



Downingtown and Caln Flood Mitigation and Stream Restoration Projects / CRS

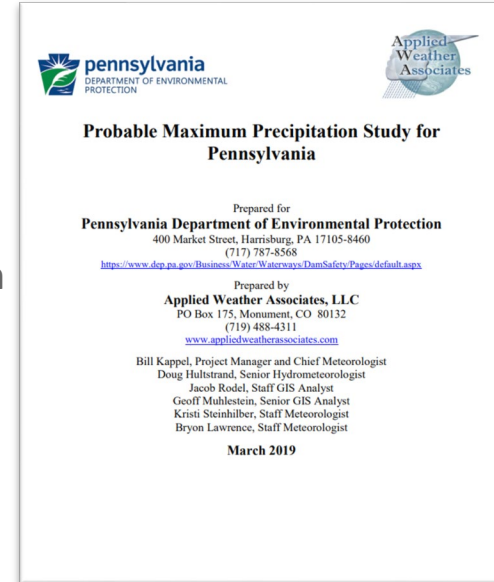
Nicholas Agnoli, P.E.
Applied Weather Associates (AWA)

November 14, 2024

Flood Mitigation and Stream Restoration Projects

Applied Weather Associates (AWA) in Pennsylvania:

- March 2019 study for PA DEP evaluating 98 historic rainfall events impacting the state, resulted in rainfall predictions for varying storm sizes and types (tropical, general and local).
- AWA reviewed over 500 storms when completing this evaluation , including Hurricane Ida.
- Inspected approximately 30 project locations in Downingtown Borough and Caln Township on October 16, 2024.
- Coordinated with the Borough Engineer and the Chester County Water Resources Authority for a copy of the latest FEMA stream models.
- Nicholas Agnoli, P.E. is lead on the project and has:
 - Inspected over 250 dams
 - Conducted over 100 flood studies
 - Completed over 25 stream restoration projects in the northeast
 - Worked in Federal, state and regional government



Flood Mitigation and Stream Restoration Projects

Progress:

- We narrowed approximately 30 projects down to 7 based on viability and beneficial changes to flooding and water quality
- We were able to identify available stream models for:
 - East Branch Brandywine Creek
 - Beaver Creek
 - Upper Brandywine Creek
- We were able to acquire rainfall data and stream gage data for the watershed:
 - 7 USGS stream gages
 - 6 National Weather Service rainfall gages and several private gages
- Partnered with Verdantas:
 - 1,700 staff in 72 offices, including 5 locations in PA
 - Experts in environmental permitting in PA, survey and environmental design



Flood Mitigation and Stream Restoration Projects

Project D-1: Mary Street Floodplain Restoration

- Beaver Creek, Downingtown, PA
- Flood zone AE (and in floodway)
- Project area is 8.5 acres in a 17.9 square mile watershed (11,500 acres)
- Projected soil removal from floodplain up to 55,000 CY (3,700 truckloads)
- 18 multi-family structures would benefit
- 5 athletic fields would benefit
- Work includes:
 - Engineering design
 - Survey with wetland delineation
 - Environmental sampling and testing
 - Eco-restoration design (plantings for water quality and scour control)
 - Environmental permitting (Erosion and Sediment Pollution Control, PA 104 & USACE 404)

Flood Mitigation and Stream Restoration Projects



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Project D-2: Brandywine Sediment Removal at E. Lancaster Avenue Bridge

- East Branch Brandywine Creek, Downingtown, PA
- Flood zone AE (and in floodway)
- Project area is 0.17 acres in an 81.8 square mile basin
- Projected soil removal from floodplain up to 1,100 CY (70 truckloads)
- Upstream structures would benefit
- Work includes:
 - Engineering design
 - Survey with wetland delineation
 - Environmental sampling and testing
 - Eco-restoration design (plantings for water quality and scour control)
 - Environmental permitting (Erosion and Sediment Pollution Control, PA 104 & USACE 404)

Flood Mitigation and Stream Restoration Projects



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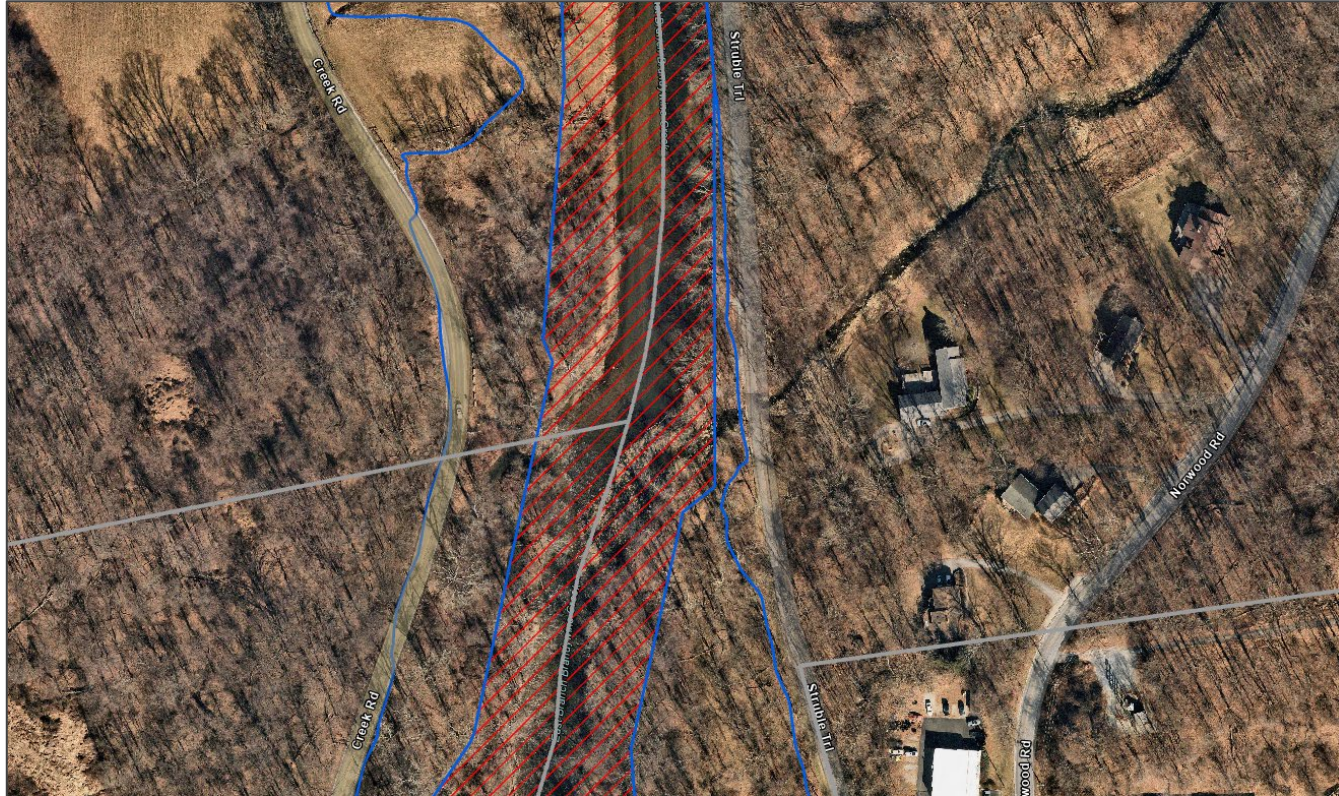


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Project D-9: Former Brandywine Dam Rock Removal and Forebay

- East Branch Brandywine Creek, Downingtown, PA
- Flood zone AE (and in floodway)
- Project area is 0.26 acres in a 62.2 square mile watershed
- Projected rock removal from floodplain up to 1,300 CY (80 truckloads)
- Removes impediment to stream flow
- Work includes:
 - Engineering design
 - Survey with wetland delineation
 - Environmental sampling and testing
 - Eco-restoration design (plantings for water quality and scour control)
 - Environmental permitting (Erosion and Sediment Pollution Control, PA 104 & USACE 404)

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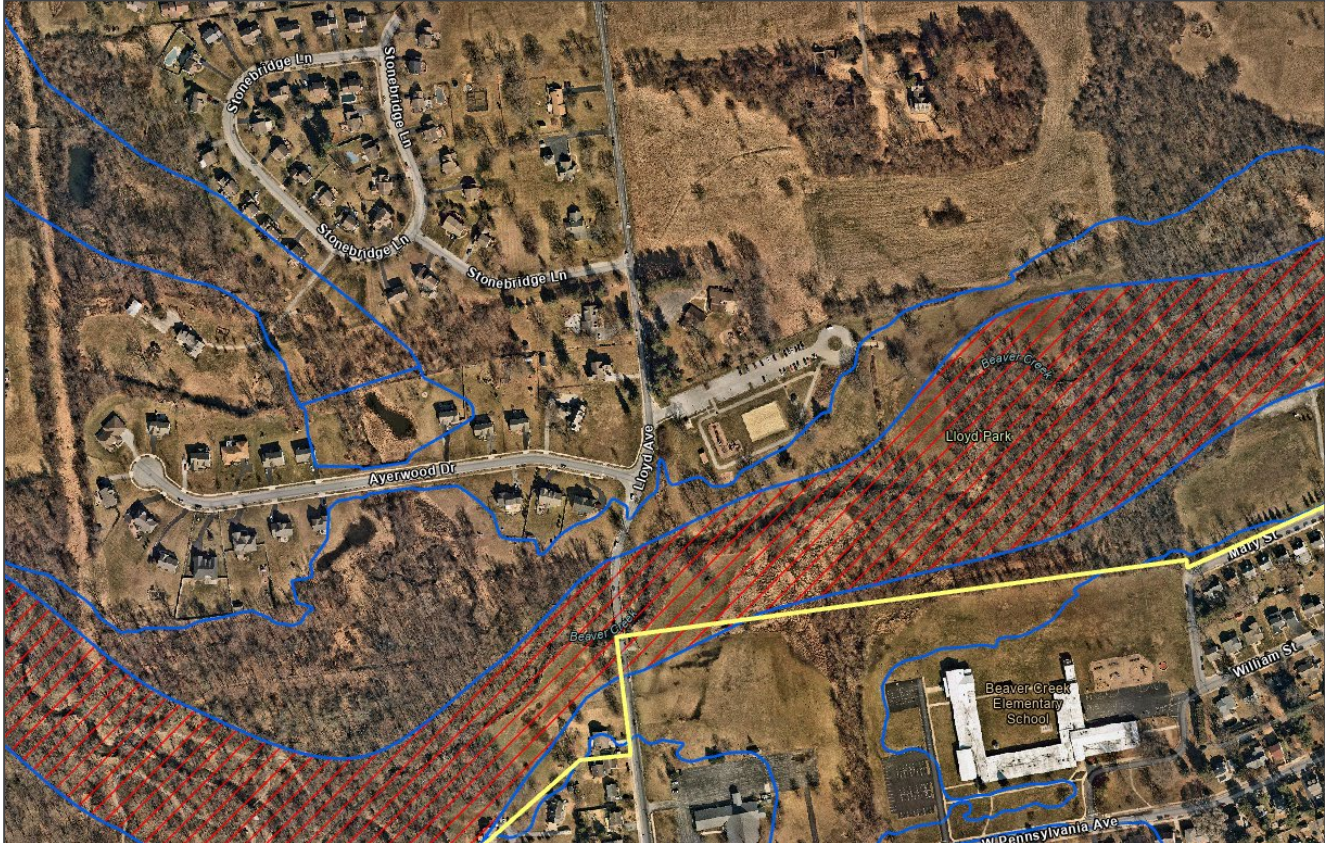


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Project D-4: Lloyd Avenue at Beaver Creek Clean-Out & Pump Station Investigation, includes Stonebridge Lane

- Beaver Creek, Caln and Downingtown, PA
- Flood zone AE (and in floodway) in a 16.5 square mile watershed
- Project area is below a single lane bridge (FHWA No. 10688x)
- Projected sediment removal from floodplain up to 50 CY (3-4 truckloads)
- Removes impediment to stream flow and reviews the need for the current (inactive) pump station and a bridge replacement near Stonebridge Lane
- Work includes:
 - Engineering design
 - Survey with wetland delineation
 - Environmental sampling and testing
 - Environmental permitting (Erosion and Sediment Pollution Control, PA 102 & PA 105)

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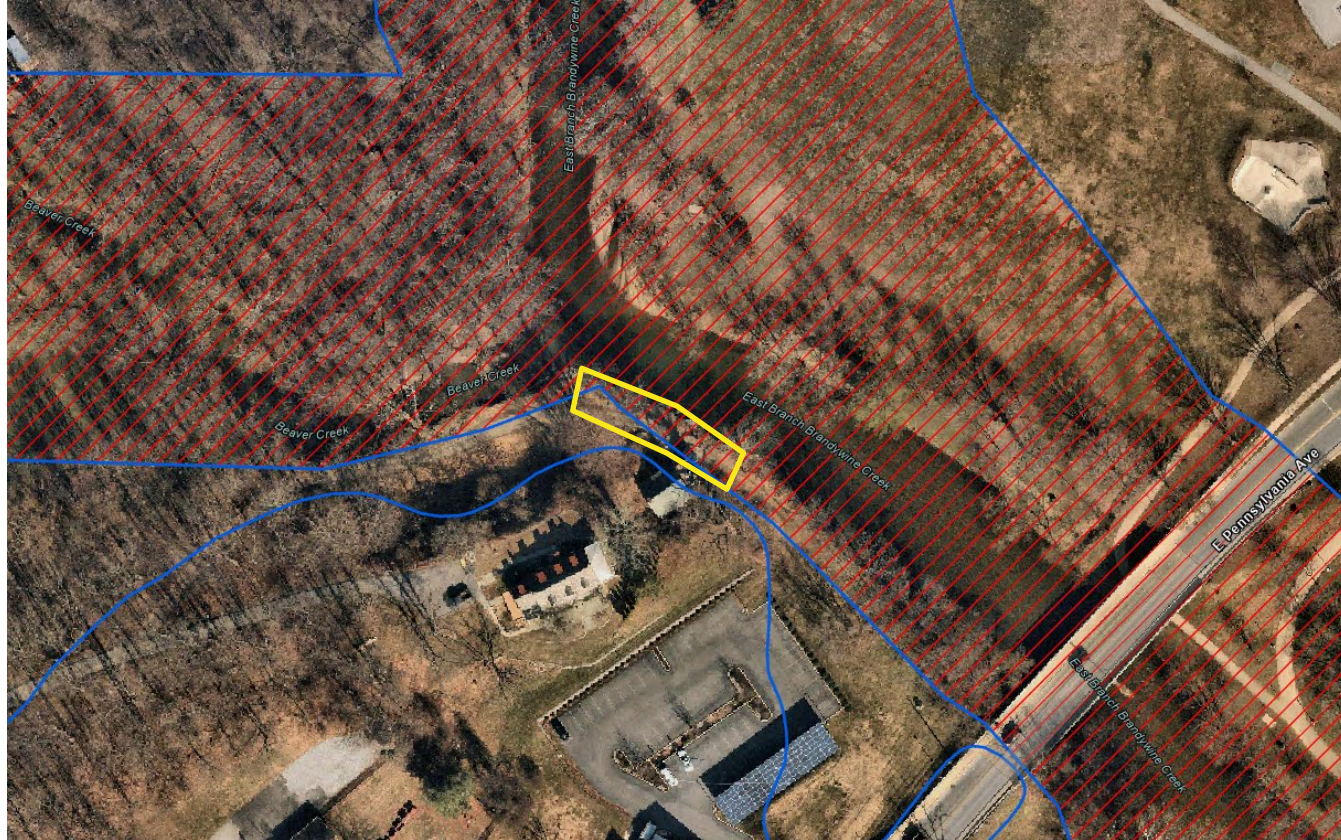


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Project D-7 and D-8: Manor and Wallace Avenues

- East Branch Brandywine Creek, Downingtown, PA
- Flood zone AE (and in floodway) in an 81.7 square mile drainage area
- Project area is 1,000 sf and 1,250 sf on the streambanks of the E. Branch
- Restores streambanks above and below the confluence with Beaver Creek, including along Struble Trail
- Work includes:
 - Engineering design
 - Survey with wetland delineation
 - Environmental sampling and testing
 - Environmental permitting (Erosion and Sediment Pollution Control, PA 102 & PA 105)

Flood Mitigation and Stream Restoration Projects



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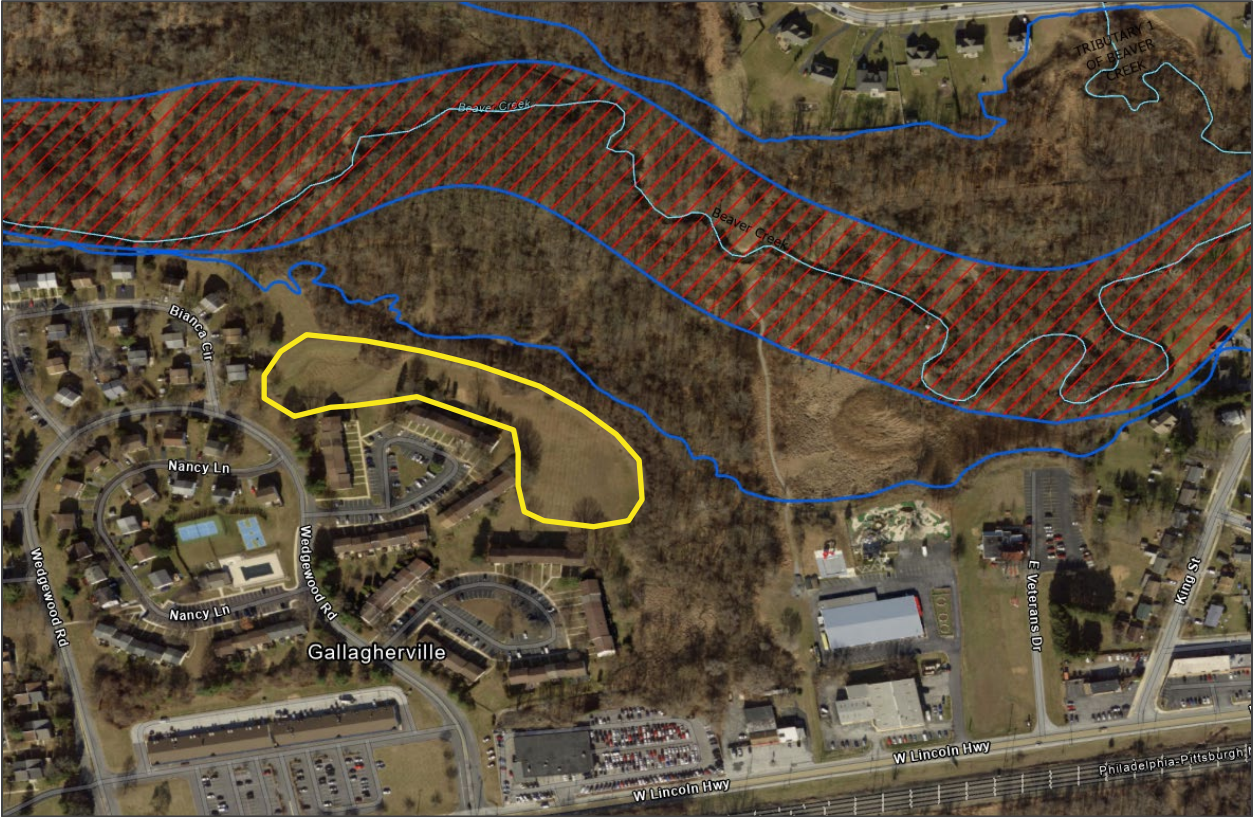


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Project D-10: Flood Study at Wedgwood Estates

- Adjacent to Beaver Creek, Downingtown, PA
- Not in a studied flood zone
- Project area is a 2.9-acre detention basin (dry) in a development
- Project includes a full 2-D analysis of flood impacts from runoff and Beaver Creek
- Work includes:
 - Engineering design of alternatives only

Flood Mitigation and Stream Restoration Projects



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Flood Mitigation and Stream Restoration Projects



FEMA's Community Rating System

- The Community Rating System (CRS) is a **voluntary** incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the [National Flood Insurance Program \(NFIP\)](#).
- Over 1,500 communities participate nationwide.
- In CRS communities, **flood insurance premium rates are discounted** to reflect the reduced flood risk resulting from the community's efforts that address the three goals of the program:
 1. Reduce and avoid flood damage to insurable property
 2. Strengthen and support the insurance aspects of the National Flood Insurance Program
 3. Foster comprehensive floodplain management

FEMA's Community Rating System

- Caln Township has 49 policies in force (PIF) with an annual payment of \$83,380 by residents.
- Downingtown Borough has 169 PIF with an annual payment of \$402,653 by residents.
- A typical community gets a discount of 15-20 percent which would be **\$72,904 - \$97,206 of savings per year** or up to \$445 per policy.
- Typically, the CRS is administered by the construction code official or municipal engineer and requires about **2-4 hours** per month to maintain.
- Every year, there is an **Annual Certification** due and every 3 or 5 years, there is a **Re-authorization** (audit) on-site by FEMA/ISO.
- I have successfully completed 21 applications since 2010.
- There are 38 communities in PA in the CRS.
- Both communities (Caln and Downingtown) are in good standing with FEMA in the NFIP

FEMA's Community Rating System

What do you have to do?

- **Public Information Activities (300 Series)**

This series credits programs that advise people about the flood hazard, encourage the purchase of flood insurance, and provide information about ways to reduce flood damage.

- **Mapping and Regulations (400 Series)**

This series credits programs that provide increased protection to new development. These activities include mapping areas not shown on the FIRM, preserving open space, protecting natural floodplain functions, enforcing higher regulatory standards, and managing stormwater.

- **Flood Damage Reduction Activities (500 Series)**

This series credits programs for areas in which existing development is at risk. Credit is provided for a comprehensive floodplain management plan, relocating or retrofitting floodprone structures, and maintaining drainage systems.

- **Warning and Response (600 Series)**

This series provides credit for measures that protect life and property during a flood, through flood warning and response programs. There is credit for the maintenance of levees and dams and also for programs that prepare for their potential failure.

FEMA's Community Rating System

Activity	Town 1	Town 2	Town 3	Town 4
310 Elevation Certificates	19	36	26	38
320 Map Information Services	90	90	90	90
330 Outreach Projects (w/PPI)	141	204	74	40
340 Hazard Disclosure	23	15	15	10
350 Flood Protection Information	72	69	68	48
360 Flood Protection Assistance	55	55	55	55
370 Flood Insurance Promotion	15	0	0	0
410 Floodplain Mapping	183	121	129	147
420 Open Space Preservation	788	367	297	213
430 High Regulatory Standards	154	271	192	303
440 Flood Data Maintenance	167	172	162	131
450 Stormwater Management	269	267	264	282
510 Floodplain Management Planning	229	219	220	153
520 Acquisition and Relocation	190	190	475	0
530 Flood Protection	58	0	38	0
540 Drainage System Maintenance	159	210	275	0
610 Flood Warning and Response	0	289	170	0
630 Dams	42	45	45	45
Total	2654	2620	2595	1555
Class	5	5	5	7
Discount	25%	25%	25%	15%

Thank you

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