips collected at each transect is a function of the volume of water and the number of transects.

9.10.1.9.4 A representative sample is ensured when more transects and fewer trips and dips are taken.

9.10.1.10 Move sampling crane to the next transect and continue the sample collection, using the same number of trips and dips and the same rate established at the first transect.

9.10.1.11 After collecting the sample into a sample bottle, record the number of transects, trips, and dips, sampling end time, ending gage height, and any deviations from standard sampling procedures on field sheets and in a logbook.

NOTE: The number of transects, trip and dips should remain consistent for subsequent samples collected at the site and under similar stream flow conditions.

9.10.2 Sampling directly from a stream (i.e., stream wading) with a depth-integrating suspended sediment sampler

9.10.2.1 Assemble the rod and nozzle head and secure the collection bottle, designated for the site, into the nozzle head.

9.10.2.2 Enter the stream downstream from where sample will be collected.

9.10.2.3 Select the first transect in the portion of the stream that appears to have the highest flowing volume of water.

9.10.2.4 Record start time and orient sampler with nozzle facing upstream and into the flow while standing downstream of sampler.

9.10.2.5 Lower sampler through the water column to the bottom of the stream without disturbing the bottom sediment. Bed material may enter through the nozzle, resulting in erroneous data.

9.10.2.6 Raise sampler to the water surface level. A uniform rate of descent/ascent should be maintained while raising and lowering the sampler through the water column.

9.10.2.6.1 One complete cycle from the water surface level to the stream bottom and back again is referred to as a "dip."

9.10.2.6.2 Repeat dips until the sample bottle is about 75% full and keep track of the number of dips on a field sheet. Do not fill the sample bottle more than 75%, as it will act as a sediment trap.

9.10.2.6.3 Each time the sampler and sample bottle is brought up and emptied into the churn is considered a "trip." A trip is made up of the same number of dips along each transect.

9.10.2.6.4 The number of trips to be collected at each transect is determined by the volume of water that is required and the number of transects.

9.10.2.6.5 The number of dips per trip depends upon the stream depth and the speed with which the sample bottle fills.

9.10.2.6.6 It is generally preferred to have more transects and fewer trips to ensure a representative sample.

9.10.2.7 Move to the next transect and continue the sample collection using the same number of trips and dips as was established at the first transect.

9.10.2.8 After collecting the sample, record the number of transects, trips, and dips, sampling end time, and any deviations from standard sampling procedures on field sheets or in a logbook.

NOTE: The number of transects, trip and dips should remain consistent for subsequent samples collected at the site and under similar stream flow conditions.

9.10.3 Sampling with a point sampler

9.10.3.1 Set sampler to the open position by following the manufacturer's instructions for setting the end caps. This is done by either pulling the trip head into the trip plate or by holding the top and bottom stoppers and giving a short, hard pull to the bottom stopper.

9.10.3.2 Lower the sampler to a desired depth while holding the messenger and feeding the sampler cord through the sampler.

9.10.3.3 Release the messenger or trip the mechanism used to close both of the end caps/stoppers.

9.10.3.4 Raise the sampler and pour water from the drain valve or one of the sampler ends into the sample splitting churn.

9.10.3.5 Rinse the sampler and sample splitting churn with the first collected water.

9.10.3.6 Repeat steps 9.10.3.1-9.10.3.4 at desired depths and verticals across the stream for actual sample collection.

9.10.3.6.1 Take sample from the deepest depth first then move up the water column to the middle section, and finally, to the top section.

9.10.3.7 After sampling is completed, rinse point sampler with distilled/deionized water, let dry in the "opened" position and store the sampler in the "closed" position.

9.10.4 Direct Grab

9.10.4.1 Enter the stream downstream from where the sample will be collected.

9.10.4.2 Select the area of the stream having the greatest flow.

9.10.4.3 Face upstream and into the flow.

9.10.4.4 Orient sample container with the opening towards the flow and in front of you.

9.10.4.5 Invert sample container.

9.10.4.6 Lower container into water six (6) to ten (10) inches below the water surface.

9.10.4.7 Uncap the container underwater to avoid introducing surface scum into the bottle.

9.10.4.8 Tilt the container at a 45-degree angle and hold the container steady

9.10.4.9 Allow the container to fill with water.

9.10.4.10 Cap the container underwater when container is full.

9.11 Sample Collection – Special Samples

9.11.1 Collection Methodology

A single grab sample taken directly in the stream is the most efficient way of collecting water column samples when the nature of the parameter to be analyzed is not amenable to compositing collection techniques (ie., depth-integrating suspended sediment sampler). To ensure that the most representative sample is collected, select the area of the stream having the greatest flow and avoid agitation or aeration to the sample. If a direct sample cannot be collected, the sample collection equipment must be constructed of an inert material or material compatible with the parameter being analyzed (Table 1). Ropes or extension poles can be used to lower collection equipment into the water column. Detailed procedures for the most commonly collected parameters requiring non-compositing techniques are listed below.

9.11.2 Phenolic Compounds

9.11.2.1 Direct Grab

9.11.2.1.1 Select the area of the stream having the greatest flow.

9.11.2.1.2 Continue by following procedures (9.10.4.1-9.10.4.10) for a direct grab sample.

9.11.2.1.3 Collect a grab water sample directly into a glass sample container.

9.11.2.1.4 Do not composite sample.

9.11.2.2 Alternative Method – steel bucket or swing sampler

9.11.2.2.1 Use a stainless steel bucket or a swing sampler with glass bottle attached.

9.11.2.2.2 Rinse stainless steel bucket /glass container with water from the site to be sampled before collecting the sample.

9.11.2.2.3 Select area of the stream with the greatest flow.

9.11.2.2.4 Collect a grab water sample with stainless steel bucket or swing sampler. Try to minimize agitating the sample.

9.11.2.2.5 Fill the phenol bottle directly.

9.11.2.2.6 Do not composite sample.

9.11.3 Volatile Halogenated Organics (VHOs)

9.11.3.1 Direct Grab

9.11.3.1.1 Select the area of the stream having the greatest flow.

9.11.3.1.2 Continue by following procedures (9.10.4.1-9.10.4.10) for a direct grab sample.

9.11.3.1.3 Hold the vial at a 45-degree angle and slowly submerge and uncap the vial.

9.11.3.1.4 Hold the vial in place for 15 - 20 seconds to ensure the transfer of a non-turbulent flow of sample down the inside of the vial.

9.11.3.1.5 Fill the vials completely and secure the cap while the vial is still submerged to avoid aeration.

9.11.3.1.6 Remove the sample vial from the water.

9.11.3.1.7 Turn the vial upside down and tap the side lightly to check for air bubbles. If the vial contains any air bubbles, the sample vial must be uncapped and topped off with more sample.

9.11.3.2 Alternative Method 1 – dissolved oxygen bucket

9.11.3.2.1 Use a dissolved oxygen (D.O.) sampling bucket outfitted with pre-cleaned Tygon tubing.

9.11.3.2.2 Select the area of the stream having the greatest flow.

9.11.3.2.3 Place two (2) clean, uncapped biochemical oxygen demand (BOD) bottles into D.O. sampling bucket.

9.11.3.2.4 Close the D.O. bucket lid making sure the Tygon tubing is inserted into the BOD bottles.

9.11.3.2.5 Lower the sampling bucket one (1) foot below the water surface.

9.11.3.2.6 When all the air has escaped from the exhaust vent, gently raise the D.O. sampling bucket. Be sure not to agitate the water that has been collected in the bucket.

9.11.3.2.7 Slowly remove the lid of the D.O. sampling bucket and cap the BOD bottles under the water surface of the bucket.

9.11.3.2.8 Submerge, uncap and fill pre-cleaned, 40-mL vials with the collected water. This is accomplished by slanting the vials at a 45 degree angle and letting the sample flow down the inside of the vial.

9.11.3.2.9 Secure the vial caps underneath the water surface of the bucket, making sure the Teflon side of the septum comes in contact with the sample creating a hermetic seal.

9.11.3.2.10 Turn the vial upside down and tap the side lightly to check for air bubbles. If the vial contains any air bubbles, the sample vial must be uncapped and topped off with more sample.

9.11.3.3 Alternative Method 2 – stainless steel or glass container

9.11.3.3.1 Select the area of the stream having the greatest flow.

9.11.3.3.2 Use a clean sample container made of either stainless steel or glass.

9.11.3.3.3 Lower the sample container into the stream using a rope or a swing sampler extension pole.

9.11.3.3.4 Raise the sampler making sure not to agitate the water that has been collected.

9.11.3.3.5 Submerge, uncap, and fill pre-cleaned 40-mL vials. This is accomplished by slanting the vials at a 45-degree angle and allowing the sample to flow slowing down the inside of the vial.

9.11.3.3.6 Secure the vial caps underneath the water surface of the container, making sure the Teflon side of the septum comes in contact with the sample creating a hermetic seal.

9.11.3.3.7 Turn the vial upside down and tap the side lightly to check for air bubbles. If the vial contains any air bubbles, the sample vial must be uncapped and topped off with more sample.

9.11.4 Bacteriological Samples

Bacteriological samples are collected directly into a special bacteriological container obtained from the analytical laboratory. Extra care needs to be taken to ensure that the sample container and cap and the sample itself is not contaminated during the collection process.

9.11.4.1 Direct Grab

9.11.4.1.1 Select the area of the stream having the greatest flow.

9.11.4.1.2 Continue by following procedures (9.10.4.1-9.10.4.10) for a direct grab sample.

9.11.4.1.3 Remove the cap from the sterile container taking care not to touch the inside of the container.

9.11.4.1.4 Place the cap in a clean, poly bag or by wrapping the cap in clean aluminum foil to prevent contamination.

9.11.4.1.5 Grasp the container at the base with one hand and plunge the mouth of the container into the water facing the current direction.

9.11.4.1.6 Avoid introducing surface scum by sampling at a depth 6-12 inches below the water surface.

9.11.4.1.7 Fill the container and secure the container's cap.

9.11.4.2 Alternative Method – Whirl-Pak sampling bags

9.11.4.2.1 Select the area of the stream having the greatest flow.

9.11.4.2.2 Attach a sterile sample container to a rope or a swing sampler extension pole. If using Whirl-Pak sampling bags, use Whirl-Pak sampling pole or line.

9.11.4.2.3 Remove the cap from the sterile container taking care not to touch the inside.

9.11.4.2.4 Place the cap in a clean, poly bag or by wrapping the cap in clean aluminum foil to prevent contamination.

9.11.4.2.5 Lower the container into the stream about 6-12 inches below the water surface.

9.11.4.2.6 Fill the container.

9.11.4.2.7 Raise the container and secure the cap.

10. Sample Handling, Transport, and Chain-of-Custody

Samples must be handled in accordance with the NYSDEC DOW SOP# 101-02 for Sample Handling, Transport, and Chain-of-Custody.

11. Data and Records Management

11.1 Each instrument has a logbook assigned to it. The logbook serves as record of calibration checks, repair work, routine maintenance and cleaning performed on the instrument. Dates, times, comments, and names of individuals performing the work are to be noted in the logbooks. The recording of the calibration data, maintenance, and repair work is necessary to counter challenges to the quality, integrity and acceptability of the field data.

11.2 All pertinent information regarding the field sampling process must be recorded on field sheets or in a field logbook. Sampling information to be recorded should be sufficient to reconstruct the sampling event without relying on the sample collector's memory. At a minimum, the field person should record an unique sampling site identifier (name or number), a description of the sampling site, sample collector's name, type of samples collected, type of analyses requested, date and time of sample collection, weather conditions, and field observations and measurements.

12. Quality Assurance/Quality Control

12.1 The samples that are collected for analyses must accurately represent the stream being sampled and be unaffected by the collection procedures. The objective of this quality assurance methodology is to establish and maintain standards that will ensure the integrity of the water samples collected.

12.1.1 Prior to use, check all equipment to ensure good operating condition and cleanliness.

12.1.2 Follow manufacturer's specifications in carrying out routine maintenance on sampling equipment.

12.1.3 To the extent possible and practical, backup equipment should be available.

12.1.4 All sampling equipment (buckets, churn, sampler, etc.) should be cleaned and rinsed with a distilled (de-ionized) water wash before and after each sampling event. Refer to SOP#102-03 Equipment Cleaning.

12.1.5 At each sampling site, equipment should be rinsed with ambient water before a sample is collected and rinsed with distilled water after sampling is completed.

12.1.6 Whenever the sampling site has known or suspected contamination problems, sampling equipment should be washed with a phosphate free detergent, then scrubbed with water, and finally rinsed with distilled water.

12.1.7 A record of equipment cleaning should be maintained.

12.1.8 Whenever possible, use site-dedicated sample collection equipment.

12.1.9 Sampling should progress from the sites with the best water quality to the poorest.

12.1.10 The sample equipment must be appropriate for the samples being analyzed.

12.1.11 All instruments used in the field must be calibrated following manufacturers' instructions. Frequency for calibrating instruments should be based on either the manufacturer' recommendations or as outlined below, whichever is the more stringent.

12.1.11.1 Initially, instruments shall be calibrated before and after each day of fieldwork. After it has been demonstrated that the instrument can hold a calibration, the frequency may be adjusted. At a minimum, instruments should be calibrated at least once during each week of sampling. All calibrations are recorded in a instrument logbook.

12.1.12 Sampling equipment should be replaced when the equipment is damaged or exposed to highly contaminated waters, or when routine equipment cleaning is impaired.

12.1.13 All sampling equipment should be stored and maintained in a "clean" manner.

13. References

13.1 Clesceri, L.S. and et al. (eds.). Standard Methods for the Examination of Water and Wastewater, 20th Edition.

13.2 NYSDEC, Division of Water, 2002. SOP#101- Sample Handling, Transport and Chain of Custody.

13.3 NYSDEC, Division of Water, 2002. SOP#102-02 Data Handling and Archiving.

13.4 NYSDEC, Division of Water, 2002. SOP#103-02 Equipment Cleaning.

13.5 NYSDEC, Division of Water, 1999. Health and Safety Standard Operating Procedures for the Division of Water.

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13.7 U.S. Geological Survey. Techniques of Water-Resources Investigations of the United States Geological Survey, Methods for Collection and Analysis of Water Samples for Dissolved Minerals and Gases, Book 5, Chapter A1.

13.8 U. S. Geological Survey. Techniques of Water-Resources Investigations of the United States Geological Survey, Methods for the Determination of Organic Substances in Water and Fluvial Sediments, Book 5, Chapter A3.

13.9 Carter, L.W. River Water Quality Monitoring. Lewis Publishers Inc., City.

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13.11 Authors. Field Methods for Measurement of Fluvial Sediment, United States Geological Survey Open-File Report 86-531.

13.12 U.S. EPA. April 1995. Volunteer Stream Monitoring: A Methods Manual. EPA 841 D 95-001.

13.13 Cheremisinoff and Manganiello. Environmental Field Sampling Manual. Publisher, city.

13.14 Ward, J.R. and Harr, C.A. (eds.). Methods for Collection and Processing of Surface-Water and Bed-Material Samples for Physical and Chemical Analyses. U.S. Geological Survey Open-File Report 90-140.

13.15 U.S. EPA. September 1994. NPDES Compliance Inspection Manual, United States Environmental Protection Agency, Enforcement and Compliance Assurance (2223A), EPA 300-B-94-014.

Table 1 – SAMPLING HANDLING SPECIFICATIONS – Water Column				
Parameter	**Collection Method**	**Sample Processing**	**Sample Container**	**Filling**
Alkalinity	Depth Integrated	Composite	Plastic Glass	DO NOT AERATE
Ammonia	Depth Integrated	Composite	Plastic Glass	
Chloride	Depth Integrated	Composite	Plastic Glass	
Coliform-Total & Fecal	Grab - direct into Sterile container	none	sterile	
Conductance	Direct Field measurement			
Dissolved Oxygen	Direct Field Measurement			DO NOT AERATE
Fluoride	Depth Integrated	Composite	Plastic only	
Hardness	Depth Integrated	Composite	Plastic Glass	
Kjeldahl Nitrogen	Depth Integrated	Composite	Plastic Glass	
Metals, Total Recoverable	Depth Integrated	Composite	Plastic Glass	
Metals, Dissolved	Depth Integrated	Composite Filtered	Plastic Glass	
Mercury, Total	Depth Integrated	Composite	Plastic Glass	
Nitrate-Nitrite	Depth Integrated	Composite	Plastic Glass	
Nitrate	Depth Integrated	Composite	Plastic Glass	
Nitrite-NO_2	Depth Integrated	Composite	Plastic Glass	

Table 1 – SAMPLING HANDLING SPECIFICATIONS – Water Column (cont.)				
Parameter	**Collection Method**	**Sample Processing**	**Sample Container**	**Filling**
Oil and Grease	Grab	Do Not Composite	Glass only	DO NOT AERATE
Orthophosphate	Depth Integrated	Composite Filtered	Plastic Glass	
pH	Direct Field Measurement			
Phenolic Compounds	Grab - Steel Bucket	Do Not Composite	Glass only	
Phosphorous, Total	Depth Integrated	Composite	Plastic Glass	
Solids: Total	Depth Integrated	Composite	Plastic Glass	
Solids: Total Dissolved	Depth Integrated	Composite	Plastic Glass	
Solids Total Suspended	Depth Integrated	Composite	Plastic Glass	
Solids Total Volatile	Depth Integrated	Composite	Plastic Glass	
Sulfate	Depth Integrated	Composite	Plastic Glass	
Toxicity Testing Sample	Depth Integrated	Composite	2 L Plastic	
Turbidity	Depth Integrated	Composite	Plastic Glass	
Volatile Halogenated Organics	Direct Grab or D.O. Sample Bucket	Do Not Composite	Glass, Teflon lined septa	DO NOT AERATE

ATTACHMENT 3

Sample Labeling

Attachment 3 – Sample Labeling

1.0 INTRODUCTION

This guideline presents a method for sample labeling in order to properly identify environmental samples collected during the field investigation.

2.0 METHODOLOGY

1. Assign each sample of each matrix a unique identification alpha-numeric code.
2. Affix a non-removable (when wet) label to each sample container. The following information should be written on the label with permanent marker:
    - Site name
    - Sample identification
    - Project number
    - Date/time of sample collection (month, day, year)
    - Sampler's initials
    - Sample preservation
    - Analysis required
3. Wrap the label with 2-inch cellophane tape such that the label is completely covered and the tape wraps around the entire perimeter of the bottle.

3.0 SAMPLE DESIGNATION

A sample numbering system will be used to identify each sample. The sample identification for the samples collected at the river transects, tributaries, and the potential beach sites will consist of four components as described below.

- **Sample Group Designation:** The first component consists of a letter designation that identifies the sample group. For this project the groups will be lettered A, B, C, D, or E.

- **Sample Type:** The second component will identify the sample type with letter and number designations using the following codes:

    - River Transect 1 through 10: RT1 – RT10
    - Tributary 11 through 16: T11 – T16
    - Beach Locations 1 and 2: B1 and B2

- **Sample Location:** The third component will identify the sample location using the following codes:

    - West Bank: WB
    - River Center: RC
    - East Bank: EB
    - Shore: SH

- **Date:** Since samples will be collected at the same locations over several sampling events, the date and time of each sample will be part of the sample designation.

The samples collected from the six wastewater treatment plants will be collected by plant personnel and identified with a four or five letter code for the appropriate plant and the date of sample collection. The six plants will be identified using the following codes.

- Albany County Sewer District North: ACSDN
- Albany County Sewer District South: ACSDS
- Rensselaer County Sewer District: RCSD
- East Greenbush Plant: EGRN
- Waterford Plant: WTFD
- Watervliet Arsenal Plant: WVTA

Duplicate samples will be numbered uniquely as if they were samples, but will not be the same as any potential environmental sample. A record of identification for duplicate samples will be maintained.

An example sample designation is listed below:

> **A-RT4-WB (7/14/08 14:30):** Sample collected by sampling group A at river transect number 4 from the west bank on July 14, 2008 at 2:30 P.M.

ATTACHMENT 4

Sampling Equipment Decontamination

Attachment 4 – Sampling Equipment Decontamination

1.0 INTRODUCTION

This guideline presents a method for the decontamination of sampling equipment used in the collection of environmental samples.

2.0 HEALTH AND SAFETY

Nitric acid is a strong oxidizing agent as well as being extremely corrosive to the skin and eyes. Solvents such as acetone, methanol, hexane, and isopropanol are flammable liquids. Limited contact with skin can cause irritation, while prolonged contact may result in dermatitis. Eye contact with the solvents may cause irritation or temporary corneal damage. Safety glasses with protective side shields, neoprene or nitrile gloves, and long-sleeve protective clothing must be worn whenever acids and solvents are being used.

3.0 METHODOLOGY

- All equipment used in sampling must be clean and free from residue of any previous samples. To accomplish this, the following procedures are to be followed:

  a. wash equipment thoroughly with non-phosphate detergent and tap water(1) using a brush to remove any particulate matter or surface film;

  b. rinse with tap water(1);

  c. rinse with a 10% HNO_3 solution(2);

  d. rinse with tap water(1);

  e. rinse with pesticide grade acetone(3) or methanol(3);

  f. rinse with pesticide grade-hexane(3);

  g. rinse with deionized water (demonstrated-analyte-free)(3);

  h. air dry; and

  i. wrap in aluminum foil (shiny side out).

- Well evacuation equipment, such as submersible pumps and bailers, which are put into the borehole must be decontaminated following the procedures listed above. All evacuation tubing must be dedicated to individual wells, (i.e., tubing cannot be reused).

- Bailer cord must be cleaned with non-phosphate detergent and demonstrated analyte-free deionized water before use. Cord can be reused; it is not necessary to dedicate it to individual wells. If a ten (10) foot or greater length leader is being used, only the leader need be cleaned (assumes bailer cord is not allowed to contact water).

- All unused sample bottles and sampling equipment must be maintained in such a manner that there is no possibility of casual contamination.

4.0 EQUIPMENT REQUIREMENTS

- Personal protective garment and gear
- Brush, buckets, and wash basins
- Squirt bottles
- Supply of solvents and water
- Aluminum foil

5.0 REFERENCES

New York State Department of Environmental Conservation, Division of Hazardous Substances Regulation, August 1989, RCRA Quality Assurance Project Plan Guidance.

Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, April 1, 1986. USEPA Region IV.

NOTES

(1) Tap water may be used from any municipal water treatment system. The use of an untreated potable water supply is not an acceptable substitute.

(2) Omit this step if metals are not being analyzed. For carbon steel split spoon samplers, a 1% rather than 10% HNO_3 solution should be used.

(3) This solvent rinse can be omitted if organics are not being analyzed. Alternatively, if approval from NYSDEC has been granted, use pesticide grade isopropanol as the cleaning solvent. Isopropanol is better suited as a cleaning solvent than acetone, methanol and hexane for the following reasons:
- Acetone is a parameter analyzed for on the Target Compound List (TCL); therefore the detection of acetone in samples collected using acetone rinsed equipment is suspect;
- Almost all grades of methanol contain 2-butanone (MEK) contamination. As for acetone, 2-butanone is a TCL compound. Thus, the detection of 2-butanone in samples collected using methanol rinsed equipment is suspect. In addition, methanol is much more hazardous than either isopropanol or acetone.
- Hexane is not miscible with water (hydrophobic) and therefore, is not an effective rinsing agent unless the sampling equipment is dry. Isopropanol is extremely miscible in water (amphoteric), making it an effective rinsing agent on either wet or dry equipment.

(4) Deionized water must be demonstrated to be analyte-free water. The criteria for analyte-free water are the Method Detection Limits (MDLs) for the analytes. Specifically for the common laboratory contaminants listed below, the allowable

limits are set at three times the respective MDLs determined by the most sensitive analytical method:

1. Methylene Chloride
2. Acetone
3. Toluene
4. 2-Butanone
5. Phthalates

ATTACHMENT 5

Chain-of-Custody Form

CHAIN OF CUSTODY RECORD

Page ___ of ___

518-782-2100
fax: 518-782-0500

MALCOLM PIRNIE, INC.
43 British American Blvd
LATHAM, NEW YORK 12110
http://www.pirnie.com

CLIENT: ____________________

PROJECT: ____________________

PROJECT NUMBER: ____________________

LABORATORY: ____________________

LAB CONTACT: ____________ 0 ____________

SPECIAL INSTRUCTIONS: Bill and Results To:

Malcolm Pirnie, Inc.
Daria Navon
104 Corporate Park Drive
Box 751
White Plains, NY 10602

(914) 641-2160

LAB ID	SAMPLE ID/ DESCRIPTION	DATE	TIME	MATRIX	GRAB/ COMPOSITE	No. of Cont.	ANALYSIS REQUIRED	NOTES / PRESERVATIVE

Matrix Identification:

S - SOIL	**SL - SLUDGE**	**SW - SURFACE WATER**	**DS - DRUM SOLID**
SE- SEDIMENT	**DW - DRINKING WATER**	**L - LEACHATE**	**DL - DRUM LIQUIDS**
SO - SOLID	**GW - GROUND WATER**	**A - AIR**	**X - OTHER**
	O - OIL	**WI - WIPE**	**WW - WASTE WATER**

LAB USE ONLY

SAMPLED BY (SINGATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	DATE/TIME:
RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	DATE/TIME:
RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	DATE/TIME:
METHOD OF SHIPMENT:	DATE/TIME	LAB USE ONLY:	
RECEIVED AT LABORATORY:	DATE/TIME		

ATTACHMENT 6

APJVT Contact Details

Attachment 6 - Albany Pool Joint Venture Team Contact Details

Malcolm Pirnie, Inc.
43 British American Boulevard
Latham, NY 12110
Phone: (518) 782-2100
Fax: (518) 782-0500

Receiving Water Project Manager:	Greg Daviero Phone: (518) 782-2136 Email: gdaviero@pirnie.com
Sampling Coordinator:	Laura Zima Phone: (518) 782-2158 Email: lzima@pirnie.com
Team Leader:	Mike Traynor Phone: (518) 782-2121 Email: mtraynor@pirnie.com

Camp Dresser & McKee
15 British American Boulevard
Latham, NY 12110
Phone: (518) 782-4500
Fax: (518) 786-3810

Team Leader:	To be determined
Team Leader:	To be determined

Clough Harbour & Associates
III Winners Circle
P.O. Box 5269
Albany, NY 12205-0269
Phone: (518) 453-4500
Fax: (518) 458-1735

Team Leader:	To be determined
Team Leader:	To be determined

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway, Albany, New York 12233-3505
Phone: (518) 402-8111 • **FAX:** (518) 402-9029
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

VIA E-MAIL AND REGULAR MAIL

October 31, 2007

Rocco Ferraro
Executive Director
Capital District Regional Planning Commission
Park Place
Albany, New York 12205

Re: Albany Pool Combined Sewer Overflow Long-Term Control Plan Development; Receiving Water Quality Sampling Plan for the Cities of Albany, Rensselaer, Troy, Watervliet, and Cohoes, and the Village of Green Island. SPDES numbers: NY0025747, NY0026026, NY0099309, NY0030899, NY0031046, and NY0033031, respectively.

Dear Mr. Ferraro;

The Department has reviewed the *Receiving Water Quality Sampling Plan*, October 2007 (WQ Sampling Plan) submitted on September 28, 2007. The WQ Sampling Plan is hereby approved.

The WQ Sampling Plan was submitted in accordance with the Department's March 16, 2007 letter approving the *Scope of Work and Combined Sewer System Monitoring and Modeling Plan*, February 2007 contingent upon receipt of 3 detailed reports. The WQ Sampling Plan is the second of the three required reports.

In an October 30, 2007 meeting between Albany Pool consultants and the Department, to discuss the WQ Sampling Plan, it was agreed that:

- Both dry and wet weather monitoring will include the parameters turbidity and floatables;
- Presence and type of floatables will be monitored by taking digital photos at each sampling location and collating all the photos into a photo log on compact disk;
- Monitoring stations near the shore will be as close to shore as possible, taking safety concerns into account;
- The Albany Pool will submit an addendum to the WQ Sampling Plan to the Department by April 1, 2008

  1- Identifying the contracted laboratories that will perform sample analyses;
  2- Detailing laboratory procedures put in place to provide consistency in sampling results, and;
  3- Any changes to sampling locations.

The Department also looks forward to receiving the next detailed report on combined sewer system monitoring, due on February 1, 2008. As always, please feel free to call me, at (518) 402-8115, or Andrea Dzierwa, at (518) 357-2377, if you have any questions or concerns.

Sincerely,

Cheryle Webber

Cheryle Webber, P.E.
Environmental Engineer 2

cc:

Robert Cross, Albany Water Board
Sean Ward, Green Island
Mayor John McDonald, III, Cohoes
Mary Beth Petitt, Rensselaer
Neil Bonesteel, P.E., Troy
Nick Ostopkavich, Watervliet
Leif Engstrom, CDRPC
Jim Olander, EPA Reg. II

Andrea Dzierwa
BWCP
Alan Fuchs
Fred Sievers
Shayne Mitchell
Chandler Rowell
Phil O'Brien
Derek Thorsland