

TABLE 1
ALBERNI VALLEY LANDFILL 2023 MONITORING SCHEDULE

| Suite No. | Sites | Frequency | Analyses |
|-----------|--|--------------------------------------|--|
| 1 | MW94-4S, MW94-5S, MW94-6S MW98-9, MW98-10 MW23-2 , MW02-1D MW23-1S, MW23-1D MW02-3S, MW02-3D, MW02-4 PW-1 or PW15-1, PW2 or PW15-2 MW13-1D | Quarterly Quarterly Annual | Field: Conductance, temperature, pH, water level Lab: Conductance, pH, TDS, chloride, sulphate, ammonia, nitrate, hardness, COD, DOC dissolved metals, alkalinity MW13-1D - water level measurements collected quarterly; chemistry annually |
| | MW94-6D | Quarterly Quarterly | Field: Conductance, temperature, pH, water level Lab: Conductance, pH, TDS, chloride, sulphate, ammonia, nitrate, hardness, COD, TOC, DOC dissolved metals, alkalinity |
| 2 | MW94-4D, MW05-1S MW05-1D, MW13-1S and MW13-2S | Quarterly Quarterly | Field: Conductance, temperature, pH, water level Lab: Conductance, pH, TDS, chloride, sulphate, nitrate, ammonia |
| 3 | Heath, Stevens and Christie Creeks | Quarterly Quarterly | Field: Conductance, temperature, pH Lab: Conductance, pH, chloride, sulphate, nitrate, ammonia, hardness, COD, tot P, alkalinity total metals |
| 4 | Leachate (Aeration lagoon inlet), South Expansion Leachate Drain BH00-1C replacement | Quarterly Quarterly Annual | Field: Conductance, temperature, pH Lab: Conductance, pH, TDS, chloride, nitrate, ammonia, hardness, sulphate, COD, TOC, tot P, total metals, alkalinity Lab: VOC scan, acid extractables, PFAS (Standard List) for Leachate (lagoon inlet) only (Note 2) |
| | DW-A, DW-B, DW-C, DW-D, DW-E, DW-F | Annual Annual | Field: Conductance, temperature, pH, water level Lab: Conductance, pH, TDS, alkalinity, chloride, sulphate, nitrate, and total metals |
| 6 | BH00-1A, BH00-5A-S, BH00-5A-D, BH00-6A, BH00-7A, BH00-8A, MW09-1,2,3,4, and 10, MW13-2D, MW15-1S, MW15-1D, PW15-1, PW15-2 | Quarterly | Field: water levels until no longer accessible |

H:\Project\1005\Analysis\Chemistry\2023\[Summary Tables 2023.xlsx]Table 1

NOTES:

- 1.** **Bolded** sites to be included in monitoring program when available. MW02-3D not sampled in 2023 due to equipment problem. Equipment to be replaced in 2024. MW23-1S, MW23-1D, MW23-2 were installed in October 2023. Sample results from October 2023 sampling event reported in Appendix D. These will be incorporated into the regular quarterly monitoring program in 2024.
- 2.** If dry conditions preclude sample collection in summer 2024, samples should be collected for VOCs and acid extractable analyses at the next sampling event.

TABLE 1
SUMMARY OF WEST COAST LANDFILL SAMPLING SITES AND ANALYTICAL SUITES - 2023 PROGRAM

| Site | Site Location | Field Parameters | LABORATORY | | | | | | | | | |
|---------------------------------|--|------------------|-----------------------|--------------------------------------|--------------------------------|------------------------------------|-----------------------------------|-----|----------------|-------------------|--------------------|--|
| | | | Physical Parameters | Anions | Nutrients | Total Metals | BOD | COD | VOC Scan | Detailed Analysis | Routine Potability | |
| | | | temp, pH, conductance | pH, conductance, TDS, total hardness | alkalinity, chloride, sulphate | ammonia, nitrate, total phosphorus | ICP ICP/MS; FWAL detection limits | | | | | physical parameters, anions, cations, nitrate/nitrite, total Fe/Mn, total coliforms and e.coli |
| SW-1 | Sandhill Creek near landfill | Q | Q | Q | Q | Q | Q | Q | Q | Q (B for 2024) | | |
| SW-2 | West leachate collector ditch | Q | Q | Q | Q | Q (Al, Fe, Mn only) | Q | Q | | | | |
| SW-3 | Leachate storage lagoon | Q | Q | Q | Q | Q | Q | Q | Q (B for 2024) | A (Note 5) | | |
| SW-4 | East leachate collector ditch | Q | Q | Q | Q | Q (Al, Fe, Mn only) | Q | Q | | | | |
| SW-6 | West property line | Q | Q | Q | Q | Q (Al, Fe, Mn only) | | | | | | |
| SW-7 | Background at east property line | Q | Q | Q | Q | Q | Q | Q | | | | |
| SW-8 | Irrigation area | Q | Q | Q | Q | Q (Al, Fe, Mn only) | Q | Q | | | | |
| SW-9 | Irrigation area | Q | Q | Q | Q | Q (Al, Fe, Mn only) | Q | Q | | | | |
| SW-10 | Sandhill Creek upstream of SW-11 discharge | Q | Q | Q | Q | Q | Q | Q | | | | |
| SW-10U/S | Sandhill Creek upstream of SW-10 | A | A | A | A | A | A | A | | | | |
| SW-11 | West drainage at property line | Q | Q | Q | Q | Q | Q | Q | | | | |
| SW-12 | Sandhill Creek trib at south property line | Q | Q | Q | Q | Q (Al, Fe, Mn only) | | | | | | |
| SW-14 | Composting facility discharge | Q | Q | Q | Q | Q | Q | Q | | | | |
| Sandhill Creek d/s ⁴ | Sandhill Creek at Highway | Q | Q | Q | Q | Q (Al, Fe, Mn only) | | | | | | |
| Sandhill Creek East Tributary | East tributary to Sandhill Creek above Highway | A | A | A | A | A | A | A | | | | |
| PW-SS ³ | Tap in the scale shack fed by the pumping well | A | | | | | | | | | | A |

Notes:

1. Q indicates sample is collected quarterly, B indicates sample collected biannually (1 winter high flow and 1 summer low flow), A indicates sample is collected annually (in the summer if water is present).
2. Sites were not sampled when there was insufficient water.
3. PW-SS sampled by ACRD for routine potability, not as part of landfill monitoring program.
4. Sandhill Creek d/s has not shown any impact to date.
5. Summer sample for SW-3 was submitted for analysis of a broad spectrum of potential contaminants: chlorinated phenolics, non-chlorinated phenolics, hydrocarbons, polycyclic aromatic hydrocarbons, semi-volatile organics, and pesticides. A sample for PFAS was not analyzed in 2023, but is recommended for the summer of 2024.

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Limit of Reporting (LOR) and Method Detection Limits for Alberni-Clayoquot Regional District

LOR's for Universal Water Parameters Per Current Program:

| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|--|-------------|----------------------------|---|---------------------------------|
| Dissolved Metals/Hg+Hardness - CSR,CCME,BCAWQG,CDW | BC10 | APHA 3030B/EPA 6020B (mod) | Aluminum, dissolved | 0.001 mg/L |
| | | | Antimony, dissolved | 0.0001 mg/L |
| | | | Arsenic, dissolved | 0.0001 mg/L |
| | | | Barium, dissolved | 0.0001 mg/L |
| | | | Beryllium, dissolved | 0.0001 mg/L |
| | | | Bismuth, dissolved | 5E-05 mg/L |
| | | | Boron, dissolved | 0.01 mg/L |
| | | | Cadmium, dissolved | 5E-06 mg/L |
| | | | Calcium, dissolved | 0.05 mg/L |
| | | | Cesium, dissolved | 1E-05 mg/L |
| | | | Chromium, dissolved | 0.0005 mg/L |
| | | | Cobalt, dissolved | 0.0001 mg/L |
| | | | Copper, dissolved | 0.0002 mg/L |
| | | | Iron, dissolved | 0.01 mg/L |
| | | | Lead, dissolved | 5E-05 mg/L |
| | | | Lithium, dissolved | 0.001 mg/L |
| | | | Magnesium, dissolved | 0.005 mg/L |
| | | | Manganese, dissolved | 0.0001 mg/L |
| | | | Molybdenum, dissolved | 5E-05 mg/L |
| | | | Nickel, dissolved | 0.0005 mg/L |
| | | | Phosphorus, dissolved | 0.05 mg/L |
| | | | Potassium, dissolved | 0.05 mg/L |
| | | | Rubidium, dissolved | 0.0002 mg/L |
| | | | Selenium, dissolved | 5E-05 mg/L |
| | | | Silicon, dissolved | 0.05 mg/L |
| | | | Silver, dissolved | 1E-05 mg/L |
| | | | Sodium, dissolved | 0.05 mg/L |
| | | | Strontium, dissolved | 0.0002 mg/L |
| | | | Sulfur, dissolved | 0.5 mg/L |
| | | Tellurium, dissolved | 0.0002 mg/L | |
| Thallium, dissolved | 1E-05 mg/L | | | |
| Thorium, dissolved | 0.0001 mg/L | | | |
| Tin, dissolved | 0.0001 mg/L | | | |
| Titanium, dissolved | 0.0003 mg/L | | | |
| Tungsten, dissolved | 0.0001 mg/L | | | |
| Uranium, dissolved | 1E-05 mg/L | | | |
| Vanadium, dissolved | 0.0005 mg/L | | | |
| Zinc, dissolved | 0.001 mg/L | | | |
| Zirconium, dissolved | 0.0002 mg/L | | | |
| | | APHA 3030B/EPA 1631E (mod) | Mercury, dissolved | 5E-06 mg/L |
| | | APHA 2340B | Hardness (as CaCO ₃), dissolved | 0.6 mg/L |
| Total Metals/Hg+Hardness - CSR,CCME,BCAWQG,CDW | BC11 | EPA 200.2/6020B (mod) | Aluminum, total | 0.003 mg/L |
| | | | Antimony, total | 0.0001 mg/L |
| | | | Arsenic, total | 0.0001 mg/L |
| | | | Barium, total | 0.0001 mg/L |
| | | | Beryllium, total | 0.0001 mg/L |



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| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|--|----------|---------------------------|--|---------------------------------|
| | | | Bismuth, total | 5E-05 mg/L |
| | | | Boron, total | 0.01 mg/L |
| | | | Cadmium, total | 5E-06 mg/L |
| | | | Calcium, total | 0.05 mg/L |
| | | | Cesium, total | 1E-05 mg/L |
| | | | Chromium, total | 0.0005 mg/L |
| | | | Cobalt, total | 0.0001 mg/L |
| | | | Copper, total | 0.0005 mg/L |
| | | | Iron, total | 0.01 mg/L |
| | | | Lead, total | 5E-05 mg/L |
| | | | Lithium, total | 0.001 mg/L |
| | | | Magnesium, total | 0.005 mg/L |
| | | | Manganese, total | 0.0001 mg/L |
| | | | Molybdenum, total | 5E-05 mg/L |
| | | | Nickel, total | 0.0005 mg/L |
| | | | Phosphorus, total | 0.05 mg/L |
| | | | Potassium, total | 0.05 mg/L |
| | | | Rubidium, total | 0.0002 mg/L |
| | | | Selenium, total | 5E-05 mg/L |
| | | | Silicon, total | 0.1 mg/L |
| | | | Silver, total | 1E-05 mg/L |
| | | | Sodium, total | 0.05 mg/L |
| | | | Strontium, total | 0.0002 mg/L |
| | | | Sulfur, total | 0.5 mg/L |
| | | | Tellurium, total | 0.0002 mg/L |
| | | | Thallium, total | 1E-05 mg/L |
| | | | Thorium, total | 0.0001 mg/L |
| | | | Tin, total | 0.0001 mg/L |
| | | | Titanium, total | 0.0003 mg/L |
| | | | Tungsten, total | 0.0001 mg/L |
| | | | Uranium, total | 1E-05 mg/L |
| | | | Vanadium, total | 0.0005 mg/L |
| | | | Zinc, total | 0.003 mg/L |
| | | | Zirconium, total | 0.0002 mg/L |
| | | EPA 1631E (mod) | Mercury, total | 5E-06 mg/L |
| | | APHA 2340B | Hardness (as CaCO ₃), from total Ca/Mg | 0.6 mg/L |
| Conductivity in Water (2µS/cm) | E100 | APHA 2510 (mod) | Conductivity | 2 µS/cm |
| pH by Meter (Automated) | E108 | APHA 4500-H (mod) | pH | 0.1 pH units |
| TDS by Gravimetry (10mg/L) | E162 | APHA 2540 C (mod) | Solids, total dissolved [TDS] | 10 mg/L |
| Total Alkalinity by Titration (1 mg/L) | E290-L | APHA 2320 B (mod) | Alkalinity, total (as CaCO ₃) | 1 mg/L |
| Ammonia by Fluorescence | E298 | Method Fialab 100, 2018 | Ammonia, total (as N) | 0.005 mg/L |
| Total Organic Carbon (Non-Purgeable) by Combustion (0.5 mg/L) in Water | E355-L | APHA 5310 B (mod) | Carbon, total organic [TOC] | 0.5 mg/L |
| Total Phosphorus by Colourimetry (0.002 mg/L) | E372-U | APHA 4500-P E (mod). | Phosphorus, total | 0.002 mg/L |



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| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit | |
|--|-----------------------------------|---------------------------|---------------------------------|---------------------------------|----------|
| Biochemical Oxygen Demand - 5 day (2 mg/L) | E550 | APHA 5210 B (mod) | Biochemical oxygen demand [BOD] | 2 mg/L | |
| Chemical Oxygen Demand by Colourimetry (10 mg/L) | E559-L | APHA 5220 D (mod) | Chemical oxygen demand [COD] | 10 mg/L | |
| Anions in Water by IC | S235 | EPA 300.1 (mod) | Chloride | 0.5 mg/L | |
| | | EPA 300.1 (mod) | Nitrite (as N) | 0.001 mg/L | |
| | | EPA 300.1 (mod) | Nitrate (as N) | 0.005 mg/L | |
| | | EPA 300.1 (mod) | Sulfate (as SO ₄) | 0.3 mg/L | |
| LEPH/HEPH+EPH+PAH in Water | S666A | EPA 8270E (mod) | BC MOE Lab Manual | EPH (C10-C19) | 250 µg/L |
| | | | Acenaphthene | 0.01 µg/L | |
| | | | Acenaphthylene | 0.01 µg/L | |
| | | | Acridine | 0.01 µg/L | |
| | | | Anthracene | 0.01 µg/L | |
| | | | Benz(a)anthracene | 0.01 µg/L | |
| | | | Benzo(a)pyrene | 0.005 µg/L | |
| | | | Benzo(b+j)fluoranthene | 0.01 µg/L | |
| | | | Benzo(b+j+k)fluoranthene | 0.015 µg/L | |
| | | | Benzo(g,h,i)perylene | 0.01 µg/L | |
| | | | Benzo(k)fluoranthene | 0.01 µg/L | |
| | | | Chrysene | 0.01 µg/L | |
| | | | Dibenz(a,h)anthracene | 0.005 µg/L | |
| | | | Fluoranthene | 0.01 µg/L | |
| | | | Fluorene | 0.01 µg/L | |
| | | | Indeno(1,2,3-c,d)pyrene | 0.01 µg/L | |
| | | | Methylnaphthalene, 1- | 0.01 µg/L | |
| | | | Methylnaphthalene, 2- | 0.01 µg/L | |
| | | | Naphthalene | 0.05 µg/L | |
| | | Phenanthrene | 0.02 µg/L | | |
| Pyrene | 0.01 µg/L | | | | |
| Quinoline | 0.05 µg/L | | | | |
| | BC MOE Lab Manual (LEPH and HEPH) | HEPHw | 250 µg/L | | |
| | | LEPHw | 250 µg/L | | |

LOR's for "Routine Potability" Package Per Current Program:

| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|--|----------|---------------------------|------------------|---------------------------------|
| Total Metals/Hg+Hardness - CSR,CCME,BCAWQG,CDW | BC11 | EPA 200.2/6020B (mod) | Aluminum, total | 0.003 mg/L |
| | | | Antimony, total | 0.0001 mg/L |
| | | | Arsenic, total | 0.0001 mg/L |
| | | | Barium, total | 0.0001 mg/L |
| | | | Beryllium, total | 0.0001 mg/L |
| | | | Bismuth, total | 5E-05 mg/L |
| | | | Boron, total | 0.01 mg/L |
| | | | Cadmium, total | 5E-06 mg/L |
| | | | Calcium, total | 0.05 mg/L |
| | | | Cesium, total | 1E-05 mg/L |



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| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|--|-------------|---------------------------|--|---------------------------------|
| | | | Chromium, total | 0.0005 mg/L |
| | | | Cobalt, total | 0.0001 mg/L |
| | | | Copper, total | 0.0005 mg/L |
| | | | Iron, total | 0.01 mg/L |
| | | | Lead, total | 5E-05 mg/L |
| | | | Lithium, total | 0.001 mg/L |
| | | | Magnesium, total | 0.005 mg/L |
| | | | Manganese, total | 0.0001 mg/L |
| | | | Molybdenum, total | 5E-05 mg/L |
| | | | Nickel, total | 0.0005 mg/L |
| | | | Phosphorus, total | 0.05 mg/L |
| | | | Potassium, total | 0.05 mg/L |
| | | | Rubidium, total | 0.0002 mg/L |
| | | | Selenium, total | 5E-05 mg/L |
| | | | Silicon, total | 0.1 mg/L |
| | | | Silver, total | 1E-05 mg/L |
| | | | Sodium, total | 0.05 mg/L |
| | | | Strontium, total | 0.0002 mg/L |
| | | | Sulfur, total | 0.5 mg/L |
| | | | Tellurium, total | 0.0002 mg/L |
| | | | Thallium, total | 1E-05 mg/L |
| | | | Thorium, total | 0.0001 mg/L |
| | | | Tin, total | 0.0001 mg/L |
| | | | Titanium, total | 0.0003 mg/L |
| | | | Tungsten, total | 0.0001 mg/L |
| | | | Uranium, total | 1E-05 mg/L |
| | | | Vanadium, total | 0.0005 mg/L |
| | | | Zinc, total | 0.003 mg/L |
| Zirconium, total | 0.0002 mg/L | | | |
| | | EPA 1631E (mod) | Mercury, total | 5E-06 mg/L |
| | | APHA 2340B | Hardness (as CaCO ₃), from total Ca/Mg | 0.6 mg/L |
| Total Coliforms and E. coli (Enzyme Substrate) | E010 | APHA 9223 (mod) | Coliforms, Escherichia coli [E. coli] | 1 MPN/100mL |
| | | | Coliforms, total | 1 MPN/100mL |
| Conductivity in Water (2µS/cm) | E100 | APHA 2510 (mod) | Conductivity | 2 µS/cm |
| pH by Meter (Automated) | E108 | APHA 4500-H (mod) | pH | 0.1 pH units |
| TDS by Gravimetry (10mg/L) | E162 | APHA 2540 C (mod) | Solids, total dissolved [TDS] | 10 mg/L |
| Total Alkalinity by Titration (1 mg/L) | E290-L | APHA 2320 B (mod) | Alkalinity, total (as CaCO ₃) | 1 mg/L |
| Anions in Water by IC | S235 | EPA 300.1 (mod) | Chloride | 0.5 mg/L |
| | | EPA 300.1 (mod) | Nitrite (as N) | 0.001 mg/L |
| | | EPA 300.1 (mod) | Nitrate (as N) | 0.005 mg/L |
| | | EPA 300.1 (mod) | Sulfate (as SO ₄) | 0.3 mg/L |



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LOR's for PFAS Package Per Current Program:

| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|---|-----------|---------------------------|---|---------------------------------|
| PFAS (40 Analytes - Routine Level) in Water | E745G | MECP E3533 | Eicosafiuoro-3-oxaundecane-1-sulfonic acid, 11-chloro- [11Cl-PF3OUdS] | 0.02 µg/L |
| | | | Ethyl perfluorooctanesulfonamide, n- [NEtFOSA] | 0.02 µg/L |
| | | | Ethyl perfluorooctanesulfonamidoacetic acid, n- [NEtFOSAA] | 0.02 µg/L |
| | | | Ethyl perfluorooctanesulfonamidoethanol, n- [NEtFOSE] | 0.02 µg/L |
| | | | Fluorotelomer carboxylic acid, 3:3 [3:3 FTCA] | 0.02 µg/L |
| | | | Fluorotelomer carboxylic acid, 5:3 [5:3 FTCA] | 0.02 µg/L |
| | | | Fluorotelomer carboxylic acid, 7:3 [7:3 FTCA] | 0.02 µg/L |
| | | | Fluorotelomer sulfonic acid, 4:2 [4:2 FTS] | 0.02 µg/L |
| | | | Fluorotelomer sulfonic acid, 6:2 [6:2 FTS] | 0.02 µg/L |
| | | | Fluorotelomer sulfonic acid, 8:2 [8:2 FTS] | 0.02 µg/L |
| | | | Hexadecafluoro-3-oxanonane-1-sulfonic acid, 9-chloro- [9Cl-PF3ONS] | 0.02 µg/L |
| | | | Hexafluoropropylene oxide dimer acid [HFPO-DA] | 1 µg/L |
| | | | Methyl perfluorooctanesulfonamide, n- [NMeFOSA] | 0.02 µg/L |
| | | | Methyl perfluorooctanesulfonamidoacetic acid, n- [NMeFOSAA] | 0.02 µg/L |
| | | | Methyl perfluorooctanesulfonamidoethanol, n- [NMeFOSE] | 0.02 µg/L |
| | | | Nonafluoro-3,6-dioxaheptanoic acid [NFDHA] | 0.02 µg/L |
| | | | Perfluoro(2-ethoxyethane)sulfonic acid [PFEESA] | 0.02 µg/L |
| | | | Perfluoro-3-methoxypropanoic acid [PFMPA] | 0.02 µg/L |
| | | | Perfluoro-4-methoxybutanoic acid [PFMBA] | 0.02 µg/L |
| | | | Perfluorobutanesulfonic acid [PFBS] | 0.02 µg/L |
| | | | Perfluorobutanoic acid [PFBA] | 0.1 µg/L |
| | | | Perfluorodecane sulfonic acid [PFDS] | 0.02 µg/L |
| | | | Perfluorodecanoic acid [PFDA] | 0.02 µg/L |
| | | | Perfluorododecanesulfonic acid [PFDoS] | 0.02 µg/L |
| | | | Perfluorododecanoic acid [PFDoA] | 0.02 µg/L |
| | | | Perfluoroheptanesulfonic acid [PFHpS] | 0.02 µg/L |
| Perfluoroheptanoic acid [PFHpA] | 0.02 µg/L | | | |
| Perfluorohexanesulfonic acid [PFHxS] | 0.02 µg/L | | | |



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| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|-------------|----------|---------------------------|--|---------------------------------|
| | | | Perfluorohexanoic acid [PFHxA] | 0.02 µg/L |
| | | | Perfluorononanesulfonic acid [PFNS] | 0.02 µg/L |
| | | | Perfluorononanoic acid [PFNA] | 0.02 µg/L |
| | | | Perfluorononanoic acid, 4,8-dioxa-3H-[ADONA] | 0.02 µg/L |
| | | | Perfluorooctanesulfonamide [PFOSA] | 0.02 µg/L |
| | | | Perfluorooctanesulfonic acid [PFOS] | 0.02 µg/L |
| | | | Perfluorooctanoic acid [PFOA] | 0.02 µg/L |
| | | | Perfluoropentanesulfonic acid [PFPeS] | 0.02 µg/L |
| | | | Perfluoropentanoic acid [PFPeA] | 0.02 µg/L |
| | | | Perfluorotetradecanoic acid [PFTeDA] | 0.02 µg/L |
| | | | Perfluorotridecanoic acid [PFTeDA] | 0.02 µg/L |
| | | | Perfluoroundecanoic acid [PFUnA] | 0.02 µg/L |
| | | | PFAS, total [EPA 1633 list] | 1.1 µg/L |

LOR's for "Pesticides" Package Per Current Program:

| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|---|------------|---------------------------|---------------------------|---------------------------------|
| Organochlorine Pesticides (OCPs - Routine Level) in Water by GC-MS-MS | E660F | EPA 8270E (mod) | Aldrin | 0.008 µg/L |
| | | | Chlordane, cis- (alpha) | 0.008 µg/L |
| | | | Chlordane, total | 0.011 µg/L |
| | | | Chlordane, trans- (gamma) | 0.008 µg/L |
| | | | DDD, 2,4'- | 0.004 µg/L |
| | | | DDD, 4,4'- | 0.004 µg/L |
| | | | DDD, total | 0.006 µg/L |
| | | | DDE, 2,4'- | 0.004 µg/L |
| | | | DDE, 4,4'- | 0.004 µg/L |
| | | | DDE, total | 0.006 µg/L |
| | | | DDT + metabolites, total | 0.01 µg/L |
| | | | DDT, 2,4'- | 0.004 µg/L |
| | | | DDT, 4,4'- | 0.004 µg/L |
| | | | DDT, total | 0.006 µg/L |
| | | | Dieldrin | 0.008 µg/L |
| | | | Endosulfan, alpha- | 0.007 µg/L |
| | | | Endosulfan, beta- | 0.007 µg/L |
| | | | Endosulfan, total | 0.01 µg/L |
| | | | Endrin | 0.01 µg/L |
| | | | Heptachlor | 0.008 µg/L |
| Heptachlor epoxide | 0.008 µg/L | | | |
| Hexachlorocyclohexane, gamma- | 0.008 µg/L | | | |
| Methoxychlor | 0.008 µg/L | | | |
| Pesticide Residue Scan 1 in Water by LC-MS-MS (Routine Level) | E755 | MECP E3553 | Azinphos-methyl | 0.1 µg/L |
| | | | Diazinon | 0.025 µg/L |
| | | | Dimethoate | 0.05 µg/L |
| | | | Malathion | 0.025 µg/L |
| | | | Phorate | 0.25 µg/L |
| Pesticide Residue Scan 2 (Routine Levels) in Water (Chlorpyrifos, methyl and ethyl) | E756 | MECP E3553 | Terbufos | 0.5 µg/L |
| | | | Chlorpyrifos | 0.1 µg/L |
| | | | Parathion | 0.1 µg/L |



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| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|---|----------|---------------------------|---------|---------------------------------|
| Parathion, Ethalfuralin and Trifluralin | | | | |

LOR's for "Acid Extractables" Package Per Current Program:

| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|-------------------------------------|-----------|---------------------------|------------------------------------|---------------------------------|
| BNA (ON 625 list) in Water by GC-MS | E655B | EPA 8270E (mod) | Chlorophenol, 2- | 0.3 µg/L |
| | | | Pentachlorophenol [PCP] | 0.5 µg/L |
| | | | Tetrachlorophenol, 2,3,4,6- | 0.5 µg/L |
| | | | Trichlorophenol, 2,4,5- | 0.5 µg/L |
| | | | Trichlorophenol, 2,4,6- | 0.5 µg/L |
| | | | Dimethylphenol, 2,4- | 0.5 µg/L |
| | | | Dinitrophenol, 2,4- | 1 µg/L |
| | | | Methylphenol, 2- | 0.5 µg/L |
| | | | Methylphenol, 3+4- | 0.5 µg/L |
| | | | Phenol | 0.5 µg/L |
| | | | bis(2-Ethylhexyl) phthalate [DEHP] | 1 µg/L |
| | | | Diethyl phthalate | 0.2 µg/L |
| | | | Dimethyl phthalate | 0.2 µg/L |
| | | | Acenaphthene | 0.2 µg/L |
| | | | Acenaphthylene | 0.2 µg/L |
| | | | Anthracene | 0.2 µg/L |
| | | | Benz(a)anthracene | 0.2 µg/L |
| | | | Benzo(a)pyrene | 0.05 µg/L |
| | | | Benzo(b+j)fluoranthene | 0.2 µg/L |
| | | | Benzo(g,h,i)perylene | 0.2 µg/L |
| | | | Benzo(k)fluoranthene | 0.2 µg/L |
| | | | Chrysene | 0.2 µg/L |
| | | | Fluoranthene | 0.2 µg/L |
| | | | Fluorene | 0.2 µg/L |
| | | | Indeno(1,2,3-c,d)pyrene | 0.2 µg/L |
| | | | Naphthalene | 0.2 µg/L |
| | | | Phenanthrene | 0.2 µg/L |
| | | | Pyrene | 0.2 µg/L |
| | | | Biphenyl | 0.4 µg/L |
| | | | bis(2-Chloro-1-methylethyl) ether | 0.4 µg/L |
| | | | bis(2-Chloroethyl) ether | 0.4 µg/L |
| | | | Chloroaniline, 4- | 0.4 µg/L |
| | | | Dichlorobenzidine, 3,3'- | 0.4 µg/L |
| | | | Dinitrotoluene, 2,4- | 0.4 µg/L |
| Dinitrotoluene, 2,4 + 2,6- | 0.6 µg/L | | | |
| Dinitrotoluene, 2,6- | 0.4 µg/L | | | |
| Hexachlorobenzene | 0.04 µg/L | | | |
| Hexachlorobutadiene | 0.2 µg/L | | | |
| Hexachloroethane | 0.4 µg/L | | | |
| Trichlorobenzene, 1,2,4- | 0.4 µg/L | | | |



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LOR's for "VOC" Package Per Current Program:

| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|---------------------------------|----------|---------------------------|---|---------------------------------|
| VOCs (BC Special List) in Water | E611H | EPA 8260D (mod) | Acetone | 20 µg/L |
| | | | Bromobenzene | 1 µg/L |
| | | | Bromochloromethane | 1 µg/L |
| | | | Bromomethane | 1 µg/L |
| | | | Butylbenzene, n- | 1 µg/L |
| | | | Butylbenzene, sec- | 1 µg/L |
| | | | Butylbenzene, tert- | 1 µg/L |
| | | | Carbon disulfide | 5 µg/L |
| | | | Chlorobenzene | 1 µg/L |
| | | | Chloromethane | 5 µg/L |
| | | | Chlorotoluene, 2- | 1 µg/L |
| | | | Chlorotoluene, 4- | 1 µg/L |
| | | | Cyclohexane | 1 µg/L |
| | | | Dibromo-3-chloropropane, 1,2- | 0.5 µg/L |
| | | | Dibromobenzene, 1,3- | 10 µg/L |
| | | | Dibromobenzene, 1,4- | 10 µg/L |
| | | | Dibromomethane | 1 µg/L |
| | | | Dichlorobenzene, 1,2- | 1 µg/L |
| | | | Dichlorobenzene, 1,3- | 1 µg/L |
| | | | Dichlorobenzene, 1,4- | 1 µg/L |
| | | | Dichlorodifluoromethane | 1 µg/L |
| | | | Dichloropropane, 1,2- | 1 µg/L |
| | | | Dichloropropane, 1,3- | 1 µg/L |
| | | | Dichloropropane, 2,2- | 1 µg/L |
| | | | Dichloropropylene, 1,1- | 1 µg/L |
| | | | Dichloropropylene, cis+trans-1,3- | 1.5 µg/L |
| | | | Dichloropropylene, cis-1,3- | 1 µg/L |
| | | | Diethyl ether | 1 µg/L |
| | | | Ethyl acetate | 1 µg/L |
| | | | Hexachlorobutadiene | 1 µg/L |
| | | | Hexanone, 2- | 10 µg/L |
| | | | Methyl ethyl ketone [MEK] | 20 µg/L |
| | | | Methyl isobutyl carbinol [MIBC] | 20 µg/L |
| | | | Methyl isobutyl ketone [MIBK] | 20 µg/L |
| | | | Octane, n- | 1 µg/L |
| | | | Pentane, n- | 1 µg/L |
| | | | Tetrachloroethane, 1,1,1,2- | 1 µg/L |
| | | | Tetrachloroethane, 1,1,2,2- | 0.2 µg/L |
| | | | Trichloro-1,2,2-trifluoroethane, 1,1,2- [Freon 113] | 1 µg/L |
| | | | Trichlorobenzene, 1,2,3- | 1 µg/L |
| Trichlorobenzene, 1,2,4- | 1 µg/L | | | |
| Trichloroethane, 1,1,2- | 1 µg/L | | | |
| Trichlorofluoromethane | 1 µg/L | | | |
| Trichloropropane, 1,1,2- | 1 µg/L | | | |
| Trichloropropane, 1,2,3- | 0.5 µg/L | | | |
| Trichloropropylene, 1,2,3- | 1 µg/L | | | |
| Carbon tetrachloride | 1 µg/L | | | |
| Chloroethane | 1 µg/L | | | |



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| Description | ALS Code | External Method Reference | Analyte | Limit of Reporting (LOR) + unit |
|-------------|----------|---------------------------|--------------------------------|---------------------------------|
| | | | Dichloroethane, 1,1- | 1 µg/L |
| | | | Dichloroethylene, 1,1- | 1 µg/L |
| | | | Dichloroethylene, cis-1,2- | 1 µg/L |
| | | | Dichloroethylene, trans-1,2- | 1 µg/L |
| | | | Dichloromethane | 1 µg/L |
| | | | Dichloropropylene, trans-1,3- | 1 µg/L |
| | | | Tetrachloroethylene | 1 µg/L |
| | | | Trichloroethane, 1,1,1- | 1 µg/L |
| | | | Trichloroethylene | 1 µg/L |
| | | | Vinyl chloride | 0.4 µg/L |
| | | | Benzene | 0.5 µg/L |
| | | | BTEX, total | 1 µg/L |
| | | | BTEX+Styrene, total | 1.5 µg/L |
| | | | Butadiene, 1,3- | 0.2 µg/L |
| | | | Cymene, p- | 1 µg/L |
| | | | Decane, n- | 1 µg/L |
| | | | Dibromoethane, 1,2- | 0.2 µg/L |
| | | | Dichloroethane, 1,2- | 1 µg/L |
| | | | Ethylbenzene | 0.5 µg/L |
| | | | Heptane, n- | 1 µg/L |
| | | | Hexane, n- | 1 µg/L |
| | | | Isopropylbenzene | 1 µg/L |
| | | | Methylcyclohexane | 1 µg/L |
| | | | Methyl-tert-butyl ether [MTBE] | 0.5 µg/L |
| | | | Nonane, n- | 1 µg/L |
| | | | Propylbenzene, n- | 1 µg/L |
| | | | Styrene | 0.5 µg/L |
| | | | Toluene | 0.4 µg/L |
| | | | Trimethylbenzene, 1,2,3- | 1 µg/L |
| | | | Trimethylbenzene, 1,2,4- | 1 µg/L |
| | | | Trimethylbenzene, 1,3,5- | 1 µg/L |
| | | | Xylene, m+p- | 0.4 µg/L |
| | | | Xylene, o- | 0.3 µg/L |
| | | | Xylenes, total | 0.5 µg/L |
| | | | Bromodichloromethane | 1 µg/L |
| | | | Bromoform | 1 µg/L |
| | | | Chloroform | 1 µg/L |
| | | | Dibromochloromethane | 1 µg/L |
| | | | Trihalomethanes [THMs], total | 2 µg/L |



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Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

| Analytical Methods | ALS Method Code | Matrix | Method Description |
|--|-----------------|--------|--|
| Total Coliforms and E. coli (Enzyme Substrate) | E010 | Water | (APHA 9223 (mod)) The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used). |
| Conductivity in Water | E100 | Water | (APHA 2510 (mod)) Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C. |
| pH by Meter | E108 | Water | (APHA 4500-H (mod)) pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time. |
| TDS by Gravimetry | E162 | Water | (APHA 2540 C (mod)) Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue. |
| Chloride in Water by IC | E235.Cl | Water | (EPA 300.1 (mod)) Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. |
| Nitrite in Water by IC (Low Level) | E235.NO2-L | Water | (EPA 300.1 (mod)) Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. |
| Nitrate in Water by IC (Low Level) | E235.NO3-L | Water | (EPA 300.1 (mod)) Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. |
| Sulfate in Water by IC | E235.SO4 | Water | (EPA 300.1 (mod)) Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. |
| Alkalinity Species by Titration | E290 | Water | (APHA 2320 B (mod)) Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values. |
| Ammonia by Fluorescence | E298 | Water | (Method Fialab 100, 2018) Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021) |
| Total Organic Carbon (Non-Purgeable) by Combustion (Low Level) | E355-L | Water | (APHA 5310 B (mod)) Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC). |
| Total Phosphorus by Colourimetry (0.002 mg/L) | E372-U | Water | (APHA 4500-P E (mod).) Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample. |
| Total Metals in Water by CRC ICPMS | E420 | Water | (EPA 200.2/6020B (mod)) Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. |



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| | | | Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method. |
| Dissolved Metals in Water by CRC ICPMS | E421 | Water | (APHA 3030B/EPA 6020B (mod)) Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method. |
| Total Mercury in Water by CVAAS | E508 | Water | (EPA 1631E (mod)) Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS |
| Dissolved Mercury in Water by CVAAS | E509 | Water | (APHA 3030B/EPA 1631E (mod)) Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS. |
| Biochemical Oxygen Demand - 5 day | E550 | Water | (APHA 5210 B (mod)) Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples. |
| Chemical Oxygen Demand by Colourimetry (Low Level) | E559-L | Water | (APHA 5220 D (mod)) Samples are analyzed using the closed reflux colourimetric method. |
| BC PHCs - EPH by GC-FID | E601A | Water | (BC MOE Lab Manual) Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions. |
| VOCs (Regular Full + BC Special List) by Headspace GC-MS | E611H | Water | (EPA 8260D (mod)) Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. |
| PAHs in Water by Hexane LVI GC-MS | E641A | Water | (EPA 8270E (mod)) Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS. |
| BNA (ON 625 list) by GC-MS | E655B | Water | (EPA 8270E (mod)) BNA are analyzed by GC-MS. |
| OCP Analysis by GC-MS-MS or GC-MS | E660F | Water | (EPA 8270E (mod)) Pesticides are analyzed by GC-MS-MS or GC-MS |
| PFAS (Extended List) in Water by LC-MS-MS | E745 | Water | (MECP E3533) An aliquot of water is analyzed for PFAs by direct injection LC/MS/MS |
| Pesticides in Water by LC-MS-MS (Routine Level) | E755 | Water | (MECP E3553) Pesticides are determined in Water Samples by Direct Aqueous Injection coupled to LC-MS/MS |
| Chlorpyrifos, methyl and ethyl Parathion, Ethalfuralin and Trifluralin in Water by LC-MS-MS | E756 | Water | (MECP E3553) Pesticides are determined in Aqueous Sample by Direct Injection coupled to LC-MS/MS |
| Dissolved Hardness (Calculated) | EC100 | Water | (APHA 2340B) "Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. |
| Hardness (Calculated) from Total Ca/Mg | EC100A | Water | (APHA 2340B) "Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent |



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| | | | cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters. |
| LEPH and HEPH: EPH-PAH | EC600A | Water | (BC MOE Lab Manual (LEPH and HEPH)) Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene. |
| Preparation Methods | Method Code | Matrix | Method Description |
| BC PHCs - EPH by GC-FID | E601A | Water | (BC MOE Lab Manual) Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions. |
| Preparation for Autotitrator | EP108-TITR | Water | Sample preparation for parameters analysed by Autotitrator |
| Preparation for Ion Chromatography | EP235-IC | Water | Sample preparation for ion chromatography |
| Preparation for Ammonia | EP298 | Water | Sample preparation for Preserved Nutrients Water Quality Analysis. |
| Preparation for Total Organic Carbon by Combustion | EP355 | Water | Preparation for Total Organic Carbon by Combustion |
| Digestion for Total Phosphorus in water | EP372 | Water | (APHA 4500-P E (mod).) Samples are heated with a persulfate digestion reagent. |
| Total Metals Water Digestion | EP420 | Water | (EPA 200.2 (mod)) Water samples are digested with HNO ₃ and HCl to liberate "total recoverable" metals. |
| Dissolved Metals Water Filtration | EP421 | Water | (APHA 3030B) Water samples are filtered (0.45 um), and preserved with HNO ₃ . |
| Mercury Water BrCl Digestion | EP508 | Water | (EPA 1631E (mod)) Water samples are digested with BrCl. |
| Dissolved Mercury Water Filtration | EP509 | Water | (APHA 3030B) Water samples are filtered (0.45 um), and preserved with HCl. |
| VOCs Preparation for Headspace Analysis | EP581 | Water | (EPA 5021A (mod)) Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into a GC-MS-FID. |
| PHCs and PAHs Hexane Extraction | EP601 | Water | (EPA 3511 (mod)) Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction. |
| BNA Extraction | EP655 | Water | (EPA 3510C (mod)) SVOCs are extracted from aqueous sample using DCM liquid-liquid extraction. |
| Pesticides, PCB, and Neutral Extractable Chlorinated Hydrocarbons Extraction | EP660 | Water | (EPA 3511 (mod)) Samples are extracted from aqueous sample using an organic solvent liquid-liquid extraction. |
| Preparation of PFAS in Water by Direct Injection | EP745 | Water | (MECP E3533) An aliquot of water is analyzed for PFAs by direct injection LC/MS/MS |
| Preparation of Pesticides for Direct Injection in Water by LC-MS-MS | EP755 | Water | (MECP E3553) Pesticides are determined in Water Samples by Direct Aqueous Injection coupled to LC-MS/MS |
| Preparation of Chlorpyrifos, methyl and ethyl Parathion, Ethalfuralin and Trifluralin in Water by Direct Injection | EP756 | Water | (MECP E3553) Pesticides are determined in Aqueous Sample by Direct Injection coupled to LC-MS/MS |
| Conductivity Screen (Internal Use Only) | ES100 | Water | (APHA 2510 (mod)) Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc. |