CHARLOTTESVILLE, VIRGINIA

A FORECAST ANALYSIS OF POSSIBLE PLANTING SCENARIOS

The forest of Charlottesville offers a lot more than greener views and patches of shade. It creates meaningful environmental, economic, and social benefits for the community, valued at almost $16 million/year. In 2020, a Tree canopy assessment was undertaken to better understand the composition of the City's canopy infrastructure. This assessment identified tree canopy, possible planting area (PPA), and areas unsuitable for planting. It analysed how they are currently distributed throughout the city. The results will allow the City to revise existing strategies and develop new ones to protect and expand the tree canopy.

Building upon the results of this assessment, the aim of this summary report is to analyze and communicate the effects of various planting strategies on Charlottesville's future canopy resource. Four scenarios were chosen (see results table below) to illustrate how Charlottesville's canopy cover could shift over a time period from now (2023) to 2050. The results presented for each scenario may be used as guidelines to inform the scale and methods of future planting efforts.

38% TREE CANOPY

22% POSSIBLE PLANTING AREA

36% TOTAL IMPERVIOUS AREA

**Charlottesville's 2023 canopy cover is an assumption based on 2020 canopy data and input from ReLeaf Cville.*

7,006	TOTAL ACRES
6,980	LAND ACRES
46,553	RESIDENTS

ANNUAL TREE PLANTING REQUIRED FOR EACH SCENARIO

500	BUSINESS AS USUAL
2,572	MAINTAIN EXISTING UTC %
3,697	ATTAINABLE GROWTH
4,500	AGGRESSIVE GROWTH

Planting **2,572 trees per year** will maintain the citywide canopy cover, and any additional plantings will increase citywide canopy.

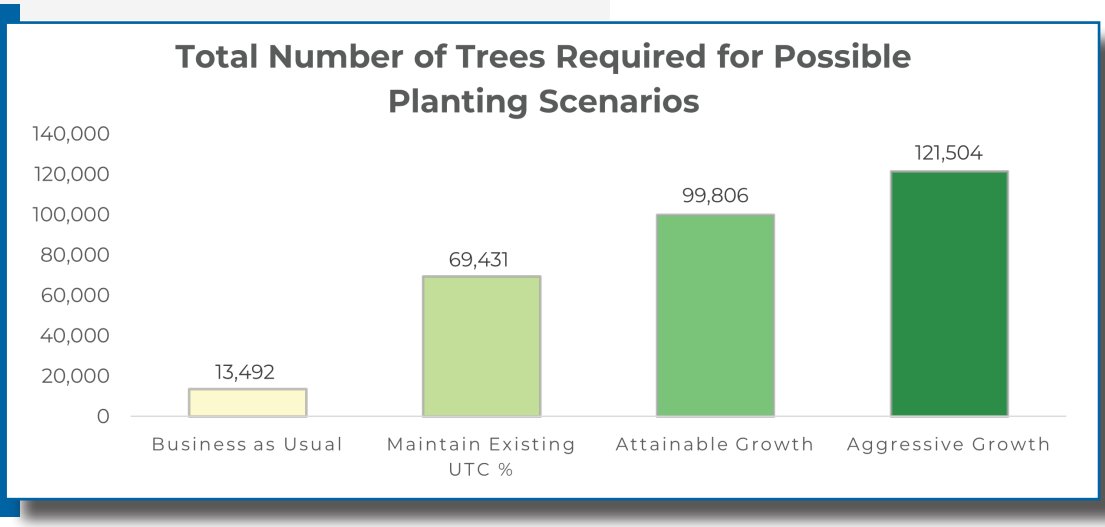

Figure 1. The total number of tree plantings required over the next 27 years for each of the scenarios.

Comparison of Planting Scenarios

A variety of possible planting scenarios were explored in order to assist the City in putting the tree canopy and PPA metrics derived in this study into action. These scenarios were designed to represent different approaches that the City could take when deciding where to plant new trees and to help synthesize the tree canopy and PPA data with its goals, priorities, and available resources. Using PlanIT Geo's Canopy Calculator tool, target canopy cover goals were established for a given area of interest, and the amount of canopy required to achieve those targets (in both acres and number of trees planted) was calculated over a 27-year planning horizon. The calculator tool takes into account the estimated natural growth, regeneration, and loss of canopy due to mortality or development that would occur in that time frame. In this model, planting scenarios were explored for the entire City of Charlottesville (6,980 land acres with approximately *2,650 acres of existing UTC as of 2023).

In order to maintain the existing 38% tree canopy cover in Charlottesville, approximately 69,431 individual trees (or 2,572 per year) would need to be planted throughout the 27-year planning horizon. If the city continues with it's pre-existing planting strategy (500 trees per year), canopy could decline to 25% amidst natural mortality and losses to development. Implementing the "attainable" urban canopy growth option, meant to represent a realistic level of canopy increase for the urban areas of the City (3,697 trees per year), would increase the citywide canopy cover to 45%. On the other hand, if an "aggressive" urban planting schedule is implemented (4,500 trees per year), the City could potentially grow it's citywide canopy cover to 50%.

CANOPY CALCULATOR ASSUMPTIONS

27	Planning Horizon (years)
5%	New Tree Mortality
1%	Annual Canopy Loss to Mortality
25	Annual Canopy Loss to Development (acres)
0.2%	Natural Regeneration
0.2%	Annual Canopy Growth

Tree size distribution (average crown radius at full maturity, percent of total tree population):

12.5 ft	Small Tree (25%)
15 ft	Medium Tree (35%)
30 ft	Large Tree (40%)

Table 1. *Planting scenario descriptions and results.*

Scenario	Goal	Estimated Citywide UTC % in 2023	Planting Required		Net Tree Canopy Change		Citywide UTC % in 2050	
			Total	Annual	Acres	%	Acres	%
Business as Usual Planting Trends	Calculate the citywide canopy % in 2050 if the City continues to plant approx. 500 trees a year for the next 27 years.	38%	13,492	500	-889	-13%	1,761	25%
Maintain Existing UTC %	Calculate the number of tree plantings required to maintain 38% canopy cover over the next 27 years.	38%	69,431	2,572	5	0%	2,655	38%
Attainable Growth	Calculate the number of tree plantings needed to grow the citywide canopy to 45% by 2050.	38%	99,806	3,697	491	7%	3,141	45%
Aggressive Growth	Calculate the number of tree plantings needed to grow the citywide canopy to 50% by 2050.	38%	121,504	4,500	837	12%	3,487	50%