UPPER FRANKLIN TRAIL
Construction Proposal

January 4, 2017

For: John "Pancho" Smith, Santa Barbara District Ranger
Los Padres National Forest

Submitted By:

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I. OVERVIEW

The Santa Barbara County Trails Council (SBCTC) proposes to restore a 2.69-mile section of the upper Franklin Trail, onto and across land under the management of the Los Padres National Forest (LPNF). The proposed trail would extend from the Phase II section of the lower trail on Santa Barbara County land to the crest of the Santa Ynez Mountains.

The purpose of the proposed project is to make improvements to a section of the historic Franklin Trail that is currently inaccessible to the public. The proposed project would increase recreational opportunities for a wide range of trail users to the upper Santa Ynez River watershed and connectivity to existing trails in the Santa Barbara backcountry.

It should be noted that restoration of the Franklin Trail poses unique challenges given the steep topography and larger-than-usual portions of the trail that far exceed Forest Service standards for grade. While the underlying bedrock and associated soils have shown to resist erosion over the hundred year existence of the trail, careful use of the sustainable-use techniques described below, best management practices for reducing sedimentation as shown in Appendix A and their specific application by severity of grade as shown in Appendix B should be sufficient to mitigate for excessive grade and minimize erosion such that it meets Forest Service standards.

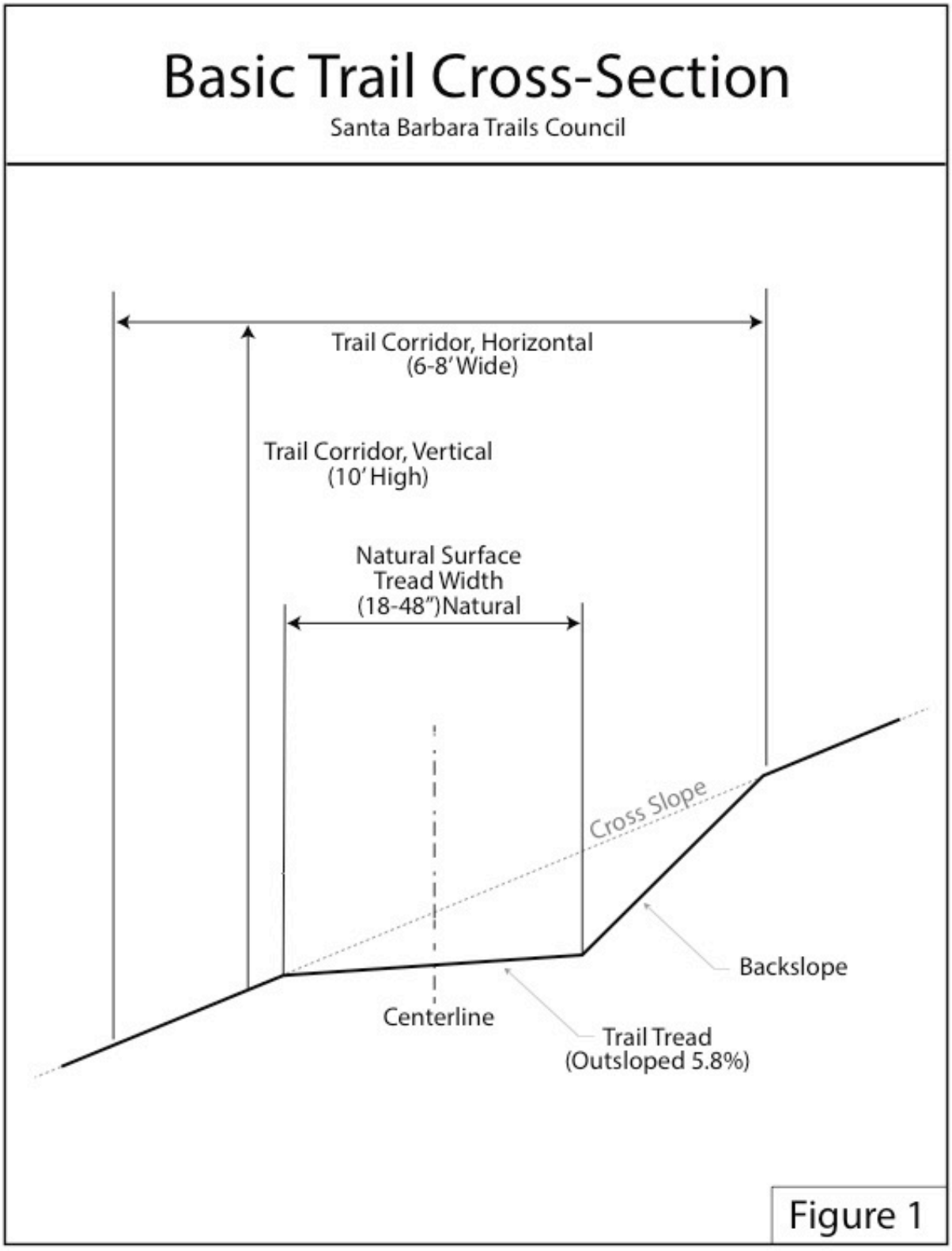
For more detailed descriptions of any of the trail construction guidelines described below please refer to the "Trail Assessment & Analysis For Phase III of the Franklin Trail."

II. TRAIL CONSTRUCTION GUIDELINES

Trail construction will use established Forest Service guidelines as described in the "Trail Construction and Maintenance Notebook, 2007 Edition" in restoration of the Franklin Trail. The goal of the project is to provide for safe and sustainable multi-use for hikers, backpackers, mountain bikers, trail runners and equestrians among others.

A. Trail Corridor Improvements (See Figure 1 below).

Brush will be cleared on either side of the trail centerline to a to create a corridor width ranging of from 6-8 feet and a height of 10 feet depending on side slope steepness and the need to increase the sightlines (amount of distance uphill and downhill users can see one another).



Typical cross-section of a trail that meets Forest Service standards for a pack-and-saddle trail. Tread and corridor widths will vary for different grades and sideslopes.

(corridor continued)

As needed, and especially on side slopes in excess of 30%, the outside brush may not be cut back as much while the uphill side slope brush may be cleared further uphill. Along steeper slopes, vegetation can help maintain the outside edge of the trail while clearing uphill brush hanging over the trail will minimize the need to brush the trail as often.

In either case the goal is to maintain the trail corridor to a total width of no more than 8 feet and provides sufficient distance for users to see one another.

B. Tread Restoration

The Franklin Trail will be constructed to U.S. Forest Service Class 3 Pack-and-Saddle trail width standards with special consideration for sections of the trail with the grades steeper than 8% and/or sideslopes in excess of 30% to achieve expectations for long-term safety and sustainability.

As noted above, large portions of the Franklin Trail far exceed Forest Service standards for grade of 3-12% with many sections over 20% and some in excess of 30%. The project proposes the following to provide safe multi-use:

- Up to 8% Grade (Non-Wilderness Single Lane Standard): 18" – 48" wide tread (with widths of 48" – 60" where sideslopes exceed 30%)
- 9-19% (Non-Wilderness Single Lane Standard): 36 – 48" wide tread, with provision for short passing lanes of up to 60" wide where sideslopes exceed 30%
- 20% +: (Non-Wilderness Double Lane Standard): 48 – 60" wide tread to accommodate passing lanes of up to 60" wide and sideslopes exceed 30%

C. Erosion Control (See Figures 5 & 6).

One of the basic principles of trail construction is that they be sustainable, meaning that they will last over time with a minimum of maintenance. A key component of sustainability is erosion control and the key part of that is to get the water off the trail as soon as possible and to keep it from continuing down the trail for any distance.

Restoration of the Franklin Trail poses unique challenges given the topography and larger-than-usual portions of the trail that exceed Forest Service standards. While the underlying bedrock and associated soils have shown to resist erosion over the hundred year existence of the trail, careful use of the sustainable-use techniques described below, best management practices for reducing sedimentation as shown in Appendix A and their specific application by severity of grade as shown in Appendix B should be sufficient to mitigate for excessive grade and minimize erosion such that it meets Forest Service standards.

The project proposes use of the following measures to ensure sustainability:

Brush and Fill. The technique involves lining the lower edge of the trail with brush, chainsawing it into fine pieces and then filling it with the slough material cleared from the lower backslope. This serves to act as a sedimentation barrier that prevents erosion, traps any soil being carried off the trail and makes valuable use both of the brush and backslope material.

Outsloping. Outsloping (sloping the tread away from the hillside) is one of the key concepts used to eliminate the impacts caused by running water. The project proposes to outslope the trail in amounts ranging from 5-7% wherever possible, with slightly higher percents (8-9%) where the

trail grade is steeper. Slightly increasing outslope, along with armoring edge armoring (see below), can be very effective in mitigating for grade.

Armoring the Trail. In areas where the outside edge of the trail is less stable, use of nearby rock material will be embedded to further stabilize trail edge. Used in conjunction with outsloping, this not only protects the outer edge from user damage, but also will serve to reduce erosion.

Use of outsloping, brush and fill techniques and armoring works extremely well to meet several key basics:

Sheets water off the trail, which is critical in offsetting the potential damage that can be done when water runs down steep sections of trail such as those found along the Phase III section of the Franklin Trail.

Makes good use of the brush and slough removed when widening the inner part of the tread.

Reduces sedimentation by catching soil that might wash off the trail.

Adds a protective barrier on the trail edge to resist gullying, maintain the edge and reduce the impacts from trail use.

Rock "Stacking". The phrase comes from the concept used by those who originally built the Franklin Trail, though they might not have used this term. In constructing the trail, it appears they realized that they could stabilize the outer edge of the trail simply by using the rock pried up when they were removing rock and soil to create the tread. The project proposes use of this technique wherever there is a large supply of rock, loosely stacking it below the lower edge of the trail to lightly armor the slope.

Use of Grade Reversals.

Designing grade reversals into an existing trail presents challenges, especially on trails contouring along a steep hillside where it isn't that easy to add rises and falls without extensive backsloping and creating the potential to destabilizing the hillside.

However, even on steep trails like the Franklin, it is possible to add grade reversals at key points above and in the middle of many of the steeper sections where there are short level areas. The goal is to divert water off the trail above any steep section and in the middle of it wherever there is enough relatively level tread to build them.

Addition of Rolling Drain Dips (Super-Charged Trail Knicks). Rolling drain dips are achieved by removing soil to create a dip in the trail where water can be diverted off it. True dips are much longer, typically constructed with a gentle drop into the dip, a level section and the followed by a gentle rise out of the dip, creating the effect of a grade reversal in locations where reversals aren't practical.

In contrast, the rolling drain dips are relatively short, serve to get water off the trail like water bars were designed to do, but do it more effectively and requiring much less maintenance over time. Rolling drain dips that work well to get water off the trail, minimize the need for maintenance and reduce sedimentation — especially on steeper grades — have a number of characteristics:

Use of changes in trail direction. Dips work extremely well at any location where there is a turn in the trail. Water by its nature wants to flow in a straight line. Adding dips where the trail is

changing direction aligns the water flow with the direction you want it to go off the trail and reduces opportunities for the dip to become clogged with sediments.

Use of rock armoring at the lower edge and bottom of the dip will reduce damage to the dip, protect the lower part of the dip during high water flows and can help slow the water down so sediments are left on the hillside rather than washing downhill into the creeks.

The project proposes extensive use of rolling drain (see Appendix C) dips to mitigate the impact of the steep grades and use of armoring to stabilize the hillside below the dips, allowing sediments to be deposited on the upper hillsides rather than being washed down into the creeks below them.

Use of Step Overs. In locations where the trail grade is excessively steep, as is the case on the Phase III section of the Franklin Trail, use of rock step overs embedded at a diagonal angle creates a barrier that helps divert water off the trail and slowing users down.

Where the grade exceeds 20% step overs can work really well to divert water off the trail and also slow down trail users.

The project proposes to use step overs approximately every 75 feet where the grade is between 12-20% and approximately every 50 feet where in excess of 20%. This will serve as a series of barriers that forces water off the trail at regular intervals. The step overs will be angled between $45\text{-}60^0$, with the tread armored above the step overs and the slope below armored to minimize erosion. The step overs will be designed to allow mountain bike travel over the upper edge of the step over along the backslope. The number of step overs will vary based on field conditions.

Sedimentation Armoring. As noted in several of the descriptions above, use of rock and other material to armor the areas where water is being forced off the trail (dip drains, step overs, grade reversals) can help protect them from damage and slow down the flow of water as it goes off the trail.

Appendix A

Best Management Practices for Reducing Sedimentation.

Develop site-specific BMP prescriptions for the following practices, as appropriate or when required, using State BMPs, Forest Service regional guidance, land management plan direction, BMP monitoring information, and professional judgment.

- Use a watershed perspective and available watershed assessments when planning aquatic ecosystem improvement or restoration projects.
    - Consider how existing water quality and habitat conditions at the project site have been affected by past habitat alterations, hydrologic modification, and riparian area changes in the watershed.
    - Consider how past, current, and future land use patterns may affect the proposed project site.
    - Recognize that inhabitants and users at the site (beaver, deer, birds, and people) may change the current ecosystem state to suit their needs.
- Use desired future conditions to set project goals and objectives.
    - Establish desired future conditions that are consistent with the land management plan's goals and direction.
    - Use a reference condition to determine the natural potential water quality and habitat conditions of a water body.
    - Consider the potential for future changes in environmental conditions, such as changes in precipitation and runoff type, magnitude and frequency, community composition and species distribution, and growing seasons that may result from climate change.
    - Consider water quality and other habitat needs for sensitive aquatic or aquatic-dependent species in the project area.
- Favor project alternatives that correct the source of the degradation more than alternatives that mitigate, or treat symptoms of, the problem.
    - Consider the risk and consequences of treatment failure, such as the risk that design conditions could be exceeded by natural variability before the treatment measures are established, when analyzing alternatives.
    - Consider as a first priority treatment measures that are self-sustaining or that reduce requirements for future intervention.
- Use natural stabilization processes consistent with stream type and capability where practicable rather than structures when restoring damaged stream banks or shorelines.
- Prioritize sites to implement projects in a sequence within the watershed in such a way that they will be the most effective to achieve improvement or restoration goals.

Site-specific BMP prescriptions:

- Develop an erosion and sediment control plan to avoid or minimize downstream impacts using measures appropriate to the site and the proposed activity.

- Avoid or minimize unacceptable damage to existing vegetation, especially plants that are stabilizing the bank of the water body.
- Conduct operations during dry periods.
- Stage construction operations as needed to limit the extent of disturbed areas without installed stabilization measures.
- Promptly install and appropriately maintain erosion control measures.
- Promptly rehabilitate or stabilize disturbed areas as needed following construction or maintenance activities.
- Minimize bank and riparian area excavation during construction to the extent practicable.
- Properly compact fills to avoid or minimize erosion.
- Contour site to disperse runoff, minimize erosion, stabilize slopes, and provide a favorable environment for plant growth
- Inspect the work site at suitable regular intervals during and after construction or maintenance activities to check on quality of the work and materials and identify need for mid-project corrections.
- Consider short- and long-term maintenance needs and unit capabilities when designing the project.
- Develop a strategy for providing emergency maintenance when needed.
- Include implementation and effectiveness monitoring to evaluate success of the project in meeting design objectives and avoiding or minimizing unacceptable impacts to water quality.

Appendix B

Grade Data, Mitigation Types and Intervals

The following chart provides information regarding appropriate types of mitigation and intervals for those types based on grade and sideslope.

Grade	Grade Reversal	Rolling Drain	Step Over	Rock Stacking	Brush & Fill	Notes
0-5	✓				✓	Outslope 5-7%, add dips and grade reversals every 25-40 yards; fine-cut brush and place along lower outside edge of the tread and scatter dirt from cutting the full bench tread or backsloping in the brush to serve as a sediment barrier.
6-10	✓	✓			✓	Same as above.
11-15	✓	✓		✓	✓	Same as above but increase outslope to 7%; armor the rolling drain dips to minimize gullying at the point where the water flows off the trail; add rock along the outside edge of the trail where there are any signs of instability to protect the slope; brush and fill as noted above.
16-20		✓	✓	✓	✓	Note: grade reversals no longer feasible due to increased grade. Same as above but increase outslope to 8-9%; armor the rolling drain dips to minimize gullying at the point where the water flows off the trail and increase frequency of drains to no more than 25 yards where feasible; add

						rock along the outside edge of the trail where there are any signs of instability to protect the slope; brush and fill as noted above; add step overs along with rolling drain dips and in other locations where feasible.
21-25		✓	✓	✓	✓	Same as above but shorten the dips (similar to knicks) and armor them with rock to minimize gullying at the point where the water flows off the trail; increase frequency of drains to no more than 20 yards; add several layers of rock along the outside edge of the trail where there are any signs of instability to protect the slope; brush and fill as noted above; add step overs along with rolling drain dips and in other locations where feasible.
26-30		✓	✓	✓	✓	Same as above. Add shorter drain dips and armor them where full drain dips are not feasible; focus on use of step overs along with armoring every 15 yards to prevent gullying. Add several layers of rock along the outside edge of the trail where there are any signs of instability to protect the slope; brush and fill as noted above.
30+		✓	✓	✓	✓	Same as above but focus on use of step overs along with armoring every 15 yards to

						prevent gullying. Add several layers of rock along the outside edge of the trail where there are any signs of instability to protect the slope; brush and fill as noted above.

Appendix C

Safety is the number one priority for the Santa Barbara County Trails Council (Trails Council) and those working on the Santa Barbara area trails. The Trails Council has created a culture of safety that encompasses all trail maintenance and construction activities and has adopted a set of safety requirements based on the USFS Health and Safety Code Handbook.

Workers should always be conscious of the dangers of sharp tools, rough vegetation and terrain, excess heat, cold, fatigue, insects and poisonous snakes. All tools including chain saws, power brush-cutters, mowers and hand tools can be hazardous if not used properly. Be sure there is sufficient room between workers using these tools. The group safety's equipment required for all trail maintenance and construction activities and tools are:

1) First Aid kit
2) USFS radio, working cellphone and/or working satellite phone
3) USFS approved hardhat, work gloves, safety glasses, non-skid boots, and ear protection (when working with power tools).
4) In some cases, long trousers, long sleeves, and 8" high (tall) leather boots may be required.

Trailhead Safety Sessions

Crew leaders are responsible for ensuring that all participants are able to safely perform trail duties assigned to them. It is required that prior to the start of any construction or maintenance project, the Activity Leader conduct a Trailhead Safety Session. Before going on the trail, crew leaders are required to discuss the details of the project, any potential hazards, and all required safety equipment. Refer to the Job Hazard Analysis (JHA - see Figure 10) for items to discuss prior to every project.

The Trailhead Safety Session can also be used to ensure that all volunteers and paid trail crew members have enough water, are equipped with the proper clothing and footwear, and have signed all necessary documents. Those with specialized training like CPR or chainsaw certification can also be identified.

When going over required safety gear, take the opportunity to pass out the Trails Council Safety Quick Reference Card for those that don't have them, along with any gear that is required. When going over the details of the project or hike have the group identify potential hazards and ways to avoid them. This gets the group involved and helps them understand why we are creating a "Culture of Safety" within the Trails Council.

Planning for Emergencies

Should there be an accident or emergency of any kind while you are conducting a volunteer or agency contracted project, it is important you do the following:

1) Make sure you fill out the **Incident Report Form (See Figure 7)** completely regardless of the severity of the injury or type of accident after you have dealt with the situation. We need to learn what we can so we can prevent similar incidents on future projects.
2) If the incident requires an emergency response, take a few moments to assess the severity of the accident, your exact location, and what you need to have done. If a GPS is available, note your coordinates.

3) Call 911. Cell phone calls are usually routed through Ventura and the person on duty may not know our area at all. Be sure the person understands how they can locate your position.
4) Optionally, call the Watch Commander at the Sheriff's Department if you feel Search and Rescue may be needed.
5) Contact the appropriate agency representative to let him or her know what the nature of the emergency was and the current situation.

FIRE AWARENESS & SAFETY

Working during periods of time when there is any potential for a fire occurring as a result of work being conducted during the project, extreme vigilance is required, especially if the project involves the use of power tools or machinery that could start a fire.

The following are guidelines used by Trails Council for fire prevention during periods when fire danger is an issue:

1) Power trimmers or weed whackers with any type of metal blade or other cutting blade may not be used.
2) All chainsaws and other machinery that have exhauset outlets will have Forest Service approved spark arrestors on them.
3) Chain saws shall be limited to use in the mornings before noon or when conditions exist that minimize the potential for a fire (such as foggy weather, shade, lack of flammable vegetation such as dry grasses).
4) Chain saw cutting should be limited to a minimum of 12" above any ground surface or rocky areas where sparking may occur.
5) In any location where power tools or machinery are being used there shall be a shovel and fire extinguisher present and available should a fire begin.
6) Refueling shall be done on mineral soil in a cleared area at least 5 feet in diameter. Chain saws or other power tools shall not be refuled for a minimum of 10 minutes to allow them to cool.
7) Crewmembers shall patrol the work area regularly to ensure that any spot fires that may be starting can be identified and put out. Crewmember will stay a minimum of 30 minutes at the end of the work day or if moving to another work site to ensure that any fire starts or smoldering material is not allow to escape.

Appendix D

Contact Information, Safety Check Lists & Report Form

CONTACT INFORMATION

In an Emergency: call 911 immediately and then others as needed afterward.

SANTA BARBARA RANGER DISTRICT

Santa Barbara Ranger District

3505 Paradise Road

Santa Barbara, CA 93105

Telephone: (805) 967-3481

Fax: (805) 967-7312

SANTA BARBARA COUNTY TRAILS COUNCIL

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SAFETY CHECKLIST

TRAIL LEADER RESPONSIBILITIES

Prior to the start of any construction or maintenance project, the Leader MUST conduct a Trailhead Safety Session that includes reviewing each item on the Job Hazard Analysis (JHA).

Aside from ensuring each volunteer signs in and is part of a review of safety issues as described in the JHA, each leader is responsible for ensuring that all participants are able to safely perform trail duties assigned to them.

This session can also be used to ensure that all volunteers have enough water, are equipped with the proper clothing and footwear, and have signed all necessary documents. Those with specialized training like CPR, other first aid training or specific trail maintenance skills can also be identified.

SAFETY COMES FIRST

It is essential to consider safety when doing any kind of trail work. Sharp tools, unfamiliar ground, weather, fatigue and natural hazards can lead to injuries and must be considered. Sturdy boots and gloves are a must to protect hands and feet. Long pants and shirts are recommended. Eye protection and hard hats may also be required.

Crew leaders should know where the closest medical facility is located and who will go for help. When an accident happens in the field, time is critical and every second counts. Create an emergency plan before heading out on the trail. Make sure everyone knows who to notify if an emergency occurs. Every workday should start with a talk about tool safety and the emergency action plan.

Points to cover in your pre-trail work safety talk:

1. Tools should be carried at your side – not on your shoulder.
2. Carry tools with the sharpest side facing down.
3. Carry only one tool in each hand. If only carrying one tool, hold it in your downhill hand.
4. While working, maintain at least a tool's length distance between yourself and other trail workers.
5. Tools rarely need to be swung above waist level. If a tool must be raised higher, nearby workers should be advised.
6. When walking past other trail workers who are using tools, announce yourself and make eye contact before passing.
7. Lay tools down on the uphill side of the path with handles pointing towards the trail.
8. Be aware of environmental hazards such as poison ivy, stinging insects, poisonous creatures, sunstroke, altitude, dehydration, hypothermia, etc.
9. Find out if any crewmembers have medical conditions and if they are carrying their medication. Heart conditions, bee sting allergies and asthma are common medical conditions to be aware of.
10. Make sure your crew is drinking, eating and resting adequately. This will help prevent accidents from happening.

PERSONAL PROTECTIVE GEAR (PPE)

This list is designed as a general reference for staff and volunteers working on the Los Padres National Forest trails and is subscribed to by Trails Council.

1. Hard Hat (bike helmets are acceptable)
2. Eye protection
3. Long-sleeved shirt and pants
4. Gloves
5. Non-skid boots
6. Basic first aid kit
7. Lots of water
8. Insect repellant

9. Sunscreen lotion

INCIDENT REPORT FORM

Use this form to report any injury or accident that occurred during the project or for any incident you may observe involving others who were not members of your work party.

Please be as accurate as possible as we will use this information to help insure future projects are carried out as safely as possible.

1. Reporting Party _____ Telephone _____

2. Date _____

3. Location of incident:

4. Brief description of the injury, accident or incident:

5. Name of Victim:
   Address:
   Telephone:

6. Name(s) of Witness or Witnesses:

7) Disposition:

PERSONAL PROTECTIVE GEAR (PPE)

This list is designed as a general reference for staff and volunteers working on the Los Padres National Forest trails and is subscribed to by Trails Council.

10. Hard Hat (bike helmets are acceptable)
11. Eye protection
12. Long-sleeved shirt and pants
13. Gloves
14. Non-skid boots
15. Basic first aid kit
16. Lots of water
17. Insect repellant
18. Sunscreen lotion

Appendix E

Job Hazard Analysis (JHA)

The JHA should be used as a teaching and safety tool for volunteers and paid trail crewmembers who are participating in Trails Council sponsored projects. Crew Leaders are required to provide a safety talk at the beginning of every workday and to go over all items on the JHA appropriate for the work being done.

TRAIL CREWS

Task-Procedure	Hazard	Mitigation actions
Working in forested areas	Head injuries from falling branches	Wear hard hats.
	Eye injuries from chips or branches	Leave plenty of room between crew members when working. Wear safety goggles if using axe, loppers or chopping tools. Wear proper gear if operating a chainsaw. (Refer to chainsaw JHA) (Chainsaw use only in non-wilderness areas).
	Insect Bites	Use insect repellent and wear clothing with long pants and sleeves. Check each other's clothing, exposed areas and hair regularly for ticks especially during spring and summer months, although in this area, ticks are present year around.
	Rattlesnakes	During warm/hot weather avoid moving large rocks or boulders. If one has to be moved, proceed with caution. Remember that rattlesnakes will coil under rocks and boulders as they seek shelter from the heat. When cutting brush, never stick your hand/arm in blindly. Prior to cutting, use a long handled tool to make sure that snakes are not present. If you hear the rattle sound AVOID THAT AREA ALTOGETHER. If a bite occurs, seek medical help immediately.
Walking on trails	Slips, trips, falls and blisters	Watch where you are walking. Be aware of boulders, branches, holes and other obstacles on the trail. If adverse weather is present, be alert of areas that might be wet and icy. Wear proper footwear including boots/shoes and socks. Leave plenty of room between crew members when walking.
	Falls from unstable ground	Keep crews out of steep country with unstable soils during hazardous conditions such as heavy rainfall or high winds. Be cautious on wet plant material and loose rocks/gravel on steep slopes.
Working with tools	Bodily injuries	Use gloves, protective clothing and footwear. Make sure you are familiar with and know how to operate all tools you

		might use. If there is uncertainty as to the use of any tool, check with a supervisor/leader and learn proper operating techniques prior to using that tool.
Lifting	Back injuries	Use proper lifting techniques. Bend knees when lifting. Lift with legs and not with back. Do not exceed your personal ability. Careful of slippery footing.
Working in warm or hot weather	Heat exhaustion and dehydration	DRINK PLENTY OF WATER. Take periodic breaks in shaded areas. Pace yourself while working.

CHAINSAW USE — FIRE SAFETY

Task-Procedure	**Hazard**	**Mitigation actions**
Tailgate safety meeting	New crews unfamiliar with safety issues.	Hold tailgate safety meetings at start of project, once weekly, and if conditions or crew personnel change.
Fueling	Fire from gas spilled on muffler or other ignition source	Let saw cool before refueling Fuel up on bare ground, prevent spillage during fueling NO SMOKING DURING REFUELING Move at least 10 feet away from fueling area before starting saw Stay 20 feet away from ignition sources when fueling Replace excessively gas/oil soaked gloves Read, and be familiar with MSDS Mix fuel in well-ventilated area Clean up spills promptly Use labeled containers
	Chemical burn from gas spilled on clothes, skin, and eyes.	Wear gloves and safety eye wear Remove contaminated clothing and gloves, immediately wash exposed area with soap and water
Saw Maintenance	Improperly operating saw may lead to fatigue, injury	Keep saw in good working order Ensure spark arrester is in good condition Keep idle adjusted properly Inspect bar for wear, and proper chain tension Do not use a saw not properly maintained
Sharpening Chain	Cuts to hands	Wear gloves when sharpening chain When sharpening chain use a vise if available Never file chain while saw is running Keep guard over chain when saw is not in use Understand proper angle, raker height, and filing Adjust raker height as needed but avoid taking too much off
Transporting Saw	Cuts from chain or dogs due to tripping while carrying the saw	Point bar forward when going downhill with saw at side Keep bar to rear if going uphill with saw at side

	Burns from muffler	Use shoulder pad and chain and/or dog guard when carrying saw on shoulder Always keep muffler away from body
General Cutting	Cuts to body Struck on head by falling material Struck in eye by flying objects Hearing loss Slips, trips, and falls Cuts to body from thrown chain Fatigue Back injury and pulled muscles, torn ligaments Heat exhaustion and hypothermia Lack of communications with employees in cutting area Serious cuts to body from KICKBACK Cuts to co-workers in area	To reduce risk of throwing chain, check chain tension each time saw is refueled Do not operate saw above shoulder height Take frequent rest breaks as needed Alternate cutting tasks, and ask for additional sawyers if needed Stop cutting when tired Do not attempt to carry heavy logs Cut materials to sizes which can be safely carried or ask for help Wear proper clothing for time of year and weather conditions Wear layers that can be removed or added to, as conditions dictate Take breaks, drink fluids Radio contact from cutting operations will be maintained with dispatch or ICP Verbal and visual communications will be established and maintained with crewmembers Keep bar tip extended through the cut, keep bar tip clear of all other objects, wear protective equipment Ensure saw has a chain break Keep thumb and fingers wrapped around handlebar at all times Maintain a minimum 10 feet spacing (2 ½ BAR LENGTH SECURE AREA) Be alert, and do not permit co-workers to work immediately behind sawyer Shut off saw, and/or engage chain break if co-worker needs to access the area near the saw Step over logs, not on them Clear work area around material being cut

Medical Emergencies	Insect stings, bites & allergic reactions, personal injury	Watch for bee nests or swarms while walking, cutting and after tree has been felled People who know they are allergic to bees should have a sting kit and know how to use it They need to make it known they are allergic and inform other crewmembers on how to use the sting kit All sawyers will maintain current first aid/CPR training Communications must be established and maintained at all times so that advanced emergency medical treatment can be requested, and promptly obtained, if necessary
Swamping		Be aware at all times where the chain saw operator is and stay out of the cutting area until the operator signals it is safe to enter and remove cut brush.

FIRE DANGER

Task-Procedure	Hazard	Mitigation actions
Using Power Tools	Fire hazard from sparking in rocky terrain or where the brush is dry.	Power trimmers or weed whackers with any type of metal blade or other cutting blade will not be used on the project
Spark Arrestors	Sparks from exhaust.	All chainsaws and other machinery that have exhauset outlets will have Forest Service approved spark arrestors on them.
Brush cutting with chain saw.	Sparks.	Chain saw cutting should be limited to a minimum of 12" above any ground surface or rocky areas where sparking may occur. Chain saws shall be limited to use in the mornings before noon or when conditions exist that minimize the potential for a fire (such as foggy weather, shade, lack of flammable vegetation such as dry grasses).
Extinguishing smoldering areas or embers.	Wildfire spread.	In any location where power tools or machinery are being used there shall be a shovel and fire extinguisher present and available should a fire begin. Crew members shall patrol the work area regularly to ensure that any spot fires that may be starting can be identified and put out. Crew member will stay a minimum of 30 minutes at the end of the work day or if moving to another work site to ensure that any fire starts or smoldering material is not allow to escape.
Refueling equipment	Fire hazard.	Refueling shall be done on mineral soil in a cleared area at least 5 feet in diameter. Chain saws or other power tools shall not be refuled for a minimum of 10 minutes to allow them to cool.