



TREE PRESERVATION GUIDELINES REPORT
GRADY RANCH, MARIN COUNTY, CALIFORNIA

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1.0 INTRODUCTION

During August and September 2008 WRA, Inc. conducted a tree survey of a portion of the Grady Ranch Property (Project Area) in San Rafael, Marin County, California. The purpose of this report is to provide guidelines for the protection and preservation of trees to remain on site.

Great care must be exercised when development is proposed in the vicinity of established trees of any species or size. Trees to be preserved in the Project Area will require specialized protection techniques during all construction activities to minimize negative impacts on their health and vigor and to limit the spread of diseases that may be present such as Sudden Oak Death (SOD). The area immediately under canopy driplines of these trees is especially critical as the majority of tree roots are found in this area. For these reasons the recommendations which follow have been established for short and long term tree protection.

1.1 Effects of Construction on Established Trees

Established, mature trees respond in a number of different ways to disruption of their environmental conditions. Change of grade within the dripline or near the root crown, damage to the bark of the tree, soil compaction above the root system, root system reduction or damage, or alteration of summer soil moisture levels may individually or collectively cause physiological stress leading to tree decline and death. The individual effects of these procedures may cause trees to immediately exhibit symptoms and begin to decline, but more commonly the process may take many years, with symptoms appearing slowly over a period of time. Trees may not begin to show obvious signs of decline until many years after construction is completed.

1.2 Project Coordination for Tree Protection

The following guidelines are meant to be utilized by project managers and those supervising any construction in the vicinity of these trees including grading contractors, underground contractors, all equipment operators, construction personnel, and landscape contractors. Guidelines are presented in an outline form to be applied to each individual circumstance which occurs during development activities. It is left to the project supervisor to apply and enforce these protection measures. Questions which arise, or interpretation of guidelines as they apply to site activities, should be referred to a consulting arborist as they occur.

1.3 Dripline and Tree Protection Zone

The term dripline has different meanings and is defined for use at this project as the perimeter of each tree canopy at the widest point from the main trunk. Where a one-sided tree structure exists and the tree is not structurally uniform, the dripline is defined as the widest distance to the edge of the canopy extending equally around the tree's circumference. The Tree Protection Zone (TPZ) is defined for this project as two feet beyond the dripline of the tree. Activities within the TPZ should be minimized to the extent practicable. Tree protection guidelines are focused on minimizing intrusion, soil cut or fill, and all activities causing compaction within the TPZ. Site supervisors should be completely familiar with this definition and these guidelines, as well as utilizing common sense when working near this critical area.

2.0 REGULATORY BACKGROUND

2.1 Marin County Native Tree Preservation Ordinance

On April 16, 2002 the County of Marin adopted the Native Tree Preservation and Protection Ordinance. This ordinance provides for the preservation and protection of native trees in unincorporated portions of Marin County through limiting the removal of protected trees and requiring replacement plantings for trees that are removed. The recommendations in this Tree Preservation Guidelines Report are designed to ensure compliance with the Tree Ordinance specifically in regards to preservation of native trees and oak woodlands.

2.2 Grady Ranch Environmental Impact Report

The County of Marin adopted an Environmental Impact Report in 1996 for the Lucasfilm Ltd. Grady Ranch/Big Rock Ranch Master Plan which covered the Project Area. The EIR concluded that the proposed project would have significant environmental impacts related to native tree impacts and included several mitigation measures to reduce tree impacts to less than significant levels. The mitigation measures from the EIR are included below:

Mitigation Measure 5.3-2(a) *Where feasible from an engineering and geotechnical standpoint and warranted based on the good to excellent health and structure of the tree, trees near the limits of anticipated grading should be preserved and protected. An engineering survey for trees with trunk diameters of four inches or greater (measured at four and one-half feet above grade) should be performed prior to preparation of the Precise Development Plan, and trunk locations within 50 feet of the limits of grading should be mapped. Individual specimen-sized trees should be preserved through the use of retaining walls, short oversteepened slopes, and other methods. Protection of larger native trees with trunk diameters exceeding 24 inches should take precedence over smaller live oaks and California bay which are abundant in the forest and woodland habitat.*

Mitigation Measure 5.3-2(b) *Proposed grading to accommodate the Ancillary Building and associated access improvements on Grady Ranch should be modified to protect the numerous specimen-sized trees to the east of the building footprint. The existing grade in the vicinity of the trees should be retained to avoid tree loss. This may require adjustment to the proposed building footprint and the alignment of the access roads to the building.*

Mitigation Measure 5.3-2(c) *Detailed guidelines should be prepared by a certified arborist to control possible damage to trees to be preserved. The location of tree trunks to be retained within 50 feet of proposed grading should be mapped by engineering survey, and the trees identified in the field through flagging or other obvious marking method prior to any grading. Standards contained in the preservation guidelines should include the following:*

- *Grade changes within 1.5 times the width of the tree dripline should be avoided and any encroachment closer than one-third the distance from the dripline to the trunk should be prohibited. Restrictions on the limits of grading, adjustments to the final grade of cut and fill slopes, and use of retaining walls should all be used to protect individual trees worthy of preservation.*
- *Temporary fencing should be provided along the outermost edge of the dripline of each tree or group of trees to be retained in the vicinity of grading to avoid compaction of the root zone and*

mechanical damage to trunks and limbs.

- Paving within the tree dripline should be prohibited or stringently minimize by using porous materials such as gravel, loose boulders, cobbles, wood chips, or bark mulch where hardscape improvements are necessary for access in the vicinity of trees.*
- Trenching within the tree dripline should be prohibited, with any required utility line within the dripline installed by boring or drilling through the soil.*
- The amount of landscape irrigation within the tree dripline should be minimized by prohibiting turf or any landscaping with high water requirements and limiting permanent irrigation improvements to bubbler, drip, or subterranean systems.*
- Storage of construction equipment, materials, and stockpiled soils should be prohibited within the tree dripline.*

Mitigation Measure 5.3-2(d) *A tree replacement program should be prepared to provide for replacement of native trees with trunk diameters exceeding 12 inches removed by proposed development. The tree replacement program should be incorporated as a component of the Landscape and Vegetation Management Plan, and implemented as part of site revegetation and landscaping. Provisions of the tree replacement program should include the following:*

- Oaks should generally be replaced at a ratio of 5 to 1 (ratio of replacement trees to number of trees removed) unless salvaged from the site or grown from a locally-collected seed source as specified below.*
- All other native tree species should be replaced at a ratio of 3 to 1.*
- Species composition of plantings in the tree replacement program should be consistent with the percentage of each tree species removed. If offsite nursery stock is used for replacement plantings, the plants should preferably be seedlings with a container size of one-gallon or smaller. Younger plant material tends to have a higher survival rate than older nursery stock which has become established under ideal growing conditions associated with most nurseries.*
- Young trees and saplings (with trunk diameters of less than 12 inches) within the limits of anticipated grading should qualify as replacement plantings if successfully salvaged and transplanted as part of revegetation. Use of onsite salvage trees for replacement plantings would serve to preserve younger trees and protect the genetic integrity of the native species. Trees from a local source, particularly seedlings, typically have a higher success rate for reestablishment than nursery stock due to their adaptation to local conditions. Due to the benefits of using local plant material, salvage of young oaks should be encouraged by reducing the required replacement ratio from 5 to 1 to 3 to 1 where onsite oaks are used as replacement plantings.*
- A program to collect onsite seed and grow seedlings for use in the tree replacement program should be considered as part of the tree replacement program. Seed would be collected onsite in the fall months, planted in temporary containers, and maintained for a period of one or more years until seedlings are ready for planting. As with the salvage plantings, oak seedlings grown from an onsite seed source would be preferable to offsite nursery stock, and this program should be encouraged by reducing the required replacement ratio from 5 to 1 to 3 to 1 where*

seedlings from onsite collection are used as replacement plantings.

- *If mature trees (with trunk diameters of 12 inches or greater) proposed for removal are successfully salvaged and transplanted, no additional replacement mitigation should be required.*
- *Tree replacement plantings should be monitored as part of the Landscape and Vegetation Management Plan for a minimum of five years. If mature salvaged trees die within this time period, replacement plantings should be made at the respective 5 to 1 or 3 to 1 ratios. Any onsite salvage, locally-collected and grown seedlings, or nursery stock plantings lost within this monitoring period should be replaced at a 1 to 1 ratio on an annual basis.*

2.3 Sudden Oak Death Quarantine Regulations

Fourteen counties in California have been quarantined for Sudden Oak Death host plant materials. These counties are Alameda, Contra Costa, Humboldt, Lake, Marin, Mendocino, Monterey, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma. The transportation or disposal of all Sudden Oak Death host plant material outside of the 14 quarantined counties is regulated by the California Department of Food and Agriculture and requires obtaining a permit prior to moving these materials.

3.0 TREE PROTECTION RECOMMENDATIONS

A TPZ was identified based upon site plans and tree survey data. The extent of the TPZ is presented on drawing sheet Tree Preservation and Replacement Plan (LA 2.1). The following guidelines describe common circumstances which might arise during construction, but will likely require application to the particular circumstances in the Project Area based on the actual conditions present.

3.1 During Construction

Protection within the Tree Protection Zones identified on sheet LA 2.1:

- 1) Prior to initiating any construction activity in the area, including demolition or grading, temporary protective fencing shall be installed a minimum of two feet beyond the canopy driplines that create the TPZ. This fencing shall serve as a barrier to prevent dripline encroachment of any type by construction activities, equipment, materials storage, and personnel.
- 2) Fencing shall be a minimum four foot height at all locations, and shall form a contiguous barrier without entry points around the TPZ. Barrier type fencing such as chain link or Tensar plastic fencing is suggested, but any fencing system that adequately prevents the entry of equipment and activity is acceptable. The use of simple post and cable fencing is not recommended as this is easily removed or moved by construction personnel. Fencing shall be installed in a professional manner with adequate uprights and appropriate attachments. Any encroachments into the dripline for fencing or construction purposes shall be discussed with the project arborist in advance.
- 3) Contractors and subcontractors shall direct all equipment and personnel to remain outside

the fenced areas at all times until the project is complete, and shall instruct personnel and subcontractors about the importance of tree preservation.

4) Fencing shall remain in place and not be removed until all construction activities are completed. This shall include grading and compaction activities, installation of underground utilities, all construction activities, and any other construction or activity which is scheduled prior to landscape installation. There may be occasion when access is required, and fencing may temporarily be moved to facilitate the work.

5) Roots of single standing trees often extend two to three times the distance of the actual dripline and function primarily in the uptake of nutrients and water. As much area as possible around the circumference of the tree beyond the dripline should have minimum intrusion to further ensure tree survival and health.

3.2 Grade Changes

1) Grade changes within 1.5 times the width of the tree dripline are to be minimized wherever possible. Grade changes within this zone shall not change from that which existed prior to grading activities without approval from the project arborist.

2) Maximum cut or fill within 1.5 times the width of the dripline is not to exceed six inches. Detailed mitigation is required to remove or place a greater amount. The amount of cut and fill should be determined by actual tree species, rooting characteristics, soil conditions, and purpose of grade change. All cut and fill activities within 1.5 times the width of the tree dripline should be done in cooperation with the project arborist to minimize root damage. All cut and fill activities within 1.5 times the width of the tree dripline increases percentage of short and long term tree decline and loss, and approval of these activities shall be done with full knowledge of the negative potential that is incurred.

3) Original grade shall be maintained in the immediate area of the root crown, where the soil contacts the tree trunk, at all times. No increase in grade shall be allowed under any circumstances in this area.

4) Physical retaining structures are required where any fill operation is approved and exceeds six inches above original grade. Retaining structures function to prevent soil grade from being raised in the root crown area. Retaining structures shall be permanent in nature and may be constructed from any material which is appropriate in function to hold raised grade away from the root crown on a long term basis.

5) Tree retaining structures shall be installed a minimum distance of four feet from any tree trunk and may completely or partially surround the tree depending on location of grade change. Retaining structures must be installed to prevent soil from moving to the root crown in the area of grade change. If the grade is raised within 100 percent of the dripline, the retaining structure must surround the tree entirely. It is the responsibility of the project designer to develop an appropriate structure for this purpose.

6) If site conditions exist which necessitate installation of retaining structures closer than four feet to tree trunk, the project arborist shall be consulted for details of this installation.

7) No part of the retaining structure shall be placed below original grade to minimize impacts on

the root system. If necessary, structural posts may be installed to hold walls in place, providing that care is taken during installation to minimize damage to the root system, and that post hole size is minimized. The excavation and pouring of footings and other structural supports are not recommended.

8) Grade changes outside the retaining structures shall be such that drainage water of any type or source is not diverted toward or around the root crown in any manner. Grade shall drain away from root crown at a minimum of 2 percent. If grading toward the root crown is required, appropriate surface and/or subsurface drain facilities shall be installed so that water is effectively diverted away from the root crown area.

9) Tree roots will be expected to grow into areas of soil fill, and quality of imported soil shall be considered. Ideally, fill soil should be site soil that closely matches that present within the tree dripline. If imported soil is utilized, it should be the same or slightly coarser texture than existing site soil, should have a pH range comparable to site soils, and generally should have acceptable chemical properties for appropriate plant growth. A soil analysis is recommended prior to importation to evaluate import soil for these criteria.

10) Roots are to be hand cut and sealed wherever possible when major structural roots are encountered over one inch in diameter. The tearing of roots by equipment of any type within the dripline shall not be allowed.

3.3 Underground construction

1) Root impact or removal may lead to weakened anchorage, compromised root system integrity, and reduction in the ability to acquire moisture from the root soil areas. All underground work within tree driplines shall be avoided wherever possible to reduce negative impacts on trees. The location of underground utilities well outside the dripline is recommended as part of tree preservation.

2) Underground trenching may sever large structural roots, reducing nutrient and water uptake and more seriously affecting the ability of each tree to remain appropriately anchored, thus is prohibited within the TPZ of any protected tree.

3) The existing root system within the dripline should not be severed by construction activities of any type. If undergrounding within the dripline is required for unavoidable logistical reasons, the project arborist shall be consulted to determine whether the impact on tree health will be significant

3.4 Pruning Recommendations

1) The removal of dead wood, damaged branches, structurally unsound wood, narrow crotches, and crossing branches shall be considered for trees in the immediate vicinity of proposed development. Co-dominant leaders or lateral branches that overhang targets (structures, walking paths, etc) shall be removed, pruned to retard growth, or cabled whenever necessary as determined by the project arborist.

2) The removal of significant live wood is discouraged at all times. The use of heading type cuts shall be minimized or eliminated whenever possible. Pruning shall be as minimal as possible, removing dead or damaged branches, crossing or rubbing branches, or correcting other

structural deficiencies which may be present. Minimal pruning is recommended for all protected trees.

3) The following techniques shall be used during all pruning procedures:

Lateral branch removal:

- All laterals shall be removed immediately beyond the branch bark ridge, always preserving the branch collar.
- No stub cuts should be made which leave an inch or more beyond the branch collar.
- No flush cuts through the branch collar shall occur

Triple cuts

- All branches too large to be hand held shall be removed by means of the triple cut: undercutting the branch four to eight inches beyond its base, removing the branch beyond the undercut, and removing the remaining stub using a shoulder cut.

Terminal pruning

- Thinning: Cut back terminal portions of branches by cutting back to laterals with a basal diameter 1/3 the size of the terminal being removed. Removal of many smaller terminals is preferred over removal of a few large ones.
- Size reduction: Remove portions of the crown for reducing height by removing terminals back to laterals. Each lateral remaining should be located to serve as a new terminal. This will establish the crown at a lower level. The diameter at the base of a remaining lateral should be 1/3 the diameter of the terminal being removed.

4) Pruning may also be required to create appropriate access for construction equipment where low limb presence may obstruct access. The pruning is to be done by a qualified arborist, and shall by no means be done by construction personnel.

5) Pruning shall occur prior to initiation of any approved ground trenching. No ground shall be broken within the dripline of protected trees without having pruning completed.

6) The project arborist shall be consulted prior to initiation of any pruning procedures to coordinate activities with the working arborist. Continued discussion and coordination between the project arborist, owners, designers, and general contractor should occur to further discuss and define the following guidelines based on the actual work planned in the vicinity of these trees.

3.5 Fertilization

Fertilization is generally not recommended unless a specific nutrient deficiency symptom is visible. Following completion of construction activities, a determination of tree health shall be conducted to visually evaluate tree performance and to recommend fertilization or mitigation if it is required based on the appearance of each individual tree. Owners additionally should monitor visible tree appearance and contact the project arborist should any tree exhibit unusual growth or characteristics.

3.6 Pest Control

A close visual examination for tree pests shall be conducted by the climbing arborist as they complete pruning procedures. If a serious infestation is present which was not apparent from ground observation then pesticide application should be considered at that time. However, the simple presence of tree pests does not warrant the use of chemical pesticides, and a serious infestation capable of causing tree decline must be present to warrant their use. The use of organic sprays or pesticidal soaps is the preferred method for treating any serious pest infestation. If infestations do occur, discussion with the project arborist is recommended.

3.7 Weed Control

No specific measures are recommended for weed control as it relates to tree preservation. The presence of weeds should not be considered a problem in relation to continued tree health.

3.8 Disease Control

Sudden Oak Death is a fairly recent disease that has been threatening coastal oak woodlands from Monterey County, California to Curry County, Oregon and is abundant in lands surrounding the Project Area. This disease is caused by a water mold and is spread by spores in water, moist soils and plant material. The disease affects many species of trees including coast live oak, California bay, and coast redwood, all of which are present in the Project Area. While the disease only causes minor foliage dieback and discoloration in California bay and redwood, the disease is fatal in coast live oak resulting in accelerated rot and total tree failure.

The pathogen that causes Sudden Oak Death can only be positively identified in a laboratory, however there are common symptoms that can indicate an infection. A common symptom of Sudden Oak Death in coast live oak is a trunk canker bleeding a red to dark brown sap. Several recently dead oak trees were observed within the Project Area many of which showed signs of bleeding. These signs indicate that Sudden Oak Death may be affecting trees within the Project Area and special precautions should be made to ensure vegetation removal does not contribute to spread of this disease. The following actions are recommended by the California Oak Tree Mortality Task Force to reduce the spread of this disease:

Ongoing Management

- Monitor non-symptomatic trees (coast live oak and California bay) regularly for symptoms of infection particularly between March and July
- Monitor symptomatic trees for symptom progression
- Arrange for samples to be collected and analyzed by a laboratory for trees suspected of infection

Tree Removal

- Only remove infected trees if they are hazardous or undesirable
- Cut tree stumps as close to the ground as possible
- Stump grinding is not recommended
- Schedule removals during the dry period (June-October)

Debris Disposal

- If possible leave infected debris on-site in an area where it will not likely pose a fire or safety hazard and is unlikely to contaminate uninfected areas.

- When possible dispose of debris downslope and away from potential hosts.
- Chip branches of downed trees, split wood and place in sunny locations to promote drying
- Do not place split wood near roadsides where it may be transported to other locations
- If debris must be removed from the site it shall be disposed of at an approved and permitted dump site

Sanitation

- Clean and disinfect pruning tools after use on suspected infested trees or in known infestation areas
- Sanitize tools before working on healthy trees or in uninfested areas
- Clean vehicles and heavy equipment of mud, dirt, leaves and woody debris before leaving or switching work sites

3.9 Paving within the Dripline

The use of asphalt or concrete as a primary paving surface within the canopy dripline is generally discouraged. Utilization of a permeable surface which does not impede the natural percolation of water or limit the nature of gaseous exchange is recommended. Materials such as decomposed gravel or cobble are ideal for this purpose, however do not function satisfactorily as a parking or driving surface.

Interlocking pavers come in a variety of shapes, colors, and sizes and provide a suitable surface for driving, parking, and walking. At the same time they will allow some infiltration of water and air to the original soil level. Functionally and aesthetically they are appropriate for consideration at many projects. Utilization of an installation method which excludes fine sand joints must be used, however, to maintain infiltration. A coarse sand leveling bed and coarse sand joints are recommended to increase water infiltration and aeration.

3.10 Planting under Existing Trees

The installation of lawn beneath established native trees is strongly discouraged. The ideal treatment under native trees is the use of an organic or inert mulch. Redwood chips, gravel, or stone cobble are all recommended materials. If planting is required for aesthetic or functional purposes, the use of drought resistant, woody species is most appropriate. Species should be selected for their ability to survive with minimal or no water through the summer months after the initial establishment period. Only very limited drip irrigation should be utilized within the canopy dripline to minimize summer water in the root zone.

4.0 CONCLUSIONS

The development of these Tree Preservation Guidelines was based on the results of the Tree Survey Report for Grady Ranch prepared by WRA (2008) and industry standards for responsible tree care. Recommendations are based on obvious external conditions and symptoms. Annual inspections are recommended to determine whether any tree on site is in a declining state and may become a hazard to the proposed development. Trees are living, changing organisms which can be affected by any number of environmental conditions and biotic factors. Construction activities, even when appropriately supervised, may lead to a quick decline in tree health or to unseen hazards and should be considered potentially damaging to

the landscape that was present before development began.

5.0 REFERENCES

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