

Bedfordshire Stormwater Pond Retrofit & Stream Restoration



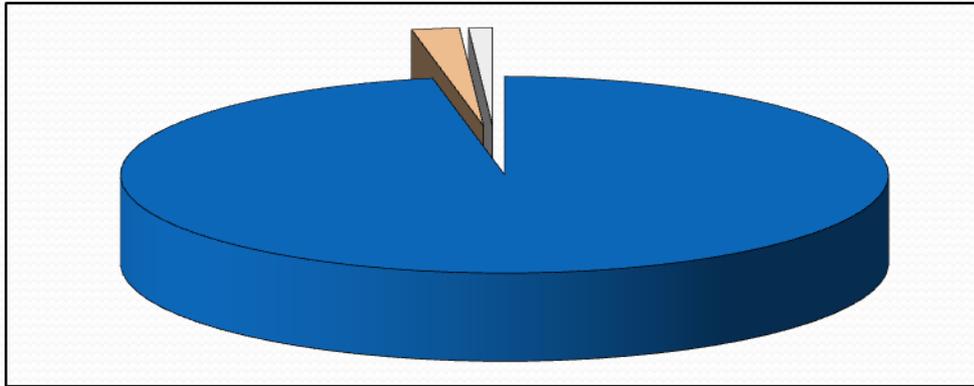
60% Design



Today's Agenda

- **Sources of Water on Earth**
- **Montgomery County background**
- **What is a Watershed & Runoff?**
- **Intro to Stormwater**
- **What the County is Doing to Protect Our Streams**
- **Goals of the Project**
- **Proposed Retrofit of the Pond**
- **Trees proposed to be saved and removed**
- **Health of those trees to be removed**
- **Proposed Restoration of Bedfordshire Tributary**
- **Questions/Comments**

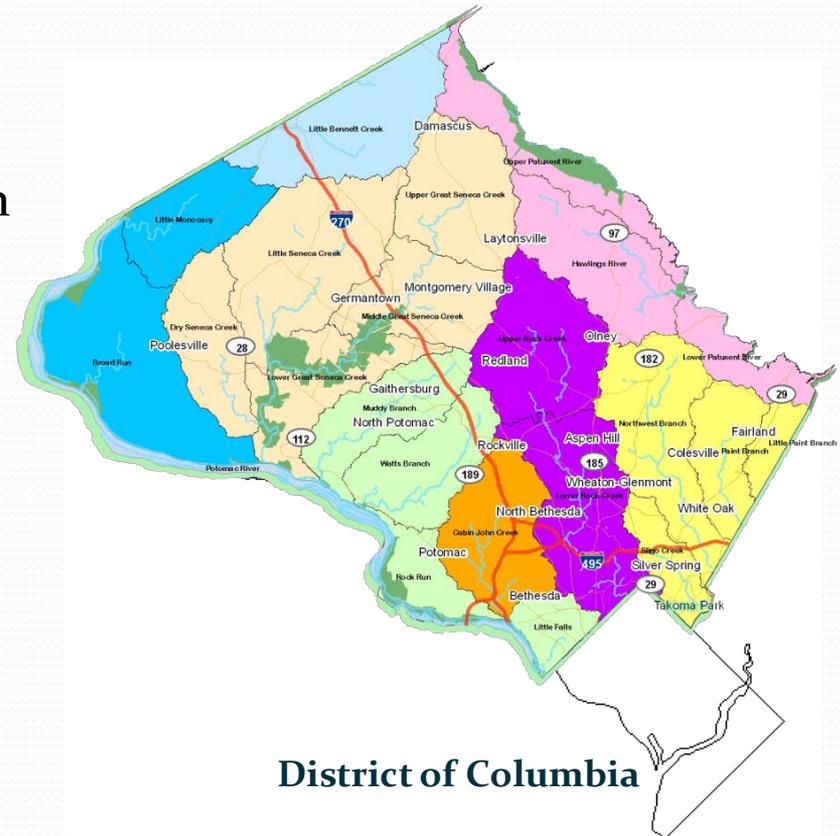
Sources of Water



- About 97% is salt water
- About 2% is frozen
- Only 1% is available for drinking water
 - 95% from groundwater across the Country
 - 32% from groundwater, 68% from surface water in Maryland
 - Potential for greater impacts from runoff in Maryland

Montgomery County, MD

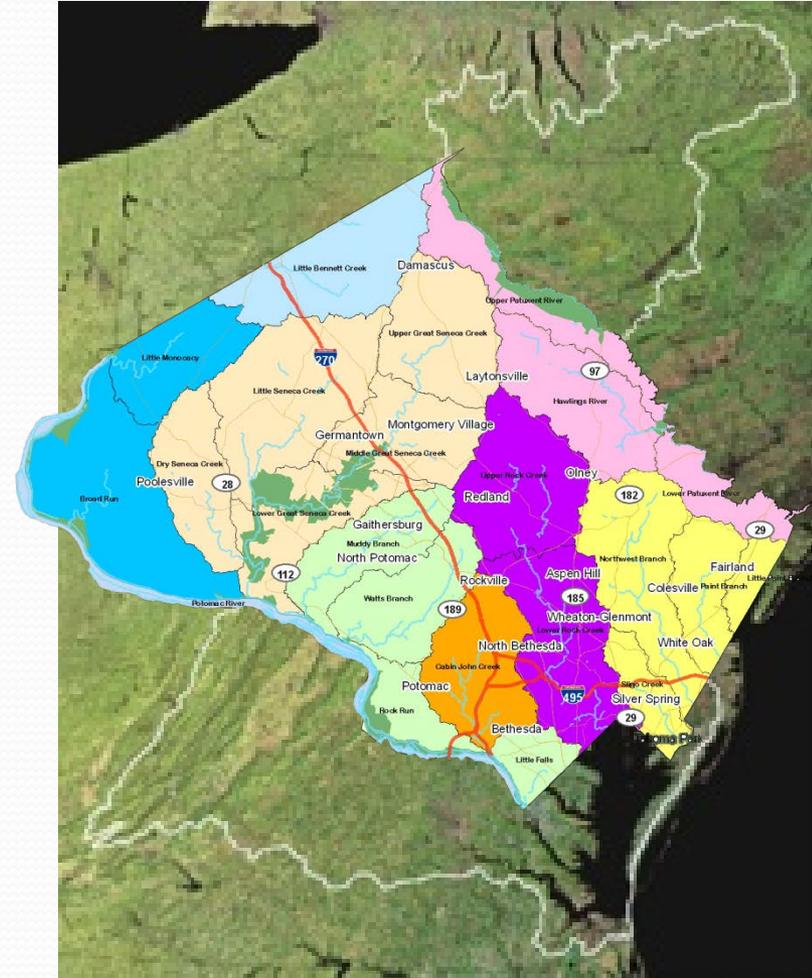
- 500 sq. miles
- 970,000 people
 - Second only to Baltimore City within Maryland in average people per square mile
 - 184 languages spoken
- About 12% impervious surface overall
 - About the size of Washington DC
- Over 1,500 miles of streams
- Two major river basins:
 - Potomac
 - Patuxent
- Eight local *watersheds*



Impervious: Not allowing water to soak through the ground.

What is a Watershed?

- A *watershed* is an area from which the water above and below ground drains to the same place.
- Different scales of watersheds:
 - Chesapeake Bay
 - Eight local watersheds
 - Neighborhood (to a storm drain)

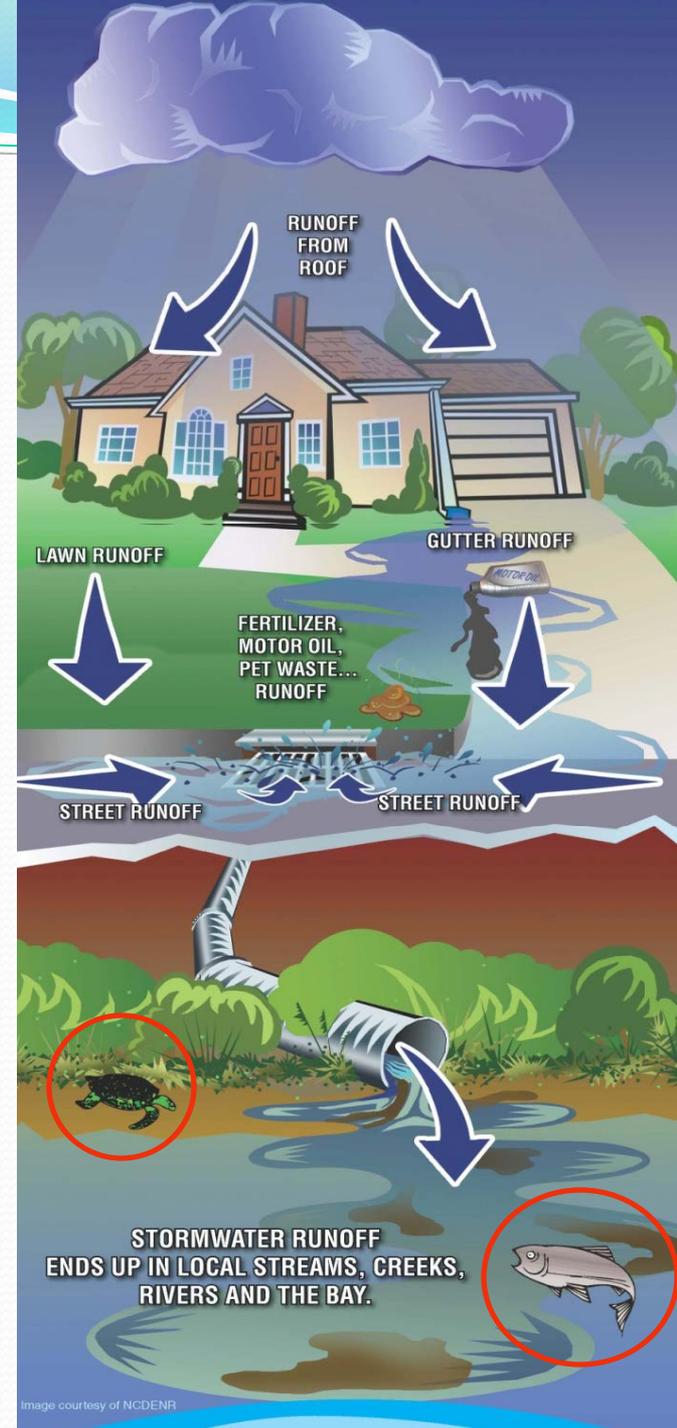


What is Runoff?

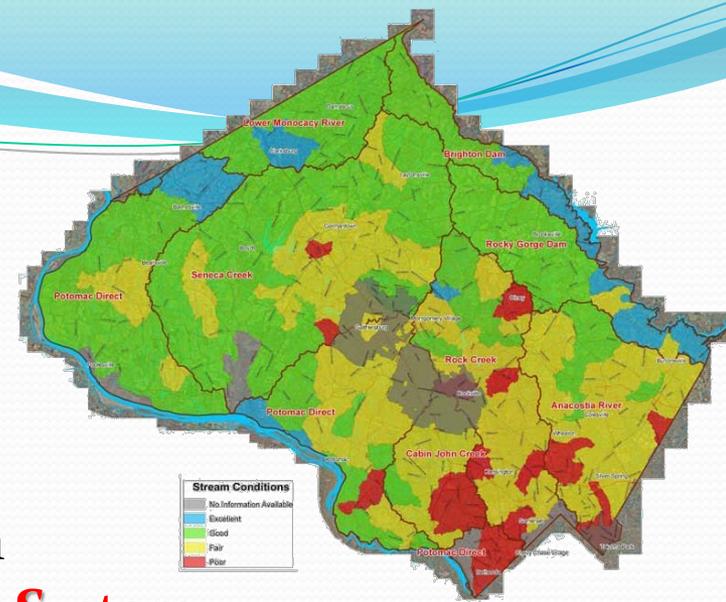
Water that does not soak into the ground becomes surface runoff. This runoff flows over hard surfaces like rooftops, driveways and parking lots collecting potential contaminants and flows:

- **Directly into streams**
- **Into storm drain pipes, eventually leading to streams**
- **Into stormwater management facilities, then streams**

Two Major Issues:
Volume/Timing of Runoff
Water Quality



What is the County doing to protect our Streams?



- Must meet regulatory requirements
 - Federal Clean Water Act permit program
 - **MS4 = Municipal Separate Storm Sewer System**
- Applies to all large and medium Maryland jurisdictions
- County programs
 - Restore our streams and watersheds
 - Add runoff management
 - Meet water quality protection goals
 - Reduce pollutants getting into our streams
 - Educate and engage all stakeholders
 - Individual actions make a difference
 - Focus on watersheds showing greatest impacts

MS4 permit, what is it?

- Montgomery County is responsible for:
 - What goes into our storm drain pipes
 - What comes out of them
 - What flows into the streams
- Requires additional stormwater management for **20 percent** of impervious surfaces (4,292 acres = 6.7 square miles). That's about three times the size of Takoma Park.

Overall Goals of the Project

- **Improve efficiency of two facilities upstream in the Clagett Farm HOA and the Bedfordshire stormwater management (SWM) facilities in the Watts Branch watershed**
 - ❑ **Maximize SWM facility storage volume with emphasis on meeting**
 - 1) **channel protection (CP_v) and**
 - 2) **water quality (WQ_v)**
 - ❑ **Obtain compliance by meeting current safety standards**
 - ❑ **Improve access for routine maintenance**

- **Improve stream stability and habitat of the Bedfordshire Stream**



Existing Bedfordshire Pond Conditions

- **Built in the late 1970s, the pond is currently not meeting Maryland Department of Environment's current standards**
- **A dry pond managing for flood control only**
- **No permanent pool and no water quality management**
- **No riser structure and no channel protection management**
- **No forebay or maintenance access path**
- **The principle spillway pipe is in need of repair**

Goals of the Pond Retrofit

- Capture more “peak-flow” runoff from Impervious Surfaces (Rooftops/Driveways/etc.) within the Stormwater Pond, also called Channel Protection Volume (Cpv)
 - Flows are evaluated to ensure no upstream houses are flooded
- Create a Permanent Pool to Capture Nutrients
 - Aquatic plants within and along the perimeter of the permanent pool will help absorb nutrients and provide a balanced aquatic ecosystem.
 - May Attract Red Winged Black Birds
 - Aquatic ecosystem will have a balance of prey (mosquitoes) vs. predator species.
 - Referred to as Water Quality Volume (WQv)

SWM Retrofit ~ Bedfordshire Pond

- **Grade pond to provide full channel protection and partial water quality requirement volumes**
Water Quality Provided: 1.13 acre-feet
Channel Protection Provided: 7.25 acre-feet
- **Install new principal spillway pipes and concrete riser**
- **Convert dry pond to wet pond and provide safety bench around interior**
- **Install wetland plantings around pond's perimeter**
- **Provide pond access for maintenance**



Stormwater Pond Retrofit ~ During Construction



Stormwater Pond Retrofit ~ Within 1 Year After Construction



Stormwater Pond Retrofit ~ Within 5 Year After Construction



Goals of Stream Restoration

- **Improve aquatic and terrestrial habitat**
- **Reduce stream channel bank and bed erosion**
- **Protect infrastructure and utilities**
- **Reconnect stream to floodplain**
- **Reforest along the stream corridor**
- **Create/improve wetlands**

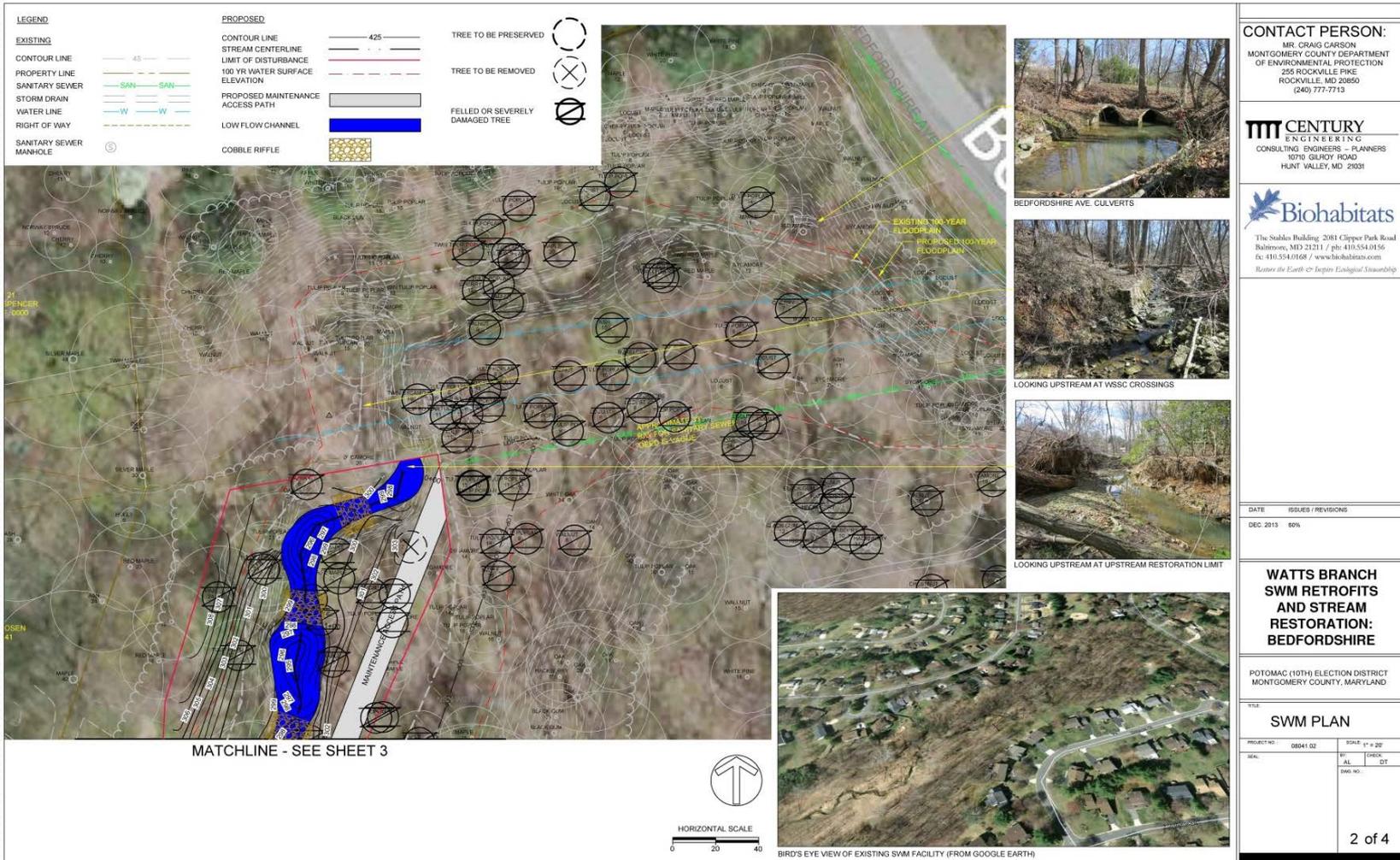


Evaluating the Project Goals – Restoration Monitoring

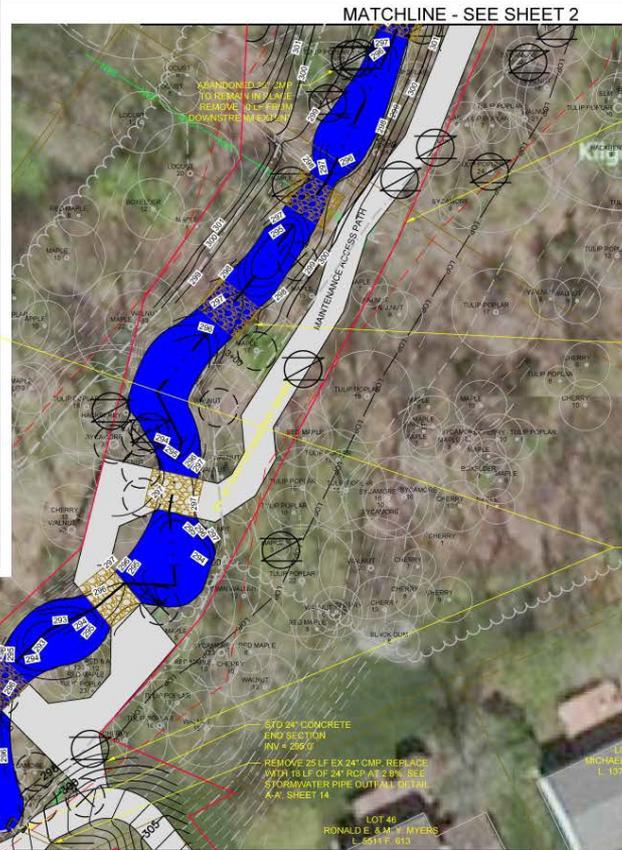
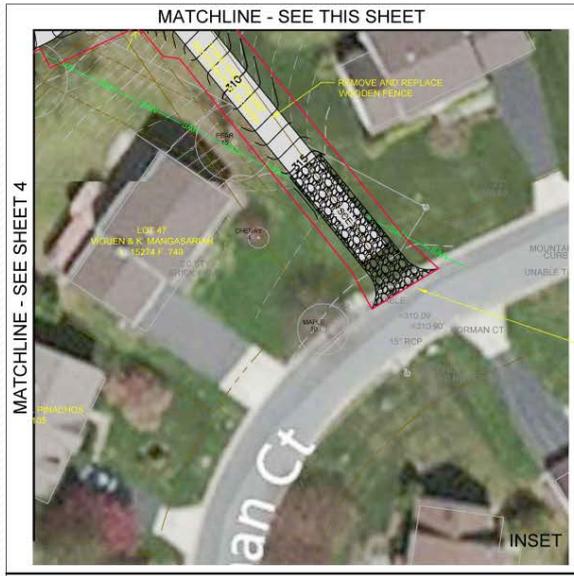
- **County monitoring to evaluate whether project goals are achieved**
 - **Salamanders**
 - **Aquatic insects**



60% Design



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CONTACT PERSON:
 MR. CRAIG CARSON
 MONTGOMERY COUNTY DEPARTMENT
 OF ENVIRONMENTAL PROTECTION
 255 ROCKVILLE PIKE
 ROCKVILLE, MD 20850
 (240) 777-7713

MM CENTURY
 ENGINEERING
 CONSULTING ENGINEERS - PLANNERS
 10710 GILROY ROAD
 HUNT VALLEY, MD 21031

Biohabitats
 The Stables Building, 2181 Clipper Park Road
 Baltimore, MD 21211 / ph: 410.554.0156
 fs: 410.554.0168 / www.biohabitats.com
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HORIZONTAL SCALE
 0 20 40

DATE: DEC 2013
 ISSUES / REVISIONS: 80%

**WATTS BRANCH
 SWM RETROFITS
 AND STREAM
 RESTORATION:
 BEDFORDSHIRE**

POTOMAC (10TH) ELECTION DISTRICT
 MONTGOMERY COUNTY, MARYLAND

SWM PLAN

PROJECT NO: 08841.02
 SHEET NO: 11 OF 20
 DATE: 12/13
 CHECKED: []
 DESIGNED: []

LEGEND

EXISTING
 CONTOUR LINE
 PROPERTY LINE
 SANITARY SEWER
 STORM DRAIN
 WATER LINE
 RIGHT OF WAY
 SANITARY SEWER
 MANHOLE

40
 SAN
 W
 5

PROPOSED

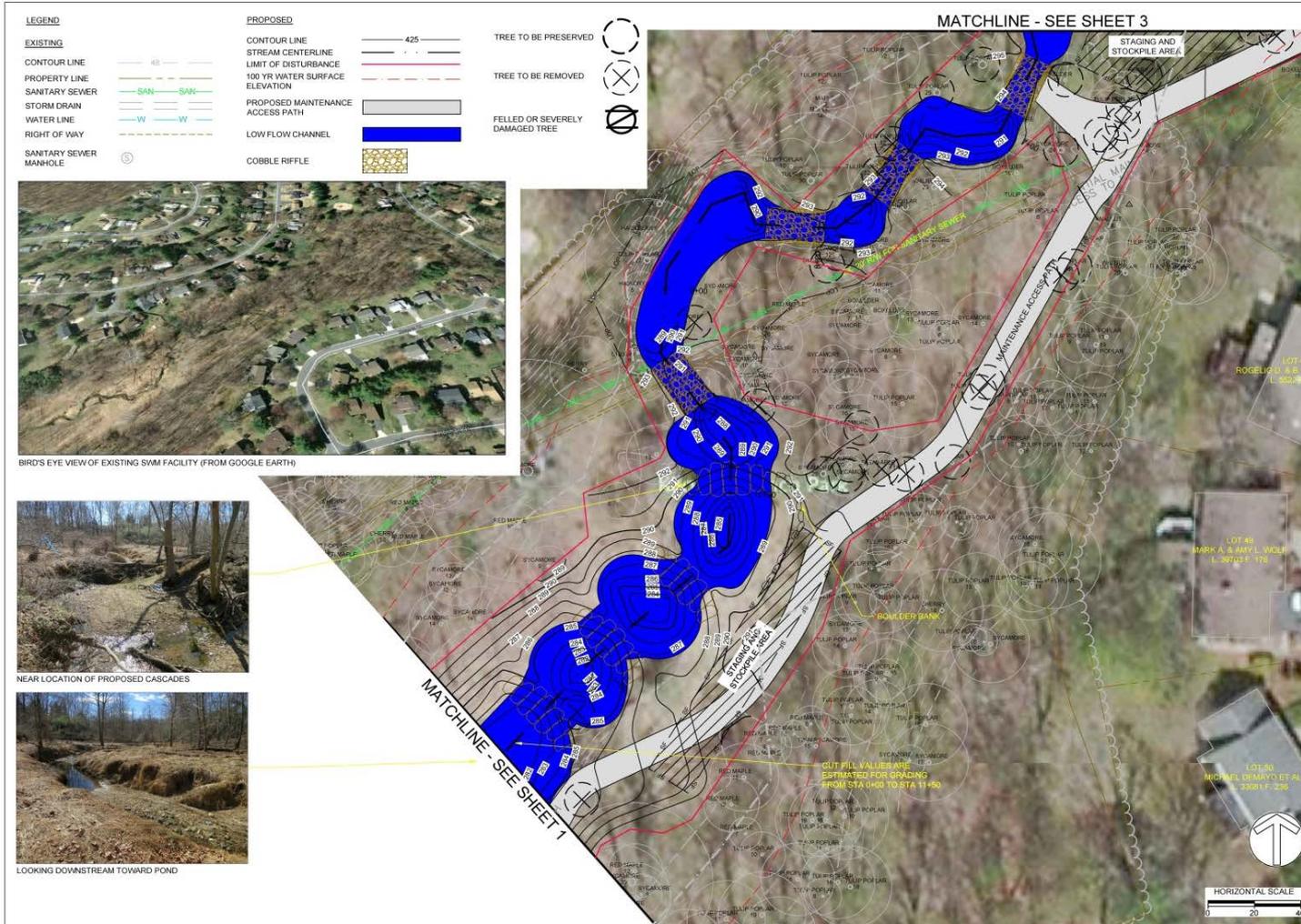
CONTOUR LINE
 STREAM CENTERLINE
 LIMIT OF DISTURBANCE
 100 YR WATER SURFACE
 ELEVATION
 PROPOSED MAINTENANCE
 ACCESS PATH
 LOW FLOW CHANNEL
 COBBLE RIFFLE

425

TREE TO BE PRESERVED
 TREE TO BE REMOVED
 FELLED OR SEVERELY
 DAMAGED TREE



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 MR. CRAIG CARSON
 MONTGOMERY COUNTY DEPARTMENT
 OF ENVIRONMENTAL PROTECTION
 255 ROCKVILLE PIKE
 ROCKVILLE, MD 20850
 (240) 777-7713

CENTURY
 ENGINEERING
 CONSULTING ENGINEERS - PLANNERS
 10710 GLENDY ROAD
 HUNT VALLEY, MD 21031

Biohabitats
 The Stable Building 2081 Clipper Park Road
 Baltimore, MD 21211 / ph: 410.554.0156
 fx: 410.554.0168 / www.biohabitats.com
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MATCHLINE - SEE INSET SHEET 3

DATE: DEC 2013
 ISSUES / REVISIONS: 60%

**WATTS BRANCH
 SWM RETROFITS
 AND STREAM
 RESTORATION:
 BEDFORDSHIRE**

POTOMAC (10TH) ELECTION DISTRICT
 MONTGOMERY COUNTY, MARYLAND

SWM PLAN

PROJECT NO: 08041.02 SCALE: 1" = 20'
 SHEET NO: 4 OF 4
 DATE: 12/13/13

60% Design



PHOTO A: LOOKING UPSTREAM FROM PROPOSED SWM POND.

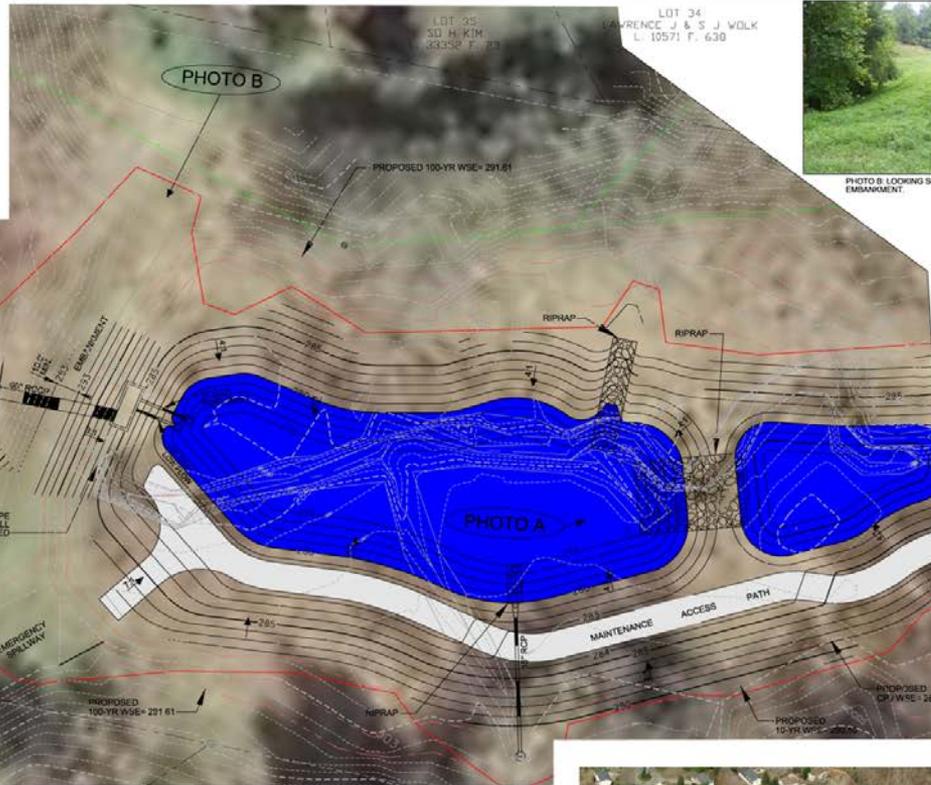


PHOTO B: LOOKING SOUTHEAST AT SWM POND EMBANKMENT.

LEGEND	
PROPOSED WATER SURFACE ELEVATION	--- 295 ---
PROPOSED MAJOR CONTOUR	--- 295 ---
PROPOSED MINOR CONTOUR	--- 315 ---
EXISTING MAJOR CONTOUR	--- 315 ---
EXISTING MINOR CONTOUR	--- 315 ---
TREE REMOVAL	○
EXISTING SANITARY	---
EXISTING STORMDRAIN	---
PROPERTY LINE	---
LIMIT OF DISTURBANCE	---
PROPOSED MAINTENANCE ACCESS PATH	---
PERMANENT POOL	■



BIRD'S EYE VIEW OF EXISTING SWM FACILITY (FROM BING MAP)

CONTACT PERSON:
MR. CRAIG CARSON
 MONTGOMERY COUNTY DEPARTMENT
 OF ENVIRONMENTAL PROTECTION
 255 ROCKVILLE PIKE
 ROCKVILLE, MD 20850
 (240) 777-7713

THIRD CENTURY
 ENGINEERING
 CONSULTING ENGINEERS - PLANNERS
 1070 GILROY ROAD
 HUNT VALLEY, MD 21031

Biohabitats
 The Seltzer Building, 3981 Clipse Park Road
 Baltimore, Maryland 21211 / ph: 410.534.0136
 fax: 410.534.0168 / www.biohabitats.com
Restoring the Earth and Enriching Ecological Knowledge

DATE	ISSUES/REVISIONS
DEC. 2013	60%

**WATTS BRANCH
 SWM RETROFITS
 AND STREAM
 RESTORATION:
 BEDFORDSHIRE**

POTOMAC (10TH) ELECTION DISTRICT
 MONTGOMERY COUNTY, MARYLAND

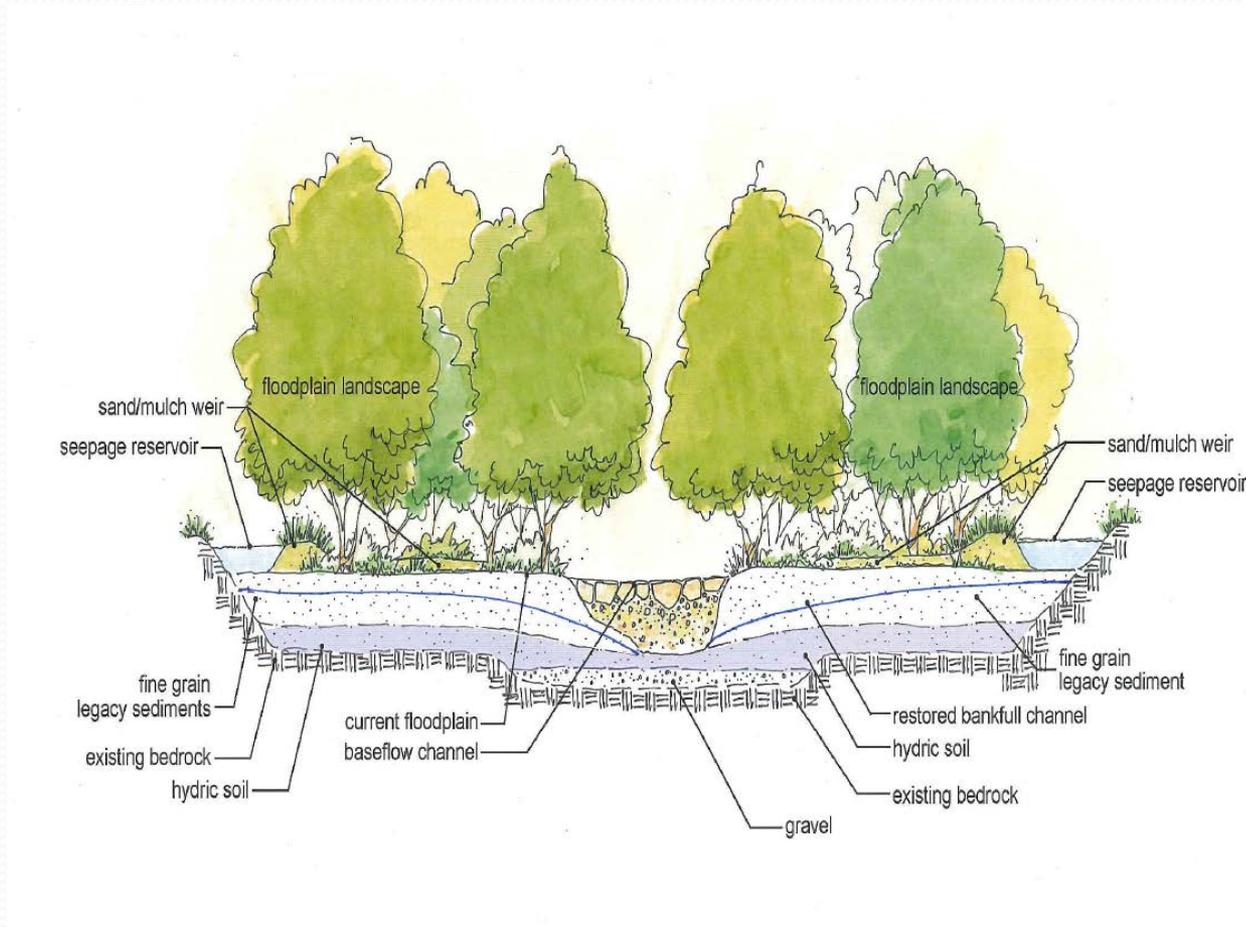
SWM PLAN			
PROJECT NO.	SCALE: 1" = 20'	DATE	CHECK
DRAWN BY: MJL		DATE	CAL
DATE NO.			

Restoration Approach – Bedfordshire Tributary

- **Habitat enhancement**
 - ❑ riffle/pool system
 - ❑ riparian cover – shading and avian habitat
 - ❑ diverse and native plant communities, floodplain forested wetlands, and vernal pools
- **Stabilization channel bed and banks**
 - ❑ raising channel invert and minimizing bank height
- **Increase Floodplain function**
 - ❑ reconnecting to floodplain
 - ❑ sediment and nutrient trapping
 - ❑ hydrologic retention

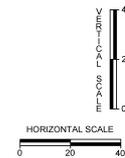
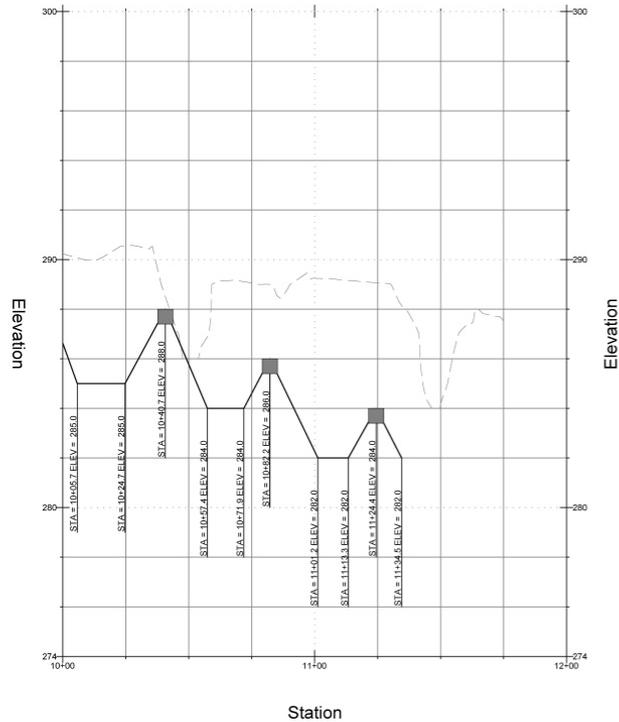


Restoration Approach – Floodplain Reconnection

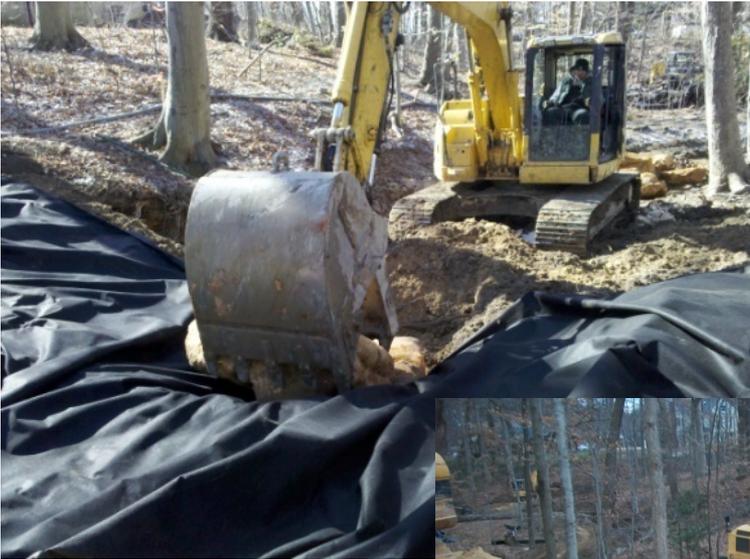


Restoration Approach – Boulder Cascades

PROFILE VIEW OF BEDFORDSHIRE



Stream Restoration – During Construction



Construction Access



During Construction



After Construction

Stream Restoration – Reforestation

- **Native Trees and shrubs will be planted along the entire stream corridor**



Stream Restoration – Immediately Following Construction



Stream Restoration – 1+ Year After Construction



Schedule

Bedfordshire Pond and Tributary

- **Public Meeting to discuss 60% Designs 12/4/13**
- **90% design March 2014**
- **Permits issued Summer/Fall 2014**
- **Construction June 2015 – March 2016**

Questions/Comments?



Don Dorsey

240-777-7712

donald.dorsey@montgomerycountymd.gov

www.montgomerycountymd.gov/watershedrestoration

Click on -->Stormwater Pond Retrofits

Mosquito Predators

- Non-Biting Midge
- Diving Beetle
- Damselfly Larvae
- Backswimmers
- Water Scorpion
- Dragonfly Nymph
- Phantom Midge
- Water Strider
- Swallows, Adult Dragonflies, Frogs

