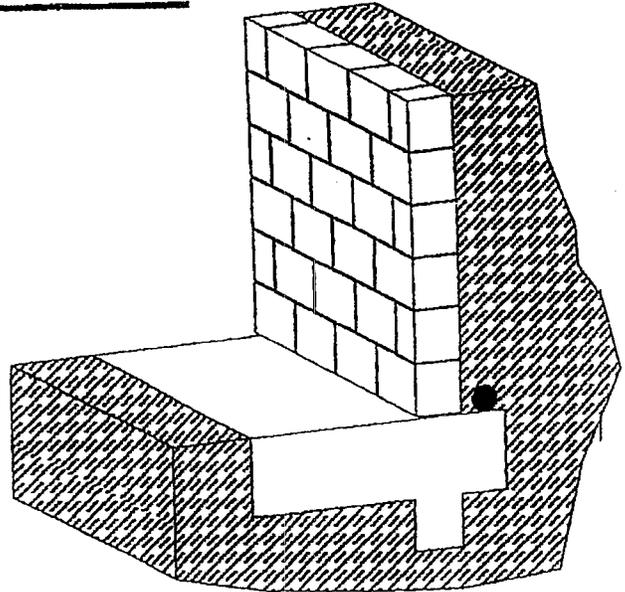




# Retaining Walls In Expansive Soils

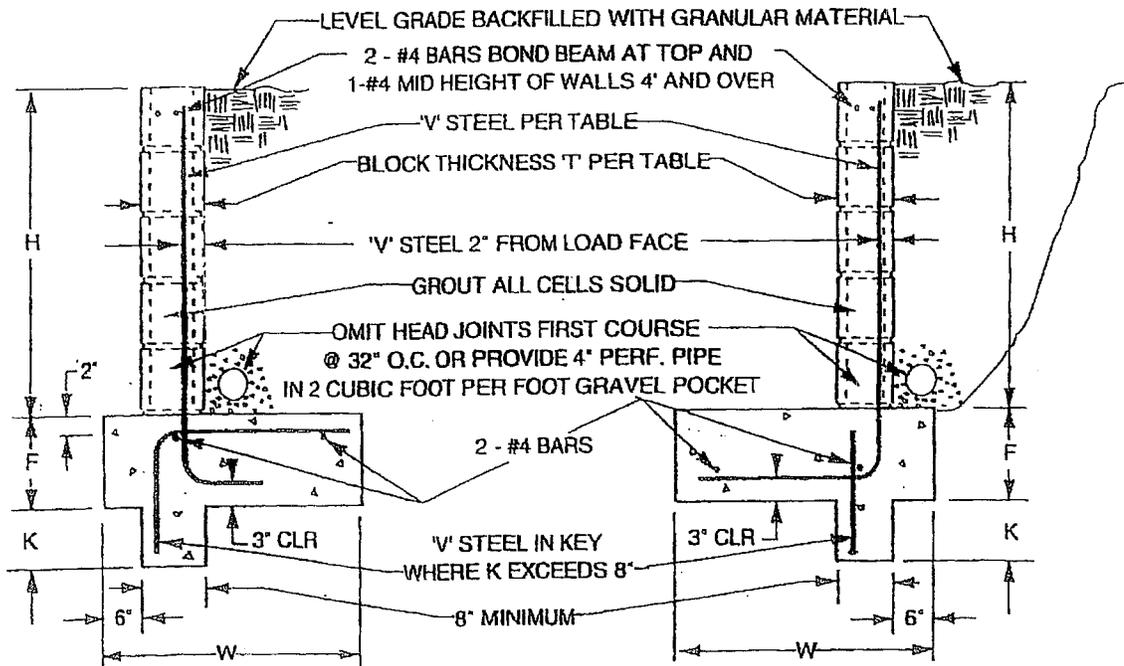
## Notes

- General:** This information summarizes certain parts of the CA Building Code™ (C.B.C.). This handout is not a replacement for the C.B.C. It is simply an attempt to make certain parts of it more accessible. Where unusual conditions are encountered or where other choices are desired the C.B.C. should be consulted. It may be reviewed at many libraries and at your Building and Safety Department.
- Materials:** Use only concrete with a minimum compressive strength of 2000 p.s.i. at 28 days. Use Grade 40 reinforcing steel. Use grade "N" concrete masonry units with type "M" mortar.
- Mixing Mortar:** To mix type "M" mortar use 1 part portland cement, 1/4 part hydrated lime or lime putty and sand equal to 2 1/4 to 3 times the sum of the cement and lime. Do not use plastic cement or masonry cement. They are prohibited in this seismic zone.



TOE UNDER WALL

TOE OUT WALL



TOE UNDER WALL

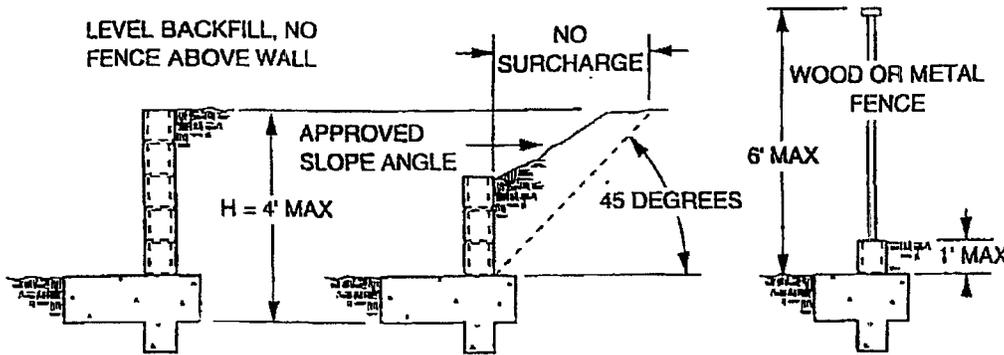
H	'V' STEEL	F	K	T	W
2'-0"	#4 @ 24" O.C.	12"	8"	6"	1'-6"
3'-0"	#4 @ 24" O.C.	12"	15"	8"	2'-0"
4'-0"	#4 @ 16" O.C.	12"	17"	8"	3'-3"

TOE OUT WALL

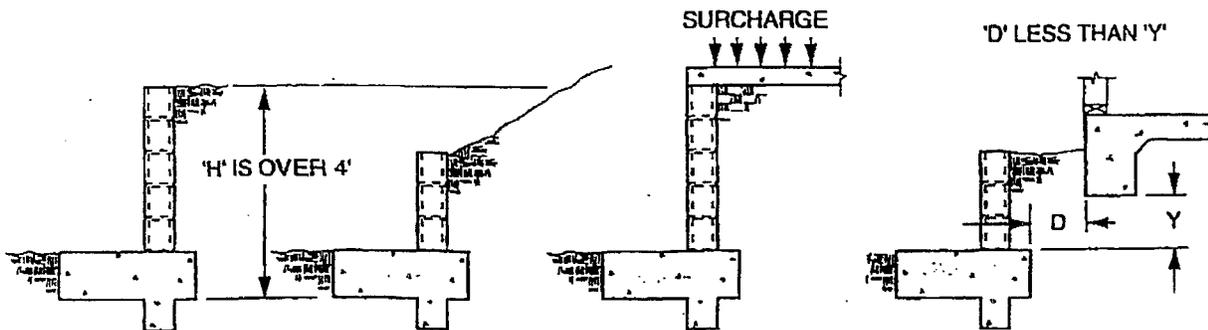
H	'V' STEEL	F	K	T	W
2'-0"	#4 @ 24" O.C.	12"	8"	6"	1'-6"
3'-0"	#4 @ 24" O.C.	12"	15"	8"	2'-0"
4'-0"	#4 @ 16" O.C.	12"	25"	8"	3'-0"

4. **Concrete:** Do not attempt to mix your own concrete. Order 2000 p.s.i. concrete from a ready-mix plant.
5. **Mixing Grout:** Grout may be ordered or mixed on site. Use 1 part Cement, 2 1/4 to 3 parts sand and 2 parts pea gravel.
6. **Reinforcing steel:** Lap steel minimum 20". Never heat it with a torch. #4 reinforcing bars must not be bent in a curve smaller than that which would result from bending the bar around a 3" cylinder. They should be held securely in place so that placing concrete or grout will not move them.
7. **Foundations:** Place concrete foundations only against undisturbed soil. If artificial fill is encountered then consult a soil engineer.
8. **Drainage:** Discharge from drain pipes may not flow over sidewalks etc. Route only to locations approved by the Building Department.

**THESE CONDITIONS DO REQUIRE A BUILDING PERMIT**



**THESE CONDITIONS DO REQUIRE ENGINEERING**



8. **Design:** Where a building permit is required and the wall is beyond the scope of the design that appears on the front of this handout, a design by a registered civil engineer, structural engineer or architect must be submitted. Where a building permit is required, a soil and/or geology report may be required and if so, these reports should specify appropriate design values. Where soil and/or geology reports are not required, the design may be based on the following:

EQUIVALENT FLUID WT. (PCF) BASED ON SLOPE OF RETAINED MATERIAL	
LEVEL	45
5 TO 1	47
4 TO 1	50
3 TO 1	55
2 TO 1	60
1 1/2 TO 1	90

OTHER VALUES	
ALLOWABLE SOIL BEARING	1000 PSF
LATERAL BEARING (PASSIVE)	200 PCF
FRICTION	0.30