Let j be the order of the moving average process in the error. Hansen (1982) and Hansen and Singleton (1982) show that the weighting matrix for a first order moving average process (presented in Chapter 2 equation 2.14) is:

$$W_T^* = \left[\sum_{t=1}^{T} [h(x_{t+1}, \theta_T) Z_t][h(x_{t+1}, \theta_T) Z_t]' \right]^{-1} \qquad (B.1)$$

More generally, if $j \geq 0$ then the matrix is formed by:

$$R_t(i) = \frac{1}{T} \sum_{t=1+i}^{T} [h(x_{t+i}, \theta_T) Z_t][h(x_{t+j-i}, \theta_T) Z_{t-i}]'$$

$$W_T^* = \left[R_T(0) + \sum_{i=1}^{j-1} [R_t(i) + R_t(i)'] \right]^{-1} \qquad (B.2)$$

Note that an estimate of the parameter vector θ_t is necessary before solving for the weighting matrix. The standard estimation procedure proceeds in two stages. First, a sub-optimal choice of the weighting matrix, such as the identity matrix, is chosen and parameters are solved for. The initial parameter estimates are used to solve for the optimal weighting matrix W_T^*. This matrix is used in the objective function and the final parameter vector θ_t^* is solved for.