

CHAPTER 12-C*(New 08/26/25)***RETAINING WALL REQUIREMENTS**

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Section 12-C.010. Retaining Wall Requirement Purpose and Intent

The purpose of this chapter is to establish the requirements and minimum design standards for retaining wall design and construction.

A. The reasons to provide the design standards herein are to:

1. Ensure safe structures are being constructed and will function as intended.
2. Ensure the drainage and water runoff are adequately addressed.
3. Protect property, health, safety and general welfare of the residents of Lehi City.
4. Protect property owner's rights/
5. Assist in the maintenance and preservation of hillside areas.
6. Maintain the aesthetics of the community.

B. The City's approval of retaining wall plans does not convey design responsibility to the City. Responsibility for the design lies solely with the design professional(s).

Section 12-C.020. Retaining Wall Requirement General Provisions

This section applies to all retaining walls that retain 4'-0" (See section 12-C.020 G, 2 for definition of wall height) or more in height.

A. Building Permit requirements:

1. All walls meeting section 12-C.020 A, unless it is exempt in paragraph F, shall be required to have a building permit and provide the required submittals as specified in section 12-C.020 B, 7 for review prior to issuance of a

building permit for construction of new walls or alteration of existing walls.

2. Each wall design shall be specific to the site and not a generic standard design.

3. All submittals for a building permit shall be stamped by a licensed professional civil, structural or geotechnical engineer registered in the State of Utah with experience designing the type of wall specified for the project.

4. Building permit review fees shall be assessed and collected at the time the permit is issued.

5. Permit applications shall be processed and issued in accordance with the Building Division permit procedures and applicable provisions of the Development Code.

6. Retaining wall permits are issued as a separate permit and are not included in permits for new homes, remodels, additions, etc.

7. Submittals for a building permit shall include:

- (a) structural design calculations,
- (b) structural drawings,
- (c) a drainage plan showing slopes, grades, pipes, detention and retention facilities and other associated details pertaining to the drainage of the wall,
- (d) profile drawings of the wall if the retaining wall is longer than 50 lineal feet, with the footing elevation and top of wall elevations labeled at the ends of the wall and every 25 linear feet or change in grade or height,
- (e) cross-sectional drawings including a drainage system behind the wall as well as surface grades and structures located in front of and behind the retaining wall a distance equivalent to two times the height of the retaining wall with level fill. Additionally, if the retaining wall is supporting sloped fill, then the cross section shall include the fill slope showing surface grades and structures within a horizontal distance equivalent to three times the height of the retaining wall,
- (f) a site plan showing the location of the retaining wall(s),
- (g) a copy of the geotechnical report used by the design engineer. The geotechnical report needs to include, but is not limited to:

- (i) allowable soil bearing value
- (ii) soil and footing friction factor
- (iii) soil unit weights
- (iv) seismic design criteria and information
- (v) the active, passive and at-rest equivalent fluid pressures of the soil as well as the associated k values,
- (vi) if a geotechnical report was conducted at an off-site location that is to be used for the design of the wall(s) that has similar soils, it needs to be within a 2000-foot radius of the proposed wall location(s), and the geotechnical report needs to be submitted,
- (vii) if a Proctor test is completed, the type of testing shall be identified and submitted with the Proctor results.
- (h) material strength and parameters used in the design of the retaining wall or laboratory testing results of the materials used as needed to substantiate non-standard building products as follows:
 - (i) concrete and/or masonry design strengths,
 - (ii) steel reinforcement grade and type,
 - (iii) laboratory testing results of other materials in accordance with applicable American Society for Testing and Materials (ASTM) standards,
 - (iv) for segmented block walls, the manufacturer's test data for the wall facing, soil reinforcement and connection parameters shall be submitted.

B. No rock or boulder walls shall be allowed for retained fill more than 4'-0" and shall be used for landscaping purposes only. No structures, roadways or surcharge loads shall apply a lateral load to the wall or be supported above and rely on rock or boulder walls for support.

C. Wall systems 4'-0" or taller which are based on organic material such as treated lumber or railroad ties are not allowed and shall be used for landscaping purposes only. No structures, roadways or surcharge loads shall apply a lateral load to the wall or shall be supported above and rely on walls constructed with organic material for support.

D. All retaining walls with footings shall have the bottom of the footings embedded in the soil below the frost depth as measured from the front face

of the wall.

E. Building permit exemptions:

1. The following walls do not require a building permit:

- (a) Walls that retain less than 4'-0" of fill behind the wall
- (b) Non-tiered retaining walls with less than 50 square feet of exposed wall surface area that are less than five feet in exposed height with back slopes flatter than or equal to 4H:1V within ten feet of the wall; and having front slopes no steeper than or equal to 4H:1V and which do not support any structure, roadway or surcharge behind the wall.
- (c) Tiered retaining walls less than a total of 100 square feet of exposed wall surface area, less than five feet in exposed height per wall, have front slopes and back slopes of each wall no steeper than or equal to 6H:1V within ten feet of the walls, have a five foot minimum spacing between front face of the upper wall and back edge of the lower wall and which do not support any structure, roadway or surcharge behind the walls.

F. Location, Height, Separation and Plantings:

1. No retaining wall, or portions thereof shall be placed on land designated as a recorded easement, such as a utility or trail easement, unless the owner(s) of said easement agrees to allow the encroachment. Documentation of the agreement shall be provided to the City.

2. For the purposes of this code, the height of a retaining wall is measured as the exposed height (H) of wall of an individual tier.

3. Terracing of retaining walls is permitted where justified by topographic conditions. Walls with a separation of at least 2H (H of largest of the two walls) from the front face of the upper wall and back edge of the lower wall shall be considered as separate walls for analysis purposes and applicability to this ordinance.

4. In a terrace of retaining walls, a minimum horizontal separation of $H/2$ (H of the lower wall) is required as measured from the front face of the upper wall and back edge of the lower wall.

5. For terraced walls, the horizontal separation between walls shall be planted with a minimum of five shrubs for every 20 linear feet of planting area. The size of the shrubs shall be less than one-half the width of the terrace when fully grown. Shrubs shall be drip irrigated and when possible and the use of drought resistant vegetation is encouraged to minimize future watering needs. The drip irrigation system shall be installed by the Developer or owner and the future owner(s) of the property shall be responsible for the drip irrigation maintenance and cost of operation after the warranty period expires.

G. No retaining wall component, or construction disturbance during construction of the wall, shall extend beyond the property lines unless written permission in the form of an easement (permanent or temporary) is obtained from the affected property owner(s).

H. Retaining Wall Preconstruction Meeting: At least 48 hours prior to the construction of any approved retaining wall, a preconstruction meeting shall be held as directed by the Building Official. The meeting shall include the Building Official or their representative, the design engineer, the contractor and the project owner or their representative. The preconstruction meeting can be waived at the discretion of the Building Official.

I. Modification of existing walls shall be treated the same as if it were a new wall with the same design and approval requirements and process.

Section 12-C.030 Retaining Wall Design Requirements

A. The design engineer shall indicate the design standards used and provide the design calculations and details in accordance with the following:

1. Design calculations ensuring stability against overturning, base sliding, excessive foundation settlement, bearing capacity and global stability. A minimum safety factor of 1.50 is required for the static analysis for overturning and sliding and a minimum safety factor of 1.10 for load combinations including seismic.

2. Calculations shall include analysis under static, surcharge and seismic loads. The seismic loading shall be based on the Peak Ground Acceleration (PGA) as determined from probabilistic analysis for the maximum credible

earthquake (MCE), with the spectral acceleration factored for site conditions in accordance with the currently adopted IBC and ASCE 7 codes.

3. Mechanically Stabilized Earth (MSE) walls shall be designed in accordance with current FHWA or AASHTO standards for design of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes or the current National Concrete Masonry Association (NCMA) Design Manual for Segmental Retaining Walls. No mechanical stabilization devices may encroach into a PUE or roadway space.

4. Rock walls, smaller than 4'-0" tall, shall be designed in accordance with 2006 FHWA-CFL/TD-06-006 "Rockery Design and Construction Guidelines," or current FHWA standards. No rock or boulder walls above a retained fill height of 4'-0" are allowed.

5. Concrete cantilever walls shall be designed in accordance with specifications provided in the currently adopted International Building Code (IBC), American Concrete Institute 318 (ACI 318) and the American Society of Civil Engineers (ASCE 7) standards and specifications.

6. CMU block walls shall be designed in accordance with specifications provided in the currently adopted International Building Code (IBC), American Concrete Institute 530 (ACI 530), TMS 402/602 and the American Society of Civil Engineers (ASCE 7) standards and specifications.

7. All walls shall provide a drainage system or method to remove the hydrostatic pressure from behind the wall, unless otherwise designed for it. The drainage system shall be shown on the plans and the drainage from the wall shall be accounted for in the drainage plan submitted for a building permit. The drainage design may include the following:

- (a) free draining gravel layer wrapped in filter fabric located behind the retaining wall with a drainpipe draining to daylighting or to a proper outlet or weep holes placed through the base of the wall,
- (b) a synthetic drainage composite may be used behind MSE walls if warranted and specified by the design engineer,
- (c) a synthetic drainage composite is not allowed behind rock walls,
- (d) a synthetic drainage composite may be used behind the stem of concrete and

masonry cantilever walls,

(e) if the engineering can substantiate proper filtering between the retained soils and the drain rock, then the filter fabric may be omitted,

(f) if a retaining wall is designed to withstand hydrostatic pressures or the retained soils or backfill is free draining as substantiated through appropriate testing and the geotechnical report, then additional drainage material and design may be omitted.

8. If a fall hazard equal to or greater than six feet is caused by a retaining wall, a fence 3'-6" minimum tall shall be positioned at the top of the wall to prevent the hazard in accordance with the provisions of Section 12.070.C of this Code.

9. The design engineer's acknowledgement that the site is suitable for the retaining wall.

B. The design engineer shall provide a final letter of certification to the Lehi City Building Official after completion of the construction stating the walls were constructed according to the project drawings.