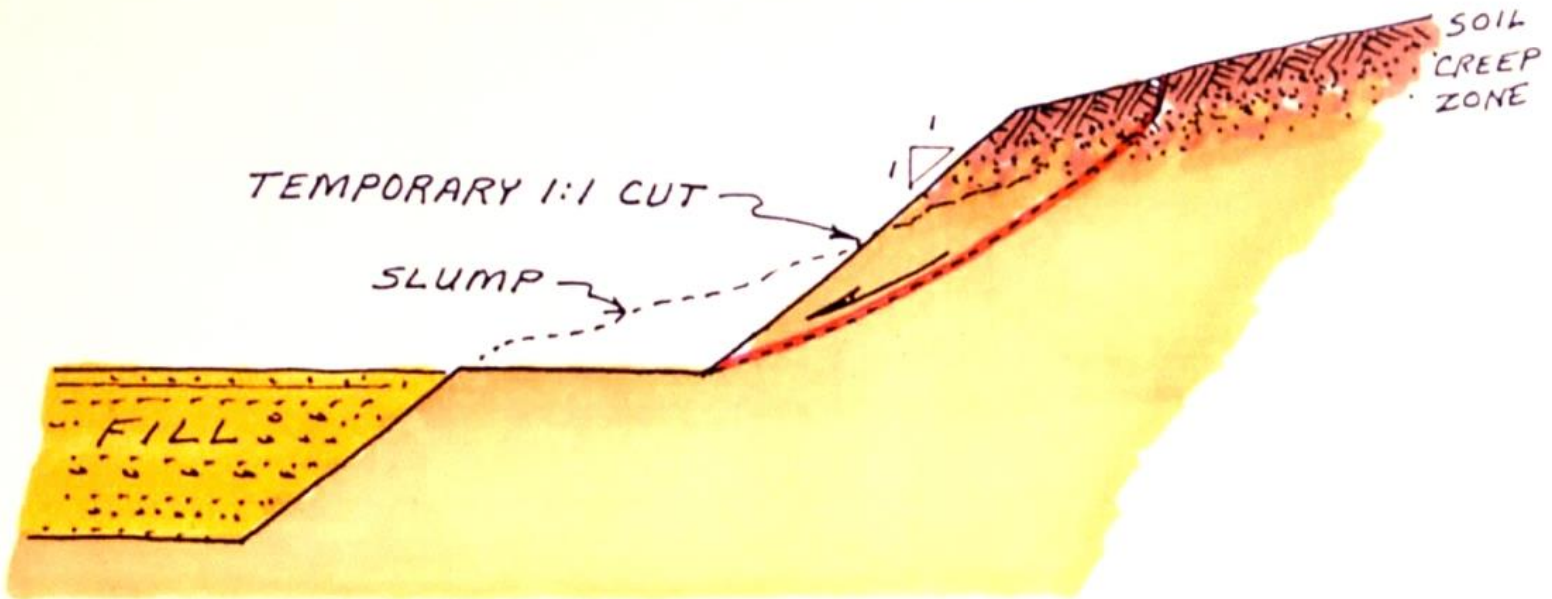


Part 5

BACKSLOPE FAILURES, CANYON CLEAN OUTS, AND CUT-FILL TRANSITIONS

BACKSLOPE FAILURES

BACKSLOPE FAILURE



- **Keyways are usually constructed with temporary oversteepened slopes, as sketched above. When these slopes fail, the sliding material must be removed and recompact as the fill is brought up.**

TEMPORARY BACKSLOPE FAILURE



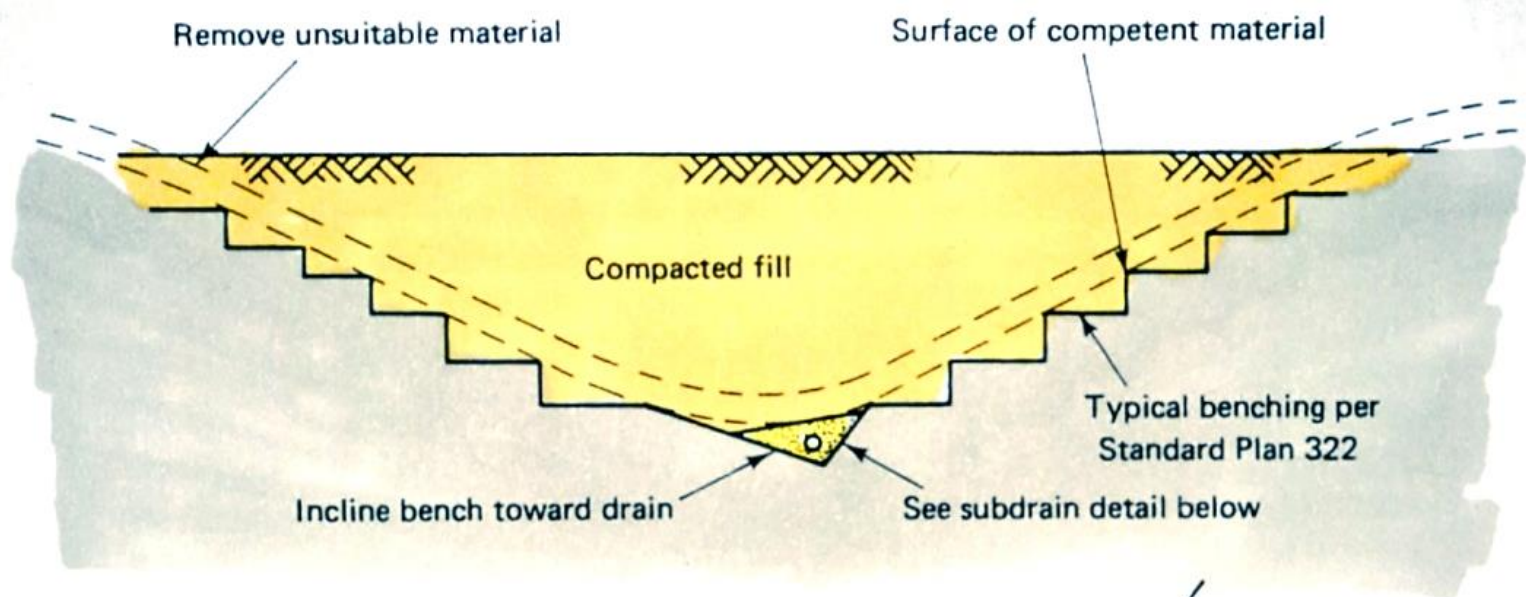
- **Backcuts are temporary excavations, usually made at steep inclinations to minimize volume. **Backslope failures** are usually triggered by: 1) strain relaxation and dilation sufficient to cause strain softening; 2) accelerated creep, due to rapid unloading, and, least often; 3) absorption of moisture, such as rainfall.**



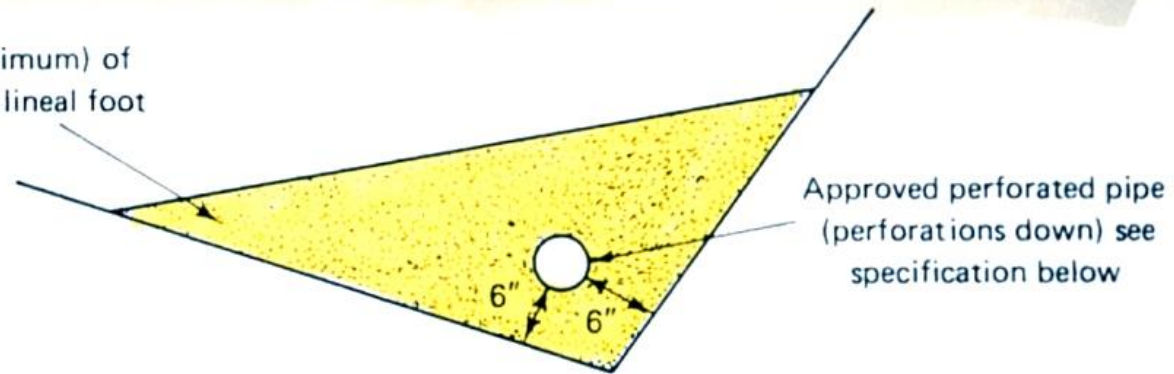
- **Canyon cleanout excavations can provide significant challenges for equipment access**
- **The engineering geologist should check these excavations for evidence of past seepage and emplace adequate underdrainage**



- **The deepest overexcavations usually occur in “canyon cleanouts”, similar to that shown here. Ample subdrainage is always recommended along the axes of former watercourses**

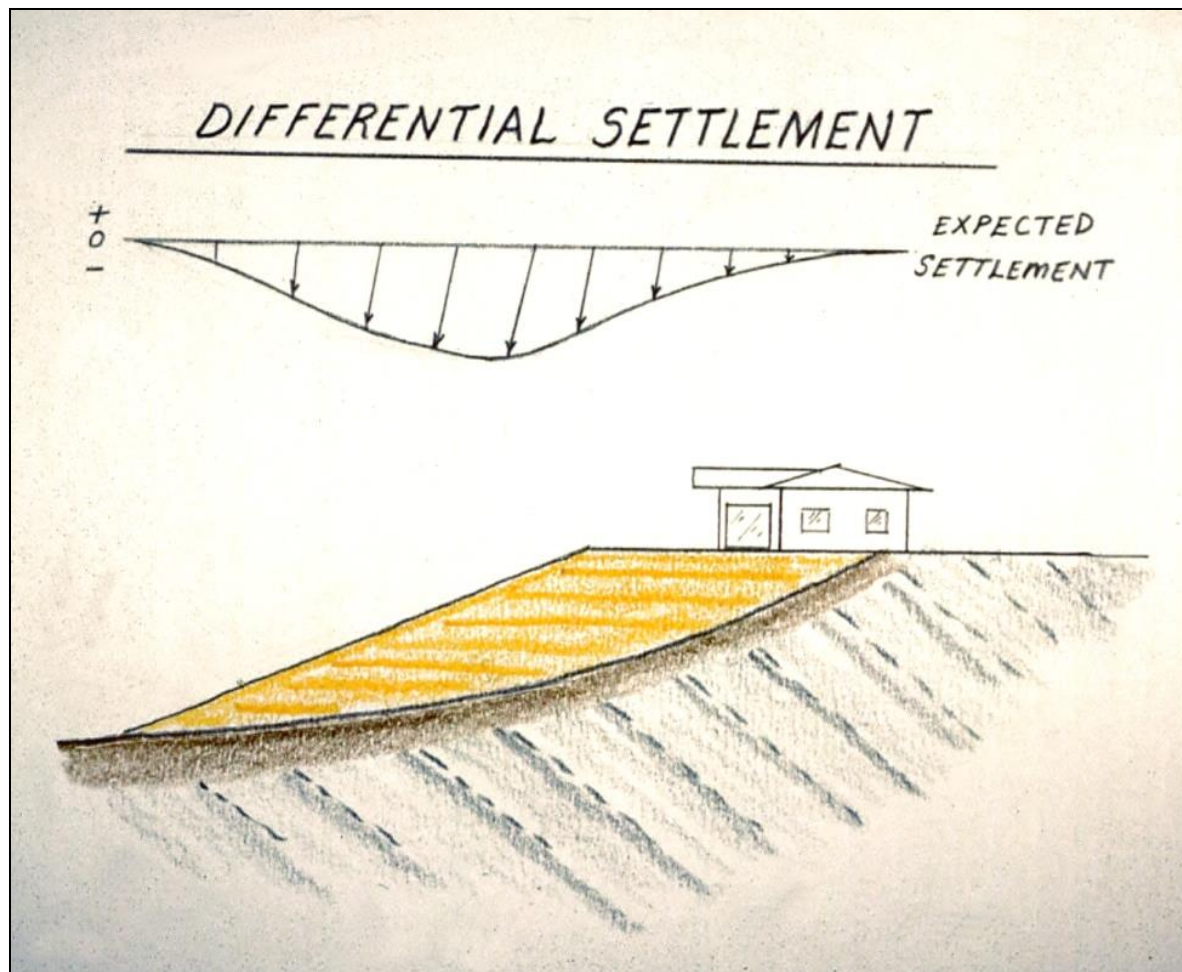


9 cubic feet (minimum) of filter material per lineal foot



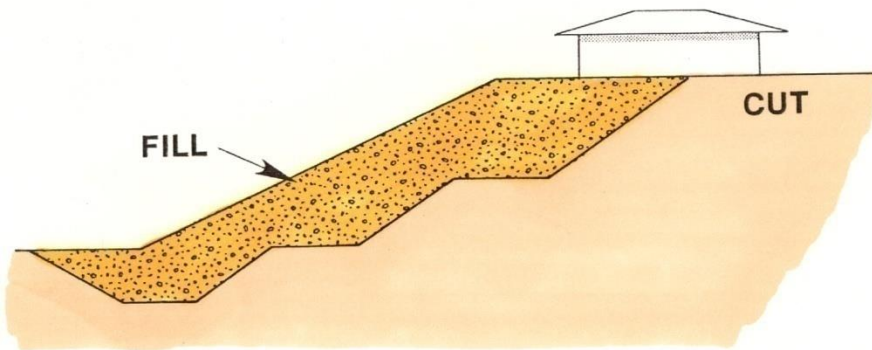
SUBDRAIN DETAIL

- Typical **canyon cleanout** and **subdrain** details. The UBC specifies 9 cubic feet of drain rock per lineal foot of subdrain and a perforated collector pipe.

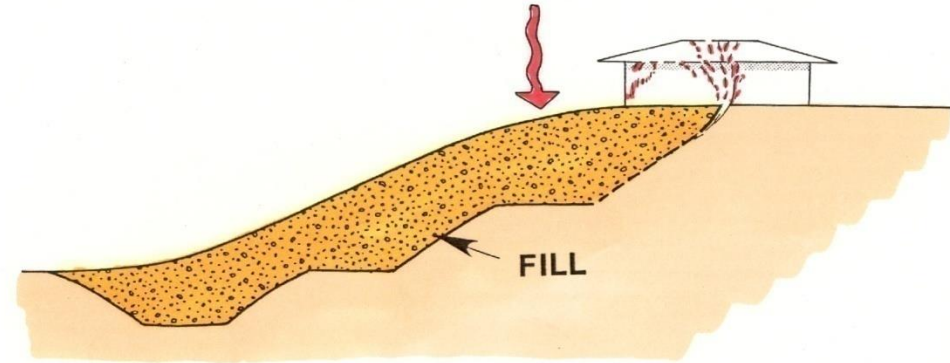


- Fill wedges tend to **settle differentially**, as sketched here. The horizontal component of this settlement can pull wood frame structures apart, causing loss of structural integrity.

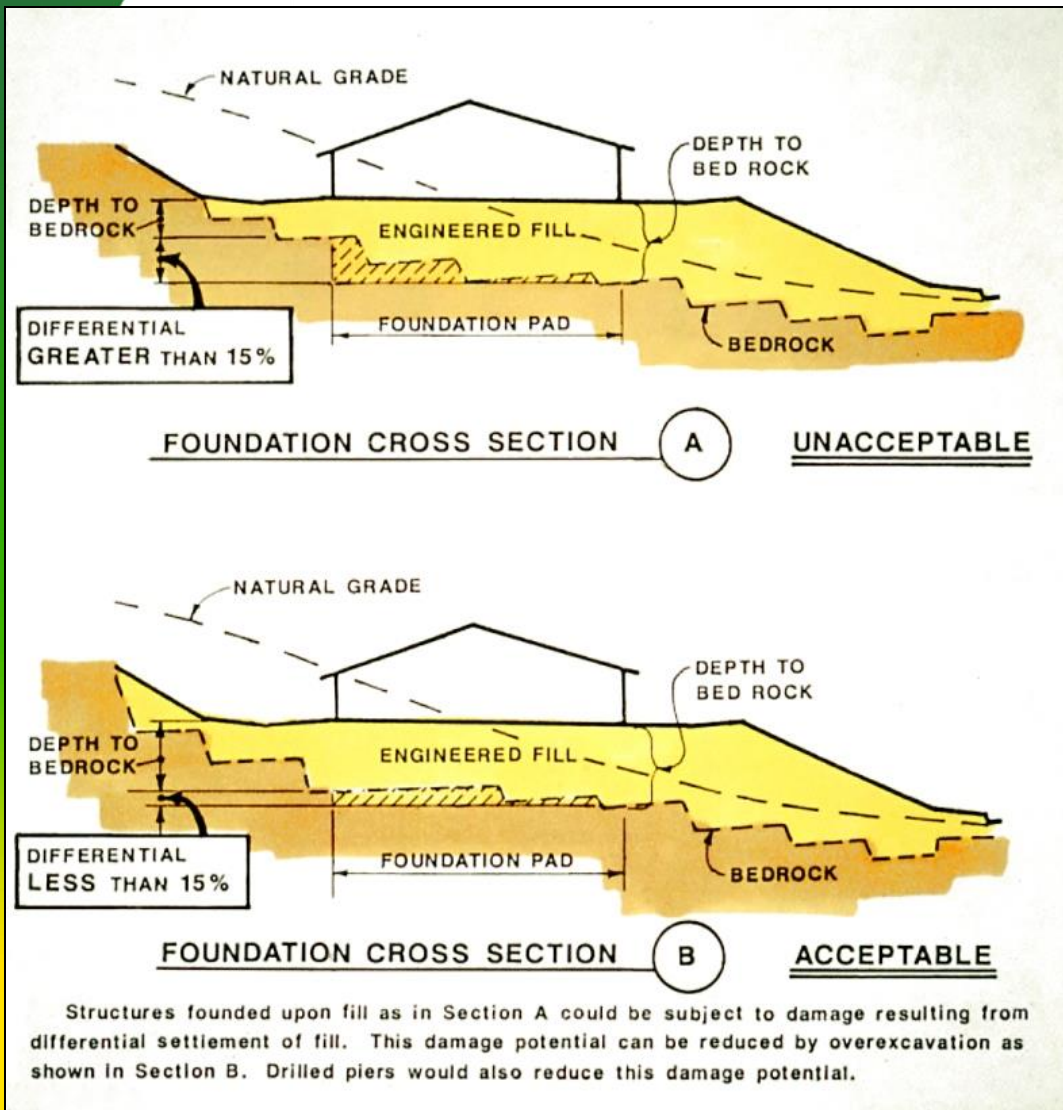
STRUCTURE BUILT STRADDLING
CUT-FILL TRANSITION



LONG TERM
SETTLEMENT OF FILL



- **Cut-fill transition lots** are known for exhibiting problems with differential settlement and/or differential heave. They are especially vulnerable to earthquake-induced settlement and structural damage.



- **Cushion fills** are typically employed on cut-fill transition lots slated for development
- Los Angeles County requires 3 feet overexcavation below the deepest element of the foundation
- Rogers (1992) recommended fill thickness differential of $< 15\%$, shown at bottom left