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Be Legendary.™

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## QUALITY CONTROL/QUALITY ASSURANCE DOCUMENTATION

Title: Collection and Preservation of Tile Drain Grab Samples
Type: Standard Operation Procedure #7.36
Version: 1.0
Date: 03/31/2025
Author: Brian Houle

## REVISION HISTORY

| Revision | Change Description | Date | Authorization |
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**ACKOWLEDGEMENTS**

(Place to acknowledge peer reviewer)

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# 1.0 SCOPE AND APPLICABILITY

This document presents the North Dakota Department of Environmental Quality, Division of Water Quality's (DWQ) Standard Operating Procedure (SOP) for collecting and preserving tile drain grab samples. This SOP applies to all DWQ field staff, non-DWQ cooperators, and citizen volunteers. Grab samples collected for chemical analysis should be representative of the tile drain area. To be representative, samples must be carefully collected, properly preserved, and appropriately analyzed. In general, samples should be collected from the outlet of the tile drain. If outlet is not flowing, the pump should be turned on and allowed to purge before collecting sample.

# 2.0 SUMMARY OF METHOD

Grab samples are only collected at end of pipe at tile drain outlets. The grab sample can be collected either directly at the outlet with a bottle, or with a sampling device such as a dipper.

When collecting the sample at outlet, triple-rinse each sample bottle with tile drain water prior to collecting the sample. Place sample bottle into the main flow of the outlet, remove the lid and allow the bottle to fill. Replace the lid prior to removing bottle from outlet stream. A small portion of the sample will need to be decanted off prior to preserving and/or placing in cooler.

When collecting with a dipper, triple rinse sample device prior to collection, lower the device into the middle of outlet flow. Note: Do not rinse the fecal coliform bacteria or the pesticide sample bottles.

# 3.0 HEALTH AND SAFETY WARNING

Field personnel should be aware that hazardous conditions potentially exist at every waterbody. If unfavorable conditions are present at the time of sampling, the sample visit should be rescheduled. If hazardous weather conditions arise during sampling, such as lightning or high winds, personnel should cease sampling and move to a safe location. Samplers should be aware of ice conditions when sampling during winter months. If ice is dangerous, samples should be taken at a different time.

Field personnel should also be aware of wildlife, insects, and plants that could be harmful as well as heat stroke and hypothermia. A first aid kit should be accessible for

any potential cuts, stings, bites, or contact with poisonous plants. Also ensure there is access to water, sunscreen, insect repellant, and extra clothing.

# 4.0 CAUTIONS

The tile drain will need to be purged if it is not currently flowing, to dislodge any stagnant water.

# 5.0 INTERFERENCES

Note all factors that may affect the water sample such as high winds/wave action, cattle in water, observed flow, water surface, water clarity, water color, water odor, visual algae cover, number of dead fish, present weather, estimated inches of rain fall in past 72 hours, and any other comments that may be of interest.

# 6.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

All personnel collecting and preserving grab samples must read this SOP annually and acknowledge they have done so via a signature page (see Appendix B). New field personnel must also demonstrate successful performance of the method. The signature page will be signed by both trainee and trainer to confirm that training was successfully completed and that the new personnel is competent in carrying out this SOP. The signature page will be kept on-file at DWQ along with the official hard copy of this SOP.

# 7.0 EQUIPMENT AND SUPPLIES

- A non-metallic sampler (e.g., dipper)
- Sample containers
- Acid for sample preservation
- Sample labels.
- Clear tape for sample containers
- Coolers with ice and/or frozen gel pack(s).
- Field report form.
- Gloves
- Sample ID/Custody Record
- Black ballpoint pen or pencil
- Sample and blank log forms

# 8.0 PROCEDURE

## Tile Drain Outlet Sample Collection

1. Place a label on each sample container and use clear tape to secure the label to the container. Note: Add information to the cap (e.g., number of samples; analysis type) to make the sample identifiable if the label were to fall off).

2. If the tile drain is not running during the time of sampling, then it needs to be purged. Turn on the pump and let the water run for 1 minute before beginning collection.

3. Triple rinse each sample bottle using tile drain water. Note: Do not rinse the fecal coliform bacteria or the pesticide sample bottles.

4. Fill the sample bottle: Samples should be collected in the main current. Approach the sampling location and insert sample container facing against the current, allowing it to fill naturally.

5. Preserve the sample containers appropriately with sulfuric or nitric acid and place samples in a cooler on ice.

6. Fill out the Sample ID/Custody Report (Appendix A) and the water chemistry sample log (Appendix A).

## Tile Drain Sample Collection using Dipper Cup

1. Place a label on each sample container and use clear tape to secure the label to the container. Note: Add information to the cap (e.g., number of samples; analysis type) to make the sample identifiable if label were to fall off.

2. If the tile drain is not running during the time of sampling, then it needs to be purged. Turn on the pump and let the water run for 1 minute before beginning collection.

3. Triple rinse dipper cup using tile drain water.

4. Fill the dip cup: Samples should be collected in the main current.

5. Sample bottles will be triple rinsed and filled from the dip cup.

6. Preserve the sample containers appropriately and place samples in a cooler on ice.

7. Fill out the Sample ID/Custody Report (Appendix A) and the water chemistry sample log (Appendix A).

# 9.0 DATA AND RECORDS MANAGEMENT

Data collected will be recorded on the field form (Appendix A). Once personnel reach the office, data recorded on the field form are entered into the DWQ Sample Identification Database (SID). Field notes should be used to record any quality control activity performed such as measurements taken by more than one sampler, or to record any sampling conditions that may have interfered with the reading such as high winds/wave action, cattle in water, observed flow, water surface, water clarity, water color, water odor, visual algae cover, number of dead fish, present weather, estimated inches of rain fall in past 72 hours, and any comments. Field forms and notes should be stored in the appropriate project folder at DWQ.

# 10.0 QUALITY ASSURANCE AND QUALITY CONTROL

**Tile Drain Duplicate Sample Collection**

1. Duplicate samples are collected with the first and every following tenth stream sample collected (i.e., 1st, 10th, 20th....). If the sample log indicates a duplicate sample should be collected, follow the steps below.

2. Place a label on each sample container and fill out the Sample ID/Custody Report (Appendix A). Note: Duplicate samples should be identified with STORET number 389999. Be sure to indicate on the label the project name and type of sample being duplicated.

3. Collect the sample following steps in the procedure for Tile Drain Grab Samples.

4. Place the samples in a cooler on ice.

# 11.0 REFERENCES

INTERAGENCY FIELD MANUAL FOR THE COLLECTION OF WATER-QUALITY DATA Collecting Water-Quality Samples. USGS https://pubs.usgs.gov/of/2000/ofr00-213/manual_eng/collect.html.

# APPENDIX A

Field Reporting Form

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Sample Arrival Timestamp _____

# Sample Information Sheet/ Chain of Custody

| | | | | |
|---|---|---|---|---|
| **Account #:** | **Program:** | | **Results to:** | |
| **Project Name:** | **DEQ Project #:** | **DEQ Cost Center #:** | **Project Code:** | **Checked for preservation by:** |
| **Sampled By:** | **Sampler Phone #:** | **Collection Method** | **Enforcement Yes No** **Matrix:** **Soil Water Other_____** | |
| **Analysis Requested:** | | | **Temp of Cooler/#____** | **Temp of Cooler/#____** |

| Lab ID | Sample Name/Location # | Aquifer/Storet # | Sample Date | Sample Time | # of Bottles | ANS Y/N | Depth m | Temp °C | DO mg/L | pH | SC µS/cm | Co-Located site ID/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
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* Collection Methods (Record Above): Depth Integrated (DI), Depth/Width Integrated (DWI), Grab, 0-2 Meter Column
When collecting lake samples, You MUST include the sampling depth(s)

| Relinquished by | Date and Time | Received by | Date and Time |
|---|---|---|---|
| | | | |
| | | | |

**Water Quality Sampling Field Log**
**North Dakota Department of Environmental Quality**
**Division of Water Quality – Watershed Management Program**
**Telephone: 701-328-6140**
**Fax: 701-328-6280**

| Sample Number | Station ID and Description | Depth | Date | Time | QA/QC | | Initials | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | DUP | BLK | | |
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# APPENDIX B

SOP Acknowledgement and Training Form

# SOP Acknowledgement and Training Form

This SOP must be read, and this form signed annually. This form must be kept with the latest version of the SOP.

| | |
|---|---|
| **Document Title:** | |
| **Document Revision Number:** | |
| **Document Revision Date:** | |

Please sign below in accordance with the following statement:
“I have read and understand the above referenced document. I agree to perform the procedures described in this SOP in accordance with the document until such time that it is superseded by a more recent approved revision.”

| Printed Name | Signature | Date |
|---|---|---|
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# SOP Acknowledgement and Training Form (cont.)

Trainee: Sign below to acknowledge that training on this SOP was received, understood, and all questions/concerns were addressed by the trainer.

Trainer: Sign below to acknowledge that training on this SOP was completed for the individual listed and that training is competent to perform the procedures described within.

| Date of Training | Trainee Printed Name | Trainee Signature | Trainer Printed Name | Trainer Signature |
|---|---|---|---|---|
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