
Consulting Arborist Services

Tree Risk Assessment

Prepared For:

Town of Westport Public Works
110 Myrtle Ave
Westport, CT 06880

For Service At:

Jesup Green
20 Jesup Rd.
Westport, CT 06880

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ARB-LOGIC LLC
Tree & Landscape Consulting

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Summary

In April of 2023, an ANSI Level II Tree Risk Assessment¹ was performed on three trees at Jesup Green located at 20 Jesup Road in Westport Connecticut. Tree #1 is assigned a High Risk while tree #'s 2 and 3 are assigned a Moderate Risk and it is recommended to further investigate with a Level 3 Advanced Assessment.

Introduction

Background

For the reconstruction of the Parker Harding Plaza parking lot the installation of 40 new parking spaces is required. The eastern portion of Jesup Green has been identified for the new parking spaces. This would involve the removal of 3 mature trees. A more thorough understanding of the present health, physical condition, and level of assigned risk of the trees to be remove was requested.

Assignment

Perform a Level II Basic Tree Risk Assessment on three trees located at Jesup Green.

Limits of Assignment

Trees were observed in the beginning of April under early spring conditions. All trees were assessed by ground observations using Level II methodology.

Purpose and Use of the Report

To provide information regarding the present health, physical condition, and level of assigned risk.

Observations

Site Observations

Jesup Green is a 1.2-acre area of green space located in downtown Westport. The green is immediately surrounded by the Public Library to the south, Jesup road to the north, a parking area to the east and an additional parking area to the west. Just past the parking area to the west, the Saugatuck River can be found. The Green is mostly level with sloping terrain to the east. The Green contains a mix of small caliper trees as well as few semi-mature to mature trees. There is a mix of conifer as well as deciduous trees, though deciduous trees dominate the landscape.

Tree #1- Norway spruce (*Picea abies*)

The Norway spruce is located at the eastern side of the green adjacent to the parking lot (appendix A). The tree is approximately 65-feet tall with **codominant** structure (appendix B photo 2). The south stem measures 28-inches in **diameter at breast height (DBH)** while the north stem is 21.5-inch DBH. Each stem had an approximate lean of 20-25-degrees. The south stem has secondary large diameter branch growing above where the two main stems intersect. Oozing sap was observed in multiple locations. The origins of all the sap could not be identified, though some of the observed damage was consistent with damage from a type of a sap sucking bird (appendix B photo 1).

A metal probe with blue and red marking spaces every 3-inches was used to inspect the codominant stems (appendix B Photos 3,4,5). The seam extends from the soil line to where the stems bifurcate approximately 3.5 to 4- feet above grade (appendix B photo 6). When sounded with a mallet the seam as well as portions of the stems indicated hollow sections as well as possible decayed sections. Large surface roots with mechanical damage were also observed (appendix B photo 7).

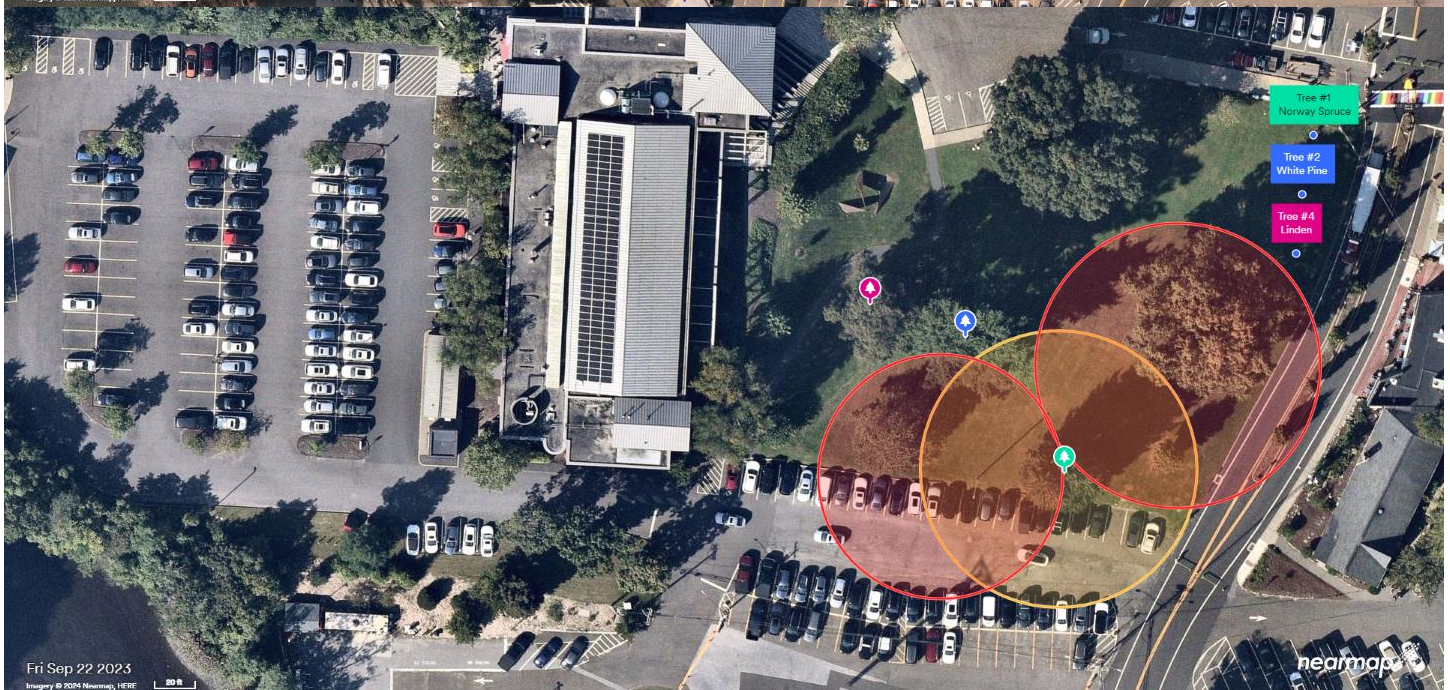
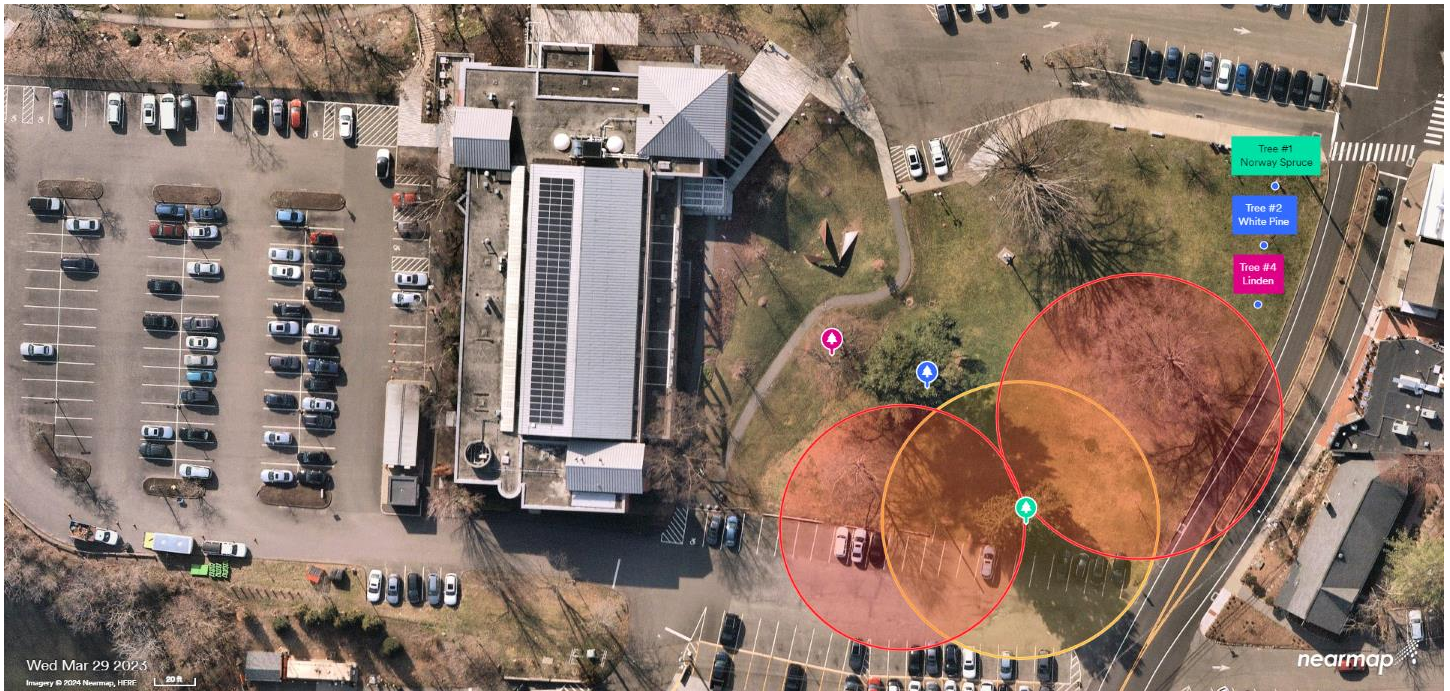
¹ An ANSI Level II Tree Risk Assessment is a ground-based evaluation performed by a Tree Risk Assessment Qualified Arborist using methodology found in the ANSI A300 Part 9: Best Management Practices for Tree Risk Assessment, Smiley, E. Thomas, et.al. Copyright © 2011 by the International Society of Arboriculture

The tree appears to be in average health with typical amounts dead branches for the species. Some upper crown thinning was observed.

The Norway spruce has the following targets within its failure zone (winter and summer). These zones depict likely areas of failed portions of tree and or tree debris that may impact surroundings. This is based on tree height, lean, and failure points.

- Yellow circle: Whole tree failure, one times the height.
 - Parking lot and greenspace.
- Red circle: Individual stem failures.
 - Parking lot, greenspace portion of roadway.

*These projections are likely scenarios of impact, however, do not account for all possibilities.



Tree #2 White pine (*Pinus strobus*)

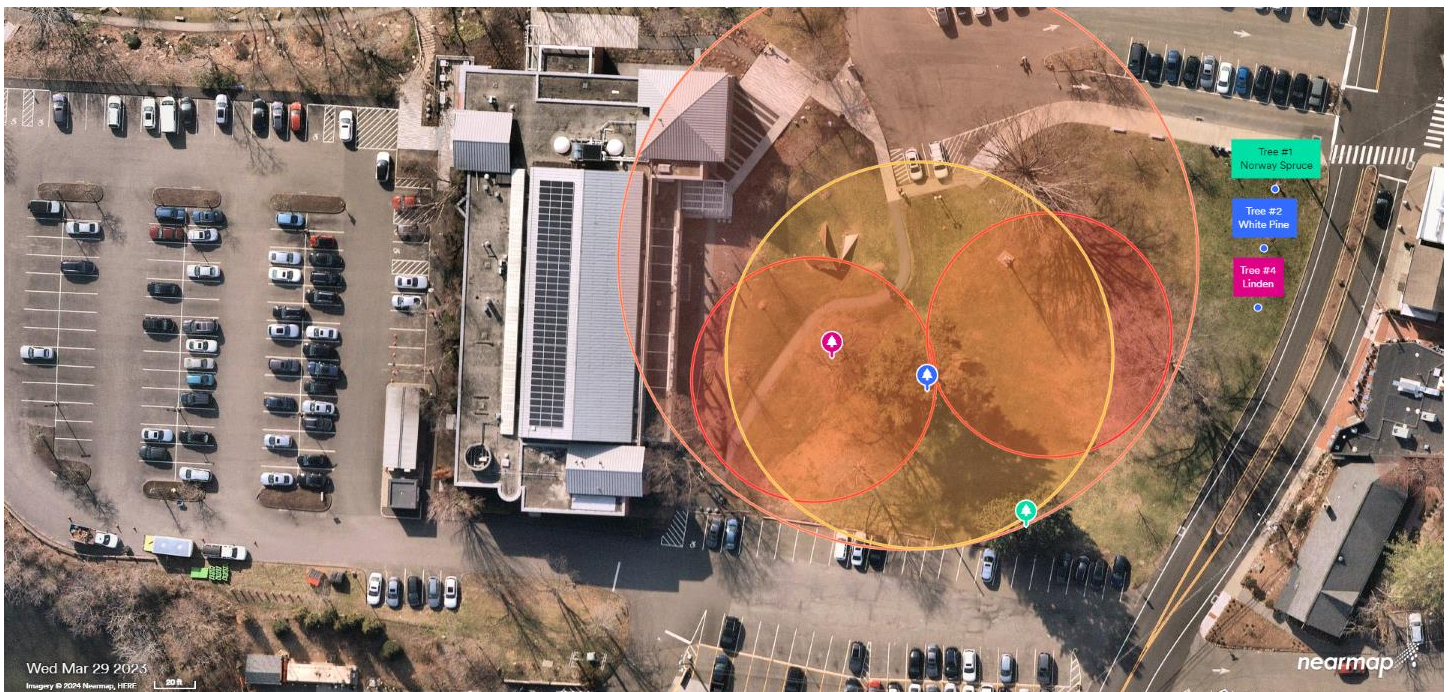
The White Pine is located in the southeastern portion of the Green adjacent to the library. The tree is approximately 95-foot tall and 52-inch DBH with codominant structure with **included bark** likely (appendix B photos 8 and 9). The codominant intersection begins approximately 44-feet from grade level. The tree has an 8 to 12-degree lean towards the southwest. The trees canopy presents with over extended branches outside the natural canopy shape. A previous large diameter branch failure can be identified in the upper third of the tree on the north side (appendix B photos 10 and 11). Discoloration of the stem at the base of the codominant intersection resembling wet bark was observed (appendix B photo 12). Several branches in the lower portion of the canopy show weak attachment with sharp angles or more than one branch growing from a single point of origin.

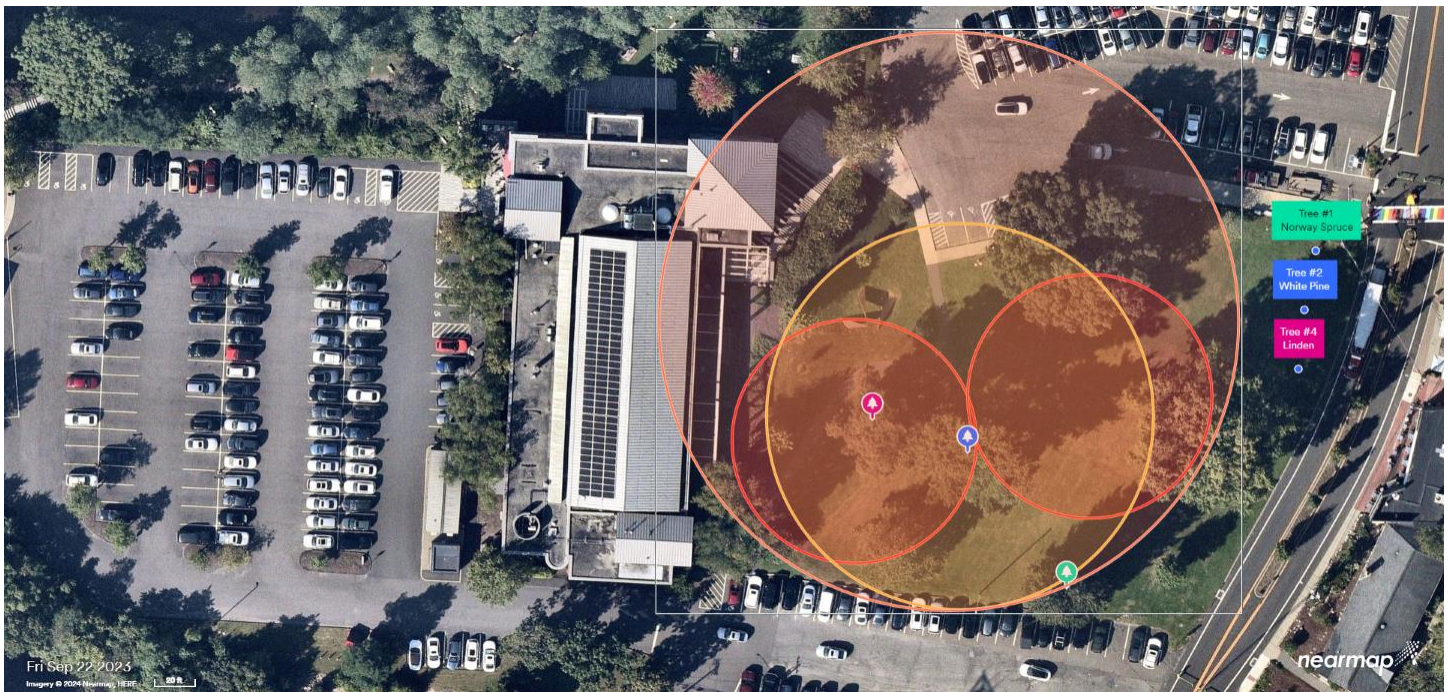
When sounding the lower stem changes in pitch were observed which may indicate inconsistencies in wood density. The root crown as well as surface roots show signs of wounding from mechanical damage (appendix B photos 13, 14, 15) Typical amounts of dead and stubbed branches were observed and is consistent for the species. The tree appears to be in good health though old for the species in the local area.

The White pine has the following targets within its failure zone (winter and summer). These zones depict likely areas of failed portions of tree and or tree debris that may impact surroundings. This is based on tree height, lean, and failure points.

- Yellow circle: Whole tree failure, 1X the height.
 - Walkway, green space, parking lot, adjacent trees, small structures.
- Orange circle: Whole tree failure, 1.5X the height (increased target zone based on tree height and species)
 - Walkway, parking lot, building, small structures, adjacent trees.
- Red circle: Individual stem failures.
 - Walkway, adjacent trees, green space.

*These projections are likely scenarios of impact, however, do not account for all possibilities.





Tree #3 Linden (*Tilia sp.*)

The Linden tree is located south of tree #2 and adjacent to the library. It measures approximately 85-feet tall and has a 38-inch DBH. The tree also has codominant structure and has been recently pruned (appendix B photos 16 and 17). The tree leans to the west 3 to 8 degrees. A cavity was observed in the lower portion of the stem 12-feet from grade level as well as swelling in the stem below the cavity (appendix B photo 18). When the stem was sounded changed in pitch indicated portions of the stem below the cavity may be hollow and or decayed. The root crown area on the north side of the tree shows areas of swelling as well as a vertical seam which can indicate decay (appendix B photo 19). Some damage to the buttress roots was observed on the south side of the tree (appendix B photo 20).

The Linden has the following targets within its failure zone (winter and summer). These zones depict likely areas of failed portions of tree and or tree debris that may impact surroundings. This is based on tree height, lean, and failure points.

- Yellow circle: Whole tree failure, 1X the height.
 - Walkway, adjacent trees, small structures, Parking lot.
- Red circle: Individual stem failure.
 - Walkway, adjacent trees, small structures, Parking lot

*These projections are likely scenarios of impact, however, do not account for all possibilities.



Qualitative Tree Risk Assessment

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. Ratings are combined in a matrix, (Table 1), to categorize risk. To increase the 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. This approach is a recognized and respected method of risk assessment used internationally by many governments and businesses².

² Qualitative Tree Risk Assessment, Arborist News, E. Thomas Smiley, Nelda Matheny, and Sharon Lilly, February 2012, © International Society of Arboriculture.

Glossary of Terms

Codominant Stems- forked branches of nearly the same diameter, arising from a common union in lacking a branch collar; May have included bark.

Diameter at Brest Height (DBH)- tree diameter measured at 4.5 feet above the soil line.

Failure- (tree failure) is the breakage of stem, branches, roots, or loss of mechanical support in the root system.

Imminent- failure has started or is most likely to occur in the near future, even if there is no significant wind or increased load.

Improbable- the tree or branch is not likely to fail during normal weather conditions and may not fail in extreme weather conditions within the specified time period.

Included Bark- Bark that is embedded between a branch and its parent stem, or between codominant stems decreasing the strength of the attachment.

Likelihood- is the chance of an event occurring. In the context of tree failures, the term likelihood is used in three places to specify: 1) the chance of a tree failure occurring, 2) the chance of impacting a specific target, and 3) the combination of the likelihood of a tree failing and the likelihood of impacting a specific target.

Possible- failure could occur, but it is unlikely during normal weather conditions within the specified time period.

Probable- failure may be expected under normal weather conditions within the specified time period.

Residual Risk-Risk remaining following mitigation.

Risk- is the combination of the likelihood of an event and the severity of the potential consequences or the likelihood of a tree failure occurring and affecting a target; and the severity of the associated **Consequences**—personal injury, property damage, or disruption of activities.

Risk matrix (Table 1) is a means of combining ratings of likelihood and consequence factors to determine a level or rating of the risk.

Tree risk assessment is the systematic process to identify, analyze, and evaluate tree risk.

Targets (risk targets) are people, property, or activities that could be injured, damaged, or disrupted by a tree failure.

Tree Risk Matrix

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	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

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	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

Table 1: Matrices 1 & 2 above are used in tree risk assessment by the assessor to assign a risk rating.

Assigned Risk Rating

Tree # 1: Norway Spruce:

Likelihood of failure: Probable
 Likelihood of failure & Impact: Likely
 Consequences of failure: Severe
Risk level assigned: High- Time Period: (1year)
Mitigation: Removal recommended when actionable.

Tree # 2: White Pine:

Likelihood of failure: Possible
 Likelihood of failure & Impact: Somewhat Likely
 Consequences of failure: Severe
Risk level assigned: Moderate - Time Period: (3 years)
Mitigation: RECOMMEND LEVEL 3 ASSESSMENT

Tree # 3: Linden:

Likelihood of failure: Possible
 Likelihood of failure & Impact: Somewhat Likely
 Consequences of failure: Severe
Risk level assigned: Moderate - Time Period: (3year)
Mitigation: RECOMMEND LEVEL 3 ASSESSMENT

Discussion

Tree #1: The Norway spruce contains significant structural concerns which warrant it's removal when actionable. Conifer trees in general are weak wooded trees in conjunction with codominant structure containing decay and separation are factors that can not be reliably mitigated.

Tree #2: White pine trees are considered a pioneer species. This means that they are often on of the first species to grown after a disturbance. They are fast growers and thus weak wooded trees. It is common for limb failure in weather events such as wind, snow, and ice. These trees are also known for uprooting due to shallow rooting when compared to other tree species. Given the location of the tree and its exposure due to the height and relatively open surrounding wind exposure is an important factor to consider. In combination with its codominant structure and previous branch failures mitigation to reduce risk might be possible however not until a level 3 investigation is performed.

Tree#3: The Linden tree apers to be in average health and with its recent pruning reduced the immediate risk of falling dead, dying and or broken and hanging branches. Lindens are also considered to be rapid growing trees which can make the wood weaker compared to other tree species. They also are known to compartmentalize decay poorly which can increase the likelihood of cavities and decay. The identified cavity should be investigated further to understand the extent of the decay since it was found to extend downward in the stem from the cavity. Decay also can travel upwards for the cavity which was not possible to investigate during the initial evaluation.

Recommendations

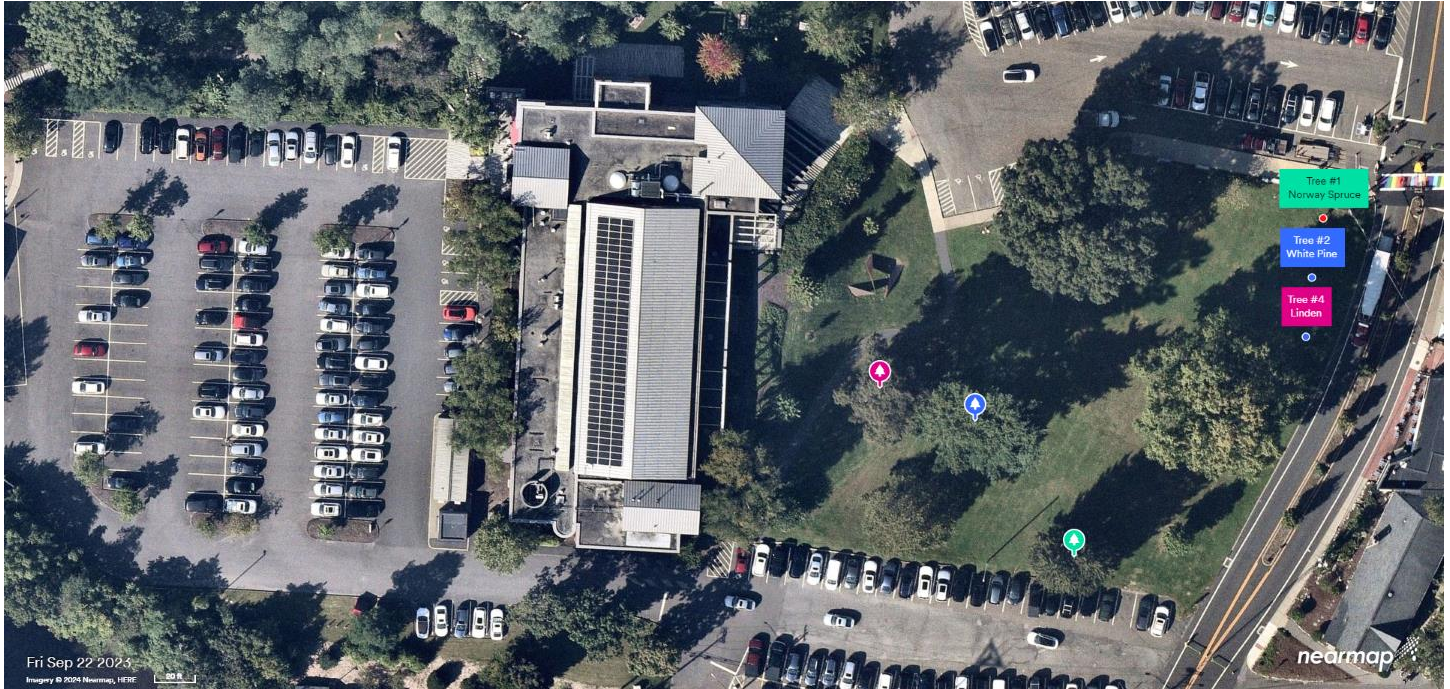
Tree #1: Remove when actionable.

Tree #2: Perform a level 3 investigation to inspect cavity. Wood resistance drilling and or sonic tomography is also recommended for the stem and root crown.

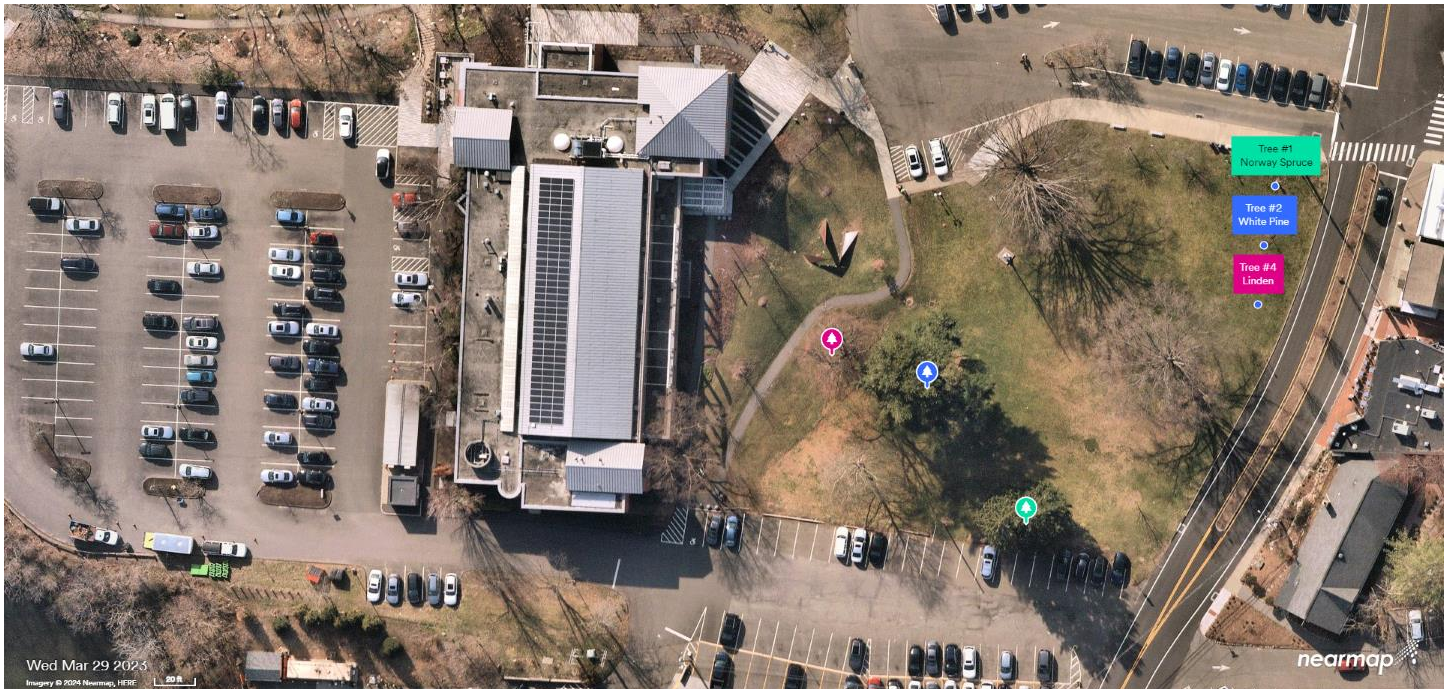
Tree #3 Perform a level 3 investigation to inspect codominant structure, upper canopy, previous large diameter branch failure. Wood resistance drilling and or sonic tomography is also recommended for the stem, root crown and codominant intersection.

Appendix A: Site Map

Aerial Image 1: Trees 1-3 in summer condition, showing crown spread.



Aerial Image 2 : Trees 1-3 in winter condition showing location and proximity to structures.



Appendix B: Photographs



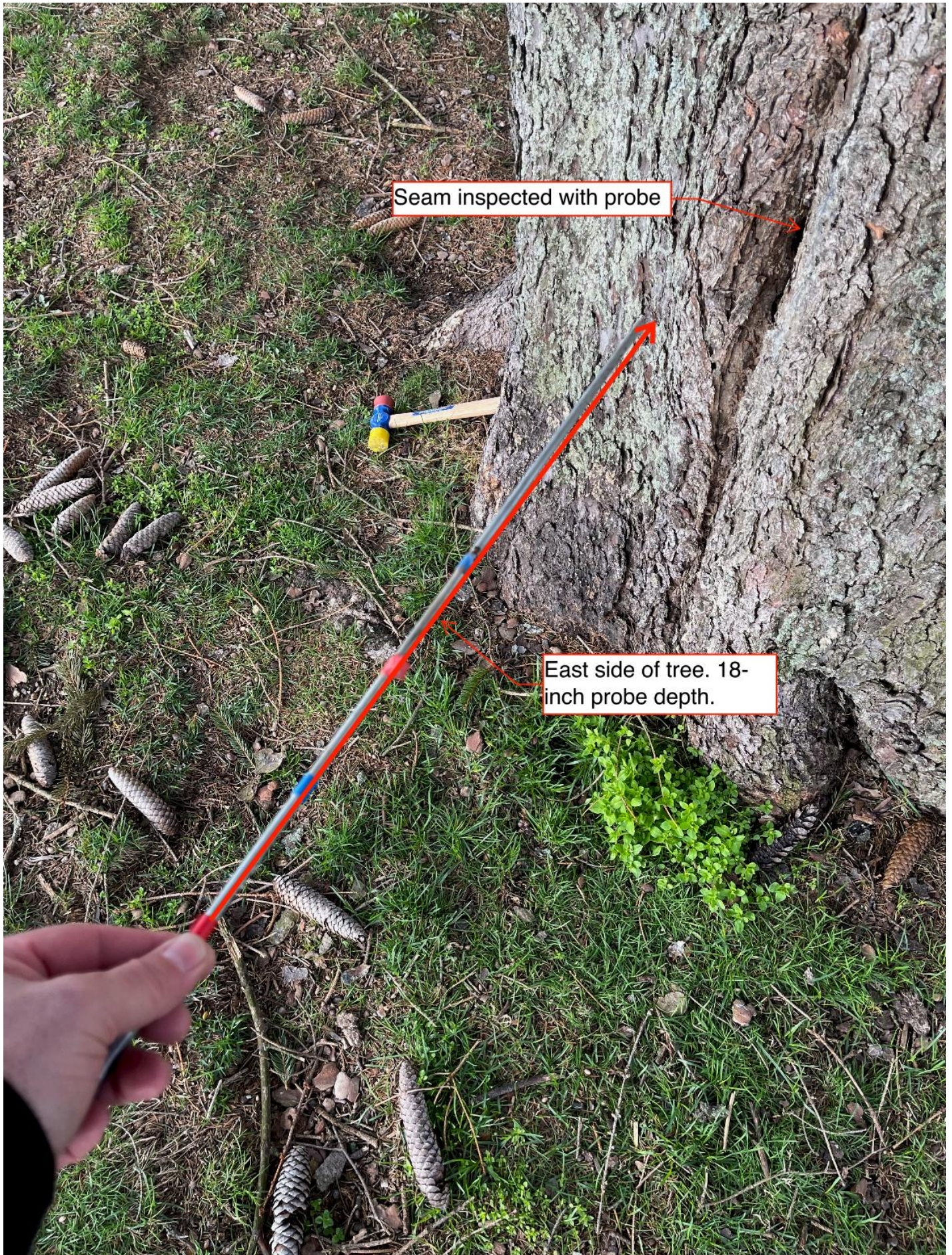
Photograph 1: Norway Spruce- Sapsucker damage



Photograph 2: View of Tree #1 showing trunk and codominant crown structure.



Photograph 3: Tree #1 probe inserted into seam east side of tree.



Seam inspected with probe

East side of tree. 18-inch probe depth.

Photograph 4: Tree #1 seam probed to a depth of 18 inches.



Photograph 5: Tree #1 Probe inserted into seam 18 to 21-inches on west side of tree.



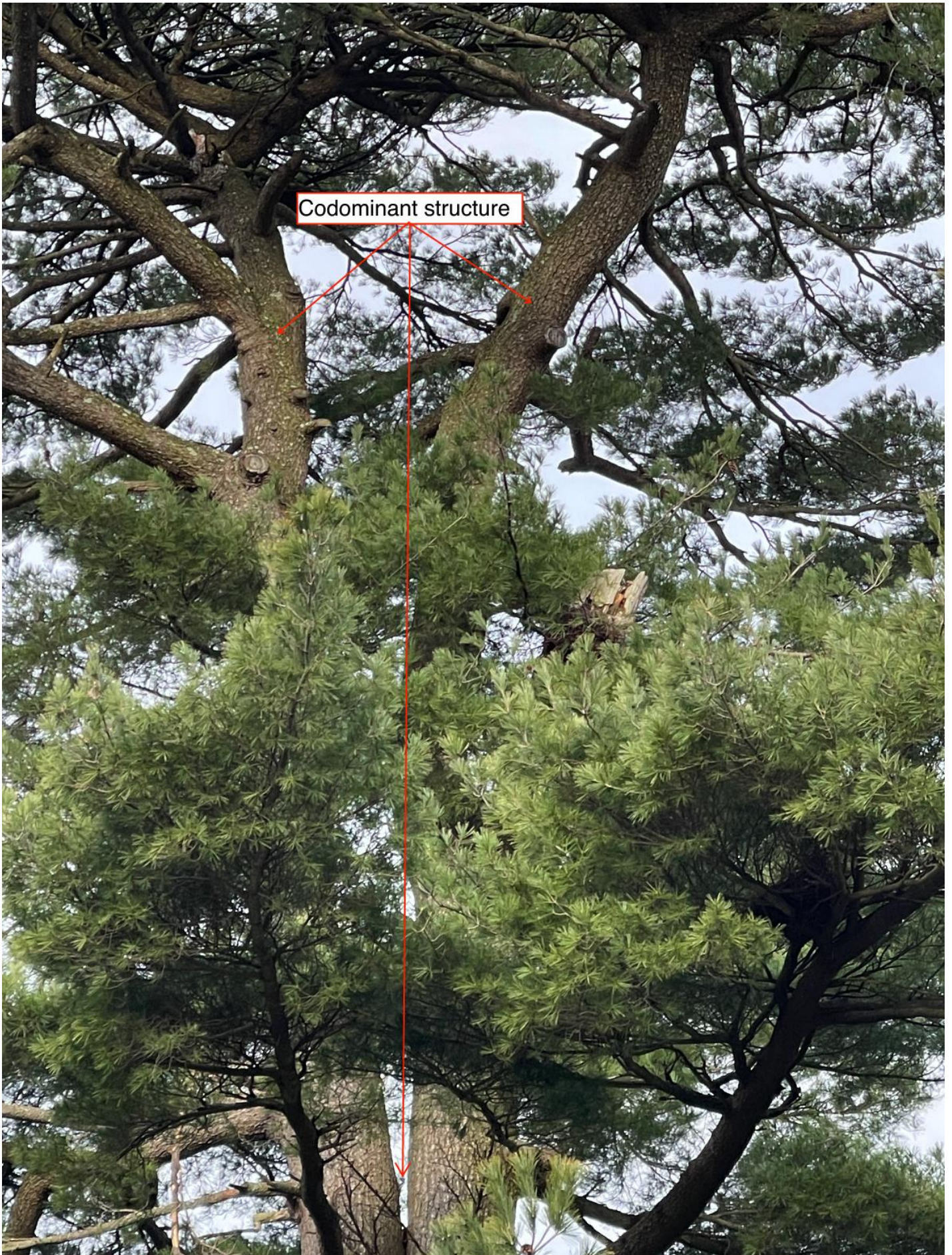
Photograph 6 Tree #1: Seam view from west side of tree.



Potograph #7: Tree #1 Surface roots with mechanical damage west side of tree.



Potograph #8: Tree #2 West view of White pine.



Potograph #8: Tree #2 Codominant structure.



Past large diameter
branch failure

Over extended
branch structure

Potograph #9: Tree #2 Past large branch failure, overextended branch structure.



Potograph #10: Tree #2 Closeup of branch failure.



Potograph #11: Tree #2 Wet bark at base of codominant intersection.



Potograph #12: Tree #2 Wounding on root crown.



Potograph #13: Tree #2 Surface roots with mechanical damage.



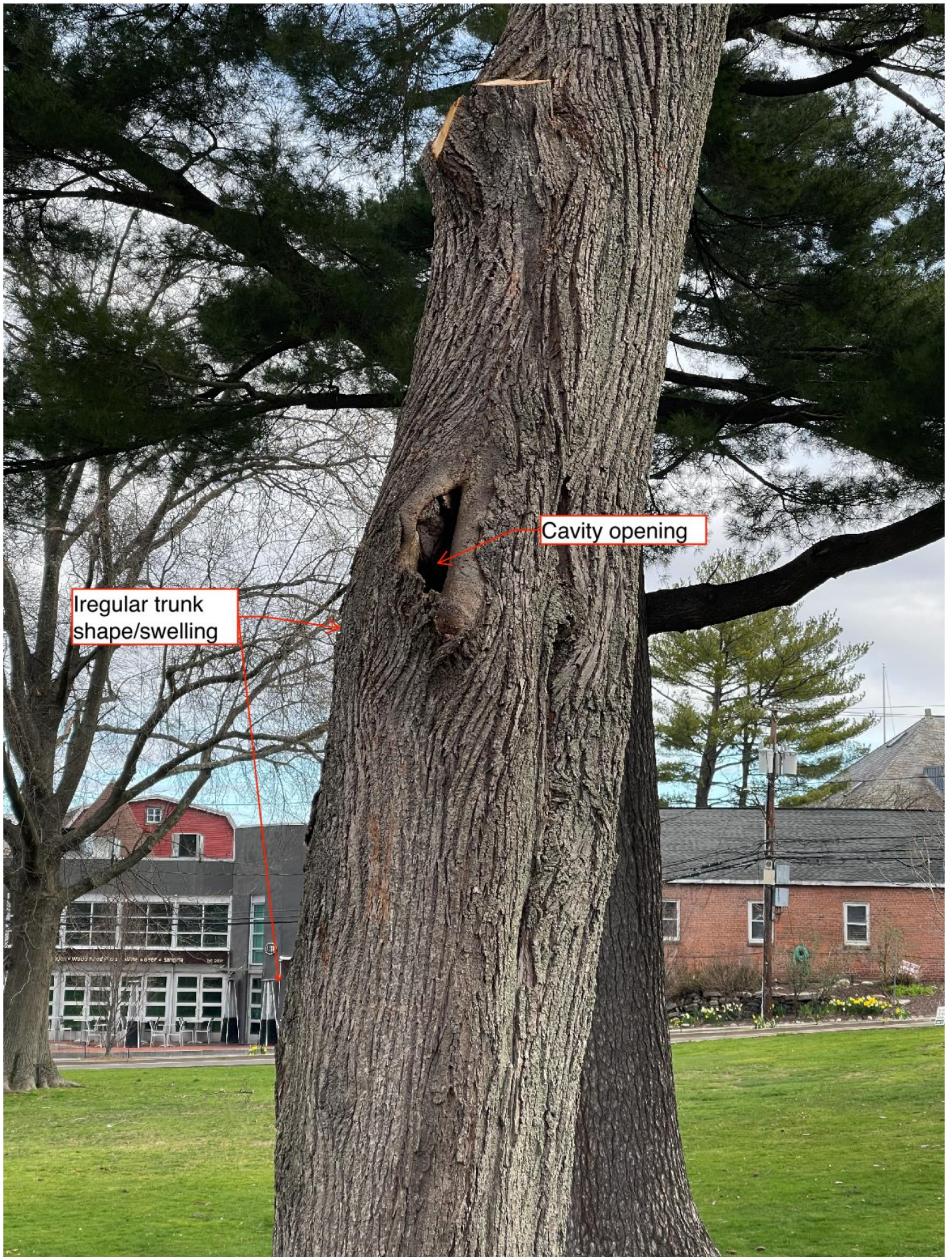
Potograph #14: Tree #2 Surface roots.



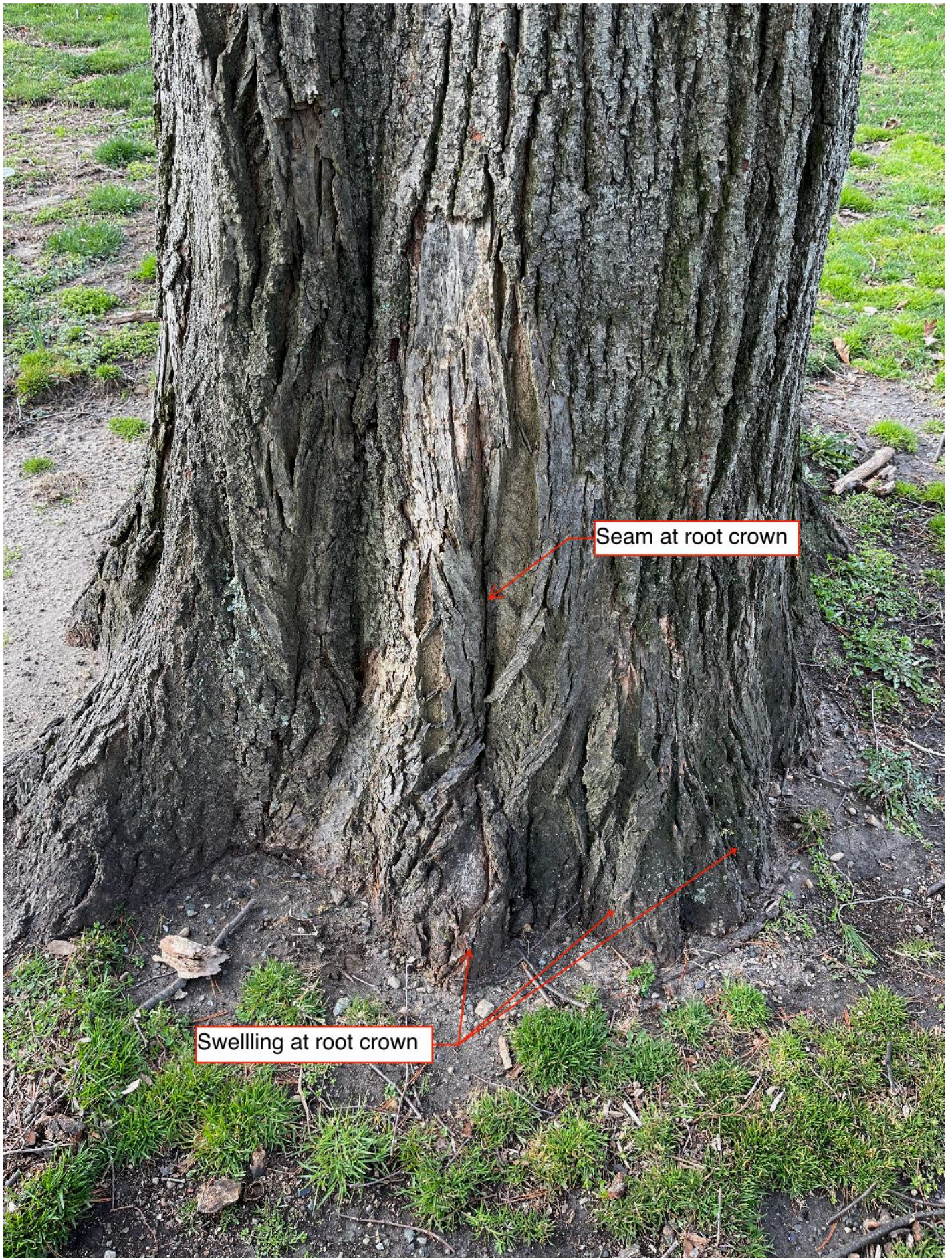
Potograph #15: Tree #3 Linden east side view.



Potograph #17: Tree #3 Recent pruning cuts, codominant structure.



Potograph #18: Tree #3 Recent pruning cuts, codominant structure.



Seam at root crown

Swelling at root crown

Potograph #19: Tree #3 Vertical seam and swelling.



Potograph #19: Tree #3 Vertical seam and swelling.

Appendix C: Assumptions and Limiting Conditions

1. Any legal description provided to the consultant 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 legal in character. Any property is appraised or evaluated as though free and clear, under responsible ownership and competent management.
2. Care has been taken to obtain all information from reliable sources. All data had been verified as far 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 attend court or any other public or private meetings by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the original or subsequent proposal.
4. Loss or alteration of any part of this report invalidates the entire report.
5. Possession of this report or a copy thereof does not imply the right of publication or use for any purpose by anyone other than the person to whom it is addressed, without the prior written or verbal consent of the consultant.
6. 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, the 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 qualification.
7. This report and values 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 any finding to be reported.
8. Sketches, diagrams, graphs, and photographs in this report, are intended as visual aids, are not necessarily to scale, and should not be construed as engineering or architectural reports or surveys.
9. 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. 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.

Appendix D: Certification of Performance

I, Ben Sykas, certify that:

- I have personally inspected the trees and the property referred to in this report and have stated my findings accurately. The extent of the evaluation is stated in the attached report and the stated terms and conditions.
- I have no current or prospective interest in the vegetation or the property that is the subject of this report and have no personal interest or bias concerning the parties involved.
- The analysis, opinions, and conclusions stated herein are my own and are based on current scientific procedures and facts.
- My analysis, opinions, and conclusions were developed, and this report has been prepared according to commonly accepted arboriculture practices.
- No one provided significant professional assistance to me, except as indicated within the report.
- My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause either of the client or any other party or upon the results of the assignment, the attainment of stipulated results, or the occurrence of any subsequent events.

I further certify that I am a member in good standing of the American Society of Consulting Arborists and the International Society of Arboriculture. I have been involved in the practice of arboriculture and the care and study of trees for over 20 years.



Benjamin Sykas