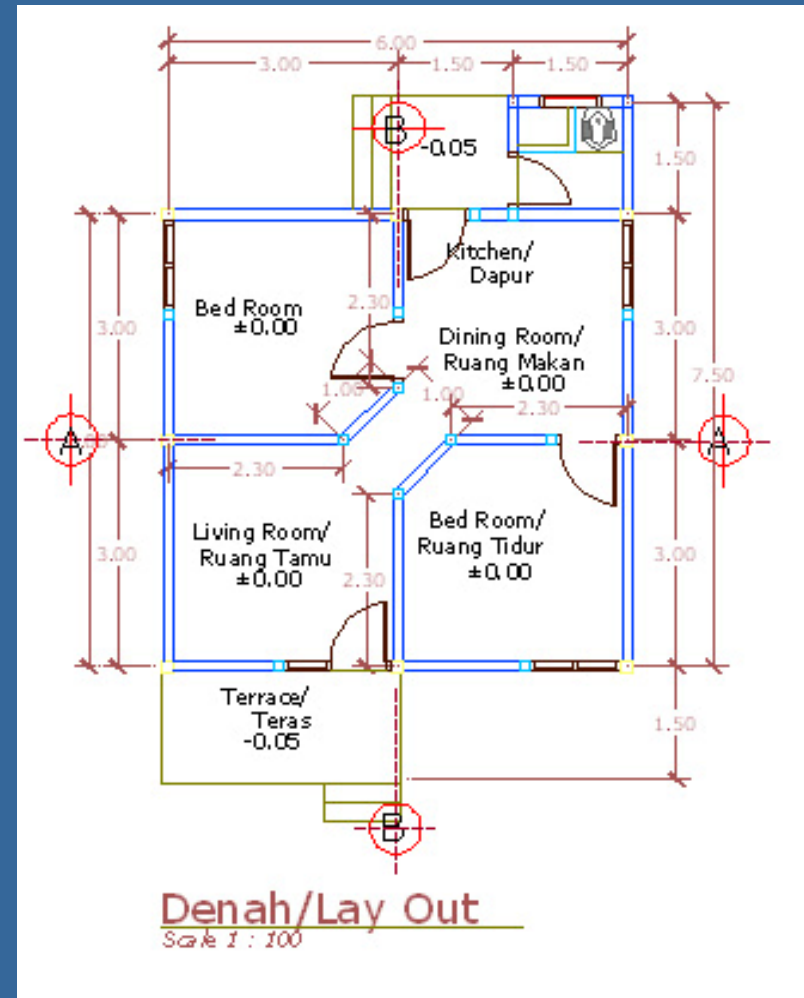


# CONFIGURATION

- ❑ Careful thought to the plan and layout can improve earthquake-resistance at little or no extra cost
- ❑ Moving around windows, doors, shear walls

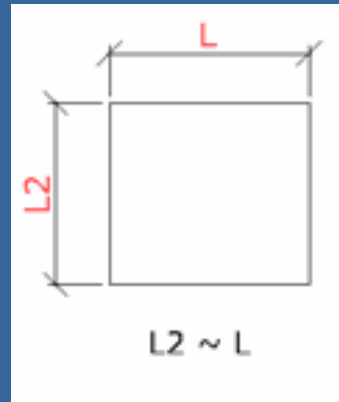


# Layout Rule #1

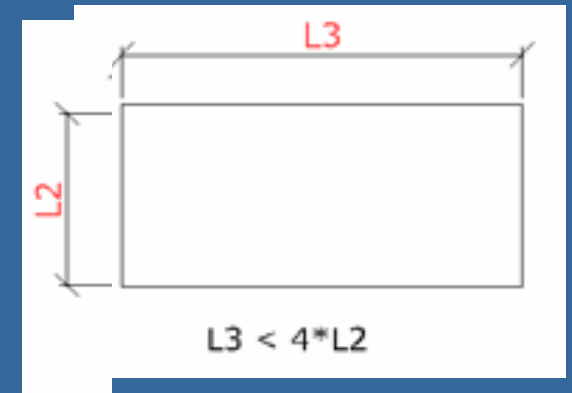
## Use Simple, Square Plan

Regular in plan and elevation – uniform and symmetrical along both axes

→ Square is best



→ If rectangular, length should be less than 4 times width

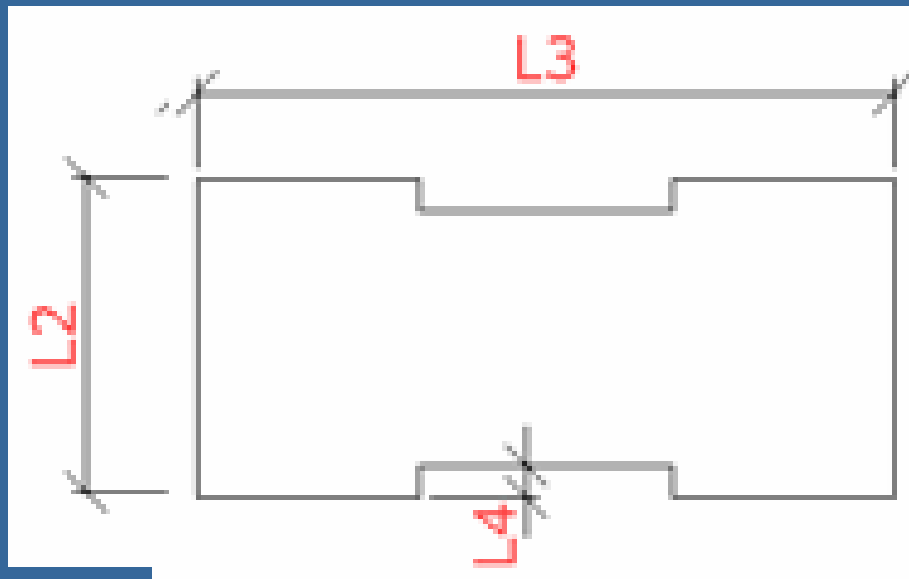


*Schematics from City University of London  
Guideline on Confined Masonry and Interpretation  
of Eurocode 8*

## Layout Rule #2

# Avoid/Limit Reentrant Corners, Recesses

Reentrant corners, projections or recesses should be less than 15% of the overall dimension in that direction



$$L4 < 0.15 * L2$$

*Schematic from City University of London Guideline on Confined Masonry and Interpretation of Eurocode 8*

# Layout Rule #3

## Sufficient Wall Density

Total structural wall area divided by the floor area should be at least 3% (in each direction)

A structural wall is a confined masonry horizontal span (without an opening) with length

- 1) greater than 30% of the length of the building in the wall plane, and
- 2) greater than 30% of the clear height of the opening next to it

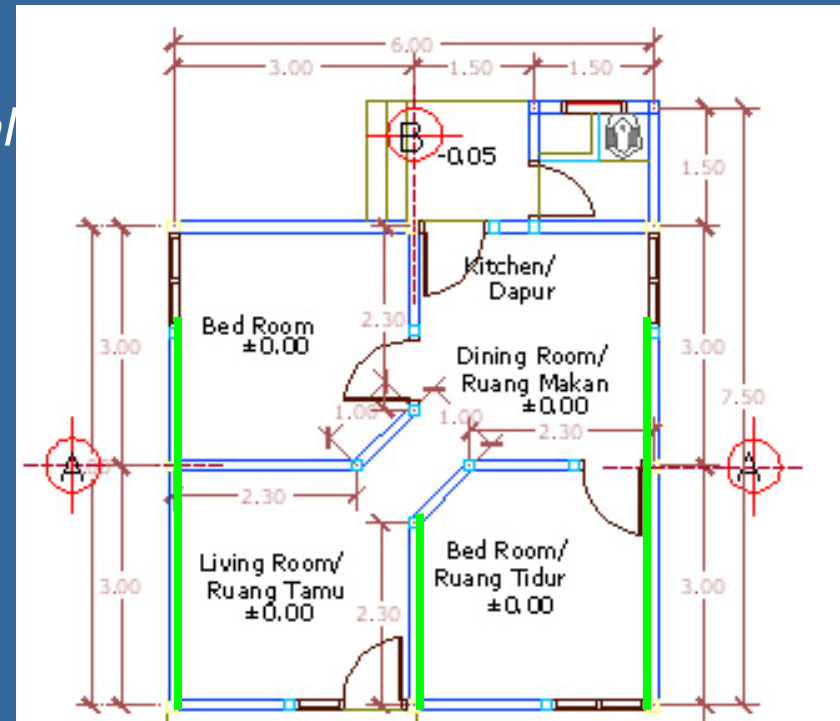
# EXAMPLE - Layout Rule #3 Sufficient Wall Density

→ In North – South direction,  
 $(4.8\text{m} + 2.4\text{m} + 4.8\text{m}) \times 0.13\text{m} =$   
 $1.56\text{m}^2$

*length of structural walls x thickness of wall*

$$1.56\text{m}^2 / 36\text{m}^2 = 4.3\%$$

*wall area / total floor area = wall density*



# EXAMPLE - Layout Rule #3

## Sufficient Wall Density

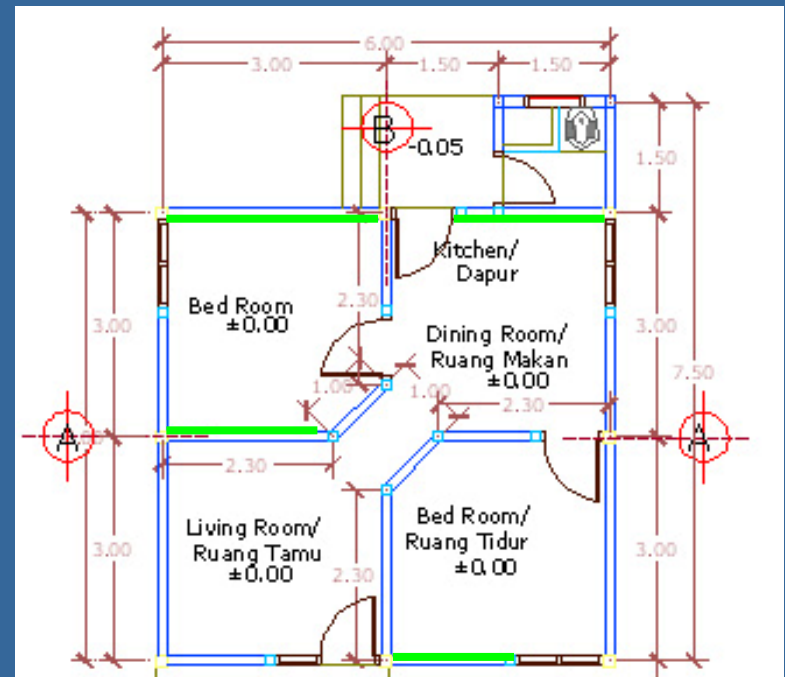
→ In East – West direction,

$$(1.8\text{m} + 2.4\text{m} + 5.2\text{m}) \times 0.13\text{m} = 1.22\text{m}^2$$

*length of structural walls x thickness of wall with plaster = wall area*

$$1.22\text{m}^2 / 36\text{m}^2 = 3.4\%$$

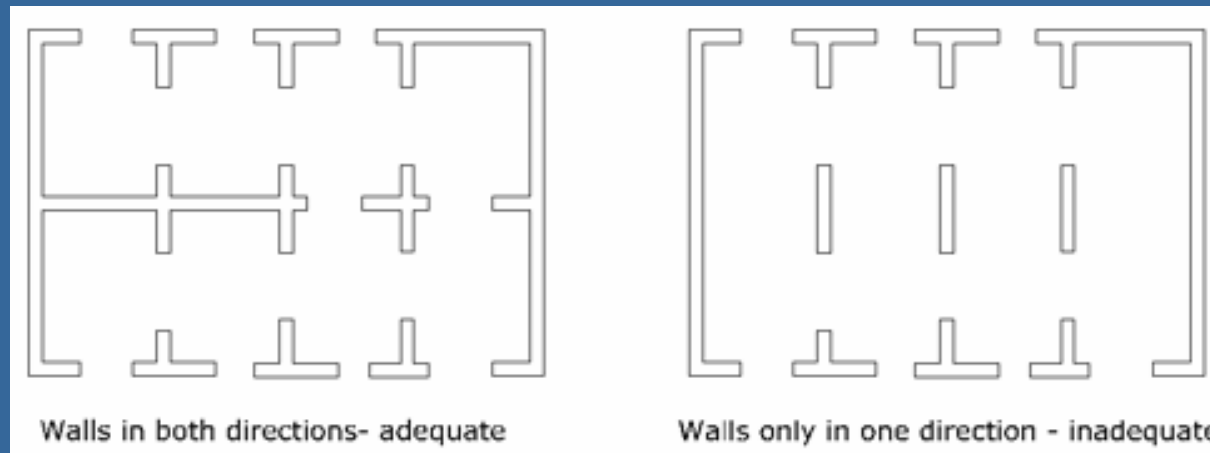
*wall area / total floor area = wall density*



# Layout Rule #4

## Symmetry of Wall Density

- ❑ Minimum of two structural walls each direction
- ❑ Structural walls approximately symmetric in plan
- ❑ Approximately same number of load bearing walls in each direction, with same stiffness
- ❑ Difference in structural wall cross-sectional area in two directions should be maximum 20%



*Schematics from City University of London Guideline on  
Confined Masonry and Interpretation of Eurocode 8*

# Layout Rule #5

## Symmetry of Openings

- ❑ Openings should be located symmetrically in plan
- ❑ Consolidate your openings →
- ❑ Horizontally align tops



*Better to consolidate*

# CONFIGURATION

- ❑ Careful thought to the plan and layout can improve earthquake-resistance at little or no extra cost
- ❑ Moving around windows, doors, shear walls

