

Arch 463  
ECS  
Fall 97

Name \_\_\_\_\_

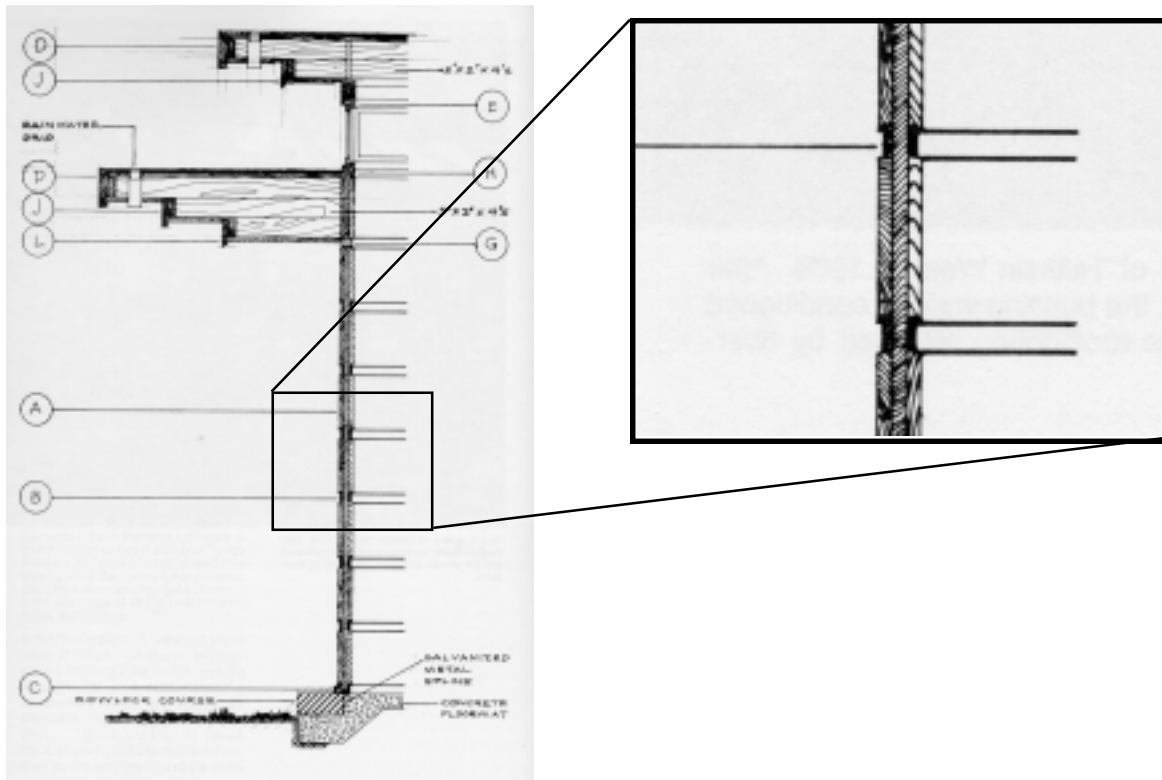
Quiz #3

## "Wright to Code"

For this problem you are the energy consultant for a Frank Lloyd Wright enthusiast who is intent on building a Usonian home on his suburban site. He submitted a copy of the plans as designed by Wright to the local building department. Much to his chagrin, the building did not meet the local code. Your first assignment is to access the as-designed wall and to suggest design modifications in the spirit of Wright's original design that do meet the code.

**The Building Code.** The building code mandates that walls have a U-value of 0.05 or less.

**Wright's Design Intent.** "The walls will be wood board-walls, the same inside as outside—three thicknesses of board with paper placed between them, the boards fastened together with screws. These slab-walls of boards will be high in insulating value, be vermin proof, and practically fireproof. These walls like the fenestration may be prefabricated on the floor and raised up into place, or they may be made at the mill."—Frank Lloyd Wright



*Wall section and detail showing the three layers of boards—the outside and inside boards are 7/16" cypress and the middle board is 3/4" plywood.*

1. Calculate the U-value of the Wright-designed wall. See MEEB tables 4.2 and 4.3, pp. 136–143 for appropriate thermal conductance and resistance values.

2. Find the surface temperature of the wall when the outside temperature is 20 °F and the thermostat is set at 68 °F

3. Redesign the wall to meet code and remain true to Wright's intentions. You might consider replacing the middle board with (1) a thicker wooden core, (2) concrete panels, (3) rigid insulation, or (4) a metal plate. Draw the redesigned section and prove that it complies with code.

4. Comment on how your redesign is in harmony with Wright's intent and why it is superior to the original wall.