352 Turnpike Road
Southborough, MA 01772
508.480.9900

June 03, 2022

Sutton Town Hall
Attn: Sutton Planning Board
4 Uxbridge Road
Sutton, MA 01590

RE: Supplemental Drainage Information
UGPG RE Sutton, LLC
Unified Building 2 & 3 (40 & 42 Unified Parkway)
Providence Road/Boston Road, Sutton, Massachusetts

Dear Members of the Sutton Planning Board:

We have provided supplemental information in response to the Planning Board's peer reviewer's (Graves Engineering, Inc.) comments requesting additional stormwater treatment be provided for runoff generated from pavement areas discharging to the DEP Wellhead Protection Areas on site (Graves Engineering, Inc. comments 7 & 13). Accordingly, we have incorporated bioretention areas and proprietary stormwater quality units into the stormwater management areas that discharge to the DEP Wellhead Protection Areas. The additional BMP's exceed the state standard for pretreatment and we are providing the below calculations to supplement the previously summitted drainage report:

- Bioretention Sizing Calculations
- 1" Water Quality Volume to Flow Rate Calculation Sheet

If you should have any questions, comments or require additional information, please do not hesitate to contact either of us at (508) 480-9900.

Thank you,

BOHLER ENGINEERING

John A. Kucich, PE

Keith W. Curran, PE

W211141-Supplimental Drainage Information.doc

**Proposed Buildings 2 & 3**
**UNIFIED Parkway**
**Sutton, MA**
**Bohler Job Number: W211141**

## Bioretention Sizing Calculations

| **Bioretention Area BA2b** | |
|---|---|
| Post Develpoment Impervious Area Directed to BMP (ac) | 0.4 |
| BMP Volume Required (cf) | 1588 |
| **Bioretention Volume Provided (cf)*** | **1,775** |

| **Bioretention Area BA2c** | |
|---|---|
| Post Develpoment Impervious Area Directed to BMP (ac) | 2.3 |
| BMP Volume Required (cf) | 8186 |
| **Bioretention Volume Provided (cf)*** | **8,468** |

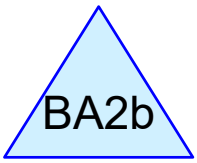
| **Bioretention Area BA3a** | |
|---|---|
| Post Develpoment Impervious Area Directed to BMP (ac) | 4.7 |
| BMP Volume Required (cf) | 17017 |
| **Bioretention Volume Provided (cf)*** | **18,559** |

| **Bioretention Area 2b BA3b** | |
|---|---|
| Post Develpoment Impervious Area Directed to BMP (ac) | 2.4 |
| BMP Volume Required (cf) | 8554 |
| **Bioretention Volume Provided (cf)*** | **9,034** |
| | |

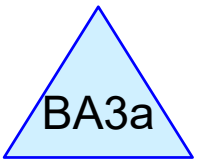
*Volume provided below lowest outlet of Infiltration BMP, refer to attached storage tables

Prepared By:
BOHLER
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

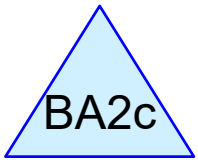
6/3/2022



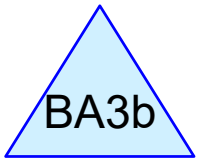

Bioretention Area BA2b



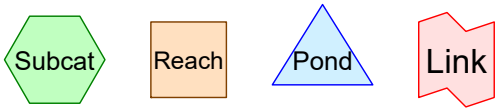

Bioretention Area BA3a




Bioretention Area BA2c




Bioretention Area BA3b




**Routing Diagram for W211141-BioAreas-Bldg2.3**
Prepared by Bohler Engineering, Printed 6/3/2022

## Summary for Pond BA2b: Bioretention Area BA2b

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 366.50' | 1,775 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) x 1.1 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 366.50 | 1,133 | 0 | 0 |
| 367.50 | 2,095 | 1,614 | 1,614 |

## Summary for Pond BA2c: Bioretention Area BA2c

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 374.00' | 8,486 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) x 1.1 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 374.00 | 2,571 | 0 | 0 |
| 375.00 | 3,818 | 3,195 | 3,195 |
| 376.00 | 5,222 | 4,520 | 7,715 |

## Summary for Pond BA3a: Bioretention Area BA3a

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 373.00' | 18,559 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) x 1.1 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 373.00 | 6,246 | 0 | 0 |
| 374.00 | 8,377 | 7,312 | 7,312 |
| 375.00 | 10,744 | 9,561 | 16,872 |

## Summary for Pond BA3b: Bioretention Area BA3b

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 383.00' | 9,034 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) x 1.1 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 383.00 | 2,683 | 0 | 0 |
| 384.00 | 4,067 | 3,375 | 3,375 |
| 385.00 | 5,609 | 4,838 | 8,213 |

Bohler Job # W211141
Calc: KME
Date: 6/2/2022

## 1" Water Quality Volume to Flow Rate Calculation Sheet

This spreadsheet should be used to convert water quality volume to an equivalent water quality peak flow rate as outlined in the new MA DEP guidelines that take effect on October 15, 2013.

**Glossary**

Water Quality Flow Rate = WQF
Water Quality Volume = WQV*
Unit peak discharge (csm/in) = qu**
Impervious Area in watershed (square miles) = Ai

*WQV is expressed in watershed inches (you must use 1.0-inches in all cases with this method and not 0.5-inches)
** calculate the qu based on the time of concentration (see 1" - qu Table)

**Compute Water Quality Flow with the following Equation**

WQF = (qu)(A)(WQV)

**Input Information (in colored cells only)**

| Site Plan Callout | | Enter qu (from 1" - qu Table) | Enter Impervious Area (SF) | Ai (sq/mi) | WQV (inches) | | WQF (cfs) |
|---|---|---|---|---|---|---|---|
| WQU-112 | = | 774 | 138154 | 0.004956 | 1 | = | **3.84** |
| WQU-203 | | 774 | 19052 | 0.000683 | 1 | = | **0.53** |
| WQU-306 | | 774 | 98235 | 0.003524 | 1 | = | **2.73** |
| WQU-611 | | 774 | 204202 | 0.007325 | 1 | = | **5.67** |
| WQU-705 | | 774 | 33480 | 0.001201 | 1 | = | **0.93** |
| WQU-706 | | 774 | 69173 | 0.002481 | 1 | = | **1.92** |