



Residential Retaining Wall Handout

Community Development – Building Division
(650) 259 - 2330

This handout is a reference guide for a retaining wall

When is a permit and construction documents required for a retaining wall?

One of the preference projects for homeowners is landscaping their front and back yards. Often in Millbrae, this landscaping requires the use of retaining walls, especially in cases where homeowners want to cut back an uphill slope or level and downhill grade at the rear or side yard. The City of Millbrae has some requirements based on State building codes that property owners should consider when constructing a retaining wall.

The main purpose of building permits and State and local building code compliance are to protect the health, safety, and general welfare of the public. Non-compliant construction can lead to property damage or other potential adverse impacts caused by structural collapse, improper shoring, landslides, and general deterioration.

What is a retaining wall?

A retaining wall is a structure that is designed to uphold soil behind it. This allows for changes in the uphill or downhill slope of a lot to be leveled or used in building structures or other backyard features.

Several factors must be considered in order to build a safe and compliant retaining wall. For example, property owners will need to determine the properties of the soil condition, the elevation and slope of the ground, and what is the finished height

of the wall. These factors will determine what type of wall is needed and how it should be designed.

A variety of retaining walls, such as cast in place concrete walls, masonry unit block walls, sheet pile walls, and others, can be designed and built to achieve the desired outcome. For taller walls, it is necessary to utilize the services of a soil engineer or geologist to ensure investigate the soil condition and the proper type of retaining wall is designed and built within standard engineering practices.

Is a permit necessary?

When remodeling a residential or commercial building, a permit is usually required when additions, alterations, or new construction is involved. Please see the bullet points below for when a building permit is required. Regardless of the requirement for a building permit, always check with the City's Public Works Engineering and Planning Division before starting work as there may be other requirements that relate to the height and location of the retaining wall. Millbrae municipal code section 10.05.2010 states height limits for retaining walls. In most cases, a construction plan prepared by a licensed civil engineer will be required for the project. A permit is required in the following instances:

- If the total height of the retaining wall exceeds four feet measured from the bottom of the footing to the top of the retaining wall.
- If surcharge load conditions exist (building foundation load, vehicle wheel loads imposed on the retaining wall, or sloped conditions); and/or,
- If solid fences such as concrete or masonry wall are attached on top of a retaining wall or are present adjacent to the proposed retaining wall.

The following are the typical types of retaining walls:

- Wood post and lagging (boards)
- Steel I Beams and Lagging
- Reinforced Concrete Wall
- Concrete Masonry Block
- Gravity Block Systems
- Sheet Piling
- Shotcrete

What is tiered retaining walls?

Tiered retaining walls are where two or more short walls, which are horizontally offset from one another, are used in lieu of a single tall retaining wall. When tiered walls are not properly offset from each other, the upper wall may impose a surcharge condition on the lower wall.

In order for the walls to be treated as a separate retaining wall, a general guideline is that the tiered walls need to be horizontally offset by a minimum distance where the base of the upper retaining wall shall not intersect the base of the lower retaining wall at a 45-degree angle.

Each of these types of wall systems has a unique way on how they are designed and constructed.

Required information and documents for Submittal

The following are needed to be submitted for review and approval:

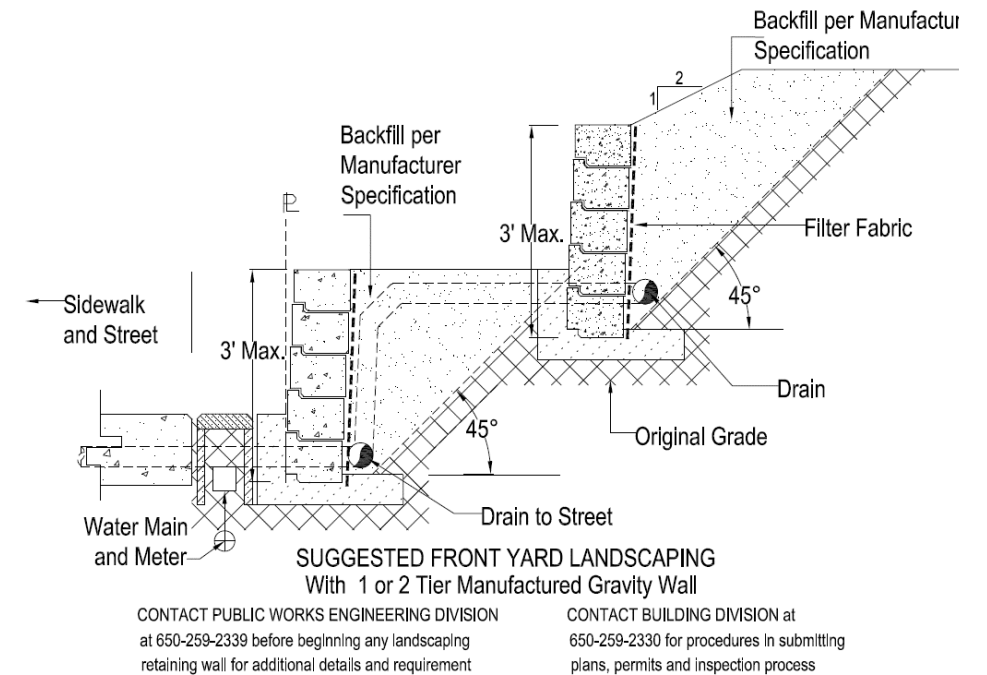
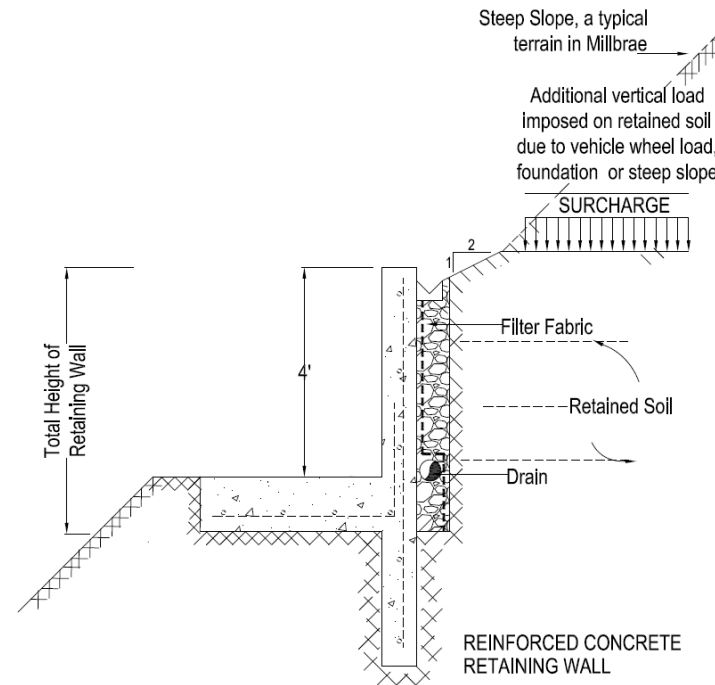
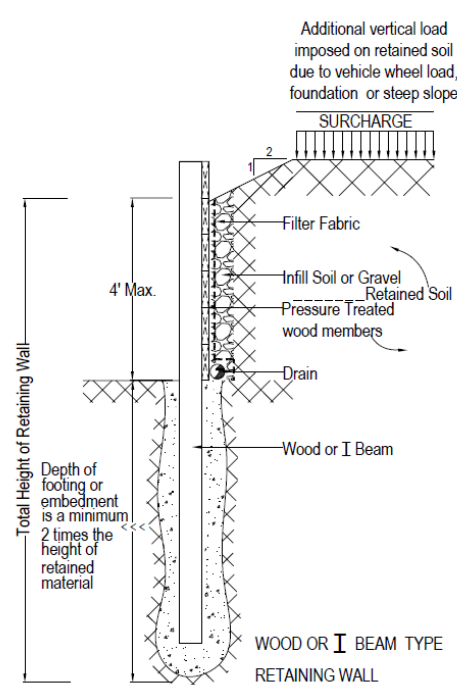
- A plot plan showing the location of the retaining wall(s) in relation to the property, structures, property lines.

Note: If the proposed retaining wall is located less than 3 feet from property line, a property line survey would be required to assure that the retaining wall does not cross over to another property. Survey shall be prepared and certified by California Licensed Surveyor.

- A written description or scope of work shall be placed on the construction documents.
- Construction cross section details of the retaining wall per structural calculation.
- Structural calculations showing the stability and strength of retaining wall. These calculations shall have the professional licensure seal and signature of the Registered Civil or Structural Engineer preparing this document.
- Material or manufacturers installation guides and recommendations for manufactured gravity type block walls.
- If the retaining wall is designed to be a drained condition.
- Show the drainage behind the wall. and type of drainage.
- Show the path where the drainage will terminate.
- If drainage will terminate to the street, an encroachment permit is required from Public Works.
- Drainage piping shall be run to an approved storm drain, to the street curb face, V-ditch, creek, storm drain collection system or box
- Drainage piping cannot drain into the sewer line. Drainage cannot flow across someone else's property.

Soils Reports

Soil investigation report may be required when there are known weak soil conditions; sloping condition greater than 2 units horizontal to 1 unit vertical (2:1) slope ratio, and proximity to a known fault zone where the retaining wall will be constructed.



The ultimate decision if a soils report is required is up to the Building Official. Public Works Engineering requires a peer review of all soils reports.

Slope Stabilization

Backfill or altered slopes behind a retaining shall not exceed a 2 to 1 slope angle or per approved structural design due to existing terrain.

Slopes also need to be stabilized – or protected to prevent erosion. This could be using jute netting, hydro seeding or planting.

Retaining walls in the front yards.

Front yard retaining wall for landscaping will not be allowed to be built over utilities that may be buried in the planting strip between sidewalk and curb or behind the sidewalk.

Public Works Engineering Division

The City of Millbrae Engineering Department may allow encroachments onto City land by way of a revocable encroachment permit³. Property owners are required to consult with the Public Works Engineering Division prior to commencing work on a retaining wall. There is a possibility that a main water utility pipe may be present at the proposed location of the proposed wall.

Footnote:

1. *Surcharge: Is an additional excessive load due to slope of terrain, adjacent foundation or vehicle wheel load.*
2. *Retaining walls shall not be built over property lines without the expressed written approval of the adjoining property owner*

Written permission is required to be recorded on the property records for both parties so that future owners will be aware of this agreement.

Proof of recordation shall be submitted to the City of Millbrae prior to final inspection signoff.

3. *Surcharge: Is an additional excessive load due to slope of terrain, adjacent foundation or vehicle wheel load.*

These diagrams are some of the typical retaining wall that are common to the existing terrain found in Millbrae.

These diagrams as shown will require a building permit and shall be prepared by a licensed civil engineer and reviewed by the Staff of the City of Millbrae. It is seldom that only a few areas in Millbrae have a low slope terrain in which a

proposed retaining wall may be exempted from permits.

It is highly recommended that before replacing an existing or planning to construct a new retaining wall that the Building and Planning Divisions and Public Works – Engineering Department be consulted to avoid delays or constructing a non-conforming retaining wall.

Questions?

Call the City of Millbrae Building Division at (650) 259-2330.