# ANNUAL REPORT
# FOR THE MUNICIPALITY OF ARCTIC BAY

## EAR BEING REPORTED: 2022

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence No. **3BM-ARC1924** issued to the **Municipality of Arctic Bay**.

i) - iii) tabular summaries of all data generated under the "Monitoring Program"; monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

Attached are the quantities of water used as reported in our On Tap Water Delivery System and the estimated discharge of sewage waste.

| Month Reported | Quantity of Water Obtained from all sources ($m^3$) | Quantity of Sewage Waste Discharged ($m^3$) |
|---|---|---|
| **January** | 2498.53 | Same |
| **February** | 2016.82 | Same |
| **March** | 2361.91 | Same |
| **April** | 2188.87 | Same |
| **May** | 2501.83 | Same |
| **June** | 2284.39 | Same |
| **July** | 2091.94 | Same |
| **August** | 2429.02 | Same |
| **September** | 2436.00 | Same |
| **October** | 2284.59 | Same |
| **November** | 2056.76 | Same |
| **December** | 2243.19 | Same |
| **ANNUAL TOTAL** | **27393.85** | **Same** |

**Note**: The water consumption volume is considered equal to the sewage discharge volume because there is no meter at the end of the discharge pipe.

IV. A summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities:

None.

V. A list of unauthorized discharges and summary of follow-up action taken:

There were no spills associated with licensed infrastructure in 2022.

VI. A summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year:

There was no abandonment and restoration work completed during 2022. There is no abandonment and restoration work anticipated for 2023.

VII. A summary of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned:

A detailed design is being developed for the water treatment plant upgrade with an anticipated completion date of March 31, 2025. Construction is anticipated to begin on site summer 2026. An application for amendment will be submitted in 2024.

VIII. Any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and

No other details on water use or waste disposal requested by the Board by November 1st of 2022.

IX. updates or revisions to the approved Operation and Maintenance Plans:

There were no updates or revisions to the approved Operation and Maintenance Plans in 2022.

## ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

No additional information to report that the licensee deems useful.

## FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

CIRNAC Inspection took place July 9, 2022. Municipality is working to address compliance items.

**Appendix A: ARC-4 Effluent Quality Limits**

**Appendix B: Certificate of Analysis**

**Appendix C: Arctic Bay 2022 CIRNAC Inspection Report**

# Appendix A

**ARC-4 Effluent Quality limits**

| Parameter | Maximum Concentration of any Grab Sample | September 12, 2022 | September 22, 2022 |
|---|---|---|---|
| $BOD_5$ | 120 mg/L | 138 | 88 |
| Total Suspended Solids | 180 mg/L | 16 | 28 |
| Fecal Coliform | $1x10^6$ CFU/100 mL | 1400000 | 700000 |
| Oil and Grease | No visible sheen | 18.6 | 10.7 |
| pH | Between 6 and 9 | 7.72 | 7.83 |

# Appendix B

CADUCEON ENVIRONMENTAL LABORATORIES
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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: G096047** **REPORT No. B22-30878**

**Report To:**

**Hamlet of Arctic Bay**
Box 150,
Arctic Bay NU X0A 0A0 Canada
**Attention:** Sam Willie

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 30-Sep-22
DATE REPORTED: 11-Oct-22
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:
P.O. NUMBER: 19703
WATERWORKS NO.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Client I.D.** | | End of Decanting - ARC-8 W/W Lagoon 2022 | | | |
| | | | **Sample I.D.** | | B22-30878-1 | | | |
| | | | **Date Collected** | | 27-Sep-22 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Hardness (as CaCO3) | mg/L | 1 | SM 3120 | 05-Oct-22/O | 69 | | | |
| Alkalinity(CaCO3) to pH4.5 | mg/L | 5 | SM 2320B | 30-Sep-22/O | 364 | | | |
| pH @25°C | pH Units | | SM 4500H | 30-Sep-22/O | 7.91 | | | |
| Conductivity @25°C | µmho/cm | 1 | SM 2510B | 30-Sep-22/O | 1010 | | | |
| Total Suspended Solids | mg/L | 3 | SM2540D | 04-Oct-22/K | 58 | | | |
| Chloride | mg/L | 0.5 | SM4110C | 03-Oct-22/O | 57.8 | | | |
| Nitrite (N) | mg/L | 0.1 | SM4110C | 03-Oct-22/O | < 0.1 | | | |
| Nitrate (N) | mg/L | 0.1 | SM4110C | 03-Oct-22/O | < 0.1 | | | |
| Sulphate | mg/L | 1 | SM4110C | 03-Oct-22/O | < 1 | | | |
| Calcium | mg/L | 0.02 | SM 3120 | 05-Oct-22/O | 13.0 | | | |
| Potassium | mg/L | 0.1 | SM 3120 | 05-Oct-22/O | 23.3 | | | |
| Aluminum | mg/L | 0.01 | SM 3120 | 05-Oct-22/O | 0.44 | | | |
| Arsenic | mg/L | 0.0005 | EPA 200.8 | 07-Oct-22/O | 0.0014 | | | |
| Cadmium | mg/L | ).000070 | EPA 200.8 | 07-Oct-22/O | 0.000128 | | | |
| Chromium | mg/L | 0.002 | SM 3120 | 05-Oct-22/O | 0.002 | | | |
| Cobalt | mg/L | 0.005 | SM 3120 | 05-Oct-22/O | < 0.005 | | | |
| Copper | mg/L | 0.002 | SM 3120 | 05-Oct-22/O | 0.076 | | | |
| Iron | mg/L | 0.005 | SM 3120 | 05-Oct-22/O | 1.63 | | | |
| Lead | mg/L | 0.0001 | EPA 200.8 | 11-Oct-22/O | 0.0015 | | | |
| Manganese | mg/L | 0.001 | SM 3120 | 05-Oct-22/O | 0.313 | | | |
| Mercury | mg/L | 0.00002 | SM 3112 B | 05-Oct-22/O | 0.00005 | | | |
| Nickel | mg/L | 0.01 | SM 3120 | 05-Oct-22/O | < 0.01 | | | |
| Zinc | mg/L | 0.005 | SM 3120 | 05-Oct-22/O | 0.083 | | | |
| Ammonia (N)-Total | mg/L | 0.01 | SM4500-NH3-H | 05-Oct-22/K | 92.9 | | | |

Tahir Yapici Ph.D
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™ ENVIRONMENTAL LABORATORIES
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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: G096047** **REPORT No. B22-30878**

**Report To:**

**Hamlet of Arctic Bay**
Box 150,
Arctic Bay NU X0A 0A0 Canada
**Attention:** Sam Willie

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 30-Sep-22
DATE REPORTED: 11-Oct-22
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:
P.O. NUMBER: 19703
WATERWORKS NO.

| | Client I.D. | End of Decanting - ARC-8 W/W Lagoon 2022 | | | |
|---|---|---|---|---|---|
| | Sample I.D. | B22-30878-1 | | | |
| | Date Collected | 27-Sep-22 | | | |

| Parameter | Units | R.L. | Reference Method | Date/Site Analyzed | | | | |
|---|---|---|---|---|---|---|---|---|
| Phenolics | mg/L | 0.001 | MOEE 3179 | 03-Oct-22/K | 0.890 | | | |
| BOD(5 day) | mg/L | 3 | SM 5210B | 05-Oct-22/K | 102 | | | |
| Total Organic Carbon | mg/L | 0.2 | EPA 415.2 | 04-Oct-22/O | 46.7 | | | |
| Oil & Grease-Total | mg/L | 1.0 | SM 5520 | 04-Oct-22/K | 23.0 | | | |
| Fecal Coliform | cfu/100mL | 1 | MOE E3371 | 30-Sep-22/O | 700000 | | | |

Tahir Yapici Ph.D
Lab Manager - Ottawa District

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# CERTIFICATE OF ANALYSIS

## Final Report

**C.O.C.: ---**

**REPORT No. B22-30251**

**Report To:**

**Hamlet of Arctic Bay**
Box 150,
Arctic Bay NU X0A 0A0 Canada
**Attention:** Sam Willie

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 22-Sep-22
DATE REPORTED: 29-Sep-22
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:
P.O. NUMBER: 19670
WATERWORKS NO.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Client I.D.** | | 1 WW Kit | | | |
| | | | **Sample I.D.** | | B22-30251-1 | | | |
| | | | **Date Collected** | | 22-Sep-22 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Hardness (as CaCO3) | mg/L | 1 | SM 3120 | 28-Sep-22/O | 70 | | | |
| Alkalinity(CaCO3) to pH4.5 | mg/L | 5 | SM 2320B | 22-Sep-22/O | 374 | | | |
| pH @25°C | pH Units | | SM 4500H | 22-Sep-22/O | 7.83 | | | |
| Conductivity @25°C | µmho/cm | 1 | SM 2510B | 22-Sep-22/O | 1020 | | | |
| Total Suspended Solids | mg/L | 3 | SM2540D | 26-Sep-22/K | 28 | | | |
| Chloride | mg/L | 0.5 | SM4110C | 26-Sep-22/O | 27.8 | | | |
| Nitrite (N) | mg/L | 0.1 | SM4110C | 26-Sep-22/O | < 0.1 | | | |
| Nitrate (N) | mg/L | 0.1 | SM4110C | 26-Sep-22/O | 0.2 | | | |
| Sulphate | mg/L | 1 | SM4110C | 26-Sep-22/O | 33 | | | |
| Calcium | mg/L | 0.02 | SM 3120 | 28-Sep-22/O | 13.0 | | | |
| Potassium | mg/L | 0.1 | SM 3120 | 28-Sep-22/O | 25.5 | | | |
| Aluminum | mg/L | 0.01 | SM 3120 | 28-Sep-22/O | 0.10 | | | |
| Arsenic | mg/L | 0.0005 | EPA 200.8 | 23-Sep-22/O | 0.0011 | | | |
| Cadmium | mg/L | ).000070 | EPA 200.8 | 23-Sep-22/O | 0.000079 | | | |
| Chromium | mg/L | 0.002 | SM 3120 | 28-Sep-22/O | < 0.002 | | | |
| Cobalt | mg/L | 0.005 | SM 3120 | 28-Sep-22/O | < 0.005 | | | |
| Copper | mg/L | 0.002 | SM 3120 | 28-Sep-22/O | 0.041 | | | |
| Iron | mg/L | 0.005 | SM 3120 | 28-Sep-22/O | 0.753 | | | |
| Lead | mg/L | 0.0001 | EPA 200.8 | 23-Sep-22/O | 0.0010 | | | |
| Manganese | mg/L | 0.001 | SM 3120 | 28-Sep-22/O | 0.282 | | | |
| Mercury | mg/L | 0.00002 | SM 3112 B | 26-Sep-22/O | 0.00002 | | | |
| Nickel | mg/L | 0.01 | SM 3120 | 28-Sep-22/O | < 0.01 | | | |
| Zinc | mg/L | 0.005 | SM 3120 | 28-Sep-22/O | 0.038 | | | |
| Ammonia (N)-Total | mg/L | 0.01 | SM4500-NH3-H | 27-Sep-22/K | 94.8 | | | |
| Phenolics | mg/L | 0.001 | MOEE 3179 | 23-Sep-22/K | 0.816 | | | |
| BOD(5 day) | mg/L | 3 | SM 5210B | 23-Sep-22/K | 88 | | | |
| Total Organic Carbon | mg/L | 0.2 | EPA 415.2 | 22-Sep-22/O | 73.3 | | | |

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Tahir Yapici Ph.D
Lab Manager - Ottawa District

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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: ---**

**REPORT No. B22-30251**

**Report To:**

**Hamlet of Arctic Bay**
Box 150,
Arctic Bay NU X0A 0A0 Canada
**Attention:** Sam Willie

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 22-Sep-22
DATE REPORTED: 29-Sep-22
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:
P.O. NUMBER: 19670
WATERWORKS NO.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Client I.D.** | | 1 WW Kit | | | |
| | | | **Sample I.D.** | | B22-30251-1 | | | |
| | | | **Date Collected** | | 22-Sep-22 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Oil & Grease-Total | mg/L | 1.0 | SM 5520 | 26-Sep-22/K | 10.7 | | | |
| Fecal Coliform | cfu/100mL | 1 | MOE E3371 | 22-Sep-22/O | 700000 | | | |

Tahir Yapici Ph.D
Lab Manager - Ottawa District

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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: G095982** **REPORT No. B22-30248**

**Report To:**

**Hamlet of Arctic Bay**
Box 150,
Arctic Bay NU X0A 0A0 Canada
**Attention:** Sam Willie Foreman

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 22-Sep-22
DATE REPORTED: 06-Oct-22
SAMPLE MATRIX: Leachate

JOB/PROJECT NO.: 2022 Leachate Landfill
P.O. NUMBER:
WATERWORKS NO.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Client I.D.** | | Kit. Leachate Landfill-ARC-6 | | | |
| | | | **Sample I.D.** | | B22-30248-1 | | | |
| | | | **Date Collected** | | 19-Sep-22 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Hardness (as CaCO3) | mg/L | 1 | SM 3120 | 28-Sep-22/O | 729 | | | |
| Alkalinity(CaCO3) to pH4.5 | mg/L | 5 | SM 2320B | 22-Sep-22/O | 160 | | | |
| pH @25°C | pH Units | | SM 4500H | 22-Sep-22/O | 7.79 | | | |
| Conductivity @25°C | µmho/cm | 1 | SM 2510B | 22-Sep-22/O | 2510 | | | |
| Total Suspended Solids | mg/L | 3 | SM2540D | 26-Sep-22/K | 21 | | | |
| Chloride | mg/L | 0.5 | SM4110C | 27-Sep-22/O | 419 | | | |
| Nitrite (N) | mg/L | 0.1 | SM4110C | 26-Sep-22/O | < 0.1 | | | |
| Nitrate (N) | mg/L | 0.1 | SM4110C | 26-Sep-22/O | < 0.1 | | | |
| Sulphate | mg/L | 1 | SM4110C | 27-Sep-22/O | 629 | | | |
| Calcium | mg/L | 0.02 | SM 3120 | 28-Sep-22/O | 151 | | | |
| Potassium | mg/L | 0.1 | SM 3120 | 28-Sep-22/O | 34.5 | | | |
| Aluminum | mg/L | 0.01 | SM 3120 | 28-Sep-22/O | 0.06 | | | |
| Arsenic | mg/L | 0.0005 | EPA 200.8 | 23-Sep-22/O | 0.0009 | | | |
| Cadmium | mg/L | ).000070 | EPA 200.8 | 23-Sep-22/O | < 0.000070 | | | |
| Chromium | mg/L | 0.002 | SM 3120 | 28-Sep-22/O | < 0.002 | | | |
| Cobalt | mg/L | 0.005 | SM 3120 | 28-Sep-22/O | < 0.005 | | | |
| Copper | mg/L | 0.002 | SM 3120 | 28-Sep-22/O | < 0.002 | | | |
| Iron | mg/L | 0.005 | SM 3120 | 28-Sep-22/O | 2.45 | | | |
| Lead | mg/L | 0.0001 | EPA 200.8 | 23-Sep-22/O | 0.0001 | | | |
| Manganese | mg/L | 0.001 | SM 3120 | 28-Sep-22/O | 1.61 | | | |
| Mercury | mg/L | 0.00002 | SM 3112 B | 26-Sep-22/O | < 0.00002 | | | |
| Nickel | mg/L | 0.01 | SM 3120 | 28-Sep-22/O | < 0.01 | | | |
| Zinc | mg/L | 0.005 | SM 3120 | 28-Sep-22/O | 0.005 | | | |
| Ammonia (N)-Total | mg/L | 0.01 | SM4500-NH3-H | 27-Sep-22/K | 0.06 | | | |
| Phosphorus-Total | mg/L | 0.01 | E3516.2 | 04-Oct-22/K | 0.16 | | | |

Tahir Yapici Ph.D
Lab Manager - Ottawa District

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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: G095982** **REPORT No. B22-30248**

**Report To:**

**Hamlet of Arctic Bay**
Box 150,
Arctic Bay NU X0A 0A0 Canada
**Attention:** Sam Willie Foreman

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 22-Sep-22
DATE REPORTED: 06-Oct-22
SAMPLE MATRIX: Leachate

JOB/PROJECT NO.: 2022 Leachate Landfill
P.O. NUMBER:
WATERWORKS NO.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Client I.D.** | | Kit. Leachate Landfill-ARC-6 | | | |
| | | | **Sample I.D.** | | B22-30248-1 | | | |
| | | | **Date Collected** | | 19-Sep-22 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Phenolics | mg/L | 0.001 | MOEE 3179 | 23-Sep-22/K | < 0.001 | | | |
| BOD(5 day) | mg/L | 3 | SM 5210B | 23-Sep-22/K | 9 | | | |
| Total Organic Carbon | mg/L | 0.2 | EPA 415.2 | 22-Sep-22/O | 9.4 | | | |
| Fecal Coliform | cfu/100mL | 1 | MOE E3371 | 22-Sep-22/O | 24 | | | |
| PHC F1 (C6-C10) | µg/L | 25 | MOE E3421 | 26-Sep-22/R | < 25 | | | |
| PHC F2 (>C10-C16) | µg/L | 50 | MOE E3421 | 23-Sep-22/K | < 50 | | | |
| PHC F3 (>C16-C34) | µg/L | 400 | MOE E3421 | 23-Sep-22/K | < 400 | | | |
| PHC F4 (>C34-C50) | µg/L | 400 | MOE E3421 | 23-Sep-22/K | < 400 | | | |
| Benzene | µg/L | 0.5 | EPA 8260 | 26-Sep-22/R | < 0.5 | | | |
| Toluene | µg/L | 0.5 | EPA 8260 | 26-Sep-22/R | < 0.5 | | | |
| Ethylbenzene | µg/L | 0.5 | EPA 8260 | 26-Sep-22/R | < 0.5 | | | |
| Xylene, m,p- | µg/L | 1.0 | EPA 8260 | 26-Sep-22/R | < 1.0 | | | |
| Xylene, o- | µg/L | 0.5 | EPA 8260 | 26-Sep-22/R | < 0.5 | | | |
| Xylene, m,p,o- | µg/L | 1.1 | EPA 8260 | 26-Sep-22/R | < 1.1 | | | |
| Dibromofluoromethane (SS) | % rec. | | EPA 8260 | 26-Sep-22/R | 91.3 | | | |
| Toluene-d8 (SS) | % rec. | | EPA 8260 | 26-Sep-22/R | 93.0 | | | |
| Bromofluorobenzene,4(SS) | % rec. | | EPA 8260 | 26-Sep-22/R | 108 | | | |

Tahir Yapici Ph.D
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: G095982** **REPORT No. B22-29537**

**Report To:**

**Hamlet of Arctic Bay**
Box 150,
Arctic Bay NU X0A 0A0 Canada
**Attention:** Sam Willie

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 14-Sep-22
DATE REPORTED: 26-Sep-22
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:
P.O. NUMBER: 19670
WATERWORKS NO.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Client I.D.** | | 1 WW Kit | | | |
| | | | **Sample I.D.** | | B22-29537-1 | | | |
| | | | **Date Collected** | | 12-Sep-22 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Hardness (as CaCO3) | mg/L | 1 | SM 3120 | 15-Sep-22/O | 66 | | | |
| Alkalinity(CaCO3) to pH4.5 | mg/L | 5 | SM 2320B | 15-Sep-22/O | 374 | | | |
| pH @25°C | pH Units | | SM 4500H | 15-Sep-22/O | 7.72 | | | |
| Conductivity @25°C | µmho/cm | 1 | SM 2510B | 15-Sep-22/O | 1000 | | | |
| Total Suspended Solids | mg/L | 3 | SM2540D | 19-Sep-22/K | 16 | | | |
| Chloride | mg/L | 0.5 | SM4110C | 16-Sep-22/O | 56.2 | | | |
| Nitrite (N) | mg/L | 0.1 | SM4110C | 16-Sep-22/O | < 0.1 | | | |
| Nitrate (N) | mg/L | 0.1 | SM4110C | 16-Sep-22/O | < 0.1 | | | |
| Sulphate | mg/L | 1 | SM4110C | 16-Sep-22/O | 2 | | | |
| Calcium | mg/L | 0.02 | SM 3120 | 15-Sep-22/O | 11.8 | | | |
| Potassium | mg/L | 0.1 | SM 3120 | 15-Sep-22/O | 24.9 | | | |
| Aluminum | mg/L | 0.01 | SM 3120 | 15-Sep-22/O | 0.11 | | | |
| Arsenic | mg/L | 0.0005 | EPA 200.8 | 19-Sep-22/O | 0.0011 | | | |
| Cadmium | mg/L | 0.000070 | EPA 200.8 | 19-Sep-22/O | 0.000077 | | | |
| Chromium | mg/L | 0.002 | SM 3120 | 15-Sep-22/O | < 0.002 | | | |
| Cobalt | mg/L | 0.005 | SM 3120 | 15-Sep-22/O | < 0.005 | | | |
| Copper | mg/L | 0.002 | SM 3120 | 15-Sep-22/O | 0.046 | | | |
| Iron | mg/L | 0.005 | SM 3120 | 15-Sep-22/O | 0.717 | | | |
| Lead | mg/L | 0.0001 | EPA 200.8 | 19-Sep-22/O | 0.0008 | | | |
| Manganese | mg/L | 0.001 | SM 3120 | 15-Sep-22/O | 0.275 | | | |
| Mercury | mg/L | 0.00002 | SM 3112 B | 16-Sep-22/O | 0.00003 | | | |
| Nickel | mg/L | 0.01 | SM 3120 | 15-Sep-22/O | < 0.01 | | | |
| Zinc | mg/L | 0.005 | SM 3120 | 15-Sep-22/O | 0.046 | | | |
| Ammonia (N)-Total | mg/L | 0.01 | SM4500-NH3-H | 16-Sep-22/K | 92.5 | | | |
| Phenolics | mg/L | 0.001 | MOEE 3179 | 16-Sep-22/K | 0.858 | | | |
| BOD(5 day) | mg/L | 3 | SM 5210B | 15-Sep-22/K | 138 | | | |
| Total Organic Carbon | mg/L | 0.2 | EPA 415.2 | 19-Sep-22/O | 67.3 | | | |

Tahir Yapici Ph.D
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™ ENVIRONMENTAL LABORATORIES
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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: G095982** **REPORT No. B22-29537**

**Report To:**

**Hamlet of Arctic Bay**
Box 150,
Arctic Bay NU X0A 0A0 Canada
**Attention:** Sam Willie

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 14-Sep-22
DATE REPORTED: 26-Sep-22
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:
P.O. NUMBER: 19670
WATERWORKS NO.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Client I.D.** | | 1 WW Kit | | | |
| | | | **Sample I.D.** | | B22-29537-1 | | | |
| | | | **Date Collected** | | 12-Sep-22 | | | |
| **Parameter** | **Units** | **R.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Oil & Grease-Total | mg/L | 1.0 | SM 5520 | 21-Sep-22/K | 18.6 | | | |
| Fecal Coliform | cfu/100mL | 1 | MOE E3371 | 14-Sep-22/O | 1400000 | | | |

Tahir Yapici Ph.D
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

# Appendix C

# WATER LICENCE INSPECTION FORM

☒ **Original**
☐ **Follow-Up Report**

| **Licensee** | **Licensee Representative** |
|---|---|
| Hamlet of Arctic Bay | Gord Marinic |
| **Licence No. / Expiry** | **Representative's Title** |
| 3BM-ARC1924 | Regional Engineer |
| **Land / Other Authorizations** | **Land / Other Authorizations** |
| | |
| **Date of Inspection** | **Inspector** |
| July 9, 2022 | Joseph Monteith |

**Activities Inspected**

☐ Camp ☐ Drilling ☐ Mining ☐ Construction ☐ Reclamation ☐ Fuel Storage

☐ Roads/Hauling ☒ Other: Potable water, Sewage, and Solid Waste ☐ Other:

**Conditions:** **A- Acceptable** **U-Unacceptable** **C-Concern** **NI-Not Inspected** **NA- Not applicable**

| **PART:** | **Condition** | **Observation No.*** |
|---|---|---|
| A: SCOPE, DEFINITIONS AND ENFORCEMENT | A | |
| B: GENERAL CONDITIONS | A | |
| C: CONDITIONS APPLYING TO SECURITY | NI | |
| D: CONDITIONS APPLYING TO WATER USE | A | 1-3 |
| E: CONDITIONS APPLYING TO WASTE DISPOSAL AND MANAGEMENT | C | 4-18 |
| F: CONDITIONS APPLYING TO MODIFICATIONS | NA | |
| G: CONDITIONS APPLYING TO CONSTRUCTION | NA | |
| H: CONDITIONS APPLYING TO EMERGENCY RESPONSE AND CONTINGENCY PLANNING | A | |
| I: CONDITIONS APPLYING TO ABANDONMENT, RECLAMATION AND CLOSURE PLANNING | NA | |
| J: CONDITIONS APPLYING TO MONITORING | A | |
| SCHEDULES | A | |

**The licence and the observation number corresponds with specific comments provided below.*

| Samples taken by Inspector: | Location(s): N 73° 1'59.65",W 85° 9'51.63" |
|---|---|
| ☐ Yes ☒ No | |

**SECTION 1** ☒ **Comments** (s.__) ☐ **Non-Compliance with Act or Licence** (s.__) ☐ **Action Required** (s.__)

**BACKGROUND**

The community was issued Water Licence 3AM-ARC1924 in 2019, which is set to expire in August of 2024. They are permitted to withdraw 299 cubic metres of water per day for an annual total of 109,135 cubic metres. The way they calculate the amount of sewage waste discharged is by duplicating the water withdrawal amounts.

**Inspector Statement**

On July 9, 2022, a water licence inspection was conducted by Water Resource Officer(WRO) Joseph Monteith at the Hamlet of Arctic Bay, Qiqiktani Region, Nunavut to verify compliance with the terms and conditions of 3BM-ARC1924.

**Water Use and Related structures**

1. Water is being withdrawn from pump house at Marcil Lake(photo 1), as approved by the Water Licence. They were withdrawing water from Marcil Lake using trucks when the water pump from the pump house was broken.
2. The flow meter in the pump house reads 38985538$m^3$ (photo 2). The municipality records the amount withdrawn from trucks, and that information is recorded in a log book (photo 3).
3. On October 12, 2022 Sam Willie, Foreman, emailed the Hamlet of Arctic Bay's Water Usage Report, from January 2022, to August, 2022. 18,373 $m^3$ withdrawn from the water source and delivered(photo 4).

**Waste Water Treatment Facility**

4. At the time of the inspection, the sewage lagoon was in-use and operating as intended. The walls were retaining the sewage as intended. A Sewage truck was observed at the time of inspection discharging into the sewage lagoon.
5. The berm walls surrounding the lagoon did have a pool of water on the west side of the lagoon, with minor migration of raw water from the pool into the lagoon.

6. The freeboard was sufficient and estimated to be between 4-6 metres.
7. Discharge is syphoned over the berm wall, and takes 2 weeks to decant. To create a seal tight fit for the decanting of the lagoon, the foreman uses farmers grease at the connection points. The hose does not have heat tracing to encourage unfreezing of the pipe.
8. A notification to decant was emailed to WRO Monteith on September 1, 2022.
9. The lagoon has 1 monitoring station at the lagoon titled ARC-8, 4 Thermistors, 4 Stan Pipes, and 1 overflow canal. The thermistors access box appears to be damaged.
10. The concerns of this site would be the pooling of water on the west side of the lagoon wall, and the damage to the access box for the thermistors, which were noted by Bhabesh Roy at the time of the inspection.
11. It was observed that signs of large spills, or accumulated small spills had drenched the location of the discharge. No spill reports have come out of this site to date (photo 5 & 6)

**Solid Waste Facility**

12. The licensee segregates their waste into Burn and Cap, Bulk Metal, Tires, and hazardous waste.
13. It was observed that a small stream flow through the existing metal storage area and then flows through the hazardous waste facility (photo 7).
14. Hazardous Waste batteries were observed throughout the metals section of the land fill. Any rain that gets in contact with the batteries has the potential to carry with it the hazardous waste into water.
15. At the time of the inspection it was observed that a lot of the hazardous waste found throughout the solid waste facility was not in secondary containment, and not encapsulated, which runs contrary to Part D: Subsection 7 which is to prevent the deposit of deleterious substances into any water. Hazardous waste exposed to the elements poses a significant risk of migration of the hazardous waste into water.
16. The burn and cap section of the solid waste (photo 8). 3 piles of contaminated waste was deposited on plastic sheets, and covered with plastic sheets, and weighted down (photo 9).
17. Hazardous Waste Drums were observed at the Municipal Garage within municipal boundaries. Numerous signs of spills were observed behind the garage (photo 10, 11, 12).

**Sedimentation**

18. It was observed that the road was washing out between the community and the tank farm (photo 13). Silt fencing should be installed to mitigate the spread of the sediments into the ocean.

**SECTION 2** ☐ **Comments** ☐ **Non-Compliance with Act or Licence** ☒ **Action Required**

The following information is a summary of the actions Required by the licensee to promote and ensure compliance:

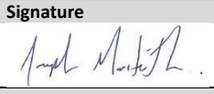
- It was encouraged at the time of the inspection to consolidate all the hazardous waste such as batteries found throughout the bulk metal section of the Solid Waste section to segregate them to the hazardous waste sea can.
- Articulate how you calculate water usage.
- The Licensee is reminded to remain diligent to prevent wastes from entering water, and the environment.
- Stop all the water from interacting with the hazardous waste facility, and the burn and cap from migrating off site.
- Submit spill reports for all spills regardless of size and quantity, from all hamlet facilities.
- Submit a spill report for the observed spills at the municipal garage. Move the Hazardous Waste Drums to the Solid Waste Facility as per the terms and conditions of your water license Part D: Item 7, and clean the spills.
- Install silt fencing to the areas where surface run off typically washes out the roads.

**SECTION 3** ☐ **Comments** ☒ **Non-Compliance with Act or Licence** ☐ **Action Required**

Please review the subsections of the water license:

- Part D: Item 7:
  The Licensee shall segregate and store all hazardous materials and/or hazardous waste within the Solid Waste Disposal Facility and in such a manner as to prevent the deposit of deleterious substances into any Water and until such time that proper disposal arrangements are made;
- Part B: Subsection 5:
  The Licensee shall install flow meters or other such devices, or implement suitable methods required for the measuring of Water volumes as required under Part I, Item 3
- Part B: Subsection 11
  The Licensee shall immediately report any spills of Waste, which are reported to, or observed by the Licensee, within the municipal boundaries or in the areas of the Water Supply or Waste Disposal Facilities, to the NWT/NU 24-Hour Spill Line at (867) 920-8130 and to the Inspector at (867) 975-4289.
  *Inspector telephone number 1 867 975-1787
- Part G: Subsection 4

If, during the term of this Licence, an unauthorized discharge of Waste occurs, or if such a discharge is foreseeable, the Licensee shall:
a. employ the appropriate contingency measures outlined in the Spill Contingency Plan referred to in Part G, Item1;
b. report the incident immediately to the NWT/NU 24-Hour Spill Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and
c. for each spill occurrence, submit to the Inspector, within thirty (30) days after initially reporting the event, a detailed report that provides the necessary information on the location (including the GPS coordinates), initial response action, remediation/clean-up, status of response (ongoing, complete), proposed disposal options for dealing with contaminated materials and any preventative measures to be implemented.

| Licensee or Representative | Inspector's Name |
|---|---|
| Gord Marinic | Joseph Monteith |
| **Signature** | **Signature** |
| |  |
| **Date** | **Date** |
| | November 10, 2021 |

CC: Licensing Department, NWB
Justin Hack, Manager of Field Operations, CIRNAC

**PHOTO LOG**

| Date | Camera | Inspector | Location |
|---|---|---|---|
| July 9, 2022 | Galaxy S9 | Joseph Monteith | Arctic Bay |

**Photo Log**

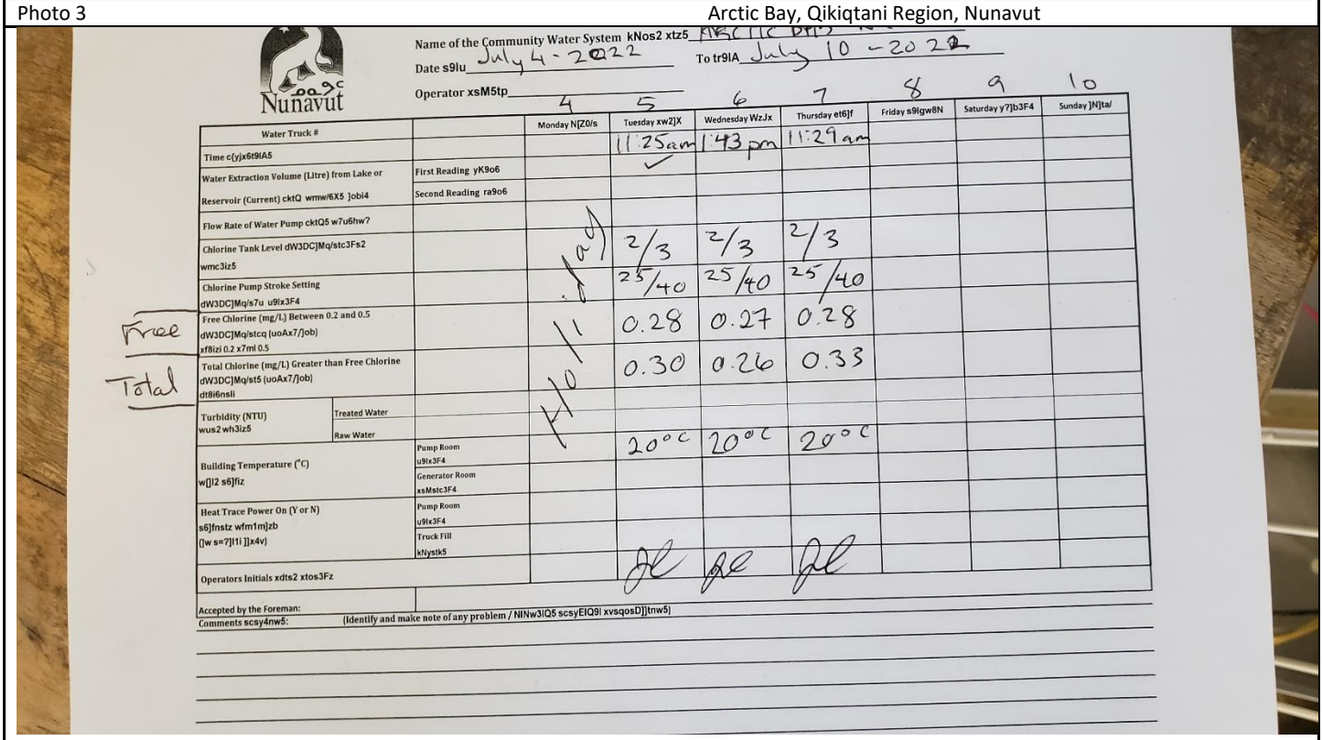
Photo 1


**Description: Site of water withdrawal – water meter broken.**

| Photo Log | Location |
|---|---|
| Photo 2 | Arctic Bay, Qikiqtani Region, Nunavut |


**Description: Flow Gauge Accumulator. +GF+ Signet. Totals read 38985538m³.**

| Photo Log | Location |
|---|---|
| Photo 3 | Arctic Bay, Qikiqtani Region, Nunavut |



Name of the Community Water System kNos2 xtz5 ARCTIC BAY
Date s9lu July 4 - 2022 To tr9lA July 10 - 2022
Operator xsM5tp

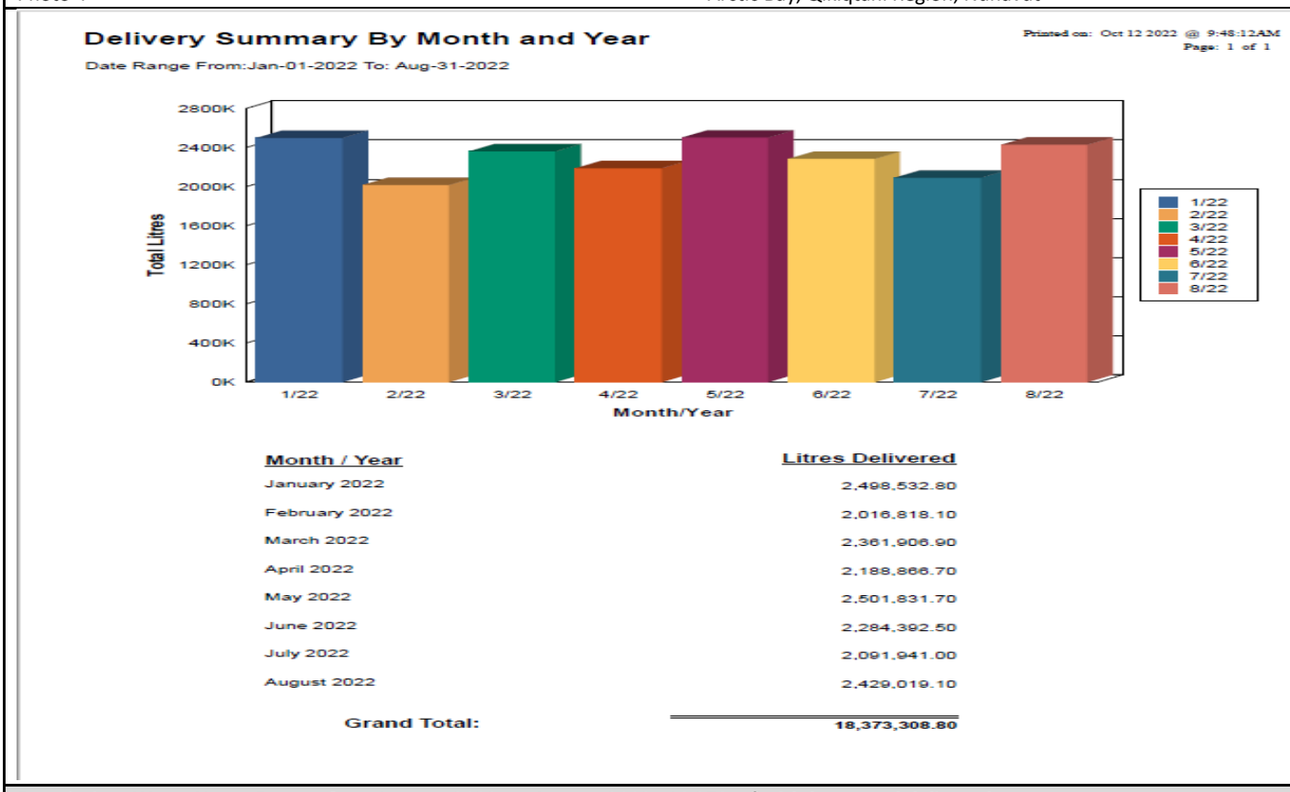
| Water Truck # | | Monday N[Z0/s 4 | Tuesday xw2]X 5 | Wednesday Wz.Jx 6 | Thursday et6]f 7 | Friday s9lgw8N 8 | Saturday y7]b3F4 9 | Sunday ]N]ta/ 10 |
|---|---|---|---|---|---|---|---|---|
| Time c(yjx6t9lA5 | | | 11:25am | 1:43 pm | 11:29 am | | | |
| Water Extraction Volume (Litre) from Lake or Reservoir (Current) cktQ wmw/6X5 ]obi4 | First Reading yK9o6 | | ✓ | | | | | |
| | Second Reading ra9o6 | | | | | | | |
| Flow Rate of Water Pump cktQ5 w7u6hw7 | | | | | | | | |
| Chlorine Tank Level dW3DCJMq/stc3Fs2 wmc3iz5 | | 1.0 | 2/3 | 2/3 | 2/3 | | | |
| Chlorine Pump Stroke Setting dW3DCJMq/s7u u9lx3F4 | | 1.0 | 25/40 | 25/40 | 25/40 | | | |
| Free Chlorine (mg/L) Between 0.2 and 0.5 dW3DCJMq/stcq (uoAx7/]ob) xf8izi 0.2 x7ml 0.5 | | 1 | 0.28 | 0.27 | 0.28 | | | |
| Total Chlorine (mg/L) Greater than Free Chlorine dW3DCJMq/st5 (uoAx7/]ob) dt8i6nsli | | 1.0 | 0.30 | 0.26 | 0.33 | | | |
| Turbidity (NTU) wus2 wh3iz5 | Treated Water | | | | | | | |
| | Raw Water | | | | | | | |
| Building Temperature (°C) w[]l2 s6]fiz | Pump Room u9lx3F4 | | 20°C | 20°C | 20°C | | | |
| | Generator Room xsMstc3F4 | | | | | | | |
| Heat Trace Power On (Y or N) s6]fnstz wfm1m]zb ([w s=7]l1i ]]x4v) | Pump Room u9lx3F4 | | | | | | | |
| | Truck Fill xNysIk5 | | | | | | | |
| Operators Initials xdts2 xtos3Fz | | | JL | JL | JL | | | |

Accepted by the Foreman:
Comments scsy4nw5: (Identify and make note of any problem / NlNw3lQ5 scsyElQ9l xvsqosD]]tnw5)

Free
Total

**Description: Water logs being kept. But, records of water withdrawal volumes not recorded.**

| Photo Log | Location |
|---|---|
| Photo 4 | Arctic Bay, Qikiqtani Region, Nunavut |



**Delivery Summary By Month and Year**

Printed on: Oct 12 2022 @ 9:48:12AM
Page: 1 of 1

Date Range From:Jan-01-2022 To: Aug-31-2022



| Month / Year | Litres Delivered |
|---|---|
| January 2022 | 2,498,532.80 |
| February 2022 | 2,016,818.10 |
| March 2022 | 2,361,906.90 |
| April 2022 | 2,188,866.70 |
| May 2022 | 2,501,831.70 |
| June 2022 | 2,284,392.50 |
| July 2022 | 2,091,941.00 |
| August 2022 | 2,429,019.10 |
| **Grand Total:** | **18,373,308.80** |

**Description: Water Usage Report, from January 2022, to August, 2022. 18,373 $m^3$ withdrawn and delivered.**

| Photo Log | Location |
|---|---|
| Photo 5 | Arctic Bay, Qikiqtani Region, Nunavut |

**Description: Spill on the banks of the sewage lagoon at the site of truck discharge appears to have been covered.**

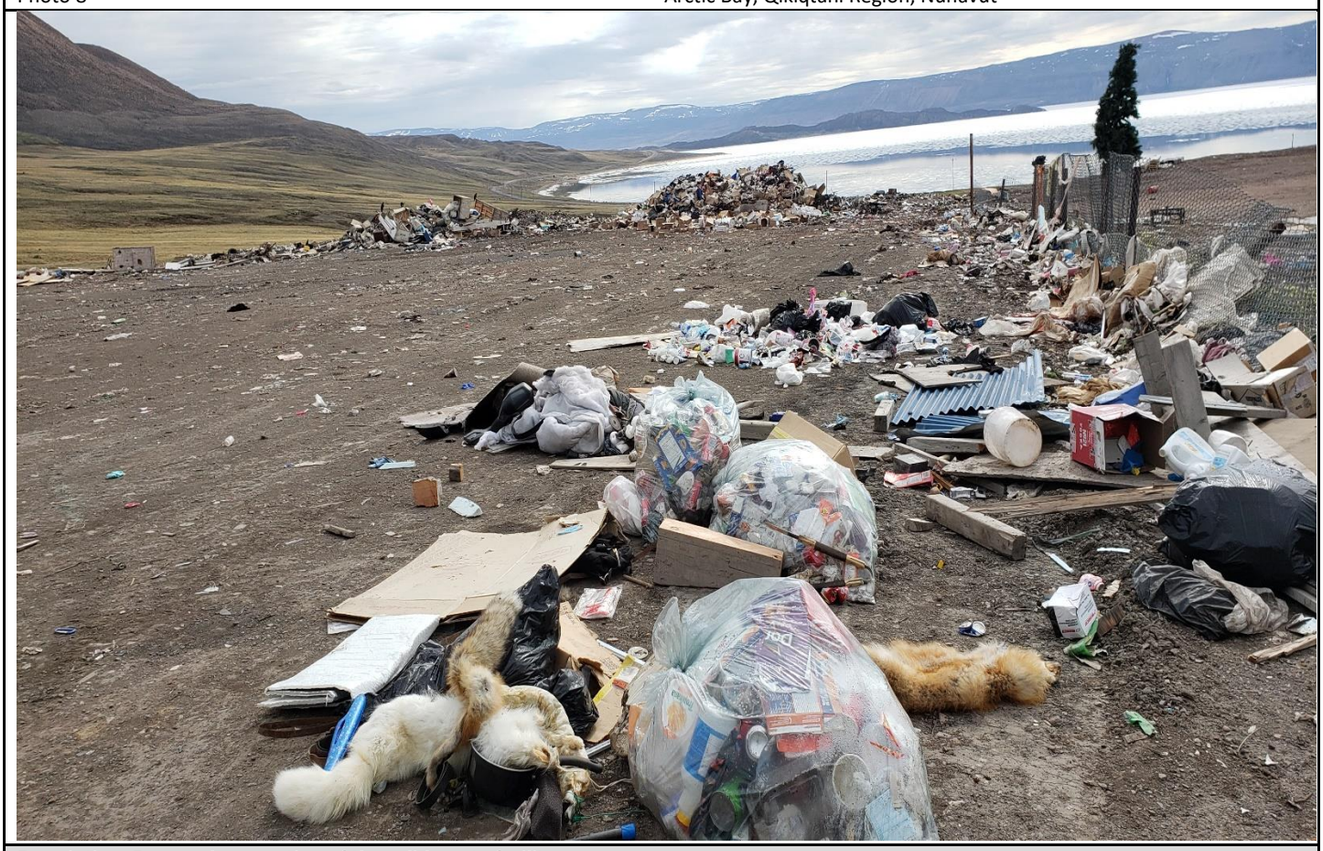
| Photo Log | Location |
|---|---|
| Photo 6 | Arctic Bay, Qikiqtani Region, Nunavut |

**Description: West side of Waste Water Treatment Lagoon. Surface Water Run off drains into the lagoon.**

| Photo Log # | Location |
|---|---|
| Photo 7 | Arctic Bay, Qikiqtani Region, Nunavut |

**Description: Hazardous Waste exposed to the elements. Numerous spills observed.**

| Photo Log # | Location |
|---|---|
| Photo 8 | Arctic Bay, Qikiqtani Region, Nunavut |



**Description: Burn and cap section of the solid waste facility.**

| Photo Log # | Location |
|---|---|
| Photo 9 | Arctic Bay, Qikiqtani Region, Nunavut |

**Description: Contaminated Soil, placed at the entrance to the burn and cap section of the Solid Waste Facility.**

| Photo Log # | Location |
|---|---|
| Photo 10 | Arctic Bay, Qikiqtani Region, Nunavut |

**Description: Contaminated Soil, placed at the entrance to the burn and cap section of the Solid Waste Facility.**

| Photo Log # | Location |
|---|---|
| Photo 11 | Arctic Bay, Qikiqtani Region, Nunavut |

**Description: Hazardous Waste Drums, spilling its product to the receiving environment. Spill migrates to culvert that diverts surface run-off.**

| Photo Log # | Location |
|---|---|
| Photo 12 | Arctic Bay, Qikiqtani Region, Nunavut |


**Description: Hazardous Waste Drums observed behind 2nd Municipal garage. Spills observed.**

| Photo Log # | Location |
|---|---|
| Photo 13 | Arctic Bay, Qikiqtani Region, Nunavut |

**Description: Road washing out, gravel from road migrating to the ocean. Silt fencing required.**