

**REPUBLIC OF INDIA
GOVERNMENT OF JHARKHAND,
DEPARTMENT OF DRINKING WATER AND SANITATION
RANCHI MUNICIPAL CORPORATION**

**PREPARATORY SURVEY ON
RANCHI SEWERAGE PROJECT**

**FINAL REPORT
(DRAWINGS FOR ZONE II)**

September 2014

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.

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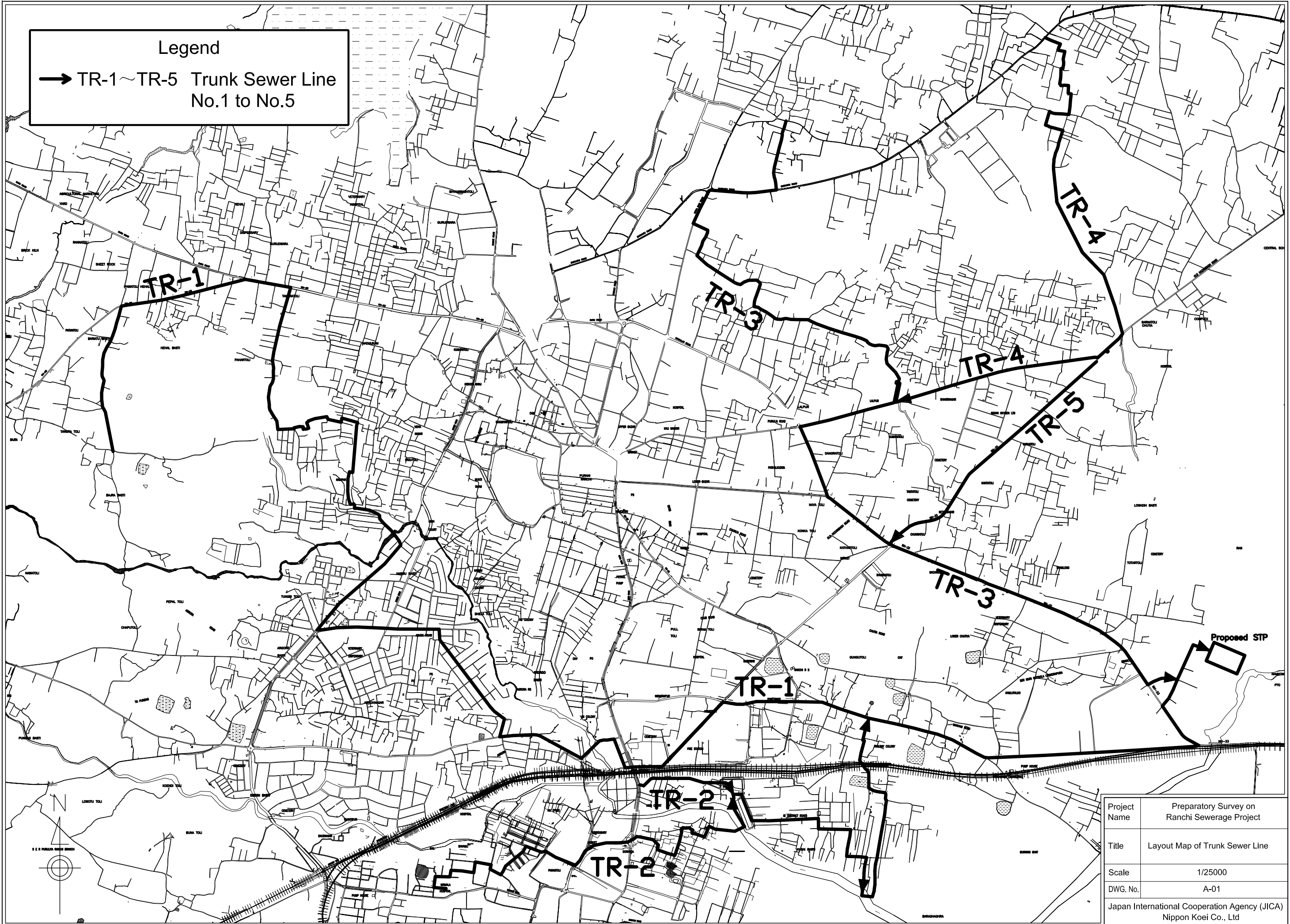
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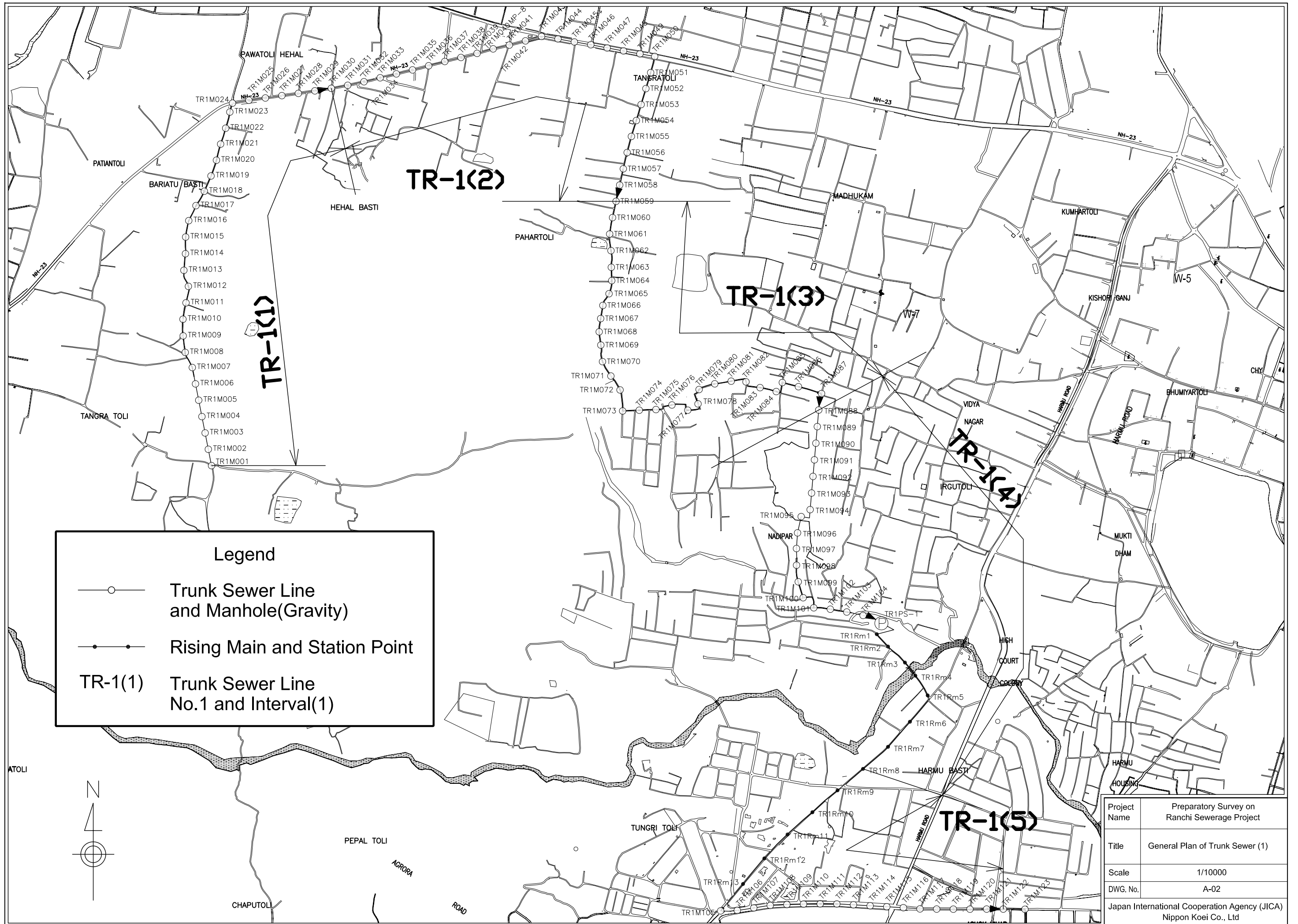
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Legend
 → TR-1 ~ TR-5 Trunk Sewer Line
 No.1 to No.5

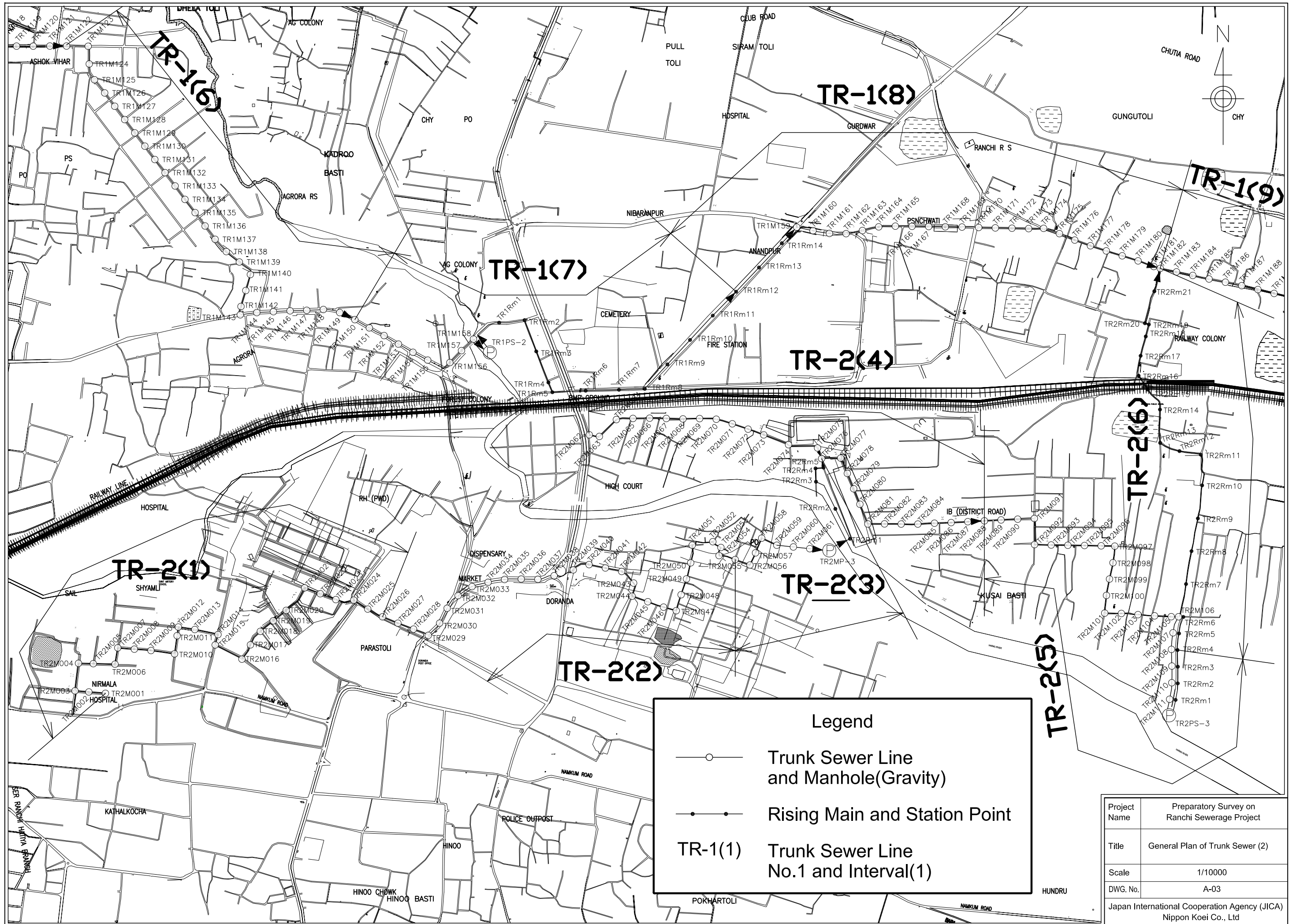




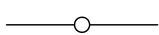
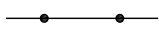
Legend

- — Trunk Sewer Line and Manhole(Gravity)
- — Rising Main and Station Point
- TR-1(1) Trunk Sewer Line No.1 and Interval(1)

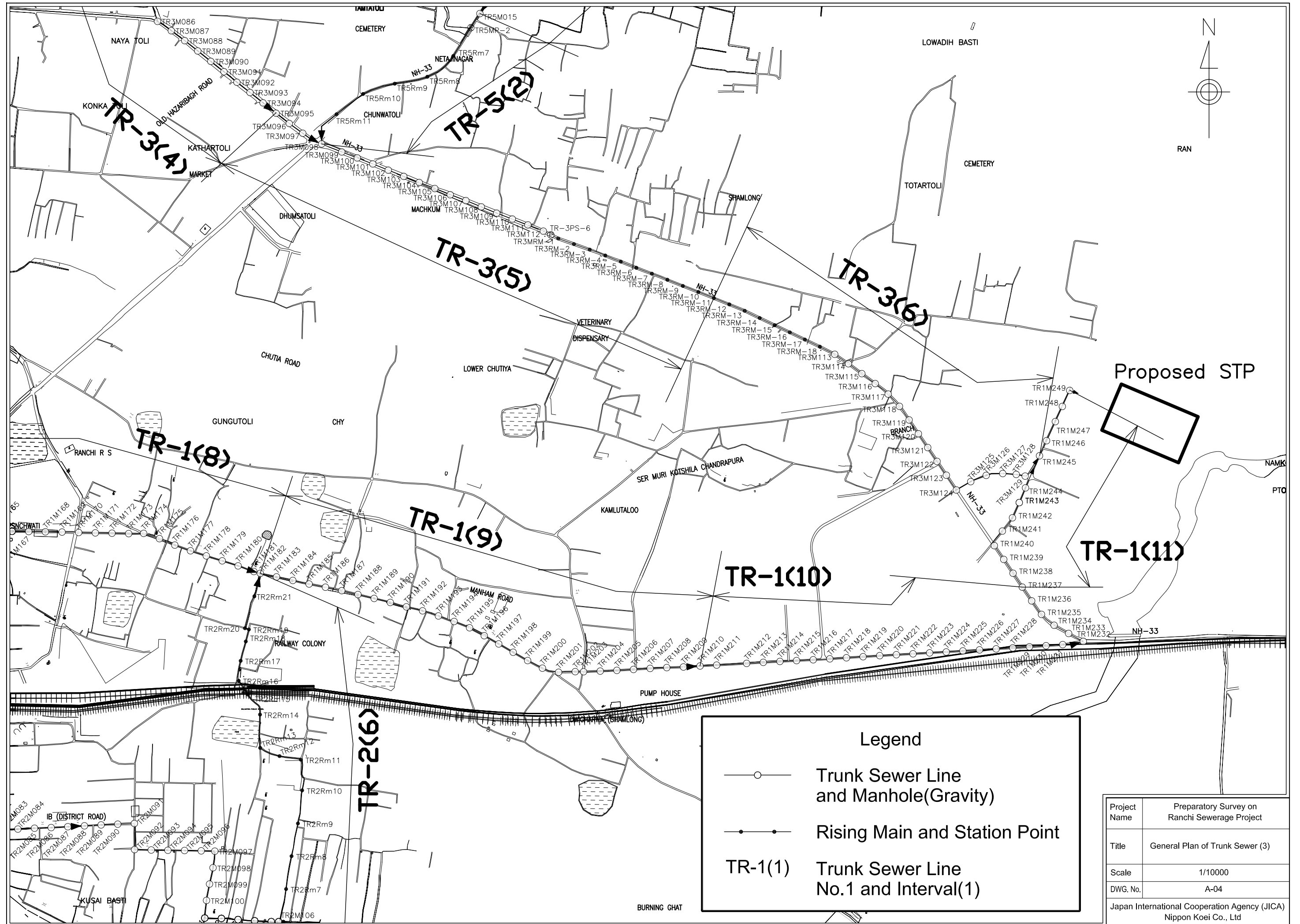
Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	General Plan of Trunk Sewer (1)
Scale	1/10000
DWG. No.	A-02
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	



Legend

-  Trunk Sewer Line and Manhole(Gravity)
-  Rising Main and Station Point
- TR-1(1)** Trunk Sewer Line No.1 and Interval(1)

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	General Plan of Trunk Sewer (2)
Scale	1/10000
DWG. No.	A-03
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	



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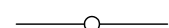

Proposed STP

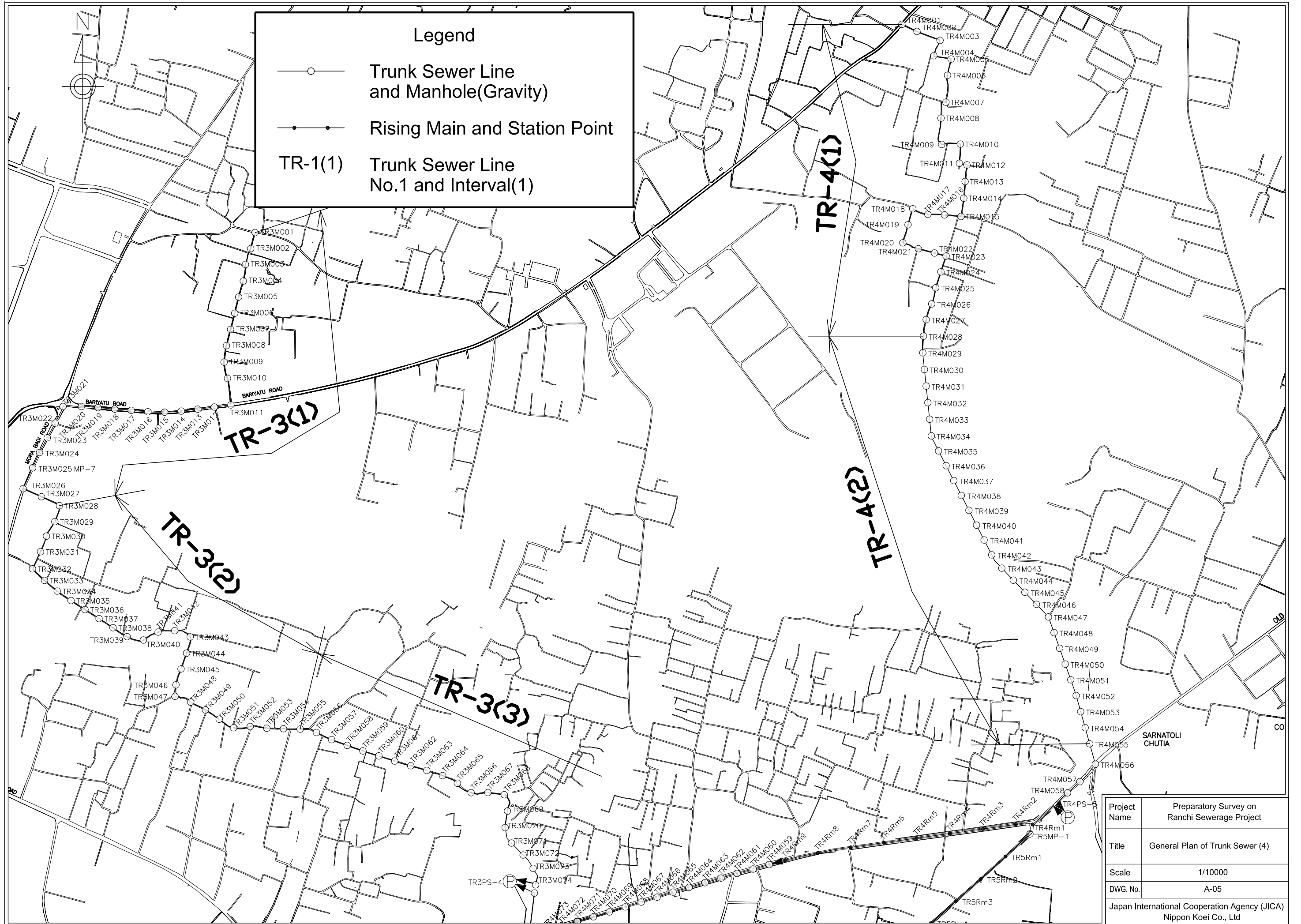
Legend

- Trunk Sewer Line and Manhole(Gravity)
- Rising Main and Station Point
- TR-1(1)** Trunk Sewer Line No.1 and Interval(1)

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	General Plan of Trunk Sewer (3)
Scale	1/10000
DWG. No.	A-04
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

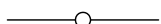
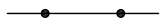
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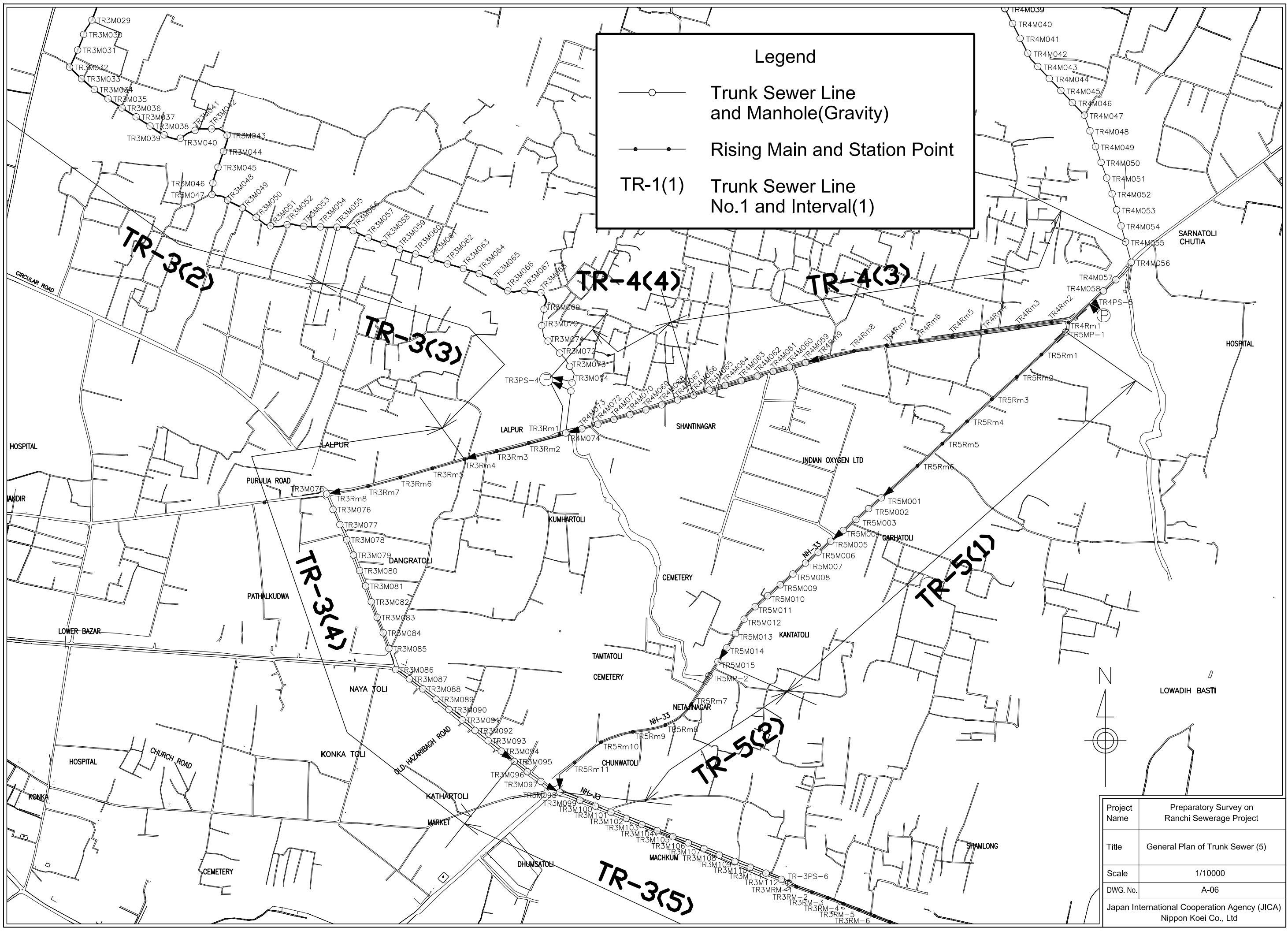
-  Trunk Sewer Line and Manhole(Gravity)
-  Rising Main and Station Point
- TR-1(1)** Trunk Sewer Line No.1 and Interval(1)



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	General Plan of Trunk Sewer (4)
Scale	1/10000
DWG. No.	A-05
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend

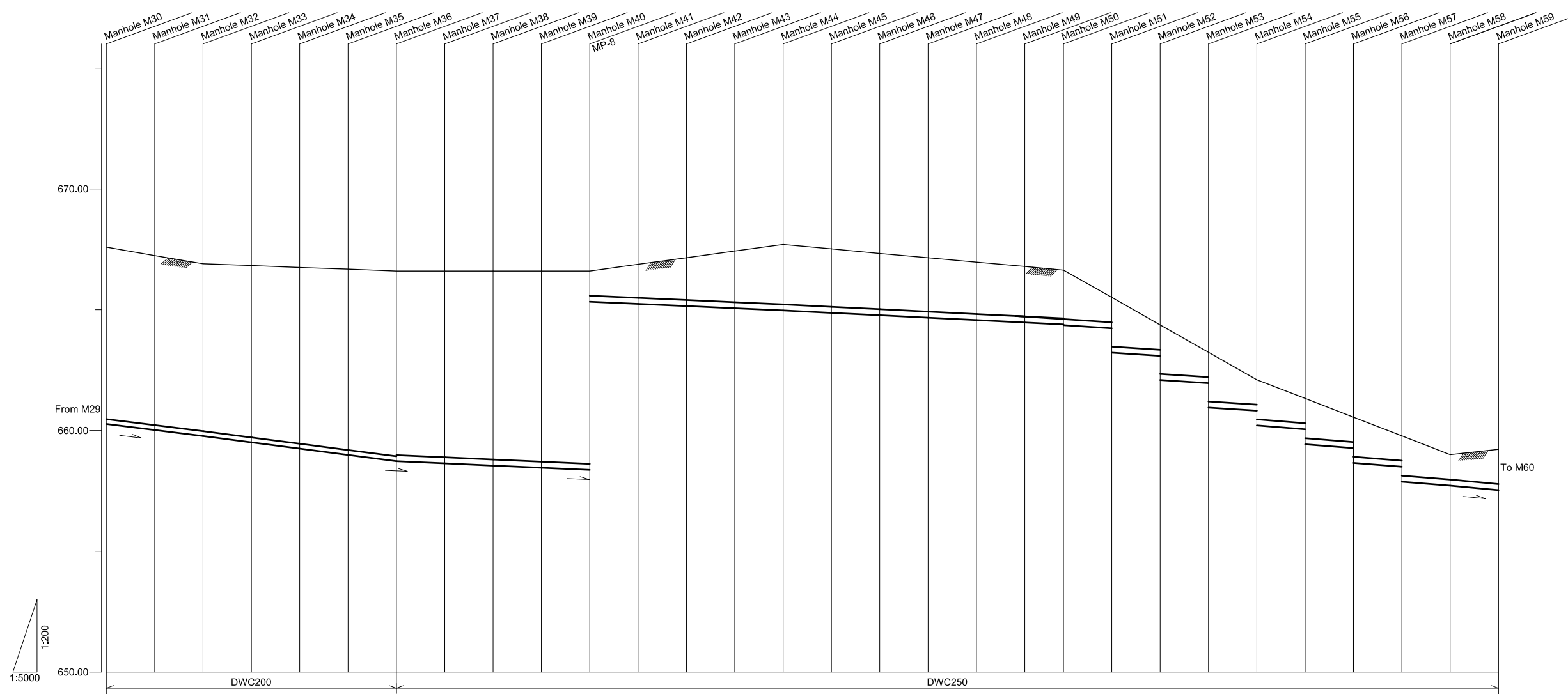
-  Trunk Sewer Line and Manhole(Gravity)
-  Rising Main and Station Point
- TR-1(1)** Trunk Sewer Line No.1 and Interval(1)



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	General Plan of Trunk Sewer (5)
Scale	1/10000
DWG. No.	A-06
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

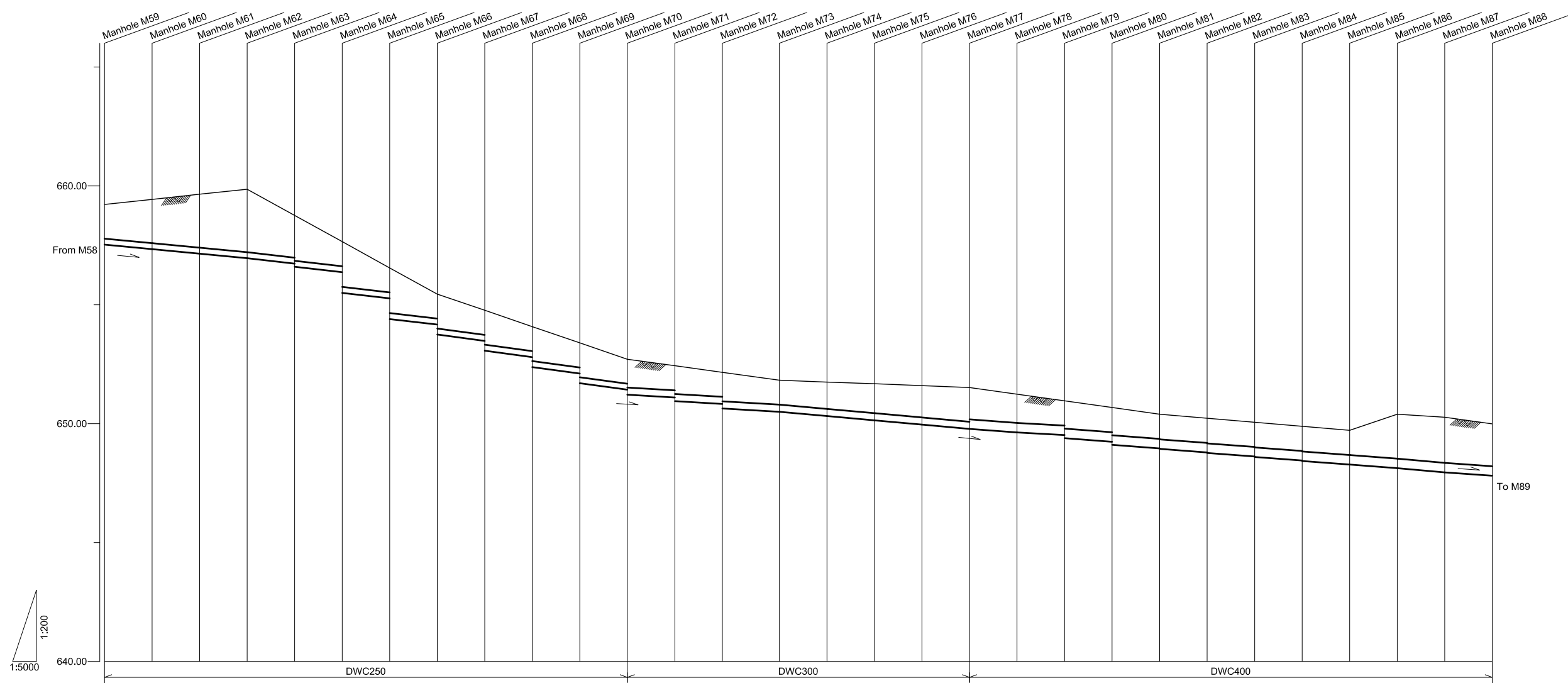


Ground Level (m)	667.59	667.24	666.90	666.83	666.75	666.68	666.60	666.60	666.60	666.60	666.60	666.60	666.88	667.15	667.43	667.70	667.52	667.33	667.15	666.97	666.79	666.64	665.51	664.37	663.24	662.10	661.33	660.55	659.78	659.00	657.53
Earth Covering(m)	7.09	7.00	6.91	7.09	7.28	7.46	7.65	7.68	7.77	7.86	7.95	1.35	1.72	2.09	2.45	2.37	2.28	2.20	2.12	2.04	1.97	2.00	1.00	1.00	1.00	1.00	1.61	1.62	1.00	1.41	
Invert Elevation (m)	660.27	660.02	659.77	659.51	659.25	658.99	658.73	658.64	658.55	658.46	658.37	665.24	665.15	665.06	664.97	664.87	664.77	664.67	664.57	664.47	664.39	664.23	663.22	662.09	661.96	660.82	660.05	659.27	658.50	657.72	657.53
Gradient (%)	4.9	4.9	5.2	5.2	5.2	5.2	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	3.2	3.2	3.2	3.2	3.8		
Interval of Manhole (m)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	40.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	
Cumulative Length of Manhole (m)	1440.0	1490.0	1540.0	1590.0	1640.0	1690.0	1740.0	1790.0	1840.0	1890.0	1940.0	1990.0	2040.0	2090.0	2140.0	2190.0	2240.0	2290.0	2340.0	2390.0	2430.0	2480.0	2530.0	2580.0	2630.0	2680.0	2730.0	2780.0	2830.0	2880.0	

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (2)
Scale	H=1/5000, V=1/200
DWG. No.	A-08
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

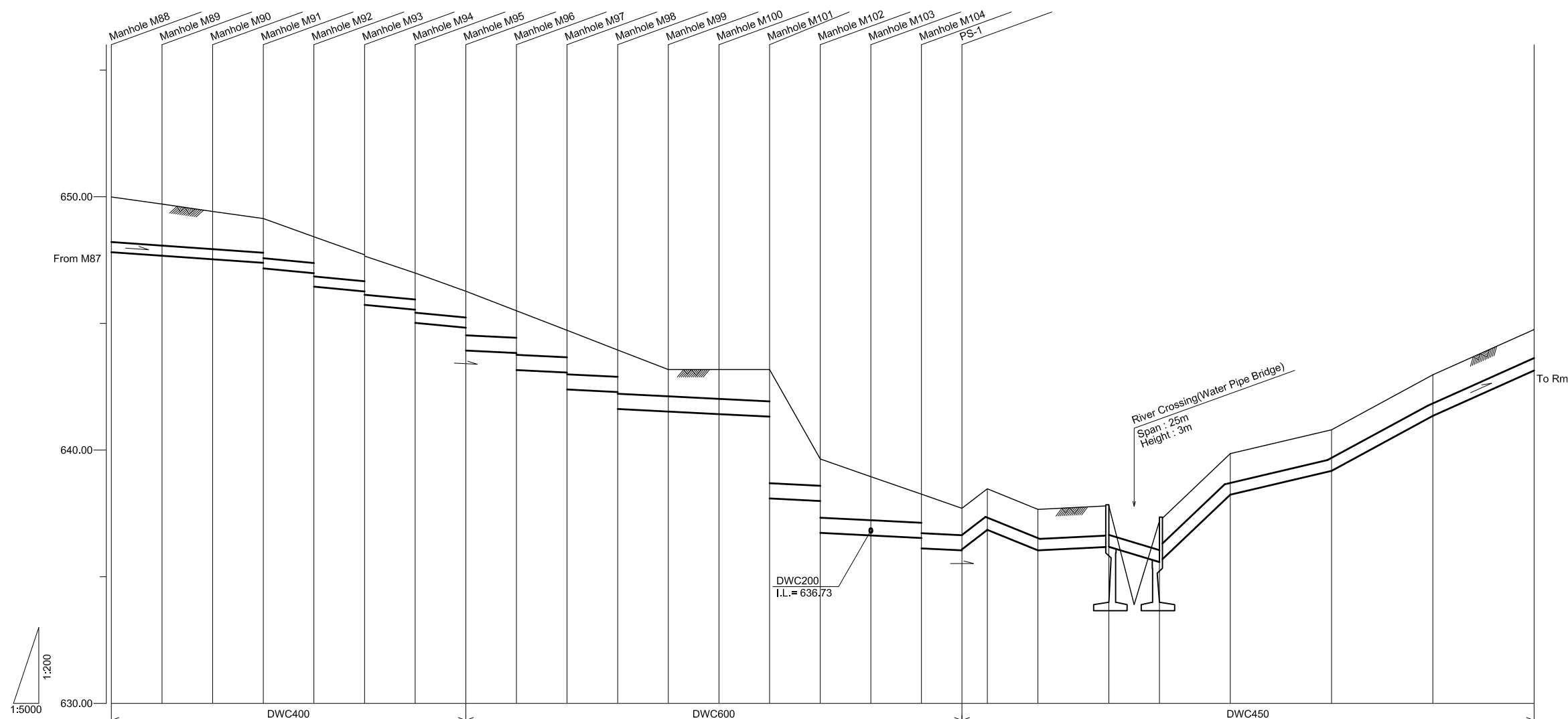


Ground Level (m)	659.22	659.43	659.65	659.86	658.76	657.66	656.55	655.45	654.77	654.08	653.40	652.71	652.44	652.16	651.83	651.75	651.68	651.60	651.52	651.24	650.96	650.68	650.40	650.23	650.06	649.89	649.72	650.40	650.27	649.99								
Earth Covering(m)	1.41	1.81	2.22	2.62	1.75	1.01	1.00	1.00	1.01	1.00	1.01	1.00	1.01	1.00	1.00	1.10	1.20	1.31	1.41	1.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.83	1.88	1.74								
Invert Elevation (m)	657.53	657.34	657.15	656.96	656.73	656.37	655.27	654.17	653.75	653.48	653.07	652.80	652.38	652.11	651.70	651.43	651.22	651.10	650.95	650.83	650.64	650.50	650.32	650.14	649.96	649.78	649.63	649.52	649.39	649.24	648.96	648.79	648.62	648.45	648.28	648.13	647.95	647.81
Gradient (%)		3.8	3.8	3.8	4.5	4.5	4.5	4.5	5.3	5.3	5.3	5.3	2.3	2.3	2.3	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.7		
Interval of Manhole (m)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	60.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0		
Cumulative Length of Manhole (m)	2880.0	2930.0	2980.0	3030.0	3080.0	3130.0	3180.0	3230.0	3280.0	3330.0	3380.0	3430.0	3480.0	3530.0	3590.0	3640.0	3690.0	3740.0	3790.0	3840.0	3890.0	3940.0	3990.0	4040.0	4090.0	4140.0	4190.0	4240.0	4300.0	4350.0								

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (3)
Scale	H=1/5000, V=1/200
DWG. No.	A-09
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

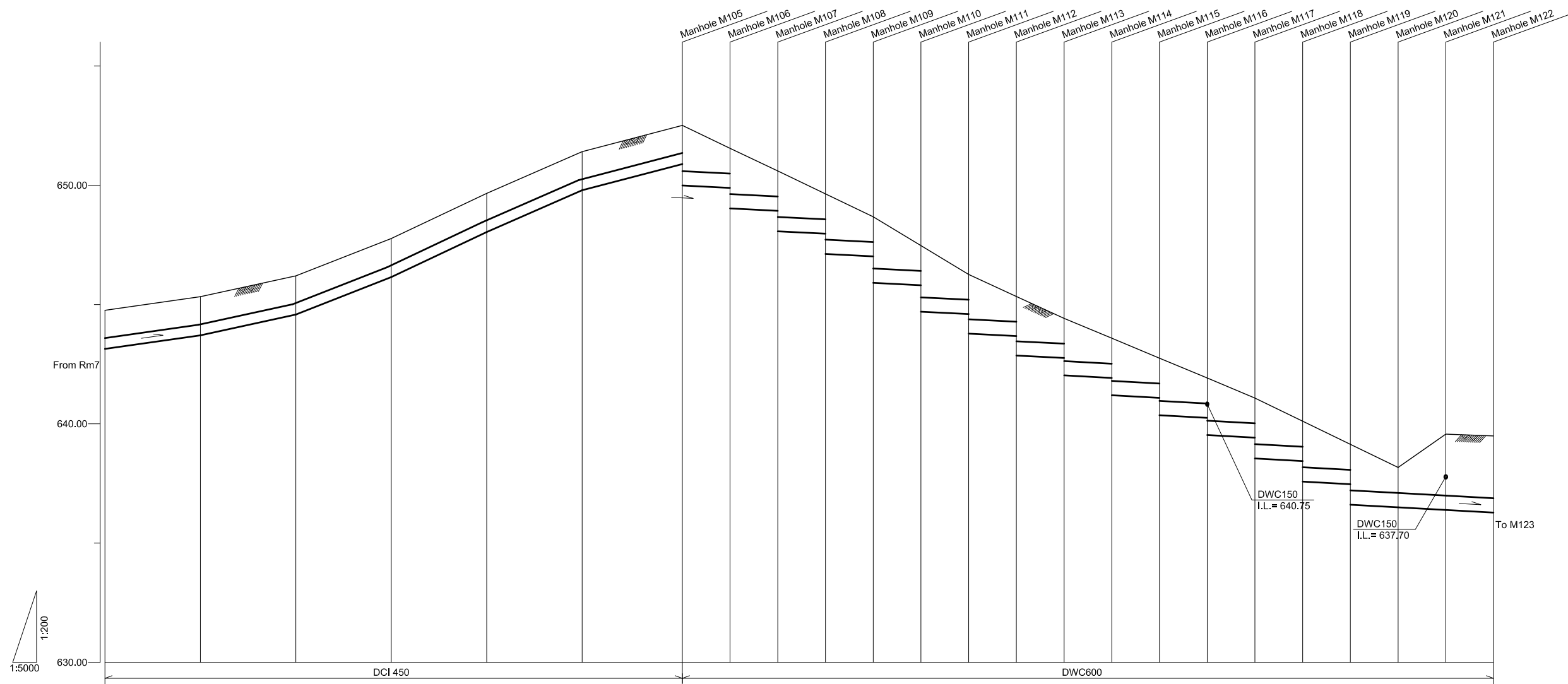


Ground Level (m)	649.99	649.71	649.42	649.14	648.42	647.71	646.99	646.27	645.50	644.73	643.95	643.18	643.18	643.18	639.65	638.95	638.26	637.70	638.47	637.66	637.80	637.20	639.86	640.80	642.97	644.76																						
Earth Covering(m)	1.74	1.59	1.45	1.31	1.53	1.01	1.54	1.01	1.53	1.00	1.68	1.01	1.68	1.00	1.67	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																					
Invert Elevation (m)	647.81	647.67	647.53	647.39	647.17	646.98	646.45	646.26	645.73	645.54	645.02	644.83	643.93	643.83	643.16	643.06	642.39	642.29	641.62	641.52	641.42	641.42	641.32	638.09	637.99	636.73	636.63	636.63	636.53	636.12	636.04	636.08	636.85	636.85	636.04	636.04	636.18	636.18	635.58	635.58	636.24	636.24	639.18	639.18	641.35	641.35	643.14	
Gradient (%)		2.7	2.7	2.7	3.7	3.7	3.7	3.7	3.7	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Interval of Manhole (m)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Cumulative Length of Manhole (m)	4350.0	4400.0	4450.0	4500.0	4550.0	4600.0	4650.0	4700.0	4750.0	4800.0	4850.0	4900.0	4950.0	5000.0	5050.0	5100.0	5150.0	5190.0	5215.0	5265.0	5335.0	5385.0	5455.0	5555.0	5655.0	5755.0																						

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (4)
Scale	H=1/5000, V=1/200
DWG. No.	A-10
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

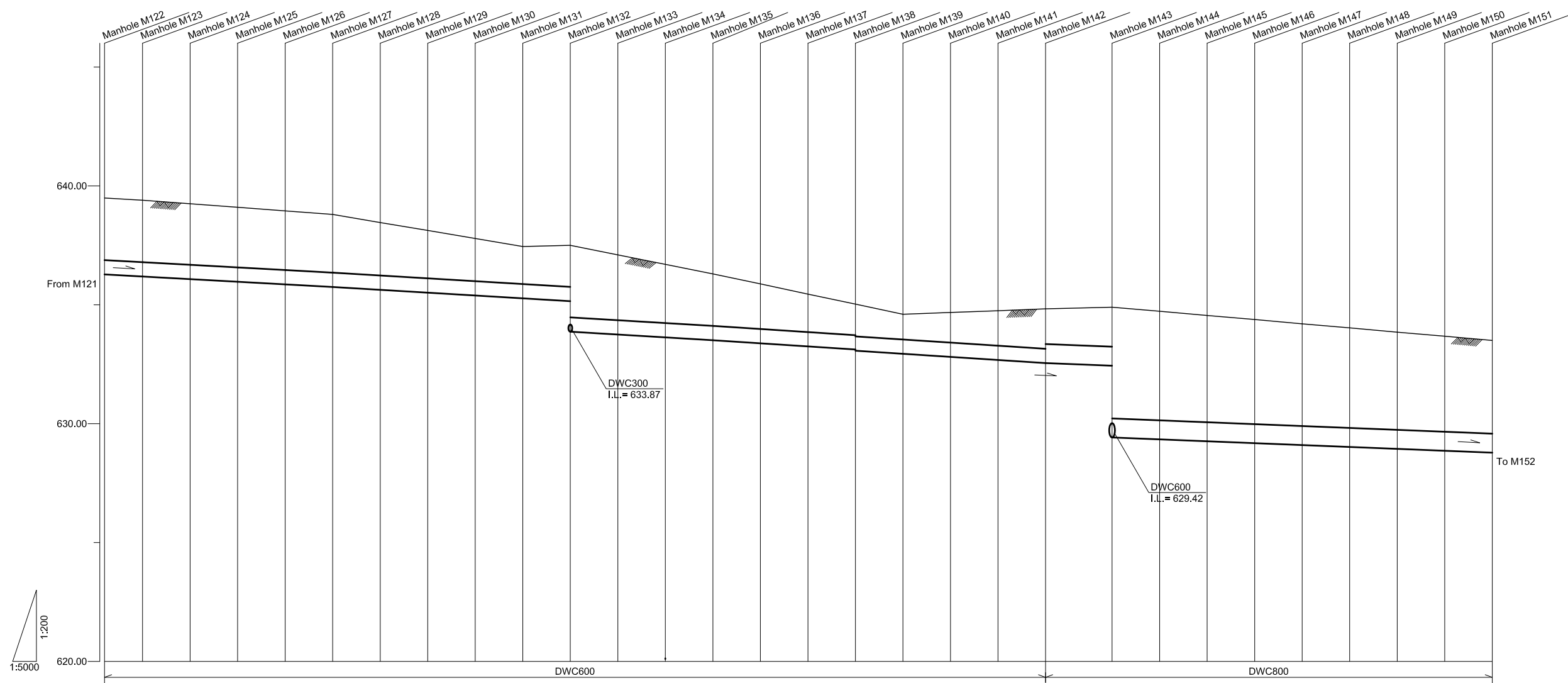


Ground Level (m)	644.76	645.33	646.20	647.77	649.66	651.41	652.51	651.55	650.60	649.64	648.68	647.47	646.26	645.34	644.42	643.59	642.75	641.92	641.08	640.11	639.14	638.17	369.57	639.49		
Earth Covering(m)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.86	1.00	1.86	1.01	1.86	1.00	1.82	1.00	1.82	1.00	1.73	1.01	1.72	1.00	1.87	1.01	1.87	2.52	2.55
Invert Elevation (m)	643.14	643.71	644.58	646.15	648.04	649.79	650.89	649.89	648.93	647.97	647.02	645.81	644.60	643.68	642.76	641.92	640.25	639.53	639.42	638.44	637.58	637.47	636.61	636.50	636.39	636.28
Gradient (%)							2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
Interval of Manhole (m)	100.0	100.0	100.0	100.0	100.0	100.0	105.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Cumulative Length of Manhole (m)	5755.0	5855.0	5955.0	6055.0	6155.0	6255.0	6360.0	6410.0	6460.0	6510.0	6560.0	6610.0	6660.0	6710.0	6760.0	6810.0	6860.0	6910.0	6960.0	7010.0	7060.0	7110.0	7160.0	7210.0		

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (5)
Scale	H=1/5000, V=1/200
DWG. No.	A-11
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

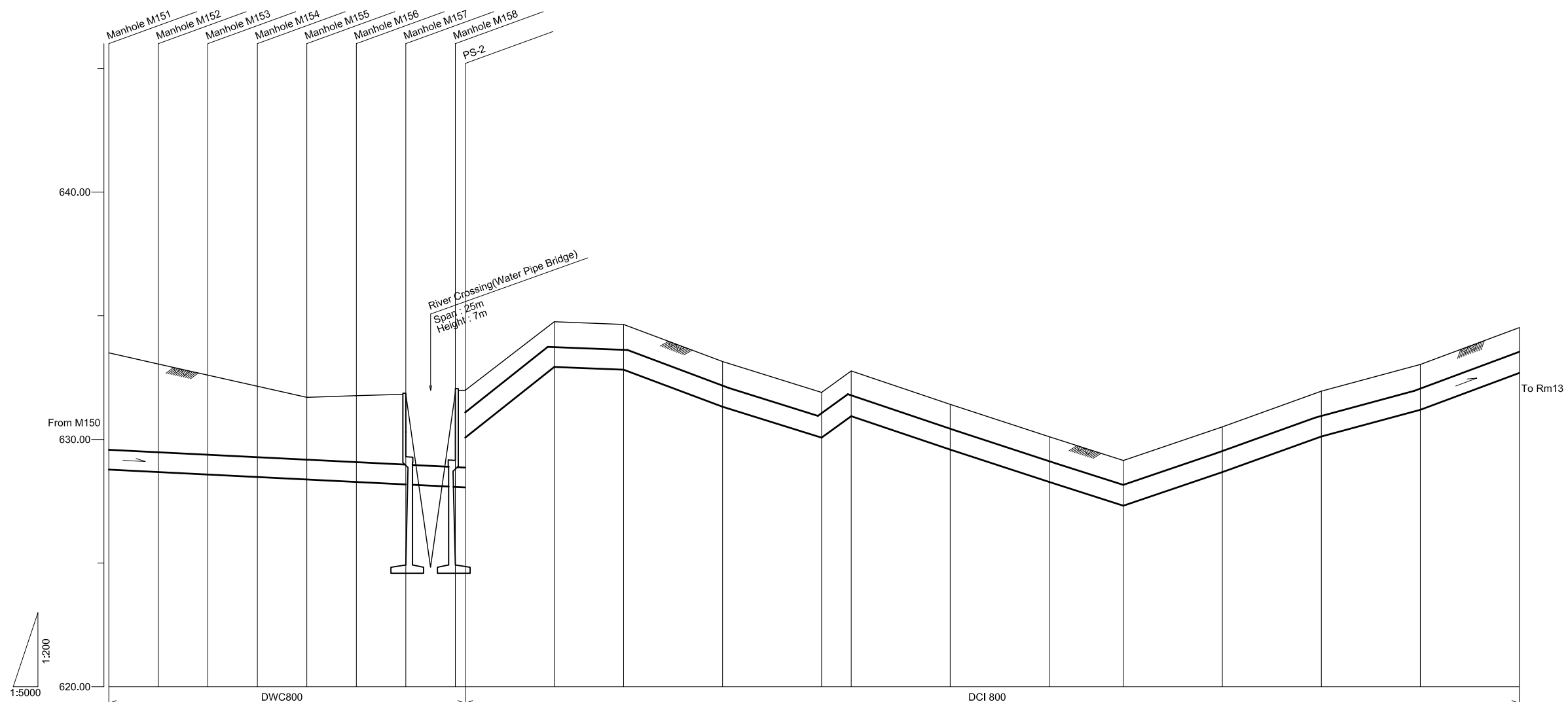


Ground Level (m)	639.49	639.40	639.25	639.10	638.95	638.80	638.46	638.13	637.79	637.45	637.50	637.10	636.70	636.30	635.88	635.45	635.03	634.60	634.68	634.75	634.83	634.90	634.73	634.55	634.38	634.20	634.03	633.85	633.68	633.50
Earth Covering(m)	2.55	2.55	2.51	2.47	2.43	2.39	2.17	1.96	1.74	1.52	1.69	2.69	2.41	2.13	1.84	1.54	1.25	1.00	1.20	1.41	1.61	1.58	4.51	4.41	4.32	4.22	4.13	4.03	3.94	3.84
Invert Elevation (m)	636.28	636.19	636.08	635.97	635.86	635.75	635.63	635.51	635.39	635.27	635.15	633.75	633.63	633.51	633.38	633.25	633.12	632.94	632.81	632.68	632.55	632.44	629.34	629.26	629.18	629.10	629.02	628.94	628.86	628.78
Gradient (%)	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Interval of Manhole (m)	50.0	40.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	70.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	
Cumulative Length of Manhole (m)	7210.0	7250.0	7300.0	7350.0	7400.0	7450.0	7500.0	7550.0	7600.0	7650.0	7700.0	7750.0	7800.0	7850.0	7900.0	7950.0	8000.0	8050.0	8100.0	8150.0	8200.0	8270.0	8320.0	8370.0	8420.0	8470.0	8520.0	8570.0	8620.0	8670.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (6)
Scale	H=1/5000, V=1/200
DWG. No.	A-12
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

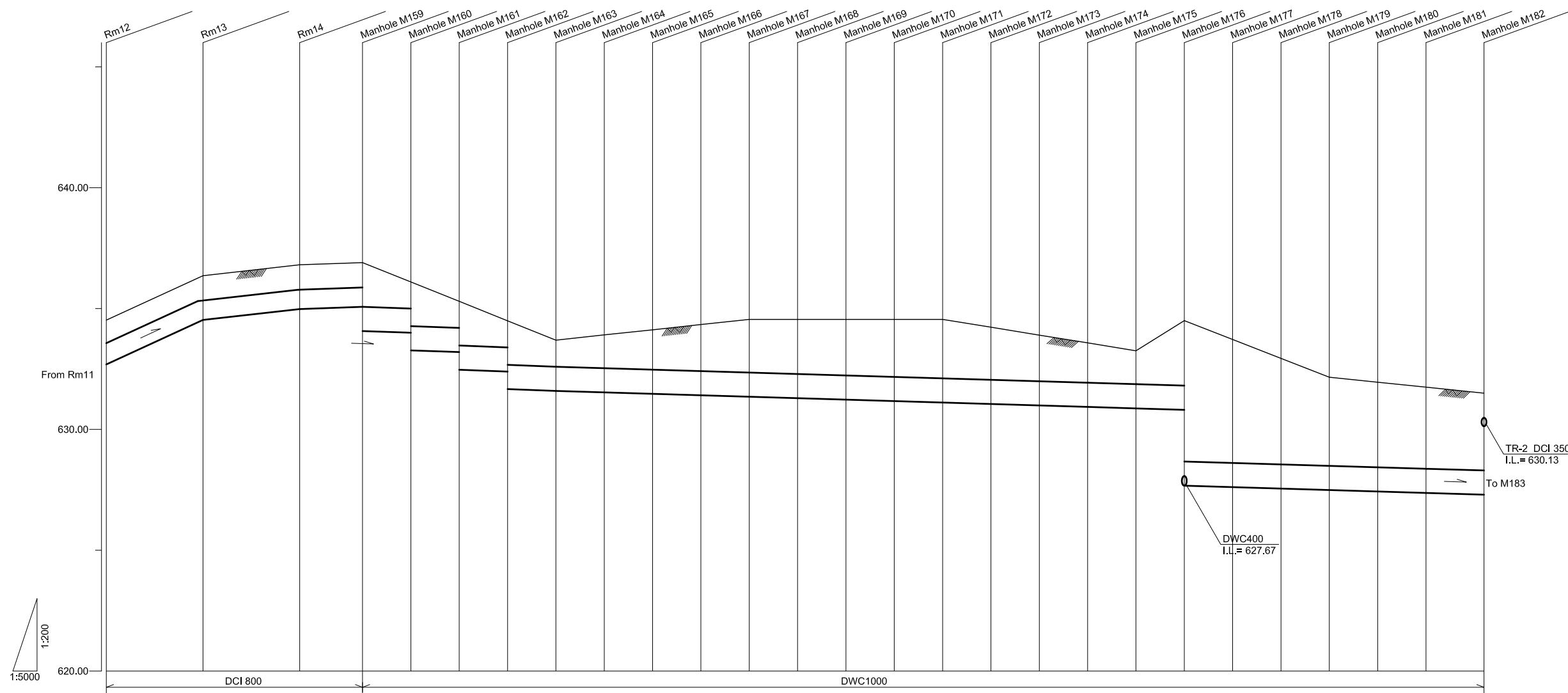


Ground Level (m)	633.50	633.05	632.60	632.15	631.70	631.77	631.83	631.90	631.90	634.76	634.65	633.15	631.90	632.77	631.42	630.11	629.15	630.51	631.95	633.03	634.52
Earth Covering(m)	3.84	3.49	3.14	2.79	2.44	2.61	2.77	2.94	2.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Invert Elevation (m)	628.78	628.68	628.58	628.48	628.38	628.28	628.18	628.08	628.06	632.93	632.82	631.32	630.07	630.94	629.59	628.28	627.32	628.68	630.12	631.20	632.69
Gradient (%)		1.9	1.9	1.9	1.9	1.9	1.9	1.9													
Interval of Manhole (m)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	10.0	90.0	70.0	100.0	100.0	30.0	100.0	100.0	75.0	100.0	100.0	100.0	100.0
Cumulative Length of Manhole (m)	8670.0	8720.0	8770.0	8820.0	8870.0	8920.0	8970.0	9020.0	9030.0	9120.0	9190.0	9290.0	9390.0	9420.0	9520.0	9620.0	9695.0	9795.0	9895.0	9995.0	10095.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (7)
Scale	H=1/5000, V=1/200
DWG. No.	A-13
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

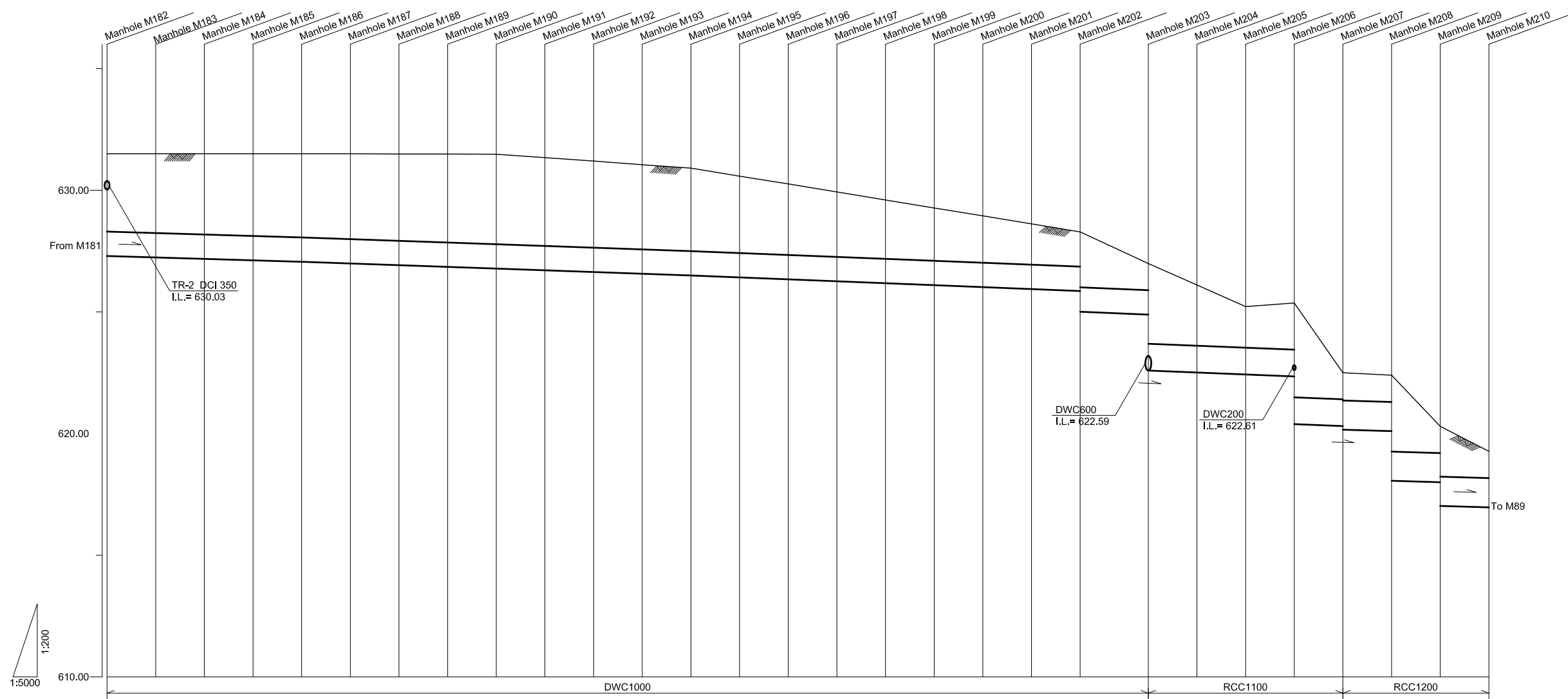


Ground Level (m)	634.52	636.36	636.81	636.90	636.10	635.30	634.49	633.69	633.91	634.12	634.34	634.55	634.55	634.55	634.23	633.90	633.58	633.25	634.50	633.72	632.94	632.16	631.95	631.75	631.50		
Earth Covering(m)	1.00	1.00	1.00	1.00	1.73	1.73	1.73	1.00	1.27	1.55	1.82	2.10	2.16	2.22	2.28	1.81	1.54	1.28	2.59	5.01	4.29	3.57	3.42	3.28	3.10		
Invert Elevation (m)	632.69	634.53	634.98	634.07	634.00	633.20	632.39	631.59	631.53	631.47	631.41	631.35	631.29	631.23	631.17	630.99	630.93	630.87	630.81	627.61	627.55	627.49	627.43	627.37	627.30		
Gradient (‰)				1.5	1.5	1.5	1.5	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1			
Interval of Manhole (m)	100.0	100.0	100.0	65.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	60.0			
Cumulative Length of Manhole (m)	10095.0	10195.0	10295.0	10360.0	10410.0	10460.0	10510.0	10560.0	10610.0	10660.0	10710.0	10760.0	10810.0	10860.0	10910.0	10960.0	11010.0	11060.0	11110.0	11160.0	11210.0	11260.0	11310.0	11360.0	11410.0	11460.0	11520.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (8)
Scale	H=1/5000, V=1/200
DWG. No.	A-14
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

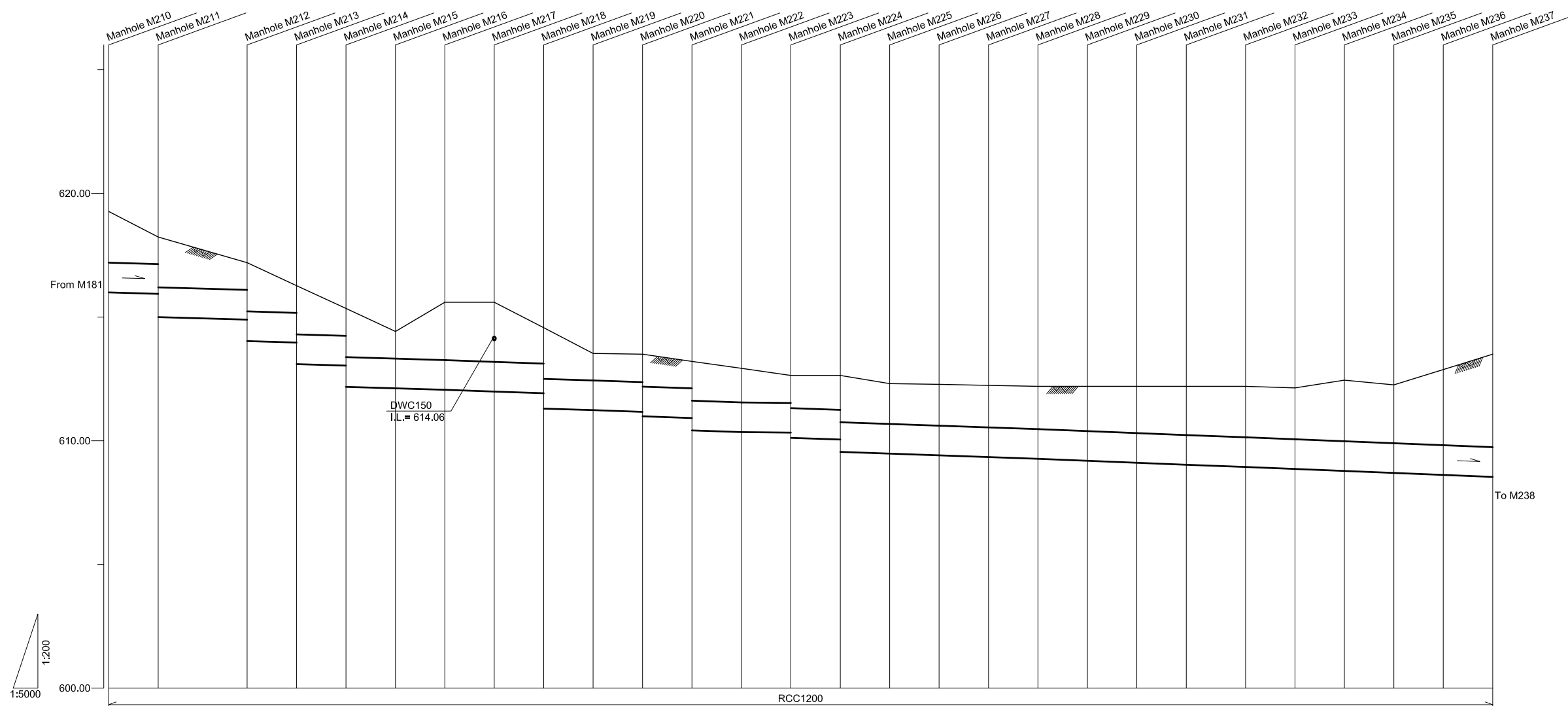


Ground Level (m)	631.50	631.50	631.50	631.50	631.50	631.50	631.49	631.49	631.48	631.34	631.20	631.05	630.91	630.58	630.26	629.93	629.60	629.27	628.95	628.62	628.29	626.99	626.11	625.22	625.37	622.50	622.40	620.30	619.27
Earth Covering(m)	3.10	3.16	3.22	3.28	3.34	3.40	3.47	3.53	3.60	3.53	3.45	3.38	3.31	3.06	2.82	2.57	2.32	2.07	1.83	1.58	1.33	1.00	2.41	1.60	1.83	1.00	1.00	1.00	1.00
Invert Elevation (m)	627.30	627.24	627.18	627.12	627.06	626.99	626.92	626.85	626.78	626.71	626.64	626.57	626.50	626.42	626.34	626.26	626.18	626.10	626.02	625.94	625.86	624.89	622.51	622.43	622.35	620.31	620.10	618.00	616.97
Gradient (%)	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.1	1.1	1.1	
Interval of Manhole (m)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	70.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	
Cumulative Length of Manhole (m)	11520.0	11570.0	11620.0	11670.0	11720.0	11770.0	11820.0	11870.0	11920.0	11970.0	12020.0	12070.0	12120.0	12170.0	12220.0	12270.0	12320.0	12370.0	12420.0	12470.0	12520.0	12590.0	12640.0	12690.0	12740.0	12790.0	12840.0	12890.0	12940.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (9)
Scale	H=1/5000, V=1/200
DWG. No.	A-15
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

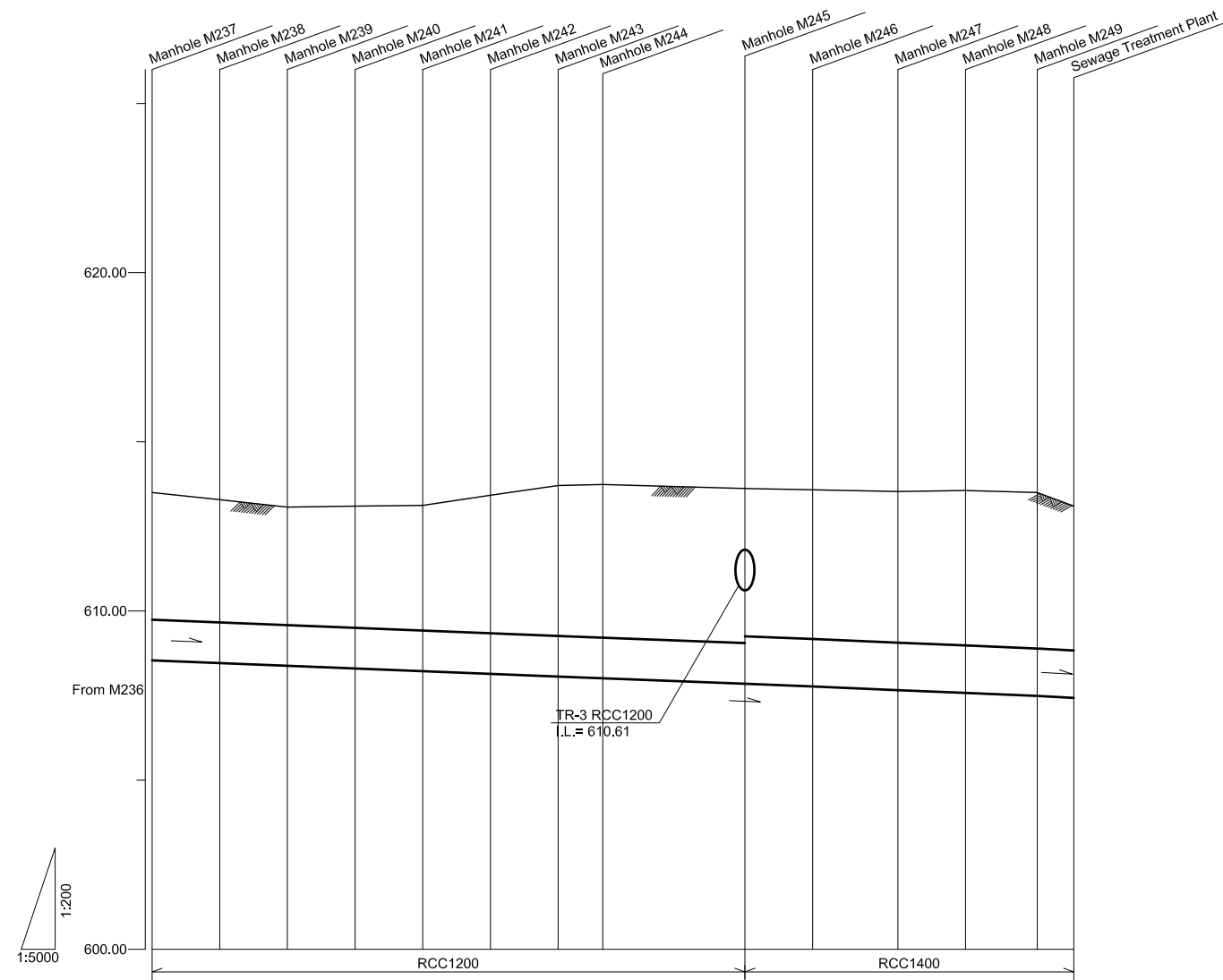


Ground Level (m)	619.27	618.24	617.20	616.27	615.35	614.42	615.60	615.60	614.57	613.53	613.50	613.21	612.93	612.64	612.64	612.31	612.28	612.24	612.20	612.20	612.20	612.20	612.24	612.24	612.45	612.26	612.88	613.50
Earth Covering(m)	1.97	1.00	1.87	1.87	1.01	1.00	2.24	2.31	1.35	1.00	1.04	1.00	1.28	1.01	1.50	1.53	1.57	1.60	1.63	1.71	1.79	1.87	1.96	2.08	2.37	2.26	2.96	3.66
Invert Elevation (m)	616.00	615.94	614.90	613.97	613.04	612.12	612.06	611.99	611.92	611.24	611.17	610.92	610.35	610.33	610.05	609.48	609.41	609.34	609.27	609.19	609.11	609.03	608.94	608.86	608.78	608.70	608.62	608.54
Gradient (%)		1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Interval of Manhole (m)	50.0	50.0	90.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	60.0	50.0	50.0	50.0	50.0	50.0	50.0
Cumulative Length of Manhole (m)	12940.0	12990.0	13080.0	13130.0	13180.0	13230.0	13280.0	13330.0	13380.0	13430.0	13480.0	13530.0	13580.0	13630.0	13680.0	13730.0	13780.0	13830.0	13880.0	13930.0	13980.0	14030.0	14090.0	14140.0	14190.0	14240.0	14290.0	14340.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (10)
Scale	H=1/5000, V=1/200
DWG. No.	A-16
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

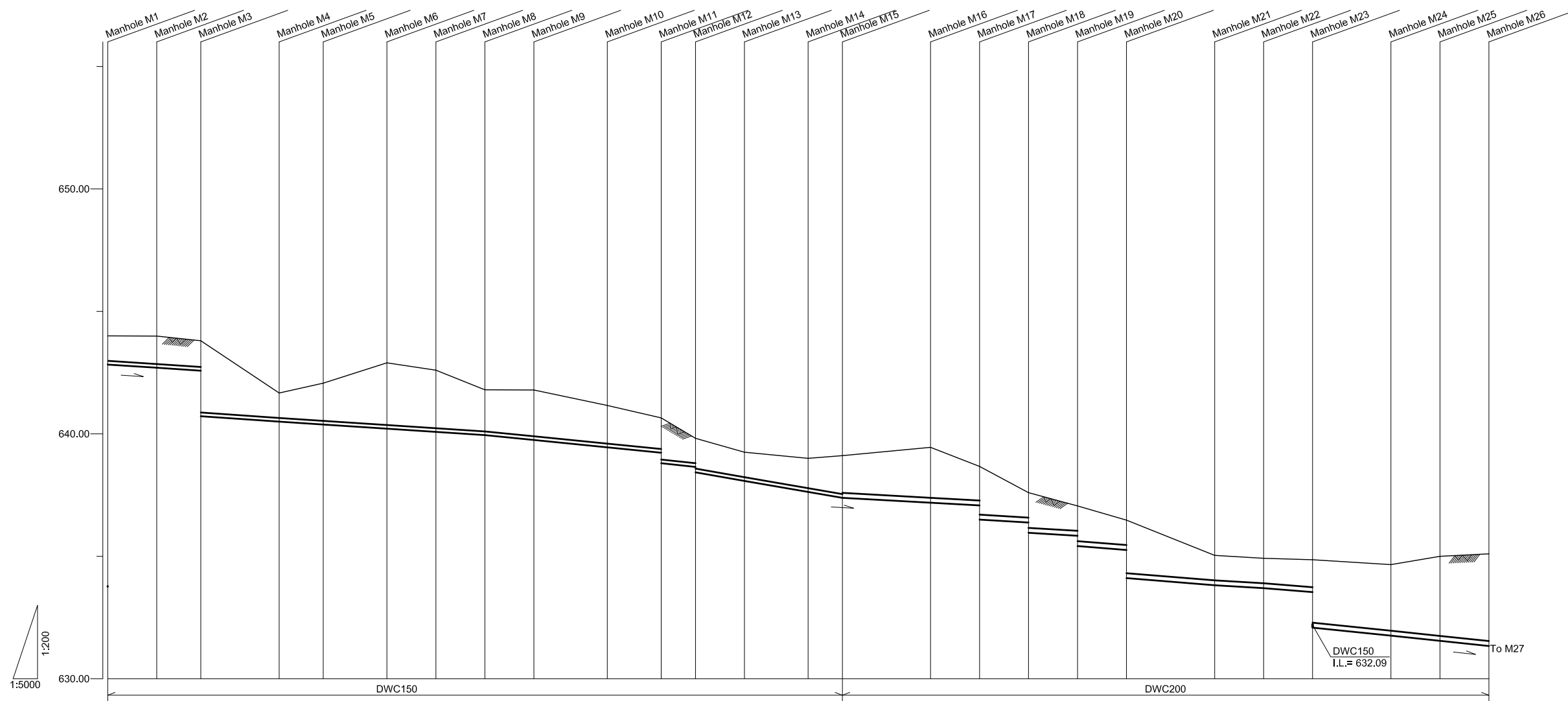


Ground Level (m)	613.50	613.29	613.07	613.10	613.12	613.42	613.71	613.74	613.62	613.58	613.53	613.56	613.50	613.10
Earth Covering(m)	3.66	3.53	3.39	3.50	3.60	3.98	4.35	4.43	4.47	4.27	4.33	4.44	4.47	4.13
Invert Elevation (m)	608.54	608.46	608.38	608.30	608.22	608.14	608.06	608.01	607.85	607.77	607.66	607.58	607.49	607.43
Gradient (%)		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6
Interval of Manhole (m)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	33.0	105.0	50.0	63.0	50.0	53.0	37.0
Cumulative Length of Manhole (m)	14340.0	14390.0	14440.0	14490.0	14540.0	14590.0	14640.0	14673.0	14778.0	14828.0	14891.0	14941.0	14994.0	15021.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-1 (11)
Scale	H=1/5000, V=1/200
DWG. No.	A-17
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

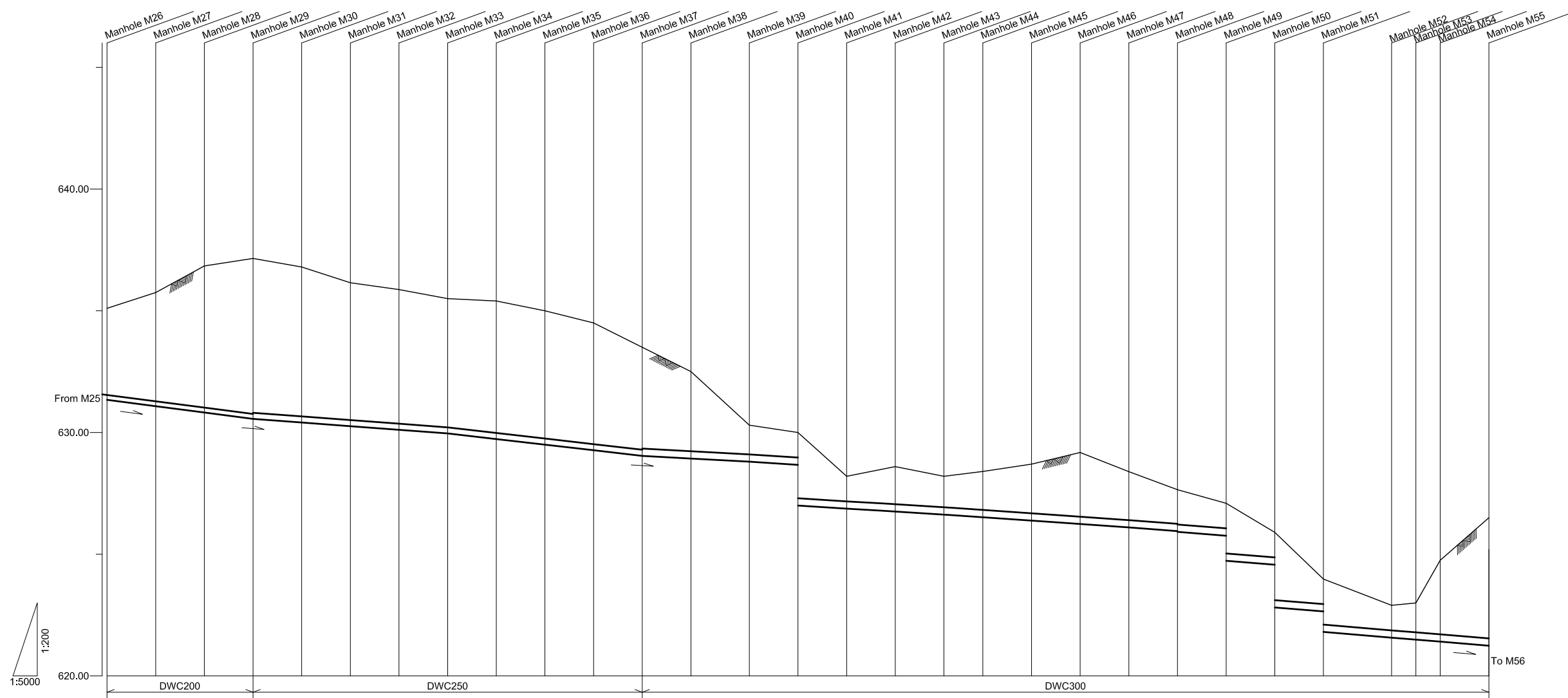


Ground Level (m)	644.00	643.99	643.80	641.67	642.07	642.90	642.60	641.80	641.79	641.16	640.65	639.82	639.25	639.00	639.11	639.45	638.67	637.60	637.06	636.48	635.04	634.92	634.86	634.66	635.00	635.10
Earth Covering(m)	1.00	1.12	2.91	1.00	1.52	2.52	2.35	1.68	1.87	1.54	1.25	1.00	1.00	1.20	1.35	1.84	1.17	1.00	1.00	1.00	1.00	1.00	1.10	2.68	3.23	3.54
Invert Elevation (m)	642.83	642.70	640.72	640.50	640.38	640.21	640.08	639.95	639.75	639.45	639.23	638.80	638.65	638.08	637.39	637.19	637.08	636.50	635.96	635.84	635.26	633.82	633.70	633.54	631.76	631.34
Gradient (%)		2.7	2.7	2.7	2.7	2.7	2.7	4.1	4.1	4.1	4.1	7.0	7.0	7.0	2.3	2.3	2.3	2.3	3.2	3.2	3.2	3.2	4.2	4.2	4.2	4.2
Interval of Manhole (m)	0.0	50.0	45.0	80.0	45.0	65.0	50.0	50.0	50.0	75.0	55.0	35.0	50.0	65.0	35.0	90.0	50.0	50.0	50.0	50.0	90.0	50.0	50.0	80.0	50.0	50.0
Cumulative Length of Manhole (m)	0.0	50.0	95.0	175.0	220.0	285.0	335.0	385.0	435.0	510.0	565.0	600.0	650.0	715.0	750.0	840.0	890.0	940.0	990.0	1040.0	1130.0	1180.0	1230.0	1310.0	1360.0	1410.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-2 (1)
Scale	H=1/5000, V=1/200
DWG. No.	A-18
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

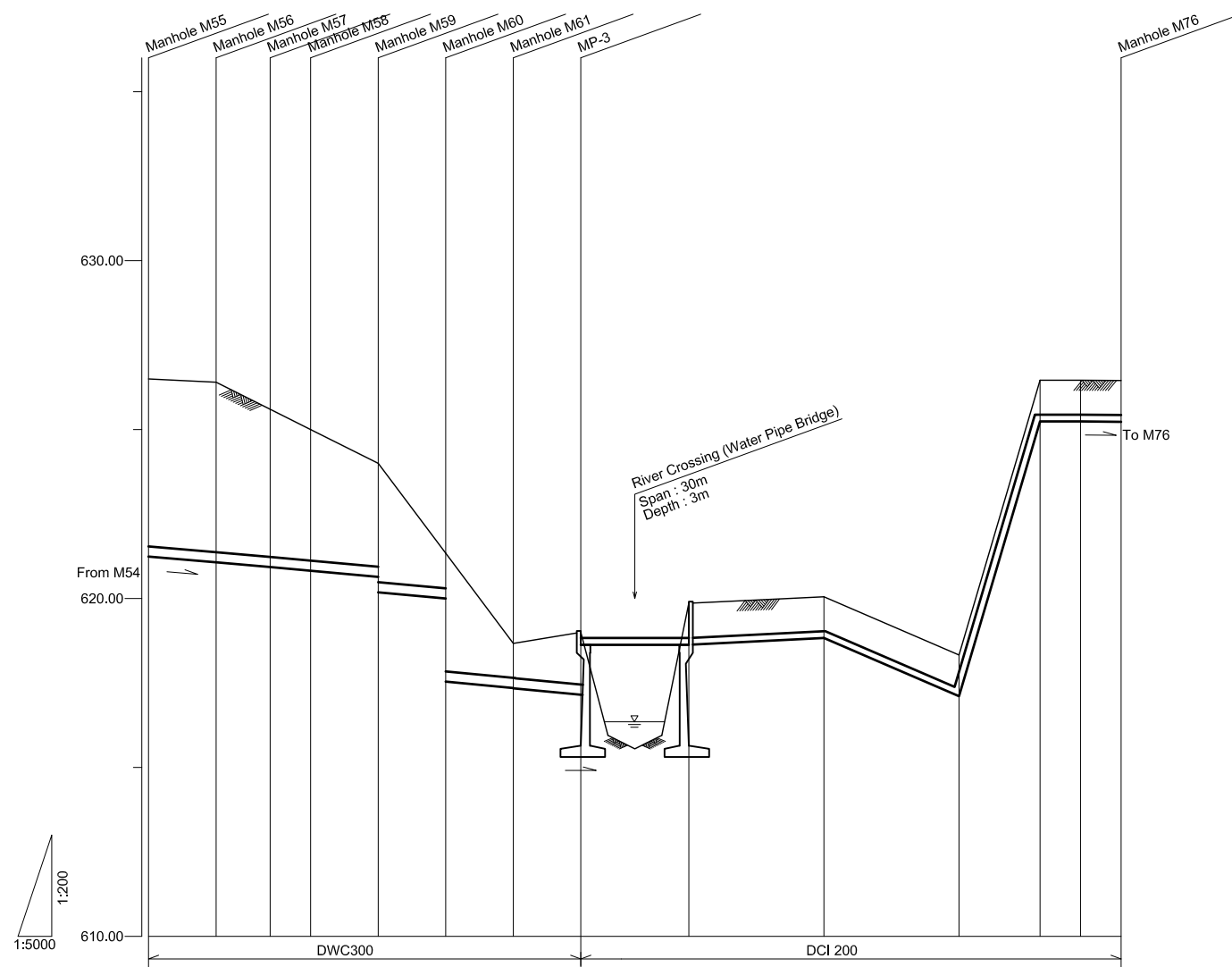


Ground Level (m)	635.10	635.75	636.84	637.15	636.80	636.15	635.87	635.50	635.40	635.00	634.50	633.50	632.50	630.30	630.00	628.20	628.60	628.20	628.40	628.70	629.18	628.39	627.65	627.09	625.90	623.98	622.90	623.00	624.75	626.50
Earth Covering(m)	3.54	4.45	5.80	6.37	6.11	5.61	5.48	5.26	5.39	5.22	4.95	4.18	3.24	1.17	1.00	1.00	1.52	1.24	1.55	1.99	2.61	1.96	1.37	1.00	1.00	1.00	1.00	1.18	3.01	4.93
Invert Elevation (m)	631.34	631.08	630.82	630.56	630.41	630.26	630.11	629.96	629.73	629.50	629.27	629.04	628.93	628.80	628.67	628.87	628.75	628.63	628.52	628.38	628.24	628.10	625.95	624.73	624.57	622.65	621.57	621.49	621.41	621.24
Gradient (%)		5.2	5.2	5.2	3.0	3.0	3.0	3.0	4.7	4.7	4.7	4.7	2.2	2.2	2.5	2.5	2.5	2.8	2.8	2.8	2.8	3.1	3.1	3.1	3.1	3.4	3.4	3.4	3.4	
Interval of Manhole (m)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	60.0	50.0	50.0	50.0	50.0	40.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	70.0	25.0	25.0	50.0
Cumulative Length of Manhole (m)	1410.0	1460.0	1510.0	1560.0	1610.0	1660.0	1710.0	1760.0	1810.0	1860.0	1910.0	1960.0	2010.0	2070.0	2120.0	2170.0	2220.0	2270.0	2310.0	2360.0	2410.0	2460.0	2510.0	2560.0	2610.0	2660.0	2730.0	2755.0	2780.0	2830.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-2 (2)
Scale	H=1/5000, V=1/200
DWG. No.	A-19
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

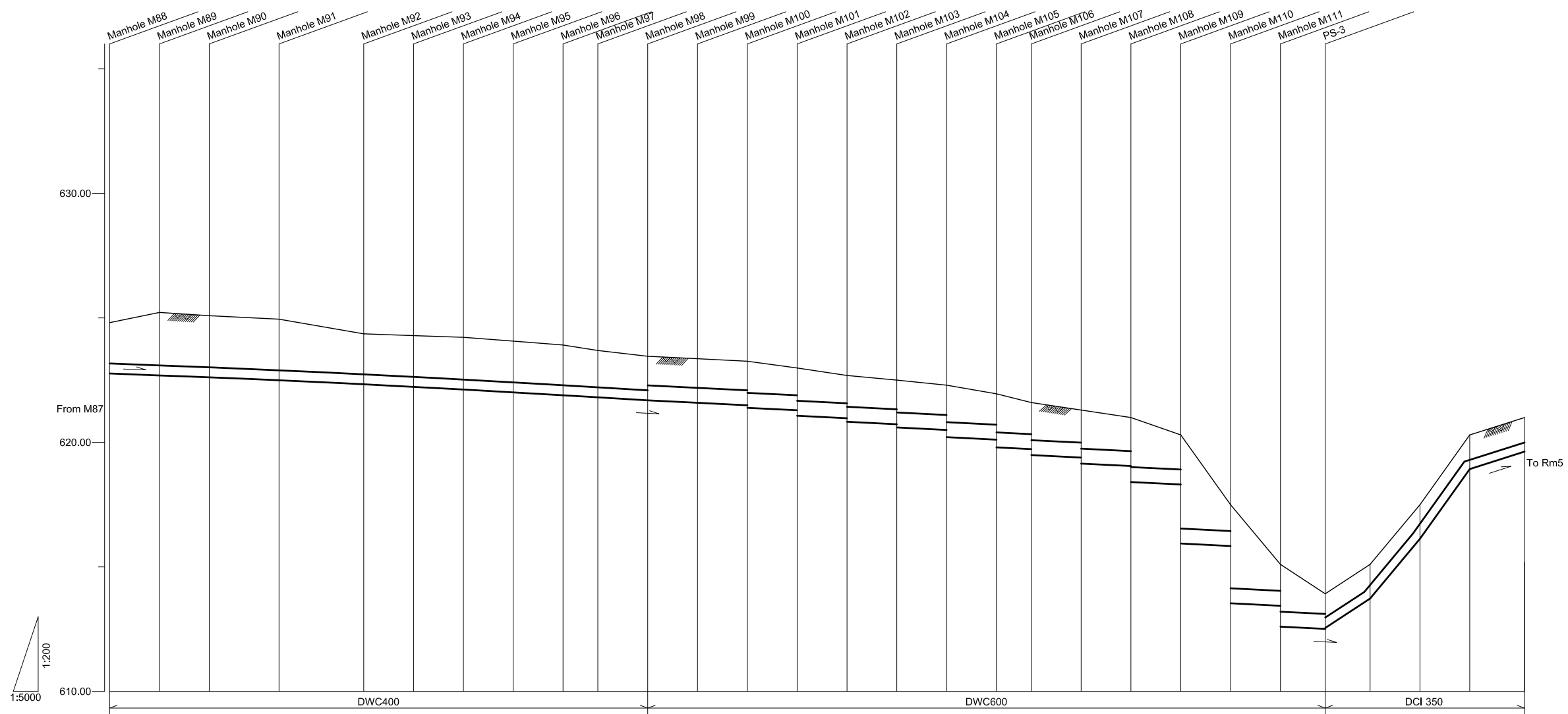


Ground Level (m)	626.50	626.40	625.60	625.00	624.00	621.34	618.67	619.00	619.86	620.05	618.33	626.46	626.46	626.45
Earth Covering(m)	4.93	5.00	4.34	3.85	3.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Invert Elevation (m)	621.24	621.07	620.93	620.82	620.64	620.00	617.35	617.15	618.63	618.83	617.11	625.24	625.24	625.23
Gradient (%)		3.4	3.7	3.7	3.7	3.7	3.9	3.9						
Interval of Manhole (m)	50.0	50.0	40.0	30.0	50.0	50.0	50.0	50.0	80.0	100.0	100.0	60.0	60.0	60.0
Cumulative Length of Manhole (m)	2830.0	2880.0	2920.0	2950.0	3000.0	3050.0	3100.0	3150.0	3230.0	3330.0	3430.0	3490.0	3520.0	3550.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-2 (3)
Scale	H=1/5000, V=1/200
DWG. No.	A-20
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

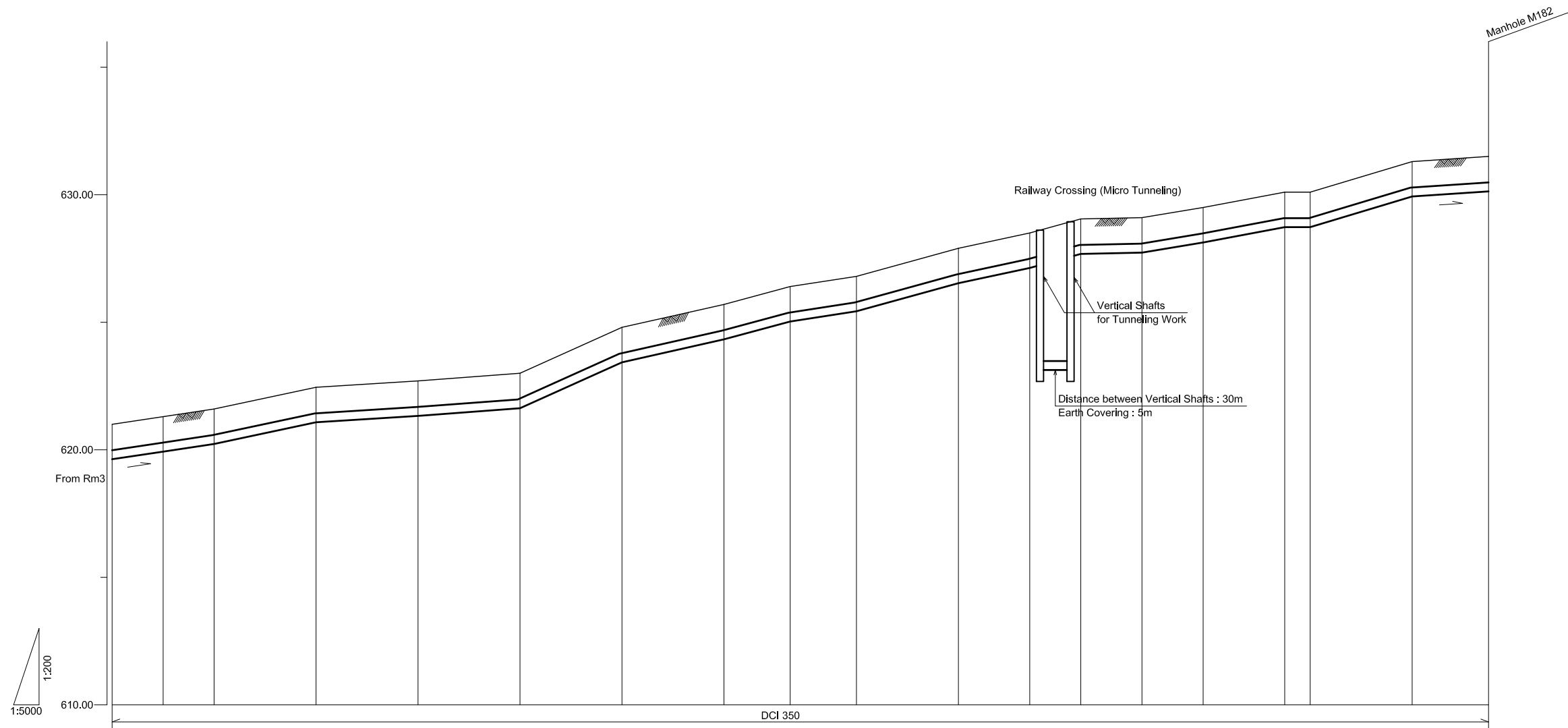


Ground Level (m)	624.81	625.22	625.09	624.95	624.36	624.29	624.22	624.07	623.91	623.69	623.46	623.36	623.26	622.98	622.69	622.50	622.30	621.95	621.60	621.30	621.00	620.30	617.50	615.10	613.92	615.10	617.50	620.30	621.00
Earth Covering(m)	1.59	2.09	2.03	2.01	1.59	1.62	1.65	1.61	1.58	1.43	1.33	1.11	1.11	1.02	1.06	1.10	1.14	1.18	1.21	1.25	1.29	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Invert Elevation (m)	622.77	622.69	622.61	622.50	622.33	622.23	622.13	622.01	621.89	621.81	621.69	621.59	621.49	621.29	620.97	620.73	620.50	620.11	619.80	619.73	619.39	618.41	618.31	615.84	612.51	613.73	616.13	618.93	619.63
Gradient (%)		1.6	1.6	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Interval of Manhole (m)	50.0	50.0	50.0	70.0	85.0	50.0	50.0	50.0	50.0	35.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	35.0	50.0	50.0	50.0	50.0	50.0	45.0	45.0	50.0	50.0	50.0
Cumulative Length of Manhole (m)	1410.0	1460.0	1510.0	1580.0	1665.0	1715.0	1765.0	1815.0	1865.0	1900.0	1950.0	2000.0	2050.0	2100.0	2150.0	2200.0	2250.0	2300.0	2335.0	2385.0	2435.0	2485.0	2535.0	2585.0	2630.0	2675.0	2725.0	2775.0	2825.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-2 (5)
Scale	H=1/5000, V=1/200
DWG. No.	A-22
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

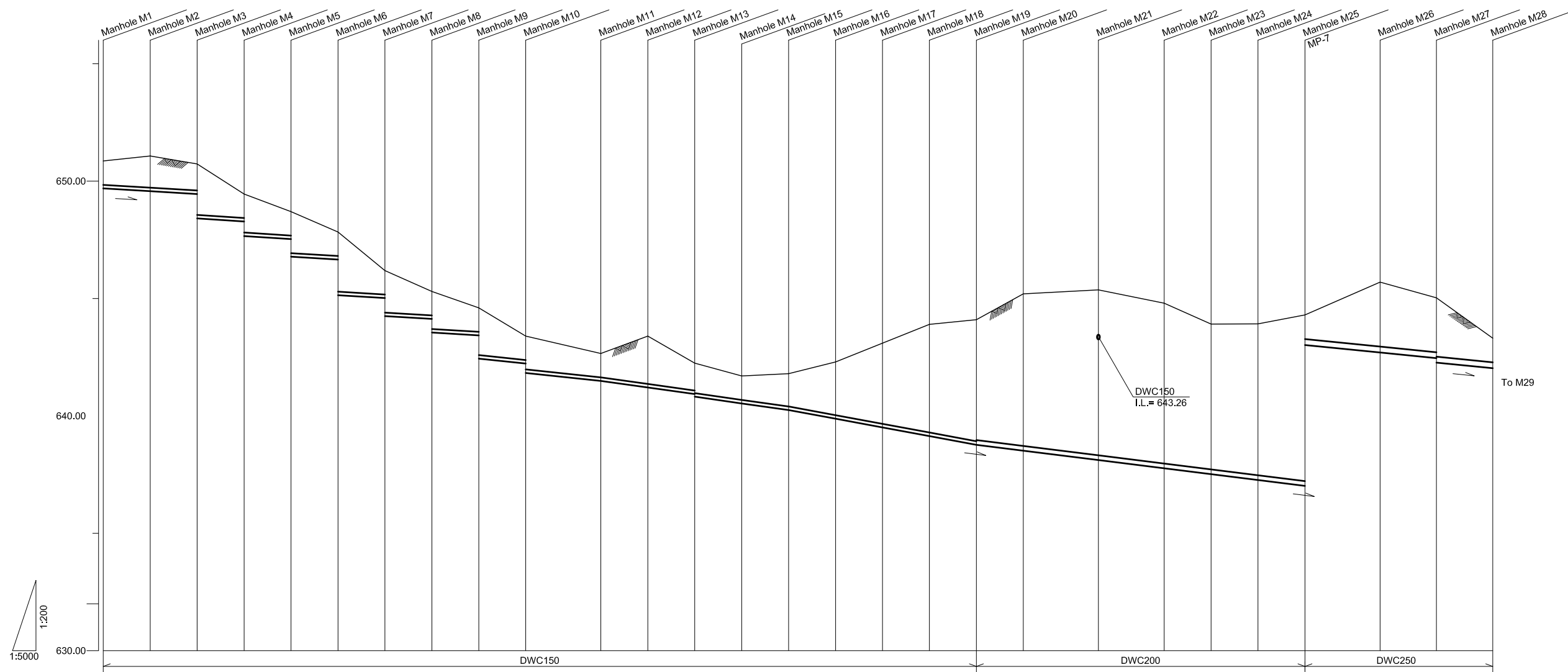


Ground Level (m)	621.00	621.30	621.60	622.45	622.70	623.00	624.80	625.70	626.40	626.80	627.90	628.50	629.05	629.10	629.50	630.10	630.10	631.30	631.50																					
Earth Covering(m)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5.00	5.55	1.00	1.00	1.00	1.00	1.00	1.00																				
Invert Elevation (m)	619.63	619.93	619.93	620.23	620.23	621.08	621.08	621.33	621.33	621.63	621.63	623.43	623.43	624.33	624.33	625.03	625.03	625.43	625.43	626.53	626.53	627.13	627.13	623.13	623.13	623.68	627.73	627.73	628.13	628.13	628.73	628.73	628.73	628.73	629.93	629.93	630.13	630.13		
Gradient (%)																																								
Interval of Manhole (m)	50.0	50.0	50.0	100.0	100.0	100.0	100.0	100.0	65.0	65.0	100.0	70.0	50.0	60.0	60.0	80.0	25.0	100.0	75.0																					
Cumulative Length of Manhole (m)	2825.0	2875.0	2925.0	3025.0	3125.0	3225.0	3325.0	3425.0	3490.0	3555.0	3655.0	3725.0	3775.0	3835.0	3895.0	3975.0	4000.0	4100.0	4175.0																					

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-2 (6)
Scale	H=1/5000, V=1/200
DWG. No.	A-23
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

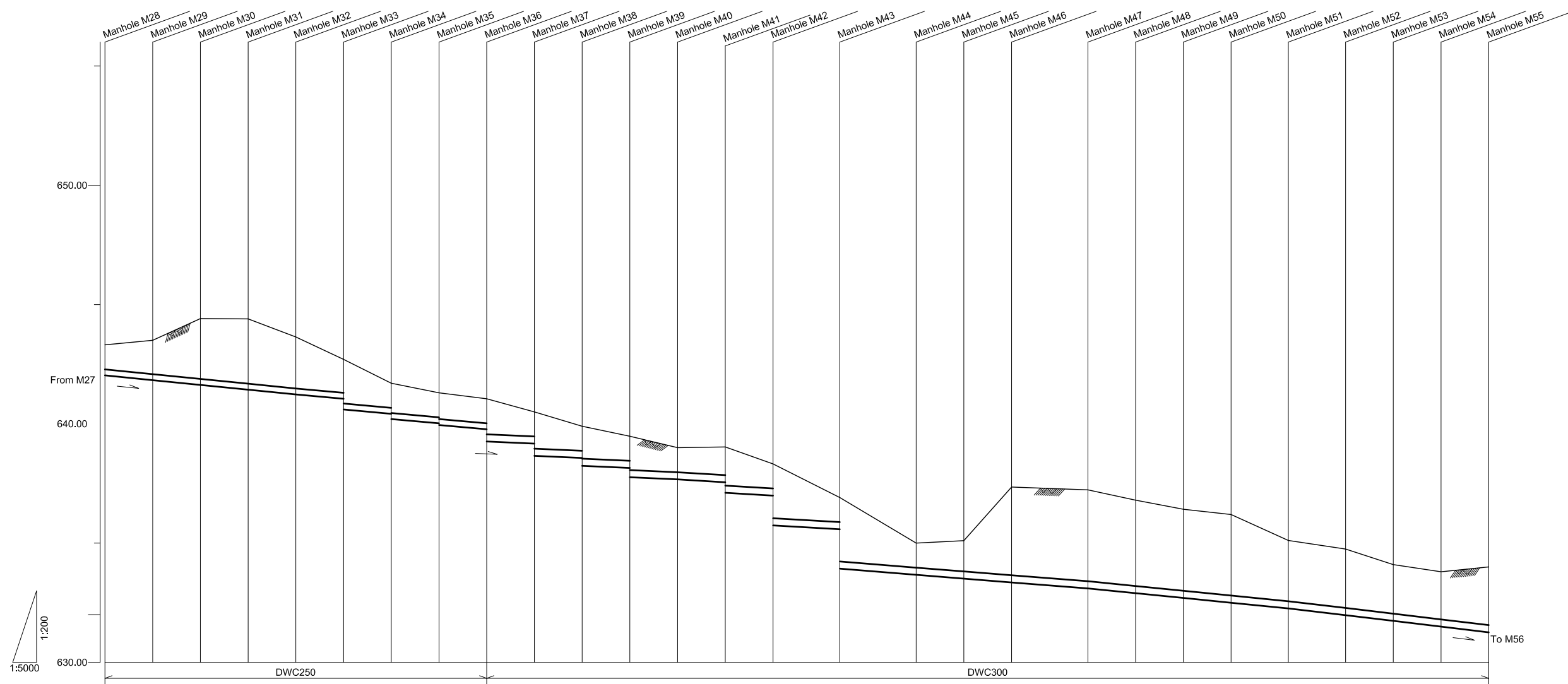


Ground Level (m)	650.86	651.07	650.73	649.45	648.70	647.83	646.19	645.30	644.60	643.40	642.66	643.40	642.25	641.70	641.80	642.30	643.10	643.90	644.10	645.20	645.37	644.80	643.91	643.92	644.30	645.70	645.03	643.31
Earth Covering(m)	1.00	1.33	1.11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.02	1.15	1.00	1.38	2.25	3.42	4.59	5.16	6.46	7.03	6.81	6.17	6.43	7.06	2.72	2.29	1.00
Invert Elevation (m)	649.69	649.57	649.45	648.28	647.53	646.66	645.02	644.13	643.43	642.23	641.49	641.21	640.93	640.53	640.25	639.88	639.51	639.14	638.77	638.52	638.12	637.77	637.52	637.27	637.02	642.70	642.46	642.03
Gradient (%)		2.5	2.5	2.5	2.4	2.4	2.4	2.4	4.2	4.2	5.7	5.7	5.7	5.7	7.5	7.5	7.5	7.5	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	
Interval of Manhole (m)	0.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	80.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	80.0	70.0	50.0	50.0	50.0	80.0	60.0	60.0
Cumulative Length of Manhole (m)	0.0	50.0	100.0	150.0	200.0	250.0	300.0	350.0	400.0	450.0	530.0	580.0	630.0	680.0	730.0	780.0	830.0	880.0	930.0	980.0	1060.0	1130.0	1180.0	1230.0	1280.0	1360.0	1420.0	1480.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-3 (1)
Scale	H=1/5000, V=1/200
DWG. No.	A-24
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

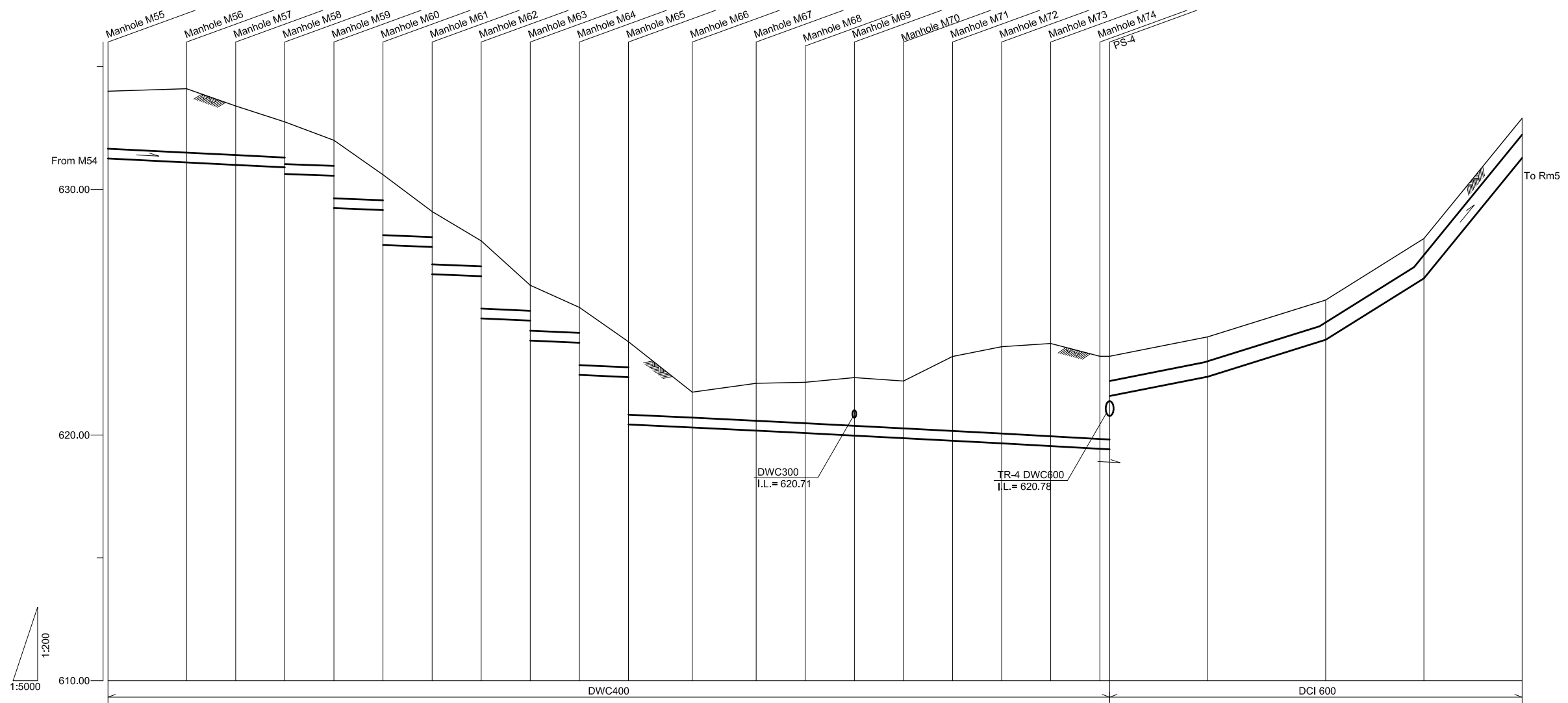


Ground Level (m)	643.31	643.50	644.10	644.40	643.64	642.70	641.70	641.30	641.05	640.50	639.90	639.48	639.00	639.03	638.32	636.91	635.00	635.10	637.35	637.23	636.80	636.42	636.20	635.11	634.75	634.10	633.80	634.00
Earth Covering(m)	1.00	1.39	2.19	2.69	2.13	1.37	1.00	1.07	1.46	1.00	1.33	1.39	1.00	1.59	2.25	2.65	1.00	1.26	3.67	3.80	3.57	3.39	3.37	2.52	2.44	2.03	1.97	2.41
Invert Elevation (m)	642.03	641.83	641.63	641.43	641.23	641.05	640.42	640.20	639.95	639.77	639.24	638.57	637.67	637.55	637.4	635.58	633.67	633.51	633.35	633.10	632.90	632.70	632.50	632.26	631.98	631.74	631.50	631.26
Gradient (%)	4.0	4.0	4.0	4.0	3.7	3.7	3.7	3.7	1.9	1.9	1.9	1.9	2.4	2.4	2.4	3.2	3.2	3.2	3.2	4.0	4.0	4.0	4.0	4.8	4.8	4.8	4.8	
Interval of Manhole (m)	60.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	70.0	80.0	50.0	50.0	80.0	50.0	50.0	50.0	60.0	60.0	50.0	50.0	50.0	
Cumulative Length of Manhole (m)	1480.0	1530.0	1580.0	1630.0	1680.0	1730.0	1780.0	1830.0	1880.0	1930.0	1980.0	2030.0	2080.0	2130.0	2180.0	2250.0	2330.0	2380.0	2430.0	2510.0	2560.0	2610.0	2660.0	2720.0	2780.0	2830.0	2880.0	2930.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-3 (2)
Scale	H=1/5000, V=1/200
DWG. No.	A-25
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

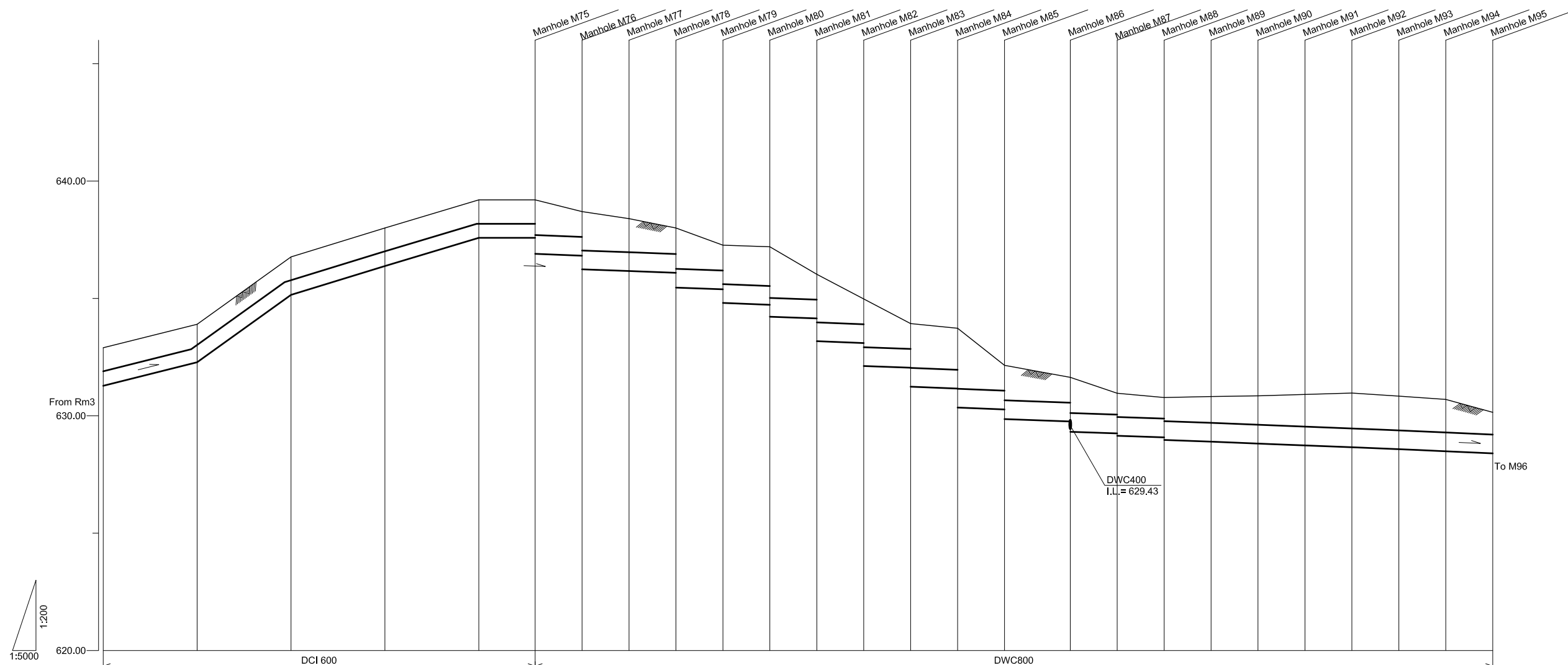


Ground Level (m)	634.00	634.10	634.40	632.75	632.00	630.60	629.10	627.91	626.10	625.20	623.80	621.75	622.11	622.15	622.34	622.20	623.20	623.60	623.73	623.21	623.21	624.00	625.50	628.00	632.90																									
Earth Covering(m)	2.30	2.56	2.56	1.96	1.96	1.41	1.68	1.00	2.32	1.00	2.42	1.00	2.11	1.00	2.72	1.00	1.81	1.00	2.31	1.00	2.93	1.00	1.00	1.00	1.49	1.49	1.63	1.63	1.92	1.92	1.88	1.88	2.99	2.99	3.50	3.50	3.74	3.74	3.33	3.33	3.33	3.33	1.00	1.00	1.00	1.00	1.00	1.00		
Invert Elevation (m)	631.26	631.10	631.10	631.00	631.00	630.90	630.63	630.56	629.24	629.16	627.74	627.66	626.55	626.47	624.75	624.66	623.85	623.76	622.45	622.36	620.43	620.31	620.31	620.18	620.18	620.08	620.08	619.98	619.98	619.88	619.88	619.77	619.77	619.66	619.66	619.55	619.55	619.44	619.44	619.44	619.44	622.38	622.38	623.88	623.88	626.38	626.38	631.28		
Gradient (%)		2.0	2.0	2.0	1.5	1.5	1.5	1.5	1.5	1.8	1.8	1.8	1.8	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.3	2.3																												
Interval of Manhole (m)	50.0	80.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	65.0	65.0	65.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	100.0	100.0	100.0	100.0	100.0			
Cumulative Length of Manhole (m)	2930.0	3010.0	3060.0	3110.0	3160.0	3210.0	3260.0	3310.0	3360.0	3410.0	3460.0	3525.0	3590.0	3640.0	3690.0	3740.0	3790.0	3840.0	3890.0	3940.0	3950.0	3950.0	4050.0	4150.0	4250.0	4350.0																								

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-3 (3)
Scale	H=1/5000, V=1/200
DWG. No.	A-26
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

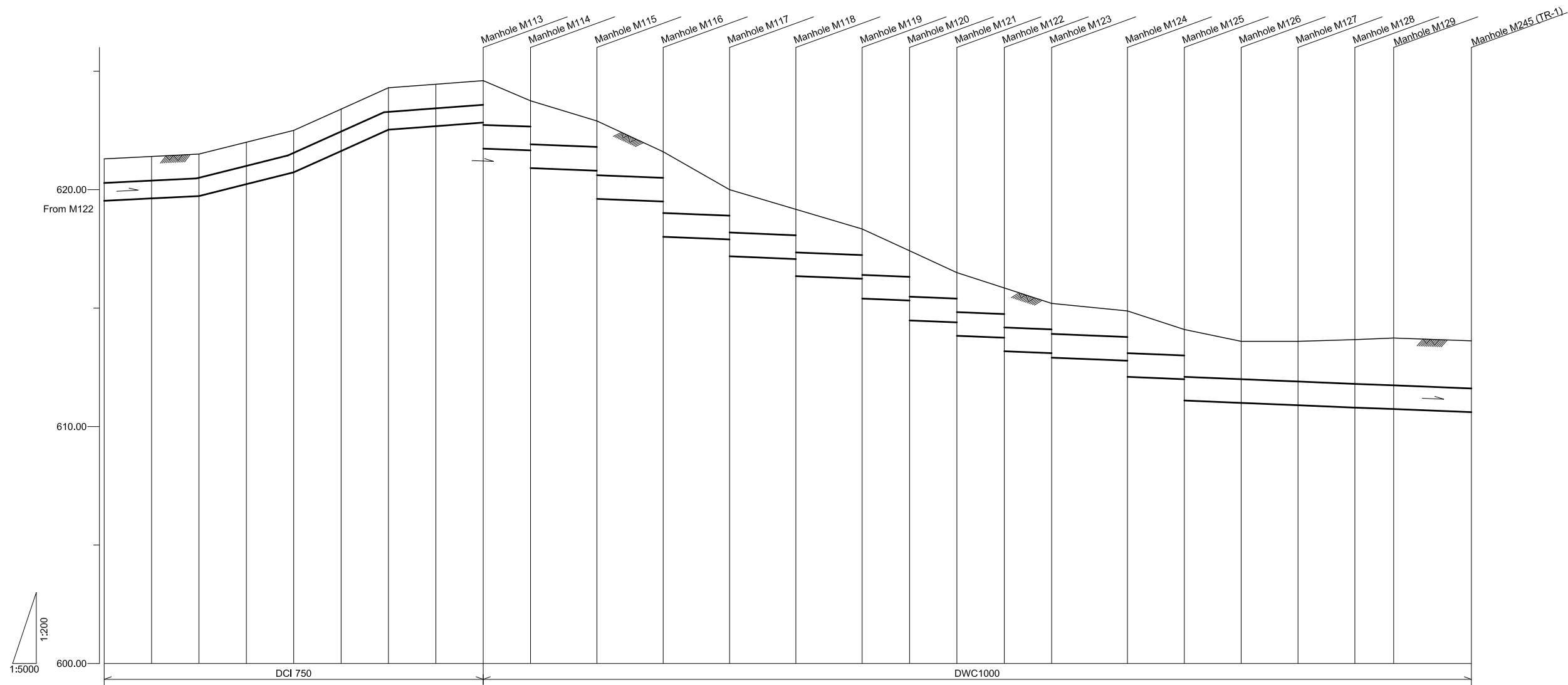


Ground Level (m)	632.90	633.90	636.77	638.00	639.20	639.20	638.70	638.40	638.00	637.27	636.03	636.03	634.98	633.93	633.04	632.15	631.64	631.13	630.96	630.78	630.82	630.85	630.91	630.97	630.84	630.70		
Earth Covering(m)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.12	1.12	1.23	1.23	1.37	1.37	1.47	1.42
Invert Elevation (m)	631.28	632.28	635.15	636.38	637.58	636.90	636.82	636.17	635.09	634.81	634.73	634.22	634.15	633.18	633.10	632.12	629.76	629.32	629.25	629.08	628.90	628.82	628.74	628.66	628.58	628.49	628.40	
Gradient (%)						1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.8	1.8		
Interval of Manhole (m)	100.0	100.0	100.0	100.0	100.0	60.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	70.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	
Cumulative Length of Manhole (m)	4350.0	4450.0	4550.0	4650.0	4750.0	4810.0	4860.0	4910.0	4960.0	5010.0	5060.0	5110.0	5160.0	5210.0	5260.0	5310.0	5380.0	5430.0	5480.0	5530.0	5580.0	5630.0	5680.0	5730.0	5780.0	5830.0		

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-3 (4)
Scale	H=1/5000, V=1/200
DWG. No.	A-27
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

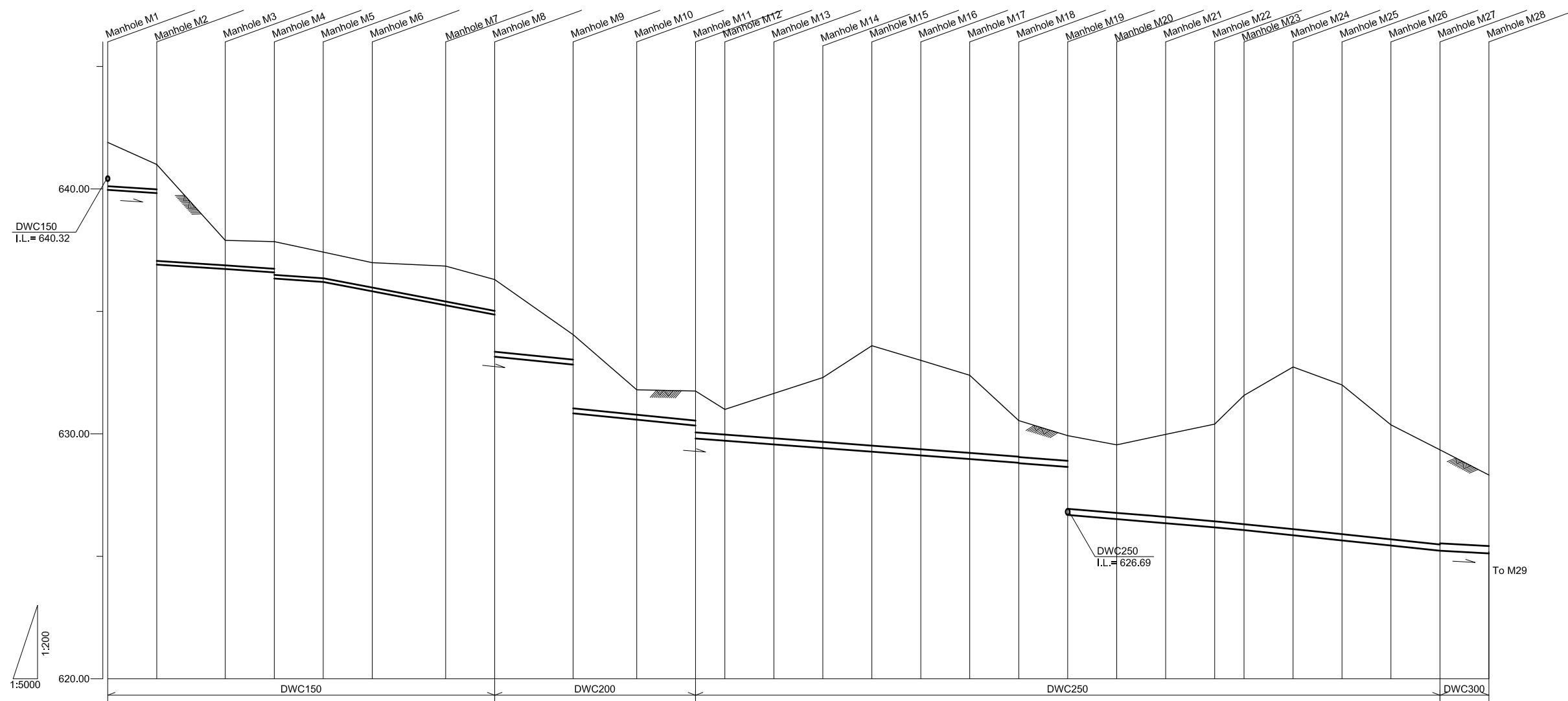


Ground Level (m)	621.30	621.40	621.50	622.00	622.50	623.40	624.30	624.45	624.60	623.75	622.90	621.60	620.00	619.17	618.34	617.42	616.50	615.85	615.20	614.88	614.10	613.60	613.60	613.67	613.74	613.62	
Earth Covering(m)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.77	2.19	2.49	1.71	1.72	1.84	1.84	1.57	1.57	1.19	1.68	1.90	1.50	1.60	1.67	1.69	1.91	
Invert Elevation (m)	619.53	619.63	619.73	620.23	620.73	621.63	622.53	622.68	622.83	621.73	620.80	619.50	617.90	617.07	616.24	615.32	614.40	613.75	613.10	612.91	612.78	612.00	611.00	610.90	610.80	610.74	610.61
Gradient (%)										1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
Interval of Manhole (m)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0	80.0	60.0	60.0	60.0	60.0	41.0	82.0	
Cumulative Length of Manhole (m)	7300.0	7350.0	7400.0	7450.0	7500.0	7550.0	7600.0	7650.0	7700.0	7750.0	7820.0	7890.0	7960.0	8030.0	8100.0	8150.0	8200.0	8250.0	8300.0	8380.0	8440.0	8500.0	8560.0	8620.0	8661.0	8743.0	

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-3 (6)
Scale	H=1/5000, V=1/200
DWG. No.	A-29
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

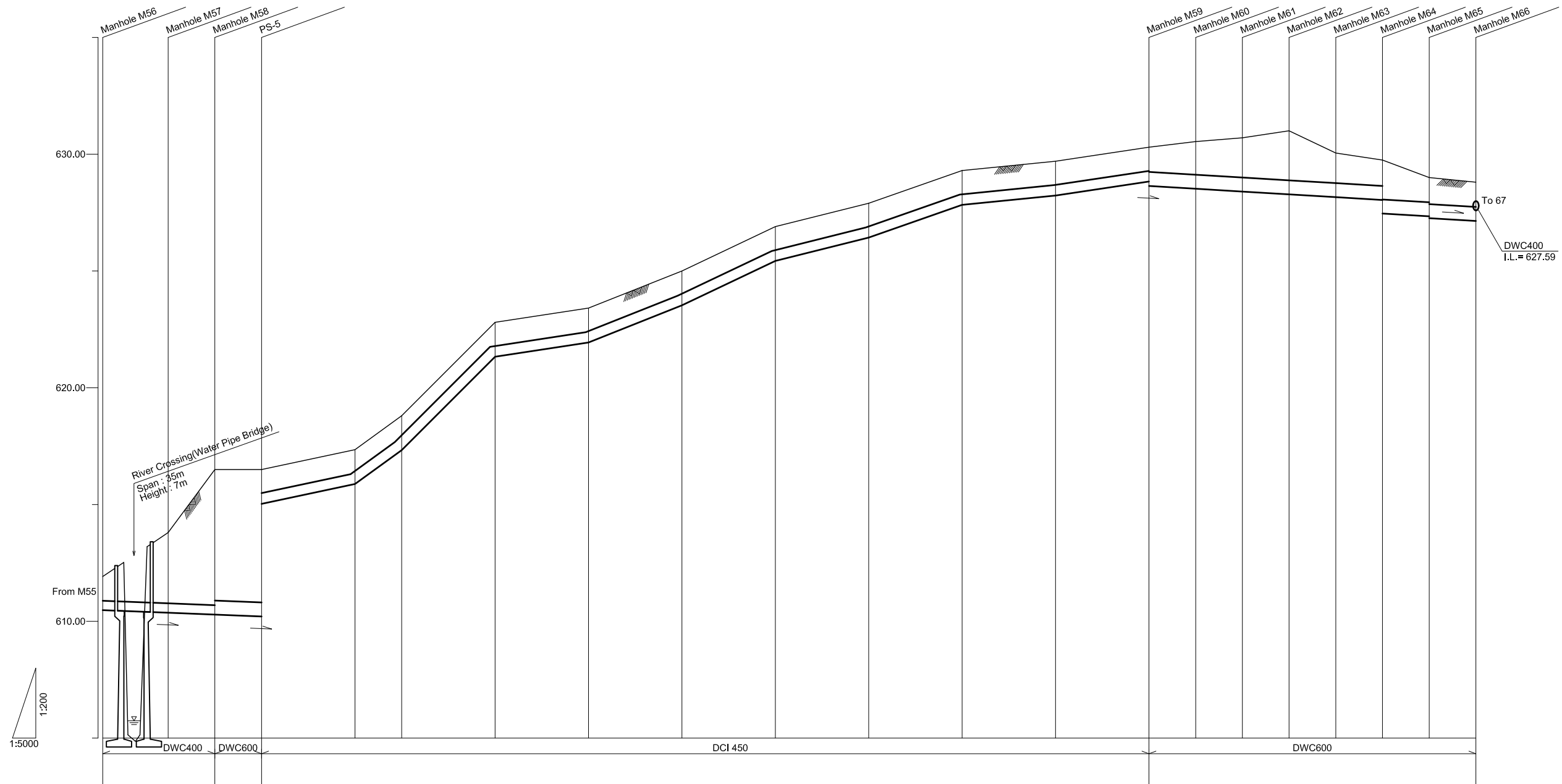


Ground Level (m)	641.90	641.00	637.90	637.85	637.42	636.98	636.85	636.30	634.05	631.80	631.75	631.00	631.65	632.30	633.60	633.00	632.38	630.54	629.93	629.55	629.98	630.40	631.57	632.73	632.00	630.37	629.35	628.32																									
Earth Covering(m)	1.77	1.00	3.92	1.00	1.09	1.34	1.05	1.05	1.00	1.00	1.43	1.43	1.26	2.93	1.00	2.99	1.00	1.00	1.19	1.66	1.00	1.00	1.80	1.80	2.60	2.60	4.05	4.05	3.59	3.59	3.14	3.14	1.44	1.46	1.00	2.96	2.75	2.75	3.34	3.34	3.94	3.94	5.21	5.21	6.59	6.59	6.07	6.07	4.65	4.65	3.84	3.79	2.87
Invert Elevation (m)	639.96	639.83	636.91	636.73	636.59	636.34	636.20	636.20	635.82	635.82	635.25	635.25	634.87	633.15	632.83	630.84	630.58	630.58	630.34	629.81	629.72	629.72	629.57	629.57	629.42	629.42	629.27	629.27	629.12	629.12	628.97	628.97	628.82	628.80	628.65	626.69	626.52	626.52	626.35	626.35	626.18	626.18	626.07	626.07	625.86	625.86	625.65	625.65	625.44	625.44	625.23	625.23	625.12
Gradient (%)		2.7	2.7	2.7	2.7	7.6	7.6	7.6	4.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.4	3.4	3.4	3.4	4.2	4.2	4.2	4.2	2.2																									
Interval of Manhole (m)	0.0	50.0	70.0	50.0	50.0	50.0	75.0	50.0	80.0	65.0	60.0	30.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	30.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0				
Cumulative Length of Manhole (m)	0.0	50.0	120.0	170.0	220.0	270.0	345.0	395.0	475.0	540.0	600.0	630.0	680.0	730.0	780.0	830.0	880.0	930.0	980.0	1030.0	1080.0	1130.0	1160.0	1210.0	1260.0	1310.0	1360.0	1410.0																									

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-4 (1)
Scale	H=1/5000, V=1/200
DWG. No.	A-30
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

PROFILE Scale : H=1/5000, V=1/200

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

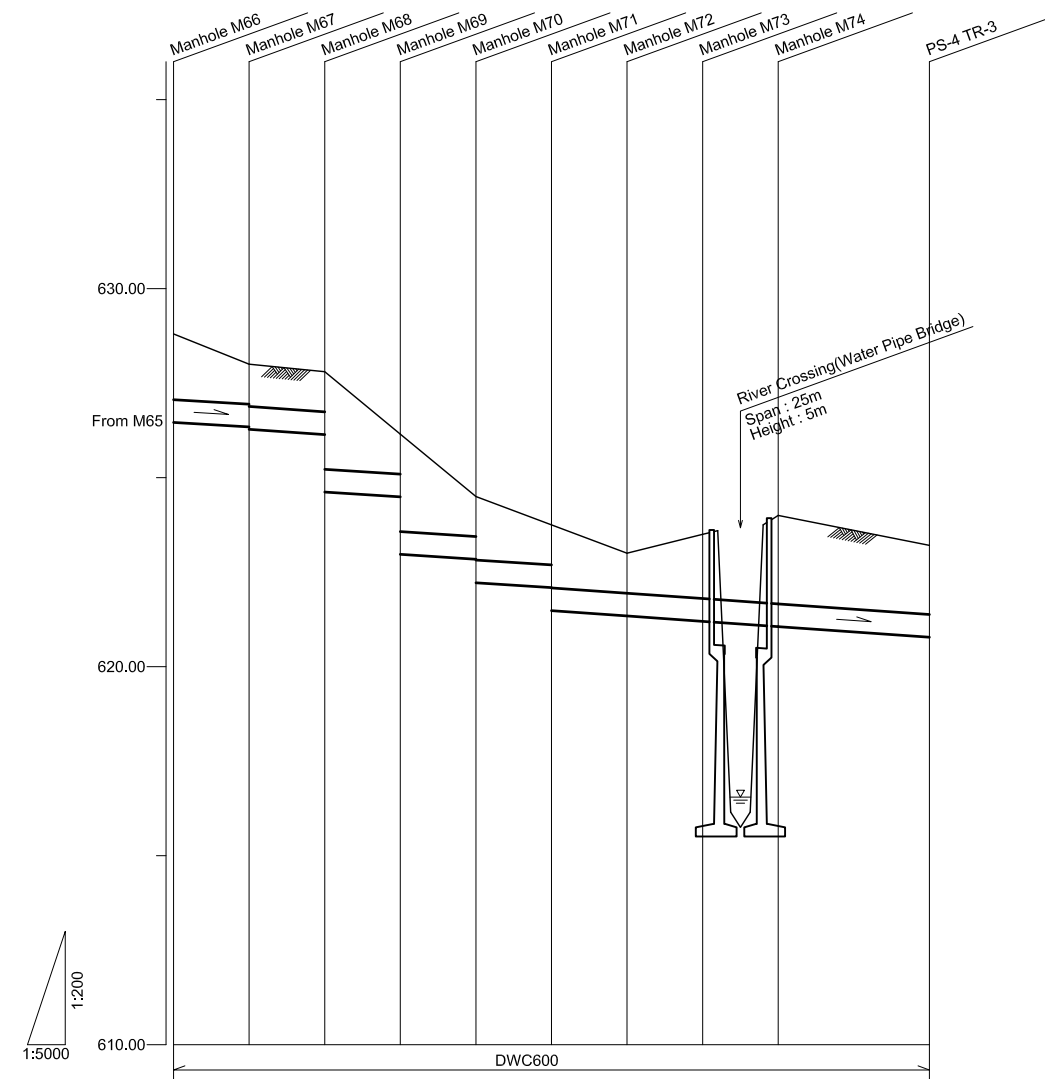


Ground Level (m)	611.92	613.80	616.50	616.50	617.35	618.80	622.80	623.41	625.00	626.90	627.90	629.30	629.70	630.30	630.54	630.70	631.00	630.50	629.75	629.00	628.80
Earth Covering(m)	1.00	2.99	5.77	5.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.36	1.64	2.06	1.68	1.63	1.00	1.00
Invert Elevation (m)	610.48	610.37	610.29	610.21	615.88	617.33	621.33	621.94	623.53	625.43	626.43	627.83	628.23	628.83	628.52	628.40	628.28	628.16	628.04	627.34	627.14
Gradient (%)	1.5	1.5	2.2												2.3	2.3	2.3	2.3	2.5	2.5	2.5
Interval of Manhole (m)	50.0	70.0	50.0	50.0	100.0	50.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Cumulative Length of Manhole (m)	2810.0	2880.0	2930.0	2980.0	3080.0	3130.0	3230.0	3330.0	3430.0	3530.0	3630.0	3730.0	3830.0	3930.0	3980.0	4030.0	4080.0	4130.0	4180.0	4230.0	4280.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-4 (3)
Scale	H=1/5000, V=1/200
DWG. No.	A-32
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

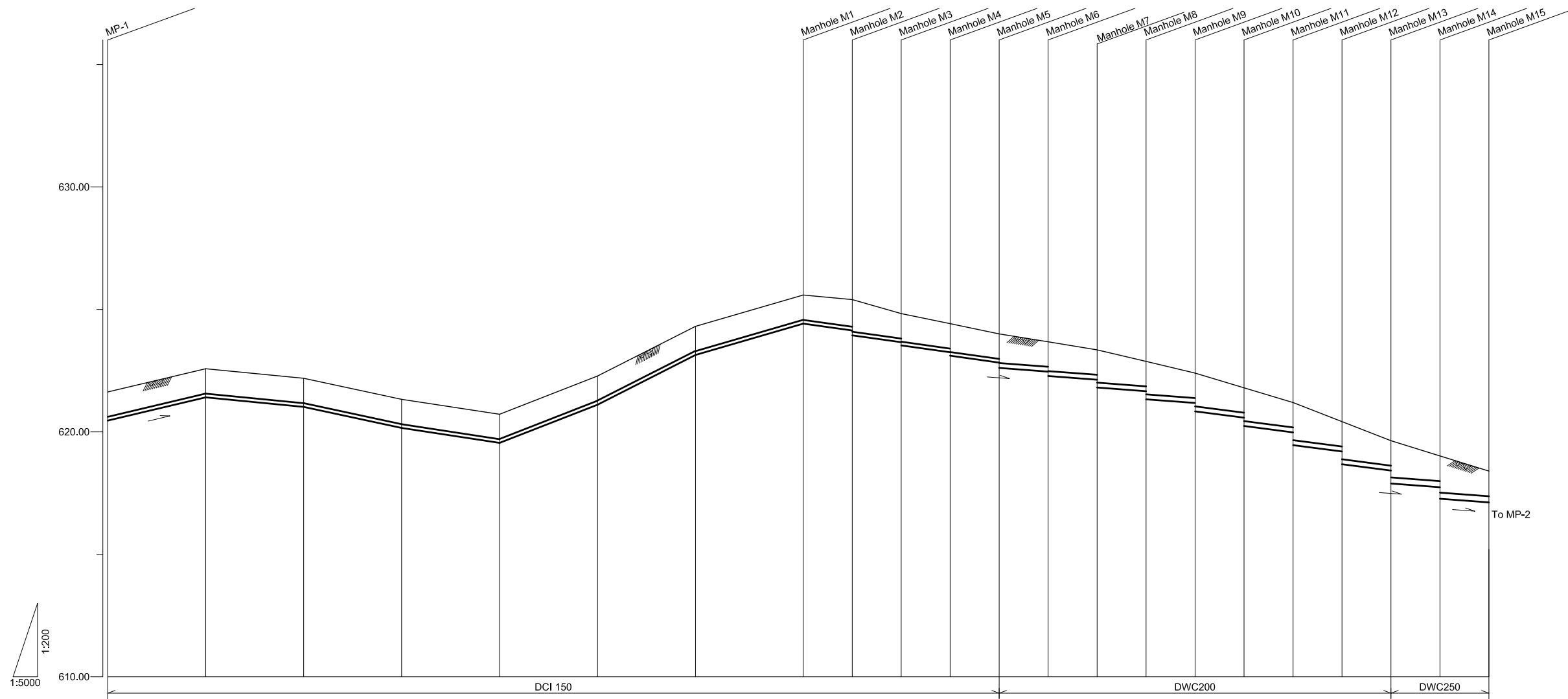


Ground Level (m)	628.80	628.00	627.80	626.15	624.50	623.75	623.00	623.50	624.00	623.21
Earth Covering(m)	1.68	1.00	1.06	1.00	1.00	1.62	1.00	1.64	2.28	1.00
Invert Elevation (m)	626.46	626.34	626.28	624.62	624.49	622.84	622.22	622.09	621.48	621.34
Gradient (‰)		2.5	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Interval of Manhole (m)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	100.0
Cumulative Length of Manhole (m)	4280.0	4330.0	4380.0	4430.0	4480.0	4530.0	4580.0	4630.0	4680.0	4780.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-4 (4)
Scale	H=1/5000, V=1/200
DWG. No.	A-33
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

PROFILE Scale : H=1/5000, V=1/200

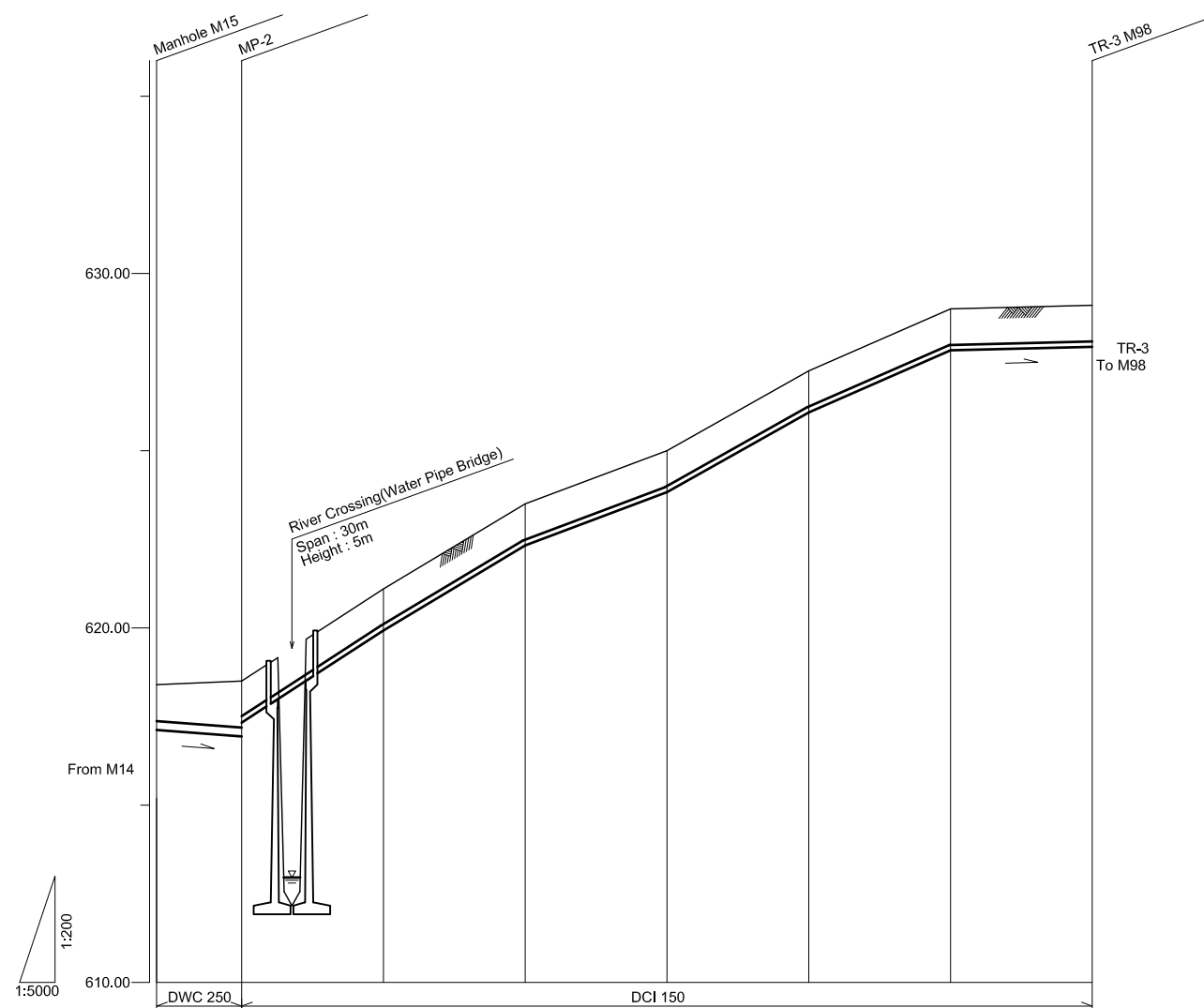


Ground Level (m)	621.63	622.58	622.19	621.33	620.72	622.28	624.31	625.59	625.40	624.83	624.42	624.00	623.68	623.35	622.88	622.40	621.80	621.20	620.42	619.64	619.02	618.40
Earth Covering(m)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.09	1.14	1.00	1.18	1.00	1.33	1.33	1.00	1.34	1.52	1.52	1.00	1.47	1.00
Invert Elevation (m)	620.46	621.41	621.02	620.16	619.55	621.11	623.14	624.42	624.14	623.66	623.25	622.83	622.46	622.13	621.66	621.18	620.58	619.98	619.20	618.42	617.74	617.12
Gradient (‰)								5.5	5.5	5.5	5.5	3.0	3.0	3.0	3.0	5.2	5.2	5.2	5.2	3.0	3.0	
Interval of Manhole (m)	0.0	100.0	100.0	100.0	100.0	100.0	100.0	110.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Cumulative Length of Manhole (m)	0.0	100.0	200.0	300.0	400.0	500.0	600.0	710.0	760.0	810.0	860.0	910.0	960.0	1010.0	1060.0	1110.0	1160.0	1210.0	1260.0	1310.0	1360.0	1410.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-5 (1)
Scale	H=1/5000, V=1/200
DWG. No.	A-34
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend	
DWC	: Double Wall Cerrugated Pipe
RCC	: Reinforced Cement Concrete Pipe
DCI	: Ductile Cast Iron Pipe
PS	: Pump Station
MP	: Manhole Pump

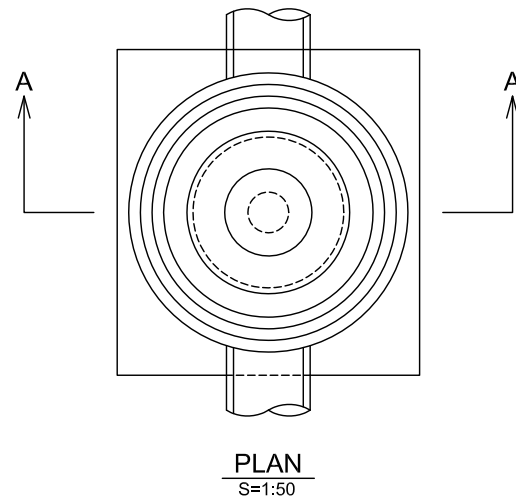
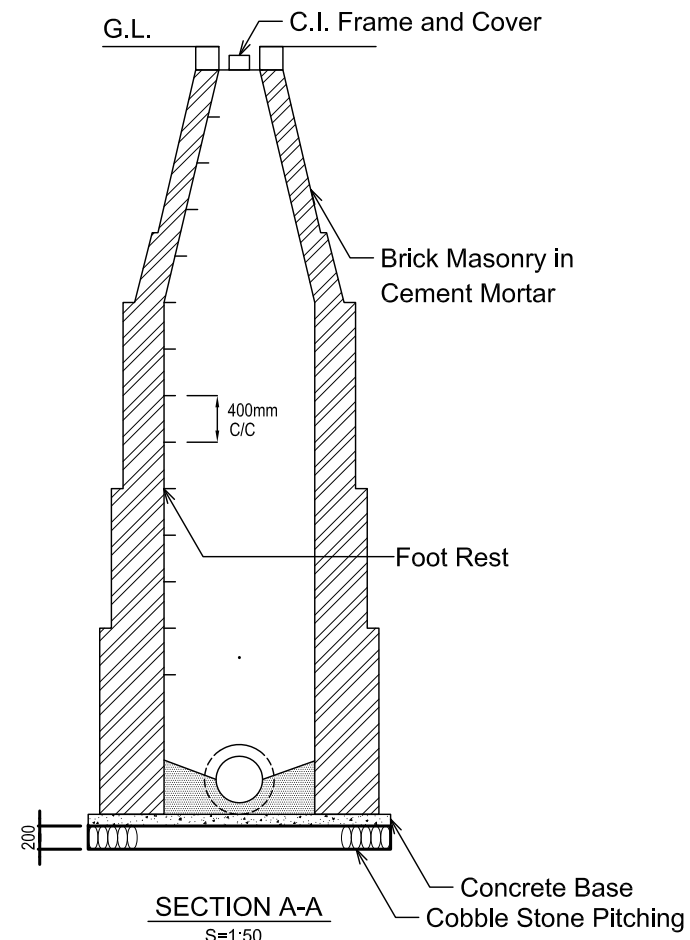
PROFILE Scale : H=1/5000, V=1/200



Ground Level (m)	618.40	618.50	621.10	623.50	625.00	627.25	629.00	629.10
Earth Covering(m)	1.00	1.28	1.00	1.00	1.00	1.00	1.00	1.00
Invert Elevation (m)	617.12	616.94 617.33	619.93 619.93	622.33 622.33	623.83 623.83	626.08 626.08	627.83 627.83	627.93
Gradient (%)	3.0							
Interval of Manhole (m)	0.0	60.0	100.0	100.0	100.0	100.0	100.0	100.0
Cumulative Length of Manhole (m)	1410.0	1470.0	1570.0	1670.0	1770.0	1870.0	1970.0	2070.0

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Profile of Trunk Sewer Line TR-5 (2)
Scale	H=1/5000, V=1/200
DWG. No.	A-35
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

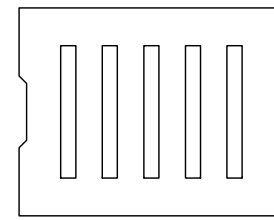
Typical Structure of Diversion Chamber, Manhole and U-shaped Drain



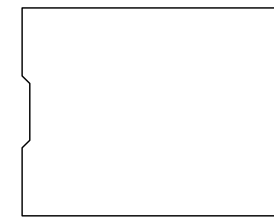
Typical Circular Manhole

Diameter by Manhole Depth

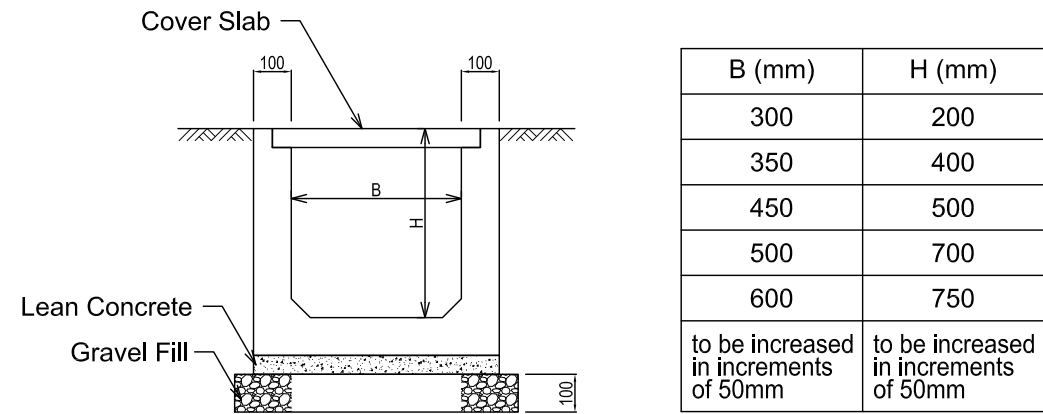
No.	Range of Depths	Internal Diameter
1	above 0.90 m and up to 1.65 m	0.9 m
2	above 1.65 m and up to 2.30 m	1.2 m
3	above 2.30 m and up to 9.0 m	1.5 m
4	above 9.0 m and up to 14.0 m	1.8 m



Perforated Cover Slab

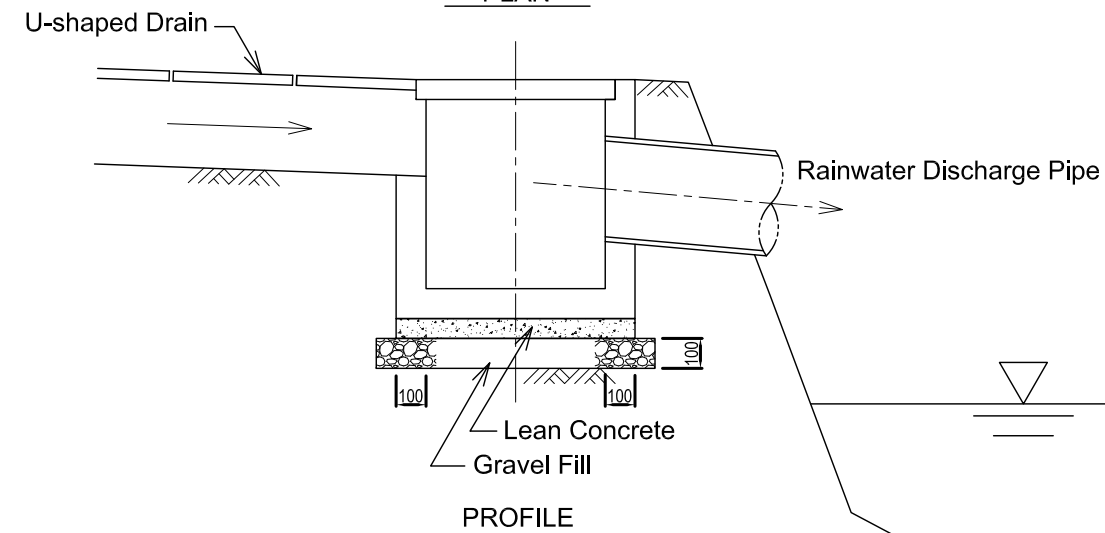
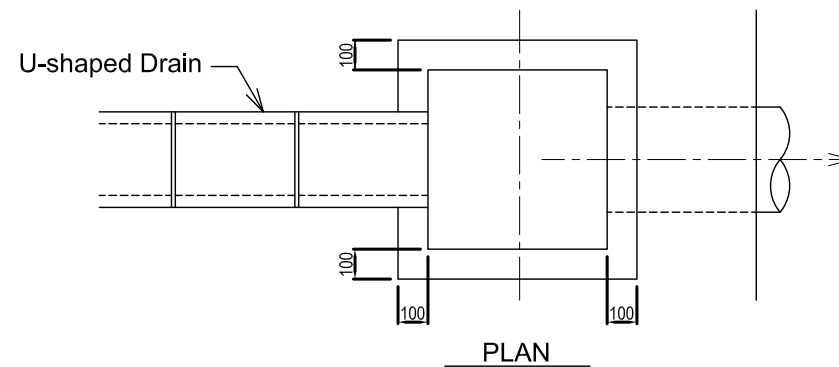


Normal Cover Slab



Typical Section of U-shaped Drain

S=1:20

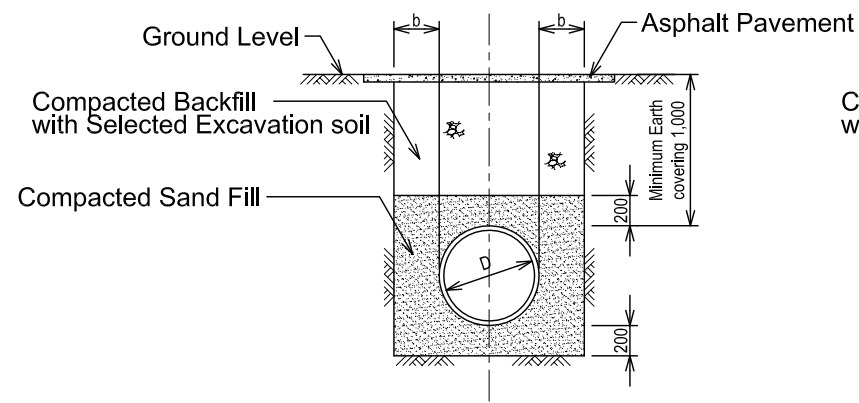


Rainwater Outlet

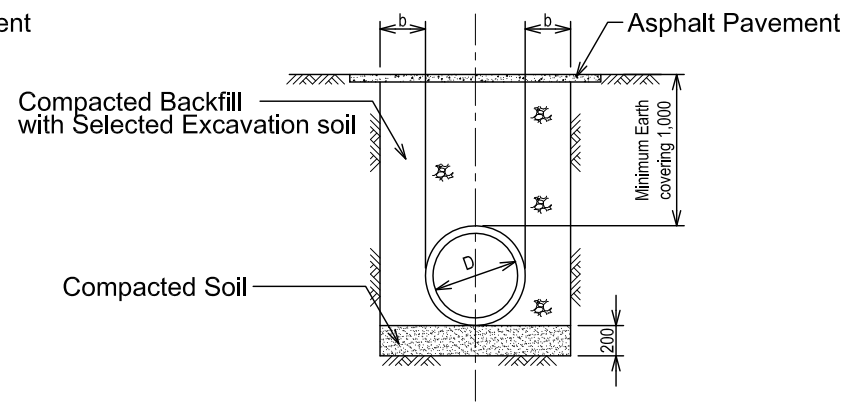
S=1:20

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Typical Structure of Diversion Chamber, Manhole and U-shaped Drain
Scale	1/20, 1/50
DWG. No.	A-36
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Pipe Installation and Pipe Bridge



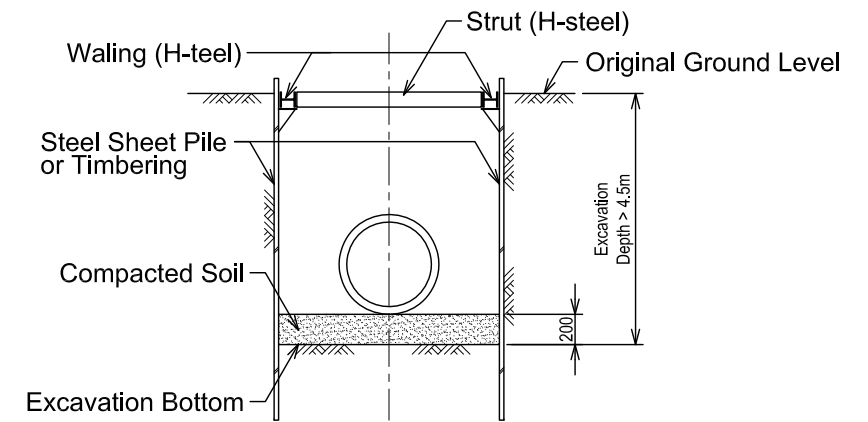
Double Wall Corrugated Pipe ($D \leq 1000$)
S=1:50



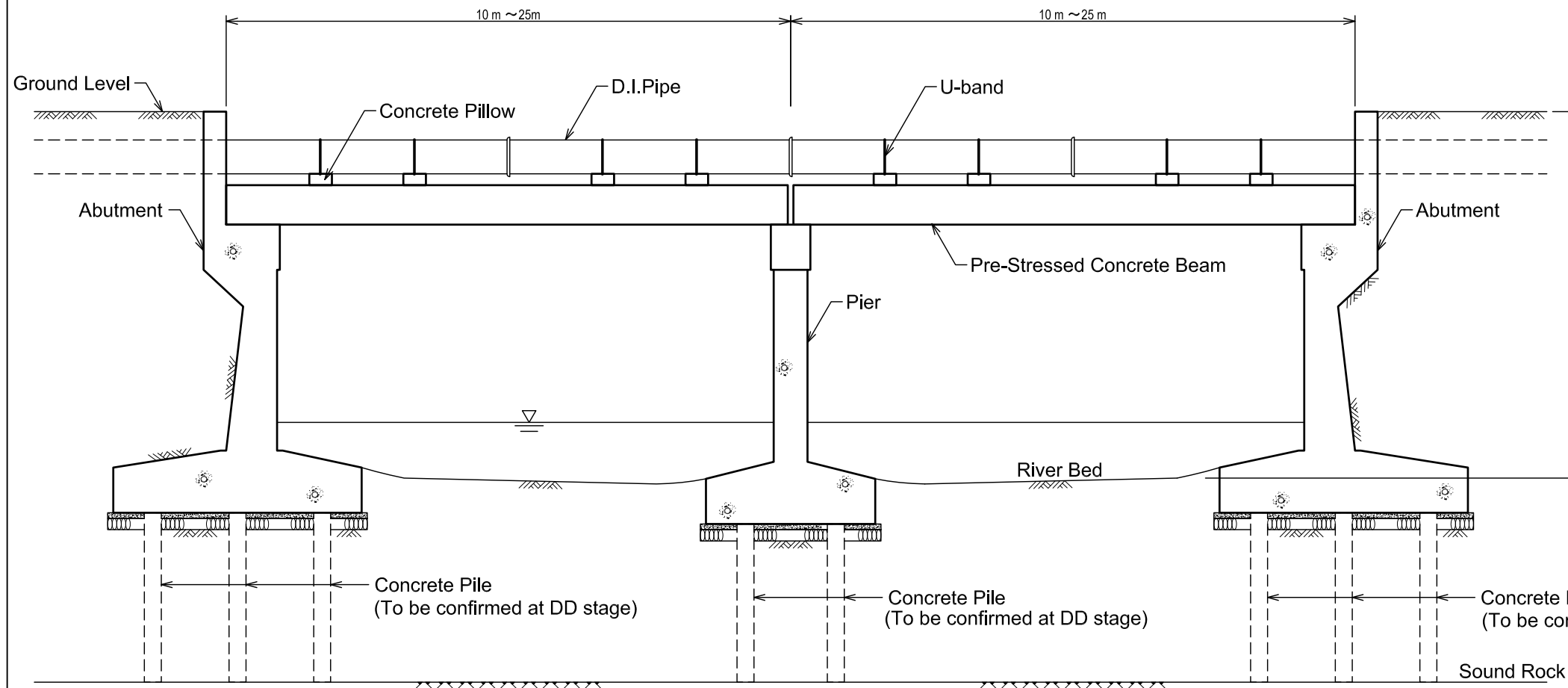
Reinforced Concrete Hume Pipe ($D > 1000$) / Ductile Cast Iron Pipe
S=1:50

Typical Section of Pipe Installation

Pipe Dia (mm)	b (mm)
$D \leq 300$	300
$D > 300$	600



Pipe Installation Applying Steel Sheet Pile
S=1:50



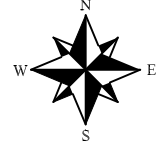
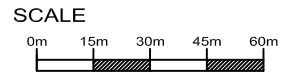
Typical River Crossing Structure
S=1:100

No.	No. of Span	One Span Length (m)	Location
Zone-II			
RC1	3	10 m	TR-1, PS-1 site
RC2	1	25 m	TR-1, PS-2 site
RC3	3	10 m	TR-2, PS-3 site
RC4	1	10 m	TR-3, Manhole No.110 site
RC5	1	25 m	TR-4, Manhole No.73 site
RC6	4	16 m	TR-4, PS-6 site
RC7	2	15 m	TR-5, MP-2 site
Zone-III/IV			
RC1	5	24 m	TR-1, PS-3 site
RC2	1	20 m	TR-2, Nati River Crossing of Khuti Road
RC3	3	23 m	TR-3, PS-4 site on Khuti Road

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Pipe Installation and Pipe Bridge
Scale	1/50, 1/100
DWG. No.	A-37
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Legend

Description	Symbol
Contour Line	
Electric Pole	
Existing Structure	
Road	
High Tension Tower	
River	



X=333194.413
Y=2584246.500

X=333353.679
Y=2584191.028

X=333454.995
Y=2584186.449

X=333642.242
Y=2584142.546

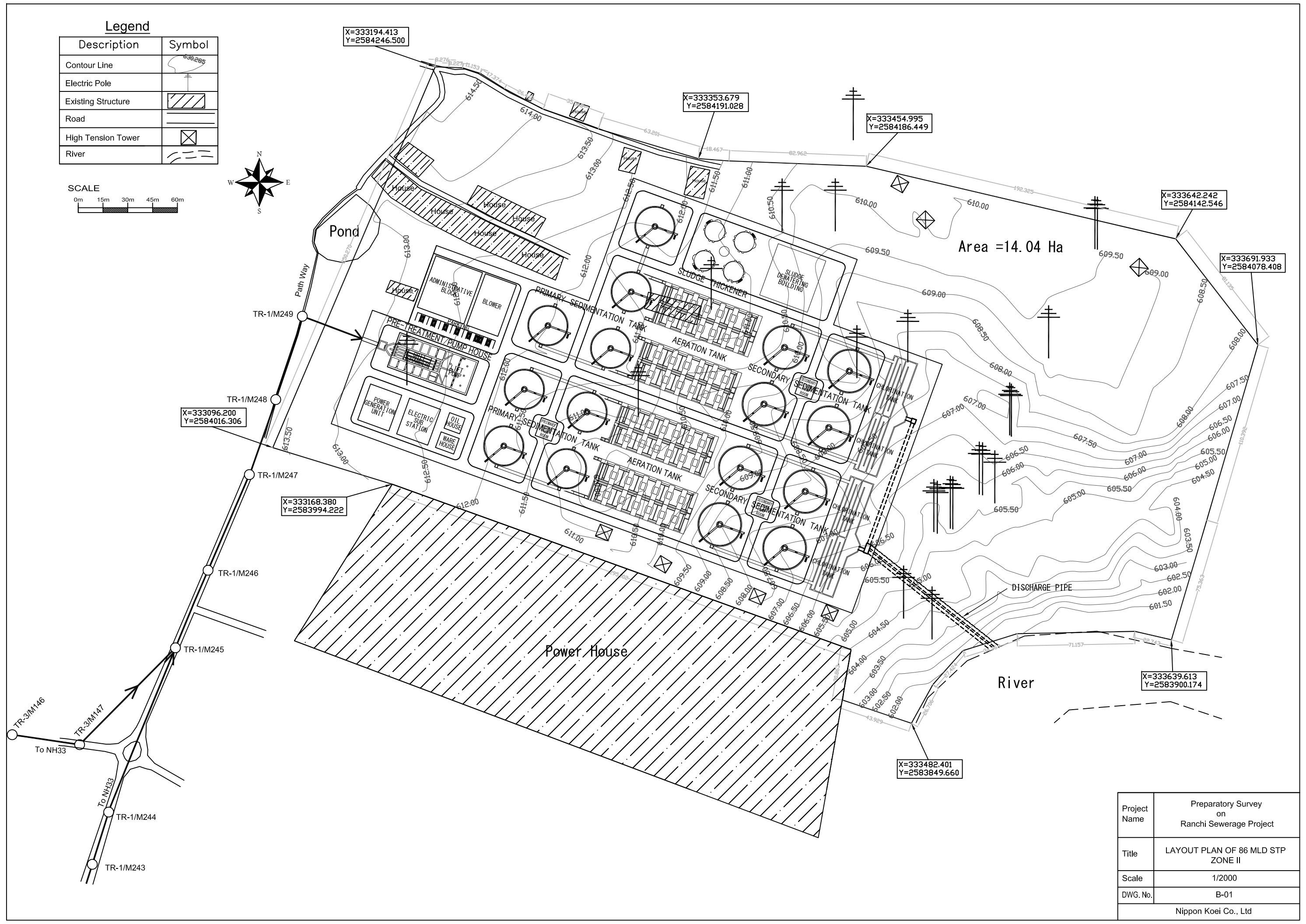
X=333691.933
Y=2584078.408

X=333096.200
Y=2584016.306

X=333168.380
Y=2583994.222

X=333639.613
Y=2583900.174

X=333482.401
Y=2583849.660



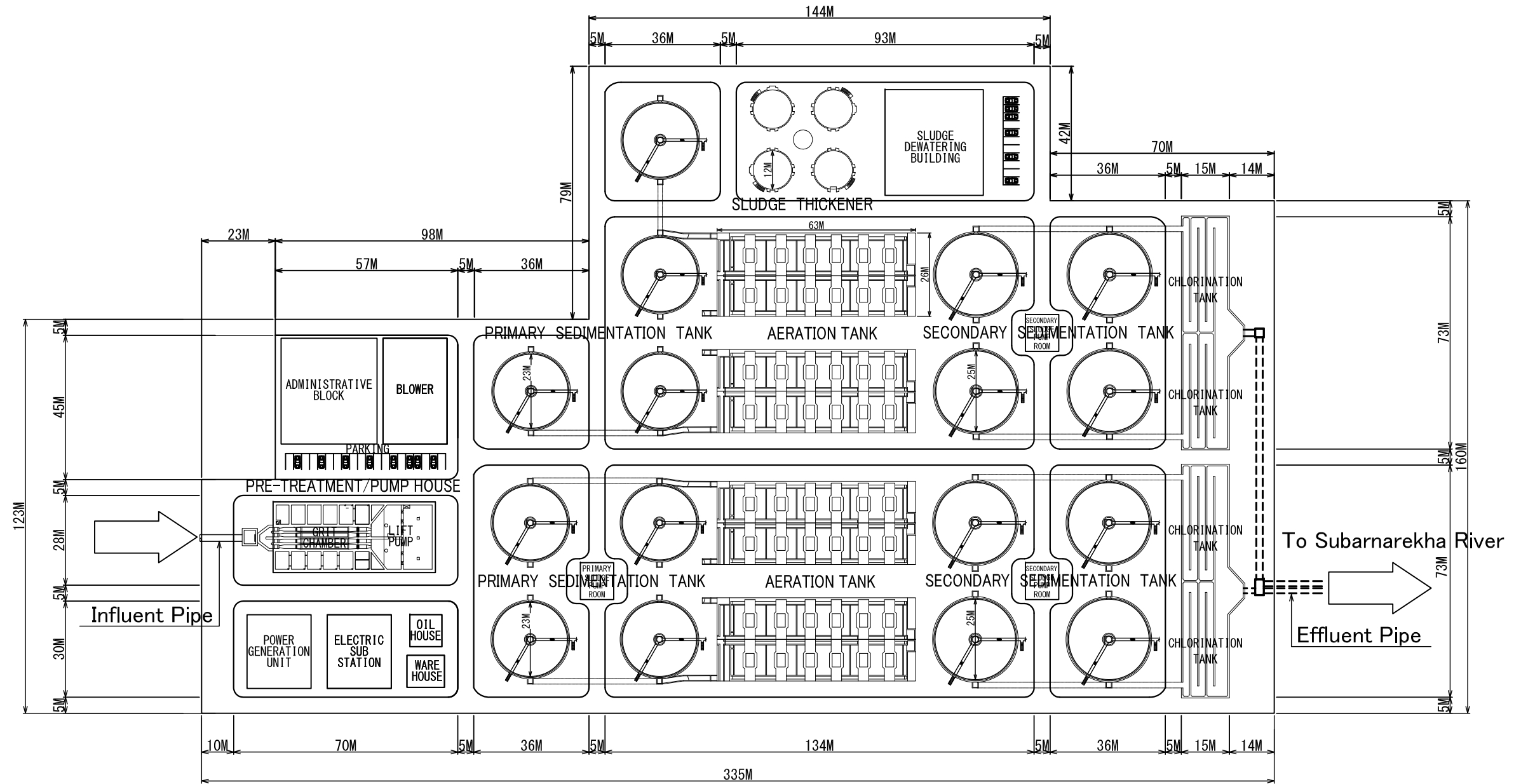
Area =14.04 Ha

Power House

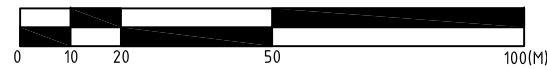
River

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	LAYOUT PLAN OF 86 MLD STP ZONE II
Scale	1/2000
DWG. No.	B-01
Nippon Koei Co., Ltd	

LAYOUT PLAN OF 86 MLD STP (CAS: 5.4 ha)



SCALE 1/1500

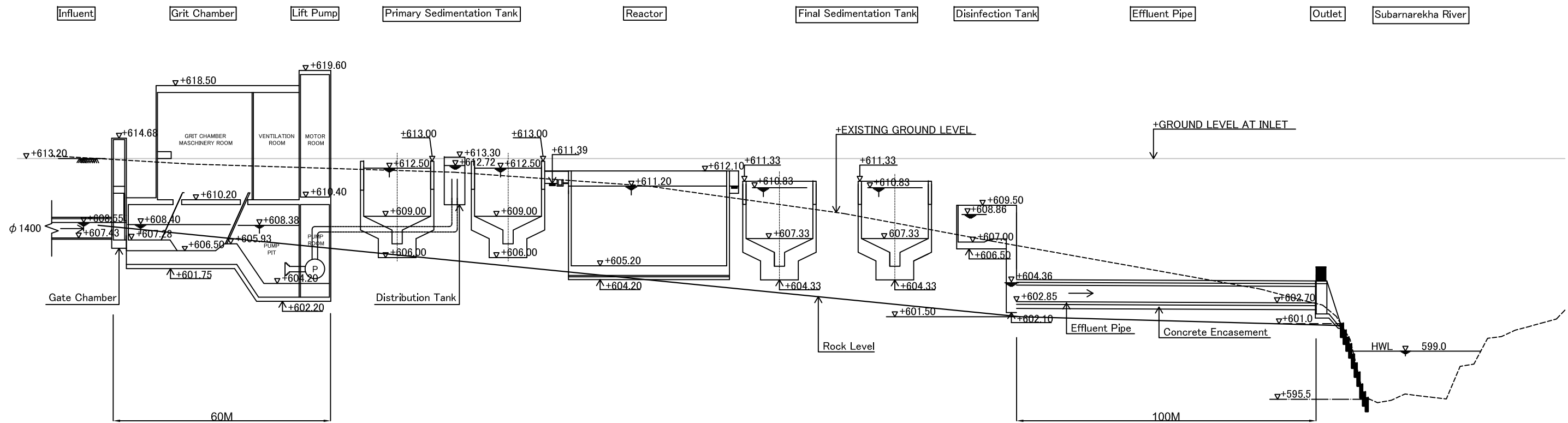


Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	LAYOUT PLAN OF 86 MLD STP
Scale	1/1500
DWG. No.	B-02
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

GENERAL CROSS-SECTION OF 86MLD STP

SCALE : H=1/1500

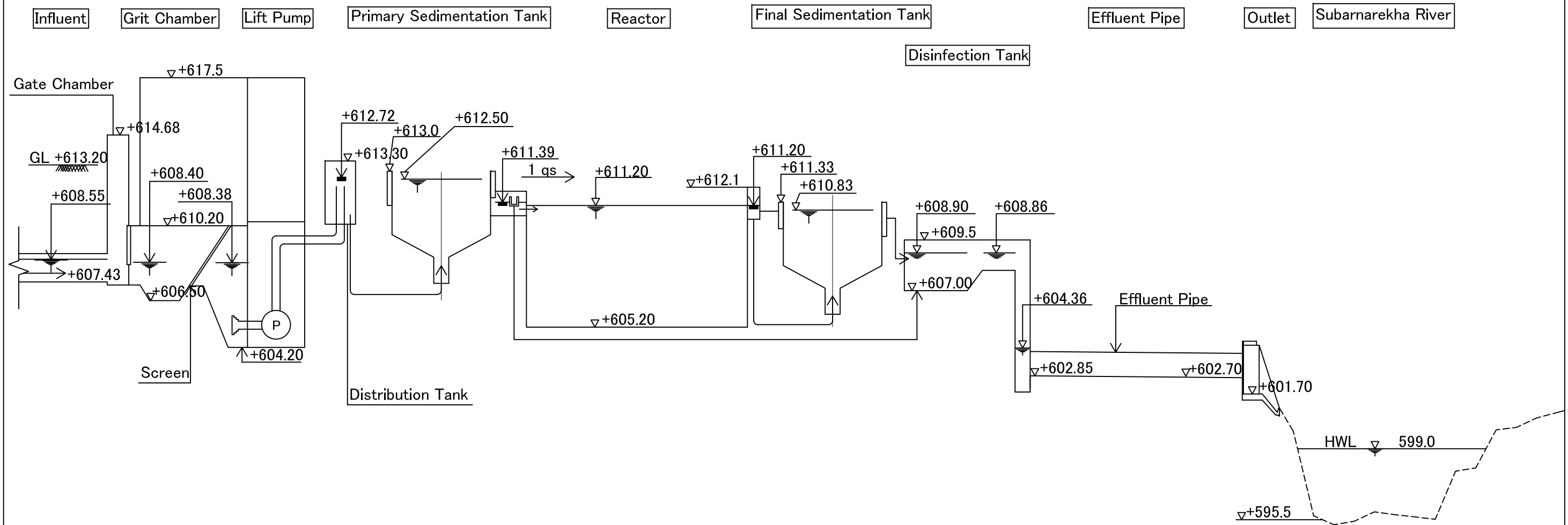
V=1/300



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	GENAL CROSS SECTION OF 86MLD STP
Scale	1/1500 (Horizontal) 1/300 (Vertical)
DWG. No.	B-03
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

HYDRAULIC PROFILE OF 86MLD STP

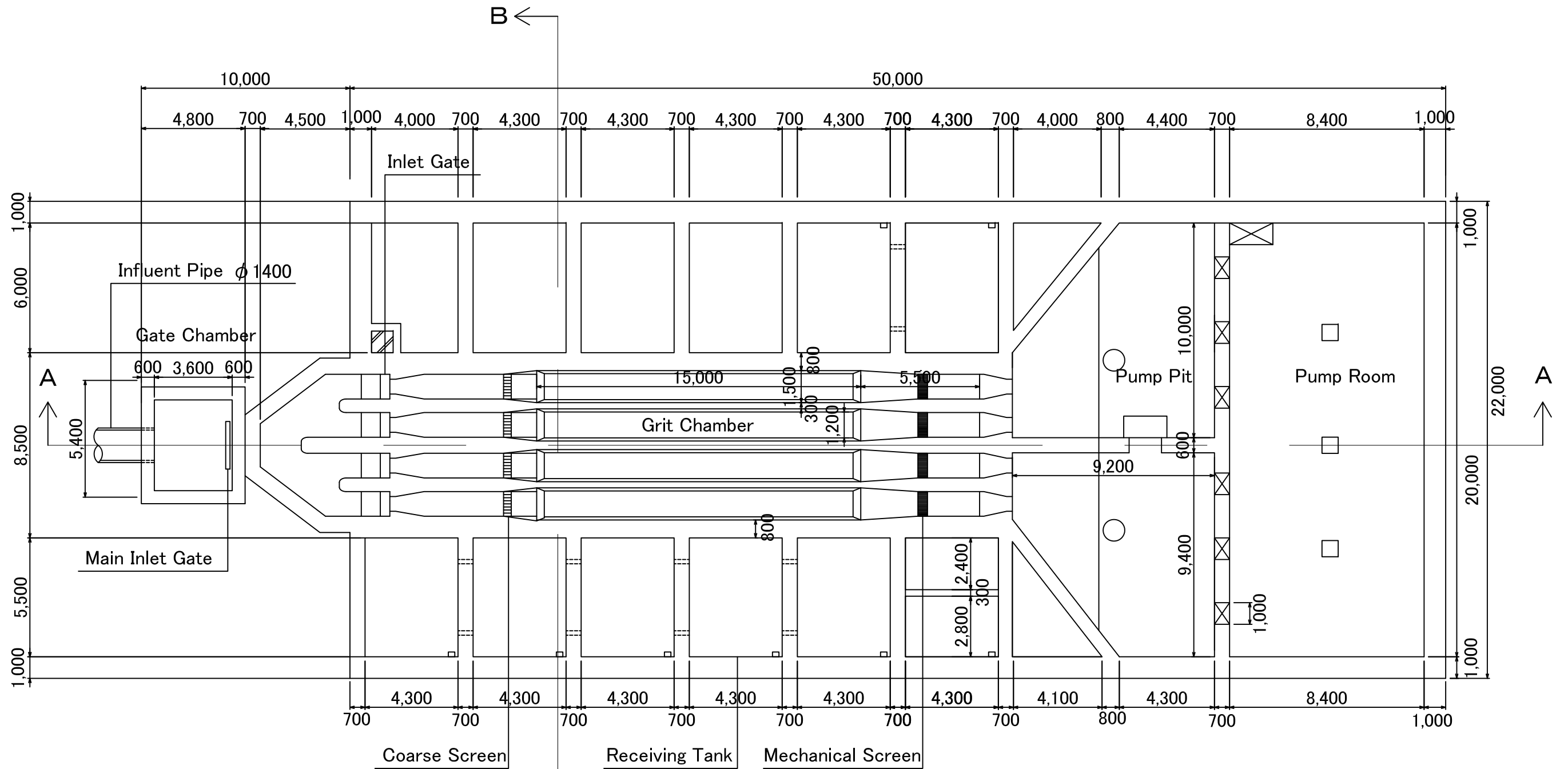
SCALE :1/200 (Vertical)



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	HYDRAULIC PROFILE OF 86MLD STP
Scale	1/200 (Vertical)
DWG. No.	B-04
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

PLAN OF INLET, GRIT CHAMBER AND PUMP HOUSE

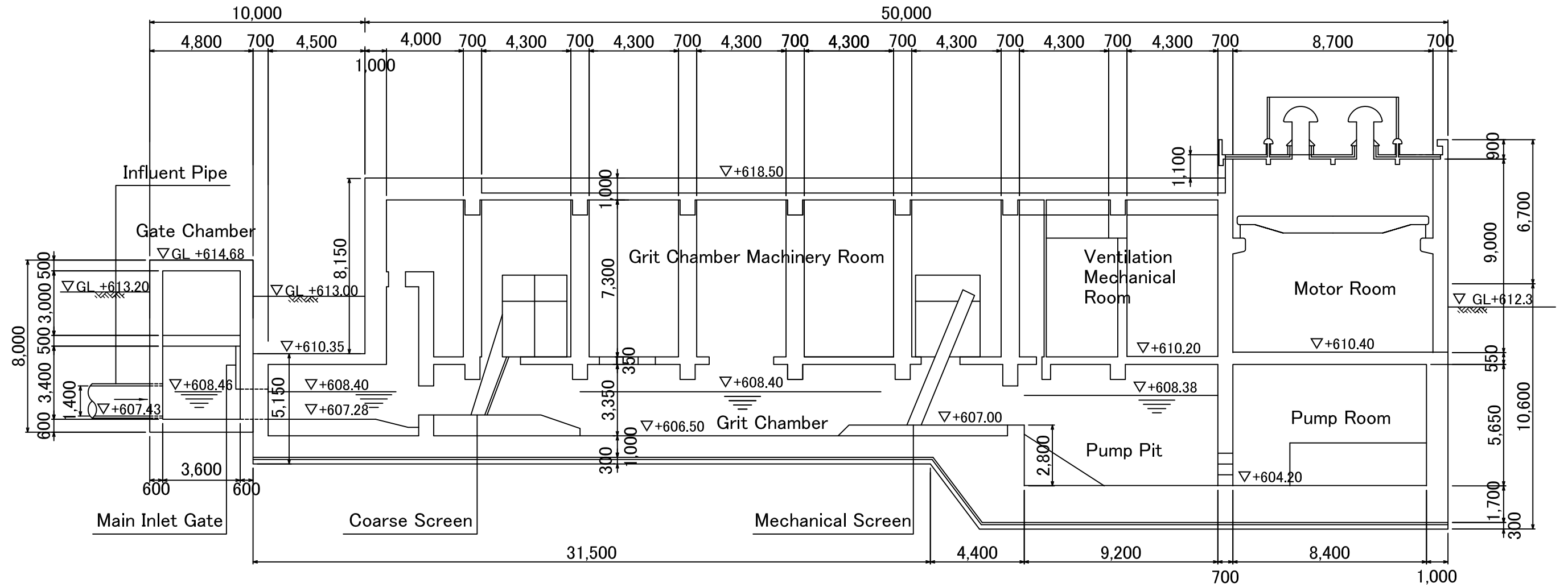
SCALE:1/200



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	PLAN OF INLET, GRIT CHAMBER AND PUMP HOUSE
Scale	1/200
DWG. No.	B-05
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

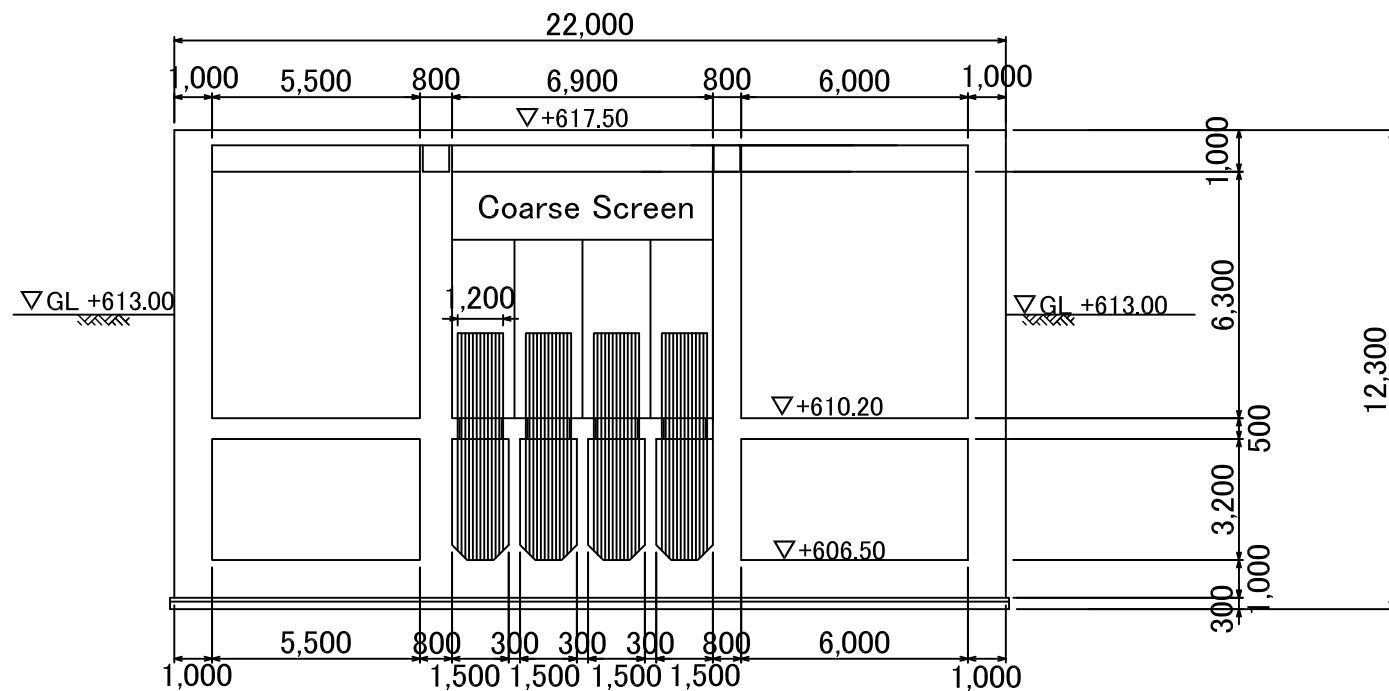
SECTION OF INLET, GRIT CHAMBER AND PUMP HOUSE

SCALE:1/200



B-B SECTION

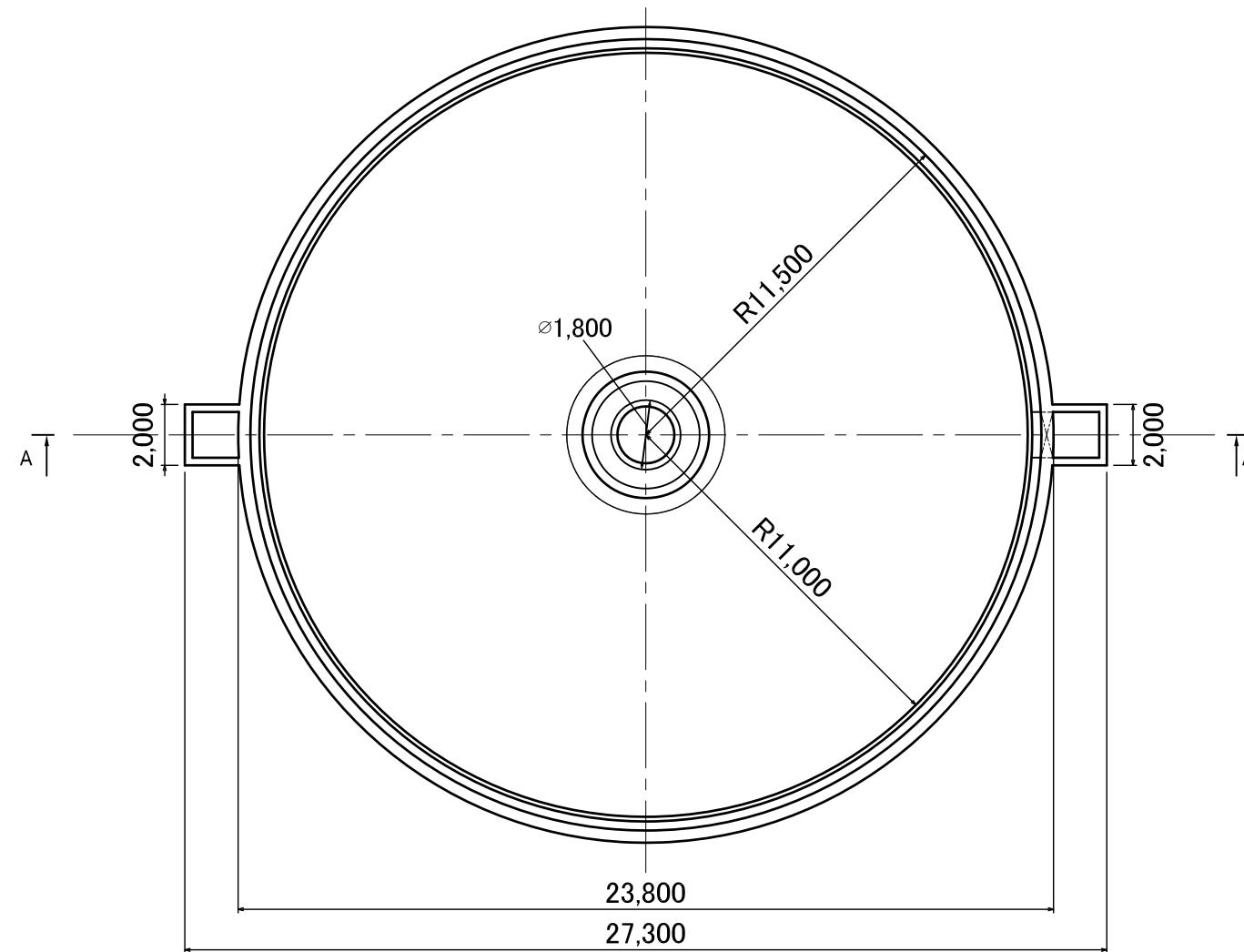
SCALE : 1/200



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	SECTION OF INLET, GRIT CHAMBER AND PUMP HOUSE
Scale	1/200
DWG. No.	B-06
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

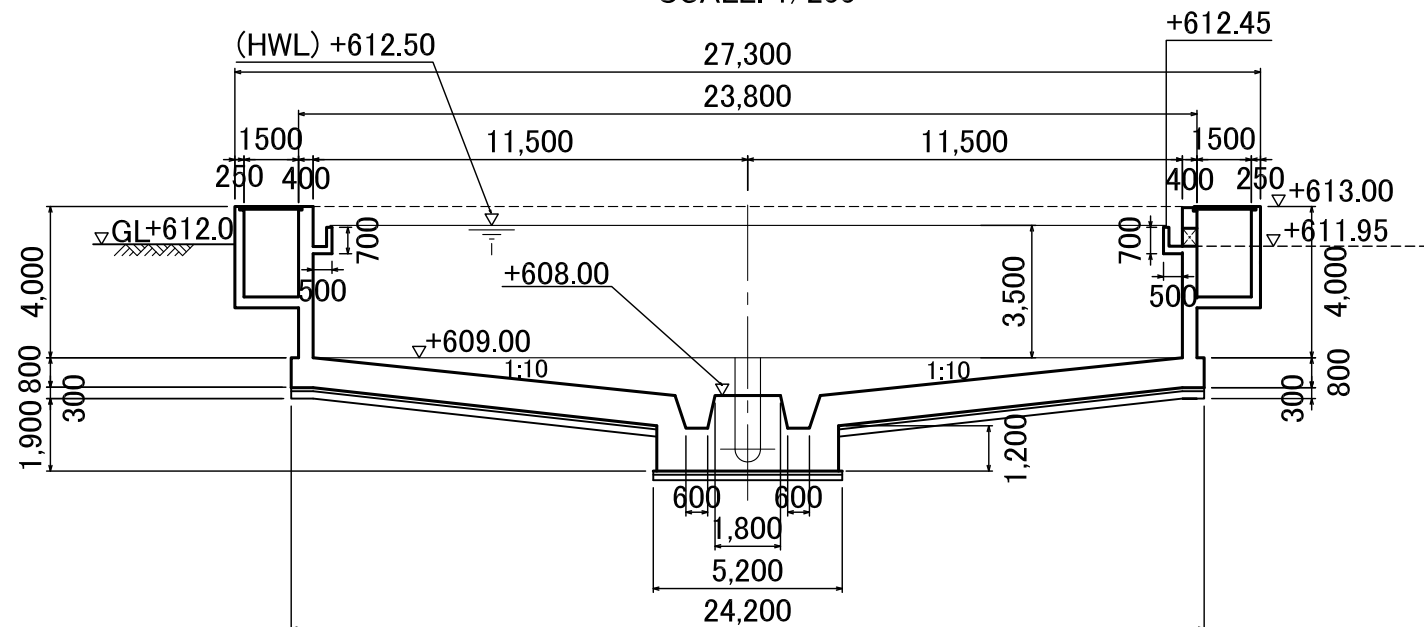
PLAN AND CROSS SECTION OF PRIMARY SEDIMENTATION TANK

SCALE : 1/200



A-A SECTION

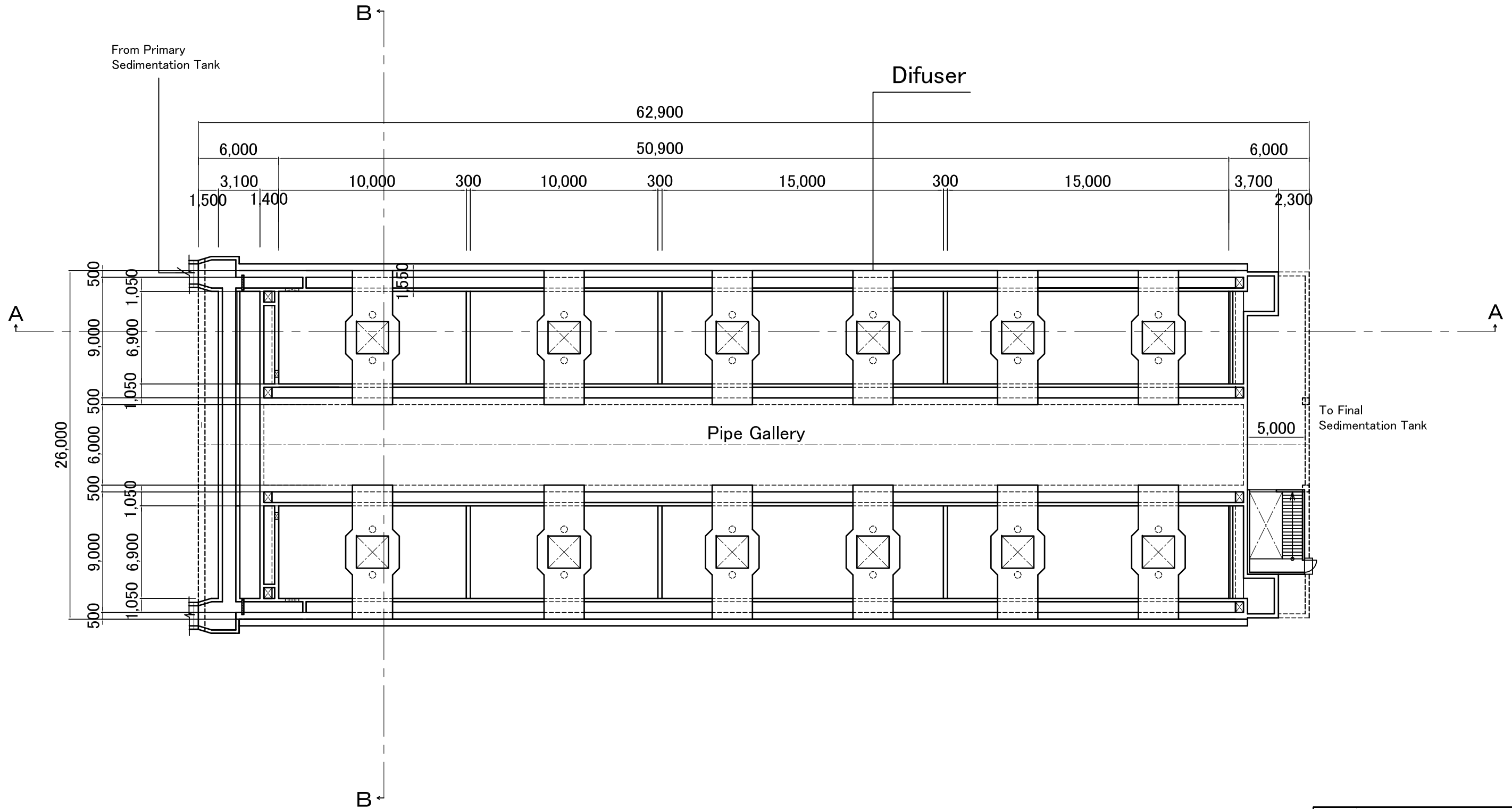
SCALE: 1/200



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	PLAN AND CROSS SECTION OF PRIMARY SEDIMENTATION TANK
Scale	1/200
DWG. No.	B-07
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

PLAN OF REACTOR

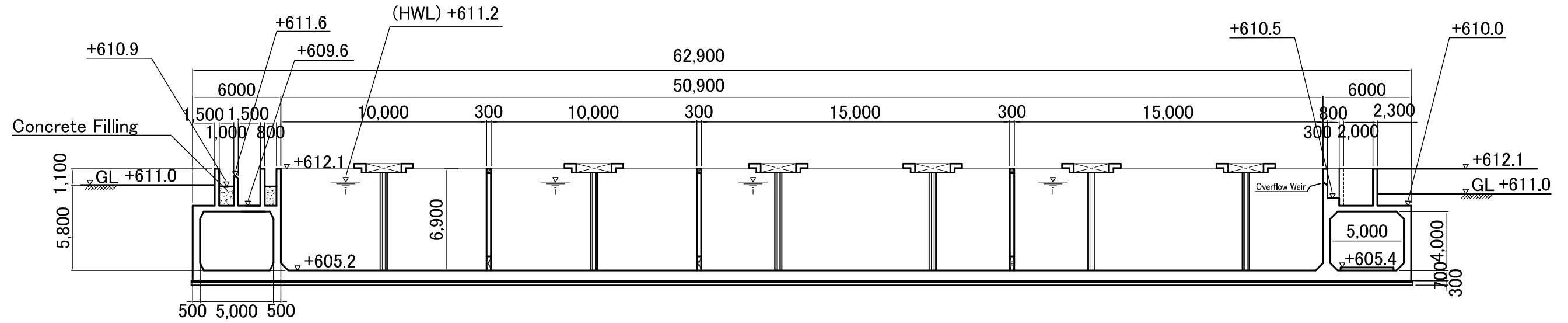
SCALE: 1/300



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	PLAN OF REACTOR
Scale	1/300
DWG. No.	B-08
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

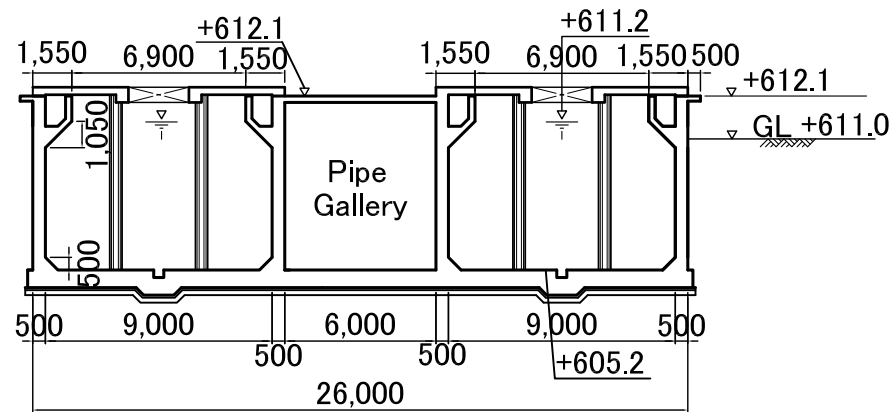
SECTION OF REACTOR

SCALE: 1/300



B-B SECTION

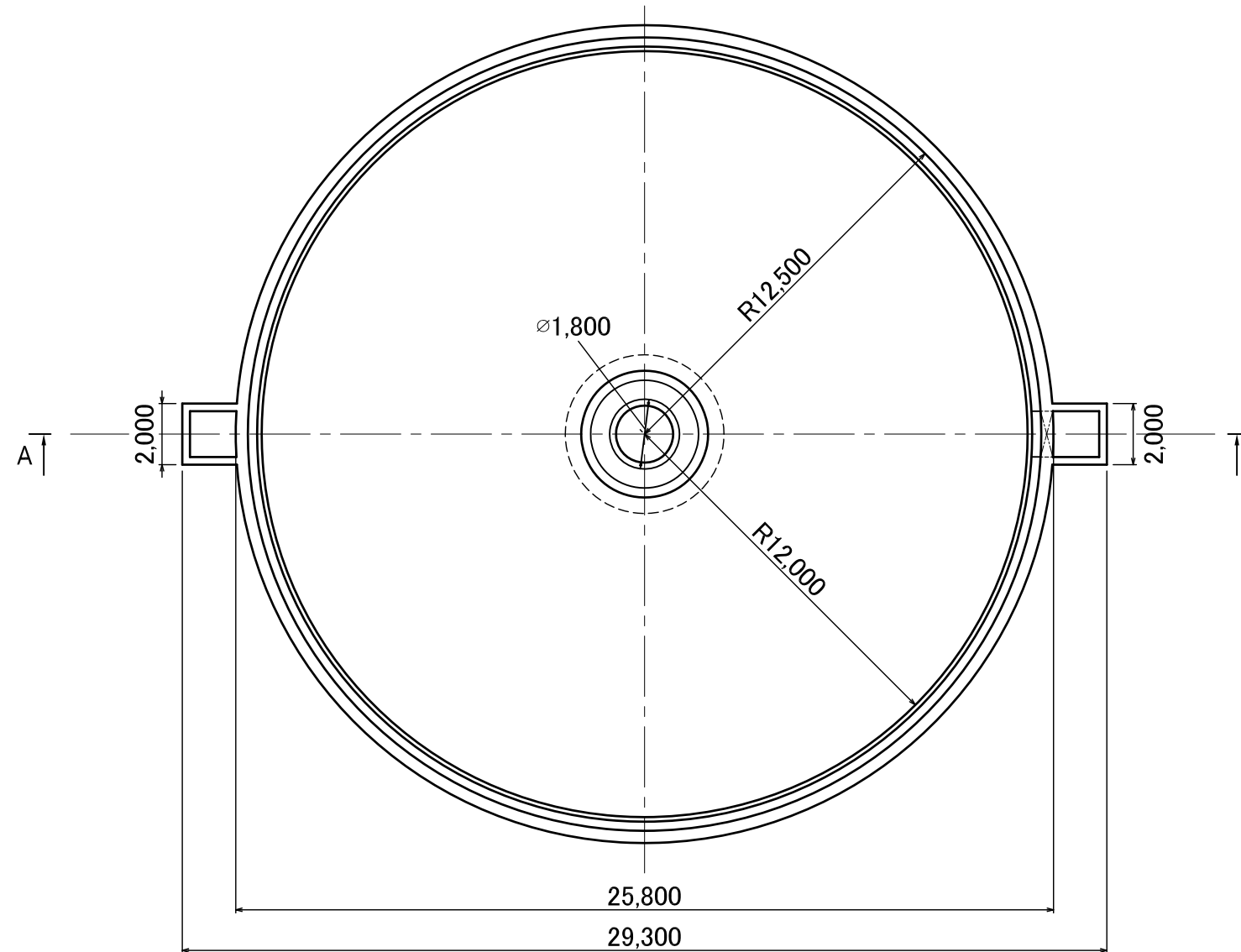
SCALE: 1/300



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	SECTION OF REACTOR
Scale	1/300
DWG. No.	B-09
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

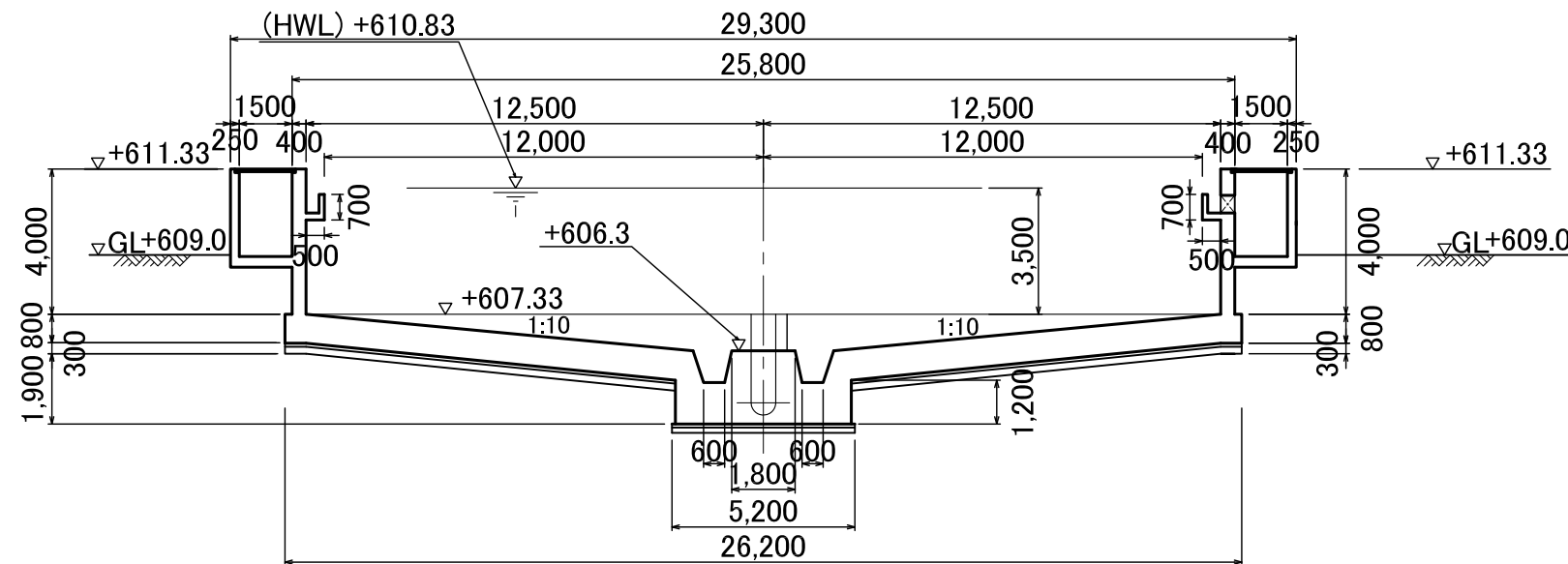
PLAN AND CROSS SECTION OF FINAL SEDIMENTATION TANK

SCALE: 1/200



A-A SECTION

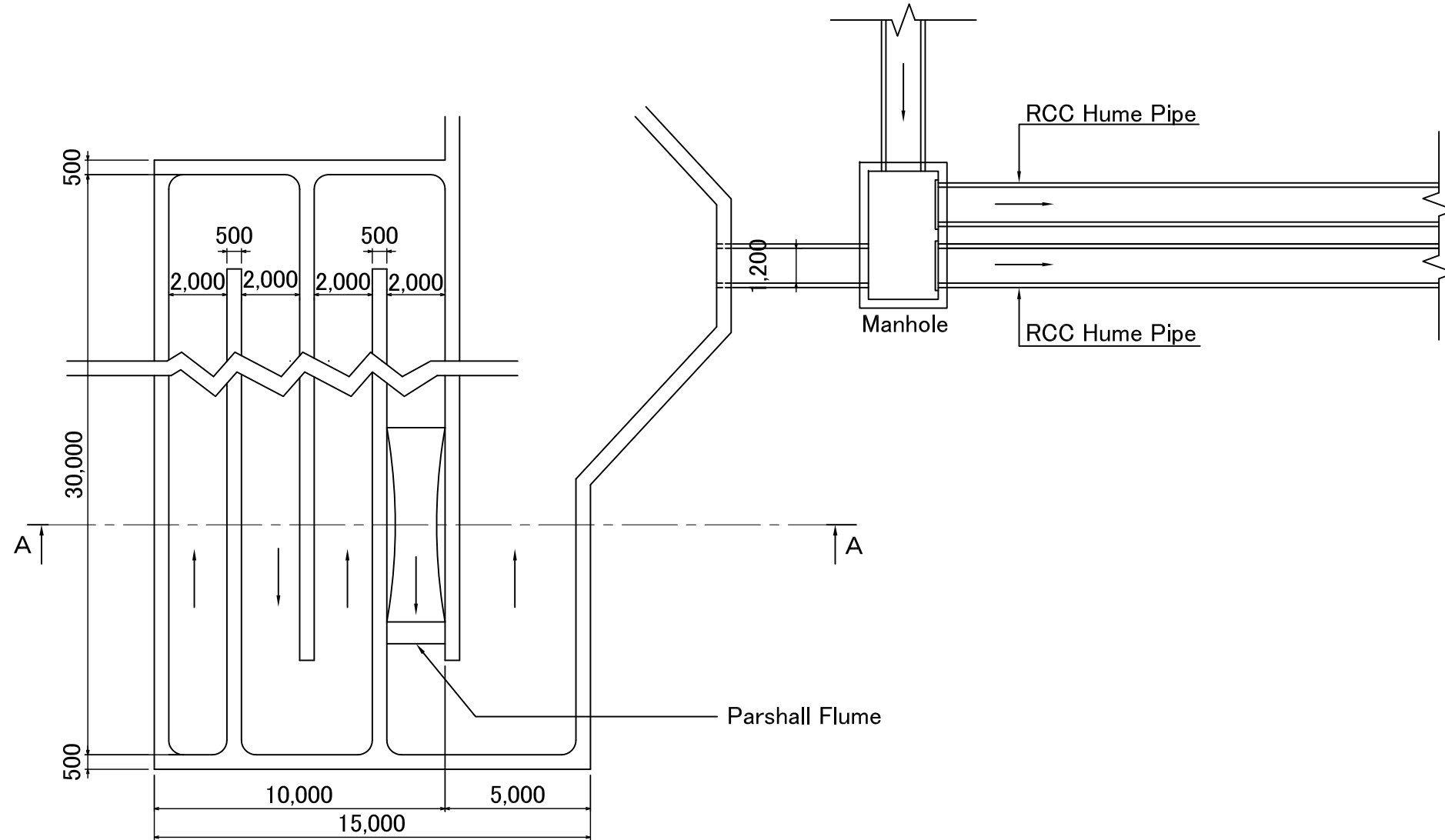
SCALE: 1/200



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	PLAN AND CROSS SECTION OF FINAL SEDIMENTATION TANK
Scale	1/200
DWG. No.	B-10
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

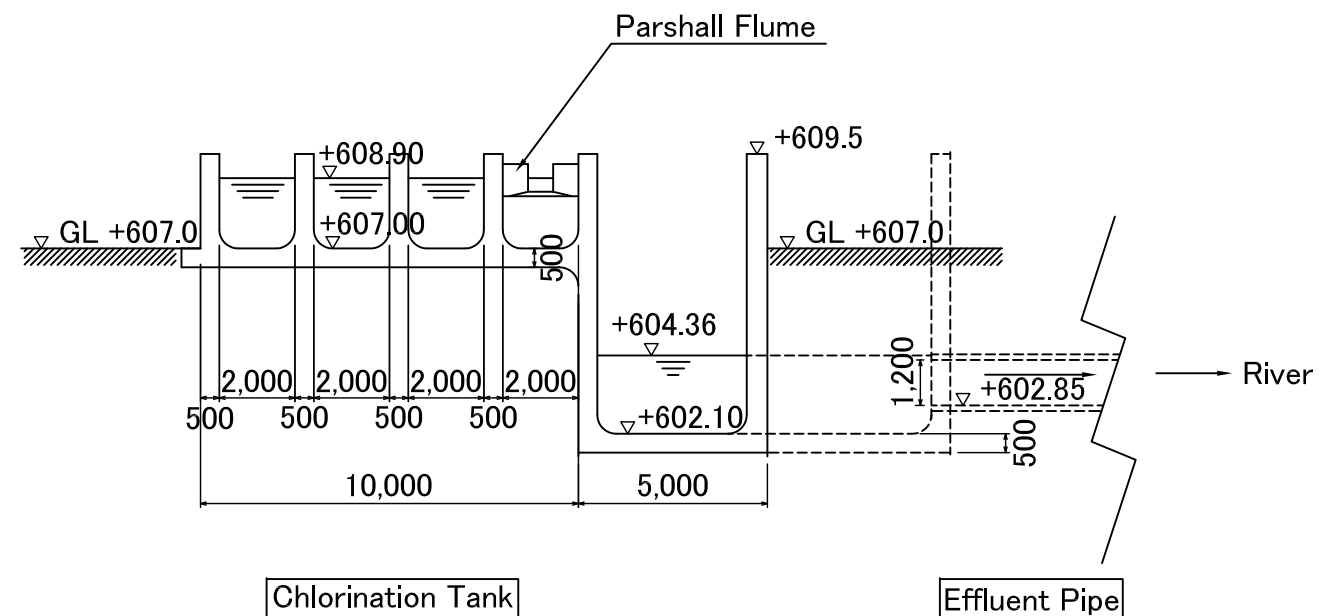
PLAN AND CROSS-SECTION OF CHLORINATION TANK AND EFFLUENT PIPE

SCALE: 1/200



A-A SECTION

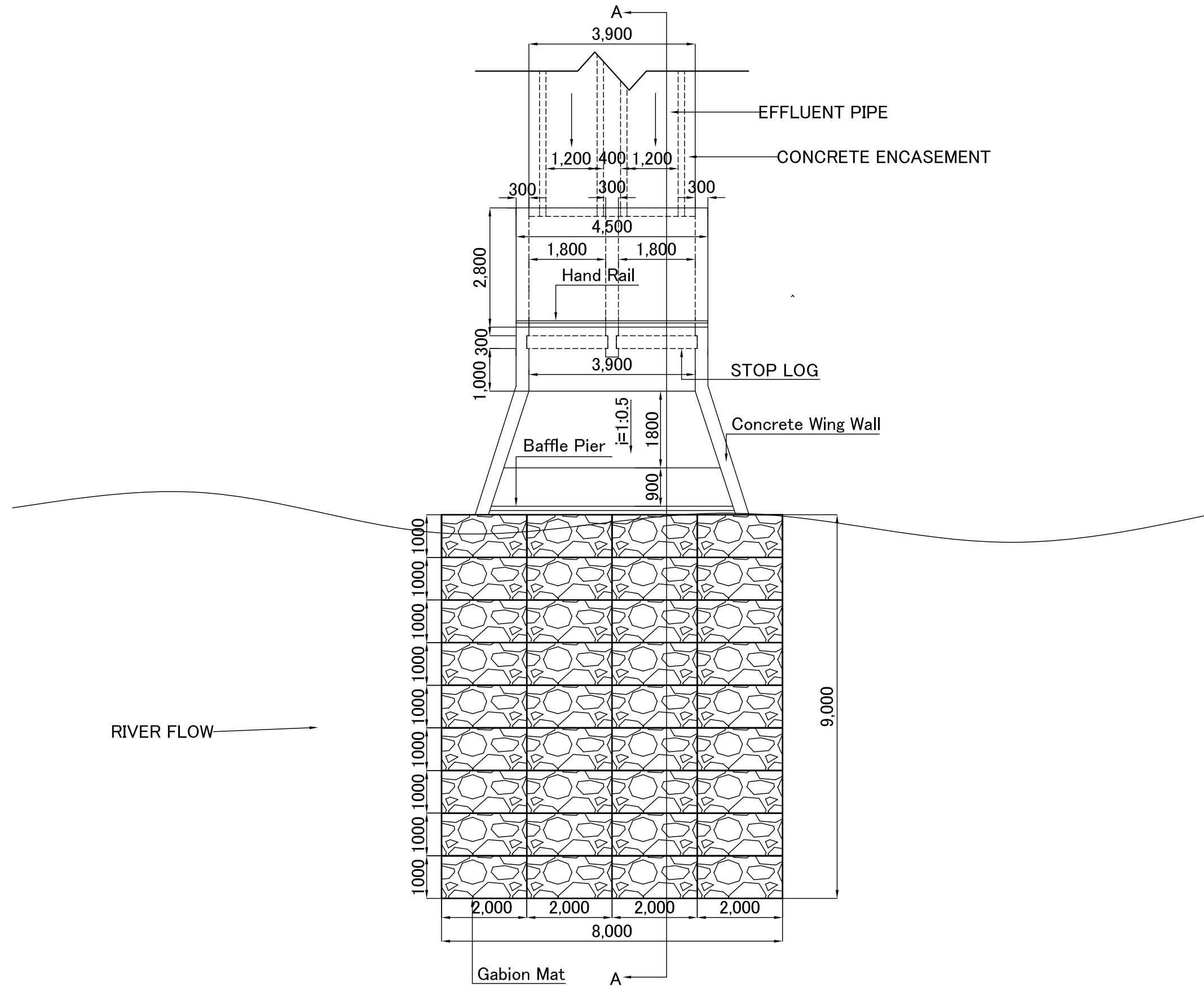
SCALE: 1/200



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	PLAN AND CROSS-SECTION OF CHLORINATION TANK AND EFFLUENT PIPE
Scale	1/200
DWG. No.	B-11
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

PLAN OF OUTLET STRUCTURE

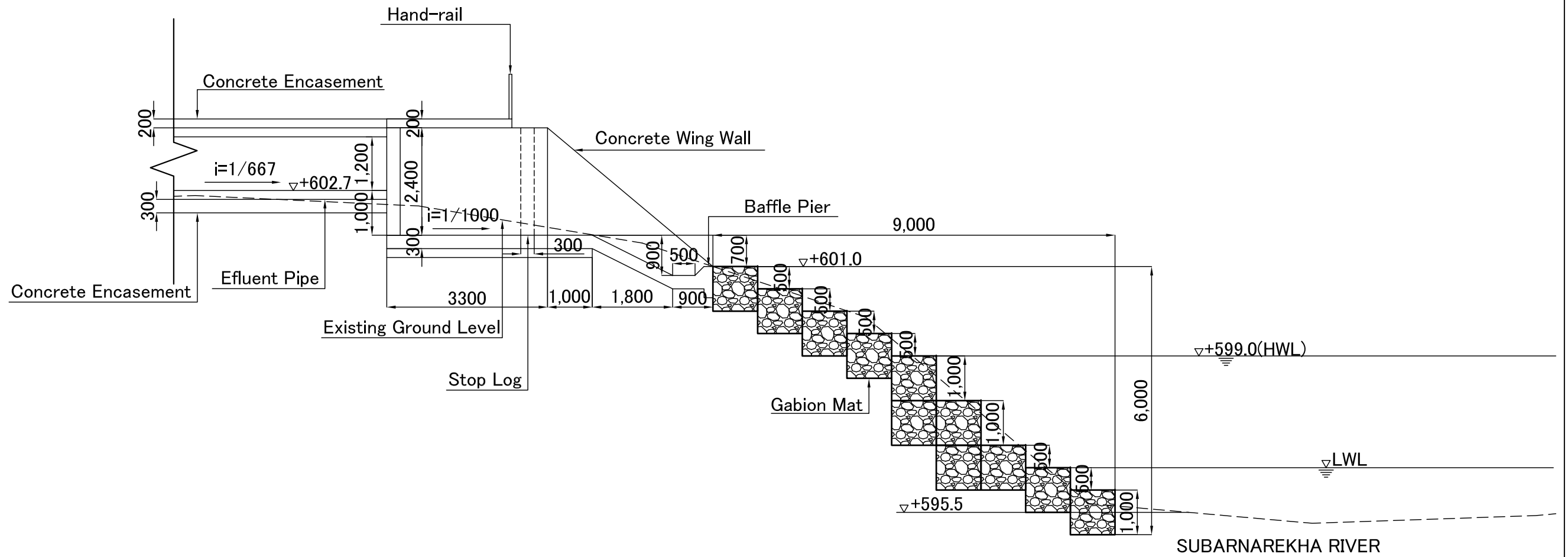
SCALE: 1/100



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	PLAN OF OUTLET STRUCTURE
Scale	1/100
DWG. No.	B-12
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

SECTION OF OUTLET STRUCTURE

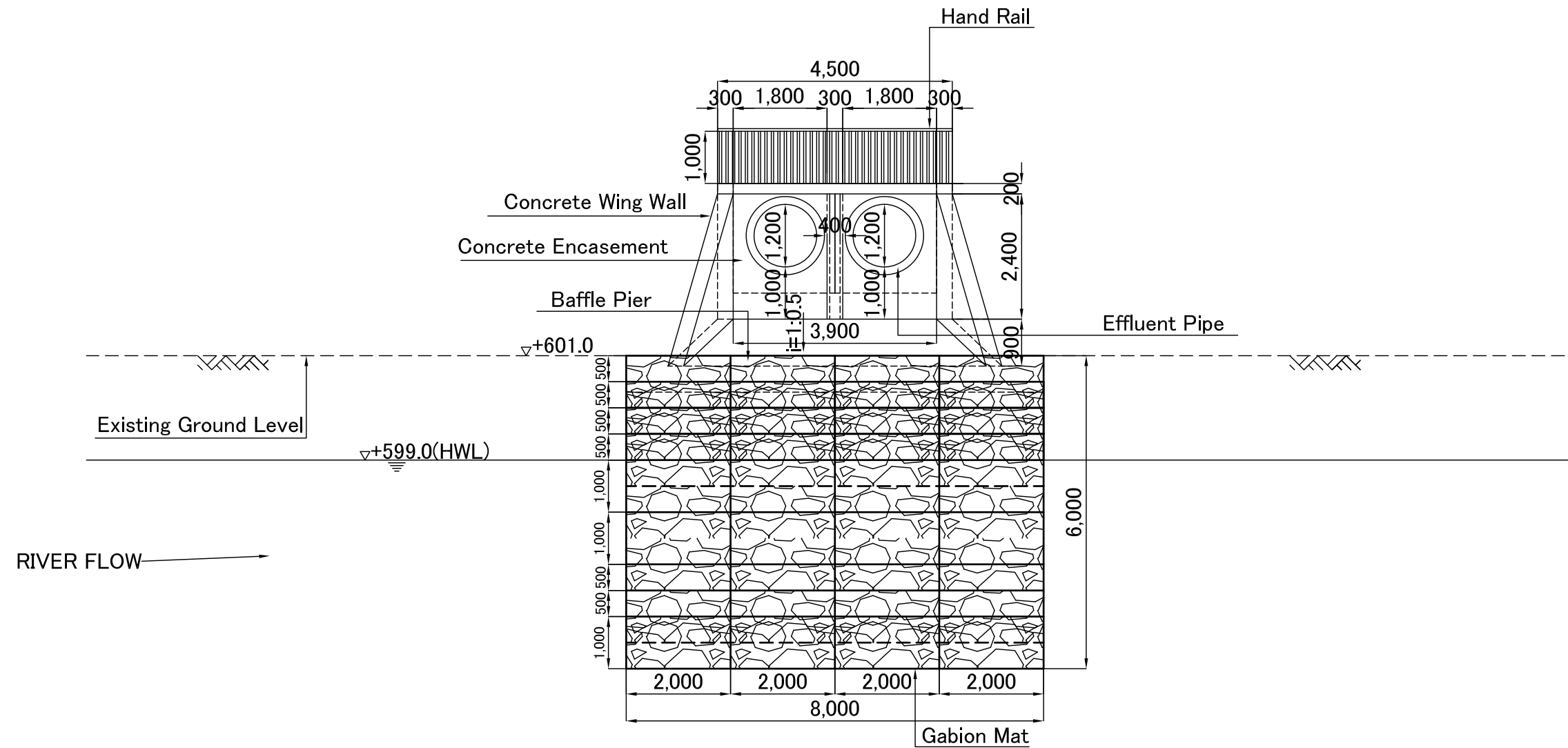
SCALE: 1/100



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	PLAN OF OUTLET STRUCTURE
Scale	1/100
DWG. No.	B-13
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

FRONT ELEVATION VIEW OF OUTLET STRUCTURE

SCALE: 1/100

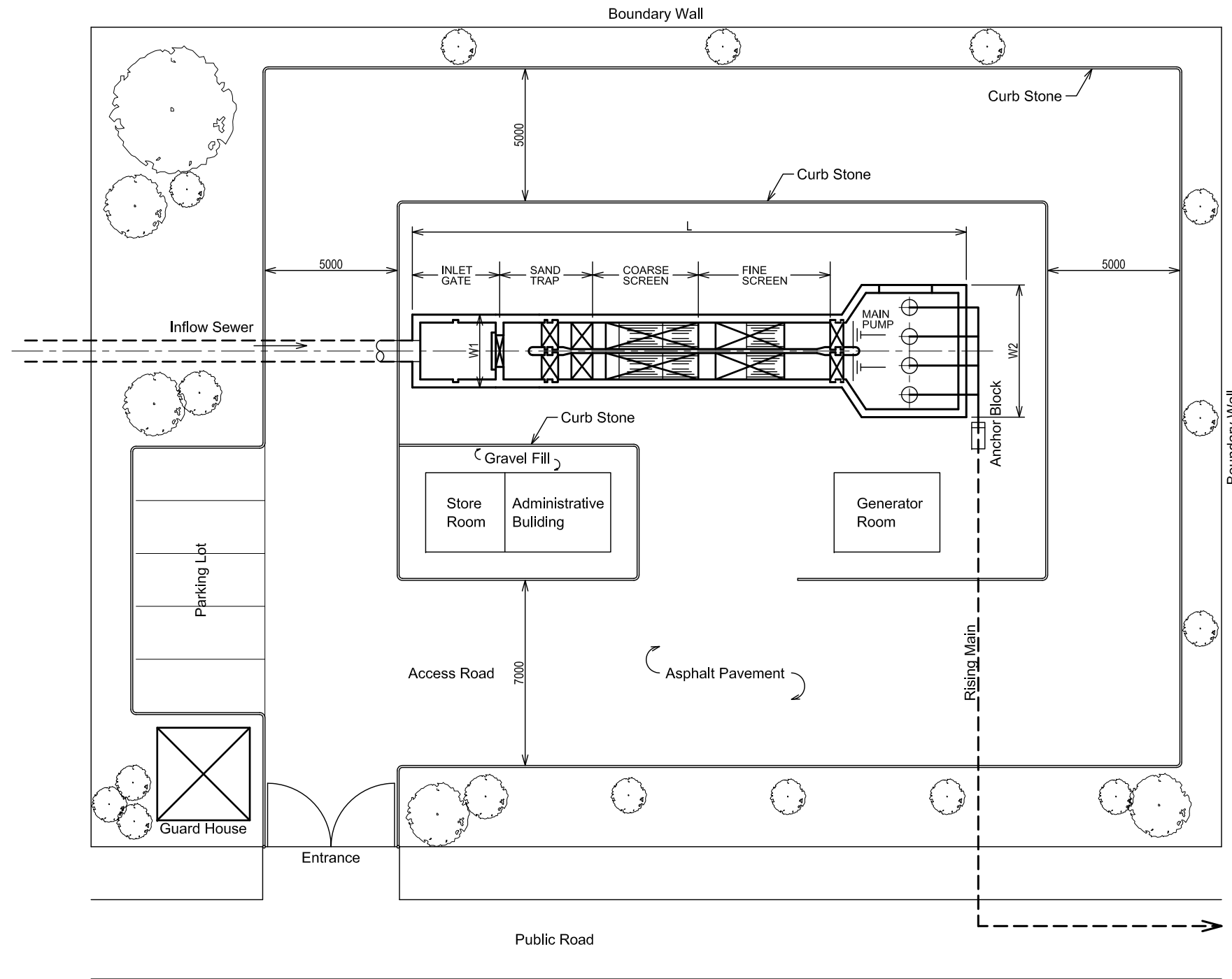


Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	FRONT ELEVATION VIEW OF OUTLET STRUCTURE
Scale	1/100
DWG. No.	B-14
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

General Layout of Pump Station S=1/200

Dimensions

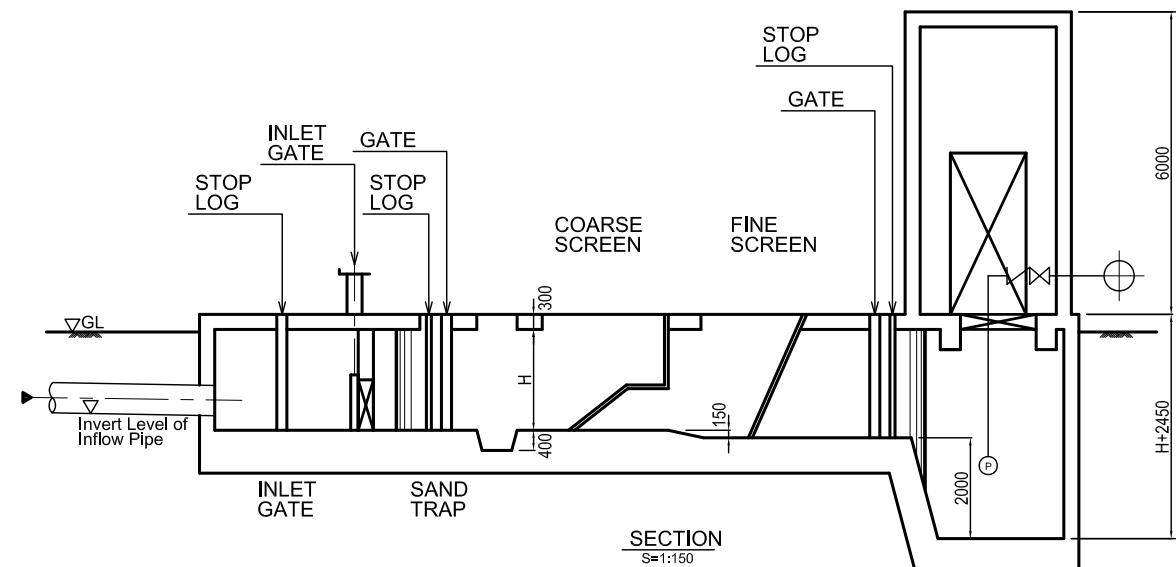
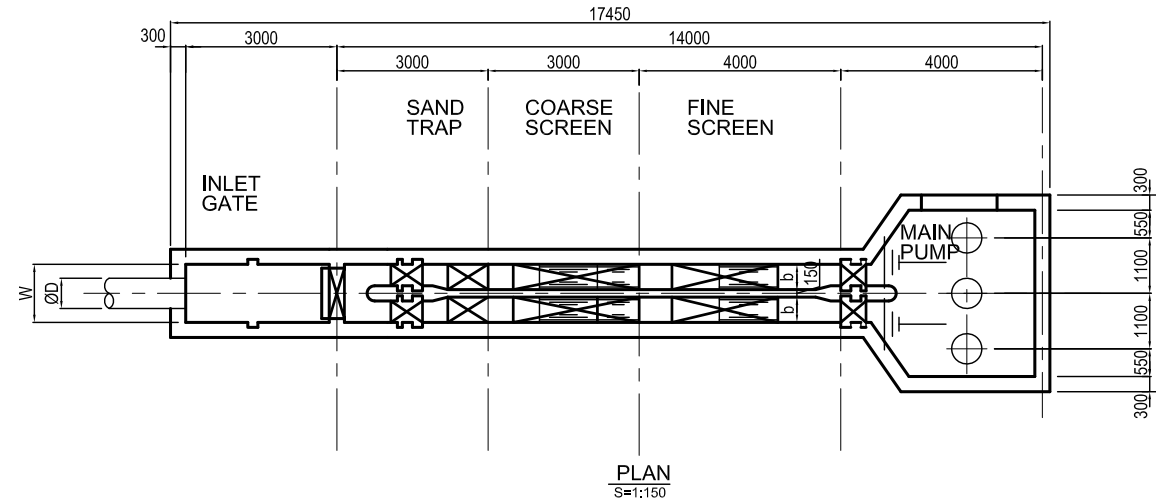
PS	L (m)	W1 (m)	W2 (m)
PS-1	17.45	1.75	3.90
PS-2	23.95	3.95	6.20
PS-3	17.45	1.25	3.90
PS-4	20.95	2.75	5.00
PS-5	17.45	1.75	3.90
PS-6	23.95	3.95	6.20



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	General Layout of Pump Station
Scale	1/200
DWG. No.	C-01
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Pump and Section View of Pump Station PS-1, PS-3 and PS-5

S=1/150

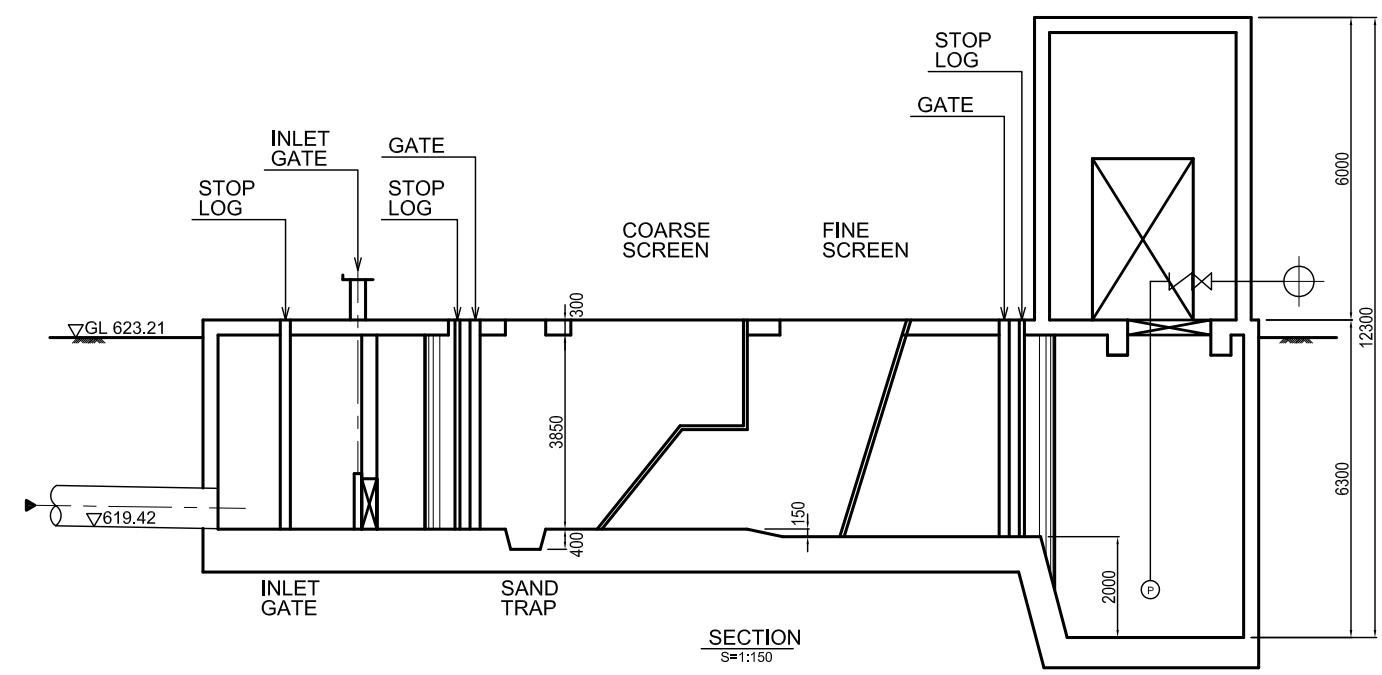
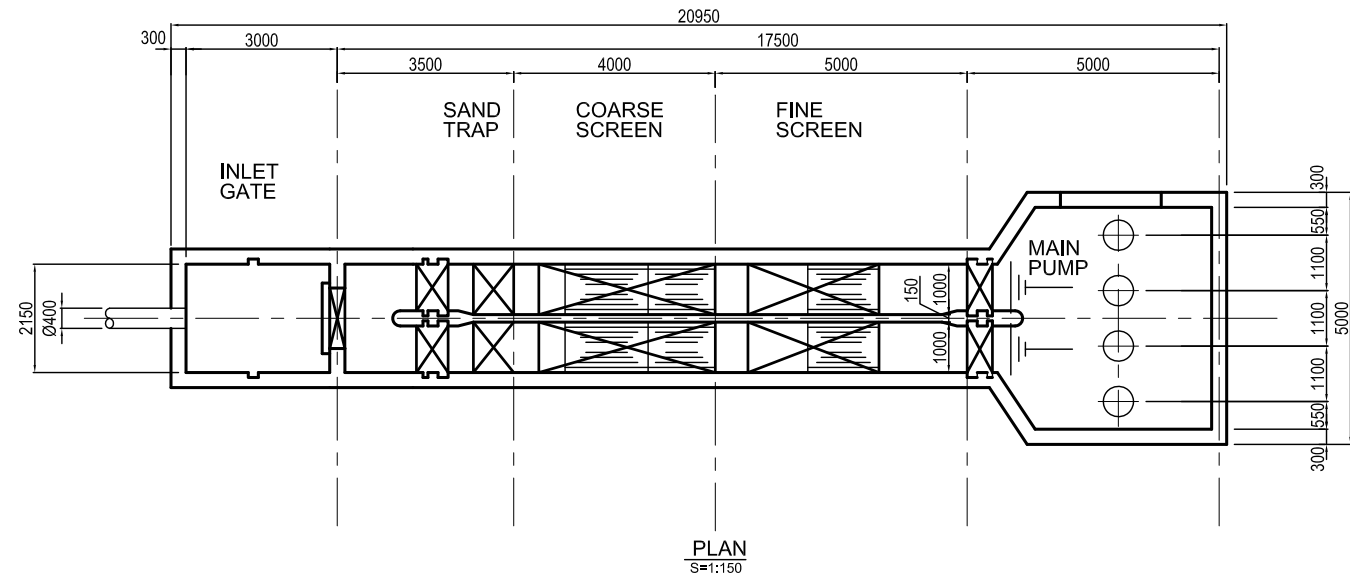


	Ground Level	Invert Level of Inflow Pipe	b	H	D	W
P.S. - 1	637.70	636.04	0.50 m	2 m	600 mm	1.15 m
P.S. - 3	613.92	612.51	0.25 m	1.5 m	600 mm	0.65 m
P.S. - 5	616.50	610.21	0.50 m	6.5 m	600 mm	1.15 m

Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Plan and Section View of Pump Station PS-1, PS-3 and PS-5
Scale	1/150
DWG. No.	C-02
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Pump and Section View of Pump Station PS-4

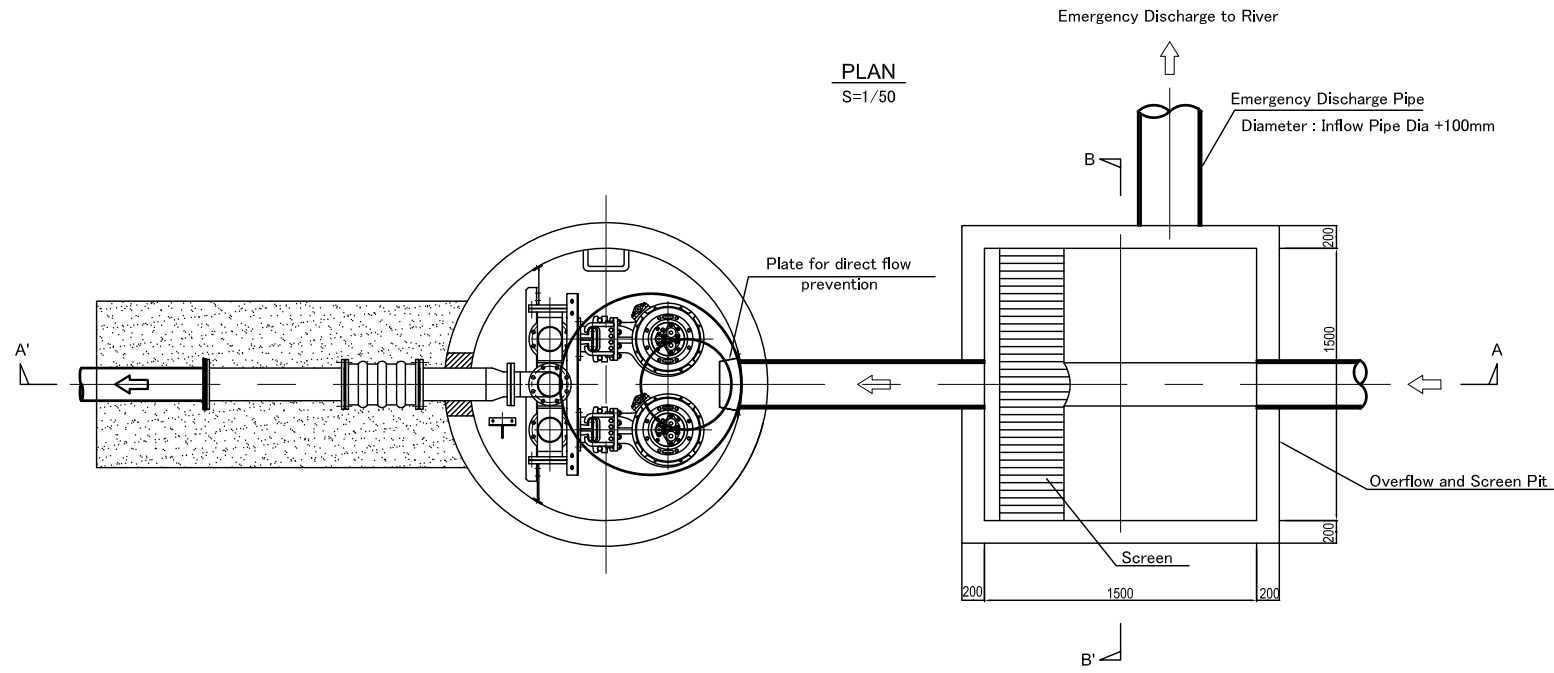
S=1/150



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Plan and Section View of Pump Station PS-4
Scale	1/150
DWG. No.	C-04
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	

Typical Drawing of Manhole Pump Unit

S=1/50



Principal Features of Manhole Pump Facility

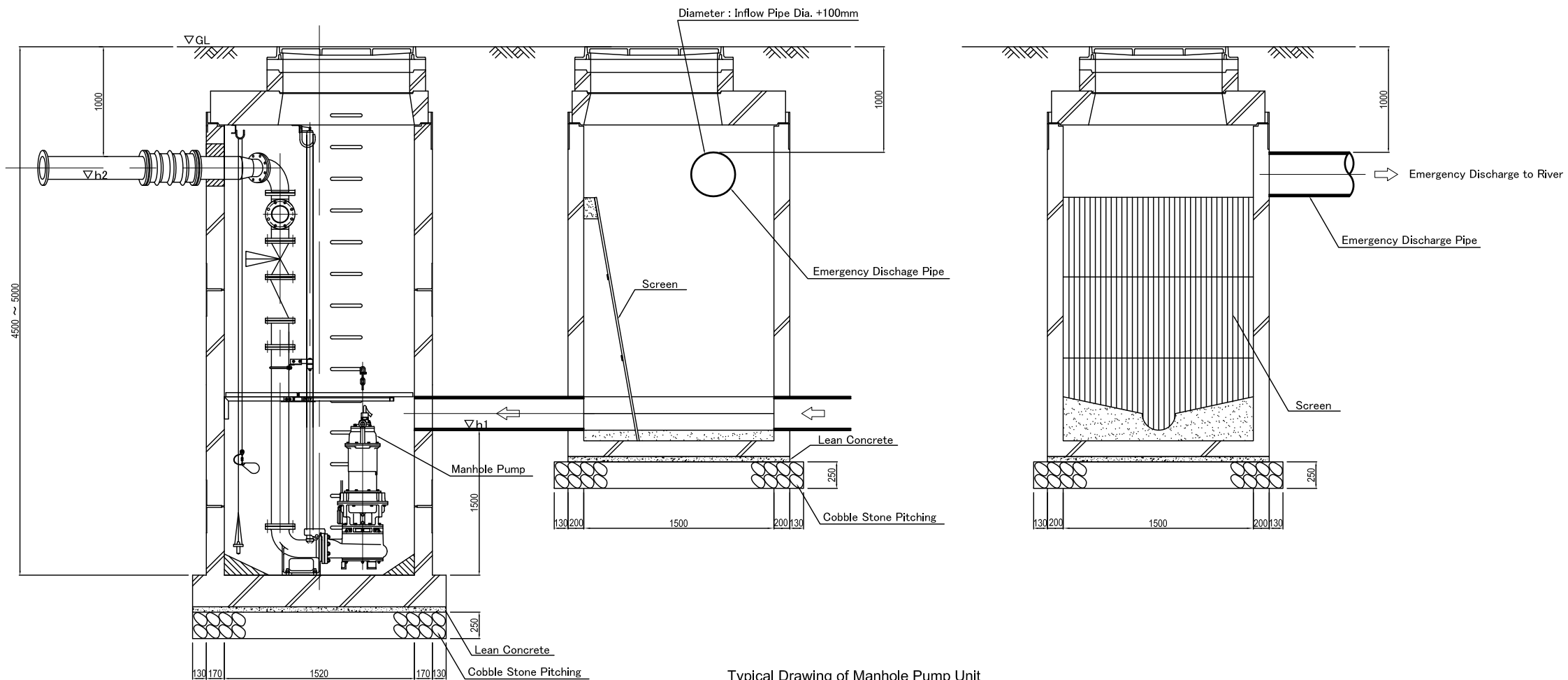
Pump Facility Code	Trunk System	Location	No. of Pump Unit	Pump Unit Capacity (m ³ /min)	Total Head (m)	Pump Outlet Pipe Dia (mm)	G.L. (m)	Inflow Pipe		Rising Main	
								h1 Invert Level(m)	Dia (mm)	h2 Invert Level(m)	Dia (mm)
MP-1	TR-5	On Trunk	2	0.15	20	80	621.63	-	-	620.46	150
MP-2	TR-5	On Trunk	2	0.84	34	80	618.50	616.94	250	617.33	150
MP-3	TR-2	On Trunk	2	1.74	19	80	619.00	617.15	300	618.63	200
MP-4	TR-1	On Sub-trunk	2	0.75	25	80	-	-	-	-	150
MP-5	TR-4	On Sub-trunk	2	0.69	30	80	-	-	-	-	150
MP-6	TR-5	On Sub-trunk	2	0.81	23	80	-	-	-	-	150
MP-7	TR-3	On Trunk	2	0.69	7	80	644.30	637.02	200	-	-
MP-8	TR-1	On Trunk	2	0.75	7	80	666.60	658.37	250	-	-

A-A' SECTION

S=1/50

B-B' SECTION

S=1/50



Project Name	Preparatory Survey on Ranchi Sewerage Project
Title	Typical Drawing of Manhole Pump Unit
Scale	1/50
DWG. No.	C-05
Japan International Cooperation Agency (JICA) Nippon Koei Co., Ltd	