Inspection Standard for Tuolumne County - Foundations

What you should know before calling for an inspection.

Presented by,
Doug Oliver
Chief Building Official
County of Tuolumne

What We'll Cover:

- General Provisions
  - Setbacks
  - Depth and width
  - Steel installation
  - Bolts and Holddowns
  - Ufer Ground
  - Slab insulation
  - Retaining walls
- Driveways
- Defensible Space
- Green Building

- Prevailing Documents
  - 2013 CBC, Chapters 18, 19
  - 2013 CRC, Chapter 4
  - ACI 318

Did we find your project?

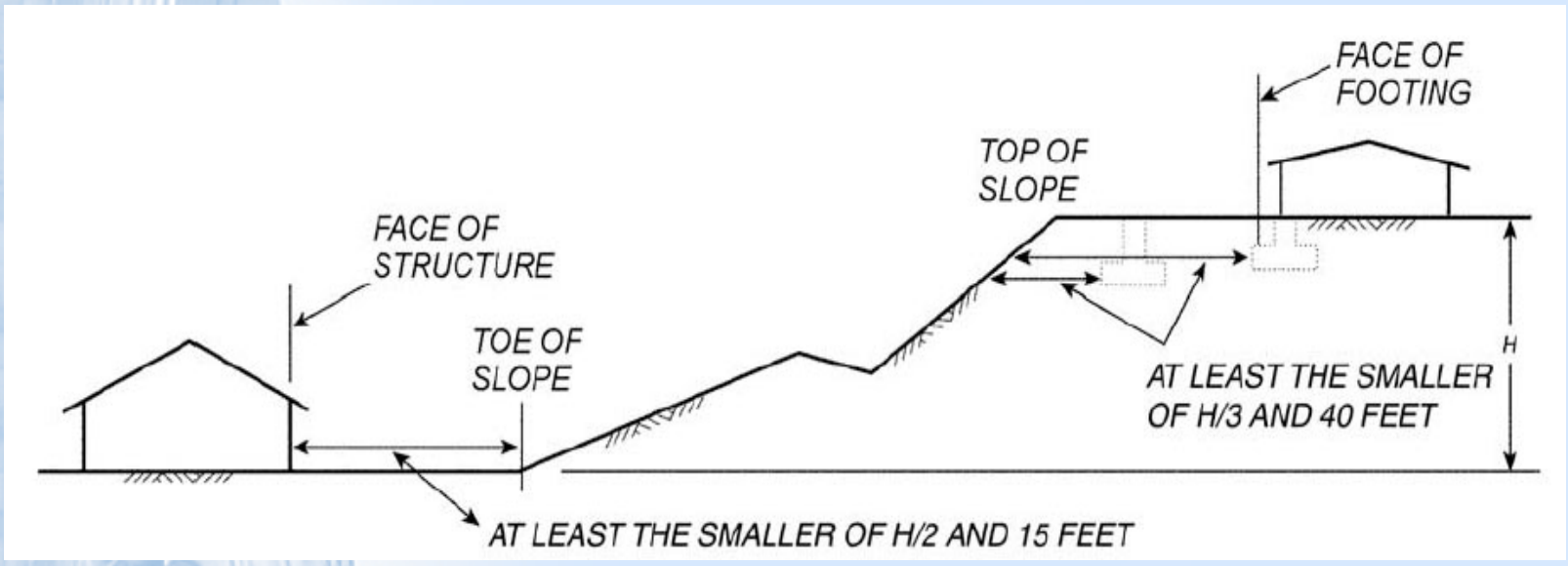
- Address must be posted per County Standard for all inspections
  - 4 inch stroke
  - ½" lettering
  - Contracting, reflectorized background

General Provisions

- Setbacks
  - Follow approved site plan
    - Setbacks based on zoning
    - Setbacks between buildings
      - Generally 10 feet between SFD's and accessories
  - Ascending Slope
    - The smallest of H/2 or 15 feet
  - Descending Slope
    - The smallest of H/3 or 40 feet
  - If over a 1:1 slope, the toe of the slope is determined by 45 degrees from the top of the foundation.

Setbacks

- Measured from property lines
  - String line from pin to pin
  - Survey stakes
  - Pad certification
  - Site Plan shall include fixed setbacks to all buildings, property lines, easements etc.
  - *If the inspector can't verify accurate location, inspection is considered not ready.*


FACE OF
FOOTING
TOP OF
SLOPE
FACE OF
STRUCTURE
TOE OF
SLOPE
H
AT LEAST THE SMALLER
OF H/3 AND 40 FEET
AT LEAST THE SMALLER OF H/2 AND 15 FEET

General Provisions

- Depth
  - Measured from bottom of footing to top of NATIVE GRADE or COMPACTED FILL- R403.1.4
- Width
  - Per Plans
  - Minimum standard based on type of footing

CBC standard

TABLE 1805.4.2
FOOTINGS SUPPORTING WALLS OF LIGHT-FRAME CONSTRUCTION[a, b, c, d, e]

NUMBER OF FLOORS SUPPORTED BY THE FOOTING[f]	WIDTH OF FOOTING (inches)	THICKNESS OF FOOTING (inches)
1	12	6
2	15	6
3	18	8[g]

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Depth of footings shall be in accordance with Section 1805.2.

b. The ground under the floor is permitted to be excavated to the elevation of the top of the footing.

c. Interior-stud-bearing walls are permitted to be supported by isolated footings. The footing width and length shall be twice the width shown in this table, and footings shall be spaced not more than 6 feet on center.

d. See Section 1910 for additional requirements for footings of structures assigned to Seismic Design Category C, D, E or F.

e. For thickness of foundation walls, see Section 1805.5.

f. Footings are permitted to support a roof in addition to the stipulated number of floors. Footings supporting roof only shall be as required for supporting one floor.

g. Plain concrete footings for Group R-3 occupancies are permitted to be 6 inches thick.

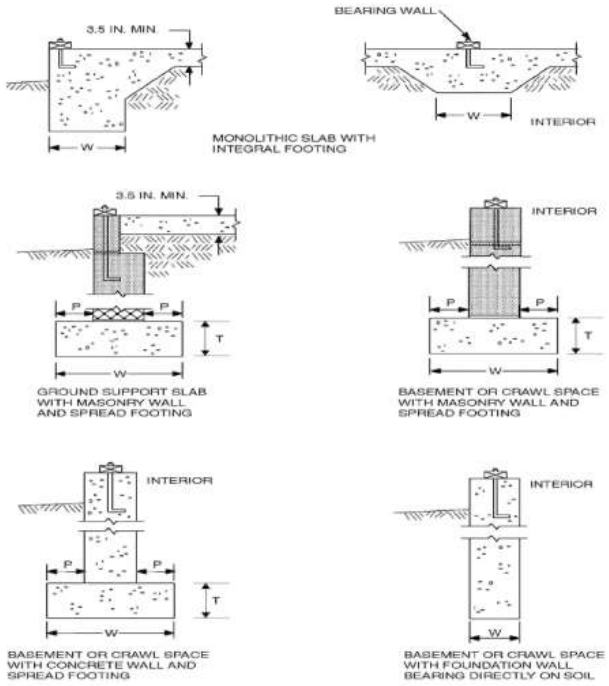
CRC

TABLE R403.1
MINIMUM WIDTH OF CONCRETE OR MASONRY FOOTINGS (inches)[a]

	LOAD-BEARING VALUE OF SOIL (psf)			
	1,500	2,000	3,000	≥4,000
Conventional light–frame construction				
1-story	12	12	12	12
2-story	15	12	12	12
3-story	23	17	12	12
4-inch brick veneer over light frame or 8-inch hollow concrete masonry				
1-story	12	12	12	12
2-story	21	16	12	12
3-story	32	24	16	12
8-inch solid or fully grouted masonry				
1-story	16	12	12	12
2-story	29	21	14	12
3-story	42	32	21	16

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kN/m^2.

a. Where minimum footing width is 12 inches, a single wythe of solid or fully grouted 12–inch nominal concrete masonry units is permitted to be used.



For SI: 1 inch = 25.4 mm.

FIGURE 403.1(1)
CONCRETE AND MASONRY FOUNDATION DETAILS

Steel Placement

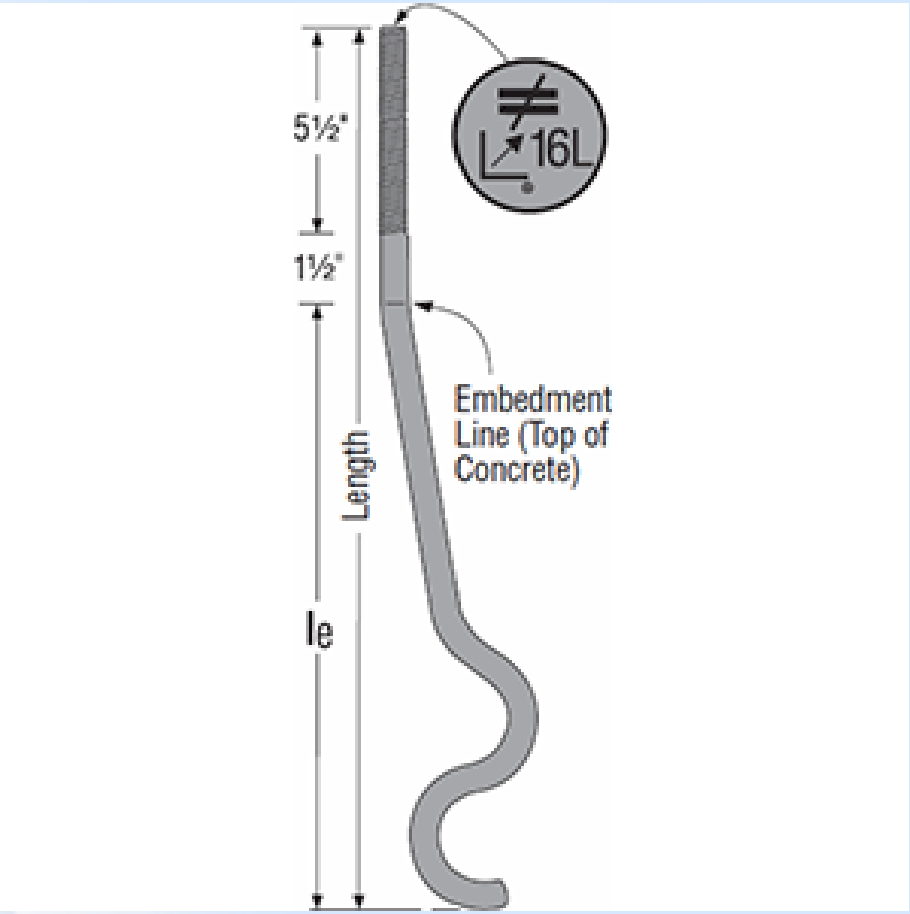
- Per plans
- Must be in place for inspection.
- Multiple reinforcement layers and parallel bars must be at least 1” apart and placed directly above the lower layers. ACI 318 7.6
- Must be encased in 3” of concrete – ACI 318 7.7.1
- Bar Lap –
  - Conventional Construction = 40 bar diameters
  - Engineered = as designed

Bolts and Hold-downs

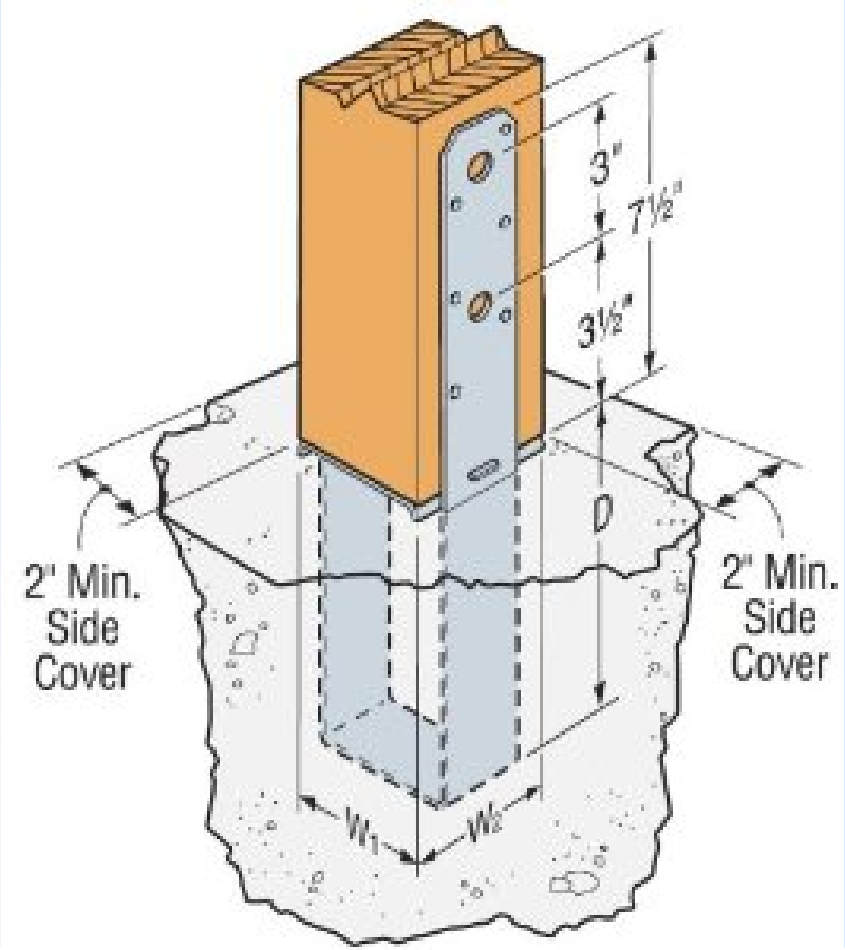
- Bolts and Hold-downs must be placed, per plans, for inspection.
- Bolts (CBC 2308.6/CRC 403.1.6/or Engineered Design
  - Size ½" minimum
  - Length = 7" embed minimum, Tall enough for full threads.
  - Spacing = 6' o.c., 4 to 12" from plate breaks
- Hold-downs (including pre-engineered shear and moment frames)
  - Size
  - Type
  - Manufacturers install requirements

Bolts cannot be stabbed in anymore.

Uplift Bolts: manufacturers instructions



Embedded connectors: watch edge clearances



Ufer Ground – CEC 250.52(A)(3)

- *Either*
  - 20 ft of ½" (#4) rebar
  - 20 ft of #4 AWG bare copper conductor
- Must have 2 inches of encasement in concrete in direct contact with earth.
- If conductors are clamped to Rebar, Clamps must be rated for concrete encasement

Don’t look at anything but the UFER……


APPROVED FOR REBAR 4-6
SUITABLE FOR DIRECT BURIAL
IN EARTH & CONCRETE

Plumbing encased in concrete

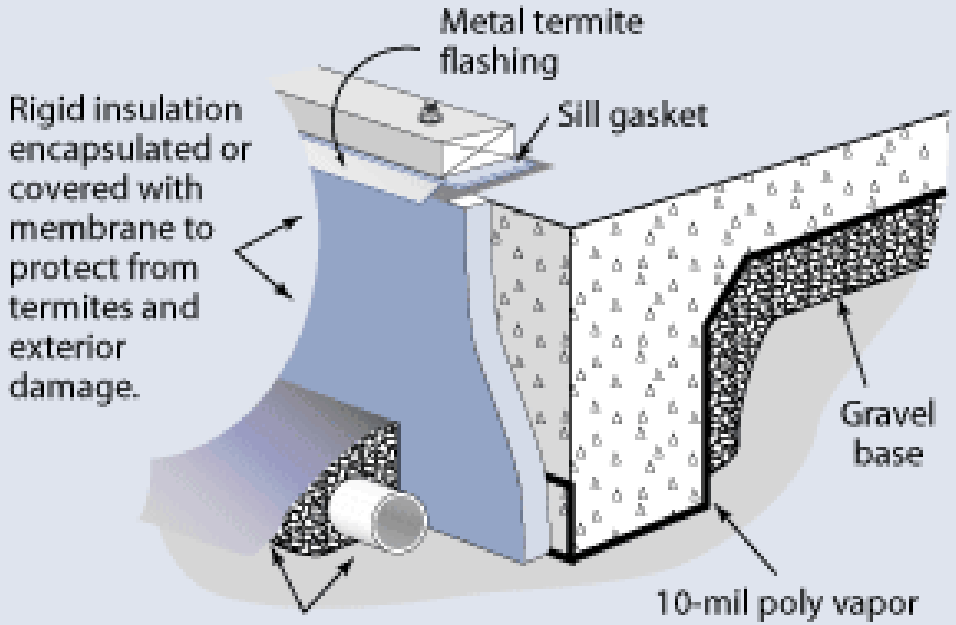
- Only allowed when plumbing is intersecting continuous footing or stubbing up through slab.
- Plumbing must be sleeved or suitably protected where in contact with concrete.

Slab Insulation

- Determined by Energy Calculations.
- Most common with hydronic heating systems.
- Should be shown on foundation details.

Perimeter Insulation—Slab-on-grade Construction

Provide good drainage away from the foundation and capillary breaks for a durable foundation. Perimeter insulation increases comfort in the living space.

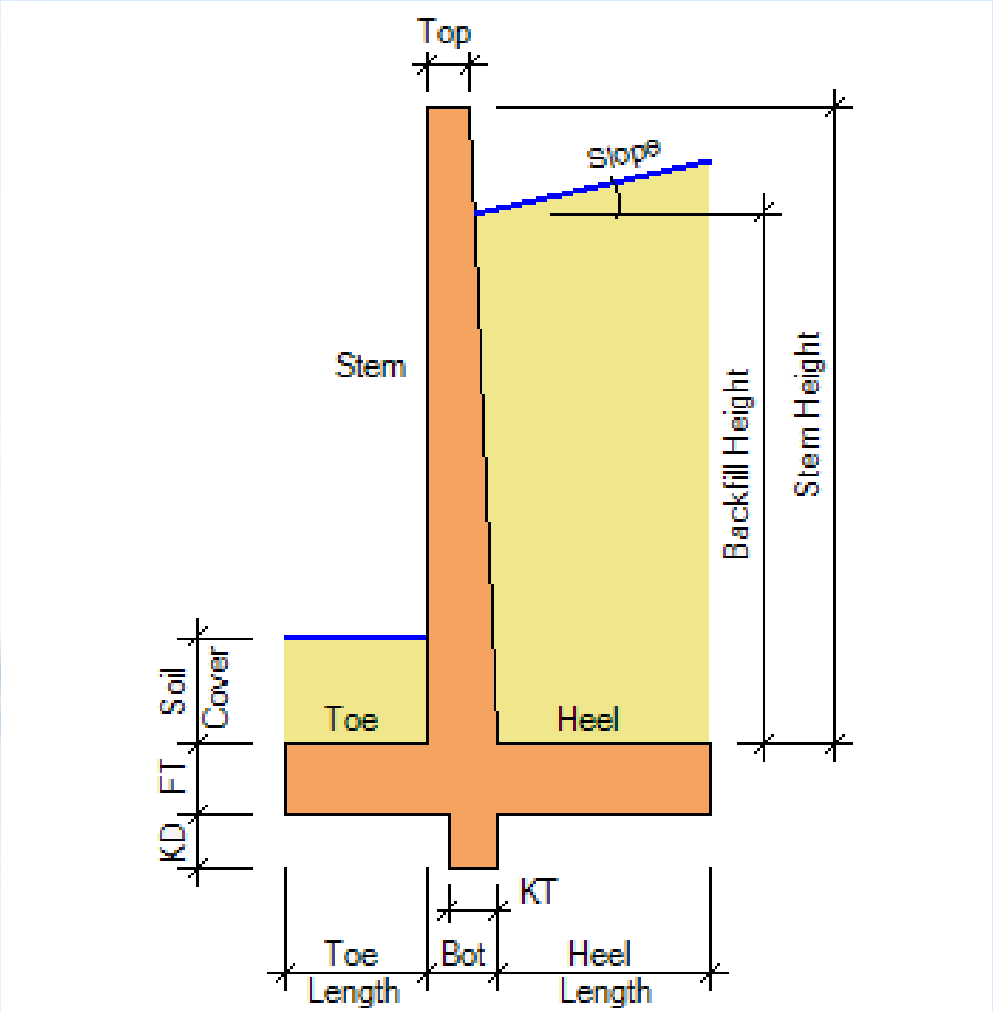


Perforated drainage pipe is embedded in gravel, covered with filter fabric, and located at lower perimeter of foundation footing to provide drainage.

Retaining Walls

- Inspected per Plan
- Drainage method is important!
- Heel/Toe/Keyway sizes important
  - Don't Mix them up!
- Same rules apply for steel/bolts/etc.
- Watch steel location in wall cavity regardless of wall construction!
  - Restrained walls vs. unrestrained

Over simplified, perhaps



Driveways

- Must be in for inspection at Foundation
- Must be per approved plans
- Changes must be approved BEFORE inspection
- Few exceptions
  - Base rock only on request (heavy equipment rule)

Driveway Dimensions

- Up to 150 feet (assuming no joint driveways)
  - 12 feet wide min.
  - 16% grade max for Class II aggregate
  - 22% max paved
- 151 to 300 feet (ADD)
  - 10 wide x 30 long turnout at mid-point
- Over 300 feet (ADD)
  - Turnouts every 400 ft.
  - 40 ft. radius turning bulb or approved hammer-head

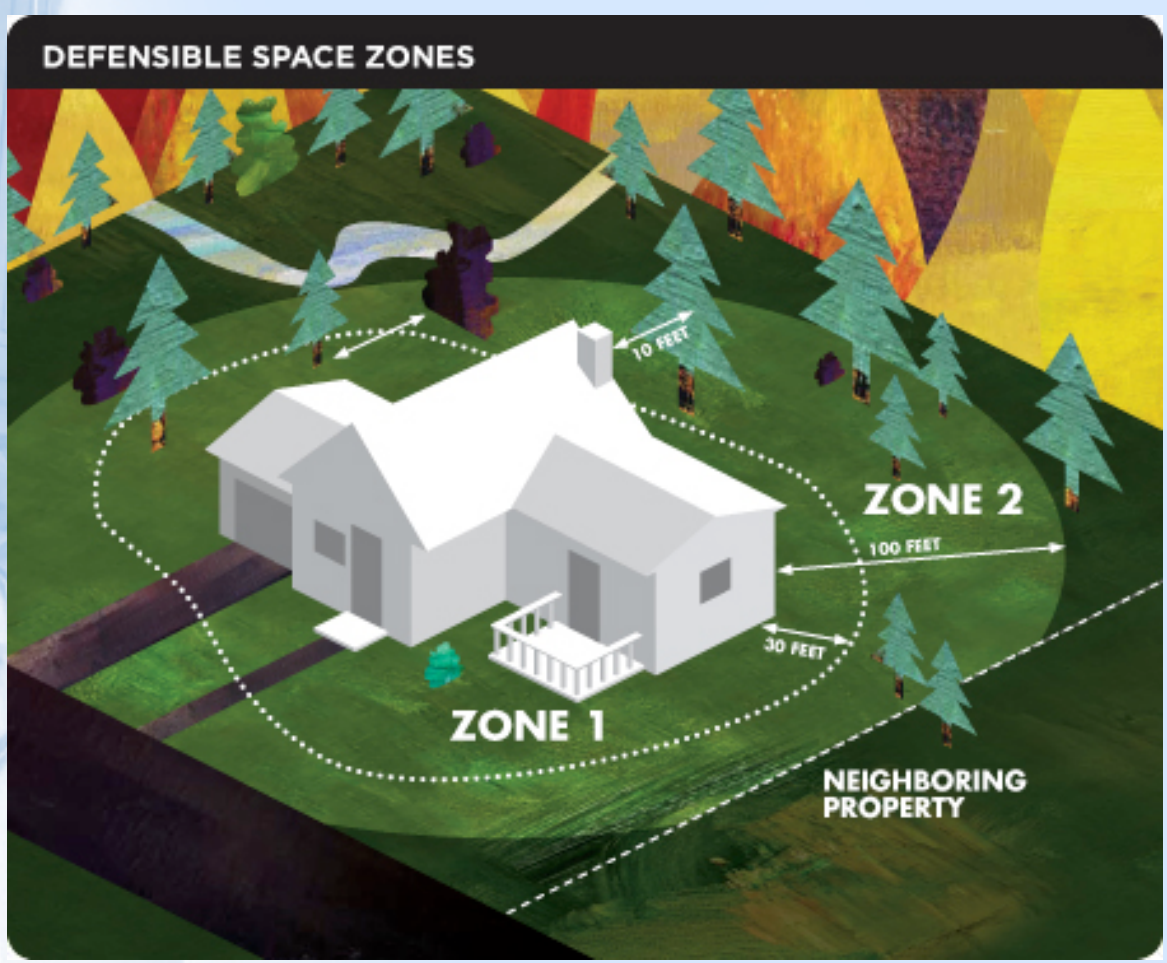
Weird field stuff:

- Site concerns discovered during grading must be negotiated PRIOR to inspection.
- Fire Department is the ultimate authority
  - If a site condition is not repairable, Fire department has the authority to determine alternate remediation or approve existing condition.
  - Case-by-case only

Defensible Space

- Also must be commenced by foundation inspection.
- Must be complete by shear inspection
- Fire Department overall authority
- Basic Rules:
  - Trees 10 ft from chimneys
  - 30 ft "lean, clean, and green zone"
  - 31-100 ft: removal of flammable vegetation and mature trees limbed up to 6'
    - Does not include single specimen trees, ornamentals and similar
    - Don't limb more than ½ the height nor 1/3 of the live crown of the tree

Do you comply:



Green Building:

- Erosion Control
  - BMP's in year round
  - Stock piles covered
- Drainage concerns
  - Projects less than one acre shall manage storm water by one of the following:
    - Retention basins
    - Conveyed to public drainage system and filtered
    - Compliance with TCOC
  - Over one acre: Follow SWPPP
- Onsite waste management
  - Per required Construction Waste Management Plan
  - Waste collection bins to be covered

When the inspection is not ready:

- Steel substantially incomplete
- Driveway not attempted
- Defensible space not attempted
- Forms not complete
- Footings full of water

Questions?