December 2020

CITY OF SALISBURY

Tree Canopy Study

Salisbury

Biohabitats

Acknowledgements

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Introduction

The City of Salisbury (City) has long acknowledged the benefits and importance of trees as a recognized Tree City USA community, a designation established by the Arbor Day Foundation. Additionally, the City's Environmental Policy Task Force identified a goal to protect and enhance the tree canopy with an emphasis on building citizen support and participation (City of Salisbury, 2009).

The benefits of trees are numerous and include improved air quality, increased property values, reduced energy consumption, reduced air and water temperatures, improved water quality, higher quality habitat and greater biodiversity, increased carbon storage, and improved cultural support inspiring, calming, and creating space for community interactions. As illustrated in **Figure 1**, trees are an integral component of the water cycle through interception and evapotranspiration.

The City is also an active participant in the Heathy Waters Roundtable (Roundtable), a regional collaboration of Eastern Shore jurisdictions convened to identify local governments' needs to address the Chesapeake Bay Total Maximum Daily Load (TMDL) and other water quality goals. One of the priorities identified through the Roundtable was "to comprehensively evaluate opportunities for tree canopy increases and/or improvements…"

Bridging a desire to bring the benefits of trees to City residents with a need to address multiple goals and commitments, the City initiated a Tree Canopy Study. This document summarizes the Tree Canopy Study effort which consisted of a desktop analysis of tree canopy within the City, assessed plantable areas, developed concepts for plantable areas, and evaluated programs and regulations that impact tree canopy.

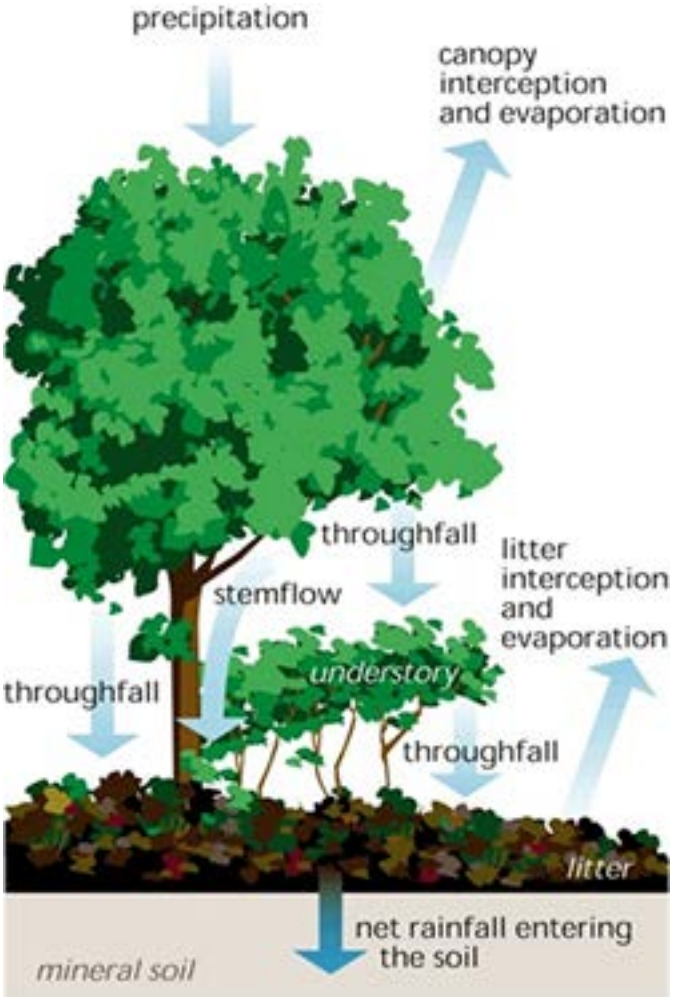

Figure 1: Effect of Trees on Hydrologic Cycle (FISRWG, 2001)

City Programs and Drivers

The City has several mechanisms already in place that increase and/or maintain trees during development and on existing lots. State and City programs and regulations are summarized within **Table 1**.

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Table 1: City of Salisbury Existing Programs and Drivers

Program/Regulation	Description
New Development/Redevelopment	
State	
Forest Conservation Act	Provides guidelines for the amount of forested land retained or planted after the completion of development projects. To meet these requirements, information on the condition of the existing forest and a plan for conserving the most valuable portions of the forest are required.
Chesapeake Bay and Coastal Bays Critical Area	Within Intensely Developed Areas (IDA), non-structural practices, such as reforestation can be used to help meet the stormwater phosphorus removal performance standard. In Limited Development Areas (LDA) and Resource Conservation Areas (RCAs), cleared trees must be replaced at ratios ranging from 1:1 to 3:1 depending on the amount of forest acreage cleared. Fee-in-lieu may be collected in areas where it is impossible to replace forest cover.
City	
Zoning	Planned Residential District, Landscaping: On wooded sites, existing trees shall be retained and utilized in perimeter setback areas as screening in open space areas and, where possible, as individual lot and street trees. Cluster Development: Space designed for preserving natural areas should be designed to include irreplaceable natural features located in the tract such as but not limited to stream beds, significant stands of trees, marshlands or riverbanks.
Existing Development on Privately-Owned Property	
State	
Forest Preservation Act	Establishes no net forest loss as a state policy. To help accomplish this goal, the Act expands financial incentives and reforestation tools to encourage more landowners to convert residential property to forestland and to retain/manage existing tree cover.
Other Programs	
City	
Environmental Task Force Report	Includes a goal to protect and enhance the tree canopy with an emphasis on building citizen support and participation.
Comprehensive Plan	Sensitive Areas objectives include developing regulations that minimize tree removal and maintaining and expanding the forest canopy.
National Pollutant Discharge Elimination System Phase II Municipal Separate Storm Sewer System Permit (Phase II MS4 Permit)	Reforestation is one of several options that the City can leverage to address the Phase II Permit's Chesapeake Bay TMDL restoration requirement.
Wicomico County Phase II Watershed Implementation Plan (WIP)	The WIP identifies actions to improve water quality (specifically to address nutrient and sediment) loads. Urban tree planting/increasing canopy is identified as action to meet nutrient and sediment reductions. The 2014/2015 milestone recommendations include the establishment of an urban tree canopy program.

Project Overview and Summary of Findings

In an effort to expand upon existing programs and formalize the implementation of the Environmental Task Force's Urban Tree Canopy goal, the Tree Canopy Study conducted an analysis of existing tree canopy within City limits, identified potential plantable areas on City property via a desktop and field assessment, and created concepts for four viable plantable areas. An overview of these efforts and summary of findings is provided below.

Tree Canopy Analysis

Overall Results

The tree canopy analysis, based on land cover data (**Figure 2**) derived from 2018 high-resolution aerial imagery, found that 3,249 acres of the City is covered by tree canopy. This represents 35.55% of the City area (**Table 2**). Non-tree vegetation, defined as all vegetated areas of the City without tree canopy, comprise approximately 28% of the City. The remaining approximate 36% of the City is non-vegetation. Non-vegetation includes all surfaces without plant material, such as paving, buildings, water, and bare soil.

Table 2: City Land Cover (2018)

Landcover	Percentage	Acres
Tree Canopy	35.55%	3,249
Non-Tree Vegetation	28.04%	2,564
Non-Vegetation	36.41%	3,328
TOTAL	**100%**	**9,140**

Of the 3,249 acres of tree canopy, approximately 95% was on public or private parcels and approximately 5% was within rights-of-way, which are primarily for streets (**Table 3**).

Table 3: Tree Canopy in Parcels vs Rights-of-Way

Category	Percentage	Acres
Parcels	95.14%	3,092
Rights-of-Way	4.86%	158
TOTAL	**100%**	**3,249**

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Figure 2: Land Cover (2018)

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Watersheds

The City sits in eight HUC 12 subwatersheds. As they have a 12-digit numerical identifier, and not a name, this study identifies them by their 8-digit watershed name, and the last two digits of their 12-digit number. Tree canopy coverage was calculated by subwatershed area within the City limits (**Figure 3**). At the north end of the City, Wicomico River Head-67 has the highest tree canopy coverage at 60% in 2018. Seven sparse parcels, also in the north, comprise the lowest coverage (11% tree canopy) at the edge of Wicomico River Head-68. Of watershed areas that are more completely within the City, Lower Wicomico River-61 has the lowest tree canopy coverage at 27%. This subwatershed includes the downtown area.

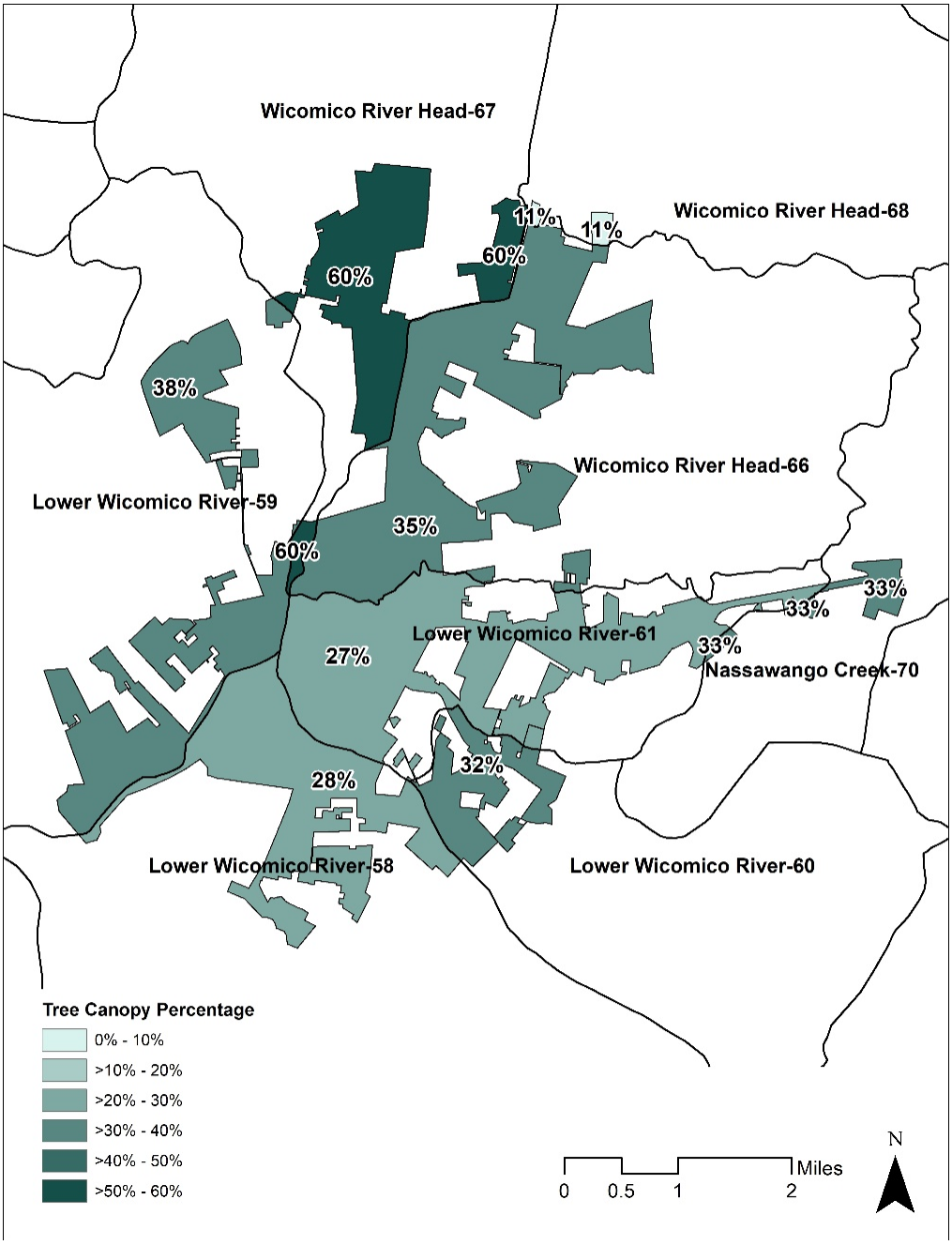

Figure 3: Tree Canopy Coverage by Subwatershed

Neighborhoods

Eighty-two neighborhoods are formally identified throughout the City. Chelsy Court, Cotton Patch Island, and Westwood Commerce Park have the highest tree cover, with all over 65% (**Figure 4** and **Table 4**). The large Northwood neighborhood has the highest overall tree canopy coverage with more than 220 acres in tree canopy (32% of neighborhood is tree canopy). River Place, Williams Landing, and PRMC Hospital has the lowest canopy coverage, with all under 5%. Neighborhoods with low tree canopy may be important targets for new planting initiatives.

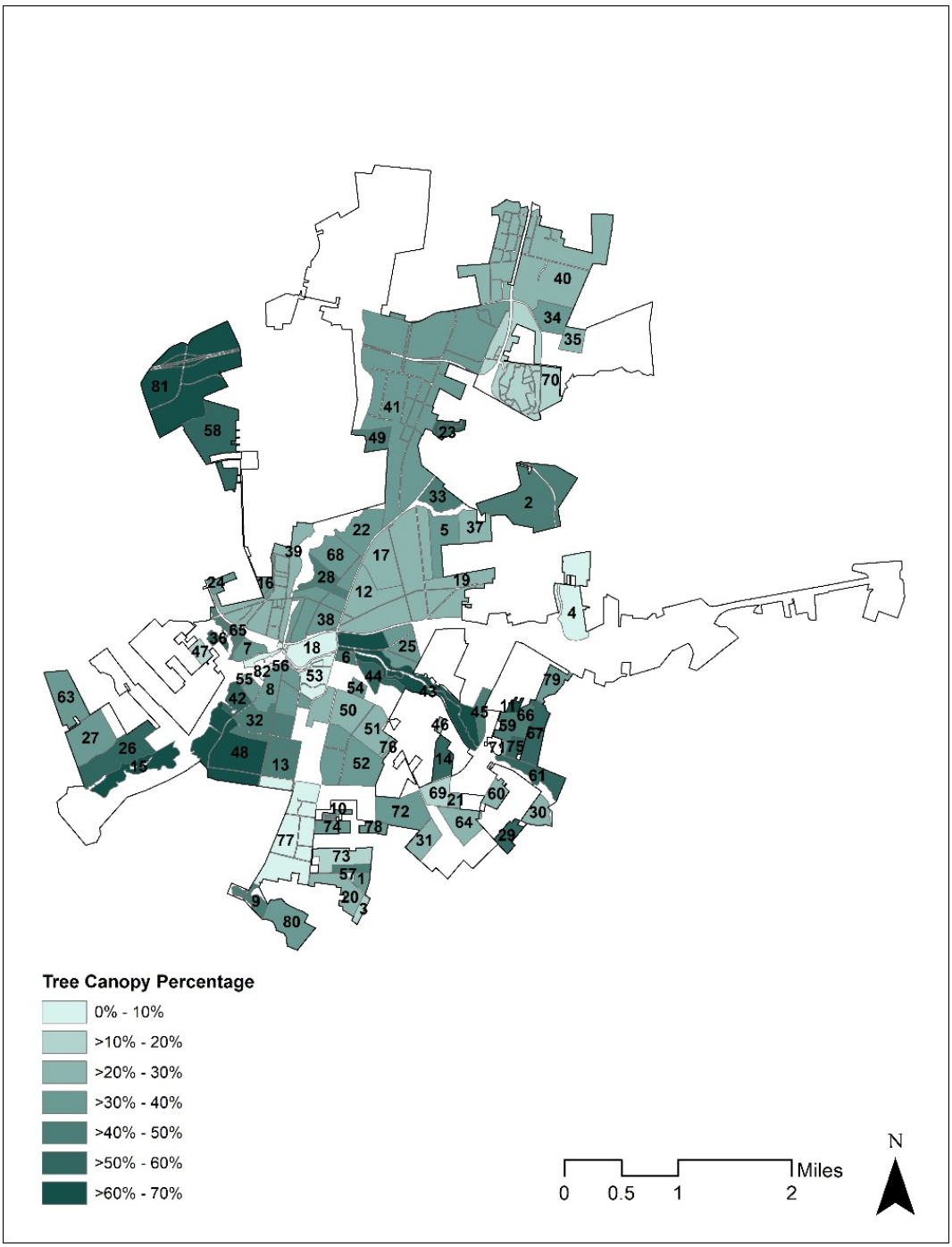

Figure 4: Tree Canopy Coverage by Neighborhood

Table 4: Tree Canopy Coverage by Neighborhood

Map Key	Neighborhood (NH)	Tree Canopy Acres in NH	Percent of NH with Tree Canopy Coverage	SVI		Map Key	Neighborhood (NH)	Tree Canopy Acres in NH	Percent of NH with Tree Canopy Coverage	SVI
1	Aspen Hills	4.89	39	0.75		42	Oak Hill	14.06	51	0.91
2	Aydelotte Farm	90.80	50	0.70		43	Park Area	87.80	61	0.99
3	Briar Cliff	1.89	19	0.79		44	Park Heights	16.95	54	0.80
4	Brittingham Square	10.53	10	0.70		45	Parkside	11.63	50	0.76
5	Bryn Mawr	22.18	37	0.99		46	Parkview Apartments	0.62	12	0.75
6	Buena Vista	4.73	46	0.80		47	Pemberton Manor	2.57	16	0.74
7	California	9.12	39	0.96		48	Pinehurst	104.92	61	0.91
8	Camden Heights	36.24	36	0.91		49	Poet's Colony	14.33	48	0.70
9	Canal Woods	10.14	44	0.79		50	Presidents Area	24.91	28	0.80
10	Cedar Crossing	3.11	38	0.75		51	Prince Street Area	14.43	28	0.80
11	Chelsy Court	5.42	67	0.76		52	Princeton Avenue Area	49.30	36	0.80
12	Church Street Area	40.13	24	0.99		53	PRMC Hospital	1.58	4	0.91
13	Clairmont	18.75	45	0.91		54	Rabbit Knaw	4.26	39	0.80
14	College Lane	19.39	57	0.75		55	River Oak	1.47	30	0.91
15	Cotton Patch Island	40.94	66	0.74		56	River Place	0.00	0	0.91
16	Coty Cox	4.73	32	1.00		57	Salisbury Commons	6.56	42	0.75
17	Doverdale	60.03	29	0.99		58	Sassafras Meadows	70.32	55	1.00
18	Downtown	5.48	7	0.96		59	Schumaker Glen	10.09	45	0.76
19	East Main Street Area	22.49	23	0.99		60	Schumaker Manor	7.09	30	0.75
20	Eireann Mohr	12.57	27	0.79		61	Schumaker Woods	22.21	52	0.76
21	Ellington	1.90	21	0.75		62	Shady Grove	0.22	9	0.75
22	Emerson Heights	22.46	36	0.71		63	Sleepy Hollow	26.59	38	0.74
23	Foxwood	10.38	54	0.70		64	South Johnsons	11.78	24	0.75
24	Gateway Village	4.97	33	1.00		65	South Westside	9.87	49	0.96
25	Glen Haven	23.21	40	0.99		66	Spring Chase	10.86	50	0.76
26	Handys Meadow	57.21	58	0.74		67	Stonegate	27.28	54	0.76
27	Harbor Pointe	27.93	34	0.74		68	Sumpter Point	24.30	33	0.71
28	Johnson's Lake	15.76	41	0.71		69	Tamarac	6.11	19	0.75
29	Johnsons Retreat	14.18	58	0.75		70	The Centre Mall	35.62	17	0.69
30	Mallard Landing	8.69	30	0.75		71	The Glade	1.79	40	0.76
31	Marley Manor	8.61	24	0.75		72	The Holly Center	23.74	31	0.75
32	Mid Camden	44.64	46	0.91		73	The Orchards	6.68	13	0.75
33	Middle Neck	16.26	41	0.70		74	The Seasons	7.20	33	0.75
34	Mill Pond	14.42	31	0.69		75	Tide Mill	8.86	57	0.76
35	Misty Hallow	5.78	22	0.69		76	Twin Parks	2.06	27	0.75
36	Mitchels Landing	5.07	51	0.96		77	University District	15.43	8	0.75
37	Moss Hill Area	12.77	28	0.99		78	University Village	4.56	31	0.75
38	Newtown	37.11	35	0.71		79	Valley Wood	10.03	33	0.76
39	North Westside	47.34	28	0.96		80	Village at Tony Tank	27.07	40	0.79
40	Northpointe	100.85	24	0.91		81	Westwood Commerce Park	198.00	66	1.00
41	Northwood	224.31	32	0.70		82	Williams Landing	0.18	3	0.91

Note: NH= Neighborhood, SVI= Social Vulnerability Index

Neighborhood Rights-of-Way

Tree canopy coverage was also calculated within street rights-of-way and summarized by neighborhood **(Figure 5** and **Table 5**). Neighborhoods that have the highest tree canopy cover of over 50% often have conditions that benefit those statistics, including: legal rights-of-way for streets that are not yet built; single road through a wooded area; primarily private roads without rights-of-way; or the formal neighborhood boundary excludes major roads with low tree canopy. Fourteen neighborhoods have less than 1% tree canopy coverage in their rights-of-way: Shady Grove, Salisbury Commons, River Place, Marley Manor, Parkview Apartments, Aspen Hills, Misty Hallow, Chelsy Court, Briar Cliff, The Orchards, Ellington, and Aydelotte Farm. Neighborhoods with the lowest tree canopy coverage in their street rights-of-way may warrant future detailed review for new street tree planting.

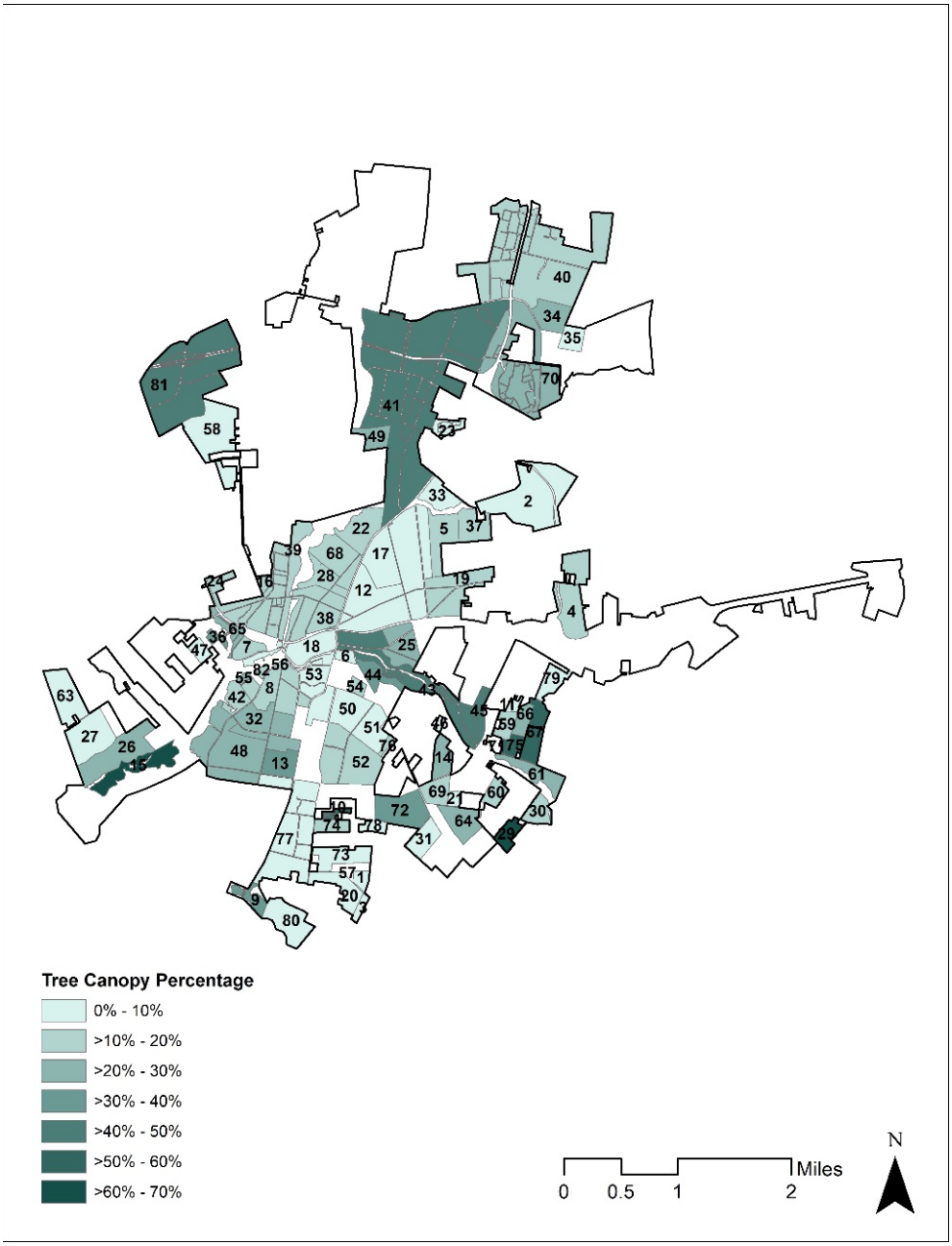

Figure 5: Tree Canopy Coverage in Rights-of-Way by Neighborhood

Table 5: Tree Canopy Coverage in Rights-of-Way by Neighborhood

Map Key	Neighborhood (NH)	Tree Canopy Acres	Percent of NH ROW with Tree Canopy Coverage	SVI		Map Key	Neighborhood (NH)	Tree Canopy Acres	Percent of NH ROW with Tree Canopy Coverage	SVI
1	Aspen Hills	0.004	0.19	0.75		42	Oak Hill	0.257	19	0.91
2	Aydelotte Farm	0.059	0.86	0.70		43	Park Area	8.514	47	0.99
3	Briar Cliff	0.006	0.48	0.79		44	Park Heights	1.548	35	0.80
4	Brittingham Square	0.278	11.00	0.70		45	Parkside	1.312	48	0.76
5	Bryn Mawr	1.950	18.66	0.99		46	Parkview Apartments	0.000	0	0.75
6	Buena Vista	0.103	6.97	0.80		47	Pemberton Manor	0.106	7	0.74
7	California	0.378	10.71	0.96		48	Pinehurst	7.059	29	0.91
8	Camden Heights	2.421	17.04	0.91		49	Poet's Colony	1.269	25	0.70
9	Canal Woods	1.049	31.70	0.79		50	Presidents Area	0.948	7	0.80
10	Cedar Crossing	0.097	59.40	0.75		51	Prince Street Area	0.726	10	0.80
11	Chelsy Court	0.001	0.41	0.76		52	Princeton Avenue Area	3.227	12	0.80
12	Church Street Area	1.964	7.93	0.99		53	PRMC Hospital	0.194	6	0.91
13	Clairmont	2.552	33.70	0.91		54	Rabbit Knaw	0.156	11	0.80
14	College Lane	0.238	25.07	0.75		55	River Oak	0.094	22	0.91
15	Cotton Patch Island	2.981	68.00	0.74		56	River Place	0.000	0	0.91
16	Coty Cox	0.050	10.23	1.00		57	Salisbury Commons	0.000	0	0.75
17	Doverdale	2.181	8.26	0.99		58	Sassafras Meadows	0.513	8	1.00
18	Downtown	0.865	5.41	0.96		59	Schumaker Glen	0.755	17	0.76
19	East Main Street Area	1.583	15.07	0.99		60	Schumaker Manor	0.538	12	0.75
20	Eireann Mohr	0.677	9.39	0.79		61	Schumaker Woods	1.865	23	0.76
21	Ellington	0.009	0.74	0.75		62	Shady Grove	0.000	0	0.75
22	Emerson Heights	1.359	14.32	0.71		63	Sleepy Hollow	0.333	4	0.74
23	Foxwood	0.000	6.25	0.70		64	South Johnsons	0.998	20	0.75
24	Gateway Village	0.033	14.85	1.00		65	South Westside	0.411	25	0.96
25	Glen Haven	2.521	24.39	0.99		66	Spring Chase	1.049	28	0.76
26	Handys Meadow	0.845	20.41	0.74		67	Stonegate	2.008	60	0.76
27	Harbor Pointe	0.751	7.19	0.74		68	Sumpter Point	1.273	14	0.71
28	Johnson's Lake	0.983	14.69	0.71		69	Tamarac	0.800	18	0.75
29	Johnsons Retreat	1.839	63.59	0.75		70	The Centre Mall	2.408	21	0.69
30	Mallard Landing	0.368	10.63	0.75		71	The Glade	0.010	59	0.76
31	Marley Manor	0.000	0.01	0.75		72	The Holly Center	0.134	36	0.75
32	Mid Camden	3.693	21.50	0.91		73	The Orchards	0.002	1	0.75
33	Middle Neck	0.010	1.68	0.70		74	The Seasons	0.442	10	0.75
34	Mill Pond	0.133	28.57	0.69		75	Tide Mill	0.866	56	0.76
35	Misty Hallow	0.009	0.28	0.69		76	Twin Parks	0.345	19	0.75
36	Mitchels Landing	0.041	38.25	0.96		77	University District	0.388	6	0.75
37	Moss Hill Area	0.501	10.54	0.99		78	University Village	0.009	7	0.75
38	Newtown	2.242	18.14	0.71		79	Valley Wood	0.291	9	0.76
39	North Westside	1.322	12.86	0.96		80	Village at Tony Tank	0.425	8	0.79
40	Northpointe	0.309	11.08	0.91		81	Westwood Commerce Park	6.761	47	1.00
41	Northwood	19.606	45.65	0.70		82	Williams Landing	0.051	16	0.91

Note: NH= Neighborhood, SVI= Social Vulnerability Index

Social Vulnerability

Social vulnerability refers to social conditions that can exacerbate environmental stresses on human health and wellbeing. The United States Centers for Disease Control and Prevention (CDC) has developed a Social Vulnerability Index (SVI) to quantify some of these factors. The SVI incorporates a variety of demographic variables under the categories of socioeconomic status, household composition and disability, minority status and language, and housing type and transportation. These variables are calculated at the census tract level. Census tracts within each state are compared to develop an SVI percentile rank. The ranking values range from 0 to 1, with higher values indicating greater vulnerability.

Census tracts in Salisbury have an SVI that ranges from 0.43 to 1.00, with 1.00 being the highest and most vulnerable rating in the Index (**Figure 6**). **Table 4** and **Table 5** indicate the SVI for each neighborhood. When a neighborhood crosses more than one census tract, the highest rated SVI was indicated. In the city, there are neighborhoods with high SVI that have very low tree canopy coverage, and neighborhoods with high SVI that also have relatively high tree canopy. The three neighborhoods with the lowest tree canopy also have a high SVI of 0.91. By contrast, Westwood Commerce Park has one the three highest levels of tree canopy coverage by neighborhood in the city and also has a high SVI of 1.00.

Areas of higher SVI can be more vulnerable to the negative human health and well-being effects of having less tree canopy and greenspace in the local environment. People living in high SVI neighborhoods may also have less flexibility in living location and less mobility to access areas of high tree canopy and greenspace. Neighborhoods of high SVI and low tree canopy should be considered a high priority for tree canopy increase.

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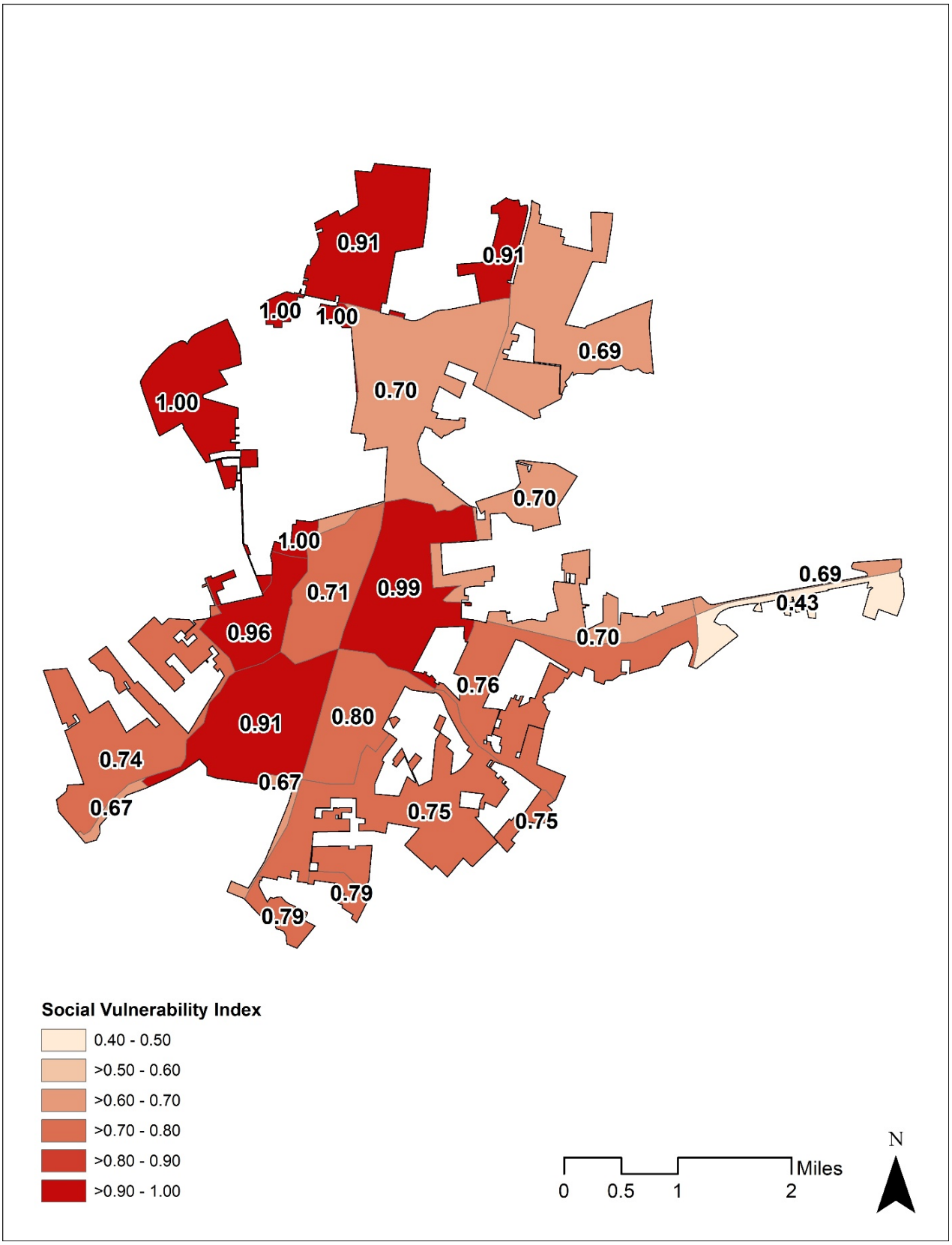

SVI Data Source: United States Centers for Disease Control and Prevention

Figure 6: Social Vulnerability Index

Zoning

Zoning tabulations of tree canopy can be useful to inform updates to City development policy, regulations, and standards associated with zoning categories. Tree canopy was calculated by zoning category (**Figure 7** and **Table 6**). As with many other cities, conservation and low-density residential zoning have both the highest percent tree canopy coverage and the highest total tree acreage. The Hospital District, River Redevelopment, Central Business, College and University, Select Commercial, and Regional Commercial zoning districts all had less than 15% tree canopy. The College and University District in particular, represents an opportunity for significant improvement. The Industrial Park District, Industrial District, and Light Industrial District zoning categories had collectively approximately 252 acres of canopy and a percent tree canopy coverage ranging from 30% to 34%. Industrial zoning have relatively permissive development regulations compared to other zoning categories. The future trajectory of the industrial zoning categories may have a significant impact on overall tree canopy in the City.

Table 6: Tree Canopy Coverage by Zoning Category

Map Key	Zoning Category	Tree Canopy Acres	Tree Canopy Percent
C	Conservation District	318.27	76
R1A	Residential R-10 A	334.85	65
PDD	Planned Development District	198.12	58
R10	Residential R-10	383.00	54
R8A	Residential R-8 A	367.80	48
R5	Residential R-5	114.03	46
PRD	Planned Residential District	230.77	44
R8	Residential R-8	289.94	39
R5A	Residential R-5 A	149.08	35
MNR	Mixed Use - Non-Residential District	32.60	35
IP	Industrial Park District	74.48	34
I	Industrial District	37.38	31
LI	Light Industrial District	139.92	30
OSR	Office & Service Residential	9.36	27
LBI	Light Business & Institutional District	59.95	21
OSH	Office & Service Highway	3.65	18
GC	General Commercial District	191.45	17
NB	Neighborhood Business District	12.74	17
RC	Regional Commercial District	25.45	14
SC	Select Commercial District	0.04	12
CU	College and University District	12.54	11
CBD	Central Business District	7.09	9
RRM	Riverfront Redevelopment Multiuse District	3.40	7
H	Hospital District	0.98	3

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Figure 7: Tree Canopy Coverage by Zoning Category

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Plantable Areas

A combined desktop and field assessment effort was undertaken to identify significant opportunities for reforestation of undeveloped or underutilized land on publicly owned parcels with an emphasis on City parks. The primary objective was to identify candidates for reforestation, especially the largest available unforested areas and areas bordering the longest length of stream.

Desktop Assessment

Sixty-eight publicly owned sites, comprised of public parks, schools, and paper streets, were analyzed in a desktop assessment using the 2018 land cover data. Potentially plantable area for new trees was defined as the non-tree vegetation land cover class, with existing sports fields and major utilities removed. In select parcels, where the City indicated that impervious surface was intended to be removed in the future, were also included in the potentially plantable area. A weighted scoring system was employed to rank sites for planting opportunities and for field assessment. Four metrics were applied in the following categories.

- Total plantable area: to evaluate general opportunity for additional trees
- Total plantable area within 100’ of streams and rivers: to incorporate opportunity for water quality and riparian enhancement
- Habitat connectivity: to evaluate potential increase in forest habitat connectivity from additional tree planting
- Neighborhood tree canopy coverage: to identify sites in neighborhoods with the greatest need for additional tree canopy

The highest scoring sites have the most potentially plantable area overall and within stream buffers, have the greatest potential to improve habitat connectivity, and are located in low tree canopy neighborhoods (**Figure 8**). Schools were not included in the field assessment, as their property ownership structure will require additional parties to be involved to discuss potential new tree plantings. However, several school sites scored high in the desktop assessment and could be considered for additional review and discussion in the future. The 15 highest scoring parks and non-school municipal sites were selected for field assessment.

Detailed scoring for each site can be found in **Appendix B.**

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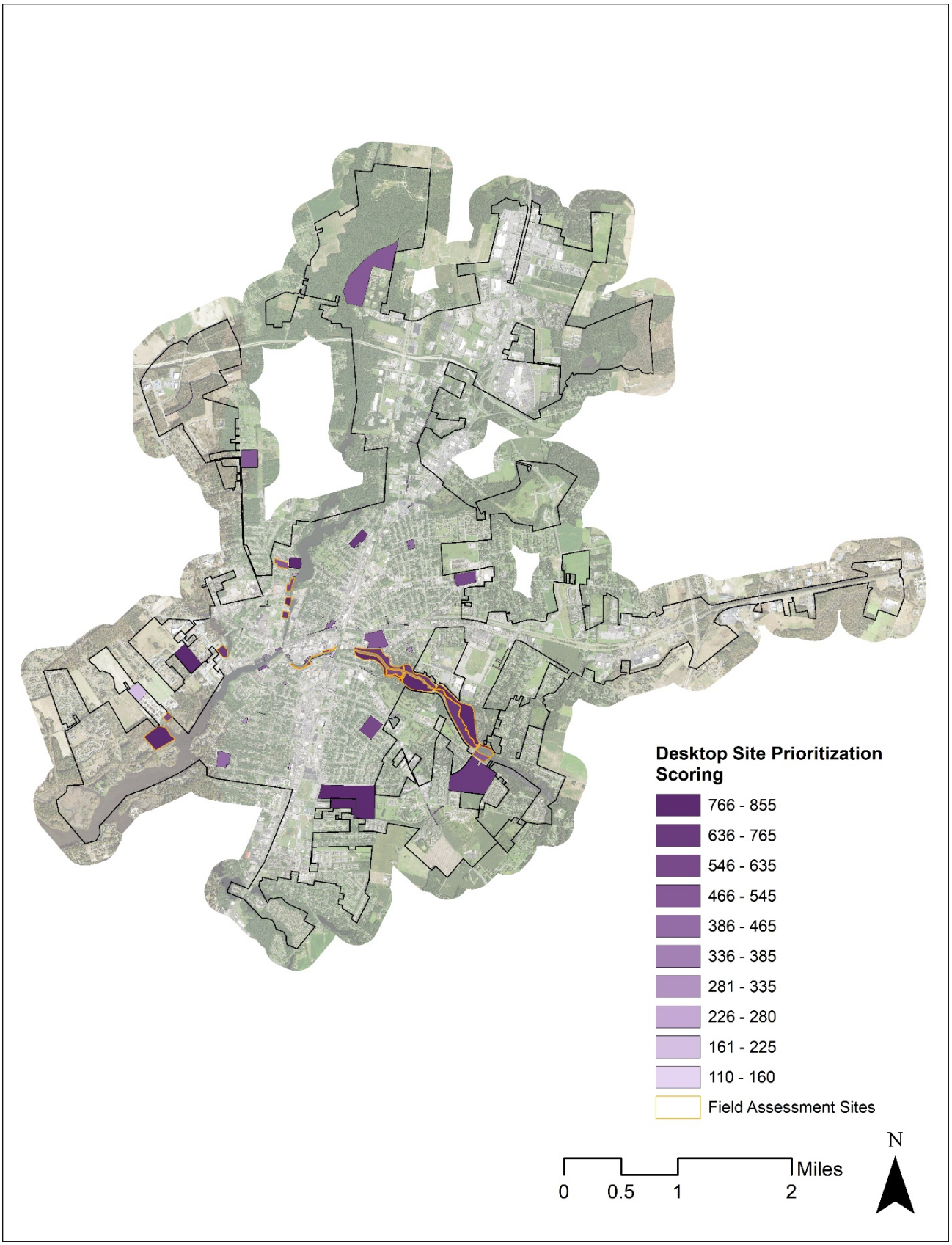

Figure 8: Plantable Area Desktop Assessment for City Parcels

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Field Assessment

A modified version of the Urban Reforestation Site Assessment (CWP, 2006) was used to field assess 15 plantable areas identified via the desktop assessment. These sites are highlighted in **Figure 8.** The assessment evaluated (1) planting viability by evaluating vegetation, soils, slopes, and site hydrology; (2) site constraints owing to current/planned uses, access, utilities, wetlands, required setbacks, and aesthetics issues; and (3) potential benefits evidenced by wildlife, invasive species, and total area available for forest planting. Other opportunities to improve existing vegetative conditions, remove invasives, and/or restore wetlands and other natural habitats were also identified and impacts of sea level rise were considered.

The field assessment data was utilized to identify the top plantable sites. Specifically, plantable sites were evaluated for the following metrics:

- Field Verified Plantable Area
- Feasibility
    - Access: Evaluated ability for heavy equipment to easily access the site; space for stockpiles, etc.
    - Site Prep: Based on amount of preparation needed to conduct planting. Factors such as severe compaction and extensive invasive species removal were taken into account.
    - Water Source: Based on readily accessible source to water plantings.
    - Site Conflicts/ Planting Constraints: Included utilities and existing use conflicts.
- Volunteer Opportunity: Evaluated readiness and appropriateness of site for volunteer plantings.

Detailed scoring for each site can be found in **Appendix C.**

Plantable Areas Concepts

The results of the field assessment evaluation were used to develop concepts for the top four sites: Lake Street Park and Playground, Lower Northside City Park, Riverwalk (Southside), and Waterside Park and Playground (**Figure 9**).

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Figure 9: Photos Depicting Conditions at the Plantable Areas Concept Sites (Upper Right: Lake Street Park and Playground, Upper Left: Lower Northside City Park, Lower Right: Riverwalk (South), and Lower Left: Waterside Park and Playground)

Concepts can be found in **Appendix E** and consist of a summary of onsite conditions and planting opportunities, including planting recommendations (species, number, location, etc.). Additional onsite recommendations were made related to management of existing vegetation and invasive species, and sea level rise, where appropriate. Planting recommendations for each site are based on four types of plantings:

- Riparian Native Flowering/Ornamental Trees: These understory trees are intended for application in heavier use areas with trails and walking paths; riparian is generally defined as the area within 100' of water's edge; trees within riparian areas were selected based on ability to tolerate the more frequent periods of inundation that will accompany increasing sea level rise.
- Riparian Native Shade Trees: For application where greater canopy coverage and/or shade is feasible and/or desirable; riparian is generally defined as the area within 100' of water's edge; trees within riparian areas were selected based on ability to tolerate the more frequent periods of inundation that will accompany increasing sea level rise
- Upland Native Flowering/Ornamental Trees: These understory trees are intended for application in heavier use areas with trails and walking paths for areas outside of riparian area

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- Upland Native Shade Trees: For application where greater canopy coverage and/or shade is feasible and/or desirable in areas outside of the riparian area.

Specific planting recommendations for each of the four planting types are provided in **Appendix D** and photos illustrating a tree species from each category is provided in **Figure 10**.

Figure 10: Select Tree Species from Each of the Four Planting Types (Upper right: Riparian Ornamental - Pawpaw, Upper Left: Riparian Shade – American elm; Lower right: Upland Ornamental – Flowering dogwood ; Lower left: Upland Shade – White oak) (Source: USDA-NRCS PLANTS Database)

Within these four planning types there are two generalized recommended planting densities:

- Landscape In-fill: Trees planted between existing vegetation and infrastructure to fill gaps in the tree canopy. Typical land cover/use is maintained as park/grass and trees are planted generally on center at 30’ minimum spacing for shade trees and 20’ spacing

for understory trees. Appropriate species selection (shade vs. understory) is relative to any height restrictions based on overhead utilities.

- Reforestation: Trees planted to convert land use/cover to unmaintained forest area and planted on center at maximum 20' spacing. Species selection should be a mixture of shade trees and understory.

Sea Level Rise Considerations

Several of the areas that were mapped as part of the Tree Canopy Study fall within riparian areas subject to fluctuations in water level. The Wicomico River and its tributaries are impacted by tidal influence as well as large storm events that are becoming more frequent. Projected Sea Level Rise is also a concern as it will amplify seasonal flooding in these same areas. Maryland natives, indigenous to the Coastal Plain, are recommended in the plantable areas, specifically those species that can tolerate inundation and the low oxygen characteristics of compacted soils. These include but are not limited to Bald Cypress (*Taxodium distichum*), River Birch (*Betula nigra*), and Willow Oak (*Quercus phellos*).

Impervious Acre Credit

As part of the Clean Water Act, the City of Salisbury is a National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Separate Storm Sewer System (MS4) permit (Phase II MS4 Permit) holder. The Phase II MS4 Permit includes a Chesapeake Bay TMDL restoration requirement that requires the City to "commence restoration efforts for twenty percent of existing developed lands that have little to no stormwater management" (MDE, 2018). Reforestation is one of several options that the City can leverage to address its Chesapeake Bay TMDL restoration requirement.

According to Maryland Department of the Environment's (MDE) guidance document, *2014 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* (2014 Accounting Guidance Document) and the Phase II MS4 Permit, "Reforestation on Pervious Urban" receives an impervious acre equivalent of 0.38. The 2014 Accounting Guidance Document further specifies that reforestation must have a survival rate of 100 trees/acre or greater and at least 50% of trees have two-inch diameter or greater (4.5 ft. above ground). **Table 7** estimates the potential impervious acre credit from the four concept sites.

Table 7: Estimated Impervious Acre Credit for Four Concept Sites

Site Name	Estimated Plantable Acres	Estimated Impervious Acre Credit
Lower Northside City Park	4.36	1.66
Waterside Park and Playground	1.75	0.67
Riverwalk (Southside)	0.47	0.18
Lake Street Park and Playground	1.58	0.60
TOTAL	**8.16**	**3.10**

Potential Tree Canopy Goal

Based on the unknowns and challenges described, this study recommends a no-net loss tree canopy goal for the city. Additionally, this study recommends that the City set a specific acreage goal for new forest planting that will be managed to maturity. New forest planting acreage can be more directly influenced, can be tracked annually, and can more easily rally immediate

momentum than city-wide tree canopy statistics where there is a time-lag in results and a myriad of factors influencing the outcome. That new tree planting acreage can be targeted in areas for the greatest ecological and human health benefit as this study has begun to identify. While percent city-wide tree canopy coverage is a useful metric, the function of that the urban forest in meeting the needs of the City and its ecosystems should be a focus. In tree canopy analysis, potential new tree planting acreage is considered equivalent to potential future tree canopy from a planning perspective. It represents area that can be planted with trees at a size and density to achieve a connected canopy at maturity.

With no loss of existing canopy, to increase the City's tree canopy by 1% requires approximately 33.3 acres of new forest cover. The four concepts in this study represent 8.16 acres of estimated plantable area. If that plantable area is fully reforested, that represents approximately 8.16 acres of potential future forest cover. However, there is a time lag for that forest to mature and represent actual tree canopy. The other 64 publicly owned sites from the desktop assessment identified approximately another 67 acres of potentially plantable area. The over 2,000 acres of non-tree vegetation on private land presents still more opportunity.

While this study comprises a comprehensive analysis of the City tree canopy, there are unknowns that present challenges in predicting the trajectory of the City tree canopy and identifying an informed goal for a significant net tree canopy increase. Understanding tree canopy trends from past years is important to developing future scenarios, particularly with respect to zoning and development impacts on tree canopy. A 2011 tree canopy assessment for the City by the University of Vermont determined 2,670 acres of tree canopy. This study calculated 3,249 acres of tree canopy in 2018 which would represent a significant increase of 579 acres from 2011. However, the GIS files and accuracy assessment statistics from the previous 2011 study are not available to do a comparative analysis of where gains and losses occurred in those years. This kind of analysis could determine whether the acreage increase was from infill and maturing of existing forest versus expansion of forest into unforested parcels, and to determine the possible range of increase based on the statistical accuracy of the 2011 and 2018 canopy assessments. Some more recent assessments were also done by the City but did not include an accuracy assessment. Additionally, the mortality rate and removal rate of trees in in rights-of-way and public lands is unknown. The percentage of tree species in the City at high risk from pests or disease, such as ash species at risk from emerald ash borer is an additional factor that lacks data. An inventory of trees on City-owned land will help to address this data gap.

Often, urban forests in developing cities require programs for active tree planting and management of those trees to maturity just to maintain a steady city-wide tree canopy coverage. Generally, there are scenarios where there is tree canopy decrease on private land over time that can be offset by tree canopy increase on preserved public land. Development of a single large parcel can offset tree canopy gains from growth and new planting throughout a city. Moreover, outside of naturally regenerating forest stands, trees must be planted to offset tree mortality. In the urban public realm, that can be challenging. Based on a meta-analysis of 16 other studies, Roman and Scatena (2011) note that in a typical U.S. city, for every 100 street trees planted, 50 or fewer will survive to 13-20 years. Circumstances can vary from these statistics, but the study illustrates the potential difficulty in achieving mature tree canopy in urban areas.

An update to the tree canopy analysis in three to five years could then accurately identify trends in tree canopy gain and loss, assess the progress in the new planting acreage goal, and establish a more informed long-term tree canopy goal.

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Recommendations

Successful implementation of a tree canopy program will require the City to address the following overarching principals:

1. Prevent loss of tree canopy as parcels are developed
2. Maintain and expand tree canopy on City-owned/operated parcels
3. Encourage landowners to expand tree canopy on private lands

Recommendations were developed with these overarching principals in mind. Specific recommendations for protecting and enhancing tree canopy in the City are described below and are organized as Programmatic, Privately-Owned Property, City Funded Efforts and Partnerships, and Plantable Areas on Public Property. **Table 9** summarizes the recommendations, identifies overarching principals addressed and indicates priority for implementation as high, medium, or low.

Programmatic

Adopt Tree Canopy Goal: The City should adopt a tree canopy goal to enable the City to initiate plans and make policy decisions that work towards maintaining and increasing. As previously discussed, a no net loss tree canopy goal is currently recommended based on available data and analysis. Additionally, the City should set a specific acreage goal for new forest planting that will be managed to maturity. New planting acreage can be more directly influenced, can be tracked annually, and can more easily rally immediate momentum than city-wide tree canopy statistics where there is a time-lag in results and a myriad of factors influencing the outcome. That new tree planting acreage can be targeted in areas for the greatest ecological and human health.

Modify Zoning Code: The City is in the process of an update to the Zoning Code. As part of these updates, the City should consider the following modifications to prevent loss of tree canopy as development occurs, add shade trees to new development/redevelopment projects, and provide funds for tree plantings and maintenance on City-owned property.

> Establish a No Net Loss of Tree Canopy Requirement: This provision would require that tree canopy removed as a result of development must be replaced onsite, off site, or a fee in lieu must be paid to the City to replace the trees removed. The City should establish a designated fund for the in-lieu fees to be used to plant and maintain trees on City-owned land. Earlier in 2020, Frederick County passed a no net loss ordinance (Forest Resource Ordinance, Bill 20-08) in response to seeing more than 450 acres of forest lost from 2012 to 2019. Tracking should include acreage of tree removal from development from site plan permits.
>
> Create Minimum Tree Canopy/Shading Requirement: In addition to preventing a loss of tree canopy to new development/redevelopment, this requirement, in combination with the no net loss, could work to increase the City's tree canopy as a result of development. An example of a similar requirement from Manassas, VA is provided in **Table 8**.

Table 8: Manassas, VA Minimum Tree Canopy/Tree Cover Requirements (City of Manassas Code of Ordinances, Sec. 130-217)

Zoning District	Minimum Percent Coverage
A-1, R-1, R-2, R-2-S, R-3, R-4	20%
R-5, R-6, R-7, B-3.5 (residential), PMD (residential)	15%
B-1, B-2, B-3.5 (non-residential or mixed-use), B-4, I-1, I-2, PMD (non-residential or mixed-use)	10%
B-3, I-A	None

Require Street Trees: Requiring development projects to add street trees will bring numerous benefits to residents including traffic calming and increased property value over time. Example language from Arlington County's Landscape Standards (2017):

> *Street trees: All properties requiring site landscaping shall include major deciduous trees at the minimum rate of one for every 35 feet along any property line abutting public right-of-way. The requirement maybe satisfied by planting trees within the public right-of-way at a location to be designated by the zoning administrator or, alternatively, such trees shall be planted on site within the front yard setback.*

Privately-Owned Property

Investigate Stormwater Management Utility Fee Credit: The City's current stormwater utility fee is a flat $20 for residential properties while commercial properties are based on the amount of onsite impervious cover. An incentive program could be built into the City's existing credit program to provide a small credit or discount for native shade trees planted on existing commercial properties.

Leverage Existing Tree Giveaway/Coupon Programs: Several programs exist in Maryland that provide low cost or free trees to homeowners. Maryland Department of Natural Resources' Marylanders Plant Trees, provides a coupon for $25 off the purchase of a native tree at 86 participating nurseries across the State while the Lawn to Woodland program, administered by the Maryland Forest Service in collaboration with the National Arbor Day Foundation, provides outreach and no-cost tree planting supplies to landowners with one-to-five acres of plantable space. To improve the distributional equity of tree canopy across the City, efforts to distribute should be focused on neighborhoods with the lowest tree cover as previously depicted in **Figure 4 and Table 4.**

Initiate a Public Education Program: Increasing and maintaining tree canopy on existing lots will require support from the public. A social media/ outreach campaign should be initiated to increase awareness of the benefits of trees, the City's new tree canopy goal, and help homeowners understand the importance of tree selection and siting. A graphic from the Arbor Day Foundations Right Tree, Right Place program is provided in **Figure 11.** Additionally, this program could be expanded over time to improve homeowners' understanding of stream buffers and how to preserve and enhance the stream buffers in their backyards. Fairfax County's Watch the Green Grow program uses an ArcGIS StoryMap to encourage homeowner implementation of environmental-friendly practices such as planting a tree and stopping yard waste dumping in the stream buffer:
https://storymaps.arcgis.com/stories/2f0d7b9a53ed403a92a8bbda1befc5e1

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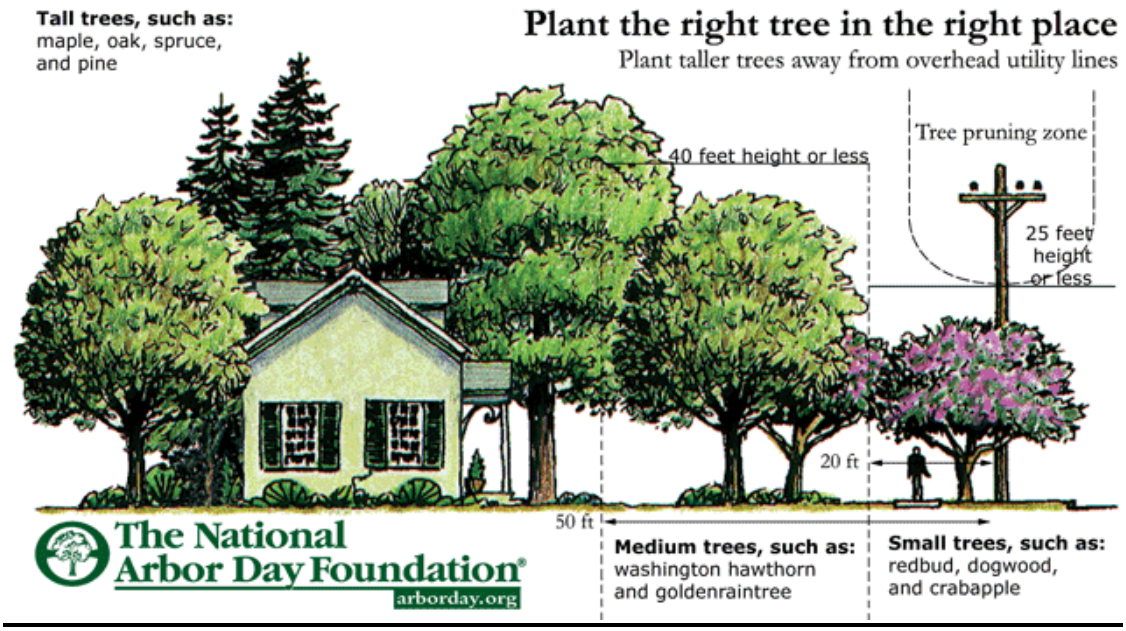

Figure 11: Right Tree Right Place Educational Campaign (Source: Arbor Day Foundation)

City Funded Efforts and Partnerships

Integrate Trees with Capital Improvement Projects and Restoration Opportunities: Whenever possible, the City should encourage the use of trees in Capital Improvement Projects such as street repair or restoration opportunities such as the installation of a new bioretention facility.

Pursue Opportunities to Partner with Wicomico County Public Schools and Salisbury University: Wicomico County Public Schools and Salisbury University are large landowners within the City boundary and potentially offer significant open space available for tree planting. Engaging schools and the University in tree canopy protection/enhancement projects can provide connectivity, increase the quality and width of stream buffers, improve water quality and provide habitat for target species. Potential plantable areas were identified in the Desktop Assessment discussed earlier in this document.

Inventory Existing Trees on City-owned Property: The City should conduct an inventory to maintain and enhance trees on City-property, including street trees. The age, type, and condition of trees should be noted so that maintenance and replacement can be completed as necessary. Tracking should also include tree mortality and removal rates over time so the City can anticipate the replacement rate needed to maintain tree canopy on City-owned land. The City should begin its effort in neighborhoods with the lowest tree canopy coverage in their street rights-of-way to identify potential tree replacement and new tree planting opportunities in these areas. As mentioned earlier in the report, the percentage of tree species in the City at high risk from pests or disease is unknown and an inventory would help to fill these data gaps.

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Plantable Areas on Public Property

Pursue Funding to Implement Plantings for Priority Sites Identified in Concepts: The four sites identified in the concepts (see **Appendix E**) are priority sites for making progress towards the City's tree canopy goal. Maryland has several funding and incentive programs in place to support the expansion and maintenance of tree canopy programs (UMD EFC and ACB, 2019). Funding is available via grants administered by the Maryland Urban and Community Forestry Committee, the Chesapeake Bay Trust, and the Chesapeake and Coastal Bays Trust Fund.

Pursue Funding for Additional Plantable Areas on City-Owned Property: The desktop and field assessment evaluated plantable areas beyond the four that went to concept. The City should continue to pursue funding for these additional City-owned sites. Additionally, the City should direct and oversee volunteer planting efforts at these sites. General scoring for volunteer planting suitability is provided in **Appendix C**. Volunteer suitability scoring takes into account site readiness and appropriateness of the site for volunteers. The sites that scored the highest for volunteer planting suitability include:

- Lower Northside City Park
- Upper Northside City Park
- Lower Southside City Park
- Waterside Park and Playground
- Riverwalk (Northside)
- Riverwalk (Southside)
- Lake Street Park and Playground

Prioritization of plantable areas should also take socially vulnerable areas (**Figure 6**) into account. Addressing socially vulnerable areas may open up additional funding opportunities to the City for tree canopy expansion. For example, the TD Green Space Grant gives preference to areas that serve low- to moderate-income residents (https://www.arborday.org/programs/tdgreenspacegrants/eligibility.cfm).

Plan and Fund for Tree Maintenance: As the City's tree inventory expands and grows the City should identify and earmark funds to provide for consistent funding of proactive tree maintenance such as tree pruning and replacement. Funding sources could include in-lieu fees, permit review fees, and/or earmarked capital improvement funds.

Table 9: Summary of Recommendations

Recommendation	Overarching Principal Addressed[1]	Priority (High, Medium, Low)
Programmatic		
Adopt Tree Canopy Goal	1, 2, 3	High
Modify Zoning Code	1	High
Privately-Owned Property		
Investigate Stormwater Management Utility Fee Credit	3	Low
Leverage Existing Tree Giveaway/Coupon Programs	3	Medium
Initiate a Public Education Program	3	High
City Funded Efforts and Partnerships		

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Recommendation	Overarching Principal Addressed[1]	Priority (High, Medium, Low)
Integrate Trees with Capital Improvement Projects and Restoration Opportunities	2	High
Pursue Opportunities to Partner with Wicomico County Public Schools and Salisbury University	2	Low
Inventory Existing Trees on City-owned Property	2	Medium
Plantable Areas on Public Property		
Pursue Funding to Implement Plantings Identified in Concepts	2	High
Pursue Funding for Additional Plantable Areas on City-Owned Property	2	Low
Plan and Fund Maintenance	2	Medium

1: Overarching Principals:

1. Prevent loss of tree canopy as parcels are developed
2. Maintain and expand tree canopy on City-owned/operated parcels
3. Encourage landowners to expand tree canopy on private lands

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Appendix A: Tree Canopy Classification Methodology

Land cover was derived from publicly available United States Department of Agriculture (USDA) National Agricultural Imagery Program (NAIP) high-resolution aerial imagery from 2018, which was the most recent data available for the study area. Aerial imagery was "leaf-on," 4-band Red, Green, Blue, Near Infrared (R,G,B,NIR), and at 0.6 meter by 0.6 meter resolution. Imagery collection for full coverage of the City spanned two dates, August 15, 2018 and November 14, 2018. Because of the change in vegetation between August and November, imagery from each date was classified separately. The most recently available lidar data was from 2012, publicly available from the State Office of the USDA Natural Resources Conservation Service (NRCS). It was determined that this lidar data was too old to use as a primary source for land cover classification, however it was used for selective corrections.

A supervised, object-based classification was implemented using ArcGIS Pro software. Research and comparisons of land cover classification approaches have demonstrated that object-based methods can improve accuracy levels by 10-15% over pixel-based classification (Aplin and Smith 2008). An initial test was conducted for this study area, through an urban to rural transect sample, and demonstrated an initial approximately 10% greater accuracy with the object-based approach. Iterations and testing of different options within an object-based methodology, with visual and statistical accuracy review of the tests, yielded the following basic process for classification.

- R, G, and NIR bands were used for initial segmentation.
- A stack of 6 rasters was used for classification.
    - Four rasters (R,G,B,NIR) came directly from the NAIP imagery.
    - A fifth band was a normalized difference vegetation index (NDVI) derived from the NAIP imagery.
    - The sixth band was derived from NAIP imagery to create a texture raster. The intent of the texture raster is to help differentiate between the more variable texture of tree canopy and the more consistent texture of lawn and other non-tree vegetation. To create the texture raster each segment was used as a region of calculation. Within each segment a range statistic was applied to the G and the NIR bands. The average of the two values created a texture value.
- Six classes were trained for classification. Shadows were placed into a separate class for greater accuracy.
    - Tree canopy
    - Non-tree vegetation (all vegetated areas without tree canopy)
    - Non-vegetation (all surfaces without plant material, such as paving, buildings, water, and bare soil)
    - Shadows on and within tree canopy
    - Shadows on non-tree vegetation
    - Shadows on non-vegetation.
- The Random Trees classifier was applied.
- The six separate classes were assembled into three classes: tree canopy, non-tree vegetation, and non-vegetation.

- A preliminary accuracy assessment was conducted for August 2018 and November 2018 separately to direct further refinements.
- 2012 lidar was used for selected adjustments to further improve differentiation between tree canopy and non-tree vegetation.
    - First returns and ground returns were used to derive digital elevation and digital surface models. The elevation and surface models were used to calculate object heights over six feet.
    - Planimetric building data from the City was used to remove building objects leaving primarily tree cover.
    - Visual inspection of 2018 and 2012 aerial imagery identified areas of significant change, which were removed from the lidar data.
    - Areas of high concentration of lidar data indicating trees were used to adjust segments in specific areas of the City. Visual and statistical review helped to identify where to make these changes.
- Manual corrections were implemented in selected areas of highest confusion, referencing the 2018 aerial imagery.
- August 2018 and November 2018 were assembled into a single raster.
- A final accuracy assessment was conducted using 750 sample points, stratified by three classes and the two source imagery areas.

The final land cover classification demonstrates a 94.27% overall accuracy and a 0.9136 kappa coefficient (**Table A-1**). Kappa coefficient is a widely accepted metric to evaluate land cover classification agreement with a reference image. It measures how much better the classification is than what would be expected from random chance. A value of 0.80 or greater represents very good agreement with values of 0.90 and greater even stronger in agreement.

Table A-1: Land Cover Classification Accuracy Assessment

Land Cover Class	Tree Canopy	Non-Tree Vegetation	Non-Vegetation	**Row Total**	**Users Accuracy**	
Tree Canopy	**243**	21	3	267	91.01%	
Non-Tree Vegetation	9	**198**	3	210	94.29%	
Non-Vegetation	1	6	**266**	273	97.44%	
Column Total	253	225	272	**750**		
Producers Accuracy	96.05%	88.00%	97.79%		**94.27%**	**Overall Accuracy**
					0.9136	**Kappa Coefficient**

Appendix B: Plantable Areas – Desktop Methodology

Sixty-eight publicly owned sites, comprised of public parks, schools, and paper streets, were analyzed in a desktop assessment using the 2018 land cover data. "Potentially plantable area" consisted of non-tree vegetation landcover with utilities (based on available GIS data) removed and sports fields removed. Based on the city's description of planned future actions, the following three sites also considered future removal of paving and structures as potentially plantable area: Service center parking lot on Lake St, field operations utilities department at Lake St and W Isabella St, and the former Salkap property at 317-325 Lake St. All other sites considered impervious surface to not be potentially plantable area.

Table B-1 describes the metric and scoring system. **Table B-2** presents the results of the scoring.

The metric used to calculate connectivity was the "effective mesh" metric (Spanowicz and Jaeger 2019). The effective mesh metric measures the average area of contiguous tree canopy available to an individual animal if they were dropped on the site in a random location. This metric considers roads and other impervious surfaces to be a habitat fragmenting break between tree canopy patches.

The Jenks Natural Breaks data clustering method is used to group calculations for A through D into scores 1 (low) through 10 (high) for each indicator. This cluster method is commonly used in spatial analysis. It maximizes the numerical differences in values between groups, while minimizing the differences within groups. This method is useful for comparing values within a unique data set and finding distinctive numerical clusters within the data range. In this study it is particularly beneficial to find sites that are uniquely high scoring.

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Table B-1. Plantable Areas Prioritization Metric

Indicator Label	Multiplier	Indicator	Field Names	Notes
A	45	Plantable Area	A_AREA_SF= Calculation result for this indicator. A_SCORE= Score for this indicator.	Total potentially plantable area within a site, in square feet units. The greater the total potentially plantable area, the higher the score.
B	35	Plantable Riparian Area	B_AREA_BUFFER_SF= Calculation result for this indicator. B_SCORE= Score for this indicator.	Total potentially plantable area (as defined in Indicator A), in square feet units, within 100' of stream edges, centerlines of small streams, and ponds. The greater the total plantable area in this indicator, the higher the score. This indicator relates to potential to improve water quality and riparian habitat.
C	10	Connectivity (Effective Mesh)	C_CONNECTIVITY_CHANGE= Calculation result for this indicator. C_SCORE= Score for this indicator.	This indicator looks not just at total tree canopy, but how connected that tree canopy is within the site. If all potentially plantable area (as defined in Indicator A) were to be reforested, this indicator measures the increase in tree canopy connectivity from current condition to the future reforested condition. This indicator factors in existing tree canopy within the site. The greater the increase in connectivity for this indicator, the higher the score.
D	10	Neighborhood Tree Canopy Context	D_NH_TREE_CANOPY= Calculation result for this indicator. D_SCORE= Score for this indicator.	In this indicator, sites in neighborhoods with the lowest existing tree canopy are considered to have the greatest need for additional tree canopy. Sites in neighborhoods with the lowest percentage of tree canopy receive the highest score.
SUM	**100**	**Summary Score**	**SUM_SCORE= Summary score with multiplier applied.**	**Summary Score potential scores range from 100 (lowest) to 1000 (highest). Multipliers are applied to each indicator (A through D) to weight their relative contribution to the Summary Score.**

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Table B-2. Plantable Areas Prioritization Metric Results

Note: Dark green highlight indicates sites selected for field assessment.

SITE_ID	SITE_NAME	A_SCORE	B_SCORE	C_SCORE	D_SCORE	SUM_SCORE
28	Upper Southside City Park	9	10	8	2	855
40	Pemberton Elementary	9	9	6	6	840
30	Lower Northside City Park	9	8	10	2	805
47	WWTP- Soil Stockpile	10	7	9	2	805
36	Chipman First Grade Center	8	8	6	9	790
44	Field Operations Utilities Department	7	9	7	9	790
39	James M Bennett Senior High School	10	7	4	5	785
25	Upper Northside City Park	8	9	7	2	765
38	North Salisbury Elementary	8	9	3	6	765
27	Lower Southside City Park	8	8	10	2	760
13	Waterside Park and Playground	8	8	8	3	750
42	Parkside High School	10	5	5	7	745
43	Former Salkap- 317 to 325 Lake St	7	7	7	9	720
34	East Salisbury Elementary School	10	1	6	9	635
37	Prince Street Elementary School	8	4	3	9	620
29	Picnic Island	6	7	6	2	595
45	Service Center Parking Lot	7	4	5	9	595
4	Riverwalk (Northside)	5	7	2	10	590
24	Riverwalk (Southside)	5	7	2	10	590
46	WWTP- CAC Permit Conversion	7	5	7	2	580
35	West Salisbury Elementary School	10	1	5	1	545
26	Ward Museum	6	6	3	2	530
18	Lake Street Park and Playground	7	1	6	9	500
20	Market Street Park	4	6	2	9	500
3	Naylor Mill Walking/Bike Trail	7	1	8	7	500
12	Riverside Boat Ramp	4	6	1	10	500
33	Wicomico Middle School	9	1	4	2	500
32	Marina Riverwalk Park	4	5	1	10	465
41	Pinehurst Elementary	8	1	5	2	465
49	Paper Street- A	5	3	2	9	440
16	Doverdale Park and Playground	6	1	4	8	425
61	Paper Street- H	6	1	5	7	425
58	Paper Street- F	7	1	4	3	420
64	Paper Street- K	4	4	2	7	410
6	Jeanette P. Chipman Boundless Park and Playground	6	1	3	7	405
55	Paper Street- C	6	1	7	1	385
62	Paper Street- I	5	1	5	7	380
23	Memorial to War Veterans	4	2	4	8	370
11	Newtown Park	3	3	1	10	350
52	Paper Street- B	4	1	4	9	345
50	Paper Street- Linwood Ave A	4	1	3	9	335
15	Newtown-Camden Tot Lot Park and Playground	4	1	5	6	325
7	Monument Park	4	1	5	5	315
21	Elizabeth W. Woodcock Park and Playground	4	1	6	4	315
8	Riverwalk Park	2	3	1	10	305

SITE_ID	SITE_NAME	A_SCORE	B_SCORE	C_SCORE	D_SCORE	SUM_SCORE
31	Port of Salisbury Marina	2	3	1	10	305
2	Comfort Safety Zone Playground	3	1	2	9	280
9	Rose Street Boat Ramp	2	2	3	9	280
53	Paper Street- Raymond Rd	3	1	4	7	280
17	City Peace Monument Park	3	1	3	7	270
66	Paper Street- L	2	1	5	9	265
59	Paper Street- Healthway Dr	2	1	1	9	225
22	Clairmont Park	2	1	3	6	215
1	Westside Little League Park	3	1	2	2	210
19	Riverwalk Amphitheater	1	1	2	10	200
63	Paper Street- J	1	1	5	7	200
67	Paper Street- M	1	1	2	10	200
51	Paper Street- Grier Ave	2	1	1	5	185
65	Paper Street- Linwood Ave B	1	1	1	9	180
54	Paper Street- Elm St	1	1	1	8	170
5	Robins Nest Park	1	1	1	7	160
14	Johnson Lake Neighborhood Playground	1	1	2	5	150
10	Monument Square	1	1	1	5	140
48	Paper Street- Catherine St	1	1	1	4	130
56	Paper Street- D	1	1	2	3	130
57	Paper Street- E	1	1	1	4	130
68	Paper Street- Johnson Rd	1	1	1	3	120
60	Paper Street- G	1	1	1	2	110

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Appendix C: Plantable Areas – Field Assessment Methodology and Results

For the field assessment, a modified version of CWP's Urban Reforestation Site Assessment (CWP. 2006) was used to collect data for 15 plantable areas as identified in the desktop assessment. Data was collected on tablets using ESRI's Survey123 platform. A description of the fields collected are provide in **Table C-1**. Prioritization of the plantable areas using field assessment results are provided in **Table C-2.**

Table C-1: Field Descriptions

Field Name	Description	Field Type and Options
Location	Plantable area site name	Select from list: Site names
Property	Property owner type	Select from list: City or Private
Landuse	Land use type	Text Entry
CliZone	Climate: USDA Plant Hardiness Zone	Prepopulated with hardiness zone 7b
CliSun	Climate: Sunlight Exposure	Select from list: Full sun (>= 6 hours per day direct sun) Part sun or filtered light (< 6 hours per day direct sun) Shade (< 3 hours per day direct sun)
CliMicro	Climate: Microclimate	Select from list: High wind exposure Re-reflected heat load Other
ClMicroOth	Climate: Microclimate Other	Text entry Description for Other entry
TopLow	Topography: Low Lying Areas Present	Select from list: Yes/No
TopNote	Topography Notes	Text entry
VegRegion	Vegetation: Regional Forest Association	Text entry
VegCur	Vegetation: Current Vegetative Cover	Check all that apply: Mowed Turf Other Herbaceous None Trees or Shrubs
VegMowP	Vegetation: % mowed turf present onsite	Integer Field appears when Mowed Turf is selected from Current Vegetative Cover list
VegOthHerb	Vegetation: % other herbaceous vegetation present onsite	Integer Field appears when Other Herbaceous is selected from Current Vegetative Cover list
VegNoneP	Vegetation: % of no vegetation cover present onsite	Integer Field appears when None is selected from Current Vegetative Cover list
VegTreeP	Vegetation: % trees or shrubs present onsite	Integer Field appears when Trees or Shrubs is selected from Current Vegetative Cover list

Field Name	Description	Field Type and Options
VegTreeLis	Vegetation: List tree or shrub species to be preserved	Text entry Field appears when Trees or Shrubs is selected from Current Vegetative Cover list
VegInv	Vegetation: Asks if Are invasive plants or noxious weeds present?	Select from list: Yes/No
VegInvSpec	Vegetation: Note invasive species	Text entry Field appears when Yes is selected for invasive species presence
VegInvP	Vegetation: % invasive species present onsite	Integer Field appears when Yes is selected for invasive species presence
VegAdj	Vegetation: Is forest present adjacent to the site	Select from list: Yes/No
VegAdjSpec	Vegetation: What dominant species are present in adjacent forest	Text entry Field appears when Yes is selected for forest presence
VegAdjInv	Vegetation: Are invasive plants or noxious weeds present adjacent to the site?	Select from list: Yes/No
VegAdjInvS	Vegetation: Note invasive species adjacent to site	Text entry Field appears when Yes is selected for adjacent invasive species presence
VegAdjInvP	Vegetation: % invasive species present adjacent to site	Integer Field appears when Yes is selected for adjacent invasive species presence
SoiTexture	Soils: Texture	Select one from list: Clay Loam Sand
SoiCompact	Soils: Compaction	Select one from list: None Moderate Severe
SoiFeature	Soils: Other soil features	Select from list (can select multiple): Active or severe soil erosion Potential soil contamination Debris and rubble in soil Recent construction or other soil disturbance Other
SoiFeatNot	Soils: Soils features other	Text entry Description for Other entry
SoiNote	Soils: Other soil feature notes	Text
HydLHyd	Hydrology: Site Hydrology left side	Select one from list: Upland Riparian
HydRHyd	Hydrology: Site Hydrology left side	Select one from list: Upland Riparian

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Field Name	Description	Field Type and Options
HydStorm	Hydrology: Stormwater runoff to planting site	Select from list (can select multiple): Bypasses site in pipe Upslope drainage area outfalls to site (note diameter below) Open channel directs flow across or around the site Shallow concentrated flows (ie. rills, gullies, sediment deposit) Sheetflow Unknown
HydStrmOut	Hydrology: Outfall pipe diameter (in)	Integer
HydLevee	Hydrology: Are Levees present?	Select from list: Yes/No
HydBank	Hydrology: Levee bank height in ft	Decimal
HydTable	Hydrology: Depth to water table, optional, in ft	Decimal
PlaSpace	Potential Planting Conflicts: Potential Space Limitations	Select from list (can select multiple): Overhead wires Pavement Structures Signs Lighting Underground utilities Other
PlaSpaceWi	Potential Planting Conflicts: Overhead wire height in ft	Decimal Field appears when Overhead wires are selected as potential conflict
PlaSpaceSi	Potential Planting Conflicts: Sign height in ft	Decimal Field appears when signs are selected as potential conflict
PlaSpaceLi	Potential Planting Conflicts: Lighting height in ft	Decimal Field appears when lighting is selected as potential conflict
PlaSpaceUt	Potential Planting Conflicts: Underground utility type	Text entry Field appears when underground utilities are selected as potential conflict
PlaSpaceOt	Potential Planting Conflicts: Other conflicts	Text entry Field appears when other is selected as potential conflict
PlaLimit	Potential Planting Conflicts: Other limiting factors	Select from list (can select multiple): Trash dumping/debris Deer, beaver, or other animal impacts Mowing conflict (site in mowed regularly) Wetland present Insect infestation or disease Heavy pedestrian traffic Other
PlaLimitTT	Potential Planting Conflicts: Trash type	Text entry Field appears when trash dumping is selected as a potential limiting factor

Field Name	Description	Field Type and Options
PlaLimitTV	Potential Planting Conflicts: Trash volume	Integer Field appears when trash dumping is selected as a potential limiting factor
PlaLimitTS	Potential Planting Conflicts: Trash source	Text entry Field appears when trash dumping is selected as a potential limiting factor
PlaLimitOt	Potential Planting Conflicts: Other	Text entry Field appears when other is selected a potential other limiting factor
LogAccess	Site Access: Accessibility of site	Select from list (can select multiple): Delivery access for planting materials Temporary storage areas for soils, mulch, etc. Heavy equipment access Volunteer parking Nearby facilities for volunteers
LogWater	Water Source: watering source for tree plantings	Select from list (can select multiple): Rainfall only Stormwater runoff Hose hook-up nearby (Note distance below) Irrigation system in place Overbank flow from river or stream Pumping from adjacent river or stream Fire hydrant nearby Other
LogHose	Water Source: Distance from Hose hook-up to planting area in ft	Integer
LogOther	Water Source: Other	Text entry Field appears when other is selected a potential water source
LogVol	Volunteer Suitability: Site suitable for volunteer planting efforts	Select from list: Yes/No
LogVolCom	Volunteer Suitability: Comment	Text entry
GenPlant	General: What type of planting could occur here	Text entry
GenComment	General: Comment field to capture additional notes about the site	Text entry

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Table C-2: Assessment Plantable Sites Scoring

SITE_ID	SITE_NAME	Field Verified Plantable Area (SF)[1]	Field Verified Plantable Area Score[2]	Feasibility 1 (worst) - 5 (best)				Volunteer Opportunity[5] 1 (worst) - 5 (best)	TOTAL SCORE (35 total possible points)
				Access[3]	Site Prep[4]	Water Source	Site Conflicts/ Planting Constraints[4]		
28	Upper Southside City Park	136,760	9	5	4	3	4	4	29
47	WWTP- Soil Stockpile	241,612	10	3	2	3	5	2	25
30	Lower Northside City Park	102,040	8	4	4	5	4	5	30
25	Upper Northside City Park	43,874	7	4	4	4	3	5	27
27	Lower Southside City Park	61,409	7	3	4	2	4	5	25
13	Waterside Park and Playground	35,087	7	5	4	5	5	5	31
44	Field Operations Utilities Department	62,347	7	4	2	5	4	2	24
29	Picnic Island	18,013	6	5	3	5	4	4	27
43	Former Salkap- 317 to 325 Lake St	65,902	7	3	1	5	4	1	21
46	WWTP- CAC Permit Conversion	60,325	7	3	1	3	5	2	21
26	Ward Museum	18,257	6	5	4	5	3	2	25
45	Service Center Parking Lot	48,664	7	4	2	4	4	2	23
4	Riverwalk (Northside)	12,114	5	4	5	5	4	5	28
24	Riverwalk (Southside)	14,539	6	4	5	5	4	5	29
18	Lake Street Park and Playground	62,994	7	5	5	5	4	5	31

1: Indicates the most promising, but not necessarily all plantable areas
2: Desktop assessment methodology utilized to assign score
3: Evaluates ability for heavy equipment to easily access the site; space for stockpiles, etc.
4: Includes severe compaction and extensive invasive species removal
5: Includes utilities and existing use conflicts
6: Evaluates readiness and appropriateness of site for volunteer plantings

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Appendix D: Plantable Areas Recommended Tree Species

* indicates species better adapted to wet conditions

Riparian Native Flowering/Ornamental Understory Trees

- American hornbeam (Carpinus caroliniana)
- Pawpaw (Asimina triloba)
- American holly (Ilex opaca var. opaca)
- Spicebush (Lindera benzoin)
- Sweetbay magnolia (Magnolia virginiana)

Riparian Native Shade Trees

- Sycamore (Platanus occidentalis)
- Red maple (Acer rubrum)
- Sweetgum (Liquidambar styraciflua)
- Black gum (Nyssa sylvatica)
- River birch (Betula nigra)
- Swamp chestnut oak (Quercus michauxii)
- Willow oak (Quercus phellos)
- American elm (Ulmus americana)
- Pin oak (Quercus palustris)
- Cherrybark oak (Quercus pagoda)*
- Loblolly pine (Pinus taeda)
- Bald cypress (Taxodium distichum)*
- Overcup oak (Quercus lyrata)*
- Swamp tupelo (Nyssa biflora)*

Upland Native Flowering/Ornamental Understory Trees

- Sassafras (Sassafras albidum)
- Flowering dogwood (Cornus florida)
- Eastern hop hornbeam (Ostrya virginiana)
- Eastern redbud (Cercis canadensis var. canadensis)
- American holly (Ilex opaca var. opaca)

Upland Native Shade Trees

- White oak (Quercus alba)
- Southern red oak (Quercus falcata)
- Northern red oak (Quercus rubra)
- Chestnut oak (Quercus montana)
- Black oak (Quercus velutina)
- Scarlet oak (Quercus coccinea)
- American beech (Fagus grandifolia)
- Virginia pine (Pinus virginiana)
- Loblolly pine (Pinus taeda)
- Black gum (Nyssa sylvatica)

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Appendix E: Plantable Areas Concepts

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CITY OF SALISBURY

Tree Canopy Study

Plantable Areas Concept: Lake Street Park and Playground

Site Description

The Lake Street Park & Playground is located at 710 Lake Street, across the street from Chipman Elementary School and shares a parking lot with the First Baptist Church Family Life and Cultural Center. The park is 4.4 acres and has a recreational softball field, two lighted basketball courts with bleachers, a large playground area, a pavilion with picnic tables and grills, and a permanent concessions building with restroom facilities. The playground equipment includes a play set with a climbing wall and slides.

Aside from park amenities and associated hardscape features (i.e. paved paths), the majority of the current site cover consists of mowed turf and scattered individual trees. Overhead wires are located along the perimeter roads and an underground stormdrain pipe exits the site to the east from the center of the parcel.

Site Conditions at Lake Street Park and Playground

Planting and Maintenance Logistics

Site Consideration	Assessment
Sunlight exposure (full sun/partial sun/shady)	Full sun
Microclimate features (high wind exposure/excessive heat/other)	None
Steep slopes (>15%)	None
Low-lying area	None
Soil texture	Sandy loam
Soil compaction(none/moderate/severe)	Moderate pedestrian compaction
Invasive plants	None
Stormwater runoff to planting site	None
Potential planting conflicts	Sports area lighting, overhead wires

Site Consideration	Assessment
Site Access	Very good access from 3 sides of the parcel
Water source	Concessions building hose bib
Sea Level Rise considerations	Upland site

Summary of Planting Recommendations

Category	Recommendation
Planting Type	Upland Shade and Ornamentals
Planting Density	Landscape In-fill planting
Recommended Species	Oaks (Red, White, Black, Chestnut & Scarlet) Evergreens (American holly, loblolly pine, Virginia pine, magnolia) Short stature flowering and ornamental trees near/under overhead utilities and around the perimeter of the parcel Shade trees beyond 200’ outfield boundary and in-fill around amenities

Lake Street Park and Playground

Tree Planting Type	Area (ac)	Est. # of Trees
Upland Flowering/Ornamental	0.25	26
Upland Shade	1.33	72
Total	**1.58**	**98**

Salisbury Tree Canopy Study

Site: Lake Street Park and Playground

Salisbury, MD

Base Legend

- Assessment Site Boundaries
- Mean Sea Level 2100
- Mean Sea Level 2050
- Overhead wire (approx.)

Arborist Recommendations

- Non-native Invasive Treatment Recommended
- Water Access for Irrigation
- Riparian Flowering/Ornamental Tree Planting
- Riparian Shade Tree Planting
- Upland Flowering/Ornamental Tree Planting
- Upland Shade Tree Planting

0 37.5 75 150 US Feet

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CITY OF SALISBURY

Tree Canopy Study

Plantable Areas Concept: Lower Northside City Park

City Park (Scout Field)

Site Description

Due to the large size of this area and wide range in conditions, Lower Northside Park is discussed as Lower Northside City Park North and Lower Northside City Park South. The concept maps are reflect this divide.

Lower Northside City Park North

Lower Northside City Park North includes the Frances J. Tilghman Memorial Dog Park and is located near the intersection of Memorial Plaza and South Park Drive. Amenities include a dirt parking lot for vehicles with a large pavilion. The approximately 4.75 acre area has upland forest, riparian scrub-shrub, mowed grass and scattered mature trees with an off-lease dog area that is surfaced with a covering of sandy dirt and grass. There is no piped water at the this park but the Wicomico River (Beaverdam Creek) borders the park to the south. Overhead utilities are present along the northern and eastern edges of the park.

Site Conditions at Lower Northside City Park North

Lower Northside City Park South

Lower Northside City Park South includes Scout Field and is located within the Salisbury City Park on North Park Drive, approximately 500 feet south of the intersection with Hannibal Street. This open area of the park is approximately 2.25 acres of mowed grass surrounded by mature upland forest. Much of the forest edge contains non-native invasive species.


Site Conditions at Lower Northside City Park South

Planting and Maintenance Logistics

Lower Northside City Park North

Site Consideration	Assessment
Sunlight exposure (full sun/partial sun/shady)	Full to partial sun
Microclimate features (high wind exposure/excessive heat/other)	None
Steep slopes (>15%)	None
Low-lying area	Along the stream
Soil texture	Sandy
Soil compaction(none/moderate/severe)	Severe around parking area, moderate in dog run
Invasive plants	Along stream and forest edges
Stormwater runoff to planting site	Flows across the site from South Park Dr. to the stream
Potential planting conflicts	Overhead utilites
Site Access	Good access and parking throughout
Water source	Stream only
Sea Level Rise considerations	Minimal along stream

Lower Northside City Park South

Site Consideration	Assessment
Sunlight exposure (full sun/partial sun/shady)	Full sun
Microclimate features (high wind exposure/excessive heat/other)	Dry and windy
Steep slopes (>15%)	None
Low-lying area	Along canal edge
Soil texture	Sandy
Soil compaction(none/moderate/severe)	None
Invasive plants	Along the perimeter
Stormwater runoff to planting site	None
Potential planting conflicts	Occasional field use
Site Access	Good vehicle access off N. Park Drive

Site Consideration	Assessment
Water source	Municipal fire hydrant across N. Park Dr. near vehicle entrance
Sea Level Rise considerations	None

Summary of Planting Recommendations

Lower Northside City Park North

Category	Recommendation
Planting Type	Mix of Riparian Ornamental and Shade
Planting Density	Mix of landscape In-fill planting along stream and N Park Dr; reforestation in interior portion of parcel
Recommended Species	Reforestation: Remove NNI in existing forest and stream edges Plant native floodplain forest along stream Red maple, Sweetgum, Tupelo, Bald cypress, Sycamore, Willow oak Landscape infill: Plant shade trees to in-fill existing canopy gaps and maintain open understory Oaks (Red, White, Black, Chestnut & Scarlet) Plant short stature flowering and ornamental trees under existing overhead utilities

Lower Northside City Park South

Category	Recommendation
Planting Type	Primarily Upland Shade
Planting Density	Reforestation
Recommended Species	Remove NNI in existing forest edge Plant with native upland forest Oaks (Red, White, Black, Chestnut & Scarlet) Evergreens (American holly, loblolly pine, Virginia pine, magnolia)

City Park (Dog Park)

- Summary of Planting Recommendations

Lower Northside City Park North

Tree Planting Type	Area (ac)	Est. # of Trees
Riparian Flowering/Ornamental	0.43	50
Riparian Shade	1.16	86
Total	**1.58**	**136**

Salisbury Tree Canopy Study

Site: Lower Northside City Park North

Salisbury, MD

Base Legend

- Assessment Site Boundaries
- Mean Sea Level 2100
- Mean Sea Level 2050
- Overhead wire (approx.)

Arborist Recommendations

- Non-native Invasive Treatment Recommended
- W Water Access for Irrigation
- Riparian Flowering/Ornamental Tree Planting
- Riparian Shade Tree Planting
- Upland Flowering/Ornamental Tree Planting
- Upland Shade Tree Planting

0 50 100 200 US Feet

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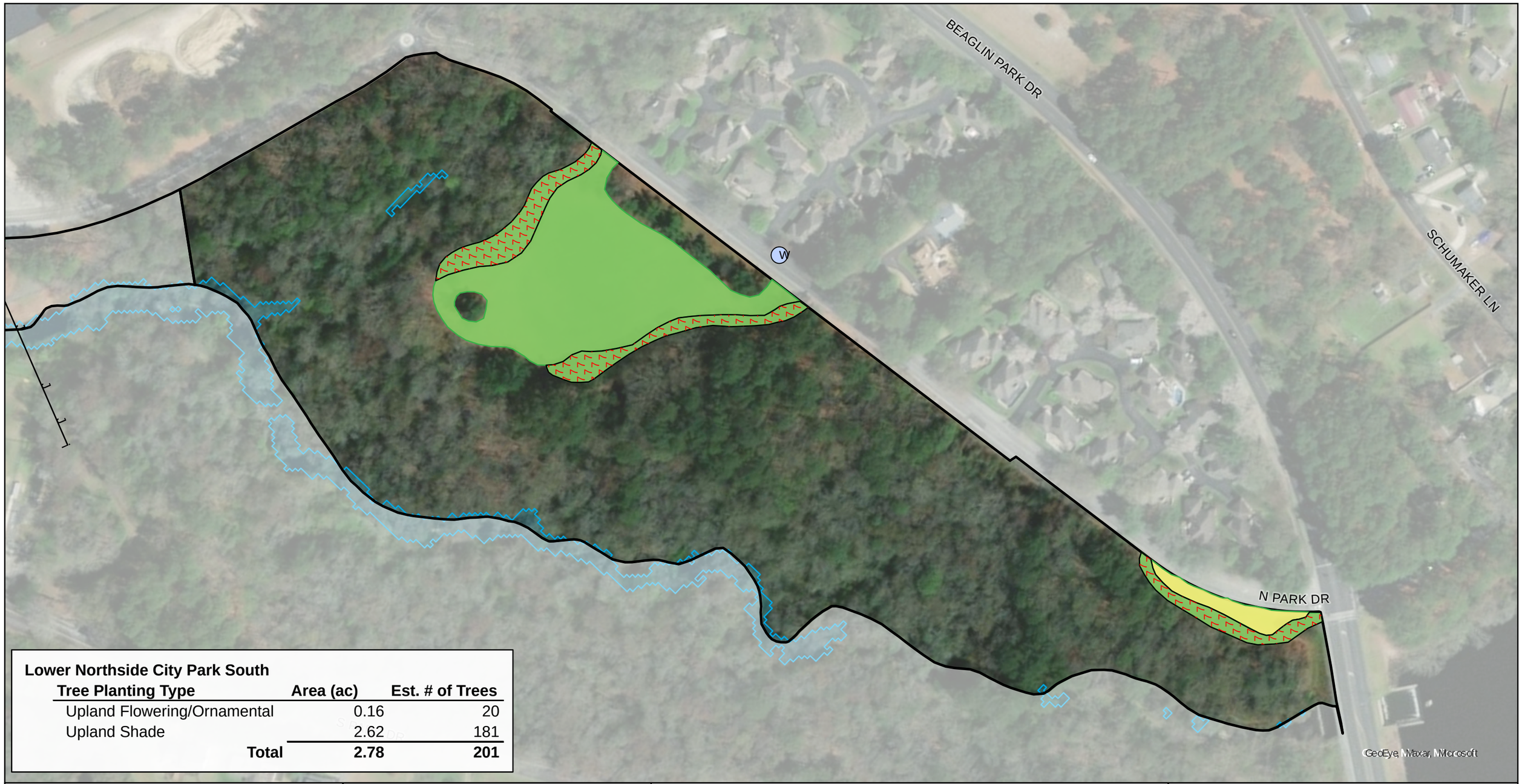

Lower Northside City Park South

Tree Planting Type	Area (ac)	Est. # of Trees
Upland Flowering/Ornamental	0.16	20
Upland Shade	2.62	181
Total	**2.78**	**201**

Salisbury Tree Canopy Study

Site: Lower Northside City Park South

Salisbury, MD

Base Legend

- Assessment Site Boundaries
- Mean Sea Level 2100
- Mean Sea Level 2050
- Overhead wire (approx.)

Arborist Recommendations

- Non-native Invasive Treatment Recommended
- W Water Access for Irrigation
- Riparian Flowering/Ornamental Tree Planting
- Riparian Shade Tree Planting
- Upland Flowering/Ornamental Tree Planting
- Upland Shade Tree Planting

0 75 150 300 US Feet

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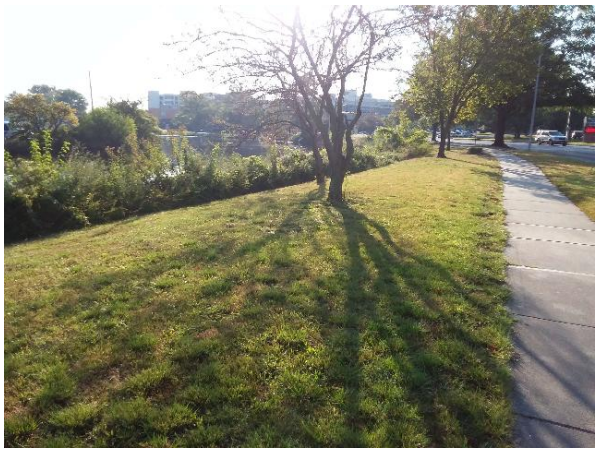
CITY OF SALISBURY

Tree Canopy Study

Plantable Areas Concept: Riverwalk Park (Southside)

Site Description

The Riverwalk is a concrete pedestrian path from Route 13 to the Marina, along the Wicomico River, in Downtown Salisbury. The majority of the site consists of bulkhead along the water and discrete landscape beds which contain newly planted trees and shrubs. Hardscape and other amenities can be found throughout most of the park but the 1.24 acre section along the southern shoreline from Circle Ave to South Division St is primarily mowed grass with a gradual slope to a rip-rap shore. Scattered trees are present and multiple underground utilities enter the canal through this section. Water for irrigation exists as hose connections.



Site Conditions at Riverwalk Park (Southside)

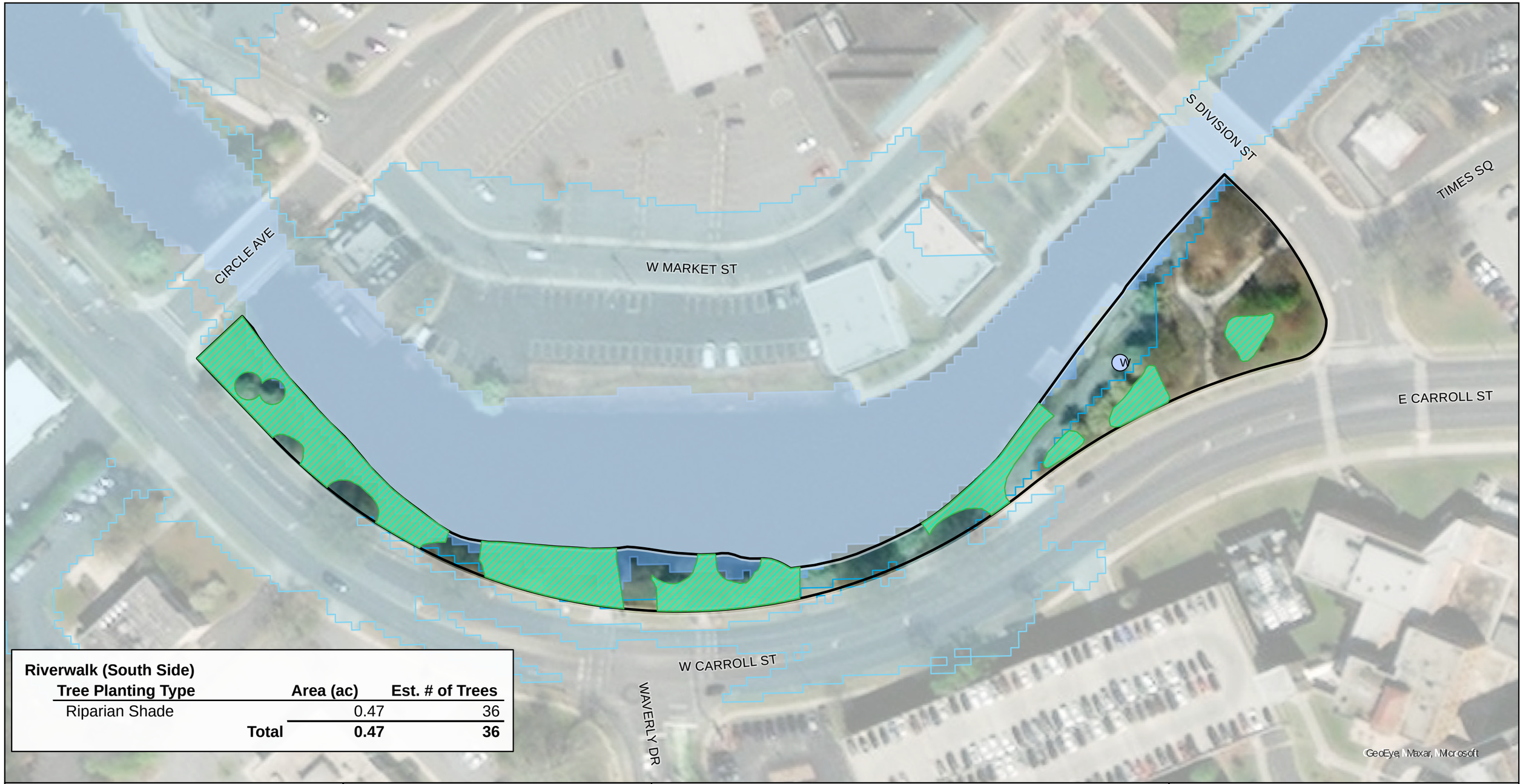
Planting and Maintenance Logistics

Site Consideration	Assessment
Sunlight exposure (full sun/partial sun/shady)	Full sun
Microclimate features (high wind exposure/excessive heat/other)	Reflective heat, flooding
Steep slopes (>15%)	None
Low-lying area	Along canal edge
Soil texture	Sandy
Soil compaction(none/moderate/severe)	Moderate near amenities
Invasive plants	Minor along shoreline
Stormwater runoff to planting site	None
Potential planting conflicts	Underground utilities, art installations
Site Access	Good along entire length, parking and storage limited
Water source	Irrigation hose bibs

Site Consideration	Assessment
Sea Level Rise considerations	Increased flooding along shoreline likely

Summary of Planting Recommendations

Category	Recommendation
Planting Type	Riparian Shade
Planting Density	Primarily Landscape Infill with some Reforestation
Recommended Species	Landscape In-fill: Trees planted between existing vegetation and infrastructure to fill gaps in the tree canopy. Typical land cover/use is maintained as park/grass and trees are planted generally on center at 30' minimum spacing for shade trees and 20' spacing for understory trees. Appropriate species selection (shade vs. understory) is relative to any height restrictions Reforestation: Trees planted to convert land use/cover to unmaintained forest area and planted on center at maximum 20' spacing. Species selection should be a mixture of shade trees and understory. Remove NNI in existing canal edge. Plant native floodplain forest along canal. Species include Red maple, Sweetgum, Tupelo, Bald cypress, Sycamore, Willow oak, River birch based on overhead utilities.



Riverwalk (South Side)

Tree Planting Type	Area (ac)	Est. # of Trees
Riparian Shade	0.47	36
Total	**0.47**	**36**

Salisbury Tree Canopy Study

Site: Riverwalk (South Side)

Salisbury, MD

Base Legend

- Assessment Site Boundaries
- Mean Sea Level 2100
- Mean Sea Level 2050
- Overhead wire (approx.)

Arborist Recommendations

- Non-native Invasive Treatment Recommended
- W Water Access for Irrigation
- Riparian Flowering/Ornamental Tree Planting
- Riparian Shade Tree Planting
- Upland Flowering/Ornamental Tree Planting
- Upland Shade Tree Planting

0 37.5 75 150 US Feet

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CITY OF SALISBURY

Tree Canopy Study

Plantable Areas Concept: Waterside Park and Playground

Site Description

Waterside Park and Playground is located on Parsons Road at the intersection with Fitzwater Drive. The park is 4.09 acres and has two basketball courts, a playground area, a pavilion with picnic tables and grills, and a community garden. A multi-purpose playing field and parking is proposed for the is site in the future.

Aside from park amenities and associated hardscape features (i.e. paved paths), the majority of the current site cover consists of mowed turf and scattered individual trees. The east side of the park is bound by a tributary to the Wicomico River which has a narrow wooded riparian buffer that contains a mix of native and non-native unmaintained vegetation.

Site Conditions at Waterside Park and Playground

Planting and Maintenance Logistics

Site Consideration	Assessment
Sunlight exposure (full sun/partial sun/shady)	Full sun
Microclimate features (high wind exposure/excessive heat/other)	None
Steep slopes (>15%)	None
Low-lying area	Along the east parcel boundary
Soil texture	Sandy loam
Soil compaction(none/moderate/severe)	Moderate near recent basketball court
Invasive plants	In the forested riparian buffer
Stormwater runoff to planting site	None
Potential planting conflicts	Proposed multi-use field and parking, community garden

Site Consideration	Assessment
Site Access	Good access off Parsons Rd through vehicle gate
Water source	Hose bib at community garden, adjacent waterbody
Sea Level Rise considerations	Along riparian area near stream

Summary of Planting Recommendations

Category	Recommendation
Planting Type	Upland and Riparian Shade
Planting Density	Mix of landscape In-fill planting and reforestation
Recommended Species	Landscape In-fill: Upland plant species community Oaks (Red, White, Black, Chestnut & Scarlet) Evergreens (American holly, loblolly pine, Virginia pine, magnolia) Shade trees between and around existing/proposed infrastructure Reforestation: Remove NNI in existing riparian buffer Expand forested buffer along stream with native floodplain forest Red maple, Sweetgum, Tupelo, Bald cypress, Sycamore, Willow oak

Waterside Park and Playground

Tree Planting Type	Area (ac)	Est. # of Trees
Riparian Shade	0.31	33
Upland Shade	1.44	80
Total	**1.75**	**113**

Salisbury Tree Canopy Study

Site: Waterside Park and Playground

Salisbury, MD

Base Legend

- Assessment Site Boundaries
- Mean Sea Level 2100
- Mean Sea Level 2050
- Overhead wire (approx.)

Arborist Recommendations

- Non-native Invasive Treatment Recommended
- W — Water Access for Irrigation
- Riparian Flowering/Ornamental Tree Planting
- Riparian Shade Tree Planting
- Upland Flowering/Ornamental Tree Planting
- Upland Shade Tree Planting

0 37.5 75 150 US Feet

December 2020

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