

REPUBLIC OF SENEGAL
NATIONAL OFFICE OF SANITATION OF SENEGAL
NATIONAL AGENCY FOR PUBLIC CLEANING OF SENEGAL

**THE PROJECT FOR TREATMENT OF SEWAGE, RAINWATER
AND WASTES IN KAOLACK CITY
IN THE REPUBLIC OF SENEGAL**

FINAL REPORT

Volume II: Main Report

Drawings and Design Notes

MARCH 2014

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

**CTI ENGINEERING INTERNATIONAL CO., LTD
EARTH AND HUMAN CORPORATION**

GE
JR
14-074

**REPUBLIC OF SENEGAL
NATIONAL OFFICE OF SANITATION OF SENEGAL
NATIONAL AGENCY FOR PUBLIC CLEANING OF SENEGAL**

**THE PROJECT FOR TREATMENT OF SEWAGE, RAINWATER
AND WASTES IN KAOLACK CITY
IN THE REPUBLIC OF SENEGAL**

FINAL REPORT

Volume II: Main Report

Drawings and Design Notes

MARCH 2014

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

**CTI ENGINEERING INTERNATIONAL CO., LTD
EARTH AND HUMAN CORPORATION**

COMPOSITION DU RAPPORT FINAL

Volume I : Résumé

Volume II : Rapport Principal

Volume II : Rapport Principal Dessins et Notes de Conception

Les taux de change utilisés dans le présent document sont comme suit :

EUR 1,00	= FCFA 655,957	= USD 1,305	= JPY 109,545
USD 1,00	= FCFA 502,649	= EUR 0,766	= JPY 83,943
JPY 100,00	= FCFA 598,823	= USD 1,191	= EUR 0,913

(au mois de décembre 2012)

Les taux de change utilisés dans le présent document sont comme suit :

EUR 1,00	= FCFA 657,071	= USD 1,326	= JPY 130,100
USD 1,00	= FCFA 495,455	= EUR 0,754	= JPY 98,100
JPY 100,00	= FCFA 505,051	= USD 1,019	= EUR 0,769

(au mois d'août 2013)

Note: les Tableaux et les Figures sans indication de source(s) ont été élaborés sur la base des données ou des informations recueillies directement ou analysées de façon indépendante par l'Equipe d'Experts de la JICA.

DRAWINGS

THE PROJECT FOR TREATMENT OF SEWAGE, RAINWATER AND WASTES IN KAOLACK CITY

LIST OF DRAWINGS

NO.	TITLE OF DRAWINGS	DRAWING NO.
SEWERAGE AND SANITATION FACILITIES		
GENERAL MAP AND GENERAL LAYOUT PLAN		
1	GENERAL MAP	S-GM-01
2	GENERAL LAYOUT PLAN (1/3)	S-GM-02
3	GENERAL LAYOUT PLAN (2/3)	S-GM-03
4	GENERAL LAYOUT PLAN (3/3)	S-GM-04
TRUNK SEWER		
PLAN AND PROFILE		
5	TRUNK SEWER A-1	S-TS-01
6	TRUNK SEWER A-2	S-TS-02
7	TRUNK SEWER A-3	S-TS-03
8	TRUNK SEWER A-4	S-TS-04
9	TRUNK SEWER A-5	S-TS-05
10	TRUNK SEWER A-6	S-TS-06
11	TRUNK SEWER A-7	S-TS-07
12	TRUNK SEWER A-8	S-TS-08
13	TRUNK SEWER B-1	S-TS-09
14	TRUNK SEWER B-2	S-TS-10
15	TRUNK SEWER B-3	S-TS-11
16	TRUNK SEWER B-4	S-TS-12
17	TRUNK SEWER B-5	S-TS-13
18	TRUNK SEWER B-6	S-TS-14
19	TRUNK SEWER B-7	S-TS-15
20	TRUNK SEWER B-8	S-TS-16
21	TRUNK SEWER B-9	S-TS-17
22	TRUNK SEWER B-10	S-TS-18
23	TRUNK SEWER B-11	S-TS-19
24	TRUNK SEWER B-12	S-TS-20
25	TRUNK SEWER B-13	S-TS-21
26	TRUNK SEWER B-14 (FROM SMB14-01 TO SMB14-24)	S-TS-22
27	TRUNK SEWER B-14 (FROM SMB14-24 TO SMB18-01)	S-TS-23
28	TRUNK SEWER B-15	S-TS-24
29	TRUNK SEWER B-16	S-TS-25
30	TRUNK SEWER B-17	S-TS-26
31	TRUNK SEWER B-18	S-TS-27
32	TRUNK SEWER B-19	S-TS-28
33	TRUNK SEWER B-20	S-TS-29

NO.	TITLE OF DRAWINGS	DRAWING NO.
35	TRUNK SEWER B-21	S-TS-30
36	TRUNK SEWER B-22	S-TS-31
37	TRUNK SEWER B-23	S-TS-32
38	TRUNK SEWER B-24	S-TS-33
39	TRUNK SEWER B-25	S-TS-34
40	TRUNK SEWER C-1	S-TS-35
41	TRUNK SEWER C-2	S-TS-36
42	TRUNK SEWER C-3	S-TS-37
43	TRUNK SEWER C-4	S-TS-38
44	TRUNK SEWER C-5	S-TS-39
45	TRUNK SEWER C-6	S-TS-40
46	TRUNK SEWER C-7	S-TS-41
47	TRUNK SEWER C-8	S-TS-42
48	TRUNK SEWER C-9	S-TS-43
49	TRUNK SEWER C-10	S-TS-44
50	TRUNK SEWER C-11	S-TS-45
51	TRUNK SEWER C-12	S-TS-46
52	TRUNK SEWER C-13	S-TS-47
53	TRUNK SEWER C-14	S-TS-48
54	TRUNK SEWER C-15 (FROM SMC15-01 TO SMC15-15)	S-TS-49
55	TRUNK SEWER C-15 (FROM SMC15-15 TO SMC16-01)	S-TS-50
56	TRUNK SEWER C-16	S-TS-51
57	TRUNK SEWER C-17	S-TS-52
58	TRUNK SEWER C-18	S-TS-53
STRUCTURAL DETAIL		
59	DETAIL OF MANHOLE	S-TS-54
PUMPING STATION		
60	PS DAROU SALAM NDANGANE AND PS BOUSTANE	S-PS-01
SEWAGE TREATMENT PLANT		
61	GENERAL LAYOUT PLAN	S-ST-01
62	FLOW DIAGRAM	S-ST-02
63	HYDRAULIC PROFILE	S-ST-03
64	CONNECTING PIPE	S-ST-04
65	STRUCTURAL DETAILS (1/2)	S-ST-05
66	STRUCTURAL DETAILS (2/2)	S-ST-06
67	REFERENCE (GENERAL LAYOUT PLAN OF ALTERNATIVE 2)	S-ST-07

NO.	TITLE OF DRAWINGS	DRAWING NO.
STORMWATER DRAINAGE FACILITIES		
GENERAL MAP		
68	GENERAL MAP	D-GM-01
DRAINAGE BOX CULVERT		
PLAN AND PROFILE		
69	ROUTE N-0 (DMN0-01 TO DMN0-12)	D-BC-01
70	ROUTE N-0 (DMN0-12 TO DMN1-01)	D-BC-02
71	ROUTE N-1	D-BC-03
72	ROUTE N-3	D-BC-04
73	ROUTE N-5 (DMN5-01 TO DMN5-12)	D-BC-05
74	ROUTE N-5 AND N-6 (DMN5-12 TO DMN6-09)	D-BC-06
75	ROUTE N-6 (DMN6-09 TO DMN6-22)	D-BC-07
76	ROUTE N-6 AND N-9 (DMN6-22 TO DMN9-PS)	D-BC-08
77	PUMPING STATION AND ROUTE N-PE (PS TO DMPE-11)	D-BC-09
78	ROUTE N-PE (DMPE-11 TO DMPE-22)	D-BC-10
79	ROUTE N-PE (DMPE-22 TO EXISTING CANAL)	D-BC-11
80	ROUTE N-2 (DMN2-01 TO DMN2-09)	D-BC-12
81	ROUTE N-2 (DMN2-09 TO DMN3-01)	D-BC-13
82	ROUTE N-4 (DMN4-01 TO DMN4-13)	D-BC-14
83	ROUTE N-4 (DMN4-13 TO DMN5-01)	D-BC-15
STRUCTURAL DETAILS		
84	ROUTE N-0 AND N-1	D-BC-16
85	ROUTE N-2 AND N-3	D-BC-17
86	ROUTE N-4 AND N-5	D-BC-18
87	ROUTE N-6 AND N-9	D-BC-19
88	ROUTE N-PE AND MANHOLE COVER	D-BC-20
PUMPING STATION		
89	GENERAL LAYOUT PLAN	D-PS-01
90	STRUCTURAL DETAILS (1/2)	D-PS-02
91	STRUCTURAL DETAILS (2/2)	D-PS-03
92	DETAIL OF INLET	D-PS-04
93	DETAIL OF OUTLET	D-PS-05
RETENTION POND		
94	GENERAL PLAN AND TYPICAL CROSS SECTION	D-RP-01
MISCELLANEOUS		
95	DETAIL OF HANDRAIL, SCREEN AND FENCE	D-MS-01

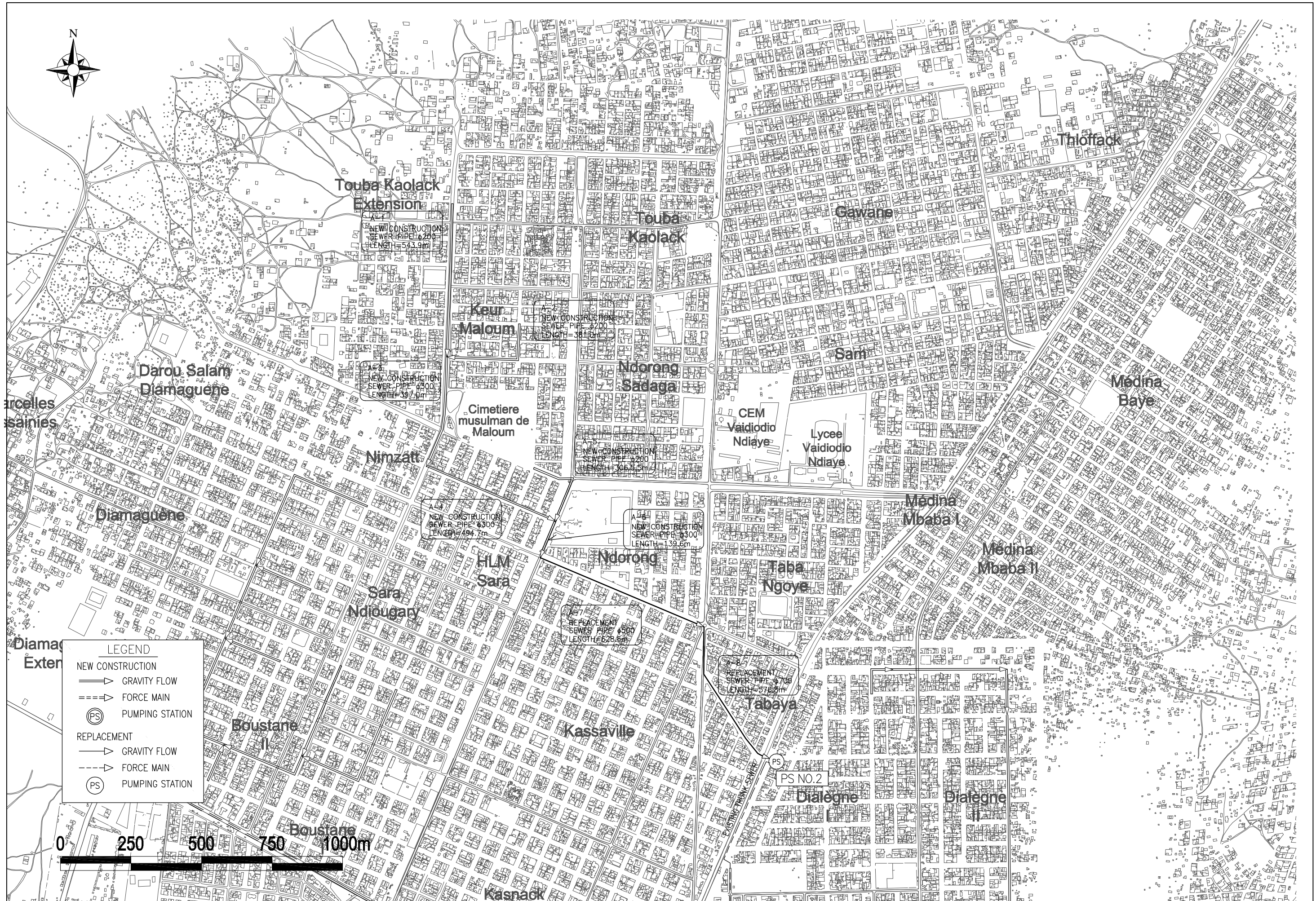
SEWERAGE AND SANITATION FACILITIES

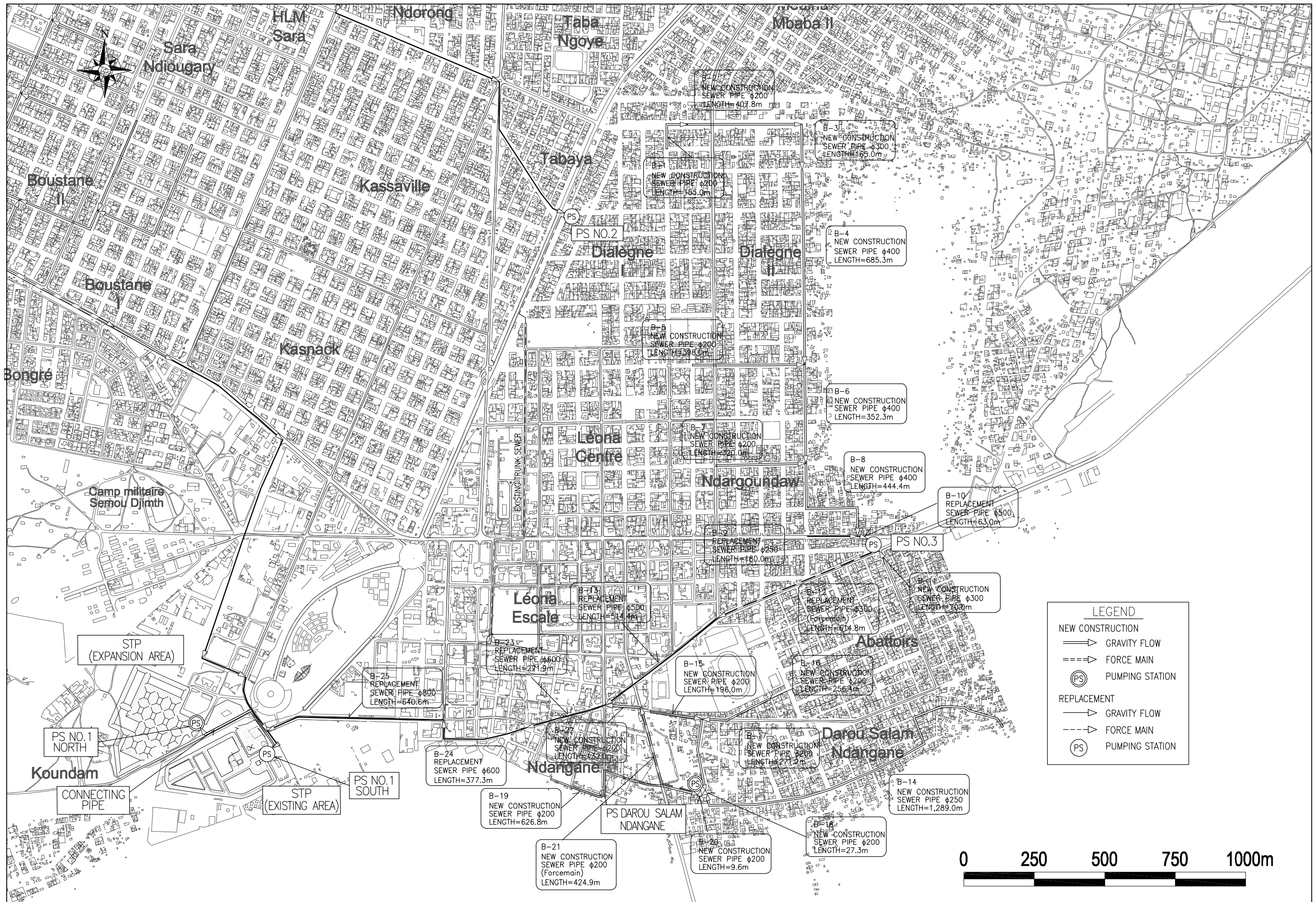


LEGEND

NEW CONSTRUCTION	
(NO) →	GRAVITY FLOW
(NO) - - - →	FORCE MAIN
(PS)	PUMPING STATION
REPLACEMENT	
(NO) →	GRAVITY FLOW
(NO) - - - →	FORCE MAIN
(PS)	PUMPING STATION

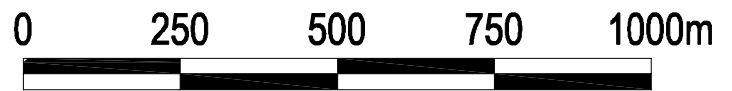


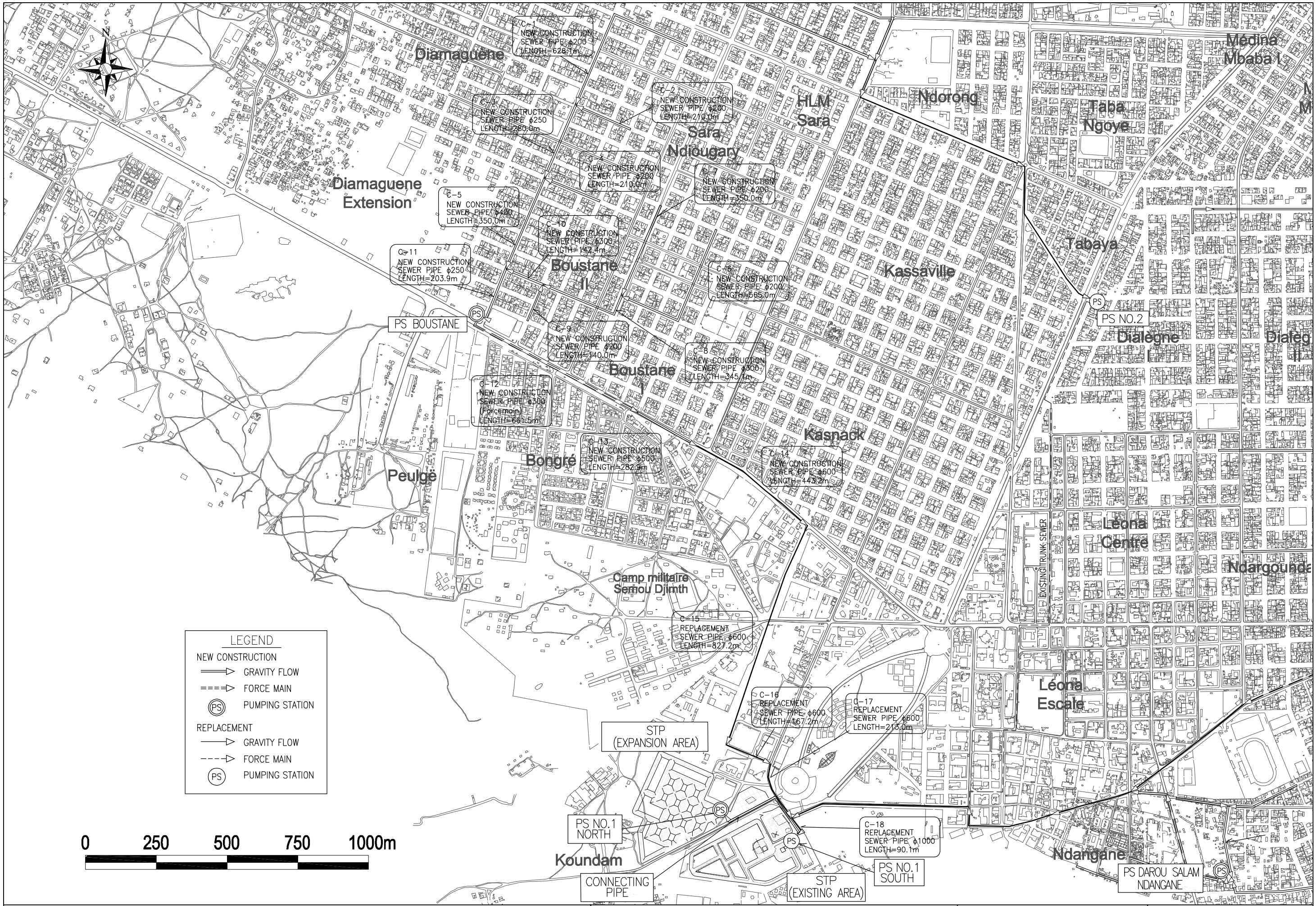




LEGEND

- NEW CONSTRUCTION
 - GRAVITY FLOW
 - FORCE MAIN
 - (PS) PUMPING STATION
- REPLACEMENT
 - GRAVITY FLOW
 - FORCE MAIN
 - (PS) PUMPING STATION





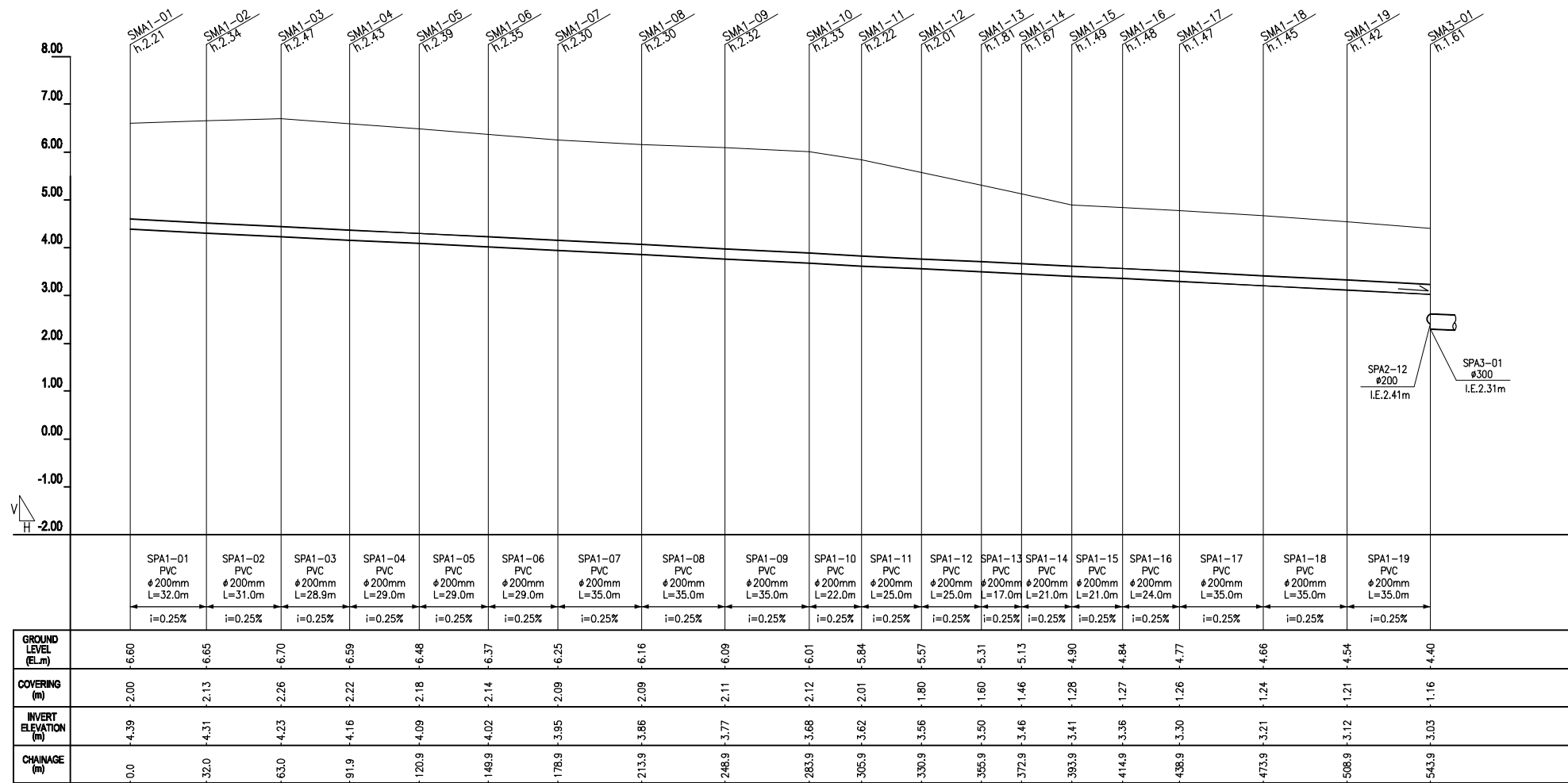


LEGEND

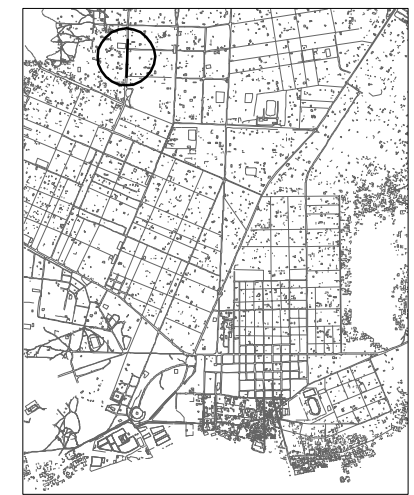
PROPOSED
 — SEWER PIPE
 ○ MANHOLE

EXISTING
 - - - SEWER PIPE
 → FLOW DIRECTION

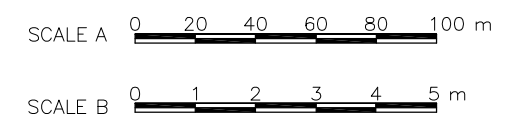
PLAN
SCALE A

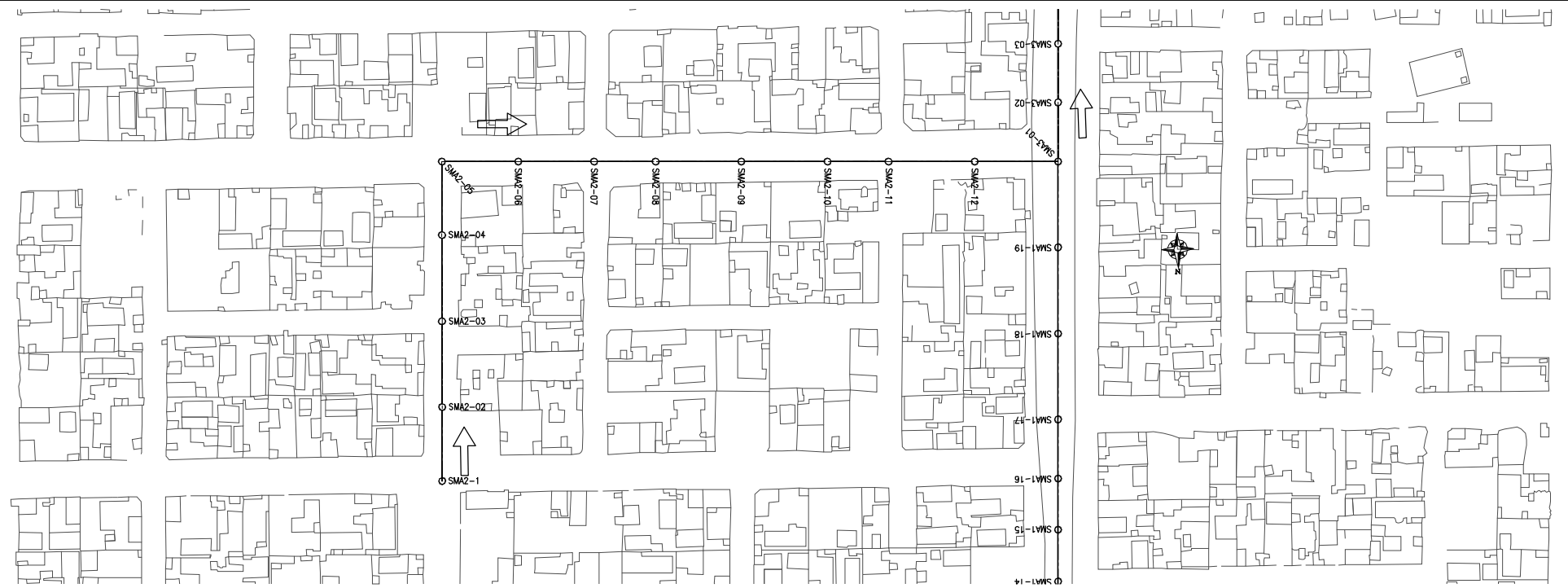


PROFILE
H: SCALE A V: SCALE B

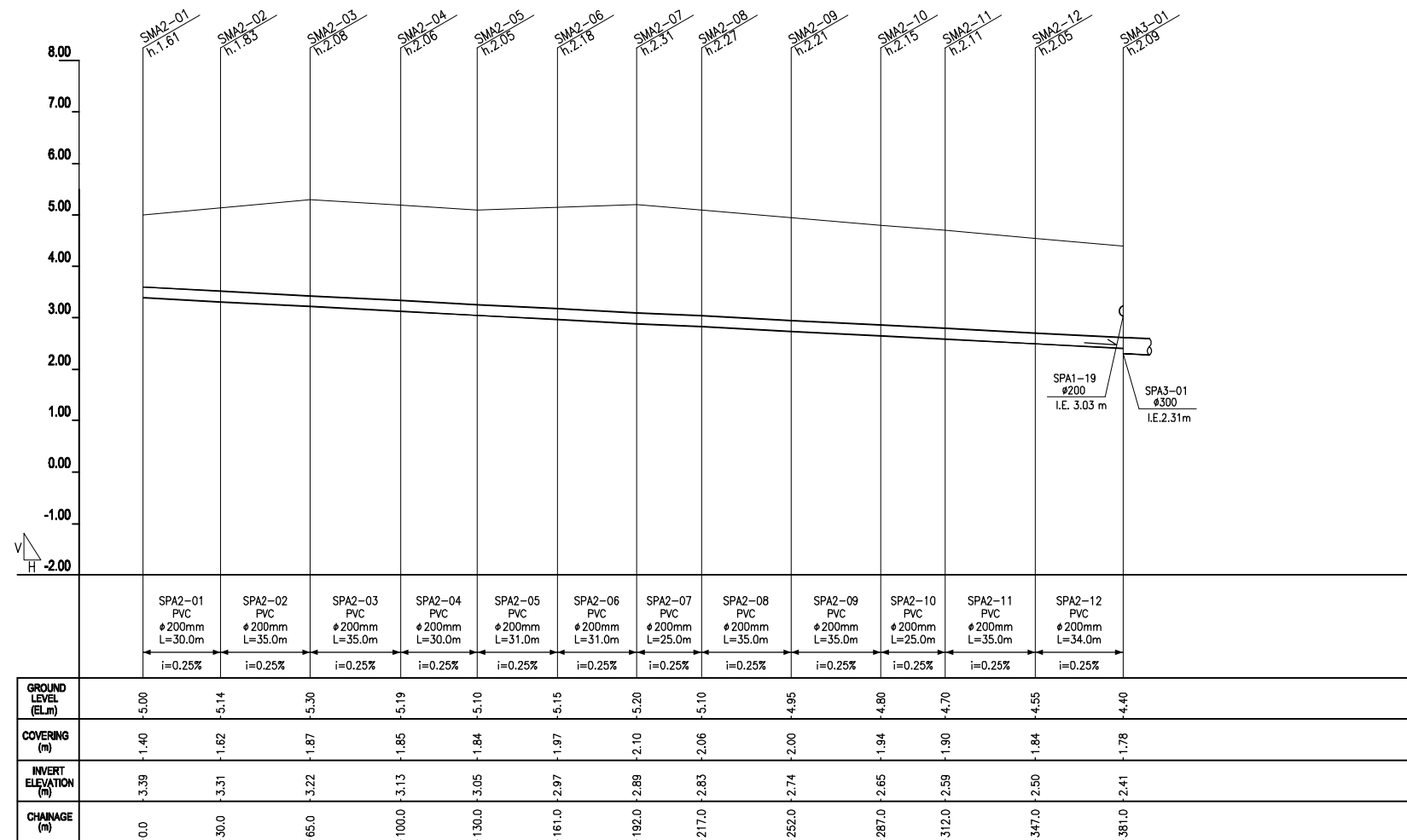


KEY PLAN

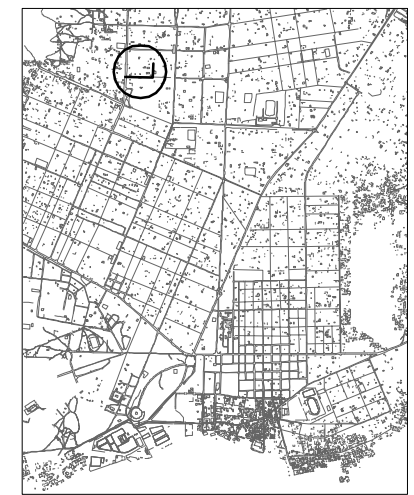




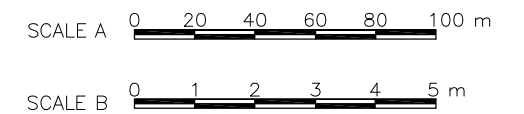
PLAN
SCALE A

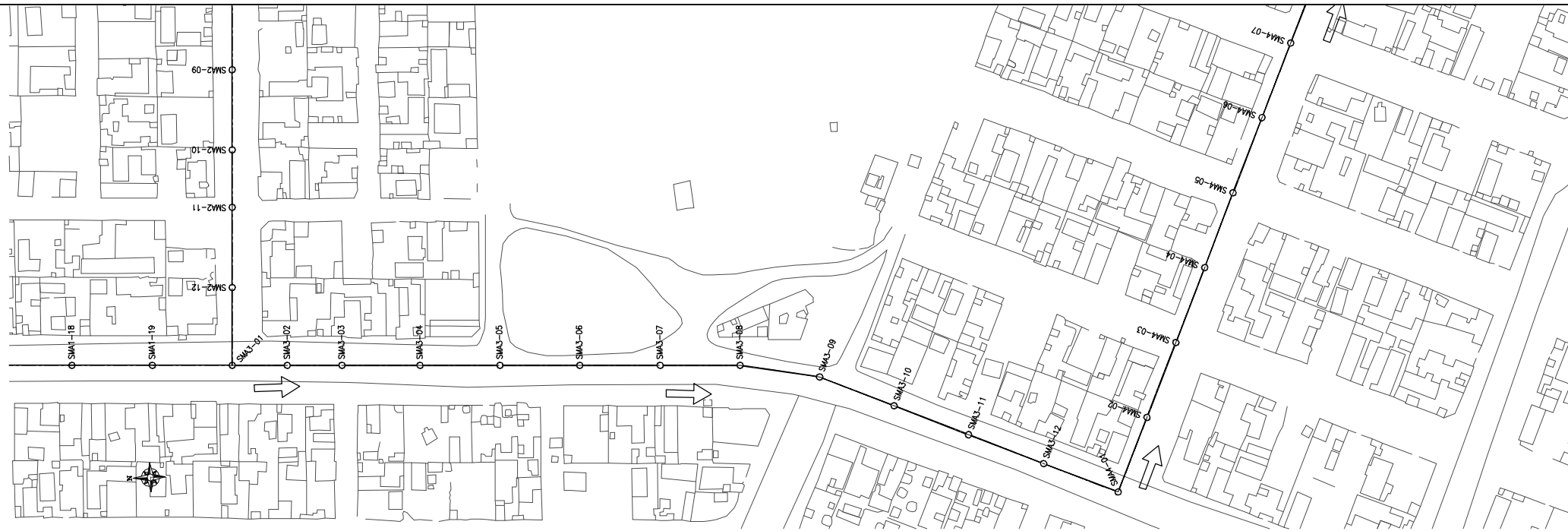


PROFILE
H: SCALE A V: SCALE B

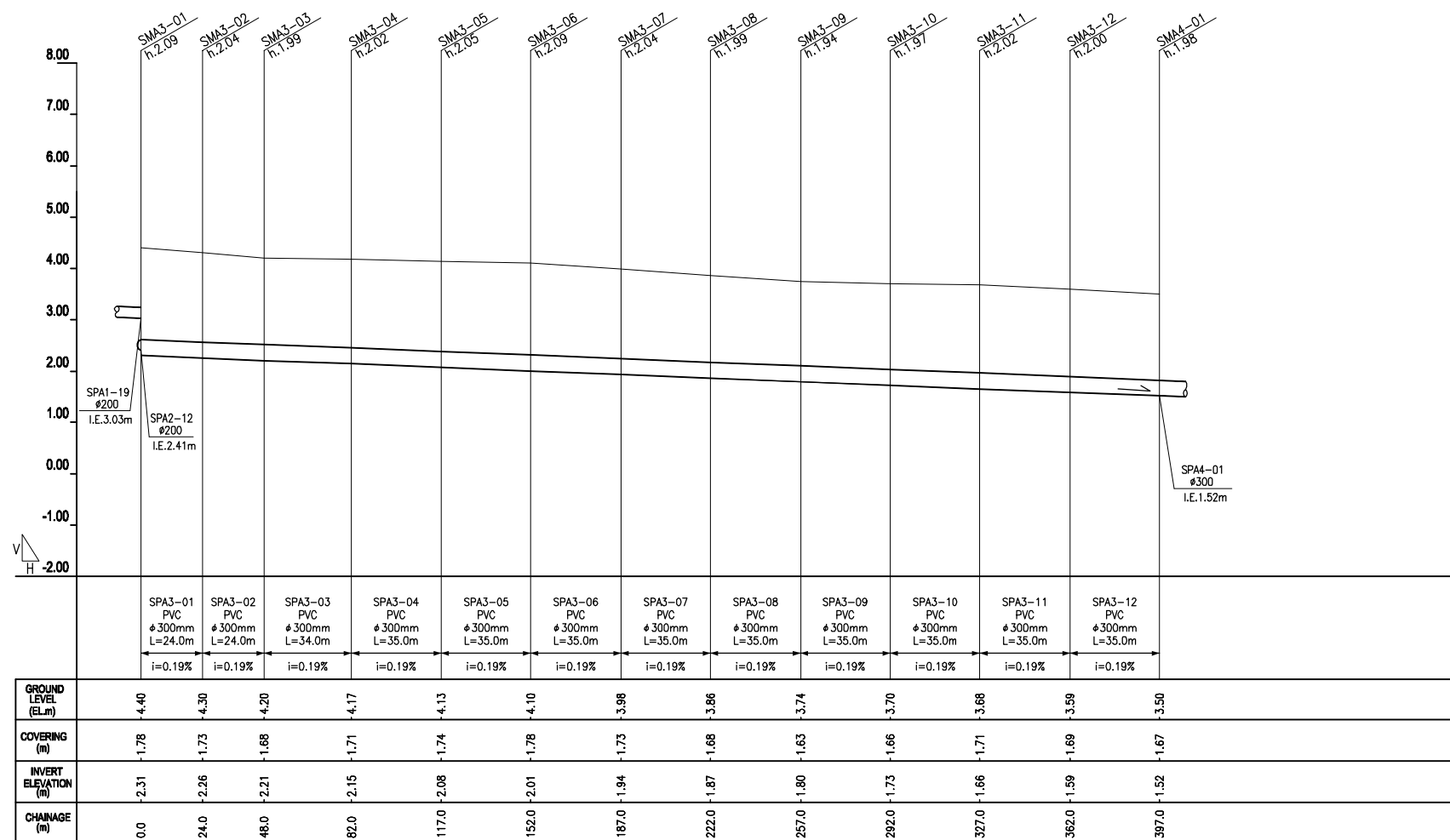


KEY PLAN

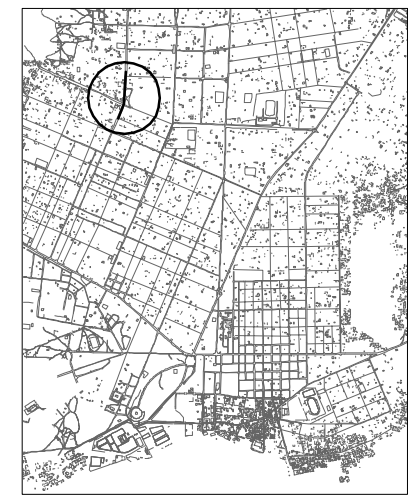




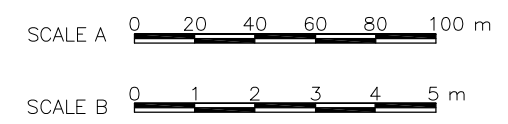
PLAN
SCALE A



PROFILE
H: SCALE A V: SCALE B



KEY PLAN



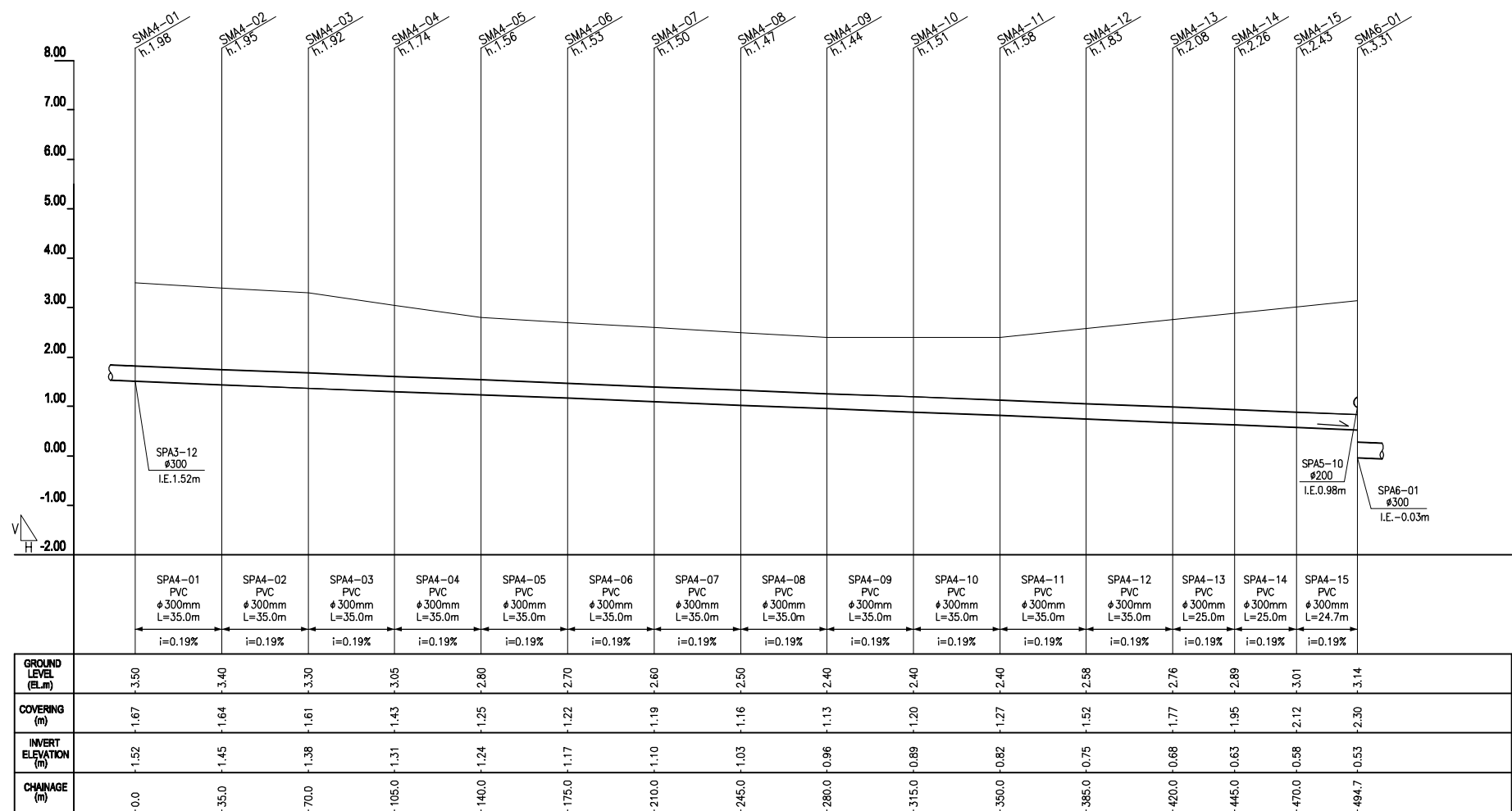


LEGEND

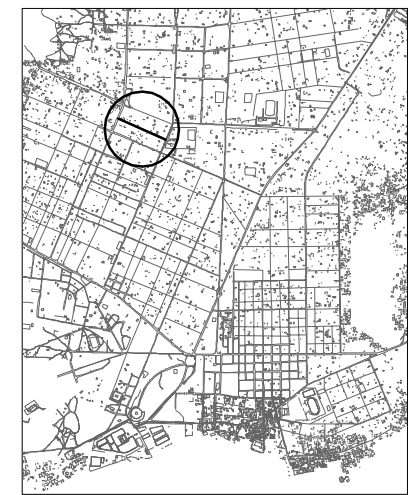
PROPOSED
 — SEWER PIPE
 ○ MANHOLE

EXISTING
 - - - SEWER PIPE
 → FLOW DIRECTION

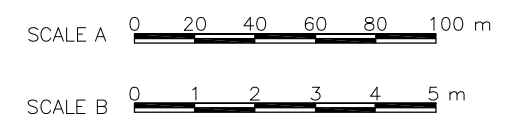
PLAN
SCALE A

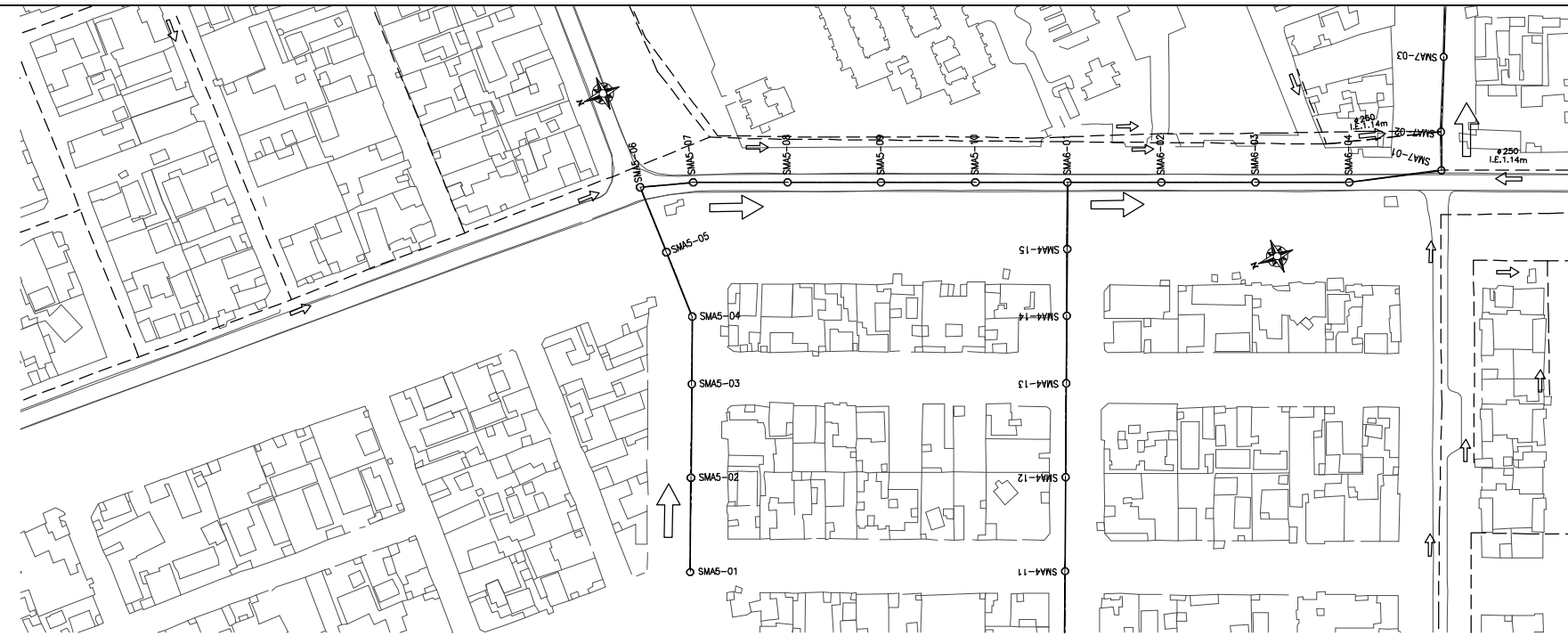


PROFILE
H: SCALE A V: SCALE B

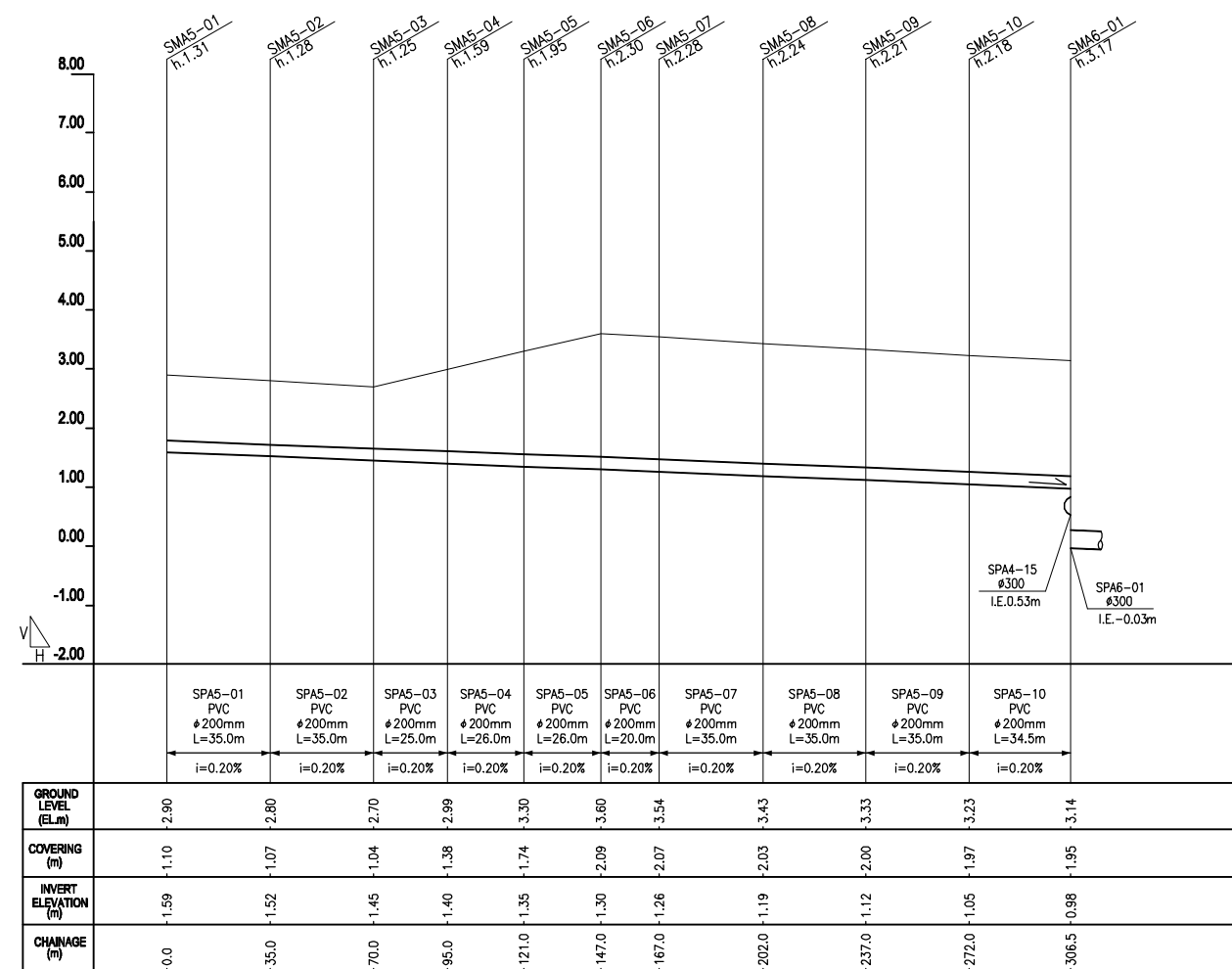
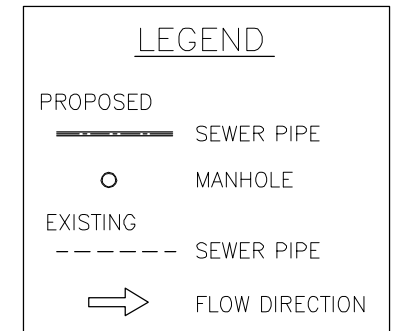


KEY PLAN

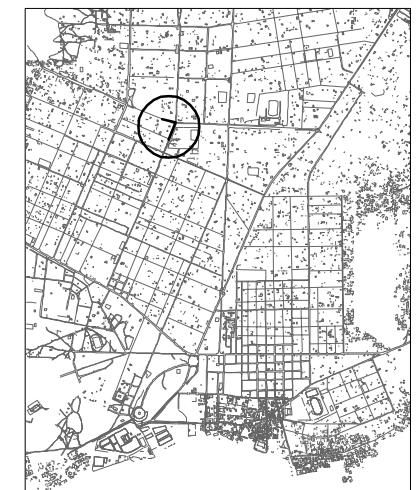




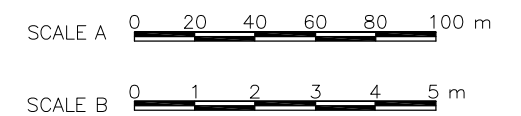
PLAN
SCALE A

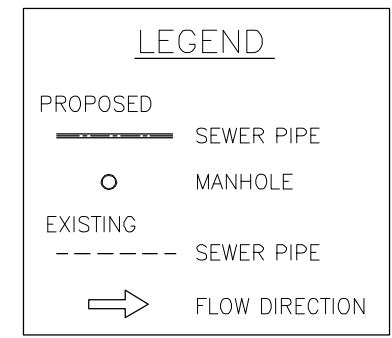
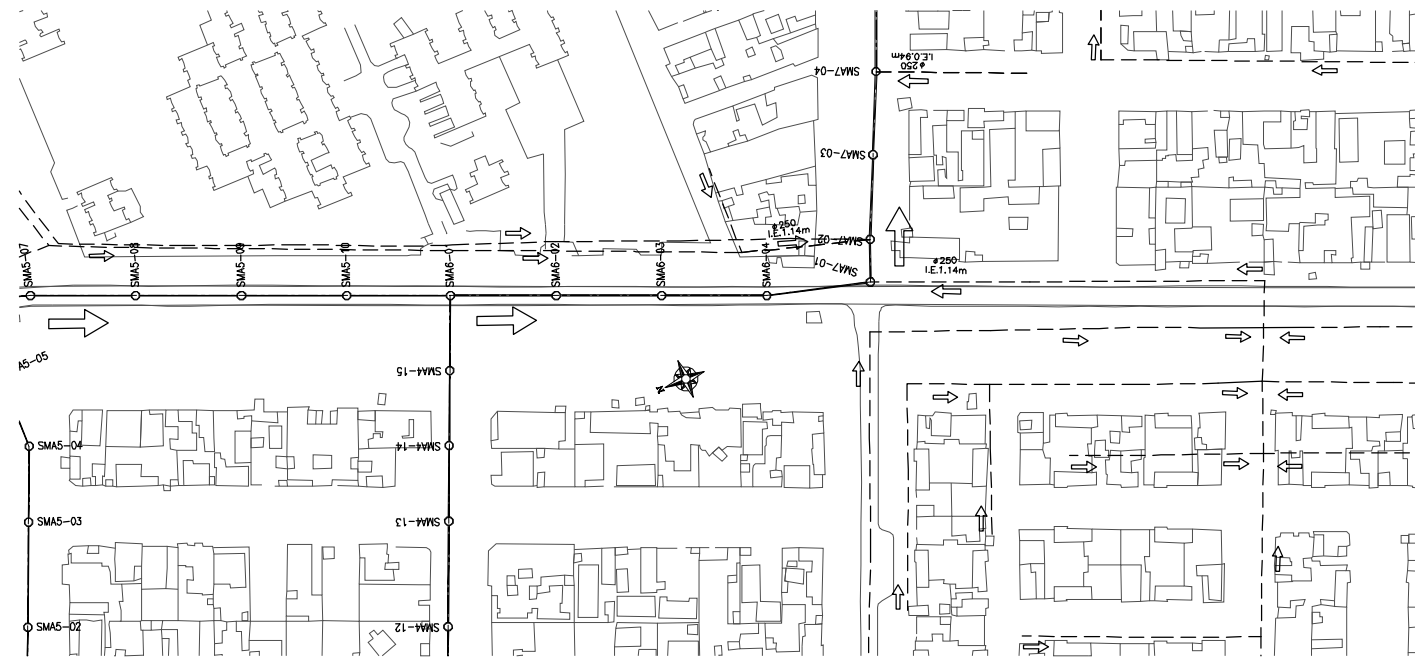


PROFILE
H: SCALE A V: SCALE B

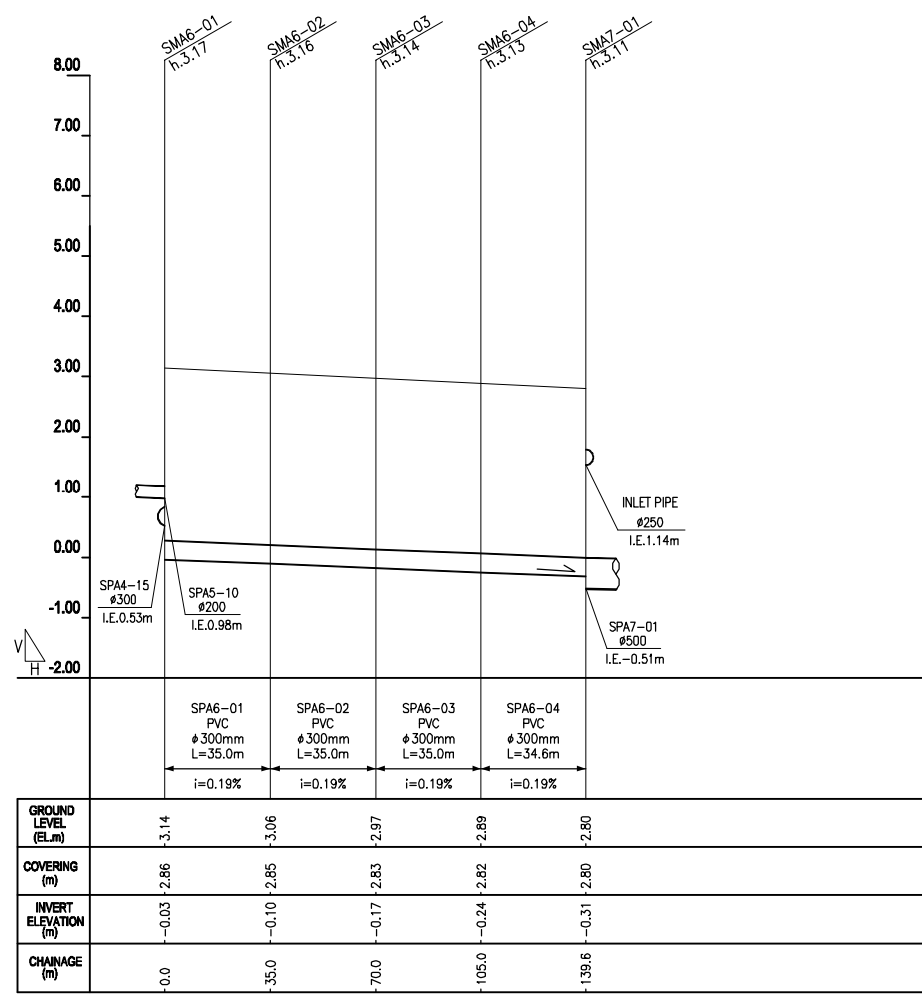


KEY PLAN

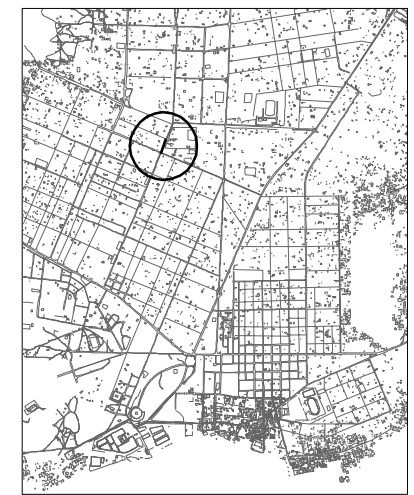




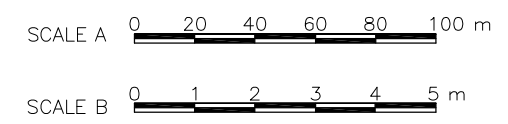
PLAN
SCALE A

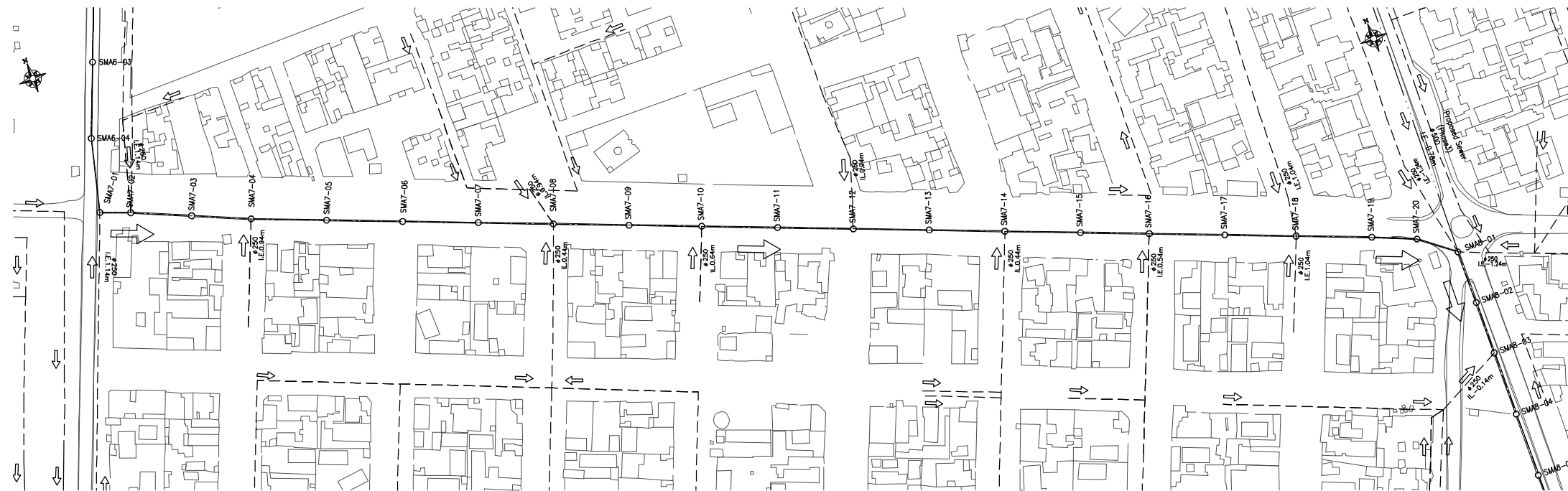


PROFILE
H: SCALE A V: SCALE B

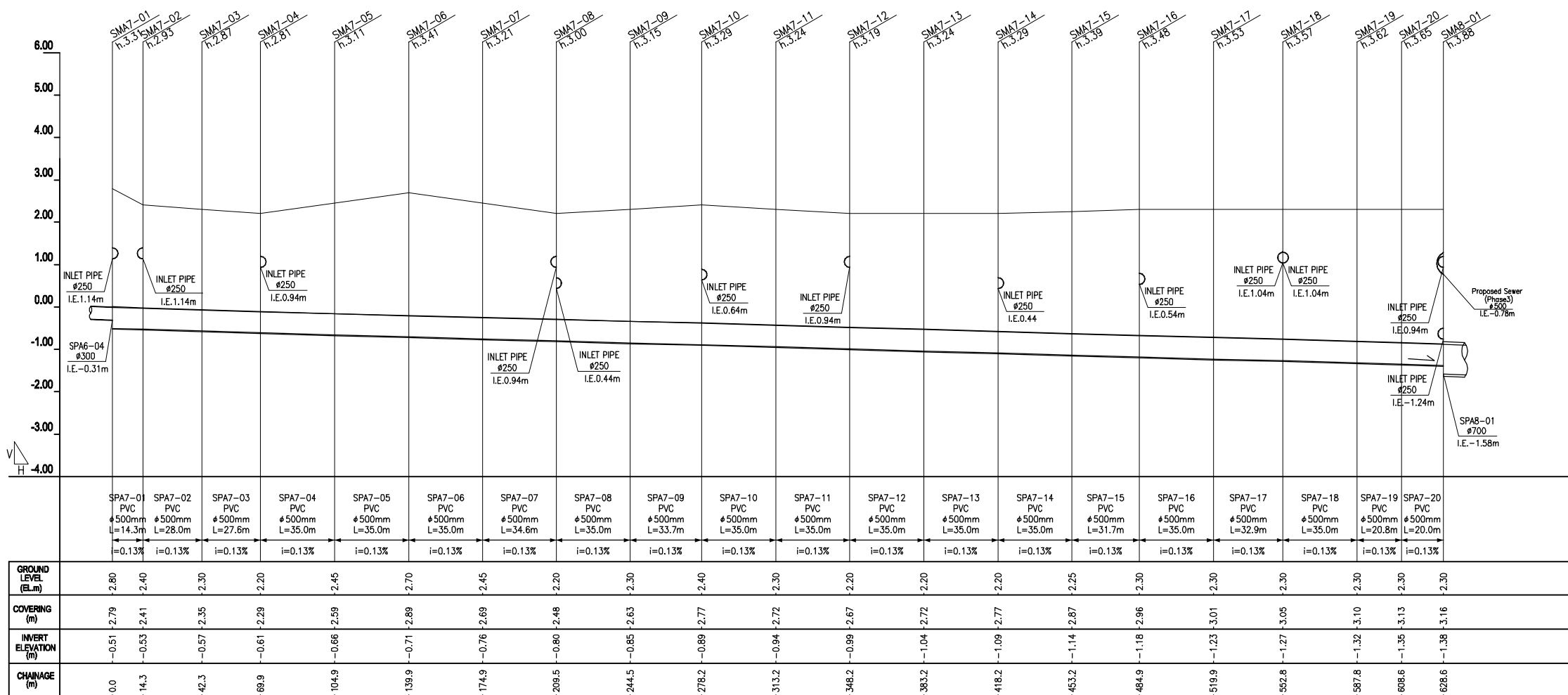
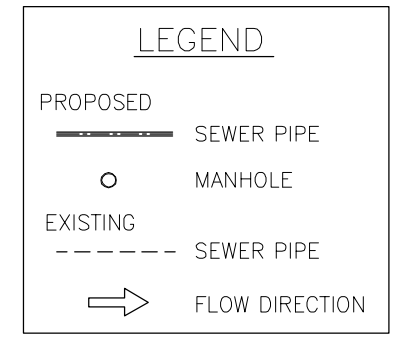


KEY PLAN

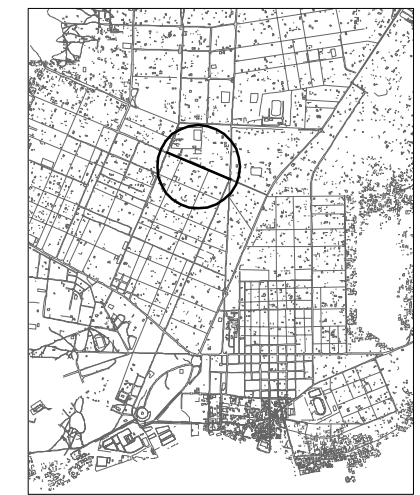




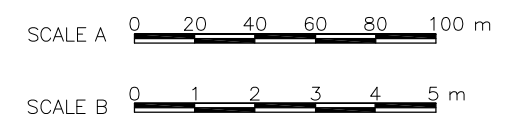
PLAN
SCALE A



PROFILE
H: SCALE A V: SCALE B

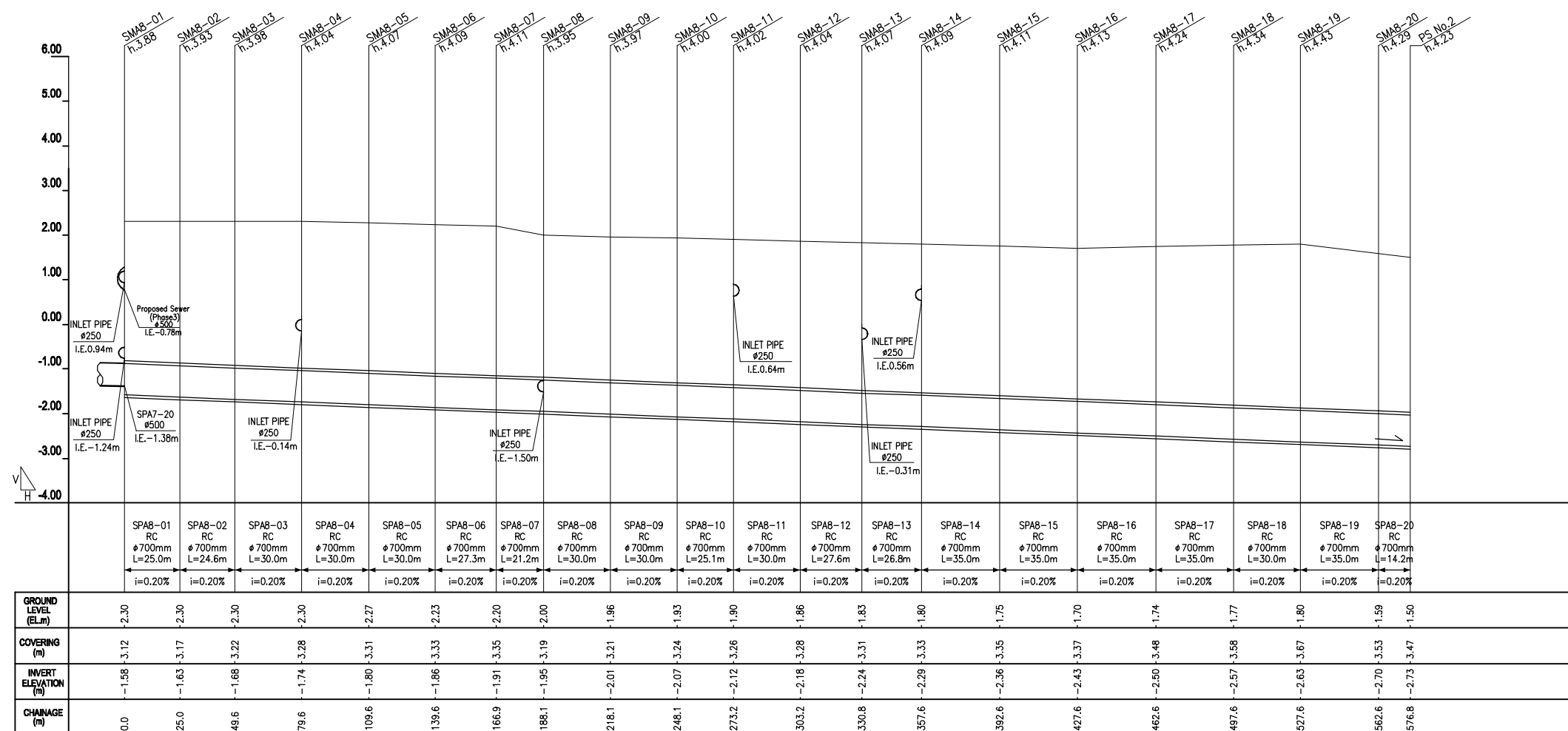
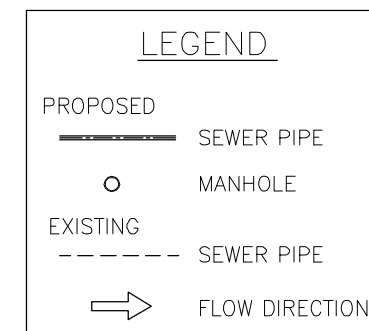


KEY PLAN

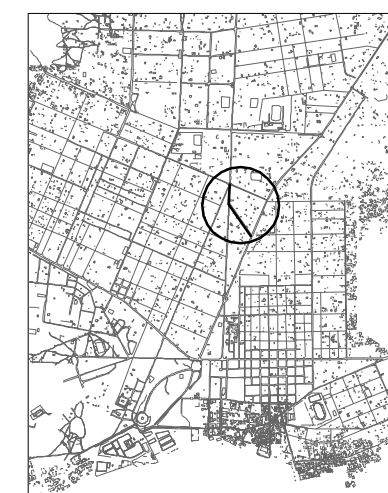




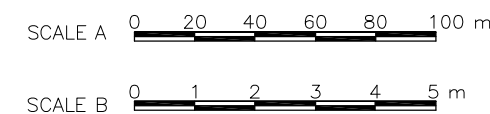
PLAN
SCALE A

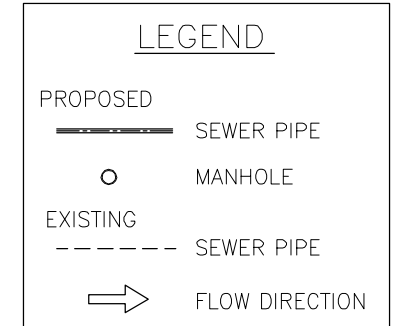
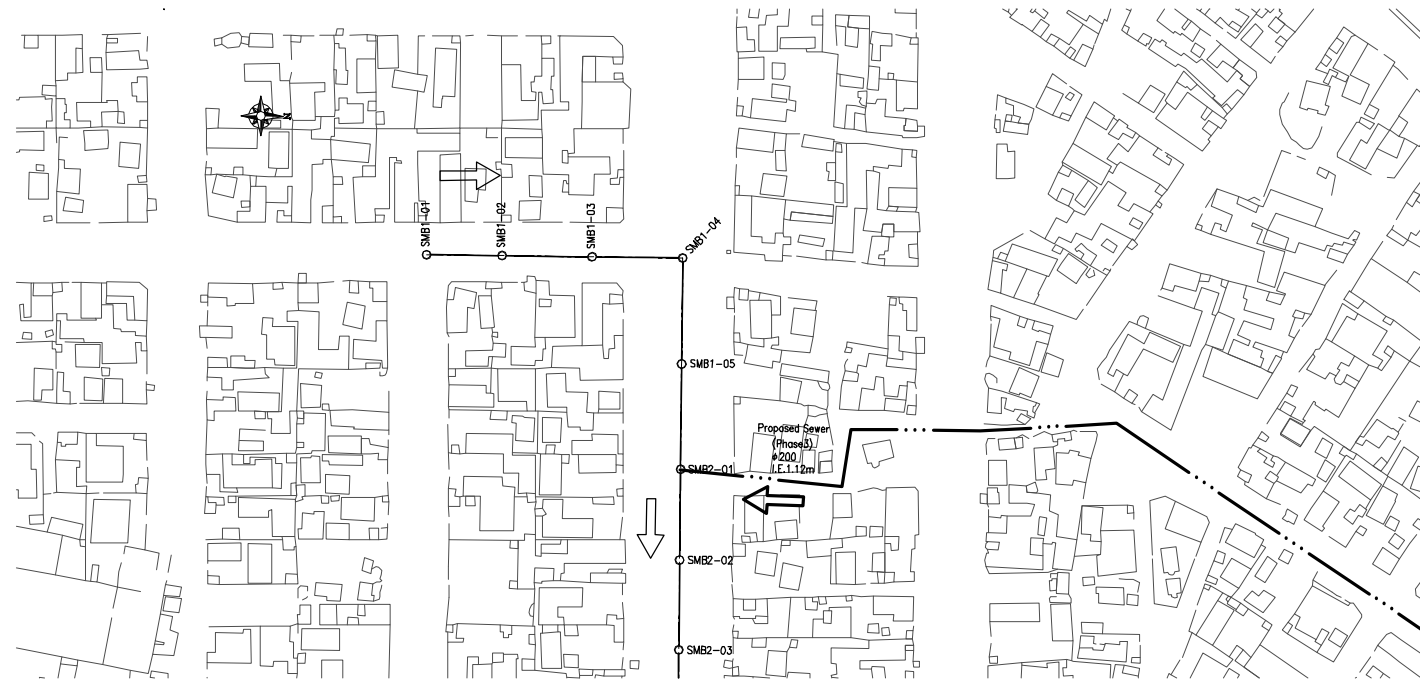


PROFILE
H: SCALE A V: SCALE B

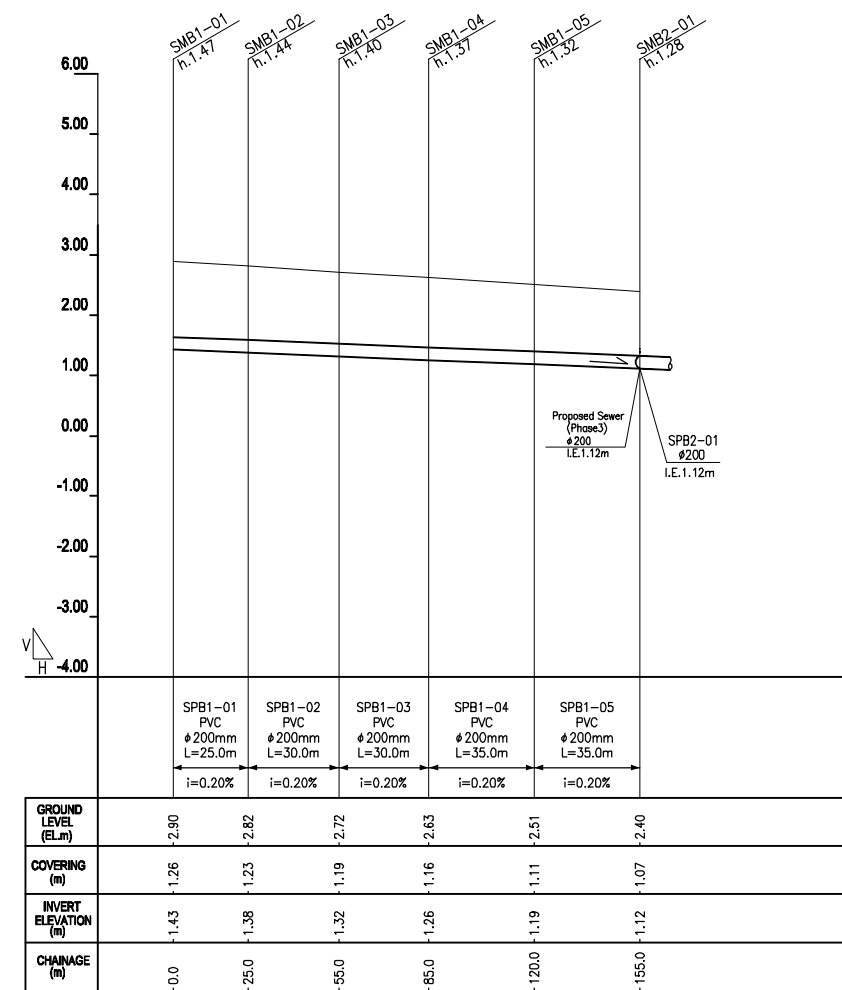


KEY PLAN

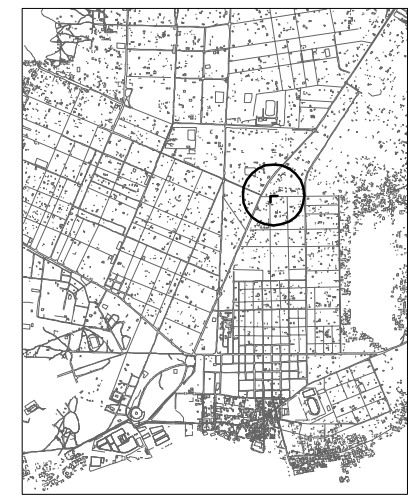




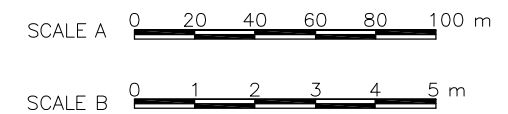
PLAN
SCALE A

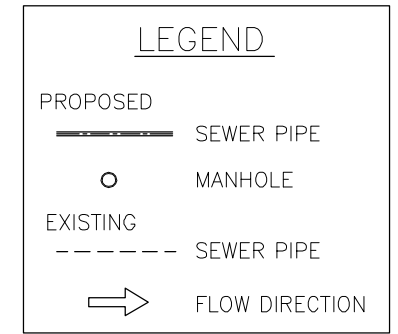


PROFILE
H: SCALE A V: SCALE B

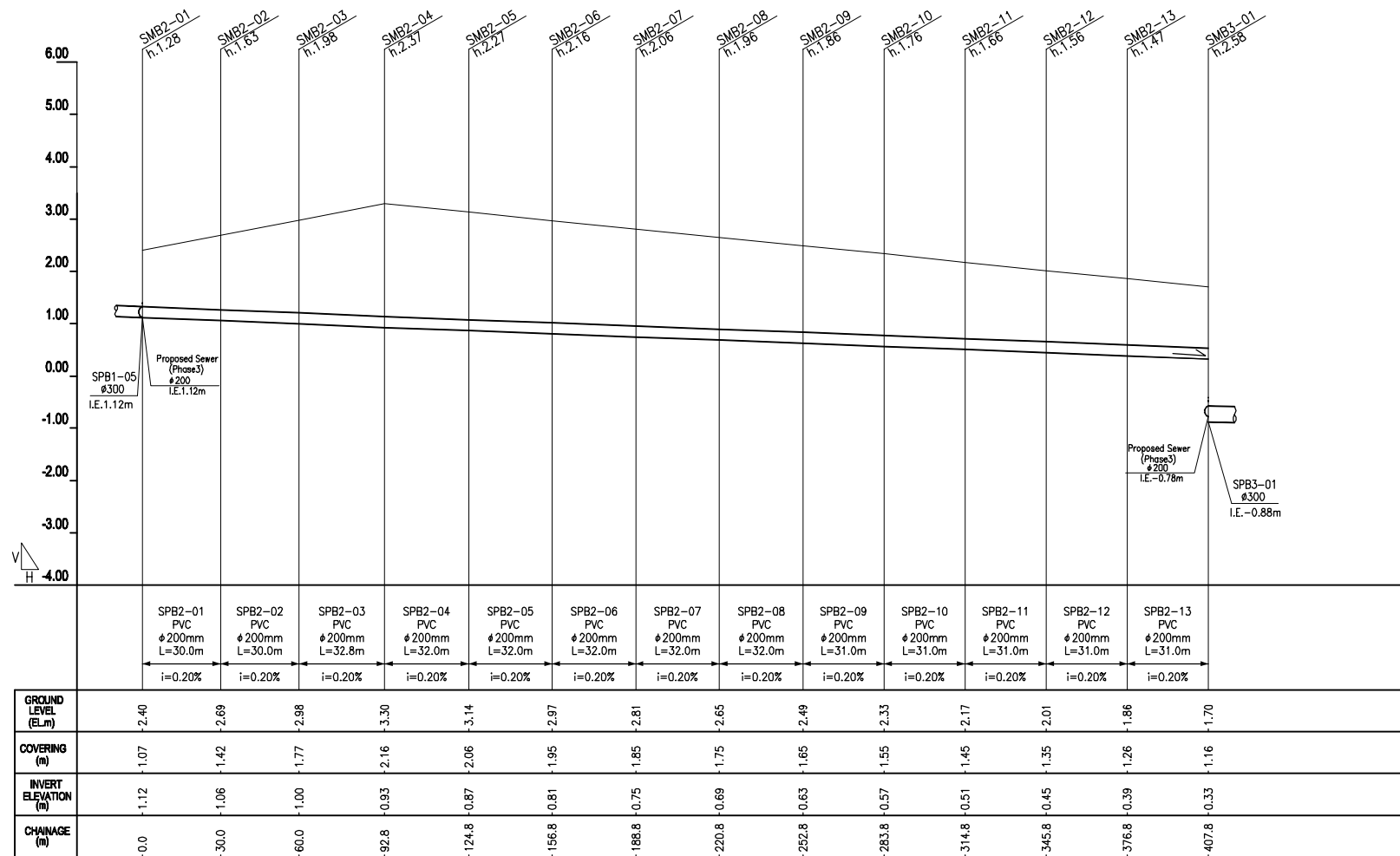


KEY PLAN

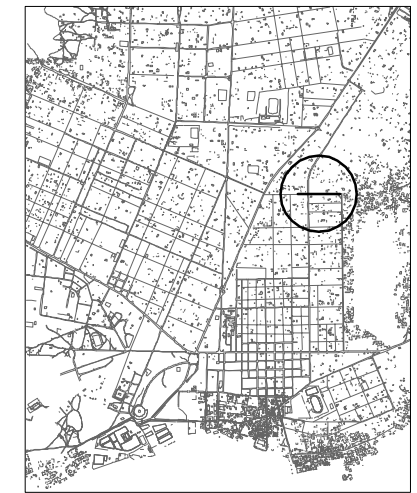




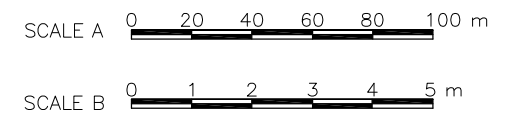
PLAN
SCALE A



PROFILE
H: SCALE A V: SCALE B

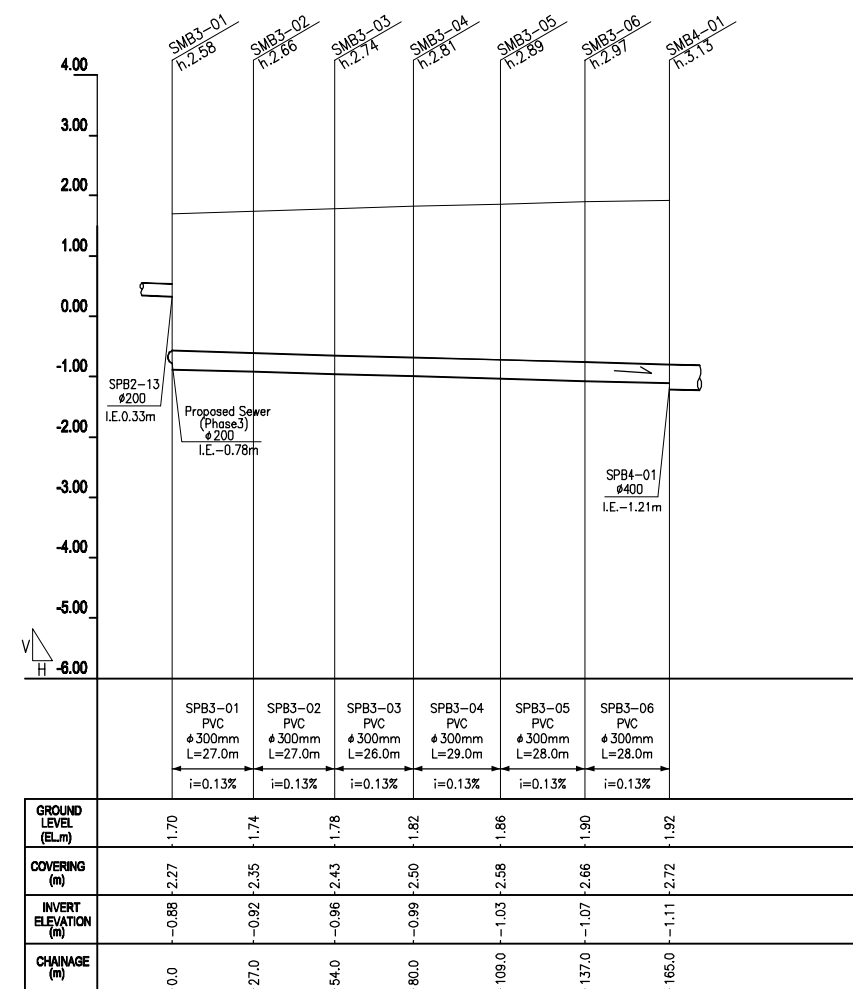
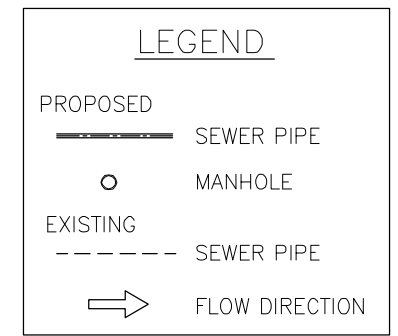


KEY PLAN

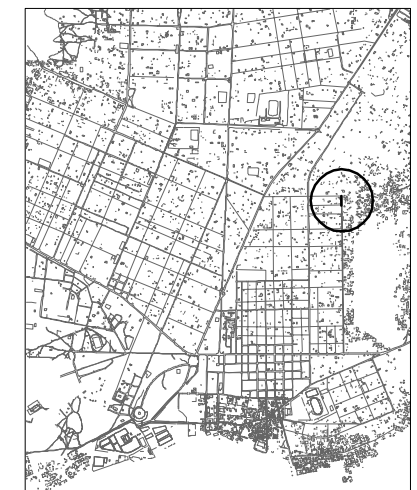




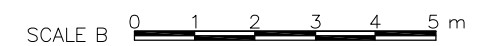
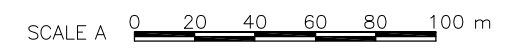
PLAN
SCALE A

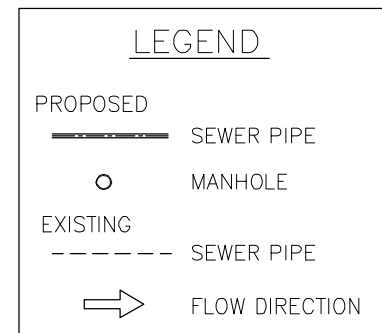


PROFILE
H: SCALE A V: SCALE B

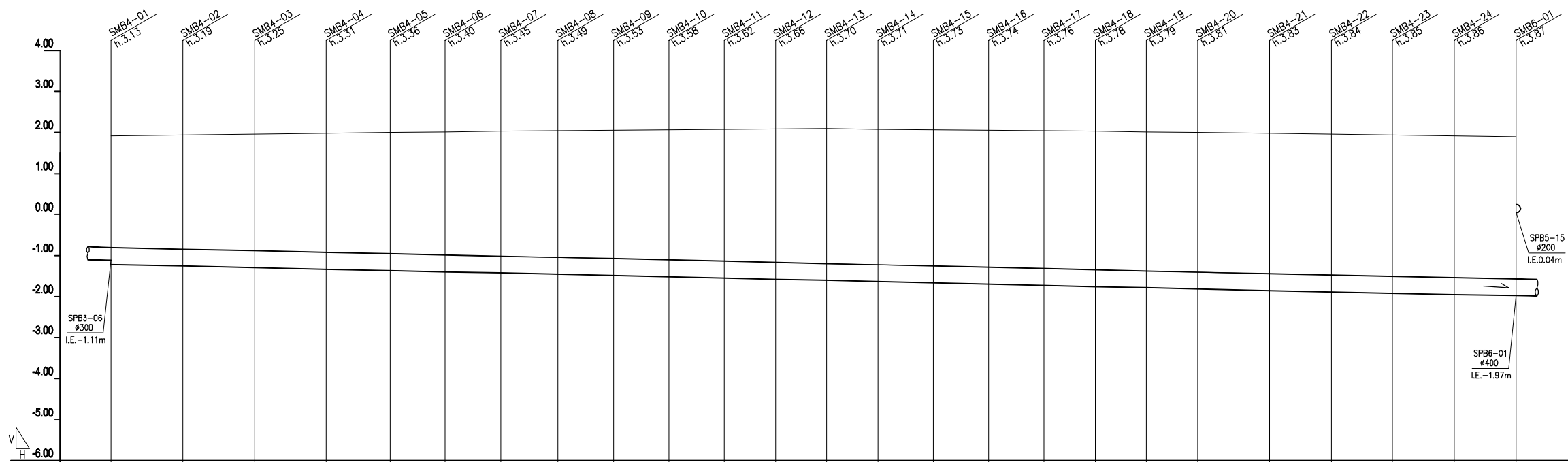


KEY PLAN

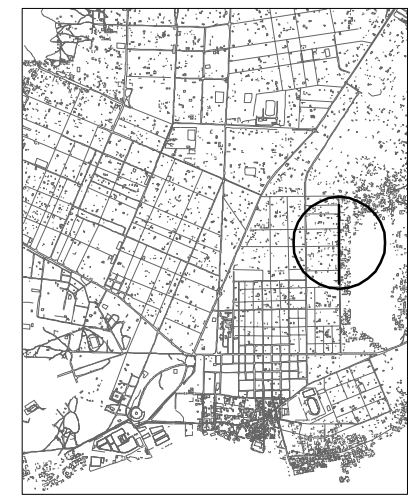




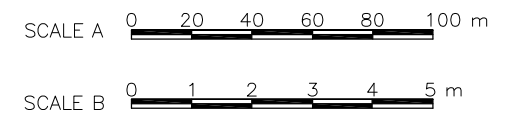
PLAN
SCALE A



	SMB4-01	SMB4-02	SMB4-03	SMB4-04	SMB4-05	SMB4-06	SMB4-07	SMB4-08	SMB4-09	SMB4-10	SMB4-11	SMB4-12	SMB4-13	SMB4-14	SMB4-15	SMB4-16	SMB4-17	SMB4-18	SMB4-19	SMB4-20	SMB4-21	SMB4-22	SMB4-23	SMB4-24	SMB6-01
GROUND LEVEL (ELm)	-1.92	-1.94	-1.96	-1.98	-2.00	-2.01	-2.03	-2.04	-2.05	-2.07	-2.08	-2.09	-2.10	-2.08	-2.07	-2.05	-2.04	-2.03	-2.01	-2.00	-1.98	-1.96	-1.94	-1.92	-1.90
COVERING (m)	2.71	2.77	2.83	2.89	2.94	2.98	3.03	3.07	3.11	3.16	3.20	3.24	3.28	3.29	3.31	3.32	3.34	3.36	3.37	3.39	3.41	3.42	3.43	3.44	3.45
INVERT ELEVATION (m)	-1.21	-1.25	-1.29	-1.33	-1.36	-1.39	-1.42	-1.45	-1.48	-1.51	-1.54	-1.57	-1.60	-1.63	-1.66	-1.69	-1.72	-1.75	-1.78	-1.81	-1.85	-1.88	-1.91	-1.94	-1.97
CHAINAGE (m)	0.0	35.0	70.0	105.0	136.0	163.0	190.0	218.0	245.0	272.0	299.0	324.0	349.0	374.0	401.0	428.0	455.0	480.0	505.0	530.0	565.0	595.0	625.0	655.0	685.3



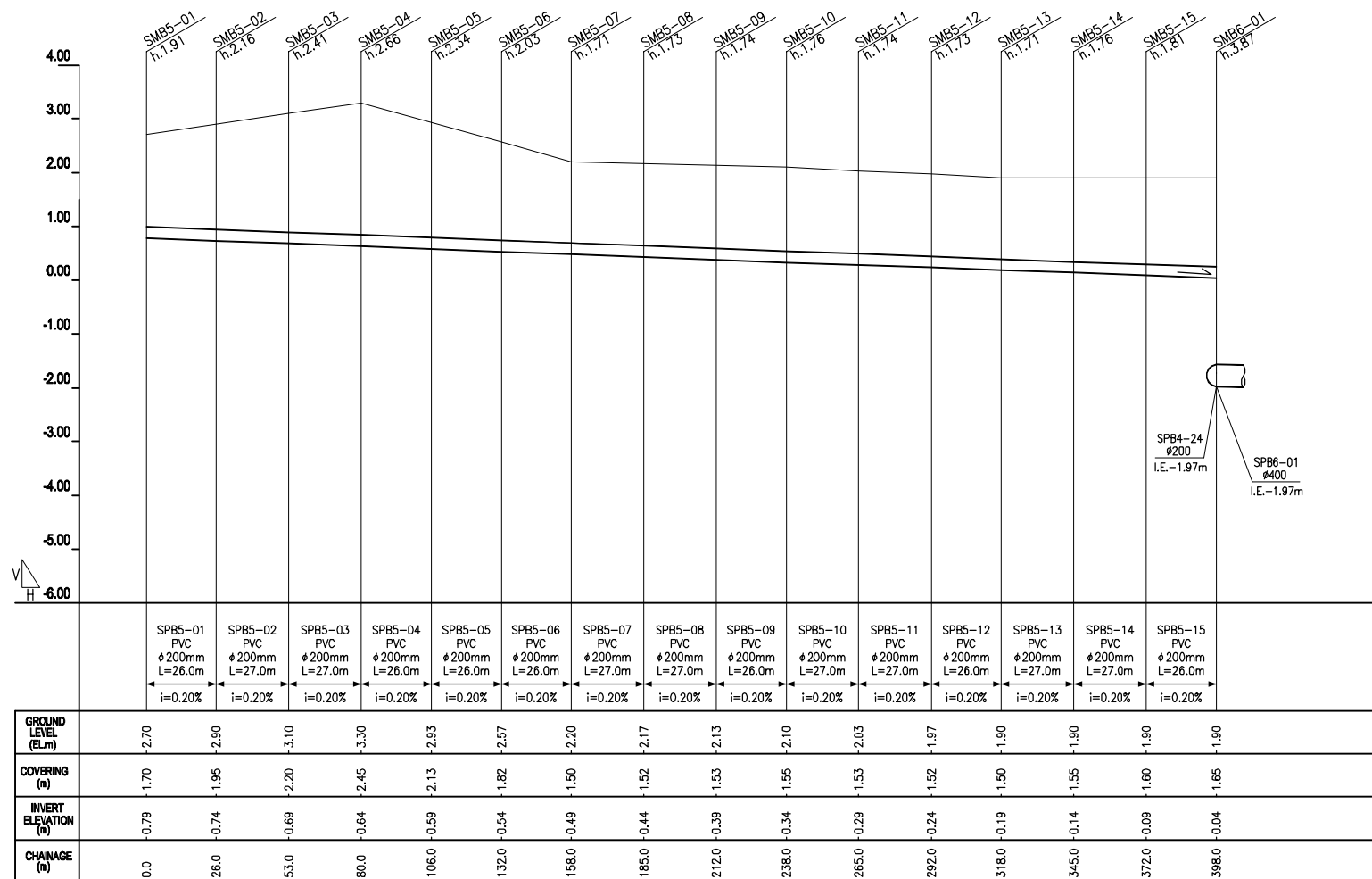
KEY PLAN



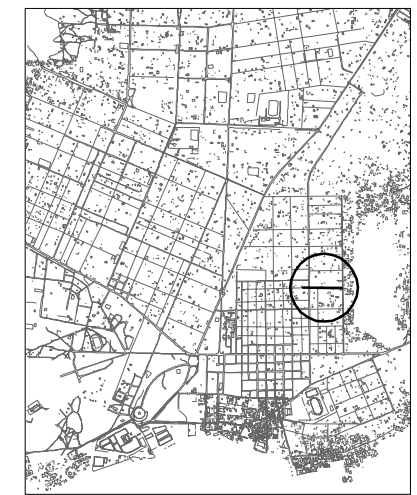
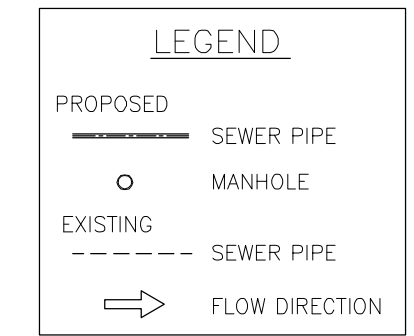
PROFILE
H: SCALE A V: SCALE B



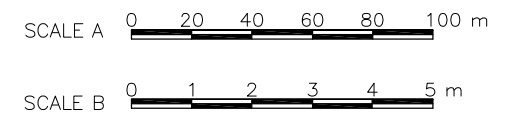
PLAN
SCALE A

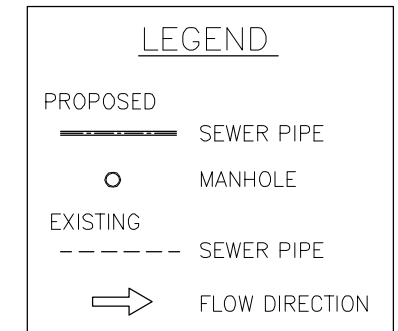


PROFILE
H: SCALE A V: SCALE B

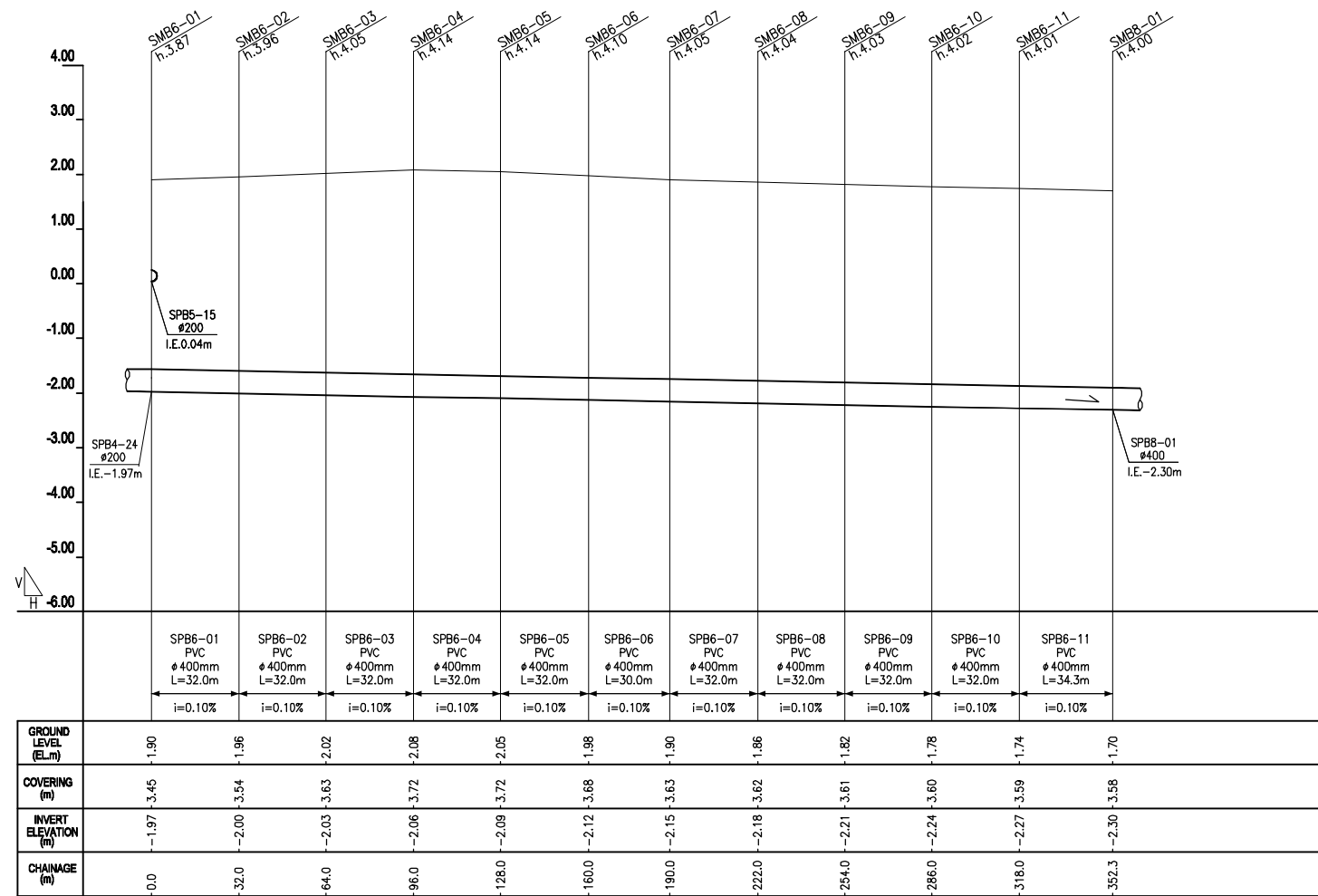


KEY PLAN

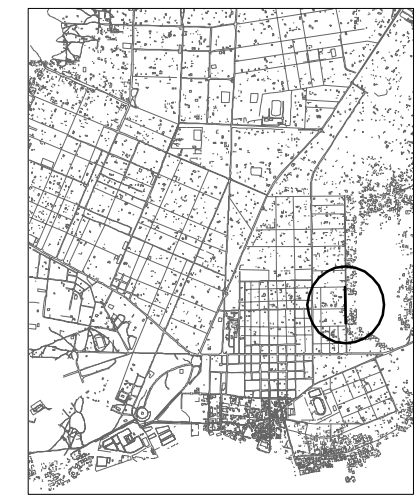




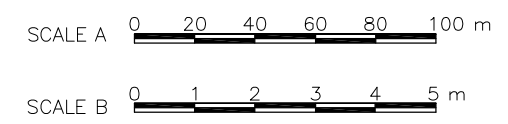
PLAN
SCALE A

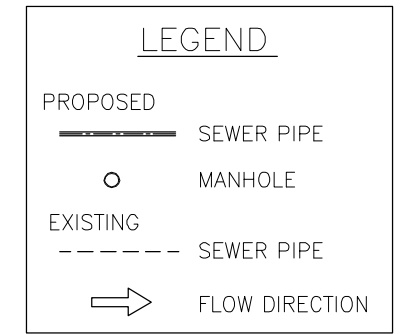


PROFILE
H: SCALE A V: SCALE B

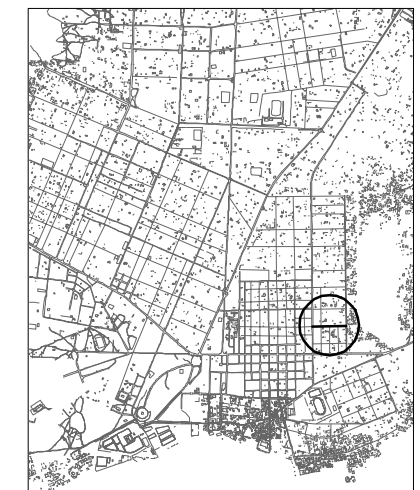
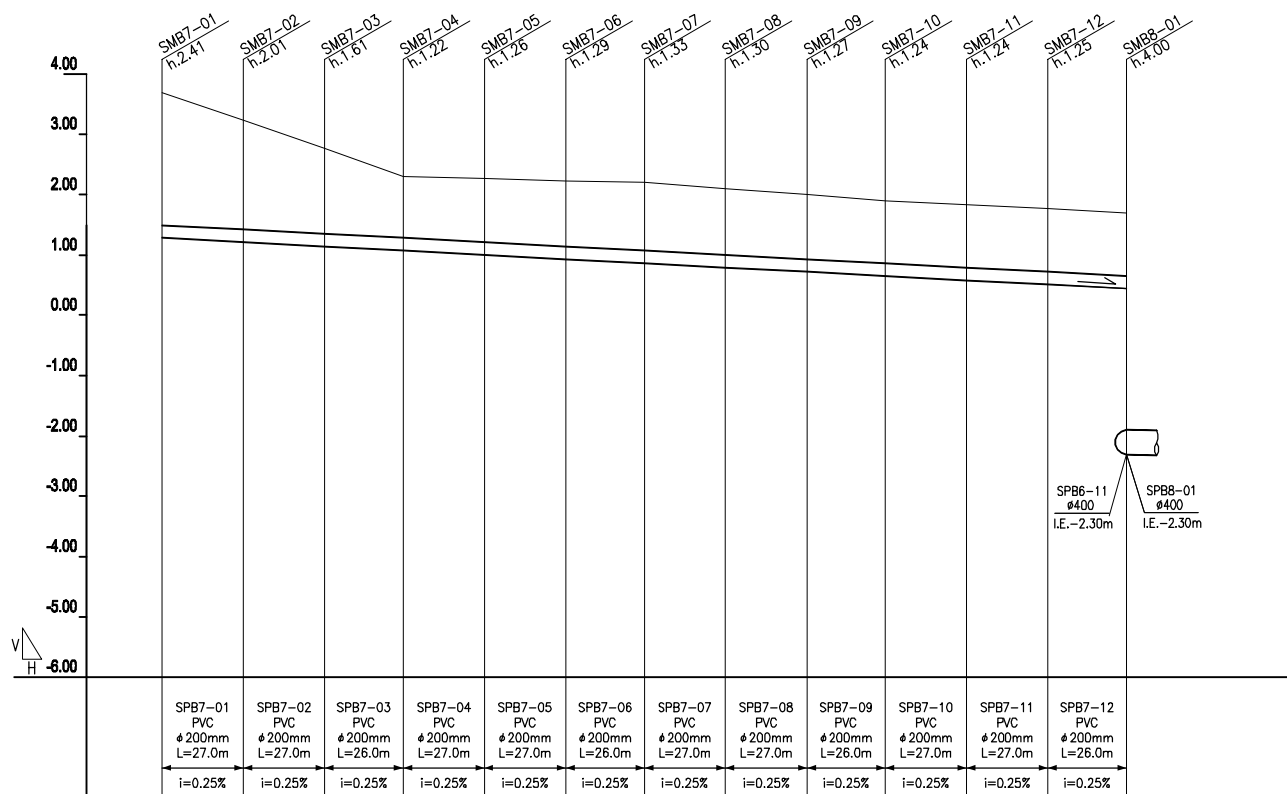


KEY PLAN

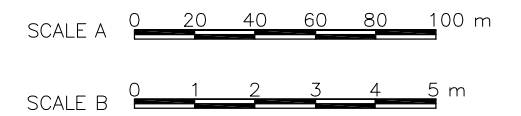




PLAN
SCALE A



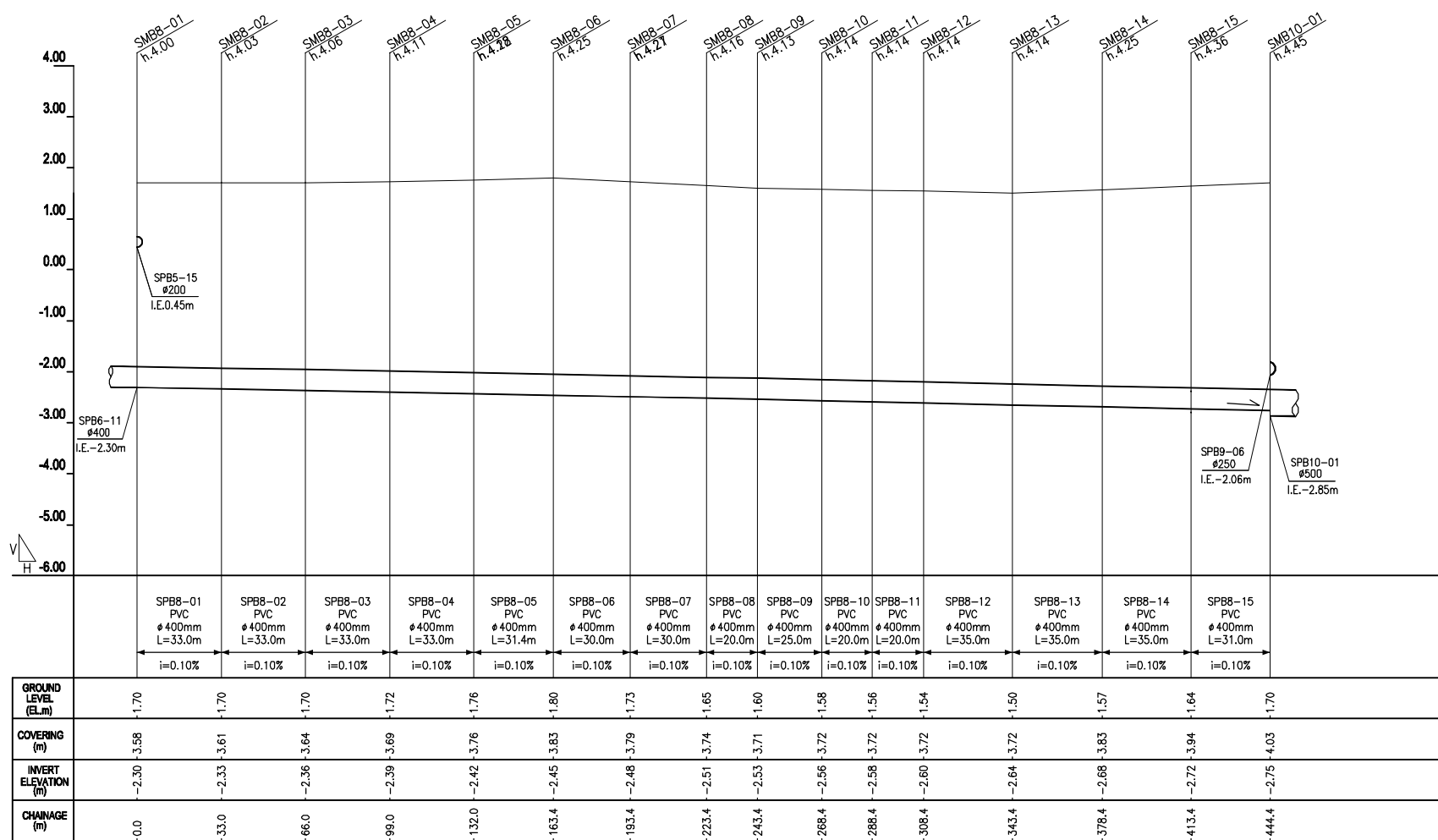
KEY PLAN



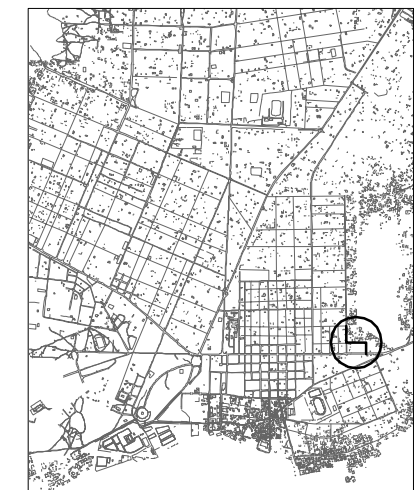
PROFILE
H: SCALE A V: SCALE B



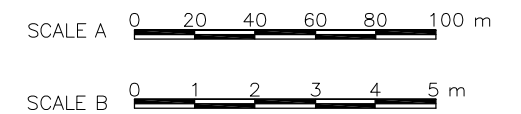
PLAN
SCALE A

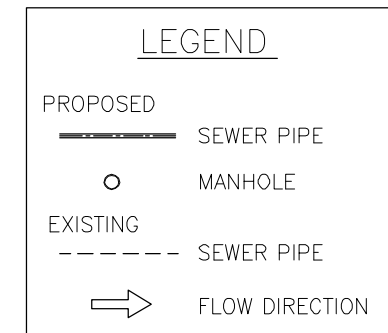


PROFILE
H: SCALE A V: SCALE B

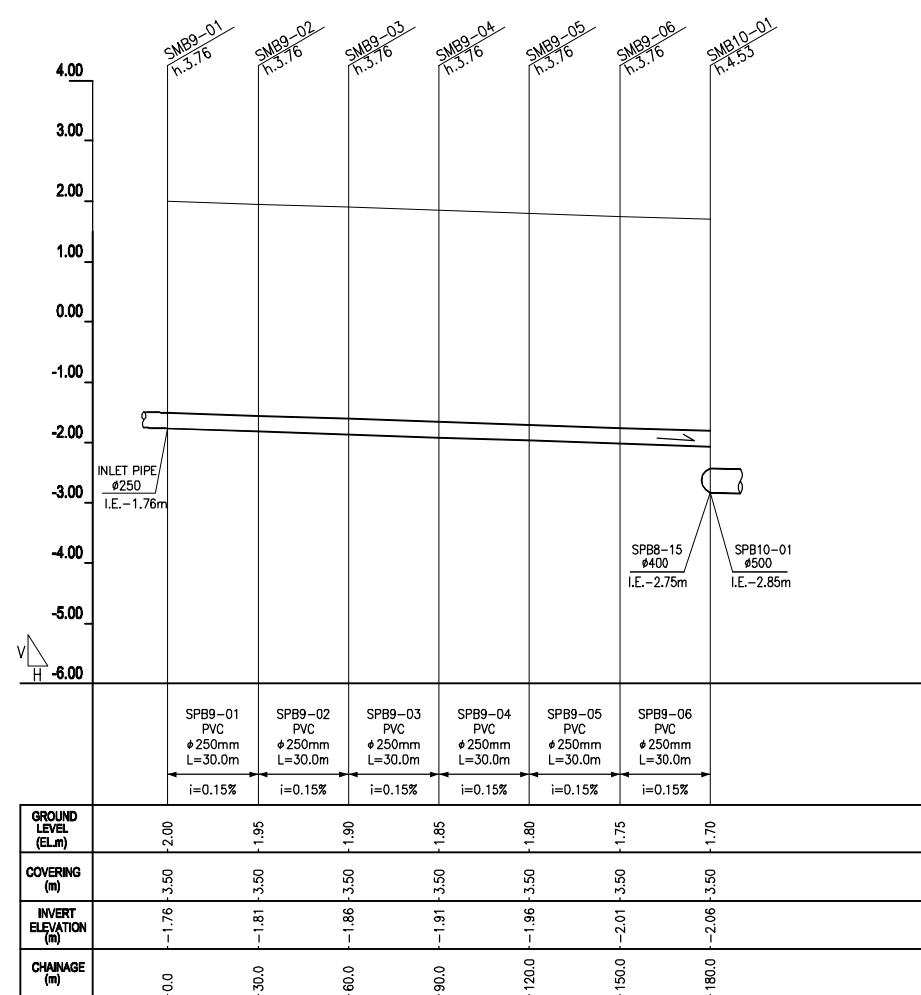


KEY PLAN

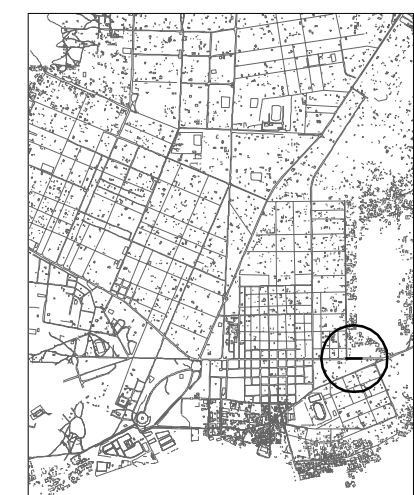




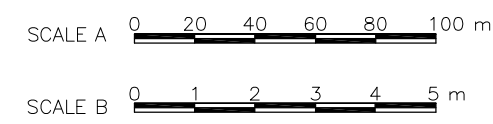
PLAN
SCALE A

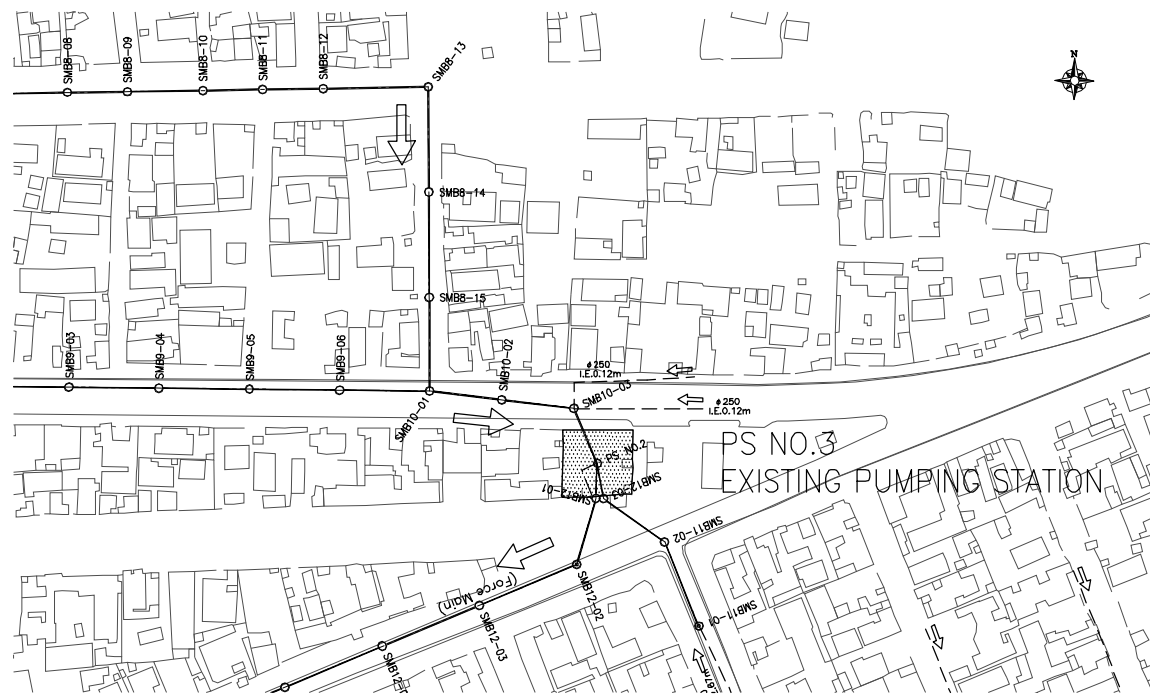


PROFILE
H: SCALE A V: SCALE B

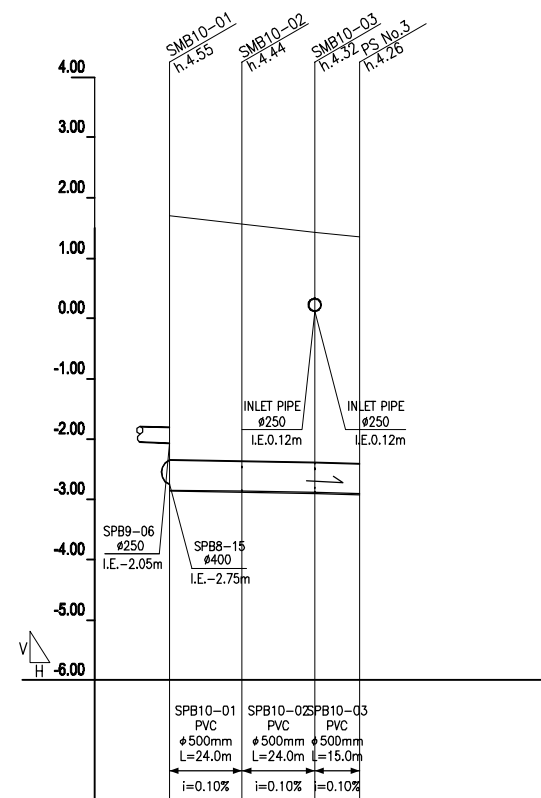


KEY PLAN



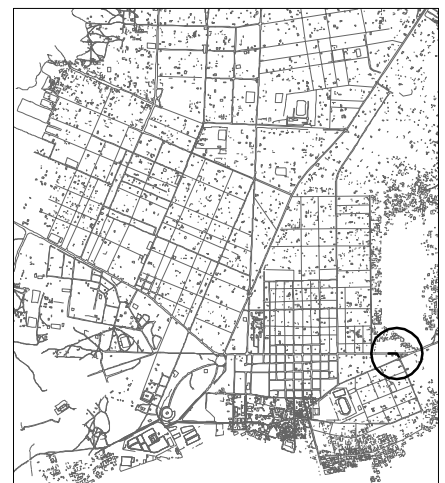


PLAN
SCALE A

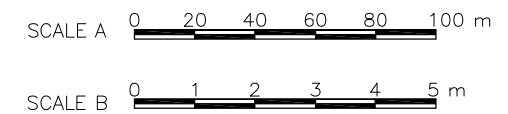


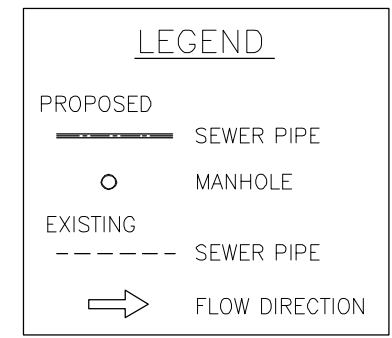
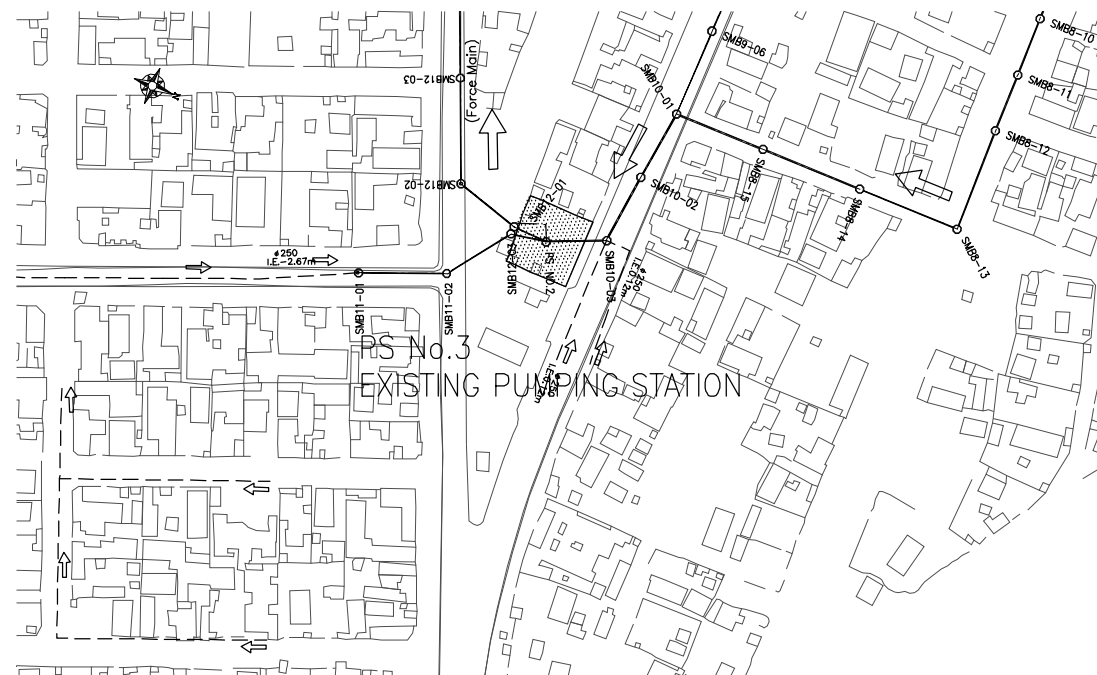
	SMB10-01	SMB10-02	SMB10-03
GROUND LEVEL (EL.m)	-1.70	-1.57	-1.43
COVERING (m)	4.03	3.92	3.80
INVERT ELEVATION (m)	-2.85	-2.87	-2.89
CHANGAGE (m)	0.0	24.0	48.0

PROFILE
H: SCALE A V: SCALE B

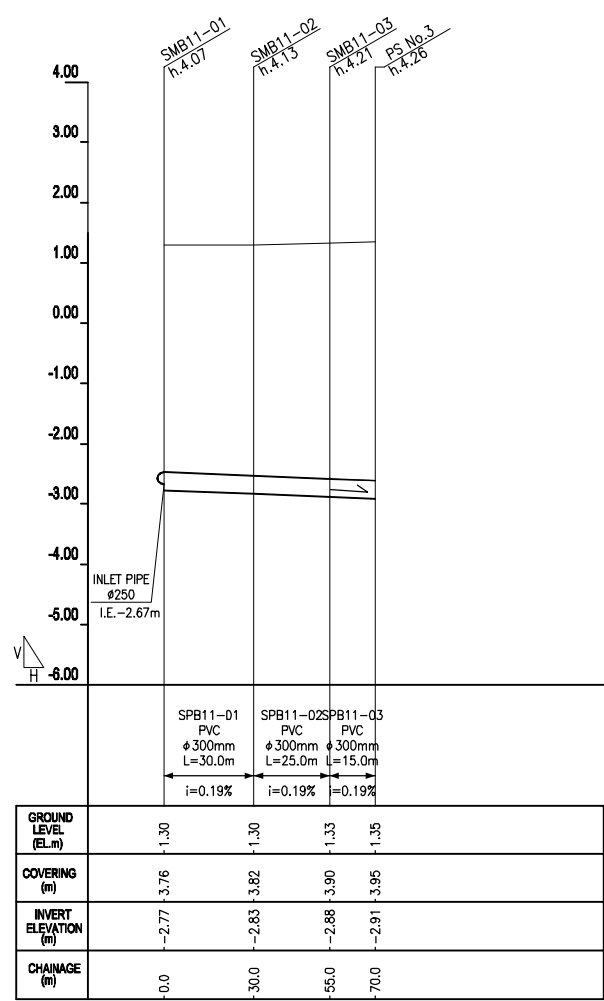


KEY PLAN





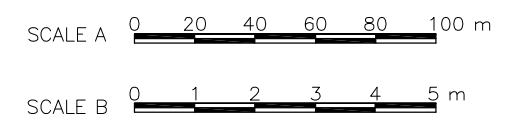
PLAN
SCALE A



PROFILE
H: SCALE A V: SCALE B

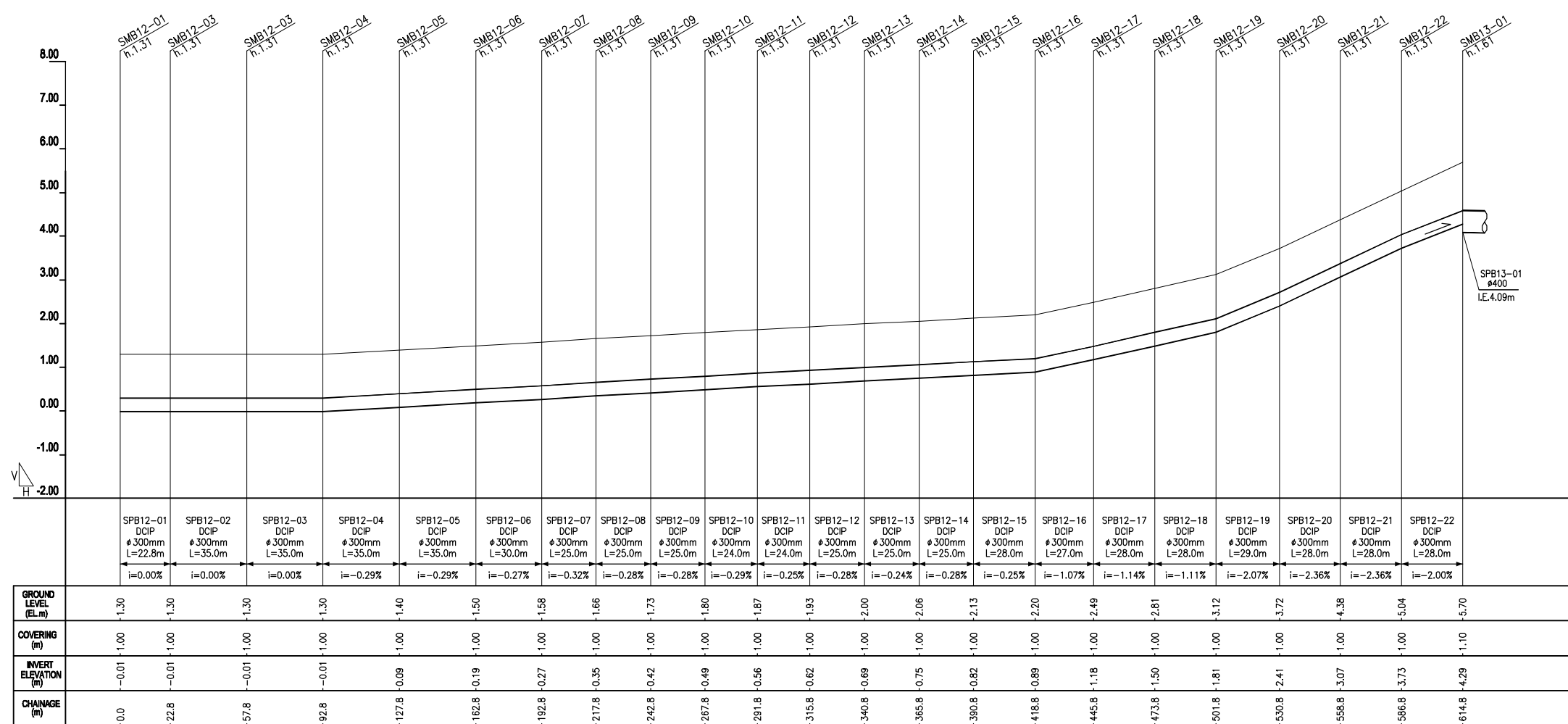


KEY PLAN

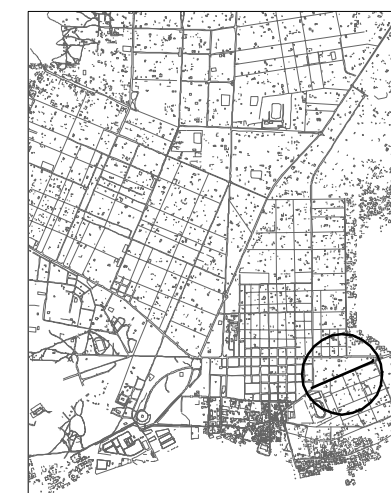




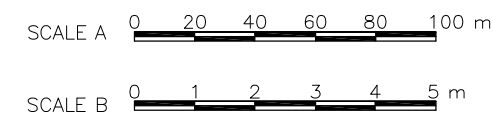
PLAN
SCALE A

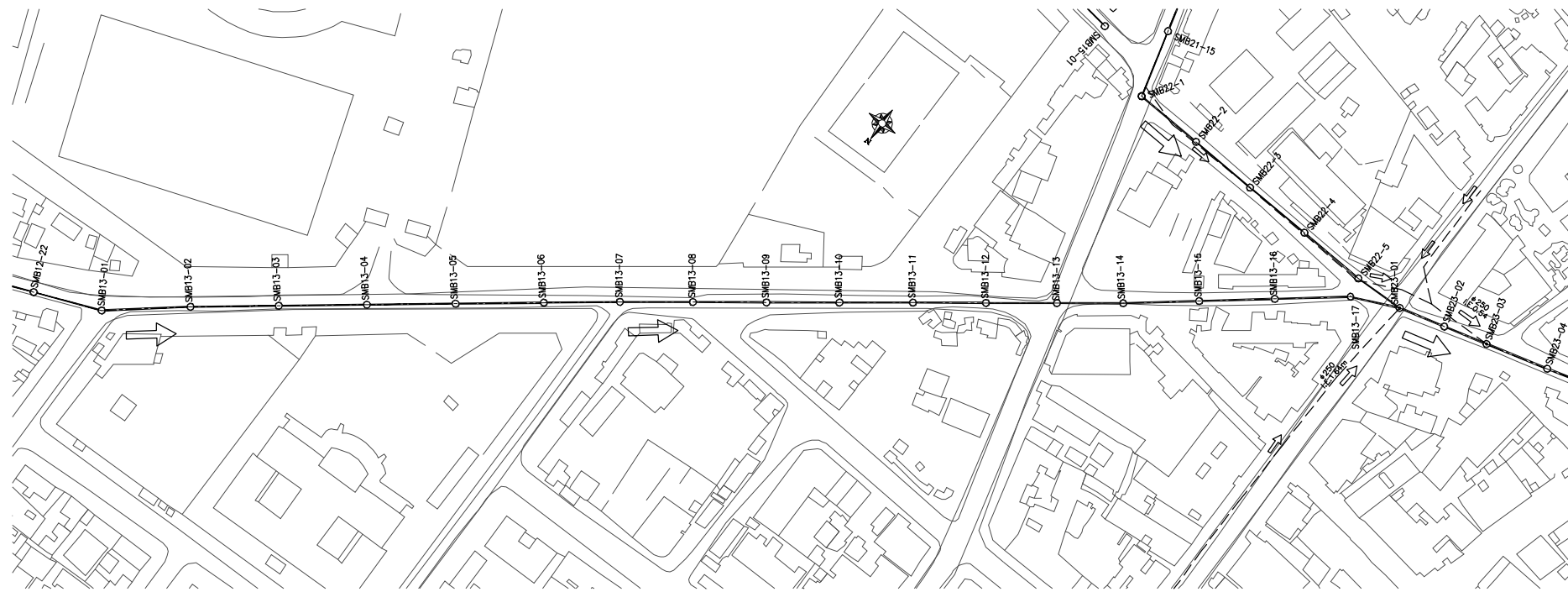


PROFILE
H: SCALE A V: SCALE B



KEY PLAN



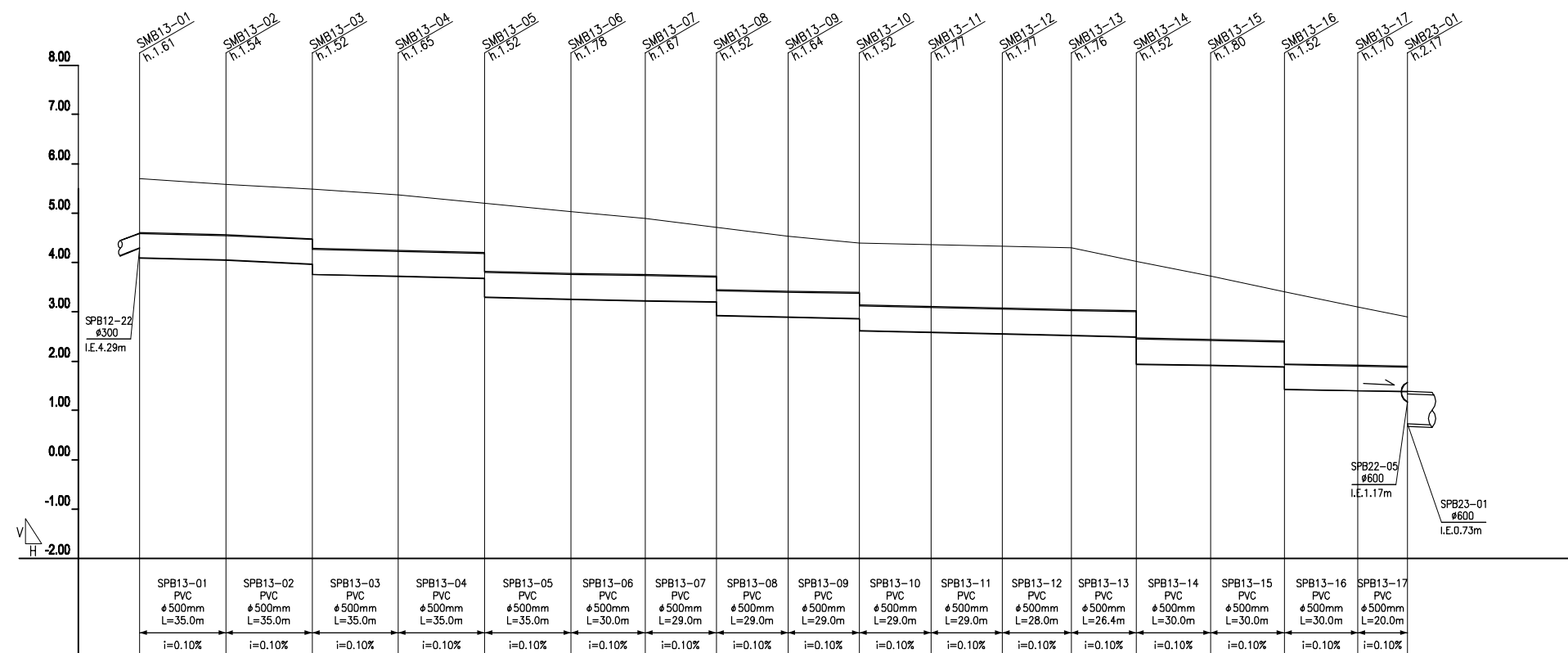


PLAN
SCALE A

LEGEND

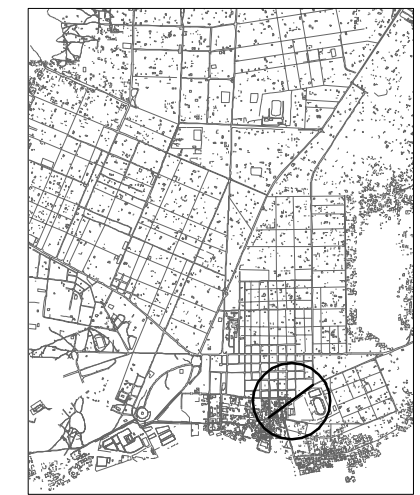
PROPOSED
 — SEWER PIPE
 ○ MANHOLE

EXISTING
 - - - SEWER PIPE
 → FLOW DIRECTION

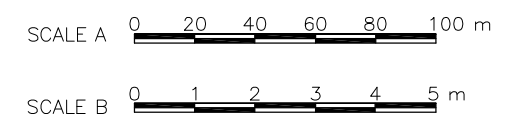


	SMB13-01	SMB13-02	SMB13-03	SMB13-04	SMB13-05	SMB13-06	SMB13-07	SMB13-08	SMB13-09	SMB13-10	SMB13-11	SMB13-12	SMB13-13	SMB13-14	SMB13-15	SMB13-16	SMB13-17
GROUND LEVEL (E.L.m)	5.70	5.59	5.49	5.37	5.20	5.04	4.90	4.72	4.54	4.39	4.36	4.33	4.29	4.02	3.72	3.41	2.90
COVERING (m)	1.09	1.02	1.00	1.13	1.00	1.26	1.15	1.00	1.00	1.25	1.25	1.24	1.00	1.28	1.00	1.18	1.00
INVERT ELEVATION (m)	4.09	4.05	3.97	3.76	3.68	3.26	3.23	3.20	2.87	2.59	2.56	2.53	2.50	1.92	1.89	1.40	1.38
CHAINAGE (m)	0.0	35.0	70.0	105.0	140.0	175.0	205.0	234.0	263.0	292.0	321.0	350.0	378.0	404.4	434.4	464.4	494.4

PROFILE
H: SCALE A V: SCALE B

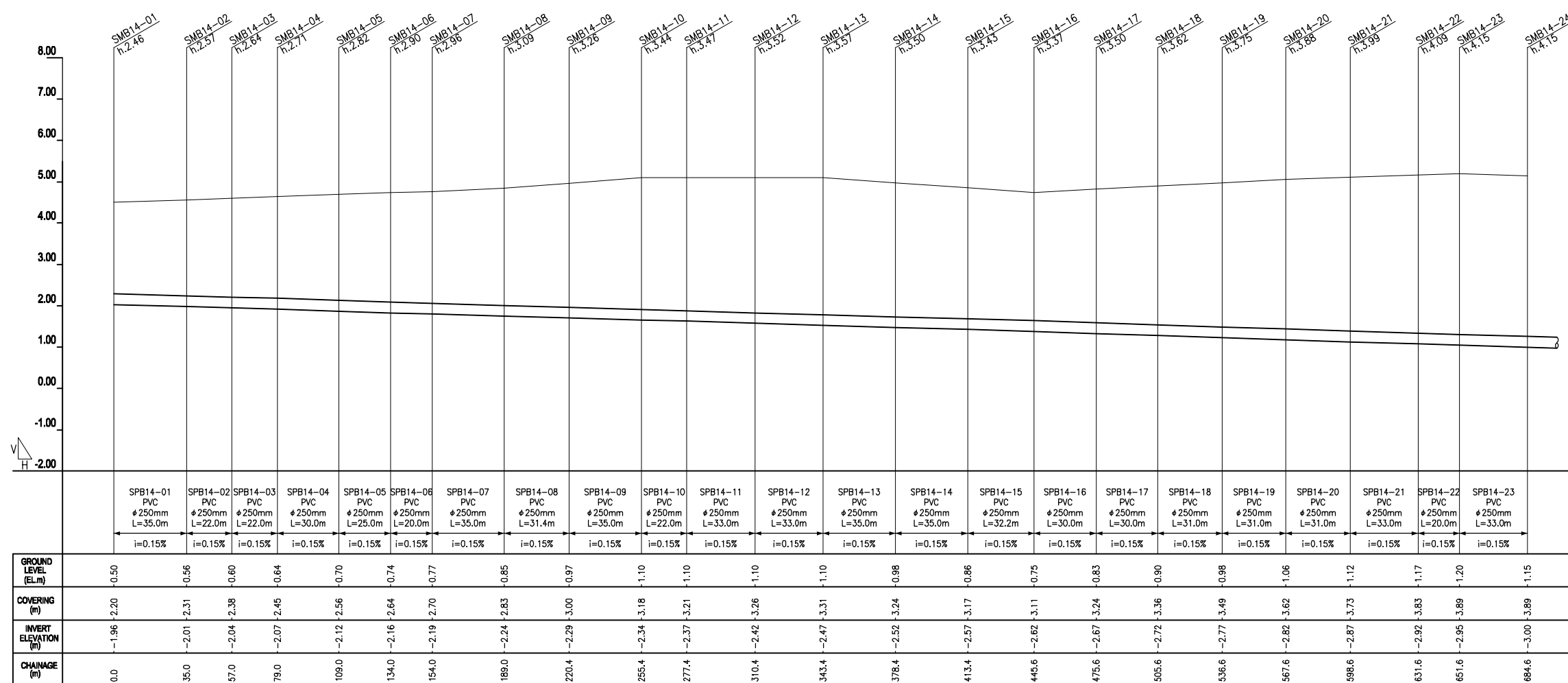
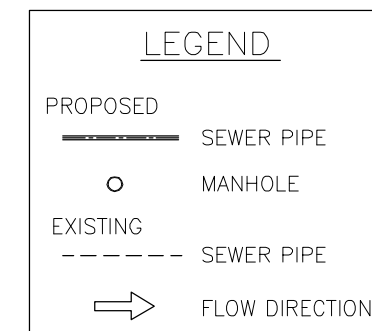


KEY PLAN

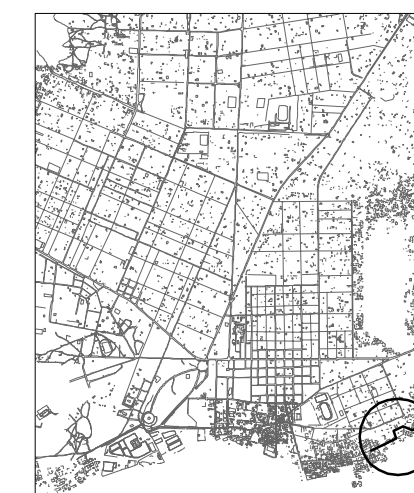




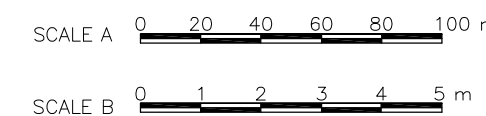
PLAN
SCALE A



PROFILE
H: SCALE A V: SCALE B



KEY PLAN



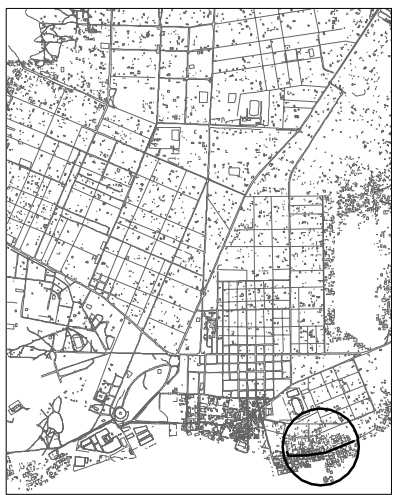
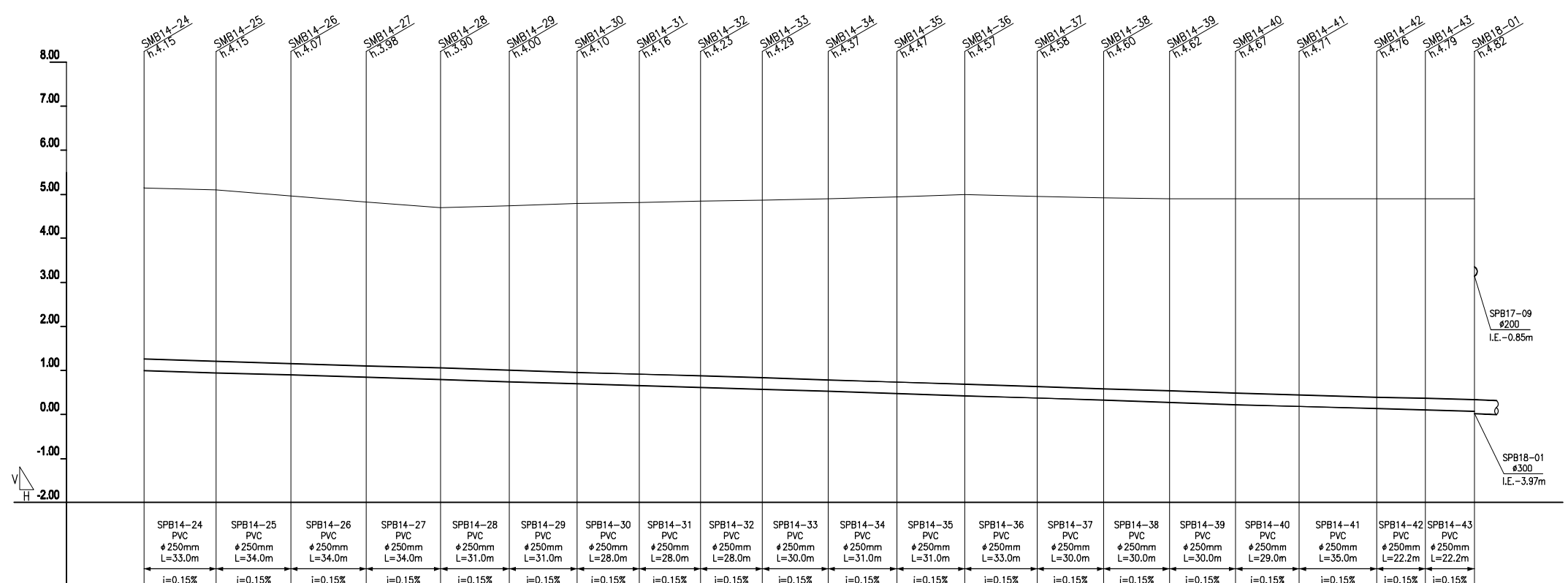


LEGEND

PROPOSED
 — SEWER PIPE
 ○ MANHOLE

EXISTING
 - - - SEWER PIPE
 → FLOW DIRECTION

PLAN
SCALE A

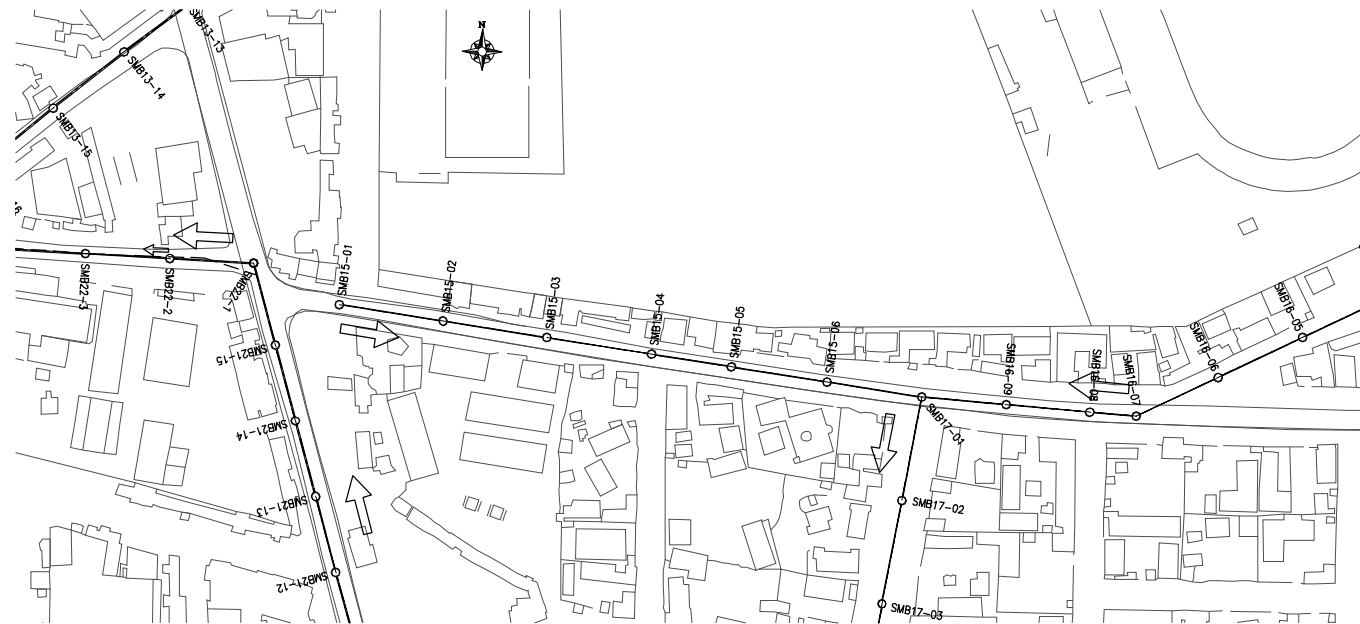


KEY PLAN

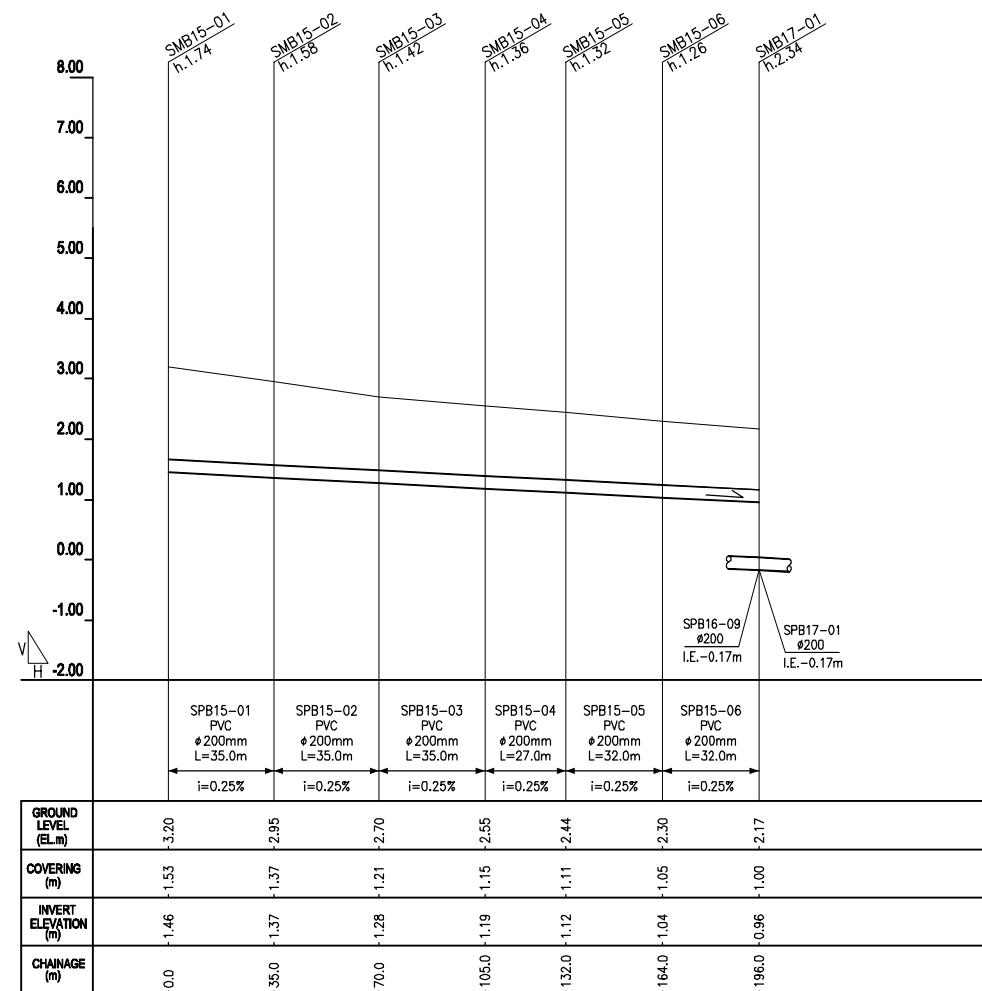
	SMB14-24	SMB14-25	SMB14-26	SMB14-27	SMB14-28	SMB14-29	SMB14-30	SMB14-31	SMB14-32	SMB14-33	SMB14-34	SMB14-35	SMB14-36	SMB14-37	SMB14-38	SMB14-39	SMB14-40	SMB14-41	SMB14-42	SMB14-43	
GROUND LEVEL (EL.m)	+1.15	+1.10	+0.97	+0.83	+0.70	+0.75	+0.80	+0.82	+0.85	+0.87	+0.90	+0.95	+0.96	+0.93	+0.90	+0.90	+0.90	+0.90	+0.90	+0.90	+0.90
COVERING (m)	3.89	3.89	3.81	3.72	3.64	3.74	3.84	3.90	3.97	4.03	4.11	4.21	4.32	4.34	4.36	4.41	4.45	4.50	4.53	4.56	
INVERT ELEVATION (m)	-3.00	-3.05	-3.10	-3.15	-3.20	-3.25	-3.30	-3.34	-3.38	-3.42	-3.47	-3.52	-3.62	-3.67	-3.72	-3.77	-3.81	-3.86	-3.89	-3.92	
CHAINAGE (m)	684.6	717.6	751.6	785.6	819.6	853.6	887.6	921.6	955.6	989.6	1023.6	1057.6	1091.6	1125.6	1159.6	1193.6	1227.6	1261.6	1295.6	1329.6	



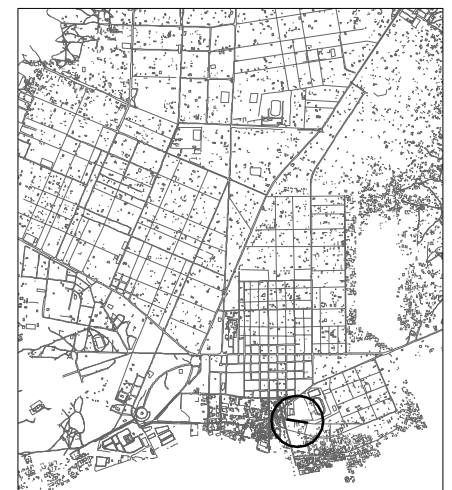
PROFILE
H: SCALE A V: SCALE B



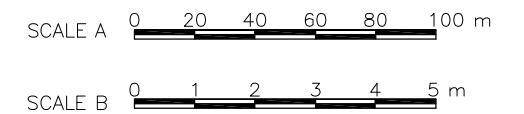
PLAN
SCALE A

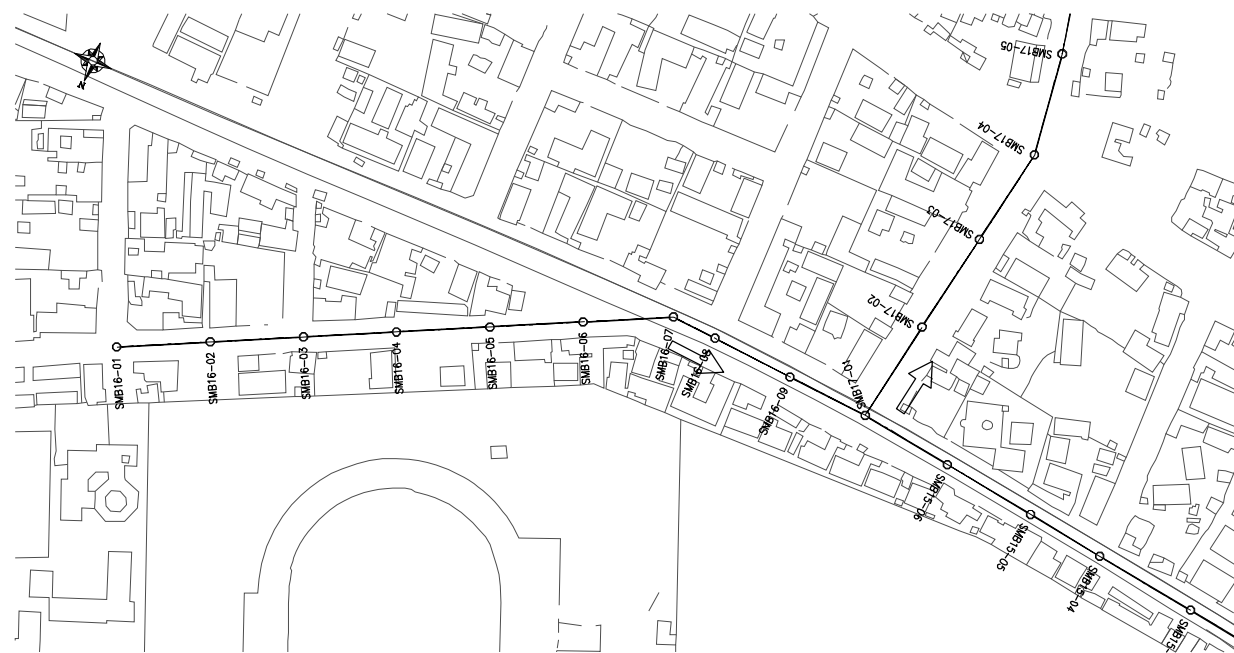


PROFILE
H: SCALE A V: SCALE B



KEY PLAN



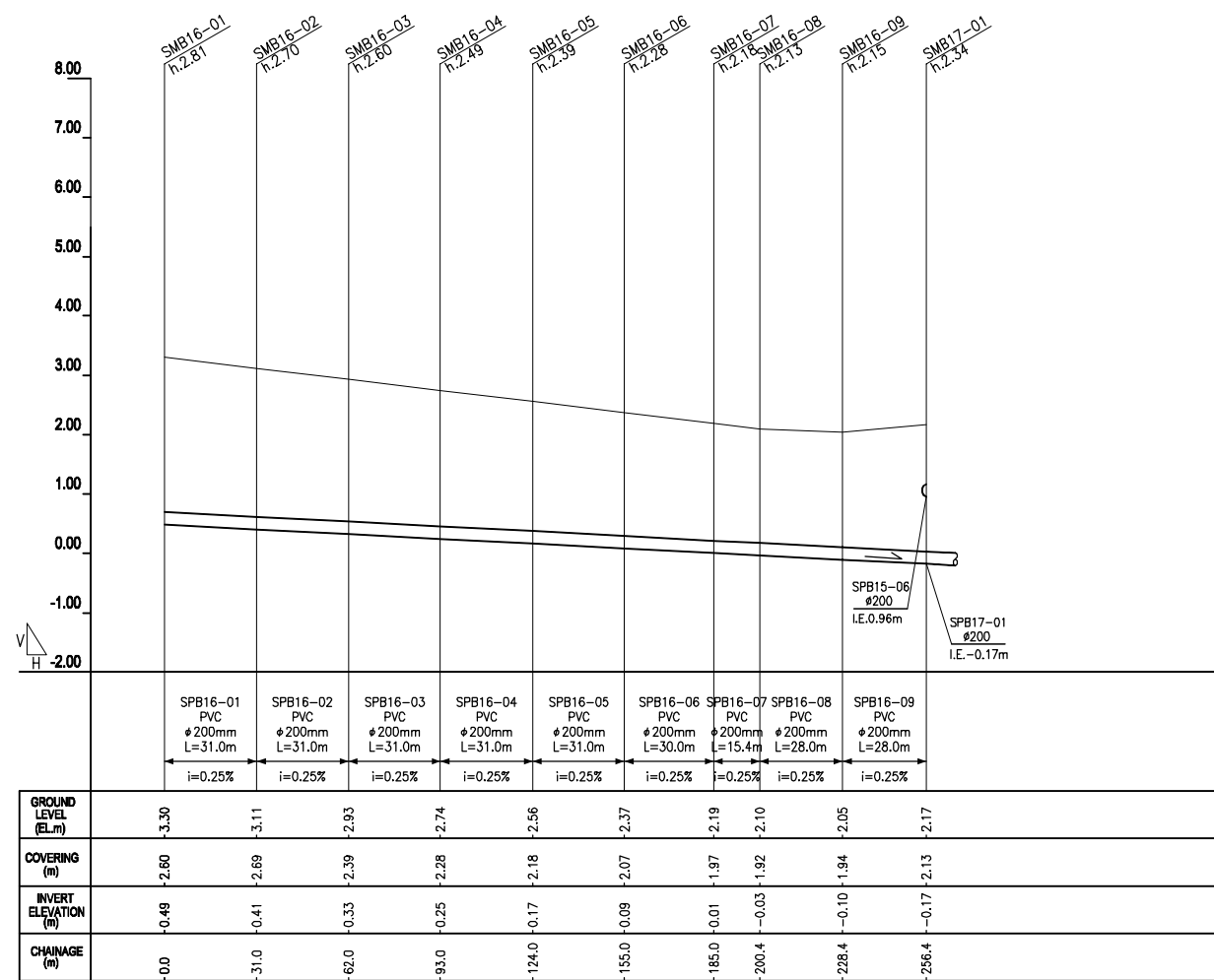


PLAN
SCALE A

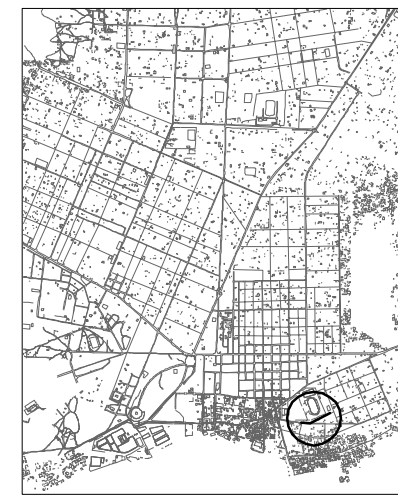
LEGEND

PROPOSED
 — SEWER PIPE
 ○ MANHOLE

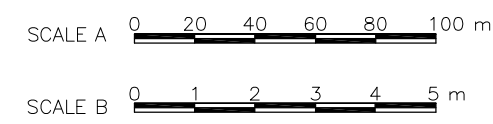
EXISTING
 - - - SEWER PIPE
 → FLOW DIRECTION

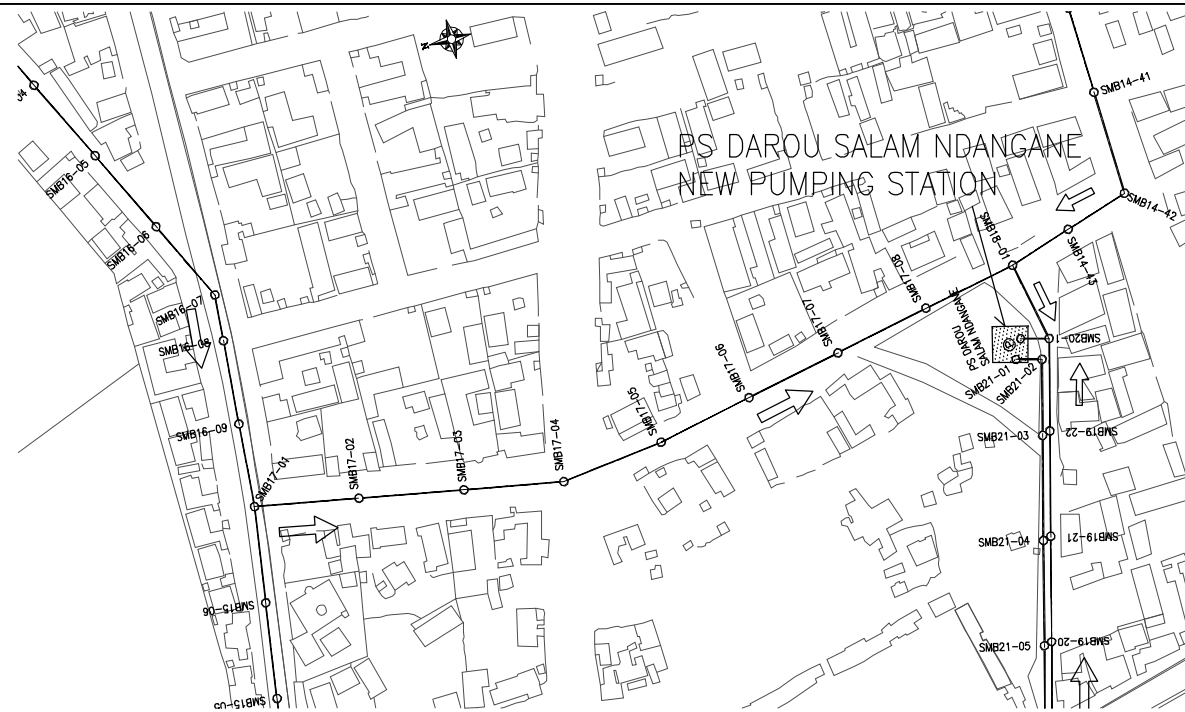


PROFILE
H: SCALE A V: SCALE B

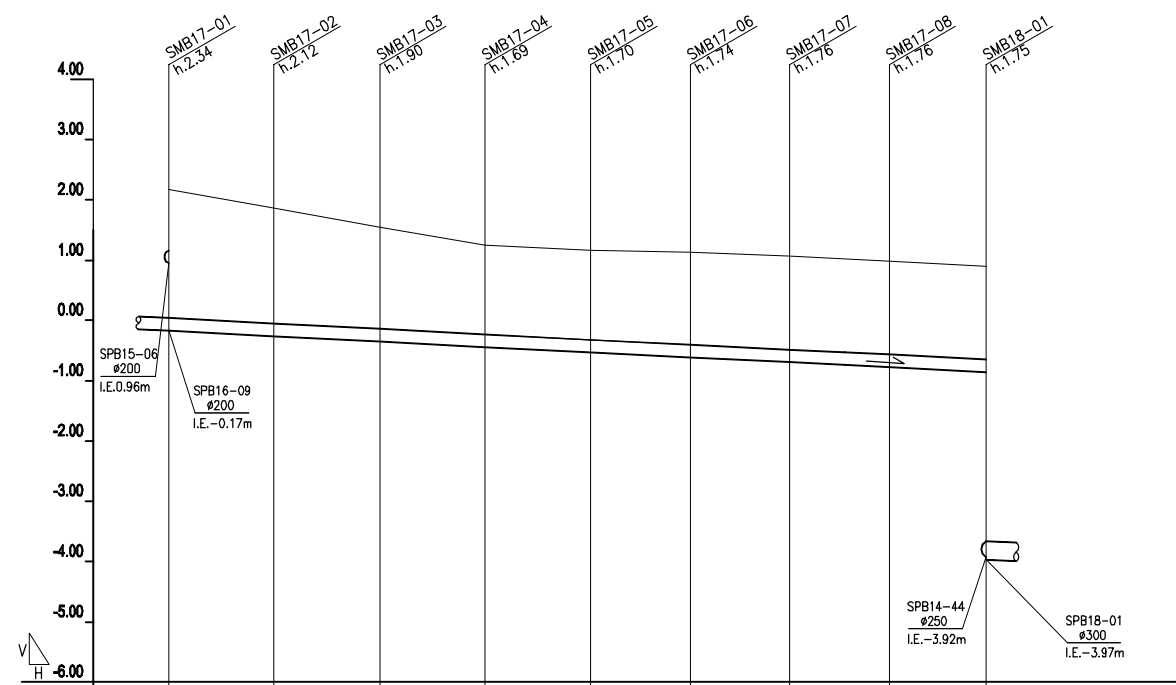
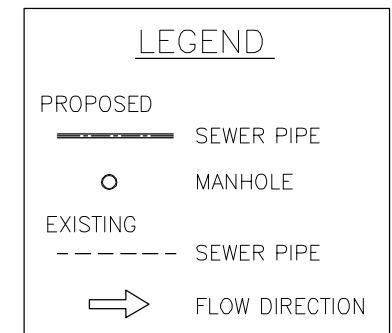


KEY PLAN



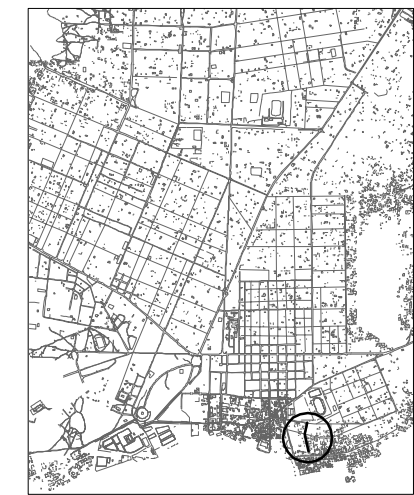


PLAN
SCALE A

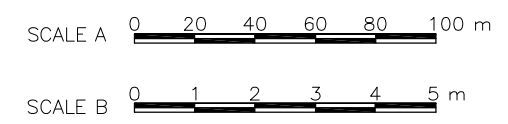


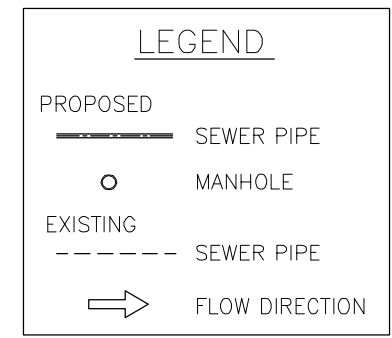
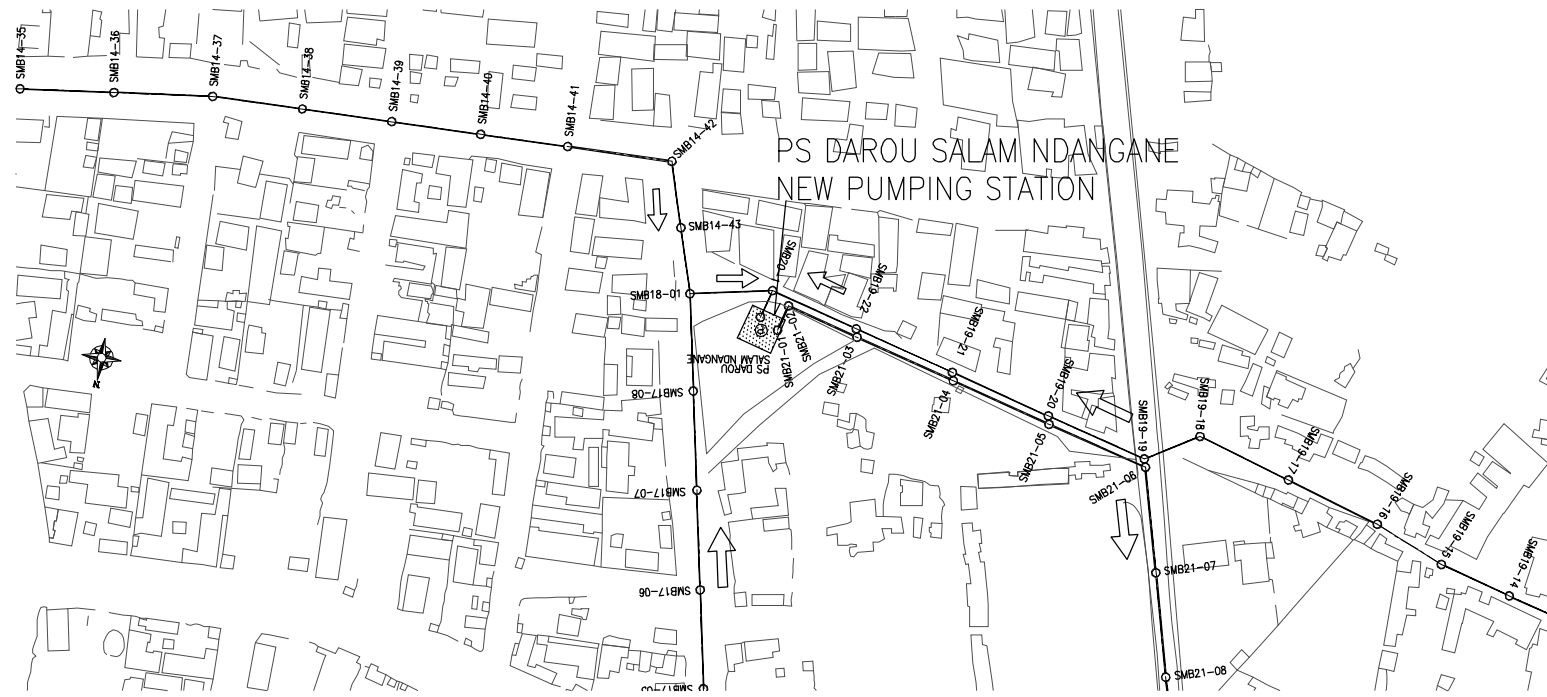
	SMB17-01	SMB17-02	SMB17-03	SMB17-04	SMB17-05	SMB17-06	SMB17-07	SMB17-08
	SPB17-01 PVC #200mm L=35.0m	SPB17-02 PVC #200mm L=35.0m	SPB17-03 PVC #200mm L=35.0m	SPB17-04 PVC #200mm L=35.0m	SPB17-05 PVC #200mm L=33.0m	SPB17-06 PVC #200mm L=33.0m	SPB17-07 PVC #200mm L=33.0m	SPB17-08 PVC #200mm L=32.2m
	i=0.25%	i=0.25%	i=0.25%	i=0.25%	i=0.25%	i=0.25%	i=0.25%	i=0.25%
GROUND LEVEL (EL.m)	-2.17	-1.86	-1.55	-1.25	-1.17	-1.13	-1.07	-0.99
COVERING (m)	-2.13	-1.91	-1.69	-1.48	-1.49	-1.53	-1.55	-1.54
INVERT ELEVATION (m)	-0.17	-0.26	-0.35	-0.44	-0.53	-0.61	-0.69	-0.77
CHAINAGE (m)	0.0	35.0	70.0	105.0	140.0	173.0	206.0	239.0

PROFILE
H: SCALE A V: SCALE B

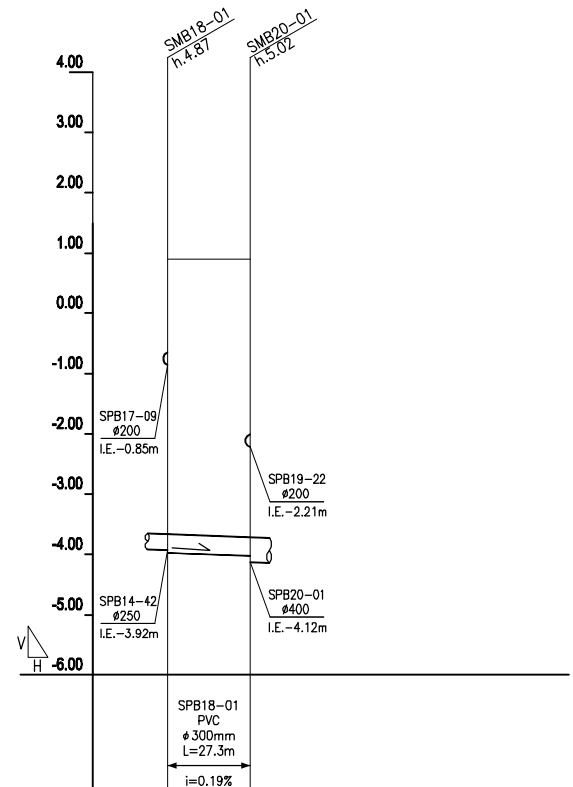


KEY PLAN



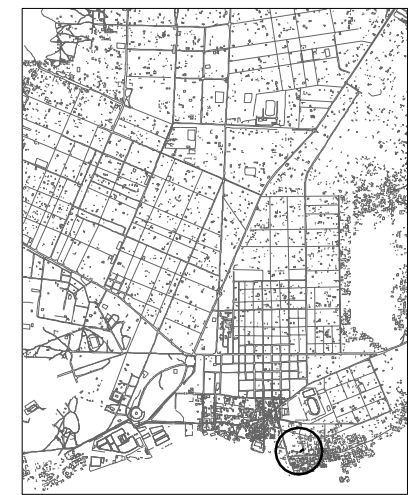


PLAN
SCALE A

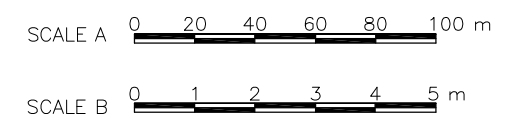


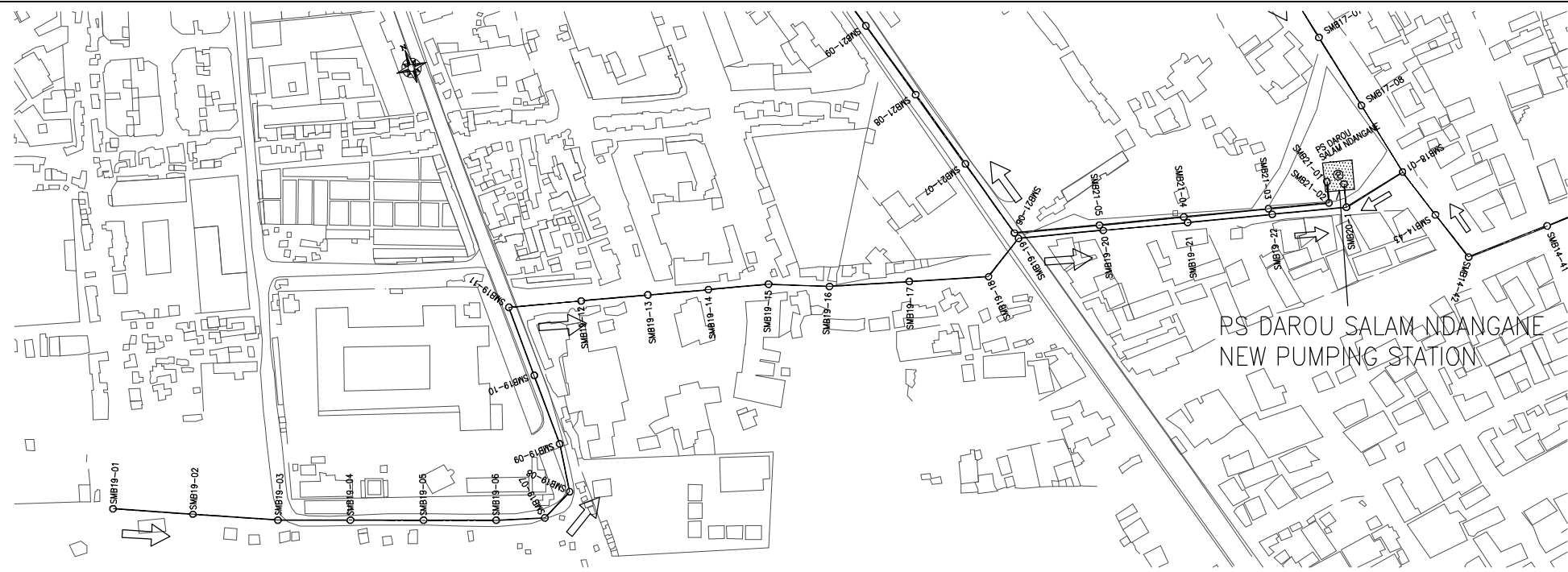
GROUND LEVEL (EL.m)	0.90	0.90
COVERING (m)	4.56	4.61
INVERT ELEVATION (m)	-3.97	-4.02
CHAINAGE (m)	0.0	27.3

PROFILE
H: SCALE A V: SCALE B



KEY PLAN

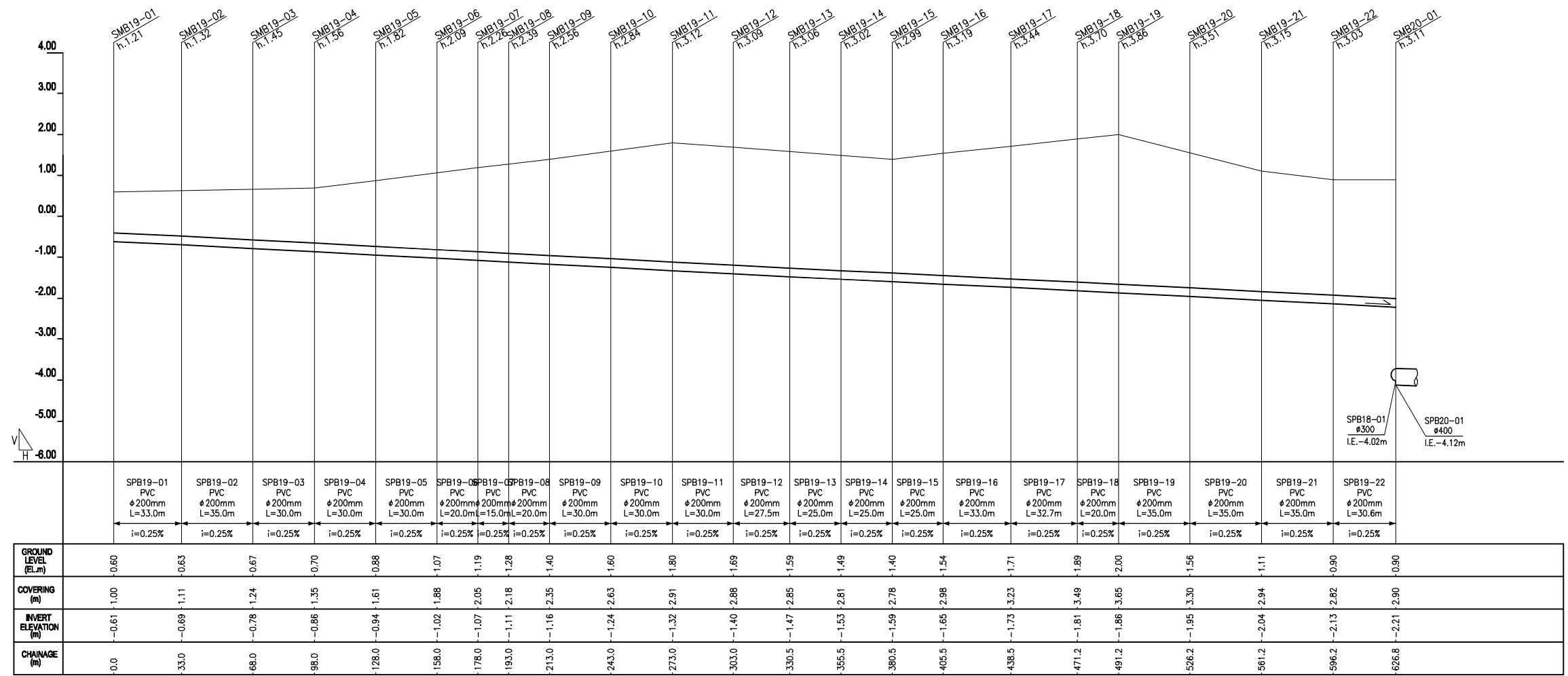




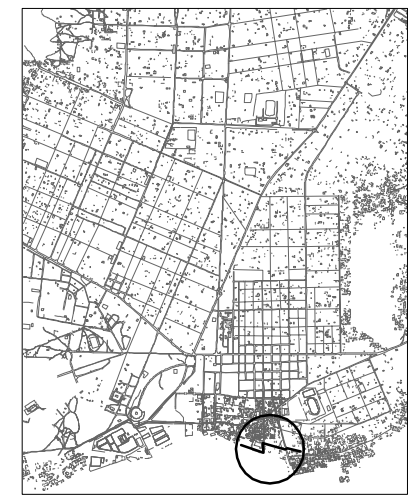
PLAN
SCALE A

LEGEND

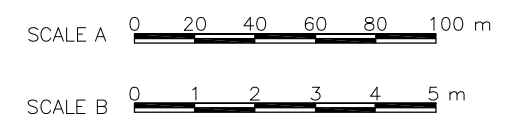
- PROPOSED
 - SEWER PIPE
 - MANHOLE
- EXISTING
 - - - SEWER PIPE
 - ➔ FLOW DIRECTION

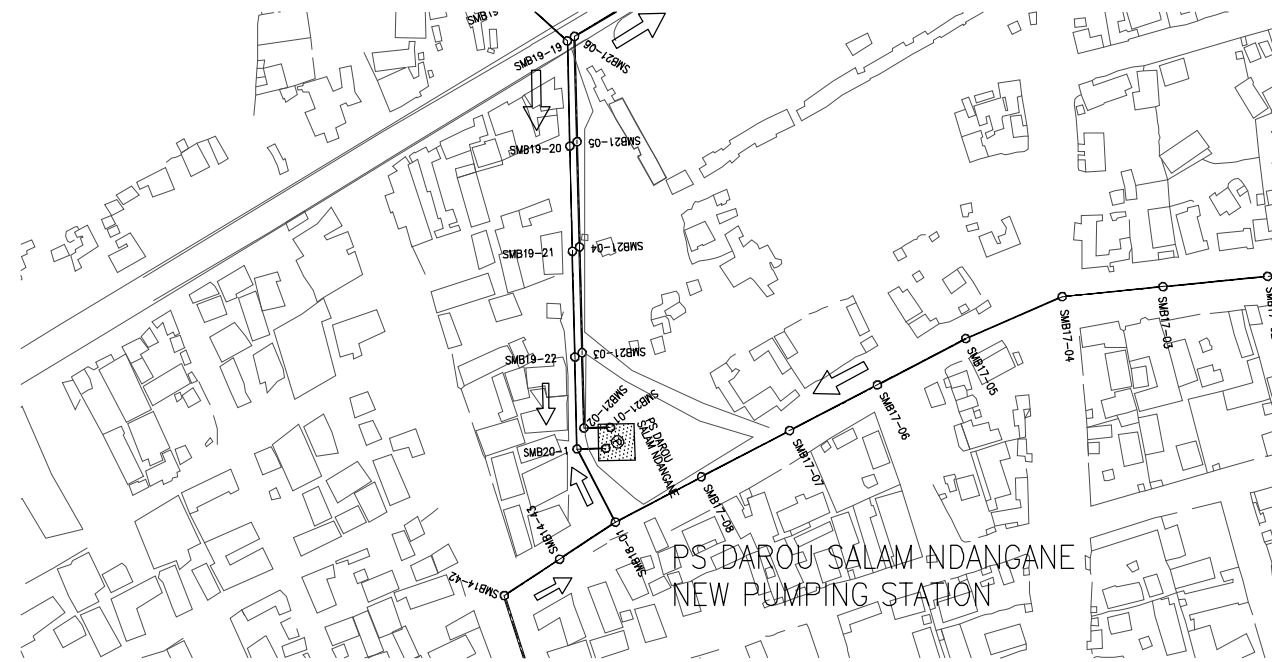


PROFILE
H: SCALE A V: SCALE B

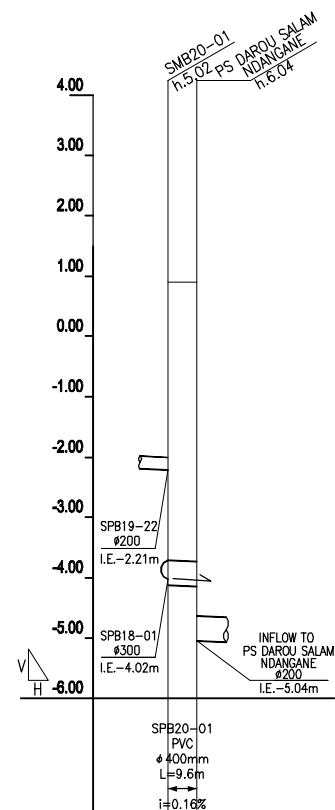
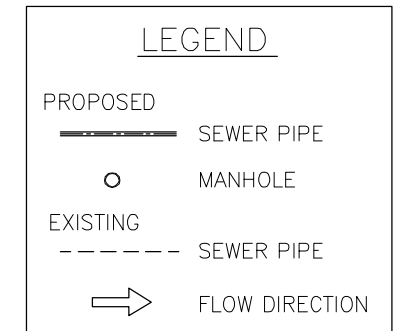


KEY PLAN



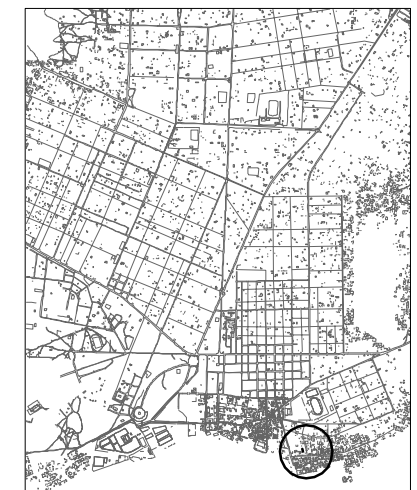


PLAN
SCALE A

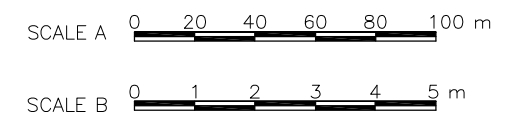


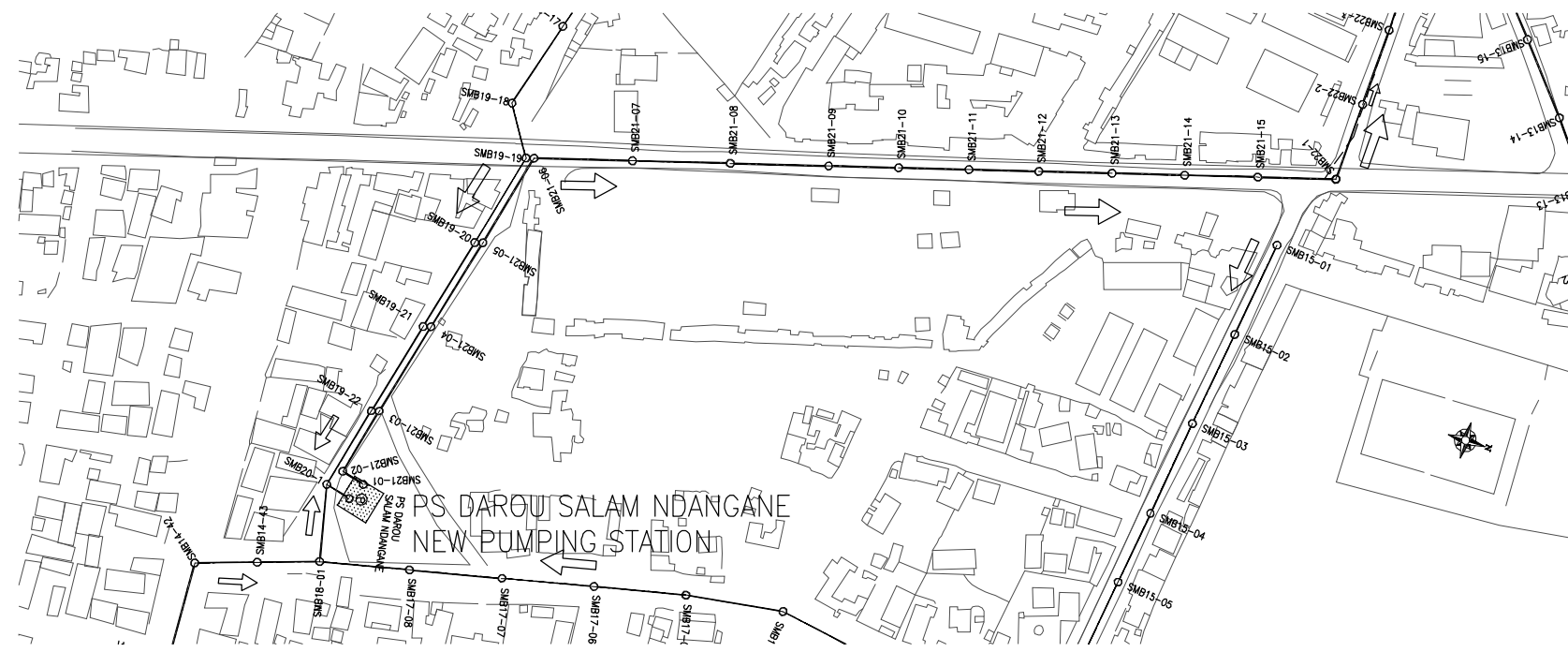
GROUND LEVEL (EL.m)	0.90	0.90
COVERING (m)	4.61	4.62
INVERT ELEVATION (m)	-4.12	-4.14
CHAMAGE (m)	0.0	9.6

PROFILE
H: SCALE A V: SCALE B

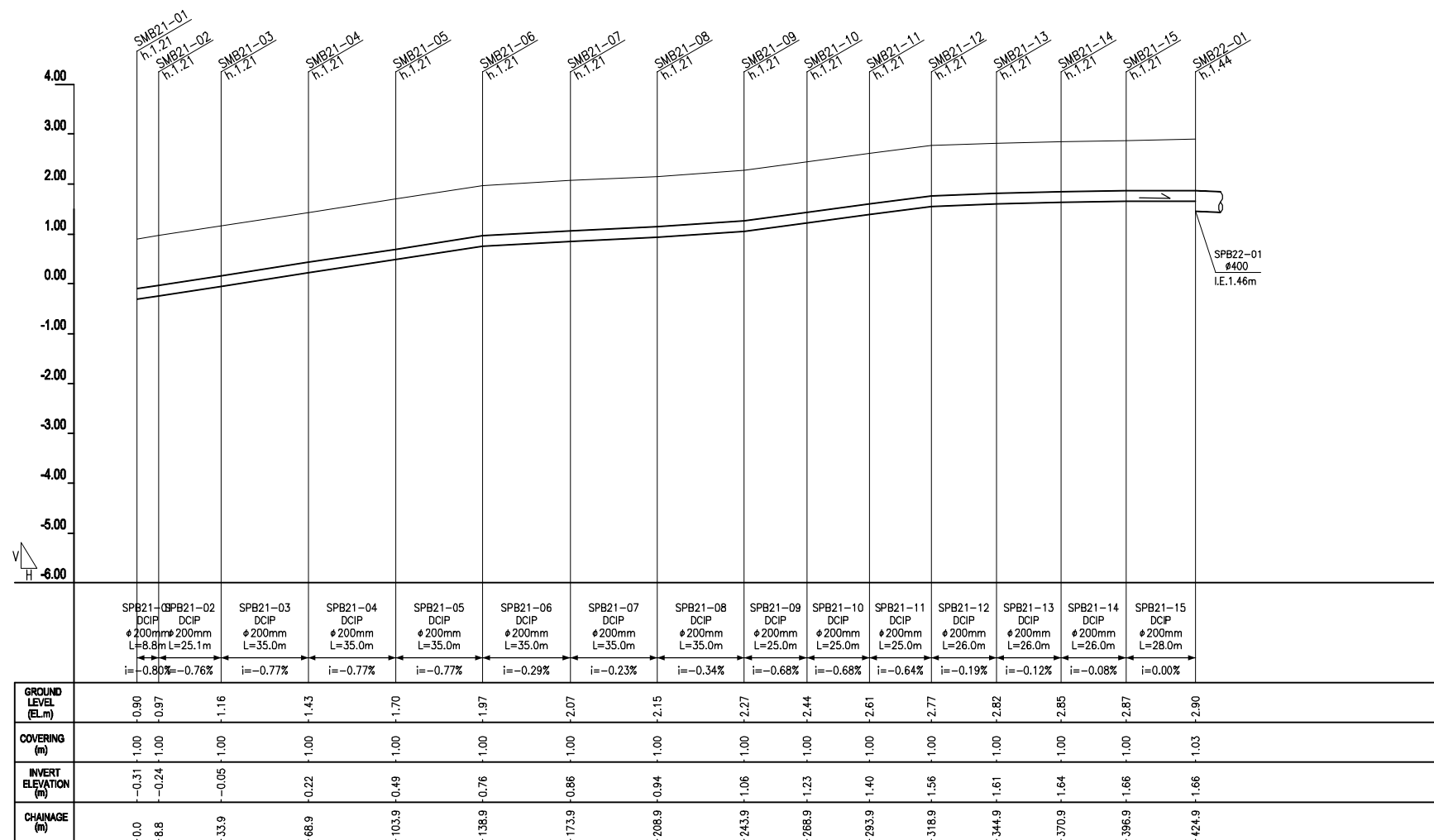
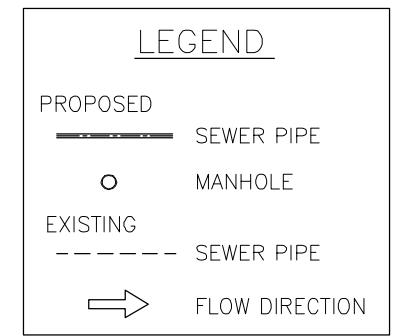


KEY PLAN



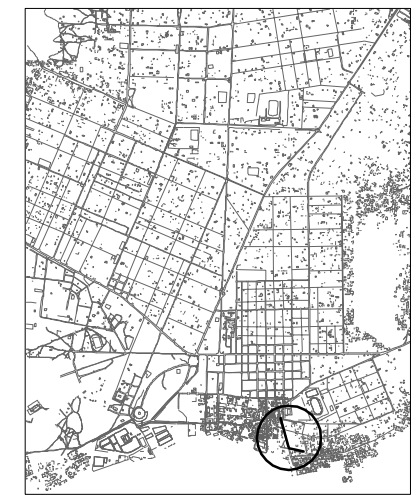


PLAN
SCALE A



PROFILE

H: SCALE A V: SCALE B



KEY PLAN

