September 21, 2021

Kelsey Lang, Planner III
San Mateo County Planning and Building Department
455 County Center, Redwood City, CA 94063
Email: klang@smcgov.org

SUBJECT: Comments on the Consideration of an Appeal to Approve a Grading Permit for the Proposed Project at 250 Bonita Road, County File Number: PLN 2020-00130

Dear Ms. Lang,

On behalf of the Midpeninsula Regional Open Space District (Midpen), I appreciate the opportunity to comment on the consideration of an appeal of the Community Development Director's decision to approve a Grading Permit for a proposed residential landscape improvement and septic system expansion project at 250 Bonita Road, Portola Valley, CA, which will be presented at a Planning Commission public hearing on September 22, 2021. The property is in close proximity to Coal Creek Open Space Preserve (Preserve), and Midpen therefore would like to provide the following concerns regarding this project.

This project proposes the removal of nine significant trees, including two madrones, five California bays, and two black oaks. The area surrounding the proposed project has been heavily hit by *Phytophthora*-caused plant diseases, including Sudden Oak Death (SOD). Since its discovery in California in 1994, SOD has been responsible for the death of over one million oak and tanoak trees in California alone. Mortality rates are greater than 50 percent in some areas and continue to increase. Trees grown in nurseries have been known to carry *Phytophthora* and spread the pathogen where planted. Notably, current research suggests that larger healthy trees in SOD infested areas may carry a genetic resistance to the pathogen.

Should the project move forward, Midpen requests that the County incorporate appropriate protocols for the developer to implement to minimize the spread of *Phytophthora*, including disinfecting tools and removing soil from heavy equipment before entering and when leaving the project site. Moreover, to protect the genetic integrity of native oak trees and reduce the risk of vectoring *Phytophthora* to the project site and our adjacent Preserve, Midpen requests that the County require replacement of the two oak trees with acorns sourced from the same watershed instead of using nursery stock. Midpen would be pleased to issue a free permit for acorn collection at Los Trancos or Coal Creek Open Space Preserves. Additionally, due to the proliferation of *Phytophthora* through bay trees, Midpen requests the County require replacement of the bay trees with an alternative native tree species, such as additional black oaks. Though it is not known if the trees on the site are hosts or carriers of known plant diseases, attention is needed to reduce the potential risk of spreading SOD and related *Phytophthora* pathogens, which are known to be present in the vicinity of the Preserves. For reference, I have attached four best management practice documents for conducting vegetation work in areas with potential *Phytophthora* infection.

We appreciate the opportunity to comment on this project. Should you have any questions about this letter, please contact me at (650) 625-6563, or jmark@openspace.org.

Sincerely,

Jane Mark, AICP, Planning Manager

Attachments:

1. Guidelines to Minimize *Phytophthora* Contamination
2. *Phytophthora* Sterilization Guidelines
3. Sudden Oak Death Precautions and Acorn Planting Protocols
4. Guidelines to Minimize *Phytophthora* Pathogens in Restoration Nurseries

Guidelines to Minimize *Phytophthora* Contamination in Restoration Projects

These guidelines aim to avoid contamination of restoration sites with exotic pathogenic *Phytophthora* species or other plant pathogens during planting and related activities.

Contents

Definitions:

- **Holding facility or nursery**: A facility where nursery stock is maintained for a short to extended period of time prior to planting. Plant maintenance activities may include irrigation, fertilization or light pruning, as necessary. Nurseries involved in most other activities, including propagation or repotting are considered production nurseries.
- **Job site:** The job site includes areas for planting, soil stockpiling, parking, and access roads within and leading to the site.
- **Nursery stock:** All types of nursery grown plants.
- **Planting area:** Area being planted for habitat restoration, erosion control, or other purposes.
- **Planting site:** An individual planting basin or other spot, typically no larger than one square yard, where an individual plant or several grouped plants will be installed.
- **Sanitize:** Clean and treat with a sanitizing agent or via a lethal heat exposure to kill plant pathogens present as external contamination.
- **Sanitizing agent:** Materials such as bleach (sodium hypochlorite solutions), alcohol, quaternary ammonium compounds, and peroxides that can directly kill exposed propagules of *Phytophthora* or other plant pathogens when used properly. Most sanitizing agents can also kill a wide variety of bacteria and deactivate many viruses. Note that most materials referred to as fungicides are applied to plants to suppress disease but may not kill the pathogens and are not sanitizing agents.

I. Construction projects

In an effort to minimize the spread of plant pathogens the exterior and interior of all equipment and tools must be clean and free of debris, soil and mud (including tires, treads, wheel wells and undercarriage) prior to arrival at a new job site.

General guidance – suggested standard operating procedures:

a. Vehicles need to stay on established roads unless infeasible.
b. In general, vehicles and equipment need to be maintained clean – interior and exterior free of mud, debris and soil especially during the wet season.
c. In general, work shoes need to be kept clean- inspect shoe soles and knock mud, debris and soil off treads before moving to a new job site.
d. To minimize the potential for spreading potentially contaminated soil and time required for decontamination, if possible, avoid vehicle traffic and field work when soils are wet enough to stick readily to shoes, tools, equipment and tires.

II. Planting at Field Sites

Overview: Three general routes for the spread of *Phytophthora* and other soilborne plant pathogens are addressed in these guidelines. These routes are (1) contamination of planting material, including clean nursery stock, and other materials installed at the site, (2) inadvertent introduction of pathogens to a job site from other outside sources (e.g., via contaminated equipment), and (3) potential movement of undetected contamination within the planting area.

These guidelines assume that all nursery stock was originally grown under phytosanitary conditions and tested as remaining free from disease in the nursery (refer to nursery guidelines). These guidelines address how to protect the planting area from subsequent contamination during the delivery, storage onsite, and installation of planting stock and materials.

1. Prevent contamination of clean nursery stock or other clean plant materials

Planting stock shall be protected from potential contamination from the point that it leaves the production nursery or collection site until planting. Note that nursery stock has a high risk of infection by *Phytophthora* species if exposed to these pathogens. Excluding these pathogens provides the only viable option for maintaining outplanted nursery stock free of *Phytophthora*.

1.1. Maintaining nursery stock in a holding facility

When holding stock for an extended period (after delivery from production nursery and before planting), the following practices need to be followed to prevent contamination of the nursery stock with *Phytophthora.*

1.1.1. Delivered nursery plants that will be held before planting shall be transferred to cleaned and sanitized raised benches and maintained as described in "Guidelines to Minimize *Phytophthora* Pathogens for holding (non-production) nurseries at restoration sites, Section 3."

1.2. Handling and transporting nursery plants at the job site

1.2.1. Nursery plants shall be transported on or in vehicles or equipment that have been cleaned before loading the stock. Truck beds, racks, or other surfaces need to be swept, blown with compressed air and/or power washed as needed so they are visibly free of soil and plant detritus. More information on sanitizing surfaces are described in the Appendix.

1.2.2. Keep plants in sanitized vehicles or on sanitized carts, trailers, etc. until delivered to their planting sites. (More information may be found in sections 1.3.3. and 1.3.4.)

1.2.3 At the job site, plants shall be handled to prevent contamination until delivered to each planting site. Nursery stock shall not be placed on the soil or other potentially contaminated surfaces until they are placed at their specific planting sites.

1.2.4 If it is necessary to offload plants at the job site, plants may be placed on clean waterproof plastic tarps or other clean, sanitized surfaces. If tarps are used for holding plants, one surface needs to be dedicated for contact with nursery stock and will be cleaned and sanitized to maintain phytosanitary conditions.

1.3. Other planting site inputs

1.3.1 Washing, soaking, or irrigation of plant material shall be conducted using clean water sources as specified in the Appendix below. Untreated surface waters should not be used for these purposes.

1.3.2. On-site or off-site collection of plant materials, including seed and cuttings for direct planting, shall be conducted in a phytosanitary manner (see guidelines for collection practices at www.calphytos.org).

1.3.3. Prior to delivery to the planting areas, mulch, compost, soil amendments, inoculants, and other organic products need to be examined and determined to be low-risk for pathogen introduction. Acceptable materials are those that are free of contamination by plant pathogens based on their composition or manufacturing conditions, or that have been exposed to an effective heat treatment to eliminate pathogens. Such materials must be handled and stored in a manner that prevents contamination. At the job site, delivered materials shall be handled to prevent contamination until delivered to each planting site in the same manner specified for nursery stock in section 1.2 above.

1.3.4. All other materials to be installed at the site shall be of new or sanitized material that has not been stored in contact with soil, untreated surface waters, or other potentially contaminated materials. This includes irrigation supplies (such as pipe, fittings, valves, drip line, emitters, etc.), erosion control fabrics, fencing, stakes, posts, and other planting site inputs.

2. Cleaning and sanitation required before entering planting area to prevent introducing contamination from other locations

Phytophthora contamination can be present in agricultural and landscaped areas, in commercial nursery stock, and in some infested native or restored habitat areas. Contamination can be spread via soil, plant material and debris, and water from infested areas. Arriving at the site with clean vehicles, equipment, tools, footwear, and clothing helps prevent unintentional contamination of the planting site from outside sources.

2.1. Vehicles, equipment, and tools

2.1.1. Equipment, vehicles and large tools must be free of soil and debris on tires, wheel wells, vehicle undercarriages, and other surfaces before arriving at the planting area. A high pressure washer and/or compressed air may be used to ensure that soil and debris are completely removed. Vehicles that only travel and park on paved roads do not require external cleaning.

2.1.2. The interior of equipment (cabs, etc.) should be free of mud, soil, gravel and other potentially contaminated material. Interiors should be vacuumed, washed, and/or treated with sanitizing agents as needed to eliminate pathogen propagules that could be transferred to the planting area.

2.1.3. Small tools and other small equipment (including hoses, quick couplers, hose nozzles, and irrigation wands) need to be washed to be free of soil or other contamination and sanitized (see Appendix).

2.1.4. Hoses shall be new or previously used only for clean water sources (see Appendix).

2.2. Footwear and clothing

2.2.1. Soles and uppers of footwear need to be visibly free of debris and soil before arriving at the planting area. (See the Appendix for more details.)

2.2.2. At the start of work at each new job site, worker clothing shall be free of all mud, soil or detritus. If clothing is not freshly laundered, all debris and adhered soil should be removed by brushing with a stiff brush.

2.2.3. Gloves and non-porous knee pads must be new (if disposable) or laundered/sanitized at the start of each work day, and/or clean coveralls must be worn. Non-disposable gloves should be made of or coated with material, such as nitrile, that can be sanitized.

3. Prevent potential spread of contamination within planting areas

Phytophthora can also be spread within plantings areas if some portions of the site are contaminated. However, it is not possible to identify every portion of a planting area that may contain *Phytophthora.* Because *Phytophthora* contamination is not visible, working practices should minimize the movement of soil within the planting area to reduce the likelihood of pathogen spread.

Note that areas with higher risk of *Phytophthora* infestation include areas adjacent to planted landscaping, areas previously planted with *Phytophthora*-infected stock, areas with existing or recently removed woody vegetation, disturbed wetlands, and areas directly along watercourses. Areas with low risk of contamination typically include upland sites with only grassy vegetation or sites where surface soils have been removed.

3.1. Worker training and site access

3.1.1. Before entering the job site, field workers need to receive training that includes information on *Phytophthora* pathogens and how to prevent the spread of these and other soilborne organisms by following approved phytosanitary procedures. Workers should also be informed about any site-specific phytosanitary practices before work commences.

3.1.2. Do not bring more vehicles into the planting area than necessary and keep vehicles on surfaced or graveled roads whenever possible to minimize potential for soil movement.

3.1.3. Travel off roads or on unsurfaced roads should be avoided when soil and road surfaces are wet enough that soil will stick to vehicle tires and undercarriages.

3.1.4. To allow for adequate decontamination of equipment, tools, gloves, and shoes, avoid planting under overly wet conditions or when soil is saturated.

3.2. Minimize unnecessary movement of soil and plant material within the planting area, especially from higher to lower risk areas

3.2.1 Brush off soil from tools and gloves when moving between successive planting sites to prevent repeated collection and deposition of soil across multiple sites.

3.2.2. Avoid contaminating clothing with soil during planting operations. Brush off soil accumulations before moving from one planting site to the next. Use nonporous knee pads that are cleaned between planting sites if kneeling is necessary.

3.2.3 When possible, plant nursery stock from a given block in the same local area rather than spreading it widely. If a problem is associated with a given block of plants, it will be easier to detect and deal with it if the plants are spatially grouped.

3.2.4. Phase work to minimize movement between areas with high and low risk of contamination. Where possible, complete work in low risk areas before moving to higher risk areas. Alternatively, assign personnel to working in either high or low risk areas exclusively to reduce the need for decontamination.

3.2.5. Clean soil and plant debris from large equipment and sanitize hand tools, buckets, gloves, and footwear when moving from higher risk to lower risk areas or when moving between widely separated portions of the planting area.

3.2.6. All non-plant materials to be installed at the site (irrigation equipment, erosion control fabric, fencing, etc.) shall be handled to prevent movement of soil within the site, especially movement from higher risk to lower risk areas. Materials should be kept free of soil contamination by maintaining them in clean vehicles or carts, trailers, etc., or stockpiling in elevated dry areas on clean tarps until used.

4. Clean water specifications

Objective: use only uncontaminated, appropriately-treated water for irrigation.

4.1.1. Water used for irrigating plants needs to be uncontaminated. See Appendix for specifications.

Appendix

A. Procedures for sanitizing tools, surfaces, and footwear

Surfaces and tools should be clean and sanitized before use. Tools and working surfaces (e.g., plant carts) should be smooth and nonporous to facilitate cleaning and sanitation. Wood handles on tools should be sealed with a waterproof coating to make them easier to sanitize.

Before sanitizing items, remove all soil and organic material (roots, sap, etc.) from their surfaces. If necessary, use a detergent solution and brush to scrub off surface contaminants. The sanitizing agent may also be used as a cleaning solution. Screwdrivers or similar implements may be needed to clean soil out of crevices or shoe treads. Brushes and other implements used to help remove soil must be visibly clean and sanitized after use.

After surface soil and contamination are removed, treat the surface with one of the following sanitizing agents, allowing the appropriate contact time before rinsing. If surfaces are clean and dry, wet surfaces thoroughly and allow for the appropriate contact time listed. If the sanitizer has been used to help clean the surface, use fresh sanitizer to rinse off any dirty solution and then allow the required contact time. If treated surfaces are wetted with water, the sanitizing solution will become diluted. Apply enough sanitizer to completely displace the water film and then allow the required contact time. Sanitizing agents may be applied with spray bottles to thoroughly wet the surface. Observe all appropriate safety precautions to prevent contact with eyes or skin when using these solutions.

- 70-90% ethyl or isopropyl alcohol - spray to thoroughly wet the surface and allow to air dry before use
- freshly diluted bleach solution (0.525% sodium hypochlorite, Table 1) for a minimum of 1 minute (due to corrosivity, not advised for steel or other materials damaged by bleach)
- quaternary ammonium disinfectant - use according to manufacturer recommendations, making sure that the label indicates that the product is suitable for your use situation and has activity against *Phytophthora* when used as directed. Solution should be freshly made or tested to ensure target concentration.

Table 1. Dilutions of commonly available bleach products needed to obtain approximately 0.525% sodium hypochlorite concentrations (5000 ppm available chlorine).

Percent sodium hypochlorite in bleach	Parts bleach	Parts water	Diluted bleach percent sodium hypochlorite
5.25%	1	9	0.525%
6.0%	1	10.4	0.526%
8.25%	1	14.6	0.529%
8.3%	1	14.8	0.525%

For example, adding 100 ml of 5.25% bleach to 900 ml of water will make 1000 ml of 0.525% NaOCl solution. If using 8.3% bleach, add 100 ml of bleach to 1480 ml of water to make 1580 ml of 0.525% NaOCl.

B. Clean water specifications

Surface waters, including untreated water from streams or ponds and nursery runoff, can be sources of *Phytophthora* contamination. Only uncontaminated water or water that has been effectively treated to remove or kill *Phytophthora* should be used for rinsing or irrigating plant material.

5.1. Water used for irrigation shall be from treated municipal water supplies or wells and delivered through intact pipes with backflow prevention devices. Tertiary-treated municipal recycled water is acceptable.

5.2. If well water is used, wellheads shall be protected from contamination by surface water sources.

5.3 Untreated surface waters and recycled nursery runoff shall not be used, and plants shall not be held where potential contamination from such sources is possible via splash, runoff, or inundation.

5.4. Irrigation equipment must be kept free of contamination that could be transferred to irrigation water or plants. All hoses, wands, and nozzles, and hand irrigation equipment must either be new or sanitized before use. Drip irrigation and other sprinkler parts should be new or sanitized. Hose ends, wands, or nozzles that become contaminated with soil or mud during use should be cleaned and sanitized before being used further.

Attachment 2

Guidelines for Minimizing *Phytophthora* Contamination at Midpeninsula Regional Open Space District Preserves

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The goal of these guidelines is to minimize the contamination of Midpeninsula Regional Open Space District (MROSD) preserves with *Phytophthora*, a soil pathogen that kills plants. Once a site is contaminated, this soil pathogen can spread farther into wildland areas and can be difficult to eradicate. Prevention is the lowest cost and easiest method to manage contamination.

The best way to prevent the spread of this disease is to not move soil from one location to another by cleaning tools, equipment, and footwear.

Part of the District's mission is to protect and restore the natural environment. Within the last few years, planted restoration sites have unintentionally exposed preserves to soil pathogens brought in by nursery plants that were later found to be contaminated. Testing of former restoration sites on District preserves is now underway to determine which sites are contaminated and the necessary remedial actions.

Who should use these guidelines?
These guidelines are intended for use by field staff and Natural Resource (NR) staff who pose the highest chance of spreading soil *Phytophthora* via equipment and footwear. Several methods are provided on how and when to decontaminate tools and equipment depending on the site conditions (contaminated versus clean site) and staff activities (planting, other). Guidelines for contractors, consultants, volunteers and preserve visitors are under development. Consult NR staff (Amanda Mills, amills@openspace.org or x558, or Coty Sifuentes-Winter, csifuentes@openspace.org or x560) on which guidelines are best for your project.

When to use these guidelines?
Use these guidelines for any activity that contacts soil, water or plants on a known Phytophthora-contaminated site, on a formerly planted site, on a site with rare plants, or when preparing or planting a new restoration site.

Table of Contents

1. Overview

Remember to **Arrive Clean and Leave Clean**. The best way to prevent the spread of *Phytophthora* is to leave soil at its original location in the field. Equipment and footwear should be clean and sanitized before entering a site, especially for planting events where extra precautionary steps will be taken. Before leaving a site, especially at contaminated sites, it's crucial to clean and sanitize footwear and equipment.

Definitions:

Clean - remove soil and organic debris from tools and footwear

Sanitize - Use disinfecting agent such as alcohol or chlorine bleach.

Phytosanitary- control of plant pests and diseases especially in agricultural crops

1.1 What is Phytophthora?

1.1.1 *Phytophthora* (Fie-tof-thora) is a group of water molds that infect plants. There are many species, mostly notably *P. ramorm* (Sudden Oak Death), *P. infestans* (potato blight/ Irish potato famine) and *P. tentaculata* (nursery root rot).

1.1.2 Symptoms are similar to drought, making diagnosis difficult without testing.

1.1.3 Symptoms include leaf spots, branch die-back, cankers, trunk bleeding and death of whole plant.

1.1.4 Hosts include many native and nursery plants including oaks, bay laurel, madrones, sticky monkeyflower.

1.1.5 Brought to California through imported camellia and rhododendron nursery plants.

1.1.6 Mainly spreads from contaminated nursery stock, pots and soil. Can spread by foot traffic from contaminated footwear.

1.2 General Steps:

1.2.1 **What -** Items to be cleaned: Anything that comes into contact with soil, water or plants. This includes tools (shovels, hand trowels, hori-horis, rakes, tree cages, plant protection tubes etc.), footwear, equipment, wheeled equipment and vehicles.

1.2.2 **When -** Prior to the project day, field staff will be notified what items need to be cleaned and by which method. In general, tools and equipment should be cleaned at the field office before bringing them to the field site, and soil should be removed from footwear beforehand and more thoroughly cleaned at the entrance to the field site.

1.2.3 **Transportation** - Cleaned equipment should be transported in a truckbed from which all soil has been washed out, or cleaned equipment can be wrapped in a clean tarp before placed in a dirty truck.

1.3 Proper Disinfectants

All recommended disinfectants are considered pesticides. Personal protective equipment required by the State of California for anyone using disinfectants is eye protection with wrap-around and brow protection and 14 mil chemical resistant gloves. You can use smaller mil gloves if handling chemicals for 15 minutes or less.

1.3.1 The disinfectants listed in Table 1 are recommended by standard phytosanitary guidelines.

1.3.2 Other disinfecting agents or methods, such as Lysol or heat treatments, must be reviewed and approved by NR staff before use.

1.3.3 Disinfectants are most effective when surfaces are clean of soil and user follows label instructions.

Disinfecting Agent	**Active ingredient**	**Contact time**	**Product shelf life**	**Proper Disposal**	**Health Risk**	**Personal Protective Equipment**
Granular Chlorine Bleach (Leslies Chlor Brite, EZ Chlor)	Sodium dichloroisocyanurate dihydrate	2 min	Long if undiluted	Neutralizer (Vita-D-Chlor)	High	Eyewear, gloves; do not inhale
Liquid Bleach (Clorox)*	Sodium chloride	2 min	3-5 months	TBD	High	Eyewear, gloves; do not inhale
Rubbing Alcohol	Ethanol or Isopropyl Alcohol	1 min	Long	TBD	Med	Eyewear, gloves; flammable
Quaternary ammonium compounds (Quat 128 or Physan 20)	Dodecyl dimethyl ammonium chloride	10 min	Long if undiluted	TBD	Med	Eyewear, gloves; toxic to fish

Table 1: List of approved disinfecting agents. Always follow chemical label instructions.
*Liquid bleaches are generally not recommended as a disinfectant because they lose potency in storage.

2. Cleaning at the Field Office

Clean equipment, tools and footwear at the field office **before** arriving to the project site. This is the easiest way to prevent soil contamination. For those occasions where equipment and footwear must be cleaned at a field site, see Cleaning at Field Site (page 7).

2.1 Remove Soil from Equipment and Footwear

2.1.1 At the field office, scrape, brush, and wash off any soil or organic material. Take care to remove soil trapped in treads or cracks.

2.1.2 Pathogens can survive inside soil clods even after soaking because disinfectants may not completely penetrate large or clayey masses. Therefore, it is important to remove large clods of soil before soaking or otherwise treating with disinfectants.

2.2 Disinfect Tools With Bleach

Several disinfecting agents are available for treating Phytophthoras (Table 1). When many tools need treatment, use granular chlorine bleach at the field office. Spraying with rubbing alcohol is more appropriate for spot treatment at remote field locations.

NEVER MIX DIFFERENT DISINFECTING AGENTS.

ALWAYS FOLLOW LABEL DIRECTIONS.

FOLLOW REQUIREMENTS FOR PERSONAL PROTECTIVE EQUIPMENT WHEN USING DISINFECTING AGENTS.

List of Equipment for Disinfecting Tools:

- **Disinfectant** – most frequently, we expect to be using granular chlorine bleach such as EZ Chlor or Leslie's Chlor Brite when cleaning multiple tools at the field office. Carefully follow the directions below when using any [?] of the bleach disinfectants.
- **Vita-D-Chlor (chlorine neutralizer) -** This neutralizing product is only required if you used chlorine bleach as a disinfectant.
- **Waterproof container -** A large [minimum size?] plastic trashcan or waterproof pop-up garden trimming container in which to mix the water-based disinfectant and soak the tools.
- **Hard bristled scrub brushes and paint scrapers** - Grill brushes with scrapper attachment are handy tools to loosen soil from both flat surfaces and narrow cracks.
- **Personal Protective Equipment** Close-toed shoes, apron or coveralls, protective eyewear, 14 mil chemical resistant gloves (not leather or cloth).
- **Clean water source** - should not be cloudy or with a lot of organic material in it**.** Pressure washers or nozzles are helpful to remove soil quickly and get into small cracks.

2.2.1 Before using the disinfectant, remove soil as described in above section.

2.2.2 Fill waterproof container with 10 gallons of water. Use label instructions to add the right amount of disinfecting agent. For granular bleach, use one teaspoon in 10 gallons to get the desired 0.525% dilution.

2.2.3 Dunk tools in solution for required soaking time (see Table 1). For granular bleach, this is 2-minutes. Just getting tools wet does not mean they will be disinfected. Think of it as chemical cooking.

2.2.4 If you used chlorine bleach as a disinfectant, it needs to be neutralized after soaking. This 'rinse cycle" will deactivate the bleach so it does not corrode metal and so that it is safer to dispose of the soak water. Equipment sprayed with alcohol does not require this neutralization step.

2.2.5 In addition to tools, remember to disinfect the sanitation kit, gloves, tarps, or other miscellaneous items that have come into contact with soil.

2.2.6 Let tools dry. The hose lay is great for drying tarps.

2.3 Disinfect Wheeled Equipment/ Vehicles

Anything with wheels, including wheel barrels, ATV's, motorized carts that will be used at the field site needs to be cleaned and this is best done at the field office before the project. Vehicles that stay at the staging area do not have to be cleaned and sanitized. However, it is good phytosanitary practice to remove soil from wheels every time you leave a site.

2.3.1 Scrub down tires either by hand scrubbing or using a pressure spray wash.

2.3.2 Sanitize using disinfecting spray such as bleach (must be made weekly) or rubbing alcohol.

3. Cleaning at Field Site

Remember to **Arrive Clean and Leave Clean**. If equipment was cleaned and treated with a disinfectant at the field office and delivered in a clean truck, then on-site cleaning of equipment will only be required when leaving at the end of a work day. We recommend that everyone be encouraged to thoroughly clean their footwear of soil before arrival at the site, and then footwear be treated with alcohol upon arrival. Volunteers may not always be aware of this recommendation and may arrive with boots that need to be cleaned of foreign soil at the field site. Scraping all soil off equipment and footwear is required before leaving site, and sanitation of all footwear is usually recommended when leaving a site, especially for known contaminated sites. Rubbing alcohol is usually the preferred disinfectant in the field. Bleach products can be used in the field, but it is harder to mix and dispose of them properly in the field. See details below.

3.1 Cleaning at Start of Field Day

Tools:

Portable sanitation kits include the following items in a bin: 2 tarps, boot brush with scraper, 2 spray bottles of 70% isopropyl alcohol, 2 long-handled brushes, 2 paint scrapers, and instructions. On muddy days, also bring a basin and 2 jugs of water.

Alcohol 70% Ethyl alcohol (Ethanol) or 90% Isopropyl alcohol is fine. Called rubbing alcohol at drug stores.

Spray bottle - we take the nozzles from chemical resistant spray bottles and screw them directly into the rubbing alcohol bottle. Sometimes the stem needs to be trimmed. This allows you to have a spray bottle that is properly labeled with rubbing alcohol information and precautions.

3.1.1 Any equipment or footwear not cleaned and sanitized at the field office must be cleaned and sanitized before entering the site. Off-site soil should be considered contaminated.

3.1.2 Using the items in the portable sanitation kit, set up a staging area where equipment and footwear will be cleaned and sanitized. A paved parking lot or surface near the entrance to the work site is preferred.

3.1.3 Lay out 2 tarps, one labeled 'dirty' and one labeled 'clean'.
Remove any off-site soil from footwear and equipment onto the 'dirty' tarp. Try not to use water. If water is used, DO NOT dump potentially contaminated water onto on-site soil. Water can be dumped onto non-permeable pavement such as a road or parking lot in a low traffic area. This will UV-sterilize the dirty water (24 hr daylight cycle) as long as no clumps exist. Potentially contaminated soil in the 'dirty' tarp should be bagged in a trash bag and thrown away. DO NOT dispose of off-site soil at the new site.

3.1.4 Use the 'clean' tarp to sanitize soil-free footwear and equipment. Standing on the tarp, spray cleaned footwear and tools with 70% isopropyl alcohol, thoroughly wetting the surface. If the surface of your footwear or tools is already wet, spray extra alcohol to displace the water and allow the alcohol to soak the surface. Spray the footwear from the top down to avoid contamination.

3.1.5 Allow alcohol to evaporate (approx. 1 min) before starting work. You can stand on the tarp until your shoes are dry.

3.1.6 Footbath Alternative - we are investigating sanitizing mats where sanitizing only requires stepping on the mat. Gemplers.com, sanistride.com, and nelsonjameson.com sell both sponge mats and footbath mats for disinfecting shoes. Either chlorine bleach or non-evaporating disinfectants are used in these footbaths and the solution is changed weekly or as needed. Chemical strips are available to test if disinfectants are still effective. Caution should be taken if footbaths and solutions are transported to avoid spills.

3.1.7 Bleach alternative in the field. We are currently recommending that the bleach alternative be used at the field office and alcohol be used in the field. Bleach may be a better alternative in the field under some circumstances (large amounts of tools that must be disinfected in field), but will require special processes for safety and to properly dispose of the chlorine treatment water. Consult with the NR Department to determine best methods under these conditions.

3.2 Cleaning at End of Field Day

Tools:

Portable sanitation kits include the following items in a bin: 2 tarps, boot brush withscraper, 2 spray bottles of 70% isopropyl alcohol, 2 long-handled brushes, 2 paint scrapers, and instructions. On muddy days, also bring a basin & 2 jugs of water.

3.2.1 Sanitation of equipment and shoes is important for known or suspected contaminated sites. More leniency can be given for 'clean' sites.

3.2.2 Remove all soil and organic material from footwear and equipment. Leave soil onsite. Use the boot scraper, paint scraper and a stiff brush to remove any soil and plant material on both the top and bottom of footwear and from tools including the digging ends and handles. Make sure to clean out crevices. On muddy days, fill the basin with water to assist in rinsing off excess soil once the majority of debris has been removed.

3.2.3 Water helps in removing dried clods of soil. This water can be dumped on-site only if the soil originates from on-site.

3.2.4 Standing on the 'clean' tarp, spray cleaned footwear and tools with 70% isopropyl alcohol, thoroughly wetting the surface and allowing it to dry (approx. 1 min). If the surface of your footwear or tools is already wet, spray extra alcohol to displace the water and allow the alcohol to soak the surface.

3.2.5 Before leaving the site, shake soil off the scrapers, brushes and tarp.

3.2.6 At the field office, thoroughly clean the portable sanitation kit by washing out, spraying with alcohol and drying the container and all contents before storage. The portable sanitation kit must be clean before moving to a new site.

4. FAQ

Q. What do we do with left over soil?
A. Depends on the soil. Soil from off-site should be disposed of in a trash bag and thrown away--there's no knowing if off-site soil is contaminated or not. On site soil can be disposed of on-site back where it came from.

Q. What do we do with dirty water?
A. Pouring on pavement or another non-porous surface should disperse the contaminated soil enough to UV (sun) sterilize the water. If using bleach, use neutralizer and the water can be considered clean and safe enough to pour out anywhere. Don't pollute! Other disinfectants need proper disposal that isn't safe for dumping on the ground. Contact Natural Resources Department (Amanda Mills/Coty Sifuentes-Winter) or EH&S for safe disposal procedures.

Q. How do we use the tarps?
A. Two tarps, two purposes. Dirty tarp: use as a containment area to clean off soil clogs, especially offsite soil, for later disposal. Clean tarp: provides users a clean surface to sterilize (with alcohol or other sanitation liquid) shoes and equipment not cleaned at the Field offices.

Q. When will we need to sanitize or use the kits?

A. 1. Contaminated sites (list TBD) 2. Planting events-NR staff lead 3. When NR Staff recommend sanitation. Most of these will be NR staff lead, otherwise a leading crew member will advise on Phytosanitary BMP.

Q. Can we use hot water to sterilize?
A. Hot water can be used only if equipment bathes in 120-125° water for 30 minutes in order to be effective at killing both surface contaminants and internal infections.

Q. What about large equipment and Ranger lead projects?
A. TBD. Field staff will be trained on phytosanitary measures. For field crew lead projects, a crew member should be in charge of facilitating phytosanitary compliance.

Q. Why does this take so much time?
A. It's best to prevent rather than respond to contamination by *Phytophthora*. Once a natural area has been exposed to this soil disease, it can slowly spread and kill other plants. It is very difficult and expensive to kill all the pathogens in the soil of a natural area.

5. Sources

CalPhytos.org. "Guidelines to minimize *Phytophthora* Pathogens in Restoration Nurseries". Suddenoakdeath.org. http://www.suddenoakdeath.org/wp-content/uploads/2016/04/Restoration.Nsy_.Guidelines.final_.092216.pdf

Kurowki, Chet. "Control Pathogen Spread through use of Disinfectants". Calseed.org. http://www.calseed.org/documents/Disinfectants%2004-22-14a.pdf

Cornell University Institutional Animal Care and Use Committee "Cleaning and sanitizing equipment used in the transport of animals." https://ras.research.cornell.edu/care/documents/ACUPs/ACUP532.pdf

http://agriculture.mo.gov/animals/pdf/animalag_guide4.pdf

6. Future Methods

Let us know how these guidelines worked for your project! We may adjust guidelines based on feedback.

Attachment 3

Midpeninsula Regional Open Space District
Sudden Oak Death Precautions and Acorn Planting Protocol

1. Sudden Oak Death (SOD) Precautions
    a. Prior to the start of construction work, the Construction Superintendent shall inform construction personnel that they are working in a potential SOD-infested area, the implications of the disease, and the need to prevent further disease spread. Non-English speaking personnel shall be provided the appropriate written or verbal translations.
    b. To the extent practical, avoid locating equipment and material near host plants and trees, especially if showing disease symptoms.
    c. Route equipment away from host plants and trees, especially if showing disease symptoms.
    d. Any cutting or chipping of on-site plant material shall be restricted to the project area and the debris shall remain in the project area.
    e. After completing any cutting or chipping of on-site plant material, ensure that the equipment is free from host debris by first removing any visible plant material that clings to the equipment and follow with the cutting or chipping of non-host material.
    f. Before any equipment or vehicles leave the preserve, the contractor shall inspect the equipment and vehicles for host plant debris (leaves, twigs, and branches). Host plant debris must be removed from equipment and vehicles prior to their departure.
    g. If conditions at the work site are muddy due to dust suppression activities or summer rains, remove or wash off accumulations of soil, mud, and organic debris from shoes, boots, vehicles, and heavy equipment prior to exiting the preserve. If an equipment power wash station is used, its location must first be approved by the District Representative.

2. Acorn Planting Protocols
    a. Prior to planting, the contractor will remove debris within a 2-3 foot diameter of the planting basin and hollow out a planting hole fist deep and wide in loose soil. Place 3 seeds on their side in the hole, cover with soil to grade and firmly pat down. Contractor shall install Tubex Shrubshelters (2.5' height) centered on the planted seeds. Contractor shall insure that each installed Tubex Scrubshelter is in good condition and securely attached to wooden stakes with the bottom edge covered by soil. Contractor shall install a mulch layer or certified weed free stray 3 to 5-inches deep in an area of 3-foot diameter around each tree shelter. Contractor will provide and water each basin with one (1) gallon of water.
    b. After the first Spring, keep only the most vigorous seedling in each basin. If space is an issue, plant trees closer together.
    c. At year 5, thin trees to 2:1 ratio.
    d. At year 10, thin trees to 1:1 ratio.

Midpen will gladly issue a free permit to collect acorns for use from either Coal Creek or Los Trancos Open Space Preserves to a qualified contractor.

2. Clean planting materials

Objective: Start with propagative material that is free from infection or external contamination by *Phytophthora* species as well as other possible pathogens.

Suggested practices:

2.1. To avoid introducing *Phytophthora* into seed collection areas, make sure your equipment, vehicle, and footwear are clean. Clean and sanitize your footwear and tools between locations.

2.2. Where possible, collect seeds and cuttings as high above the ground as possible, preferably at least 3 ft above the soil surface.

2.3. Whenever possible, seed/fruit should not be collected directly from the ground. Seed can be knocked onto clean tarps placed on the ground or collected using seed traps. If seed is otherwise unavailable, exceptions may be considered based on the following criteria: 1). Vegetation is robustly healthy, the site is not known to be and not likely to be contaminated; 2). Seed has recently dropped on dry ground or leaf litter. Seeds that may be contaminated with soil via water splashed from the soil should be appropriately treated before storage or use (see section 9. Sanitizing materials and treatments). Ground-collected seed will be kept separate from other collected material during seed processing and planting and should be prioritized for testing throughout propagation.

2.4. Seeds, cuttings, and other plant propagules should not be collected from the vicinity of past restoration plantings or other areas where *Phytophthora* infestations are known, suspected, or likely. In the unusual situations where this is not possible (e.g., for rare populations), seed or tip cuttings may be collected if collected at a distance of 1 m or more above the ground. Material propagated from such sources should be kept segregated from plant material propagated from pathogen-free areas.

2.5. Protocols for seed collection from species that are low growing (with height stature less than 1 m above the ground) should minimize the risk of potential *Phytophthora* contamination. In general, seed that matures after the rainy season has ended has a low risk of being contaminated if collected before fall rains begin.

2.6. Collect seeds, cuttings, or other propagules only from plants and fruit that appear healthy. Do not collect or store seeds or other propagules with apparent disease symptoms such as decay, atypical discoloration, or fungal fruiting bodies.

2.7. If possible, avoid collecting seeds or other propagules during wet or muddy conditions to minimize potential for contaminating propagules or spreading contaminated soil.

2.8. Collect propagules with clean hands/gloves and equipment (pruning shears, etc.) and place them in new bags/envelopes and new or clean containers. Sanitize gloves, hands, and tools immediately if they come in contact with soil. Sanitize cutting tools frequently.

2.9. Conduct all processing of seeds or cuttings in a clean work area with clean equipment and clean hands or gloves. Discard or sanitize any seed or propagule that is dropped on the ground or comes in contact with contaminated surfaces or materials.

2.10. Clean seed as soon as possible after collection to remove any debris before storage or stratification. Inspect stored seeds or other propagules regularly and discard materials that develop symptoms in storage.

2.11. Where compatible with seed storage and germination requirements, treat seed using heat or appropriate disinfecting chemicals to eliminate seed-borne pathogens or external contamination. Seed treatment may be omitted for species where it is impractical or the risk of seed-borne or contaminating pathogens is negligible.

2.12. Do not bring potentially infected or contaminated plant material into clean production areas of the nursery. Properly collected seed and tip cuttings (described above) will normally be free of *Phytophthora.*

2.13. Plant propagules that have been in contact with the soil (divisions, tubers, rhizomes, bulbs, etc.) have an elevated risk of being infected or contaminated with *Phytophthora* or other soilborne pathogens. Plant stock originating from such propagules should be segregated from planting material started from cleaner sources, such as seed or cuttings and from other vegetatively propagated material from different localities. The goal is to avoid introducing pathogens, including pathogens that may be endemic to a given site, to new areas or native plant populations via plants that become infected in the nursery.

2.14. Plant propagules from the soil (divisions, tubers, rhizomes, bulbs, etc.) should be thoroughly cleaned to remove soil and inspected. Discard propagules that show evidence of decay. Surface contamination can be removed with treatments such as diluted bleach dips, but surface treatments will not eliminate internal infections. Internal infections can only be eliminated by heat treatments, but not all plant propagules will tolerate temperatures needed to kill *Phytophthora* infections.