Strategies for Conserving the Green Infrastructure of Petersburg, VA

Prepared by Green Infrastructure Cities Class

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UNIVERSITY *of* VIRGINIA
SCHOOL OF ARCHITECTURE

This report was prepared by students at the University of Virginia's School of Architecture.

Green Infrastructure Center

Contents

INTRODUCTION

Green infrastructure is the interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas that support native species, clean water and contribute to community health and quality of life. Just as localities plan for grey infrastructure, they also need to take care of their green infrastructure to create healthful places for residents and businesses. For example, forests help to filter and absorb rainfall thereby reducing flooding frequency while also protecting streams and facilitating the recharge of groundwater supplies. Green infrastructure planning is a framework for assessing and valuing these environmental assets.

This report was prepared by students in an applied planning class Green Infrastructure Cities at the University of Virginia (UVA). This project is a collaborative partnership between the Green Infrastructure Center and UVA. It was funded by the Virginia Department of Forestry (VDOF). Students proposed strategies for protecting environmental assets and landscape-influenced cultural resources.

Students worked in teams to evaluate the green infrastructure of the City of Petersburg in Virginia. Student teams conducted research and utilized natural resource data and city data.

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GOAL SUMMARY

URBAN FORESTS AND HABITATS

Goal 1: Preserve and support existing tree canopies across Petersburg, especially in low-income and historically disadvantaged neighborhoods, to enhance the public health and the economic benefits trees provide.

Goal 2: Combat stormwater runoff through planting more trees, reducing impervious surfaces and creating stormwater parks to alleviate urban heat island effect and cultivate open green community spaces.

Goal 3: Increase biodiversity in the existing and future urban tree canopy to create a more resilient urban forest environment.

WATER

Goal 1: Proactively protect and restore waterways, groundwater, and sensitive environments. (Objective 8.2 Petersburg Comp Plan)

Goal 2: Proactively reduce flooding risks to residents and property owners by reducing the volume of the water entering the system. (Objective 8.4. Petersburg Comp Plan)

PARKS AND RECREATION

Goal 1: Create a citywide network of parks and green spaces in Petersburg to improve equitable access, increase connectivity, and promote community physical and mental health and wellbeing.

Goal 2: Improve the quality and design of existing public infrastructure, such as public seating, sidewalks, and waste bins to revitalize underutilized spaces, and better respond to environmental stressors and city needs.

CULTURE AND HISTORY

Goal 1: Create opportunities for tourism with well-connected historic and cultural sites to enhance economic growth and civic pride.

Goal 2: Increase civic and community pride in Petersburg's history and culture.

URBAN FORESTS & HABITATS: RECOMMENDED POLICIES AND STRATEGIES

Written by: Shaima Alharbi, Christopher Chao, Connor Loeber, Shunan Na, Charlotte Pitts

OVERVIEW

Urban forestry is a vital component of any city. A healthy urban tree canopy maximizes social, economic, and environmental benefits for residents and visitors of the City, providing tourism opportunities, increased green space and recreation, and leads to healthier, happier citizens by supporting water, air, and soil quality. A comprehensive urban forest can also contribute to increased home values, heat resilience, and habitat for local species. Notably, trees can both intercept thousands of gallons of water a year, depending on size, species, and maturity, and also purify air quality. Today, during a 2-year storm event over a 24-hour period, the existing tree coverage in Petersburg can capture over 40-million gallons of water (equivalent to approximately 80 Olympic-sized swimming pools), including 53,934 lbs. of nitrogen, 4,405 lbs. of phosphorus and 2,712 tons of prevented sediment runoff (Figure 1, Map 2). Petersburg trees sequester over 31,335 metric tons of carbon annually, including over 200,000 lbs. of ozone per year (Figure 2).

However, despite known benefits of urban tree canopies, urban forests and tree canopy densities are threatened by increased development and expansion within Petersburg. The City has identified a series of problems in the 2021 Comprehensive Plan including access to the Appomattox River amenities, connectivity of parks, and pedestrian connectivity in the Parks and Recreation Section (beginning with page 4715). Currently, the tree cover across Petersburg is 47%, with the opportunity to grow to over 56% (Map 1). As a multifaceted topic, the City's parks and recreation goals can be considered in tandem with tree canopy goals, with the expansion of pedestrian walkways and connecting greenspaces. Urban tree canopies will provide shade in the summer months for existing pedestrian infrastructure, incentivizing more individuals to visit and spend money in the city. In keeping with the City of Petersburg's stated 2040 goals around the need for stormwater management, *'The Federal and State government has mandated that cities the size of Petersburg develop and implement a series of programs to improve the quality of stormwater runoff,'* which provides the opportunity for increasing the urban tree canopy.

Today, the City of Petersburg does not have a comprehensive strategy for maintaining existing or promoting biodiverse tree canopy networks. While the 2040 Comprehensive Plan mentions '*trees*' only three times, the City of Petersburg has recently applied for support to develop an urban forest masterplan, and the following strategies that we suggest should be implemented in such a plan. In turn, there are opportunities for greater investment in tree canopy and connectivity in order to bolster many of the City's goals.

> *The preservation of vegetated natural areas helps reduce pollution, provides relief from heat islands, and naturally captures carbon. Sensitive areas such as floodplains, endangered species habitats, and waterways can be preserved within parkland while still allowing public access to their recreational and educational benefits.* [From the 2014 City of Petersburg Comprehensive Plan, Section 05, page 99]

STRATEGIES

GOAL 1: PRESERVE AND SUPPORT EXISTING TREE CANOPIES ACROSS PETERSBURG, ESPECIALLY IN LOW-INCOME AND HISTORICALLY DISADVANTAGED NEIGHBORHOODS, TO ENHANCE THE PUBLIC HEALTH AND THE ECONOMIC BENEFITS TREES PROVIDE.

RATIONALE:

Due to the lack of tree canopy guidelines in the Petersburg Comprehensive Plan, the establishment of formal guidelines around tree canopy preservation, maintenance, and enhancement would allow the City to strategically plan their approach based on funding, leadership, public interest, and other priorities, while also guaranteeing an enhanced level of public health and supporting the city economy. In turn, current tree canopy should be maintained while increasing the number of future tree canopy in areas of lower median household income, high amount of impervious surface, with high cultural and social import (Map 2-6).

At least 90% of people in the United States are aware of the importance of planting trees to cope with climate change and are requiring the government to do more (Tyson & Kennedy, 2020). There is increasing awareness around the benefits of trees, and this recognition could enhance not only climate but also our well-being, and the investment in a city's green assets became more important (Ulmer et al., "Multiple Health Benefits of Urban Tree Canopy."). Urban tree canopies are beneficial economically, educationally, and socially, and also reduce social stress and pollution. These social ailments can be mitigated not only by preventing damage to the urban tree canopy, but also instilling the notion that nature has rights just like humans (Nash 1989). Increasing the city's tree canopy is not limited to planting more trees but it also expands to preservation and maintenance with a high level of dedication towards a collective responsibility approach.

While taking care of Petersburg's tree canopy, the city is enhancing the public health and preventing potential diseases, planting trees encourages walking and will lead to lower overweight and obesity rates, in specific lesser spread of type 2 diabetes, high blood pressure and asthma (Ulmer et al., "Multiple Health Benefits of Urban Tree Canopy" 2016). Increasing the tree cover in lower-income neighborhoods, especially near streets with businesses, will offer not only enhanced public space, with greater shade, lower surface temperatures, and opportunities for gathering, but will also enhance social connections, attract greater use from visitors who will contribute to economic prosperity in the downtown (Figure 3). Tree-canopy and planting-related programming across the city of Petersburg would integrate different communities in an effort to empower groups to take ownership in the care and keeping of the canopy landscapes. *Reforest Richmond* is a collaborative campaign to rebuild Richmond's urban tree canopy. It offers a great example of how instilling collective responsibility within a tree canopy board could grow through time within local organizations and communities.

There are many potential participants and stakeholders in Petersburg that could be a part of this investment in tree canopy growth. In partnering with existing organizations, such as Friends of the Lower Appomattox River (FoLAR) and the Green Infrastructure Center (GIC), the City could implement strategically planned and community-based tree canopy preservation efforts and events within different neighborhoods. Moreover, engagement with academic service fraternities, such as those at Virginia State University, would enhance

long-term city tree canopy research and community-based involvement. Additionally, the creation of a tree inventory within Pocahontas Island (see Figure 4 - 5) and across neighborhoods in Brickhouse Run (see Figure 6) through direct resident engagement could help pilot a tree-care program on privately owned parcels. An implementation team is required to complete these tasks and potential allies include Chesapeake Bay Foundation, local organizations such as FoLAR, the Recreation and Parks Department, residents and urban planners are all key actors. As noted by the Reforest Richmond campaign "Rebuilding canopy is impossible without rebuilding trust" and the tree canopy in Petersburg is in need of collective action.

Objective 1: Plant a total of 1,700 trees within plots and streets of Pocahontas Island and across Brickhouse Run in the span of 1 to 2 years.

> **Action 1:** Engage residents in planting on privately owned parcels along Rofle St., Witten St., and Pocahontas St., after attending workshops through non-profit organizations.

Objective 2: Improve the existing tree canopy and increase it along Joseph Jenkins Robert St., as well as within the superblock between W. Bank St. and W. Tabb St.

> **Action 1**: Create and adopt a master plan determining the best places to plant trees in coordination with the community.
>
> **Action 2:** Obtain grants to support tree planting, care, and community education.

Objective 3: Create a community tree board to oversee, manage, and report on the tree canopy condition within these areas.

> **Action 1:** Partner with existing organizations, such as Friends of the Lower Appomattox River, and Green Infrastructure Center, to strategically plan community-based tree-canopy preservation efforts and events in different neighborhoods across the city.
>
> **Action 2:** Evaluate adequacy of planting spaces to determine the size of trees that can be supported.

GOAL 2: COMBAT STORMWATER RUNOFF THROUGH PLANTING MORE TREES, REDUCING IMPERVIOUS SURFACES AND CREATING STORMWATER PARKS TO ALLEVIATE URBAN HEAT ISLAND EFFECT WHILE CULTIVATING OPEN GREEN COMMUNITY SPACES.

RATIONALE:
Flooding and stormwater management are notable challenges within the City of Petersburg (see Map 3). The City, especially the downtown area, is inundated with impervious surfaces, which allow for excess water runoff to overwhelm the infrastructure. This can then lead to flooding, stagnant water buildup and other damage across the city. To combat these effects, the City of Petersburg has an opportunity to reformat the Petersburg Non-Residential/Multi-family Fee Credit Manual to incentivize a reduction of impervious surfaces on private property and create storm

water parks. Additional steps include retrofitting existing greyfield sites into resilient pocket parks. Sites such as these include the greyfield site in between 3rd and Bank Street or increase tree planting in vacant parcels to act as a buffer for current infrastructure (Figures 7 - 8)

To improve the current condition of stormwater runoff, some changes must be made citywide. First and foremost, replacing blacktop and concrete areas with permeable pavers to introduce small segments of permeable surface for water to infiltrate. This would help to reduce the stress on the current stormwater infrastructure of the city. Taking this one step further, roads that are built to facilitate heavy traffic but never do, should be reduced in size. The deconstruction of any over-engineered roads will open more square footage for the implementation of trees along the streetscape which in turn combat water runoff. Following this step, the tree beds themselves must also have permeable or removeable forms to allow the trees to grow unencumbered all the while reducing the risk to any infrastructure in the same area.

At this site street trees are planted in a line with enough room per tree (top). However, the foreground lot sits empty and leads to hundreds of gallons of runoff which could be ameliorated by pervious surfaces and trees.

To meet these objectives, both the city and its citizens must reduce impervious surfaces. Through the proposed guide above, both parties could do so. Next, partnering with Petersburg Area Transit, a traffic analysis study can be done to identify roads that could potentially be reduced thus allowing for more green space. Finally, in conjunction with both P.A.T. and Building & Permitting City of Petersburg, remove current concrete/metal tree beds to allow for these trees to grow while reducing risk of damage to property and the trees themselves.

Objective 1: Retrofit existing greyfield sites into resilient pocket parks. (Notable: greyfield site in between 3rd and Bank Street)

Objective 2: Establish a tree planting buffer on unused plots along the Appomattox River.

Objective 3: adopt standards in the city comprehensive plan for tree care, creation of a tree ordinance, and education on how to plant trees.

> **Action 1:** Focus on the below streets that need trees including Dupuy Road, S. Whitehill Drive, and Mistletoe St./Porterville St. Intersection.

GOAL 3: INCREASE BIODIVERSITY IN THE EXISTING AND FUTURE URBAN TREE CANOPY TO CREATE A MORE RESILIENT URBAN FOREST ENVIRONMENT.

RATIONALE:

Biodiversity is lacking in many Petersburg areas. Careful selection of tree species is important. While native trees provide the most benefit to local ecosystems, they may not be suitable to be planted as street trees with increased ambient temperatures, pollution levels, and land uses. The city should plant a minimum of 5 different species in either open space parks or long road corridors to follow the Tree Diversity Index. This protects from the rapid spread of disease that impacts one specific species and minimizes tree canopy impact.

By enhancing biodiversity, simply the number and representation of species, the urban forest is more resilient to threats such as drought, pests, and other stressors of the urban environment (Environmental Protection Agency, 2015). Biodiversity has also been shown to increase human health values and overall resiliency, offering the option of a healthier life for Petersburg residents (Morton and Hill, 2014). Furthermore, biodiversity in the ecosystem can increase human resiliency to infectious diseases, such as Lyme disease, a growing threat to southern states such as Virginia (LoGiudice et al., 2003). Biodiverse communities have higher levels of food and resource production, relating to gardens, an important tool for local communities to combat food insecurity and increase healthful outcomes (Cardinale et al., 2012). Biodiverse cities are healthier and offer more benefits to the citizens. Petersburg has the opportunity to take advantage of this opportunity to increase biodiversity in its urban forest as a secondary goal while increasing its urban tree canopy coverage.

It is well known that a diversity of plantings increases resiliency to pests and diseases as evidenced by the loss of many street trees following from Dutch Elm Disease during the 20th century (Minnesota Extension Service). Increasing biodiversity in practice will require the best tree to be planted for each site, giving priority to native species when possible and forbidding the introduction of known invasive species. For example, the neighborhoods along Brickhouse Run or Pocahontas Island, scattered with invasive and low-quality trees, need investment and care, both on City-owned and on private property. These trees need to be planted with the appropriate methods to ensure their long-term success and the overall health of the tree canopy. Prioritizing native trees will allow for maximum ecological benefits to be contributed to the local environment, supporting bird, small mammal, and insect populations that will all aid in the overall biodiversity of the city. See the recommended species list for specific recommendations.

Objective 1: Publicize a recommended species pamphlet for distribution to homeowners and formally adopt is as a species list for the City of Petersburg.

> **Action 1:** Target distribution of materials to private landowners through nonprofits, retail nursery centers, homeowners' associations, and community organizations.

> **Action 2:** Encourage City officials to adopt a recommended species list into planning materials.

> **Action 3:** Become a Tree City USA for grant access and increased funding*. (*See Appendix G*)

FIGURES

FIGURE 1: POUNDS OF CHEMICALS IN STORMWATER RUNOFF REMOVED BY TREES IN PETERSBURG

Pounds of chemicals removed by trees
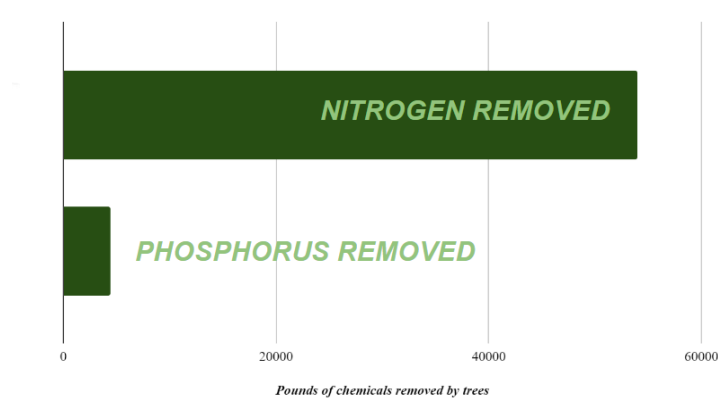
FIGURE 2: REMOVAL RATE OF CHEMICALS BY TREES (LBS./YEAR)

Removal Rate (lbs/year)
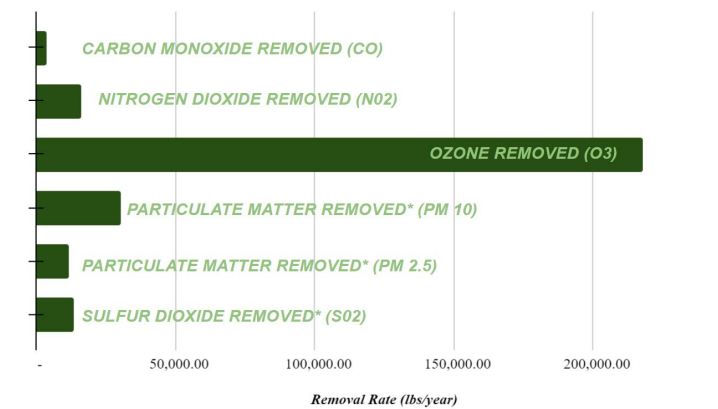
FIGURE 3: TREE QUALITY BASED ON CAPACITY TO RETAIN STORMWATER (SEE WITH MAP 2)
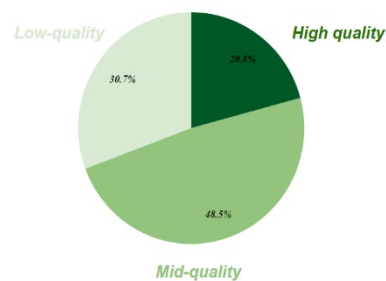
FIGURE 4: VIEW OF DOWNTOWN INTERSECTION WITH FEW TREES (BANK & NORTH ADAMS ST)

FIGURE 5: EXISTING LOT ON POCAHONTAS ISLAND

FIGURE 6: REIMAGINED LOT ON POCAHONTAS ISLAN. AS A NEW KIND OF COMMUNITY GATHERING PARK SPACE.

FIGURE 7: EXISTING LOT IN NEIGHBORHOOD ALONG BRICKHOUSE RUN

FIGURE 8: GREYFIELD SITE AT THE INTERSECTION OF 3RD AND BANK ST.

FIGURE 9: REIMAGINED SITE AT THE INTERSECTION OF 3RD AND BANK ST. AS A WATER-RETENTION COMMUNITY PLANTING SPACE.

MAPS

MAP 1: EXISTING & POTENTIAL TREE PLANTING AREAS

MAP 01

EXISTING AND POTENTIAL TREE
PLANTING AREAS

Potential

Existing
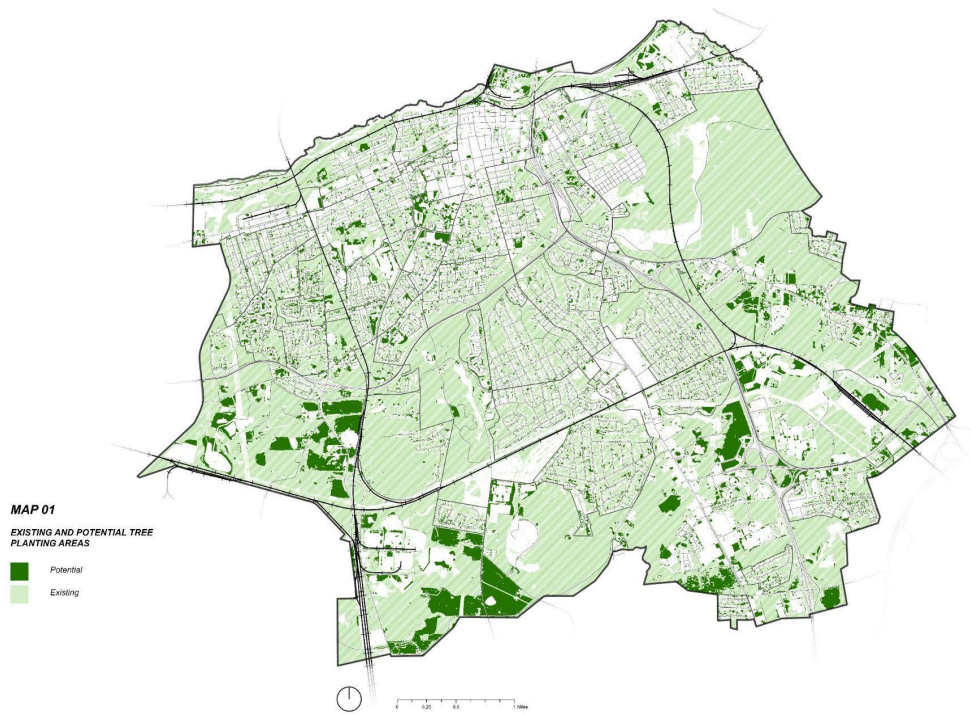
MAP 2: TREE CANOPY RETENTION CAPACITY [MEASURED BY STORM WATER CAPTURED IN INCHES]

MAP 02

TREE CANOPY RETENTION CAPACITY
(Measured by Amount of Storm
Water Captured in Inches)

0.801-1 in (Best Quality)

0.601 - 0.80 in

0.401-0.60 in

0.201-0.40 in

0.136-0.20 (Worst Quality)

MAP 3: IMPERVIOUS/PERVIOUS SURFACES & SURFACE TEMPERATURE

MAP 03

**IMPERVIOUS/PERVIOUS SURFACES &
SURFACE TEMPERATURE**

Least impervious, lowest surface temperature
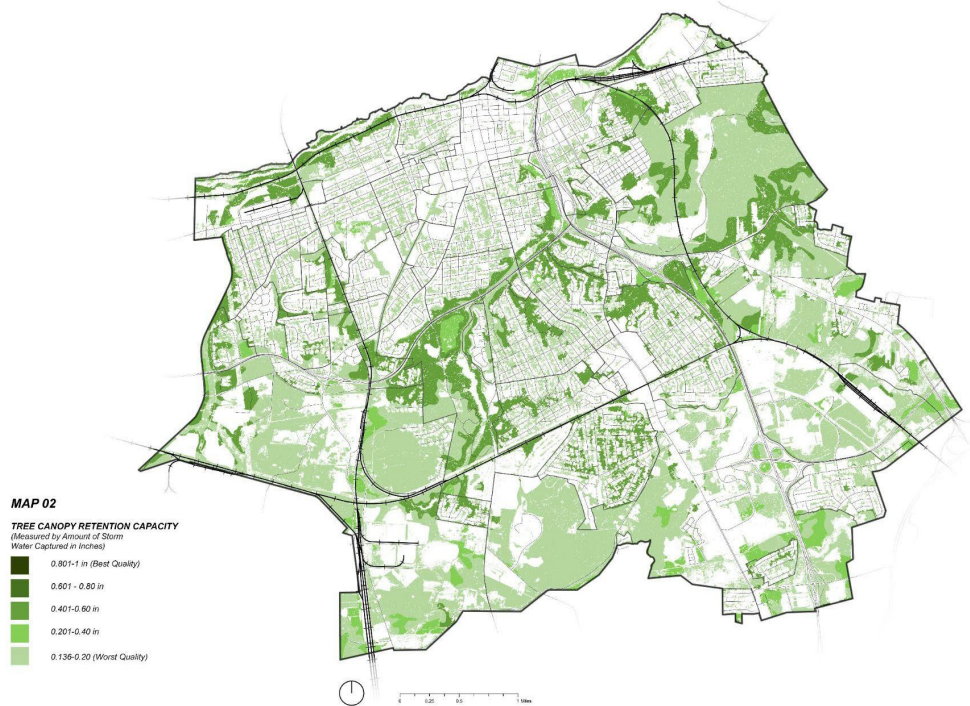
Most impervious, highest surface temperature

MAP 4: FORESTED AREAS & SURFACE TEMPERATURE

MAP 04

**FORESTED AREAS &
SURFACE TEMPERATURE**
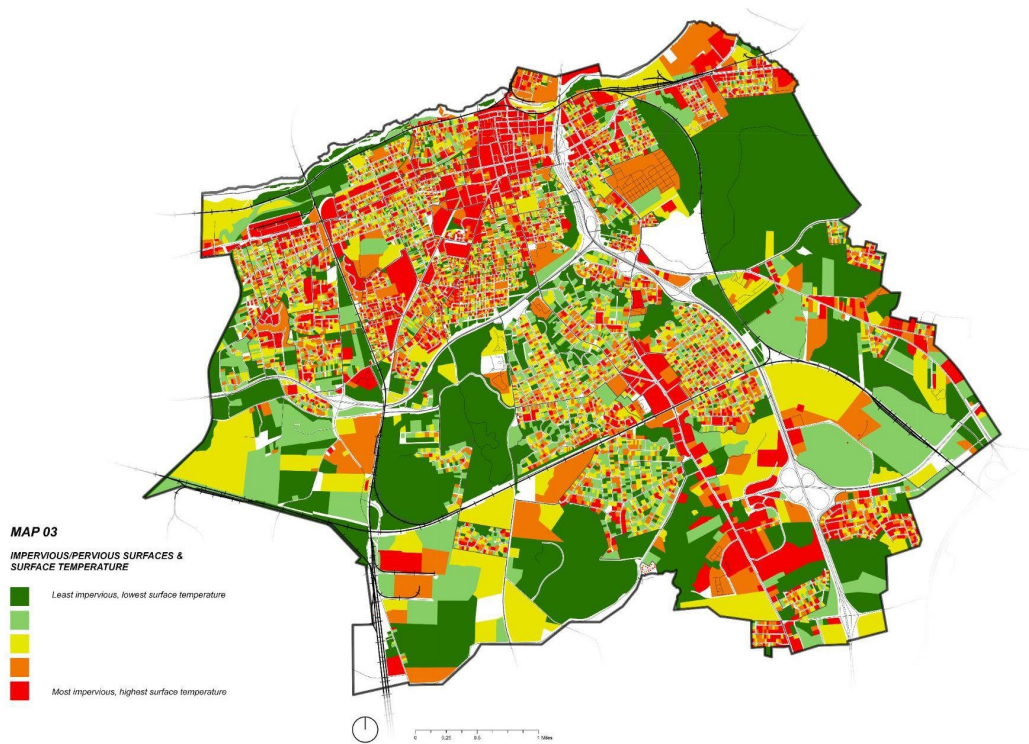
Lowest surface temperature

Highest surface temperature

MAP 5: MEDIAN HOUSEHOLD INCOME & SURFACE TEMPERATURE

MAP 05

MEDIAN HOUSEHOLD INCOME &
SURFACE TEMPERATURE

High income, low surface temperature
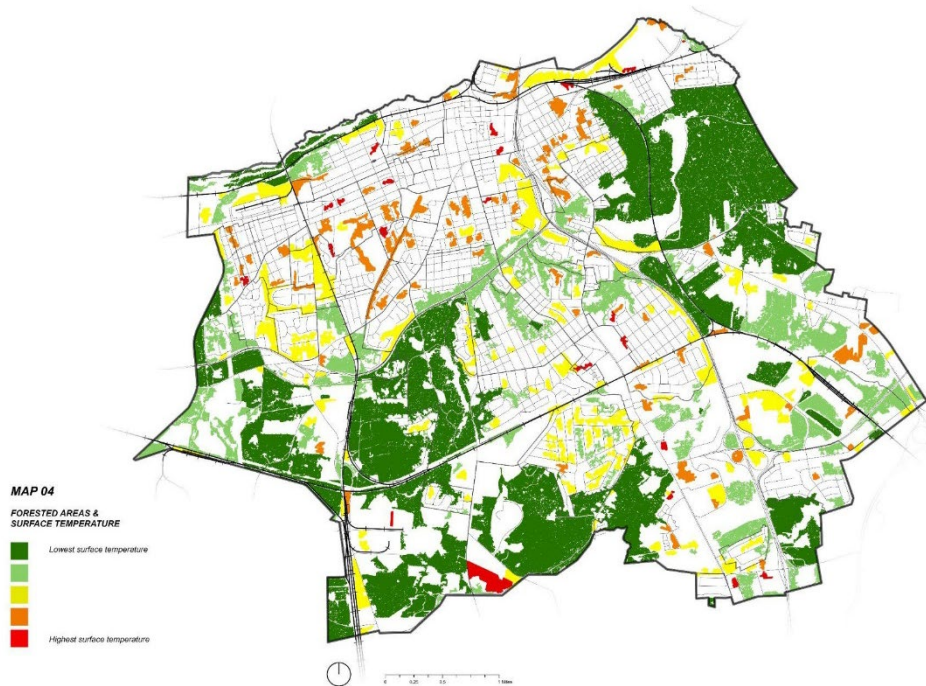
Low income, high surface temperature

MAP 6: STREET TREE COVERAGE & CULTURAL, HISTORICAL, AND EDUCATIONAL SITES

MAP 06

STREET TREE COVERAGE (%) &
CULTURAL, HISTORICAL, AND EDUCATIONAL
SITES OF SIGNIFICANCE

50.1 - 100%
25.1 - 50%
15.1 - 25%
10.1 - 15%
5.1 -10%
0 - 5%
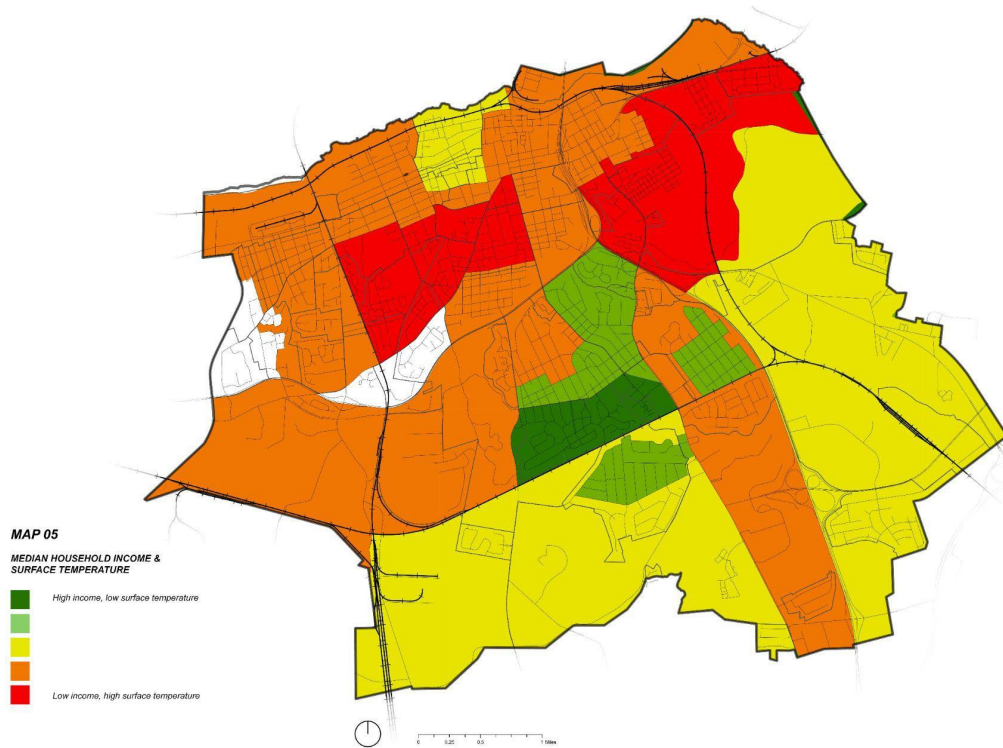
■ Cultural Sites
▲ Historical Sites
+ Elementary & High Schools

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WEB LINKS

TREE CITY USA PROGRAM:
https://www.arborday.org/programs/treecityusa/index.cfm

VIRGINIA DEPARTMENT OF FORESTRY:
https://dof.virginia.gov/

UNITED STATES DEPARTMENT OF FORESTRY:
https://www.fs.usda.gov/

RESOURCES

1. Virginia Department of Forestry Grant Programs: The Virginia Department of Forestry offers grants to provide financial assistance that Petersburg could benefit from. The Virginia Trees for Clean Water Grant Program funds tree planting efforts and public education on trees. Recommended funding ranges from $1,000- $50,000 on a reimbursement basis and grant funding can be applied to private contractors, supplies, trees, site preparation, and maintenance expenses as well7. Similarly, the Urban and Community Forest Grant Program encourages citizen involvement in urban forestry projects. For funding matching, proposals are accepted up to $50,000, and for non-matching grants, proposals can be up to $250,000. Towns, nonprofits, civic groups, and neighborhood associations are all eligible to apply for the Urban and Community Forest Grant. Virginia Department of Forestry: https://dof.virginia.gov/urban-community-forestry/urban-forestry-community-assistance/

2. United States Department of Forestry Grant Programs: The United States Forestry Service (USFS) and the United States Department of Agriculture (USDA) have partnered to create a grant program titled "Urban & Community Forestry Inflation Reduction Act Grants". The grants are funded by the 2021 Inflation Reduction Act and are over 1.5 billion dollars (nationwide) for the planting of trees in disadvantaged communities. There is an additional 250 million dollars for state-wide forestry initiatives to also assist the urban forest in historically disadvantaged areas.   U.S. Forest Service: https://www.fs.usda.gov/managing-land/urban-forests

FUNDING OPPORTUNITIES

Virginia Department of Forestry: Provides funds for tree planting and offers technical assistance. See: http://www.dof.virginia.gov/financing/grants.htm

U.S. Forestry Service provides grants for tree plantings in marginalized communities. See: https://www.fs.usda.gov/managing-land/urban-forests/ucf

The Cameron Foundation offers grants that increase the quality of life for Petersburg residents. See: https://camfound.org/fund/grant-guidelines

The Petersburg Community Foundation provides grants to improve the community within Petersburg. See: https://petersburgcf.org/grants/

VOLUNTEER AND PARTNER ORGANIZATIONS

Friends of the Appomattox River

https://far-va.org/

Petersburg Community Foundation

https://petersburgcf.org/

Virginia State University Student Organizations

https://www.vsu.edu/student-life/club-organizations/student-organizations.php

Appendixes

Appendix A: Maps

Map 7: Existing Land Coverage

APPENDIX:
MAP 07
EXISTING LAND COVERAGE

- Tree Canopy
- Scrub/Shrub
- Pervious/Turff
- Bare Land
- Wetland
- Forested Wetland
- Water

Map 8: Potential Land Coverage

APPENDIX:
MAP 08
POTENTIAL LAND COVERAGE

- Tree Canopy
- Scrub/Shrub
- Pervious/Turff
- Bare Land
- Wetland
- Forested Wetland
- Water
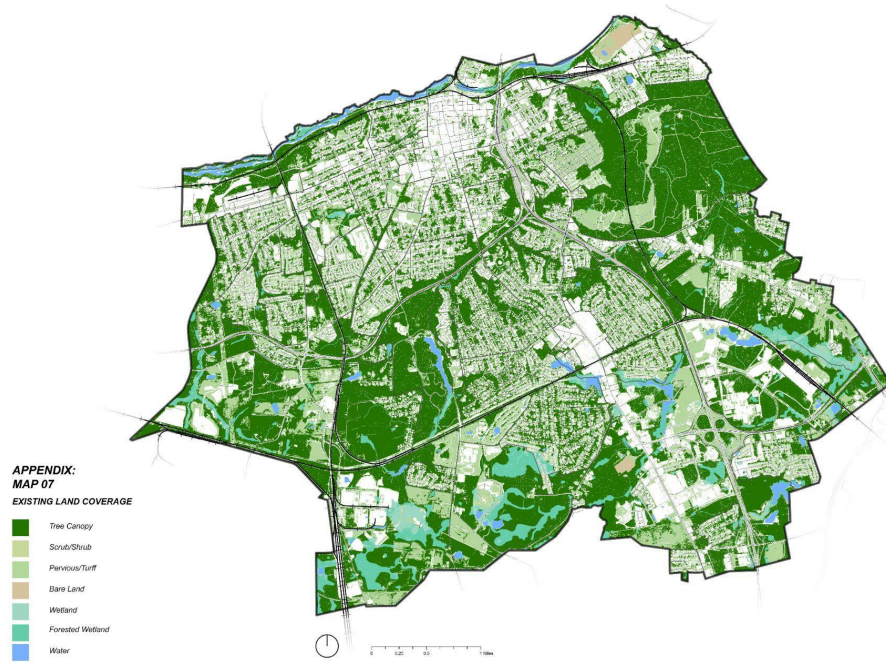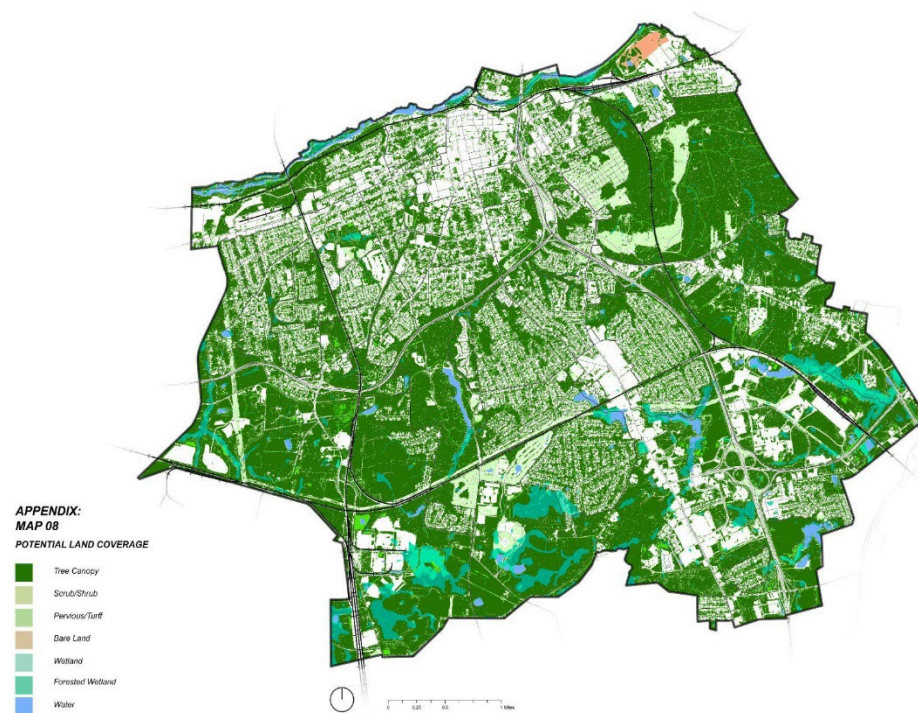
MAP 9: PARCEL TEMPERATURE [MEASURED OCTOBER 2023]

APPENDIX:
MAP 09

PARCEL TEMPERATURE (DEGREES F)
(Measure in October 2023)

73.0 - 74.0 (LOW)

81.0 - 82.0 (HIGH)
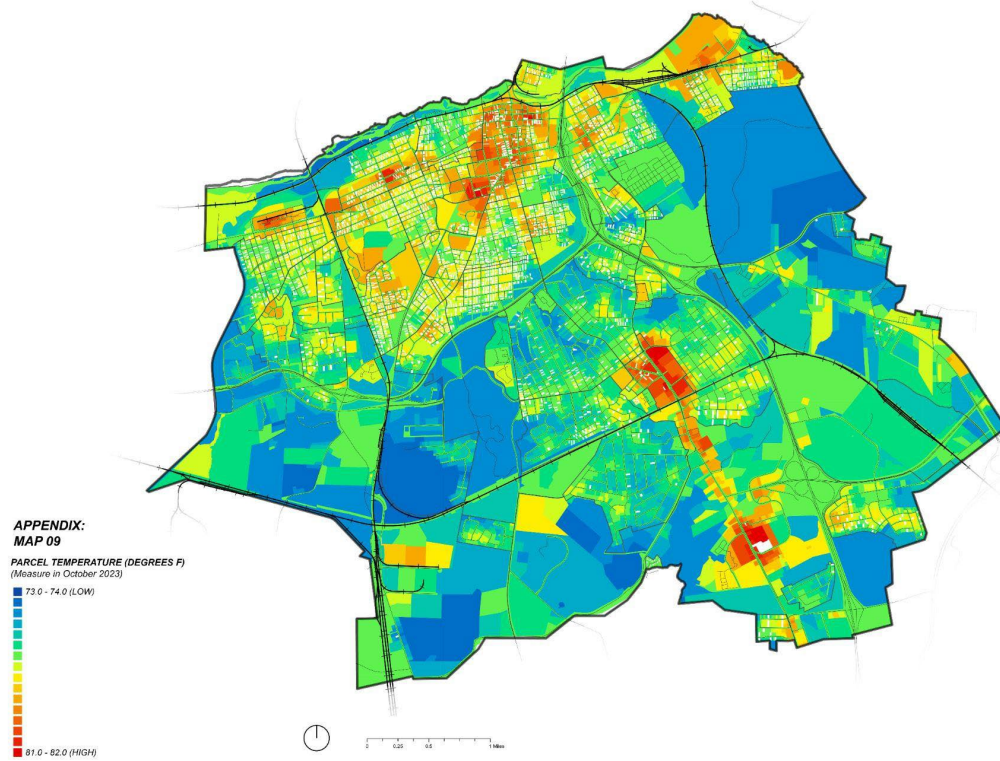
MAP 10: PERCENTAGE OF PEOPLE WHO ARE LOW-INCOME

APPENDIX:
MAP 10

PERCENTAGE OF PEOPLE LOW-INCOME

0 - 10%
10.1 - 20%
20.1 - 30%
30.1 - 40%
40.1 - 50%
50.1 - 60%
60.1 - 70%
70.1 - 80%
80.1 - 90%
90.1 - 100%
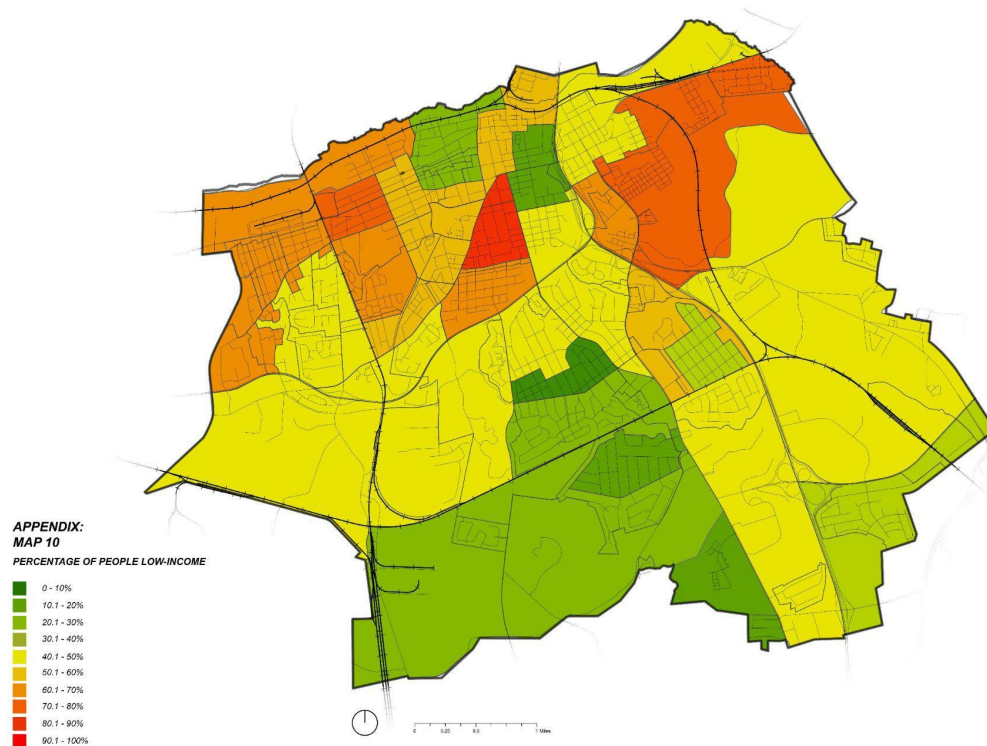
APPENDIX:
MAP 11

STREET TREE PLANTING POTENTIAL

- 50.1 - 100%
- 25.1 - 50%
- 15.1 - 25%
- 10.1 - 15%
- 5.1 - 10%
- 0 - 5%

■ Cultural Sites
▲ Historical Sites
+ Elementary & High Schools

APPENDIX B: RECOMMENDED SPECIES LIST (YARD LOCATIONS)

Downy Serviceberry (Amelanchier arborea)

A multi-stemmed tree that is growing in popularity in food forests.

American Hornbeam (Carpinus caroliniana)

Easily identified by its sinewy and smooth gray bark, it is a popular understory tree for shaded areas.

Eastern Redbud (Cercis canadensis)

An ideal small tree for the urban landscape. It is tolerant of many of the urban challenges often found in cities.

White Fringetree (Chionanthus virginicus)

A small, multi-stemmed tree identified by its fragrant clusters of white flowers.

Saucer Magnolia (Magnolia x soulangeana)

It makes a great statement piece in the landscape and requires a lot of room for its root space.
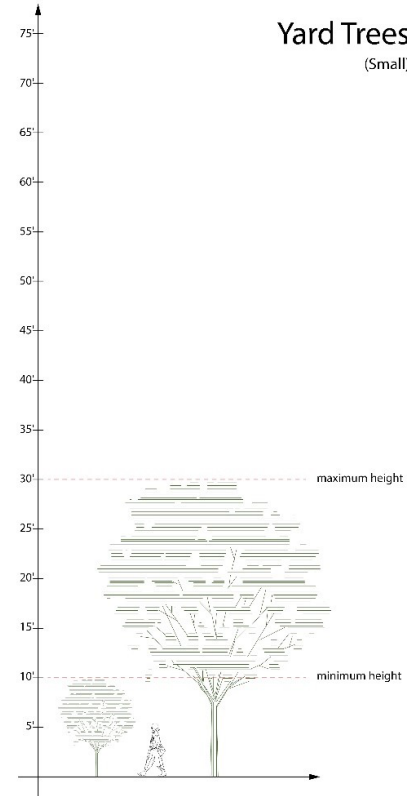
Star Magnolia (Magnolia stellata)

A multi-stemmed shrub that can be trained to be a tree.

Sweetbay Magnolia (Magnolia virginiana)

A small, multi-stemmed tree that ranges from deciduous to semi-evergreen.

Yard Trees
(Small)

maximum height — 30'

minimum height — 10'

Common Hackberry (Celtis occidentalis)

A hardy urban tree. Tolerant of many challenges in city soils, it makes a great street or lawn tree.

Katsura Tree (Cercidiphyllum japonicum)

A medium tree with a dense pyramidal habit and low arching branches at maturity.

American Yellowwood (Cladastrus kentukea)

An excellent shade tree that allows other plants to grow under it. It provides year round visual interest.

American Holly (Ilex opaca)

A broadleaf evergreen tree that is often found as an understory tree or shrub. Ideal for its conical and pyramidal form to be a visual border or hedge.

Eastern Redcedar (Juniperus virginiana)

A tough dependable tree that can grow where most trees cannot. A hardy evergreen that makes an excellent visual barrier.

Black Gum (Nyssa sylvatica)

These trees can be very hardy and can tolerate some of the more challenging urban issues such as compaction and poor drainage.

Eastern Hophornbeam (Ostrya virginiana)

Named for its fruit that resembles chains of hops in the fall, it is a generalist tree that can tolerate small challenges in the landscape.
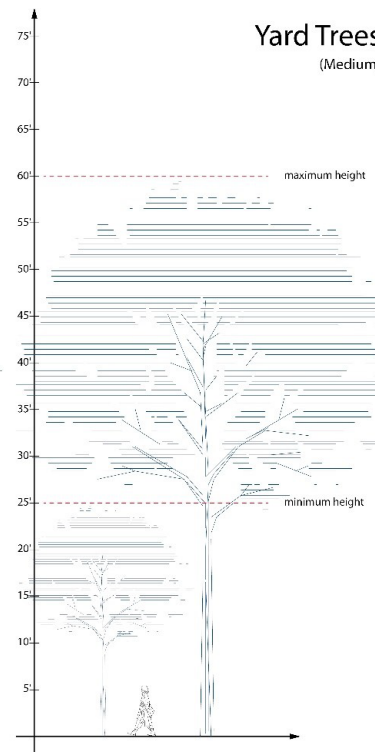
Sourwood (Oxydendron arboreum)

An excellent ornamental tree if given healthy soil and space.

Shumard Oak (Quercus shumardii)

An excellent option for streetscapes, this tree is popular due to its upright branches that provide clear walking space.

Yard Trees
(Medium)

maximum height — 60'

minimum height — 25'

American Beech (Fagus grandifolia)

A great statement tree that should only be used in large, open spaces.

Kentucky Coffeetree (Gymnocladus dioicus)

For street trees, plant male trees. If litter is not a problem, the flowers on the female tree make the tree worth planting.

Tulip Poplar (Liriodendron tulipifera)

An excellent shade tree that has a moderately fast growth rate and needs a lot of space to grow.

American Sycamore (Platanus occidentalis)

Its beautiful scene comes at the price of messy seed pods and large amounts of raking. An excellent tree for along rivers and streams, not so much in a perfectionist's front lawn.

White Oak (Quercus alba)

One of the most iconic and loved trees in the United States due to its ability to become massive and live to an old age.

Swamp White Oak (Quercus bicolor)

Though not quite as grand as the white oak, it is more hardy and can survive some challenges its cousin cannot.

Scarlet Oak (Quercus coccinea)

Named for its fall foliage, it has the best foliage of all the oaks.

Overcup Oak (Quercus lyrata)

An up and coming oak in the urban forest, it is one of the only deciduous oaks to tolerate moderate compaction.

Northern Red Oak (Quercus rubra)

A staple in Eastern forests, this oak can be quite resilient and is quite popular to plant in parks and other landscapes due to its ability to tolerate a little bit of everything.

Yard Trees

(Large)

75' maximum height

70'

65'

60'

55'

50'

45'

40' minimum height

35'

30'

25'

20'

15'

10'

5'
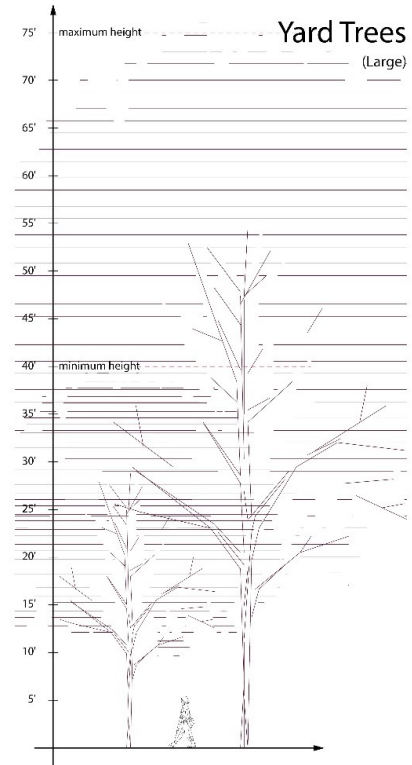
Trident Maple (Acer buergerianum)

A low, multi-stem plant that can be trained into a small single stem tree. Often used as a street tree due to its tolerances to challenging site conditions.

Paperbark Maple (Acer griseum)

A slow growing tree planted for its paperlike orange bark that self-exfoliates.

American Hornbeam (Carpinus carolinana)

Easily identified by its sinewy and smooth gray bark, it is a popular understory tree for shaded areas.

Eastern Redbud (Cercis canadensis)

An ideal small tree for the urban landscape. It is tolerant of many of the urban challenges often found in cities.

Japanese Snowbell (Styrax japonicus)

A beautiful, ornamental tree. Must choose an upright cultivar such as PRYSTINE SPIRE to avoid low branches. Can be messy.

Black Gum (Nyssa sylvatica)

These trees can be very hardy and can tolerate some of the more challenging urban issues such as compaction and poor drainage.

Shumard Oak (Quercus shumardii)

An excellent choice along streets, this tree is popular due to its upright branches that provide clear walking space.

Street Trees (Small)

75' 70' 65' 60' 55' 50' 45' 40' 35' — maximum height 30' 25' 20' — minimum height 15' 10' 5'

Street Trees (Medium)

75' 70' 65' 60' — maximum height 55' 50' 45' 40' 35' 30' — minimum height 25' 20' 15' 10' 5'
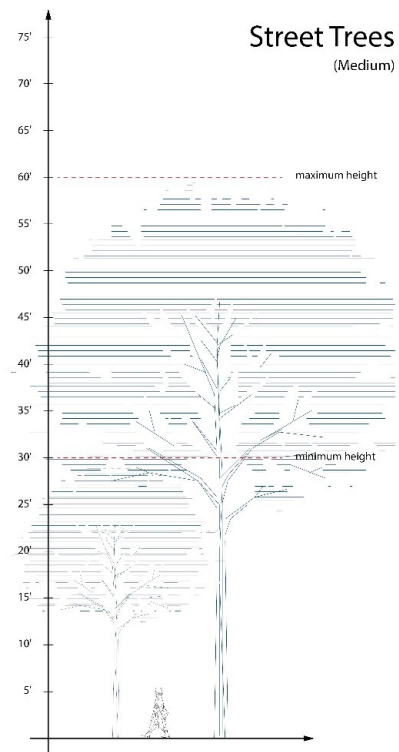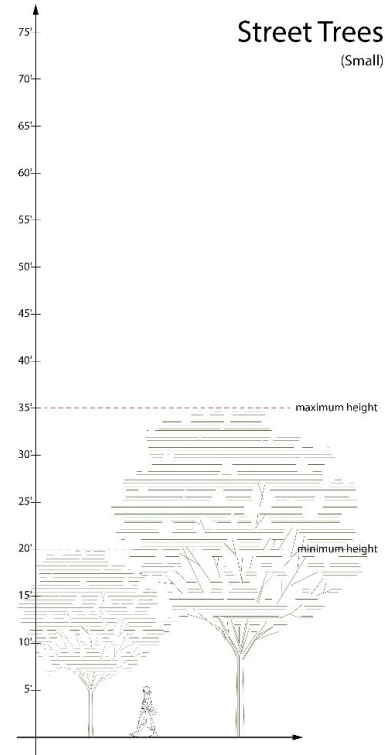
Ginkgo (Ginkgo biloba) — It's a popular and hardy street tree. Note to only plant males, as females produce poorly smelling fruit.

Honeylocust (Gleditsia triacanthos var. inermis) — A thornless variety of the species. A great street tree except for its messy fruit.

Swamp White Oak (Quercus bicolor) — Though not quite as grand as the white oak, it is more hardy and can survive some challenges its cousin cannot.

Scarlet Oak (Quercus coccinea) — Named for its fall foliage, it has the best foliage of all the oaks.

Overcup Oak (Quercus lyrata) — An up and coming oak in the urban forest, it is one of the only deciduous oaks to tolerate moderate compaction.

Nuttall Oak (Quercus nuttallii) — One of the few oaks that can act at a street tree, this oak can tolerate a bit of everything. Fast growing for an oak, it can create shade in a shorter amount of time.

Willow Oak (Quercus phellos) — Perhaps the most common oak in landscapes, these trees can grow to be massive sizes in a relatively short time.

Bald Cypress (Taxodium distichum) — A common inhabitant of the swamp, this tree makes an excellent landscape tree. Tolerates some of the most challenging sites.
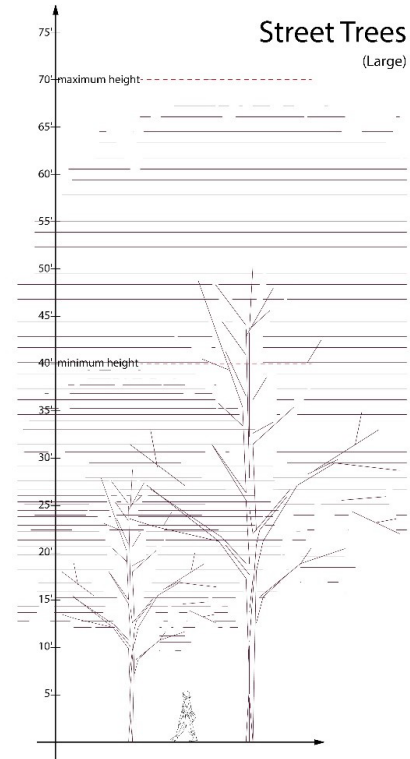
Lacebark Elm (Ulmus parvifolia) — Planted for its resiliency and beautiful bark that self-exfoliates into puzzle-like pieces.

Japanese Zelkova (Zelkova serrulata) — It can tolerate more challenges than most elms can.

APPENDIX D: TREE CITY USA INFORMATION

Designations such as TreeCityUSA through the Arbor Day Foundation give their respective cities a series of benefits if the municipality meets the four basic criteria. Some of these benefits include increased citizen engagement, potential preference for green infrastructure grants, and publicity. The four basic criteria were selected because they give no preference to community size but include: maintaining a tree board, community tree ordinance, spending of at least $2 per capita on urban forestry, and celebration of Arbor Day. Based on the available materials, it's unclear whether Petersburg offers a tree ordinance, and it doesn't appear that they have a tree board. To qualify for the annual "TreeCityUSA" designation, Petersburg would have to invest just over $68,000 in urban forestry based on the $2 per capita requirement outlined by the Arbor Day Foundation. More information about Tree City USA can be found on the website: https://www.arborday.org/programs/treecityusa/index.cfm

WATER: RECOMMENDED POLICIES AND STRATEGIES

Written by: Elizabeth Suffa, Vishal Jayan, Abigail Sepulveda, Joe Mallon, Zoque Wahid

OVERVIEW

Water is one of the most important resources a community has. Rivers and lakes can provide food and recreation for a community. They can also provide vital drinking water. Waterways must be protected and restored so that we can continue to live off this vital resource as clean drinking water becomes increasingly sparse due to climate change. Protecting waterways can also have other benefits besides the important life-giving benefits. Improving the quality of waterways can provide economic benefits for the city from increased recreational use of the river, increasing property values by 25%, and saving money on water treatment costs (Chesapeake Bay Foundation 2012). For every dollar spent on source water protection, the city can save an average of $27 on water treatment costs (Chesapeake Bay Foundation 2012).

Water has played an important role in the development and growth of Petersburg. The city of Petersburg historically grew on the banks of The Appomattox River and has been heavily dependent on the river for trade and commerce. Today, however, the city's relationship to the Appomattox River is more recreation-based. The Appomattox River falls on the other side of the train tracks in downtown Petersburg and the Appomattox River trail follows along the river that provides recreational opportunities. Although the river provides recreational opportunities for citizens, it is ranked as impaired. The impairment of the river makes it both dangerous for fishing and recreational purposes due to the presence of PCBs (Polychlorinated Biphenyls) and E. Coli ("PetersburgNext: Comprehensive Plan 2044" 2023 Draft). The Appomattox River is not the only impaired waterway in the city, however, eleven of the city's waterways are also impaired and many of the other waterways are potentially impaired as well but may not have yet been tested.

Stormwater runoff is one of the major causes of water pollution in urban areas. Water that falls on impermeable surfaces such as roofs and streets cannot soak into the ground and instead collects pollutants as it flows into stormwater drains eventually flowing into the river (US EPA 2020). Since the city has a Municipal Separate Storm Sewer System (MS4) system, the water that flows through the storm drains goes directly into the waterways, meaning all the pollutants that are collected as stormwater runoff enter the waterways. Flooding is also an issue with impervious surfaces since the water cannot soak into the ground. Petersburg is 30% impervious and there are 224 land parcels that are
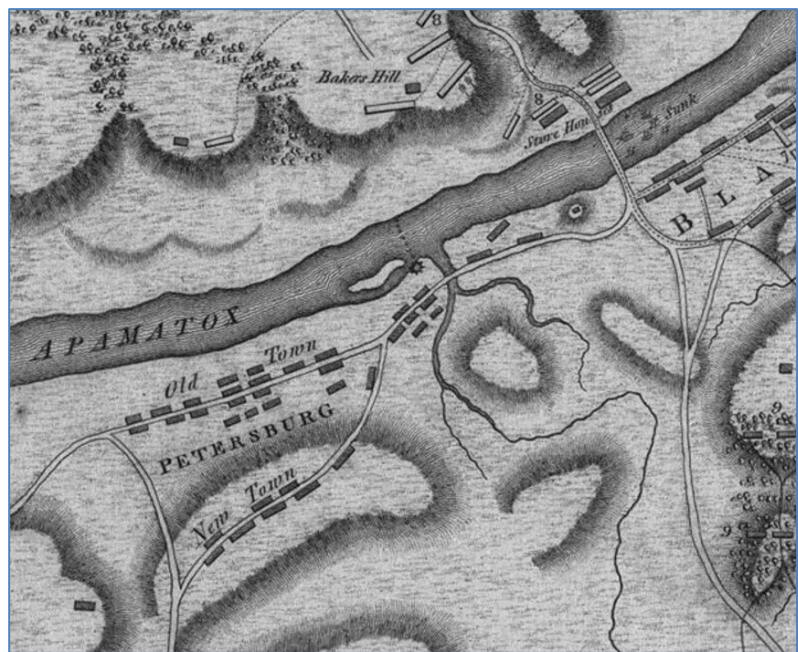

Figure 1: Map of Petersburg in 1781, Urban Scale Petersburg

27

100% impervious. Many impervious surfaces in Petersburg are in the downtown area, where there are also many flood hazard areas.

There are numerous ways to decrease the amount of impervious surfaces in the city and improve the quality of water entering the Appomattox River. The goal is to reduce the amount of water entering the drains in the first place by increasing green infrastructure projects that can slow down and prevent stormwater runoff. For example, planting more trees can provide huge benefits in the uptake of stormwater. The city's trees currently take up 40.3 million gallons of water or 80 Olympic-sized swimming pools. By planting just 50% of the potential planting area, stormwater uptake can be increased by 4.8 million gallons or 4 Olympic swimming pools based on the Trees and Stormwater Calculator model produced by the Green Infrastructure Center Inc.
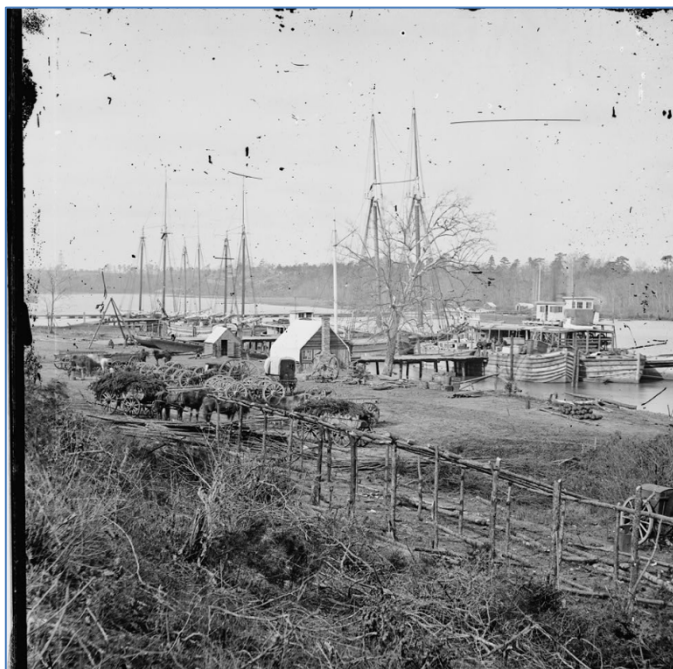

Figure 2: Trading posts on the Appomattox

STRATEGIES

GOAL 1: PROACTIVELY PROTECT AND RESTORE WATERWAYS, GROUNDWATER, AND SENSITIVE ENVIRONMENTS. (OBJECTIVE 8.2 PETERSBURG COMP PLAN)

RATIONALE:

Safeguarding a city's waterways, groundwater, and other water resources is imperative for public health, economic stability, and ecosystem health. Clean water is vital for human well-being, sustaining industries, preventing soil erosion, and preserving biodiversity. It contributes to sustainable development, and climate resilience, and enhances the overall quality of life. Protecting water resources also ensures legal compliance with environmental regulations, minimizes pollution, and maintains cultural and historical connections. Overall, responsible water management is essential for the health and resilience of urban communities, impacting public health, economic stability, and environmental well-being (The Nature Conservancy 2017).

Objective 1: Amend the Zoning Ordinance to bolster requirements and incentives to incorporate low-impact development and environmental site design into development applications. (Objective 8.2.1 Petersburg Comprehensive Plan)

> *Action 1:* Establish a stormwater volume credit trading program for commercial properties and new developments.

Action 2: Identify areas where the current regulations can be strengthened to better support low-impact development and environmental site design.

Action 3: Develop and implement an outreach program to educate developers, businesses, and the community about the benefits of low-impact development.

Action 4: Engage organizations such as the Chesapeake Bay Foundation and other consultants working to implement similar programs, create design guidelines, and offer technical assistance and support to developers in the planning and execution of low impact development.

Responsible Parties: The initiative will be led by the Public Utilities Department of Petersburg in conjunction and the Public Works Department. These departments will collaborate and actively engage with the Chesapeake Bay Foundation to gain insights from their strategies and offer technical assistance in implementing some of the strategies.

Cost: The outreach program and the implementation of low-impact developments such as bioswales will be funded through grants. Additionally, existing stormwater fees collected by the city could be used to implement some of these developments as pilot programs on public school land.

Timeline: A strategic approach is slated for development over four years. The initial two years will be dedicated to assessing water quality through an analysis of pollutants present in the water systems, and a public outreach program will be initiated to comprehend the concerns of the residents. Towards the end of the second year, an action plan and an outreach program will be formulated. In the first half of the third year, potential sites for low-impact developments such as small-scale green infrastructure projects, pocket parks, and water management systems will be identified in close collaboration with community partners. The final year and a half will be allocated for the implementation of these projects, along with awareness programs designed to engage the community and ensure that these projects are actively maintained over the years.

Funding*:* This objective could be funded through the Building Resilient Infrastructure and Communities FEMA Grant (deadline February 29, 2024), EPA grants for clean water, and Watershed and Flood Prevention Operations (WFPO) Program National Resources Conservation Service grant.

Funding: This project requires funding to implement the requirements of the CBPA in sensitive areas. This could be sourced from the Chesapeake Bay trust, through the Chesapeake Bay Program Goal Implementation Team (GIT) Funding Program, specifically the GIT 4 for Healthy Watersheds.

Objective 2: Restore the water quality of impaired waterways within the city.

Action 1: Collaborate with local high schools to establish "Don't Dump - Chesapeake Bay Drainage" signage on every downtown storm drain. This activity will foster a sense of

Figure 3: Low impact development such as a bioswale

responsibility for maintaining cleanliness of the Appomattox River and Chesapeake Bay watershed.

>   *Action* 2: Strengthen working relationships with Central Virginia's "Don't Trash Central Virginia" campaign. Develop relationships with local fraternities and sororities at Virginia State University to conduct quarterly inspections to remove potential litter and debris scattered along the riverbanks.

>   *Action* 3: Implement bioengineering to restore eroded water banks (Fripp, 2008), focusing on stabilizing soil erosion at the following sites along the Appomattox: Tavern Park, Under Interstate 95 Bridge, and West Side of Pocahontas Island.

>   *Action* 4: Collaborate with Virginia State University biology classes to conduct a seasonal assessment of the Appomatax, Lieutenant Run, Rohoic Creek, and Blackwater Swamp all of which are currently impaired. Use the Virginia Save Our Streams program to properly carry out sampling procedures.

Timeline: Within 2 years, this project will establish environmental signage and organize riverbank clean-ups, alongside implementing bioengineering for erosion control and conducting annual ecological assessments of local waterways.

Funding: 1. The project requires funding for signage production, educational materials, clean-up supplies, and community workshops. Seeking support from the EPA Environmental Education Grant to cover these expenses and ensure the project's success would be a good option to cover associated costs. The deadline for the 2024 Environmental Education grant by the U.S. Environmental Protection Agency (EPA) will be in November. 2. FEMA is an ideal target agency for a bioengineering soil erosion prevention grant, as their mandate includes disaster prevention and mitigation, directly aligning with projects that stabilize riverbanks and prevent erosion-related disasters. The deadline for submitting applications is February 29, 2024.

Figure 4: Example of bioengineering along a riverbank

Rationale: Cities must reduce flood risks for public safety, protecting lives, and preserving property. Mitigating flood dangers ensures the resilience of critical infrastructure, sustaining essential services and promoting economic stability. By minimizing risks, cities lower insurance costs, contribute to community well-being, and safeguard the environment. Efficient emergency responses and adapting to climate change are additional benefits. Reducing flood risks is a proactive, cost-effective measure that supports long-term urban development, planning, and overall community resilience in the face of increasingly unpredictable weather patterns and climate challenges.

Objective 1: Decrease impervious surfaces within the city.

>*Action* 1: Identify areas of the city that would make good demonstration sites of green stormwater infrastructure.

>*Action* 2: Identify and transform vacant lots in flood-prone areas into stormwater management parks.

>*Action* 3: Create incentives for green roofs for forthcoming developments, particularly in the Corridor Commercial Suburban-1 (CCS-1) zones, to enhance environmental sustainability. Incentives can look like tax credits, zoning upgrades, or expedited permitting (EPA 2009). FOLAR would be an ideal community organization to coordinate with for this task.

>*Action* 4: Develop and implement a comprehensive Residential Water Runoff Education Initiative to empower residents with knowledge on effective water runoff methods for private properties, aimed at minimizing street flooding. Collaborate with water management experts and local authorities to create user-friendly educational materials, host community workshops, and establish demonstration projects showcasing best practices. FOLAR would be an ideal community organization to coordinate with for this task.

>*Action* 5: Develop rainwater harvesting initiatives encouraging private property owners to utilize water barrels, rain gardens, and other best management practices for collecting rainwater. The city has a stormwater utility fee that allows residents to reduce their fees by implementing stormwater best management practices such as rain barrels and rain gardens. However, information about the utility fee and the best management practices are not the easiest to access. The city should create a page on its website dedicated to highlighting the various BMPs, their environmental benefits, and how implementing the BMPs can lower the stormwater utility fees. The city could also partner with local schools and artists to paint and install rain barrels as a way of educating and inspiring community members to place rain barrels on their properties, like a rain barrel painting initiative in Northern Virginia.
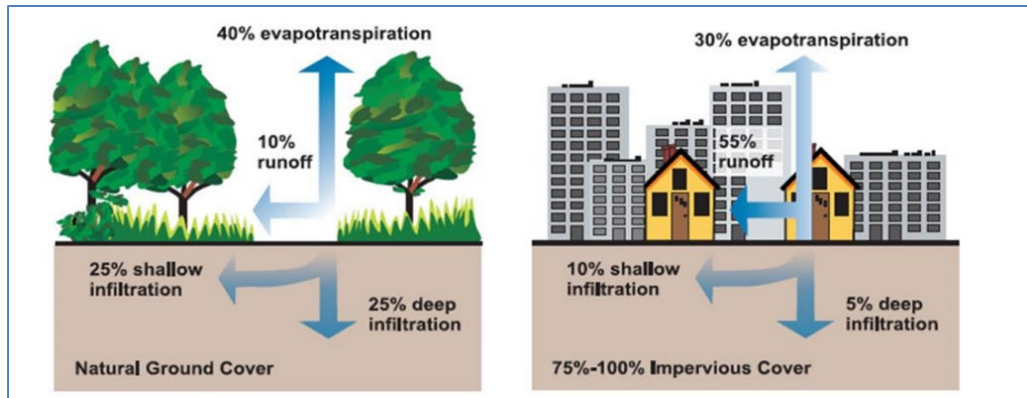
Figure 5: Relationship between impervious cover and surface runoff

Responsible Parties: This initiative can be taken on by the city's planners. The city planners will work with other community organizations like the Wilcox Watershed Conservancy, the James River Association, the Friends of the Lower Appomattox River, and the Chesapeake Bay Foundation.

Costs: One way that the city could fund demonstration sites of green stormwater infrastructure and stormwater management parks is by applying for a general grant from the Virginia Environmental Endowment. The applications are December 1st and June 15th. The NOAA Chesapeake Bay-Watershed Education and Training Program provides grants that support the development of watershed education programs in schools. The application for this grant is due February 16th, 2024.

Timeline: This strategy is proposed to be developed within two years. The initial quarter of the first year will focus on selecting sites and designing demonstration sites and stormwater management parks. Following this, construction of the sites will commence concurrently with promoting their uses and disseminating best practices for stormwater management in the city. Information dissemination and workshops will be integrated with the construction phase. The creation of incentives for green roofs can be completed within a year. The Stormwater Runoff Education Initiative could be developed in a year and implemented quickly. Rainwater harvesting initiatives could be developed over a year too, and community education would be ongoing.

Figure 6: Painted rainwater barrels

Objective 2: Increase the tree and shrub cover throughout the city to help manage stormwater runoff.

> *Action* 1: Increase tree canopy cover in the city. The Trees and Habitats team has more details for this task.

> *Action* 2: Coordinate seasonal tree planting campaigns. "A large mature oak can transpire 4,000 gallons of water per year", which is around 800 bathtubs worth of water (EPA: Reducing Urban Heat Islands: Compendium of Strategies). Enhance water

uptake and increase community awareness about stormwater runoff. Partner with Virginia State University to organize the campaigns. Involve at least 50 university students and community volunteers in each planting event.

Timeline: Over three years, this environmental initiative will focus on expanding urban tree canopy and enhancing stormwater management: conducting quarterly tree planting campaigns with Virginia State University and planting native grasses and wildflowers on selected bare patches

Funding: The National Forest Foundation and American Water - Environmental Grant program (deadline is March 31, 2024) are two good funding agencies to target for the tasks listed above.

Objective 3: Daylight Brick's Run Creek and transform its surroundings into vibrant parks, fostering community engagement and creating revenue-generating opportunities.

> *Action* 1: Identify the areas of the creek that are most suitable for daylighting
>
> *Action* 2: Paint a stream line on the pavement over the creek with help from local artists until daylighting can be done.
>
> *Action* 3: Develop comprehensive guidelines for public-private partnerships involving structures over the creek.

Responsible Parties: City of Petersburg Planners, Virginia Municipal Stormwater Association (VAMSA).

Funding: The costs of daylighting a stream can vary but "a general rule of thumb is $1,000 per linear foot of stream daylighted" (Trice 2016). The project can be funded in partnership with local businesses in collaboration with the City of Petersburg. Other funding options include applying for a Virginia Environmental Endowment grant, the Chesapeake Bay Small Watershed Grant Program, the Five Star and Urban Waters Restoration Grant Program, or the FEMA Building Resilient Infrastructures and Communities grant. Local businesses potentially involved: Old Towne's Alibi, Longstreet's Deli, Yoga One Studio, Loco Kitty, Comeback Burger, Tramonto Ristorante, Oyster Society and Dixie's.

Figure 7: Painting the street to highlight the underground creek

Timeline: Initiate the long-term goal of daylighting the creek seven years from now, outlining phased planning and implementation strategies. In the short term, the city would hire local artists to paint over where the stream is.

Objective 4: Increase the water-carrying capacity of the existing stormwater system.

> *Action* 1: Identify the flood-prone areas that have insufficient stormwater carrying capacities.
> *Action* 2: Define new sizes for stormwater drains that include rainy-day scenarios that are in line with the latest climate change models with the help of the Virginia Municipal Stormwater Association (VAMSA).

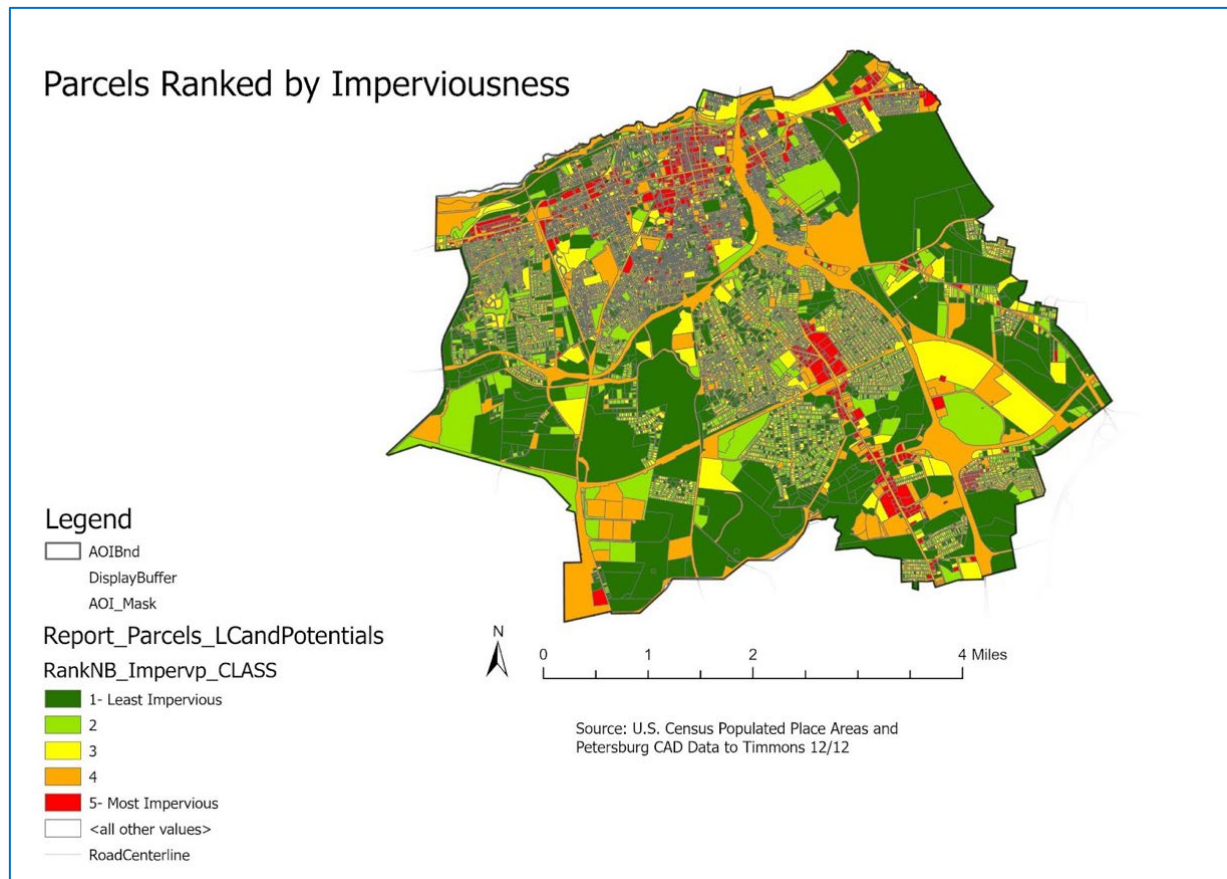*Action* 3: Construct new stormwater drains based on the revised sizes with the help of FEMA.

Timeline: The initial phase will involve identifying the streets that get flooded due to inadequate stormwater drain sizes, which should be completed within a year. This will be followed by a period where the city can source funding and permits to start the work. Finally, the redesigned stormwater drains will be constructed in a phased manner over five years.

Responsible Parties: City of Petersburg Planners, Virginia Municipal Stormwater Association (VAMSA), Federal Emergency Management Agency (FEMA).
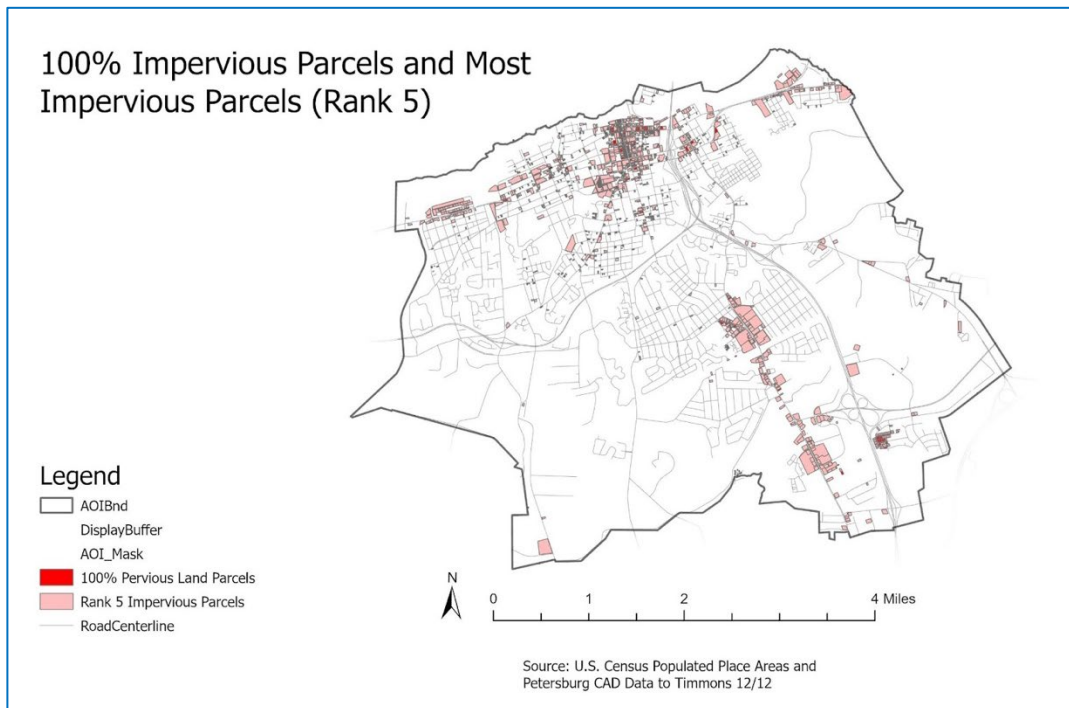
Funding: One option for funding the improvement of stormwater infrastructure is the Sewer Overflow and Stormwater Reuse Municipal Grants Program. Further, the city can utilize the Flood Mitigation Assistance Program grant by FEMA to enhance and expand the sewer system infrastructure across the entire city, addressing crucial flood mitigation needs.
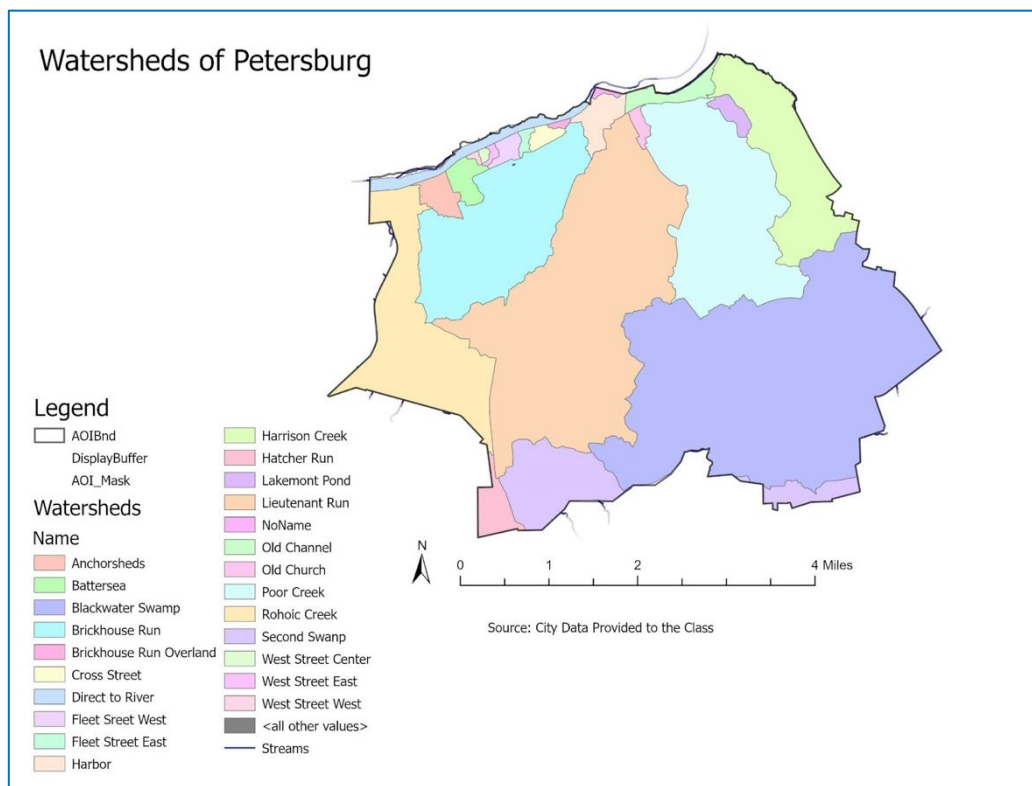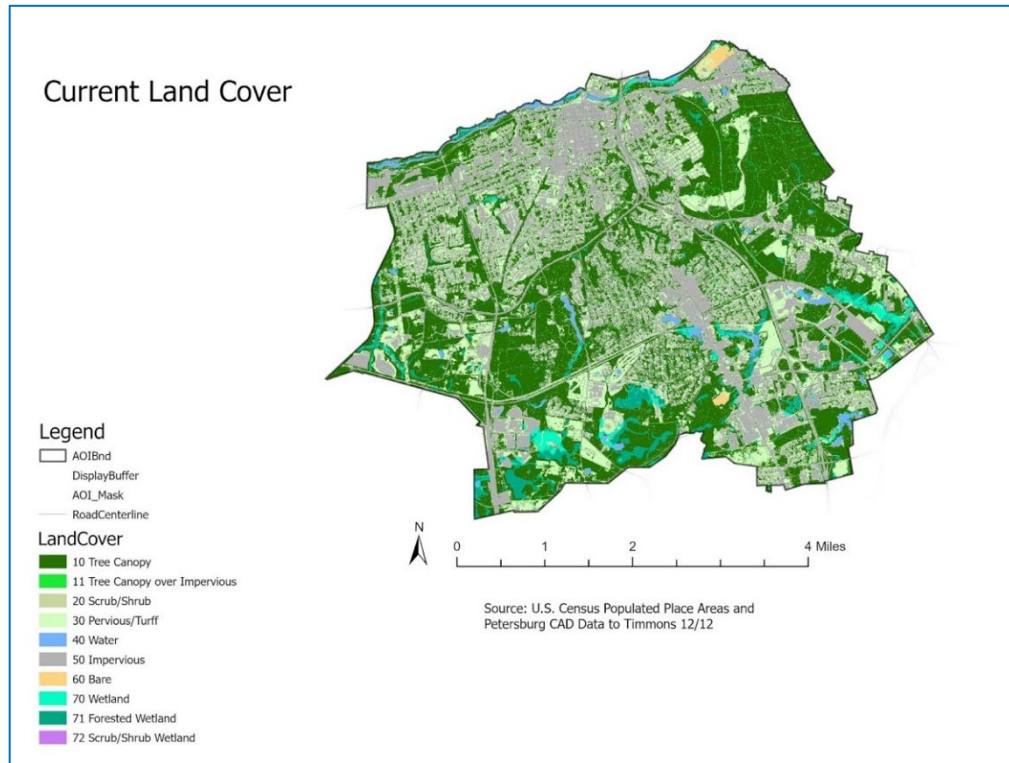
MAPS

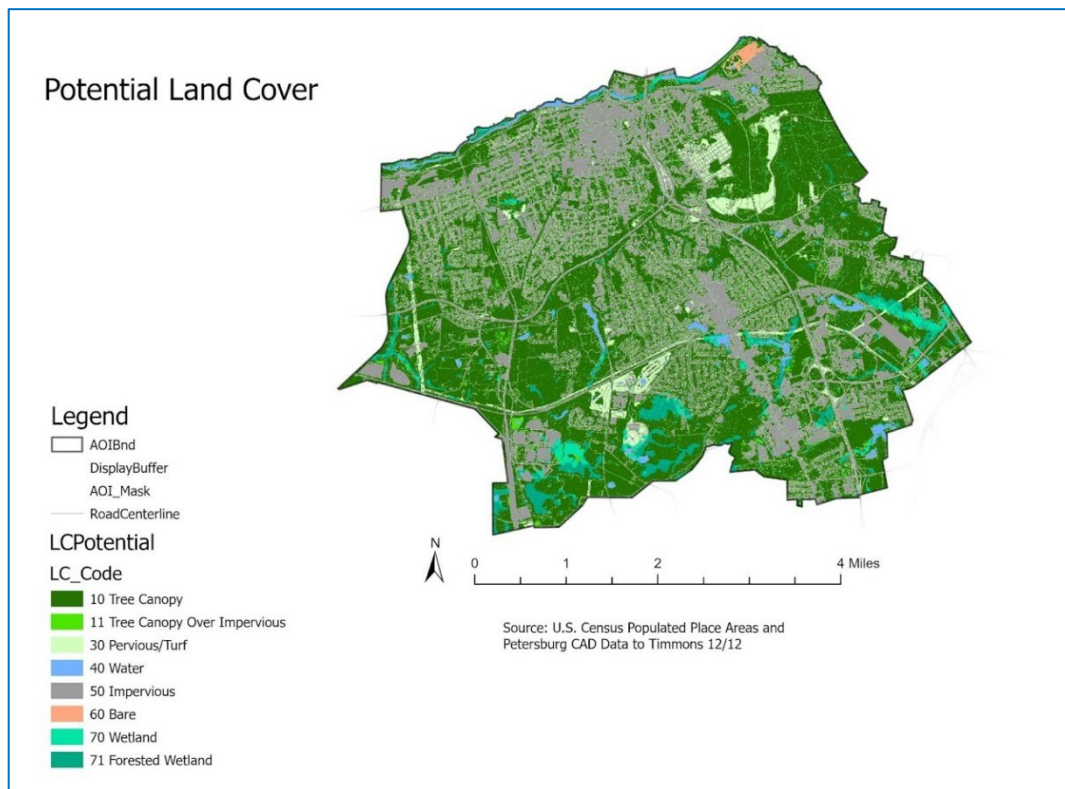MAP 1: PARCELS RANKED BY IMPERVIOUSNESS

100% Impervious Parcels and Most Impervious Parcels (Rank 5)

Legend
AOIBnd
DisplayBuffer
AOI_Mask
100% Pervious Land Parcels
Rank 5 Impervious Parcels
RoadCenterline

N

0   1   2   4 Miles

Source: U.S. Census Populated Place Areas and
Petersburg CAD Data to Timmons 12/12

MAP 3: WATERSHEDS

Watersheds of Petersburg

Legend
AOIBnd
DisplayBuffer
AOI_Mask
Watersheds
Name
Anchorsheds
Battersea
Blackwater Swamp
Brickhouse Run
Brickhouse Run Overland
Cross Street
Direct to River
Fleet Sreet West
Fleet Street East
Harbor
Harrison Creek
Hatcher Run
Lakemont Pond
Lieutenant Run
NoName
Old Channel
Old Church
Poor Creek
Rohoic Creek
Second Swanp
West Street Center
West Street East
West Street West
<all other values>
Streams

N

0   1   2   4 Miles

Source: City Data Provided to the Class

MAP 4: CURRENT LAND COVER

MAP 5: POTENTIAL LAND COVER (VEGETATION)

Brickhouse Run Map

Legend
- AOIBnd
- DisplayBuffer
- AOI_Mask
- Brickhouse Run
- RoadCenterline
- Streams

N

0   1   2   4 Miles

Source: City Data Provided for Class
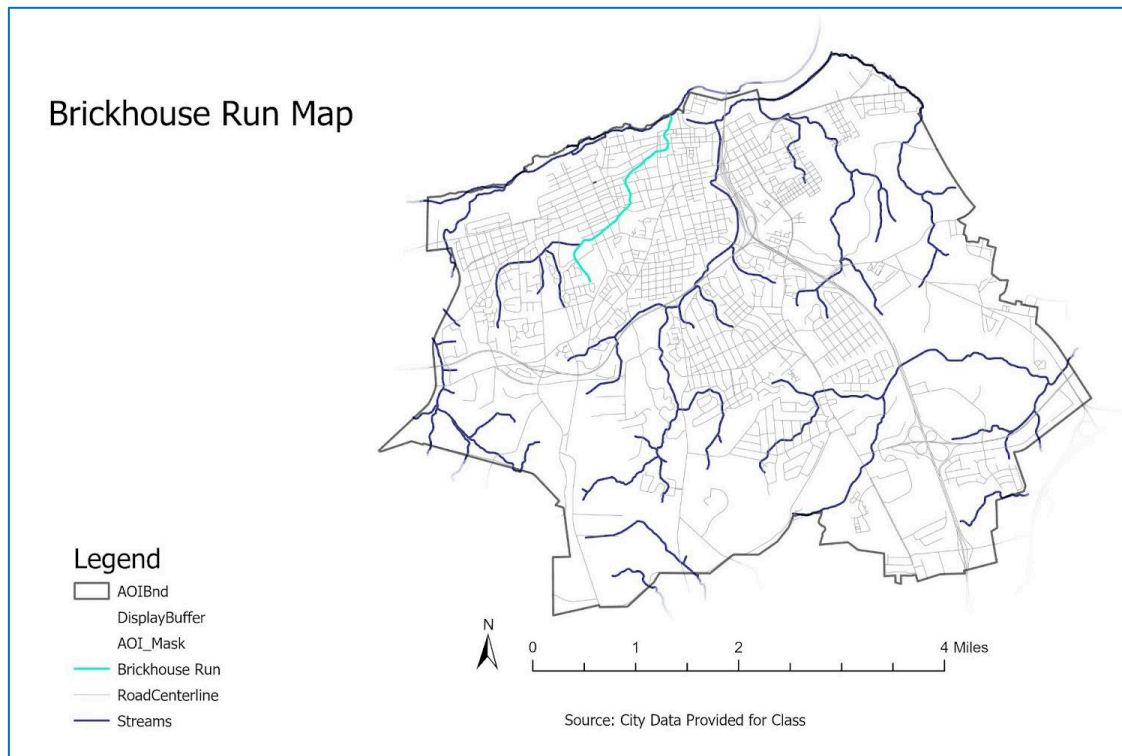
MAP 7: STREAM BUFFER AREAS

Stream Buffers

Legend
- AOIBnd
- DisplayBuffer
- AOI_Mask
- Stream Buffers
- RoadCenterline

N

0   1   2   4 Miles

Source: City Data Provided for Class

Watersheds of Petersburg that are 50% Impervious or More

Legend
AOIBnd
DisplayBuffer
AOI_Mask
Watersheds that are 50% or more impervious
RoadCenterline
Watersheds
Watersheds

N

0   1   2   4 Miles

Source: City Data Provided to the Class and the Trees and Stormwater Calculator
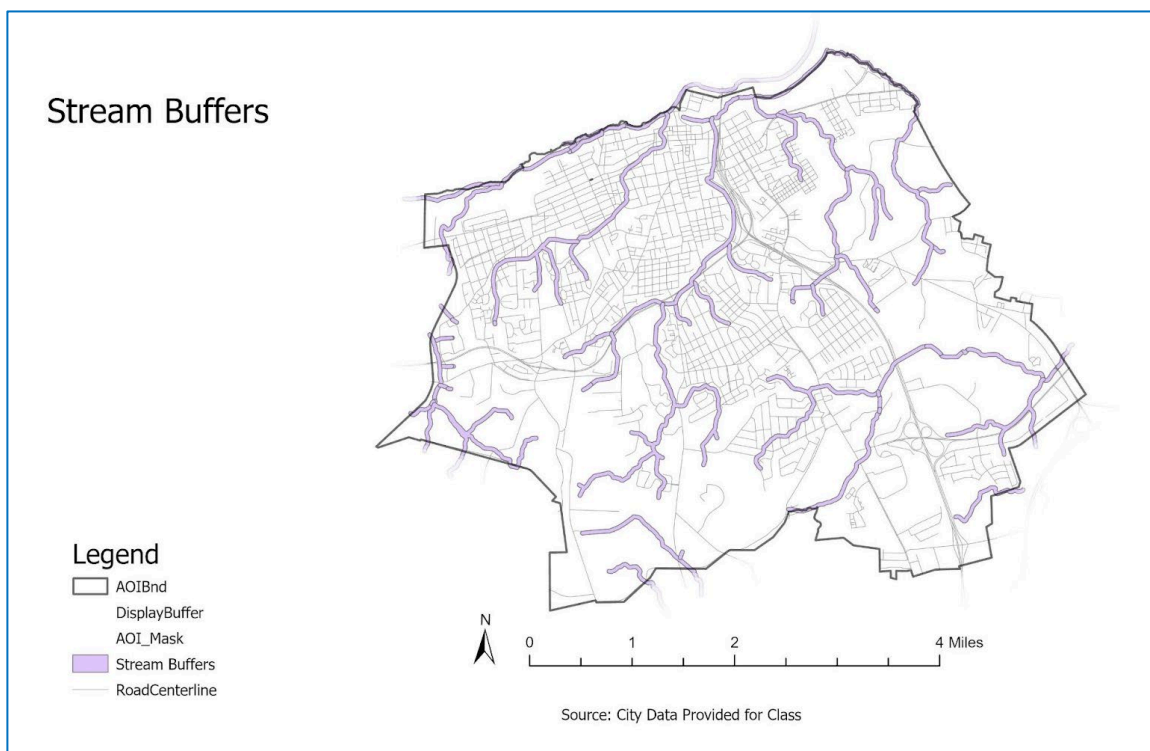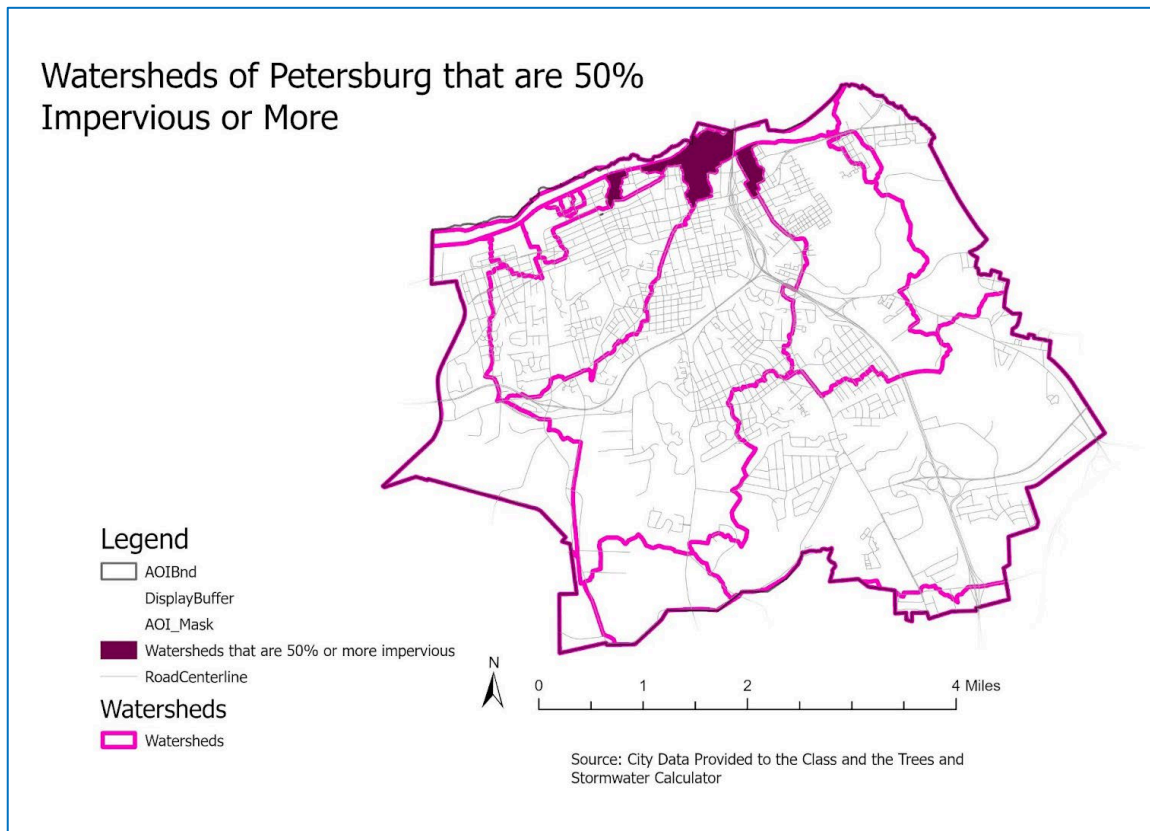
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Figure 8 & 9: "Arcadia Creek." 'Seven Canyons Trust'. Accessed November 11, 2023. https://sevencanyonstrust.org/blog/arcadia-creek.

Figure 10: City of Norfolk. "Education & Outreach." City of Norfolk, Virginia - Official Website. Accessed November 28, 2023. https://www.norfolk.gov/4179/Education-Outreach.

RESOURCES

Managing Wet Weather with Green Infrastructure Municipal Handbook: Incentive Mechanisms

Retain Your Rain

AR_StormwaterVolumeCreditTrading_Final.pdf (americanrivers.org)

NACTO Urban Street Stormwater Guide

https://www.norfolk.gov/4179/Education-Outreach

GRANTS:

EPA: Environmental Education Grant

The Virginia Municipal Stormwater Association (VAMSA)

Building Resilient Infrastructure and Communities FEMA Grant

Hazard Mitigation Grant Program FEMA

FEMA Flood Mitigation Assistance Grant Program

Pre-Disaster Mitigation (PDM) Grant Program FEMA

Watershed and Flood Prevention Operations (WFPO) Program National Resources Conservation Service grant

WaterSMART Cooperative Watershed Management Program Phase I for Fiscal Year 2023

Clean Water State Revolving Fund (CWSRF)EPA

NOAA Chesapeake Bay-Watershed Education and Training Program

Five Star and Urban Waters Restoration Grant Program

Sewer Overflow and Stormwater Reuse Municipal Grants Program

APPENDIXES

APPENDIX A: DAYLIGHTING CREEK CASE STUDY

Daylighting projects expose parts or the entirety of a previously covered river, stream or stormwater drainage (Trice 2016). There are three different forms of daylighting a creek, including natural restoration, architectural restoration, and cultural restoration. A natural restoration consists of restoring a stream to natural stream conditions (Trice 2016). An architectural restoration consists of restoring the stream to open air, but through a constructed channel. Cultural restoration consists of celebrating a buried stream by placing markers or public art where the stream would flow, but keeping the stream buried. (Trice 2016). There are numerous benefits to daylighting a body of water such as Petersburg's Brickhouse Run. In terms of stormwater benefits, daylighting the creek could provide increased hydraulic capacity, reduce runoff velocities and erosion, and "improve water quality by exposing water to air, sunlight, vegetation, and soil, all of which help transform, bind up, or otherwise neutralize pollutants" (Pinkham 2000). There are also other

benefits to daylighting a body of water, such as providing new recreational opportunities, increasing property values, and generating business for local businesses by creating a new attraction (Trice 2016). Stream daylighting can also be very cost-effective, especially when a city is completing storm drain upgrades, maintenance, or if a culvert collapses ("Stream Daylighting"). Since the city is completing a citywide drainage study, this may be an opportunity to evaluate the implementation of a creek daylighting project.

The daylighting we propose the city implement is a combination of cultural and architectural restoration. We first propose a cultural restoration as a short-term to mid-term goal for daylighting the creek. The cultural restoration would comprise of having local artists paint over pavement to highlight where Brickhouse Run creek has historically flowed. A great precedent for this is the Ghost Rivers Project. The Ghost Rivers Project is a public art installation in Baltimore that creates a walking tour out of the visualization of Sumwalt Run, a buried stream, to illustrate the history of Baltimore's watershed, the city's social history, and the relationships between human and natural environments (Willen).

For the long-term goal of architectural restoration, we have identified suitable areas for daylighting. We would like to acknowledge the Downtown Revitalization Plan's proposal to daylight part of the creek, but we hope the city also considers the other areas our team has identified, perhaps in conjunction with the Downtown Revitalization Plan. There are several considerations to be made when undertaking a creek daylighting project. Technical considerations include the design, performance, water quality objectives, pollutant load and construction logistics. "Detailed engineering and hydrology assessments need to be conducted to determine the appropriate configuration of the daylighted stream given its projected water volume, flow rate and contributing watershed area" ("Stream Daylighting"). Other considerations include ownership, maintenance, liability, permits and coordination between agencies (Pinkham 2000).

A precedent to look toward Arcadia creek in Kalamazoo, Michigan. Arcadia Creek is a precedent because the creek was daylighted in a dense urban center, similar to the Brickhouse Run creek. Kalamazoo is a city in Michigan that housed around 80,000 people and around the mid-1980s part of its central business district went into decline, resulting in increased crime and rundown buildings. The area also had a history of flooding (Pinkham 2000). Arcadia Creek was buried for more than 100 years and drained into a highly urban watershed before joining the Kalamazoo River. During a downtown redevelopment project to attract business to the declining area, the idea to daylight Arcadia Creek was brought forward. There was opposition to the idea at first, saying that the project would be too costly, but engineering studies showed that daylighting the creek could provide the necessary flood capacity at relatively low incremental costs (Pinkham 2000). From 1989 to 1992, the Downtown Development Authority and the consultants completed engineering studies, completed design work, and secured funding for the project. Construction of the project took place from 1989 to 1995 (Pinkham 2000).

Arcadia Creek was daylighted through 5 blocks of Kalamazoo. Three blocks were a concrete-lined channel and the other two served as an open stormwater pond with grassy slopes. There was no room to create a more natural, earthy channel and impervious surfaces combined with stormwater drainage systems would have prevented flow in the creek because of the dropping of the water table (Pinkham 2000). The concrete channel contained several weirs to make the flow of the water seem deeper, which had the added benefits of slowing the water in the channel, allowing the water to drop much of its sediment load on the bottom of the concrete, making for easier maintenance. The project cost the city a total of $18 million dollars (Pinkham 2000). The actual daylighting of the creek cost the city around $7.5 million dollars; the other costs were related to challenges faced by the city during the project. Some of the challenges faced in the project included contaminated soils and unforeseen complications with the aged infrastructure (Pinkham 2000). However, the entire redevelopment project gained more than $200 million dollars in private development.

The property tax revenues in the area also increased from $60,000 to $400,000 annually. Property owners downtown no longer need flood insurance either (Pinkham 2000). In the end, the project was successful in protecting the city from flooding and in generating revenue for the city.

Figure 8: Construction of Arcadia Creek daylighting project

Figure 9: Arcadia Creek today after the daylighting project

APPENDIX B: EDUCATION & OUTREACH CASE STUDY

Norfolk, Virginia faces significant challenges related to stormwater runoff and its impact on water quality in the Chesapeake Bay. The Environmental Storm Water Management Division has embarked on a comprehensive educational initiative aimed at residents, businesses, civic leagues, and school children. The objective is to increase awareness about stormwater issues and educate the community about the detrimental effects of illicit discharges on water quality.

Storm Water's educational programs are meticulously designed to align with Virginia Standards of Learning (SOLs). These programs focus on imparting knowledge about stormwater, pollution, and illicit discharges. Importantly, all programs are offered free of charge to Norfolk Schools, ensuring that students receive valuable information that correlates with their academic curriculum. One of the primary challenges faced by Norfolk is stormwater runoff, a leading cause of water pollution in Chesapeake Bay and nationwide. When rain falls on impervious surfaces such as roads, streets, and rooftops, it carries pollutants like fertilizer, pet waste, chemicals, and litter into storm drains. Many residents are unaware that the stormwater system is untreated, directly transporting pollutants to the nearest waterway. Illicit discharges of any substance other than rainwater entering the stormwater system are deemed unlawful.

To address these challenges, Storm Water has employed a multifaceted approach. Educational flyers on illicit discharges are distributed to raise awareness about unlawful substances entering the stormwater system. Common pollutants resulting from daily activities, such as car washing, application of pesticides and herbicides, pool discharge, pet waste, and yard waste, are highlighted. The community is encouraged to take responsibility and adopt practices that minimize stormwater runoff. A unique initiative involves the community actively participating in marking storm drains across the city. Participants are provided with medallions, adhesive, and maps to record medallion placements. This project, open to all ages, serves as an opportunity to learn about waterways and emphasizes the collective responsibility to protect them.

The ongoing efforts of the Storm Water Management Division are expected to yield positive results in terms of increased community awareness and changed behaviors regarding stormwater management. By addressing common pollutants and encouraging responsible practices, Norfolk aims to create a lasting impact on water quality, contributing to the health of the Chesapeake Bay and the overall well-being of the community. The program's success hinges on sustained community involvement and adherence to best practices in stormwater management.

Figure 10: Community outreach program by the City of Norfolk 'Retain your rain' Program

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PARKS & RECREATION: RECOMMENDED POLICIES AND STRATEGIES

Written by Anna Lou Bernstein, Mariya Anwar, Andre Rezaie, John Ward, and Sean Michael Cursain

OVERVIEW

Parks and recreational spaces play a critical role in shaping the character and vitality of cities, significantly contributing to the health and wellbeing of residents and the overall urban fabric. Petersburg has many natural assets that provide the basis for green infrastructure planning, including proximity to the Appomattox River, a rich Civil War history, and the emergence of a redeveloping warehouse district. Building upon these existing assets and connecting them to new outdoor spaces will help enhance quality of life and increase tourism while simultaneously providing environmental benefits.

Investing in parks and trails gives Petersburg the potential to increase their tax revenue and marketability, which helps attract and draw new businesses and residents to the city. Multiple studies have documented the economic and health benefits of investing in parks and recreation facilities. Homes that fall within a half-mile of parks have 6-9% higher property values, which can also increase the city's tax revenue (Kovacs 2012).

People are also willing to pay more for housing located near green spaces (Economic Benefits of Open Space 2010). Parks therefore boost the economic value and desirability of an area. Investing in parks and trails not only helps the local economy, but also provides numerous physical and mental health benefits for residents.

Lake in Legends Park, Petersburg's Largest and Most Frequented Park

Health remains a top concern in Petersburg and as of 2022 it had been named the least healthy locality in Virginia for 8 of the past 10 years. (Kolenich, 2022). Link to article Moreover, the city's levels of diabetes and obesity fall above the national average (Overview of Petersburg City 2023). Rates of physical inactivity have been increasing over the past 5 years, along with rates of poor mental health (Petersburg City 2021). However, the health issues that these statistics highlight can be addressed through investment in, and the development of, green spaces. Some of these interventions may be common sense, such as adding parks to promote physical activity, while others are more nuanced. For example, people will walk to destinations, instead of driving, when they perceive that the surrounding environment has many natural features (Wolf 2008). Walkability is another factor that effects Petersburg's health outcomes, as people that live in walkable neighborhoods get more physical activity and experience lower rates of obesity (Economic Benefits of Open Space 2010). Investment thus needs to go beyond just parks and make it easier for Petersburg residents to incorporate physical activity throughout their routines through

a greater emphasis on intracity connectivity. These investments in parks and walkability can be the remedy Petersburg needs to become the healthiest city it can be.

Health Statistics for Petersburg
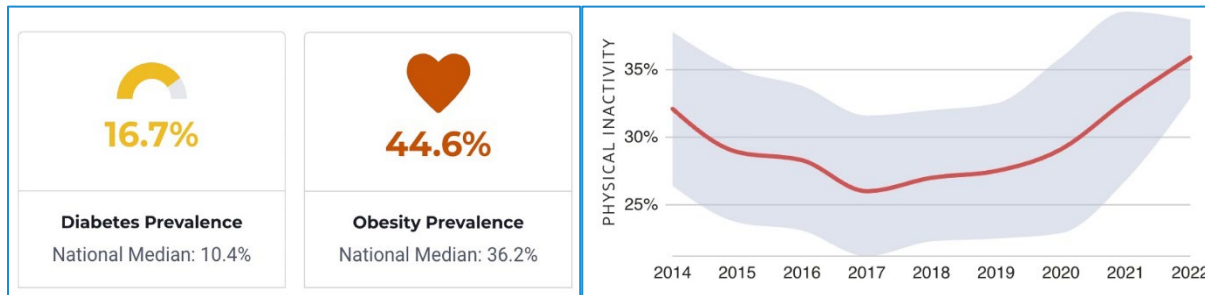
Petersburg contains 18 parks in its collection, but its network remains incomplete as there are areas of the city entirely without parks or parks lack access for residents to easily reach them. Building up and supporting this network is important in ensuring that Petersburg's parks serve everyone. Having easily accessible parks is necessary to foster good physical health through exercise along with bolstering mental health by increasing social cohesion with spaces for residents to gather in both formal and informal capacities (Wolf 2008).

Maintenance is another issue facing Petersburg's parks and trails, which can create feelings of neglect and deter members of the community from interacting with these spaces. Low maintenance, but importantly high-impact interventions that incorporate community input can reinvigorate these sites and activate them to be more inviting spaces for people in the Petersburg community. These interventions have to cultivate desirable activities to create reasons to go to a given park, or else they won't become utilized by residents and thus remove the potential for any benefits of access to these parks.

To address maintenance concerns and successful activation of parks, the City should work closely with the community to best understand what interventions are needed for parks as each neighborhood may have different needs and desires for their public spaces. Incorporation of the community in input process can instill greater sense of stewardship and care over park space, and lead to more meaningful use of spaces. Petersburg has a history of neighbor-led initiatives to improve whole communities, from Free Little Libraries downtown to the John Brown Memorial Playground in Pocahontas, so any initiatives to improve parks should engage those they are meant to serve throughout the process. Such engagement and turning these improvements into reality can also build up social capital in communities, creating impacts stretching well beyond just a new swing set. Community involvement can further benefit the city as neighborhood groups and volunteer organizations can plan events such as park clean up days to alleviate the strain on the city to maintain these areas.

John Bragg Memorial Park maintained by residents.

STRATEGIES

GOAL 1: CREATE A CITYWIDE NETWORK OF PARKS AND GREEN SPACES IN PETERSBURG TO IMPROVE EQUITABLE ACCESS, INCREASE CONNECTIVITY, AND PROMOTE COMMUNITY PHYSICAL AND MENTAL HEALTH AND WELLBEING.

RATIONALE

Though Petersburg already contains 18 parks in its collection, its network remains incomplete as there are areas of the City entirely without parks, and in some cases, parks are deficient in ease of access for the city's residents. Building up this network is important in ensuring Petersburg's parks are able to serve everyone. Having easily accessible parks is important to foster good physical health through exercise along with bolstering mental health by increasing social cohesion with spaces for residents to gather in formal and informal capacities. To improve access and encourage park usage, a city parks and trails map is needed to make the system easier to navigate for both residents and tourists. This map can additionally benefit tourists visiting the city and encourages tourism by providing clear ways to get to parks and trails that showcase the natural beauty of Petersburg. The natural beauty of Petersburg seen at the Appomattox River and in Legends Park are valuable and rare assets to have within or immediately adjacent to a city, and relatively unknown to those unfamiliar with the area. Thus, showcasing such features will promote a new image of Petersburg as a green city where the urban landscape is connected to the natural one. Such a blend can make the city more attractive to businesses and families looking for such assets. To create this synergy, measures such as rails-to-trails and creating park space on vacant land near the river can serve as the intersection of the downtown and the river and encourage movement between the two, making both desirable destinations for visitors and residents alike.

Objective 1: Create and distribute a trail network map that shows the location of trails and parks in the city and places they connect to.

> **Action 1:** Publish the map online and print copies to distribute.

> **Action 2:** Restock printed copies once a month at all locations.

> **Timeframe:** Post the map on the city's website. Physical maps should be distributed at community centers, churches, civic buildings, and nearby hotels and popular restaurants.

> **Responsible Parties:** The City of Petersburg.

> **Cost:** Around $5,000 expected for printing and distribution.

Objective 2: Develop a large linear park between Tavern Park/Peter Jones Trading Station and the Martin Luther King, Jr Bridge (U.S. Highway 1/301) to serve as a link to neighboring communities and the Appomattox River.

> **Action 1:** Identify possible parcels/rights-of-way for park and trail alignment, as well as park connections.

> **Action 2:** Generate schemes for trail alignment in accordance with the Lower Appomattox River plan and coordinate with Friends of the Lower Appomattox River. Start researching and applying for grants to fund the park.

Action 3: Produce suggested plan for linear park and trail, then share with the City of Petersburg.

Action 4: City of Petersburg acquires any needed land.

Action 5: The city develops the park.

Timeframe: Actions 1-3 to be completed within 1-3 months. Action 4 will depend on the availability and ownership of land and could range from 1-3 years. Action 5 will take around 6-18 months.

Responsible Parties: Group members will develop a conceptual map of alignment and park area, including preferred right-of-way following discussions with Friends of the Lower Appomattox River and reviewing the Lower Appomattox River Trail plan as well as the Fall Line Trail plan. The City of Petersburg will need to acquire any land already not municipally owned from CSX/Norfolk Southern in order to develop this project to its full potential.

Cost: City cost for any needed land acquisition and construction to be determined. Grants will supplement city funds. One example of a grant the city could apply for is the National Park Service Rivers and Trails fund. The Preservation Trust Fund provides grant funding for park land acquisition, with recent grant awards averaging $150,000.

Objective 3: Achieve equitable access to recreational spaces by establishing citywide 10-minute park access through the development of a series of smaller-size, low-maintenance parks along and south of Washington Street.

Action 1: Map out zones highlighting areas of the city covered by a 10-minute walk to a park and define areas outside of these zones. This can be seen in Appendix A, which shows a 10-minute walk time map from the Comprehensive Plan Update.

Action 2: Identify potential parking lots and/or vacant lots which may be candidates to create a low-maintenance pocket park.

Action 3: Develop visualizations/conceptual design for these potential parks, with consideration to lower footprint for ease of maintenance.

Action 4: Seek funding for land acquisition and acquire any non-municipally owned land.

Action 5: Develop parks in conjunction with local neighbors or by hiring a contractor.

Timeframe: To be completed within three to five years.

Responsible Parties: The City of Petersburg will purchase/acquire the sites, and then may hire a contractor and/or collaborate with community members to construct/assemble these parks.

Cost: City cost for land acquisition and park building materials to be determined.

RATIONALE:

As previously mentioned, Petersburg's collection of parks is vast, with 18 park sites, but these park sites lack a sense of cohesion or connectivity, and many parks have not been sufficiently maintained. This can be seen throughout the parks with visual evidence of litter and pollution as well as deteriorating walking and recreational surfaces. The lack of maintenance creates feelings of neglect and deters members of the community from interacting with these spaces. Investment can reinvigorate these sites and activate them to be more inviting spaces for people in the Petersburg community.

Once infrastructure in these areas is repaired and retrofitted to be more manageable and sustainable, parks should be consistently maintained for years to come. It is critical for any additions to be low maintenance given the underfunding of the municipal park system. In addition, it's necessary to explore further private sector opportunities to maintain parks such as neighborhood groups and volunteer organizations. To demonstrate the potential for the success of such measures, Legends Park can serve as a case study to assess current issues with the park and potential positive impacts of interventions. From such an assessment, a low-maintenance toolbox can be created with community input to identify what these infrastructure improvements should be that can create the best effect the community wants out of these spaces.

Objective 1: Upgrade Legends Park by creating an inventory of the specific public infrastructure that will be improved at this site, as well as any additional infrastructure.

Action 1: Locate the infrastructure assets that are in need of improvement.

Action 2: For each location, describe the current condition and add images if available.

Action 3: When applicable, add an explanation of why the inventory is not meeting current needs.

Action 4: For each improvement area, specify the upgrades to be implemented and why they are needed (the specific environmental and social benefits, discussed in the introduction of this section).

Timeframe: All actions to be completed within 1-4 months.

Responsible Parties: The City of Petersburg will continue these studies using the suggestions from this report.

Cost: No cost expected for this objective as a planning tool.

Objective 2: Repurpose existing, underutilized infrastructures in order to provide added recreational spaces using the space beneath the Dr. Martin Luther King, Jr. overpass (US 1/301).

Action 1: Research funding opportunities for the interventions.

Action 2: Involve community members and residents in the design of the park; document the process for future reference.

Action 3: Petersburg to implement and start developing the park.

Timeframe: Action 1 to be completed in 1-2 months. Action 2 to be undertaken throughout the process until completion of the park.

Responsible Parties: The City's parks and recreation staff will lead the implementation of this project. Communication and coordination with residents will be needed and it is advised to have a volunteer coordinator.

Cost: Implementing these improvements will be costly. Grants will provide a large portion of the smaller scale interventions. Petersburg's comprehensive plan update notes that they can use funding from the National Recreation and Park Association to upgrade park equipment.

MAP 1: PROPOSED PARKS
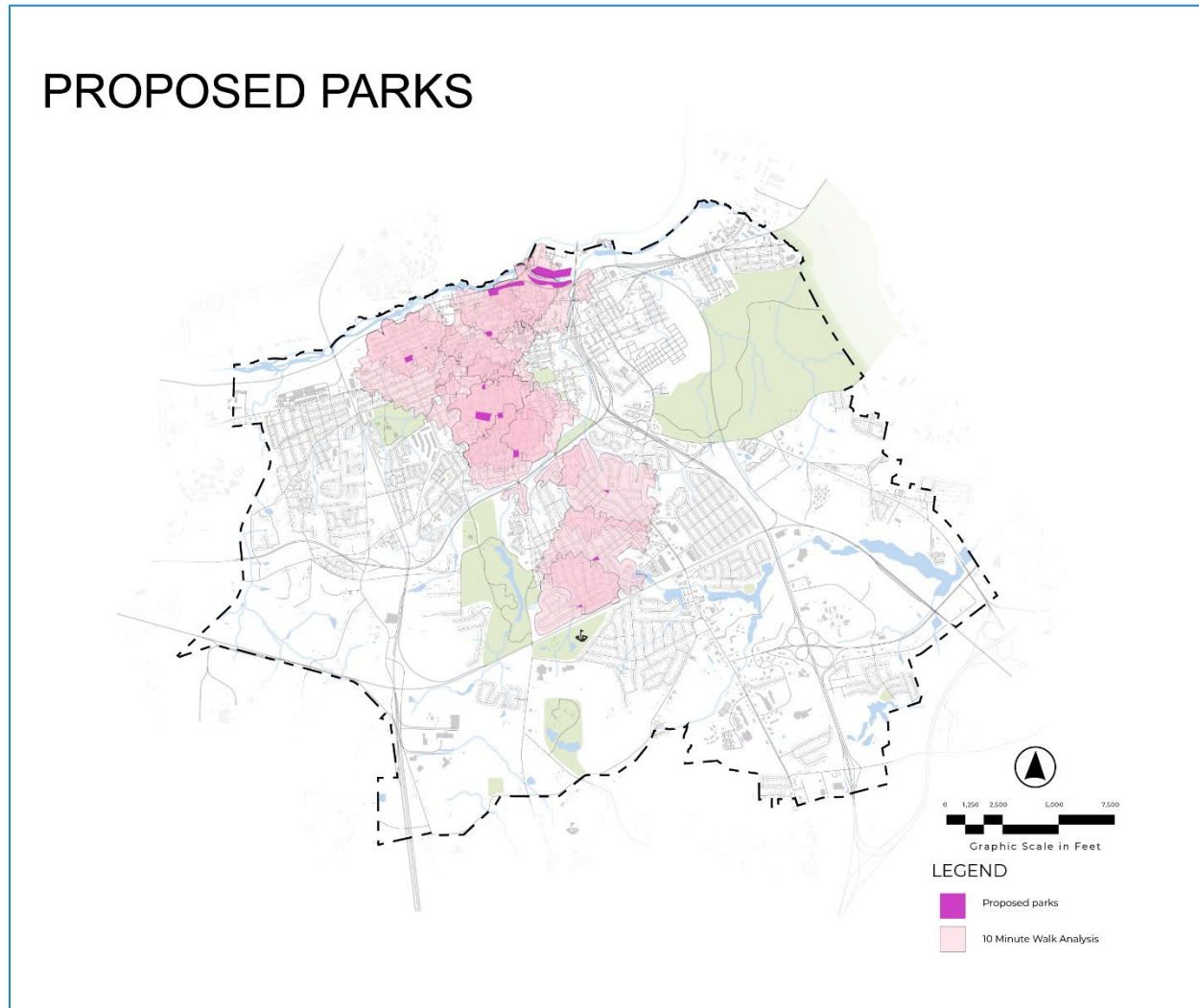
Map 1 shows the location of proposed parks for the city of Petersburg, along with 10-minute walk time boundaries in light pink. 54% of residents in Petersburg have access to a park within a 10-minute walk, so the proposed parks aim to increase access for the remaining 46% of residents (Petersburg VA). Proposed sites in the southern portion of Petersburg are focused on a smaller set of pocket parks that utilize existing greenspace, which require minimal maintenance outside of initial implementation. Additional parks in central Petersburg would help connect the city's park network, support green street initiatives and walkability, and attract residents and visitors alike to the city's downtown core.
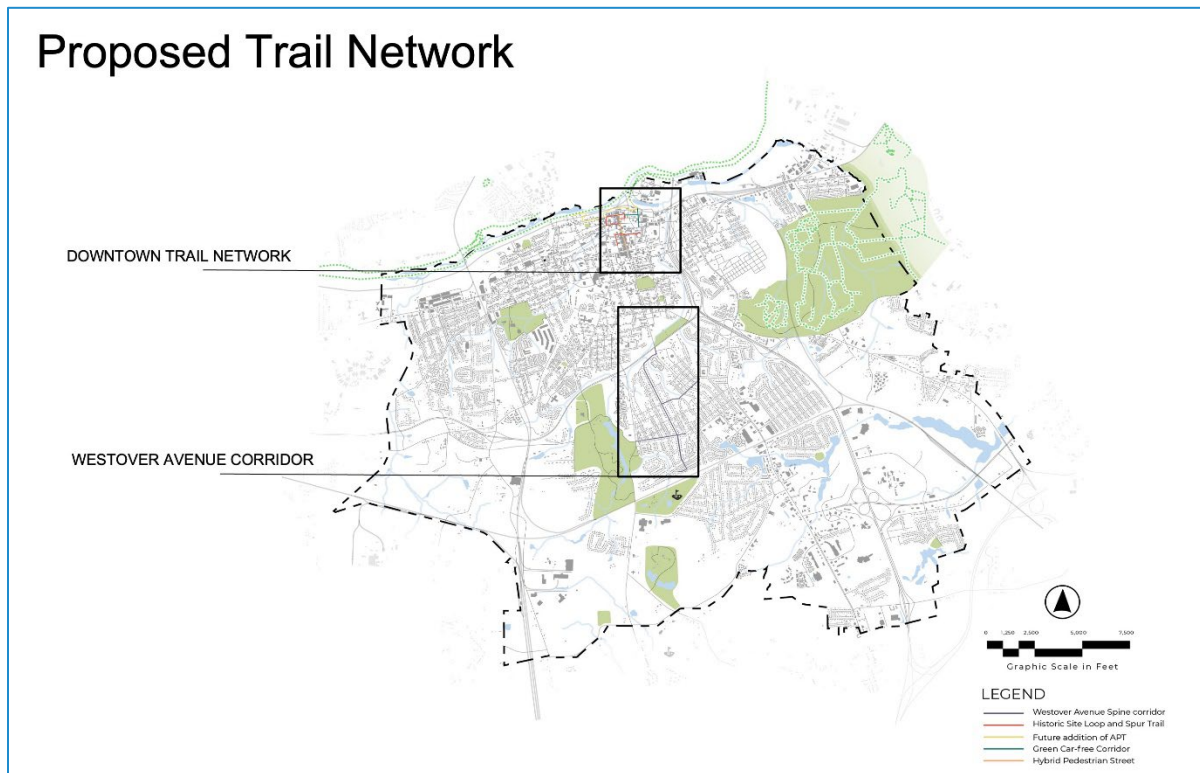
Map 2 shows the proposed trails for Petersburg that would create an interconnected trail and park network throughout the city. Existing trails are primarily situated around the river and within the National Battlefield grounds with minimal connections within and to the city. Proposed trails in the downtown area expand the trail network to Petersburg's downtown and neighborhoods south of Interstate 85. These trails connect important historic and cultural assets, increase access to the Appomattox River Trail, and promote pedestrian-friendly green streets. The downtown trails are shown in further detail in Map 3. The proposed Westover Avenue Corridor, shown in further detail in Map 4, would serve as a spine linking both existing and proposed parks in the south-central area of Petersburg.

MAP 3: PROPOSED TRAIL NETWORK – DOWNTOWN TRAIL NETWORK

LEGEND
- Historic Site Loop and Spur Trail
- Future addition of APT
- Green Car-free Corridor
- Hybrid Pedestrian Street
- Existing Lower Appomattox Trail
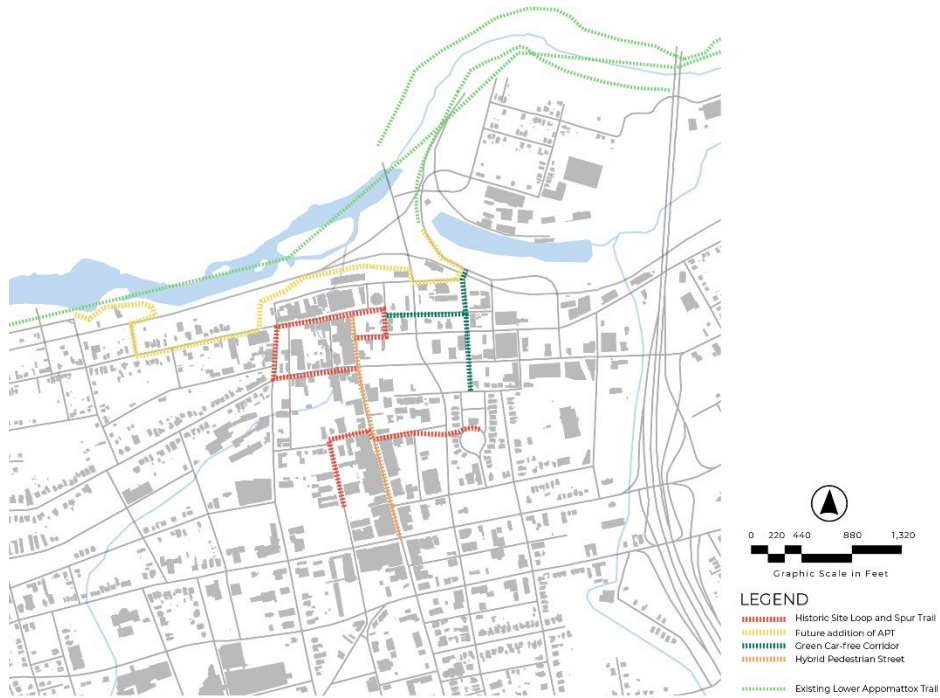
MAP 4: PROPOSED TRAIL NETWORK – WESTOVER AVENUE CORRIDOR

LEGEND
- Westover Avenue Spine corridor
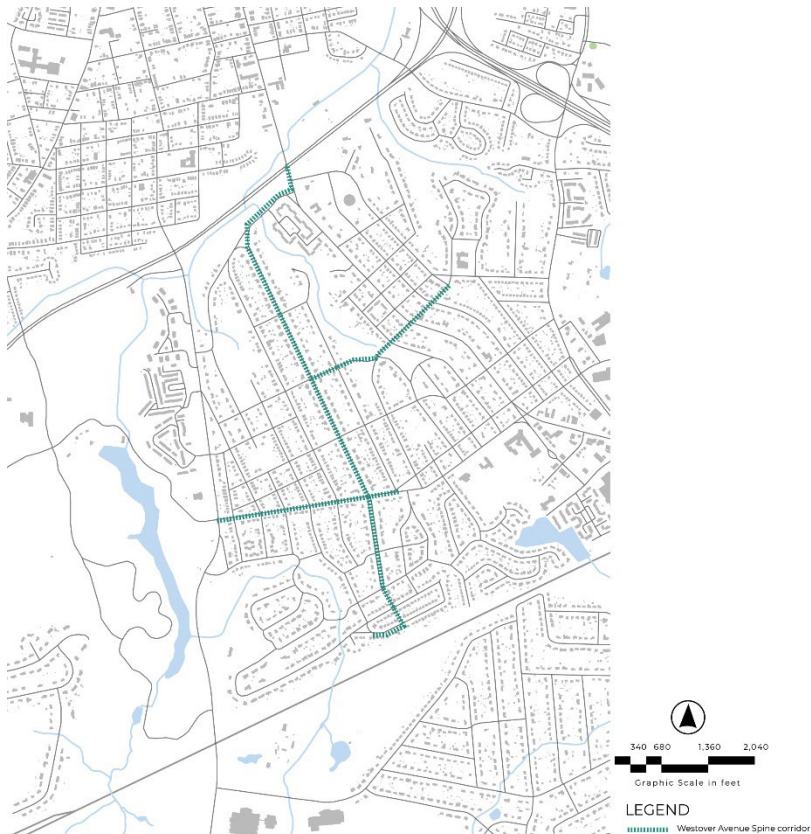
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RESOURCES

Partner Organizations identified to work with the City of Petersburg to realize these goals include Friends of the Lower Appomattox River, Virginia State University, and Pathways.

Funding Sources identified include grants from public organizations FEMA, The US Forest Service, the National Parks Service, the Land and Water Conservation Fund, the Preservation Trust Fund (Virginia Outdoors Foundation), and Virginia Humanities.

Private companies identified to also serve as potential funding sources include Domain Energy and Genworth Insurance, both based in Richmond, and Kaboom, a nonprofit based in DC.

APPENDIX A: 10-MINUTE WALK-TIME MAP FROM PETERSBURG'S DRAFT COMPREHENSIVE PLAN UPDATE

MAP 5.2 | 10-MINUTE WALK TIME MAP
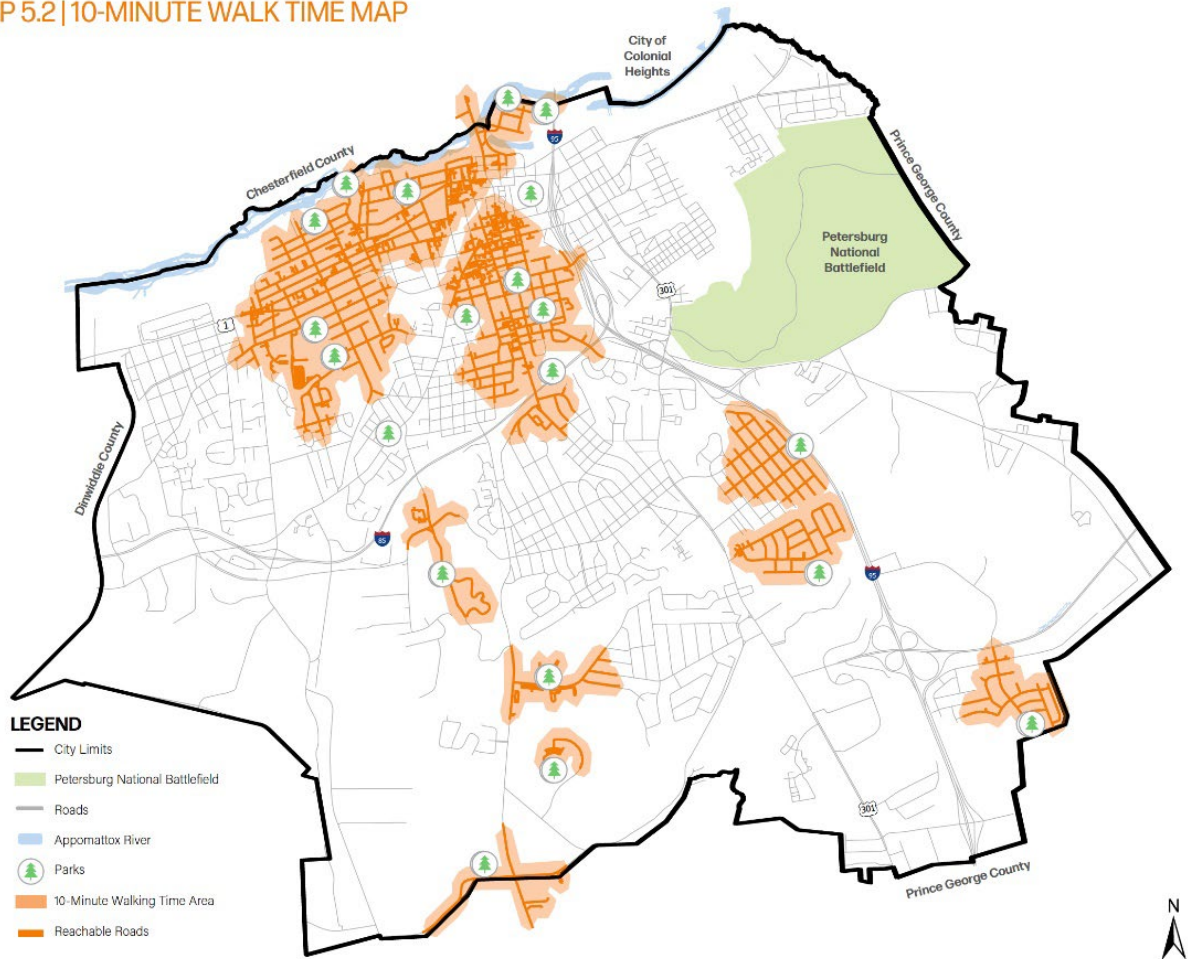
trail benefits

shared used bike-ped path creating new urban corridor

| celebrating history | reactivating old rail lines as walkways | emergency call stops | emergency medical stops |
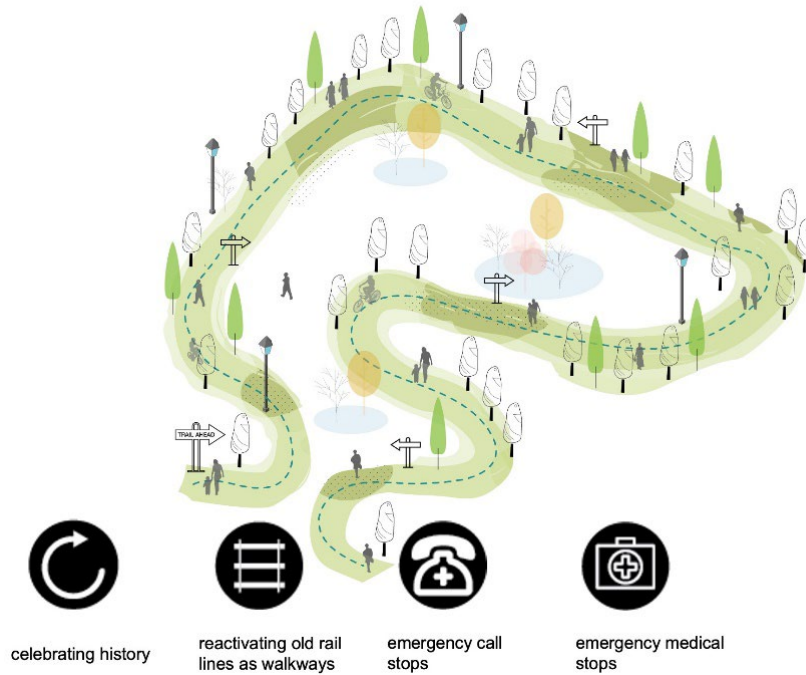
park benefits

green parks/ parklets/ plazas/ squares encouraging recreational community

| parks within 10 min walking radius | creating network of green parks | new green buffer pockets by planting more trees | repurposing and redefining underutilized parcels |
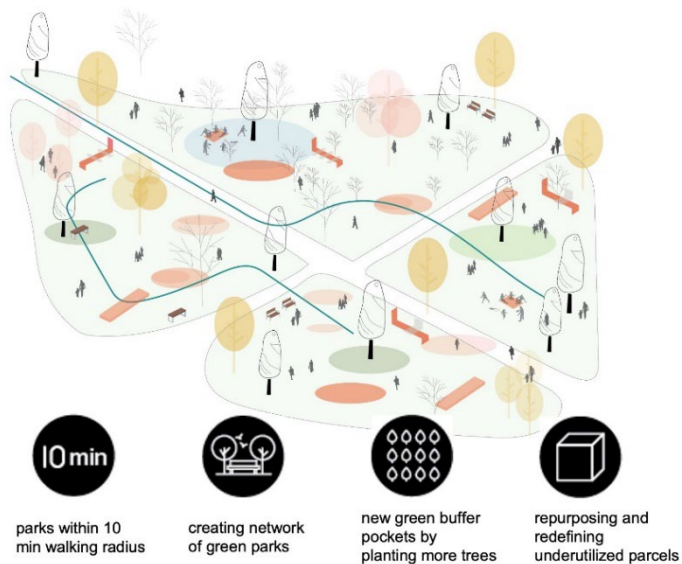
green street benefits

shared used bike-ped path creating new
urban corridor

promoting green
pedestrianized
walkable street

green shaded
canopies

infusing
more seating
across the
footpath

support local
business

CULTURE AND HISTORY: RECOMMENDED POLICIES AND STRATEGIES

Written by Maddy Duval, Nkosinobubelo Ndebele, Emily Routman, Xinyi Shao, Trent Vera

OVERVIEW

Recently the Petersburg Mayor, Sam Parham, spoke ambitiously about the future vision for the downtown area, while commenting on the highly anticipated restoration project of the oldest train station in Virginia. Mayor Parham noted an important overarching impact the project hopes to establish when it opens in 2024. He remarked, "from Revolutionary War history, to Civil War history, to Civil Rights history… we want it all to start right here downtown at South Side Depot" (Covil, 2023). Fostering a cultural nexus in downtown Petersburg is timely and pertinent to creating a greener city that attracts visitors. The attentive cultivation of historical assets will increase tourism, and in turn, boost revenue for local businesses. A more lively downtown will promote a healthier and sustainable city for residents, draw visitors from afar, as well as attract more neighboring VSU students into Petersburg. However, a singular restoration project is only one step the city can take to begin developing a prosperous downtown for the city.

Petersburg's South Side Railroad Train Depot currently being restored to attract visitors to the Old Towne Historic District.

Petersburg only receives around 200,000 visitors a year (Higgins, 2023). Last year, the Petersburg National Battlefield alone accounted for roughly 180,000 visitors (NPS Stats). For comparison, the much smaller area of Gettysburg exceedingly gets about a million visitors a year (Higgins, 2023). While Gettysburg is similarly known for its notable Civil War history, Petersburg has the potential to offer so much more than just the National Battlefield. The city already contains several parks, is positioned along the Appomattox River, and possesses rich African-American/Black history, Revolutionary War history, and Civil War history. Additionally, with an impressive number of seven local historic districts and 44 National Register of Historic Places sites, Petersburg has many existing assets available to become a hub for cultural and social life in Virginia.

The Old Towne Historic District and downtown contain many vacant lots, and the levels of commercial and tourism activity aren't at their full potential. Kate Sangregorio, a preservation planner with the city, noted that ever since Petersburg's brush with financial collapse in 2016, focusing on historic resources and tourism have not been a priority for the city.[1] However, the city is hoping to reverse this trend and highlight the city's rich cultural and historical landscapes. Based on site visits and discussions with local planners, the most pressing issues relating to cultural and historic assets in Petersburg are a lack of connection between historic sites, outdated wayfinding and signage, little focus on the area's African American or Native history, and a lack of opportunity for local residents and visitors alike to enjoy what Petersburg has to offer. Protecting and promoting cultural and historic assets is beneficial for tourism and economic activity as well as the community's social fabric.

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[1] Personal interview conducted October 17, 2023.

Petersburg has a rich history that spans centuries and encompasses many significant events in American history. Many people are familiar with the famed story of Jamestown as the first permanent settlement in the Americas in 1607, resulting in visitors from all around the world (*The 13 Oldest, Most Historic Towns in Virginia*, 2016). Despite the beginnings of Petersburg similarly dating back to 1611, the city is not well known for its long-standing role in Virginia history. While Petersburg is most recognized for its significance within the American Civil War, there was also the Battle of Petersburg in 1781 during the American Revolutionary War (*Petersburg Historical Timeline*, n.d.). The Battersea Estate, which remains well-preserved today, was occupied by British troops during the Revolutionary War. The Civil War history in Petersburg already attracts history enthusiasts who are likely aware of significant events such as The Battle of Old Men and Young Boys, the Siege of Petersburg, and The Battle of the Crater all of which occurred in Petersburg in 1864. Several sites on the National Register of Historic Places have ties to the war history in Petersburg such as Blandford Cemetery, which is a burial ground for 30,000 Confederate soldiers (*Blandford Church and Cemetery | American Battlefield Trust*, n.d.).

Sycamore Street in Old Towne Petersburg is example of the city's unique historic street frontages.

In addition to the Revolutionary and Civil Wars, there are a variety of other notable aspects of Petersburg's history such as its Harbor & Port settlement dating back to 1730, Petersburg's Tobacco Industry lasting from 1730-1985, Peter Jones Trading Station, and Petersburg's Cotton Industry which thrived for a century after beginning in the 1820s. All of these significant historic sites, events and vibrant economic periods could be better marketed to draw heritage tourists to the city. Studies show nearly 80% of all trips taken involve some element of cultural heritage (Timothy, 2011).

BLACK HISTORY/AFRICAN-AMERICAN HISTORIC & CULTURAL ASSETS

While Petersburg is often celebrated for its prominent Civil War history, it's crucial to recognize that the city also boasts a significant and rich African-American heritage and history that deserve equal attention. Like many parts of the American South, Petersburg was deeply entrenched in the institution of slavery. African-Americans in the region endured the hardships of enslavement, contributing to the city's economic prosperity through their labor in various industries, including tobacco and cotton. Pocahontas Island is thought to be Petersburg's earliest predominantly African-American neighborhood. The first enslaved blacks were brought to the peninsula in 1732 to work in tobacco factories, and it became its own town 20 years later. Pocahontas Island was home to many Underground Railroad houses, which provided a pathway to freedom for enslaved laborers, including the Jarrett House (Pocahontas Island Black History Museum - The Best Part of Virginia, n.d.). The Petersburg area was a hotbed of abolitionist sentiment, and home to many of the leaders of the movement. As a result, many enslaved men and women were freed, and Petersburg became the home of the largest number of free African-Americans of any Virginia town or city, and

proportionally one of the largest free black populations in the nation. Many of Petersburg's free Blacks owned considerable property in the communities of Blandford and Pocahontas. Richard Steward, who recently passed away, founded the Pocahontas Black History Museum inside his home in 2003 and was named the "Mayor of Pocahontas Island" (Martz, 2023). He collected over 200 artifacts in his home and told stories to visitors. His legacy should be remembered in future efforts to tell the story of Pocahontas Island.

After the Civil War, Petersburg's Black community, segregated via Jim Crow laws, established many of its own institutions - some of which still stand today. First Baptist Church and Gillfield Baptist Church were known as two of the oldest Black congregations in the country, both originating in the 1870s. In the realm of education, Peabody Colored High School was the first public high school for African-Americans in Virginia and one of the oldest in the South, and Virginia State University was first established as Virginia's first public college for African-Americans. The "Avenue," also known as the "Triangle," located on Halifax Street and South Avenue, was the hub of Black-owned businesses in Petersburg until the 1970s.

Pocahontas Island Signage

During the 1950s and 1960s, many Black Petersburgers helped to advance the Civil Rights Movement through sit-ins and other non-violent forms of protest. Reverend Martin Luther King, Jr. came to Petersburg multiple times, culminating in a major speech at Virginia State University in 1965. Several of Reverend King's top associates were drawn from Petersburg, including Reverend Wyatt Tee Walker, pastor of Gillfield Baptist Church (African-Americans in Petersburg Historical Marker, n.d.). Petersburg's current preservation planner, Kate Sangregorio, noted that one of their current goals is to make sure to highlight this rich African-American history that spans decades.

SELF-SUSTAINABILITY

It is important for the City of Petersburg to prioritize incorporating heritage and culture into their urban planning and development plans as this will contribute towards making it a self-sustainable, economically vibrant, socially cohesive, and environmentally conscious city. This approach will not only preserve the past but also shape a more resilient and dynamic future for the community. Heritage and culture often serves as a significant economic driver through generating revenue for local businesses and contributing to the overall economic development of a city. Because Petersburg has rich heritage and cultural assets, it has the potential to generate its own sources of income and employment, ultimately creating a more diversified and resilient economy.

LENGTHENING THE STAY OF VISITORS

Through prioritizing and improving the status of heritage and cultural assets of Petersburg, more visitors will be attracted to the city. Enhancing the overall tourist experience by making the destination more appealing and encouraging visitors to spend more time there will enable the generation of more income into the city. The longer a visitor stays in town, the more they spend. Petersburg can create a compelling and enjoyable experience for tourists, encouraging them to

extend their stays and explore more of what the historic city has to offer through the implementation of some of these strategies;

o Accommodation Options: Offering a range of accommodation options, including hotels, resorts, hostels, and vacation rentals, to cater to different preferences and budgets.

o Culinary Experiences: Promoting local cuisine and providing a diverse range of dining options, from street food to fine dining as well as encouraging culinary events and food festivals.

o Cultural and festival Events: Organizing regular cultural events, festivals, and celebrations to showcase the local culture and highlight unique cultural experiences that visitors can participate in.

o Local Community Involvement: Involving the local community in tourism initiatives to ensure that tourism benefits are shared as well as encouraging the development of locally-owned businesses.

o Tour Packages and Special Offers: Collaborating with travel agencies to create attractive tour packages that offer special promotions and discounts for extended stays.

o Green City Benefits: Special attention to incorporating landscaping and beautification of the natural environment into tourism attracts visitors. For example, simple interventions such as benches in parks and shaded areas under trees improves the visitor experience.

o One study revealed that 20% of tourists were involved in ecotourism (Joppe and Dodds, 1998). Therefore, maintenance of green spaces is worth the investment. Ecotourism is defined as "purposeful travel to understand the culture and natural history of the environment; taking care not to alter the integrity of the ecosystem; producing economic opportunities that make the conservation of natural resources beneficial to local people" (Joppe and Dodds, 1998).

STRATEGIES

GOAL 1: CREATE OPPORTUNITIES FOR TOURISM WITH WELL-CONNECTED HISTORIC AND CULTURAL SITES TO ENHANCE ECONOMIC GROWTH AND CIVIC PRIDE.

RATIONALE:
A healthy tourism industry is essential for the City of Petersburg to build financial resilience. Despite its past fiscal challenges, Petersburg has explored various strategies to increase its economic sustainability. However, due to resource and staffing constraints, tourism as a strategy for economic growth has been largely untapped. Petersburg has a rich history relating to the Civil War and Civil Rights/Black history, as well as a myriad of interesting historic districts and sites that aren't well promoted. These historic sites and districts are crucial assets in developing a strong

tourism network unique to Petersburg that will both recognize and celebrate its heritage and bring in needed revenues.

Tourism provides numerous benefits to communities, including the stimulation of economic growth through spending, generating tax revenue, and creating a brand (How Does Tourism Support Small Businesses?, 2022). For example, tourism spending in nearby Richmond is trending up, with things such as lodging, food and beverage, retail, recreation and transportation generating $165.1 million in local taxes and $95.6 million in state tax revenues last year. 27,634 jobs were also supported by tourism-generated revenues (Dickerson, 2023). Petersburg has a large collection of historic sites that could capture similar visitors.

Although there are some documented walking paths/history tours in the City of Petersburg, they should be integrated with the existing recreational and environmental landscape to create a walking tour that connects the two ends of the existing Appomattox River Trail. Additionally, these could be expanded by incorporating options for food and drink, hotels and other lodging, and other modern cultural sites alongside the documented historic sites to boost tax revenues and improve visitor experience. Providing opportunities for residents and visitors alike to experience Petersburg's history while enjoying local cultural and commercial amenities is key to developing a tourism strategy and a long-term source of economic growth.

Objective 1a: Create a new tourism website/landing page that contains a cultural + historic assets map with walking tour paths for visitors.

> **Action 1:** Maintain an ongoing list of historic + cultural sites (use initial list prepared by UVA student team). Pull information from its resources and community knowledge, and continuously update the list with new information.
>
> **Action 2:** Build a website or landing page to house the cultural + historic assets map.
>
> *Responsible parties:* Naomi Siodmok (Director of Planning & Community Development) to hire web designer
> *Cost:* Cost of web designer
> *Timeframe:* Short-Term
> *Funding:* Grant + Local Match

Objective 1b: Incorporate cultural and historic assets in a new tourism strategy, with branding, a slogan, and signage. Example guidance here from the Virginia Department of Housing and Community Development.

> **Action 1:** Update/improve city tourism branding, advertisement, and promotion on city websites.
>
> *Responsible parties:* Naomi Siodmok (Director of Planning & Community Development) to hire outside consultants and work with Virginia DHR.

Cost: Medium to High
Timeframe: Medium Term
Funding: Grants + Local Match

Objective 1c: Purchase and install new wayfinding and historical signage to align with the proposed walking paths. Pursue funding through federal/state programs or community organizations.

> **Action 1:** Seek funding opportunities for new wayfinding, signage, and tourism programs/materials.
>
> *Responsible parties:* Naomi Siodmok (Director of Planning & Community Development) to hire outside consultants and work with Virginia DHR.
> *Cost:* Medium to High (may expect roughly $10k per sign)
>   *Cost will vary following a survey of the number of signs needed as well as future cost escalation of materials, installation, regulation, and permits.
> *Timeframe:* Medium Term
> *Funding:* Grants + Local Match

GOAL 2: INCREASE CIVIC AND COMMUNITY PRIDE IN PETERSBURG'S HISTORY AND CULTURE.

RATIONALE:
To bolster the economic approach through tourism, it's crucial to actively involve the community. Placing emphasis on engaging residents to foster a sense of ownership and pride in what the city offers through its tourism initiatives. This community involvement will strengthen the social fabric, garnering increased support from residents for future implementation of tourism strategies. Balancing the needs of current residents while attracting visitors from beyond the city is vital. Ultimately, by fostering civic pride through community engagement, negative impacts from increased visitation can be mitigated and ensure lasting success through local backing.

Objective 2a*:* Involve the community in generating a new tourism branding identity and slogan.
> **Action 1:** Conduct a "city slogan contest" where the winning slogan gets a prize of donations from local businesses. This contest could also include a new city logo, flag, and other aspects of branding and identity.
>
> *Responsible parties:* City of Petersburg to call for submissions
> *Cost:* None. Leverage resident expertise in community for submissions
> *Timeframe:* Medium Term
> *Funding:* N/A

Objective 2b: Conduct community work sessions and focus groups to gather local knowledge that can inform the city's database of historic and cultural sites. Community involvement in the process will also create a sense of ownership and pride in the outcome.

Action 1: Schedule work sessions and community meetings to brainstorm ideas for tourism and culture-related strategies based on lived experiences and local knowledge of history and culture.

Action 2: Schedule focus groups and community meetings to gather input from community members on important cultural and historic sites that should be included in Cultural + Historic Assets walking tours.

Responsible parties: City of Petersburg, outside consultant, Virginia DHR, Petersburg Public Library, Virginia State University
Cost: Low to Medium (<$20k)
　　　*Cost will vary depending on the need for venue rental, facilitator fees, marketing/outreach, food/refreshments, and any technology desired to conduct the events.
Timeframe: Short Term
Funding: Grants + Local Match + in-kind work from VSU

Local Petersburger, Trey Songz, commissioned an artist to create a mural in Petersburg for his new album.

APPENDIXES

MAP 1: GOOGLE MY MAP ASSET + WALKING TOUR MAP

As stated in Objective 1a, compiling an asset map of all historic and cultural sites with different walking tours can be one part of a tourism strategy for Petersburg. Using the existing Clio Petersburg Walking Tour and other online and print resources, the team compiled a list of 50 historic and cultural assets (Petersburg Historical Sites Walking Tour by Clio, 2017). Each site was grouped into categories such as hotels & lodging, food & drink, Civil War history, Black history, and museums. The team elected to use the Google MyMaps platform to display the map, as it is user friendly, can be accessed on mobile devices, and can be updated easily. On the platform, each category of historic and cultural sites is separated into its own layer that can be turned off and on by the user. There are 3 different proposed themed walking paths: the Old Towne Architecture Loop, the Civil Rights Loop, and the Appomattox Trail connector. The existing Clio walking tour resource does not provide options for the user, so this Google MyMaps expanded resource provides flexibility and connects the existing ends of the Appomattox River Trail to downtown historic and cultural resources. The Petersburg GoogleMyMaps resource can be accessed here.

In connection with the recommendations from the Trees and Habitats section of this report, several culturally significant areas in need of tree planting interventions were identified: neighborhoods along Brickhouse Run near downtown, Pocahontas Island, and the downtown district near Demolition Coffee. Although the proposed tour paths are already fairly shaded and green, further tree plantings and greening initiatives can only enhance the visitor experience for the neighborhoods.

The next page depicts the cultural walking paths and sites. It can be added to by city users.
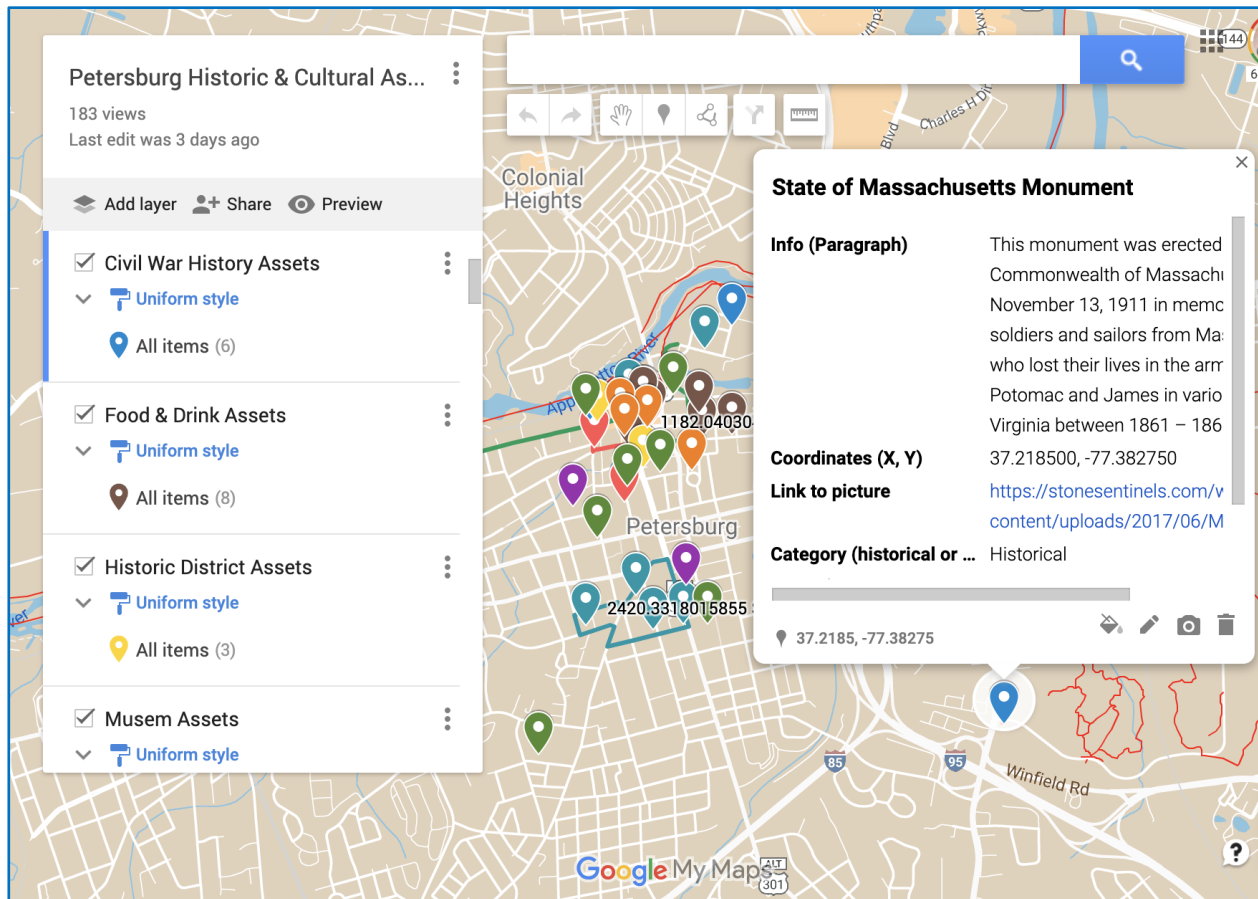
Google MyMaps interactive Historic & Cultural resources map created by the team to provide a powerful tourism tool for Petersburg.

APPENDIX 2: BRANDING/WAYFINDING TOOLKIT

In order to fulfill Objectives 1a and 2a, Petersburg should create a brand identity for tourism, wayfinding, and marketing purposes. This brand identity should include a branding template that includes a color palette, typography, messaging tone, and potentially templates for official documents. Many cities have examples of these kinds of comprehensive guidelines, such as Boston, MA, Boulder, CO, and Durham, NC. After the guidelines are established, they can extend to official Petersburg signage, such as historic and wayfinding signage. The team created an example template that Petersburg could use as a starting point for branding and wayfinding signage. This guide includes a sample color palette, font library, and some templates for pedestrian and vehicle wayfinding, historic signage, and lamp post banners. If Petersburg decides to create these kinds of uniform branding guidelines, they should use community engagement, such as focus groups, to understand what the public think should be incorporated. Focus groups should also be created for outside tourists to better understand current impressions of Petersburg before and after visiting. If Petersburg decides to get a new city seal/flag or new city slogan, the public should be involved in the conception of these two creative assets and should be able to vote on their favorites.

Branding/Wayfinding Design Toolkit

Though the "Best Part of Virginia" tourism web page exists, it highlights the entire region, including Colonial Heights, Dinwiddie, and Prince George, as well as Petersburg. Objective 1a calls for Petersburg to have its own tourism website where its unique assets can be featured and marketed. Other Virginia localities with similar or smaller populations have their own tourism webpages. Several tourism websites, including Visit Charlottesville, Visit Fredericksburg, and Visit Staunton, were reviewed to determine what aspects Petersburg could or should include if they decide to invest in their own tourism website. One feature from the Staunton website was a "24 Hours in Staunton: Activities You Can't Miss" page, which featured several "must-do" activities to give visitors the full Staunton experience. This approach was used to inspire a "24 Hours in Petersburg" guide that can be featured on the proposed tourism website. The guide can be updated to feature any number of activities, from the Centre Hill museum to Trapezium Brewing. Petersburg's rich cultural landscape and plethora of historic features should be showcased, and giving visitors a reason to come to the city will boost civic pride, create economic opportunities for businesses, and boost revenue.

Sample "24 Hours in Petersburg"

Following are additional aspects of the tourism websites that could be incorporated into a future Petersburg tourism website.

Visit Charlottesville
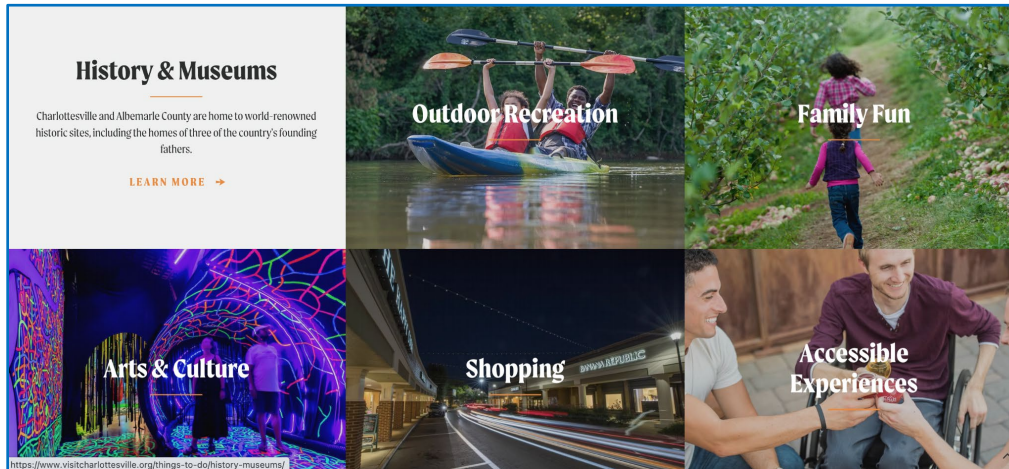
The Charlottesville tourism website is aesthetically pleasing and uses great fonts, symbology, and colors. The website also uses immersive features such as photos, videos, and upcoming events.
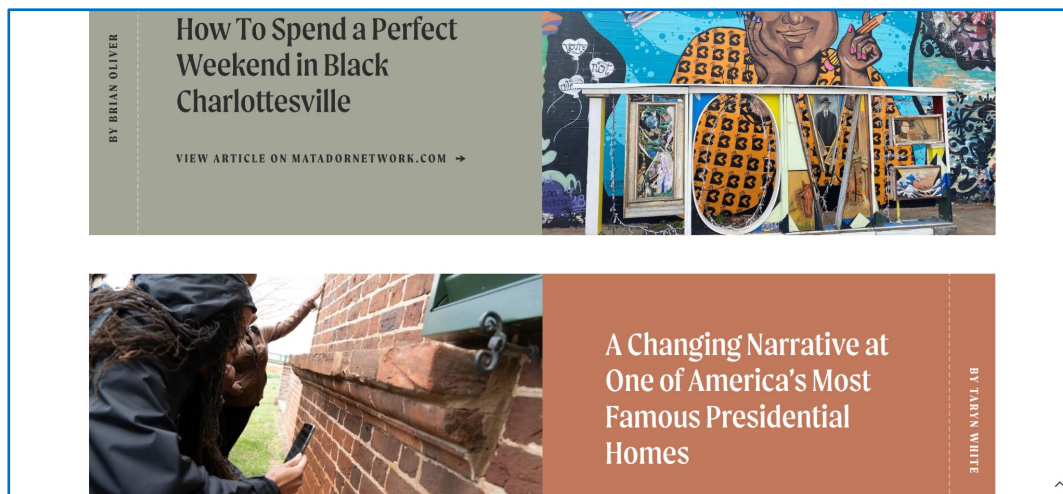
One of the unique aspects of Charlottesville's tourism website that Petersburg could utilize is an entire page dedicated to "Black Cville," about Black history, locally-owned Black businesses, and more.

Charlottesville's Food & Drink page has featured sponsored links from local businesses. Petersburg could utilize this idea by getting local businesses to pay a certain amount for a featured spot on the tourism website.

Staunton

Staunton also has a whole page dedicated to activities going on. Local businesses could pay a certain amount to have activities featured on a page like this (or for free). This type of page could also be utilized by local Petersburg residents as well as visitors.
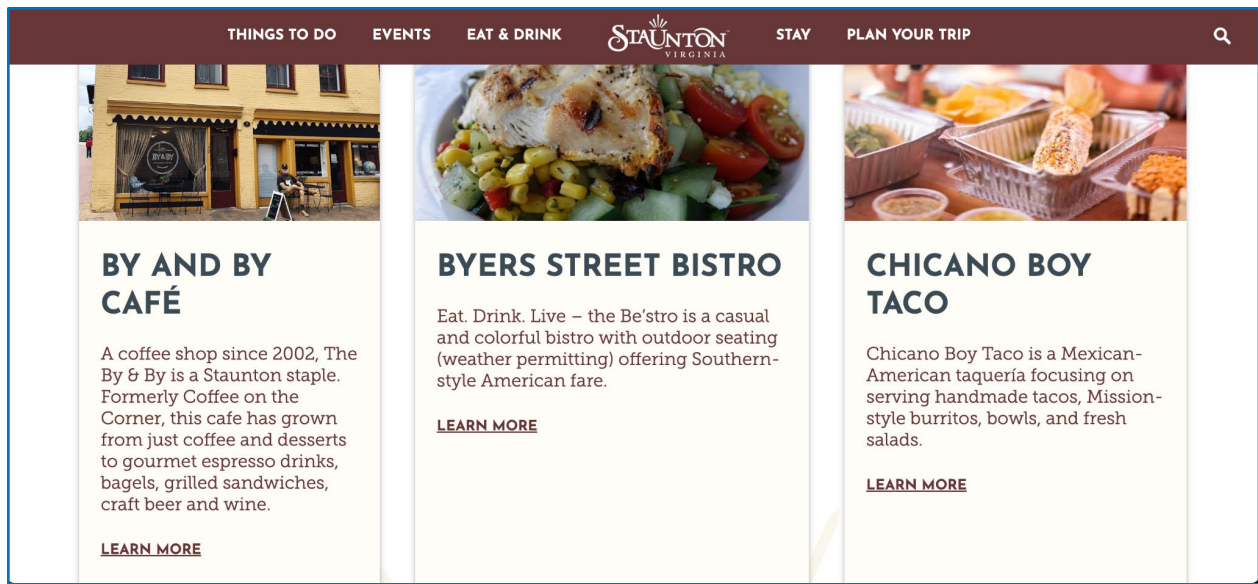
On the Staunton "Eat & Drink" page, they have lists of all establishments with a small description and image. Petersburg could charge a small fee to these businesses to be featured on the website.
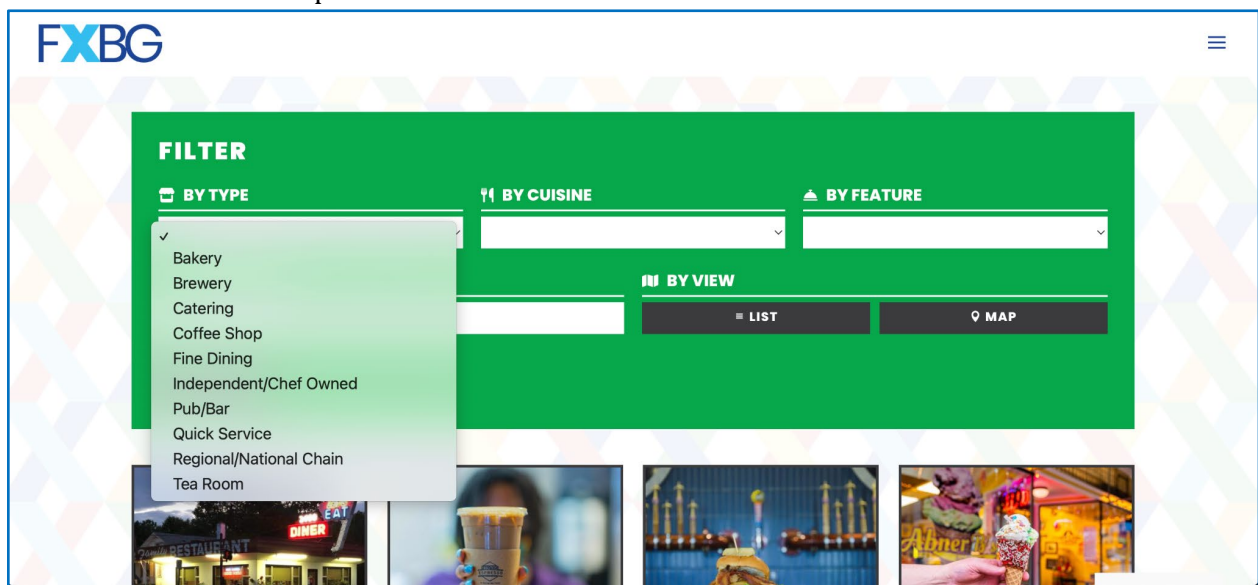
Fredericksburg

Fredericksburg's "History" page has different history sections available to click on. Petersburg could utilize this kind of setup to highlight its unique histories.
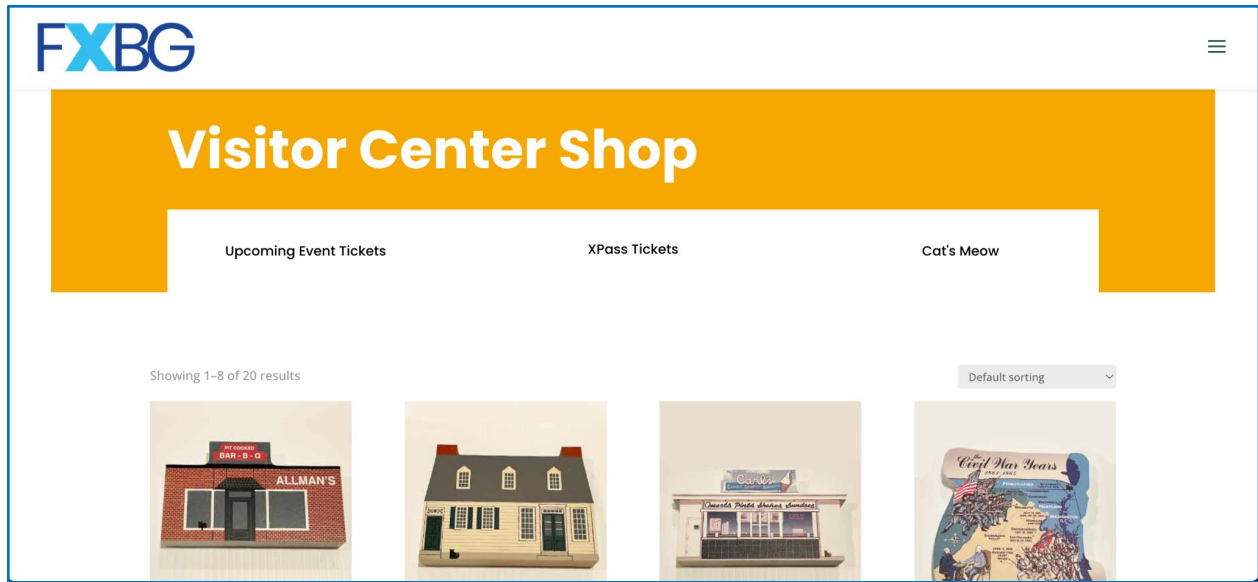
Another revenue-generating idea is to have a tourism shop with local artisan crafts and gifts that locals and visitors could purchase.

Having these kinds of filters can be extremely useful for visitors and even locals who may want to try something new.

FUNDING RECOMMENDATIONS

National Endowment for the Humanities (NEH)

The NEH is an independent federal agency that enables individuals and institutions across the United States to study, preserve, and share the best of America's history and culture. The NEH accomplishes its mission by awarding grants for top-rated proposals and their grants typically go to cultural institutions. The preservation of Pocahontas Island could qualify for this grant. Under the Division of Preservation and Access, there are diverse grant options that could range between $100,000 and $350,000.

Virginia Foundation for Humanities

The foundation's aim is to share the stories of Virginians and find ways for people to share their own stories. Their grants support projects that explore the stories of Virginia, its history, people, communities, and cultural traditions as well as issues and questions that impact the lives of Virginians in the present day. Because of Petersburg's rich heritage and culture, the city could qualify for grants from this foundation. Regular grants range from $5,000 to $20,000.

Virginia Main Street (VMS)

The Virginia Main Street Program is a preservation-based economic and community development program that offers a range of services and assistance to communities interested in revitalizing their historic commercial districts. VMS grants are available for revitalization activities, such as wayfinding system development and the City of Petersburg could apply for the grant in order to enable the designing and implementation of wayfinding/ signage that would make Petersburg more visible and promote a source of community pride. Grant opportunities have maximum awards that can range between $15,000 and $150,000.

Preserve America

This federal initiative encourages and supports community efforts to preserve and enjoy America's cultural and natural heritage. Grants are administered by the Advisory Council on Historic Preservation and are designed to support a variety of activities related to heritage tourism and innovative approaches to the use of historic properties as educational and economic assets. Acquiring such a grant may enable the City of Petersburg to become an educational tool for Black American history and ultimately support the economic vitality of the community. Historic preservation programmes are funded between a range of $20,000 and $250,000.

Virginia Tourism Corporation

The Virginia Tourism Corporation (VTC) offers several funding programs to assist the Virginia travel industry. It is committed to creating and sharing resources with Virginia's tourism industry to maximize tourism potential. The main aim of VTC's key programs is to support and expand tourism marketing and product development, with an emphasis on leveraging tourism resources. Grand awards can be a maximum of $10,000 and $20,000.

Southern Virginia Regional Chamber of Commerce

Since the primary focus of the SOVA Chamber of Commerce is on economic development, the promotion of history and culture aligns with these goals. The Chamber works with both the City of Colonial Heights and the City of Petersburg to

provide opportunities to promote their different historic and cultural assets to individuals and groups in different geographic areas. Marketing efforts of historic and cultural cities are instrumental in driving tourism, supporting local businesses, preserving heritage, fostering community engagement, and positioning the city as a dynamic and attractive destination. These efforts will be essential for the sustainable development and prosperity of the City of Petersburg.

Bank of America's Arts and Culture Initiative

Some corporations may have a vested interest in supporting projects related to heritage and culture, especially if it aligns with their corporate social responsibility initiatives. The City of Petersburg could explore partnerships with companies that have a connection to cultural preservation or heritage, such as Bank of America's Arts and Culture initiative.

Crowdfunding and Public Engagement

The City of Petersburg could engage with the public through crowdfunding platforms or community fundraising efforts. Some projects related to heritage and culture resonate well with the public, and individuals may be willing to contribute. In addition to monetary crowdfunding, there is immense knowledge and local expertise that could be utilized rather than paying consultants to conduct work.

University Research Partnerships

The City of Petersburg could consider exploring options of partnering with university research groups that have an interest in heritage and culture. These collaborations are often supported by different sources of funding. Virginia State University professors may be open to collaboration on semesterly schedules with students. Partnering with universities such as the Virginia State Universities on branding and marketing would benefit both the City of Petersburg and the local university. The university wants to attract students to attend it so it would help them to make the city appear hip, fun, green and outdoorsy. Attracting students to apply to universities in fun and vibrant cities requires a combination of branding and marketing strategies, creating a positive campus experience, and promoting the unique qualities of the city.

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WEB LINKS

Petersburg Historical Sites Walking Tour (Clio):

https://theclio.com/tour/311

RESOURCES

EXAMPLE CITY BRANDING GUIDELINES

Boston, MA

Boulder, CO,

Durham, NC.

EXAMPLE CITY TOURISM WEBSITES

Visit Charlottesville

Visit Fredericksburg

Visit Staunton

EXAMPLE FUNDING RECOMMENDATIONS

National Endowment for the Humanities (NEH)

Virginia Foundation for Humanities

Virginia Main Street (VMS)

Preserve America

Virginia Tourism Corporation

SOVA Chamber of Commerce

Bank of America's Arts and Culture initiative.