TREATED WOOD PILING

1. SCOPE OF WORK:

(A) EXTENT: The work required under this section consists in furnishing all plant, labor, equipment, appliances, and materials; and in performing all operations necessary to complete the installation of wood piling, indicated on drawings, and described in specifications.

(B) BUIDING DOCUMENTS: See applicable sections of Species and General Conditions. These sections are applicable to this section and shall form a part of the contract.

2. MATERIALS:

(A) TIMBER PILES: to be southern pine or any wood of comparable strenght-capable of carrying 600 pounds per square inch for a maximum allowable load of 25 tons. The areas to be considered for stress is two thirds up the lenght of pile. Piles shall be in one piece, containing no evidence of decay, free from short kinks or reverse bends and shall have a uniform taper from butt to tip. A straight line drawn from the center of the butt to the tip shall lie wholly within the body of the pile. The diameter at the tip shall not be less than 8" and at the butt shall not be less than 12". No piles with spiral grain which exceeds one complete turn in 40 feet shall be used. No bark or wane shall be measured in required dimensions. All piles required to be treated shall be thoroughly peeled and shall have not less than 1" of exposed end butt end. Piles shall be in accordance with ASTM Specification D25-58 using Class B piles.

(B) WOOD PRESERVATIVES: Coal tar creosote for impregnation by pressure treatment shall be in accordance with the American Wood Preservers' Association Specifications P1-56 and treatment shall be in accordance with their Standard C1-'60, C3-'60 and C12-'61. Minimum retention of creosote to be not less than 12 pounds per cubic foot of wood. A certificate from the wood-preserving company, attesting that the piles have been treated in accordance with the specified requirements, shall be delivered to the Architect prior to the commencement of the pile driving. Treated piles shall be carefully handled without sudden dropping, breaking of the creosoted shell, bruising or penetrating the surface with hooks. All cuts as required for cut-off or splices shall be given three brush treatments of hot coal-tar creosote oil in such quantity as will thoroughly penetrate the cut surfaces.

3. DRIVING EQUIPMENT:

(A) Driving equipment shall be the type generally used in standard pile-driving practice, and shall be subject to approval of the Architect and County Building Department. Pile-driving hammers shall be of a size and type able to consistently deliver effective dynamic energy suitable to the piles to be driven and the material into which they are to be driven but with a minimum of 35,000 foot-pounds per blow when operating at not less than 75% efficiency. Equipment for driving shall be in first class condition and shall be at all times maintained and operated at the efficiency and capacity required herein and as directed by the Architect. The Contractor shall assume full responsibility for any damage resulting from pile driving.

4. LENGHT OF PILES:

(A) The piling design is based on an average lenght from point to cut-off of 45 feet. At least one foot of over lenght shall be allowed for cutting at the required "cut-off" elevation. Where piles longer than the designed effective lenghts, measured from point to "cut-off" elevation, are required to provide specified bearing capacities, the longer piles shall be provided. Where the specified bearing capacities are attained with piles of lenghts less than the designed effective lenghts, shorter piles may be used subject to the approval of the Architect and County Building Department. If, in driving, it is found that any bearing pile is longer than necessary to obtain the bearing power specified, the pile shall be cut off at the proper elevation provided the minimum penetration below cut-off has been reached. If, in driving, it is found that any bearing pile is not of a lenght sufficient to give, the bearing power specified, the contractor shall follow one of the following methods as may be directed by Architect.

(a) The pile shall be spliced as specified hereinafter, the lenght of the upper portion being as directed, and driving continued until the bearing power specified is obtained, or

(b) The first pile shall be pulled and a longer pile of the lenght directed driven.

5. WOOD PILE SPLICES:

(A) Wood pile splices shall consist of steel pipe having a wall thickness of not less than 3/8", a diameter approximately that of the pile at the plane of splicing but a minimum of 8", and a lenght of not less than 1.5' above and below the joint. Before the sleeves are driven in them, piles to be spliced shall be trimmed sufficiently to preclude the slivers or shavings cut by the sleeve being heavy enough to produce objectionable shaver or splintering. Full bearing of timber on timber shall be provided and air pockets or cushions in the sleeves avoided. The cut surface of pile and splice shall be given at least two brush treatments with coal tar creosote oil before driving splice in place.

6. FORMS:

(A) Collars or hoops, of design approved by Architect shall be used where required for the protection of butts against splitting, brooming, or other damage, when the piles are being driven.

7. PILE CHECKING:

(A) Each pile shall be driven to a minimum penetration of 10 feet below cut off plus additional penetration as necessary to obtain a bearing value of not less than 30,000 pounds as determined by the formulas:

$$\frac{2E}{S+0.1} \quad \text{for double-acting steam hammers}$$

$$\frac{2Wh}{S+0.1} \quad \text{for single-acting steam hammers}$$

$$\frac{2Wh}{S+1} \quad \text{for drop hammers}$$

in which E equals the energy in foot-pounds per blow based on an acceptable certified statement from the manufacturer of the hammer, W equals the weight of the hammer or rig in pounds, h equals the fall of the hammer or ram in feet, and S equals the average penetration per blow for the last three blows in inches.

8. PILE DRIVING:

(A) GENERAL: All piles shall be driven until the excavation or fill in the area which they are to occupy has been completed to elevation of grade indicated on the drawings. No piles shall be driven within 20 feet of concrete less than 7 days old, unless so directed by Architect. Piles shall be carefully located to the lines and spacing shown on the drawings, and shall be driven to the plumb position indicated on the drawings, with no permissible deviation from indicated locations exceed 3" at any pile.

(B) INTERRUPTION: Each permanent pile shall be driven without interruption from the first blow of the hammer until the required penetration per blow, or penetration as specifically specified, has been attained; any interruption in the driving required will be permitted only subject to approval of the Architect. In any event, the final 25 to 75 percent of each lenght of pile to be driven to completion without interruption. All piles shall be driven to the full lenght specified or indicated on the drawings, except that if Architect and County Building Department determine sufficient lenght of certain piles to be impracticable or uneconomical, such piles shall be cut off at depths as directed by Architect and County Building Department. After driving, all piles shall be cut off at the cut-off grade line and the surplus material removed from the site.

(C) SPECIAL CONDITION: When handling and driving long piles of a high slenderness ratio, special precautions shall be taken to insure against over stress or leading away from a plumb or true position when driving. When high resistant strata lying near the surface must be penetrated, spud piles may be used to relieve long piles of hard driving during the early stages of driving operations.

(D) DAMAGED PILES: Piles that are damaged, dislocated, or driven out of alignment shall be withdrawn and replaced by new piles or shall be cut off and abandoned and additional piles driven at the contractor's expense.

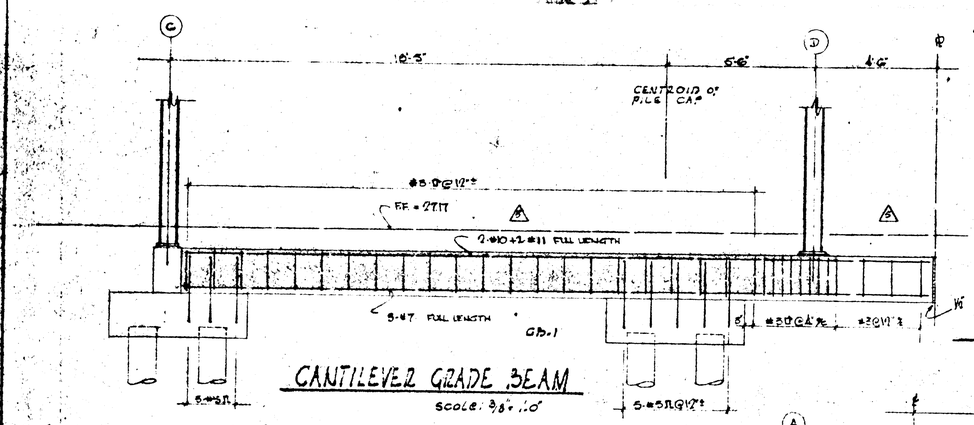
(E) RECORD OF DRIVING: A complete report of each pile driven shall be made for Architect or County Building Department. This report shall contain all dimensions, elevations of point, and elevation of butt before and after cutting off. The record shall include the average penetration of each pile under the last 10 to 20 blows where steam hammers are used, or the last 5 to 10 blows where drop hammers are used.

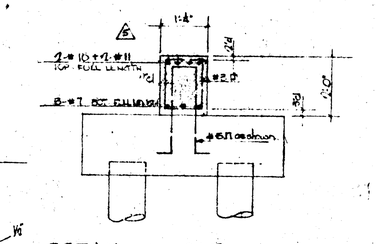
9. LOAD TESTS:

(A) GENERAL: A minimum of two load tests shall be required for determination of allowable pile loads. Load tests shall be performed in strict accordance with the requirements of the County Building Code and the latest edition of the Basic Building Code (B.O.A.C.). Before any load test is made, the proposed apparatus and structure to be used in making the load tests shall be approved by the County Building Inspector. All load tests shall be made under the supervision of the Building Inspector or his representative. A complete record of each load tests shall be furnished the Architect and the County Building Inspector. All load tests shall be made at the expense of the Contractor. Test piles may be used as foundation piles, subject to the approval by Architect and County Building Inspector.

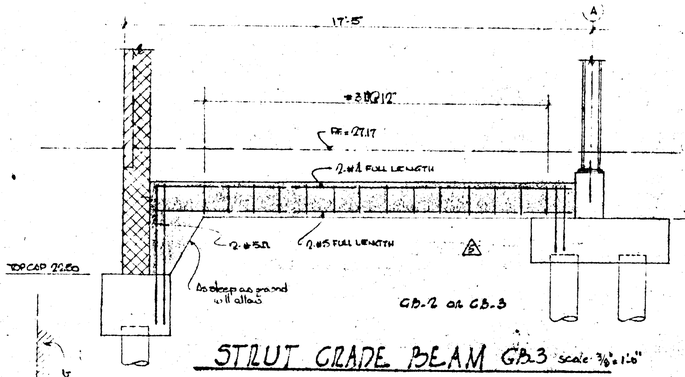
(B) FOUNDATION PILES: In the subsequent driving of the foundation piles for the structure, a pile shall be deemed to have a bearing value equal to that determined by the load test pile for that area of the foundation, when the foundation pile, using the same or equivalent pile and model of pile hammer, and the same operation of the hammer with regard to speed, height of fall, stroke, and pressure, and all other velocity factors, shall develop equal or greater final resistance to driving than the load test pile. Where actual pile lenghts vary more than 50% from that of the test pile, the County Building Inspector may require investigation to determine the adequacy of the piles.

(C) PILE GROUPS: Where the County Building Inspector has reason to doubt the safe load carrying capacity of pile groups, he may require, at the expense of the Contractor, group load tests up to 100% of the proposed group load.

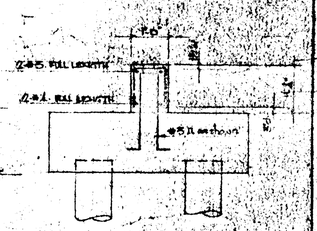




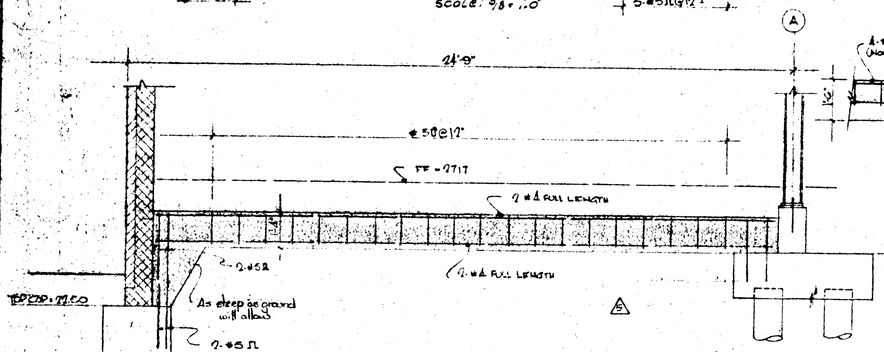
DETAIL at CAP scale: 1½" = 1'-0"



STRUT GRADE BEAM GB-3 scale: 3/8" = 1'-0"



DET. of CAP for GB-2 & GB-3 scale: 1½" = 1'-0"



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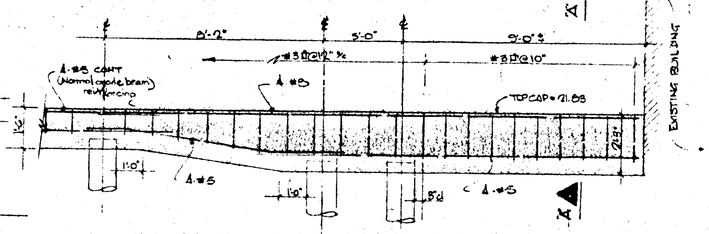
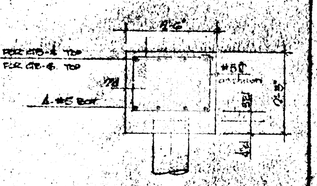
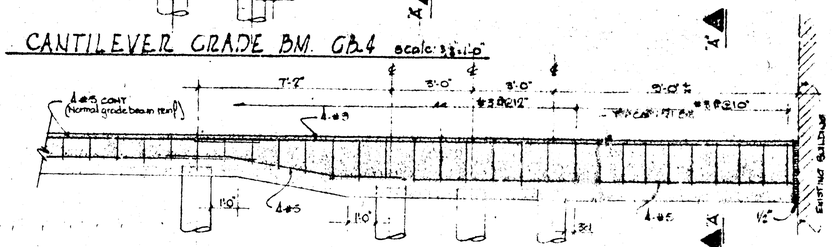


CANTILEVER GRADE BM. GB-4 scale: 3/8" = 1'-0"



SECT. A-A scale: 1½" = 1'-0"



CANTILEVER GRADE BEAM GB-5 scale: 3/8" = 1'-0"

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