Inventory and Analysis

Overview

In order to understand the site, its physical characteristics and its role in a larger environment, temple students conducted an inventory and analysis of Rock Creek. Existing conditions were documented and examined, as well as compared to previously completed precedent reports on greenways. In addition to the qualitative data compiled such as soils information, vegetation patterns and hydrologic issues, it was quickly discovered that Rock Creek was a unique urban green-space. Wedged between two rows of houses and bordered by extremely steep slopes, Rock Creek is the remnants of a once natural stream that still exists as an above ground tributary to the Tookany Creek. Unfortunately, human development has changed Rock Creek into a severely degraded ecosystem. Due to the creeks current state many degenerative factors are discussed at length in the Inventory and Analysis section.

An inquiry into the creek's history was critical to a thorough summary of the existing conditions of Rock Creek. Historical data pertaining to both the creek, Curtis Arboretum and Cheltenham Township was researched. To better understand the link between Rock Creek, the surrounding neighborhood and city, an assessment of connections was undertaken. Transportation, trails, and other green spaces were documented and plotted to aid this portion of the inventory process.

Watershed statistics, movement of water, sewer system specifics, and other hydrologic concerns were an obvious focus as well. Although the surrounding region is highly industrialized, and there is a large amount of man-made soil in the area, there are other soils contained within Rock Creek Park that all contribute to the creeks health in different ways. Thus, an exploration of these soils was also necessary.

Information regarding vegetation within the site was gathered via multiple site visits as well as outside research of Northeastern forest types. To finalize and make use of the extensive information accumulated from these combined factors, a graphic was created exhibiting opportunities and constraints of the creek. Lastly, this combined study was presented at a public meeting and to a steering committee in order to receive feedback.

Consequently, this inventory and analysis phase was taken into account as both an aid in design development, and more importantly as a guide to understanding and representing important contextual matters related to Rock Creek.

A list of Inventory and Analysis studies and images are titled below and graphically represented in the following pages:

- Historical Context
- Historical Aerial Photography
- Open Space Linkages
- Hydrology: Watershed Information
- Hydrology: Regional Context
- Hydrology: Sewage and Erosion
- Soils and Slopes: Topography
- Soils and Slopes: Soil Specifics
- Vegetation: Native and Invasive Species
- Vegetation: Wildlife
- Opportunities and Constraints

Water Powered Cheltenham's Rise

1900's
1986 Wyncote Historic District added to National Registry
1985 LaMott Historic District added to National Registry
1979 Rowland House (Shovel Shop) added to National Registry
1974 Township acquires Curtis Hall
1959 Cheltenham Sqaure Mall opens
1937 Olmsted landscapes Curtis Hall

1800's
1898 Elkins Park RR Station constructed
1885 LaMott section established
1870s AG Bell demonstrates phone at Barker estate
1868 1st African American buys Cheltenham land
1863 Camp William Penn founded
1856 Railroad built
1854 Chelten Hills established
1851 Limekiln Pike laid

1700's
1798 Tacoony Creek bridge built
1781 Mather's spring waters Edge Hill troops
1776 Cheltenham Academy established
1746 Shoemaker build grist mill
1734 Church Road laid

1600's
1690 First grist mil built in Cheltenham
1682 Richard Wall builds house
1682 Quakers buy land from Penn

Pre-1600
The Lenni Lenape call the densely wooded area filled with wildlife "Tawcawomink."

1959 (g)
Shopping Malls Arrive

As the area flourished and became more densely populated, stores like Gimbels opened n malls in Cheltenham.

Following the Industrial Revolution, wealthy tycoons began purchasing land in Cheltenham. Some of them built estates, others became land developers. The population began to rise, increasing from 3,236 in 1850 to 12,299 in 1880 to 15,731 in 1930 to 35,990 in 1960. As of 2010, the population was just over 36,000. When compared with the shaded area on the atlas map below, the road map above shows how much the area has changed in the last 125 years.

1937 (f)
Township Acquires Curtis Hall

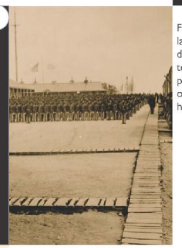
This building, with an Olmsted designed landscape, was built on land once owned by Cyrus Curtis. It is now the site of Curtis Arboretum and a town park.

1897 (e)
Widener Builds a Mansion

Tycoons like Peter Widener built huge mansions in Cheltenham during the Gilded Age. Lynnewood is the largest surviving period mansion in the Philadelphia area.

1863 (d)
Camp William Penn Opens

Camp William Penn (open from 1863-65) was Pennsylvania's first training ground for African Americans who enlisted to fight for the Union Army in the Civil War.



1861 (c)
Jay Cooke Finances Civil War

In 1861, Jay Cooke issued a war bond to help finance the Civil War. His mansion (right) became the Ogontz School for Girls in 1883.

1746 (b)
Shoemaker Builds Mill

This grist mill became the nucleus of the village of Shoemakertown. Charles Bosler & Sons later bought and operated the mill.

Cheltenham quickly turned from agriculture to manufacturing because of its proximity to the Tookany Creek. By the 1800's, there were over twenty mills operating in Cheltenham.

1682 (a)
Richard Wall Builds House

This stop on the Underground Railroad was the oldest in Pennsylvania with a continuous family residence. The town now owns it.

Cheltenham Includes Many Historically Noteworthy Sites

Historically important sites overlay an 1877 atlas of Cheltenham. The shaded area includes Rock Creek and surrounding properties. Compare how few roads there were in 1877 with the recent satellite image at the top of this page.

Cheltenham's founding fathers included Humphrey Morrey, the first mayor of Philadelphia.

1687
Thomas Holme Map of the Improved Parts of PA

The founders of Cheltenham received their land grants, highlighted above, directly from William Penn. Note the town's boundaries have barely changed since its founding.

Cheltenham's founding fathers improved the land by converting forests to agriculture. They also built mills on the Tookany to harness the creek's power for grist, fulling, and saw mills. As the importance of water power waned during the industrial revolution, their descendants starting selling their land to tycoons from Philadelphia. Cheltenham entered the Gilded Era, with weathy people from Philadelphia building numerous mansions on country estates. Today Cheltenham is a suburban township with a population of just over 36,000 people.

ROCK CREEK
HISTORICAL CONTEXT

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

School of Environmental Design
Temple University Ambler

R. Lotka, DJ Smith, C. Baker

1942

1958

1971

1992

2002

2011

ROCK CREEK SITE BOUNDARY

Aerial photography from the second half of the 20th century shows rapid development of Cheltenham and the areas surrounding Rock Creek. Although housing increases quickly, distinct patches of open and green space such as our site are preserved throughout the years.

ROCK CREEK

SITE HISTORY

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

School of Environmental Design
Temple University Ambler

Jaive Kuklick, Peter Straus, Stephen Passaci

SOURCE: MONTGOMERY COUNTY PLANNING COMMISSION

Existing Trails

Proposed Trails

Proposed County Trail - Cresheim Trail

Potential Greenway

Public Open Space

Private Open Space

ROCK CREEK

OPEN SPACE LINKAGES

Map is not to scale.

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

School of Environmental Design
Temple University Ambler

Sean Malloy and Jim Durkin

Rock Creek Watershed & Stormwater

Pennsylvania is made up of 6 major watersheds. Rock Creek is located in the Delaware Watershed and eventually empties into the Delaware River.

The Delaware watershed begins in the Catskill Mountains in New York and ends at the mouth of the Delaware Bay in Philadelphia. The 300- mile long Delaware River winds its way through four states encompassing 42 counties and 838 municipalities in the Mid-Atlantic region. The river has recreational purposes, and most importantly is a source of drinking water. The Delaware River provides drinking water to 17 million people or 10% of the US population.

The Delaware Watershed

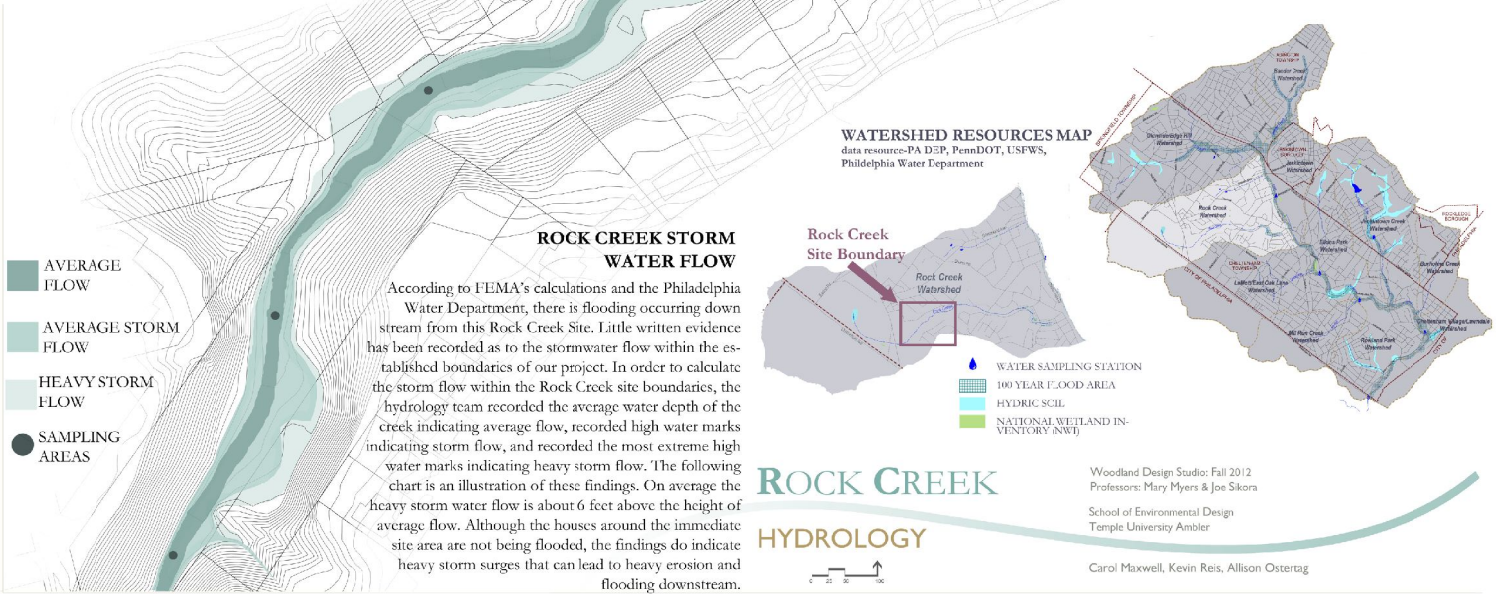
Tookany/Tacony-Frankford Creek Watershed is located within the Lower Delaware Watershed. The Tookany-Tacony Watershed is about 37 square miles and drains portions of Montgomery and Philadelphia Counties. The watershed is highly developed and includes residential, commercial, industrial, recreational and transportation land uses. There is more vegetative cover, less housing density, less impermeable surfaces and less urban living in the northern portion of the watershed north of where Rock Creek is located.

Lower Delaware Watershed

Tookany/Tacony Frankford Watershed

The main stem of the Tookany originates on the grounds of Holy Sepulcher Cemetery in Cheltenham Township, Montgomery County. The Tookany begins by flowing west to east through the propery of local schools and recreaton parks to the confluence of an unnamed tributary to Tookany Creek. Then it flows northwest to southeast through residential areas, urban land and open space around the Septa Regional r-5 Regional Rail. The main stem flows parallel to Tookany Parkway and is then primarily located in public green space and golf courses. Then the creek enters Philadelphia city limits. Here the creek is named Tacony Creek. It then flows north to south through Tacony Creek Park, residential, commercial and green space into the Delaware.

Tookany/Tacony Frankford Watershed



AVERAGE FLOW

AVERAGE STORM FLOW

HEAVY STORM FLOW

SAMPLING AREAS

ROCK CREEK STORM WATER FLOW

According to FEMA's calculations and the Philadelphia Water Department, there is flooding occurring down stream from this Rock Creek Site. Little written evidence has been recorded as to the stormwater flow within the established boundaries of our project. In order to calculate the storm flow within the Rock Creek site boundaries, the hydrology team recorded the average water depth of the creek indicating average flow, recorded high water marks indicating storm flow, and recorded the most extreme high water marks indicating heavy storm flow. The following chart is an illustration of these findings. On average the heavy storm water flow is about 6 feet above the height of average flow. Although the houses around the immediate site area are not being flooded, the findings do indicate heavy storm surges that can lead to heavy erosion and flooding downstream.

WATERSHED RESOURCES MAP

data resource-PA DEP, PennDOT, USFWS, Phildelphia Water Department

WATER SAMPLING STATION

100 YEAR FLOOD AREA

HYDRIC SOIL

NATIONAL WETLAND INVENTORY (NWI)

ROCK CREEK HYDROLOGY

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

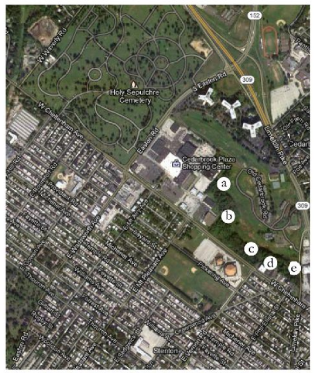
School of Environmental Design
Temple University Ambler

Carol Maxwell, Kevin Reis, Allison Ostertag

Upper Creek

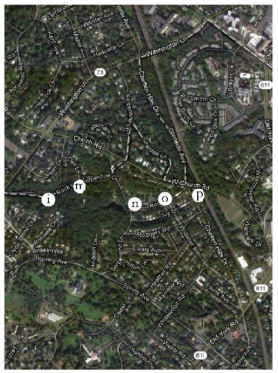
Rock Creek flows from Phila. Water Dept. storm water pipe (outfall) T-096-2. The creek accounts for approximately 9% of the basins total area. The upper portion of the creek is relatively clean with stable stream banks. There are few outfalls along the upper portion.

Upon visiting the upper portion no odor of sewage was noticed. Fish were seen in a pond before the inlet which takes the creek under Limekiln Pike and Route 309.



Upper

Middle



Lower

Middle Creek

The middle portion of the creek has many outfalls some of which need erosion and flow control (f), and one that drains the northern neighborhood (g). Increased flow rates are evidenced by deeper scouring of the creek bed and erosion from the stream banks. An odor of sewage was noticed upon visiting the middle portion.

Impervious Surfaces

Primary impervious surfaces such as; Cheltenham Mall (pictured above), Cedarbrook Plaza Shopping Center, and other large paved and roofed surfaces account for approximately 6% of impervious cover in Rock Creek Basin, not including roads and houses.

Primary Impervious Surface Cover

Impervious surfaces including, roofs, roads, and parking lots effect the rate of flow within the creek by putting water directly in the creek. With increased surface coverage from development, increased storm rates due to climate pattern shifts and intensity Rock Creek is likely to see increased flows in the future. Current storm flow rates range from 0.33 inches to 87 inches above baseflow. The average storm flow rate is 2.51 inches.

Lower Creek

The lower portion of the creek has more permanent banks with concrete walls (n & o)channeling the creek in many areas. Erosion is still prevalent in the lower portion, but flooding is the main issue. Excessive water from upstream burdens the channelized portion of the creek leaving the storm flow nowhere to go but over the creek banks. Along with the evidence of high creek flows, and documented flooding in the lower portion the odor of sewage is also present. The lower portion of the creek enters the Tookany Creek from under the train tracks (p) at Wall Park, with the closest intersection being West Church Road (Route 73) and Chelten Hills Drive.

Rock Creek

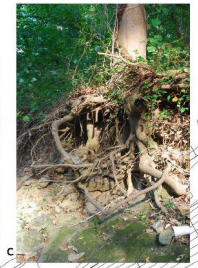
Hydrology

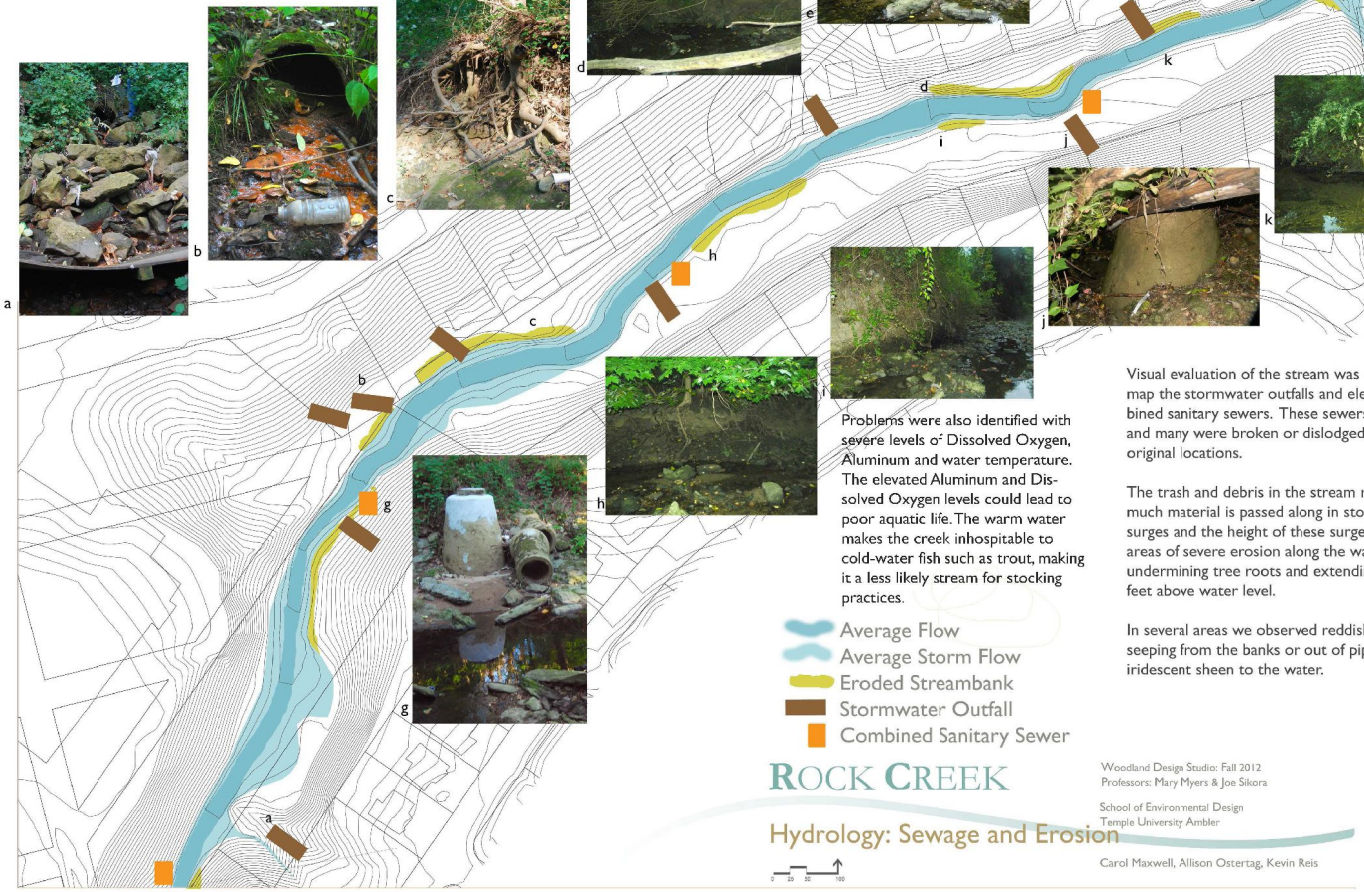
Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

School of Environmental Design
Temple University Ambler

Carol Maxwell, Allison Ostertag, Kevin Reis

The creek was tested and found in violation of Fecal Coliform levels. The PA Department of Environmental Protection suggests a maximum fecal level of 200 CFU/mL during the swimming season. The creek was tested at 430,000 CFU/mL during the same season, after a rainstorm., showing evidence of severe wet weather sewage impacts.
-Philadelphia Water Department Report, 2009





Problems were also identified with severe levels of Dissolved Oxygen, Aluminum and water temperature. The elevated Aluminum and Dissolved Oxygen levels could lead to poor aquatic life. The warm water makes the creek inhospitable to cold-water fish such as trout, making it a less likely stream for stocking practices.

Visual evaluation of the stream was conducted to map the stormwater outfalls and elevated combined sanitary sewers. These sewers ranged in age and many were broken or dislodged from their original locations.

The trash and debris in the stream reflected how much material is passed along in stormwater surges and the height of these surges. We noted areas of severe erosion along the water's edge, undermining tree roots and extending several feet above water level.

In several areas we observed reddish brown fluid seeping from the banks or out of pipes or an iridescent sheen to the water.

Average Flow
Average Storm Flow
Eroded Streambank
Stormwater Outfall
Combined Sanitary Sewer

ROCK CREEK

Hydrology: Sewage and Erosion

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

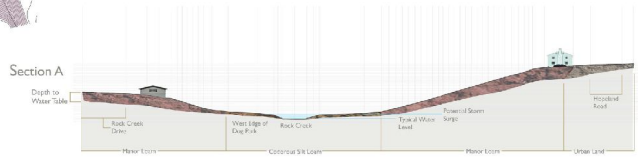
School of Environmental Design
Temple University Ambler

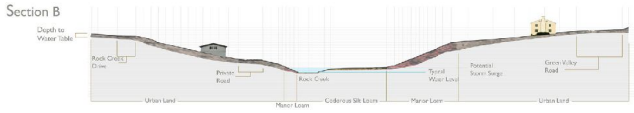
Carol Maxwell, Allison Ostertag, Kevin Reis

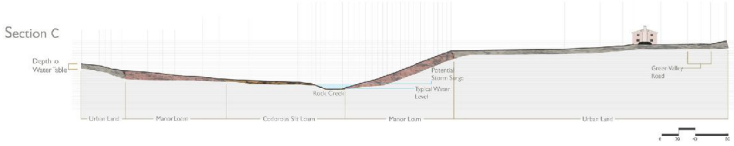
Slope Analysis Map

Map Key:

- Relatively Steep Slopes with Moderate Potential for Erosion
- Extremely Steep Slopes with High Potential for Erosion
- Relatively Flat Ground and Floodplain
- Rock Creek Center Line







Topographical Components and General Soil Characteristics of Rock Creek:

Creek Bed:

- Mostly flat
- Scoured Vertical Stream Banks
- High Silt and Sand Content
- Extremely Erodible Soil
- Areas of Exposed Parent Material

Floodplain:

- 0-5% slopes
- Silt Loam Soil
- Erodible Soil
- Low Organic Content, but Highest in the Creek

Steep Slopes:

- 5-40% Slopes
- Silt Loam and Urban Soils
- Highly Erodible Soil
- Very Low Organic Content

The creek bed and floodplain provide flat areas, richer soils and are more easily traveled than other areas of the site. Areas of the stream with exposed rock, stabilized stream banks and higher water levels provide natural, aesthetically pleasing spaces and views.

ROCK CREEK

SLOPE AND SOILS ANALYSIS

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

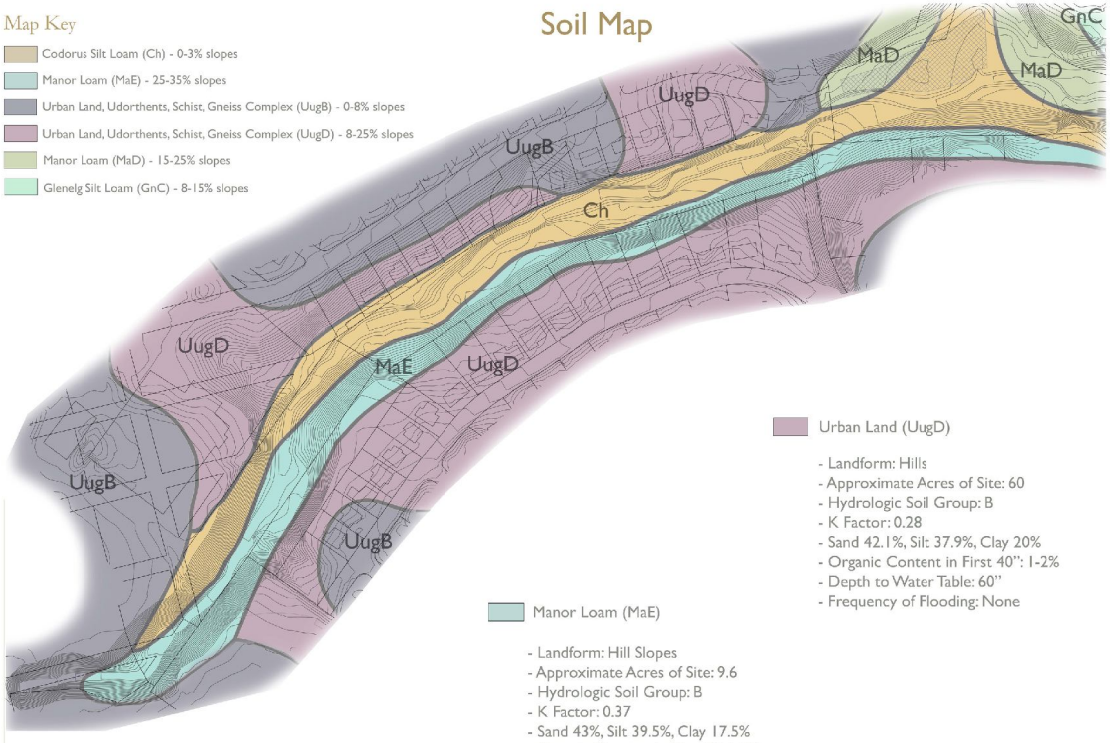
School of Environmental Design
Temple University Ambler

Jake Kuklick, Peter Straus, Stephen Parasci

Soil Map

Map Key

- Codorus Silt Loam (Ch) - 0-3% slopes
- Manor Loam (MaE) - 25-35% slopes
- Urban Land, Udorthents, Schist, Gneiss Complex (UugB) - 0-8% slopes
- Urban Land, Udorthents, Schist, Gneiss Complex (UugD) - 8-25% slopes
- Manor Loam (MaD) - 15-25% slopes
- Glenelg Silt Loam (GnC) - 8-15% slopes



Urban Land (UugD)

- Landform: Hills
- Approximate Acres of Site: 60
- Hydrologic Soil Group: B
- K Factor: 0.28
- Sand 42.1%, Silt 37.9%, Clay 20%
- Organic Content in First 40": 1-2%
- Depth to Water Table: 60"
- Frequency of Flooding: None

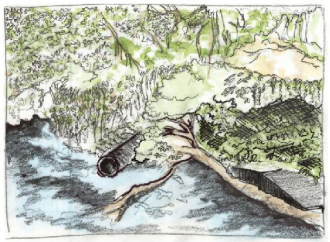
Manor Loam (MaE)

- Landform: Hill Slopes
- Approximate Acres of Site: 9.6
- Hydrologic Soil Group: B
- K Factor: 0.37
- Sand 43%, Silt 39.5%, Clay 17.5%
- Organic Content in First 7": 1-3%
- Depth to Water Table: 80"+
- Frequency of Flooding: Occasional

Codorus Silt Loam (Ch)

- Landform: Floodplain
- Approximate Acres of Site: 16.3
- Hydrologic Soil Group: C
- K Factor: 0.37
- Sand, 26.5%, Silt 53.5%, Clay 20%
- Organic Content in first foot: 2-4%
- Depth to Water Table: 18-36"
- Frequency of Flooding: Occasional

Codorus Silt Loam makes up much of the creek bed. Its high silt content erodes easily, resulting in scoured stream beds.



Man made structures such as this pipe bring increased amounts of storm water to the creek during heavy rains.

Rock Creek

Slope and Soils Analysis

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

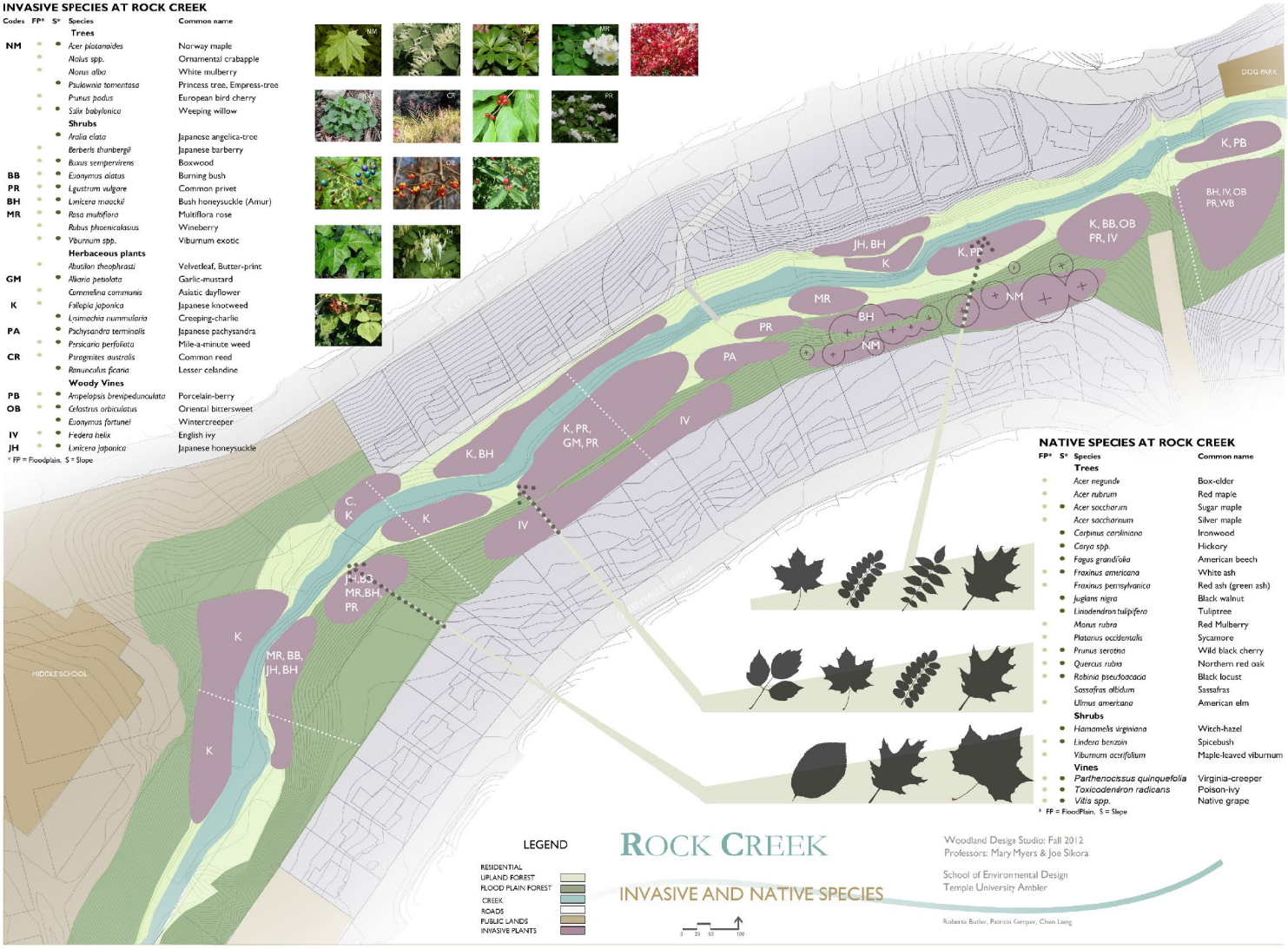
School of Environmental Design
Temple University Ambler

Jake Kuklick, Peter Straus, Steven Panasci

INVASIVE SPECIES AT ROCK CREEK

Codes	FP*	S*	Species	Common name
			Trees	
NM	•	•	*Acer platanoides*	Norway maple
	•		*Malus spp.*	Ornamental crabapple
	•		*Morus alba*	White mulberry
		•	*Paulownia tomentosa*	Princess tree, Empress-tree
	•		*Prunus padus*	European bird cherry
	•	•	*Salix babylonica*	Weeping willow
			Shrubs	
		•	*Aralia elata*	Japanese angelica-tree
	•		*Berberis thunbergii*	Japanese barberry
	•	•	*Buxus sempervirens*	Boxwood
BB	•	•	*Euonymus alatus*	Burning bush
PR	•	•	*Ligustrum vulgare*	Common privet
BH	•	•	*Lonicera maackii*	Bush honeysuckle (Amur)
MR	•	•	*Rosa multiflora*	Multiflora rose
	•		*Rubus phoenicolasius*	Wineberry
	•	•	*Viburnum spp.*	Viburnum exotic
			Herbaceous plants	
	•		*Abutilon theophrasti*	Velvetleaf, Butter-print
GM		•	*Alliaria petiolata*	Garlic-mustard
	•		*Commelina communis*	Asiatic dayflower
K	•		*Fallopia japonica*	Japanese knotweed
		•	*Lysimachia nummularia*	Creeping-charlie
PA		•	*Pachysandra terminalis*	Japanese pachysandra
	•	•	*Persicaria perfoliata*	Mile-a-minute weed
CR	•		*Phragmites australis*	Common reed
		•	*Ranunculus ficaria*	Lesser celandine
			Woody Vines	
PB	•	•	*Ampelopsis brevipedunculata*	Porcelain-berry
OB	•	•	*Celastrus orbiculatus*	Oriental bittersweet
		•	*Euonymus fortunei*	Wintercreeper
IV	•	•	*Hedera helix*	English ivy
JH	•	•	*Lonicera japonica*	Japanese honeysuckle

* FP = Floodplain, S = Slope



NATIVE SPECIES AT ROCK CREEK

FP*	S*	Species	Common name
		Trees	
•		*Acer negundo*	Box-elder
•		*Acer rubrum*	Red maple
•	•	*Acer saccharum*	Sugar maple
•		*Acer saccharinum*	Silver maple
	•	*Carpinus caroliniana*	Ironwood
	•	*Carya spp.*	Hickory
	•	*Fagus grandifolia*	American beech
•	•	*Fraxinus americana*	White ash
•		*Fraxinus pennsylvanica*	Red ash (green ash)
	•	*Juglans nigra*	Black walnut
	•	*Liriodendron tulipifera*	Tuliptree
•		*Morus rubra*	Red Mulberry
•		*Platanus occidentalis*	Sycamore
•	•	*Prunus serotina*	Wild black cherry
•	•	*Quercus rubra*	Northern red oak
•	•	*Robinia pseudoacacia*	Black locust
		Sassafras albidum	Sassafras
•		*Ulmus americana*	American elm
		Shrubs	
	•	*Hamamelis virginiana*	Witch-hazel
•	•	*Lindera benzoin*	Spicebush
•		*Viburnum acerifolium*	Maple-leaved viburnum
		Vines	
•	•	*Parthenocissus quinquefolia*	Virginia-creeper
•	•	*Toxicodendron radicans*	Poison-ivy
•	•	*Vitis spp.*	Native grape

* FP = FloodPlain, S = Slope

ROCK CREEK

INVASIVE AND NATIVE SPECIES

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

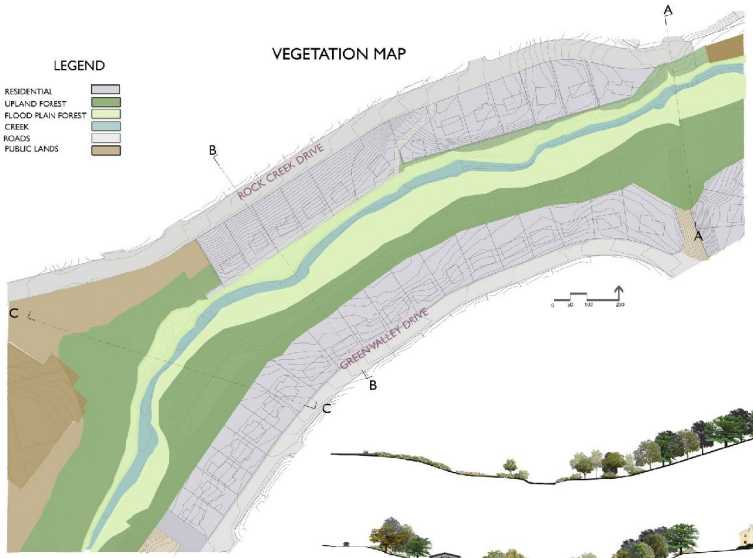
School of Environmental Design
Temple University Ambler

Roberta Butler, Patricia Gempar, Chen Liang

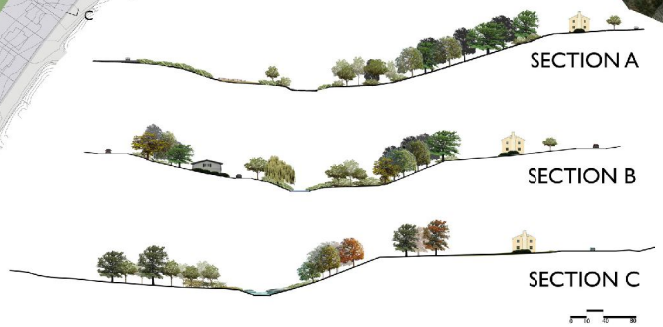
LEGEND

- RESIDENTIAL
- UPLAND FOREST
- FLOOD PLAIN FOREST
- CREEK
- ROADS
- PUBLIC LANDS

VEGETATION MAP



CANOPY AERIAL VIEW



SECTION A LOOKING UP STREAM

PHOTO COURTESY ALISON OSTERTAG

SECTION B LOOKING DOWN STREAM

SECTION C LOOKING WEST

WILD LIFE AT ROCK CREEK

Common Name	Scientific Name
American toad	*Bufo americanus*
Blacknose dace	*Rhinichthys atronasus*
Blue jay	*Cyanocitta cristat*
Eastern chipmunk	*Tamois striatus*
Eastern garter snake	*Thamnophis s. sirtalis*
Eastern gray squirrel	*Sciurus niger*
Exotic earthworm *	*Lumbricus terrestris*
Great horned owl	*Buba virginionus*
Northern water snake	*Nerodia s. sipedon*
Opossum	*Didelphis marsupialis*
Raccoon	*Procyon lotor*
Red fox *	*Vulpes fulva*
Red-backed salamander	*Plethedon c. cinereus*
Red-tailed hawk	*Butea lineatus*
Robin	*Turdus migratonus*
Spotted skunk	*Spilogale putoris*
Spring peeper	*Hyla crucifer*
Whitetail deer	*Odocoileus virginicus*
Woodchuck	*Marmota monax*

* Not native to North America

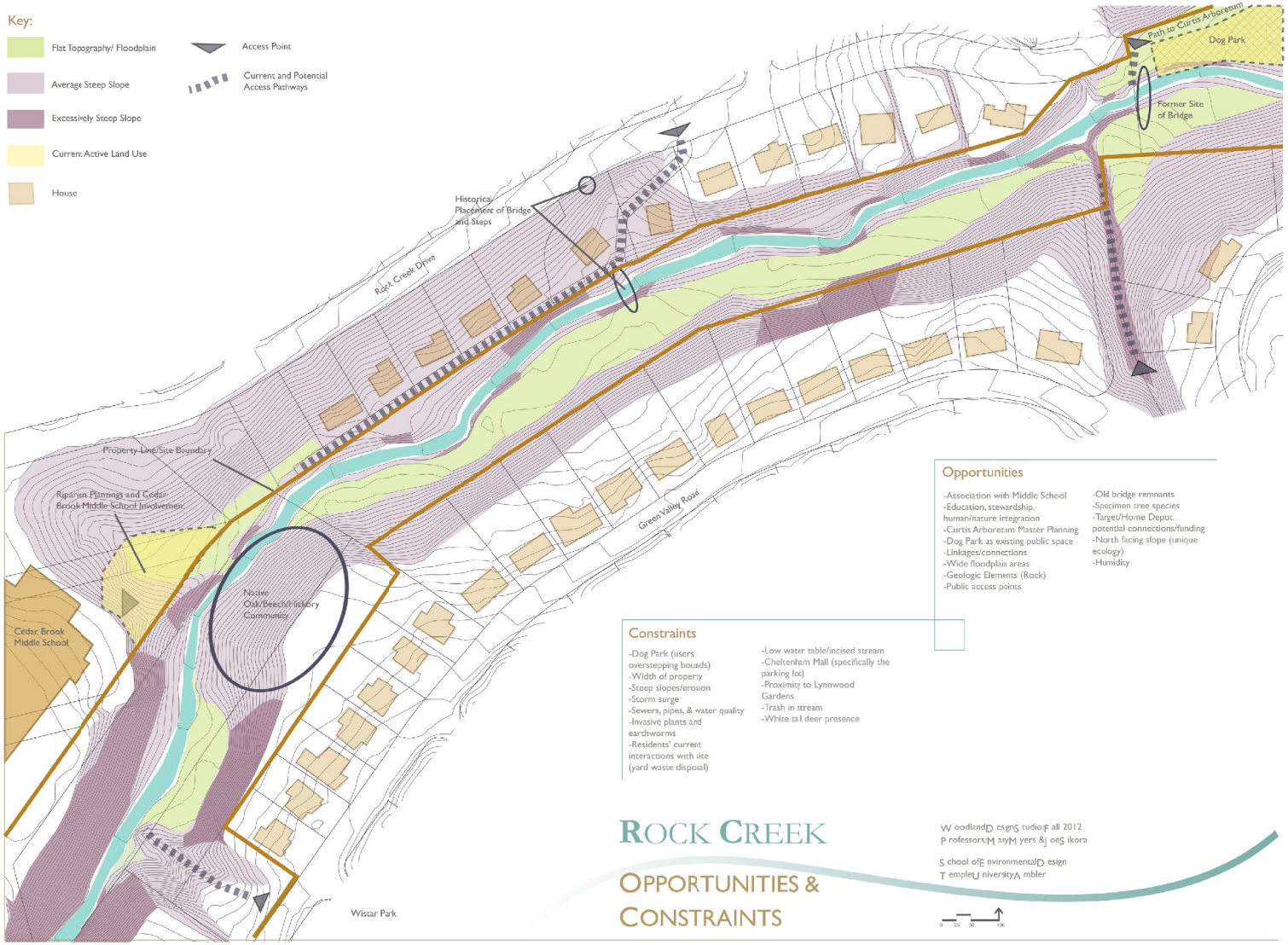
ROCK CREEK

VEGETATION AND WILDLIFE

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

School of Environmental Design
Temple University Ambler

Roberta Butler, Patricia Gempler, Chien Liang



Opportunities

-Association with Middle School
-Education, stewardship, human/nature integration
-Curtis Arboretum Master Planning
-Dog Park as existing public space
-Linkages/connections
-Wide floodplain areas
-Geologic Elements (Rock)
-Public access points
-Old bridge remnants
-Specimen tree species
-Target/Home Depot potential connections/funding
-North facing slope (unique ecology)
-Humidity

Constraints

-Dog Park (users overstepping bounds)
-Width of property
-Steep slopes/erosion
-Storm surge
-Sewers, pipes, & water quality
-Invasive plants and earthworms
-Residents' current interactions with site (yard waste disposal)
-Low water table/incised stream
-Cheltenham Mall (specifically the parking lot)
-Proximity to Lynnwood Gardens
-Trash in stream
-White tail deer presence

ROCK CREEK

OPPORTUNITIES & CONSTRAINTS

Woodland Design Studio: Fall 2012
Professors: Mary Myers & Joe Sikora

School of Environmental Design
Temple University Ambler

0 25 50 100