TDE-C02 – Water Sampling Operating Protocol

Lands of Excellence | Version 1.0 – 10 November 2026

Scope: springs, wells/groundwater and surface waters, including irrigation waters actually used.

1. Purpose and qualification principle

Water sampling contributes to the environmental qualification of a Land of Excellence (TDE), even where all crops are rainfed. Water is used as an indicator of territorial environmental quality and, when used for agriculture, also as a potential pathway carrying contaminants to farmland.

The TDE assessment integrates soil and bioindicators. This document defines how to select, collect, preserve and document water samples; it does NOT change the analytical thresholds already established in TDE technical documents.

2. Planned analytical parameters

• Multi-residue pesticides and pesticide metabolites included in the TDE analytical plan.

• Conventional PFAS included in the TDE panel.

• Trifluoroacetic acid (TFA), measured separately where required.

• Phosphonic acid, using a dedicated analytical method.

Panels, limits of quantification (LOQs) and decision thresholds are exclusively those of the already approved TDE documents. Do not add routine analytes without technical justification.

3. Sampling-point selection and territorial representativeness

Before sampling, identify the hydrogeological unit or catchment to be characterized. For each relevant unit, select at least one representative point where technically justified, without assuming that every farm must necessarily have its own sampling point.

Water source	Operating criterion
Local: spring or well	Prefer a point representative of the area's aquifer or water system, documenting any agricultural use.
Local: stream/brook	Sample a reach relevant to the TDE catchment, identifying its contributing basin and possible upstream inputs.
External: canal/diversion	If actually used, sample at the entry or point of use; assess the external source separately.
Storage: reservoir/tank	Where used, collect water representative of the fraction actually utilized; record provenance and residence time.

Where several farms share a water source and hydrogeological setting, a single point may represent them if the choice is documented. Sources with different origins must not be

combined into one sample.

4. General sampling rules

• Identify each point by code, coordinates/location, date and time; record weather, approximate flow or water regime, agricultural use and relevant observations.

• Use clean, suitable sample bottles supplied or approved by the laboratory; never reuse food bottles or rinse pretreated bottles unless directed by the laboratory.

• Wear clean nitrile gloves and change them between points; avoid contact between hands/surfaces and bottle or cap interiors.

• Collect directly into the final container, especially for PFAS; avoid unverified buckets, funnels or intermediate transfers.

• Do not filter, acidify, add reagents or freeze in the field without written method-specific instructions.

• Avoid equipment and sample-contact materials containing PTFE or other fluoropolymers for PFAS/TFA determinations.

• Samples are point-in-time grabs: do not mix different water sources or sampling times; do not deliberately collect settled sediment.

5. Procedures by point type

Case A – Agricultural wells and groundwater

• Identify the well, its known depth (if available), pumping system, usual use and any treatment or storage tanks.

• Prefer a dedicated tap upstream of treatment, storage and secondary distribution networks, avoiding unverified flexible hoses.

• Start pumping and flush stagnant water in the circuit; continue until sufficiently stable/representative conditions are reached. Determine purge time and volume according to the particular well, rather than imposing one fixed duration.

• Minimize turbulence, fill the bottle directly and close immediately. Record whether the well was already operating or had been idle, and the purge procedure.

Case B – Springs

• Choose the emergence point or the earliest accessible collection point before unnecessary tanks and pipework.

• Sample flowing water while avoiding debris, stagnant water, rock/sediment contact and manipulation with unsuitable equipment.

• If direct collection is impossible, use a clean capture point and describe it in the record; do not automatically assume a public fountain represents the natural spring.

• Record the spring regime (perennial/seasonal where known), any abstraction works and preceding weather conditions.

Case C – Streams, brooks and irrigation canals

• Choose a reach with steady flow and safe access, avoiding stagnant banks, immediate discharge points and resuspended sediment unless these are precisely under investigation.

• Sample directly from the current at an accessible depth, without scraping the bed or collecting surface film.

• For irrigation canals, choose a point actually connected to the field-supply system and record whether its origin is local or external.

• Record recent rain, visible turbidity, upstream tributaries/discharges and whether the canal is being used for irrigation.

6. Containers and preservation

Determination	Basic indication	Mandatory laboratory verification
Conventional PFAS	Suitable, controlled HDPE bottles; caps without PTFE liners.	Bottle number/volume; field blanks; method instructions.
TFA	Single-use amber HDPE, HDPE/PP cap: choice supported by method CAC-TFA-1.1.	Volume, possible field blank, method compatibility and holding times.
Phosphonic acid	HDPE or PP as a practical proposal, NOT a validated requirement in this protocol.	Written confirmation of container, volume, stability and storage.
Pesticides and metabolites	Amber glass generally suitable for many multi-residue methods, but polar metabolites may require other bottles.	Bottle set for all planned methods, preservatives and holding times.

Immediately store away from light in an insulated cooler at approximately 4 °C, preventing direct bottle contact with melting ice water. Deliver as soon as possible and within the laboratory's prescribed holding times for each method. Do not combine PFAS, TFA and phosphonic acid in the same bottle without explicit confirmation of analytical compatibility.

7. Quality controls, frequency and special cases

For initial qualification, choose sampling periods when the water resource is representative of the area; for seasonal canals and irrigation sources, include the actual period of use. Subsequent monitoring frequency will reflect variability, results and potential external pressures, without imposing identical intervals on every source at this stage.

For TFA and PFAS, use at least the field blanks required by the method or laboratory, and an additional duplicate where appropriate for the campaign. Anomalies, external sources, unexpected results or floods call for targeted evaluation; do not automatically expand testing

at every point.

8. Short field record (one form per point)

Item	To be completed
Campaign / point code / operator	_____
Date, time, locality, coordinates	_____
Matrix / case A–B–C / irrigation use	_____
Local or external origin / catchment–aquifer	_____
Weather / water regime notes	_____
Well: pump, purge / spring: abstraction	_____
Stream/canal: reach / observed turbidity	_____
Bottle codes / requested analyses	_____
Start of refrigeration / delivery time	_____
Anomalies / observations / signature	_____

9. Pre-campaign laboratory verification

Before the first TDE campaign, obtain one written confirmation from the appointed laboratory covering the entire parameter set: bottle types and volumes, any preservatives, blanks, LOQs compatible with TDE thresholds, maximum collection-to-analysis times, treatment of turbid samples and refrigerated delivery. This verification concerns analytical execution only and does not alter TDE thresholds.

10. Essential technical references

US EPA, Method 1633A (December 2024), Section 8: PFAS water collection and preservation: https://www.epa.gov/system/files/documents/2024-12/method-1633a-december-5-2024-508-compliant.pdf

California Department of Food and Agriculture, CAC-TFA-1.1 (revision 19 June 2025), Section 8: amber HDPE containers and TFA collection: https://waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/2025/cac-tfa-1.1-%28acc%29.pdf

US EPA, FAQ on PFAS methods for NPDES: contamination prevention, direct sampling and bottle selection:

https://www.epa.gov/cwa-methods/frequent-questions-about-pfas-methods-npdes-permits

Methodological note: this TDE-C02 is a project operating procedure; the cited references support specific technical requirements and are not automatically mandatory regulatory methods for every TDE matrix.