

- $R_c$  = reinforcement coverage ratio from Article 11.10.6.4.1 (dim.)
- $RF_{ID}$  = strength reduction factor to account for installation damage to reinforcement from Article 11.10.6.4.3b (dim.)
- $RF_D$  = strength reduction factor to prevent rupture of reinforcement due to chemical and biological degradation from Article 11.10.6.4.3b (dim.)

The reinforcement strength required for the static load component must be added to the reinforcement strength required for the transient load component to determine the required total ultimate strength using Eq. 11.10.7.3-3.

Parapets and traffic barriers shall satisfy crash testing requirements as specified in Section 13. The anchoring slab shall be strong enough to resist the ultimate strength of the standard parapet.

Flexible post and beam barriers, when used, shall be placed at a minimum distance of 3.0 ft. from the wall face, driven 5.0 ft. below grade, and spaced to miss the reinforcements where possible. If the reinforcements cannot be missed, the wall shall be designed accounting for the presence of an obstruction as described in Article 11.10.10.4. The upper two rows of reinforcement shall be designed for an additional horizontal load  $\gamma P_{HI}$ , where  $P_{HI} = 300$  lbs. per linear ft. of wall, 50 percent of which is distributed to each layer of reinforcement.

#### 11.10.10.3 Hydrostatic Pressures

For structures along rivers and streams, a minimum differential hydrostatic pressure equal to 3.0 ft. of water shall be considered for design. This load shall be applied at the high-water level. Effective unit weights shall be used in the calculations for internal and external stability beginning at levels just below the application of the differential hydrostatic pressure.

#### 11.10.10.4 Obstructions in the Reinforced Soil Zone

If the placement of an obstruction in the wall soil reinforcement zone such as a catch basin, grate inlet, signal or sign foundation, guardrail post, or culvert cannot be avoided, the design of the wall near the obstruction shall be modified using one of the following alternatives:

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Situations where the wall is influenced by tide or river fluctuations may require that the wall be designed for rapid drawdown conditions, which could result in differential hydrostatic pressure considerably greater than 3.0 ft., or alternatively rapidly draining backfill material such as shot rock or open graded coarse gravel can be used as backfill. Backfill material meeting the gradation requirements in the *AASHTO LRFD Bridge Construction Specifications* for MSE structure backfill is not considered to be rapid draining.

#### C11.10.10.4