

A building permit is required for retaining walls in excess of 4 feet. This measurement is taken from the bottom of the footing to the top of the masonry. Retaining walls of any size supporting a surcharge as described on page two also require a building permit. The appropriate San Diego County Regional Standard may be used for construction of walls with level backfill or walls with sloping backfill of 1 1/2:1 slope or up to 250psf live load surcharge. All other walls will require an engineered design along with architectural plans, structural calculations and a soils report prepared by a licensed design professional. Link provided below. Contact the Building Division for information on how to obtain a building permit for a retaining wall. The details provided in this handout refer specifically to wall designs meeting these specific parameters as required for permitted work.

**For construction details refer to the San Diego County Regional Standards at:**  
<http://www.regional-stds.com/home/book/drawings>.

**NOTE: When retaining walls are part of an approved grading plan, a separate building permit will NOT be issued. Review design for retaining walls that are a part of a grading plan with your civil engineer and Land Development Engineering. Retaining walls that are part of the approved grading will be inspected by the Construction Management & Inspection division.**

**INSPECTIONS**

Inspections must be performed and approved during several phases of retaining wall construction. Please call for an inspection at the following times:

- When the footing has been excavated, the reinforcing steel is tied into its final position, and the site is ready for concrete to be placed, a foundation inspection is required.
- An inspection of the wall reinforcement and masonry unit lay-up is required before grouting the wall.  
If clean out holes are used, masonry may be laid to the full height of the grout pour before calling for the inspection. Grout shall then be poured in a continuous pour in lifts not exceeding six feet.  
If clean out holes are not used, a pregrout 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 in excess of five feet.
- After grouting is complete, and wall drain systems are in place, a backfill/drainage inspection is required.
- When all backfill and fine grading operations are finished, a final inspection is required.

**BUILDING PLANCHHECK CHECLIST FOR RETAINING WALLS**

Provide a fully dimensioned site plan drawn to scale. Show:

- ◆ North Arrow
- ◆ Easements
- ◆ Existing & Proposed Structures
- ◆ Retaining Wall(s)
- ◆ Property Lines (dimensioned from street)
- ◆ Show Proposed location(s) of walls
- ◆ Show wall heights (top of wall-TW and bottom of wall-BW) at ends of walls, tallest points of wall & at points of height change.
- ◆ Drainage patterns
- ◆ Existing and proposed slopes
- ◆ Existing topography

Include on plans:

- ◆ Site address
- ◆ Assessor's parcel number
- ◆ Legal description

Grading quantities: Cut \_\_\_\_\_ Fill \_\_\_\_\_ Import/Export \_\_\_\_\_

A "surcharge" on a retaining wall is any load in addition to level grade, within that area defined by a 45 degree angle from the bottom of the footing to level grade. See hatched "Surcharge Area" shown below. Examples of a surcharge may be a building or structure, fence, driveway, or **slope above level grade**, within the hatched "Surcharge Area" shown in the figures below.

Because of the varying soils conditions throughout the City, all retaining walls over 4 feet, measured from the bottom of the footing, are required to have a building permit.

Walls supporting a 1 1/2:1 sloping backfill or live load surcharge of 250psf may utilize the San Diego Regional standard drawings below. All other wall designs outside the above parameters require an engineered design along with architectural plans, structural calculations and a soils report prepared by a licensed design professional.

\*\*\*Walls constructed using the City of San Diego Regional retaining wall standard plan shall not support a soil surcharge in excess of 1 1/2:1 slope above the top of wall or in excess of 250psf live load surcharge.

Section 105.2 of the 2019 California Building Code, as adopted by the City of Carlsbad, exempts a retaining wall from a building permit provided:

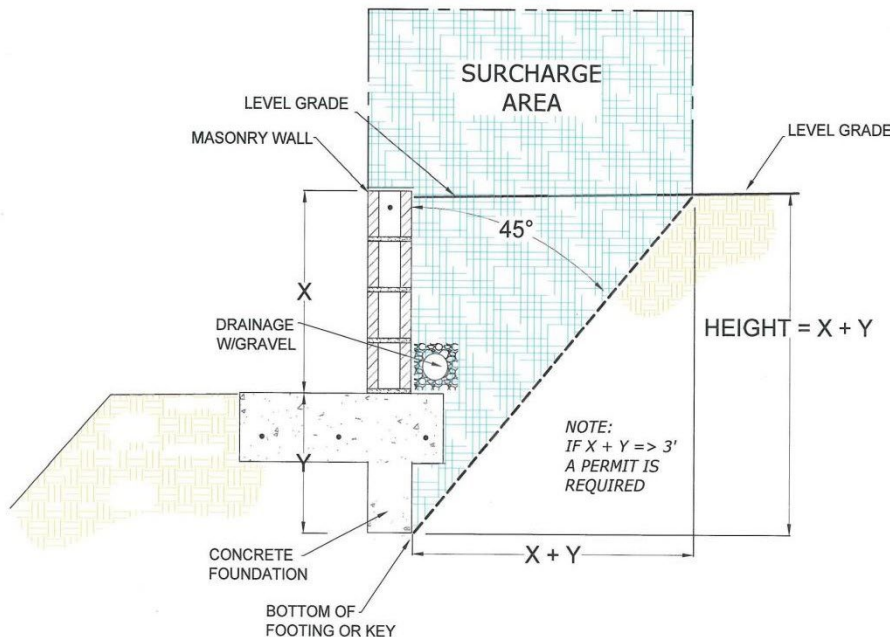
- It is not over 4 feet in height measured from the bottom of the footing to the top of the wall.
- It does not support a surcharge.
- It does not impound Class I, II, or IIIA liquids.

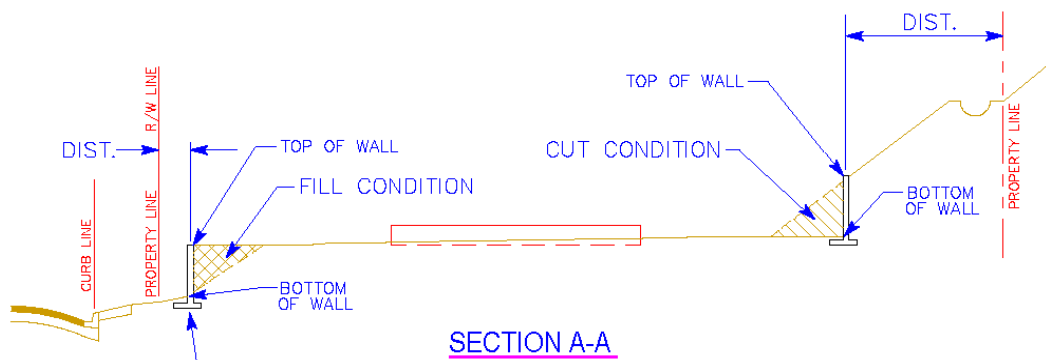
If you have any questions regarding your specific retaining wall project, please contact Building Division at (442) 339-2710 or you may visit the Development Services Counter at City Hall.

**SURCHARGE AREA = WALL HEIGHT (X) + FOOTING DEPTH (Y)**

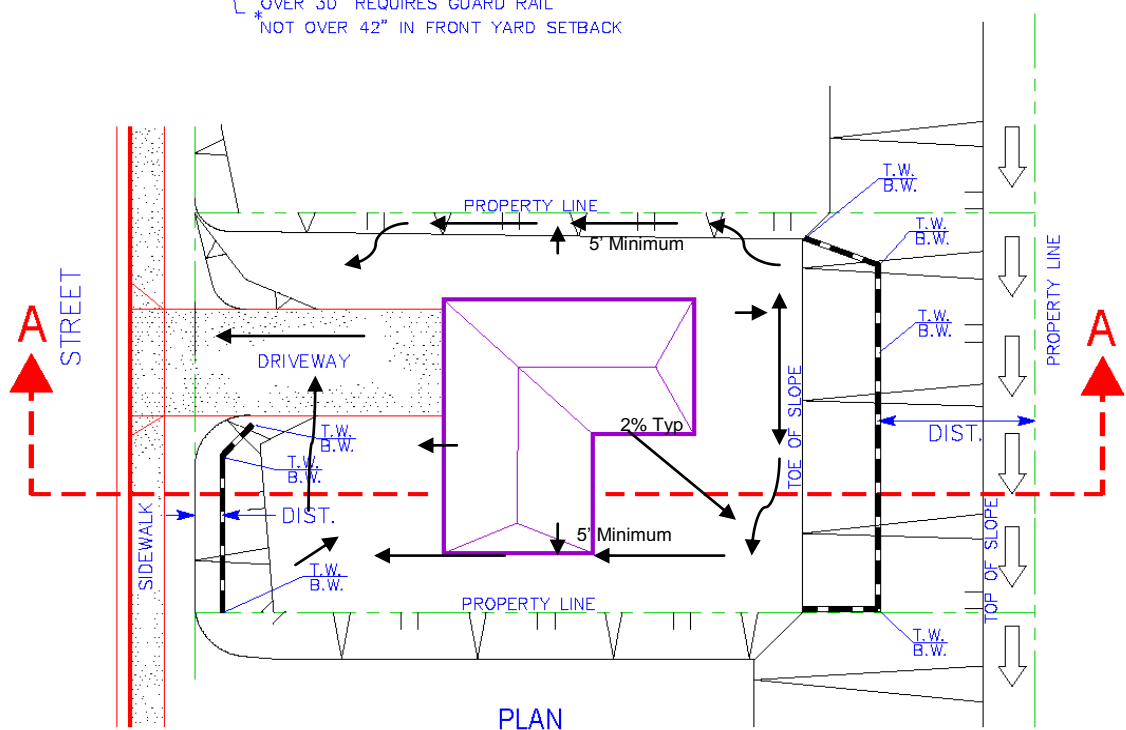
Wall drains are required per this handout or in compliance with CBC section 1805.4.2 and 1805.4.3.

Walls that are proposed without drains shall be engineered to support the weight of the full hydrostatic pressure of undrained backfill. **THIS HANDOUT DOES NOT QUALIFY FOR USE FOR WALLS PROPOSED WITH NO DRAIN.**





\* OVER 30" REQUIRES GUARD RAIL  
 \* NOT OVER 42" IN FRONT YARD SETBACK



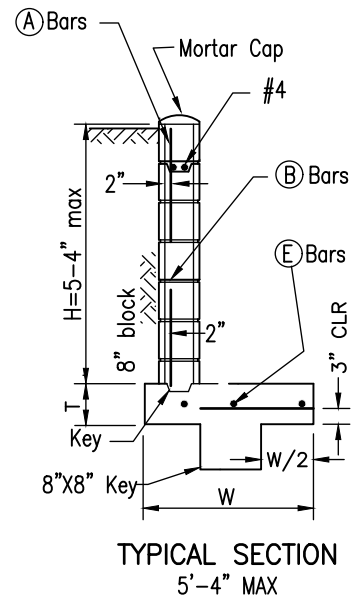
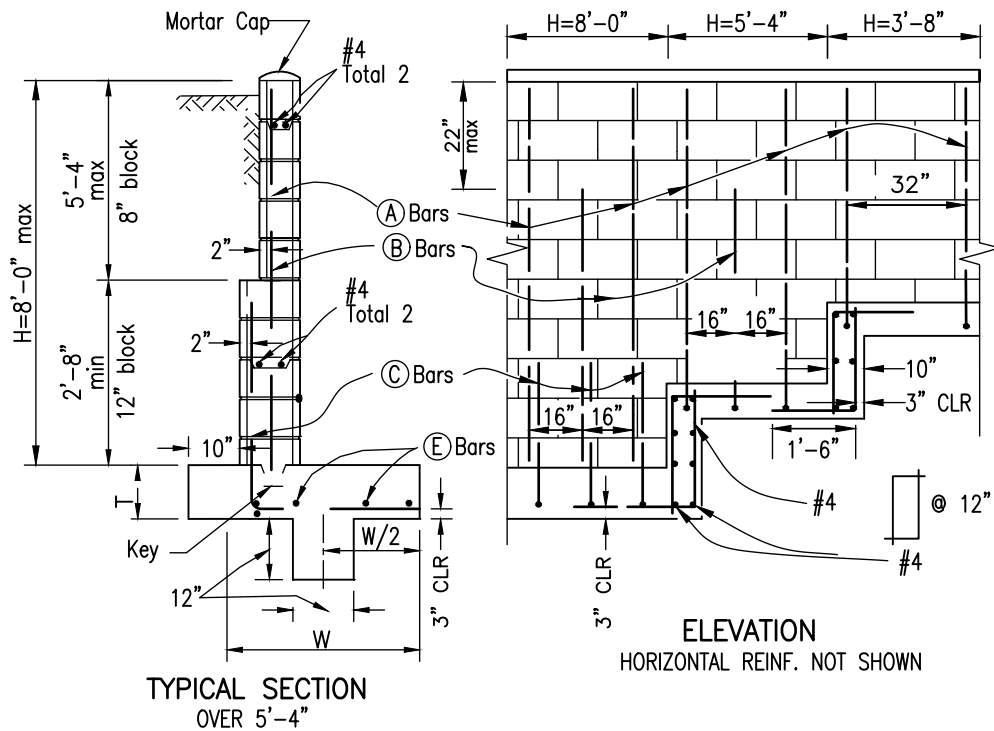
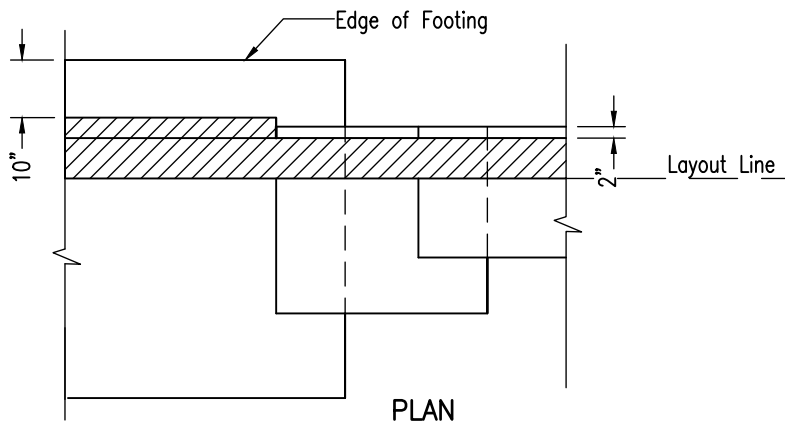
T.W. — TOP OF WALL ELEVATION  
 B.W. — BOTTOM OF WALL ELEVATION

PROVIDE CUBIC YARDAGE  
 OF PROPOSED CUT/FILL

CITY OF CARLSBAD

SAMPLE PLOT PLAN FOR RETAINING WALLS

DRAWN BY: SCOTT EVANS, CARLSBAD ENGINEERING DEPT. 1/28/03 C:\TEMPORARY DRAWINGS\RETAINING WALL EXHIBIT.DWG



TYPICAL SECTION OVER 5'-4"

ELEVATION HORIZONTAL REINF. NOT SHOWN

TYPICAL SECTION 5'-4" MAX

| DIMENSIONS AND REINFORCING STEEL |            |            |            |
|----------------------------------|------------|------------|------------|
| H (MAX)                          | 3'-8"      | 5'-4"      | 8'-0"      |
| T (MIN)                          | 0'-11"     | 1'-0"      | 1'-4"      |
| W (MIN)                          | 2'-7"      | 3'-8"      | 5'-10"     |
| (A) BARS                         | #4@32"     | #4@16"     | #5@24"     |
| (B) BARS                         | —          | #4@16"     | #5@24"     |
| (C) BARS                         | —          | —          | #6@16"     |
| (E) BARS                         | #4 TOTAL 4 | #4 TOTAL 5 | #4 TOTAL 6 |
| MAX SOIL PRESSURE                | 1500 PSF   | 2000 PSF   | 3000 PSF   |

- NOTES: 1. SEE C-7 AND C-8 FOR ADDITIONAL NOTES AND DETAILS.  
2. FILL ALL BLOCK CELLS WITH GROUT.

| Revision      | By   | Approved   | Date  |
|---------------|------|------------|-------|
| ORIGINAL      |      | Kercheval  | 12/75 |
| Add Metric    |      | T. Stanton | 03/03 |
| Delete Metric | S.S. | T. Shell   | 03/11 |
| Reviewed      | TS   | T. Stanton | 11/15 |
| Reviewed      | DH   | T. Stanton | 09/17 |

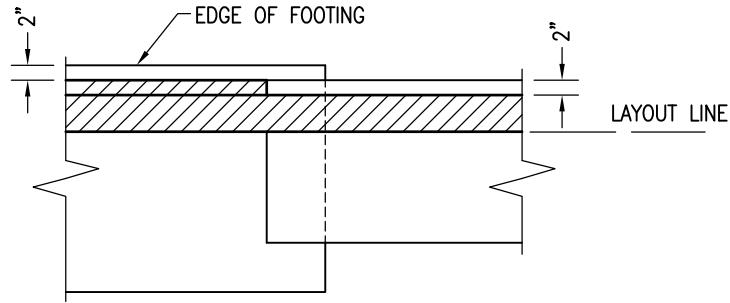
SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 1  
LEVEL BACKFILL WITH 10-IN HEEL

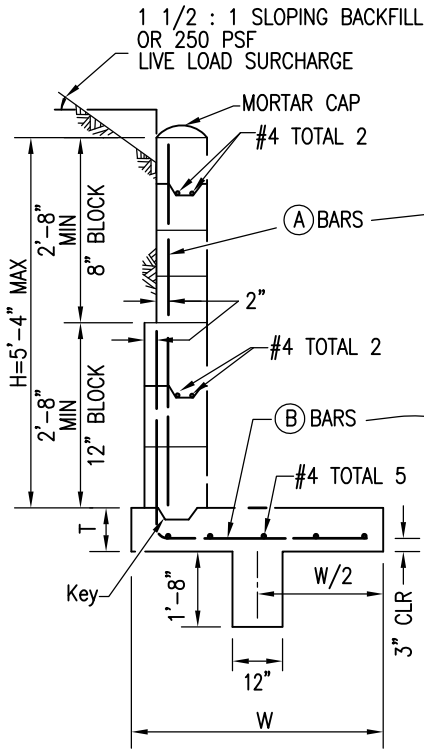
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 10/25/2018  
Chairperson R.C.E. 19246 Date

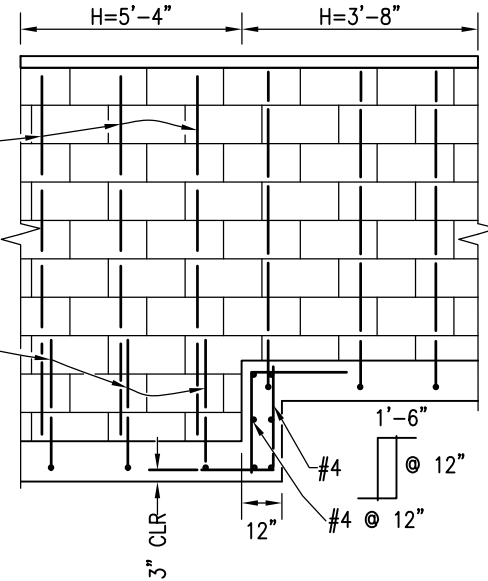
DRAWING NUMBER C-01



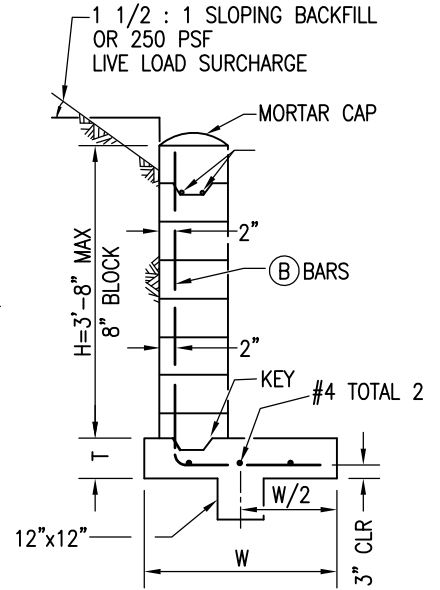
PLAN



TYPICAL SECTION OVER 3'-8"



ELEVATION  
HORIZONTAL REINF. NOT SHOWN



TYPICAL SECTION 3'-8" MAX

| DIMENSIONS AND REINFORCING STEEL |          |         |
|----------------------------------|----------|---------|
| H (MAX)                          | 5'-4"    | 3'-8"   |
| T (MIN)                          | 1'-1"    | 0'-10"  |
| W (MIN)                          | 5'-0"    | 3'-9"   |
| (A) BARS                         | #4@16"   | ---     |
| (B) BARS                         | #5@16"   | #4@16"  |
| MAX SOIL PRESSURE                | 1000 PSF | 800 PSF |

NOTES:

- SEE C-7 AND C-8 FOR ADDITIONAL NOTES AND DETAILS.
- FILL ALL BLOCK CELLS WITH GROUT.

| Revision      | By   | Approved   | Date  |
|---------------|------|------------|-------|
| ORIGINAL      |      | Kercheval  | 12/75 |
| Add Metric    |      | T. Stanton | 03/03 |
| Delete Metric | S.S. | T. Shell   | 03/11 |
| Reviewed      | TS   | T. Stanton | 11/15 |
| Revised       | DH   | T. Stanton | 09/17 |

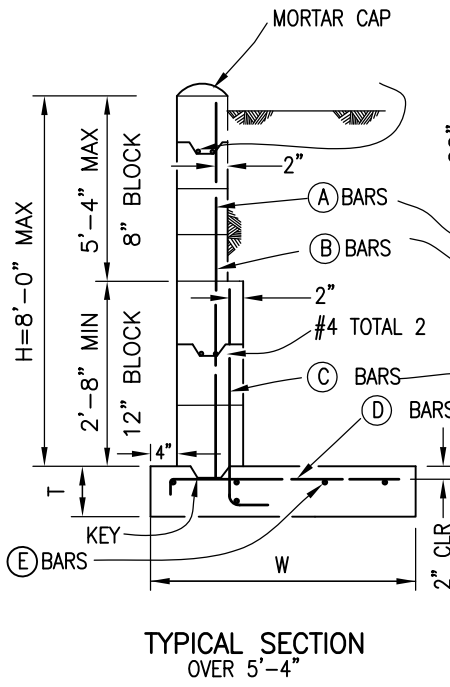
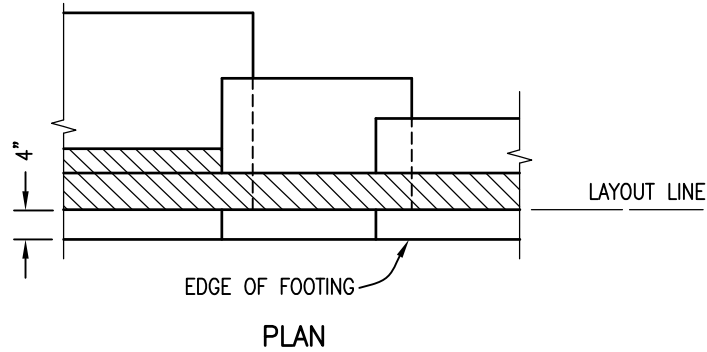
SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 2  
(LIVE LOAD SURCHARGE OR SLOPING BACKFILL)

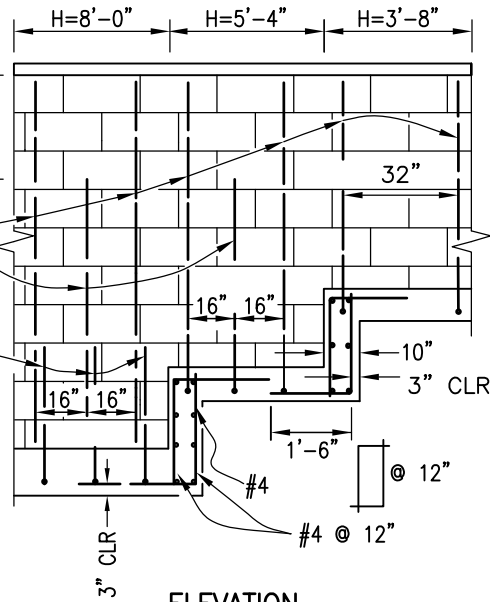
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 10/25/2018  
Chairperson R.C.E. 19246 Date

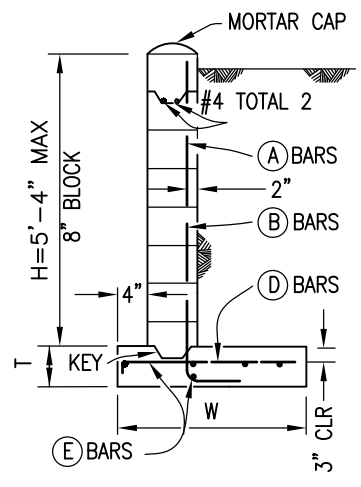
DRAWING NUMBER C-02



TYPICAL SECTION OVER 5'-4"




ELEVATION  
HORIZONTAL REINF. NOT SHOWN

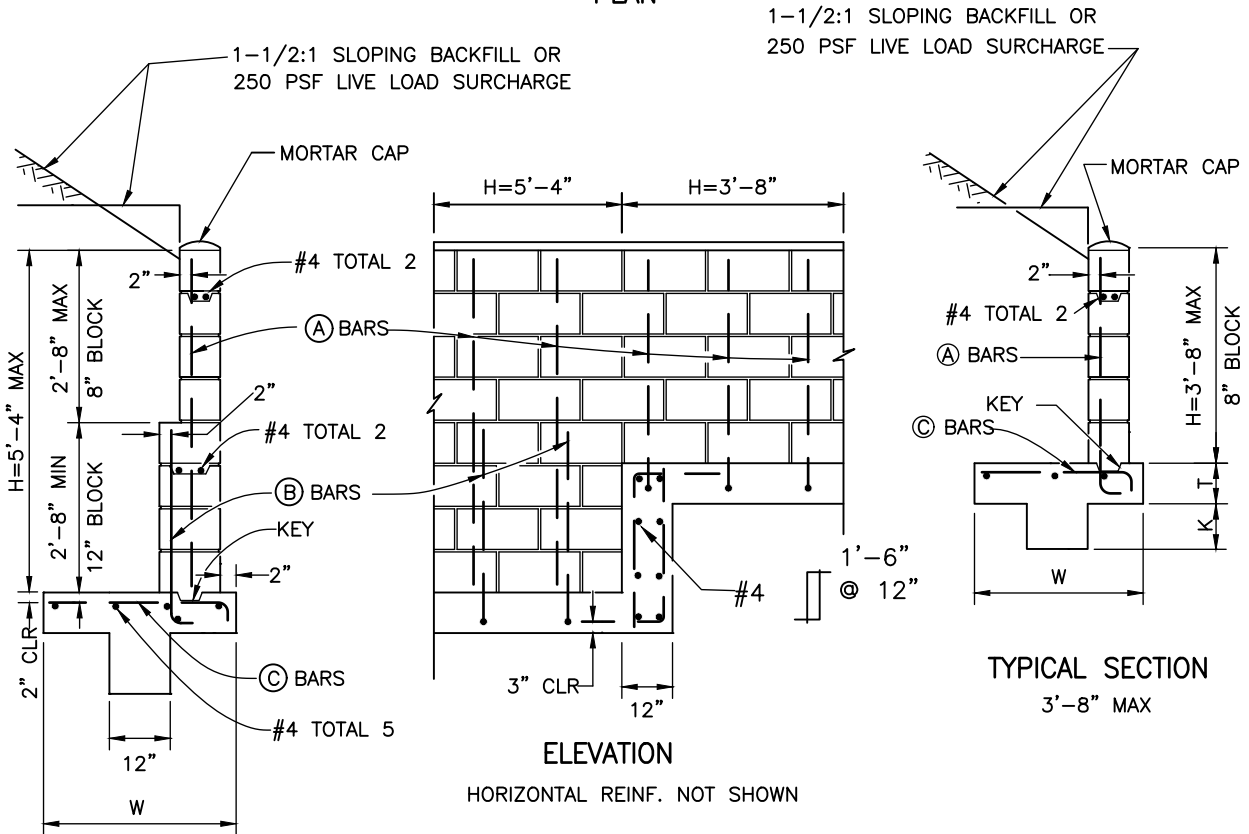
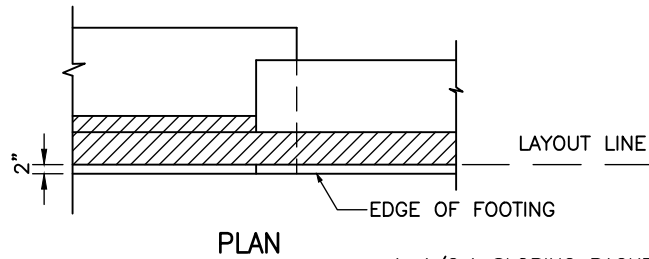


TYPICAL SECTION 5'-4" MAX

| DIMENSIONS AND REINFORCING STEEL |            |            |            |
|----------------------------------|------------|------------|------------|
| H (MAX)                          | 3'-8"      | 5'-4"      | 8'-0"      |
| T (MIN)                          | 0'-8"      | 1'-1"      | 1'-3"      |
| W (MIN)                          | 2'-4"      | 3'-9"      | 5'-3"      |
| (A) BARS                         | #4@32"     | #5@16"     | #4@24"     |
| (B) BARS                         | ---        | #5@16"     | #4@24"     |
| (C) BARS                         | ---        | ---        | #6@16"     |
| (D) BARS                         | #4@32"     | #5@12"     | #6@16"     |
| (E) BARS                         | #4 TOTAL 4 | #4 TOTAL 5 | #4 TOTAL 6 |
| MAX SOIL PRESSURE                | 1100 PSF   | 2500 PSF   | 3000 PSF   |

NOTES: 1. SEE C-7 AND C-8 FOR ADDITIONAL NOTES AND DETAILS.  
2. FILL ALL BLOCK CELLS WITH GROUT.

|               |      |            |       |   |   |
|---------------|------|------------|-------|---|---|
| Revision      | By   | Approved   | Date  | SAN DIEGO REGIONAL STANDARD DRAWING               | RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE   |
| ORIGINAL      |      | Kercheval  | 12/75 |   |   |
| Add Metric    |      | T. Stanton | 03/03 | MASONRY RETAINING WALL TYPE 3<br>(LEVEL BACKFILL) | <br>Chairperson R.C.E. 19246 Date 10/25/2018 |
| Delete Metric | S.S. | T. Shell   | 03/11 |   |   |
| Reviewed      | TS   | T. Stanton | 11/15 |   |   |
| Revised       | DH   | T. Stanton | 09/17 |   |   |
|               |      |            |       |   |   |




TYPICAL SECTION  
OVER 3'-8"

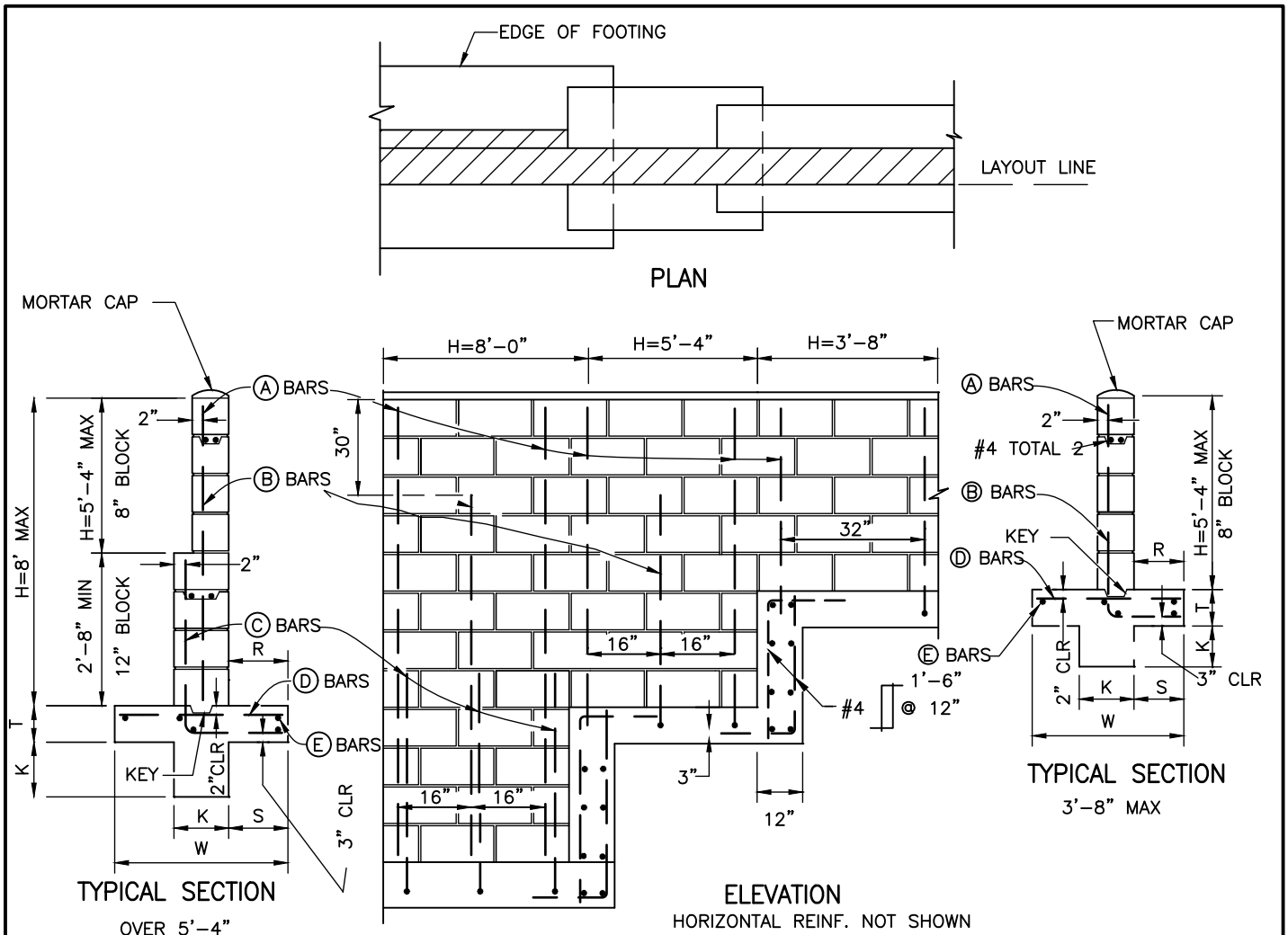
TYPICAL SECTION  
3'-8" MAX

| DIMENSIONS AND REINFORCING STEEL |          |           |          |           |
|----------------------------------|----------|-----------|----------|-----------|
| H (MAX)                          | 5'-4"    |           | 3'-8"    |           |
| T (MIN)                          | 0'-10"   |           | 0'-8"    |           |
| W (MIN)                          | 4'-0"    |           | 3'-0"    |           |
| (A) BARS                         | #4@16"   |           | #4@16"   |           |
| (B) BARS                         | #6@16"   |           | ---      |           |
| SURCHARGE                        | sloping  | live load | sloping  | live load |
| (C) BARS                         | #6@8"    | #6@16"    | #6@16"   | #6@16"    |
| K (MIN)                          | 1'-0"    | 0'-8"     | 1'-0"    | 0'-8"     |
| TOE PRESS.                       | 2700 PSF | 1900 PSF  | 1700 PSF | 1430 PSF  |

NOTES:

- SEE C-7 AND C-8 FOR ADDITIONAL NOTES AND DETAILS.
- FILL ALL BLOCK CELLS WITH GROUT.

|               |      |            |       |  |  |
|---------------|------|------------|-------|--|--|
| Revision      | By   | Approved   | Date  | SAN DIEGO REGIONAL STANDARD DRAWING  | RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  |
| ORIGINAL      |      | Parkinson  | 02/95 |  |  |
| Add Metric    |      | T. Stanton | 03/03 | MASONRY RETAINING WALL TYPE 4<br>(LIVE LOAD SURCHARGE OR SLOPING BACKFILL) | <br>Chairperson R.C.E. 19246 Date |
| Reformatted   |      | T. Stanton | 04/06 |  |  |
| Delete Metric | S.S. | T. Shell   | 03/11 |  |  |
| Reviewed      | TS   | T. Stanton | 11/15 |  |  |
|               |      |            |       |  | DRAWING NUMBER C-04  |



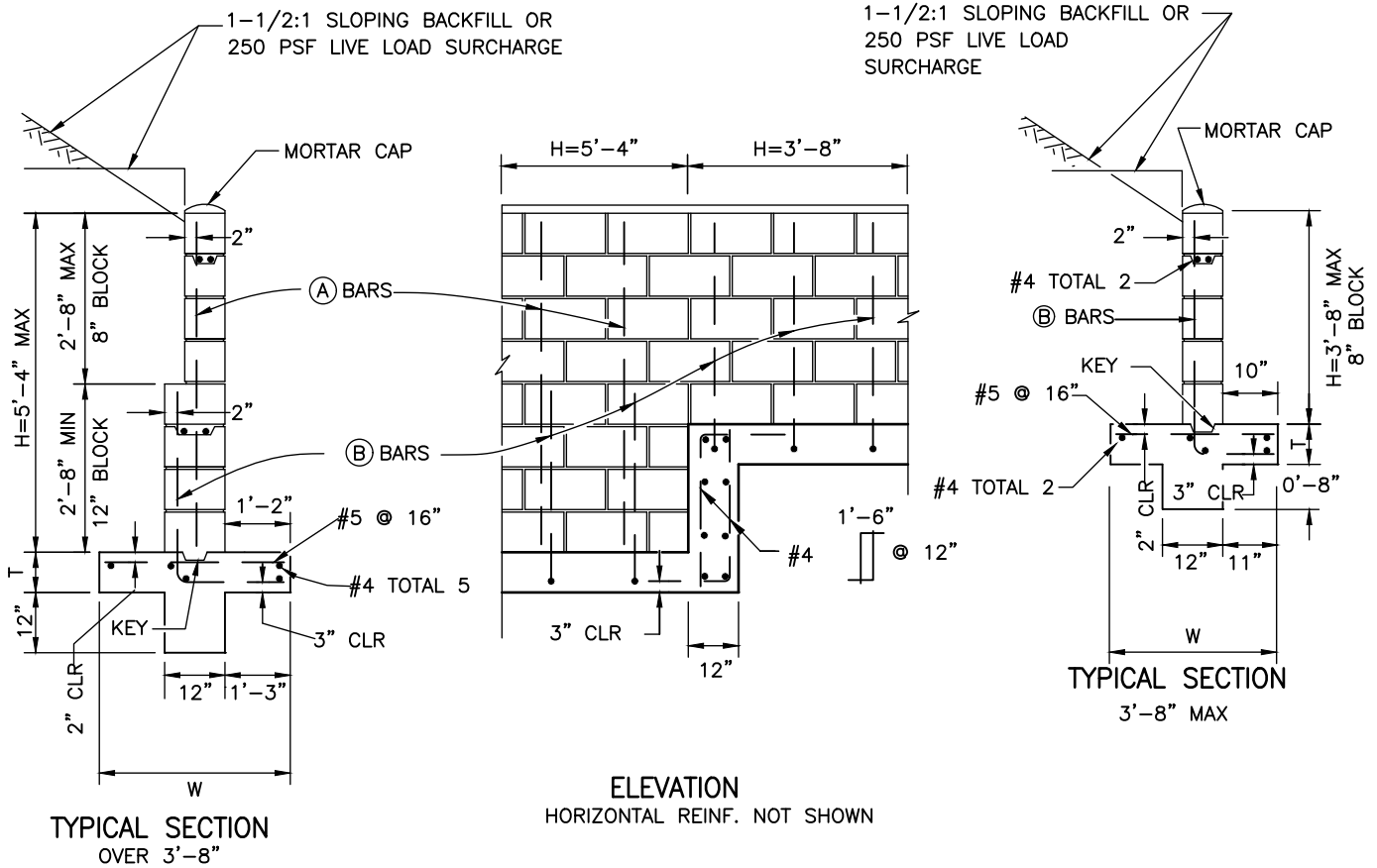
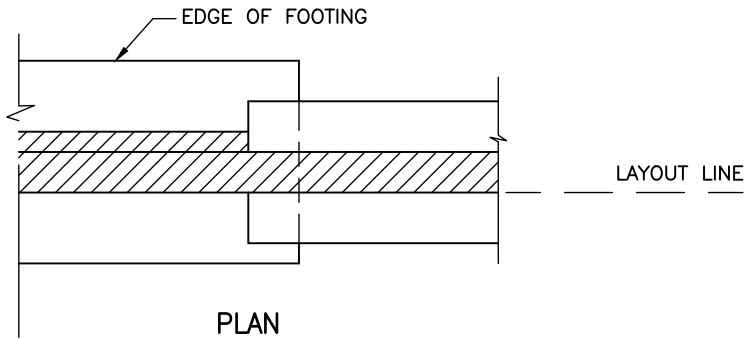
| DIMENSIONS AND REINFORCING STEEL |            |            |            |
|----------------------------------|------------|------------|------------|
| H (MAX)                          | 3'-8"      | 5'-4"      | 8'-0"      |
| T (MIN)                          | 0'-8"      | 0'-10"     | 1'-0"      |
| W (MIN)                          | 2'-1"      | 3'-1"      | 4'-3"      |
| R                                | 0'-9"      | 1'-2"      | 1'-5"      |
| S                                | 0'-8 1/2"  | 1'-1 1/2"  | 1'-7 1/2"  |
| K                                | 0'-8"      | 0'-8"      | 1'-0"      |
| (A) BARS                         | #4@32"     | #4@32"     | #4@32"     |
| (B) BARS                         | —          | #4@32"     | #4@32"     |
| (C) BARS                         | —          | —          | #7@16"     |
| (D) BARS                         | #4@32"     | #4@16"     | #4@16"     |
| (E) BARS                         | #4 total 5 | #4 total 5 | #4 total 6 |
| MAX TOE PRESSURE                 | 774 psf    | 1,030 psf  | 1,660 psf  |

**NOTES:**

1. SEE C-7 AND C-8 FOR ADDITIONAL NOTES AND DETAILS.
2. FILL ALL BLOCK CELLS WITH GROUT.

|               |      |            |       |   |   |
|---------------|------|------------|-------|---|---|
| Revision      | By   | Approved   | Date  | SAN DIEGO REGIONAL STANDARD DRAWING                       | RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE |
| ORIGINAL      |      | Parkinson  | 2/95  |   |   |
| Add Metric    |      | T. Stanton | 03/03 | <b>MASONRY RETAINING WALL TYPE 5<br/>(LEVEL BACKFILL)</b> | 10/25/2018<br>Chairperson R.C.E. 19246 Date               |
| Delete Metric | S.S. | T. Shell   | 03/11 |   |   |
| Reviewed      | TS   | T. Stanton | 11/15 |   |   |
|               |      |            |       |   |   |
|               |      |            |       | DRAWING NUMBER <b>C-05</b>                                |   |





| DIMENSIONS AND REINFORCING STEEL |           |           |
|----------------------------------|-----------|-----------|
| H (MAX)                          | 5'-4"     | 3'-8"     |
| T (MIN)                          | 0'-10"    | 0'-8"     |
| W (MIN)                          | 3'-10"    | 2'-9"     |
| (A) BARS                         | #4@16"    | ---       |
| (B) BARS                         | #6@16"    | #4@16"    |
| MAX TOE PRESSURE                 | 2,000 PSF | 1,400 PSF |

**NOTES:**

- SEE C-7 AND C-8 FOR ADDITIONAL NOTES AND DETAILS.
- FILL ALL BLOCK CELLS WITH GROUT.

| Revision      | By   | Approved   | Date  | SAN DIEGO REGIONAL STANDARD DRAWING | RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE |
|---------------|------|------------|-------|-------------------------------------|---|
| ORIGINAL      |      | Parkinson  | 2/95  |                                     |   |
| Add Metric    |      | T. Stanton | 03/03 |                                     |   |
| Delete Metric | S.S. | T. Shell   | 03/11 |                                     |   |
| Reviewed      | TS   | T. Stanton | 11/15 |                                     |   |
|               |      |            |       | DRAWING NUMBER                      | C-06  |

**DESIGN CONDITIONS:**

Walls are to be used for the loading conditions shown for each type wall. Design H shall not be exceeded. Footing key is required except as shown otherwise or when found unnecessary by the Engineer. Special footing design is required where foundation material is incapable of supporting toe pressure listed in table.

**DESIGN DATA:**

**Reinforced Concrete:**

F<sub>c</sub>=1200 psi      F'<sub>c</sub>=3000 psi  
 F<sub>s</sub>=20,000 psi      n=10

**Reinforced Masonry:**

F'<sub>m</sub>=600 psi      F<sub>m</sub>=200 psi  
 F<sub>s</sub>=20,000 psi      n=50  
 Earth=120 pcf and Equivalent Fluid  
 Pressure=36 psf per foot of height

Walls shown for 1 1/2:1 unlimited sloping surcharge are designed in accordance with Rankline's formula for unlimited sloping surcharge with a  $\phi = 42'$ .

**REINFORCEMENT:**

Intermediate grade, hard grade, or rail steel deformation shall conform ASTM A615, A616, A617. Bars shall lap 40 diameters, where spliced, unless otherwise shown on the plans. Bends shall conform to the Manual of Standard Practice, A.C.1. Backing for hooks is four diameters. All bar embedments are clear distances to outside of bar. Spacing for parallel bars is center to center bars.

**MASONRY:**

All reinforced masonry retaining walls be constructed of regular or light weight standard units conforming to the "Standard Specifications for Public Works Construction."

**JOINTS:**

Vertical control joints shall be placed at 32' intervals maximum. Joints shall be designed to resist shear and other lateral forces while permitting longitudinal movement. Vertical expansion joints shall be placed at 96' intervals maximum.

**CONCRETE:**

Footing concrete shall be 560-C-3250, using Type B aggregate when placing conditions permit.

**BACKFILL:**

No backfill material shall be placed against masonry retaining walls until grout has reached design strength or until grout has cured for a minimum of 28 days. Compaction of backfill material by jetting or ponding with water will not be permitted. Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compacting is not less than 90%.

**FENCING:**

Safety fencing shall be installed at the top of the wall as required by the agency.

**INSPECTIONS:**

Call for inspections as follows:

- A. When the footing has been formed, with the steel tied securely in final position, and is ready for the concrete to be placed.
- B. Where cleanout holes are not provided:
  - (1) After the blocks have been laid up to a height of 4' or full height for walls up to 5', with steel in place but before the grout is poured, and.....
  - (2) After the first lift is properly grouted, the blocks have been laid up to the top of the wall with the steel tied securely in place but before the upper lift is grouted.

Where cleanout holes are provided:

After the blocks have been laid up to the top of the wall, with the steel tied securely in place, but before grouting.

- C. After grouting is complete and after rock or rubble wall drains are in place but before earth backfill is placed.
- D. Final inspection when all work has been completed.

**CONCRETE GROUT AND MORTAR MIXES:**

Concrete grout shall attain a minimum compressive strength of 2,000 psi in 28 days and mortar shall attain 1,800 psi in 28 days. All cells shall be filled with grout. Rod or vibrate consolidation. Bring grout within 10 minutes of pouring to insure grout to a point 2" from the top of masonry units when grouting of second lift is to be continued at another time.

**MORTAR KEY:**

To insure proper bonding between the footing and the first course of block, a mortar key shall be formed by embedding a flat 2 x 4 flush with and at the top of the freshly poured footing. The 2 x 4 should be removed after the concrete has started to harden (approximately 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.

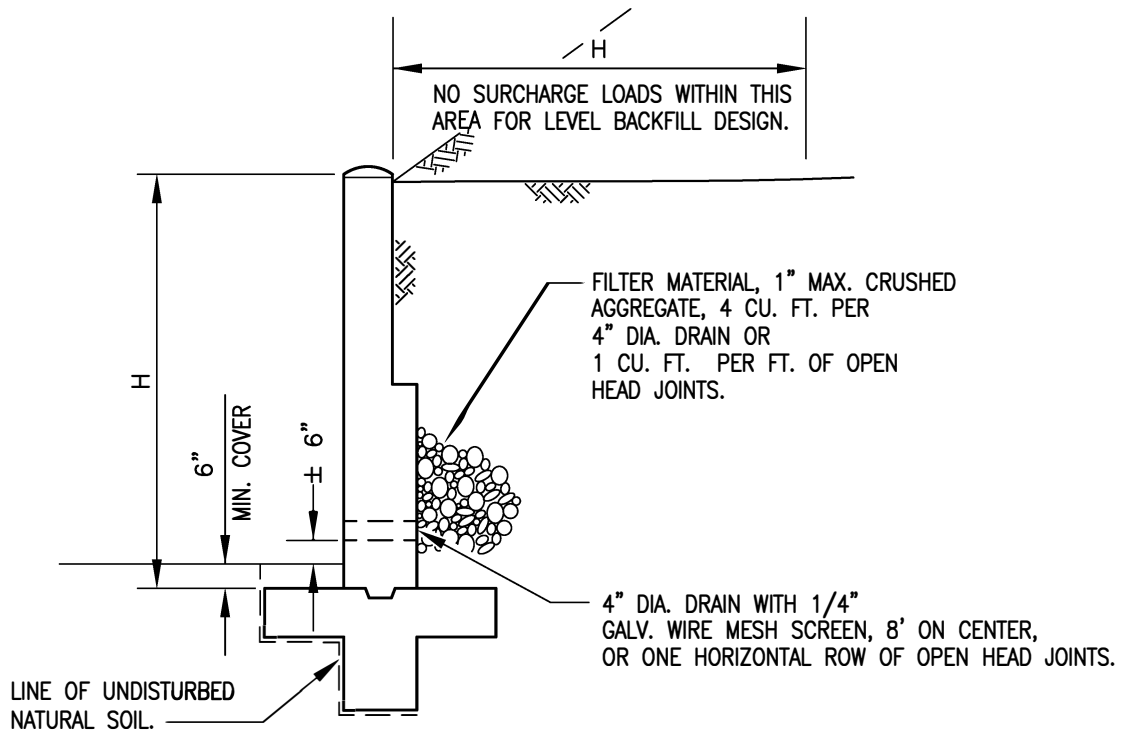
**WALL DRAINS:**

Wall drains shall be provided in accordance with Standard Drawing C-8.

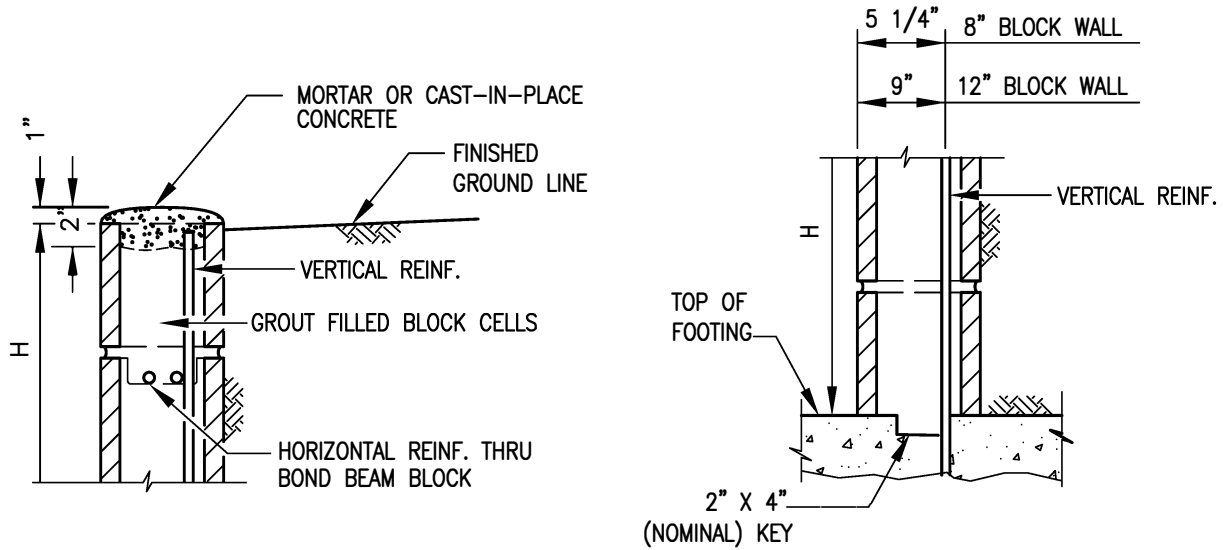
**SOIL:**

All footings shall extend at least 12" into undisturbed natural soil or approved compacted fill. Soil should be dampened prior to placing concrete in footings.

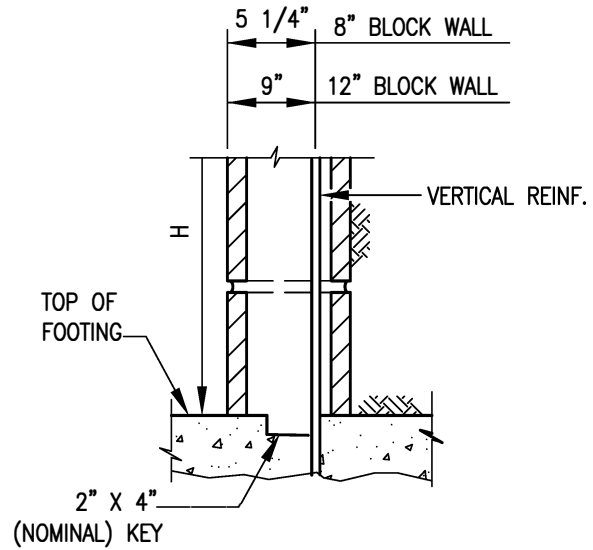
|               |      |              |       |   |   |
|---------------|------|--------------|-------|---|---|
| Revision      | By   | Approved     | Date  | SAN DIEGO REGIONAL STANDARD DRAWING<br><br>GENERAL NOTES FOR MASONRY<br>RETAINING WALLS | RECOMMENDED BY THE SAN DIEGO<br>REGIONAL STANDARDS COMMITTEE<br><br> 10/25/2018<br>Chairperson R.C.E. 19246 Date |
| ORIGINAL      |      | A. Kercheval | 12/75 |   |   |
| Add Metric    |      | T. Stanton   | 03/03 |   |   |
| Delete Metric | S.S. | T. Shell     | 03/11 |   |   |
| Reviewed      | GT   | T. Stanton   | 09/15 |   |   |
|               |      |              |       | DRAWING NUMBER  | C-07  |



TYPICAL SECTION



CAP DETAIL



KEY DETAIL

NOTES:

1. ALL MASONRY RETAINING WALLS SHALL BE CONSTRUCTED WITH CAP, KEY AND DRAINAGE DETAILS AS SHOWN HEREON.
2. 4" DIAMETER DRAIN MAY BE FORMED BY PLACING A BLOCK ON IT'S SIDE.

| Revision      | By   | Approved   | Date  |
|---------------|------|------------|-------|
| ORIGINAL      |      | Kercheval  | 12/75 |
| Add Metric    |      | T. Stanton | 03/03 |
| Delete Metric | S.S. | T. Shell   | 03/11 |
| Reviewed      | TS   | T. Stanton | 11/15 |

SAN DIEGO REGIONAL STANDARD DRAWING

DETAILS FOR MASONRY RETAINING WALL

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 10/25/2018  
Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-08

**Site Plan Checklist**

- Dimensioned & to scale
- Shown:
  - North Arrow
  - All existing and proposed structures
  - Property lines dimensions
  - Drainage patterns
  - Existing & proposed slopes
  - Slope cross section
  - Distance from pool to property lines and all structures
  - Distance- house to water's edge
  - Distance- pool heater to P/L and any operable window
  - Length, width & sq. ft. of pool
  - Existing topography and pool's distance from toe/top of slope
  - Easements
  - Pool fencing w/height & gate compliance noted.
  - ROW permit required.
  - Indicate what will happen w/ soil excavated
- For Retaining Walls Add:*
  - Wall heights at ends of walls or at any change in height. TW=top of wall, BW=bottom of wall.
  - Cross-section of wall stating wall height above and below grade
  - Grading quantities:  
Cut \_\_\_\_\_ Fill \_\_\_\_\_  
Import/Export

The discharge of pollutants to any storm drainage system is prohibited. No solid waste, petroleum byproducts, soil particulate, construction waste materials, or waste water generated on construction site or by construction activities shall be placed, conveyed or discharged into the street, gutter or storm drain system.

*This project shall comply with the 2013 CA Building Code, 2013 CA Mechanical Code, 2013 CA Plumbing Code, 2013 CA Electrical Code, 2013 CA Energy Efficiency Standards and City of Carlsbad Municipal Code.*

Scale used:



# Site Plan for Pools & Retaining Walls

1/8 inch scale shown

Site Address:

A.P.N

Legal Description:

Contractor's Name

State Lic. #:

Phone:

Owner's Name

Address:

Phone: