MATERIALS

Products suggested are for the purpose of establishing a standard of quality. The specialty sub-contractor may elect to use other products of similar quality, providing prior approval is obtained from the Engineer. Special inspections and testing as required by the Building Department may be noted on the approved drawings, and shall be provided by the owner.

1. Structural steel (rolled shapes and plate) shall conform to the requirements of ASTM A-36 and fastenings shall be ASTM A307 unless otherwise specified for tieback materials.

2. Concrete (structural) for caissons (back-filling of the toe length in drilled shafts of tieback and cantilever soldier beams) shall have a minimum compressive strength f'c of 2,500 PSI at the age of 28 days. Portland Cement to be Type I-II, 5-1/2 sacks per cubic yard (Type III-High Early Strength may be used). Aggregate to be 1-1/2" maximum and free from deleterious substances. No additives shall be used in the mix without approval by the Special Inspector. Mixing water to be potable; water/cement ratio shall not exceed 0.53 by weight, slump to be not more than 4 inches or less than 2 inches. Concrete to be inspected and approved by the Special Inspector immediately prior to placement. Cylinder samples may be required by the Building Department or the Special Inspector to be tested at the specialty sub-contractor's expense.

3. Concrete (lean) for caissons (backfilling the lagged length in drilled shafts of tieback and cantilever soldier beams), shall contain 1-1/2 sacks of Portland Cement per cubic yard.

4. Grout (high-strength) used in the primary zones of tieback anchorage shall contain 7 sacks of Portland Cement (Type III-High Early Strength may be used) per cubic yard of mix and have a minimum compressive strength f'c, prior to any loading, of 3,000 PSI. Cylinder samples may be required to be taken and tested under the direction of the Special Inspector and at the specialty sub-contractor's expense.

5. Grout (lean) used in the secondary zones of tieback shafts shall contain 1-1/2 sacks of Portland Cement per cubic yard.

6. Left-in-place timber lagging and cleats shall be full dimension (rough sawn) Douglas Fir (Fb=800 PSI minimum), pressure treated for ground contact.

7. High strength steel rods (post-tensioned soil anchors) shall conform to the requirements of ASTM A-722 (steel) and ASTM A-615 (deformations), and shall have a minimum ultimate jacking strength of 150 KSI, a maximum temporary jacking stress of 120 KSI (80% of ultimate strength), and a minimum effective (working) prestress level of 90 KSI (60% of ultimate). Anchorages shall be capable of developing the actual ultimate strength of the rods without excessive deformations. Rods and anchorages shall be Dywidag Thread Bars, 1 inch nominal diameter minimum, "double-corrosion protected", as manufactured by Dywidag Systems International, USA, Inc., 11526 Sorrento Valley Road, San Diego, CA 92121, phone (619) 755-6787.

8. Welds shall conform to AWS specifications and/or the State of California Department of Transportation publication "Standard Specifications for Welding Structural Steel". Welders shall be certified and shop welding shall be performed by licensed fabricators.

9. Geotextile (filter fabric) shall be Trevira Spunbond, #1115, as manufactured by Hoechst Fibers Industries, P. O. Box 5887, Spartanburg, SC 29304, phone (800) 845-7597; represented by Armco Inc., Construction Products Division, P. O. Box 909 (925 Village Center), Lafayette CA 94549-0909 phone (415) 283-6200.

10. Prefabricated drainage (in-plane composite drain system) shall be Miradrain #6000, as manufactured by Mirafi Inc., P. O. Box 240967, Charlotte, NC 28244 phone (800) 438-1855; represented by Dean L. Bradfield Inc., P. O. Box 491 (4529 Angeles Crest, Suite 317), La Canada, CA 91011-0491 phone (800) 525-6525.

11. Contractor may elect to pneumatically place (gunite) concrete walls. If so, contractor shall obtain approval from the property owners and shall submit proposed gunite material and procedure specifications to the Engineer for approval.

12. All steel components shall be double corrosion protected to provide permanent protection. Steel beams shall be shop sandblasted to white metal and then immediately coated, in strict accordance with the manufacturers recommendations, with Carboline "Carbomastic 15" two component, high build, modified aluminum epoxy mastic. General Contractor shall be responsible for the quality and permanence of all field touch-up coating of steel and welds. Where steel will be exposed, a topcoat of Carboline 1265 shall be applied for appearance.

13. Drain pipe shall be bell (expanded or pre-welded collar) and spigot smooth wall PVC (Polyvinyl Chloride) SDR 35 rated sewer pipe conforming to ASTM D-3034 as manufactured by Manville Corporation (J-M), East 3rd & Harbor, Pittsburg CA 94565 (415) 432-6426; local representative is ATCO, 1781 Arnold Industrial Way, Concord CA 94520 phone (415) 686-4430. Pipe to be 4 inches in diameter for foundation and retaining wall backdrains and downspout drains, and 6 inches in diameter for subsurface drains and collection lines. Pipe to be supplied in 12-1/2 foot lengths, fittings to be PVC, and cement to be as recommended by the manufacturer. Where used for to collect subsurface seepage, pipe shall be perforated with 1/2 inch round holes spaced at 5 inch centers, staggered, in rows 120^{o} apart.