ISLAMIC REPUBLIC OF PAKISTAN
WATER AND SANITATION AGENCY FAISALABAD (WASA-F)

ISLAMIC REPUBLIC OF PAKISTAN

THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD

FINAL REPORT

VOLUME IV DATA BOOK

FEBRUARY 2019

JAPAN INTERNATIONAL COOPERATION AGENCY
（JICA）

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FINAL REPORT
ON
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD

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(In addition to the above reports, a Completion Report summarizing the results, outcomes, and recommendations obtained from the pilot activities of this Project will be prepared in May 2019 as a supplemental report.)

VOLUME IV
DATA BOOK

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AD1.1 Groundwater Quality Survey

(1) Sampling

To verify the existing analysis data of arsenic (As) in groundwater, 36 samples are collected at existing tube-wells in Sep. 2016 and then the samples are sent to Japan for arsenic analysis after pre-treatment by following the procedures of sample storage and preservation regulated in the "Standard Method for the Examination of Water and Wastewater" of American Public Health Association (APHA) and American Water Works Association (AWWA). Sampling location of groundwater quality survey is summarized in **Table D1.1.1**.

Table D1.1.1 Summary of Sampling Location for Groundwater Quality Survey

Place	NO.	Well No	Date	Sample ID	Location		Remarks
					Longitude	Latitude	
Chenab Wellfield	1	2	2016/09/22	GW C-1	72˚57.206'E	31˚36.265'N	Electrical Problem for Well No 1 20 Hours Daily, 3 Shifts
	2	4	2016/09/22	GW C-2	72˚56.878'E	31˚36.588'N	Electrical Problem for Well No 3 20 Hours Daily, 3 Shifts
	3	5	2016/09/22	GW C-3	72˚56.633'E	31˚36.566'N	20 Hours Daily 3 Shifts
	4	7	2016/09/22	GW C-4	72˚56.153'E	31˚36.527'N	20 Hours Daily 3 Shifts
	5	9	2016/09/22	GW C-5	72˚55.616'E	31˚36.563'N	20 Hours Daily 3 Shifts
	6	11	2016/09/22	GW C-6	72˚55.154'E	31˚36.392'N	20 Hours Daily 3 Shifts
	7	13	2016/09/22	GW C-7	72˚55.856'E	31˚36.988'N	20 Hours Daily 3 Shifts
	8	15	2016/09/22	GW C-8	72˚55.885'E	31˚37.431'N	20 Hours Daily 3 Shifts
	9	17	2016/09/22	GW C-9	72˚55.893'E	31˚37.868'N	20 Hours Daily 3 Shifts
	10	19	2016/09/22	GW C-10	72˚55.829'E	31˚38.269'N	20 Hours Daily 3 Shifts
	11	22	2016/09/22	GW C-11	72˚55.765'E	31˚39.285'N	Electrical Problem for Well No 21 20 Hours Daily, 3 Shifts
	12	24	2016/09/22	GW C-12	72˚55.779'E	31˚36.338'N	Electrical Problem for Well No 23 20 Hours Daily, 3 Shifts
	13	25	2016/09/22	GW C-13	72˚57.684'E	31˚36.314'N	20 Hours Daily 3 Shifts
	14	29	2016/09/22	GW C-14	72˚58.578'E	31˚37.405'N	Electrical Problem for Well No 27 20 Hours Daily, 3 Shifts
Jhang Wellfield	15	1	2016/09/21	GW J-1	73˚4.203'E	31˚37.405'N	3 Shifts 16-18 Hours Daily
	16	3	2016/09/21	GW J-2	73˚3.867'E	31˚36.816'N	3 Shifts 16-18 Hours Daily
	17	5	2016/09/21	GW J-3	73˚3.515'E	31˚36.205'N	3 Shifts 16-18 Hours Daily
	18	6	2016/09/21	GW J-4	73˚3.358'E	31˚35.927'N	No. 7: out of operation 3 Shifts 16-18 Hours Daily
	19	9	2016/09/21	GW J-5	73˚2.579'E	31˚35.194'N	3 Shifts 16-18 Hours Daily
	20	12	2016/09/21	GW J-6	73˚1.543'E	31˚34.714'N	No. 11: out of operation 3 Shifts 16-18 Hours Daily
	21	13	2016/09/21	GW J-7	73˚1.213'E	31˚34.562'N	3 Shifts 16-18 Hours Daily
	22	15	2016/09/21	GW J-8	73˚0.544'E	31˚34.253'N	3 Shifts 16-18 Hours Daily
	23	17	2016/09/21	GW J-9	72˚59.895'E	31˚33.95'N	3 Shifts 16-18 Hours Daily
	24	19	2016/09/21	GW J-10	72˚59.165'E	31˚99.626'N	3 Shifts 16-18 Hours Daily
	25	21	2016/09/21	GW J-11	72˚58.4061'E	31˚33.506'N	3 Shifts 16-18 Hours Daily
	26	23	2016/09/21	GW J-12	72˚57.657'E	31˚33.292'N	3 Shifts 16-18 Hours Daily
	27	24	2016/09/21	GW J-13	72˚57.314'E	31˚33.195'N	No. 25: out of operation 3 Shifts 16-18 Hours Daily

Place	NO.	Well No	Date	Sample ID	Location		Remarks
					Longitude	Latitude	
	28	3	2016/09/20	GW R-1	73° 7.251'E	31° 25.789'N	6 Hours Daily
	29	1	2016/09/20	GW R-2	73° 7.447'E	31° 25.961'N	6 Hours Daily
	30	16-A	2016/09/20	GW R-3	73° 9.420'E	31° 27.247'N	6 Hours Daily
	31	16	2016/09/20	GW R-4	73° 9.485'E	31° 27.270'N	6 Hours Daily
	32	9	2016/09/20	GW R-5	73° 9.555'E	31° 27.253'N	6 Hours Daily
	33	7	2016/09/20	GW R-6	73° 8.754'E	31° 26.925'N	6 Hours Daily
	34	4	2016/09/20	GW R-7	73° 8.323'E	31° 26.614'N	Tube Well No. 6 6 Hours Daily
	35	5	2016/09/20	GW R-8	73° 8.402'E	31° 26.673'N	6 Hours Daily
Gugera	36		2016/09/24	GW G-1	73°24.594'E	31° 20.297'N	Existing well

SOURCE: JICA Mission Team

(2) Results

Arsenic analysis is conducted at io Co., Ltd., Tokyo, Japan, who has achieved excellent score in "External Quality Assessment Survey for Drinking Water Testing Labs." organized by Japan Ministry of Health, Labour and Welfare. Agilent 7500-cx ICP-MS (Inductively Coupled Plasma-Mass Spectrometry) with the detection limit less than 0.0001 mg/L is applied to all samples for arsenic analysis. Analysis results of arsenic in groundwater are shown in **Table D1.1.2**. In addition, all existing analysis results of arsenic in groundwater also are summarized in the same table.

Table D1.1.2 Arsenic Analysis Results of Groundwater in the Project

No.	Sampling Code	Sampling Location	This Project		Remarks
			Total As (mg/L)	Soluble As (mg/L)	
1	GW C-1	Chenab well-field tube well No.2	0.009	0.009	No. 1: out of operation
2	GW C-2	Chenab well-field tube well No.4	0.007	0.007	No. 3: out of operation
3	GW C-3	Chenab well-field tube well No.5	0.005	0.005	
4	GW C-4	Chenab well-field tube well No.7	0.003	0.003	
5	GW C-5	Chenab well-field tube well No.9	0.003	0.003	
6	GW C-6	Chenab well-field tube well No.11	0.001	0.001	
7	GW C-7	Chenab well-field tube well No.13	0.002	0.002	
8	GW C-8	Chenab well-field tube well No.15	0.003	0.003	
9	GW C-9	Chenab well-field tube well No.17	0.004	0.004	
10	GW C-10	Chenab well-field tube well No.19	0.004	0.004	
11	GW C-11	Chenab well-field tube well No.22	0.002	0.002	No. 21: out of operation
12	GW C-12	Chenab well-field tube well No.24	0.006	0.006	No. 23: out of operation
13	GW C-13	Chenab well-field tube well No.25	0.008	0.008	
14	GW C-14	Chenab well-field tube well No.29	0.007	0.007	No. 27: out of operation
15	GW J-1	Jhang Well-Field tube-well No.2	0.003	0.003	
16	GW J-2	Jhang Well-Field tube-well No.4	0.002	0.002	
17	GW J-3	Jhang Well-Field tube-well No.5	0.003	0.003	
18	GW J-4	Jhang Well-Field tube-well No.6	0.002	0.002	No. 7: out of operation
19	GW J-5	Jhang Well-Field tube-well No.9	0.004	0.003	
20	GW J-6	Jhang Well-Field tube-well No.12	0.003	0.003	No. 11: out of operation
21	GW J-7	Jhang Well-Field tube-well No.13	0.002	0.002	
22	GW J-8	Jhang Well-Field tube-well No.15	0.004	0.004	
23	GW J-9	Jhang Well-Field tube-well No.17	0.002	0.002	
24	GW J-10	Jhang Well-Field tube-well No.19	0.004	0.004	
25	GW J-11	Jhang Well-Field tube-well No.22	0.002	0.002	
26	GW J-12	Jhang Well-Field tube-well No.23	0.002	0.002	
27	GW J-13	Jhang Well-Field tube-well No.24	0.002	0.002	No. 25: out of operation
28	GW R-1	Rakh Well-Field tube-well No.1	0.004	0.003	
29	GW R-2	Rakh Well-Field tube-well No.3	0.003	0.003	
30	GW R-3	Rakh Well-Field tube-well No.16-A	0.003	0.003	
31	GW R-4	Rakh Well-Field tube-well No.16	0.002	0.002	
32	GW R-5	Rakh Well-Field tube-well No.9	0.002	0.001	
33	GW R-6	Rakh Well-Field tube-well No.7	0.006	0.006	

No.	Sampling Code	Sampling Location	This Project		Remarks
			Total As (mg/L)	Soluble As (mg/L)	
34	GW R-7	Rakh Well-Field tube-well No.4	0.002	0.002	No. 6: out of operation
35	GW R-8	Rakh Well-Field tube-well No.5	0.012	0.011	
36	GW G-1	Tube-well	0.002	0.002	Gugera Branch Canal in Jaranwala

SOURCE: JICA Mission Team

AD1.2 Surface Water Quality Survey

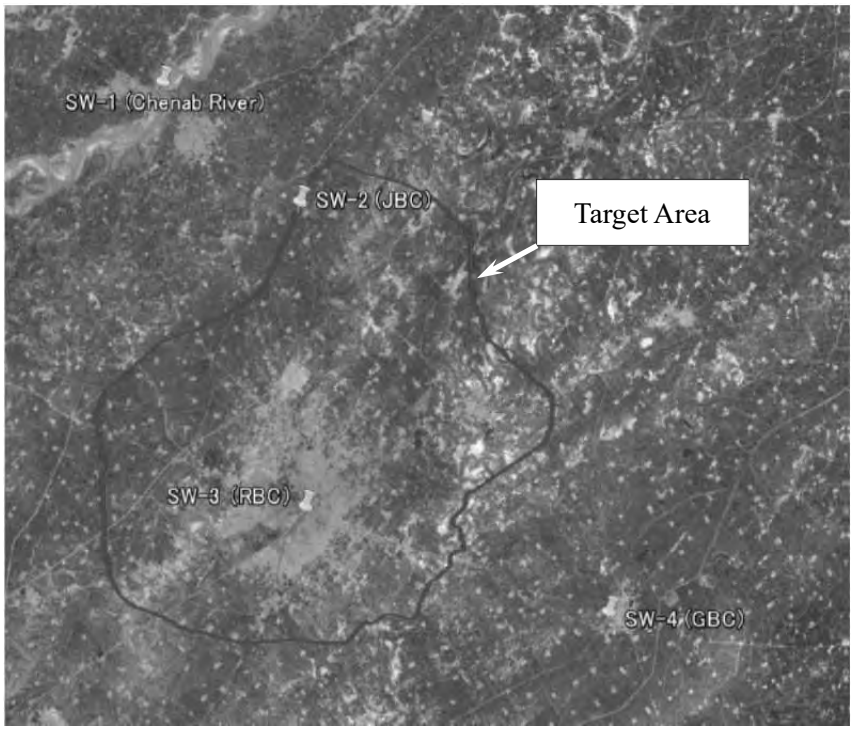
(1) Sampling

In order to confirm the suitability as drinking water sources and to decide water treatment process, a surface water quality survey in conducted both in wet season and dry season. Sample method is shown in the **Table D1.2.1**. Sampling location is given in **Figure D1.2.1**.

Table D1.2.1 Sampling Location for the Surface Water Quality Survey

Sampling Site		Sample ID	Coordinates	Number of Sample
1	Chenab River	SW 1	31˚45.486' N 72˚57.018' E	2 (1 in wet and 1 in dry season)
2	Jhang Branch Canal (JBC)	SW 2	31˚35.155' N 73˚2.489' E	2 (1 in wet and 1 in dry season)
3	Rakh Branch Canal (RBC)	SW 3	31˚24.31' N 73˚5.226' E	2 (1 in wet and 1 in dry season)
4	Gugera Branch Canal (GBC)	SW 4	31˚19.184' N 73˚23.853' E	2 (1 in wet and 1 in dry season)
Total number of sample				8
Sample type: Composite sample (at least three grab samples are collected at different points of one sampling section)				

SOURCE: JICA Mission Team



SOURCE: JICA Mission Team and Google Earth

Figure D1.2.1 Sampling Locations of Surface Water Quality Survey

(2) Results

The results of surface water quality survey during wet season and dry season are summarized in **Table D1.2.2** and **Table D1.2.3**, respectively.

Table D1.2.2 Summary of the Surface Water Quality Survey (Wet Season)

No.	Parameter	Unit	Standard Values for Pakistan	WHO Guideline (2011)	SW 1 (Chenab River)	SW 2 (JBC)	SW 3 (RBC)	SW 4 (GBC)
				Sampling Date	2016/09/23	2016/09/23	2016/09/23	2016/09/24
1	Temperature	˚C	-	-	31.9	26.6	27	26.1
2	Turbidity	NTU	5	5	8	38	57	65
3	Colour	TCU	15	15	1.1	4.1	5.5	13.0
4	pH		6.5-8.5	(6.5-8.5)[1]	8.6	8.3	2.2	8.1
5	EC	µs/cm	-	-	296	178	193	189
6	Hardness	mg/L	500	-	82	98	88	106
7	Total alkalinity	mg/L	-	-	110	90	70	95
8	Chloride (Cl^-)	mg/L	250	(250)[2]	60	50	70	20
9	Total dissolved solids (TDS)	mg/L	1,000	(1,000)[3]	222	145	140	152
10	DO	mg/L	-	-	3.75	5.98	5.64	6.24
11	Nitrite-N (NO_2^-)	mg/L	NO_2^--N:0.9 NO_2^-:3	NO_2^--N:0.9 NO_2^-:3	0.11	0.12	0.19	0.18
12	Nitrate-N (NO_3^-)	mg/L	NO_3^--N:19 NO_3^-:50	NO_3^--N:11 NO_3^-:50	3.3	4.8	5.5	4.1
13	Ammonia	mg/L	-	-	<0.01	<0.01	<0.01	<0.01
14	COD_{Cr}	mg/L	-	-	38	23	32	41
15	Sulphate (SO_4^{2-})	mg/L	-	(500)[4]	28	20	22	29
16	Fluoride (F^-)	mg/L	1.5	1.5	3.0 (1.13)[8]	3.9 (1.06)[8]	4.8 (0.95)[8]	1.3 (1.17)[8]
17	Manganese (Mn)	mg/L	0.5	(0.4)[5]	<0.01	< 0.01	< 0.01	< 0.01
18	Iron (Fe)	mg/L	0.3	-	0.32	1.89	1.83	1.9
19	Calcium (Ca)	mg/L	-	-	31	23	21	31
20	Sodium (Na)	mg/L	-	(200)[2]	48	21	55	211
21	Magnesium (Mg)	mg/L	-	-	<0.01	<0.01	<0.01	<0.01
22	Aluminum (Al)	mg/L	0.2	0.2	<0.020	0.19	<0.020	< 0.02
23	Antimony (Sb)	mg/L	0.005	0.02	0.186	0.288	0.139	0.123
24	Barium (Ba)	mg/L	0.7	0.7	< 0.70	< 0.70	< 0.70	< 0.70
25	Cadmium (Cd)	mg/L	0.01	0.003	< 0.002	< 0.002	< 0.002	< 0.002
26	Chromium (Cr)	mg/L	0.05	0.05	0.40	0.27	0.30	< 0.01
27	Copper (Cu)	mg/L	2	2	< 0.002	< 0.002	< 0.002	< 0.002
28	Lead (Pb)	mg/L	0.05	0.01	< 0.01	< 0.01	< 0.01	< 0.01
29	Mercury (Hg)	mg/L	0.001	0.006	< 0.001	< 0.001	< 0.001	< 0.001
30	Nickel (Ni)	mg/L	0.02	0.07	< 0.02	< 0.02	< 0.02	< 0.02
31	Selenium (Se)	µg/L	10	10	0.37	0.09	0.35	0.25
32	Zinc (Zn)	mg/L	5	(3)[6]	< 0.05	< 0.05	< 0.05	< 0.05
33	Cyanide (CN^-)	mg/L	0.05	(0.07)[5]	< 0.002	< 0.002	< 0.002	< 0.002
34	Total Arsenic (As)[7]	mg/L	0.05	0.01	0.004	0.002	0.002	0.003
	Soluble Arsenic (As)[7]	mg/L	-	-	0.004	0.002	0.002	0.002
35	Standard plate count bacteria	MPN/ 100mL	-	-	24	72	120	39
36	E. coli	MPN/ 100mL	0	0	5.1×10^2	6.2×10^2	5.1×10^2	2.1×10^3
Remarks					6 point composite sample	3 point composite sample	3 point composite sample	3 point composite sample

1) Value for corrosion control in pipeline.
2) Value for taste.
3) Guideline value in year 1984.
4) Recommended value from point view of gastrointestinal effects.
5) Guideline value in year 2004.
6) Recommended value from point view of consumers' acceptability.
7) Analyzed in Japan.
8) Values of supplementary survey conducted on 24th Sep., 2017.
SOURCE: JICA Mission Team

Table D1.2.3 Summary of the Surface Water Quality Survey (Dry Season)

No.	Parameter	Unit	Standard Values for Pakistan	WHO Guideline (2011)	SW 1 (Chenab River)	SW 2 (JBC)	SW 3 (RBC)	SW 4 (GBC)
				Sampling Date	2016/11/16	2016/11/15	2016/11/16	2016/11/16
1	Temperature	˚C	-	-	21.0	20.3	18.8	17.8
2	Turbidity	NTU	5	5	15	5	36	38
3	Colour	TCU	15	15	0.7	0.6	0.8	1.4
4	pH		6.5-8.5	(6.5-8.5)[1)]	8.99	9.48	8.83	8.81
5	EC	µs/cm	-	-	330	211	197	222
6	Hardness	mg/L	500	-	130	96	104	128
7	Total alkalinity	mg/L	-	-	133	190	120	123
8	Chloride (Cl^-)	mg/L	250	(250)[2)]	40	30	30	30
9	Total dissolved solids (TDS)	mg/L	1,000	(1,000)[3)]	227	129	141	160
10	DO	mg/L	-	-	5.08	5.03	5.04	4.4
11	Nitrite (NO_2^-)	mg/L	3	3	0.04	0.06	0.05	0.04
12	Nitrate (NO_3^-)	mg/L	50	50	4.7	5.1	4.9	3.2
13	Ammonia	mg/L	-	-	<0.01	<0.01	<0.01	<0.01
14	COD_{Cr}	mg/L	-	-	71	943[8)] (22)[9)]	22	75
15	Sulphate (SO_4^{2-})	mg/L	-	(500)[4)]	33	20	32	28
16	Fluoride (F^-)	mg/L	1.5	1.5	0.3	0.17	0.11	0.38
17	Manganese (Mn)	mg/L	0.5	(0.4)[5)]	0.01	< 0.010	< 0.010	< 0.010
18	Iron (Fe)	mg/L	0.3	-	0.18	0.32	0.36	0.39
19	Calcium (Ca)	mg/L	-	-	36	27	30	38
20	Sodium (Na)	mg/L	-	(200)[2)]	9.2	16.1	13.8	13.8
21	Magnesium (Mg)	mg/L	-	-	10	7	7	8
22	Aluminum (Al)	mg/L	0.2	0.2	<0.020	<0.020	<0.020	< 0.02
23	Antimony (Sb)	mg/L	0.005	0.02	0.115	0.127	0.298	0.233
24	Barium (Ba)	mg/L	0.7	0.7	< 0.70	< 0.70	< 0.70	< 0.70
25	Cadmium (Cd)	mg/L	0.01	0.003	< 0.002	< 0.002	< 0.002	< 0.002
26	Chromium (Cr)	mg/L	0.05	0.05	<0.01	<0.01	<0.01	< 0.01
27	Copper (Cu)	mg/L	2	2	< 0.002	< 0.002	< 0.002	< 0.002
28	Lead (Pb)	mg/L	0.05	0.01	< 0.01	< 0.01	< 0.01	< 0.01
29	Mercury (Hg)	mg/L	0.001	0.006	< 0.001	< 0.001	< 0.001	< 0.001
30	Nickel (Ni)	mg/L	0.02	0.07	< 0.02	< 0.02	< 0.02	< 0.02
31	Selenium (Se)	µg/L	10	10	<0.04	<0.04	<0.04	<0.04
32	Zinc (Zn)	mg/L	5	(3)[6)]	< 0.05	< 0.05	< 0.05	< 0.05
33	Cyanide (CN^-)	mg/L	0.05	(0.07)[5)]	< 0.002	< 0.002	< 0.002	< 0.002
34	Total Arsenic (As)[7)]	mg/L	0.05	0.01	0.006	0.002	0.002	0.002
	Soluble Arsenic (As)[7)]	mg/L	-	-	0.005	0.001	0.002	0.002
35	Standard plate count bacteria	MPN/ 100mL	-	-	3.4×10^2	4.1×10^2	4.1×10^2	3.7×10^2
36	E. coli	MPN/ 100mL	0	0	2.0×10^2	2.0×10^2	2.5×10^2	1.1×10^2
Remarks					6 point composite sample	3 point composite sample	3 point composite sample	3 point composite sample

1) Value for corrosion control in pipeline.
2) Value for taste.
3) Guideline value in year 1984.
4) Recommended value from point view of gastrointestinal effects.
5) Guideline value in year 2004.
6) Recommended value from point view of consumers' acceptability.
7) Analyzed in Japan.
8) Abnormal value.
9) The result of additional water quality survey conducted on 17th April, 2017.
SOURCE: JICA Mission Team

AD1.3 Tap Water Quality Survey

To confirm tap water quality and identify major issues within the study area, a water quality survey at 80 taps (63 within WASA-F service area, 17 outside of WASA-F service area but with the study area) is conducted by JICA Mission Team in both wet season (Sep. 2016) and dry season (Dec. 2016). The results of tap water quality survey are show in **Table D1.3.1** and **Table D1.3.2**, respectively.

Table D1.3.1 Results of the Tap Water Quality Survey (Wet Season)

	Date	Time	Sample ID	Latitude	Longitude	Residual Chlorine (Cl_2, mg/L)	EC (µS/Cm)	E. Coli (cfu/100 mL)	Nitrate Nitrogen (NO_3^--N, mg/L)
1	2016/09/24	15:17	TW 1-1	31°26.898'N	73°3.181'E	0.83	538	Nil	4
2	2016/09/24	15:00	TW 1-2	31°26.731'N	73°3.277'E	0.68	435	Nil	2.7
3	2016/09/24	13:45	TW 1-3	31°26.508'N	73°3.813'E	0.00	565	Nil	2.1
4	2016/09/24	16:20	TW 1-4	31°26.984'N	73°4.729'E	0.82	634	Nil	2.2
5	2016/09/24	14:45	TW 2-1	31°26.614'N	73°3.085'E	0.42	540	Nil	4.2
6	2016/09/24	10:50	TW 2-2	31°26.324'N	73°2.341'E	0.34	532	Nil	2.1
7	2016/09/24	11:55	TW 2-3	31°26.394'N	73°1.277'E	0.59	598	Nil	2.7
8	2016/09/24	15:40	TW 2-4	31°27.145'N	73°2.623'E	0.79	540	Nil	1.8
9	2016/09/25	15:30	TW 3-1	31°25.805'N	73°2.771'E	0.63	613	Nil	3
10	2016/09/23	11:10	TW 3-2	31°25.786'N	73°1.904'E	0.00	630	Nil	2.6
11	2016/09/23	12:40	TW 3-3	31°25.257'N	73°2.394'E	0.62	553	Nil	2.4
12	2016/09/22	16:00	TW 3-4	31°24.487'N	73°2.181'E	0.57	561	Nil	2.4
13	2016/09/23	9:25	TW 4-1	31°25.481'N	73°3.954'E	0.65	531	Nil	3
14	2016/09/23	9:50	TW 4-2	31°25.701'N	73°3.104'E	0.83	503	Nil	2.6
15	2016/09/26	12:20	TW 4-3	31°25.749'N	73°4.74'E	0.08	1,083	Nil	6.8
16	2016/09/22	11:19	TW 4-4	31°24.881'N	73°4.453'E	1.02	532	Nil	2.5
17	2016/09/26	10:45	TW 4-5	31°25.616'N	73°3.536'E	0.40	557	Nil	4.6
18	2016/09/22	11:42	TW 5-1	31°24.676'N	73°3.914'E	0.95	485	Nil	2.2
19	2016/09/22	14:15	TW 5-2	31°24.421'N	73°3.487'E	0.06	690	Nil	2.2
20	2016/09/22	16:40	TW 5-3	31°24.783'N	73°2.707'E	1.08	567	Nil	2.1
21	2016/09/22	15:25	TW 5-4	31°24.373'N	73°1.92'E	0.02	604	Nil	2.2
22	2016/09/22	10:52	TW 6-1	31°24.281'N	73°4.456'E	0.50	605	Nil	2.2
23	2016/09/22	10:26	TW 6-2	31°24.509'N	73°4.872'E	0.81	609	Nil	2.6
24	2016/09/22	12:04	TW 6-3	31°24.513'N	73°3.964'E	0.67	494	Nil	2.4
25	2016/09/22	12:14	TW 6-4	31°22.706'N	73°3.787'E	0.82	576	Nil	2.4
26	2016/09/19	11:30	TW 7-1	31°26.049'N	73°4.914'E	0.79	712	26	2.3
27	2016/09/19	12:15	TW 7-2	31°25.76'N	73°5.484'E	0.00	880	620	2.1
28	2016/09/19	12:45	TW 7-3	31°26.549'N	73°5.484'E	0.93	587	6	2.3
29	2016/09/19	13:49	TW 7-4	31°25.977'N	73°6.3'E	0.00	756	360	2.2
30	2016/09/20	10:13	TW 8-1	31°26.901'N	73°5.727'E	0.46	514	Nil	2.4
31	2016/09/20	11:00	TW 8-2	31°27.243'N	73°6.378'E	1.02	512	180	2.3
32	2016/09/20	9:37	TW 8-3	31°25.167'N	73°5.632'E	0.95	704	4	2
33	2016/09/20	11:49	TW 8-4	31°27.234'N	73°6.434'E	0.70	625	Nil	2.8
34	2016/09/26	12:50	TW 9-1	31°25.963'N	73°7.219'E	0.00	693	104	6.2
35	2016/09/20	12:24	TW 9-2	31°26.35'N	73°6.787'E	0.00	978	34	2.8
36	2016/09/20	13:00	TW 9-3	31°26.327'N	73°6.127'E	0.28	635	Nil	2.2
37	2016/09/20	13:36	TW 9-4	31°26.943'N	73°7.093'E	0.00	801	410	2.3
38	2016/09/21	16:36	TW 10-1	31°24.71'N	73°7.061'E	0.58	629	8	2.5
39	2016/09/20	16:20	TW 10-2	31°25.787'N	73°7.242'E	0.00	374	Nil	2.3
40	2016/09/26	10:15	TW 10-3	31°24.39'N	73°7.971'E	0.01	660	56	5.4
41	2016/09/26	9:20	TW 10-4	31°25.187'N	73°7.753'E	0.09	2,116	Nil	4.6
42	2016/09/21	16:47	TW 11-1	31°24.992'N	73°6.194'E	0.04	720	36	2.6
43	2016/09/21	10:23	TW 11-2	31°23.113'N	73°2.207'E	0.04	1,934	20	3.3
44	2016/09/21	15:20	TW 11-3	31°24.021'N	73°6.587'E	0.97	611	12	2.4
45	2016/09/21	13:34	TW 11-4	31°23.765'N	73°5.272'E	0.01	1,707	Nil	3.5
46	2016/09/21	12:34	TW 12-1	31°23.47'N	73°4.566'E	0.07	761	24	4.6
47	2016/09/21	13:00	TW 12-2	31°23.669'N	73°5.227'E	0.97	220	Nil	2.5
48	2016/09/21	9:21	TW 12-3	31°23.023'N	73°5.517'E	0.20	591	Nil	2.3
49	2016/09/21	11:23	TW 12-4	31°22.672'N	73°5.683'E	0.04	606	10	2.3

	Date	Time	Sample ID	Latitude	Longitude	Residual Chlorine (Cl_2, mg/L)	EC (µS/Cm)	E. Coli (cfu/10 0 mL)	Nitrate Nitrogen (NO_3^--N, mg/L)
50	2016/09/21	12:09	TW 12-5	31°23.013'N	73°4.592'E	0.47	487	Nil	2.2
51	2016/09/24	10:30	TW 13-1	31°27.629'N	73°3.966'E	0.58	507	Nil	2.4
52	2016/09/24	12:05	TW 13-2	31°27.763'N	73°3.712'E	1.14	498	Nil	2
53	2016/09/24	11:00	TW 13-3	31°27.298'N	73°3.957'E	0.38	498	48	2.1
54	2016/09/29	10:10	TW 14-1	31°28.518'N	73°3.361'E	0.06	2,875	Nil	10.9
55	2016/09/29	9:45	TW 14-2	31°29.283'N	73°3.989'E	0.00	1,968	14	11.2
56	2016/09/24	12:41	TW 14-3	31°28.912'N	73°4.134'E	1.28	538	Nil	2.7
57	2016/09/25	1:23	TW 15-1	31°29.768'N	73°6.37'E	0.02	2,641	Nil	18.9
58	2016/09/25	12:40	TW 15-2	31°28.757'N	73°6.112'E	0.11	202	144	3
59	2016/09/29	9:20	TW 15-3	31°28.821'N	73°4.758'E	0.00	3,402	Nil	5.3
60	2016/09/24	10:00	TW 15-4	31°27.437'N	73°4.637'E	0.89	514	Nil	4.1
61	2016/09/25	11:45	TW 16-1	31°27.434'N	73°9.345'E	0.02	333	72	4.4
62	2016/09/25	10:53	TW 16-2	31°27.613'N	73°9.09'E	0.06	323	32	4.3
63	2016/09/25	10:37	TW 16-3	31°27.487'N	73°9.008'E	0.23	1,091	Nil	14.7
64	2016/09/19	13:15	TW O-1	31°26.545'N	73°5.648'E	0.00	400	220	3.1
65	2016/09/20	11:17	TW O-2	31°27.265'N	73°6.374'E	0.00	318	28	2.2
66	2016/09/28	13:15	TW O-3	31°27.998'N	72°59.024'E	0.00	2,375	Nil	5.1
67	2016/09/27	10:08	TW O-4	31°22.063'N	72°56.67'E	0.22	388	Nil	2.7
68	2016/09/27	11:00	TW O-5	31°18.892'N	73°1.68'E	0.11	2,549	Nil	2.9
69	2016/09/27	11:45	TW O-6	31°19.441'N	73°8.191'E	0.02	1155	16	2.6
70	2016/09/27	12:05	TW O-7	31°20.396'N	73°10.476'E	0.00	665	24	2.1
71	2016/09/27	12:45	TW O-8	31°21.471'N	73°12.984'E	0.00	1,457	Nil	2.8
72	2016/09/27	13:30	TW O-9	31°22.518'N	73°14.085'E	0.05	760	10	3.1
73	2016/09/27	13:05	TW O-10	31°22.939'N	73°11.982'E	0.00	1,486	Nil	3.3
74	2016/09/27	9:35	TW O-11	31°30.098'N	73°16.126'E	0.07	3,013	18	5.3
75	2016/09/28	9:45	TW O-12	31°30.051'N	73°16.07'E	0.00	543	12	1.9
76	2016/09/28	10:30	TW O-13	31°32.825'N	73°12.336'E	0.00	991	4	8.1
77	2016/09/28	11:25	TW O-14	31°33.975'N	73°10965'E	0.00	275	4	1.3
78	2016/09/28	11:45	TW O-15	31°34.234'N	73°11.143'E	0.00	268	12	1.2
79	2016/09/28	12:25	TW O-16	31°31.519'N	73°5.975'E	0.00	2,791	8	2.4
80	2016/09/28	12:25	TW O-17	31°31.519'N	73°5.975'E	0.00	540	6	4.9

Nil: Not detected.
SOURCE: JICA Mission Team

Table D1.3.2 Results of the Tap Water Quality Survey (Dry Season)

	Date	Time	Sample ID	Latitude	Longitude	Residual Chlorine (Cl_2, mg/L)	EC (µS/Cm)	E. Coli (cfu/10 0 mL)	Nitrate Nitrogen (NO_3^--N, mg/L)
1	2016/12/10	15:00	TW 1-1	31°26.898'N	73°3.181'E	0.75	640	Nil	5.4
2	2016/12/10	14:40	TW 1-2	31°26.731'N	73°3.277'E	0.75	634	Nil	3.7
3	2016/12/10	13:50	TW 1-3	31°26.508'N	73°3.813'E	0.34	666	Nil	5.8
4	2016/12/10	16:20	TW 1-4	31°26.984'N	73°4.729'E	0.57	687	Nil	6.2
5	2016/12/10	14:20	TW 2-1	31°26.614'N	73°3.085'E	0.00	642	Nil	5.3
6	2016/12/14	13:15	TW 2-2	31°26.324'N	73°2.341'E	0.40	526	Nil	4.2
7	2016/12/14	13:40	TW 2-3	31°26.394'N	73°1.277'E	0.88	890	Nil	3.4
8	2016/12/10	15:30	TW 2-4	31°27.145'N	73°2.623'E	0.29	711	Nil	6.1
9	2016/12/07	15:30	TW 3-1	31°25.805'N	73°2.771'E	0.07	1,058	820	3.3
10	2016/12/14	12:45	TW 3-2	31°25.786'N	73°1.904'E	0.19	4,213	Nil	7.3
11	2016/12/14	12:25	TW 3-3	31°25.257'N	73°2.394'E	0.84	838	Nil	4.9
12	2016/12/14	23:35	TW 3-4	31°24.487'N	73°2.181'E	1.43	795	Nil	8.6
13	2016/12/07	9:40	TW 4-1	31°25.481'N	73°3.954'E	0.88	732	Nil	6.5
14	2016/12/07	10:30	TW 4-2	31°25.708'N	73°3.105'E	1.55	704	Nil	5.9
15	2016/12/07	9:15	TW 4-3	31°25.749'N	73°4.74'E	0.70	914	Nil	7.1
16	2016/12/14	9:25	TW 4-4	31°24.881'N	73°4.453'E	0.90	708	Nil	7.4
17	2016/12/07	10:00	TW 4-5	31°25.616'N	73°3.536'E	0.66	753	Nil	4.2
18	2016/12/14	10:00	TW 5-1	31°24.676'N	73°3.914'E	0.10	803	Nil	7.1
19	2016/12/14	10:25	TW 5-2	31°24.421'N	73°3.487'E	0.29	832	Nil	5.8

	Date	Time	Sample ID	Latitude	Longitude	Residual Chlorine (Cl_2, mg/L)	EC (µS/Cm)	E. Coli (cfu/100 mL)	Nitrate Nitrogen (NO_3^--N, mg/L)
20	2016/12/14	12:00	TW 5-3	31°24.783'N	73°2.707'E	0.72	801	Nil	4.9
21	2016/12/14	11:15	TW 5-4	31°24.373'N	73°1.92'E	0.87	840	Nil	5.0
22	2016/12/13	10:00	TW 6-1	31°24.281'N	73°4.456'E	0.00	763	Nil	5.1
23	2016/12/13	10:25	TW 6-2	31°24.509'N	73°4.872'E	0.95	761	Nil	4.6
24	2016/12/14	9:45	TW 6-3	31°24.513'N	73°3.964'E	0.31	710	Nil	4.1
25	2016/12/14	18:00	TW 6-4	31°22.706'N	73°3.787'E	0.78	674	Nil	6.0
26	2016/12/06	11:30	TW 7-1	31°26.049'N	73°4.914'E	1.30	672	Nil	7.2
27	2016/12/06	13:15	TW 7-2	31°25.76'N	73°5.484'E	0.00	685	Nil	5.4
28	2016/12/06	11:25	TW 7-3	31°26.555'N	73°5.648'E	0.68	687	Nil	8.2
29	2016/12/13	15:40	TW 7-4	31°25.977'N	73°6.3'E	0.07	930	211	5.7
30	2016/12/06	11:15	TW 8-1	31°26.901'N	73°5.727'E	0.57	774	Nil	8.3
31	2016/12/14	16:10	TW 8-2	31°27.243'N	73°6.378'E	0.96	775	Nil	4.2
32	2016/12/06	10:45	TW 8-3	31°27.375'N	73°5.608'E	0.14	703	Nil	5.4
33	2016/12/13	16:30	TW 8-4	31°27.495'N	73°7.424'E	0.98	706	21	4.5
34	2016/12/14	12:50	TW 9-1	31°25.963'N	73°7.219'E	0.00	1,240	Nil	5.6
35	2016/12/14	15:35	TW 9-2	31°26.35'N	73°6.787'E	0.00	1,126	Nil	5.4
36	2016/12/14	15:15	TW 9-3	31°26.327'N	73°6.127'E	0.87	815	Nil	4.4
37	2016/12/13	16:10	TW 9-4	31°26.943'N	73°7.093'E	0.00	810	Nil	6.4
38	2016/12/13	11:30	TW 10-1	31°24.71'N	73°7.061'E	1.14	738	Nil	5.7
39	2016/12/13	12:55	TW 10-2	31°25.787'N	73°7.242'E	0.00	551	Nil	6.6
40	2016/12/13	12:00	TW 10-3	31°24.39'N	73°7.971'E	0.07	740	Nil	24.1
41	2016/12/13	12:35	TW 10-4	31°25.187'N	73°7.753'E	0.51	654	Nil	6.8
42	2016/12/13	14:45	TW 11-1	31°24.992'N	73°6.194'E	0.05	942	Nil	7.9
43	2016/12/11	13:20	TW 11-2	31°23.103'N	73°6.276'E	0.00	1,520	Nil	6.8
44	2016/12/15	9:00	TW 11-3	31°24.021'N	73°6.587'E	1.22	738	Nil	4.4
45	2016/12/11	13:10	TW 11-4	31°23.765'N	73°5.272'E	0.00	5,216	Nil	13.3
46	2016/12/13	9:20	TW 12-1	31°23.47'N	73°4.566'E	0.00	1,142	Nil	11.6
47	2016/12/11	12:30	TW 12-2	31°23.669'N	73°5.227'E	0.85	796	Nil	5.2
48	2016/12/11	10:10	TW 12-3	31°23.023'N	73°5.517'E	0.00	587	Nil	5.5
49	2016/12/11	10:50	TW 12-4	31°22.672'N	73°5.683'E	0.05	734	Nil	4.9
50	2016/12/13	9:40	TW 12-5	31°23.013'N	73°4.592'E	0.19	709	Nil	6.0
51	2016/12/10	11:30	TW 13-1	31°27.629'N	73°3.966'E	0.03	4,004	Nil	4.1
52	2016/12/10	12:40	TW 13-2	31°27.763'N	73°3.712'E	0.07	641	Nil	3.8
53	2016/12/10	12:00	TW 13-3	31°27.298'N	73°3.957'E	0.93	756	Nil	5.9
54	2016/12/10	10:15	TW 14-1	31°28.518'N	73°3.361'E	0.00	3,390	Nil	6.7
55	2016/12/10	11:00	TW 14-2	31°29.283'N	73°3.989'E	0.00	2,170	Nil	8.1
56	2016/12/10	10:40	TW 14-3	31°28.912'N	73°4.134'E	1.04	702	Nil	9.2
57	2016/12/14	16:55	TW 15-1	31°29.768'N	73°6.37'E	0.00	2,412	5	4.1
58	2016/12/14	16:30	TW 15-2	31°28.757'N	73°6.112'E	0.00	476	130	6.2
59	2016/12/10	10:00	TW 15-3	31°28.821'N	73°4.758'E	0.00	3,996	10	5.2
60	2016/12/10	9:40	TW 15-4	31°27.437'N	73°4.637'E	0.17	699	Nil	4.9
61	2016/12/13	11:45	TW 16-1	31°27.434'N	73°9.345'E	0.00	489	Nil	6.4
62	2016/12/13	10:53	TW 16-2	31°27.613'N	73°9.09'E	0.00	454	Nil	8.3
63	2016/12/13	10:37	TW 16-3	31°27.487'N	73°9.008'E	0.00	1,197	Nil	12.0
64	2016/12/15	17:00	TW O-4	31°27.063'N	72°56.67'E	0.00	1,127	Nil	10.4
65	2016/12/15	16:10	TW O-5	31°18.892'N	73°1.68'E	0.02	2,765	Nil	6.5
66	2016/12/15	9:40	TW O-6	31°19.441'N	73°8.191'E	0.00	791	Nil	5.2
67	2016/12/15	10:00	TW O-7	31°20.396'N	73°10.476'E	0.00	4,380	Nil	13.4
68	2016/12/15	10:40	TW O-8	31°21.471'N	73°12.984'E	0.00	1,848	Nil	4.8
69	2016/12/15	11:00	TW O-9	31°22.518'N	73°14.085'E	0.00	857	Nil	6.1
70	2016/12/15	10:20	TW O-10	31°22.939'N	73°11.982'E	0.00	838	Nil	5.7
71	2016/12/15	11:35	TW O-11	31°30.098'N	73°16.126'E	0.00	3,434	Nil	4.3
72	2016/12/15	11:50	TW O-12	31°30.051'N	73°16.07'E	0.08	652	Nil	4.2
73	2016/12/15	12:15	TW O-13	31°32.825'N	73°12.336'E	0.00	1,307	Nil	5.4
74	2016/12/15	13:00	TW O-14	31°33.975'N	73°10965'E	0.05	425	Nil	5.3
75	2016/12/15	13:20	TW O-15	31°34.234'N	73°11.143'E	0.08	422	Nil	4.8
76	2016/12/15	13:50	TW O-16	31°31.519'N	73°5.975'E	0.00	3,355	Nil	5.2
77	2016/12/15		TW O-18	Provided by JICA Team		0	556	Nil	7.2

	Date	Time	Sample ID	Latitude	Longitude	Residual Chlorine (Cl_2, mg/L)	EC (µS/Cm)	E. Coli (cfu/100 mL)	Nitrate Nitrogen (NO_3^--N, mg/L)
78	2016/12/15		TW O-19	Member in WASA-F office		0	421	Nil	1.4
79	2016/12/15		TW O-20			0	441	Nil	1.9
80	2016/12/15		TW O-21			0	395	Nil	1.3

Nil: Not detected.
SOURCE: JICA Mission Team

AD1.4 Drains Water Quality Survey

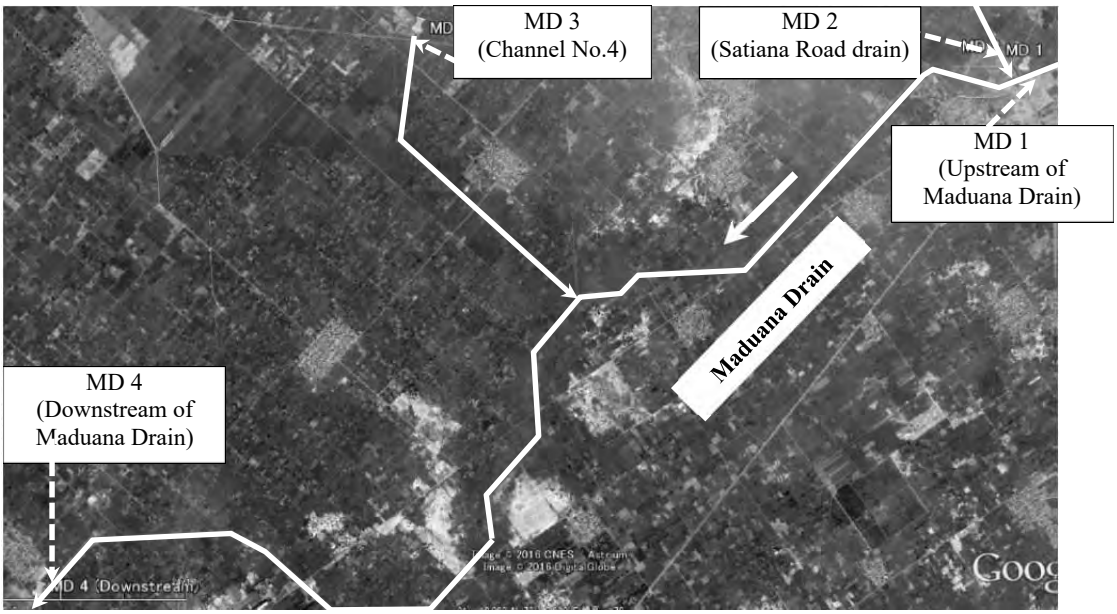
(1) Sampling

In order to understand current situation of pollution loads discharging into Main Drains and to estimate the results of planned sewerage system on reduction of pollution loads, a survey along Main Drains within target area of the project is conducted. Sampling method and flowrate measurement is summarized in the **Table D1.4.1**. Sampling location is shown in **Figure D1.4.1 to D1.4.5**.

Table D1.4.1 Sampling for the Survey on Main Drains

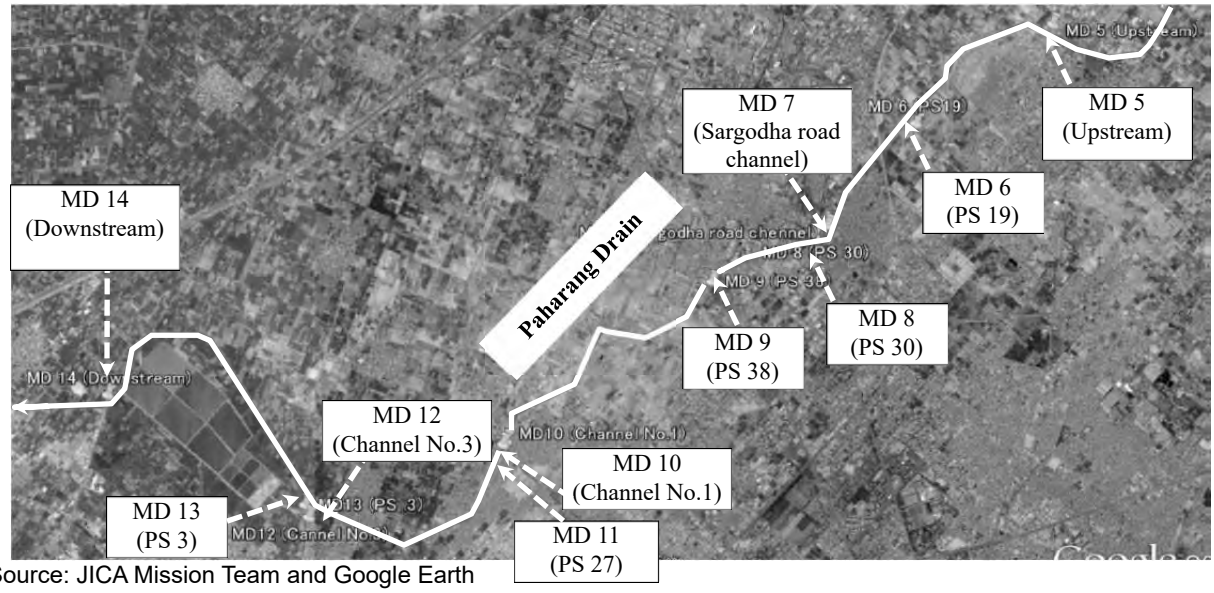
Sampling Site		Sample ID	Coordinates	Number of Sample	Flowrate Measuring
1	Upstream of Maduana Drain	MD 1	31°19.558' N 73°9.954' E	1	Velocity meter & section area
2	Satiana road drain before discharging into Maduana Drain	MD 2	31°19.631' N 73°9.903' E	1	Velocity meter & section area
3	Channel No.4 before discharging into Maduana Drain	MD 3	31°19.769' N 73°6.195' E	1	Velocity meter & section area
4	Downstream of Maduana Drain	MD 4	31°16.747' N 73°3.839' E	1	Velocity meter & section area
5	Upstream of Paharang Drain	MD 5	31°29.924' N 73°6.223' E	1	Velocity meter & section area
6	Disposal pump stations PS-19	MD 6	31°29.313' N 73°5.265' E	1	Pump operation (velocity meter)
7	Sargodha road channel before mixing with Paharang Drain	MD 7	31°28.700' N 73°4.639' E	1	Velocity meter & section area
8	Disposal pump stations PS-30	MD 8	31°28.638' N 73°4.546' E	1	Pump operation (velocity meter)
9	Disposal pump stations PS-38	MD 9	31°28.362' N 73°3.828' E	1	Pump operation (velocity meter)
10	Channel No. 1 before discharging into Paharang Drain	MD 10	31°27.400' N 73°2.380' E	1	Velocity meter & section area
11	Disposal pump stations PS-27	MD 11	31°27.375' N 73°2.361' E	1	Pump operation (velocity meter)
12	Channel No. 3 before discharging into Paharang Drain	MD 12	31°26.935' N 73°0.995' E	1	Velocity meter & section area
13	Disposal pump stations PS-3	MD 13	31°27.011' N 73°0.970' E	1	Pump operation (velocity meter)
14	Downstream of Paharang Drain	MD 14	31°27.679' N 72°59.585' E	1	Velocity meter & section area
Total number of sample				14	
Sample type: Drain or channel: Composite sample (grab samples are collected at different points of one sampling section) Pump station: Grab sample					

Source: JICA Mission Team



Source: JICA Mission Team and Google Earth

Figure D1.4.1 Sampling Locations of Main Drains (Maduana Drain)



Source: JICA Mission Team and Google Earth

Figure D1.4.2 Sampling Locations of Main Drains (Paharang Drain)

(2) Results

The results of the survey along Maduana Drain and Paharang Drain within target area of the project are shown in **Table D1.4.1** and **Table D1.4.2**, respectively.

Table D1.4.1 Summary of Survey Results for Maduana Drain

No.	Parameter	Unit	Pakistan Standard (NEQS)	WHO Irrigation Guideline	MD 1 (Upstream)	MD 2 (Satiana Road Drain)	MD 3 (Channel No. 4)	MD 4 (Down-stream)
				Sampling Date	2016/10/4	2016/10/4	2016/10/4	2016/10/4
1	Flowrate	m^3/s	-	-	3.48	2.61	1.2	6.69
		m^3/d	-	-	300,700	225,600	103,700	578,100
		cusec	-	-	123	92	42	236
2	Temperature	˚C	=<3˚C	-	33.8	33.9	33.2	33.2
3	pH		6-9	-	8.4	7.9	7.8	8.2
4	SS	mg/L	200	100	184	119	230	205
5	BOD_5	mg/L	80	-	114	63	91	121
6	COD_{Cr}	mg/L	150	-	351	206	290	351
7	TDS	mg/L	3,500	2,000	3,710	2,278	4,083	3,948
8	NO_2^--N	mg/L	-	-	0.12	0.07	0.12	0.11
9	NO_3^--N	mg/L	-	-	4.6	3.5	4.1	4.1
10	Ammonia-N	mg/L	40	-	<0.010	<0.010	0.21	0.41
11	T-N	mg/L	-	30	201	126	81.5	87.5
12	T-P	mg/L	-	-	10.6	8.1	14.1	15.3
13	Oil and Grease	mg/L	10	-	<10	<10	<10	< 10
14	Sulfate (SO_4^{2-})	mg/L	600	-	54	103	120	68
15	Cyanide (CN^-)	mg/L	1.0	-	< 0.002	<0.002	<0.002	< 0.002
16	Phenol	mg/L	0.1	-	Nil	Nil	Nil	Nil
17	Copper (Cu)	mg/L	1.0	0.2	< 0.002	<0.002	<0.002	< 0.002
18	Zinc (Zn)	mg/L	5.0	2.0	< 0.05	<0.05	<0.05	< 0.05
19	Arsenic (As)	mg/L	1.0	0.1	0.005	<0.005	0.05	0.005
20	Cadmium (Cd)	mg/L	0.1	0.01	< 0.002	<0.002	<0.002	< 0.002
21	Chromium (Cr)	mg/L	1.0	0.1	< 0.01	<0.01	<0.01	< 0.01
22	Lead (Pb)	mg/L	0.5	5.0	< 0.01	<0.01	<0.01	< 0.01
23	Mercury (Hg)	mg/L	0.01	-	< 0.001	<0.001	<0.001	< 0.001
24	Nickel (Ni)	mg/L	1.0	0.2	< 0.02	<0.02	<0.02	< 0.02
25	Coliform	MPN/ 100mL	-	1×10^3	1.1×10^4	7.2×10^3	6.4×10^3	8.8×10^3
	BOD load	Ton/day	-	-	34.3	14.2	9.4	70.0
	Rate	%	-	-	59%	25%	16%	-
	Main pollution sources	-	-	-	Ind.[1)]	Dom.+Ind.	Dom.+Ind.	Ind.+Dom.

1) Ind.: Industrial wastewater, Dom.: Domestic wastewater
Source: JICA Mission Team

Table D1.4.2 Summary of Survey Results for Paharang Drain

No.	Parameter	Unit	NEQS	WHO Irrigation Guideline	MD 5 (Up-stream)	MD 6 (PS 19)	MD 7 (Sargodha)	MD 8 (PS 30)	MD 9 (PS 38)	MD 10 (Channel No. 1)	MD 11 (PS 27)	MD 12 (Channel No. 3)	MD 13 (PS 3)	MD 14 (Down-stream)
Sampling Date					2016/10/6	2016/10/6	2016/10/6	2016/10/6	2016/10/6	2016/10/6	2016/10/6	2016/10/6	2016/10/6	2016/10/6
1	Flowrate	m^3/s	-	-	1.53	0.11	2.54	0.63	2.21	1.81	0.48	0.8	2.75	8.2
		m^3/d	-	-	132,200	9,600	219,500	54,500	191,000	156,400	41,500	69,200	237,600	708,500
		cusec	-	-	54	4	90	22	78	64	17	28	97	289
2	Temperature	˚C	=<3˚C	-	31.6	31.7	36.3	32.2	31.9	31.7	31.3	32.6	30.6	32.7
3	pH		6-9	-	8.11	7.75	8.90	9.70	7.65	7.48	7.85	7.80	7.75	8.75
4	SS	mg/L	200	100	164	179	187	161	183	143	159	163	219[1)]	233
5	BOD_5	mg/L	80	-	97	148	219	103	184	104	119	94	141	197
6	COD_{Cr}	mg/L	150	-	275	468	641	344	593	351	337	324	448	634
7	TDS	mg/L	3,500	2,000	2,254	2,764	3,424	2,214	2,515	1,337	2,214	2,188	3,552	3,948
8	NO_2^--N	mg/L	-	-	0.02	0.06	0.08	0.03	0.10	0.08	0.09	0.08	0.07	0.10
9	NO_3^--N	mg/L	-	-	5.8	5.7	8.6	5.8	5.7	6.0	6.3	5.8	6.3	7.0
10	Ammonia-N	mg/L	40	-	< 0.01	< 0.01	0.25	0.13	0.15	< 0.01	0.02	0.19	0.21	0.14
11	T-N	mg/L	-	30	8.8	41	15.3	27.5	8.3	24.7	14.3	11.8	16.8	14.1
12	T-P	mg/L	-	-	4.7	7.4	12.4	18.8	11.2	20.1	12.9	9.7	10.8	19.4
13	Oil and Grease	mg/L	10	-	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
14	Sulfate (SO_4^{2-})	mg/L	600	-	87	75	80	62	105	71	119	84	68	59
15	Cyanide (CN^-)	mg/L	1.0	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
16	Phenol	mg/L	0.1	-	0.02	0.05	0.07	0.05	0.25	0.09	0.06	< 0.002	0.12	0.29
17	Copper (Cu)	mg/L	1.0	0.2	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
18	Zinc (Zn)	mg/L	5.0	2.0	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
19	Arsenic (As)	mg/L	1.0	0.1	0.050	0.025	0.050	0.005	0.050	0.025	0.050	0.100	0.250	0.100
20	Cadmium (Cd)	mg/L	0.1	0.01	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
21	Chromium (Cr)	mg/L	1.0	0.1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
22	Lead (Pb)	mg/L	0.5	5.0	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
23	Mercury (Hg)	mg/L	0.01	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
24	Nickel (Ni)	mg/L	1.0	0.2	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
25	Coliform	MPN/ 100mL	-	1×10^3	1.44×10^4	8.4×10^3	9.8×10^3	9.8×10^3	6.2×10^3	9.2×10^3	4.0×10^3	5.1×10^3	6.6×10^3	8.8×10^3

Source: JICA Mission Team

AD1.5 Rivers Water Quality Survey

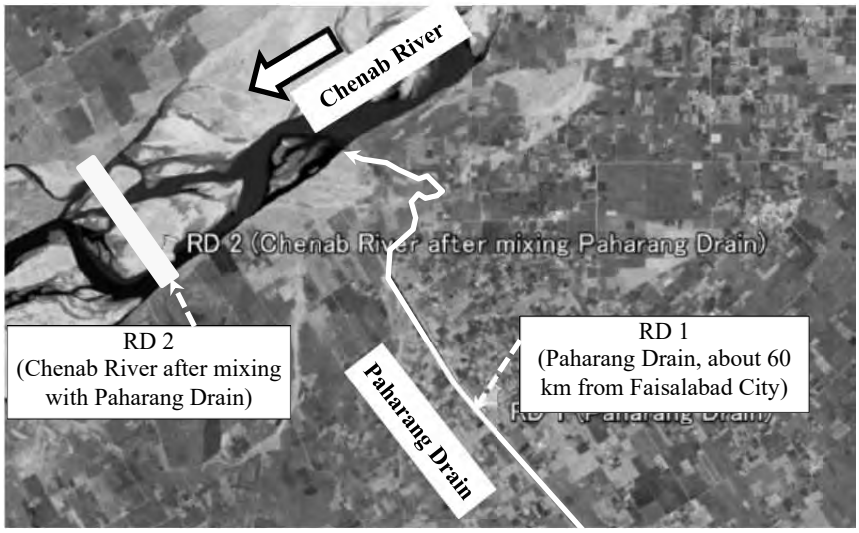
(1) Sampling

In order to analyze current water quality of rivers after receiving wastewater of main drains and to estimate the results of planned sewerage system on improving river water quality, a survey on Chenab River and Ravi River as well as their inflowing drains is conducted. Sampling method and flowrate measurement is summarized in the **Table D1.5.1**. Sampling locations are shown in **Figure D1.5.1** and **Figure D1.5.2**.

TableD1.5.1 Sampling for the Survey on Rivers after Receiving Wastewater of Main Drains

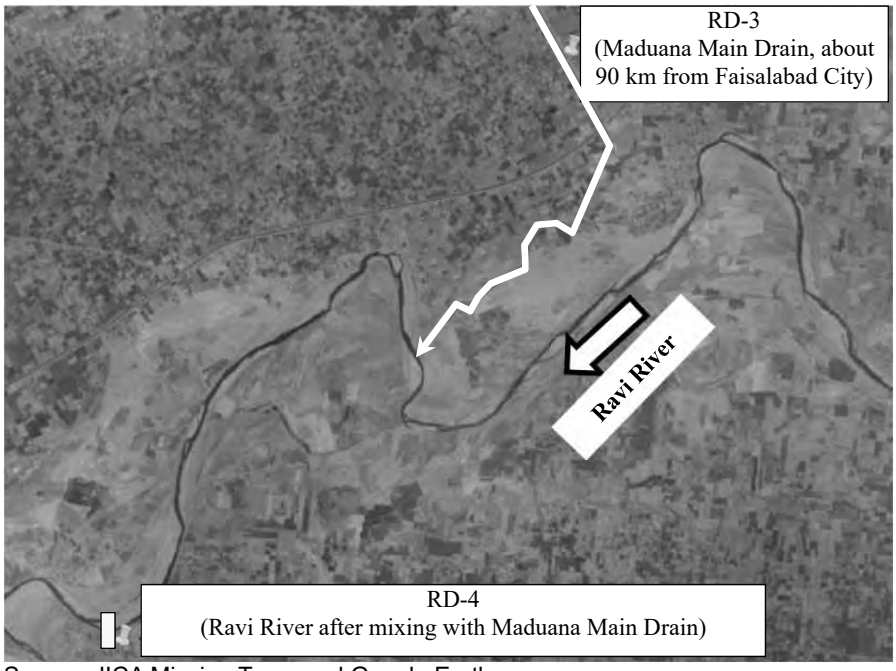
Sampling Site		Sample ID	Coordinates	Number of Sample	Flowrate Measuring
1	Paharang Main Drain before discharging into Chenab River	RD 1	31°33.149' N 72°32.798' E	1 (dry season)	Velocity meter & section area
2	Chenab River after receiving wastewater of Paharang Main Drain	RD 2	31°33.869' N 72°31.516' E	2 (1 in wet and 1 in dry season)	Velocity meter & section area (dry season only)
3	Maduana Main Drain before discharging into Ravi River	RD 3	30°44.255' N 72°48.191' E	1 (dry season)	Velocity meter & section area
4	Ravi River after receiving wastewater of Maduana Main Drain	RD 4	30°40.245' N 72°45.257' E	2 (1 in wet and 1 in dry season)	Velocity meter & section area (dry season only)
Total number of sample				6	
Sample type: Composite sample (at least three grab samples are collected at different points of one sampling section)					

Source: JICA Mission Team



Source: JICA Mission Team and Google Earth

Figure C2.4.4 Sampling Locations of Chenab River and Paharang Main Drain



Source: JICA Mission Team and Google Earth

Figure D1.5.2 Sampling Locations of Ravi River and Maduana Main Drain

(2) Results

The results of the survey on Chenab River and Ravi River as well as their inflowing Main Drains are shown in **Table D1.5.2** and **Table D1.5.3**, respectively.

Table D1.5.2 Summary of Survey Results for Chenab River and Paharang Drain

No.	Parameter	Unit	Pakistan Standard (NEQS)	WHO Irrigation Guideline	RD 1 (Paharang Drain in Dry Season)	RD 2 (Chenab River in Dry Season)	RD 2 (Chenab River in Wet Season)
				Sampling Date	2016/12/17	2016/12/17	2016/09/27
1	Flowrate	m^3/s	-	-	10.31	38.01	-
		m^3/d	-	-	890,900	3,284,000	-
		cusec	-	-	364	1,343	-
2	Temperature	˚C	=<3˚C	-	19.5	17.5	31.5
3	pH		6-9	-	9.25	10.5	8.7
4	EC	µS/cm	-	3,000	4,798	1,403	924
5	SS	mg/L	200	100	394	470	160
6	DO	mg/L	-	-	0	7.08	3.55
7	BOD_5	mg/L	80	-	298	1,590[1)] 95[2)]	890[2)]
8	Ammonia-N	mg/L	40	-	31	8	<0.01
9	Coliform	MPN/ 100mL	-	1×10^3	7.5×10^3	7.8×10^3	1.9×10^4

1) Abnormal value
2) The value estimated from the result of additional water quality survey conducted on 17th April, 2017.
Source: JICA Mission Team

Table D1.5.3 Summary of Survey Results for Ravi River and Maduana Drain

No.	Parameter	Unit	Pakistan Standard (NEQS)	WHO Irrigation Guideline	RD 3 (Maduana Drain in Dry Season)	RD 4 (Ravi River in Dry Season)	RD 4 (Ravi River in Wet Season)
				Sampling Date	2016/12/18	2016/12/18	2016/09/29
1	Flowrate	m^3/s	-	-	9.96	14.36	-

No.	Parameter	Unit	Pakistan Standard (NEQS)	WHO Irrigation Guideline	RD 3 (Maduana Drain in Dry Season)	RD 4 (Ravi River in Dry Season)	RD 4 (Ravi River in Wet Season)
		m^3/d	-	-	860,900	1,240,900	-
		cusec	-	-	352	508	-
2	Temperature	˚C	=<3˚C	-	20.4	18.6	33.3
3	pH		6-9	-	8.5	9.38	8.7
4	EC	µS/cm	-	3,000	4,858	4,098	1,930
5	SS	mg/L	200	100	443	413	124
6	DO	mg/L	-	-	0	0	0.04
7	BOD_5	mg/L	80	-	330	290	420
8	Ammonia-N	mg/L	40	-	7	17	<0.01
9	Coliform	MPN/ 100mL	-	1×10^3	8.1×10^3	7.9×10^3	2.4×10^4

Source: JICA Mission Team

AD1.6 Water Quality Survey on Wastewater Treatment Plant

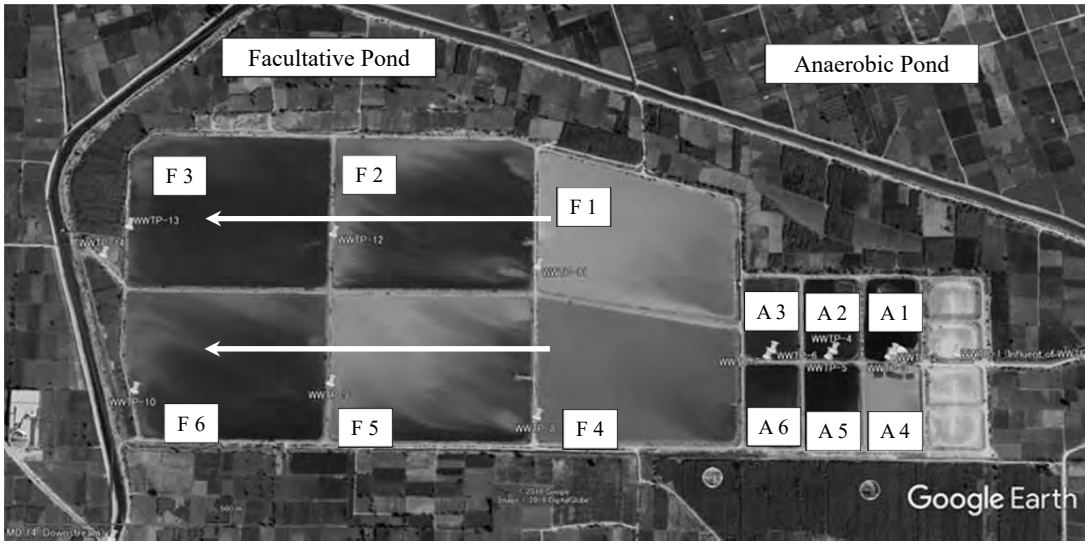
(1) Sampling

To verify the treatment performance of each unit treatment process and to provide a reference for planning WWTPs, a survey on existing Chokera WWTP is conducted. Sampling location and method is summarized in the **Table D1.6.1**. Sampling locations are shown in **Figure D1.6.1**.

TableD1.6.1 Sampling Locations for the Survey on Chokera WWTP

Sampling Site		Sample ID	Latitude	Longitude	Sample Nome
1	Influent of the WWTP	WWTP 1	31° 27.144'N	73° 0.728'E	1 time in dry season
2	Effluent of anaerobic pond No. 1	WWTP 2	31° 27.214'N	73° 0.637'E	1 time in dry season
3	Effluent of anaerobic pond No. 4	WWTP 3	31° 27.213'N	73° 0.628'E	1 time in dry season
4	Effluent of anaerobic pond No. 2	WWTP 4	31° 27.265'N	73° 0.571'E	1 time in dry season
5	Effluent of anaerobic pond No. 5	WWTP 5	31° 27.264'N	73° 0.560'E	1 time in dry season
6	Effluent of anaerobic pond No. 3	WWTP 6	31° 27.316'N	73° 0.503'E	1 time in dry season
7	Effluent of anaerobic pond No. 6	WWTP 7	31° 27.314'N	73° 0.491'E	1 time in dry season
8	Effluent of facultative pond No. 4	WWTP 8	31° 27.447'N	73° 0.173'E	1 time in dry season
9	Effluent of facultative pond No. 5	WWTP 9	31° 27.649'N	72° 59.972'E	1 time in dry season
10	Effluent of facultative pond No. 6	WWTP 10	31° 27.804'N	72° 59.745'E	1 time in dry season
11	Effluent of facultative pond No. 1	WWTP 11	31° 27.590'N	73° 0.319'E	1 time in dry season
12	Effluent of facultative pond No. 2	WWTP 12	31° 27.793'N	73° 0.118'E	1 time in dry season
13	Effluent of facultative pond No. 3	WWTP 13	31° 27.971'N	72° 59.893'E	1 time in dry season
14	Effluent of the WWTP	WWTP14	31° 28.023'N	72° 59.829'E	1 time in dry season
Sample type: Composite sample (grab samples are collected at two outlets of each facultative pond)					

Source: JICA Mission Team



Source: JICA Mission Team and Google Earth

Figure D1.6.1 Sampling Locations of Chokera WWTP

(2) Results

The results of the survey on Chokera WWTP are shown in **Table D1.6.2**.

Table D1.6.2 Summary of Survey Results for Chokera WWTP

No.	Parameter	Unit	WWTP 1	WWTP 2	WWTP 3	WWTP 4	WWTP 5	WWTP 6	WWTP 7	WWTP 8	WWTP 9	WWTP 10	WWTP 11	WWTP 12	WWTP 13	WWTP 14
1	pH		9.43	7.46	7.45	7.64	8.02	8.05	7.90	8.75	8.86	9.00	8.50	8.72	8.67	9.08
2	Temperature	˚C	30.4	29.5	31.3	30.7	29.2	29.9	33.6	32.8	32.3	33.2	30.9	31.4	30.7	32.6
3	EC	µS/cm	3,121	2,992	2,945	2,960	2,969	2,955	2,957	3,030	3,040	2,999	2,984	2,985	3,017	2,973
4	SS	mg/L	189	116	123	159	152	173	177	181	193	211	178	184	201	198
5	TDS	mg/L	2,252	2,227	2,137	2,182	1,772	3,129	2,188	2,182	2,240	2,176	2,220	2,284	2,336	3,296
6	COD_{Cr}	mg/L	1862	379	386	348	262	510	544	351	268	344	324	413	379	530
7	BOD_5	mg/L	580	116	122	114	84	176	174	104	87	107	103	122	121	165
8	Sodium	mg/L	315	364	812	378	449	497	610	709	631	596	1018	474	460	457
9	Calcium	mg/L	60	84	96	116	108	92	136	116	92	140	116	104	136	88
10	Sulfate (SO_4^{2-})	mg/L	83	54	80	82	87	85	74	74	85	96	73	64	86	81
11	T-N	mg/L	18.7	12.9	28.4	37.5	26	25.1	16.6	31.7	24.6	19.2	22.8	29.8	26.2	11.5
12	Coliform	MPN/ 100mL	6.6×10^3	1.04×10^4	2.1×10^3	3.4×10^3	4.8×10^3	9.2×10^3	1.04×10^4	7.4×10^3	9.0×10^3	8.2×10^3	4.0×10^3	6.6×10^3	7.6×10^3	4.8×10^3
13	T-P	mg/L	23.8	14.6	20.8	17.9	13.2	20.2	12.4	9.9	20.2	18.6	18.2	16.0	15.8	18.4
14	Ammonia-N	mg/L	14	17	15	21	24	9	22	11	17	16	17	19	17	12
15	Zinc (Zn)	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
16	Lead (Pb)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
17	Nickel (Ni)	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
18	Copper (Cu)	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
19	Arsenic (As)	mg/L	0.05	< 0.005	0.005	0.025	0.1	0.05	0.05	0.025	0.01	0.05	0.10	0.01	0.25	0.05
20	Mercury (Hg)	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
21	Cadmium (Cd)	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
22	Chromium (Cr)	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
23	Magnesium (Mg)	mg/L	65	50	41	28	35	51	20	30	44	14	31	39	19	52
24	NO_2^--N	mg/L	6.1	4.0	4.6	5.5	4.5	4.9	6.2	5.3	5.8	4.9	5.5	5.3	5.6	5.4
25	NO_3^--N	mg/L	0.07	0.15	0.13	0.07	0.1	0.19	0.14	0.04	0.11	0.15	0.19	0.09	0.10	0.015

Source: JICA Mission Team

AD1.7 Industrial Wastewater Quality Survey

(1) Sampling

To understand current water quality and pollution loads of industrial wastewater, the 30 factories as shown in **Table D1.7.1** are selected for industrial wastewater quality survey based on existing information and discussion with WASA-F.

Table D1.7.1 Sampling Location of 30 Factories Selected for Industrial Wastewater Survey

Factory Name		Sample ID	Coordinates		Type of Industry	Receiving Body
1	Kay & Emms Dying	IW-1	31° 30.075'N	73° 7.050'E	Textile	Paharang Drain
2	Kelash Textile	IW-2	31° 29.852'N	73° 5.658'E	Textile	Paharang Drain
3	Crescent Textiles	IW-3	31° 26.931'N	73° 5.217'E	Textile	Channel No.1
4	Zafar Fabric	IW-4	31° 29.251'N	73° 4.303'E	Textile	Sargodha drain
5	Dawood Exports (Pvt.) Ltd	IW-5	31° 29.211'N	73° 4.360'E	Textile	Sargodha drain
6	Dawood Textile (Pvt.) Ltd	IW-6	31° 29.198'N	73° 4.385'E	Textile	Sargodha drain
7	Hilal Textile	IW-7	31° 24.374'N	73° 5.904'E	Textile	Sewer (PS 31)
8	Five Star Textile	IW-8	31° 24.432'N	73° 5.843'E	Textile	Sewer (PS 31)
9	Rasheed Textile Mills	IW-9	31° 28.683'N	73° 4.608'E	Textile	Paharang Drain
10	Mumtaz Mahal Dyeing	IW-10	31° 28.670'N	73° 4.540'E	Textile	Sargodha drain
11	Bashir Dyeing Unit	IW-11	31° 28.646'N	73° 4.412'E	Textile	Paharang Drain
12	Moon Textile	IW-12	31° 28.066'N	73° 4.568'E	Textile	Sewer (PS 30)
13	Usman Cloth Mill	IW-13	31° 28.773'N	73° 4.374'E	Textile	Paharang Drain
14	Sitara Textile	IW-14	31° 28.304'N	73° 4.734'E	Textile	Paharang Drain
15	Nishat Mills	IW-15	31° 27.656'N	73° 6.525'E	Textile	Channel No.1
16	M/S AHK	IW-16	31° 30.254'N	73° 4.318'E	Textile	Sargodha drain
17	Slaughter House	IW-17	31° 25.858'N	73° 3.197'E	Slaughter	Sewer (PS 3)
18	Rafhan Maize	IW-18	31° 25.296'N	73° 6.761'E	Food	Sewer (PS 42)
19	National Silk Mills	IW-19	31° 24.39'N	73° 7.416'E	Textile	Sewer (PS 42)
20	Kashmir Banaspati (United)	IW-20	31° 27.235'N	73° 7.363'E	Food	Channel No.1
21	Shakot Gatta Factory	IW-21	31° 23.029'N	73° 14.969'E	Paper/card board	Maduana Drain
22	Zam Zam Textiles	IW-22	31° 23.436'N	73° 7.295'E	Textile	Sewer (PS 31)
23	Gulshan Fabrics	IW-23	31° 27.013'N	73° 6.139'E	Textile	Channel No.1
24	Capitan PQ Chemicals	IW-24	31° 28.300'N	73° 4.717'E	Chemicals	Sewer (PS 30)
25	Muhammadi Dyeing	IW-25	31° 24.389'N	73° 5.381'E	Textile	Sewer (PS 31)
26	Golden Dyeing	IW-26	31° 23.704'N	73°5.330'E	Textile	Sewer (PS 31)
27	Azeem Textile	IW-27	31° 23.630'N	73°5.361'E	Textile	Sewer (PS 31)
28	Shah Dyeing	IW-28	31° 23.607'N	73° 5.337'E	Textile	Sewer (PS 31)
29	Insaf Textile	IW-29	31° 24.222'N	73° 5.628'E	Textile	Sewer (PS 31)
30	Sadaqat Textiles	IW-30	31° 30.639'N	73° 16.164'E	Textile	Maduana Drain

Source: JICA Mission Team

(2) Results

The results of industrial wastewater quality survey on 30 selected factories are summarized in **Table D1.7.2**.

Table D1.7.2 (1) Results of Industrial Wastewater Quality Survey

Sample ID	Flowrate	Temp.	pH	EC	SS	TDS	Color	COD	BOD	Phenol	SO_4	Oil	NH_3-N	NO_2-N	NO_3-N	T-N	T-P
	m^3/d	^0C		µs/cm	mg/L	mg/L	m^{-1}	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
IW-1	3,488	39.2	9.8	9,500	280	7,219	22.1	1,435	457	0.12	207	<10	18.0	0.11	4.8	196	29.6
IW-2	2,503	38.1	9.6	3,070	169	2,464	18.0	1,041	334	0.90	115	<10	16.0	0.09	2.9	150	25.6
IW-3	13,306	32.8	10.0	5,544	269	4,281	8.4	8,194	2,702	2.11	139	13	19.0	0.4	2.4	137	43.6
IW-4	6,595	37.9	9.6	5,235	299	4,057	18.3	3,333	1,010	0.72	138	<10	14.0	0.14	2.0	113	24.9
IW-5	2,736	42.3	9.7	4,249	261	3,347	32.2	3,577	1,072	0.92	179	<10	13.0	1.1	5.4	150	72.1
IW-6	11,203	36.7	11.7	7,124	324	5,286	24.4	1,026	322	0.12	148	<10	18.0	1.2	3.1	67	4.8
IW-7	1,670	39.1	9.6	6,736	291	5,030	14.6	11,404	3,308	2.02	190	12	21.0	1.7	3.2	115	18.2
IW-8	1,498	41.4	9.5	6,620	326	5,280	22.4	1,463	466	0.12	198	<10	17.0	0.6	3.2	148	10.6
IW-9	2,045	39.7	10.1	9,073	293	6,150	22.5	883	297	0.04	211	<10	21.0	1.09	2.5	9.46	9.46
IW-10	6,365	36.2	11.0	11,510	404	7,494	3.7	3,482	1,140	1.09	224	<10	11.0	2.1	5.7	117	10.01
IW-11	9,101	36.4	8.3	7,627	261	4,998	20.2	1,516	490	0.16	166	<10	17.0	1.1	2.7	123	15.4
IW-12	4,959	33.7	10.8	6,901	384	4,518	7.0	1,499	480	0.19	119	<10	15.0	1.05	2.3	95	4.77
IW-13	1,275	31.7	12.7	11,120	414	7,398	3.3	2,999	960	1.02	24	<10	15.0	1.02	3.8	69	5.3
IW-14	5,386	38.4	10.6	6,807	398	4,588	15.1	1,149	370	1.01	239	<10	18.0	1.18	2.6	115.5	5.2
IW-15	1,325	24.6	8.5	3,285	212	2,129	5.6	4,066	1,260	1.20	183	<10	17.0	0.7	3.9	80.4	8.4
IW-16	16,848	33.9	13.5	9,257	483	6,336	19.5	1,056	340	0.14	227	<10	14.0	0.06	19.5	37.8	72.3
IW-17	156	22.7	7.4	6,524	392	5,248	29	13,394	4,061	2.09	396	13	19.0	0.17	17.5	85.5	174.6
IW-18	8,986	30.3	7.9	2,845	140	1,856	4.7	4,423	1,159	<0.002	205	<10	13.1	0.07	2.7	9.4	90.8
IW-19	6,774	39.9	10.0	7,383	290	4,966	2.7	5,007	1,510	0.01	310	<10	11.2	0.06	3.6	21.7	62
IW-20	9,562	37.6	12.8	11,200	305	7,520	0.7	5,135	1,690	0.09	280	<10	12.7	0.2	4.5	23.4	66.8
IW-21	3,312	25.8	10.0	3,806	195	2,944	20.1	7,105	870	0.03	199	<10	15.7	0.04	5.8	14	11.8
IW-22	2,297	36.5	11.7	6,441	266	4,294	0.4	1,741	510	0.09	304	<10	11.1	0.26	7.0	21.2	21.9
IW-23	4,694	32.6	10.6	10,100	362	6,336	35.9	415	123	<0.002	254	<10	7.0	0.07	4.8	44	1.6
IW-24	1,708	28.3	11.5	7,750	293	5,068	14.2	1,509	456	<0.002	266	<10	9.2	0.04	4.5	38	1.8
IW-25	2,016	29.2	10.2	4,880	230	3,194	1.5	2,942	820	0.02	410	<10	3.6	0.21	1.7	7.8	2.7
IW-26	2,102	36.8	11.7	9,925	431	6,329	0.1	1,131	390	0.01	501	<10	7.0	0.4	2.2	14.3	1.8
IW-27	2,016	48.1	8.0	8,031	270	5,088	2.1	1,999	590	0.00	414	<10	3.0	0.15	2.3	12.2	3.7
IW-28	3,874	34.9	8.6	9,291	310	5,894	53.8	490	134	0.12	451	<10	23.0	0.1	5.7	13.8	2
IW-29	4,138	37.0	12.4	11,750	516	7,500	1.0	716	210	<0.002	521	<10	1.4	0.1	3.4	19.4	3.3
IW-30	11,802	40.0	9.6	4,564	370	4,023	29.2	3,207	1,110	0.12	320	<10	4.8	0.09	0.2	9.3	2.7
Total	**153,738**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Source: JICA Mission Team

Table D1.7.2 (2) Results of Industrial Wastewater Quality Survey

Sample ID	Zinc	Lead	Nickel	Copper	Arsenic	Cyanide	Mercury	Cadmium	Chromium	Coliform
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	cfu/100mL
IW-1	<0.05	<0.01	<0.02	<0.002	0.1	<0.002	<0.001	<0.002	<0.10	1.5×10^{2}
IW-2	<0.05	<0.01	<0.02	<0.002	0.1	<0.002	<0.001	<0.002	<0.10	4.1×10^{3}
IW-3	<0.05	<0.01	<0.02	<0.002	<.005	<0.002	<0.001	<0.002	<0.10	3.8×10^{3}
IW-4	<0.05	<0.01	<0.02	<0.002	0.005	<0.002	<0.001	<0.002	<0.10	4.5×10^{3}
IW-5	<0.05	<0.01	<0.02	<0.002	0.025	<0.002	<0.001	<0.002	<0.10	1.8×10^{3}
IW-6	<0.05	<0.01	<0.02	<0.002	0.01	<0.002	<0.001	<0.002	<0.10	8.4×10^{2}
IW-7	<0.05	<0.01	<0.02	<0.002	<0.005	<0.002	<0.001	<0.002	<0.10	6.2×10^{2}
IW-8	<0.05	<0.01	<0.02	<0.002	0.05	<0.002	<0.001	<0.002	<0.10	1.0×10^{3}
IW-9	<0.05	<0.01	<0.02	<0.002	<0.005	<0.002	<0.001	<0.002	<0.10	3.0×10^{3}
IW-10	<0.05	<0.01	<0.02	<0.002	<0.005	<0.002	<0.001	<0.002	<0.10	2.0×10^{3}
IW-11	<0.05	<0.01	<0.02	<0.002	<0.005	<0.002	<0.001	<0.002	<0.10	6.0×10^{3}
IW-12	<0.05	<0.01	<0.02	<0.002	<0.005	<0.002	<0.001	<0.002	<0.10	7.5×10^{3}
IW-13	<0.05	<0.01	<0.02	<0.002	<0.005	<0.002	<0.001	<0.002	<0.10	5.2×10^{3}
IW-14	<0.05	<0.01	<0.02	<0.002	<0.005	<0.002	<0.001	<0.002	<0.10	2.1×10^{3}
IW-15	<0.05	<0.01	<0.02	<0.002	0.005	<0.002	<0.001	<0.002	<0.10	1.0×10^{3}
IW-16	<0.05	<0.01	<0.02	<0.002	<0.005	<0.002	<0.001	<0.002	<0.10	8.0×10^{3}
IW-17	<0.05	<0.01	<0.02	<0.002	0.01	<0.002	<0.001	<0.002	0.93	1.1×10^{4}
IW-18	<0.05	<0.01	<0.02	<0.002	0.01	<0.002	<0.001	<0.002	<0.10	1.5×10^{3}
IW-19	<0.05	<0.01	<0.02	<0.002	0.025	<0.002	<0.001	<0.002	<0.10	1.6×10^{3}
IW-20	<0.05	<0.01	<0.02	<0.002	0.05	<0.002	<0.001	<0.002	<0.10	2.6×10^{3}
IW-21	<0.05	<0.01	<0.02	<0.002	0.005	<0.002	<0.001	<0.002	<0.10	1.6×10^{4}
IW-22	0.05	<0.01	<0.02	<0.002	0.1	<0.002	<0.001	<0.002	<0.10	1.9×10^{3}
IW-23	<0.05	<0.01	<0.02	<0.002	0.005	<0.002	<0.001	<0.002	<0.10	6.3×10^{2}
IW-24	<0.05	<0.01	<0.02	<0.002	0.005	<0.002	<0.001	<0.002	<0.10	8.0×10^{2}
IW-25	<0.05	<0.01	<0.02	<0.002	0.05	<0.002	<0.001	<0.002	<0.10	1.9×10^{3}
IW-26	<0.05	<0.01	<0.02	<0.002	<0.005	<0.002	<0.001	<0.002	<0.10	1.0×10^{3}
IW-27	<0.05	<0.01	<0.02	<0.002	0.005	<0.002	<0.001	<0.002	<0.10	9.0×10^{6}
IW-28	<0.05	<0.01	<0.02	<0.002	0.1	<0.002	<0.001	<0.002	<0.10	3.0×10^{3}
IW-29	<0.05	<0.01	<0.02	<0.002	0.1	<0.002	<0.001	<0.002	<0.10	4.1×10^{4}
IW-30	<0.05	<0.01	<0.02	<0.002	0.1	<0.002	<0.001	<0.002	<0.10	2.5×10^{3}

Source: JICA Mission Team

APPENDIX: AD2 FLOW RATE SURVEY

AD2.1 Measurement Locations of River Flowrate Survey

To evaluate the effectiveness of Project on improving water quality of public waters, a flowrate survey on Chenab River and Ravi River as well as their inflowing drains is conducted. Measurement locations are shown in **Table D2.1.1**.

TableD2.1.1 Flowrate Measurement Locations of Rivers after Main Drains

Sampling Site		Sample ID	Coordinates	Number of Measurement
1	Paharang Main Drain before discharging into Chenab River	RD 1	31°33.149' N 72°32.798' E	1 (dry season)
2	Chenab River after receiving wastewater of Paharang Main Drain	RD 2	31°33.869' N 72°31.516' E	1 (dry season)
3	Maduana Main Drain before discharging into Ravi River	RD 3	30°44.255' N 72°48.191' E	1 (dry season)
4	Ravi River after receiving wastewater of Maduana Main Drain	RD 4	30°40.245' N 72°45.257' E	1 (dry season)

Source: JICA Mission Team

AD2.2 Measurement Results of River Flowrate Survey

The results of river flowrate survey are shown **Table D2.1.2** to **Table D2.1.5**.

TableD2.1.2 Flowrate Measurement Result of Chenab River

Measurement Place:		Type:			Measuring Date:		2016/12/17				Starting Time:		2:25 PM			Velocity Meter:	
River Chenab		River			Weather:		Clear/Sunny				Finishing Time:		3:30 PM			Flowatch	
No.	The distance from the left bank (m)	Water Depth (m)			Velocity							Cross Section Area					**Flowrate (m^3/s)**
		One Way	Return	Average Depth	Meter Depth (m)	Velocity at Each Point (ft/s) 1st Time	2nd Time	3rd time	4th time	Point V (ft/s)	**Average V (m/s)**	Average Depth (m)	Section Width (m)	Section Area (m^2)	**Total Area (m^2)**		
1	0.00	0.50	0.52	0.51								0.97	5.00	4.86			
2	5.00	1.46	1.41	1.44	0.29	1.80	1.60	1.40	1.50	1.58	0.38				11.81		4.55
					1.15	0.50	0.60	1.40	1.30	0.95		1.39	5.00	6.95			
3	10.00	1.32	1.37	1.35								1.27	5.00	6.36			
4	15.00	1.20	1.2	1.20	0.24	0.70	0.50	0.60	0.70	0.63	0.18				12.26		2.15
					0.96	0.50	0.40	0.80	0.40	0.53		1.18	5.00	5.90			
5	20.00	1.16	1.16	1.16								1.23	5.00	6.13			
6	25.00	1.28	1.30	1.29	0.26	1.50	1.70	1.90	2.00	1.78	0.32				12.79		4.14
					1.03	0.30	0.40	0.30	0.40	0.35		1.33	5.00	6.66			
7	30.00	1.37	1.38	1.38								1.30	5.00	6.51			
8	35.00	1.24	1.22	1.23	0.25	2.80	2.60	3.00	2.70	2.78	0.70				12.41		8.70
					0.98	1.70	1.40	2.00	2.20	1.83		1.18	5.00	5.90			
9	40.00	1.12	1.14	1.13								1.19	5.00	5.93			
10	45.00	1.25	1.23	1.24	0.25	3.00	2.80	2.70	3.00	2.88	0.73				12.25		8.96
					0.99	2.40	1.60	1.80	1.90	1.93		1.27	5.00	6.33			
11	50.00	1.28	1.30	1.29								1.11	5.00	5.53			
12	55.00	0.93	0.91	0.92	0.18	2.80	3.00	2.90	3.10	2.95	0.72				9.80		7.06
					0.74	1.60	2.00	1.60	1.90	1.78		0.86	5.00	4.28			
13	60.00	0.78	0.80	0.79								0.80	5.00	3.98			
14	65.00	0.81	0.79	0.80	0.32	1.50	1.30	1.10	1.20	1.28	0.39				7.79		3.03
						1.50	1.30	1.10	1.20	1.28		0.76	5.00	3.81			
15	70.00	0.72	0.73	0.73								0.67	5.00	3.34			
16	75.00	0.62	0.6	0.61	0.24	1.60	1.40	1.80	1.00	1.45	0.44				5.53		2.44
						1.60	1.40	1.80	1.00	1.45		0.44	5.00	2.19			
17	80.00	0.26	0.27	0.27								0.15	5.00	0.74			
18	85.00	0.02	0.04	0.03	0.01	0.10	0.00	0.10	0.00	0.05	0.02				0.74		0.01
						0.10	0.00	0.10	0.00	0.05							
										Total	**0.44**				**77.59**		**38.01**

TableD2.1.3 Flowrate Measurement Result of Paharang Main Drain before Flowing into Chenab River

Measurement Place:	Type:	Measuring Date:	2016/12/17	Starting Time:	4:15 PM	Velocity Meter:
Paharang Drain D/s	Drain	Weather:	Clear/Sunny	Finishing Time:	4:55 PM	Flowatch

No.	The distance from the left bank (m)	Water Depth (m)			Velocity							Cross Section Area				Flowrate (m^3/s)
		One Way	Return	Average Depth	Meter Depth (m)	Velocity at Each Point (ft/s) 1st Time	2nd Time	3rd time	4th time	Point V (ft/s)	**Average V (m/s)**	Average Depth (m)	Section Width (m)	Section Area (m^2)	**Total Area (m^2)**	
1	0.00	0.15	0.10	0.13								0.25	1.00	0.25		
2	1.00	0.34	0.39	0.37	0.15	1.00	0.70	0.80	0.90	0.85	0.26				0.70	0.18
						1.00	0.70	0.80	0.90	0.85		0.46	1.00	0.46		
3	2.00	0.57	0.53	0.55								0.57	1.00	0.57		
4	3.00	0.57	0.61	0.59	0.24	3.60	3.60	3.20	3.50	3.48	1.06				1.20	1.27
						3.60	3.60	3.20	3.50	3.48		0.63	1.00	0.63		
5	4.00	0.67	0.65	0.66								0.61	1.00	0.61		
6	5.00	0.58	0.53	0.56	0.22	1.10	1.60	1.50	2.00	1.55	0.47				1.19	0.56
						1.10	1.60	1.50	2.00	1.55		0.58	1.00	0.58		
7	6.00	0.60	0.61	0.61								0.70	1.00	0.70		
8	7.00	0.81	0.78	0.80	0.16	8.70	6.10	5.20	4.90	6.23	1.52				1.60	2.43
					0.64	3.10	4.70	3.60	3.70	3.78		0.90	1.00	0.90		
9	8.00	1.00	1.00	1.00								0.96	1.00	0.96		
10	9.00	0.91	0.92	0.92	0.18	5.50	5.60	5.50	5.40	5.50	1.42				1.82	2.58
					0.73	3.20	3.50	4.10	4.40	3.80		0.87	1.00	0.87		
11	10.00	0.81	0.82	0.82								0.73	1.00	0.73		
12	11.00	0.64	0.64	0.64	0.26	3.70	4.50	4.20	4.40	4.20	1.28				1.28	1.64
						3.70	4.50	4.20	4.40	4.20		0.55	1.00	0.55		
13	12.00	0.47	0.46	0.47								0.50	1.00	0.50		
14	13.00	0.53	0.54	0.54	0.21	3.70	4.10	5.50	4.20	4.38	1.33				1.03	1.37
						3.70	4.10	5.50	4.20	4.38		0.53	1.00	0.53		
15	14.00	0.50	0.53	0.52								0.56	1.00	0.56		
16	15.00	0.59	0.62	0.61	0.24	3.10	3.70	4.80	5.30	4.23	1.29				1.10	1.42
						3.10	3.70	4.80	5.30	4.23		0.54	1.00	0.54		
17	16.00	0.46	0.50	0.48								0.36	1.00	0.36		
18	17.00	0.24	0.25	0.25	0.10	2.40	2.10	1.70	1.60	1.95	0.59				0.38	0.23
						2.40	2.10	1.70	1.60	1.95		0.18	0.10	0.02		
19	17.10	0.11	0.12	0.12												
										Total	**0.99**				**9.27**	**10.31**

TableD2.1.4 Flowrate Measurement Result of Ravi River

Measurement Place:	Type:	Measuring Date:	2016/12/18	Starting Time:	11:30 AM	Velocity Meter:
River Chenab	River	Weather:	Clear/Sunny	Finishing Time:	12:45 PM	Flowatch

No.	The distance from the left bank (m)	Water Depth (m)			Velocity							Cross Section Area				Flowrate (m^3/s)
		One Way	Return	Average Depth	Meter Depth (m)	Velocity at Each Point (ft/s) 1st Time	2nd Time	3rd time	4th time	Point V (ft/s)	**Average V (m/s)**	Average Depth (m)	Section Width (m)	Section Area (m^2)	**Total Area (m^2)**	
1	0.00	0.13	0.15	0.14								0.18	3.00	0.53		
2	3.00	0.20	0.22	0.21	0.08	1.50	1.70	1.60	1.40	1.55	0.47				1.26	0.60
						1.50	1.70	1.60	1.40	1.55		0.25	3.00	0.74		
3	6.00	0.26	0.30	0.28								0.29	3.00	0.87		
4	9.00	0.29	0.31	0.30	0.12	1.60	1.50	1.60	1.30	1.50	0.46				2.18	0.99
						1.60	1.50	1.60	1.30	1.50		0.44	3.00	1.31		
5	12.00	0.58	0.56	0.57								0.52	3.00	1.55		
6	15.00	0.43	0.49	0.46	0.18	1.30	1.50	1.70	1.10	1.40	0.43				2.99	1.27
						1.30	1.50	1.70	1.10	1.40		0.48	3.00	1.44		
7	18.00	0.48	0.52	0.50								0.57	3.00	1.70		
8	21.00	0.61	0.65	0.63	0.25	2.40	2.30	2.50	3.20	2.60	0.79				3.68	2.91
						2.40	2.30	2.50	3.20	2.60		0.66	3.00	1.98		
9	24.00	0.68	0.70	0.69								0.69	3.00	2.06		
10	27.00	0.68	0.68	0.68	0.27	3.20	3.60	3.20	3.00	3.25	0.99				4.25	4.21
						3.20	3.60	3.20	3.00	3.25		0.73	3.00	2.20		
11	30.00	0.75	0.82	0.79								0.74	3.00	2.21		
12	33.00	0.67	0.70	0.69	0.27	3.10	3.50	3.60	3.40	3.40	1.04				4.06	4.20
						3.10	3.50	3.60	3.40	3.40		0.62	3.00	1.85		
13	36.00	0.53	0.57	0.55								0.36	2.10	0.76		
14	38.10	0.15	0.20	0.18	0.07	0.90	0.80	0.20	1.00	0.73	0.22				0.76	0.17
						0.90	0.80	0.20	1.00	0.73						
										Total	**0.63**				**19.17**	**14.36**

TableD2.1.5 Flowrate Measurement Result of Maduana Main Drain before Flowing into Ravi River

Measurement Place:	Type:	Measuring Date:	2016/12/18	Starting Time:	1:30 PM	Velocity Meter:
Maduana Drain D/s	Drain	Weather:	Clear/Sunny	Finishing Time:	2:25 PM	Flowatch

No.	The distance from the left bank (m)	Water Depth (m)			Velocity							Cross Section Area				Flowrate (m^3/s)
		One Way	Return	Average Depth	Meter Depth (m)	Velocity at Each Point (ft/s) 1st Time	2nd Time	3rd time	4th time	Point V (ft/s)	**Average V (m/s)**	Average Depth (m)	Section Width (m)	Section Area (m^2)	**Total Area (m^2)**	
1	0.00	0.30	0.38	0.34								0.50	1.00	0.50		
2	1.00	0.68	0.65	0.67	0.27	0.60	0.40	0.50	0.30	0.45	0.14				1.17	0.16
						0.60	0.40	0.50	0.30	0.45		0.66	1.00	0.66		
3	2.00	0.64	0.68	0.66								0.77	1.00	0.77		
4	3.00	0.88	0.88	0.88	0.18	3.60	3.40	3.50	3.30	3.45	0.67				1.66	1.11
					0.70	1.20	0.70	1.00	0.90	0.95		0.89	1.00	0.89		
5	4.00	0.91	0.87	0.89								0.80	1.00	0.80		
6	5.00	0.70	0.71	0.71	0.28	3.90	4.20	3.50	3.20	3.70	1.13				1.69	1.91
						3.90	4.20	3.50	3.20	3.70		0.89	1.00	0.89		
7	6.00	1.08	1.08	1.08								1.09	1.00	1.09		
8	7.00	1.08	1.12	1.10	0.22	3.10	3.60	4.00	4.40	3.78	0.89				2.24	1.98
					0.88	1.90	1.60	2.20	2.50	2.05		1.15	1.00	1.15		
9	8.00	1.20	1.18	1.19								1.14	1.00	1.14		
10	9.00	1.05	1.12	1.09	0.22	3.40	3.30	3.90	3.70	3.58	0.93				2.17	2.02
					0.87	2.00	2.50	2.70	2.90	2.53		1.03	1.00	1.03		
11	10.00	0.98	0.98	0.98								0.97	1.00	0.97		
12	11.00	0.92	0.98	0.95	0.19	3.70	4.20	3.60	4.40	3.98	0.97				1.87	1.81
					0.76	2.00	2.20	2.90	2.50	2.40		0.90	1.00	0.90		
13	12.00	0.82	0.88	0.85								0.83	1.00	0.83		
14	13.00	0.82	0.81	0.82	0.16	3.00	3.20	3.40	3.70	3.33	0.69				1.64	1.13
					0.65	1.00	1.70	1.30	0.90	1.23		0.80	1.00	0.80		
15	14.00	0.80	0.78	0.79								0.83	1.00	0.83		
16	15.00	0.85	0.89	0.87	0.17	1.80	1.90	2.00	1.70	1.85	0.43				1.69	0.73
					0.70	1.00	1.30	0.90	0.70	0.98		0.86	1.00	0.86		
17	16.00	0.80	0.88	0.84								0.70	1.00	0.70		
18	17.00	0.54	0.58	0.56	0.22	0.70	0.80	1.00	0.90	0.85	0.26				0.96	0.25
						0.70	0.80	1.00	0.90	0.85		0.38	0.70	0.26		
19	17.70	0.18	0.20	0.19												
										Total	**0.68**				**13.43**	**9.96**

APPENDIX: AD3 INTERVIEW SURVEY

Salfraz Colony customer basic data

Survey Date	Total Number of family	Effective answer/House	Average number / households	No Answer
2016/11/5	141	19	7.42	
2016/11/6	176	25	7.04	
2016/11/7	203	27	7.52	
2016/11/8	176	22	8.00	2
2016/11/9	205	30	6.83	
2016/11/10	160	21	7.62	1
2016/11/11	248	32	7.75	1
Total	1309	176	7.44	4

Salfraz Colony (Water Service Level Poor?)

	Drinking water from /WASA	Drinking Water from/Others
2016/11/5	2	17
2016/11/7	2	23
2016/11/8	0	27
2016/11/9	1	23
2016/11/10	1	29
2016/11/11	0	22
2016/11/12	0	33
Total number	6	174
User %	3.3%	96.7%

Salfraz Colony (Case of Pump Installed)

	Installed Electric Pump in House	/House Numbers
2016/11/5	14	19
2016/11/7	20	25
2016/11/8	23	27
2016/11/9	19	24
2016/11/10	26	30
2016/11/11	19	22
2016/11/12	31	33
Total number	152	180
Pump User %	84%	

Salfraz Colony (which water is the most safe for drinking?)

	Can Unit and Private Bottle	WASA Tap Water
2016/11/5	15	2
2016/11/7	18	2
2016/11/8	22	0
2016/11/9	21	1
2016/11/10	26	1
2016/11/11	16	0
2016/11/12	24	0
Total number	142	6
	79%	3%

*Incloud multiple answers

Salfraz Colony (Did your family member suffered from a water-born disease in last one year?)

	Yes	No answer	No
2016/11/5	5	0	10
2016/11/7	9	0	15
2016/11/8	6	0	18
2016/11/9	5	0	19
2016/11/10	9	0	22
2016/11/11	2	0	20
2016/11/12	7	0	27
Total number	43	4	131
	24%	2%	73%

Salfraz Colony (Where do you dispose the garbage?)

	Designated Place	Street nearby house	Drainage Channels/Sewers	Society's responsibility
2016/11/5	19	0	0	0
2016/11/7	25	0	0	0
2016/11/8	27	0	0	0
2016/11/9	24	0	0	0
2016/11/10	30	0	0	0
2016/11/11	22	0	0	0
2016/11/12	33	0	0	0
Total number	180	0	0	0
	100%	0%	0%	0%

Salfraz Colony (Water kind of sanitation facilities do you use at your house?)

	Sewer Line	Saptic Tank	Open Drain
2016/11/5	19	0	0
2016/11/7	25	0	0
2016/11/8	27	0	0
2016/11/9	24	0	0
2016/11/10	30	0	0
2016/11/11	22	0	0
2016/11/12	33	0	0
Total number	180	0	0
	100%	0%	0%

Salfraz Colony (Do you have experience of wastewater overflowing from sewer pipeline or rainwater

	Yes	When YES happen 2hrs~6hrs_per event	No
2016/11/5	16	10	3
2016/11/7	25	8	0
2016/11/8	27	16	0
2016/11/9	20	11	3
2016/11/10	23	7	5
2016/11/11	16	4	6
2016/11/12	26	5	6
Total number	153	(61)	23
	85.0%		13.1%

Madina Town Customer basic data

Survey Date	Total number of family	Effective answer/House	Average number / households	No Answer
2016/11/21	95	15	6.33	
2016/11/22	265	36	7.36	
2016/11/23	313	40	7.83	1
2016/11/24	307	42	7.31	1
2016/11/25	309	48	6.44	1
2016/11/26	114	16	7.13	
Total	1403	197	7.12	3

Madina Town (Water Service Level Poor?)

	Drinking water from /WASA	Drinking Water from /Others
2016/11/21	0	15
2016/11/22	0	36
2016/11/23	0	41
2016/11/24	0	43
2016/11/25	1	48
2016/11/26	0	16
Total number	1	199
User %	0.5%	99.5%

Madina Town (Case of Pump Installed)

	Installed Electric Pump in House	/House Numbers
2016/11/21	13	15
2016/11/22	25	36
2016/11/23	37	41
2016/11/24	35	43
2016/11/25	47	49
2016/11/26	15	16
Total number	172	200
Pump User %	86%	

Madina Town (which water is the most safe for drinking?)

	Can Unit and Private Bottle	WASA Tap Water
2016/11/21	16	0
2016/11/22	35	0
2016/11/23	36	0
2016/11/24	38	0
2016/11/25	41	1
2016/11/26	14	0
Total number	180	1
	100%	1%

*Incloud multiple answers

Madina Town (Did your family member suffered from a water-born disease in last one year?)

	Yes	No Answer	No
2016/11/21	1	0	14
2016/11/22	0	0	34
2016/11/23	0	0	41
2016/11/24	0	0	42
2016/11/25	0	0	46
2016/11/26	0	0	15
Total number	1	7	192
	1%	4%	96%

Madina Town (Where do you dispose the garbage?)

	Designated Place	Street nearby house	Drainage Channels/Sewers	Society's responsibility
2016/11/21	15	0	0	0
2016/11/22	36	0	0	0
2016/11/23	40	1	0	0
2016/11/24	43	0	0	0
2016/11/25	47	2	0	0
2016/11/26	16	0	0	0
Total number	197	3	0	0
	98.5%	1.5%	0%	0%

Madina Town (Water kind of sanitation facilities do you use at your house?)

	Sewer line	Saptic Tank	Open Drain
2016/11/21	15	0	0
2016/11/22	36	0	0
2016/11/23	41	0	0
2016/11/24	43	0	0
2016/11/25	49	0	0
2016/11/26	16	0	0
Total number	200	0	0
	100.0%	0.0%	0%

Madina Town(Do you have experience of wastewater overflowing from sewer pipeline or rainwater flooding due to poor drainage facility?)

	Yes	When YES happen 2hrs~6hrs_per event	No
2016/11/21	14	14	1
2016/11/22	21	8	15
2016/11/23	27	11	14
2016/11/24	33	5	10
2016/11/25	31	3	18
2016/11/26	13	2	3
Total number	139	(43)	61
	69.5%		30.5%

Sitara Sapna Customer basic data

Survey Deta	Total Number of family	Effective answer/House	Average number / households	No Answer
2016/11/16	125	26	4.81	
2016/11/17	234	41	5.71	
2016/11/18	204	32	6.38	
2016/11/19	297	51	5.82	
Total	860	150	5.73	0

Sitara Sapna City (Water Service Level Poor?)

	Drinking water from/ WASA	Drinking water from/Others
2016/11/16	4	22
2016/11/17	3	38
2016/11/18	7	25
2016/11/19	6	45
Total number	20	130
User %	13.3%	86.7%

Sitara Sapna City (Case of Pump Installed)

	Installed Electric Pump in House	/House Numbers
2016/11/16	19	26
2016/11/17	32	41
2016/11/18	21	32
2016/11/19	43	51
Total number	115	150
Pump User %	77%	

Sitara Sapna City (which water is the most safe for drinking?)

	Can Unit and Private Bottle	WASA Tap Water
2016/11/16	19	4
2016/11/17	38	3
2016/11/18	25	7
2016/11/19	40	6
Total number	122	20
	81%	13%

*Incloud multiple answers

Sitara Sapna City (Did your family member suffered from a water-born disease in last one year?)

	Yes	No answer	NO
2016/11/16	2	0	22
2016/11/17	3	0	36
2016/11/18	0	0	32
2016/11/19	2	0	47
Total number	7	6	137
	5%	4%	91%

Sitara Sapna City (Where do you dispose the garbage?)

	Designated Place	Street nearby house	Drainage Channels/Sewers	Society's responsibility
2016/11/16	10	0	1	15
2016/11/17	12	0	0	29
2016/11/18	3	0	0	29
2016/11/19	21	0	0	30
Total number	46	0	1	103
	30.7%	0%	0.7%	68.7%

Sitara Sapna City (Water kind of sanitation facilities do you use at your house?)

	Sewer Line	Saptic Tank	Open Drain
2016/11/16	26	0	0
2016/11/17	41	0	0
2016/11/18	32	0	0
2016/11/19	51	0	0
Total number	150	0	0
	100.0%	0%	0.0%

Sitra Sapna City (Do you have experience of wastewater overflowing from sewer pipeline or rainwater

	Yes	When YES happen 2hrs~6hrs_per event	No
2016/11/16	1	0	25
2016/11/17	6	0	35
2016/11/18	3	0	28
2016/11/19	8	2	43
Total number	18	2	131
	12.0%	(4)	87.3%

Commercial & industorial tariff revision befor /after

Date	Monthry revenue	Collection ratio	Result
Aug.2016	1,000,000Rs	80%~90%	ratio is good
Dec.2016	1,250,000Rs	75%~80%	Income increase

WASA water supply service /exist/non operation

Category	Existing water supply area	Non operatin
Commercial	69	1
Industrial	24	6
Total	93	7

What kind of bussines is your company ?

Category	Restaurant	Textile factory	Manufacturing	Hotel	Retail shop	Other
Commercial	37	0	0	1	6	26
Industry	0	18	4	0	1	7

What purpose you use large amount of water

Category	Washing/ Dish Washing	Bleaching/Printing	Processing	Dying	Other
Commercial	38	0	0	0	2
Industry	3	2	5	4	4

How do you obtain water for your daily business?

Category	WASA	WASA & Well	Neighbour sharing	Well	Bottled by WASA	Other
Commercial	7	7	6	41	4	5
Industry	1	11	0	18	0	0

*Well : Deep well with pump

Does your company have OHR or Ground reservoir?

Category	Yes	Capacity <1000L	Capacity>1000L	Don't know	No
Commercial	50	30	7	13	20
Industry	30	7	23	0	0

APPENDIX: AD4 TOPOGRAPHIC SURVEY

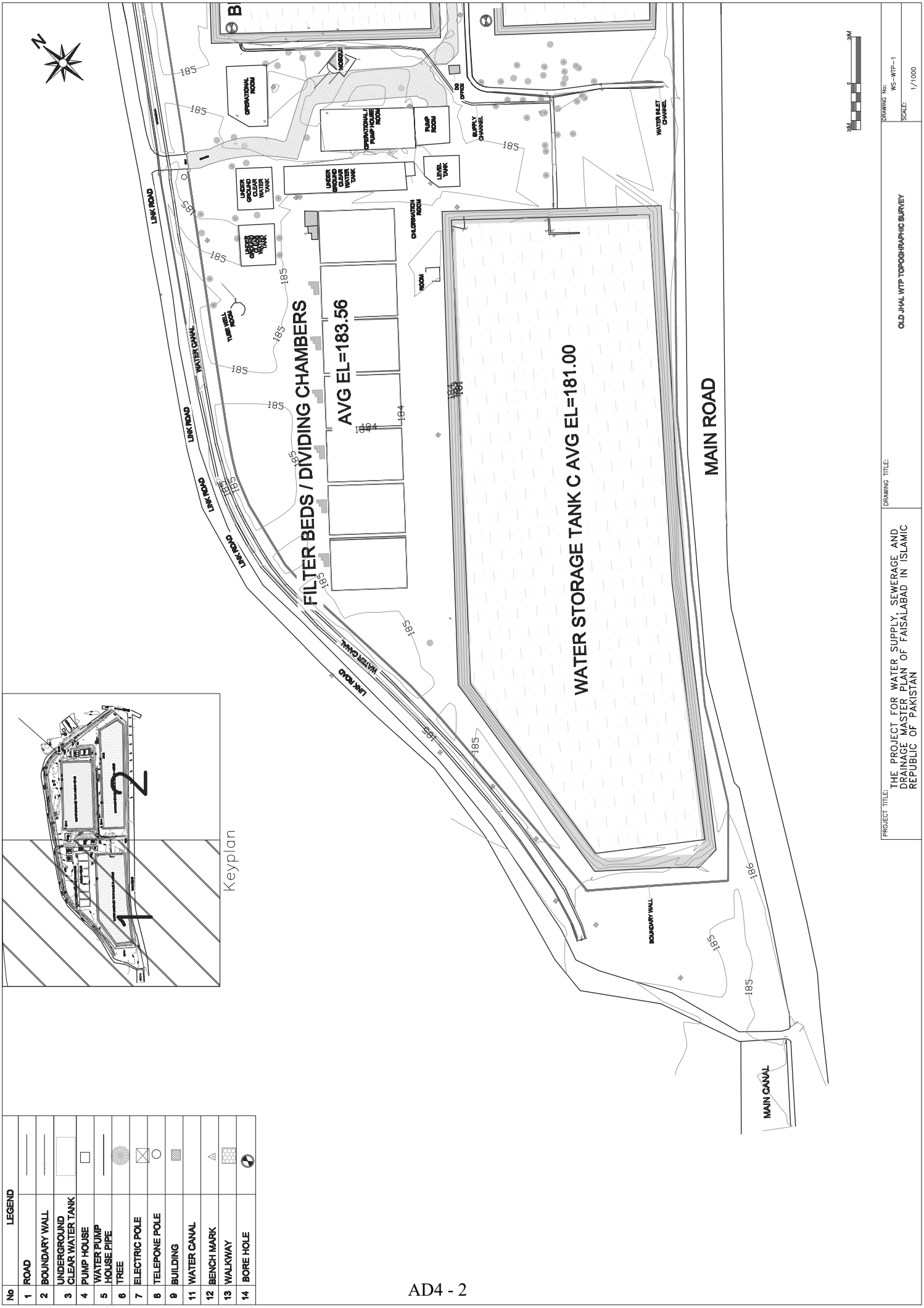
Priority Project Sites

1) Water Treatment Plant and Distribution Centers AD4 - 02

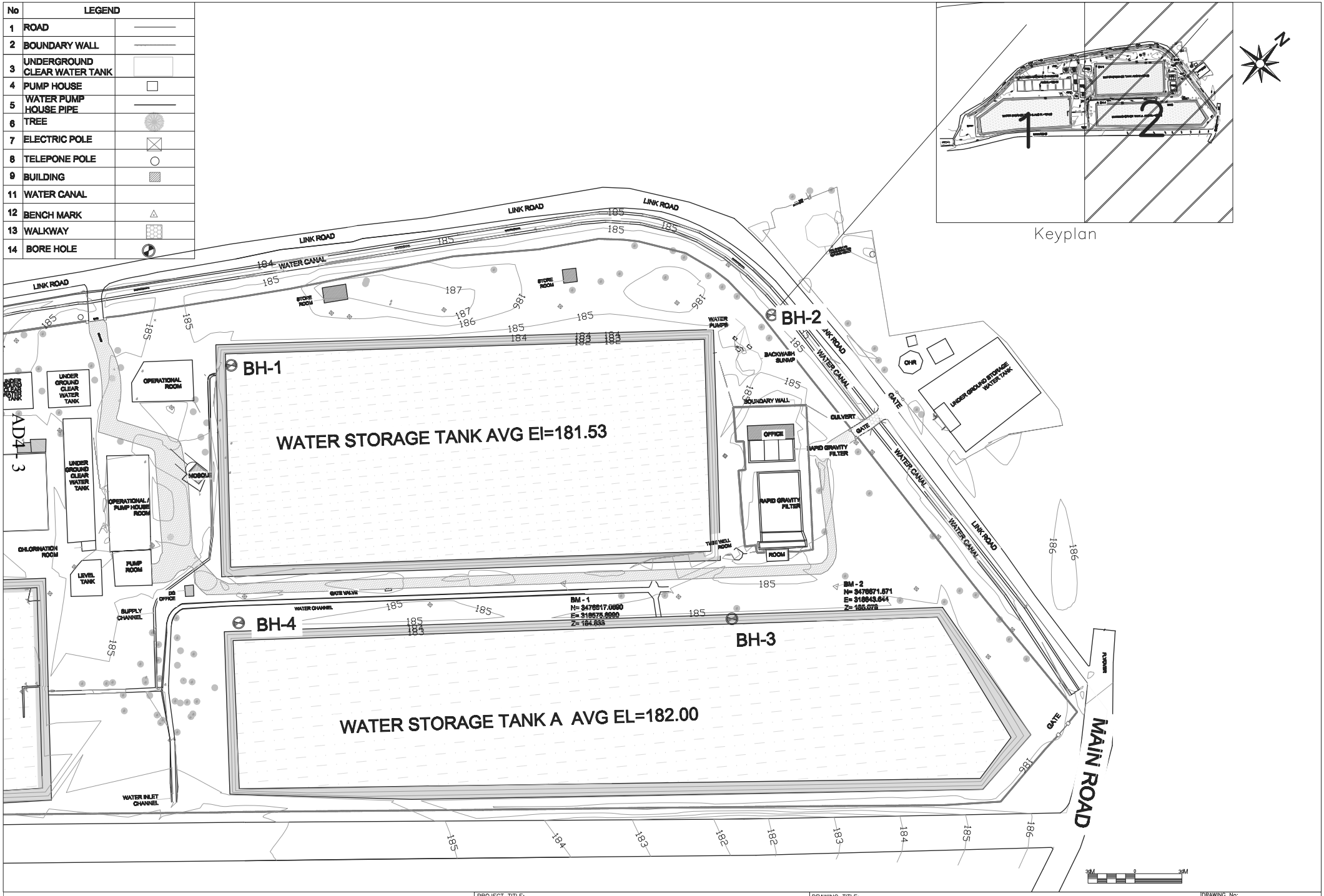
2) Transmission Mains AD4 - 07

3) Distribution Mains AD4 - 27

1) Water Treatment Plant and Distribution Centers

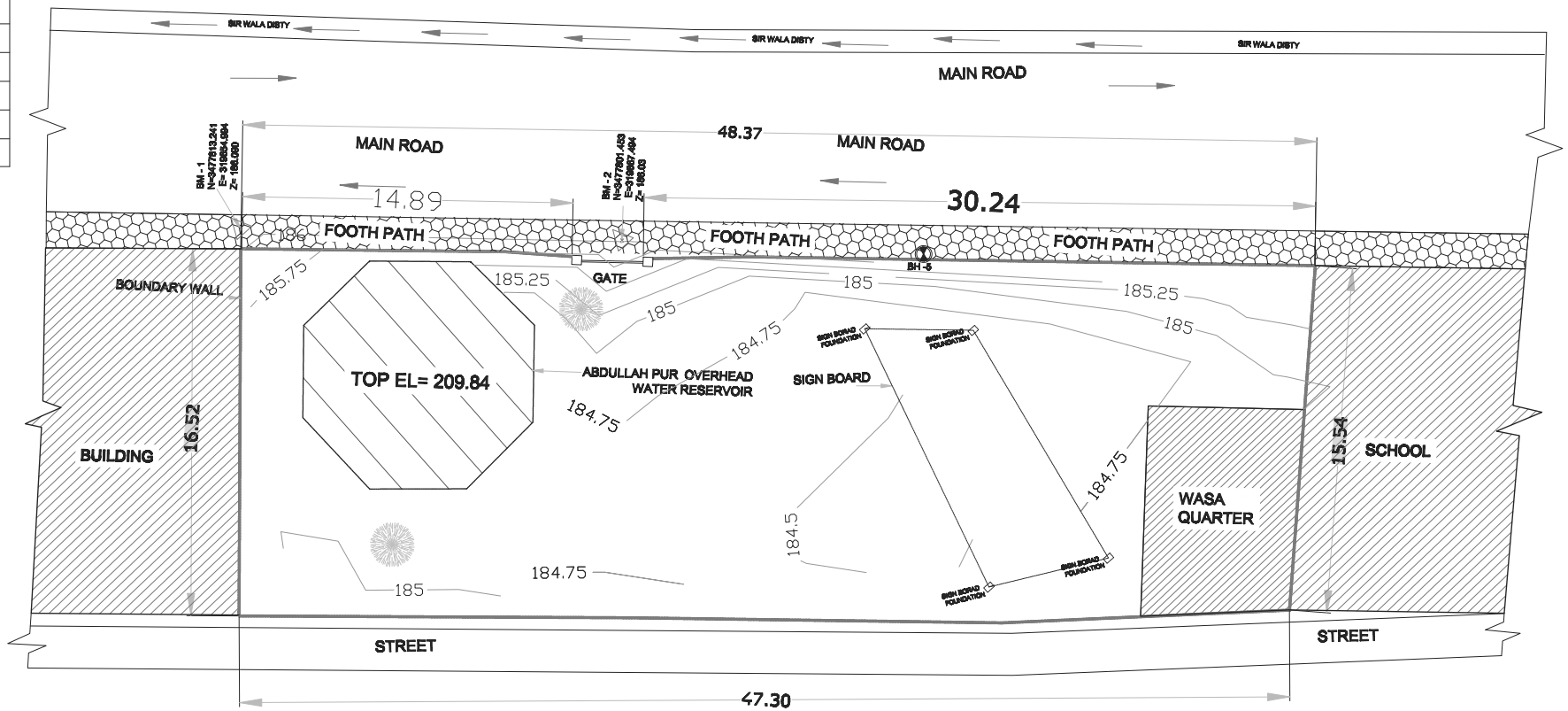


No	LEGEND	
1	ROAD	
2	BOUNDARY WALL	
3	UNDERGROUND CLEAR WATER TANK	
4	PUMP HOUSE	
5	WATER PUMP HOUSE PIPE	
6	TREE	
7	ELECTRIC POLE	
8	TELEPONE POLE	
9	BUILDING	
11	WATER CANAL	
12	BENCH MARK	
13	WALKWAY	
14	BORE HOLE	



PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	OLD JHAL WTP TOPOGHRAPHIC SURVEY	WS-WTP-2
		SCALE: 1/1000

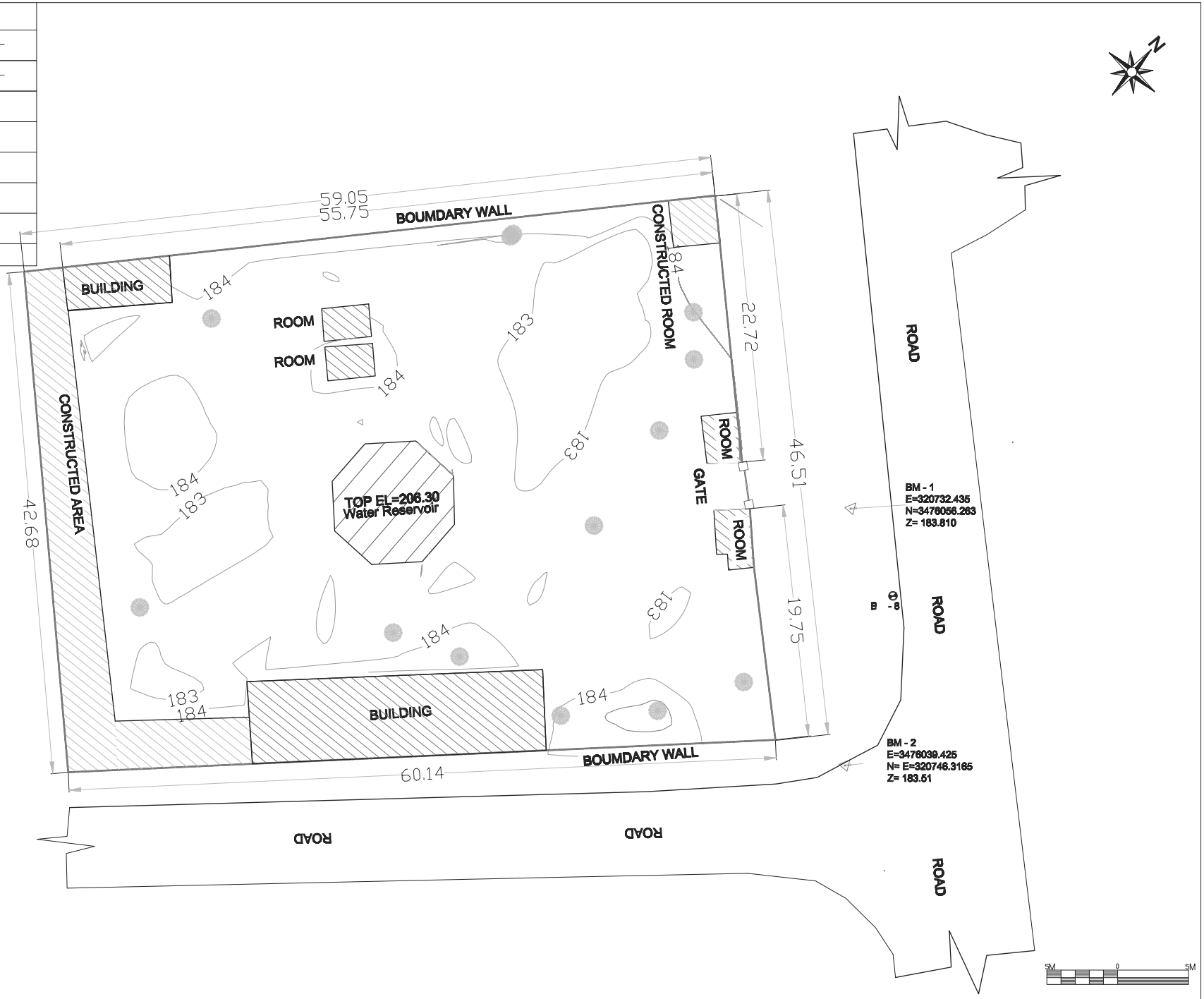
No	LEGEND	
1	ROAD	
2	BOUNDARY WALL	
3	UNDERGROUND CLEAR WATER TANK	
4	PUMP HOUSE	
5	WATER PUMP HOUSE PIPE	
6	TREE	
7	ELECTRIC POLE	
8	ELECTRIC POLE	
9	BUILDING	
10	WATER CANAL	
11	OVERHEAD WATER RESERVOIR	
12	BENCH MARK	
13	WALKWAY	
14	BORE HOLE	



AD4 - 4

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	ABDULLAH PUR OHR TOPOGHRAPHIC SURVEY	WS-OHR-2
		SCALE: 1/200

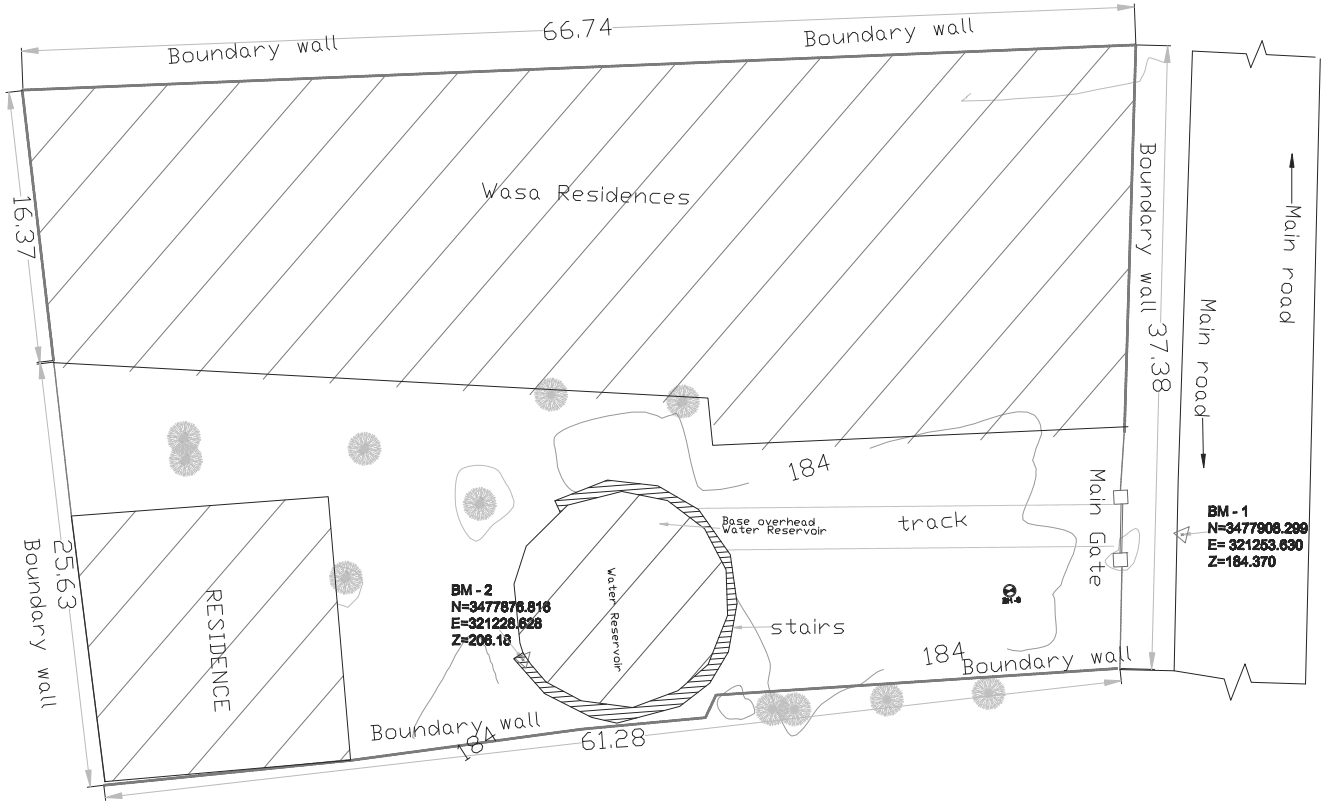
No	LEGEND	
1	ROAD	
2	BOUNDARY WALL	
3	TREE	
4	BUILDING	
5	OVERHEAD WATER RESERVOIR	
6	BENCH MARK	
7	CONSTRUCTED BUILDING	
8	BORE HOLE	



AD4 - 5

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PEOPLE COLONY OHR-2 TOPOGHRAPHIC SURVEY	WS-OHR-3
		SCALE: 1/250

No	LEGEND
1	BOUDARY WALL
2	BUILDING
3	CONTOUR
4	GRASS
5	TREE
6	BENCH MARK
7	OVERHEAD WATER RESERVOIR
8	BORE HOLE

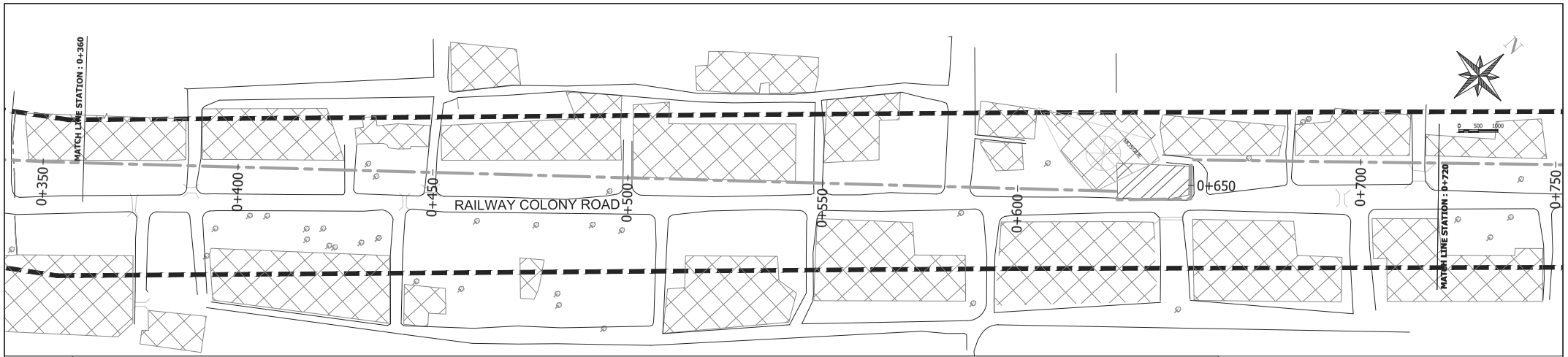


AD4 - 6

5M 0 5M

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	MADINA TOWN OHR-2 TOPOGHRAPHIC SURVEY	WS–OHR–1
		SCALE: 1/150

0+000
0+050
0+100
0+150
0+200
0+250
0+300
0+350
0+400
MATCH LINE STATION : 0+360
JHAL KHANUWALA FLYOVER
JHAL KHANUWALA FLYOVER
WASA OFFICES
WASA RESIDENCES
UNDER GROUND STORAGE WATER TANK
OLD PUMPING STATION
GATE
0
Old Jhal Khanuana WTP
MOSQUE
COMMERCIAL BUILDING
BUILDINGS
SCHOOL BUILDING
CANAL
TREE
CULVERT
ROW
PROPOSED LINE
NATURAL GROUND LEVEL
LEGEND
MATCH LINE STATION: 0+000
MATCH LINE STATION: 0+360
Water Level
Ground Elevations
Pipe Center Level
Pipeline (Diameter)
Cumulative Distance
Chainage
0+000 0 0 184.97
+25 25 184.84
+50 50 184.72
+75 75 185.26
0+100 100 185.46
+25 125 185.34
+50 150 185.33
+75 175 185.55
0+200 200 185.55
+25 225 185.58
+50 250 185.83
+75 275 185.90
0+300 300 185.68
+25 325 185.47
+50 350 185.27
0+360 360 185.11
PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN
DRAWING TITLE: PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I
DRAWING No: WS-TM-I-001
SCALE: L:1/1000 , H:1/400



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																
Ground Elevations	185.11	184.86	184.67	184.50	184.32	184.15	183.97	183.80	183.78	183.78	183.78	183.78	183.79	183.82	183.83	183.83
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	360	375	400	425	450	475	500	525	550	575	600	625	650	675	700	720
Chainage	**0+360**	+75	**0+400**	+25	+50	+75	**0+500**	+25	+50	+75	**0+600**	+25	+50	+75	**0+700**	**0+720**

AD4 - 8

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I	WS-TM-I-002
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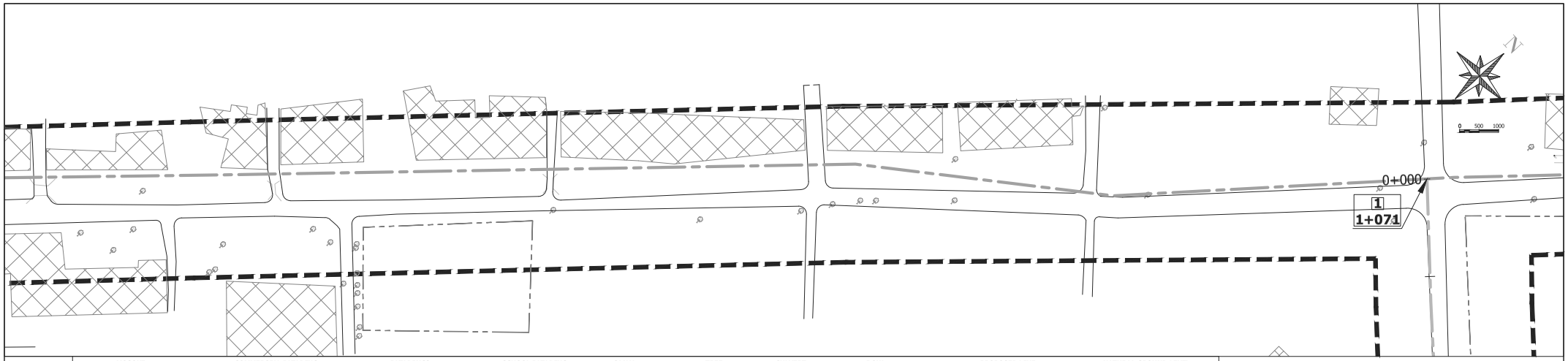
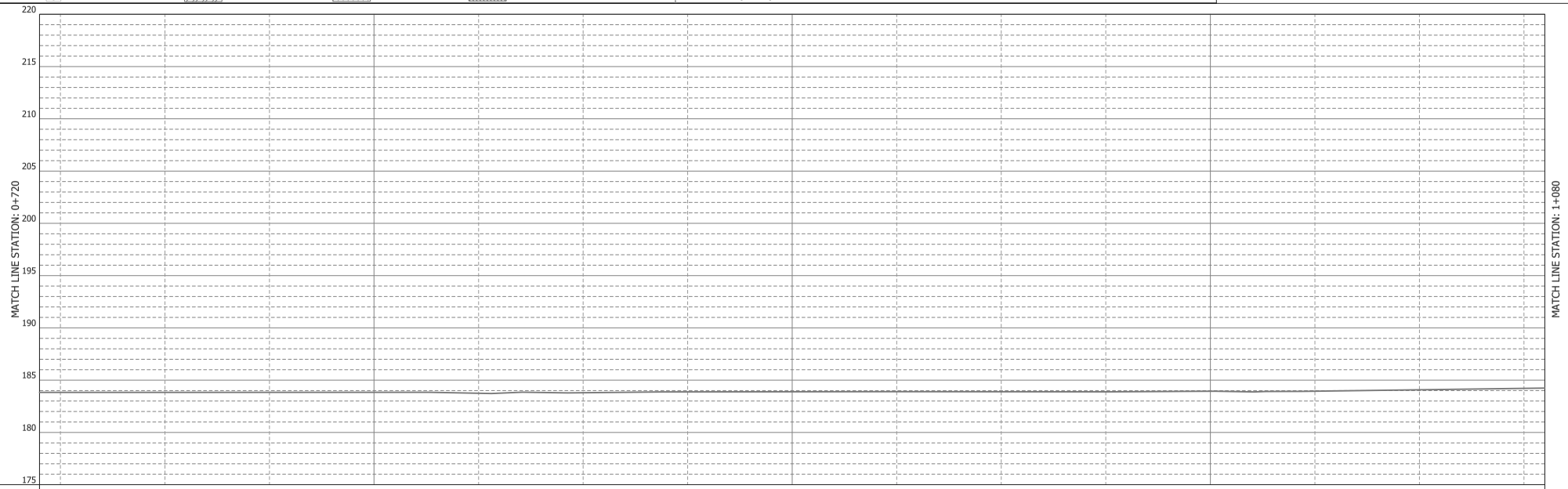


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																			
Ground Elevations	183.83	183.83	183.83	183.84	183.84	183.75	183.80	183.87	183.88	183.90	183.89	183.89	183.94	183.95	184.08	184.23	184.22	184.25	
Pipe Center Level																			
Pipeline (Diameter)																			
Cumulative Distance	720	725	750	775	800	825	850	875	900	925	950	975	1000	1025	1050	1071	1075	1080	
Chainage	**0+720**	+25	+50	+75	**0+800**	+25	+50	+75	**0+900**	+25	+50	+75	**1+000**	+25	+50	1 +71	+75	**1+080**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I	WS-TM-I-003
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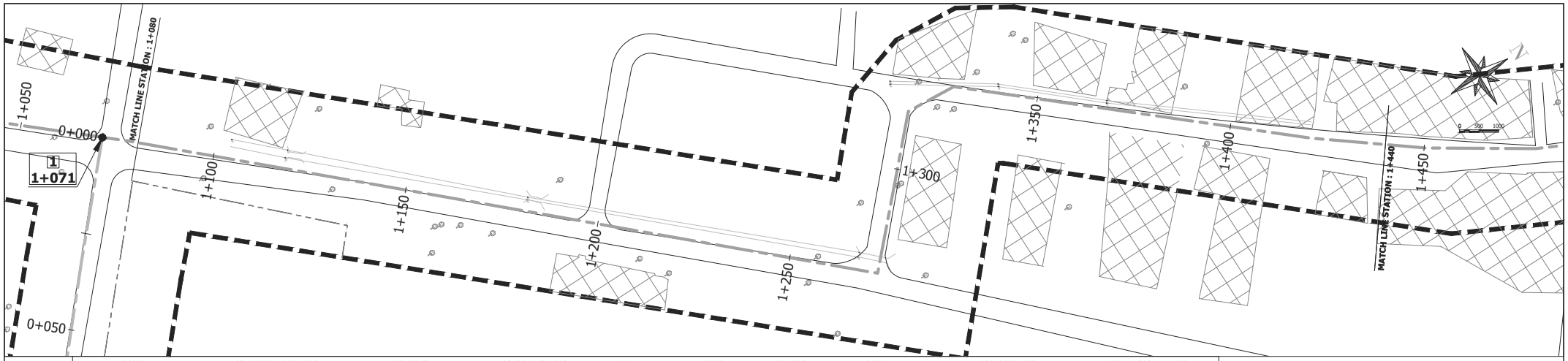
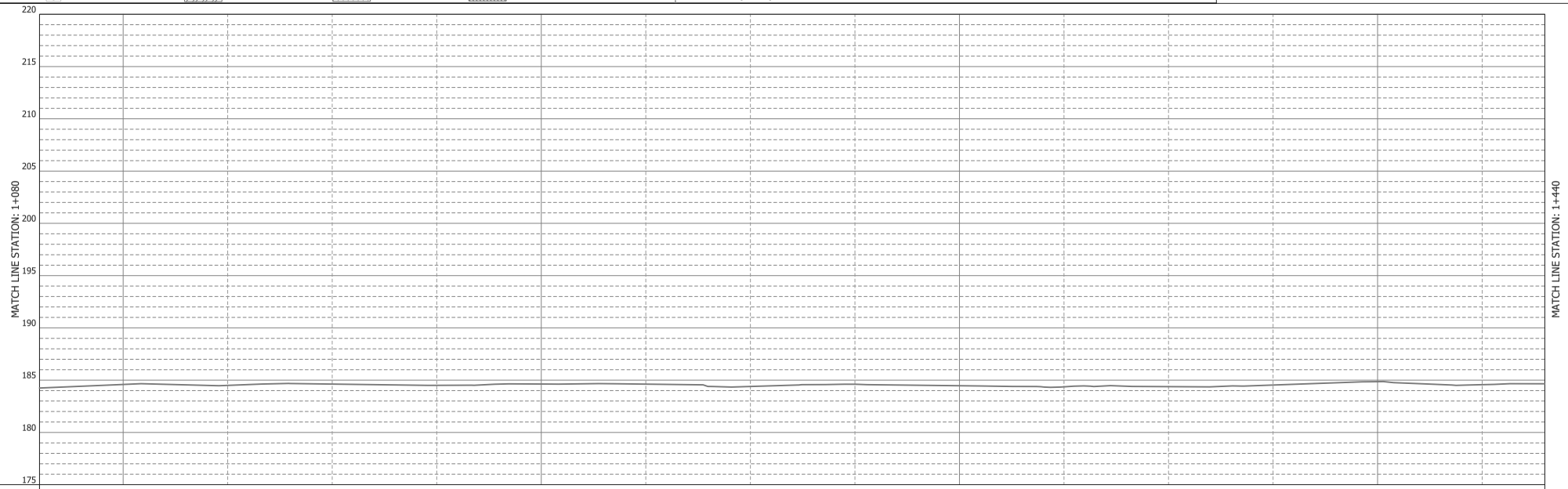


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																
Ground Elevations	184.25	184.59	184.50	184.63	184.51	184.63	184.62	184.40	184.61	184.47	184.37	184.38	184.53	184.86	184.57	184.65
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1080	1100	1125	1150	1175	1200	1225	1250	1275	1300	1325	1350	1375	1400	1425	1440
Chainage	**1+080**	**1+100**	+25	+50	+75	**1+200**	+25	+50	+75	**1+300**	+25	+50	+75	**1+400**	+25	**1+440**

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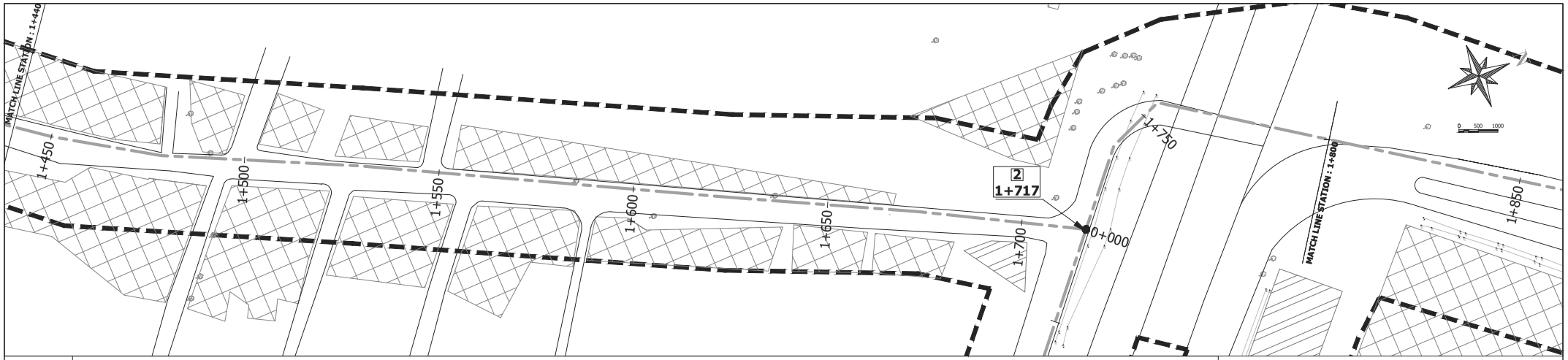
PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

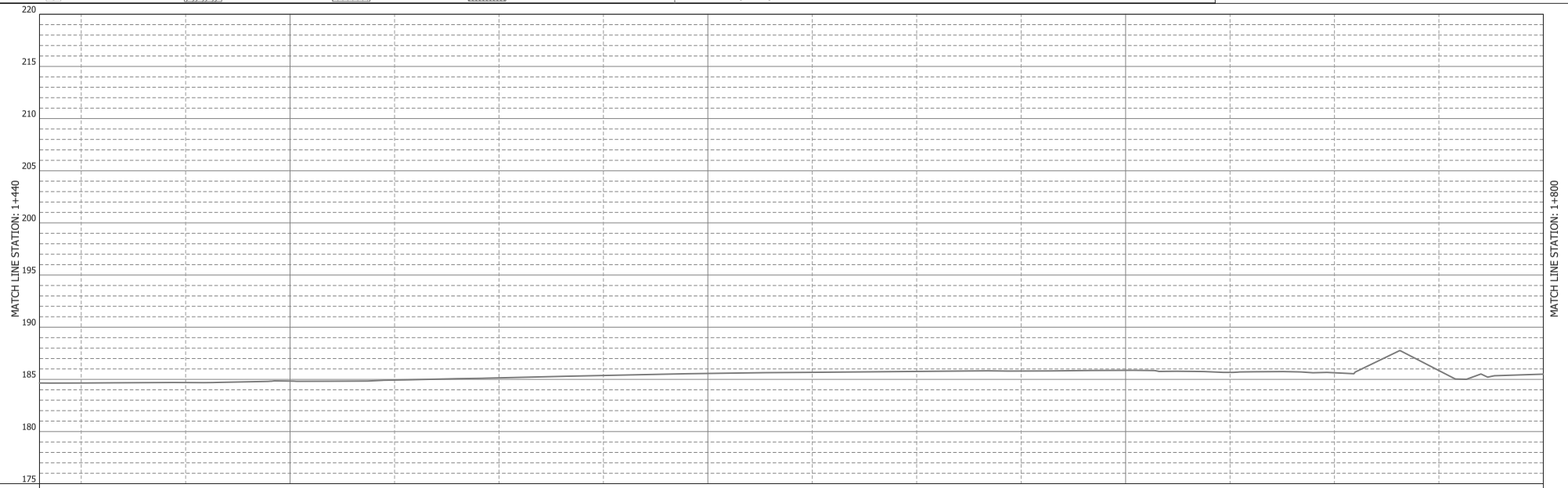
DRAWING TITLE:
PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I

DRAWING No: WS-TM-I-004

SCALE: **L:1/1000 , H: 1/400**



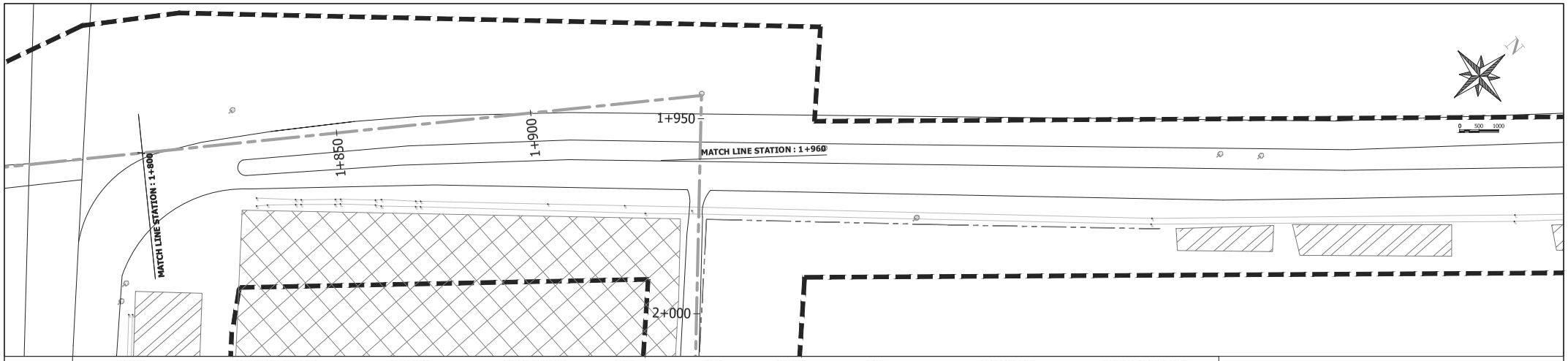
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



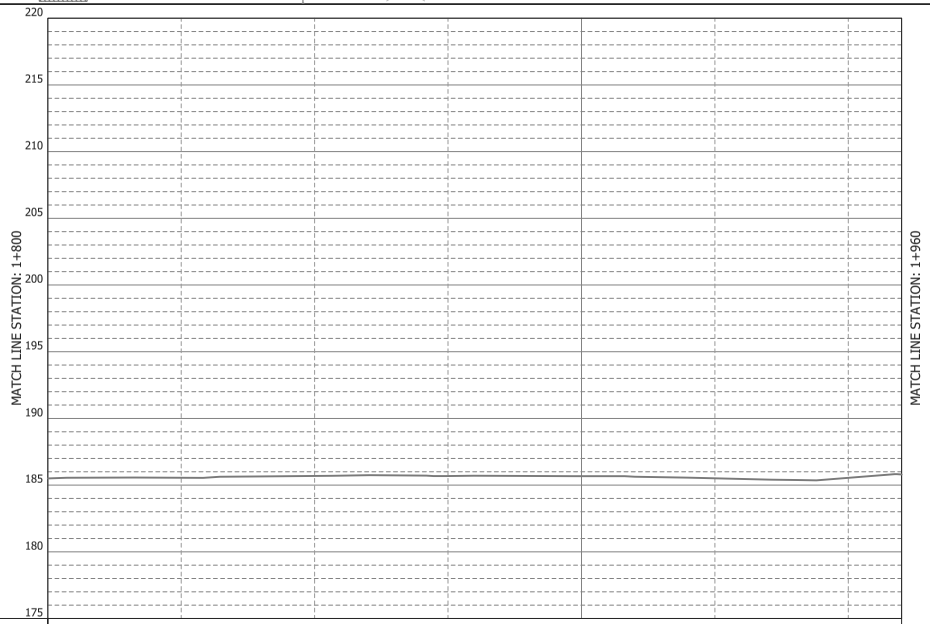
Water Level																		
Ground Elevations	184.65	184.65	184.70	184.84	184.93	185.13	185.37	185.58	185.67	185.76	185.80	185.87	185.76	185.67	185.63	185.85	185.50	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	1440	1450	1475	1500	1525	1550	1575	1600	1625	1650	1675	1700	1717	1725	1750	1775	1800	
Chainage	**1+440**	+50	+75	**1+500**	+25	+50	+75	**1+600**	+25	+50	+75	**1+700**	+17	2 +25	+50	+75	**1+800**	

AD4 - 11

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I	WS-TM-I-005
		SCALE: L:1/1000 , H: 1/400

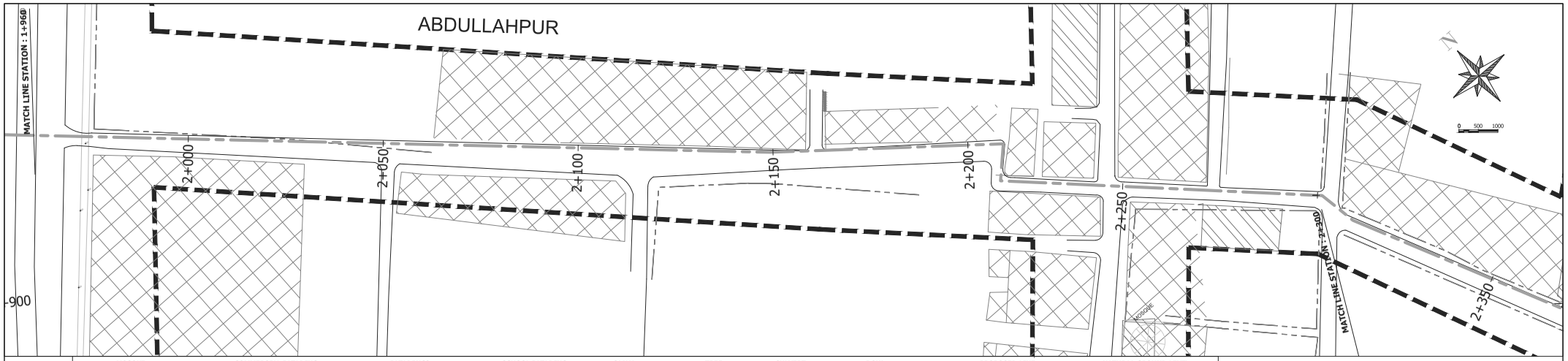


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

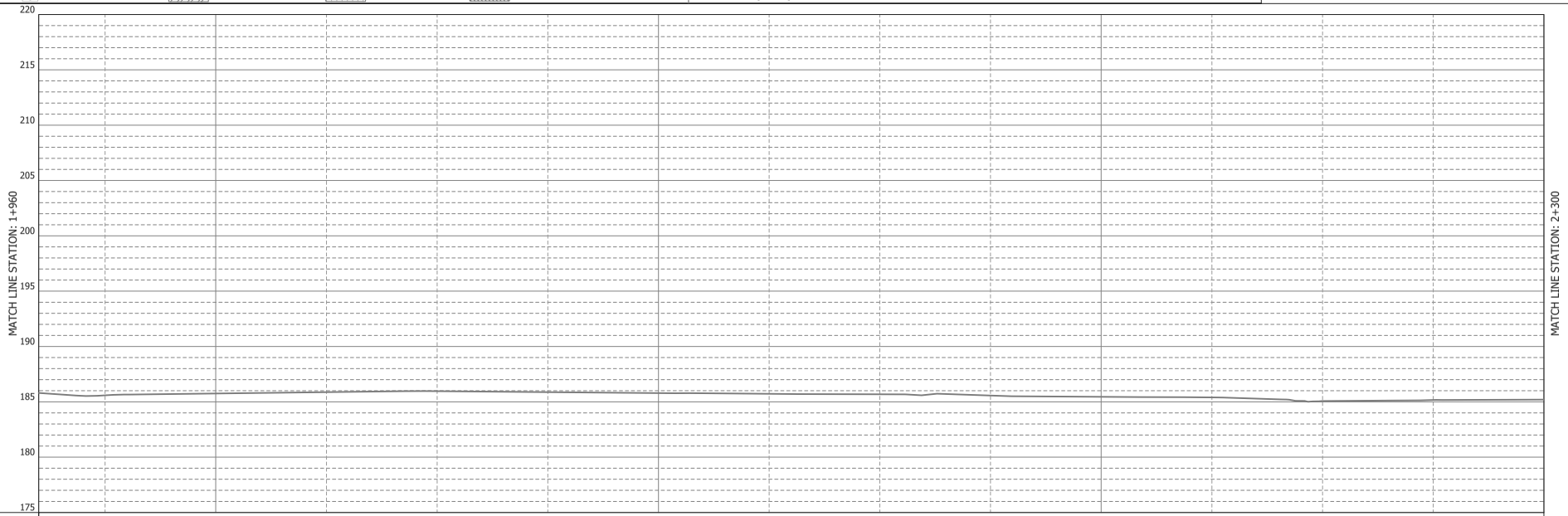


Water Level								
Ground Elevations	185.50	185.55	185.69	185.68	185.67	185.51	185.54	185.80
Pipe Center Level								
Pipeline (Diameter)								
Cumulative Distance	1800	1825	1850	1875	1900	1925	1950	1960
Chainage	**1+800**	+25	+50	+75	**1+900**	+25	+50	**1+960**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I	WS-TM-I-006
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level															
Ground Elevations	185.80	185.58	185.75	185.87	185.96	185.88	185.79	185.72	185.68	185.56	185.45	185.40	185.07	185.17	185.20
Pipe Center Level															
Pipeline (Diameter)															
Cumulative Distance	1960	1975	2000	2025	2050	2075	2100	2125	2150	2175	2200	2225	2250	2275	2300
Chainage	**1+960**	+75	**2+000**	+25	+50	+75	**2+100**	+25	+50	+75	**2+200**	+25	+50	+75	**2+300**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I	WS-TM-I-007
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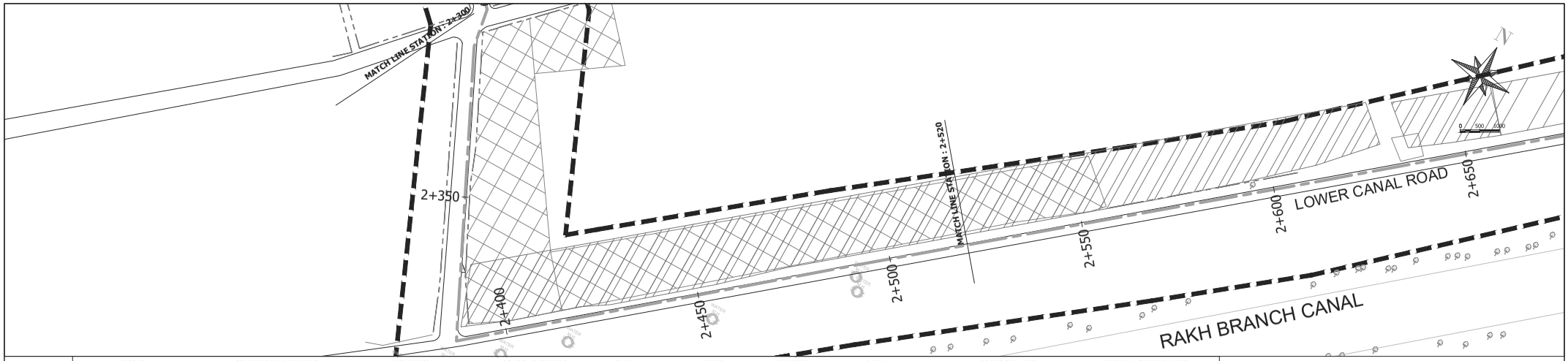
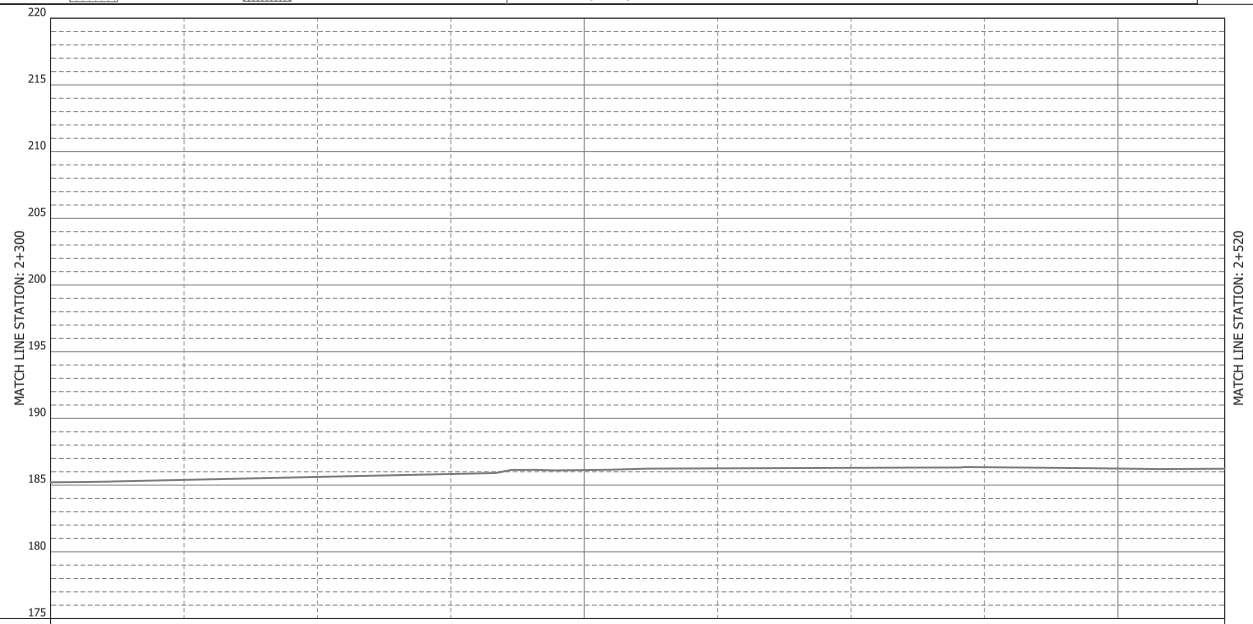


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level										
Ground Elevations	185.20	185.39	185.61	185.83	186.13	186.25	186.29	186.34	186.24	186.23
Pipe Center Level										
Pipeline (Diameter)										
Cumulative Distance	2300	2325	2350	2375	2400	2425	2450	2475	2500	2520
Chainage	**2+300**	+25	+50	+75	**2+400**	+25	+50	+75	**2+500**	**2+520**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I	WS-TM-I-008
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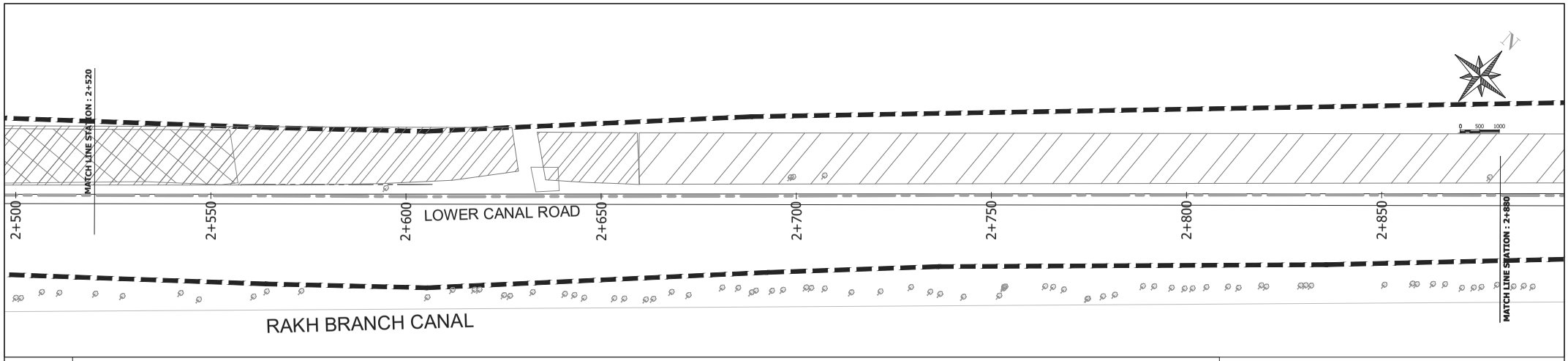
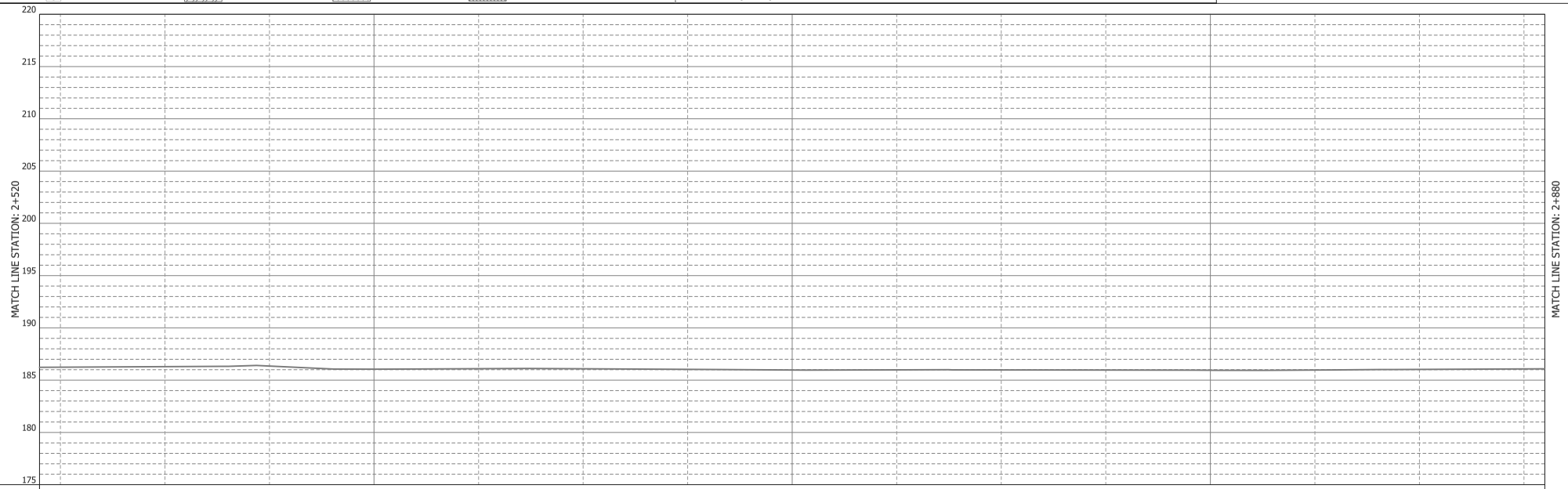


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																	
Ground Elevations	186.23	186.24	186.29	186.34	186.05	186.09	186.08	186.03	185.97	185.99	185.98	185.97	185.95	185.97	186.03	186.08	186.09
Pipe Center Level																	
Pipeline (Diameter)																	
Cumulative Distance	2520	2525	2550	2575	2600	2625	2650	2675	2700	2725	2750	2775	2800	2825	2850	2875	2880
Chainage	**2+520**	+25	+50	+75	**2+600**	+25	+50	+75	**2+700**	+25	+50	+75	**2+800**	+25	+50	+75	**2+880**

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PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I	WS-TM-I-009
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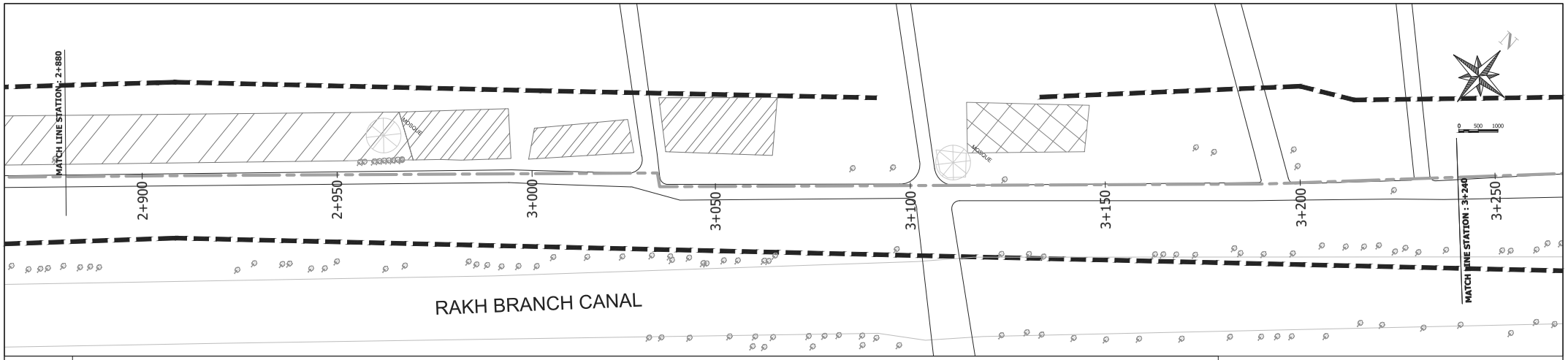
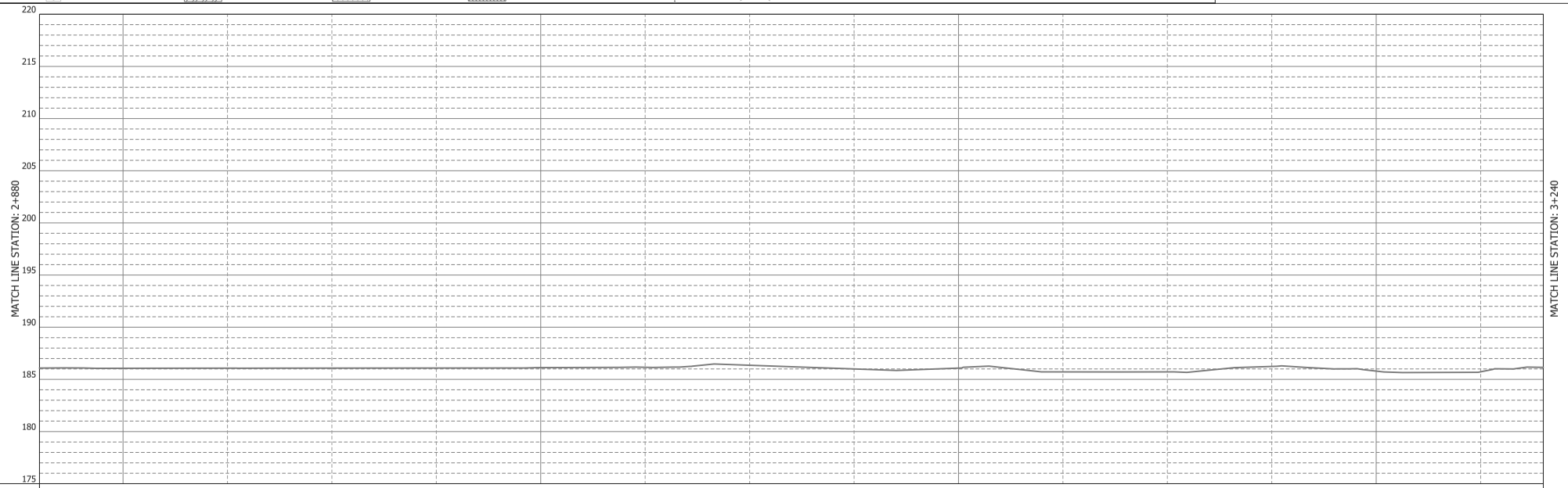


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



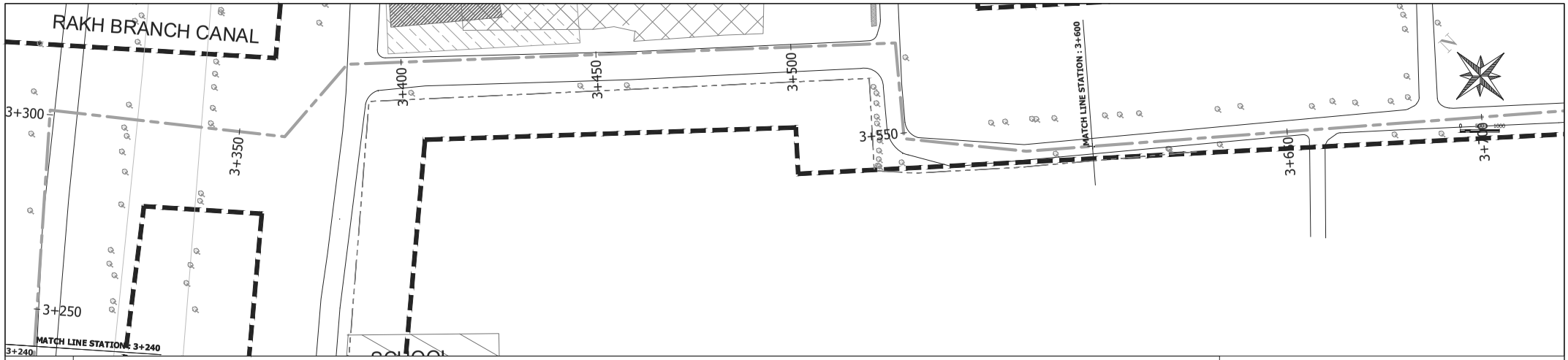
Water Level																
Ground Elevations	186.09	186.06	186.07	186.08	186.09	186.13	186.16	186.35	186.00	186.08	185.72	185.72	186.23	185.79	185.72	186.15
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	2880	2900	2925	2950	2975	3000	3025	3050	3075	3100	3125	3150	3175	3200	3225	3240
Chainage	**2+880**	**2+900**	+25	+50	+75	**3+000**	+25	+50	+75	**3+100**	+25	+50	+75	**3+200**	+25	**3+240**

PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

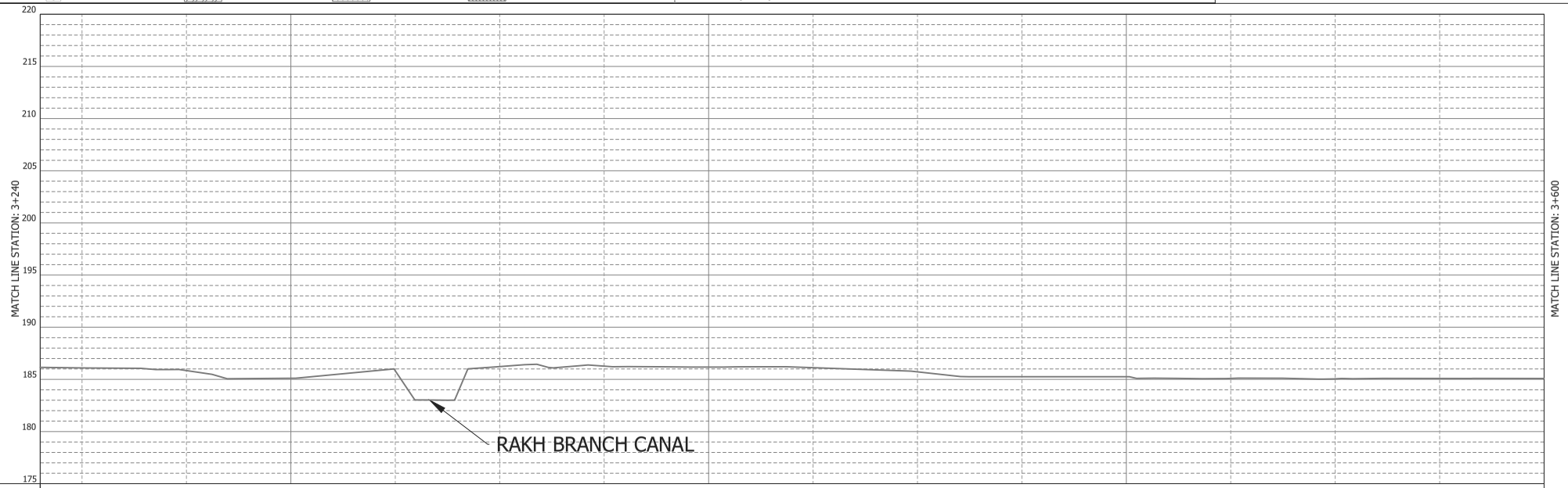
DRAWING TITLE:
PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I

DRAWING No: WS-TM-I-010

SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



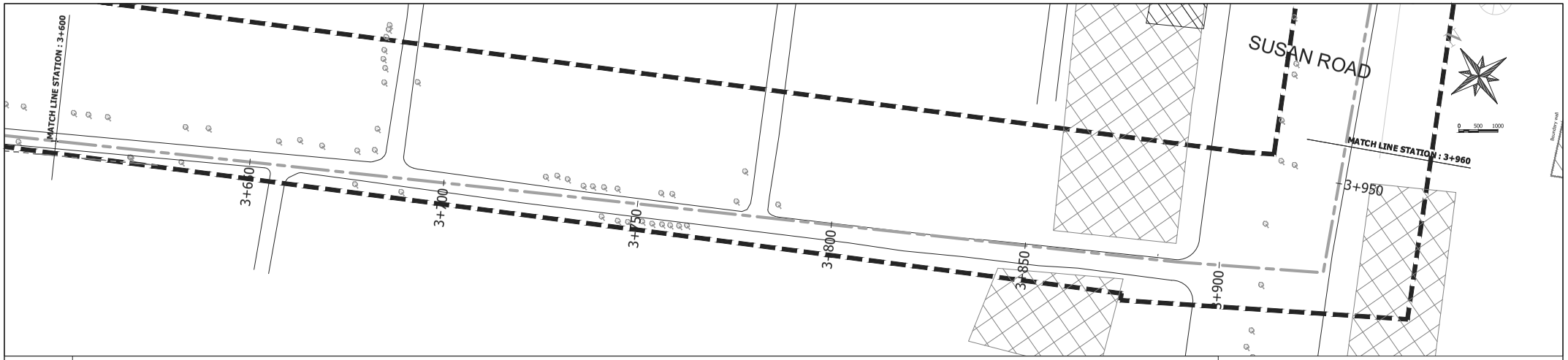
Water Level																
Ground Elevations	186.15	186.10	185.84	185.11	185.81	186.23	186.27	186.18	186.12	185.72	185.25	185.25	185.10	185.05	185.09	185.08
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	3240	3250	3275	3300	3325	3350	3375	3400	3425	3450	3475	3500	3525	3550	3575	3600
Chainage	**3+240**	+50	+75	**3+300**	+25	+50	+75	**3+400**	+25	+50	+75	**3+500**	+25	+50	+75	**3+600**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

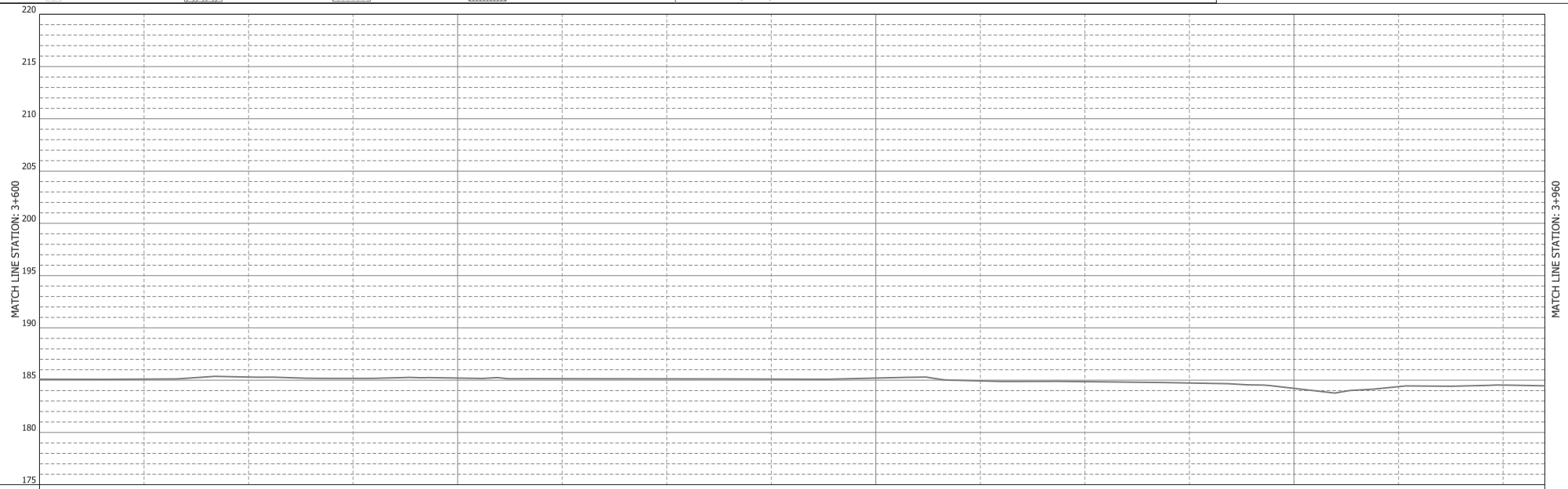
DRAWING TITLE: PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I

DRAWING No: WS-TM-I-011

SCALE: L:1/1000 , H: 1/400

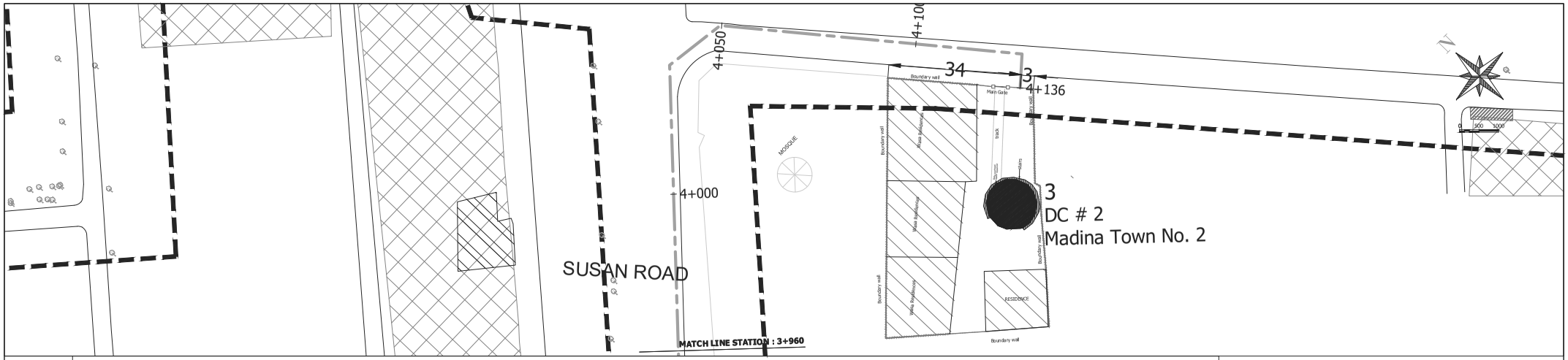


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																
Ground Elevations	185.08	185.10	185.30	185.17	185.20	185.14	185.12	185.10	185.20	184.93	184.86	184.73	184.21	184.38	184.53	184.46
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	3600	3625	3650	3675	3700	3725	3750	3775	3800	3825	3850	3875	3900	3925	3950	3960
Chainage	**3+600**	+25	+50	+75	**3+700**	+25	+50	+75	**3+800**	+25	+50	+75	**3+900**	+25	+50	**3+960**

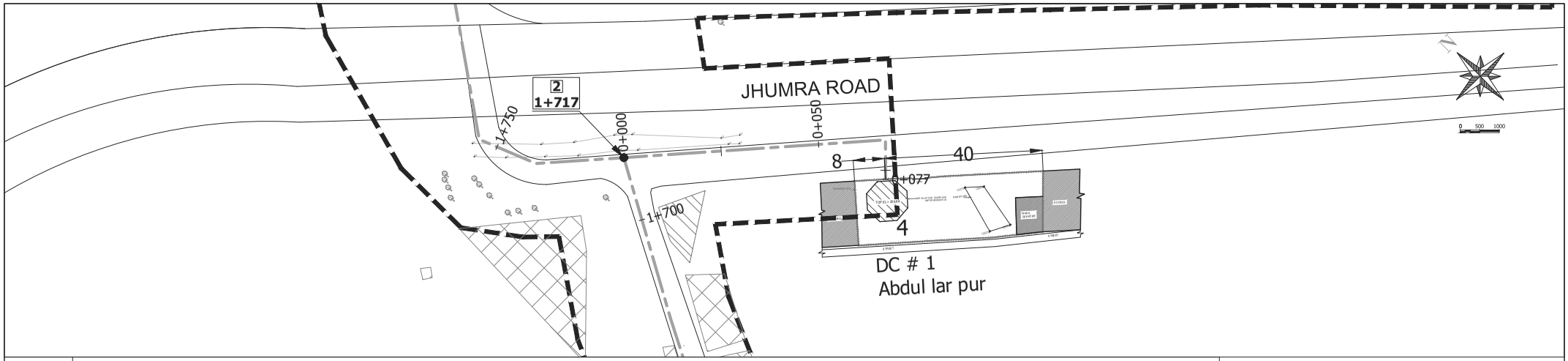
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I	WS-TM-I-012
		SCALE: L:1/1000 , H: 1/400



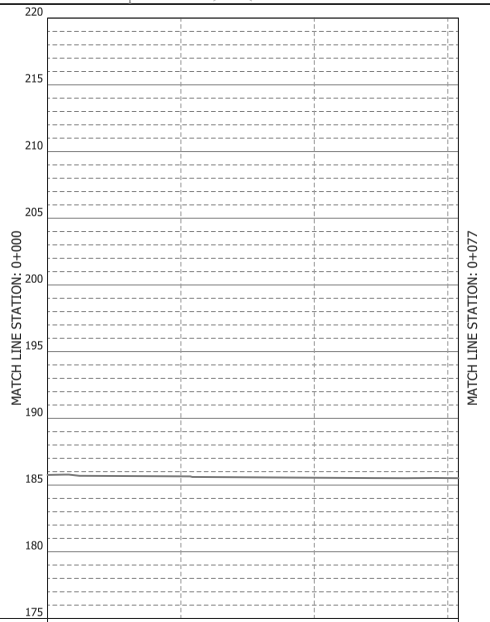
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level										
Ground Elevations	184.46	184.61	184.46	184.38	184.42	184.57	184.47	184.35	184.34	
Pipe Center Level										
Pipeline (Diameter)										
Cumulative Distance	3960	3975	4000	4025	4050	4075	4100	4125	4136	
Chainage	**3+960**	+75	**4+000**	+25	+50	+75	**4+100**	+25	**4+136**	3

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I	WS-TM-I-013
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



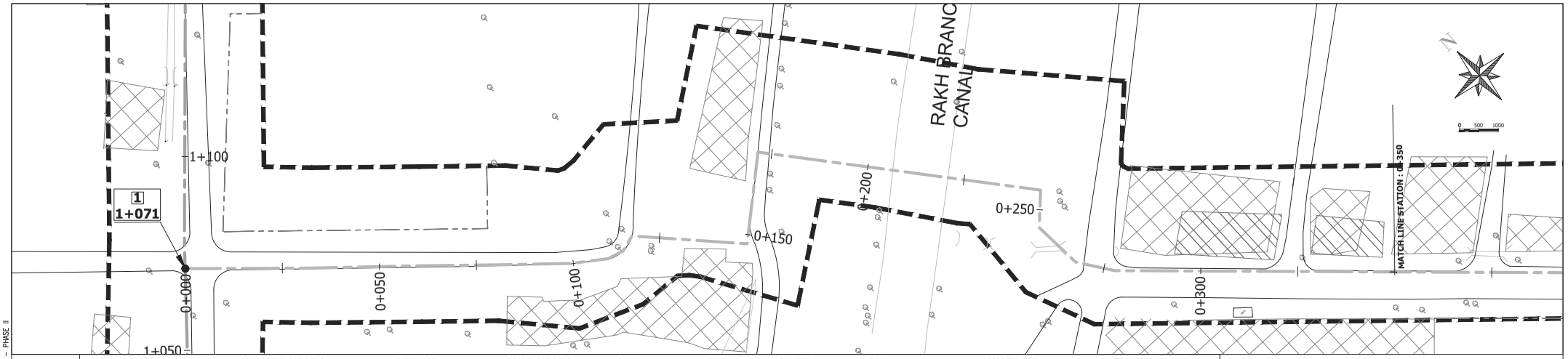
Water Level				
Ground Elevations	185.76	185.65	185.55	185.52 185.51
Pipe Center Level				
Pipeline (Diameter)				
Cumulative Distance	0	25	50	75 77
Chainage	**0+000** 1+717 2	+25	+50	+75 **0+077** 4

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

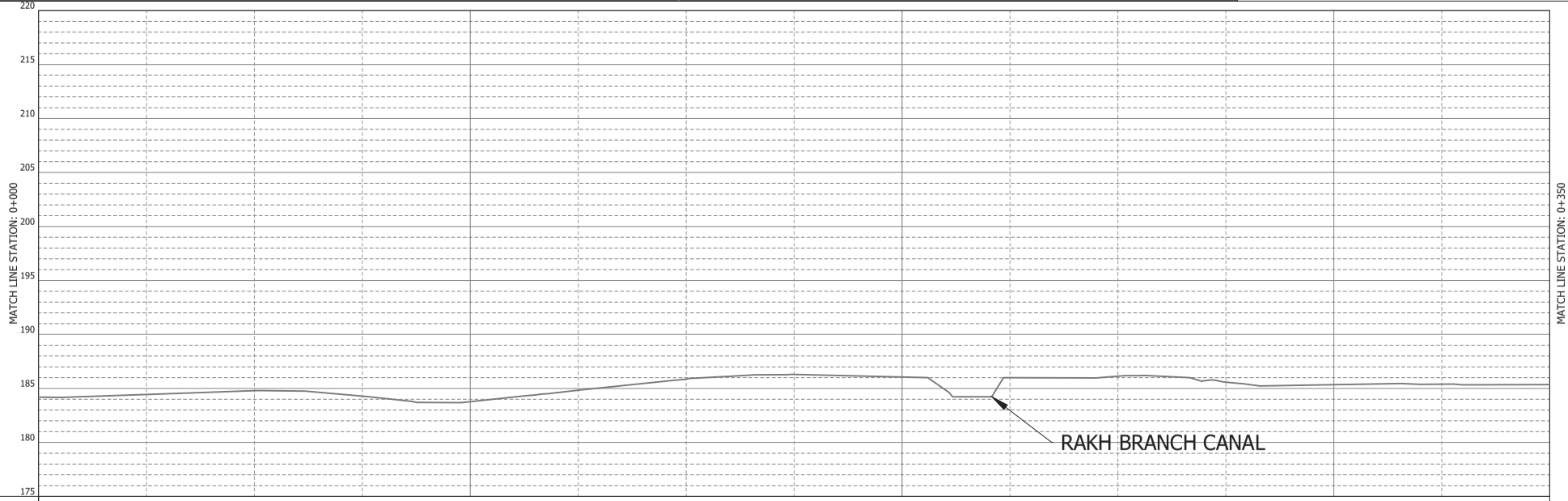
DRAWING TITLE: PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE I

DRAWING No: WS-TM-I-014

SCALE: **L:1/1000 , H: 1/400**



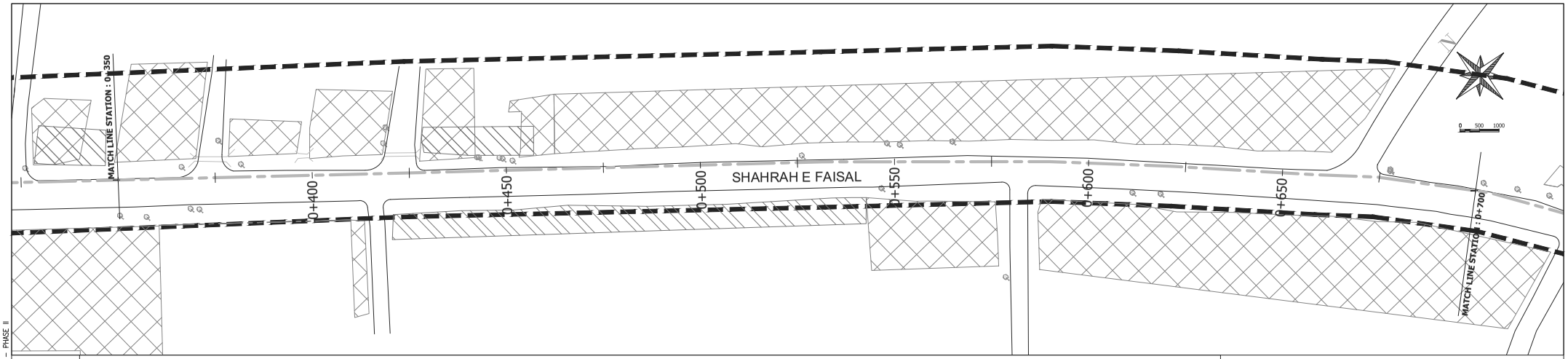
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level															
Ground Elevations	184.23	184.56	184.74	184.10	183.84	184.85	185.98	186.34	186.18	185.98	185.86	185.94	185.45	185.39	185.25
Pipe Center Level															
Pipeline (Diameter)															
Cumulative Distance	0	25	50	75	100	125	150	175	200	225	250	275	300	325	350
Chainage	**0+000**	+25	+50	+75	**0+100**	+25	+50	+75	**0+200**	+25	+50	+75	**0+300**	+25	**0+350**
	1+071 1														

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II	WS-TM-II-001
		SCALE: L:1/1000 , H: 1/400

CAD Ref: D:\FSD PLAN AND PROFILE\ STYLES SET OF FSD.dwg Last saved: Sat, 3 Nov 2018 02:04 pm PLOTTED BY : Highway-1 Plot Layout : 001 PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level															
Ground Elevations	185.25	185.31	185.14	185.33	185.05	185.06	185.04	185.10	185.14	185.16	185.11	185.07	185.07	185.07	185.04
Pipe Center Level															
Pipeline (Diameter)															
Cumulative Distance	350	375	400	425	450	475	500	525	550	575	600	625	650	675	700
Chainage	**0+350**	+75	**0+400**	+25	+50	+75	**0+500**	+25	+50	+75	**0+600**	+25	+50	+75	**0+700**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II	WS-TM-II-002
		SCALE: **L:1/1000 , H: 1/400**

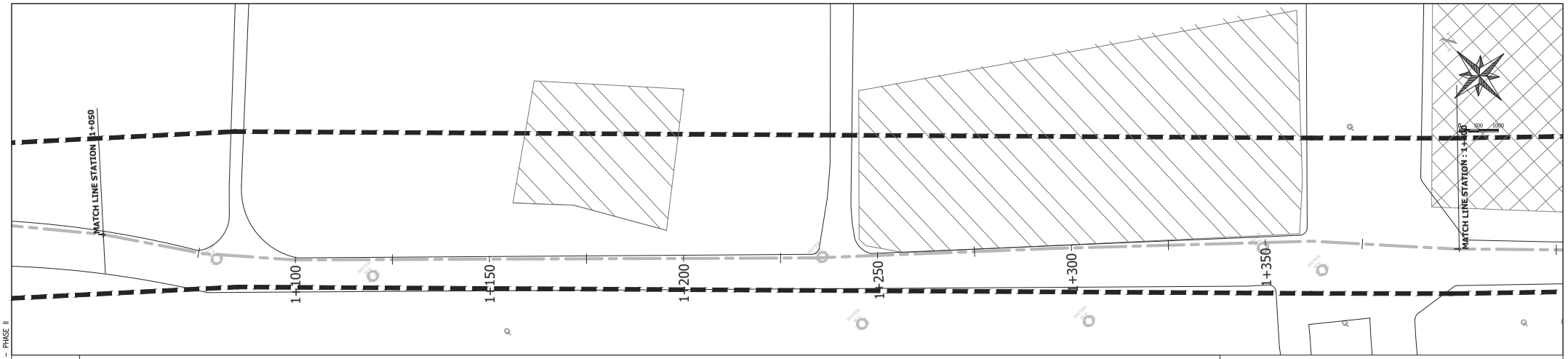
CAD Ref: D:\FSD PLAN AND PROFILE\ STYLES SET OF FSD.dwg Last saved: Sat, 3 Nov 2018 02:08 pm PLOTTED BY : Highway-1 Plot Layout : 002 PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II

LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

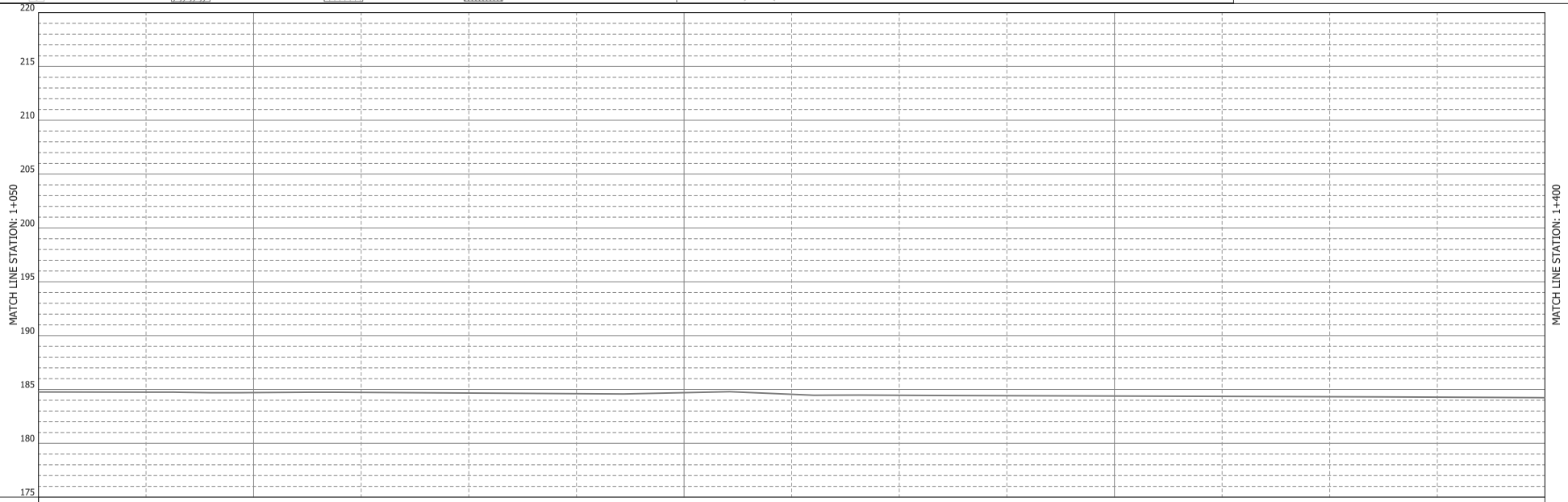
Water Level														
Ground Elevations	185.04	185.11	185.15	185.00	184.90	184.94	185.00	184.89	184.83	184.79	184.78	184.77	184.77	184.77	184.76
Pipe Center Level														
Pipeline (Diameter)														
Cumulative Distance	700	725	750	775	800	825	850	875	900	925	950	975	1000	1025	1050
Chainage	**0+700**	+25	+50	+75	**0+800**	+25	+50	+75	**0+900**	+25	+50	+75	**1+000**	+25	**1+050**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II	WS-TM-II-003
		SCALE: **L:1/1000 , H: 1/400**

CAD Ref: D:\FSD PLAN AND PROFILE\ STYLES SET OF FSD.dwg Last saved: Sat, 3 Nov 2018 02:12 pm PLOTTED BY : Highway-1 Plot Layout : 003 PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II



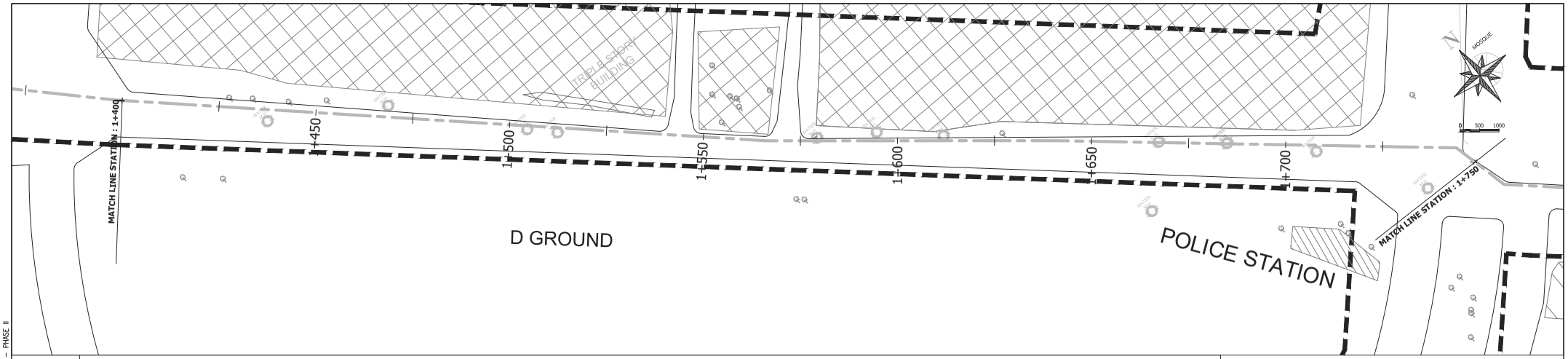
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level															
Ground Elevations	184.76	184.74	184.77	184.71	184.65	184.59	184.53	184.64	184.55	184.51	184.47	184.41	184.36	184.31	184.26
Pipe Center Level															
Pipeline (Diameter)															
Cumulative Distance	1050	1075	1100	1125	1150	1175	1200	1225	1250	1275	1300	1325	1350	1375	1400
Chainage	**1+050**	+75	**1+100**	+25	+50	+75	**1+200**	+25	+50	+75	**1+300**	+25	+50	+75	**1+400**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II	WS-TM-II-004
		SCALE: L:1/1000 , H: 1/400

CAD Ref: D:\FSD PLAN AND PROFILE\ STYLES SET OF FSD.dwg Last saved: Sat, 3 Nov 2018 02:16 pm PLOTTED BY : Highway-1 Plot Layout : 004 PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II



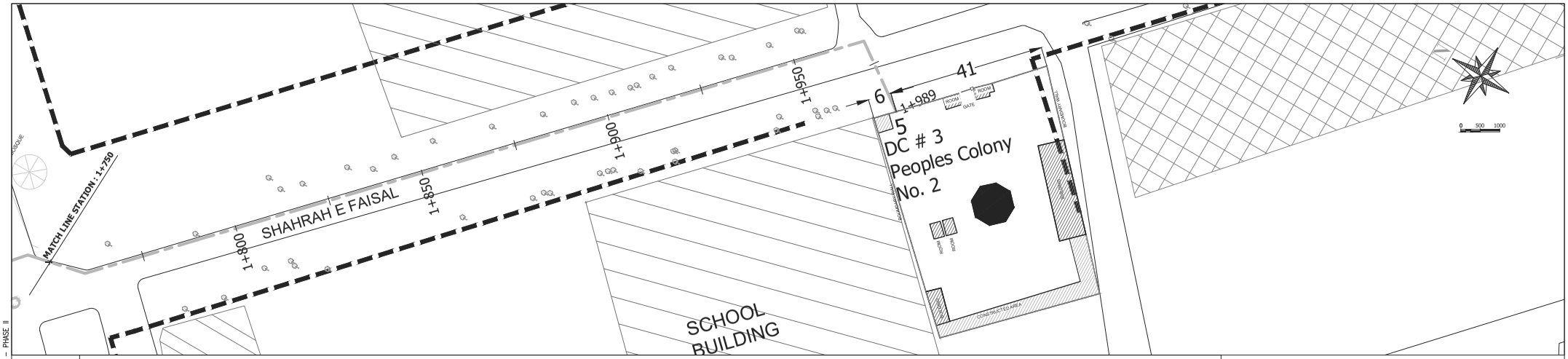
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level															
Ground Elevations	184.26	184.20	184.15	184.09	184.04	183.98	183.55	183.96	183.91	183.88	183.84	183.77	183.70	183.64	183.61
Pipe Center Level															
Pipeline (Diameter)															
Cumulative Distance	1400	1425	1450	1475	1500	1525	1550	1575	1600	1625	1650	1675	1700	1725	1750
Chainage	**1+400**	+25	+50	+75	**1+500**	+25	+50	+75	**1+600**	+25	+50	+75	**1+700**	+25	**1+750**

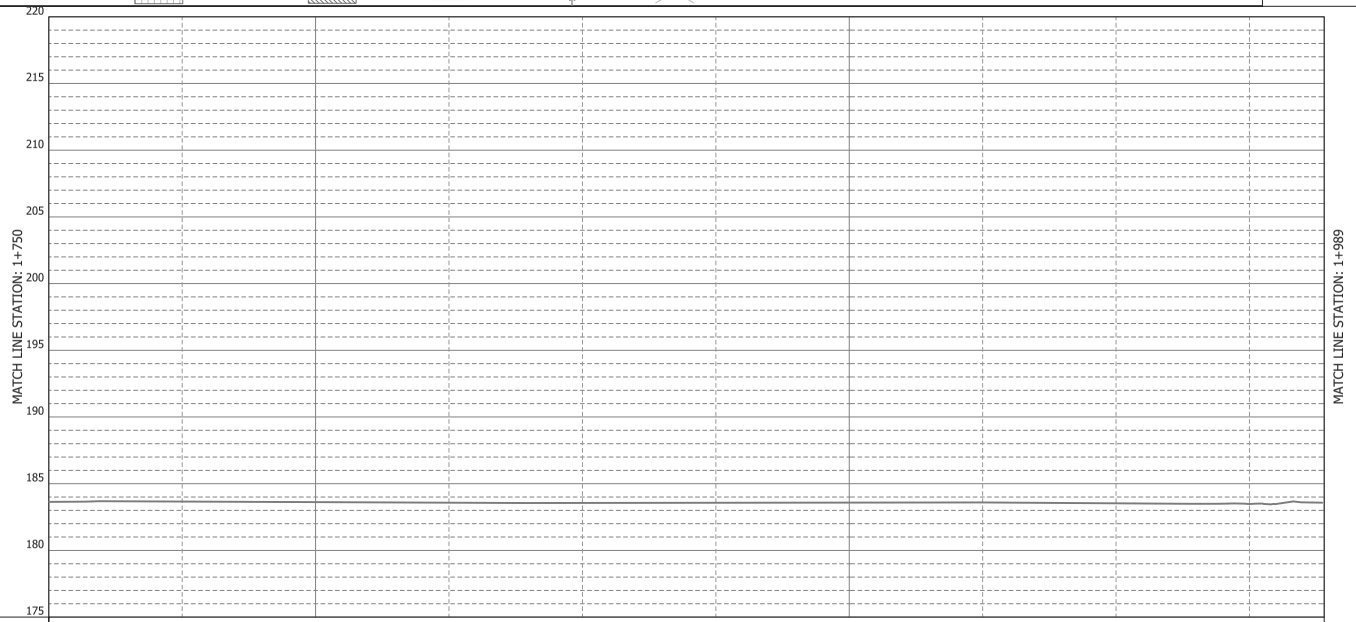
AD4 - 25

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II	WS-TM-II-005
		SCALE: L:1/1000 , H: 1/400

CAD Ref: D:\FSD PLAN AND PROFILE\ STYLES SET OF FSD.dwg Last saved: Sat, 3 Nov 2018 02:20 pm PLOTTED BY : Highway-1 Plot Layout : 005 PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



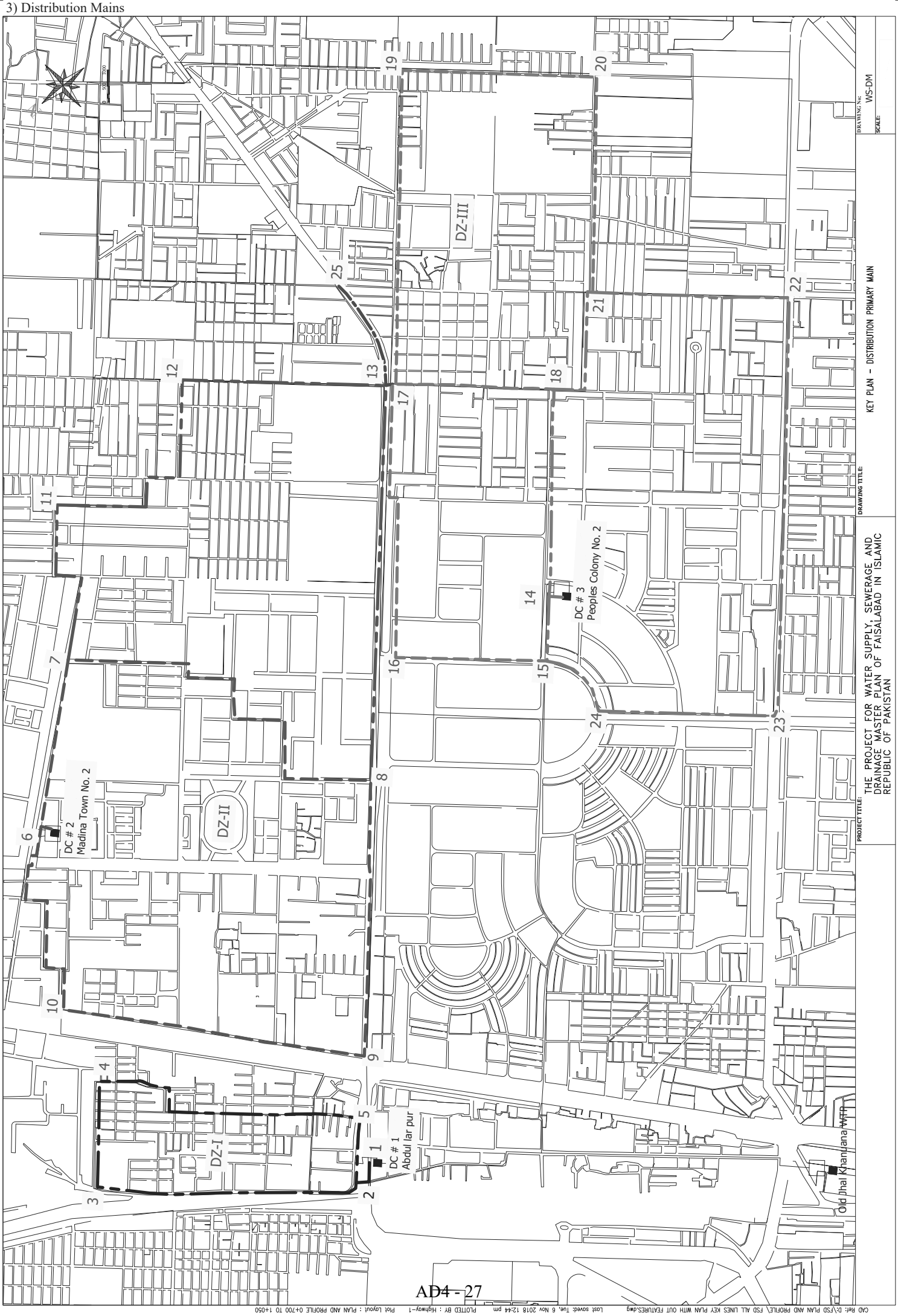
Water Level											
Ground Elevations	183.61	183.60	183.54	183.55	183.66	183.65	183.53	183.45	183.38	183.32	183.42
Pipe Center Level											
Pipeline (Diameter)											
Cumulative Distance	1750	1775	1800	1825	1850	1875	1900	1925	1950	1975	1989
Chainage	**1+750**	+75	**1+800**	+25	+50	+75	**1+900**	+25	+50	+75	**1+989**

5

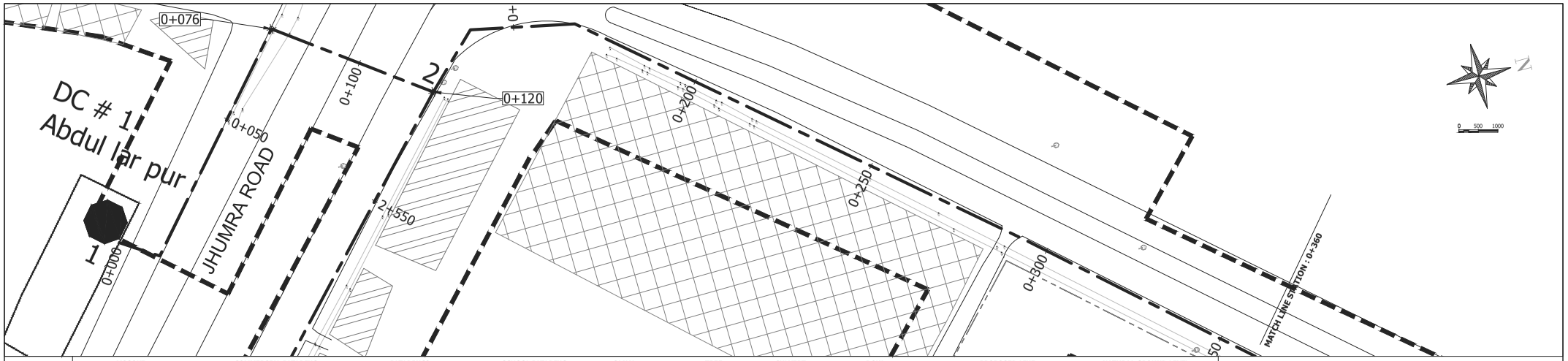
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II	WS-TM-II-006
		SCALE: **L:1/1000 , H: 1/400**

CAD Ref: D:\FSD PLAN AND PROFILE\ STYLES SET OF FSD.dwg Last saved: Thu, 8 Nov 2018 11:07 am PLOTTED BY : Highway-1 Plot Layout : 006 PLAN AND PROFILE OF TRANSMISSION MAIN – PHASE II

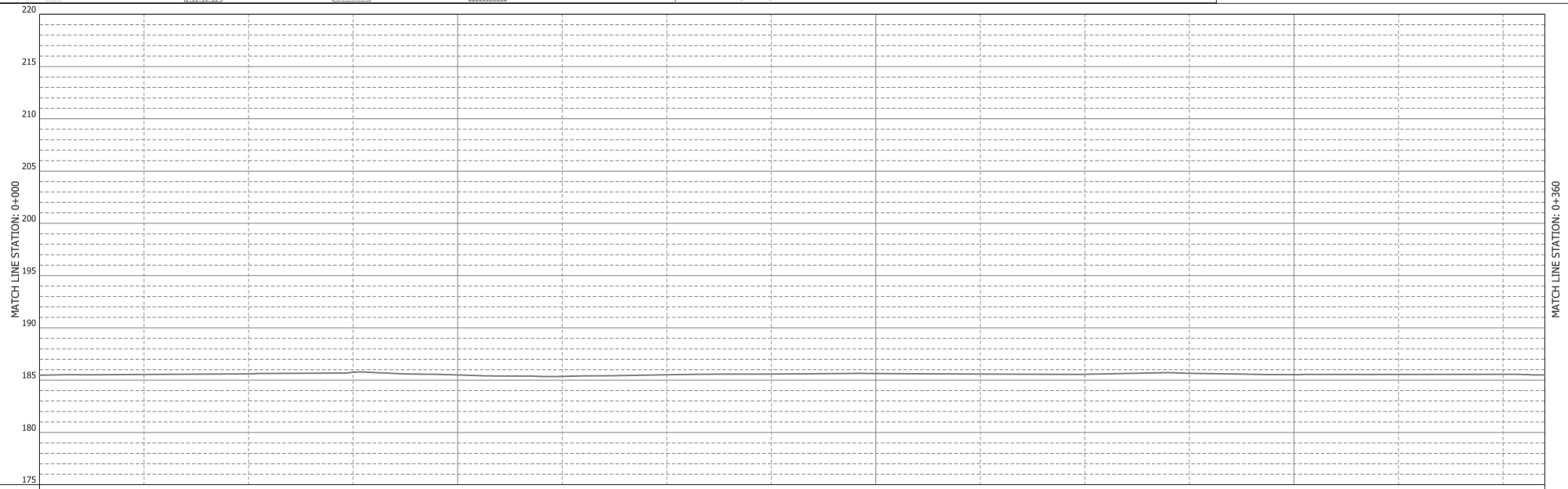
3) Distribution Mains



CAD Ref: D:\FSD PLAN AND PROFILE\ FSD ALL LINES KEY PLAN WITH OUT FEATURES.dwg Last saved: Tue, 6 Nov 2018 12:44 pm PLOTTED BY : Highway-1 Plot Layout : PLAN AND PROFILE 0+700 TO 1+050

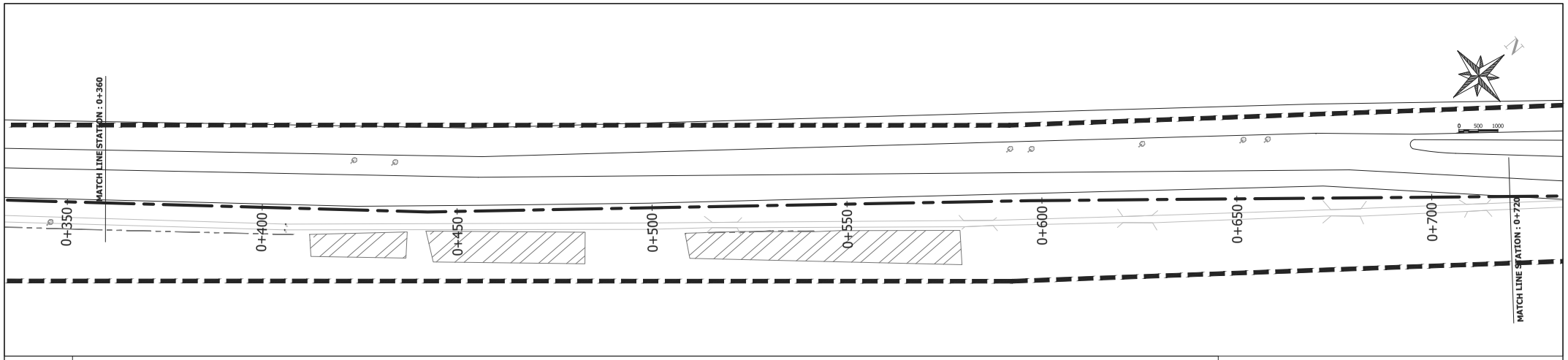


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

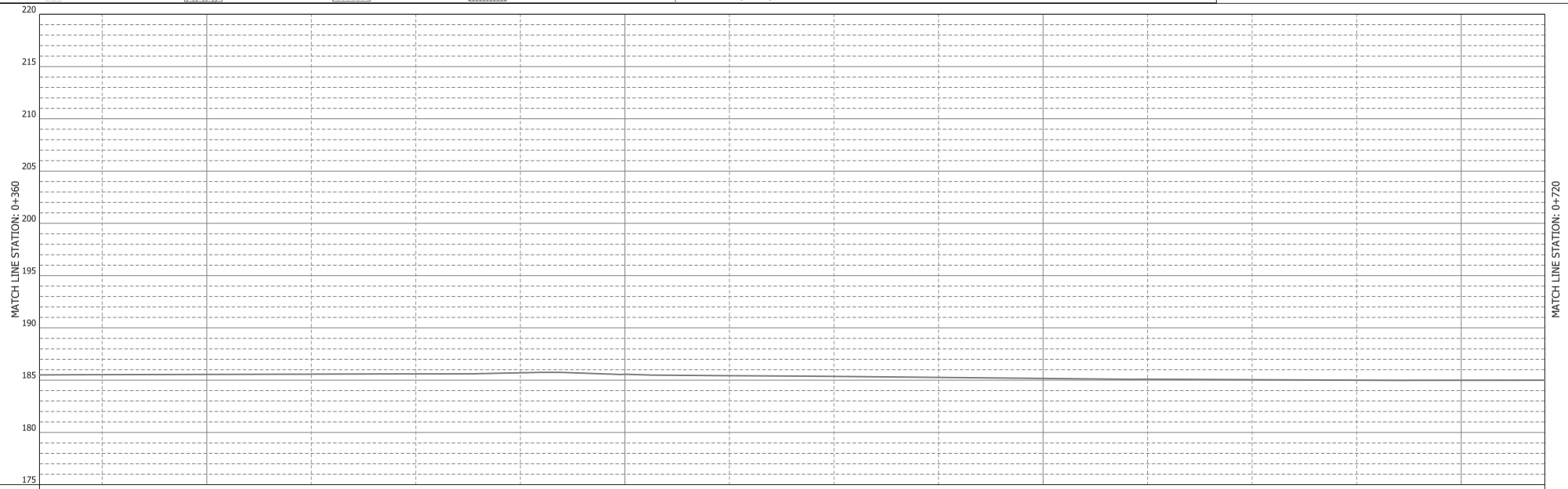


Water Level																		
Ground Elevations	185.51	185.54	185.60	185.75	185.49	185.35	185.36	185.51	185.58	185.63	185.58	185.56	185.65	185.53	185.54	185.56	185.50	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	0	25	50	75	100	120	125	150	175	200	225	250	275	300	325	350	360	
Chainage	0+000	1 +25	+50	+75	**0+100**	2 +20	+25	+50	+75	**0+200**	+25	+50	+75	**0+300**	+25	+50	**0+360**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-I-001
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



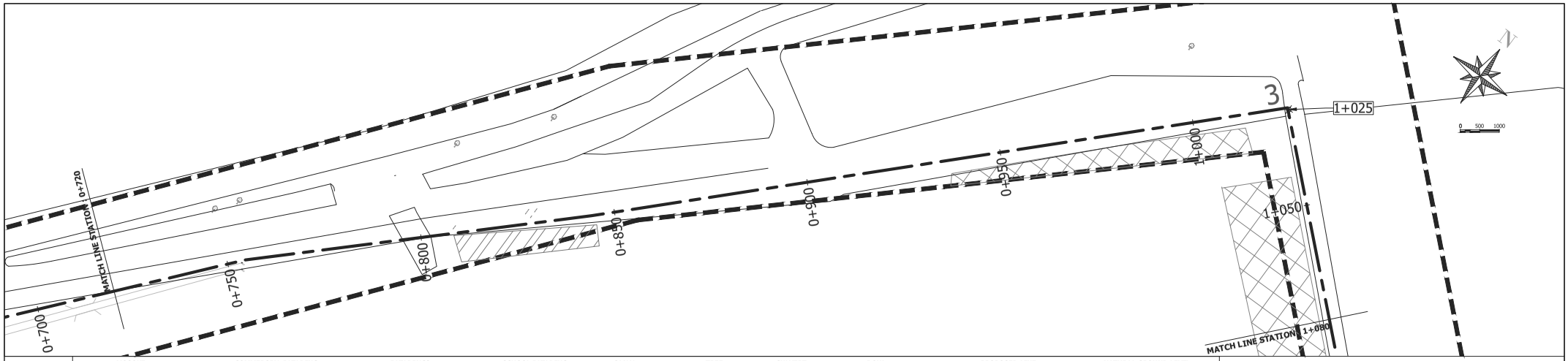
Water Level																
Ground Elevations	185.50	185.53	185.55	185.57	185.60	185.70	185.55	185.42	185.36	185.26	185.16	185.09	185.04	185.00	184.98	184.99
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	360	375	400	425	450	475	500	525	550	575	600	625	650	675	700	720
Chainage	**0+360**	+75	**0+400**	+25	+50	+75	**0+500**	+25	+50	+75	**0+600**	+25	+50	+75	**0+700**	**0+720**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

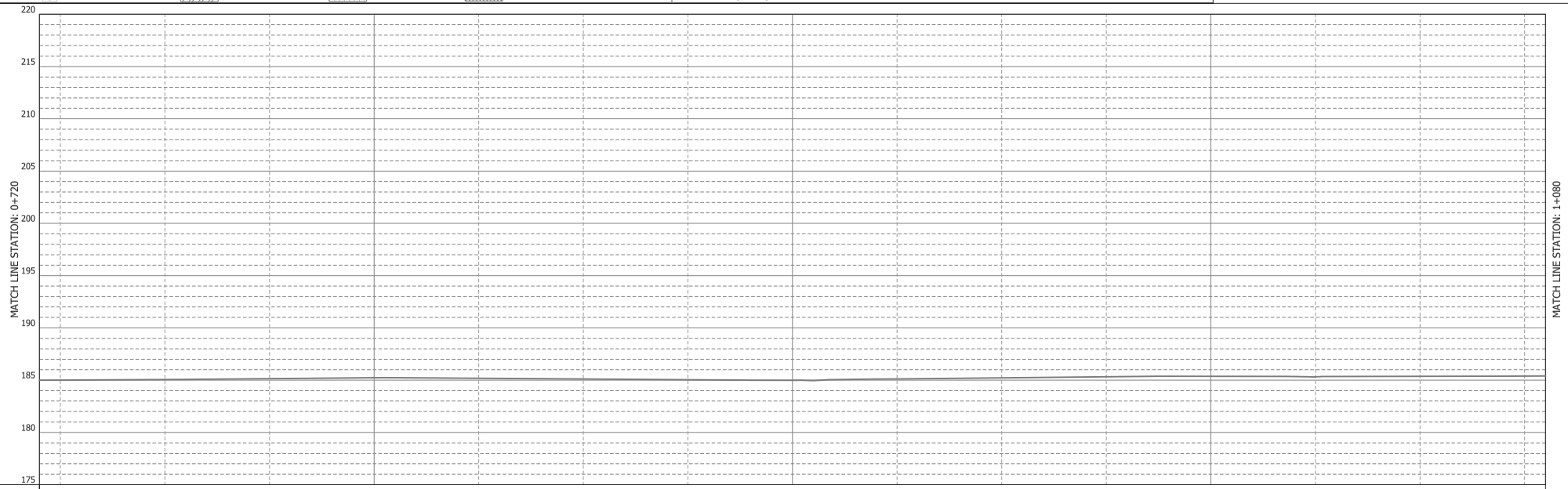
DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-I-002

SCALE: **L:1/1000 , H: 1/400**

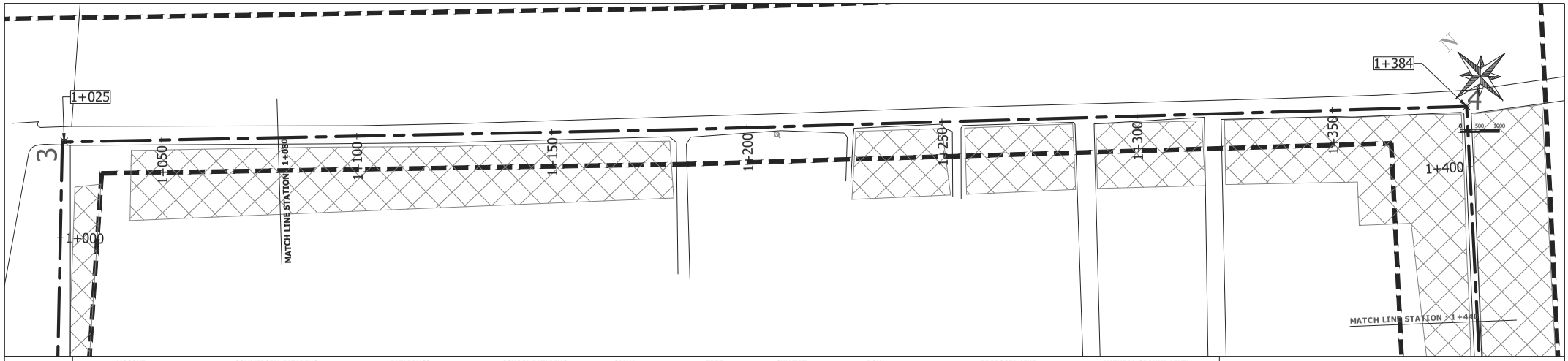


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																		
Ground Elevations	184.99	185.00	185.06	185.14	185.23	185.18	185.11	185.04	184.99	185.12	185.22	185.32	185.37	185.32	185.37	185.39	185.40	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	720	725	750	775	800	825	850	875	900	925	950	975	1000	1025	1050	1075	1080	
Chainage	**0+720**	+25	+50	+75	**0+800**	+25	+50	+75	**0+900**	+25	+50	+75	**1+000**	+25	3 +50	+75	**1+080**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-I-003
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																				
Ground Elevations	185.40	185.43	185.54	185.56	185.54	185.54	185.55	185.55	185.61	185.62	185.66	185.65	185.60	185.64	185.44	185.33	185.28			
Pipe Center Level																				
Pipeline (Diameter)																				
Cumulative Distance	1080	1100	1125	1150	1175	1200	1225	1250	1275	1300	1325	1350	1375	1384	1400	1425	1440			
Chainage	**1+080**	**1+100**	+25	+50	+75	**1+200**	+25	+50	+75	**1+300**	+25	+50	+75	+84	**1+400**	+25	**1+440**			

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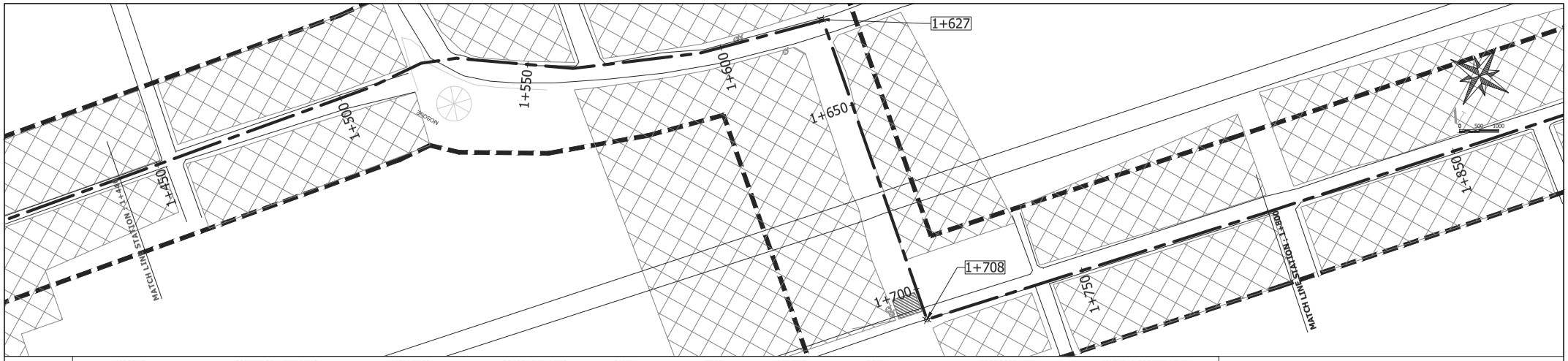
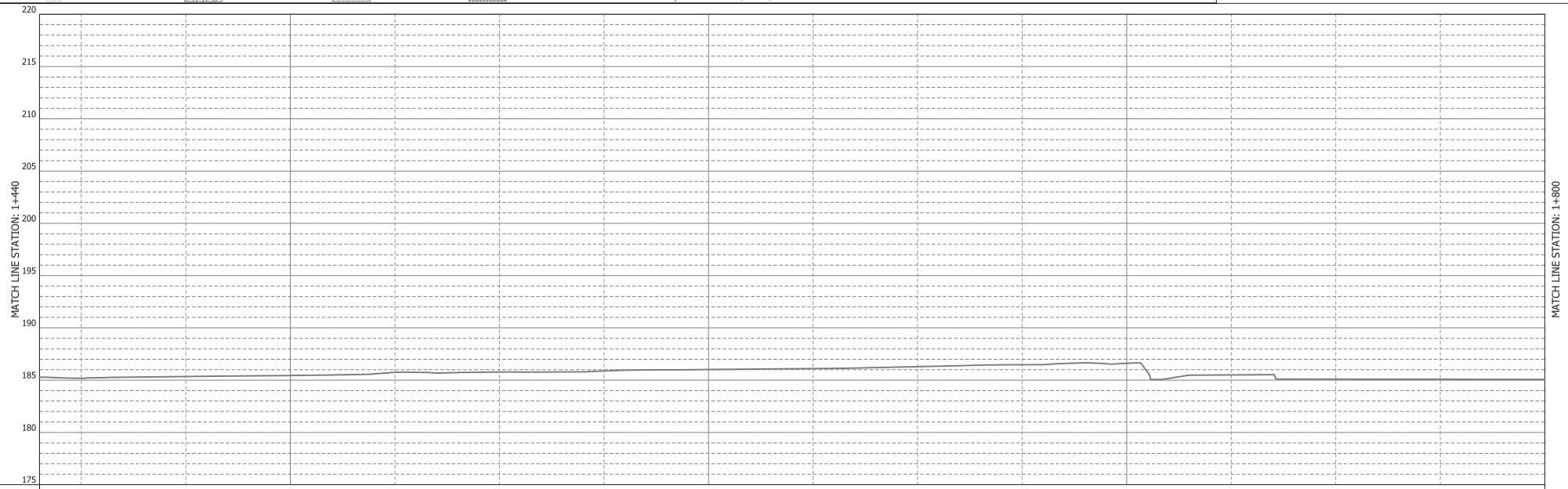
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-I-004
		SCALE: L:1/1000 , H: 1/400

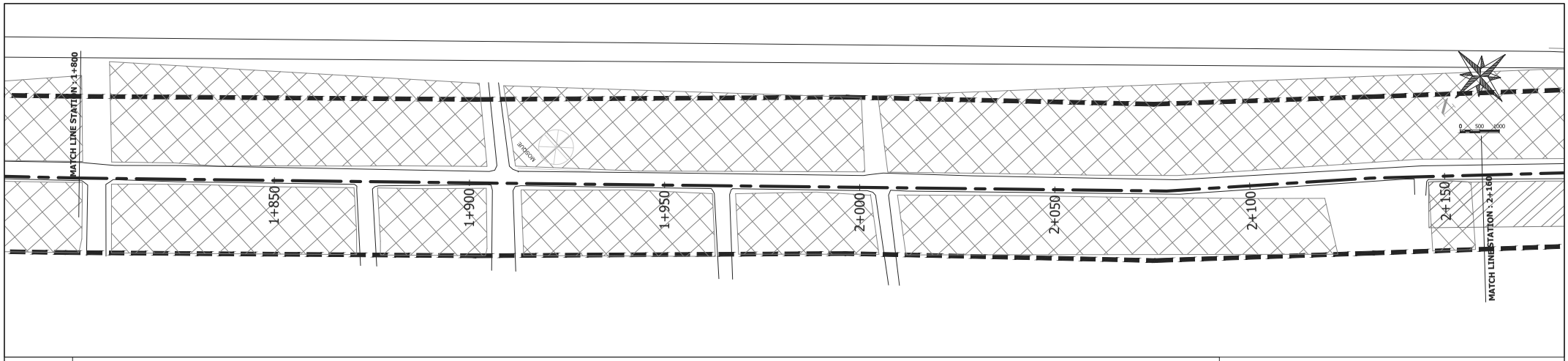


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																	
Ground Elevations	185.28	185.18	185.34	185.44	185.75	185.77	185.88	186.02	186.11	186.29	186.48	186.61	185.50	185.10	185.08	185.07	
Pipe Center Level																	
Pipeline (Diameter)																	
Cumulative Distance	1440	1450	1475	1500	1525	1550	1575	1600	1625	1650	1675	1700	1725	1750	1775	1800	
Chainage	**1+440**	+50	+75	**1+500**	+25	+50	+75	**1+600**	+25	+50	+75	**1+700**	+25	+50	+75	**1+800**	

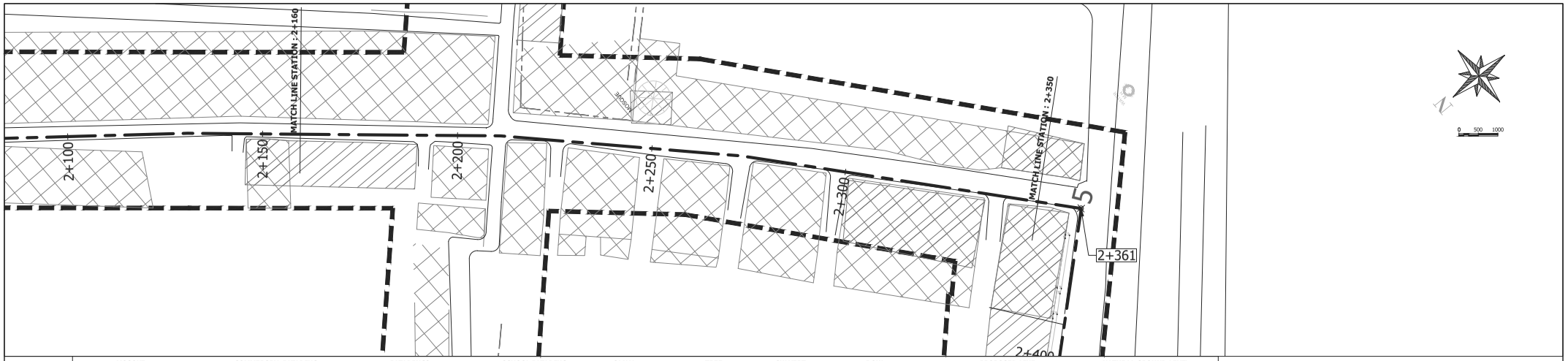
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-I-005
		SCALE: **L:1/1000 , H: 1/400**



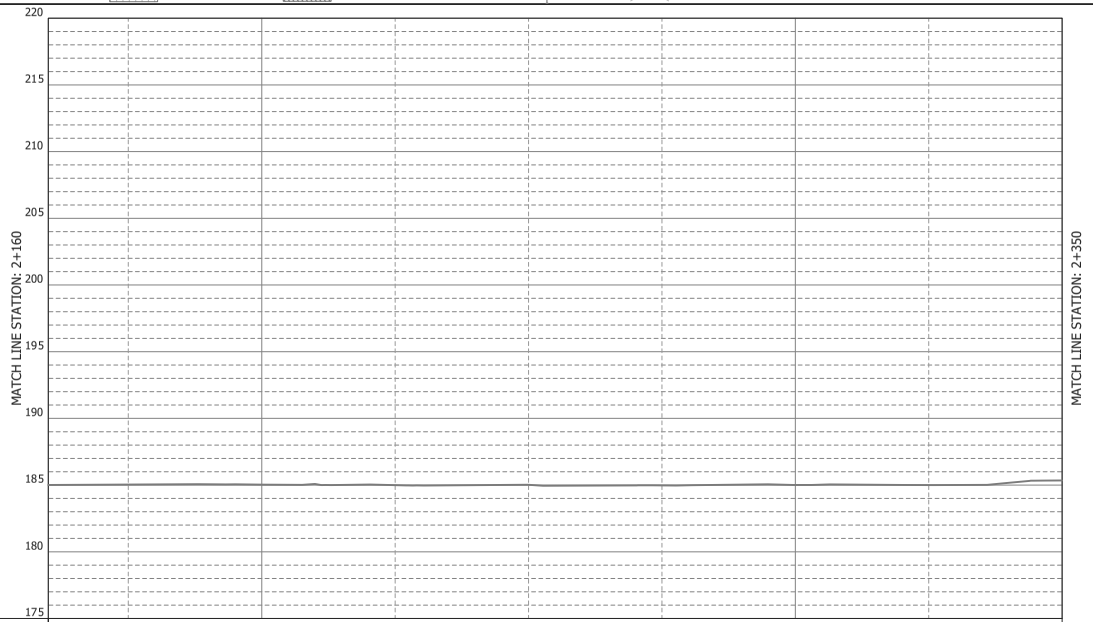
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																
Ground Elevations	185.07	185.07	185.07	185.05	185.04	184.97	185.10	185.02	185.00	185.05	185.02	184.99	185.00	185.03	184.98	185.00
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1800	1825	1850	1875	1900	1925	1950	1975	2000	2025	2050	2075	2100	2125	2150	2160
Chainage	**1+800**	+25	+50	+75	**1+900**	+25	+50	+75	**2+000**	+25	+50	+75	**2+100**	+25	+50	**2+160**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-I-006
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



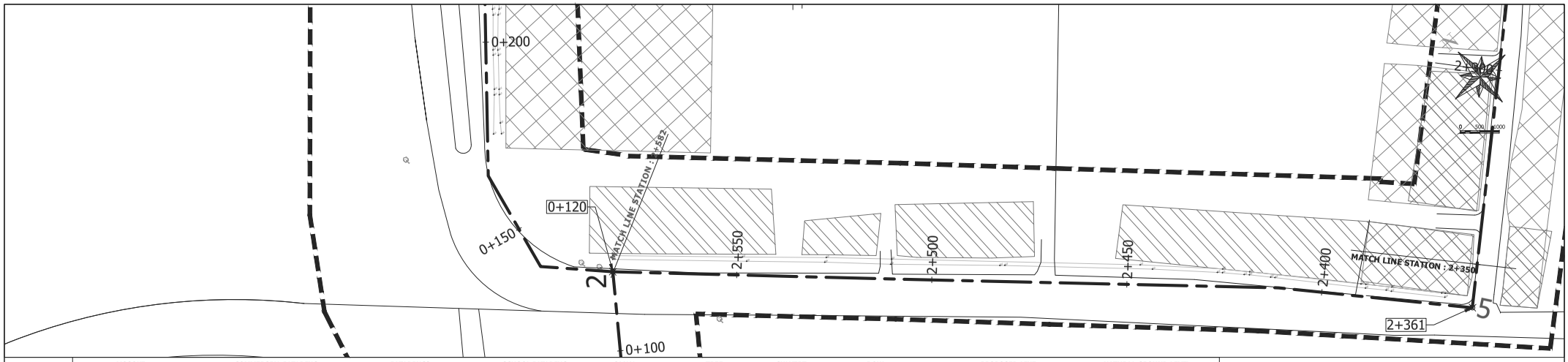
Water Level									
Ground Elevations	185.00	185.04	185.03	184.99	185.02	184.98	185.01	185.00	185.35
Pipe Center Level									
Pipeline (Diameter)									
Cumulative Distance	2160	2175	2200	2225	2250	2275	2300	2325	2350
Chainage	**2+160**	+75	**2+200**	+25	+50	+75	**2+300**	+25	**2+350**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

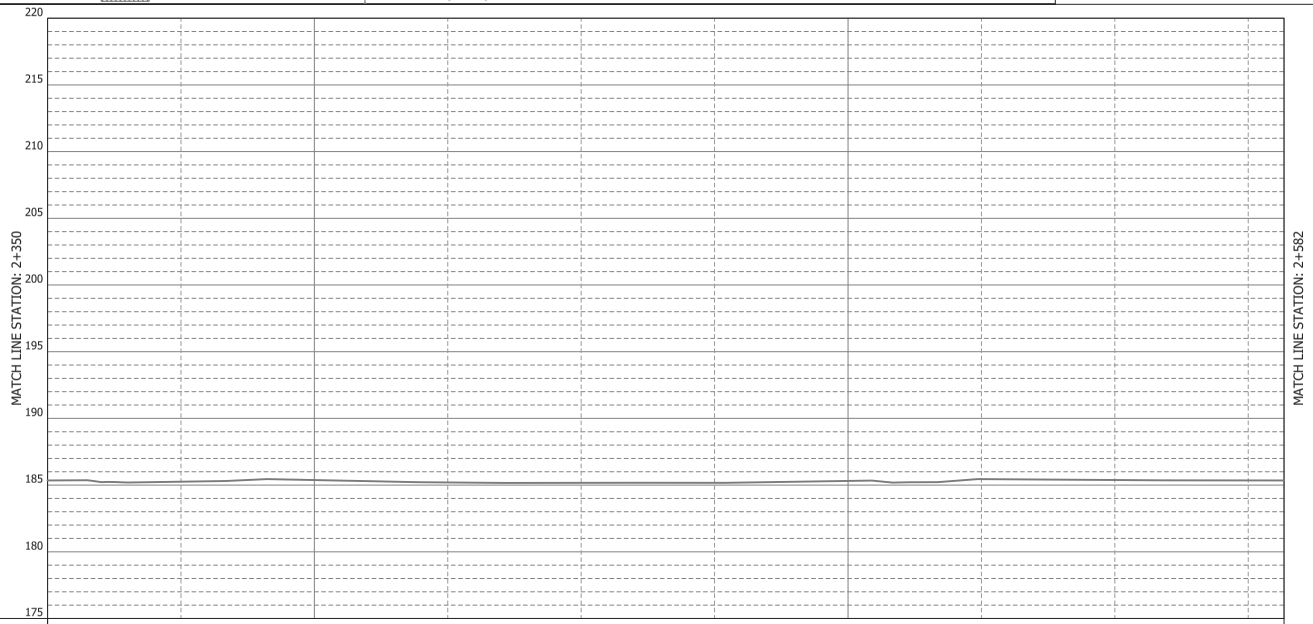
DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-I-007

SCALE: **L:1/1000 , H: 1/400**

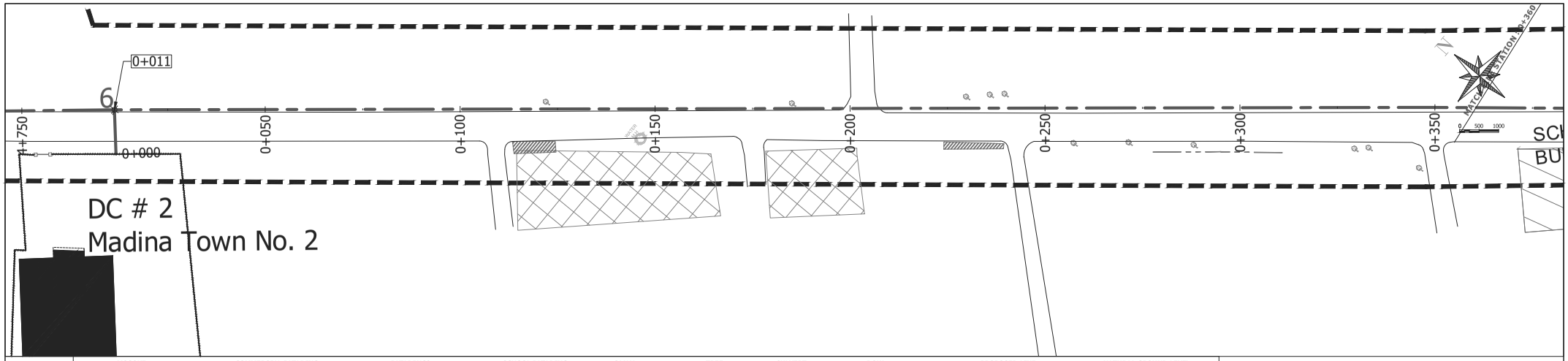


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

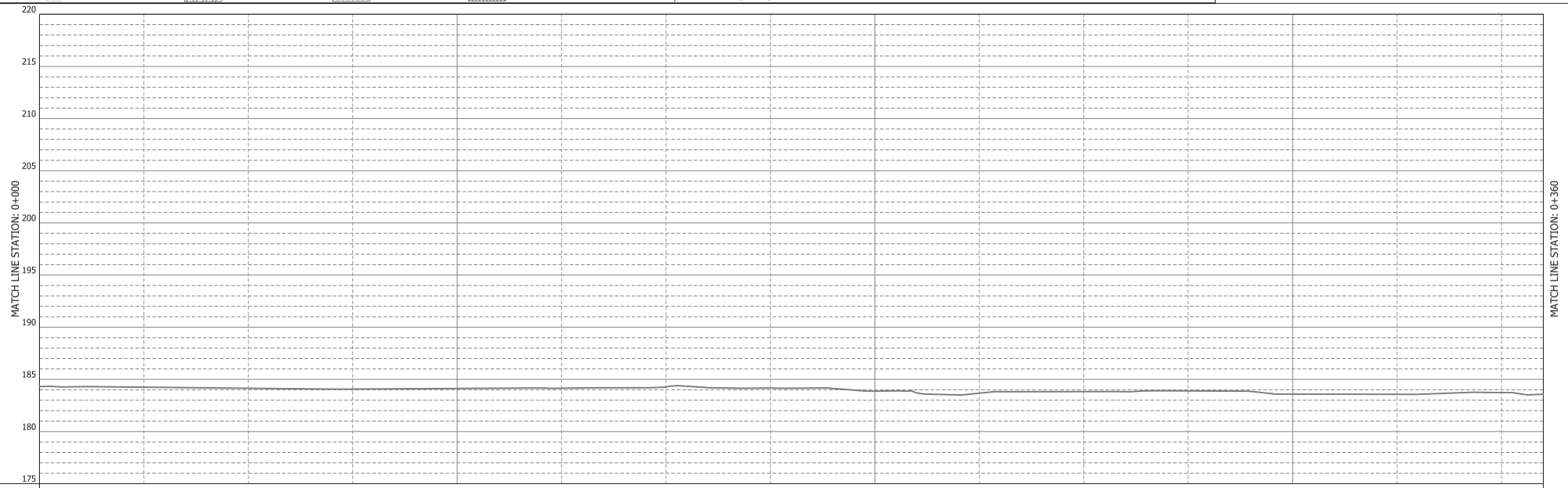


Water Level													
Ground Elevations	185.35	185.31	185.25	185.38	185.19	185.17	185.17	185.31	185.45	185.38	185.35	185.35	
Pipe Center Level													
Pipeline (Diameter)													
Cumulative Distance	2350	2361	2375	2400	2425	2450	2475	2500	2525	2550	2575	2582	
Chainage	**2+350**	+61	5	+75	**2+400**	+25	+50	+75	**2+500**	+25	+50	+75	**2+582** 2

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-I-008
		SCALE: **L:1/1000 , H: 1/400**

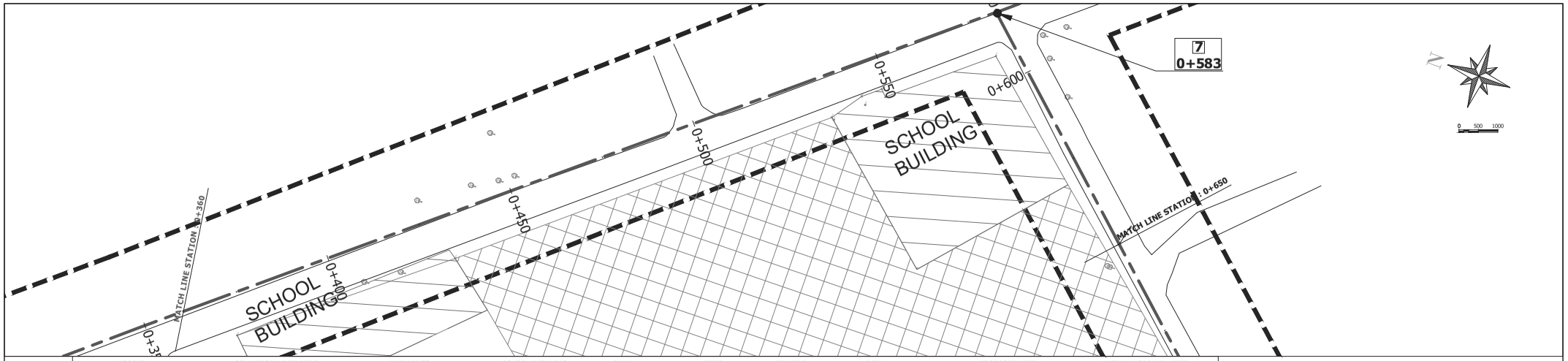


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

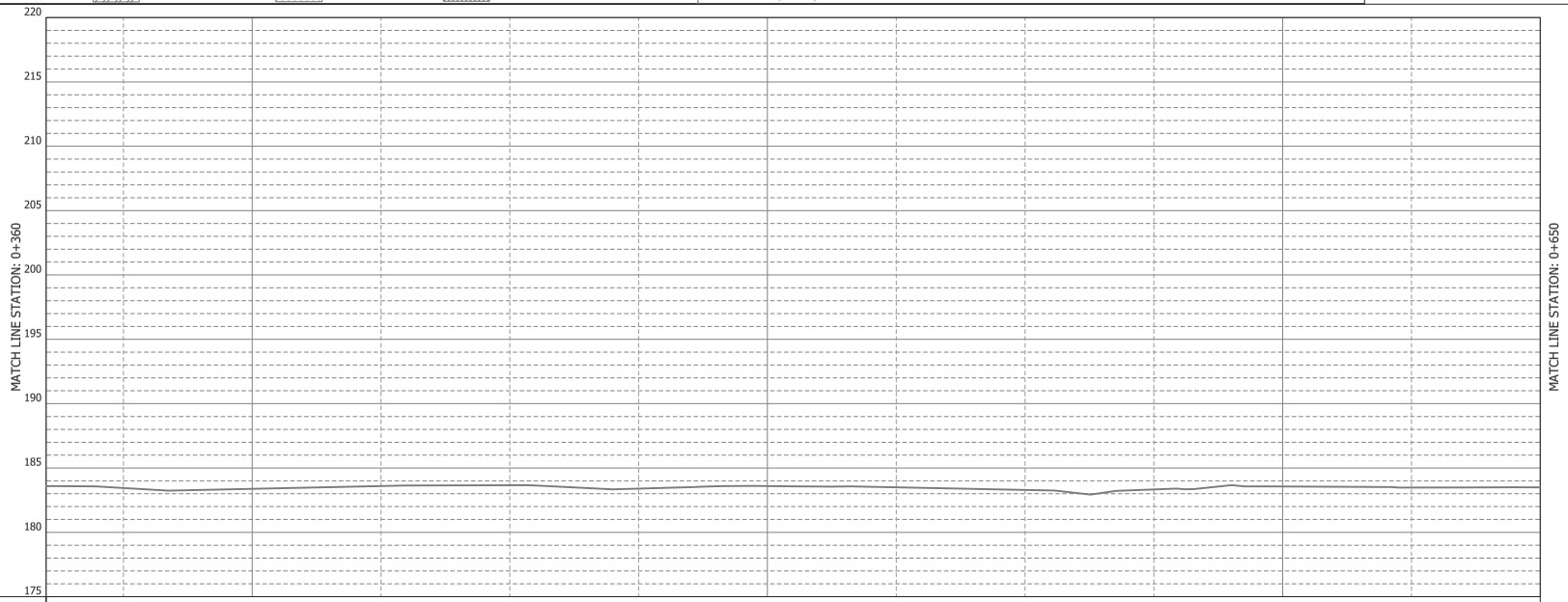


Water Level																		
Ground Elevations	184.31	184.30	184.25	184.15	184.07	184.13	184.15	184.27	184.17	183.87	183.67	183.82	183.89	183.58	183.57	183.74	183.58	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	0	11	25	50	75	100	125	150	175	200	225	250	275	300	325	350	360	
Chainage	**0+000**	+11	6 +25	+50	+75	**0+100**	+25	+50	+75	**0+200**	+25	+50	+75	**0+300**	+25	+50	**0+360**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-001
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level														
Ground Elevations	183.58	183.45	183.38	183.59	183.66	183.40	183.58	183.50	183.29	183.33	183.36	183.57	183.48	183.49
Pipe Center Level														
Pipeline (Diameter)														
Cumulative Distance	360	375	400	425	450	475	500	525	550	575	583	600	625	650
Chainage	**0+360**	+75	**0+400**	+25	+50	+75	**0+500**	+25	+50	+75	+83	**0+600**	+25	**0+650**

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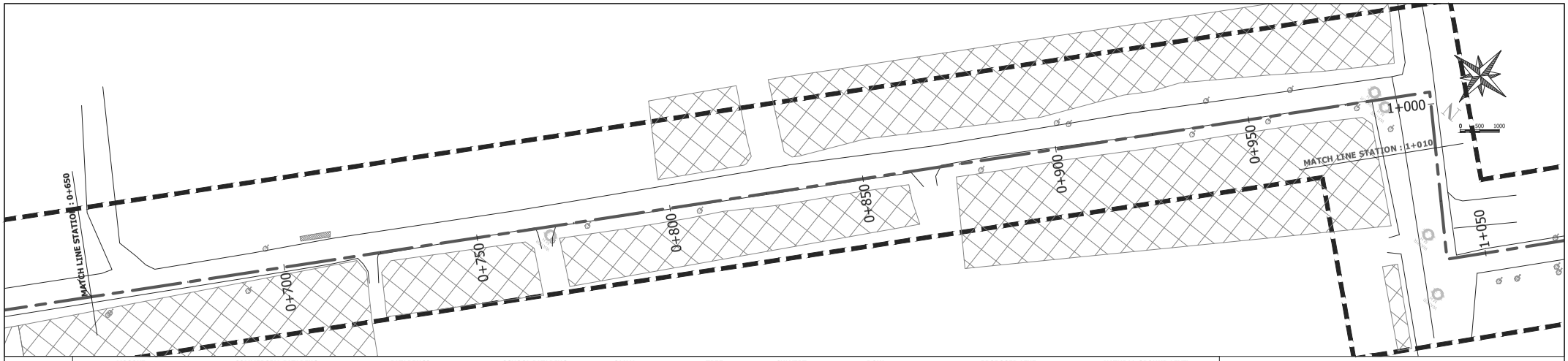
PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-002

SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

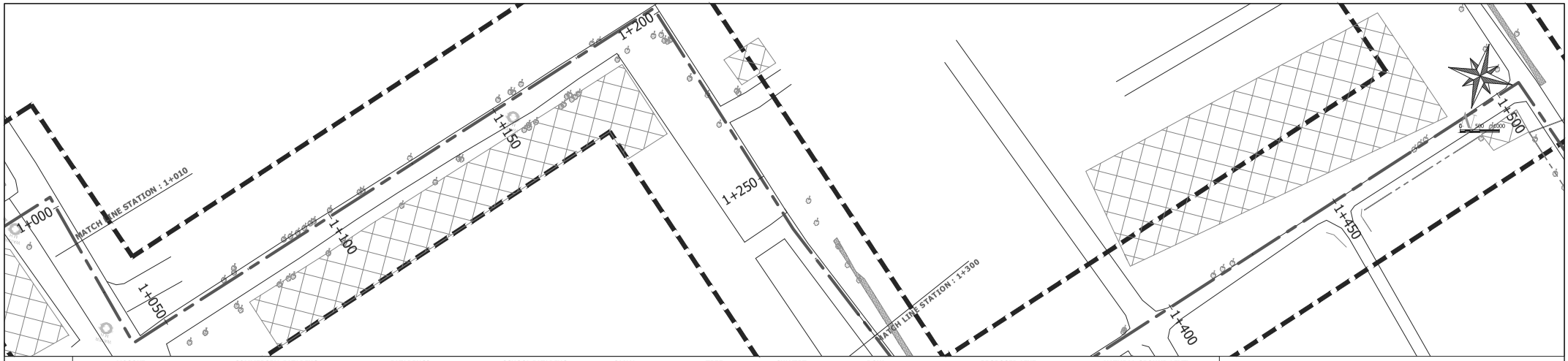
Water Level																
Ground Elevations	183.49	183.49	183.52	183.57	183.65	183.71	183.77	183.82	183.87	183.98	183.95	183.96	183.96	183.96	184.02	183.98
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	650	675	700	725	750	775	800	825	850	875	900	925	950	975	1000	1010
Chainage	**0+650**	+75	**0+700**	+25	+50	+75	**0+800**	+25	+50	+75	**0+900**	+25	+50	+75	**1+000**	**1+010**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

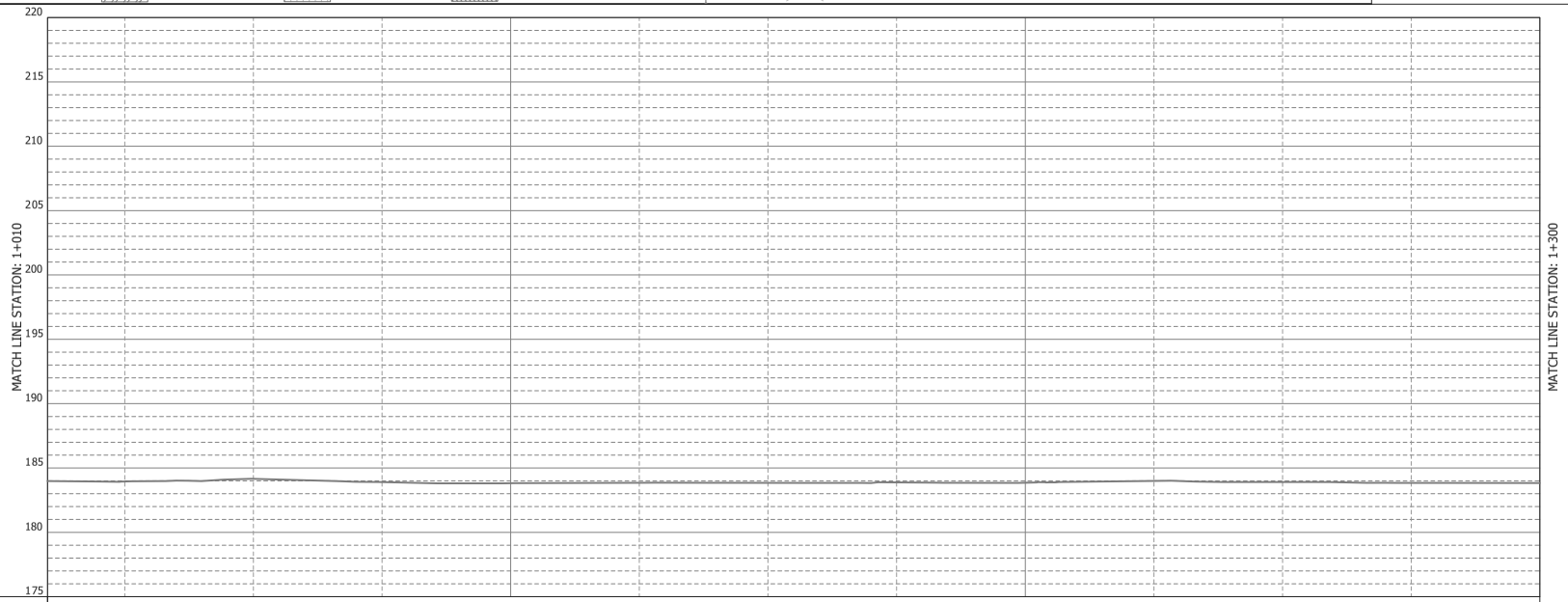
DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-003

SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



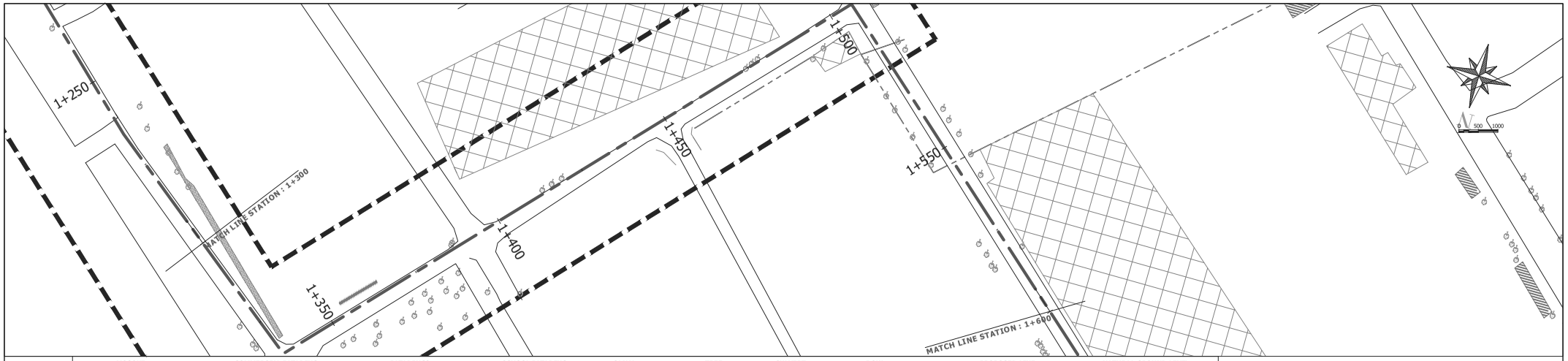
Water Level													
Ground Elevations	183.98	183.95	184.16	183.91	183.82	183.85	183.84	183.88	183.85	183.99	183.91	183.84	183.83
Pipe Center Level													
Pipeline (Diameter)													
Cumulative Distance	1010	1025	1050	1075	1100	1125	1150	1175	1200	1225	1250	1275	1300
Chainage	**1+010**	+25	+50	+75	**1+100**	+25	+50	+75	**1+200**	+25	+50	+75	**1+300**

PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

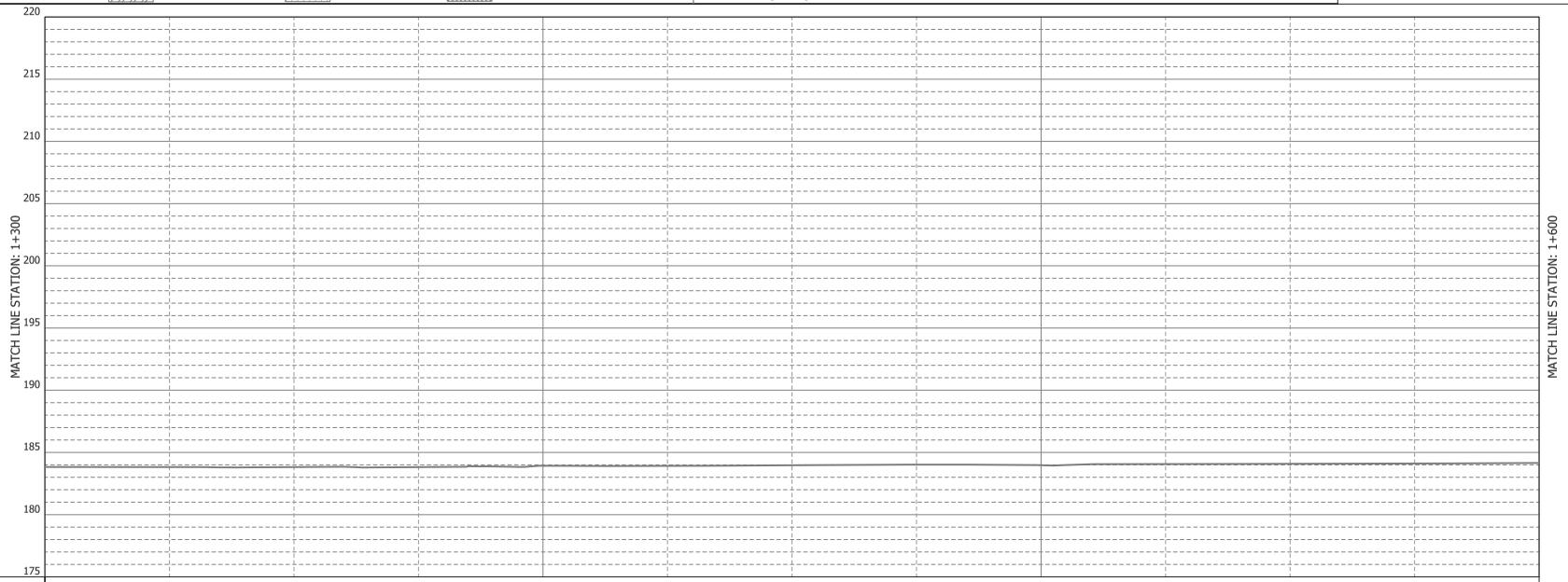
DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-004

SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level													
Ground Elevations	183.83	183.83	183.82	183.82	183.93	183.92	183.97	184.01	183.97	184.07	184.09	184.11	184.16
Pipe Center Level													
Pipeline (Diameter)													
Cumulative Distance	1300	1325	1350	1375	1400	1425	1450	1475	1500	1525	1550	1575	1600
Chainage	**1+300**	+25	+50	+75	**1+400**	+25	+50	+75	**1+500**	+25	+50	+75	**1+600**

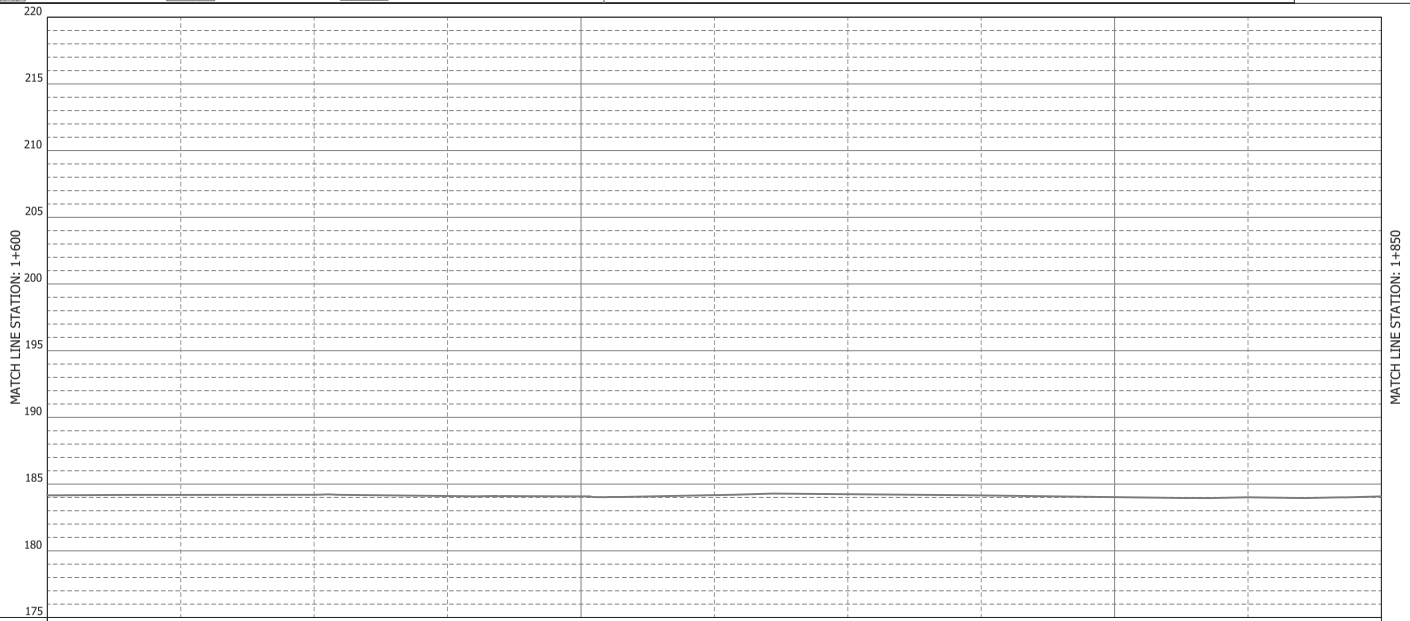
PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-005

SCALE: **L:1/1000 , H: 1/400**

LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



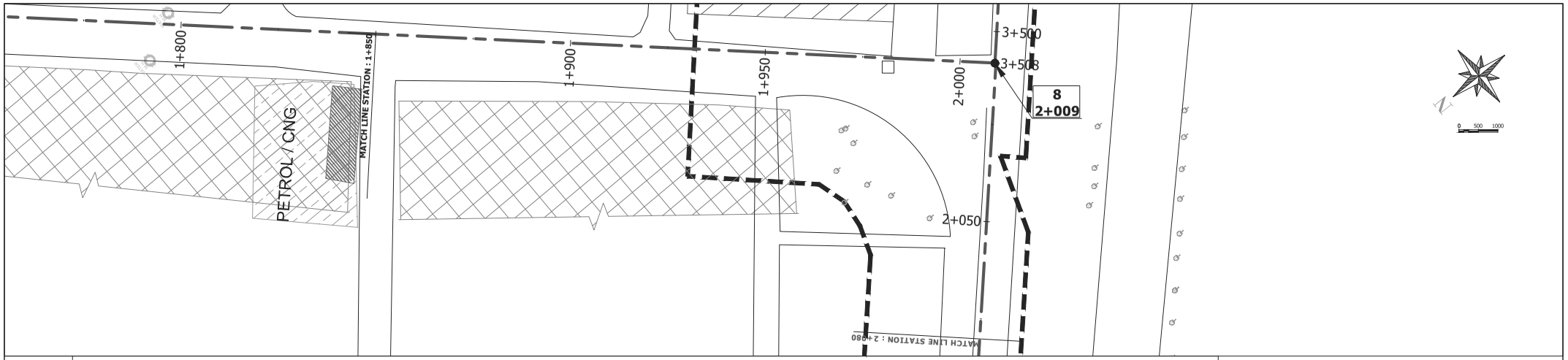
Water Level											
Ground Elevations	184.16	184.19	184.19	184.10	184.08	184.17	184.24	184.15	184.02	184.01	184.08
Pipe Center Level											
Pipeline (Diameter)											
Cumulative Distance	1600	1625	1650	1675	1700	1725	1750	1775	1800	1825	1850
Chainage	**1+600**	+25	+50	+75	**1+700**	+25	+50	+75	**1+800**	+25	**1+850**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

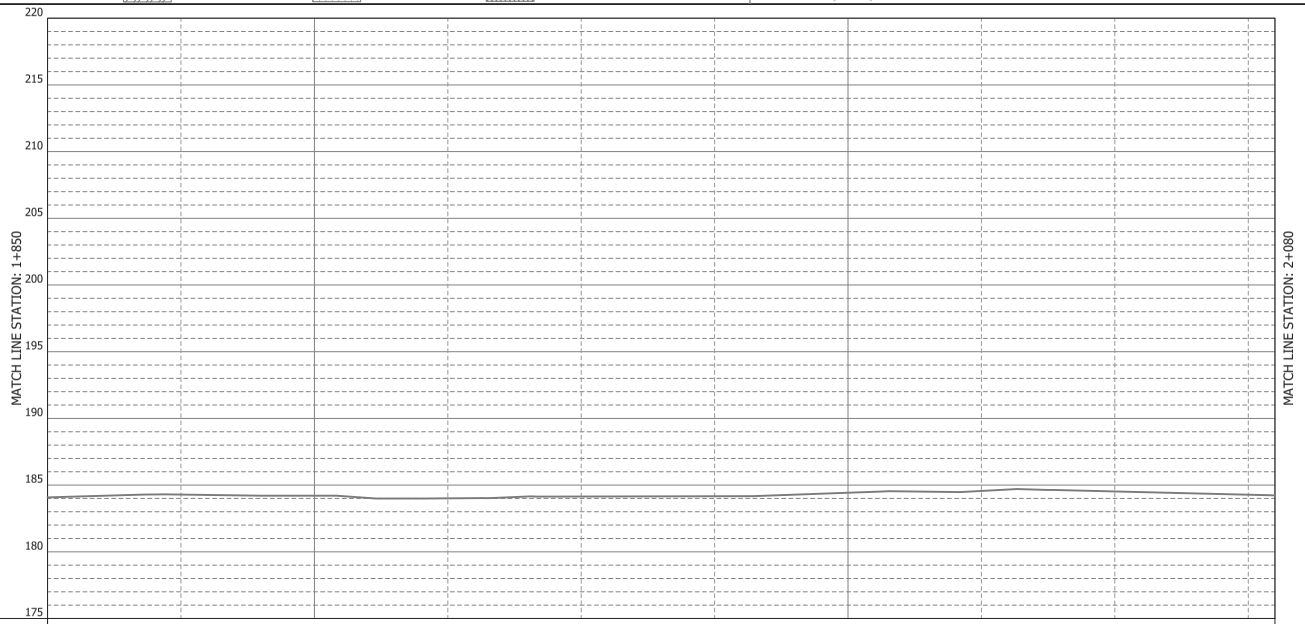
DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-006

SCALE: **L:1/1000 , H: 1/400**

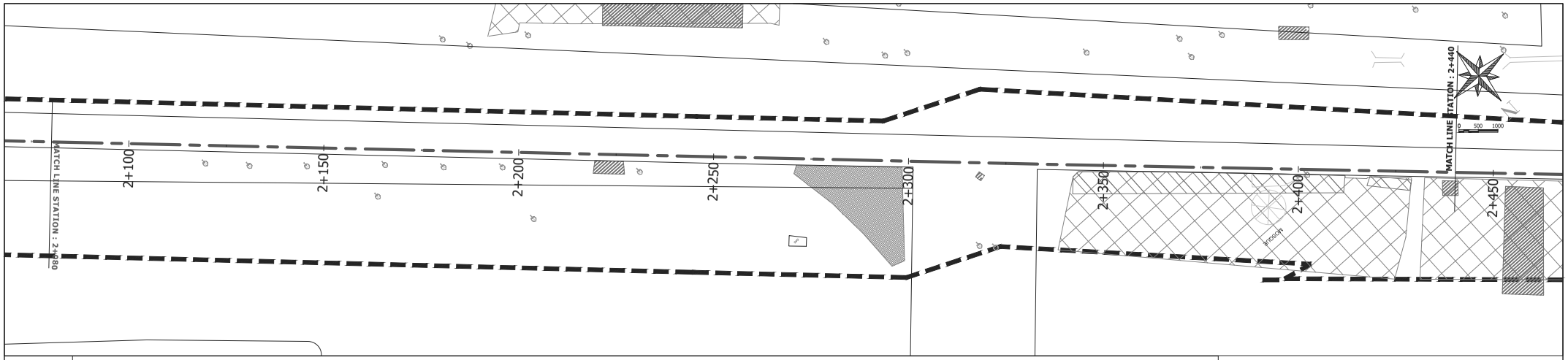


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

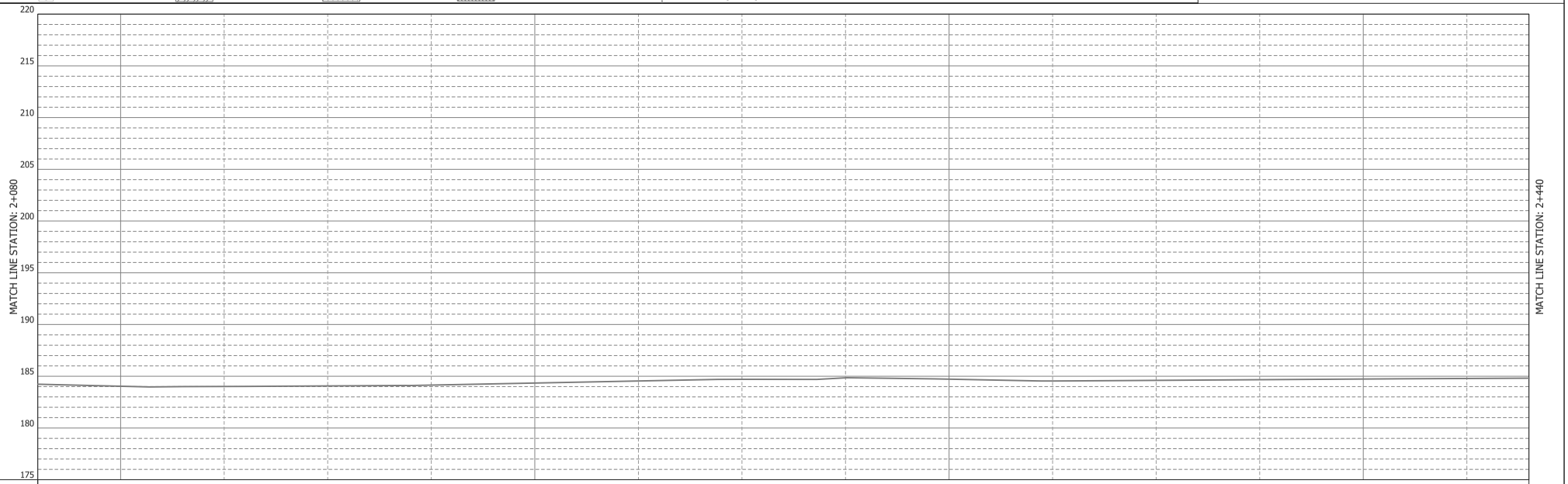


Water Level												
Ground Elevations	184.08	184.29	184.20	184.01	184.14	184.17	184.42	184.53	184.56	184.52	184.28	184.23
Pipe Center Level												
Pipeline (Diameter)												
Cumulative Distance	1850	1875	1900	1925	1950	1975	2000	2009	2025	2050	2075	2080
Chainage	**1+850**	+75	**1+900**	+25	+50	+75	**2+000**	+09	8 +25	+50	+75	**2+080**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-007
		SCALE: **L:1/1000 , H: 1/400**

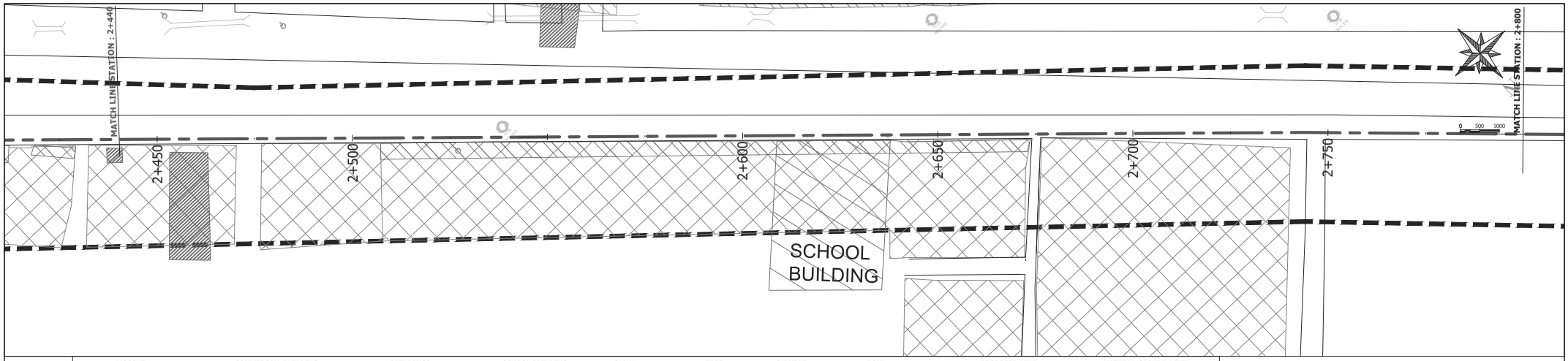


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																
Ground Elevations	184.23	184.04	184.01	184.07	184.15	184.35	184.54	184.70	184.85	184.72	184.54	184.61	184.67	184.73	184.79	184.82
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	2080	2100	2125	2150	2175	2200	2225	2250	2275	2300	2325	2350	2375	2400	2425	2440
Chainage	**2+080**	**2+100**	+25	+50	+75	**2+200**	+25	+50	+75	**2+300**	+25	+50	+75	**2+400**	+25	**2+440**

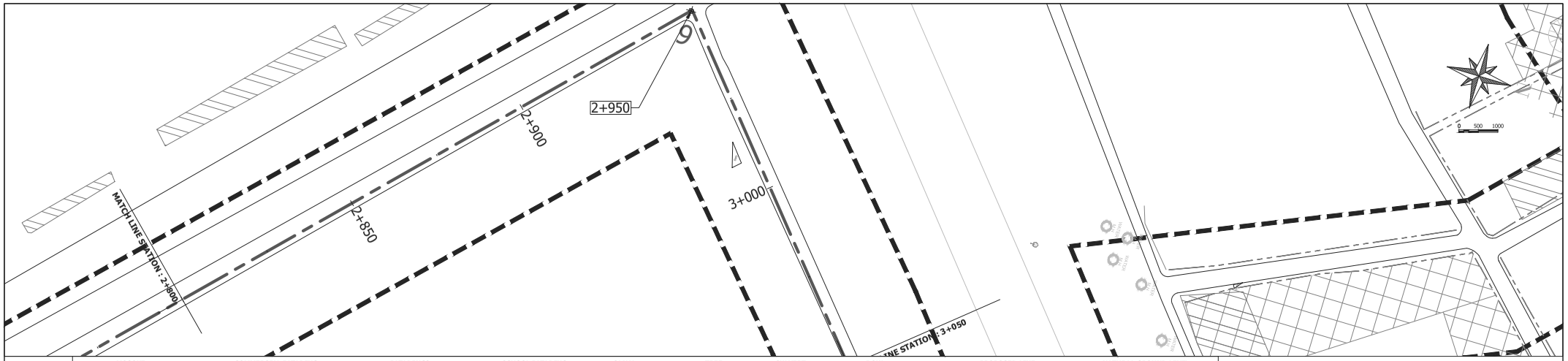
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-008
		SCALE: **L:1/1000 , H: 1/400**



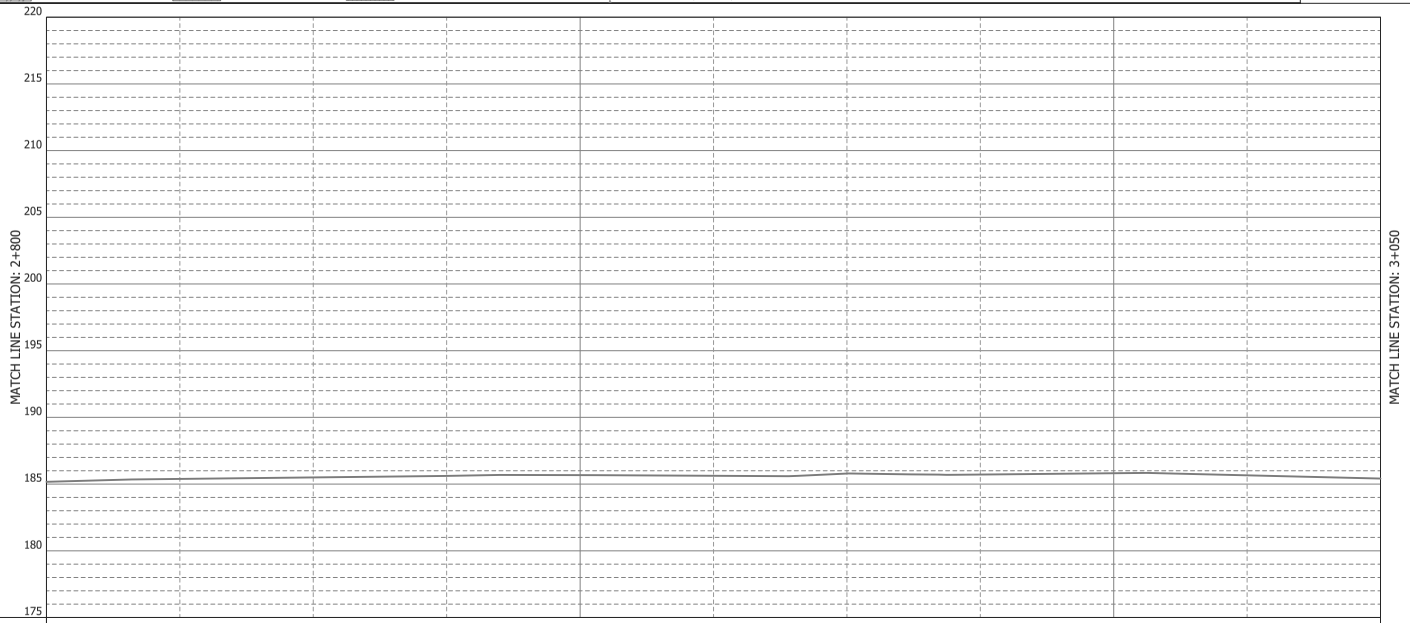
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																
Ground Elevations	184.82	184.84	184.93	185.02	185.10	185.18	185.26	185.26	185.24	185.24	185.23	185.21	185.17	185.19	185.14	185.17
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	2440	2450	2475	2500	2525	2550	2575	2600	2625	2650	2675	2700	2725	2750	2775	2800
Chainage	**2+440**	+50	+75	**2+500**	+25	+50	+75	**2+600**	+25	+50	+75	**2+700**	+25	+50	+75	**2+800**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-009
		SCALE: **L:1/1000 , H: 1/400**

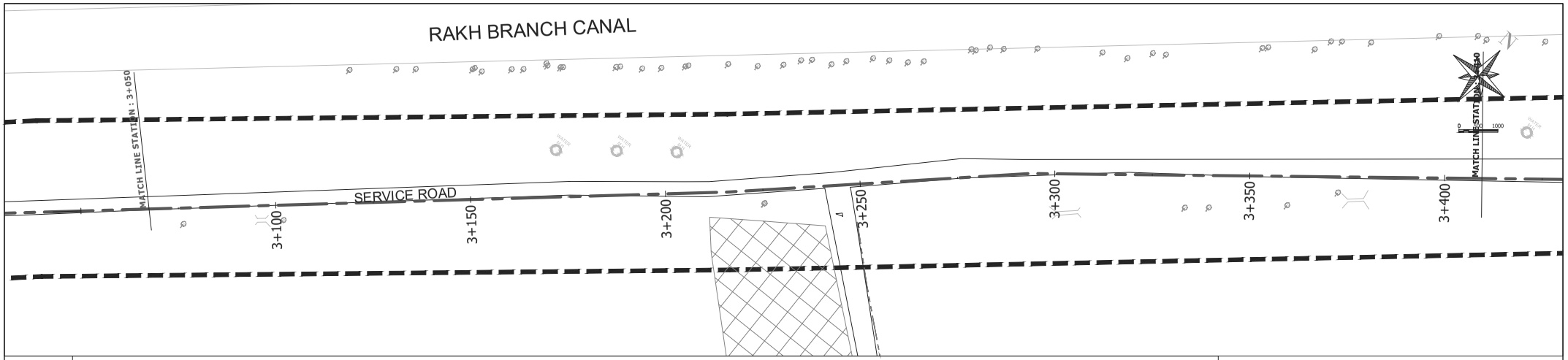


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

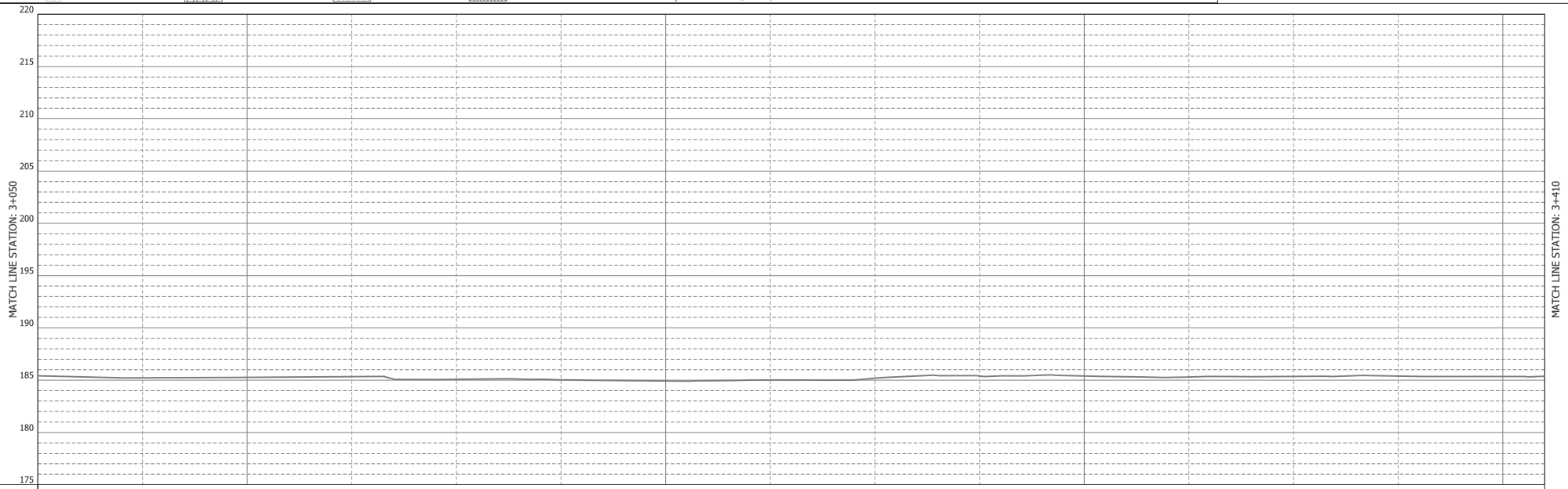


Water Level											
Ground Elevations	185.17	185.38	185.50	185.61	185.67	185.62	185.79	185.71	185.82	185.66	185.41
Pipe Center Level											
Pipeline (Diameter)											
Cumulative Distance	2800	2825	2850	2875	2900	2925	2950	2975	3000	3025	3050
Chainage	**2+800**	+25	+50	+75	**2+900**	+25	+50	9 +75	**3+000**	+25	**3+050**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-010
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



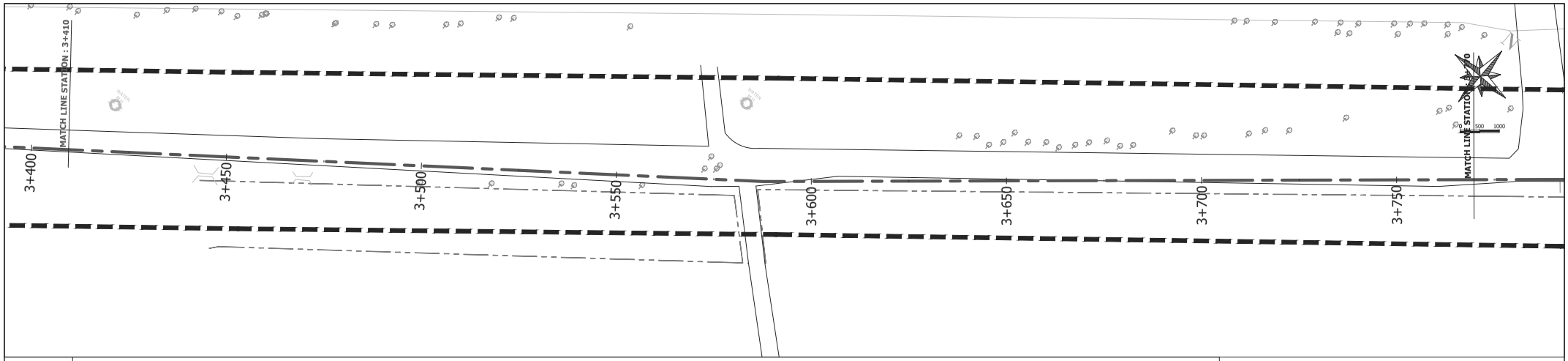
Water Level																
Ground Elevations	185.41	185.22	185.26	185.33	185.08	185.03	184.92	185.01	185.18	185.40	185.40	185.30	185.35	185.39	185.35	185.37
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	3050	3075	3100	3125	3150	3175	3200	3225	3250	3275	3300	3325	3350	3375	3400	3410
Chainage	**3+050**	+75	**3+100**	+25	+50	+75	**3+200**	+25	+50	+75	**3+300**	+25	+50	+75	**3+400**	**3+410**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

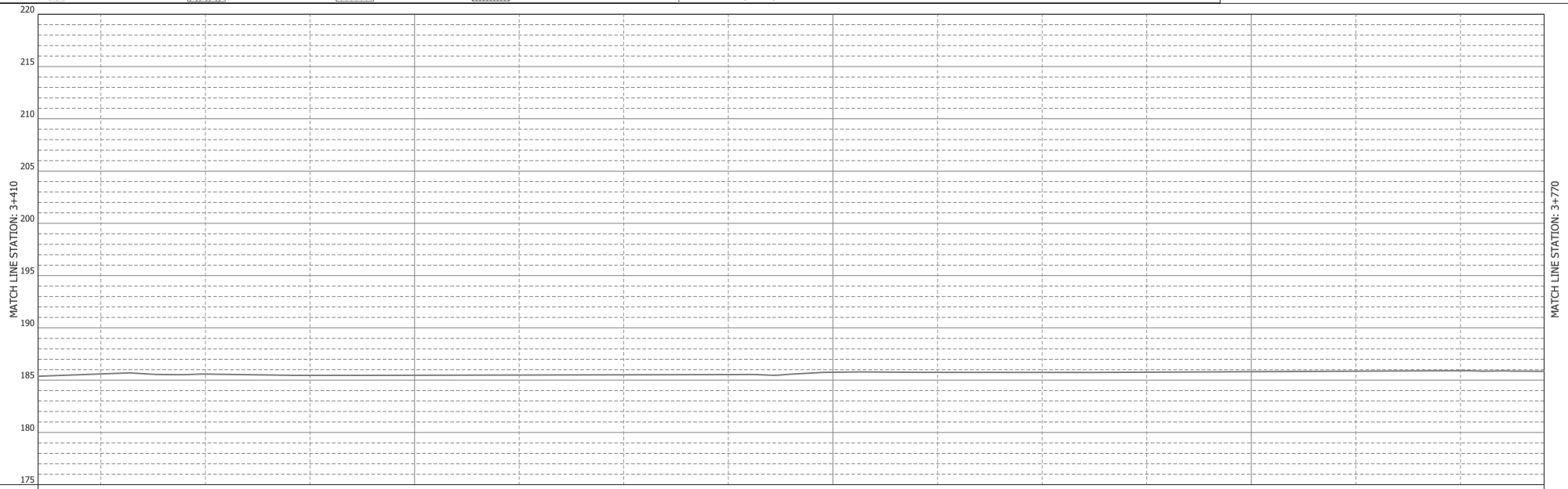
DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-011

SCALE: **L:1/1000 , H: 1/400**

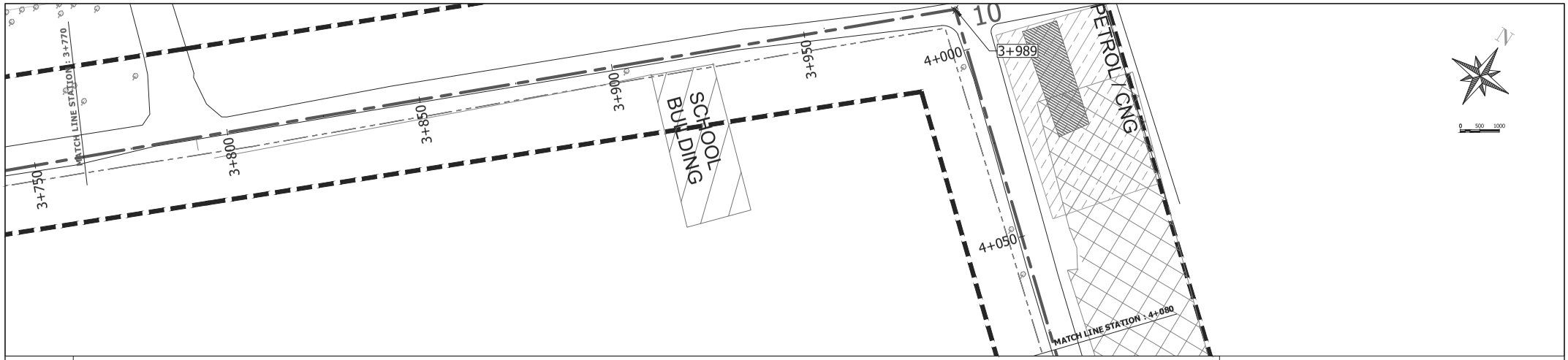


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

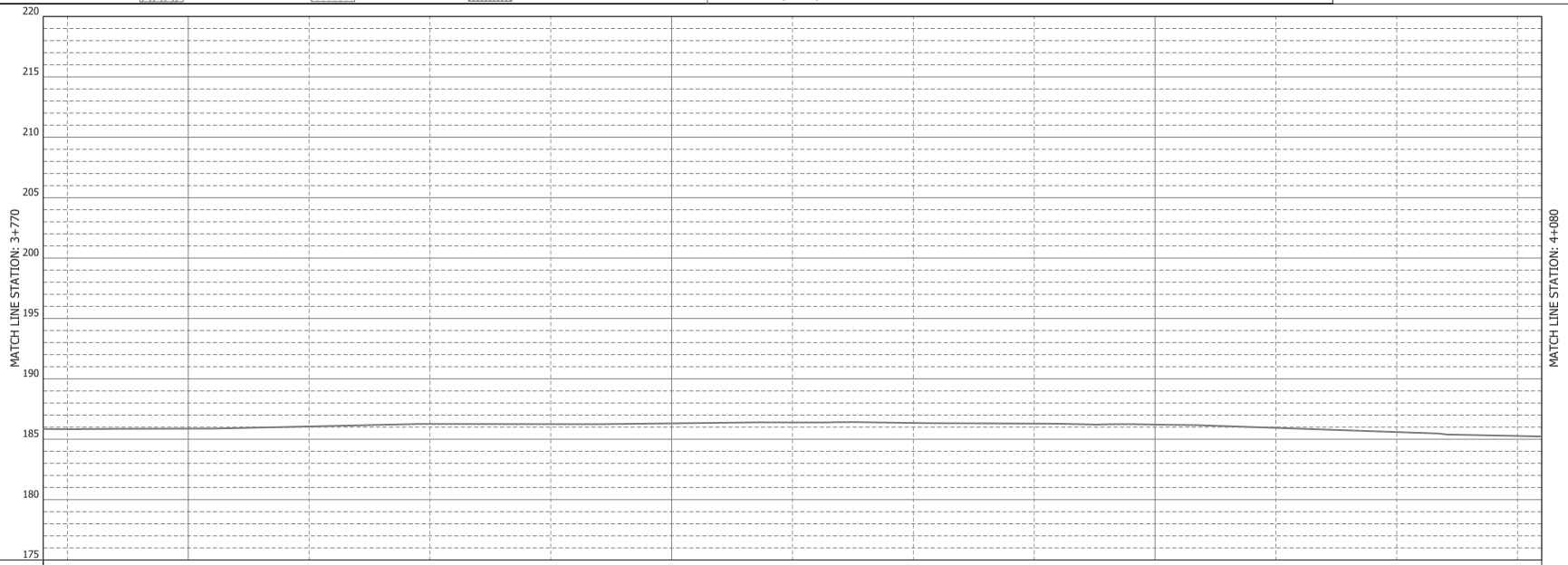


Water Level																
Ground Elevations	185.37	185.59	185.58	185.45	185.46	185.49	185.51	185.53	185.75	185.74	185.74	185.76	185.81	185.86	185.90	185.85
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	3410	3425	3450	3475	3500	3525	3550	3575	3600	3625	3650	3675	3700	3725	3750	3770
Chainage	**3+410**	+25	+50	+75	**3+500**	+25	+50	+75	**3+600**	+25	+50	+75	**3+700**	+25	+50	**3+770**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	DRAWING No: WS-DZ-II-012	SCALE: **L:1/1000 , H: 1/400**

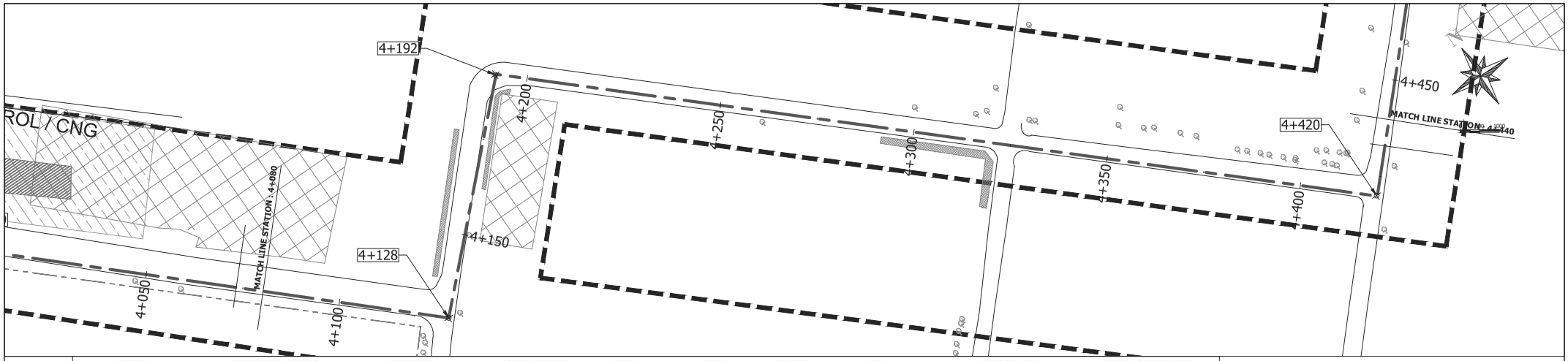


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

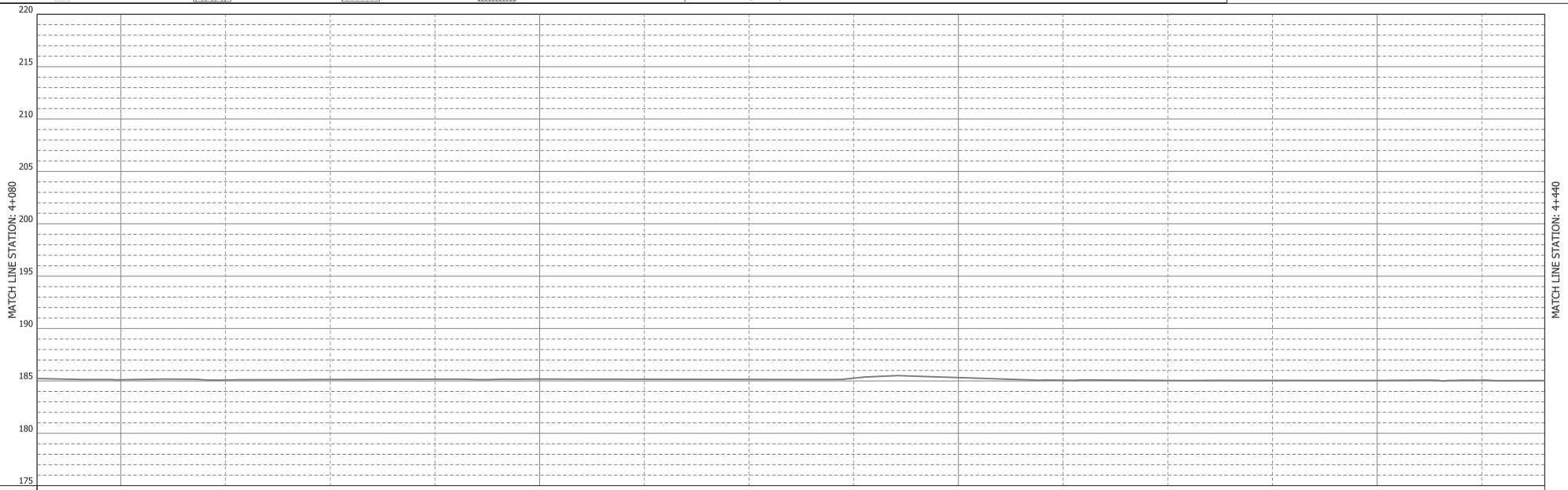


Water Level																			
Ground Elevations	186.22	185.85	185.84	185.87	186.06	186.26	186.25	186.31	186.38	186.34	186.29	186.22	186.21	185.94	185.59	185.27	185.23		
Pipe Center Level																			
Pipeline (Diameter)																			
Cumulative Distance	3967	3770	3775	3800	3825	3850	3875	3900	3925	3950	3975	3989	4000	4025	4050	4075	4080		
Chainage	+197	**3+770**	+75	**3+800**	+25	+50	+75	**3+900**	+25	+50	+75	+89	10 **4+000**	+25	+50	+75	**4+080**		

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-013
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



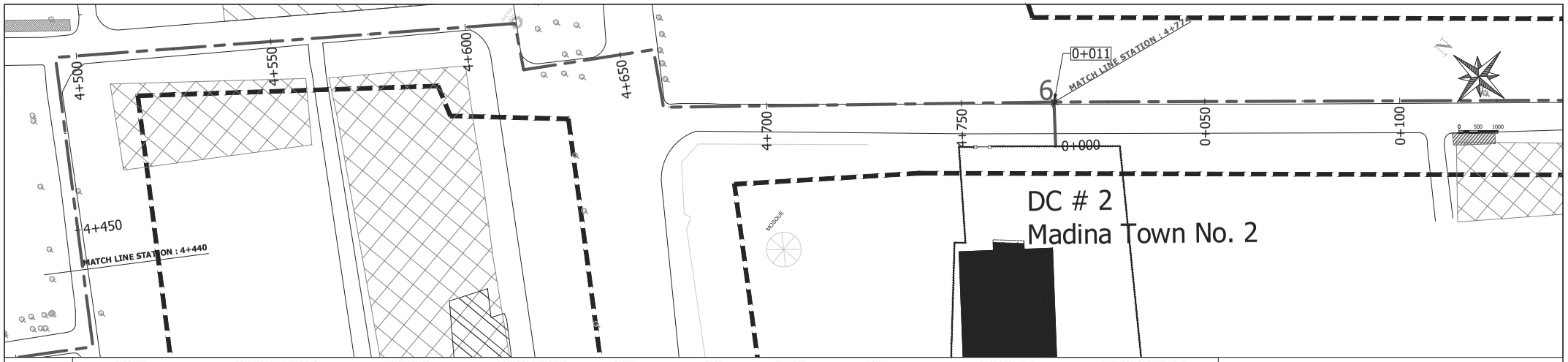
Water Level																
Ground Elevations	185.23	185.11	185.09	185.13	185.16	185.18	185.16	185.15	185.26	185.32	185.07	185.05	185.05	185.04	185.07	185.03
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	4080	4100	4125	4150	4175	4200	4225	4250	4275	4300	4325	4350	4375	4400	4425	4440
Chainage	**4+080**	**4+100**	+25	+50	+75	**4+200**	+25	+50	+75	**4+300**	+25	+50	+75	**4+400**	+25	**4+440**

PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

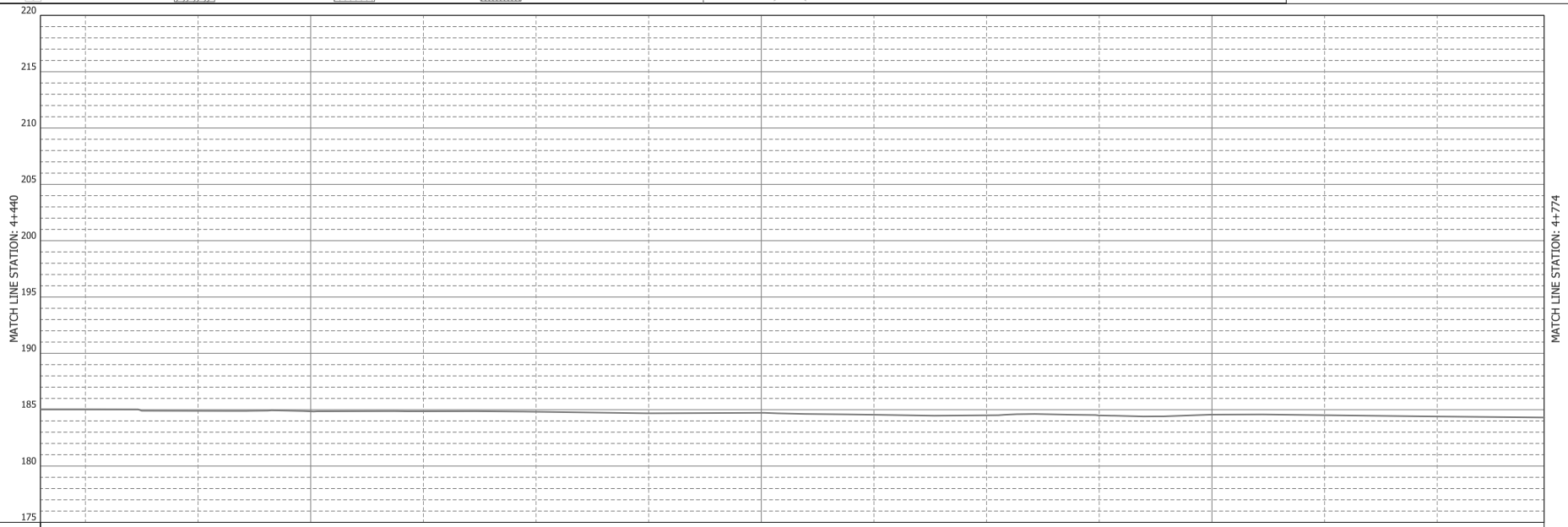
DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-014

SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level															
Ground Elevations	185.03	185.03	184.90	184.85	184.85	184.81	184.68	184.72	184.55	184.50	184.49	184.56	184.51	184.40	184.30
Pipe Center Level															
Pipeline (Diameter)															
Cumulative Distance	4440	4450	4475	4500	4525	4550	4575	4600	4625	4650	4675	4700	4725	4750	4774
Chainage	**4+440**	+50	+75	**4+500**	+25	+50	+75	**4+600**	+25	+50	+75	**4+700**	+25	+50	**4+774**

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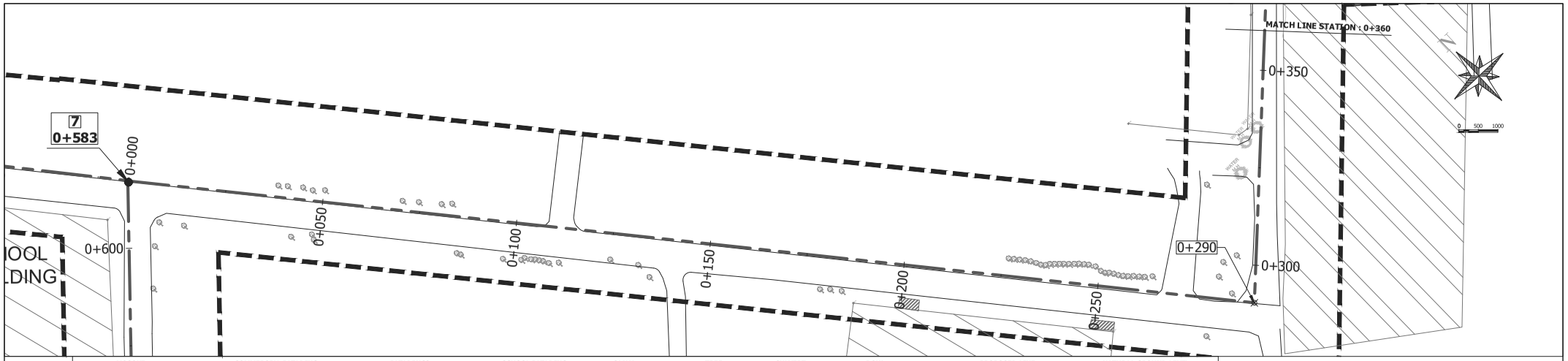
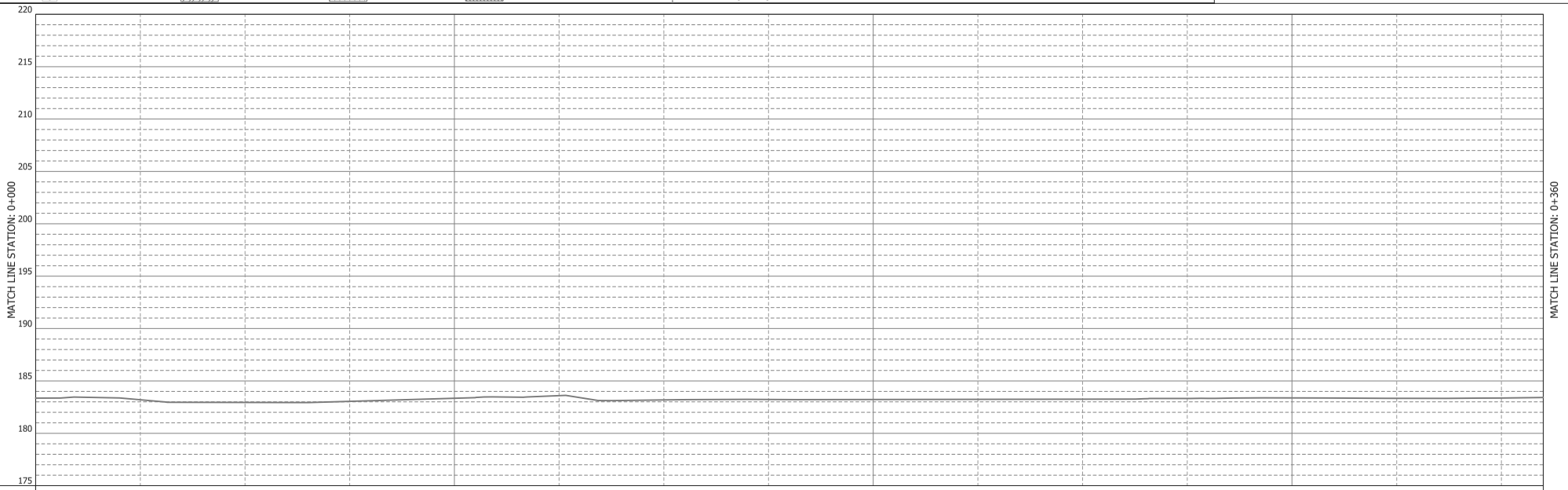
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-015
		SCALE: L:1/1000 , H: 1/400



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



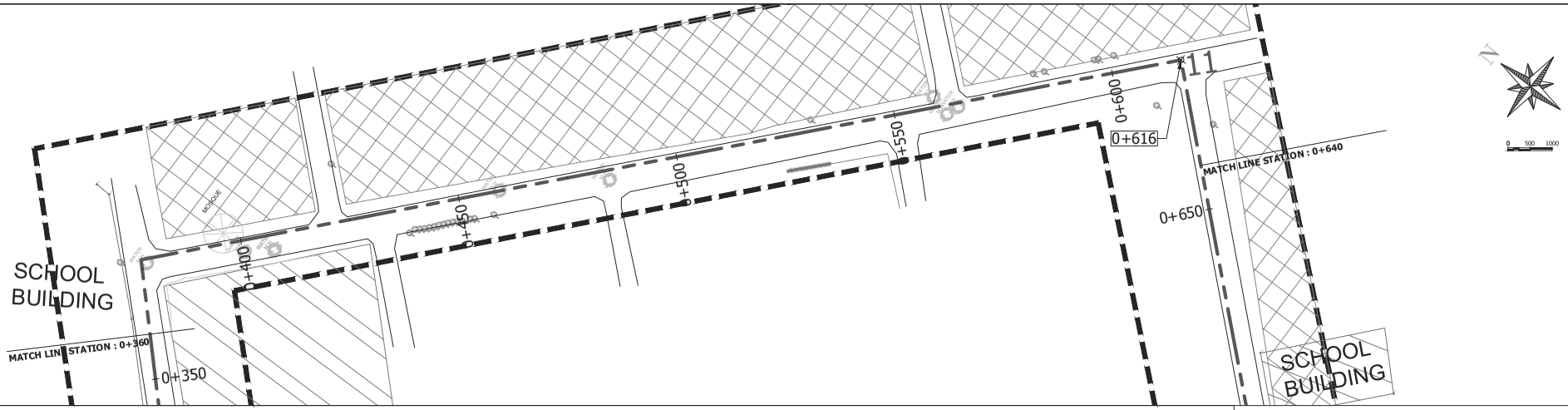
Water Level																
Ground Elevations	183.36	183.20	182.94	183.05	183.35	183.59	183.18	183.23	183.22	183.24	183.25	183.32	183.39	183.34	183.37	183.41
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	0	25	50	75	100	125	150	175	200	225	250	275	300	325	350	360
Chainage	**0+000** 0+583 7	+25	+50	+75	**0+100**	+25	+50	+75	**0+200**	+25	+50	+75	**0+300**	+25	+50	**0+360**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-016

SCALE: L:1/1000 , H: 1/400



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

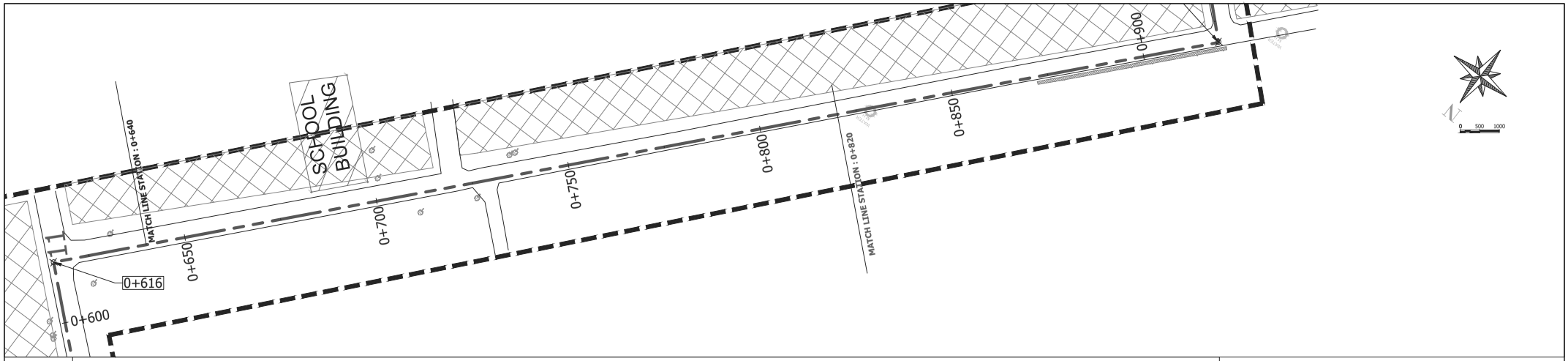
Water Level														
Ground Elevations	183.41	183.46	183.44	183.46	183.45	183.57	183.52	183.51	183.48	183.49	183.45	183.45	183.46	183.64
Pipe Center Level														
Pipeline (Diameter)														
Cumulative Distance	360	375	400	425	450	475	500	525	550	575	600	616	625	640
Chainage	**0+360**	+75	**0+400**	+25	+50	+75	**0+500**	+25	+50	+75	**0+600**	+16	11 +25	**0+640**

PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No:
WS-DZ-II-017

SCALE:
L:1/1000 , H: 1/400



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

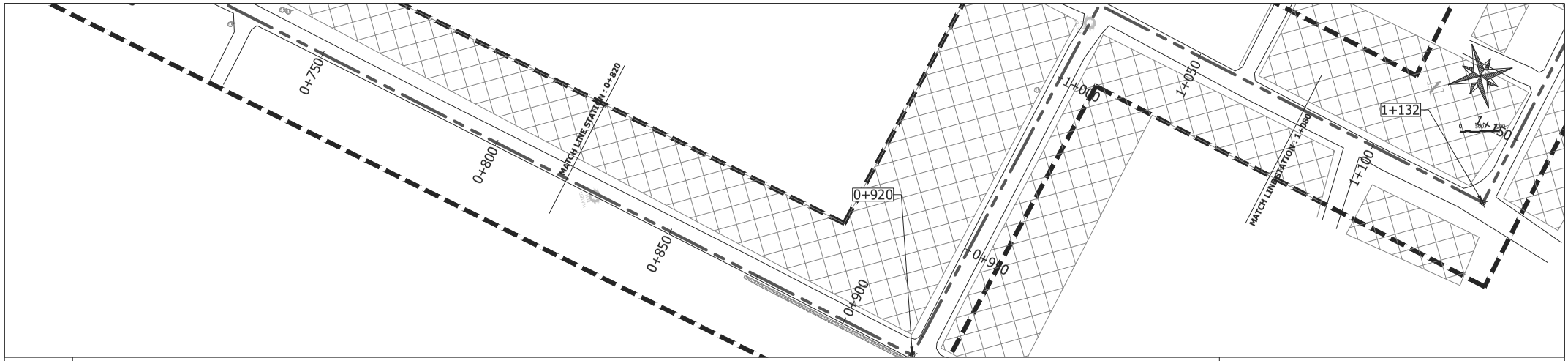
Water Level									
Ground Elevations	183.64	183.55	183.50	183.46	183.47	183.57	183.60	183.64	183.66
Pipe Center Level									
Pipeline (Diameter)									
Cumulative Distance	640	650	675	700	725	750	775	800	820
Chainage	**0+640**	+50	+75	**0+700**	+25	+50	+75	**0+800**	**0+820**

PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

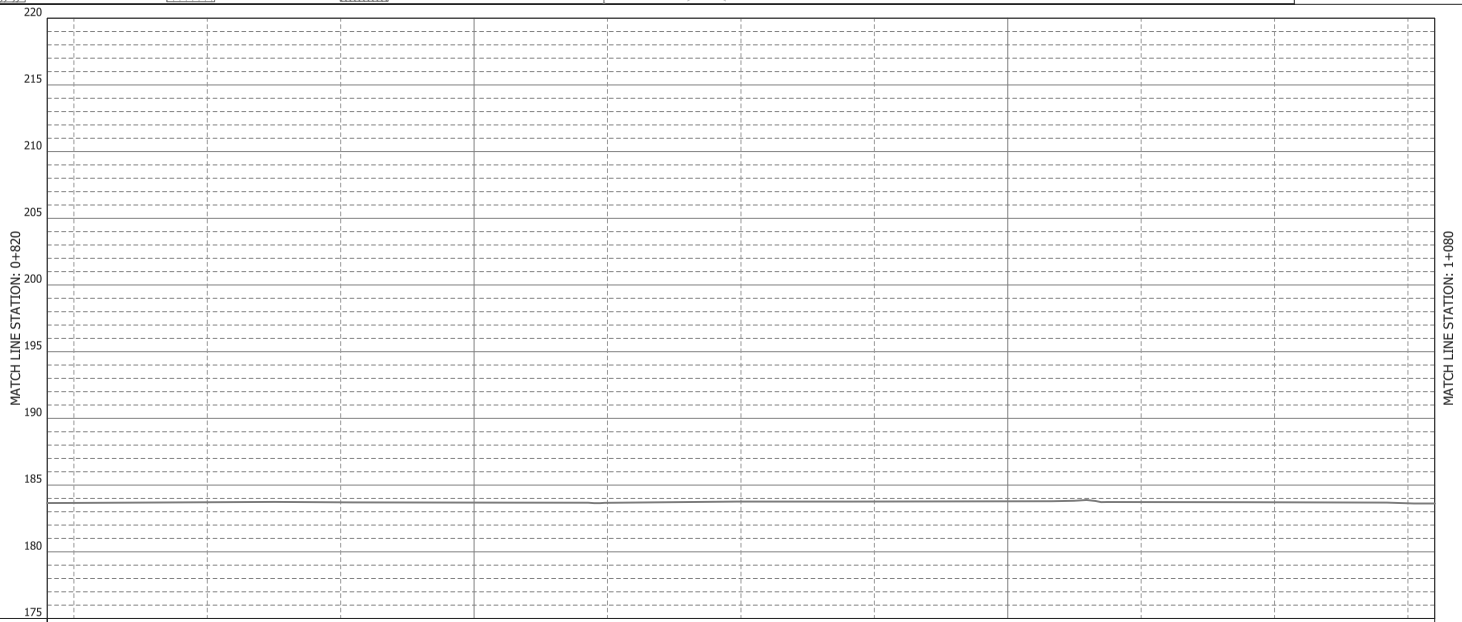
DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-018

SCALE: **L:1/1000 , H: 1/400**

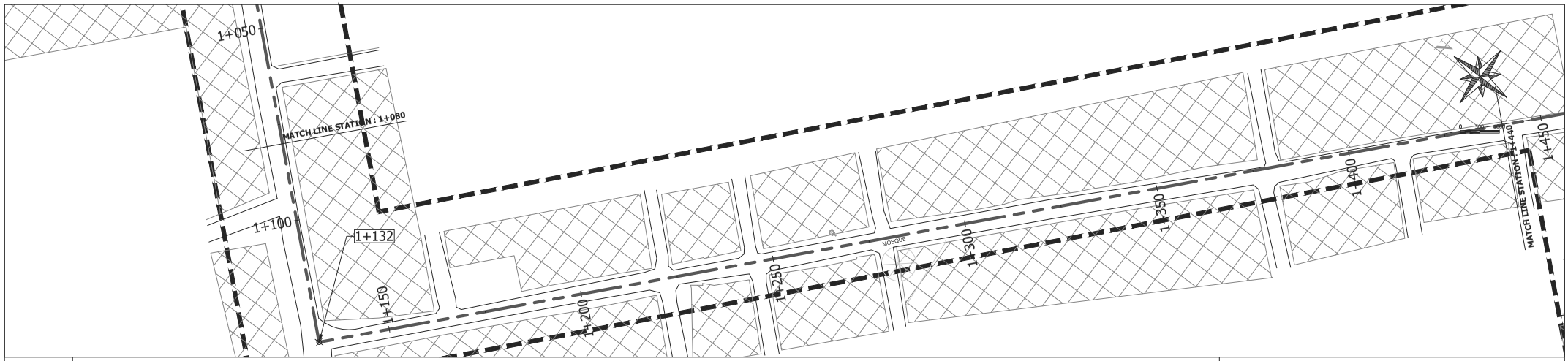


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level													
Ground Elevations	183.66	183.66	183.71	183.71	183.69	183.67	183.77	183.77	183.78	183.72	183.72	183.63	183.62
Pipe Center Level													
Pipeline (Diameter)													
Cumulative Distance	820	825	850	875	900	925	950	975	1000	1025	1050	1075	1080
Chainage	**0+820**	+25	+50	+75	**0+900**	+25	+50	+75	**1+000**	+25	+50	+75	**1+080**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-019
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

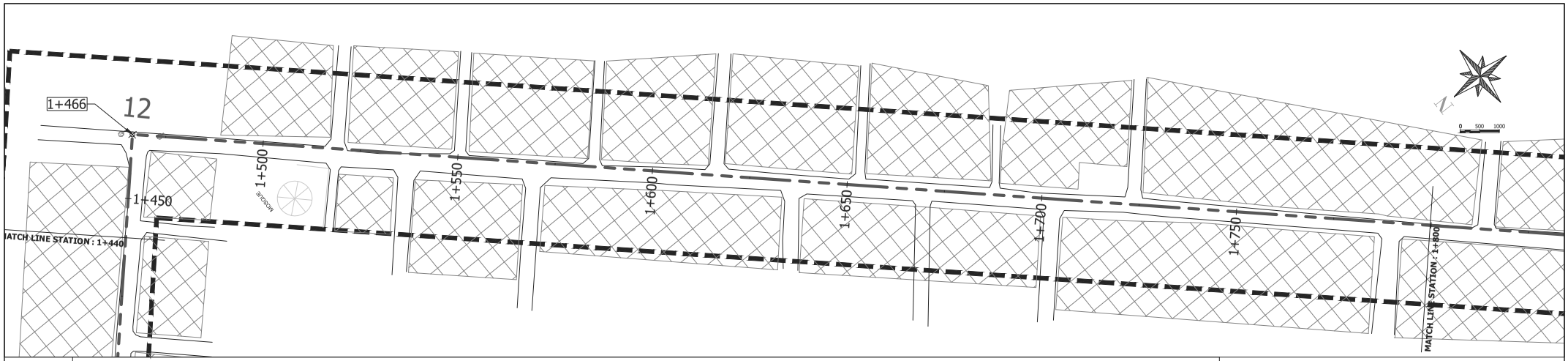
Water Level																
Ground Elevations	183.62	183.68	183.65	183.55	183.53	183.49	183.49	183.56	183.57	183.64	183.70	183.82	183.91	184.11	184.07	184.05
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1080	1100	1125	1150	1175	1200	1225	1250	1275	1300	1325	1350	1375	1400	1425	1440
Chainage	**1+080**	**1+100**	+25	+50	+75	**1+200**	+25	+50	+75	**1+300**	+25	+50	+75	**1+400**	+25	**1+440**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

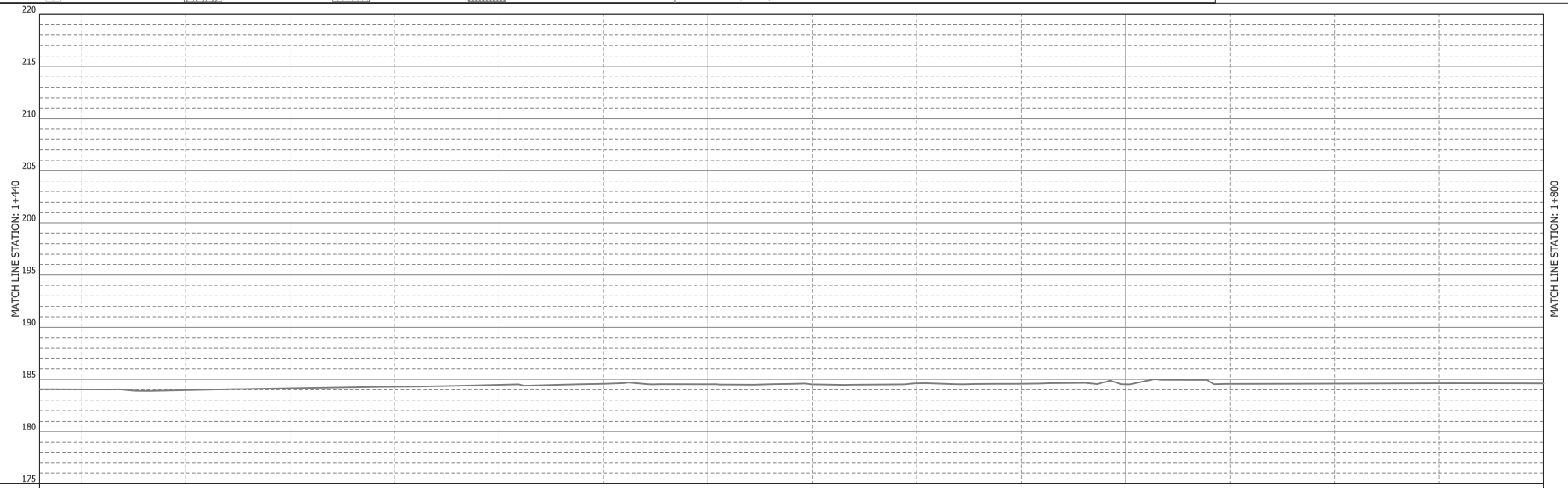
DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-020

SCALE: L:1/1000 , H: 1/400



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



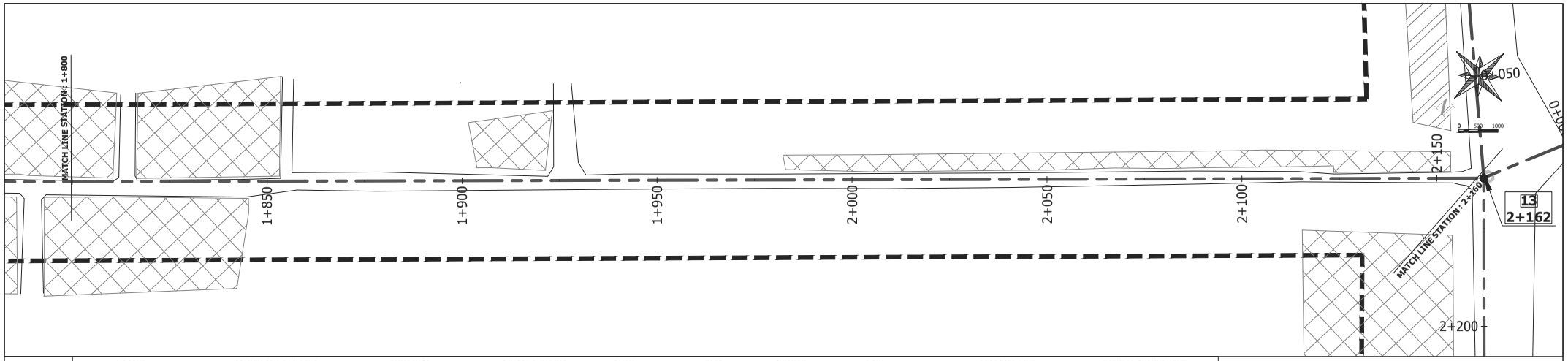
Water Level																		
Ground Elevations	184.05	184.04	183.90	183.97	184.15	184.30	184.48	184.57	184.53	184.52	184.62	184.59	184.53	184.56	184.60	184.62	184.61	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	1440	1450	1466	1475	1500	1525	1550	1575	1600	1625	1650	1675	1700	1725	1750	1775	1800	
Chainage	**1+440**	+50	+66	12 +75	**1+500**	+25	+50	+75	**1+600**	+25	+50	+75	**1+700**	+25	+50	+75	**1+800**	

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

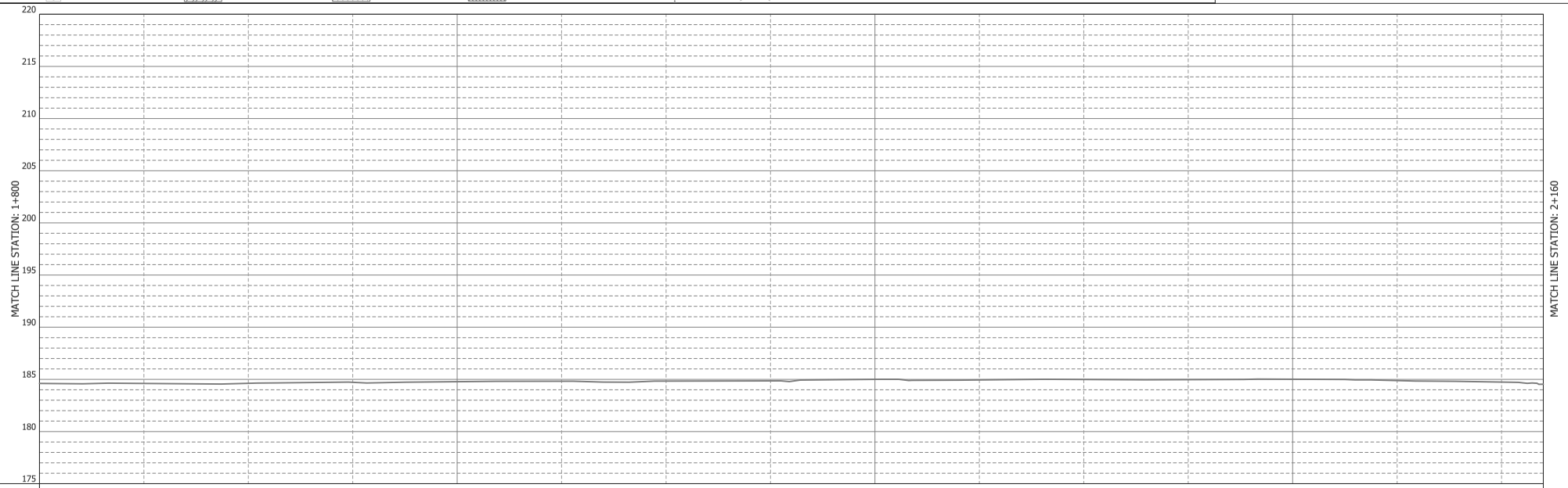
DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I

DRAWING No: WS-DZ-II-021

SCALE: L:1/1000 , H: 1/400

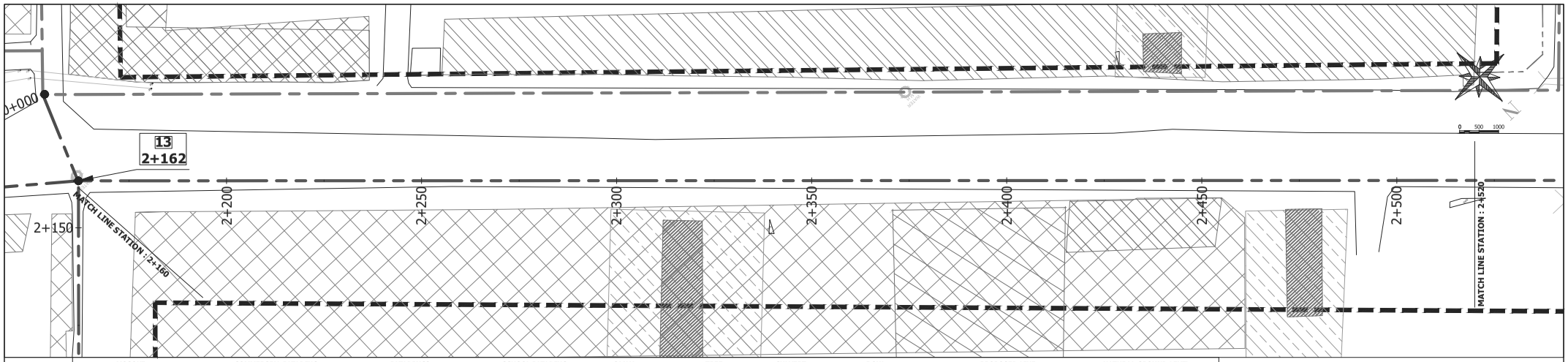


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																
Ground Elevations	184.61	184.61	184.62	184.72	184.78	184.82	184.83	184.86	185.00	184.95	184.99	184.97	185.01	184.88	184.74	184.53
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1800	1825	1850	1875	1900	1925	1950	1975	2000	2025	2050	2075	2100	2125	2150	2160
Chainage	**1+800**	+25	+50	+75	**1+900**	+25	+50	+75	**2+000**	+25	+50	+75	**2+100**	+25	+50	**2+160**

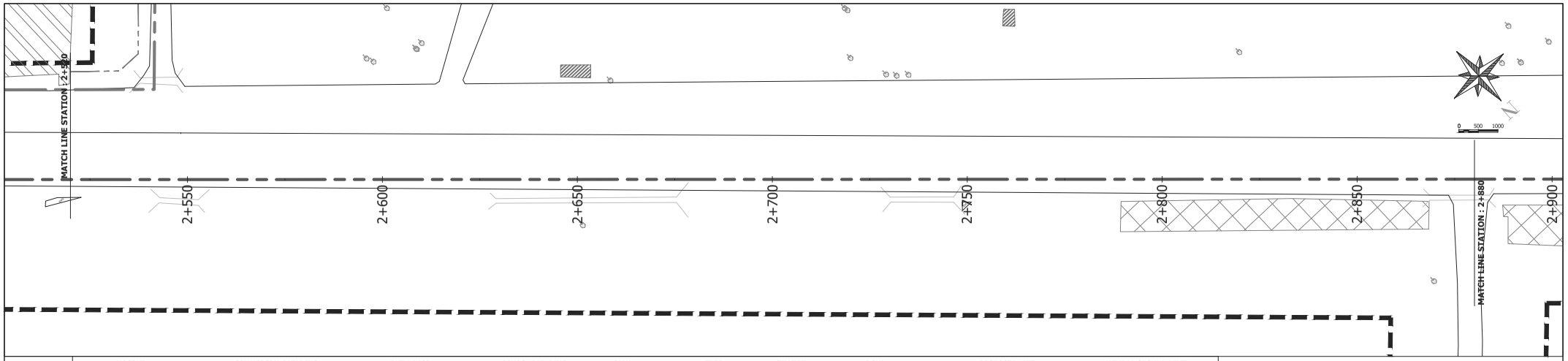
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-022
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																		
Ground Elevations	184.53	184.55	184.50	184.45	184.42	184.40	184.42	184.61	184.62	184.51	184.43	184.54	184.69	184.77	184.90	184.83	184.75	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	2160	2162	2175	2200	2225	2250	2275	2300	2325	2350	2375	2400	2425	2450	2475	2500	2520	
Chainage	**2+160**	+62	13 +75	**2+200**	+25	+50	+75	**2+300**	+25	+50	+75	**2+400**	+25	+50	+75	**2+500**	**2+520**	

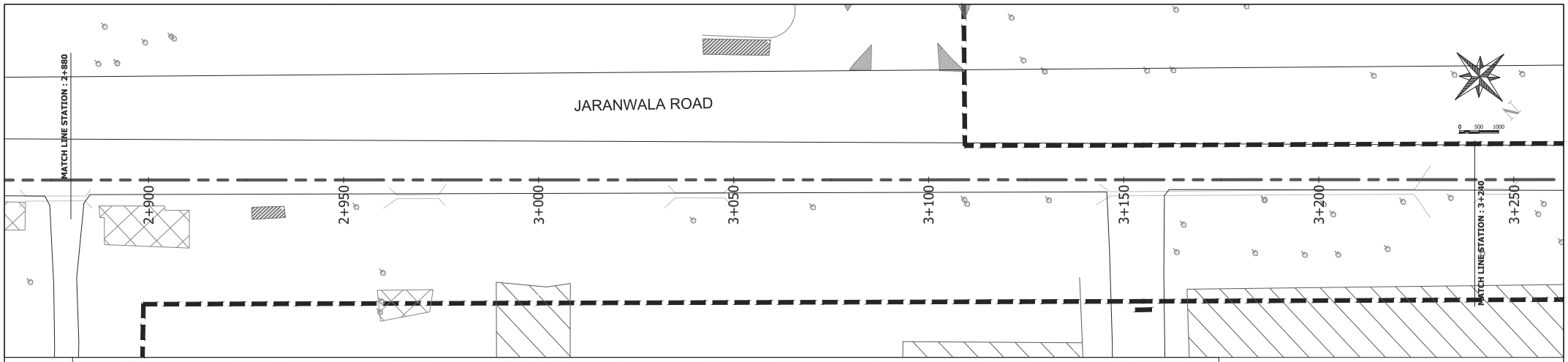
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-023
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																		
Ground Elevations	184.75	184.71	184.69	184.93	184.98	184.91	184.84	184.77	184.82	184.99	184.84	184.69	184.65	184.68	184.63	184.57	184.61	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	2520	2525	2550	2575	2600	2625	2650	2675	2700	2725	2750	2775	2800	2825	2850	2875	2880	
Chainage	**2+520**	+25	+50	+75	**2+600**	+25	+50	+75	**2+700**	+25	+50	+75	**2+800**	+25	+50	+75	**2+880**	

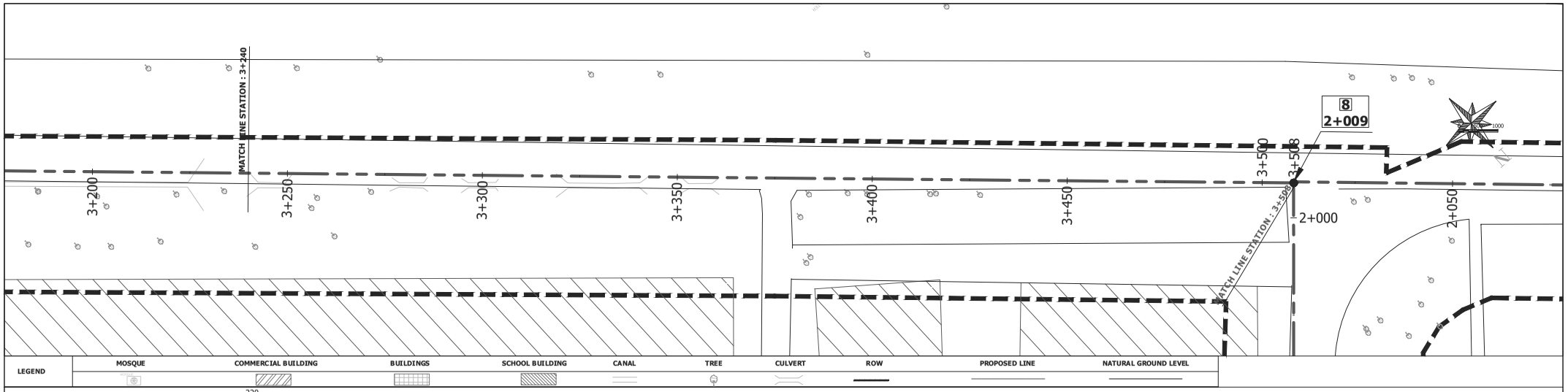
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-024
		SCALE: **L:1/1000 , H: 1/400**

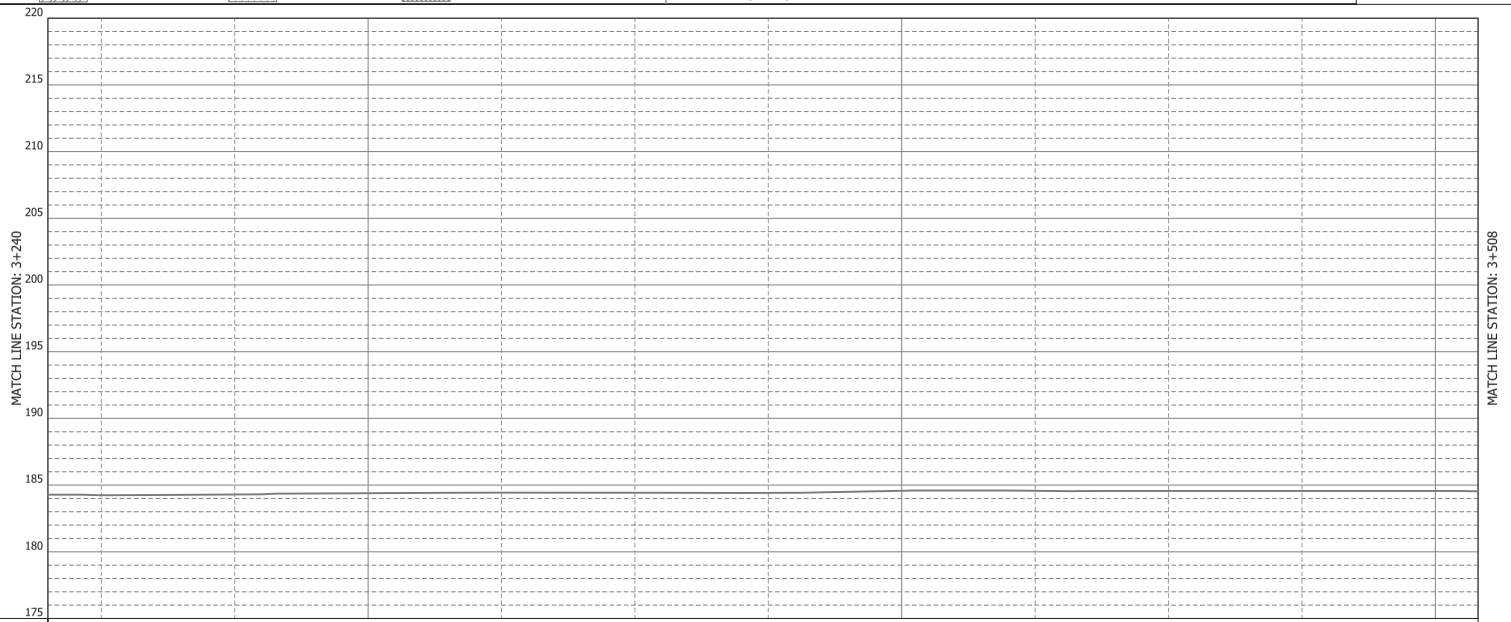


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																
Ground Elevations	184.61	184.60	184.51	184.71	184.88	184.74	184.66	184.58	184.50	184.42	184.53	184.31	184.29	184.28	184.27	184.28
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	2880	2900	2925	2950	2975	3000	3025	3050	3075	3100	3125	3150	3175	3200	3225	3240
Chainage	**2+880**	**2+900**	+25	+50	+75	**3+000**	+25	+50	+75	**3+100**	+25	+50	+75	**3+200**	+25	**3+240**

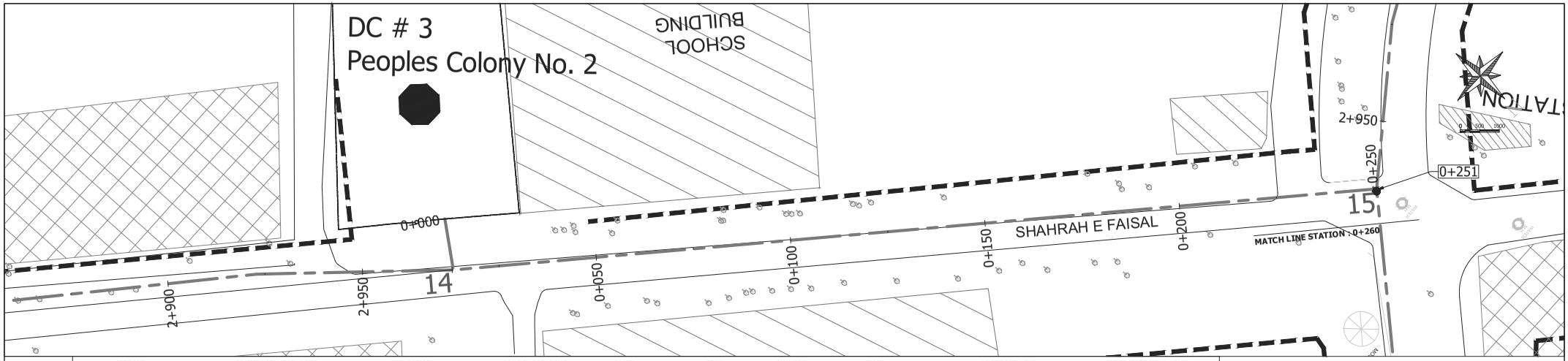
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	WS-DZ-II-025
		SCALE: **L:1/1000 , H: 1/400**



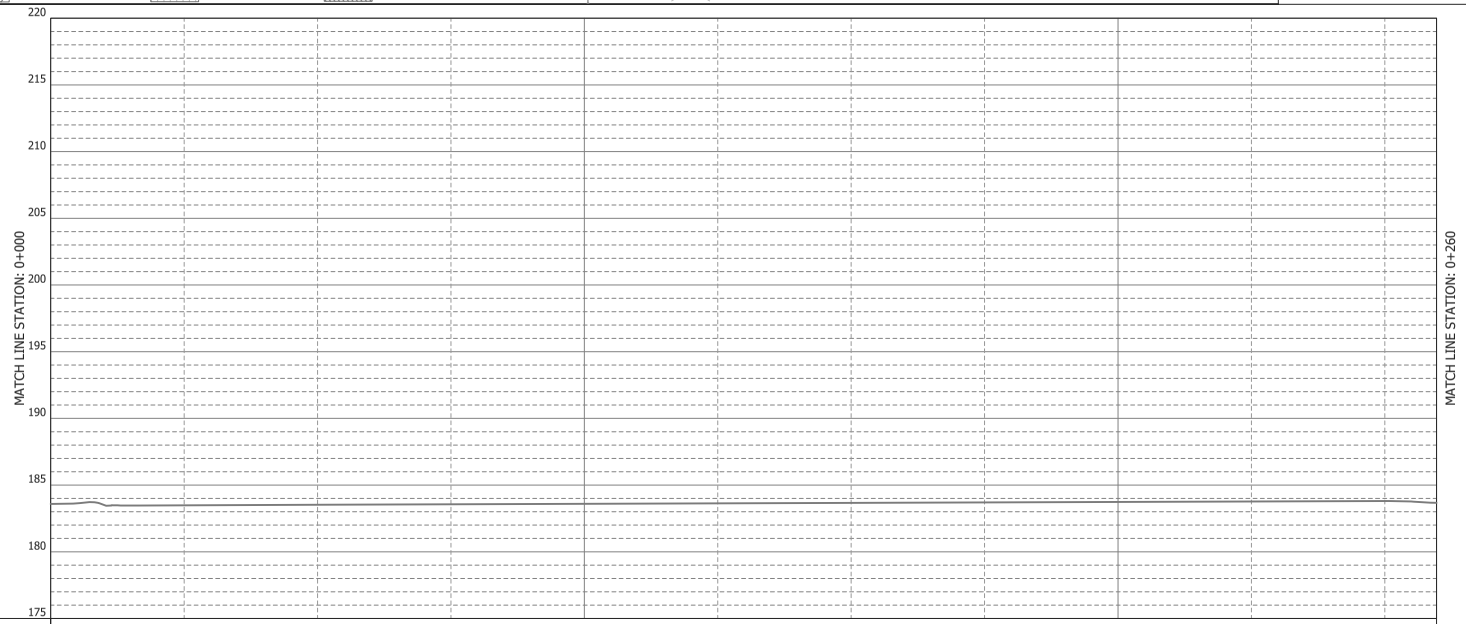


Water Level													
Ground Elevations	184.28	184.24	184.29	184.39	184.44	184.42	184.42	184.57	184.57	184.56	184.56	184.56	184.53
Pipe Center Level													
Pipeline (Diameter)													
Cumulative Distance	3240	3250	3275	3300	3325	3350	3375	3400	3425	3450	3475	3500	3508
Chainage	**3+240**	+50	+75	**3+300**	+25	+50	+75	**3+400**	+25	+50	+75	**3+500**	**3+508** 2+009 8

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE I	DRAWING No: WS-DZ-II-026	SCALE: **L:1/1000 , H: 1/400**

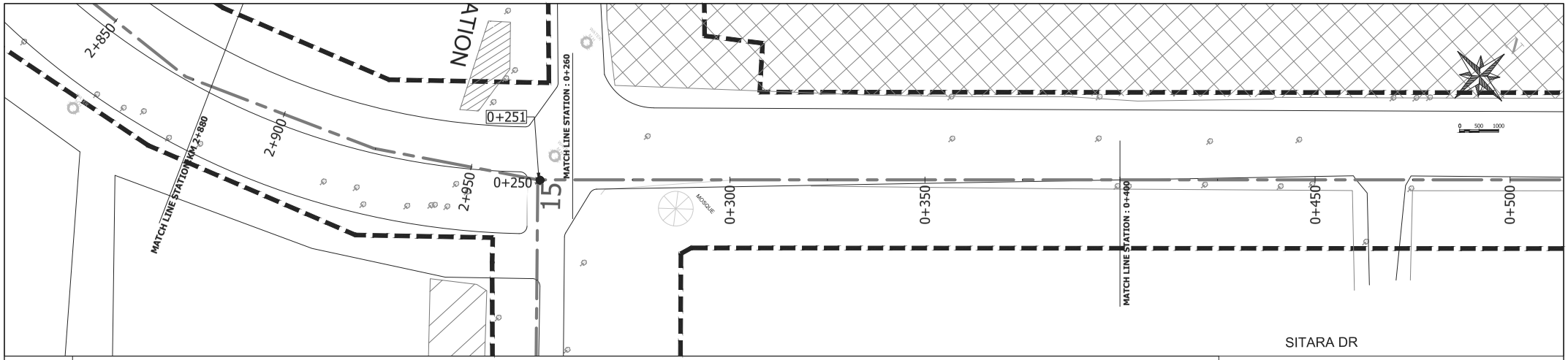


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

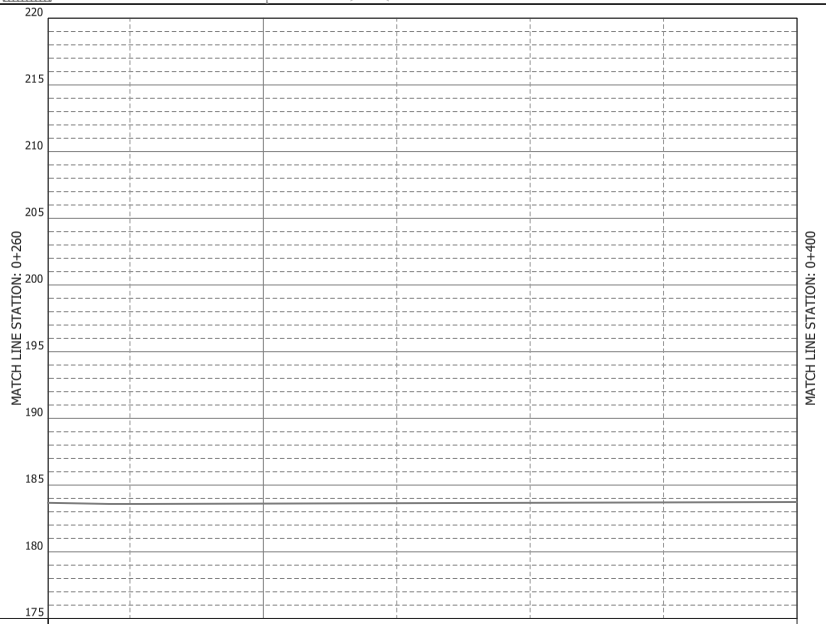


Water Level														
Ground Elevations	183.58	184.47	183.48	183.53	183.56	183.60	183.63	183.66	183.70	183.73	183.77	183.80	183.80	183.67
Pipe Center Level														
Pipeline (Diameter)														
Cumulative Distance	0	13	25	50	75	100	125	150	175	200	225	250	251	260
Chainage	**0+000**	+13	14	+25	+50	+75	**0+100**	+25	+50	+75	**0+200**	+25	+50	+51	15	**0+260**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-001
		SCALE: L:1/1000 , H: 1/400



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level								
Ground Elevations	183.67	183.59	183.61	183.64	183.67	183.70	183.73	
Pipe Center Level								
Pipeline (Diameter)								
Cumulative Distance	260	275	300	325	350	375	400	
Chainage	**0+260**	+75	**0+300**	+25	+50	+75	**0+400**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-002
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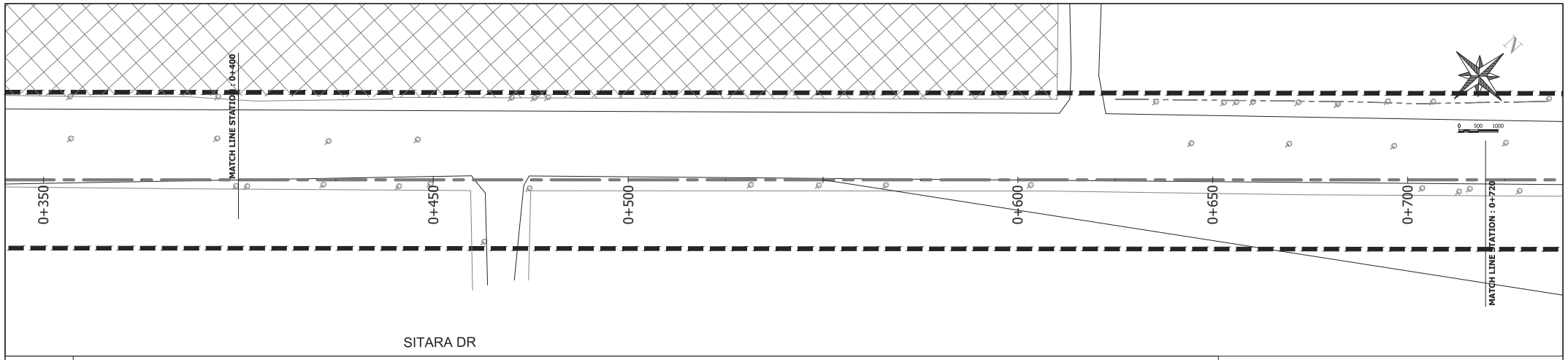
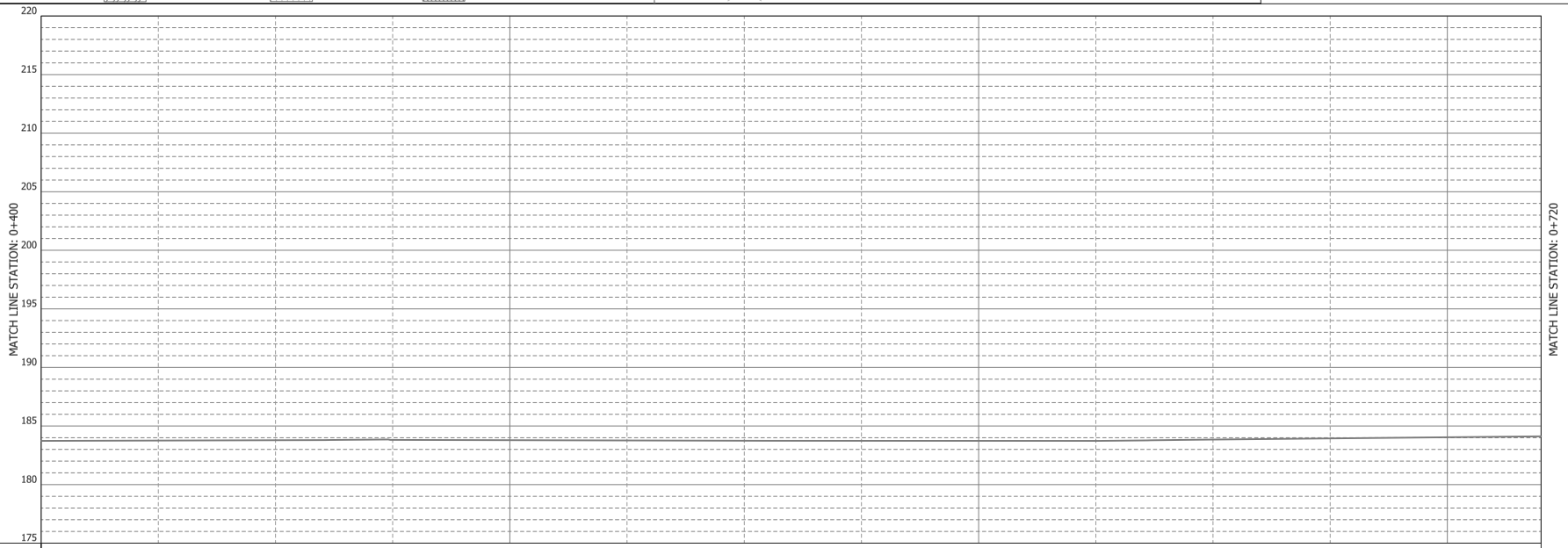
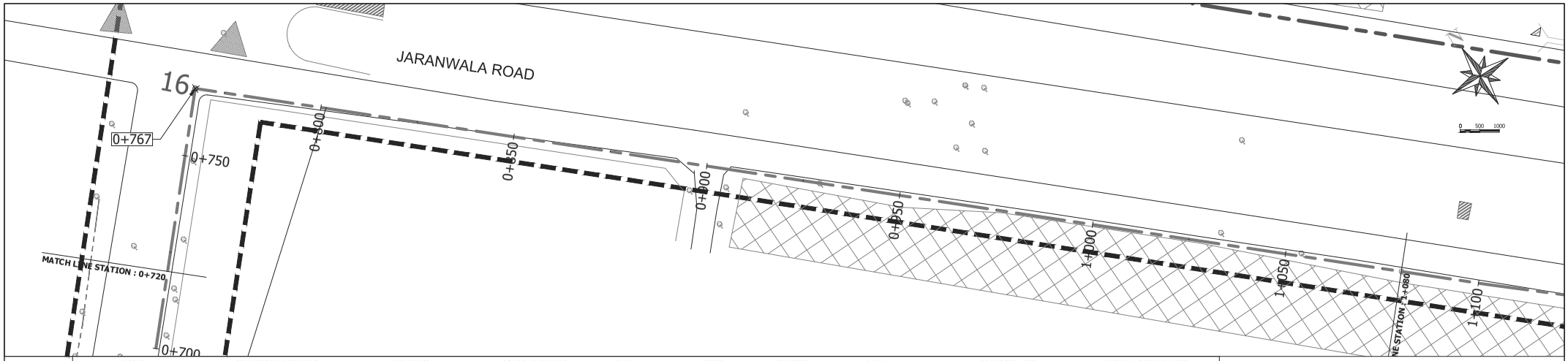


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

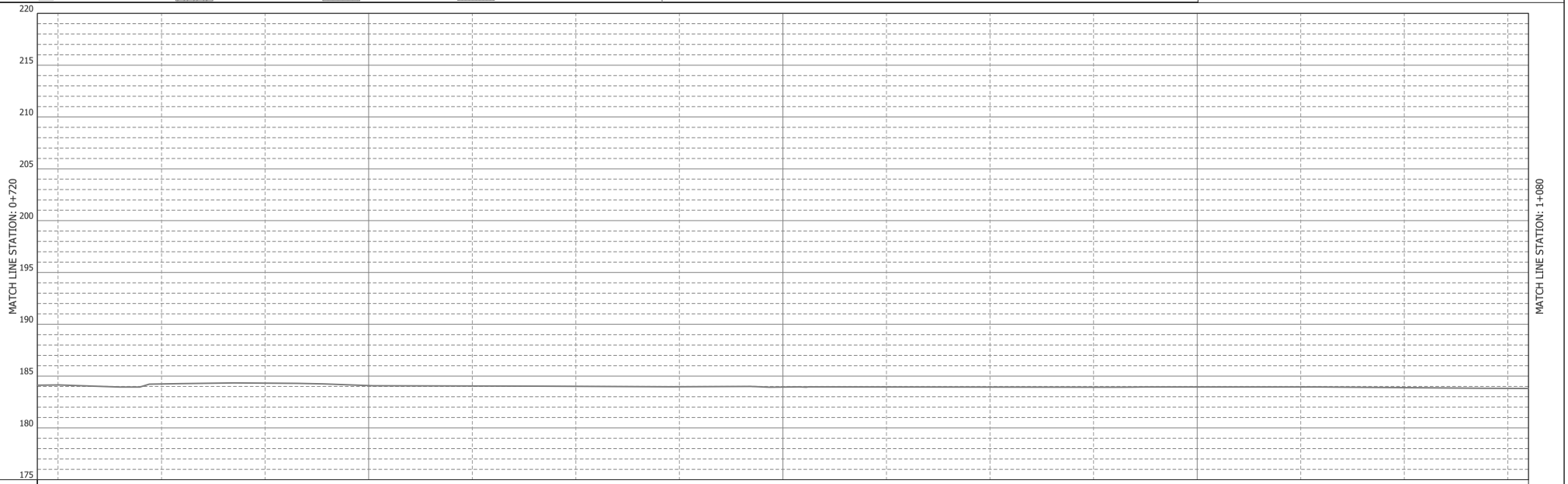


Water Level														
Ground Elevations	183.73	183.76	183.78	183.81	183.79	183.76	183.74	183.74	183.73	183.73	183.84	183.94	184.04	184.12
Pipe Center Level														
Pipeline (Diameter)														
Cumulative Distance	400	425	450	475	500	525	550	575	600	625	650	675	700	720
Chainage	**0+400**	+25	+50	+75	**0+500**	+25	+50	+75	**0+600**	+25	+50	+75	**0+700**	**0+720**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-003
		SCALE: **L:1/1000 , H: 1/400**

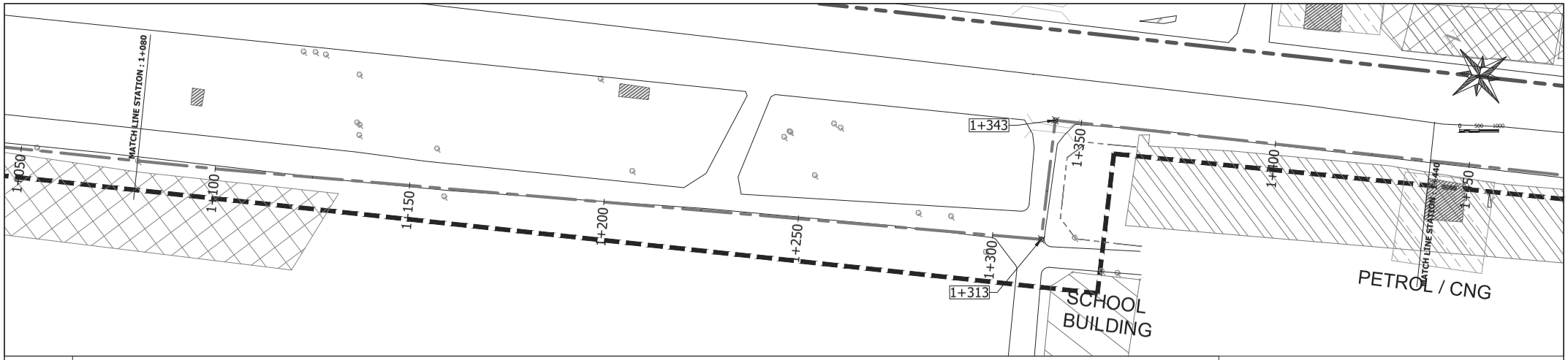


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

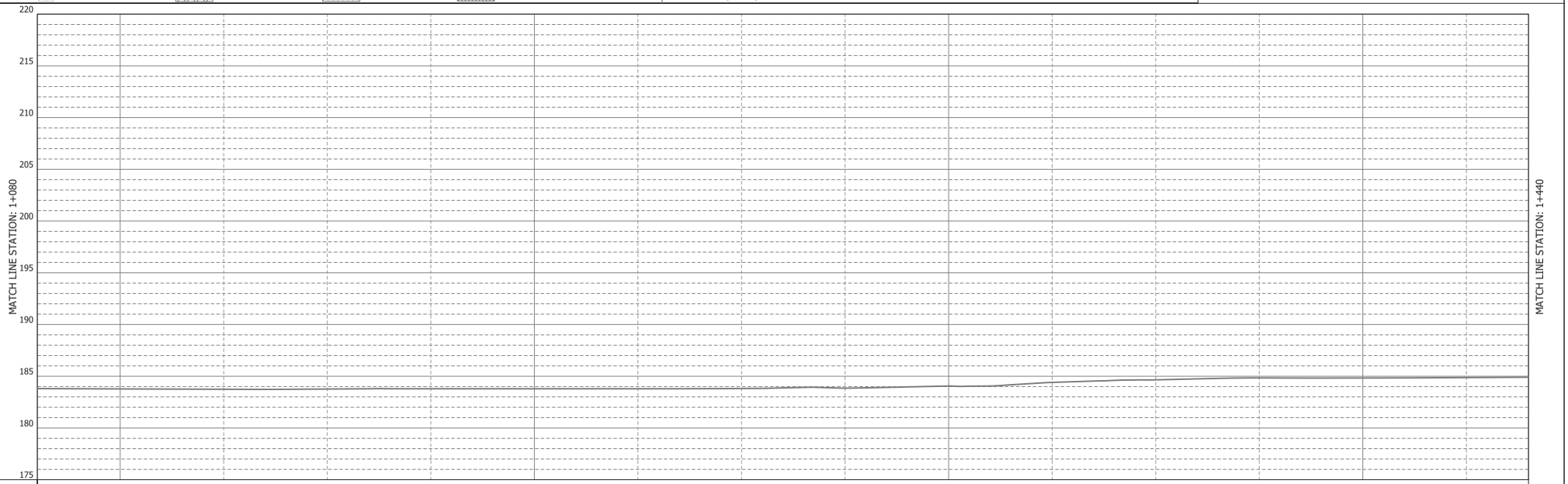


Water Level																						
Ground Elevations	184.12	184.14	184.24	184.34	184.32	184.08	184.04	184.01	183.97	183.94	183.95	183.94	183.93	183.95	183.95	183.88	183.81	183.81
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	720	725	750	767	775	800	825	850	875	900	925	950	975	1000	1025	1050	1075	1080
Chainage	**0+720**	+25	+50	+67	16 +75	**0+800**	+25	+50	+75	**0+900**	+25	+50	+75	**1+000**	+25	+50	+75	**1+080**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-004
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



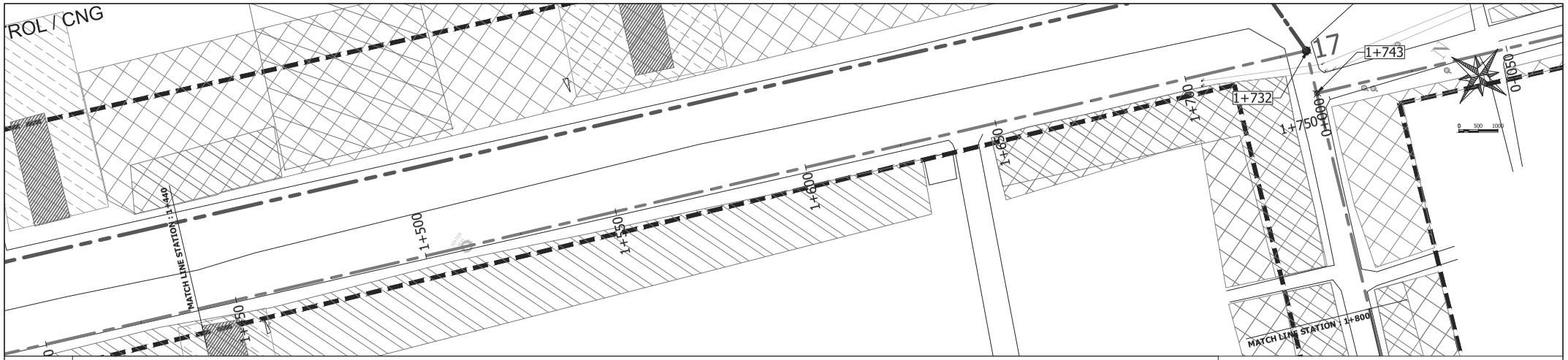
Water Level																
Ground Elevations	183.81	183.78	183.74	183.76	183.79	183.79	183.79	183.81	183.85	184.06	184.41	184.65	184.83	184.83	184.87	184.91
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1080	1100	1125	1150	1175	1200	1225	1250	1275	1300	1325	1350	1375	1400	1425	1440
Chainage	**1+080**	**1+100**	+25	+50	+75	**1+200**	+25	+50	+75	**1+300**	+25	+50	+75	**1+400**	+25	**1+440**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-005

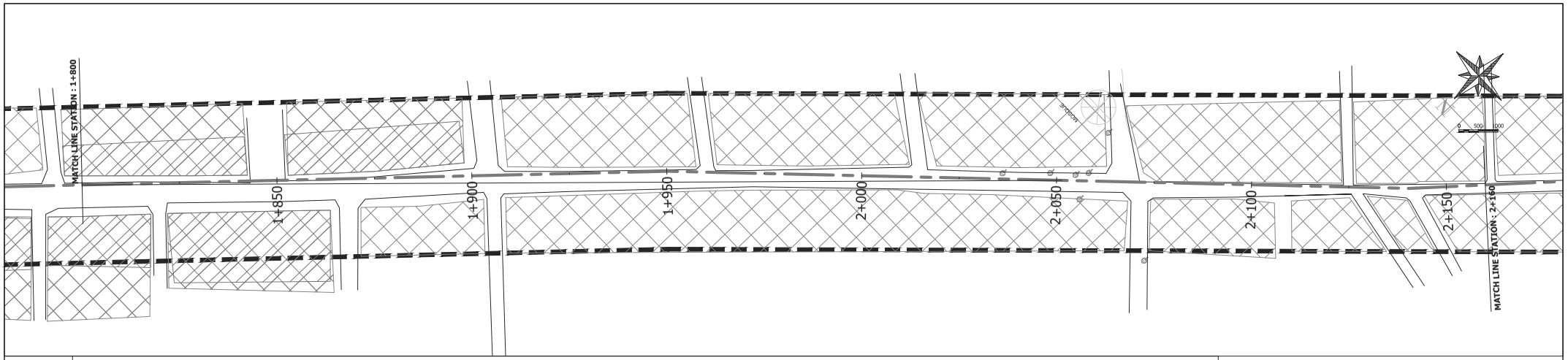
SCALE: L:1/1000 , H: 1/400



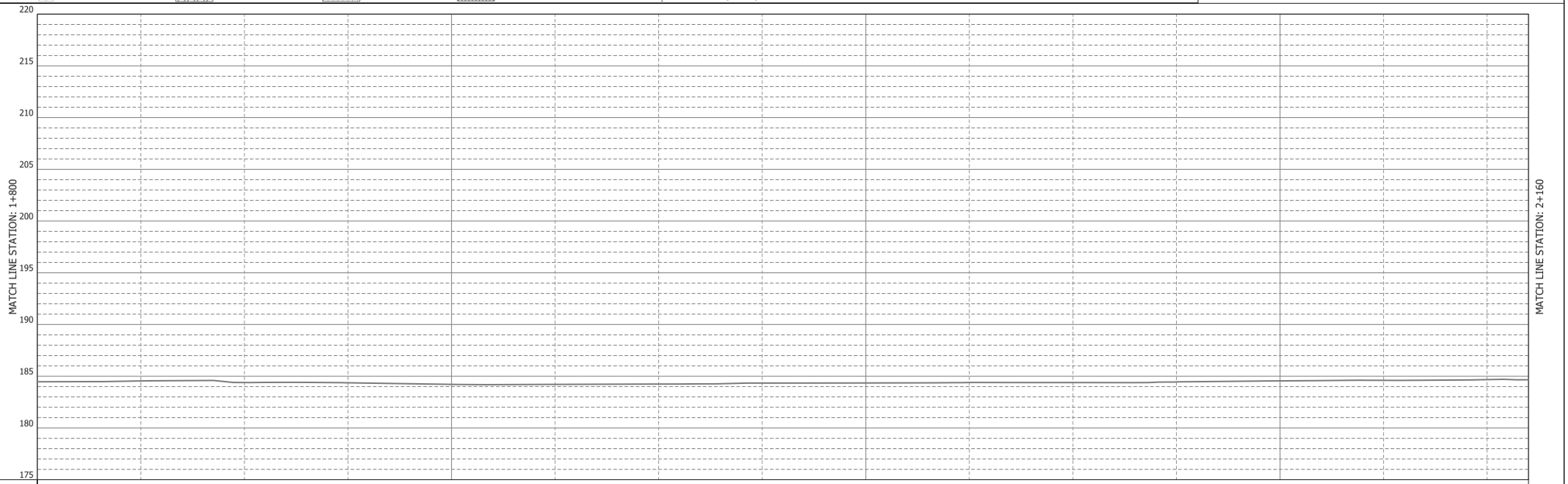
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																				
Ground Elevations	184.91	184.93	184.87	184.79	184.72	184.65	184.57	184.51	184.47	184.57	184.67	184.71	184.73	184.82	184.72	184.69	184.51	184.46		
Pipe Center Level																				
Pipeline (Diameter)																				
Cumulative Distance	1440	1450	1475	1500	1525	1550	1575	1600	1625	1650	1675	1700	1725	1732	1743	1750	1775	1800		
Chainage	**1+440**	+50	+75	**1+500**	+25	+50	+75	**1+600**	+25	+50	+75	**1+700**	+25	+32	17	+43	+50	+75	**1+800**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-006
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



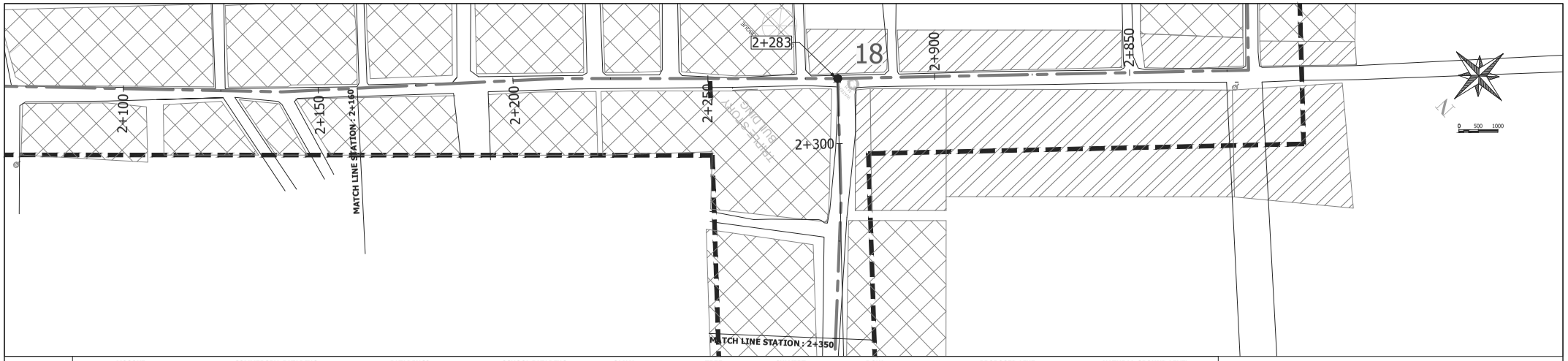
Water Level																
Ground Elevations	184.46	184.55	184.39	184.36	184.23	184.22	184.24	184.34	184.35	184.39	184.39	184.45	184.55	184.61	184.68	184.66
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1800	1825	1850	1875	1900	1925	1950	1975	2000	2025	2050	2075	2100	2125	2150	2160
Chainage	**1+800**	+25	+50	+75	**1+900**	+25	+50	+75	**2+000**	+25	+50	+75	**2+100**	+25	+50	**2+160**

PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

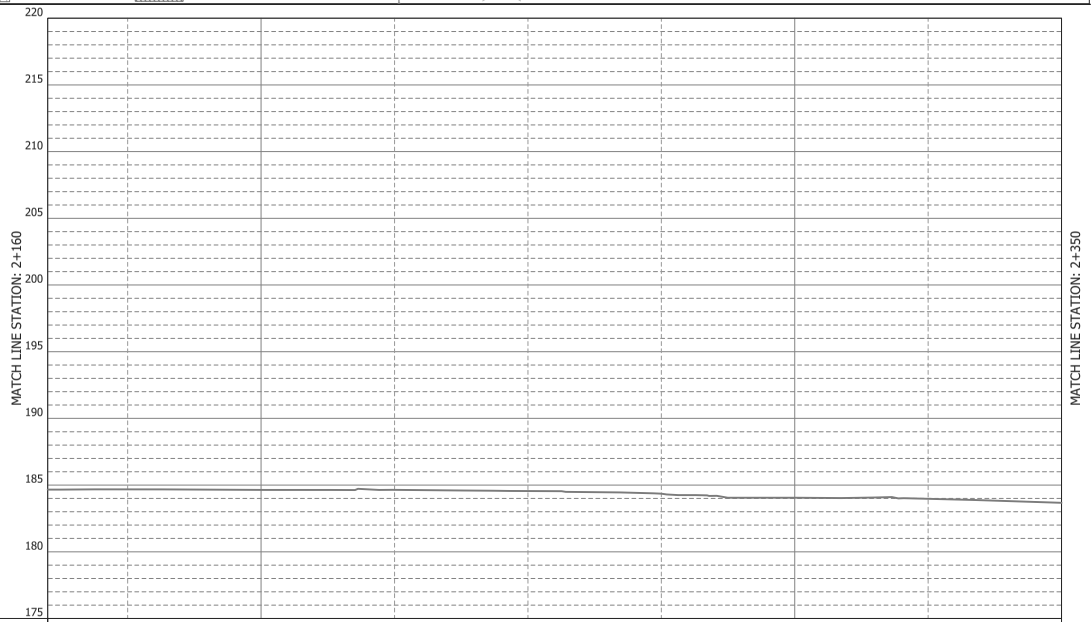
DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-007

SCALE: **L:1/1000 , H: 1/400**

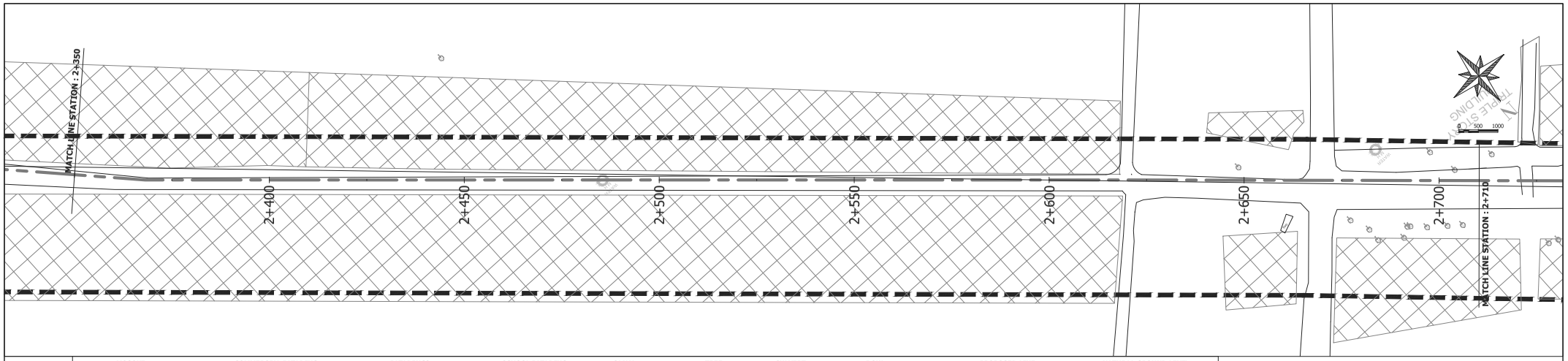


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

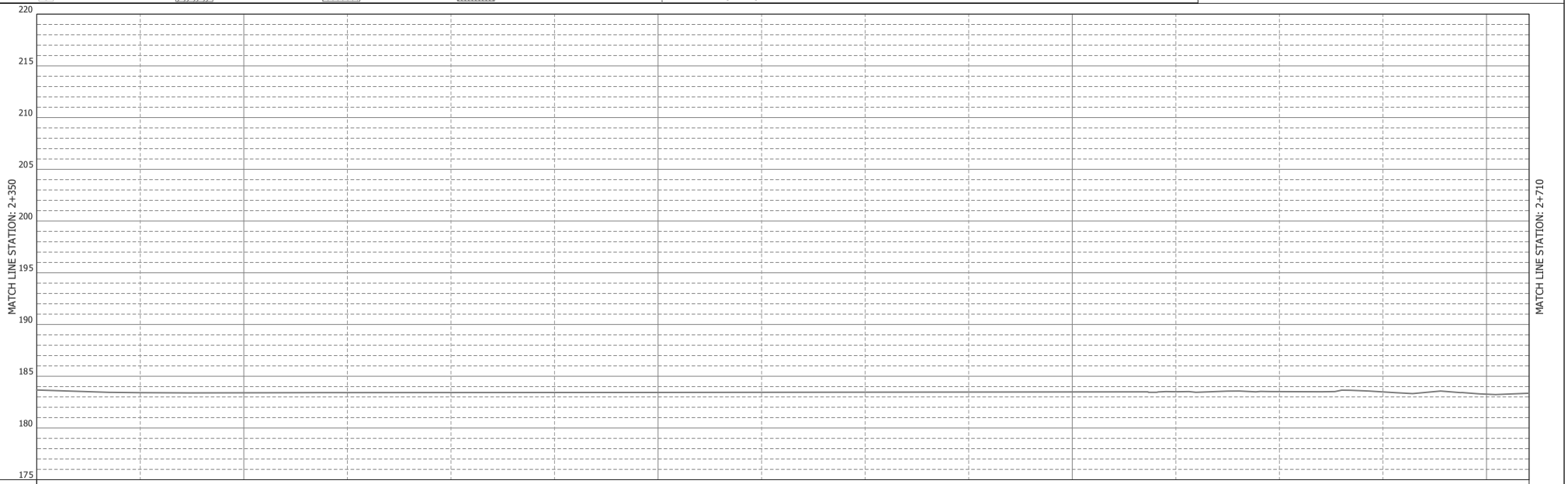


Water Level											
Ground Elevations	184.66	184.67	184.65	184.65	184.56	184.36	184.23	184.05	183.97	183.67	
Pipe Center Level											
Pipeline (Diameter)											
Cumulative Distance	2160	2175	2200	2225	2250	2275	2283	2300	2325	2350	
Chainage	**2+160**	+75	**2+200**	+25	+50	+75	+83	18 **2+300**	+25	**2+350**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-008
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



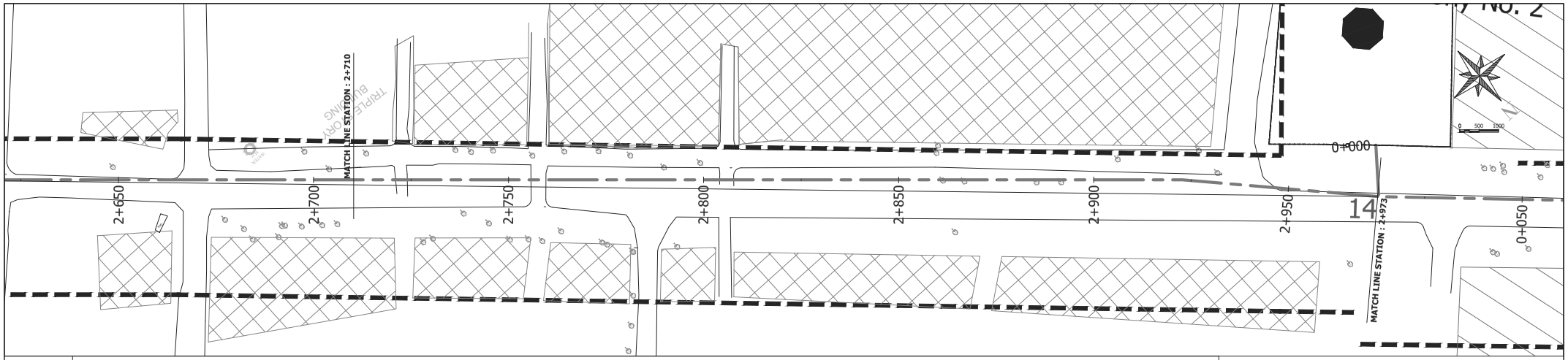
Water Level																
Ground Elevations	183.67	183.42	183.40	183.42	183.42	183.43	183.43	183.45	183.46	183.47	183.48	183.50	183.52	183.51	183.26	183.36
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	2350	2375	2400	2425	2450	2475	2500	2525	2550	2575	2600	2625	2650	2675	2700	2710
Chainage	**2+350**	+75	**2+400**	+25	+50	+75	**2+500**	+25	+50	+75	**2+600**	+25	+50	+75	**2+700**	**2+710**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-009

SCALE: L:1/1000 , H: 1/400



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level												
Ground Elevations	183.36	183.55	183.40	183.52	183.41	183.43	183.38	183.36	183.38	183.39	183.46	183.47
Pipe Center Level												
Pipeline (Diameter)												
Cumulative Distance	2710	2725	2750	2775	2800	2825	2850	2875	2900	2925	2950	2973
Chainage	2+710	+25	+50	+75	**2+800**	+25	+50	+75	**2+900**	+25	+50	**2+973**

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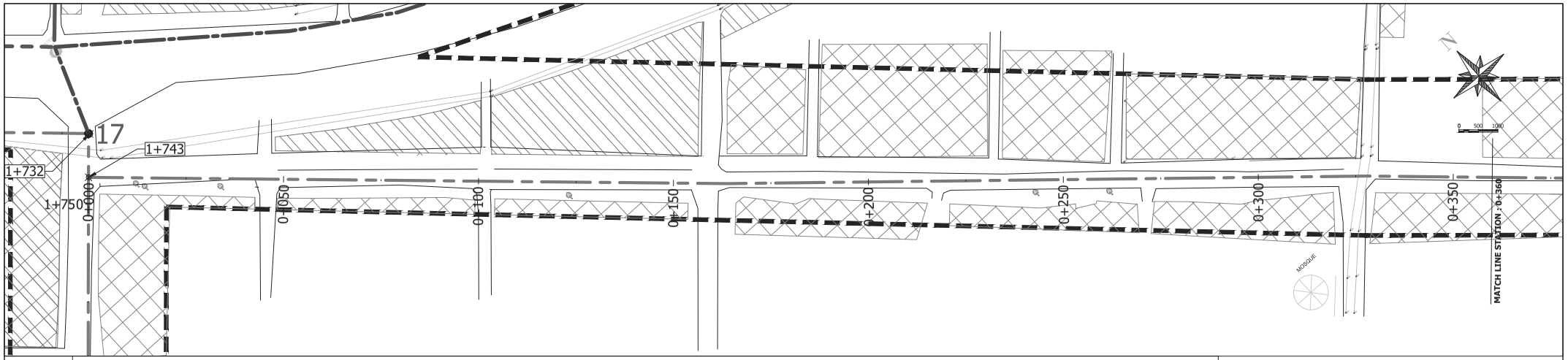
PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

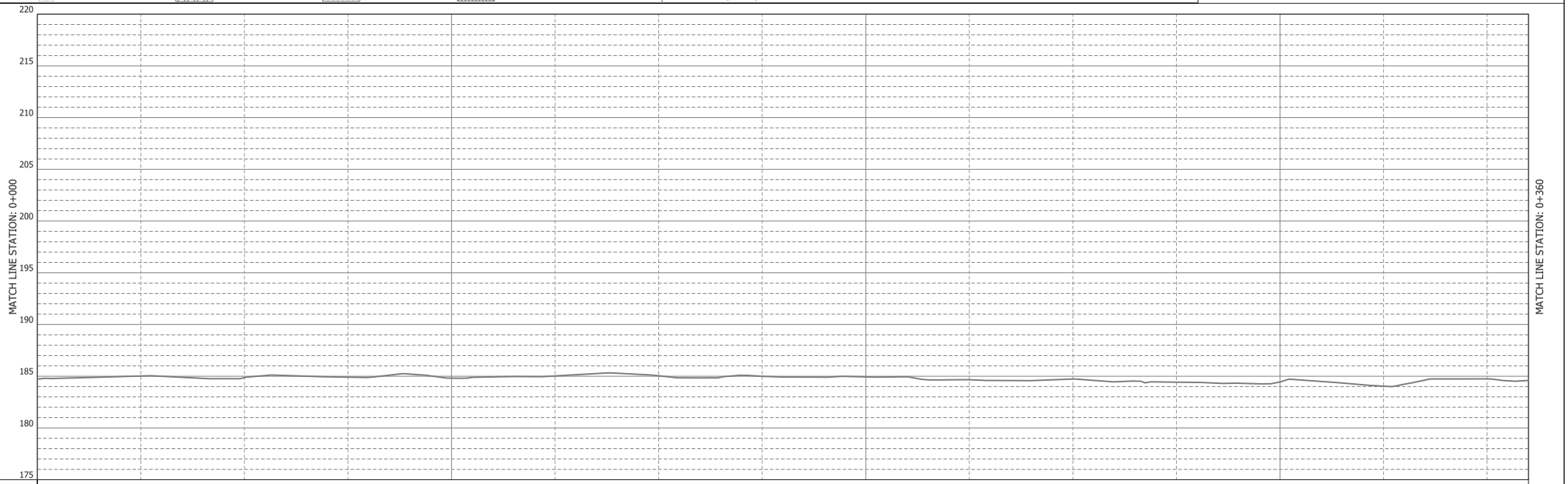
DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-010

SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



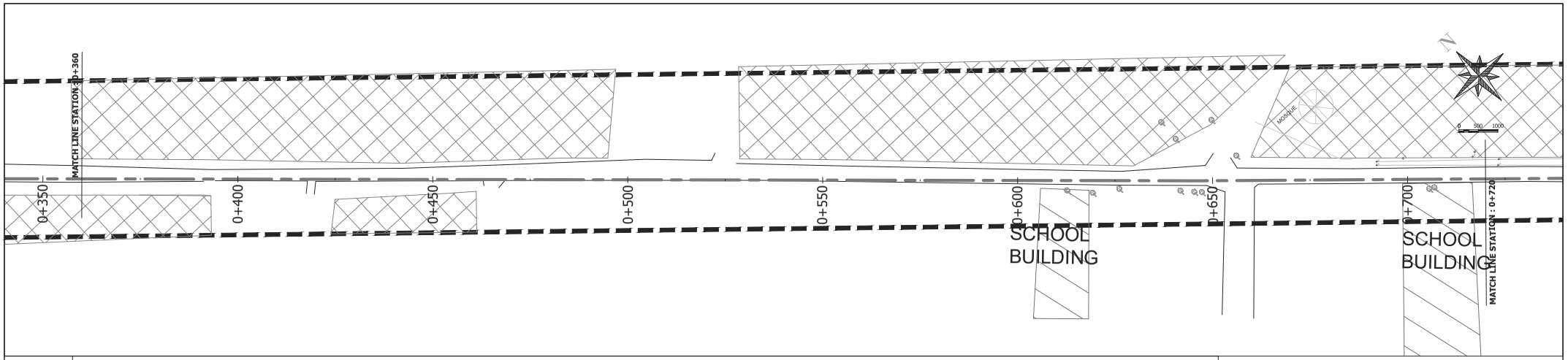
Water Level																
Ground Elevations	184.72	185.02	184.87	184.91	184.82	185.03	185.05	185.00	184.94	184.66	184.73	184.43	184.45	184.04	184.74	184.59
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	0	25	50	75	100	125	150	175	200	225	250	275	300	325	350	360
Chainage	**0+000** 1+743	+25	+50	+75	**0+100**	+25	+50	+75	**0+200**	+25	+50	+75	**0+300**	+25	+50	**0+360**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-011

SCALE: L:1/1000 , H: 1/400



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

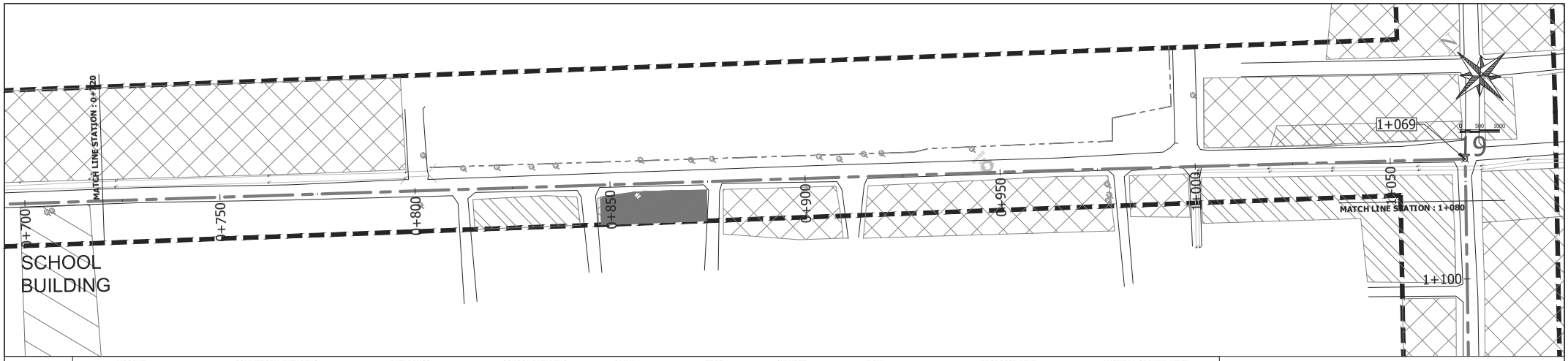
Water Level																
Ground Elevations	184.59	184.91	184.64	184.71	184.77	184.60	184.56	184.48	184.44	184.59	184.56	184.42	184.29	184.24	184.20	184.13
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	360	375	400	425	450	475	500	525	550	575	600	625	650	675	700	720
Chainage	**0+360**	+75	**0+400**	+25	+50	+75	**0+500**	+25	+50	+75	**0+600**	+25	+50	+75	**0+700**	**0+720**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

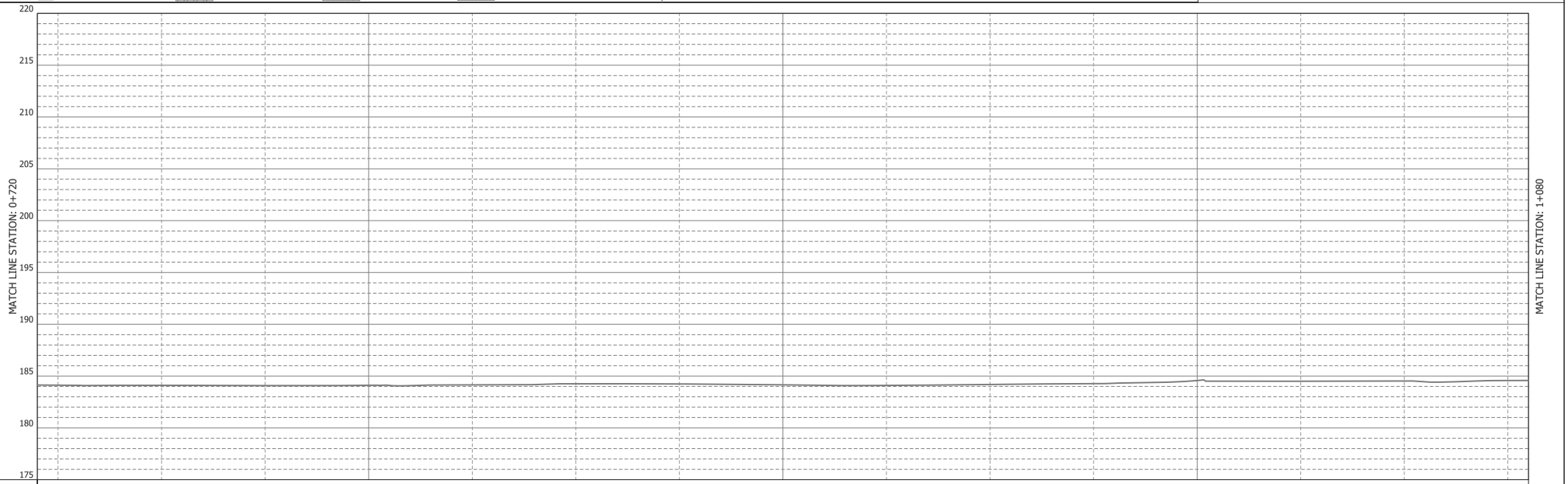
DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-012

SCALE: **L:1/1000 , H: 1/400**

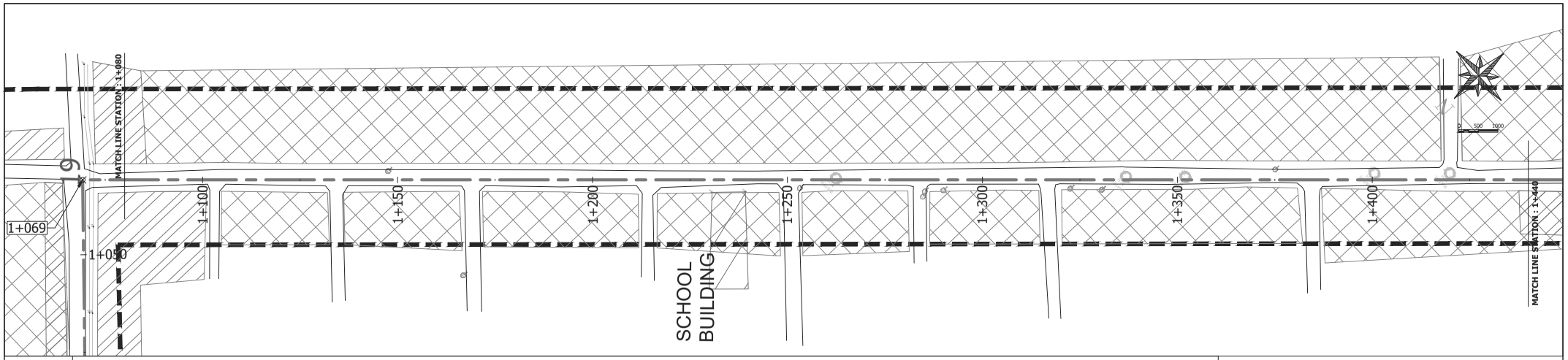


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

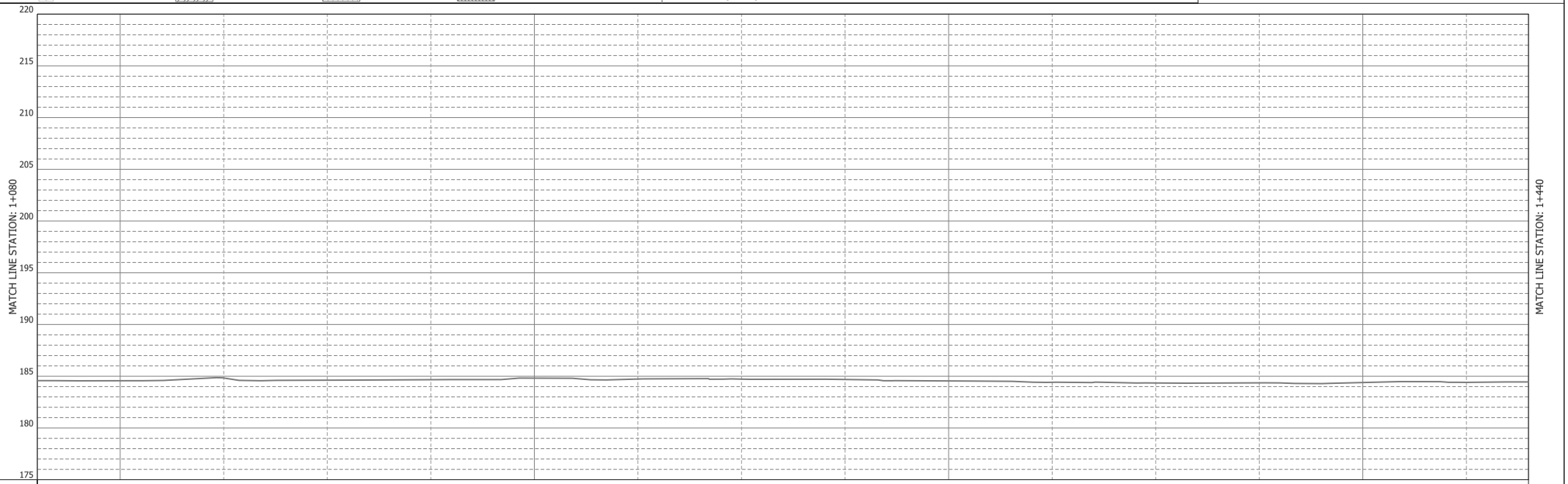


Water Level																			
Ground Elevations	184.13	184.12	184.09	184.08	184.12	184.15	184.26	184.24	184.15	184.11	184.19	184.27	184.58	184.50	184.53	184.52	184.57	184.57	
Pipe Center Level																			
Pipeline (Diameter)																			
Cumulative Distance	720	725	750	775	800	825	850	875	900	925	950	975	1000	1025	1050	1069	1075	1080	
Chainage	**0+720**	+25	+50	+75	**0+800**	+25	+50	+75	**0+900**	+25	+50	+75	**1+000**	+25	+50	+69	+75	**1+080**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-013
		SCALE: L:1/1000 , H: 1/400

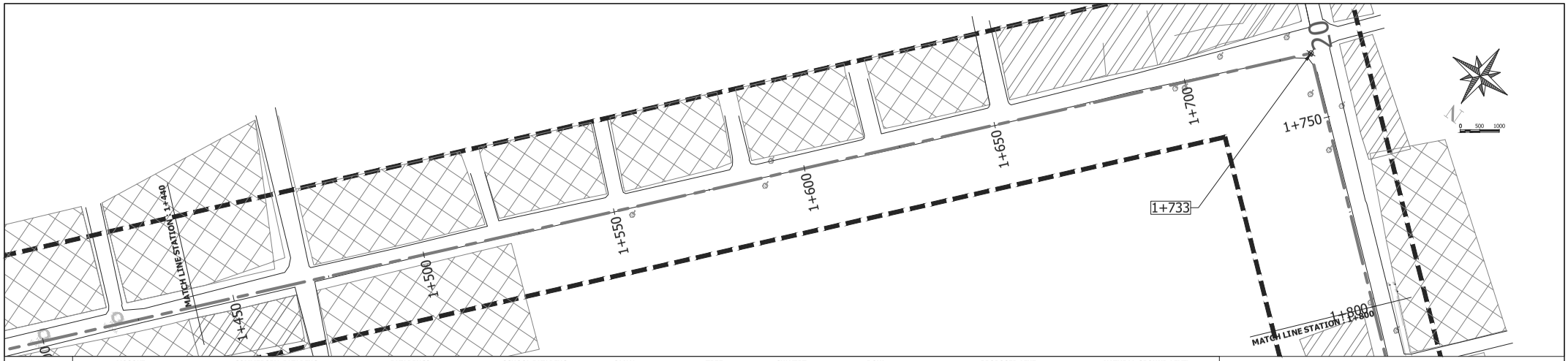


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

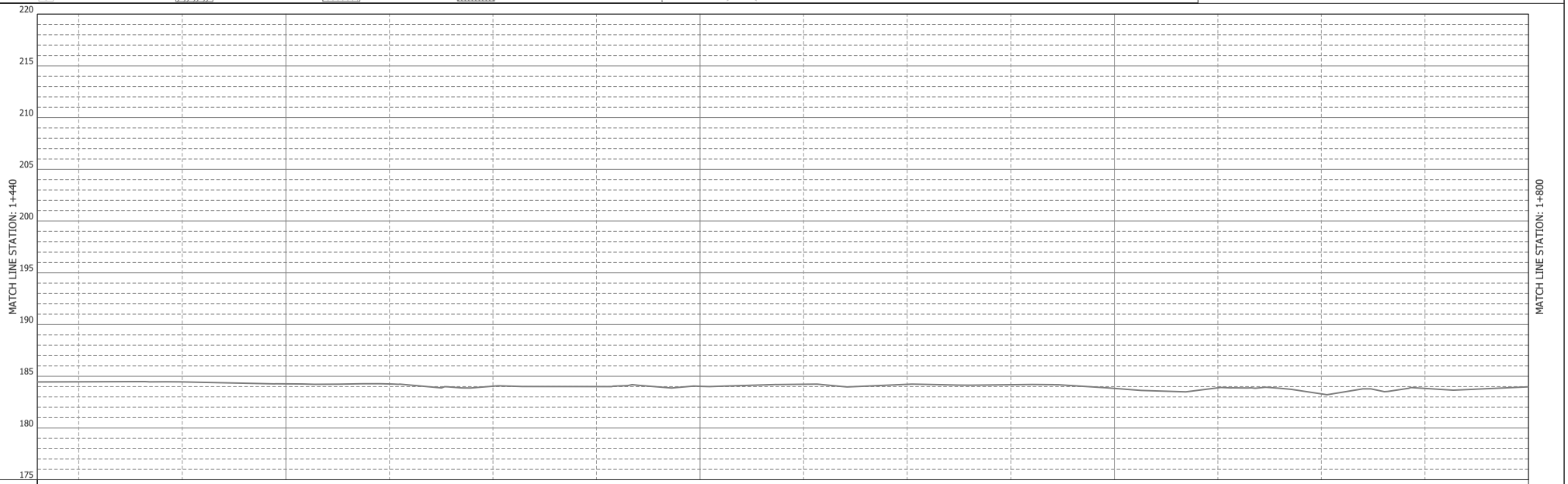


Water Level																
Ground Elevations	184.57	184.57	184.83	184.62	184.66	184.82	184.73	184.73	184.69	184.55	184.41	184.35	184.36	184.39	184.41	184.45
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1080	1100	1125	1150	1175	1200	1225	1250	1275	1300	1325	1350	1375	1400	1425	1440
Chainage	**1+080**	**1+100**	+25	+50	+75	**1+200**	+25	+50	+75	**1+300**	+25	+50	+75	**1+400**	+25	**1+440**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-014
		SCALE: **L:1/1000 , H: 1/400**

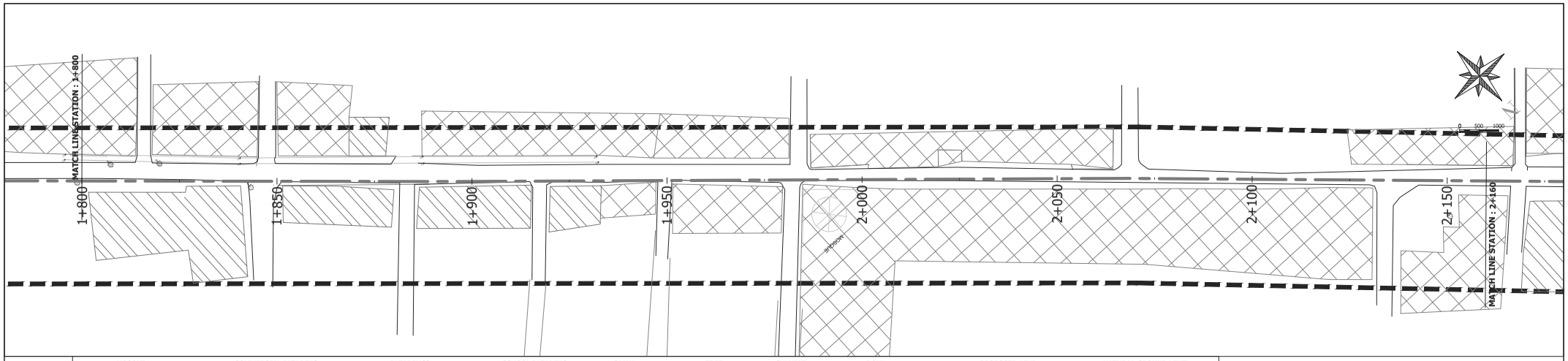


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																		
Ground Elevations	184.45	184.46	184.45	184.26	184.23	184.04	184.00	184.03	184.22	184.22	184.18	183.83	183.88	184.87	183.29	183.82	183.98	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	1440	1450	1475	1500	1525	1550	1575	1600	1625	1650	1675	1700	1725	1733	1750	1775	1800	
Chainage	**1+440**	+50	+75	**1+500**	+25	+50	+75	**1+600**	+25	+50	+75	**1+700**	+25	+33	20 +50	+75	**1+800**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-015
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

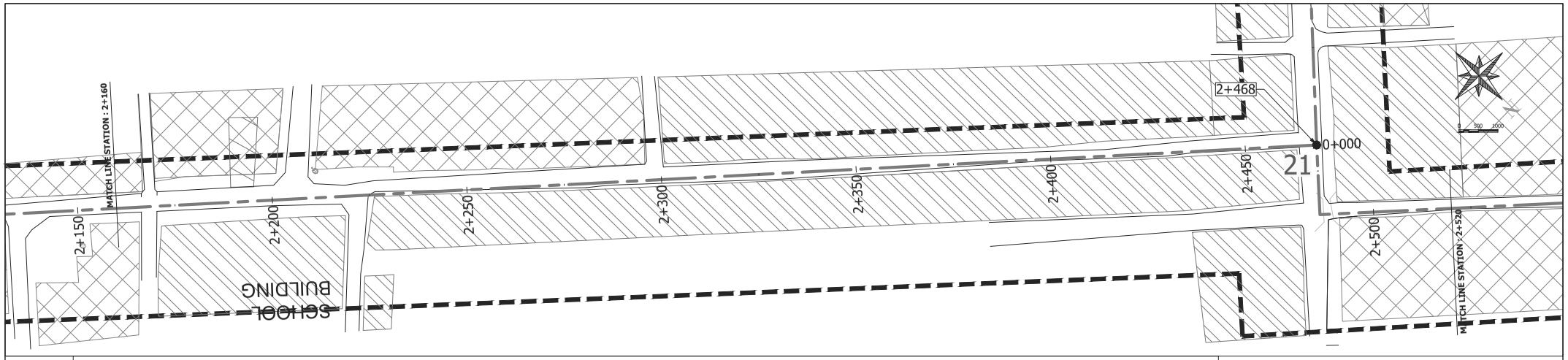
Water Level																
Ground Elevations	183.98	184.06	184.05	184.17	184.20	184.15	184.12	184.19	184.05	184.11	183.94	183.81	183.84	184.05	184.25	184.28
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1800	1825	1850	1875	1900	1925	1950	1975	2000	2025	2050	2075	2100	2125	2150	2160
Chainage	**1+800**	+25	+50	+75	**1+900**	+25	+50	+75	**2+000**	+25	+50	+75	**2+100**	+25	+50	**2+160**

PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

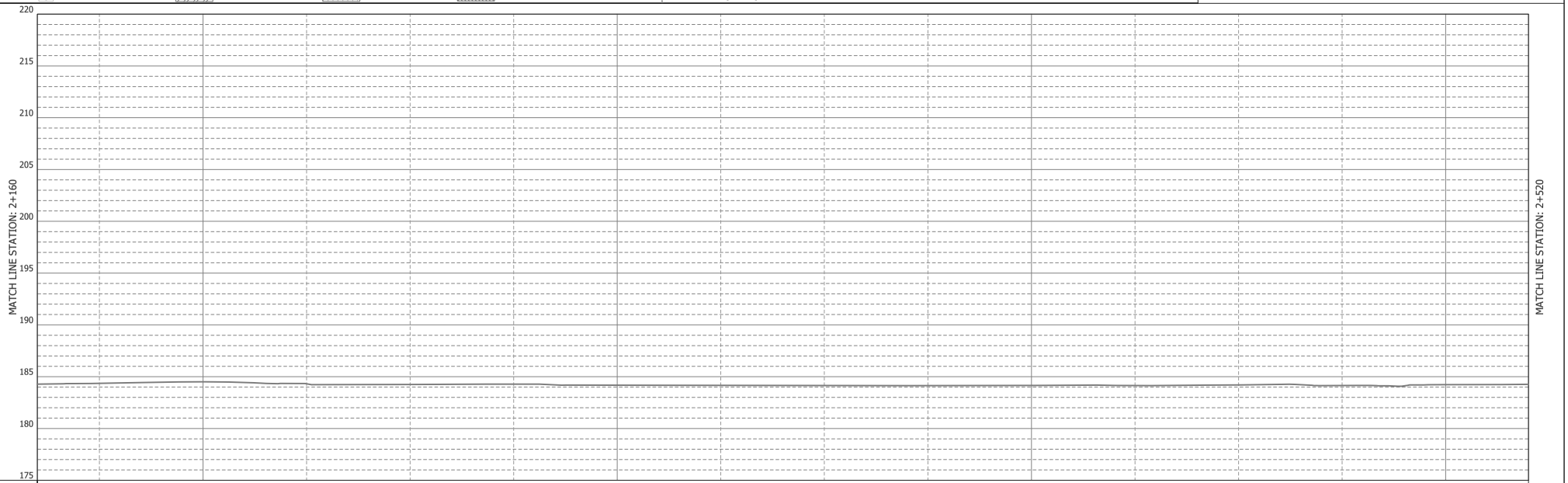
DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-016

SCALE: **L:1/1000 , H: 1/400**

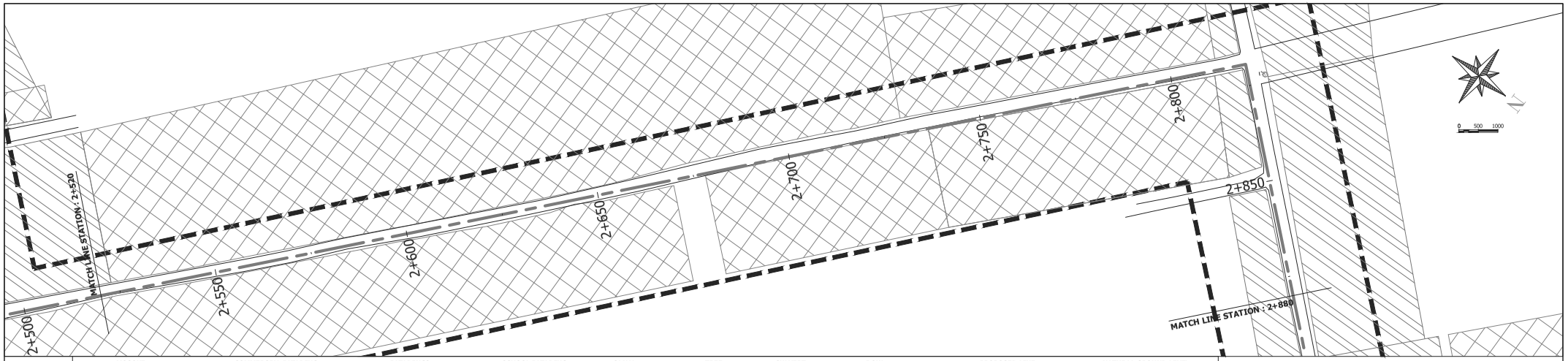


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																		
Ground Elevations	184.28	184.37	184.52	184.32	184.25	184.28	184.18	184.16	184.14	184.15	184.15	184.15	184.20	184.14	184.14	184.23	184.26	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	2160	2175	2200	2225	2250	2275	2300	2325	2350	2375	2400	2425	2450	2468	2475	2500	2520	
Chainage	**2+160**	+75	**2+200**	+25	+50	+75	**2+300**	+25	+50	+75	**2+400**	+25	+50	+68	21 +75	**2+500**	**2+520**	

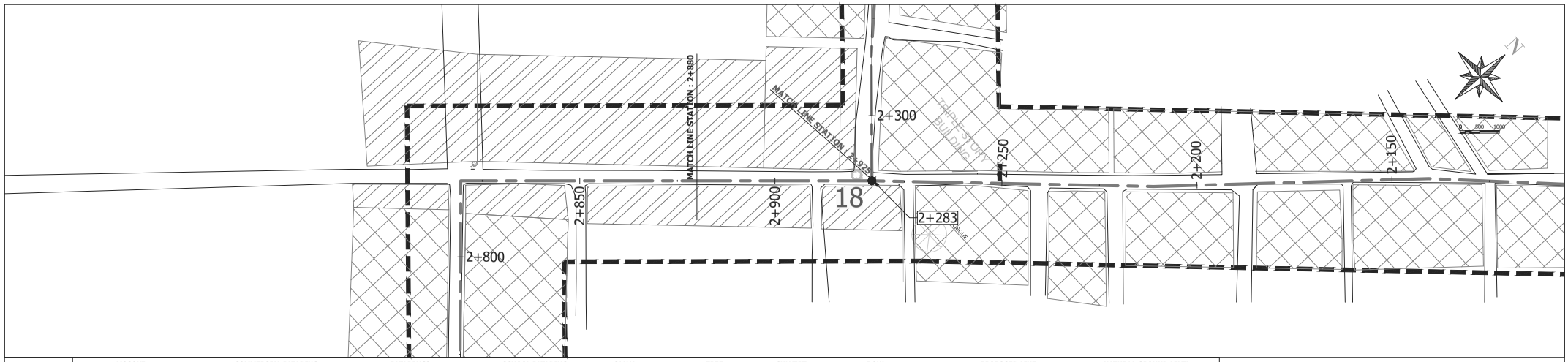
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-017
		SCALE: **L:1/1000 , H: 1/400**



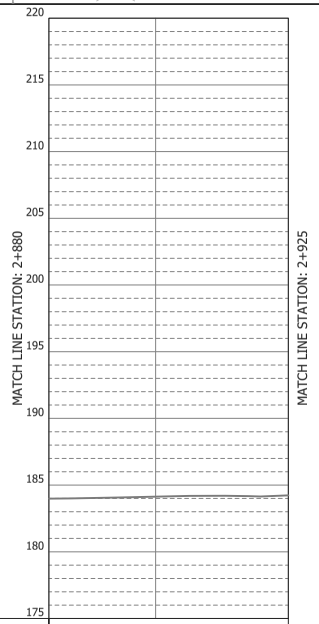
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																	
Ground Elevations	184.26	184.27	184.31	184.32	184.34	184.20	184.00	184.02	183.88	183.84	183.83	183.79	183.72	183.74	183.83	183.96	183.98
Pipe Center Level																	
Pipeline (Diameter)																	
Cumulative Distance	2520	2525	2550	2575	2600	2625	2650	2675	2700	2725	2750	2775	2800	2825	2850	2875	2880
Chainage	**2+520**	+25	+50	+75	**2+600**	+25	+50	+75	**2+700**	+25	+50	+75	**2+800**	+25	+50	+75	**2+880**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-018
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



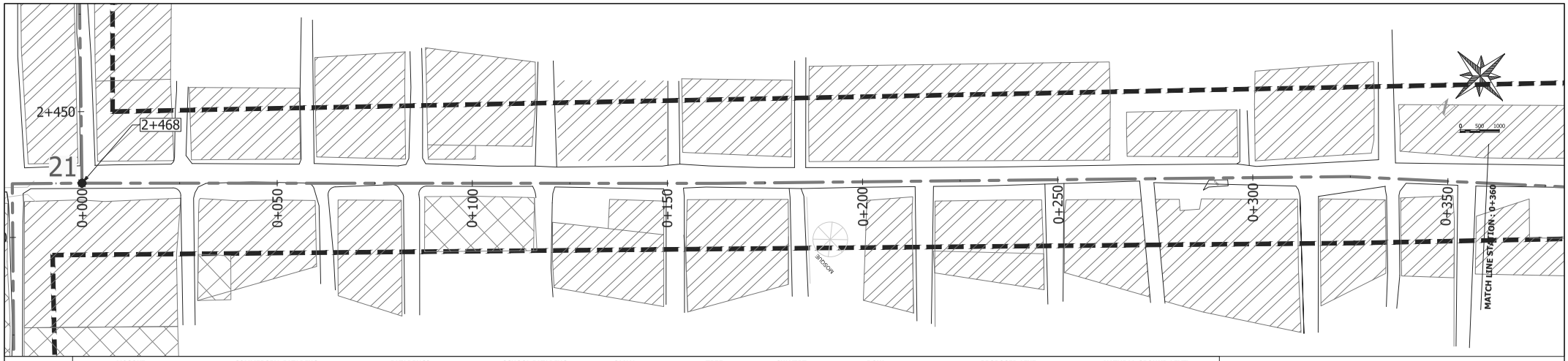
Water Level			
Ground Elevations	183.98	184.13	184.23
Pipe Center Level			
Pipeline (Diameter)			
Cumulative Distance	2880	2900	2925
Chainage	**2+880**	**2+900**	**2+925** 2+283 18

PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

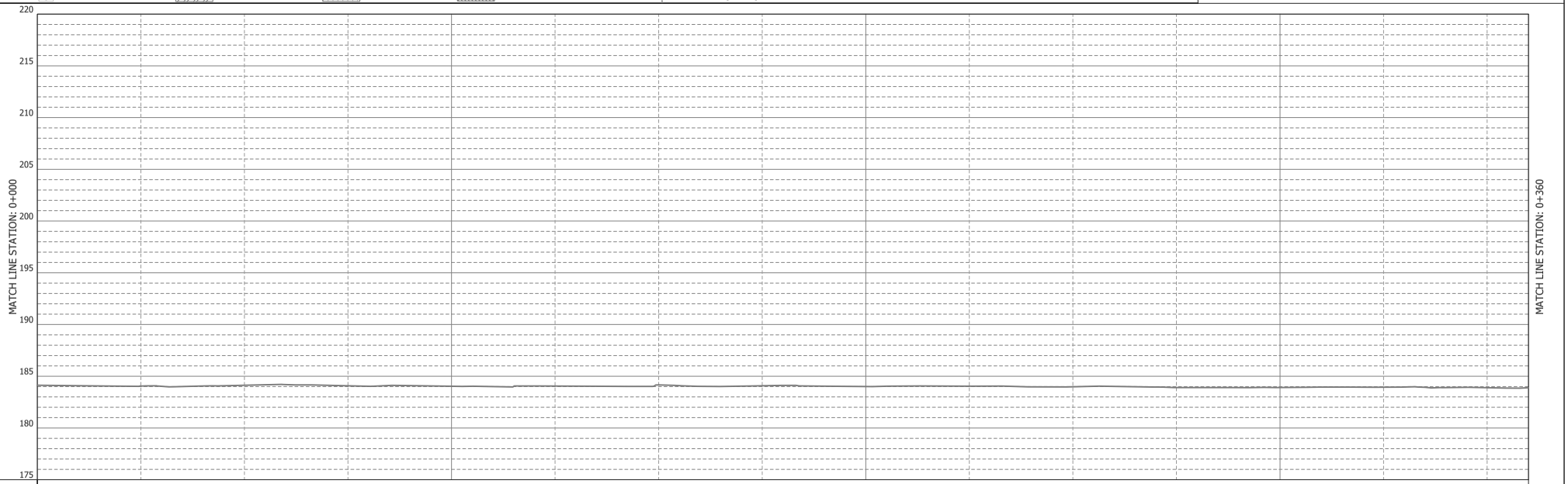
DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-019

SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



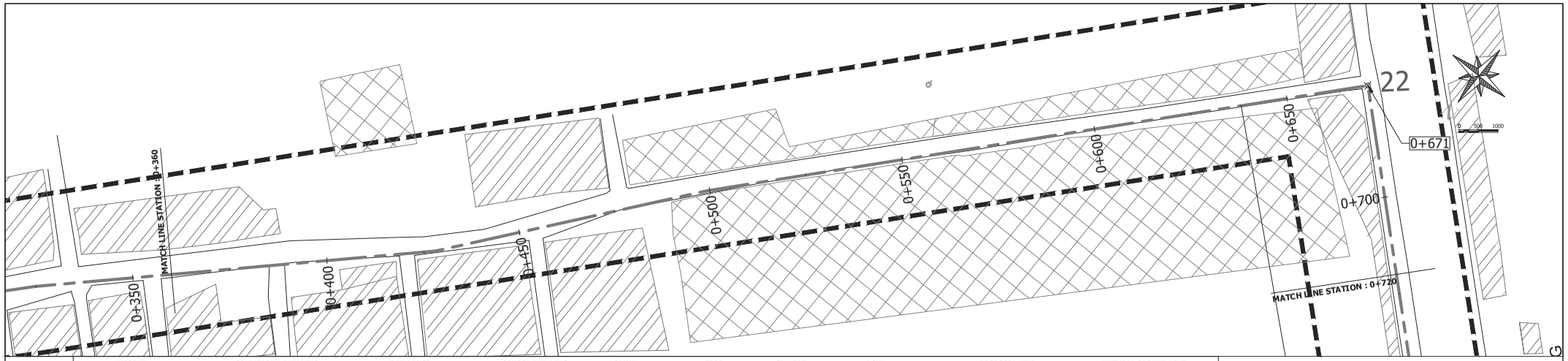
Water Level																
Ground Elevations	184.14	184.05	184.13	184.08	184.03	184.05	184.16	184.09	184.01	184.05	183.98	183.91	183.91	183.93	183.90	183.89
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	0	25	50	75	100	125	150	175	200	225	250	275	300	325	350	360
Chainage	**0+000** 2+468 21	+25	+50	+75	**0+100**	+25	+50	+75	**0+200**	+25	+50	+75	**0+300**	+25	+50	**0+360**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-020

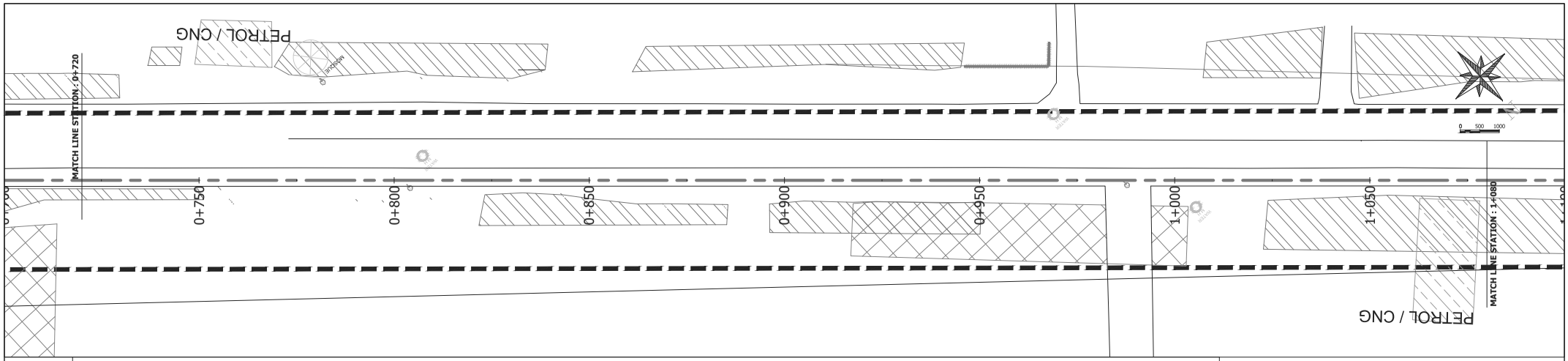
SCALE: L:1/1000 , H: 1/400



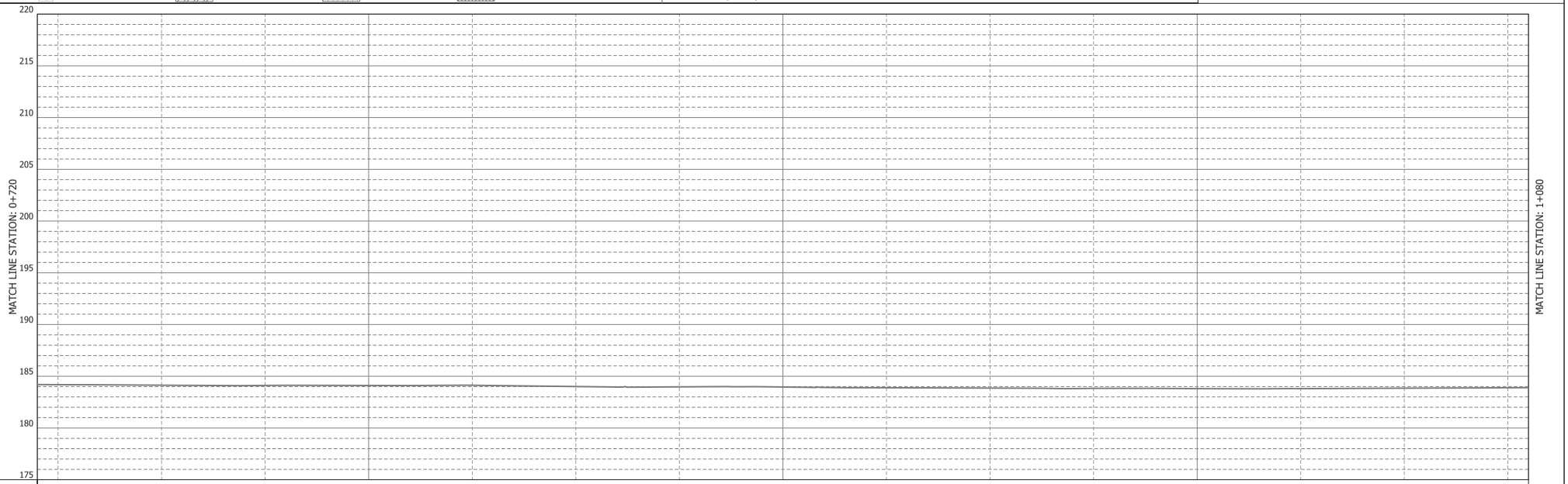
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																	
Ground Elevations	183.89	183.91	183.96	183.87	183.87	184.00	183.87	183.91	183.93	183.95	184.00	184.00	184.00	184.22	184.23	184.24	184.19
Pipe Center Level																	
Pipeline (Diameter)																	
Cumulative Distance	360	375	400	425	450	475	500	525	550	575	600	625	650	671	675	700	720
Chainage	**0+360**	+75	**0+400**	+25	+50	+75	**0+500**	+25	+50	+75	**0+600**	+25	+50	22 +71	+75	**0+700**	**0+720**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-021
		SCALE: **L:1/1000 , H: 1/400**

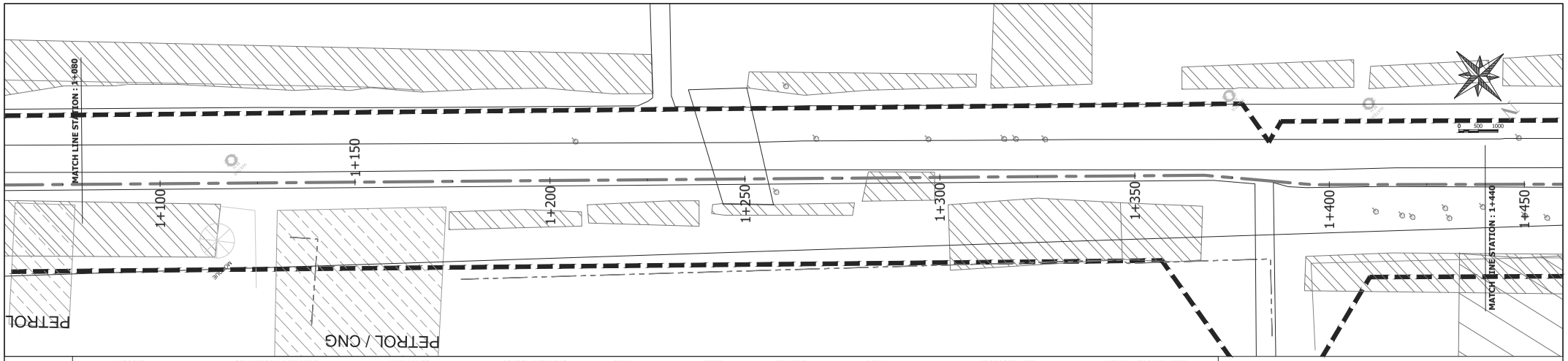


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																		
Ground Elevations	184.19	184.19	184.14	184.11	184.11	184.13	184.01	183.97	183.96	183.89	183.86	183.83	183.80	183.80	183.85	183.89	183.90	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	720	725	750	775	800	825	850	875	900	925	950	975	1000	1025	1050	1075	1080	
Chainage	**0+720**	+25	+50	+75	**0+800**	+25	+50	+75	**0+900**	+25	+50	+75	**1+000**	+25	+50	+75	**1+080**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-022
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

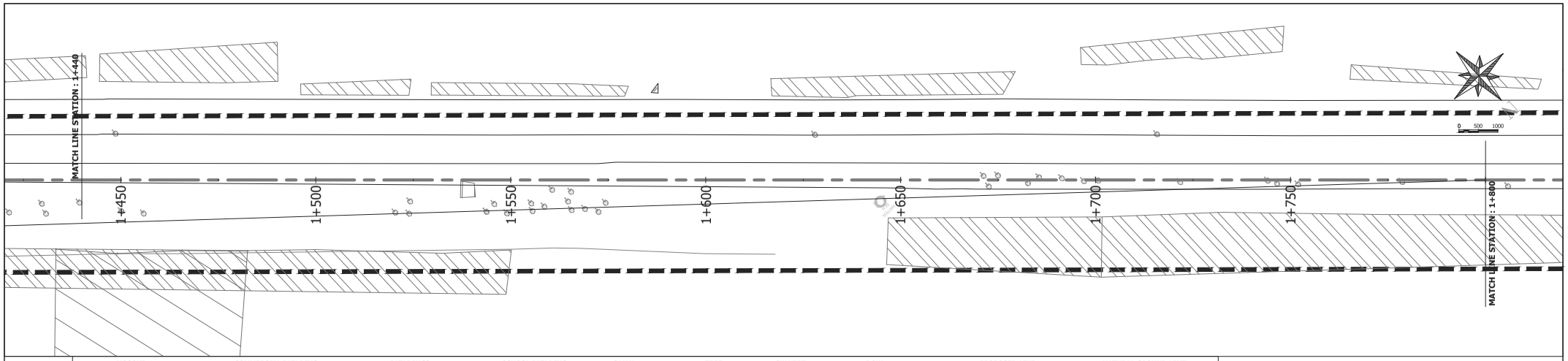
Water Level															
Ground Elevations	183.90	183.90	183.89	183.89	183.88	183.88	183.83	183.82	183.80	183.72	183.75	183.77	183.74	183.68	183.66	183.65
Pipe Center Level															
Pipeline (Diameter)															
Cumulative Distance	1080	1100	1125	1150	1175	1200	1225	1250	1275	1300	1325	1350	1375	1400	1425	1440
Chainage	**1+080**	**1+100**	+25	+50	+75	**1+200**	+25	+50	+75	**1+300**	+25	+50	+75	**1+400**	+25	**1+440**

PROJECT TITLE: THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

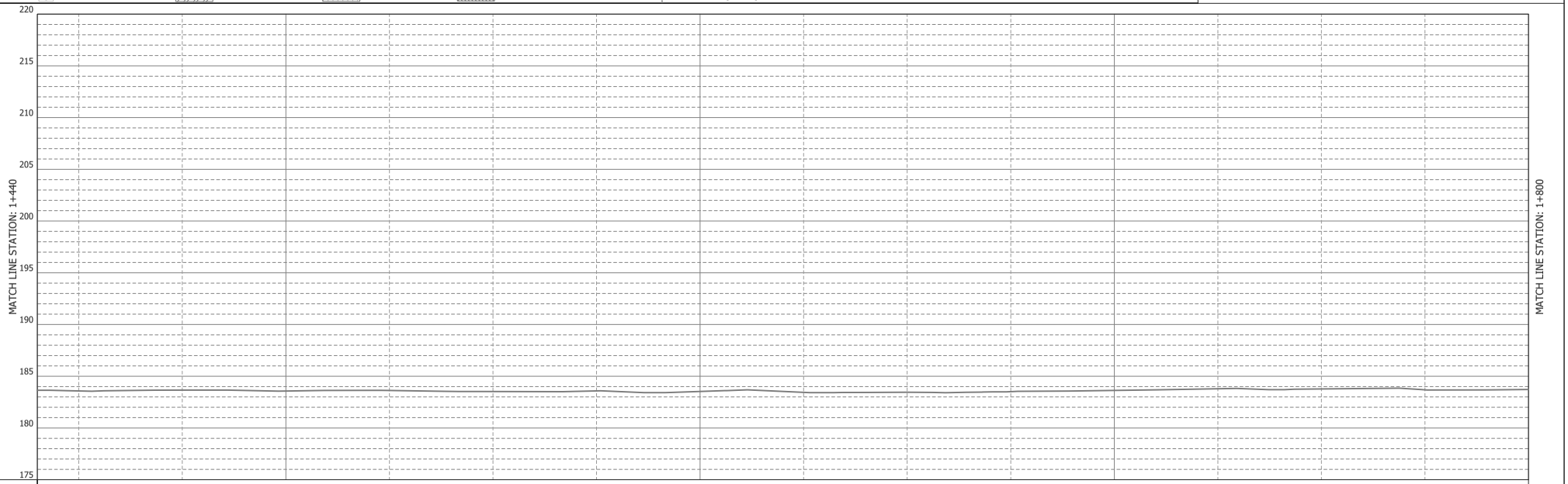
DRAWING TITLE: PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-023

SCALE: L:1/1000 , H: 1/400

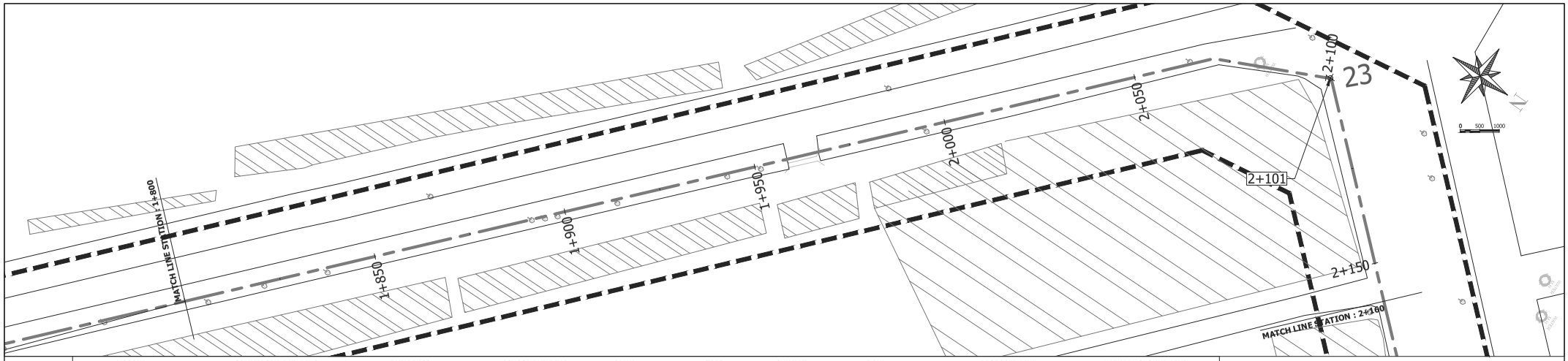


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																
Ground Elevations	183.65	183.58	183.66	183.57	183.63	183.52	183.58	183.53	183.44	183.45	183.51	183.63	183.79	183.77	183.69	183.72
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1440	1450	1475	1500	1525	1550	1575	1600	1625	1650	1675	1700	1725	1750	1775	1800
Chainage	**1+440**	+50	+75	**1+500**	+25	+50	+75	**1+600**	+25	+50	+75	**1+700**	+25	+50	+75	**1+800**

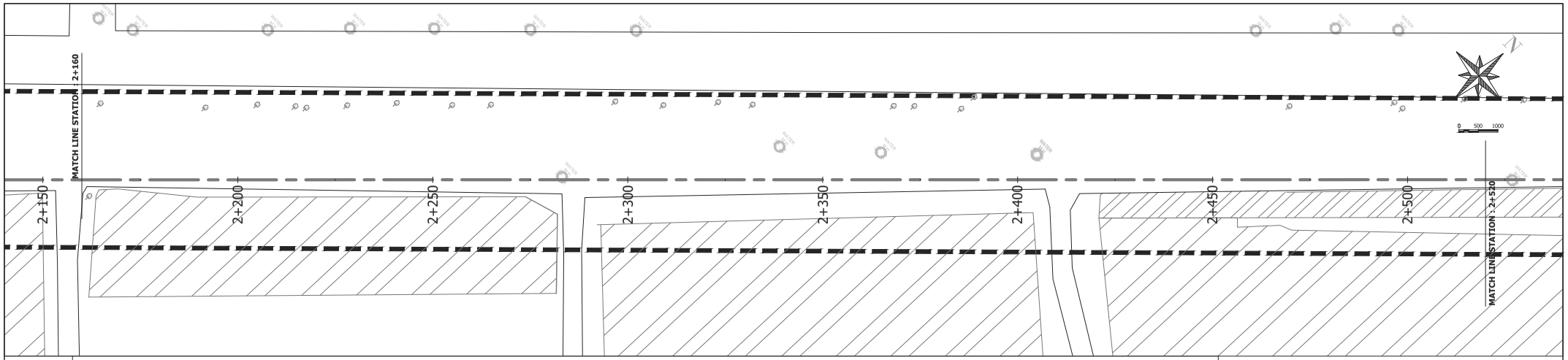
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-024
		SCALE: **L:1/1000 , H: 1/400**



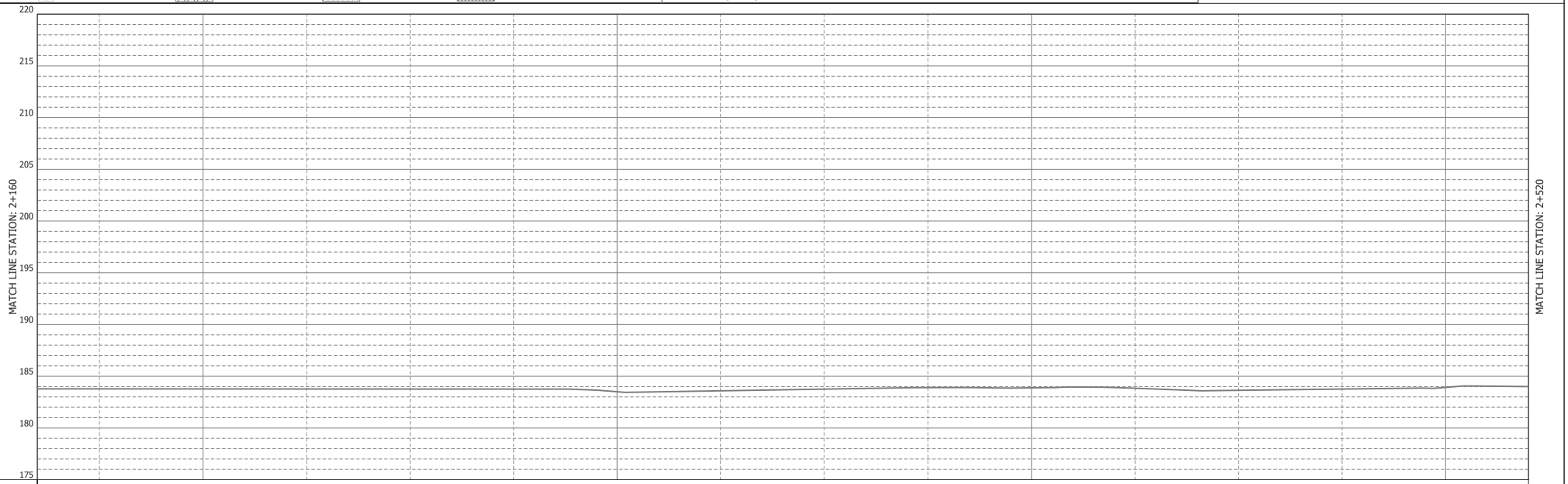
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																
Ground Elevations	183.72	183.75	183.87	183.93	183.90	183.83	183.81	183.96	183.83	183.76	183.84	183.74	183.65	183.62	183.65	183.75	183.78
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	1800	1825	1850	1875	1900	1925	1950	1975	2000	2025	2050	2075	2100	1101	2125	2150	2160
Chainage	**1+800**	+25	+50	+75	**1+900**	+25	+50	+75	**2+000**	+25	+50	+75	**2+100**	+01 23	+25	+50	**2+160**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-025
		SCALE: **L:1/1000 , H: 1/400**

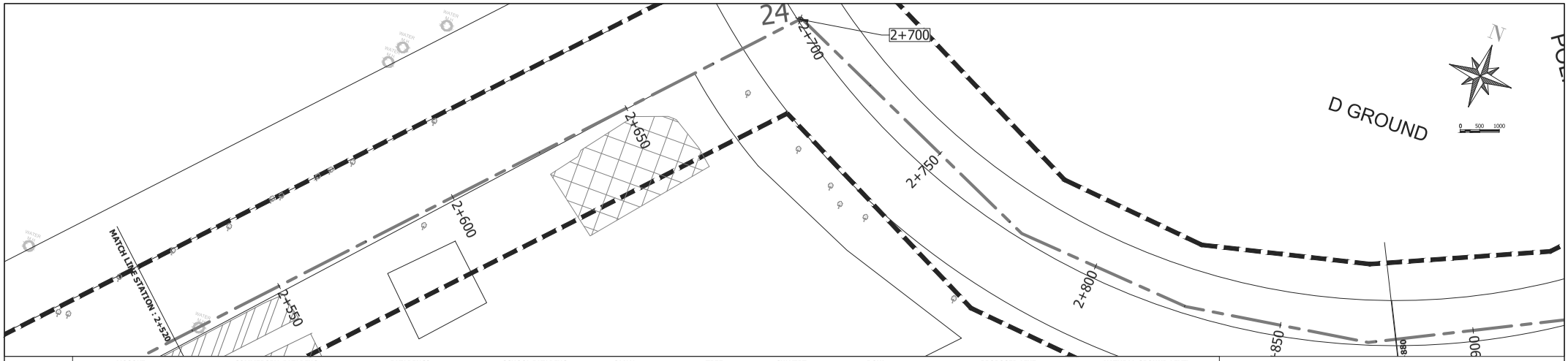


LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level																
Ground Elevations	183.78	183.78	183.78	183.77	183.77	183.76	183.50	183.59	183.75	183.90	183.88	183.84	183.64	183.76	183.92	184.00
Pipe Center Level																
Pipeline (Diameter)																
Cumulative Distance	2160	2175	2200	2225	2250	2275	2300	2325	2350	2375	2400	2425	2450	2475	2500	2520
Chainage	**2+160**	+75	**2+200**	+25	+50	+75	**2+300**	+25	+50	+75	**2+400**	+25	+50	+75	**2+500**	**2+520**

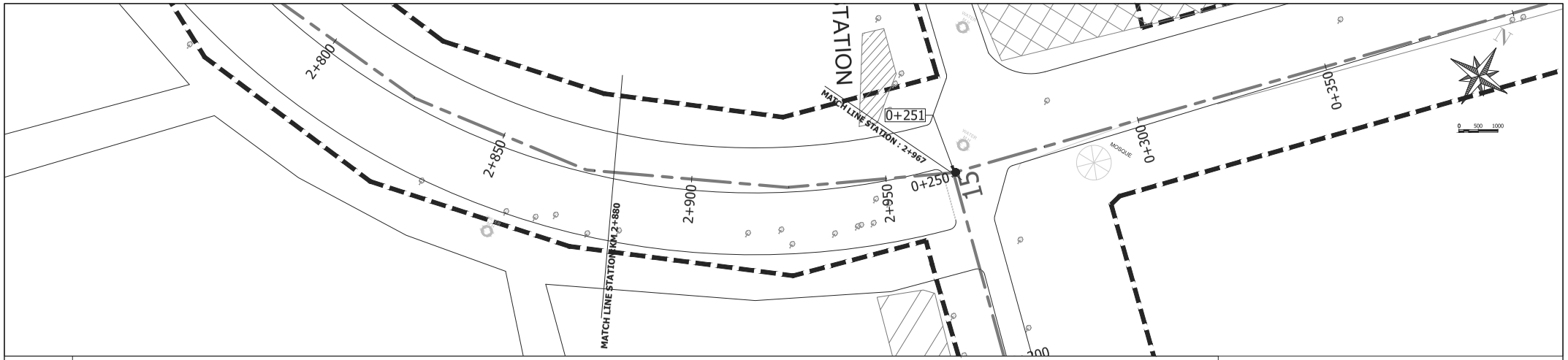
PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-026
		SCALE: **L:1/1000 , H: 1/400**



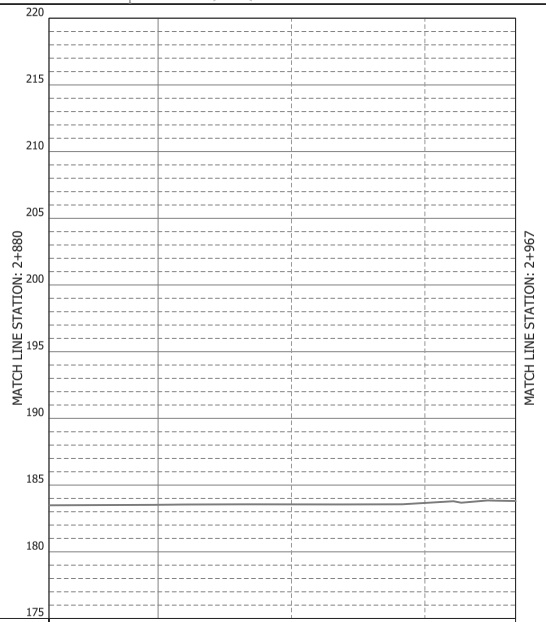
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																		
Ground Elevations	184.00	183.98	183.88	183.81	183.75	183.68	183.61	183.51	183.46	183.44	183.42	183.41	183.41	183.43	183.45	183.48	183.49	
Pipe Center Level																		
Pipeline (Diameter)																		
Cumulative Distance	2520	2525	2550	2575	2600	2625	2650	2675	2700	2725	2750	2775	2800	2825	2850	2875	2880	
Chainage	**2+520**	+25	+50	+75	**2+600**	+25	+50	+75	**2+700**	24	+25	+50	+75	**2+800**	+25	+50	+75	**2+880**

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-027
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



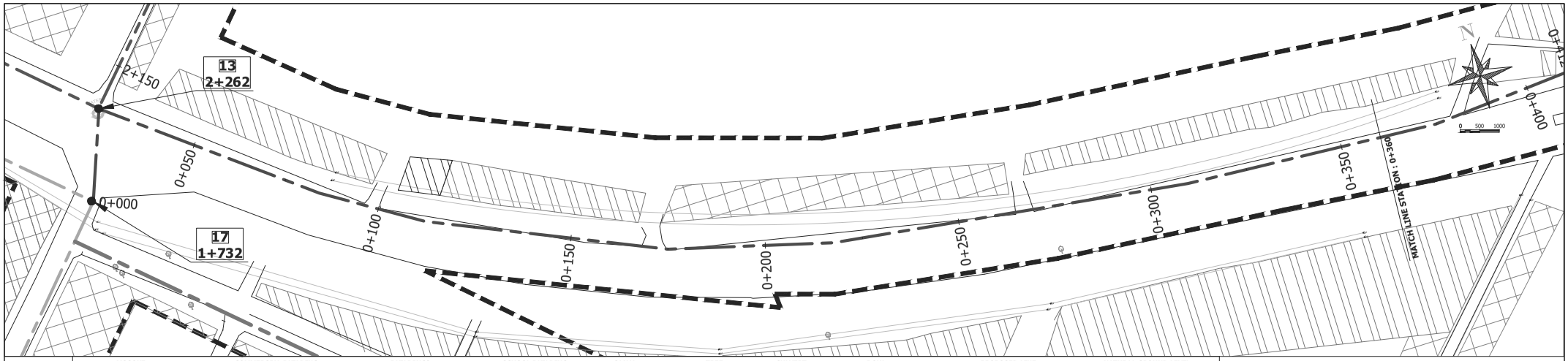
Water Level					
Ground Elevations	183.49	183.52	183.56	183.66	183.80
Pipe Center Level					
Pipeline (Diameter)					
Cumulative Distance	2880	2900	2925	2950	2967
Chainage	**2+880**	**2+900**	+25	+50	**2+967** 0+251 15

PROJECT TITLE:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

DRAWING TITLE:
PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II

DRAWING No: WS-DZ-III-028

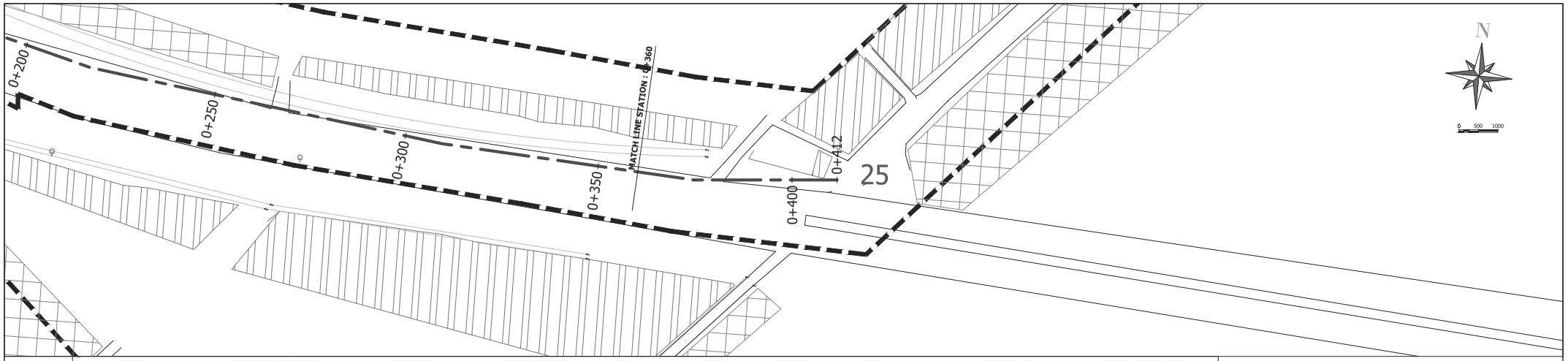
SCALE: **L:1/1000 , H: 1/400**



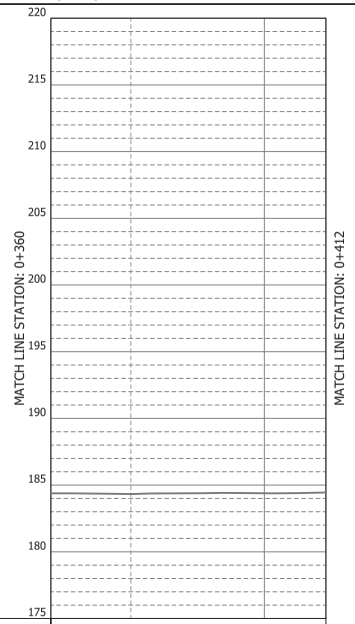
LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL

Water Level																	
Ground Elevations	184.82	184.55	184.80	184.80	184.52	184.73	184.52	184.44	184.58	184.58	184.52	184.37	184.42	184.41	184.39	184.38	
Pipe Center Level																	
Pipeline (Diameter)																	
Cumulative Distance	0	25	50	75	100	125	150	175	200	225	250	275	300	325	350	360	
Chainage	**0+000**	1+732 17 +25	1+262 13 +50	+75	**0+100**	+25	+50	+75	**0+200**	+25	+50	+75	**0+300**	+25	+50	**0+360**	

PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-029
		SCALE: **L:1/1000 , H: 1/400**



LEGEND	MOSQUE	COMMERCIAL BUILDING	BUILDINGS	SCHOOL BUILDING	CANAL	TREE	CULVERT	ROW	PROPOSED LINE	NATURAL GROUND LEVEL



Water Level				
Ground Elevations	184.38	184.33	184.39	184.44
Pipe Center Level				
Pipeline (Diameter)				
Cumulative Distance	360	375	400	412
Chainage	**0+360**	+75	**0+400**	**0+412**

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PROJECT TITLE:	DRAWING TITLE:	DRAWING No:
THE PROJECT FOR WATER SUPPLY, SEWERAGE AND DRAINAGE MASTER PLAN OF FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN	PLAN AND PROFILE OF DISTRIBUTION PRIMARY MAIN – PHASE II	WS-DZ-III-030
		SCALE: **L:1/1000 , H: 1/400**