Stantec

# Field Report

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|---|---|---|---|
| Project: | City of Wasilla WWTP Pilot Study | Field Crew: | Jake Alward, John Marshall |
| File: | 204700415 | Date: | September 19, 2019 |

Subsurface☒ Surface☒ Vegetation Plot☒

**Reference: September Water Sampling Event**

## 1.1 BACKGROUND

The September sampling event was for surface and subsurface water and vegetation plots only. All sites were sampled, including vegetation plots. The weather varied by day; however it was rainy most days. This was the first large rain event of the summer and therefore the first time to observe how the added water affected the discharge. Flows throughout the wetland did not appear to be any faster or turbulent that observed previously. The stream however at the south end of the wetland was completely out of its normal banks. The wetland also appeared to be storing more water than it has in the summer.

## 1.2 SAMPLING EVENT HIGHLIGHTS

### SURFACE

Water was sampled at all 18 surface water locations on the city property with a duplicate of SW15. Mr. Shaw's property was also sampled. Samples were collected by either dipping or peristaltic pump. Intrinsic data from the YSI was taken at all locations apart from SW1 and the effluent discharge.

It was observed that the vegetation around the effluent discharge bed is still noticeably greener and thicker than surrounding areas.

Surface water samples were also analyzed by Source Molecular for human DNA markers. There was only one detectible result at SW14. This hit may suggest SW14 is influenced by the percolation beds. This location has low water levels and a lack of surface flow inputs, and therefore the hit may simply be a contamination from the researchers or wildlife.

The water level in the stream at the south end of the wetland was higher than it has been over the summer. The water was far outside its normal banks around SW17, which explains why the calculated flow is much lower than at weir number 2.

### SUBSURFACE

Water was sampled from nearly all subsurface water locations except for MW14B as there was not enough water in the casing to sample, which has become normal. Intrinsic data was collected from nearly all locations as well except for B3 as the well went dry before water could be analyzed. Wells were sampled either by peristaltic pumping or using a bailer.

**Reference: September Water Sampling Event**

**WIER FLOW**

**Weir 1 (SW17)**
Width: 2.21 -ft
Water Depth: 0.95 -ft
Veoicty: 0.197 -ft/s
Flow: 0.41 -cf/s

**Weir 2 (SW18)**
Width: 3.22 -ft
Water Depth: 0.83 -ft
Veoicty: 0.328 -ft/s
Flow: 0.8766 -cf/s

**IMPROVEMENTS FOR FUTURE SAMPLING:**

Ensure the water level meter is packed when sampling the wells

## 1.3 SAMPLE RESULT

Complete lab results can be found in the attachments. Results are from SGS

Detectable Results Summary Table

September-2019

| Site ID | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | SW9 | SW10 | SW11 | SW12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date Collected | 9/19/2019 | 9/19/2019 | 9/19/2019 | 9/20/2019 | 9/20/2019 | 9/20/2019 | 9/20/2019 | 9/25/2019 | 9/25/2019 | 9/25/2019 | 9/25/2019 | 9/25/2019 |
| Time | 10:46 | 12:40 | 12:58 | 12:00 | 12:40 | 11:30 | 11:00 | 10:51 | 11:13 | 11:43 | 14:15 | 13:56 |
| Sample Type | Surface | Surface | Surface | Surface | Surface | Surface | Surface | Surface | Surface | Surface | Surface | Surface |
| Water Temperature (°C) | 9.7 | 11.23 | 11.74 | 10.58 | 9.87 | 10.76 | 10.84 | 6.73 | 7.16 | 7.57 | 5.42 | 7.15 |
| Conductivity | 239 | 758 | 901 | 631 | 389 | 735 | 529 | 332 | 667 | 472 | 370 | 404 |
| pH | 6.08 | 6.49 | 6.85 | 7.24 | 7.01 | 7.44 | 6.94 | 6.19 | 6.64 | 6.61 | 7.18 | 6.73 |
| DO | 2.28 | 4.93 | 2.51 | 4.27 | 4.62 | 3.2 | 2.99 | 2.5 | 5.17 | 1.07 | 1.25 | 1.01 |
| Nitrate | ND(0.100) | 2.36 | 13.3 | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) |
| Total Nitrate/Nitrite | ND(0.100) | 2.38 | 13.3 | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) |
| TSS | 1.61 | 1.13 | 12.5 | 3.6 | 36.5 | ND(0.515) | 4.06 | 6.26 | 8.2 | 1.35 | ND(0.505) | 2.86 |
| TKN | ND(0.500) | ND(0.500) | 1.18 | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) |
| Ammonia | 0.119 | ND(0.0500) | 0.143 | ND(0.0500) | ND(0.0500) | ND(0.0500) | ND(0.0500) | ND(0.0500) | ND(0.0500) | ND(0.0500) | ND(0.0500) | ND(0.0500) |
| Total P | 0.0207 | ND(0.0100) | 2.57 | ND(0.0100) | 0.0365 | ND(0.0100) | 0.0349 | 0.0363 | 0.0613 | ND(0.0100) | 0.028 | ND(0.0100) |
| BOD | ND(2.00) | ND(2.00) | ND(2.00) | ND(2.00) | 4.59 | ND(2.00) | ND(2.00) | ND(2.00) | 2.68 | ND(2.00) | ND(2.00) | ND(2.00) |
| FC | 8.3 | 46 | 2421 | 20 | 20 | 10 | 560 | 10 | 2 | ND(2) | 4 | 10 |
| E. Coli | 2 | 18 | 2421 | 60 | ND(10) | 10 | 420 | ND(10) | 10 | ND(1) | 6 | 17 |
| TC | 435 | 727 | 2421 | 4610 | 9800 | 1500 | 9800 | 2610 | 1986 | 411 | 689 | 1986 |

| Site ID | SW13 | SW14 | SW15 | SW15.1 | SW16 | SW17 | SW18 | Shaw |
|---|---|---|---|---|---|---|---|---|
| Date Collected | 9/26/2019 | 9/26/2019 | 9/26/2019 | 9/26/2019 | 9/26/2019 | 9/26/2019 | 9/26/2019 | 9/26/2019 |
| Time | 10:30 | 12:00 | 11:40 | 11:42 | 11:30 | 13:45 | 14:15 | 12:51 |
| Sample Type | Surface | Surface | Surface | Surface | Surface | Surface | Surface | Surface |
| Water Temperature (°C) | 10:33 | 4.09 | 5.84 | 5.84 | 7.32 | 5.14 | 5 | 4.87 |
| Conductivity | 0:00 | 438 | 377 | 377 | 287 | 576 | 599 | 352 |
| pH | 12:57 | 6.05 | 6.25 | 6.25 | 6.01 | 6.14 | 6.04 | 5.73 |
| DO | 5:45 | 4.49 | 2.66 | 2.66 | 2.93 | 7.34 | 9.16 | 7.92 |
| Nitrate | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | 2.43 | 3.25 | ND(0.100) |
| Total Nitrate/Nitrite | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | 2.43 | 3.26 | ND(0.100) |
| TSS | 14:24 | 16.3 | 12.4 | 56.6 | 146 | 1.02 | 1.41 | 2.19 |
| TKN | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) |
| Ammonia | ND(0.0500) | ND(0.0500) | 0.107 | ND(0.0500) | ND(0.0500) | 0.112 | 0.167 | 0.101 |
| Total P | 0:54 | 0.0333 | ND(0.0100) | ND(0.0100) | 0.151 | 0.067 | 0.266 | 0.0265 |
| BOD | ND(2.00) | ND(2.00) | ND(2.00) | 2.77 | ND(2.00) | ND(2.00) | ND(2.00) | ND(2.00) |
| FC | 0:00 | 10 | 2 | 6 | ND(2) | 70 | 10 | 4 |
| E. Coli | 0:00 | 8 | 8 | 8 | ND(10) | 88 | 20 | 5 |
| TC | 0:00 | 435 | 517 | 613 | 2360 | 921 | 1414 | 488 |

| Site ID | B1 | B3 | B4 | B11 | B11.1 | MW2b | MW6 | MW8 |
|---|---|---|---|---|---|---|---|---|
| Date Collected | 9/19/2019 | 9/20/2019 | 9/19/2019 | 9/25/2019 | 9/25/2019 | 9/19/2019 | 9/20/2019 | 9/25/2019 |
| Time | 11:30 | 10:24 | 13:48 | 14:30 | 14:31 | 11:15 | 10:35 | 10:20 |
| Sample Type | Sub-surface | Sub-surface | Sub-surface | Sub-surface | Sub-surface | Sub-surface | Sub-surface | Sub-surface |
| Water Temperature (°C) | 3.84 | | 5.48 | 4.54 | 4.54 | 11.09 | 3.15 | 3.42 |
| Conductivity | 424 | | 498 | 443 | 443 | 228 | 235 | 234 |
| pH | 6.06 | | 6.1 | 6.53 | 6.53 | 6.36 | 6.5 | 5.3 |
| DO | 3.2 | | 11.38 | 2.2 | 2.2 | 7.4 | 2.85 | 3.51 |
| Nitrate | ND(0.100) | ND(0.100) | 1.41 | | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) |
| Total Nitrate/Nitrite | ND(0.100) | ND(0.100) | 1.41 | | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) |
| Ammonia | 0.126 | 0.117 | ND(0.0500) | | 0.269 | 0.152 | 0.128 | ND(0.0500) |
| FC | ND(2) | ND(9) | ND(1) | | ND(9) | ND(1) | ND(2) | ND(2) |

| Site ID | MW10 | MW12 | MW13 | MW14a | MW15 | MW16 | MW17 | MW20 |
|---|---|---|---|---|---|---|---|---|
| Date Collected | 9/19/2019 | 9/26/2019 | 9/26/2019 | 9/27/2019 | 9/19/2019 | 9/25/2019 | 9/25/2019 | 9/27/2019 |
| Time | 11:58 | 11:00 | 12:10 | 11:10 | 13:35 | 13:28 | 12:10 | 10:38 |
| Sample Type | Sub-surface | Sub-surface | Sub-surface | Sub-surface | Sub-surface | Sub-surface | Sub-surface | Sub-surface |
| Water Temperature (°C) | 3.66 | 7.33 | 3.27 | | 9.16 | 3.93 | 3.01 | 3.28 |
| Conductivity | 462 | 214 | 243 | | 362 | 240 | 321 | 258 |
| pH | 6.46 | 6.73 | 7.04 | | 6.75 | 6.68 | 5.86 | 5.4 |
| DO | 1.9 | 3.51 | 1.02 | | 6.6 | 3.6 | 2.46 | 10.02 |
| Nitrate | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | 0.247 |
| Total Nitrate/Nitrite | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | ND(0.100) | 0.247 |
| TKN | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | ND(0.500) | 3.04 | ND(0.500) |
| Ammonia | ND(0.0500) | ND(0.0500) | 0.262 | ND(0.0500) | 0.35 | 0.208 | 2.39 | ND(0.0500) |
| FC | ND(1) | ND(2) | ND(2) | 4 | ND(1) | ND(9) | 240 | ND(9) |

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# September Photo Log

Photo 1:
Berm

Photo 2:
MW15

B1

Photo 4:
MW8

Photo 5:
SW9

Photo 6:
SW18