



**Angie Gruys, Program Specialist**  
**Resource Conservation District of Santa Cruz County**



# RCDSCC Rural Road Program

- Started in 1998
- Completed over 100 projects to date
- Education and outreach
  - Publications and workshops
- Technical assistance
- Permit assistance
- Cost-Share assistance

# Ultimate Goal

reduce sediments derived from roads and parcels to  
improve water quality and salmonid rearing habitat.



# Problem #1





# Problem #2



# Plan of Attack

- Educate
- Communicate
- Assess
- Plan
- Build
- Maintain/Monitor



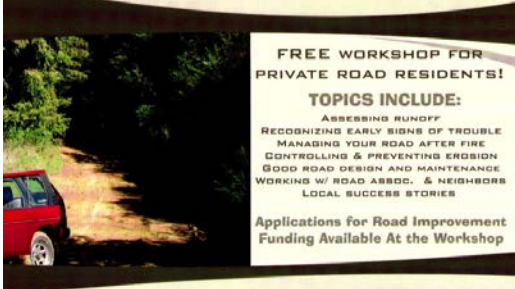


# Educate



## Don't Get Stuck in a Rut!

PROTECT YOUR PRIVATE ROAD FROM STORMWATER RUNOFF



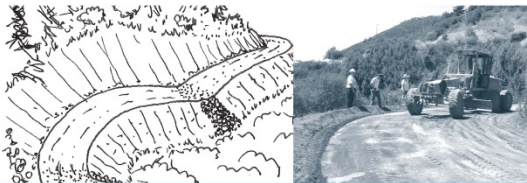
**FREE WORKSHOP FOR  
PRIVATE ROAD RESIDENTS!**

### TOPICS INCLUDE:

ASSESSING RUNOFF  
RECOGNIZING EARLY SIGNS OF TROUBLE  
MANAGING YOUR ROAD AFTER FIRE  
CONTROLLING & PREVENTING EROSION  
GOOD ROAD DESIGN AND MAINTENANCE  
WORKING W/ ROAD ASSOC. & NEIGHBORS  
LOCAL SUCCESS STORIES

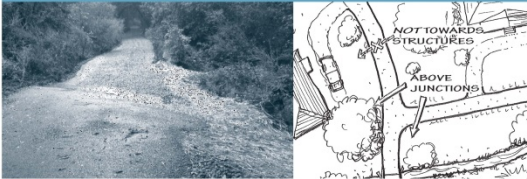
Applications for Road Improvement  
Funding Available At the Workshop

Register today! 831.464.2950 ext 22 or [astuart@rcdsantacruz.org](mailto:astuart@rcdsantacruz.org)



central coast

## PRIVATE ROAD MAINTENANCE GUIDE



# Communicate

- With each other:
  - Neighbor to Neighbor meeting
  - Group meetings/Road association meetings
  - Walk the road with a professional
  - Understand each others goals
    - Long term vs short term
    - Safety, environmental, etc...
  - Budget
- With RCD/Contractor
  - Authorized representative





# Assess



- What IS the problem
  - Is there a safety concern?
  - History vs current use.
  - Specific or general
- What CAUSED the problem
  - A one time event or chronic problem
- What are POSSIBLE solutions
  - What's your budget
  - Recommends an road assessments of the entire road and prioritize

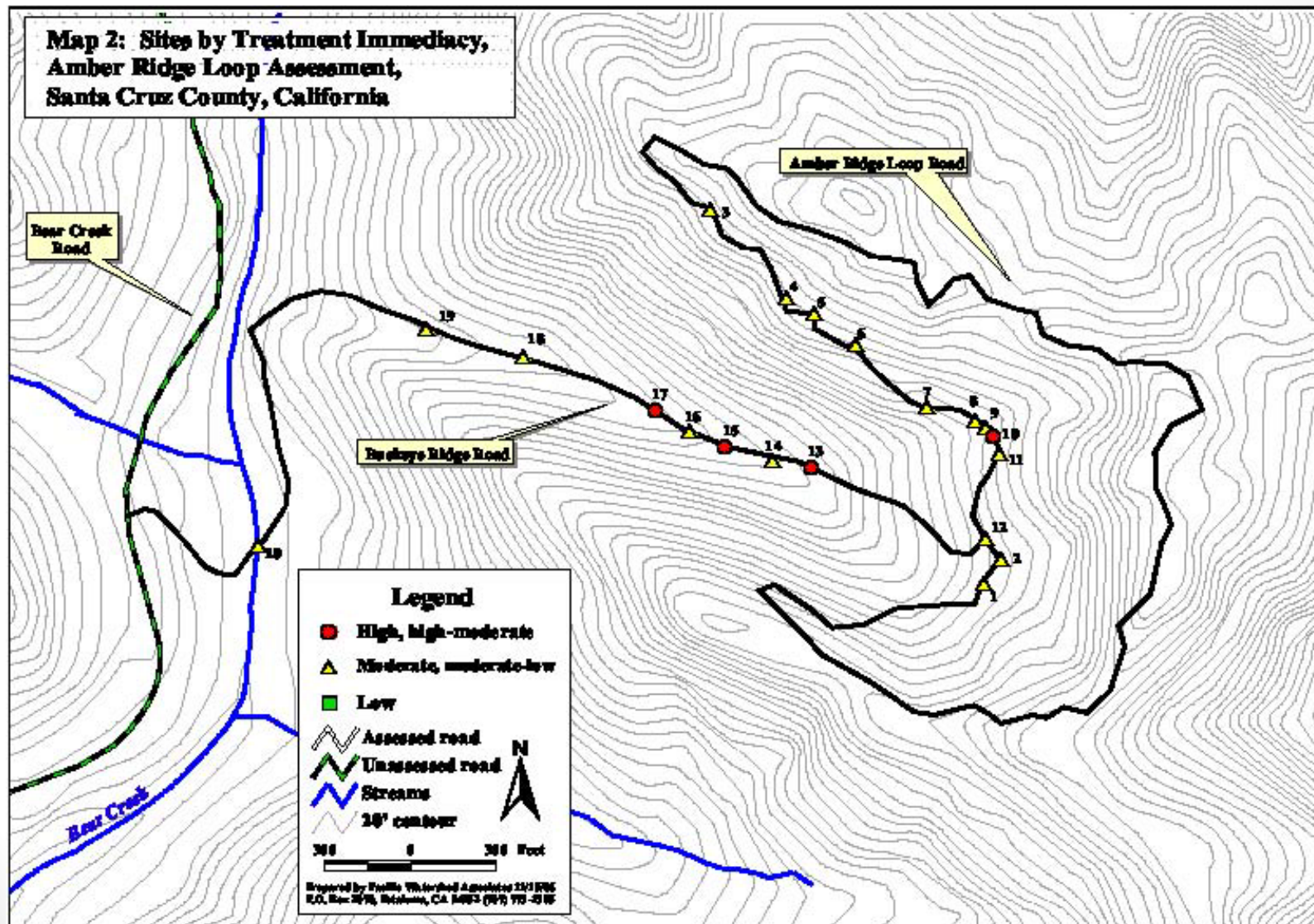






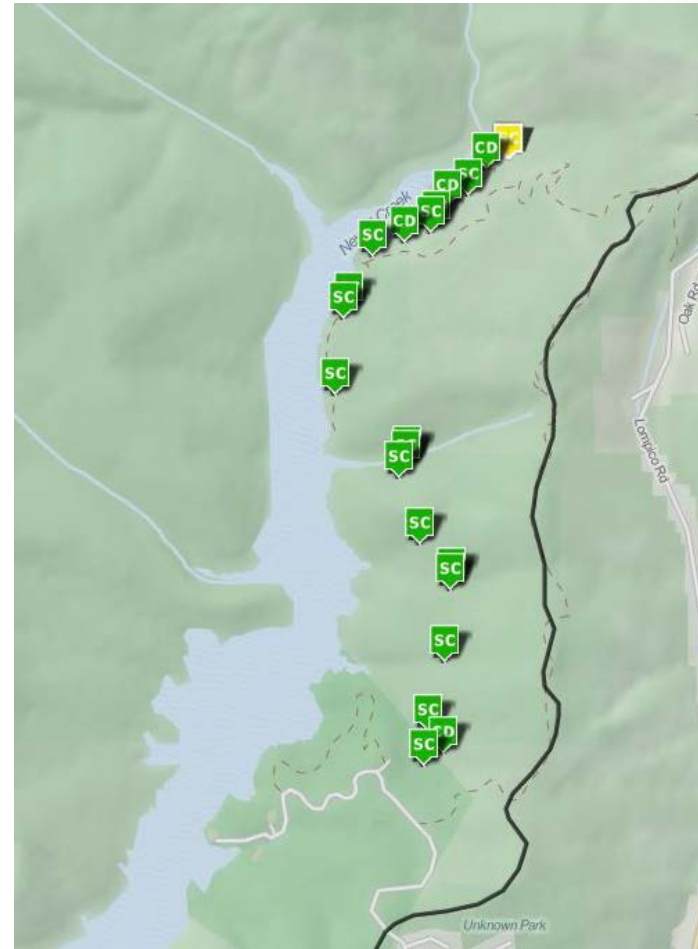
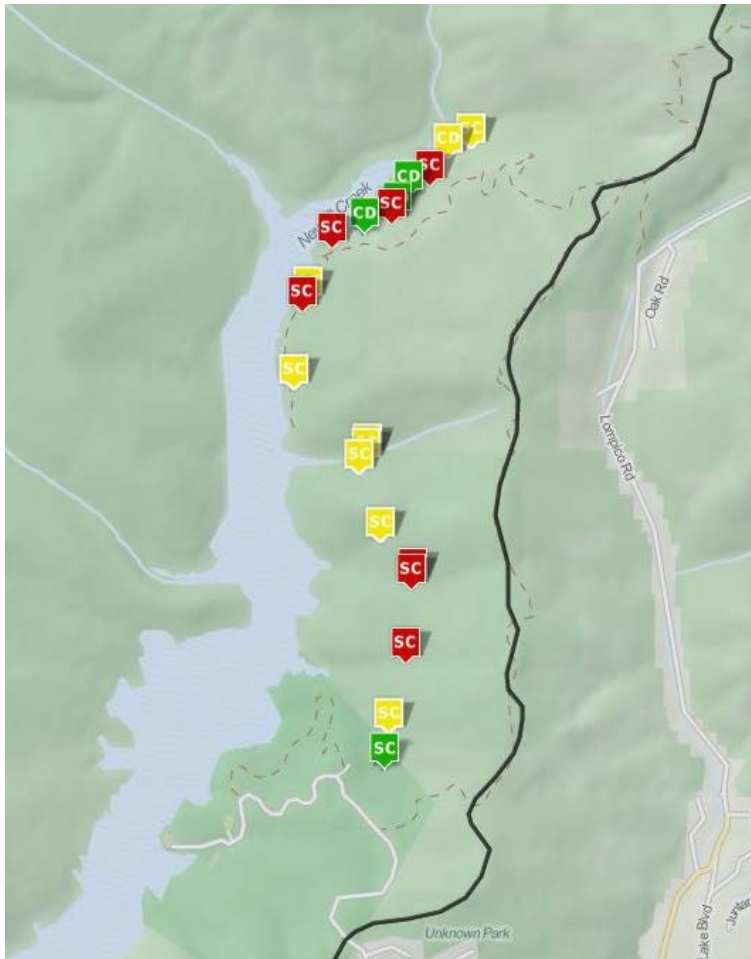


# Sample assessment map





# Rural Road Rapid Assessment

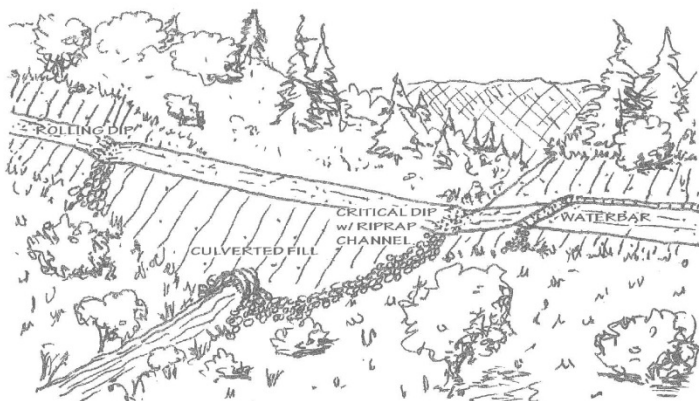


# Self Assessment



## Road Drainage Maintenance and Repair

## A RAPID SELF-ASSESSMENT FOR YOUR PRIVATE ROAD



Before getting into a discussion of how to assess the condition and maintenance needs of your road, it is important to understand the parts of a road and their functions.



### ROAD ANATOMY TERMS

**Aggregate:** Mechanically crushed, angular rock used for road surfacing.

**Base course:** The layer of road surface rock between the subgrade and the surface layer of crushed rock.

**Cross slope:** The slope of the road measured perpendicular to the direction of travel.

**Culvert:** A drainpipe that channels water underneath and off a road.

**Cut slope/cut bank:** The inside road slope cut into the face of the hill.

**Dissipator:** Rock or other infrastructure that protects the ground below a culvert outlet from erosion.

**Ditch relief culvert:** A drainpipe that channels water from a road ditch underneath a road to a safe outlet.

**Fill:** Earthen material used to build a structure above natural ground level.

**Fill slope:** Area on the downhill side of a roadway that must have excavated material placed on it to build a road section up to grade.

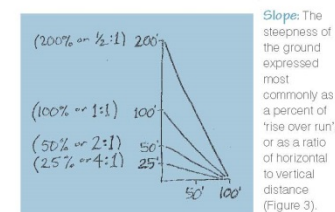
**Inboard ditch:** A ditch at the base of a cut-slope to carry water from the slope and road surface.

**In-sloped road:** The road surfaces slopes toward the cut slope or inside of the road and runoff is collected in an inboard ditch.

**Outboard berm:** A small ridge along the outer edge of a road typically placed to keep drainage off the fill slope, but also often inadvertently formed from the spoils of periodic road maintenance grading.

**Road alignment:** The physical path of a road, typically—as defined by a road's longitudinal centerline.

**Road grade:** The slope of a road surface in the direction of travel, usually expressed in percent of 'rise over run'. For example, a 20% grade equals a change along the road of 20 feet vertical in 100 feet horizontal. See 'slope', below.



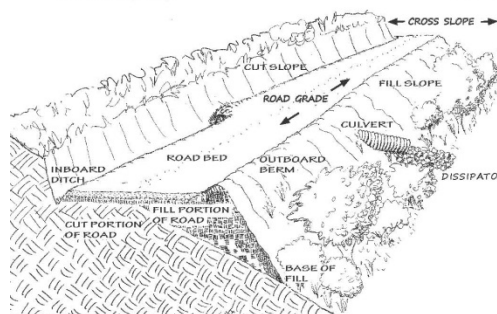
**Slope:** The steepness of the ground expressed most commonly as a percent of 'rise over run', or as a ratio of horizontal to vertical distance (Figure 3).

For example, a 2-1 slope means that for every two feet in the horizontal direction the land surface rises or falls 1 foot in elevation. A 2-1 slope is also said to have a gradient of 50%. A 100% gradient would correspond to a 1-1 slope, and a 25% grade has a 4-1 slope. If you know the degree of the angle, just enter it into your scientific calculator then hit Tangent for the slope and then multiply by 100 for the percent grade. The slope is the tangent of the angle.

**Spoils:** Excavated soil that can be used and compacted as 'fill' on-site or transported for use or stockpiling elsewhere.

**Subgrade:** The layer of roadbed on which the base or surface course is placed. On an unsurfaced (dirt) road, the finished subgrade is the traffic-bearing surface.

**Surface course:** The top layer of a road surface.



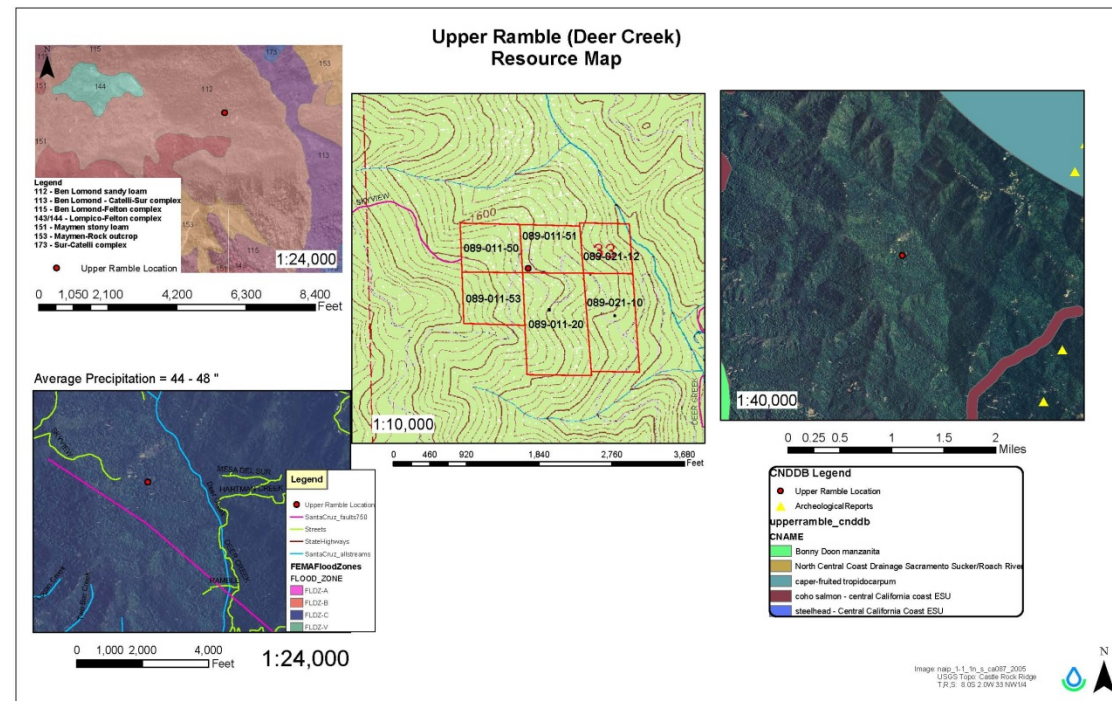
	PROBLEM	VISUAL INDICATORS	SEDIMENT IMPACT	Good	Fair	Poor	REPAIR
	ROAD SURFACE						
ROAD SURFACE	POTHOLES	<input type="checkbox"/> Potholes observed <input type="checkbox"/> Wet road <ul style="list-style-type: none"> <li>Seeps, wet areas</li> <li>Ponded water</li> </ul> <input type="checkbox"/> Spider cracks in pavement <ul style="list-style-type: none"> <li>Start of pothole</li> </ul> <input type="checkbox"/> Other <ul style="list-style-type: none"> <li>Poor road surface material</li> </ul>	LOW	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>Few</li> </ul>	<ul style="list-style-type: none"> <li>Many</li> </ul>	<b>REPAIR</b> <ul style="list-style-type: none"> <li>Backfill pothole <ul style="list-style-type: none"> <li>Use compacted earth, mixed gravel, and/or asphalt.</li> <li>For longer term success remove and excavate unsuitable soil from area surrounding and below the pothole</li> </ul> </li> <li>Correct any drainage problems</li> <li>Seal cracks in pavement</li> </ul> <b>PREVENTION</b> <ul style="list-style-type: none"> <li>Improve road drainage. <ul style="list-style-type: none"> <li>Install additional cross drains (dips or culverts) to drain road</li> <li>Reshape road (inslope/outslope/crown) to prevent ponding.</li> <li>Install subdrain or road ditch to elevate road prism and dry road</li> </ul> </li> <li>Rock road: <ul style="list-style-type: none"> <li>Use aggregate with good cohesive or binding characteristics.</li> <li>Install woven geotextile fabric placed below the aggregate to improve longevity.</li> </ul> </li> <li>Repave road / seal cracks in pavement</li> </ul>
ROAD SURFACE	WASHBOARD	<input type="checkbox"/> Washboard observed <input type="checkbox"/> Other <ul style="list-style-type: none"> <li>High traffic speed</li> <li>Lack of fines in road surface aggregate</li> <li>Lack of maintenance</li> </ul>	LOW	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>&lt;30% road</li> <li>Infrequent</li> <li>Small</li> </ul>	<ul style="list-style-type: none"> <li>&gt; 30% Road</li> <li>Large</li> <li>Impacts access</li> </ul>	<b>REPAIR</b> <ul style="list-style-type: none"> <li>Regrade Road: <ul style="list-style-type: none"> <li>Regrade road tread smooth. Grading a dry road without water will often result in quick return of the washboard effect.</li> </ul> </li> <li>Rock road: <ul style="list-style-type: none"> <li>Use aggregate with good cohesive or binding characteristics. Surface rock should have appreciable fines (including some clay). Compact aggregate.</li> </ul> </li> </ul> <b>PREVENTION</b> <ul style="list-style-type: none"> <li>Modify Use <ul style="list-style-type: none"> <li>Reduce speed of vehicles</li> <li>Minimize hard acceleration and braking</li> </ul> </li> <li>Rock road</li> <li>Increase road maintenance</li> </ul>
ROAD SURFACE	TIRE RUTS	<input type="checkbox"/> Shallow ruts extending down wheel track <input type="checkbox"/> Other <ul style="list-style-type: none"> <li>High road use / wear</li> <li>Poor drainage / concentrated runoff</li> <li>"Soft" subgrade</li> <li>Lack of maintenance</li> </ul>	HIGH if drains directly to a watercourse	<ul style="list-style-type: none"> <li>Minor</li> <li>No erosion</li> </ul>	<ul style="list-style-type: none"> <li>&lt;30% road</li> <li>Runoff diverted less than 300 feet</li> </ul>	<ul style="list-style-type: none"> <li>&gt; 30% road</li> <li>Runoff diverted for &gt; 300 feet</li> <li>Erosion noted</li> </ul>	<b>REPAIR</b> <ul style="list-style-type: none"> <li>Regrade Road: <ul style="list-style-type: none"> <li>Regrade road tread smooth. Grading a dry road without water and not compacting the soil will often result in quick return of the wheel ruts.</li> </ul> </li> </ul> <b>PREVENTION</b> <ul style="list-style-type: none"> <li>Maintain proper road drainage. <ul style="list-style-type: none"> <li>Install cross drains (dips or culverts) to drain road</li> <li>Reshape road (inslope/outslope/crown) to prevent ponding.</li> </ul> </li> <li>Rock road: <ul style="list-style-type: none"> <li>Use aggregate with good cohesive or binding characteristics. Surface rock should have appreciable fines (including some clay). Compact aggregate.</li> </ul> </li> </ul>
ROAD SURFACE	ROAD TREAD EROSION (rills and gullies)	<input type="checkbox"/> Rutting, rilling or gullying of road tread <input type="checkbox"/> Flowing or ponded water along road <input type="checkbox"/> Inadequate road drainage <ul style="list-style-type: none"> <li>Lack of cross drains</li> </ul>	HIGH if drains directly to a watercourse	<ul style="list-style-type: none"> <li>Minor</li> </ul>	<ul style="list-style-type: none"> <li>&lt; 30% road</li> <li>Runoff diverted less than 300 feet</li> <li>Deep rills absent</li> </ul>	<ul style="list-style-type: none"> <li>&gt; 30% road</li> <li>Runoff diverted for &gt; 300 feet</li> <li>Deep rilling or gullying</li> </ul>	<b>REPAIR</b> <ul style="list-style-type: none"> <li>Regrade Road: <ul style="list-style-type: none"> <li>Regrade road tread smooth.</li> <li>Grading a dry road without water will and poor soil compaction often result in quick return of the erosional feature</li> </ul> </li> <li>Rock road: <ul style="list-style-type: none"> <li>Use aggregate with good cohesive or binding characteristics. Surface rock should have appreciable fines (including some clay). Compact aggregate.</li> </ul> </li> </ul> <b>PREVENTION</b> <ul style="list-style-type: none"> <li>Maintain proper road drainage. <ul style="list-style-type: none"> <li>Install additional cross drains (dips or culverts) to drain road</li> <li>Reshape road (inslope/outslope/crown) to prevent ponding.</li> </ul> </li> <li>Rock road: <ul style="list-style-type: none"> <li>Use aggregate with good cohesive or binding characteristics. Surface rock should have appreciable fines (including some clay). Compact aggregate.</li> </ul> </li> </ul>
ROAD SURFACE	LOOSE GRAVEL	<input type="checkbox"/> Loose tread <input type="checkbox"/> Poor traction <input type="checkbox"/> Other <ul style="list-style-type: none"> <li>Poor road surface material – sandy and gravelly material lacking fines.</li> </ul>	LOW	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>1 to 2 locations</li> <li>Minor impact to use</li> </ul>	<ul style="list-style-type: none"> <li>&gt; 2 locations</li> <li>Impacts use</li> </ul>	<b>REPAIR / PREVENTION</b> <ul style="list-style-type: none"> <li>Re Rock road: <ul style="list-style-type: none"> <li>Use road aggregate with good cohesive or binding characteristics. Surface rock should have appreciable mix of sizes and contain fines (including some clay). ¾" drain rock</li> </ul> </li> </ul>



# Plan



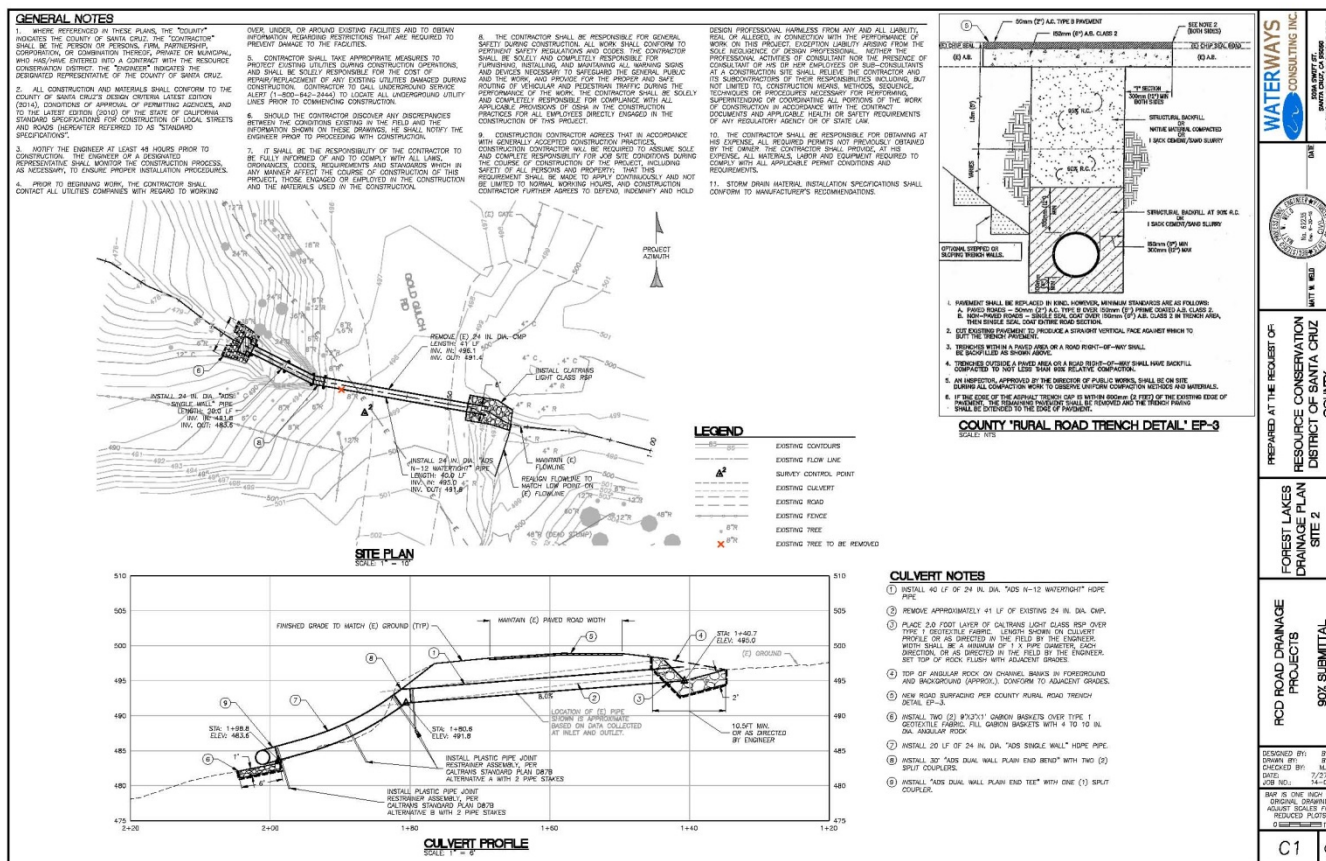
- Gather information
  - Deeds, road easements, utility easements, etc
- Identify potential resource concerns
  - Protected plant and animal species
  - Cultural
  - Flood zones
  - Soils



# Plan (cont..)



- Project Designs
  - Work with an engineer or contractor
  - Work within your budget



# Potential Permits





# US Army Corps of Engineers

- Federal
- Nation-Wide permit, Regional General Permit
- Regulatory authority over “waters of the US”
  - **Section 404 of Clean Water Act**
  - Section 10 of the Rivers and Harbors Act

**Translations:** Material or work in the water    ➞ ACOE jurisdiction

Section 404  
Intentionally  
placing fill in  
waters of US?  
Unintentionall  
y placing fill in  
water of US?





# U.S. Fish and Wildlife Service

- Federal
- **Habitat Conservation Plan or Biological Opinion**
- Endangered Species Act (and others)
- If applying for Army Corp, the Corp consults with USFWS
- If out of Army Corp jurisdiction, individual consultation with agency may be required (Habitat Conservation Plan or Biological Opinion)
- **Translation:** Determine with there are federally protected plant or animal species that could be impacted by your project.

# National Marine Fisheries Service



- Federal
- **Biological Opinion, Not Likely to Adversely Affect**
- Authority over marine and anadromous fish
  - **Endangered Species Act**
  - **National Environmental Policy Act**
  - Magnus-Sevens Fishery Conservation/Management Act
  - Fish and Wildlife Coordination Act

## **Translation:**

Work in the water with fish    ➡ NMFS jurisdiction

Potential to harm fish    ➡ NMFS jurisdiction



# Regional Water Quality Control Board



- State
- 401 Certification
- Regulatory authority of Water of the State.
  - Section 401 Clean Water Act
  - National Pollution Discharge Elimination System |

**Translation:** Material or work in water or upland impacts ☞ RWQCB jurisdiction



# California Department of Fish and Wildlife



- State
- Streambed Alteration Agreement, Incidental Take Permit
- Regulatory authority of riparian corridors and special status species
  - State Endangered Species Act (CESA)
  - Section 1602 Fish and Game Code

**Translation:** Material or work in the water or upland with fish or wildlife impacts ➡ CDFW jurisdiction

# California Coastal Commission



- State
- Coastal Development Permit
- Regulatory authority to protect, conserve, restore, and enhance the environment of the California coastline
  - California Coastal Act

**Translation:** Material or work “near” the coast      ➡ CCC jurisdiction



# Build



- Landowners or road association agreements
  - Put it in writing!
- Construction bids and contracting (do this early!)
- Timing of construction
- Follow all permit requirements



# Maintain and Monitor

- Have a long term maintenance plan!
- Monitor you project and know what to looks for
- Highly recommend annual photo monitoring



**Rolling dips and outsloping**







# Road Projects



**Ditch armoring**





## Streambank Protection





# Bridge



Funding when  
fish passage is  
an issue?





# Culverts



Summit fire  
culvert  
replacements.







Bridge





## Road shaping



Outsloped and rolling dips added. Road was paved after grading.





## Road shaping

