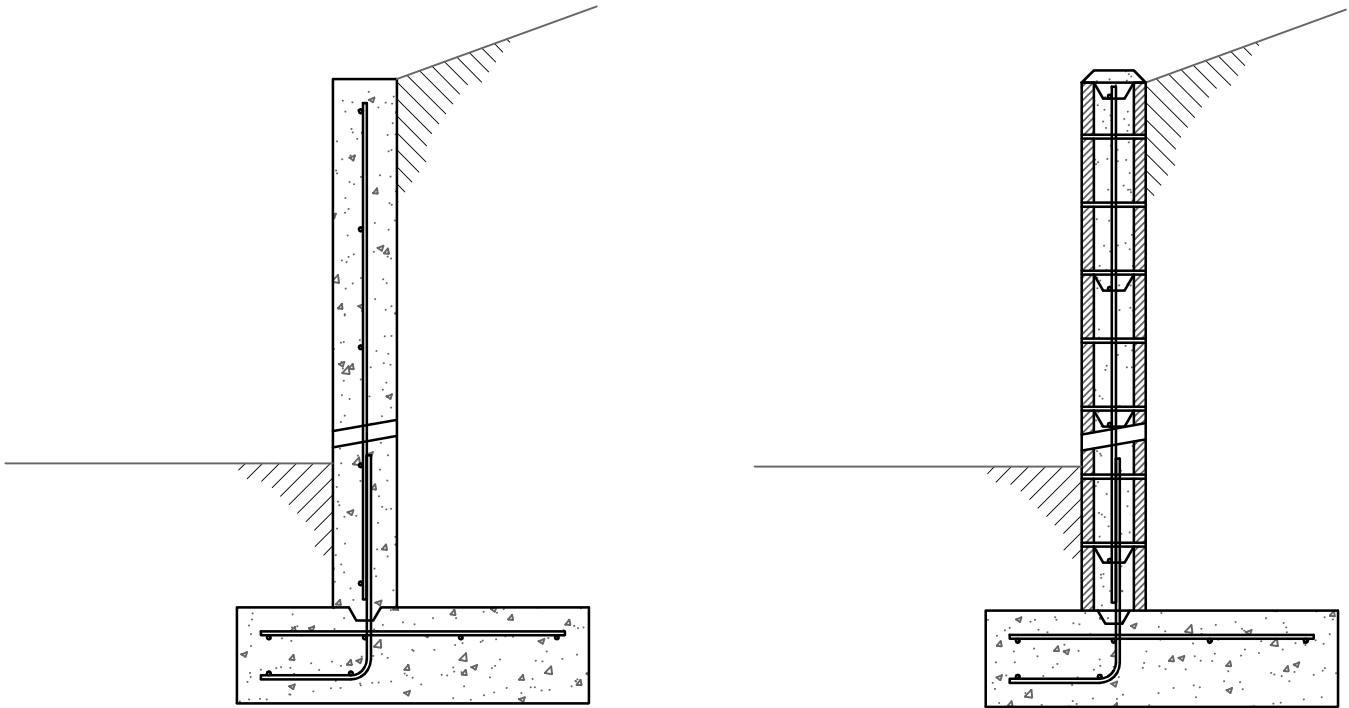


# Residential Site Retaining Walls

*Based on the 2006 International Building Code*



The use of this package in lieu of an engineered design, including drawings and calculations sealed by a registered Professional Engineer in the State of Utah, is subject to the limitations noted in the "General Notes". This package is applicable to simple residential site retaining walls only. Retaining walls must be constructed in strict conformance with the notes, details and schedules contained in this package. A copy of this package must be kept at the job site and available to the inspector throughout the construction and inspection process. All walls listed herein require that a building permit be obtained prior to commencing construction.

# GENERAL NOTES

## I. LIABILITY

1. This handout is provided as an alternative to providing an engineered design for County approval. The County takes no responsibility for the design included herein. If the owner wishes to use this handout, they claim full liability.

## II. LIMITATIONS

1. This handout is meant for residential site retaining walls only.
2. The retaining walls have been designed assuming a Soil Site Class 'D', a soil bearing pressure of 1,500psf, an active pressure of 45pcf, passive pressure of 250pcf, a friction coefficient of 0.30, and a 40-inch frost protection requirement. Prior to using this handout please confirm with the building official that these assumptions are appropriate for your site.
3. The grade at the top of the retaining wall may have a maximum slope ( $\beta$ ) of 20 degrees.
4. No surcharge loads are to be placed adjacent to the retaining walls. These loads could consist of parked vehicles, fences attached to the top of the wall, adjacent structural footings, etc.
5. If terraced retaining walls are provided, adjacent walls must provide a minimum clear distance of A + C (measured face-to-face).
6. If your project does not satisfy the limitations noted above this handout may not be used.

## III. DRAINAGE

1. Adequate drainage must be provided behind the retaining walls. Drainage can be provided by use of perforated pipe or weep holes as noted in Figure 5.
2. Clean gravel is to be placed as noted in Figure 5 and wrapped with filter fabric.
3. If perforated pipe is selected it shall discharge by gravity or mechanical means into an approved drainage system as required by IBC 1807.4.3.

## IV. CONCRETE

1. All concrete shall have a minimum compressive strength of 3,000psi and maximum slump of 5-inches.
2. Footings shall be placed on compacted natural soil or structural fill.
3. All items to be cast in concrete such as reinforcing, dowels, etc. shall be securely tied in place prior to the placement of concrete. Installation after pour (i.e. "wet-setting") is not allowed.
4. Remove all debris from forms prior to placing concrete.
5. Properly consolidate and tamp the concrete when placed.
6. Provide 2x4 beveled keyway at the footing.
7. Control joints (see Figure 1) shall be placed no more than 20-feet o.c. Expansion joints (see Figure 2) shall be placed at every fourth control joint.
8. Brace walls as required and allow walls to properly cure prior to placing backfill.

## V. MASONRY

1. All masonry units shall have a minimum compressive strength of 1,500psi and conform to ASTM C90.
2. Mortar shall conform to ASTM C270, Type M (2,500psi) or S (1,800psi).
3. All head and bed joints shall be 3/8-inch thick. Bed joints of the starting course over concrete foundation may be between 1/4-inch and 3/4-inch.
4. Masonry grout shall have a minimum compressive strength of 2,000psi and conform to ASTM C476 for fine or coarse grout.
5. Place grout in lifts not exceeding 5-feet. Walls are to be grouted solid.
6. All items to be cast in masonry such as reinforcing, dowels, etc. shall be securely tied in place prior to the placement of concrete. Installation after pour (i.e. "wet-setting") is not allowed.
7. Properly consolidate and tamp the grout when placed.
8. Provide 2x4 beveled keyway at the footing.
9. Control joints (see Figure 3) shall be placed no more than 20-feet o.c. Expansion joints (see Figure 4) shall be placed at every fourth control joint.
10. Brace walls as required and allow walls to properly cure prior to placing backfill.

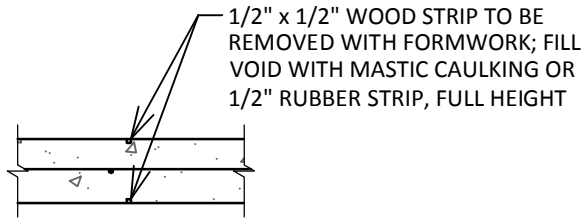
## VI. STEEL

1. All reinforcing steel shall conform to ASTM A615 Grade 60 and shall be #4 bars (1/2"Ø), #5 bars (5/8"Ø), or #6 bars (3/4"Ø), as noted in the schedules.
2. Reinforcing bars shall not be welded.
3. Remove grease, oil, rust, and other laitance from reinforcing steel prior to installation.
4. Use chairs or other acceptable methods to support reinforcement prior to placing concrete. Lifting or holding reinforcement in place is not permitted.
5. A minimum concrete cover of 3-inches shall be provided for all reinforcing steel.
6. Provide one horizontal bar within 5-inches of the top of the stem wall and within 5-inches of the top of the footing, but not closer than the 3-inch clear cover requirement. All remaining horizontal steel is to be evenly spaced between the top and bottom bar.
7. All lap splices of reinforcing steel shall be 22-inches.

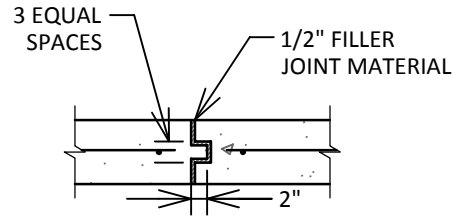
### NOTATIONS

Ø	Diameter
ASTM	ASTM International
IBC	International Building Code
min.	Minimum
o.c.	On center
pcf	Pounds per cubic foot
psf	Pounds per square foot
psi	Pounds per square inch

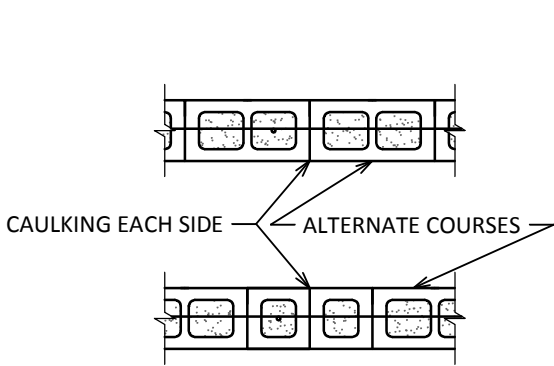
# TYPICAL DETAILS



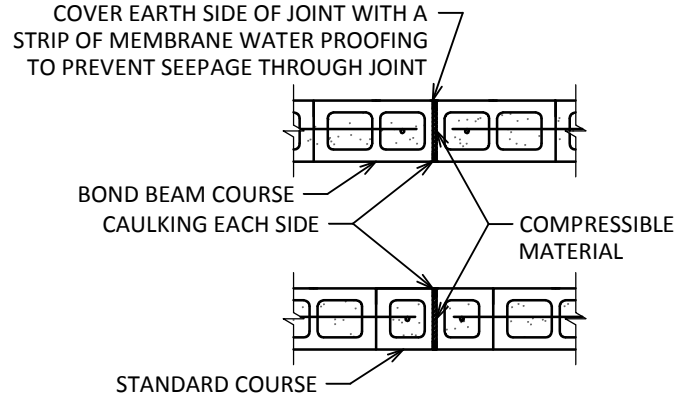
**FIGURE 1: CONCRETE CONTROL JOINT DETAIL**



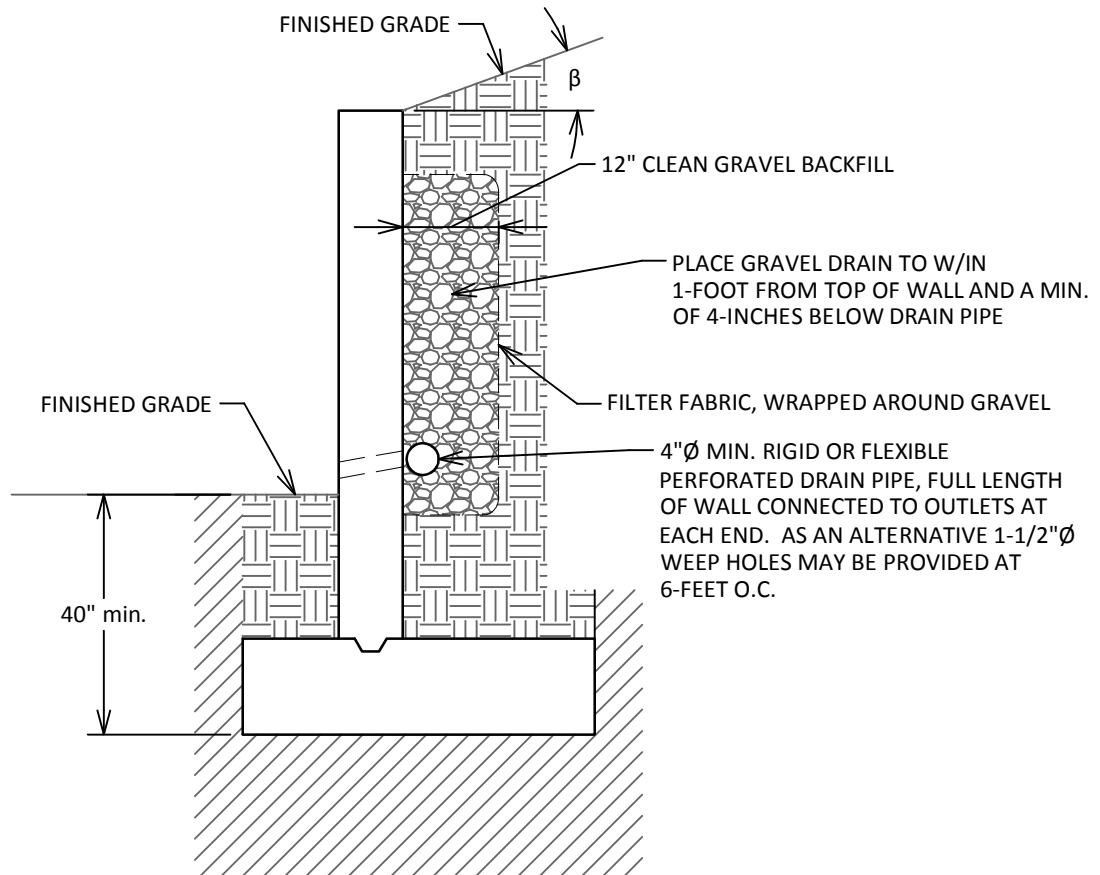
**FIGURE 2: CONCRETE EXPANSION JOINT DETAIL**



**FIGURE 3: MASONRY CONTROL JOINT DETAIL**



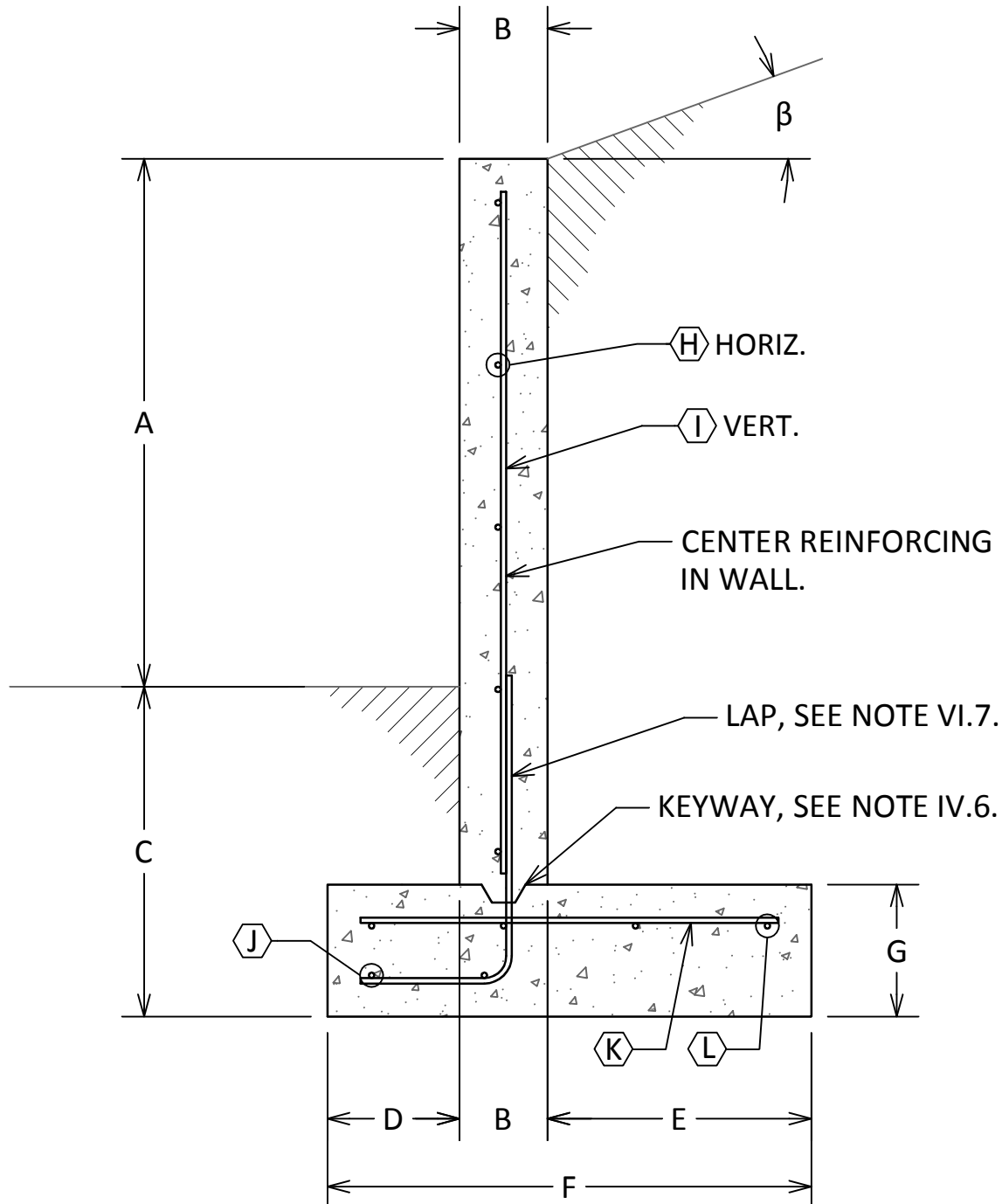
**FIGURE 4: MASONRY EXPANSION JOINT DETAIL**



**FIGURE 5: TYPICAL BACKFILL AND DRAINAGE DETAIL**

# Residential Concrete Retaining Walls

HEIGHT	DIMENSIONS						REINFORCING STEEL				
	A	B	C	D	E	F	G	(H)	(I)	(J)	(K)
2'	8"	3'-4"	6"	8"	1'-10"	1'-0"	(4) #4 BARS	#4 @ 15"O.C.	(1) #4 BARS	#4 @ 12"O.C.	(2) #4 BARS
3'	8"	3'-4"	10"	1'-0"	2'-6"	1'-0"	(5) #4 BARS	#4 @ 15"O.C.	(1) #4 BARS	#4 @ 12"O.C.	(2) #4 BARS
4'	8"	3'-4"	1'-4"	1'-6"	3'-6"	1'-0"	(5) #4 BARS	#5 @ 15"O.C.	(2) #4 BARS	#4 @ 12"O.C.	(3) #4 BARS
5'	12"	3'-4"	2'-6"	3'-0"	6'-6"	1'-2"	(6) #4 BARS	#5 @ 13"O.C.	(3) #4 BARS	#4 @ 12"O.C.	(4) #4 BARS



# Residential Masonry Retaining Wall

HEIGHT	DIMENSIONS						REINFORCING STEEL				
	A	B	C	D	E	F	G	(H)	(I)	(J)	(K)
2'	8"	3'-4"	6"	8"	1'-10"	1'-0"	(2) #4 BARS	#4 @ 24"O.C.	(1) #4 BARS	#4 @ 12"O.C.	(2) #4 BARS
3'	8"	3'-4"	8"	10"	2'-2"	1'-0"	(2) #4 BARS	#4 @ 16"O.C.	(1) #4 BARS	#4 @ 12"O.C.	(2) #4 BARS
4'	10"	3'-4"	1'-4"	1'-6"	3'-8"	1'-0"	(3) #4 BARS	#5 @ 16"O.C.	(2) #4 BARS	#4 @ 12"O.C.	(3) #4 BARS
5'	10"	3'-4"	2'-8"	3'-0"	6'-6"	1'-4"	(3) #4 BARS	#6 @ 8"O.C.	(3) #4 BARS	#4 @ 12"O.C.	(4) #4 BARS

