To Whom It May Concern:

Enclosed is a Tree Risk Assessment ordered by Don Alexander of Parrish and Partners based on my independent field investigation of a 36" Live oak, *Quercus virginiana*, 44" Live oak, *Quercus virginiana*, 30" Live oak, *Quercus virginiana*, 23" Laurel oak, *Quercus laurifolia*, 32" Live oak, *Quercus virginiana*, and a 44" Laurel oak, *Quercus laurifolia*, located on a site proposed for road construction on Camp Road (S-28) near the intersection of Fort Johnson Road (S-94), Charleston, SC 29412. It has been prepared for the consideration of his desire to determine the size, health and safety of the trees and to determine the impacts of a proposed road construction project. I have included my assessment of the trees' current conditions, as well as my recommendations associated with the risks and their vitality through and after construction.

Please feel free to contact me with any questions you may have about this report, or any other service we can provide.

Best regards,

E. Marshall Badeaux, RCA #742, BCMA SO-7159B
Registered Consulting Arborist
ISA Board Certified Master Arborist
(843) 501-4297
marshall@charlestontreeexperts.com
2851 Maybank Hwy
Johns Island, SC 29455

TREE RISK ASSESSMENT

www.charlestontreeexperts.com
marshall@charlestontreeexperts.com
(843) 952-8300

Location:
Camp Road (S-28) at Intersection of Fort Johnson Road (S-94)
Charleston, SC 29412

Prepared for:
Don Alexander
Parrish and Partners

Prepared By:
Marshall Badeaux, RCA #742, BCMA SO-7159B
ASCA, Registered Consulting Arborist
International Society of Arboriculture Board Certified Master Arborist
Member, American Society of Consulting Arborists
TPAQ, Tree and Plant Appraisal Qualified
CTSP, Certified Treecare Safety Professional #03122
EHAP, Electrical Hazards Awareness Program

January 08, 2023

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NARRATIVE

Summary

After Don Alexander of Parrish and Partners became concerned with the conditions of a 36" Live oak, *Quercus virginiana*, 44" Live oak, *Quercus virginiana*, 30" Live oak, *Quercus virginiana*, 23" Laurel oak, *Quercus laurifolia*, 32" Live oak, *Quercus virginiana*, 44" Laurel oak, *Quercus laurifolia*, located on a site proposed for road construction, my firm was contacted to provide an independent, objective opinion regarding the health and structural stability of the trees located on the site, as well as the impact of the proposed road construction. I performed a Level 2: Basic Tree Risk Assessment (BTRA).

Based on this level 2 evaluation, I have determined that the 36" Live oak (Tree #1), 44" Live oak (Tree #2), 23" Laurel oak (Tree #4), 32" Live oak (Tree #5) and 44" Laurel oak (Tree #6) outlined in this report would not sustain through construction, are structurally compromised, an imminent hazard and should be removed as soon as possible to reduce unnecessary risk of failure, injury to people and/or damage to property.

The 30" Live oak (Tree #3) has a high survivability rating if properly preserved through construction and no additional encroachment is permitted. Any additional shift to the west would likely compromise the health and structural stability of this tree and cause its ultimate destruction as well.

Background

In December 2022, Don Alexander of Parrish and Partners contacted my firm and expressed concerns after observing several high-risk trees on a proposed construction site. My Qualified Arborist, Ashley Connelly discussed the terms of my engagement and upon approval of the Tree Risk Assessment service line item, I was scheduled for a site inspection to perform a BTRA.

Assignment

Prepared for:
Don Alexander
Parrish and Partners

Parcel location:
1138 Camp Road
Charleston, SC 29412

Prepared by:
Marshall Badeaux, RCA #742
Charleston Tree Experts
2851 Maybank Hwy
Johns Island, SC 29455
ISA BCMA Certification Number: SO-7159B

After discussing the terms of my engagement and the levels of assessment with Don

Alexander of Parrish and Partners, he agreed that I would conduct the following:

1. Identify the tree species.
2. Measure and determine the diameter at breast height (DBH).
3. Assess and provide a health grade and risk rating to the trees.
4. Provide recommendations for the trees outlined in this report.
5. Provide my findings in a booklet style report.

Limits of Assignment

My inspection was performed at ground level using visual observations, and my knowledge of the site history was limited to the past-history details provided by Don Alexander of Parrish and Partners. These were my only limitations in addition to the normal restrictions of a Level 2: BTRA.

Purpose and Use of Report

The purpose of this report is to provide an accurate depiction of defective or hazardous conditions of the trees and site, and develop recommendations based on that data. This report is intended to be used by Don Alexander and Parrish and Partners. Upon submission, this report will become the property of Don Alexander and Parrish and Partners and its use will be at their discretion. Reproduction or making of additional copies without explicit consent by the preparing Arborist is strictly prohibited.

OBSERVATIONS

Site

The trees reside within the right of way on either side of Camp Road near the intersection of Fort Johnson Road on James Island, Charleston, SC. Due to high traffic volume at the intersection and for improved safety of vehicular and pedestrian use of the intersection, a roundabout construction project has been proposed for this site.

Analysis

The roadway, vehicular traffic, sidewalk, pedestrian foot traffic, and construction workers and their equipment during the proposed roundabout project are targets of concern within 1x height of the trees.

Tree Condition and Inventory Table

Tree #	(DBH)	Species	Health	Risk Rating	Comments
1	36"	Live oak, *Quercus virginiana*	F	High	Extensive root collar damage, large cavity of decay at root collar, hollow in root collar, cavities of decay in main stems, vine saturation, root system damage.
2	44"	Live oak, *Quercus virginiana*	F	High	Extensive root collar damage, large cavity of decay at root collar with white rot fungi observed, multiple cavities of decay in large leaders, co-dominant stem loading toward roadway, large, failed limbs, overall canopy die-back, vine saturation.
3	30"	Live oak, *Quercus virginiana*	C	Moderate	Non-structural trunk injuries, dead limbs, bark canker suspected.
4	23"	Laurel oak, *Quercus laurifolia*	F	High	Wood decay pathogen of unknown species, large, failed limbs, large cavities of decay, unbalanced canopy from years of utility clearance pruning.
5	32"	Live oak, *Quercus virginiana*	F	High	Wood decay pathogen suspected based on presence of fruiting bodies, unknown species. Failed codominant stem. Unbalanced canopy from years of utility clearance pruning.
6	44"	Laurel oak, *Quercus laurifolia*	F	High	Wood decay pathogen of unknown species, large, failed limbs, large cavities of decay, hollow suspected, shear plain fracture along large leader.

Tree Grading System

A - Specimen tree exhibiting vigorous growth and showing little or no sign of disease or storm damage.

B - Healthy tree, exhibiting vigorous growth, showing minimal signs of disease, but having suffered notable storm damage.

C - Semi-healthy tree, showing some signs of decline which are perhaps correctable (i.e., some insect infestations, some diseases, root compaction, etc.); still shows signs of growth, but suffered significant storm damage.

D - Tree in declining health; has suffered extensive storm damage; tree may still live for many years without posing a hazard but may not be successfully treated to again become a healthy, specimen tree.

F - Tree which is determined to be irreparably damaged, diseased or hazardous.

Discussion

Trees provide numerous benefits to the urban environment. These benefits increase as the age and size of the trees increase. However, as a tree becomes larger and more mature, it is likely to shed branches or develop decay or other conditions that can predispose it to failure. In assessing and managing trees, we strive to strike a balance between the risk that a tree poses and the benefits that individuals and communities derive from trees.

Tree risk assessment (TRA) is the systematic approach used to identify, analyze and evaluate tree risk. By identifying the tree risk, mitigation can be conducted to reduce risk while preserving the trees that meet acceptable levels of risk.

A primary goal of TRA is to provide the tree owner with resourceful information about the level of risk posed by a tree over a period of time. This is accomplished by conducting a qualitative analysis and determining the likelihood and consequences of a tree failure. If the risk rating defined for a tree exceeds the level of acceptable risk, mitigation is recommended.

Tree #1 Conditions:
Upon inspection of the site proposed for road construction, I found a 36" Live oak (Tree #1) to be growing in extremely close proximity (approx. 3') of the North side of Camp Road. I noted a large cavity of decay and extensive damage at the root collar. I performed a sounding test with a rubber mallet and detected hollow in the root collar. Additionally, multiple cavities of decay were found in the main stems making weak points vulnerable to fracturing, pest infestation, and continued rot and decay. The tree's inability to efficiently compartmentalize decay and heal wounds is also an indication of overall declining health and the presence of a wood decay pathogen likely propagating in the woody tissue of this tree. The adjacent tree verifiably contains a white-rot pathogen so I would expect it to be the same here as well. Heavy vine saturation made it difficult to assess the entire tree canopy and I suspect

additional defects are present. Based on the various tire tracks on the ground, I suspect the tree's root system is frequently damaged by vehicles incidentally steering off the roadway. As is, the tree is steadily declining, has a high risk of mechanical failure and poses a hazard to life and property within 1x its height.

Tree #2 Conditions:
The adjacent Live oak (Tree #2), measuring 44", is also located extremely close to the asphalt of the North side of Camp Road. Upon inspection, I found it to be in an even worse condition than Tree #1. Extensive root collar damage and a large cavity of decay at the root collar with a white-rot pathogen present were noted. White-rot fungi degrades the heartwood's lignin, a key structural element, causing it to be bleached and become soft and sponge-like. White-rot is among the most aggressive types of wood decay pathogens. It advances through the heartwood of the tree thereby causing structural compromise and ultimately resulting in a whole tree mechanical failure. Multiple cavities of decay in large leaders present weak points vulnerable to fracturing. Of additional concern was a co-dominant stem with a cavity of decay loading toward the roadway. The tree had numerous large, failed limbs, overall canopy die-back and severe vine saturation. The vine presence made it difficult to inspect the entire canopy and I suspect additional defects are present. The tree will not sustain through the proposed construction impacts. As is, the tree is steadily declining, has a high risk of mechanical failure and poses a hazard to life and property within 1x its height.

Impacts of Conceptional Construction Plan to Trees #1 and #2
I also reviewed the conceptional construction plan "concept plan" which proposes shifting the road to the west in an effort to retain these two trees. The construction impacts to the trees would cause them to more rapidly decline and significantly increase the risk of mechanical failure. Construction generally has a stressful impact on trees. Trees suffer from root damage when the area is excavated, root compaction and oxygen deprivation from both the installation of additional materials/soil and the use of heavy machinery, as well as other negative impacts.

Trees that are already in declining health cannot sustain damage to fibrous roots without imminent fatality, which is unavoidable under the proposed concept plan. This is because ninety percent of fine (fibrous) roots that absorb water and minerals are found within the top few inches of soil. Roots require air, space, water, and grow most vigorously when these requirements are met, which is usually the surface of the soil. Additionally, the most essential roots form the structural root plate which is the zone of rapid root taper that provides the tree stability against wind throw. These large, strong roots extend up to 11 feet from the stem in larger diameter trees. The current road, as well as the proposed concept plan, require construction within 3-5' of the root collars. Damaging these roots in any way is usually fatal and may leave the trees unable to stabilize themselves.

Under the proposed concept plan, the existing asphalt near the trees will either need to be excavated or additional asphalt installed thereby changing the grade. Both processes and the weight of machinery/material would irreparably damage both the fibrous roots and the structural root plate of the trees. The lowering or raising of grade within the root zone can damage or kill the trees. The normal exchange of moisture

and gases within the root zone is disrupted with any change in grade. Impervious surface restricts movement of water and air in the root zone.

Lastly, since there will be use of heavy machinery near the trees, wounds to tree branches, trunk, and root collar caused by mechanical damage are also likely and may also reduce tree stability by decreasing the wood strength, the internal movement of water and nutrients, and the ability to compartmentalize against decay.

The proposed concept plan would significantly increase the risk of mechanical failure, increase the hazard each tree poses to life and property within 1x its height. There is no way to mitigate risk and removal is the only option. These trees are no longer viable specimens.

Tree #3 Conditions:
Across the street, on the South side of Camp Rd, I found a 30" Live oak (Tree #3) growing a sufficient distance from the roadway. Upon inspection, I found the tree had minor non-structural trunk injuries, one fully and adequately healed and another appeared to only be as deep as the cork cambium (bark). There were numerous dead limbs, as well as bark canker suspected. The dead limbs pose a hazard to people and property directly under the tree's canopy.

Impacts of Conceptional Construction Plan to Tree #3:
The conceptional construction plan requires Tree #3 to be removed therefore the tree would not sustain/exist under the proposed concept plan.

I have found Tree #3 to be healthy enough to withstand impacts of construction so long as the road remains in its existing place, and if an adequate Tree Preservation Plan (TPP) is enacted. In addition to the specifications set forth by a TPP, I recommend pruning to remove dead limbs 1" in diameter and greater to reduce risk. The original proposed construction plan for the site appears to be the best possible solution for preservation of the most viable tree specimen (Tree #3) in this area. Any shift to the west would likely compromise the health and structural stability of this tree.

Tree #4 Conditions
On the same side of Camp Rd., I inspected a 23" Laurel oak (Tree #4) in extremely close proximity to the road. Upon inspection, I identified evidence of a wood decay pathogen of unknown species through dark staining at pruning and branch loss sites as well as on the tree trunk. Additionally, large, failed limbs, large cavities of decay and an unbalanced canopy from years of utility clearance pruning were noted; all of which compromise the structural integrity of the tree. This tree has extensive rot in these sites of decay. The tree will not sustain through the proposed construction. It has a high risk of mechanical failure and poses a hazard to life and property within 1x its height. There is no way to mitigate risk and removal is the only option. This tree is no longer a viable specimen.

Tree #5 Conditions
Further down the South side of Camp Rd., I inspected a 32" Live oak (Tree #5) in extremely close proximity to the road. Upon inspection, I identified fungal fruiting

bodies that are suspected to be a wood decay pathogen, unknown species, and a codominant stem has already failed. The tree has an unbalanced canopy from years of utility clearance pruning. The tree will not sustain through the proposed construction. It has a high risk of mechanical failure and poses a hazard to life and property within 1x its height. There is no way to mitigate risk and removal is the only option. This tree is no longer a viable specimen.

Tree #6 Conditions
Lastly, I inspected a 44" Laurel oak, same side of Camp Rd., further away from the roadway than all other trees. Upon inspection, I identified evidence of wood decay pathogen of unknown species through dark staining at pruning and branch loss sites as well as on the tree trunk. Prior large, failed limbs were noted and large cavities of decay were present throughout the canopy. Hollow is suspected within the trunk at approximately 15' above ground level and a shear plane crack was noted along the large leader. The tree will not sustain through the proposed construction. It has a high risk of mechanical failure and poses a hazard to life and property within 1x its height. There is no way to mitigate risk and removal is the only option. This tree is no longer a viable specimen.

CONCLUSION

Trees #1 and #2 are hazardous and no longer viable specimens. The proposed conceptual construction plan would significantly increase the risk of mechanical failure, increase the hazard each tree poses to life and property within 1x its height. There is no way to mitigate risk and removal is the only option.

Tree #3 is a moderate risk and will sustain through construction under the original site plan if an adequate Tree Preservation Plan is enacted.

Trees #4, #5 & #6 are hazardous and no longer viable specimens. There is no way to mitigate risk and removal is the only option.

RECOMMENDATIONS

Trees #1 and #2: Do not cater plans to retain these trees. Complete removal utilizing ANSI A300 Standards for Tree Care Operations.

Tree #3: Cater construction plans for the preservation and retainment of Tree #3. Enact an adequate Tree Preservation Plan, and prune to remove dead limbs 1" in diameter and greater to reduce risk.

Trees #4, #5 and #6: Do not adjust plans to retain these trees. Complete removal utilizing ANSI A300 Standards for Tree Care Operations.

GLOSSARY

acceptable risk--the degree or amount of risk that the owner, manager, or controlling authority is willing to accept.

analysis--detailed examination of the elements or structure of something.

ANSI--American National Standards Institute, a private, nonprofit organization that oversees the development of voluntary consensus standards by accredited representatives of government agencies industry, and other stakeholders.

ANSI A300--in the United States, industry-developed, national consensus standards of practice for tree care.

Arborist--Professional who possesses the technical competence, through experience and related training, to provide for or supervise the management of trees and other woody plants in residential, commercial, and public landscapes.

booklet style report--booklet reports present information in an abbreviated book form. Booklet reports are probably the most commonly used and readily recognizable report format.

dbh--diameter at breast height [U.S., 4.5 feet above ground] measured in inches.

decay--(1) (noun) an area of wood that is undergoing decomposition. (2) (verb) decomposition of organic tissues by fungi or bacteria.

diameter--the length of a straight line through the center of a circle.

failure--breakage of a stem, branch, or roots, or loss of mechanical support in the root system.

hazard--situation or condition that is likely to lead to a loss, personal injury, property damage, or disruption of activities; a likely source of harm. Tree part identified as likely source of harm.

height--tree height either visually estimated or measured. If measured, the tool used for measurement should be noted in Tools used.

high--(risk rating) defined by its placement in the risk rating matrix; consequences are significant and likelihood is very likely or likely, or consequences are severe and likelihood is likely.

imminent--(likelihood of failure) failure has started or is most likely to occur in the near future, even if there is no significant wind or increased load. The imminent category overrides any stated time frame.

inspection--a procedure to inspect a tree or trees. Variables used to describe a tree include position (if not already plotted on a topographical survey), species identity, maturity, various dimensions (main stem diameter, height, crown radius etc.), aspects of form, vigor, condition, incidence of pests, diseases, damage and defects, evidence of past management etc. Site factors, position in the landscape and site usage may also be relevant, usually including its position, species identity, dimensions, age class, condition, conservation value etc. as appropriate, and to identify and evaluate defects. It is also common to make management recommendations (see schedule of works). Tree inspection is a fundamental of tree management and advisory practice in arboriculture.

mitigation--in tree risk assessment, the process for reducing risk.

rot--decay of plant tissues characterized by the breakdown of tissues within the cell walls. fungal decay of wood in which cellulose and/or lignin are broken down.

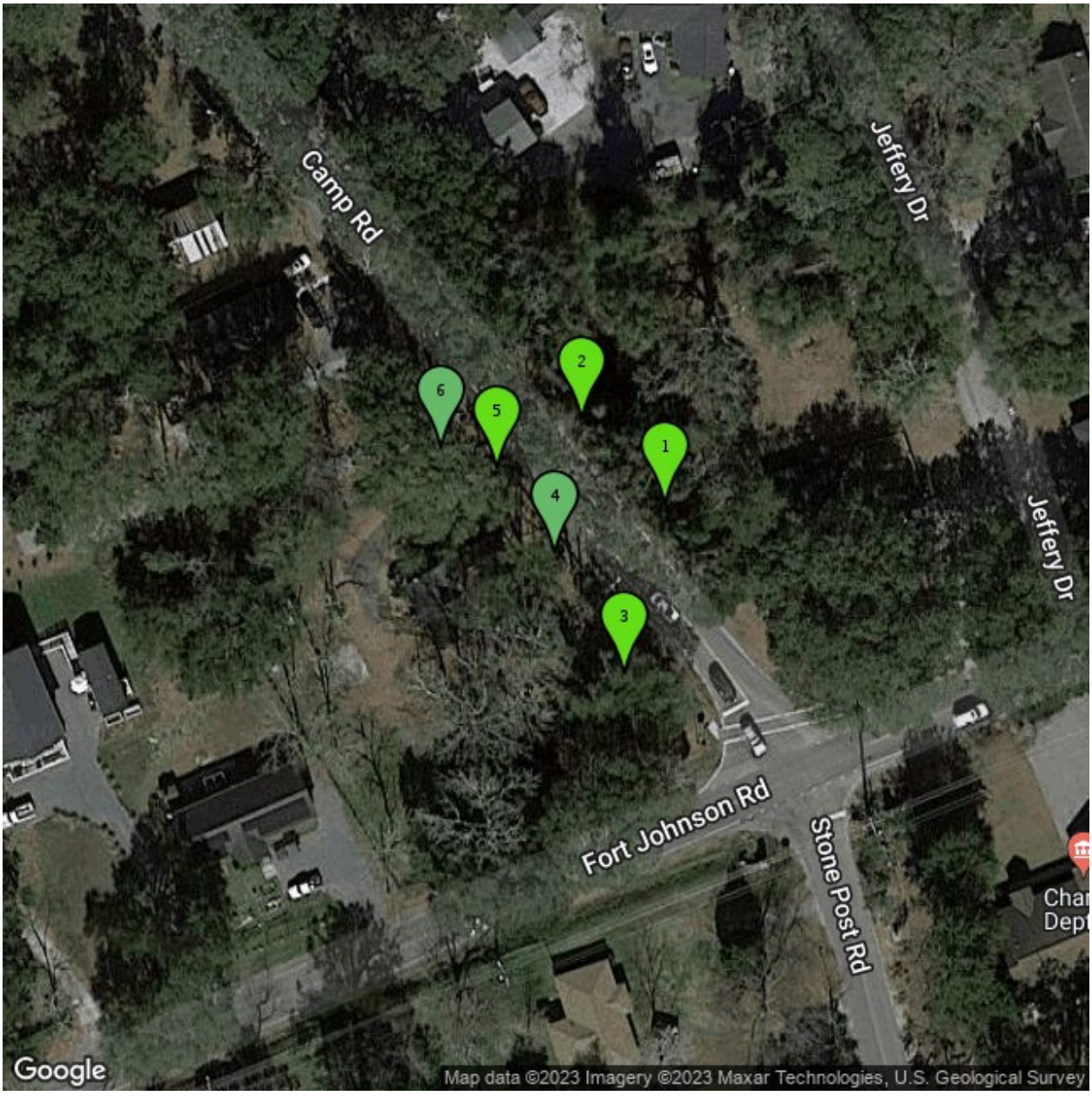
species--taxonomic group of organisms composed of individuals of the same genus that can reproduce among themselves and have similar offspring.

target--(1) person, object, or structure that could be harmed (damaged or injured) by a tree or tree part in the event of a failure. (2) location of a target pruning.

tree protection plan (TPP)--written guideline of process for protecting trees from damage related to construction activities. Usually written by a Certified Arborist experienced in preservation of trees on construction sites.

APPENDIXES

Appendix A - Tree Map



Appendix B – Trees

#1 LIVE OAK, *QUERCUS VIRGINIANA*

Figure 1: The root collar of this tree is approx. 3 ft from the asphalt edge of the roadway. This would mean that a significant area of the critical root zone and root plate are located beneath the roadway.

Figure 2: Based on the ground disturbance in this area, I suspect the root system of this tree is frequently impacted by motorist leaving the roadway.

Figure 3: While the tree appears to be compartmentalizing this trauma wound in the root collar, I suspect a wood decay pathogen is already present based on the observed level of wood decay.

Figure 4: The adjacent wound appears to host internal decay and termite activity. I suspect both wounds are hosting the same wood decay pathogen. Also, note the root collar is buried.

Figure 5: Decay in a very large branch collar from a stem removed many years earlier.

Figure 6: This wound contains a deep cavity which opens to a larger chamber inside the trunk of the tree.

Figure 7: Severe vine saturation.

#2 LIVE OAK, *QUERCUS VIRGINIANA*

Figure 8: In this image we find the remnants of a large storm-damaged branch hanging in the vines above and an older branch collar on the trunk column exhibiting severe decay and rot.

Figure 9: The root collar of this tree is approx. 4 ft from the asphalt edge of the roadway. This would mean that a significant area of the critical root zone and root plate are located beneath the roadway.

Figure 10: Decay and rot found in one of the buttress roots from a prior injury.

Figure 11: Basal injury just above the root collar caused by an unknown mechanical injury.

Figure 12: This wound is harboring a white-rot wood decay pathogen, most likely Armillaria spp based on the bleaching of the wood and corky composition.

Figure 13: Storm-damaged branch, vine saturation likely contributed to this failure.

Figure 14: Two very large cavities with rot contained in one of the primary stems approx. 15 and 20 ft above ground level.

Figure 15: Severe vine saturation throughout the canopy.

Figure 16: Numerous large dead branches overhanging the roadway.

Figure 17: A very large wound with rot in the secondar primary stem.

Figure 18: Another wound with rot in the secondary primary stem.

Figure 19: Another cavity with decay located in the upper canopy. This cavity appears to be 1 ft in depth.

#3 LIVE OAK, *QUERCUS VIRGINIANA*

Figure 20: Minor mechanical injury to the base of the trunk column.

Figure 21: Lots of minor deadwood throughout the canopy.

Figure 22: Bark canker found on several stems.

#4 LAUREL OAK, *QUERCUS LAURIFOLIA*

Figure 23: A very damaged and over-pruned tree.

Figure 24: The base of this tree is approx. 1 ft from the walking path and 5-6 ft from the roadway.

Figure 25: Severe decay and rot discovered in this cavity on the trunk column.

Figure 26: This primary stem failed in a recent storm event.

#5 LIVE OAK, *QUERCUS VIRGINIANA*

Figure 27: A large stem removed and damaged cambium where the cut was peeled. This area will continue to decay.

Figure 28: Unknown wood decay fruiting fungal conks.

Figure 29: A large cavity at the intersection of what was co-dominant stems primary to the remove of one of the two stems.

#6 LAUREL OAK, *QUERCUS LAURIFOLIA*

Figure 30: Decay and tannic acid present along the trunk; an indicator of the presence of a wood decay pathogen living in the wood.

Figure 31: More tannic acid seeping out of the trunk column.

Figure 32: Decay present beneath this stem.

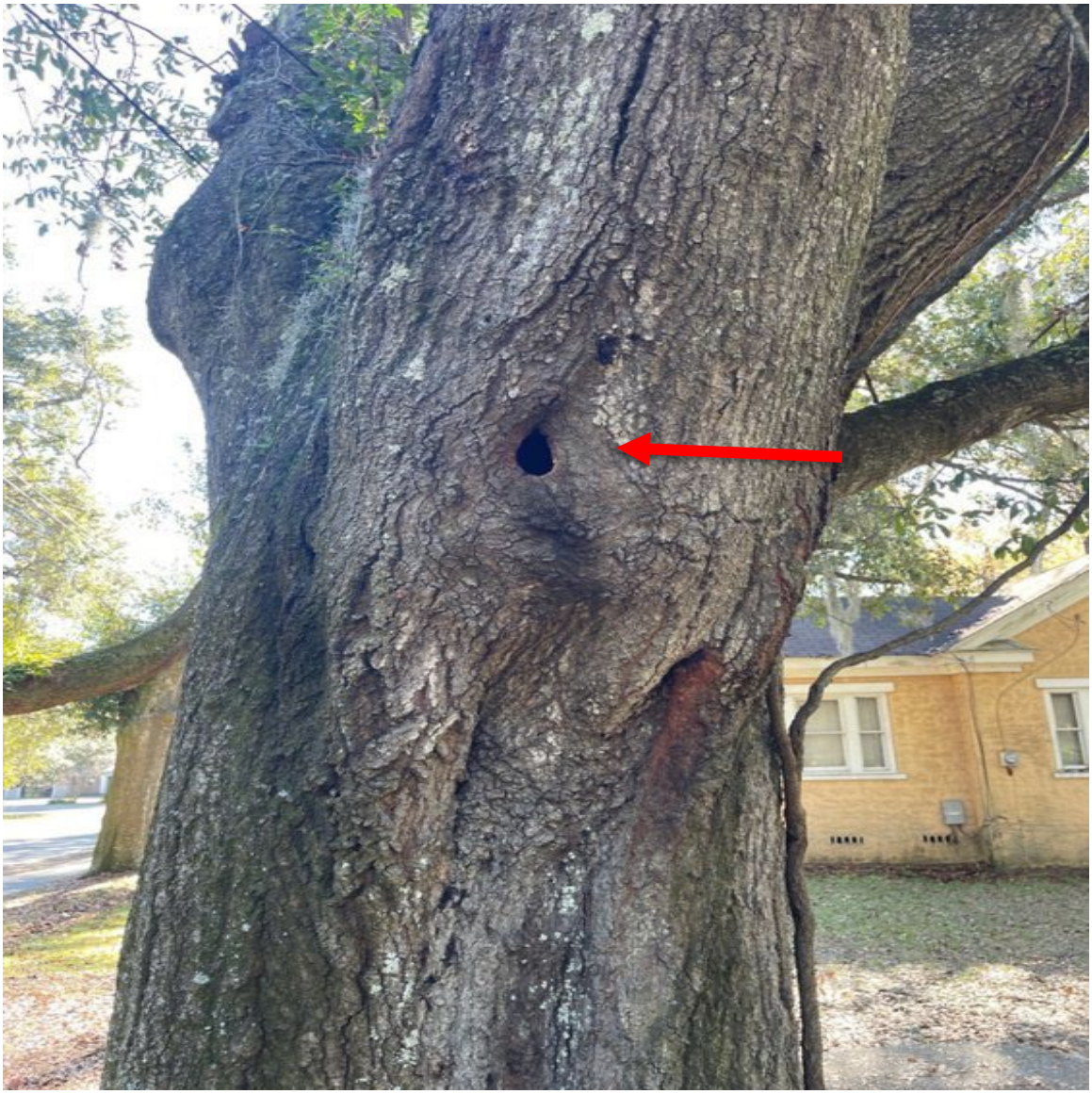


Figure 33: A large cavity in the base of this primary stem.

Figure 34: A large shear plane crack in the base of this primary stem.

Appendix C – Assumptions and Limiting Conditions

1. Any legal description provided to the consultant/appraiser is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable.

2. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible for the accuracy of information provided by others.

3. 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 described in the fee schedule and contract of engagement.

4. Loss or alteration of any report invalidates the entire report.

5. Possession of this report of a copy thereof does not imply right of publication or use for any purpose by any person other than to whom it is addressed, without the prior expressed written consent of the consultant/appraiser.

6. This report and values expressed herein represent the opinion of the consultant/appraiser, and the consultant's/appraiser's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

7. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports.

8. Unless expressed otherwise: 1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and 2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the trees or property in question may not arise in the future.

Appendix D - Certification of Performance

I, Marshall Badeaux, certify:

1. That I have personally inspected the trees referred to in the report, and have stated my findings accurately. The extent of the evaluation is stated in the attached report;

2. That I have no bias with respect to the parties involved;

3. That the analysis, opinion and conclusions stated herein is my own and is based on current scientific procedures and facts;

4. That my analysis, opinion and conclusions were developed and this report has been prepared according to commonly accepted Arboriculture practices;

5. That no one provided significant professional assistance to me, except as indicated within the report;

6. That 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 if the assignment of stipulated results, or the occurrence of any subsequent events.

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

Signed: 

Date: January 08, 2023