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Best Management Practices Workshop



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Slope Stabilization
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Combine Re-vegetation with Slope Retention Techniques




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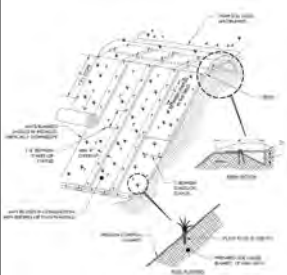
Slope Stabilization

- Slope Work
 - Grading
 - Blanketing
 - Compost Berm
- Mechanical Treatments
 - Rip-Rap
 - Rockery Walls & Block Walls
 - Timber Walls



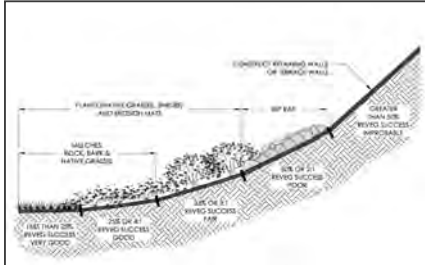
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Blanket Slope Protection

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Cut Slope Re-vegetation Only vs. Using Mechanical treatments




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Integrate Non-Vegetation Elements Into the Landscape if Necessary

Functions Together




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Retaining Structures

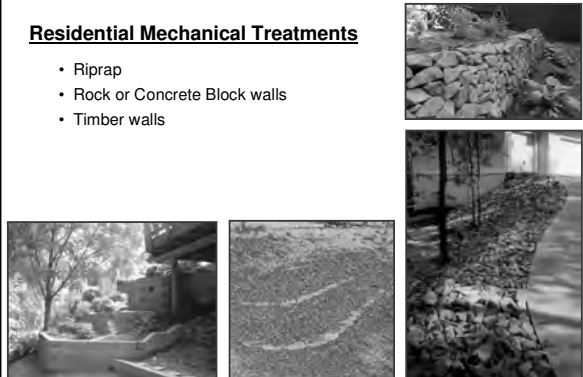
- Two Types
 - Protecting:** Supports itself & armors underlying slope
 - Usually placed at the toe of a steep slope
 - Allows flattening above for re-vegetation
 - Prevents soil erosion for wind/water
 - Retaining:** Supports itself and resists lateral earth pressures
 - Same as above
 - Prevents mass soil movement – retains fill

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Residential Mechanical Treatments

- Riprap
- Rock or Concrete Block walls
- Timber walls




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TRPA Requirements

- Use Retaining Structures only when necessary (cut and fill areas)
- Always maintain Natural Contours
- Stay out of Right-of-Way unless you have an Encroachment Permit (County, Highway Department)
- Excavate only between May 1 and Oct 15, unless TRPA approved
- Do NOT excavate when raining/snowing or when soil is saturated at ANYTIME


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Riprap

- Angular or Sub-angular
- Rough unhewn quarry stone – HARD
- Avoid porous rock, limestone or soft rock, shale

YES **NO**




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When excavating more than 7 yards: YOU NEED A PERMIT


- If excavating between 3 and 7 yards, a BMP Site Evaluation serves as your grading permit
- BMP Retrofit permits are free (Only BMP Work)
- Cuts greater than 5' usually require hydrology report

Do NOT disturb Stream Environment Zones
Call TRPA if you have an eroding stream bank

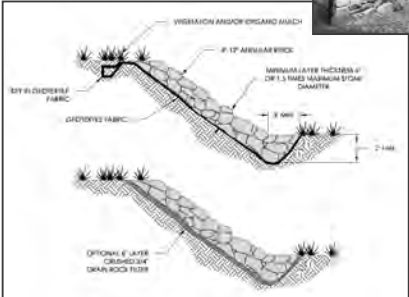


Shore Zone properties have many regulations
No BMP retrofit permits given for this area

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Riprap



— AVOID RUNNING SEAMS
— NO VOIDS GREATER THAN 4"

Courtesy N.R.C.S.

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Riprap Filter

- Can use Geo-Textile Fabric
 - Anchor the fabric at the top (bury & pin)
- 6" of crushed stone (2" dia.)

Courtesy N.R.C.S.

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Timber Wall

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Riprap

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Retaining Wall

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Timber Wall

- Must be engineered if 4' high from bottom of footing to top of wall

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Rockery Walls

ROCK SIZE DESIGNATION					
Rock Size (Nominal)	(2)	(3)	(4)	(5)	(6)
1.0 to 1.5	1.5 to 2.0	2.0 to 2.5	2.5 to 3.0	3.0 to 3.5	3.5 to 4.0
4.0 to 4.5	4.5 to 5.0	5.0 to 5.5	5.5 to 6.0	6.0 to 6.5	6.5 to 7.0
7.0 to 7.5	7.5 to 8.0	8.0 to 8.5	8.5 to 9.0	9.0 to 9.5	9.5 to 10.0
10.0 to 10.5	10.5 to 11.0	11.0 to 11.5	11.5 to 12.0	12.0 to 12.5	12.5 to 13.0

ROCK SIZE		
Rock Size (Nominal)	Rock Weight (lb)	Approx. Capacity (lb)
2	10 to 15	1,000 to 2,000
3	15 to 20	2,000 to 3,000
4	20 to 25	3,000 to 4,000
5	25 to 30	4,000 to 5,000
6	30 to 35	5,000 to 6,000
7	35 to 40	6,000 to 7,000
8	40 to 45	7,000 to 8,000

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Stacked Rock Wall

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Terraces

- Level and key in the first course
- Follow manufacturer specifications

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Rockery Walls

- Base width 0.5 height (not less than 18" diameter)
- Minimum embedment 12"
- Slope base surface back into the slope
- Face Batter 4 V : 1 H or flatter
- Soil cut 6 V : 1 H or flatter

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Terraces

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Rockery Walls – 6 Common Failures

- Little or no drainage is provided
- The backfill is of poor quality or poorly placed and compacted
- Constructed too steep or too high
- Constructed over a poor foundation
- Constructed of unsound rock
- The overall craftsmanship is poor

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Terraces

- An option to minimize large construction of walls
- Each terrace under 4 feet total height
- Flattens each area in between to establish vegetation
- Maintains natural contours

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Concrete Retaining Walls

- Concrete mixed with Flyash replaces a high percentage of Portland Cement
- Flyash is a byproduct of coal
- Improves concrete performance, making it stronger, more durable, and creates significant benefits for the environment



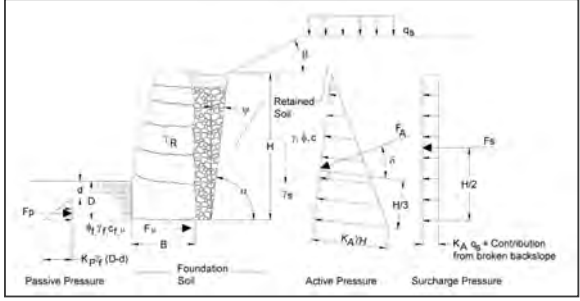
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REMEMBER TO:

- Phase in your work when doing a big job –
 - work on and complete sections before starting another
- Refrain from retaining treatments if feasible
- Maintain the natural contours of the property
- Leave a Small Footprint on the natural landscape
- Disturb the LEAST amount of soil as possible

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When to Involve an Engineer



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Questions



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How to Green Retaining Walls

- Trex Boards
 - Combination of reclaimed wood & plastics
 - Shields the wood from moisture & insect damage
 - No rotting or splintering
- Regional materials
 - Fractured Granite
- Fly-Ash Concrete (CalTrans)
- Use high recycled content steel posts instead of pressure treated wood

