Check the wall described below for both out-of-plane flexure and shear and in-plane flexure and shear. Specify flexural and/or shear reinforcement, if required. Show the locations of the reinforcement in a sketch.

You may use a spreadsheet or computer program to help you design the wall, but all calculations must be documented in pencil and paper. For example, if depth to neutral axis (x) and max. stress in masonry (f_m) are calculated using the computer, then start your hand calculations with x and f_m and calculate C, T, Sum_F and Sum_M to show that the section is in equilibrium.

Height of Wall = 20’
Length of Wall = 14’

12” CMU, unit weight of block = 110 pcf
Type M Masonry Cement Mortar, running bond
f’m = 1500 psi

Wind Load normal to wall = 20 psf (check flexure at mid-height)
Shear parallel to wall = 18,000 lb at top of wall

No vertical load except self-weight of masonry.