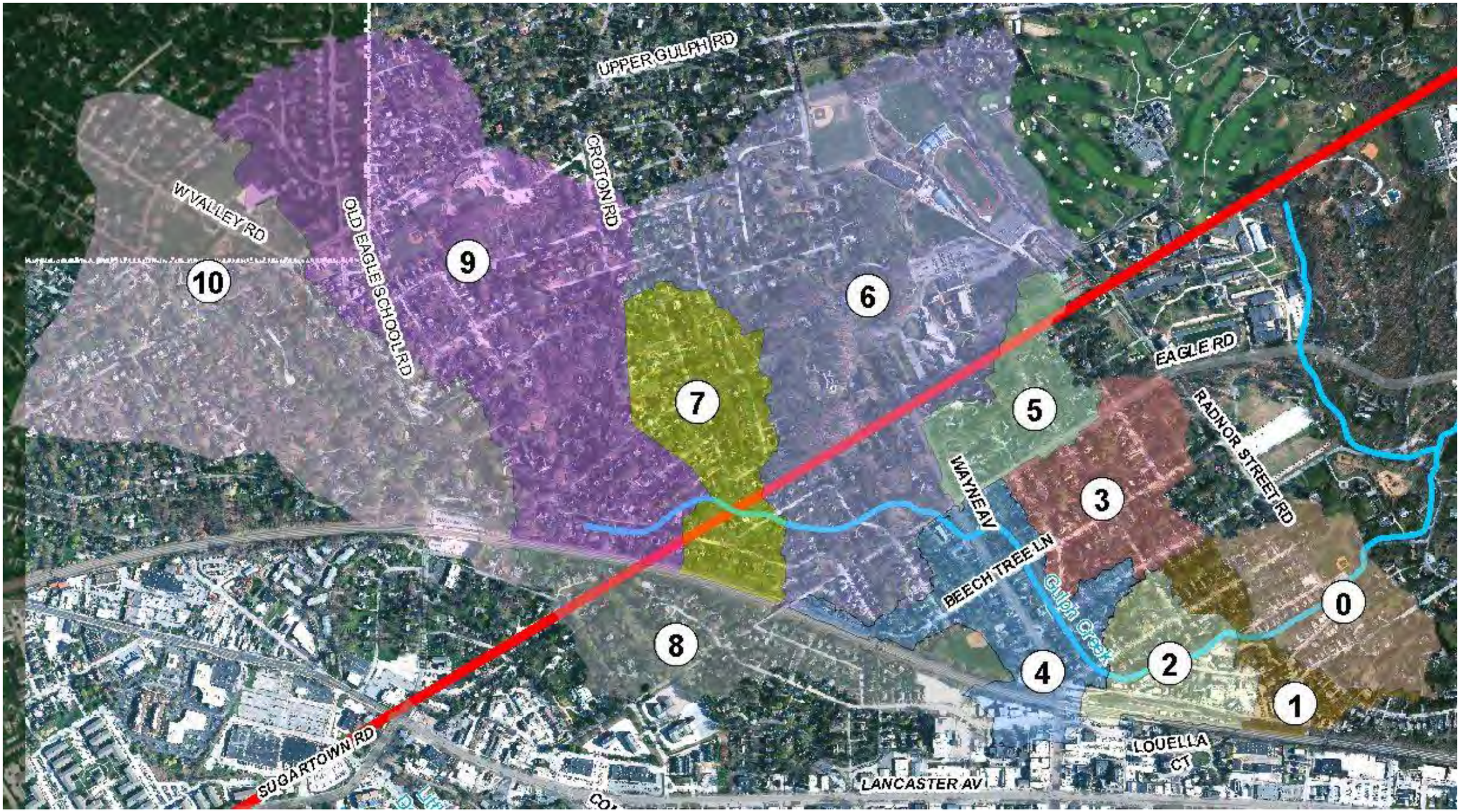
North Wayne & Poplar Avenue Flood Reduction Analysis



meliora

Poplar Ave on a Sunny Day

meliora

Poplar Ave Flooding Photos

tinyurl.com/Schuyler

Flood Reduction Options Modeled

1. Poplar Bypass to Cowan Park Stormwater System
2. Increased Storage below North Wayne Basin
3. Green Infrastructure in streets (10’ wide Tree Trenches along North Wayne)
4. Green infrastructure on private property (large properties and residential)
5. Restored Floodplain connection along stream

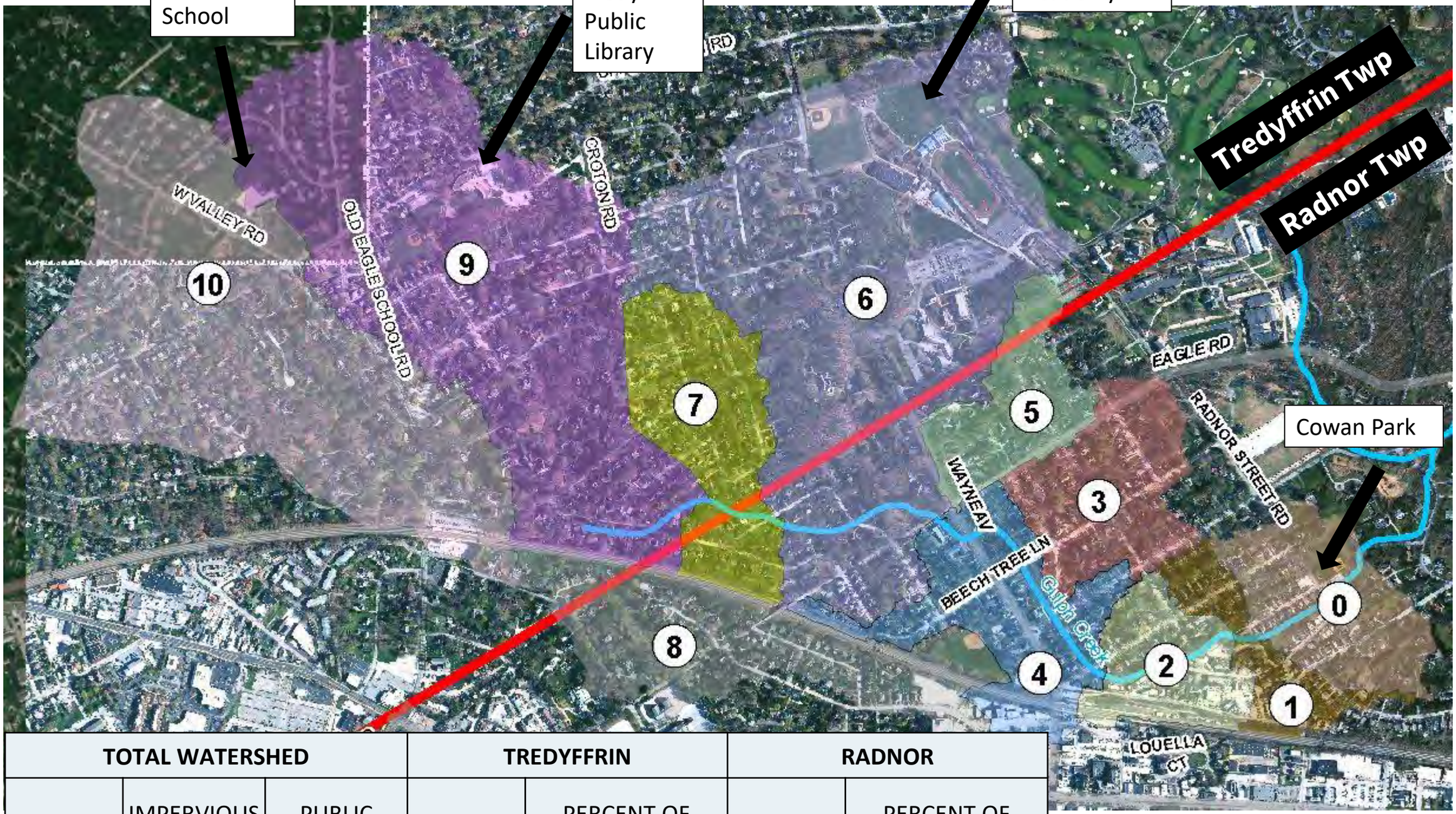
Other efforts to <u>reduce</u> runoff volume should still be implemented, especially during development.

Stream restoration supports Township Pollution Reduction Plan

meliora

Study Area

Gulph Creek at Cowan Park Watershed



TOTAL WATERSHED			TREDYFFRIN		RADNOR	
AREA (AC)	IMPERVIOUS AREA (AC)	PUBLIC ROADS (AC)	AREA (AC)	PERCENT OF DRAINAGE AREA	AREA (AC)	PERCENT OF DRAINAGE AREA
910	276	41	615	68%	295	32%

DA 10 (293 ac) was not included in CH2M study

meliora

design guided by nature

How much water do we need to manage?

2.6” Rainfall in 2 hours - high intensity rainfall causes flooding

How much runoff does that generate? 3,060,000 cubic feet or 22.9 Million gallons

That’s enough to fill Finneran Pavillion at Villanova

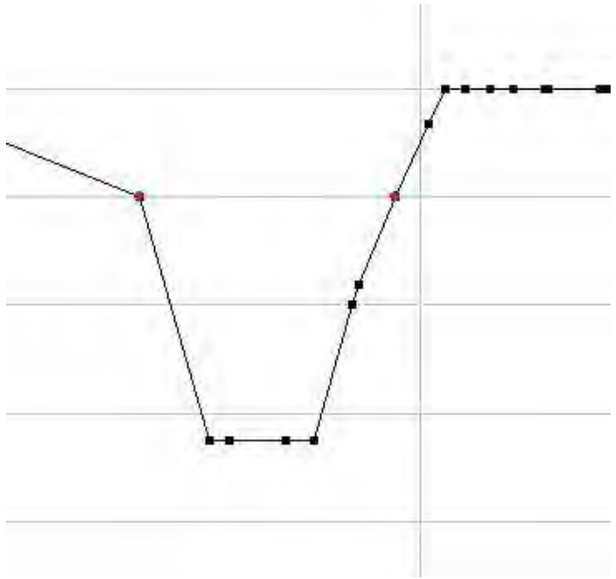
meliora

Water Balance for In-Stream Storage and Floodplain

2.6” Rainfall in 2 hours

Storm Runoff Volume: 3,060,000 cubic feet

Stream Length to Cowan Park: 5,100 feet
Average channel area (to top of bank): 62 square feet
Total In-stream storage volume: 316,200 CF



- Stream velocity averages 5 feet per second during flood (2.2 million CF)
- We cannot increase flooding downstream

We need to “hold” about 800,000 cubic feet to alleviate flooding.

Where do we hold water?

meliora

We need to “hold” about 800,000 cubic feet – where?

- Cowan Park – 30,000 cubic feet
- Infiltration / Storage below Wayne Basin - 80,000 cubic feet
- Tree Trenches along North Wayne – 8,000 CF +/-

Retrofit all impervious –

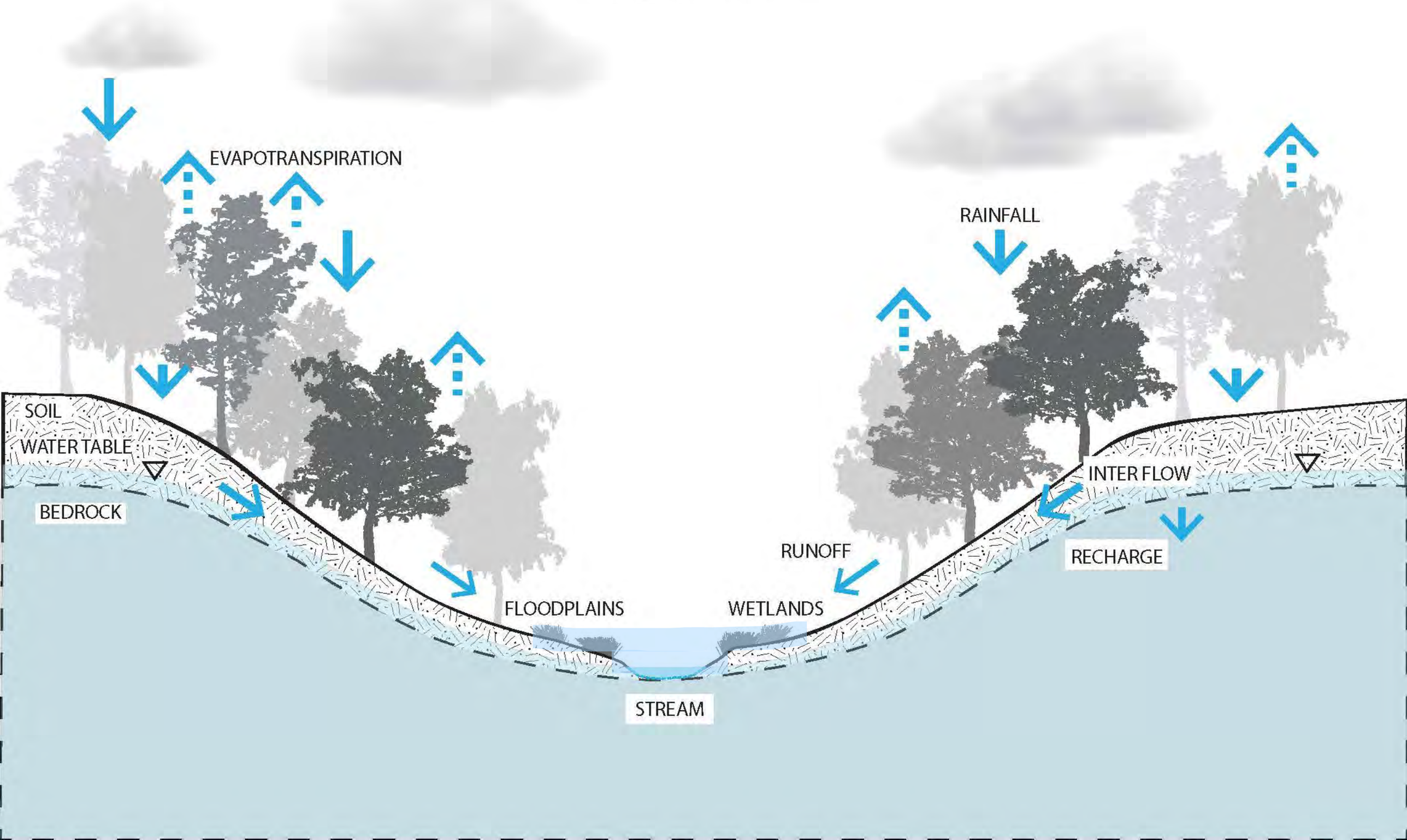
- We would need to capture the first 1.3” off of all roofs, roads, parking lots, etc., including Tredyffrin property
- Future projects should manage volume!

We can provide the most flood relief by restoring the floodplain.

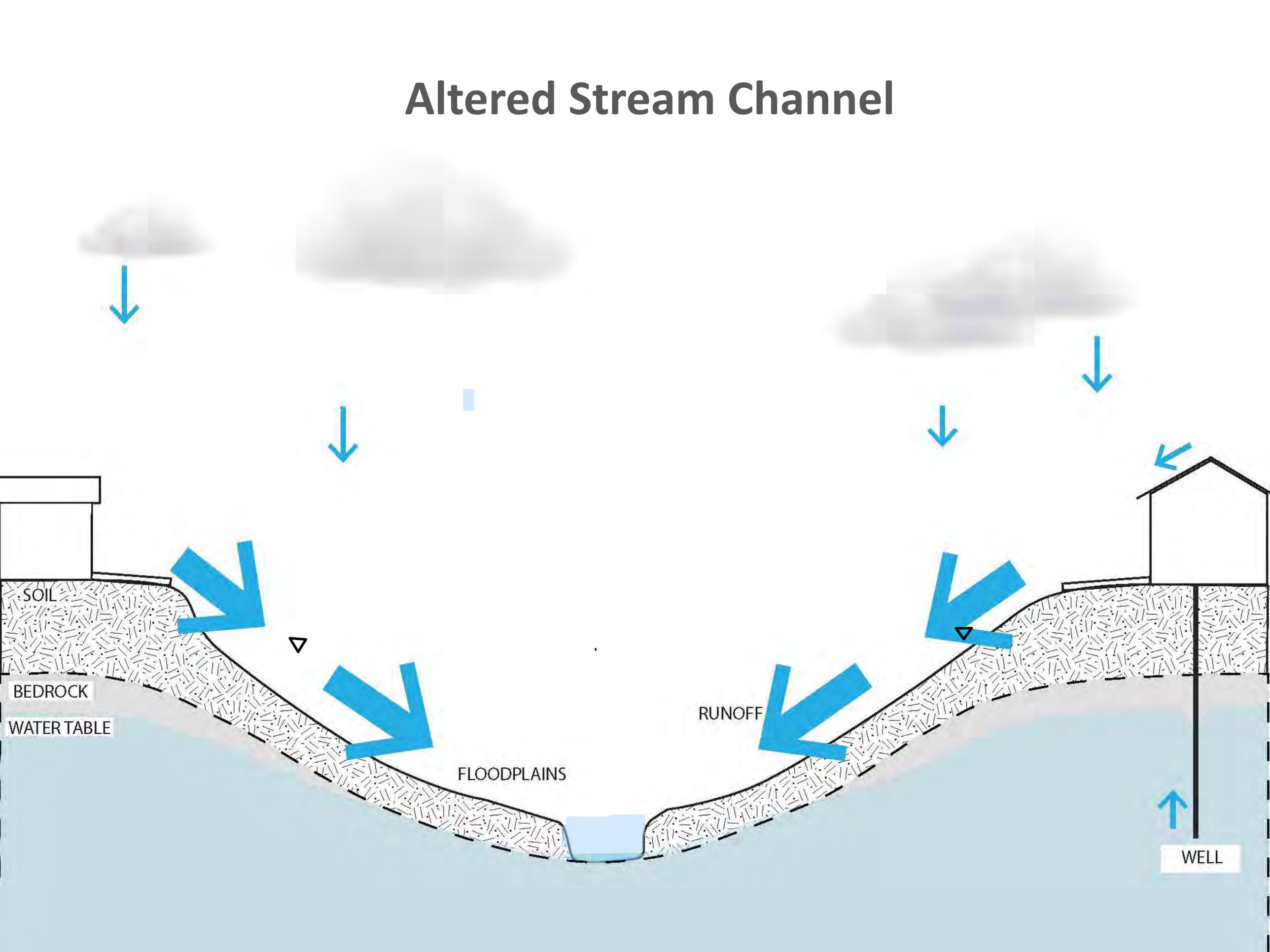
meliora

Healthy Stream Channel

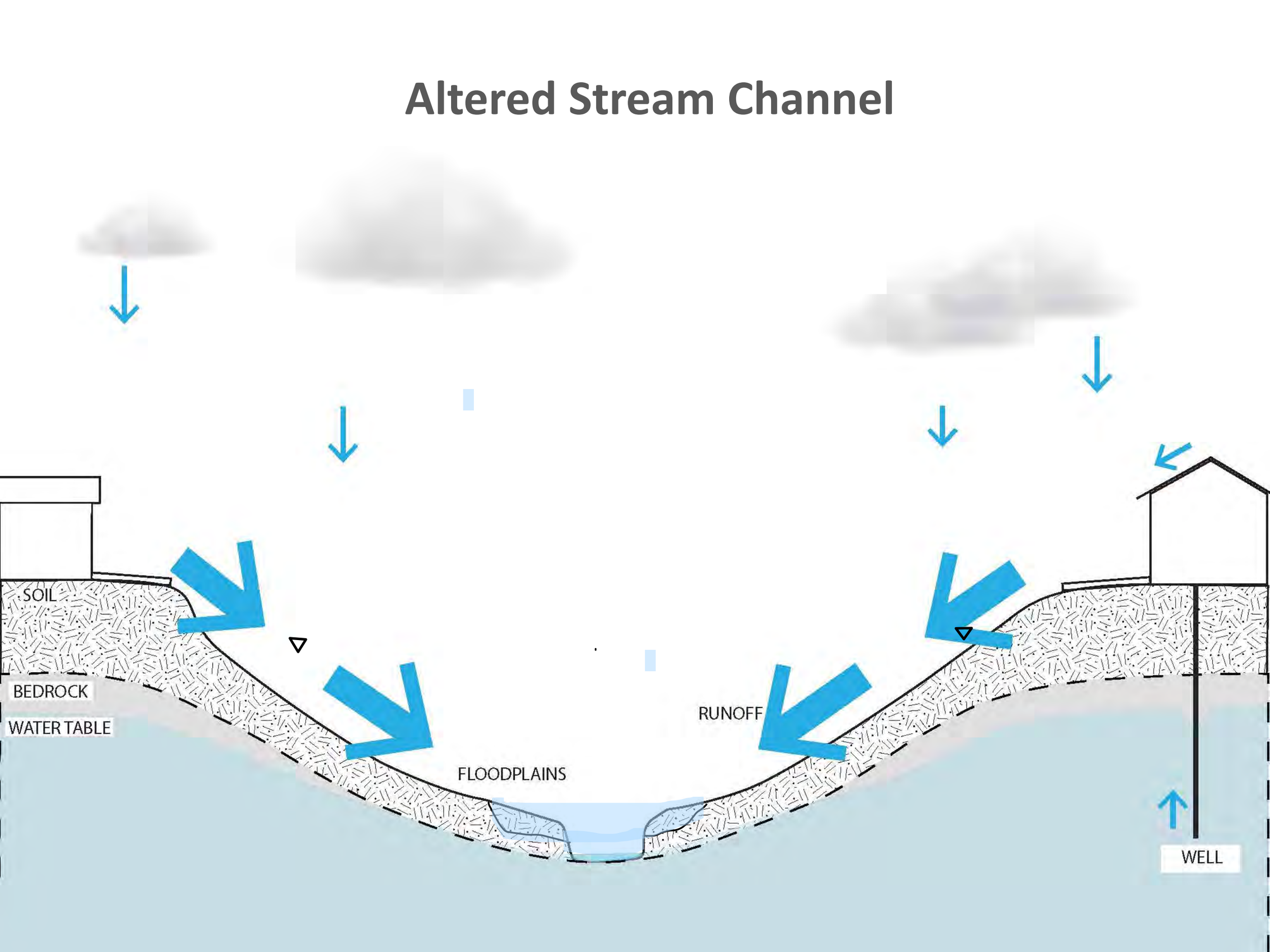
Healthy Stream Channel



Altered Stream Channel



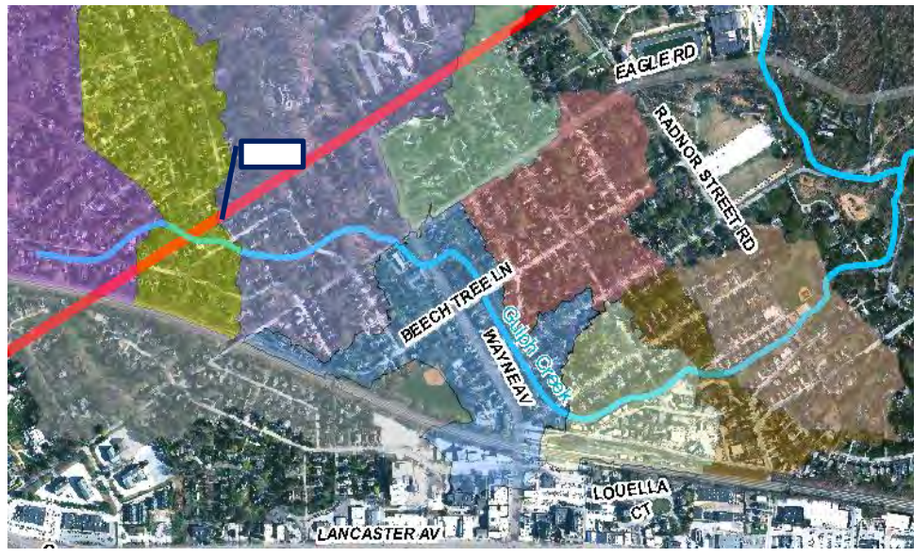
Altered Stream Channel



Gulph Creek - Existing Stream Conditions

meliora

Gulph Creek - Existing Stream Conditions



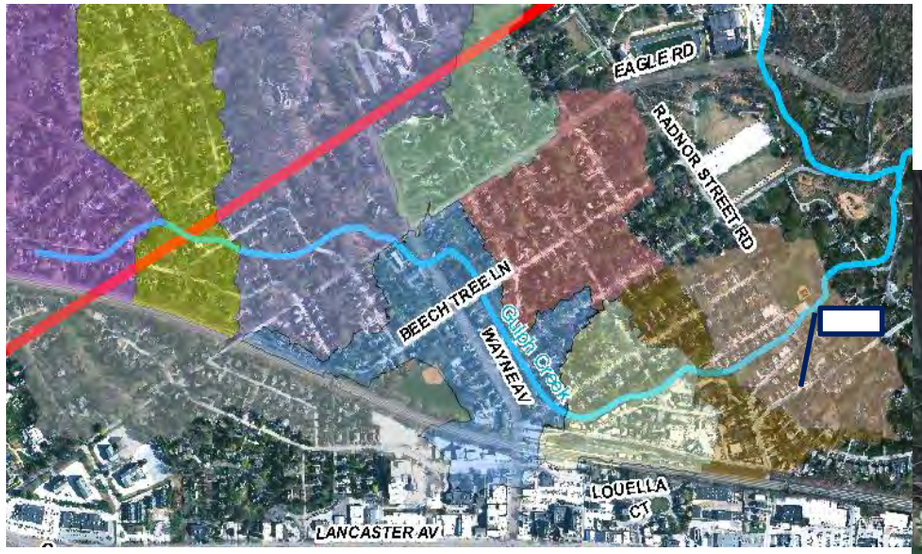
meliora

Gulph Creek - Existing Stream Conditions

Gulph Creek - Existing Stream Conditions

meliora

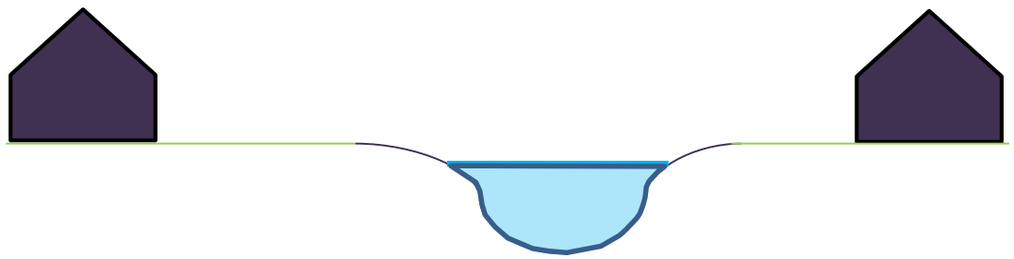
Gulph Creek - Existing Stream Conditions



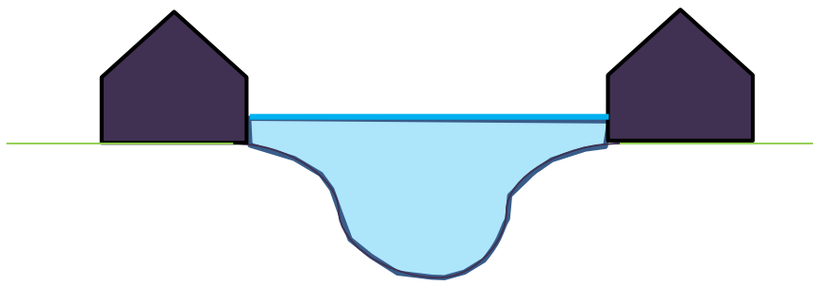
meliora

Existing Conditions

High velocity flow in channel shoots water downstream causing flooding



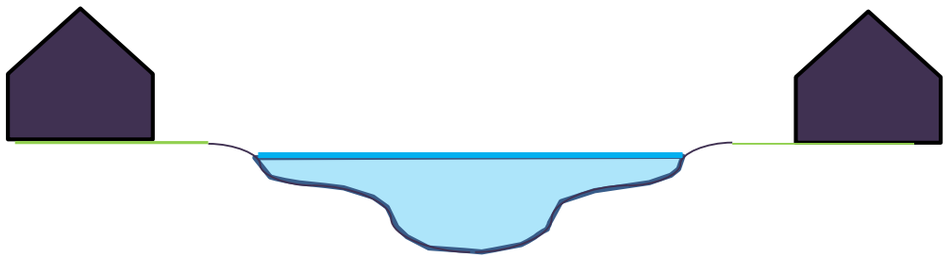
Upstream



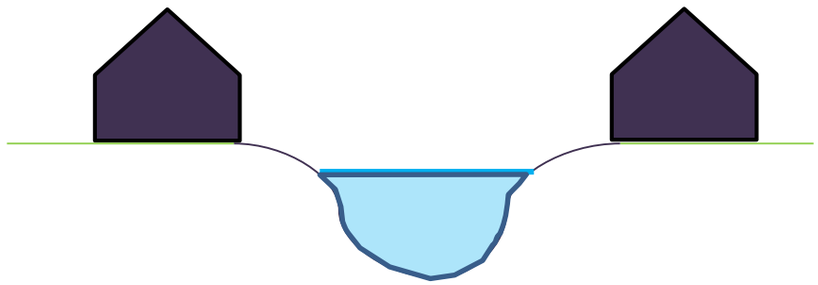
Downstream

Floodplain Restoration

Floodplain allows storage for storm volume resulting in lower velocity flow and reduced downstream flooding



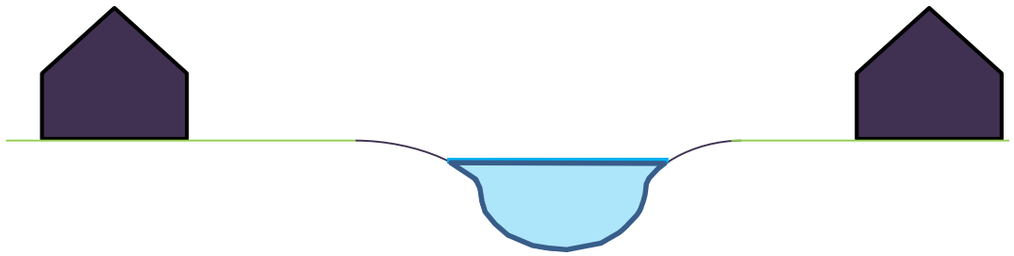
Upstream



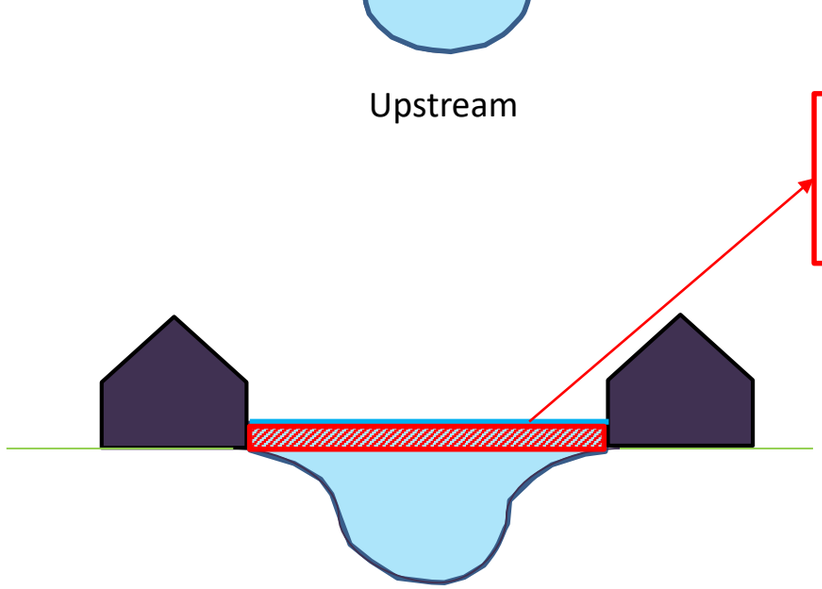
Downstream

Existing Conditions

High velocity flow in channel shoots water downstream causing flooding



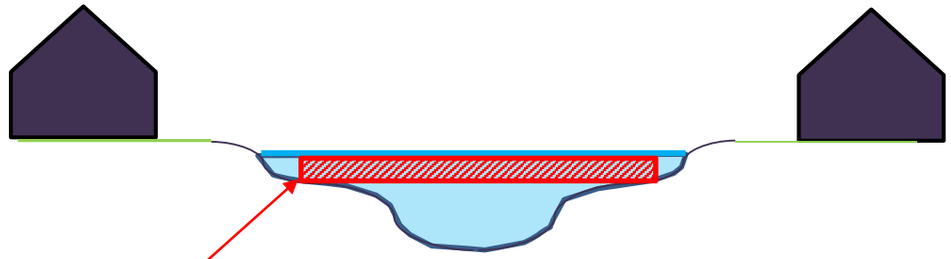
Upstream



Downstream

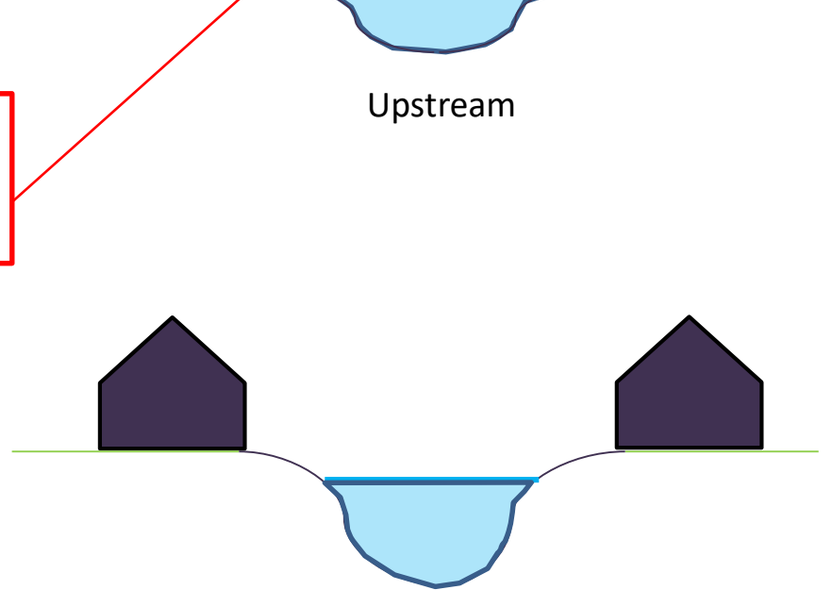
Floodplain Restoration

Floodplain allows storage for storm volume resulting in lower velocity flow and reduced downstream flooding

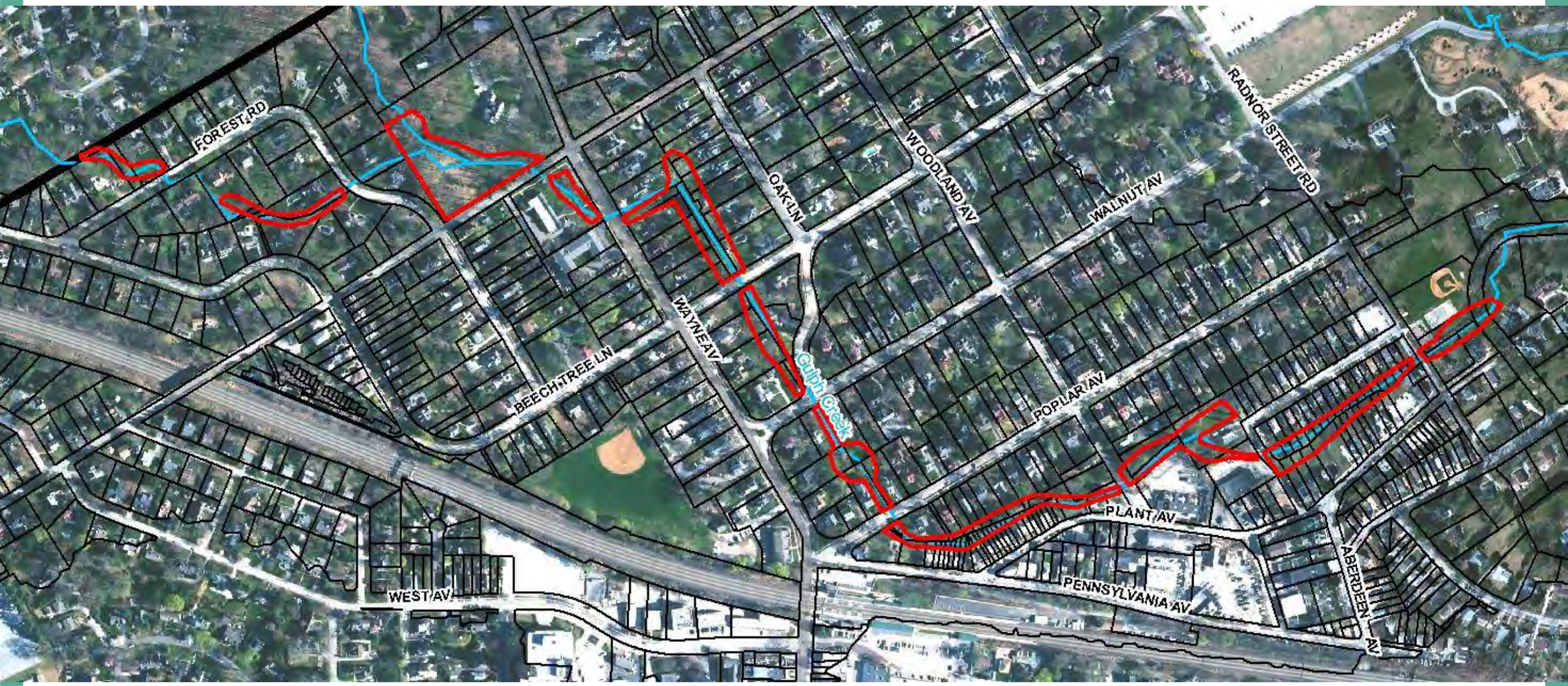


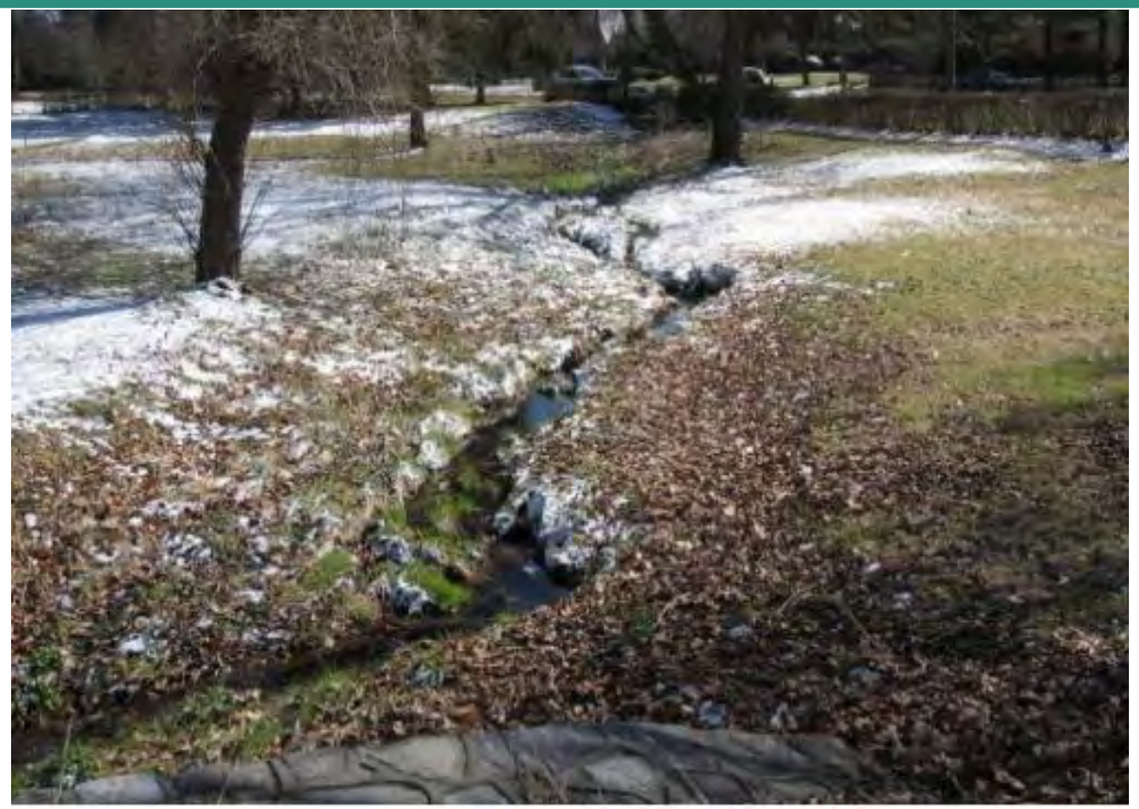
Upstream

Excess volume distributed along stream reach



Downstream


FOREST RD
BEECHTREE LN
WAYNE AV
OAK LN
WOODLAND AV
WALNUT AV
RADNOR STREET RD
Gulph Creek
POPLAR AV
PLANT AV
PENNSYLVANIA AV
ABERDEEN AV
WEST AV



Before

After

meliora

Next steps

- PaDEP and Corps of Engineers Meeting
- Confirmation of locations and widths
- Detailed topographic survey
- Detailed Design and Modeling
- Construction Plans and Cost Estimate
- Approval by PaDEP – 6 months
- Bidding
- Construction

Questions?

meliora