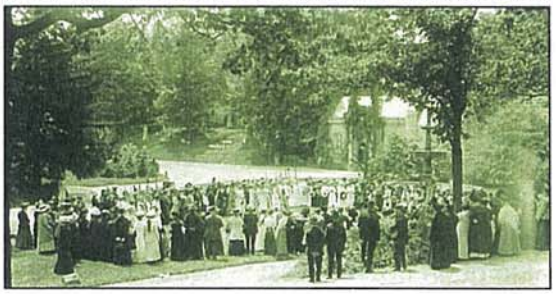
MOUNT HOPE CEMETERY
CULTURAL LANDSCAPE REPORT
TREE INVENTORY & MANAGEMENT PLAN



CHAPTER IV: MOUNT HOPE CEMETERY TREE INVENTORY

A. INTRODUCTION TO MOUNT HOPE CEMETERY TREE INVENTORY

The tree inventory at Mount Hope Cemetery was an important component of this planning project. There has never been such a comprehensive inventory undertaken in the history of this landscape. The intent of this inventory is to form a baseline of detailed information about the trees of Mount Hope Cemetery. The ongoing stewardship of the unique collection of specimen trees is the first area of concern in terms of care as these trees are mature and some have already been removed. The entire tree collection is important to the character of the landscape. The inventory was undertaken following arboricultural best practices with the intent to make the data accessible and useable by the City of Rochester.

The cemetery is a designed, maintained environment and the tree population within it is considered an urban forest. Urban forests are small pockets of green in a gray landscape, ribbons of life meandering through a largely artificial environment. They are enclaves of serenity and biological diversity tucked within suburban development and busy streets. The trends toward urbanization and 'urban sprawl' threaten the green infrastructure of cities, making the need to understand these ecosystems increasingly important.[1] It is important to recognize that while the tree inventory is comprehensive, the trees inventoried for this report represent only a portion of the trees within the cemetery boundary and an even smaller fraction of the larger urban forest in the greater Rochester area. The findings in this chapter focus on this smaller collection of inventoried trees, additional consideration should be given to the external pressures that may be placing this smaller urban forest at risk as discussed in Chapter VI. Traditional urban forest management practices tend to focus on one component of the urban forest ecosystem, trees. These practices may ignore other components of the urban forest, such as other plants, animals, people, and infrastructure. Attention to the health of urban trees is a necessary, but not a sufficient, requirement for urban forest sustainability. If management activities are administered independently of community goals, they are not likely to represent the convergence of what is socially desirable and ecologically possible. Consequently urban forest programs will not be sustained by community support.[2]

The preservation treatment and management chapter of this report recognizes many of the components of the urban forest including other plants, slopes and infrastructure. The information in Chapter IV contains straightforward recommendations, such as remove or prune a tree, and the methods for arriving at the recommendation. The tree inventory also provided the ability to analyze the data to illustrate species composition, age and highlight potential issues with this collection of trees. While the inventory and maintenance recommendations form a baseline for management, sustaining this resource cannot be achieved without community support. The value of an urban forest is equal to the net benefits that members of society obtain from it.[3] In the case of Mount Hope the benefits transcend measureable factors such as storm water reduction and air pollutant removal as the trees are a cultural asset. The critical component to the success of this landscape relies on the public understanding the value of sustaining it.

B. TREE INVENTORY METHODOLOGY & FIELD PROCESS

After reviewing the site, including the tree canopy density and topography, it was determined that the most efficient means of collecting the tree data would be to utilize aerial photography overlaid with a CAD drawing and a reference grid. Both the aerial photograph and CAD drawing were rectified to the State Plane Coordinate system.

The issue of geographic placement using satellite signals for global positioning (GPS) was considered. GPS data collection is feasible in the larger open areas with minimal topographic relief. However, the cemetery landscape is marked by topographic change and is heavily vegetated. The accuracy of the GPS data collection in these conditions would be limited to several meters and, in many cases, adjoining tree locations would overlap and conflict within these accuracy limits.

A MS Access database was established in which to store the collected data. Relevant data was collected for each inventoried tree, including "x" and "y" coordinates, cemetery section, tree type, size (DBH), condition and recommendation.

Field data collection was performed using a laptop computer running ESRI ArcPad. The aerial photo, CAD drawing and MS Access database were imported into the ArcPad application. Data collection points were located using visual cues from the aerial photo, CAD drawing and objects on the ground. The southern boundary for the tree inventory was Grove Avenue. Several areas within the project boundary would be considered "wooded", with larger trees comprising the canopy and numerous volunteer trees and shrubs comprising the understory. In these areas the larger canopy trees and understory single-stem trees greater than 3-inches DBH were included in the inventory. Understory shrubs and small volunteer trees within the "wooded" areas were not included in the inventory. It is estimated that an additional 400-600 smaller volunteer trees are present in these areas.

C. MOUNT HOPE CEMETERY TREE INVENTORY FINDINGS

The tree inventory was completed over a period of several weeks during August and September 2008. The major findings of Mount Hope's Tree Inventory include:

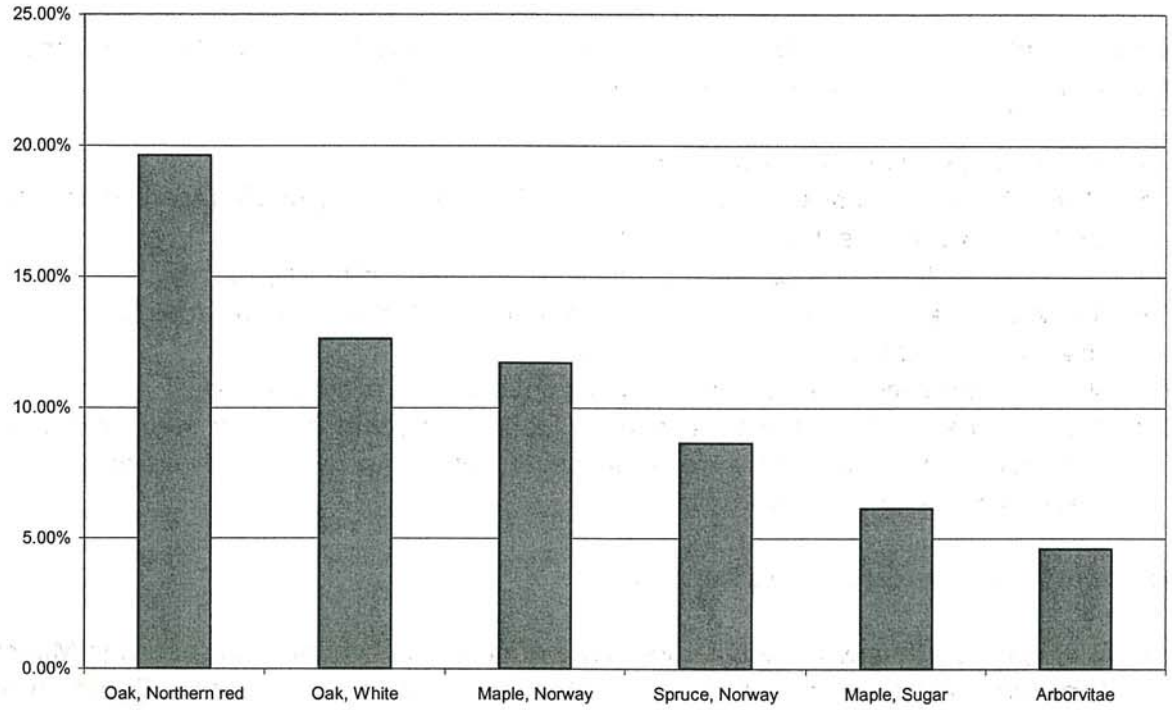
- 2,191 tree locations were inventoried
- Oaks (*Quercus*) comprise 34% of the population, followed by maple (*Acer*) comprising 23% and spruce (*Picea*) comprising 10%
- The size distribution indicates a high percentage of medium to large, or mature trees
- The overall health of the tree population is good with 91% of the population found to be in good to fair condition
- 476 trees were identified as existing during or before the historic period
- One hundred (0.5%) of the trees were found to present a higher level of risk to Cemetery visitors. 55 trees were recommended as high priority removal and 45 trees were recommended as hazard prune

Analysis of Tree Inventory Findings & Issues

In terms of species diversity there is a wide range of native and ornamental species in Mount Hope Cemetery, and there is notable infestation of exotic invasive species. Eighty-seven individual species were identified within the project boundary. As shown in Figure IV.1 six individual species represent over 63% of the inventoried population. The species contributing most significantly to the tree population is Northern Red Oak (*Quercus rubra*), followed by White Oak (*Quercus alba*) and Norway Maple (*Acer platanoides*). A table illustrating the relationship of all inventoried trees is provided in Appendix B.

The diversity of tree population at the level of the genus, species, or genotype are important considerations in terms of the ability of the urban forest to withstand stress. A diverse tree population may slow or prevent the spread of insects or diseases, and, in the event that such pests should become established, the impact on a diverse tree population may be less severe. Perhaps one of the most obvious examples of this in the urban forest is that of American Elm (*Ulmus americana*).[4]

FIGURE IV.1 - SPECIES DIVERSITY



It is important to note that within the project boundary Northern Red Oak comprises nearly one-fifth of the inventoried population and just over one-third of the tree population is Oak. In 2008 Oak Wilt (*Ceratocystis fagacearum*) was discovered in upstate New York. Throughout the range of Oak Wilt in the United States, red oaks are the most important hosts, but susceptibility varies somewhat by species. Mortality in red oaks can occur within 3 weeks after infection by the Oak Wilt pathogen under some circumstances. White oaks are susceptible as well and tend to survive longer. However, the pathogen is fatal in most cases. Considerations should be given to the existing urban forest structure when selecting species for future plantings, in particular Oak. Many of the largest and oldest trees within the Cemetery are Oak. These trees help define the character and create the sense of place for the Cemetery. Through careful planning the experience the Cemetery offers can be preserved, but it should be recognized that this experience may or may not occur under a canopy of Oak trees in the next century. Diversity can limit the impact of genus or species specific pests and diseases by reducing the number of susceptible trees within the population. It is important to recall the lessons learned from the past, such as the dramatic impact from the losses of American Elm. And to recognize the lessons being taught today as millions of Ash (*Fraxinus*) are being removed in the mid-west. Species diversity will enable this urban forest, this landscape as a whole to survive an epidemic.

FIGURE IV.2 - GENUS DISTRIBUTION

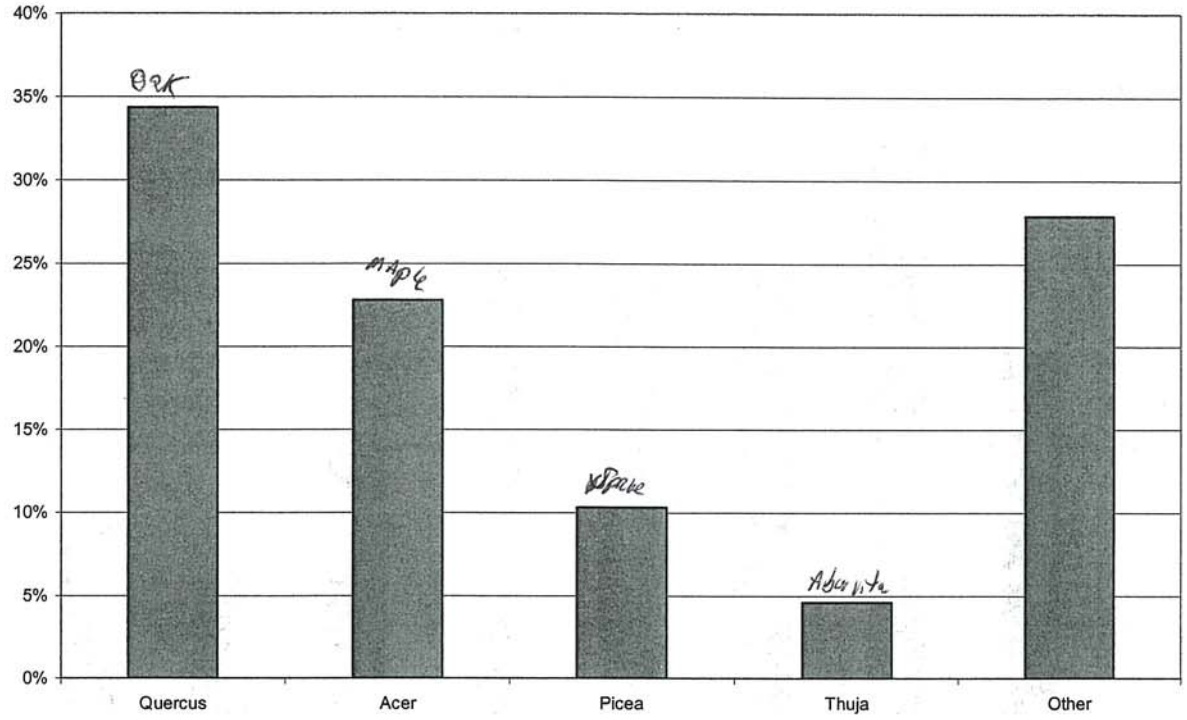


Figure IV.2 Genus Distribution: This chart considers all of the species within a single genus as related to the overall population of inventoried trees.

The genus *Quercus* including Black Oak (*Quercus velutina*), Chestnut Oak (*Quercus prinus*), English Oak (*Quercus robur*), Northern Red Oak (*Quercus rubra*), Pin Oak (*Quercus palustris*), Scarlet Oak (*Quercus coccinea*), Schumard Oak (*Quercus shumardii*), Swamp White Oak (*Quercus bicolor*), White Oak (*Quercus alba*) and Willow Oak (*Quercus phellos*) comprises 34.4% of the inventoried population.

The genus *Acer* including Japanese Maple (*Acer palmatum*), Norway Maple (*Acer platanoides*), Schwedleri Norway Maple (*Acer platanoides 'Schwedleri'*), Red Maple (*Acer rubrum*), Silver Maple (*Acer saccharinum*), Sugar maple (*Acer saccharum*) and Sycamore Maple (*Acer pseudoplatanus*) comprises 22.8% of the population.

The genus *Picea* including Blue Spruce (Picea pungens 'Glauca'), Norway Spruce (Picea abies) and Oriental Spruce (Picea orientalis) comprises 10.3% and Arborvitae (*Thuja)* comprises 4.6%.

The remaining thirty-nine genera (other) comprise 28% of the population with each genera representing typically less than 1% of the total population.

Tree Size Distribution

FIGURE IV.3 - SIZE CLASS DISTRIBUTION

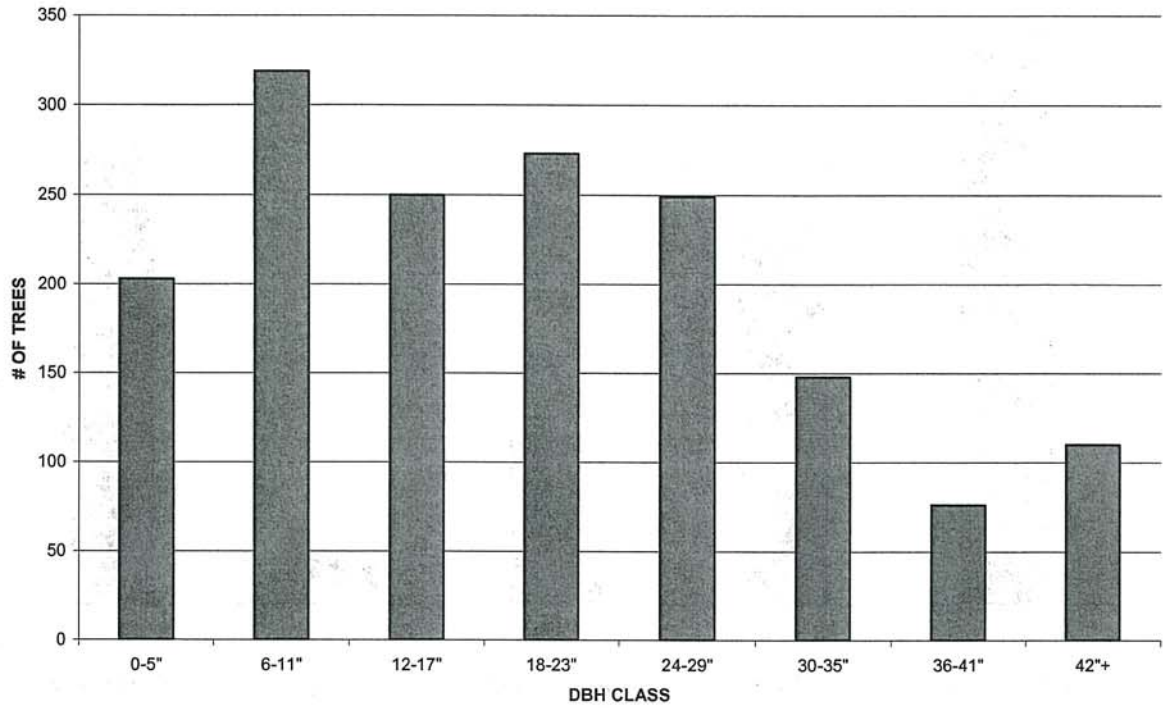


Figure IV.3 Size Class Distribution illustrates the distribution of trees by Size Class, or diameter breast height (DBH) in inches.

Within the urban forest the size class distribution will depend on the conditions in which it was established, land use and the management of the forest. The distribution of size classes, or ages is an important consideration. Natural forests are often broadly divided between even-aged and uneven-aged. An example of an even-aged forest may include the regeneration that occurs from events such as landslides, fires or clear cutting. An uneven-aged forest is characterized by successional growth which occurs as a result of smaller openings in the canopy, typically resulting in bell shaped curve when charted. In the case of a managed urban forest an uneven-aged distribution of trees is more desirable. The planting of new trees on a sustained basis helps to preserve the tree canopy as older, larger trees are removed.

Figure IV.3 appears to indicate that the tree population has a broad distribution of young to mature trees. However, closer analysis of the data demonstrates that a high percentage of these smaller trees are Norway Maple, which are in fact invasive volunteers within the landscape. 25% of the inventoried trees with a DBH less than 12" are Norway Maple and this figure does not include the estimated 400-600 smaller trees within the wooded areas. The treatment recommendations for Norway Maple provided in Chapter VI conclude that this

species should be suppressed. There are also trees within the landscape which will maintain a smaller DBH when mature such as Arborvitae, Crabapple (*Malus*), Dogwood (*Cornus*) and other ornamentals. These smaller trees represent a large percentage of the trees less than 12-inch DBH. After considering the species that represent the younger trees a sustained planting program is recommended.

Tree Condition

Trees are evaluated using two major sets of criteria, one being the biological health of the tree and the other being the structural integrity or stability of the tree. Tree condition for purposes of this inventory focused on biological health. Assessing the structure of a tree would include testing the trunk for the presence of decay and soil excavation to examine the root plate. Since both of these procedures involve either damage to the tree or disruption of the ground plane these procedures should be performed on a limited basis. Conditions that warrant these additional testing procedures should be outlined in a Master Plan as recommended in Chapter VI.

The condition or health of each tree was evaluated by considering a number of factors including foliage characteristics, canopy density, observable leaf disease, pest damage, tree architecture and to some extent the presence of structural defects including observable cracks or cavities. The condition of each tree was determined from ground level observations and included only a visual inspection of accessible components. Figure IV.4 illustrates that approximately 70% of the tree population is in good condition. The 'trees' that were given a rating of unknown are stumps.

The following table illustrates the characteristics that were observed and their relation to the condition rating:

	Good	Fair	Poor
Growth rate:	Good	Average	Below average
Foliage size and color:	Normal for species	Off color	Undersized, off color
Canopy density:	Full	Average	Below average
Disease (foliar):	None observed	Affects <33% of tree	Affects >33% of tree
Pest damage (foliar):	None observed	Affects <50% of tree	Affects >50% of tree
Structural defect:	None observed	None observed	Crack or cavity noted
Tree architecture:	Normal for species	Imbalanced crown Epicormic growth	Excessive lean Excessive epicormic growth Storm damage Positive decay indicator - fungus

(Epicormic growth or water sprouts arise from latent or dormant buds and are often a symptomatic response to a disruption in cambium or mechanical injury.)

FIGURE IV.4 - TREE CONDITION

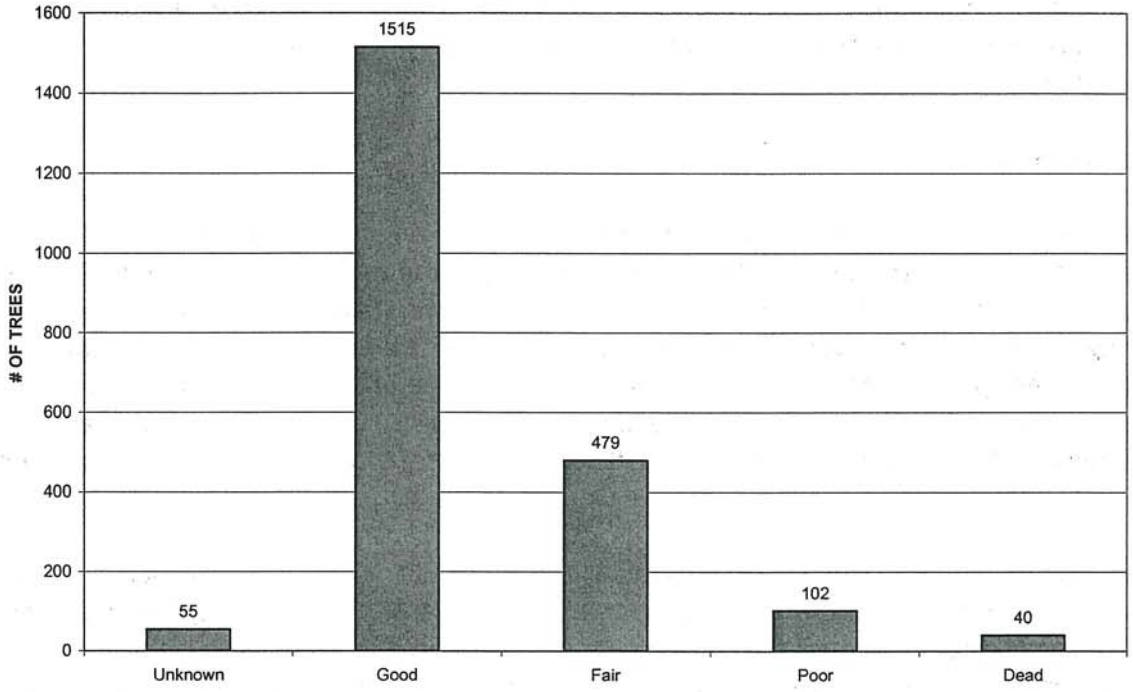
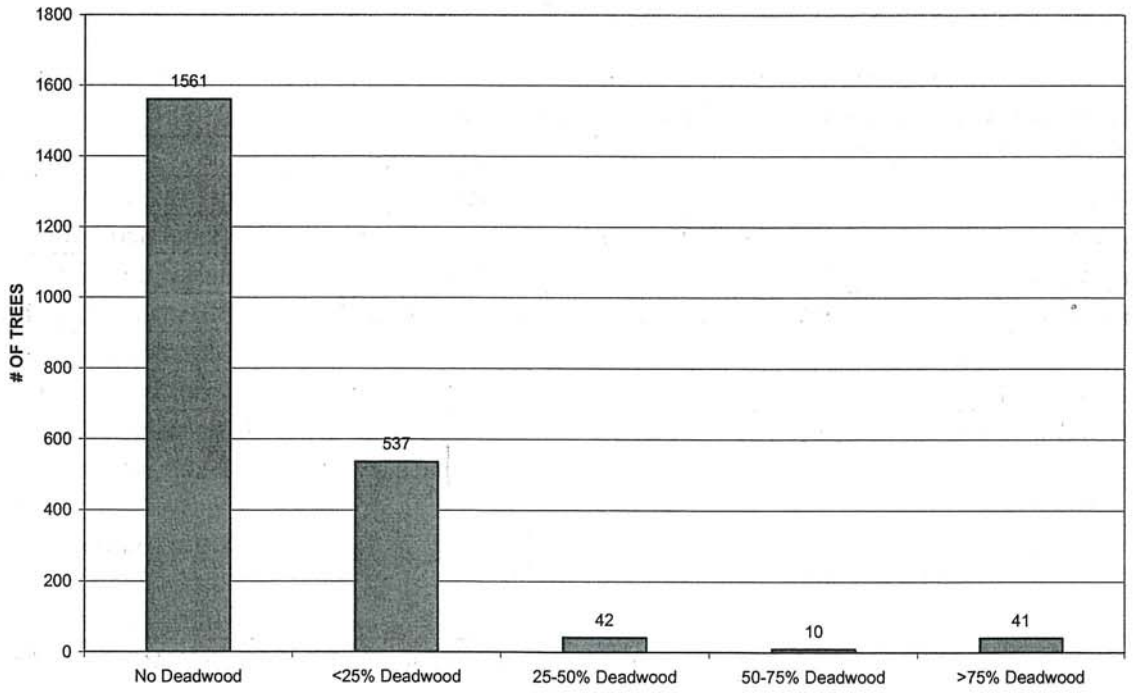


FIGURE IV.5 - DEADWOOD



In addition to the biological health, or condition of the tree, the amount of deadwood was also noted as illustrated in Figure IV.5. Deadwood is described as dead limbs and branches. The shedding of limbs is a natural process as trees mature. The upper canopy of the tree shades out the lower and inner limbs. As these limbs are no longer providing benefit to the tree as a whole they are closed off, or compartmentalized, and allowed to shed. The amount of deadwood was determined from ground level observation during the inventory procedure. Most of the trees identified with deadwood are located within the 'wooded' areas of the Cemetery.

Tree Age Observations

Of the trees inventoried, it was determined that 476 existed in the Mount Hope Cemetery landscape during the period of significance with several trees that likely predate the founding of the cemetery. The age of individual trees was determined by examining and comparing growth rates at Mount Hope Cemetery and other historic properties. Through extensive research and study at numerous properties, Heritage Landscapes has developed a protocol for estimating tree growth rates by decade. A more in-depth discussion of this process is provided in the following section. When Mount Hope Cemetery was first established, the character of the existing woodland ramble strongly contributed to the character of the early cemetery landscape. As the cemetery grounds were improved over time, native and non-native plantings, including a number of specimen trees, were added to augment the naturalistic landscape character. Currently, trees that likely existed during the historic period comprise approximately 22% of the overall tree collection. These trees are considered remnant historic features and help convey the historic character of the cemetery landscape. This group of trees aids in understanding and interpretation of the historic landscape and the intended character of vegetation that was implemented during the period of significance. They continue to contribute to the existing, picturesque character of Mount Hope Cemetery. Because of the valuable role these trees continue to play in the landscape, ongoing care is an important element in tree management. Some resources are available that can aid in the valuation of the cemetery trees. Gaining funding to aid in management of the plant collection is related to accessioning the collection. The accessioning process needs to be completed before funding and grants can be acquired. There are a number of funding and grant resources that will aid in future management of the cemetery tree collection.[5]

D. TREE GROWTH & AGE OBSERVATIONS BY HERITAGE LANDSCAPES

An important component of the existing tree inventory is to develop a uniform method of determining which trees date to the period of significance. Trees that date from the historic period or earlier are considered historic landscape features that contribute to an understanding of the historic landscape and convey a sense of the intended effect of cemetery vegetation on the overall landscape character. The process to determine which trees date to earlier decades

requires answering the following question: "How quickly do trees grow at Mount Hope Cemetery given its particular climate, location, and soils?"

Heritage Landscapes' research and study of existing trees and graphic materials for multiple properties in varying climates has yielded vegetative growth rates by tree type per decade. Using this information, current diameters at breast height (DBH) of trees can be sized back based on the number years elapsed and the growth rate of specific tree types. In general, Heritage Landscapes has found that deciduous trees of 30 inches are about 100 years of age, depending upon tree genus, species, and growing conditions.

For the Camp Hill CLR in Harpers Ferry, West Virginia, near Washington DC, the tree dating process was based on a comparison of the known DBH of existing trees today with estimated DBH of trees in dated historic photographs. This estimation was also verified by comparing the DBH of existing trees with recorded DBH from a late 1960s tree survey. The specific rates of growth were determined for deciduous, coniferous, and flowering or fruiting tree types. These growth rates for the Harpers Ferry area were approximately 4 inches per decade for deciduous trees, approximately 2 inches per decade for flowering/fruiting trees, and approximately 2 inches per decade for coniferous trees.

A similar process was used for the Graycliff CLR in Derby, New York, on the shores of Lake Erie. By comparing the estimated DBH of trees in the earliest dated photographs to the known DBH of existing trees today, rough growth rates were determined. Refinements were made to the sizing protocols through the use of historic correspondence between the owner and architect that noted specific trees that were planted at particular sizes. Growth rates of trees were determined to have been rather slow in comparison to other sites, as the property has relatively shallow, low nutrient soils and harsh weather and wind conditions, which yield a slower growth rate than a more hospitable environment with deeper, richer soils. Studying all the documents, Heritage Landscapes found that growth rates for the Lake Erie shore to be approximately 3 inches per decade for deciduous trees, about 1 inch per decade for flowering/fruiting trees, and approximately 1 inch per decade for coniferous trees.

Tree growth rates at Mount Hope likely resemble the growth rates at Harpers Ferry, based on hardiness zone, growth rates, soils and climate conditions. According to US Department of Agriculture hardiness zone mapping, Rochester and Harpers Ferry both fall within a hardiness zone of 6. Additionally, the glacial soils and deposits found in Mount Hope Cemetery have likely contributed to the robust growth and health of existing trees. Because of this, the following growth rates can be assumed for trees within Mount Hope Cemetery:

- Deciduous tree, approximate growth rate about 4 inches per decade
- Flowering/Fruiting trees, approximate growth rate of about 2 inches per decade
- Coniferous trees, approximate growth rate of about 2 inches per decade

Following this protocol, existing deciduous trees can be downsized from their 2008 DBH measurements to determine their approximate age. A 60-inch deciduous tree, at a growth rate of 4 inches per decade, is about 150 years old, dating to the late 1850s. Similarly, a 24-inch evergreen tree, at a growth rate of 2 inches per decade, is about 120 years old, dating to the late 1880s.

While this tree sizing protocol is very useful, it is important to note that individual variations are present within the cemetery landscape. For example, it is likely that the trees within the evergreen grove along Glen Avenue were planted at the same time, but are somewhat different in their dimensions today due to variations in soil, nutrient availability, etc.

Trees are an integral feature within any landscape, particularly Mount Hope Cemetery, as a valuable resource to the City of Rochester, Friends of Mount Hope, cemetery visitors, and cemetery neighbors. The existing mature trees are scenic and benefit site users and City staff by providing shade, conserving energy, reducing storm water runoff, increasing property values, enhancing community aesthetics, promoting human health and psychological well-being, increasing quantity and quality of wildlife, and improving local air, soil, and water quality.

E. RECOMMENDED MAINTENANCE

The maintenance recommendations provided within this Chapter represent a static view or 'snapshot' of the of the tree inventory which was completed in August 2008. It should be recognized that trees are not static objects as they grow and respond to environmental factors and mechanical damage and that the maintenance recommendations provided herein shall not be the sole source of information when determining priorities or scheduling maintenance activities. The tree inventory database, including recommended maintenance, has been provided to the Forestry Division of the City of Rochester, NY for the purposes of executing maintenance operations in accordance with their policies and procedures.

Chapter VI provides treatment recommendations including the development of an Urban Forest Master Plan specifically for the Cemetery which would provide a comprehensive management strategy.

The maintenance recommendations provided within the inventory includes pruning trees, removing trees and removing stumps. The process that was followed, to some degree, to determine a recommendation was the USDA Forest Service Community Tree Risk Rating System. The U.S. Forest Service system is a seven step process with only the first four steps being relevant for this tree inventory. Steps five through seven involve actually performing the maintenance, logging the work and performance of a follow up evaluation.

The first two steps include identifying the trees to inspect, inspecting the individual trees and assessing the defects. Given the goal of inventorying all the trees within the project area, with the exceptions noted previously, no determinations needed to be made as to which individual trees would be inspected as they were all included.

The third step in the process is to estimate the risk for each tree. The U.S. Forest Service uses a 10-point numeric system to rate the risk of damage or injury posed by a defect tree or tree part. This tree inventory did not include the collection of the four individual numerical ratings for each component which comprise the total rating. However, the same organizational process was used in determining the maintenance recommendations.

- The first of the four components is the probability of failure, is partially subjective and has a maximum value of 4-points. This value is determined by identifying a defect part on the tree, then assessing the probability that this defective part will fail. Ratings for this component include low, moderate, high and extremely high. An example of a moderate rating may include a weak branch union with included bark, a high rating may include a standing dead tree with no other defect, and an extremely high rating may include a broken hanging limb or a standing dead tree with extensive decay and a cracked trunk.
- The second of the four components is completely objective and relates to the size of the defective part with a maximum value of 3-points. 1-point if the defective part is less than four-inches, 2-points between four and twenty-inches and 3-points for parts larger than twenty-inches.
- The third component is the probability of target impact and given the site usage of the Cemetery this component can be very subjective. Observations of Cemetery visitors made during the tree inventory process formulated a conclusion that recreation was a common activity. Walking, jogging and cycling along the roads and pathways appeared to be popular activities. However, it is understood that tours, those visiting a loved one, burials and others just looking for some quiet reflection do occupy all areas of the Cemetery grounds. This component of the U.S. Forest Service system has a maximum value of 3-points and defines the probability of target impact by occasional use, intermediate use and frequent use. For the purposes of determining the maintenance recommendations within this tree inventory a target was defined as a Cemetery visitor. The entire Cemetery grounds were considered to have occasional use, the footpaths and roads closed to vehicular traffic were considered intermediate use and the roads open to vehicular traffic were considered frequent use. The trees with defects located adjacent to roads and footpaths would have a higher probability of impacting a pedestrian or vehicle as the use of these features is more frequent.
- The final component of the risk rating system is subjective and can be used if professional judgment suggests the need to increase the risk rating up to two additional points. While this tree inventory did not include this numerical system within the collected data, the process was followed.

The fourth step is to prioritize defective trees for treatment. For the pruning and removal maintenance recommendations there were two priorities. Pruning was defined as maintenance or hazard, and removals were defined as low priority or high priority. The determination as to which recommendation was provided resulted from the estimation of risk as defined above.

The maintenance recommendations were determined from ground level observations of the trunk, large branches and canopy of each tree and included only a visual inspection of accessible components. No excavation of soil was performed to examine the condition of the roots or root plate. The trees were not inspected using an aerial lift, climbing or ladders. No instruments were used to probe or sound the interior of the tree to determine the extent of internal decay such as drills, increment borers, resistographs or hammers. However, where decay indicators such as bottle butt or fungi were observed on the bark exterior a description of the observation was added in the comments section for each tree. Additional examination and testing may be required to determine the hazard potential or risk of individual trees.

A high priority removal recommendation was made for trees with a higher probability of failure, large defects and there is a higher probability that a pedestrian or vehicle may be impacted. High priority tree removals are identified as presenting a higher level of risk to the Cemetery visitor. The removal of these trees should commence within a timely manner, or in accordance with the policies prescribed in the Urban Forest Master Plan for the City of Rochester. The trees with this recommendation are located on Drawing TI-HZRD.

A low priority removal recommendation was made for trees that presented a lower level of risk to the Cemetery visitor. Trees with this recommendation identified within the tree inventory are primarily trees in poor health, smaller trees or trees with a low probability of impacting a target such as a tree located in the middle of a wooded slope. The removal of these trees should commence within a timely manner, or in accordance with the policies prescribed in the Urban Forest Master Plan for the City of Rochester.

A hazard prune recommendation was made for trees with a higher probability of failure, large defects and there is a higher probability that a pedestrian or vehicle may be impacted. The pruning of these trees should commence within a timely manner, or in accordance with the policies prescribed in the Urban Forest Master Plan for the City of Rochester. The trees with this recommendation are located on Drawing TI-HZRD.

A maintenance prune recommendation was made for trees that did not present a high level of risk. 90% of the inventoried trees received a recommendation of maintenance prune. It should be noted that approximately 25% of the tree population contained some amount of deadwood, however the sizes of dead limbs and branches were generally less than two-inches. Since the shedding of limbs and branches is a natural process deadwood will always be observed within a tree population and is typically addressed through routine inspection and maintenance.

Maintenance pruning is an activity that should occur on a cyclical basis. The timing of the cycle should be determined within the proposed Master Plan identified in Chapter VI after a thorough examination of the personnel, equipment and finances available. Consideration may be given to establishing two distinct cycles within the Cemetery. Trees located along the roadways, footpaths, tour routes and points of interest that have a higher frequency of traffic may be on a shorter cycle than the remainder of the Cemetery. Through cyclical pruning potentially serious problems can be mitigated as the trees are inspected during the pruning operations. The Urban Forest Master Plan for the City of Rochester indicates a five year pruning cycle but does not specifically address parks and cemeteries within this cycle.

The tree inventory included the location of several stumps noted with a 'remove stump' recommendation. The stumps that have been included in the inventory were in locations where it was deemed that equipment could be used to either grind or extract the stump. It should be noted that up to an additional 75-100 stumps may be present within the project boundary, but these stumps were typically located on the steeper woodland slopes inaccessible for equipment and pedestrian traffic is unlikely to occur. The stumps deemed to be inaccessible were not included in the inventory as it unlikely that they will be removed. The inventoried stumps are identified on Drawing TI-STMP.

FIGURE IV.6 - RECOMMENDED MAINTENANCE

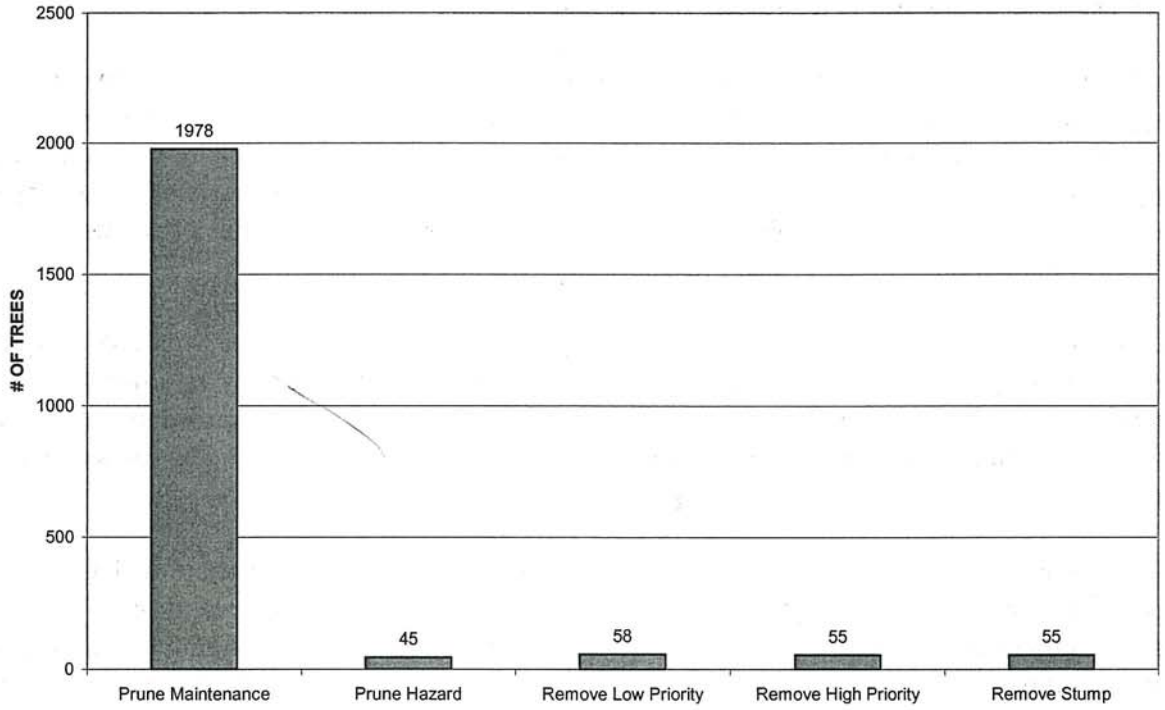


Figure VI.6 Recommended Maintenance: summarizes the recommended maintenance for the inventoried tree population.

F. INVENTORY MANAGEMENT RECOMMENDATIONS

As indicated previously, the tree inventory is simply a static collection of information stored within a database structure. In order to obtain the maximum value from this information it needs to be updated on a regular and systematic basis. How this data is manipulated, appended and updated may largely rest with the abilities of the Cemetery staff. Currently the tree inventory is in Microsoft Access database format which does allow a moderately experienced user to sort, filter and query the data and export the results into spreadsheets and other document forms to develop reports. In addition to the database a GIS based shape file has been provided, however, files of this type require specific software and training to view and manipulate the data associated with it.

A tree management software application is recommended to simplify the management of the tree inventory. Tree management software typically provides a user friendly interface to the tree inventory database and typically provides greater capabilities to easily sort or query the data, produce work orders and reports, and store annual inspection records and photographs. The acquisition of a software program for management of the trees should be carefully considered and should not be based on cost alone. The City of Rochester does maintain a computerized street tree inventory and the City is considering a different software package as the current software is no longer supported by the vendor. The decision whether or not to add the Cemetery trees into the City street inventory, and use the street tree system to manage the Cemetery trees will result from the specific management needs as identified during the Urban Forest Master Plan process as recommended in Chapter VI. The management of the historic Cemetery trees may greatly differ from those of the street and other park trees within the City, and the tools required to preserve these assets may need to be more robust than offered in a standard software application. Prior to acquiring tree management software a set of specific criteria as to the functions, ease of use and related hardware and software requirements should be developed. The range of management applications vary from simple database solutions, map based solutions which may require expensive third party software to web based solutions which only require an internet connection. Additional consideration should be given to a management solution which recognizes the other components of the Cemetery including infrastructure such as utilities, buildings, roads, paths, fences, other plant materials, monuments and headstones.

The current tree inventory database includes a provision to implement a tree tagging system. A tree tagging system would entail affixing a numbered tag to each tree, then recording this tag number into the tree inventory database. This type of system provides an alternate method of identifying a tree without the need for a keyed plan. Tree tags are available in many materials and forms. It is recommended as a baseline to utilize an aluminum tag with pre-stamped numbers and affix the tag to the tree using an aluminum nail. Depending on the tree inventory

management software, bar coded tree tags can be used in conjunction with a bar code reader on a PDA loaded with the tree inventory.

A key component to the usefulness and validity of the tree inventory is to perform routine updates to the tree information data. The entire inventory should be updated within a five year period, or sooner. New plantings should be added and tree removals should be noted to the inventory when they take place. The updates to the inventory should include size, condition, amount of deadwood, recommended maintenance and any additional notes. The initial inventory of 2,191 trees was completed over a period of nine days averaging 240 new entries per day. It is recommended to develop a rotating schedule which can be based on Cemetery section for annual inventory updates. It is assumed that an additional 1,300 trees exist south of Grove Ave. and these should be added to the inventory for a total of 3,500 trees. Allotting a minimum three days per year for the inventory update process a complete update should be accomplished within five years.

G. SUMMARY TREE INVENTORY RECOMMENDATIONS

All maintenance operations, routine and hazard inspections should commence in a timely manner in accordance under the current policies and procedures as prescribed in the Urban Forest Master Plan for the City of Rochester and Forestry Technical and Administrative Procedures Manual.

Complete the tree inventory for the entire Cemetery to include the trees located south of Grove Avenue.

Consider the acquisition of a tree management software application.

Consider implementing a tree tagging system.

Develop schedule for updating tree inventory.

CHAPTER IV: ENDNOTES

[1] E. Gregory McPherson, Urban Ecosystems, 1997
[2] Dwyer, Nowak and Noble, Journal of Arboriculture, Vol. 29, No. 1, January 2003
[3] David J. Nowak, Journal of Forestry, Vol. 92, No. 10, October 1994
[4] W.A. Kenney.
[5] One resource is the Stanley Smith Horticultural Trust, which relates to horticultural and management issues. Projects completed with grants from this trust include Oldfields, Indianapolis Museum of Arts, which used grant funding to address the relationship between horticulture and sculpture. Longe Vue House and Gardens in New Orleans also utilized a Stanley Smith Horticultural Trust grant to focus on restoration of the wild garden. Another grant source is the Institute of Museum and Library Services, which provides grants for plant inventories. This agency provided grant funds to accession the plant collection at Highland Park in Rochester, completed by Doell and Doell. A similar grant project was undertaken at Lyndhurst to accession the historic collection of plant materials.


MOUNT HOPE CEMETERY
CULTURAL LANDSCAPE REPORT
& TREE INVENTORY
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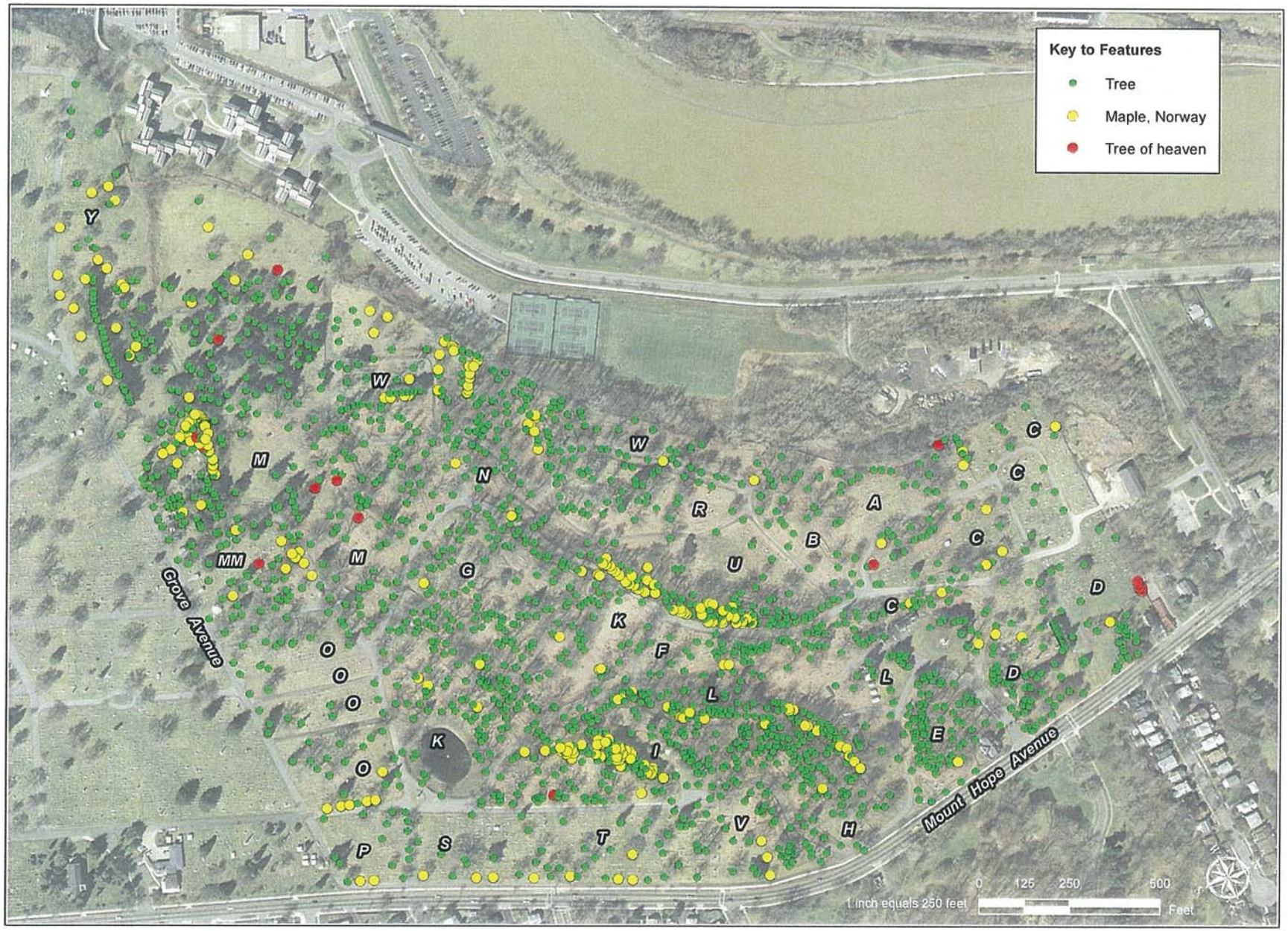
NOVEMBER 11, 2010
WENDEL



Mount Hope Cemetery
Cultural Landscape Report
Rochester, New York

Client:
City of Rochester, NY
30 Church St.
Rochester, NY 14614

Team Leader:
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34 Wall Street
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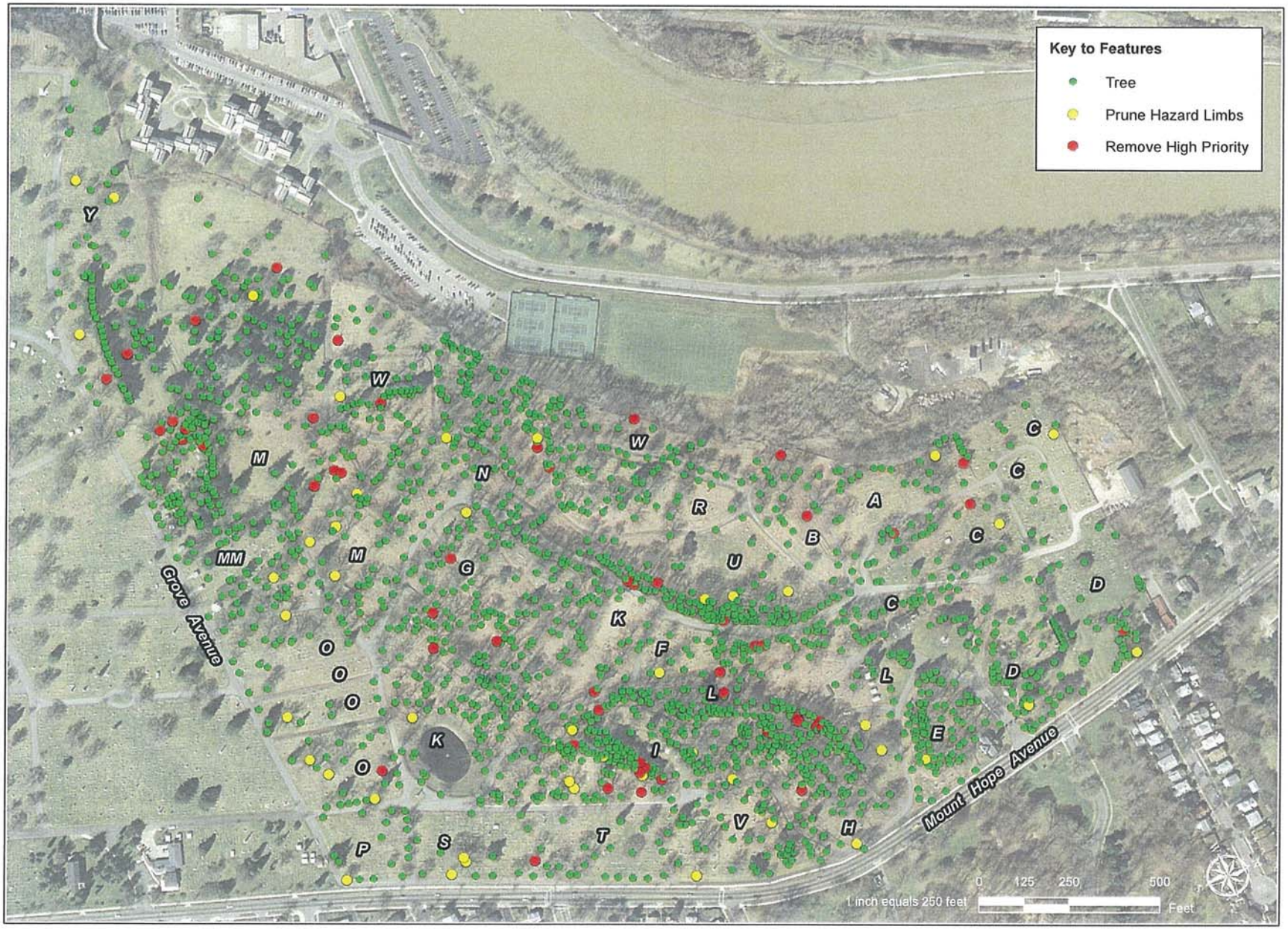
Drawing Title:

Invasive Tree Locations

Date:
December 8, 2008

Drawing Number:
TI-INVS



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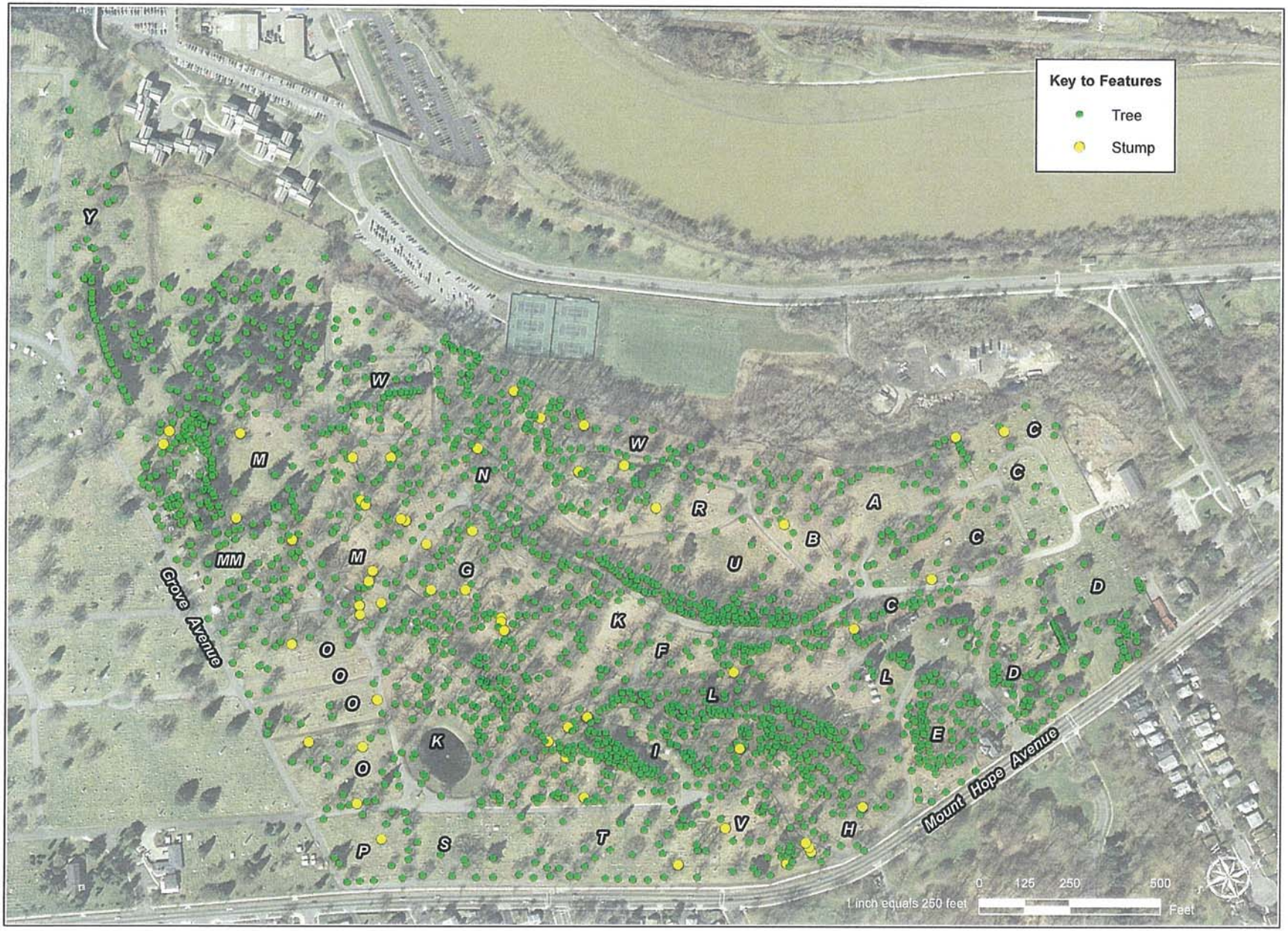
Drawing Title:

Hazard Tree Locations

Date:
December 8, 2008

Drawing Number:
TI-HZRD



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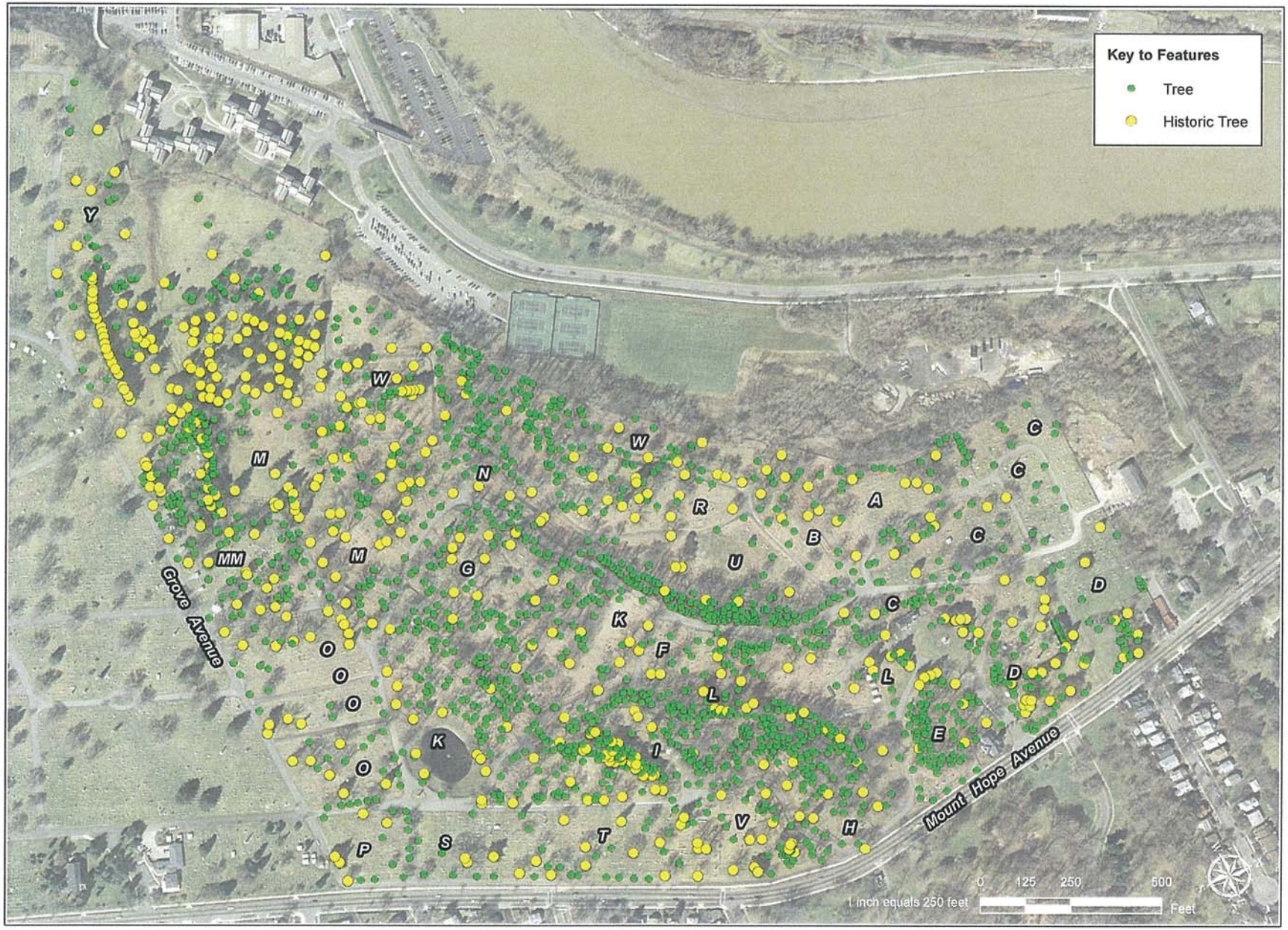
Drawing Title:

Stump Locations

Date:
December 8, 2008

Drawing Number:
TI-STMP



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Drawing Title:

Historic Tree Locations

Date:
December 8, 2008

Drawing Number:
TI-HIST