



**City of El Cajon**  
**Building and Fire Safety Division**  
200 Civic Center Way.  
El Cajon, CA 92020  
(619) 441-1726, 1727

## **Retaining Wall - Sloping Backfill**

San Diego Area Chapter Policy 222

### **I. Permits:**

Permits are required for the construction of retaining walls over 3 feet in height, and for walls less than 3 feet in height which support a surcharge.

### **II. Inspections:**

Inspections must be performed during several phases of construction. Please call for inspections at the following times:

1. Footing Inspection - Call for footing inspection when the footing is dug, the steel is in place, but before concrete has been placed.
2. Grout Inspection - Call for a masonry grout inspection when the block has been laid, the steel is in place, but before the grout has been placed.
  - A. If cleanout holes are used, block may be laid to the full height of the grout pour before calling for inspection. Grout shall be placed in a continuous pour in grout lifts not exceeding 6 feet.
  - B. If cleanout holes are not used, an inspection is required prior to each grout pour. Block cannot be laid higher than the grout pour. Note that cleanouts are required for all grout pours over 5 feet in height.
3. Final Inspection - Call for a final inspection when all work is complete.

### **III. Wall Height:**

Wall height is measured from the top of the footing to the top of the wall. No surcharge (building foundation, driveway, or other loading) is allowed within a distance equal to the height of the wall.

### **IV. Block:**

Block must be type "N", w/  $F_m = 1,500$  psi. All Cells must be solid grouted.

### **V. Mix Requirement:** *(Note - Use of plastic cement is not permitted.)*

1. Concrete mix shall have a compressive strength of  $f'_c = 2,000$  psi minimum, or the following proportions by volume:  
1 part portland cement, 2-1/2 parts sand, 3-1/2 parts 3/4 inch maximum size gravel, 7 gallons water max. per sack of cement
2. Mortar mix shall have a compressive strength equal to 1,800 psi minimum, or the following proportions by volume:  
1 part portland cement, 3-1/2 parts sand, 1/4 part hydrated lime or lime putty,
3. Grout mix shall have a compressive strength 2,000 psi minimum, or the following proportions by volume:  
1 part portland cement, 3 parts sand, 2 parts pea gravel (3/8-inch aggregate)  
Add water until pouring consistency is achieved without segregation of the grout constituents. Rod or vibrate immediately.  
Rerod or revibrate grout about 10 minutes after pouring to insure solid consolidation. Stop grout 2 inches from top of masonry units when grouting of second lifts is to be continued at another time. All cells must be solidly grouted.

### **VI. Mortar Key:**

To insure proper bonding between the footing and the first course of block, a mortar key must be formed by embedding a flat 2x4 flush with and at the top of the freshly poured footing. It should be removed after the concrete has started to harden (about 1 hour). A mortar key may be omitted if the first course of block is set into the fresh concrete when the footing is poured and a good bond is obtained.

### **VII. Wall Drains:**

Wall drains (4 inch diameter) must be placed at 6-foot intervals along the length of the wall and located just above the level of the soil or paving on the front face of the wall. The drains may be formed by placing a block on its side at 6-foot intervals, by leaving out the mortar in the vertical spaces between blocks (head joint) in the first course above the soil or paving on the front face of the wall or by any other acceptable equivalent method. Backfill behind wall drains or open head joints must be loose rubble or gravel 12 inches wide and extending up from the top of the footing to the top of the wall.

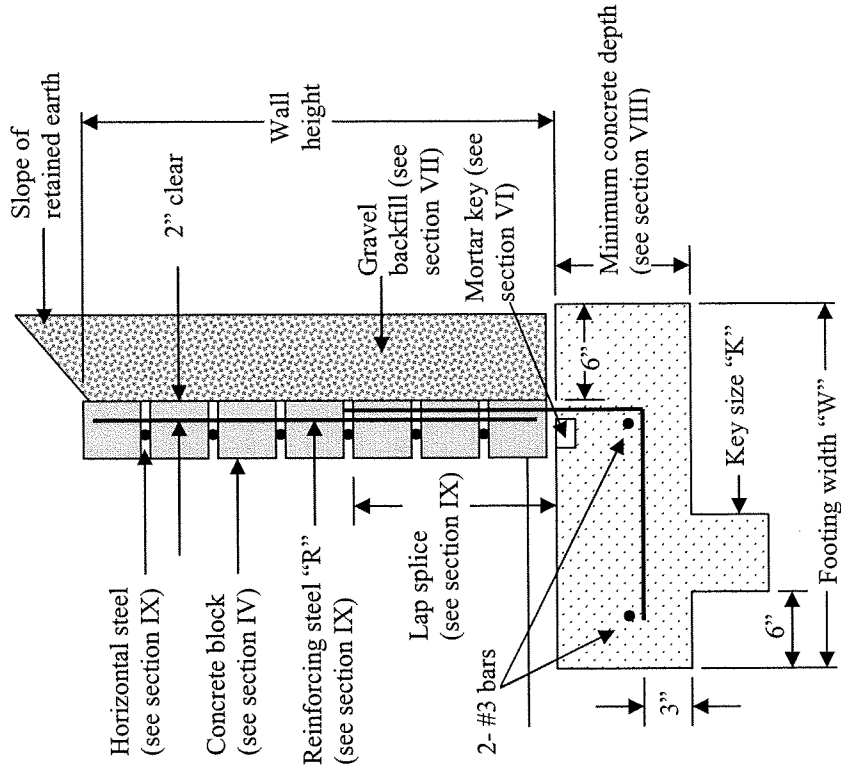
### **VIII. Soil:**

Wall design is based on an active earth pressure equivalent to fluid weight of 30 lbs. per cubic foot. Footings must extend at least 12 inches into undisturbed soil or compacted fill. A soils report may be required. Soil should be dampened prior to placing concrete. A minimum 7 feet must be provided horizontally from the toe of the footing to daylight. Footing sizes are based on 1,000 psf bearing capacity. Any deviations from this standard will require design by a licensed architect or engineer.

### **IX. Reinforcing Steel:**

Reinforcing steel must be deformed and comply with ASTM specification A615-85, grade 40 or 60. Lap splices shall be 40 bar diameters. Two # 3 bars must be placed longitudinally in the footing as shown. For 6-inch or 8-inch blocks one #3 bar shall be placed longitudinally in the center of the wall in a mortar joint every 16 inches as the blocks are laid up. For 12-inch blocks one #4 bar shall be placed every 16 inches as the wall is laid up.

### TYPE I WALL



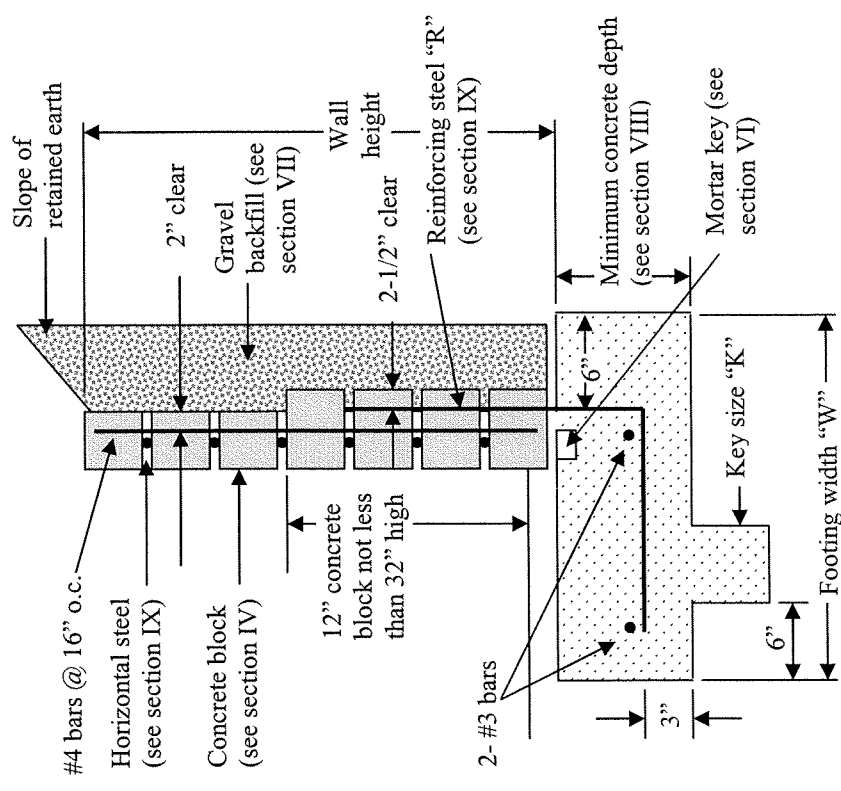
**Table B**

**Wall Type "T"**  
**A** - Type I, 6" Block  
**B** - Type I, 8" Block  
**C** - Type II, first 32" of block must be 12" wide masonry, regardless of wall height, 8" block for remainder.

**Reinforcing Steel "R"**  
 1 - # 3 bars @ 24" o.c.  
 2 - # 4 bars @ 32" o.c.  
 3 - # 3 bars @ 16" o.c.  
 4 - # 4 bars @ 24" o.c.  
 5 - # 4 bars @ 16" o.c.  
 6 - # 5 bars @ 16" o.c.  
 7 - # 6 bars @ 16" o.c.

**Key Size "K"**  
 D - 6" wide x 6" deep  
 E - 8" wide x 8" deep  
 F - 12" wide x 12" deep  
 G - 12" wide x 18" deep  
 N - None

### TYPE II WALL



**Table A / Slope of Retained Earth (Horizontal run to Vertical Rise)**

Wall Ht.	Level			5 to 1			4 to 1			3 to 1			2 to 1			1-1/2 to 1			1 to 1					
	T	R	W	T	R	W	T	R	W	T	R	W	T	R	W	T	R	W	T	R	W			
1'-6"	A	1	N	1'-4"	A	1	N	1'-4"	A	1	N	1'-4"	A	1	N	1'-4"	A	1	N	1'-6"	A	1	D	1'-7"
2'-0"	A	1	N	1'-4"	A	1	N	1'-4"	A	1	N	1'-4"	A	1	N	1'-4"	A	1	N	1'-8"	A	1	D	1'-10"
2'-6"	A	1	N	1'-7"	A	1	N	1'-7"	A	1	N	1'-7"	A	1	N	1'-7"	A	1	N	1'-10"	A	1	E	2'-2"
3'-0"	A	1	N	2'-0"	A	1	N	2'-0"	A	1	N	2'-0"	A	1	N	2'-0"	A	1	E	2'-2"	B	1	F	2'-5"
3'-6"	A	1	N	2'-1"	A	1	N	2'-1"	A	1	N	2'-1"	A	3	D	2'-1"	A	3	D	2'-1"	B	4	F	2'-4"
4'-0"	B	1	N	2'-4"	B	1	N	2'-4"	B	1	N	2'-4"	B	1	D	2'-4"	B	1	E	2'-4"	B	4	F	2'-4"
4'-6"	B	1	N	2'-6"	B	2	D	2'-6"	B	2	D	2'-6"	B	2	D	2'-6"	B	4	E	2'-6"	B	6	F	3'-1"
5'-0"	B	4	D	2'-9"	B	5	E	2'-9"	B	5	E	2'-9"	B	5	E	2'-9"	B	6	F	2'-9"	C	5	G	3'-5"
5'-6"	B	5	D	3'-0"	B	6	E	3'-0"	B	6	E	3'-0"	B	6	E	3'-0"	C	5	F	3'-2"	C	5	G	3'-9"
6'-0"	C	5	E	3'-3"	C	5	E	3'-3"	C	5	E	3'-4"	C	5	E	3'-4"	C	5	F	3'-6"	C	6	G	4'-2"
7'-0"	C	5	E	3'-9"	C	5	F	3'-10"	C	5	F	3'-10"	C	6	G	3'-11"	C	6	G	3'-11"	C	7	G	4'-1"
8'-0"	C	5	G	4'-6"																				