PEOPLE'S REPUBLIC OF BANGLADESH

JICA PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT

NK/JWA

List of Drawings

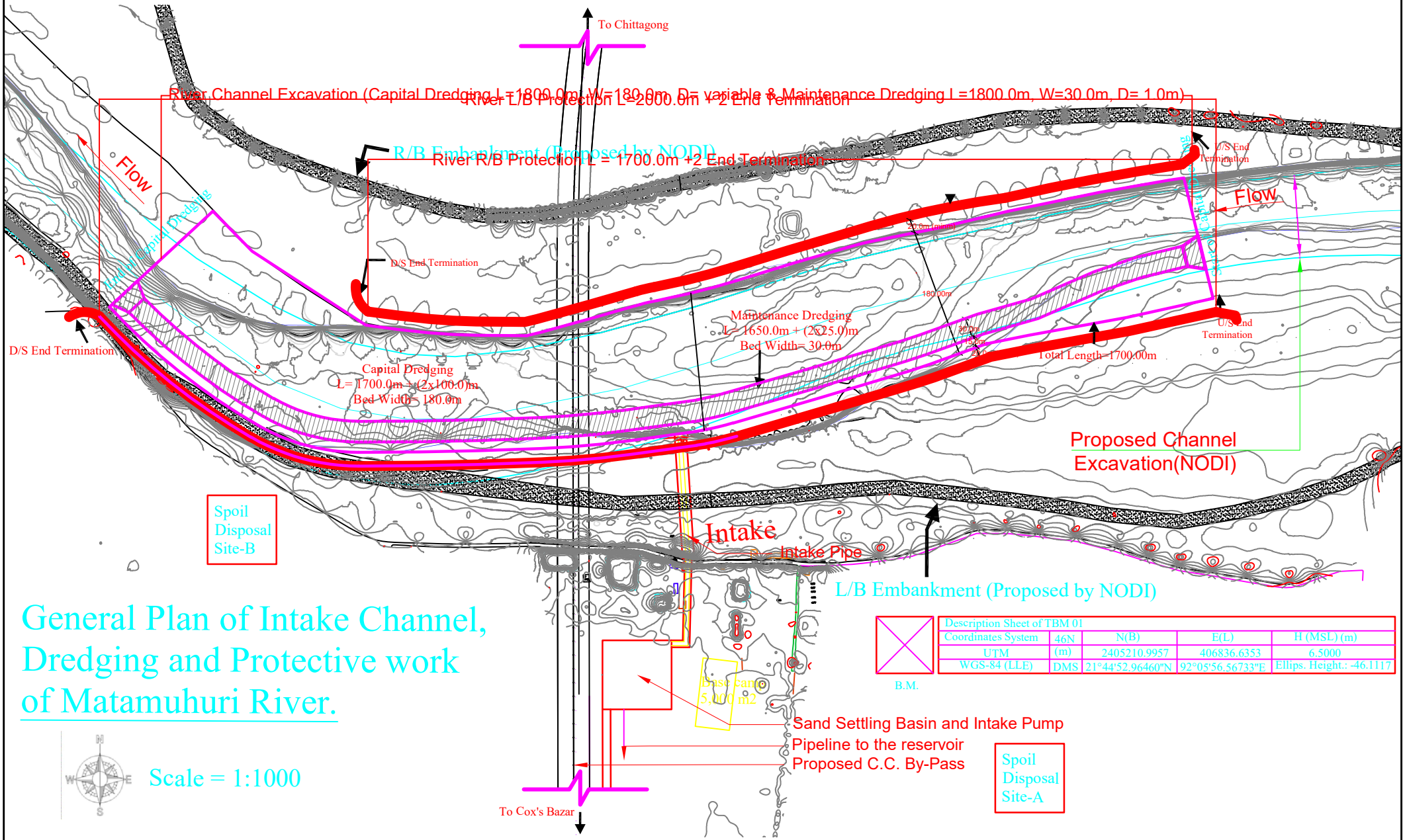
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A



General Plan of Intake Channel, Dredging and Protective work of Matamuhuri River.

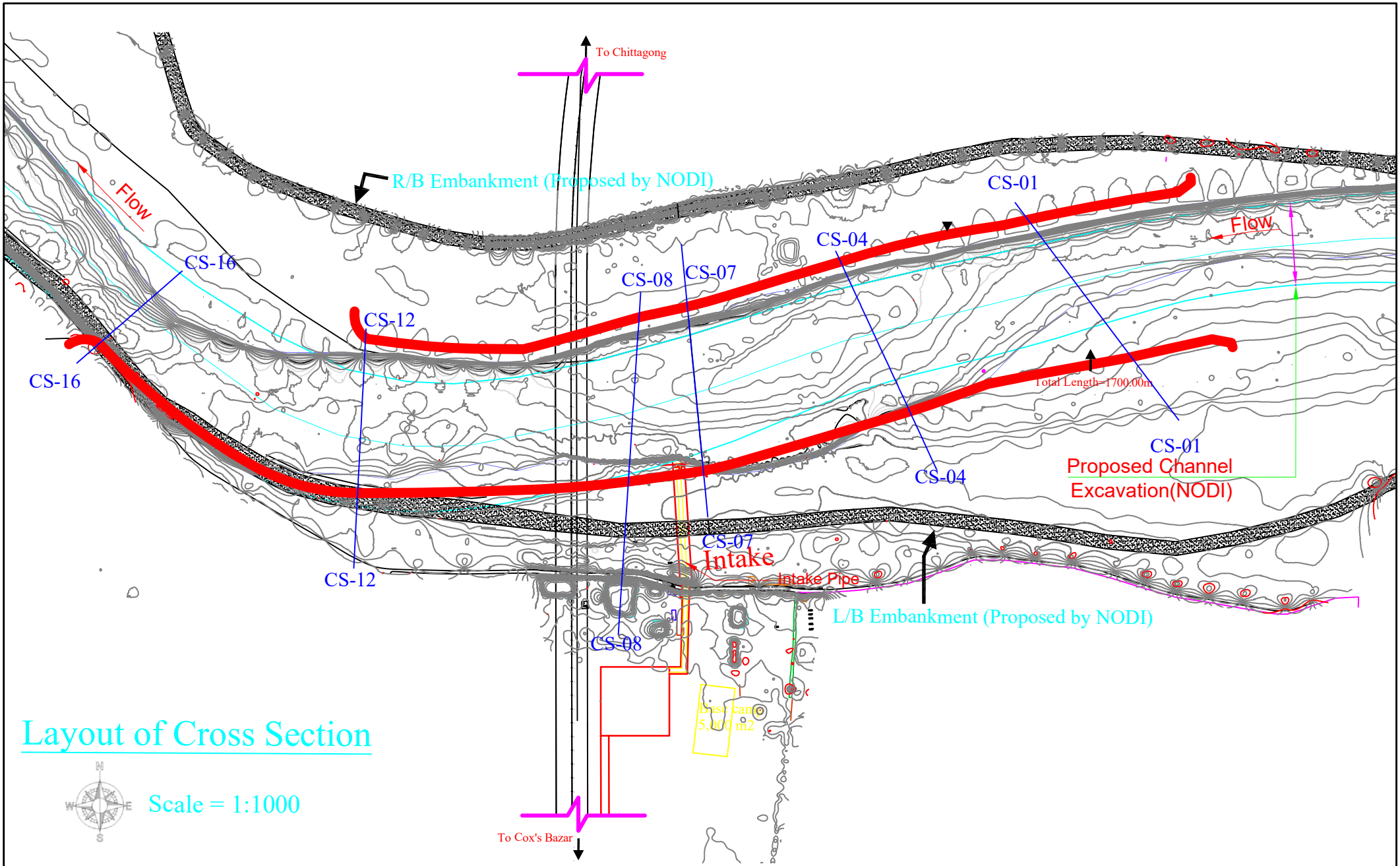
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B.M.

Description Sheet of TBM 01				
Coordinates System	46N	N(B)	E(L)	H (MSL) (m)
UTM	(m)	2405210.9957	406836.6353	6.5000
WGS-84 (LLE)	DMS	21°44'52.96460"N	92°05'56.56733"E	Ellips. Height.: -46.1117

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** General Plan	
		SCALE 1:1000	**DRAWING NO.** A-1

A

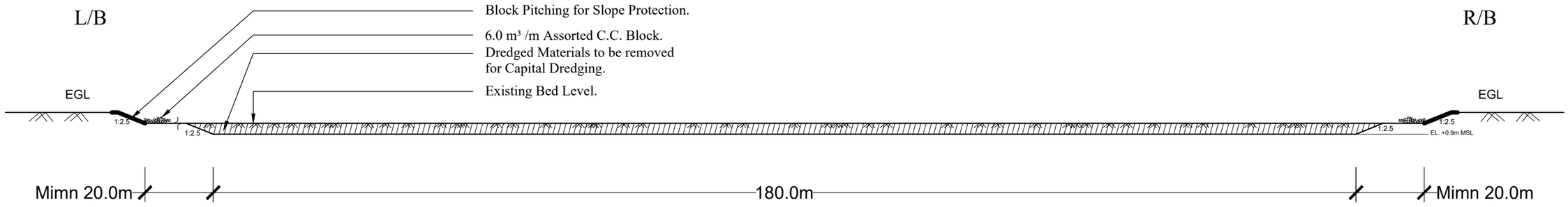


Layout of Cross Section

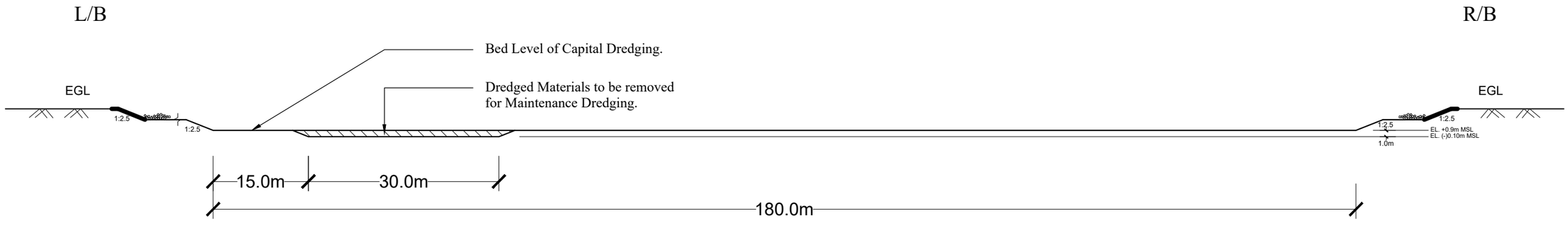
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PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Layout of Cross Section **SCALE** 1:1000 **DRAWING NO.** A-2

A



Typical Cross Section of Capital Dredging

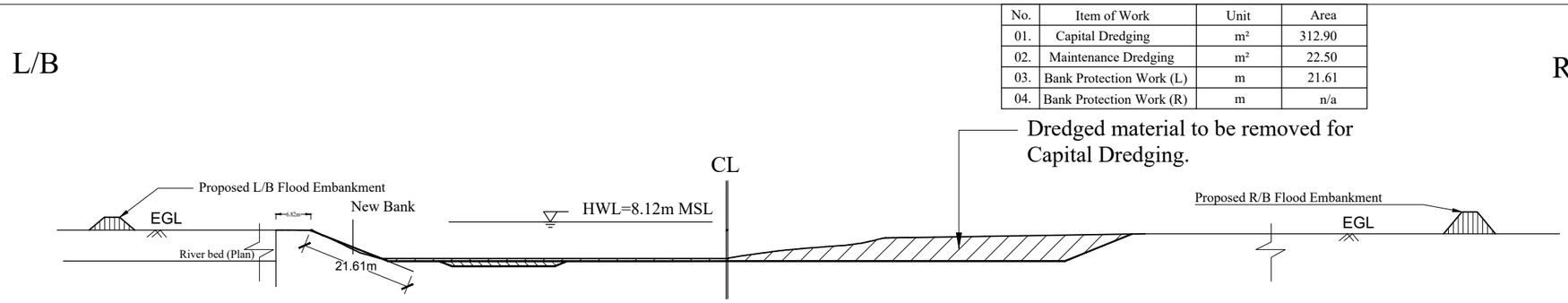


Typical Cross Section of Maintenance Dredging

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Typical Cross Section **SCALE** NTS **DRAWING NO.** A-3

A

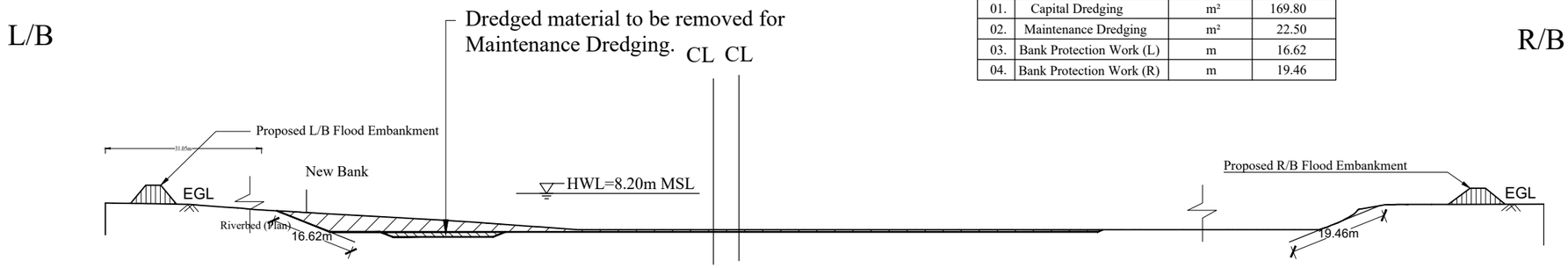
No.	Item of Work	Unit	Area
01.	Capital Dredging	m²	312.90
02.	Maintenance Dredging	m²	22.50
03.	Bank Protection Work (L)	m	21.61
04.	Bank Protection Work (R)	m	n/a



Cross Section no-16 of Matamohuri River

CL(NODI_Low Channel)
CL(Planned Section)

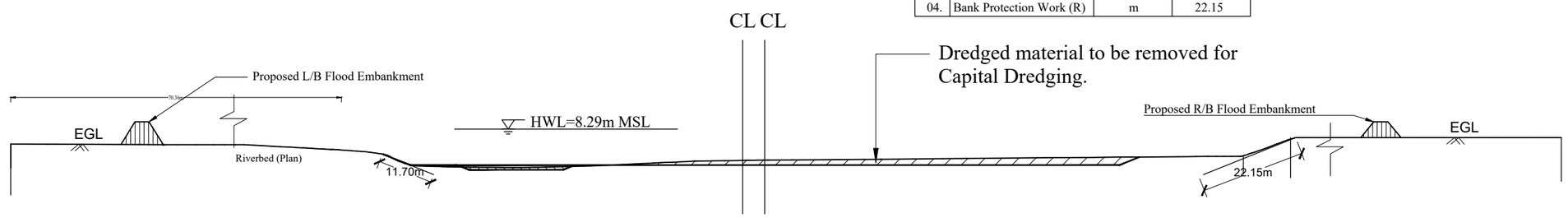
No.	Item of Work	Unit	Area
01.	Capital Dredging	m²	169.80
02.	Maintenance Dredging	m²	22.50
03.	Bank Protection Work (L)	m	16.62
04.	Bank Protection Work (R)	m	19.46



Cross Section no-12 of Matamohuri River

CL(NODI_Low Channel)
CL(Planned Section)

No.	Item of Work	Unit	Area
01.	Capital Dredging	m²	127.8
02.	Maintenance Dredging	m²	11.70
03.	Bank Protection Work (L)	m	11.70
04.	Bank Protection Work (R)	m	22.15



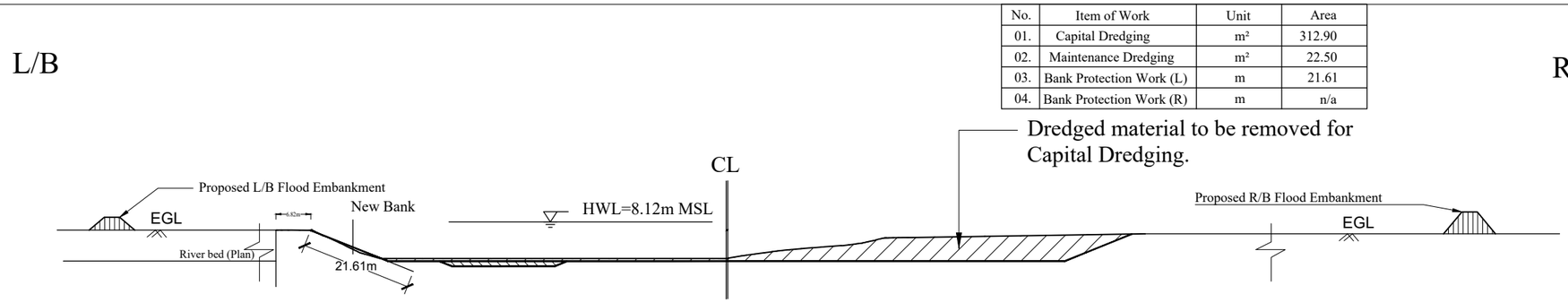
Cross Section no-08 of Matamohuri River

CL(NODI_Low Channel)
CL(Planned Section)

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Cross Sections (1) **SCALE** NTS / **DRAWING NO.** A-4

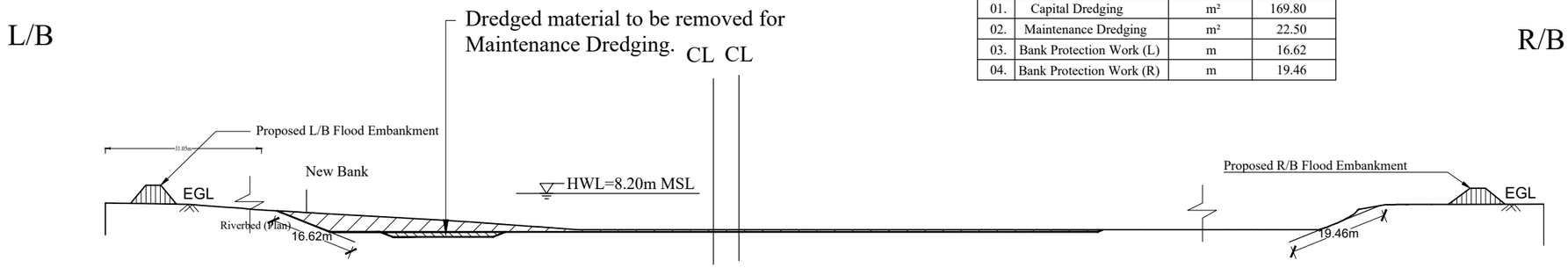
A

No.	Item of Work	Unit	Area
01.	Capital Dredging	m²	312.90
02.	Maintenance Dredging	m²	22.50
03.	Bank Protection Work (L)	m	21.61
04.	Bank Protection Work (R)	m	n/a



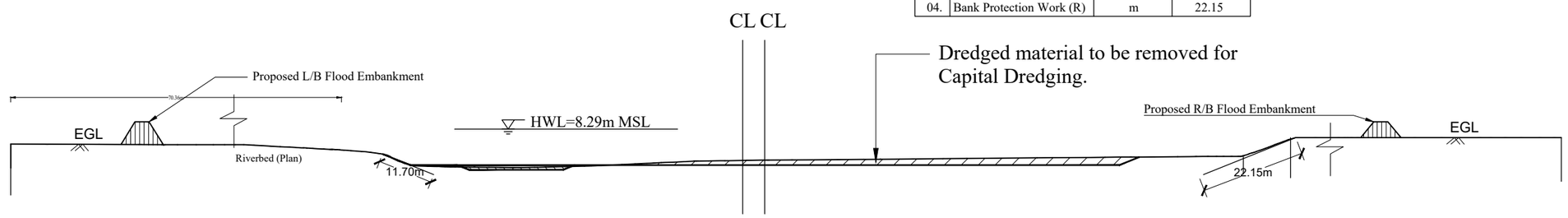
Cross Section no-16 of Matamohuri River

No.	Item of Work	Unit	Area
01.	Capital Dredging	m²	169.80
02.	Maintenance Dredging	m²	22.50
03.	Bank Protection Work (L)	m	16.62
04.	Bank Protection Work (R)	m	19.46



Cross Section no-12 of Matamohuri River

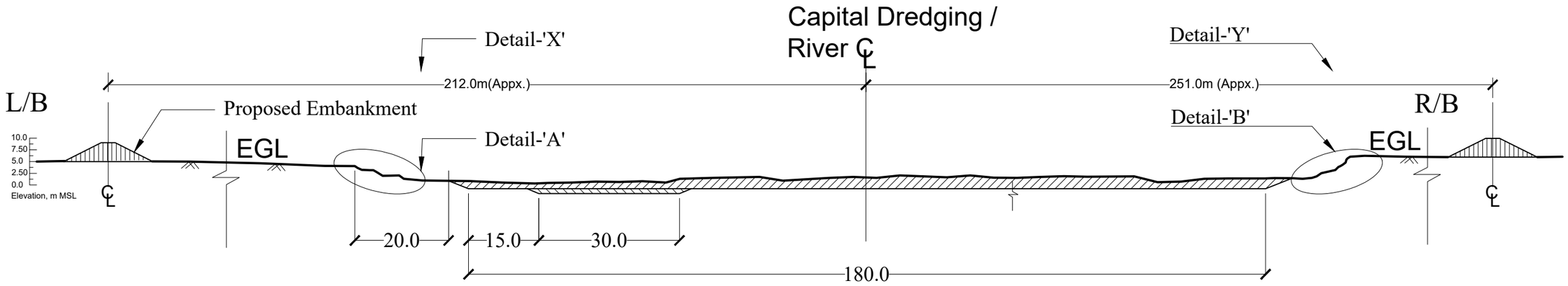
No.	Item of Work	Unit	Area
01.	Capital Dredging	m²	127.8
02.	Maintenance Dredging	m²	11.70
03.	Bank Protection Work (L)	m	11.70
04.	Bank Protection Work (R)	m	22.15



Cross Section no-08 of Matamohuri River

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Cross Sections (2) **SCALE** NTS | **DRAWING NO.** A-5

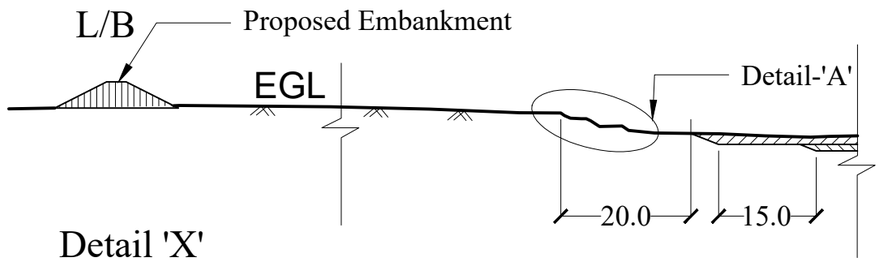
A



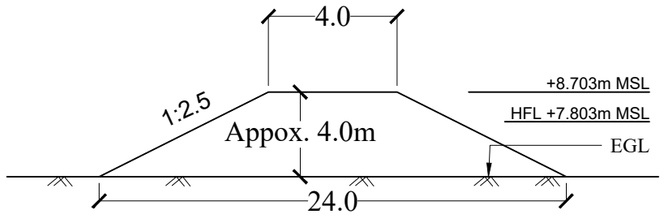
Cross Section no-07 of Matamohuri River (at Intake Point)

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Details of River Bank Protection Works	
		SCALE NTS	**DRAWING NO.** A-6

A

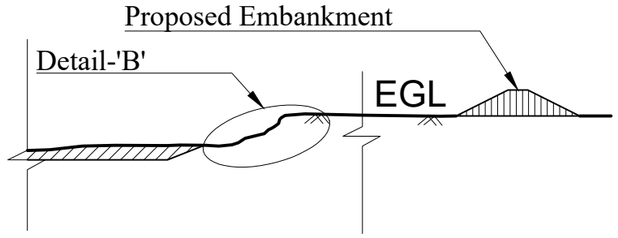


Detail 'X'



Section of Proposed Embankment

R/B

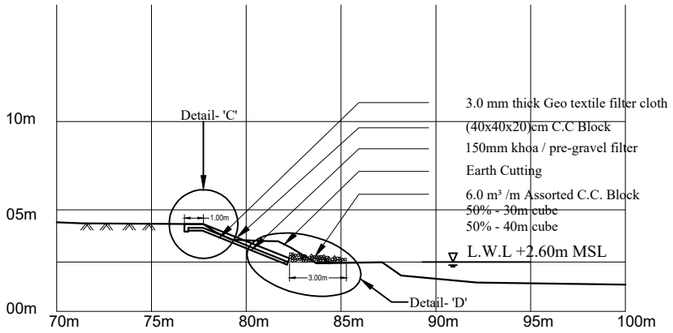


Detail 'Y'

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Detail 'X', Detail 'Y', Embankment **SCALE** NTS **DRAWING NO.** A-7

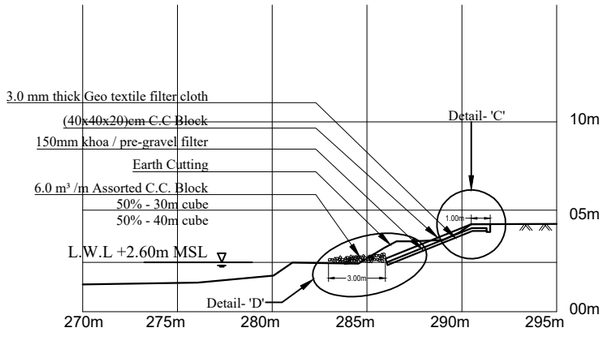
A

L/B

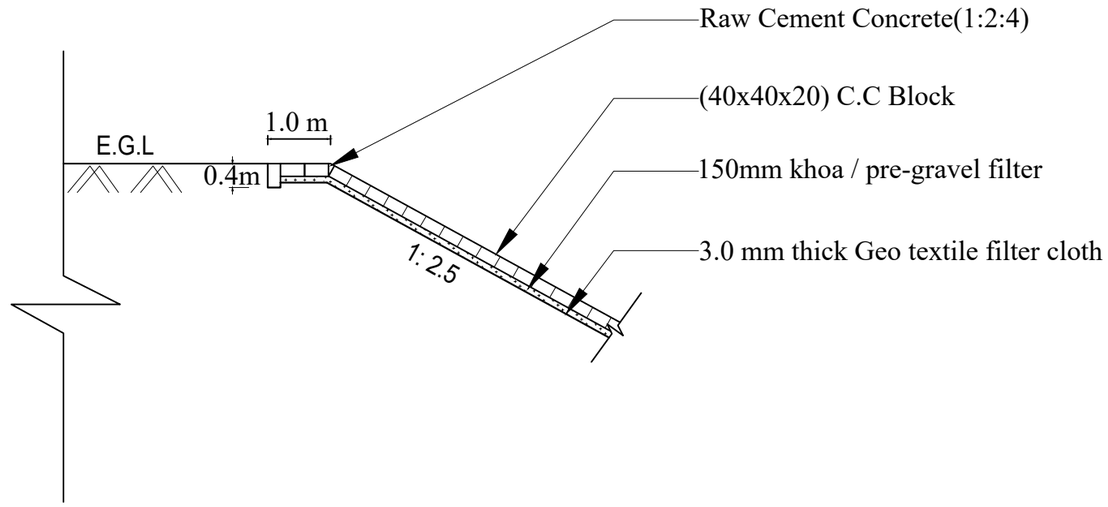


Detail - A
P/W of Cross Section of L/B of Matamohuri River
Near Intake Channel

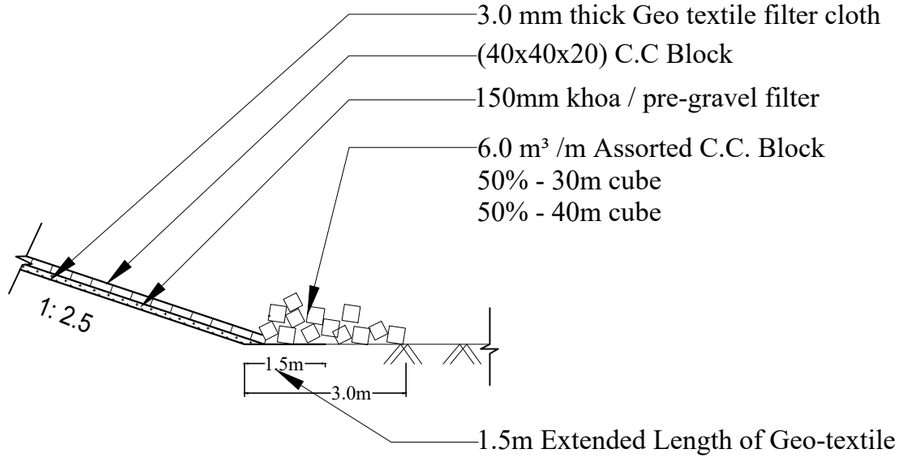
R/B



Detail - B
P/W of Cross Section of R/B of Matamohuri River
Near Intake Channel



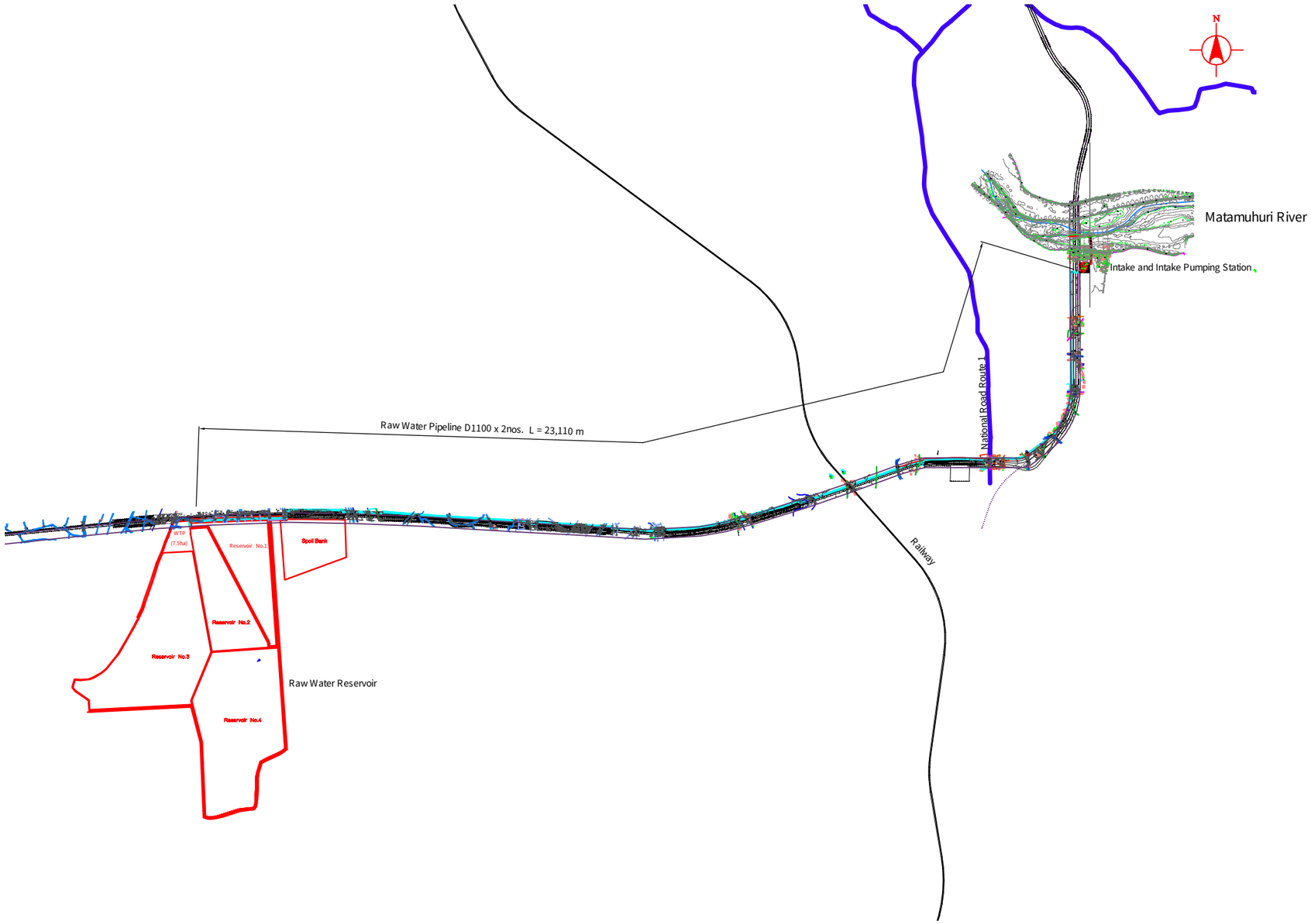
Detail - 'C'
(Not to Scale)



Detail - 'D'
(Not to Scale)

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Detail 'A', Detail 'B', Detail 'C', & Detail 'D' **SCALE** NTS **DRAWING NO.** A-8

B



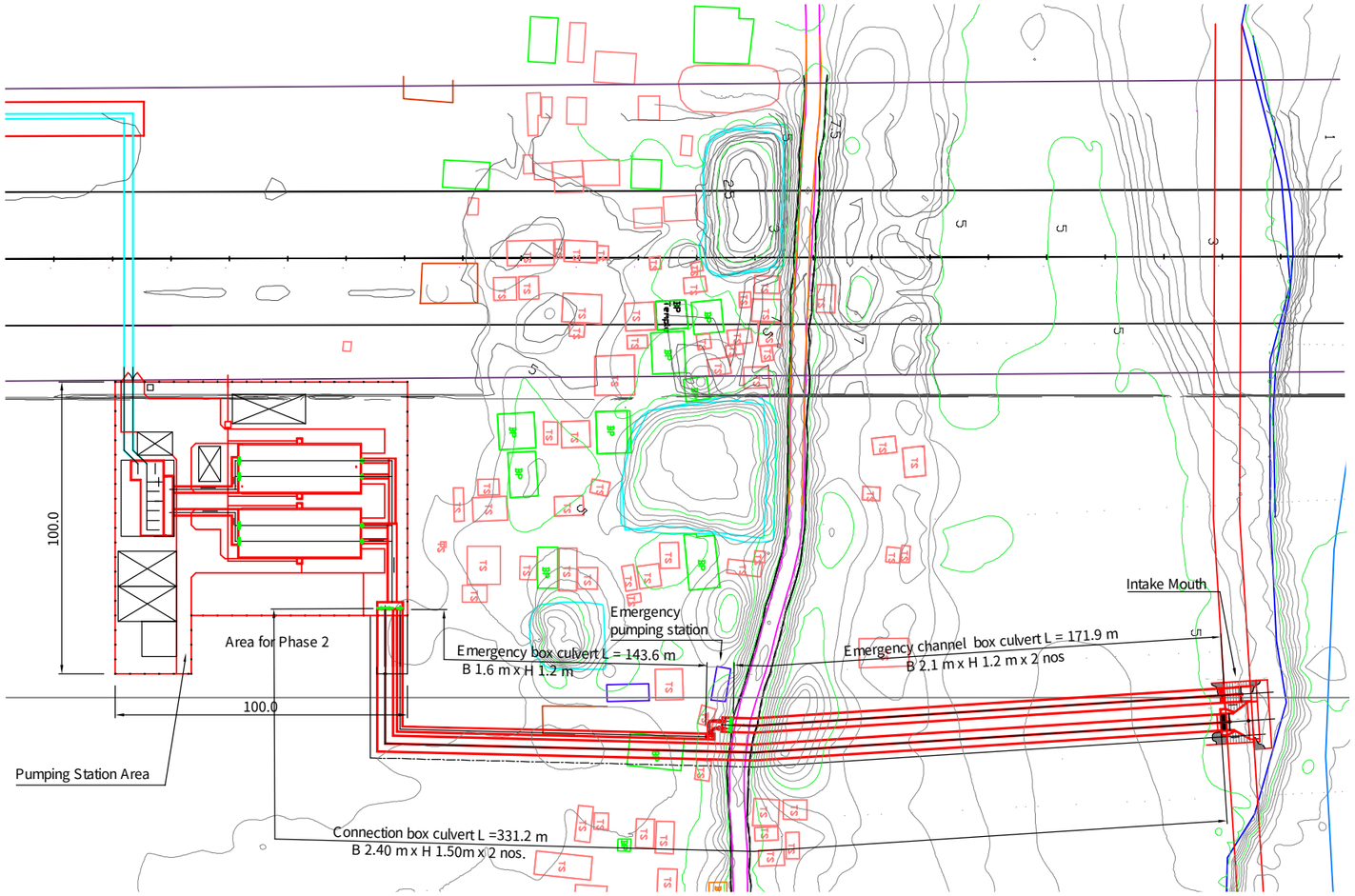
0 0.5 1.0 1.5 2.0 2.5 km

SCALE IN METERS

Location Map from Intake to Raw Water Reservoir

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Location Map from Intake to Raw Water Reservoir **SCALE** As shown **DRAWING NO.** B-1

B



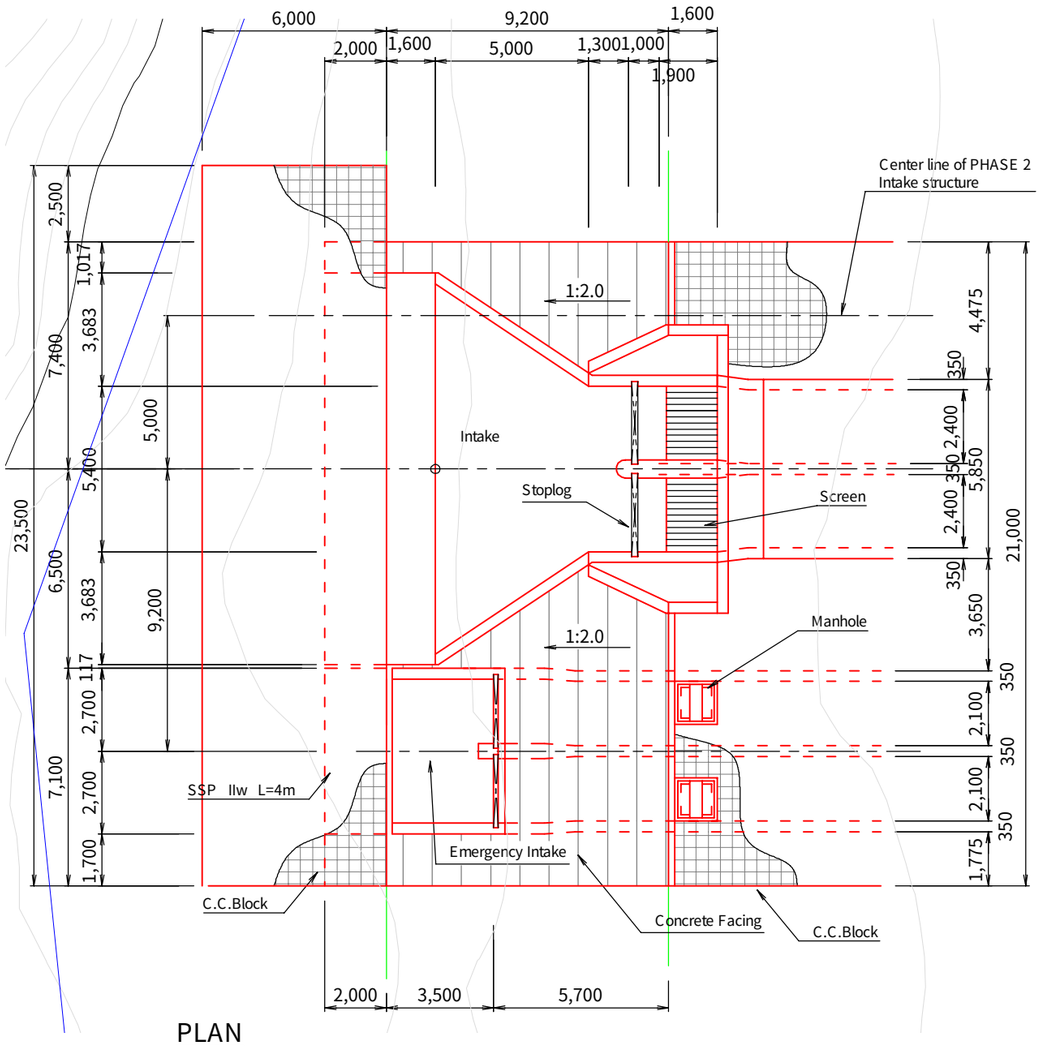
GENERAL PLAN OF INTAKE

0 25 50 75 100 125m

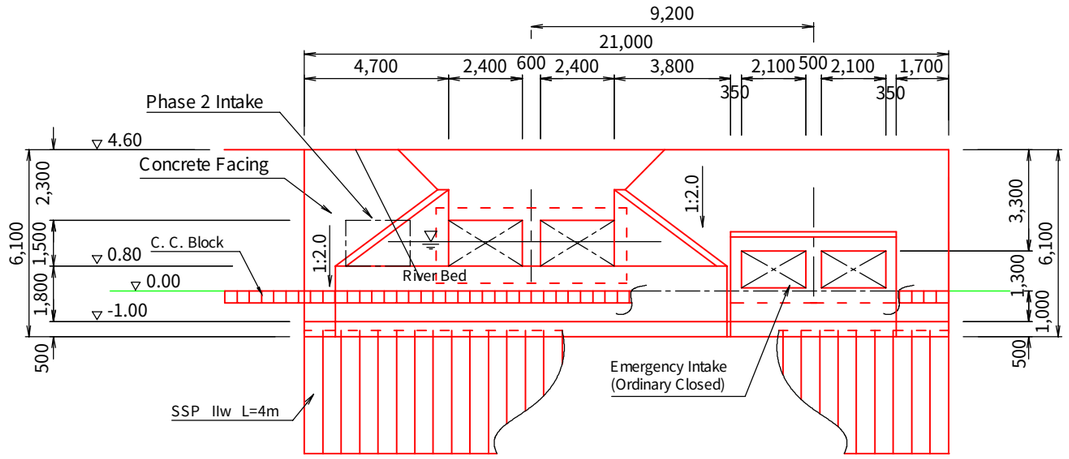
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** GENERAL PLAN OF INTAKE **SCALE** As shown / **DRAWING NO.** B-2

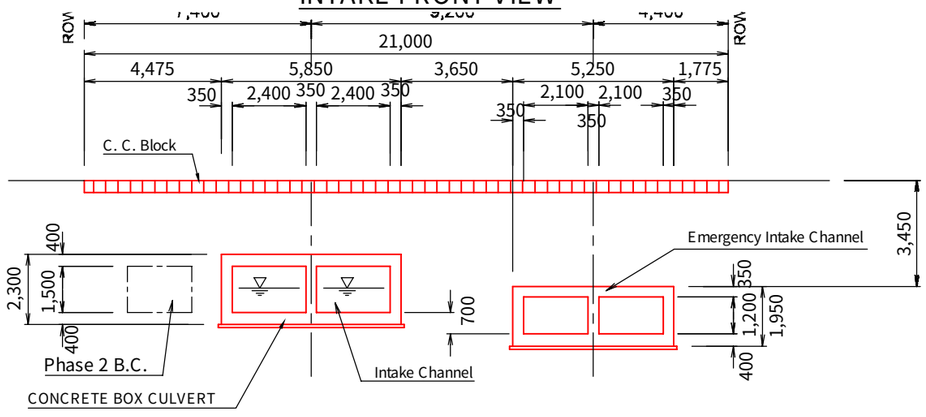
B



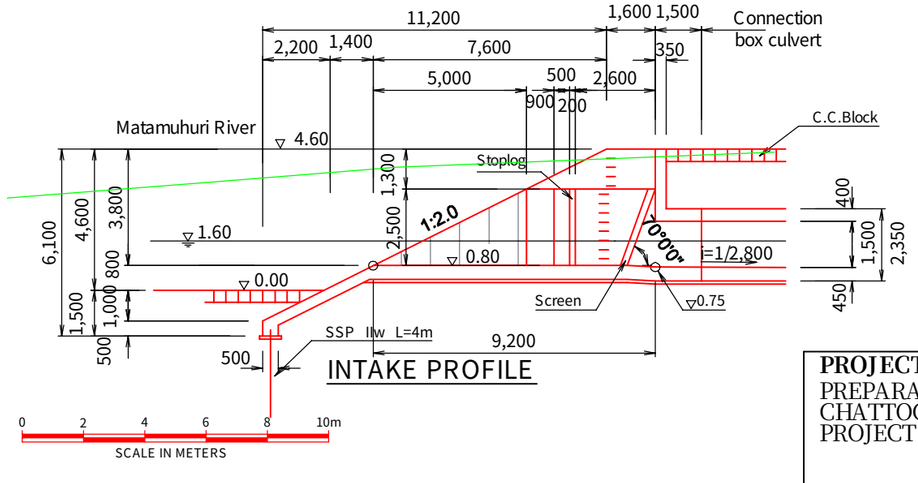
PLAN



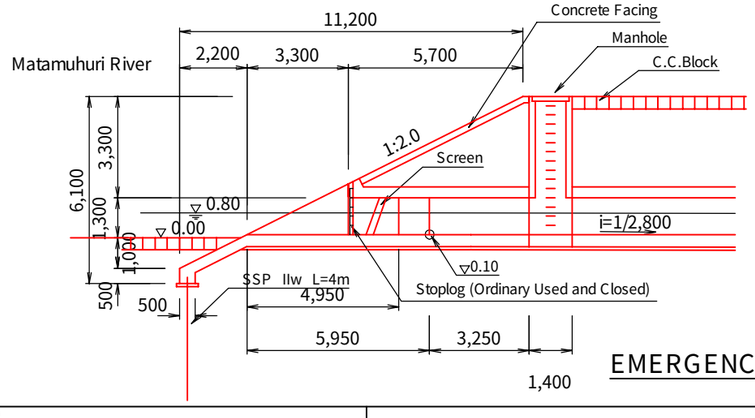
INTAKE FRONT VIEW



INTAKE CHANNEL
TYPICAL CROSS SECTION



INTAKE PROFILE

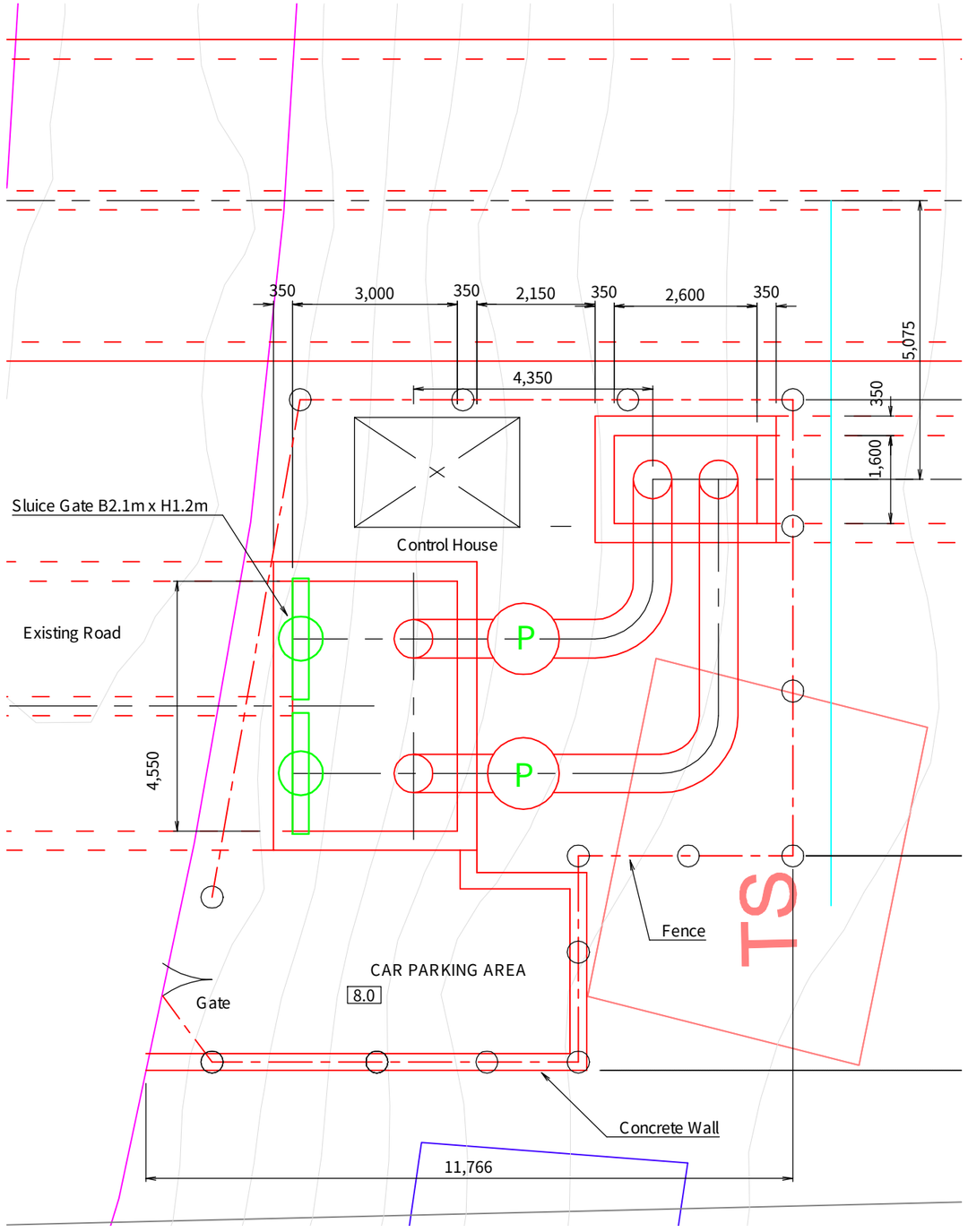


EMERGENCY INTAKE PROFILE

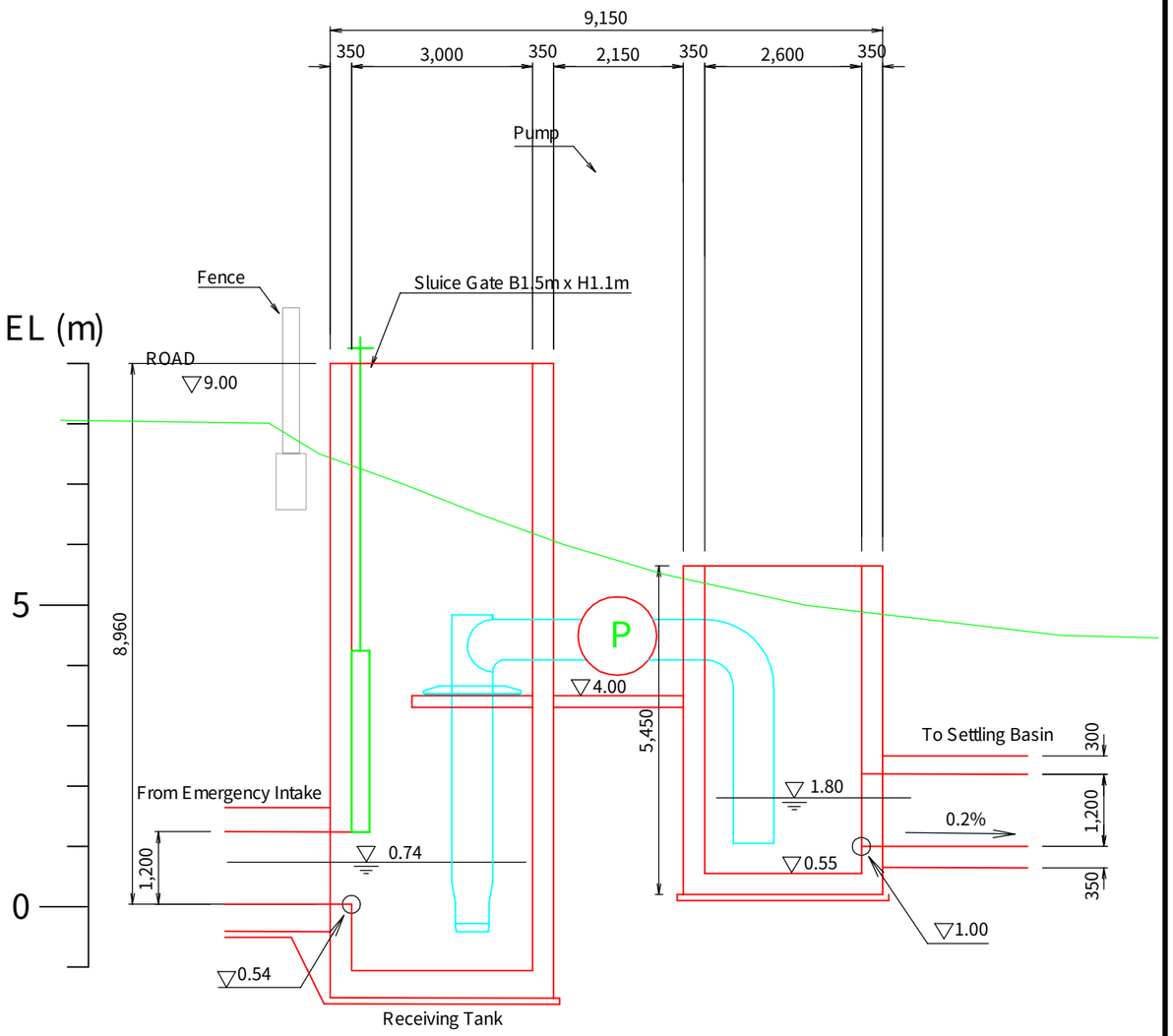
INTAKE DETAIL

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** INTAKE DETAIL	
		SCALE As shown	**DRAWING NO.** B-3

B



PLAN of EMERGENCY PUMP



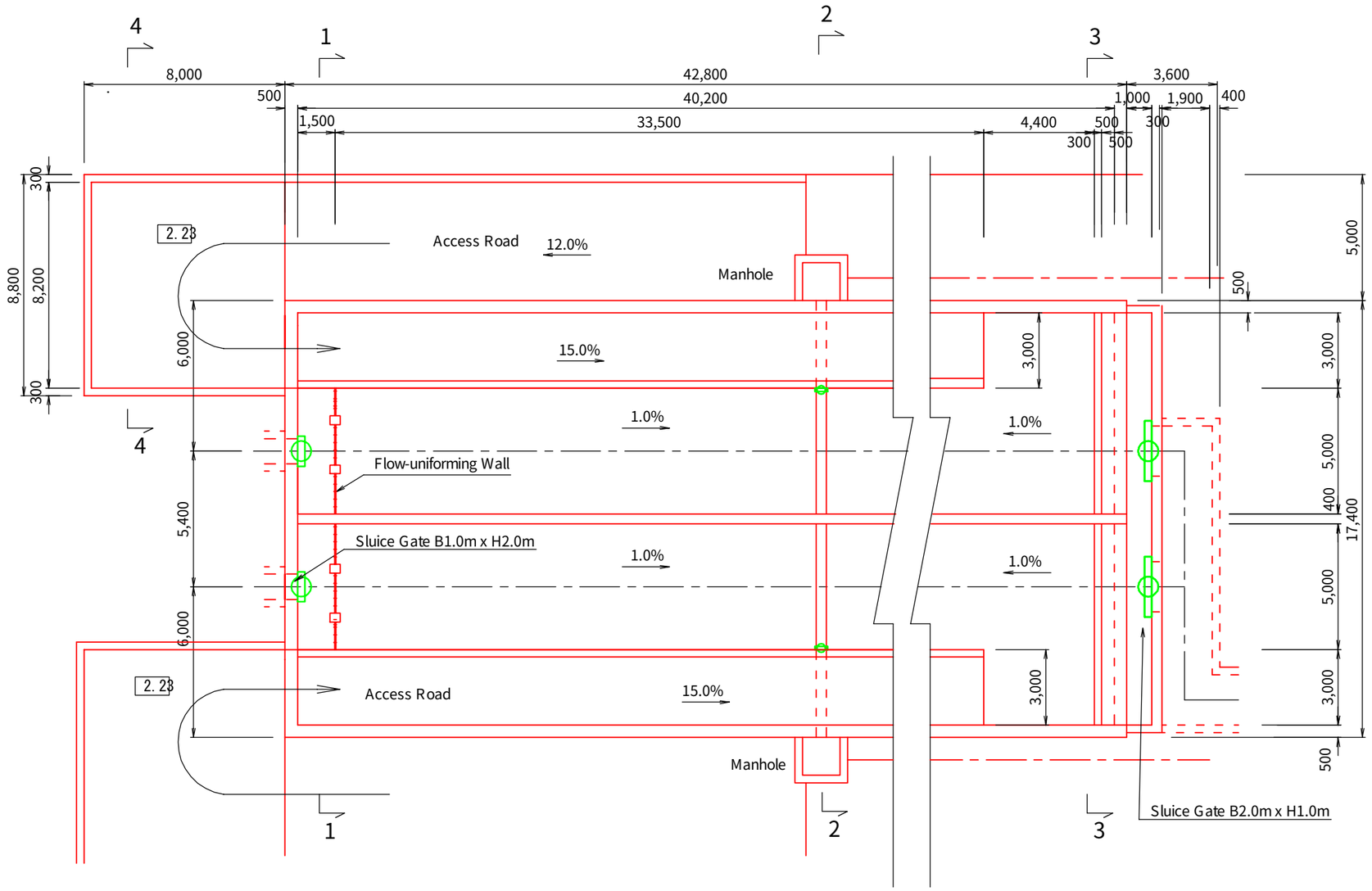
PROFILE of EMERGENCY PUMP

EMERGENCY PUMP DETAIL

0 1 2 3 4 5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** EMERGENCY PUMP DETAIL **SCALE** As shown / **DRAWING NO.** B-4

B



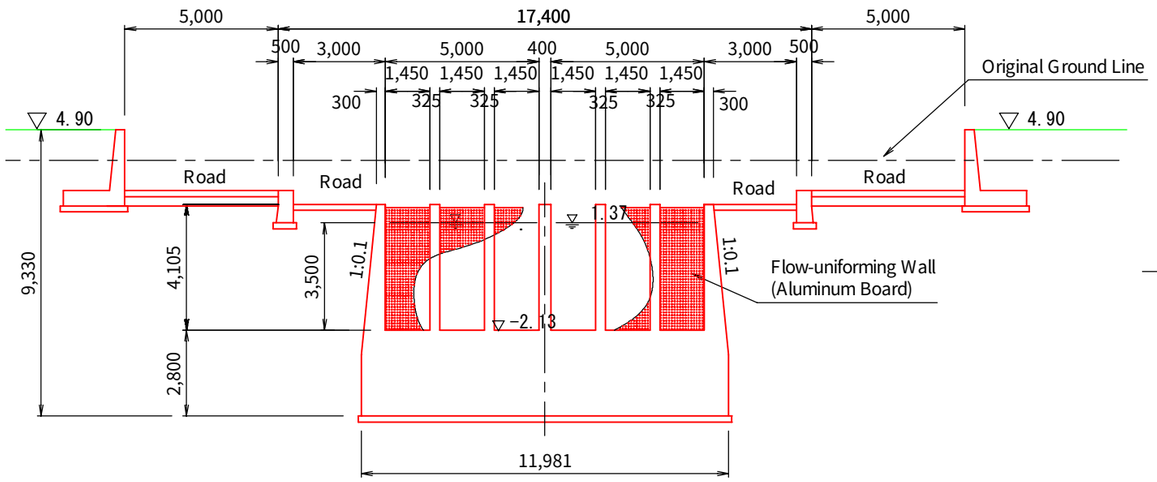
GRIT CHAMBER PLAN

GRIT CHAMBER DETAIL (1/2)

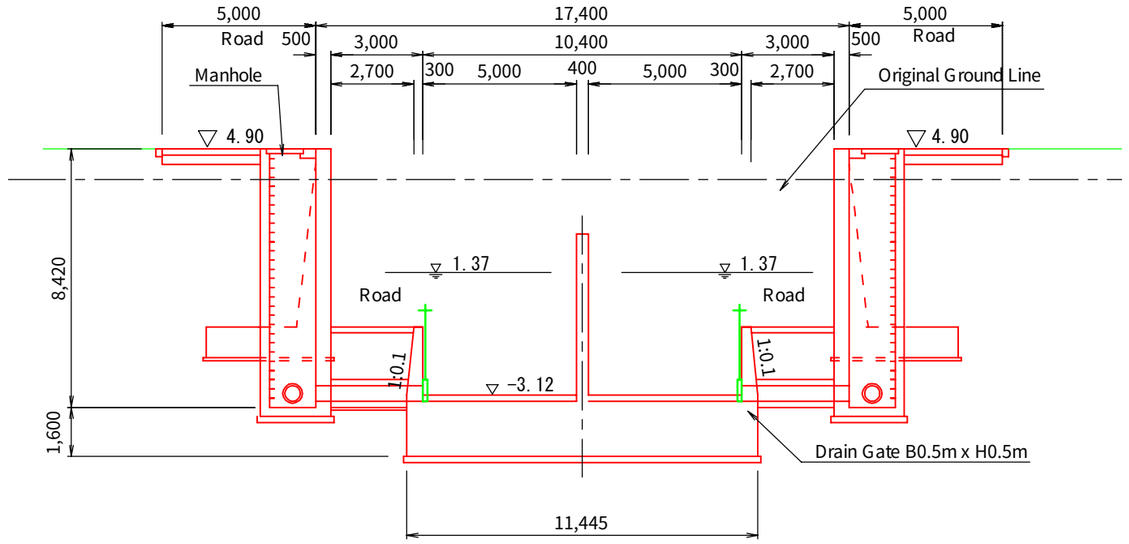
0 2 4 6 8 10m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** GRIT CHAMBER DETAIL (1/2) **SCALE** As shown / **DRAWING NO.** B-5

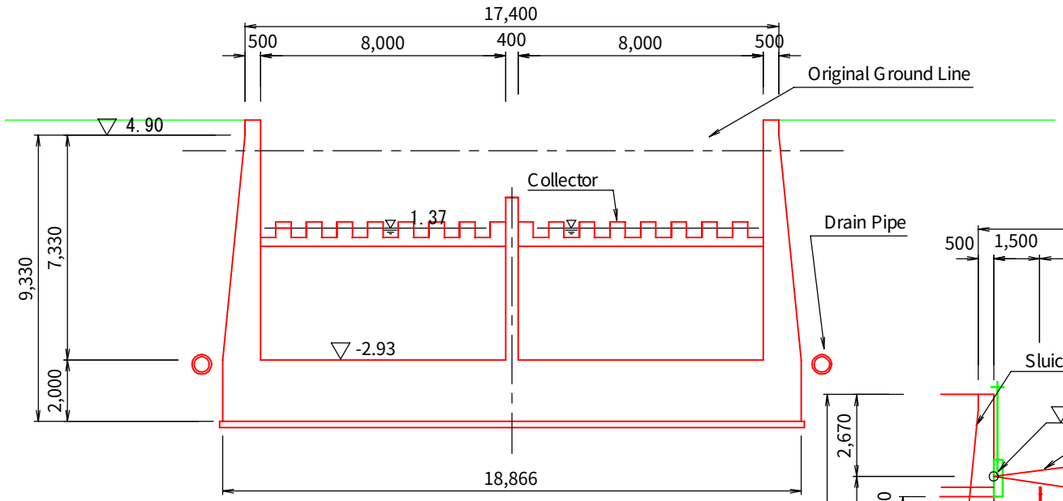
B



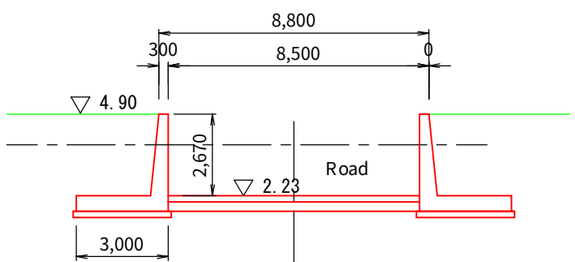
SECTION 1-1



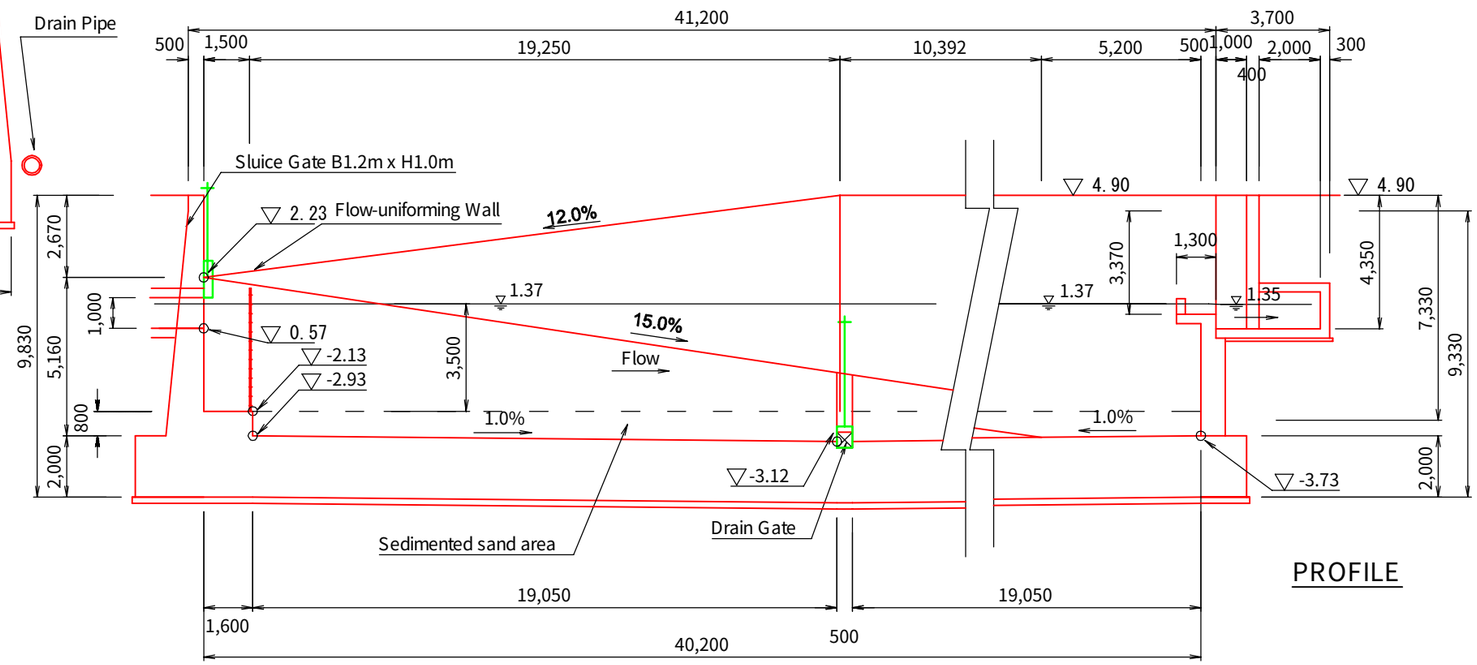
SECTION 2-2



SECTION 3-3



SECTION 4-4



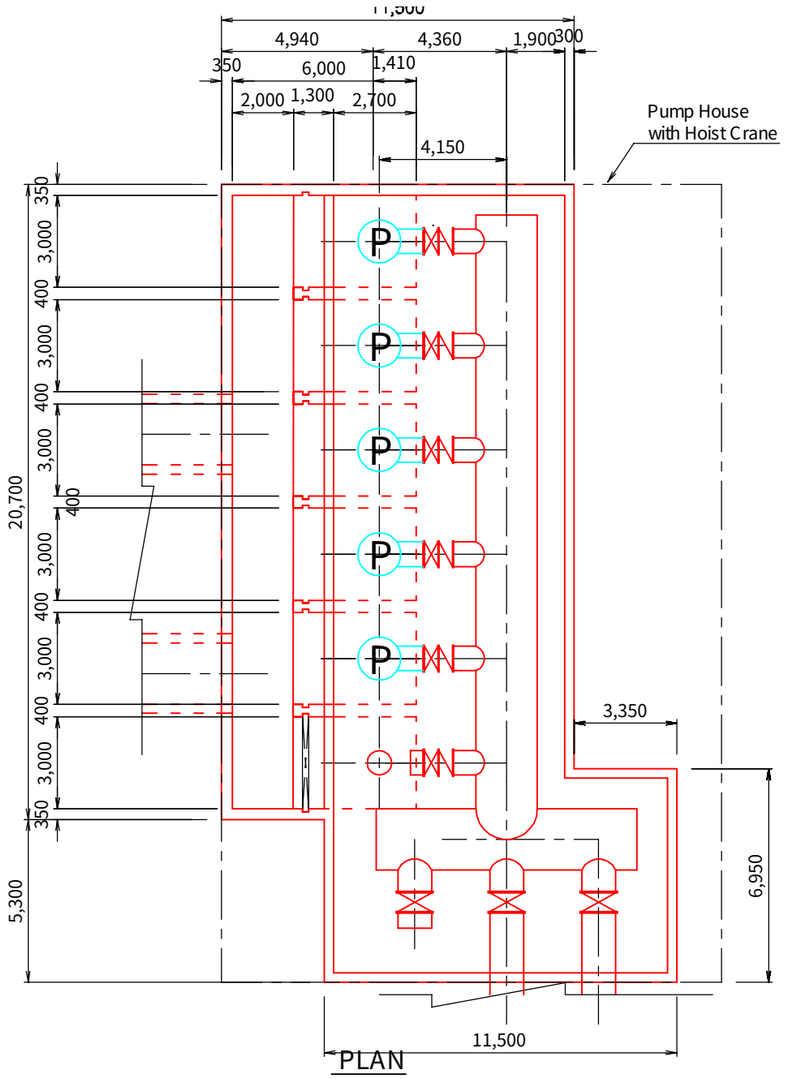
PROFILE

GRIT CHAMBER DETAIL (2/2)

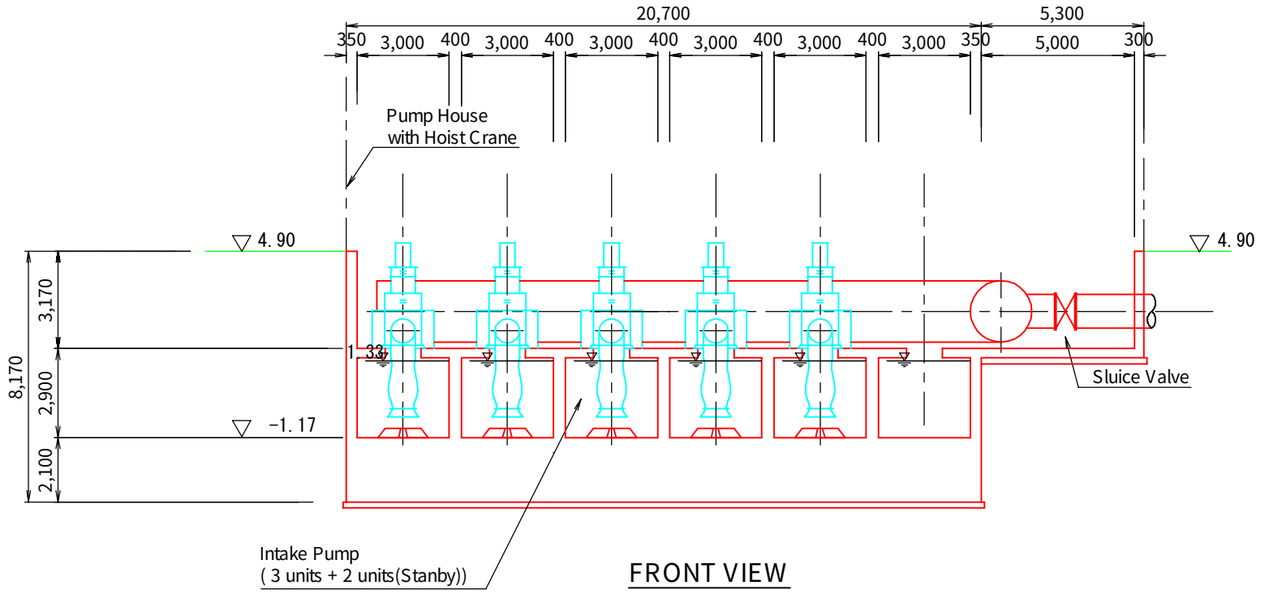
0 2 4 6 8 10m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** GRIT CHAMBER DETAIL (2/2) **SCALE** As shown / **DRAWING NO.** B-6

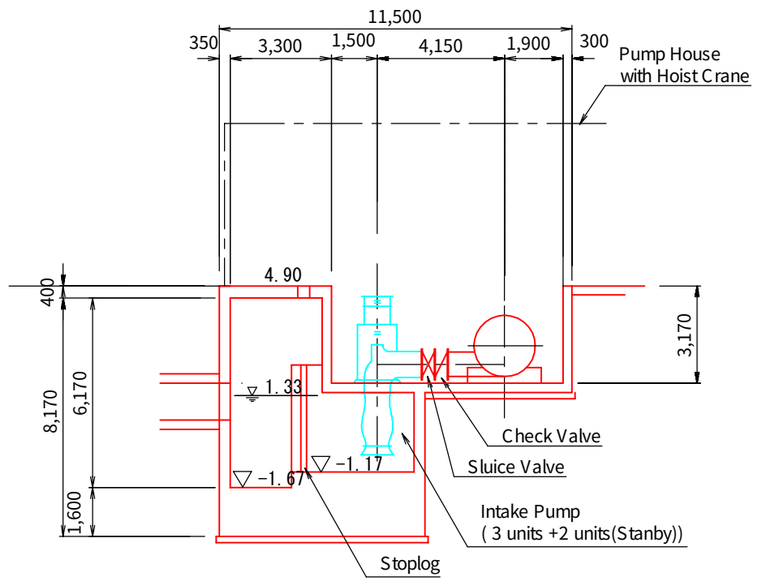
B



PLAN



FRONT VIEW

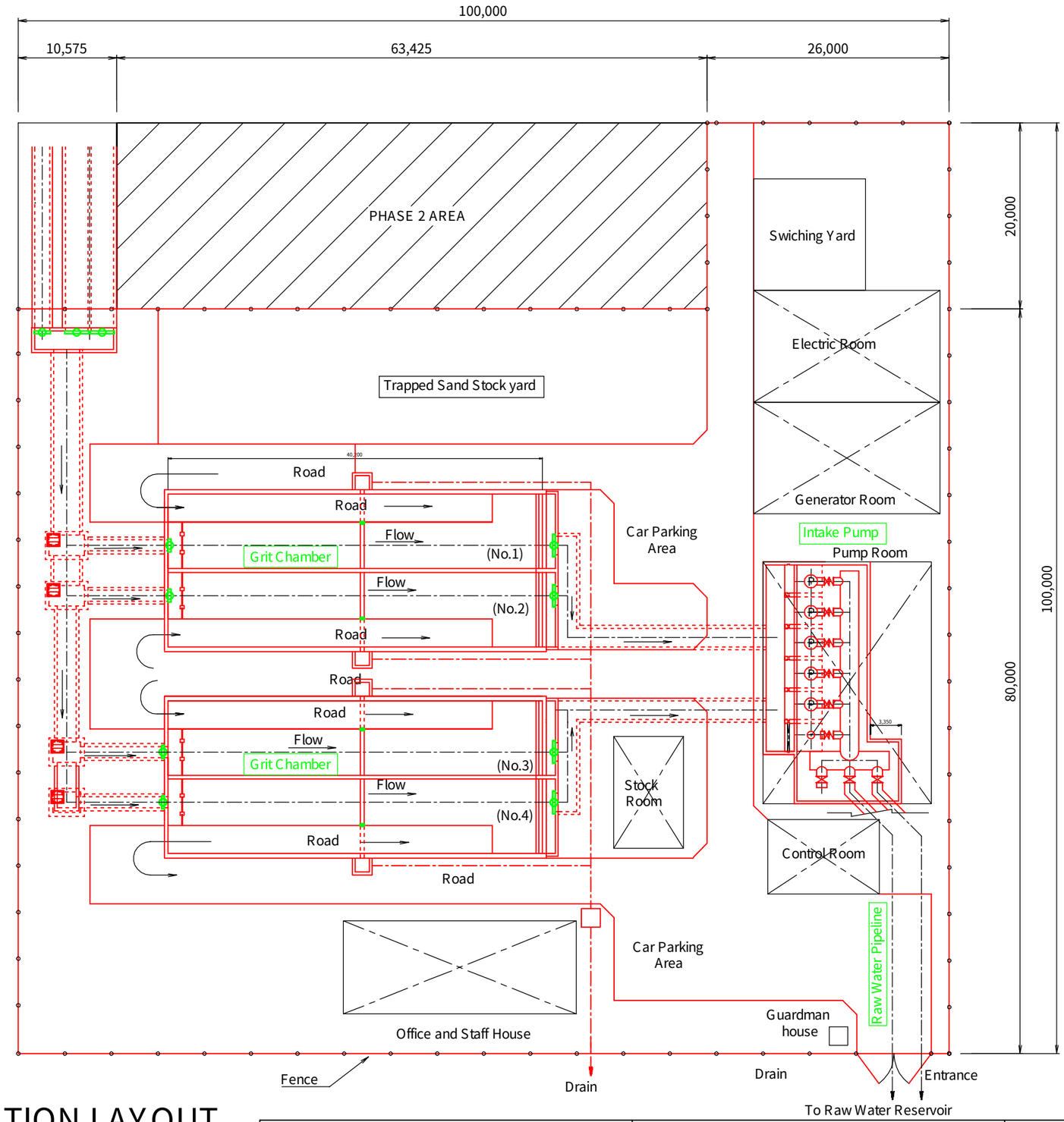


PUMP STATION DETAIL

0 2 4 6 8 10m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	TYPICAL CROSS SSECTION Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** PUMP STATION DETAIL **SCALE** As shown / **DRAWING NO.** B-7

B

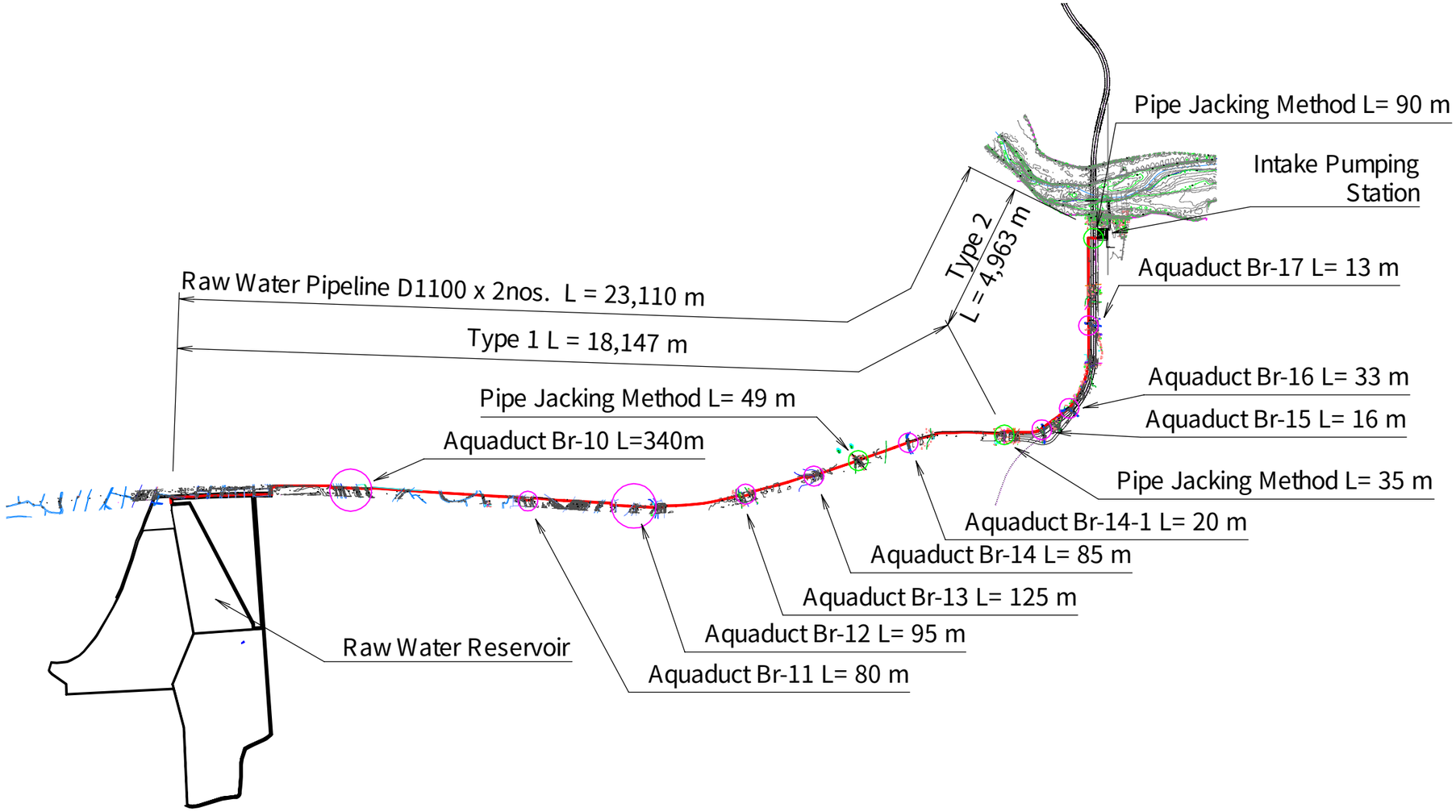


INTAKE PUMP STATION LAYOUT

0 5 10 15 20 25m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** INTAKE PUMP STATION LAYOUT **SCALE** As shown / **DRAWING NO.** B-8

B

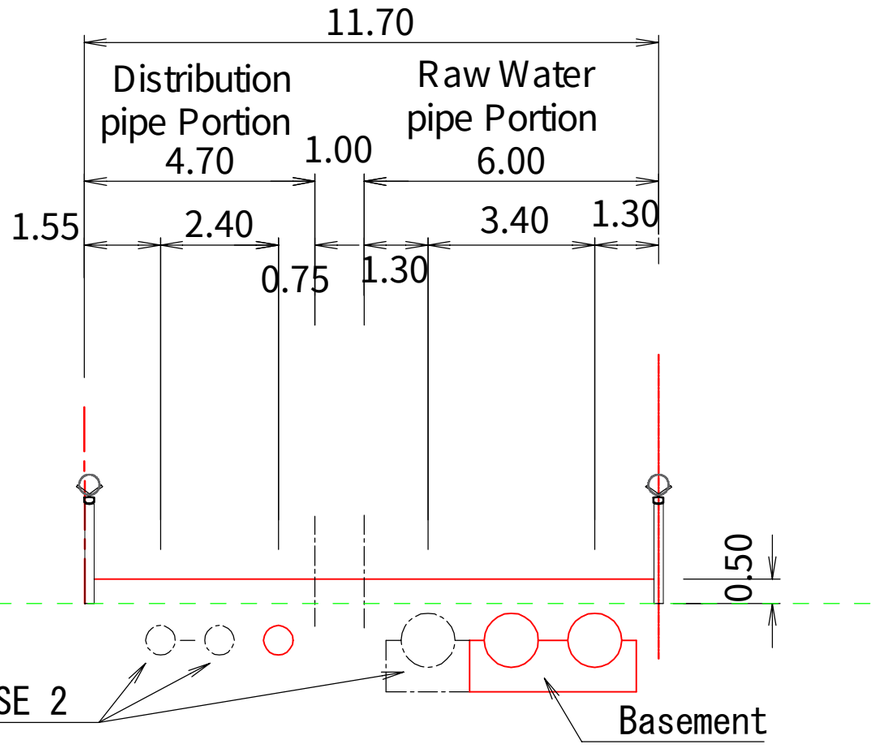


RAW WATER PIPELINE PLAN

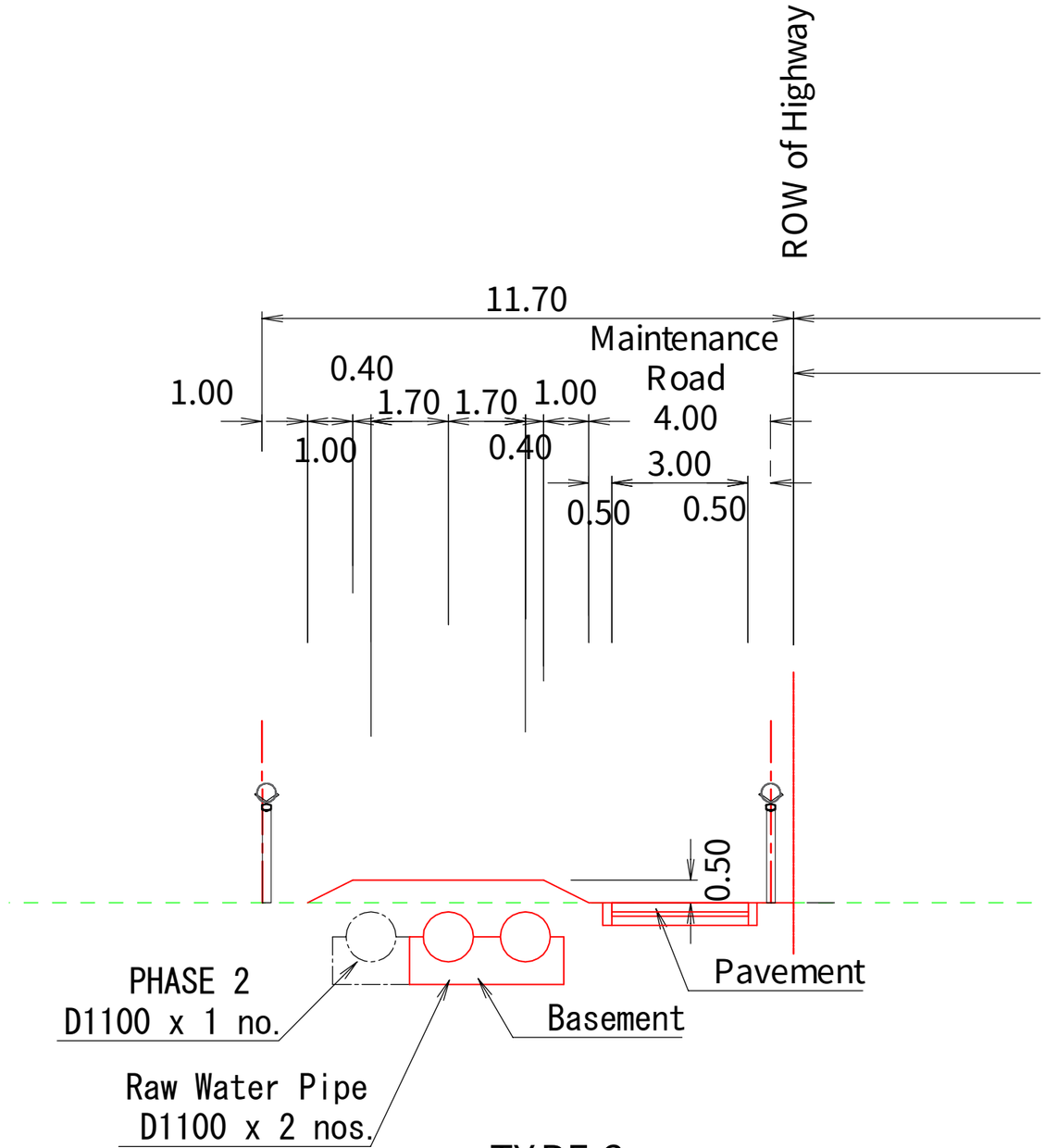
0 0.5 1.0 1.5 2.0 2.5 km
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** RAW WATER PIPELINE PLAN **SCALE** As shown / **DRAWING NO.** B-9

B



TYPE 1



TYPE 2

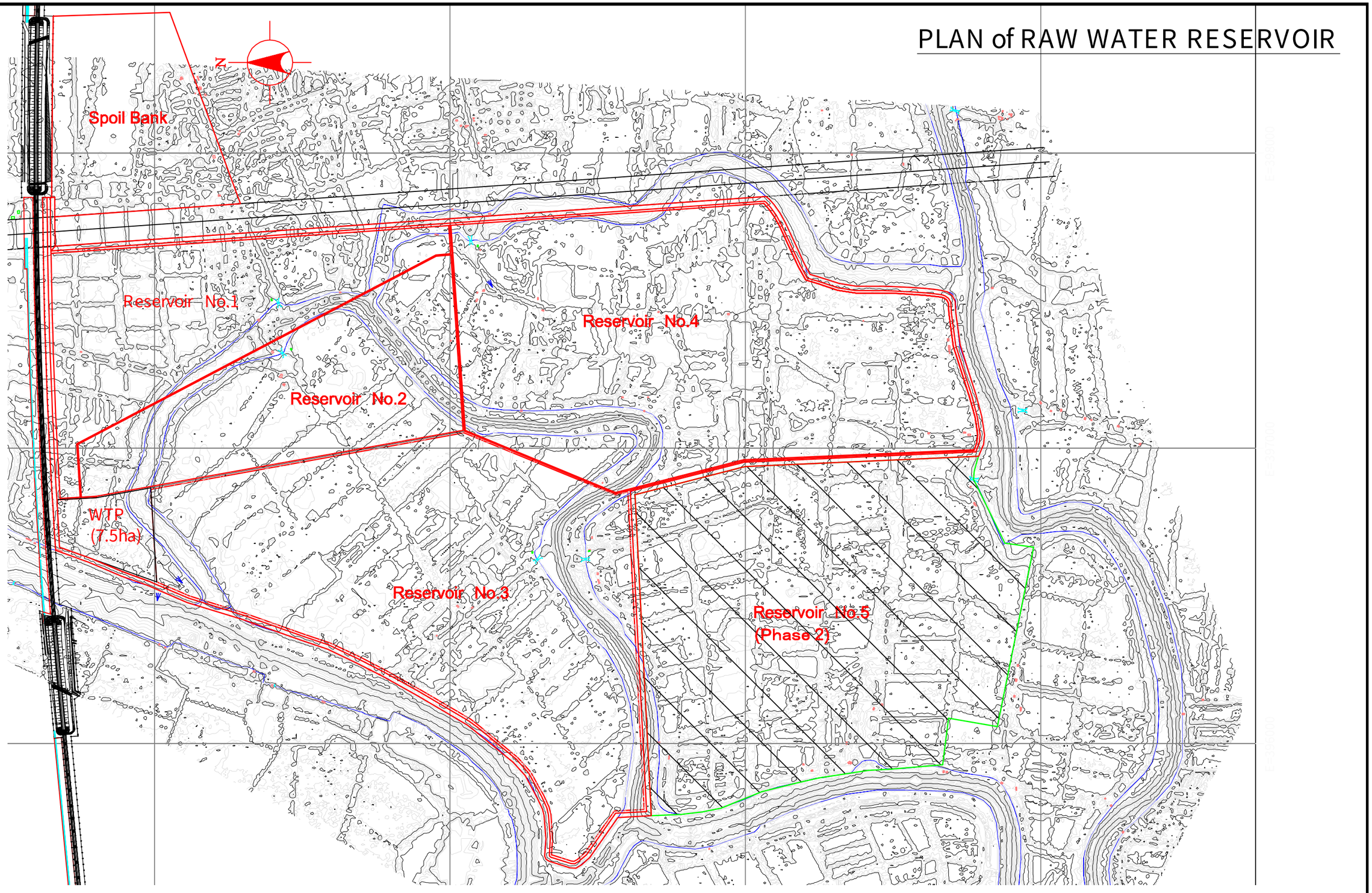
RAW WATER PIPELINE TYPICAL CROSS SECTION

0 5 10 15 20 25m
SCALE IN METERS

PROJECT		TITLE OF DRAWING	
PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	RAW WATER PIPELINE TYPICAL CROSS SECTION	
		SCALE As shown	DRAWING NO. B-10

B

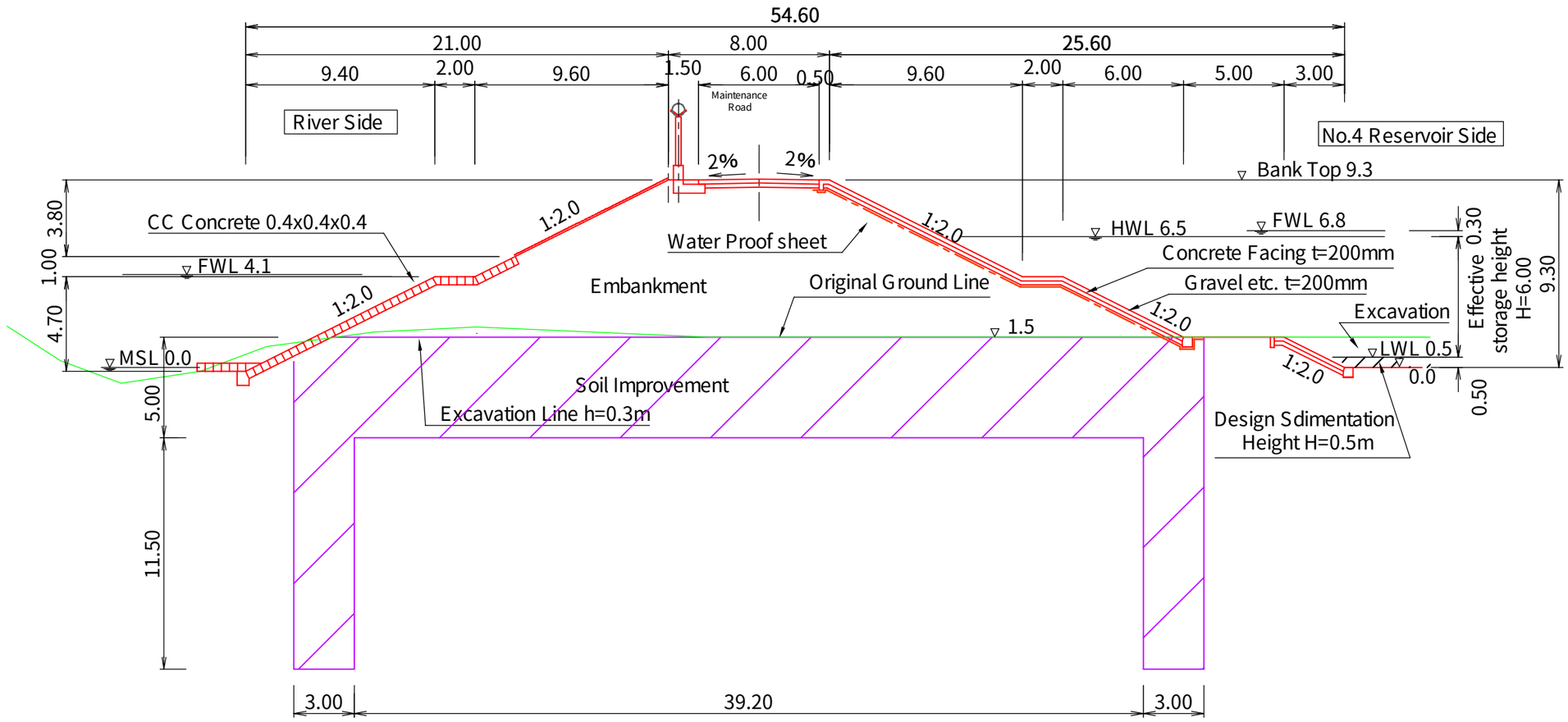
PLAN of RAW WATER RESERVOIR



0 100 200 300 400 500m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** PLAN of RAW WATER RESERVOIR **SCALE** As shown / **DRAWING NO.** B-11

B



TYpical Cross Section

0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT		TITLE OF DRAWING
PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	Typical Cross Section
		SCALE: As shown / DRAWING NO.: B-12

B

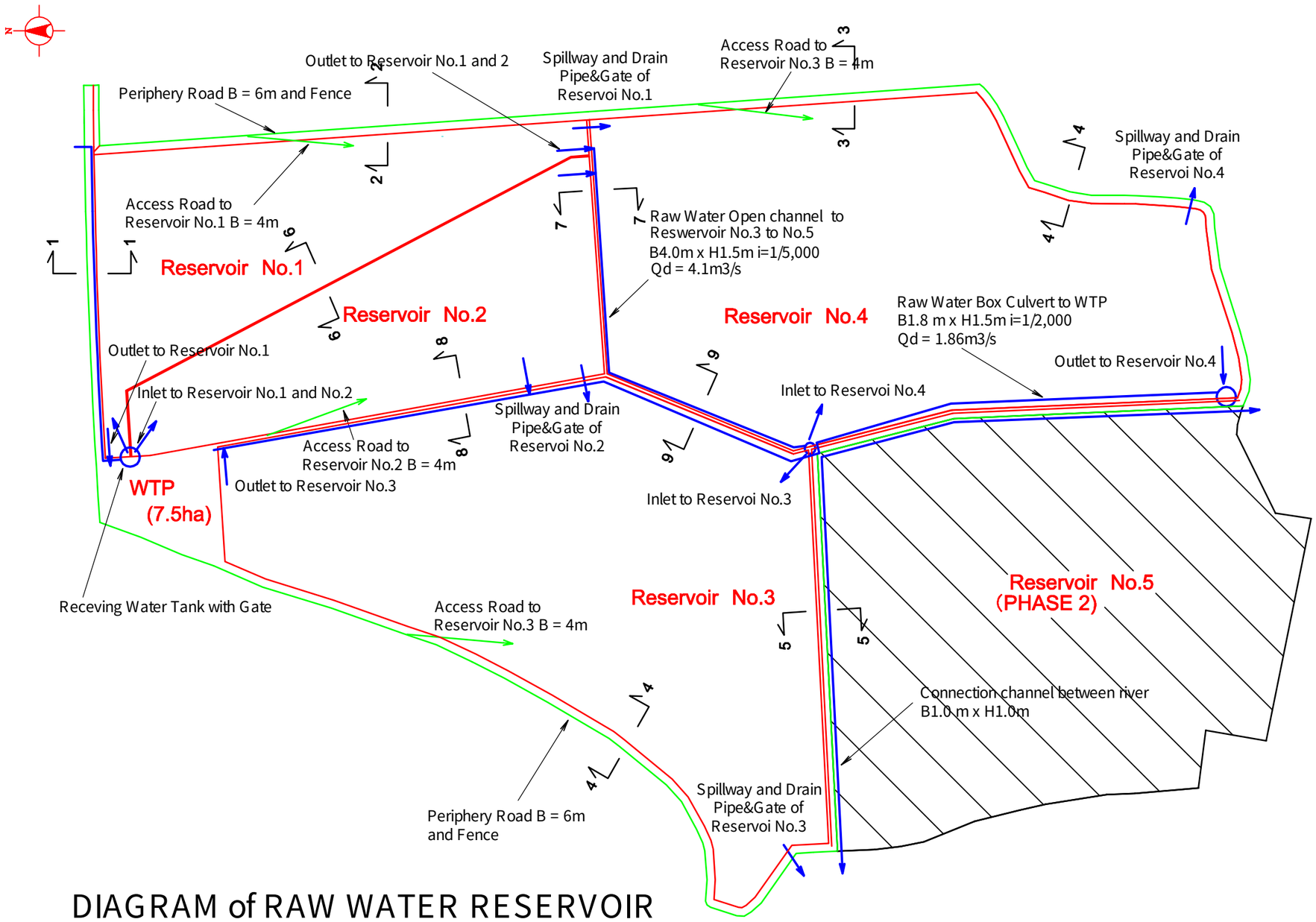
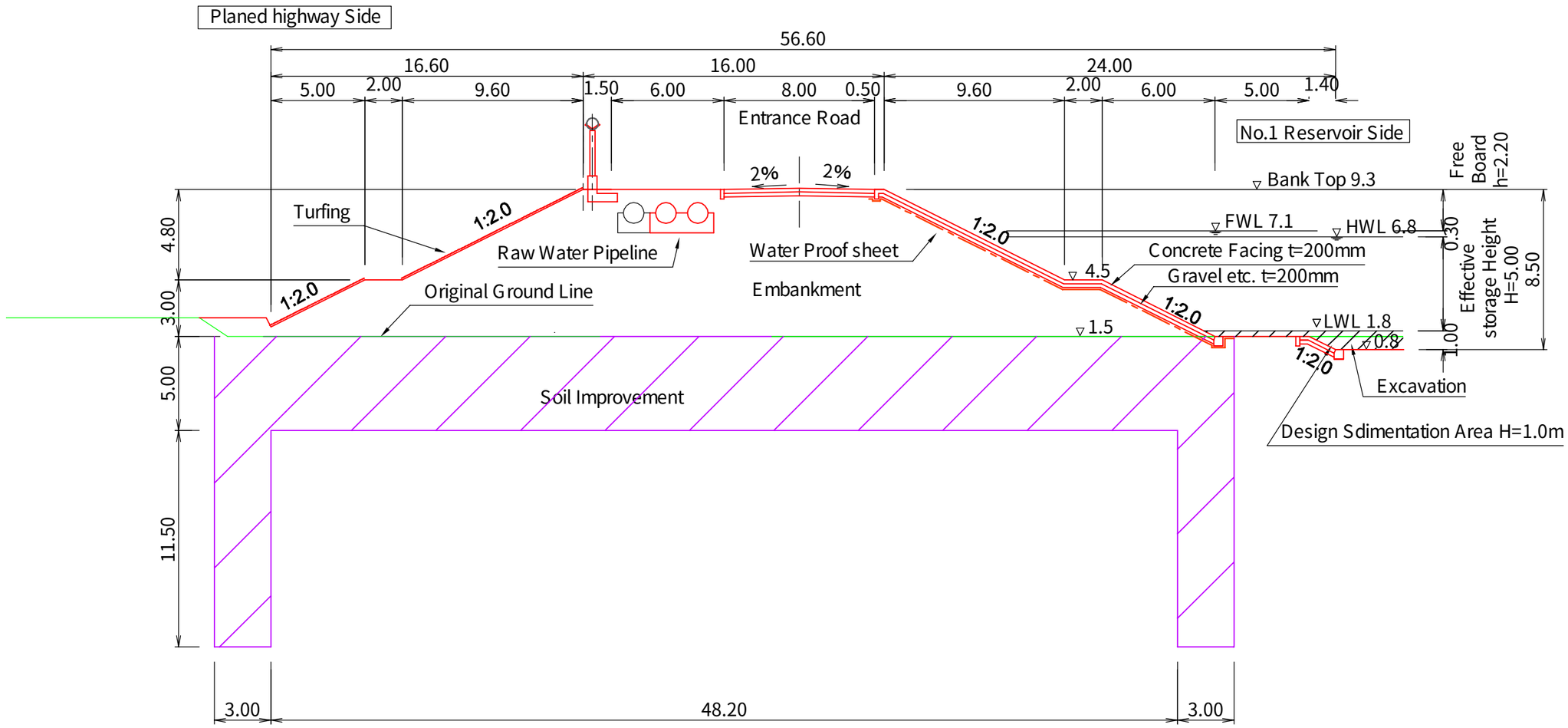


DIAGRAM of RAW WATER RESERVOIR

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** DIAGRAM of RAW WATER RESERVOIR	
		SCALE As shown	**DRAWING NO.** B-13

B

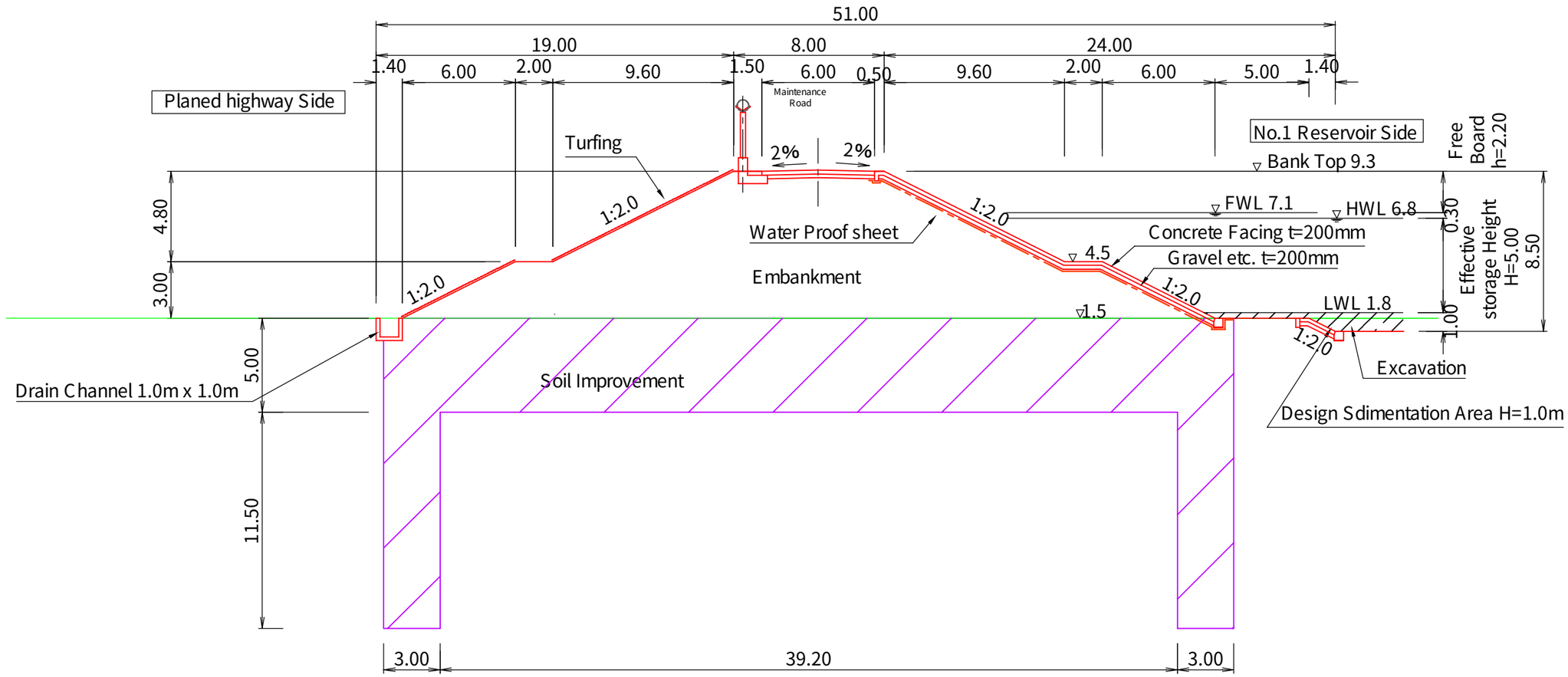


Section 1-1

0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Section 1-1 **SCALE** As shown / **DRAWING NO.** B-14

B

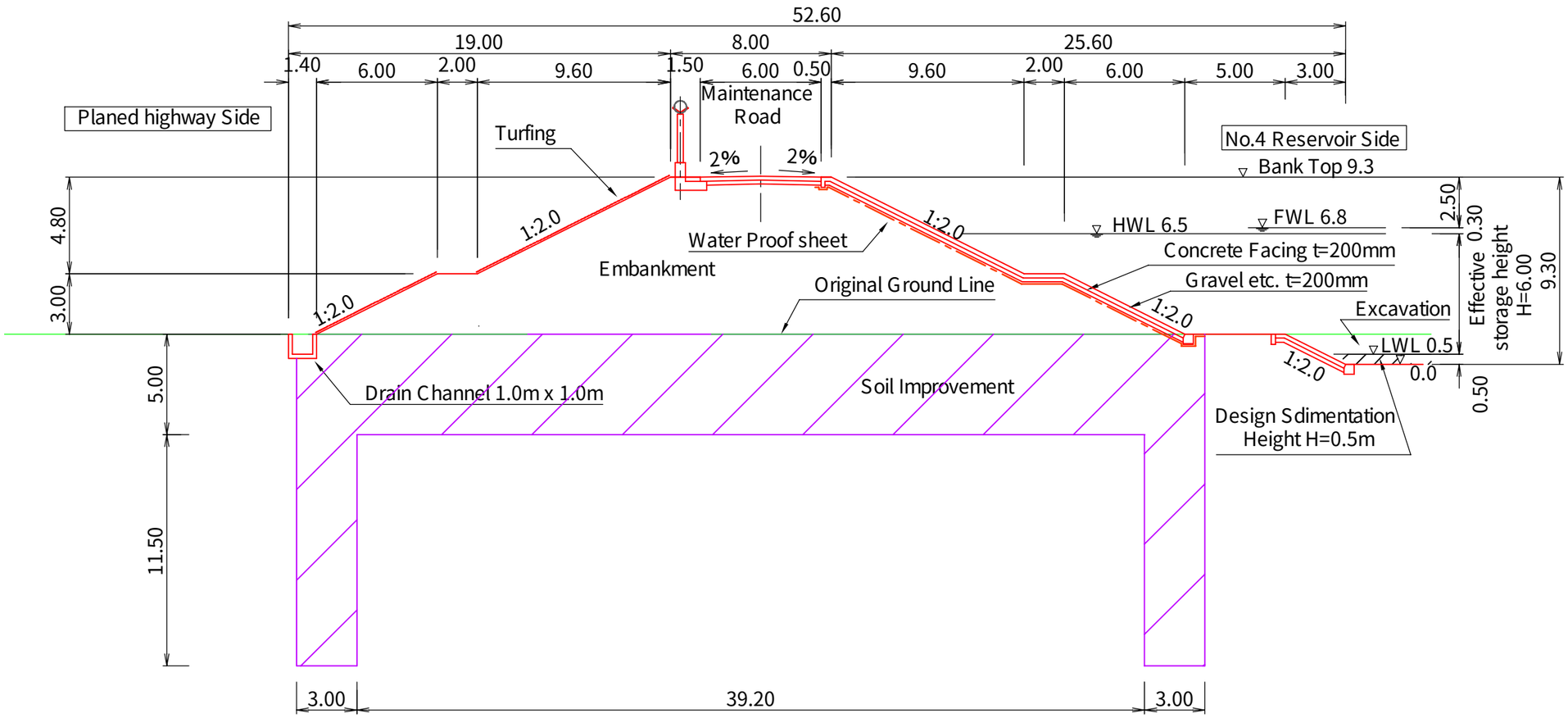


Section 2-2

0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Section 2-2 **SCALE** As shown / **DRAWING NO.** B-15

B

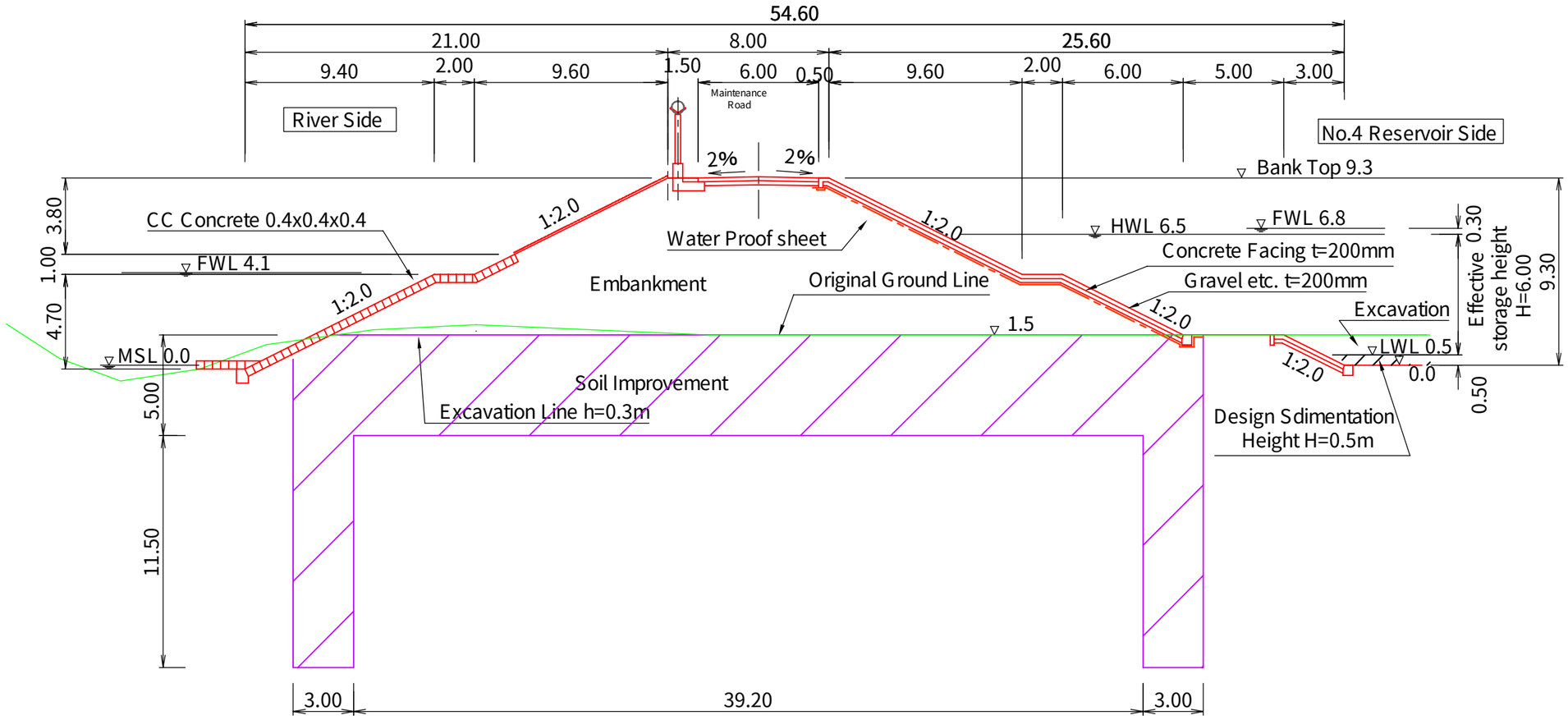


Section 3-3

0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Section 3-3 **SCALE** As shown **DRAWING NO.** B-16

B

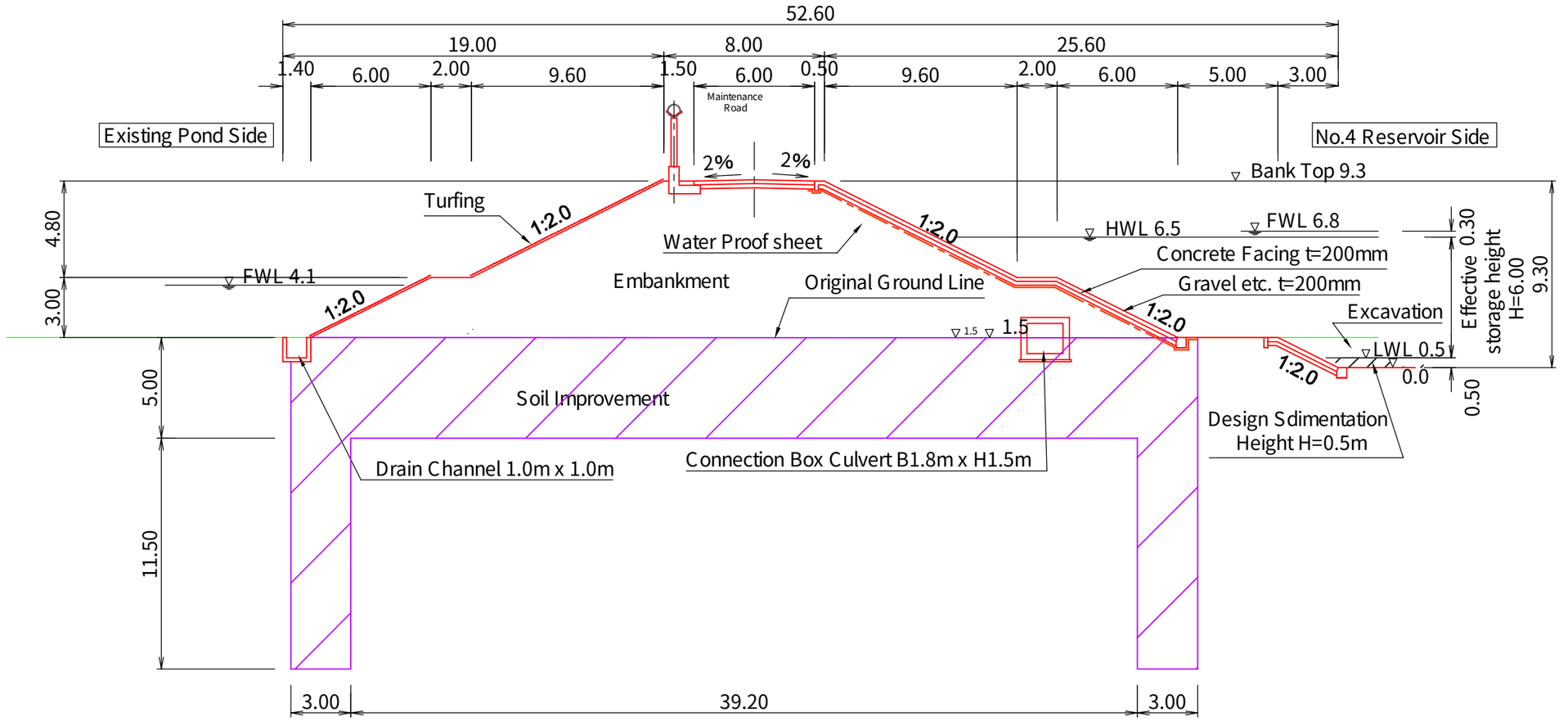


Section 4-4

0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Section 4-4 **SCALE** As shown / **DRAWING NO.** B-17

B

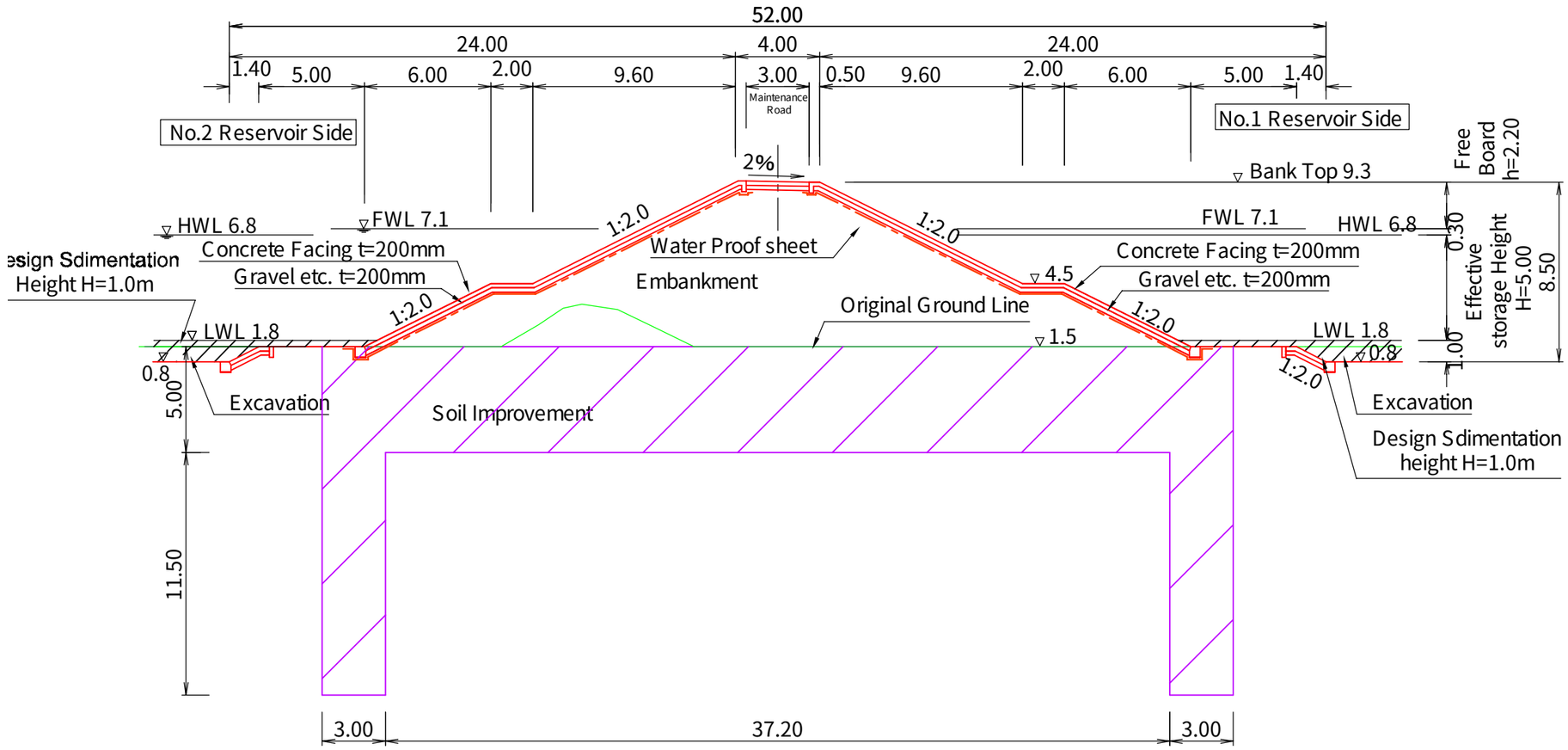


Section 5-5

0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Section 5-5 **SCALE** As shown / **DRAWING NO.** B-18

B

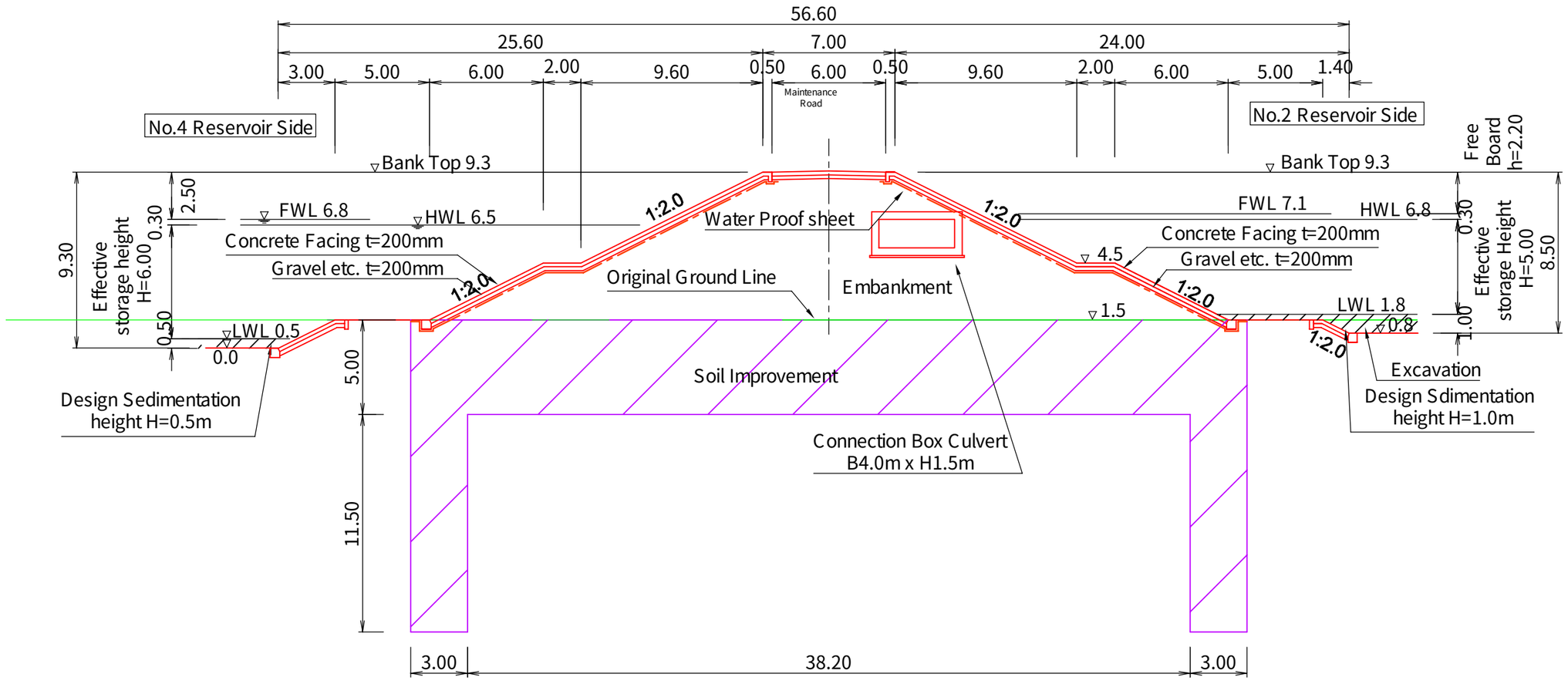


Section 6-6

0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Section 6-6 **SCALE** As shown / **DRAWING NO.** B-19

B

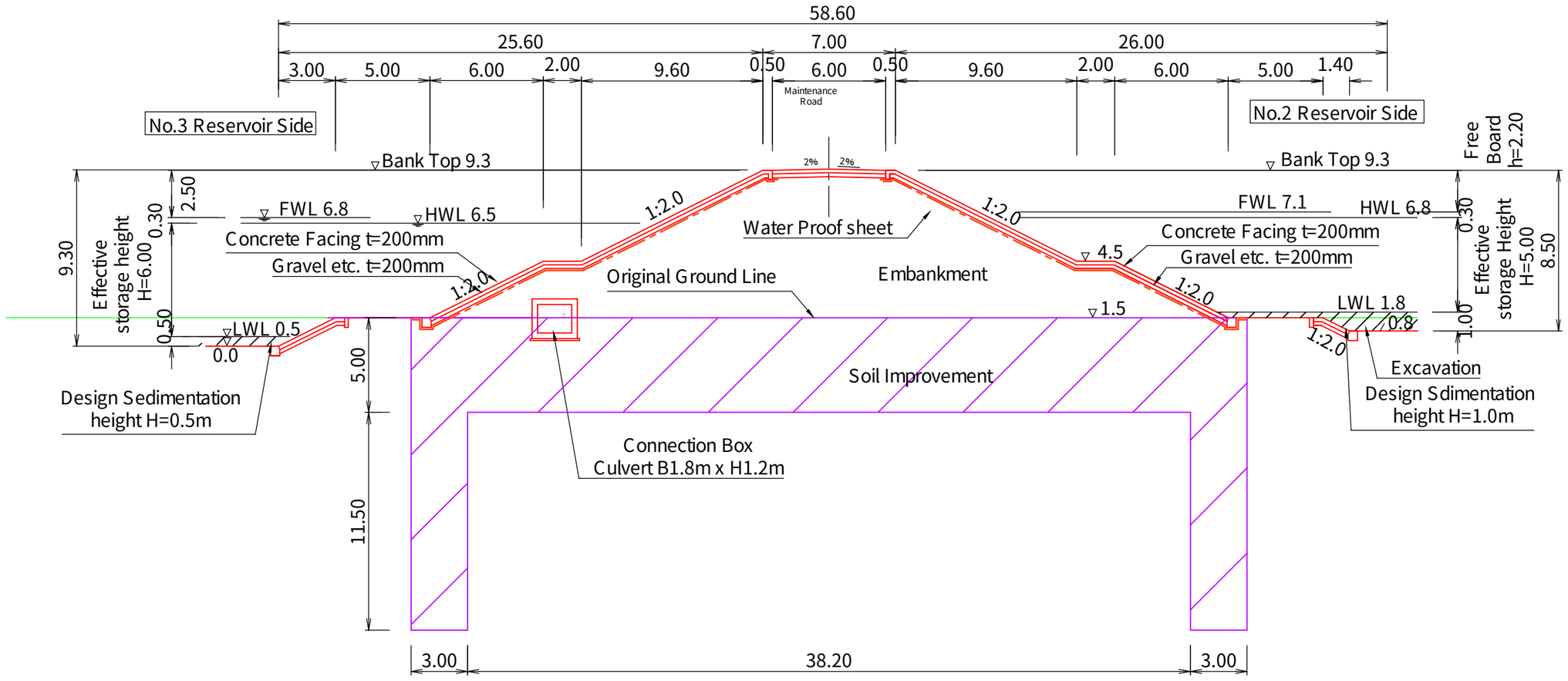


Section 7-7

0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Section 7-7	
		SCALE As shown	**DRAWING NO.** B-20

B

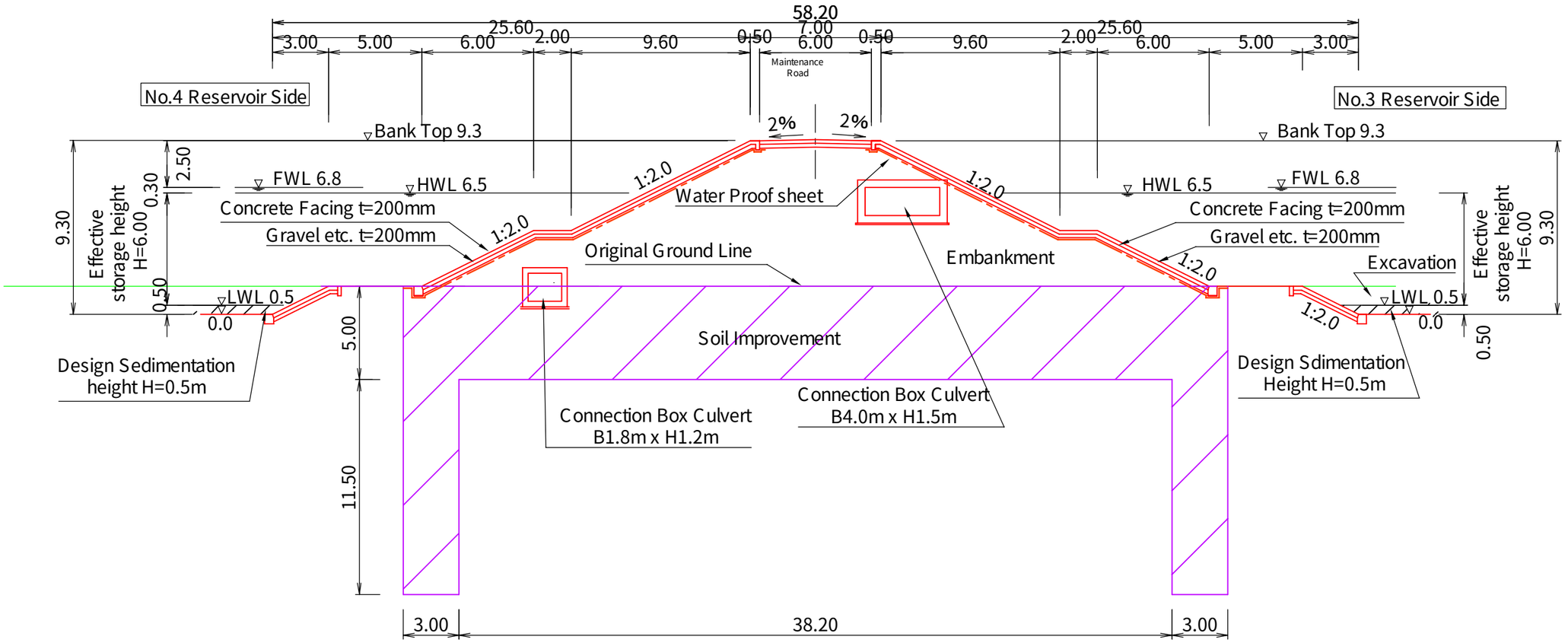


Section 8-8

0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Section 8-8	
		SCALE As shown	**DRAWING NO.** B-21

B

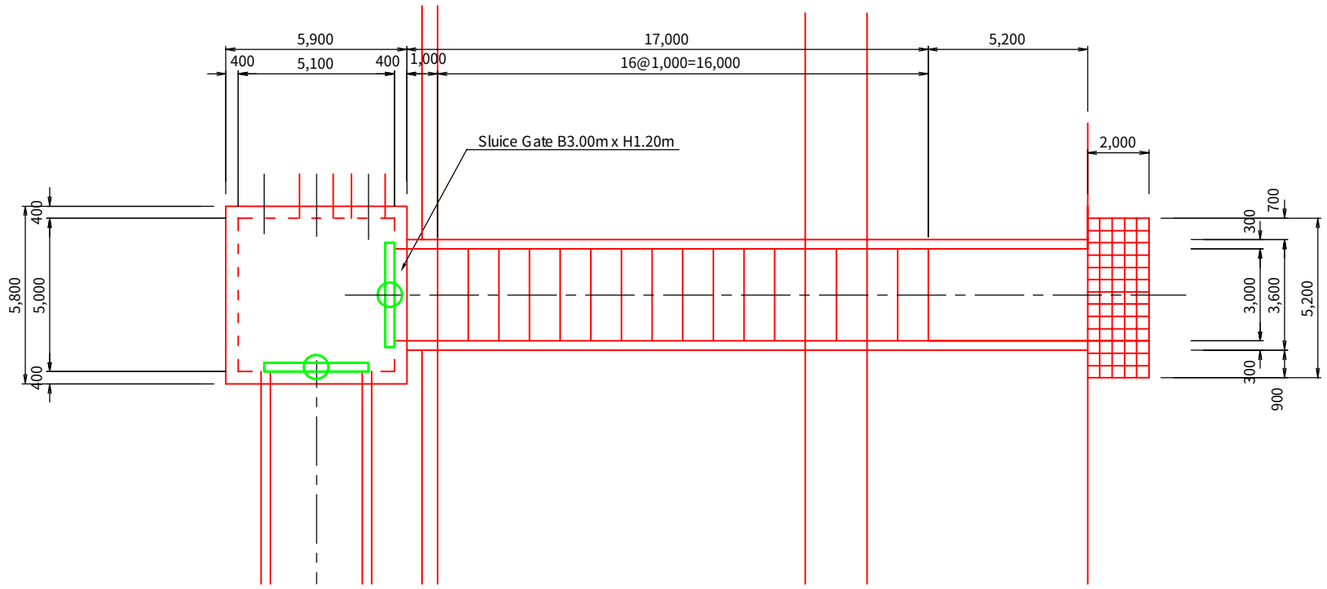


Section 9-9

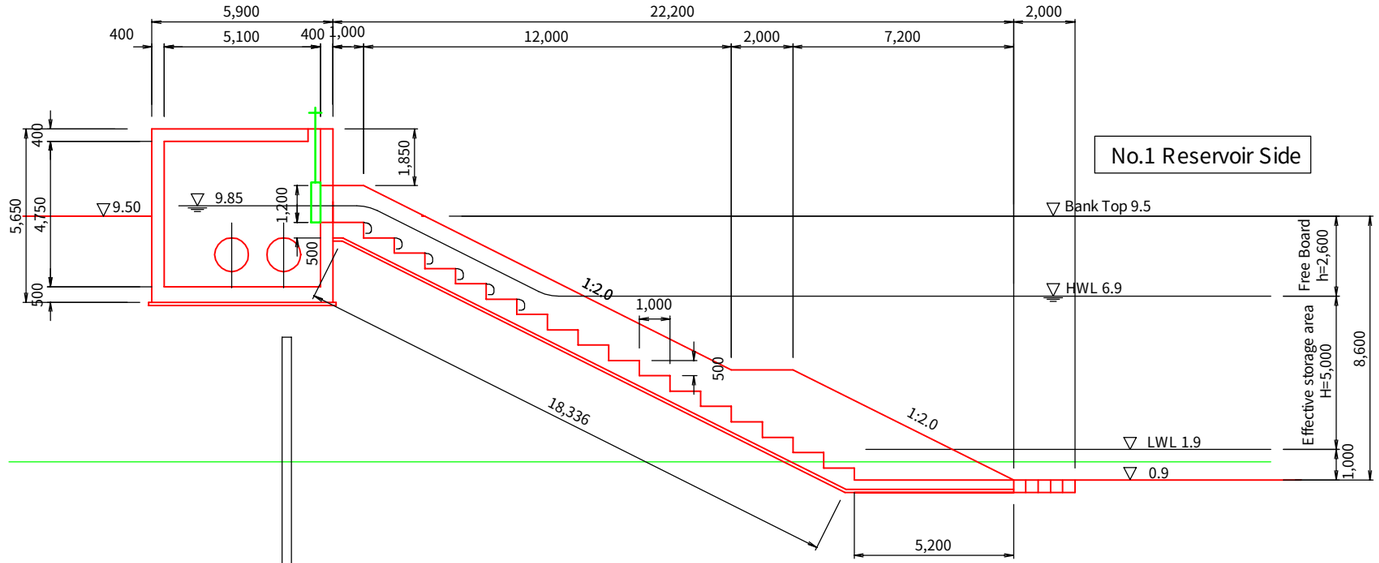
0 2.5 5.0 7.5 10.0 12.5m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Section 9-9 **SCALE** As shown / **DRAWING NO.** B-22

B



RECEIVING TANK PLAN



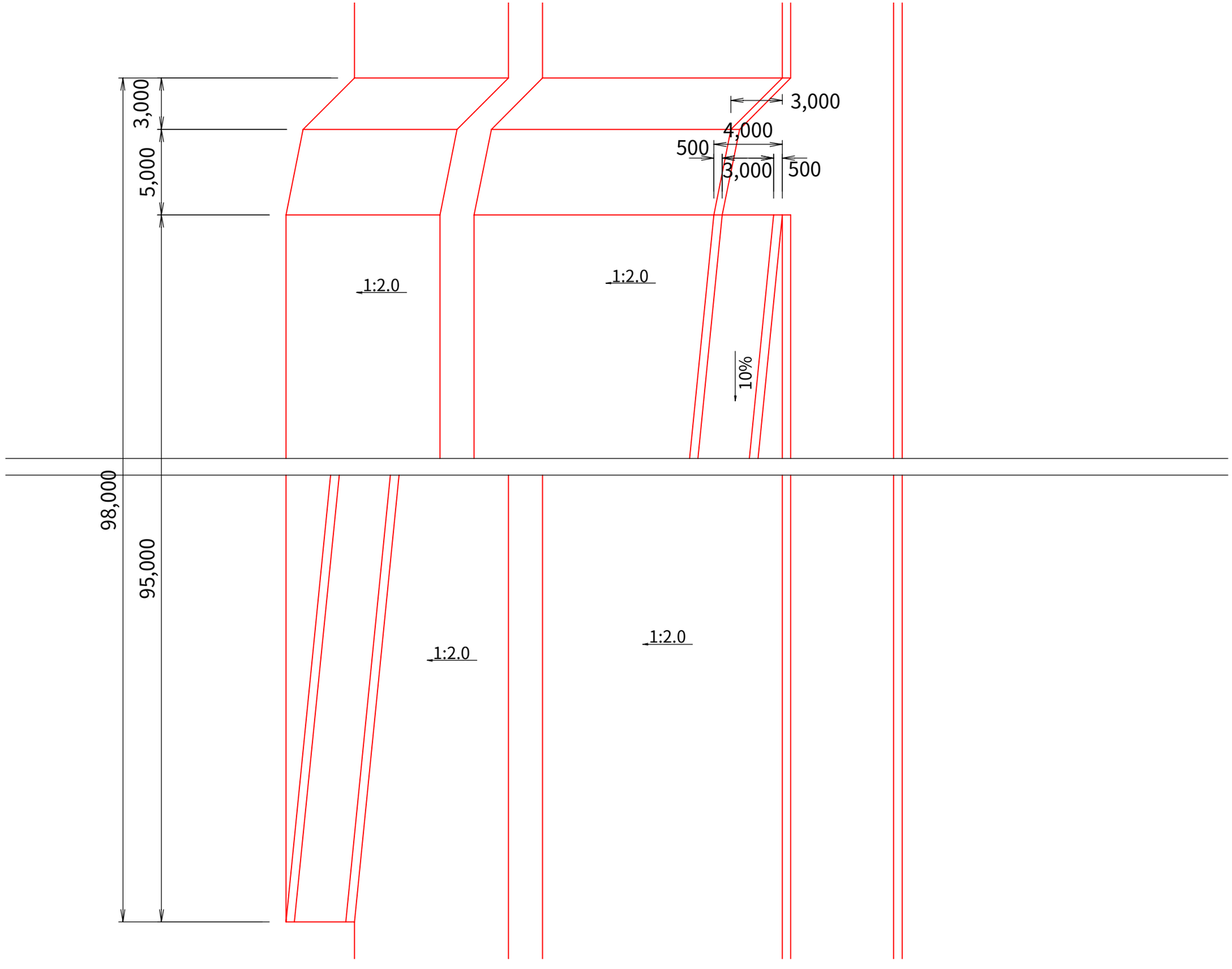
RECEIVING TANK PROFILE

RECEIVING TANK PLAN and PROFILE

0 2 4 6 8 10m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** RECEIVING TANK PLAN and PROFILE
		SCALE As shown
		DRAWING NO. B-23

B

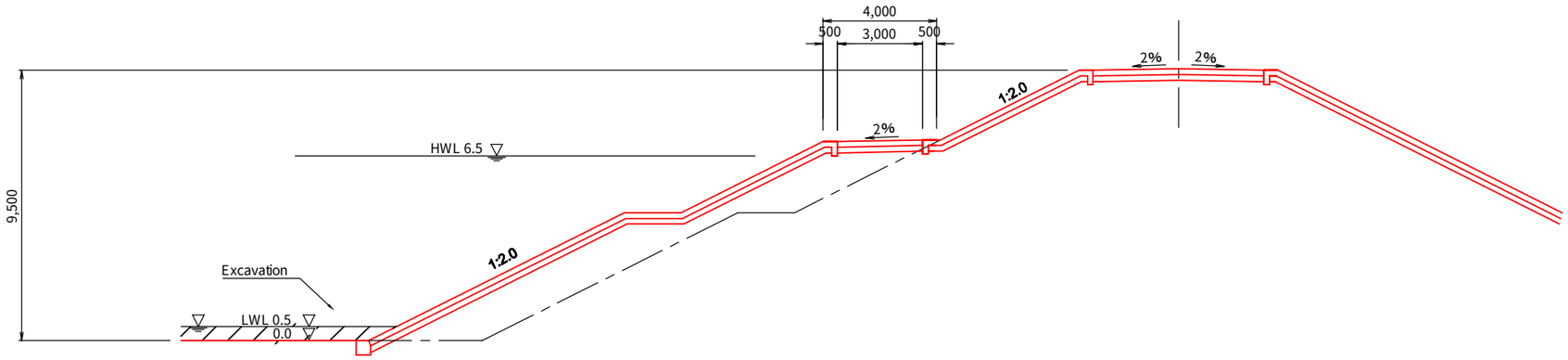


MAINTENANCE ROAD PLAN

0 2.5 5 7.5 10 12.5m
SCALE IN METERS

PROJECT		TITLE OF DRAWING	
PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	MAINTENANCE ROAD PLAN	
		SCALE As shown	DRAWING NO. B-24

B

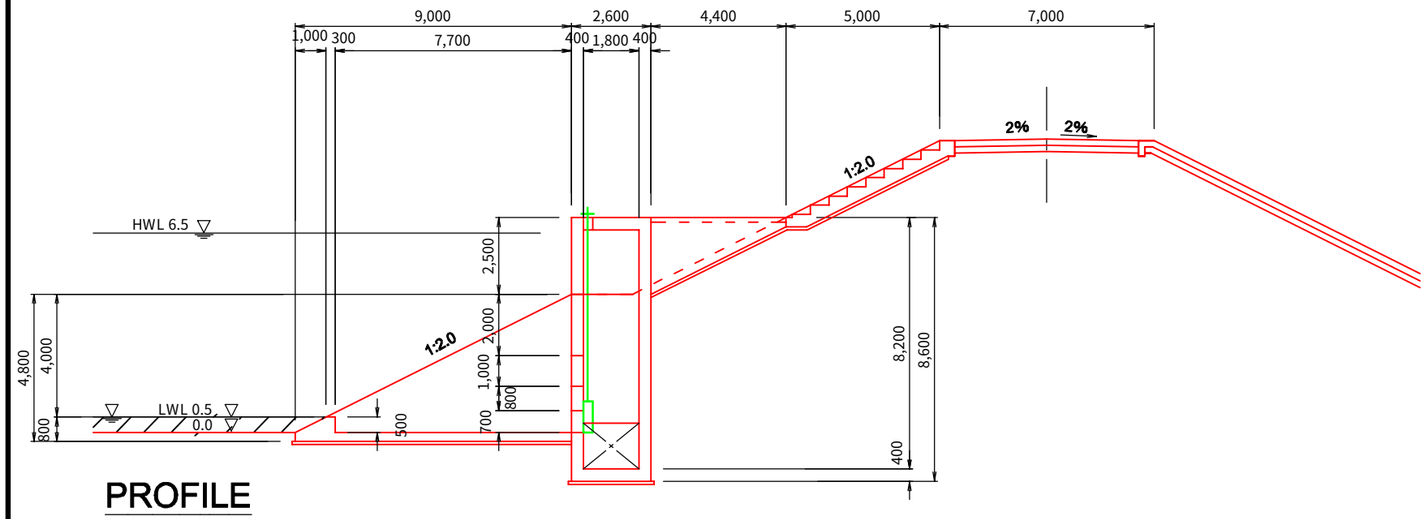


MAINTENANCE ROAD TYPICAL CROSS SECTION

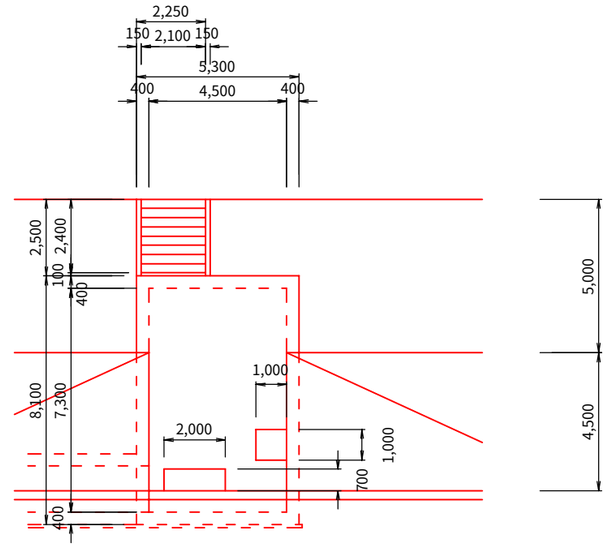
0 2 4 6 8 10m
SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** MAINTENANCE ROAD TYPICAL CROSS SECTION **SCALE** As shown / **DRAWING NO.** B-25

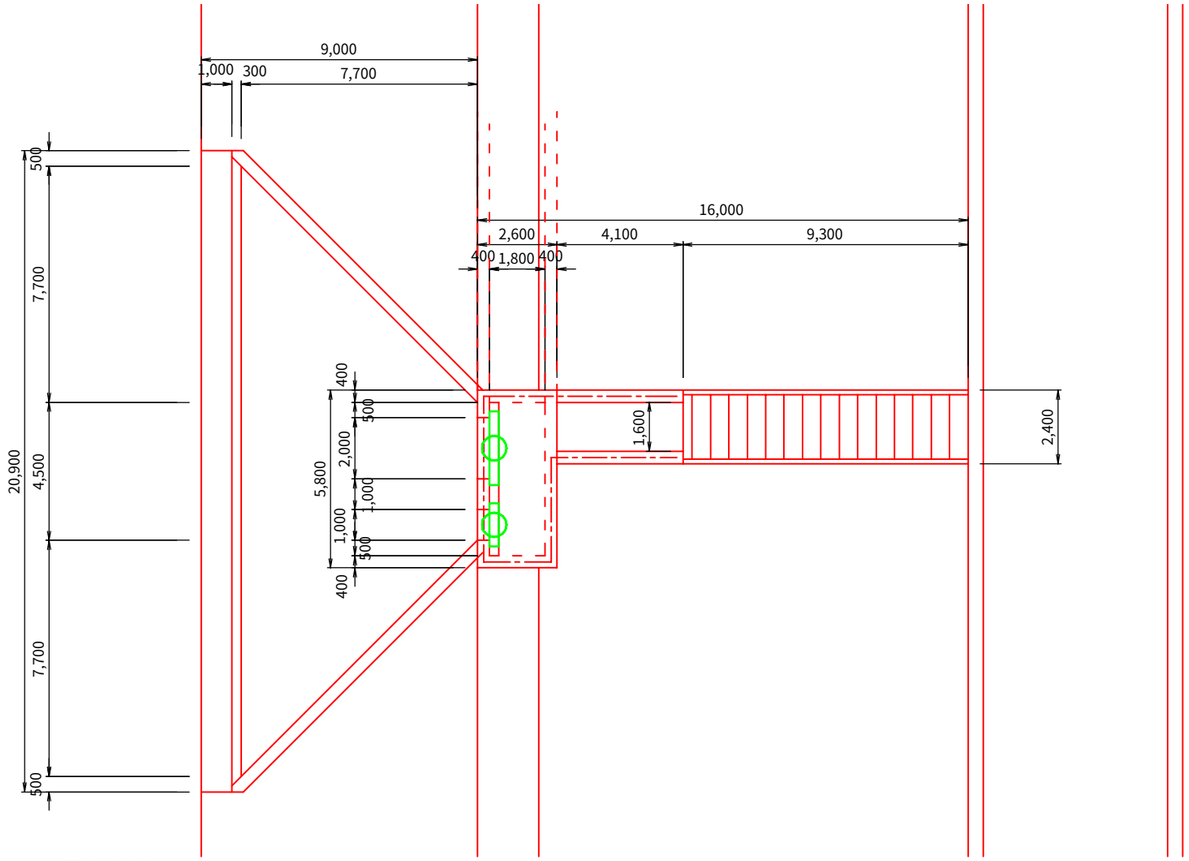
B



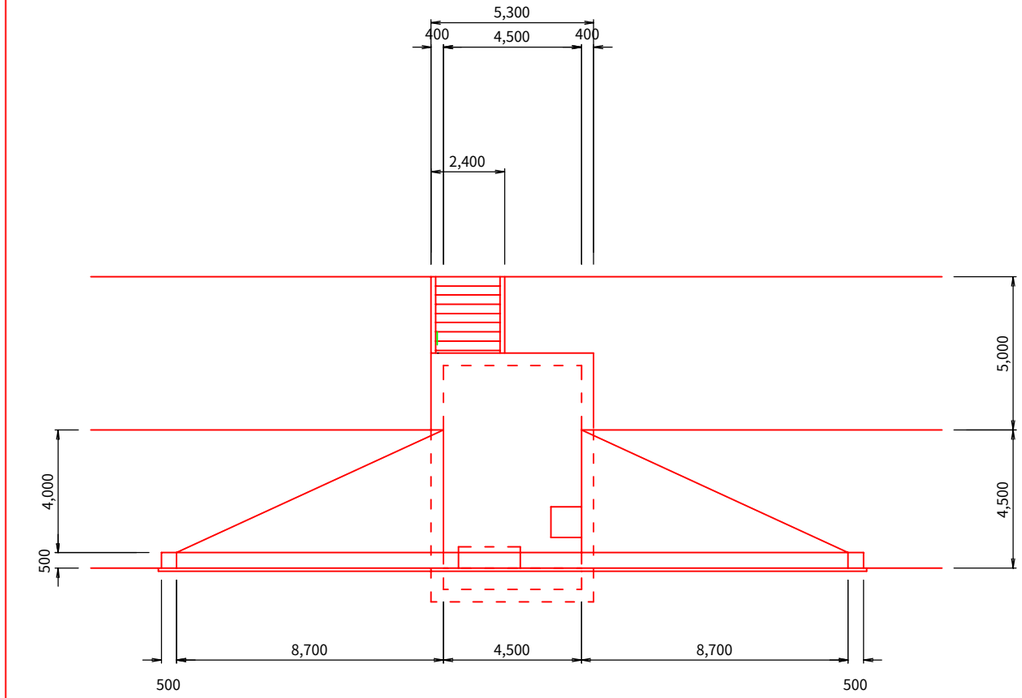
PROFILE



FRONT SECTION



PLAN



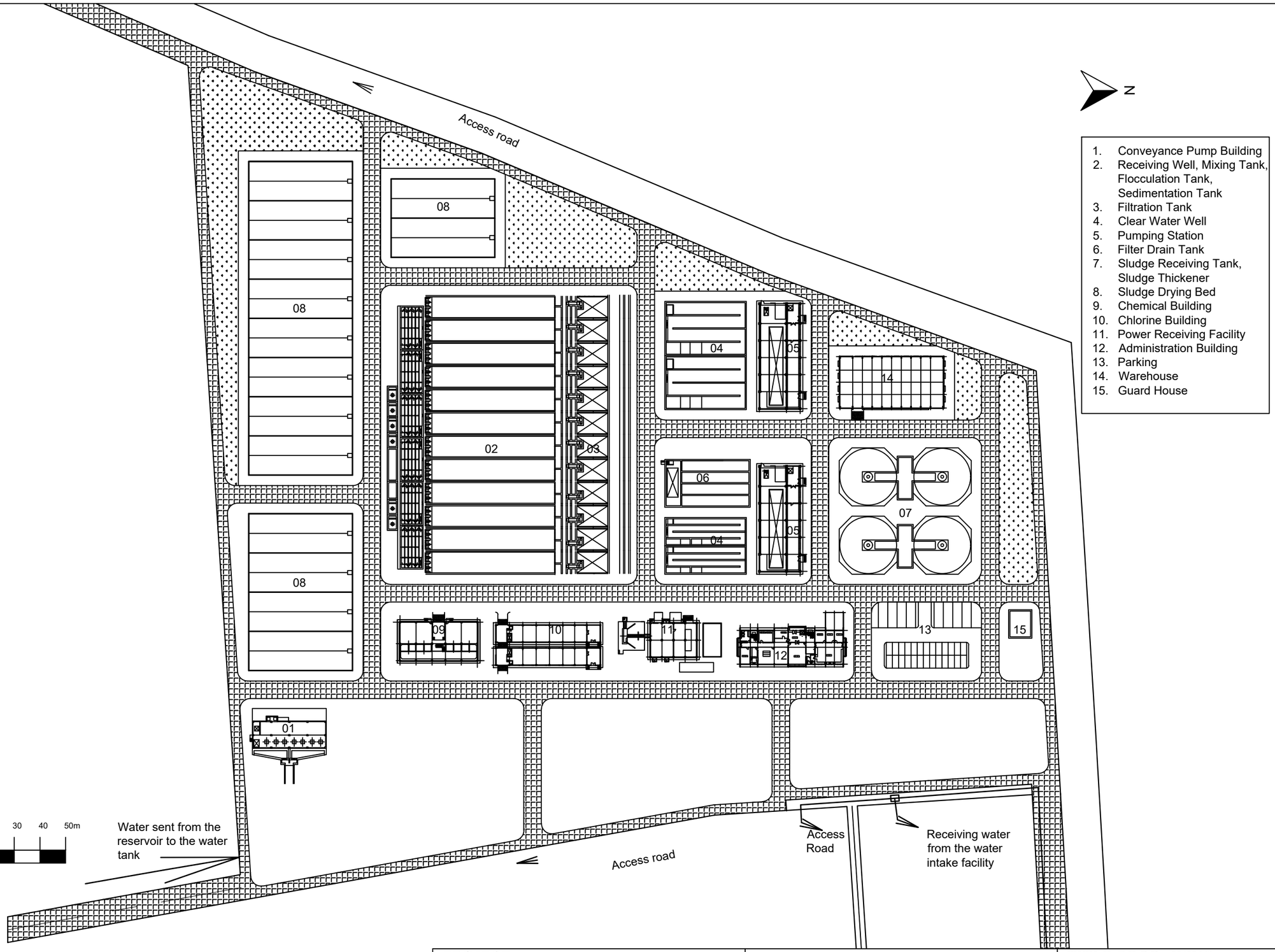
FRONT VIEW

OUTLET TO WTP DETAILS

0 2 4 6 8 10m
SCALE IN METERS

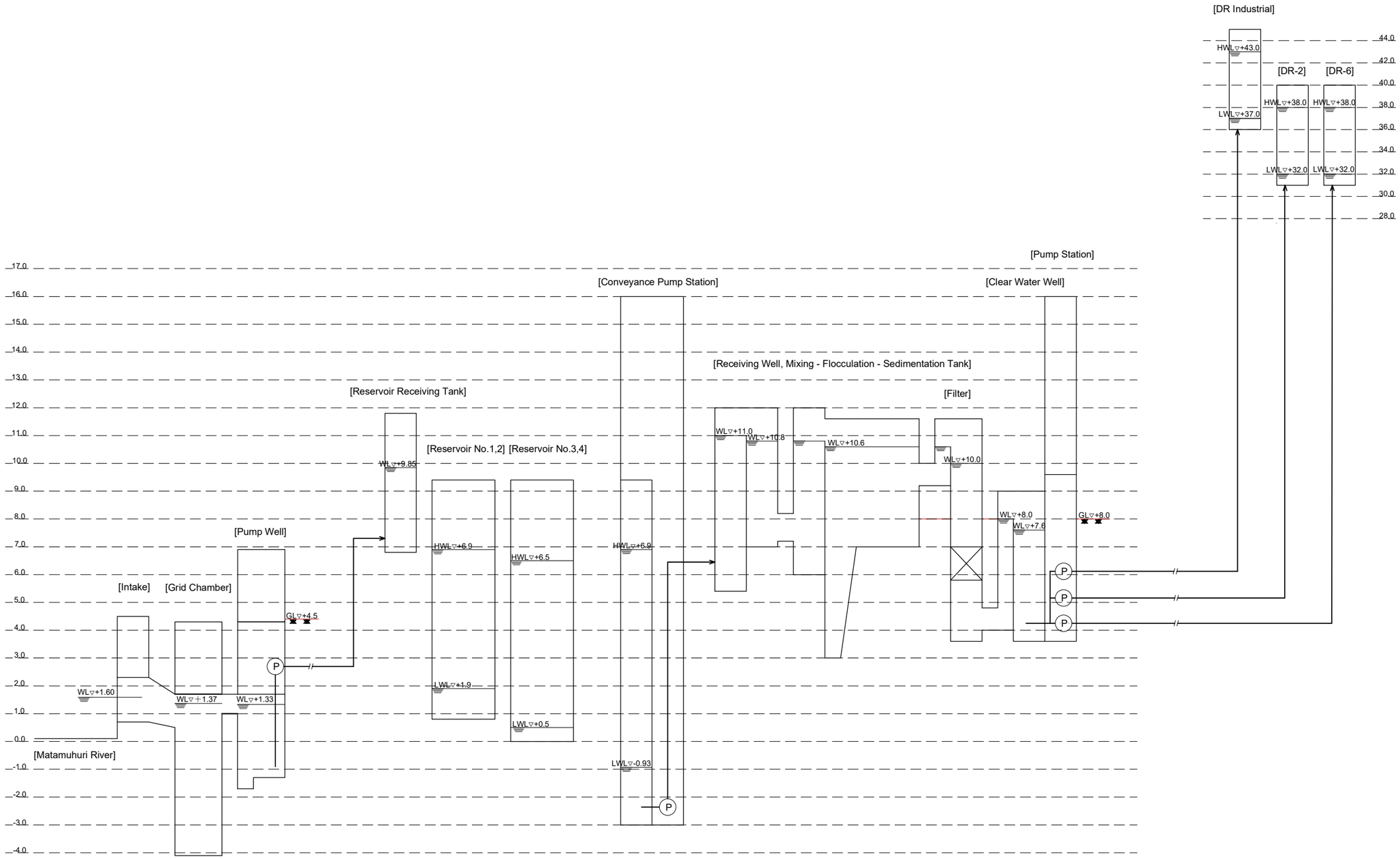
PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** OUTLET TO WTP DETAILS **SCALE** As shown / **DRAWING NO.** B-26

C



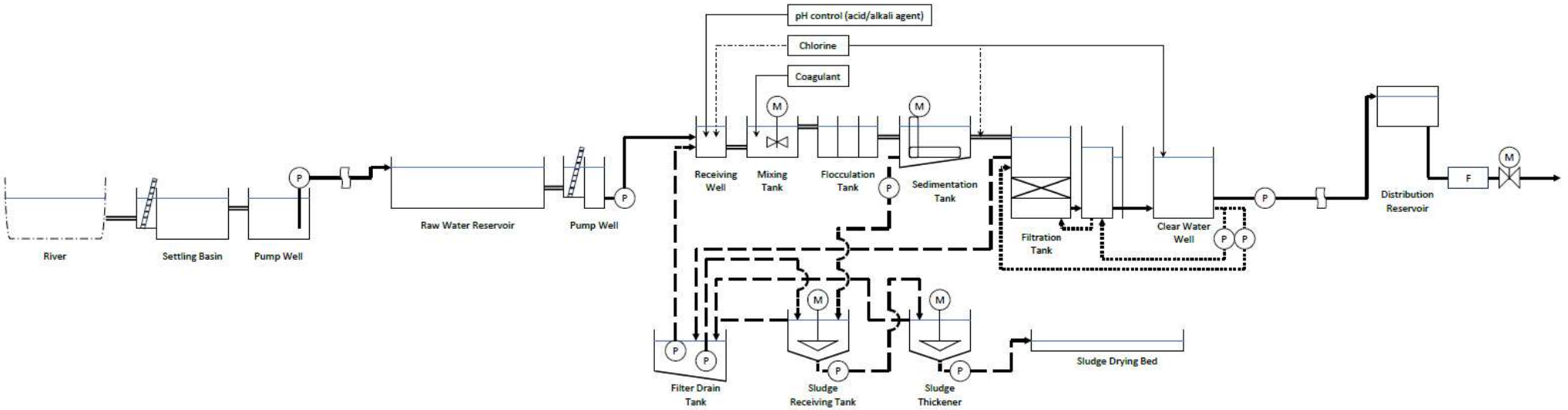
PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** General Plot Plan **SCALE** 1:1500 **DRAWING NO.** C-1

C



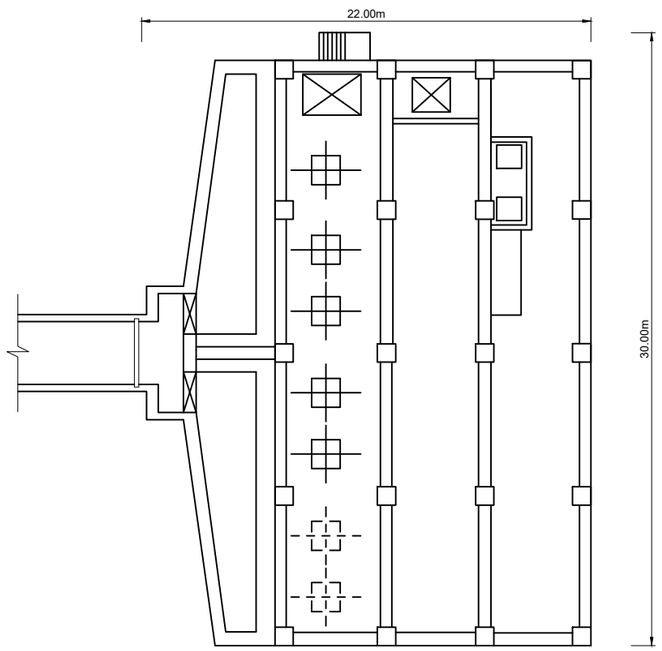
PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Hydraulic Profile **SCALE** NTS **DRAWING NO.** C-2

C

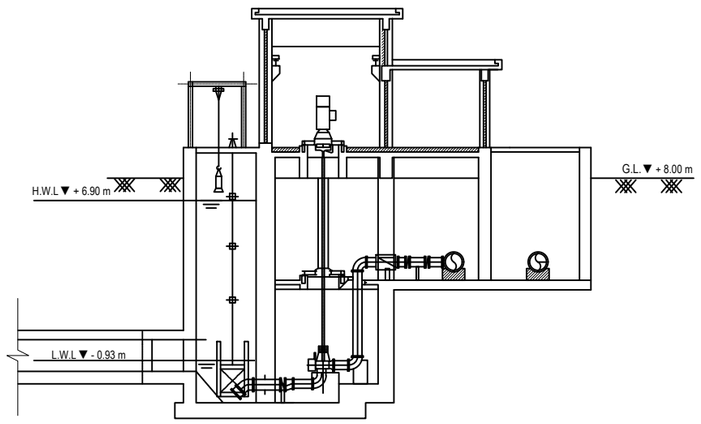


PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Process Flow Diagram **SCALE** NTS **DRAWING NO.** C-3

C



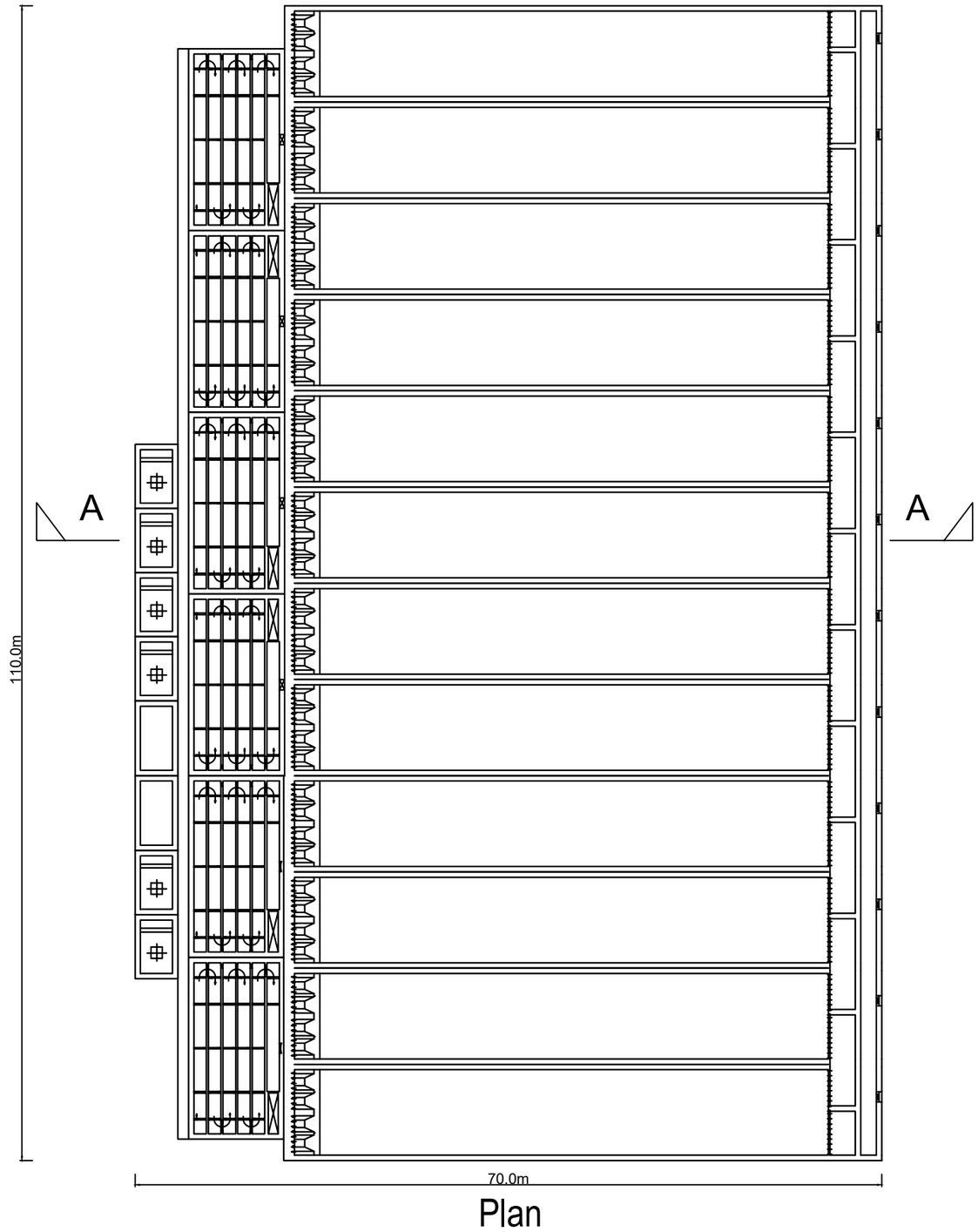
Plan



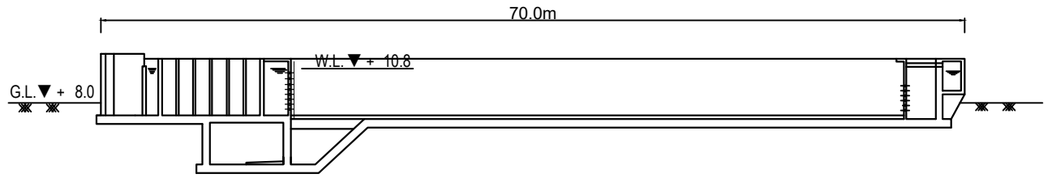
Section

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Conveyance Pump Building **SCALE** 1:300 **DRAWING NO.** C-4

C



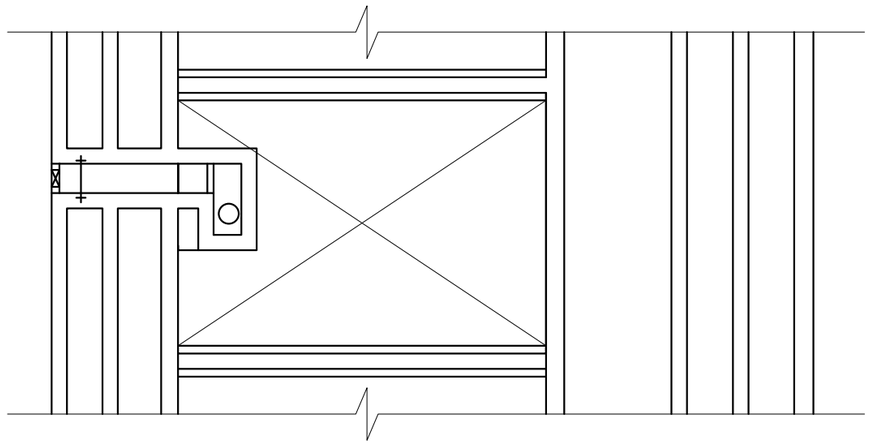
Plan



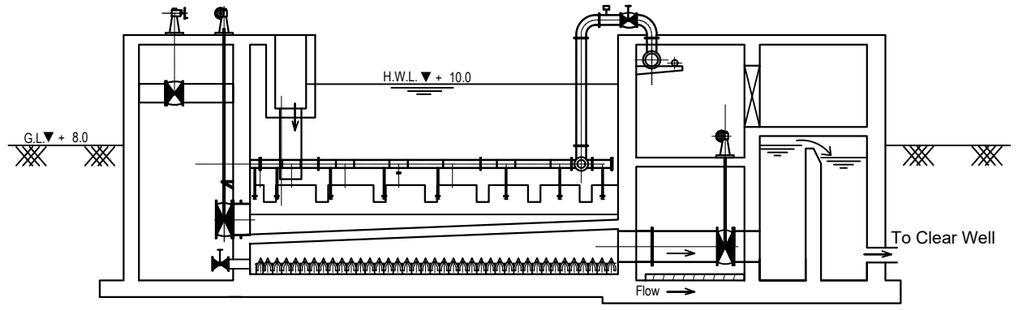
Section A-A

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Receiving Tank, Mixing Tank, Flocculation tank, Sedimentation Tank **SCALE** 1:500 **DRAWING NO.** C-5

C



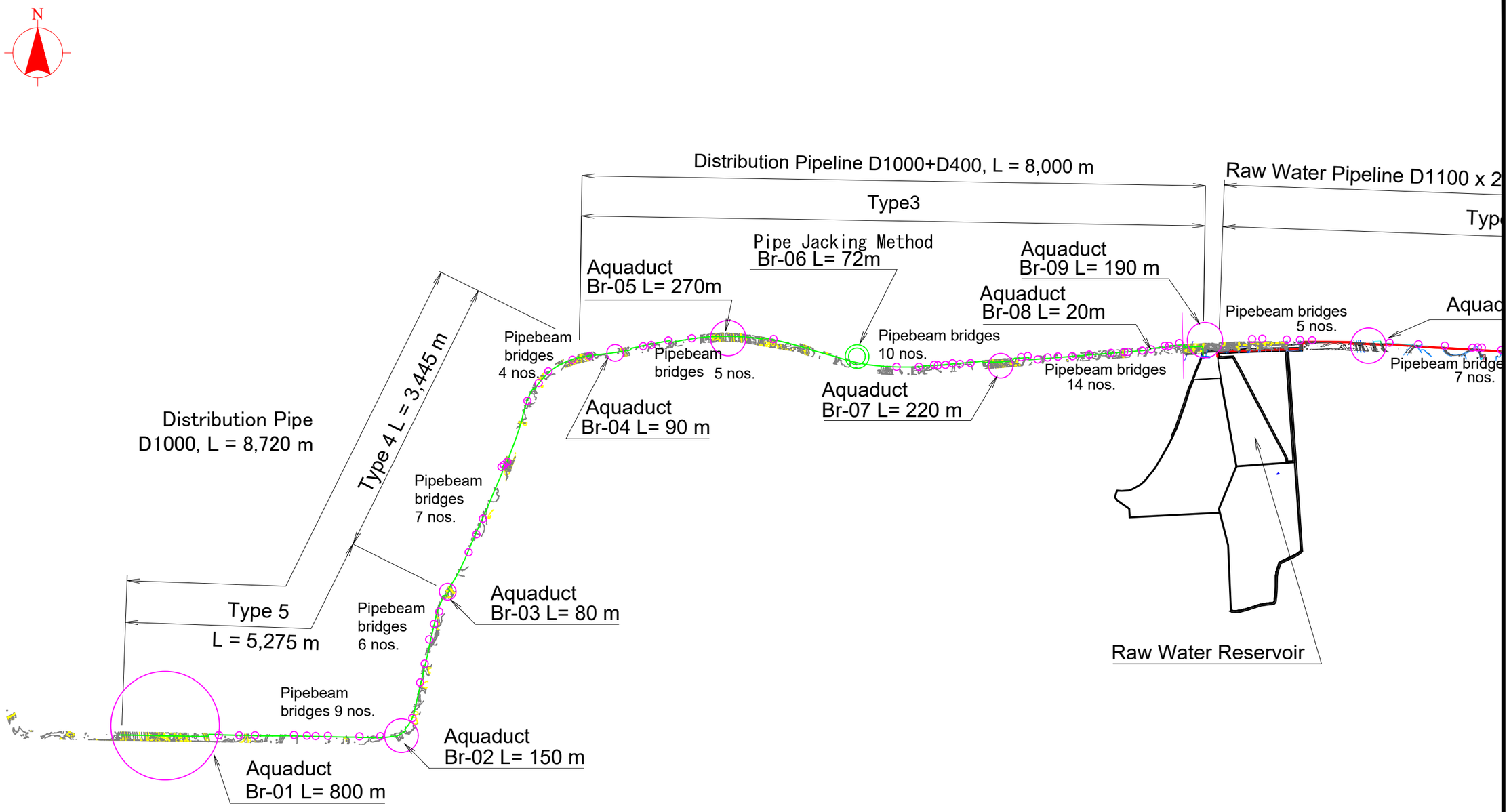
Plan



Section

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Filtration Tank **SCALE** 1:200 **DRAWING NO.** C-6

D

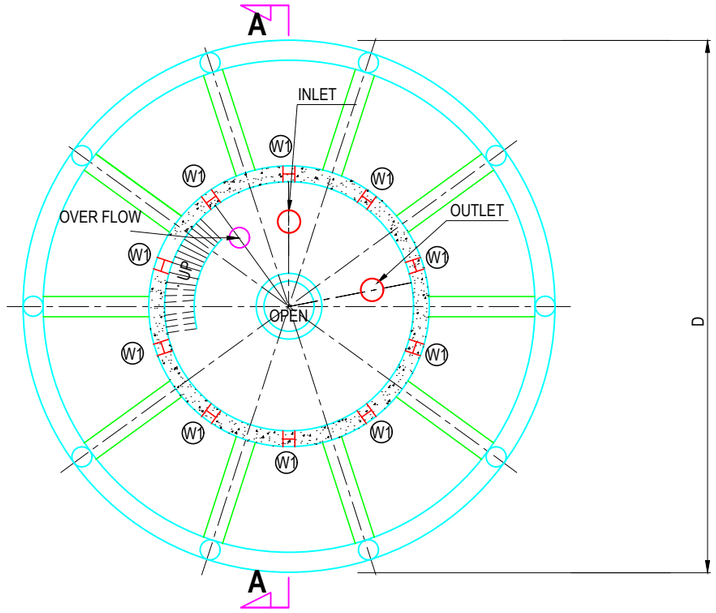


TRANSMISSION PIPELINE AND STRUCTURES

0 0.5 1.0 1.5 2.0 2.5 km
SCALE IN METERS

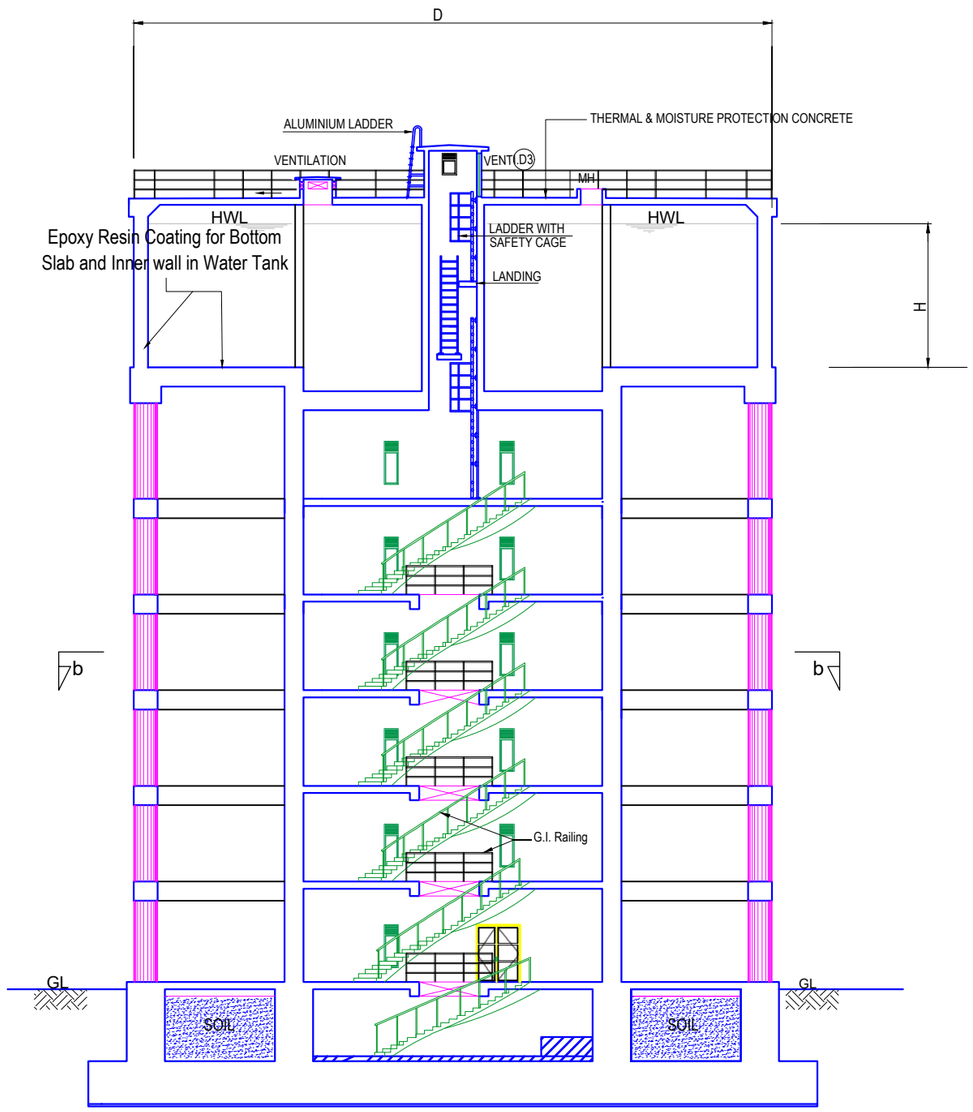
PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Transmission Pipeline and Structures	
		SCALE As shown in Scale Bar	**DRAWING NO.** D-1

D



PLAN b-b

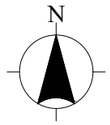
Name	D (m)	H (m)	Capacity (m^3)
Distribution Reservoir at Chakaria Paurashova	18 21	6 6	1,500 2,000
Distribution Reservoir at Matarbari Union	15	6	1,000
Distribution Reservoir at Moheshkhali EZ (Dhalghata)	15 x 1 25 x 3	6 6	1,000 3,000



SECTION A-A

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Plan and Section of Distribution Reservoir **SCALE** - **DRAWING NO.** D-2

D





LEGEND

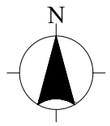
Road Pavement	:	House Building (BP)	: BP
Road RCC	:	House Tin Shed (TS)	: TS
Road Earth	:	House Semi Permanent	: SP
River Bank	:	Shop Building	:
Drain	:		
Pond	:		
Feature	:		

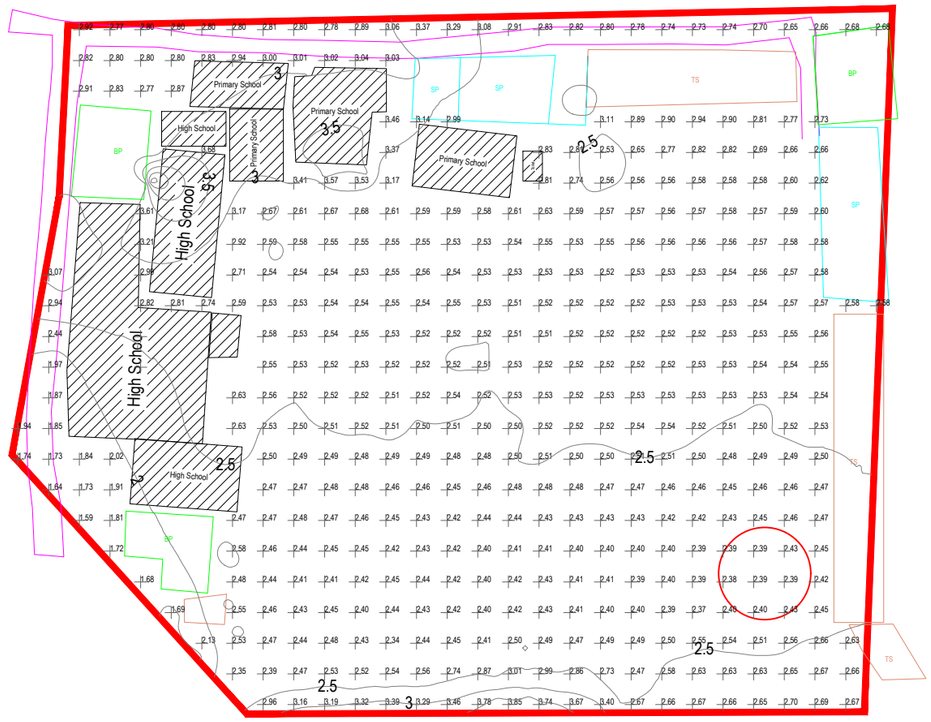
0 10 20 30 40 50 m

SCALE IN METERS

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Site Condition of Distribution Reservoir at Chakaria Paurashova
		SCALE As shown in Scale Bar **DRAWING NO.** D-3

D





LEGEND

Road Pavement	:	House Building (BP)	:
Road RCC	:	House Tin Shed (TS)	:
Road Earth	:	House Semi Permanent (SP)	:
River Bank	:	Shop Building	:
Boundary Wall	:		
Pond	:		
Feature	:		

0 10 20 30 40 50 m

SCALE IN METERS

PROJECT
PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT

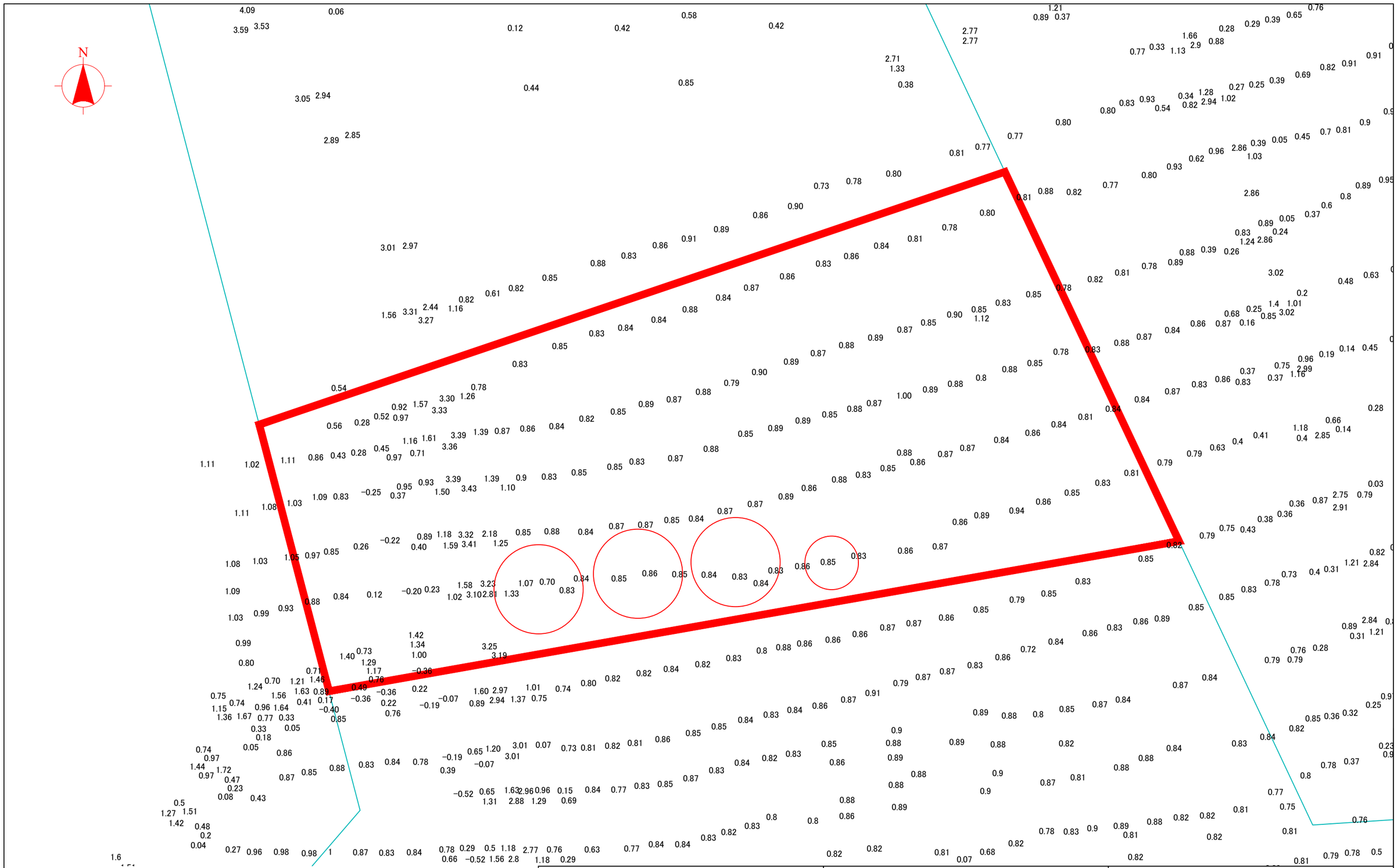
Japan International Cooperation Agency (JICA)
Nippon Koei Co. Ltd.
Japan Water Agency

TITLE OF DRAWING
Site Condition of Distribution Reservoir at Matarbari Union

SCALE
As shown in Scale Bar

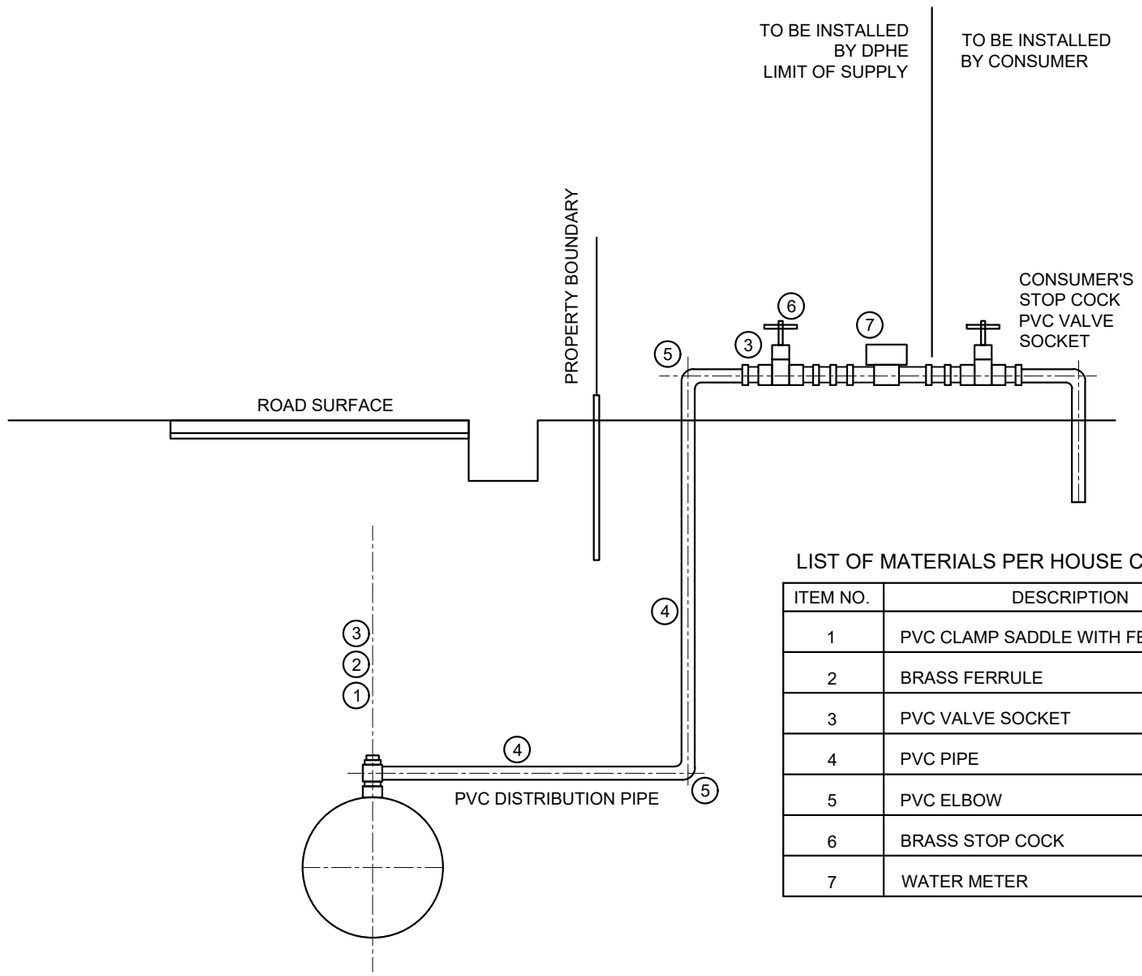
DRAWING NO.
D-4

D



PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Site Condition of Distribution Reservoir at Moheshkhali Economic Zone (Dhalghata) **SCALE** As shown in Scale Bar **DRAWING NO.** D-5

D



HOUSE CONNECTION

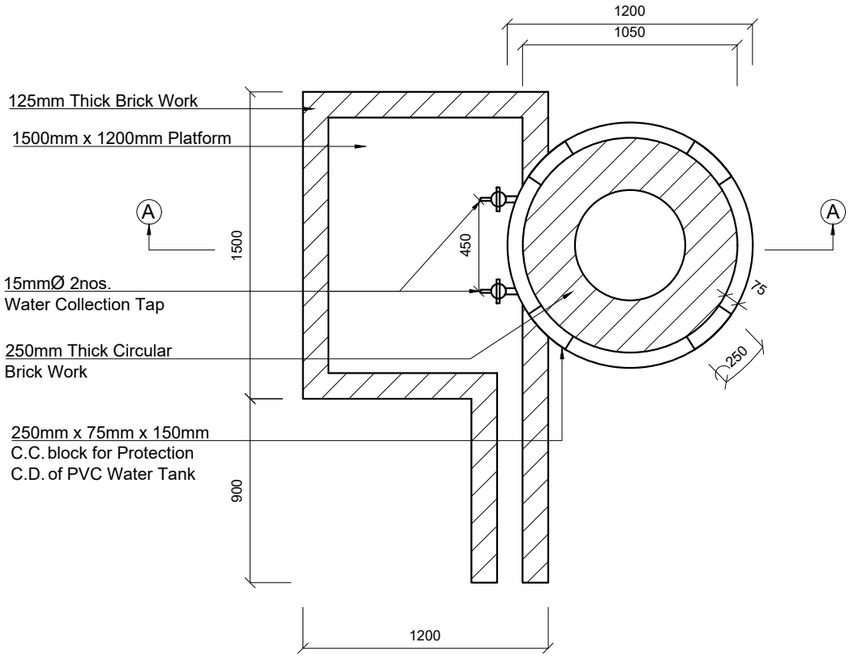
THE WATER MAIN & THE PROPERTY ARE ON THE SAME SIDE OF THE ROAD

LIST OF MATERIALS PER HOUSE CONNECTION

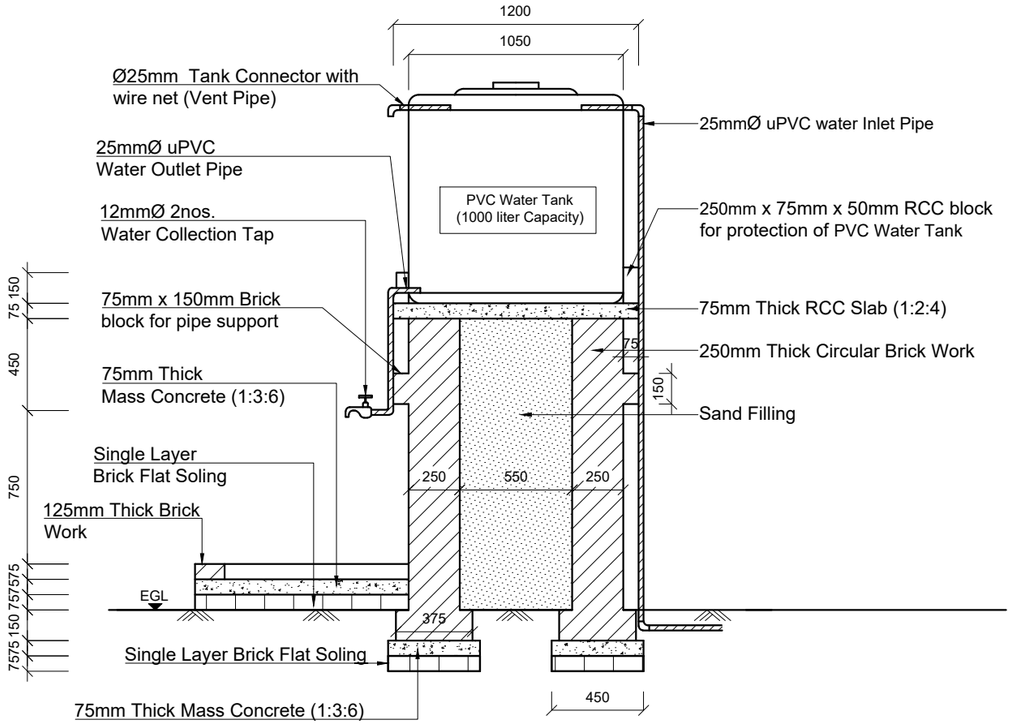
ITEM NO.	DESCRIPTION	QTY
1	PVC CLAMP SADDLE WITH FEMALE OUYLET	1
2	BRASS FERRULE	1
3	PVC VALVE SOCKET	2
4	PVC PIPE	1
5	PVC ELBOW	2
6	BRASS STOP COCK	1
7	WATER METER	1

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Individual House Connection **SCALE** None **DRAWING NO.** D-6

D



Plan of Superstructure with platform

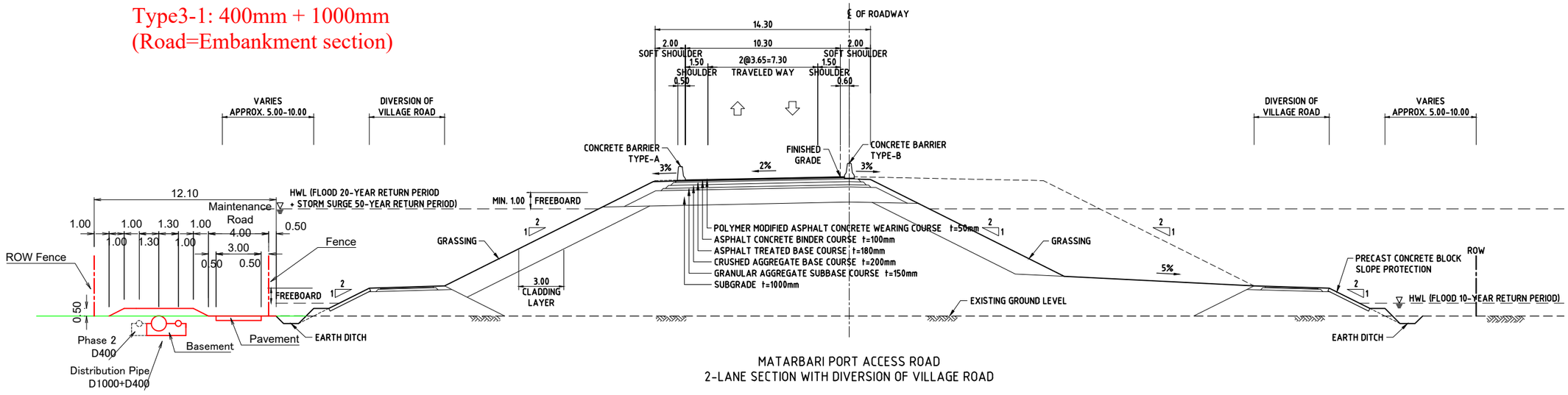


Section of Superstructure with platform (A-A)

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Group Tap Connection	
		SCALE 1:30	**DRAWING NO.** D-7

D

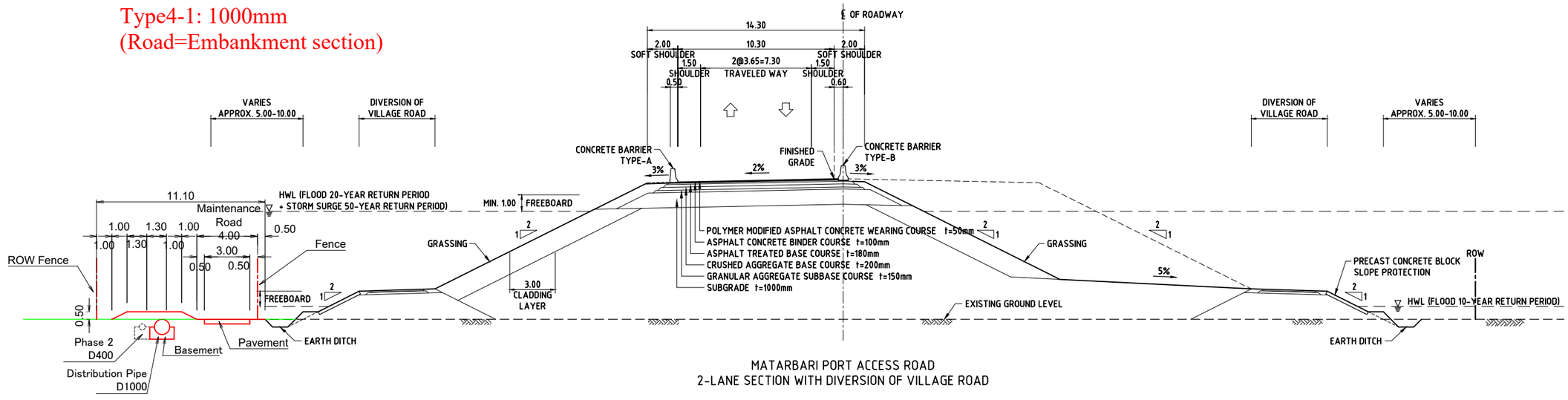
Type3-1: 400mm + 1000mm
(Road=Embankment section)



MATARBARI PORT ACCESS ROAD
2-LANE SECTION WITH DIVERSION OF VILLAGE ROAD

TYPE 3

Type4-1: 1000mm
(Road=Embankment section)



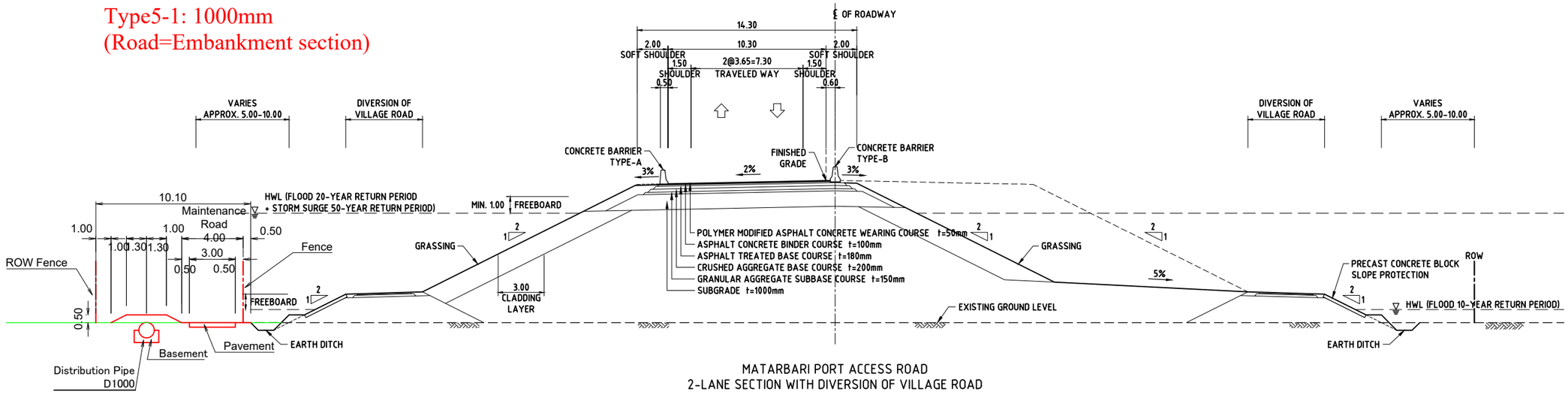
MATARBARI PORT ACCESS ROAD
2-LANE SECTION WITH DIVERSION OF VILLAGE ROAD

TYPE4

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Cross Section of Transmission Pipelines (1/6)	
		SCALE 1:300	**DRAWING NO.** D-8

D

Type5-1: 1000mm
(Road=Embankment section)



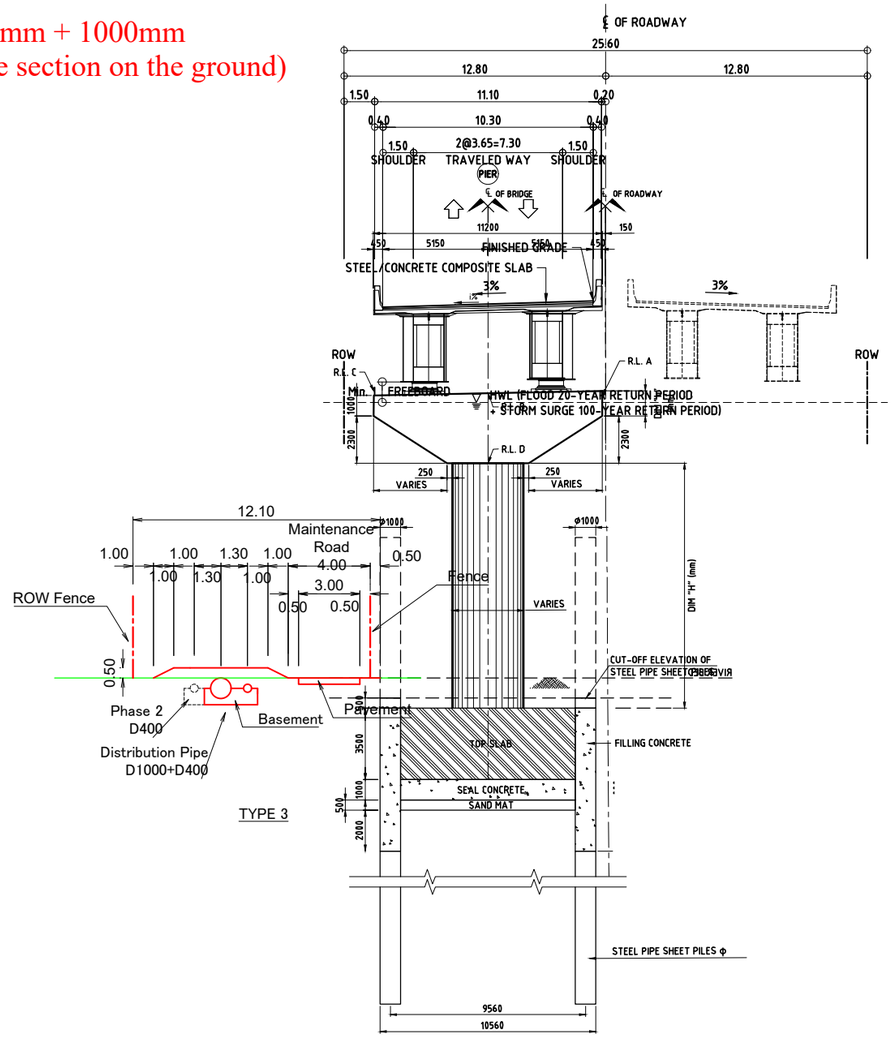
MATARBARI PORT ACCESS ROAD
2-LANE SECTION WITH DIVERSION OF VILLAGE ROAD

TYPE5

PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Cross Section of Transmission Pipelines (2/6)	
		SCALE 1:300	**DRAWING NO.** D-9

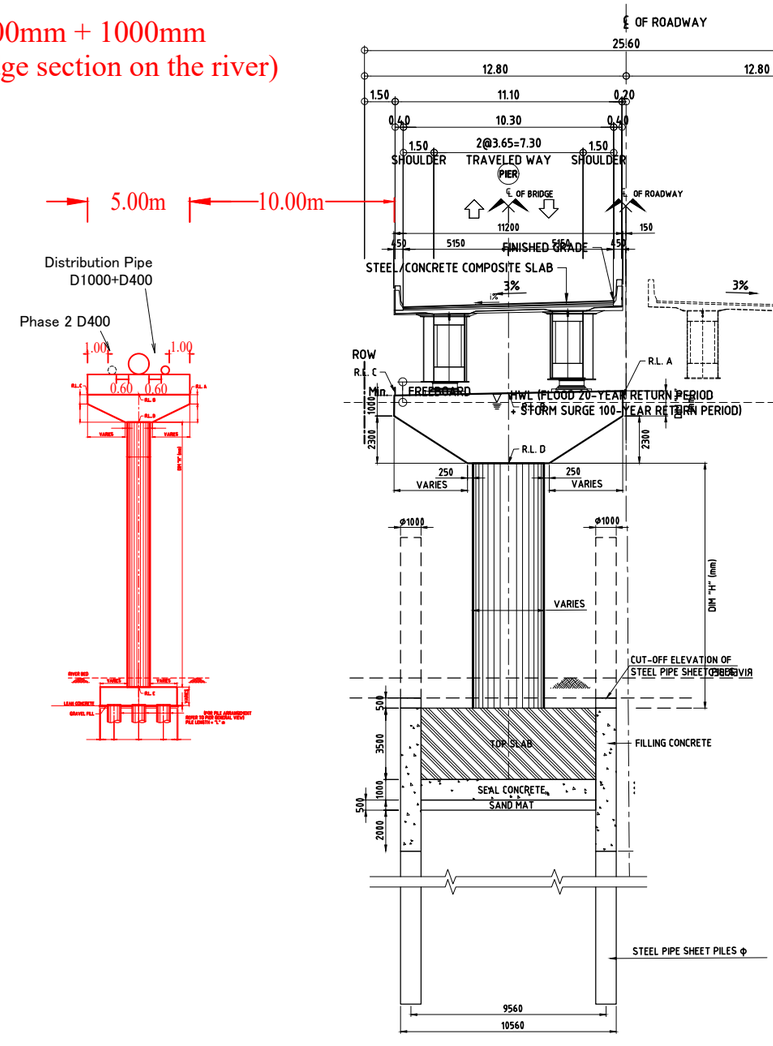
D

Type3-2: 400mm + 1000mm
(Road=Bridge section on the ground)



TYPE 3

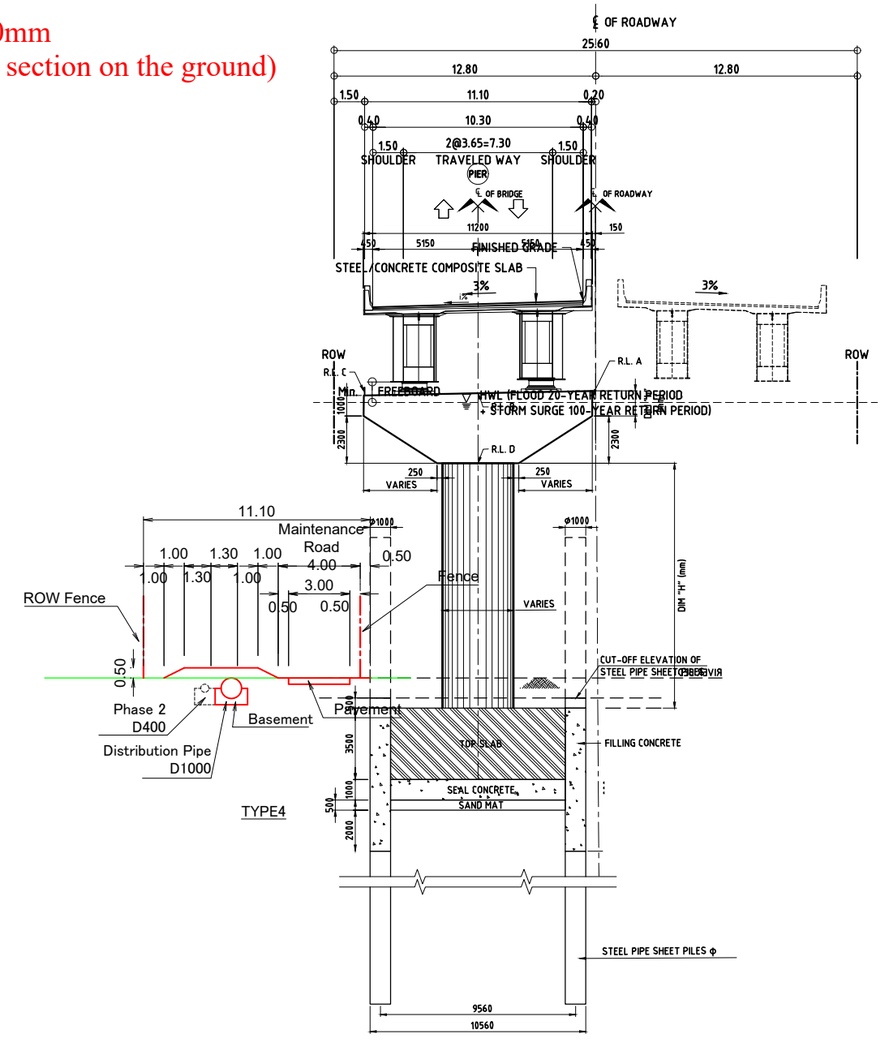
Type3-3: 400mm + 1000mm
(Road=Bridge section on the river)



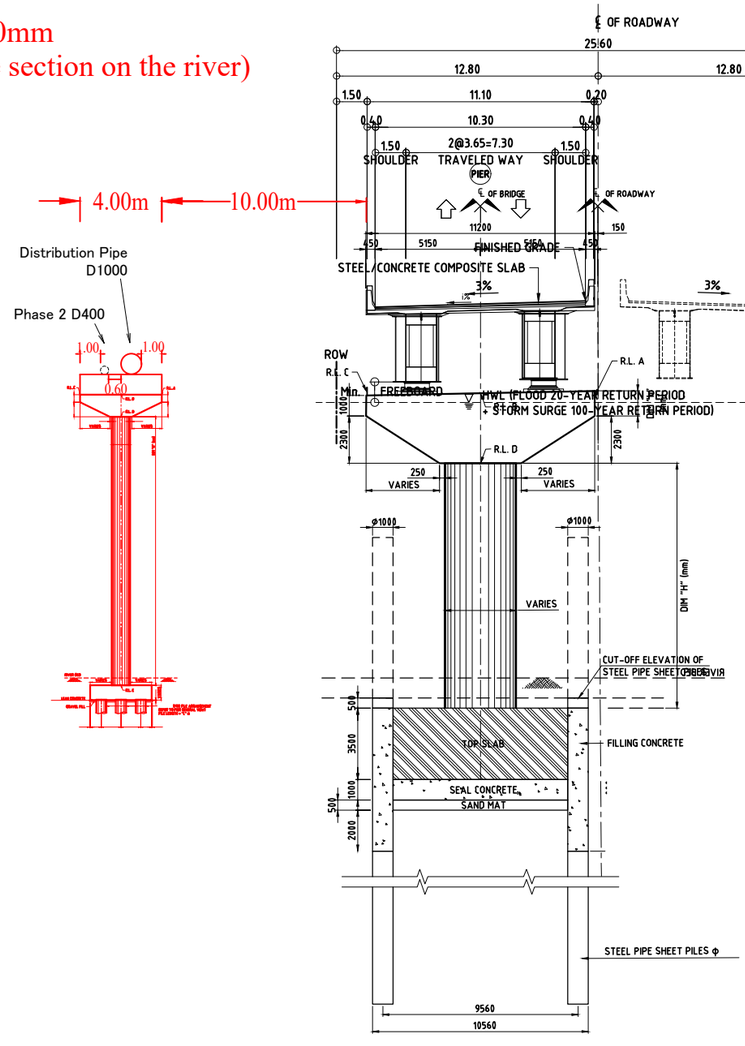
PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Cross Section of Transmission Pipelines (3/6)
		SCALE 1:300 / **DRAWING NO.** D-10

D

Type4-2: 1000mm
(Road=Bridge section on the ground)



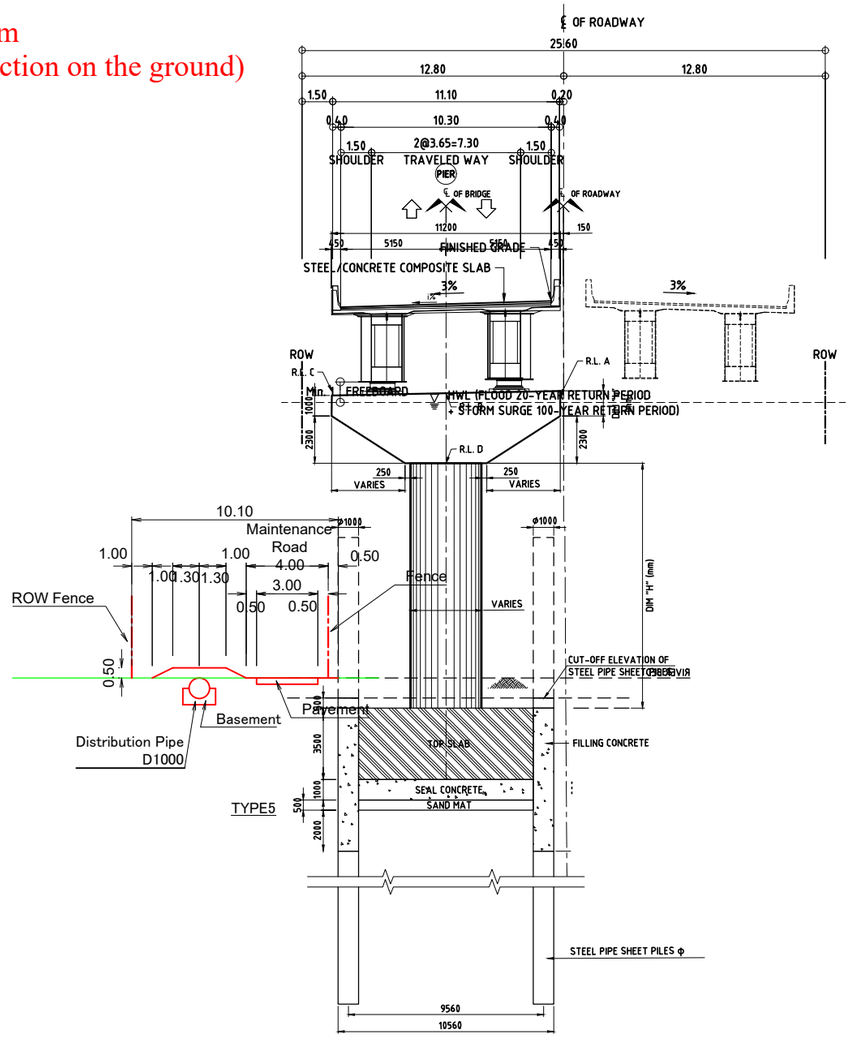
Type4-3: 1000mm
(Road=Bridge section on the river)



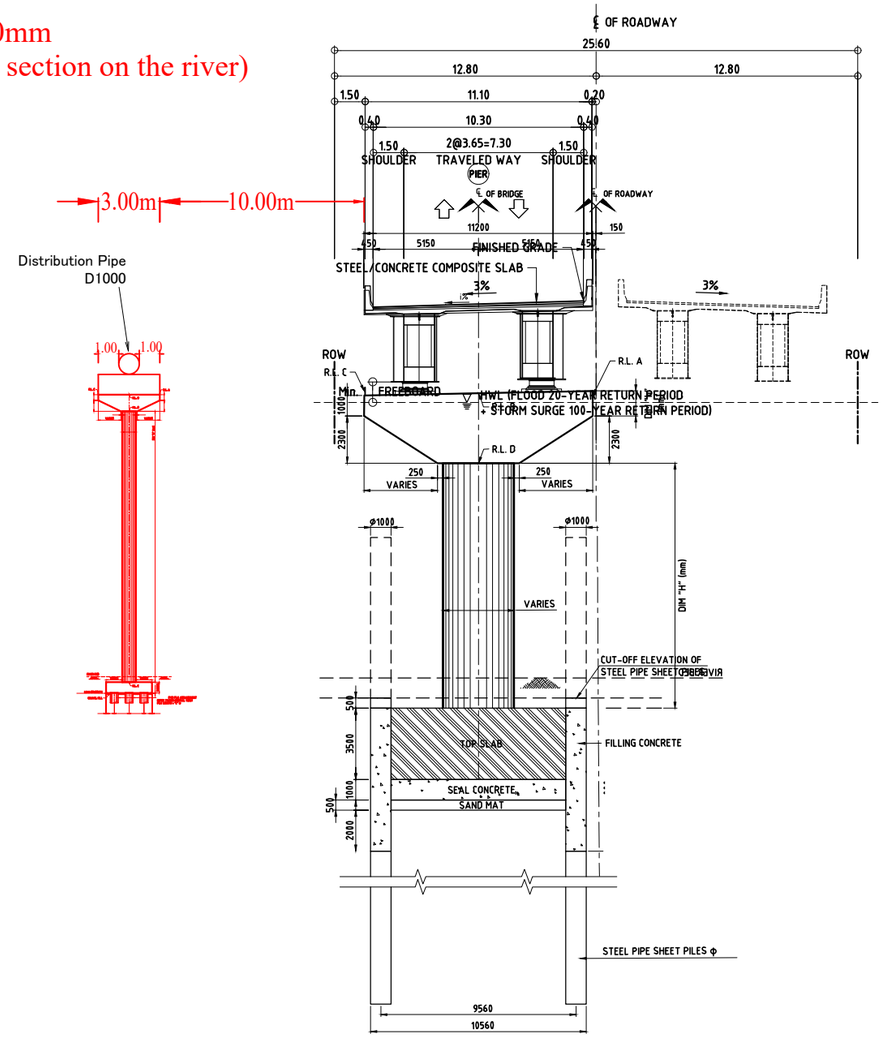
PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Cross Section of Transmission Pipelines (4/6) **SCALE** 1:300 / **DRAWING NO.** D-11

D

Type5-2: 1000mm
(Road=Bridge section on the ground)

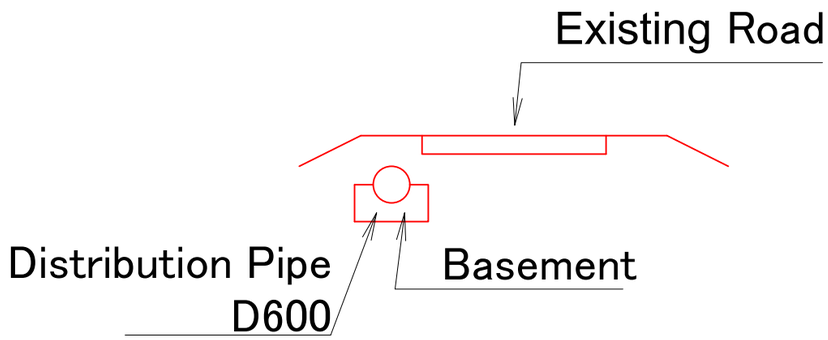


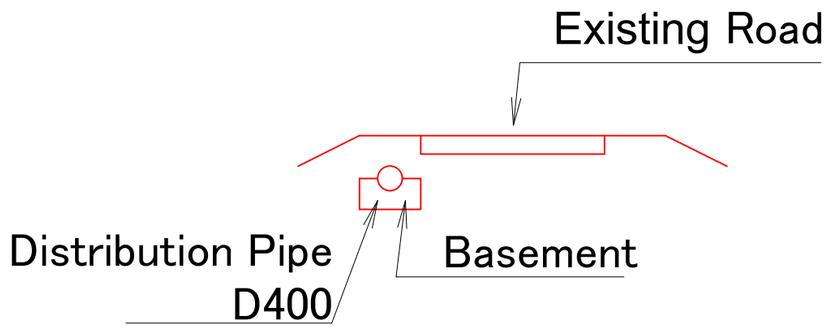
Type5-3: 1000mm
(Road=Bridge section on the river)

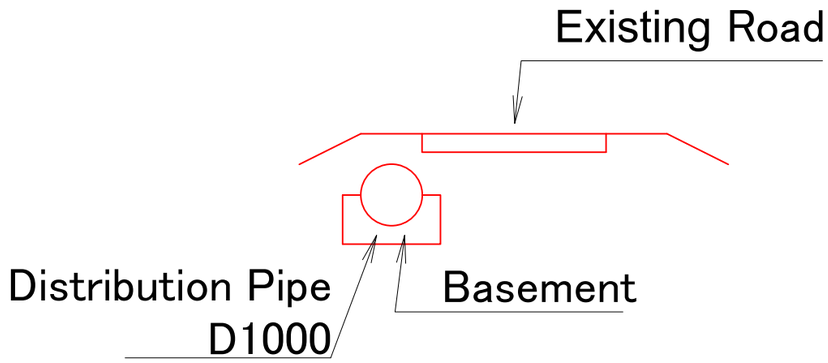


PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Cross Section of Transmission Pipelines (5/6)	
		SCALE 1:300	**DRAWING NO.** D-12

D







PROJECT PREPARATORY SURVEY FOR SOUTHERN CHATTOGRAM REGION WATER SUPPLY PROJECT	Japan International Cooperation Agency (JICA) Nippon Koei Co. Ltd. Japan Water Agency	**TITLE OF DRAWING** Cross Section of Transmission Pipelines (6/6)	
		SCALE 1:100	**DRAWING NO.** D-13

Appendix 9.1.1

Environmental Monitoring Form

1. Pre-Construction Phase and Construction Phase

The latest results of the below monitoring items shall be submitted to JICA as part of the Quarterly Progress Report throughout the construction phase.

1.1 Air Pollution

- Exhaust Gases (Measurement)

Location	Date (Day, Month, Year)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	CO ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	Pb ($\mu g/m^3$)	Frequency
AQ1								Monthly
AQ2								Monthly
AQ3								Monthly
AQ4								Monthly
AQ5								Monthly
AQ6								Monthly
Reference	Bangladesh Standard Value**	150 (24hr)	65 (24hr)	5 (8hr)	80 (24hr)	80 (24hr)	0.50 (24hr)	-
	International Standard Value (WHO)***	45 (24hr)	15 (24hr)	-	25 (24hr)	40 (24hr)	-	-

**Air Pollution Control Rules, 2022 (Schedule 2)

***WHO Ambient Air Quality Guideline Values 2021, which are also being referred in the World Bank and IFC's General EHS Guidelines (2007)

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

If any problem arises (parameters measured are more than the reference values), such vehicles and equipment to be sustained to use or be replaced by appropriate ones as well as necessary instruction and education on exhaust gases to drivers and operators.

It is noted that dredging activities for the embankment construction of the water reservoir was determined after the baseline natural environmental survey was completed. This dredging activities are to be conducted along tributaries around the water reservoir construction site. So that, it would be recommended to implement supplemental air quality survey (both dry and rainy seasons) by adding several sampling points based on the latest dredging activity and relevant construction schedule plan.

Survey Results (Ambient Air Quality)

Location ID.	Ambient Air Pollutants' Concentration in $\mu g/m^3$										CO (mg/m^3)	
	PM_{10}		$PM_{2.5}$		O_3		NO_2		SO_2			
	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy
AQ 1	59	42.4	26.4	23.3	10.2	18.6	13	30.2	3.5	6.6	0.0	0.0
AQ 2	109.3	105.7	35.0	29.2	38.2	36.7	67.6	74.0	44.7	17.5	0.6	0.8
AQ 3	40.1	47.1	17.0	15.4	7.6	12.6	19.6	33.8	3.9	5.9	0.0	0.0
AQ 4	58.8	40.9	27.7	16.5	9.9	16.1	25.7	33.3	7.0	6.6	0.0	0.0
AQ 5	54.4	73.8	17.6	20.9	13.9	20.6	42.2	56.2	3.4	10.5	0.5	0.0

Appendix 9.1.1

Location ID.	Ambient Air Pollutants' Concentration in µg/m³										CO (mg/m³)	
	PM_{10}		$PM_{2.5}$		O_3		NO_2		SO_2			
	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy
AQ 6	68.6	50.9	25.3	26.2	18.6	22.2	50.5	43.6	21.3	17.7	0.7	0.0
Duration (Hours)	**24**		**24**		**8**		**24**		**24**		**8**	

Source: Primary Monitoring (Wet season: July 2024 & Dry season: March 2024)

1.2 Water Quality

- **Surface water**

Location	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Frequency	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Date								
Temperature (°C)								
pH								
TDS (mg/L)								
TSS (mg/L)								
Coliform (total) (CFU/100 ml)								
Oil and Grease (mg/L)								
DO (mg/L)								
BOD5 (mg/L)								
COD (mg/L)								
Phosphate (mg/L)								
Nitrate (mg/L)								

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

It is noted that dredging activities for the embankment construction of the water reservoir was determined after the baseline natural environmental survey was completed. This dredging activities are to be conducted along tributaries around the water reservoir construction site. So that, it would be recommended to implement supplemental surface water quality survey (both dry and rainy seasons) by adding several sampling points based on the latest dredging activity and relevant construction schedule plan.

Surface Water Quality Analytical Results

Appendix 9.1.1

Parameters	Unit	Seasons	Concentration Present								Bangladesh Standard*
			SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	
Temperature	°C	Rainy	24.7	25.3	24.8	25.2	25.1	25.1	25.0	24.8	-
		Dry	24.8	25.1	24.7	25.2	25.3	24.6	25.2	24.7	
Turbidity	NTU	Rainy	358	970	491	6.24	131	80.5	44.5	41.5	-
		Dry	20.6	10.8	15.0	165	213	311	148	217	
pH	-	Rainy	6.83	6.58	6.91	6.65	6.61	6.84	6.91	7.53	6-9
		Dry	7.15	7.42	7.58	7.27	7.62	7.73	7.75	7.80	
DO	mg/L	Rainy	5.80	5.71	5.69	5.87	5.70	5.76	5.61	5.78	≥5
		Dry	6.06	6.00	6.05	5.91	5.85	5.72	5.82	6.10	
BOD	mg/L	Rainy	<0.2	<0.2	<0.2	<0.2	0.22	<0.2	<0.2	<0.2	≤6
		Dry	0.20	<0.2	<0.2	0.53	0.33	<0.2	0.21	0.60	
COD	mg/L	Rainy	2.92	3.90	1.95	3.06	4.08	2.04	3.04	2.03	50
		Dry	3.92	2.94	1.96	4.7	2.82	1.88	3.06	5.10	
TDS	mg/L	Rainy	69.0	52.0	59.0	57.0	1980	6710	6170	13240	1000
		Dry	142	143	141	32000	31000	30000	30900	30500	
EC	µS/cm	Rainy	141	106	128	120	3540	11150	11110	25100	-
		Dry	248	249	248	47010	46660	46680	48820	47730	
TSS	mg/L	Rainy	559	700	663	500	196	299	66.0	257	-
		Dry	54.0	85.0	112	802	850	1043	512	582	
NH_3	mg/L	Rainy	0.51	3.61	2.07	<0.5	<0.5	3.24	5.57	9.68	-
		Dry	<0.5	<0.5	<0.5	<0.5	<0.5	1.64	3.18	<0.5	
NO_3	mg/L	Rainy	<3.0	3.26	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	7
		Dry	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	
Total Coliform	MPN/ 100 ml	Rainy	4.5	4.5	4.5	<1.8	<1.8	<1.8	<1.8	<1.8	≤5000
		Dry	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	2.0	
Faecal Coliform	MPN/ 100 ml	Rainy	<1.8	4.5	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	-
		Dry	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	
Cl	mg/L	Rainy	4.84	2.99	2.81	10.1	2194	10608	10316	13228	-
		Dry	10.3	9.18	9.67	52413	52046	36262	53511	52743	

Source: Primary Monitoring (Wet season: July 2024 & Dry season: March 2024)

- **Groundwater**

Location	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
Frequency	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Date								
Temperature (°C)								
pH								
TDS (mg/L)								
EC (µS/cm)								
Coliform (total) (CFU/100 ml)								
Arsenic (mg/L)								
Iron (mg/L)								
Manganese (mg/L)								

NO3 (mg/L)								
PO4 (mg/L)								
Fluoride (mg/L)								

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

- It is noted that dredging activities for the embankment construction of the water reservoir was determined after the baseline natural environmental survey was completed. This dredging activities are to be conducted along tributaries around the water reservoir construction site. So that, it would be recommended to implement supplemental groundwater quality survey (both dry and rainy seasons) by adding several sampling points based on the latest dredging activity and relevant construction schedule plan.

Groundwater Quality Analytical Results

Parameters	Unit	Seasons	Concentration Present								Bangladesh Standard*
			GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	
Temperature	°C	Rainy	25.1	25.2	24.7	25.3	25.1	25.3	25.1	25.2	20-30
		Dry	24.8	25.1	24.8	25.1	24.7	25.1	25.3	24.7	
Turbidity	NTU	Rainy	19.5	17.1	69.4	9.17	2.51	6.52	46.2	0.15	5
		Dry	25.1	14.8	12.5	15.6	1.13	12.7	0.54	0.49	
pH	-	Rainy	7.01	6.91	6.03	6.85	7.29	6.94	6.82	8.14	6.5 – 8.5
		Dry	7.68	7.78	6.59	7.43	7.56	7.27	7.52	8.04	
TDS	mg/L	Rainy	101	83.0	51.0	95.0	108	102	108	117	1000
		Dry	239	356	62.0	113	130	119	116	142	
EC	µS/cm	Rainy	213	173	108	205	224	213	224	245	-
		Dry	474	715	127	229	262	241	235	286	
Arsenic (As)	mg/L	Rainy	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05
		Dry	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron (Fe)	mg/L	Rainy	0.80	1.70	0.39	0.78	0.22	0.69	0.29	<0.2	0.3-1.0
		Dry	0.46	2.82	2.76	2.14	0.4	1.6	<0.2	<0.2	
Manganese (Mn)	mg/L	Rainy	0.24	0.25	0.49	<0.05	0.15	0.18	0.39	<0.05	0.4
		Dry	0.62	<0.05	0.26	0.07	0.10	0.09	0.08	<0.05	
NO_3	mg/L	Rainy	<3.0	<3.0	<3.0	<3.0	14.3	3.43	<3.0	<3.0	45
		Dry	12.7	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	
PO_4	mg/L	Rainy	<0.5	0.72	<0.5	0.71	1.15	1.24	<0.5	<0.5	-
		Dry	0.55	8.33	2.46	2.89	2.89	3.92	1.50	<0.5	
Fluoride (F)	mg/L	Rainy	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1
		Dry	<0.5	1.58	<0.5	<0.5	0.55	0.53	<0.5	<0.5	
Total Coliform	MPN/ 100 ml	Rainy	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	-
		Dry	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	
Faecal Coliform	MPN/ 100 ml	Rainy	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	-
		Dry	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	

- Source: Primary Monitoring (Wet season: July 2024 & Dry season: March 2024)

1.3 Wastes

- Construction wastes and debris

Location (Water Intake Point/ Pipeline/ Water	Waste Composition	Waste Quantity (ton/month)	Transportation, Disposal/Treatment Methods (Specify: ex. Registered Service Provider, Officially final disposal site, registered treatment facility (or company)				Frequency
			Transport	Disposal	Treatment	Remarks	Monthly

Reservoir)							
	Construction Wastes						
	Dredged Soil						
	Toxic and chemical Waste (if any)						
	Other (specify)						
	Excavated and Surplus soil management		Back Filling	Designated Soil Disposal Site	Others (if any)	Remarks	

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

1.4 Soil Contamination

Location (Construction yard/Sewer Pipe)	Date	Type of Construction Vehicles/Equipment	Fleet/Registration Number	Oil/Fuel Leakage Conditions				Frequency
	(Day, Month, Year)			Items	Yes	No	If Yes, Measures Taken	Daily
				Engine oil				
				Fuel				
				Others (Specify)				

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones.

1.5 Noise and Vibration

- Noise/Vibration from Construction Vehicles and Equipment (Measurement)

Location	Date (Day, Month, Year)	Noise (L_{Aeq})	Vibration (dB)	Frequency
NL1/VL1				Monthly
NL2/VL2				
NL3/VL3				
NL4/VL4				
NL5/VL5				
NL6/VL6				

Reference				
	Bangladesh Standard		Bangladesh Standard	
	Receptor	LAeq (dBA)	- (There is no standard)	
	Silent	50 (Day) 40 (Night)		
	Residential	55 (Day) 45 (Night)		
	IFC (EHS)		Japanese Request Limit[1] (dB)	
	Receptor	LAeq (dBA)	Receptor (dB)	
	Residential	55 (Day)	Residential 65 (Day)	

		45 (Night)	Residential, factory, and commercial facilities	70 (Day)	

Japanese Request Limit[1]: Applied "Type 1: Residential Area"; The Vibration Regulation Law (Japan) (Law No.75 of 1995 (Not Environmental Standard but Request Limit Value on Vehicle Traffic Vibration stipulated by the Ministry of the Environment of Japan)

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

If any problem arises (parameters measured are more than the reference values), such vehicles and equipment to be sustained to use or be replaced by appropriate ones as well as necessary instruction and education on exhaust gases to drivers and operators.

Baseline (Noise)			
Location	**Average Noise level [dB(A)]**		**Location Setting**
	Leq_{day}	**Leq_{night}**	
NL1	65.3	56.0	Mixed Zone
NL2	75.3	76.0	Commercial Zone
NL3	62.6	51.0	Residential Zone
NL4	56.3	50.5	Residential Zone
NL5	67.2	55.0	Mixed Zone
NL6	58.1	53.2	Commercial Zone

Source: Field Survey by EQMS (March 2024)

Baseline (Vibration)		
Location	**Average Vibration (ppv, mm/s)**	**Vibration velocity level in decibels (VdB)**
VL1	0.00	N/A
VL2	0.00	N/A
VL3	0.00	N/A
VL4	0.00	N/A
VL5	0.00	N/A
VL6	0.00	N/A

Source: Field Survey by EQMS (March 2024)

1.5 Subsidence

Date	Problems (reported by local people/ observed around the construction site)	Measures (If any)
(Day, Month, Year)		

1.6 Odor

Date	Problems (reported by local people/ observed around the construction site)	Measures (If any)
(Day, Month, Year)		

1.7 Sediment

Date	Problems (reported by local people/ observed around the construction site)	Measures (If any)
(Day, Month, Year)		

1.8 Biological Environment (Protected area and Ecosystem)

- Local animal migration patterns (Asian Elephant)

Monitoring points	Results	Note	Frequency
Coordinate of animal paths, set up within ADB-financed railway project		Animal paths are to be introduced within this project, also. It is important to establish coherency o animal paths, implemented within both ADB-financed railway project and this water supply project.	Before the initiation of the construction.
Latest local migration pattern of Asian Elephant around the project site		Interviews with nearby local communities and identify the latest crossing points along the boundary of buffer zone of Fasiskhali WS. It is noted that 5 crossing points were identified along the boundary of Fasiakhali WS within EIA Study of this water supply project.	Monthly
Roadkill/unusual deaths of animals		Count number of roadkill and/or unusual death of animals around the project site.	Observation shall be made on daily basis, and its reporting shall be done monthly.

- **Phytoplankton**

Sl. No.	Class	Genus	P1	P2	P3	P4
			Number (cells/ L)			
1.	Bacillariophyceae					
2.	Dinophyceae					
3.	Ulotrichaceae					
4.	Euglenophyceae					
5.	Others					

- Log Book (Photo records included): to be prepared and recorded by contractor(s) which is submitted to DPHE every six months.

It is noted that dredging activities for the embankment construction of the water reservoir was determined after the baseline natural environmental survey was completed. This dredging activities are to be conducted along tributaries around the water reservoir construction site. So that, it would be recommended to implement supplemental phytoplankton survey (both dry and rainy seasons) by adding several sampling points based on the latest dredging activity and relevant construction schedule plan.

Table XXXX Phytoplankton Profile in the Study Area

Sl. No.	Class	Genus	P4	P3	P2	P1
			Number (cells/ L)			
1.	Bacillariophyceae	*Melosira* sp.	14	0	0	0
2.		*Navicula* sp.	9	15	7	4
3.		*Chlorella* sp.	19	12	07	28
4.		*Amphora* sp.	13	0	0	0
5.		*Nitzschia* sp.	17	28	11	26
6.		*Fragilaria* sp.	8	26	0	6
7.	Dinophyceae	*Ceraatium* sp.	0	0	0	8
8.		*Dinophysis* sp.	0	13	0	0
9.	Ulotrichaceae	*Ulothrix* sp.	14	0	0	0
10.	Euglenophyceae	*Euglena* sp.	12	15	0	16

Source: Primary Monitoring (March 2024)

- **Zoo Plankton**

Sl. No.	Class	Species	Number (Individuals/L)			
			Z1	Z2	Z3	Z4
1.	Copepoda	*Calanus* sp.				
2.	Monogononta	*Brachionus* sp.				
3.	Branchiopoda	*Daphnia* sp.				
4.	Mysidae	*Mysis* sp.				
5.	Others					

- Log Book (Photo records included): to be prepared and recorded by contractor(s) which is submitted to DPHE every six months.

It is noted that dredging activities for the embankment construction of the water reservoir was determined after the baseline natural environmental survey was completed. This dredging activities are to be conducted along tributaries around the water reservoir construction site. So that, it would be recommended to implement supplemental zoo plankton survey (both dry and rainy seasons) by adding several sampling points based on the latest dredging activity and relevant construction schedule plan.

Table XXX Zooplankton Profile in the Study Area

Sl. No.	Class	Species	Number (Individuals/L)			
			Z4	Z3	Z2	Z1
1.	Copepoda	*Calanus* sp.	8	0	0	4
2.	Monogononta	*Brachionus* sp.	2	0	5	3
3.	Branchiopoda	*Daphnia* sp.	15	0	7	10
4.		*Moina* sp.	19	9	3	11
5.		*Bosmina* sp.	6	0	0	0
6.	Mysidae	*Mysis* sp.	2	0	7	2

Source: Primary Monitoring (March 2024)

- **Macrobenthos**

Sl. No.	Groups	Species	PB1		PB2		PB3		PB4	
			Number (Individuals/m^2)							
			n	N	n	N	n	N	N	N
1.	Polychaeta									
2.	Gastropoda									
3.	Bivalvia									
4.	Insecta									
5.	Crustacea									

**n= Number of individuals per sample (Grab area= 0.0225 m^2); N= Number of individuals/m^2*

- Log Book (Photo records included): to be prepared and recorded by contractor(s) which is submitted to DPHE every six months.

It is noted that dredging activities for the embankment construction of the water reservoir was determined after the baseline natural environmental survey was completed. This dredging activities are to be conducted along tributaries around the water reservoir construction site. So that, it would be recommended to implement supplemental macro benthos survey (both dry and rainy seasons) by adding several sampling points based on the latest dredging activity and relevant construction schedule plan.

Table XXX Macro Benthos Profile in the Study Area (Dry Season)

Sl. No.	Groups	Species	PB4		PB3		PB2		PB1	
			Number (Individuals/m^2)							
			n	N	n	N	n	N	N	N
1.	Polychaeta	*Nereis lamellose*	4	177	0	0	3	133	9	400
2.		*Lumbrineris* sp.	3	133	6	266	0	0	1	44
3.	Gastropoda	*Bellamya* sp.	0	0	0	0	2	88	3	133
4.		*Lymnaea* sp.	5	222	3	133	3	133	0	0
5.		*Planorbis* sp.	2	88	0	0	0	0	1	44
6.		*Melanoides* sp.	0	0	2	88	0	0	0	0
7.		*Telescopium* sp.	3	133	2	88	0	0	0	0
8.		*Gyraulus* sp.	0	0	3	133	0	0	0	0
9.	Bivalvia	*Anadara* sp.	2	88	1	44	2	88	0	0
10.		*Trachycardium* sp.	1	44	3	133	0	0	0	0
11.	Insecta	*Chironomus* sp.	5	222	2	88	1	44	0	0
12.	Crustacea	*Shrimp larvae*	6	266	4	177	0	0	2	88

**n= Number of individuals per sample (Grab area= 0.0225 m^2); N= Number of individuals/m^2*

Source: Primary Monitoring (March 2024)

1.9 Hydrology and Topography

Date	Problems (reported by local people/ observed around the construction site)	Measures (If any)
(Day, Month, Year)		

1.10 Water usage

Date and time	Water level	Monitoring location
		Intake point (Downstream of intake point if necessary)

1.11 Risks of Infectious diseases such as HIV/AIDS

- Health and Sanitation Education

Date	Venue	Agenda	Lecturer	Number of Participants	Frequency
(Day, Month, Year)				Community ( )	Monthly
				Worker/Labor ( )	
				Others (Specify)	
				Total ( )	

Appendix 9.1.1

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

Participant list and educational materials shall be attached

- Infection case

Date	Symptomatic state	Treatment	Name	Frequency
(Day, Month, Year)				Monthly

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

1.12 Occupational health and safety

- Occupational health and safety Education

Date	Venue	Agenda	Lecturer	Number of Participants	Frequency
(Day, Month, Year)				Community ( )	Monthly
				Worker/Labor ( )	
				Others (Specify)	
				Total ( )	

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

Participant list and educational materials shall be attached

- Personnel Protective Equipment (PPE)

Location	Date	Monitoring Item	If any problems, measures taken	Frequency
	(Day, Month, Year)	PPE: such as Helmet, Gloves, Masks, shoes, safe belts and etc. (specify).)		Daily

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

- Safety patrol

Date	Checked point	Result	Measures (If any)	Frequency
(Day, Month, Year)				Monthly

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

Occupational health and safety Problem

Sl. No	Date and Time	Accident/Incident Locations	Types of works	Types of Accident/ Incidents	Descriptions	Corrective Action Plan (CAP)

Appendix 9.1.1

1.13 Accidents

- Traffic and Safety Educational Meetings

Location	Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
	(Day, Month, Year)				Community ( ) Worker/Labor ( ) Others (Specify) Total ( )		Once/Two Months

Log Book/ Minutes of Meeting: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

Participant list and meeting minutes shall be attached

- Accident case

Sl. No	Date and Time	Accident/Incident Locations	Types of works	Types of Accident/ Incidents	Descriptions	Corrective Action Plan (CAP)

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE.

2. Operation Phase

The latest results of the below monitoring items shall be submitted to JICA on biannual basis for the first three years of operation phase.

2.1 Water Quality

- Surface water

Location	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Frequency	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly
Date								
Temperature (°C)								
pH								
TDS (mg/L)								
TSS (mg/L)								
Coliform (total) (CFU/100 ml)								
Oil and Grease (mg/L)								
DO (mg/L)								
BOD5 (mg/L)								
COD (mg/L)								
Phosphate (mg/L)								
Nitrate (mg/L)								

2.2 Wastes

- Sludge Disposal at Water Treatment Plant

Location (WTP)	Waste Composition	Waste Quantity (ton/month)	Transportation, Disposal/Treatment Methods (Specify: ex. Registered Service Provider, Officially final disposal site, registered treatment facility (or company)				Frequency
			Transport	Disposal	Treatment	Remarks	
	Sludge						Monthly
	Other (specify)						

Log Book: to be prepared and recorded by contractor(s) which is submitted to DPHE monthly.

2.3 Subsidence

Date	Problems (reported by local people/ observed around the construction site)	Measures (If any)
(Day, Month, Year)		

2.4 Sediment

Date	Problems (reported by local people/ observed around the construction site)	Measures (If any)
(Day, Month, Year)		

2.5 Protected area

Date and time	Observed wildlife	Measures (If any)
(Day, Month, Year)		

2.6 Hydrology and Topography

Date	Problems (reported by local people/ observed around the construction site)	Measures (If any)
(Day, Month, Year)		

2.7 Occupational health and safety

- Occupational health and safety Education

Date	Venue	Agenda	Lecturer	Number of Participants	Frequency
(Day, Month, Year)				Community ( )	Monthly
				Worker/Labor ( )	
				Others (Specify)	
				Total ( )	

- Safety patrol

Date	Checked point	Result	Measures (If any)	Frequency
(Day, Month, Year)				Monthly

Appendix 9.1.1

Occupational health and safety Problem

Sl. No	Date and Time	Accident/Incident Locations	Types of works	Types of Accident/ Incidents	Descriptions	Corrective Action Plan (CAP)

2.8 Accidents

- Traffic and Safety Educational Meetings

Location	Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
	(Day, Month, Year)				Community ( ) Worker/Labor ( ) Others (Specify) Total ( )		Two Times/Year

Participant list and education materials shall be attached

- Accident case

Sl. No	Date and Time	Accident/Incident Locations	Types of works	Types of Accident/ Incidents	Descriptions	Corrective Action Plan (CAP)

Appendix 9.1.1

Location of Baseline Data Collection Survey*

Station Code	GPS Coordinate	Local Info of Sampling Station
Air quality		
AQ1	21°44'52"N 92°5'45"E	Brojendra Mohan Ghat Area, Digarpankhali, Chakaria, Cox's Bazar
AQ2	21°46'2.615"N 92°4'40.333"E	Infront of RHD Office, Chakaria Pourashava, Cox's Bazar
AQ3	21°43'48.622"N 92°5'12.229"E	Chararkul Area, Fasiakhali, Chakaria, Cox's Bazar
AQ4	21°43'42.977"N 92°2'6.458"E	Paschim Saodagar Ghona Area, Chiringa, Chakaria, Cox's Bazar
AQ5	21°42'44.453"N 91°55'43.944"E	Uttar Nalbila Area, Kalarmarchora, Moheshkhali, Cox's Bazar
AQ6	21°43'40.747"N 91°54'17.653"E	Rajghat Bazar Area, Matarbari, Moheshkhali, Cox's Bazar
Water Quality (surface water)		
SW1	21°45'23.002"N 92°4'51.621"E	Matamuhuri River, Nij Pankhali, Kakara, Chakaria, Cox's Bazar
SW2	21°45'3.713"N 92°5'52.929"E	Matamuhuri River, Digar Pankhali, Kakara, Chakaria, Cox's Bazar
SW3	21°45'8.901"N 92°6'17.452"E	Matamuhuri River, Digar Pankhali, Kakara, Chakaria, Cox's Bazar
SW4	21°43'16.619"N 92°1'16.015"E	Bara Matamuhuri River, Chiringa, Chakaria, Cox's Bazar
SW5	21°41'15.623"N 91°58'51.873"E	Matamuhuri River, Rampur Area, Chakaria, Cox's Bazar
SW6	21°43'14.007"N 91°56'44.483"E	Matamuhuri River, Badarkhali, Chakaria, Cox's Bazar
SW7	21°43'32.622"N 91°54'22.628"E	Kuhelia River, Matarbari, Moheshkhali, Cox's Bazar
SW8	21°39'59.857"N 91°52'55.445"E	Kuhelia River, Dhalghata, Moheshkhali, Cox's bazar
Water Quality (ground water)		
GW1	21°44'50.012"N 92°5'45.604"E	Haradon's House Area, Digorpankhali, Kakara, Chakaria, Cox's Bazar
GW2	21°46'3.911"N 92°4'43.271"E	Infront of Jam Jam Hospital, Chakaria Pourashava, Cox's Bazar
GW3	21°43'33.626"N, 92°5'4.15"E	Near NRC Filling Station, Fasiakhali, Chakaria, Cox's Bazar
GW4	21°43'49.374"N 92°2'15.068"E	Saiful's House Area, Chiringa, Chakaria, Cox's Bazar
GW5	21°43'0.456"N 91°58'50.224"E	Paschim Bara Bheola Area, Badarkhali, Chakaria, Cox's Bazar
GW6	21°43'8.474"N 91°57'2.236"E	Badarkhali Market Area, Chakaria, Cox's Bazar
GW7	21°41'15.107"N 91°55'7.358"E	Jamir Uddin's House Area, Uttor Jhapua, Kalarmarchara, Moheshkhali, Cox's Bazar
GW8	21°43'50.813"N 91°53'49.835"E	Mahabub Kamal's House, Natun Bazar Area, Matarbari, Moheshkhali, Cox's Bazar
Noise/Vibration		
NL1/ VL1	21°44'52"N 92°5'45"E	Brojendra Mohan Ghat Area, Digarpankhali, Chakaria, Cox's Bazar
NL 2/ VL2	21°46'2.615"N 92°4'40.333"E	Infront of RHD Office, Chakaria Pourashava, Cox's Bazar
NL 3/ VL3	21°43'48.622"N 92°5'12.229"E	Chararkul Area, Fasiakhali, Chakaria, Cox's Bazar

Appendix 9.1.1

NL 4/ VL4	21°43'42.977"N 92°2'6.458"E	Paschim Saodagar Ghona Area, Chiringa, Chakaria, Cox's Bazar
NL 5/ VL5	21°42'44.453"N 91°55'43.944"E	Uttar Nalbila Area, Kalarmarchora, Moheshkhali, Cox's Bazar
NL 6/ VL6	21°43'40.747"N 91°54'17.653"E	Rajghat Bazar Area, Matarbari, Moheshkhali, Cox's Bazar
Phytoplankton/Zoo Plankton		
P1	21°45'0.01"N 92° 5'48.89"E	Matamuhuri River (adjacent to the intake points), Modhom Dighor Pankhali, Chakaria
Z1	21°45'1.81"N 92° 5'51.69"E	
P2	21°43'15.54"N 92° 1'14.55"E	Baro Matamuhuri River, Rampur, Chakaria
Z2	21°43'22.10"N 92° 1'11.56"E	
P3	21°41'41.92"N 91°58'59.01"E	End of the Transect Line-2 (T2), Chowarfari Canal, Kaharia Ghona
Z3	21°41'44.48"N 91°58'58.25"E	
P4	21°39'49.06"N 91°53'6.61"E	Sapmaradale Ghat, Kohelia River, Dalghata (adjacent to the Transect line-1)
Z4	21°39'55.40"N 91°53'1.61"E	
Macrobenthos		
MB1	21°44'59.42"N 92° 5'47.72"E	Matamuhuri River (adjacent to intake points), Modhom Dighor Pankhali, Chakaria
MB2	21°43'18.22"N 92° 1'13.77"E	Baro Matamuhuri River, Rampur, Chakaria
MB3	21°41'41.10"N 91°59'0.42"E	End of the Transect Line-2 (T2), Chowarfari Canal, Kaharia Ghona
MB4	21°39'50.87"N 91°53'4.66"E	Sapmaradale Ghat, Kohelia River, Dalghata (adjacent to Transect line-1)

Appendix 9.1.1

RAP Monitoring Form

(1) Pre-Construction Stage

Land Acquisition/compensation and Grievance for household (Pre-Construction Stage)

Target		Compensation completed until last month		Compensation completed this month	
Area (Ha)	**Owners (HHs)**	**Area (Ha)**	**Owners (HHs)**	**Area (Ha)**	**Owners (HHs)**

Received grievances				
Name / contact information	**Received Date**	**Contents**	**Response**	**Measures if any**

HHs: Households

Detailed information shall be recorded in the following table.

No.	Name of head of household	Address	Compensation Amount	Date of payment	Name of recipient

(2) After Acquisition Stage

Grievance

Received grievances (Monthly)				
Name / contact information	**Received Date**	**Contents**	**Response**	**Measures if any**

1 SUMMARY OF PUBLIC CONSULTATION MEETING – CHAKARIA UPAZILA

The validation workshop was held at Chakaria Upazila Parishad Complex on the 3 July 2024. The event commenced at 11 AM, with attendance of a total of 44 participants, including Assistant Commissioner (Land), Councilors of Chakaria Paurashava, Chairmen of local union parishad, representatives of local government offices, journalists, teachers of local educational institutes, NGOs and local community members.



Glimpses of the Public Consultation Meeting at Chakaria Upazila



Glimpses of the Public Consultation Meeting at Chakaria Upazila

Source: EQMS, July 2024

Mr. Al Amin Bishwas from the Department of Public Health Engineering inaugurated the session with a welcome statement to all participants. The session was followed by a self-introduction by the participants.

NKB team made a PowerPoint presentation including project background and location, objectives of the study, approach and methodology, description of the project, water intake points, reservoir areas, supply areas, environmental issues, etc. After the presentation, the floor was open for the participants and the participants shared their opinions from their perspective. The AC (Land), Chakaria gave the concluding remarks and the session ended.

1.1 Main Issues and Concerns Raised

The following table presents a summary of the main outputs of the PCM at Chakaria Upazila.

Participants	Issue Raised	Comments/Concerns/Expectations	Response
Md. Jahangir Alam, Upazila Engineer	• Water Quality, Cost, Water Pollution	• Since there is a plan to intake water from the river, there will be chance of sedimentation with water. It will require a sedimentation management plan. • Two types of supply have been mentioned – industrial and drinking. Will the quality of both waters be the same? As drinking water will require more purification, the cost will be	• It will be a challenge for the project to handle the sediment. • Four (4) sedimentation channels are being planned in the intake structure.

Participants	Issue Raised	Comments/Concerns/Expectations	Response
		different from that of industrial water. The cost could be reduced if the water is delivered this way. • The reservoir should be protected from fish cultivation. If fish cultivation is practiced, birds will come with the risk of water pollution.	• The reservoir is also having four (4) components. Since sedimentation will also be deposited in the reservoir, the plan is to stop one component for re-excavation while others will continue. • Treatment plants will be established for different levels of quality of industrial and domestic water. • Regarding the capacity of the reservoir, it covers five to six months. Another detailed analysis is being carried out to finalize the plan. • Currently 800+ acres have been considered. • Since the project will be phase wise and components wise, it will increase as per need in future. • The plan for pumping is for six months so that we do not need to pump during lean period when the water reduces in Matamuhuri. • Sludge treatment plant's design is
Jakir Uddin, Executive Engr. Chakaria Paurashava	• Water Crisis and Availability	• He mentioned he never seen such a big water reservoir with the capacity of 2600 crore liters. As mentioned, water could be used for 6 months. It can be estimated that if it requires 17 crore liters a day, the reservoir can serve for around 5 months, not six months. • There is a crisis for drinking water in Chakaria and Cox's Bazar although the area is full of water. • There is no chance of containing smell in the water since the water is collected form river. It is a good project for the area.	
Nasim Hossain, Upazila Agriculture Officer, Chakaria	• Impact on Agriculture, Salinity, Involvement of Agriculture Department	• The officer mentioned that "since the Agriculture Department or the Department of Agricultural Extension (DAE) is not involved in the project, I do not understand if I should make any comment". • The agriculture of Chakaria is greatly dependent on the Matamuhuri river. If the project is about the Matamuhuri river, it cannot avoid the agriculture department anyhow. Agriculture department is always involved in other JICA funded project in the area. • Flood is a main problem in the area during rainy season (July – August). Does this project has any plan for flood management since it is going to intake water during rainy season? What is the plan of the study/project team regarding this? • The rain scenario differs during the seasons. If the Dhemushia	

Participants	Issue Raised	Comments/Concerns/Expectations	Response
		Jalmahal is not blocked during rainy season, the Dhemushia Khal will be full of Saline water which will adversely impact on Aman cultivation. What is your plan for the existing sluice gates? • If the entrance of saline water is not controlled, the water cannot be used for drinking purposes. • It has been mentioned that the water of Matamuhuri will not be used in winter season, if it is used, the agriculture will face big crisis. • The agriculture will also be impacted due to the river control in the upper end of the Matamuhuri. It will reduce the cultivated lands.	ongoing. Huge sludge will be generated by the treatment process. If we dump sludge in local areas, it will be an environmental pollution. A treatment plant will be there to manage the sludge by standard process. • The sludge will be re-used in industries after proper treatment. • Although the Agriculture department is not in the list though, agriculture and fishery departments are very important for the project. • The study team has collected detailed agricultural demand data during data collection since 2020. The extension plan is being prepared considering the existing demand. • The main objective of the study is to assess environmental impacts and how to mitigate the impacts. It will be
Kazi Masudur Rahman, SARPV (NGO)	• Environmental Impact, Mitigation Measures, Future Risks, Water Supply Areas	• An environmental change will take place if such a big reservoir is created in Chakaria. As agriculture officer has already mentioned, the area is already vulnerable to flood and huge challenges are faced by the area every year. The extended areas of Badarkhali and Dhemushia are used for salt cultivation. An environmental impact is being made there. Since the project will reserve 2600 crore liters of water and such a big project will require the clearance form Department of Environment, what are the measure are being considered for this? • From one perspective, the project is good for the area and from another perspective, it will create environmental hazards if the mitigation measures are not followed properly. • In Badarkhali, ground water depletion is occurring, and the drainage system is also poor. • Will the drinking water be supplied in Municipality areas or in the Matarbari and surrounded UP areas, particularly	

Participants	Issue Raised	Comments/Concerns/Expectations	Response
		Dhemushia, Matarbari, Bodorkhali, Paschim Boro Bheula?	identified phase by phase. • The intake point is near the Dighar patkhali, around 1.5-2 km up from Chakaria bridge. • Sand mining and soil stabilization will be of course difficult. BWDB will do it as they are expert in such intervention like river control and river bank protection. • More consultations are in plan to identify if any other issues are there during construction phase.
Belal Uddin, Councilor, Chakaria Paurashava	• Riverbank Protection	• Intake points need to be clearly described for better understanding of the audience. As it appears, protecting the riverbanks and constructing embankment will be difficult near the intake points.	
Executive Office, Chakaria Paurashava	• Local Cultivation • Salinity Intrusion	• Agriculture, fisheries and salt cultivation are connected with the water of Matamuhuri river. • Will the reservoir be down the Matamuhuri river or in the upper end? If it is in the down, there will be chance of salinity. If in the upper areas, there will be available fresh water without salinity. The more you go down, the more the project will trigger the issues of agriculture, fisheries and other resources.	• The study team has a study on the total region (covering Cox's Bazar, Kaptai) and finally selected this location. Salinity has also been considered in the design. • Total water supply will be depending on surface water. There is no linkage of the project with ground water of the area. Only one relation can be considered that if there is no water in the river it has an impact on ground water.
• Mesbaul Haque, Secretary, Chakaria Press Club, Chakaria		• There are both saline water and sweet water in Chakaria. • If water is reduced due to rising temperature in any year, will there be any impact on local community by intaking water by the project? Such a crisis is seen in some areas.	

Participants	Issue Raised	Comments/Concerns/Expectations	Response
			The water table will fall. Since the project will not intake such an amount of water that makes the river empty, the question is not applicable to this project. • The team also studied total ground water availability of the region. This study showed that the ground water in Chakaria area is depleting around 10 cm every year. • In this situation, there is no option of considering a ground water-based supply project. • Water reservoir will help recharge ground water. • The project will avoid environmental impacts.
• Salah Uddin Khaled, Principal, Chakaria City College	Surplus water, River Control,	• Is there any chance of reversing industrial water? • What is the plan for using surplus water? How many days such surplus water be reserved? • Local people are not experiencing benefit of BWDB's water control properly?	• Planning for industrial development is going on. A masterplan including township development is being prepared currently. That is not directly related to this project. • Around 8 economic zones
• Ariful Islam Bappy, Lecturer, Chakaria	• Energy Crisis	• Local people are already suffering from the electricity crisis. The question is if there is any chance of increasing this crisis due to implementation of this project?	

Participants	Issue Raised	Comments/Concerns/Expectations	Response
Degree College			are in plan and 1 is considered in Chakaria near the reservoir. • A high-level coordination is already there to avoid the conflict/repetition of projects. • A good amount of power will be required to run the project. Development to meet this demand will surely be made.
Al Amin Bishwas	Water Sources, Water Supply Coverage, • Energy Sources	• Cox's Bazar, Chattogram and Dhaka industrial development and Cox's Bazar Development master plan has been implemented since 2014. Water supply project is a part of that. Each project is related to another project. • This project will supply water to the Matarbari industrial zone. In addition to that, domestic areas of 18 UPs and Paurashava of Chakaria and Matarbari will also be under the coverage of this project. • The project will totally be dependent on surface water so there is nothing to be worried about ground water. • It would be better if the project could utilize Solar energy instead of local energy. It needs to assess if a solar plant or bio plant could be established.	
Md Erfan Uddin Ahmed, AC (Land), Chakaria	• Amount of Water Requirement • Land Acquisition	• It would have been better if you could show how many cusecs water is flown in Matamuhuri river each day and how many cusecs will be taken by the project each day. • During rainy season, water comes with sedimentation and wastes, if the project intakes water, these wastes would not pass easily and sediment will be deposited at the lower end usually. Have you conducted this study? • Land acquisition (800 acres) will be another challenge for this project considering the local reality. • The project will contribute to meet our prime minister's vision 2041.	

Participants	Issue Raised	Comments/Concerns/Expectations	Response
		• The AC (land) thanked all participants and declared the closing of the PCM.	

Appendix A: Attendance of the Participants

দক্ষিণ চট্টগ্রাম অঞ্চল পানি সরবরাহ প্রকল্পের পরিবেশগত প্রভাব মূল্যায়নের লক্ষ্যে

অংশীজন পরামর্শ সভার উপস্থিতি তালিকা

বাস্তবায়নে: জনস্বাস্থ্য প্রকৌশল অধিদপ্তর, কক্সবাজার

স্থান: [illegible] তারিখ: ০৬ জুলাই, ২০২৪

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
1	[illegible]	[illegible]	[redacted]	
2	[illegible]	UAO		
3	[illegible]	UE, LGED		
4	[illegible]	DPHE, SAE		
5	ABM Sadiqur Rahman	Sr. Water & Envr. Engr. NKB		
6	Eng. Md. Zakir uddin	Executive Engineer Chakaria pourashava		
7	MD Salah uddin Khaled	Principal, Chakaria city College		
8	Nurul Alam	DPHE		

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ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
9	[illegible]	[illegible] D.P.H.E	[redacted]	
10	[illegible]	M.U.P.		
11	[illegible]	M.U.P.		
12	কাজল রেখা	M.U.P		
13	Md. Khabir Uddin	Social Expert KMC		
14	SHESHIR GHOSH	Sr. Socio-Economic Expert		SHESHIR GHOSH
15	Aminur Rahman	Consultant EQMS		
16	MD. TANVIR MAHTAB FAHIM	Jnr. Environmental Engineer		
17	Babal Uddin	councillor 09		
18	Md. Afzal Goni Parvez	UP Secretary, Chuinga		
19	Md. Nurul Absar.	MUP, Chuinga UP		
20	[illegible]	[illegible]		

NIPPON KOEI BANGLADESH

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
21	Md. Ibrahim Khalil	Project Officer Monitoring	[redacted]	
22	ABUL MONSUR MD. MOHSHIN	Daily Dugdha Chakaria Upazila Cresp		
23	Kazi Maksodul Alom	Regional Director SARPV		K. M. Alom
24	Mahabubur Rahman Bhuiyan	Project Manager AC2 ATB		
25	Sultan Ahmed	Officer Livestock		
26	Mijba Ul Hoque	Journalist		
27	Sultan Mahamud	M.U.P. P.B.B.		
28	Mohammad Bappy	Lecturer		
29	S.M Eftekar uddin Emad	Lecturer		
30	Shahalal Shaheal	Journalist		
31	Helal Uddin.	Chairman. Fashiakhali		
32	MD. Touhidul Islam.	MUP-4-Fashiakhali.		

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
33	SM Rabin	Assistant Consultant	[redacted]	
34	Saddam Hossen	M.C.P. Dadankhali		
35	Khurshed Alam	Teacher, chakaria Central High		
36	আফসানা উল হুসনা	কারিগরি সহায়তা কার্যালয়		আফসানা
37	নাসরিন ছিদ্দিকী	DMechanic/DPHE		
38	মো: ফজলুল কবির	C.C.T/DPHE		
39	মো: মফিজুর রহমান আরিফ	AM/Chakaria Central High		
40	কেমাল উদ্দিন			
41	শাহরুখ রশিদ	কোয়ালিটি, ফিল্ড		
42.	Mesud Mostahed	Power Nirbahi officer, ek po		
43.	Shahabuc Mahmud.	Secretariat		
44	Md. Shahriar Islam	UNO		

SUMMARY OF PCM – COX'S BAZAR

The public consultation meeting was held at the Conference room at Department of Public Health Engineering, Cox's Bazar on 2nd July 2024. The event commenced at 3:00 PM, with an attendance of a total of 32 participants, including DPHE, non-government organizations, civil society organizations/community-based organizations, journalists and representatives from various government organizations.

Photographs of the Participants in the Workshop at Chakaria Upazila












Glimpses of the PCM at Cox's Bazar District

Source: EQMS, July 2024

Aminur Rahman, consultant from EQMS Consulting Limited, opened the session with a welcome statement to all participants and the Nippon Koei Bangladesh team. Kushal Roy, the team leader from Nippon Koei Bangladesh, followed with a PowerPoint presentation covering various aspects of the project. His presentation included the project background and location, study objectives, project standards, study area, approach and methodology, project description (including the phasing plan, associated facilities, utility requirements, and benefits), environmental and social baseline conditions, stakeholder engagement, potential environmental and social risks and impacts on the region, and identified valued environmental components for Cumulative Impact Assessment.

Mustafizur Rahman, Executive Engineer of DPHE, delivered the closing speech, extending his greetings to all participants. He emphasized the project's importance for the improvement of the area, noting that it is still in its early stages. He mentioned that various data and components are being surveyed and analyzed, with careful consideration of the environment to ensure minimal impact from the proposed project. He concluded by expressing the commitment to making the project sustainable.

Main Issues and Concerns Raised

Following table presents a summary of the main outputs of the PCM at Cox's Bazar District.

Summary of the PCM at Cox's Bazar District

Commentor	Issue Raised	Comments/Concerns/Expectations	Response
Jamir Uddin (DD DoE, Cox's Bazar)	• EIA Preparation, Public Consultation Meeting and sludge management	• Public consultation is crucial for the project and obtaining the Environmental Clearance Certificate. He emphasized the importance of local people participating in the Q&A session to understand the project's impact and benefits. He also noted that non-compliance can lead to adverse impacts from the project. • Indigenous species must be considered in the EIA report	Several field-level participatory meetings on salt and shrimp cultivation have already been conducted. A land acquisition plan and a resettlement action plan will be prepared for the affected people. Consequently, participatory meetings and public consultations will be held, involving local people, local leaders, representatives

		using the IUCN Red List or other relevant reports. The EIA report must comply with ECR 2023. • According to ECR 2024, public consultation meetings must be held with local people, with the presence of DOE, and the schedule must be announced in local and national newspapers. • For this project, the rainy season is considered the water intake period. However, climate change has altered the rainy season's duration. What will be the specific months for water intake? • A sludge management guideline for Bangladesh has been developed by GIZ, which we are following. Sludge management must adhere to this guideline. • Local people should have priority access to water before the industry.	of government organizations, and other stakeholders.
Jashim Uddin (Superintendent PTI Cox's Bazar)	• Natural Calamities and Sustainable development	• He expressed his gratitude to all participants, JICA, EQMS Consulting Limited, and Nippon Koei Bangladesh for organizing such a wonderful session. He mentioned that JICA plans to undertake various activities to supply water in southern Chittagong, particularly in Maheshkhali. He emphasized that the project should be designed to withstand floods and other natural calamities to ensure sustainable development. Therefore, it is essential to consider the water scarcity faced by local people during adverse natural situations.	
Ahmed Ullah (Labour Inspector, DIFE)	• Impact on Salt and shrimp cultivation	• He noted that Chakaria and Maheshkhali are well-known for salt and shrimp cultivation, activities that involve many people. Consequently, a significant amount of land will	

		be acquired for this project. He inquired how JICA plans to consider the needs of these people in the project. If there is a plan in place, it should be shared with the local community.	
Md Enayet Ullah Rana (Fisheries Extension Officer, Cox's Bazar)	• Impact on shrimp cultivation	• He stated that the proposed project area encompasses Chakaria and Matarbari, with water sourced from the Matamuhuri River. This area is crucial for shrimp and salt production. He noted that river water levels decrease during the summer. During the rainy season, is there a possibility of salinity imbalance affecting shrimp cultivation? Alternatives should be considered, and measures taken to reduce sedimentation to ensure shrimp cultivation is not disrupted.	• The study indicates that water will be drawn 4-5 km upstream from the shrimp cultivation zone, ensuring that this activity will not cause a salinity imbalance for shrimp farming. Therefore, there is no connection between the saline water and the project activities, and salt cultivation will remain unaffected.
Mr. Harun (Focal Person, YPSA, Cox's Bazar)	• Salinity Intrusion and Climate Change	• This proposed project area is well-known for salt and shrimp cultivation. Given the project's scale, land acquisition might occur, potentially disrupting these activities. He also noted that during the winter season, people rely on water from the Matamuhuri River for crop cultivation. Therefore, it is crucial to consider this season carefully to avoid adverse effects on local farmers. He requested clarification on the potential for salinity intrusion during the rainy season when large amounts of water will be stored. He emphasized that climate change is a significant concern in this area, and its impacts must be considered in the project.	• The reservoir and embankment designs have been developed based on studies of flood levels and the effects of past floods, taking climate change into account.

Syeda Tanzina Sultana (Executive Engineer, RHD, Cox's Bazar)	• Collaboration with RHD	• She inquired about the commencement date of the project planning. • She mentioned that since this proposed project is linked to RHD (Department of Roads and Highway), and the proposed road project of RHD is in its final stages with land acquisition nearing completion. It was noted in the presentation that a 5m radius pipeline will be installed alongside the road. Has there been any official communication on this matter? If not, it would be beneficial to initiate collaboration with RHD, especially considering that the construction of the RHD's proposed road project is set to commence soon.	• The planning for this project began in 2020, with preparatory surveys initiated in 2022. • While there is no official correspondence yet, discussions are ongoing.
Engr. K. Paul (Executive Director, Experoul)	• Water demand and alternative of reservoir	• The groundwater in Cox's Bazar is contaminated with saline water, making it a significant initiative to use surface water to meet water demand. He proposed that JICA could consider utilizing various ponds in the area for water storage. • He highlighted the changing climate and variability in rainfall during some rainy seasons, posing the question of how this situation will be managed.	• Our water demand and the required reservoir size are substantial. If ponds were considered as alternative reservoirs, we would need more than a thousand ponds, posing significant challenges in terms of connectivity. Therefore, supplying untreated water directly is not feasible, making centralized reservoir planning a preferable option. • We have already analyzed 40

			years of rainfall data, ensuring that the reservoir will be designed to ensure water supply even during drought periods.
Md. Hasibur Rahman (Project Manager, BID4CJ Project, CODEC)	• EIA Preparation and sludge management	• The EIA report should identify potential biotic components that will be impacted and compile mitigation measures diligently. It is crucial to identify the sources affecting both biotic and abiotic components. He expressed confidence in JICA's ability to address these concerns and take necessary actions. He emphasized the importance of involving local leaders and ensuring public participation in such projects. • As part of this project, a water treatment plant will be constructed. He inquired about the management of residues after treatment.	• All environmental issues will be carefully considered in the Environmental Impact Assessment (EIA). • The water treatment plant and sludge management are currently in the design stage. The management of sludge will involve either onsite or offsite methods. Plans for reusing sludge will be considered after the design phase, as sludge can be reused.
Prof. MD. Solaiman (Principal, Cox's Bazar Govt. College)	• Cost effective and minimal environmental impact	• There is a significant demand for water in this region, compounded by groundwater levels being 400-500 feet deep and a growing population. Projects like this one are crucial for meeting the increasing water demands of the population. However, it is essential to prioritize low cost and minimal environmental impact when implementing such projects. He also emphasized the importance	• Initially, there was a plan to build a dam to store water by raising the water level. However, after careful consideration and analysis of flood issues, we have decided against the dam concept. Instead, we are

		of considering flood conditions to ensure that people are not adversely affected by the project's activities.	planning to intake water from the river without major intervention.

Appendix A: Participant List at the PCM in Cox's Bazar

NIPPON KOEI BANGLADESH

JICA EQMS

দক্ষিণ চট্টগ্রাম অঞ্চল পানি সরবরাহ প্রকল্পের পরিবেশগত প্রভাব মূল্যায়নের লক্ষ্যে

অংশীজন পরামর্শ সভার উপস্থিতি তালিকা

বাস্তবায়নে: জনস্বাস্থ্য প্রকৌশল অধিদপ্তর, কক্সবাজার

স্থান: [illegible] তারিখ: ০২ জুলাই, ২০২৪

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
১	[illegible]	[illegible]	[redacted]	
২	[illegible]	[illegible]		
৩	A B M Sadiqur Rahman	Sr. Water & Env. Engineer		
৪	Jaheda Akter	Councilor Ward No. 8, 9		02/7/24
৫	Sabiha Arman	Assistant Engineer, LGED		02.07.24
৬	JASHIM UDDIN PRODHAN	INSPECTOR FSED		02/7/24
৭	Ahmed Ullah	Labour Inspector (DIFE)		02/7/24
৮	Saiful Islam.	B.O. Bangladesh Forest Dep.		2/7/24

NIPPON KOEI BANGLADESH

JICA EQMS

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
০৯.	Md. Khabir Uddin	Social Expert, KMC	[redacted]	
১০.	Md. Enayet Ullah Rana	Fisheries Extension Officer		
১১	Shyamal Kumer Ghose	Assistant Conservator of Forests		02.07.24
১২.	Ranjan Kumar Saha	Sub-Divisional Engr. Cox's Bazar 132/33kV Grid Sub-station		
১৩.	SHESHIR GHOSH	Sr. Socio-Economic Expert, NKB		
১৪.	MD. TANVIR MAHTAB FAHIM	Jnr. Environmental Engineer, NKB		
১৫.	MD. REZAUL KARIM	Environmental Specialist		
16.	Mohammed Harun	Focal Person, Cox's Bazar, YPSA		
17.	Mohd Shohel Rana	STAFF REPORTER Dainik Coxsbazar		
18.	Syeda Tanzima Sultana	Project Manager-3 (EE, RHD) Matarbari Port Development Project		02.07.24
19.	Shafique Rahman Shovan	Project Manager-1 (EE, RHD) Matarbari Port Development Project (RHD Part)		02.07.24
20.	Md Hasibur Rahman	Project Manager, BIDACJ Project, CODEC		02.07.24

NIPPON KOEI BANGLADESH

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
21.	Engr. K. Paul	Executive Director	[redacted]	
22.	Md. Jashim Uddin Siddique	Executive Director Green Bangladesh		
23.	Raj Bihary Agus.	Councillor Ward 8 Cox's Bazar Pourashava		02.07.24
24.	Md. Jashim uddin	Superintendent PTI, Cox'sbazar		02/07/2024
25.	Jamin Uddin	Deputy Director Cox's Bazar, DoE		
26.	Syed Ahsan Habib	S.D. Officer Bsed. expenses		
27.	Md. Obid Ullah	Trainer - UCEP Bangladesh		
28.	Nupa Alam	Cox's Bazar Progress		
29.	Keshab Roy	Team Leader, EIA Study team		KRoy
30.	Engr. Pradipta Khisa	~~Principal, Cox's Bazar Polytechnic Institute~~		2.7.2024
31.	Aminur Rahman	Consultant, EQMS		
32.	S.M. Tanvir	Assistant Consultant EQMS		

Southern Chattagram Region Water Supply Project

Participatory Consultation Meeting

Location: Matarbari Union Parishad

Date: 4th July 2024 Time: 11am

Summary of Participatory Consultation Meeting

On 4 July 2024, a stakeholder consultation meeting was held in the meeting room of the Matarbari Union Parishad, Maheshkhali Upazila, Cox's Bazar District, with the aim of conducting an Environmental Impact Assessment (EIA) for the Southern Chattagram Region Water Supply Project. The meeting commenced at 11:00 AM, with a total of 43 stakeholders in attendance. The participants included the Honorable Mayor of Maheshkhali Municipality, the Chairman of Matarbari Union Parishad, officials from the Upazila Public Health Engineering Department, representatives from various government offices in Maheshkhali Upazila, Union Parishad members, media personnel, teachers, and stakeholders from various other sectors.



Glimpse of Participatory Consultation Meeting



Glimpse of Participatory Consultation Meeting

Source: EQMS, July 2024

Aminur Rahman, Consultant at EQMS Consulting Limited, initiated the meeting by welcoming all attendees and facilitating the proceedings. He began by allowing everyone to introduce themselves. Following this, the Team Leader of EIA,Southern Chattagram Region Water Supply Project,Nippon Koei Bangladesh,(NKB)delivered a PowerPoint presentation covering key topics, including the project description, the project's background, the water supply area, environmental considerations, the water source, and the water extraction site, among other details.

After the presentation, an open discussion took place, during which participants shared their valuable opinions on the potential impacts of the project. The Honorable Mayor of Maheshkhali then gave his remarks, and the meeting concluded with the closing speech by the Chairman of Matarbari Union Parishad.

Main Issues and Concerns Raised

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
Mahabubur Rahman Faruki, Vice	• Impact on Land	• If water is extracted from a location for an extended period, soil may also be drawn up along with the water from the extraction site. This can lead to	• In this case, morphological modeling will be developed to determine the

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
Principle, Matarbari		soil depletion and create a void, increasing the risk of land subsidence. Could this land slidings have any impact on neighboring regions in the event of an earthquake?	stability of the riverbank and assess the potential risk of land degradation based on the amount of water extracted. Based on the results of this model, a 3-kilometer embankment will be constructed along the riverbank. • The project area is located near a subtraction zone, making it naturally prone to earthquakes. Therefore, the guidelines of the Bangladesh National Building Code (BNBC) will be followed, which specify the design requirements based on the magnitude of potential earthquakes. The engineering team from JICA (Japan International Cooperation Agency) will adhere to these guidelines in their work.
Nur Hossen Mohammad, Assistant Agriculture Officer, Department of Agriculture, Maheshkhali	• Impacts on Agriculture	• Will water extraction from the Matamuhuri River affect the Boro season in Chakaria?	• In the project, water will only be extracted from the Matamuhuri River during the monsoon season, not during the dry season. Therefore, there

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
			is no likelihood of any adverse impact on irrigation.
Abdul Khalek, 3 no UP Member and Pannel Chairman, Matarbari Union Parishad	• Drainage system • Positive impact • Impact of the project at the union level • Waterlogging	• The people of Matarbari Union may not be very aware of the potential impacts of water extraction from the Matamuhuri River because the river is quite far from Matarbari Union. Bringing water from the Matamuhuri River would be beneficial for everyone. However, what will be done with the water after it has been used by the people? • Since the initiation of the mega project in Matarbari, there has been severe waterlogging in the area. Every monsoon, Matarbari gets submerged under water. There needs to be a proper drainage system to address this waterlogging. • The chairman is requested not to approve any infrastructural development without ensuring proper drainage systems. The Rangakhali Canal is referred to as a "Jalmahal" (waterbody), but in reality, it is the only route for water flow in Matarbari. After it was designated as a "Jalmahal" and misused, water flow was obstructed, leading to waterlogging. Subsequently, a complaint was lodged with the Cox's Bazar District Council regarding this issue. • Previously, there were alternative drainage routes, but they were blocked after the construction of a new sluice gate over the Rangakhali Canal. Although the control of water was once in the hands of the people, it has now shifted to various businessmen and shrimp farmers, leaving the area submerged in water.	• The Maheshkhali-Matarbari area is referred to as an integrated area, where multiple projects are continuously being implemented under the coordination of the Honorable Prime Minister's Office. A single project can never encompass everything. • The environmental condition of the Matarbari area is quite poor. Due to its proximity to the sea and the low elevation above sea level, the area experiences rapid waterlogging. However, a master plan is currently being developed under the Moheskhali-Matarbari Integrated Infrastructure Development Initiative (MIDI) cell, where significant emphasis will be placed on the infrastructural development of the Matarbari area. • Several roads and drainage

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
			projects have already begun in Maheshkhali and Chakaria, funded by JICA. Similar activities are expected to start in Matarbari as well.

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
Maksud Miah, Mayor, Maheshkhali Municipalty, Maheshkhali	• Waterbody • Drainage System • Reservoir	• An application can be made to the Assistant Commissioner (AC) along with the Union Parishad and local leaders to take effective measures regarding the waterbody. • Water from the Matamuhuri River will be brought and stored in a reservoir. How will the local population be supplied by this reservoir? • No distribution reservoir has been established in Maheshkhali Municipality.	• A reservoir will be established in Palakata, next to which a treatment plant will be set up to ensure the water is suitable for drinking. The treated water will be distributed through pipelines to various areas and sent to distribution reservoirs. Seven reservoirs have already been identified under this project. One will be located in a specific industrial zone in the Dhulkot area for industrial purposes, and another will be set up in Matarbari for the local population. Additionally, one reservoir will be established in Chakaria Municipality and a few others in various unions for distribution purposes. • Maheshkhali is a very important area. At this stage of the project, no reservoir is being established in Maheshkhali. This is because the pipeline needs to be extended about 25 to 30 kilometers to reach Maheshkhali Municipality.

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
			Since JICA has a comprehensive development plan for the entire region, reservoirs will certainly be installed in Maheshkhali in the future stages of the project.
Khayer Hossen, Councillor	• Benefits of Water Supply	• Will every household benefit from the water supply? • Will there be arrangements for collecting this water in each household?	• The reservoirs for household water supply are being designed in such a way that water can be distributed to all communities. However, whether each community will

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
			have access to this facility or not will depend on the specific arrangements made. This is because some amount of fee will be set for the water supply service.
Maksud Miah, Mayor, Maheshkhali Municipalty, Maheshkhali	• Water Source • Salt Cultivator • Water Supply Diversity • Drinking Water	• In the proposed project, water will be extracted from the river. The Honorable Prime Minister has initiated another project aimed at purifying seawater to provide drinking water. This project will not only supply water to the area but also support salt farmers, potentially increasing salt production significantly. If you opt to purify seawater instead of extracting water from the Matamuhuri River, you won't need to lay such extensive pipelines. Alternatively, if these two projects are implemented together, both parties could benefit. • Another task is to purify the local water and supply it directly here. Only those who can have access to the water will receive it. If the local people cannot access to the water, where will it be supplied? • We aim to provide clean drinking water everywhere. Most major diseases are waterborne, so the Bangladeshi government wants to ensure that everyone has access to safe drinking water. • The water supplied through this project might not be sufficient for these areas. Currently, many people in the area bathe, wash clothes, and perform other activities in the canals and rivers. With the introduction of this water supply, people might perform	• The Prime Minister's project involves a desalination plant. The proposed project is examining whether to supply water from the river or from the sea. Future development projects will take place in your area. Currently, work is starting in an economic zone through Dhulkot, and an additional eight economic zones will be developed. These industrial areas will eventually require a significant amount of water, which may not be feasible to provide from our current project. Therefore, seawater will be purified and supplied to these industrial areas. • However, for household purposes, our proposed project will supply water because it is

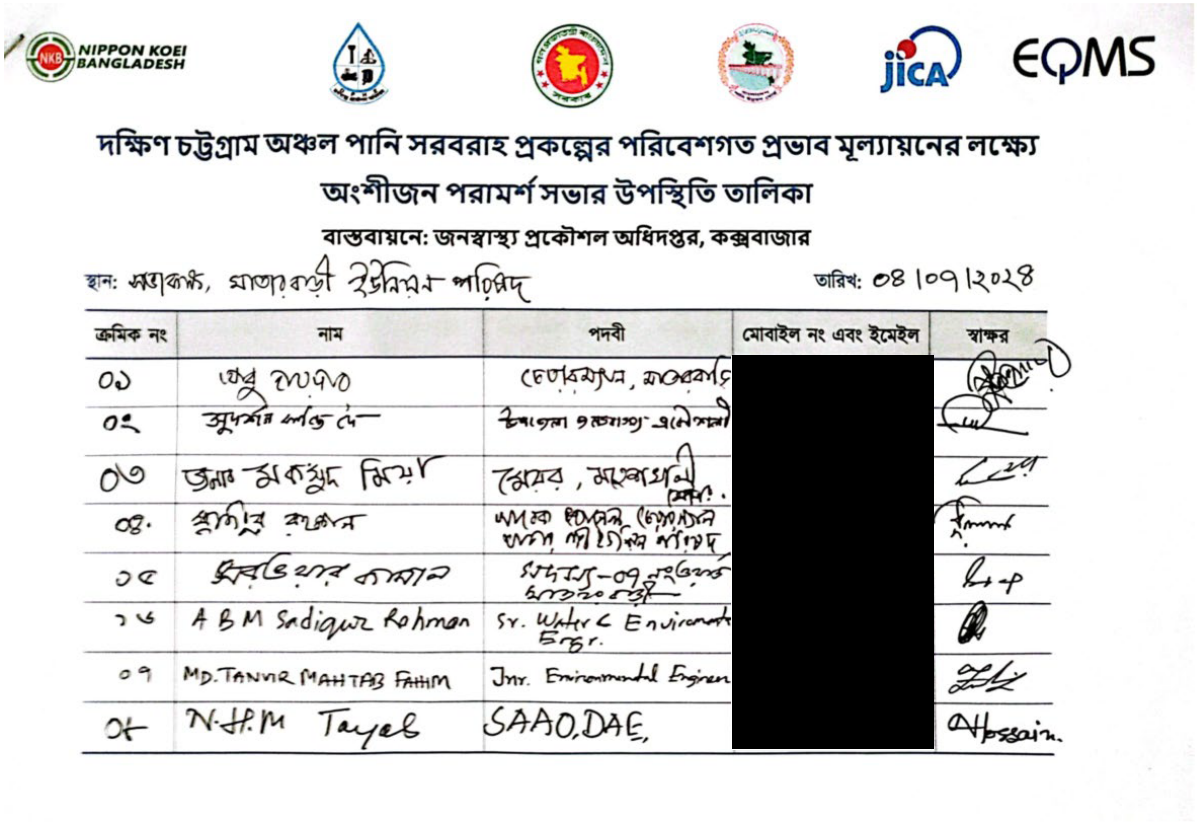
Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
		these activities inside their homes, leading to a higher likelihood of water wastage.	much more cost-effective.
Sudarshan Kanti Dey, Upazilla Engineer, DPHE, Maheshkhali	• Scarcity of Drinking Water • Impacts due to Water extraction	• In Matarbari, most people do not have access to clean drinking water; only about 30% to 40% of the population receives it. For the rest, a project funded by the World Bank for extracting and supplying groundwater has been initiated. However, this water is often saline. In Maheshkhali, the water layers are most critical, particularly in Matarbari and Dhulkot. The Public Health Engineering Department has already drilled 700-1000 feet deep tubewells in these areas. • The salinity of the water is increasing day by day. If groundwater extraction continues to increase, the level of salinity will also rise. To address this, the Public Health Engineering Department is	

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
		considering rainwater harvesting and storage. • Given the overall situation, 1,700 to 1,800 liter rainwater harvesting systems (rainwater harvesters) will be provided in Matarbari and Dhulkot. Currently, there are some 3,000-liter water tanks in the area. Each household receives one tank and filter to collect water during the monsoon season and use it throughout the year after filtering. However, it is not feasible for a government department to manage the entire system. Therefore, JICA, the World Bank, and others are working on various development projects, with desalination being one of them. However, feasibility studies have shown that the cost of such a project is very high, making household-level supply challenging. In this case, extracting water from the Matamuhuri River is a more viable option.	
Maksud Miah, Mayor, Maheshkhali Municipalty, Maheshkhali	• Water Distribution Cost	• Water that is costly and requires higher payments should be supplied to industrial sectors. On the other hand, water that can be collected at a relatively lower cost should be supplied for household use, given that about 90% to 95% of the population in this area belongs to low-income communities. • Industries can finance their own water collection, purification, and usage. If the water extracted from the Matamuhuri River is allocated to industrial areas, the general public will not receive any water. • Desalinated water will be provided to us, and the salt will be given to salt farmers. These are also sold in the Napitkhali area.	• This matter is under our consideration. Industries will pay a higher price for water, while at the household level, water will be supplied at a lower cost. • Seven distribution reservoirs will be established, of which only one will be designated for industrial use. The remaining six will be supplied to the general public at the household level.

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
	• Water Bill	• The billing rate per unit should be different for industrial areas and residential areas.	• Certainly, there will be a significant difference in the billing rate per unit between industrial areas and residential areas.
	• Environmental Impact • Drainage System	• The local people may not fully understand the environmental impacts. However, many environmental experts are among you. The environment is crucial for both humans and other biodiversity. Now, to ensure that we do not face any environmental issues, please keep this in mind as you work. • Please plan for a proper drainage system. The wastewater used by people should be collected, treated, and then safely discharged into the sea. If this can be done, it is expected that the environment will remain healthy.	
MD. Hubaib, Representative of Bijoy TV	• Environmental Impact	• It is requested that special emphasis be placed on the environment when implementing the water supply project.	
Chairman	• Environmental Impcat • Compensation to the affected People • Challenges of Project Implementation	• I request that the environmental issues raised during this discussion be presented in written form. Additionally, care must be taken to ensure that no one suffers any harm during the implementation of the project. If anyone is affected, they must receive fair compensation, and efforts should be made to ensure that no one is deprived of their rightful compensation. • Previously, the Honorable Prime Minister inaugurated a project in this area. The project mentioned compensation in about 21 categories, but for various reasons, many were deprived of it. Some received a	

Participants	Topic	Consultation and Suggestions	Comments of Survey Teams
		one-time grant, while others did not. Later, when project officials were asked, they said that JICA was no longer overseeing the project, and therefore, there was no possibility of compensation. Due to this, public representatives often face public resentment. • It took five years to build a road here. The Honorable MP made significant efforts to have the road constructed. The road was built to handle 10-ton vehicles, but 30 to 40-ton vehicles used it, leading to rapid deterioration. Subsequently, with JICA's assistance, the road was repaired. The delay in this work was primarily due to the contractor. • The matters discussed here must be implemented in practice. The groundwater level is decreasing, and salinity is increasing, making this project extremely urgent. There is a strong expectation that the commitments made will align with the work carried out.	

Appendix A: Attendance of the Participants



দক্ষিণ চট্টগ্রাম অঞ্চল পানি সরবরাহ প্রকল্পের পরিবেশগত প্রভাব মূল্যায়নের লক্ষ্যে
অংশীজন পরামর্শ সভার উপস্থিতি তালিকা

বাস্তবায়নে: জনস্বাস্থ্য প্রকৌশল অধিদপ্তর, কক্সবাজার

স্থান: সভাকক্ষ, মাতারবাড়ী ইউনিয়ন পরিষদ তারিখ: ০৪/০৭/২০২৪

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
০১	[illegible]	[illegible]	[redacted]	
০২	[illegible]	[illegible]		
০৩	[illegible]	[illegible]		
০৪	[illegible]	[illegible]		
০৫	[illegible]	[illegible]		
০৬	A B M Sadiqur Rahman	Sr. Water & Environment Engr.		
০৭	MD. TANVIR MAHTAB FAHIM	Jnr. Environmental Engineer		
০৮	N.H.M Tayeb	SAAO, DAE,		Hossain

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
০৯	SHESHIR GHOSH	Sr. Socio-economic Expert, NKB	[redacted]	SHESHIR GHOSH
১০	হাসিনা বেগম	[illegible]		
১১	[illegible]	[illegible]		
১২	[illegible]	[illegible]		
১৩	Nurul Absar	[illegible]		
১৪.	[illegible]	[illegible]		
১৫.	[illegible]	[illegible]		
১৬.	[illegible]	[illegible]		
১৭	[illegible]	[illegible]		
১৮.	[illegible]	[illegible]		
১৯	[illegible]	[illegible]		
২০	[illegible]	[illegible]		

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
২১	মোঃ ইমরান সাজিব	~~সহকারী~~ = সহকারী	[redacted]	
২২	কামরুল নাহিদ বাবু	উপ: সহ: সম্পাদক ২নং ওয়ার্ড ওয়াসা		
২৩	জর্জ্জুর হোসেন	কাউন্সিলর ৩নং ওয়ার্ড		
২৪	~~মাসুদ মোস্তফা~~	~~প্রকৌশলী~~ উঃ মহাব্যবস্থাপক-পেশা:সহ		
২৫	মোঃমনসুরআলম সরদার	সহকারী সচিব		
২৬.	সাইফুর রহমান ঘাঁটনী	চৌকিদার- কার্যালয় মাসিন্দিয়া পুরিষদ জনিত		
২৭,	ওসমান গনি	প্রবীন শিক্ষক (অব.) বাজেদপুর সঃপ্রা.বি;		
২৮.	মোঃ আবীর উদ্দিন	KMC,		
২৯,	Aminur Rahman	Consultant EQMS		
৩০,	মোঃ মাহমুদ হোসেন	সদস্য সচিব বিতয় টিটি		
৩১	মোস্তাফা আলী	MUP-3 সাজেবাতী		
৩২	মোঃ জোনাবউদ্দিন	M.U.P-3 সাজেবাতী		

ক্রমিক নং	নাম	পদবী	মোবাইল নং এবং ইমেইল	স্বাক্ষর
৬৬	[illegible]	M.W.P [illegible]	[redacted]	
৬৪	[illegible]	MUP — -		
৬৫	মো: সফিকুল হাসান	[illegible]		
৬৬	[illegible]	DPHE		
৬৭	শহীদুল হাসান	DPHE		
৬৮	[illegible]	[illegible]		
৬৯	আনোয়ার হোসেন	MPA		
৪০	S.M. Rabbin	Assistant Consultant, EQMS		
41	Rahadul Islam	SAE, LGED		
42	Kaushal Roy	TL, NKB		
43	Md. Rezaul Karim	Envtl Specialist		

Appendix

Record of Discussion
&
Discussion Memo

The Government of the People's Republic of Bangladesh
Ministry of Water Resources
Development-1Section
Bangladesh Secretariat

Subject: The Record of Discussion on JICA Preparatory Survey for Southern Chattogram Region Water Supply Project

Chairperson	:	Mallick Sayeed Mahbub Additional Secretary Ministry of Water Resources
Date & Time	:	27 July 2023, 14.00 pm
Venue	:	Conference Room of MoWR
Participants	:	**Annex A**

Welcoming all the participants the Chair bid the participants for their introduction. After that Mr. Kozi Kawamura, Team Leader of the JICA Survey Team appointed by the Japan International Cooperation Agency (JICA) was invited for the presentation on the agenda. He presented the issue on "The Southern Chattogram Water Resources Development Project" to materialize the Moheshkhali Matarbari Integrated Infrastructure Development Initiative. The participants of the meeting delivered their input in the discussions. The following agenda are discussed and decisions are prepared:

No.	Issues/Topics	Summary of Discussion
1	Introduction from Japan International Cooperation Agency, Head Quarter	JICA Headquarters provided a brief overview of the project and outlined the objectives of MIDI (Moheshkhali-Matarbari Integrated Infrastructure Development Initiative) and the importance of the project for MIDI. As there are no WASAs operating in the project area, it will be a challenge for BWDB and DPHE to handle a bulk pipeline and water supply project. There are two critical issues to be addressed in the primary stages of the survey. Firstly, water supply plan needs to be formulated through confirming planned water quantity and target area. Secondly, coordination and cooperation among various agencies are important for the sustainable implementation structure of the project. To confirm the project implementation structure and solve other technical issues, the Technical Working Group (TWG) and Sub-TWG are to be formed. Japan International Cooperation Agency, Head Quarter has a plan to dispatch a mission around the end of September to November this year for a TWG meeting.
2	Introduction of the Preparatory Survey from JICA Survey Team	Mr. Kawamura, Team Leader of the JICA Survey Team, presented the preparatory survey along with the basic idea for water supply (as per Appendix B). In the presentation, he highlighted the proposal of

		establishment of sub-TWGs under the TWG and their composition, resulting in acceptance of the proposal in the meeting. [Different revision by Tsukishima] The JICA Survey Team explained that, through individual meetings with BWDB, DPHE and DoE, the establishment of three Sub-TWGs (River Water Intake/Water Demand Group (chaired by BWDB), Water Treatment, Transmission and Distribution Group (chaired by DPHE), and Environmental and Social Considerations Group (chaired by DoE)) has been agreed with respective chair organizations.
3	Proposal for 2nd TWG meeting time from Japan International Cooperation Agency, Head Quarter	Japan International Cooperation Agency, Head Quarter proposed that the 2nd TWG meeting should be held in October or November this year. The priority items need to be examined early in the preparatory survey (basic plan of the water supply project, study on alternative layouts of major facilities, and institutional arrangement), which requires discussions with all relevant government organizations and authorities. The meeting attendees agreed with the JICA's proposal.
4	Question on Water Conveyance Techniques and Pipeline Distance from LGED:	Mr. Sattar, PD, SCRDP, LGED, inquired about the techniques to bring water from the Matamuhuri River to the water reservoir and the tentative pipeline distance. Mr. Kawamura stated that the approximate water pipeline length would be 30km in total, and the survey team would analyze the techniques and financial proposals before confirming the final approach. Mr. Sattar also asked about desalination, but the chair of the meeting stated that, due to high-cost involvement, this option is not considered.
5	Question on Source of Water from MoWR	The MoWR questioned whether the survey team considered using wastewater or reusable water. The survey team explained that due to the high water demand in the Moheshkhali-Matarbari and Chakaria areas, approximately 4.7m^3/s, the need for surface water development was identified in the prior data collection survey. The reusable and wastewater amount in the area is considered to be rather small, comparing the future water demand.
6	Question on Permission for river water use and cost of water from BWDB	Mr. Romjan Ali, DG, BWDB asked if the survey team had obtained permission from the government for river water use and the cost of water for river water use. The survey team clarified that the preparatory survey (feasibility study) started last June, and decisions about the cost of river water use, service charges, preliminary design, etc., would be made after the survey's completion.

7	Question on Environmental impact/cost of ecosystem and deforestation for making water reservoir from Forest Department	Dr. Jaglul, DCC of the Forest Department, supplemented that the cost of the ecosystem should also be considered and asked whether there is any forest/protected area near the intake/pipeline/ reservoir sites. The survey team will address concerns about the environmental impact and deforestation for the water reservoir construction. Several environmental impact surveys were conducted in the prior survey, indicating no forest or protected areas are there. Further Environmental Impact Assessments (EIA) would be conducted. There would be no forests destroyed for water intake and reservoir construction.
8	Question on Water demand and Priority area from DPHE	Mr. Saiful from DPHE inquired about how the survey team would determine industrial water demand and priority areas. The survey team explained that the water demand in the area would be carefully measured during the preparatory survey, and priority areas would be decided through discussions with different stakeholders. Then the data would be proposed to the Sub-TWG and subsequently submitted to the TWG for confirmation.
9	Suggestion regarding water demand analysis and MIDI master plan from BEZA	Mr. Hasan Arif from BEZA suggested that the survey team should consider the following three particular points: 1. The survey team needs to do a water demand analysis for all upcoming projects in Chakaria and Matarbari areas under the MIDI, including economic zones. 2. All the future projects and economic zones under the MIDI area should be anticipated in this survey as much as possible. 3. Integration of all future projects, incorporating this water supply project, should be included in the MIDI master plan. The JICA Survey Team answered that they will conduct the preparatory survey in due consideration of the said suggestions.
10	Questions on time required for basic water supply planning by CWASA	Mr. Maksud, Chief Engineer, CWASA raised concern regarding the schedule to complete the basic plan of water supply, including a pipeline layout plan, by October 2023, and inquired whether there is enough time for preparation of such a basic water supply plan. The JICA Survey Team answered that, since the results of the prior data collection survey can be utilized, October 2023 is set as the current target for the basic plan of water supply.

11	Comments on Working Group and other issues from BWDB	Dr. Shamol, CE, Planning, BWDB proposed to include representatives from the TWG in the Sub-TWGs, and the survey team agreed with the suggestion. Also, he suggested adding more workshops at the field level and increasing the working days based in Bangladesh rather based in Japan. The survey team will discuss this matter with JICA.
11	Proposal for visiting a foreign country to inspect such kind of project from MoWR	The Chair of the meeting inquired about the possibility of visiting the projects which have been completed in Japan as part of the horizontal learning process. JICA/BD mentioned that courtesy visits in Japan to showcase some completed water projects may be planned.
12	Question Water quality index and alternative reservoir to face drought situation from Chair	Chairperson asked if there would be a provision for water quality indexing, and the survey team confirmed that water quality checks would be conducted during the preparatory survey, with some samples to be brought to Japan for detailed testing, in addition to a study on water quality standers to be applied to the project supplied water. Regarding the drought issue and alternative arrangements for additional reservoirs due to the climate change impact raised by the Chair, the survey team confirmed that this matter would be studied during the preparatory survey.

02. Decisions:

(a) The TWG and Sub-TWG's (Sub-TWG's formulated by MoWR Memo No:42.00.0000.035.24.014.19-59, 60 & 61; Date: 24.02.2020) will remain same following the composition during the data collection survey.
(b) Representatives from TWG in the Sub-TWG will be included respectively.
(c) The JICA Survey Team would consider the following three particular points during conduct of the preparatory survey:

  (i) The survey team needs to do a water demand analysis for all upcoming projects in Chakaria and Matarbari areas under the MIDI, including economic zones.
  (ii) All the future projects and economic zones under the MIDI area should be anticipated in this survey as much as possible.
  (iii) Integration of all future projects, incorporating this water supply project, should be included in the MIDI master plan.

(d) The survey team will address concerns about the environmental impact and deforestation for the water reservoir construction.
(e) The Sub-TWG's are requested to hold regular meetings and supply data to the Consultants whenever it is necessary.

03. Finally, the Chair made the closing remark appreciating highly for active contribution of the participants and ended the meeting with vote of thanks.

05.10.2023

Mallick Sayeed Mahbub
Additional Secretary

Annex A

ATTENDEES:		**Sl. No.**	**Name**	**Designation**
In Person	Virtual			
√		1	Mr. Mallick Sayeed Mahbub, Chair	Additional Secretary, Ministry of Water Resources (MoWR)
√		2	Mr. Md. Romjan Ali Pramanik	Director General, Bangladesh Water Development Board (BWDB)
		3	Mr. Md. Robiul Alam	Joint Secretary, Ministry of Water Resources
	√	4	Mr. Jasim Uddin	Joint Secretary, Water Supply Branch, LGD
	√	5	Mr. Hasan Arif	GM Administration, Joint Secretary, BEZA
√		6	Mr. Jatan Marma	Deputy Secretary, Ministry of Water Resources
	√	7	Ms. Asma Shaheen	Deputy Secretary, MoEFCC
	√	8	Ms. Ishrat Reza	Deputy Secretary, Ministry of Agriculture
	√	9	Ms. Shamia Sharmin	Deputy Secretary, Power Division
√		10	Mr. S.M Shahidul Islam	Addl. DG (East Region), Bangladesh Water Development Road
√		11	Mr. Kazi Nazrul Islam	ADG(Fin), BWDB
√		12	Dr. Shamal Chandra Das	C.E.(Planning), BWDB
	√	13	Mr. Mohammad Akbar Hossain Patwary	Project Director (PD) / ACE, Matarbari Port Development Project, RHD
	√	14	Ms. Nahida	DPD, Matarbari Port Development Project
	√	15	Mr. Morimoto	Consultant, Matarbari Port Development Project
	√	16	Mr. Md. Abdus Sattar	PD, SCRDP, LGED
	√	17	Mr. Tushar Mohon Shadhu Khan	Addl. Chief Engineer (Planning), DPHE
	√	18	Mr. Saifur Rahman	Superintendent Engineer, Ground Water

Annex A

				Circle, DPHE
	√	19	Dr. Jaglul Hossain	Deputy Chief Conservator, Department of Forest
	√	20	Mr. Sajjad Hossain	Deputy Chief Engineer, Bangladesh Agricultural Development Cooperation (BADC)
	√	21	Mr. Badhan Kumar Sen	Promotion Officer, BSCIC
	√	22	Mr. Vinsnu Kumar Sarkar	Deputy Managing Director, CWASA
	√	23	Mr. Maksud Alam	Chief Engineer, CWASA
	√	24	Mr. Masud Iqbal Md. Shameem	Director (Environment clearance), Department of Environment
	√	25	Mr. Rezaul Karim	Chief Engineer, Distribution , Southern Zone, Bangladesh Power Development Board (BPDB)
	√	26	Mr. Samarukh Moutushi	Executive Engineer, BPDB
	√	27	Mr. Abul Kalam Azad	Executive Director (Project), Coal Power Generation Company Limited
	√	28	Mr. Shamsul Huda	Additional Chief Engineer, Barind Multipurpose Development Authority
√		29	Md. Abul Hashem	Senior Assistant Secretary Chattogram Development Authority
	√	30	Mr. Shinsuke Nagai	Senior Director, South Asia Division-4, JICA HQ
	√	31	Mr. Hiroshi Yoshida	Senior Deputy Director, South Asia Division-4, JICA HQ
	√	32	Mr. Shunsuke Nakamaru	Country Officer, South Asia Division-4, JICA HQ
	√	33	Ms. Ayane Tsukishima	Country Officer, South Asia Division-4, JICA HQ
√		34	Mr. Daisuke Ito	Representative, JICA Bangladesh Office
√		35	Mr. Md. Anisuzzaman	Senior Program Manager, JICA Bangladesh Office
	√	36	Mr. Fushimi Katsutoshi	JICA Advisor to DPHE
	√	37	Mr. Morimasa Tsuda	JICA Advisor to BWDB

Annex A

			JICA Survey Team (Consultants)	
√		38	Mr. Koji Kawamura	Team Leader/Water Supply Plan1
√		39	Mr. Tadahiro Fukuda	Water Resources Development/ River Management Facility Planning
√		40	Mr. Michio Ota	Organizational Structure and Legal System
√		41	Mr. Takenori Kono	Hydrology/Hydraulics/Climate Change
√		42	Mr. Md Fakhrul Abedin	Local Manager/Water Supply Plan
√		43	Mr. A.B.M. Sadiqur Rahman	Environmental and Social Considerations (Local)
	√	44	Mr. Md. Tanvir	Hydrology, Hydraulics & Water Quality (Local)
	√	45	Mr. Ashif Rahman Jane	Organizational and Legal System (Local)

JICA
Preparatory Survey for Southern Chattogram Region Water Supply Project

1st Sub Technical Working Group Meeting (River Intake/Water Demand)

Discussion Memo

DATE:	19 th October 2023	**TIME**:	2:00 PM
VENUE:	Conference Room, Bangladesh Water Development Board		
SUBJECTS:	1st Sub Technical Working Group Meeting (River Intake/Water Demand) on Basic Water Supply Plan in connection with "JICA Preparatory Survey for Southern Chattogram Region Water Supply Project"		

ATTENDEES:		Sl. No.	Name	Designation
In Person	Virtual			
√		1	AKM Tahmidul Islam, Chair	Additional Director General, Planning, Bangladesh Water Development Board (BWDB)
√		2	Dr. Shamal Chandra Das	Chief Engineer, Planning, Bangladesh Water Development Board (BWDB)
√		3	Saifur Rahman	Superintendent Engineer (Ground Water Circle), DPHE
√		4	Md. Mostafizur Rahman	Executive Engineer (Cox's bazar), DPHE
√		5	Md. Nurul Amin	Superintending Engineer, CWASA
√		6	Farhana Haque	Deputy Director, DAE
√		7	Dr.Md.Aminul Haque	Principal Scientific Officer, WARPO
√		8	Md. Nurul Islam	BADC
	√	9	Jatan Marma	Deputy Secretary, Ministry of Water Resources
	√	10	Md. Abdus Sattar	Project Director, SCRDP, LGED
	√	11	Md. Anwarul Amin	APD, Matarbari Port Development Project, RHD
	√	12	Md. Mahmud Alam	SE, CPGCBL
	√	13	Sabrin Chowdhury	Senior Assistant Secretary/Deputy Manager (Planning), BEZA
	√	14	Md.Shahadat	BEZA
	√	15	Md. Abdul Kader Goni	XEN, Coxbazar, BPDB
	√	16	Nur Nabi	AE, S&D, Chakaria, BPDB
√		17	Tsukishima Ayane	Country Officer, JICA/HQ
√		18	Md. Anisuzzaman Chowdhury	Sr. Programme Officer, JICA/BD
√		19	Koji Kawamura	Team Leader, JICA Survey Team

√		21	Taisuke Watanabe	Deputy Team Leader, JICA Survey Team
√		22	Tadahiro. Fukuda	Water Resource Expert, JICA Survey Team
√		23	Md Fakhrul Abedin	Local Manager/Water Supply Plan Expert, JICA Survey Team
√		24	A.B.M. Sadiqur Rahman	Sr. Water and Environmental Engineer, Nippon Koei Bangladesh
√		25	Ashif Rahman Jane	Legal and Organization Expert (Local)

No.	Issues/Topics	Summary of Discussion
1	Introduction from BWDB	BWDB CE planning Dr. Shamal Chandra Das started the program with a short overview of the project. He mentioned that multiple organizations are involved in this project and the main objective is to establish a functional water sourcing in the southern Chattogram region, especially in the Chakaria and Moheshkhali Upozillas of Cox's Bazar District.
2	Introduction of the project by JICA Country Officer	Country officer Japan International Cooperation Agency (JICA) Headquarters in charge of this Preparatory Survey provided a brief overview of the project and outlined the responsibility of Sub Technical Working Group (Sub-TWG). She pointed out that some key elements of this Sub-TWG discussion are the target year for the water supply plan, the area that will receive the water, and the amount of water that can be supplied by this project. She also explained that the Basic Water Supply Plan will lead up to the Basic Water Intake Plan, which also needs to be agreed by November to allow the JICA Survey Team to work on to basic design of the project during the election period.
3	Presentation by JICA Survey Team	Mr. Watanabe, Deputy Team Leader, presented the project description along with the basic plan for water supply. The target water supply areas and their water demands were also presented.
4	Estimate of Project Cost	The Department of Public Health Engineering (DPHE)

		inquired about the project cost, with a specific focus on ascertaining whether the costs related to land acquisition, taxes, value-added tax (VAT), overhead cost and miscellaneous expenses were factored into the project budget. The JICA Survey Team (the Survey Team) clarified that the provided cost estimate exclusively pertained to the essential components. It is important to note that the estimate solely covers construction-related costs, encompassing the intake facilities, raw water reservoir and transmission pipeline along with a water treatment plant (WTP) and distribution reservoirs, and does not encompass costs associated with taxes, VAT, land acquisition and other miscellaneous costs.
5	Industrial & Domestic Water:	The Chattogram Water Supply and Sewerage Authority (CWASA) sought a comprehensive elucidation of the distinctions between domestic and industrial water, along with a detailed insight into the treatment and calculation procedures for water intake, WTP and transmission pipelines. In response, the Survey Team provided the following clarifications. • At this stage, it is assumed that industrial water will be treated by sedimentation process and domestic water will be treated by filtration process. A decision on these policies will be made after confirmation of treatment method of other industrial areas established by BEZA. • The calculation of water demand was initially based on the allocation of industrial zones within the EZ area as designated by BEZA. This allocation was subsequently multiplied by the consumption rates applicable to various portions within the EZ.
6	Data Source and Source of Water	BEZA sought information regarding the sources of data used to estimate the demand for industrial water, as well as the origin of the water to be connected to the water treatment plant. In response to these inquiries, the Survey Team provided the following details. • The data concerning the development area forecast have been sourced from the report on the comprehensive feasibility study for the Moheshkhali

		Economic Zone (Dhalghata) in the year 2022. • The water supply source has been designated as the Matamuhuri River, located upstream of Chakaria. Furthermore, a water reservoir facility is planned in Palakata, of which the water will be transported to some areas of Chakaria & Moheshkhali Upozillas via pipelines for distribution after treatment.
7	CWASA & DPHE suggestions	CWASA and DPHE have made three noteworthy recommendations to the Survey Team, which should be taken into careful consideration. • The Survey Team is advised to include an assessment of seawater salinity levels and the potential impact of sea level rising in their evaluation. This consideration is crucial to ensure the long-term sustainability of the project, especially given to its proximity of the coastal area. • Additionally, the conditions of the existing Palakata rubber gate constructed by BWDB downstream of Chakaria need attention. It is imperative to monitor the effectiveness and maintenance of this rubber gate, as its proper functioning directly affects the water supply in the area. Ensuring the continued performance of the rubber gate is vital for maintaining a reliable water supply. • The land acquisition process of the reservoir in Palakata and a resettlement plan are considered to be notably included in the project time.
8	Concluding remarks by the Chair	The chair of the meeting gave thanks to the Survey Team for the nice presentation. He said that “several critical issues have been discussed during this meeting, which will greatly enhance the project design. The initial design input has been valuable, and this first meeting has been productive. Our second meeting is scheduled for the coming November, during which we anticipate more technical and detailed aspects.”

JICA Preparatory Survey for
Southern Chattogram Region Water Supply Project

2nd Sub Technical Working Group Meeting
Discussion Memo

DATE:		06/11/2023		**TIME**:	2:45 PM
VENUE:		Conference Room, Bangladesh Water Development Board			
SUBJECTS:		2nd Sub Technical Working Group Meeting on "River Water Intake Basic Plan"			
ATTENDEES:		Sl. No.	Name	Designation	
In Person	Virtual				
√		1	S.M Shahidul Islam	Director General, Bangladesh Water Development Board (BWDB)	
√		2	AKM Tahmidul Islam, Chair	Additional Director General, Planning, Bangladesh Water Development Board (BWDB)	
√		3	Dr. Shamal Chandra Das	Chief Engineer, Planning, Bangladesh Water Development Board (BWDB)	
√		4	Md.Enayet Ullah	Chief Engineer, Design, Bangladesh Water Development Board (BWDB)	
√		5	Tasnia Haque	Executive Engineer, Bangladesh Water Development Board (BWDB)	
	√	6	Md. Mostafizur Rahman	Executive Engineer (Coxbazar), DPHE	
√		7	Dr.Md.Aminul Haque	Principal Scientific Officer, WARPO	
	√	8	Md. Nurul Islam	BADC	
	√	9	Mr. Jatan Marma	Deputy Secretary, Ministry of Water Resources	
	√	11	Md. Anwarul Amin	APD, Matarbari Port Development Project, RHD	
	√	12	Md. Mahmud Alam	SE, CPGCBL	
	√	13	Nur Nabi	AE, S&D, Chakaria, BPDB	
√		14	Tsukishima Ayane	Country Officer, JICA HQ	
√		15	Md. Anisuzzaman Chowdhury	Sr. Programme Officer, JICA Bangladesh Office	
√		16	Mr. Koji Kawamura	Team Leader, JICA Survey Team	
	√	17	Mr. Taisuke Watanabe	Deputy Team Leader, JICA Survey Team	
√		18	Mr. T. Fukuda	Water Resource Expert, JICA Survey	

				Team
√		19	Mr. Motokazu Ishikawas	Water Intake Facility & Reservoir Planning/Design
	√	20	Mr.Takanori Kono	Hydrologist
√		21	Mr. Md Fakhrul Abedin	Local Manager/Water Supply Plan Expert, JICA Survey Team
	√	22	Mr. A.B.M. Sadiqur Rahman	Sr. Water and Environmental Engineer, Nippon Koei Bangladesh
√		23	Mr.Ashif Rahman Jane	Legal and Organization Expert (Local)
√		24	SK Golam Quader	Water Supply Facility Design Expert
√		25	Mr. Md. Tanvir Mahtab Fahim	Jr. Environmental Engineer, Engineer, Nippon Koei Bangladesh
√		26	Rubiya Sayed	Secretary

No.	Issues/Topics	Summary of Discussion
1	**Opening Remarks by BWDB**	The meeting was initiated by BWDB CE planning Dr. Shamal Chandra Das with a brief project overview. He emphasized the significance of the Matarbari area as a pivotal hub, where numerous development projects, including Matarbari Deep Sea Port and power plants, are currently under way. This area faces a critical demand for both industrial and domestic water supply. To address this pressing need, JICA conducted a data collection survey in 2019 and subsequently commenced the preparatory survey, a crucial step in formulating the Development Project Proposal (DPP).
2	**Remarks by JICA Headquarters**	A country officer from Japan International Cooperation Agency (JICA) Headquarters, in charge of the preparatory survey, delivered a concise overview and delineated the principal objective of the 2nd Sub-Technical Working Group (STWG) meeting. She underscored that crucial components to be addressed in the STWG meeting include the foundational water intake plan along with a location of intake

		point with its major infrastructure. She further informed in the meeting the time of initial design phase of the project.
3	**Presentation by JICA Survey Team**	Messrs. T.Fukuda, T.Kono, and M.Ishikawa delivered a comprehensive presentation encompassing the basic river water intake plan, fundamental site conditions, the design of intake structures, and the plan for the raw water reservoir area.
4	**Domestic Water Supply**	Regarding the provision of domestic water supply, the Bangladesh Water Development Board (BWDB) inquired about the integration of domestic water supply with industrial water supply. The JICA Survey Team (the Survey Team) clarified that the population density in Chakaria will substantially increase once the industrial area becomes fully operational in Matarbari and Mohakhali areas. Furthermore, the Department of Public Health Engineering (DPHE) and the Local Government Division have formally requested JICA to incorporate domestic water supply provisions in the Chakaria area. The Survey Team stated that it was worth noting that during the data collection survey in 2019, JICA had identified a pressing need for domestic water supply in both the Chakaria and Moheshkhali regions.
5	**Available water quantity and demand analysis**	Inquiries were made by BWDB regarding the availability of comprehensive water quantity and demand analysis while selecting the most suitable intake site location. The Survey Team responded that they have relied on the findings of prior surveys to conduct the water demand analysis and have duly taken these considerations into account when formulating the intake plan layout and determining the maximum discharge capacity.
6	**Water intake sites**	
	BWDB Comments	JICA Survey Team Answers

	BWDB has expressed concerns about the potential for sediment deposition in the river if there is a regulator in the main river. They have requested a detailed analysis to assess the extent and severity of this issue. Additionally, they have recommended the implementation of a maintenance program to mitigate the effects of sedimentation and maintain the desired water level and flow characteristics of the river.	The Survey Team will give due consideration to the sedimentation issue and will undertake a detailed analysis to finalize the intake point location.
	A multi-criteria analysis is required to evaluate the proposed sites within the Option 4 (4a, 4b, 4c and 4d) as presented in the Survey Team's presentation. This analysis should assign appropriate weightage to each criterion to identify the most suitable option.	The Survey Team will perform the analysis.
	Engaging in stakeholder consultation is crucial for the selection of land acquisition and intake point locations.	The Survey Team will initiate the first stakeholder consultation regarding land acquisition and other relevant aspects once the project layout is finalized.
	The Survey Team should proactively share the layout plans and proposals with local-level BWDB representatives, considering their valuable input and consent are essential for finalizing the intake point location. To further facilitate collaboration and ensure the alignment, a joint field visit involving team members from both JICA and BWDB can be arranged if deemed necessary.	The Survey Team concurs with this proposal and will promptly disseminate the alternative layout plans to relevant local field officers for their thorough review and input.
	With respect to the Sub-TWG	The Survey Team requested the assistance of

	meeting and field visit, Dr. Shamal Chandra Das (BWDB) will serve as the focal person. He will coordinate and assign the appropriate personnel to ensure the necessary cooperation and support.	relevant stakeholders so as to facilitate coordination with BWDB team members and other stakeholders
	BWDB also suggests getting data from the "NODI" project to finalize the location layout.	The Survey Team confirms that they have already taken several kinds of information from the "Nodi" Project.
7	**Water intake structure**	
	BWDB Comments	JICA Survey Team Answers
	BWDB does not recommend constructing an intake weir structure on the Matamuhuri River. Instead, they propose utilizing water pumps to extract water from the river. The construction of a weir structure at the river's intake point poses several potential issues, including: • Sediment deposition in the upstream area of the Matamuhuri River, which could obstruct the river natural flow and eventually lead to the river demise. • Inability to maintain consistent downstream water level if any weir structure is installed.	The Survey Team noted the major issues concerning the intake weir structure. The issues are as stated below. • Upstream sediment deposition is the main problem. And • A maintenance program must be needed to solve the issue.
	Considering the proposed alternative of utilizing pumps at an intake point instead of an intake weir structure, the BWDB senior officials have suggested the following criteria: • During the monsoon season, the excess water can be pumped and	The Survey Team expresses its concern about the proposed use of pumps as the water level in the Matamuhuri River fluctuates throughout the year. During the dry season, the water level may drop significantly, making it challenging to extract sufficient water using pumps alone. Considering these concerns, the Survey Team

	stored in a reservoir. However, to ensure an adequate storage capacity, a thorough analysis of the reservoir volume is required. • To accommodate varying water levels during the wet and dry seasons, the installation of dual lifting pump system is recommended. • To utilize high-lift pumps as they are commonly employed in Bangladesh for water extraction purposes.	favors the construction of an intake weir structure to ensure continuous and reliable water supply from the Matamuhuri River. The intake structure would provide a more consistent and dependable source of water, even during the periods of low river water levels.
8	**RAW water reservoir**	BWDB is concerned about the storage capacity of the two reservoirs (the north and south), particularly whether the north reservoir is larger than the southern one. The Survey Team informs that the capacities of both the reservoirs are almost the same.
9	**Suggestion from Md. Mostafizur Rahman EE, Coxs bazar, DPHE (online platform)**	The river-bank protection work from the distance of the Chattogram-Cox's Bazar bypass road should be extended as the intake point location lies within that area.
10	**Concluding remarks by the Chair**	The meeting chairperson expressed gratitude to the Survey Team for delivering an insightful presentation. He remarked "Several critical issues have been thoroughly discussed during this meeting, which will significantly contribute to the project design. The initial design input has been invaluable, and this second meeting has proven to be highly productive."

JICA
Preparatory Survey for Southern Chattogram Region Water Supply Project
2nd Technical Working Group Meeting
Discussion Memo (Draft)

				Prepared by:	JICA Survey Team
DATE:		29/02/2024		**TIME**:	2:00 PM
VENUE:		Conference Room, Ministry of Water Resources			
SUBJECTS:		2nd Technical Working Group Meeting for Explanation and Discussion of Draft Interim Report			
ATTENDEES:		Sl. No.	Name	Designation	
In Person	Virtual				
√		1	Nazmul Ahsan	Secretary, Ministry of Water Resources	
√		2	Dr. Malay Choudhury	Additional Secretary, Local Government Division	
√		3	AKM Tahmidul Islam	Additional Director General, Planning, Bangladesh Water Development Board (BWDB)	
√		4	Mohammad Lutfur Rahman	Joint Secretary, Ministry of Water Resources	
√		5	Dr. Shamal Chandra Das	Chief Engineer, Planning, Bangladesh Water Development Board (BWDB)	
√		6	Md.Abdul Basit	Chief Engineer, Design, Bangladesh Water Development Board (BWDB)	
√		7	Jatan Marma	Deputy Secretary, Ministry of Water Resources	
√		8	Dr.Robin Kumar Biswas	Superintending Engineer, BWDB	
√		9	Md. Saifur Rahman	Superintending Engineer, DPHE	
	√	10	Jibon Kumar Sarkar	C.E.(Hydrology), BWDB	
	√	11	Md. Manzurul	Director, Prime Minister Office	
	√	12	Md.Akbor Hossain Patwari	PD, Matarbari Port Development Project, RHD	
	√	13	Md. Maksud Alam	Chief Engineer, CWASA	
	√	14	Md Nasir Uddin	Additional Director, DAE	

	√	15	Md. Mahmud Alam	SE, CPGCBL
√		16	Ms Miura Mari	Senior Representative, JICA Bangladesh Office
√		17	Ms Tsukishima Ayane	Country Officer, JICA HQ
√		18	Md. Anisuzzaman Chowdhury	Sr. Programme Officer, JICA Bangladesh Office
√		19	Mr. Koji Kawamura	Team Leader, JICA Survey Team
√		20	Mr. Taisuke Watanabe	Deputy Team Leader, JICA Survey Team
√		21	Mr. T. Fukuda	Water Resource Expert, JICA Survey Team
√		22	Yukako Tanaka	Pipeline Facility Planning/Design,JICA Survey Team
√		23	Risa Watanabe	Economic & Financial Expert,JICA Survey Team
√		24	Yasuhiro Takaoka	Construction and Procurement Planning/Design Expert, JICA Survey Team
√		25	Nyandaro Jonathan Mteki	Environmental and Social Consideration (Social Consi.1), JICA Survey Team
√		26	Shinji Tanaka	GM, Nippon Koei Bangladesh
	√	27	Mr.Ota	JICA Survey Team
√		28	Mr. Md Fakhrul Abedin	Local Manager/Water Supply Plan Expert, JICA Survey Team
√		29	Mr. A.B.M. Sadiqur Rahman	Sr. Water and Environmental Engineer, Nippon Koei Bangladesh
		30	Jati Das Kundu	JICA Survey Team
√		31	Ashif Rahman Jane	Sr. Civil Engineer, Nippon Koei Bangladesh

No.	Issues/Topics	Summary of Discussion
1	Welcome Speech	The Ministry of Water Resources program commences with a welcoming address by its official. Following this, Mr. Nazmul Ahsan, the

		Secretary of Water Resources, extends a warm welcome to all attendees, both physically and virtually, at the 2nd Technical Working Group Meeting. He urges personnel from relevant departments to share their valuable opinions and actively participate in the discussions. Additionally, he requests JICA Survey Team to take note of all suggestions/comments provided by participants from various organizations.
2	Presentation	In the meeting, Mr. Kawamura, Mr. Watanabe, Mr. Fukuda, Mr. Ota, and Ms. Tanaka delivered a comprehensive presentation, offering a detailed overview of the interim draft report. The presentation encompassed a broad spectrum of elements, including the project overview, the basic water supply plan, an analysis of natural conditions, details about project implementation, the operation and maintenance system, and the proposed work schedule for the upcoming stage. Furthermore, a succinct summary of the data gathered during the survey was also provided.
3	Open discussion	Upon concluding the presentation, Mr. Secretary extended his gratitude to the JICA Survey Team for their excellent presentation. He then excused himself from the meeting to attend another emergency session, handing over the meeting chair responsibilities to Dr. Malay Choudhury, the Additional Secretary of LGD.
4	Opinion from DPHE	Mr. Saiful, Superintendent Engineer from DPHE, shared his perspective on the project implementation structure. He emphasized that there are no legal constraints necessitating the execution of the entire project under a single ministry or authority, such as MoWR & LGD. If

		the government grants authorization to a specific authority, they can independently carry out the project. However, Mr. Saiful acknowledged that DPHE currently faces a manpower shortage in the Coxbazar area, but they are committed to gradual improvement. He also highlighted that DPHE is presently engaged in extracting water from the river and distributing it, demonstrating their capability to manage water supply projects of a similar nature.
5	Query from CWASA	CWASA raised concerns about the sustainability of the water reservoir and its ability to retain water during the dry season. Additionally, they questioned why the NAF River was not taken into consideration for the project. In response to these inquiries, the Team Leader explained that the survey results indicated that the water from the Naf River is saline and, therefore, not suitable for use. Furthermore, it was clarified that the reservoir facility is designed to be sustainable even during the dry season and other sustainability issues
6	Project Implementation and Operation & Maintenance System	The Additional Secretary of LGD is seeking opinions on the Project Implementation and Operation & Maintenance System. In response, DPHE and BWDB have conveyed that they will internally deliberate on this matter, and the ministry will subsequently decide on the organizational functions related to it.
7	BWDB opinion	BWDB's perspective includes the preparation of a single Development Project Proposal (DPP) by LGD. Given their expertise in river protection along with Raw Water Reservoir and intake facility related to water supply project, BWDB aims to be involved in these aspects within the framework of a unified DPP. The final determination of BWDB's role will be made by MoWR. Furthermore, BWDB

		expresses its commitment to providing any necessary technical support during this period.
8	Maintenance of river and reservoir	Considering the matter of river and reservoir maintenance, BWDB has highlighted a shortage of funds in their Operation and Maintenance (O&M) budget. They suggest that, if necessary, there should be an allocation of additional funds specifically for this purpose.
9	Water Demand Analysis Report	The Joint Secretary has inquired about the water demand analysis report. In response, Ms. Tsukishima from JICA HQ has clarified that the scope of this project is limited to the water supply and demand analysis of specific MIDI areas. Other households and industries fall under the purview of the MIDI masterplan project, not the current project (SCRWSP) analysis. The analysis conducted by the JICA survey team indicates a projected demand of 176 MLD by the year 2041. Future development in this area is not comprehensively covered under this project.
10	The Joint Secretary's viewpoint	✓ In the survey, all forthcoming projects within the economic zone under the MIDI area should be foreseen to the greatest extent possible. ✓ Given the ongoing MIDI program, the survey report should comprehensively incorporate information about future projects within the MIDI area.
11	Evaporation Loss	DPHE inquired whether the survey team took into account evaporation loss and evapotranspiration loss in calculating reservoir water volume and the duration of service for both dry and rainy seasons. In response, the survey team clarified that a loss factor has been factored in to address evaporation loss when determining reservoir water volume and operational days.

12	Beneficiary list of Matamuhuri river	In response to CWASA's inquiry regarding the beneficiary list of Matamuhuri River and the number of stakeholders withdrawing water both presently and, in the future, the survey team leader stated that the survey considered various water users, including irrigation and environmental concerns. The team conducted a water balance analysis to determine the water reservoir capacity, possible maximum water extraction from Matamuhuri river keeping into consideration E-flow and these findings will be detailed in the upcoming report.
13	Opinion From Prime Minister Office	From the Prime Minister's Office, Md. Manzurul has sought several clarifications regarding the overall study. He has requested a copy of the presentation for review. Additionally, he has raised concerns, shared with other stakeholders, about the potential challenges in meeting the increasing demand solely through the withdrawal of water from Matamuhuri River. Expressing apprehension about the smoothness of water withdrawal during the monsoon period, he highlights the expected surge in turbidity, posing difficulties in treatment. As a proposed solution, he suggests exploring the introduction of a saline water treatment process, deeming it potentially effective in addressing the challenges faced during the monsoon season.
14	Concluding Meeting	Ms. Tsukishima from JICA HQ expressed that LGD might be able to be the owner of the project but MoWR is to be also involved. Government should decide the responsible agency for water tariff collection and O&M. Ms. Miura Mari, Sr. Representative, JICA Bangladesh expressed her gratitude to all participants for their engagement in the meeting

		and for sharing their views. She conveyed that the JICA team would await feedback following their reviews and subsequent internal discussions among ministries and departments. She expressed that the project is technically challenging having different components which has expertise with difference departments. She hopes the project will achieve it goals successfully overcoming all the hurdles.
10	Concluding remarks by the Chair	The meeting chairperson expressed gratitude to the survey team for delivering an insightful presentation. He gave thanks to all participants for their active participation.

JICA Preparatory Survey for Southern Chattogram Region Water Supply Project
Final TWG Meeting at MoWR
Discussion Memo

		Prepared by:	Ashif
DATE:	23/09/2024 (Mon)	**TIME**:	10:00-12:00 AM
VENUE:	Conference Room, Ministry of Water Resources (Room no-406, Building No-6, 4th Floor), Bangladesh Secretariat, Dhaka		
SUBJECTS:	Final Technical Working Group Meeting		

ATTENDEES:		Sl. No.	Name	Designation
In Person	Virtual			
√		1	Dr. A.N.M. Bazlur Rashid	Additional Secretary, Ministry of Water Resources
√		2	Mohammad Lutfur Rahman	Director General, Water Resource Planning Organization & joint Secretary, Ministry of Water Resource.
√		3	Dr. Md. Manzurul Islam	Director-1(Joint Secretary), Chief Adviser's Office
√		4	Md. Habibur Rahman	Joint Secretary (Planning Wing), Ministry of Water Resources
√		5	Md. Jahir Uddin Dewan	Additional Chief Engineer, DPHE
√		6	Jatan Marma	Deputy Secretary, Ministry of Water Resources
√		7	Farhana Karim	Deputy Secretary (Planning-1 Branch), Ministry of Water Resources
√		8	Dr. Robin Kumar Biswas	Superintending Engineer, BWDB
	√	9	Md. Zohirul Islam	Additional Director General (Planning, Design & Research), BWDB
	√	10	Md. Saifur Rahman	Superintending Engineer, DPHE
	√	11	Md. Nurul Amin	Superintending Engineer, CWASA
	√	12	Md. Alamgir	Principle Scientific Officer, WARPO
	√	13	Asfia Sultana	Deputy secretary, Director (Planning-6), BEZA
√		14	Tsukishima Ayane	Country Officer, JICA HQ
√		15	Hideki Osawa	Representative, JICA Bangladesh

√		16	Shinichi Wada	Sr. Deputy Director, JICA HQ
√		17	Hideo Omagari	Sr. Deputy Director, JICA HQ
√		18	Md. Anisuzzaman Chowdhury	Sr. Programme Officer, JICA Bangladesh Office
√		19	Koji Kawamura	Team Leader, JICA Survey Team
√		20	Taisuke Watanabe	Deputy Team Leader, JICA Survey Team
	√	21	Tadahiro Fukuda	Water Resource Expert, JICA Survey Team
	√	22	Risa Watanabe	Economic & Financial Expert, JICA Survey Team
	√	23	Yukako Tanaka	Pipeline Facility Planning/Design
√		24	Yasuhiro Takaoka	Construction and Procurement Planning/Design Expert, JICA Survey Team
√		25	Masahide Suzuki	Mechanical and Electrical Equipment Planning
√		26	Nyandaro Jonathan Mteki	Environmental and Social Consideration (Social Consi.1), JICA Survey Team
√		27	Michio Ota	Organization Expert, JICA Survey Team
		28	Toshihiko Tamama	O & M Planning, JICA Survey Team
√		29	Md Fakhrul Abedin	Local Manager/Water Supply Plan Expert, JICA Survey Team
√		30	A.B.M. Sadiqur Rahman	Sr. Water and Environmental Engineer, Nippon Koei Bangladesh
√		31	Jati Das Kundu	JICA Survey Team
√		32	Ashif Rahman Jane	Sr. Civil Engineer, Nippon Koei Bangladesh

No.	Issues/Topics	Summary of Discussion
1	Welcome Speech	The Ministry of Water Resources (MoWR) program commenced with a welcoming address by its personnel. Following this, Dr. A.N.M. Bazlur Rashid, the Additional

		Secretary of MoWR, extended a warm welcome to all attendees, both physically and virtually, at the final Technical Working Group (TWG) meeting. He urged personnel from relevant departments to share their valuable opinions and actively participate in the discussions. Additionally, he requested JICA to take note of all suggestions provided by participants from various organizations.
2	Remarks by Ms. Ayane Tsukishima, South Asia Department, JICA HQ	Ms. Ayane Tsukishima, South Asia Department, JICA Headquarters, provided a brief overview of the project and noted that the target date for the JICA loan agreement is March 2025. She also requested that the relevant personnel ensure the signing of the Minutes of Discussion of the Fact-Finding Mission by October 3, 2024.
3	Presentation	During the meeting, the JICA Survey Team (JST), comprising Mr. Kawamura, Mr. Watanabe, Mr. Takaoka, Mr. Suzuki, Mr. Fukuda, Mr. Tamama, Ms. Nyandaro, and Ms. Kikuchi, delivered a thorough presentation on the Draft Final Report (DFR) of the project. Their presentation covered a wide range of topics, including an overview of the project, preliminary design, construction plan/cost estimate, institutional framework for implementing agencies, and environmental/social considerations, including EIA, land acquisition/resettlement issues.
4	Open discussion	Upon concluding the presentation, the Additional Secretary expressed his sincere gratitude to the JST for their excellent presentation. He then invited all attendees to share their opinions and feedback.
5	Query from CWASA	Mr. Nurul Amin from CWASA inquired about the type of water treatment process planned for industrial water. Additionally, he asked whether the JST is considering the DMA (District Metered Area) concept for the water supply system. In response, Mr. Watanabe clarified that the coagulation-flocculation, sedimentation and rapid filtration treatment process will be applied for both domestic and industrial water,

		and the DMA system will indeed be implemented for the supply system. He continued that Bangladesh drinking water standards will be applied to both domestic and industrial water.
6	Opinion from BWDB	Dr. Robin, the Superintending Engineer from BWDB, shared his thoughts on the project's organizational structure. He expressed concern that appointing the ADG as the Project Director (PD) could create administrative challenges. Instead, he recommended that the Additional Chief Engineer of Chittagong serve as the PD. He also suggested establishing a Project Coordinator in Dhaka to maintain coordination with the Dhaka office. In response to Dr. Robin's query, Dr. Bazlur Rashid, the chair of the TWG meeting, proposed that the Additional Chief Engineer of Chittagong be appointed as the PD. For site administration and the tendering process, he suggested that the Additional Chief Engineer take the lead, as this arrangement could help resolve potential administrative issues. Secondly, he noted that the items in the contract package were not clearly detailed. He suggested that the package items should be presented more comprehensively. Additionally, before submitting the final report, he recommended that a draft version be submitted to BWDB for their review. Thirdly, he highlighted the issue of finding a dumping site for the large volume of spoiled sand. He emphasized that if BWDB is the implementing agency for this work, managing the disposal of these materials would be very challenging. He urged the JST to carefully consider this problem during the survey phase. Fourthly, he suggested that the JST should incorporate a disaster management plan, particularly for the raw water reservoir area. Dr. Robin also pointed out that the JST should provide the total length of the bank protection area to the BWDB design team. This would allow the BWDB design team to review and provide their feedback on the bank protection plan. Dr. Robin highlighted that a large quantity of spoiled material

		and sediment will need to be regularly disposed of, particularly in the raw water reservoir and intake areas. He emphasized that BWDB does not have the capacity to manage or dispose of this volume of materials on a regular basis.
7	Query from Ministry of Water Resources	Mr. Jatan Marma from the MoWR raised concerns about the potential impact on the upstream communities along the Matamuhuri River. In response, Ms. Nyandaro and Mr. Sadiq explained that the water for the project will be drawn from the Matamuhuri River only during the rainy season, primarily from the river water which exceeds the environmental flow (in other words, river maintenance flow). As such, the upstream communities will not be affected by the project.
8	Query from Chief Advisors Office	Mr. Manzurul from the Chief Advisor's office requested that the draft final report be circulated among all stakeholders for their review. He also suggested to include justification in the draft final report as to why surface water treatment will be adapted instead of seawater desalination.
9	Opinion from DG of WARPO	The Joint Secretary (Director General of WARPO) of MoWR has shared several key points for consideration. First, he emphasized that the draft final report should be circulated to all relevant stakeholders for their review and feedback. Second, he highlighted that the project implementation must align with the National Water Management Plan of 2001, the Water Act of 2013, and the Water Rules of 2018. Additionally, he noted that for DPP approval, the concerned authority must obtain a Project Clearance Certificate from WARPO and an Environmental Clearance Certificate from the Department of Environment (DOE). Lastly, he expressed concern over the proposed 9-year implementation timeline for the project, stating that it is excessively long, and urged the JST to reconsider this duration.
10	DPHE Query	The Additional Chief Engineer and Superintendent Engineer of the Department of Public Health Engineering (DPHE) raised the following questions to the JST: 1. The DPHE inquired whether the economist had consulted

		with the Bangladesh Economic Zones Authority (BEZA) regarding the proposed water rate. 2. They also questioned whether the reservoir volume is adequate to ensure a continuous water supply for 180 days. 3. The Superintendent Engineer of DPHE asked what percentage of water the project plans to withdraw from the river, emphasizing that this is a transboundary river. Therefore, the water withdrawal must be calculated thoroughly, in coordination with the Bangladesh Water Development Board (BWDB). 4. He expressed concern about whether it is feasible to fill the reservoir during the monsoon season. According to the plan, the water transmission rate is 1.9 m^3/s, which would require more than four months to fill the reservoir. 5. Finally, he asked whether the resettlement costs are included in the land acquisition costs. He also asked whether the dumping site land acquisition cost is included or not. Ms. Nyandaro responded that the resettlement costs are indeed included in the land acquisition expenses except dumping site.
11	The Additional Secretary (MoWR)'s viewpoint	He expressed his concern whether the BWDB has sufficient manpower to manage and maintain the project over time, since it is a long-term project. He also mentioned that the asset wil be handed over from BWDB to DPHE.
12	Concluding Meeting	Ms. Tsukishima (JICA Headquarters) expressed her gratitude to all participants for their active engagement in the meeting and for sharing their valuable insights. She assured that the JST will remain for several more days to address all questions and concerns raised during the meeting, as well as any arising from subsequent internal discussions with ministries and departments.
13	Concluding remarks by the Chair	The meeting chairperson expressed gratitude to the JST for delivering an insightful presentation.