Environmental Protection Agency

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ANNEX-Z

21 MAR 2006

Environmental Permit

(Issued under the Environmental Protection Act, No.11 of 1996 & Environmental Protection Regulations 2000)

Reference No.: 20050722-CTWSS

22 MAR 2006

Addressee: Guyana Water Inc.
Lot 10 Fort Street Kingston
Georgetown Guyana

Activity: Construction and Operation Of Corriverton Water Treatment Plants

Guyana Water Inc, herein after referred to as the "Permit Holder" is hereby authorised in accordance with the Environmental Protection Act 1996 and the Environmental Protection Regulations 2000 to construct and operate two (2) Water Treatment Plants. At Number 56 Village and Queenstown, East Coast Berbice, Corriverton, herein after referred to as the "Project" in the manner indicated in Application Ref #20050722-CTWSS dated August 22nd 2005 and subject to the terms and conditions set forth herein and any forthcoming regulations and standards relevant to this project.

Terms and Conditions:

The '**Permit Holder**' shall at all times conduct all operations under its control in such a manner that will result in minimum impact on public health and safety and the environment. ***To this end the Permit Holder shall:***

CONSTRUCTION AND OPERATION

i. Ensure that the operations and maintenance schedule are compiled with to assure proper functioning of the treatment system.

ii. Not construct, alter, expand or replace any plant, structure, equipment, apparatus, mechanism or thing that may discharge or from which may be discharged a contaminant into any part of the environment except and in accordance with this Permit.

iii. Ensure that the Contractors and third parties responsible for the execution of this project are aware of the environmental and human health hazards that are associated with construction and operation of a water treatment plant and comply with the condition of this permit and the EPAct and Regulations.

iv. Notify the EPA within 24 hours of the occurrence of any spills or accidental release of chemicals.

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v. Take necessary precautions to avoid erosion, siltation and sedimentation of drains and canals during construction. Susceptible surfaces should be appropriately protected.

vi. Adequately store and protect raw materials and waste material, especially in rainy conditions, to avoid runoff into waterways.

vii. Remove all construction tools, equipment, machinery, and waste material from site on the completion of construction works.

viii. Ensure that all chemicals (chlorine, alum, lime) are safely stored and handled. labeled and that labels are continuously maintained.

WATER QUALITY

ix. Maintain the integrity of the existing waterways at all times. Discharges into the environment should be in accordance with the *Guyana National Bureau of Standards' National Standards GYS 207; 2002 Interim Guidelines for Industrial Effluent Discharge into the Environment. (pH 5-9, temperature <40, BOD 50, COD 250, TSS 50, P2, Cl 0.2(fuorine 20, phenols 0.5, 400MPN per 100mls, oils and grease 10)*

x. Maintain and implement a plan for the appropriate disposal of backwash water, sludge and hypochlorinated water.

xi. Ensure that the existing drainage channels are maintained to prevent sedimentation of surface water.

xii. Avoid aquifer exploitation and contamination, by all practicable means. Ground water levels and quality should be monitored on a quarterly basis and results sent to the EPA. what parameters

xiii. Ensure that drinking water distributed to the communities meet the WHO Standards for drinking water quality. Guyana has relaxed standard for Fe

xiv. Chlorinate or fluorinate drinking water before distribution.

xv. Notify the EPA of any intent to generate chlorine on site, at least three (3) months before commencement.

xvi. Disinfect/flush the network/distribution system on the regular basis.

xvii. Check distribution system should be properly maintained and checked for leaks and breakages to reduce risk of contamination.

xviii. Implement all practical means to prevent risks of flooding, as results of spills, leakage, etc.

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AIR QUALITY

xix. Implement necessary mitigation measures during construction to prevent dust pollution.

xx. Utilize wet suppression methods i.e. watering and/or cover material stockpiles to control dust emissions during construction activities.

xxi. Ensure that generator is working efficiently and exhaust pipe is higher than the tallest building to prevent emissions from affecting neighbours.

xxii. Ensure that all air emissions from this facility conform to *Guyana National Bureau of Standards' Draft National Standards: Interim Guidelines for Industrial Air Emissions into the Environment.*

NOISE ABATEMENT

xxiii. Ensure that all sound making devices such as generators, pumps, compressors and other machinery, are suitably equipped with silencers or mufflers to reduce noise levels.

xxiv. Fully enclose all rooms/buildings in which noisy equipment will be used with noise attenuating materials.

xxv. Sound level from noise-making devices shall not exceed 75 dB during the day and 70 dB at night, at a distance of 15m (50 ft) from the source or at the property boundary, whichever is closer.

WASTE MANAGEMENT

xxvi. Adhere to the provisions of the *Environmental Protection (Hazardous Waste Management) Regulations 2000.*

xxvii. Promote good sanitation and solid waste disposal practices on site; covered garbage receptacles must be placed at strategic locations, both within and outside the facility. Wastes must be collected and disposed of at an approved waste disposal facility.

xxviii. Store waste oil and chemicals in a covered, bunded area to minimize adverse impacts to the environment in the event of spillage. The bunded area must be able to provide containment for the maximum volume of waste oil/chemical on site.

xxix. Label, store and dispose of used oil in an environmentally acceptable manner. Used oil or fuel should not be mixed with any other waste materials.

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EMPLOYEES' RESPONSIBILITIES, COMPLIANCE MONITORING AND REPORTING

xxx. Assign an individual at the commencement of construction activities and during operation, who will be responsible for coordinating environmental management, monitoring for compliance, reporting to the EPA, implementing the conditions of this permit, ensuring employees are trained in environmental management and emergency response procedures.

xxxi. Provide employees with suitable protective clothing and equipment in accordance with the requirements of the Occupational Safety and Health Department.

xxxii. Monitor the implementation of the conditions of this permit, in so far as they involve adherence by your employees.

xxxiii. Practice emergency shut down and containment procedures in the event of uncontrolled discharge due to plant maintenance activities, severe storm water events, start ups or shut downs, or other causes.

xxxiv. Submit annual reports to the EPA on the progress of the operation and compliance with the conditions under which this permit was granted on or before **March 31** of each year.

xxxv. Establish an emergency response plan for the treatment plants and submit to the EPA for approval within six (6) months of receipt of this permit. This should also include your waste disposal plan.

GENERAL

xxxvi. Before commencement of the project, inform all individuals and institutions that may be adversely affected by project activities.

xxxvii. Execute the project in a manner that will result in minimal adverse impacts to communities through use of flexible working hours.

xxxviii. Ensure that an approval for the use and management of chemicals is obtained from the Pesticide Toxic and Chemical Control Board.

xxxix. Comply with any lawful directions given by the EPA from time to time in furtherance of the implementation of any international or other obligations for the environmental protection of Guyana.

xl. The EPA reserves the right to conduct regular inspections of your operation as part of its monitoring and enforcement requirements under the Environmental Protection Act, 1996.

xli. The EPA reserves the right to review the conditions attached to this Permit.

Environmental Permit Ref. No. 20050722-CTWSS
(Issued under of the Environmental Protection Act, No.11 of 1996 and the Environmental Protection Regulations 2000)

xlii. The EPA shall have the right to cancel or suspend this Permit for breach of any of the terms and conditions contained herein.

xliii. Implement all practicable means of preventing chemical spill on site and possible injury, loss of life, effects on property to workers and residences.

xliv. You shall be liable to compensate for any loss or damage to the environment that arises from the implementation of this project.

xlv. Failure to comply with any or all the provisions of this Permit shall render you liable to prosecution and to penalties prescribed under the Environmental Protection Act, 1996.

xlvi. This Permit is not the final development consent; permission should be sought and obtained from other relevant regulatory bodies prior to project implementation.

This Environmental Permit shall remain valid until **March 31, 2010** unless otherwise suspended or revoked in accordance with the provisions of this Permit or the Environmental Protection Act. A written request to renew this Permit shall be submitted to the EPA no later than **September 31, 2010.**

Signed by _____ on behalf of the Environmental Protection Agency
Eliza Florendo
Director, Environmental Management

I hereby accept the above terms and conditions upon which this Environmental Permit is granted and agree to abide by the Environmental Protection Act and any forthcoming regulations and standards made under this Act.

NAME	
DATE	
SIGNATURE	

Annex 3 – Draft Leakage Control Strategy for Corriverton Water Supply Project

1.0 Background

The area designated for the Corriverton Water Supply Project extends from No. 51 Village to Moleson Creek. The proposed sites for the construction of two water treatment plants are No. 56 Village and Queenstown. This project area is located in Division 5 of the GWI network and falls under the jurisdiction of the GWI office at Chesney on the East Coast of Berbice.

At present, customers in the area are being served by seven wells which are located at No. 57 Village, No. 63 Village (Benab), No. 69 Village (Friendship), No.75 Village (Spring Garden), No.78 Village (Springlands), Crabwood Creek and Queenstown respectively. Some of the pump stations supply isolated networks exclusively while there is an overlapping of distribution between others.

The first of these wells, located at Springlands, was drilled in 1948 and the most recent, located at Friendship, No.69 Village, was drilled in 1981. As far as the records show, prior to the studies that were carried out for the Corriverton project, there was no detailed hydraulic model done for the network in the area. Between 1994 and 1998, the well stations in the project area were converted to electrical submersible motors and pumps. At that time 270 litres per capita was the design demand due to the poor distribution network. An analysis may very well lead us to the down sizing of some of these systems with active leakage control.

To make a bad situation worse, there was never a mindset towards active leakage control prior to the formulation of the company's Leakage Control Strategy. The very idea of a continuous leakage control program was not in anyway a part of our company psyche. When new customers were to be incorporated into the existing network new mains were simply installed to bring water to them. When customers at the end of the network were receiving a poor level of service or no service at all, the existing pump was simply replaced by a larger one to supply the network. As a consequence, even by our most moderate estimations, each pump station is now over producing considerably.

The central leakage team is now trying to get a handle on the situation, not only in the Corriverton project area but across the GWI network. However, this document is exclusive

to outlining, in detail, our strategy for leakage control in the project area.

2.0 Institutional Capacity Building

The staff in Division 5 will benefit from two leakage control seminars which shall be delivered by the Central Leakage Team. These seminars have been done for staff at the senior and middle management levels. There is however the need to build capacity at all levels including Operation and Management staff and Customer Services staff. The seminars are scheduled for June 2006.

3.0 Reducing Real Losses

The central leakage team is geared towards actively reducing losses ahead of the Corriverton Project coming on stream. Our strategy aims to target primarily those losses that can be attributed to leakages in the network and those that are due to customer wastage. Our actions shall take the form of:

- Leakage survey
- Leak repairs
- Issuing of cautionary notices to customers to warn against wastage

3.1 Leakage Survey

The leakage survey shall be carried out by a leakage inspection team which shall comprise eight (8) leakage inspectors. The survey shall take the form of house-to-house inspections of customers' connections. Based on our experience with leakage surveys we have determined that each inspector is quite capable of carrying out an average of twenty-five (25) inspections per day under favourable weather conditions. This means that we should be able to carry out inspections at an average rate of about two hundred (200) inspections per day.

The inspection team shall be guided by a leakage inspection work program prepared by the Leakage Engineer. The work program shall provide information on the estimated number of

customers in each village in the survey area and the estimated time to complete the survey of each village.

All detected leaks shall be recorded and the information passed on to the relevant divisional office on a daily basis for repairs to be carried out.

3.2 Leak Repairs

A work order form shall be filled out for each leak repair job at the divisional office for repairs to be carried out. Usually, the backlogs of leak repair jobs from customer complaints are handled internally by the divisions' leak repair teams. However, in cases where a more proactive approach is used for leak detection the large numbers of leak repair jobs prove to be too much for the in-house leak repair teams and are therefore outsourced to private contractors.

At present, there is an allocated three million Guyana dollars (**G$3,000,000**) for leak repairs in Division 5. This allocation was made by the Ministry of Housing and Water. There are currently fourteen (14) temporary contract employees carrying out leak repair jobs in the division. Of these, four (4) are carrying out leak repairs in the project area ahead of the scheduled commencement of the leakage survey. Additionally, there is also an in-house leak repair team of two (2) craftsmen carrying out repairs in the area. The leakage control strategy for the project area makes provisions for the recruitment of additional contractors if the need arises.

3.3 Issuing of Cautionary Notices

Cautionary notices shall be issued to customers during the leakage survey. These notices shall be issued by the leakage inspectors to customers who are observed to be wasting water and who have failed to repair leaks on their internal plumbing. The notice prescribes a time frame for corrective action by the customers. If no action is taken by the time a revisit is carried out by the inspector to verify correction by the customer, then the customer's service shall be disconnected.

4.0 Public Education via Flyers

The central leakage team has formulated an educational package in the form of flyers for educating the public on the importance of water conservation. It is hoped that this will:

- Create public awareness of the negative effects of leakage
- Sensitize the public towards making behavioural changes to minimise wastage
- Motivate the public to support in general the company's leakage control strategy

These flyers shall be distributed to the public by the leakage inspectors as they carry out their inspections. Additionally, flyers shall be handed out at the divisional office to customers on their visits to make enquiries and pay their water bills. Flyers shall be placed with the bills of those customers who usually receive their bills in the mail. The in-house leak repair teams will also be used as means of issuing flyers to the public.

5.0 Community Outreach via Schools and Community Groups

The Central Leakage Team is also seeking to educate the public by targeting especially those communities that have consistently demonstrated unusually high levels of leakage. These communities shall be engaged in sessions where presentations shall be made, on the importance of water conservation and management, to the young children in the schools and to the various community groups for dissemination to the wider community. These sessions shall also take the form of discussions through which members of the community will be able to air their concerns about the quality of service they have been receiving and to give suggestions as to how they think the GWI can improve its service to them.

The Central Leakage Team is presently working with other communities on the East Coast of Demerara and has achieved some success through the support of the GWI Public Relations Department and the Voluntary Services Overseas (VSO). Our objective is to use the present program as a model for implementation in the project area.

It is hoped that at the end of these outreach sessions members of the communities would better appreciate the objectives of GWI where water conservation and management is concerned and that GWI would have garnered additional public support for the implementation and sustainability of its leakage control strategy.

6.0 DMA Construction

District Metered Areas (DMAs) are being constructed to measure water supplied and manage the network more effectively. The construction of DMAs will help us to more accurately determine significant levels of leakage through systematic monitoring and enable us to isolate sections of the network for corrective action with greater efficiency.

Our plan is to create seven DMAs in the project area. To facilitate the DMAs, the service area of each pump station in the project area will be completely isolated from each other. The current well station bulk flow meter will be used as the point of supply for monitoring supply to the DMA. This method is adopted to monitor the water supplied to the network without significant change to the infrastructure ahead of the planned intervention. It is anticipated that the supply points of the well stations can be replaced by the transmission mains supply points if the hydraulics in the proposed DMAs are acceptable. It is anticipated that the DMA meters will then be installed to the supply points off of the transmission main.

The installation of the transmission mains as part of the Corriverton Water Supply Project will significantly reduce the hydraulic head loss in each DMA and give greater control to pressure regulation by facilitating the use of pressure reducing valves (PRVs).

Tenders for construction of the DMAs are closed and are presently being evaluated. Consultants for supervision of the project are currently preparing proposals.

7.0 Non-Domestic Customers

In the assessment of non-revenue water (NRW) figures in the project area, the determination of the non-domestic consumption has proven to be most problematic. The primary reason for this is that we have not established a data base of any significant integrity. At present, many non-domestic customers remain un-metered and their monthly consumption figures have to be estimated for billing - hence the dilemma with our NRW calculations. This has a negative impact on our leakage control strategy. Therefore we have

made it an objective of our strategy to ensure that all non-domestic customers in the project area are metered and to assemble a database of the demand of non-domestic customers against domestic customers on a monthly basis for analysis and billing.

ANNEX-4: Undertakings of the Guyanese Side

(1) General Undertakings

Undertakings of the Government of Guyana confirmed at the beginning of the Basic Design Study are as follows:

i) To provide available relevant data, information and materials necessary for the project.

ii) To secure land for the water treatment plants to be constructed in the project.

iii) To bear commissions required for the Authorization of Pay and the Banking Arrangement.

iv) To ensure prompt unloading and custom clearance of the products for the project.

v) To exempt Japanese nationals from custom duties, internal taxes and fiscal levies which may be imposed in Guyana with respect to the project.

vi) To bear all the expenses, other than those covered by the Japan's Grant Aid, necessary for the project.

vii) To ensure that the facilities and the equipment provided by the project be maintained and used properly and effectively.

(2) Undertakings specific to the Project

Undertakings identified by the Study are as follows:

i) To install water meters for all customers in the project area procured by the project before the completion of the project.

ii) To assign 4 operators of No.56 Village WTP before the completion of the 1st phase of the project and 4 operators of Queenstown WTP before the completion of 2nd phase. The operators of No.56 Village WTP are one of intended target group members of the soft component of the project (technical assistance).

iii) To complete the provision of electric power line to the project sites within the time specified.

iv) To secure space for the installation of an emergency generator and its fuel tank in No.56 Village Well, Spring Garden Well and Queenstown Well sites.

v) To hold meetings to present construction works inviting residents along pipeline routes prior to the commencement of the work. Special attention shall be paid to the residents along Corriverton urban area as the work may cause some interruption of their daily and business activities along the main road.

vi) To publicize water supply cut off to the residents and to attend at the sites of pipe joint works requiring water cut off.

vii) To secure land for No.56 Village WTP and Queenstown WTP and to clear sugar cane from the Queenstown WTP site prior to commencement of the work.

viii) To secure land next to the No.56 Village WTP and Queenstown WTP for the temporary yards.

ix) To provide the contractor with water for pipe washing, pressure tests and water tightness tests.

Attachment 5: Basic Design Drawings

List of Drawings

DWG. No.	Title	
001	General Plan	
002	No.56 Village Water Treatment Plant	General Plan
003	No.56 Village Water Treatment Plant	Flow Diagram
004	No.56 Village Water Treatment Plant	Plan
005	No.56 Village Water Treatment Plant	Water Level Profile
006	No.56 Village Water Treatment Plant	Slow Sand Filter (1/2)
007	No.56 Village Water Treatment Plant	Slow Sand Filter (2/2)
008	No.56 Village Water Treatment Plant	Storage Reservoir (1/3)
009	No.56 Village Water Treatment Plant	Storage Reservoir (2/3)
010	No.56 Village Water Treatment Plant	Storage Reservoir (3/3)
011	No.56 Village Water Treatment Plant	Elevated Tank
012	No.56 Village Water Treatment Plant	General Plan of Pipeline
013	Queenstown Water Treatment Plant	General Plan
014	Queenstown Water Treatment Plant	Flow Diagram
015	Queenstown Water Treatment Plant	Plan
016	Queenstown Water Treatment Plant	Water Level Profile
017	Queenstown Water Treatment Plant	Slow Sand Filter (1/2)
018	Queenstown Water Treatment Plant	Slow Sand Filter (2/2)
019	Queenstown Water Treatment Plant	Storage Reservoir (1/3)
020	Queenstown Water Treatment Plant	Storage Reservoir (2/3)
021	Queenstown Water Treatment Plant	Storage Reservoir (3/3)
022	Queenstown Water Treatment Plant	Elevated Tank
023	Queenstown Water Treatment Plant	General Plan of Pipeline

N

Atlantic Ocean

No.56 Village Water Treatment Plant

No.67 Village
Connection point to existing
distribution trunk-PVC φ150mm

Distribution main to No.67 Village
PVC φ250mm L=7038m

No.57 Village
Connection point to existing
distribution trunk-PVC φ150mm

Distribution main to No.57 Village
PVC φ250mm L=798m

Start Point of Project

New valve φ150mm×2
Close of existing
distribution trunk

798m

1250m

Springlands
Connection point to existing
distribution trunk-PVC φ250mm

Spring Garden
Well Pump Station

New valve φ150mm×2
Close of existing
distribution trunk

3200m

New valve φ150mm×1
Close of existing
distribution trunk

Benab

Annandale

Springlands

Skeldon

Corriverton

Corentyne River

Block 3 L=6015m

Block 2 L=6320m

Study Area L=36210m

Block 1 L=9535m

Line Path

No.51 Village

Distribution main
to Springlands
PVC φ250mm L=1805m

Conduction pipeline to Queenstown W.T.P
PVC φ250mm L=4332m

Distribution main to Crabwood Creek
PVC φ250mm×5830m

Block 4 L=14340m

Crabwood Creek

New valve φ150mm×2
Close of existing
distribution trunk

No.57 Well Pump Station

Queenstown
Well Pump Station

Conduction pipeline
to Queenstown W.T.P
PVC φ200mm L=100m

Conduction pipeline to No.56 Village W.T.P
PVC φ250mm L=798m

Queenstown Water Treatment Plant

Crabwood Creek
Connection point to existing
distribution trauk-PVC φ150mm

Moleson Creek

End Point of Project

0 1 2 5 km
Scale

KEY PLAN

- Start/End point of Project
- Connection point to existing pipe
- Boundary of distribution block
- New Water Treatment Plant
- Existing Pump Station
- New Pipeline
- Existing distribution trunk

LEGEND

No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

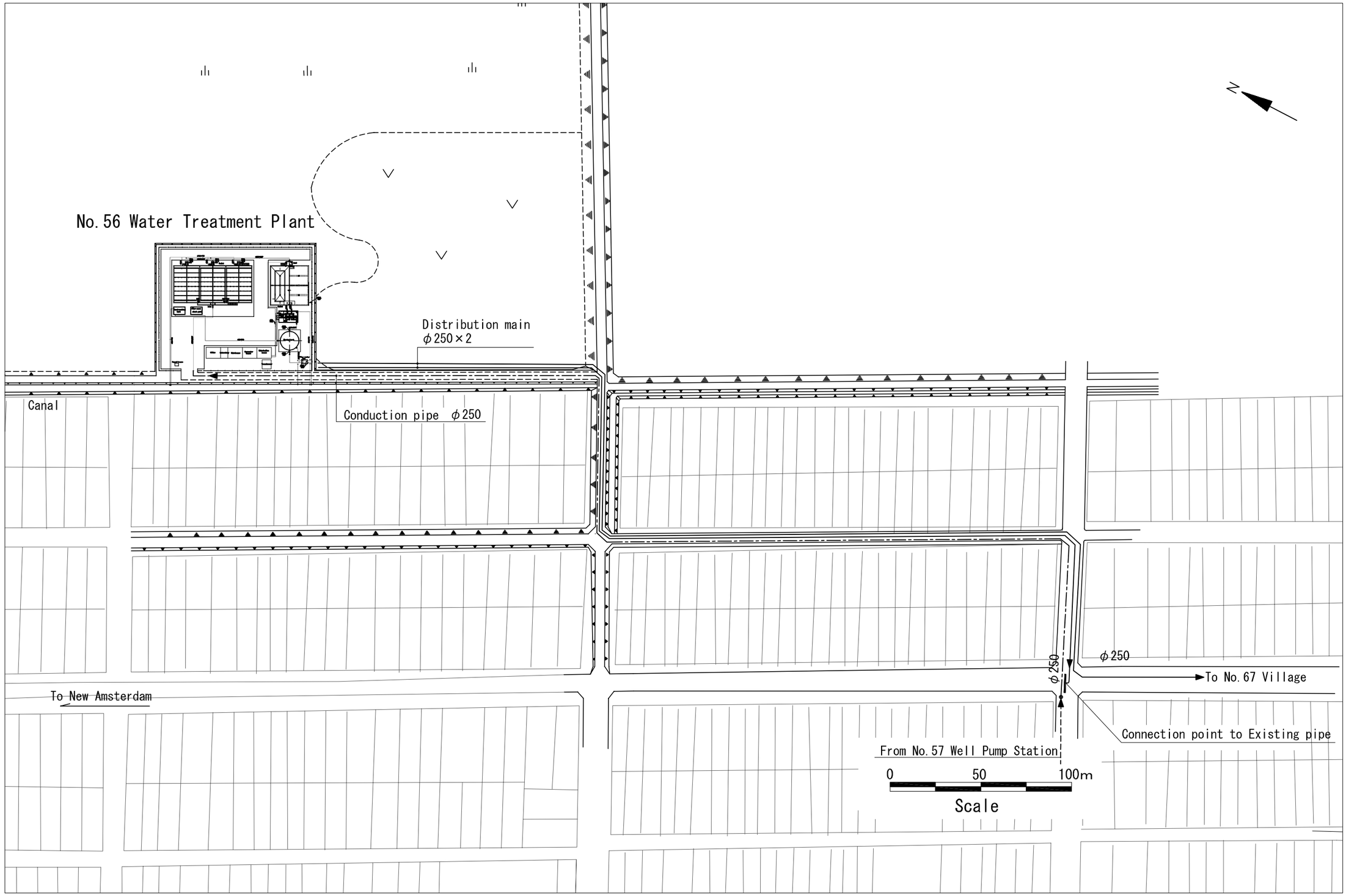
Japan International Cooperation Agency
(JICA)

Title : General Plan

Date

Scale : 1 : 100,000

No 001 REV



No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATION REPUBLIC OF GUYANA

Japan International Cooperation Agency
(JICA)

No.56 Village Water Tretment Plant

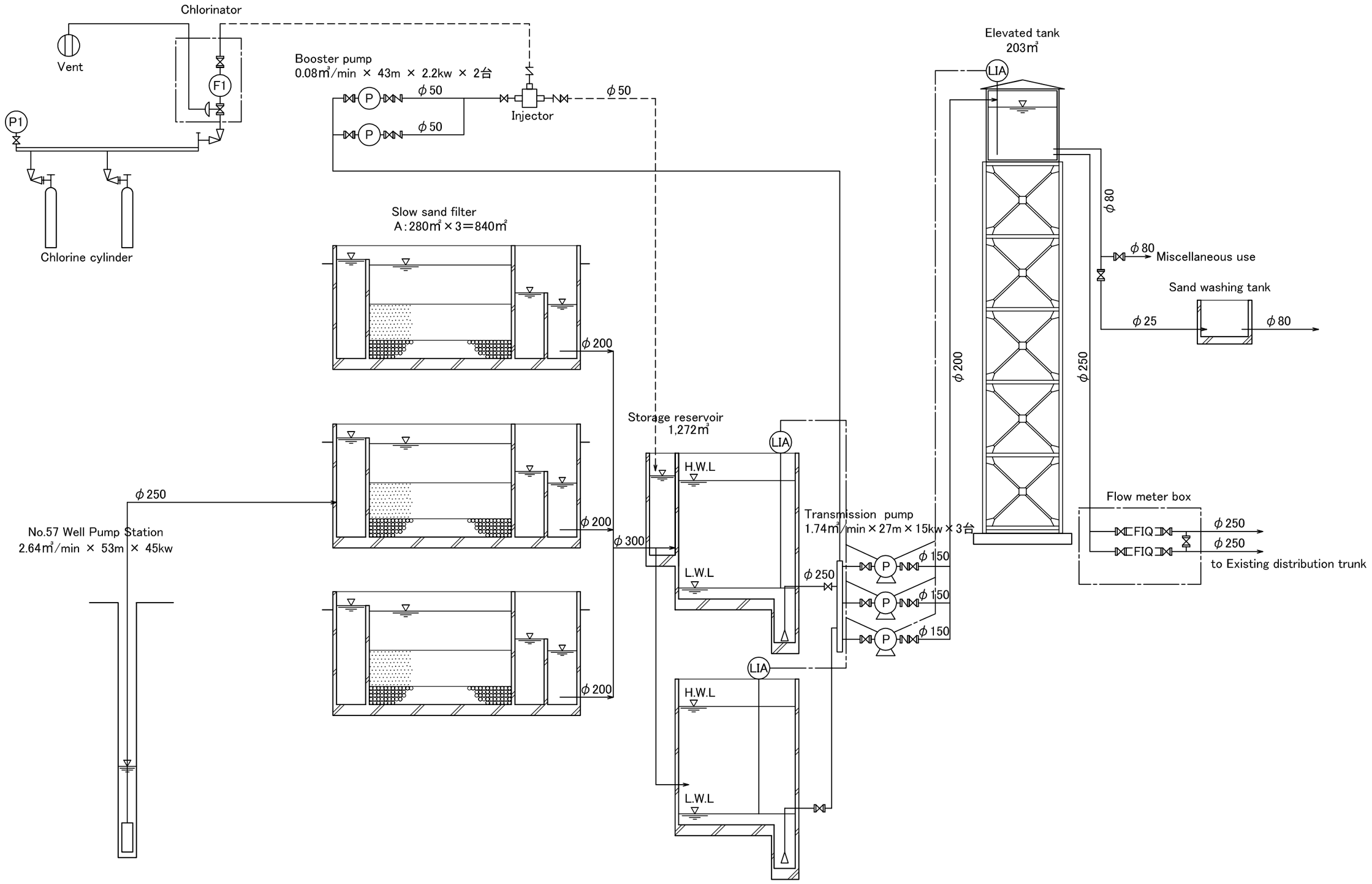
Title : General Plan

Date :

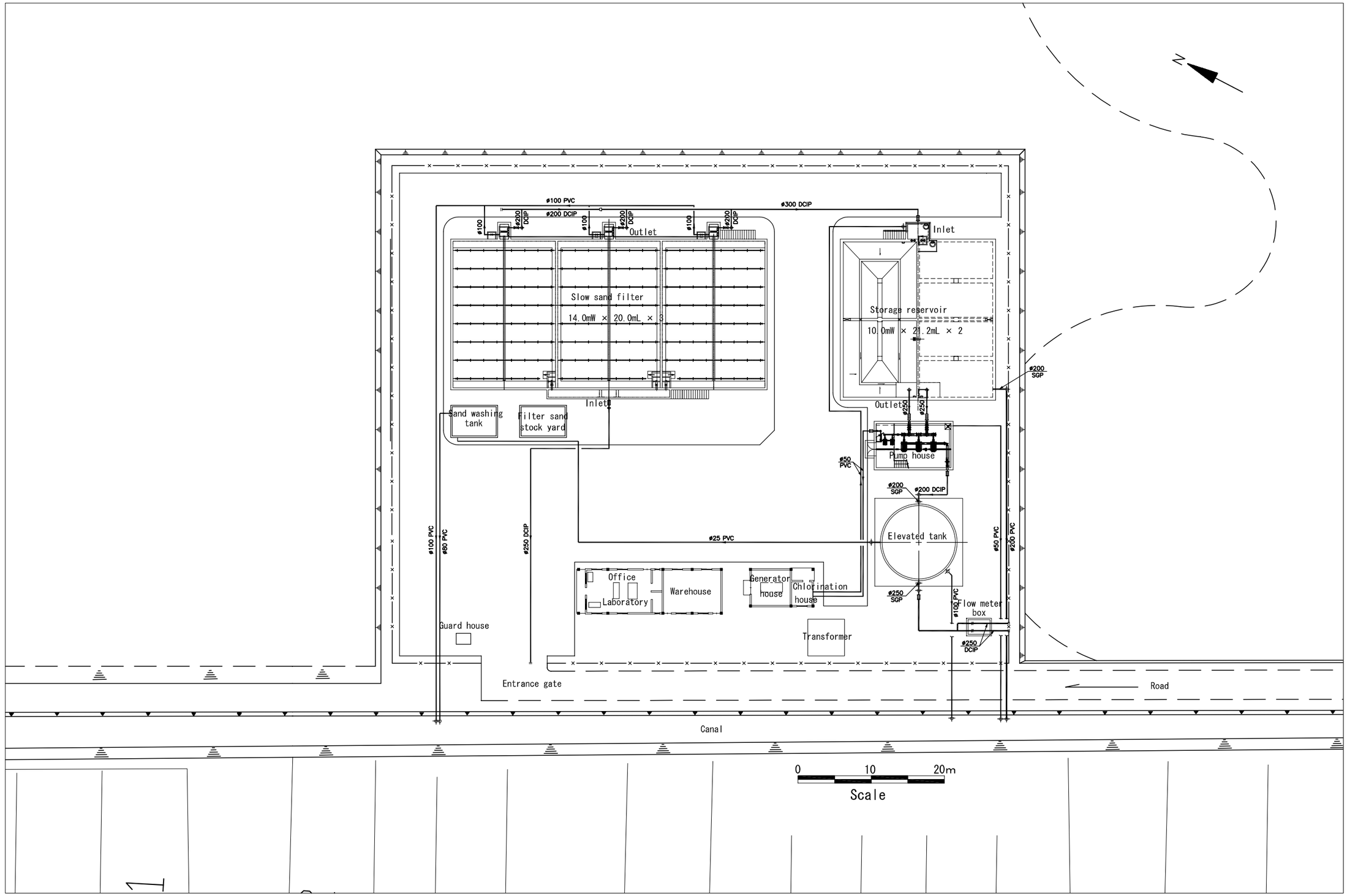
Scale : 1:2,000

No 002 REV

FLOW DIAGRAM



No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	No.56 Village Water Treatment Plant	Date :	Scale : N/S
						Title : FLOW DIAGRAM		No 003 REV ◇



No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

Japan International Cooperation Agency
(JICA)

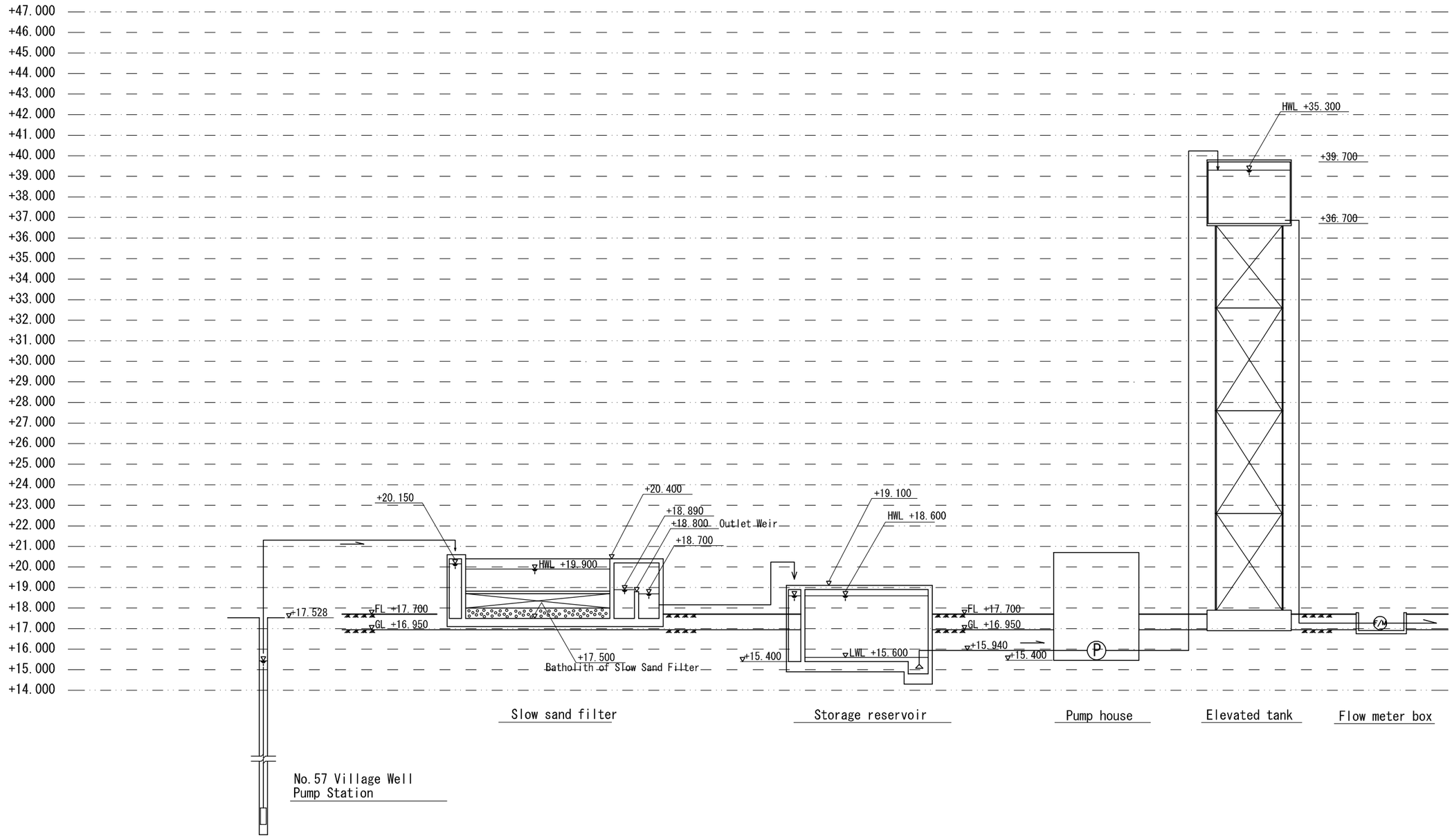
No. 56 Village Water Treatment Plant

Title : PLAN

Date

Scale : 1:500

No 004 REV



No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

Japan International Cooperation Agency
(JICA)

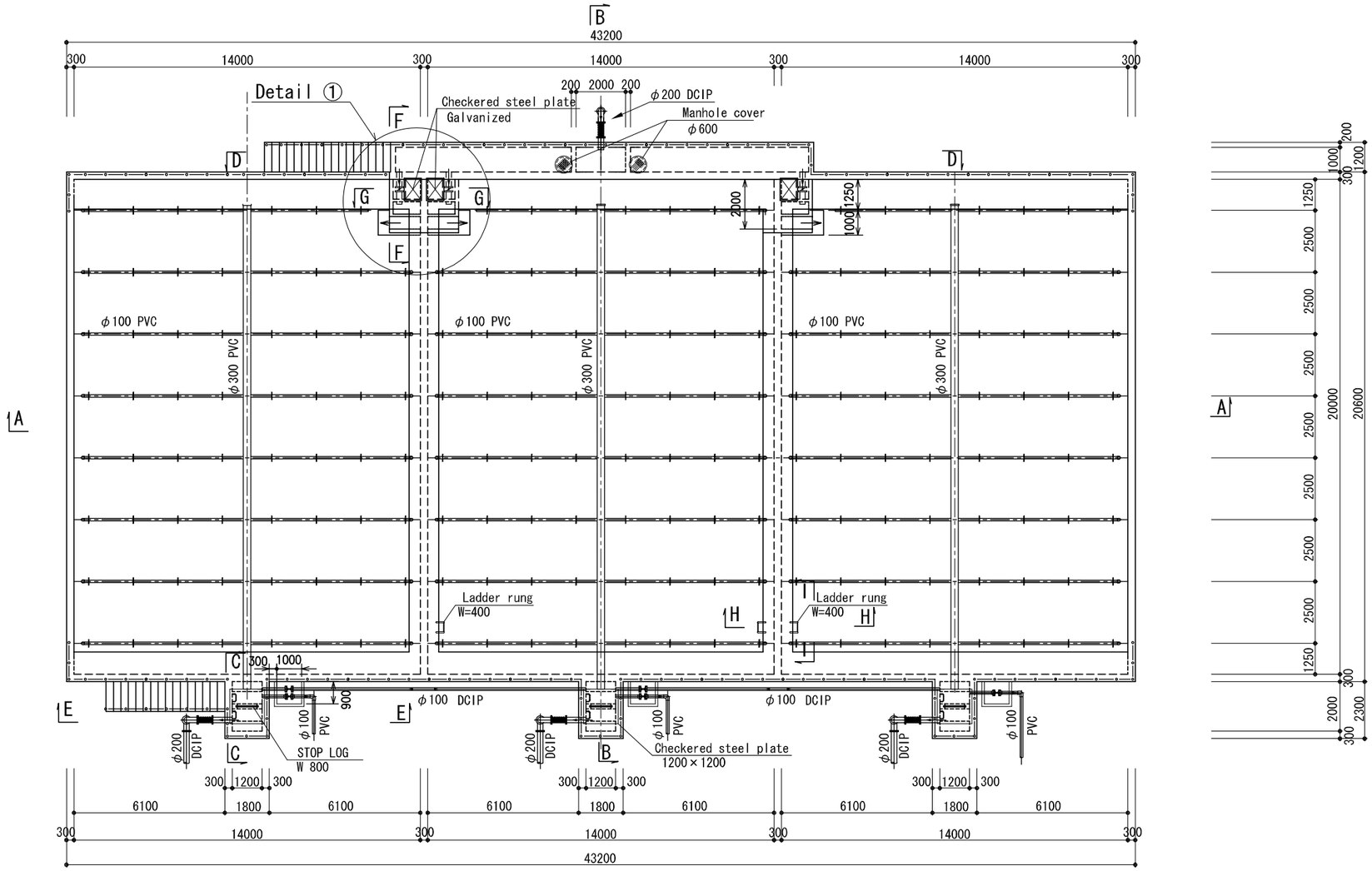
No.56 Village Water Treatment Plant

Title : Water Level Profile

Date :

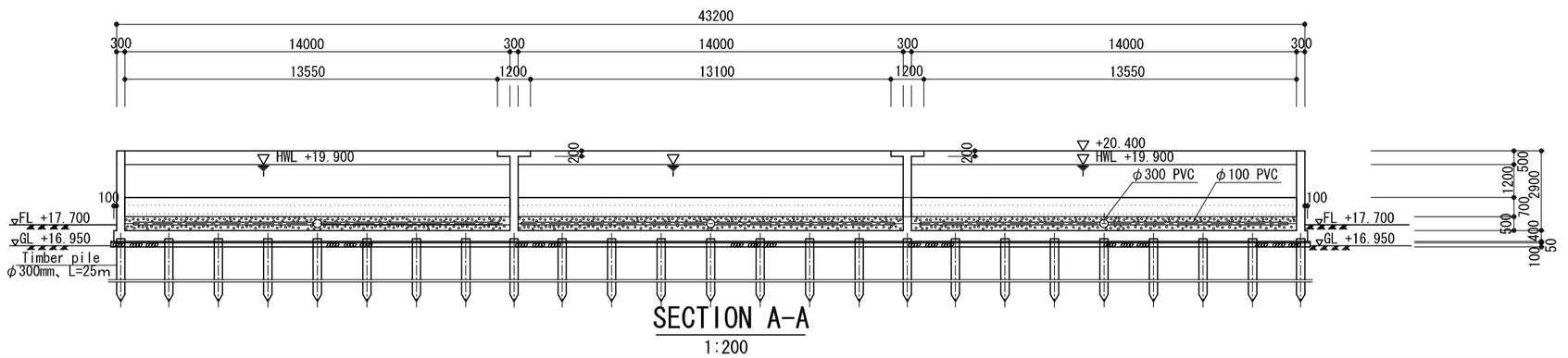
Scale : V= 1:200

No 005 REV



PLAN

1:200



SECTION A-A

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No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

Japan International Cooperation Agency
(JICA)

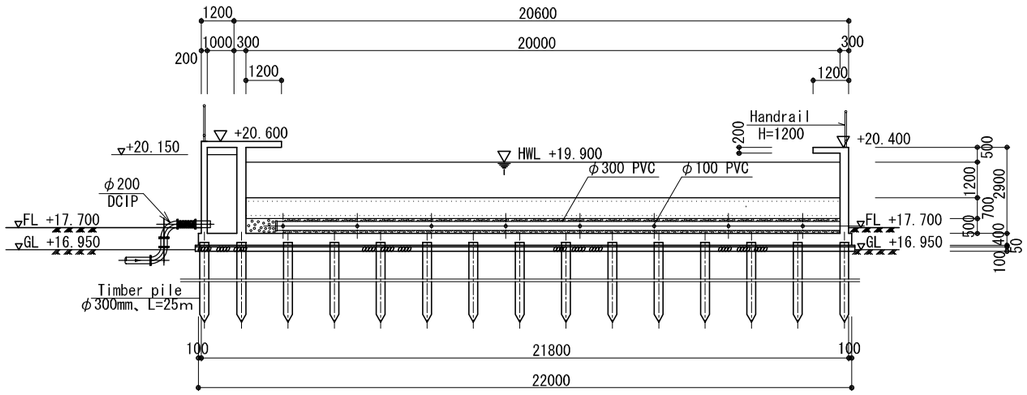
No.56 Village Water Treatment Plant

Title : Slow sand filter(1/2)

Date :

Scale : 1:200

No 006 REV



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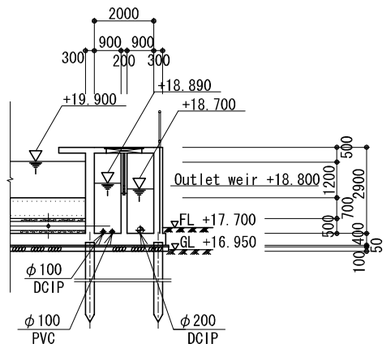

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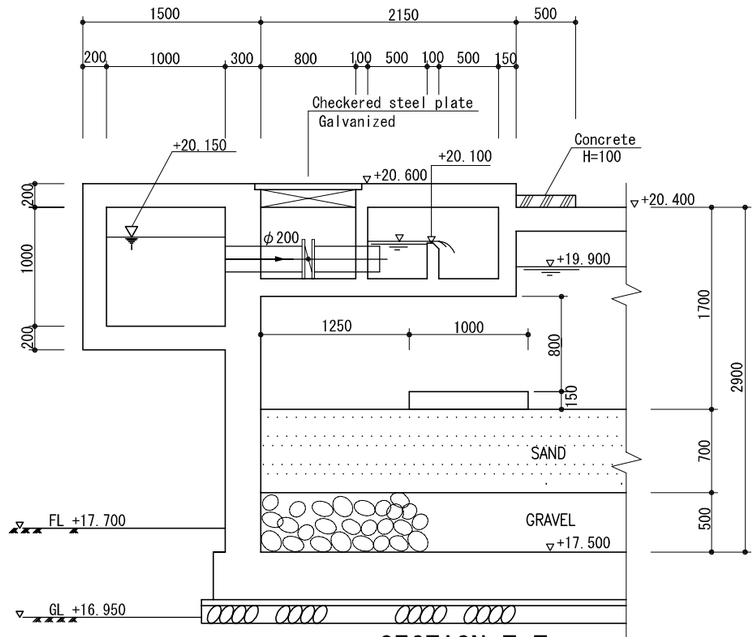

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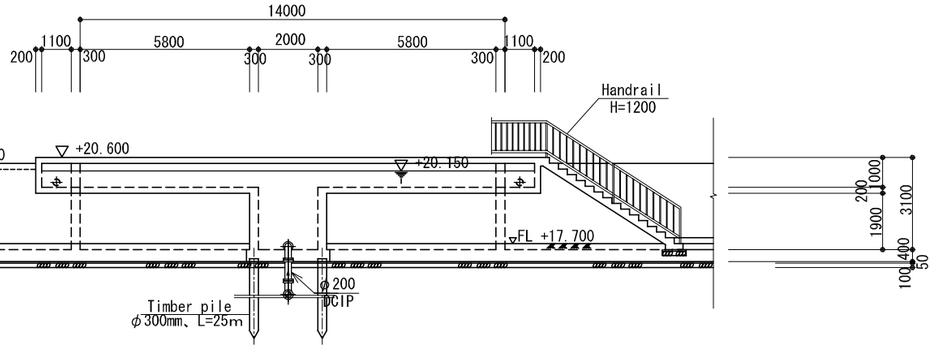

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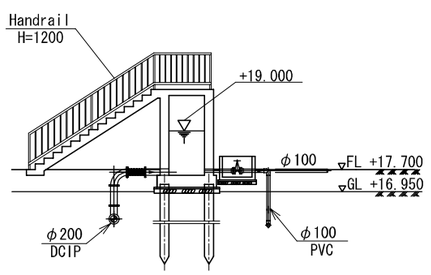
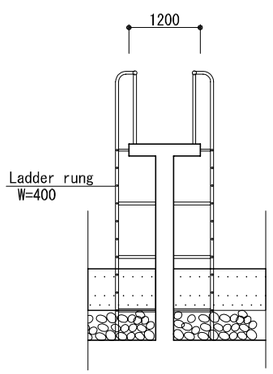


SECTION E-E



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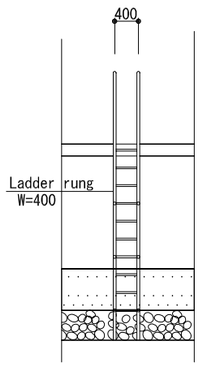

SECTION I-I
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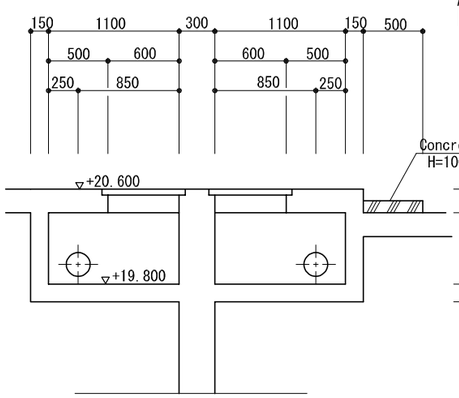
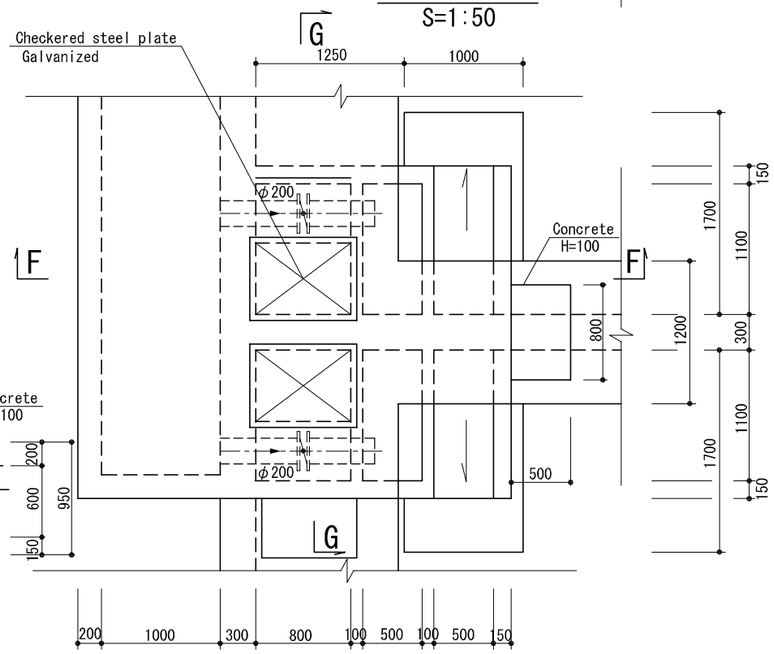


SECTION G-G



DETAIL ①

No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

Japan International Cooperation Agency
(JICA)

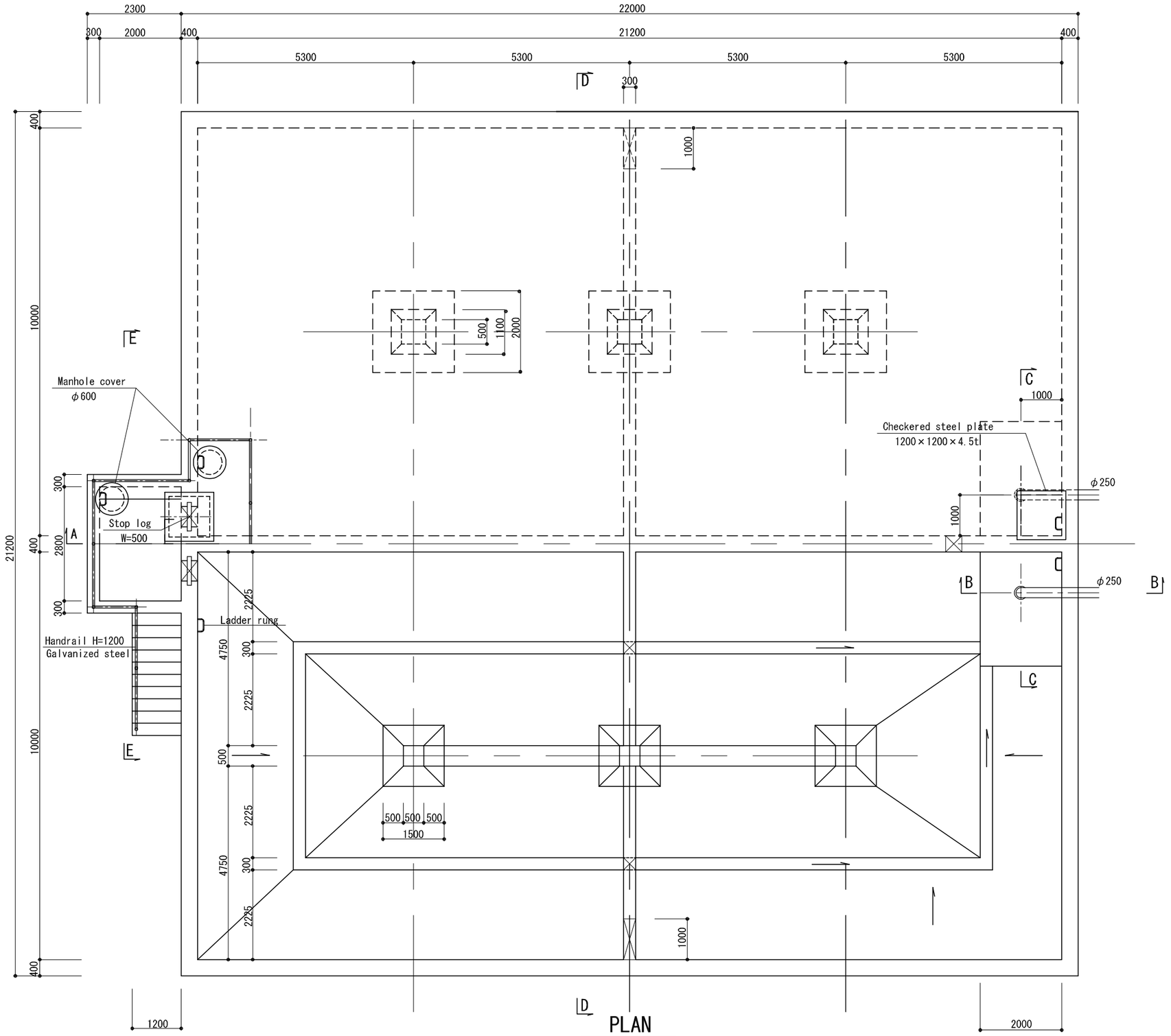
No.56 Village Water Treatment Plant

Title : Slow sand filter(2/2)

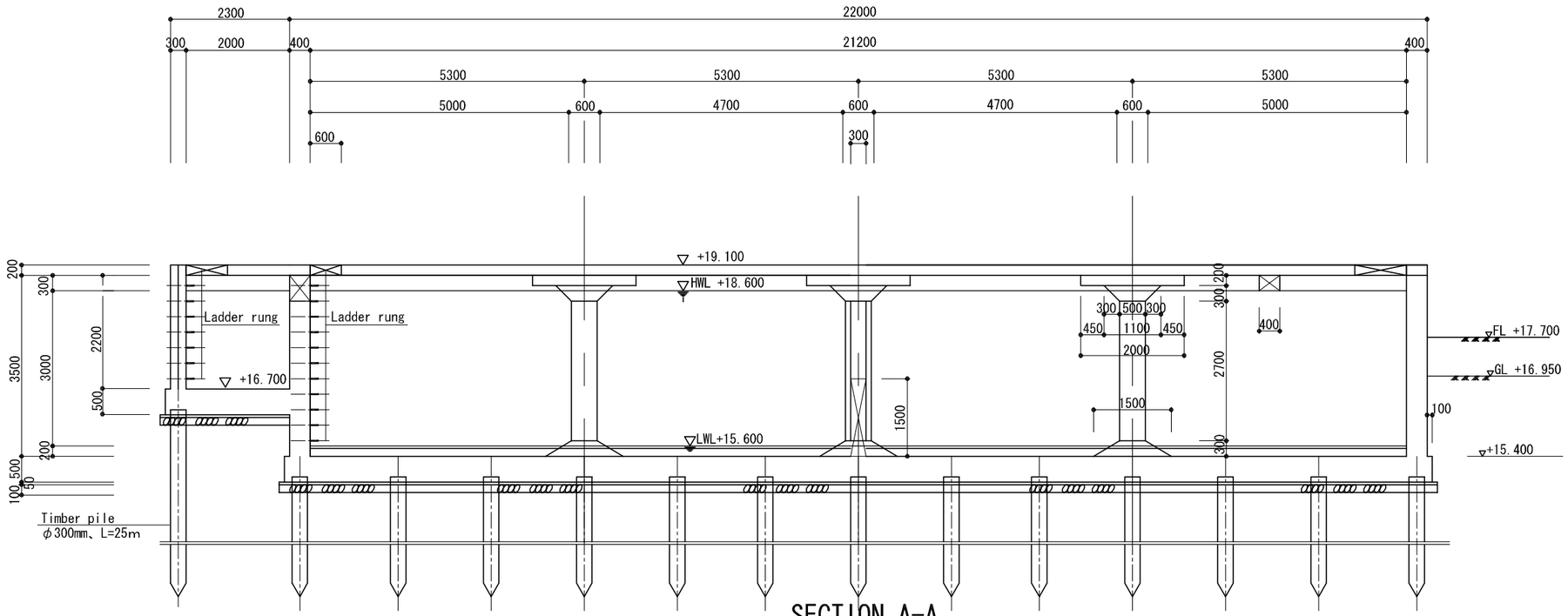
Date :

Scale : 1:200, 1:100, 1:50

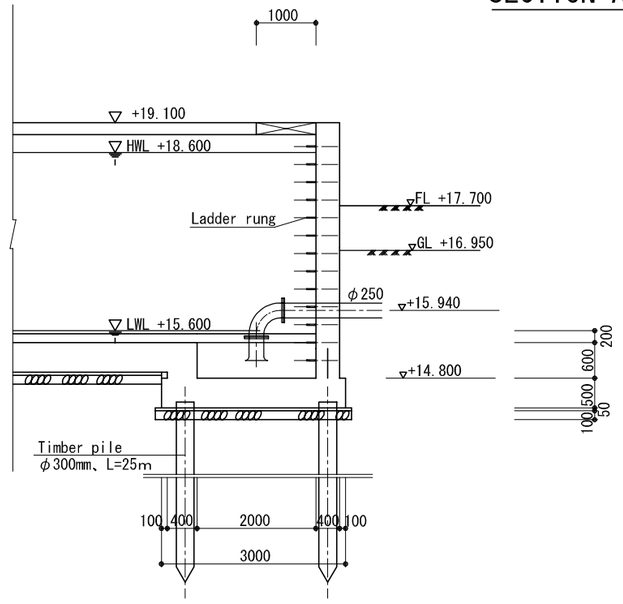
No 007 REV



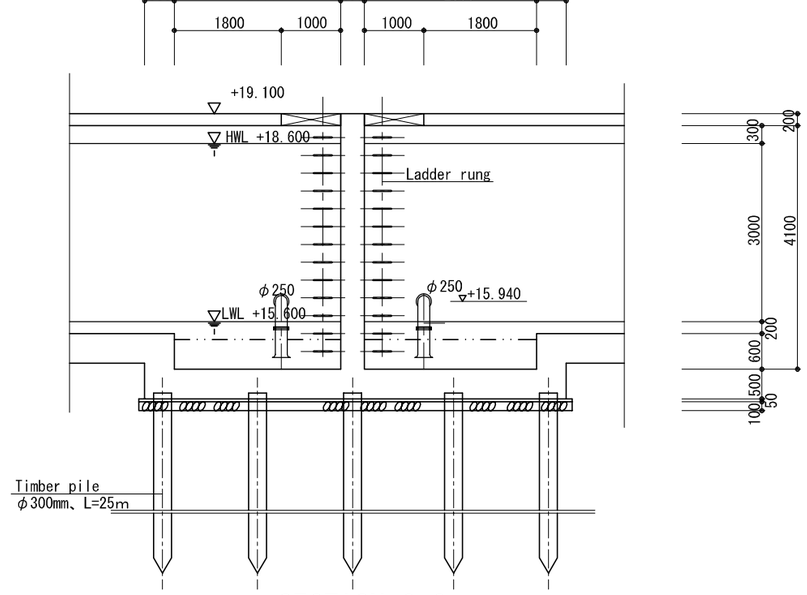
No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	No.56 Village Water Treatment Plant	Date :	Scale : 1:100
						Title : Storage reservoir (1/3)		No 008 REV



SECTION A-A

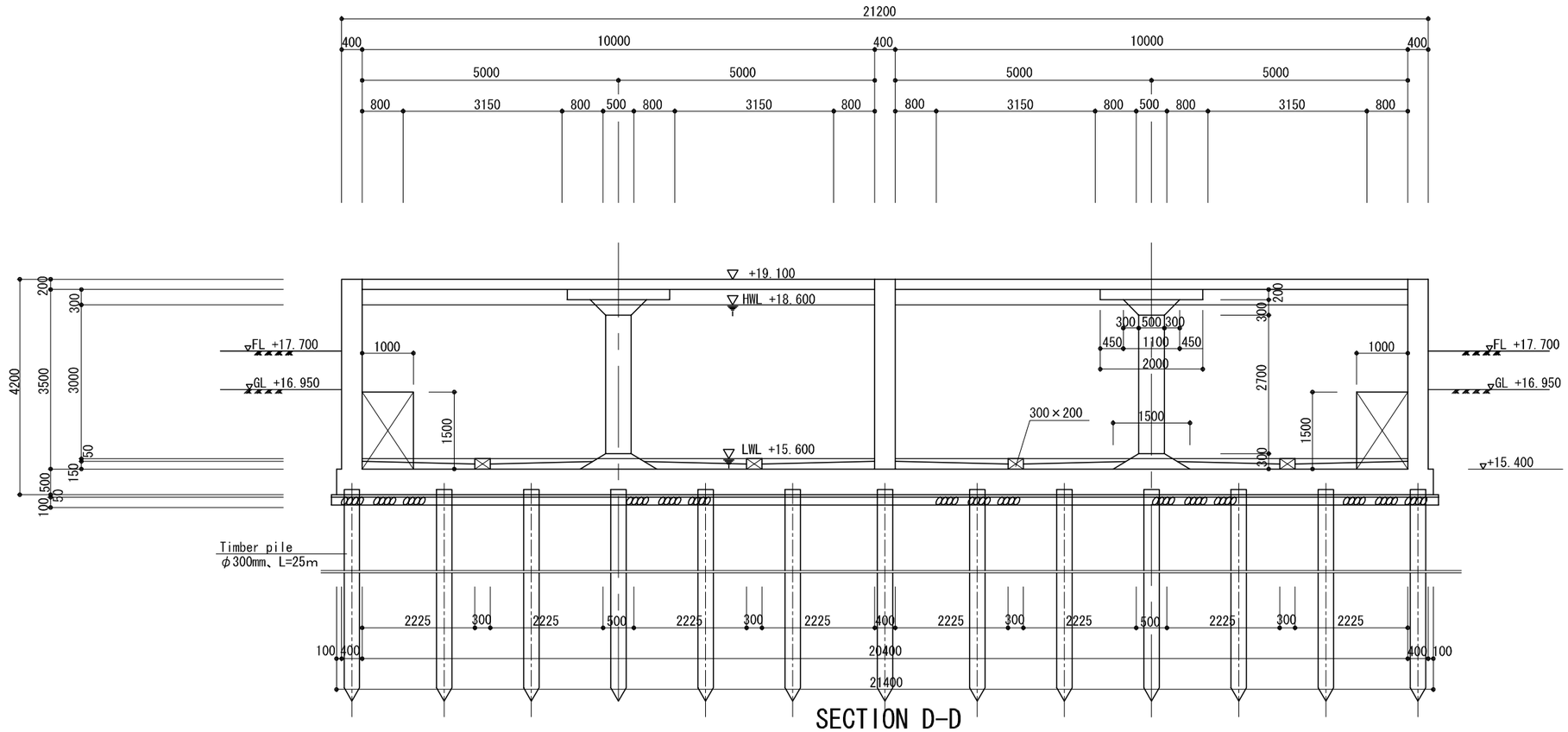


SECTION B-B

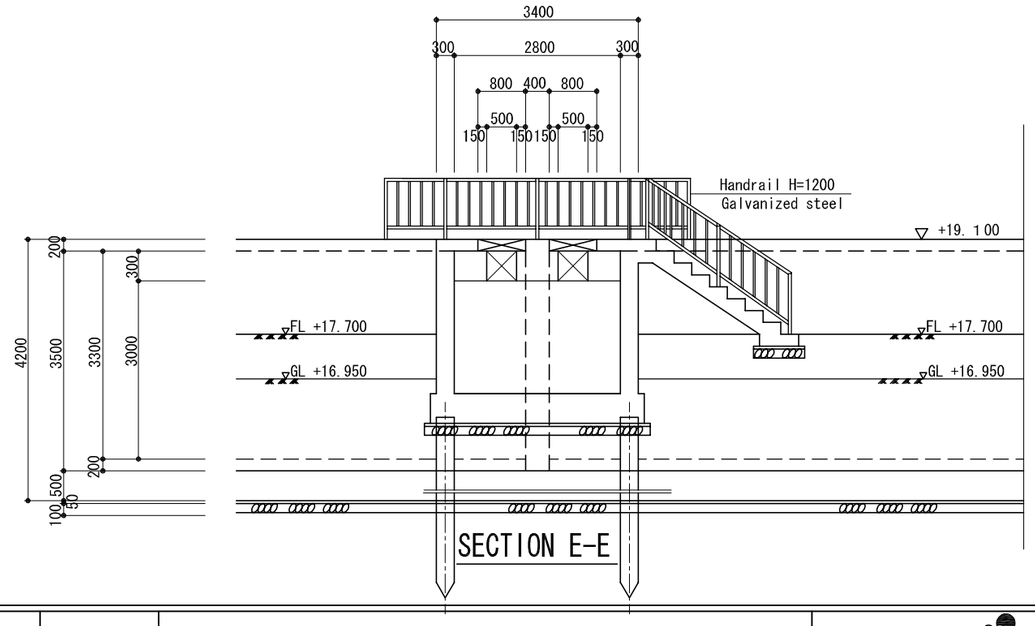


SECTION C-C

No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	No.56 Village Water Treatment Plant	Date :	Scale : 1:100
						Title : Storage reservoir(2/3)		No 009 REV



SECTION D-D

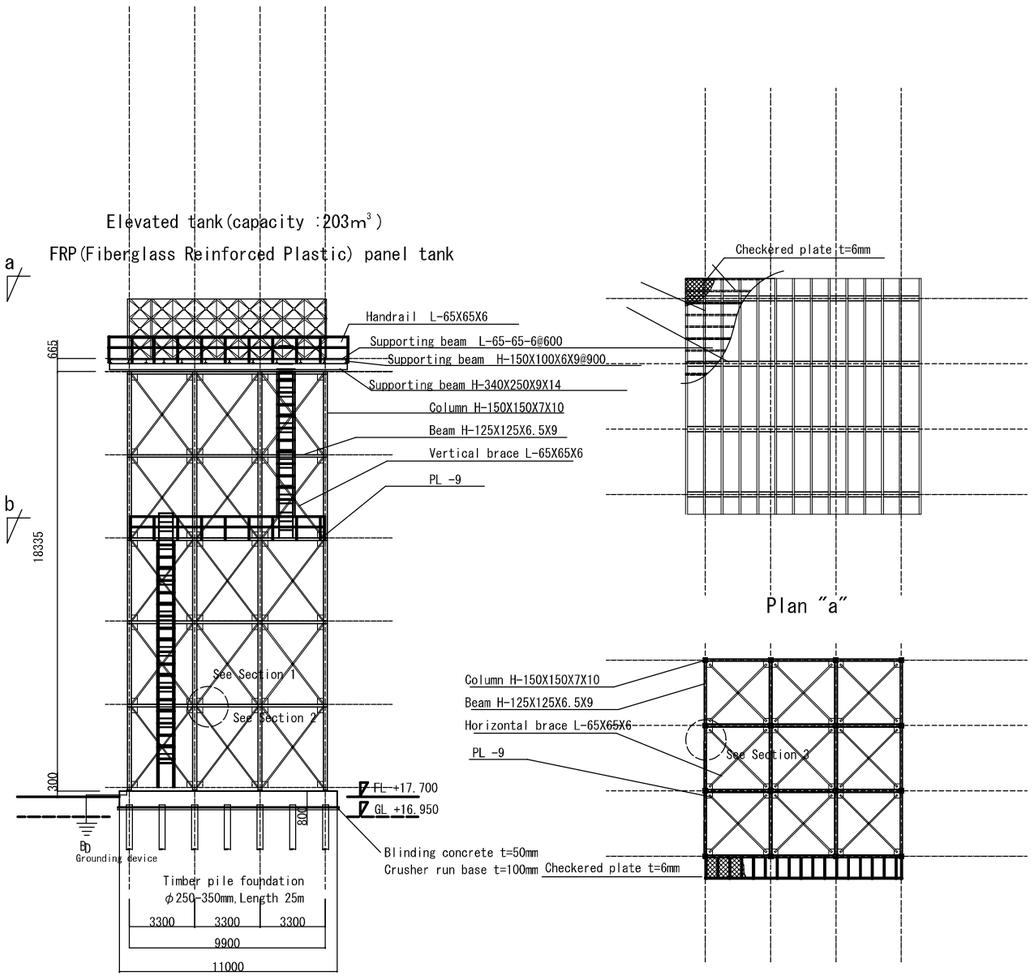


SECTION E-E

No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	No.56 Village Water Treatment Plant	Date :	Scale : 1:100
						Title : Storage reservoir(3/3)		No 010 REV ◇

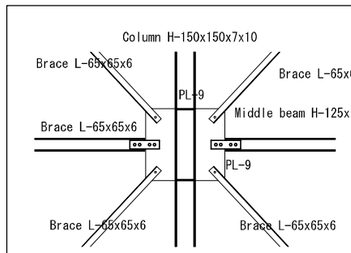
Elevated tank(capacity :203m^3)

FRP(Fiberglass Reinforced Plastic) panel tank

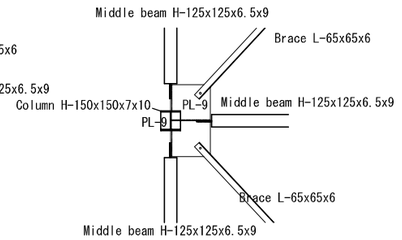


Plan "a"

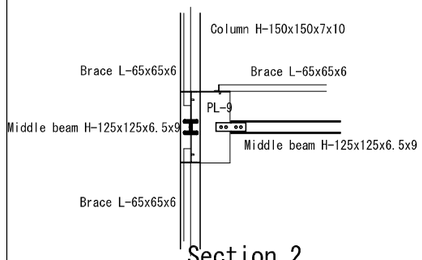
Plan "b"



Section 1



Section 3(Plan)

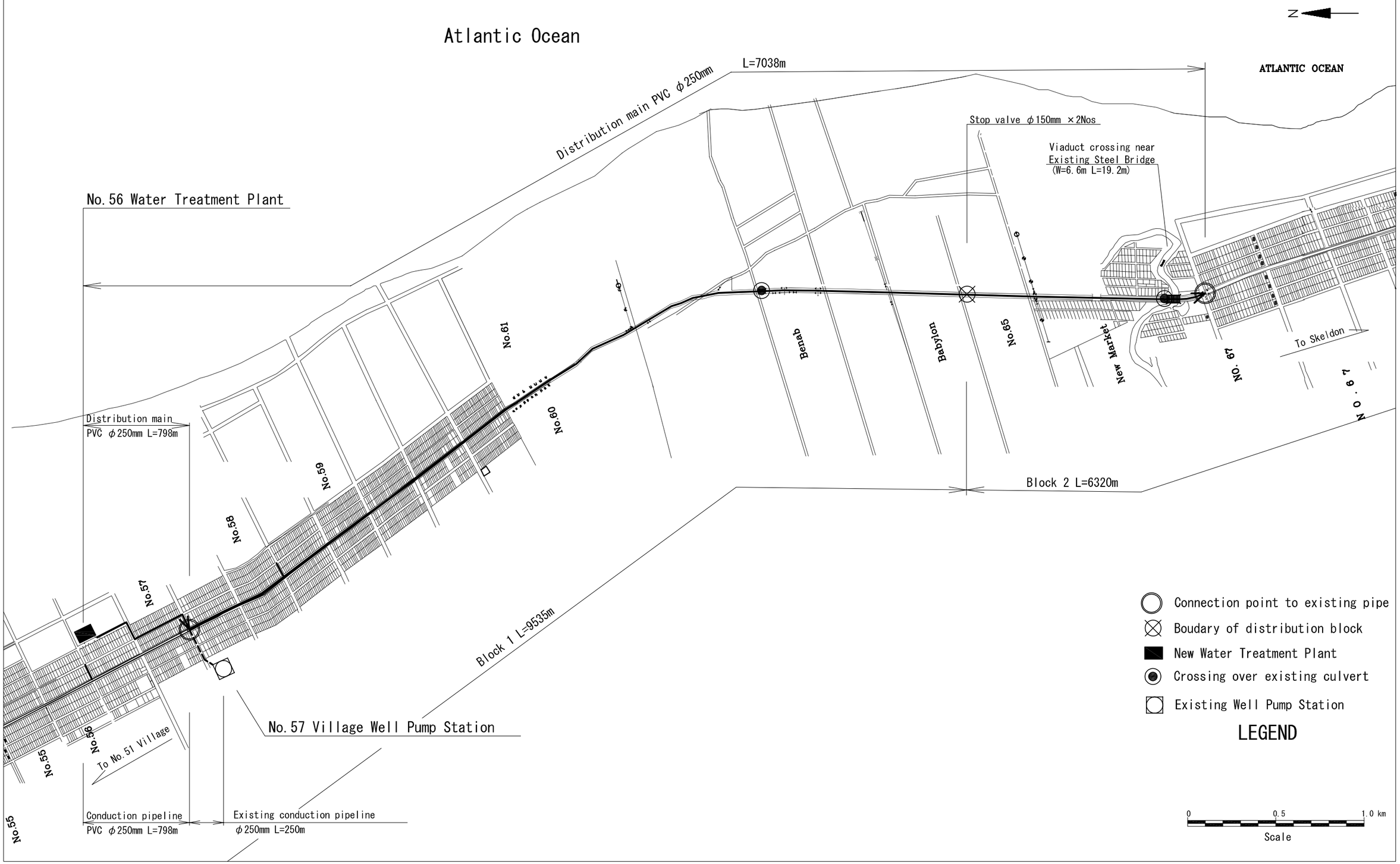


Section 2

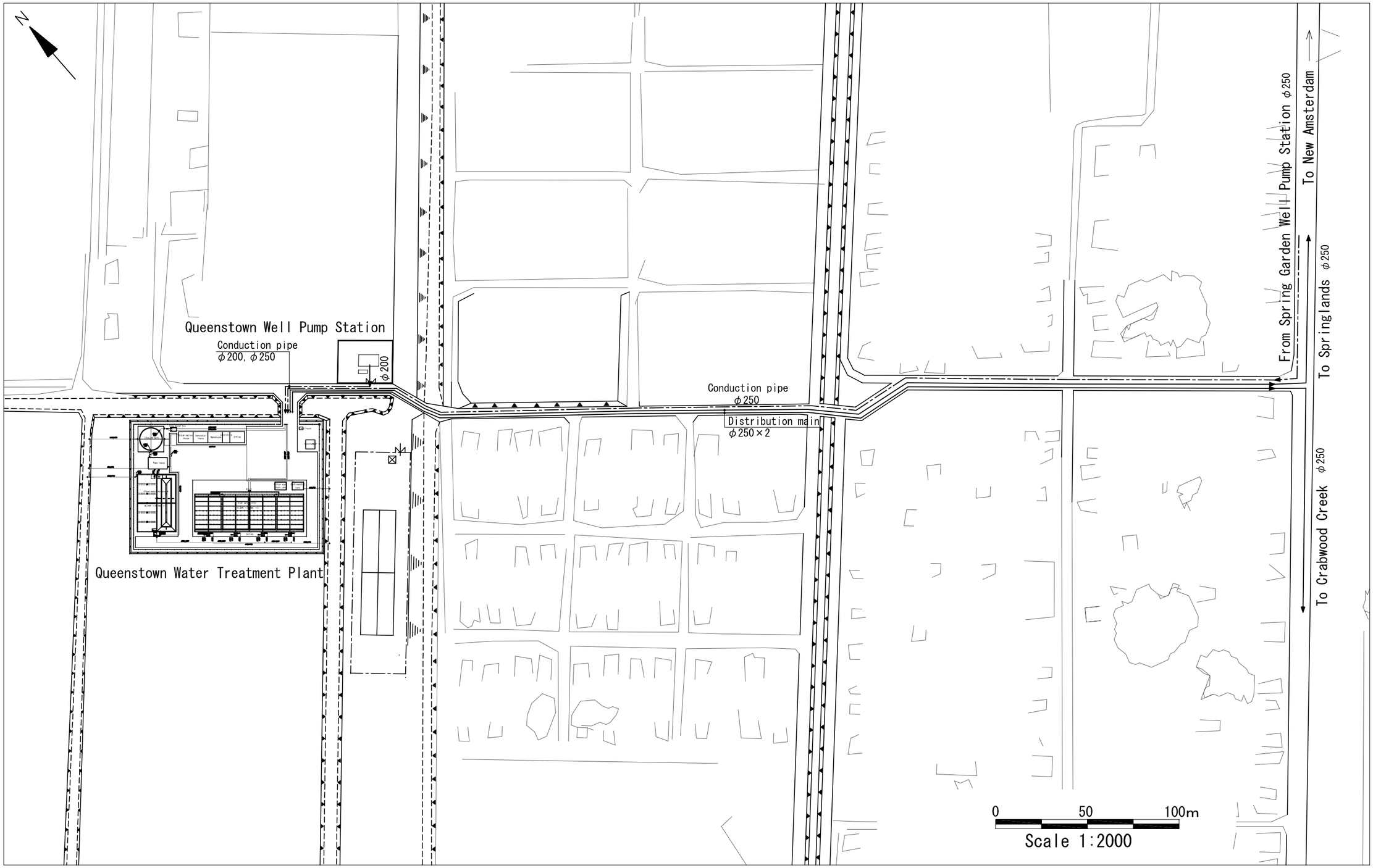
Detail of Steel Structure

Capacity =203m^3

No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	NO.56 Water Treatment Plant	Date :	Scale : 1:300
						Title : Elevated Tank		No 011 REV



No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	No.56 Village Water Treatment Plant	Date :	Scale :	1:20,000
						Title : General Plan of Pipeline		No 012	REV ◇



No	Date	Approved	Rrvised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

Japan International Cooperation Agency
(JICA)

Queenstown Water Treatment Plant

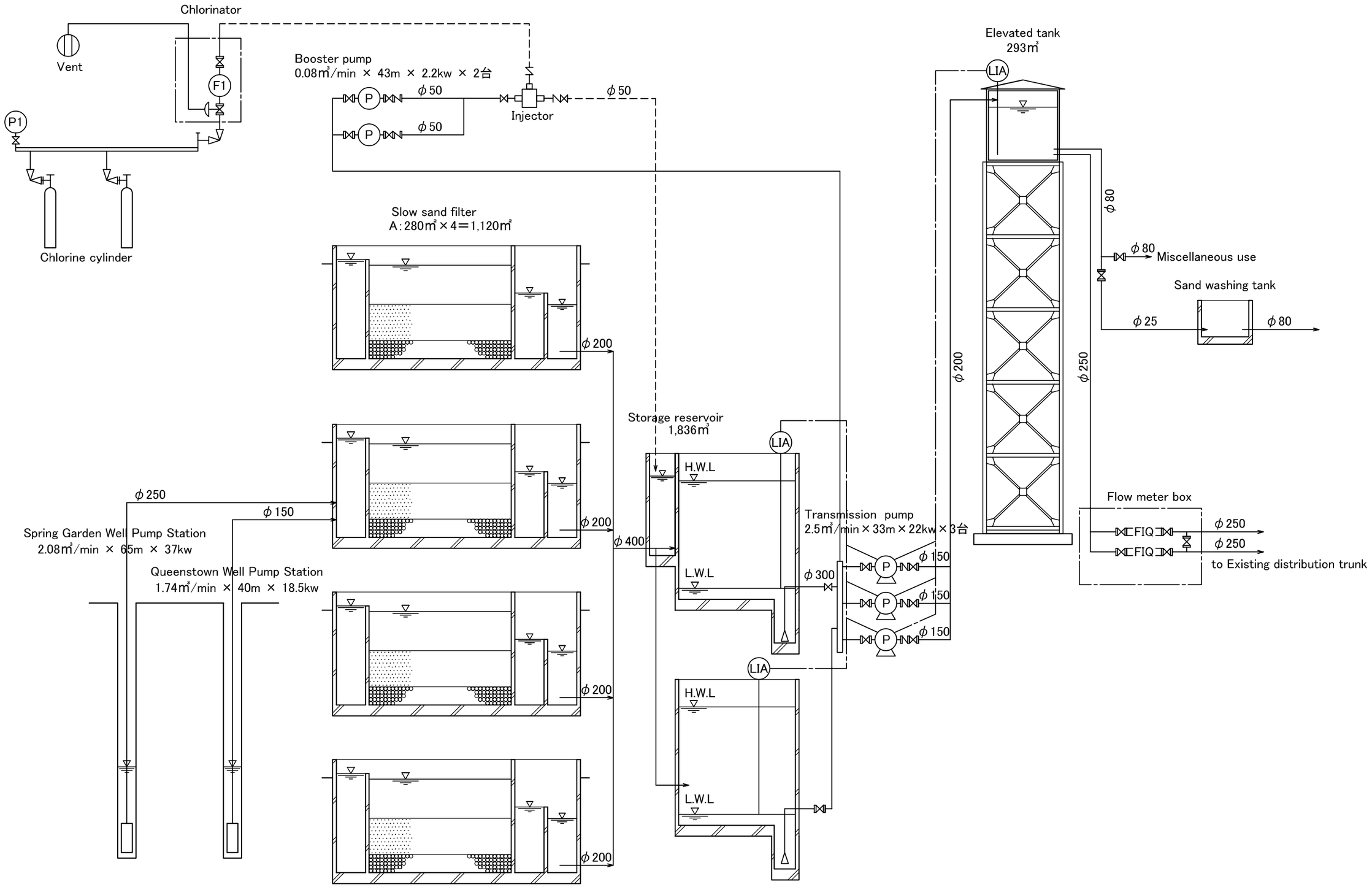
Title : General Plan

Date :

Scale : 1:2,000

No 013 REV

FLOW DIAGRAM



No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	Queenstown Water Treatment Plant	Date :	Scale : N/S
						Title : FLOW DIAGRAM		No 014 REV ◇

N

Canal

Flow meter box

ø250 DCIP
ø250 DCIP

ø250 SGP

Elevated tank

ø100 PVC

ø200 SGP

ø200 DCIP

ø50 PVC

Chlorination house

Generator house

Warehouse

Office

Laboratory

ø25 PVC

ø250 DCIP

ø200 DCIP

Guard house

Transformer

Pump house

ø50 PVC

ø200 SGP

ø200 PVC

ø300

ø300

Clear water reservoir

10.0mW ×30.6mL ×2

ø50 PVC

Filter sand stock yard

Sand washing tank

ø80 PVC

Inlet

Slow sand filter

14.5mW ×20.0mL ×4

Outlet

ø400 DCIP

ø200 DCIP

ø100

ø400 DCIP

ø200 DCIP

ø100

ø200 DCIP

ø200 DCIP

ø100

ø100 PVC

ø100 PVC

Canal

0 10 20m

Scale

No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

Japan International Cooperation Agency
(JICA)

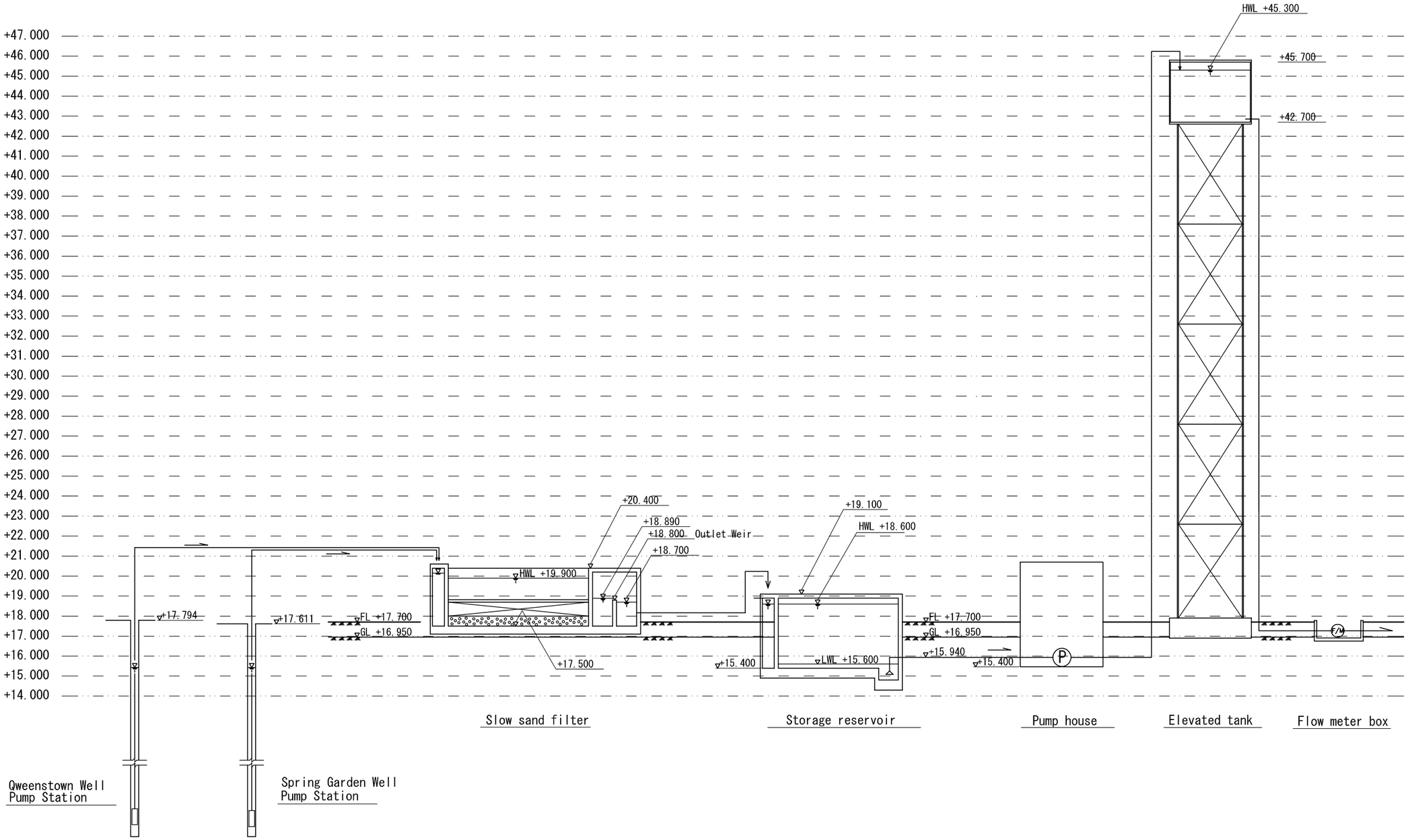
Queenstown Water Treatment Plant

Title : PLAN

Date

Scale : 1:500

No 015 REV



No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA

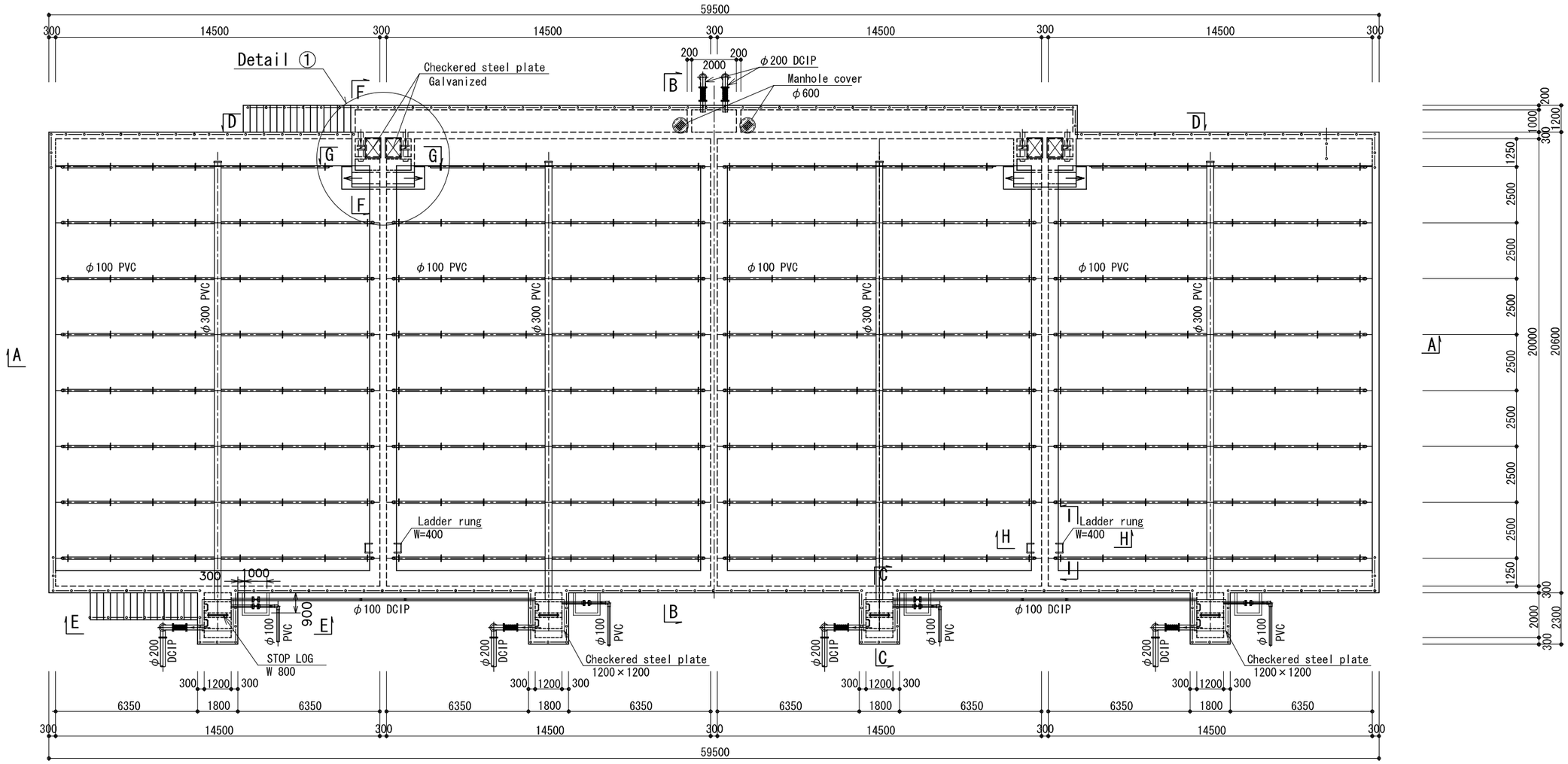
Japan International Cooperation Agency (JICA)

Queenstown Water Treatment Plant

Title : Water Level Profile

Scale : V= 1:200

No 016 REV



No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

Japan International Cooperation Agency
(JICA)

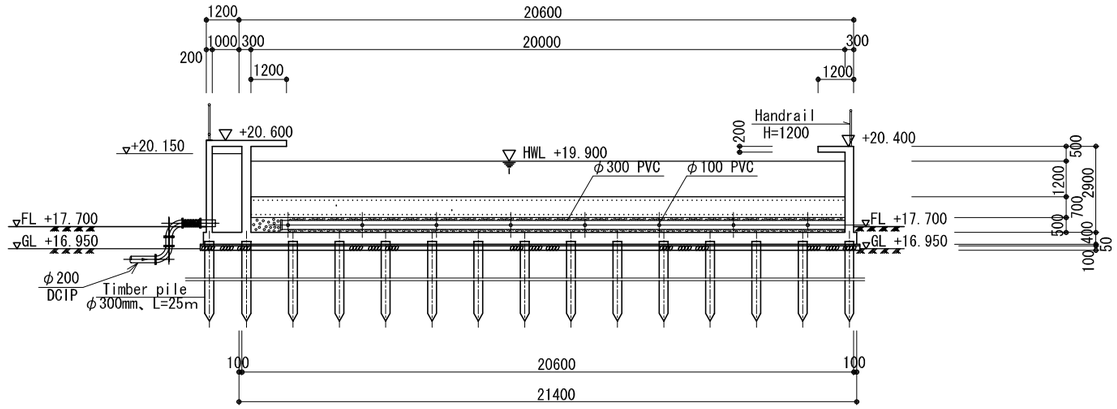
Queenstown Water Treatment Plant

Title : Slow sand filter(1/2)

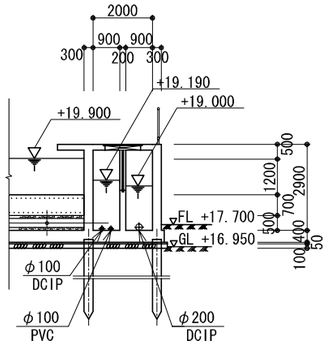
Date :

Scale : 1:200

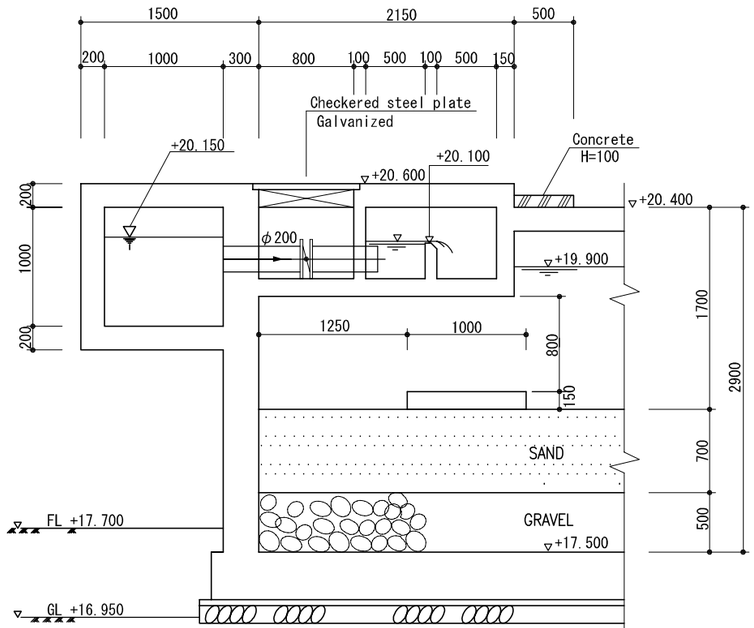
No 017 REV



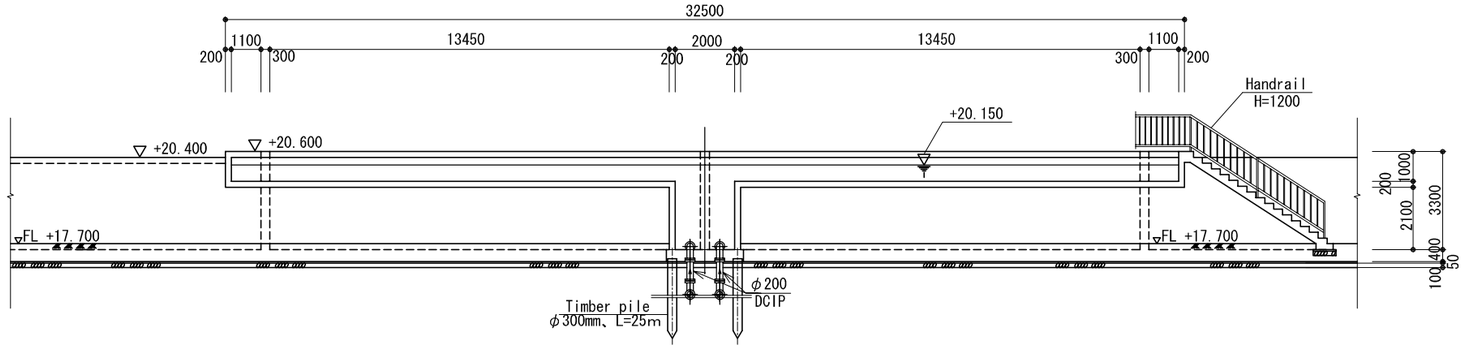
SECTION B-B



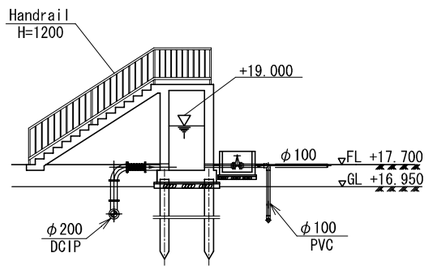
SECTION C-C



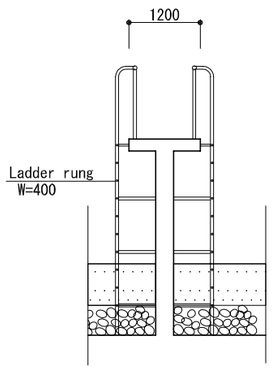
SECTION F-F
S=1:50



SECTION D-D



SECTION E-E



SECTION H-H
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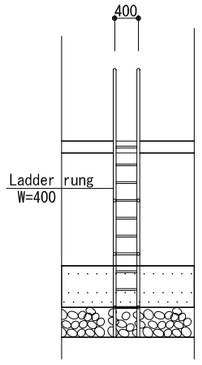
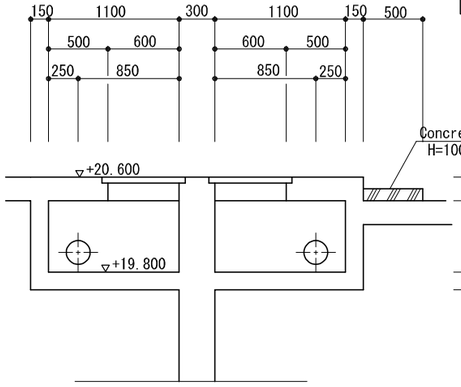
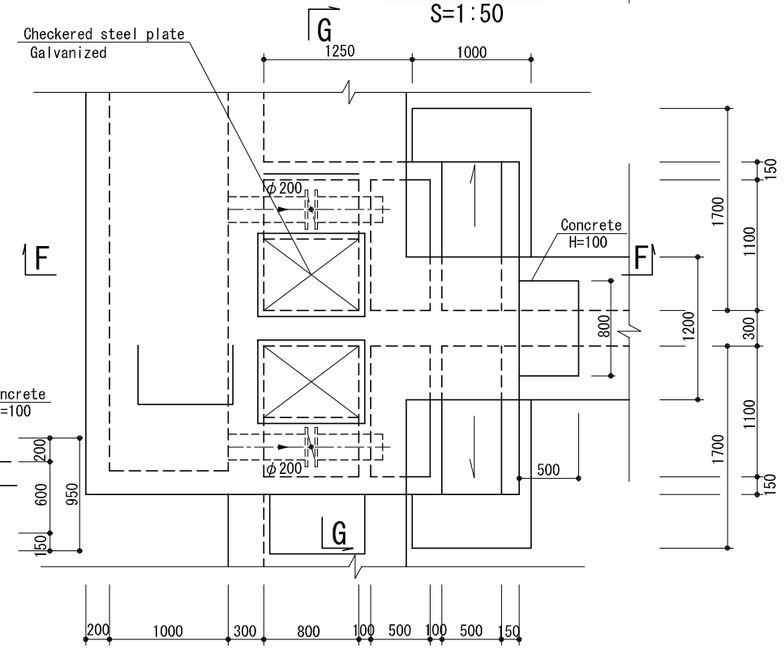


SECTION I-I
S=1:100



SECTION G-G



DETAIL ①

No	Date	Approved	Revised
◇			
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THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

JICA
Japan International Cooperation Agency
(JICA)

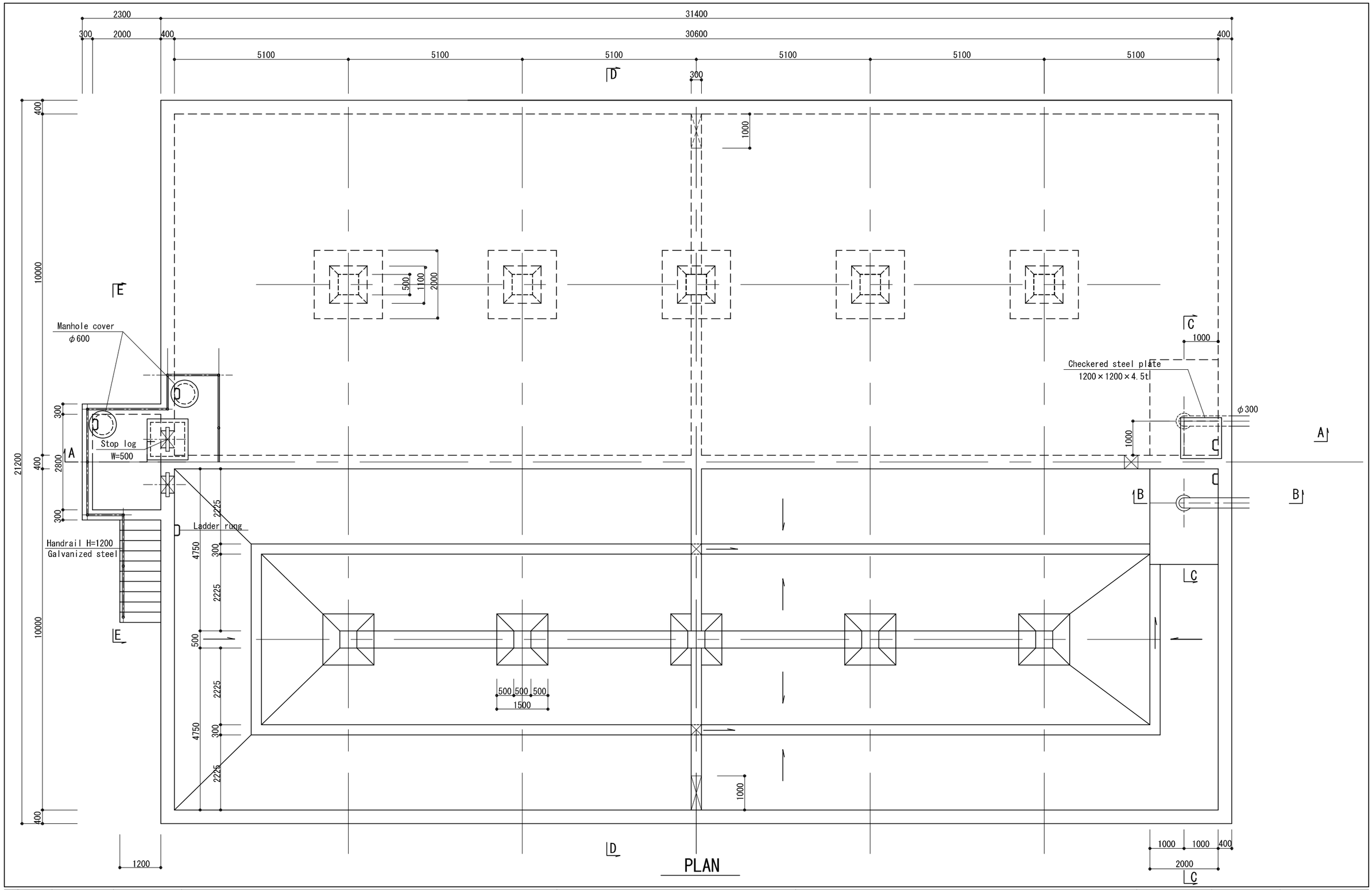
Queenstown Water Treatment Plant

Title : Slow sand filter(2/2)

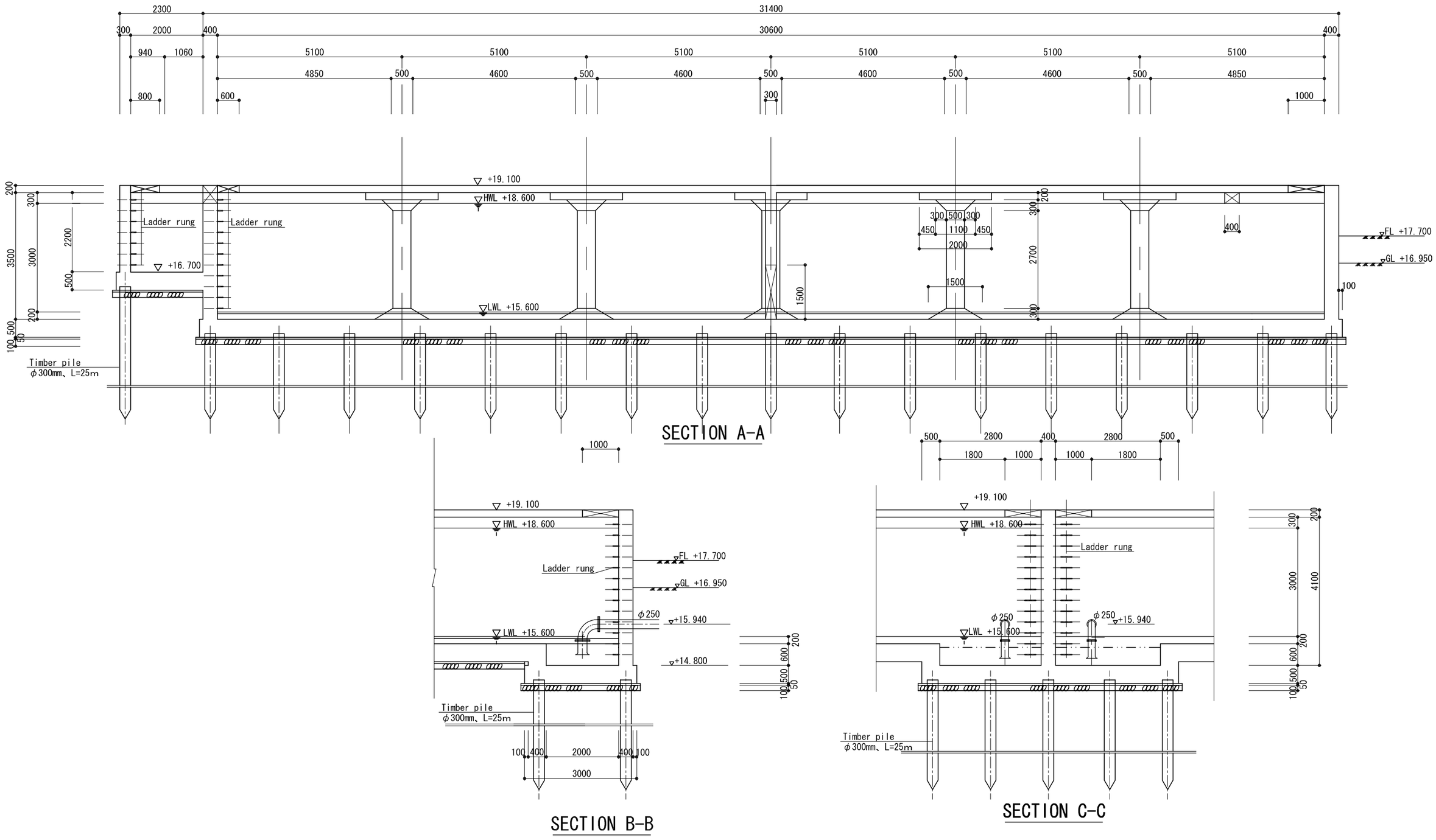
Date :

Scale : 1:200,1:100,1:50

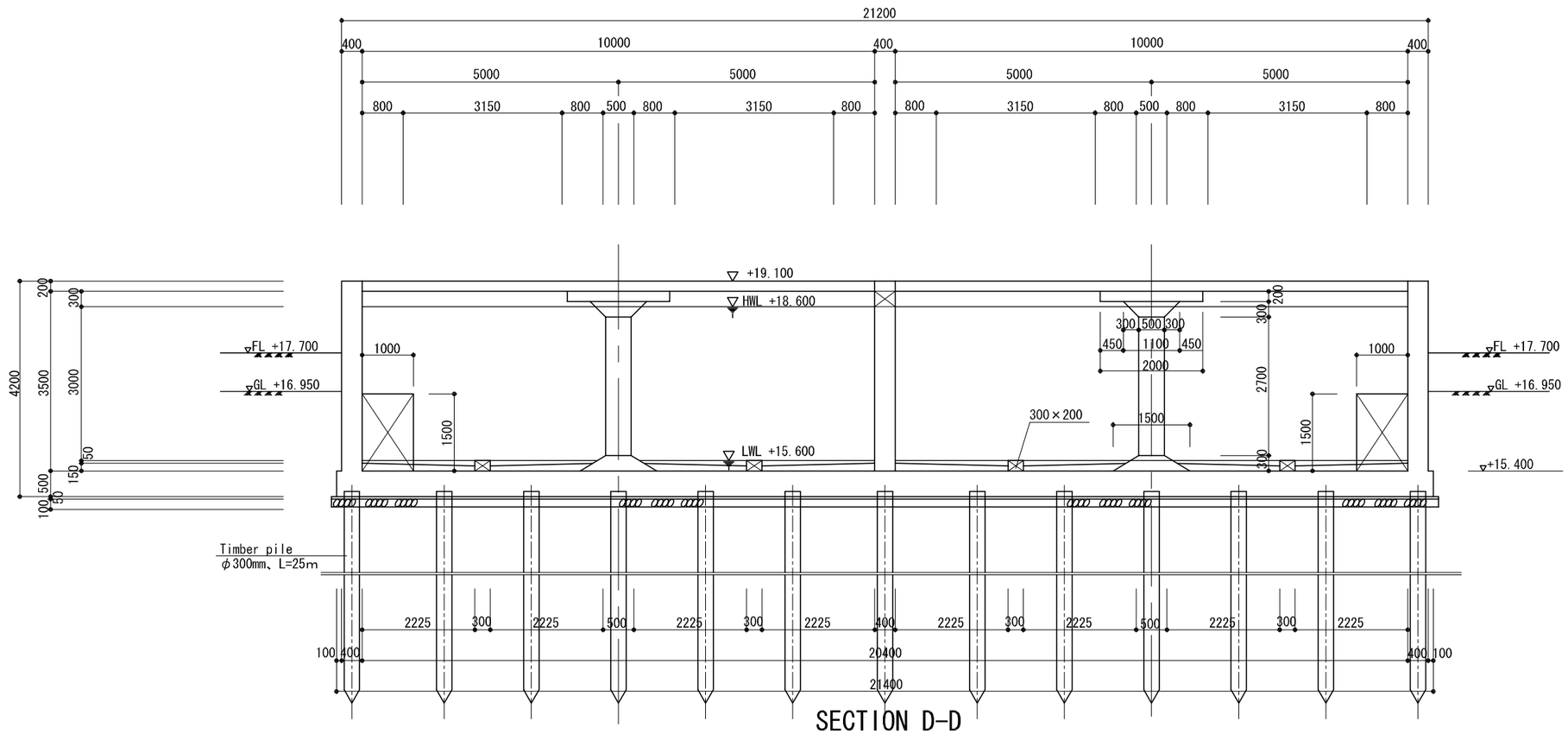
No 018 REV ◇



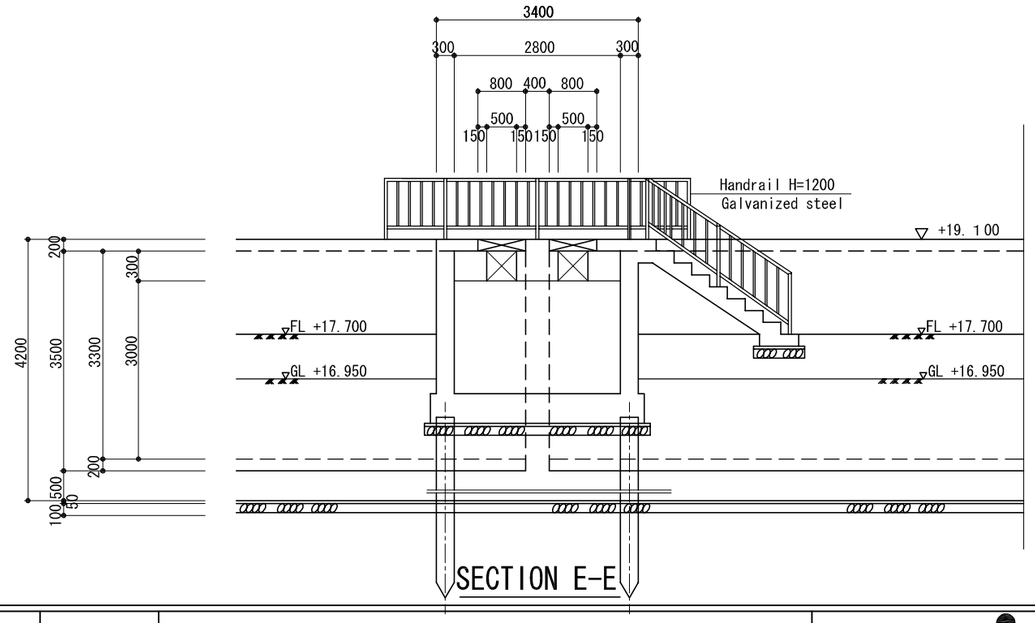
No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	Queenstown Water Treatment Plant	Date :	Scale : 1:100
						Title : Storage reservoir (1/3)		No 019 REV



No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	Queenstown Water Treatment Plant	Date :	Scale : 1:100
						Title : Storage reservoir(2/3)		No 020 REV



SECTION D-D



SECTION E-E

No	Date	Approved	Revised

THE PROJECT FOR WATER SUPPLY IN CORRIVERTON
IN THE CO-OPERATIVE REPUBLIC OF GUYANA

Japan International Cooperation Agency
(JICA)

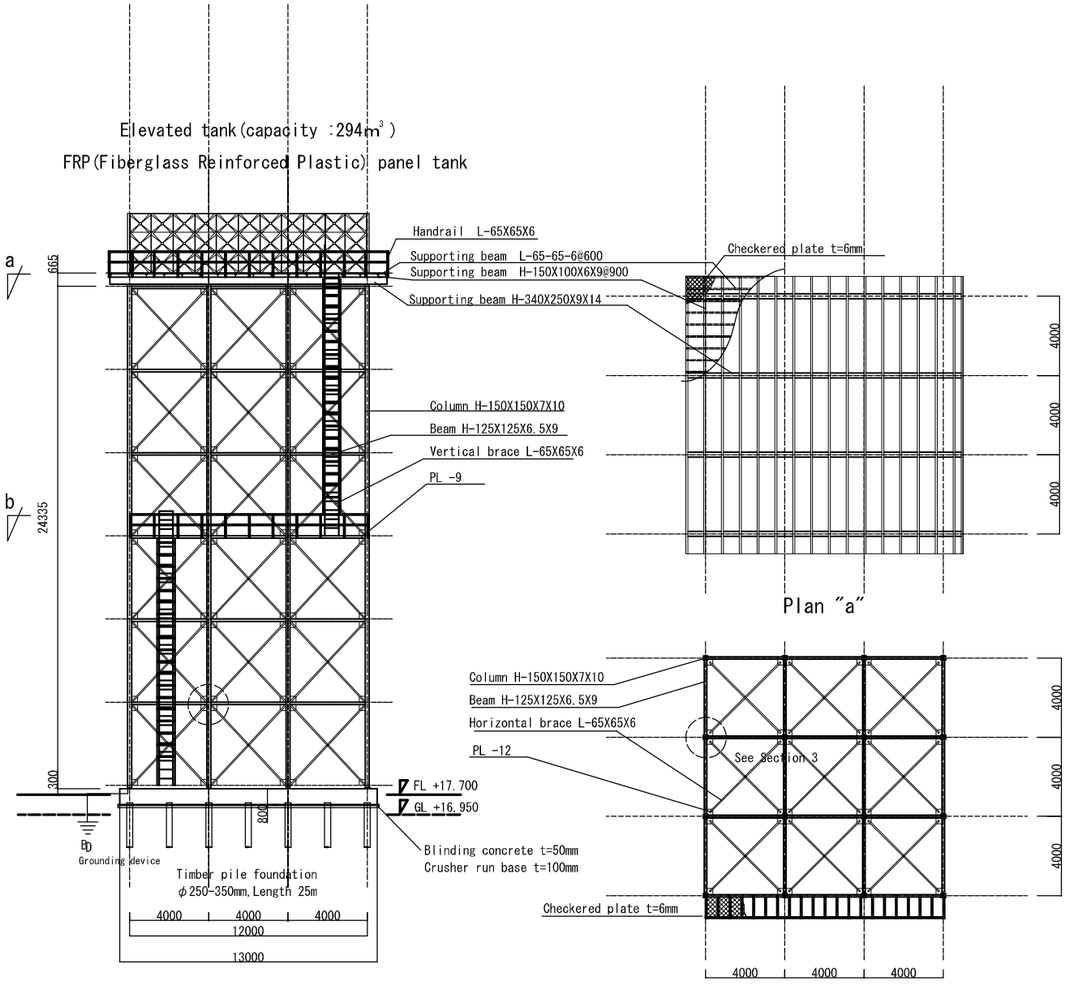
Queenstown Water Treatment Plant

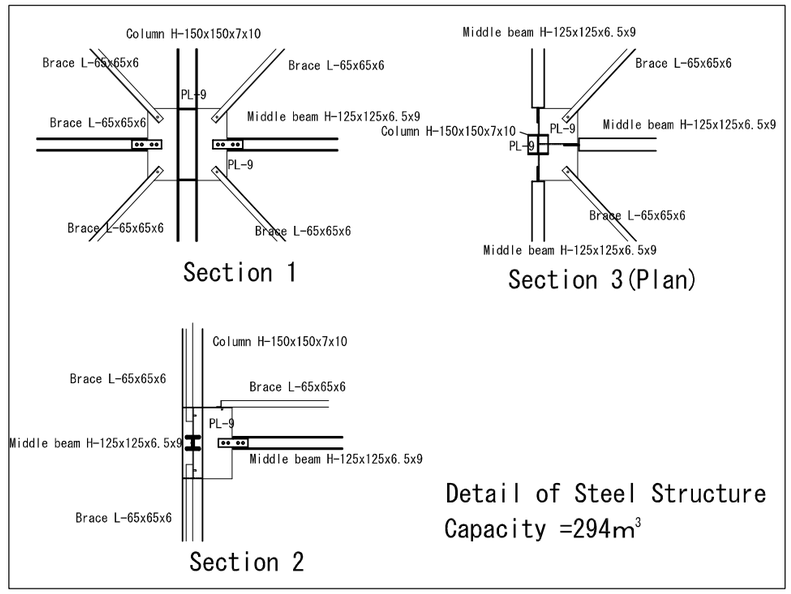
Title : Storage reservoir (3/3)

Date :

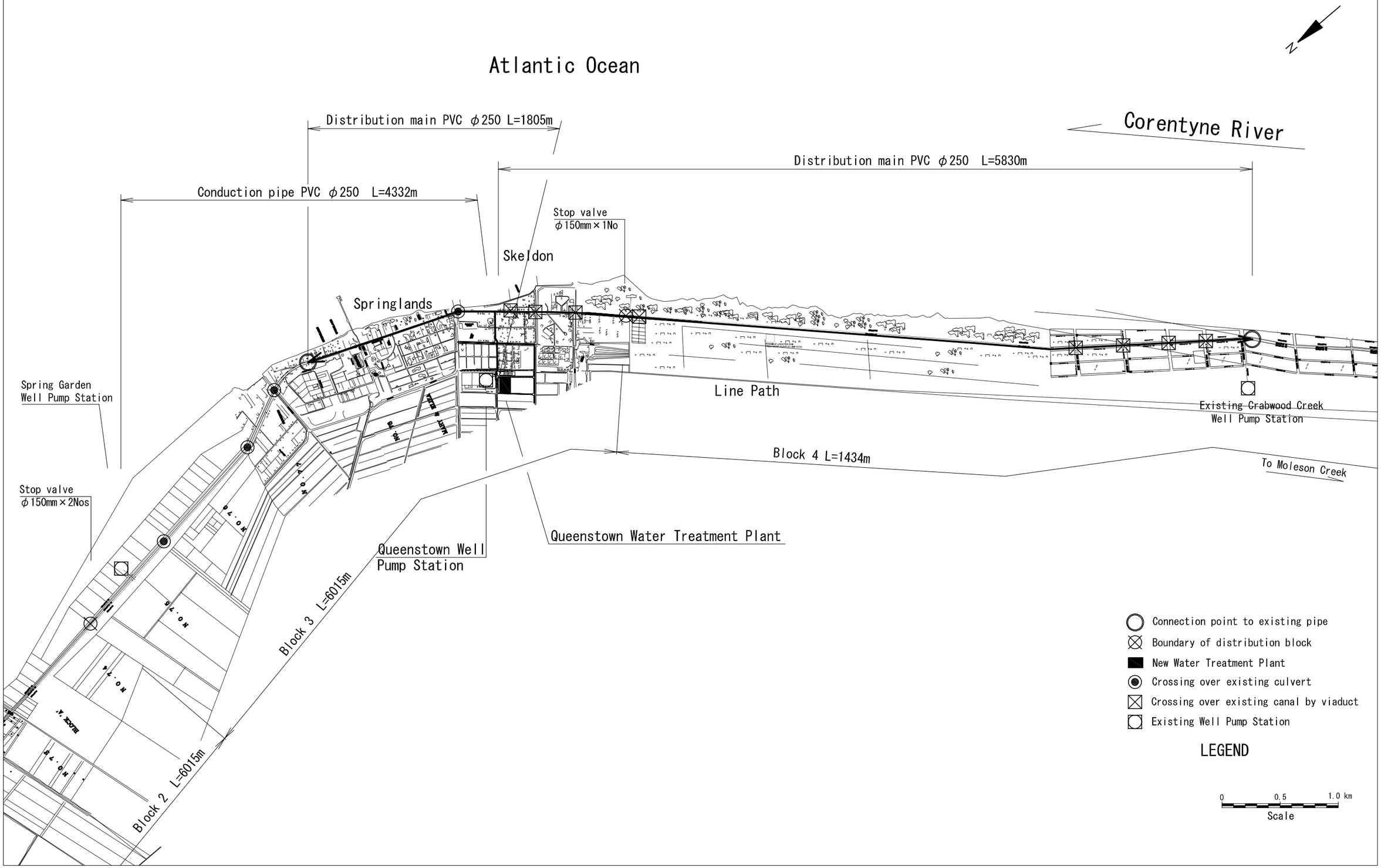
Scale : 1:100

No 021 REV





No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	Queenstown Water Treatment Plant	Date :	Scale : 1:300
						Title : Elevated Tank		No 022 REV



No	Date	Approved	Revised	THE PROJECT FOR WATER SUPPLY IN CORRIVERTON IN THE CO-OPERATIVE REPUBLIC OF GUYANA	Japan International Cooperation Agency (JICA)	Queenstown Water Treatment Plant	Date :	Scale : 1:30,000
						Title : General Plan of Pipeline		No 023 REV ◇