



CITY OF CORONADO

CITY COUNCIL STAFF REPORT

July 18, 2023

{{section.number}}c

REQUEST COUNCIL DIRECTION FOR FINAL DESIGN AND AUTHORIZE BID ADVERTISEMENT FOR THE LAWN BOWLING GREEN TURF REPLACEMENT PROJECT

RECOMMENDATION:

Provide direction for final design to complete the bid documents and authorize bid advertisement for the Lawn Bowling Green Turf Replacement project using two bid packages: 1) Install concrete root barriers and drainage system; and 2) Remove existing turf, repair/replace existing base, install new turf. In addition, staff requests Council provide direction on the proposed removal of the leaning torrey pine tree P-56.

BACKGROUND:

In 2010, the John D. Spreckels Center's (JDSC) Lawn Bowling Green complex (Complex) was constructed. The construction replaced the existing turf surface with an artificial surface (Green). The Green had a 10-year life expectancy.

In September 2019, staff responded to a request to investigate numerous mounds that had developed under the Green on the D Avenue side of the Complex. Approximately twenty mounds were identified ranging from as small as a golf ball, to the size of a softball, thus rendering portions of the Complex unplayable. The mounds were the result of the puffball mushroom fungus *Pisolithus arhizus/tinctorius* (common name: dyeball or deadman's foot fungus). Staff temporarily slowed the progress of the fungus through fungicidal injections, but this process required puncturing the Green numerous times and was detrimental to the playability and longevity of the Green.

On February 16, 2021, staff presented an overview of the project to Council and stated that the fungus lived on both live and dead conifer tree roots. Staff recommended the removal of the four canary pine trees on D Avenue, installation of a (root) barrier along the north side of the Green, replacement of the substrate and Green, and installation of a pump to divert the drainage away from the Green that was coming from the JDSC roof and being treated by the northerly planter. In the Analysis portion of the staff report, staff included the following: "At this time, there are no known remedies for the fungus and eradication is difficult to impossible. The more mitigation measures employed, the greater the opportunity for success."

The Council discussed staff's recommendation and alternatives provided by the West Coast Arborists, Inc. (WCA) report (Attachment 1). Discussion also centered around the Rutgers University and PACE Turf, LLC (excerpts included in the WCA report), both of which did not provide confidence that there was a definite solution to the issue. In a 3-2 vote, the City Council supported staff's recommendation with the exception of the removal of the trees. In addition, direction was provided to design a barrier of some sort (concrete, gravel, etc.) to prevent roots from reaching the Green, within a reasonable budget.

Over the course of approximately a year and a half the city saw a significant amount of turnover in personnel involved in the project which resulted in significant delays. Due to the timing of onboarding of new staff in multiple departments, management of the project was moved from

Recreation and Golf Services to Public Services and Engineering.

On June 7, 2022, City Council approved a contract with Nasland Engineering to design and prepare the bid documents.

From late June to November of 2022, city staff and the consultant prepared draft design documents and met with the Coronado Lawn Bowling Club (bowlers) regarding the project. In discussions with the bowlers every facet of the project was questioned. This included: the cause and nutrient source of the fungus, use of herbicides/barriers on the Green, use, placement, and depth of the root barriers, determining tree health and need for tree protection, need for a drainage system under the Green, replacement of the hedges, and much more. Ultimately it was determined that definitively identifying the cause and nutrient source of the fungus was the most important factor to address these questions and ensure the optimal design solution was reached.

Because there were differing opinions and no conclusive solution from the original consultants on the project (Rutgers, Pace Turf, WCA), staff decided to obtain more definitive research. Pace Turf recommended a mycologist-plant pathologist who is an expert on the specific mushroom, *psilocybe arhizus/tinctarius* that is invading the City's lawn bowling green.

Staff contacted Ms. Pat Nolan, who spent 27 years as a plant pathologist in the Department of Agriculture, Weights and Measures for the County of San Diego including work in mushroom identification. Now retired, she continues to use her mycological skills in mushroom identification as a long-time member of the San Diego Mycological Society, and especially in unusual cases. For this project, she has and continues to volunteer her time.

On February 9, 2023, staff, consultants, bowlers and Ms. Nolan visited the Complex. Ms. Nolan confirmed the other consultants' findings: a symbiotic "mycorrhizal" relationship exists between the fungus and the nearby conifer trees growing along D Avenue and adjacent to the Library. But she added an important distinction: this mushroom is created only on living roots and not dead roots or organic debris (Attachment 2). Staff also received a second confirmation from a microbiology and plant pathology professor at UC Riverside (Attachment 3). Therefore, excavating the soil beneath the green to remove all dead organic matter and fungal spores is not necessary as this fungal mushroom will not fruit or multiply unless a living root is present to supply it with nutrients.

ANALYSIS:

Given this new knowledge about the specific mushroom invading the City's turf, staff was able to tailor a new solution. Based on the collective opinion of the involved parties and the City, staff recommends splitting the original project into two bid packages with the following scopes of work:

Phase I

1. Construct a concrete barrier along D Avenue and the Library to block root intrusion from nearby trees.
2. Complete the roof drain system by installing a pump to redirect water away from the Green.

Phase II

3. Remove existing Green exposing the base material, repair base material as needed.
4. Install new Green.

By splitting the project into two, each of the projects can be completed by contractors who perform work within their expertise. Separately, the root barriers can be installed as one of the first items

of work which would provide an opportunity to visually observe the quantity and size of the roots under the Green coming from the trees. Applying herbicide to the roots at this time will also be considered.

Staff believes that constructing a concrete root barrier at a depth of five feet in conjunction with WCA recommendations for tree health will reduce/prevent tree roots from growing under the Green. The consensus from speaking to several arborists is that tree roots are generally two to two and half feet deep. Staff does not believe roots from the hedges along D Avenue are a source for the fungus under the Green.

Staff reviewed the option of placing a concrete/gravel barrier beneath the Green, but significant costs were a concern along with feedback from the bowlers that this was not preferred. A drain system was also considered; however, it added additional costs and was also not preferred. In general, preserving the existing base to the Green was preferred by the bowlers.

In the course of significant coordination and interaction with the bowlers to understand the issues and with a goal to construct a project that met their needs, the bowlers made one request: to remove the four canary island pine trees (F-9 through F-12) thereby eliminating any possibility of tree roots intruding under the Green and averting the need to install a concrete root barrier along D Avenue. It is also staff's understanding that these trees add maintenance duties due to the trees dropping sap and leaves onto the Green.

Lastly, as part of staff's review of the project, the health of one of the torrey pines was questioned. The arborist working under Nasland Engineering recommends removing the leaning torrey pine P-56 (WCA) / Tree #5 (Rappoport) because it overcrowds the adjacent pines and is detrimental to their health (Attachment 4). Staff requests Council provide direction on removing tree P-56.

As part of staff's presentation to the City Council, project estimates and individual tasks costs will be provided. Overall, it is staff's opinion that an additional \$600,000 or more will be needed to complete the project as outlined above. Costs for remediation of the soil below the base material are anticipated at another \$150,000 or more.

FISCAL IMPACT:

There is no significant fiscal impact associated with advertising the project(s) for bid. This project was added during the FY 20-21 Capital Improvement Program midyear adjustment process with an allocation of \$800,000 (400700000-98090-21003). To date, a total of \$110,200 has been expended for design, leaving a balance of \$689,800 for construction. Requests for additional appropriations will be included during award of each of the contracts for construction.

ALTERNATIVE:

The Council could choose not to authorize staff to advertise the project for bid and return with additional options/information.

CALIFORNIA ENVIRONMENTAL QUALITY ACT:

The project is categorically exempt from the provisions of CEQA based on Article 19, Sections 15301 (existing facilities), 15302 (replacement or reconstruction), and 15304 (minor alterations to land).

PUBLIC NOTICE:

No notice required.

ATTACHMENTS:

1. WCA Updated Report updated (5/22/23)
2. Mushroom Documentation
3. Plant Pathology Letter from UC Riverside
4. Arborist Report

Submitted By: Public Services and Engineering Department / Leon Firsht, Jackie Lu

City of Coronado

Assessment of Three Pine Trees Near The Lawn Bowling Club

SUBMITTED TO:

Art Valdivia
City of Coronado

PREPARED BY:

Gene Bordson
ISA Board Certified Master Arborist
ISA Certified Tree Worker (Climber)
ISA Qualified Tree Risk Assessor
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DPR Applicator License# 140768
TCIA Plant Health Care Technician

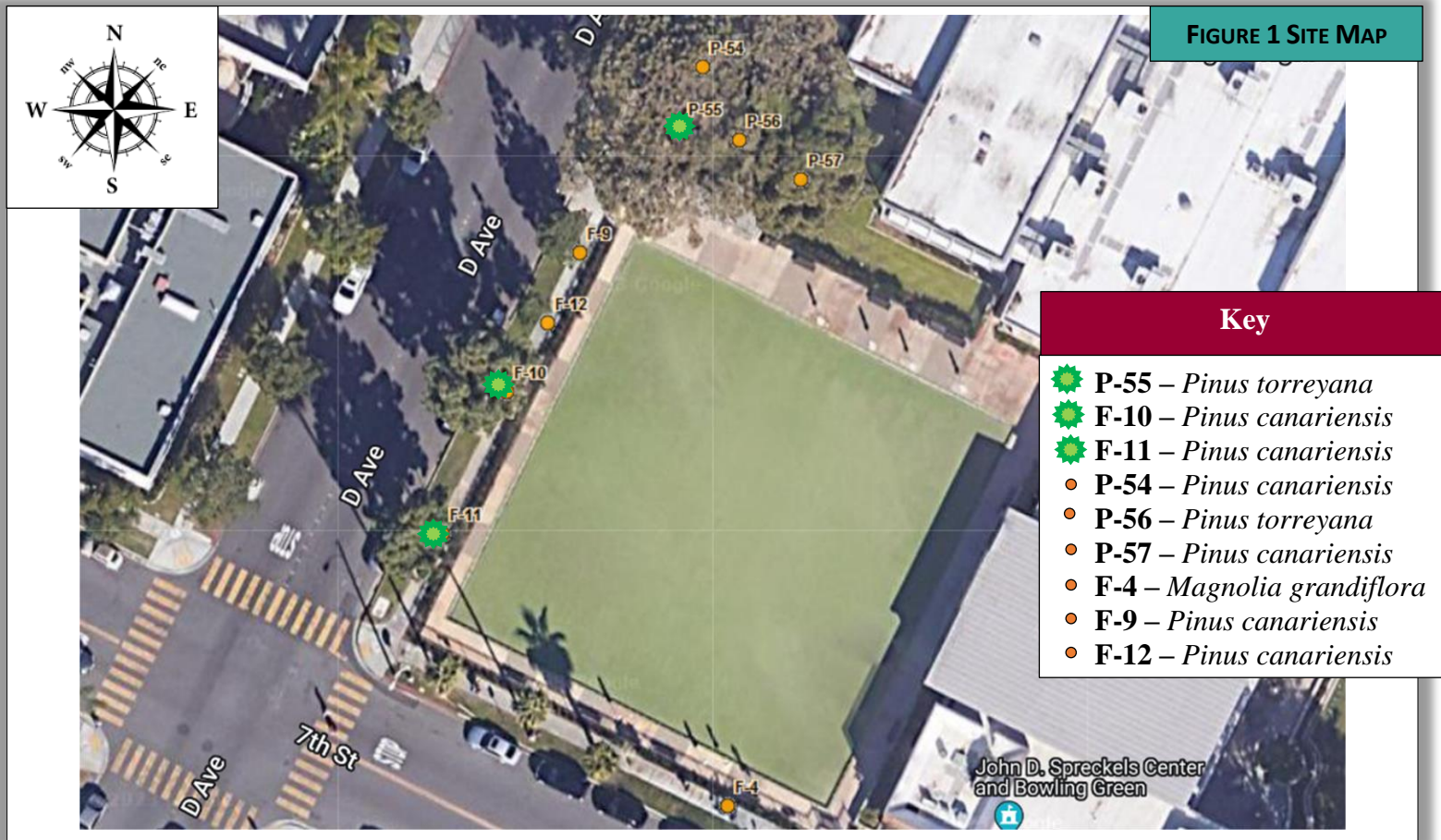


DATE: OCTOBER 6, 2020

(Minor edits were made on
5/22/23 upon City request to
clarify information.)

BACKGROUND AND ASSIGNMENT

In September of 2020, West Coast Arborists, Inc. (WCA) was contacted by the City of Coronado regarding the assessment of one Torrey pine (*Pinus torreyana*) and two Canary Island pines (*Pinus canariensis*) trees located on the northwest side of the Coronado lawn bowling club. In Arbor Access (WCA's tree inventory database), the trees are inventoried as 2 X SPRECKELS PARK WEST PLAZA P-55, 601 D AV F-10, and 601 D AV F-11. For this report, the trees will be referred to as Tree P-55, Tree F-10, and Tree F-11. The site map below identifies the location of these three subject trees with this icon "🌲" and six other surrounding trees with this icon "🌳".



The City had concerns regarding fungal fruiting bodies that were creating lumps within the artificial lawn bowling turf. The City requested that WCA assess the situation and provide management recommendations from an arboricultural perspective¹, specifically regarding the three subject pine trees (P-55, F-10, & F-11) being considered for removal to mitigate these turf problems.

¹ The City had already acquired a pathology report from Rutgers University as well as a report from PACE Turf LLC. Both of these reports were provided to WCA to review.



OBSERVATIONS

The subject trees and site were inspected on September 30, 2020. On-site, the health and structure of the trees was assessed in accordance with the **ISA Best Management Practices (BMPs)**². The inspection of defects within the crowns was limited to a ground-level visual inspection, below ground parts such as roots was limited by soil, hardscaping, artificial turf, and photos within a PACE Turf, LLC report from 9/23/2020 when some turf was cut open. On-site and within the two provided reports, the following relevant observations were noted:

Refer to Photos in Appendix A

General Site & Report Observations

- The trees were located on the northwest side of the Coronado lawn bowling club and surrounded by irrigated turf grass.
- Judging by the color and density of foliage, the trees were in fair-good health for the species and time of year. The trees also exhibited generally good structure having a dominant central leader with subordinate branching.
- There were various other trees in close proximity to the lawn bowling area, including a young magnolia (F-4) to the south and several other pines to the north. There was also a privet hedge (*Ligustrum spp.*) adjacent to the lawn bowling area to the northwest.
- There was a plastic root barrier between the privet hedge and the lawn bowling area.
- There were several noticeable bumps and depressions on the northwest side of the artificial lawn bowling turf as well as repairs and holes from fungicide injections. These bumps ranged between 35 and 60 feet from the subject trees.
- There were numerous fungal fruiting bodies growing in the same planting area as the privet hedge. The mushroom species appeared to match the tentative identification of the dyemaker's puffball from the pathology report.

² Terms appearing in boldface type are defined in the Glossary at the end of this report.



- The pathology report from Rutgers University tentatively identified the fungus as a dyemaker's puffball (*Pisolithus tinctorius*). It also stated that these mushrooms "are quite capable of producing enough turgor pressure to force their way through asphalt and other hard surfaces. These fungi usually grow in decaying organic matter, such as buried tree stumps, tree roots, or even buried construction lumber, and some live symbiotically with the roots of living trees. They will eventually disappear after the organic matter food source is exhausted, however, it can take up to ten years for a large stump or root to decay. Be aware that the fungus can also thrive in sand, asphalt, gravel, or other poor soil conditions which have little or no organic content. It is difficult to totally eradicate puffballs from the landscape. The only adequate control would be to dig up and destroy the underground sources of organic debris, but we have little faith in this approach."
- PACE Turf, LLC's report differed slightly from Rutgers University's pathology report, saying that "effectiveness of the repair is unknown as long as conifer roots are present under the green." The report offered a recommendation of removing all trees and the privet hedge from the surrounding area as well as any existing roots under the green before it is rebuilt. The report had an image of a small root that was said to be a likely source of nutrition for the fungus. This root appeared to be dead, decaying, and was not identified as belonging to a conifer. The report also stated that "effectiveness of fungicides or other chemical barriers to growth of the fungus is unknown."

Tree Specific Observations

- **Tree P-55** had a height of about 90 feet and had a trunk diameter of 42 inches. The tree had a slight lean towards the northwest, likely in response to sunlight. The tree was quite mature and appeared to have multiple bird nests in the upper canopy (likely egrets or herons). The tree's trunk was about 12 feet northeast of the bowling area's concrete footing and about 60 feet from the nearest bump/ repair in the artificial turf.
- **Tree F-10** had a height of about 60 feet and a trunk diameter of 27 inches. The tree was growing within a parkway about 35 feet from the nearest bump in the artificial turf.
- **Tree F-11** had a height of about 60 feet and a trunk diameter of 24 inches. The tree was growing within a parkway about 35 feet from the nearest bump in the artificial turf.

DISCUSSION AND RECOMMENDATIONS

Species/Root Profiles

Pinus torreyana is a pine tree native to coastal San Diego and on Santa Rosa Island. Several sources say it is the rarest native pine tree in North America (possibly the world). It is a protected species in several areas of San Diego, but to my knowledge, it is not protected in Coronado; however, mature specimens may be eligible for protected heritage tree status. Aside from the few undisturbed native ecoregions in San Diego, it is commonly planted as an ornamental tree in our coastal and inland areas. When mature, this tree will often have a rounded or vase-shaped canopy. This tree is susceptible to several canker diseases and bark beetles, especially when stressed.

Pinus canariensis is a pine tree native to the Canary Islands but is commonly planted as an ornamental tree in San Diego. This tree species generally has no protected tree status in Coronado/San Diego. It often has a columnar or conical shape and is susceptible to canker diseases and bark beetles, especially when stressed.

Roots are an essential component of all trees and shrubs. They anchor and support their structure, absorb water and minerals, store carbohydrates, and produce hormones. The radius of a tree's root system is approximately equal to the height of the tree; however, the root systems will vary substantially with species, soil conditions, and surrounding history/environment. My general experience with these two species is that the roots are much more likely to grow outwards than downwards. This is especially the case in urban environments surrounded by irrigated turf. The root systems often grow laterally in the top 6 -18 inches of soil, where essential resources are most plentiful.

Appraisal Review - Trees provide numerous valuable benefits, including increased real estate values, conserving energy, removing atmospheric contaminants, moderating stormwater runoff, sequestering carbon, wildlife habitat, improving physical/ mental aspects of human health, and increasing social capital. An appraisal of the three subject trees was included in this report as seeing a dollar amount could be useful information when making final management decisions regarding tree removal or preservation decisions. Based on the *Trunk Formula Method*, the three subject trees were assessed as having a combined value of \$186,800 (refer to Tree Appraisals in Appendix B). There were also five other valuable pines and a magnolia tree with a root-growing potential to reach the lawn bowling area (refer to Figure 1 Site Map).

Discussion of the Problem – The lumps in the artificial lawn bowling turf appear to be a nuisance with somewhat complicated solutions. These puffball fungi are known to form beneficial mycorrhizal associations with pine roots, so I understand the concerns and desires to remove the subject pines and all organic matter beneath the greens. However, Rutgers University said they have little faith in this approach working and that this fungi generally grows on decaying organic matter and is known to also thrive in sand/ gravel with little or no organic matter content. In addition, the root that was found in the lab sample appeared to be dead/ decaying and was not identified as being from a conifer. There



seems to be a lack of evidence to show that removing the trees would considerably impact mitigating the conflicts between the artificial turf and the fungi.

Mitigation Strategies - Below is a list of five strategies to consider in helping mitigate the conflicts between the puffball fungi and the artificial lawn bowling turf:

1. Replace the artificial turf with natural turf. This may be the least expensive option up front, but water and maintenance expenses of living turf would need to be considered. This option would have minimal impacts on tree health and stability, reduce heat island effects, and maintaining healthy soils, should reduce the occurrence, and facilitate removal of puffball mushrooms.
2. Replace the gravel base material beneath the artificial turf with concrete. I have seen and heard of these mushrooms popping up through asphalt but the likelihood of it popping up through intact concrete seems quite unlikely. A drainage system would have to be implemented for this impermeable surface; however, looking at how fine and compacted the gravel beneath the turf was, there are likely already drainage improvements desired. Suspending the turf over thick interlocking drainage tiles may also be a valuable addition to improve drainage.
3. Remove all organic materials beneath the artificial turf, increase the depth of base material below, and install a 3-foot-deep concrete footing or plastic root barrier around the perimeter of the lawn bowling area. This approach would likely help mitigate the problem but considering that the fungi can grow in gravel without organic matter, there would be no guarantee. There is also the concern of impacting the health and stability of the trees, particularly P-55 due to its size and lean. The book ISA Best Management Practices for Root Management 2017 states that "linear root cuts on one side of a tree can reduce stability when the cut is made at a distance from the trunk that is less than three times the trunk diameter." It also says that "cutting roots at a distance greater than six times the trunk diameter (**DSH**) minimizes the likelihood of affecting both health and stability." If a linear root cut must be made, I recommend that it does not exceed the recommendations in the following chart:

Tree #	Trunk Diameter (DSH)	Closest Linear Root Cut Distance From Trunk	Notes
Tree P-55	42"	21 feet (252")	I specified a distance of at least 6 times the DSH away from the trunk on this tree due to its large size and slight lean.
TreeF-10	27"	6.75 feet (81")	I specified a distance of at least 3 times the DSH away from the trunk on these trees as I didn't observe any notable load factors or defects.
Tree F-11	24"	6 feet (72")	
Other Surrounding Trees	n/a	3x (DSH) away from trunk	I specified a distance of at least 3 times the DSH away from other surrounding trees as I didn't observe any notable load factors or defects.

Keep in mind that aside from removal, there is no way to guarantee that any tree will not fail. These are recommendations based on research and industry best management practices to help tree managers make informed decisions on these assets. If concerns over potential hazards remain, I recommend having an ISA-qualified risk assessor perform a Level 2 assessment.



4. Remove all nine trees and woody plants (hedges) surrounding the perimeter of the lawn bowling area, remove all organic matter beneath the artificial turf, and increase the depth of base material below. This approach could also help mitigate the problems, but there doesn't appear to be a guarantee, and you would lose all of the benefits the trees provide. Suspending the turf over thick interlocking drainage tiles may also be a beneficial addition to improve drainage.

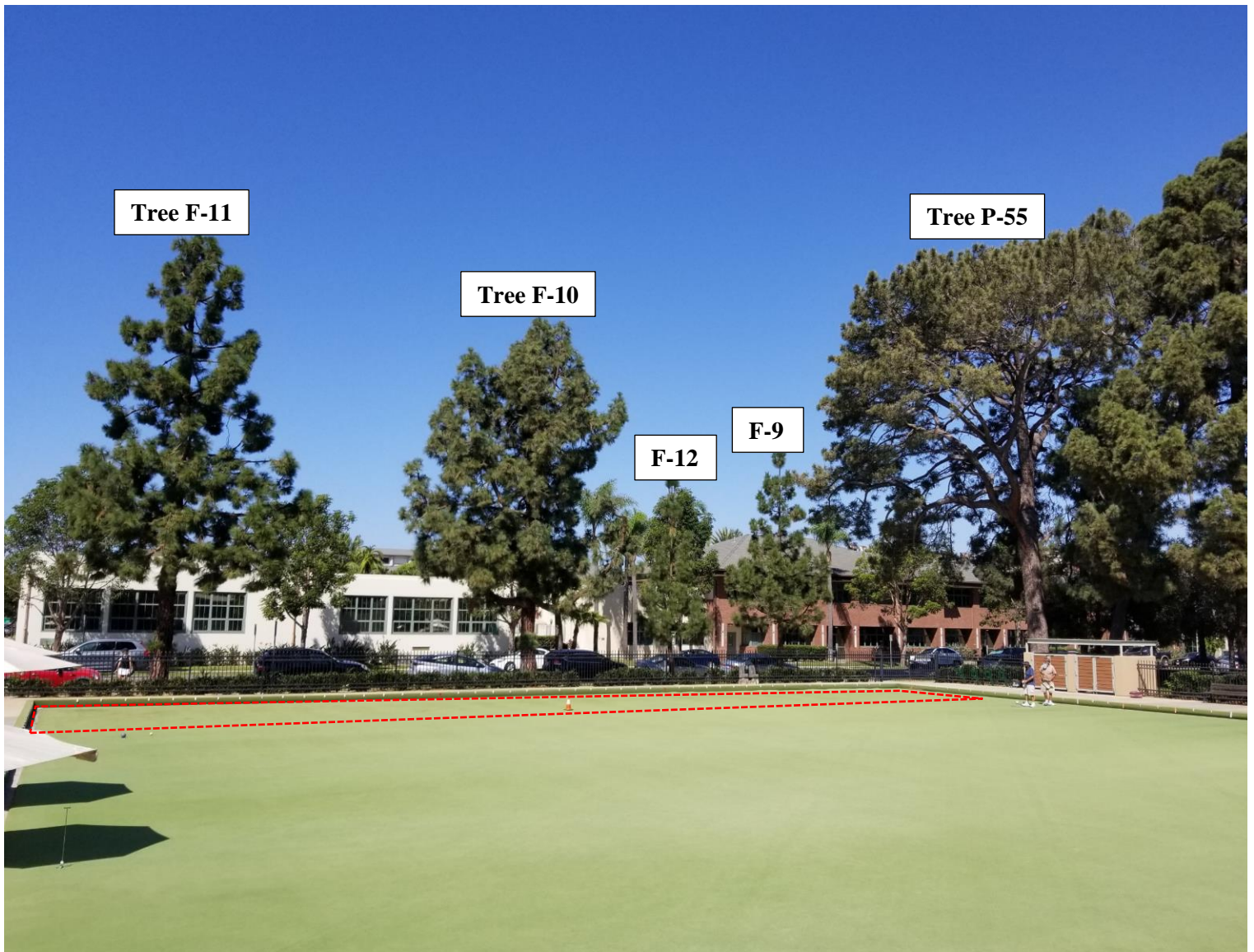
Tree Protection Plan – I also recommend establishing a formal tree protection plan before commencing any construction work to help mitigate impacts to tree health and stability. This is an additional service WCA can provide.

Bird Precautions – There were several large bird nests (likely egrets or herons) in the upper canopy of Tree P-55. There are numerous federal and state laws with serious consequences for protecting birds and their habitat. Collaborating with a wildlife biologist to identify the birds (if any) and review options before removing the tree or nests is recommended.

Replacement Trees – If trees are removed, I recommend that replacements are species that comply with the City's approved tree list(s). To make any specific recommendations, I would like to speak with the City to help ensure that a balance between the trees' needs and the goals of the community/city are being met. To help mitigate root conflicts, I would generally recommend larger trees in the open turf area (to northeast) and smaller trees in the parkways with restricted soil volume. Keep in mind that all trees have woody roots that could provide a growing medium for fungi.

APPENDIX A – PHOTOS

Photo #1



- The subject trees were located on the northwest side of the Coronado lawn bowling club and were surrounded by irrigated turf grass.
- Judging by the color and density of foliage the trees were in fair-good health for the species and time of year. The trees also exhibited generally good structure having a dominant central leader with subordinate branching.
- There were several noticeable bumps and depressions on the northwest side of the artificial lawn bowling turf as well as repairs and holes from fungicide injections. These bumps ranged between about 35 and 60 feet from the subject trees. The red dotted section above indicates the area where most problems have been occurring.

APPENDIX A – PHOTOS

Photo #2



- **Tree P-55** had a height of about 90 feet and had a trunk diameter of 42 inches. The tree had a slight lean towards the northwest, likely in response to sunlight. The tree was quite mature and appeared to have multiple large bird nests in the upper canopy (likely egrets or herons). The tree's trunk was about 12 feet northeast of the bowling area's concrete footing, and about 60 feet from the nearest bump/ repair in the artificial turf.

APPENDIX A – PHOTOS

Photo #3



- Shown above in an image of an artificial turf repair.

APPENDIX A – PHOTOS

Photo #4



- Shown above in an image of a depression in the artificial turf (red arrow).

APPENDIX A – PHOTOS

Photo #5



- Shown above is an image of a bump in the artificial turf (red arrow).

APPENDIX A – PHOTOS

Photo #6



- There was a plastic root barrier (red arrow) between the privet hedge and the lawn bowling area.

APPENDIX A – PHOTOS

Photo #7



- There were numerous fungal fruiting bodies growing in the same planting area as the privet hedge (see **red arrows**). The mushroom species appeared to match the tentative identification of dyemaker's puffball (*Pisolithus tinctorius*) from the pathology report.

APPENDIX A – PHOTOS

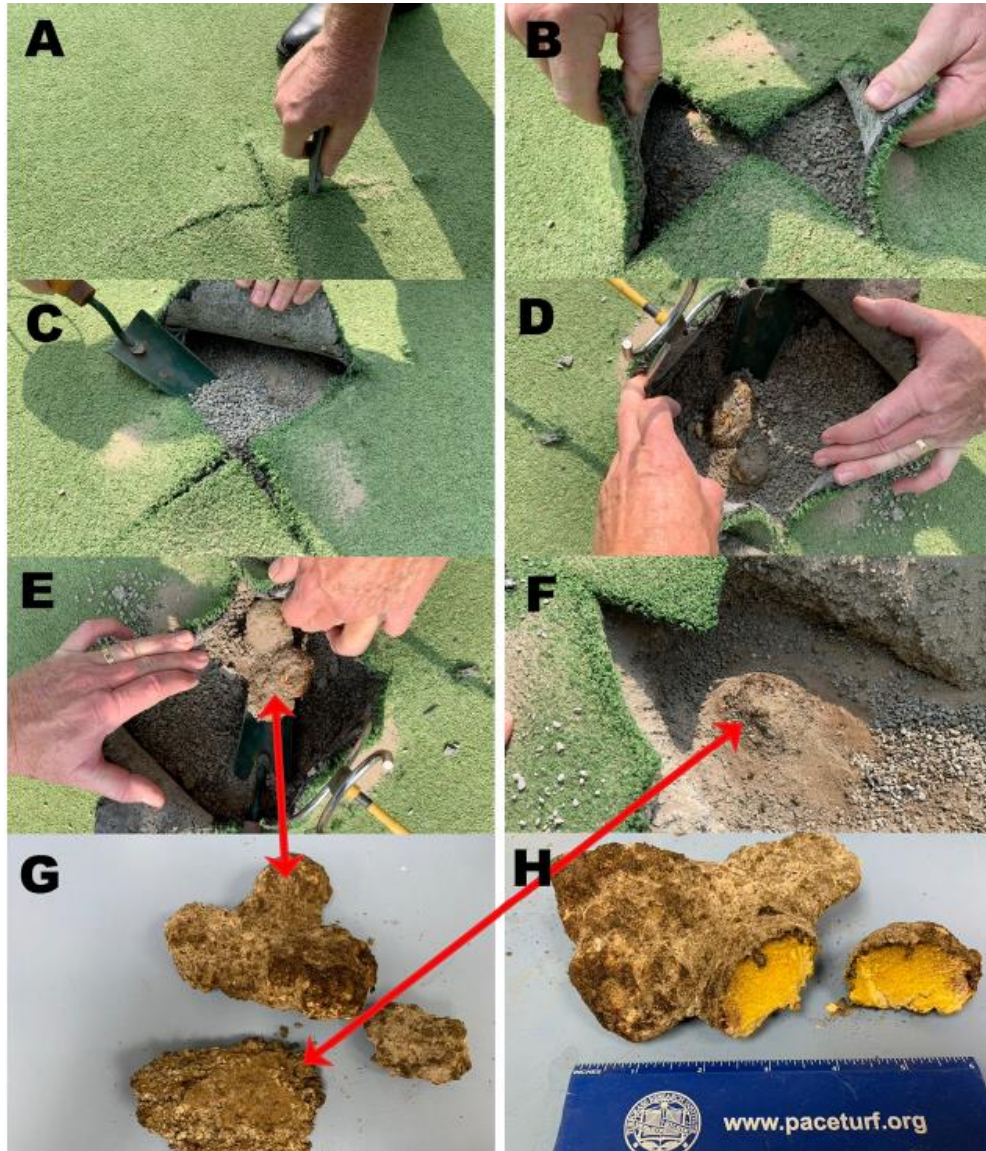
Photo #8



- Tree P-55 was quite mature and appeared to have multiple large bird nests (likely egrets or herons) in the upper canopy (see red arrows for some locations).

APPENDIX A – PHOTOS

Photo #9



- Shown above is are images from PACE Turf, LLC's report showing the mushroom getting extracted from beneath the artificial turf.

APPENDIX A – PHOTOS

Photo #10



- Shown above is an image from PACE Turf, LLC's report showing a small root that was said to be a likely source of nutrition for the fungus. This root appeared to be dead, decaying, and was not identified to as being from a conifer.

APPENDIX B APPRAISAL

Appraisal Methodology

The appraisal process used in this report is based on the methodology found in the 9th Edition Guide for Plant Appraisal. For regional-based information, the Species Classification and Group Assignment publication from the Western Chapter of the International Society of Arboriculture was also used.

There are multiple approaches to calculating a tree's value, and the Trunk Formula Method is the method that was used for the subject tree. This method is generally used to appraise the monetary value of trees considered too large to be directly replaced with nursery or field-grown stock. Determination of the value of a tree is based on the cost of the largest commonly available transplantable tree and its cost of installation, plus the increase in value over time to grow to its current size. These values are adjusted according to the Species of the tree and its physical Condition, as well as the landscape Location (Site, Contribution, and Placement) (Council 70).



APPENDIX B APPRAISAL

Tree P-55 Appraisal Chart

BASED ON ISA WESTERN CHAPTER PUBLICATION: *SPECIES AND GROUP CLASSIFICATION AND GROUP ASSIGNMENT*
AND: *GUIDE FOR PLANT APPRAISAL 9th EDITION*

Trunk Formula Appraisal Species- Torrey Pine (<i>Pinus torreyana</i>)		
Trunk Area	1) Trunk Area in square inches	1385
Basic Tree Cost	2) Replacement Diameter (Nursery Group 1)	12.56
	3) Trunk Area Increase in square inches	1372.44
	4) Unit Tree Cost Per square inch	\$118
	5) Median Nursery Cost Plus Shipping and Installation	\$1,482
	6) Basic Tree Cost- notionally ideal replacement = (#3 x #4 + #5)	\$163,430
Location	7) Site Rating	92%
	8) Contribution Rating	80%
	9) Placement Rating	80%
	10) Location Rating	84%
Species (So. Cal Seacoast)	11) Published Value	90%
	12) Modification Value	0%
	13) Species Rating	90%
Condition Rating (1-4)	14) Root Structure (1- 4)	3
	15) Root Health (1- 4)	3
	16) Trunk Structure (1- 4)	3
	17) Trunk Health (1- 4)	4
	18) Scaffold Branches Structure (1- 4)	3
	19) Scaffold Branches Health (1- 4)	4
	20) Branches and Twig Health (1- 4)	4
	21) Foliage and Bud Health (1- 4)	4
	22) Condition Rating	84%
Appraised Value	23) Appraised Cost = (#6 x #10 x #13 x #22) rounded to nearest \$100	\$108,100
Calculations by appraiser using field and regional information from ISA Western Chapter Publication: <i>Species Classification and Group Assignment</i> , as well as: The Council of Tree and Landscape Appraisers publication: <i>The Guide for Plant Appraisal</i> (9 th Edition).		



APPENDIX B APPRAISAL

Tree F-10 Appraisal Chart

BASED ON ISA WESTERN CHAPTER PUBLICATION: *SPECIES AND GROUP CLASSIFICATION AND GROUP ASSIGNMENT*
AND: *GUIDE FOR PLANT APPRAISAL 9th EDITION*

Trunk Formula Appraisal Species- Canary Island Pine (<i>Pinus canariensis</i>)		
Trunk Area	1) Trunk Area in square inches	572
Basic Tree Cost	2) Replacement Diameter (Nursery Group 1)	12.56
	3) Trunk Area Increase in square inches	559.44
	4) Unit Tree Cost Per square inch	\$118
	5) Median Nursery Cost Plus Shipping and Installation	\$1,482
	6) Basic Tree Cost- notionally ideal replacement = (#3 x #4 + #5)	\$67,496
Location	7) Site Rating	90%
	8) Contribution Rating	80%
	9) Placement Rating	80%
	10) Location Rating	83%
Species (So. Cal Seacoast)	11) Published Value	90%
	12) Modification Value	-5%
	13) Species Rating	85%
Condition Rating (1-4)	14) Root Structure (1- 4)	3
	15) Root Health (1- 4)	3
	16) Trunk Structure (1- 4)	4
	17) Trunk Health (1- 4)	4
	18) Scaffold Branches Structure (1- 4)	3
	19) Scaffold Branches Health (1- 4)	4
	20) Branches and Twig Health (1- 4)	4
	21) Foliage and Bud Health (1- 4)	4
	22) Condition Rating	91%
Appraised Value	23) Appraised Cost = (#6 x #10 x #13 x #22) rounded to nearest \$100	\$43,300
Calculations by appraiser using field and regional information from ISA Western Chapter Publication: <i>Species Classification and Group Assignment</i> , as well as: The Council of Tree and Landscape Appraisers publication: <i>The Guide for Plant Appraisal</i> (9 th Edition).		



APPENDIX B APPRAISAL

Tree F-11 Appraisal Chart

BASED ON ISA WESTERN CHAPTER PUBLICATION: *SPECIES AND GROUP CLASSIFICATION AND GROUP ASSIGNMENT*
AND: *GUIDE FOR PLANT APPRAISAL 9th EDITION*

Trunk Formula Appraisal Species- Canary Island Pine (<i>Pinus canariensis</i>)		
Trunk Area	1) Trunk Area in square inches	452
Basic Tree Cost	2) Replacement Diameter (Nursery Group 1)	12.56
	3) Trunk Area Increase in square inches	439.44
	4) Unit Tree Cost Per square inch	\$118
	5) Median Nursery Cost Plus Shipping and Installation	\$1,482
	6) Basic Tree Cost- notionally ideal replacement = (#3 x #4 + #5)	\$53,336
Location	7) Site Rating	90%
	8) Contribution Rating	80%
	9) Placement Rating	80%
	10) Location Rating	83%
Species (So. Cal Seacoast)	11) Published Value	90%
	12) Modification Value	-5%
	13) Species Rating	85%
Condition Rating (1-4)	14) Root Structure (1- 4)	3
	15) Root Health (1- 4)	3
	16) Trunk Structure (1- 4)	4
	17) Trunk Health (1- 4)	4
	18) Scaffold Branches Structure (1- 4)	4
	19) Scaffold Branches Health (1- 4)	4
	20) Branches and Twig Health (1- 4)	4
	21) Foliage and Bud Health (1- 4)	4
	22) Condition Rating	94%
Appraised Value	23) Appraised Cost = (#6 x #10 x #13 x #22) rounded to nearest \$100	\$35,400
Calculations by appraiser using field and regional information from ISA Western Chapter Publication: <i>Species Classification and Group Assignment</i> , as well as: The Council of Tree and Landscape Appraisers publication: <i>The Guide for Plant Appraisal</i> (9 th Edition).		



ASSUMPTIONS AND LIMITING CONDITIONS

1. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the Consultant can neither guarantee nor be responsible for the accuracy of information provided by others. Standard of Care has been met with regards to this project within reasonable and normal conditions.
2. The Consultant will not be required to give testimony or to attend court by reason of this report unless subsequent contractual agreements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.
3. Loss or alteration of any part of this report invalidates the entire report.
4. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the prior written consent of the Consultant.
5. This report and any values expressed herein represent the opinion of the Consultant, and the Consultant's fee is in no way contingent upon the reporting of a stipulated result, a specified value, the occurrence of a subsequent event, nor upon any finding to be reported.
6. 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, or coring, unless otherwise stated. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the tree(s) or property in question may not arise in the future.
7. Arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. It is highly recommended that you follow the arborist recommendations; however, you may choose to accept or disregard the recommendations and/or seek additional advice.
8. Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specific period of time.



9. Any recommendation and/or performed treatments (including, but not limited to, pruning or removal) of trees may involve considerations beyond the scope of the arborist's services, such as property boundaries, property ownership, site lines, disputes between neighbors, and any other related issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist. An arborist can then be expected to consider and reasonably rely on the completeness and accuracy of the information provided.
10. The author has no personal interest or bias with respect to the subject matter of this report or the parties involved. He/she has inspected the subject tree(s) and to the best of their knowledge and belief, all statements and information presented in the report are true and correct.
11. Unless otherwise stated, trees were examined using the risk assessment criteria detailed by the International Society of Arboriculture's publications *Best Management Practices – Tree Risk Assessment* and the *Tree Risk Assessment Manual*.



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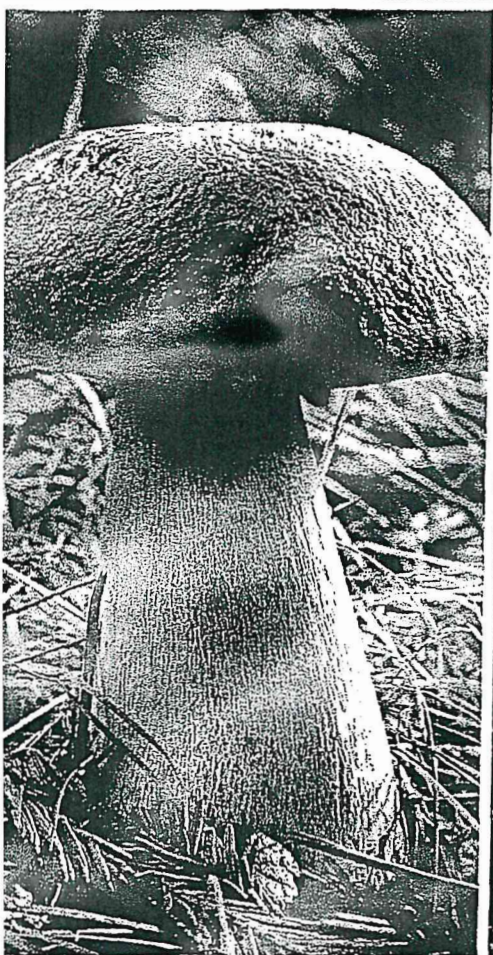
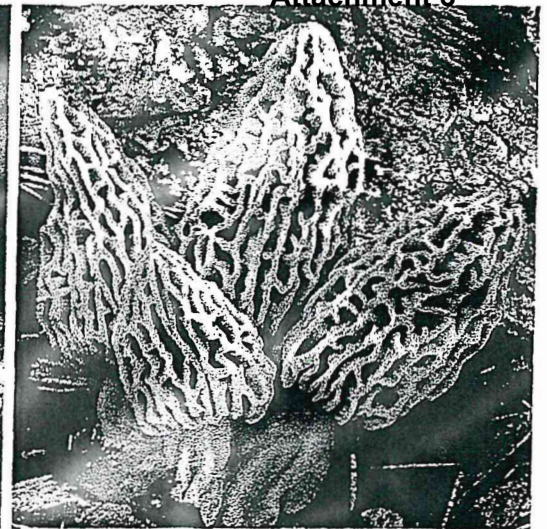
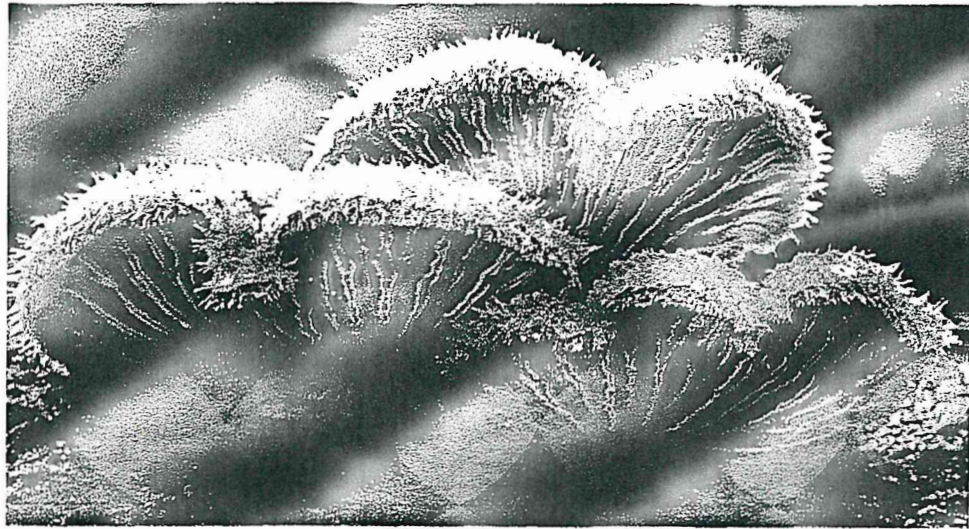
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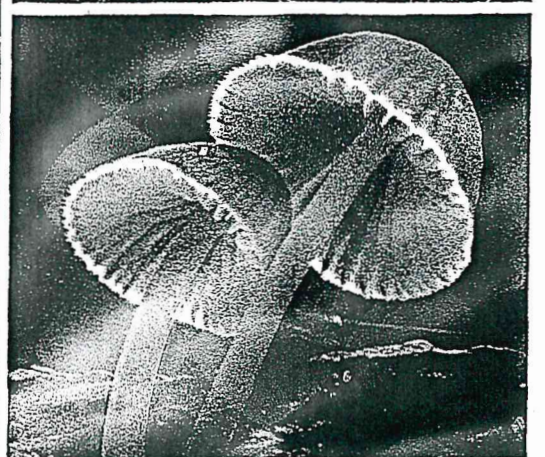
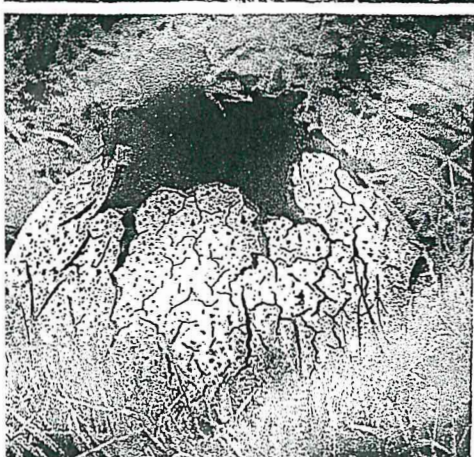
ISA Western Chapter Publication: *Species Classification and Group Assignment*, as well as: The Council of Tree and Landscape Appraisers publication: *The Guide for Plant Appraisal* (9th Edition).

Kara Donohue, Ryan Gilpin, and Corey Bassett. *Best Management Practices: Tree Care For Birds & Other Wildlife*



CALIFORNIA MUSHROOMS

The Comprehensive Identification Guide



Mycenastrum corium [continued]

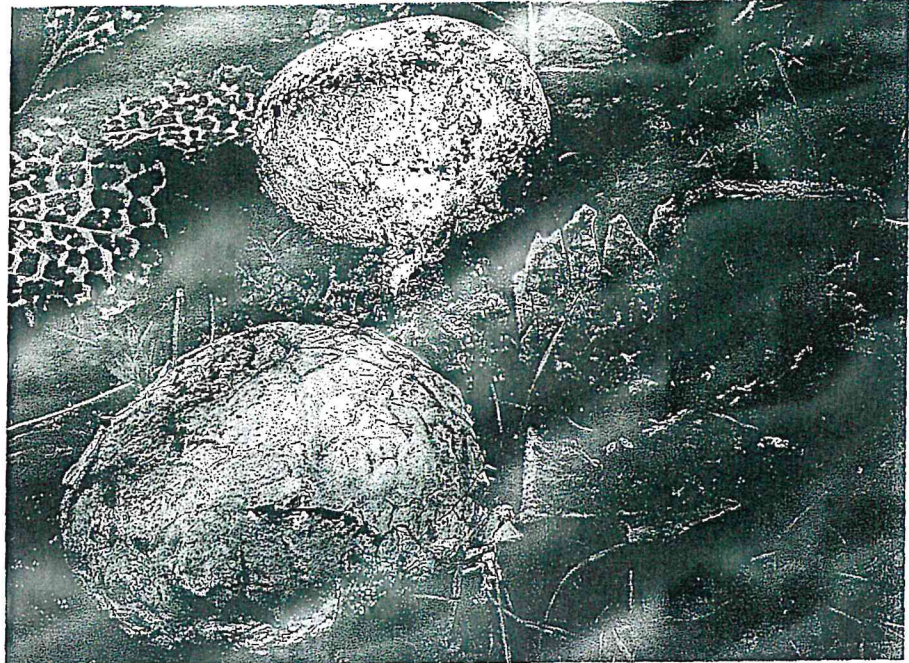
ODOR slightly pungent, earthy; TASTE slightly astringent.

SPORES 8-11.5 μm including ornamentation, globose, warted to partially or completely reticulate, medium brown in mass; capillitium *Bovista*-type, composed of separate, occasionally branched elements with thorn-like projections, aseptate, pores absent.

HABITAT Solitary, scattered, or clustered in pastures, around compost heaps or similar disturbed ground; uncommon, fruiting throughout the year in watered areas, and after fall rains, widely distributed.

EDIBILITY Unknown; has an unpleasant taste.

COMMENTS This medium-sized puffball is unusual for its partially underground development. It is recognized when young by a thick, matted-tomentose white exoperidium that soon thins and becomes patchy over a tough, leathery dark brown to purplish brown endoperidium. The thick peridium and manner of dehiscence are similar to those seen in *Calvatia pachyderma* and *Sclerodermapolyrhizum*,



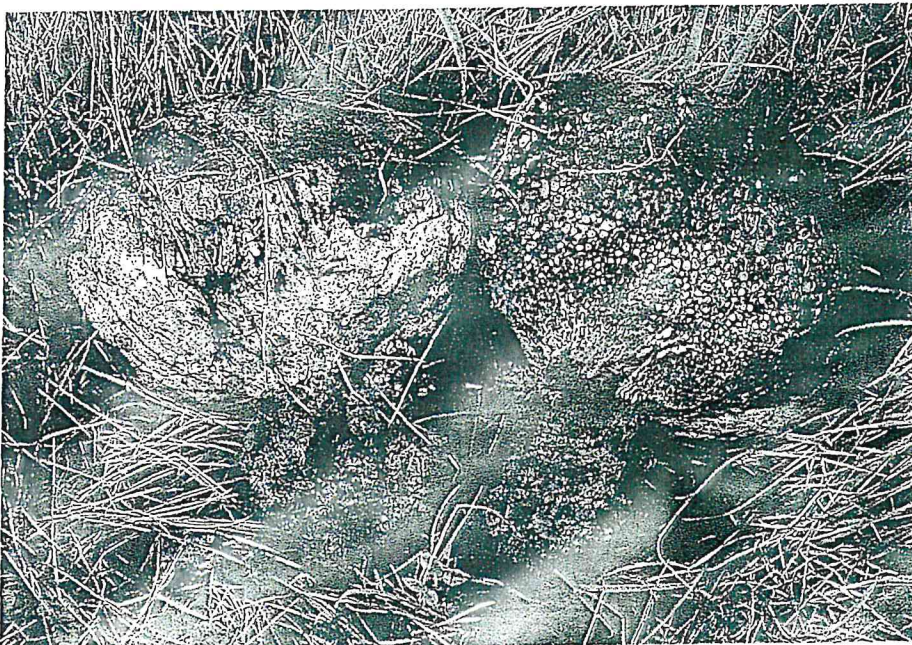
Mycenastrum corium FAS

potential look-alikes. *Calvatia pachyderma* can be distinguished by a thin, smooth, scaly to warted exoperidium, thick but brittle endoperidium, and ovoid spores that are smooth, not reticulate-warted.

Sclerodermapolyrhizum differs with a dark grayish purple gleba and microscopically by the absence of capillitial elements.

Pisolithus arhizus (Scop.) Rauschert**DEADMAN'S FOOT**

Synonym: *Scleroderma arhizum* (Scop.) Pers.



Pisolithus arhizus Blk

FRUITBODY 60-170 mm tall x 40-110 mm broad, initially hypogaeous, then emergent, club-shaped to obpyriform or ovoid, with or without a well-developed pseudostipe, coarse yellowish mycelium at the base; fragmenting from the apex, in age a crumbly mass of dull brown to cinnamon-brown spores. **PERIDIUM** smooth, thin, fragile, yellowish brown, maturing dark brown, sometimes with purplish tints. **GLEBA** consisting of pea-sized peridioles, white to yellowish brown, maturing reddish brown, embedded in blackish brown gel; **SUBGLEBA** absent. **ODOR** pleasant, mushroom-like; **TASTE** untried.

SPORES 7-12 μm including ornamentation, globose, spinose, cinnamon-brown in mass; capillitium absent.

HABITAT Solitary, scattered, or clustered in impoverished soils and disturbed

ground; in the San Francisco Bay Area associated with hardwoods such as coast live oak and conifers (Monterey pine), also found at low to mid elevations of the Sierra Nevada; common, fruiting early in the mushroom season, often before fall rains, widely distributed.

EDIBILITY Poorly known; not recommended.

Scleroderma cepa Pers.

SMOOTH-SKIN EARTHBALL

Synonyms: *Scleroderma verrucosum* var. *cepa* (Pers.) Maire, *Scleroderma vulgare* var. *cepa* (Pers.) W.G. Sm.



Scleroderma cepa FAS

FRUITBODY hypogeous, becoming epigeous, 15–60 mm broad, subglobose to cushion-shaped, base pinched or folded, attached to the substrate by soil-incrusted rhizomorphs sometimes forming a pseudostipe; splitting irregularly at apex, often recurved into petaloid lobes.

PERIDIUM 1–1.5 mm thick, tough, smooth, white, becoming dingy yellow to brown, tinged vinaceous brown when bruised or

COMMENTS *Pisolithus arhizus*, like its relatives in the earthball genus *Scleroderma*, develops partially underground, breaking the surface as it matures, giving rise to the disparaging common name, then crumbles into a mass of spores in age. Young fruitbodies when sectioned reveal a brightly colored gleba of pea-sized, yellowish brown to dark reddish brown

peridioles. Though ignored by most mushroom hunters, it is an important mycorrhizal species and has been used as an inoculum to enhance the growth of tree seedlings. It also finds use as a fabric dye. Molecular studies indicate it represents a species complex that may include what has been called *P. tinctorius*.

HABITAT Solitary or in small groups under ornamental and native trees, especially pine and eucalyptus; common, fruiting during the summer months in watered areas and after fall rains, widely distributed.

EDIBILITY Toxic, to be avoided.

COMMENTS A thick, tough peridium (hence the genus name) along with a firm, dark purple gleba and the absence of capillitium, distinguishes this and other *Scleroderma* species from the “true” puffballs. All tend to develop partially underground (hence “earthballs”). Many are found by scraping in areas where a single fruiting body is exposed. When young, the peridium of *S. cepa* is typically smooth and white, but as it ages becomes areolate and ochraceous brown, bruising pinkish brown. Another common species, *S. citrinum* (= *S. aurantium*), has prominent brownish scales over a yellow background and reticulate rather than spiny spores. The widely distributed but uncommon *S. polyrhizum* can be up to 120 mm broad when expanded, splitting open to resemble an earthstar.

injured, finely cracked or areolate in dry weather. **GLEBA** white, firm when young, maturing purplish black, sometimes with interspersed white mycelium, eventually dark grayish brown and powdery; **SUBGLEBA** absent. **ODOR** mushroom-like; **TASTE** mild.

SPORES 8–12 µm including ornamentation, globose, spinose, dark purplish brown in mass; capillitium absent.

Tulostoma fimbriatum Fr.

FRUITBODY initially hypogeous, at maturity composed of an endoperidial body elevated on a woody stipe. **ENDOPERIDIAL BODY** 8–15 mm broad, subglobose to compressed-globose; **PERIDIUM** thin, aperturate, tough, glabrous or covered with

soil particles, tan to pale cream-brown; **PERISTOME** poorly differentiated, fimbriate. **GLEBA** yellowish brown. **STIPE** 20–60 × 2–6 mm, cylindrical, solid, fibrous-woody, brown, usually covered with soil particles. **ODOR** and **TASTE** undetermined.

SPORES 4.5–6 µm including ornamentation, globose, coarsely warted, rusty brown in mass; capillitium hyaline, thick-walled, rarely branched, aseptate, pores absent.

HABITAT Solitary to scattered in sandy soil in arid habitats, often under pinyon

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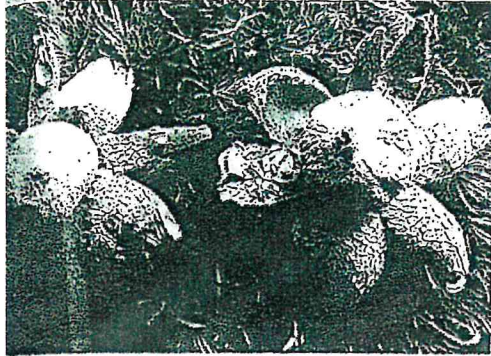


NORTH AMERICAN MUSH ROOMS

A FIELD GUIDE TO EDIBLE AND INEDIBLE FUNGI



DR. ORSON K. MILLER JR. AND HOPE H. MILLER



Astraeus hygrometricus (Pers.) Morgan
INEDIBLE

Fruiting body 1-3 cm broad, globose or somewhat depressed at first; outer skin splits into 7-15 pointed, checkered rays that open up and flatten out when wet, and are hygroscopic (on drying, the rays close around the spore case, opens at the top by tearing, and no regular pore is formed. The inner spore case is similar to *Geastrum* except it is covered with dense hairs. Gleba white at first, soon cocoa-brown, and divided into oval locules. Sterile base absent. Odor none. Taste unknown.

Spores 7-11 μ m globose, thick-walled, with warts and spines, yellow-brown.

Habit and distribution: Scattered to numerous, in sand or sandy soil, under hardwoods and conifers. Widely distributed. Fruiting in the summer and fall.

Comments: This species has a broad host range and is mycorrhizal with many different plants. The immature gleba has locules, a characteristic of the earth balls, and not found in *Geastrum*.

Astraeus pteridus (Shear) Zeller is much larger 8-15 cm broad when open; but otherwise appears very similar; and is only found along the West Coast



Pisolithus tinctorius (Michx.:Pers) Coker & Couch
INEDIBLE

Fruiting body at first globose to clavate 4-12 cm broad, 4-25 cm high, and irregularly club-shaped, dull white, spotted olive-brown, yellowish brown to dingy brown in age. Peridium breaking open and disintegrates at the apex, revealing the brown powdery spores. Gleba composed of oval locules, pure white at first, becoming yellowish then dark brown and powdery when mature. Locules mature from the top down and more locules form near the base until almost the entire fruiting body is converted into a powdery mass. Odor mild young, but unpleasant in age. Taste unknown.

Spores 7-12 μ m globose, with long spines, thick-walled, gleba brown.

Habit and distribution: Single to several; occasionally gregarious on ground under hardwoods and conifers. Widely distributed. Fruiting in spring, summer, and fall during wet weather.

Comments: Also known as *Pisolithus arhizus* (Scop.:Pers) Rauschert. It has a broad host range and is often an early successional mycorrhizal partner of tree seedlings. *Pisolithus tinctorius* is widely used in forestry where new pine plantations are often established with trees that have been inoculated with it

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SANTA BARBARA • SANTA CRUZ

DEPARTMENT OF PLANT PATHOLOGY AND MICROBIOLOGY

2317 WEBBER HALL

RIVERSIDE, CALIFORNIA 92521-0122

<http://www.plantpathology.ucr.edu>**Date:** Monday, April 10, 2023

To: Jacqueline Lu, Principal Architect City of Coronado
 City of Coronado Public Services and Engineering
 101 B Avenue
 Coronado, CA 92118

From: Dr. J. E. Adaskaveg, Professor

The mushroom in the photographic plate that was sent to me and that was identified as *Pisolithus tintorius* by scientists at Rutgers University is a common mycorrhizal fungus of pine (*Pinus* spp.) and oak (*Quercus* spp.) trees in California and the United States. The fungus forms a symbiotic relationship with the tree host and is beneficial to the tree in supplying micronutrients that the plant may not have access to while receiving plant produced carbohydrates. The fungus commonly forms a mushroom during adequate soil wetness and high nutrition from the tree typically occurring in late fall and winter in California. Publications concerning this fungus demonstrate that it can be cultured on standard microbiological media in the laboratory and therefore, it is not limited to a biotrophic relationship with roots of a host tree. Still, the fungus is thought to primarily exist in mycorrhizal relationships in nature. A few reports have found the fungus producing a fruiting body (i.e., mushroom) in bare sandy soil, but this is not typical, and most reports document the fungus fruiting in association with a tree species.

Your premise that, 'the fungus will not thrive on dead roots' is most likely true. However, large tree roots may remain alive for months until carbohydrate supplies are diminished, with eventual root death. The length of time of root survival after cutting the roots depends on the root size and the tree species. In general, mushrooms form from larger roots that have adequate nutrition and during wet periods (from irrigation or rainfall). During the time period of roots dying, the fungus may try to produce fruiting bodies again in a survival response so it can disseminate itself as basidiospores that develop in the fruiting body.

The second part of your plan to excavate the soil to remove living roots and replace the soil with "clean" soil beneath the green is also sound to prevent a re-occurrence of this situation in a few years. If most of the surface roots under the bowling green are removed to a depth of one foot and there are no large roots present and a root barrier is installed to prevent new tree roots from regrowing into the new replacement soil, it is highly unlikely that the mushrooms of *Pisolithus tintorius* will develop under the new bowling green of artificial turf. To sever roots of pine or oak trees, a mechanical trencher (perhaps one used for installing irrigation systems) may have to be used to cut the roots to a depth of three to four feet (depending on the tree species and tree size) just within the dripline of the tree canopy. A root barrier can be installed in the trench to prevent re-growth of roots into the area under the bowling green.

Many people have personally complained about this fungus to me. The mushrooms of the fungus are capable of lifting up pavement in driveways or sidewalks. Root removal and installation of root barriers are the common practices used to prevent this from re-occurring.



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Jeremy S. Rappoport, President

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1286 University Ave. #807 San Diego, CA. 92103

September 29, 2022

Mr. Greg Kump
Project Manager
Nasland Engineering
4740 Ruffner Street
San Diego, CA. 92111

RE: Arborist Report for Tree #5 at Coronado Lawn Bowling Site

Dear Mr. Kump,

Per your request, the following is a brief summary of why I recommended removing tree #5:

1. Tree leans over the bowling green, tree roots expected to be beneath the bowling green.
2. Tree had a 35% live crown ration, (LCR). A measurement below 50% is a metric for poor health condition.
3. Tree had been previously topped, resulting in a 15% lean.
4. The tree was suppressing and deforming the crowns of surrounding trees.
5. The site is overcrowded with four large growing trees.
6. Removing the tree would provide improved sunlight, benefitting the health condition of the surrounding trees and removing a root source growing beneath the bowling green.
7. The removal recommendation is not due to the tree health or potential risk of failure. However, the tree lean, low live crown ratio, suppression of adjacent trees and proximity to the bowling green with roots are defects that create risk to the public and the future bowling green.

Please contact me with any questions or comments.

Sincerely,

Jeremy Rappoport

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