

August 19, 2020



Cascade Lake Dam Breach and Restoration

Cascade Lake

- ▶ Recreation Facility
 - ▶ Six-acre lake
 - ▶ Areas to fish, swim, picnic
 - ▶ Slides and platforms
 - ▶ Splash pad
 - ▶ Pool
 - ▶ Pavilions
 - ▶ Basketball courts
 - ▶ Concessions
 - ▶ Restrooms
 - ▶ Owner's residence



Photo credit:
Carroll County Times/Baltimore Sun

History

▶ Saw mill

- ▶ Original (upper) dam built prior to 1862
- ▶ Final (lower) dam built early 1900's

1862



1943



2017

History

- ▶ Purchased by current owners in 1992
- ▶ Mill removed in 1994
- ▶ 14 feet high
- ▶ 220 feet wide



Incident Overview

Wednesday July 25, 2018

Week of July 23, 2018

24
July, 2018



Flood Stage Update And Radar Simulation With More Record Rain

July 24th, 2018 | Tags: flood, July 24, radar, record rain, warning

July 24 2018 The record rain continues and the local rivers and Chesapeake Bay shorelines are flooding. The heavy persistent rain has been training over the same areas, making for

24
July, 2018



Record Wettest July As Flooding Increases With Severe Storms Today

July 24th, 2018 | Tags: flood, July 24, radar, record rain, weather

Tuesday July 24 2018 We now have the numbers to prove how epic this month has been for rainfall. There is some irony considering both how dry lawns were last

23
July, 2018



Flood Watches And Warnings Today July 23 May Last All Week

July 23rd, 2018 | Tags: flood, July 23, radar, warning, weather

Monday July 23 2018 We are stuck in the

Wednesday, July 25



Flash Flood Warning

Valid Until
9:00 PM EDT Wednesday
July 25, 2018

Safety Information

- Avoid walking or driving through flood waters!
- Move immediately to higher ground!

Potential Exposure

- Population: 98,677
- Schools: 30
- Hospitals: 1

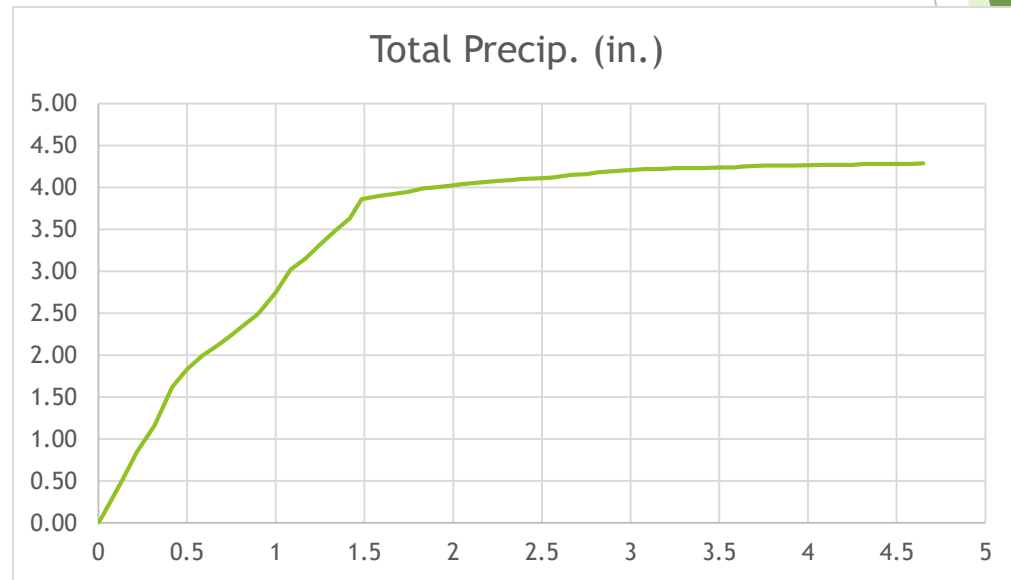






Peaks	Precip. (in.)	Start Time		End Time
6-min	0.44	5:52 PM	-	5:58 PM
12-min	0.77	5:34 PM	-	5:46 PM
18-min	1.17	5:40 PM	-	5:58 PM
24-min	1.54	5:34 PM	-	5:58 PM
30-min	1.83	5:34 PM	-	6:04 PM
60-min	2.75	5:34 PM	-	6:34 PM
120-min	4.03	5:34 PM	-	7:34 PM

NOAA Reference	Avg Rec. Int. (years)	Range (in)
5-min	5	0.423-0.52
10-min	10	0.752-0.924
15-min	25	1.07-1.31
30-min	25	1.57-1.94
60-min	50	2.33-2.89
120-min	100	3.26-4.11



Source: Weather Underground
 KMDWESTM38 Gage
 Compiled: CLSI

Thursday, July 26





SXT 358
MOUNTED ON PILLAR
MOUNTED ON PILLAR
MOUNTED ON PILLAR







Friday, July 27











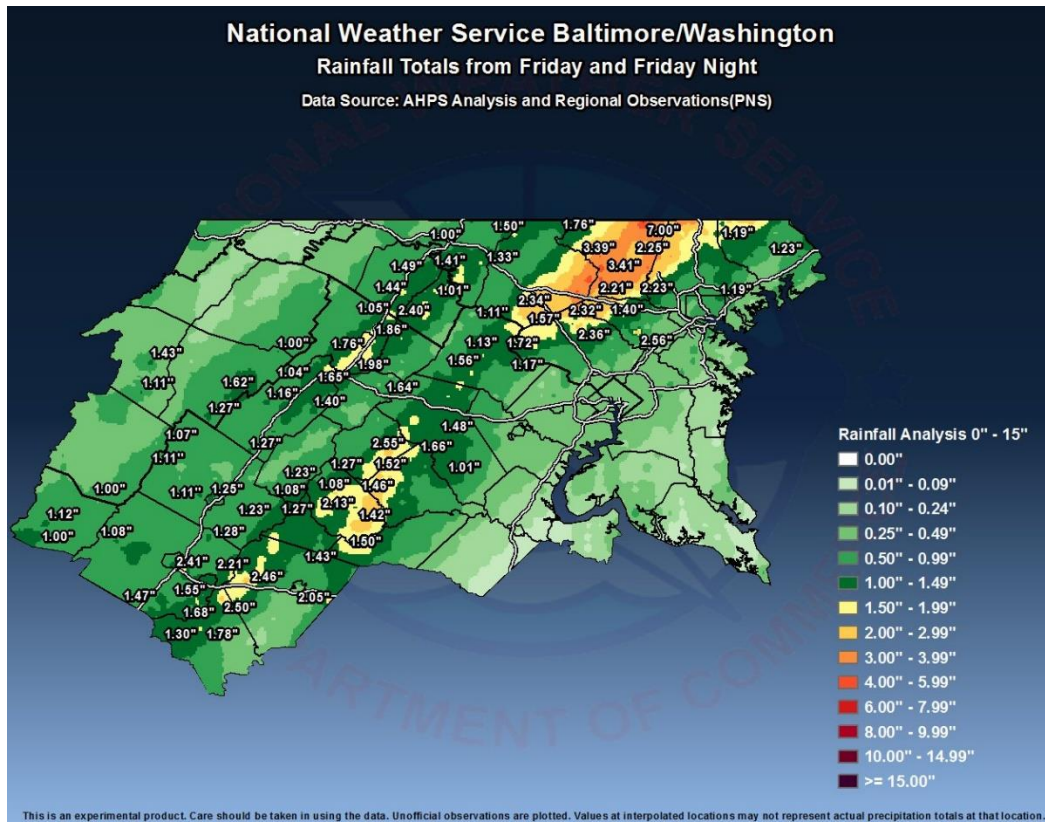


Friday, August 3



And then this happened.....

August 3



Saturday, August 4



Monday, August 6







July 2018



Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
22	23	24	25 Initial Rain Event	26 Damage Survey of Carroll County and Cascade Lake	27 EOC Activated MDE, SHA, CCSO, MSP, CCOPS, CCBRM, CJ Miller	28 Pumping Continues
29 Pumping Continues	30 Pumping Continues	31 Pumping Continues	1 Pumping Continues	2 Pumping Continues	3 Second Rain Event	4 EOC Activated Pumping begins again
5 Pumping Continues	6 Start of controlled breach	7 Controlled breach continues	8 Controlled breach continues	9 Controlled breach continues	10 Controlled breach complete	





Stream Restoration and Impervious Treatment

Moving Forward

Mainstem:

Drainage Area: 2.53 sq.mi.

Impervious Area: 105.5 Acres

Untreated Impervious Area: 78 Acres

Use Class III Watershed



Tributary:

Drainage Area: 1.07 sq.mi.

Impervious Area: 38.5 Acres

Untreated Impervious Area: 36 Acres

Use Class III Watershed

TABLE 7: IMPERVIOUS SURFACE TREATMENT SUMMARY

Treatment Practice	Impervious Area Treated (ac)
Cascade Lake Watershed - SWM	78.1
Cascade Lake Watershed – Stream Restoration	105.5
Downstream Tributary Watershed – Stream Restoration (720 linear feet) ¹	7.2
Impervious Surface Removal	0.6
Project Total	191.4

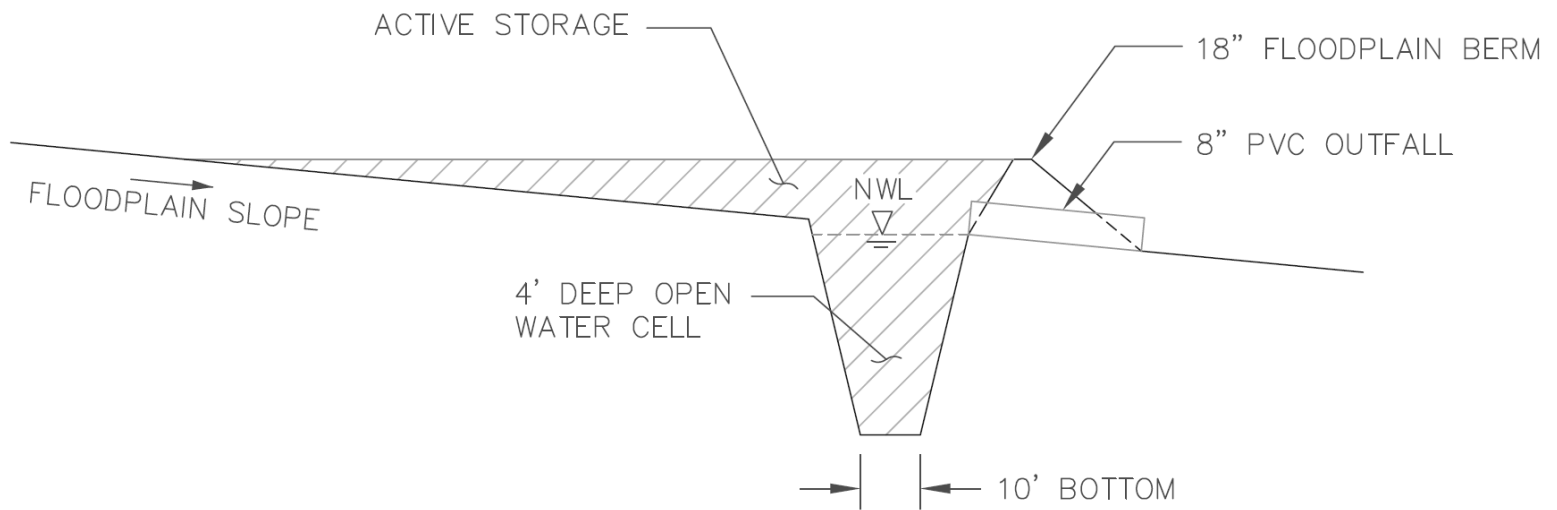
¹ Credit for the restoration of the downstream tributary has been estimated using 1 acre treated per 100 linear feet of restoration and will be updated following the stream protocol evaluation during Preliminary Design.

Design One

- ▶ Restore the stream on one side of the valley, and provide SWM treatment area on other side.
- ▶ 1000-foot long flood plain berm to separate the two areas.

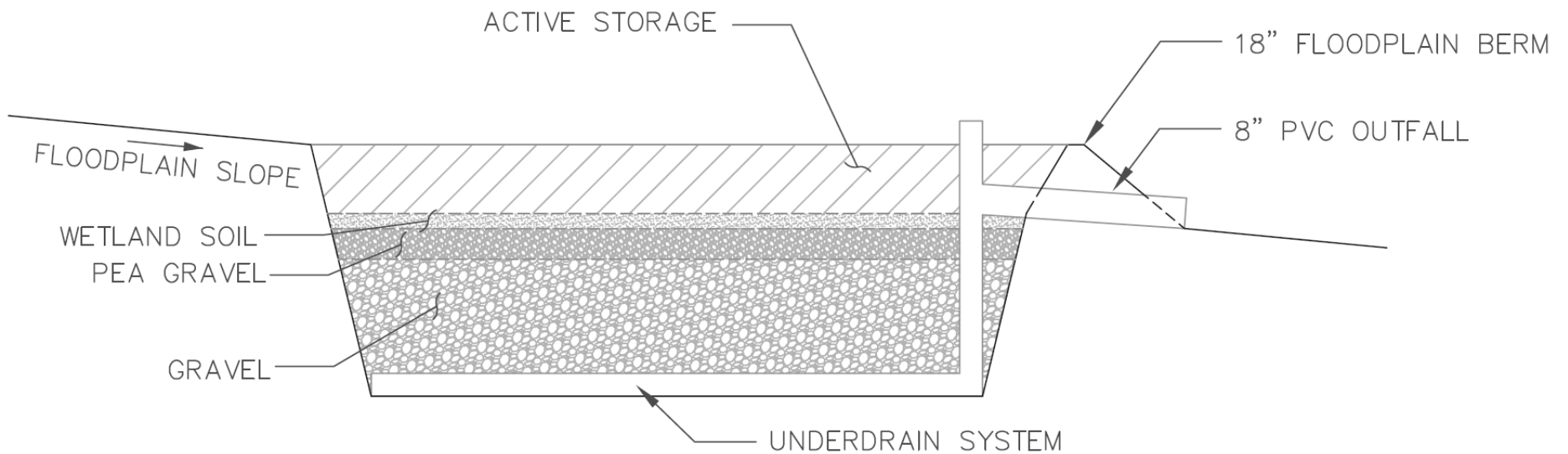
Design Two





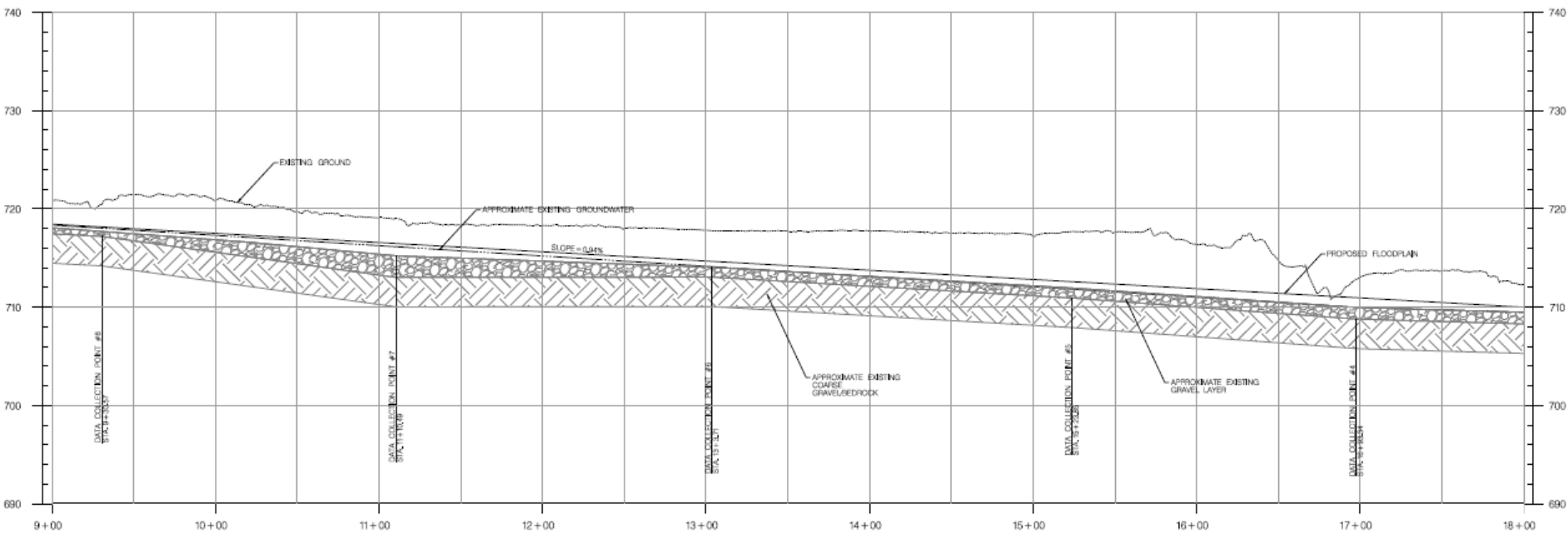
STORMWATER WETLANDS

Design Three



SUBMERGED GRAVEL WETLANDS

Design Four



**FLOODPLAIN
BASELINE PROFILE**
SCALE: 1" = 30' HORZ.
1" = 5' VERT.



Project Support

Worked towards gaining support from:

Property Owners

Commissioners

Maryland Department of the Environment

MD Department of Natural Resources

US Army Corps of Engineers

Trout Unlimited

Grant funding

The future is uncertain

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the frame, creating a sense of depth and movement. The overall aesthetic is clean and modern.



Wrap Up

Questions?