

論 說 報 告

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LIAO RIVER UNDER INTERNATIONAL ORGANIZATION.

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Synopsis.

A sequel to the previous articles under the same topic by the author.—Remarkably silt bearing Liao river escaping to waste since 20 years to be reverted.—Revision of the original plan in order to dispel stout local oppositions.—Entire width of the diversion channel provided with 7 long span Stoney gates of up to date construction to be clearly opened in case of flood.—Specification in full.

The new scheme of upper Liao river improvement works as proposed by the author and adopted by the Liao River Conservancy Board is in course of construction and its historical summaries with its details had been explained in the previous issue of this journal except the details of Weir & Lock to be built at Erh-tao-chiao as the head work to control the share of discharge between the Shwang-tai-tzu channel and the new cutting. In the present issue the object and function of the said Weir & Lock together with its details of construction and specifications in full are to be illustrated.

In order to realize the purpose of reverting the river water which has been escaping into the Shwang-tai-tzu channel since 20 years past to Liao proper through the new cutting (see contract plan no. 1.) as was explained in the issue of August, 1923 of this journal and keep the stability of the new channel the mere opening of the new cut does not suffice by seeing that new cut may have still natural tendency to silt up owing to Liao river water's containing exceptionally high percentage of sedimentary matters as will be seen from the result of silt analysis below combined with its slack gradient such as 1 in 16,200 at low water stage if the new cut is left alone.

How rich is the Liao water as to its silt contents is seen in the following :—

On the 30th July, 1923 at the flow stage of 113.6 ft. (depth of water being 23.3 ft.) the silt contained in 1,000 grams of water is 15 grams viz. 1.5 per cent.

in weight (the observations for surface, mid depth and bottom show quite same proportion) in case of medium summer flood, although it is so low as 0.1 (one-tenth) per cent. while the water stage is low. On the 23rd April, 1924 at the ebb stage of 110.2 ft. (depth of water being 14.9 ft.) we found the proportion to be 1.8 per cent. (not much different as to the depth at which the sample is taken). The above two are cases of maximum silt observed.

Such being the case it is necessary to have an expedient of getting artificially some motive effective enough to induce a proper scouring power so as to prevent silting action or for clearing the river bed when silted to any extent. To meet this requirement we are to built Weir at Erh-tao-chiao viz. at a point a little downstream of the inlet of the new cut across the entire width of the diverted Shwang-tai-tzu channel (see contract plan no. 1. & 2.). The Weir the bottom of which is flush with the river bottom of the said channel and the new cut is provided with 7 sluice gates of Stoney type (single clear span being 47.5 ft.) with its crests 12 ft. high above the river bottom or floor level so that the water surface at the upper extremity of the new cut can be raised $4\frac{1}{2}$ ft. above its normal level when all gates are closed (see contract plan no. 3.). This periodical raising of water surface is what by means of which we increase the flow of new cut and induce the flushing and scouring power in order to maintain the stability of the new channel, not to mention the favourable tidal effect due to better propagation of tide owing to regular shape of new cut than in the irregular natural river channel. Moreover, with these gates the share of river water between Shwang-tai-tzu channel and the new cut can be accomplished to any degree of delicacy. When all gates are lifted up beyond the reach of any known high water the structure makes no obstruction to natural stream as the Weir is constructed all across the entire width of the diverted river viz. there is no contraction of sectional area of river channel arising from the structure.

The Lock to be built by the side of the Weir is 80 ft. long and 18 ft. wide (see contract plan no. 4.) so as to allow the junks going up and down the Shwang-tai-tzu channel to pass freely at any stage of water it being of the primary importance as claimed by the Shwang-tai-tzu people to preserve the existing junk navigation of the Shwang-tai-tzu channel after the new cut is made.

Reversion problem of Liao Water was the fear to Shwang-tai-tzu people as it may result in the entire abolition of junk navigation and the fatal blow to the irrigation project existing in the down-stream portion of the said channel

due to cut off of fresh water supply by the restoration scheme of Liao River Conservancy, and stout opposition was met in the former scheme of Shwang-tai-tzu closure as was planned by the late Mr. Hughes the Chief Engineer to Feng-tien Government and Liao River Conservancy and the force of arms raised by the local people resulted in the partial destruction of the structure of the said closure which was nearing completion then. The claims of the Shwang-tai-tzu people seem to be based on the water rights obtained by prescription or time effect caused by long usage of river water since the accidental cut off of Liao into Shwang-tai-tzu channel 20 years ago and the stout opposition of the people seems to have come from the fact that in the scheme of Shwang-tai-tzu closure of the Late Mr. Hughes no lock was contemplated and a masonry fixed dam was built all across the entire width of the river bed with its top raised a few feet above the present river bottom as was described in the previous issue of the journal.

Be it so in the present and revised scheme the location of the structure was removed to tidal compartment of Shwang-tai-tzu channel viz. at a point in Erh-tao-chiao 12 miles downstream of the point (at Lian-chia-kou) where the former structure of Shwang-tai-tzu closure was located and a lock is to be constructed by the side of the Weir having its floor flush with the present river bottom with lift gates as above described in order to do away all drawbacks unavoidable with the former scheme as were feared of by the local people.

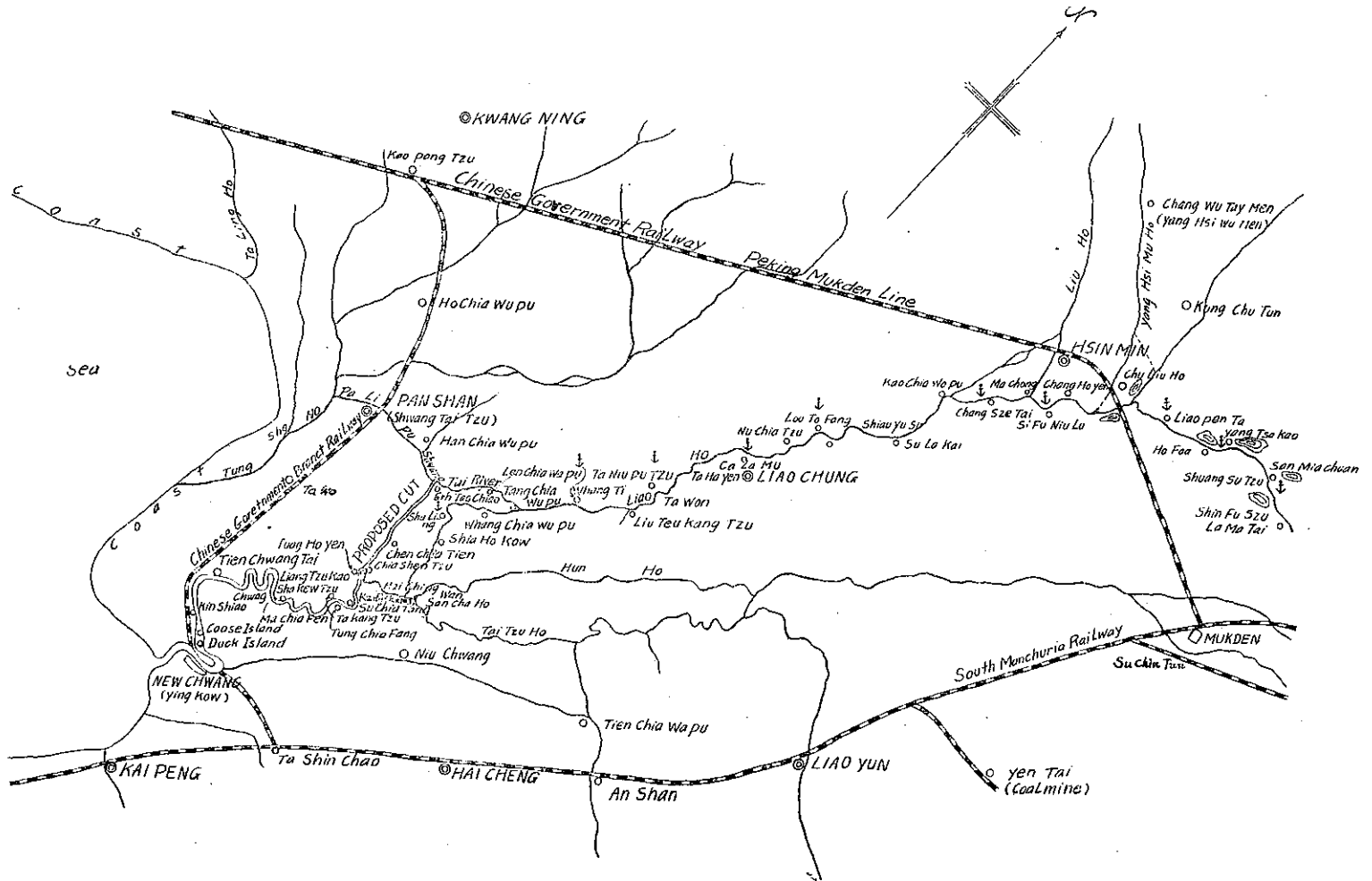
In short the Weir & Lock in the present scheme is the ideal means of harmonizing the interests of both parties viz. both Shwang-tai-tzu people and the Liao people, as the controlment of water can be accomplished to any accuracy according circumstances by way of manipulating the sluice gates of up to date construction.

The temporizing measure to keep the inlet at Tan-chia-wo-pu present worst pass 24 miles long open in order to take back to much water as possible to Liao proper by means of dredging alone which has been continued since past several years is to be stopped soon after the new cut under way is opened.

The contract for the new cutting and the Weir & Lock was awarded to Messrs. McDonnell & Gorman, Tientsin, China & the works are under way.

— The end —

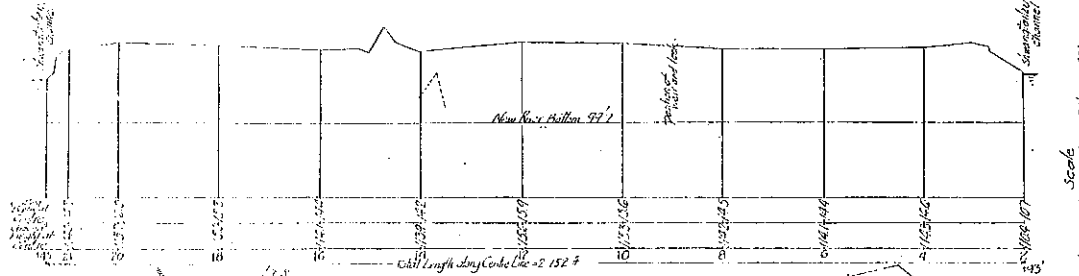
附圖第一



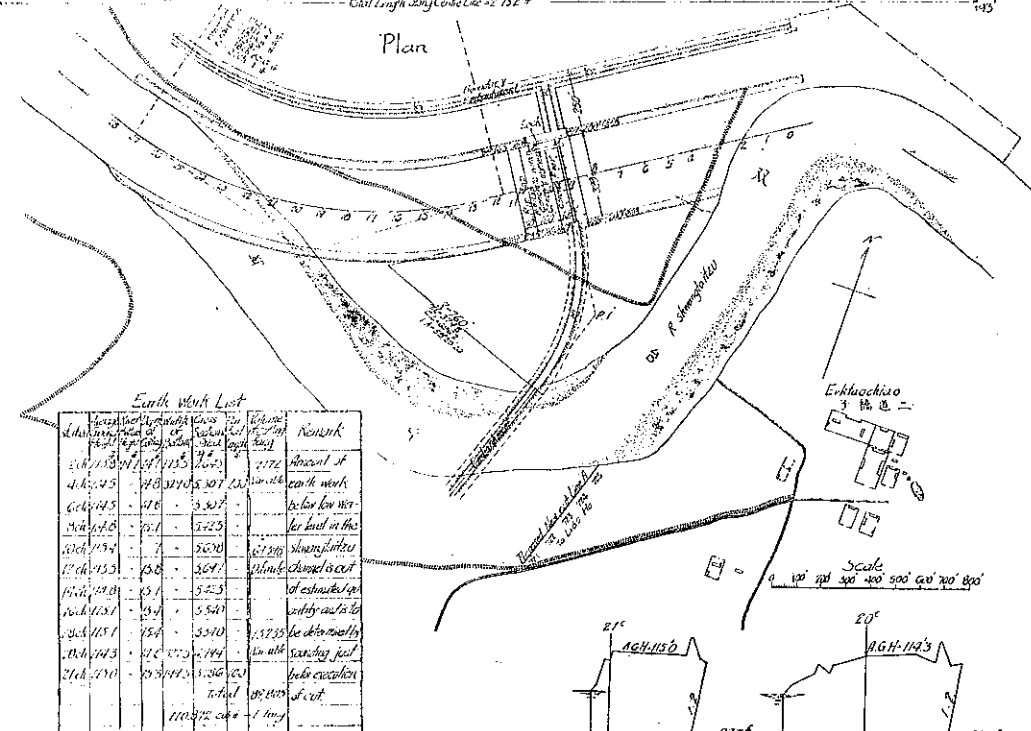
（土木學會誌第十一卷第一號附圖）

Longitudinal Section of Diversion channel of Erkuochiao in Shuanglatzu Channel

Scale 0' 100' 200' 300' 400'



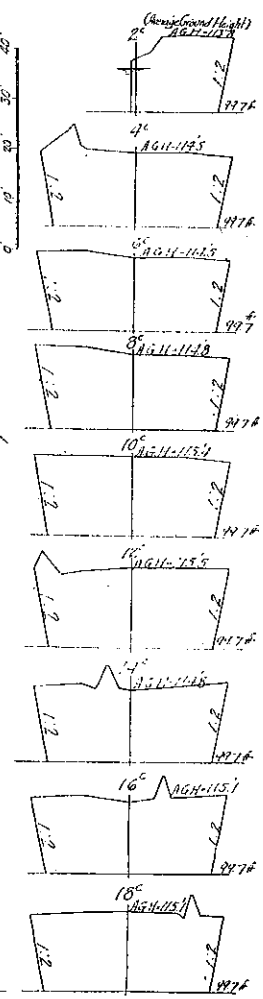
Plan



Earth Work List

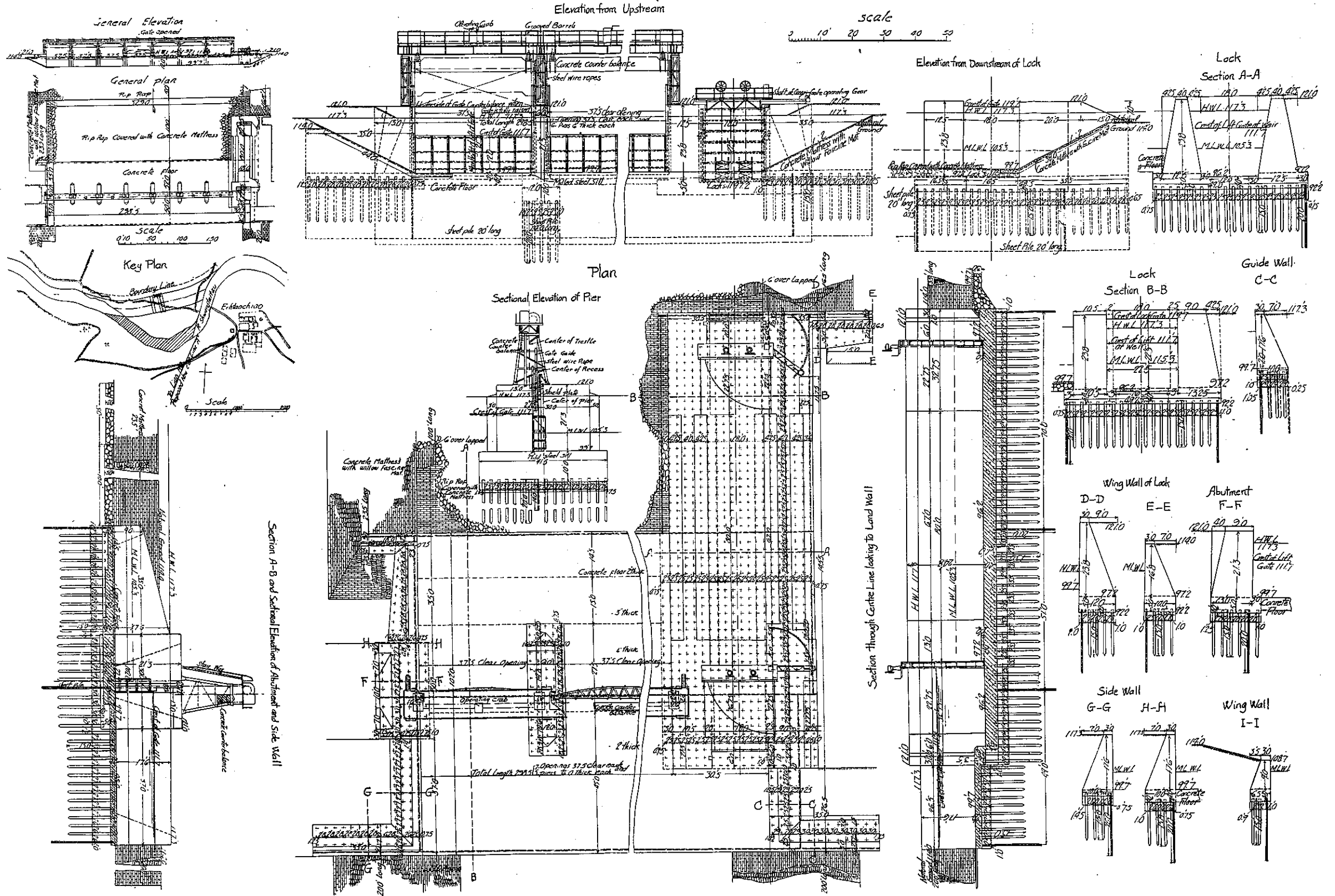
Station	Area	Volume	Remarks
0+00	113.5	29.2	channel at
0+10	113.5	29.2	channel work
0+20	113.5	29.2	to low low water
0+30	113.5	29.2	level in the
0+40	113.5	29.2	channel
0+50	113.5	29.2	channel
0+60	113.5	29.2	channel
0+70	113.5	29.2	channel
0+80	113.5	29.2	channel
0+90	113.5	29.2	channel
1+00	113.5	29.2	channel
Total	113.5	29.2	

Cross Section



附圖第二

(土木學會誌第十二卷第一號附圖)



(1:1000 比例尺) (1:1000 Scale)

附圖第四

