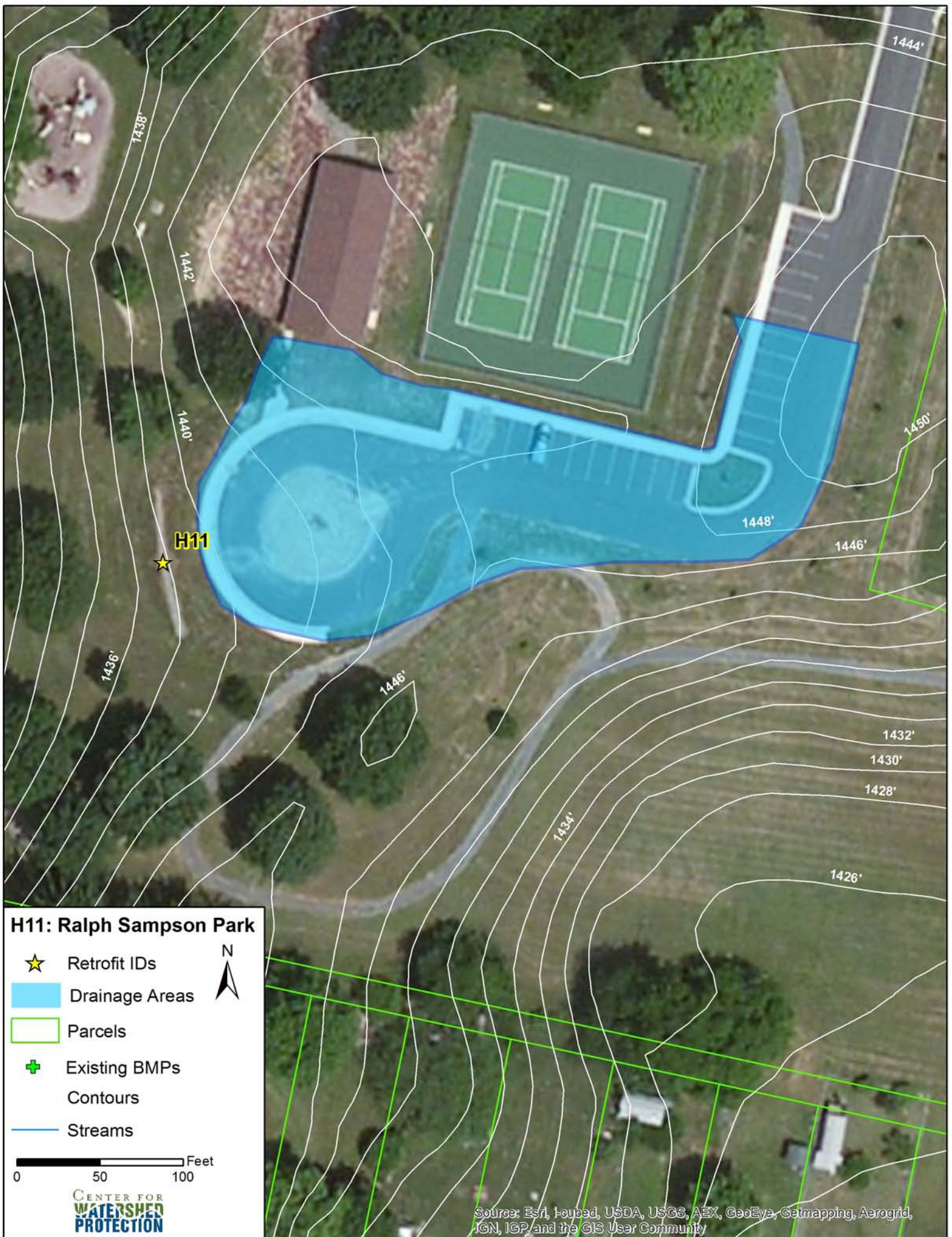


H11: Ralph Sampson Park



H11: Ralph Sampson Park

- ★ Retrofit IDs
- Drainage Areas
- ▭ Parcels
- ⊕ Existing BMPs
- Contours
- Streams

0 50 100 Feet



Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

H11: Ralph Sampson Park Existing BMP

Score: 62

Rank: 2

Investigators: David Hirschman, Tom Hartman



Figure 1: Existing level spreader below parking & travelway

Description: The existing level spreader on the slope serves the uphill travelway and parking. An 8" pipe comes from an inlet in the circular travelway and discharges to the middle of the level spreader. Most of the flow seems to be going directly downhill, as the level spreader is on a slope, thus the treatment mechanism is being by-passed.

Proposed Retrofit: This is a fairly simple enhancement to ensure that the BMP functions correctly and does not by-pass. The stone can be replaced and a T-junction added to the outlet to evenly distribute the flow. A downhill berm can be added to ensure that water is held within the BMP. Alternately, the level spreader could be converted to a long, skinny bioswale.



WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: H-11	
DATE: 03/19/13		ASSESSED BY: DJH TAH		CAMERA ID:	
GPS ID:		LMK ID:		LAT:	
PICTURES: 24-26		LONG:			
SITE DESCRIPTION					
Name: <u>Ralph Sampson Park</u>					
Address: _____					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown If Public, Government Jurisdiction: <input type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other: _____					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond <input type="checkbox"/> Above Roadway Culvert			<input type="checkbox"/> Hotspot Operation <input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall <input type="checkbox"/> In Conveyance System			<input checked="" type="checkbox"/> Small Parking Lot <input type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW <input type="checkbox"/> Near Large Parking Lot			<input type="checkbox"/> Individual Street <input type="checkbox"/> Landscape / Hardscape		
<input type="checkbox"/> Other: _____			<input type="checkbox"/> Underground <input type="checkbox"/> Other: _____		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ _____ Imperviousness ≈ _____ % Impervious Area ≈ _____			Drainage Area Land Use:		
Notes:			<input type="checkbox"/> Residential <input type="checkbox"/> Institutional		
			<input type="checkbox"/> SFH (< 1 ac lots) <input type="checkbox"/> Industrial		
			<input type="checkbox"/> SFH (> 1 ac lots) <input type="checkbox"/> Transport-Related		
			<input type="checkbox"/> Townhouses <input checked="" type="checkbox"/> Park		
			<input type="checkbox"/> Multi-Family <input type="checkbox"/> Undeveloped		
<input type="checkbox"/> Commercial <input type="checkbox"/> Other: _____					
EXISTING STORMWATER MANAGEMENT					
Existing Stormwater Practice: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe: <u>Level spreader - seems to be by-passing. Most of it doesn't seem to be accessed</u>					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable): _____ <u>Relatively new park - to DI to level spreader</u>					
Existing Head Available: <u>Lots!</u>			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		



PROPOSED RETROFIT

Purpose of Retrofit:
 Water Quality Recharge Channel Protection Flood Control
 Demonstration / Education Repair Other: _____

Retrofit Volume Computations - Target Storage:	Retrofit Volume Computations - Available Storage:

<p>Proposed Retrofit Practice: (Runoff Reduction) <input type="checkbox"/> Disconnection <input type="checkbox"/> Bioretention <input type="checkbox"/> Bio Swale <input type="checkbox"/> Expanded Tree Pit <input type="checkbox"/> Infiltration <input type="checkbox"/> Green Roof <input type="checkbox"/> Permeable Pavement <input type="checkbox"/> Rainwater Harvesting</p>	<p>Proposed Retrofit Practice: (Stormwater Treatment) <input type="checkbox"/> Constructed Wetland <input type="checkbox"/> Wet Swale <input type="checkbox"/> Wet Pond <input type="checkbox"/> Filtering Practice <input type="checkbox"/> Proprietary: _____ <input checked="" type="checkbox"/> Other: <u>Level spreader</u></p>
--	--

Retrofit Category (as defined by Chesapeake Bay Program):
 New BMP BMP Enhancement BMP Restoration BMP Conversion Not CBP-approved

Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance:

*Repair/enhance ex. level spreader.
Use T w/ perforated pipe & berm on down slope side*

Available Width:	<u>3'</u>
Available Length:	<u>72'</u>
Available Area:	
Ponding Depth:	<u>N/A</u>
Soil Depth:	

SITE CONSTRAINTS

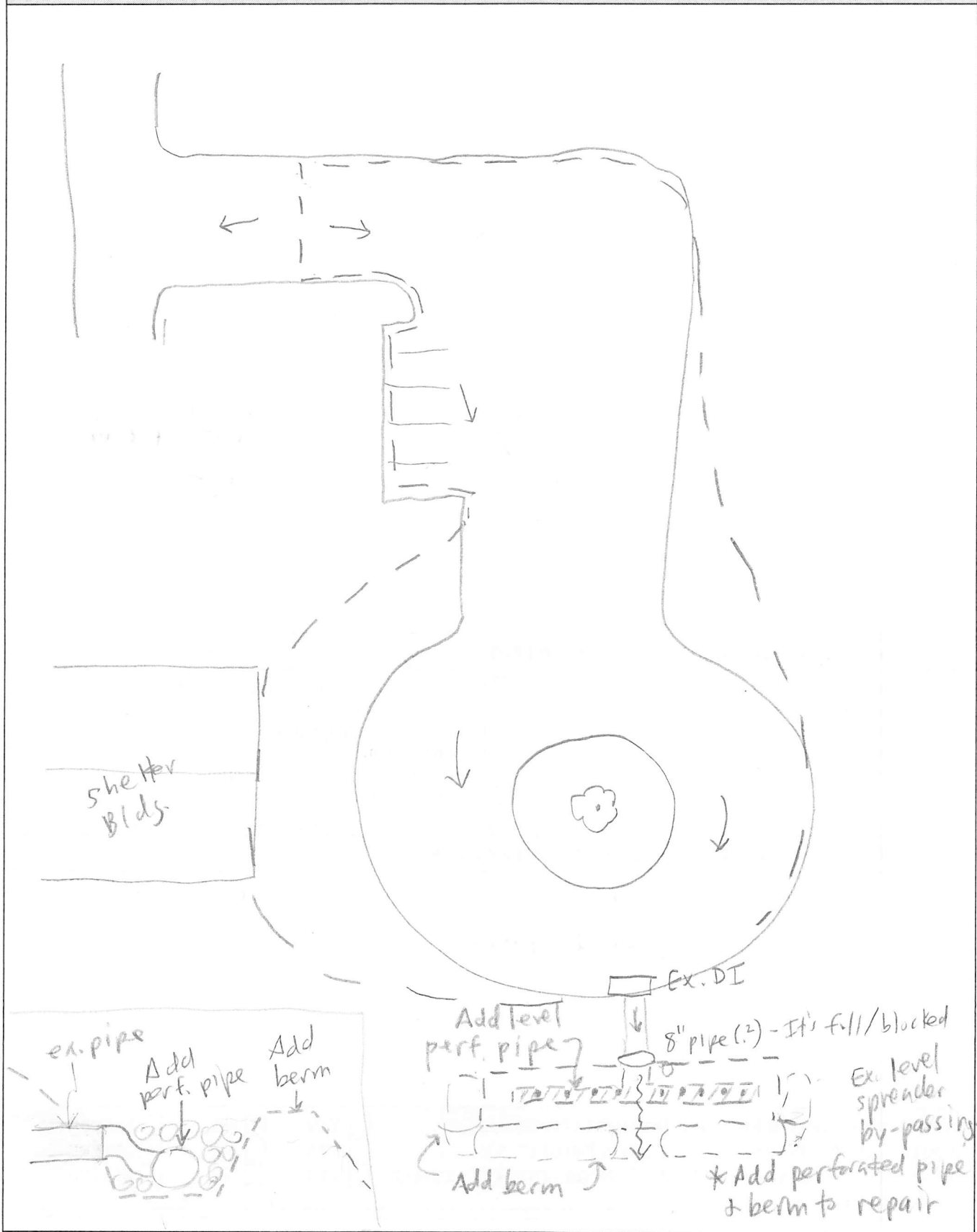
<p>Adjacent Land Use: <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Institutional <input type="checkbox"/> Industrial <input type="checkbox"/> Transport-Related <input checked="" type="checkbox"/> Park <input type="checkbox"/> Undeveloped <input type="checkbox"/> Other: _____</p> <p>Possible Conflicts Due to Adjacent Land Use? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Describe:</p>	<p>Access: <input checked="" type="checkbox"/> No Constraints Constrained due to <input type="checkbox"/> Slope <input type="checkbox"/> Space <input type="checkbox"/> Utilities <input type="checkbox"/> Tree Impacts <input type="checkbox"/> Structures <input type="checkbox"/> Property Ownership <input type="checkbox"/> Other: _____</p>
---	---

<p>Conflicts with Existing Utilities:</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Yes</th> <th style="text-align: center;">Possible/ Modifiable</th> <th style="text-align: center;">No</th> <th style="text-align: center;">Unknown</th> </tr> </thead> <tbody> <tr> <td>Sewer:</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Water:</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Gas:</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Electric to Streetlights:</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Other:</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </tbody> </table>		Yes	Possible/ Modifiable	No	Unknown	Sewer:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Gas:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Electric to Streetlights:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Potential Permitting Factors:</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td>Dam Safety Permits Necessary</td> <td style="text-align: center;"><input type="checkbox"/> Probable</td> <td style="text-align: center;"><input checked="" type="checkbox"/> Not Probable</td> </tr> <tr> <td>Impacts to Wetlands</td> <td style="text-align: center;"><input type="checkbox"/> Probable</td> <td style="text-align: center;"><input checked="" type="checkbox"/> Not Probable</td> </tr> <tr> <td>Impacts to a Stream</td> <td style="text-align: center;"><input type="checkbox"/> Probable</td> <td style="text-align: center;"><input checked="" type="checkbox"/> Not Probable</td> </tr> <tr> <td>Floodplain Fill</td> <td style="text-align: center;"><input type="checkbox"/> Probable</td> <td style="text-align: center;"><input checked="" type="checkbox"/> Not Probable</td> </tr> <tr> <td>Impacts to Forests</td> <td style="text-align: center;"><input type="checkbox"/> Probable</td> <td style="text-align: center;"><input checked="" type="checkbox"/> Not Probable</td> </tr> <tr> <td>Impacts to Specimen Trees</td> <td style="text-align: center;"><input type="checkbox"/> Probable</td> <td style="text-align: center;"><input checked="" type="checkbox"/> Not Probable</td> </tr> </table> <p>How many? _____ Approx. DBH _____</p> <p>Other factors: _____</p>	Dam Safety Permits Necessary	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Impacts to Wetlands	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Impacts to a Stream	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Floodplain Fill	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Impacts to Forests	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Impacts to Specimen Trees	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
	Yes	Possible/ Modifiable	No	Unknown																																													
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Impacts to Specimen Trees	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable																																															

Soils:

Soil auger test holes:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Evidence of poor infiltration (clays, fines):	<input type="checkbox"/> Yes <input type="checkbox"/> No
Evidence of shallow bedrock:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Evidence of high water table (gleying, saturation):	<input type="checkbox"/> Yes <input type="checkbox"/> No

SKETCH



DESIGN OR DELIVERY NOTES

- Check plans

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|--|---|
| <input type="checkbox"/> Confirm property ownership | <input checked="" type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input checked="" type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input checked="" type="checkbox"/> Confirm volume computations | <input type="checkbox"/> Obtain utility mapping |
| <input checked="" type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| <input type="checkbox"/> Other: _____ | <input type="checkbox"/> Confirm soil types |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

Basically, this makes an ex. BMP
more functional

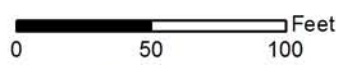
- | | | | |
|--|------------------------------|-----------------------------|--------------------------------|
| SITE CANDIDATE FOR FURTHER INVESTIGATION: | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
| IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S): | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
| IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S): | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
- IF YES, TYPE(S): _____

H13: City of Harrisonburg
Hose Company #4



**H13: City of Harrisonburg
Hose Company #4**

- ★ Retrofit IDs
- Drainage Areas
- Parcels
- ⊕ Existing BMPs
- Contours
- Streams



Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

H13-PP: City of Harrisonburg Hose Company #4

Score: N/A

Rank: N/A

Investigators: Megan O'Gorek, Laurel Woodworth

**Figure 1:** Stains on asphalt from wash water**Figure 2:** Fresh oil stain leaking to street

Description: As suggested by stains on the asphalt, it appears that fire trucks are washed outside of the station where wash water flows untreated into the street, then the storm drain system, and eventually into a local stream (Figure 1). There reportedly is a wash bay inside the station where trucks can be washed and where water enters the sanitary sewer system for treatment. Fresh oil was also found on the asphalt in front of the station (Figure 2), which also would have been washed off into the storm drain during the next rain storm.

Proposed Solutions: All washing should be done in the indoor wash bay to avoid wash water runoff into the street and storm drain. Keep and maintain trucks indoors to avoid outdoor oil leaks. When leaks do occur outside, put down absorbent material to soak up liquid and then sweep up and discard in trash.

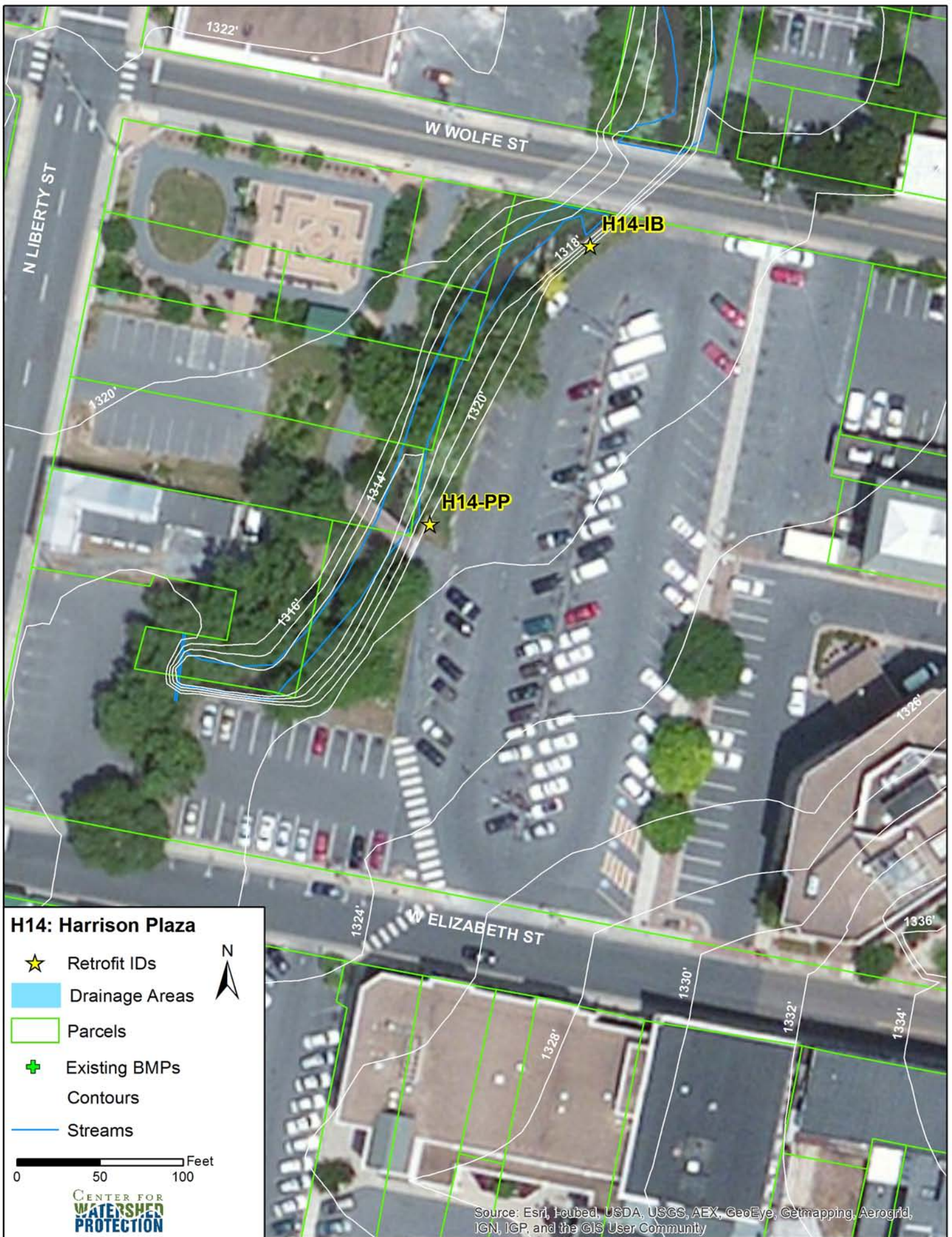


WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: <u>H-13-PP</u>	
DATE: <u>3/19/13</u>		ASSESSED BY: <u>Mo, LW</u>		CAMERA ID:	
MAP GRID:		LAT ___ ° ___ ' ___ " LONG ___ ° ___ ' ___ "		PIC#: <u>3150-3152</u>	
MAP GRID:		LAT ___ ° ___ ' ___ " LONG ___ ° ___ ' ___ "		LMK #	
A. SITE DATA AND BASIC CLASSIFICATION					
Name and Address: <u>City of Fiburg</u> <u>Hose Co. #4</u>		Category: <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Institutional <input checked="" type="checkbox"/> Municipal <input type="checkbox"/> Golf Course <input type="checkbox"/> Transport-Related <input type="checkbox"/> Marina <input type="checkbox"/> Animal Facility			
SIC code (if available): _____		Basic Description of Operation: <u>fire dept.</u>		INDEX*	
NPDES Status: <input type="checkbox"/> Regulated <input checked="" type="checkbox"/> Unregulated <input type="checkbox"/> Unknown					
B. VEHICLE OPERATIONS <input type="checkbox"/> N/A (Skip to part C)				Observed Pollution Source? <input type="checkbox"/>	
B1. Types of vehicles: <input checked="" type="checkbox"/> Fleet vehicles <input type="checkbox"/> School buses <input checked="" type="checkbox"/> Other: <u>fire trucks, cars</u>					
B2. Approximate number of vehicles: _____					
B3. Vehicle activities (circle all that apply): <u>Maintained</u> <u>Repaired</u> <u>Recycled</u> <u>Fueled</u> <u>Washed</u> <u>Stored</u>					
B4. Are vehicles stored and/or repaired outside? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
Are these vehicles lacking runoff diversion methods? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
B5. Is there evidence of spills/leakage from vehicles? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
B6. Are uncovered outdoor fueling areas present? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N <input type="checkbox"/> Can't Tell					
B7. Are fueling areas directly connected to storm drains? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N <input type="checkbox"/> Can't Tell					
B8. Are vehicles washed outdoors? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell <u>street -> storm drain</u> s the area where vehicles are washed discharge to the storm drain? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell <u>I wash bay inside but not used due to fire truck</u>					
C. OUTDOOR MATERIALS <input type="checkbox"/> N/A (Skip to part D)				Observed Pollution Source? <input type="checkbox"/>	
C1. Are loading/unloading operations present? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
If yes, are they uncovered and draining towards a storm drain inlet? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
C2. Are materials stored outside? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell If yes, are they <input type="checkbox"/> Liquid <input type="checkbox"/> Solid Description: _____					
Where are they stored? <input type="checkbox"/> grass/dirt area <input type="checkbox"/> concrete/asphalt <input type="checkbox"/> bermed area					
C3. Is the storage area directly or indirectly connected to storm drain (circle one)? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
C4. Is staining or discoloration around the area visible? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
C5. Does outdoor storage area lack a cover? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
C6. Are liquid materials stored without secondary containment? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
C7. Are storage containers missing labels or in poor condition (rusting)? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
D. WASTE MANAGEMENT <input type="checkbox"/> N/A (Skip to part E)				Observed Pollution Source? <input type="checkbox"/>	
D1. Type of waste (check all that apply): <input type="checkbox"/> Garbage <input type="checkbox"/> Construction materials <input type="checkbox"/> Hazardous materials any of these					
D2. Dumpster condition (check all that apply): <input type="checkbox"/> No cover/Lid is open <input type="checkbox"/> Damaged/poor condition <input type="checkbox"/> Leaking or evidence of leakage (stains on ground) <input type="checkbox"/> Overflowing any of these					
D3. Is the dumpster located near a storm drain inlet? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell					
If yes, are runoff diversion methods (berms, curbs) lacking? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell if both are yes					
E. PHYSICAL PLANT <input type="checkbox"/> N/A (Skip to part F)				Observed Pollution Source? <input type="checkbox"/>	
E1. Building: Approximate age: _____ yrs. Condition of surfaces: <input type="checkbox"/> Clean <input type="checkbox"/> Stained <input type="checkbox"/> Dirty <input type="checkbox"/> Damaged					
Evidence that maintenance results in discharge to storm drains (staining/dyscoloration)? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Don't know					

*Index: ○ denotes potential pollution source; denotes confirmed polluter (evidence was seen)

E2. Parking Lot: Approximate age ____ yrs. Condition: <input type="checkbox"/> Clean <input type="checkbox"/> Stained <input type="checkbox"/> Dirty <input type="checkbox"/> Breaking up Surface material <input type="checkbox"/> Paved/Concrete <input type="checkbox"/> Gravel <input type="checkbox"/> Permeable <input type="checkbox"/> Don't know	○
E3. Do downspouts discharge to impervious surface? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Don't know <input type="checkbox"/> None visible Are downspouts directly connected to storm drains? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Don't know	○
E4. Evidence of poor cleaning practices for construction activities (stains leading to storm drain)? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell	○
E5. Evidence of poor cleaning practices for washing activities (observed washwater dumping, stains leading to storm drain)? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell	○
F. TURF/LANDSCAPING AREAS <input type="checkbox"/> N/A (skip to part G)	Observed Pollution Source?
F1. % of site with: Forest canopy ____% Turf grass ____% Landscaping ____% Bare Soil 20 %	○
F2. Rate the turf management status: <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low 40% medium to high	○
F3. Evidence of permanent irrigation or "non-target" irrigation <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell	○
F4. Do landscaped areas drain to the storm drain system? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell	○
F5. Do landscape plants accumulate organic matter (leaves, grass clippings) on adjacent impervious surface? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Can't Tell	○
G. STORM WATER INFRASTRUCTURE <input type="checkbox"/> N/A (skip to part H)	Observed Pollution Source?
G1. Are storm water treatment practices present? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Unknown If yes, please describe: _____	○
G2. Are private storm drains located at the facility? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Unknown > 25 % Is trash, sediment and/or organic material present in gutters leading to storm drains? (circle appropriate)	○
H. INITIAL HOTSPOT STATUS - INDEX RESULTS	
<input type="checkbox"/> Not a hotspot (fewer than 5 circles and no boxes checked) <input type="checkbox"/> Potential hotspot (5 to 10 circles but no boxes checked) <input type="checkbox"/> Confirmed hotspot (10 to 15 circles and/or 1 box checked) <input type="checkbox"/> Severe hotspot (>15 circles and/or 2 or more boxes checked)	
Follow-up Action: Immediate (1 week) <input type="checkbox"/> Refer for immediate enforcement <input type="checkbox"/> Test for illicit discharge <input type="checkbox"/> Check to see if hotspot is an NPDES non-filer Mid-term (2-3 months) <input type="checkbox"/> Schedule a review of storm water pollution prevention plan <input checked="" type="checkbox"/> Suggest follow-up on-site inspection Long-term (1 year) <input type="checkbox"/> Onsite non-residential retrofit <input type="checkbox"/> Suggest pollution prevention training for employees <input type="checkbox"/> Other: _____	Fueling Islands <input type="checkbox"/> Cover fueling islands (covered area: _____sf) <input checked="" type="checkbox"/> Install dry spill response kits (#: _____) Landscaping / turf <input type="checkbox"/> Turf conversion to landscaping / Bayscaping (area: _____sf) <input type="checkbox"/> Pervious area restoration (turf area: _____sf) <input type="checkbox"/> Tree planting (# or area: _____) <input type="checkbox"/> Reduce maintenance (mowing, herbicides, fertilizers) Vehicle repairs <input type="checkbox"/> Plumb indoor shop drains to sanitary <input checked="" type="checkbox"/> Store fluids/batteries inside or under cover Outdoor materials <input type="checkbox"/> Provide cover or secondary containment (area: _____sf) <input type="checkbox"/> Place materials on pallets Dumpster management <input type="checkbox"/> Cover or add/repair lids (#: _____) <input type="checkbox"/> Move dumpsters away from storm drains or streams Parking lots <input checked="" type="checkbox"/> Find and fix fluid leaks <input type="checkbox"/> Trash and litter pick-up, sweeping <input type="checkbox"/> Identify retrofit projects <input type="checkbox"/> Reduce salt application Stormwater Infrastructure <input type="checkbox"/> Clean out storm drain inlets <input type="checkbox"/> Perform maintenance inspection Notes:
Identified Opportunities: General <input type="checkbox"/> Include in future education effort (add specifics to Notes) <input type="checkbox"/> Stencil or mark storm drain inlets <input type="checkbox"/> Signage opportunities (buffer, wetland, bacteria, etc.) <input type="checkbox"/> Other: _____ Rooftop <input type="checkbox"/> Evaluate feasibility of cistern or water reuse (roof area: _____sf) <input type="checkbox"/> Downspout disconnection (#: _____) Loading Areas <input type="checkbox"/> Sweep loading areas <input type="checkbox"/> Cover loading docks or redesign drainage (area: _____sf)	<div style="position: absolute; top: 50px; right: 50px; font-family: cursive; font-size: 1.2em;"> Wash trucks indoors </div>

H14: Harrison Plaza



1322'

W WOLFE ST

H14-IB

1318'

H14-PP

1320'

1344'

1346'

N LIBERTY ST

1320'

W ELIZABETH ST

1324'

1328'

1336'

1330'

1332'

1334'

1328'

H14-ER: Harrison Plaza, Erosion

Score: N/A

Rank: N/A

Investigators: Megan O’Gorek, Laurel Woodworth

**Figure 1:** Erosion in front of foot bridge**Figure 2:** Close-up of erosion along bridge abutment

Description: Stormwater from the Harrison Plaza parking lot behind the Harrisonburg Police Administration building runs off directly into the adjacent stream. Runoff from approximately half of the lot becomes concentrated in one spot along the stream bank, right next to the abutment at the foot of the bridge (Figure 1). This concentrated stormwater runoff has caused the bank to start eroding (Figure 2). Further erosion could undermine the concrete bridge abutment.

Proposed Solutions: A number of solutions may help dissipate the parking lot runoff and reduce erosion along the stream bank. Where runoff approaches the stream bank (near telephone pole), excavate a small plunge pool to catch the runoff, with a rip-rap spillway down to the stream. Since the erosion is happening so close to the bridge, an alternative is to build a swale along the edge of the parking lot to carry the runoff further away from the bridge, with a level rip-rap spillway for the water to drop down to the stream.

H14-IB: Harrison Plaza, Buffer**Score:** N/A**Rank:** N/A**Investigators:** Megan O’Gorek, Laurel Woodworth

Figure 1: *Left bank of stream, no buffer*

Description: A section of the left bank just downstream of the W. Wolfe Street bridge is lacking a vegetated buffer. Runoff from a portion of the parking lot behind the Police Administration building drains across this area and into the stream. The edge of the bank at the top of the concrete retaining wall is beginning to erode (Figure 1)

Proposed Solutions: Re-vegetate this area with shrubs and tall grasses, or simply reduce mowing frequency. The taller vegetation will not only help hold the soil in place, but also help reduce pollution in the stormwater. The edge of the buffer above the retaining wall may also need to be secured with erosion control matting.

Be aware that there may be underground utility lines in this area.

H-14 IB Harrison Plaza

WATERSHED/SUBSHED:		DATE: 3/19/13	ASSESSED BY:
SURVEY REACH:		TIME: _____ AM/PM	PHOTO ID: (Camera-Pic #) 3142 /# 3144
UNIT ID: (Condition-#)	START LAT _____ ° ' " LONG _____ ° ' " LMK _____	GPS: (Unit ID)	
IB- _____	END LAT _____ ° ' " LONG _____ ° ' " LMK _____		

IMPACTED BANK: LT RT Both

REASON INADEQUATE: Lack of vegetation Too narrow Widespread invasive plants
 Recently planted Other: *Some erosion/some weeds/invasive*

LAND USE: Private Institutional Golf Course Park Other Public

(Facing downstream) LT Bank Liberty :
 RT Bank Park : *Harrison Plaza parking lot*

DOMINANT LAND COVER: Paved Bare ground Turf/lawn Tall grass Shrub/scrub Trees Other

LT Bank :
 RT Bank :

INVASIVE PLANTS: None Rare Partial coverage Extensive coverage unknown

STREAM SHADE PROVIDED? None Partial Full **WETLANDS PRESENT?** No Yes Unknown

POTENTIAL RESTORATION CANDIDATE Active reforestation Greenway design Natural regeneration Invasives removal
 no Other: *Stabilization/revegetation*

RESTORABLE AREA	REFORESTATION POTENTIAL: (Circle #)	Impacted area on public land where the riparian area does not appear to be used for any specific purpose; plenty of area available for planting	Impacted area on either public or private land that is presently used for a specific purpose; available area for planting adequate	Impacted area on private land where road; building encroachment or other feature significantly limits available area for planting
		5	4	3
LT BANK RT				
Length (ft): _____				
Width (ft): _____				

POTENTIAL CONFLICTS WITH REFORESTATION Widespread invasive plants Potential contamination Lack of sun
 Poor/unsafe access to site Existing impervious cover Severe animal impacts (deer, beaver) Other:

NOTES:
** Some willows along top of LT Bank*

H14-ER Harrison Plaza

Severe Bank Erosion



WATERSHED/SUBSHED:		DATE: 3/19/13	ASSESSED BY: LW
SURVEY REACH: Between W. Wolfe + W. Elizabeth St.		TIME: : AM/PM	PHOTO ID (CAMERA-PIC #): 3145 /# 3149
SITE ID: (Condition-#) ER-	START LAT ° ' " LONG ° ' "	LMK	GPS: (Unit ID)
	END LAT ° ' " LONG ° ' "	LMK	

PROCESS: Currently unknown

Downcutting Bed scour

Widening Bank failure

Headcutting Bank scour

Aggrading Slope failure

Sed. deposition Channelized

BANK OF CONCERN: LT RT Both (looking downstream)

LOCATION: Meander bend Straight section Steep slope/valley wall Other:

DIMENSIONS:

Length (if no GPS) LT _____ ft and/or RT _____ ft Bottom width _____ ft

Bank Ht LT _____ ft and/or RT _____ ft Top width _____ ft

Bank Angle LT _____ ° and/or RT _____ ° Wetted Width _____ ft

LAND OWNERSHIP: Private Public Unknown

LAND COVER: Forest Field/Ag Developed:

POTENTIAL RESTORATION CANDIDATE: Grade control Bank stabilization

No Other:

THREAT TO PROPERTY/INFRASTRUCTURE: No Yes (Describe): Slight threat to bridge abutment

EXISTING RIPARIAN WIDTH: <25 ft 25 - 50 ft 50-75ft 75-100ft >100ft

EROSION SEVERITY(circle#)	Active downcutting; tall banks on both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	Pat downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.
	5	4	3
ACCESS:	Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.	Fair access: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.	Difficult access. Must cross wetland, steep slope or other sensitive areas to access stream. Minimal stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.
	5	4	3

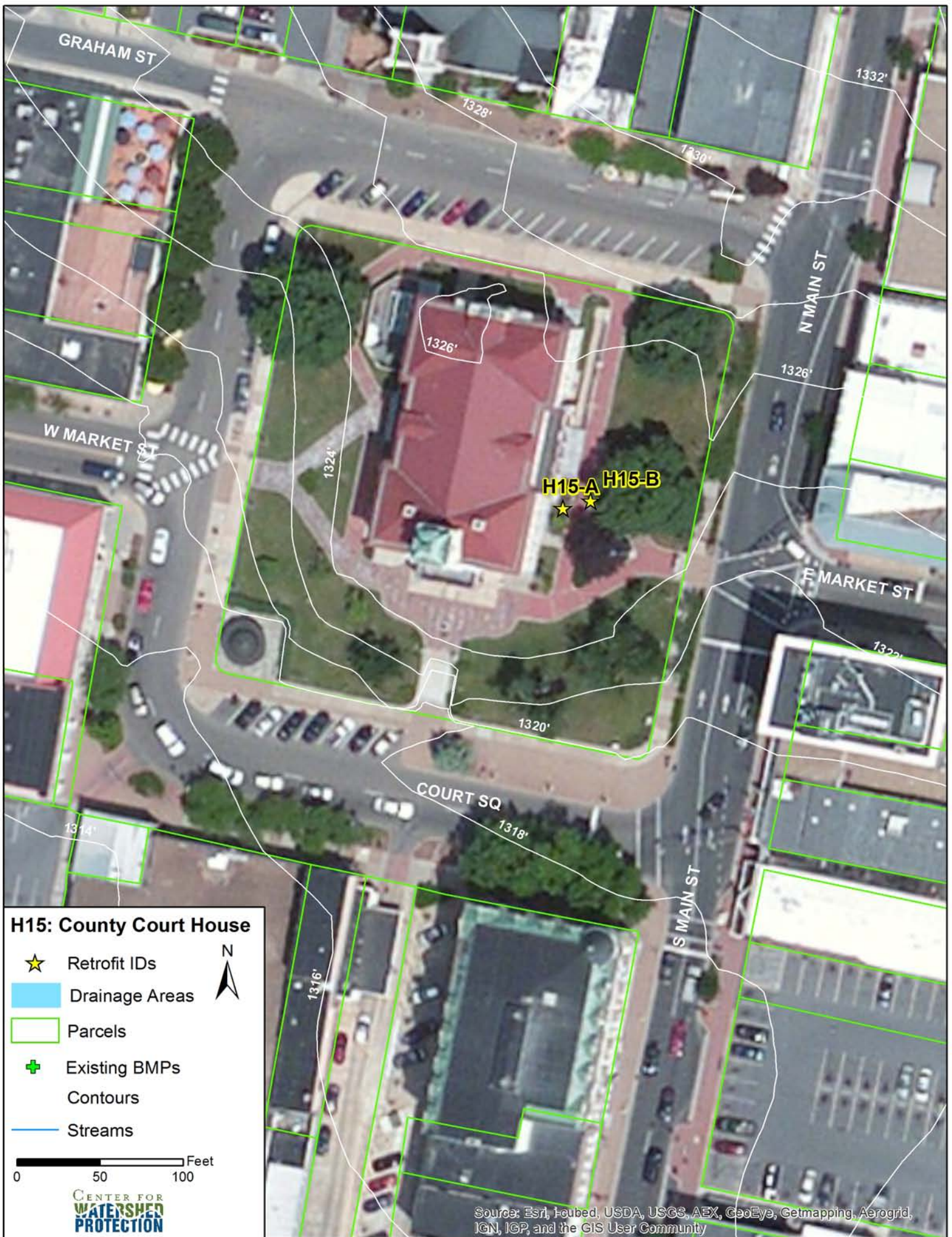
NOTES/CROSS SECTION SKETCH:

- Slight erosion of bank caused by parking lot runoff, not from stream flow.

- Stabilize "at-fall" spot with rip-rap or other material to dissipate runoff velocity

REPORTED TO AUTHORITIES YES NO

H15: County Court House



H15: County Court House

- ★ Retrofit IDs
- Drainage Areas
- Parcels
- ✚ Existing BMPs
- Contours
- Streams



0 50 100 Feet



Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

H15: County Courthouse

Score: N/A

Rank: N/A

Investigators: Ray Bailey, Megan O’Gorek, Laurel Woodworth

**Figure 1:** Planter bed & downspout in background**Figure 2:** Water ponded on walkway and grass**Figure 3:** Roof downspout

Description: A roof downspout is located on the East side of the courthouse building (Figure 3), just to the left of the steps/porch. Flow from this downspout travels across the brick walkway and ponds in the grass and on part of the walkway (Figure 2). This likely causes an ice problem in winter, which may be a safety issue.

Proposed Solutions: Just to the left of the downspout is a planter bed with its surface elevation flush with the level of the brick walkway (Figure 1). This area could potentially be used to capture and absorb runoff coming out of the downspout. The planter bed could be dug down several inches to give more depth for ponding and the downspout opening would need to be diverted to the left toward the planter bed rather than toward the walkway.

Another potential solution is to replace some of the brick walkway with permeable pavers underlain by a thick gravel or sand bed. This would allow water to seep in rather than pond on the surface.

WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: <u>H15</u>	
DATE: <u>3/19/13</u>		ASSESSED BY: <u>LW</u>		CAMERA ID: <u>cville</u>	
GPS ID:		LMK ID:		PICTURES: <u>3132-3138</u>	
GPS ID:		LMK ID:		LAT:	
GPS ID:		LMK ID:		LONG: <u>(3139-314)</u>	
SITE DESCRIPTION					
Name: <u>County Courthouse</u>					
Address: _____					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input checked="" type="checkbox"/> Other: <u>county</u>					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond <input type="checkbox"/> Above Roadway Culvert			<input type="checkbox"/> Hotspot Operation <input checked="" type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall <input type="checkbox"/> In Conveyance System			<input type="checkbox"/> Small Parking Lot <input checked="" type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW <input type="checkbox"/> Near Large Parking Lot			<input type="checkbox"/> Individual Street <input type="checkbox"/> Landscape / Hardscape		
<input checked="" type="checkbox"/> Other: <u>existing planing bed</u>			<input type="checkbox"/> Underground <input type="checkbox"/> Other: _____		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ _____			Drainage Area Land Use:		
Imperviousness ≈ _____ %			<input type="checkbox"/> Residential <input checked="" type="checkbox"/> Institutional		
Impervious Area ≈ _____			<input type="checkbox"/> SFH (< 1 ac lots) <input type="checkbox"/> Industrial		
Notes: <u>See Map and GIS</u>			<input type="checkbox"/> SFH (> 1 ac lots) <input type="checkbox"/> Transport-Related		
			<input type="checkbox"/> Townhouses <input type="checkbox"/> Park		
			<input type="checkbox"/> Multi-Family <input type="checkbox"/> Undeveloped		
			<input type="checkbox"/> Commercial <input type="checkbox"/> Other: _____		
EXISTING STORMWATER MANAGEMENT					
Existing Stormwater Practice: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe:					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable): _____					
<u>- Open downspout on EAST side of building</u>					
<u>- Flow from downspout is causing ponding in grass; also likely causes ice problems on the brick walkway in winter</u>					
Existing Head Available:			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		



PROPOSED RETROFIT

Purpose of Retrofit:

- Water Quality Recharge Channel Protection Flood Control
 Demonstration / Education Repair Other: Safety - prevent ice in winter

Retrofit Volume Computations - Target Storage:

Retrofit Volume Computations - Available Storage:

Proposed Retrofit Practice: (Runoff Reduction)

- Disconnection Bioretention Bio Swale
 Expanded Tree Pit Infiltration Green Roof
 Permeable Pavement Rainwater Harvesting

Proposed Retrofit Practice: (Stormwater Treatment)

- Constructed Wetland Wet Swale Wet Pond
 Filtering Practice Proprietary: _____
 Other: _____

Retrofit Category (as defined by Chesapeake Bay Program):

- New BMP BMP Enhancement BMP Restoration BMP Conversion Not CBP-approved

Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance:

① retrofit existing planting bed to absorb downspout flow
 ② propose gravel or sand bed below pavers to provide some storage

Available Width:	<u>6</u>
Available Length:	<u>20.5</u>
Available Area:	
Ponding Depth:	
Soil Depth:	

SITE CONSTRAINTS

Adjacent Land Use:

- Residential Commercial Institutional
 Industrial Transport-Related Park
 Undeveloped Other: _____

Possible Conflicts Due to Adjacent Land Use? Yes No

If Yes, Describe:

Access:

- No Constraints
 Constrained due to
 Slope Space
 Utilities Tree Impacts
 Structures Property

Ownership

Other: COUNTY?

Conflicts with Existing Utilities:

	Yes	Possible/ Modifiable	No	Unknown
Sewer:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gas:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Electric to Streetlights:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Potential Permitting Factors:

- Dam Safety Permits Necessary Probable Not Probable
 Impacts to Wetlands Probable Not Probable
 Impacts to a Stream Probable Not Probable
 Floodplain Fill Probable Not Probable
 Impacts to Forests Probable Not Probable
 Impacts to Specimen Trees Probable Not Probable

How many? _____

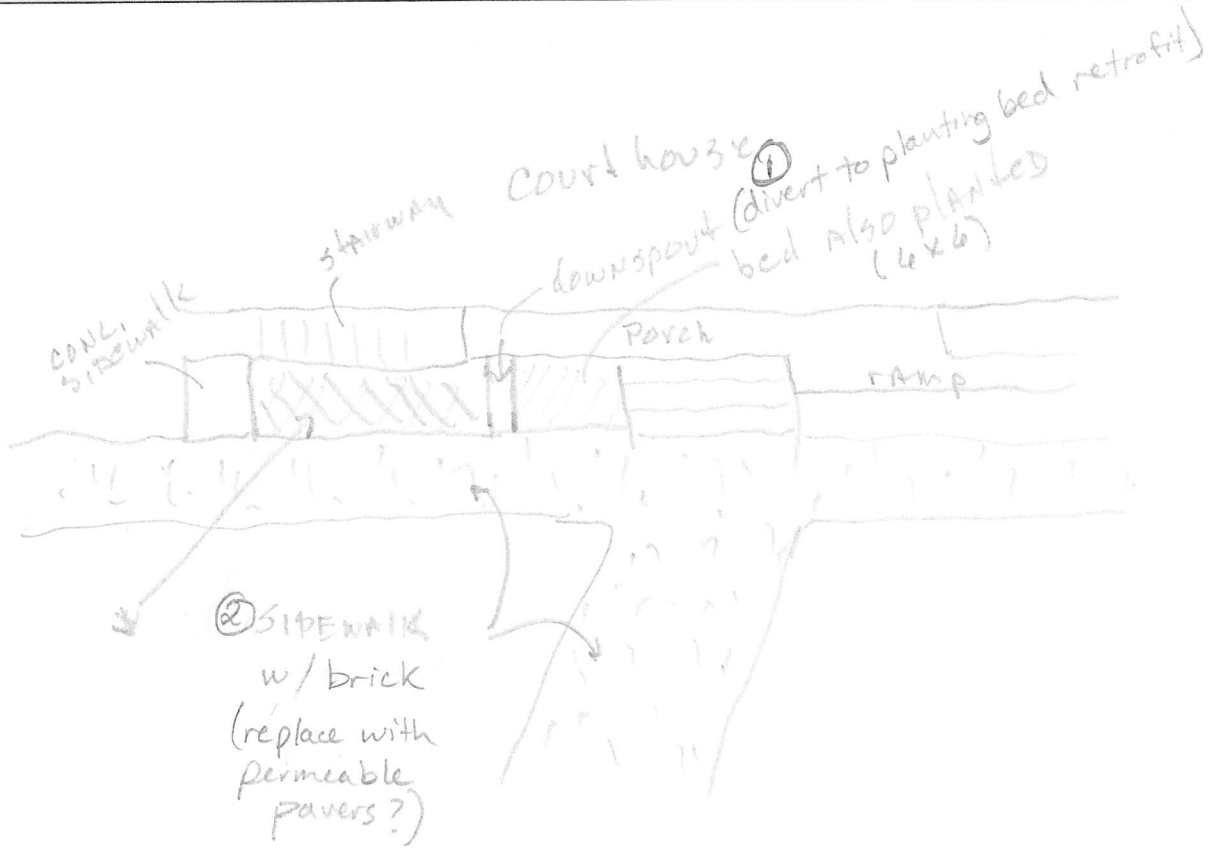
Approx. DBH _____

Other factors: _____

Soils:

- Soil auger test holes: Yes No
 Evidence of poor infiltration (clays, fines): Yes No
 Evidence of shallow bedrock: Yes No
 Evidence of high water table (gleying, saturation): Yes No

SKETCH



DESIGN OR DELIVERY NOTES

- No storm drain network available to which to connect an underdrain
 - ↳ ensure that overflow from planter bed has a safe place to go (not towards the building)
 - ↳ OR install storm drain on site

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|---|--|
| <input checked="" type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input checked="" type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input type="checkbox"/> Confirm volume computations | <input checked="" type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| <input type="checkbox"/> Other: _____ | <input type="checkbox"/> Confirm soil types |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

SITE CANDIDATE FOR FURTHER INVESTIGATION: YES NO MAYBE
IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S): YES NO MAYBE
IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S): YES NO MAYBE
IF YES, TYPE(S): _____

H16: Massanutten Regional Library



H16: Massanutten Regional Library

-  Retrofit IDs
-  Drainage Areas
-  Parcels
-  Existing BMPs
-  Contours
-  Streams



0 50 100 Feet



Source: Esri, iCubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

H16: Massanutten Regional Library

Score: 25

Rank: 32

Investigators: Ray Bailey, Megan O’Gorek, Laurel Woodworth



Figure 1: Downspout next to planter bed



Figure 2: Existing planter bed

Description: A 3’-wide and 24’-long planter bed is located along the outside wall of the library, along Newman Avenue. A roof downspout is located right next to it, but is connected to an underground storm drain pipe. This downspout appears to collect approximately 0.10 acres of roof runoff.

Proposed Retrofit: Convert the existing planter bed into a stormwater planter to capture runoff from the downspout. This would consist of making the planter bed structure taller to allow enough depth for more soil (bioretention soil mix), a gravel sump, and an underdrain/overflow pipe. This extra depth should also allow for about 6 inches of surface ponding depth. There may also be an option to make the bed wider, as space allows next to the sidewalk, to increase water capacity. An impermeable liner should also be installed against the walls to keep the water from seeping through.

The downspout should then be diverted into the planter bed. The underdrain pipe in the planter bed should be connected to the underground storm drain pipe that the downspout is currently connected to.

WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: <u>H-16</u>	
DATE: <u>3/19/13</u>		ASSESSED BY: <u>LW</u>		CAMERA ID: <u>oville</u>	
PICTURES: <u>3128-3131</u>		GPS ID:		LONG:	
LMK ID:		LAT:		LONG:	
SITE DESCRIPTION					
Name: <u>Massachusetts Regional Library</u>					
Address: _____					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input checked="" type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other: _____					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond	<input type="checkbox"/> Above Roadway Culvert	<input type="checkbox"/> Hotspot Operation	<input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall	<input type="checkbox"/> In Conveyance System	<input type="checkbox"/> Small Parking Lot	<input type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW	<input type="checkbox"/> Near Large Parking Lot	<input type="checkbox"/> Individual Street	<input checked="" type="checkbox"/> Landscape / Hardscape		
<input type="checkbox"/> Other: _____		<input type="checkbox"/> Underground	<input type="checkbox"/> Other: _____		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area \approx <u>0.10 acres</u>			Drainage Area Land Use:		
Imperviousness \approx <u>100</u> %			<input type="checkbox"/> Residential	<input checked="" type="checkbox"/> Institutional	
Impervious Area \approx <u>0.10</u>			<input type="checkbox"/> SFH (< 1 ac lots)	<input type="checkbox"/> Industrial	
Notes: <u>see map and GIS</u>			<input type="checkbox"/> SFH (> 1 ac lots)	<input type="checkbox"/> Transport-Related	
			<input type="checkbox"/> Townhouses	<input type="checkbox"/> Park	
			<input type="checkbox"/> Multi-Family	<input type="checkbox"/> Undeveloped	
			<input type="checkbox"/> Commercial	<input type="checkbox"/> Other: _____	
			EXISTING STORMWATER MANAGEMENT		
Existing Stormwater Practice: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe:					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable): _____					
<u>roof drains tied into storm drain system</u>					
Existing Head Available:			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		
<u>unknown</u>					

PROPOSED RETROFIT

Purpose of Retrofit:
 Water Quality Recharge Channel Protection Flood Control
 Demonstration / Education Repair Other: _____

Retrofit Volume Computations - Target Storage:

Retrofit Volume Computations - Available Storage:

Proposed Retrofit Practice: (Runoff Reduction)
 Disconnection Bioretention Bio Swale
 Expanded Tree Pit Infiltration Green Roof
 Permeable Pavement Rainwater Harvesting

Proposed Retrofit Practice: (Stormwater Treatment)
 Constructed Wetland Wet Swale Wet Pond
 Filtering Practice Proprietary: _____
 Other: _____

Retrofit Category (as defined by Chesapeake Bay Program):
 New BMP BMP Enhancement BMP Restoration BMP Conversion Not CBP-approved

Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance:
- retrofit existing planter bed to stormwater planter → make taller to allow enough soil depth
- tie in existing storm drain to planter
- impermeable liner against building

Available Width:	<u>3'</u>
Available Length:	<u>24'</u>
Available Area:	_____
Ponding Depth:	<u>6"</u>
Soil Depth:	<u>12"</u>

→ must increase depth to 30", plus 12" for gravel + underdrain!

SITE CONSTRAINTS

Adjacent Land Use:
 Residential Commercial Institutional
 Industrial Transport-Related Park
 Undeveloped Other: _____

Possible Conflicts Due to Adjacent Land Use? Yes No
If Yes, Describe:

Access:
 No Constraints
 Constrained due to
 Slope Space
 Utilities Tree Impacts
 Structures Property
 Ownership
 Other: _____

Conflicts with Existing Utilities:

	Yes	Possible/ Modifiable	No	Unknown
Sewer:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Gas:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Electric to Streetlights:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Potential Permitting Factors:

Dam Safety Permits Necessary	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to Wetlands	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to a Stream	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Floodplain Fill	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to Forests	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to Specimen Trees	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable

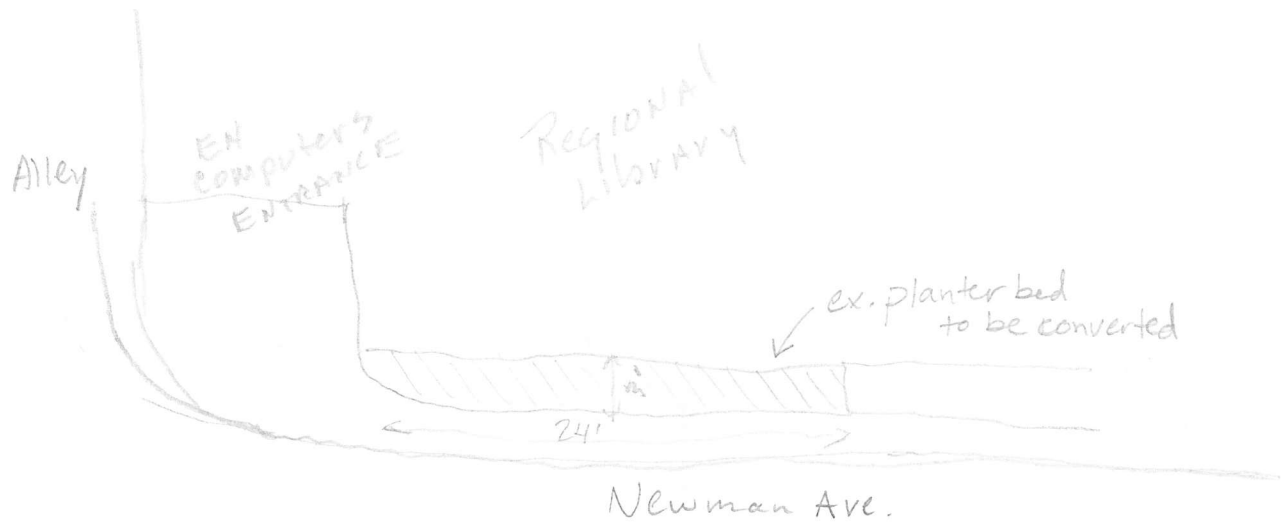
How many? _____
 Approx. DBH _____

Other factors: _____

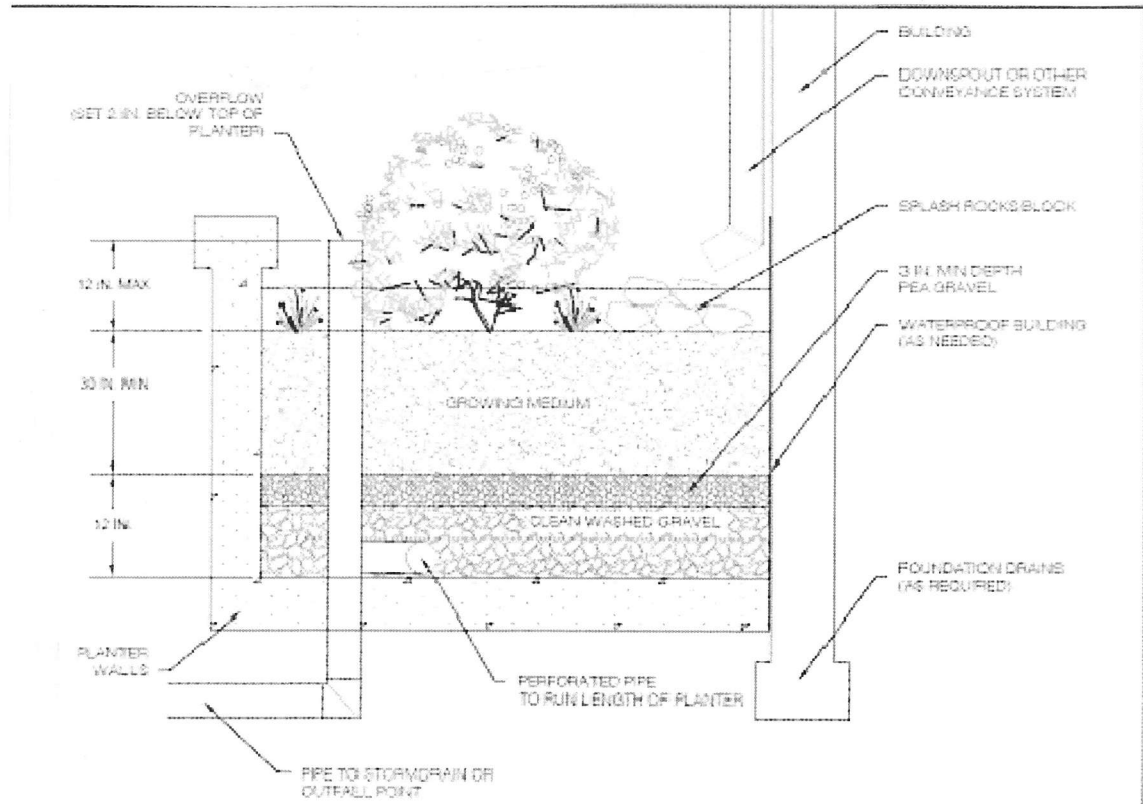
Soils:

Soil auger test holes:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Evidence of poor infiltration (clays, fines):	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of shallow bedrock:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of high water table (gleying, saturation):	<input type="checkbox"/> Yes	<input type="checkbox"/> No

SKETCH



From Bioretention Design Spec. (VA DCR) → Stormwater Planter Cross-section:



TYPICAL URBAN BIORETENTION BASIN

(Figure 9-A.4)

NTS

DESIGN OR DELIVERY NOTES

- need to look at site plans - old section of public library (Newman av.) to determine drainage area
- Ensure library wall has proper protection from water damage
- Requires significant re-construction of planter bed in order to tie in underdrain to existing storm drain and to make planter box taller (for more soil + gravel depth).

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|---|--|
| <input type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input type="checkbox"/> Confirm volume computations | <input type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| <input type="checkbox"/> Other: _____ | <input type="checkbox"/> Confirm soil types |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

SITE CANDIDATE FOR FURTHER INVESTIGATION: YES NO MAYBE

IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S): YES NO MAYBE

IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S): YES NO MAYBE

IF YES, TYPE(S): _____

H19: Department of Community Development



H19-B

H19-A

WARREN ST

S MAIN ST

CAMPBELL ST



H19-A: Department of Community Development, NE Side

Score: 28

Rank: 31

Investigators: Ray Bailey, Megan O’Gorek, Laurel Woodworth



Figure 1: Small landscape area, N. side of building **Figure 2:** Roof drain outlet on left & eroded area

Description: A triangle-shaped grass landscape area is located on the northeast side of the Department of Community Development office building (Figure 1). Runoff from the roof and parts of the parking lot is directed to this area via a green PVC pipe (Figure 2). Unfortunately, flow of water coming out of that pipe is causing a rill of erosion to form and is eventually flowing into a corner of the parking lot (near white trucks shown in background of Figure 2)

Proposed Retrofit: A stormwater retrofit of this grass area could repair existing and prevent further erosion and could reduce runoff volume from the site. The proposed retrofit involves excavating out the existing soil and replacing it with a bioretention feature that would collect, pond, and treat the runoff with plants and soil. Flow from the downspout should be re-directed to spread out across the bioretention surface so as to no create an eroded channel. Since there are no existing underground storm drains in the vicinity, there is no structure to tie in a perforated underdrain pipe. Since the bioretention practice cannot have an underdrain, it should be constructed to only pond 2 – 3” of water, which can soak in after several hours.

H19-B: Department of Community Development, NW Side

Score: 38

Rank: 19

Investigators: Ray Bailey, Megan O’Gorek, Laurel Woodworth



Figure 1: Bioswale can be located to left of asphalt **Figure 2:** Drainage area looking down Warren St.

Description: A 0.28-acre drainage area comprised of a section of Warren Street and the parking lot behind the Community Development building (Figure 2) drains to a large grass area across from the farmers’ market pavilion. This area is used for staging tents and booths during festivals and farmers’ markets, and is sometimes used for overflow parking. In recent years the grass area has become very muddy, hindering its use.

Proposed Retrofit: A stormwater retrofit to capture and treat runoff from this drainage area could both improve water quality and reduce the amount of water getting into the field. The proposed retrofit concept converts a 12’ x 50’ section of grass at the edge of the back parking lot into a bioswale (Figure 1). A very shallow storm drain pipe (approximately 1-ft deep) was installed in the vicinity to carry runoff from the roof down to Liberty Street where it enters a larger storm drain pipe. This pipe is not deep enough to tie in a regular underdrain pipe. Therefore, the bioswale can be built either without an underdrain or with an underdrain that has an “upturned elbow” joint to connect into the existing shallow storm drain pipe. If no underdrain is installed, it is recommended that the ponding depth be kept shallow (e.g., 3”) to avoid water standing for many days.



WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: <u>H19-A</u>	
DATE: <u>3/19/13</u>		ASSESSED BY: <u>LW</u>		CAMERA ID: <u>cuille</u>	
GPS ID:		LMK ID:		LAT:	
PICTURES: <u>3122 - 3126</u>		LONG:			
SITE DESCRIPTION					
Name: <u>Department of Community Development</u>					
Address: _____					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input checked="" type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other: _____					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond <input type="checkbox"/> Above Roadway Culvert			<input type="checkbox"/> Hotspot Operation <input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall <input type="checkbox"/> In Conveyance System			<input type="checkbox"/> Small Parking Lot <input type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW <input type="checkbox"/> Near Large Parking Lot			<input type="checkbox"/> Individual Street <input checked="" type="checkbox"/> Landscape / Hardscape		
<input type="checkbox"/> Other: _____			<input type="checkbox"/> Underground <input type="checkbox"/> Other: _____		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ <u>0.54 acres</u>			Drainage Area Land Use:		
Imperviousness ≈ <u>83</u> %			<input type="checkbox"/> Residential <input checked="" type="checkbox"/> Institutional		
Impervious Area ≈ <u>0.45 acres</u>			<input type="checkbox"/> SFH (< 1 ac lots) <input type="checkbox"/> Industrial		
Notes: <u>Check GIS</u>			<input type="checkbox"/> SFH (> 1 ac lots) <input type="checkbox"/> Transport-Related		
			<input type="checkbox"/> Townhouses <input type="checkbox"/> Park		
			<input type="checkbox"/> Multi-Family <input type="checkbox"/> Undeveloped		
			<input type="checkbox"/> Commercial <input type="checkbox"/> Other: _____		
EXISTING STORMWATER MANAGEMENT					
Existing Stormwater Practice: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe:					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable): <u>N/A</u>					
<u>- Roof drains and pieces of parking lot drain to small grassy area on north side of building</u>					
<u>- Erosion rill already started → retrofit would improve situation</u>					
Existing Head Available:			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		



PROPOSED RETROFIT

Purpose of Retrofit:
 Water Quality Recharge Channel Protection Flood Control
 Demonstration / Education Repair Other: erosion

Retrofit Volume Computations - Target Storage: _____
Retrofit Volume Computations - Available Storage: _____

Proposed Retrofit Practice: (Runoff Reduction)
 Disconnection Bioretention Bio Swale
 Expanded Tree Pit Infiltration Green Roof
 Permeable Pavement Rainwater Harvesting

Proposed Retrofit Practice: (Stormwater Treatment)
 Constructed Wetland Wet Swale Wet Pond
 Filtering Practice Proprietary: _____
 Other: _____

Retrofit Category (as defined by Chesapeake Bay Program):
 New BMP BMP Enhancement BMP Restoration BMP Conversion Not CBP-approved

Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance:
- Use grassy area for bioretention to collect + pond roof drain and parking lot runoff
- keep ponding shallow as there is no SW infrastructure to which an underdrain can be connected.

Available Width:	<u>35'</u>
Available Length:	<u>68'</u>
Available Area:	
Ponding Depth:	<u>2-3"</u>
Soil Depth:	

SITE CONSTRAINTS

Adjacent Land Use:
 Residential Commercial Institutional
 Industrial Transport-Related Park
 Undeveloped Other: _____

Possible Conflicts Due to Adjacent Land Use? Yes No
If Yes, Describe: _____

Access:
 No Constraints
 Constrained due to
 Slope Space
 Utilities Tree Impacts
 Structures Property
 Ownership
 Other: _____

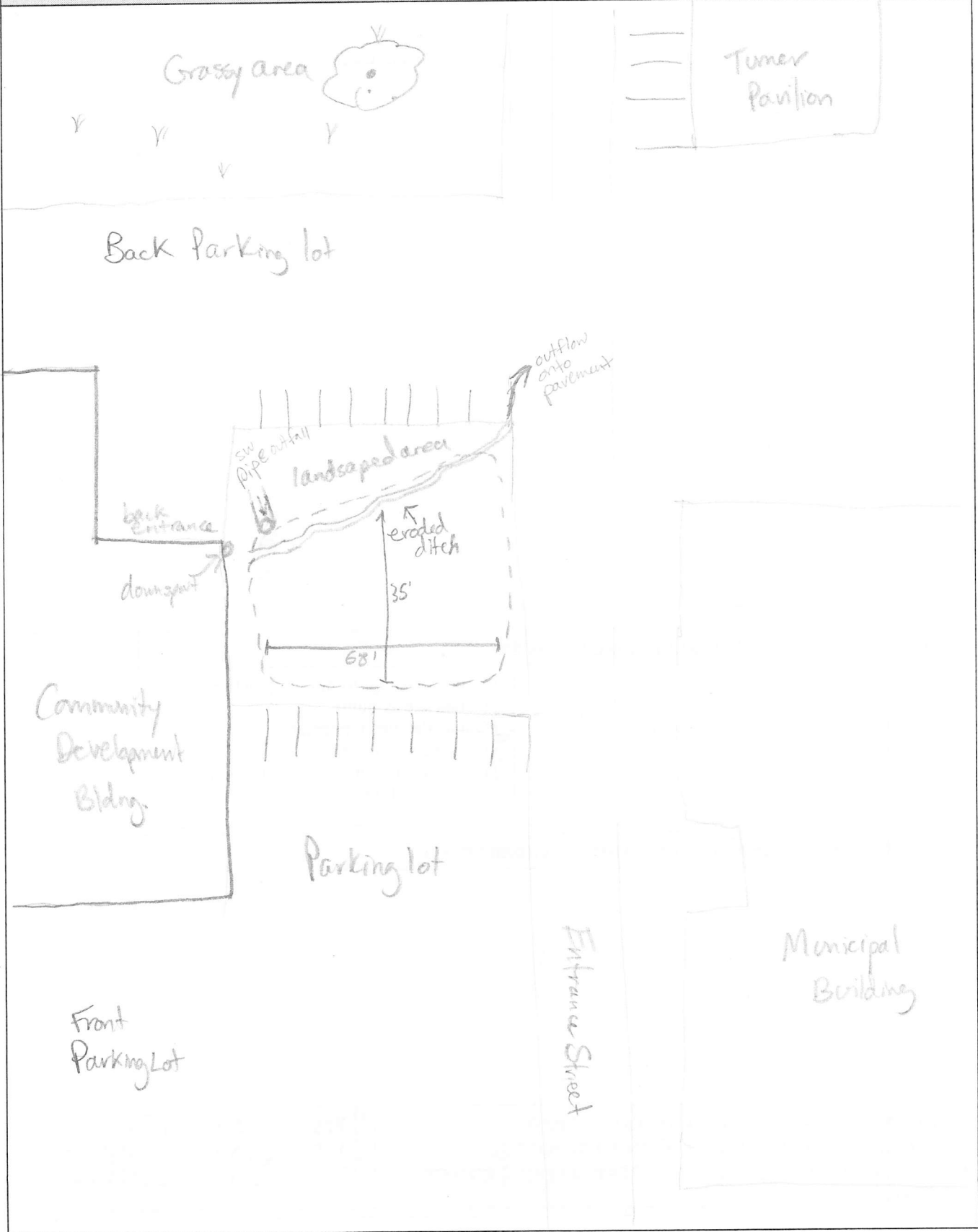
Conflicts with Existing Utilities:					Potential Permitting Factors:
	Yes	Possible/Modifiable	No	Unknown	
Sewer:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Probable <input checked="" type="checkbox"/> Not Probable
Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Probable <input checked="" type="checkbox"/> Not Probable
Gas:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Probable <input checked="" type="checkbox"/> Not Probable
Electric to Streetlights:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Probable <input checked="" type="checkbox"/> Not Probable
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Probable <input checked="" type="checkbox"/> Not Probable

Potential Permitting Factors:
 Dam Safety Permits Necessary
 Impacts to Wetlands
 Impacts to a Stream
 Floodplain Fill
 Impacts to Forests
 Impacts to Specimen Trees
 How many? _____
 Approx. DBH _____

Other factors: _____

Soils:
 Soil auger test holes: Yes No
 Evidence of poor infiltration (clays, fines): Yes No
 Evidence of shallow bedrock: Yes No
 Evidence of high water table (gleying, saturation): Yes No

SKETCH



DESIGN OR DELIVERY NOTES

- No storm drains available for underdrain pipe
- Consider adding very shallow under drain to drain bioretention area → would require building up the parking area

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|---|--|
| <input type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input type="checkbox"/> Confirm volume computations | <input checked="" type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| <input type="checkbox"/> Other: _____ | <input type="checkbox"/> Confirm soil types |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

★ High probability that Comm. Development Building will be expanded and will take up area of proposed retrofit.

SITE CANDIDATE FOR FURTHER INVESTIGATION:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> MAYBE
IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S):	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> MAYBE
IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S):	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> MAYBE

IF YES, TYPE(S): _____

WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: HA-B	
DATE: 3/19/13		ASSESSED BY: LW		CAMERA ID: cvllc	
GPS ID:		LMK ID:		LAT:	
LONG:					
SITE DESCRIPTION					
Name: Department of Community Development					
Address:					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input checked="" type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other:					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, Unique Site ID:					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond <input type="checkbox"/> Above Roadway Culvert			<input type="checkbox"/> Hotspot Operation <input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall <input type="checkbox"/> In Conveyance System			<input type="checkbox"/> Small Parking Lot <input checked="" type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW <input type="checkbox"/> Near Large Parking Lot			<input type="checkbox"/> Individual Street <input type="checkbox"/> Landscape / Hardscape		
<input type="checkbox"/> Other:			<input type="checkbox"/> Underground <input type="checkbox"/> Other:		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ 0.28 acres			Drainage Area Land Use:		
Imperviousness ≈ 79%			<input type="checkbox"/> Residential <input checked="" type="checkbox"/> Institutional		
Impervious Area ≈ 0.22			<input type="checkbox"/> SFH (< 1 ac lots) <input type="checkbox"/> Industrial		
			<input type="checkbox"/> SFH (> 1 ac lots) <input type="checkbox"/> Transport-Related		
Notes: see map and GIS			<input type="checkbox"/> Townhouses <input type="checkbox"/> Park		
			<input type="checkbox"/> Multi-Family <input type="checkbox"/> Undeveloped		
			<input type="checkbox"/> Commercial <input type="checkbox"/> Other:		
EXISTING STORMWATER MANAGEMENT					
Existing Stormwater Practice: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe: Newly installed storm drain carries rooftop runoff away from site, but back parking lot and entrance drive still drain to grass area behind building (making it muddy)					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance: Existing Street Width (if applicable):					
Existing Head Available: 2 ft.			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other) Depth of new storm pipe, below surface		



PROPOSED RETROFIT

Purpose of Retrofit:
 Water Quality Recharge Channel Protection Flood Control
 Demonstration / Education Repair Other: *reduce muddiness in grass*

Retrofit Volume Computations - Target Storage: _____
Retrofit Volume Computations - Available Storage: _____

Proposed Retrofit Practice: (Runoff Reduction)
 Disconnection Bioretention Bio Swale
 Expanded Tree Pit Infiltration Green Roof
 Permeable Pavement Rainwater Harvesting

Proposed Retrofit Practice: (Stormwater Treatment)
 Constructed Wetland Wet Swale Wet Pond
 Filtering Practice Proprietary: _____
 Other: _____

Retrofit Category (as defined by Chesapeake Bay Program):
 New BMP BMP Enhancement BMP Restoration BMP Conversion Not CBP-approved

Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance:
- Install linear bioretention (bioswale) along edge of parking lot behind building - along grass area

Available Width:	<i>10-15'</i>
Available Length:	<i>50'</i>
Available Area:	
Ponding Depth:	<i>2-3"</i>
Soil Depth:	

- Nearby storm drain not deep enough for an underdrain, so keep ponding shallow and use existing storm drain for overflow structure.

SITE CONSTRAINTS

Adjacent Land Use:
 Residential Commercial Institutional
 Industrial Transport-Related Park
 Undeveloped Other: *Used for farmers market + events*

Possible Conflicts Due to Adjacent Land Use? Yes No
If Yes, Describe: *Bioswale shouldn't take up too much room away from parking*

Access:
 No Constraints
 Constrained due to
 Slope Space
 Utilities Tree Impacts
 Structures Property
 Ownership
 Other: _____

Conflicts with Existing Utilities:	Yes	Possible/Modifiable	No	Unknown
Sewer:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Gas:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Electric to Streetlights:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Potential Permitting Factors:

Dam Safety Permits Necessary	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to Wetlands	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to a Stream	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Floodplain Fill	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to Forests	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to Specimen Trees	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable

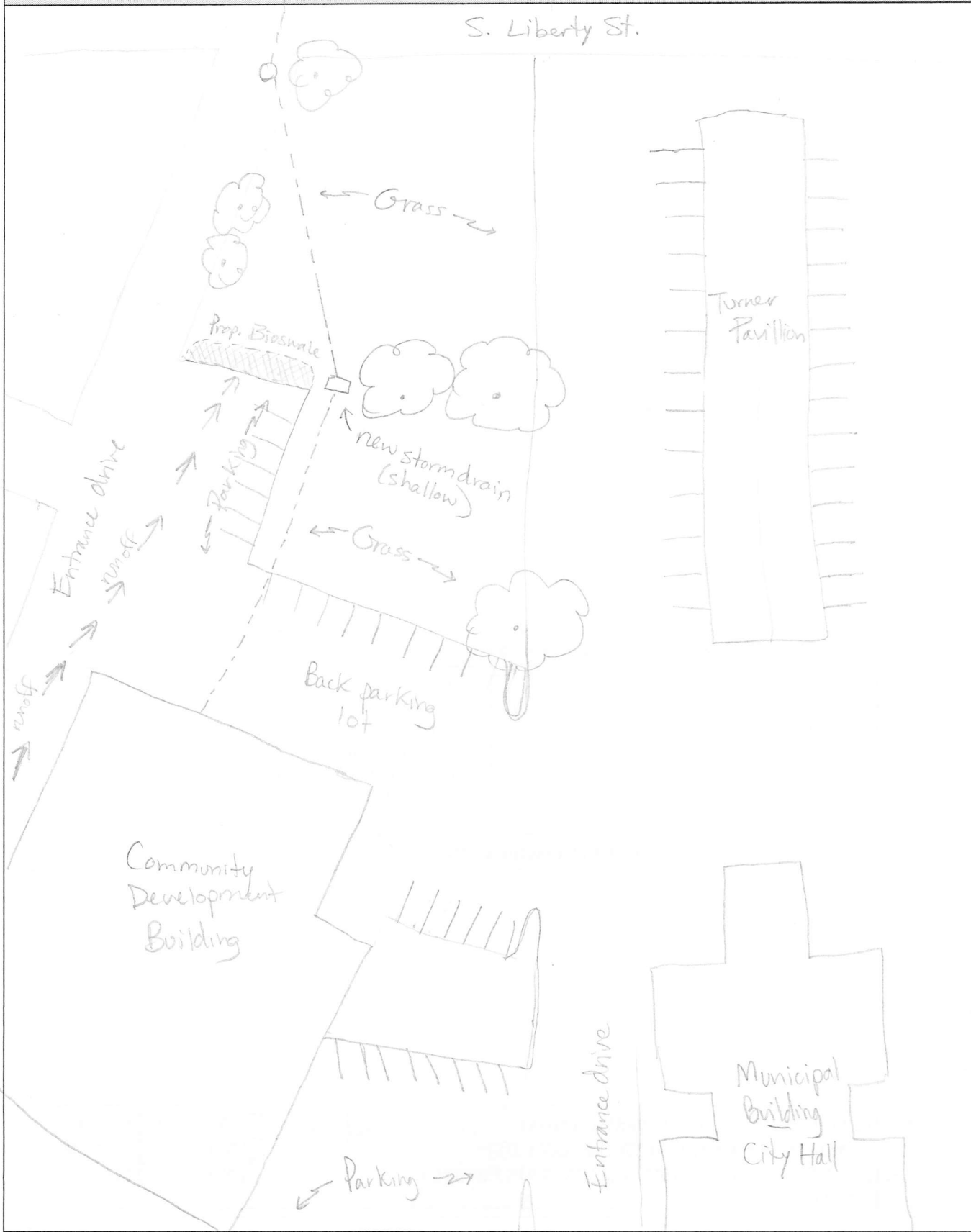
How many? _____
 Approx. DBH _____

Other factors: _____

Soils:

Soil auger test holes:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Evidence of poor infiltration (clays, fines):	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of shallow bedrock:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of high water table (gleying, saturation):	<input type="checkbox"/> Yes	<input type="checkbox"/> No

SKETCH



DESIGN OR DELIVERY NOTES

- This will only work if City allows bioswale without an underdrain. Without an underdrain, ponding should be kept shallow
- Overflow structure can be tied into new storm drain pipe (<1ft. deep)
- This retrofit should keep runoff off the grass area, which is known to get muddy.

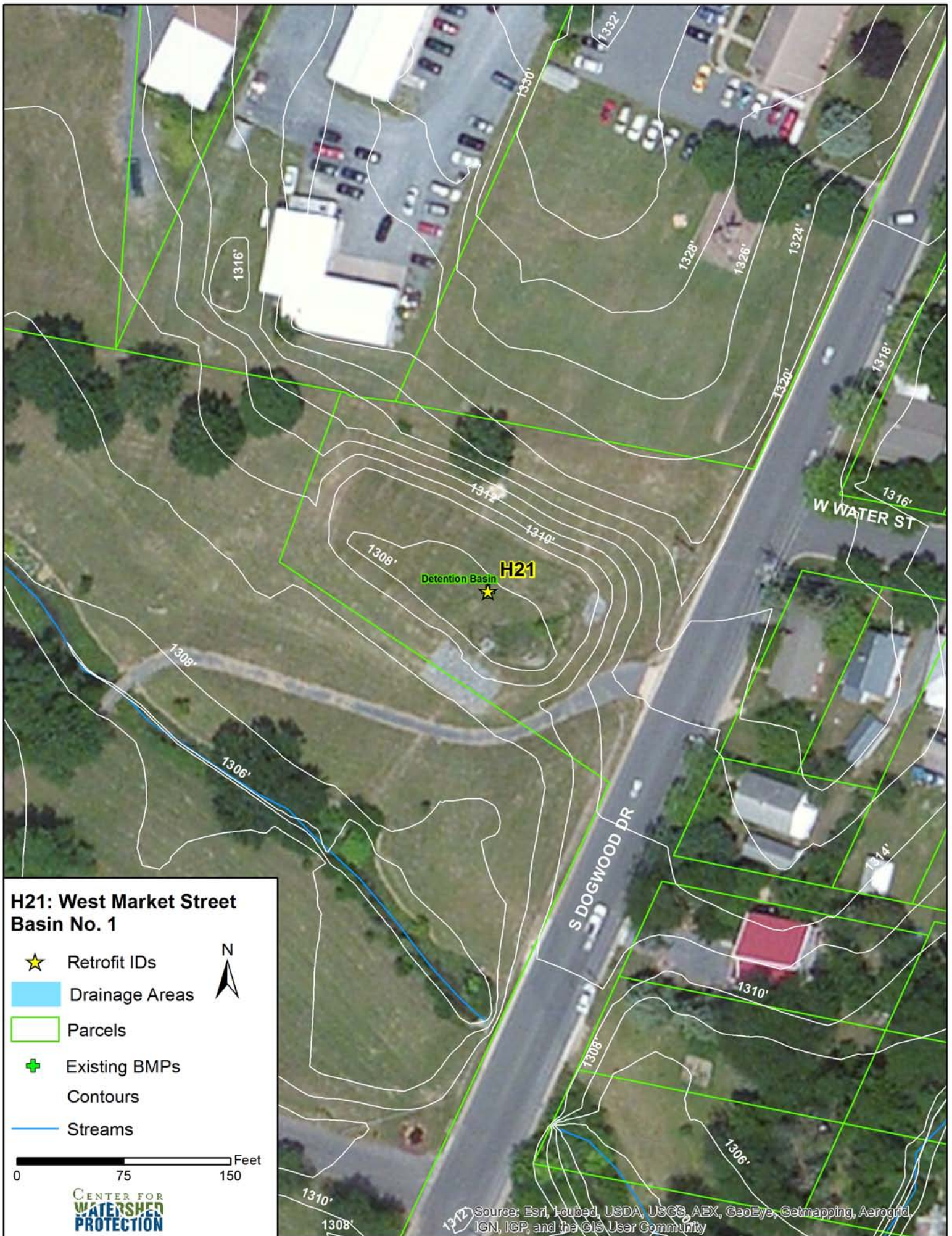
FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|---|---|
| <input type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input type="checkbox"/> Confirm volume computations | <input type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input checked="" type="checkbox"/> Confirm storm drain invert elevations |
| <input type="checkbox"/> Other: _____ | <input type="checkbox"/> Confirm soil types |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

SITE CANDIDATE FOR FURTHER INVESTIGATION: YES NO MAYBE
IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S): YES NO MAYBE
IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S): YES NO MAYBE
 IF YES, TYPE(S): _____

H21: West Market Street Basin No. 1



H21: West Market Street Basin No. 1

Score: 38

Rank: 18

Investigators: Joe Battiata



Figure 1: Principal Spillway. 2-year rectangular orifice showing (one each side); WQ orifice is buried 15" below rectangular orifice.



Figure 2: Inflow from diversion manhole in South Dogwood Street (basin silted in to top of pipe).

Description: The West Market Street (Route 33) widening project includes several stormwater management Extended Detention (ED) basins. This basin (Basin No. 1) is located near the entrance to Westover Park on South Dogwood Street and serves the added impervious cover of the West Market Street. A diversion manhole in South Dogwood Street diverts the design water quality flow rate from the drainage system to the basin. The basin consists of a primary riser structure with a low flow (water quality) orifice, a 2-year (or 1-year extended detention) channel protection orifice, and a rip rap overflow spillway (Figure 1). A significant volume of temporary storage (approximately 15" in depth across most of the basin) has been filled with sediment.

Proposed Retrofit: This "conversion" includes the removal of the sediment, and the conversion of the ED volume to a wetland pool (Figure 2). Alternatively, if the storage is needed to maintain the channel protection volume, then the conversion would include a combination of sediment removal and excavation in order to establish an adequate wetland pool. A survey may be beneficial to determine the exact storage volumes needed beyond what may already be available after sediment is removed. It may also be worth assessing whether the basin meets the new stormwater requirements. Minor modifications to the riser structure may be required.



WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: H21	
DATE: 3/20/13		ASSESSED BY: JGB		CAMERA ID:	
GPS ID:		LMK ID:		LAT:	
				LONG:	
SITE DESCRIPTION					
Name: WEST MARKET STREET BASIN No. 1 ENHANCEMENT					
Address: _____					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input type="checkbox"/> Local <input type="checkbox"/> State <input checked="" type="checkbox"/> DOT <input type="checkbox"/> Other: _____					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage			On-Site		
<input checked="" type="checkbox"/> Existing Pond <input type="checkbox"/> Above Roadway Culvert			<input type="checkbox"/> Hotspot Operation <input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall <input type="checkbox"/> In Conveyance System			<input type="checkbox"/> Small Parking Lot <input type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW <input type="checkbox"/> Near Large Parking Lot			<input type="checkbox"/> Individual Street <input type="checkbox"/> Landscape / Hardscape		
<input type="checkbox"/> Other: _____			<input type="checkbox"/> Underground <input type="checkbox"/> Other: _____		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ _____			Drainage Area Land Use:		
Imperviousness ≈ _____ %			<input type="checkbox"/> Residential <input type="checkbox"/> Institutional		
Impervious Area ≈ 1.10 AC			<input type="checkbox"/> SFH (< 1 ac lots) <input type="checkbox"/> Industrial		
Notes: LARGE DA - MANHOLE DIVERSION STRUCTURE DIVERTS APPROX. 1.10 AC OF NEW IMP TO BASIN (COMPS NOT AVAILABLE TO VERIFY)			<input type="checkbox"/> SFH (> 1 ac lots) <input type="checkbox"/> Transport-Related		
			<input type="checkbox"/> Townhouses <input type="checkbox"/> Park		
			<input type="checkbox"/> Multi-Family <input type="checkbox"/> Undeveloped		
			<input type="checkbox"/> Commercial <input type="checkbox"/> Other: _____		
EXISTING STORMWATER MANAGEMENT					
Existing Stormwater Practice: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe: - EXISTING POND W/ DIVERSION STRUCTURE IN S. DOGWOOD DR. TO DIVERT WQ FLOW INTO POND. INFLOW SHORT CIRCUITS TO OUTLET. - SIGNIFICANT SEDIMENT ACCUMULATION POND IS EXT. DETENTION BASIN					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance: Existing Street Width (if applicable): _____ POND IN A PARK SETTING ADJACENT TO S. DOGWOOD DR.					
Existing Head Available:			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		

PROPOSED RETROFIT

Purpose of Retrofit:

- Water Quality Recharge Channel Protection Flood Control
 Demonstration / Education Repair Other: _____

Retrofit Volume Computations - Target Storage:

Retrofit Volume Computations - Available Storage:

- Proposed Retrofit Practice: (Runoff Reduction)**
- Disconnection Bioretention Bio Swale
 Expanded Tree Pit Infiltration Green Roof
 Permeable Pavement Rainwater Harvesting

- Proposed Retrofit Practice: (Stormwater Treatment)**
- Constructed Wetland Wet Swale Wet Pond
 Filtering Practice Proprietary: _____
 Other: EXT DETENTION

Retrofit Category (as defined by Chesapeake Bay Program):

- New BMP BMP Enhancement BMP Restoration BMP Conversion Not CBP-approved

Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance:

- ① EXCAVATE ACCUMULATED SEDIMENT
 ② INSTALL Baffle to ELIMINATE SHORT CIRCUIT.
 ③ VERIFY STORAGE VOLUME & MODIFY RISER TO ADD

Available Width:	_____
Available Length:	_____
Available Area:	_____
Ponding Depth:	_____
Soil Depth:	_____

- SHALLOW MARSH, OR
 - ED VOLUME
 - BOTH

SITE CONSTRAINTS

Adjacent Land Use:

- Residential Commercial Institutional
 Industrial Transport-Related Park
 Undeveloped Other: ROADWAY

Possible Conflicts Due to Adjacent Land Use? Yes No
If Yes, Describe:

Access:

- No Constraints
 Constrained due to
 Slope Space
 Utilities Tree Impacts
 Structures Property
 Ownership
 Other: _____

Conflicts with Existing Utilities:

	Yes	Possible/ Modifiable	No	Unknown
Sewer:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Gas:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Electric to	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Streetlights:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Potential Permitting Factors:

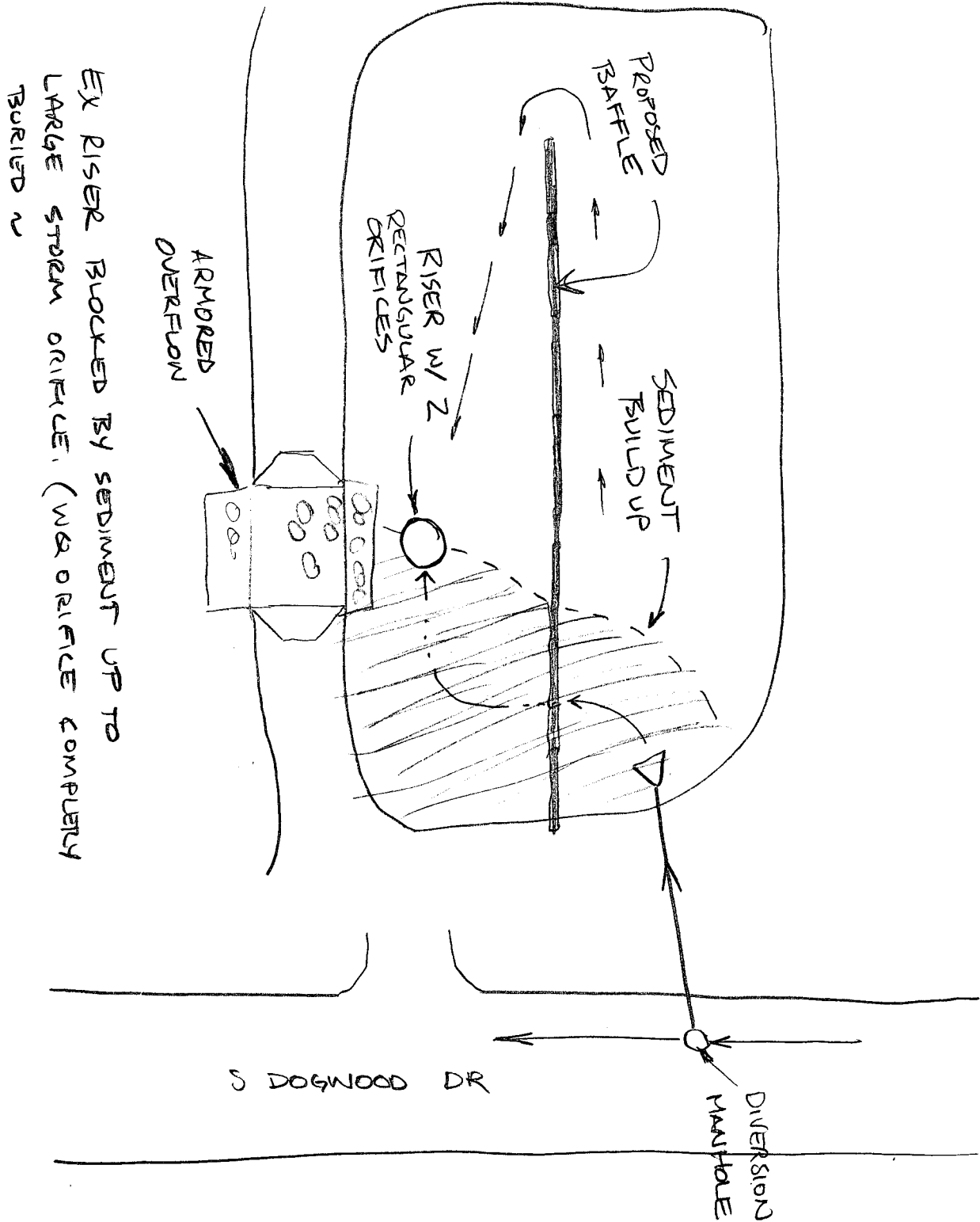
- Dam Safety Permits Necessary Probable Not Probable
 Impacts to Wetlands Probable Not Probable
 Impacts to a Stream Probable Not Probable
 Floodplain Fill Probable Not Probable
 Impacts to Forests Probable Not Probable
 Impacts to Specimen Trees Probable Not Probable
 How many? _____
 Approx. DBH _____

Other factors: _____

Soils:

- Soil auger test holes: Yes No
 Evidence of poor infiltration (clays, fines): Yes No
 Evidence of shallow bedrock: Yes No
 Evidence of high water table (gleying, saturation): Yes No

SKETCH



EX RISER BLOCKED BY SEDIMENT UP TO
LARGE STORM ORIFICE. (WAS ORIFICE COMPLETELY
BURIED ~

DESIGN OR DELIVERY NOTES

NEED DESIGN INFO:

- DA MAP
- RISER DESIGN
- STORAGE VOLUME CALCS
- SEDIMENT VOLUME REMOVAL APPROX

PROPOSED

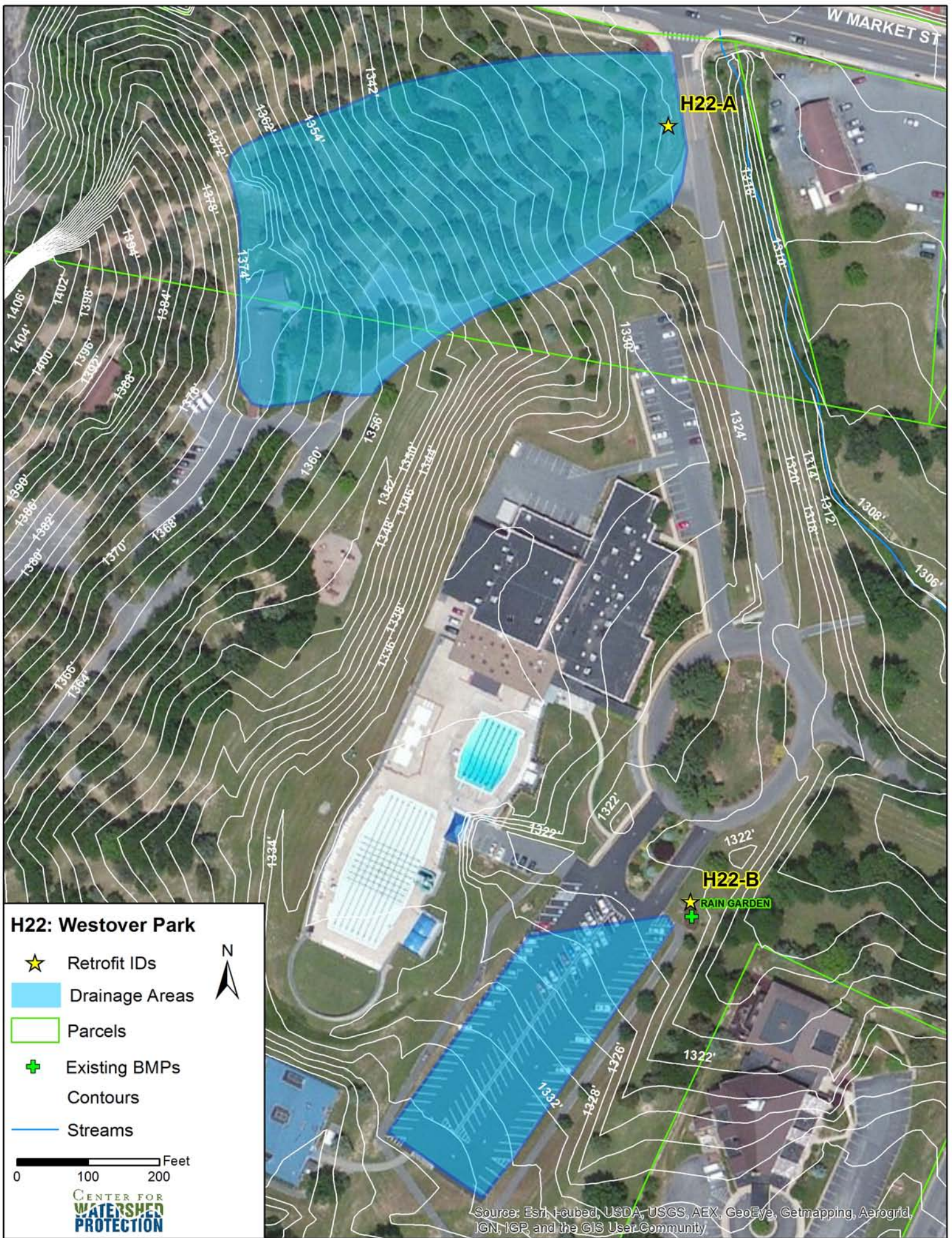
FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|--|---|
| <input type="checkbox"/> Confirm property ownership | <input checked="" type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input checked="" type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input checked="" type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input checked="" type="checkbox"/> Confirm volume computations | <input type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| <input type="checkbox"/> Other: _____ | <input type="checkbox"/> Confirm soil types |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

SITE CANDIDATE FOR FURTHER INVESTIGATION:	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> MAYBE
IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S):	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> MAYBE
IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S):	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> MAYBE
IF YES, TYPE(S): _____			

H22: Westover Park

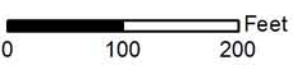


W MARKET ST

H22-A

H22-B

★ RAIN GARDEN



CENTER FOR WATERSHED PROTECTION

Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

H22-A: Westover Park Entrance

Score: 48

Rank: 7

Investigators: Wes Runion, Jeremy Harold, Lisa Fraley-McNeal



Figure 1: Stream bank erosion



Figure 2: Proposed bioretention location

Description: Approximately 3 acres of roadway, building, and vegetated hill-slope drain down a side road at the park entrance, across the main park entrance road, and into the adjacent stream. The runoff is causing erosion along the stream bank where it enters the stream near the culvert at W. Market St. (Figure 1).

Proposed Retrofit: To capture this runoff, a 20' by 75' bioretention is proposed along the grass area to the west side of the park entrance road (Figure 2). The underdrain would tie into the existing inlet at the intersection of the park entrance road and W. Market St. To direct water into the practice, an asphalt berm would need to be constructed across the side road at the park entrance. A few trees need to be avoided at the proposed location. High visibility at the park entrance makes this bioretention a good candidate for a demonstration project.

H22-B: Westover Park Parking Lot

Score: 31

Rank: 28

Investigators: Thanh Dang, David Hirschman



Figure 1: Flat, grassy area adjacent to large parking lot. Note the existing rain garden where the investigators are standing.

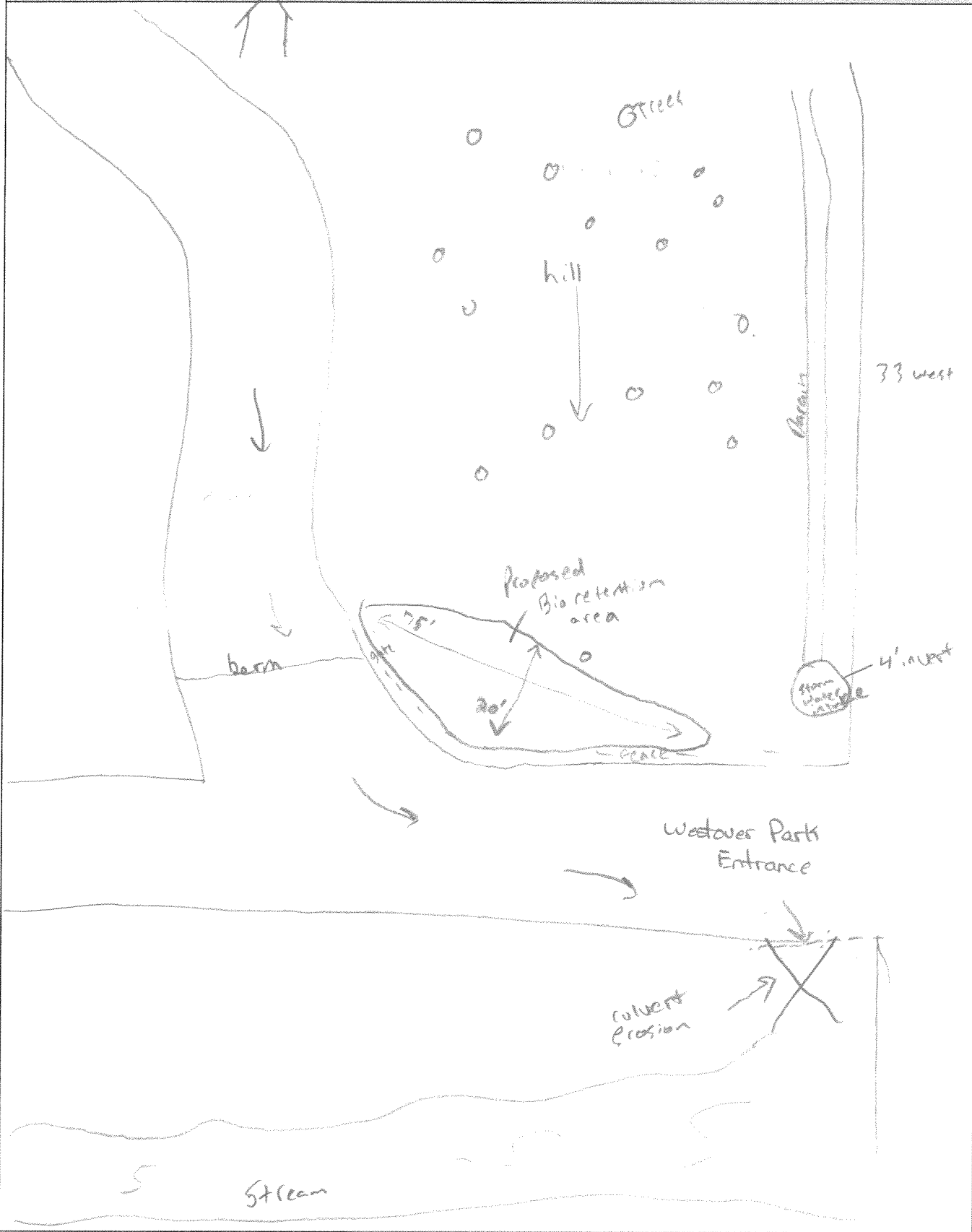
Description: The nearly 1-acre parking lot drains to the northeast corner. A small, existing rain garden has been installed here. There is a flat area here, and the ground slopes down to the east beyond the flat area (Figure 1).

Proposed Retrofit: The existing rain garden is an excellent feature, but could be expanded to treat more runoff from the parking lot. The rain garden can stop at the drip line of the existing tree or go beyond the drip line if the tree is not considered important and/or can be replaced. The underdrain can outlet down the slope, although the existing sewer line must be avoided. One area of concern is that a soil auger test in the area encountered an impenetrable barrier about 6" below the ground surface. This should be investigated further, as it may limit the feasibility of a bioretention practice in this spot.

WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: <u>H22-A</u>	
DATE: <u>20 March 2013</u>	ASSESSED BY: <u>Lisa Joerges W&P</u>	CAMERA ID:		PICTURES: <u>28-35</u>	
GPS ID:	LMK ID:	LAT:		LONG:	
SITE DESCRIPTION					
Name: <u>West over Park Entrance</u>					
Address: _____					
Ownership: <input type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input checked="" type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other: _____					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond	<input type="checkbox"/> Above Roadway Culvert	<input type="checkbox"/> Hotspot Operation	<input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall	<input type="checkbox"/> In Conveyance System	<input type="checkbox"/> Small Parking Lot	<input type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW	<input type="checkbox"/> Near Large Parking Lot	<input type="checkbox"/> Individual Street	<input type="checkbox"/> Landscape / Hardscape		
<input type="checkbox"/> Other: _____		<input type="checkbox"/> Underground	<input checked="" type="checkbox"/> Other: <u>Park drainage</u>		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ <u>3 acres</u>			Drainage Area Land Use:		
Imperviousness ≈ <u>14.7</u> %			<input type="checkbox"/> Residential	<input type="checkbox"/> Institutional	
Impervious Area ≈ <u>0.44 acres</u>			<input type="checkbox"/> SFH (< 1 ac lots)	<input type="checkbox"/> Industrial	
Notes:			<input type="checkbox"/> SFH (> 1 ac lots)	<input type="checkbox"/> Transport-Related	
			<input type="checkbox"/> Townhouses	<input checked="" type="checkbox"/> Park	
			<input type="checkbox"/> Multi-Family	<input type="checkbox"/> Undeveloped	
			<input type="checkbox"/> Commercial	<input type="checkbox"/> Other: _____	
			EXISTING STORMWATER MANAGEMENT		
Existing Stormwater Practice: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe:					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable): _____					
<u>Park location with street & hillside drainage, causing severe erosion on stream bank.</u>					
Existing Head Available:			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		
<u>4' measured from manhole rim to catch basin invert</u>					

PROPOSED RETROFIT																																																	
Purpose of Retrofit: <input checked="" type="checkbox"/> Water Quality <input type="checkbox"/> Recharge <input checked="" type="checkbox"/> Channel Protection <input type="checkbox"/> Flood Control <input checked="" type="checkbox"/> Demonstration / Education <input type="checkbox"/> Repair <input type="checkbox"/> Other: _____																																																	
Retrofit Volume Computations - Target Storage: <p style="font-size: 1.2em; margin-left: 20px;">3562 Ft³</p>	Retrofit Volume Computations - Available Storage: <p style="font-size: 1.2em; margin-left: 20px;">1982 Ft³</p>																																																
Proposed Retrofit Practice: (Runoff Reduction) <input type="checkbox"/> Disconnection <input checked="" type="checkbox"/> Bioretention <input type="checkbox"/> Bio Swale <input type="checkbox"/> Expanded Tree Pit <input type="checkbox"/> Infiltration <input type="checkbox"/> Green Roof <input type="checkbox"/> Permeable Pavement <input type="checkbox"/> Rainwater Harvesting	Proposed Retrofit Practice: (Stormwater Treatment) <input type="checkbox"/> Constructed Wetland <input type="checkbox"/> Wet Swale <input type="checkbox"/> Wet Pond <input type="checkbox"/> Filtering Practice <input type="checkbox"/> Proprietary: _____ <input type="checkbox"/> Other: _____																																																
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Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance: <p style="font-size: 1.1em; margin-left: 20px;">Create a bioretention area to capture stormwater runoff from road + hillside.</p>																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Available Width:</td><td style="text-align: center;">20'</td></tr> <tr><td>Available Length:</td><td style="text-align: center;">75' or greater</td></tr> <tr><td>Available Area:</td><td style="text-align: center;">1500 Ft²</td></tr> <tr><td>Ponding Depth:</td><td style="text-align: center;">1'</td></tr> <tr><td>Soil Depth:</td><td style="text-align: center;">30"</td></tr> </table>	Available Width:	20'	Available Length:	75' or greater	Available Area:	1500 Ft ²	Ponding Depth:	1'	Soil Depth:	30"	<p style="font-size: 1.1em; margin-left: 20px;">4' invert - Tie into existing stormdrain at intersection of West Market (Rt 33) and West over Dr.</p>																																						
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Soils: Soil auger test holes: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of poor infiltration (clays, fines): <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of shallow bedrock: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of high water table (gleying, saturation): <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																	

SKETCH



DESIGN OR DELIVERY NOTES

Will need to create a berm across the roadway to direct water into the bioretention.

Proposed bioretention length = 75', but there is the potential to expand this if the surface area needs to be increased to treat the drainage area.

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|---|--|
| <input type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input type="checkbox"/> Confirm volume computations | <input type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| | <input type="checkbox"/> Confirm soil types |
| <input type="checkbox"/> Other: _____ | |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

Site location at the park entrance makes this a good candidate for a demonstration project. There are a few trees that would need to be worked around.

SITE CANDIDATE FOR FURTHER INVESTIGATION:

IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S):

IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S):

IF YES, TYPE(S): _____

- | | | |
|------------------------------|-----------------------------|--------------------------------|
| <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
| <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
| <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |

WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: H-22-B	
DATE:		ASSESSED BY: DJH LFM		CAMERA ID:	
PICTURES: 95-96		LAT:		LONG:	
GPS ID:		LMK ID:		LONG:	
SITE DESCRIPTION					
Name: <u>Westover Park Parking</u>					
Address: _____					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other: _____					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond <input type="checkbox"/> Above Roadway Culvert			<input type="checkbox"/> Hotspot Operation <input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall <input type="checkbox"/> In Conveyance System			<input checked="" type="checkbox"/> Small Parking Lot <input type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW <input type="checkbox"/> Near Large Parking Lot			<input type="checkbox"/> Individual Street <input type="checkbox"/> Landscape / Hardscape		
<input type="checkbox"/> Other: _____			<input type="checkbox"/> Underground <input type="checkbox"/> Other: _____		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ <u>0.94</u>			Drainage Area Land Use:		
Imperviousness ≈ <u>100</u> %			<input type="checkbox"/> Residential <input type="checkbox"/> Institutional		
Impervious Area ≈ <u>0.94</u>			<input type="checkbox"/> SFH (< 1 ac lots) <input type="checkbox"/> Industrial		
Notes: <u>Parking Lot = 130 x 370</u>			<input type="checkbox"/> SFH (> 1 ac lots) <input type="checkbox"/> Transport-Related		
<u>48,100</u>			<input type="checkbox"/> Townhouses <input checked="" type="checkbox"/> Park		
			<input type="checkbox"/> Multi-Family <input type="checkbox"/> Undeveloped		
			<input type="checkbox"/> Commercial <input type="checkbox"/> Other: _____		
EXISTING STORMWATER MANAGEMENT					
Existing Stormwater Practice: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe: <u>Small rain garden</u>					
<u>20 x 30</u>					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable): _____					
<u>Large parking lot draining to one corner</u>					
<u>w/ small rain garden</u>					
Existing Head Available:			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		
<u>5.2'</u>			<u>1.3 Top</u>		
			<u>6.5 Bottom of slope</u>		

0.5
1.3
5.2

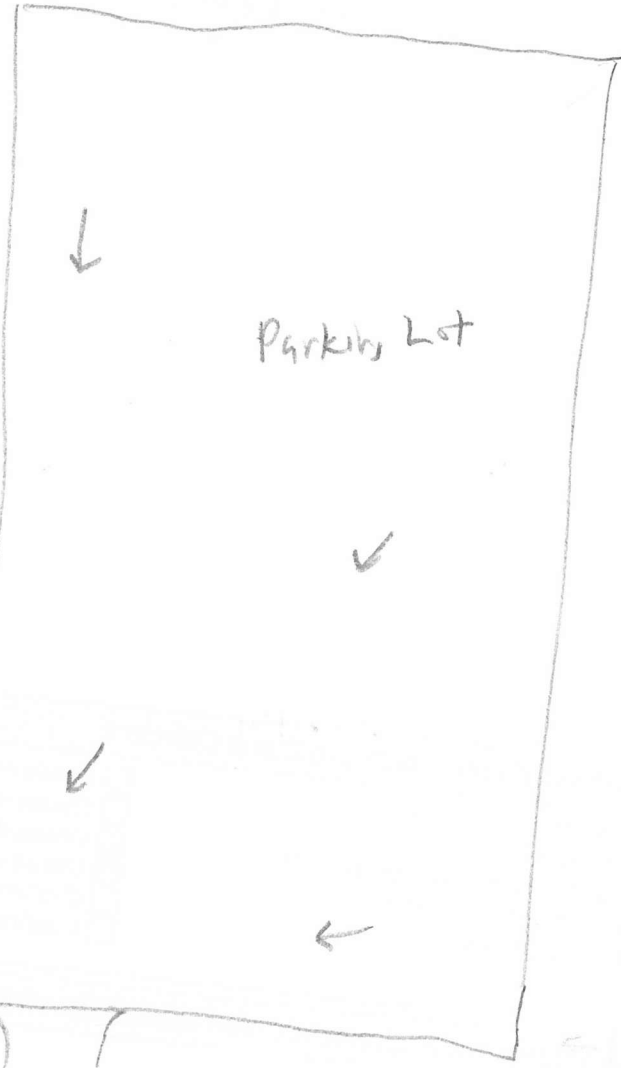
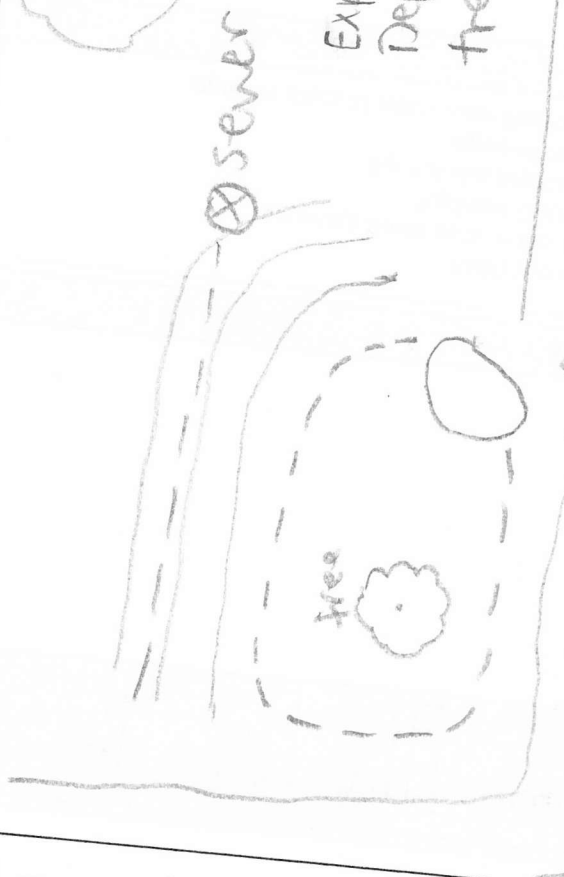


PROPOSED RETROFIT																																				
Purpose of Retrofit: <input checked="" type="checkbox"/> Water Quality <input type="checkbox"/> Recharge <input type="checkbox"/> Channel Protection <input type="checkbox"/> Flood Control <input type="checkbox"/> Demonstration / Education <input type="checkbox"/> Repair <input type="checkbox"/> Other: _____																																				
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Retrofit Category (as defined by Chesapeake Bay Program): <input type="checkbox"/> New BMP <input checked="" type="checkbox"/> BMP Enhancement <input type="checkbox"/> BMP Restoration <input type="checkbox"/> BMP Conversion <input type="checkbox"/> Not CBP-approved																																				
Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance: <div style="border: 1px solid black; padding: 5px; width: 25%; float: left;"> Available Width: _____ Available Length: _____ Available Area: _____ Ponding Depth: _____ Soil Depth: _____ </div> <div style="margin-left: 20px; margin-top: 20px;"> <p style="font-size: 1.2em;">To drip line of tree = 64 x 45 Past drip line = 89 x 45</p> </div>																																				
SITE CONSTRAINTS																																				
Adjacent Land Use: <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Institutional <input type="checkbox"/> Industrial <input type="checkbox"/> Transport-Related <input checked="" type="checkbox"/> Park <input type="checkbox"/> Undeveloped <input type="checkbox"/> Other: _____ Possible Conflicts Due to Adjacent Land Use? <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Describe:	Access: <input checked="" type="checkbox"/> No Constraints Constrained due to <input type="checkbox"/> Slope <input type="checkbox"/> Space <input type="checkbox"/> Utilities <input type="checkbox"/> Tree Impacts <input type="checkbox"/> Structures <input type="checkbox"/> Property Ownership <input type="checkbox"/> Other: _____																																			
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	Yes	Possible/ Modifiable	No	Unknown																																
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SKETCH

Main issue - soil auger hit something hard
≈ 6" down - so need to check for
rock.

Expand rain garden / bioretention -
Depending on storage needed, stop at
tree or go beyond it.





DESIGN OR DELIVERY NOTES

- Check for rock

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

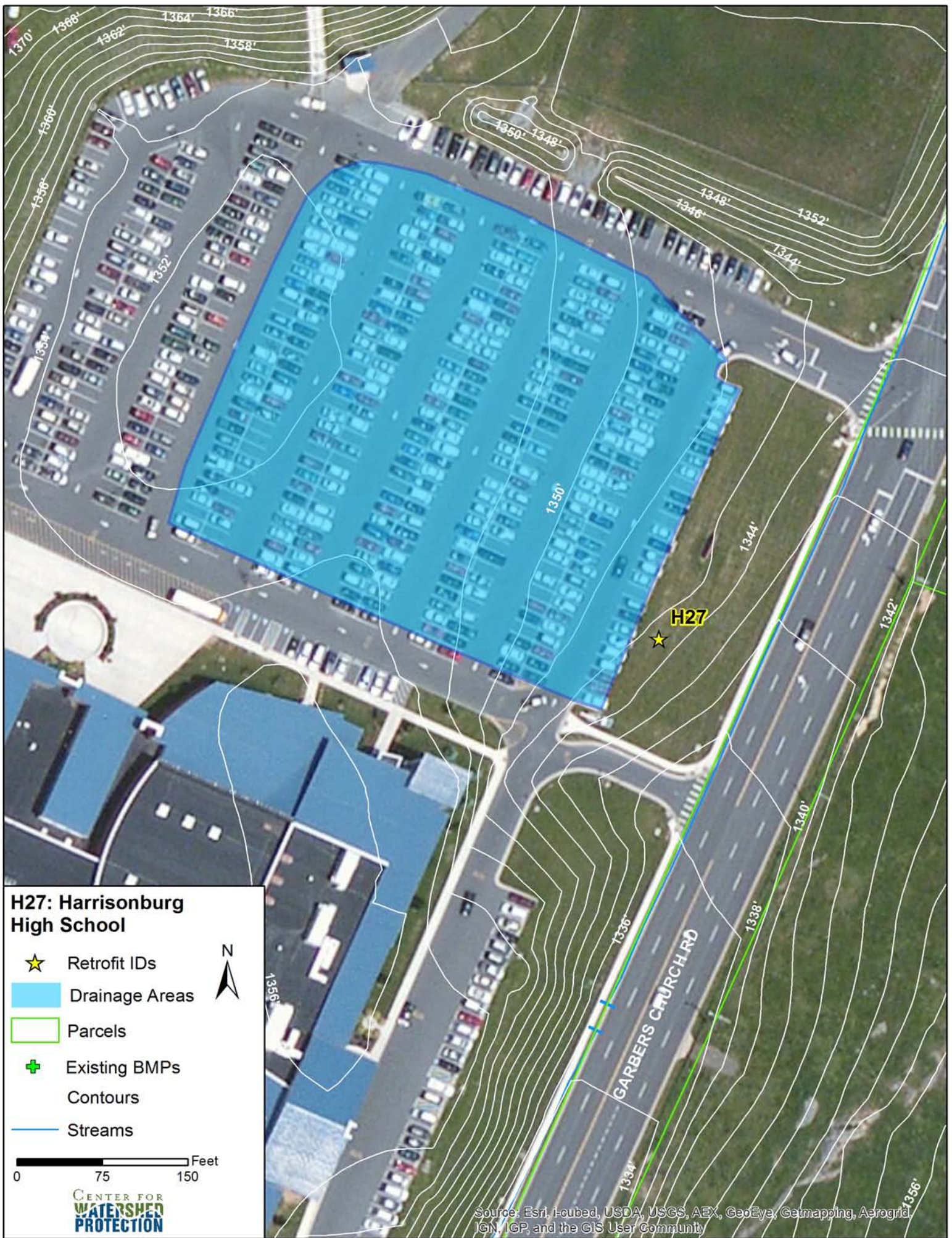
- | | |
|---|--|
| <input type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input checked="" type="checkbox"/> Obtain detailed topography |
| <input checked="" type="checkbox"/> Confirm volume computations | <input checked="" type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| | <input type="checkbox"/> Confirm soil types |
- Other: _____

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

SITE CANDIDATE FOR FURTHER INVESTIGATION:	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> MAYBE
IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S):	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> MAYBE
IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S):	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> MAYBE

IF YES, TYPE(S): _____

H27: Harrisonburg High School



H27: Harrisonburg High School

Score: 43

Rank: 10

Investigators: Wes Runion, Jeremy Harold, Lisa Fraley-McNeal



Figure 1: Convert this area to bioretention



Figure 2: Parking lot drainage to the proposed site

Description: Approximately 2 acres of the parking lot currently drains to inlets along the eastern edge of the lot. There is a large grass area between the parking lot and Garbers Church Rd that is unused except for a school sign (Figure 1).

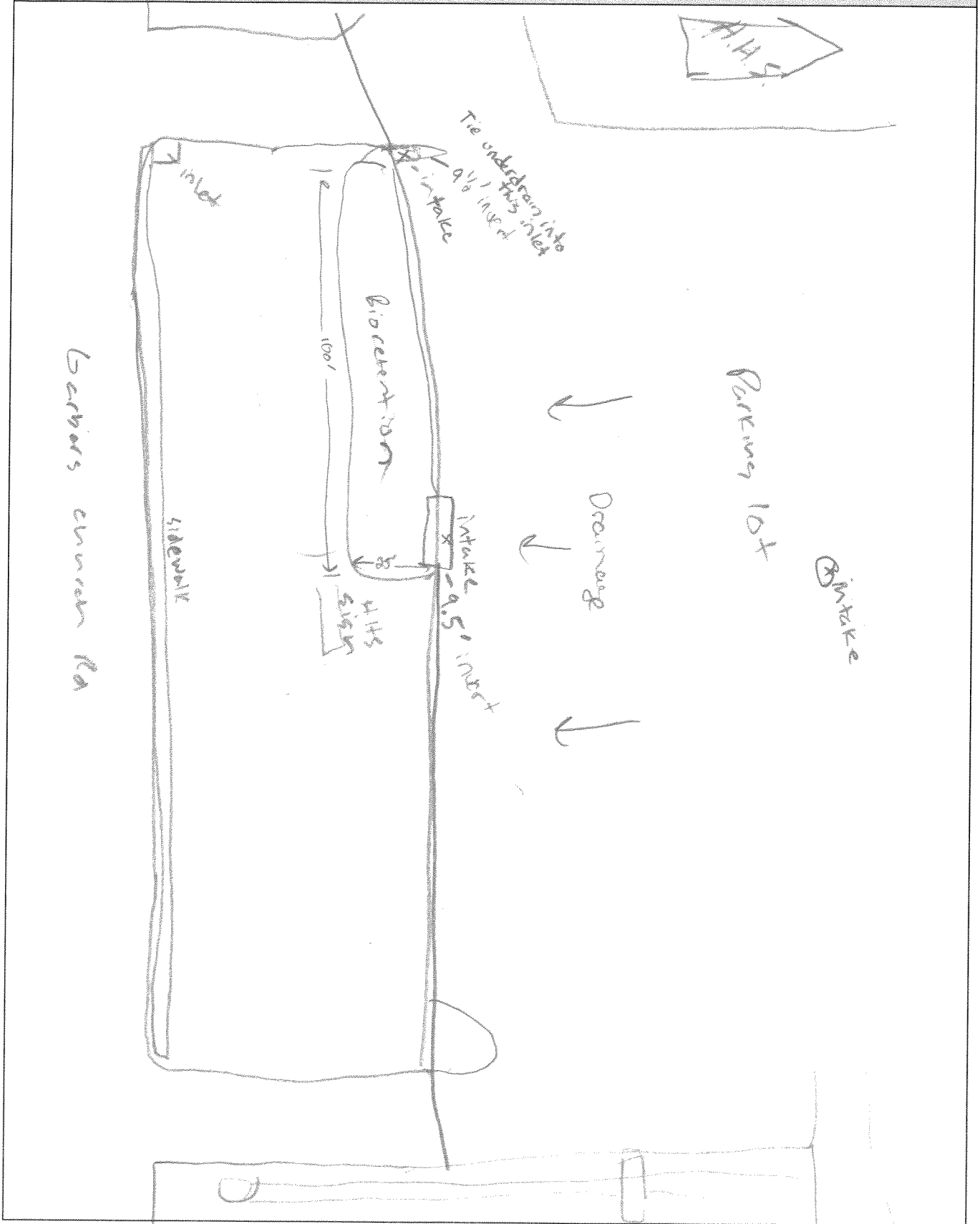
Proposed Retrofit: A bioretention practice is proposed for the grass area between the parking lot and Garbers Church Rd. Relocation of the school sign can be avoided by installing the practice to the south of the sign and near the parking lot. However, relocation of the sign may be desired for aesthetic purposes. There is adequate space to install a 25' x 100' bioretention and the underdrain would be tied into the existing inlet at the southernmost corner of the lot. The parking lot inlet would be blocked and curb cuts would direct parking lot drainage into the practice. This bioretention would be a good demonstration project due to visibility of the site, ability to treat a large amount of impervious cover, and the potential to involve students in the construction process.



WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: <u>H07</u>	
DATE: <u>20 March 2013</u>		ASSESSED BY: <u>Wes I. Sa</u>		CAMERA ID:	
GPS ID:		LMK ID:		LAT:	
LONG:					
SITE DESCRIPTION					
Name: <u>HHS</u>					
Address: <u>barbers church Rd</u>					
Ownership: <input type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input checked="" type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other: _____					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage					
<input type="checkbox"/> Existing Pond <input type="checkbox"/> Above Roadway Culvert					
<input type="checkbox"/> Below Outfall <input type="checkbox"/> In Conveyance System					
<input type="checkbox"/> In Road ROW <input type="checkbox"/> Near Large Parking Lot					
<input type="checkbox"/> Other: _____					
On-Site					
<input type="checkbox"/> Hotspot Operation <input type="checkbox"/> Individual Rooftop					
<input checked="" type="checkbox"/> Small Parking Lot <input type="checkbox"/> Small Impervious Area					
<input type="checkbox"/> Individual Street <input type="checkbox"/> Landscape / Hardscape					
<input type="checkbox"/> Underground <input type="checkbox"/> Other: _____					
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ <u>2.12 ac</u>			Drainage Area Land Use:		
Imperviousness ≈ <u>100%</u> %			<input type="checkbox"/> Residential <input checked="" type="checkbox"/> Institutional		
Impervious Area ≈ <u>2.12 ac</u>			<input type="checkbox"/> SFH (< 1 ac lots) <input type="checkbox"/> Industrial		
			<input type="checkbox"/> SFH (> 1 ac lots) <input type="checkbox"/> Transport-Related		
			<input type="checkbox"/> Townhouses <input type="checkbox"/> Park		
			<input type="checkbox"/> Multi-Family <input type="checkbox"/> Undeveloped		
			<input type="checkbox"/> Commercial <input type="checkbox"/> Other: _____		
Notes:					
EXISTING STORMWATER MANAGEMENT					
Existing Stormwater Practice: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe: <u>School drainage is treated by a detention pond at the southern end of the property.</u>					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable): _____					
<u>2/3 parking lot drained into stormwater system through parking lot inlets. Large grassy area at the front of the parking lot.</u>					
Existing Head Available:			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		
<u>9'0" measured from manhole rim to catch basin invert</u>					

PROPOSED RETROFIT																															
Purpose of Retrofit: <input checked="" type="checkbox"/> Water Quality <input type="checkbox"/> Recharge <input type="checkbox"/> Channel Protection <input type="checkbox"/> Flood Control <input checked="" type="checkbox"/> Demonstration / Education <input type="checkbox"/> Repair <input type="checkbox"/> Other: _____																															
Retrofit Volume Computations - Target Storage: <div style="font-family: cursive; font-size: 1.2em; margin-top: 10px;">7,311 ft³</div>	Retrofit Volume Computations - Available Storage: <div style="font-family: cursive; font-size: 1.2em; margin-top: 10px;">4,197 ft³</div>																														
Proposed Retrofit Practice: (Runoff Reduction) <input type="checkbox"/> Disconnection <input checked="" type="checkbox"/> Bioretention <input type="checkbox"/> Bio Swale <input type="checkbox"/> Expanded Tree Pit <input type="checkbox"/> Infiltration <input type="checkbox"/> Green Roof <input type="checkbox"/> Permeable Pavement <input type="checkbox"/> Rainwater Harvesting	Proposed Retrofit Practice: (Stormwater Treatment) <input type="checkbox"/> Constructed Wetland <input type="checkbox"/> Wet Swale <input type="checkbox"/> Wet Pond <input type="checkbox"/> Filtering Practice <input type="checkbox"/> Proprietary: _____ <input type="checkbox"/> Other: _____																														
Retrofit Category (as defined by Chesapeake Bay Program): <input checked="" type="checkbox"/> New BMP <input type="checkbox"/> BMP Enhancement <input type="checkbox"/> BMP Restoration <input type="checkbox"/> BMP Conversion <input type="checkbox"/> Not CBP-approved																															
Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance: <div style="font-family: cursive; margin-top: 10px;"> Create bioretention area b/w parking lot + Garbers church Rd to capture runoff from parking lot. Tie underdrain into existing parking lot inlet. </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr><td style="padding: 2px;">Available Width:</td><td style="padding: 2px; text-align: center;">25'</td></tr> <tr><td style="padding: 2px;">Available Length:</td><td style="padding: 2px; text-align: center;">100'</td></tr> <tr><td style="padding: 2px;">Available Area:</td><td style="padding: 2px; text-align: center;">2500 ft²</td></tr> <tr><td style="padding: 2px;">Ponding Depth:</td><td style="padding: 2px; text-align: center;">1'</td></tr> <tr><td style="padding: 2px;">Soil Depth:</td><td style="padding: 2px; text-align: center;">36"</td></tr> </table>		Available Width:	25'	Available Length:	100'	Available Area:	2500 ft ²	Ponding Depth:	1'	Soil Depth:	36"																				
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Available Area:	2500 ft ²																														
Ponding Depth:	1'																														
Soil Depth:	36"																														
SITE CONSTRAINTS																															
Adjacent Land Use: <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Institutional <input type="checkbox"/> Industrial <input type="checkbox"/> Transport-Related <input type="checkbox"/> Park <input type="checkbox"/> Undeveloped <input type="checkbox"/> Other: _____ Possible Conflicts Due to Adjacent Land Use? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, Describe:	Access: <input checked="" type="checkbox"/> No Constraints Constrained due to <input type="checkbox"/> Slope <input type="checkbox"/> Space <input type="checkbox"/> Utilities <input type="checkbox"/> Tree Impacts <input type="checkbox"/> Structures <input type="checkbox"/> Property Ownership <input type="checkbox"/> Other: _____																														
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	Yes	Possible/ Modifiable	No	Unknown																											
Sewer:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																											
Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																											
Gas:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																											
Electric to Streetlights:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																											
Other:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																											
Soils: Soil auger test holes: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of poor infiltration (clays, fines): <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of shallow bedrock: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Evidence of high water table (gleying, saturation): <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																															

SKETCH



DESIGN OR DELIVERY NOTES

May need to relocate or work around the concrete high school sign.

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|---|--|
| <input type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input checked="" type="checkbox"/> Confirm volume computations | <input type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| | <input type="checkbox"/> Confirm soil types |
| <input type="checkbox"/> Other: _____ | |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

Good site for demonstration project in front of school.

SITE CANDIDATE FOR FURTHER INVESTIGATION:

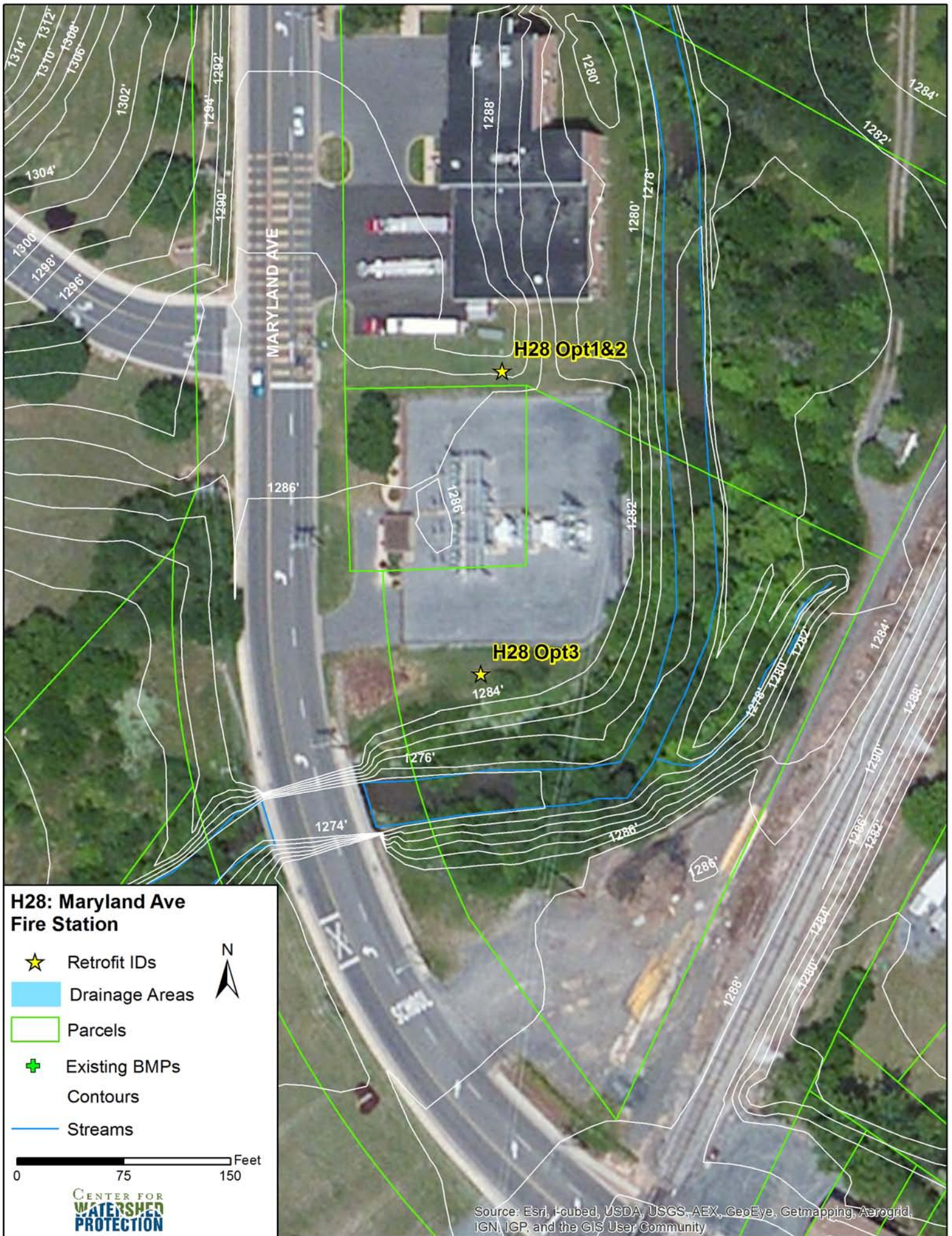
IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S):

IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S):

IF YES, TYPE(S): _____

- | | | |
|------------------------------|-----------------------------|--------------------------------|
| <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
| <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
| <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |

H28: Maryland Ave Fire Station



H28: Maryland Ave Fire Station – Options 1, 2, & 3

Score: 34 (Option 3)

Rank: 27 (Option 27)

Investigators: Joe Battiata, Thanh Dang



Figure 1: Option 1 (Bioretention) & 2 (Filter Strip) location (between fire station seen on left and electrical substation seen on right)



Figure 2: Option 3 location – south of and adjacent to electric substation (seen on left)

Description: The fire station parking lot runoff and the water from the frequent fire truck washing drains to Maryland Ave curb and gutter and then discharge directly into the adjacent creek, approximately 200 feet south of the fire station entrance. The parking lot is approximately 10,000 ft² in size. This retrofit is located in the narrow grass strip adjacent to the southern edge of the fire station between the fire station and the electrical substation (Option 1 & 2; Figure 1), or further south in the grass strip between the electrical substation and the creek (Option 3, Figure 2).

Proposed Retrofit:

Option 1: This retrofit option requires that a trench drain be built across the fire station entrance to capture the rainwater runoff and the truck wash runoff prior to entering the Maryland Ave curb and gutter drainage system. The trench drain would then discharge to the proposed 30' x 80' bioretention area and the underdrain would daylight to the existing creek behind the fire station.

Option 2: The existing gas line located in the grass strip described above may be a main transmission line and excavation of any depth may not be acceptable. In this case, the area can be converted to a 30' x 80' filter strip through minor grading of the surface. The style or model of trench drain would need to be carefully selected in order to ensure the shallowest depth possible.

Option 3: This option avoids the requirement for a trench drain in the fire station entrance, as well as the possible disturbance of the ground over the gas main, by allowing the runoff to enter the Maryland Ave curb and gutter, flowing approximately 200 feet past an existing electrical substation, through a proposed curb cut and into a grass strip. This option increases the drainage area being treated (includes the Maryland Ave drainage as well as the entire fire station parking area) and therefore requires a larger 35' x 80' bioretention footprint.

WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: H28	
DATE: 3/20/13		ASSESSED BY:		CAMERA ID:	
GPS ID:		LMK ID:		LAT:	
LONG:					
SITE DESCRIPTION					
Name: FIRE STATION ON MARYLAND AVE					
Address:					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other:					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, Unique Site ID:					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond <input type="checkbox"/> Above Roadway Culvert			<input checked="" type="checkbox"/> Hotspot Operation <input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall <input type="checkbox"/> In Conveyance System			<input checked="" type="checkbox"/> Small Parking Lot <input type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW <input type="checkbox"/> Near Large Parking Lot			<input type="checkbox"/> Individual Street <input type="checkbox"/> Landscape / Hardscape		
<input checked="" type="checkbox"/> Other: ADJACENT TO FIRE STATION & ELECT. SUBSTATION			<input type="checkbox"/> Underground <input type="checkbox"/> Other:		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ APPROX. 10,000 FT ²			Drainage Area Land Use:		
Imperviousness ≈ 100 % OPTION 1 & 2			<input type="checkbox"/> Residential <input type="checkbox"/> Institutional		
Impervious Area ≈ 10,000 FT ²			<input type="checkbox"/> SFH (< 1 ac lots) <input checked="" type="checkbox"/> Industrial		
Notes: OPTION 3 LOCATION INCREASES DA (MARYLAND AVE DRAINAGE) TO 0.83 AC (100% IMPERVIOUS)			<input type="checkbox"/> SFH (> 1 ac lots) <input type="checkbox"/> Transport-Related		
			<input type="checkbox"/> Townhouses <input type="checkbox"/> Park		
			<input type="checkbox"/> Multi-Family <input type="checkbox"/> Undeveloped		
			<input type="checkbox"/> Commercial <input type="checkbox"/> Other: FIRE STA		
EXISTING STORMWATER MANAGEMENT					
Existing Stormwater Practice: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe:					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable):					
FIRE STATION DRIVE WAY - TRUCK WASHING					
Existing Head Available:			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		
HEAD AVAILBLE IF RUN AN UNDER DRAIN ALL THE WAY TO CREEK					

PROPOSED RETROFIT

Purpose of Retrofit:
 Water Quality Recharge Channel Protection Flood Control
 Demonstration / Education Repair Other: _____

Retrofit Volume Computations - Target Storage: _____
Retrofit Volume Computations - Available Storage: _____

Proposed Retrofit Practice: (Runoff Reduction)
 Disconnection Bioretention Bio Swale
 Expanded Tree Pit Infiltration Green Roof
 Permeable Pavement Rainwater Harvesting

Proposed Retrofit Practice: (Stormwater Treatment)
 Constructed Wetland Wet Swale Wet Pond
 Filtering Practice Proprietary: _____
 Other: _____

Retrofit Category (as defined by Chesapeake Bay Program):
 New BMP BMP Enhancement BMP Restoration BMP Conversion Not CBP-approved

Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance:
 USE VEGETATED FILTER OR BIORETENTION TO FILTER TRUCK WASH WATER
 OPTION 1 & 2

Available Width:	~30'
Available Length:	~80'
Available Area:	2,400 ft ²
Ponding Depth:	6"
Soil Depth:	18"-24"

 OPTION 3
 35 x 80' = 2,800 ft²

SITE CONSTRAINTS

Adjacent Land Use:
 Residential Commercial Institutional
 Industrial Transport-Related Park
 Undeveloped Other: FIRE STATION / ELECTRIC SUB STA.

Possible Conflicts Due to Adjacent Land Use? Yes No
If Yes, Describe: _____

Access:
 No Constraints
 Constrained due to
 Slope Space
 Utilities Tree Impacts
 Structures Property
 Ownership
 Other: _____

<p>Conflicts with Existing Utilities:</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th>Yes</th> <th>Possible/ Modifiable</th> <th>No</th> <th>Unknown</th> </tr> </thead> <tbody> <tr><td>Sewer:</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>Water:</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>Gas:</td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>Electric to</td><td></td><td></td><td></td><td></td></tr> <tr><td>Streetlights:</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>Other:</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr> </tbody> </table>		Yes	Possible/ Modifiable	No	Unknown	Sewer:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Gas:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Electric to					Streetlights:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Potential Permitting Factors:</p> <table border="0" style="width: 100%;"> <tr><td>Dam Safety Permits Necessary</td><td><input type="checkbox"/> Probable</td><td><input checked="" type="checkbox"/> Not Probable</td></tr> <tr><td>Impacts to Wetlands</td><td><input type="checkbox"/> Probable</td><td><input checked="" type="checkbox"/> Not Probable</td></tr> <tr><td>Impacts to a Stream</td><td><input type="checkbox"/> Probable</td><td><input checked="" type="checkbox"/> Not Probable</td></tr> <tr><td>Floodplain Fill</td><td><input type="checkbox"/> Probable</td><td><input checked="" type="checkbox"/> Not Probable</td></tr> <tr><td>Impacts to Forests</td><td><input type="checkbox"/> Probable</td><td><input checked="" type="checkbox"/> Not Probable</td></tr> <tr><td>Impacts to Specimen Trees</td><td><input type="checkbox"/> Probable</td><td><input checked="" type="checkbox"/> Not Probable</td></tr> </table> <p>How many? _____ Approx. DBH _____</p> <p>Other factors: _____</p>	Dam Safety Permits Necessary	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Impacts to Wetlands	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Impacts to a Stream	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Floodplain Fill	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Impacts to Forests	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable	Impacts to Specimen Trees	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
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Electric to																																																						
Streetlights:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																		
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																		
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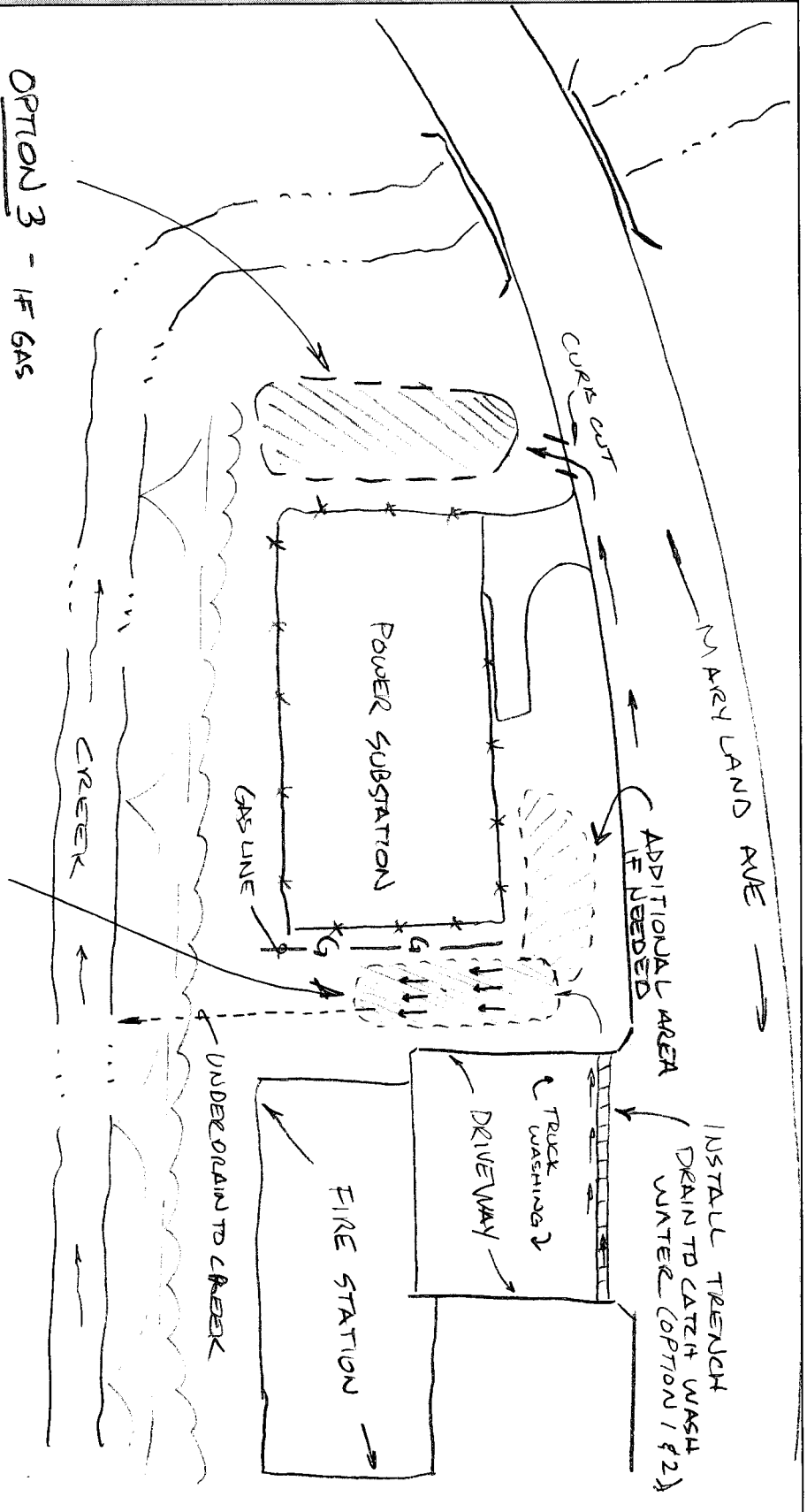
Soils:

Soil auger test holes: Yes No
 Evidence of poor infiltration (clays, fines): Yes No
 Evidence of shallow bedrock: Yes No
 Evidence of high water table (gleying, saturation): Yes No

SKETCH

OPTION 3 - IF GAS
LINE IS TOO DIFFICULT,
THEN ELIMINATE PROPOSED
TRENCH DRAIN & LET
RUNOFF GO INTO STREET W/
CURB CUT AT LOCATION
SHOWN.

BIORETENTION OR FILTER STRIP
(OPTION 1)
(OPTION 2)



DESIGN OR DELIVERY NOTES

OPTION 1: BIORETENTION W/ UNDERDRAIN TO CREEK

OPTION 2: FILTER STRIP (IF EX. GAS LINE IS TOO DIFFICULT TO
 DA = 10,000 ft² = 0.23 AC (FH DRIVEWAY TRUCK WASH
 FOR BOTH OPTION 1 & 2 AREA)

OPTION 3: IF GAS LINE CONFLICTS - LET WASH WATER EXIT
 FIRE HOUSE DRIVEWAY TO STREET. CREATE CURB CUT
 BEFORE LAST CURB INLET ON MARYLAND AVE TO DIVERT
 ROAD RUNOFF + FIRE HOUSE DRIVEWAY
 DA = 0.83 AC - FH DRIVEWAY TRUCK WASH AREA (0.23 AC)
 + ROAD WAY + ADJ. FH ENTRANCE
 (FRONT OF FIREHOUSE MAIN BLDG.) 0.60 AC

DA = 10,000 ft²

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|---|--|
| <input type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input checked="" type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input checked="" type="checkbox"/> Obtain detailed topography |
| <input checked="" type="checkbox"/> Confirm volume computations | <input checked="" type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| | <input checked="" type="checkbox"/> Confirm soil types |
| <input type="checkbox"/> Other: _____ | |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

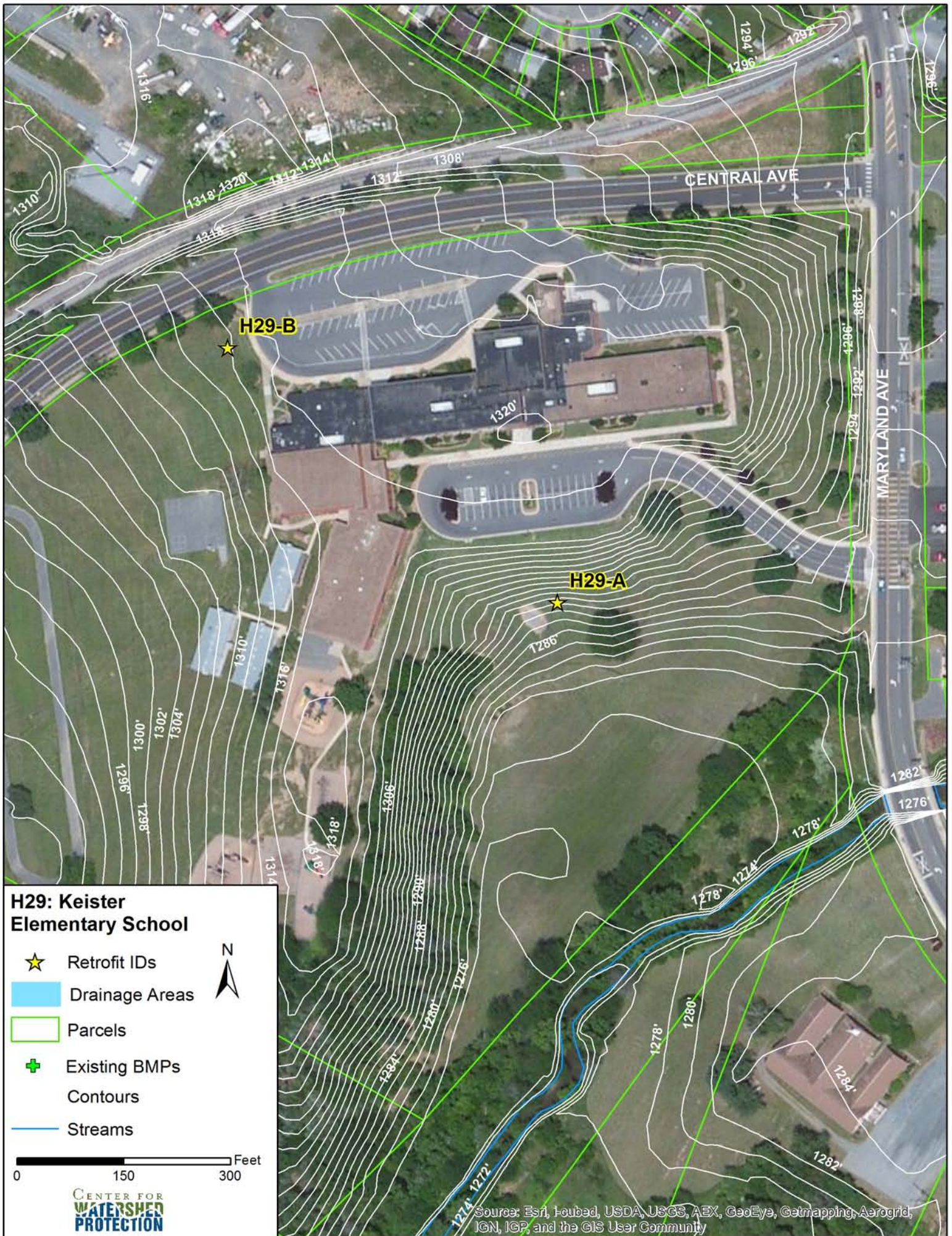
SITE CANDIDATE FOR FURTHER INVESTIGATION: YES NO MAYBE

IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S): YES NO MAYBE

IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S): YES NO MAYBE

IF YES, TYPE(S): _____

H29: Keister Elementary School



H29-A: Keister Elementary School

Score: 50

Rank: 5

Investigators: Joe Battiata, Thanh Dang



Figure 1: Parking lot contributing drainage area



Figure 2: Proposed retrofit location at storm drain outfall near toe of slope

Description: The Keister Elementary School includes two large parking lots. Retrofit H29-A serves the parking lot in the rear of the building (Figure 1). The parking lot is approximately 0.6 acres and is served by a drainage system consisting of two curb inlets that discharge to a single outfall near the bottom of a large slope (Figure 2). The existing outfall condition consists of a riprap energy dissipater that appears to be periodically sprayed with herbicide to keep vegetation and nuisance conditions down.

Proposed Retrofit: This retrofit consists of a 10' x 70' bioretention area benched into the lower portion of the hillside at the location of the existing outfall. Approximately 5 to 7 feet of vertical elevation is available below the outfall to accommodate the excavation for a full depth bioretention basin and underdrain.

H29-B: Keister Elementary School

Score: 41

Rank: 12

Investigators: Joe Battiata, Thanh Dang



Figure 1: Parking lot contributing drainage area and existing erosion



Figure 2: Existing drainage outlets to relieve ponding in parking lot

Description: The Keister Elementary School includes two large parking lots. Retrofit H29-B serves the front parking lot and bus loop (Figure 1). The drainage appears to have been modified to eliminate a ponding area. Three small diameter pipes were added to a section of sidewalk to drain approximately 0.17 acres of the impervious cover. The outlet appears to be subject to erosion (Figures 1 & 2).

Proposed Retrofit: This retrofit is a 15' x 35' bioretention basin that ideally will not require an underdrain. If required due to poor soils, the gentle slopes away from the parking lot will require the underdrain be extended in order to daylight. However, there is plenty of room if this is found necessary.

WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: H29	
DATE: 3/20/13		ASSESSED BY: JGB		CAMERA ID:	
GPS ID:		LMK ID:		LAT:	
LONG:					
SITE DESCRIPTION					
Name: <u>KEISTER ELEMENTARY SCHOOL</u>					
Address: _____					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other: _____					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond <input type="checkbox"/> Above Roadway Culvert			<input type="checkbox"/> Hotspot Operation <input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall <input type="checkbox"/> In Conveyance System			<input type="checkbox"/> Small Parking Lot <input type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW <input type="checkbox"/> Near Large Parking Lot			<input type="checkbox"/> Individual Street <input type="checkbox"/> Landscape / Hardscape		
<input type="checkbox"/> Other: _____			<input type="checkbox"/> Underground <input type="checkbox"/> Other: _____		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ <u>0.60 Ac.</u>		0.17 Ac		Drainage Area Land Use:	
Imperviousness ≈ <u>88</u> %		100%		<input checked="" type="checkbox"/> Institutional	
Impervious Area ≈ <u>0.53 Ac</u>		0.17 Ac		<input type="checkbox"/> Residential	
Notes: H29A		H29B		<input type="checkbox"/> SFH (< 1 ac lots)	
				<input type="checkbox"/> SFH (> 1 ac lots)	
				<input type="checkbox"/> Townhouses	
				<input type="checkbox"/> Multi-Family	
				<input type="checkbox"/> Commercial	
				<input type="checkbox"/> Industrial	
				<input type="checkbox"/> Transport-Related	
				<input type="checkbox"/> Park	
				<input type="checkbox"/> Undeveloped	
				<input type="checkbox"/> Other: _____	
EXISTING STORMWATER MANAGEMENT					
Existing Stormwater Practice: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe:					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable): _____					
H29 A - TOE OF SLOPE BELOW PARKING LOT. OUTFALL FROM SINGLE PIPE					
H29 B - ADJACENT TO PARKING LOT (FRONT). 3 SMALL PIPES					
DRAIN PAVEMENT UNDER SIDEWALK TO GRASS AREA.					
Existing Head Available: <u>A. 3ft. OR MORE</u>			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		
<u>B. 2.5ft. or more - gentle grade away from parking</u>					

PROPOSED RETROFIT

Purpose of Retrofit:
 Water Quality Recharge Channel Protection Flood Control
 Demonstration / Education Repair Other: _____

Retrofit Volume Computations - Target Storage:

$$\frac{A}{1,860 \text{ ft}^3}$$

$$\frac{B}{590 \text{ ft}^3}$$

Retrofit Volume Computations - Available Storage:

$$\frac{A}{700 \text{ ft}^3}$$

$$\frac{B}{595 \text{ ft}^3}$$

 ↳ MAY BE INCREASED W/ ADDITIONAL GRADING

Proposed Retrofit Practice: (Runoff Reduction)
 Disconnection Bioretention Bio Swale
 Expanded Tree Pit Infiltration Green Roof
 Permeable Pavement Rainwater Harvesting

Proposed Retrofit Practice: (Stormwater Treatment)
 Constructed Wetland Wet Swale Wet Pond
 Filtering Practice Proprietary: _____
 Other: _____

Retrofit Category (as defined by Chesapeake Bay Program):
 New BMP BMP Enhancement BMP Restoration BMP Conversion Not CBP-approved

Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance:

AREA MAY BE INCREASED A IF NEEDED AND GRADES ALLOW.

	A	B
Available Width:	10'	15'
Available Length:	70'	35'
Available Area:		
Ponding Depth:	12"	12"
Soil Depth:	24"	18"

SITE CONSTRAINTS

Adjacent Land Use:
 Residential Commercial Institutional
 Industrial Transport-Related Park
 Undeveloped Other: _____

Possible Conflicts Due to Adjacent Land Use? Yes No
If Yes, Describe: _____

Access:
 No Constraints (B)
 Constrained due to
 Slope (A) Space
 Utilities Tree Impacts
 Structures Property
 Ownership
 Other: _____

Conflicts with Existing Utilities:
 A + B

	Yes	Possible/Modifiable	No	Unknown
Sewer:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Gas:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Electric to Streetlights:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Potential Permitting Factors:

Dam Safety Permits Necessary	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to Wetlands	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to a Stream	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Floodplain Fill	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to Forests	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable
Impacts to Specimen Trees	<input type="checkbox"/> Probable	<input checked="" type="checkbox"/> Not Probable

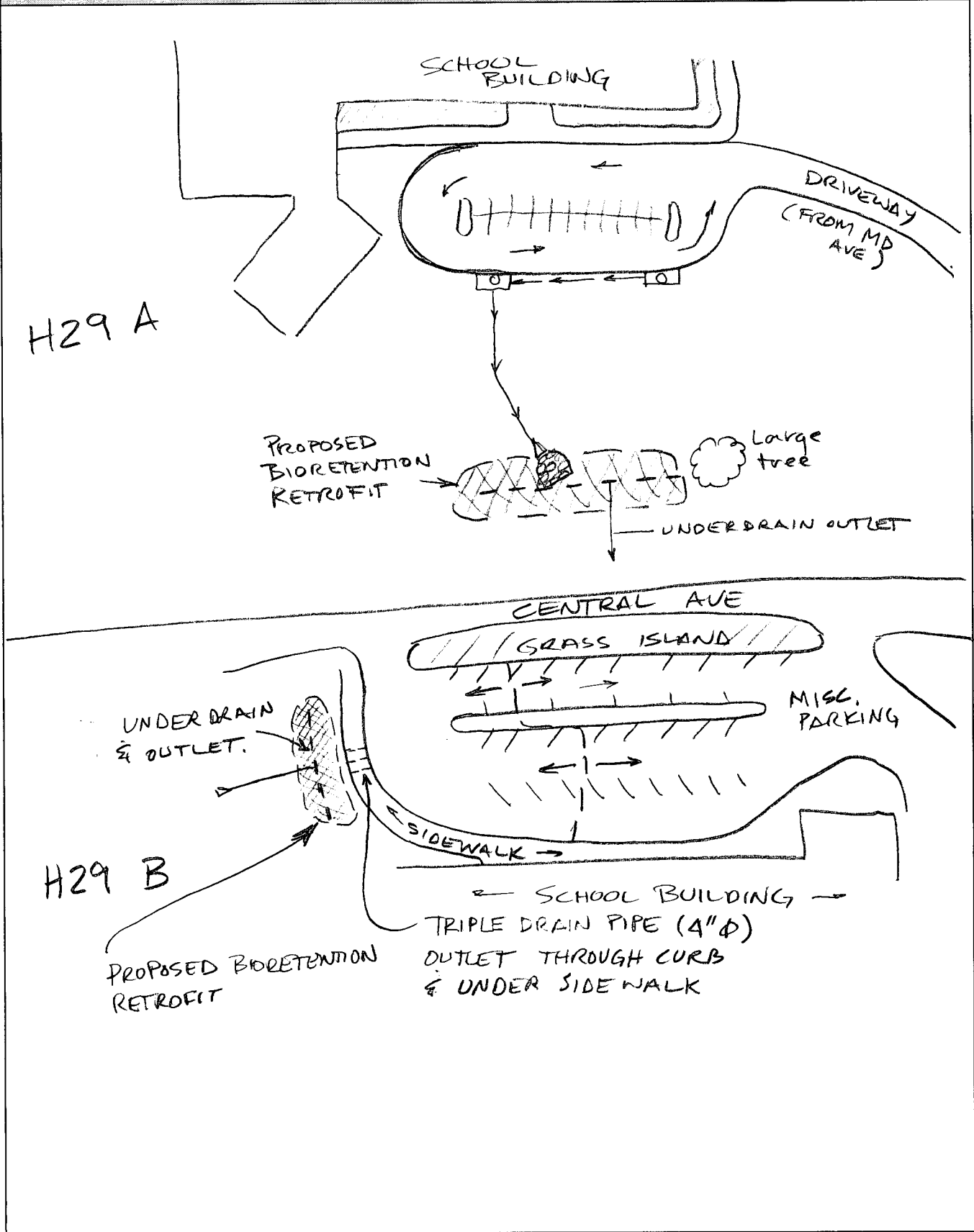
How many? _____
 Approx. DBH _____

Other factors: _____

Soils:

Soil auger test holes:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of poor infiltration (clays, fines):	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Evidence of shallow bedrock:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Evidence of high water table (gleying, saturation):	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

SKETCH





DESIGN OR DELIVERY NOTES

H29 A - WILL REQUIRE ACCESS TO TOE OF SLOPE ADJACENT TO GENERAL ATHLETIC FIELDS.
 - REQUIRE FOREBAY + LARGE STORM OVERFLOW
 - UNDERDRAIN TO OUTLET TO FIELDS

H29 B - ADJACENT TO BUS LOOP
 - EXISTING TRIPLE PIPE OUTLET THROUGH CURB.
 - SHALLOW PONDING & SOIL DEPTH WILL HELP MINIMIZE LENGTH TO DAYLIGHT UNDERDRAIN.
 - EXCAVATE GRASS AREA AS NEEDED

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

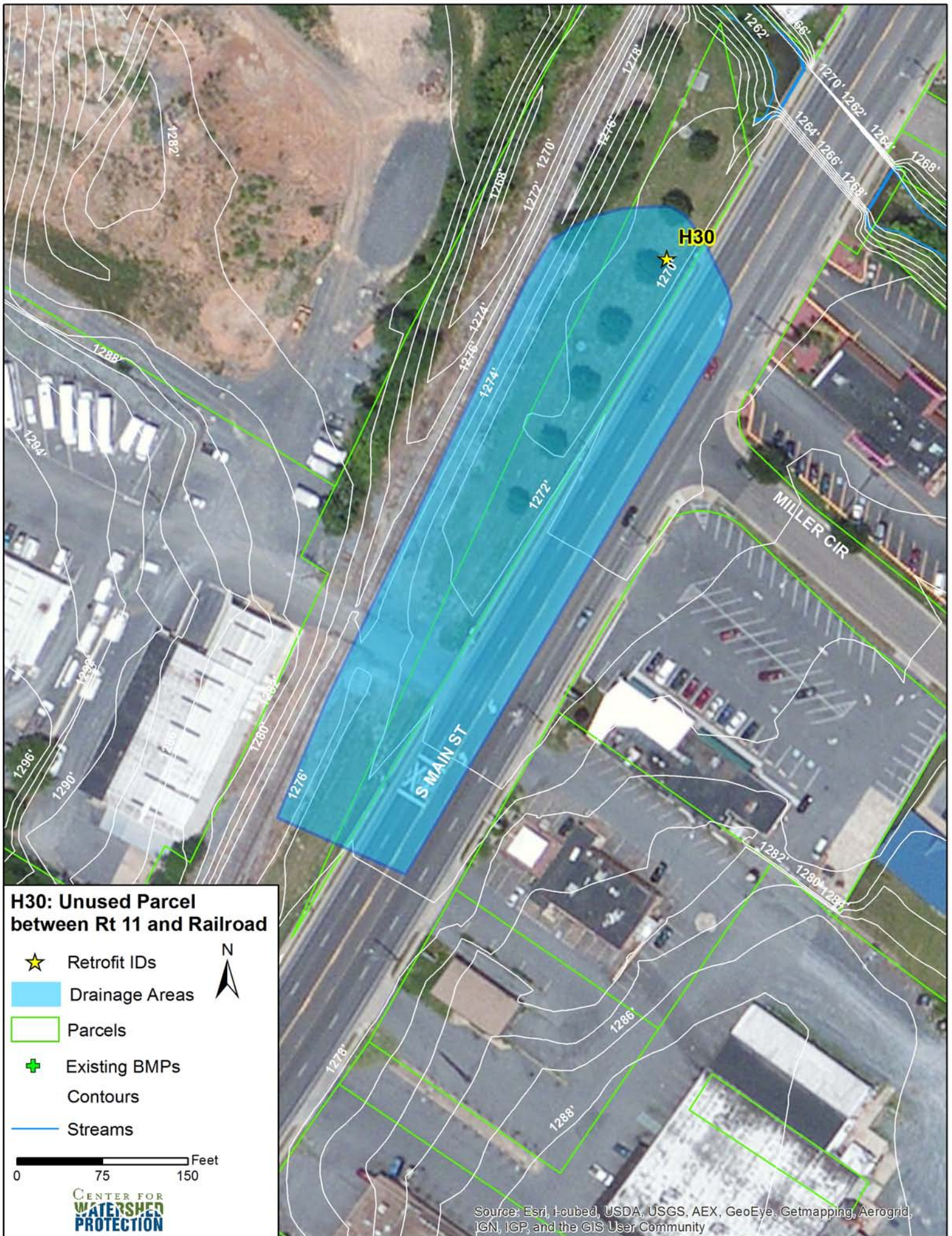
- | | |
|---|--|
| <input type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input type="checkbox"/> Confirm volume computations | <input type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| | <input type="checkbox"/> Confirm soil types |
- Other: _____

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

H29 A - DIFFICULT ACCESS; AREA OF RETROFIT MAY BE EXPANDABLE,
 H29 B - EASY ACCESS

SITE CANDIDATE FOR FURTHER INVESTIGATION: YES NO MAYBE
IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S): YES NO MAYBE
IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S): YES NO MAYBE
 IF YES, TYPE(S): _____

**H30: Unused Parcel between
Rt 11 and Railroad**



H30: Unused Parcel Between Rt. 11 and Railroad

Score: 36

Rank: 25

Investigators: Wes Runion, Jeremy Harold, Lisa Fraley-McNeal



Figure 1: Convert this area to bioswale



Figure 2: Rip-rap at downstream end of grass swale

Description: Approximately 1.3 acres of Rt. 11 near the intersection with Miller Circle, adjacent grass area, and railroad tracks drain to an unused parcel between the road and railroad. Runoff then drains across the parcel through an existing grass swale and to the stream (Figure 1). The downstream end of the swale contains rip-rap to stabilize the stream bank (Figure 2).

Proposed Retrofit: This retrofit concept converts the existing grass swale and additional grass area of the unused parcel to a bioswale. There is adequate space to install a 15' x 70' bioswale. The practice would overflow to the rip-rap area at the downstream end of the existing swale and into the stream. An existing road inlet along Rt. 11 would need to be blocked and roadway drainage directed to the bioswale. A sanitary sewer line runs the length of the parcel near the railroad and would need to be avoided. In addition, several trees are located along the parcel that should either be avoided or relocated.



WATERSHED:		SUBWATERSHED:		UNIQUE SITE ID: 1430	
DATE: 3-20-13	ASSESSED BY: Lisa Wes Jeremy		CAMERA ID:		PICTURES: 50-53
GPS ID:	LMK ID:	LAT:		LONG:	
SITE DESCRIPTION					
Name: <u>Unused Parcel</u>					
Address: _____					
Ownership: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Unknown					
If Public, Government Jurisdiction: <input type="checkbox"/> Local <input type="checkbox"/> State <input type="checkbox"/> DOT <input type="checkbox"/> Other: _____					
Corresponding USSR/USA Field Sheet? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, Unique Site ID: _____					
Proposed Retrofit Location:					
Storage			On-Site		
<input type="checkbox"/> Existing Pond	<input type="checkbox"/> Above Roadway Culvert	<input type="checkbox"/> Hotspot Operation	<input type="checkbox"/> Individual Rooftop		
<input type="checkbox"/> Below Outfall	<input type="checkbox"/> In Conveyance System	<input type="checkbox"/> Small Parking Lot	<input type="checkbox"/> Small Impervious Area		
<input type="checkbox"/> In Road ROW	<input type="checkbox"/> Near Large Parking Lot	<input checked="" type="checkbox"/> Individual Street	<input type="checkbox"/> Landscape / Hardscape		
<input type="checkbox"/> Other: _____		<input type="checkbox"/> Underground	<input checked="" type="checkbox"/> Other: <u>Unused Parcel</u>		
DRAINAGE AREA TO PROPOSED RETROFIT					
Drainage Area ≈ <u>1.32 ac</u>			Drainage Area Land Use:		
Imperviousness ≈ <u>42%</u> %			<input type="checkbox"/> Residential	<input type="checkbox"/> Institutional	
Impervious Area ≈ <u>0.55 ac</u>			<input type="checkbox"/> SFH (< 1 ac lots)	<input type="checkbox"/> Industrial	
Notes:			<input type="checkbox"/> SFH (> 1 ac lots)	<input checked="" type="checkbox"/> Transport-Related	
			<input type="checkbox"/> Townhouses	<input type="checkbox"/> Park	
			<input type="checkbox"/> Multi-Family	<input type="checkbox"/> Undeveloped	
			<input type="checkbox"/> Commercial	<input type="checkbox"/> Other: _____	
			EXISTING STORMWATER MANAGEMENT		
Existing Stormwater Practice: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Possible					
If Yes, Describe:					
Describe Existing Site Conditions, Including Existing Site Drainage and Conveyance:					
Existing Street Width (if applicable): _____					
<u>Unused Parcel of Land between Rt. 11 (Road) + Rail Road Tracks</u>					
Existing Head Available:			Note where points are measured from: (i.e. street elevation to catch basin invert, manhole rim to catch basin invert, other)		

PROPOSED RETROFIT

Purpose of Retrofit:

- Water Quality Recharge Channel Protection Flood Control
 Demonstration / Education Repair Other: _____

Retrofit Volume Computations - Target Storage:

2,512 ft³

Retrofit Volume Computations - Available Storage:

1,259 ft³

Proposed Retrofit Practice: (Runoff Reduction)

- Disconnection Bioretention Bio Swale
 Expanded Tree Pit Infiltration Green Roof
 Permeable Pavement Rainwater Harvesting

Proposed Retrofit Practice: (Stormwater Treatment)

- Constructed Wetland Wet Swale Wet Pond
 Filtering Practice Proprietary: _____
 Other: _____

Retrofit Category (as defined by Chesapeake Bay Program):

- New BMP BMP Enhancement BMP Restoration BMP Conversion Not CBP-approved

Describe Elements of Proposed Retrofit, Including Surface Area, Maximum Depth of Treatment, and Conveyance:

Install Bioretention to treat Road drainage. At inlet from roadway.

Available Width:	15'
Available Length:	70'
Available Area:	1050sqft
Ponding Depth:	1'
Soil Depth:	18"

Overflow to existing r.p trap Swale into Stream.

Need to determine available head. Assumed 4' head available for preliminary calculations.

SITE CONSTRAINTS

Adjacent Land Use:

- Residential Commercial Institutional
 Industrial Transport-Related Park
 Undeveloped Other: _____

Possible Conflicts Due to Adjacent Land Use? Yes No

If Yes, Describe:

Access:

No Constraints

Constrained due to

- Slope Space
 Utilities Tree Impacts
 Structures Property

Ownership

Other: _____

Conflicts with Existing Utilities:

	Yes	Possible/ Modifiable	No	Unknown
Sewer:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Gas:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Electric to Streetlights:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Potential Permitting Factors:

- Dam Safety Permits Necessary Probable Not Probable
 Impacts to Wetlands Probable Not Probable
 Impacts to a Stream Probable Not Probable
 Floodplain Fill Probable Not Probable
 Impacts to Forests Probable Not Probable
 Impacts to Specimen Trees Probable Not Probable

How many? _____

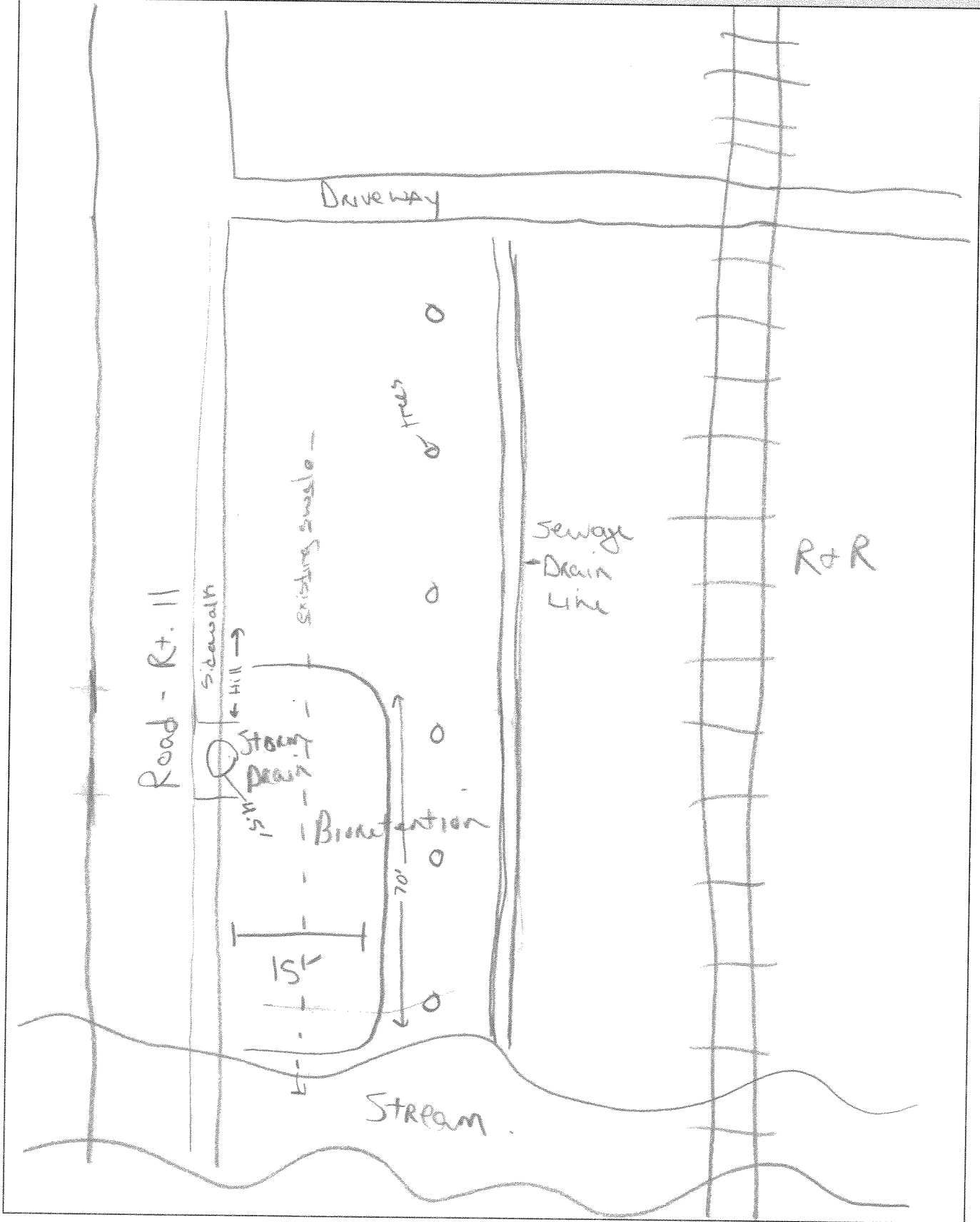
Approx. DBH _____

Other factors: _____

Soils:

- Soil auger test holes: Yes No
 Evidence of poor infiltration (clays, fines): Yes No
 Evidence of shallow bedrock: Yes No
 Evidence of high water table (gleying, saturation): Yes No

SKETCH



DESIGN OR DELIVERY NOTES

Size larger as needed

relocate as needed for sewer.

Block existing road inlet and direct drainage into bioretention area.

FOLLOW-UP NEEDED TO COMPLETE FIELD CONCEPT

- | | |
|---|--|
| <input type="checkbox"/> Confirm property ownership | <input type="checkbox"/> Obtain existing stormwater practice as-builts |
| <input type="checkbox"/> Confirm drainage area | <input type="checkbox"/> Obtain site as-builts |
| <input type="checkbox"/> Confirm drainage area impervious cover | <input type="checkbox"/> Obtain detailed topography |
| <input type="checkbox"/> Confirm volume computations | <input checked="" type="checkbox"/> Obtain utility mapping |
| <input type="checkbox"/> Complete concept sketch | <input type="checkbox"/> Confirm storm drain invert elevations |
| | <input type="checkbox"/> Confirm soil types |
| <input type="checkbox"/> Other: _____ | |

INITIAL FEASIBILITY AND CONSTRUCTION CONSIDERATIONS

- | | | | |
|--|------------------------------|-----------------------------|--------------------------------|
| SITE CANDIDATE FOR FURTHER INVESTIGATION: | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
| IS SITE CANDIDATE FOR EARLY ACTION PROJECT(S): | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
| IF NO, SITE CANDIDATE FOR OTHER RESTORATION PROJECT(S): | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> MAYBE |
| IF YES, TYPE(S): _____ | | | |