

**WASTELOAD ANALYSIS [WLA]**

Date: 8/13/2020

**Appendix A: Mass Balance Mixing Analysis for Conservative Constituents**

|                                      |                     |                   |  |
|--------------------------------------|---------------------|-------------------|--|
| Discharging Facility:                | BLX Mayflower, Inc. |                   |  |
| UPDES No:                            | UT-0026140          |                   |  |
| Outfall No:                          | 001                 |                   |  |
| Permit Flow [MGD]:                   | 1.0 Annual          | Max. Daily        |  |
|                                      | 0.7 Annual          | Max. Monthly      |  |
| Receiving Water:                     | McHenry Creek       |                   |  |
| Stream Classification:               | 1C, 2B, 3A, 4       |                   |  |
| Stream Flows [cfs]:                  | 0.3 All Seasons     | Critical Low Flow |  |
| Fully Mixed:                         | YES                 |                   |  |
| Acute River Width:                   | 100%                |                   |  |
| Chronic River Width:                 | 100%                |                   |  |
| Mixed Flow Acute Conditions [cfs]:   | 1.85                |                   |  |
| Mixed Flow Chronic Conditions [cfs]: | 1.38                |                   |  |
| Mixed Hardness [mg/L]:               | 493.1               |                   |  |

**Modeling Information**

A mass balance mixing analysis was used to determine the effluent limits.

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

**Effluent Limitations**

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort reflect the environmental conditions expected at low stream flows.

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**Effluent Limitations for Protection of Drinking Water Sources (Class 1C Waters)**

|                                | Maximum Concentration |            |       |
|--------------------------------|-----------------------|------------|-------|
|                                | Standard              | Background | Limit |
| <b>Dissolved Metals (µg/L)</b> |                       |            |       |
| Arsenic                        | 10.0                  | 4.7        | 11.0  |
| Barium                         | 1000                  | 0.09       | 1194  |
| Beryllium                      | 4.0                   | 2.0        | 4.4   |
| Cadmium                        | 10.0                  | 2.0        | 11.6  |
| Chromium                       | 50.0                  | 5.5        | 58.6  |
| Lead                           | 15.0                  | 47.4       | 15.0  |
| Mercury                        | 2.0                   | 0.006      | 2.4   |
| Selenium                       | 50.0                  | 0.6        | 59.6  |
| Silver                         | 50.0                  | 1.0        | 59.5  |
| <b>Inorganics</b>              |                       |            |       |
| Bromate (mg/L)                 | 0.0                   | 0.0        | 0.0   |
| Chlorite (mg/L)                | 1.0                   | 0.0        | 1.0   |
| Fluoride (mg/L)                | 4.0                   | 0.0        | 4.0   |
| Nitrates as N                  | 10.0                  | 0.0        | 10.0  |
| <b>Radiological</b>            |                       |            |       |
| Gross Alpha (pCi/L)            | 15.0                  | 0.0        | 17.9  |
| Gross Beta (mrem/yr)           | 4.0                   | 0.0        | 4.8   |
| Radium 226, 228 (pCi/L)        | 5.0                   | 0.0        | 6.0   |
| Strontium 90 (pCi/L)           | 8.0                   | 0.0        | 9.6   |
| Tritium (pCi/L)                | 20000                 | 0.0        | 23881 |
| Uranium (pCi/L)                | 30.0                  | 0.0        | 35.8  |

**Effluent Limitations for Protection of Recreation (Class 2B Waters)**

| Physical Parameter       | Concentration |         |
|--------------------------|---------------|---------|
|                          | Minimum       | Maximum |
| pH                       | 6.5           | 9.0     |
| Turbidity Increase (NTU) |               | 10.0    |

**Effluent Limitations for Protection of Aquatic Wildlife (Class 3A Waters)**

|   |                              |
|---|------------------------------|
| <b>Whole Effluent Toxicity (WET) Limits</b> | <b>Maximum</b>               |
| Dilution Ratio                              | 0.3 :1                       |
| IC25  | 78% percent effluent         |
| <b>Temperature (deg C)</b>                  | <b>Maximum</b>               |
| Instantaneous                               | 20.0                         |
| Change                                      | 2.0                          |
| <b>Dissolved Oxygen (mg/L)</b>              | <b>Minimum Concentration</b> |
| Instantaneous                               | 4.0                          |
| 7-day Average                               | 5.0                          |
| 30-day Average                              | 6.5                          |

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**Metals-Total Recoverable**

| Parameter                       | Chronic (4-day ave)   |            |       | Acute (1-hour ave)    |            |       |
|---------------------------------|-----------------------|------------|-------|-----------------------|------------|-------|
|                                 | Standard <sup>1</sup> | Background | Limit | Standard <sup>1</sup> | Background | Limit |
| Aluminum (µg/L)                 | 87.0                  | 43.5       | N/A   | 750                   | 43.5       | 887   |
| Arsenic (µg/L)                  | 150.0                 | 4.7        | 190.3 | 340                   | 4.7        | 405   |
| Cadmium (µg/L)                  | 2.0                   | 2.0        | 2.0   | 6.5                   | 2.0        | 7.4   |
| Chromium VI (µg/L)              | 11.0                  | 5.5        | 12.5  | 16.0                  | 5.5        | 18.0  |
| Chromium III (µg/L)             | 231                   | 2.5        | 294   | 1,773                 | 2.5        | 2,117 |
| Copper (µg/L)                   | 29.3                  | 25.00      | 30.5  | 49.6                  | 25.0       | 54.4  |
| Cyanide (µg/L) <sup>2</sup>     | 5.2                   | 2.6        | 5.9   | 22.0                  | 2.6        | 25.8  |
| Iron (µg/L)                     |                       | 0.52       |       | 1,000                 | 0.52       | 1,194 |
| Lead (µg/L)                     | 10.9                  | 47.4       | 10.9  | 281                   | 47.4       | 326   |
| Mercury (µg/L) <sup>2</sup>     | 0.012                 | 0.006      | 0.014 | 2.4                   | 0.006      | 2.9   |
| Nickel (µg/L)                   | 168                   | 5.0        | 213   | 1,513                 | 5.0        | 1,806 |
| Selenium (µg/L)                 | 4.6                   | 0.6        | 5.7   | 18.4                  | 0.6        | 21.9  |
| Silver (µg/L)                   |                       | 1.0        |       | 34.9                  | 1.0        | 41.5  |
| Tributyltin (µg/L) <sup>2</sup> | 0.072                 | 0.036      | 0.082 | 0.46                  | 0.036      | 0.54  |
| Zinc (µg/L)                     | 382                   | 217        | 428   | 379                   | 217        | 411   |

1: Based upon a Hardness of 400 mg/l as CaCO<sub>3</sub>

2: Background concentration assumed 50% of chronic standard

3: Where the pH is equal to or greater than 7.0 and the hardness is equal to or greater than 50 ppm as CaCO<sub>3</sub> in the receiving water after mixing, the 87 ug/1 chronic criterion (expressed as total recoverable) will not apply, and aluminum will be regulated based on compliance with the 750 ug/1 acute aluminum criterion (expressed as total recoverable).

**Effluent Limitation for Protection of Agriculture (Class 4 Waters)**

| Parameter                     | Maximum Concentration |            |       |
|-------------------------------|-----------------------|------------|-------|
|                               | Standard              | Background | Limit |
| Total Dissolved Solids (mg/L) | 1200                  | 376        | 1360  |
| Boron (mg/L)                  | 0.75                  | 0.38       | 0.82  |
| Arsenic, Dissolved (µg/L)     | 100                   | 4.7        | 118   |
| Cadmium, Dissolved (µg/L)     | 10                    | 2.0        | 11.6  |
| Chromium, Dissolved (µg/L)    | 100                   | 5.5        | 118   |
| Copper, Dissolved (µg/L)      | 200                   | 25.0       | 234   |
| Lead, Dissolved (µg/L)        | 100                   | 47.4       | 110   |
| Selenium, Dissolved (µg/L)    | 50                    | 0.6        | 60    |
| Gross Alpha (pCi/L)           | 15                    | 0.0        | 18    |