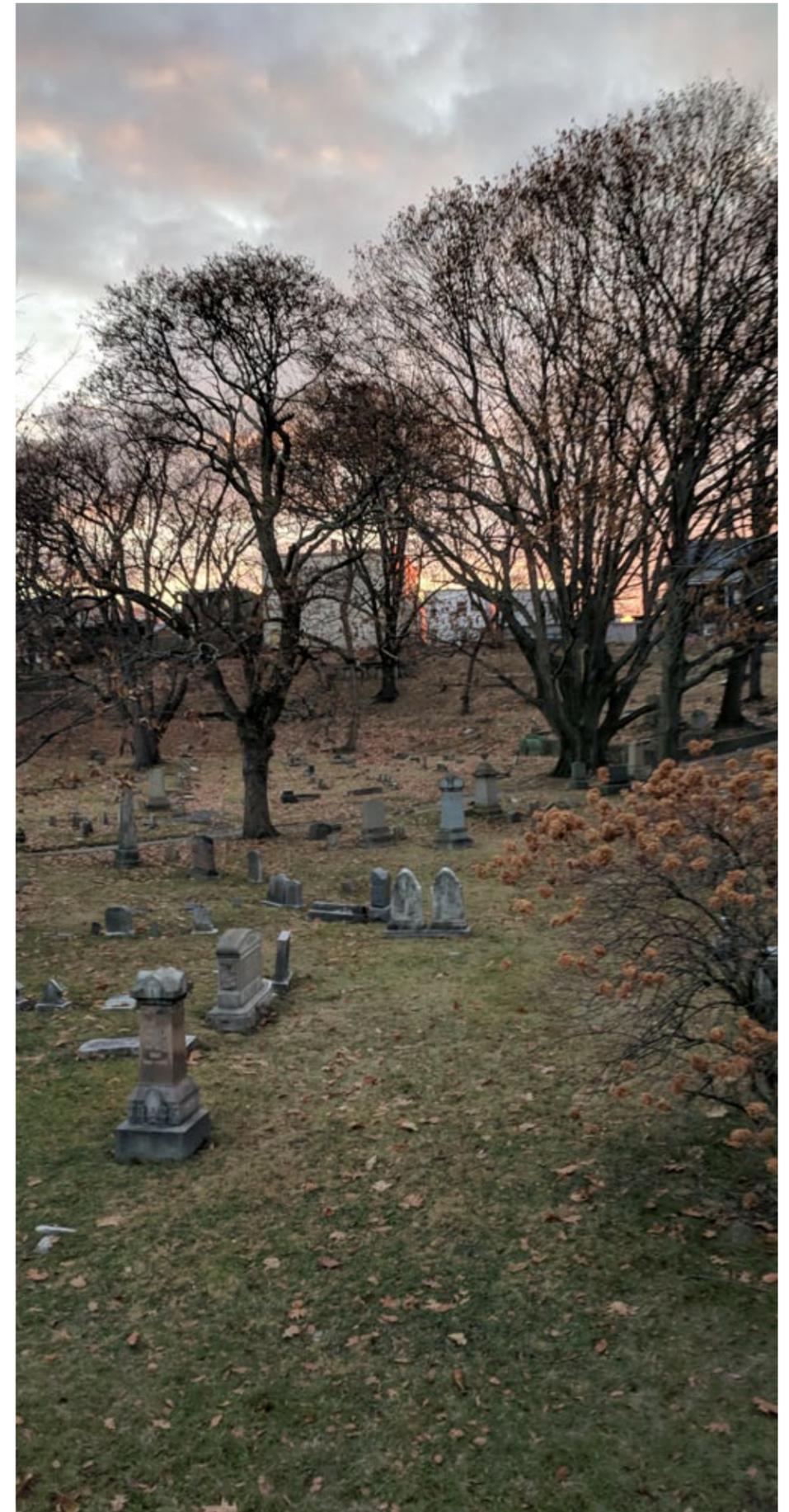


CHELSEA GARDEN CEMETERY

Chelsea, Massachusetts
2018 Master Plan



CBA Landscape Architects LLC
Chelsea Dept. Of Planning and Development



Chelsea Garden Cemetery Master Plan

This document was prepared for:
The City of Chelsea: Department of Planning & Development

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A Brief History of the Cemetery*

The Garden Cemetery Corporation was established in 1841 for the purpose of constructing and operating a private nonsectarian cemetery for the residents of Chelsea. Consecrated on the 4th of November 1841, Chelsea's Garden Cemetery was created ten years after Mount Auburn Cemetery in nearby Cambridge. As the first rural cemetery, Mount Auburn offered an alternative to the typical dense urban burial ground. Garden Cemeteries followed suit by developing in a rural area, taking advantage of the ultimate popularity of the rural cemetery concept.

Although it is a small burial ground at slightly over three acres, there were reputedly between 10,00 and 14,00 interments including many prominent community leaders of the 1800's such as members of the Slade, Stebbins, Gerrish, Low, Pratt, Pettingill and Reed families.

A plan and sketch of Garden Cemetery (circa 1844) from an original booklet given to the prospective lot buyers presents a romantic image of the cemetery within a rural setting, much like Mount Auburn Cemetery. It is assumed that the sketch is an artist's conception to assist with the sales of the cemetery lots. The plan shows the main entrance is located at the low point of Shawmut Street. Just inside the entrance gate the site rises to the left and drops to the right to the garden pond which is enveloped by a dramatic steep bank. The garden pond is shown with large tombs on the Central Avenue side and smaller individual tombs on the Chester Avenue side. Few shade trees are shown in the central area of the cemetery. It is assumed that they were omitted to better illustrate the basic concept and layout of the cemetery. Heavy perimeter planting was shown in order to provide a sense of separation between the cemetery and anticipated future residential development adjacent to the site.

A photograph taken shortly after the 1908 Chelsea fire indicates that an earlier wood picket fence had burned and was temporarily replaced with wood posts and a rope barrier. Interior walks appear to be constructed of gravel as was the public sidewalk. The concentration of vegetation appears to have shifted such that there is much more interior vegetation than perimeter vegetation. This may have been a result of the fire.

The Garden Cemetery Corporation operated the cemetery continually from the time of the dedication in 1841 until it was acquired by the City of Chelsea in 1905 and sold for back taxes. A granite monument to the

founders of the Garden Cemetery Corporation was erected prior to the 1908 fire. The property was repurchased by the City in 1915.

The site has been in continuous use for public and military burials since 1915. The last recorded burial was in the early 1990's. Private interments are still allowed on a limited basis, cremated remains only, because the City does not have the proper equipment to facilitate casket burials.

In regard to the integrity of the 1844 plan (the earliest dated plan found), much of that plan appears to have been implemented and is intact.

The site retains the sense of dramatic topography suggested in the original plan. The most significant losses include the pond and entrance gate house. Other variations exist between the original plan and current conditions in the locations of some paths and burial places. Modifications of the central area include the filling in of the pond and the addition of rows of individual grave sites in its place.

The original plan shows a series of six curved concentric paths organized around the "Garden Pond" and "Consecration Dell". The paths were terraced up a steep slope creating a sense of an amphitheatre. Later, the number of concentric paths were reduced to two. Three paths are shown radiating from this area, including stairs going up the hill. Only one path remains with stairs.

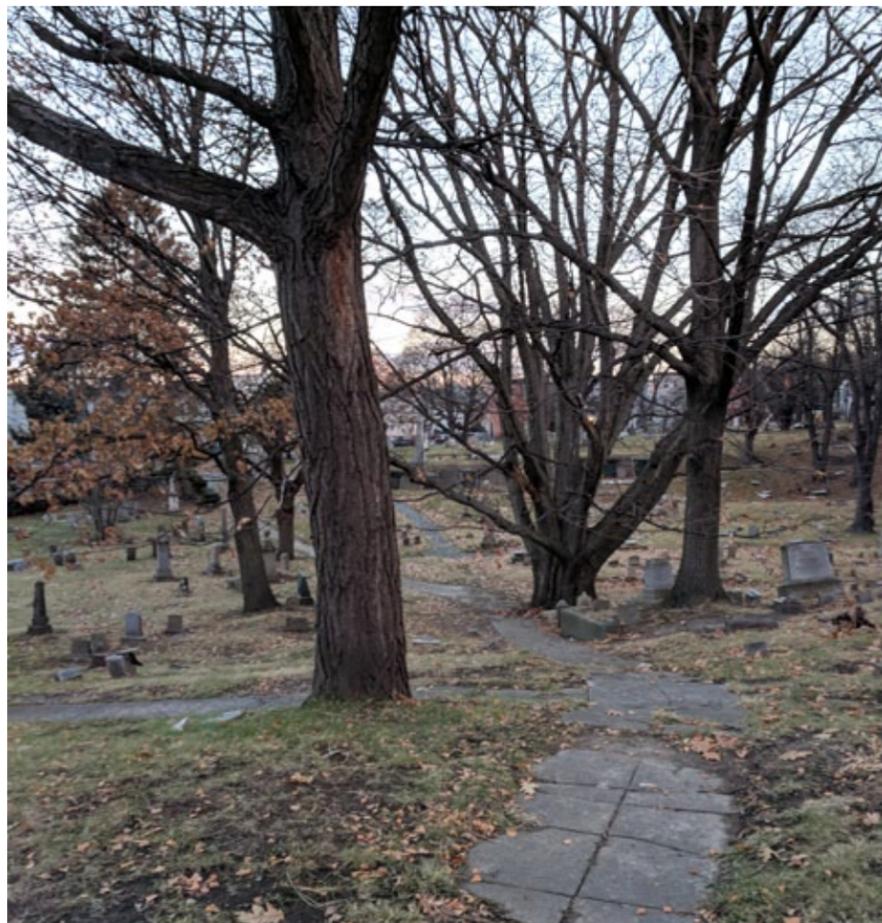
Another significant plan change is in the southwest corner, adjacent to "Consecration Dell", where the historic plan shows several curved paths. The existing condition contains a combination of grid and diagonal paths. It also has fewer family plots and more single grave sites.

In 1866, near the Shawmut Street entrance, the City purchased 18 plots and created the Soldiers Lot as a "burial place for soldiers who gave their lives in their country's service during the late Civil War". The change was relatively minor in the overall layout. The eighteen family plots were aggregated into a larger area for military graves of dozens of Civil War veterans. Local veteran groups continue to hold Memorial Day ceremonies at the Soldiers Lot to this day.

**Excerpted from Garden Cemetery Master Plan, Chelsea, Massachusetts by Walker-Kluesing Design Group, December 1998.*



Left: 12 Pound Howitzer in the Soldier's Plot Memorial Area



Left: View in from the Gate Along Central Avenue

The 21st Century Vision for Chelsea's Garden Cemetery

Although quite a few elements within the Garden Cemetery have changed or been removed since its dedication in 1841, the cemetery retains its historic rural character expressed in its expanses of lawn, meandering paths, numerous shade trees, and picturesque stone walls. The historic markers, crypts, and monuments also contribute to the scenic and rural quality of the property. The visual quality of the Garden Cemetery and the fact that it contains more than three acres of open space in this very urbanized city has inspired the municipal government to see it is a community asset and to prepare a plan to protect and improve the Cemetery so that it may be enjoyed and used by the local residents for passive recreation.

Currently the Cemetery is locked to minimize vandalism and to preserve the integrity of the site until rehabilitation can occur. The immediate goal of the City is to make improvements to the Cemetery so that it can be opened and enjoyed by the public during daylight hours. In order for the Cemetery to be open to the public it first must be made safe and accessible.

The Master Plan is designed to be implemented in phases over a multiyear time period. The first phase of the plan includes repairing walls that are an immediate danger to public safety and replacing some of the perimeter fences in order to thoroughly secure the site. Additionally, the first interior restoration phase includes the repair and improvement of the Soldier's Lot portion of the Cemetery. The Soldier's Lot is currently used by Veterans' groups during Memorial Day Celebrations. These groups also maintain several annual planting beds in the area.

Later phases include the restoration and stabilization of crypts, path restoration, including the construction of several paths that form accessible routes through the site, replacement of an existing set of steps near the rear of the site, stabilization and restoration of monuments, and the reestablishment of a mature tree canopy wherever possible in the interior of the site.

The city's goal is to have made sufficient progress with the implementation of the Master Plan to enable the cemetery to be opened to the public by 2024, the 400th anniversary of the settlement of Chelsea by Samuel Maverick, an English colonist.



Above: Crypts



Above: Wall Condition along Shawmut



Above: Existing Wall at South Corner Along Central



Above: Existing Chainlink Fence at the Corner of Central and Shawmut

Site Analysis

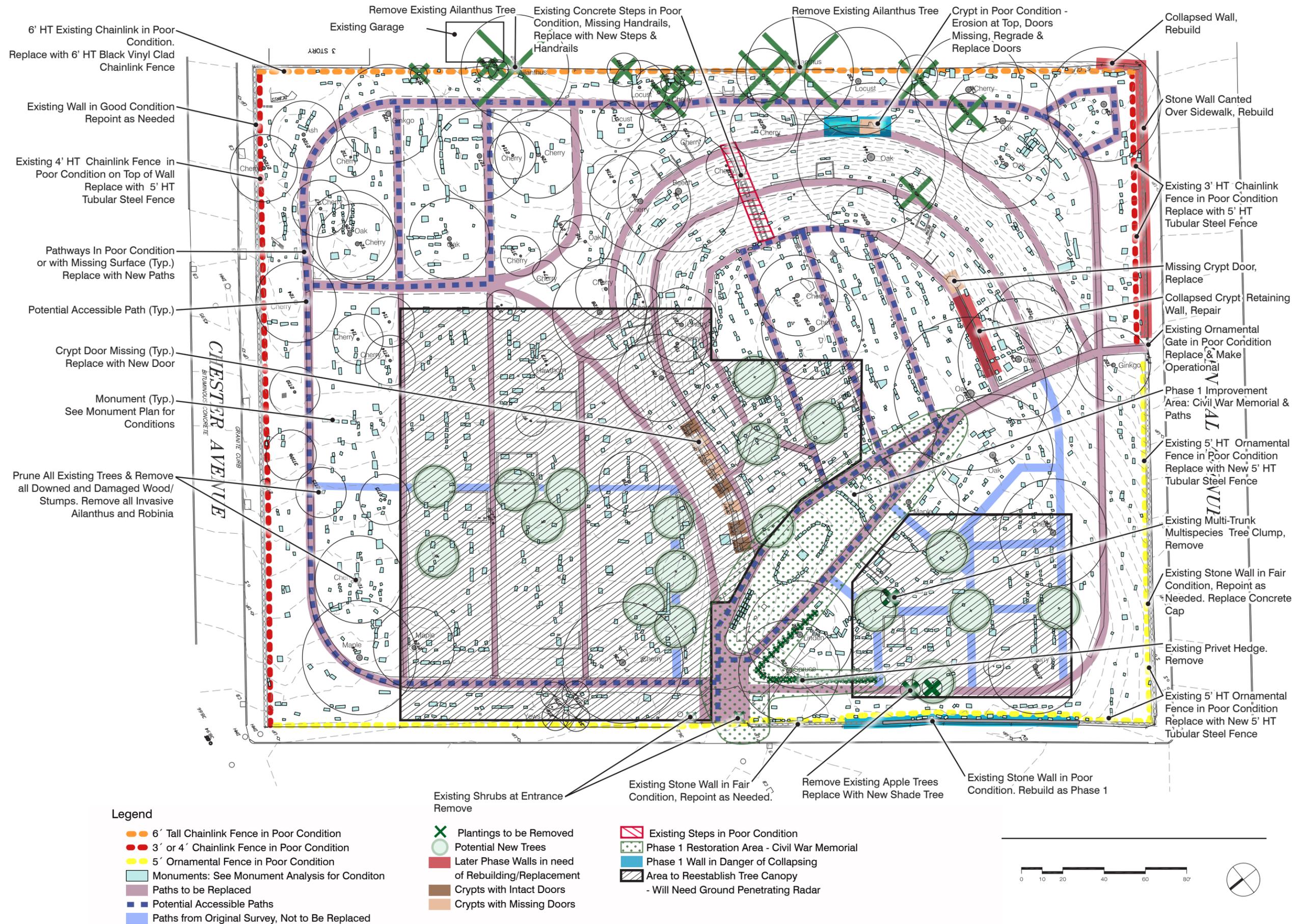
CBA Landscape Architects LLC was commissioned by the City to prepare a site analysis in order to outline and identify the conditions of the Cemetery’s paths, walls, fences, monuments, vegetation, and other physical site features. CBA generated two plans that illustrate these conditions. The first plan presented in this report is the “Site Analysis Plan”.

The Site Analysis Plan, on the following page of this report, examines the current physical condition of the fences, walls, paths, steps, and crypt doors. It also illustrates which trees should be removed, and which areas should be strategically replanted to restore a mature tree canopy. The plan also shows which paths can be made accessible without infringing upon the adjacent grave plots and it indicates which sections of wall are in danger of collapsing or in need of significant repair.

Several historic paths on this plan are identified as to not be replaced. These paths are either very narrow in nature, less than 3’ wide, or have deteriorated to the point where the original location of the path is hard to ascertain within the site.

These historic paths also provide strategic areas to restore tree canopy within the site. Locating trees in former path locations minimizes the risk of disturbing interred bodies located throughout the cemetery. Ground penetrating radar should be used to confirm locations of all trees to be planted to ensure that no remains are disturbed in the planting process.

SITE ANALYSIS PLAN



Marker Condition and Restoration

The second analysis plan in this report shows the conditions of the monuments, including all of the grave markers. It divides the monuments into four categories:

1. Visually intact Monuments,
2. Leaning Visually Intact Monuments,
3. Leaning Damaged Monuments, and
4. Heavily Damaged or Toppled Monuments.

The plan identifies the six monuments deemed significant in the Registration Form for the National Register of Historic Places for the site.

This marker summary will help the city identify markers which are either at risk of falling, or are historically significant. These markers should be prioritized for stabilization and restoration.

Markers which are indicated on the plan as either leaning and visually intact, or damaged and leaning should be stabilized prior to opening the park to the public. They should be the first markers to undergo stabilization.

Following the stabilization of markers mentioned above, historically significant markers should undergo restoration. After all markers that are leaning or historically significant are repaired, the remaining markers within the cemetery should be repaired, or restored as deemed appropriate by the City in consultation with a historic restoration specialist.

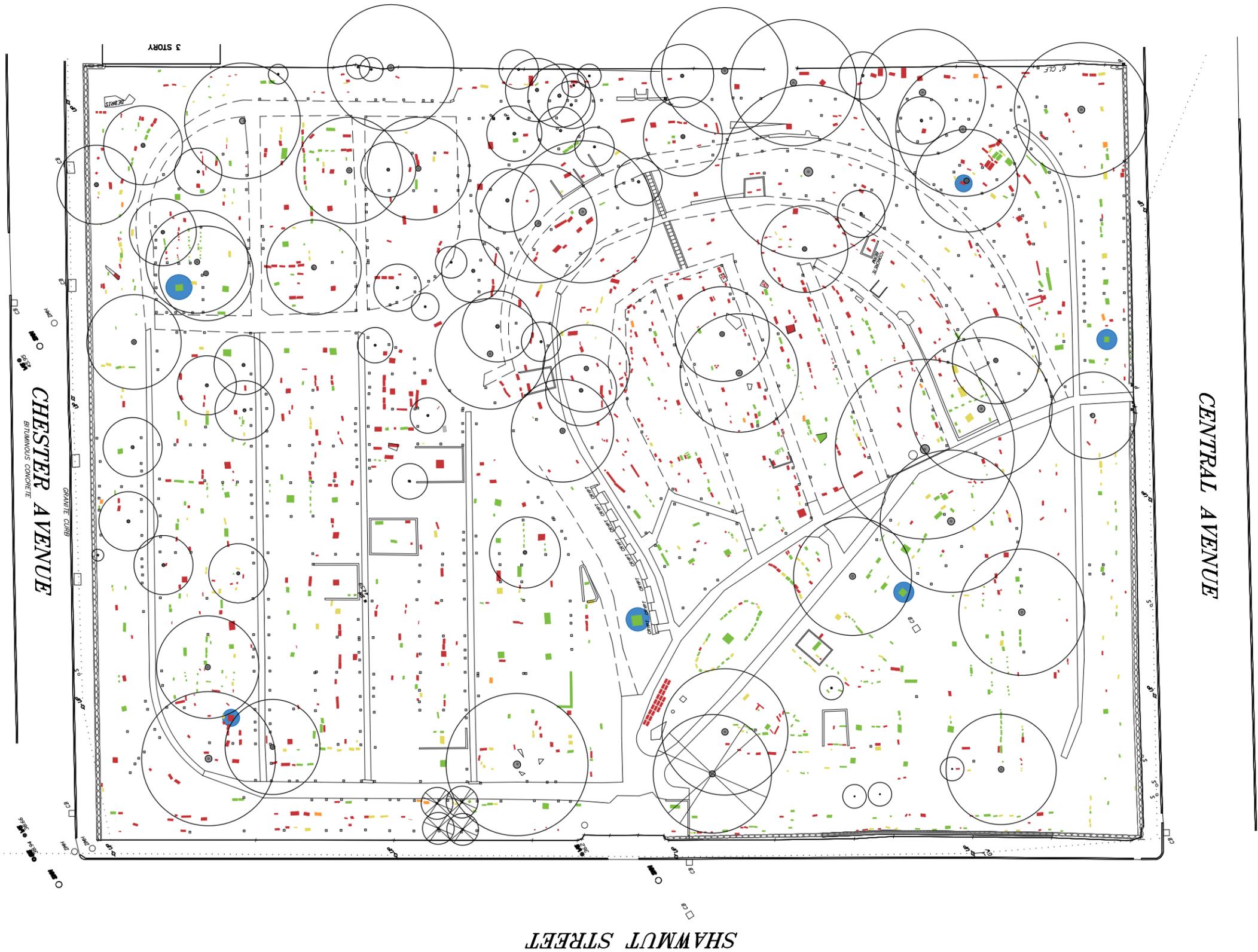
Marker restoration, except for those deemed at risk of falling, could potentially be accomplished by volunteer adult labor and high school students. In order for this to be accomplished teachers, or several volunteers would have to be trained by a historic marker restoration specialist. Once trained, these teachers and volunteers would be able to instruct and supervise students and other volunteers in the restoration of markers throughout the site. (For the care of loose fragments of this report see the maintenance section of this report.)

The cleaning and restoration process outlined above could potentially be funded by Community Preservation Act money, either as a educational opportunity, or as a summer youth enrichment initiative. The City at one time had a complete inventory of markers and memorials, but two volumes are lost. As part of the cleaning and restoration process the inventory

should be updated and tied to a CAD survey of the site. This marker documentation could potentially be uploaded online for the public to learn more about each marker.

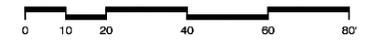
Right: Civil War Memorial & Markers at Soldier's Plot

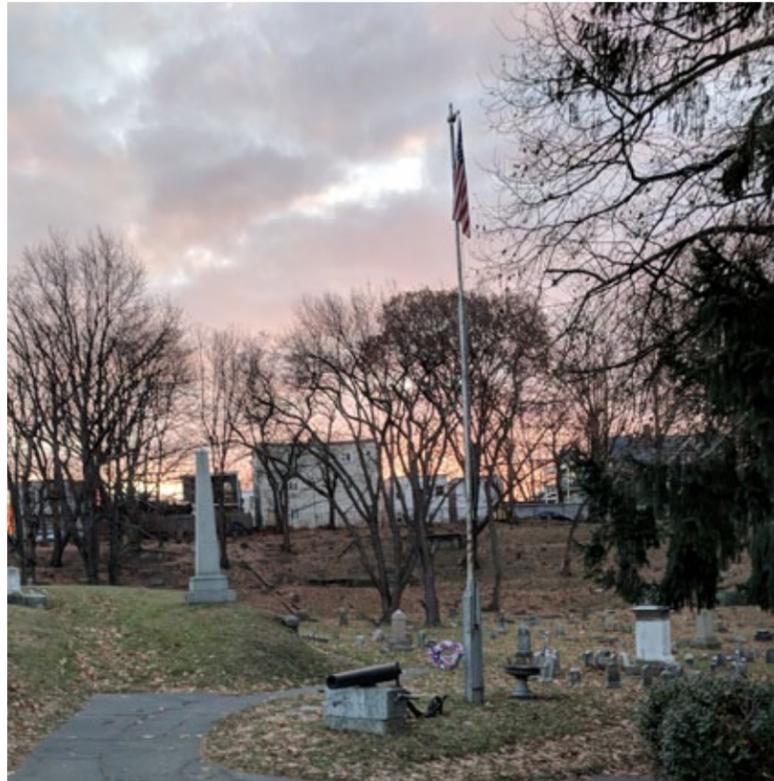




MARKER INVENTORY

- Key:
- Visually Intact Monuments - 577 Monuments
 - Leaning Visually Intact Monuments - 204 Monuments
 - Leaning Damaged Monuments - 14 Monuments
 - Heavily Damaged or Toppled Monuments - 830 Monuments
 - Historically Significant Monuments - 6 Monuments





Left: Existing Paths & Cannon at the Soldier's Plot



Left: Existing Steps Connecting the Upper and Lower Dell Areas

Site Grading & Paths

In order to provide accessible routes through the site, CBA examined the topography and layout of the current paths. Accessible paths were identified and, when possible, paths that were not accessible per the Americans with Disabilities Act were regraded and made accessible. In several locations low boulders were placed along the sides of the regraded paths to support the increased slopes along the edges of the paths. The boulders were used to maintain the rustic quality of the site. Asphalt and concrete paths will be replaced with stabilized stonedust. Stonedust paths are more aesthetically appropriate for a cemetery of this era and stonedust can be installed and maintained without the use of heavy machinery. The new and existing accessible paths make a significant area of the cemetery available to people with limited mobility.

Along steeper portions of site, notably where existing paths run perpendicular to the general slope of the landscape, pieces of granite curbing are used to stabilize the sides of the paths. This granite curbing allows for a significant reduction in the cross slope of the path, and will reduce the risk of the path washing down the hillside. These granite edges are located along paths so that construction will not encroach on the cemetery plots, and grave sites.

Paths that are not accessible have been regraded to include perron steps, single treads separated by several feet of path, in areas that are over a 5% slope. These steps provide a visual clue that the paths are not accessible and should be avoided by people with limited mobility. Furthermore, the addition of perron steps reduces the overall slope of the paths and reduces the risk that the stone dust surface will erode or washout during heavy rain events.

Drainage throughout the cemetery flows over the surface. There is one existing catch basin located at a low point in the north-west quadrant of the cemetery. This catch basin is currently in working condition and has not been identified for replacement.

Schematic Grading Plan

The following page is the proposed grading plan for the site. This plan shows all accessible routes, perron steps, existing and proposed site walls. Phase one paths, and walls are identified separately on the plan.

Key:

- Accessible Stabilized Stonedust Path - Phase 1
 - Accessible Stabilized Stonedust Paths Later Phases
 - Inaccessible Stabilized Stone Dust Paths with Perron Steps
 - New Boulder Edge
 - New Stone Wall (Max Height 3')
 - New Granite Wall (Most Approx. 12" Tall)
 - Potential New Tree Locations
- Notes: Ground Penetrating Radar Needed to Confirm New Tree Locations.
All New Trees to be Shade Tree Species



SITE GRADING PLAN



Phasing

The first phase (Phase 1) of the Garden Cemetery rehabilitation, which is scheduled to begin construction in the spring of 2019, includes the Soldier's Lot, the rebuilding of a portion of the stone wall along Shawmut Street, and the replacement of the ornamental fence along Shawmut street and along Central Avenue with a decorative tubular steel fence. The later phases of implementation of the Master Plan prioritize security, safety, accessibility, stability of the retaining walls and monuments, and the overall visual quality of the site.

Phase 1 addresses the most dangerous situation in the Garden Cemetery, the stone wall that is in danger of collapsing. It also takes the first step towards securing the site by replacing the dilapidated iron fence and requesting community preservation funds to install a new gate with an archway sign reading " Garden Cemetery 1841". A priority of this phase is making the Soldier's Lot accessible to individuals with disabilities. The Soldier's Lot is a part of the cemetery that is actively used by Veterans groups.

Phase 2 further addresses securing the perimeter of the Cemetery by replacing the remaining old fences. These include replacing the chain link fence at the rear of the property with a six foot high vinyl clad chain link fence and replacing the remaining low chain link fence along Central Avenue and the low chainlink fence along Chester Street with an ornamental tubular steel fence. This work completes the new perimeter fencing for the Cemetery. Phase 2 also calls for rebuilding the southern half of the retaining wall along Central Avenue and continuing around the corner. This portion of the wall is in danger of collapsing onto the sidewalk, and the new fence cannot be installed above the existing wall in its present condition.

Phase 3 further addresses safety and security. It calls for securing the crypts and stabilizing all monuments that are in danger of falling. Securing the crypts requires not only making sure that the doors and/or openings are completely closed, but also making sure that the roofs of the crypts are structurally sound so that they do not cave-in while visitors walk on the lawns above them. Phase 3 also calls for all the trees within the Cemetery to be pruned for safety and structural integrity.

With potential hazards addressed, work can begin on the restoration of

the remaining paths throughout the site. Given the challenging access for construction equipment within the site, the phasing calls for path improvements to begin at the perimeter of the site and then proceed in quadrants around the Soldier's Lot.

Phase 4 is the installation of the accessible loop path that runs along the edge of the property along Shawmut Street, all of Chester Avenue, and along the rear property line. Portions of the loop path requires significant grading and boulders will need to be placed in some areas to retain the adjacent slopes.

The remaining Phases 5 through 9 consist of path repair and restoration of the landscape within the interior of the cemetery. These phases work around the Cemetery in a counter-clockwise fashion, with the final path restoration proposed for the lower dell area.

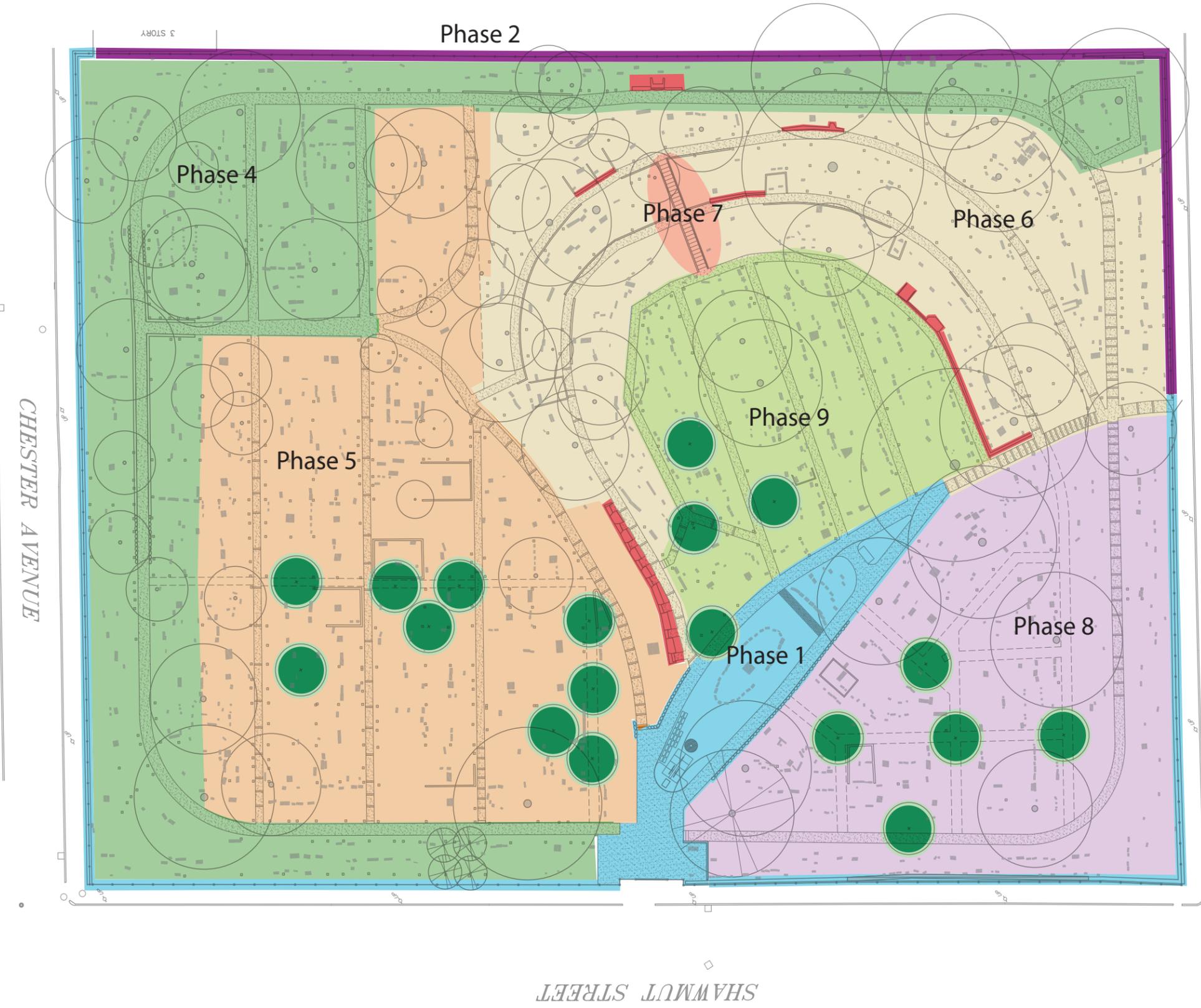
Phase 7 includes the restoration of the concrete stairs connecting the lower and upper dell areas. As path sections are completed, any tree canopy restoration and tree planting should occur concurrently to adjacent path construction. Ground penetrating radar will need to be used before tree planting to make sure that no grave sites are disturbed.

Several smaller parts of the Master Plan are not called out as part of a specific phase. These smaller projects predominately are found in the Soldier's Lot portions of the cemetery and include such things as the restoration of the existing cannon, adding smaller flagpoles in order to fly regimental flags from the Civil War, and marker restoration. The cannon restoration is a good candidate for a preservation grant and marker restoration throughout the site could be done by a group of volunteers.

The City of Chelsea will be responsible for determining that the Garden Cemetery can be safely opened to the public.

The Phasing Plan and Illustrative Master Plan follow. It should be noted that all of the plans in this report were designed to be printed on 24"x36" sheets. Digital files of the full sized plans can be requested from the City.

- Key:
- Phase 1 - Soldiers Lots, Fences & Wall at Shawmut
 - Phase 2 - Wall & Fence Along Central, Rear Fence
 - Phase 3 - Crypts, Unusable Monuments (Not Shown)
 - Phase 4 - Accessible Loop Path
 - Phase 5 - Paths Between Chester & Shawmut
 - Phase 6 - Upper Bowl Paths
 - Phase 7 - Concrete Steps in Bowl area
 - Phase 8 - Lower Paths Between Central and Shawmut
 - Phase 9 - Lower Bowl Paths
 - Proposed Tree Location



PHASING PLAN





MASTER PLAN

Legend
 Accessible Path
 Inaccessible Path

0 10 20 40 60 80



Cost Estimates

As part of the master planning process CBA prepared a schematic cost estimate for the entire site. This cost estimate has been broken down by phases and areas. This breakdown allows the city to schedule and phase the installation of site improvements as budget and time allows. Below is a table showing the cost per phase including an inflation rate of 6% in construction costs per year, but excluding any raw material tariff increases. A full cost breakdown by item for each phase follows the summary table and has all prices in 2018 dollars.

Year	Phase	Cost Estimate 2018 Dollars	Price with Inflation of 6% per year
2019	Phase 1: Soldiers Lot, Wall Repair, Fencing & Gates	\$356,692.88	\$378,094.45
2020	Phase 2: Rebuilding of Perimeter Walls & Fencing	\$256,842.44	\$288,522.16
2021	Phase 3: Monument Stabilization, Crypt Restoration	\$367,166.25	\$437,300.88
2022	Phase 4: Accessible Loop Paths, Crypt Restoration	\$278,453.38	\$351,540.98
2023	Phase 5: Paths Between Shawmut & Chester	\$101,344.29	\$135,621.52
2023	Phase 6: Paths in Upper Bowl Area	\$95,237.50	\$127,449.26
2023	Phase 7: Dell Steps	\$64,894.50	\$86,843.48
2024	Phase 8: Lower Paths below Chester & Shawmut	\$71,232.15	\$101,044.17
2024	Phase 9: Lower Bowl Paths	\$58,392.40	\$82,830.74
Total Cost: Master Plan Adjusted for Inflation			\$1,989,247.64

*Note: The total cost of rehabilitating the crypts is not yet known. A study and a \$100,000 allowance have been included in the cost estimate.

Additional Small Projects

In addition to the large phased portions of the master plan there are two projects that can be done separately and are good candidates for Community Preservation Act Funding and/or Massachusetts Historical Commission Grant money. These projects are the restoration of the existing Civil War cannon and the addition of six regimental flag poles in the Soldier's Lot. Their costs are listed in table 2 below.

Project	Description	Estimated Price
Cannon	Restoration of Cannon including repainting, fabricating historically accurate wheels, and securing to new concrete pad.	\$22,200.00
Flagpoles	Installation of 6 fifteen foot high flagpoles on a cobble mow strip.	\$9,840.00
Monument Inventory	Updating current inventory of monuments including current conditions. Linking the information to a CAD file of the site	\$15,000/Season
Monument Cleaning	Cleaning and restoring monuments, using an accredited conservator to lead the effort	\$10,000/Season

Right:
Rendering
Of The
Soldiers
Plot



Maintenance*

Laws Rules and Regulations

The City of Chelsea is the governing authority responsible for the care and maintenance of the cemetery.

Because the site is listed on the National Register of Historic Places, preservation restrictions may be imposed by the Massachusetts Historical Commission. Local rules and regulations regarding the use of the cemetery should be reviewed and reaffirmed with the Historical Commission. A rules sign in English and Spanish should be displayed at each entrance gate. The rules on the sign should include:

- No Gravestone Rubbing
- Do Not Sit or Lean on Tombs or Gravestones
- No Alcoholic Beverages
- No Dogs Allowed
- No Bicycles, Skateboards, or Running/Jogging
- No Music

Visitors should be reminded to conduct themselves in a manner keeping with the dignity and sacredness of the cemetery. Loud or unseemly conduct should be prohibited. Visitors should not litter the grounds, or cut, break, climb, or injure trees or other vegetation.

General Cleanup

Litter is a major problem in any public open space and it must be controlled to create pride in the cemetery. An appearance of neglect encourages additional trash dumping and vandalism. It is important to provide a high level of maintenance. Leaves, paper, trash and other debris should be removed on a weekly basis. Collection from trash receptacles should be performed daily. The City should place trash and recycling receptacles on the sidewalk outside of each gate. A clean up crew should be provided to clean up after any special event in the cemetery. Leaves should be removed in the fall, and the grounds should be cleared of fallen branches.

Circulation Systems and Materials

Clean paths weekly. Rake stone dust paths as needed to smooth out any depressions that may have occurred. If sections of the path become significantly depressed, or washout occurs replenish the stonedust and re-compact in an even manner. Every five years or so add a new layer of compacted stabilized stonedust to the cemetery paths.

Stone Walls

Due to the cemetery's location in a northern climate, structural elements are subjected to a wide range of temperatures, and the freeze thaw cycle. This thermal stress requires regular examination and maintenance of all structural elements. Yearly inspect all walls for cracked mortar, loose or broken stones, and other wall movement. Repair all structural deficiencies, including the repointing of walls, and replacement of concrete caps as needed.

Mound Tombs

As a general principle, mound tombs (those with vegetation on the top, and/or sides) should be maintained in lawn to preserve the continuity of image in the cemetery. The requirement to mow these lawn areas has raised concerns regarding the structural integrity of the tombs below, and mower access. Mound tombs with structural issues, or excessively steep slopes should be planted with a low groundcover, such as Vinca. Groundcovers however require more maintenance than lawn until they are established.

Gravestones

The deterioration of gravestones has become increasingly evident. Stone is subject to natural weathering which has accelerated due to air pollution. Porous stones like marble, sandstone, and limestone weather faster than nonporous stones such as granite. The prohibition of gravestone rubbing should continue as this process can leave wax or ink and cause surface losses. Seasonal site visits should be conducted to check for out-of-the-ground stones and any other cases of accelerated deterioration due to weather and vandalism. Repair/restoration efforts should be monitored at least once a year.

Upright headstones are one of the most important visual impressions conveyed to visitors. It gives the appearance of good maintenance. Fallen or tilting headstones should be reset in an upright position. Left in place, leaning headstones are more liable to damage by lawn mowers. Deterioration may be accelerated because fallen stones can absorb moisture from the ground, or collect snow and rainwater.

Gravestones that are broken should be reset if they have sufficient shaft length. Stones that are currently leaned against the back of another stone or against an adjacent wall or fence should be reset if possible, or stored if shaft length is insufficient.

Stone Fragments: The disposition of stone fragments is a significant issue. Fragments should be picked up, recorded, and stored in a secure location. The intent would be to eventually return these items to the field in their appropriate location. All significant fragments should be saved for the ultimate restructuring of stones. Fragments larger than 2" square, or smaller if they contain inscriptions or carvings, should be restructured/ reset if possible. For smaller pieces, or pieces without inscriptions they can be left where they are found and buried with their location marked. Conservation efforts shall include the documentation of all stones or monuments moved from their original location.

Lichens produce acid which eats into stone, particularly porous stones. Removal is desirable but can result in damage to the stone. The safest method for removal is to soften the lichen with water, and gently remove with a plastic brush or wooden spatula. There is insufficient research on the impacts of using ammonia solutions, formaldehyde, etc. on stones to assist with removal.

Fences and Gates

Replace bent or damaged pickets, posts, or panels, as required. Paint fences as often as required to maintain good condition and appearance. All painted fences should be monitored annual for peeling and failure.

Chainlink fences should have their posts tested for stability at least once a year, replace those that are weak or structurally unsound. Repair all damaged fence fabric as soon as possible.

Benches

Inspect at least once a year. Repairs should be made immediately upon discovery of need or notification.

Flagpole

The American Flag should be raised daily or displayed only on holidays. If the American Flag is left flying at night, it must be lit. Flagpoles should be assessed annually for structural and paint integrity. Repair as needed.

Site Drainage

Inspect storm structures four times a year and remove sediments from catch basins in early spring, or more often if required. Clean storm piping at least every five years or more often as required. Remove all mud, leaves, and other debris. Repair fractures in masonry drainage structures as often

as required.

Soils

Test for pH and fertility levels should be made every 3 to 5 years to determine fertility changes made with basic treatments and to give a benchmark for further soil improvements. It also takes 3 to 5 years for the soil to reach equilibrium.

Liming: Ground limestone should be applied every 3 to 5 years as required to bring lawn areas to the preferred 6.0-6.5 pH level. If a lime application is necessary, apply it 2 to 3 weeks prior to fertilizing. Lime should not be used in combination with animal manures or with nitrogenous fertilizers, as it causes the rapid release of ammonia. When applying lime it should be spread over the surface of the ground and should be thoroughly mixed with the upper few inches of soil. The rate of application depends upon the form in which the lime is applied and texture of the soil. The rate of application of ground limestone should be determined by soil test and should not exceed 75 pounds per 1,000 square feet at any one time, with at least 30 days between applications to bring the pH to the desired level. Lime should be applied either in early spring or late fall with early spring preferred.

Fertilizing: Soil tests are required to determine fertilization needs. Lawn areas should be fertilized a minimum of twice a year to maintain a healthy lawn. Light, frequent applications of readily available nitrogen fertilizers are preferred over heavy, infrequent applications. The chemical formulation of all fertilizers proposed for use should be checked by a stone conservator prior to use to prevent potential damage to gravestones and other artifacts.

Lawn

Seed mixes shall incorporate improved low maintenance, drought resistant and shade tolerant seed varieties of bluegrass and fescue. The best time to plant lawn is between August 15th and October 1st to reduce weed infestation, and maintenance requirements. If planting in spring, plant as soon as the ground can be worked and when the soil is free of excess moisture. Regrade any mounds or depressions in lawn areas, and blend these areas smoothly into surrounding grades.

The rehabilitation of lawn areas in the cemetery needs to be done with more care than other lawns due to the presence of gravestone and bone fragments at or just below the surface. Weeds and other undesirable

species should be removed. The soil should be loosened by power rake or vigorous hand raking. Roto-tilling is not recommended because of potential damage. Fertilizer and lime should be added as recommended by soil analysis. Mounds should be regraded and depressions filled with topsoil. Bare spots should be seeded, top dressed, and rolled. Water must be provided to maintain a sufficient moisture level to establish grass.

Water lawns as necessary to maintain normal growth and color. Avoid light, frequent sprinklings. Soak the entire root area. If necessary allow lawn to go dormant in the summer.

Mow every week or two to a height of three inches. The most serious issue is the routine removal of grass in the immediate vicinity of gravestones and tombs. Power mowers can scar and break stones. The current best solution is to mow with lawn mowers to within 12 inches of gravestones and tombs and then use weed whips to trim the remaining area. Weed whip use is permissible around all stones except for marble and weak slate stones. At marble gravestones and some weaker slate ones, grass should be removed from the base of the stones.

Weed, Disease, and Pest Control: Provide appropriate pesticide application in late spring and early fall if necessary. Do not treat a new lawn until the second year of growth. The use of salt, chemical weed killers and insect and disease sprays should be discouraged to prevent potential damage to gravestones. When chemical controls are recommended, the formula should be checked with a stone conservator before use. Do not burn grass in the cemetery.

Roll lawn areas in the spring as necessary to repair frost heaves and irregularities caused during the winter. Use a light roller and roll the lawn when the soil is fairly dry and freezing weather has passed.

In areas of the cemetery with heavy visitation aerate compacted lawn areas twice a year during the spring and late summer or early fall. Tines should not penetrate more than three inches to protect buried resources. Do not aerate when the soil is extremely wet or dry.

Trees

Trees should be pruned on a yearly basis to remove dead wood. Every five years trees should be examined and pruned by a MA licensed arborist. Prune trees in such a manner as to preserve the natural character of

the plant. Remove all dead wood, suckers, and badly bruised or broken branches. Do not cut the leader. Remove branches to provide eight feet of overhead clearance. Do not prune evergreen trees except to remove dead and broken branches. Pruning should only be done by a non arborist in an emergency situation or when it is a question of public safety. Prune trees to eliminate screened areas that can provide hideouts.

Volunteer growth should be removed on a yearly basis during the summer months when the frequency of mowing is reduced. If growth is in conflict with gravestones or tombs extreme care should be exercised. Cut trunks as close to the soil as possible and leave the stump in place to rot. After a stump has rotted out sufficiently, topsoil fill should be added to blend in with surrounding grades and the soil and seeded with lawn. Removal of all dead trees should be removed by a trained arborist.

New trees should be planted in areas where there is currently a lack of canopy. Ground penetrating radar should be used to locate trees in a way to not disturb remains. Avoid planting trees close to gravestones. Water newly planted trees for the first 3-5 years. Remove guying cables and tree wrap from new trees after the first year.

**Partially Excerpted and adapted from Garden Cemetery Master Plan, Chelsea, Massachusetts by Walker-Kluesing Design Group, December 1998.*

Phase 1 – Soldiers Lot, Wall Repair Along Shawmut, Perimeter Fencing & Gates – Spring/Summer 2019					
Removals & Pruning					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Demolition:	1	LS	\$23,865.00	\$23,865.00
2	Prune Existing (4) Trees Indicated on Phase 1 Drawings	4	EA	\$750.00	0
					DPW Budget
					Subtotal: \$23,865.00
Paving					
No.	Item	Quantity	Unit	Unit Price	Subtotal
	Stabilized Stone Dust Path	2220	SF	\$6.00	\$13,320.00
	Stabilized Entry Plaza	352	SF	\$6.00	\$2,112.00
	Rebuilt Sidewalk at Shawmut Street	965	SF	\$9.00	\$8,685.00
					Subtotal: \$24,117.00
Site Walls & Grade Transition Elements					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Placed Boulder Edge	113.5	LF	\$30.00	\$3,405.00
2a	Rebuilt Wall Along Shawmut CF Concrete – Including Footing	1393	CF	\$45.00	\$62,685.00
2b	Rebuilt Wall Along Shawmut Face Foot Veneer	603	FF	\$35.00	\$21,105.00
					Subtotal: \$87,195.00
Fencing					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	5' Height Aluminum Ornamental Fence Along Shawmut	419	LF	\$96.00	\$40,224.00
2	5' Height Aluminum Ornamental Fence Along Central	177	LF	\$96.00	\$16,992.00
3	New Gate at Central	1	LS	\$3,000.00	\$3,000.00
4	Entry Gate and Archway Along Shawmut	1	LS	\$4,000.00	\$0.00
					CPC Grant
					Subtotal: \$60,216.00
Site Elements					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Reset Existing Markers at Base of Reconstructed Wall	32	EA	\$650.00	\$20,800.00
2	Reset Existing Damaged Monument Soldiers Lot Area	1	EA	\$500.00	\$500.00
3	Granite Memorial Plaques	21	EA	\$625.00	\$13,125.00
4	Granite Dedication Plaque	1	EA	\$1,100.00	\$1,100.00
5	Paint Existing Flagpole & Install Solar Light	1	LS	\$750.00	\$750.00
6	Interpretive Sign at Gate	1	EA	\$450.00	\$450.00
7	6' Long Granite Bench	2	EA	\$900.00	\$1,800.00
8	Install 1 Trash & 1 Recycling Receptacle at Each Gate	4	EA	\$2,225.00	\$8,900.00
9	Security Cameras Mounted on Street Light Poles Adjacent to Park	TBD	EA		
					Paid out of Police Budget
					Subtotal: \$47,425.00
Planting					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Loam & Seed Lawn	5656	SF	\$0.75	\$4,242.00
					Subtotal: \$4,242.00
Subtotal Phase 1					\$247,060.00
2.5% Bond					\$6,176.50
15% Overhead/Profit					\$37,059.00
20% Contingency					\$49,412.00
Phase 1 Total without Construction Administration Fee					\$339,707.50
5% Construction Administration Fee					\$16,985.38
Total Phase 1 Including Construction Administration					\$356,692.88

Phase 2 - Rebuilding of Wall along Central, Remainder of Perimeter Fencing – 2020					
Removals					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Demolition: Remove Existing Fence, Collapsed Walls	1	LS	\$20,000.00	\$20,000.00
					Subtotal: \$20,000.00
Site Walls					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1a	Rebuild Stone Wall Along Central Avenue: Stone Including Top	657	FF	\$65.00	\$42,705.00
1b	Rebuild Stone Wall Along Central: Footing	139	LF	\$65.00	\$9,035.00
2	New Unit Block Wall at Corner of Central and Private Property	203	FF	\$40.00	\$8,120.00
					Subtotal: \$59,860.00
Fencing					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Boundary Survey to Establish Property Lines	1	LS	\$2,200.00	\$2,200.00
2	5' Height Aluminum Ornamental Fence Along Central, On Top of Wall	130	LF	\$90.00	\$11,700.00
3	6' Height Black Vinyl Clad Chainlink Fence Along Back of Cemetery	430	LF	\$65.00	\$27,950.00
4	5' Height Aluminum Ornamental Fence Along Chester	320	LF	\$96.00	\$30,720.00
					Subtotal: \$72,570.00
Study of Crypts					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Structural Study of Crypts: Cost Estimate to restore not possible at this time	1	LS	\$10,000.00	\$10,000.00
					Subtotal: \$10,000.00
Subtotal Phase 2					\$162,430.00
2.5% Bond					\$4,060.75
15% Overhead/Profit					\$24,364.50
20% Contingency					\$32,486.00
Total Construction Cost Phase 2 Without Design Fees					\$223,341.25
15% Design, Construction Documents, Construction Administration Fee					\$33,501.19
Total Phase 2					\$256,842.44
Phase 3 - Monument Stabilization, Crypt & Crypt Wall Restoration - 2021					
Site Walls & Crypts					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Wall Stabilization of Existing Walls In Cemetery (Rough Estimate)	148	LF	\$200.00	\$29,600.00
2	Crypt Stabilization & Repair (Allowance Only)	1	AL	\$50,000.00	\$50,000.00
					Subtotal: \$79,600.00
Marker Stabilization					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Stabilization of Markers that are a public safety hazard (Rough Estimate)	218	EA	\$700.00	\$152,600.00
					Subtotal: \$152,600.00
Subtotal Phase 3					\$232,200.00
2.5% Bond					\$5,805.00
15% Overhead/Profit					\$34,830.00
20% Contingency					\$46,440.00
Total Construction Cost Phase 3 Without Design Fees					\$319,275.00
15% Design, Construction Documents, Construction Administration Fee					\$47,891.25
Total Phase 3					\$367,166.25

Phase 4 – Accessible Loop Path Along Chester & Back of Cemetery - 2022					
Removals					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Demolition: Remove Existing Paths	1	LS	\$5,000.00	\$5,000.00
					Subtotal: \$5,000.00
Paving					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Stabilized Stone Dust Path	5129	SF	\$6.00	\$30,774.00
					Subtotal: \$30,774.00
Site Walls & Grade Transition Elements					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1a	New Stone Walls Along Accessible Path	751	FF	\$65.00	\$48,815.00
1b	New Stone Wall Footings	564	CF	\$40.00	\$22,560.00
2	New Placed Boulder Edge	65	LF	\$60.00	\$3,900.00
3	New Low Granite Walls Along Accessible Path	136	LF	\$40.00	\$5,440.00
4	Crypt Stabilization & Repair (Allowance Only)	1	AL	\$40,000.00	\$40,000.00
					Subtotal: \$120,715.00
Planting					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Loam & Seed Lawn	26144	SF	\$0.75	\$19,608.00
					Subtotal: \$19,608.00
Subtotal Phase 4					\$176,097.00
2.5% Bond					\$4,402.43
15% Overhead/Profit					\$26,414.55
20% Contingency					\$35,219.40
Total Construction Cost Phase 4 Without Design Fees					\$242,133.38
15% Design, Construction Documents, Construction Administration Fee					\$36,320.01
Total Phase 4					\$278,453.38

Phase 5 – Paths Between Chester and Shawmut – 2023					
Removals					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Demolition: Remove Existing Paths	1	LS	\$5,000.00	\$5,000.00
					Subtotal: \$5,000.00
Paving					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Stabilized Stone Dust Path	2203	SF	\$6.00	\$13,218.00
2	Perron Steps in Path	321.75	LF	\$25.00	\$8,043.75
3	Reset (2) Existing Granite Steps	1	LS	\$500.00	\$500.00
					Subtotal: \$21,761.75
Planting					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Loam & Seed Lawn	30706	SF	\$0.75	\$23,029.50
2	New Infill Trees	9	EA	\$1,200.00	\$10,800.00
3	Ground Penetrating Radar – Location of All Proposed New trees and flagpoles.	1	LS	\$3,500.00	\$3,500.00
					Subtotal: \$37,329.50
Subtotal Phase 5					\$64,091.25
2.5% Bond					\$1,602.28
15% Overhead/Profit					\$9,613.69
20% Contingency					\$12,818.25
Total Construction Cost Phase 5 Without Design Fees					\$88,125.47
15% Design, Construction Documents, Construction Administration Fee					\$13,218.82
Total Phase 5					\$101,344.29

Phase 6 – Upper Bowl Area – 2023					
Removals					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Demolition: Remove Existing Paths	1	LS	\$5,000.00	\$5,000.00
					Subtotal: \$5,000.00
Paving					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Stabilized Stone Dust Path	3580	SF	\$6.00	\$21,480.00
2	Perron Steps in Path	207	LF	\$25.00	\$5,175.00
					Subtotal: \$26,655.00
Site Walls					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Low Granite Walls	282	LF	\$40.00	\$11,280.00
					Subtotal: \$11,280.00
Planting					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Loam & Seed Lawn	23059	SF	\$0.75	\$17,294.25
					Subtotal: \$17,294.25
Subtotal Phase 6					\$60,229.25
2.5% Bond					\$1,505.73
15% Overhead/Profit					\$9,034.39
20% Contingency					\$12,045.85
Total Construction Cost Phase 6 Without Design Fees					\$82,815.22
15% Design, Construction Documents, Construction Administration Fee					\$12,422.28
Total Phase 6					\$95,237.50

Phase 7 – Dell Steps – 2023					
Removals					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Demolition: Remove Existing Steps and Handrails	1	LS	\$10,000.00	\$10,000.00
					Subtotal: \$10,000.00
Steps					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	New Steps including Cheekwalks and Footings per Tread	26	EA	\$1,000.00	\$26,000.00
2	Handrail for Steps	42	LF	\$120.00	\$5,040.00
					Subtotal: \$31,040.00
Subtotal Phase 7					\$41,040.00
2.5% Bond					\$1,026.00
15% Overhead/Profit					\$6,156.00
20% Contingency					\$8,208.00
Total Construction Cost Phase 7 Without Design Fees					\$56,430.00
15% Design, Construction Documents, Construction Administration Fee					\$8,464.50
Total Phase 7					\$64,894.50

Phase 8 – Lower Paths Between Central and Shawmut – 2024					
Removals					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Demolition: Remove Existing Paths	1	LS	\$5,000.00	\$5,000.00
					Subtotal: \$5,000.00
Paving & Steps					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Stabilized Stone Dust Path	1267	SF	\$6.00	\$7,602.00
2	Perron Steps in Path	96	LF	\$30.00	\$2,880.00
3	New Granite Steps (2 Risers) by Entrance	1	LS	\$1,400.00	\$1,400.00
					Subtotal: \$11,882.00
Planting					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Loam & Seed Lawn	22166	SF	\$1.00	\$22,166.00
2	New Infill Trees	5	EA	\$1,200.00	\$6,000.00
					Subtotal: \$28,166.00
Subtotal Phase 8					\$45,048.00
2.5% Bond					\$1,126.20
15% Overhead/Profit					\$6,757.20
20% Contingency					\$9,009.60
Total Construction Cost Phase 8 Without Design Fees					\$61,941.00
15% Design, Construction Documents, Construction Administration Fee					\$9,291.15
Total Phase 8					\$71,232.15

Phase 9 – Lower Bowl Paths – 2024					
Removals					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Demolition: Remove Existing Paths	1	LS	\$5,000.00	\$5,000.00
					Subtotal: \$5,000.00
Paving & Steps					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Stabilized Stone Dust Path	2224	SF	\$6.00	\$13,344.00
2	Perron Steps in Path	17.5	LF	\$30.00	\$525.00
3	3 Granite Riser Between Lower and Upper Dell Paths	1	LS	\$2,100.00	\$2,100.00
					Subtotal: \$15,969.00
Planting					
No.	Item	Quantity	Unit	Unit Price	Subtotal
1	Loam & Seed Lawn	11159	SF	\$1.00	\$11,159.00
2	New Infill Trees	4	EA	\$1,200.00	\$4,800.00
					Subtotal: \$15,959.00
Subtotal Phase 9					\$36,928.00
2.5% Bond					\$923.20
15% Overhead/Profit					\$5,539.20
20% Contingency					\$7,385.60
Total Construction Cost Phase 8 Without Design Fees					\$50,776.00
15% Design, Construction Documents, Construction Administration Fee					\$7,616.40
Total Phase 9					\$58,392.40