

**BEALS · ASSOCIATES** PLLC

70 Portsmouth Ave.  
3<sup>rd</sup> Floor, Suite 2,  
Stratham, N. H. 03885  
Phone: 603-583-4860  
Fax: 603-583-4863

April 25, 2014

Ms. Marcia Gasses  
Town Planner and Land Use Administrator  
Town of Barrington  
P.O. Box 660  
Barrington, New Hampshire 03825

**RE: River's Peak – Cabernet Builders**  
Boulder Drive, Barrington – Tax Map 215, Lot 1

Dear Ms. Gasses,

We are in receipt of a review letter from DuBois & King dated April 18, 2014, concerning the above referenced project and have addressed the comments below.

1. **RESPONSE:** The setback lines on sheet 1 do not reflect the exclusion of the steep slope areas as depicted on sheet 5. The final Mylar will be updated prior to submittal for signature.
2. **RESPONSE:** Pond 6 near STA 2+00 has been corrected regarding area data input and was found sufficient to contain the 50-year storm water flow.
3. **RESPONSE:** While Article 7.4.3(7) does not state “in any location”, upon discussion with Dubois & King, Inc., we have prepared a waiver request to the rate of runoff increases toward Nippo Brook, and New Bow Lake Road.
4. **RESPONSE:** The worst case scenario (e.g. the interior of the cul-de-sac draining entirely to the road side swale - Subcat #10) has been modeled and as can be reviewed in the attached partial HydroCAD report the 50-year storm event the average depth at peak storage within the 2' deep swale is 0.86'.
5. **RESPONSE:** The swale has been modeled dynamically and the shallower section shows a depth at peak storage of 0.45' under a 50-year event.
6. **RESPONSE:** Pipe materials have been clarified in the gravel wetland detail as requested.
7. **RESPONSE:** Cross-sections at STA 9+00 and 17+00 have been corrected as requested.
8. **RESPONSE:** As stated previously, as part of the design to meet the requirements of the Fire and Police Departments the paved portion of the roadway is 24' wide being 2 feet wider than the normal requirement and the shoulders are all proposed at 4' wide to minimize the site disturbance. This design was approved by both departments and reviewed by the Planning Board to approve the road length waiver. However, a waiver to the 6' required shoulder width in cut sections has been prepared as suggested by the reviewer.
9. **RESPONSE:** The guardrail detail and MELT platform grading has revised as requested.

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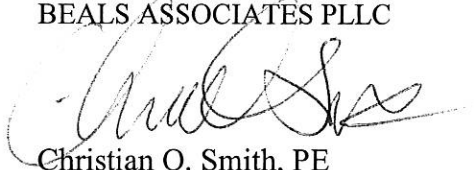
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10. **RESPONSE:** The speed limit signs have been upsized as requested.
11. **RESPONSE:** The radii have been corrected to 30' as required at the internal intersection.
12. **RESPONSE:** A sight plan and profile has been created for the internal intersection, and both now depict profiles along the horizontal sight lines depicted in plan view and begin with driver's eye 20' off the edge of pavement of the road section intersected with. (See Sheets 6a & 6b.
13. **RESPONSE:** Note 9 on sheet 6 has been updated to reference Article 12.8.4. as requested.
14. **RESPONSE:** A hard copy of the original traffic analysis is enclosed as requested.

**We trust the information and revised plans submitted here will address all cited areas of concern for this application.**

If you have any questions, please feel free to contact this office.

Very truly yours,  
BEALS ASSOCIATES PLLC



Christian O. Smith, PE  
Principal, P.E.

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**Subdivision Plan Waiver Request Form**  
*Under Subdivision Plan Regulations 5.4-Request for Waivers, 8.5-Waivers for Specific Plan  
Submission Requirements and 11.1-General Waiver Provision*

If there is more than one waiver requested, each waiver request is to be individually listed and described, as each waiver is considered individually by the Town of Barrington Planning Board. A petition for waiver shall be submitted in writing by the applicant with the application for review. The request shall fully state the grounds for which the waiver is requested and all facts supporting this request with reference to the applicable Barrington Subdivision Regulations article, section and paragraph. **Each waiver granted shall be listed on the approved subdivision plan which is to be recorded at the Strafford County Registry of Deeds.**

Name of Subdivision Plan (See Title Box):

River's Peak Subdivision

Case Number: \_\_\_\_\_

Site Location: Boulder Drive

Zoning District(s): General Residential

Owner (s): Cabernet Builders

Address of Owner(s): PO Box 291, Stratham, NH 03885

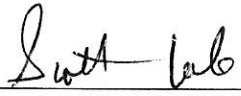
Address Line 2: \_\_\_\_\_

Name of Applicant (if different from owner): Beals Associates PLLC

Phone Number 583-4860

Email scole@bealsassociatesnh.com

Land Surveyor: Doucet Survey Inc.

I  seek the following waiver to the Town of Barrington Subdivision Regulations for the above case submittal:

Your petitioner seeks the following relief:

1.) A waiver to Subdivision Regulations Article 7.4.3(7) citing no increase in runoff from the subject parcel. Minor increases are shown under larger storm events toward Nippo Brook and New Bow Lake Road. It should be noted that the overall site flow to the analysis point (Isinglass River) shows peak flow reductions under all storm events. The increase is caused by the back lots and impervious surfaces proposed on lots 12 thru 17. To avoid the increase the developer would have to cut down far more trees currently providing a substantial buffer to construct diversion berms to redirect the storm water to detention areas to be released slowly. We feel the increase is negligible due to the proximity of the abutting river. This is consistent with the original permitting (NHDES Aot & 401 Water Quality Cert.) Finally, granting of the waiver will not be detrimental to the public safety, health or welfare or injurious to other property and will promote the public interest. The waiver will not, vary the provisions of the Barrington Zoning Ordinance, Master Plan, or Official Maps. Finally, the waiver will substantially secure the objectives, standards and requirements of the regulations.

Signature of Owner/Applicant

LAND USE OFFICE <sup>Date</sup>

Revised 07/27/2011

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## Subdivision Plan Waiver Request Form

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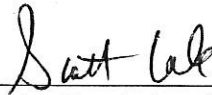
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Phone Number 583-4860

Email scole@bealsassociatesnh.com

Land Surveyor: Doucet Survey Inc.

I  seek the following waiver to the Town of Barrington Subdivision Regulations for the above case submittal:

Your petitioner seeks the following relief:

1.) A waiver to Subdivision Regulations Table I Roadway Design, Shoulder width in cut section of 6 feet.

As part of the requirements of the Fire and Police Departments the pavement width is designed to be 24' wide being 2 feet wider than is normally required. The proposed 4' shoulders will provide the normal overall road width and create less disturbance for the project.

Signature of Owner/Applicant

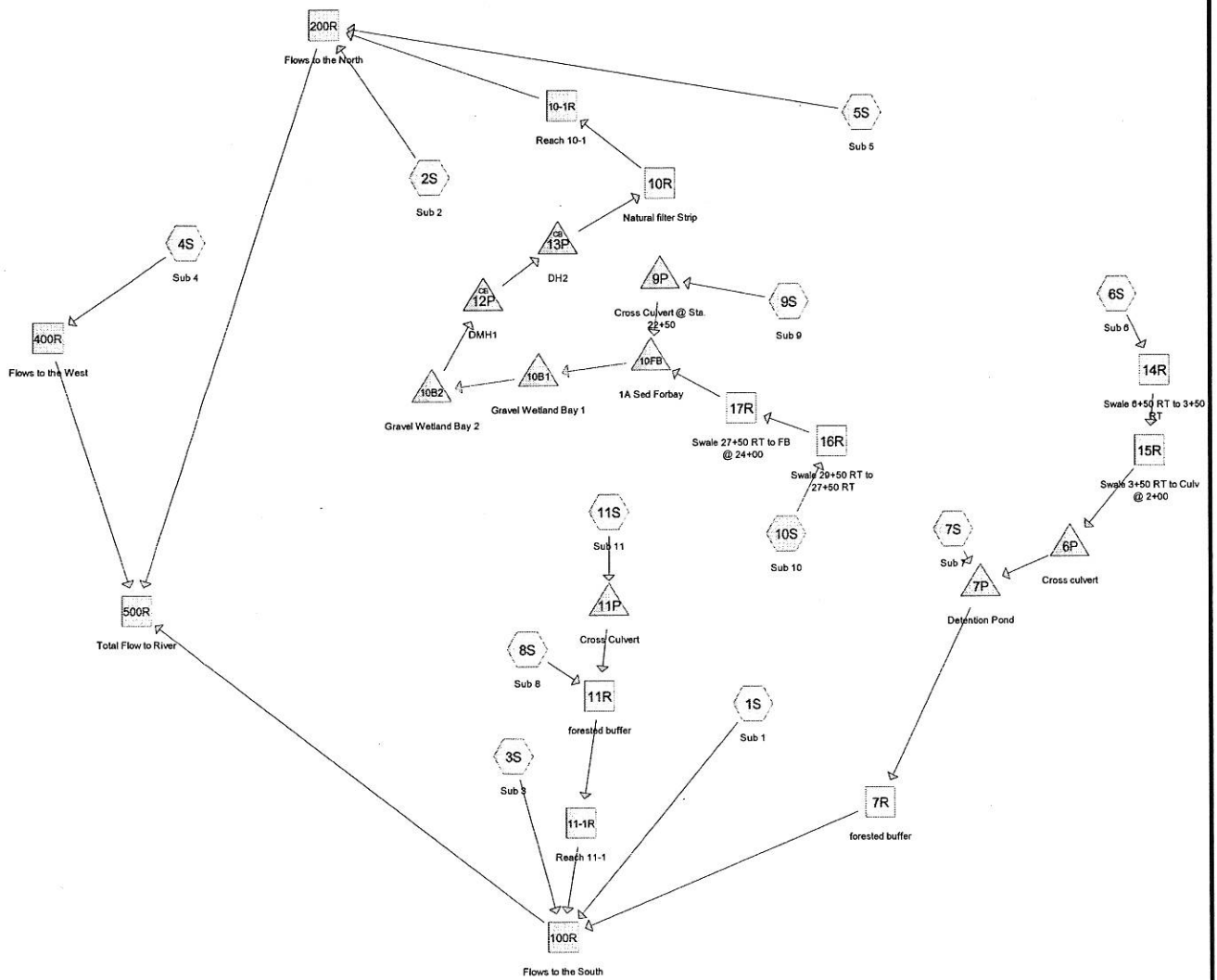
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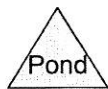
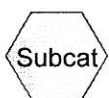
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Rivers Reach Swale eval - Proposed

Type III 24-hr 50yr Rainfall=6.82"

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Time span=5.00-50.00 hrs, dt=0.05 hrs, 901 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 1S: Sub 1**Runoff Area=13.930 ac 6.32% Impervious Runoff Depth=3.57"  
Flow Length=305' Tc=6.5 min CN=71 Runoff=56.46 cfs 4.147 af**Subcatchment 2S: Sub 2**Runoff Area=11.750 ac 2.98% Impervious Runoff Depth=3.47"  
Flow Length=657' Tc=21.6 min CN=70 Runoff=31.05 cfs 3.397 af**Subcatchment 3S: Sub 3**Runoff Area=3.370 ac 2.37% Impervious Runoff Depth=3.57"  
Flow Length=657' Tc=21.5 min CN=71 Runoff=9.20 cfs 1.003 af**Subcatchment 4S: Sub 4**Runoff Area=6.220 ac 0.00% Impervious Runoff Depth=3.27"  
Flow Length=494' Tc=12.2 min CN=68 Runoff=19.21 cfs 1.692 af**Subcatchment 5S: Sub 5**Runoff Area=18.400 ac 0.60% Impervious Runoff Depth=2.96"  
Flow Length=1,015' Tc=38.5 min CN=65 Runoff=31.64 cfs 4.545 af**Subcatchment 6S: Sub 6**Runoff Area=2.060 ac 20.39% Impervious Runoff Depth=4.31"  
Flow Length=530' Tc=14.2 min CN=78 Runoff=7.98 cfs 0.740 af**Subcatchment 7S: Sub 7**Runoff Area=0.670 ac 34.33% Impervious Runoff Depth=4.42"  
Flow Length=630' Tc=5.3 min CN=79 Runoff=3.43 cfs 0.247 af**Subcatchment 8S: Sub 8**Runoff Area=0.350 ac 48.57% Impervious Runoff Depth>5.19"  
Flow Length=450' Slope=0.0200 '/' Tc=12.6 min CN=86 Runoff=1.66 cfs 0.151 af**Subcatchment 9S: Sub 9**Runoff Area=1.640 ac 45.12% Impervious Runoff Depth>5.08"  
Flow Length=1,062' Tc=17.2 min CN=85 Runoff=6.82 cfs 0.694 af**Subcatchment 10S: Sub 10**Runoff Area=5.740 ac 11.67% Impervious Runoff Depth=3.89"  
Flow Length=502' Tc=19.1 min CN=74 Runoff=17.93 cfs 1.859 af**Subcatchment 11S: Sub 11**Runoff Area=0.350 ac 45.71% Impervious Runoff Depth>5.08"  
Flow Length=227' Tc=7.7 min CN=85 Runoff=1.89 cfs 0.148 af**Reach 7R: forested buffer**Avg. Flow Depth=0.12' Max Vel=1.20 fps Inflow=8.82 cfs 0.986 af  
n=0.055 L=125.0' S=0.0360 '/' Capacity=103.38 cfs Outflow=8.80 cfs 0.986 af**Reach 10-1R: Reach 10-1**Avg. Flow Depth=0.31' Max Vel=3.96 fps Inflow=16.30 cfs 2.293 af  
n=0.055 L=223.0' S=0.1345 '/' Capacity=38.59 cfs Outflow=16.29 cfs 2.293 af**Reach 10R: Natural filter Strip**Avg. Flow Depth=0.33' Max Vel=3.66 fps Inflow=16.32 cfs 2.293 af  
n=0.055 L=75.0' S=0.1067 '/' Capacity=34.36 cfs Outflow=16.30 cfs 2.293 af**Reach 11-1R: Reach 11-1**Avg. Flow Depth=0.05' Max Vel=1.31 fps Inflow=3.35 cfs 0.292 af  
n=0.055 L=187.0' S=0.1176 '/' Capacity=143.59 cfs Outflow=3.27 cfs 0.292 af**Reach 11R: forested buffer**Avg. Flow Depth=0.08' Max Vel=1.55 fps Inflow=3.40 cfs 0.292 af  
n=0.055 L=175.0' S=0.1029 '/' Capacity=80.76 cfs Outflow=3.35 cfs 0.292 af

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Rivers Reach Swale eval - Proposed

Type III 24-hr 50yr Rainfall=6.82"

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**Reach 14R: Swale 6+50 RT to 3+50 RT** Avg. Flow Depth=0.42' Max Vel=5.80 fps Inflow=7.98 cfs 0.740 af  
n=0.030 L=300.0' S=0.0700 '/' Capacity=222.39 cfs Outflow=7.97 cfs 0.740 af

**Reach 15R: Swale 3+50 RT to Culv @** Avg. Flow Depth=0.45' Max Vel=5.32 fps Inflow=7.97 cfs 0.740 af  
n=0.030 L=150.0' S=0.0550 '/' Capacity=197.12 cfs Outflow=7.97 cfs 0.740 af

**Reach 16R: Swale 29+50 RT to 27+50** Avg. Flow Depth=0.86' Max Vel=4.56 fps Inflow=17.93 cfs 1.859 af  
n=0.030 L=200.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=17.92 cfs 1.859 af

**Reach 17R: Swale 27+50 RT to FB @** Avg. Flow Depth=0.66' Max Vel=6.79 fps Inflow=17.92 cfs 1.859 af  
n=0.030 L=350.0' S=0.0587 '/' Capacity=203.67 cfs Outflow=17.85 cfs 1.859 af

**Reach 100R: Flows to the South** Inflow=64.90 cfs 6.428 af  
Outflow=64.90 cfs 6.428 af

**Reach 200R: Flows to the North** Inflow=72.27 cfs 10.235 af  
Outflow=72.27 cfs 10.235 af

**Reach 400R: Flows to the West** Inflow=19.21 cfs 1.692 af  
Outflow=19.21 cfs 1.692 af

**Reach 500R: Total Flow to River** Inflow=129.33 cfs 18.356 af  
Outflow=129.33 cfs 18.356 af

**Pond 6P: Cross culvert** Peak Elev=307.41' Storage=4 cf Inflow=7.97 cfs 0.740 af  
15.0" Round Culvert n=0.012 L=60.0' S=0.0833 '/' Outflow=7.95 cfs 0.740 af

**Pond 7P: Detention Pond** Peak Elev=297.70' Storage=10,552 cf Inflow=9.83 cfs 0.987 af  
Outflow=8.82 cfs 0.986 af

**Pond 9P: Cross Culvert @ Sta. 22+50** Peak Elev=307.41' Storage=3,141 cf Inflow=6.82 cfs 0.694 af  
18.0" Round Culvert n=0.013 L=49.0' S=0.0051 '/' Outflow=7.19 cfs 0.637 af

**Pond 10B1: Gravel Wetland Bay 1** Peak Elev=306.39' Storage=10,104 cf Inflow=22.27 cfs 2.461 af  
Primary=1.43 cfs 0.722 af Secondary=20.33 cfs 1.660 af Outflow=20.91 cfs 2.382 af

**Pond 10B2: Gravel Wetland Bay 2** Peak Elev=306.25' Storage=10,868 cf Inflow=20.91 cfs 2.382 af  
Outflow=16.32 cfs 2.293 af

**Pond 10FB: 1A Sed Forbay** Peak Elev=306.90' Storage=5,904 cf Inflow=24.68 cfs 2.496 af  
Outflow=22.27 cfs 2.461 af

**Pond 11P: Cross Culvert** Peak Elev=330.18' Storage=509 cf Inflow=1.89 cfs 0.148 af  
15.0" Round Culvert n=0.012 L=33.0' S=0.0052 '/' Outflow=1.77 cfs 0.140 af

**Pond 12P: DMH1** Peak Elev=304.78' Inflow=16.32 cfs 2.293 af  
24.0" Round Culvert n=0.013 L=180.0' S=0.0169 '/' Outflow=16.32 cfs 2.293 af

**Pond 13P: DMH2** Peak Elev=301.45' Inflow=16.32 cfs 2.293 af  
24.0" Round Culvert n=0.013 L=33.0' S=0.0782 '/' Outflow=16.32 cfs 2.293 af

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Type III 24-hr 50yr Rainfall=6.82"

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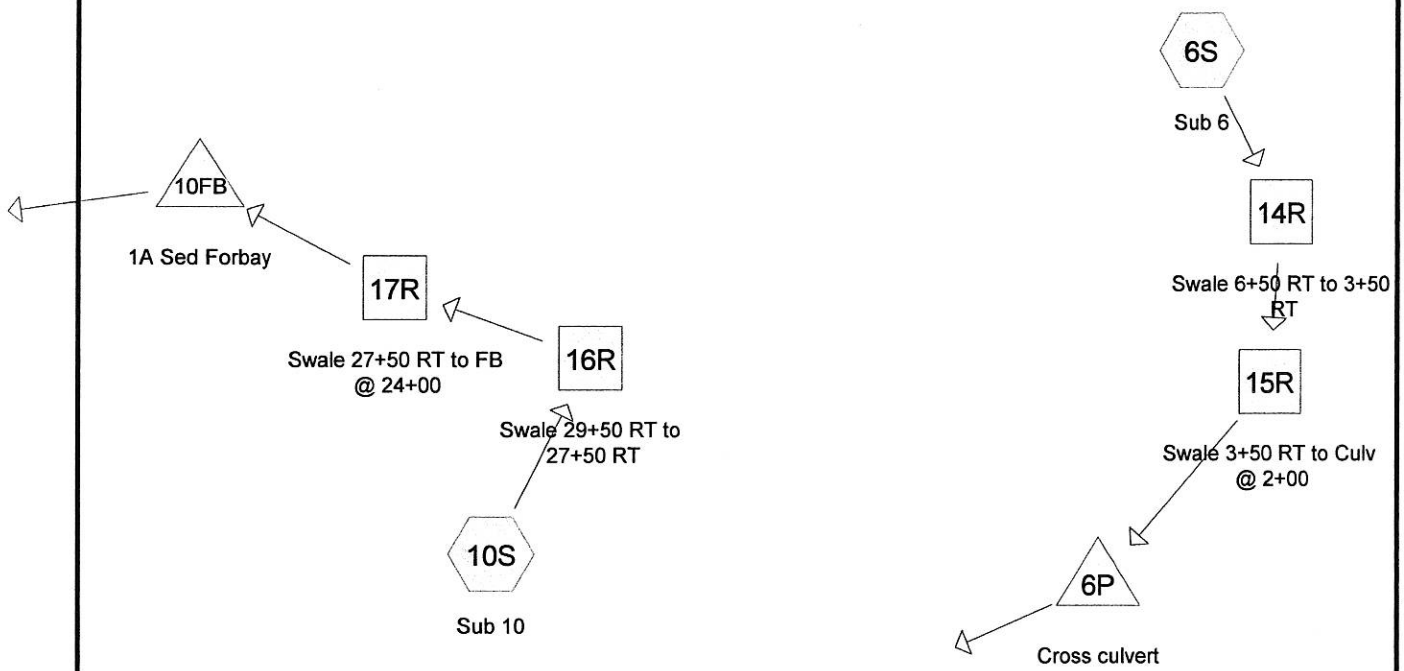
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**Total Runoff Area = 64.480 ac   Runoff Volume = 18.624 af   Average Runoff Depth = 3.47"**  
**94.09% Pervious = 60.670 ac   5.91% Impervious = 3.810 ac**

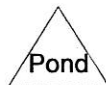
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### Summary for Subcatchment 6S: Sub 6

Runoff = 7.98 cfs @ 12.20 hrs, Volume= 0.740 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-50.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50yr Rainfall=6.82"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| * 0.420   | 98 | Impervious                    |
| 0.990     | 74 | >75% Grass cover, Good, HSG C |
| 0.650     | 70 | Woods, Good, HSG C            |
| 2.060     | 78 | Weighted Average              |
| 1.640     |    | 79.61% Pervious Area          |
| 0.420     |    | 20.39% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                            |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------------------------|
| 8.3      | 50            | 0.0600        | 0.10              |                | <b>Sheet Flow, 1</b><br>Woods: Light underbrush n= 0.400 P2= 2.90"     |
| 2.1      | 140           | 0.0500        | 1.12              |                | <b>Shallow Concentrated Flow, 2</b><br>Woodland Kv= 5.0 fps            |
| 0.1      | 40            | 0.4600        | 4.75              |                | <b>Shallow Concentrated Flow, 3</b><br>Short Grass Pasture Kv= 7.0 fps |
| 3.7      | 300           | 0.0370        | 1.35              |                | <b>Shallow Concentrated Flow, 4</b><br>Short Grass Pasture Kv= 7.0 fps |
| 14.2     | 530           | Total         |                   |                |                                                                        |

### Summary for Subcatchment 10S: Sub 10

Runoff = 17.93 cfs @ 12.26 hrs, Volume= 1.859 af, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-50.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50yr Rainfall=6.82"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| * 0.670   | 98 | Impervious                    |
| 1.480     | 74 | >75% Grass cover, Good, HSG C |
| 3.590     | 70 | Woods, Good, HSG C            |
| 5.740     | 74 | Weighted Average              |
| 5.070     |    | 88.33% Pervious Area          |
| 0.670     |    | 11.67% Impervious Area        |

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| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------------------------|
| 13.0        | 50               | 0.0200           | 0.06                 |                   | <b>Sheet Flow, 1</b>                       |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 2.90" |
| 5.5         | 300              | 0.0333           | 0.91                 |                   | <b>Shallow Concentrated Flow, 2</b>        |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                       |
| 0.2         | 50               | 0.3300           | 4.02                 |                   | <b>Shallow Concentrated Flow, 3</b>        |
|             |                  |                  |                      |                   | Short Grass Pasture Kv= 7.0 fps            |
| 0.4         | 102              | 0.0700           | 4.26                 |                   | <b>Shallow Concentrated Flow, 4</b>        |
|             |                  |                  |                      |                   | Unpaved Kv= 16.1 fps                       |
| 19.1        | 502              | Total            |                      |                   |                                            |

**Summary for Reach 14R: Swale 6+50 RT to 3+50 RT**

Inflow Area = 2.060 ac, 20.39% Impervious, Inflow Depth = 4.31" for 50yr event  
 Inflow = 7.98 cfs @ 12.20 hrs, Volume= 0.740 af  
 Outflow = 7.97 cfs @ 12.21 hrs, Volume= 0.740 af, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-50.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 5.80 fps, Min. Travel Time= 0.9 min  
 Avg. Velocity= 1.98 fps, Avg. Travel Time= 2.5 min

Peak Storage= 412 cf @ 12.21 hrs  
 Average Depth at Peak Storage= 0.42'  
 Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 222.39 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding  
 Side Slope Z-value= 3.0 '1' Top Width= 14.00'  
 Length= 300.0' Slope= 0.0700 '1'  
 Inlet Invert= 338.00', Outlet Invert= 317.00'

**Summary for Reach 15R: Swale 3+50 RT to Culv @ 2+00**

Inflow Area = 2.060 ac, 20.39% Impervious, Inflow Depth = 4.31" for 50yr event  
 Inflow = 7.97 cfs @ 12.21 hrs, Volume= 0.740 af  
 Outflow = 7.97 cfs @ 12.21 hrs, Volume= 0.740 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-50.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 5.32 fps, Min. Travel Time= 0.5 min  
 Avg. Velocity= 1.82 fps, Avg. Travel Time= 1.4 min

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Peak Storage= 225 cf @ 12.21 hrs

Average Depth at Peak Storage= 0.45'

Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 197.12 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed &amp; winding

Side Slope Z-value= 3.0 ' / ' Top Width= 14.00'

Length= 150.0' Slope= 0.0550 ' / '

Inlet Invert= 317.00', Outlet Invert= 308.75'

**Summary for Reach 16R: Swale 29+50 RT to 27+50 RT**

Inflow Area = 5.740 ac, 11.67% Impervious, Inflow Depth = 3.89" for 50yr event  
Inflow = 17.93 cfs @ 12.26 hrs, Volume= 1.859 af  
Outflow = 17.92 cfs @ 12.27 hrs, Volume= 1.859 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-50.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.56 fps, Min. Travel Time= 0.7 min

Avg. Velocity = 1.75 fps, Avg. Travel Time= 1.9 min

Peak Storage= 783 cf @ 12.27 hrs

Average Depth at Peak Storage= 0.86'

Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 118.87 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed &amp; winding

Side Slope Z-value= 3.0 ' / ' Top Width= 14.00'

Length= 200.0' Slope= 0.0200 ' / '

Inlet Invert= 332.00', Outlet Invert= 328.00'

**Summary for Reach 17R: Swale 27+50 RT to FB @ 24+00**

Inflow Area = 5.740 ac, 11.67% Impervious, Inflow Depth = 3.89" for 50yr event  
Inflow = 17.92 cfs @ 12.27 hrs, Volume= 1.859 af  
Outflow = 17.85 cfs @ 12.29 hrs, Volume= 1.859 af, Atten= 0%, Lag= 0.8 min

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Rivers Reach Swale eval - Proposed

Type III 24-hr 50yr Rainfall=6.82"

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Routing by Dyn-Stor-Ind method, Time Span= 5.00-50.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.79 fps, Min. Travel Time= 0.9 min

Avg. Velocity = 2.53 fps, Avg. Travel Time= 2.3 min

Peak Storage= 920 cf @ 12.29 hrs

Average Depth at Peak Storage= 0.66'

Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 203.67 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed &amp; winding

Side Slope Z-value= 3.0 ' / ' Top Width= 14.00'

Length= 350.0' Slope= 0.0587 ' / '

Inlet Invert= 328.00', Outlet Invert= 307.45'

**Summary for Pond 6P: Cross culvert**

Inflow Area = 2.060 ac, 20.39% Impervious, Inflow Depth = 4.31" for 50yr event  
 Inflow = 7.97 cfs @ 12.21 hrs, Volume= 0.740 af  
 Outflow = 7.95 cfs @ 12.22 hrs, Volume= 0.740 af, Atten= 0%, Lag= 0.2 min  
 Primary = 7.95 cfs @ 12.22 hrs, Volume= 0.740 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-50.00 hrs, dt= 0.05 hrs

Peak Elev= 307.41' @ 12.21 hrs Surf.Area= 19 sf Storage= 4 cf

Flood Elev= 311.00' Surf.Area= 275 sf Storage= 327 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.1 min ( 824.1 - 824.1 )

| Volume              | Invert               | Avail.Storage             | Storage Description                    |                     |
|---------------------|----------------------|---------------------------|----------------------------------------|---------------------|
| #1                  | 307.30'              | 327 cf                    | Custom Stage Data (Conic) Listed below |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)              | Wet.Area<br>(sq-ft) |
| 307.30              | 12                   | 0                         | 0                                      | 12                  |
| 308.00              | 57                   | 22                        | 22                                     | 59                  |
| 310.00              | 275                  | 305                       | 327                                    | 293                 |

| Device | Routing | Invert  | Outlet Devices                                                                                                                               |
|--------|---------|---------|----------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 305.00' | 15.0" Round Culvert L= 60.0' Ke= 0.500<br>Inlet / Outlet Invert= 305.00' / 300.00' S= 0.0833 ' / ' Cc= 0.900<br>n= 0.012, Flow Area= 1.23 sf |

Primary OutFlow Max=7.85 cfs @ 12.22 hrs HW=307.39' TW=297.66' (Dynamic Tailwater)

1=Culvert (Inlet Controls) 7.85 cfs @ 6.40 fps)

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**Proposed 02-2014**

Prepared by Microsoft

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Rivers Reach Swale eval - Proposed

Type III 24-hr 50yr Rainfall=6.82"

Printed 4/28/2014

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### Summary for Pond 10FB: 1A Sed Forbay

Inflow Area = 7.380 ac, 19.11% Impervious, Inflow Depth = 4.06" for 50yr event  
Inflow = 24.68 cfs @ 12.29 hrs, Volume= 2.496 af  
Outflow = 22.27 cfs @ 12.34 hrs, Volume= 2.461 af, Atten= 10%, Lag= 3.2 min  
Primary = 22.27 cfs @ 12.34 hrs, Volume= 2.461 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-50.00 hrs, dt= 0.05 hrs  
Peak Elev= 306.90' @ 12.36 hrs Surf.Area= 6,775 sf Storage= 5,904 cf  
Flood Elev= 307.00' Surf.Area= 7,367 sf Storage= 6,579 cf

Plug-Flow detention time= 16.4 min calculated for 2.458 af (98% of inflow)  
Center-of-Mass det. time= 7.8 min ( 847.0 - 839.2 )

| Volume | Invert  | Avail.Storage | Storage Description                                        |
|--------|---------|---------------|------------------------------------------------------------|
| #1     | 301.50' | 6,579 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 301.50              | 12                   | 0                         | 0                         |
| 302.00              | 29                   | 10                        | 10                        |
| 304.00              | 553                  | 582                       | 592                       |
| 306.00              | 1,167                | 1,720                     | 2,312                     |
| 307.00              | 7,367                | 4,267                     | 6,579                     |

| Device | Routing | Invert  | Outlet Devices                                                                                                                                                                    |
|--------|---------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 305.25' | <b>5.0' long x 23.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=21.69 cfs @ 12.34 hrs HW=306.90' TW=306.25' (Dynamic Tailwater)  
↑1=Broad-Crested Rectangular Weir (Weir Controls 21.69 cfs @ 2.64 fps)

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