

SBCA TREE CONSULTING

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Date: November 14, 2014

To: Todd Williams, Public Works Supervisor
City of Alameda

Subject: Tree Safety

Location: Pacific Ave

Species: American Sweet Gum (*Liquidambar styraciflua*)

Assignment: Arborist was asked to comment on the health, safety and future viability of seven *Liquidambar* trees located on Pacific Ave.

Introduction

Arborists were asked to inspect nine *Liquidambar* trees and prepare a report on the relative safety of the trees. This report provides inspection results seven *Liquidambar* trees on Pacific Ave, adjacent to Chapin Ave. Recommendations are provided to reduce potential for large stem failure.

Summary

Due to the brash wood of the *Liquidambar* species, significant size of the trees, and decay pockets noted from the ground, the trees do require ongoing pruning, decay inspection, and monitoring to keep them in a "safe" condition. Recommendations for the most recent inspection include:

- **Tree Removal** – As part of good urban management to remove and replace of the most problematic trees and trees that require the most amount of maintenance to retain, it is recommended that Tree #7 at 943 Pacific be removed due to the significant codominant-included bark defect. The attachment shows signs of internal cracking.
- **Codominant-Included Bark Mitigation** – If the Tree #7 cannot be removed in a timely manner, immediate safety concerns can be mitigated with severe reduction of one of the stems. This should be understood as only a temporary fix to the tree's ultimate removal. Tree #3 (1700 Chapin, side tree #2) also requires severe reduction on one stem with included bark.
- **Advanced Decay Assessment** – During every pruning cycle, all trees (notably #3, 4, 5, and 6) require assessment of decay pockets in upper scaffold. If assessments find decay areas to be excessive, limbs can be severely reduced to remove the immediate liability, or trees can be removed.
- **End Weight Reduction** – Tree #1, 2, and 6 require End Weight Reduction on heavy laterals.

Tree and Site Description

All trees are City Street Trees growing in parkway planting strips and cut outs between the sidewalk and the curb. Trees are considered to be mature with heights up to 85 feet for those on Pacific Ave.

Table 1.

Table below provides tree descriptions, arborist notes and recommendations for all seven *Liquidambar* trees recently reviewed.

	Address	DBH	Health	Structure	Notes	Recommendations
1	1013 Pacific	29.5"	G	F-G	Sidewalk has been widened, but more uplift is observed; Mallet found no signs of internal decay in trunk; No included bark observed in canopy; Healthy root flare	End Weight Reduction needed on heavier laterals over sidewalk. Aerial safety inspection during next pruning cycle
2	1700 Chapin (side tree #3) On Pacific	34"	G	F	2008 pavement improvements; Minor sidewalk uplift; Codominant; Topped at 45'; Healthy root flare	End Weight Reduction needed on lateral branch over street; Aerial safety inspection during next pruning cycle
3	1700 Chapin (side tree #2) On Pacific	33"	G	F-P	One large included bark attachment, but stem growing vertical; Slight lean but has corrected; Codominant; Two limbs over street with decay observed in previous pruning cuts; one 4" breakout observed over street; Curb displacement; Minor pavement damage since 2008 repairs	Severe reduction pruning for one of the included bark stems with pruning wounds no larger than 4" diameter; Aerial safety inspection during next pruning cycle
4	1700 Chapin (side tree #1) On Pacific	28"	F	F	Codominant; Larger pruning wounds observed in stems over street with minor decay; Not as full of canopy as other trees; No pavement uplift since 2008; Curb displacement	Aerial safety inspection during next pruning cycle
5	951 Pacific (eastern tree)	26"	F	F	One lateral branch failure observed due to unbalanced/overweight; Some pavement and curb displacement; Large branches removed on main stem; Larger parkway	Aerial safety inspection during next pruning cycle
6	951 Pacific (western tree)	34"	G	F	Some larger closed pruning wounds on main stem; Mallet found signs of hollowness in trunk, although not significant; Curb displacement; Minor sidewalk displacement; Included bark stem over street. Large pockets of decay	End Weight Reduction on Included bark attachment and heavier laterals; Aerial safety inspection during next pruning cycle



	Address	DBH	Health	Structure	Notes	Recommendations
7	943 Pacific	33"	G	P	Codominant with included bark with signs of internal cracking; Large pruning wounds on laterals over street with decay; Curb displacement; Minor sidewalk displacement; Circling girdling roots	Remove Tree

Discussion

Crown Reduction Pruning – Severe crown reduction pruning can be administered to remove the immediate liability associated with structurally problematic trees. It is important to understand that crown reduction pruning is a temporary fix to a problematic tree’s ultimate removal. The cost involved in maintaining trees that have received this type of pruning likely out way the tree’s value.

Need for Aerial Crown Inspection – There are limitations in tree risk assessment when inspecting large mature trees from the ground. Inspection from the ground can identify included bark stem attachments and areas where decay is suspected. Full assessment requires an aerial inspection of the tree scaffold and upper crown. Where signs of large heading cuts are observed, an advanced decay assessment is needed. Trees determined to be unsafe must either be removed or in some cases receive severe crown reduction pruning to mitigate the immediate liability associated with retention.

Large Over Mature Trees – Old and over mature trees become more problematic with regard to crown safety and root related maintenance issues. Larger trees generally require ever increasing levels and frequency of maintenance particularly when decay and problematic stem attachments are present.

Increased Pruning Maintenance Requirements – Trees that have been compromised by decay, major branch failure, or other defects associated with past pruning require a greater frequency in maintenance. *Liquidambar* trees are known to have brash or weaker wood strength which further adds to the safety concerns.

Good Urban Forest Management – As noted in earlier reports, a program of tree removal and replacement is much more cost effective than attempting to retain structurally problematic trees. The presence and combination of decay, problematic branch attachments and the brash wood of the *Liquidambar* tree species will require a much more frequency of inspection and pruning to prevent large stem failures.

Increase of Root Conflict with Hardscape and Underground Utilities – The *Liquidambar* tree is known for root problems. Standard planting site for a *Liquidambar* tree is a parkway at least 10 feet wide. It is common for the level of root related problems to increase as trees become larger. Large stature old trees clearly cause more hardscape damage with large old *Liquidambar* trees near the top of the list.



Planting the Correct Tree with Proper Planting Site Protection and Early Structural Pruning – Proper species selection and planting site preparation will eliminate the majority of root-hardscape conflicts later on. Most of the safety concerns are a result of past pruning or the lack of. Proper pruning eliminates poorly attached stems when they are small (less than 1 inch in diameter) and thereby avoids large pruning wounds or breakouts in the future. Large pruning wounds provide access to decay organisms that are compromising the safety of many of the trees inspected. When selected, planted and cared for properly, later tree maintenance can be reduced significantly.

Recommendations

Option #1, Tree Removal – It is recommended that Tree #7 (943 Pacific) be removed as part of good urban forest management.

Option #2, Crown Reduction – If Tree #7 cannot be removed in a timely manner, severe crown reduction can be applied to mitigate immediate safety concerns. Pruning must satisfy the safety concerns based upon the aerial inspection. Both the amount of pruning and the size of the average pruning wounds must be designated by an arborist prior to beginning.

Aerial Inspection – Trees exhibiting signs of large heading cuts made in the past require some additional investigation prior to administering pruning treatments. Visual inspection from up in the crown coupled with sounding can readily identify large cavities and internal decay. A Resistograph can be used to identify the thickness of sound wood.

If inspections reveal significant levels of decay in trees, it is recommended that trees be removed rather than receive continuous costly care to maintain.

Tree Replacement – Together with the tree replacement program must be a young tree maintenance program that allows for the elimination of the problematic qualities identified in the *Liquidambar* trees.

End Report

Report Submitted By:



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Photo Supplement



Photo 1. Photo to the left shows the tree in front of #1013 Pacific. This tree has been pruned properly; kept narrow to discourage heavy lateral growth that is prone to breakout. Some reduction on the lateral limbs over sidewalk (not pictured) is recommended for this tree during the next pruning cycle. Large old trees such as this generally require pruning maintenance a five year intervals.

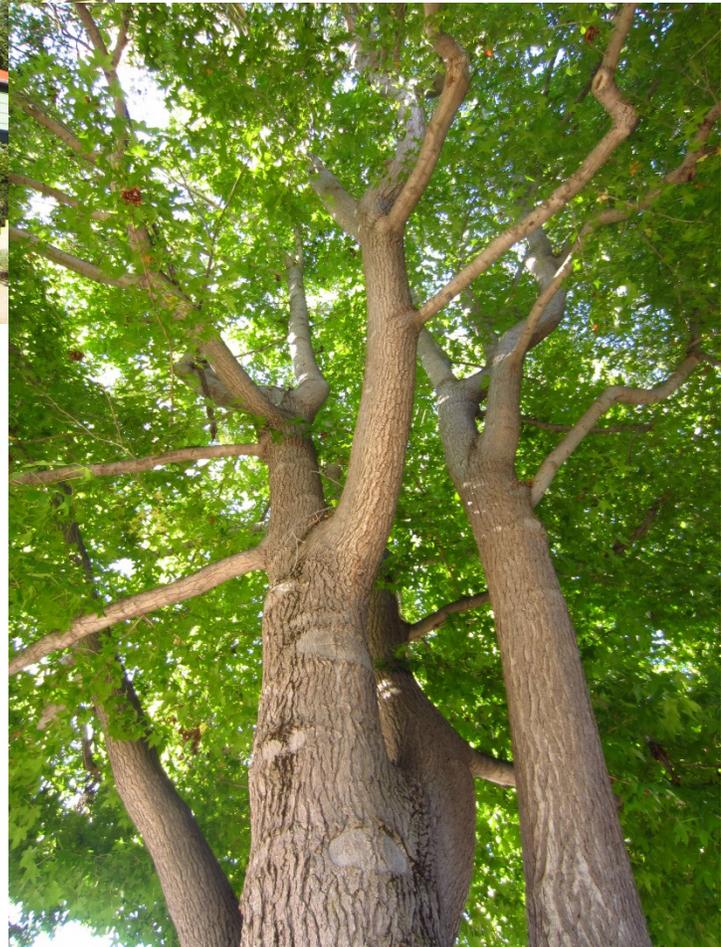


Photo 2. Photo to the left shows side tree #3 at 1700 Chapin. Past pruning has not compromised the present safety of this tree. Most of the structurally problematic trees did not receive the pruning this tree received. The relatively brash wood of the Liquidambar tree does require that lateral stems be balanced and not allowed to spread excessively to reduce twisting and branch end weight.





Photo 3. Photo to side tree #2 at 1700 Chapin. Stem codominance can be addressed through pruning only one of the two stems. Past pruning removed larger limbs on the street side leading to decay cavities seen. These areas should be investigated prior to pruning.



Photo 4. Photo to the left shows the codominant stem attachment with included bark noted on side tree #2 at 1700 Pacific. The safety concern is reduced slightly due to the vertical growth of the stems. It is recommended that one stem (red arrow) be pruned more heavily to reduce the level of codominance. Pruning cuts should be no larger than 4" in diameter.





Photo 5. Photo to the left shows side tree #1 at 1700 Chapin. This tree's codominance can be addressed with end weight reduction on one of the main stems. Trees with one central leader have a stronger structure than trees with multiple leaders. Some areas of suspected decay can be observed.



Photo 6. Photo to the left shows the eastern tree at 951 Pacific. The tree has suffered a large breakout likely due to excess end weight coupled with twisting from an unbalanced limb. Pruning to reduce branch end weight and balancing the weight can mitigate concerns for these types of failures.





Photo 7. Photo to the left shows a lateral branch with an included bark stem attachment on the western tree at 951 Pacific. This limb should be reduced to slow growth and reduce weight. Although it may be quicker and cheaper to remove this limb entirely, it is not recommended as larger pruning wounds lead to decay in time.



Photo 8. Photo to the left shows the trunk of the western tree at 951 Pacific. The large pruning wounds on the trunk have since closed, but sounding with a mallet indicated internal decay in present but likely not excessive. Advanced decay assessment is recommended for this large tree.





Photo 9. Photo to the left shows western tree at 951 Pacific. A large decay pocket is present on this unbalanced branch. Advanced decay assessment is again recommended. Lateral weight reduction should be best administered to all stems exhibiting these types of defects.

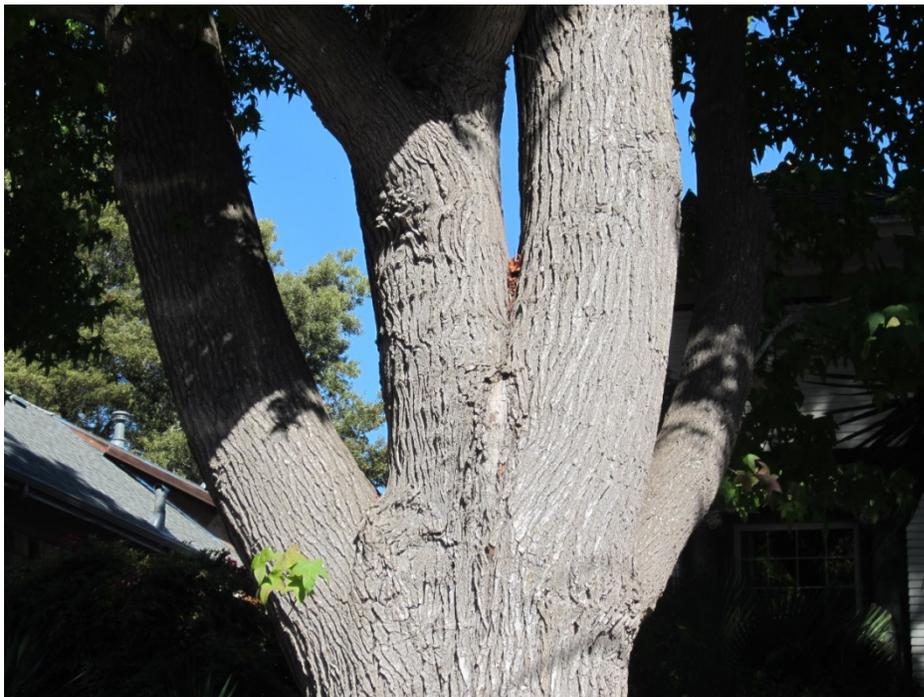


Photo 10. Photo shows tree at 943 Pacific. Co-dominance and included bark defects are present. There are signs indicating that the internal cracking is advancing. This tree is a candidate for removal but pruning can severe reduction pruning can mitigate immediate safety concerns.

End Photo Supplement

