SAMRC WASTE WATER SURVEILLANCE AND RESEACH PROGRAMME

WATER SAMPLE COLLECTION GUIDE:

PASSIVE SAMPLING

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HE VD IG

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Water Sample Collection Guide: Passive sampling

Preparation for fieldwork:

- Daily itinerary (with maps / GPS points).
- List of samples required at each site.
- Check local conditions for travel (weather).

Contact local authority/ maintenance department to arrange for opening of manholes. Ensure arrangements to open manholes are done prior to sample collection (at least 2 to 3 days before).

Personal Protective Equipment

This includes:

- Surgical face Mask/ face shield/ protective eyewear
- Box of Disposable gloves (nitrile)
- Clothing coveralls
- Gumboots/ Wellington boots (recommended when sampling from rivers/ surface water and manholes)
- Steel toe boots (when not entering water source)

PPE should be worn at all times during sample collection and handling of the wastewater on site. A first aid kit should accompany each field trip.

General equipment required

Preparation	Deployment	Retrieval
• Polypropylene rope/ woven nylon rope • Cable ties • Weight (e.g. a fishing sinker, bolt or similar small sized heavy item) • Self-adhesive and waterproof labels • Permanent marker • Passive sampling device • Surgical Gauze • Resealable freezer bags • Permanent marker	• 20 litre cooler box • Ice packs • Notebook and pen • Passive sampling device. For purposes of this sampling guide, a torpedo style device has been selected. • Checklist (if available) • Disposal bags for consumable waste materials (for gloves)	• Scissors • Spray bottle of ethanol • Paper towels • Sealed notebook and pen • Labelled resealable freezer bags • Checklist • Disposal bags for consumable waste materials (including paper towels and gloves)

All disposable items should be discarded as BSL-2 waste and re-usable items should be cleaned daily after each use with water and soap followed by 70% v/v ethanol.

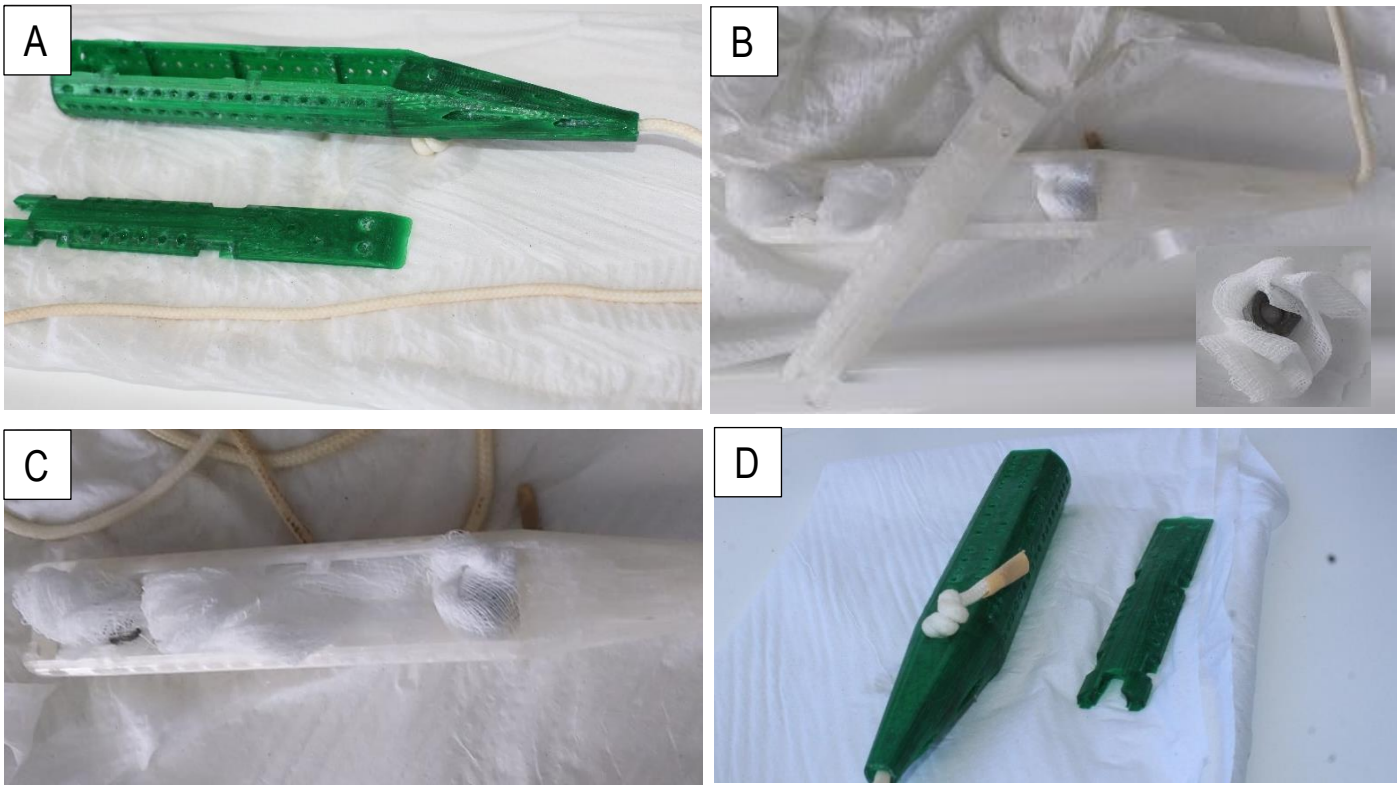
1. Passive sampling device preparation: (as prepared in/by lab)

Passive sampling devices need to be prepared prior to being deployed as follows:

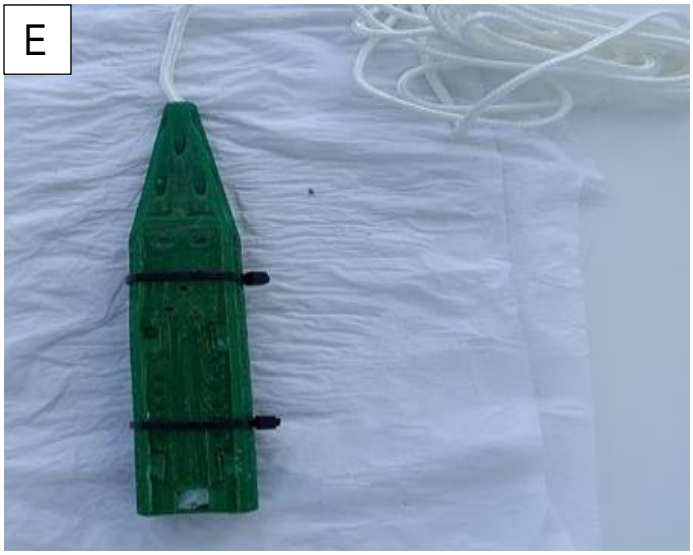
- Soak passive sampling device in a 10% bleach solution (24 hours)
- Rinse well with dH_2O
- Rinse with ethanol/methanol (methanol can be re-used between rinsing device)
- Rinse twice with dH_2O
- Leave to dry on paper towels

Once completely dried (resting on paper towels- as seen in figure A), prepare the sampling device for deployment:

- Wrap a weight (bolt/fishing sinker) in gauze and add to the empty cavity of the sampling device (as seen in figure B)
- Fill the cavity with gauze (as seen in figure C) and ensure that closure is securely in place.
- Thread string through device and secure underneath (as seen in figure D)
- Secure the ends of the closure with zip ties. (as seen in figure E)



E



Labelling the resealable freezer bags

Labels should be waterproof, labelled using a permanent marker and covered with clear tape to prevent water and ethanol damage. Ensure the freezer bags are labelled before deploying sampling devices.

Freezer bags should be labelled according to specific predetermined labelling codes as discussed with the receiving laboratory (as seen in figure F):

- Site name, abbreviation or number.
- Week of sampling.

F

2. Deploying the sampling device

- Ensure you are wearing all necessary PPE
- Secure area surrounding access point – if sampling from a manhole you may do this by erecting orange cones around manhole (as seen in figure G).
- Lower sampling device into manhole, secure rope to end of torpedo and ensure head of torpedo (end with the rope attached) is facing the current (as seen in figures H, I & J).
- Ensure to secure the end of the rope to an appropriate secure item (e.g. pole; tree; pillar etc.). If installing in manhole, ensure device is securely in the pipe to ensure it is fully submerged.
- If installing in a river, dam or other surface water body, consider weighing down sampling device with a weight in order to ensure it remains submerged.
- Leave sampling device in for desired amount of time (as stipulated by sampling protocol).
- If sampling from multiple sites, use fresh gloves for each deployment.

G

H

I

J

3. Retrieving sampling device

- Ensure you are wearing all PPE and have all necessary equipment.
- When retrieving from a manhole: gently tug rope to ensure it is not stuck. pull slowly until freed from pipe (as seen in figure K & L).
- When retrieving from surface water body: pull on rope gently until torpedo is retrieved.
- If using a shade cloth to protect the device, remove it by snipping of the securing zip tie (as seen in figure M).
- Use paper towel to remove excess wastewater solids and water from the sampling device (as seen in figure N).
- Dispose of used paper towels, zip ties and shade cloth into Biohazard bag.
- Place sampling device into labelled freezer bag (as seen in figure O),ensuring it is tightly sealed.
- Ensure the freezer bags are securely closed and spray the outside with ethanol before placing in cooler box.
- Remember to sanitise hands after each retrieval.
- Wear new gloves for the retrieval of each sampling device.

K

L

M

N

0

Spillage:

In case of accidental spillage during transport, remove all freezer bags containing sampling devices and ice packs form the cooler box. Discard the spilled sampling device into the BSL-2 waste container and disinfect with 70% v/v ethanol while wiping down the entire internal surface with paper towels. Spray down the freezer bags containing sampling devices and ice packs with 70% v/v ethanol and wipe down with paper towels. Discard all contaminated paper towels in the BSL-2 waste container.

Field log entries:

Keep a detailed field log of the date, time of sampling and the site. Also, note any conditions that could influence the outcome of the study during sample collection and record in detail. These conditions include, but are not limited to:

- The water level during sampling (in comparison to the previous week).
- The colour of the water.
- Heavy rains prior to and during sampling.
- Report blockages/ no flow.

If possible, other physico-chemical data such as temperature, electrical conductivity, dissolved oxygen and pH should be measured upon collection.

Example of sampling log sheet:

Date	Site	Code	Type of sample	Time deployed	Time retrieved	Source
01/12/2021	Example A	EA1	Passive	09h00	08h30	Example River A

Storage and transportation

Samples should be transported under refrigerated conditions to the laboratory on same day as collected.

Chain of custody

Each day the receiving laboratory should sign off on the number of samples received and list of the sample codes.

Health and safety (table of vaccinations required when working with wastewater)

Item	Doses	*Total Price
Hepatitis A and B (Twinrix)	3	R1425
Tetanus, Diphtheria, Pertussis, Polio (Tdap-IPV) vaccination	1	R420
Typhoid vaccination	1	R350
TOTAL	**5**	**R2195**

*Prices as of 2022. Average consultation cost is R350. For vaccine-specific contraindications, please consult a healthcare worker.

Please take note of the following health and safety procedures when sampling:

- Ensure hands are washed thoroughly after retrieval of sampling device.
- Avoid touching face, mouth, eyes, or nose before washing hands.
- Existing scrapes, cuts, and burns must be covered whenever undertaking sample collection activities.
- Promptly treat new cuts and abrasions, including those that are minor, using appropriate first aid measures.
- When using equipment in the field be aware of your surroundings.