

Newton Cemetery Horticultural Master Plan

February 5, 2021



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Acknowledgements

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INTRODUCTION

The President of Newton Cemetery & Arboretum first expressed an interest in developing a Horticultural Master Plan in the summer of 2017. Recognizing that the Cemetery's character defining features of topography, the curvilinear roadway system and its historic monuments were static and unchangeable, the Cemetery's Administration and Staff explored the opportunities to develop a foundational guide for future planting of trees and shrubbery for the entire Cemetery grounds.

The Newton Cemetery & Arboretum Horticultural Master Plan recognizes the challenges of developing, managing and adapting the Cemetery landscape to a changing climate where increased global average temperatures and changing rainfall patterns will alter the growing conditions for trees, shrubbery and grasslands across the region. Warmer average global temperatures may heighten rates of evaporation and alter the hydrologic cycle. Increased water vapor in the atmosphere may lead to regionally increased precipitation. Climate change is predicted to bring more intense rainfall events with increased risk of flooding, as well as longer and more intense droughts.

This Horticultural Master Plan cannot address the global challenges of changing precipitation, melting polar ice caps and glaciers, rising sea levels, acidification of ocean waters, the severity of changing weather patterns, increased cloud cover or the alteration of the carbon cycle. But on this very local level it endeavors to buffer, protect and maintain one of its most critical assets against these global challenges – its living collection. The health of its living collection of trees, shrubbery, groundcover and grass lands is a responsibility the Cemetery eagerly embraces, knowing that if all parties – governments, municipalities, large property owners and small shareholders in this marvelous planet – were to be equal stewards of the land, seas, streams and atmosphere, a changing climate could be more readily regulated and managed.

The Horticultural Master Plan is intended as a guide to the Cemetery's ongoing, year-to-year tree and shrubbery replacement strategy. Over the coming decades, the population of mature and declining trees and shrubbery will slowly be replaced by new bare root, container grown and balled and burlapped deciduous and evergreen plants. This transition and transformation of the living collection of trees, shrubs, groundcover and grasslands will be guided by this Horticultural Master Plan.

This Master Plan is not static. It has been designed as a dynamic spreadsheet that can be adjusted and adapted over time to respond to whatever direction the changing climate takes the Cemetery. The spreadsheet is supplemented by additional documents described in the following Sections.

Supporting Development Goals

Since 2012, the Newton Cemetery Corporation has dedicated significant resources to achieving four specific development goals:

1. Increase revenue development by expanding burial capacity in corporate space
2. Maintain and improve infrastructure that supports revenue development, either near-term or long-term.
3. Manage, preserve and rejuvenate Cemetery assets that directly support revenue development and

4. Manage, preserve and rejuvenate those Cemetery assets that do not directly support revenue development but, nonetheless, do maintain the Newton Cemetery & Arboretum Brand.

Planting new generations of evergreen and deciduous trees will maintain the Newton Cemetery & Arboretum Brand and will indirectly support revenue development.

Revenue Development - Cemetery Expansion – 2012 - 2015

In 2012, faced with a diminished and inadequate inventory of full-body burial and cremain plots, the Newton Cemetery Corporation embarked upon a master planning and building program to expand the Cemetery's burial capacity. The first significant expansion of burial capacity in the 21st century occurred in 2013 with the opening of the K-North expansion area, previously used as an on-site nursery and holding area. Concurrent with this small expansion project, a larger site design and construction contract occurred in 2013 and 2014 with the design, construction and opening of The Dell, an area of cemetery expansion on a portion of the underdeveloped, remnant 10-acres of land in the northeastern corner of the Cemetery. These 10 acres had been used for soils and material stockpiling for decades.

The construction of The Dell was preceded by the Master Plan for Cemetery Expansion of the 10-acre, undeveloped parcel east of Rogers Avenue and the Cemetery Garden Center and Maintenance Building. The master planning process for the entire 10-acre expansion area included site investigation, exploration of design precedents, programming studies, interviews with Cemetery staff and development of alternative design studies. Members of the Planning Committee and Administrative Staff were involved throughout the design process. A narrative report and the Master Plan drawings and support documents concluded the Master Planning design process.



2013 Master Plan for Cemetery Expansion

In 2013, bid documents were prepared for K-North and The Dell, the first phases of expansion recommended by the Master Plan.



2013, The Dell, Layout Plan

Burial Capacity in 2017

With construction of The Dell the inventory of Newton Cemetery & Arboretum had increased its interment and inurnment inventory within established sections of the Cemetery. Ten types of interments / inurnments (burials) made up the sales inventory of the Cemetery in 2017. Based on analysis of sales data through the last quarter of 2017, Newton Cemetery & Arboretum Staff determined when eight of these ten burial types would become depleted if inventory was not increased in subsequent years. These projections took into account anticipated inventory expansion in Section D-North, where new inventory would come on-line in summer 2018.

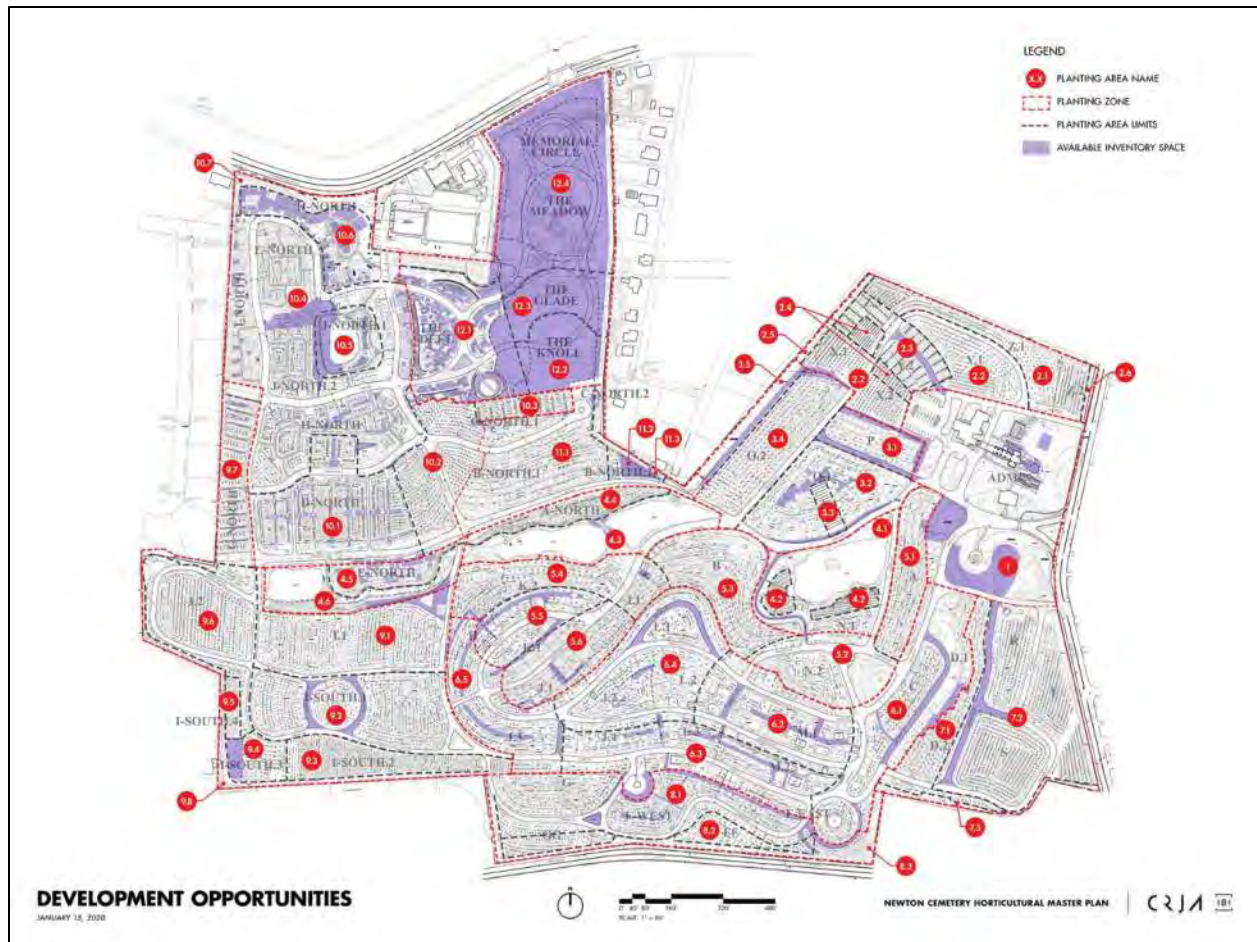
These ten types were presented in the 2018 Master Plan in order of their projected depletion.

<u>Burial Types</u>	<u>Years Projected</u>
Niche (Columbarium) – Interior Architecture	7
Double Graves with Upright Monuments	8
Urn Garden Plot with Flush Markers	9
Single Graves with Upright Monuments	10
Single Graves with Flush Markers	10
Family Lots	15
Garden Crypts – Exterior Architecture	20
Garden Niche – Exterior Columbarium Walls	33
Scattering Garden	Unlimited Capacity
Mausoleum Recent	Data Too Limited

2019 Burial Opportunities in Newton Cemetery & Arboretum Corporation Space

Newton Cemetery & Arboretum has expansion opportunities in many areas of the Cemetery. In 2019 these areas were identified on the following Cemetery Plan. Expansion is possible in the internal pathways of the historic district, where roadways might be closed off and transformed into

burial space, in the expansion area above The Dell, and by changing large family lots into double graves, single graves and urn garden plots. (See Plate 01).



2018 Master Plan

In 2018 Newton Cemetery & Arboretum commissioned an evaluation of the entire property to assess actions and projects that could be undertaken to expand its inventory of burial plots. At the direction of Newton Cemetery & Arboretum Administration the 2018 Master Plan for expansion of burial capacity focused on the six critical inventory types that will be depleted by 2034 (in 5 to 14 years). The 4 types that have ample inventory - Garden Crypts, Garden Niches, Cremain burial in the renovated Scattering Garden and new Mausoleum lots – were generally not addressed in the 2018 Master Plan.

While interment options in K-North and The Dell significantly improved the available inventory for the Cemetery, clients have consistently expressed interest in burial plots in the historic sections of the Cemetery and in sections near water. As a result, the Newton Cemetery Corporation explored expansion of interment opportunities across the historic areas of the Cemetery. The outcome of that exploration during the 2018 Master Plan process recommend a series of small, targeted expansion projects that would develop burial capacity in the historic sections of the Cemetery and in the few underdeveloped sections adjacent to water.

While the 2018 Master Plan identified specific areas within established sections of the Cemetery that could be utilized for additional burial capacity, no specific assessment of future capacity and buildout was performed. None the less, with the opportunities to 1) infill new plots in underutilized grassed paths at the center of many historic burial sections, 2) to subdivide large family plots into smaller single and double grave plots, and 3) the long-term options to expand capacity in the fallow land north of The Dell, Newton Cemetery Corporation will likely continue to sell burial plots well into the third quarter of this century.

Throughout the 2018 Master Planning effort, Newton Cemetery & Arboretum focused on the importance of maintaining its brand as one of the premier, private Garden Cemeteries in the United States. There are five essential components of the Newton Cemetery & Arboretum brand – those physical aspects of the property that define its uniqueness. These include the quality and artistic diversity of its historic grave monuments, its curvilinear roadway system, its rolling topography that sets up views and vistas across the Cemetery grounds, its mature canopy of shade trees and its five ponds, four of which are ‘natural’ ponds and the fifth a lined irrigation pond.



Chapter 5 of the 2018 Master Plan addressed managing, preserving and rejuvenating the horticultural assets of the Cemetery. Chapter 5 recognized the importance of continuously monitoring tree health and wellbeing. One of the first Action Plans recommended by the 2018 Master Plan was to develop a Cemetery-wide Tree Inventory to determine the conditions of all trees within each development Section and in adjacent areas. The 2018 Master Plan laid out the argument for a comprehensive approach to planning for resiliency of the Newton Cemetery & Arboretum horticultural assets in the face of climate change.

The 2018 Master Plan recommended to Newton Cemetery & Arboretum that it establish a formal tree planting program that would create species diversity, generational transition and maintain the signature aesthetic of the Cemetery’s quintessential landscape of large shade trees that defined the garden cemetery movement of the mid-1800s. The Master Plan recommended planting monumental species of native oaks, elms, sycamores as well as exotic beech, lindens, ginkgo and pagoda trees on a yearly basis.

Following the recommended Action Items in the 2018 and 2019 Master Plans, Newton Cemetery & Arboretum and consultants developed a comprehensive assessment of tree health. The results of this assessment were dire. In the course of the 2018 and 2019 over 60 mature shade trees were removed due to hazard designations. As the decades pass, more trees will decline and become hazard trees needing to be removed. While these noble, mature trees are an established asset to the Cemetery, their anticipated passing provides an opportunity for new tree plantings.

This Horticultural Master Plan provides a roadmap to current and future Cemetery arborists, horticultural managers and design professionals on which Families, Genera and species would:

1. Establish sufficient diversity to withstand increased predation of insect and disease vectors.

2. Maintain a collection of native trees sufficiently healthy to support a population of native insects, birds and mammals.
3. Establish a collection of native tree species that can adapt to the changing climate over the next 50 years and support the native insects, birds and mammals that have sufficient mobility to move northward and eastward in advance of increased temperatures and altered weather conditions.
4. Likely grow to reach maturity and noble size and stature in an increasingly hotter and droughtier climate, so that the urban forest of mature trees will continue to appeal to the citizens of Newton and greater Boston.

It lies within our power today to plant trees for the future so that those that follow us will love Newton Cemetery & Arboretum as we do today. And so by loving this landscape, preserve it, protect it and promote its wellbeing and prosperity when their turn comes.

CHAPTER 1: **The Goals of the Horticultural Master Plan**

The Horticultural Master Plan for the existing grounds will serve as a guide for near-term (1 – 20 years) and long-term (20 – 80-years) tree and shrub planting and landscape management of the living collections. Its overarching objectives of the Master Plan is to establish a year-to-year planting program that:

1. Strengthens the Newton Cemetery & Arboretum Brand
 - a. Supporting revenue development by creating a vibrant and verdant urban forest
 - b. Creating generation stability across the Cemetery, where all generations of trees – juvenile, middle-aged and noble masters – are present and thriving
 - c. Strategic tree planting anticipating the decline and loss of signature noble trees
 - d. Maintain significant tree icons. And when existing tree icons are declining, to proactively replace them.
2. Provides Environmental Resiliency – planting a diverse mix of native and adaptive species that can rebound and survive climate change, increasing storm intensity, prolonged drought and pest and disease vectors.
3. Promotes Ecological Sustainability – establishing tree populations that are
 - a. To the extent possible, planted in groves to be self-supporting
 - b. Associated with the moisture holding capacity of the soils in specific areas of the Cemetery
 - c. Balancing native Genera and species common to eastern New England with trees native to adjacent New England states and regions further south and west to provide (the following)
 - d. Habitat and food sources for native and near native mobile insects, birds and mammals.
4. Supports Management Efficiencies:
 - a. Operational efficiencies
 - b. Sales efficiencies
 - c. Planning for availability
 - d. Address water management
5. Creates an Integrated and Apparent Aesthetic by:
 - a. Establishing a balance of different sized trees
 - b. Creating design unity section-to-section
 - c. Establish rhythms and sequences of trees along the major avenues of travel
 - d. Create thresholds and gateways at critical intersections.
 - e. Accentuate desirable interior vistas and views
 - f. Screening unattractive, off-site views
 - g. Creating seasonal interest
6. Support the Cemetery's Strategic Planning:
 - a. Be a guide to prioritize fundraising efforts for donor cultivation
 - b. Be a tool to drive active marketing
 - c. Enhance public recognition of the Newton Cemetery & Arboretum brand and
 - d. Engage new stakeholders and new clients.

The Horticultural Master Plan is intended to be a directional guide for the future: a resilient, flexible, and sustainable document – one that can be updated periodically and can be continually tested and refined. Anticipate updating the Master Plan to be certain it remains relevant and

responsive to internal Cemetery evolutions and external changes in society, the climate and the greater culture of interments.

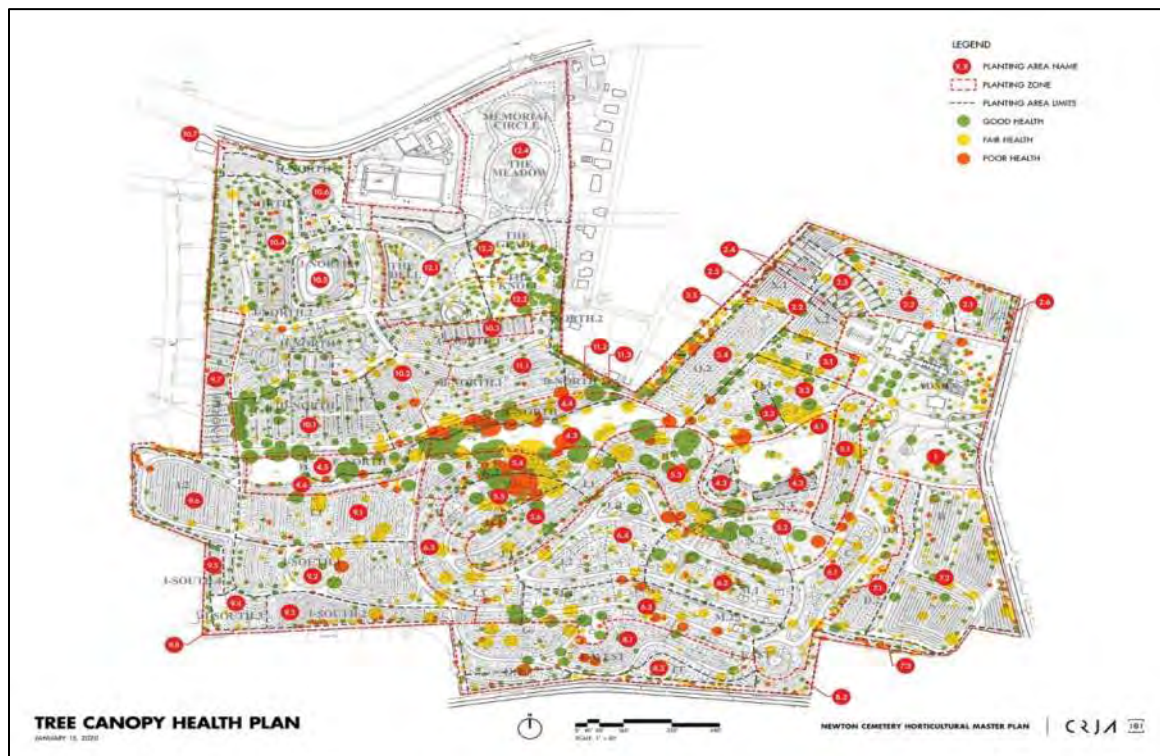
CHAPTER 12

Tree Canopy Health Plan

During the 2018 and 2019 seasons, Bartlett Tree Experts performed a basic inventory and visual inspection of all trees on the Cemetery grounds greater than 6-inch caliper, recently planted, or otherwise significant. (See Plate 18). All trees were individually inspected, GPS located and given a specific numeric tag. Bartlett prepared a written health and summary report and a five-year management plan that included a risk assessment and tree inventory, a detailed description of the tree location using the Bartlett Arborscope GPS software system. The collected attributes of each tree include tree Botanical and Common Names, a unique ID number, and caliper size at breast height. The Condition of the trees (Good, Fair, Poor or Dead) was recorded, as well as the height class (Large, Medium, Small), estimate canopy radius, recommend soil care, tree work recommendations, tree care priority (1, 2 or 3), tree defects and observed pest/disease infestation. Each tree received a Level 2 Basic Assessment of Tree Risk. When recommended, a Level 3 Advanced Risk Assessment would be performed.

Select trees did receive the more substantive Level 3 Risk Assessment. This heightened assessment allowed the Cemetery's horticulturists and arborists to prioritize and schedule tree removals and remedial treatment. During the 2019 season, following the hazard tree assessments, over 50 overly mature, hazard trees were removed and the stumps ground to below grade.

Utilizing the Arborscope software database, a plan of the entire Cemetery has been prepared showing the health of the Cemetery's overhead tree canopy at Newton Cemetery & Arboretum as of January 2020.



This plan displays a graphic representation of data extracted from the Arborscope inventory, including an accurate depiction of tree canopy diameter and color assigned categories of tree health ranging from Good to Fair to Poor. The goal of this diagram is to aid the Cemetery in understanding how the overall tree canopy may evolve in the coming years and which areas of the Cemetery are particularly vulnerable to experience significant canopy loss.

When compared against the aerial photographs of the site, the extent of tree cover can be assessed.



Even though the casual impression of Newton Cemetery & Arboretum grounds is that it has extensive tree cover, Tree Canopy Health Plan and the aerial photograph shows the extent of open turf throughout the Cemetery. After the 2019 removal of overly mature, noble trees from the Cemetery grounds the amount of full sun on the ground plane increased.

The Horticultural Master Plan strives to rectify the significant loss of shade trees and evergreen trees on the Newton Cemetery & Arboretum grounds by planting a significant number of young trees on a yearly basis. The grounds are remarkable open and shade free in 2020. The long-term benefits of planting a great number of trees includes carbon sequestration, reduced heat island effect (shading of pavement), increased species diversity, long-term resiliency, reduced stormwater runoff and the

salutary benefits to the greater Newton community in having an urban forest oasis in their neighborhood.



Open Tree Canopy, circa March 2020

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