



**TREE**  
**ASSOCIATES**

1654 Colusa Avenue  
Davis, CA 95616  
treeassociates.net

June 6, 2017

Andi Panagopoulos  
Cunningham Engineering Corporation  
Sacramento, California

RE: Development Impact Assessment and Tree Preservation Guidelines:  
Twin Rivers Project, Sacramento

Dear Andi,

Attached is the report you requested. I appreciate the opportunity to work with you. Please do not hesitate to contact me should you have questions regarding this report.

Sincerely,

John M. Lichter, M.S.  
ASCA Registered Consulting Arborist #375  
ISA Board Certified Master Arborist #863  
ISA Qualified Tree Risk Assessor





**DEVELOPMENT IMPACT ASSESSMENT AND  
TREE PRESERVATION GUIDELINES:  
TWIN RIVERS PROJECT, SACRAMENTO**

**Prepared for  
CUNNINGHAM ENGINEERING CORPORATION  
Sacramento, California**

**Prepared by  
TREE ASSOCIATES, INC.  
John M. Lichter, M.S.**

**ASCA Registered Consulting Arborist #375  
ISA Board Certified Master Arborist #863  
ISA Qualified Tree Risk Assessor**

**June 6, 2017**

## **History/Assignment**

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The Twin Rivers Housing Community is being redeveloped. During the spring of 2017, Ms. Andi Panagopoulos with Cunningham Engineering in Sacramento contacted me seeking an Arborist Report concerning existing trees within the project.

I previously prepared a Tree Evaluation and Preservation Guidelines report, dated March 30, 2017. A total of 130 trees with trunk diameters four inches or greater were tagged and evaluated on site. Detailed information concerning the species, size, attributes, condition ratings as well as recommendations for tree work, detailed investigation or removal can be found in this report.

Ms. Panagopoulos requested that I prepare a development impact assessment for protected trees to be removed due to site constraints.

## **Limits/Assumptions of the Assignment**

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- This evaluation reports on the condition of the subject trees at the time of my site visit. Tree conditions change over time and, as they change, this report may need to be revised.
- The structural condition of some of the subject trees were pending the outcome of additional recommended investigation such as aerial inspection, root examination or decay mapping (see May, 2017 Arborist Report). If any of these trees are to be preserved, these studies should be carried out to determine their suitability for preservation.
- Impact ratings assumed that 1) the description of construction was accurate; 2) the extent of excavation was limited to 5' off buildings and 1' off walkways; utility trenches were not laid back; and there was no grading within protection zones outside of these areas.
- My consideration of possible design modifications assumed that road alignment, and pavement sections could not be modified.
- Once draft construction plans are prepared, this impact assessment should be updated.



## Development Impact Assessment

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I reviewed the conceptual grading and drainage and utility plans drafted by Cunningham Engineering dated May 25, 2017. I also reviewed a tree removal exhibit Cunningham prepared on May 30, 2017 (attached).

Forty-two of the 130 trees on site (32%) were shown to be retained (protection zones marked green on the Tree Removal Exhibit). Eighty-eight of the trees were to be removed, as shown with X's on the plans and red protection zones on the exhibit described above. Fourteen of the trees to be removed were not considered "protected trees."

I recommended that 34 of the remaining 74 protected trees be removed because either 1) their health was failing and/or 2) they had uncorrectable safety concerns (marked red *with* a red X on the tree removal exhibit). I was asked to provide a development impact report for the 40 trees that remained which were to be removed due to site layout conflicts.

The following data were provided for these trees, which were marked red *without* a red X on the tree removal exhibit. The results may be found in the attached table, entitled "Development Impact Assessment."

- Tree Number – corresponds to a round aluminum tag affixed to each tree.
- Tree Protection Zone (TPZ) – the radius in feet of a circular tree protection zone recommended by the author (based on trunk diameter and species tolerance to construction impacts).
- Description of Construction within TPZ – a description of infrastructure proposed within the TPZ.
- Impact Rating – a rating low, moderate, high or extreme considering the possible impact to tree condition from construction of the proposed plan. If trees were located under structures that could not be moved, "Removal Necessary" was indicated. *Impact ratings assumed that 1) the description of construction was accurate; 2) the overbuild was limited to 5' off buildings and 1' off walkways; utility trenches were not laid back; and there was no grading within protection zones outside of these areas.*
- Possible Design Modifications- possible adjustments to the design, which could decrease the impact of the development by moving infrastructure or through the use of alternative construction details or methods.



## Summary of Development Impact Assessment

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The following table summarizes the impact ratings of the 40 trees described above.

Development Impact Rating	# of Trees
Low/Moderate	1
High	6
Extreme	11
Removal Necessary	22
TOTAL	40

## Recommendations

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I recommend the following.

- Modify plans where possible considering the design modifications provided.
- Have me review any updated plans and update the Impact Assessment as necessary.
- Where the plan is not adjusted, remove trees with “High” or “Extreme” impact ratings as these trees will very likely die or topple following construction, especially those rated “Extreme.”  
*If any of these trees are to remain, construction work should be supervised by a Certified Arborist who will determine whether injury to roots will require the removal of the tree for safety reasons.*



## Tree Preservation Guidelines

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The guidelines presented below should be followed for all trees to be preserved to ensure the least impact considering the proposed site plan.

- Indicate surveyed trunk locations and tree protection zones (TPZ's) as described in attached table on all construction plans for trees to be preserved. Note, where infrastructure is located within protection zones, indicate the *modified* protection zone (MTPZ) as close to infrastructure as possible (minimize extent of excavation and grading; use retaining walls as necessary).
- Tree preservation measures should be indicated on all pertinent construction plans.
- Engage the Consulting Arborist to revise development impact assessments for trees to be preserved once construction plans are drafted.
- Avoid grading, compaction, trenching, rototilling, vehicle traffic, material storage, spoil, waste or washout or any other disturbance within TPZ's or MTPZ's and for all nearby trees.
- Conduct a meeting to discuss tree preservation guidelines with the Consulting Arborist and all contractors, subcontractors and project managers prior to the initiation of demolition and construction.
- Prior to any demolition activity on site, identify (tagged) trees to be preserved and install tree protection fencing at the TPZ or MTPZ. Tree protection fences should be made of chain link with posts sunk into the ground. These fences should not be removed or moved until construction is complete. Avoid soil or above ground disturbances within the fenced area.
- Any pruning required for construction or recommended in this report should be performed by an ISA Certified Arborist or Tree Worker. Pruning for necessary clearance should be the minimum required to build the project and performed prior to demolition by an ISA Certified Arborist.
- Any work that is to occur within the TPZ or MTPZ's of the trees should be monitored by the Consulting Arborist. The project manager or superintendant should contact the Consulting Arborist for site visits as necessary.
- Roots should be pre-cut cleanly with a sharp saw prior to excavation under Arborist supervision.
- If roots  $\geq$  2 inches or limbs larger than 3 inches in diameter are cut or damaged during construction, contact Consulting Arborist as soon as possible to inspect and recommend appropriate remedial treatments.
- All trees to be preserved should be irrigated once every week during non-Winter months to uniformly wet the soil to a depth of at least 18 inches under and beyond their canopies. This can be achieved with hose end sprinklers or in line drip emitters on two-foot centers. The run times of the systems will vary dependent upon application rate. A tile probe can be used to determine necessary run times, as the probe will easily penetrate moist soil.



## Glossary<sup>1</sup>

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*Bow* – the gradual curve of a branch or stem.

*Callus* – growth resulting from and found at the margin of wounds.

*Canker* – a localized area of dead tissue on a stem or branch, caused by fungal or bacterial organisms.

*Central Leader* – the main stem of the tree.

*Chlorotic* – yellow.

*Codominant* – equal in size and relative importance.

*Crown* – parts of the tree above the trunk.

*Crown Clean* – the removal of dead, dying, diseased, broken, and weakly attached branches and watersprouts from a tree's crown.

*Crown Reduction* – Using reduction cuts to reduce the volume of the crown.

*Decay* – process of degradation of woody tissues by fungi and bacteria.

*Dieback* – death of shoots and branches, generally from tip to base.

*Dropcrotch* – the process of shortening trunks or limbs by pruning back to dominant lateral limbs.

*End Weight* – the concentration of foliage at the distal ends of branches.

*Epicormic* – shoots which result from adventitious or latent buds; often indicates poor vigor.

*Included bark* – pattern of development at branch junctions where bark is turned inward rather than pushed out.

*Primary limb* – limb attached directly to the trunk.

*Reduction cut* – shortening the length of a branch or stem by cutting it back to a lateral branch of at least one-third the diameter of the cut stem.

*Root crown* – area at the base of a tree where the roots and stem merge.

*Secondary limb* – limb attached directly to a primary limb.

*Sound wood* – undecayed wood.

*Suppressed* – trees which have been overtopped and whose crown development is restricted from above.

*Target* – people or property potentially affected by tree failure.

*Topped* – Pruned to reduce height by cutting large branches back to stubs.

*Train* – to prune a young tree to establish a strong structure.

*Vigor* – overall health.

*Watersprouts* – vigorous, upright, epicormic shoots that grow from latent buds in older wood.

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<sup>1</sup> Definitions from author or Matheny and Clark, Evaluation of Hazard Trees in Urban Areas, 2<sup>nd</sup> Edition c 1994, ISA.

## **Arborist Disclosure Statement**

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The following statement pertains to my work and this report.

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. Clients may choose to accept or disregard the recommendations of the Arborist, or to seek additional advice.

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 specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.

Treatment, pruning and 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 other issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the Arborist. An Arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees.



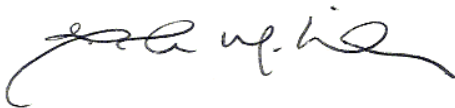


## Certification of Performance

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I, John M. Lichter, certify:

- That I have personally inspected the tree(s) and/or the property referred to in this report, and have stated my findings accurately. The extent of the evaluation and/or appraisal is stated in the attached report and the Terms and Conditions;
- That I have no current or prospective interest in the vegetation or the property that is the subject of this report, and I have no personal interest or bias with respect to the parties involved;
- That the analysis, opinions and conclusions stated herein are my own, and are based on current scientific procedures and facts;
- That my compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party, nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events;
- That my analysis, opinions, and conclusions were developed and this report has been prepared according to commonly accepted Arboricultural practices;
- That no one provided significant professional assistance to the consultant, except as indicated within the report.



John M. Lichter, M.S.  
ASCA Registered Consulting Arborist #375  
ISA Board Certified Master Arborist #863  
ISA Qualified Tree Risk Assessor



**ASSUMPTIONS AND LIMITING CONDITIONS: John M. Lichter dba TREE ASSOCIATES**

1. Any legal description provided to the consultant/appraiser is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.
2. It is assumed that any property is not in violation of any applicable codes, ordinances, statutes or other governmental regulations.
3. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/appraiser can neither guarantee nor be responsible for the accuracy of information provided by others.
4. The consultant/appraiser shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.
5. Unless required by law otherwise, 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 expressed written or verbal consent of the consultant/appraiser.
6. Unless required by law otherwise, neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of the consultant/appraiser - particularly as to value conclusions, identity of the consultant/appraiser, or any reference to any professional society or institute or to any initialed designation conferred upon the consultant/appraiser as stated in his qualifications.
7. This report and any values expressed herein represent the opinion of the consultant/appraiser, and the consultant's/appraiser's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
8. Sketches, drawings, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise. The reproduction of any information generated by architects, engineers, or other consultants on any sketches, drawings, or photographs is for the express purpose of coordination and ease of reference only. Inclusion of said information on any drawings or other documents does not constitute a representation by John M. Lichter or TREE ASSOCIATES as to the sufficiency or accuracy of said information.
9. Unless expressed otherwise: 1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and 2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.
10. Loss or alteration of any part of this report invalidates the entire report.



Tree #	TPZ (ft.)	Description of Construction within TPZ	Impact Rating	Possible Design Modifications
721	39	Sidewalk, planter and roadway 9.5' NW	High	
723	39	Within stormwater planter on road corner	Removal Necessary	
729	27	In tree lawn; roadway 2' W; sidewalk 4' E; fire hydrant 17' N	Extreme	Maintain existing curb; install walk on grade with no scarification.
730	40	In tree lawn; roadway 4' W; sidewalk 4' E; stormwater planter 9' N; fire hydrant 37' south	Extreme	Move stormwater planter. Maintain existing curb; install walk on grade with no scarification.
731	26	Within stormwater planter; roadway 8' W; sidewalk 5' E	Removal Necessary	
732	27	Roadway 2' W; sidewalk 5' E	Extreme	Maintain existing curb; install walk on grade with no scarification.
733	30	Roadway 2' W; sidewalk 5' E	Extreme	Maintain existing curb; install walk on grade with no scarification.
734	30	In roadway	Removal Necessary	
735	31	Within stormwater planter; roadway 8' W; sidewalk 5' E; building 22' E; SD 24' NE	Removal Necessary	
736	28	Roadway 2.5' W; sidewalk 5' E; SD 20' E; building 25' E	Extreme	Maintain existing curb; install walk on grade with no scarification; minimize extent of excavation; avoid grading in as much of TPZ as possible - use retaining wall.
737	48	Roadway 2.5' W; sidewalk 4' E; building 22' east	Extreme	Maintain existing curb; install walk on grade with no scarification; minimize extent of excavation; avoid grading in as much of TPZ as possible.
738	28	Fire hydrant 2' SW; roadway 7' west; sidewalk 5' east; building 25' east	Extreme	Maintain existing curb; install walk on grade with no scarification; minimize extent of excavation; avoid grading in as much of TPZ as possible - use retaining wall; move hydrant.
739	28	Roadway 4' W and 17'N; sidewalk 5' E; stormwater planter 19' NE; building 23' E	Extreme	

Tree #	TPZ (ft.)	Description of Construction within TPZ	Impact Rating	Possible Design Modifications
740	26	Roadway 2' W; sidewalk 6' E; stormwater planter 2' S; building 21' E	Extreme	Move stormwater planter; maintain existing curb; install walk on grade with no scarification; minimize extent of excavation; avoid grading in as much of TPZ as possible use retaining wall.
741	27	Fire hydrant 4' SW; roadway 5' west; sidewalk 4' E and 17' N; building 19' E	Extreme	
743	33	Buildings 21' SW and 23' SE; stormwater planter 12' S; sidewalk 14' NE	High	Move stormwater planter. Install walk on grade with no scarification; minimize extent of excavation; avoid grading in as much of TPZ as possible use retaining wall.
744	34	Building 16' S	High	Move stormwater planter. Install walk on grade with no scarification; minimize extent of excavation; avoid grading in as much of TPZ as possible use retaining wall.
765	35	Within sidewalk	Removal Necessary	
766	39	Sidewalk 30' NW; fire service 35' W	Low/ Moderate	
767	36	Within roadway	Removal Necessary	
768	25	Within roadway	Removal Necessary	
772	50	Sidewalk 12' N; roadway 29' N	High	Maintain existing curb; install walk on grade with no scarification
779	45	Within roadway	Removal Necessary	
785	31	Bldg 3' NW; stormwater planter 6' N; drain line 6' E	Removal Necessary	
786	29	Under building	Removal Necessary	

Tree #	TPZ (ft.)	Description of Construction within TPZ	Impact Rating	Possible Design Modifications
789	40	Building 2' S	Removal Necessary	
793	46	Within roadway	Removal Necessary	
795	37	Under building	Removal Necessary	
796	39	Within parking lot	Removal Necessary	
802	25	Under building	Removal Necessary	
803	43	Building 7' N; parking lot 8' S	Removal Necessary	
805	44	Under building	Removal Necessary	
806	29	Buildings 18' N and 25' W; stormwater planter 2' W; grade to be raised >2'	Extreme	Move stormwater planter. Minimize extent of excavation; avoid grading in as much of TPZ as possible; use retaining wall.
807	32	Within stormwater planter; grade to be raised >3'	Removal Necessary	Move stormwater planter; avoid grading in as much of TPZ as possible; use retaining wall.
808	46	Sidewalk 20' N; grade to be raised 2'	High	Avoid grading within as much of TPZ as possible; use retaining wall.
812	40	Within roadway	Removal Necessary	
824	62	Within stormwater planter; 6' from walk; 23' from curb	Removal Necessary	Move stormwater planter; avoid grading in as much of TPZ as possible; use retaining wall; install walk on grade or if fill, utilize coarse, well drained medium.
825	36	Within sidewalk.	Removal Necessary	

Tree #	TPZ (ft.)	Description of Construction within TPZ	Impact Rating	Possible Design Modifications
826	39	Sidewalk 10' N	High	Install walk on grade or if fill, utilize coarse, well drained medium.
829	25	Within sidewalk.	Removal Necessary	

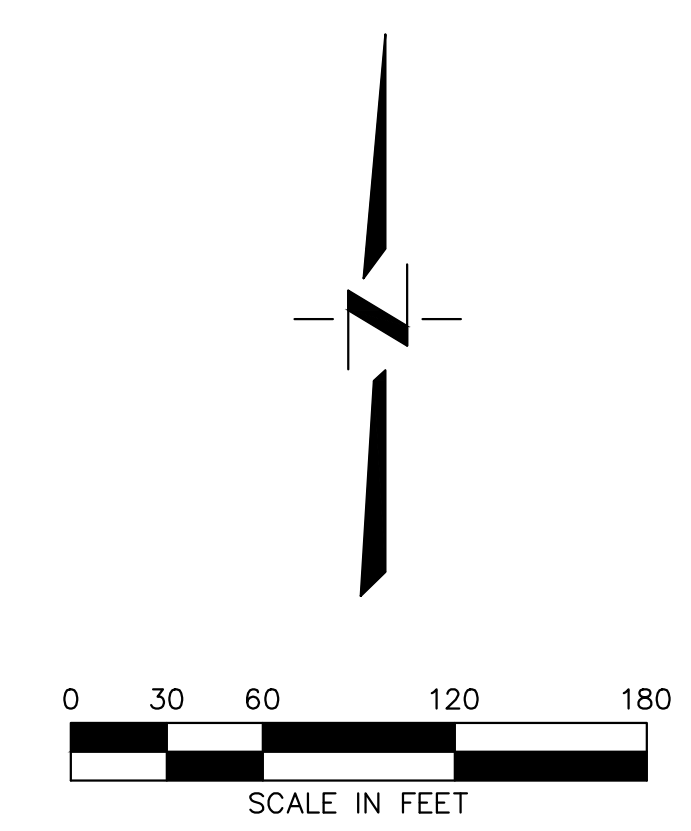


**LEGEND**

- SUBDIVISION BOUNDARY
- PROPOSED RIGHT OF WAY LINE
- PROPOSED IRREVOCABLE OFFER OF DEDICATION LINE (I.O.D.)
- PROPOSED LOT LINE
- TREE PROTECTION ZONE
- TREES PROPOSED TO BE REMOVED AS PART OF PHASE 1, PHASE 2, AND BACKBONE IMPROVEMENTS (IN RED)
- TREE RECOMMENDED FOR REMOVAL IN ARBORIST'S REPORT

**NOTES:**

1. TOPOGRAPHIC AND BOUNDARY SURVEY PREPARED BY MORROW SURVEYING DATED JULY 2016.
2. TREE TAG NUMBER CORRESPONDS TO THE ARBORIST'S REPORT DATED MARCH 30, 2017.
3. EXISTING TREES SHOWN TO BE REMOVED REPRESENT EXISTING TREES REQUIRED FOR REMOVAL FOR ENTITLEMENT OF THE PROPOSED SITE ROADS AND LOT 1, LOT 2, AND LOT 6 IMPROVEMENTS. ADDITIONAL TREE REMOVALS MAY BE REQUIRED TO BE PROCESSED UNDER FUTURE SITE ENTITLEMENT APPROVALS FOR THE REMAINDER OF THE LOTS.



	DESIGNED BY: CK	DRAWN BY: KD	CHECKED BY: DF	SCALE: 1" = 60'
	APPROVED BY:	REVISIONS:	NO.:	DATE:
<p><b>TREE REMOVAL EXHIBIT</b> FOR <b>TWIN RIVERS REDEVELOPMENT</b></p>				
SACRAMENTO CALIFORNIA				
<p>SHEET <b>1</b> OF <b>1</b></p>				
DATE: 05/25/2017				
JOB NO: 1587.00				

S:\Projects\1587 - Twin Rivers\AutoCAD\1587-04-Entitlement\_Phase\Exhibit\1587-04-Tree Removal.dwg - 1587-04-Tree Removal.dwg - 5/25/2017 - 9:16AM Plotted by: kevin