Plant Healthcare Consultants

American Society of Consulting Arborist ▪ International Society of Arboriculture
Massachusetts Arborist Association ▪ Massachusetts Tree Wardens and Foresters Association
TREE INVENTORIES ▪ APPRAISALS ▪ DIAGNOSIS ▪ TREE RISK ASSESSMENTS

Tree Protection Plan
2072 Massachusetts Avenue
Cambridge, MA 02140

Prepared for:

CC HRE 2072 MASS AVE LLC
c/o Capstone Communities LLC
1087 Beacon Street, Suite 302
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Prepared by:

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Summary

I was retained by CC HRE 2072 MASS AVE LLC for perform an evaluation of a Tilia cordata (Littleleaf linden) on the property line between 2050 and 2072 Massachusetts Avenue, Cambridge, MA. The focus of the evaluation was to assess the health and condition of the tree and, if preservation is an option, develop a Tree Protection Plan.

It is my opinion that the tree can be preserved and the specifications for the Tree Protection Plan are included in this report.

Introduction

On October 20, 2020 Jason Korb, of CC HRE 2072 MASS AVE LLC, contacted my office inquiring to retain consulting arborists in regard to a redevelopment project in Cambridge, MA. Mr. Korb informed me that there was a tree on the property line between the property he was redeveloping at 2072 Mass Ave. and the abutter at 2050 Mass Ave. He expressed a desire to preserve the tree and requested specification for a Tree Protection Plan.

I agreed to assist on the project. A site visit was scheduled for October 23, 2020 at 10:00 am.

Background & History

CC HRE 2072 MASS AVE LLC has acquired 2072 Mass Avenue, Cambridge, MA an ~8,500 sq ft property on the corners of Mass Ave and Walden Street. CC HRE 2072 MASS AVE LLC plans to renovate the property. There is one mature tree on the property line between 2072 and 2050 Mass Ave, a 12" diameter at breast height (DBH) Littleleaf linden. CC HRE 2072 MASS AVE LLC's goal is to preserve this tree.

A Tree Protection plan will be implemented to maximize the likelihood of the Littleleaf linden surviving the construction.

Assignment

The scope of the assignment is to assist CC HRE 2072 MASS AVE LLC in creating a Tree Protection Plan for the Littleleaf linden. This plan will have recommendations and specifications to provide the tree with the best chance of surviving the construction project.

The plan is included in this report.

Limits of Assignment

The recommendations and conclusions provided in this report are based on visual observations only. No examinations of the tree's interiors were taken nor were and soil or plant tissue taken and submitted for laboratory testing unless otherwise stated.

Purpose and Use of Report

This report is intended to provide CC HRE 2072 MASS AVE LLC with as much information regarding the tree at 2072 Mass Ave. It will outline the tree protection plan, tree management plan and provide recommendations and specifications for care of the tree in all phases of the site development.

This report is the property of CC HRE 2072 MASS AVE LLC and can be used and shared as they see fit.

Observations

On October 23, 2020 at approximately 10:00 am I visited the site and inspected the Littleleaf linden. At this visit I observed the tree and its surrounding and took measurements and photographs. I also examined the construction plans for the site to determine impact in regard to the tree.

I identified the tree as a 12" DBH Tilia cordata, Littleleaf linden. It is located on the south property line of 2070 Mass Ave that abuts 2050 Mass Ave. It is growing in a strip of land approximately 10' x 55' running in roughly a east-west orientation.

Planting Strip

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The Littleleaf linden appears to be in good health and has established itself well in this area.

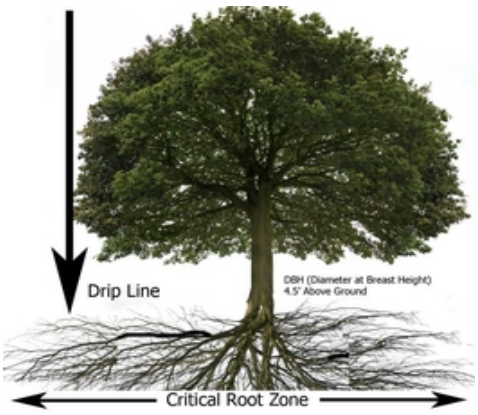
Due to the fact that the roots zone is confined by a retaining wall to the south and the paved parking area to the north, the majority, if not all, of the viable roots of the tree are located in the planting strip. As such, if this area is to be protected and proper steps taken, the root system should remain viable and sustain the tree through construction.

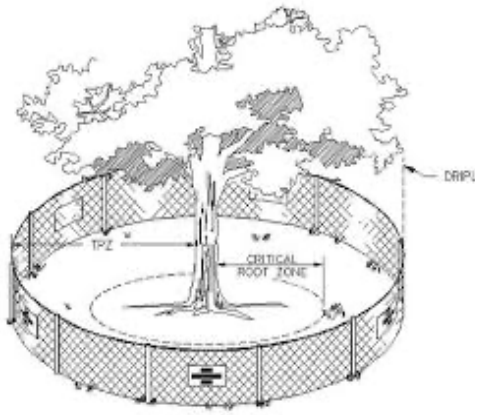
I also reviewed to attached Support of Excavation (SOE), (See page #10). The proposed soldier piles and lagging, denoted by the red-dashed line on the plans, will allow for the following tree protection plan to be implemented.

Discussion

Tree Projection Zone

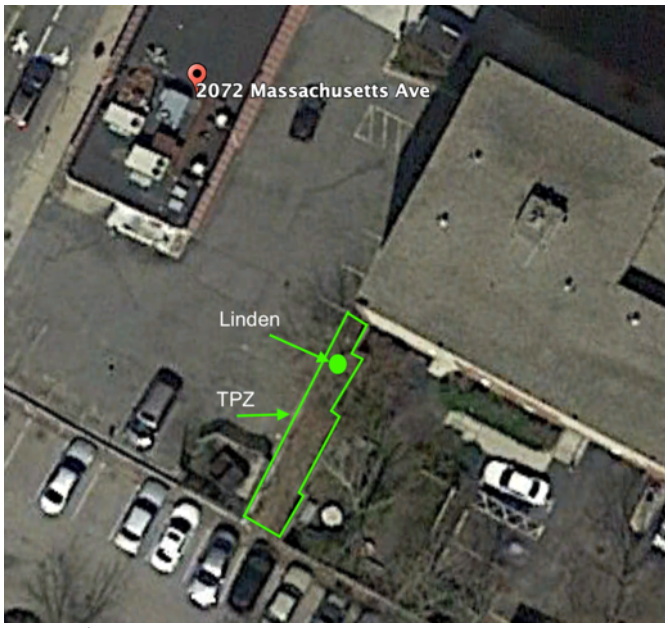
A Tree Preservation Plan has several components, all focusing on giving the tree the best chance for surviving the construction project. The majority of the components involve protection the Critical Root Zone (CRZ). The CRZ is the minimum area beneath the canopy of a tree which must be left undisturbed in order to preserve a sufficient root mass to give a tree a reasonable chance of survival. The CRZ should be defined, at a minimum, of the tree's dripline, the area represented by the outer canopy of the tree. This is crucial because the absorbing roots, the roots that take in water and nutrients, must be undisturbed or the tree will suffer stress and may decline and even die. The Tree Protection Plan includes the establishment of a Tree Protection Zone (TPZ), ideally, the TPZ must include the CRZ. The larger the TPZ the better as the root zone of a tree could extend as much as two or three times the width of the canopy. This is an area that is enclosed by a semi-permanent fence with appropriate signage. Within the CRZ, trenching, pavement, soil compaction, mechanical injury, storing of materials and spoils and any change in grade should be avoided.





Ideal Tree Protection Zone

In this case the CRZ has been encroached upon by the pavement and retaining wall and the tree has adjusted its root growth accordingly by concentrating its root into the planting strip. As a result of the trees natural compensation to its environment a modified TPZ should be made to include as much of the planting strip as possible.

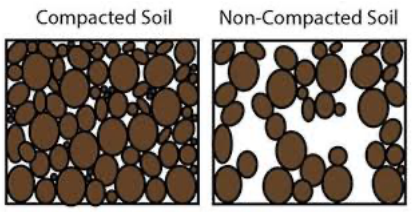


Proposed TPZ

Soil Compaction

All protected trees in the construction zone are subject to soil compaction from heavy vehicles, and any heavy debris placed in the Critical Root Zone (CRZ). Soil compaction occurs when the pore space

between soil particles is greatly reduced. This causes the reduction of oxygen available to the roots and can lead to decline in trees. Use of equipment, grading, digging, and heavily used walking paths can cause soil compaction in a construction area. Use protective fencing, mulching within the protective fencing, and limiting the amount of access routes will minimize soil compaction.



As the root system of trees is far more extensive than just the dripline, in this case in the entire planting strip, all equipment and materials should be kept out of the TPZ.

Mechanical Injury

There will be heavy equipment and vehicles used near the trees that are to be protected.
Wounds to the tree's branches and trunk, caused by mechanical damage, may reduce tree stability by decreasing the wood strength, the internal movement of water and nutrients, and the ability to compartmentalize against decay. Enclosing the Critical Root Zone with protective fencing will prevent damage from construction equipment.

Change in Grade

Lowering or rising of the grade within the root zone can damage or kill a tree. The normal exchange of moisture and gases within the root zone is disrupted with the change in grade. The original grade should be maintained as far out from the trunk as possible. As little as four inches of soil placed over the root system can kill some species of trees. The change in grade can have either immediate or long-term adverse effects on the tree. If grade change is required use of retaining walls or soil cuts can improve the tree's tolerance to the grade change.

Excavation & Trenching

This project will require excavation for foundations. Excavation & trenching within the CRZ can damage the root system of a tree. Practicality requires the need to encroach on the CRZ, but care should be taken to excavate as little of the area adjacent to the tree as possible.

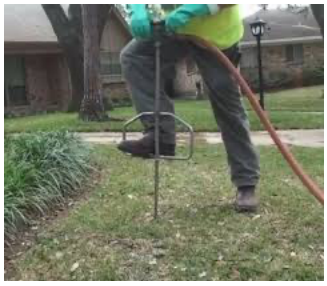
Irrigation

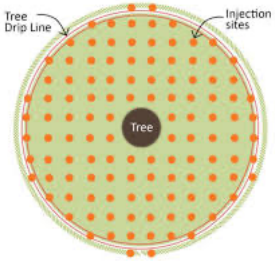
Irrigation should be provided within the CRZ as needed. A deep watering of the trees should take place before construction begins. During construction, the soil in the CRZ should be watered regularly and deeply so water penetrates the root area at least six to eight inches deep. A watering schedule will vary with climatic conditions, but a rule of thumb is 1" of water weekly during construction.

Soil Treatment

I am prescribing a non-nitrogen fertilizer that is high in phosphorus and potassium (0-20-20 fertilizer analysis) to promote root development. I recommend a fertilization in the spring. Applying the fertilizer in the early spring will prepare the trees for a flush of root development. Root development is most critical for the trees to prepare themselves for construction impact. The healthier and abundant the root system the more water and nutrients the tree can take in which is the best defense against stress.

The fertilizer shall be applied in a water solution, injected directly into the CRZ, in this case the entire TPZ, by means of an application needle under pressure. Injections should be made about every foot in a grid-like pattern.





Plant Healthcare

At this stage there does not appear to any major pest concerns on the trees. This will be monitored regularly (monthly) to see if conditions change. If there is a need to address insect, mite or disease pest a proper course of action will be prescribed at that time.

All plant healthcare treatments shall be performed by a certified arborist who is also a licensed pesticide applicator and supervised by an ISA Board Certified Master Arborist.

Conclusion

Based on my education, training and experience it is my opinion that taking this proactive approach to tree preservation will provide the Littleleaf linden at 2072 Massachusetts Avenue the best chance of surviving the construction. Setting up tree protection zones around the trees to retain, managing the flow and access of heavy equipment, performing required tree work prior to commencing construction and regular monitoring of the work site to ensure all practices are adhered to should make for a successful worksite.

Recommendations

Pre-Construction

Prior to construction the Tree Protection Zone should be established. A six-foot chain-link fence (or suitable alternative, i.e. snow fence), with signage designating a Tree Protection Zone, Keep Out, should be erected around all the protected tree and encompass the modified Critical Root Zone as explained above. Once installed this fence should not be moved nor the CRZ disturbed for the duration of the construction project.

The access way for heavy equipment should be established, as well as where equipment and materials will be stored. This should be as far away as possible from all protected trees and their root systems. No equipment or material may be stored on the root systems of the protected trees.

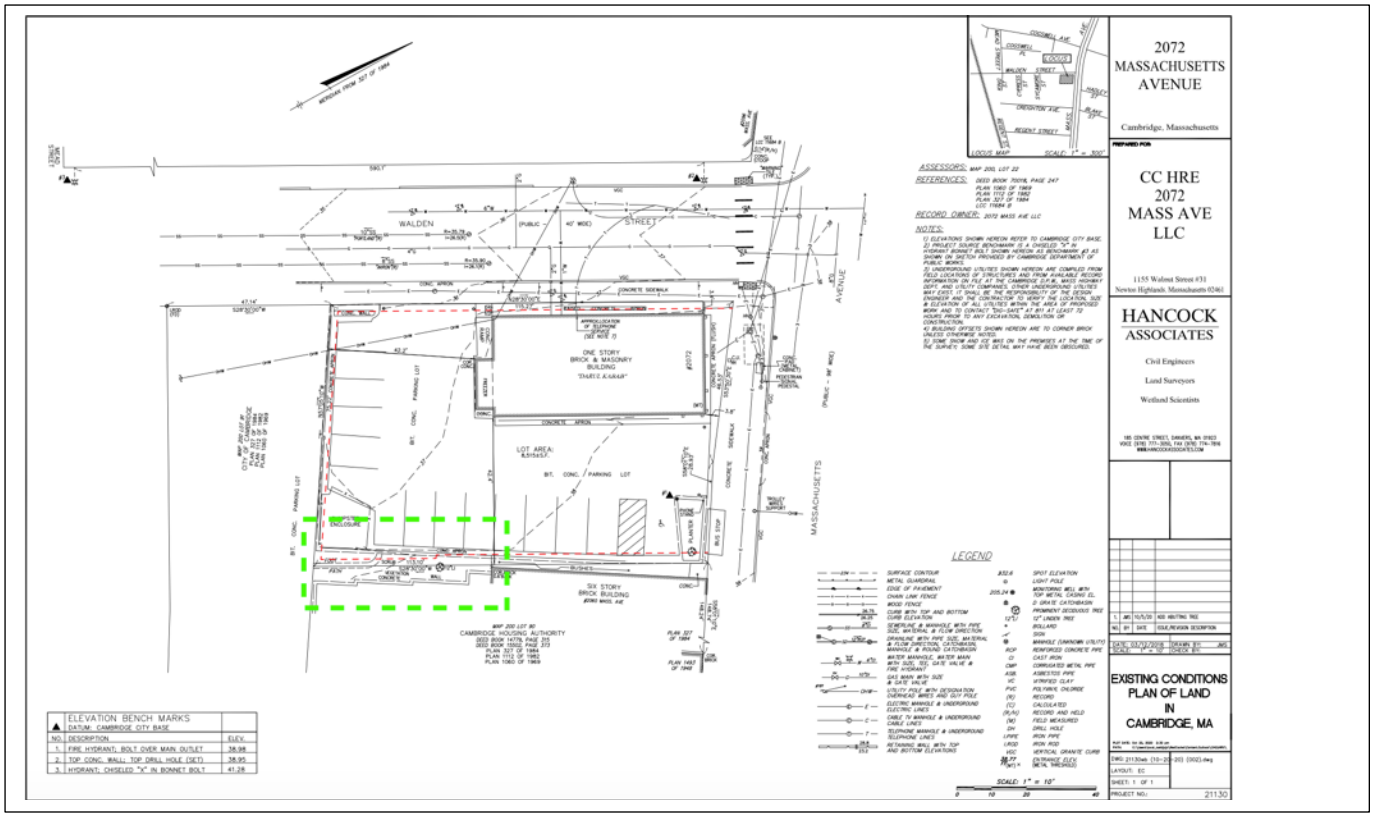
Construction

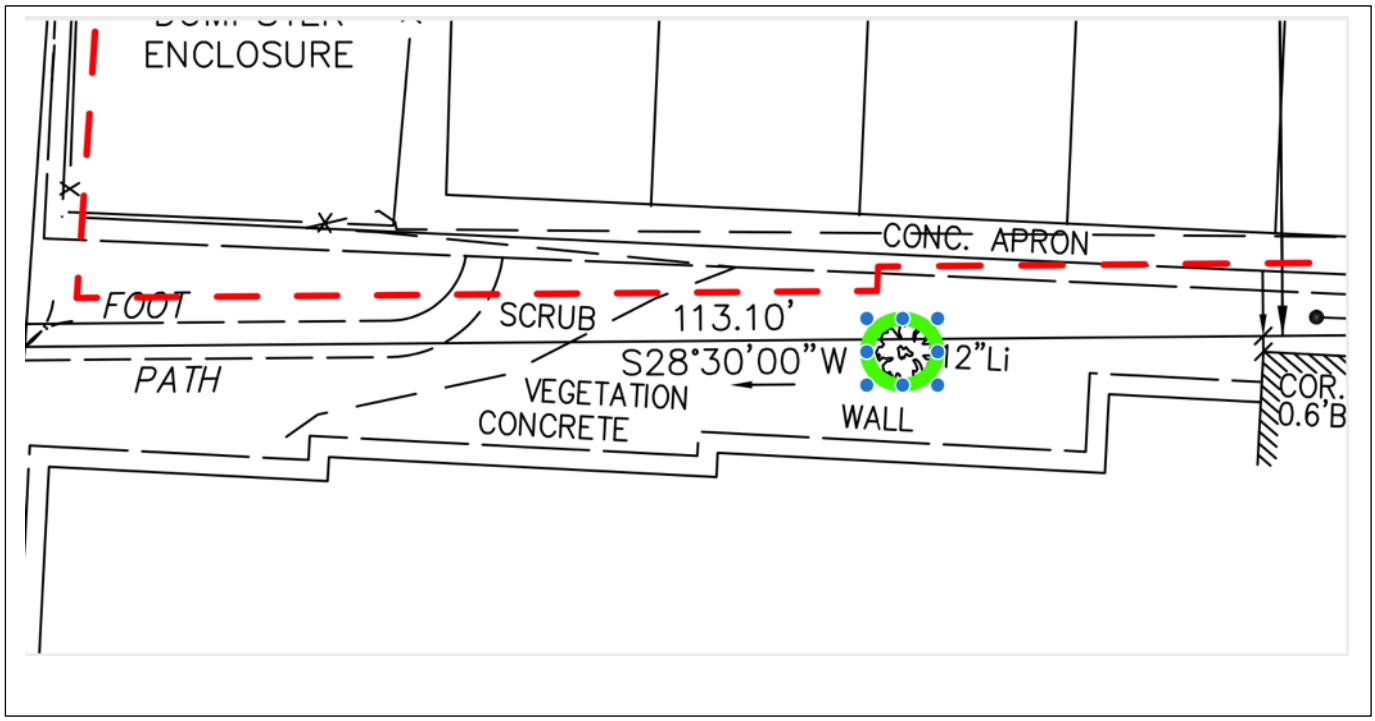
During the construction Phase of the project monitoring of the site is crucial. An ISA Board Certified Master Arborist should inspect the site monthly. The purpose of those visits is to ensure that the Tree Preservation Plan is being adhered to, adequate watering is taking place, trenching and excavations are following plan, inspect the trees for pest issues and make observations regarding any changes to the trees on the site.

Post-Construction

Monitoring after the construction is completed is very important to the long-term health of the trees. For a period of one growing season (starting the April following construction completion through that September) monthly monitoring will continue as during the construction period.

Support of Excavation Plan





Glossary of Terms

Absorbing Roots	Fine, fibrous roots that take up water and minerals; most of them are within the top 12 inches of soil
Branch Union	The structural union of a lateral branch to the tree stem.
Caliper	Is measured approximately 6-12" from the root collar. Caliper is an American Nursery Standard measurement. Synonym for trunk diameter used to measure the size of nursery stock; by convention, measured 6" above the ground.
Canopy	The part of the crown composed of leaves and small twigs.
Certified Arborist	A professional arborist possessing current certification issued by the Massachusetts Arborists Association (MAA) and/or the International Society of Arboriculture (ISA)
Clinometer	A device used to measure the height of an object
Co-dominant	equal in size and relative importance usually associated with either the trunk/stems or scaffold limbs/ branches in the crown.
Critical Root Zone (CRZ)	The minimum area beneath the canopy of a tree which must be left undisturbed in order to preserve a sufficient root mass to give a tree a reasonable chance of survival. The CRZ is represented by a concentric circle centering on the tree's trunk and extending outward towards the tree's drip-line. The minimum area of the CRZ shall be dependent on the required minimum radius of the CRZ; the required CRZ shall be determined by multiplying a tree's DBH (in inches) by eighteen (18) inches, with the resulting product constituting the minimum radius of the CRZ.
Compost	Organic matter that has been intentionally subjected to decay processes and is more or less decomposed.
Crown	The upper part of a tree, measured from the lowest branch, including all the branches and foliage
DBH	Stands for Diameter Breast Height. The diameter of a tree measured at 4.5 feet above the ground.
Drip-line	Perimeter of the area under a tree including the branches and leaves
Establishment	The process of a tree becoming acclimated to a new environment, usually correlating the new root development that can sustain normal biological functions of the tree

Monitoring	A holistic approach to plant healthcare that includes inspecting plants for cultural problems, proper soil moisture and nutrient content and insect and disease issues-treating as necessary
Parity	The time, usually in years, that it takes for a replacement tree to provide similar attributes and benefits of a removed tree
Pruning	Systematic removal of branches of a plant usually a woody perennial
Restoration/Maintenance Program	A plan of maintenance and monitoring of trees to maximize survival or recovery rate of damaged or newly planted trees
Root Collar	Area at the base of the tree where the roots and the stem merge
Soil Compaction	Compression of the soil resulting in a reduction of the total air or pore space
Specimen Tree	A tree of high perceived value attributed to location, size, aesthetics, form or function
Stress	Any change in environment conditions that produce a less than ideal plant response
Transplant Shock	The stress a tree undergoes as a result of planting in a new location
Tree Protection Plan	Report to identify and protect trees indicated to remain. Procedures shall include protective measures to be used for both above and below grade.
Tree Protection Zone	An area usually defined by the drip-line of a tree. To protect a tree, no construction should ever occur within this area.

Assumptions and Limited Conditions

1. It is assumed that any property is not in violation of any applicable codes, ordinances, statutes or other governmental regulations.
2. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.
3. The consultant shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.
4. Unless required by law, otherwise, possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of the consultant.
5. Unless required by law, neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of the consultant-particularly as to value conclusions, identity of the consultant, or any reference to any professional society or institute or to any initialed designation conferred upon the consultant as stated in his qualifications.
6. This report expressed herein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
7. Sketches, drawings, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise. The reproduction of any information generated by architects, engineers, or other consultants on any sketches, drawings, or photographs is for the express purpose of coordination and ease of reference only. Inclusion of said information on any drawings or other documents does not constitute a representation by *Plant Healthcare Consultants* as to the sufficiency or accuracy of said information.
8. Unless expressed otherwise: 1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and 2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring unless otherwise specified. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.
9. Loss or alteration of any part of this report invalidates the entire report.

Certification of Performance

Plant Healthcare Consultants certify that:

1. We have personally inspected the tree and property referred to in this report and have stated our findings accurately.

2. We have no current or prospective interest in the trees or the property that is the subject of this report and have no personal interest or bias with respect to the parties involved.

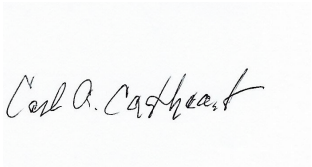
3. The analysis, opinions and conclusions stated herein are our own and are based on current scientific procedures and facts.

4. Our analysis, opinions and conclusions were developed and this report has been prepared according to commonly accepted arboricultural practices.

5. No one provided significant professional assistance to us, except as indicated within the report.

6. Our compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party or upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.

We further certify that Plant Healthcare Consultants is a member in good standing of the Massachusetts Arborist Association, American Society of Consulting Arborists, the International Society of Arboriculture and Massachusetts Tree Wardens and Foresters Association. We have been involved in the field of Arboriculture for over 60 years



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