

# County of Brunswick

3954 Clearwell Dr NE  
Leland, NC 28451

## Northwest Water Plant

Leland, NC  
Samples Received: 04/30/21

### Analytical Report 0421-803

### *Isotope Dilution Method* PFAS



### **Enthalpy Analytical, LLC – Ultratrace**

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I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s)

This analytical report was prepared in Portable Document Format (.PDF) and contains \_\_\_\_\_ pages.

....."Report Issued Date: \_\_\_\_\_"



# Summary of Results

## Enthalpy Analytical

Job No.: 0421-803-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: Northwest Water Plant, Leland N.C.

### Summary

|            | Compound           | CAS          | 043021-S01<br>ng/L | 043021-E01<br>ng/L |
|------------|--------------------|--------------|--------------------|--------------------|
| Acids      | PFBA               | 375-22-4     | 3.56               | 3.05               |
|            | PFPeA              | 2706-90-3    | 6.90               | 6.16               |
|            | PFHxA              | 307-24-4     | 4.96               | 4.23               |
|            | PFHpA              | 375-85-9     | 2.84               | 2.38 B             |
|            | PFOA               | 335-67-1     | 6.09               | 5.16               |
|            | PFNA               | 375-95-1     | 0.747              | 0.634              |
|            | PFDA               | 335-76-2     | 0.529              | 0.286              |
|            | PFUnDA             | 2058-94-8    | 0.184 J            | 0.0941 L           |
|            | PFDoDA             | 307-55-1     | 0.0963 L           | ND U               |
|            | PFTTrDA            | 72629-94-8   | 0.344              | ND U               |
|            | PFTeDA             | 376-06-7     | 0.148 L            | ND U               |
| Sulfonates | PFBS               | 375-73-5     | 3.95               | 3.36               |
|            | PFPeS              | 2706-91-4    | 0.681              | 0.662              |
|            | PFHxS              | 355-46-4     | 3.35               | 3.89               |
|            | PFHpS              | 375-92-8     | 0.344              | 0.325              |
|            | PFOS               | 1763-23-1    | 9.97               | 9.51               |
|            | PFNS               | 68259-12-1   | 0.0763 J           | ND U               |
|            | PFDS               | 335-77-3     | 0.121 L            | ND U               |
|            | 4:2 FTS            | 757124-72-4  | 0.0129 L           | ND U               |
| 6:2 FTS    | 27619-97-2         | ND U         | 0.177 J            |                    |
| 8:2 FTS    | 39108-34-4         | 0.0110 L     | ND U               |                    |
| other      | PFOSA              | 754-91-6     | ND U               | ND U               |
|            | N-MeFOSAA          | 2355-31-9    | 0.112 L            | ND U               |
|            | N-EtFOSAA          | 2991-50-6    | 0.0751 L           | ND U               |
|            | HFPO-DA            | 13252-13-6   | 18.8               | 16.3               |
|            | PFMOAA             | 674-13-5     | 107                | 82.1               |
|            | PFMOPrA            | 377-73-1     | 0.0534 L           | ND U               |
|            | PFO2HxA            | 39492-88-1   | 17.4               | 15.9               |
|            | PFO3OA             | 39492-89-2   | 9.43               | 8.96               |
|            | PFO4DA             | 39492-90-5   | 1.86 J             | 2.47 J             |
|            | Nafion Byproduct 1 | 29311-67-9   | 0.615              | 0.487              |
|            | ADONA              | 919005-14-4  | ND U               | ND U               |
|            | 9Cl-PF3ONS         | 756426-58-1  | 0.0294 L           | ND U               |
|            | 11Cl-PF3OUdS       | 763051-92-9  | 0.133 J            | ND U               |
|            | 10:2 FTS           | 120226-60-0  | 0.215 J            | ND U               |
|            | EVE Acid           | 69087-46-3   | 0.161 L            | 0.179 L            |
|            | FBSA               | 30334-69-1   | 0.388              | 0.561              |
|            | Hydro-EVE Acid     | 773804-62-9  | 0.944 L            | 0.926 L            |
|            | Hydrolyzed PSDA    | 2416366-19-1 | 28.7               | 33.9               |
|            | Nafion Byproduct 2 | 749836-20-2  | 0.601 L            | 0.651 L            |
|            | N-EtFOSA           | 4151-50-2    | ND U               | ND U               |
|            | N-EtFOSE           | 1691-99-2    | ND U               | ND U               |
|            | NFDHA              | 151772-58-6  | ND U               | ND U               |
|            | N-MeFOSA           | 31506-32-8   | ND U               | ND U               |
|            | N-MeFOSE           | 24448-09-7   | ND U               | ND U               |
|            | NVHOS              | 1132933-86-8 | 6.27               | 6.12               |
|            | PEPA               | 267239-61-2  | 15.1               | 13.7               |
|            | PFECA-G            | 801212-59-9  | ND U               | ND U               |
|            | PFEESA             | 113507-82-7  | 0.0479 L           | ND U               |
|            | PFHxDA             | 67905-19-5   | ND U               | ND U               |
|            | PFMOBA             | 863090-89-5  | ND U               | ND U               |
| PFO5DA     | 39492-91-6         | 0.625 L      | ND U               |                    |
| PMPA       | 13140-29-9         | 15.6         | 18.3               |                    |
| R-EVE Acid | 2416366-22-6       | 10.1         | 12.0               |                    |
| R-PSDA     | 2416366-18-0       | 24.8         | 20.5               |                    |
| R-PSDCA    | 2416366-21-5       | 0.195 L      | 0.0723 L           |                    |

# Detailed Results

### Enthalpy Analytical

Job No.: 0421-803-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant, Leland N.C.

|               |                  |               |                  |                  |        |
|---------------|------------------|---------------|------------------|------------------|--------|
| Enthalpy ID   | 0421-803-001-1   | Prep Batch    | EU11772          | Sample Vol (mL)  | 283.91 |
| Sample Name   | 043021-S01       | Prep Date     | 2021-04-30 16:29 | Extract Vol (mL) | 0.4    |
| Matrix        | Aqueous          | Analysis Date | 2021-05-01 03:48 | Dilution Factor  | 1      |
| Sampling Date | 20210430 00:00   | Analyst       | Itbrooker        | Method Code      | WM-026 |
| Received Date | 2021-04-30 09:58 | Instrument    | Küli             | Sample Type      | Sample |

|            | Compound           | CAS          | Extract Concentration ng/L | Sample Concentration ng/L | Formatted Result ng/L | LOD ng/L | LOQ ng/L | Recovery Limits | Recovery | Flags |
|------------|--------------------|--------------|----------------------------|---------------------------|-----------------------|----------|----------|-----------------|----------|-------|
| Acids      | PFBA               | 375-22-4     | 2527.54                    | 3.56                      | 3.56                  | 0.135    | 0.268    |                 |          |       |
|            | PFPeA              | 2706-90-3    | 4897.69                    | 6.90                      | 6.90                  | 0.150    | 0.268    |                 |          |       |
|            | PFHxA              | 307-24-4     | 3517.88                    | 4.96                      | 4.96                  | 0.170    | 0.268    |                 |          |       |
|            | PFHpA              | 375-85-9     | 2013.95                    | 2.84                      | 2.84                  | 0.107    | 0.268    |                 |          |       |
|            | PFOA               | 335-67-1     | 4323.36                    | 6.09                      | 6.09                  | 0.156    | 0.268    |                 |          |       |
|            | PFNA               | 375-95-1     | 530.24                     | 0.747                     | 0.747                 | 0.0670   | 0.268    |                 |          |       |
|            | PFDA               | 335-76-2     | 375.81                     | 0.529                     | 0.529                 | 0.0744   | 0.268    |                 |          |       |
|            | PFUnDA             | 2058-94-8    | 130.85                     | 0.184                     | 0.184                 | 0.163    | 0.268    |                 |          | J     |
|            | PFDoDA             | 307-55-1     | 68.35                      | 0.0963                    | 0.0963                | 0.178    | 0.268    |                 |          | L     |
|            | PFTeDA             | 376-06-7     | 105.33                     | 0.148                     | 0.148                 | 0.192    | 0.268    |                 |          | L     |
| Sulfonates | PFBS               | 375-73-5     | 2804.11                    | 3.95                      | 3.95                  | 0.313    | 0.313    |                 |          |       |
|            | PFPeS              | 2706-91-4    | 483.62                     | 0.681                     | 0.681                 | 0.181    | 0.252    |                 |          |       |
|            | PFHxS              | 355-46-4     | 2375.47                    | 3.35                      | 3.35                  | 0.168    | 0.245    |                 |          |       |
|            | PFHpS              | 375-92-8     | 244.45                     | 0.344                     | 0.344                 | 0.119    | 0.255    |                 |          |       |
|            | PFOS               | 1763-23-1    | 7079.37                    | 9.97                      | 9.97                  | 0.141    | 0.248    |                 |          |       |
|            | PFNS               | 68259-12-1   | 54.19                      | 0.0763                    | 0.0763                | 0.0761   | 0.258    |                 |          | J     |
|            | PFDS               | 335-77-3     | 85.60                      | 0.121                     | 0.121                 | 0.169    | 0.258    |                 |          | L     |
|            | 4:2 FTS            | 757124-72-4  | 9.18                       | 0.0129                    | 0.0129                | 0.104    | 0.251    |                 |          | L     |
|            | 6:2 FTS            | 27619-97-2   | ND                         | ND                        | ND                    | 0.102    | 0.255    |                 |          | U     |
|            | 8:2 FTS            | 39108-34-4   | 7.78                       | 0.0110                    | 0.0110                | 0.151    | 0.256    |                 |          | L     |
| Other      | PFOSA              | 754-91-6     | ND                         | ND                        | ND                    | 0.114    | 0.268    |                 |          | U     |
|            | N-MeFOSAA          | 2355-31-9    | 79.72                      | 0.112                     | 0.112                 | 0.127    | 0.268    |                 |          | L     |
|            | N-EiFOSAA          | 2991-50-6    | 53.29                      | 0.0751                    | 0.0751                | 0.0960   | 0.268    |                 |          | L     |
|            | HFPO-DA            | 13252-13-6   | 13320.51                   | 18.8                      | 18.8                  | 0.201    | 0.268    |                 |          | U     |
|            | PFMOAA             | 674-13-5     | 75997.17                   | 107                       | 107                   | 1.30     | 1.27     |                 |          | L     |
|            | PFMOPrA            | 377-73-1     | 37.93                      | 0.0534                    | 0.0534                | 0.211    | 0.268    |                 |          | L     |
|            | PFO2HxA            | 39492-88-1   | 12322.12                   | 17.4                      | 17.4                  | 1.30     | 1.27     |                 |          |       |
|            | PFO3OA             | 39492-89-2   | 6696.57                    | 9.43                      | 9.43                  | 1.30     | 1.27     |                 |          |       |
|            | PFO4DA             | 39492-90-5   | 1317.98                    | 1.86                      | 1.86                  | 1.30     | 2.65     |                 |          | J     |
|            | Nafion Byproduct 1 | 29311-67-9   | 436.57                     | 0.615                     | 0.615                 | 0.211    | 0.268    |                 |          |       |
|            | ADONA              | 919005-14-4  | ND                         | ND                        | ND                    | 0.106    | 0.254    |                 |          | U     |
|            | 9Cl-PF3ONS         | 756426-58-1  | 20.86                      | 0.0294                    | 0.0294                | 0.106    | 0.249    |                 |          | L     |
|            | 11Cl-PF3OUdS       | 763051-92-9  | 94.55                      | 0.133                     | 0.133                 | 0.106    | 0.252    |                 |          | L     |
|            | 10:2 FTS           | 120226-60-0  | 152.33                     | 0.215                     | 0.215                 | 0.211    | 0.268    |                 |          | J     |
|            | EVE Acid           | 69087-46-3   | 114.58                     | 0.161                     | 0.161                 | 1.30     | 1.27     |                 |          | L     |
|            | FBSA               | 30334-69-1   | 275.13                     | 0.388                     | 0.388                 | 0.211    | 0.268    |                 |          |       |
|            | Hydro-EVE Acid     | 773804-62-9  | 669.73                     | 0.944                     | 0.944                 | 1.30     | 1.27     |                 |          | L     |
|            | Hydrolyzed PSDA    | 2416366-19-1 | 20375.55                   | 28.7                      | 28.7                  | 1.30     | 1.27     |                 |          |       |
|            | Nafion Byproduct 2 | 749836-20-2  | 426.23                     | 0.601                     | 0.601                 | 1.30     | 0.268    |                 |          | L     |
|            | N-EiFOA            | 4151-50-2    | ND                         | ND                        | ND                    | 0.211    | 0.268    |                 |          | U     |
|            | N-EiFOSE           | 1691-99-2    | ND                         | ND                        | ND                    | 6.34     | 6.34     |                 |          | U     |
|            | NFDHA              | 151772-58-6  | ND                         | ND                        | ND                    | 0.211    | 0.268    |                 |          | U     |
|            | N-MeFOA            | 31506-32-8   | ND                         | ND                        | ND                    | 0.211    | 0.268    |                 |          | U     |
|            | N-MeFOSE           | 24448-09-7   | ND                         | ND                        | ND                    | 6.34     | 6.34     |                 |          | U     |
|            | NVHOS              | 1132933-86-8 | 4448.97                    | 6.27                      | 6.27                  | 1.30     | 1.27     |                 |          |       |
|            | PEPA               | 267239-61-2  | 10689.72                   | 15.1                      | 15.1                  | 1.30     | 1.27     |                 |          |       |
|            | PFECA-G            | 801212-59-9  | ND                         | ND                        | ND                    | 1.30     | 1.27     |                 |          | U     |
|            | PFEESA             | 113507-82-7  | 34.03                      | 0.0479                    | 0.0479                | 0.211    | 0.268    |                 |          | L     |
|            | PFHxDA             | 67905-19-5   | ND                         | ND                        | ND                    | 1.30     | 1.27     |                 |          | U     |
|            | PFMOBA             | 863090-89-5  | ND                         | ND                        | ND                    | 1.30     | 1.27     |                 |          | U     |
| PFO5DA     | 39492-91-6         | 443.77       | 0.625                      | 0.625                     | 2.65                  | 2.65     |          |                 | L        |       |
| PMPA       | 13140-29-9         | 11068.03     | 15.6                       | 15.6                      | 1.30                  | 1.27     |          |                 |          |       |
| R-EVE Acid | 2416366-22-6       | 7155.82      | 10.1                       | 10.1                      | 1.30                  | 1.27     |          |                 |          |       |
| R-PSDA     | 2416366-18-0       | 17612.25     | 24.8                       | 24.8                      | 1.30                  | 1.27     |          |                 |          |       |
| R-PSDCA    | 2416366-21-5       | 138.19       | 0.195                      | 0.195                     | 1.30                  | 1.27     |          |                 | L        |       |
| ES         | MPFBA              | 4199.30      | 5.92                       |                           |                       |          |          | 20-150%         | 84.0%    |       |
|            | M5PFPeA            | 9107.80      | 12.8                       |                           |                       |          |          | 20-150%         | 182.2%   | Q     |
|            | M3PFBS             | 10856.70     | 15.3                       |                           |                       |          |          | 20-150%         | 217.1%   | Q     |
|            | M2-4:2 FTS         | 8954.02      | 12.6                       |                           |                       |          |          | 20-150%         | 179.1%   | Q     |
|            | M5PFHxA            | 5319.19      | 7.49                       |                           |                       |          |          | 20-150%         | 106.4%   |       |
|            | M3HFPO-DA          | 4706.53      | 6.63                       |                           |                       |          |          | 20-150%         | 94.1%    |       |
|            | M4PFHpA            | 5011.18      | 7.06                       |                           |                       |          |          | 20-150%         | 100.2%   |       |
|            | M3PFHxS            | 5027.15      | 7.08                       |                           |                       |          |          | 20-150%         | 100.5%   |       |
|            | M2-6:2 FTS         | 4523.98      | 6.37                       |                           |                       |          |          | 20-150%         | 90.5%    |       |
|            | M8PFOA             | 4214.05      | 5.94                       |                           |                       |          |          | 20-150%         | 84.3%    |       |
|            | M9PFNA             | 4013.82      | 5.66                       |                           |                       |          |          | 20-150%         | 80.3%    |       |
|            | M8PFOS             | 3507.97      | 4.94                       |                           |                       |          |          | 20-150%         | 70.2%    |       |
|            | M2-8:2 FTS         | 2634.82      | 3.71                       |                           |                       |          |          | 20-150%         | 52.7%    |       |
|            | M8FOSA-I           | 1734.97      | 2.44                       |                           |                       |          |          | 20-150%         | 34.7%    |       |
|            | M6PFDA             | 3693.82      | 5.20                       |                           |                       |          |          | 20-150%         | 73.9%    |       |
|            | d3-N-MeFOSAA       | 2689.36      | 3.79                       |                           |                       |          |          | 20-150%         | 53.8%    |       |
|            | d5-N-EiFOSAA       | 2563.41      | 3.61                       |                           |                       |          |          | 20-150%         | 51.3%    |       |
|            | M7PFUdA            | 3203.12      | 4.51                       |                           |                       |          |          | 20-150%         | 64.1%    |       |
|            | MPFDoA             | 2393.27      | 3.37                       |                           |                       |          |          | 20-150%         | 47.9%    |       |
|            | M2PFTeDA           | 964.66       | 1.36                       |                           |                       |          |          | 20-150%         | 19.3%    | Q     |

## Enthalpy Analytical

Job No.: 0421-803-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant, Leland N.C.

|               |                  |               |                  |                  |        |
|---------------|------------------|---------------|------------------|------------------|--------|
| Enthalpy ID   | 0421-803-002-1   | Prep Batch    | EU11772          | Sample Vol (mL)  | 289.83 |
| Sample Name   | 043021-E01       | Prep Date     | 2021-04-30 16:29 | Extract Vol (mL) | 0.4    |
| Matrix        | Aqueous          | Analysis Date | 2021-05-01 04:11 | Dilution Factor  | 1      |
| Sampling Date | 20210430 00:00   | Analyst       | Itbrooker        | Method Code      | WM-026 |
| Received Date | 2021-04-30 09:58 | Instrument    | Küli             | Sample Type      | Sample |

|            | Compound           | CAS          | Extract Concentration ng/L | Sample Concentration ng/L | Formatted Result ng/L | LOD ng/L | LOQ ng/L | Recovery Limits | Recovery | Flags |
|------------|--------------------|--------------|----------------------------|---------------------------|-----------------------|----------|----------|-----------------|----------|-------|
| Acids      | PFBA               | 375-22-4     | 2211.47                    | 3.05                      | 3.05                  | 0.132    | 0.262    |                 |          |       |
|            | PFPeA              | 2706-90-3    | 4462.45                    | 6.16                      | 6.16                  | 0.147    | 0.262    |                 |          |       |
|            | PFHxA              | 307-24-4     | 3061.54                    | 4.23                      | 4.23                  | 0.166    | 0.262    |                 |          |       |
|            | PFHpA              | 375-85-9     | 1721.96                    | 2.38                      | 2.38                  | 0.105    | 0.262    |                 |          | B     |
|            | PFOA               | 335-67-1     | 3737.44                    | 5.16                      | 5.16                  | 0.153    | 0.262    |                 |          |       |
|            | PFNA               | 375-95-1     | 459.60                     | 0.634                     | 0.634                 | 0.0656   | 0.262    |                 |          |       |
|            | PFDA               | 335-76-2     | 207.23                     | 0.286                     | 0.286                 | 0.0729   | 0.262    |                 |          |       |
|            | PFUnDA             | 2058-94-8    | 68.15                      | 0.0941                    | 0.0941                | 0.160    | 0.262    |                 |          | L     |
|            | PFDoDA             | 307-55-1     | ND                         | ND                        | ND                    | 0.174    | 0.262    |                 |          | U     |
|            | PFTeDA             | 376-06-7     | ND                         | ND                        | ND                    | 0.188    | 0.262    |                 |          | U     |
| Sulfonates | PFBS               | 375-73-5     | 2436.82                    | 3.36                      | 3.36                  | 0.306    | 0.306    |                 |          |       |
|            | PFPeS              | 2706-91-4    | 479.37                     | 0.662                     | 0.662                 | 0.178    | 0.247    |                 |          |       |
|            | PFHxS              | 355-46-4     | 2817.20                    | 3.89                      | 3.89                  | 0.165    | 0.240    |                 |          |       |
|            | PFHpS              | 375-92-8     | 235.45                     | 0.325                     | 0.325                 | 0.116    | 0.250    |                 |          |       |
|            | PFOS               | 1763-23-1    | 6892.72                    | 9.51                      | 9.51                  | 0.138    | 0.243    |                 |          |       |
|            | PFNS               | 68259-12-1   | ND                         | ND                        | ND                    | 0.0745   | 0.253    |                 |          | U     |
|            | PFDS               | 335-77-3     | ND                         | ND                        | ND                    | 0.166    | 0.253    |                 |          | U     |
|            | 4:2 FTS            | 757124-72-4  | ND                         | ND                        | ND                    | 0.102    | 0.246    |                 |          | U     |
|            | 6:2 FTS            | 27619-97-2   | 128.55                     | 0.177                     | 0.177                 | 0.100    | 0.250    |                 |          | J     |
|            | 8:2 FTS            | 39108-34-4   | ND                         | ND                        | ND                    | 0.148    | 0.251    |                 |          | U     |
| other      | PFOSA              | 754-91-6     | ND                         | ND                        | ND                    | 0.112    | 0.262    |                 |          | U     |
|            | N-MeFOSAA          | 2355-31-9    | ND                         | ND                        | ND                    | 0.124    | 0.262    |                 |          | U     |
|            | N-EtFOSAA          | 2991-50-6    | ND                         | ND                        | ND                    | 0.0940   | 0.262    |                 |          | U     |
|            | HFPO-DA            | 13252-13-6   | 11786.90                   | 16.3                      | 16.3                  | 0.197    | 0.262    |                 |          |       |
|            | PFMOAA             | 674-13-5     | 59484.13                   | 82.1                      | 82.1                  | 1.28     | 1.24     |                 |          |       |
|            | PFMOPrA            | 377-73-1     | ND                         | ND                        | ND                    | 0.207    | 0.262    |                 |          | U     |
|            | PFO2HxA            | 39492-88-1   | 11554.70                   | 15.9                      | 15.9                  | 1.28     | 1.24     |                 |          |       |
|            | PFO3OA             | 39492-89-2   | 6492.74                    | 8.96                      | 8.96                  | 1.28     | 1.24     |                 |          |       |
|            | PFO4DA             | 39492-90-5   | 1791.44                    | 2.47                      | 2.47                  | 1.28     | 2.59     |                 |          | J     |
|            | Nafion Byproduct 1 | 29311-67-9   | 352.89                     | 0.487                     | 0.487                 | 0.207    | 0.262    |                 |          |       |
|            | ADONA              | 919005-14-4  | ND                         | ND                        | ND                    | 0.104    | 0.248    |                 |          | U     |
|            | 9Cl-PF3ONS         | 756426-58-1  | ND                         | ND                        | ND                    | 0.104    | 0.244    |                 |          | U     |
|            | 11Cl-PF3OUdS       | 763051-92-9  | ND                         | ND                        | ND                    | 0.104    | 0.247    |                 |          | U     |
|            | 10:2 FTS           | 120226-60-0  | ND                         | ND                        | ND                    | 0.207    | 0.262    |                 |          | U     |
|            | EVE Acid           | 69087-46-3   | 130.00                     | 0.179                     | 0.179                 | 1.28     | 1.24     |                 |          | L     |
|            | FBSA               | 30334-69-1   | 406.71                     | 0.561                     | 0.561                 | 0.207    | 0.262    |                 |          |       |
|            | Hydro-EVE Acid     | 773804-62-9  | 670.78                     | 0.926                     | 0.926                 | 1.28     | 1.24     |                 |          | L     |
|            | Hydrolyzed PSDA    | 2416366-19-1 | 24587.40                   | 33.9                      | 33.9                  | 1.28     | 1.24     |                 |          |       |
|            | Nafion Byproduct 2 | 749836-20-2  | 471.71                     | 0.651                     | 0.651                 | 1.28     | 0.262    |                 |          | L     |
|            | N-EtFOA            | 4151-50-2    | ND                         | ND                        | ND                    | 0.207    | 0.262    |                 |          | U     |
|            | N-EtFOSE           | 1691-99-2    | ND                         | ND                        | ND                    | 6.21     | 6.21     |                 |          | U     |
|            | NFDHA              | 151772-58-6  | ND                         | ND                        | ND                    | 0.207    | 0.262    |                 |          | U     |
|            | N-MeFOA            | 31506-32-8   | ND                         | ND                        | ND                    | 0.207    | 0.262    |                 |          | U     |
|            | N-MeFOSE           | 24448-09-7   | ND                         | ND                        | ND                    | 6.21     | 6.21     |                 |          | U     |
|            | NVHOS              | 1132933-86-8 | 4435.30                    | 6.12                      | 6.12                  | 1.28     | 1.24     |                 |          |       |
|            | PEPA               | 267239-61-2  | 9935.82                    | 13.7                      | 13.7                  | 1.28     | 1.24     |                 |          |       |
|            | PFECA-G            | 801212-59-9  | ND                         | ND                        | ND                    | 1.28     | 1.24     |                 |          | U     |
|            | PFEESA             | 113507-82-7  | ND                         | ND                        | ND                    | 0.207    | 0.262    |                 |          | U     |
|            | PFHxDA             | 67905-19-5   | ND                         | ND                        | ND                    | 1.28     | 1.24     |                 |          | U     |
|            | PFMOBA             | 863090-89-5  | ND                         | ND                        | ND                    | 1.28     | 1.24     |                 |          | U     |
| PFO5DA     | 39492-91-6         | ND           | ND                         | ND                        | 2.59                  | 2.59     |          |                 | U        |       |
| PMPA       | 13140-29-9         | 13243.98     | 18.3                       | 18.3                      | 1.28                  | 1.24     |          |                 |          |       |
| R-EVE Acid | 2416366-22-6       | 8705.62      | 12.0                       | 12.0                      | 1.28                  | 1.24     |          |                 |          |       |
| R-PSDA     | 2416366-18-0       | 14846.28     | 20.5                       | 20.5                      | 1.28                  | 1.24     |          |                 |          |       |
| R-PSDCA    | 2416366-21-5       | 52.36        | 0.0723                     | 0.0723                    | 1.28                  | 1.24     |          |                 | L        |       |
| ES         | MPFBA              |              | 4436.80                    | 6.12                      |                       |          |          | 20-150%         | 88.7%    |       |
|            | M5PFPeA            |              | 9974.39                    | 13.8                      |                       |          |          | 20-150%         | 199.5%   | Q     |
|            | M3PFBS             |              | 14003.89                   | 19.3                      |                       |          |          | 20-150%         | 280.1%   | Q     |
|            | M2-4:2 FTS         |              | 11033.73                   | 15.2                      |                       |          |          | 20-150%         | 220.7%   | Q     |
|            | M5PFHxA            |              | 5167.29                    | 7.13                      |                       |          |          | 20-150%         | 103.3%   |       |
|            | M3HFPO-DA          |              | 4388.48                    | 6.06                      |                       |          |          | 20-150%         | 87.8%    |       |
|            | M4PFHpA            |              | 4992.32                    | 6.89                      |                       |          |          | 20-150%         | 99.8%    |       |
|            | M3PFHxS            |              | 5048.09                    | 6.97                      |                       |          |          | 20-150%         | 101.0%   |       |
|            | M2-6:2 FTS         |              | 4371.85                    | 6.03                      |                       |          |          | 20-150%         | 87.4%    |       |
|            | M8PFOA             |              | 4804.57                    | 6.63                      |                       |          |          | 20-150%         | 96.1%    |       |
|            | M9PFNA             |              | 3955.91                    | 5.46                      |                       |          |          | 20-150%         | 79.1%    |       |
|            | M8PFOS             |              | 4078.29                    | 5.63                      |                       |          |          | 20-150%         | 81.6%    |       |
|            | M2-8:2 FTS         |              | 3464.21                    | 4.78                      |                       |          |          | 20-150%         | 69.3%    |       |
|            | M8FOSA-I           |              | 2796.75                    | 3.86                      |                       |          |          | 20-150%         | 55.9%    |       |
|            | M6PFDA             |              | 3863.54                    | 5.33                      |                       |          |          | 20-150%         | 77.3%    |       |
|            | d3-N-MeFOSAA       |              | 3051.15                    | 4.21                      |                       |          |          | 20-150%         | 61.0%    |       |
|            | d5-N-EtFOSAA       |              | 2476.80                    | 3.42                      |                       |          |          | 20-150%         | 49.5%    |       |
|            | M7PFUdA            |              | 3200.70                    | 4.42                      |                       |          |          | 20-150%         | 64.0%    |       |
|            | MPFDoA             |              | 2343.68                    | 3.23                      |                       |          |          | 20-150%         | 46.9%    |       |
|            | M2PFTeDA           |              | 1229.55                    | 1.70                      |                       |          |          | 20-150%         | 24.6%    |       |

# QC Data

### Enthalpy Analytical

Job No.: 0421-803-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant, Leland N.C.

|               |                  |               |                  |                  |        |
|---------------|------------------|---------------|------------------|------------------|--------|
| Enthalpy ID   | MB-11772-PFAS    | Prep Batch    | EU11772          | Sample Vol (mL)  | 250    |
| Sample Name   | MB-11772-PFAS    | Prep Date     | 2021-04-30 16:29 | Extract Vol (mL) | 0.4    |
| Matrix        | Aqueous          | Analysis Date | 2021-05-01 01:06 | Dilution Factor  | 1      |
| Sampling Date |                  | Analyst       | ltbrooker        | Method Code      | WM-026 |
| Received Date | 2021-04-30 16:29 | Instrument    | Kili             | Sample Type      | Blank  |

|            | Compound           | CAS          | Extract Concentration ng/L | Sample Concentration ng/L | Formatted Result ng/L | LOD ng/L | LOQ ng/L | Recovery Limits | Recovery | Flags |
|------------|--------------------|--------------|----------------------------|---------------------------|-----------------------|----------|----------|-----------------|----------|-------|
| Acids      | PFBA               | 375-22-4     | ND                         | ND                        | ND                    | 0.153    | 0.304    |                 |          | U     |
|            | PFPeA              | 2706-90-3    | ND                         | ND                        | ND                    | 0.170    | 0.304    |                 |          | U     |
|            | PFHxA              | 307-24-4     | 44.02                      | 0.0704                    | 0.0704                | 0.193    | 0.304    |                 |          | L     |
|            | PFHpA              | 375-85-9     | 172.44                     | 0.276                     | 0.276                 | 0.122    | 0.304    |                 |          | J     |
|            | PFOA               | 335-67-1     | 29.30                      | 0.0469                    | 0.0469                | 0.177    | 0.304    |                 |          | L     |
|            | PFNA               | 375-95-1     | ND                         | ND                        | ND                    | 0.0761   | 0.304    |                 |          | U     |
|            | PFDA               | 335-76-2     | ND                         | ND                        | ND                    | 0.0845   | 0.304    |                 |          | U     |
|            | PFUnDA             | 2058-94-8    | ND                         | ND                        | ND                    | 0.185    | 0.304    |                 |          | U     |
|            | PFDoDA             | 307-55-1     | ND                         | ND                        | ND                    | 0.202    | 0.304    |                 |          | U     |
|            | PFTrDA             | 72629-94-8   | 12.86                      | 0.0206                    | 0.0206                | 0.151    | 0.304    |                 |          | L     |
| PFTeDA     | 376-06-7           | ND           | ND                         | ND                        | 0.218                 | 0.304    |          |                 | U        |       |
| Sulfonates | PFBS               | 375-73-5     | ND                         | ND                        | ND                    | 0.355    | 0.355    |                 |          | U     |
|            | PFPeS              | 2706-91-4    | ND                         | ND                        | ND                    | 0.206    | 0.286    |                 |          | U     |
|            | PFHxS              | 355-46-4     | ND                         | ND                        | ND                    | 0.191    | 0.278    |                 |          | U     |
|            | PFHpS              | 375-92-8     | ND                         | ND                        | ND                    | 0.135    | 0.290    |                 |          | U     |
|            | PFOS               | 1763-23-1    | ND                         | ND                        | ND                    | 0.160    | 0.282    |                 |          | U     |
|            | PFNS               | 68259-12-1   | ND                         | ND                        | ND                    | 0.0864   | 0.293    |                 |          | U     |
|            | PFDS               | 335-77-3     | ND                         | ND                        | ND                    | 0.192    | 0.293    |                 |          | U     |
|            | 4:2 FTS            | 757124-72-4  | ND                         | ND                        | ND                    | 0.118    | 0.285    |                 |          | U     |
|            | 6:2 FTS            | 27619-97-2   | ND                         | ND                        | ND                    | 0.116    | 0.290    |                 |          | U     |
|            | 8:2 FTS            | 39108-34-4   | ND                         | ND                        | ND                    | 0.171    | 0.291    |                 |          | U     |
| other      | PFOSA              | 754-91-6     | ND                         | ND                        | ND                    | 0.130    | 0.304    |                 |          | U     |
|            | N-MeFOSAA          | 2355-31-9    | ND                         | ND                        | ND                    | 0.144    | 0.304    |                 |          | U     |
|            | N-EtFOSAA          | 2991-50-6    | ND                         | ND                        | ND                    | 0.109    | 0.304    |                 |          | U     |
|            | HFPO-DA            | 13252-13-6   | ND                         | ND                        | ND                    | 0.228    | 0.304    |                 |          | U     |
|            | PFMOAA             | 674-13-5     | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | PFMOPrA            | 377-73-1     | ND                         | ND                        | ND                    | 0.240    | 0.304    |                 |          | U     |
|            | PFO2HxA            | 39492-88-1   | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | PFO3OA             | 39492-89-2   | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | PFO4DA             | 39492-90-5   | ND                         | ND                        | ND                    | 1.48     | 3.01     |                 |          | U     |
|            | Nafion Byproduct 1 | 29311-67-9   | ND                         | ND                        | ND                    | 0.240    | 0.304    |                 |          | U     |
|            | ADONA              | 919005-14-4  | ND                         | ND                        | ND                    | 0.120    | 0.288    |                 |          | U     |
|            | 9Cl-PF3ONS         | 756426-58-1  | ND                         | ND                        | ND                    | 0.120    | 0.283    |                 |          | U     |
|            | 11Cl-PF3OUdS       | 763051-92-9  | ND                         | ND                        | ND                    | 0.120    | 0.286    |                 |          | U     |
|            | 10:2 FTS           | 120226-60-0  | ND                         | ND                        | ND                    | 0.240    | 0.304    |                 |          | U     |
|            | EVE Acid           | 69087-46-3   | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | FBSA               | 30334-69-1   | ND                         | ND                        | ND                    | 0.240    | 0.304    |                 |          | U     |
|            | Hydro-EVE Acid     | 773804-62-9  | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | Hydrolyzed PSDA    | 2416366-19-1 | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | Nafion Byproduct 2 | 749836-20-2  | ND                         | ND                        | ND                    | 1.48     | 0.304    |                 |          | U     |
|            | N-EtFOA            | 4151-50-2    | ND                         | ND                        | ND                    | 0.240    | 0.304    |                 |          | U     |
|            | N-EtFOSE           | 1691-99-2    | ND                         | ND                        | ND                    | 7.20     | 7.20     |                 |          | U     |
|            | NFDHA              | 151772-58-6  | ND                         | ND                        | ND                    | 0.240    | 0.304    |                 |          | U     |
|            | N-MeFOA            | 31506-32-8   | ND                         | ND                        | ND                    | 0.240    | 0.304    |                 |          | U     |
|            | N-MeFOSE           | 24448-09-7   | ND                         | ND                        | ND                    | 7.20     | 7.20     |                 |          | U     |
|            | NVHOS              | 1132933-86-8 | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | PEPA               | 267239-61-2  | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | PFECA-G            | 801212-59-9  | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | PFEESA             | 113507-82-7  | 1.85                       | 0.00297                   | 0.00297               | 0.240    | 0.304    |                 |          | L     |
|            | PFHxDA             | 67905-19-5   | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
|            | PFMOBA             | 863090-89-5  | ND                         | ND                        | ND                    | 1.48     | 1.44     |                 |          | U     |
| PFO5DA     | 39492-91-6         | ND           | ND                         | ND                        | 3.01                  | 3.01     |          |                 | U        |       |
| PMPA       | 13140-29-9         | ND           | ND                         | ND                        | 1.48                  | 1.44     |          |                 | U        |       |
| R-EVE Acid | 2416366-22-6       | ND           | ND                         | ND                        | 1.48                  | 1.44     |          |                 | U        |       |
| R-PSDA     | 2416366-18-0       | ND           | ND                         | ND                        | 1.48                  | 1.44     |          |                 | U        |       |
| R-PSDCA    | 2416366-21-5       | ND           | ND                         | ND                        | 1.48                  | 1.44     |          |                 | U        |       |
| ES         | MPFBA              |              | 4905.01                    | 7.85                      |                       |          |          | 20-150%         | 98.1%    |       |
|            | M5PFPeA            |              | 4967.97                    | 7.95                      |                       |          |          | 20-150%         | 99.4%    |       |
|            | M3PFBS             |              | 4730.67                    | 7.57                      |                       |          |          | 20-150%         | 94.6%    |       |
|            | M2-4:2 FTS         |              | 3960.64                    | 6.34                      |                       |          |          | 20-150%         | 79.2%    |       |
|            | M5PFHxA            |              | 4916.41                    | 7.87                      |                       |          |          | 20-150%         | 98.3%    |       |
|            | M3HFPO-DA          |              | 4684.88                    | 7.50                      |                       |          |          | 20-150%         | 93.7%    |       |
|            | M4PFHpA            |              | 4743.84                    | 7.59                      |                       |          |          | 20-150%         | 94.9%    |       |
|            | M3PFHxS            |              | 4366.29                    | 6.99                      |                       |          |          | 20-150%         | 87.3%    |       |
|            | M2-6:2 FTS         |              | 3798.08                    | 6.08                      |                       |          |          | 20-150%         | 76.0%    |       |
|            | M8PFOA             |              | 4765.31                    | 7.62                      |                       |          |          | 20-150%         | 95.3%    |       |
|            | M9PFNA             |              | 4539.13                    | 7.26                      |                       |          |          | 20-150%         | 90.8%    |       |
|            | M8PFOS             |              | 4062.67                    | 6.50                      |                       |          |          | 20-150%         | 81.3%    |       |
|            | M2-8:2 FTS         |              | 2924.76                    | 4.68                      |                       |          |          | 20-150%         | 58.5%    |       |
|            | M8FOSA-I           |              | 2715.60                    | 4.34                      |                       |          |          | 20-150%         | 54.3%    |       |
|            | M6PFDA             |              | 4357.34                    | 6.97                      |                       |          |          | 20-150%         | 87.1%    |       |
|            | d3-N-MeFOSAA       |              | 2770.90                    | 4.43                      |                       |          |          | 20-150%         | 55.4%    |       |
|            | d5-N-EtFOSAA       |              | 2744.35                    | 4.39                      |                       |          |          | 20-150%         | 54.9%    |       |
|            | M7PFUdA            |              | 3544.80                    | 5.67                      |                       |          |          | 20-150%         | 70.9%    |       |
|            | MPFDoA             |              | 2617.65                    | 4.19                      |                       |          |          | 20-150%         | 52.4%    |       |
|            | M2PFTeDA           |              | 1710.09                    | 2.74                      |                       |          |          | 20-150%         | 34.2%    |       |

# Enthalpy Analytical

Job No.: 0421-803-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: Northwest Water Plant, Leland N.C.

|               |                  |               |                  |                  |         |
|---------------|------------------|---------------|------------------|------------------|---------|
| Enthalpy ID   | OPR-11772-PFAS   | Prep Batch    | EU11772          | Sample Vol (mL)  | 250     |
| Sample Name   | OPR-11772-PFAS   | Prep Date     | 2021-04-30 16:29 | Extract Vol (mL) | 0.4     |
| Matrix        | Aqueous          | Analysis Date | 2021-05-01 01:29 | Dilution Factor  | 1       |
| Sampling Date |                  | Analyst       | itbrooker        | Method Code      | WM-026  |
| Received Date | 2021-04-30 16:29 | Instrument    | Kili             | Sample Type      | Control |

|            | Compound     | CAS         | Extract Concentration ng/L | Sample Concentration ng/L | Formatted Result ng/L | LOD ng/L | LOQ ng/L | Recovery Limits | Recovery | Flags |
|------------|--------------|-------------|----------------------------|---------------------------|-----------------------|----------|----------|-----------------|----------|-------|
| Acids      | PFBA         | 375-22-4    | 12286.57                   | 19.7                      | 19.7                  | 0.153    | 0.304    | 73-129%         | 98.3%    |       |
|            | PFPeA        | 2706-90-3   | 11657.45                   | 18.7                      | 18.7                  | 0.170    | 0.304    | 72-129%         | 93.3%    |       |
|            | PFHxA        | 307-24-4    | 12465.03                   | 19.9                      | 19.9                  | 0.193    | 0.304    | 72-129%         | 99.7%    |       |
|            | PFHpA        | 375-85-9    | 12493.15                   | 20.0                      | 20.0                  | 0.122    | 0.304    | 72-130%         | 99.9%    |       |
|            | PFOA         | 335-67-1    | 12295.67                   | 19.7                      | 19.7                  | 0.177    | 0.304    | 71-133%         | 98.4%    |       |
|            | PFNA         | 375-95-1    | 12025.08                   | 19.2                      | 19.2                  | 0.0761   | 0.304    | 69-130%         | 96.2%    |       |
|            | PFDA         | 335-76-2    | 12454.51                   | 19.9                      | 19.9                  | 0.0845   | 0.304    | 71-129%         | 99.6%    |       |
|            | PFUnDA       | 2058-94-8   | 12347.47                   | 19.8                      | 19.8                  | 0.185    | 0.304    | 69-133%         | 98.8%    |       |
|            | PFDoDA       | 307-55-1    | 12337.15                   | 19.7                      | 19.7                  | 0.202    | 0.304    | 72-134%         | 98.7%    |       |
|            | PFTTrDA      | 72629-94-8  | 13677.90                   | 21.9                      | 21.9                  | 0.151    | 0.304    | 65-144%         | 109.4%   |       |
| PFTeDA     | 376-06-7     | 12085.87    | 19.3                       | 19.3                      | 0.218                 | 0.304    | 71-132%  | 96.7%           |          |       |
| Sulfonates | PFBS         | 375-73-5    | 10889.28                   | 17.4                      | 17.4                  | 0.355    | 0.355    | 72-134%         | 98.2%    |       |
|            | PFPeS        | 2706-91-4   | 10700.78                   | 17.1                      | 17.1                  | 0.206    | 0.286    | 71-127%         | 91.0%    |       |
|            | PFHxS        | 355-46-4    | 10503.37                   | 16.8                      | 16.8                  | 0.191    | 0.278    | 68-131%         | 91.9%    |       |
|            | PFHpS        | 375-92-8    | 11232.43                   | 18.0                      | 18.0                  | 0.135    | 0.290    | 69-134%         | 94.3%    |       |
|            | PFOS         | 1763-23-1   | 10389.84                   | 16.6                      | 16.6                  | 0.160    | 0.282    | 65-140%         | 89.6%    |       |
|            | PFNS         | 68259-12-1  | 11859.10                   | 19.0                      | 19.0                  | 0.0864   | 0.293    | 69-127%         | 98.6%    |       |
|            | PFDS         | 335-77-3    | 9968.25                    | 15.9                      | 15.9                  | 0.192    | 0.293    | 53-142%         | 82.6%    |       |
|            | 4:2 FTS      | 757124-72-4 | 10207.15                   | 16.3                      | 16.3                  | 0.118    | 0.285    | 63-143%         | 87.1%    |       |
| 6:2 FTS    | 27619-97-2   | 11815.36    | 18.9                       | 18.9                      | 0.116                 | 0.290    | 64-140%  | 99.4%           |          |       |
| 8:2 FTS    | 39108-34-4   | 14911.05    | 23.9                       | 23.9                      | 0.171                 | 0.291    | 67-138%  | 124.3%          |          |       |
| Other      | PFOSA        | 754-91-6    | 12204.90                   | 19.5                      | 19.5                  | 0.130    | 0.304    | 67-137%         | 97.6%    |       |
|            | N-MeFOSAA    | 2355-31-9   | 12586.75                   | 20.1                      | 20.1                  | 0.144    | 0.304    | 65-136%         | 100.7%   |       |
|            | N-EtFOSAA    | 2991-50-6   | 12401.63                   | 19.8                      | 19.8                  | 0.109    | 0.304    | 61-135%         | 99.2%    |       |
|            | HFPO-DA      | 13252-13-6  | 12897.32                   | 20.6                      | 20.6                  | 0.228    | 0.304    | 70-130%         | 103.2%   |       |
| ES         | MPFBA        |             | 4775.20                    | 7.64                      |                       |          |          | 20-150%         | 95.5%    |       |
|            | M5PFPeA      |             | 4552.41                    | 7.28                      |                       |          |          | 20-150%         | 91.0%    |       |
|            | M3PFBS       |             | 4249.22                    | 6.80                      |                       |          |          | 20-150%         | 85.0%    |       |
|            | M2-4:2 FTS   |             | 5654.28                    | 9.05                      |                       |          |          | 20-150%         | 113.1%   |       |
|            | M5PFHxA      |             | 5010.76                    | 8.02                      |                       |          |          | 20-150%         | 100.2%   |       |
|            | M3HFPO-DA    |             | 4483.41                    | 7.17                      |                       |          |          | 20-150%         | 89.7%    |       |
|            | M4PFHpA      |             | 4751.18                    | 7.60                      |                       |          |          | 20-150%         | 95.0%    |       |
|            | M3PFHxS      |             | 5165.70                    | 8.27                      |                       |          |          | 20-150%         | 103.3%   |       |
|            | M2-6:2 FTS   |             | 4195.78                    | 6.71                      |                       |          |          | 20-150%         | 83.9%    |       |
|            | M8PFOA       |             | 4608.07                    | 7.37                      |                       |          |          | 20-150%         | 92.2%    |       |
|            | M9PFNA       |             | 4407.07                    | 7.05                      |                       |          |          | 20-150%         | 88.1%    |       |
|            | M8PFOS       |             | 5025.95                    | 8.04                      |                       |          |          | 20-150%         | 100.5%   |       |
|            | M2-8:2 FTS   |             | 3405.96                    | 5.45                      |                       |          |          | 20-150%         | 68.1%    |       |
|            | M8FOSA-I     |             | 3718.57                    | 5.95                      |                       |          |          | 20-150%         | 74.4%    |       |
|            | M6PFDA       |             | 4552.70                    | 7.28                      |                       |          |          | 20-150%         | 91.1%    |       |
|            | d3-N-MeFOSAA |             | 3716.20                    | 5.95                      |                       |          |          | 20-150%         | 74.3%    |       |
|            | d5-N-EtFOSAA |             | 3986.94                    | 6.38                      |                       |          |          | 20-150%         | 79.7%    |       |
|            | M7PFUDa      |             | 4297.78                    | 6.88                      |                       |          |          | 20-150%         | 86.0%    |       |
|            | MPFDaA       |             | 3951.92                    | 6.32                      |                       |          |          | 20-150%         | 79.0%    |       |
|            | M2PFTeDA     |             | 3406.01                    | 5.45                      |                       |          |          | 20-150%         | 68.1%    |       |

# Narrative Summary



# Enthalpy Analytical Narrative Summary

|            |                                                         |
|------------|---------------------------------------------------------|
| Company    | County of Brunswick                                     |
| Job No.    | 0421-803-1 PFAS by Isotope Dilution (non-potable water) |
| Client ID. | Site: Northwest Water Plant, Leland N.C.                |

## 1. Custody

Caity Hayes received the samples on April 30, 2021 at 9.4 °C after being relinquished by County of Brunswick. The samples were received in good condition.

Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, LLC

## Table 1 - Sample Inventory

| EU Lab Sample ID | Client Sample ID | Matrix  |
|------------------|------------------|---------|
| 0421-803-001-1   | 043021-S01       | Aqueous |
| 0421-803-002-1   | 043021-E01       | Aqueous |

## 2. Methods and Analytes

A list of analytes of interest and corresponding methods of analysis is shown in Table 3. Abbreviations are defined in the listed Appendices.

## Table 3 - Methods and Analytes

| EU Method | Analytes               | Cleanup Method |
|-----------|------------------------|----------------|
| EU-047    | PFAST - Brunswick List | ENVI-Carb      |

## 3. Analysis

The samples were analyzed using Waters Acquity UPLC equipped with Xevo TQ MS (LC/MS/MS "Kili").

For aqueous samples, the sample volume was measured gravimetrically by the laboratory, and spiked with Extraction Standard (ES). The sample was then mixed well and centrifuged, if needed. The samples were then extracted via SPE, and the extracts were cleaned up using ENVI-Carb.

Each final sample extract was transferred to an autosampler vial, spiked with Injection Standard (IS), and brought to a final volume of 400µL prior to analysis.

Samples that were run in more than one sequence and their comments are as follows:

043021-S01, 043021-E01 - Due to acquisition requirements for analytes requested, the samples were analyzed in more than one sequence.

## 4. Calibration

In the initial calibration, the reported analytes exhibited R<sup>2</sup> of  $\geq 0.99$ . The reported analytes in the calibration standards, continuing calibration (concal) and Initial Calibration Verification (ICV) met the 30% accuracy criterion for native analytes.

# Enthalpy Analytical Narrative Summary

|            |                                                         |
|------------|---------------------------------------------------------|
| Company    | County of Brunswick                                     |
| Job No.    | 0421-803-1 PFAS by Isotope Dilution (non-potable water) |
| Client ID. | Site: Northwest Water Plant, Leland N.C.                |

## 5. QC Notes

The QC sample analyses passed all method criteria. An analyte(s) was detected in the method blank (MB) below the Reporting Limit (RL) with values more than 1/10 the sample amount. Any analyte(s) detected in the sample(s) associated with the analyte(s) found in the MB are notated with a B qualifier.

The samples were extracted within the 28-day from collection holding time and analyzed within the 28-day from extraction to analysis holding time required by the method.

## 6. Reporting Notes

Some labeled standards in the samples fell outside the limits for ES recoveries, as noted by the Q qualifier. The target analytes are quantified based on their ratio to the labeled standards, therefore, undergo the same losses as the labeled standards. As a result, low or high recoveries do not cause any change to ratios or contribute any additional error in the measurement of the target analytes. Therefore, the data are considered acceptable.

The results presented in this report are representative of the samples as provided to the laboratory.

These analyses met the requirements of the TNI Standard. Any deviations from the requirements of the reference method or TNI Standard have been stated above.

Enthalpy Analytical, LLC in Wilmington NC is accredited by the Louisiana Department of Environmental Quality to the 2009 TNI Standard under certificate number 05075.



## General Reporting Notes – Data Qualifiers

The following are general reporting notes that are applicable to all Enthalpy Analytical, LLC - Wilmington, NC data reports, unless specifically noted otherwise.

### General Data Qualifiers

- B – The analyte was found in the method blank, at a concentration that was at least 10% of the concentration in the sample.
- Cxx – Two or more congeners co-elute. In EDDs, C denotes the lowest IUPAC congener in a co-elution group and additional co-eluters for the group ('xx') are shown with the number of the lowest IUPAC co-eluter.
- E – The reported concentration exceeds the calibration range (upper point of the calibration curve). For HRMS data, this condition does not imply additional measurement uncertainty. For LC-MS/MS data, these values should be considered as having measurement uncertainty higher than values within the calibration range.
- EDL – Estimated Detection Level. Specific to Dioxin/Furan tests and equivalent to MDL
- EMPC – Estimated Maximum Possible Concentration Specific to Dioxin/Furan tests to indicate the signal/noise ratio was not sufficient for peak identification (the determined ion-abundance ratio was outside the allowed theoretical range), or where there was a co-eluting interference. Indicates that a peak was identified but did not meet the method specified ion-abundance ratio.
- IR – The ion ratio between the primary and secondary ions was observed to be outside the method criteria therefore the actual analyte concentration cannot be accurately determined as defined by DoD QSM Table B-15.
- J – The analyte has a concentration below the minimum calibration level (LOQ value) but greater than the LOD. These values should be considered as having measurement uncertainty higher than values within the calibration range
- L - Indicates that an analyte has a concentration below the Minimum Detection Limit (MDL). The reported concentration is not recommended for regulatory use as the analyte signal may have a signal-to-noise ratio less than the criteria deemed necessary to be considered a detected analyte.
- LOD – Limit of Detection: For reports conforming to the DOD ELAP QSM, this is the QSM-defined LOD. For reports conforming to TNI requirements (but not DOD ELAP QSM requirements), this value is the minimum detection limit (MDL). The LOD is adjusted for sample weight or volume.
- LOQ – Limit of Quantiation: For reports conforming to the DOD ELAP QSM, this is the QSM-defined LOQ. For reports conforming to TNI requirements (but not DOD ELAP QSM requirements), this value is the reporting limit (RL). The LOD is adjusted for sample weight or volume.
- <LOD() – Analyte was not found at a concentration high enough to be reported as detected. It is reported as less than the LOD, and the LOD is given in the parentheses.



## General Reporting Notes – Data Qualifiers

- ND – Indicates a non-detect.
- NR – Indicates a value that is not reportable due to issues observed in sample preparation or analysis.
- PR – The associated congener(s) is(are) poorly resolved.
- QI – Indicates the presence of a quantitative interference.
- RL – Reporting Limit. Lowest reportable value. The level is higher than the MDL.
- SI – Denotes “Single Ion Mode” and is utilized for PCBs where the secondary ion trace has a significantly elevated noise level due to background PFK. Responses for such peaks are calculated using an EMPC approach based solely on the primary ion area(s) and may be considered estimates.
- U – The analyte was not detected.
- V – The labeled standard recovery is not within method control limits.
- X – Results from re-injection/repeat/second-column analysis.

### **Lab Identifiers/ Data Attributes**

- AR – Indicates use of the archived portion of the sample extract.
- CU – Indicates a sample that required additional clean-up prior to HRMS injection/processing.
- D – Dilution Data. Result was obtained from the analysis of a dilution. The number that follows the “D” indicates the dilution factor.
- DE – Indicates a dilution performed with the addition of ES (Extraction Standard) solution.
- DUP – Designation for a duplicate sample.
- MS – Designation for a matrix spike.
- MSD – Designation for a matrix spike duplicate.
- RJ – Indicates a reinjection of the sample extract.
- S – Indicates a sample split. The number that follows the “S” indicates the split factor.
- R – Indicates a re-extraction of the sample.

**PFAS Compound Acronym List**

| Acronym                | Compound Name                                                                   | CAS #        |
|------------------------|---------------------------------------------------------------------------------|--------------|
| <b>Target Analytes</b> |                                                                                 |              |
| PFBA                   | Perfluorobutanoic Acid                                                          | 375-22-4     |
| PFPeA                  | Perfluoropentanoic Acid                                                         | 2706-90-3    |
| PFHxA                  | Perfluorohexanoic Acid                                                          | 307-24-4     |
| PFHpA                  | Perfluoroheptanoic Acid                                                         | 375-85-9     |
| PFOA                   | Perfluorooctanoic Acid                                                          | 335-67-1     |
| PFNA                   | Perfluorononanoic Acid                                                          | 375-95-1     |
| PFDA                   | Perfluorodecanoic acid                                                          | 335-76-2     |
| PFUnA (PFUnDA)         | Perfluoroundecanoic acid                                                        | 2058-94-8    |
| PFDoA (PFDoDA)         | Perfluorododecanoic acid                                                        | 307-55-1     |
| PFTrDA (PFTriA)        | Perfluorotridecanoic acid                                                       | 72629-94-8   |
| PFTeDA (PFTA)          | Perfluorotetradecanoic acid                                                     | 376-06-7     |
| PFBS                   | Perfluorobutane sulfonic acid                                                   | 375-73-5     |
| PFPeS                  | Perfluoropentane sulfonic acid                                                  | 2706-91-4    |
| PFHxS                  | Perfluorohexane sulfonic acid                                                   | 355-46-4     |
| PFHpS                  | Perfluoroheptane sulfonic acid                                                  | 375-92-8     |
| PFOS                   | Perfluorooctane sulfonic acid                                                   | 1763-23-1    |
| PFNS                   | Perfluorononane sulfonic acid                                                   | 68259-12-1   |
| PFDS                   | Perfluorodecane sulfonic acid                                                   | 757124-72-4  |
| 4:2 FTS                | 4:2 fluorotelomer sulfonic acid                                                 | 27619-97-2   |
| 6:2 FTS                | 6:2 fluorotelomer sulfonic acid                                                 | 39108-34-4   |
| 8:2 FTS                | 8:2 fluorotelomer sulfonic acid                                                 | 13252-13-6   |
| PFOSA (FOSA)           | Perfluorooctane sulfonamide                                                     | 754-91-6     |
| N-MeFOSAA              | N-methyl perfluorooctane sulfonamido acetic acid                                | 2355-31-9    |
| N-EtFOSAA              | N-ethyl perfluorooctane sulfonamido acetic acid                                 | 2991-50-6    |
| HFPO-DA                | 2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-propanoic acid (Gen-X) | 13252-13-6   |
| 11Cl-PF3OUdS           | 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid                             | 763051-92-9  |
| 9Cl-PF3ONS             | 9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid                              | 756426-58-1  |
| ADONA                  | 4,8-dioxa-3H-perfluorononanoic acid                                             | 919005-14-4  |
| * PFMOAA               | Perfluoro-2-methoxyacetic acid                                                  | 674-13-5     |
| PFMOPrA (PFMPA)        | Perfluoro-3-methoxypropanoic acid                                               | 377-73-1     |
| * PFO2HxA              | Perfluoro (3,5-dioxahexanoic) acid                                              | 39492-88-1   |
| * PFO3OA               | Perfluoro (3,5,7-trioxaoctanoic) acid                                           | 39492-89-2   |
| * PFO4DA               | Perfluoro (3,5,7,9-tetraoxadecanoic) acid                                       | 39492-90-5   |
| * PFO5DA               | Perfluoro(3,5,7,9,11-pentaoxidodecanoic) acid                                   | 39492-91-6   |
| * Nafion Byproduct 1   | Nafion Byproduct 1                                                              | 29311-67-9   |
| * Nafion Byproduct 2   | Nafion Byproduct 2                                                              | 749836-20-2  |
| PFEESA                 | Perfluoro(2-ethoxyethane)sulphonic acid                                         | 113507-82-7  |
| PFMOBA (PFMBA)         | Perfluoro-4-methoxybutanic acid                                                 | 863090-89-5  |
| NFDHA                  | Nonafluoro-3,6-dioxaheptanoic acid                                              | 151772-58-6  |
| * PEPA                 | Perfluoro-2-ethoxypropanoic acid                                                | 267239-61-2  |
| * PMPA                 | Perfluoro-2-methoxypropanoic acid                                               | 13140-29-9   |
| * 10:2 FTS             | Fluorotelomer sulfonate 10:2                                                    | 120226-60-0  |
| * N-EtFOSA             | N-ethylperfluoro-1-octanesulfonamide                                            | 4151-50-2    |
| * N-EtFOSE             | 2-(N-methylperfluoro-1-octanesulfonamido)-ethanol                               | 1691-99-2    |
| * N-MeFOSA             | N-methylperfluoro-1-octanesulfonamide                                           | 31506-32-8   |
| * N-MeFOSE             | 2-(N-methylperfluoro-1-octanesulfonamido)-ethanol                               | 24448-09-7   |
| * PFECA-G              | 4-(Heptafluoroisopropoxy)hexafluorobutanoic acid                                | 801212-59-9  |
| * PFHxDA               | Perfluorohexadecanoic acid                                                      | 67905-19-5   |
| * R-PSDA               | Perfluoro-4-(2-sulfoethoxy)pentanoic acid                                       | 2416366-18-0 |



|                             |                                                                                                                |              |
|-----------------------------|----------------------------------------------------------------------------------------------------------------|--------------|
| * Hydrolyzed PSDA           | 2-fluoro-2-[1,1,2,3,3,3-hexafluoro-2-(1,1,2,2-tetrafluoro-2-sulfoethoxy)propoxy]-acetic acid                   | 2416366-19-1 |
| * R-PSDCA                   | 1,1,2,2-tetrafluoro-2-[1,2,2,3,3-pentafluoro-1-(trifluoromethyl)propoxy] ethanesulfonic acid                   | 2416366-21-5 |
| * EVE Acid                  | 2,2,3,3-tetrafluoro-3-({1,1,1,2,3,3,3-hexafluoro-3-[(1,2,2-trifluoroethenyl)oxy]propan-2-yl}oxy)propionic acid | 69087-46-3   |
| * FBSA                      | Perfluorobutylsulfonamide                                                                                      | 30334-69-1   |
| * Hydro-EVE Acid            | 2,2,3,3-Tetrafluoro-3-[[1,1,1,2,3,3,3-hexafluoro-3-(1,2,2,2-tetrafluoroethoxy)propan-2-yl]oxy]propanoic acid   | 773804-62-9  |
| * R-EVE Acid                | 4-(2-carboxy-1,1,2,2-tetrafluoroethoxy)-2,2,3,3,4,5,5,5-octafluoro-pentanoic acid                              | 2416366-22-6 |
| <b>Extraction Standards</b> |                                                                                                                |              |
| MPFBA                       | Perfluoro-n-[13C4]butanoic acid                                                                                |              |
| M5PFPeA                     | Perfluoro-n-[13C5]pentanoic acid                                                                               |              |
| M3PFBS                      | Sodium perfluoro-1-[2,3,4-13C3]-butanesulfonic acid                                                            |              |
| M2-4:2 FTS                  | Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid                                                 |              |
| M5PFHxA                     | Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid                                                                      |              |
| M3HFPO-DA                   | 2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-13C3-propanoic acid                                   |              |
| M4PFHpA                     | Perfluoro-n-[1,2,3,4-13C4]heptanoic acid                                                                       |              |
| M3PFHxS                     | Sodium perfluoro-1-[1,2,3-13C3]-hexanesulfonic acid                                                            |              |
| M2-6:2 FTS                  | Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid                                                 |              |
| M8PFOA                      | Perfluoro-n-[13C8]octanoic acid                                                                                |              |
| M9PFNA                      | Perfluoro-n-[13C9]nonanoic acid                                                                                |              |
| M8PFOS                      | Sodium perfluoro-1-[13C8]-octanesulfonic acid                                                                  |              |
| M2-8:2 FTS                  | Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid                                                 |              |
| M8FOSA                      | Perfluoro-1-[13C8]octanesulfonamide                                                                            |              |
| M6PFDA                      | Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid                                                                    |              |
| d3-N-MeFOSAA                | N-methyl-d3-perfluoro-1-octanesulfonamide                                                                      |              |
| d5-N-EtFOSAA                | N-ethyl-d5-perfluoro-1-octanesulfonamide                                                                       |              |
| M7PFUnDA (M7PFUdA)          | Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid                                                                |              |
| MPFDoA                      | Perfluoro-n-[1,2-13C2]dodecanoic acid                                                                          |              |
| M2PFTeDA                    | Perfluoro-n-[1,2-13C2]tetradecanoic acid                                                                       |              |
| <b>Injection Standards</b>  |                                                                                                                |              |
| M3PFBA                      | Perfluoro-n-[2,3,4-13C3]butanoic acid                                                                          |              |
| M2PFOA                      | Perfluoro-n-[1,2-13C2]octanoic acid                                                                            |              |
| MPFDA                       | Perfluoro-n-[1,2-13C2]decanoic acid                                                                            |              |
| MPFOS                       | Sodium perfluoro-1-[1,2,3,4-13C4]-octanesulfonic acid                                                          |              |

\* Analytes are currently not accredited under TNI Scope - Accreditation pending.

# Sample Custody



**This Is The Last Page  
Of This Report.**