

PBOT

PORTLAND BUREAU OF TRANSPORTATION

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Jo Ann Hardesty Commissioner **Chris Warner** Director

Retaining Wall Guidance on Design, Materials, Detailing and Review Requirements Effective Date: July 1, 2021

PURPOSE

Provide guidance on design, materials, detailing, and review requirements for retaining walls designed for construction in or supporting the public right of way.

DIRECTIVE

The City of Portland has an interest in assuring that retaining walls constructed in or supporting the public right of way are designed and detailed in such a manner as to provide for the safe flow of people and goods throughout the public transportation network. Retaining walls are vital elements of our transportation system that serve to reshape natural ground contours and support street sections to allow safe and efficient navigation across natural and human-created topographic barriers. Retaining walls are expected to resist constant pressures and stresses over long periods of time, whilst maintaining their intended functionality. The guidance and requirements listed below were created to provide a reasonable and consistent policy to address the minimum design and detailing practices for these important structural assets.

APPLICABILITY

All retaining walls 4 feet or taller in height measured from the bottom of the footing to the top of the wall with backfill AND retaining walls of any height supporting a surcharge of any kind, including, but not limited to, all live loads and backslopes greater than 3H:1V.

DESIGN CODE

Retaining walls shall be designed to American Association of State Highway Transportation Officials (AASHTO) design standards, or as approved otherwise by the PBOT Bridges & Structures Division.

WALL TYPE SELECTION

There are numerous types of retaining walls available to designers. Given the range of wall types and systems on the market, it is imperative that appropriate wall types are selected on a site-specific basis for use in the public right of way. Rockery walls are not considered appropriate wall types for use in the public right of way and will not be permitted. Anchored tie-back and mechanically stabilized earth walls are generally not acceptable wall types. All other wall types should be considered before the use of these wall types.



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MATERIALS

The materials specified in retaining walls are vital to the long-term performance of each wall. Timber/wood is not considered an acceptable material for use in any permanent force resisting system and will not be permitted for retaining walls constructed in public right of way.

APPLICATION OF VEHICULAR COLLISION LOADS

PBOT's preference is for traffic barriers to be designed and constructed independently from retaining walls. For retaining walls where traffic barriers are required to be constructed integral with the wall due to site constraints, the vehicular collision force shall be included in the design. The required test level shall be specified by the project traffic engineer, and approved by the appropriate PBOT traffic engineer, for any highway or local streets. To ensure that any failure due to the vehicular collision occurs in the traffic barrier section, the top of the retaining wall element shall have sufficient resistance to force the yield line failure to occur on the traffic barrier section.

DEFLECTION

Retaining walls designs should limit out-of-plane deflections to a maximum of 1" from a vertical plane measured at the top of the wall for service loads. Deflections for strength and seismic loads will be considered on a case by case basis.

DRAINAGE

Sufficient and appropriate drainage details shall be provided for each retaining wall design, as appropriate. Drainage details should be provided to fit each site on a case-by-case basis, with consideration of the specifics and needs of each location.

LIVE LOAD SURCHARGES

Designers shall include live load surcharges in retaining wall calculations. Retaining walls that support existing, proposed, or future planned sidewalks and streets in the public right of way shall consider a 250psf surcharge in their design. Consideration of both construction and in-service transient live loads shall also be considered.

FALL PROTECTION

Retaining walls shall include protective railings for walls 30" or taller, as measured from the finish grade of the walking surface behind the wall to the finish grade at the downslope side of the wall. Railing design requirements should follow the AASHTO code for strength and minimum height, post and baluster spacing.

PBOT REVIEW

All retaining walls which meet any or all the Applicability criteria above shall be reviewed and approved by the PBOT Bridges and Structures Division prior to acceptance of the design or issuance of the applicable permit.

PERMITTING

Permit type and process will vary on a case-by-case basis. It should be noted that private retaining walls located in the public right of way will also require an approved and issued encroachment permit as a condition of the associated building permit approval.

