NEW YORK FILTER MFG. CO.

NEW YORK.

DESIGNS OF FILTER PLANTS.

JANUARY, 1900.

NEW YORK FILTER MANUFACTURING CO.

15 Broad St.

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DESIGNS OF FILTER PLANTS

JANUARY, 1900.

THE thirty-seven plates contained in this atlas are intended to illustrate thirteen of the filter plants that have been designed for the New York Filter Manufacturing Company during the past two years, under the direction of Edmund B. Weston, C. E., Consulting Engineer, Providence, R. I.

The plates are reduced copies of plans, and in order to keep their number within reasonable limits in the atlas, only copies of such plans are presented as it is thought will be necessary to give a comprehensive idea of the general design of the filter plants, which have capacities ranging from about 250,000 to 75,000,000 gallons per 24 hours.

INDEX TO PLATES.

DESCRIPTION OF THE FILTER PLANTS.

Jewell Gravity Filter Plant Designed for East Providence, R. I.

(PLATE II.)

The available capacity of the filter plant is 500,000 gallons per 24 hours.

The exterior dimensions of the filter building are 59 x 42 feet.

There is 1 cypress wood filter. The filter-bed is 15 feet in diameter. The outside diameter of the filter is 16 feet 6 inches. The height of the filter is 12 feet. There is space left in the building for 3 additional filters.

The supply main is 16 inches in diameter. The wash main is 8 inches in diameter. The drain pipe is 10 inches in diameter.

The rate of filtration is about 127,000,000 gallons per acre per 24 hours.

The power for driving the agitator and wash pump is transmitted by a rope and shafting, from a turbine wheel in an adjacent pumping station.

The raw water is supplied to the filter by gravity.

The filtered water is discharged into a pure water well under the building.

Jewell Gravity Filter Plant Designed for Norfolk, Va.

(PLATES III, IV, V, VI, VII, XXXIV, XXXV.)

The available capacity of the filter plant is 8,000,000 gallons per 24 hours.

The exterior dimensions of the filter building are 179.67 x 59.67 feet.

There are 16 cypress wood filters. The filter-beds are 15 feet in diameter. The outside diameter of the filters is 16 feet 6 inches. The height of the filters is 16 feet.

The supply main is 30 inches in diameter. The wash main is 10 inches in diameter.

The available capacity of each filter is 500,000 gallons per 24 hours.

The rate of filtration is about 127,000,000 gallons per acre per 24 hours.

The steam for power and heat is generated in an adjacent boiler house, which is connected with the main pumping station.

The raw water is supplied to the filters by pumps in the main pumping station.

The filtered water is discharged into a flume from whence it flows to a pure water reservoir outside of the building.

On account of the peculiar character of the raw water at Norfolk, a longer time for subsidence is required than can be had in the filters. This is accomplished by using a subsidence basin of about 5,000,000 gallons capacity, which was formerly used as a reservoir.

Jewell Gravity Filter Plant Designed for Washington, D. C.

(PLATES VIII, IX, X, XI, XXXVI.)

The available capacity of the filter plant is 60,000,000 gallons per 24 hours.

The exterior dimensions of the filter house are 454.33 x 152.33 feet, and those of the engine and boiler house 92.17 x 94.33 feet.

There are 60 steel filters. The filter-beds are 24 feet in diameter. The extreme outside diameter of the filters, including angle irons, is 25 feet $11\frac{3}{4}$ inches. The outside diameter of the filters, not including angle irons, is 25 feet $4\frac{3}{4}$ inches. The height of the filters is 16 feet. There is space left in the building for 4 additional filters.

The supply mains are 48 inches in diameter. The wash mains are 20 inches in diameter.

The available capacity of each filter is 1,000,000 gallons per 24 hours.

The rate of filtration is about 100,000,000 gallons per acre per 24 hours.

The raw water would be supplied to the filters by pumps in an adjacent pumping station.

The filtered water would be discharged into flumes, from whence it would flow to a pure water reservoir outside of the building.

Jewell Gravity Filter Plant Designed for Providence, R. I.

(PLATES XII, XIII, XIV.)

The available capacity of the filter plant is 15,000,000 gallons per 24 hours.

The exterior dimensions of the filter building are 286.33 x 79.17 feet.

There are 15 steel filters. The filter-beds are 24 feet in diameter. The extreme outside diameter of the filters, including angle irons, is 25 feet $11\frac{3}{4}$ inches. The outside diameter of the filters, not including angle irons, is 25 feet $4\frac{3}{4}$ inches. The height of the filters is 16 feet. There is space left in the building for 1 additional filter.

The supply main is 48 inches in diameter. The wash main is 12 inches in diameter.

The available capacity of each filter is 1,000,000 gallons per 24 hours. The rate of filtration is about 100,000,000 gallons per acre per 24 hours.

The steam for power, pumping and heat would be generated in an adjacent boiler house.

The raw water would be supplied to the filters by steam pumps in the filter building.

The wash water would be supplied, under pressure, directly from the "mains."

The filtered water would be discharged into a flume, from whence it would flow to a pure water basin outside of the building.

Jewell Gravity Filter Plant Designed for Rome, Ga.

(PLATES XV, XVI.)

The available capacity of the filter plant is 1,500,000 gallons per 24 hours.

The interior dimensions of the filter building are 60 x 42 feet.

There are 3 cypress wood filters. The filter-beds are 15 feet in diameter. The outside diameter of the filters is 16 feet 6 inches. The height of the filters is 16 feet. There is space left in the building for 2 additional filters.

The supply main is 16 inches in diameter. The wash main is 10 inches in diameter. The drain pipe is 10 inches in diameter.

The available capacity of each filter is 500,000 gallons per 24 hours.

The rate of filtration is about 127,000,000 gallons per acre per 24 hours.

The raw water is supplied to the filters by gravity.

The filtered water is discharged into a well, from whence it flows to a pure water reservoir outside of the building.

Jewell Gravity Filter Plant Designed for Pittsburg, Pa.

(PLATES XVII, XVIII, XIX, XXXVII.)

The available capacity of the filter plant is 75,000,000 gallons per 24 hours.

The exterior dimensions of the filter house are 508.33 x 149.54 feet, and those of the engine and boiler house 96.67 x 98.33 feet.

There are 72 steel filters. The filter-beds are 24 feet in diameter. The outside diameter of the filters, including angle irons, is 25 feet $11\frac{3}{4}$ inches. The outside diameter of the filters, not including angle irons, is 25 feet $4\frac{3}{4}$ inches. The height of the filters is 18 feet.

The supply mains are 48 inches in diameter. The wash mains are 24 inches in diameter.

The available capacity of each filter is 1,040,000 gallons per 24 hours.

The rate of filtration is about 104,000,000 gallons per acre per 24 hours.

The raw water would be supplied to the filters by pumps in an adjacent pumping station.

The filtered water would be discharged into flumes, from whence it would flow to a pure water reservoir outside of the building.

Warren Gravity Filter Plant Designed for Pittsburg, Pa.

(PLATES XX, XXI, XXII, XXIII.)

A settling basin divided into six chambers, having a total capacity of 600,000 gallons, is directly connected with the filter house. The mean length of each of the chambers of the settling basin is 86 feet, and the mean width 77.75 feet. The depth of the chambers is 13.5 feet.

The available capacity of the filter plant is 75,000,000 gallons per 24 hours.

The exterior dimensions of the filter house are 500 x 144.33 feet, and those of the engine and boiler house 153.33 x 43.67 feet. The exterior dimensions of the settling basin are 500 x 101.96 feet.

There are 150 cypress wood filters. The filter-beds are 15 feet in diameter. The outside diameter of the filters is 16 feet 6 inches. The height of the filters is 9 feet. There is space left in the building for 6 additional filters.

The available capacity of each filter is 500,000 gallons per 24 hours.

The rate of filtration is about 127,000,000 gallons per acre per 24 hours.

The raw water would be supplied to the settling basin by pumps in an adjacent pumping station, and thence flow by gravity to the filters.

The filtered water would be discharged into a flume, from whence it would flow to a pure water reservoir outside of the building.

Jewell Gravity Filter Plant Designed for Lewiston, Me.

(PLATES XXIV, XXV.)

The available capacity of the filter plant is 4,000,000 gallons per 24 hours.

The exterior dimensions of the filter building are 90 x 46.17 feet.

There are 8 cypress wood filters. The filter-beds are 15 feet in diameter. The outside diameter of the filters is 16 feet 6 inches. The height of the filters is 16 feet.

The supply main is 24 inches in diameter. The wash main is 12 inches in diameter. The drain pipe is 12 inches in diameter.

The available capacity of each filter is 500,000 gallons per 24 hours.

The rate of filtration is about 127,000,000 gallons per acre per 24 hours.

The power for driving the agitator and wash pump would be transmitted by a rope and shafting, from a turbine wheel in an adjacent pumping station.

The raw water would be supplied to the filters by pumps in an adjacent pumping station.

The filtered water would be discharged into a pure water well under the building.

Jewell Gravity Filter Plant Designed for the Manchester Mills, Manchester, N. H.

(PLATES XXVI, XXVII.)

The available capacity of the filter plant is 5,000,000 gallons per 24 hours.

The exterior dimensions of the filter building are 92 x 53.67 feet.

There are 6 cypress wood filters. The filter-beds are 17 feet in diameter. The outside diameter of the filters is 18 feet 8 inches. The height of the filters is 16 feet.

The supply main is 30 inches in diameter. The wash main is 12 inches in diameter. The drain pipe is 16 inches in diameter.

The available capacity of each filter is 833,333 gallons per 24 hours.

The rate of filtration is about 165,000,000 gallons per acre per 24 hours.

The supply and wash pumps are combined and drive shafting. They are located in the filter building. Each pump has a capacity of 5,250,000 gallons per 24 hours.

The power for driving the pumps would be transmitted by a shaft and rope from an adjacent building.

The filtered water would be discharged into a pure water well under the building.

Jewell Gravity Filter Plant Designed for Benwood, W. Va.

(PLATES XXVIII, XXIX.)

The available capacity of the filter plant is 1,000,000 gallons per 24 hours.

The interior dimensions of the filter house are 37.83 x 37.83 feet.

There are 2 cypress wood filters. The filter-beds are 14 feet in diameter. The outside diameter of the filters is 15 feet 6 inches. The height of the filters is 16 feet. There is space left in the building for 2 additional filters.

The supply main is 16 inches in diameter. The wash main is 8 inches in diameter. The drain pipe is 10 inches in diameter.

The available capacity of each filter is 500,000 gallons per 24 hours.

The rate of filtration is about 147,000,000 gallons per acre per 24 hours

The wash pump is located in an adjoining engine room, and the power for driving the agitator is transmitted by a rope from the same room.

The raw water is supplied, by a pump in an adjoining engine room, to a settling basin of about 100,000 gallons capacity, located outside of the filter building. From the settling basin it flows by gravity to the filters.

The filtered water is discharged into a pure water well under the filter house.

The filter house is of local design and was built before the plans for the layout of the filters were made.

Jewell Gravity Filter Plant Designed for the Atlantic Mills, Providence, R. I.

(PLATE XXX.)

The available capacity of the filter plant is 1,200,000 gallons per 24 hours.

The exterior dimensions of the filter building are 47.67 x 26.17 feet.

There are 2 cypress wood filters. The filter-beds are 15 feet in diameter. The outside diameter of the filters is 16 feet 6 inches. The height of the filters is 16 feet.

The supply main is 12 inches in diameter. The wash main is 8 inches in diameter.

The available capacity of each filter is 600,000 gallons per 24 hours.

The rate of filtration is about 153,000,000 gallons per acre per 24 hours.

The power for driving the agitator and wash pump would be transmitted by a rope from an adjacent building.

The raw water would be supplied to the filters by a pump in an adjacent building.

The filtered water would be discharged into a pure water well under a portion of the building.

Jewell Gravity Filter Plant Designed for Paris, France.

(PLATES XXXI, XXXII.)

The available capacity of the filter is 264,000 gallons per 24 hours.

There is 1 cypress wood filter. The filter-bed is 12 feet in diameter. The outside diameter of the filter is 13 feet 6 inches. The height of the filter is 16 feet.

The supply main is 8 inches in diameter. The wash main is 8 inches in diameter. The drain pipe is 10 inches in diameter.

The rate of filtration is about 105,000,000 gallons per acre per 24 hours.

The power for driving the agitator and wash pump would be transmitted from an outside source.

The raw water would be supplied to the filter by a pump.

The filtered water would be discharged into a well, from whence it would flow to a pure water reservoir.

Jewell Gravity Filter Plant Designed for Winschoten, Holland.

(PLATE XXXIII.)

The available capacity of the filter plant is 300,000 gallons per 24 hours.

The interior dimensions of the filter building are 34.50 x 25 feet.

There is 1 cypress wood filter. The filter-bed is 12 feet in diameter. The outside diameter of the filter is 13 feet 6 inches. The height of the filter is 16 feet. There is space left in the building for 1 additional filter.

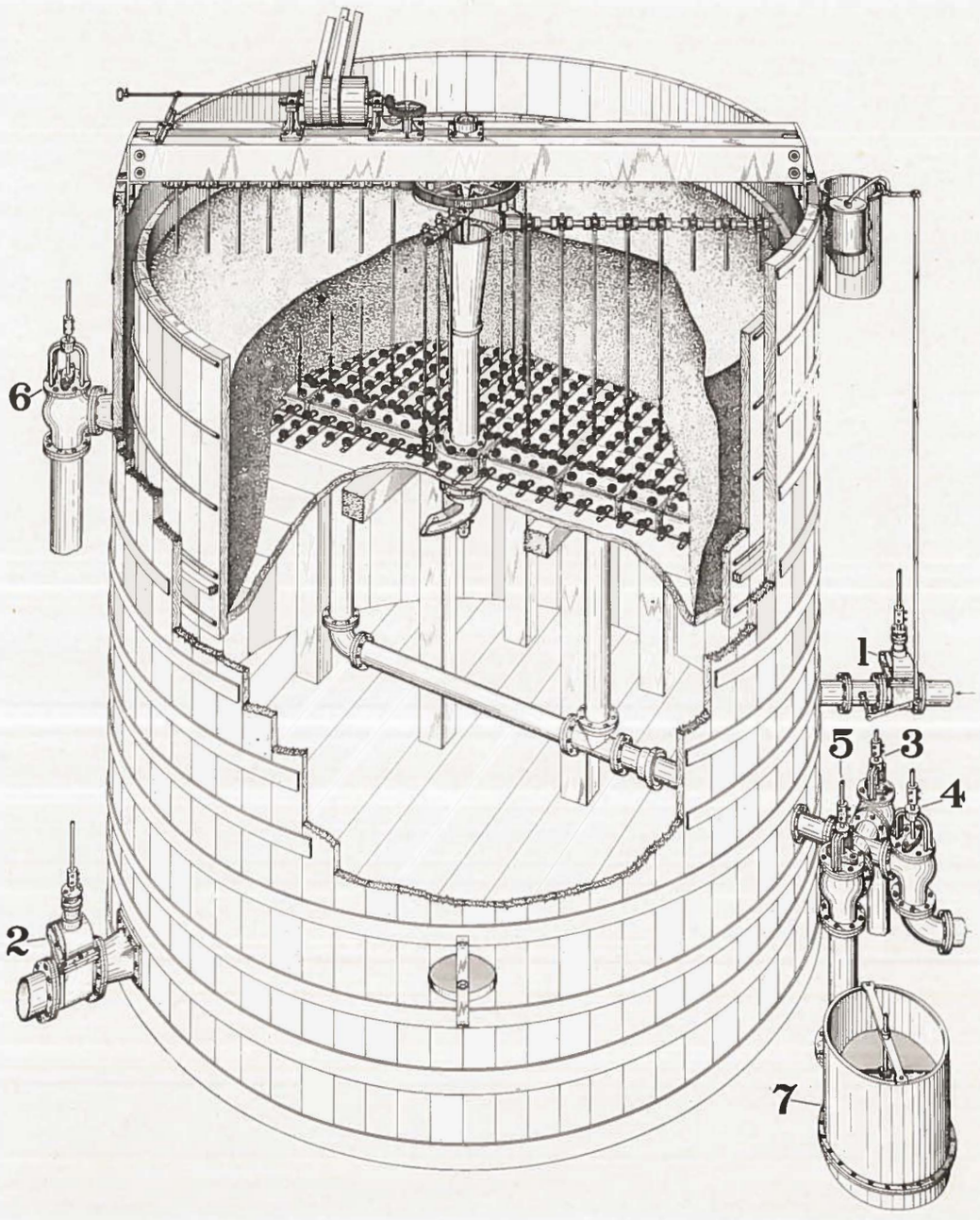
The supply main is 6 inches in diameter. The wash main is 6 inches in diameter. The drain pipe is 8 inches in diameter.

The rate of filtration is about 119,000,000 gallons per acre per 24 hours.

The wash pump would be located in an adjoining engine room, and the power for driving the agitator would be transmitted by a rope from the same room.

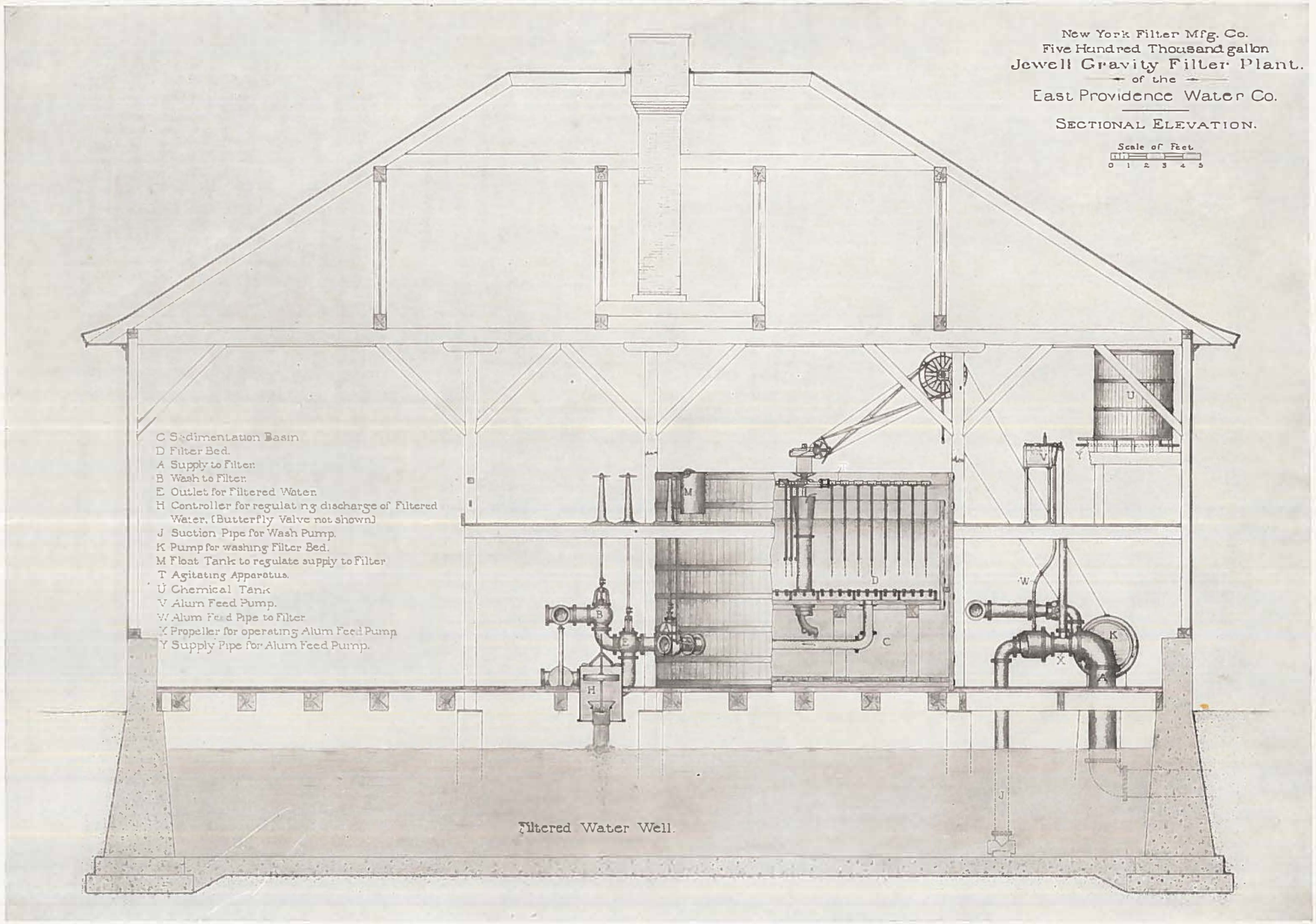
The raw water would be supplied to the filters by pumps in an adjoining engine room.

The filtered water would be discharged into a small well, from whence it would flow to a pure water tank outside of the building.

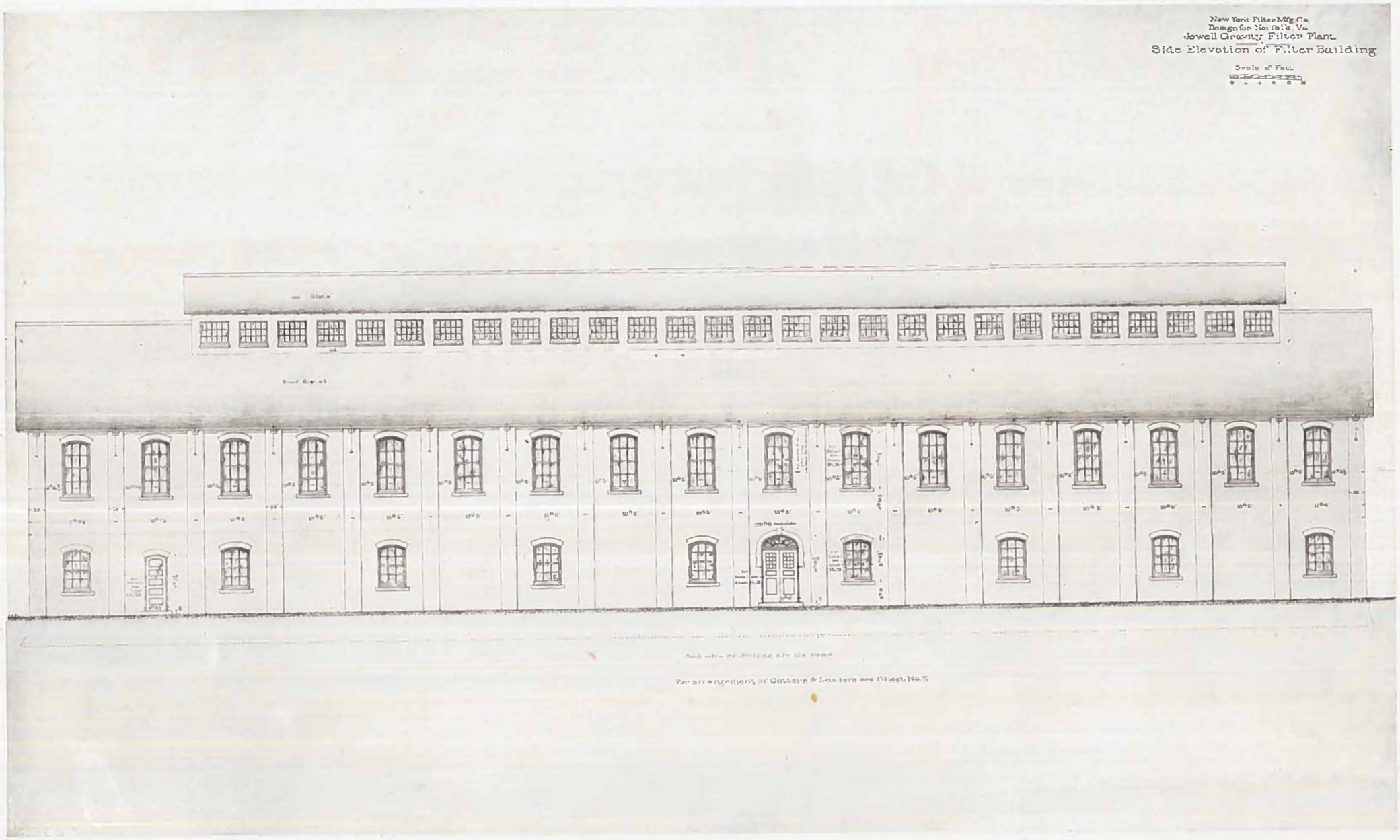


Fifteen-Foot Jewell Subsidence Gravity Filter with Weston Automatic Controller.

1 — Inlet Valve. 2 and 6 — Washout Valves. 3 — Rewash Valve. 4 — Wash Valve. 5 — Delivery Valve. 7 — Controller.



Jewell Gravity Filter Plant designed for East Providence, R. I.

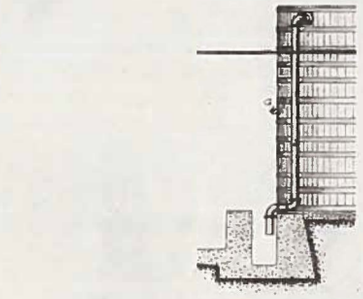


Jewell Gravity Filter Plant designed for Norfolk, Va.

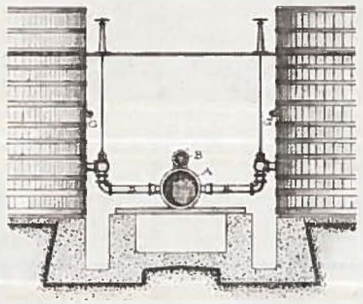
Side Elevation of Filter Building.

New York Filter Mfg. Co.
Design for Norfolk, Va.
Jewell Gravity Filter Plant
Cross Sections in Filter House.

Scale of Feet
0 2 4 6 8 10



Section on S
Sheet No. 3



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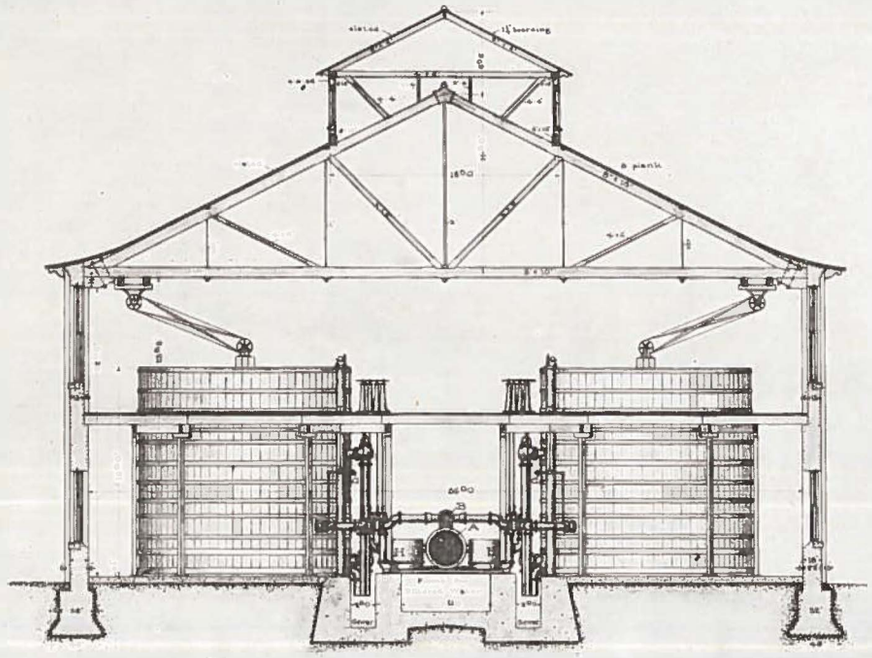
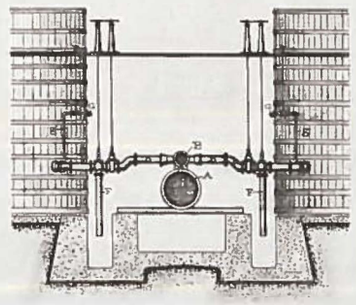
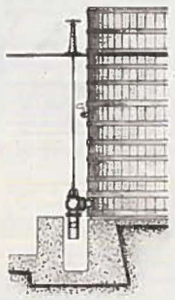


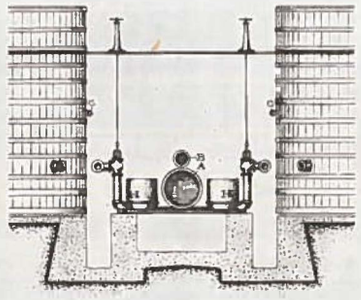
Cross Section through Filter House



Section on MM
Sheet No. 3

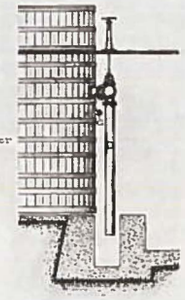


Section on R
Sheet No. 3



Section on NN
Sheet No. 3

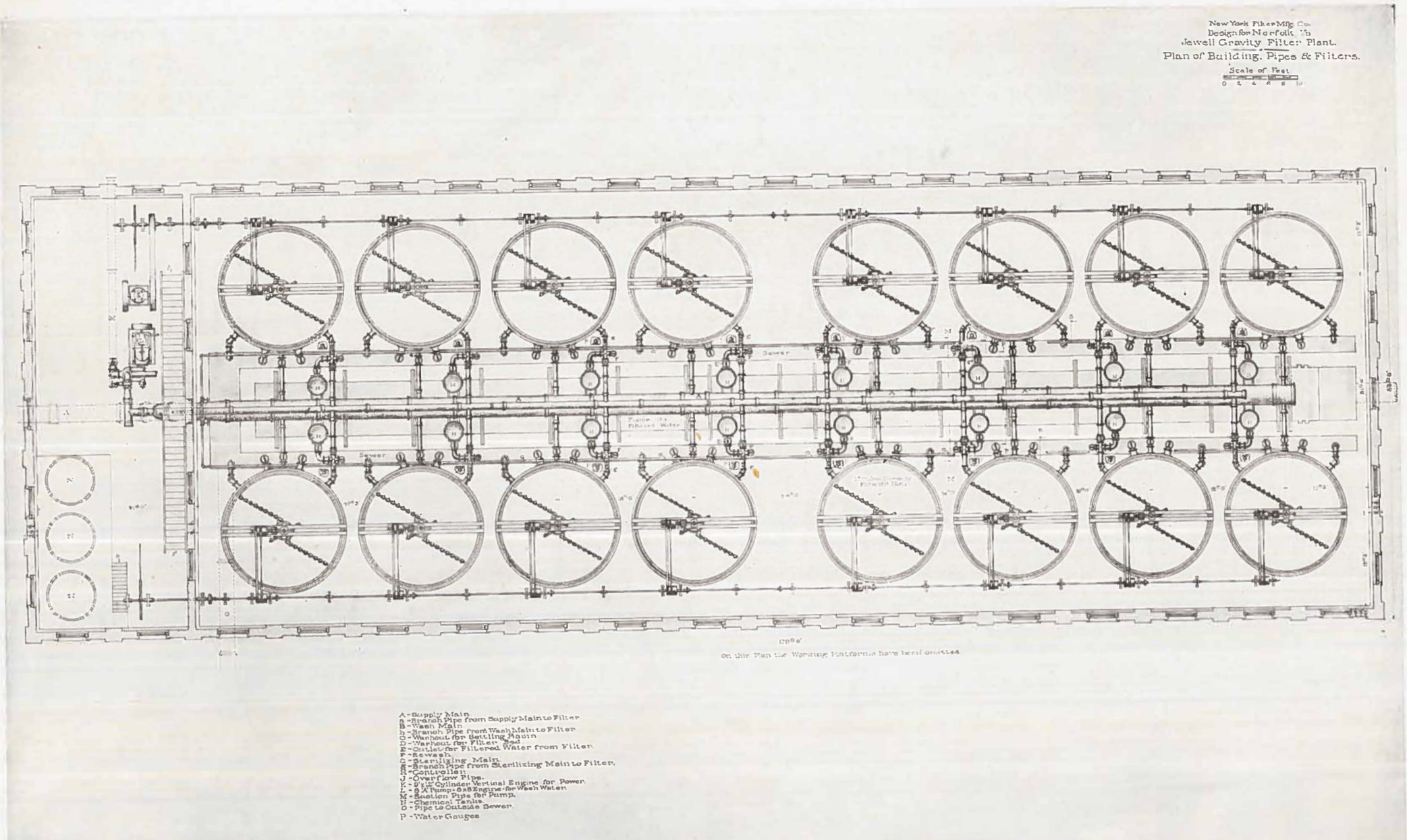
A= Supply Main.
a= Branch Pipe from Supply Main to Filter
B= Wash Main.
b= Branch Pipe from Wash Main to Filter
C= Washout for Settling Basin
D= Washout for Filter Bed.
E= Outlet for Filtered Water from Filter.
F= Rewash
G= Sterilizing Main.
g= Branch Pipe from Sterilizing Main to Filter
H= Controller
J= Overflow Pipe.



Section on O
Sheet No. 3.

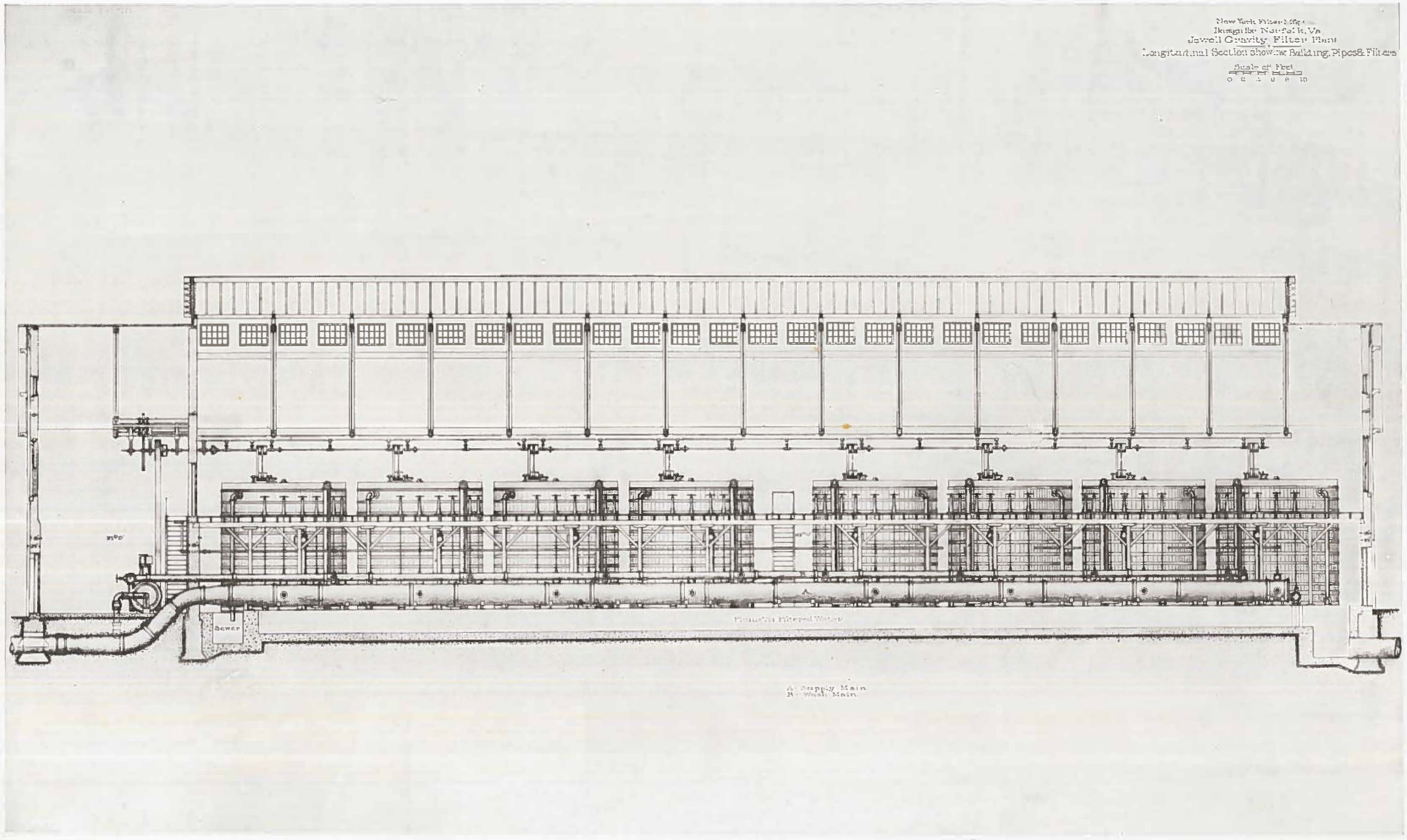
Jewell Gravity Filter Plant designed for Norfolk, Va.

Cross Sections in Filter House.



Jewell Gravity Filter Plant designed for Norfolk, Va.

Plan of Building, Pipes and Filters.

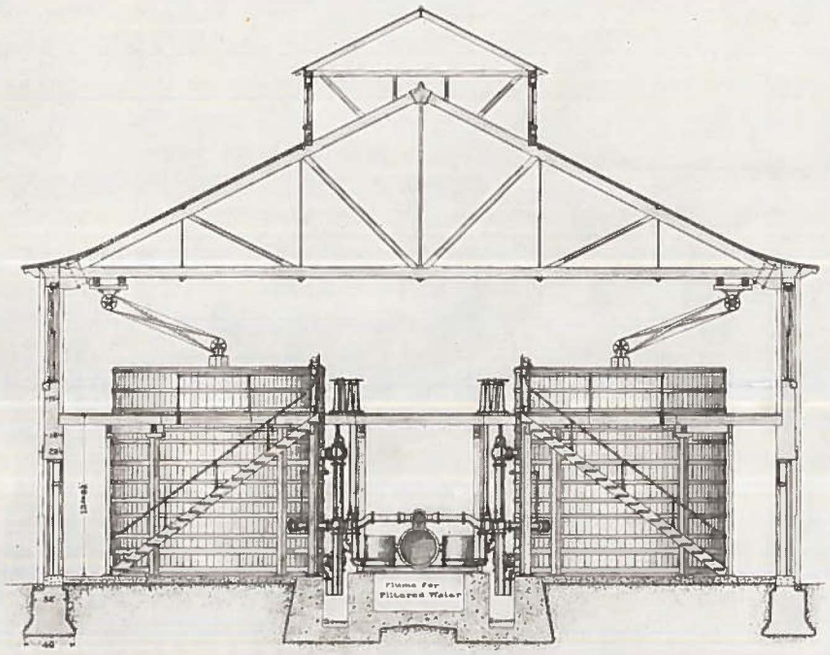


Jewell Gravity Filter Plant designed for Norfolk, Va.

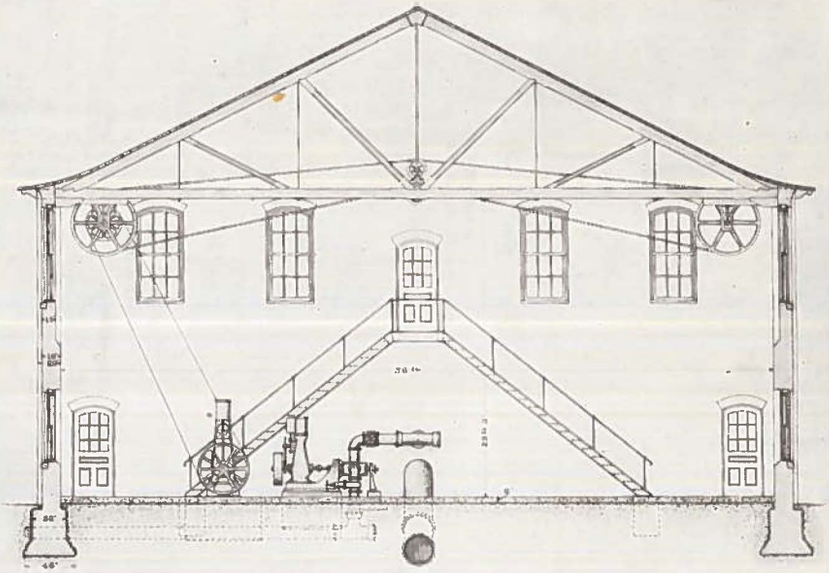
Longitudinal Section through Filter Building.

New York Filter Mfg. Co.
Design for Norfolk, Va.
Jewell Gravity Filter Plant.
Cross Sections through Filter House & Engine Room
showing General Arrangement.

Scale of Feet
0 2 4 6 8 10



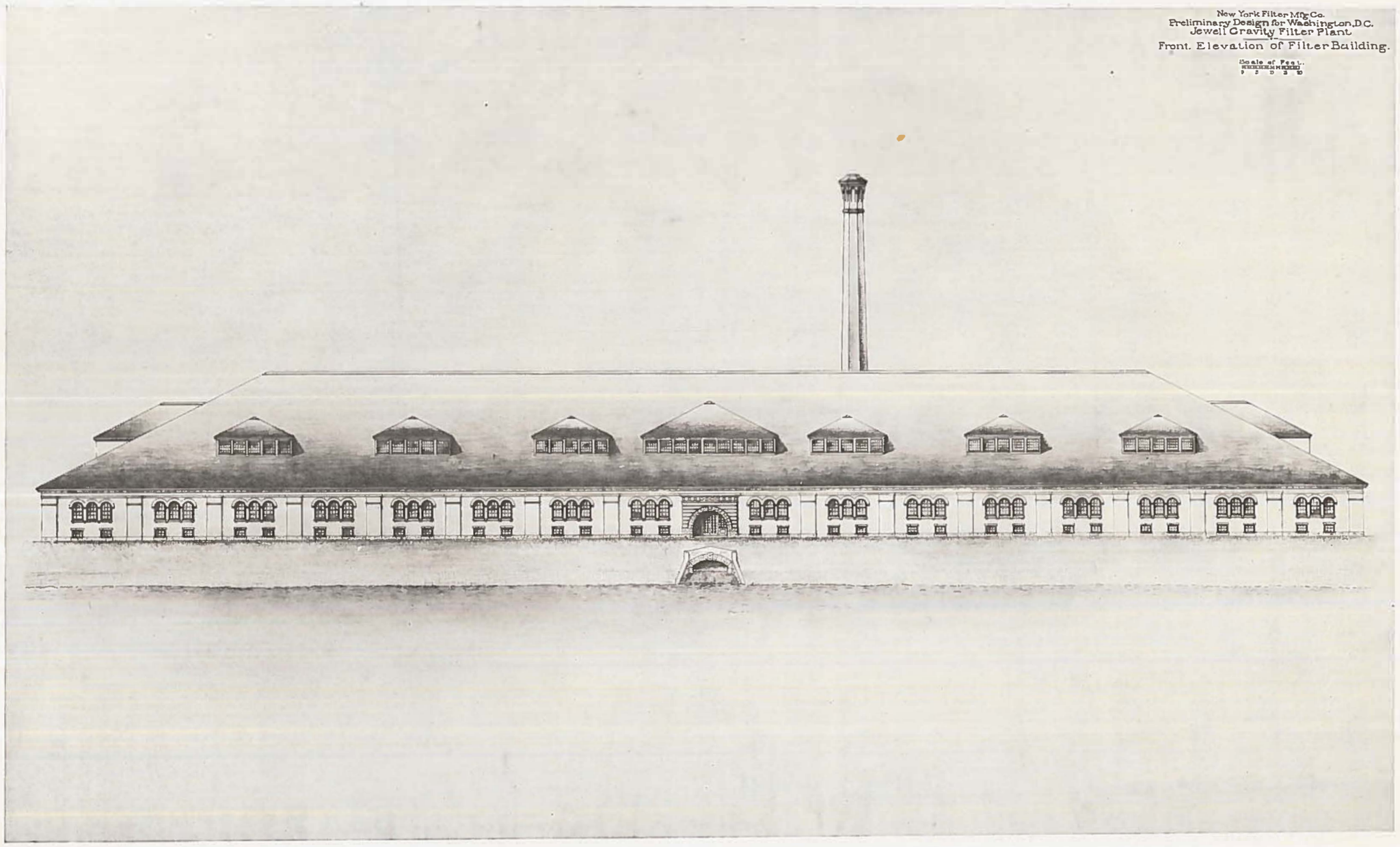
Cross Section through Centre of Filter Room



Cross Section through Engine and Pump Room

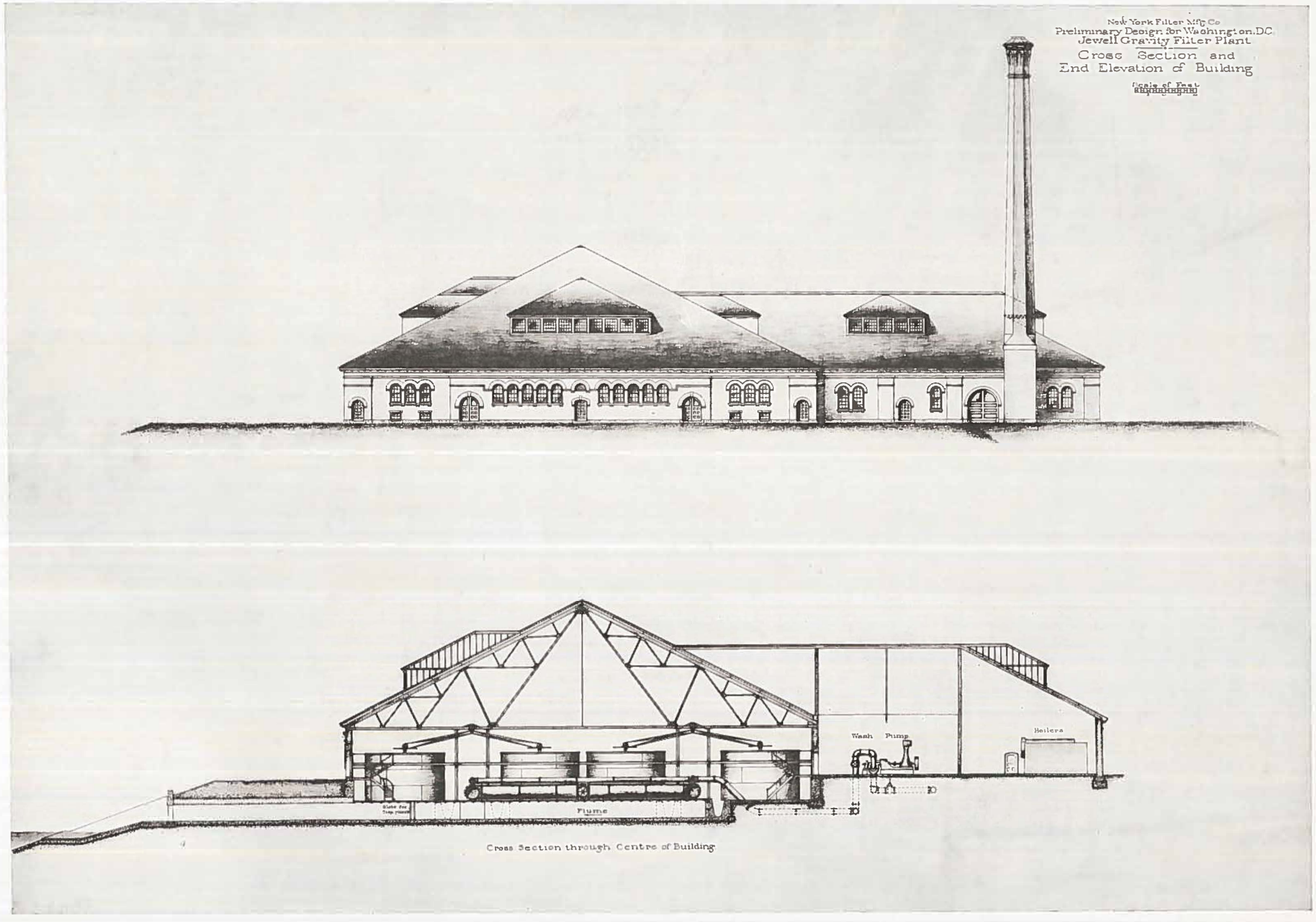
Jewell Gravity Filter Plant designed for Norfolk, Va.

Cross Sections through Filter House and Engine Room.



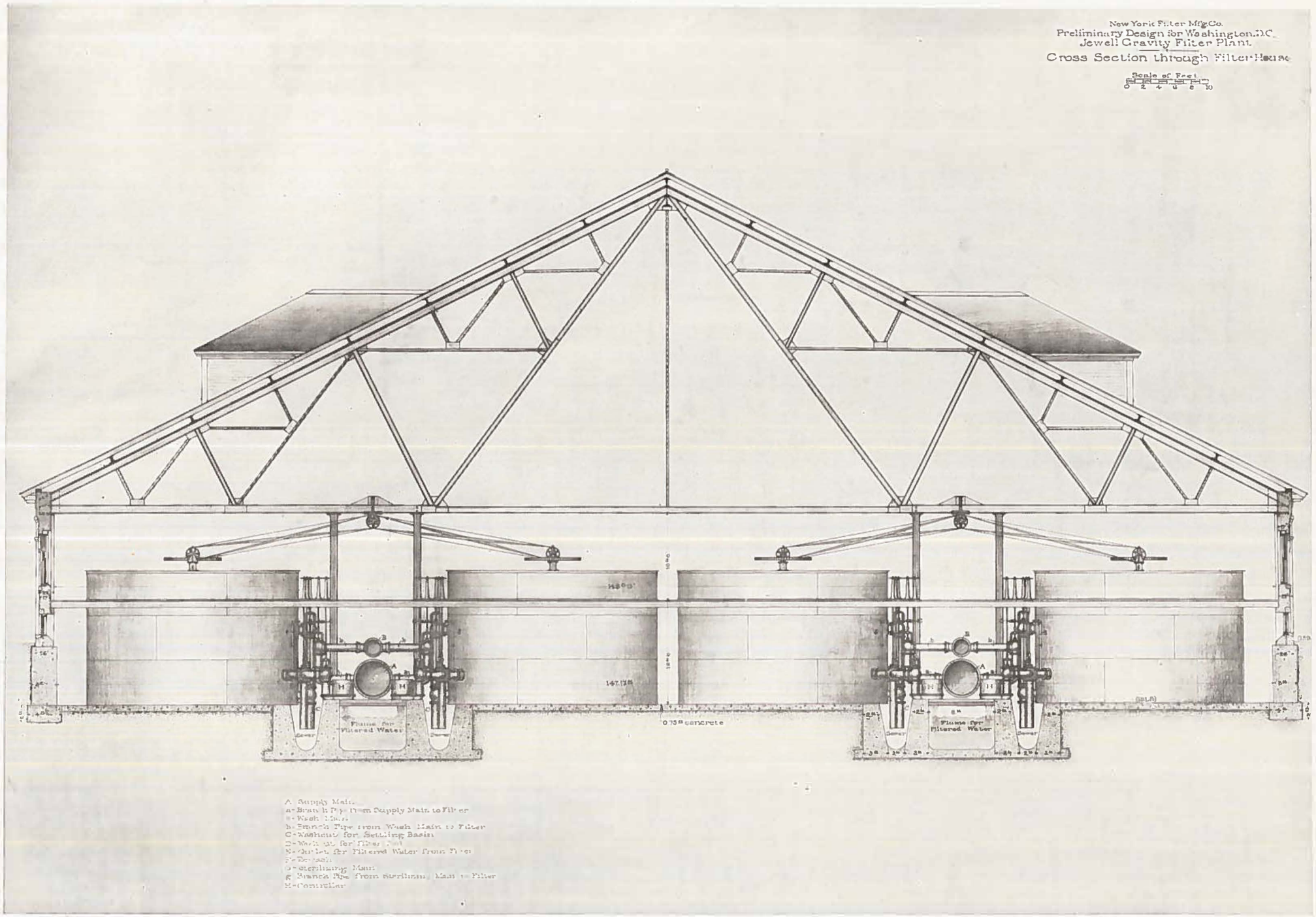
Jewell Gravity Filter Plant designed for Washington, D. C.

Front Elevation of Filter Building.



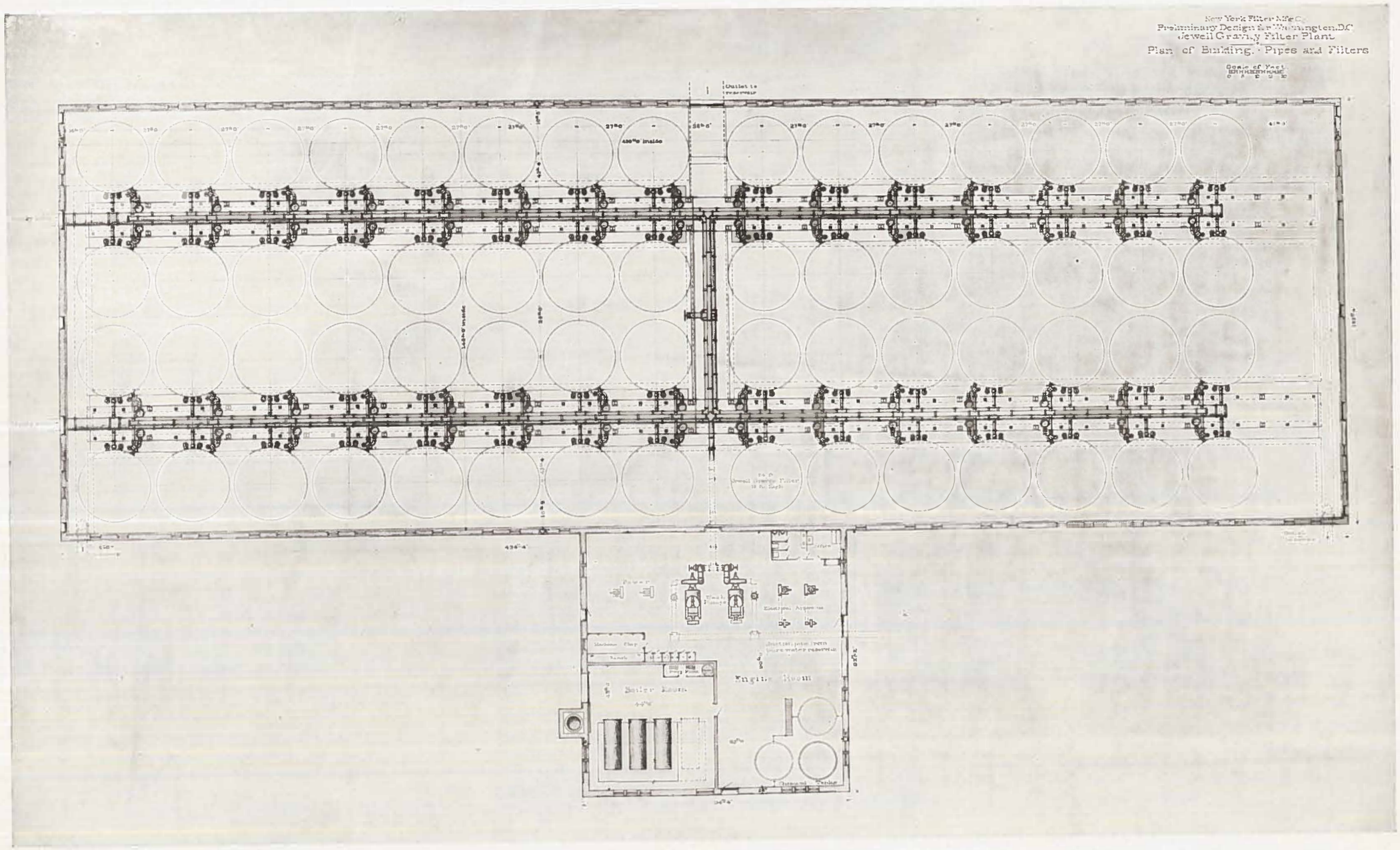
Jewell Gravity Filter Plant designed for Washington, D. C.

End Elevation and Cross Section of Building.



Jewell Gravity Filter Plant designed for Washington, D. C.

Cross Section Through Filter House.

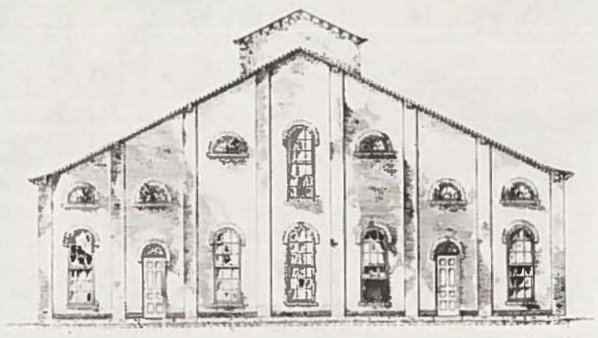


Jewell Gravity Filter Plant designed for Washington, D. C.

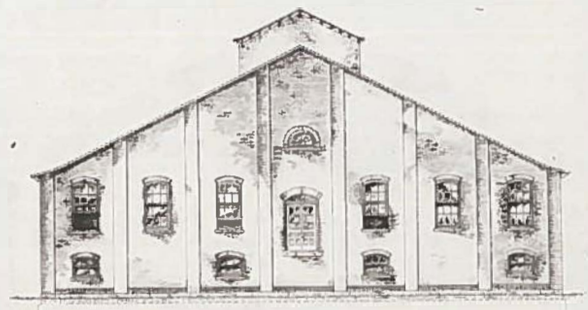
Plan of Building, Pipes and Filters.

New York Filter Mfg. Co
Preliminary Design for Providence R.I.
Jewell Gravity Filter Plant.
Outside Elevations of Filter Building.

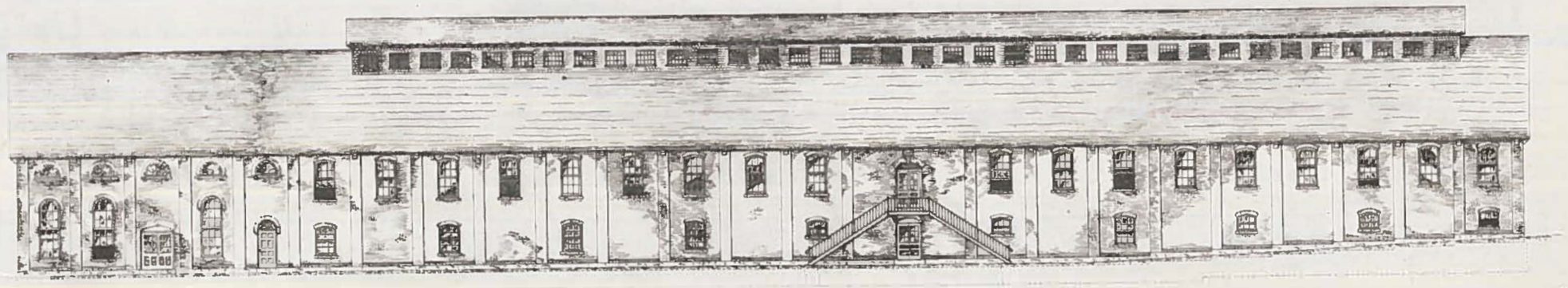
Scale of Feet
0 2 4 6 8 10



End Elevation



End Elevation



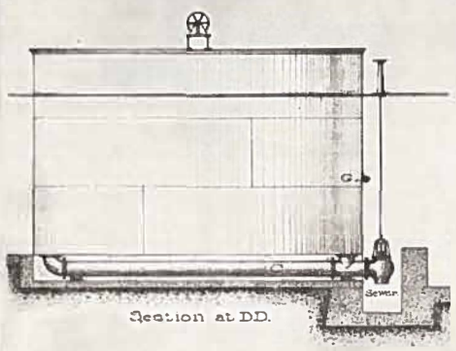
Side Elevation

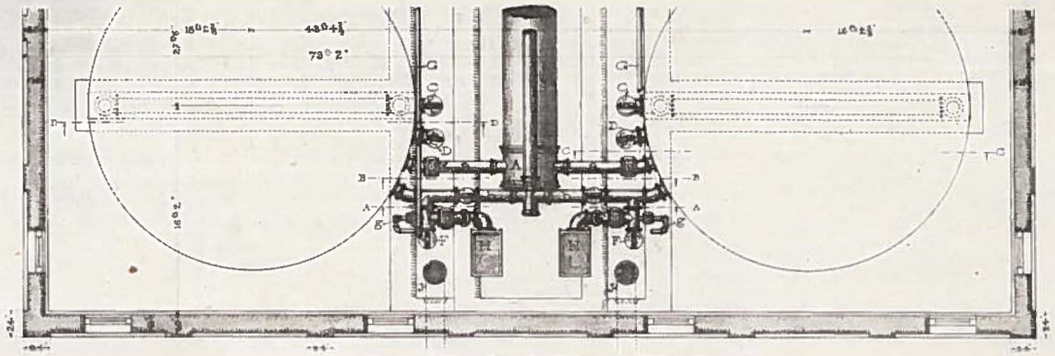
Jewell Gravity Filter Plant designed for Providence, R. I.

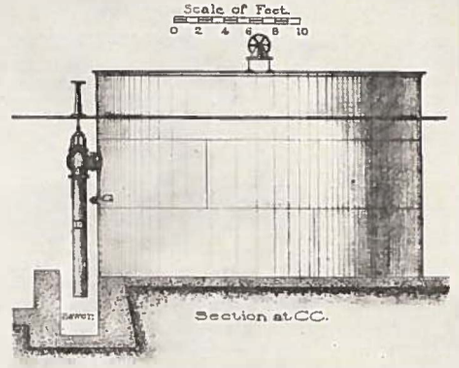
Side and End Elevations of Filter Building.

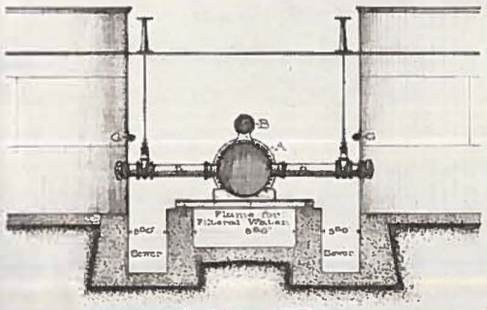
New York Filter Mfg. Co.
Preliminary Design for Providence, R.I.
Jewell Gravity Filter Plant.
Cross Sections in Filter House.

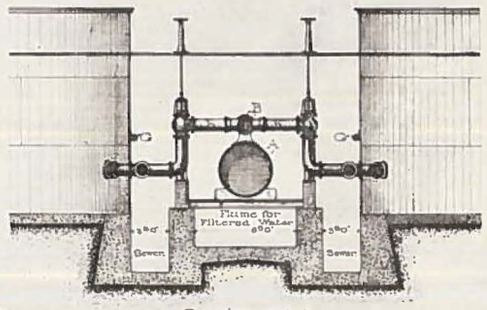
Scale of Feet.
0 2 4 6 8 10

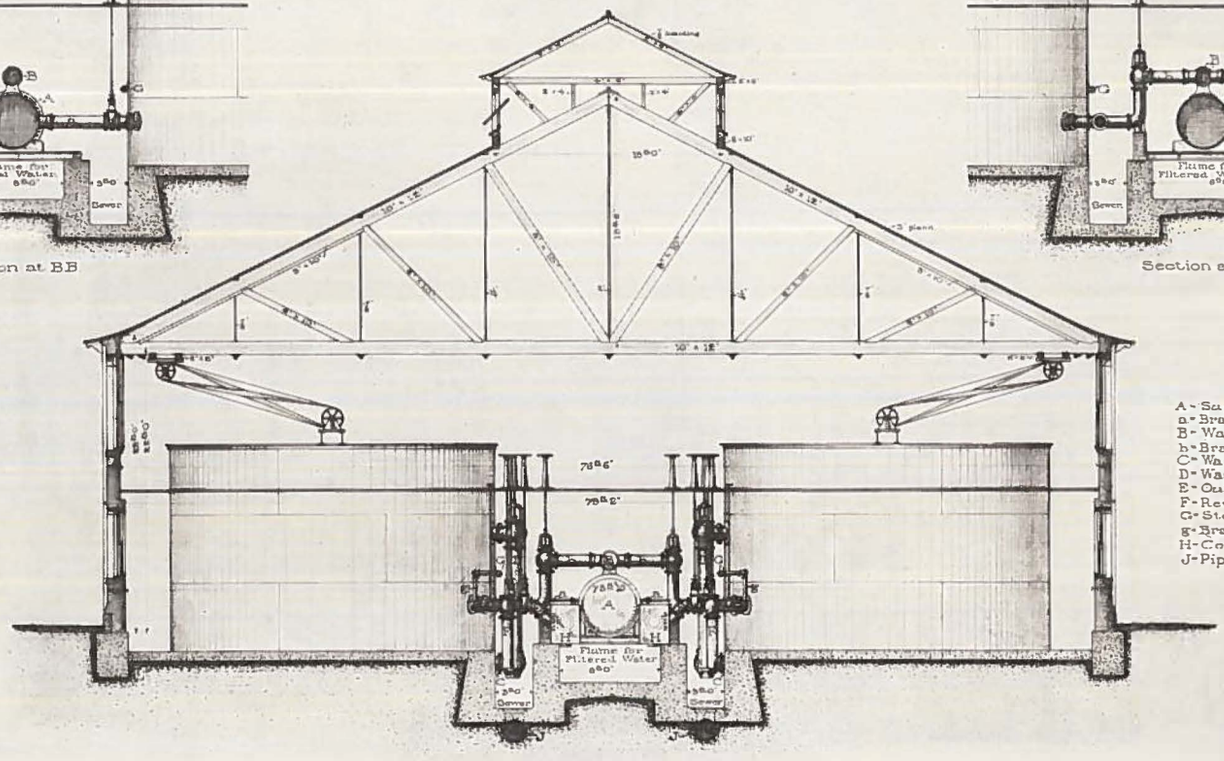








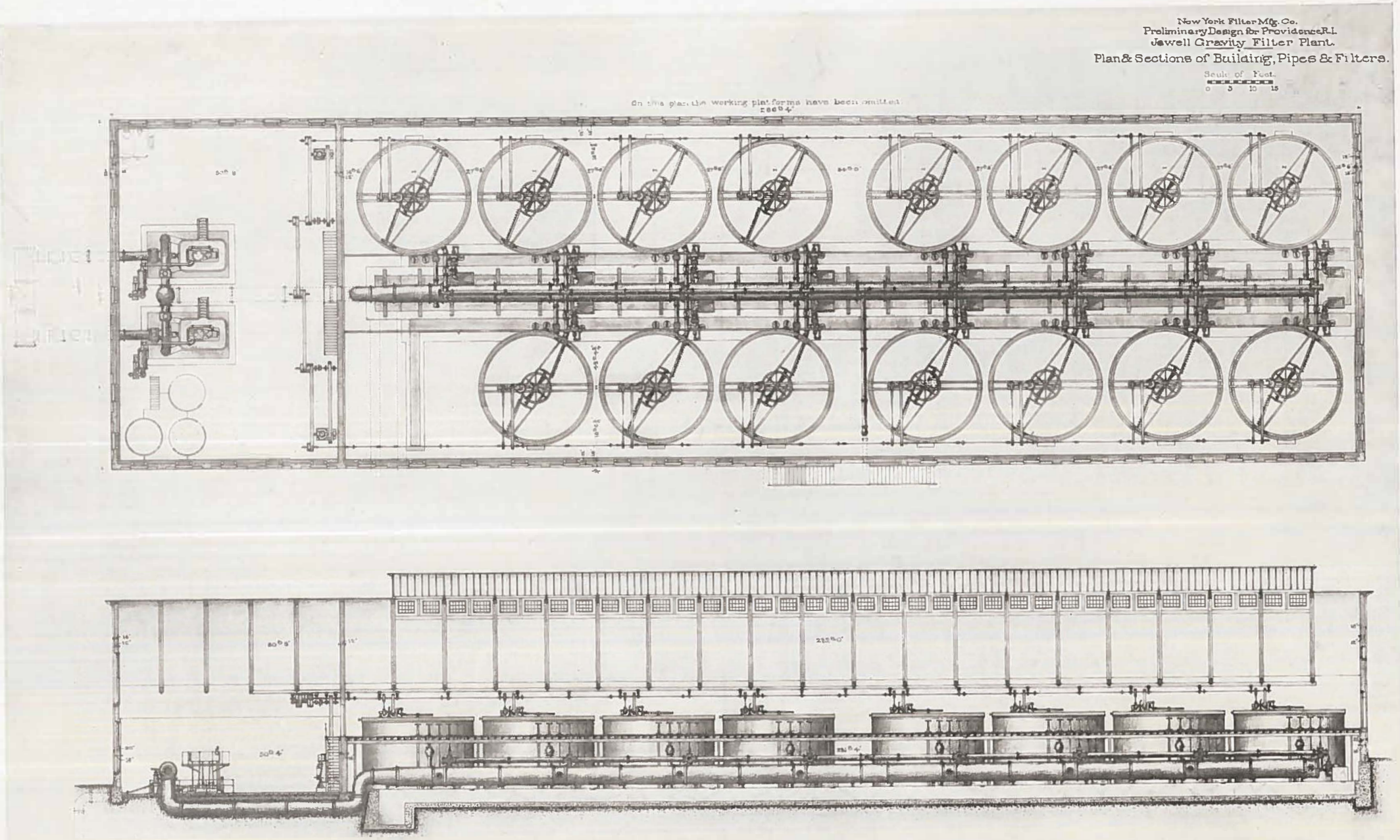




A - Supply Main.
a - Branch Pipe from Supply Main to Filter.
B - Wash Main.
b - Branch Pipe from Wash Main to Filter.
C - Washout for Settling Basin.
D - Washout for Filter Bed.
E - Outlet for Filtered Water from Filter.
F - Rewash.
G - Sterilizing Main.
g - Branch Pipe from Sterilizing Main to Filter.
H - Controller.
J - Pipe leading to Outside Sewer.

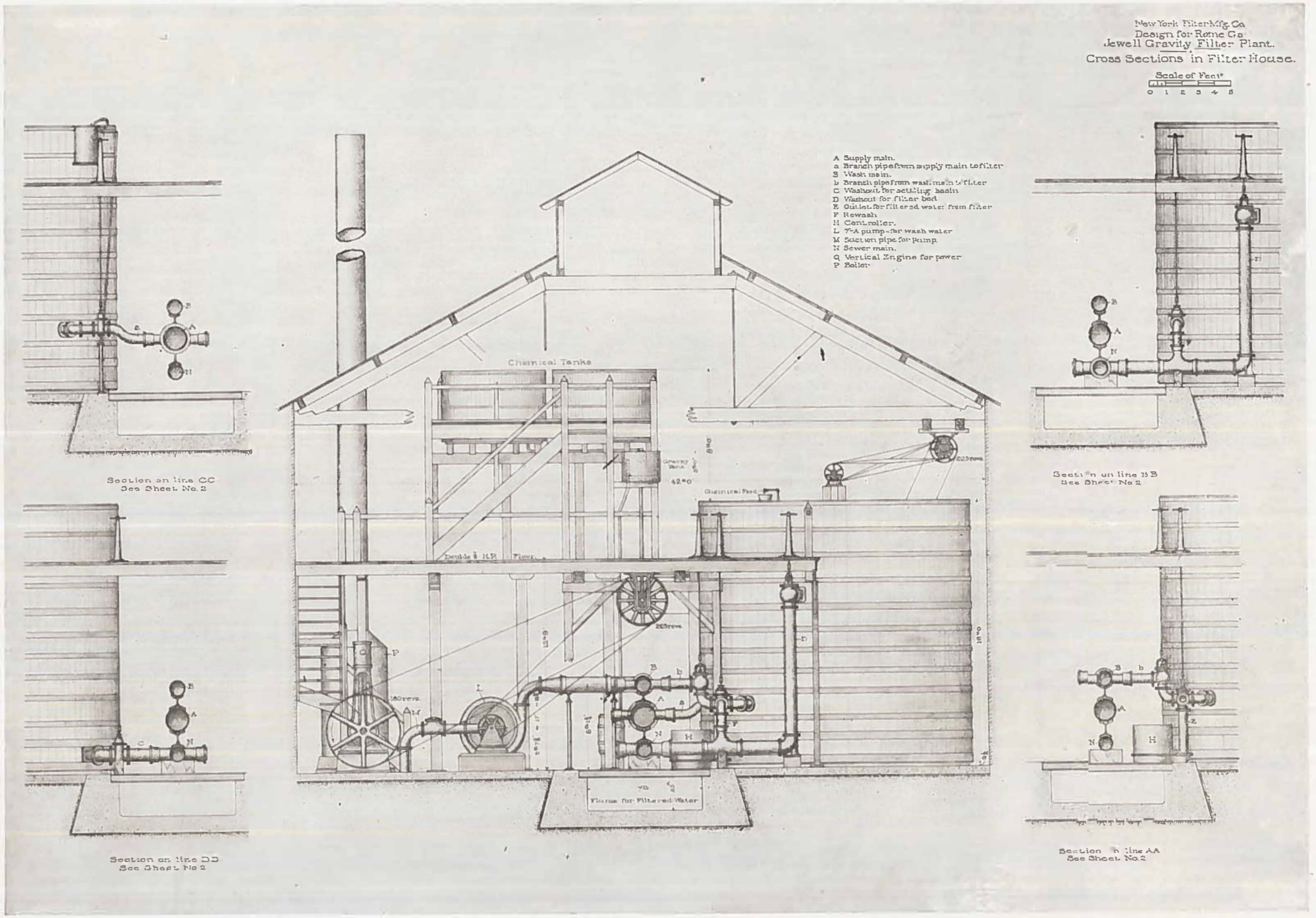
Jewell Gravity Filter Plant designed for Providence, R. I.

Cross Sections in Filter House.



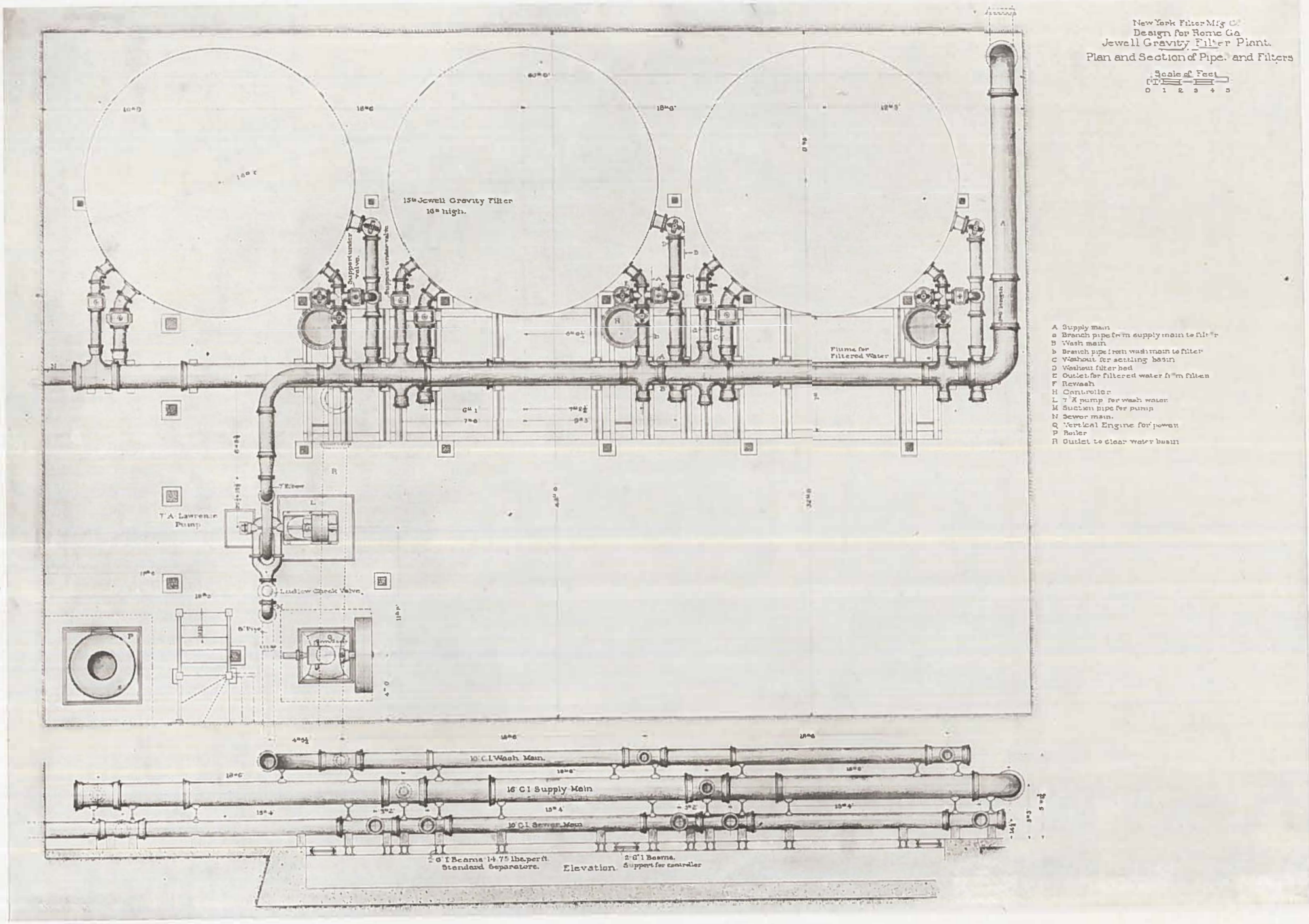
Jewell Gravity Filter Plant designed for Providence, R. I.

Plan and Sections of Building, Pipes and Filters.



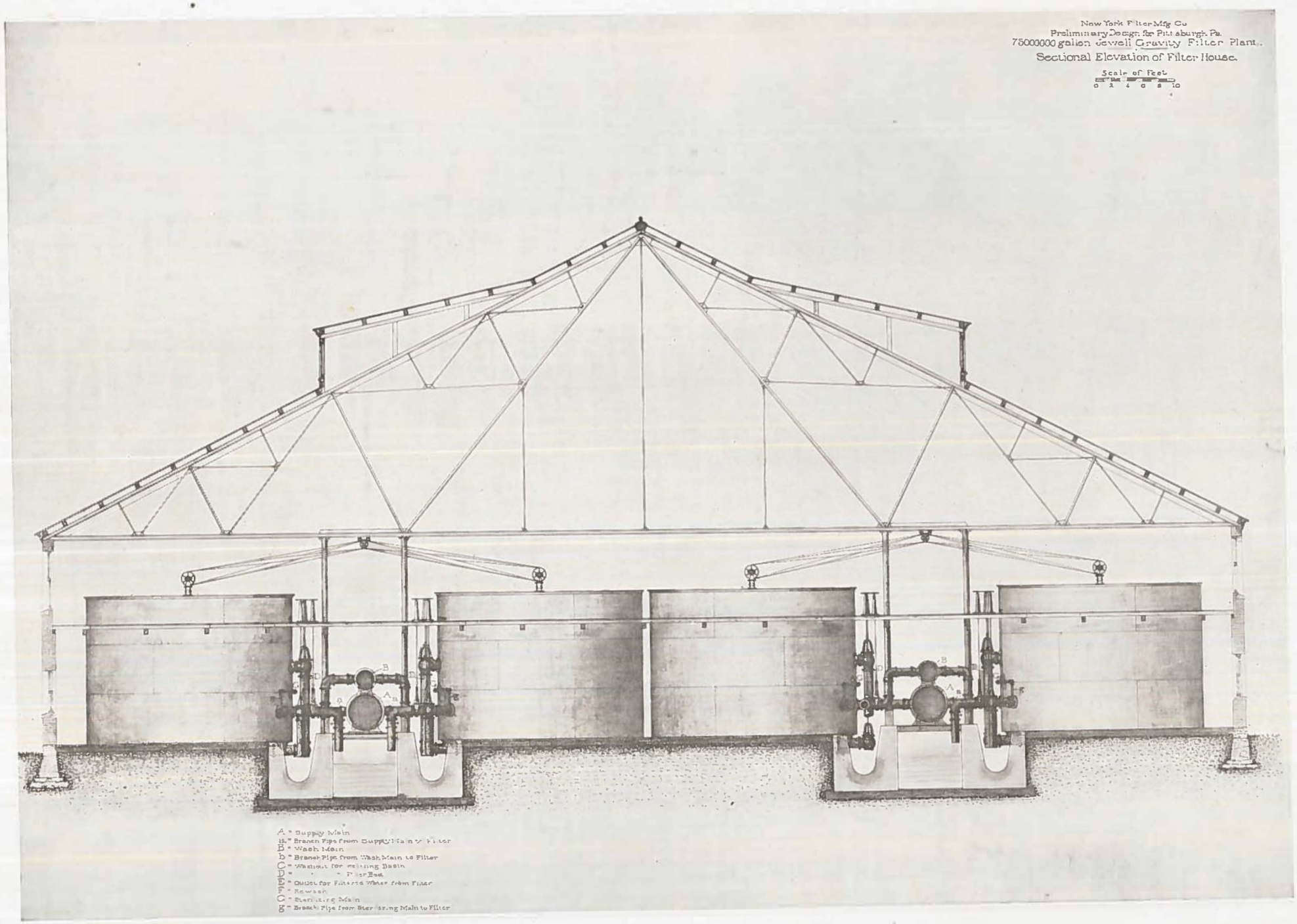
Jewell Gravity Filter Plant designed for Rome, Ga.

Cross Sections in Filter Building.



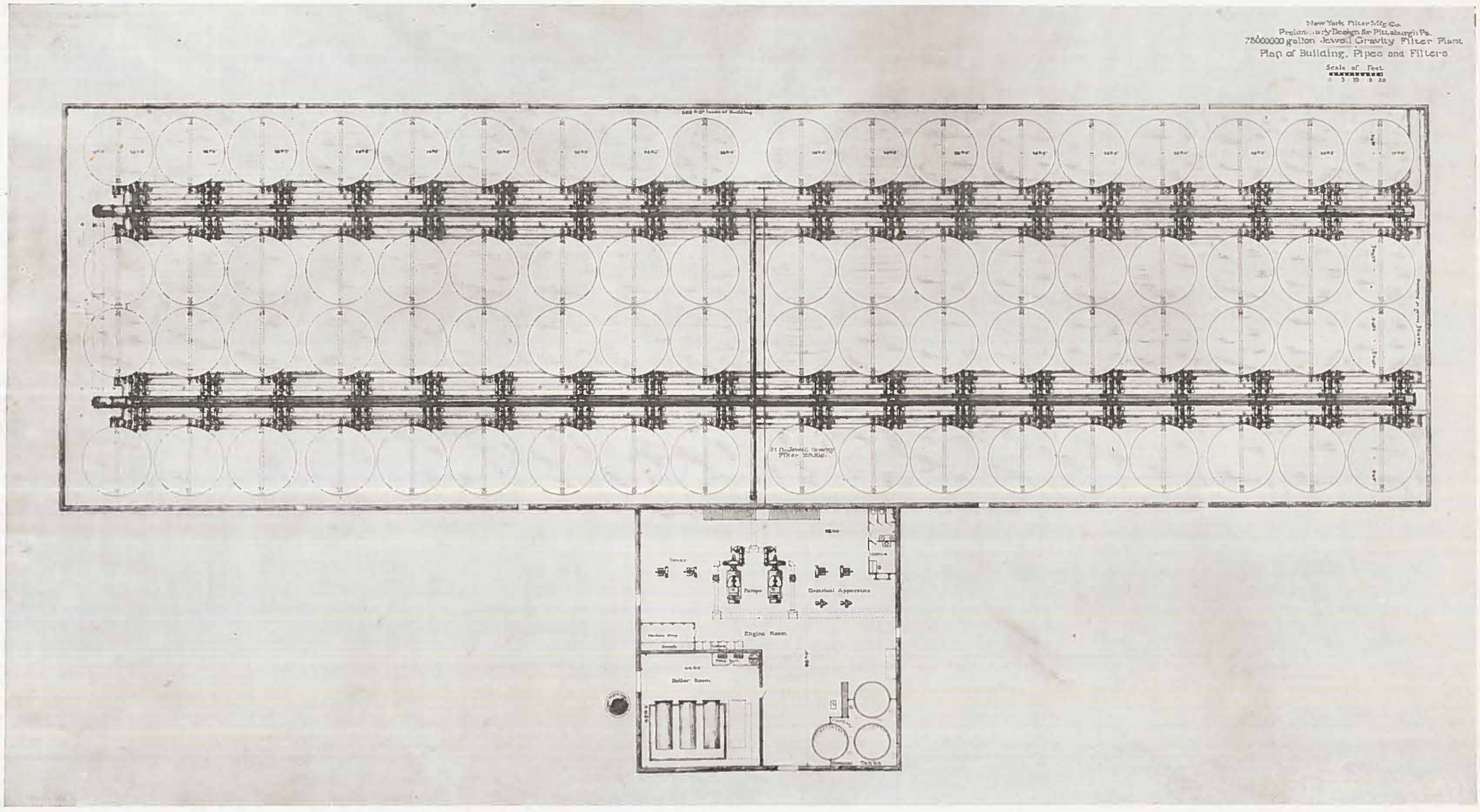
Jewell Gravity Filter Plant designed for Rome, Ga.

Plan and Section of Pipes and Filters.



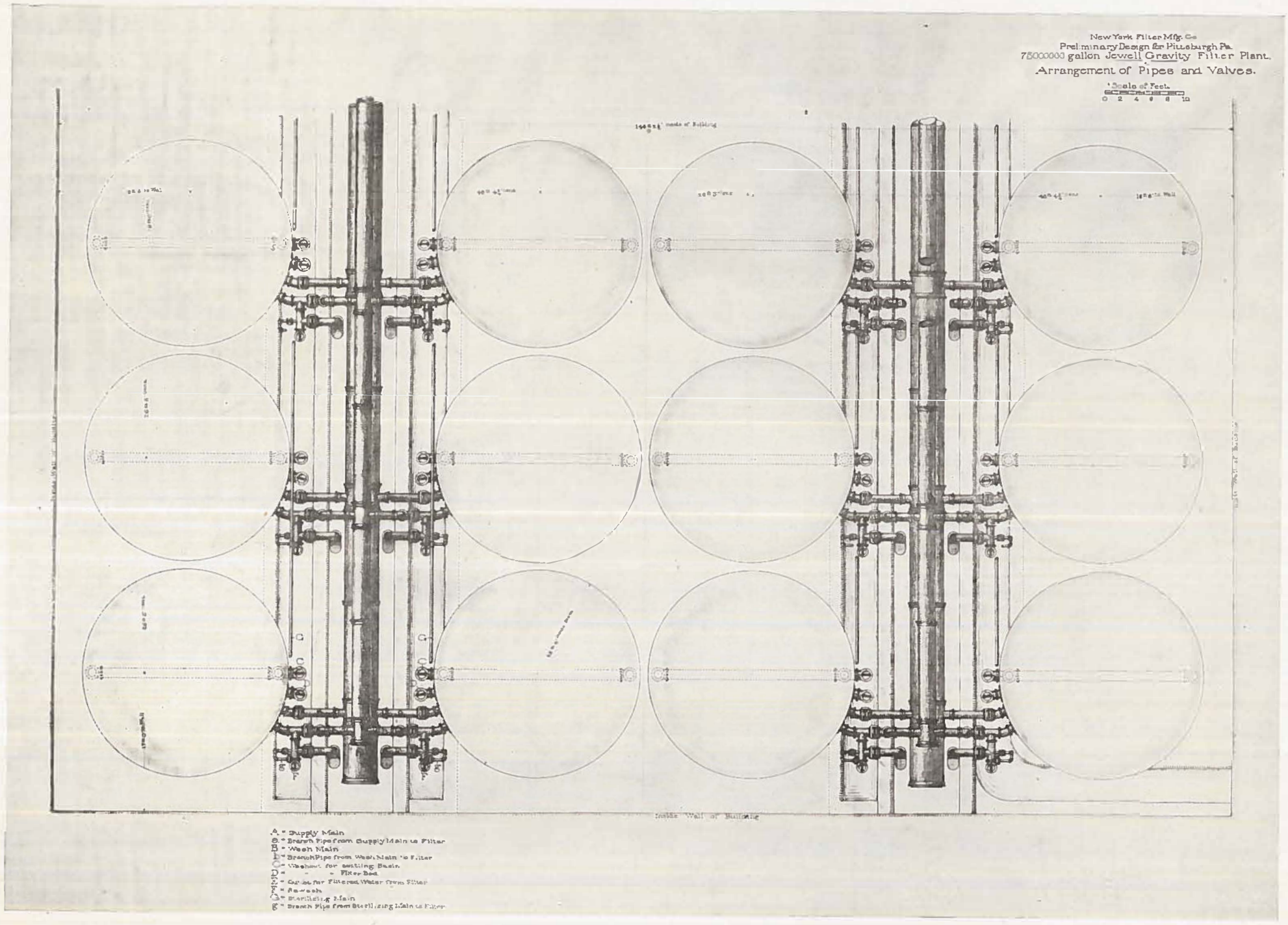
Jewell Gravity Filter Plant designed for Pittsburg, Pa.

Cross Section through Filter House.



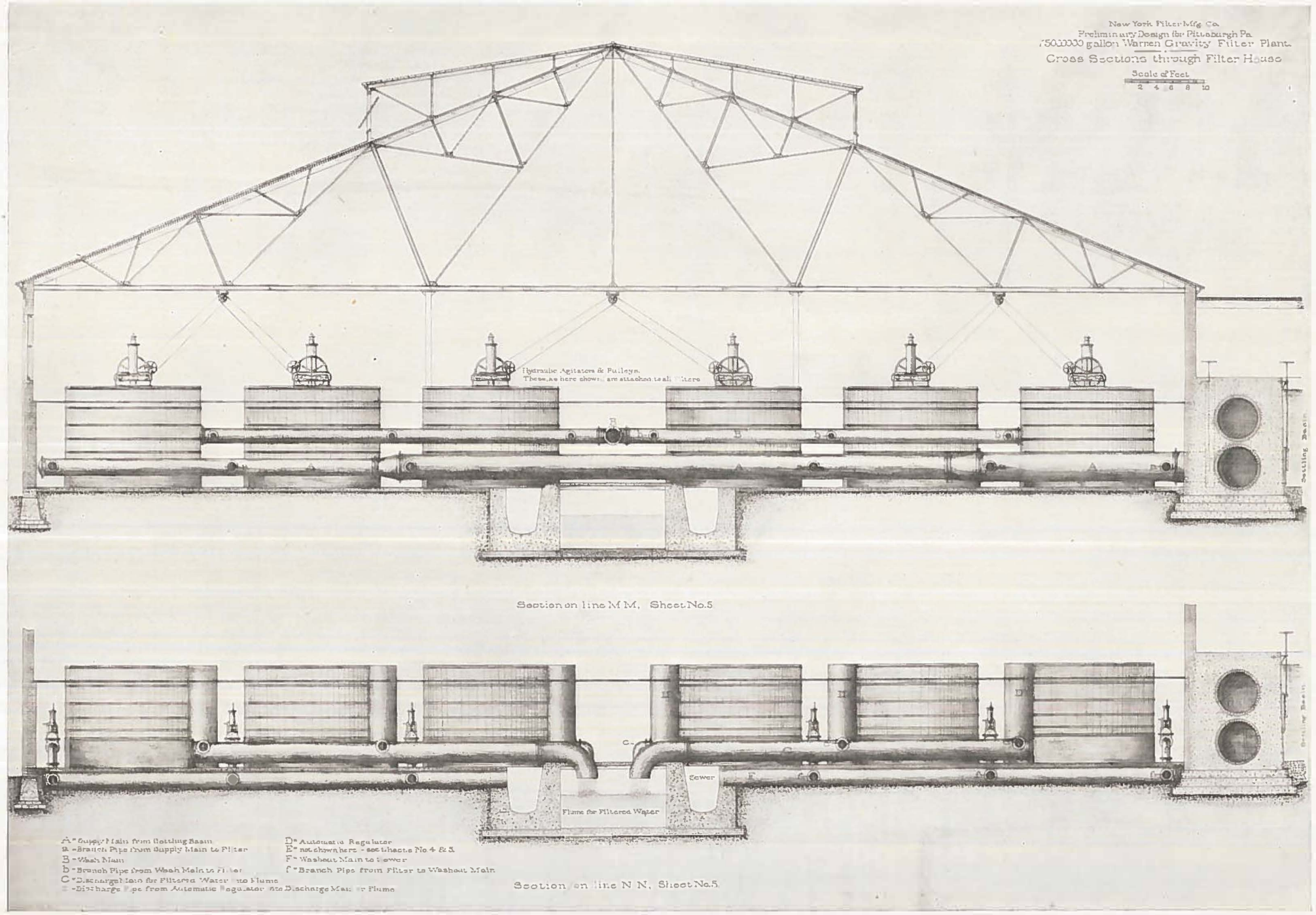
Jewell Gravity Filter Plant designed for Pittsburg, Pa.

Plan of Building, Pipes and Filters.



Jewell Gravity Filter Plant designed for Pittsburg, Pa.

Arrangement of Pipes and Valves.



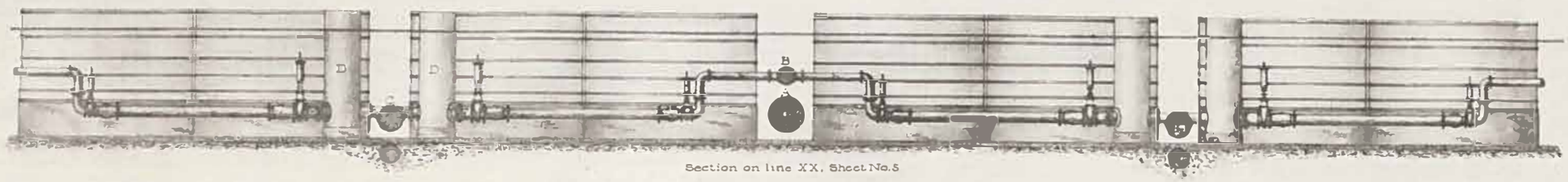
Warren Gravity Filter Plant designed for Pittsburg, Pa.

Cross Sections through Filter House.

New York Filter Mfg Co.
Preliminary Design for Pittsburgh Pa.
75000000 gallon Warren Gravity Filter Plant.

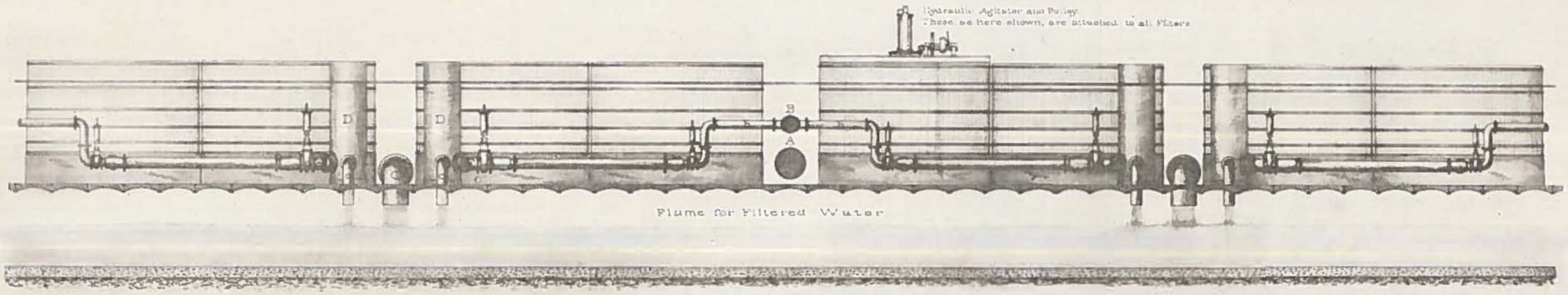
Longitudinal Sections in Filter House.

Scale of Feet.
0 2 4 6 8 10

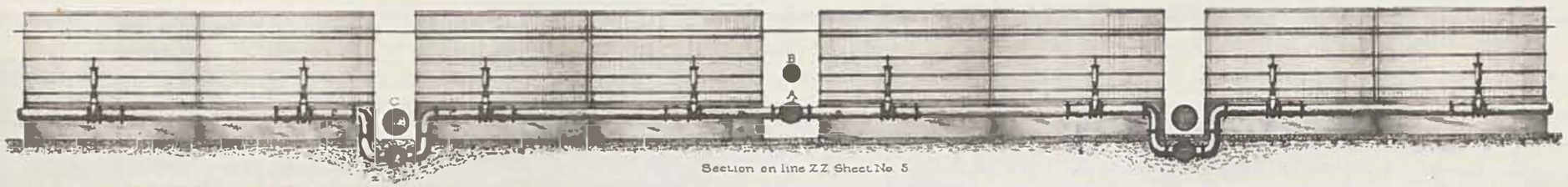


Section on line XX, Sheet No.5

Hydraulic Agitator and Pulley.
These, as here shown, are attached to all Filters



Section on line YY, Sheet No.5

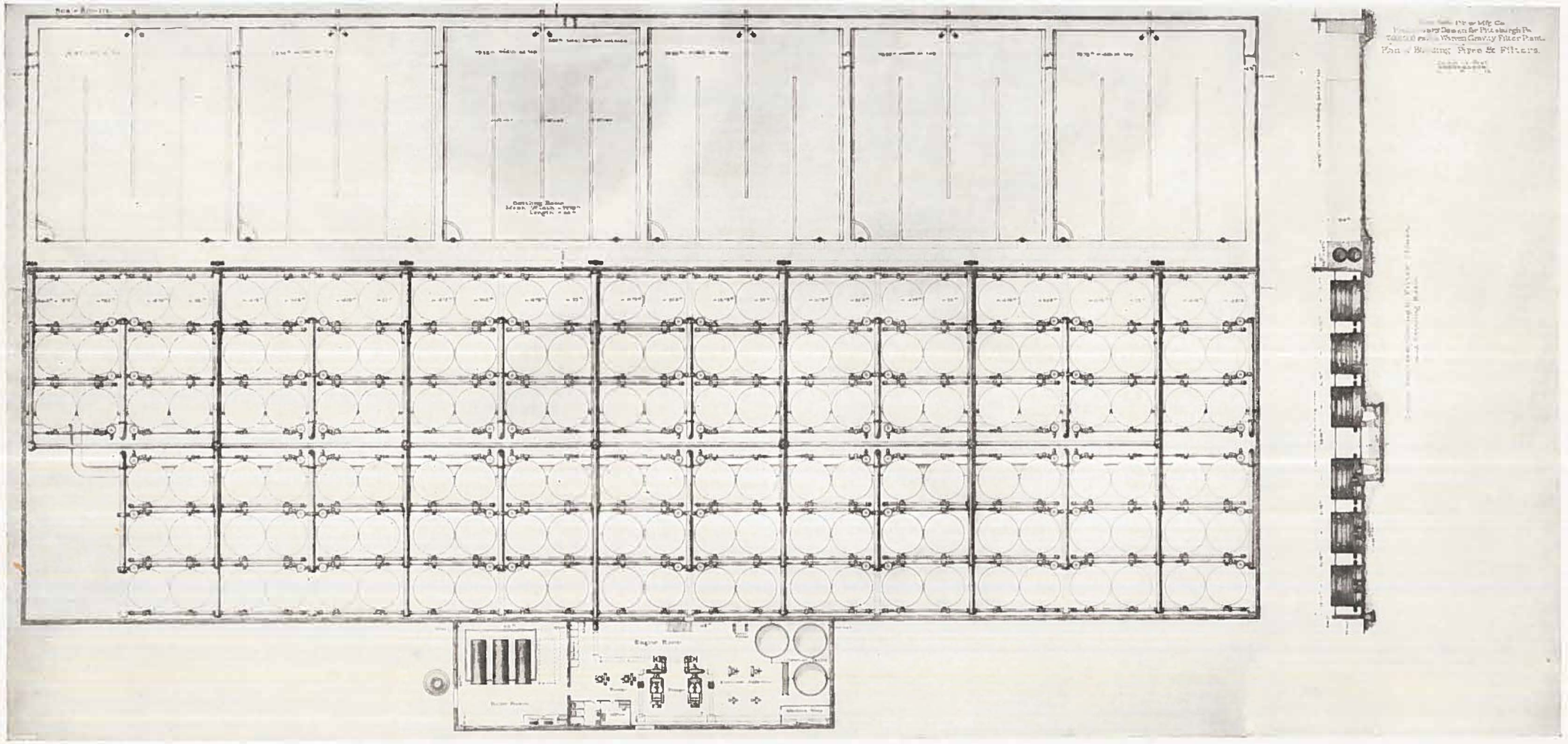


Section on line ZZ Sheet No. 5

A - Supply Main, from Settling Basin.
a - Branch Pipe from Supply Main to Filter.
B - Wash Main.
b - Branch Pipe from Wash Main to Filter.
C - Discharge Main for Filtered Water into Flume.
c - Discharge Pipe from Automatic Regulator into Discharge Main or Flume.
D - Automatic Regulator.
E - Outlet for Filtered Water from Filter.
F - Washout Main to Sewer.
f - Branch Pipe from Filter to Washout Main.

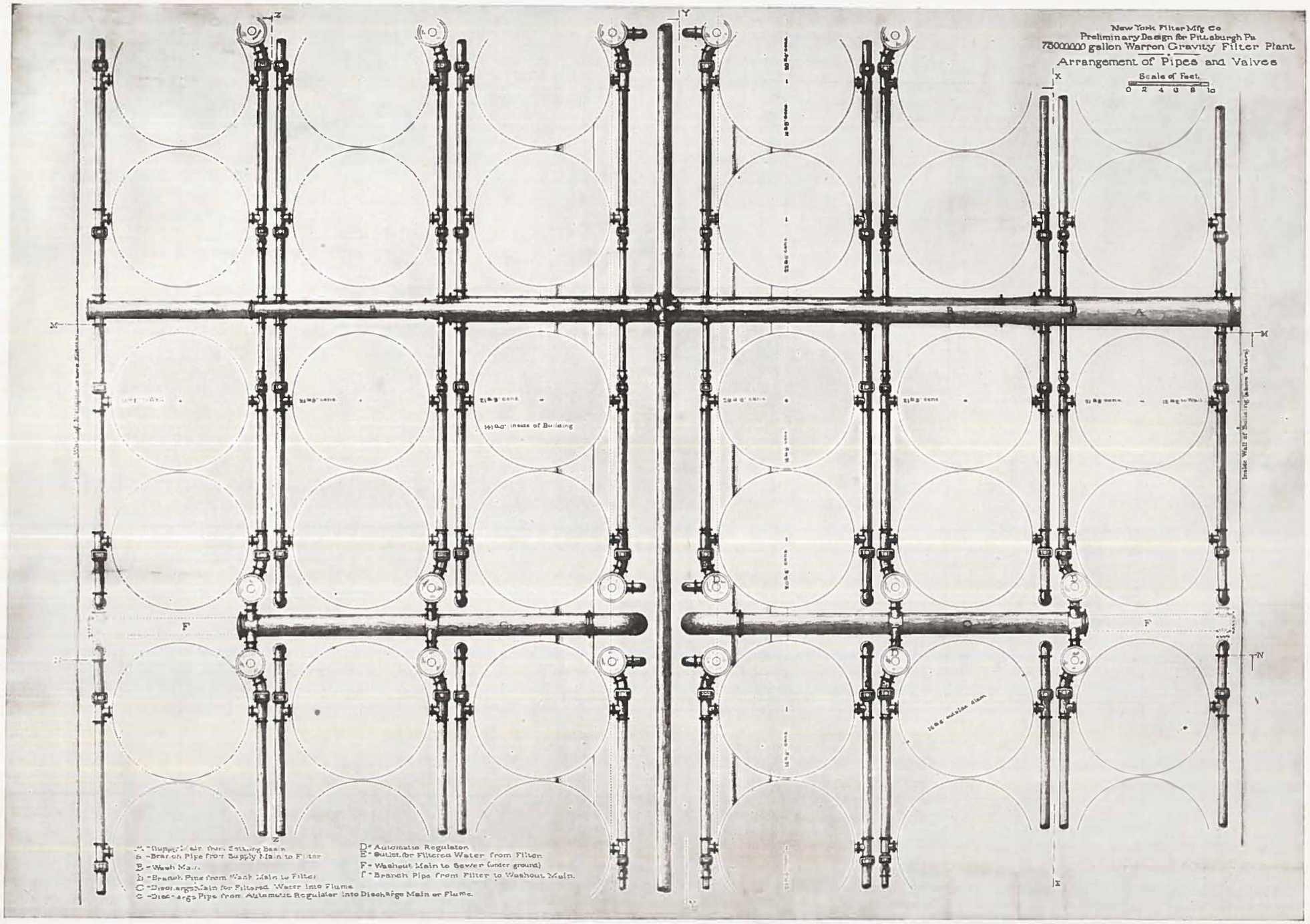
Warren Gravity Filter Plant designed for Pittsburg, Pa.

Longitudinal Sections in Filter House.



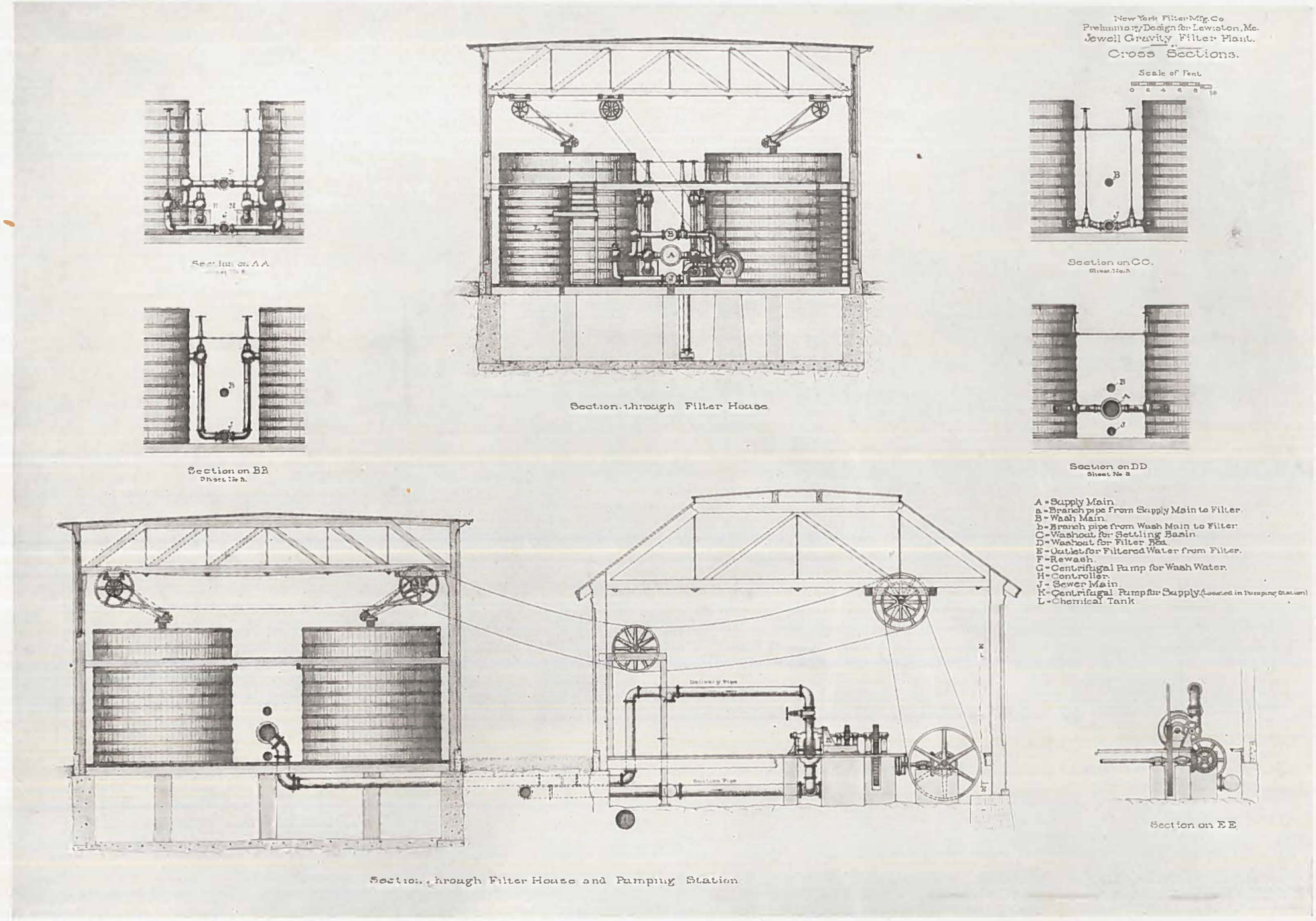
Warren Gravity Filter Plant designed for Pittsburg, Pa.

Plan of Settling Basin, Building, Pipes and Filters.



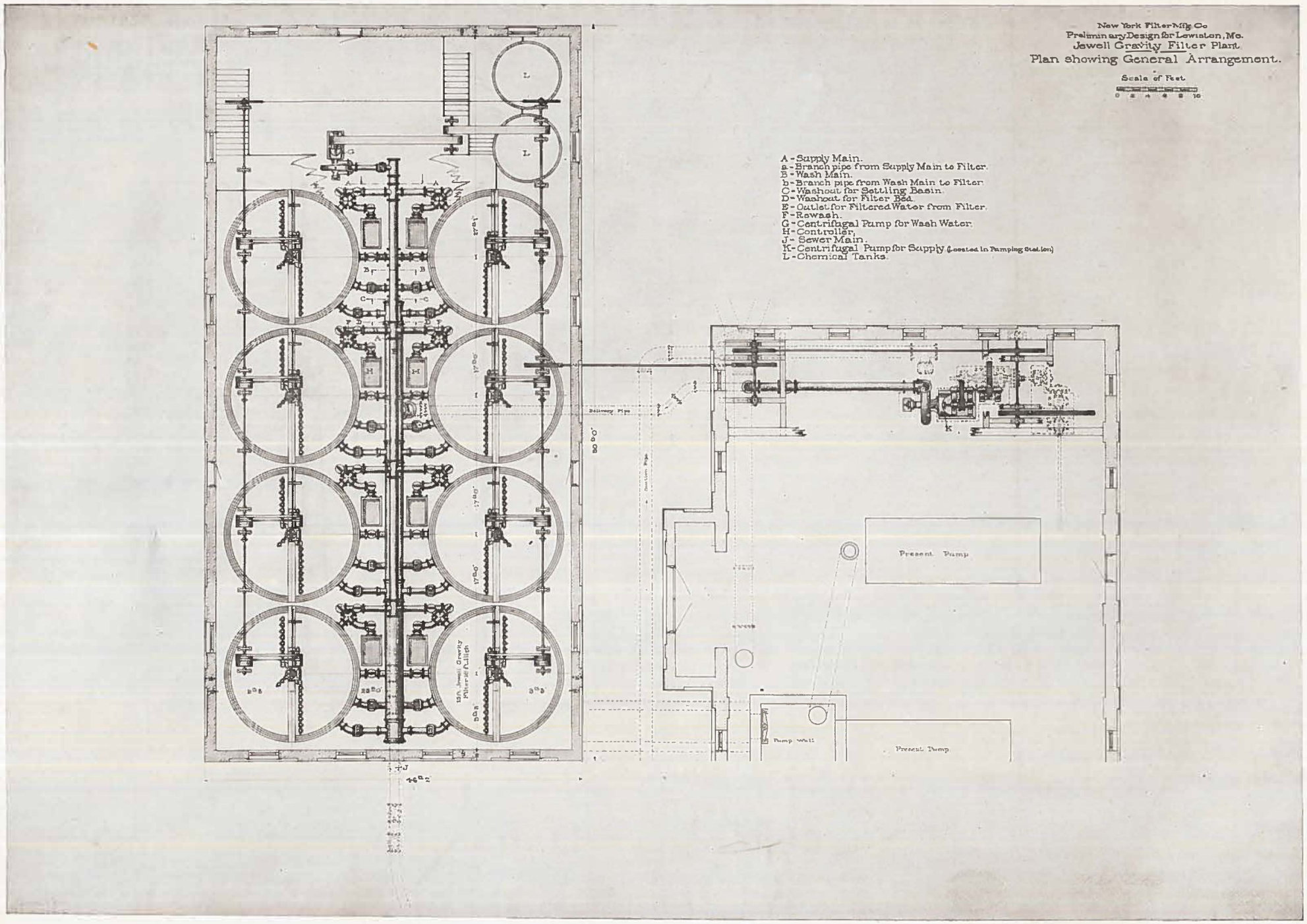
Warren Gravity Filter Plant designed for Pittsburg, Pa.

Arrangement of Pipes and Valves (referred to on other plans as "Sheet No. 5").



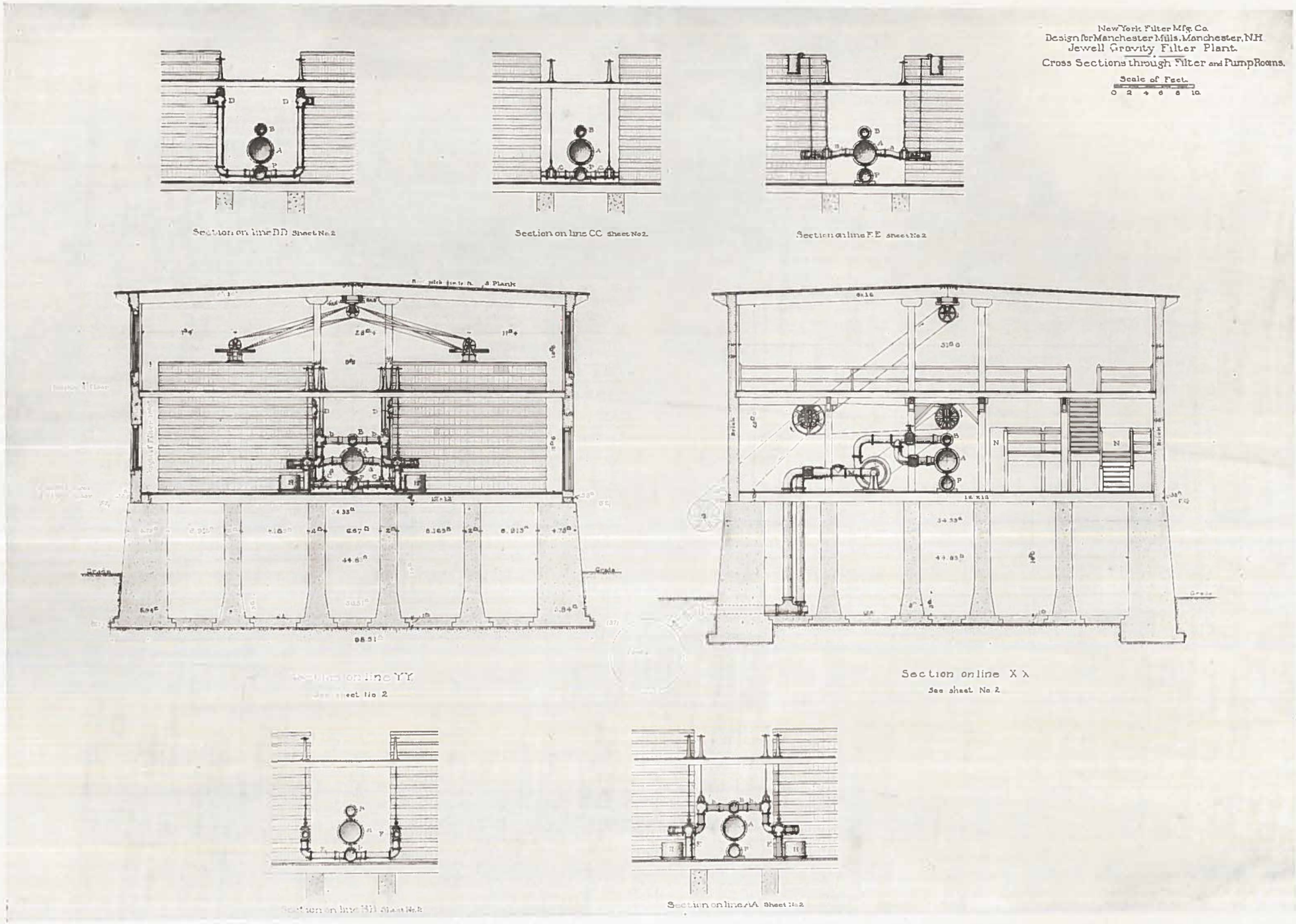
Jewell Gravity Filter Plant designed for Lewiston, Me.

Cross Sections in Filter Building.



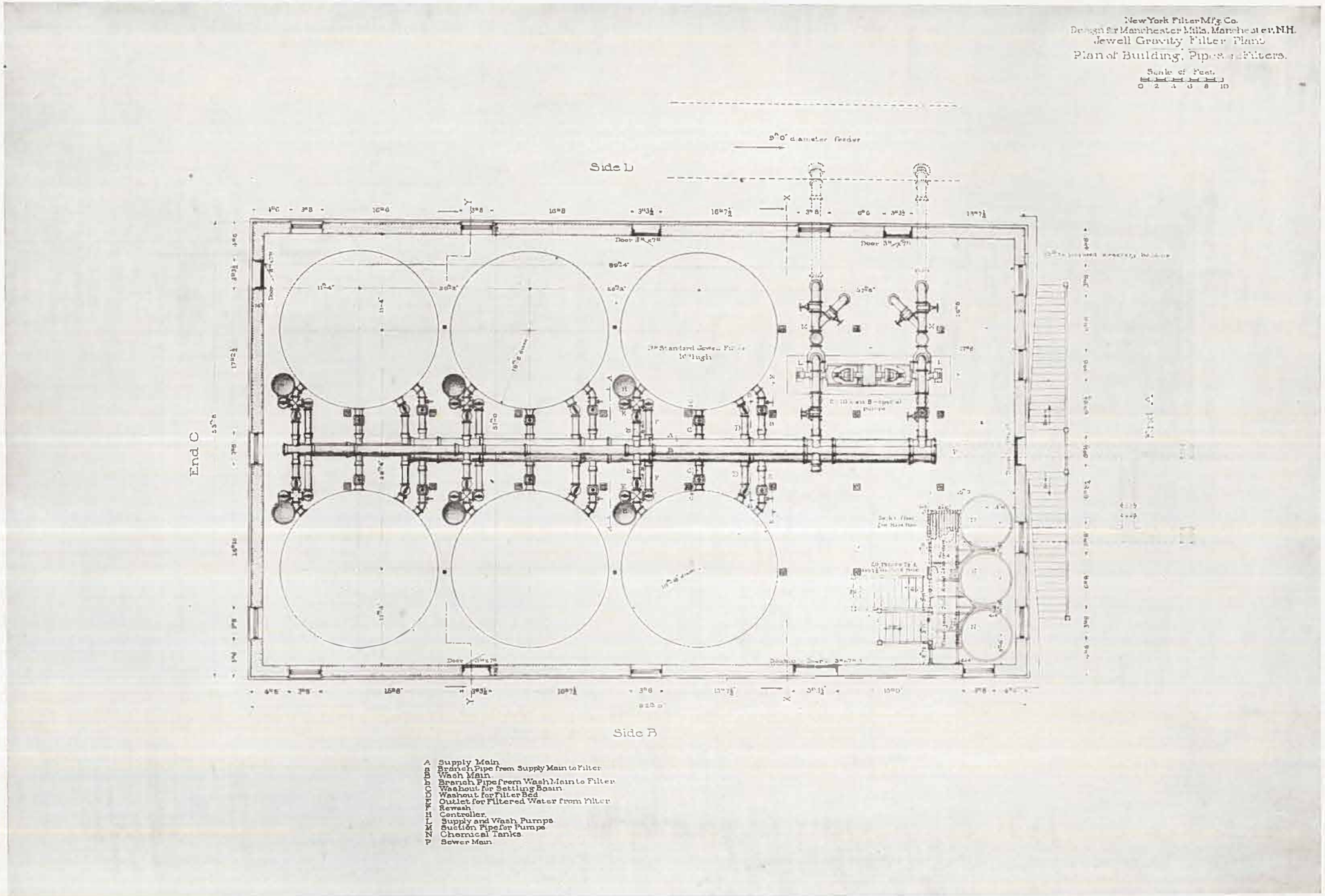
Jewell Gravity Filter Plant designed for Lewiston, Me.

Plan of Building, Pipes and Filters.



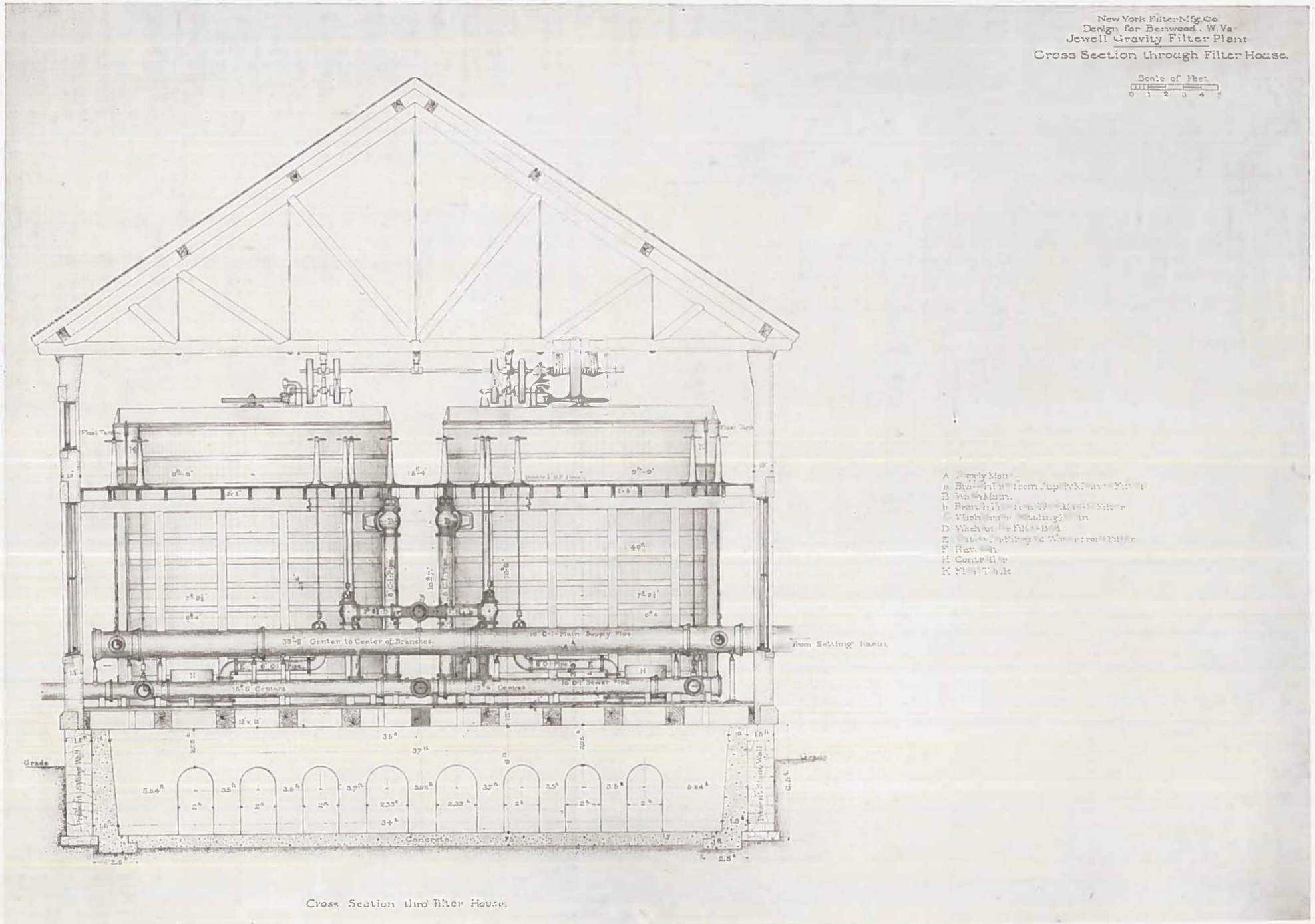
Jewell Gravity Filter Plant designed for the Manchester Mills, Manchester, N. H.

Cross Sections in Filter Building.



Jewell Gravity Filter Plant designed for the Manchester Mills, Manchester, N. H.

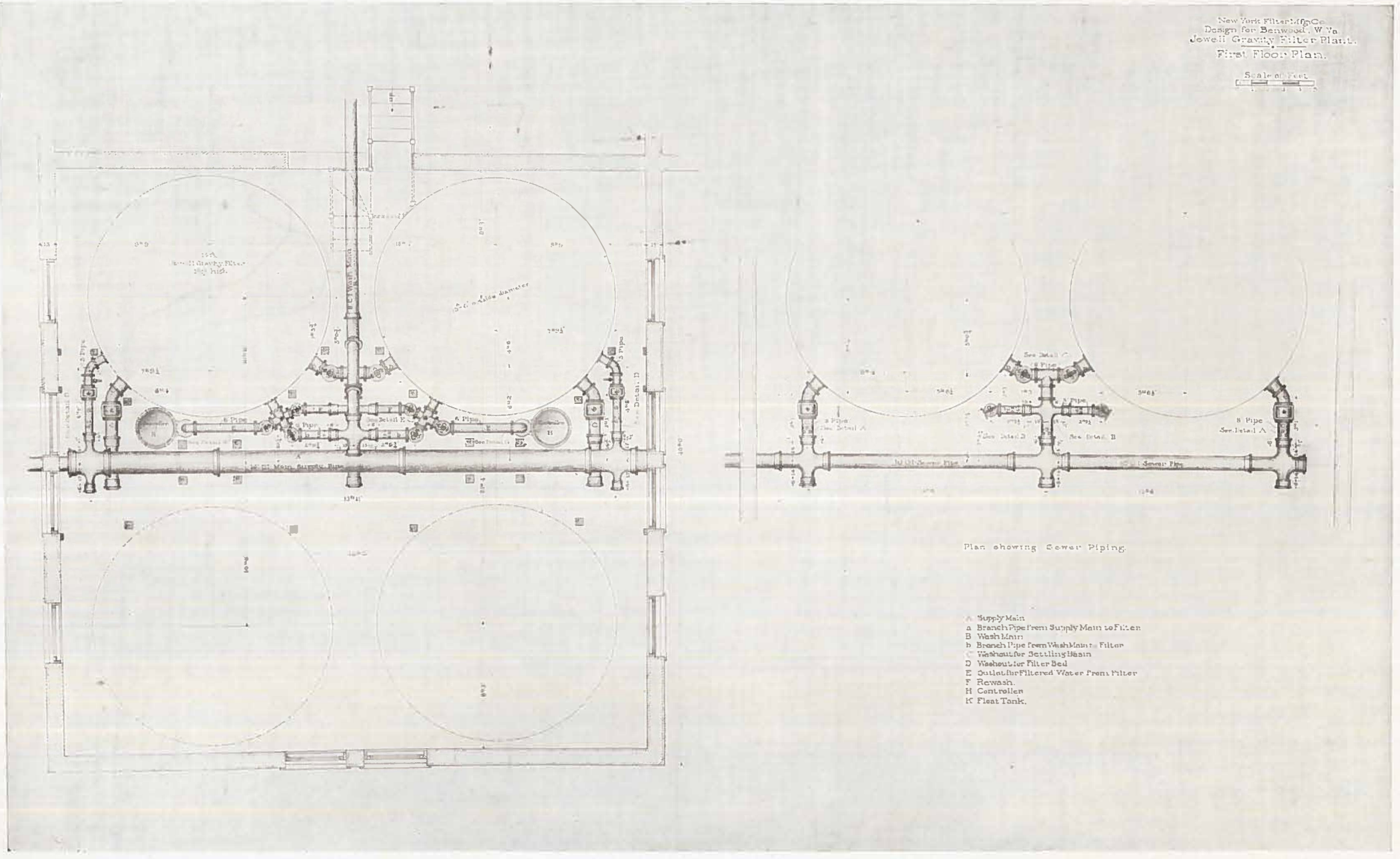
Plan of Building, Pipes and Filters.



Cross Section thro' Filter House.

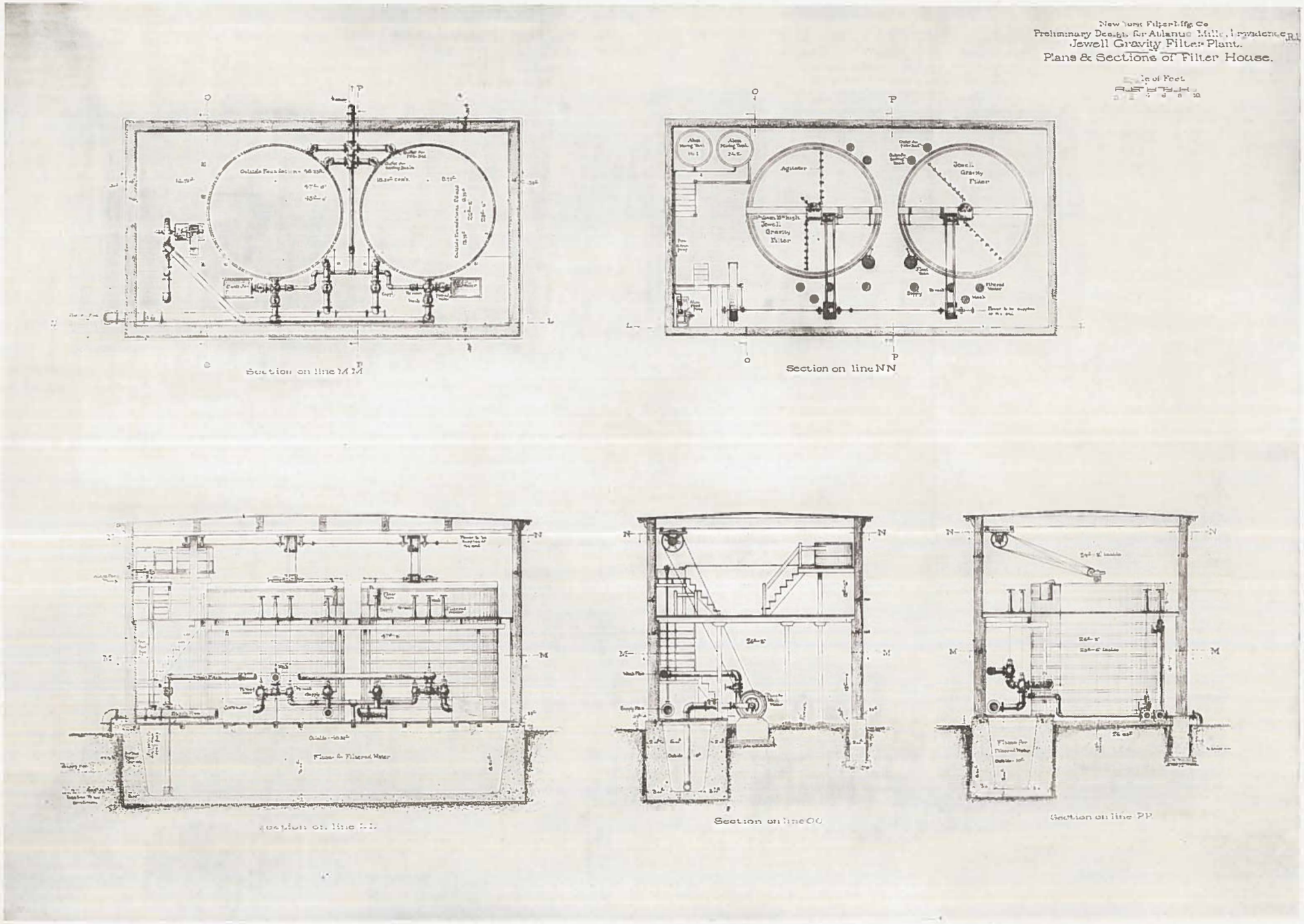
Jewell Gravity Filter Plant designed for Benwood, W. Va.

Cross Section through Filter House.



Jewell Gravity Filter Plant designed for Benwood, W. Va.

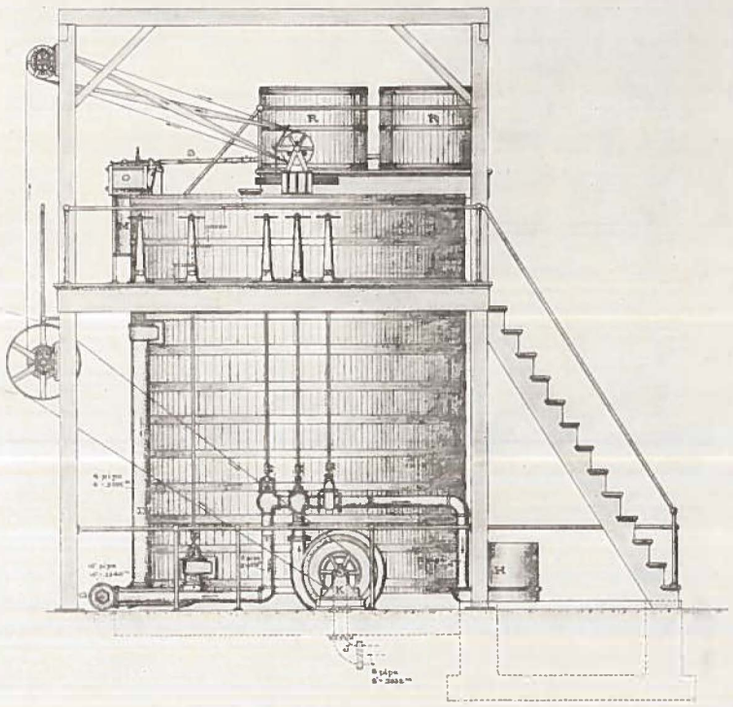
First Floor Plan.



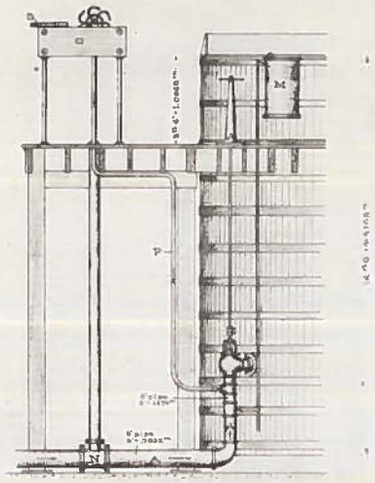
Jewell Gravity Filter Plant designed for the Atlantic Mills, Providence, R. I.

Plans and Sections of Filter House.

Jewell Export Filter Co.
Design for 1000 cubic meters per capacity.
Jewell Gravity Filter Plant.
Elevation and Sections.



End Elevation



Section on line Y Y
Sheet No. 1

For Reference Letters see Sheet No. 1

Jewell Gravity Filter Plant designed for Paris, France.

Elevation and Section.

Jewell Export Filter Co
Design for 1000 cubic metres capacity.
Jewell Gravity Filter Plant.

Plans and Section.

Scale of Feet

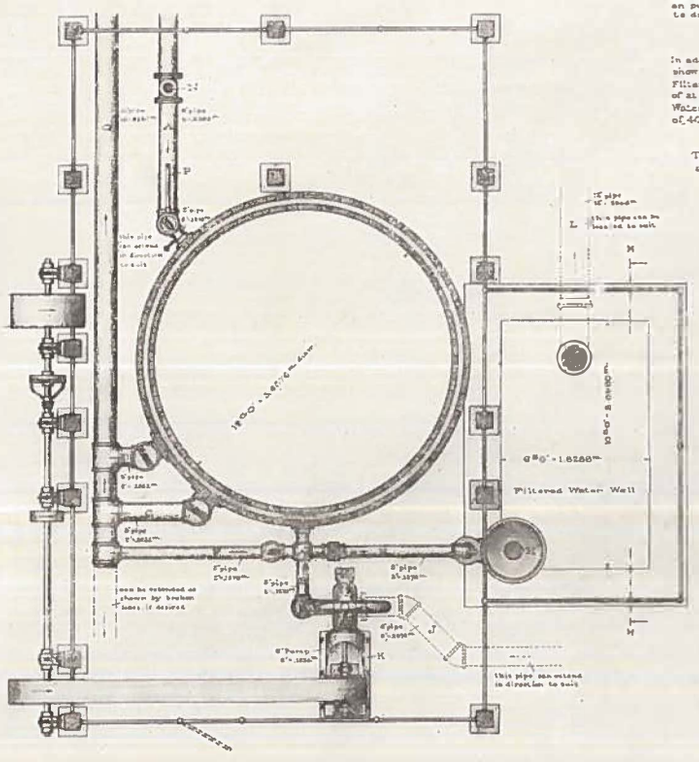
Scale of Metres.

It has been assumed that the Filter Plant as here arranged is to be located inside of a large covered building and that power will be supplied from the main line shafting of this building

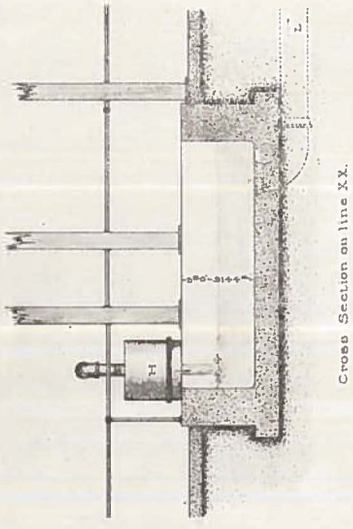
If, however, the Filter is to be located in an independant building, special for the Filter Plant, the platform would, of course, then be supported by the building walls and power transmitted either by shafting and belts as shown, or, if steam can be readily obtained, the Wash Pump can be driven by Vertical Engine direct on pump base and the Engine in turn can be arranged to drive also the Agitating Apparatus of the Filter

In addition to the Filtered Water Well shown on the plans, there should be a Filtered Water Reservoir having a capacity of at least 37 cubic meters, or the Filtered Water Well should be enlarged to a capacity of 40 cubic meters

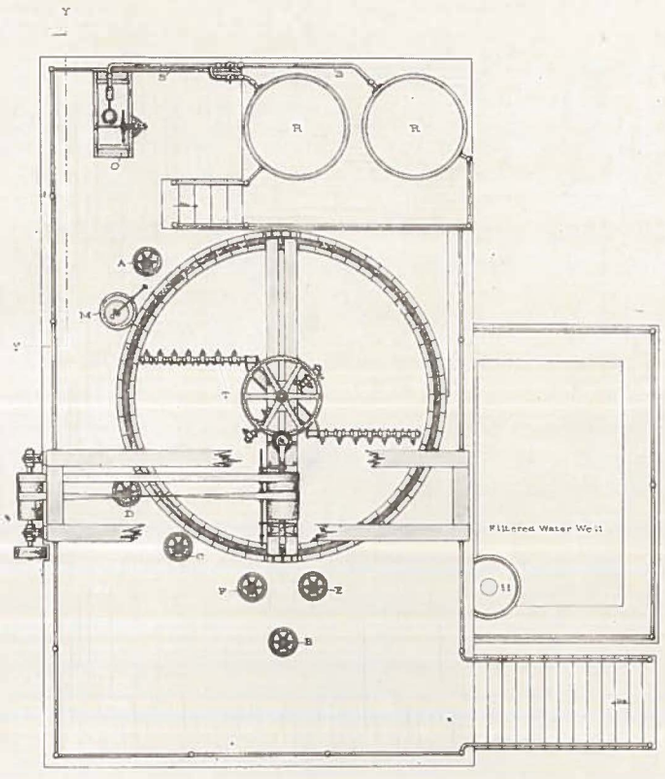
Total Space required for Plant as arranged = 8.66m x 9.00m



Plan below Platform



Cross Section on line X.X.

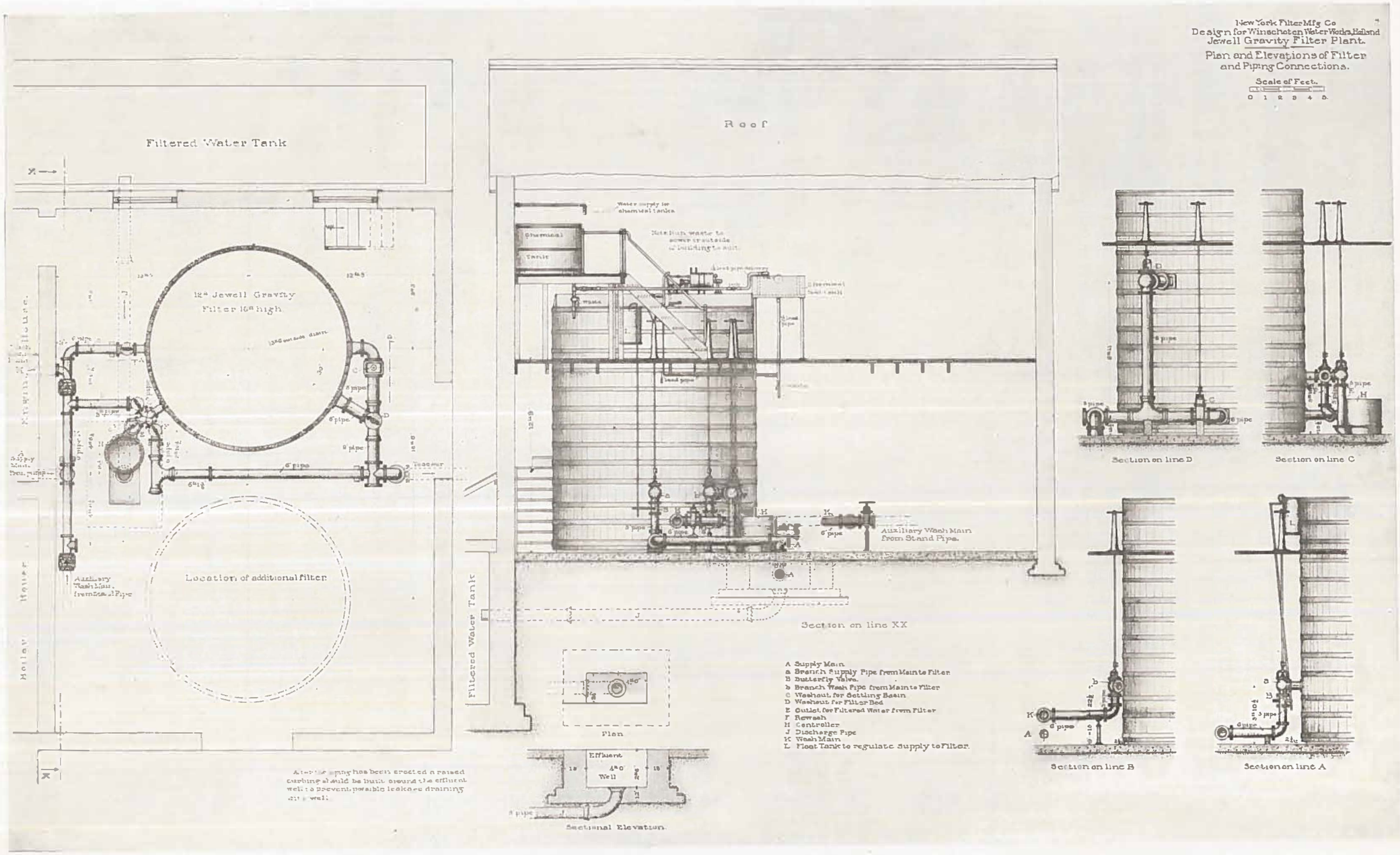


Plan above Platform

A- Supply to Filter
B- Wash to Filter (for washing Filter Bed)
C- Washout for Settling Basin from Filter
D- Washout for Filter Bed from Filter
E- Outlet for Filtered Water from Filter
F- Rewash or Waste for Filtered Water
G- Pipe to Outside Sewer
H- Controller (for regulating discharge of Filtered Water)
J- Suction Pipe for Wash Pump from Filtered Water Reservoir
K- Pump for Supplying Water to Wash Filter Bed
L- Pipe connecting Filtered Water Well with Filtered Water Reservoir
M- Float, Tank for controlling Supply to Filter.
N- Propeller for Operating Alum Feed Pump
O- Alum Feed Pump
P- Alum Feed Pipe to Filter.
R- Chemical Tanks
S- Supply Pipe for Alum Feed Pump
T- Agitating Apparatus

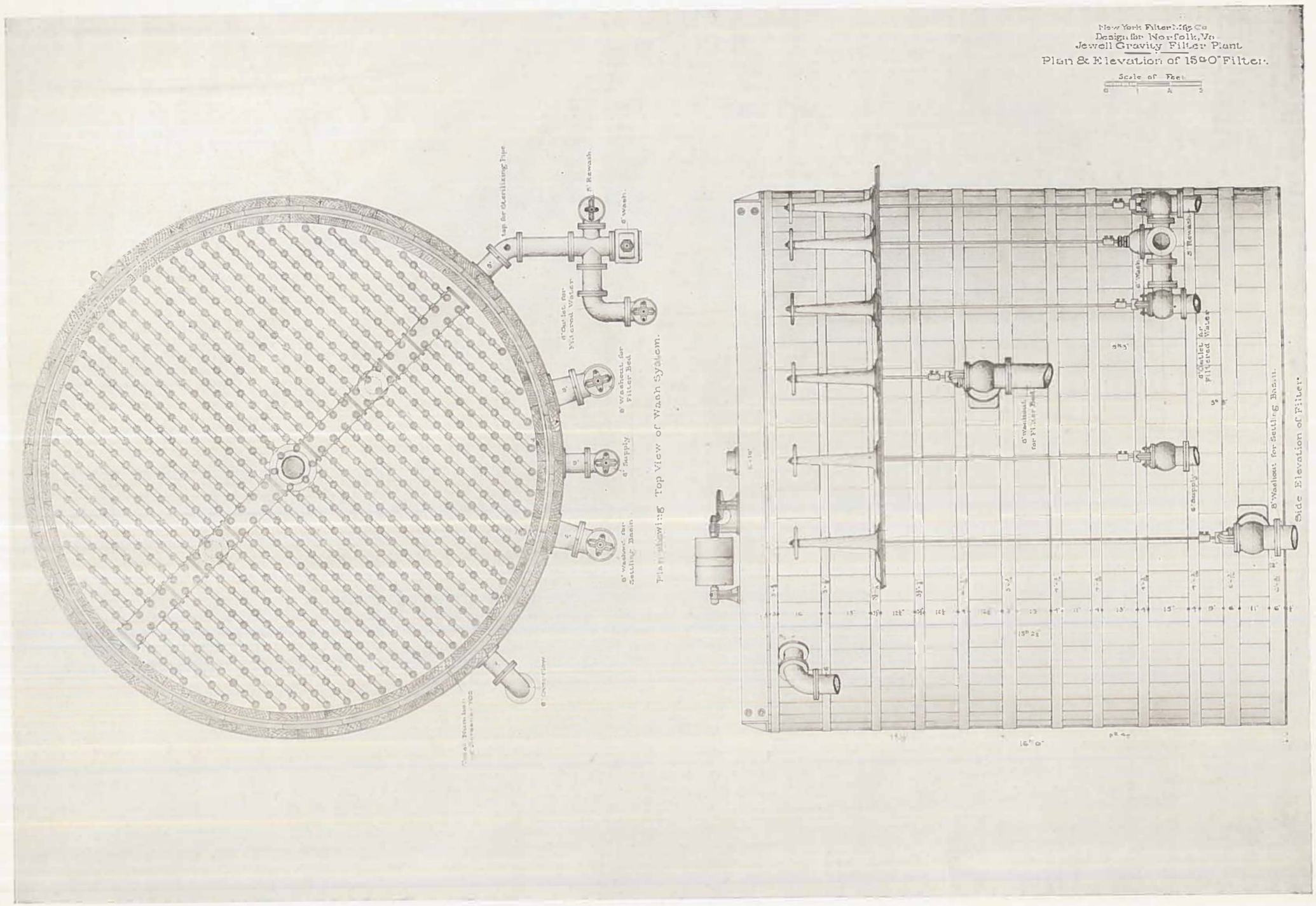
Jewell Gravity Filter Plant designed for Paris, France.

Plans and Section.



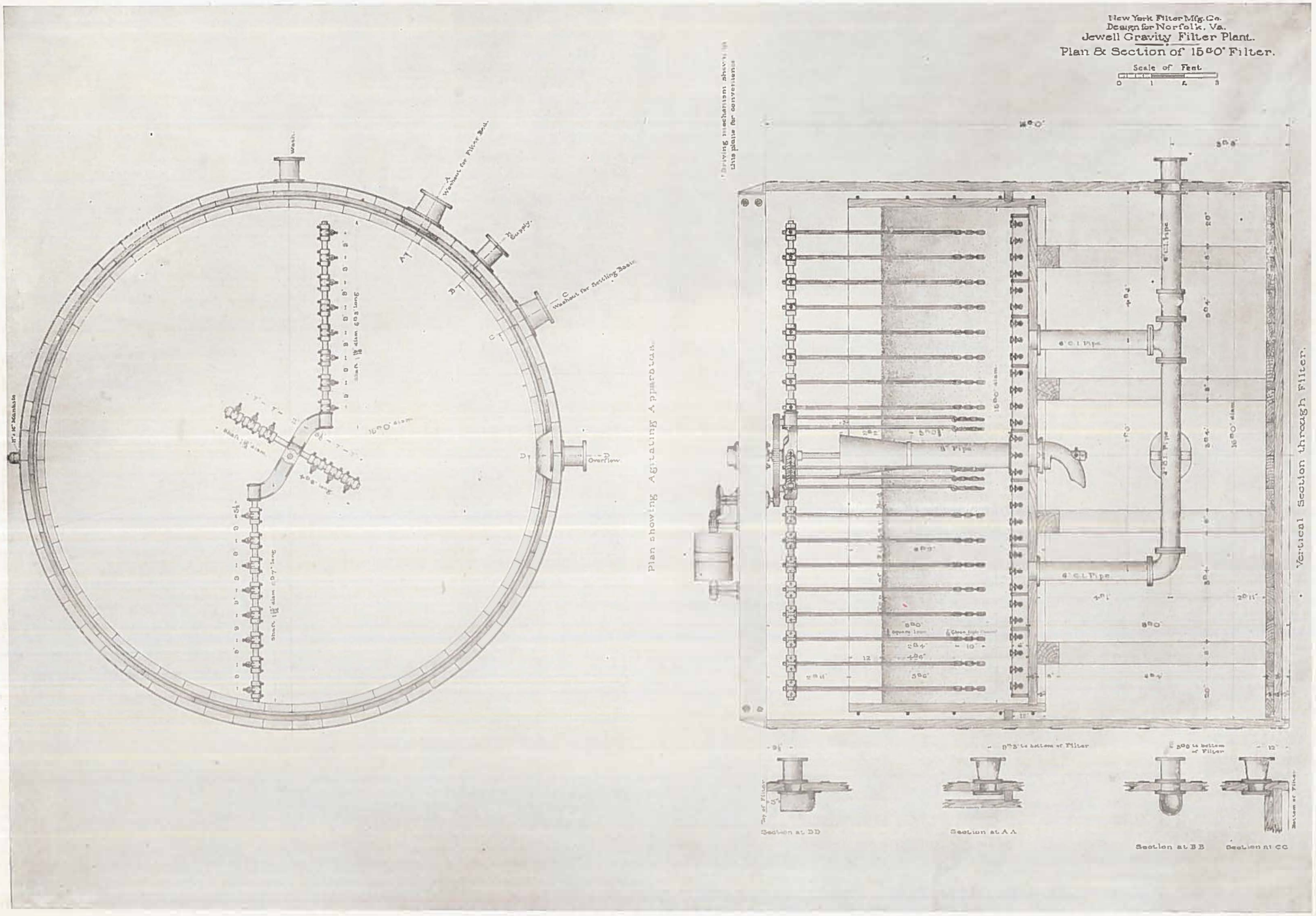
Jewell Gravity Filter Plant designed for Winschoten, Holland.

Plan and Elevations of Filter.



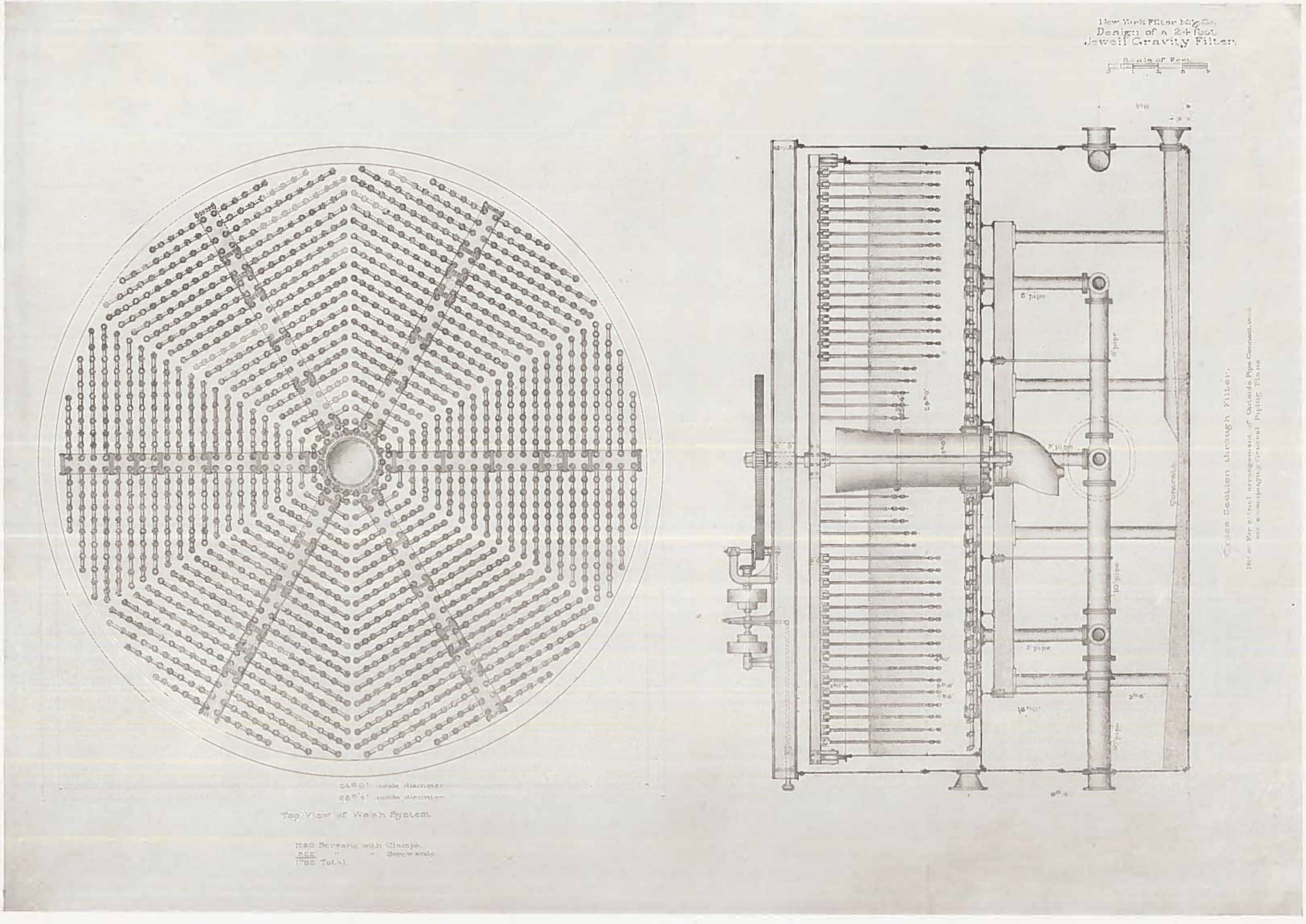
Fifteen-Foot Jewell Subsidence Gravity Filter designed for Norfolk, Va.

Elevation of Filter and Top View of Collecting and Wash Strainers.



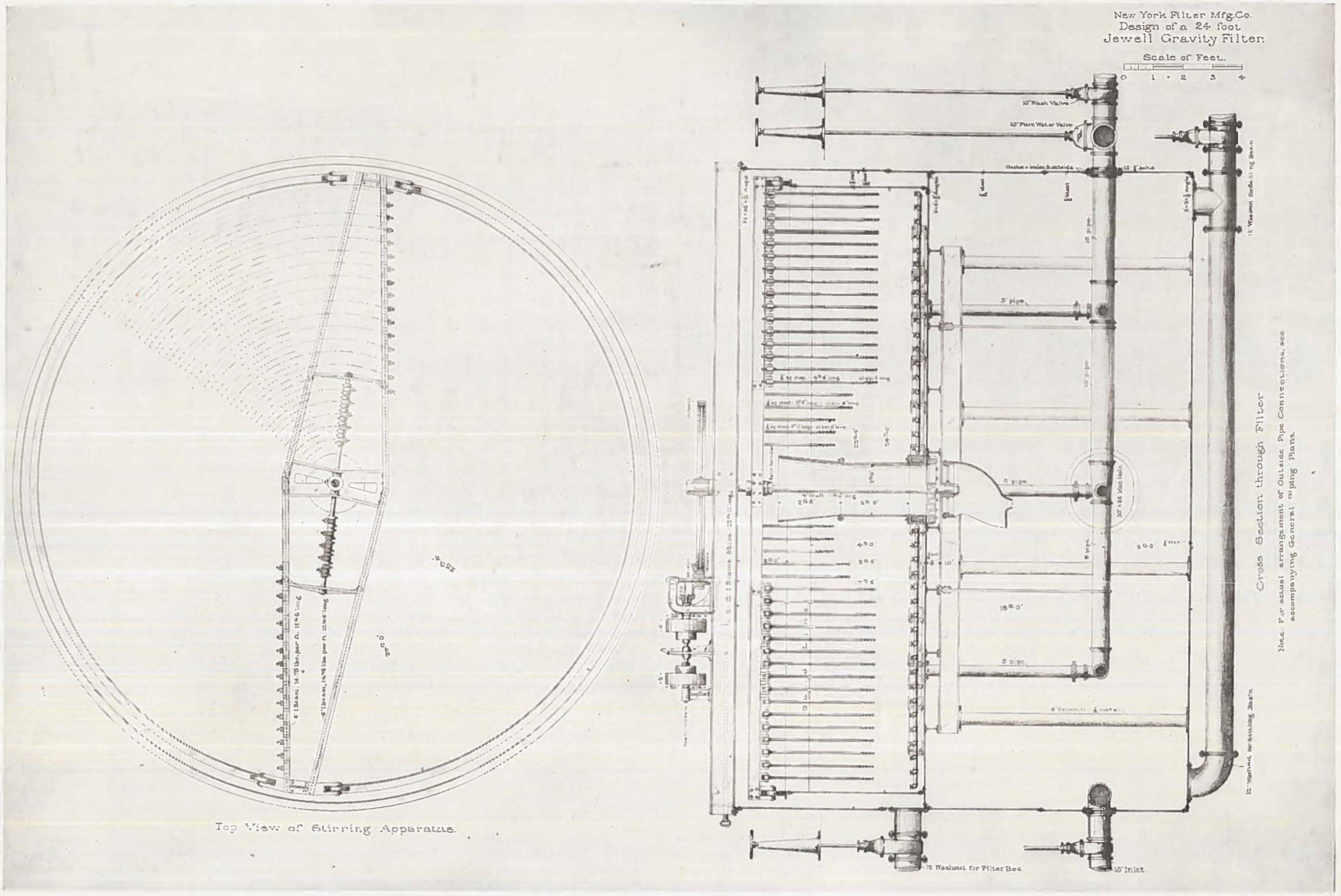
Fifteen-Foot Jewell Subsidence Gravity Filter designed for Norfolk, Va.

Section through Filter and Top View of Agitating Apparatus.



Twenty-Four Foot Jewell Subsidence Gravity Filter designed for Washington, D. C.

Section through Filter and Top View of Collecting and Wash Strainers.



Twenty-Four Foot Jewell Subsidence Gravity Filter designed for Pittsburg, Pa.

Section through Filter and Top View of Agitating Apparatus.