

Tank floor—central shaft and division walls.

The quality of concrete used in the construction of the tank is such as to ensure its impermeability without the addition of any waterproofing agents, internal lining or painting.

All horizontal and vertical joints are provided with a $\frac{1}{2}$ in. deep recess on the water retaining face which are filled with a special bituminous compound and finally sealed by a ribbon coat of bituminous paint. In addition to this surface treatment the vertical contraction joints in the tank walls are bridged by a lead sheet which is cast into the concrete.

At about 13 ft. below tank floor level, there is a gallery carrying a 15 in. diameter ring main with its several control valves and two 8 in. inlet or outlet branches serving each compartment of the tank. A gangway leads from this gallery to a 12 ft. square central platform which carries the assembly of overflow and washout pipes and valves, also a spiral staircase contained in a cylindrical shaft which passes through the tank to a Pent House on its roof from which access is gained by ladder into each compartment of the tank.



Concreting tank floor, South West corner.

An additional access shaft 4 ft. 9 ins. diameter without a stairway passes through the tank in the S.W. corner tower, making provision for handling materials to or from the roof.

The four octagonal towers are of similar form, but that at the S.W. corner accommodates the Automatic Valve Control House at ground level and a reinforced concrete staircase leading up to the pipe gallery.

The pipe gallery also serves the purpose of an observation gallery, the outer screen wall around it having unglazed window openings 9 ft. high by 2 ft. 9 ins. wide in the centre of each panel between columns. Openings of similar width, but 23 ft. 6 ins. high, occur in alternate panels below gallery level, those in the Control or Access Tower are glazed with steel framed window sashes.

The external faces of the screen walls below the tank floor are bush-hammer dressed leaving plain margins at all angles and around openings. To afford a pleasing contrast, the faces of the elevated tank and the architraves to the entrance doors have been finished smooth resembling Portland stone.



Ring main on observation gallery.

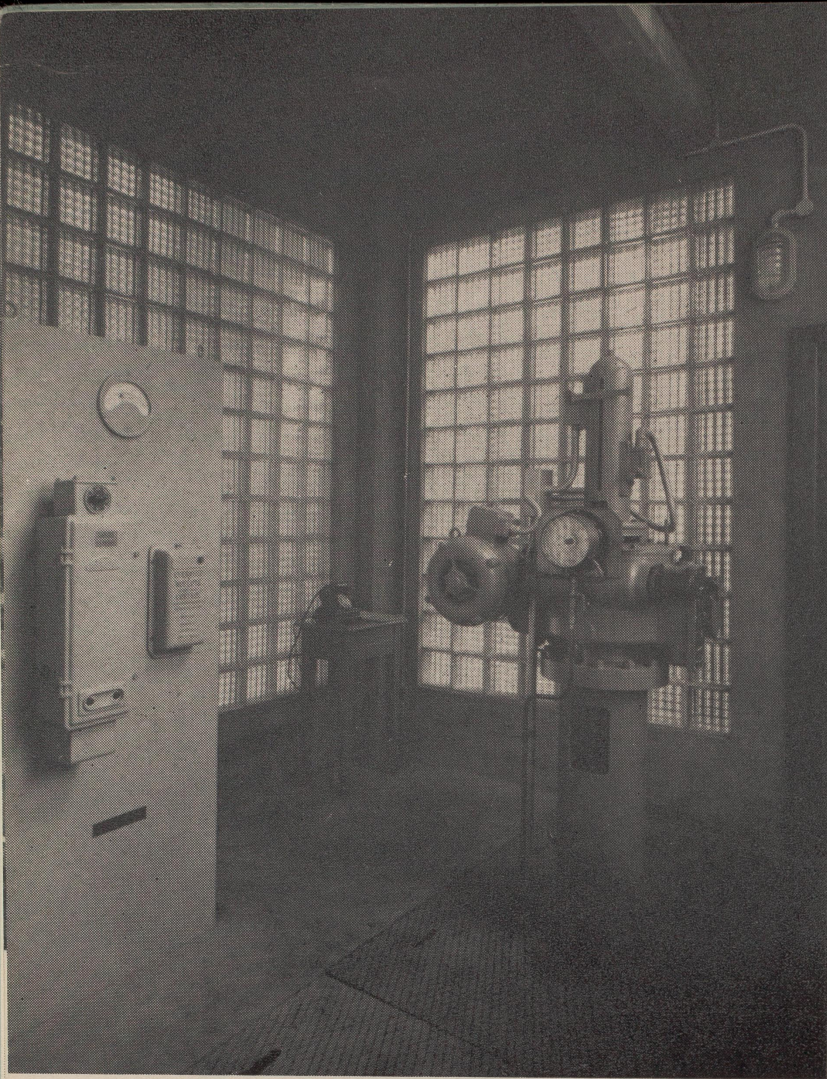
Apart from the Control Tower and one bay of the Central Tower in which lavatory accommodation is provided, the remainder of the ground floor area is available for storage of certain of the Company's equipment. The main entrance occurs in the centre of the West elevation and a secondary entrance on the same elevation of the Control Tower.

Testing

On completion, the tank was thoroughly cleansed and sterilised prior to rigorous testing, first with all compartments filled simultaneously to overflow level, followed by separate tests of diagonally opposite compartments.

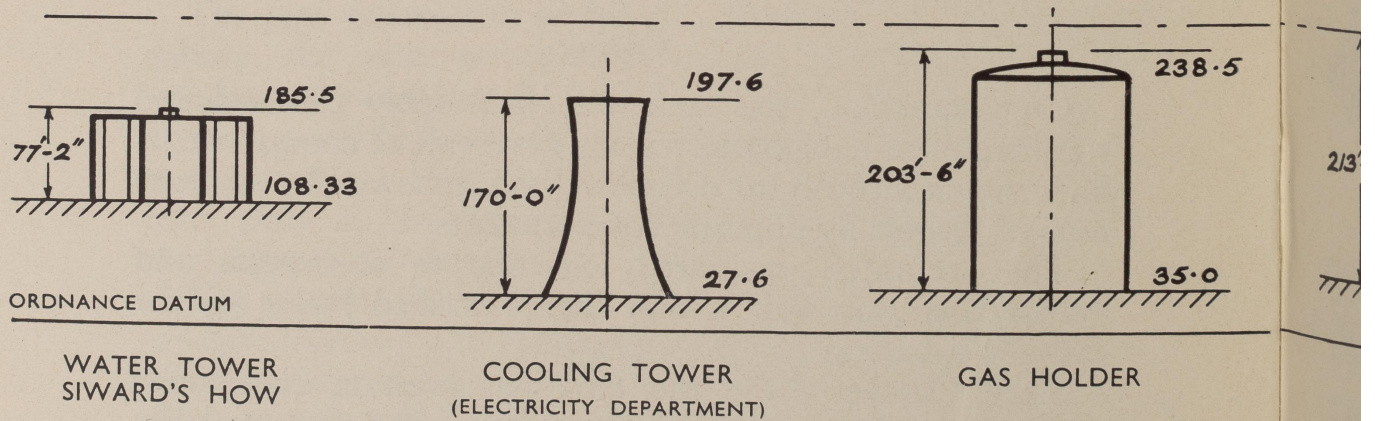
The accurately measured loss due to absorption and evaporation was well within the prescribed limits, to the entire satisfaction of all concerned.

Since October 1956 the tank has been in continuous operation and careful observation has failed to reveal the slightest sign of leakage in any part of it.



Control House.

COMPARATIVE HEIGHTS OF ELE



Operation

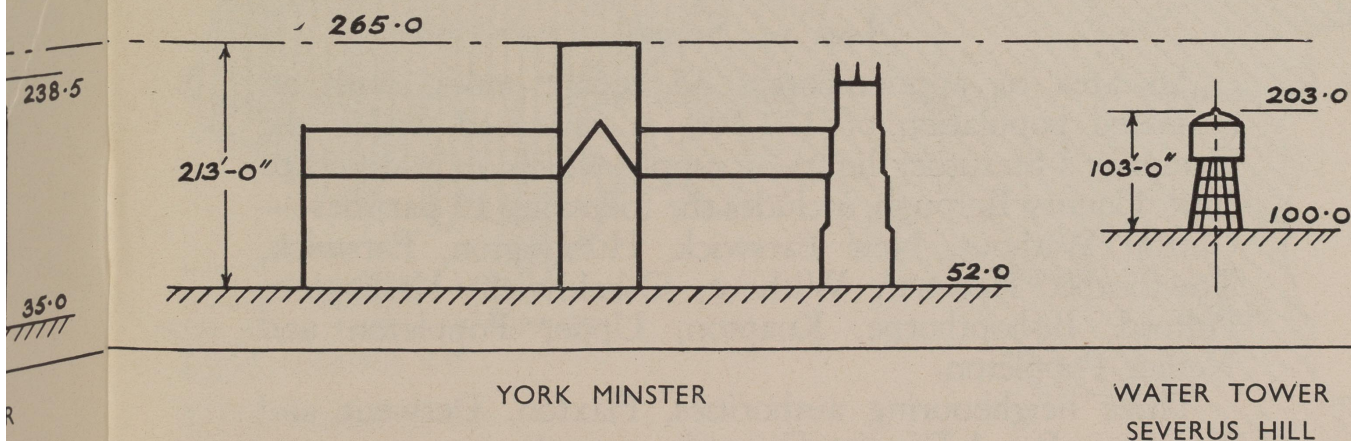
Automatic operation is obtained by Noflote electrodes in the tank working in conjunction with an electrical differential pressure gauge connected to the main downstream of the control valve.

A control panel with the necessary relays and timers receives the signal from the bridged electrodes when the tank is full, thus energising the motor to close the 15 in. valve and prevent overflow. The valve remains closed until the pressure in the mains has fallen to the pre-determined point for closing the low pressure contacts of the gauge, which, in turn, re-opens the valve, thus connecting the full tower to the mains.

A float operated transmitter in the Pent House enables the water level to be indicated by electronic repeater, both in the control house below and at the pumping station. Over the same G.P.O. telephone lines, an alarm is sounded at the works if the automatic trip mechanism has operated to close the valve due to abnormal velocity of discharge, such as would result from the fracture of a main.

To connect the tower with the pumping station and distribution system, 18 in. and 15 in. trunk mains were laid

S OF ELEVATED STRUCTURES IN THE CITY



to Piccadilly near the centre of the City (approximately 2,760 yards) where existing twin 15 in. trunk mains are interconnected.

In addition, 12 in. and 8 in. mains were laid in a southerly direction to duplicate and improve the supply to an important region embracing Military Barracks, three Hospitals and bulk supply to the adjoining Derwent Rural District Council.

Interesting Relative Figures

Volume of excavation for tower foundations	2,500 cu. yds.
Volume of mass concrete in foundations	875 cu. yds.
Volume of reinforced concrete in superstructure and tank	2,800 cu. yds.
Weight of bar and structural steel reinforcement in tank	368 tons
Weight of one million gallons of water	4,464 tons
Total weight of finished structure with tank full	11,000 tons
Average ground pressure distributed by foundations	1.75 tons per square ft.

Comparative Heights

A structure of such proportions as Siward's How Tower cannot fail to attract attention, and, to the casual observer, appears to predominate its predecessors in height on the skyline.

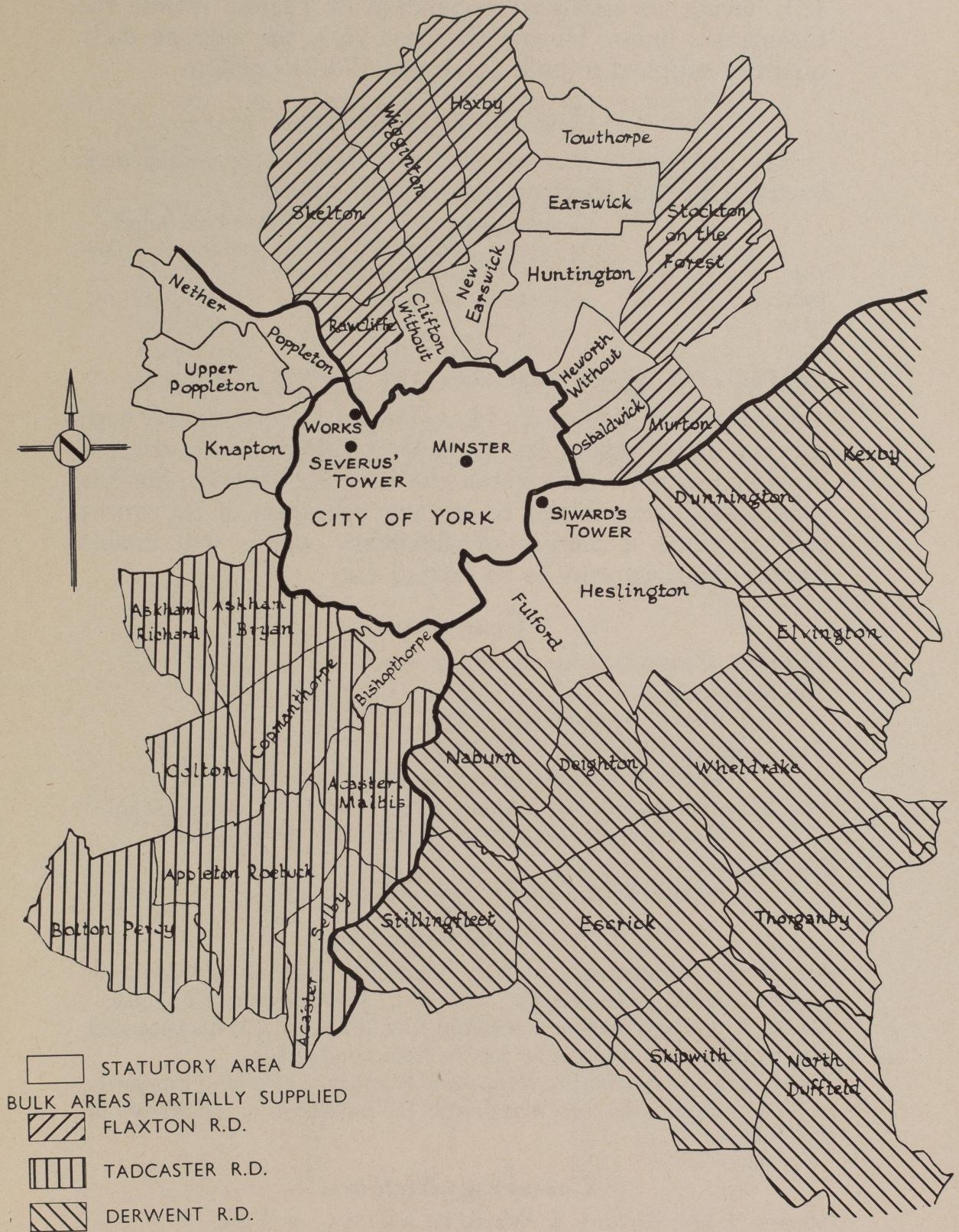
It is, however, quite interesting to compare the relative ground levels and extreme heights of other well-known structures in the City (as indicated on pages 12 and 13), and, with some surprise, discover it to be actually the lowest.

Area of Supply

An area of approximately 35 square miles, with an estimated population of 132,500, is embraced within the Company's Statutory limits of supply which, in addition to York County Borough, includes the following 13 parishes:— Clifton Without, New Earswick, Huntington, Earswick, Towthorpe, Heworth Without, Osbaldwick, Heslington, Fulford, Bishopthorpe, Knapton, Upper Poppleton and Nether Poppleton.

Three neighbouring authorities, Flaxton, Derwent and Tadcaster Rural District Councils, extending over an area of approximately 100 square miles, are afforded metered bulk

AREA OF SUPPLY



supplies for distribution in 25 parishes (indicated on page 15), having an estimated population of 12,000 outside the Company's limits. During the past year, the average daily quantity supplied to bulk areas was 378,219 gallons.

Increasing Demand

The progressive increase in demand for water is indicated by the following selection from annual records:—

Year.	Total Quantity Pumped in gallons.	Average Supply in gallons per day.
1860	473,011,000	1,292,000
1900	1,066,160,000	2,913,000
1930	1,661,571,000	4,552,000
1950	2,545,810,000	6,975,000
1956	2,787,590,000	7,616,000

Completion of Siward's How Tower, in conjunction with the new trunk mains, has not only resulted in considerably improved supplies throughout the City and district, but has substantially contributed to efficient operation of the works and provided a margin of flexibility which will enable further improvements to be carried out.

Contractors

The main Contractors for the works were:—

The Foundations:—

Messrs. Sangwin Ltd., Hull.

The Supporting Structure, first stage:—

Messrs. Leightons (Contractors) Ltd., London.

The Supporting Structure, second stage, and the Elevated Tank:—

Messrs. Currall, Lewis & Martin Ltd., Birmingham.

Mainlaying:—

Messrs. Wm. Press & Sons Ltd., London.

Engineers

Mr. Henry Whitehouse, M.I.W.E., succeeded upon his retirement by Mr. J. Dunkley, A.M.I.Mech.E., A.M.I.W.E., the Company's Engineer.

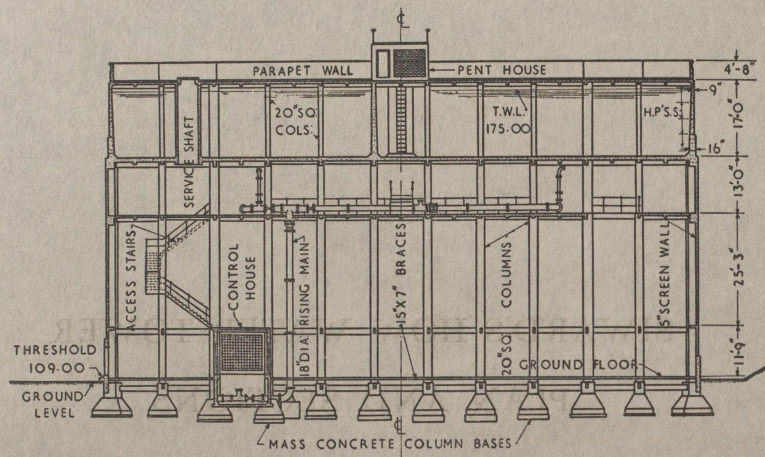
Messrs. Ritchie & Partners, Consulting Civil Engineers, of Berkhamsted, Herts., who were responsible for the Structural design.

Messrs. Edward Sandeman, Kennard & Partners, Consulting Engineers, of Westminster, who were responsible for the design of the Hydraulic Equipment.

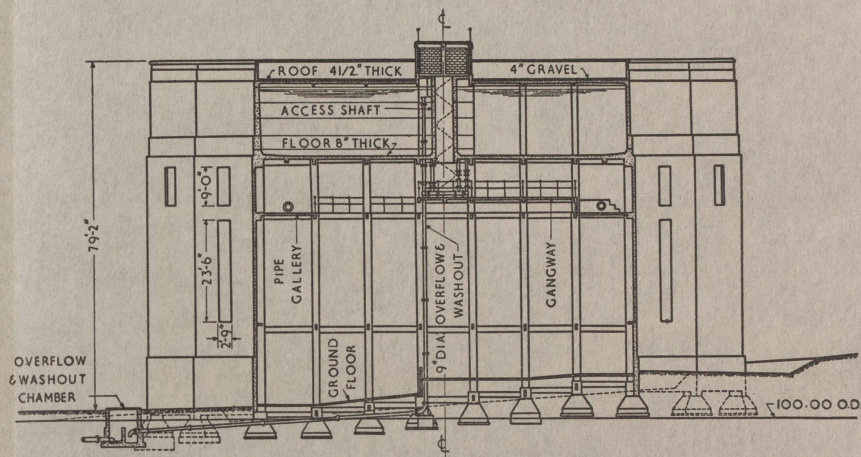
Consulting Architects

Messrs. Ward, Ruddick & Ward, F.L.A.R.I.B.A., of York.

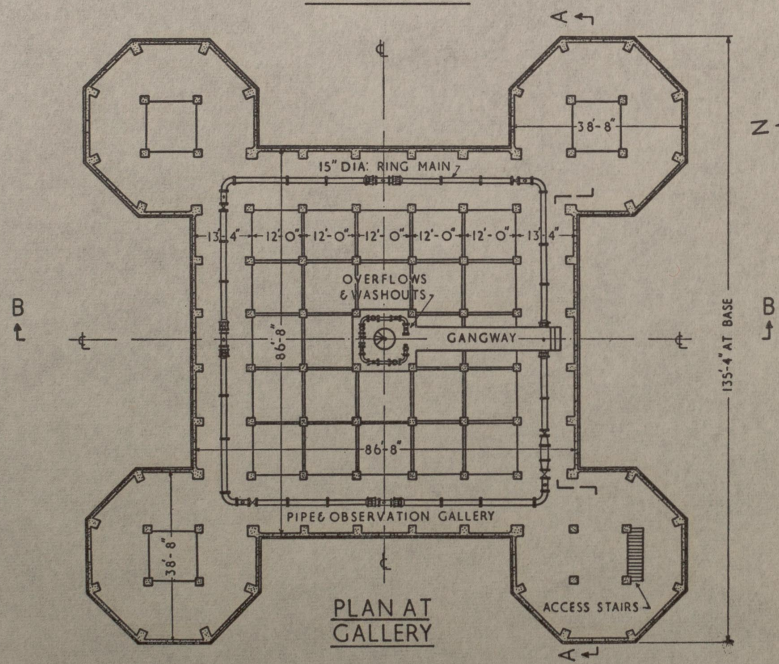
SIWARD'S HOW WATER TOWER—PLAN AND SECTIONS



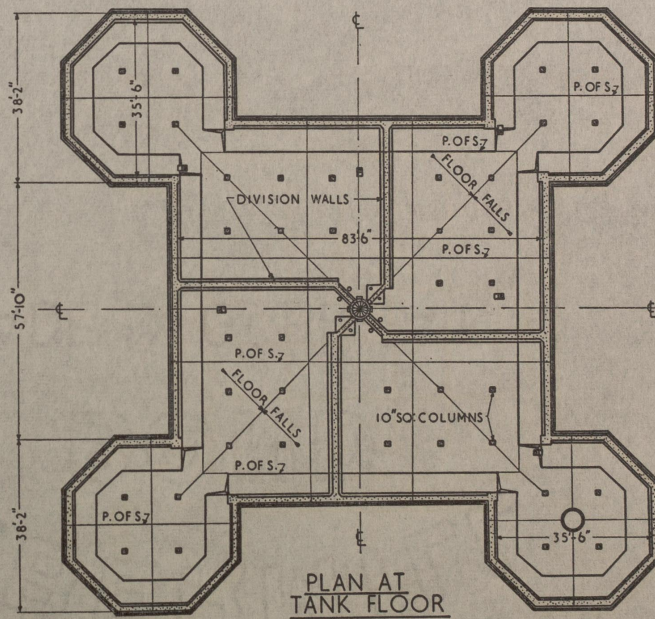
SECTION A-A



SECTION B-B



PLAN AT GALLERY



PLAN AT TANK FLOOR

BEN JOHNSON & CO. LTD., PRINTERS, YORK AND LONDON.