March 18, 2022

ASCA AMERICAN SOCIETY of CONSULTING ARBORISTS

Margot Cunningham
City of Albany Public Works
540 Cleveland Avenue
Albany, CA 94710

SUBJECT
Assessment of Tasmanian blue gum trees, *Eucalyptus globulus* in Albany Hill Park

PURPOSE
In 2021 SBCA Tree Consulting completed an inventory of Eucalyptus trees in this park as part of a comprehensive vegetation management plan. Within that inventory they identified several trees for which they wanted an advanced mechanical assessment, and requested our assistance. We have provided that assessment, with the goal of assessing risk from selected trees. We have also commented on management of trees in this inventory, within the context of the Vegetation Management Plan, and the long-term goals of the City of Albany regarding this park. This required that we consider 1) the current mechanical condition of the tree and associated failure potential, 2) whether removal of nearby trees might expose the tree to unaccustomed wind load, thus increasing failure potential, and 3) whether the health of the tree suggested it might die within a short time.

SUMMARY
Albany Hill Park is a popular destination, with a hiking trail to the summit from both north and south, and benches for resting. The dominant vegetation of Albany Hill proper is blue gum eucalyptus, with scattered coast live oak, *Quercus agrifolia*, Toyon, *Heteromeles arbutifolia*, and poison oak. The Eucalyptus on portions of the hill and the park within it have become overwintering sites for Monarch butterflies. However, most of the Eucalyptus along the ridge, where the trails and benches are located are declining in health. Fire injury to the base of many of these trees was serious, and has resulted in increased potential for mechanical failure of these trees, putting park users at risk from failure of whole trees or from dead branches falling from height. Large and mechanically critical support roots were cut from the west side of trees east of the concrete pathway installed in 2019, increasing potential for failure of these trees.

With this in mind the long term vegetation management plan recognized the impracticality of retaining the Eucalyptus as they are. SBCA Tree Consulting has suggested removal of many of these trees along the ridge and on the east slope of the ridge, over to Taft Street. Our investigation was limited to this area.

We concur with the management recommendations of SBCA Tree Consulting, with the exception of the removal of tree #258[1]. This tree is at the southern edge of the surveyed trees, and is a well-structured tree that remains in good health. We tested this tree, and in

[1] A map of trees inspected by us is provided in Appendix III. Tree numbering is by SBCA Tree Consulting.

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our opinion it is unlikely to fail within a five year timeframe, thus risk[2] to park visitors from this tree is low, provided that specified dead wood is removed. We performed a formal Risk Assessment on tree, #174, as a demonstration of risk concepts[3].

METHODOLOGY, OBSERVATIONS & DISCUSSION

We performed a Level 2 inspection of 37 Eucalyptus trees[4]. This exclusive group was near the path. We also completed a Level 2 inspection of tree #125, because of its roots washed out at the top of a bank. We walked the path from the trailhead on the north at the end of Taft Street to the tree #258 on the south. See Appendix II, a copy of Appendix 3 from the SBCA Tree Consultants report, for general tree locations by number. We sounded each tree with a mallet[5] from the ground to about eight feet.

Many of the trees showed evidence of old burn injury that killed up to half the trunk circumference from the ground up for several feet. The dead, exposed wood is decayed in some trees, sound in others. By sounding we found the wood that has built up on the outside of these tree trunks since the fire injury to be sound. Most mechanical load is carried in the outer wood. We found that wood to be sufficient.

Some trees were cut decades ago to three or four feet height and left to sprout from the base. These sprouts have become large multi-trunk trees. The individual trunks have grafted together over and around the cut stumps, creating tough, sound connections that are resistant to failure, even if the original stumps are decayed. For 31 of the 37 inspected trees our conclusions after our Level 2 inspection concurred with SBCA Tree Consultants report. In each of the other six trees, we tested the basal wounds and potentially decayed areas using a Resistograph[6]. The resulting density profiles and our interpretation of them are attached, with photographs establishing their location, as Appendix IV. Where we found decay or other defects we provided a judgment resulting in our opinion that failure of the tree was improbable or possible in a five year timeframe.

Our opinion for 28 of the 31 Level 2 inspected trees was that failure was improbable within the next five years. Despite failure improbability and low risk we concurred with the SBCA Tree Consultants conclusion to remove these trees because they were either declining or their likelihood of failure would increase if they were more exposed by removal of surrounding trees.

A summary list of the 37 trees is provided, as Appendix I.

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[2] Risk is defined as the probability of an event in a given time period combined with adverse consequences of that event. It is determined through a structured process followed by us and described in the American National Standards Institute A-300 (part 9) Standard, *Tree Risk Assessment*. Risk is described on a scale of, Low, Moderate, High, or Extreme.

[3] Judgment of likelihood of failure in a given timeframe is the first step in the A-300 Risk Assessment Process and is described as Improbable, Possible, Probable, and Imminent The likelihood of failure of each of the trees we inspected was Improbable or Possible in the stand as it is now, resulting in a Risk from whole tree failure, in our five year timeframe of Low, including tree #174. Removal of trees near #174 increased the assessed failure likelihood to Probable, and Risk to Moderate, which we believe is typical of several of the trees that are sufficiently stable only in the stand as it now exists, with trees providing mutual wind protection. See Appendix V.

[4] An A300 Level 2 inspection is visual, from all sides, without instruments other than a sounding mallet or probe stick.

[5] Tapping a tree trunk, root or limb with a hickory or rawhide mallet results in sounds of various tenor altered by various wood characteristics. Among these are, if the tapping is in an area of thinned wood over decayed or hollow interior, the sound is often of a different tone than when tapping over solid wood.

[6] A Rinntech R660 Resistograph inserts a 3 mm diameter probe to a 50 cm depth into the tree. It measures wood toughness along that track and converts the measurement into a graph that can be used to infer decay, cavities, internal knots, or other features.

Our result of Resistograph analysis for tree #258 was inconclusive. We used a sonic tomograph[7] to provide a more comprehensive data set for this tree. Results are discussed in the next section.

We collected only data pertinent to our opinions as stated in the report Purpose paragraph on page one; whether a tree was likely to fail within five years due to its current condition, or if that failure potential might be elevated if the tree was retained, but newly exposed to wind loads as trees were removed around it, or if the tree was on a downward health spiral. We did not systematically collect typical data such as trunk diameter, details of limb expanse or architecture, or targets that might be struck in the event of tree failure. SBCA Tree Consulting has provided a comprehensive list of these tree attributes.

TREE #258

This tree, seen to the right is 49 inches in trunk diameter, measured at 54 inches above ground[8].

1. The tree is 85 feet tall, but by 28 feet above ground the trunk diameter is half the diameter it is at 54 inches height.
2. At 47 feet, just over half the height of the tree, the trunk diameter is a quarter of the diameter at 54 inches.
3. The Live Crown Ratio, the percentage of height that is covered by limbs extending from the trunk is 85 percent.

These metrics are associated with highly stable trees, resistant to mechanical failure. The mass of the tree is concentrated low, close to the ground. During wind the tree develops minimal momentum, reducing stress on the base and the root system. The regular branching stabilizes the tree through mass damping[9]. In addition, the tree appears more vigorous and healthy than many neighboring Eucalyptus.

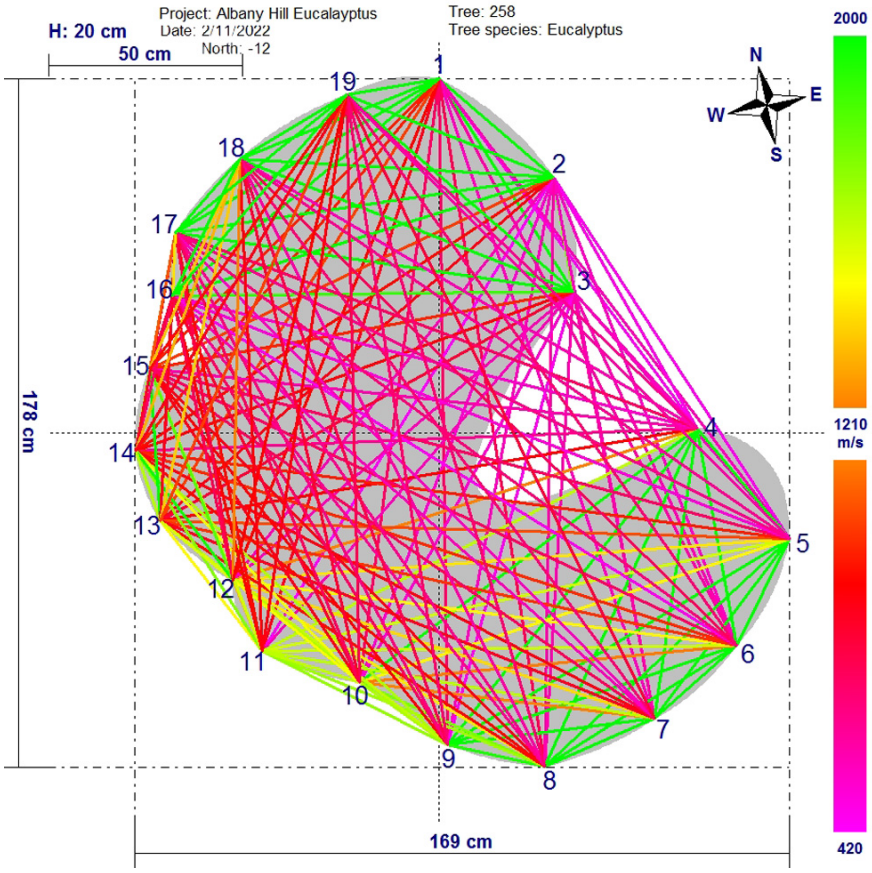
One long limb extends east over the path. Consider reducing this limb back to one of the arrows seen to the right, at the discretion of the climber. This will reduce potential for limb failure.

[7] Using an array of sonic sensors, an Arbotom creates a set of internal cross-section maps of tree trunks or limbs. These maps correspond to areas of decay, hollows, cracks, or other features that may reduce stem strength, and can be used to estimate loss of strength across the plane being imaged.
[8] SBCA measured this at 48 inches, within normal variation. The trunk tapers rapidly smaller with elevation.
[9] See Ken James, Mass Damping accessed March 18, 2022

These tree stability attributes are critical for tree #258 because of significant fire injury at the base, with associated decay. In the photo below taken from the northeast a curtain of solid wood covers the left 2/3 of the injury opening, but the wood behind the curtain is decayed.

We tested the tree with the Resistograph at six points in roots, and while we found some decay, the sound portions of the roots are large, robust, and in our opinion capable of supporting the tree, given the stability attributes listed on the previous page.

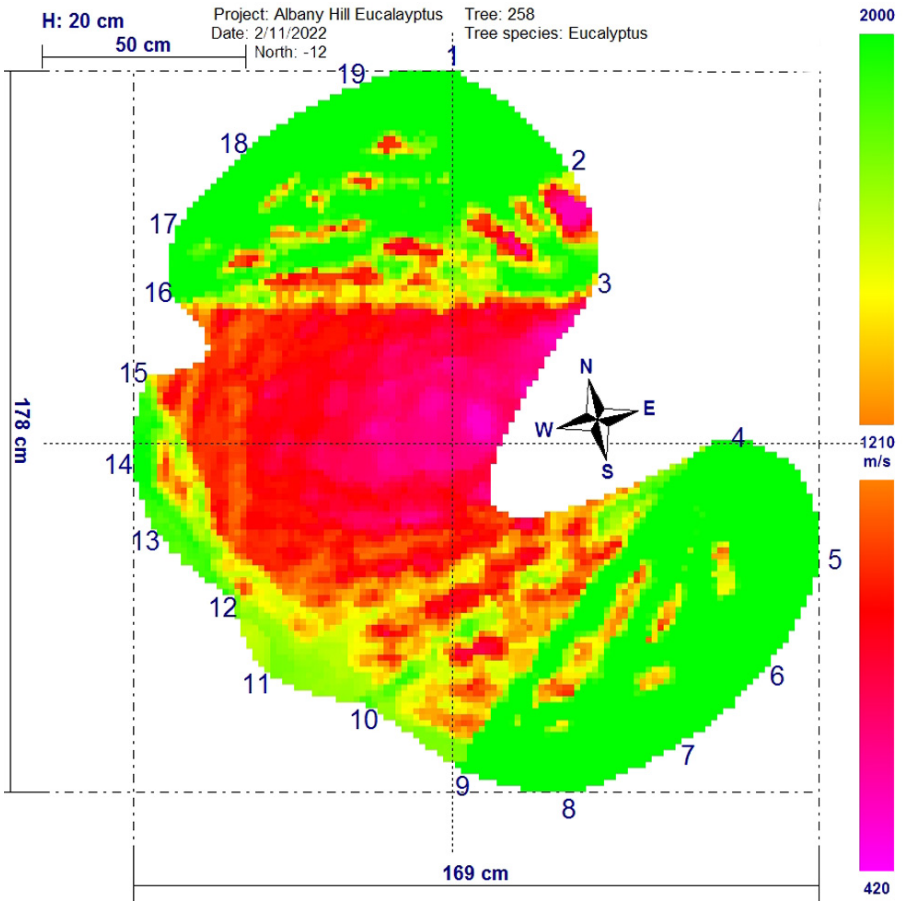
We assessed the tree with the Arbotom at a height of 20 centimeters, or just less than eight inches. One resulting graphic is to the right. Nineteen sensors were attached to the tree. Some are visible in the photo above. Each was tapped, in succession. The instrument measured the speed of the resulting compression wave between each pair of sensors. That speed is represented on the graphic by the color code at the right. The speed ranges from 420 meters/second to 2000 meters/second. A slow speed implies the signal, the compression wave must travel around a defect in the



tree, an area of low density due to decay, or a cavity.

The upper graphic to the right has converted the graphic on the previous page to a surface-coded graph. Wood density is represented by color.

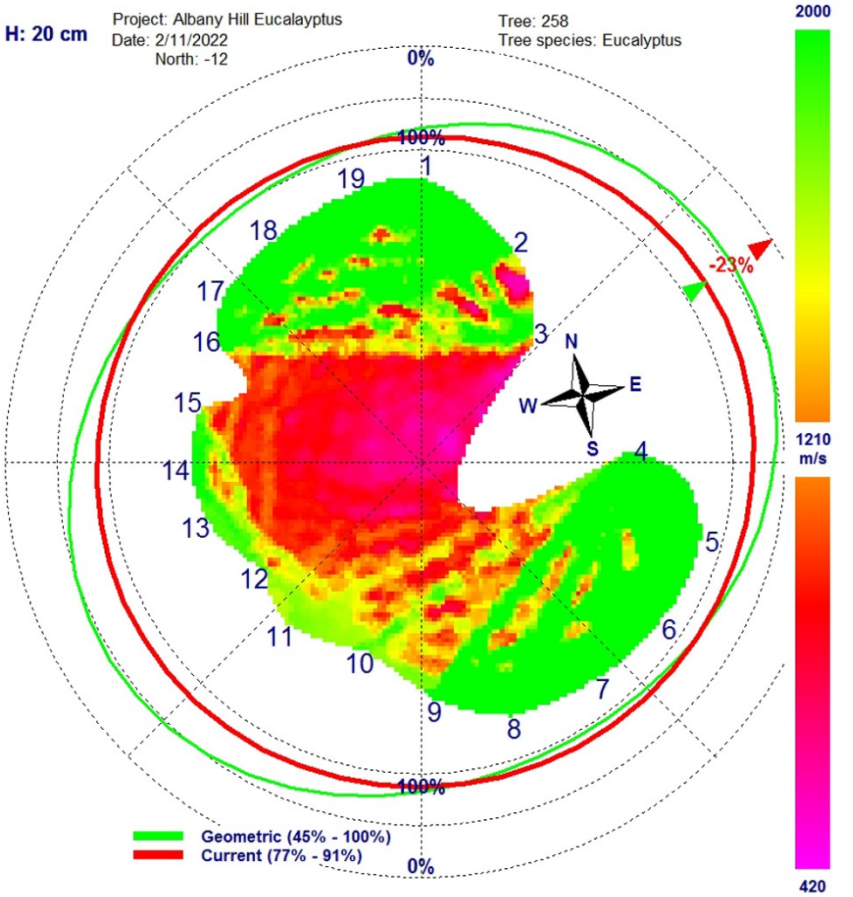
In our opinion the tree is more stable than might initially appear from seeing this graphic. The lower image is the result of mechanical calculations that suggest the tree trunk has lost about 23 percent of its strength across the trunk at 20 centimeters height, a location likely to be most critical, as the nexus of strength impairment due to injury or decay, and stress from wind loading above. All else held equal, the tree is least strong to the northeast, the direction in which it has lost 23 percent capacity.



However, the extreme taper of the trunk and limbs of the tree combined with the large trunk diameter relative to height and the favorable Live Crown Ratio more than buffer the tree against this strength loss, in our opinion.

It is our opinion this tree is stable against whole tree failure for at least the next five years. We suggest pruning dead limbs of two inch or larger diameter from the east side of the tree, where their failure could endanger persons on the trail.

Appendix IV illustrates positions of both Resistograph profiles, on a yellow background, and Arbotom sensors, numbered on a white background. Arbotom sensors are arranged sequentially. Not every sensor is numbered on the diagram.



CONCLUSION

Our observations and opinions are in line with those of SBCA Tree Consulting regarding these trees. Most of the Eucalyptus trees along the new concrete trail, the existing ridge road, and east of the ridge road over to Taft Street are in decline or were injured by past fire, with resultant basal defects. Some have structural root loss due to grading for the path, or a combination of all three impairments.

Because a well-used public pathway winds through these trees they present hazard to park visitors. Many of the trees could be pruned at considerable expense. Due to current decline in health they are not attractive, and would become less so with the pruning required to reduce risk. The pruning would likely accelerate mortality, at which time the trees would have to be removed.

Selected trees within this group are healthier, but still stressed, a condition that current climate predictions promise to increase. While these few may be preserved, their exposure to wind from loss of their neighbors may render them unstable. Tree #174 is an example of a tree whose Risk level would be increased if it were retained, and surrounding trees removed.

It is our opinion after extensive testing that tree #258 is currently stable. This tree is not declining as other trees are, and, as it is a large cornerstone tree at the edge of the grove, could be retained. Removal of dead limbs from this tree, and from others to be retained, as described in the SBCA report should be carried out, to reduce Risk from falling limbs.

Pruning causes wounds that may attract Eucalyptus longhorned borers.[10] Prune live wood during colder months, December and January. Freshly cut green limb or trunk wood is attractive to the insects as breeding sites. Fresh logs should be treated in one of three ways:

1. Chip them. This will require a tub grinder and may produce more chips than can be accommodated.
2. Remove them from the site.
3. Debark them.
4. Solarize them until they are unattractive to the insects. They can then be used on site if there is a need. Solarization requires sealing stacked or individual logs with 6 to 10 mil clear plastic. Instructions are in the link provided in the footnote on this page. Safely stacking many logs may be a challenge on this site.

[10] Eucalyptus longhorned borer

CERTIFICATION AND LIMITING CONDITIONS

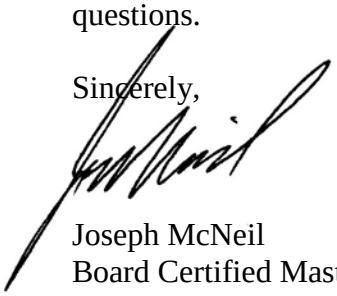
We certify that the observations and recommendations in this document are complete and correct, to the current extent of this assignment, to the best of our knowledge and belief, and are made in good faith. They reflect the condition of the trees as we analyzed them. We were not asked to, nor did we closely inspect other trees on the property beyond what is noted in the report. We walked Taft Street, observing trees #48 through #82 in a Level 1 inspection[11] to confirm agreement with the SBCA observations and recommendations. We inspected trees only within Vegetation Units ESHT and ETHT as designated in the SBCA map. We did not conduct any laboratory analysis.

The observations, analysis, and conclusions in this report are intended to reasonably reduce the risk of living and working near trees. Arborists cannot detect every condition that could possibly lead to the structural failure of a tree nor can we fully understand the complex dynamic loading that occurs in trees.

Since trees are living organisms, conditions may be hidden within the tree and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specific period of time. Likewise, remedial treatments, whether performed by others or not, cannot be guaranteed. Trees can be managed but they cannot be controlled.

We trust this information addresses your immediate concerns. Please let me know if you have questions.

Sincerely,



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ISA Qualified Tree Risk Assessor
ASCA Qualified Tree and Plant Appraiser

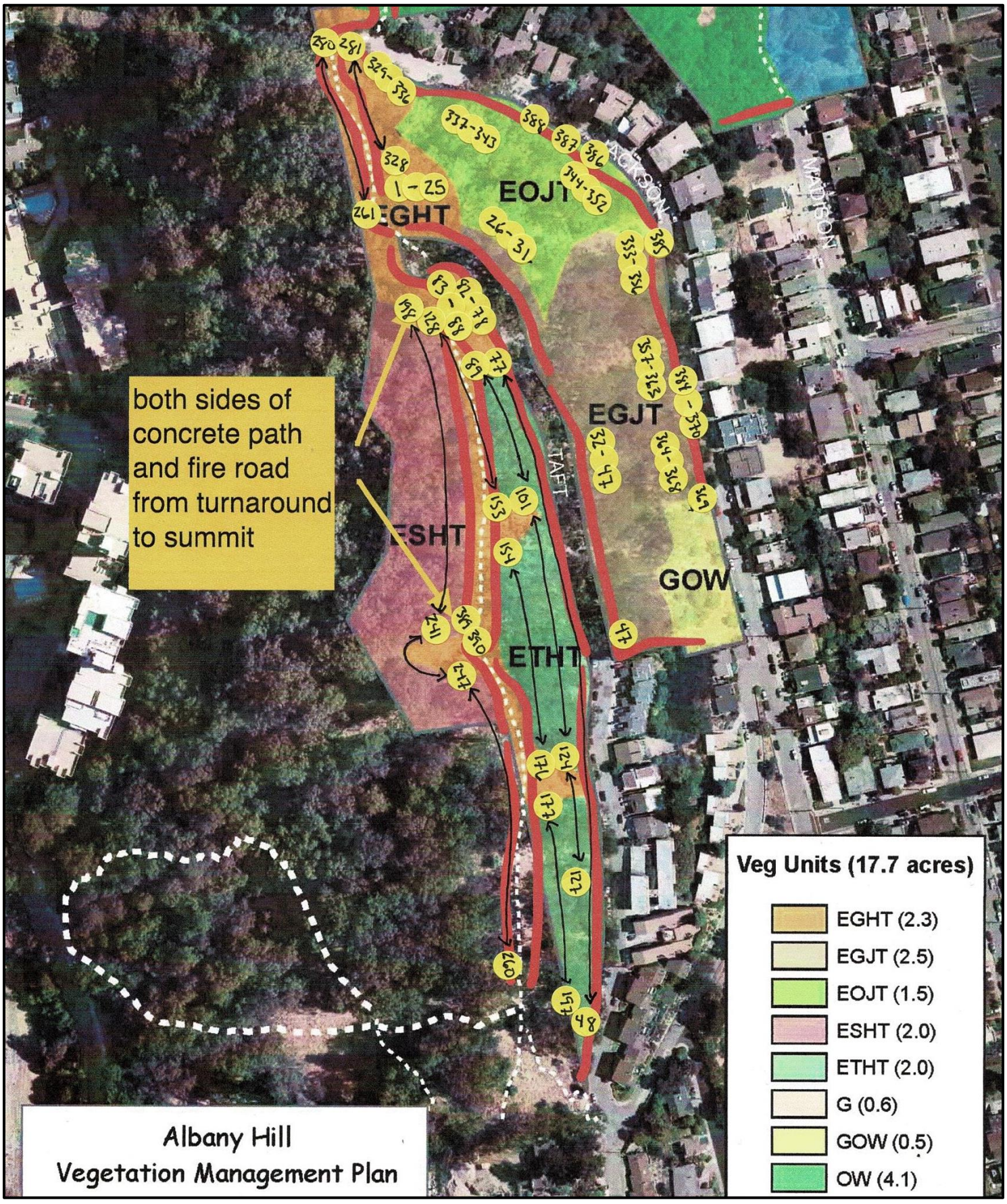
List of Appendices:

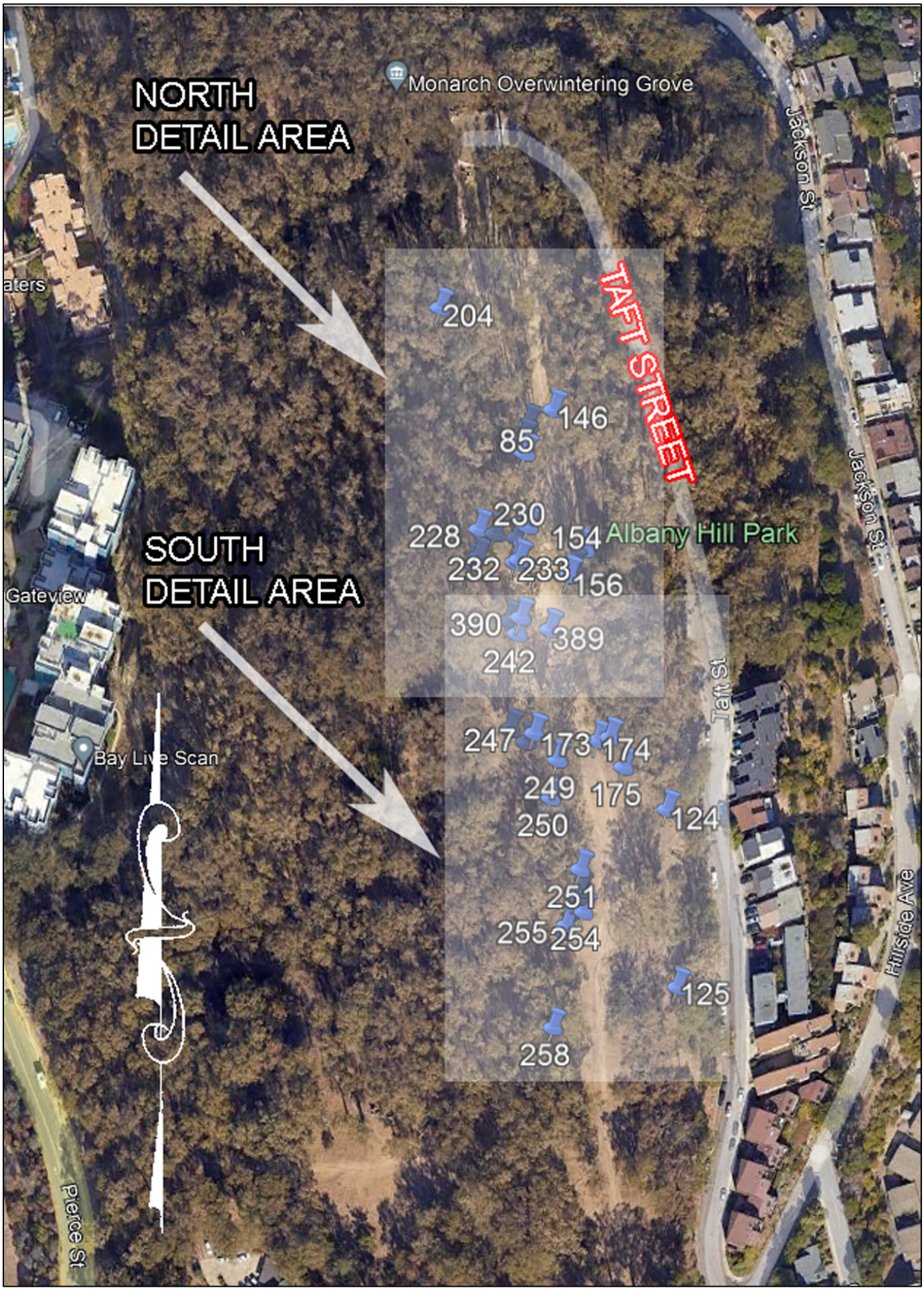
I. List of 37 Assessed Trees
II. SBCA Overview Tree Number Key
III. McNeil Arboriculture Overview Tree Number Key & Detail Key
IV. Photo Key to Resistograph/Tomograph Locations, with Resistograph Profiles[12]
V. Formal Risk Assessment for Lower Trunk Failure, Tree #174

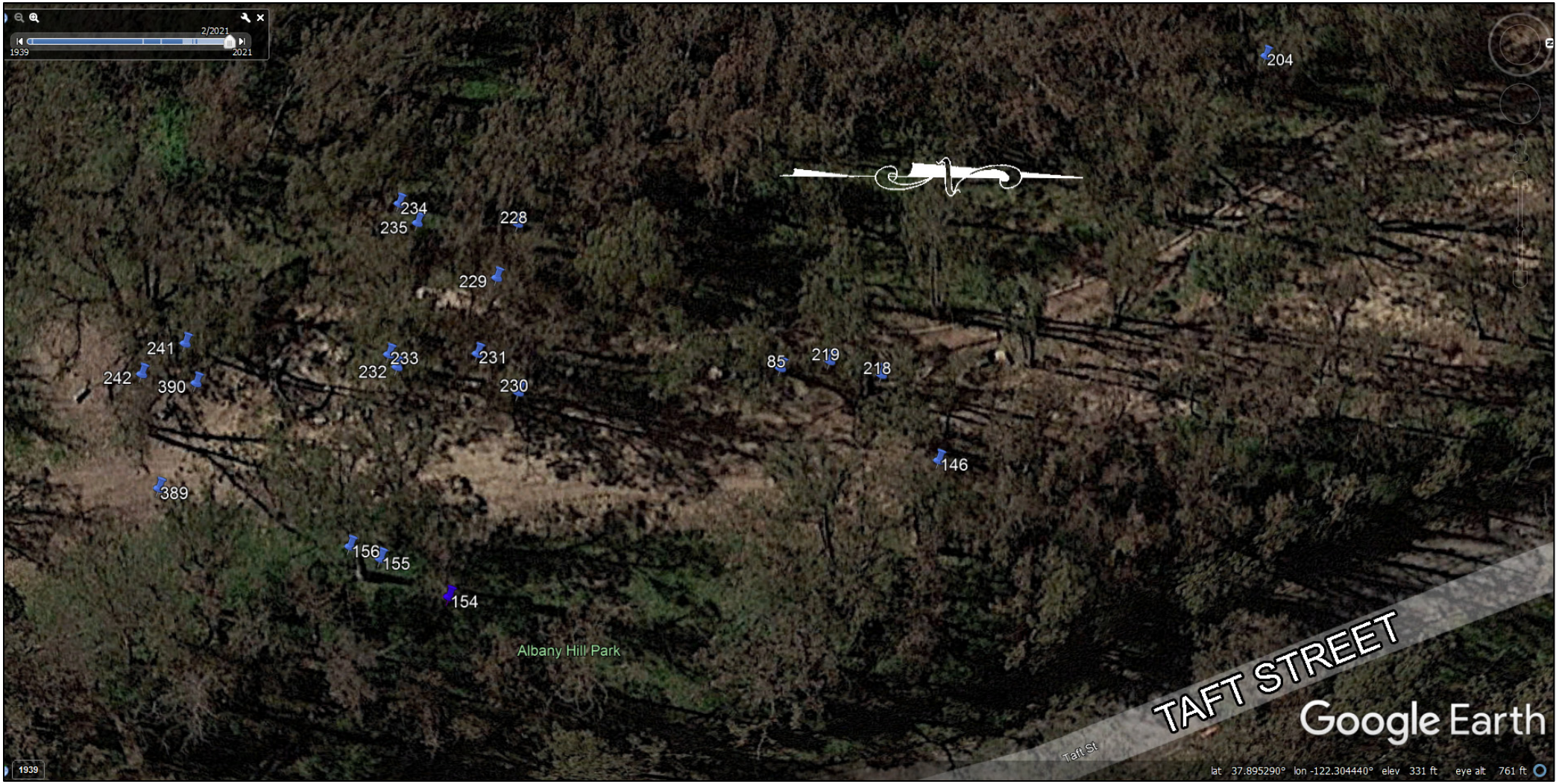
[11] An A300 Level 1 inspection entails only drive-by or walk-by inspection, observing one side of the tree.
[12] Descriptive terms used in Comments on individual Resistograph profiles: Functionally Sound means that even with decay present, the morphology of the tree combined with the sound wood is sufficient for the trunk to act as, to function as though fully sound. Sufficient is a similar term. The sound wood detected, given all attributes of the tree, is sufficient, in our opinion to support the tree through ordinarily expected environmental events.

Tree #	Whole Failure Likelihood	Disposition	Resistograph	Tomograph	Comments
85	Improbable	DW removal			By mallet sounding, the tree is stable. DW Removal = Deadwood presence & removal
124	Improbable	Remove			No basal mechanical issues, will be removed for management of the area into the future
125	Possible	Remove			At the top of steep bank, the root system is partially washed out. The tree has good trunk taper, but is declining in health
146	Improbable	Remove			Decay at base, but buttress growth surrounding is sufficient to support tree in the group as-is, but will be removed for overall area management into the future.
154	Improbable	Remove			Dead limbs do not extend over bench, tree will be removed toward area management
155	Improbable	Remove			Sufficiently sound, by mallet sounding, remove as part of overall area management
156	Improbable	Remove	X		
173	Improbable	DW removal			No basal mechanical issues.
174	Possible	Remove			50 percent east side decay. The tree is also declining.
175	Improbable	DW removal			Declining
204	Possible	Remove			Fire cavity, 50 percent, associated decay.
218	Improbable	Remove			By mallet sounding, the tree is sound. Could remove, toward replanting plan long-term.
219	Improbable	Remove			By mallet sounding, the tree is sound. Could remove, toward replanting plan long-term.
228	Improbable	Remove	X		Open catface on the east side from old burn injury. Woundwood ramshorn response on both sides bolster the trunk. Stable tree, and its size makes it a group keystone, but it is declining, may not survive past five years, not practical to retain.
229	Possible	Remove			Basal fire scar
230	Improbable	Remove			
231	Improbable	Remove			
232	Improbable	Remove	X		
233	Improbable	Remove			
234	Improbable	Remove			
235	Improbable	Remove			Sufficiently well-tapered for current stability
241	Improbable	EWR over path			Declining, may last ten years. EWR = End Weight Reduction

Tree #	Whole Failure Likelihood	Disposition	Resistograph	Tomograph	Comments
242	Possible	Remove	X		Leans downhill. Declining
246	Improbable	Remove			Current fair health, but declining.
247	Improbable	Remove			Severe decline
248	Improbable	Remove			Extreme decline
249	Improbable	EWR over path			Remove limb endweight
250	Improbable	Remove			Mechanically OK, but declining, could remove, or at minimum reduce limb endweight on the east side.
251	Improbable	Remove			Half dead currently
252	Improbable	Remove			
253	Improbable	Remove			
254	Improbable	EWR over path			Currently mechanically stable, remove limb endweight
255	Improbable	EWR over path			Currently mechanically stable, remove limb endweight
256	Improbable	Remove			Currently mechanically stable
258	Improbable	Retain	X	X	Fair to good health, full canopy. Mechanically it has excellent trunk and limb taper, foliage distribution vertically. Remove deadwood of two inch or larger diameter from the east half of the tree, toward the path.
389	Improbable	Remove	X		Removal accomplishes clearing the area for replanting
390	Improbable	Remove			Will be orphaned, exposed if 241 and 242 are removed. One of two trunks of this tree is poorly attached. Removal of 390 will preclude risk from newly exposed tree.


both sides of concrete path and fire road from turnaround to summit
EGHT
EOJT
EGJT
ESHT
ETHT
GOW
TAFT
JACKSON
MADISON
Albany Hill
Vegetation Management Plan
Veg Units (17.7 acres)
EGHT (2.3)
EGJT (2.5)
EOJT (1.5)
ESHT (2.0)
ETHT (2.0)
G (0.6)
GOW (0.5)
OW (4.1)


NORTH
DETAIL AREA
Monarch Overwintering Grove
Jackson St
TAFT STREET
204
146
85
230
228
154
Albany Hill Park
232
233
156
SOUTH
DETAIL AREA
Gateview
390
389
242
Taft St
Bay Live Scan
247
173
174
249
175
124
250
251
255
254
125
258
Hillside Ave
Pierce St


2/2021
1939
2021
204
234
235
228
229
241
242
390
233
232
231
230
85
219
218
146
389
156
155
154
Albany Hill Park
TAFT STREET
Taft St
Google Earth
1939
lat 37.895290° lon -122.304440° elev 331 ft eye alt 761 ft


2/2021
241
242
390
246
248
247
389
250
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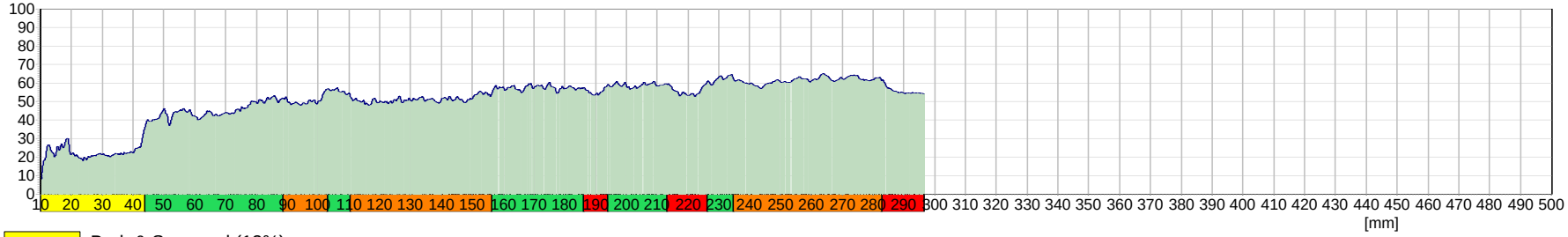
258
255
253
254
252
251
174
173
175
124
125
TAFT STREET
Taft St
Taft St
Google Earth
1939
Imagery Date: 2/24/2021 lat 37.893431° lon -122.304866° elev 226 ft eye alt 761 ft

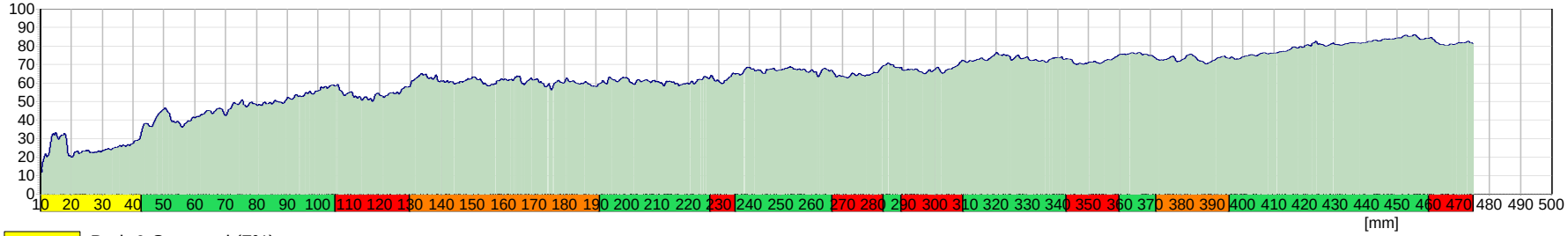
APPENDIX IV PHOTO KEY OF RESISTOGRAPH LOCATIONS, TREE #156

01560001 20220210 Albany Hill, Tree 156 Profile #1
Mixed sound with decay, functionally sound



Bark & Sapwood (12%)
Early stage decay (38%)
Advanced decay (12%)
Sound (38%)

01560002 20220210 Albany Hill Tree #156 Profile #2
Mixed sound with decay, functionally sound



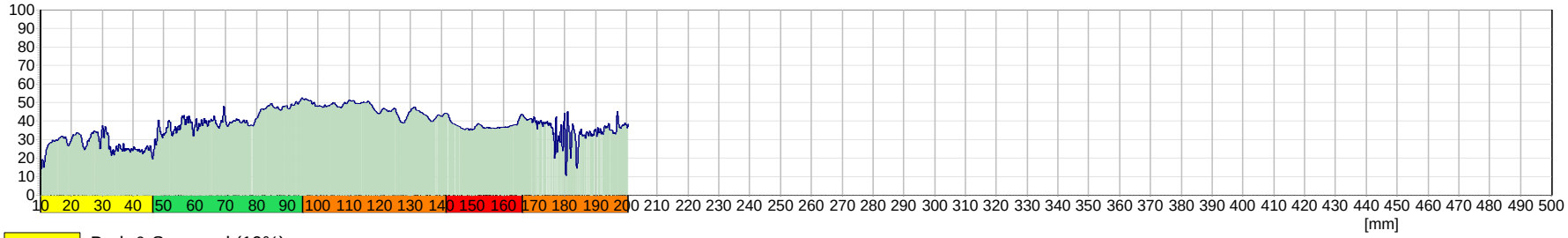
Bark & Sapwood (7%)
Early stage decay (18%)
Advanced decay (22%)
Sound (53%)


TREE 228
1
4
2.10.2022


TREE 228
3
2
1
2.10.2022

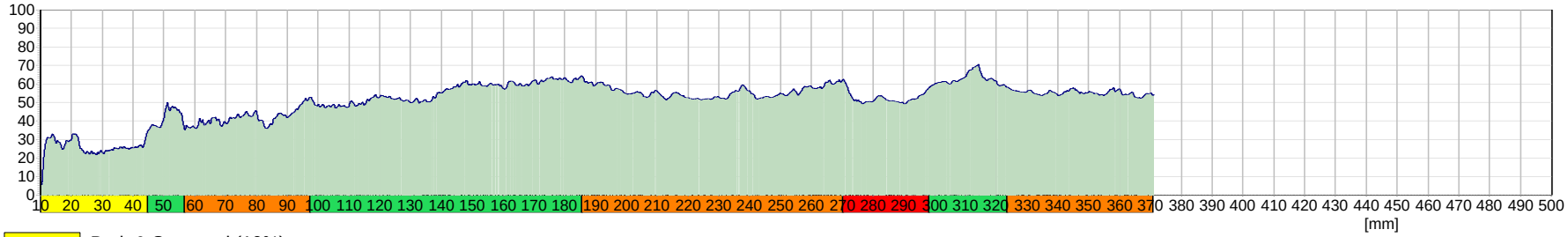

TREE 228
4
3
2.10.2022

02280001 20220210 Albany Hill Tree 228 Profile #1
Mixed decay states past about 9.5 cm



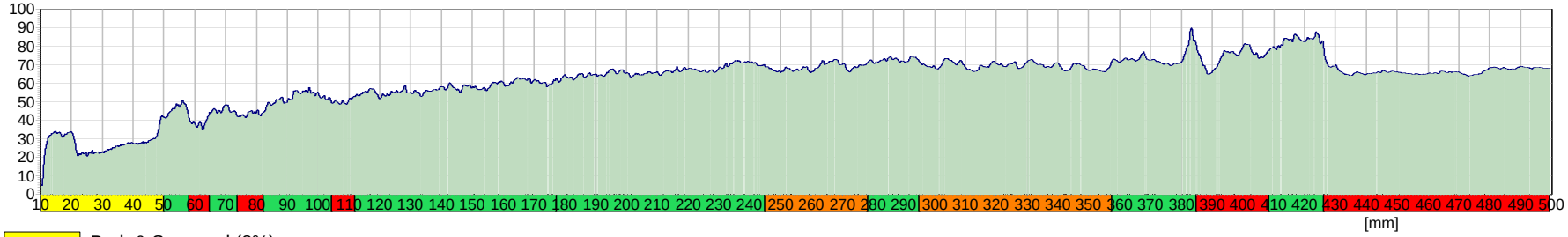
Bark & Sapwood (19%)
Early stage decay (42%)
Advanced decay (13%)
Sound (26%)

02280002 20220210 Albany Hill Tree 228 Profile #2
Mixed sound with decay states



Bark & Sapwood (10%)
Early stage decay (48%)
Advanced decay (8%)
Sound (35%)

02280003 20220210 Albany Hill Tree 228 Profile #3
Mixed sound with decay, functionally sound

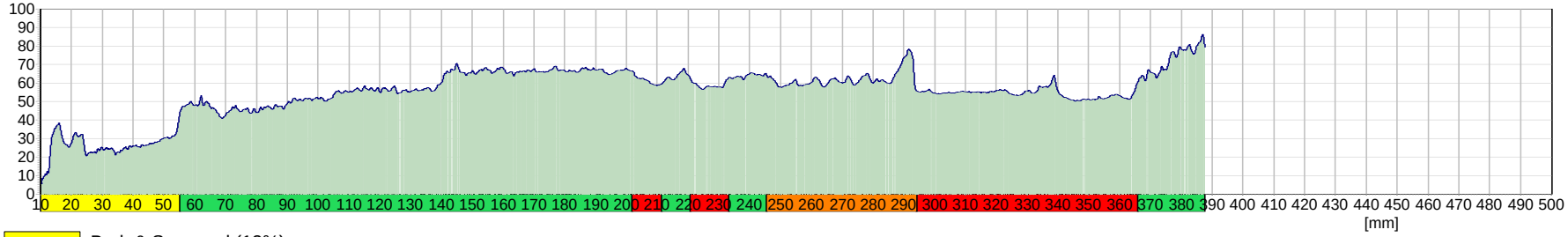


Bark & Sapwood (8%)
Early stage decay (20%)
Advanced decay (24%)
Sound (48%)

McNeil Arboriculture Consultants LLC

02280004 20220210 Albany Hill Tree 228 Profile #4

Mixed sound with decay, functionally sound given location in the tree

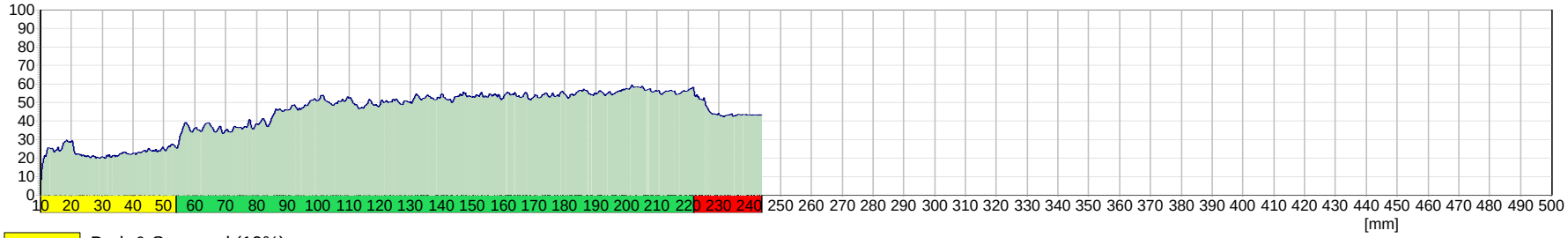


Bark & Sapwood (12%)
Early stage decay (13%)
Advanced decay (25%)
Sound (50%)


TREE 232
1
3
2.10.2022

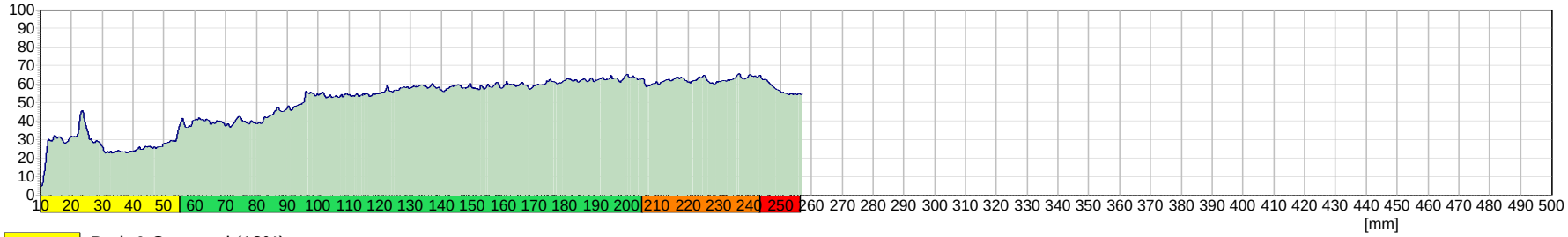

TREE 232
1
2
2.10.2022

02320001 20220210 Albany Hill Tree 232 Profile #1
Sound



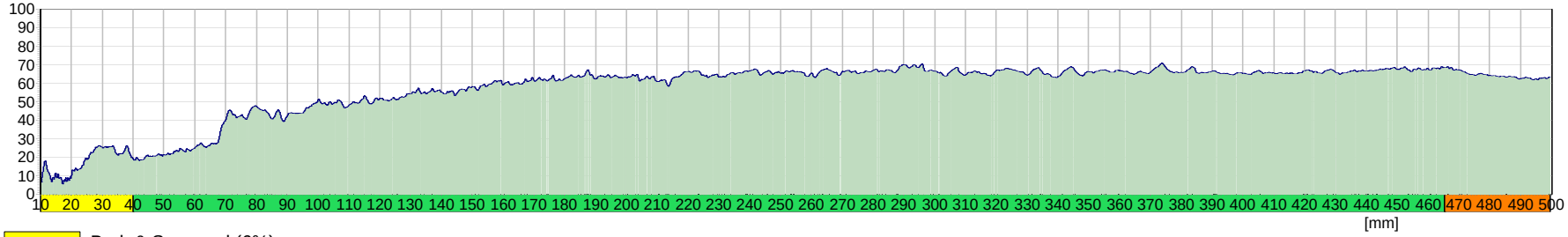
Bark & Sapwood (19%)
Advanced decay (9%)
Sound (72%)

02320002 20220210 Albany Hill Tree 232 Profile #2
Functionally sound



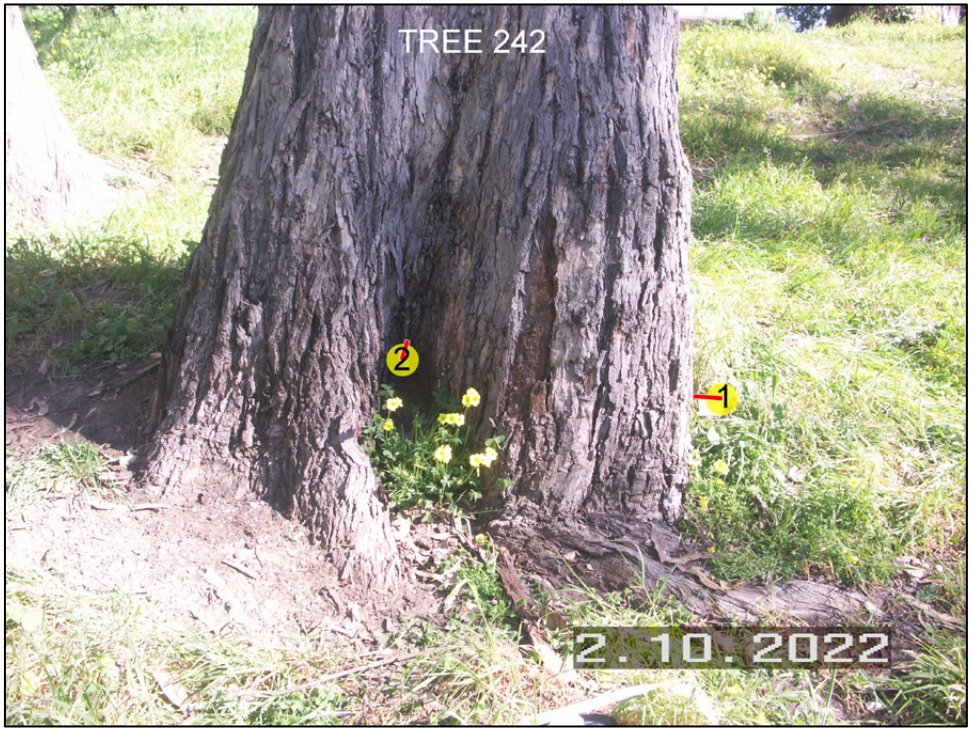
Bark & Sapwood (18%)
Early stage decay (16%)
Advanced decay (5%)
Sound (61%)

02320003 20220210 Albany Hill Tree 232 Profile #3
Sound



Bark & Sapwood (6%)
Early stage decay (7%)
Sound (87%)

APPENDIX IV PHOTO KEY OF RESISTOGRAPH LOCATIONS, TREE #242



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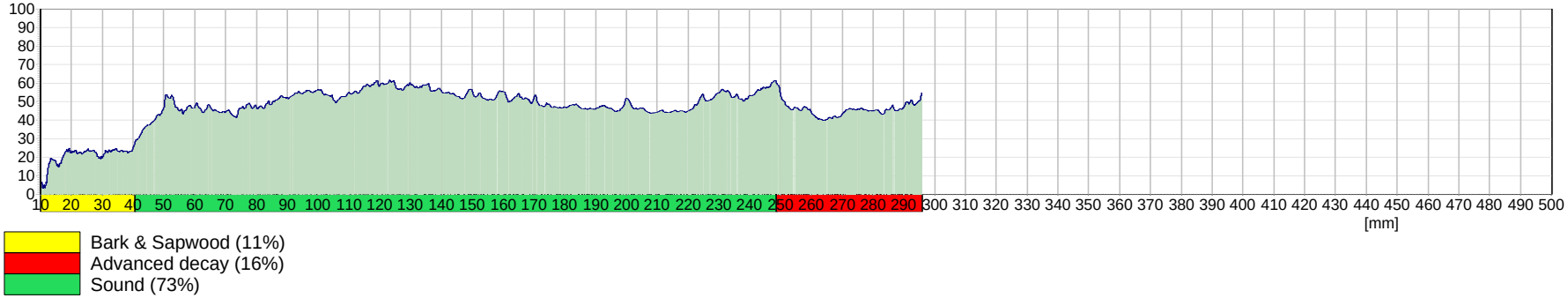
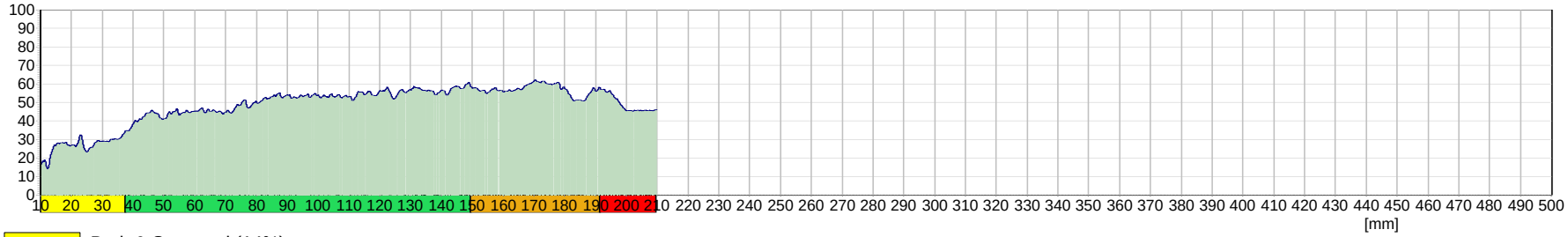
02420001 20220210 Albany Hill Tree 242 Profile #1
Sound to 24 cm, sufficient



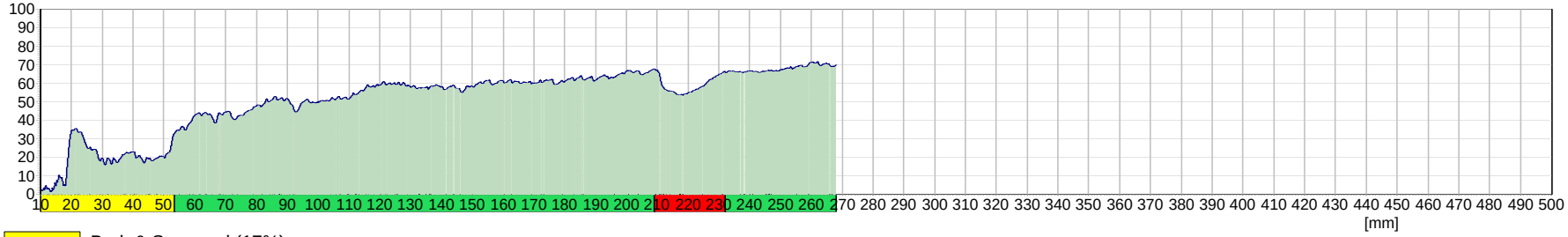
Bark & Sapwood (11%)
Advanced decay (16%)
Sound (73%)

02420002 20220210 Albany Hill Tree 242 Profile #2
Sound to 15 cm in fissured zone opposite open wound, sufficient



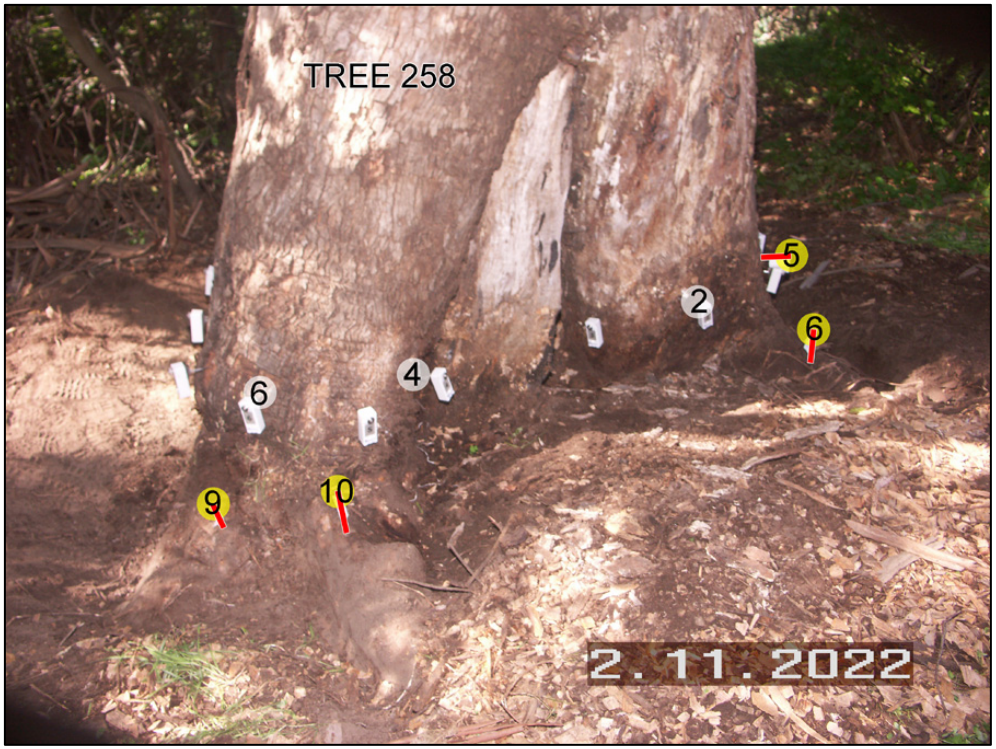
Bark & Sapwood (14%)
Advanced decay (9%)
Sound (56%)
Mixed sound/decay (21%)

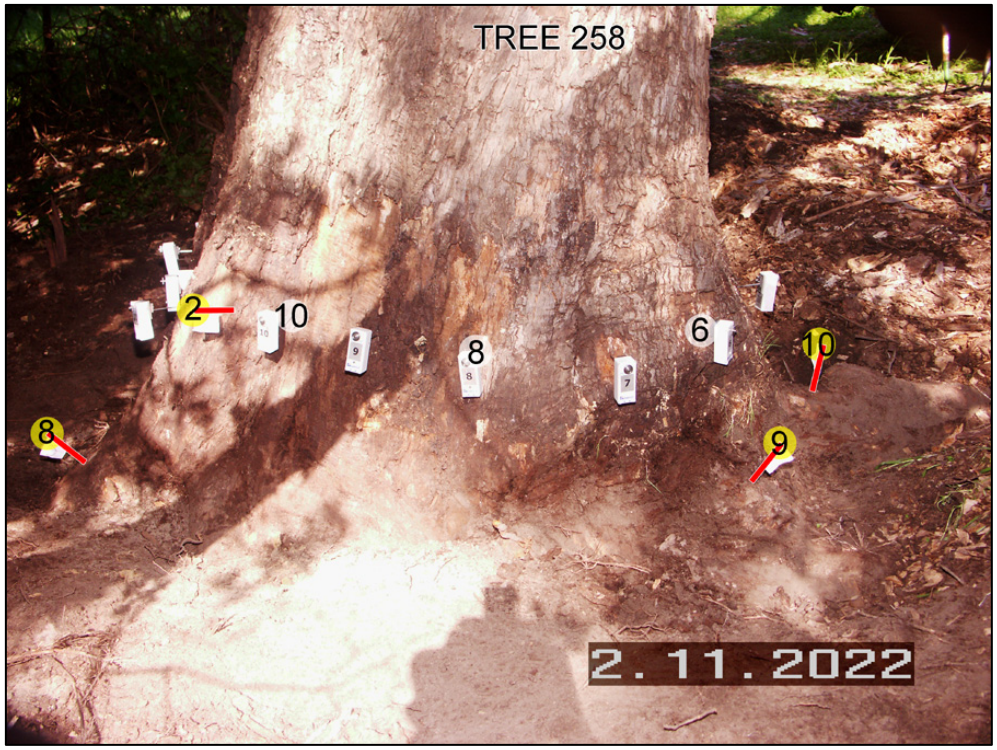
02420003 20220210 Albany Hill Tree 242 Profile #3
Functionally sound to 27 cm, sufficient, functionally sound

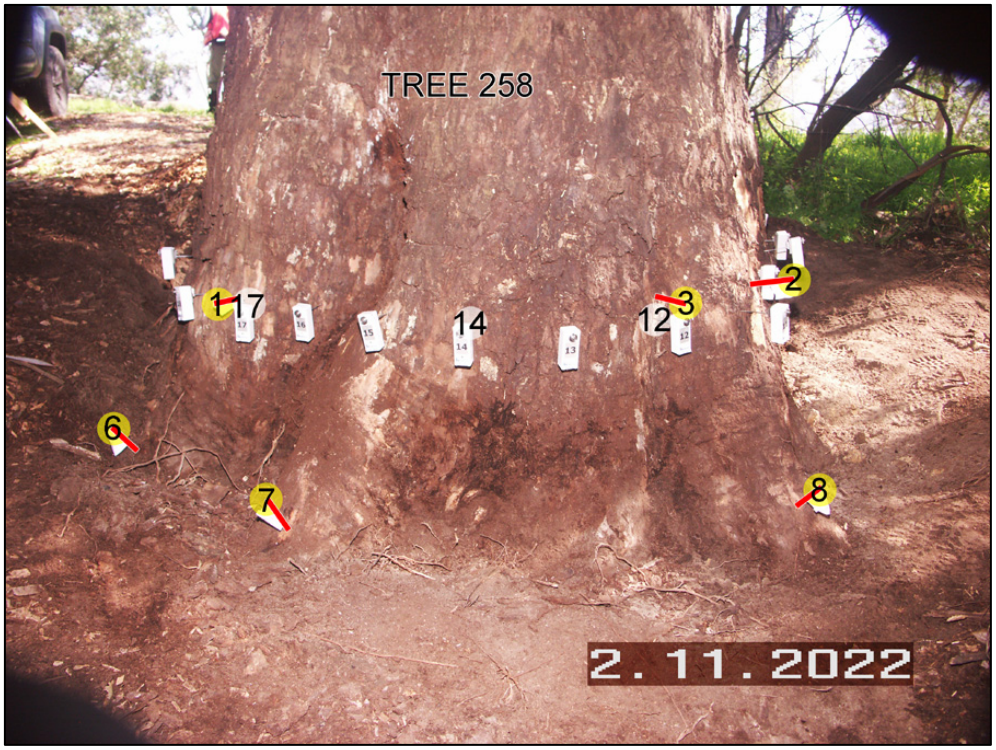


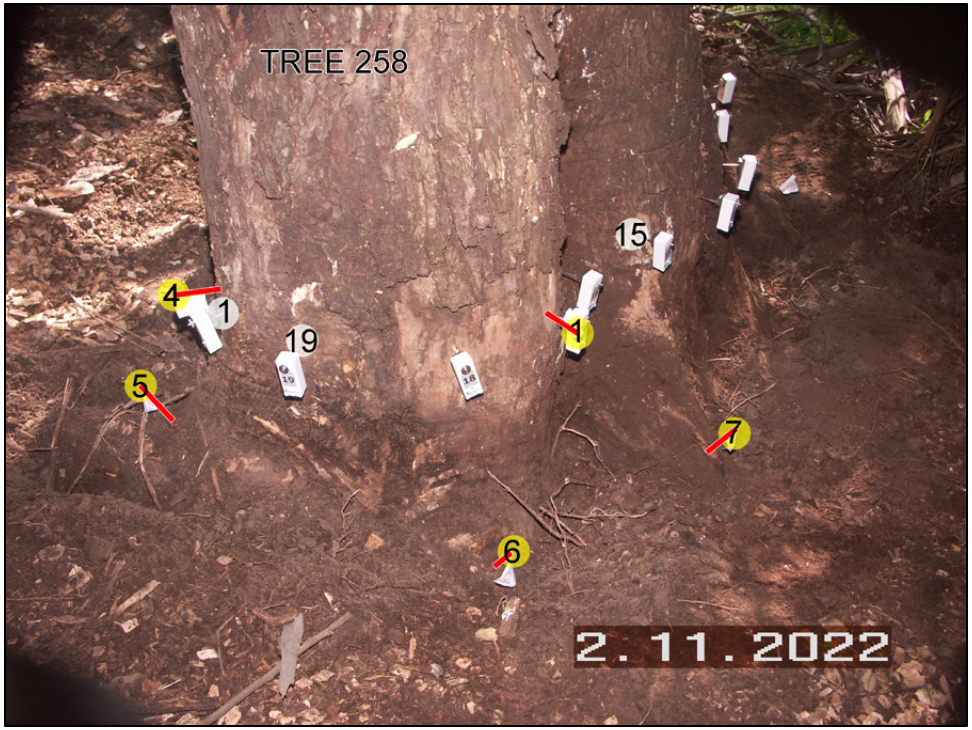
Bark & Sapwood (17%)
Advanced decay (9%)
Sound (74%)

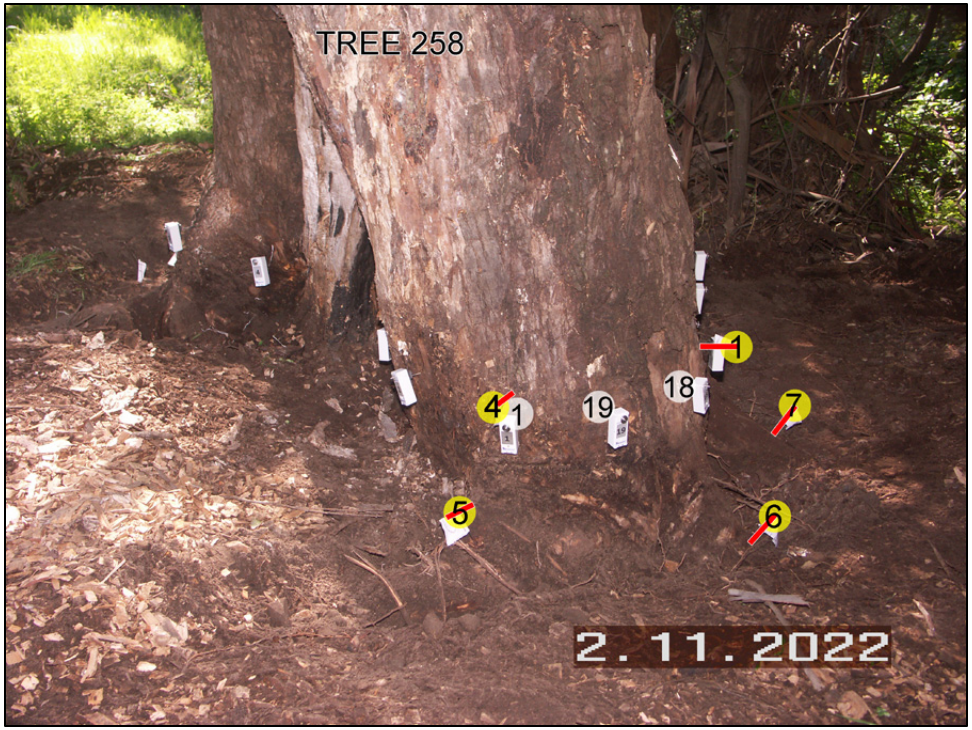
APPENDIX IV PHOTO KEY OF RESISTOGRAPH/TOMOGRAPH LOCATIONS, TREE #258



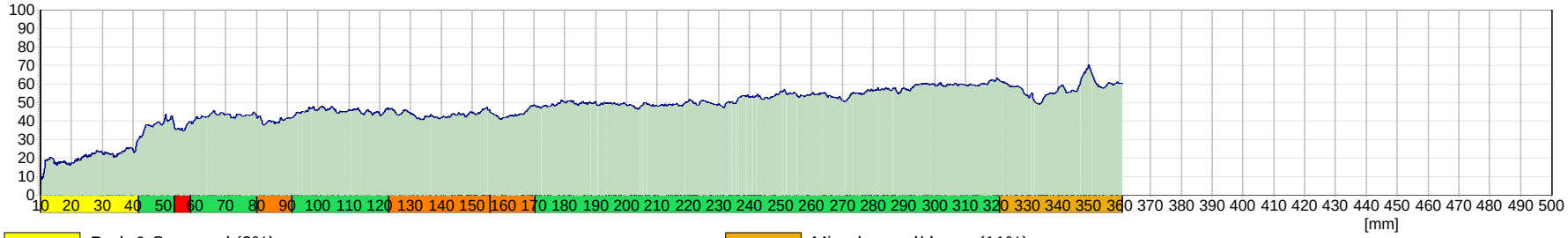





TREE 258
4
1
19
5
15
1
7
6
2.11.2022

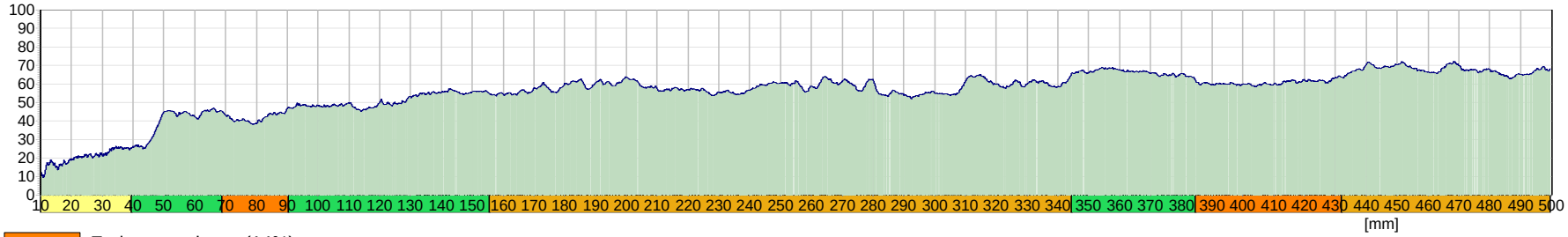

TREE 258
1
18
4
1
19
7
5
6
2.11.2022

02580001 20220211 Albany Hill, Tree #258 Profile 1, by Arbortom Sensor 17
Functionally sound



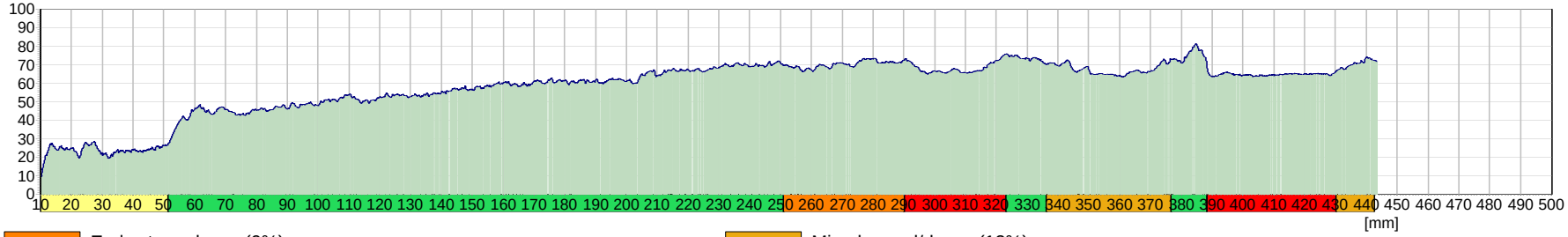
Bark & Sapwood (9%)
Early stage decay (17%)
Advanced decay (1%)
Sound (61%)
Mixed sound/decay (11%)

02580002 20220211 Albany Hill, Tree 258 Profile 2
Functionally sound to 17.5 cm



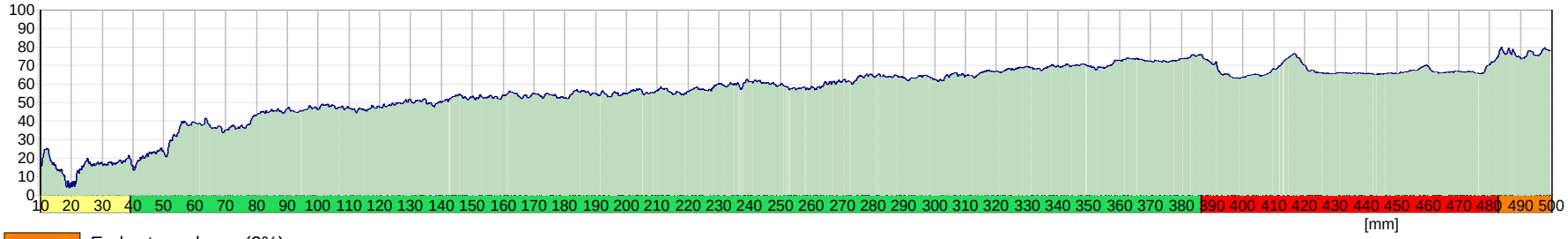
Early stage decay (14%)
Sound (27%)
Bark (8%)
Mixed sound/decay (51%)

02580003 20220211 Albany Hill Tree 238 Profile #3
Sufficiently sound



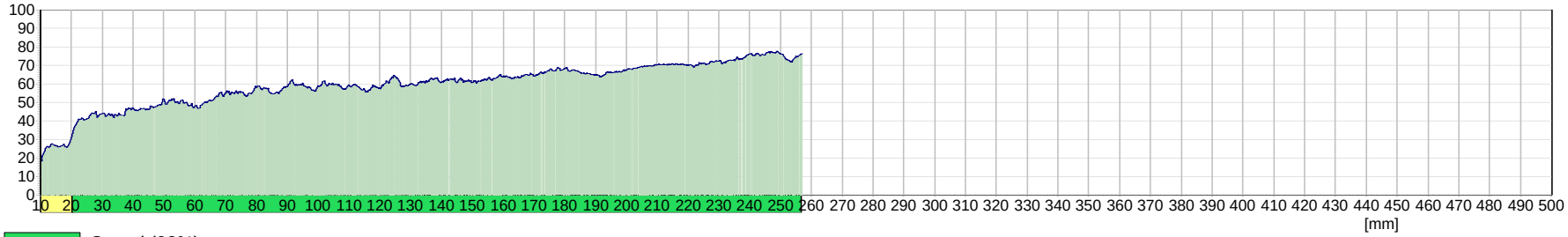
Early stage decay (9%)
Advanced decay (17%)
Sound (51%)
Bark (11%)
Mixed sound/decay (12%)

02580004 20220211 Albany Hill Tree 258 Profile #4
Sufficiently sound



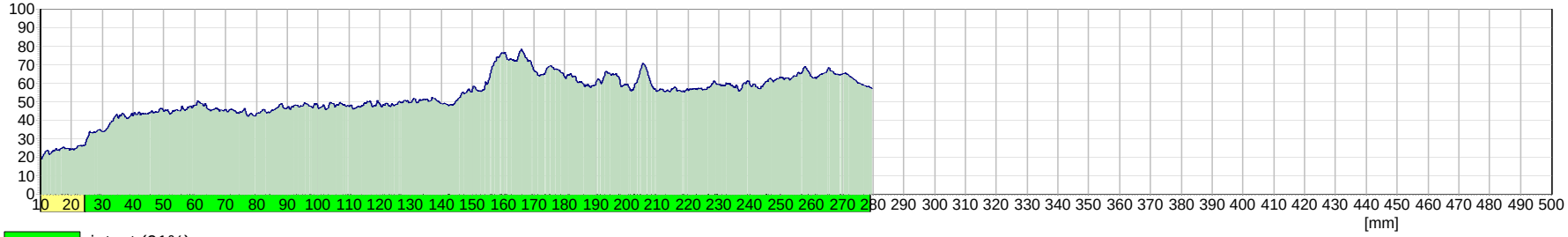
Early stage decay (3%)
Advanced decay (19%)
Sound (69%)
Bark (8%)

02580005 20220211 Albany Hill Tree 258 Profile #5, in root
Sound



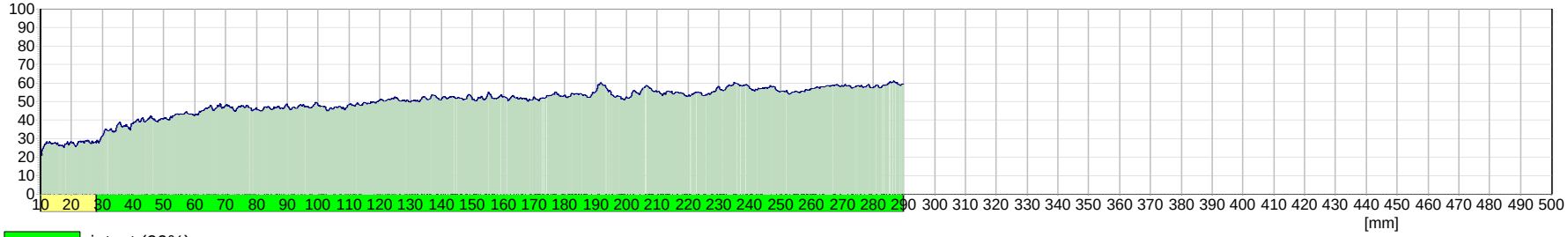
Sound (92%)
Bark (8%)

02580006 20220211 Albany Hill Tree 258 Profile #6 in root
Sound



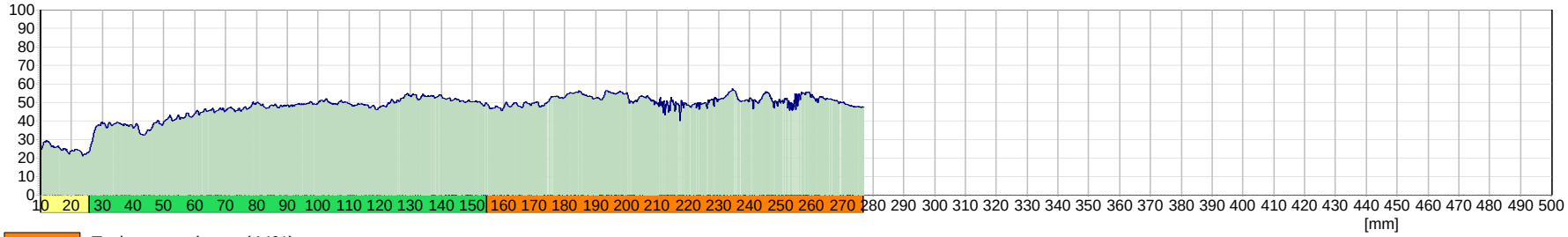
intact (91%)
Bark (9%)

02580007 20220211 Albany Hill Tree 258 Profile #7 in root
Sound



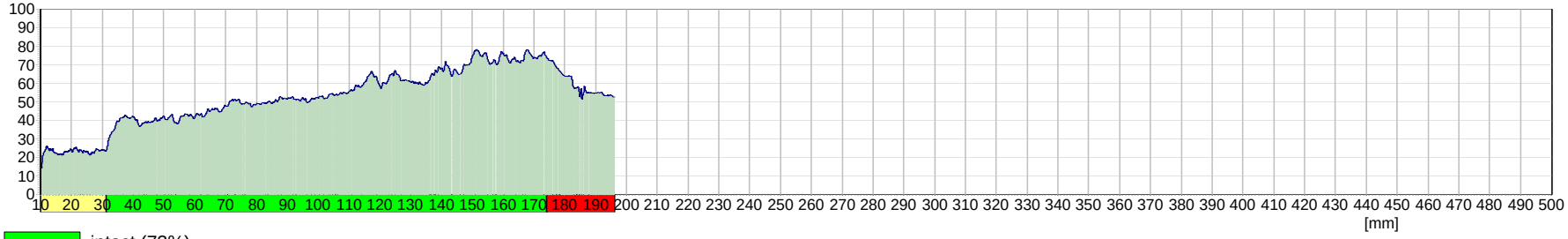
intact (90%)
Bark (10%)

02580008 20220211 Albany Hill Tree 258 Profile #8 in root
Sufficiently sound



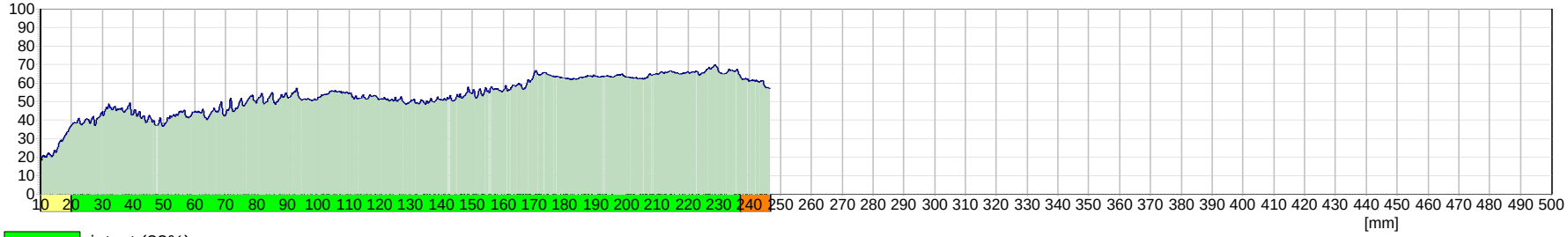
Early stage decay (44%)
Sound (47%)
Bark (9%)

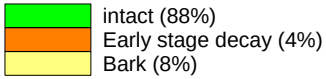
02580009 20220211 Albany Hill Tree 258 Profile #9 in root
Sound



intact (73%)
Advanced decay (11%)
Bark (16%)

02580010 20220211 Albany Hill Tree 258 Profile #10 in root
Sound

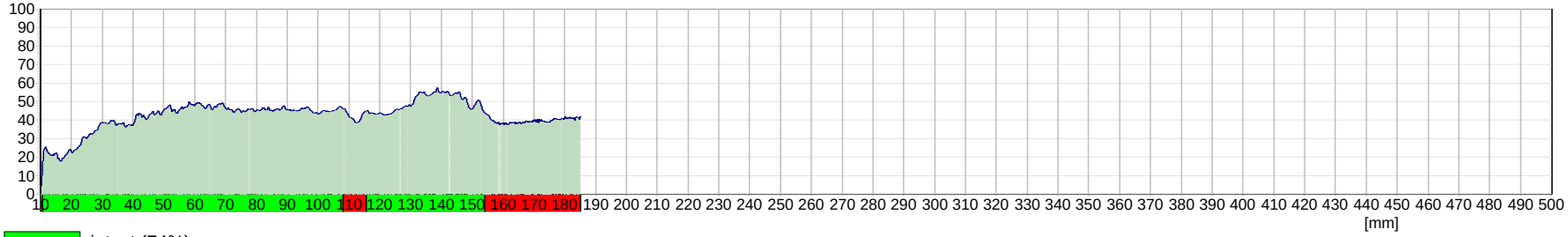




APPENDIX IV PHOTO KEY OF RESISTOGRAPH LOCATIONS, TREE #389

McNeil Arboriculture Consultants LLC

03890001 20220210 Albany Hill Tree 389 Profile #1
Sound as expected, in all new tissues outside the old stump



intact (74%)
decayed (21%)
Bark (6%)

ISA Basic Tree Risk Assessment Form

Client City of Albany Date March 18, 2022 Time _____

Address/Tree location Albany Hill Park Tree no. 174 Sheet _____ of _____

Tree species Blue Gum Eucalyptus dbh _____ Height _____ Crown spread dia. _____

Assessor(s) Joe McNeil Tools used Mallet **Time frame** _____

Target Assessment

Target number	Target description	Target protection	Target zone: Target within drip line	Target zone: Target within 1x Ht.	Target zone: Target within 1.5 x Ht.	Occupancy rate (1 – rare, 2 – occasional, 3 – frequent, 4 – constant)	Practical to move target?	Restriction practical?
1	Ridge road	None	✔			2	N	N
2	Assessment is limited to whole tree lower trunk failure only							
3								
4								

Site Factors

History of failures _____ **Topography** Flat ☒ Slope ☐ _____% **Aspect** _____

Site changes None ■ Grade change ☐ Site clearing ☐ Changed soil hydrology ☐ Root cuts ☐ Describe _____

Soil conditions Limited volume ☐ Saturated ☐ Shallow ■ Compacted ☐ Pavement over roots ☐ _____% Describe _____

Prevailing wind direction W **Common weather** Strong winds ■ Ice ☐ Snow ☐ Heavy rain ■ Describe _____

Tree Health and Species Profile

Vigor Low ■ Normal ☐ High ☐ **Foliage** None (seasonal) ☐ None (dead) ☐ Normal _____% Chlorotic _____% Necrotic _____%

Pests/Biotic Eucalyptus tortoise beetle, Eucalyptus longhorned borer **Abiotic** Drought Stress

Species failure profile Branches ■ Trunk ■ Roots ■ Describe _____

Load Factors

Wind exposure Protected ☐ Partial ■ Full ☐ Wind funneling ☐ _____ **Relative crown size** Small ☐ Medium ☐ Large ☒

Crown density Sparse ■ Normal ☐ Dense ☐ **Interior branches** Few ☐ Normal ■ Dense ☐ **Vines/Mistletoe/Moss** ☐ _____

Recent or expected change in load factors _____

Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —

Unbalanced crown ☐ LCR <50% %

Dead twigs/branches ☐ 30% % overall Max. dia. _____

Broken/Hangers Number _____ Max. dia. _____

Over-extended branches ☐

Pruning history

Crown cleaned ☐ Thinned ☐ Raised ☐

Reduced ☐ Topped ☐ Lion-tailed ☐

Flush cuts ☐ Other _____

Part Size _____ Fall Distance _____

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

Cracks ☐ _____ Lightning damage ☐

Codominant ☐ _____ Included bark ☐

Weak attachments ☐ _____ Cavity/Nest hole ____% circ.

Previous branch failures ☐ _____ Similar branches present ☐

Dead/Missing bark ☐ Cankers/Galls/Burls ☐ Sapwood damage/decay ☐

Conks ☐ Heartwood decay ☐ _____

Response growth _____

Condition(s) of concern _____

Part Size _____ Fall Distance _____

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

—Trunk —

Dead/Missing bark ■ Abnormal bark texture/color ☐

Codominant stems ■ Included bark ☐ Cracks ☐

Sapwood damage/decay ☐ Cankers/Galls/Burls ☐ Sap ooze ☐

Lightning damage ☐ Heartwood decay ■ Conks/Mushrooms ☐

Cavity/Nest hole 50 % circ. Depth 50 Poor taper ☐

Lean _____° Corrected? _____

Response growth _____

Condition(s) of concern Significant basal trunk defect, east side

Part Size 30 inches Fall Distance 60 feet

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ■

Likelihood of failure Improbable ☐ Possible ■ Probable ☐ Imminent ☐

— Roots and Root Collar —

Collar buried/Not visible ☐ Depth _____ Stem girdling ☐

Dead ☐ Decay ☐ Conks/Mushrooms ☐

Ooze ☐ Cavity ☐ _____% circ.

Cracks ☐ Cut/Damaged roots ☐ Distance from trunk _____

Root plate lifting ☐ Soil weakness ☐

Response growth _____

Condition(s) of concern _____

Part Size _____ Fall Distance _____

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

Risk Categorization

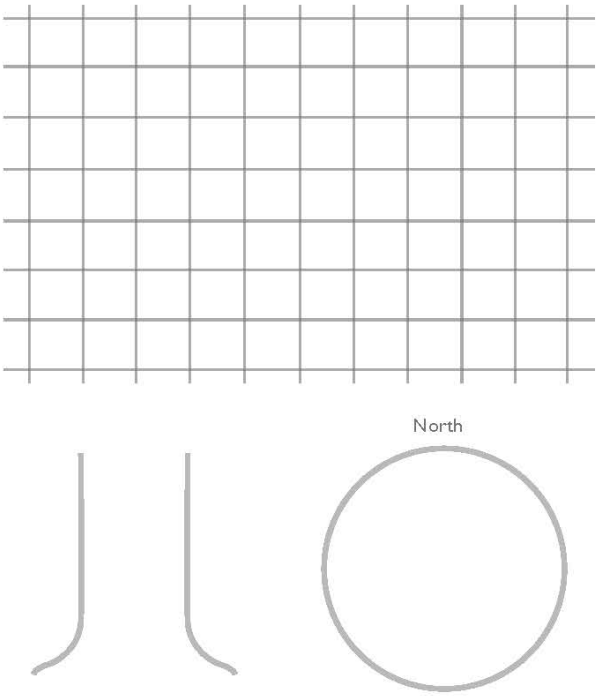
Target (Target number or description)	Tree part	Condition(s) of concern	Likelihood: Failure: Improbable	Likelihood: Failure: Possible	Likelihood: Failure: Probable	Likelihood: Failure: Imminent	Likelihood: Impact: Very low	Likelihood: Impact: Low	Likelihood: Impact: Medium	Likelihood: Impact: High	Likelihood: Failure & Impact (from Matrix 1): Unlikely	Likelihood: Failure & Impact (from Matrix 1): Somewhat	Likelihood: Failure & Impact (from Matrix 1): Likely	Likelihood: Failure & Impact (from Matrix 1): Very likely	Consequences: Negligible	Consequences: Minor	Consequences: Significant	Consequences: Severe	Risk rating (from Matrix 2)
Ridge road	Entire tree, if grove is intact	Basal defect		●					●		●							●	Low
Ridge road	Entire tree if adjacent trees are removed	Basal defect			●				●			●						●	Medium

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



Notes, explanations, descriptions

Limb and root failure assessment were not included. The above is an illustration that increased that wind exposure accompanying removal of surrounding trees will increase the likelihood of failure of tree #174 from Possible to Probable, increasing Likelihood of impact to Somewhat LIkely, and Risk to Moderate

Mitigation options

1. We expect mitigation for this tree will be removal **Residual risk** _____
2. _____ **Residual risk** _____
3. _____ **Residual risk** _____
4. _____ **Residual risk** _____

Overall tree risk rating Low ■ Moderate ■ High ☐ Extreme ☐

Overall residual risk None ☐ Low ☐ Moderate ☐ High ☐ Extreme ☐ **Recommended inspection interval** _____

Data ☐ Final ☐ Preliminary **Advanced assessment needed** ☐No ☐Yes-Type/Reason _____

Inspection limitations ☐None ☐Visibility ☐Access ☐Vines ☐Root collar buried Describe _____