NE 87$^{th}$ Street Tributary To Peter’s Creek
- Stream Enhancement -

Presented by: Peter Stringer, P.E. (CDM)
Roger Dane, ASLA (City of Redmond)
& Nils Lindwall, P.E. (CDM)

Vicinity Map
**Site Conditions**

- Steep wooded draw between houses
- Stream gradient 18% average
- New residential development upstream accelerated erosion
- Stream segment isolated by storm system
- Flashy
Project Goals:

- Reduce erosion and the associated sediment in the stream.
- Reduce the risk of slope failures.
- Enhance the riparian buffer and upland habitat.

Design Considerations

- Water Quality
- Slope Stabilization
- Bioengineering
- Limited Budget
- Urban Environment
- Design/Build
Improve Water Quality

- Reduce erosion of existing channel and banks using:
  - Streambank logs
  - Deflector logs
  - Log weirs
  - Native planting
  - Wattles / fascines

Bank Erosion

- The most critical areas were targeted for work
- Undercut banks, small sloughs & slides
Bank Erosion

- Some banks undercut 3’

Slide Area

- Saturated slope
- Recent slide 25’ high
  adding sediment to stream
Details

Area 2
- Pre-Design
- Design
Area 2
- Design
- As-built

Area 5
- Pre-Design
- Design
ELWd as Streambank Protection Logs

- Engineered Large Woody Debris (ELWd) is used to increase the required log diameter for difficult access areas
- Habitat Structure
ELWd Structure Fabrication

- Dowels
- Wedges
- Jute Mat

Anchoring Structures
Slope Failure/Hydraulic Loading

- Seep located near top of failure
- Constructed new drainage at top to convey water from impacted area

Slide Area

- Saturated soil
- Stream undercutting toe of slope
- Previous grading across slope
- Yard waste and construction debris added to slope loading
Slope Stability and ELWd

- ELWd is used to stabilize saturated slope, & create planting pockets

Bioengineering

- Tree falling for under-planting
- Dense plant spacing
- Shade tolerant species
Buffer Planting
- Dense planting
- Conifers and low trees on slope

ELWd Planting
- Shrubs & groundcover planted inside ELWd
Design/Build Benefits

- Engineers, owner & constructors working together
- Flexibility
- Quality assurance
- Lower cost

Flexibility w/ Design/Build

- Trees for planned high-line blew down before construction
- Limited Changed Conditions for Owner
Unanticipated Design/Build Opportunity

- Demolition of property owner’s structure became enhancement area

Construction Methods

- Bypass stream flow during reach construction and limit erosion
- No equipment
- Limit impact to local residences and business
- Field discussion daily
Temporary Erosion and Sedimentation Control

- Existing settlement pond secured with triangular silt dikes and wattles
- Water bypassed in construction zones

Hand Placement of Structures

- Areas of severe erosion targeted for protection
Results

- Sediment during fall storms
- Less erosion and improved water quality during rain events this winter
- Good plant survival even with summer installation (shade & moist site)

Questions: