



Third Church in Salem Linden Tree Assessment

Prepared for:
Third Church in Salem
3 Ell St.
Salem, MA

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Summary

After assessing the health and structure of a large Linden tree, I have rated it a moderate risk. The risk may be reduced, but not eliminated, through pruning treatments if the tree is to be retained.

Introduction

Background

In early August of 2017, I was contacted by Mr. Tree Guy. He is representing Third Church regarding a large Linden tree (*Tilia Cordata*) on the property. Mr. Guy is considering removal of the tree for a variety of reasons, but ran into opposition from many in the church community. I was contracted to provide an unbiased assessment of the tree.

Assignment

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

- Assess and rate the risks associated with a large Linden tree on the property
- Provide management and abatement options if applicable.
- Provide a written report of my findings

Scope of Work

The scope of this assignment is limited to one of the two large Lindens on the property.

The tree should be reassessed annually, unless noted otherwise in this report.

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 crown¹, 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 roots²
- 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. 9).

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 tree that could impact life and property.

Observations

I met with Mr. Guy at Third Church, 3 Elm St. Salem, MA on August 5, 2017 (site map, pg. 6). A large Linden tree lies to the north of a newer section of the church, in a small parking lot. The base of the tree is located against the property line. A fair sized residential structure lies just to the north of the trunk (photos 1 and 2, pg. 7). The tree diameter is 54" dbh. A height of 65 feet was recorded with a clinometer. The root zone is completely covered with asphalt. The root crown and buttress roots appear solid where they enter the pavement, which undulates due to the major roots underneath. The lower trunk is divided at the base with a seam on the south side. Each major scaffold³ divides again creating four major scaffolds that form the crown. The co-dominants on the west scaffold exhibit a tight, v-shaped union with included bark (photo 3, pg. 8)). The co-dominants on the east scaffold have a better union, tight, but no included bark. Two additional scaffolds on the north side of the tree appear to have been removed fairly recently. One exhibited an extremely large cavity (photos 4 and 5, pg. 9). Another large section was removed from the east scaffold. The live crown ratio is about 50%. The foliage appears normal in color and density. Minimal amounts of deadwood were observed.

Discussion

Methodology

I have chosen to base the risk factor on the 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).

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. Often, ratings are combined in a matrix to categorize risk. Inherent subjectivity and ambiguity are limitations of the qualitative approach. In order to increase reliability and consistency of application, it is important to provide clear explanations of the terminology and significance of the ratings defined for likelihood, consequences, and risk.

The first part of the assessment is to determine the *Likelihood of Failure* and apply one of four ratings.

I have determined the likelihood of failure for this tree to be **Possible**: "failure could occur, but it is unlikely during normal weather conditions within the specified time period".

Next, the *Likelihood of Impacting a Target* is assessed using one of four ratings: I have determined the likelihood of impacting a target to be **High**: "The failed tree or branch will most likely impact the target".

In this case there are several targets including people, vehicles, utilities, and structures.

This results in a rating for the *Likelihood of a Tree Failure Impacting a Target*, which for this tree is **Somewhat likely**.

³ scaffold limb – permanent structural branches of a tree

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. I have determined the *Consequences of Failure* to be **Significant**: “consequences are those that involve property damage of moderate to high value, considerable disruption, or personal injury”.

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
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.

Using this matrix, I have determined the risk associated with these trees to be **Moderate**: “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”.

Considerations

This large, old tree is one of few mature trees in an area surrounded by structures and hardscape, and would obviously be impossible to replace. The following list of pros and cons are offered for consideration:

Pros	Cons
<ul style="list-style-type: none">• Aesthetics• Shade (though not much benefit to First Church)• Wildlife habitat• Historic, irreplaceable old tree	<ul style="list-style-type: none">• Risk potential, many targets• Root/pavement conflicts• Falling debris• Honeydew from insect activity• Inhibits shed size and placement of new shed• Costs to preserve

It would take a catastrophic failure at one or more of the major co-dominant unions for this tree to impact the surrounding targets. Cabling the stems is often a consideration, but the structure of this tree does not, in my opinion, lend itself to this treatment. Another option, besides removal, is to perform a series of reduction pruning over time to create a stouter structure. This particular species is likely to respond well and produce newer growth in the interior that can be managed over time. Risk could be reduced immediately after the initial treatment, and managed over time.

Conclusions

From the Arborist Disclosure Statement (pg. 9): “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”.

While it is my opinion that the risk associated with this tree is moderate, I believe it can be managed and reduced. However, an extreme weather event could still cause a failure that would likely have fairly serious consequences.

Management Options

- 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 3 years to perform additional reduction pruning and manage re-generating growth
- Annual monitoring for any health or structural changes
- Check tree after any extreme weather event for changes in the soil, roots, trunk or crown. Inspect any large stem unions identified as suspect in this report
- Any tree work should be done 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 Maps



An overhead and oblique view of the site from Bing Maps shows the subject tree on site.

Photos

1 and 2, views from the east and west



The above images show the tree looking west and east respectively. Poor pruning decisions created a less stable structure. Reduction of the crown height over time is recommended if the tree is to be retained.

3, a view of the trunk looking north



This image shows the trunk looking north toward the neighboring property. The root system and pavement are certainly at odds. The 2 seams in the trunk indicate v-shaped unions with included bark but neither appear to be active at this time. The outline of the proposed shed placement is in the foreground.

4 and 5, views of the trunk looking west and south



These images of the tree show where 2 major scaffolds were removed on the north side of the trunk. The lower scaffold was extremely compromised. It is likely that multiple pruning wounds over time created the cavity. The upper scaffold appeared to be solid.

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 trees, 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
- ISA Qualified Tree Risk Assessor

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

Signed H G

Date 8/10/2017