Abbottsford HOA

Tree Risk Assessment Report

Assessment ID: 10007

PREPARED FOR:

Abbottsford HOA
Abbottsford
Nashville, Tennessee 37215

PREPARED BY:

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BARTLETT TREE EXPERTS
SCIENTIFIC TREE CARE SINCE 1907

Submitted on Mar 18, 2024

Summary

The Shumard oak located behind the playground on Overton Park in the Abbottsford HOA property was assessed for risk on March 15th, 2024 by Jacob Winn. Using the methods outlined in this report and the results of the examination of this tree, it is my professional judgment that this tree has a **high risk rating**.

Mitigation is recommended for the tree parts listed below.

Tree Part	Mitigation Options	Estimated Residual Risk
Trunk	Remove tree ASAP to eliminate the potential for failures	None
Roots	Remove tree ASAP to eliminate the potential for failures	None

If the tree should remain, I recommend an assessment interval of annually and after major storm events.

Tree risk assessment definitions are provided at the end of this report to help with understanding the terminology and with selecting the level of risk you are comfortable with when making decisions on your tree care needs.

Assignment

I was contracted by Abbottsford HOA to assess the risk of the Shumard oak located behind the playground on Overton Park due to the presence of a large stem cavity. Based on our conversation, we agreed to the following:

1. Perform a Level 2 basic and Level 3 advanced assessment (as defined in the *International Society of Arboriculture's (ISA's) Best Management Practices (BMP) for Tree Risk Assessment* and the *ANSI A300 Part 9 Standard for Tree Risk Assessment*). The limits of the assessment were discussed.
2. Make recommendations to reduce risk where appropriate.
3. Provide a written report that documents the level of risk based on tree and site conditions observed and discussed at the time of the assessment.

Assessment Procedures

The risk of root, root collar and trunk failure for the Shumard oak via a ground-based assessment was performed. In addition, the trunk and root collar had advanced assessments for failure performed using resistance drilling. The assessments occurred on March 15, 2024 and followed the *International Society of Arboriculture's (ISA) Best Management Practices for Tree Risk Assessment and American National Standards Institute A300 Tree Risk Assessment Standard)*.

Tree risk ratings are derived from a combination of three factors: the likelihood of failure, the likelihood of the failed tree part impacting a target, and the consequences of the target being struck. These factors are then used to categorize tree risk as extreme, high, moderate, or low. The factors used to define your risk rating are identified in this report.

Tools used in the assessment included: IML Resi® resistance drilling device, climbing equipment.

In addition, resistance drilling was used to identify the potential loss of structural integrity within the trunk and roots, and provide images used for analysis within this report. The device uses a small diameter drill bit to drill into the tree and measure the amount of resistance encountered. The drill bit will encounter more resistance in wood that is intact and not structurally compromised. The drill bit will move easily through compromised areas such as a crack, cavity, decay, or void, causing a drop in resistance. The amount of resistance measured is presented as a graphic image from areas with high structural integrity to areas of no structural integrity.

Observations

The following observations were made by Jacob Winn during the tree assessment conducted on March 15, 2024:

- Tree species: Shumard oak
- Tree trunk diameter (DBH): 42.5 in.

Only the following high value targets within the target zone were considered. Other targets will be considered upon request.

1. Playground (people), 2. Tennis court (people), 3. House (110 Commons Drive), 4. People in house (110 Commons Drive), 5. Garage (120 Chatsworth Drive), 6. People in garage (120 Chatsworth Drive), 7. People near tree

I assessed this tree for risk due to the Arborist Representative Michael Davie's concern for a large stem cavity with visible internal decay. This tree is a mature Shumard oak that measures 42.5" at 4.5' height. I estimated the tree to be approximately 75' in height. It is located south of the tennis court parking lot on Overton Park and grows against a fence separating it from the adjacent residential properties (see **Photo 2**). The tree has a large western-facing stem cavity at approximately 18' height (see **Photo 3**). The cavity extends vertically for 5'8" and has a width of 14" at its midpoint. The cavity's depth extended 21" from its opening to its opposing internal wall when measured with a tape measure. There was visibly decaying wood inside the cavity (see **Photo 3**) and honeysuckle growing from the cavity's floor. I also saw a single fungal conk (see **Photo 5**) on the tree's northeastern basal area. Structural issues aside, the tree has a full crown and appears to be in good health for its size and maturity.

Tree Risk Assessment

After discussing the site's usage and **occupancy rates** throughout the course of the year with you, combined with my observations during the assessment, we determined that within the tree's **target zone**:

- Playground (people) is an occasional target,
- Tennis court (people) is an occasional target,
- House (110 Commons Drive) is a constant target,
- People in house (110 Commons Drive) are a frequent target,
- Garage (120 Chatsworth Drive) is a constant target,
- People in garage (120 Chatsworth Drive) are an occasional target, and
- People near tree are an occasional target,

In determining the risk ratings, I considered a tree or tree part failure impacting a person to have the highest consequence, **severe**.

I considered a tree or tree part failure impacting a structure as having **significant** consequences.

I used a time frame of three years when I assessed the likelihood of tree or tree part failure. Following industry standards, the time frame is one factor used in the equation to determine tree risk. Trees and sites change on a daily basis. You should not consider this time frame a "guarantee period" for the risk assessment or that the tree will not fail or is safe within this time frame.

The main concerns observed during the assessment and their associated risk ratings are provided in the following paragraph. Information not specifically summarized was not considered a significant factor at the time of assessment.

The overall risk rating for this tree is considered high, indicated by the highest likelihood of failure for the tree parts assessed which is imminent, the likelihood of impacting a target listed above is medium and the consequences of the failure and impact could be severe. Mitigation should be conducted as soon as practical to reduce the risk to an acceptable level.

Discussion

I used a resistance drilling device to assess the quality of wood and to locate and estimate the loss of structural integrity in the tree's upper main stem, lower main stem, and root collar areas. In the tree's root collar, I collected readings from all nine of the tree's major root flares. Zero of the nine root flares were significantly decayed. I did find minor decay in four of the nine root flares, however, all four of these flares had enough undecayed tissue to provide support to the tree. The likelihood that this tree fails due to decay in its root collar is **improbable** for the three-year timeframe of this risk assessment.

In the tree's main stem, I collected sample readings from sampling planes at 1.5' height (see **Photo 4**) and 19' height (see **Photo 3**). I took eight sample readings from each plane to cover the full circumference of the tree's trunk. I found the most significant defects at the 19' sampling plane. Using climbing equipment to access the upper stem, I established a sampling plane level with the lower portion of the stem's cavity opening. The tree measured 40.5" in diameter at this height. The results of the resistance drilling at this height indicated a significant loss of structural integrity, which lead me to assess the likelihood of failure of the upper main stem as **imminent** for the three-year timeframe of this risk assessment.

Conclusions and Risk Mitigation Options

Mitigation is recommended for the tree parts listed below.

Tree Part	Mitigation Options	Estimated Residual Risk
Trunk	Remove tree ASAP to eliminate the potential for failures	None
Roots	Remove tree ASAP to eliminate the potential for failures	None

If the tree should remain, I recommend an assessment interval of annually and after major storm events.

All recommended work should be performed by qualified arborists and in accordance with industry accepted standards and best management practices set forth by the *American National Standards Institute* and the *International Society of Arboriculture*.

Limitations

Assignment
My assessment of the designated tree on Abbottsford HOA's property was based on a single site visit on March 15, 2024. All photographs, samples, and readings, if applicable, were taken at the time the assessment was performed.

The assessment was limited to the visible and accessible tree parts described in the assignment.

Resistance Drilling
Resistance drilling devices can provide sophisticated results related to tree structure. This is done by measuring the amount of resistance the drill bit encounters. However, as with any

higher-level technology, the amount of structural integrity loss shown can vary based on the version of the program software used. Therefore, this technology can be limited and should not be used by the tree owner/manager as the sole decision-making criteria, but rather one of many factors used in the decision-making process.

Tree Risk Assessments
It is important for the tree owner or manager to know and understand that all trees pose some degree of risk from failure or other conditions. The information and recommendations within this report have been derived from the level of tree risk assessment identified in this report, using the information and practices outlined in the *International Society of Arboriculture's Best Management Practices for Tree Risk Assessment and Assessment and American National Standards Institute A300 Tree Risk Assessment Standard*, as well as the information available at the time of the assessment. However, the overall tree risk rating, the mitigation recommendations, or any other conclusions do not preclude the possibility of failure from undetected conditions, weather events, or other acts of man or nature. Trees can unpredictably fail even if no defects or other conditions are present. Tree failure can cause adjacent trees to fail resulting in a "domino effect" that impacts targets outside the foreseeable target zone of this tree. It is the responsibility of the tree owner or manager to schedule repeat or advanced assessments, determine actions, and implement follow up recommendations, monitoring and/or mitigation.

Bartlett Tree Experts can make no warranty or guarantee whatsoever regarding the safety of any tree, trees, or parts of trees, regardless of the level of tree risk assessment provided, the risk rating, or the residual risk rating after mitigation. The information in this report should not be considered as making safety, legal, architectural, engineering, landscape architectural, land surveying advice or other professional advice. This information is solely for the use of the tree owner and manager to assist in the decision-making process regarding the management of their tree or trees. Tree risk assessments are simply tools which should be used in conjunction with the owner or tree manager's knowledge, other information and observations related to the specific tree or trees discussed, and sound decision making.

Thank you for the opportunity to provide this information. Please contact me if you wish to review these results or discuss the next steps to take with mitigation, or if I can be of any other service in the management of your landscape.

Jacob Winn
ISA Board Certified Master Arborist MA-5918B
Tree Risk Assessment Qualified

Photo 1: Shumard oak against the fence line behind the tennis court parking lot.

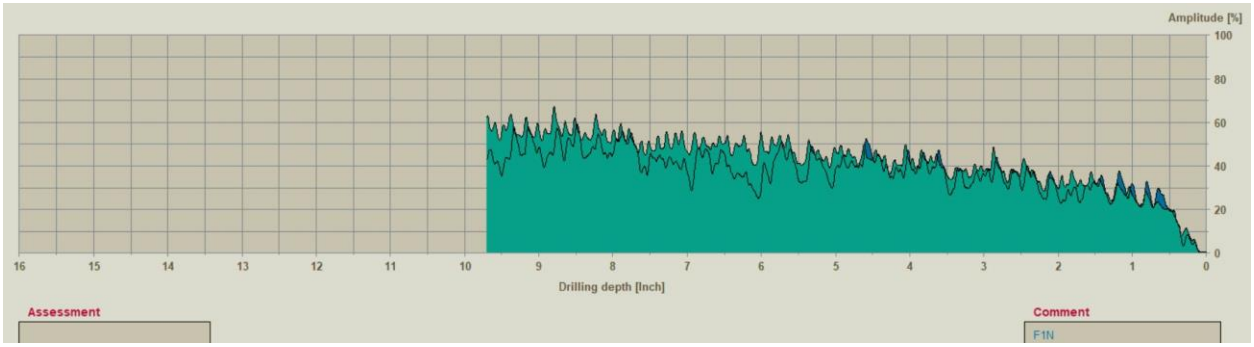
Photo 2: House (110 Commons Drive) seen to right of tree. Western-facing cavity in yellow.

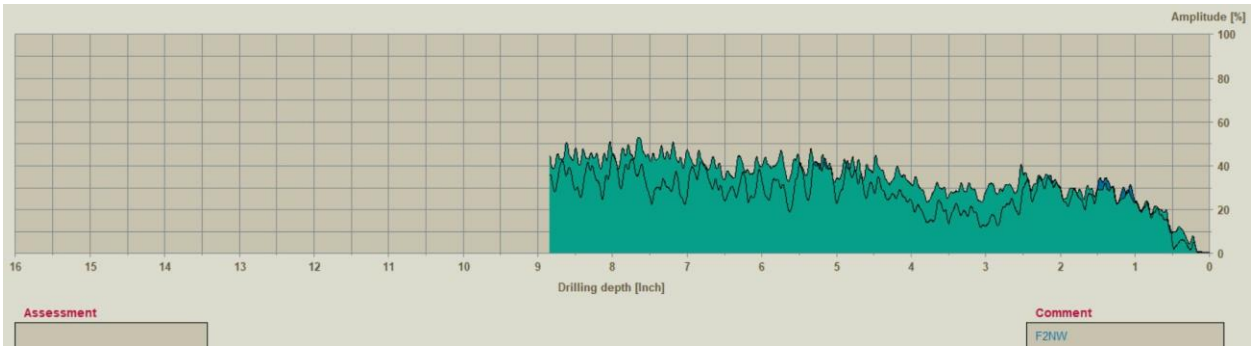
Photo 3: Close up of stem cavity. Sampling plane at 19’ approximated with yellow line.

Photo 4: 1.5’ sampling plane approximated with yellow line.

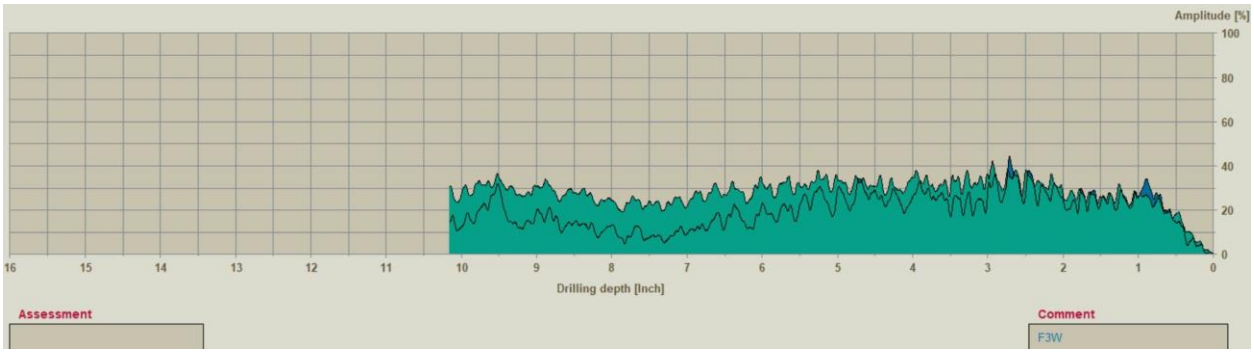
Photo 5: Single fungal conk seen on the tree's northeastern basal area.

Root Collar Drilling Graphs

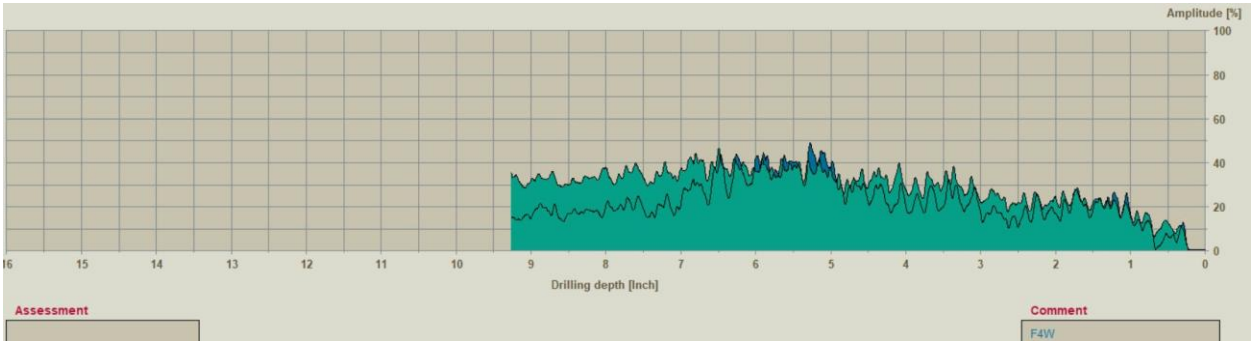




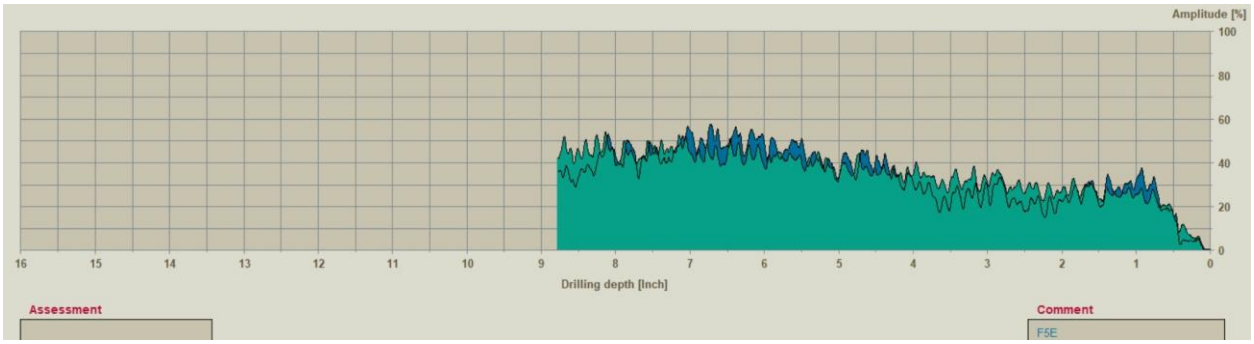
Potential indicated loss of structural integrity around 3” drilling depth.

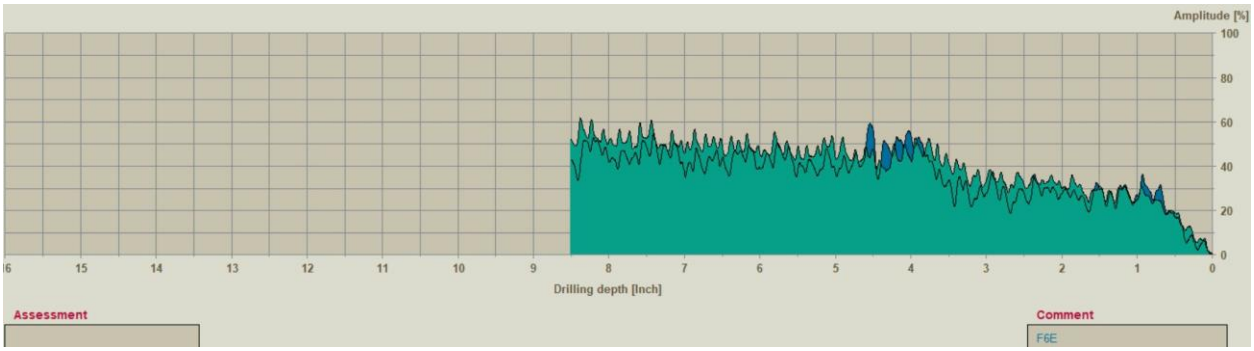


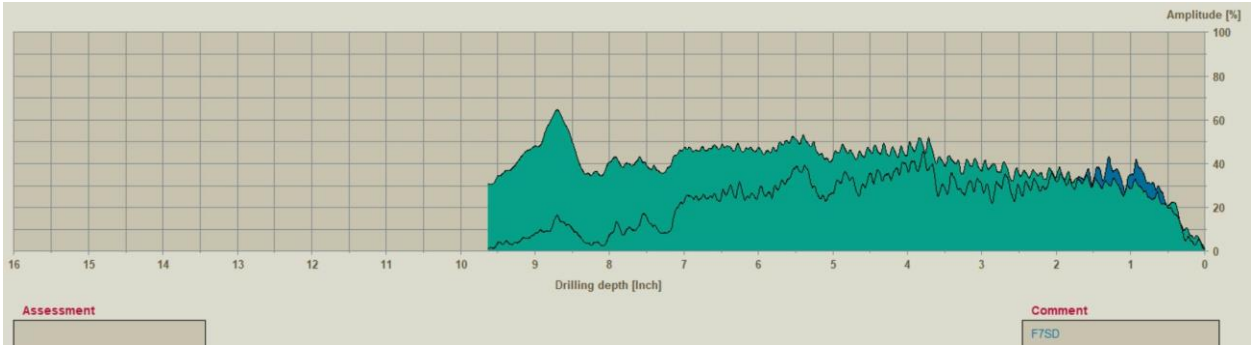
Loss of structural integrity around 6.5”-9.5” drilling depth.



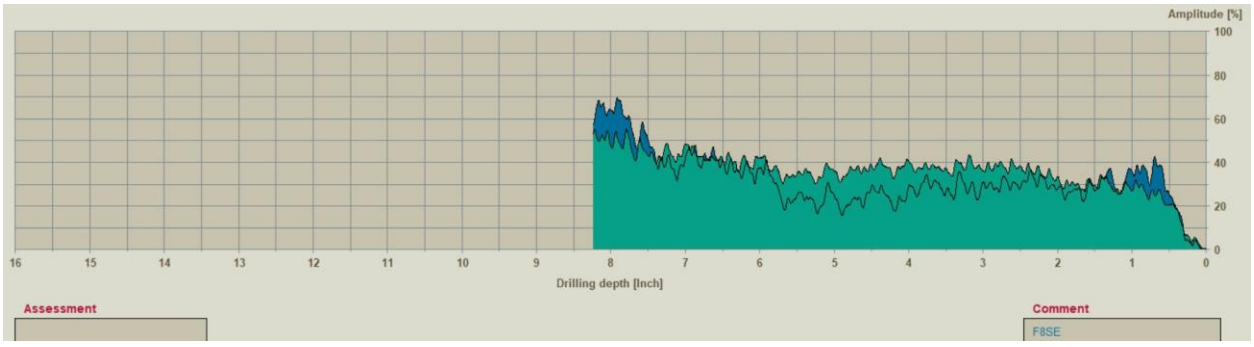
Potential loss of structural integrity beyond 7” drilling depth.

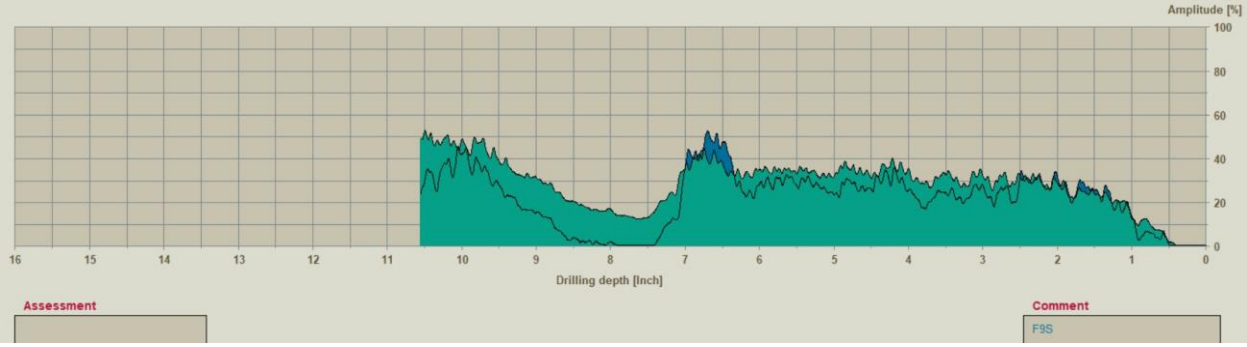






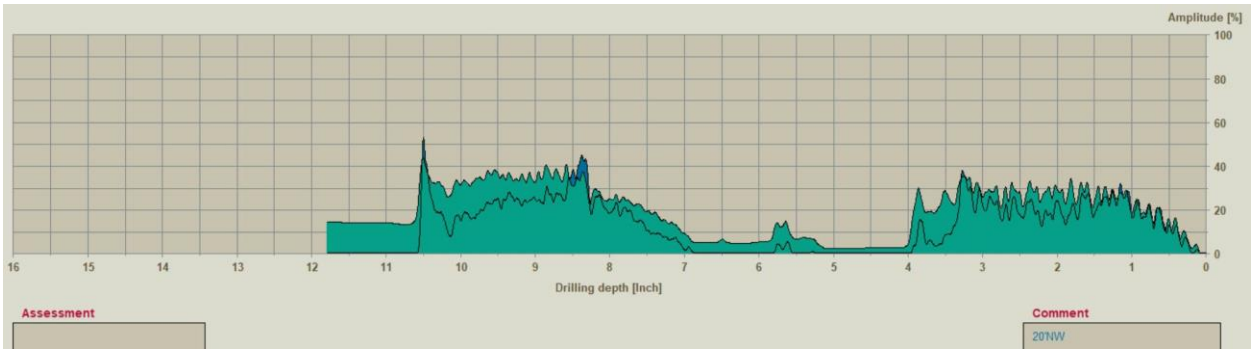
Advanced loss of structural integrity beyond 7" drilling depth.



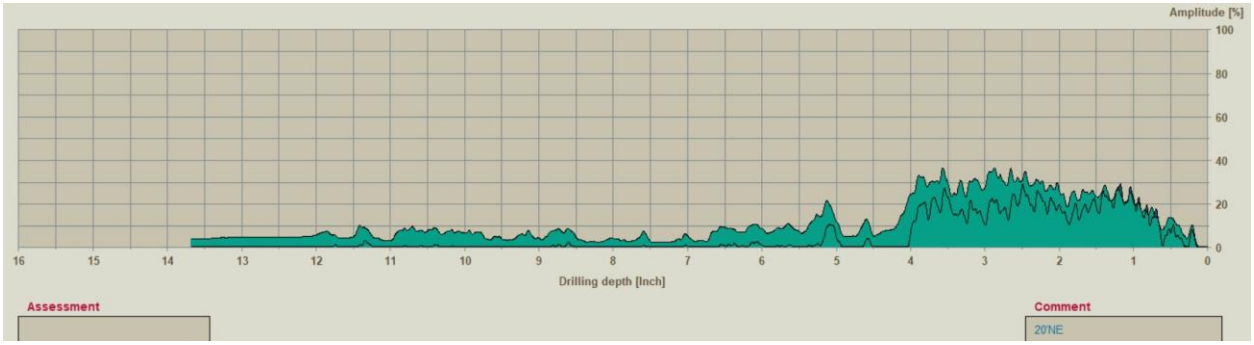


Advanced loss of structural integrity around 7”-10” drilling depth.

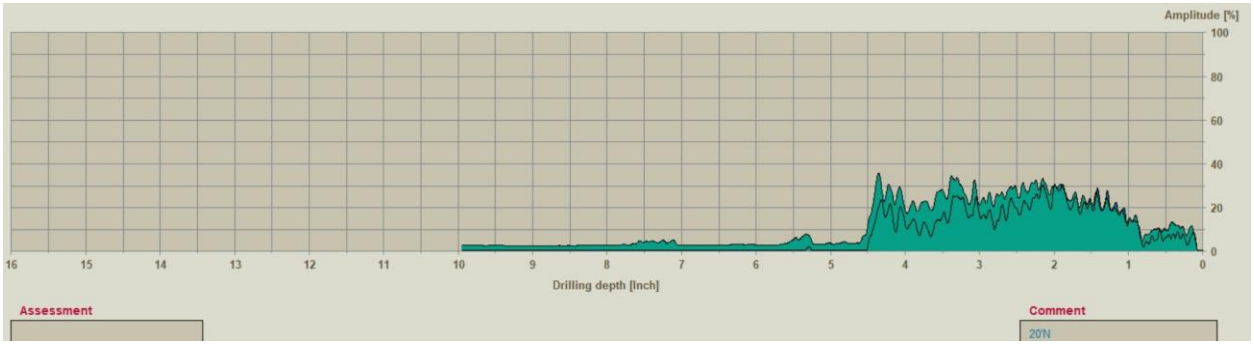
Upper Main Stem Drilling Graphs (19’ Sampling Plane)



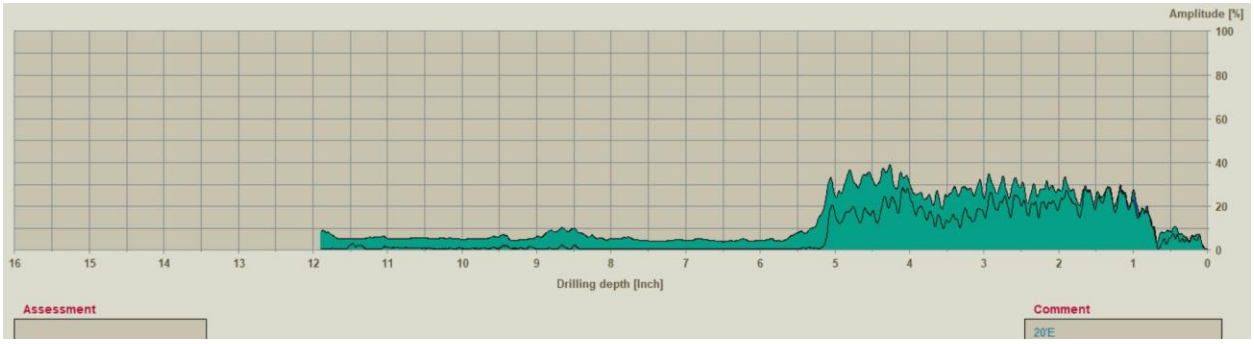
Advanced loss of structural integrity from 3”-8” drilling depth. Cavity beyond 10.5” drilling depth.



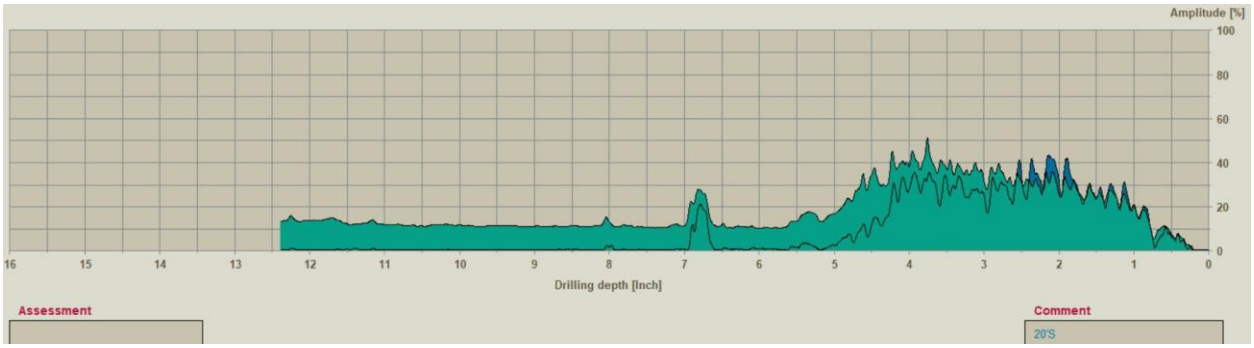
Advanced loss of structural integrity beyond 4” drilling depth.



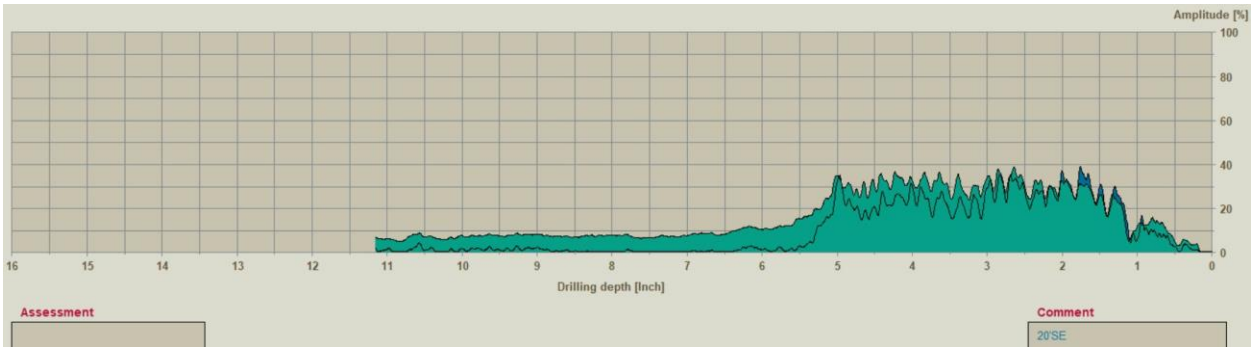
Advanced loss of structural integrity beyond 4.5” drilling depth.



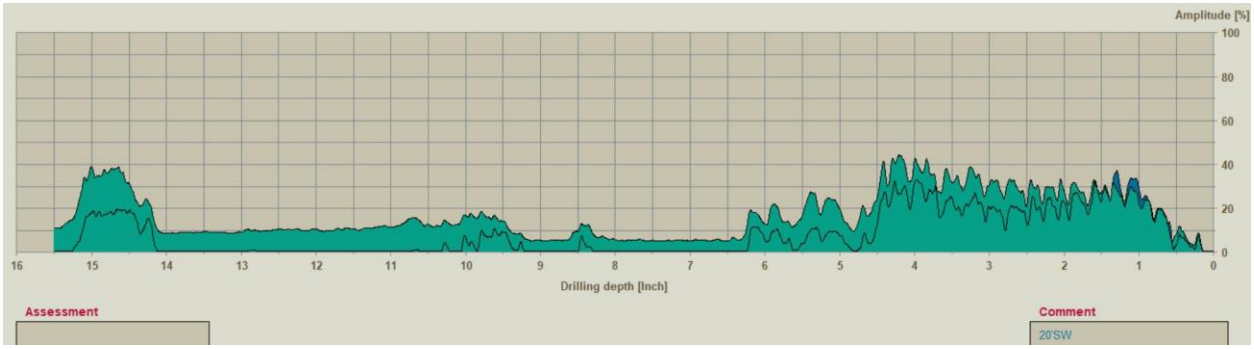
Advanced loss of structural integrity beyond 5” drilling depth.



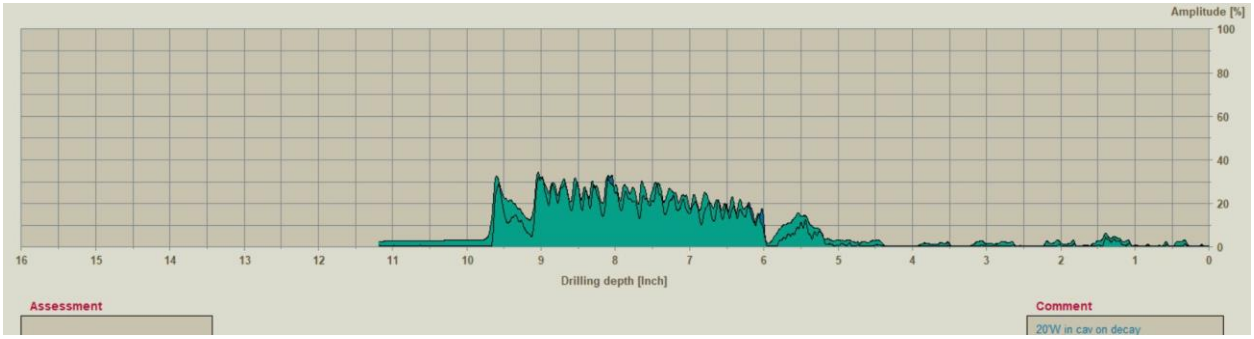
Advanced loss of structural integrity beyond 4” drilling depth.



Advanced loss of structural integrity beyond 5” drilling depth.



Advanced loss of structural integrity beyond 4.5” drilling depth.



Reading taken inside the cavity directly on the decaying wood tissue. Needle extends through 6” of heavily compromised wood before encountering sound wood at 6”-9” drilling depth. Needle passes through opposing bark layer beyond 9” drilling depth.

Tree Risk Assessment Vocabulary

Tree risk assessment has a unique set of terminology with specific meanings. A complete list of tree risk vocabulary and procedures may be found in the International Society of Arboriculture's (ISA) *Best Management Practice (BMP) for Tree Risk Assessment* or the *American National Standards Institute (ANSI) A300 Tree Risk Assessment Standard*. The following information is provided to assist the owner/client with understanding some of the common industry phrases or language, and some of the procedures and methodologies associated with the industry language used in the proposal and/or report.

Vocabulary Used Throughout Proposals and Reports

Inspection interval is the recommended amount of time between inspections or assessments.

Occupancy rates categorize the estimated time a target is physically within a target zone. Occupancy rate is classified as rare, occasional, frequent, or constant.

Overall risk rating is the highest individual risk identified for the tree.

Residual risk is the estimated level of risk that will remain after the recommended mitigation efforts to reduce the risk have been made. This estimate is provided to help the client understand that some level of risk may still exist and plan appropriately for future risk management.

Risk is the likelihood of an event and its consequences.

Risk rating for a tree or tree part is the combination of the likelihood of failure, the likelihood of impact, and the consequences.

Time frame is the period the assessor uses in which to estimate the likelihood of failure in all categories except the "imminent" category. The use of a time frame is meant solely to help the assessor better determine the portions of the risk analysis which are time dependent. The owner/client should never consider the time frame a "guarantee period" for the risk assessment or that the tree will not fail or is safe within the stated time frame.

Targets are people, property, or activities that could be injured, damaged or disrupted by a tree or tree part failure.

Target occupancy rates are typically identified based on information obtained from the owner/client prior to conducting the assessment, as well as information gained during the limited time the assessor evaluates the tree and site. Targets, target zones, and occupancy rates may be adjusted based on observations during the assessment.

Target zones are the areas where a tree or tree part is likely to land if it were to fail. The target zone(s) is determined in the field at the time of the assessment.

Trees can generally be defined as a woody perennial plant with a single trunk, defined crown, and will reach a minimum height of 15 feet at maturity.

Tree parts include branches, fruit, and trunks.

Tree risk is the likelihood of a tree failure impacting a target and the severity of the consequences.

Tree risk assessment is the systematic process used to identify, analyze, and evaluate tree risk. Tree risk assessments are conducted to assist the tree owner or client in better understanding the risk their trees pose so they can make management decisions to reduce or minimize those risks. Tree risk assessments focus on evaluating the structural integrity of the tree crown, branches, trunks, and roots and root collar.

Tree risk assessors are trained arborists or qualified professionals with experience in performing tree risk assessments.

Vocabulary Used to Communicate Occupancy Rates

Constant indicates a target is present in the target zone at nearly all times, 24 hours a day, seven days a week.

Frequent indicates a target is present in the target zone for a large portion of the day or week.

Occasional indicates a target is present in the target zone infrequently or irregularly.

Rare indicates a target zone that is not commonly used by people or other mobile/movable targets.

Vocabulary Used to Communicate the Likelihood of Failure

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

Probable indicates that failure may be expected under normal weather conditions within the specified time frame.

Possible indicates that failure could occur, but is unlikely under normal weather conditions within the specified time frame.

Improbable indicates that failure is not likely during normal weather conditions, and it may not fail in extreme weather conditions within the specified time frame.

Vocabulary Used to Communicate the Likelihood of a Failure Impacting a Target

Very likely to impact a target is reached by an imminent likelihood of failure and high likelihood of impact.

Likely to impact a target can be reached by an imminent likelihood of failure and medium likelihood of impact; or probable likelihood of failure and high likelihood of impact.

Somewhat likely to impact a target can be reached by one of the following combinations; an imminent likelihood of failure and low likelihood of impact; probable likelihood of failure and medium likelihood of impact; or possible likelihood of failure and high likelihood of impact.

Unlikely to impact a target can be reached by one of the following combinations; a possible or probable likelihood of failure and low likelihood of impact; possible likelihood of failure and medium likelihood of impact; improbable likelihood of failure with any likelihood of impact rating; or any likelihood of failure rating with very low likelihood of impact.

Vocabulary Used to Communicate the Consequences of Failure and Impact

Severe consequences could involve serious personal injury or death, high-value property damage, or major disruption to important activities.

Significant consequences are those that could involve substantial personal injury, property damage of moderate to high value, or considerable disruption of activities.

Minor consequences are those that are believed will only cause minor personal injury, low-to-moderate-value property damage, or small disruption of activities.

Negligible consequences are those that are believed will not result in personal injury, will only involve low-value property damage, or disruptions that can be replaced or repaired.

Vocabulary Used to Communicate Overall Risk Ratings

Extreme risk applies in situations in which failure is imminent, there is a high likelihood of impacting the target, and the consequences of the failure are severe.

High risk situations are those for which consequences are significant and likelihood is very likely or likely; or consequences are severe and likelihood is likely.

Moderate risk situations are those for which consequences are minor and likelihood is very likely or likely; or likelihood is somewhat likely and consequences are significant or severe.

Low risk situations are those for which consequences are negligible and likelihood is unlikely; or consequences are minor and likelihood is somewhat likely.

Explanation of Tree Risk Levels

The three levels of tree risk assessment defined in the ANSI A300 Tree Risk Assessment Standard are:

I. Level 1: Limited Visual Assessment

This level of assessment provides a visual assessment from a defined perspective (e.g., from the sidewalk, street, or aerial view) of an individual tree or population of trees to assess risk to specified targets from obvious defects or specified conditions.

Level 1 assessments are typically performed to quickly assess large populations of trees or conduct a rapid assessment of an individual tree. The assessor views only one side of the tree while walking on a sidewalk, being unable to access a neighboring property, looking from a slow-moving car, or from above with a drone, helicopter, or airplane.

A Level 1 assessment requires the client to identify the location and/or selection criteria of trees to be assessed. The assessor may:

1. Determine the most efficient route and document the route taken.
2. Assess the tree(s) within the area from the defined perspective (e.g., walk-by or drive-by).
3. Record the location of trees that meet the defined criteria (e.g., significant defects or other conditions of concern).
4. Evaluate the risk (risk rating is optional).
5. Identify trees requiring a higher level of assessment (Level 2 or Level 3) and/or prompt action.
6. Submit risk mitigation recommendations and/or a report.

Limitations: Level 1 assessments are the least thorough means of assessment. They are typically from one perspective, such as a walk-by, a drive-by, or aerial view. This level of assessment is most commonly used to prioritize higher-risk trees within larger groups of trees when there are budgetary, time, or other management constraints. Some defects or conditions will not be visible to the inspector, nor will all conditions visible at all times of the year; therefore, not all higher-risk trees will be accurately identified. In addition, the assessment may not provide enough information to assign a risk rating, make a risk mitigation recommendation, or determine residual risk.

II. Level 2: Basic Assessment

A Level 2 assessment is a detailed visual inspection of a tree and its surrounding site and a synthesis of the information collected. It requires a 360Â° ground-based inspection around a tree, including the site conditions, visible buttress roots, trunk, branches, and crown.

The Level 2 assessment may include using tools such as binoculars, mallet, or probe at the discretion of the assessor or at the request of the owner/client.

At this level, the assessor may:

1. Locate and identify the tree or trees to be assessed.
2. Determine the targets and target zone for the tree or tree part(s) of concern.
3. Review the site history and conditions, and species failure profile.
4. Assess potential load on the tree and its parts.
5. Assess general tree health.
6. Inspect the tree visually which may include the use of common tools such as binoculars, mallet, probes, and/or shovels, as specified in the Scope of Work.
7. Record observations of site conditions, defects, indicators of internal defects, and response growth.
8. If necessary, recommend a Level 3 advanced assessment.
9. Analyze data to determine the likelihood of failure, likelihood of impact, and consequences of failure to evaluate the degree of risk.
10. Develop mitigation options and estimate residual risk for each option.
11. Recommend a re-inspection interval.
12. Prepare and submit a report.

Limitations: Level 2 assessments only include conditions and defects that can be detected from a ground-based visual inspection on the day of the assessment. Below-ground, internal, or upper-crown conditions, decay, and defects may not be detected.

III. Level 3: Advanced Assessment

A Level 3 assessment is performed to provide detailed information about specific tree parts, defects, targets, or site conditions. These are usually conducted in conjunction with or after a Level 2 assessment with owner/client approval. Specialized equipment, data collection and analysis, and/or expertise are usually required for Level 3 assessments.

At this level, the assessor may:

1. Locate and identify the tree or trees to be assessed.
2. Determine the targets and target zone for the tree or tree part(s) of concern.
3. Review the site history and conditions, and species failure profile.
4. Assess potential load on the tree and its parts.
5. Assess general tree health.
6. Inspect the tree and/or site using advanced techniques as specified in the Scope of Work.
7. Record results from advanced techniques.
8. Analyze data to determine the likelihood of failure, likelihood of impact, and consequences of failure to evaluate the degree of risk.
9. Develop mitigation options and estimate residual risk for each option.
10. Recommend a re-inspection interval.
11. Recommend other advanced assessments, if necessary.
12. Prepare and submit a report.

*Items 1-5 may be included in the associated Level 2 assessment.

Procedures and Methodologies Often Used For Level 3 Assessments

Level 3 procedures and methodologies, which are referred to as technologies, may include:

Procedure	Methodology
Aerial inspection and evaluation of structural defects in upper stems and branches	• visual inspection from within the tree crown or from a lift • unmanned aerial vehicle (UAV) photographic inspection • decay testing of branches
Detailed target analysis	• property value of anything potentially impacted by tree failure • use and occupancy statistics • potential disruption of activities such as road blockage or an electrical outage
Detailed site evaluation	• history evaluation • soil profile inspection to determine root depth • soil mineral and structural testing
Decay and wood analysis	• increment boring • drilling with small-diameter bit • resistance-recording drilling • single path sonic (stress) wave • sonic tomography • electrical impedance tomography • radiation (radar, X-ray) • advanced analysis for pathogen identification
Health evaluation	• tree ring analysis (in temperate zone trees) • shoot length measurement • detailed health/vigor analysis • starch assessment
Root inspection and evaluation	• root and root collar excavation • root decay evaluation • ground-penetrating radar
Storm/wind load analysis	• detailed assessment of tree exposure and protection • computer-based estimations according to engineering models • wind reaction monitoring over a defined interval
Measuring and assessing the change in trunk lean	• visual documentation • digital level

Load testing	• hand pull • measured static pull • measured tree dynamics

Limitations: Level 3 assessments that include specialized technologies may have uncertainty and require qualified estimations. Exact measures may not be feasible.

Conclusion

Regardless of the level of assessment conducted, every assessment is limited to the trees identified in the scope of work, conditions detectable at the time of the assessment, the level of communication with the owner/client, and other conditions that affect the assessor's ability to collect information. Not all defects and conditions are detectable, and not all tree failures can be predictable. Trees are living organisms, and as such, every tree's structural conditions change over time.