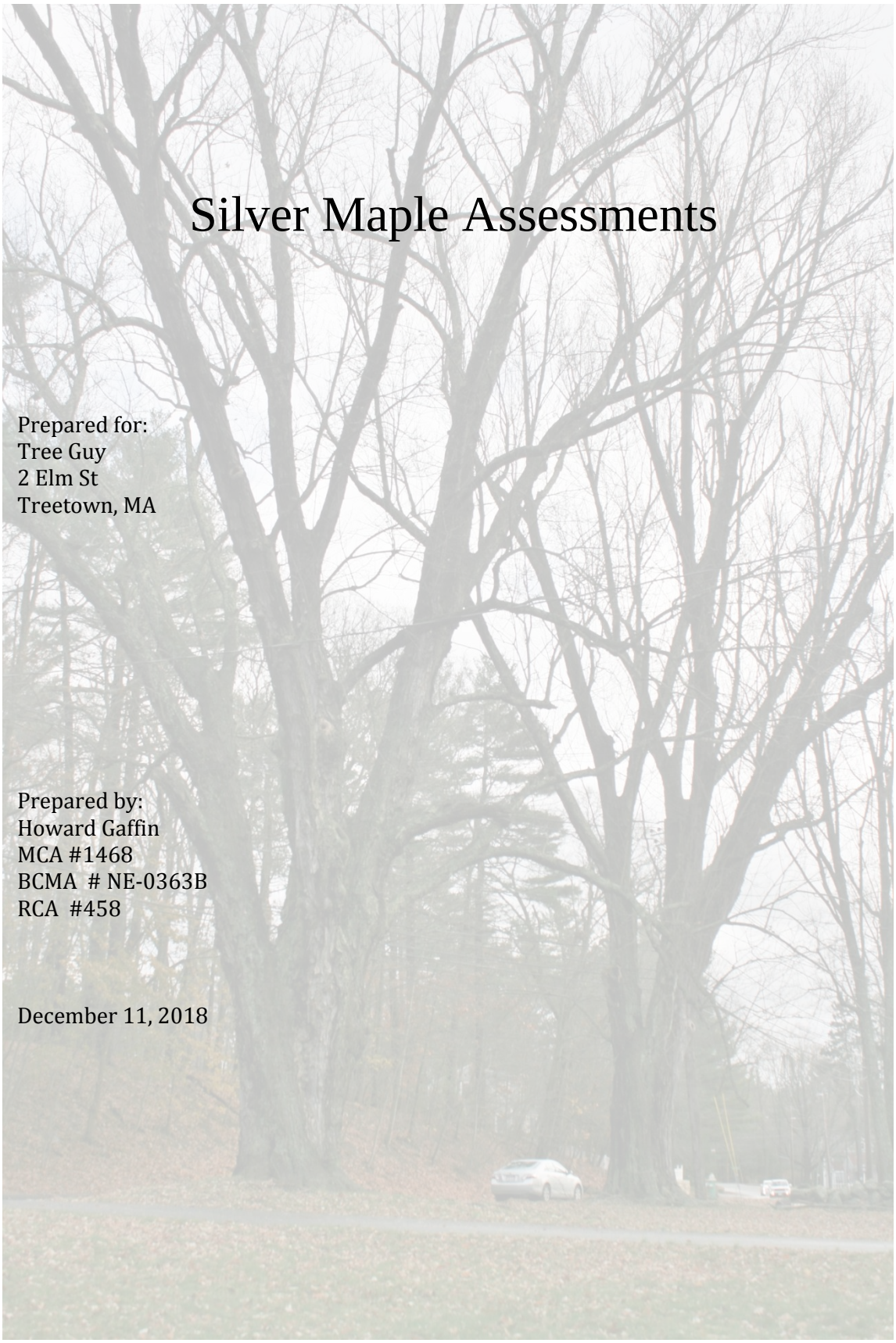

Silver Maple Assessments

Prepared for:
Tree Guy
2 Elm St
Treetown, MA

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December 11, 2018

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Summary

After assessing the health and structure of two large Silver maple trees involved in a proposed construction project, I have determined a moderate to high risk exists, but can be mitigated to lower levels. Their general good health makes them reasonable candidates for preservation. While some loss to the root system is inevitable measures are provided to mitigate the damage

Introduction

Background

In November of 2018, I was contacted by Tree Guy in regards to trees located on a proposed construction site in Treetown, MA. There is concern about possible risks posed to properties and infrastructure, as well as the effects construction would have on the trees. I was contracted to provide an assessment of the subject trees and provide mitigation strategies.

Assignment

After discussions with Mr. Guy, it was agreed that I would:

- Visit the site and document the subject trees
- Assess and rate the risks. Provide recommendations and abatement options
- Assess the impact of proposed construction. Provide mitigation strategies to abate the impact.

Scope of Work

The scope of this assignment is limited to two Silver maple trees located in front of #s 333 and 339 Elm Street. The trees should be reassessed annually after construction
A level two risk assessment was used for this report. A level two assessment includes the following (from ANSI A300 (part 9)-2011 Tree Risk Assessment):

- A 360 degree, ground-based visual inspection of the tree crown, trunk, root crown[1], above ground roots, and site conditions around the tree and targets
- When sounding is specified, a mallet or equivalent tool may be used to detect large hollows and loose bark in the trunk, root crown, and above ground buttress roots[2]
- Use of hand tools, trowels, binoculars, or probes shall not be precluded
- An assessment shall include the identification of conditions indicating the presence of structural defects

Limitations

Identifying and managing risks associated with trees is a subjective process. Since the nature of tree failures remains largely unknown, the ability to predict failure remains limited (see Arborist Disclosure Statement, pg. 20).

[1] root crown - area where main roots join the plant stem, usually at or near ground level
[2] buttress roots – roots at the trunk base that help support the tree and equalize mechanical stress

Purpose and Use

The purpose of this report is to provide objective information regarding the risks presented by the subject trees as well as mitigation options addressing both risk and preservation. It may be used to make informed decisions regarding planning and proposed construction near the trees.

Observations

I met with Mr. Guy on the site at 333 Elm St., Treetown, MA on November 27, 2018. The homes in the area are older, stately, and well maintained. The large Silver maples (Acer saccharinum) are located along the frontage of 333 Elm St. and the neighboring property, 339 Elm St. The trunks of the tree straddle Town property.
These venerable veterans are in remarkable condition given their proximity to the busy roadway and major utilities. The saving grace is likely the large, relatively undisturbed area afforded to the roots by the generous set-backs of the structures.

Discussion

Risk Assessment

I have chosen to use a Qualitative Risk Assessment as an approach for this report. The following information regarding this approach comes directly from the International Society of Arboriculture's Tree Risk Assessment Manual (Dunster, Julian A., E. Thomas Smiley, and Sharon Lilly. 2013. Tree Risk Assessment Manual. Champaign, IL: International Society of Arboriculture).
Qualitative risk assessment is the process of using ratings of the likelihood and consequences of an event to determine a risk level and evaluate the level of risk against qualitative criteria.
The first part of the assessment is to determine the *Likelihood of Failure*.
Next, the *Likelihood of Impacting a Target* is assessed.
After providing ratings for the previous two categories, a matrix is used to estimate the *Likelihood of a Tree Failure Impacting a Target* as follows:

Likelihood of a Tree Failure Impacting a Target				
Likelihood of Failure	**Likelihood of Impacting Target**			
	Very Low	**Low**	**Medium**	**High**
Imminent	Unlikely	Somewhat likely	Likely	Very Likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

The next step is to determine the *Consequences of Failure*. Consequences are estimated based on the value of the target and the harm that may be done to it. The consequences depend on the part size, fall characteristics, fall distance, and any factors that may protect the risk target from harm. The significance of target values—both monetary and otherwise—is subjective and relative to the client. Values should be assessed from the client's perspective
Once the *Consequence of Failure* rating has been determined, it is combined with the *Likelihood of a Tree Failure Impacting a Target* rating using the following matrix to determine a *Tree Risk Rating*.

Risk Rating Matrix				
Likelihood of Failure and Impact	**Consequences**			
	Negligible	**Minor**	**Significant**	**Severe**
Very Likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate likely
Unlikely	Low	Low	Low	Low

This matrix was designed specifically for the evaluation of risk posed by tree failures. The limitations associated with using a matrix include the inherent subjectivity associated with the selection of both the likelihood and consequence factors, and the lack of comparability to other types of risk assessed using other means.
In the tree risk assessment matrix, four terms are used to define levels of risk**:** low, moderate, high, and extreme. These risk ratings are used to communicate the level of risk and to assist in making recommendations to the owner or risk manager for mitigation and inspection frequency. The priority for action depends upon the risk rating and risk tolerance of the owner or manager.

- **Low -** The low-risk category applies when consequences are "negligible" and likelihood is "unlikely"; or when consequences are "minor" and likelihood is "somewhat likely." Some trees with this level of risk may benefit from mitigation or maintenance measures, but immediate action is not usually required. Tree risk assessors may recommend retaining and monitoring these trees, as well as mitigation that does not include removal of the tree.
- **Moderate -** Moderate-risk situations are those for which consequences are "minor" and likelihood is "very likely" or "likely"; or when likelihood is "somewhat likely" and consequences are "significant" or "severe." The tree risk assessor may recommend mitigation and/or retaining and monitoring. The decision for mitigation and timing of treatment depends upon the risk tolerance of the tree owner or manager. In populations of trees, moderate-risk trees represent a lower priority for mitigation than high or extreme-risk trees.
- **High -** High-risk situations are those for which consequences are "significant" and likelihood is "very likely" or "likely," or when consequences are "severe" and likelihood is "likely." This combination of likelihood and consequences indicates that the tree risk assessor should recommend mitigation measures be taken as soon as is practical. The decision for mitigation and timing of treatment depends upon the risk tolerance of the tree owner or risk manager. In populations of trees, the priority of high-risk trees is second only to extreme-risk trees.
- **Extreme -** The extreme-risk category applies in situations in which failure is "imminent" and there is a high likelihood of impacting the target, and the consequences of the failure are "severe." The tree risk assessor should recommend that mitigation measures be taken as soon as possible. In some cases, this may mean immediate restriction of access to the target zone area to avoid injury to people.

The Trees

Silver Maple is often used when fast growing trees are required and poor soil conditions limit species choices. These qualities come with liabilities that include crowns prone to storm damage and invasive root systems. They are also sensitive to high ph and roadside salts.
These trees are in remarkable condition given their size and placement, enhanced by their proximity to open areas that have remained fairly undisturbed (image 1, pg. 9). Despite their size and advanced age, the relative health of the crown and quality of woundwood closure indicate these trees are still quite viable.

Tree 1 – 64" Silver Maple

This large, 64" dbh Silver maple is located near an existing driveway entry (site map, pg. 8). A major roadway and utilities lie to the east. A driveway and utility pole with transformer are to the south. A 35'open area of lawn lies between the trunk and a house, its associate sits approximately 30' to the north (image 2, pg. 10). Surface roots are visible in the lawn area, marred by lawn mowing over time. Cracks in the driveway are also an indicator of large surface roots extending under the drive to another open lawn area on the other side (image 3, pg. 11).
The root crown and buttress roots appear solid. One area to the south-east exhibited a fungal bracket, and sounding with a mallet indicated an area of decay where it meets the pavement edging (image 4, pg. 11). The lower trunk immediately divides into 3 major stems. Two large cavities in close proximity are present on the lower portion of the scaffold growing to the west. The other major scaffolds grow to the east and south-east, over the road, driveway and utilities. The scaffold to the east extends over the road and has a large cavity at the base (images 5 and 6, pg. 12). The structure is fair and the branch unions appear sound, with minimal included bark observed at branch unions. Dozens of pruning wounds are visible throughout the crown, especially toward the road and utilities. Woundwood formation appears normal. Several dead limbs 4' in diameter are present (image 7, pg. 13). No foliage was present, but the buds looked to be of normal size and density. No serious areas of die-back were evident in the upper crown. Satellite imagery from 2014 shows a fairly healthy crown with good foliage color and density (image 8, pg. 14).

Tree: 1, Silver maple, 34" dbh **Location:** 339 Elm St
Part(s) Evaluated for Failure: Root crown/scaffold, smaller limbs
Potential Targets: Major utilities, vehicles, pedestrians
Likelihood of Failure: Root crown: Improbable. Scaffold limbs: Possible. Smaller limbs: Imminent
Likelihood of Impacting Target: High
Consequences of Failure: Significant
Risk Rating: Moderate-High. Risk can be reduced to Low-Moderate by performing a crown cleaning and reduction pruning

Tree 2 – 65” Silver Maple

Tree one’s partner is also located along the road near an existing driveway entry to the north of the trunk (image 9, pg. 15).The same open area is available for roots as Tree 1, as well as more open area available on the other side of the driveway. Surface roots abound a good distance from the trunk. The root crown is solid with no visible signs of wounding or decay (images 10 and 11, pg. 16). The lower trunk is solid and divides into 3 major scaffolds. A large cavity with good woundwood is present on the scaffold to the north growing over an existing driveway and house utility lines. The scaffold to the east grows over major utilities and the road. The remaining scaffold grows to the southwest, over the open lawn (image 12, pg. 17).
The crown structure and branch unions are good, relatively free of v-shaped unions or included bark. Two long stubs remain where the limbs failed in the lower crown. Dozens of pruning wounds are visible throughout the crown, especially toward the road and utilities. Woundwood formation appears normal. Little to no deadwood was visible in the upper crown (image 13, pg. 17). Bud set looked to be of normal size and density. No serious areas of die-back were evident. Satellite imagery from 2014 shows a fairly healthy crown with good foliage color and density (image 14, pg. 18).

Tree: 2, Silver maple, 35” dbh **Location:** 333 Elm St
Part(s) Evaluated for Failure: Root crown/scaffold, smaller limbs
Potential Targets: Major utilities, vehicles, pedestrians
Likelihood of Failure: Root crown: Improbable. Scaffold limbs: Possible. Smaller limbs: Possible
Likelihood of Impacting Target: High
Consequences of Failure: Significant
Risk Rating: Moderate. Risk can be reduced to Low by performing a crown cleaning and reduction pruning

Construction Mitigation Considerations

The majority of the root system of Tree 1 will remain undisturbed. Grades shall be carefully considered to avoid changes to current drainage patterns. Preserving the integrity of the roots growing under the existing driveway/proposed entryway however, will be a major challenge. Utilities will be moved and the pavement area extended to the south. Careful excavation and examination of this area will be required to make informed decisions regarding the driveway design.

- Remove existing asphalt. Expose roots using air excavation and hand tools.
- Document exposed roots and make determinations regarding root preservation and/or pruning
- Test the exposed sub-soil to determine suitability as a base material
- Adjust grade so pavement is built on top of natural grade
- Provide plans to either backfill with an acceptable base material or bridge roots using pier foundations
- Proposed plans shall optimize the distance from the trunk to the pavement edge.
- Use pavement types that require thinner sections

According to proposed plans, tree 2 will not be impacted by construction. As long as the Tree Protection Zone prescribed in this report (pg. 19) is implemented and respected, there should be no issues for this tree, other than those discussed in the risk assessment section above.

Tree Protection Considerations

- Protective fencing shall be installed to protect the trees from human activity.
- Fencing for tree protection should be constructed as to keep the public from entering
- A 3-4" layer of wood chips shall be placed over the protection zone.
- The TPZ shall be protected from any construction activities and run-off with hay bales or equivalent materials.
- Where trees to be protected fall within areas where construction traffic must pass, additional tree protection shall be provided by implementing the following measures:
    - Roots shall be completely covered within the drip line of any such trees with a 6" mulch layer and planking of sufficient length and thickness to allow construction equipment of all types to pass over without disrupting or compacting the ground surface.
    - The trunk and bark of such trees shall also be protected by adequately wrapping the trunk with sufficient thickness of burlap or rags over which 1 inch thick softwood cleats shall be securely tied. Nails shall not be driven into trees.
- A qualified arborist (MAA, ISA, or TCIA certified) shall be present during any excavation activities near the TPZ.
    - Roots one inch or larger in diameter shall be first exposed carefully by hand and/or air-spade, then cut before digging takes place. Cuts shall be made with a sharp, medium to fine toothed saw or lopping shears.
    - Backfill with a loam/compost mix. Cover area with a 3-4" layer of mulch, preferably wood chips.
- No storage or placement of materials intended for use in construction or waste materials accumulated due to excavation or demolition shall be placed within the fenced area.
- No equipment shall be cleaned or other liquids, including, without limitation, paint, oil, solvents, asphalt, concrete, mortar or similar materials deposited or allowed to flow into the critical root zone of a protected tree.
- No signs, wires or other attachments, other than those of a protective nature, shall be attached to any protected tree.
- No vehicular and/or construction equipment traffic or parking shall take place within the fenced area.
- No grade changes shall be allowed within the limits of the critical root zone of any protected tree unless adequate protective construction methods are approved in advance.
- No heavy equipment, including but not limited to trucks, tractors, trailers, bulldozers, bobcat tractors, trenchers, compressors, and hoists, shall be allowed inside the fence line without prior approval.

Pruning Guidelines

- Perform a thorough aerial inspection of the tree before beginning any work. Look for cavities or structural concerns that may negate preservation
- Perform crown cleaning and reduction pruning. Reduce end weight 10 to 25% at the discretion of the arborist responsible for the work
- Return in 2 years to perform additional reduction pruning and manage re-generating growth
- Annual monitoring for any health or structural changes
- Work shall be performed by a qualified arborist, experienced in the art of reduction pruning. The arborist shall hold certifications from one or more reputable organizations such as the Massachusetts Arborist Association, Tree Care Industry Association or International Society of Arboriculture.

Site Map

The numbers correspond to the trees assessed in this report.

Site map from Bing Maps

Images

Image 1

This image shows the trees looking north along Elm St.

Image 2

Tree 1 will be most impacted. The driveway to the north will be extended and the utilities moved.

Images 3 and 4

Roots can be seen uplifting the driveway in the top image. The lower image shows the root crown and buttress roots, which appeared and sounded solid, except for the area indicated by the arrow.

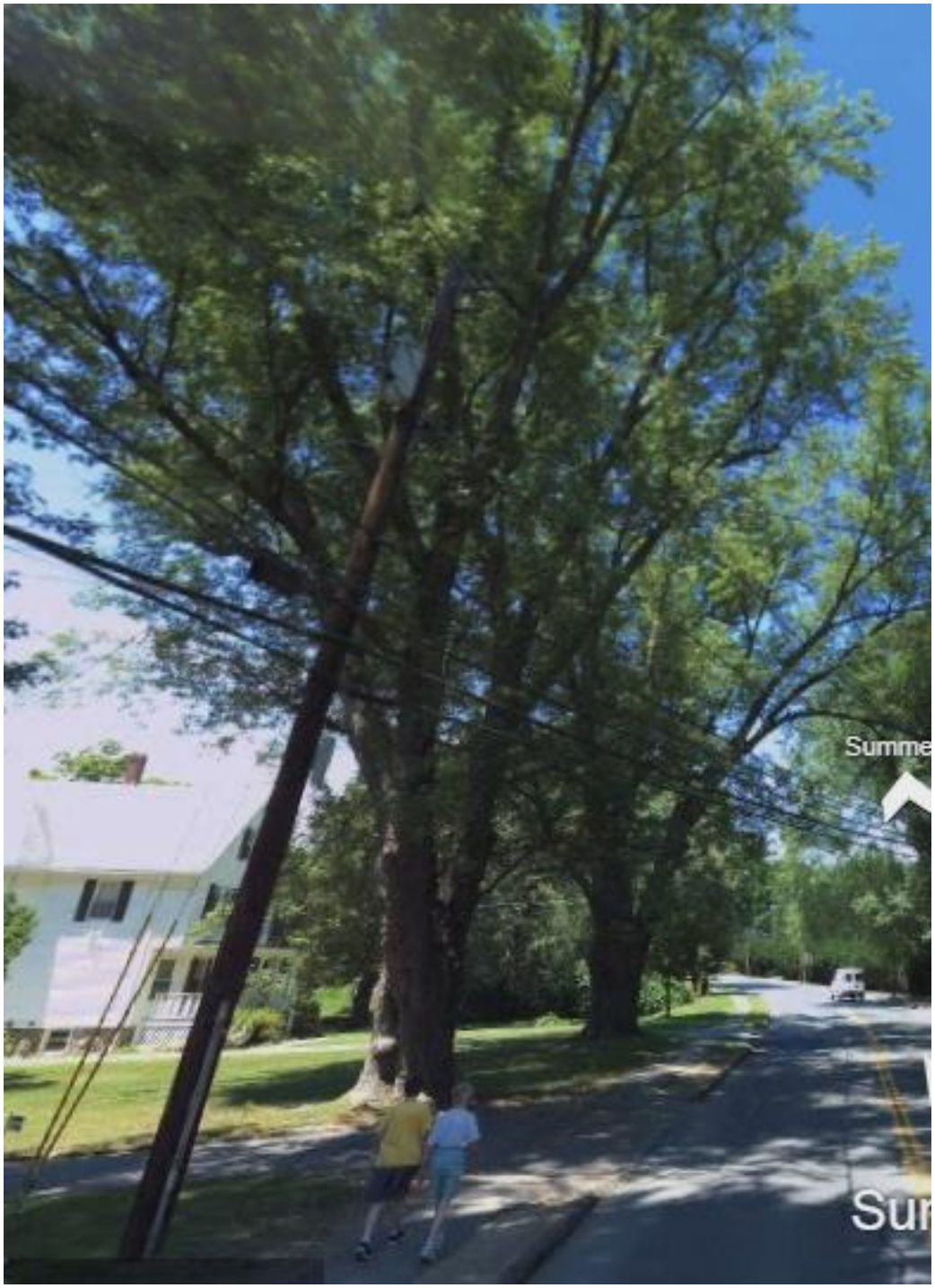
Images 5 and 6

The images show where the tree divides into 3 major scaffolds. The scaffold growing toward the west (arrow) has 2 major cavities in close proximity. The one growing toward the utilities (black arrow) has a strong union. The scaffold growing over the roadway to the east (arrow, lower image) also exhibits a large cavity at the base. Woundwood formation is good, but all these areas should be further investigated to determine the extent of decay.

Image 7

The upper crown has a moderate amount of deadwood over 4 'in diameter growing over utilities and the roadway.

Image 8



This 2014 image from Bing Maps shows a view of Tree 1 looking south along Elm St. The foliage appears to be of normal density and color.

Image 9

This image shows Tree 2 looking east toward the street.

Images 10 and 11

The above image shows the root crown and large surface roots extending into the lawn area. Another image from the other side is shown below. The root crown appears and sounds solid. No external signs of decay were noted.

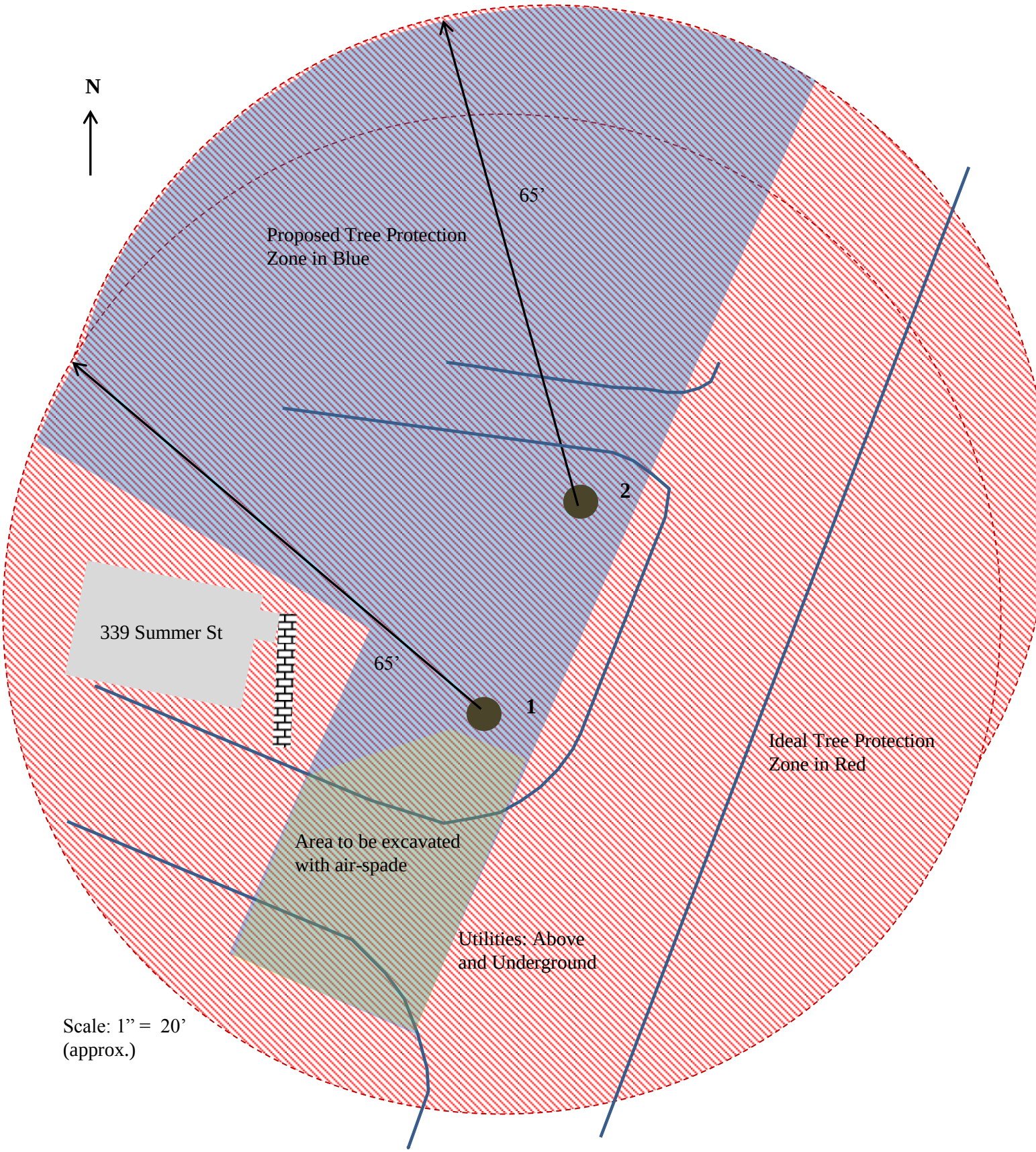
Images 12 and 13

The top image shows where the tree divides into 3 major scaffold limbs. The scaffold to the left has a large cavity near the base (arrow) and grows over a house utility line and driveway. The middle scaffold grows over the roadway. The scaffold to the right grows primarily over the open lawn. The upper crown exhibited little deadwood, good branch structure, and good bud set.

Image 14

This 2014 image from Bing Maps shows a view of Tree 2 looking north along Elm St. The foliage appears to be of normal density and color. No obvious die-back is visible.

Tree Protection Zone



Arborist Disclosure Statement

Arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the beauty and health of tress, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we don't fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the scope of the arborist's services such as property boundaries, property ownership, site lines, disputes between neighbors, and other issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist. An arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate them.

I, _____, acknowledge that I have received a copy of this disclosure and that I have read and understand the statement.

Signed _____ Date _____

Assumptions and Limiting Conditions

1 Any legal description provided to the consultant / appraiser is assumed to be correct. Any titles and ownership to any property are assumed to be good and marketable. No responsibility is assumed for matters of legal character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.

2 It is assumed that any property is not in violation of any applicable codes, ordinances, statutes, or other government regulations.

3 Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant / appraiser can neither guarantee nor be responsible for accuracy of information provided by others.

4 The consultant / appraiser shall not be required to give testimony or 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.

5 Loss or alteration of any part of this report invalidates the entire report.

6 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 written or verbal consent of the consultant / appraiser.

7 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 / appraiser--particularly as to value conclusions, identity of the consultant / appraiser, or any reference to any professional society or institute or to any initialed designation conferred upon the consultant / appraiser as stated in his qualification.

Certificate of Performance

I, Howard Gaffin, certify that:
I have personally inspected the tree on the property referred to in this report and have stated my findings accurately. The extent of the evaluation and/or appraisal is in the attached report.
I have no current or prospective interest in the vegetation or the property that is the subject of this report and have no bias with respect to the parties involved.
The analysis, opinions, and conclusions stated herein are my own and are based on
current scientific procedures and facts.
My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party, nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.
My analysis, opinions, and conclusions were developed and this report has been prepared according to commonly accepted arboricultural practices.
No one provided significant professional assistance to the consultant, except as indicated within the report.

I further certify that I hold the following credentials:

- Registered Consulting Arborist #458
- Board Certified Master Arborist #NE-0363B
- Massachusetts Arborist Association Certified Arborist#1468

I have been involved with the practice of arboriculture for over 30 years.

Signed

Date