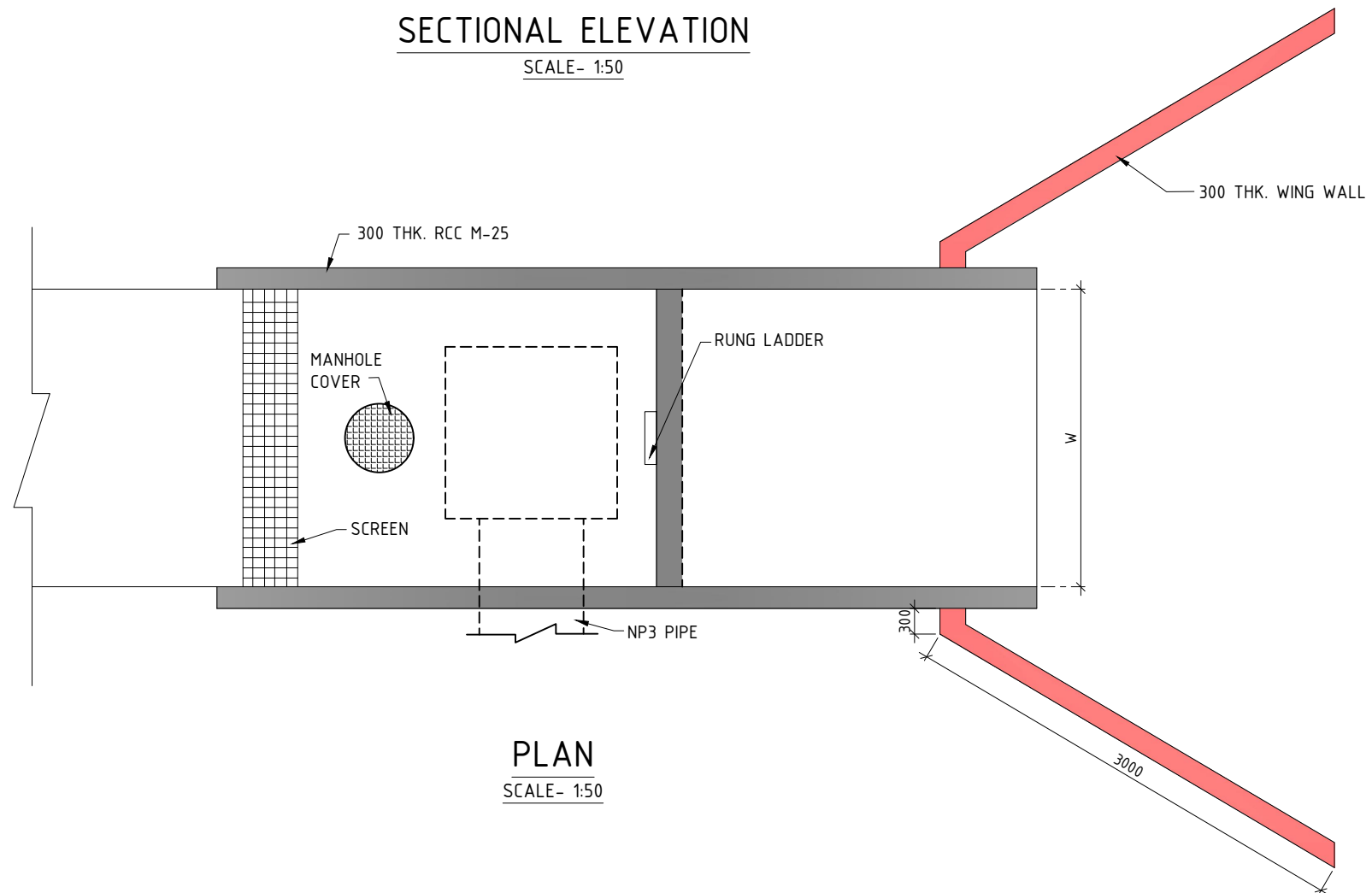


SECTIONAL ELEVATION
SCALE- 1:50





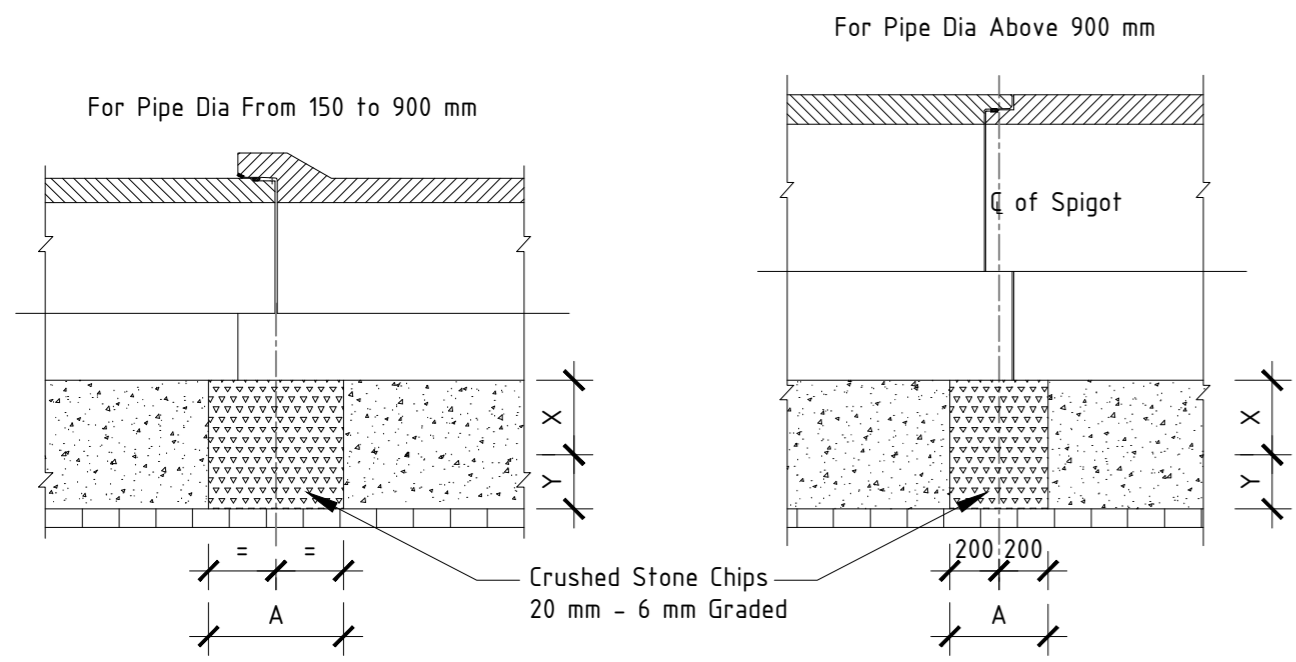
PLAN
SCALE- 1:50

Ø	D	H	E	W
500 to 1000	As per drain depth	1300	1300	As per drain width
Upto 400	As per drain depth	700	500	As per drain width

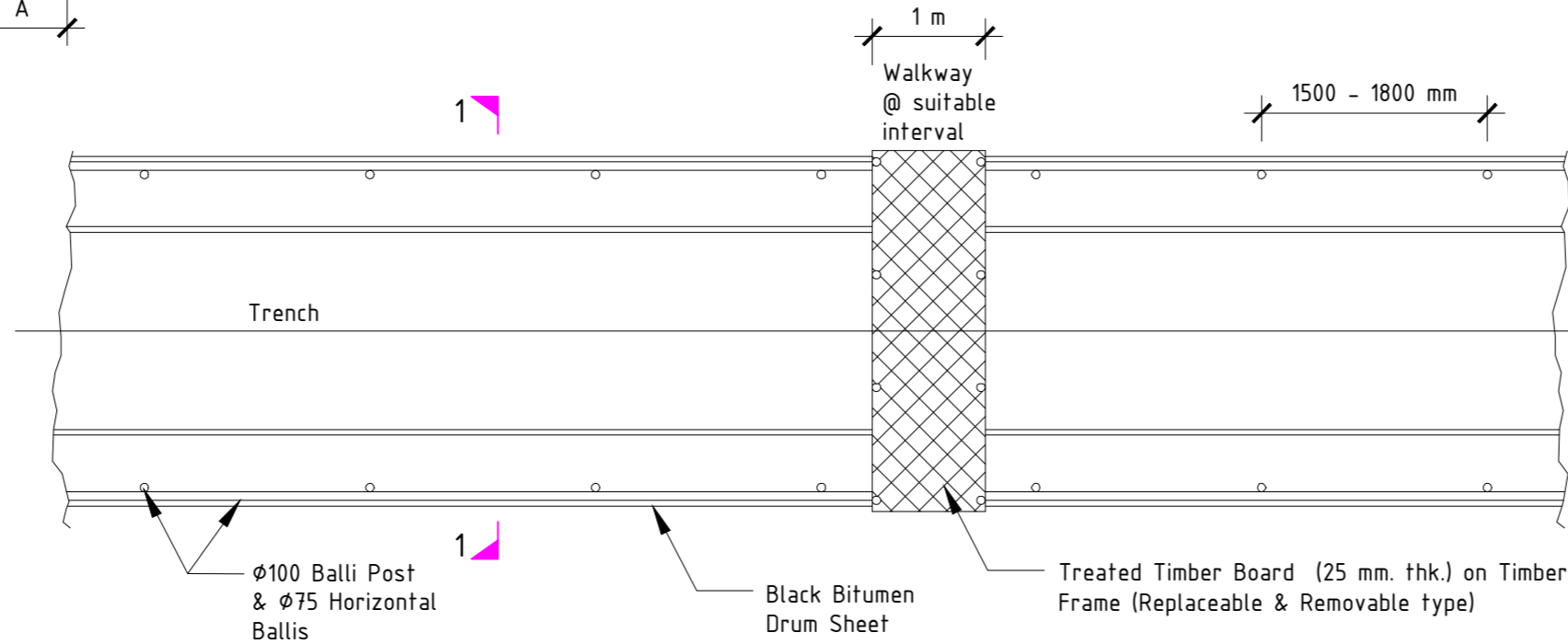
Note:

All dimensions are in mm unless otherwise specified.

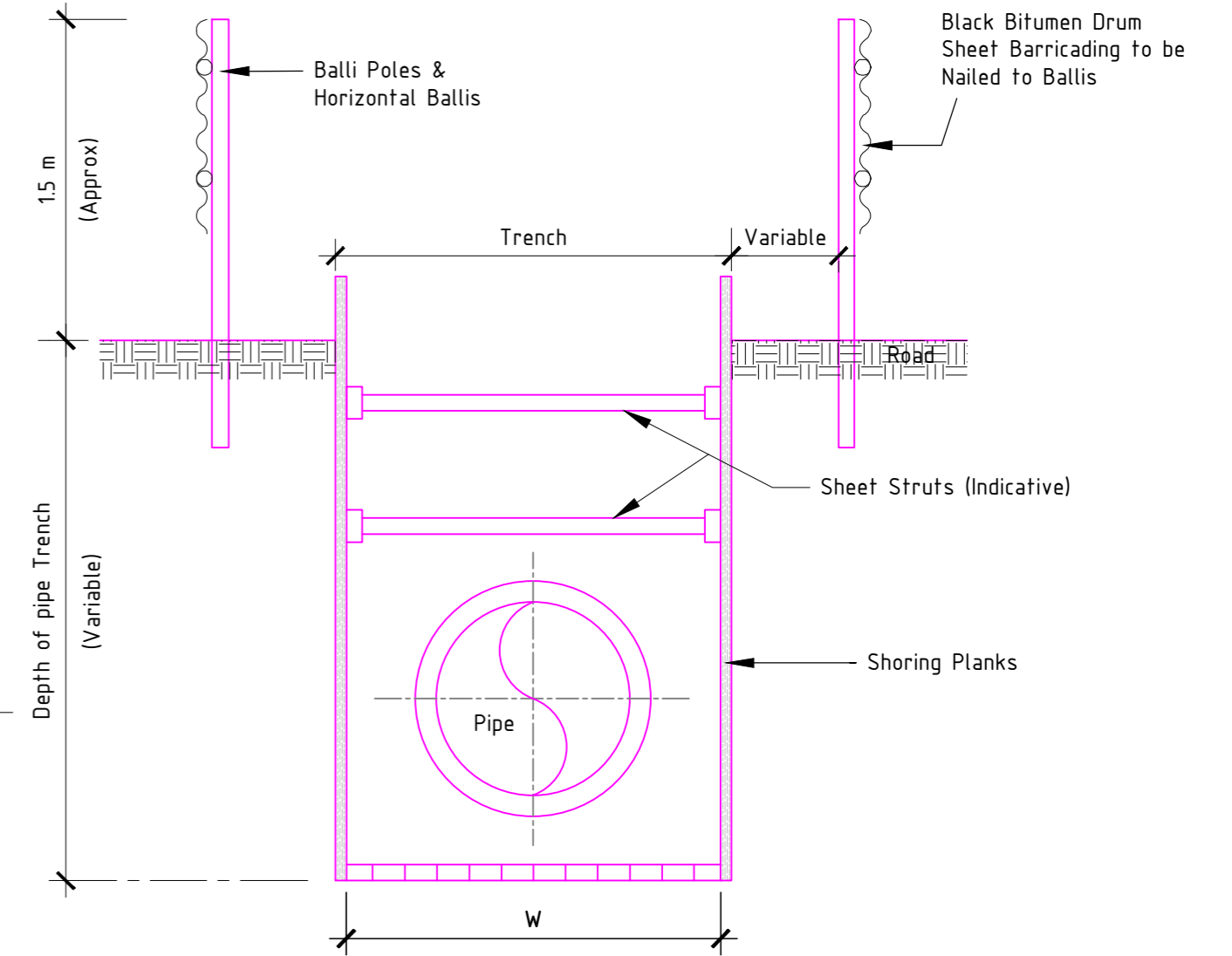
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REVISIONS					
Designed: D. Dutta		Date: 14.06.2018	Scale: NTS	Sheet Size: A3	
Drawn: K. Mukherjee		Checked: S. Nandi	FILE NAME: D:\Projects\H.505084 IN, Chhapra BUIDCo\ & D\K2\11_Outfall Structure_A3		
CLIENT:					
 BUIDCo (BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION)					
BENEFICIARY:					
CONSULTANT:					
		GKW Consult GmbH India Branch Office: PS Srijan Corporate Park, Tower 1, 13th Floor, Sector V, Salt Lake Kolkata - 700 091, West Bengal, India Tel : 91 33 40176800/6826, Fax : 91 33 40176827 E-mail : info.gkw_india@gkw-consult.com			
PROJECT:					
Preparation of Detailed Project Report on Sewerage for Chhapra, Bihar Interception and Diversion, Chhapra Detailed Project Report					
SUBJECT:					
TYPICAL DETAIL OF OUTFALL STRUCTURE					
DRAWING NO.:				SHEET:	REVISION:
H.505084-D-26 00-J-011-0				1 OF 1	0



Longitudinal Section for RCC Pipes at Joint



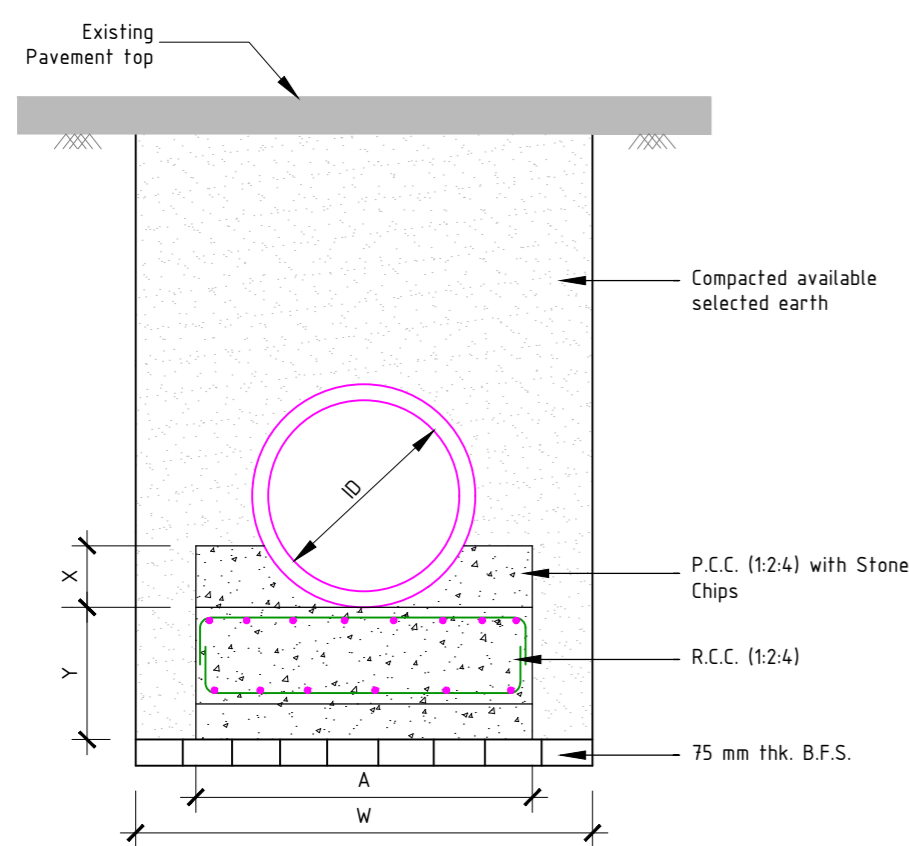
PLAN



Section 1 - 1

Typical Detail of Trench Barricading with Crossover Walkway

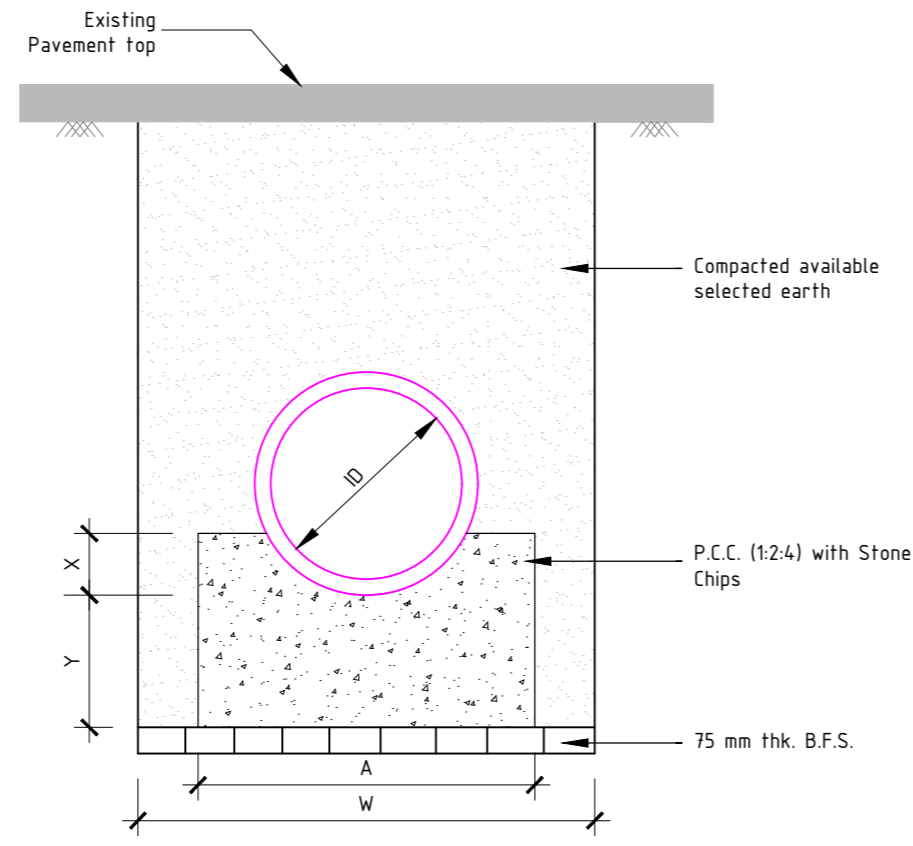
(From Dimension of D Ref. Table - 1)



Standard Cross Sectional of R.C.C. pipe (CLASS NP3)

Sewer with Continuous concrete cradle bedding

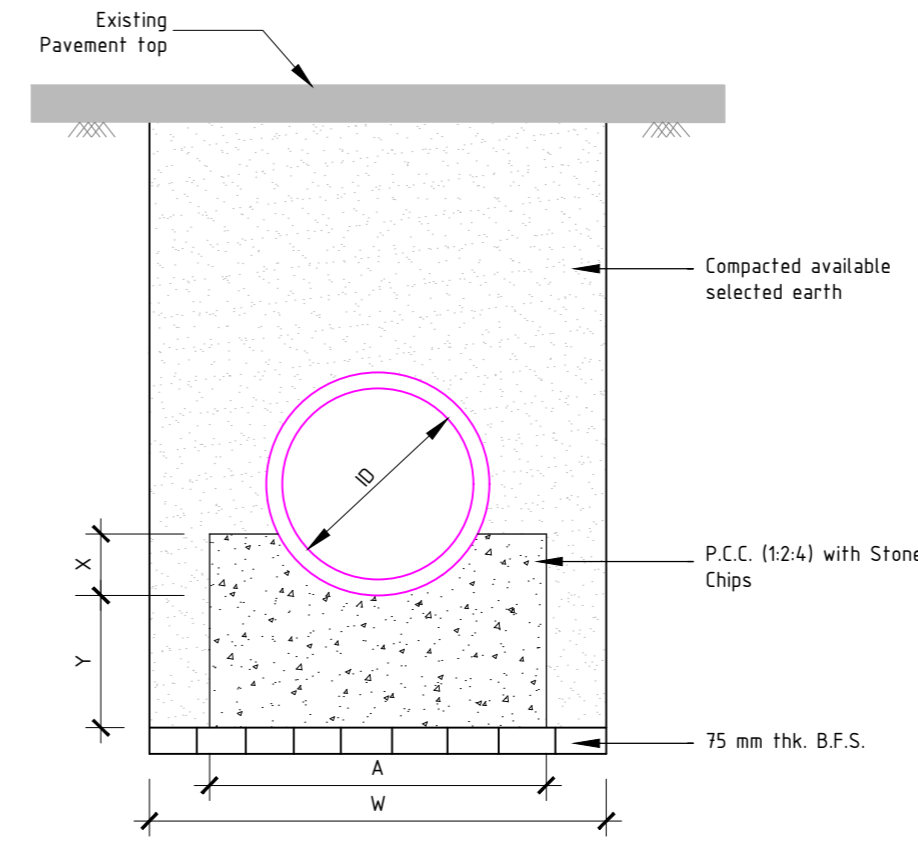
(Invert Level Above 3000 mm from G.L.)



Standard Cross Sectional of R.C.C. pipe (CLASS NP3)

Sewer with Continuous concrete cradle bedding

(Invert Level Above 1500 mm upto 3000 mm from G.L.)



Standard Cross Sectional of R.C.C. pipe (CLASS NP3)

Sewer with Continuous concrete cradle bedding

(Invert Level upto 1500 mm from G.L.)

$$W = OD + 2 \times 0.225 \text{ (min)} \quad X = OD/4 \quad Y = ID/4 \text{ (not less than 100 mm)}$$

$$W = OD + 2 \times 0.225 \text{ (min)} \quad X = OD/4 \quad Y = ID/4 \text{ (not less than 75 mm)}$$

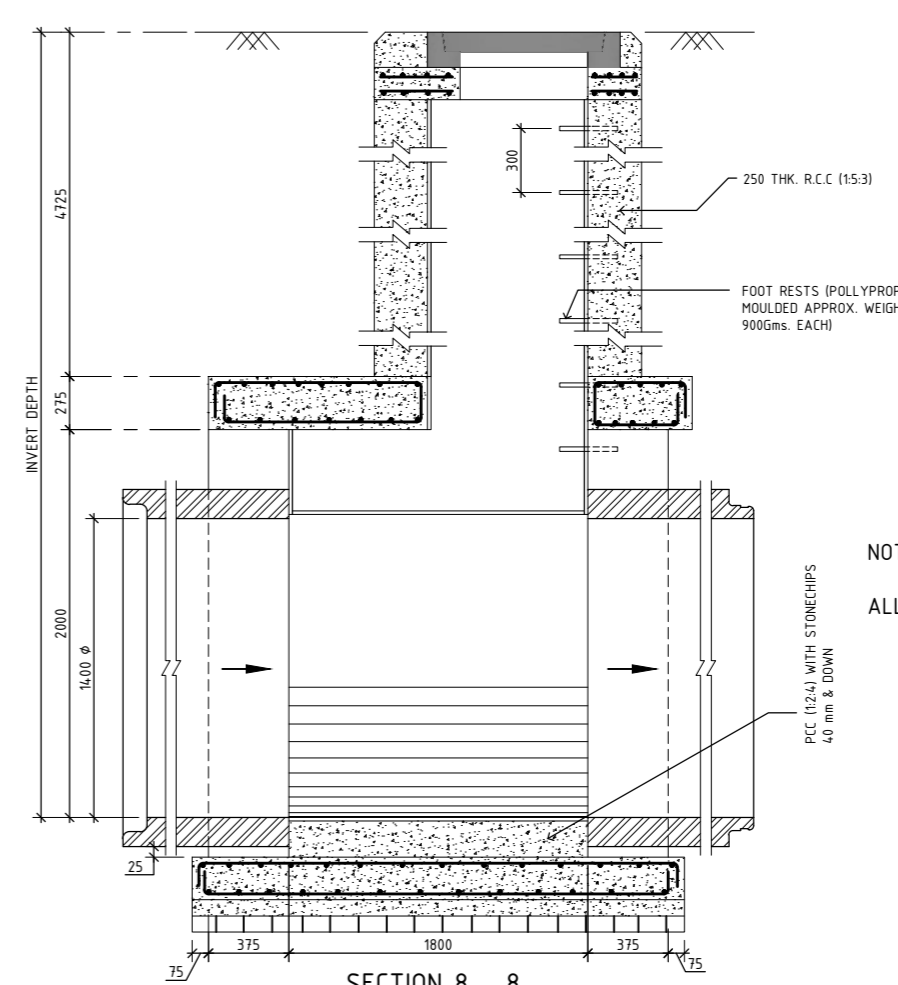
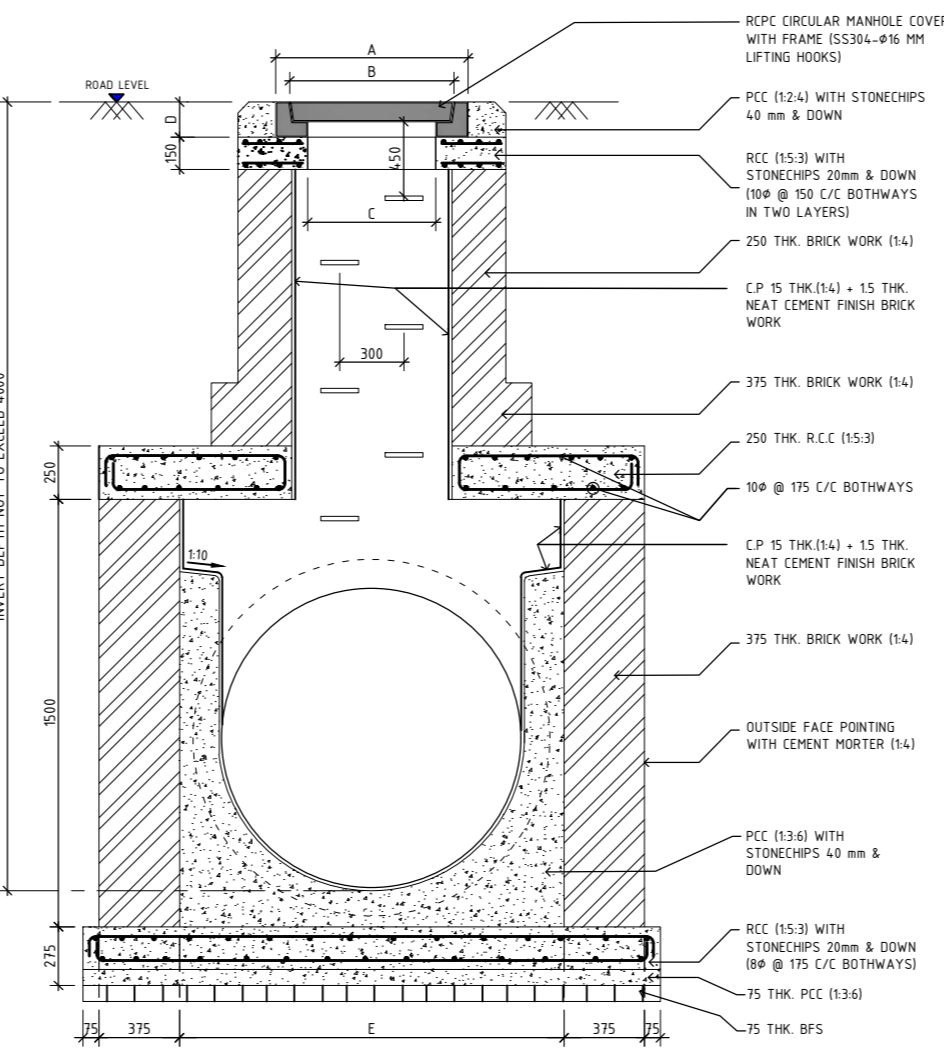
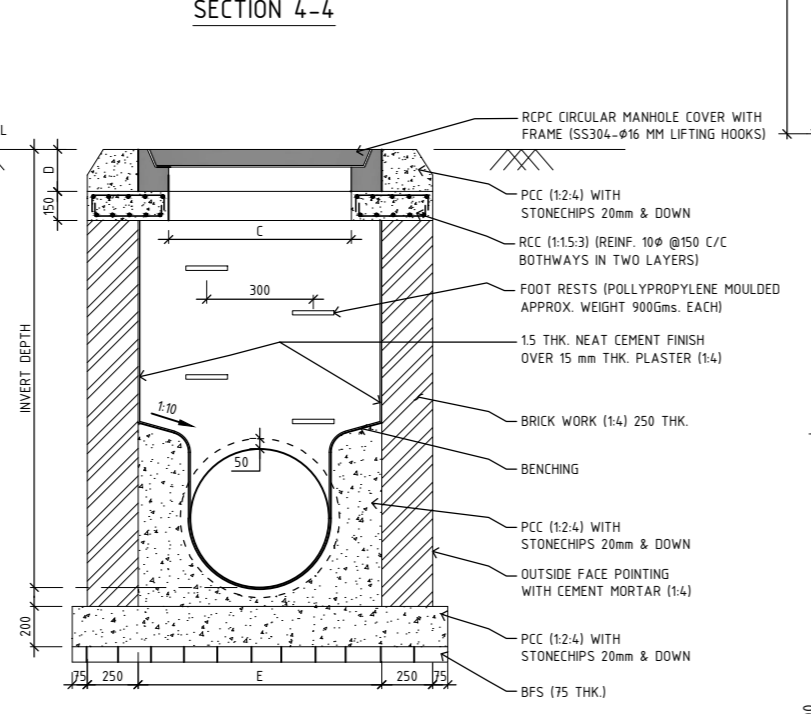
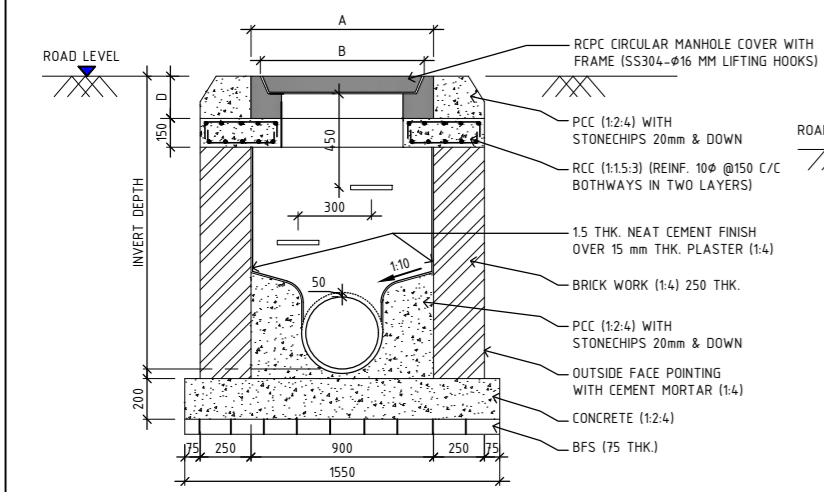
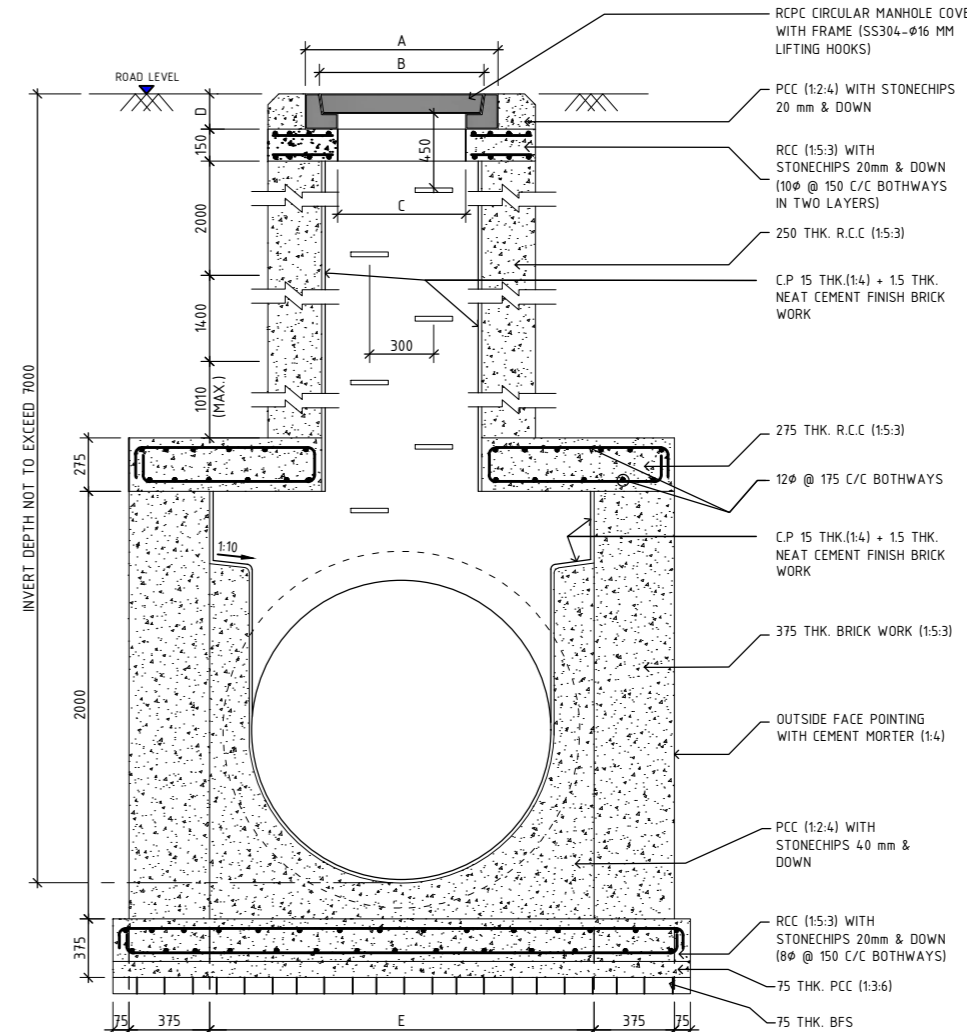
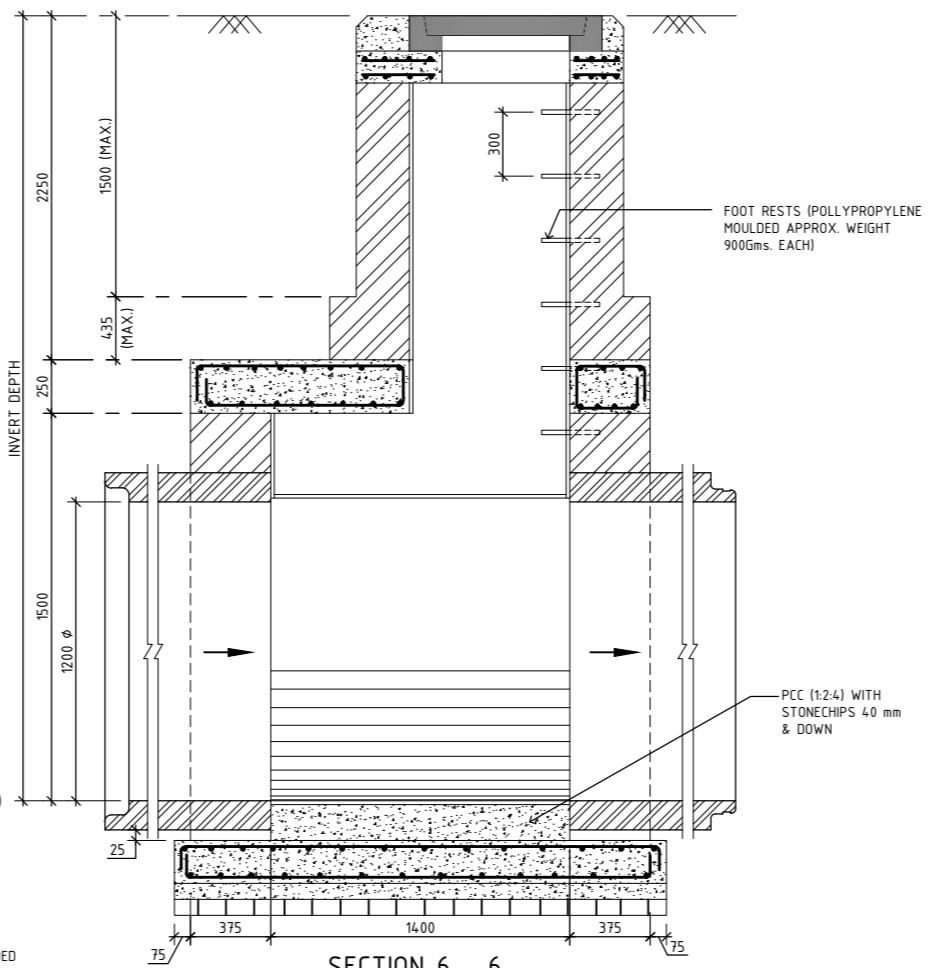
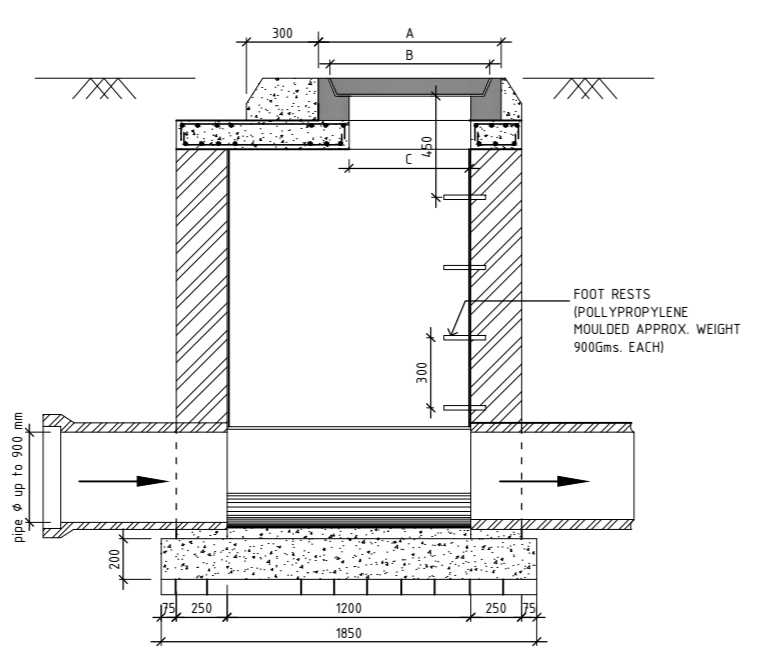
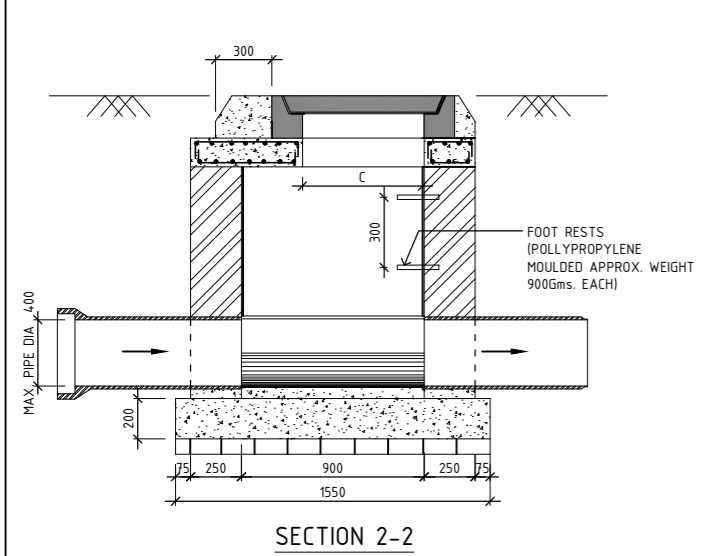
$$W = OD + 2 \times 0.225 \text{ (min)} \quad X = OD/4 \quad Y = ID/4 \text{ (not less than 100 mm)}$$

Class NP3 Pipe					
ID	T	W	X	Y	A
500	75	1100	165	125	1000
600	85	1220	195	150	1120
700	85	1320	220	175	1220
800	95	1440	250	200	1340
900	100	1550	275	225	1450
1000	115	1680	310	250	1580
1100	115	1780	335	275	1680
1200	120	1890	360	300	1790
1400	135	2120	385	325	2020

Class NP3 Pipe					
ID	T	W	X	Y	A
500	75	1100	165	125	1000
600	85	1220	195	150	1120
700	85	1320	220	175	1220
800	95	1440	250	200	1340
900	100	1550	275	225	1450
1000	115	1680	310	250	1580
1100	115	1780	335	275	1680
1200	120	1890	360	300	1790
1400	135	2120	385	325	2020

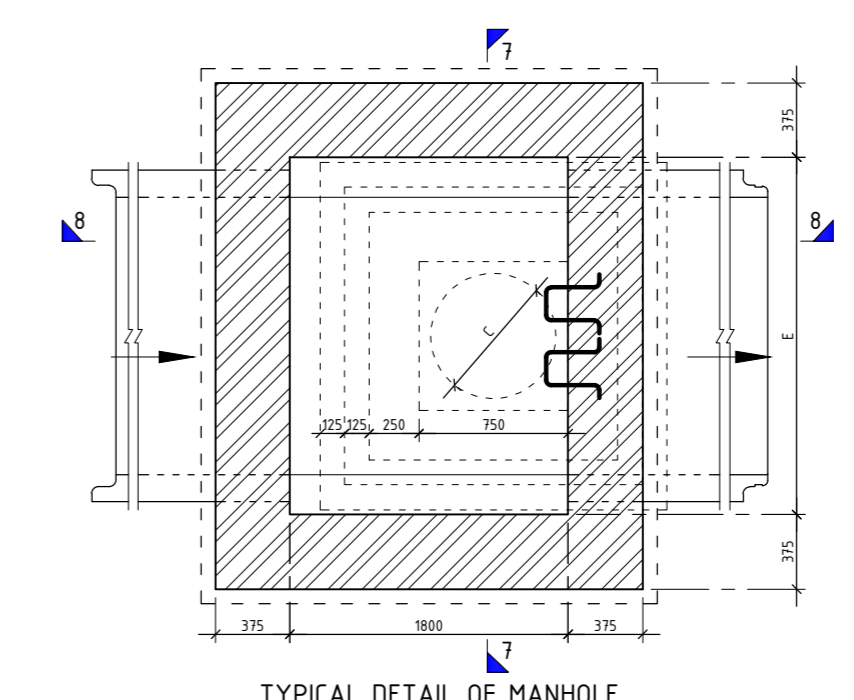
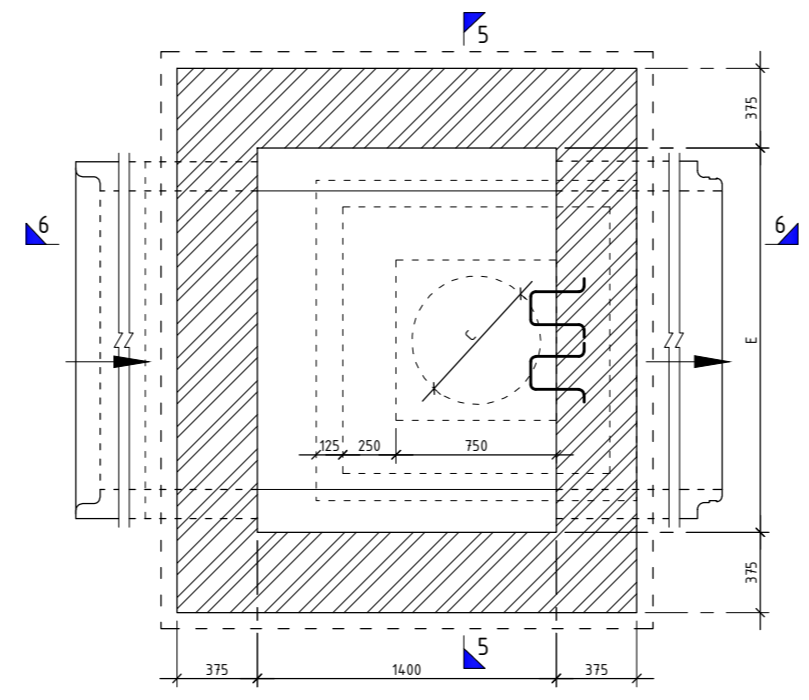
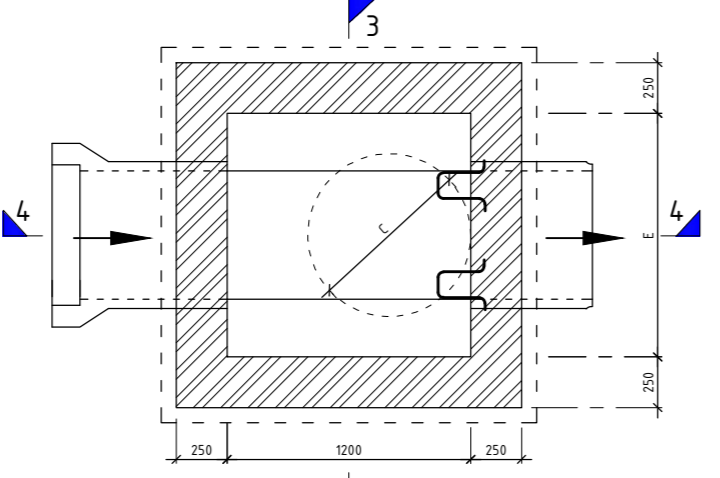
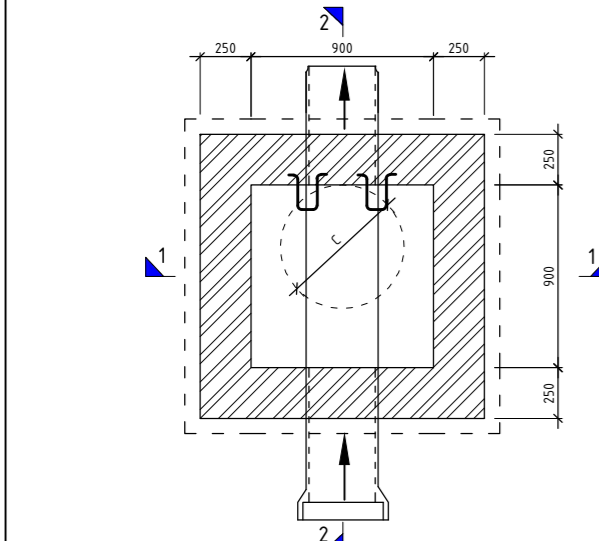
Class NP3 Pipe					
ID	T	W	X	Y	A
500	75	1100	165	125	1000
600	85	1220	195	150	1120
700	85	1320	220	175	1220
800	95	1440	250	200	1340
900	100	1550	275	225	1450
1000	115	1680	310	250	1580
1100	115	1780	335	275	1680
1200	120	1890	360	300	1790
1400	135	2120	385	325	2020

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REVISIONS					
Designed: D. Dutta	Date: 14.06.2018	Scale: NTS	Sheet Size: A2		
Drawn: K. Mukherjee	Checked: S. Nandi	FILE NAME: D:\Projects\H.505084 IN, Chhapra BUDCo\1 & D\2\12_Sewer Bedding Details_A2			
CLIENT: BUIDCo (BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION)					
BENEFICIARY: _____					
CONSULTANT: GKW CONSULT India Branch Office: PS Srijan Corporate Park, Tower 1, 13th Floor, Sector V, Salt Lake Kolkata - 700 091, West Bengal, India Tel: +91 33 40176800/6826, Fax: +91 33 40176827 E-mail: info.gkw_india@gkw-consult.com www.gkw-consult.com					
PROJECT: Preparation of Detailed Project Report on Sewerage for Chhapra, Bihar Interception and Diversion, Chhapra					
SUBJECT: NP3 SEWER BEDDING DETAIL					
DRAWING NO.: H.505084-D-29 00-J-012-0			SHEET: 1 OF 1		REVISION: 0



SL. NO.	MH TYPE	SIZE (mm)	MAX. PIPE ϕ (mm)	E (mm)
1	D1	900 X 1400	600	900
2	D2	1200 X 1400	900	1200
3	D3	1500 X 1400	1200	1500
4	D4	1800 X 1800	1400	1800

NOTES:
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.



SL. NO.	MH TYPE	SIZE (mm)	MAX. PIPE ϕ (mm)
1	A	900 X 900	400

SL. NO.	MH TYPE	SIZE (mm)	MAX. PIPE ϕ (mm)	E (mm)
1	B1	900 X 1200	500	900
2	B2	1200 X 1200	900	1200

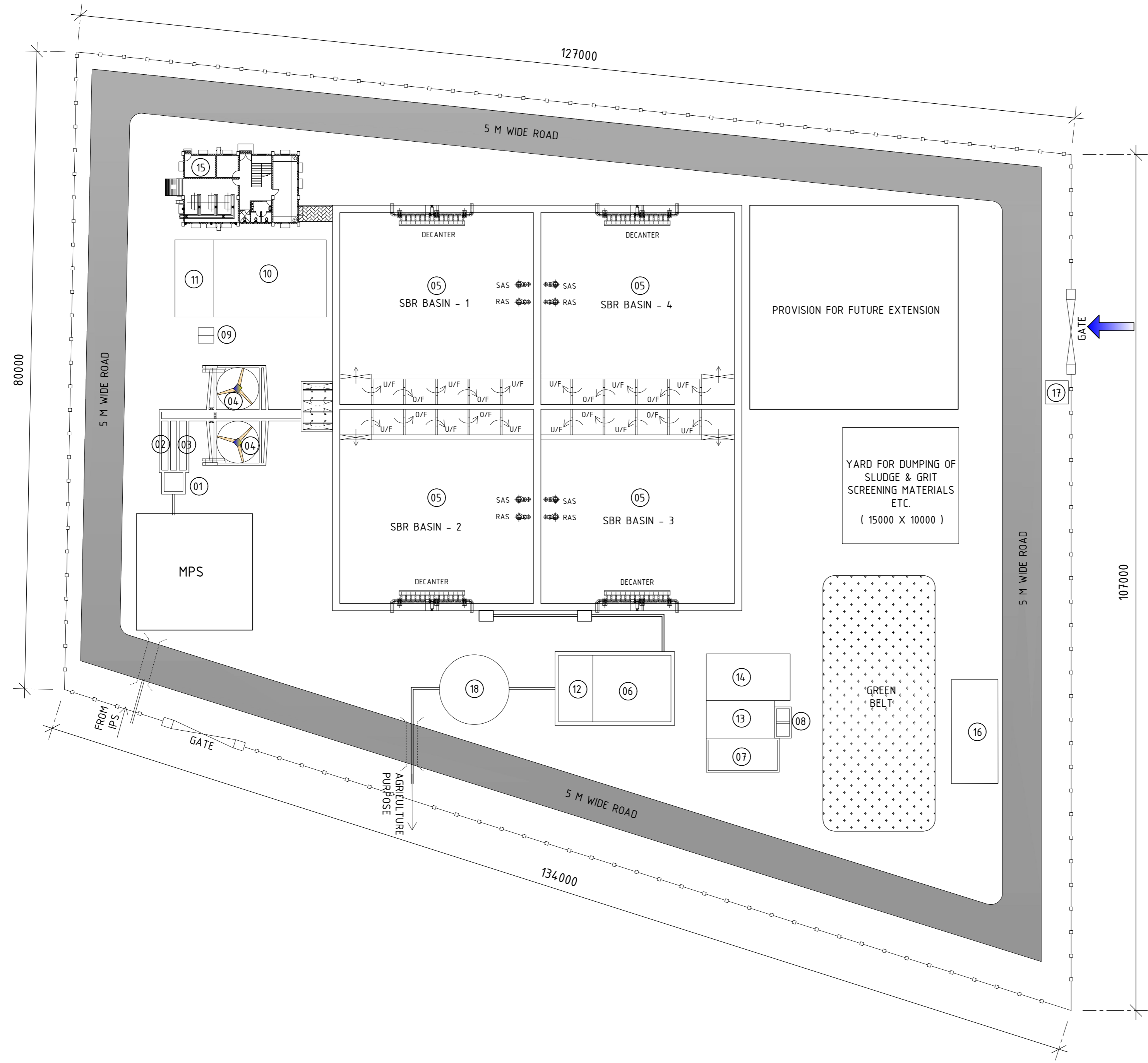
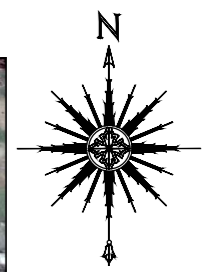
SL. NO.	MH TYPE	SIZE (mm)	MAX. PIPE ϕ (mm)	E (mm)
1	C1	900 X 1400	600	900
2	C2	1200 X 1400	900	1200
3	C3	1500 X 1400	1200	1500
4	C4	1800 X 1400	1400	1800

LOADING CAPACITY (M)	A (mm)	B (mm)	C (mm)	D (mm)
35	900	770	600	200
20	900	770	600	165
15	800	670	500	150
12	800	670	500	150
10	800	670	500	150

REV.	DATE	DESCRIPTION	DRAWN	CHECK	APPR.
REVISIONS					
Designed:		Date: 14.06.2018	Scale: NTS	Sheet Size: A2	
Drawn: K. Mukherjee	Checked: S. Nandi	FILE NAME: D:\Project\H.505084_H.Chhapra RUDCO\01 & DAE\11_Typ. detail of manholes.dwg			
CLIENT:					
BUIDCO (BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION)					
BENEFICIARY:					
CONSULTANT:					
GW Consult GmbH					
India Branch Office: PS Srijan Corporate Park, Tower 1, 13th Floor, Sector V, Salt Lake					
Kolkata - 700 091, West Bengal, India					
Tel: 91 33 40176800/8826, Fax: 91 33 40176827					
E-mail: info.gkw_india@gkw-consult.com					
A COMPANY OF THE LAMMETER GROUP					
Auguststraße 67					
68165 Mannheim, Germany					
PROJECT:					
Preparation of Detailed Project Report on Sewerage for Chhapra, Bihar Interception and Diversion, Chhapra					
Detailed Project Report					
SUBJECT:					
TYPICAL DETAIL OF MANHOLES					
DRAWING NO.: H.505084-D-26 00-J-013-0			SHEET: 1 OF 1		REVISION: 0

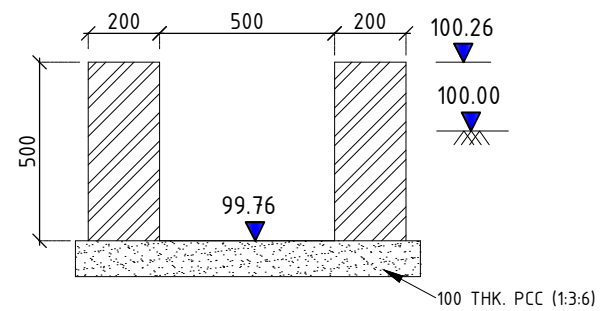
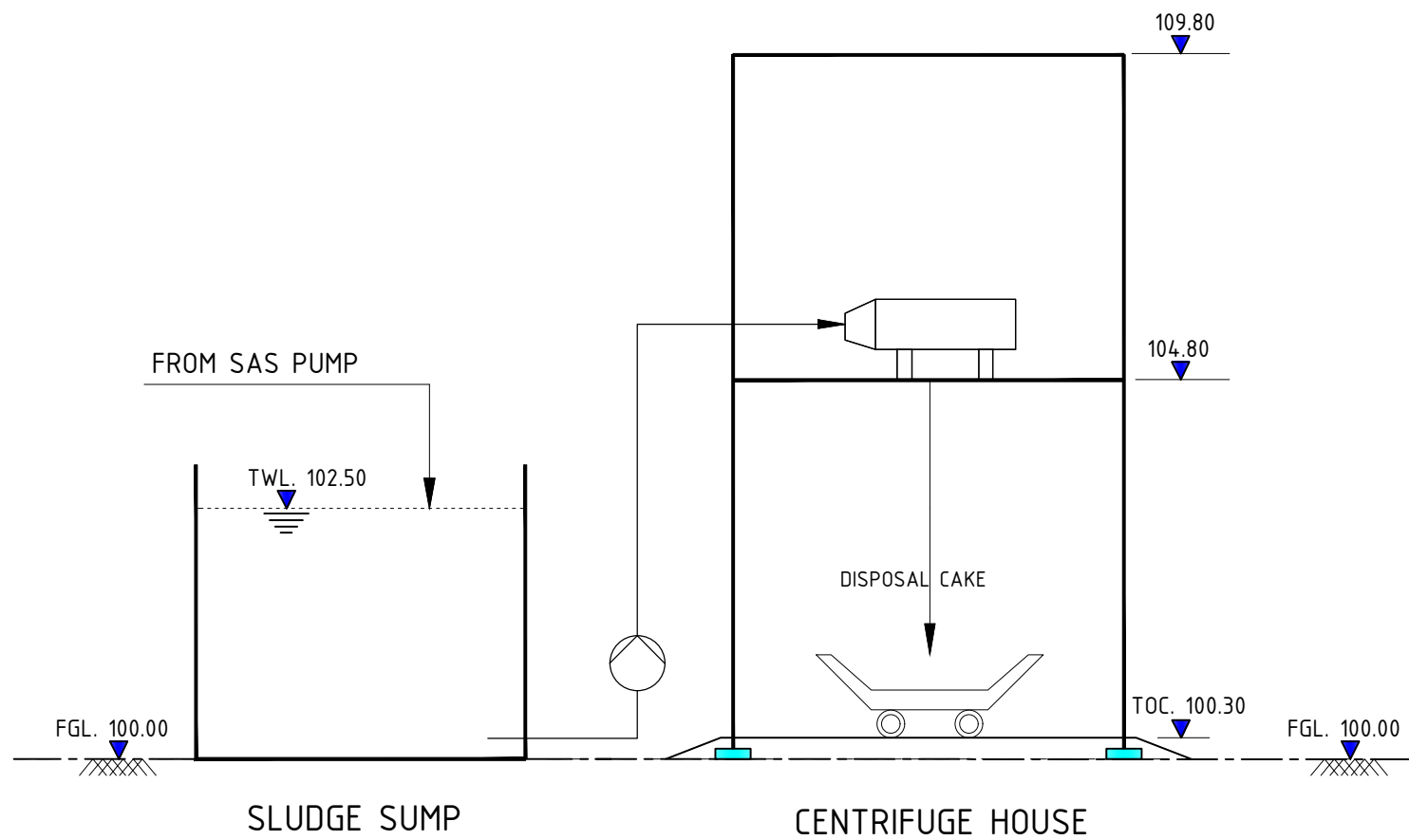
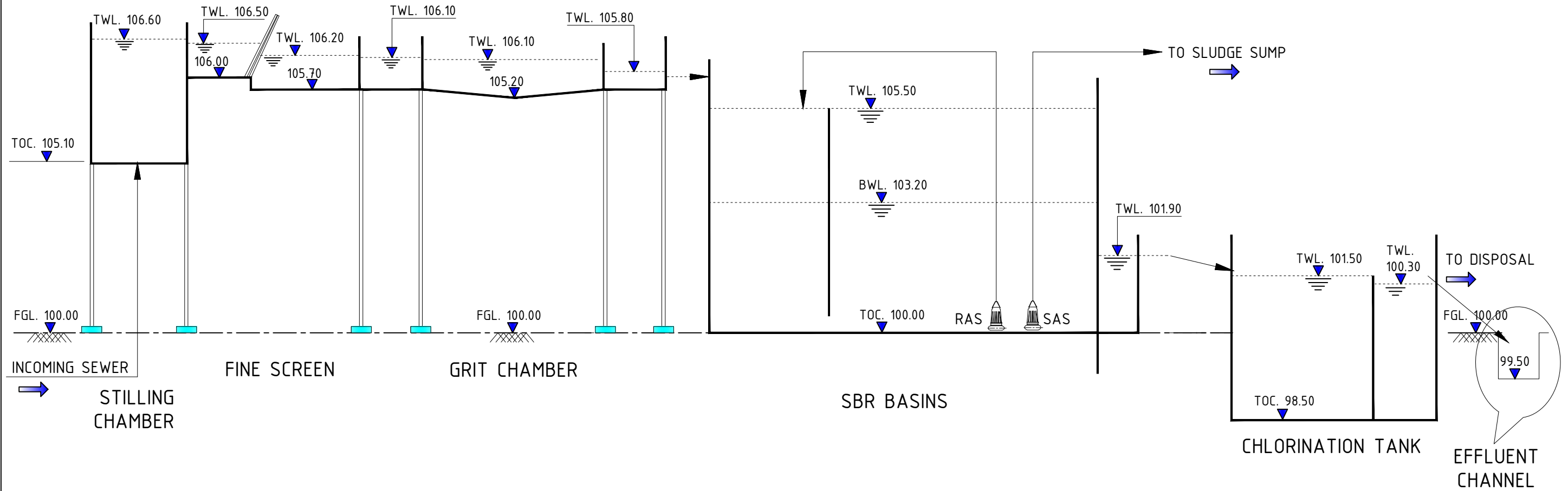


KEY MAP



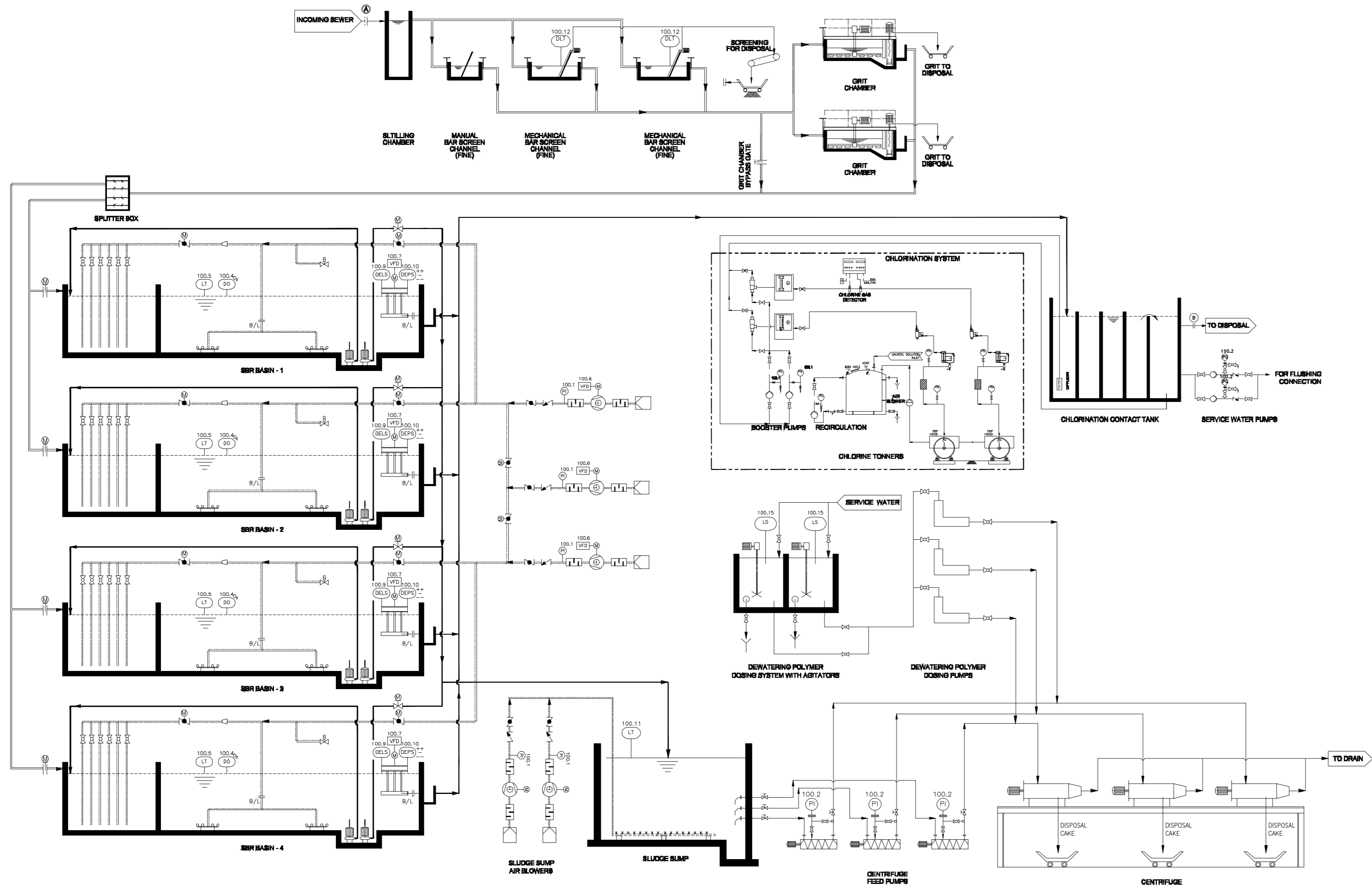
Process Units				
Sl. No.	Process Units	Size / Capacity	Qty.	Remarks
1	Inlet Chamber	3000 x 2500 x 3000 SWD.	1	RCC
2	Fine Screen Channel-Mechanical	6500 x 900 x 900 SWD.	2	RCC
3	Fine Screen Channel-Manual	6500 x 900 x 900 SWD.	1	RCC
4	Grit Chamber-Mechanical	6000 x 6000 x 900 SWD.	2	RCC
5	SBR Basin - 1/2/3/4	28700 x 28700 x 5000 SWD.	4	RCC
6	Chlorination Tank	19000 x 9000 x 3500 SWD.	1	RCC
7	Sludge Sump	9000 x 5000 x 3500 SWD.	1	RCC
8	DWPE Dosing Tank	1600 x 1600 x 2000 SWD.	2	RCC
9	FeCl3 Dosing Tank	2000 x 2000 x 2500 SWD.	2	RCC
Building List				
10	SBR Air Blower / MCC & Control Building	15000 x 10000 x 10000 HT.	1	G+1
11	DG Set House	10000 x 5000 x 4500 HT.	1	
12	Chlorination cum chlorine tonner house (Above Chlorination Tank)	9000 x 5000 x 4500 HT.	1	
13	Centrifuge Feed Pump House	7500 x 5000 x 4500 HT.	1	
14	Centrifuge House	8000 x 6000 x 9500 HT.	1	G (Stilt)+1
15	Office	15000 x 10000		
16	Staff Quarters	8700 x 7700		
17	Security Cabin	3000 x 3000 x 3000	1	
18	Effluent Pump House	9 m dia	1	

REV.	DATE	DESCRIPTION	DRAWN	CHECK	APPR.
REVISIONS					
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Drawn: K. Mukherjee	Checked: S. Nandi	FILE NAME: D:\Project\11\505084 PL Chhapra BUIDCoV & OVR\PL14_Layout of STP_132_ML2D_A2			
CLIENT: BUIDCo (BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION)					
BENEFICIARY: _____					
CONSULTANT: GWK Consult GmbH India Branch Office: PS Srijan Corporate Park, Tower 1, 13th Floor, Sector V, Salt Lake Kolkata - 700 091, West Bengal, India Tel : 91 33 40176800/6826, Fax : 91 33 40176827 E-mail : info.gkw_india@gkw-consult.com A COMPANY OF THE LAHMEYER GROUP www.gkw-consult.com Auguststraße 67 68165 Mannheim, Germany					
PROJECT: Preparation of Detailed Project Report on Sewerage for Chhapra, Bihar Interception and Diversion, Chhapra Detailed Project Report					
SUBJECT: LAYOUT OF PROPOSED STP (32 MLD)					
DRAWING NO.: H.505084-D-31 00-J-014-0			SHEET: 1 OF 1	REVISION: 0	



NOTE:
 * GROUND LEVEL ASSUMED AT 100.00 M.
 * ALL LEVELS ARE IN METER .
 * ALL DIMENSIONS ARE IN MILLIMETER.

REV.	DATE	DESCRIPTION	DRAWN	CHECK	APPR.
REVISIONS					
Designed:		Date: 14.06.2018	Scale: NTS	Sheet Size: A3	
Drawn: K. Mukherjee	Checked: S. Nandi	FILE NAME: D:\Project\H.505084 IN Chhapra BUDCOV & D&R\15_Hydraulic Flow Diagram			
CLIENT: BUIDCO (BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION)					
BENEFICIARY:					
CONSULTANT: GKW Consult GmbH India Branch Office: PS Srijan Corporate Park, Tower 1, 13th Floor, Sector V, Salt Lake Kolkata - 700 091, West Bengal, India Tel: +91 33 40176800/6826, Fax: +91 33 40176827 E-mail: info.gkw_india@gkw-consult.com www.gkw-consult.com <small>A COMPANY OF THE LAHMAYER GROUP Augustenstraße 67 68165 Mannheim, Germany</small>					
PROJECT: Preparation of Detailed Project Report on Sewerage for Chhapra, Bihar Interception and Diversion, Chhapra Detailed Project Report					
SUBJECT: HYDRAULIC FLOW DIAGRAM OF STP (32 MLD)					
DRAWING NO.: H.505084-D-31 00-W-015-0			SHEET: 1 OF 1		REVISION: 0



LINE LEGEND	
	RAS LINE
	SAS LINE
	AIR LINE
	INSTRUMENT SIGNAL
	DRAIN LINE
	RCC CHANNEL

LEGEND	
	NON-RETURN VALVE
	BUTTERFLY VALVE
	MOTORISED BUTTERFLY VALVE
	CHANNEL MOUNTED MOTORISED GATE
	MOTORIZED GATE
	KNIFE GATE VALVE
	BALL VALVE
	NEEDLE VALVE
	VARIABLE FREQUENCY DRIVE
	SOFT STARTER
	MOTOR
	AIR BLOWER
	SILENCER
	FILTER

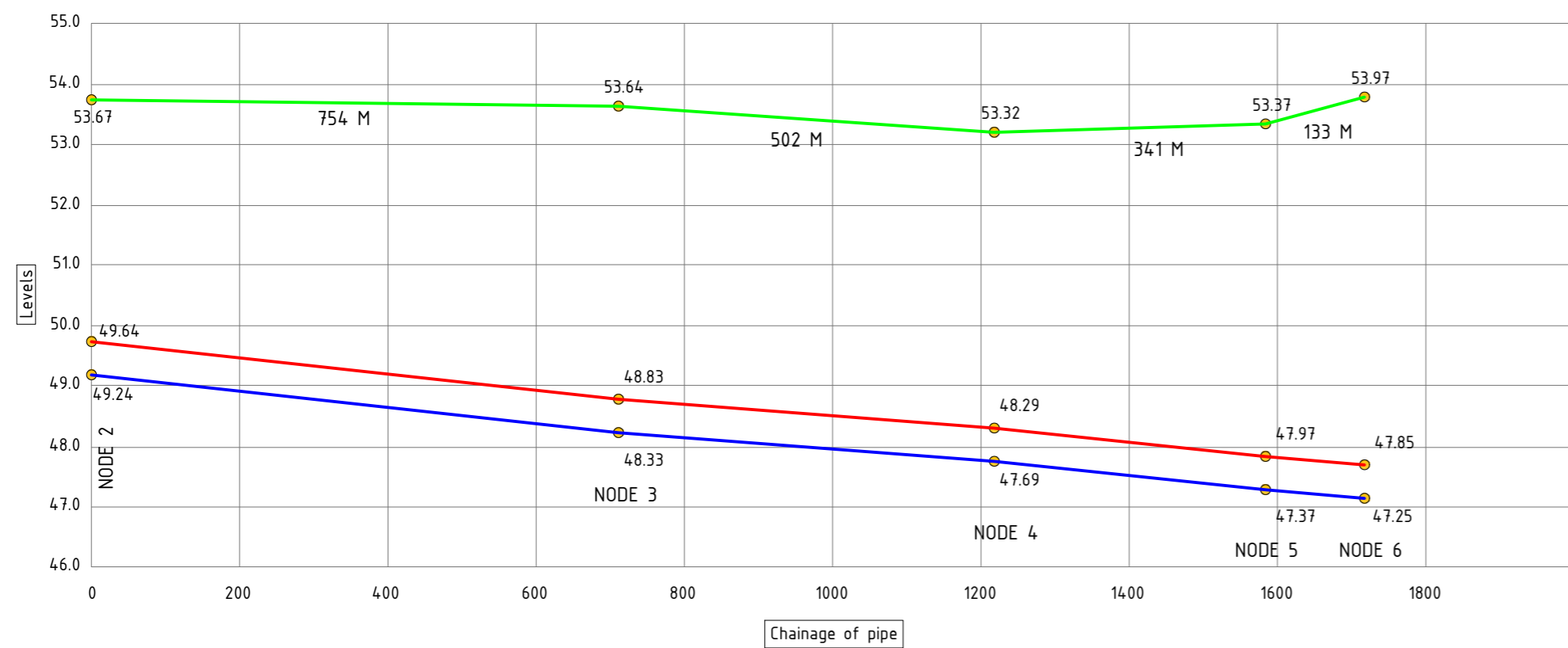
EQUIPMENT LIST			
DESCRIPTION	SIZE/CAPACITY	QTY.	REMARK
SBR AIR BLOWERS	5220 Nm ³ /hr. @ 0.60 kg/cm ²	03	2W + 1S
RETURN ACTIVATED SLUDGE PUMPS	130 m ³ /hr. @ 5 MWC	05	4W + 1S
SURPLUS ACTIVATED SLUDGE PUMPS	65 m ³ /hr. @ 10 MWC	05	4W + 1S
CHLORINATORS	5 kg/hr	02	1W + 1S
SLUDGE SUMP AIR BLOWERS	170 m ³ /hr. @ 0.40 kg/cm ²	02	1W + 1S
CENTRIFUGE FEED PUMPS	14 m ³ /hr. @ 15 MWC	03	2W + 1S
CENTRIFUGE	14 m ³ /hr.	03	2W + 1S
DWPE DOSING TANK AGITATOR	1.5 HP @ 100 RPM	02	2W
DWPE DOSING PUMPS	330 LPH @ 4.00 kg/cm ²	03	2W + 1S

INSTRUMENT LIST		
MK.NO.	DESCRIPTION	REMARK
PI 100.1	PRESSURE GAUGES	BOURDON TYPE
PI 100.2	PRESSURE GAUGES	DIAPHRAGM TYPE
DO 100.4	DISSOLVED OXYGEN METER	IMMERSION TYPE
LT 100.5	LEVEL TRANSMITTER	HYDROSTATIC TYPE
VFD 100.6	VARIABLE FREQUENCY DRIVE	FOR BLOWERS
VFD 100.7	VARIABLE FREQUENCY DRIVE	FOR DECANTERS
DELS 100.9	DECANTER LEVEL SENSOR	MERCURY FLOAT SWITCH
DEPS 100.10	DECANTER POSITION SENSOR	MAGNETIC LIMIT SWITCH
LT 100.11	LEVEL TRANSMITTER DIFFERENTIAL	ULTRASONIC TYPE
DLT 100.12	LEVEL TRANSMITTER DIFFERENTIAL	ULTRASONIC TYPE
FT 100.13	FLOW TRANSMITTER	ULTRASONIC TYPE
LS 100.15	LEVEL SWITCH	CAPACITANCE TYPE

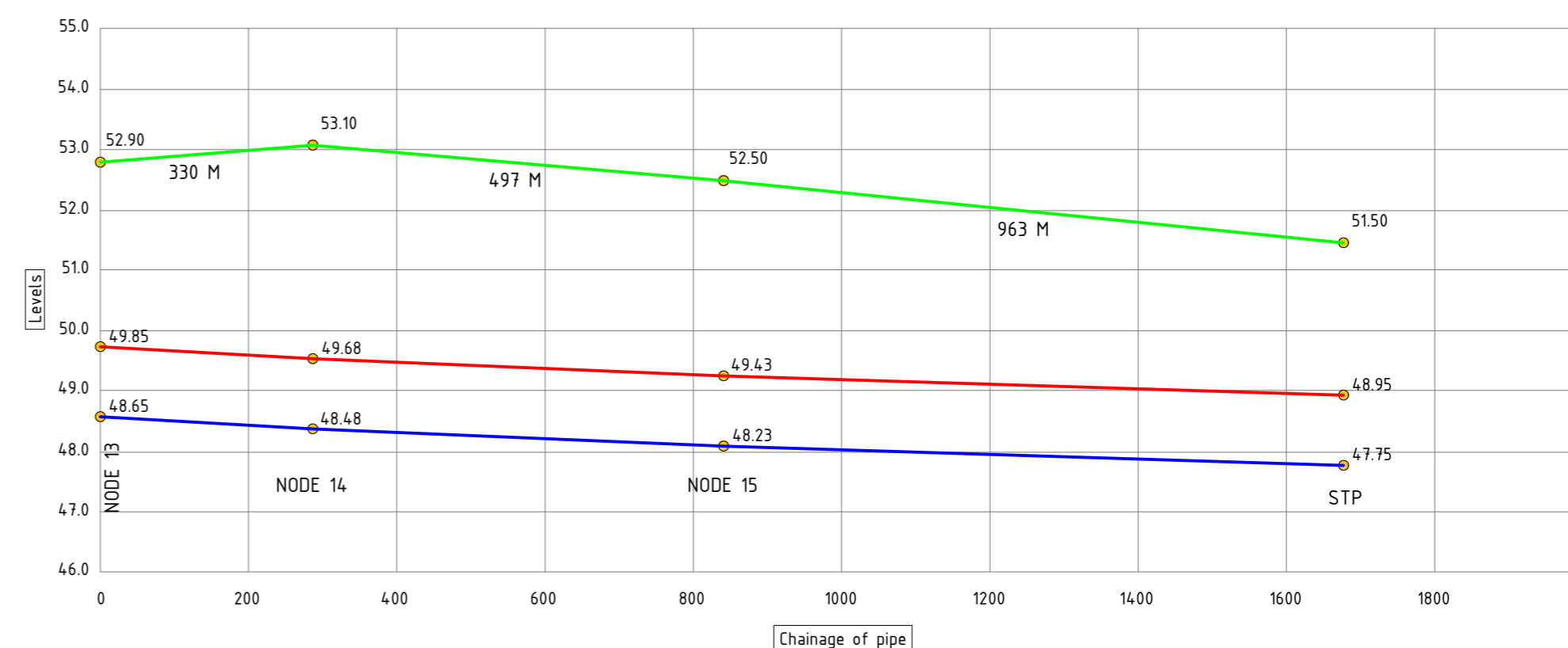
TERMINATION POINT			
MK.NO.	DESCRIPTION	PRESSURE	REMARK
A	INCOMING SEWER	ATMOSPHERIC	
B	CHLORINATION TANK OUTLET	ATMOSPHERIC	

REV.	DATE	DESCRIPTION	DRAWN	CHECK	APPR.
REVISIONS					
Designed: D. Dutta	Date: 14.06.2018	Scale: NTS	Sheet Size: A2		
Drawn: K. Mukherjee	Checked: S. Nandi	FILE NAME: D:\Projects\H.505084\H. Chhapra BUIDCo\I & D\3116_Piping & Instrumentation Diagram			
CLIENT: BUIDCo (BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION)					
BENEFICIARY:					
CONSULTANT: GKW Consult GmbH India Branch Office: PS Srijan Corporate Park, Tower 1, 13th Floor, Sector V, Salt Lake Kolkata - 700 091, West Bengal, India Tel : 91 33 40176800/6826, Fax : 91 33 40176827 E-mail : info.gkw_india@gkw-consult.com A COMPANY OF THE LAHMEYER GROUP www.gkw-consult.com Augustaanlage 67 68165 Mannheim, Germany					
PROJECT: Preparation of Detailed Project Report on Sewerage for Chhapra, Bihar Interception and Diversion, Chhapra Detailed Project Report					
SUBJECT: Piping & Instrumentation of STP (32 MLD)					
DRAWING NO.: H.505084-D-31-00-W-016-0			SHEET: 1 OF 1	REVISION: 0	

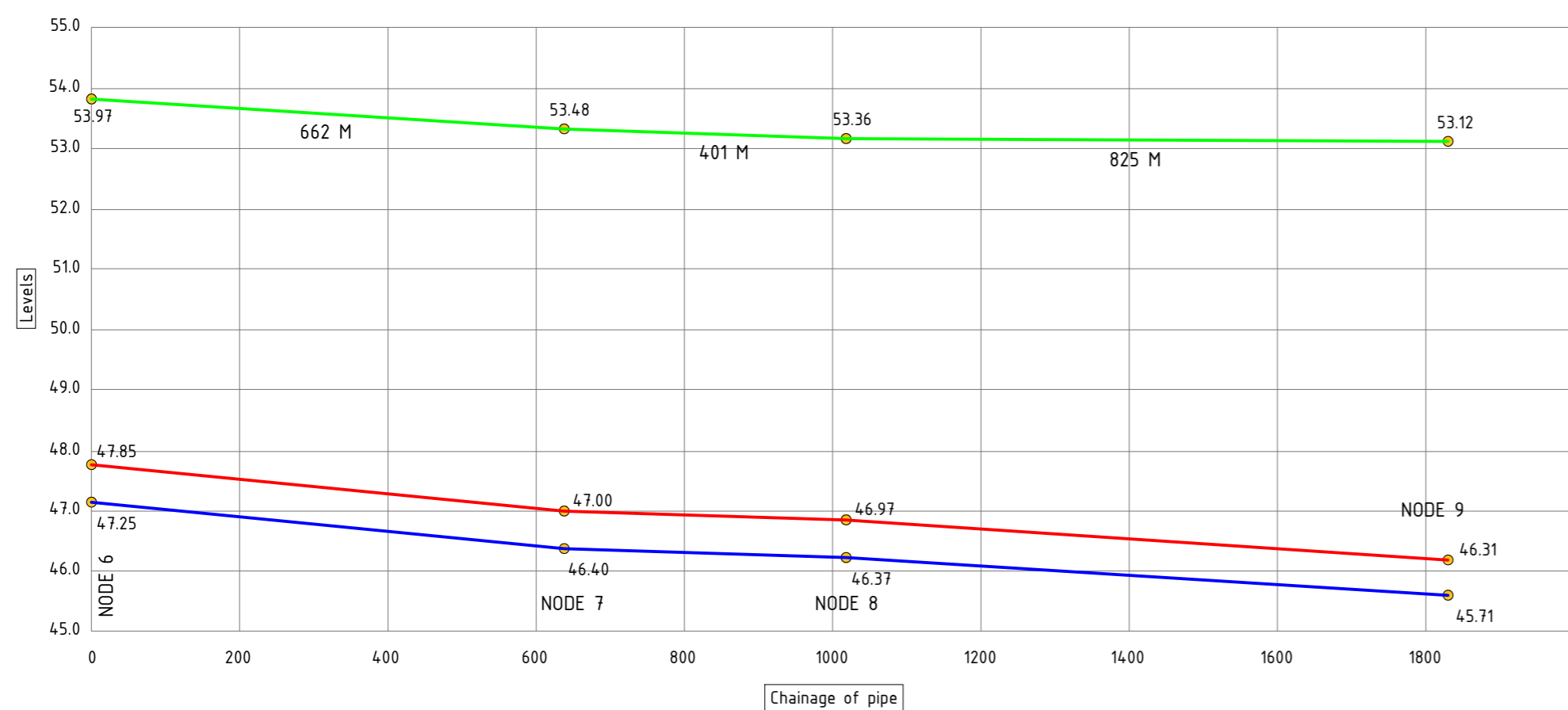
Longitudinal Section (Node 2 - Node 6)



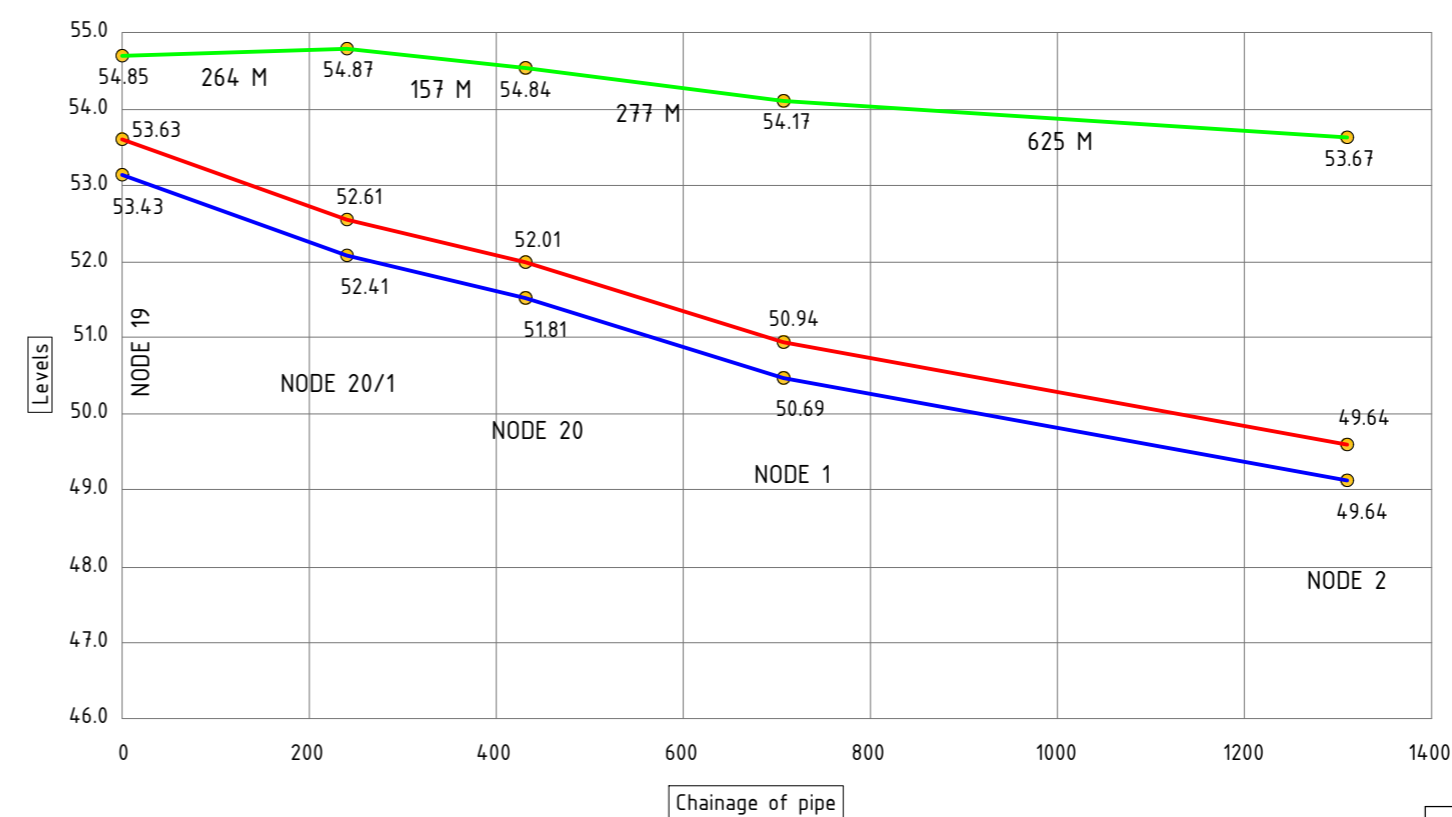
Longitudinal Section (Node 13 - STP)



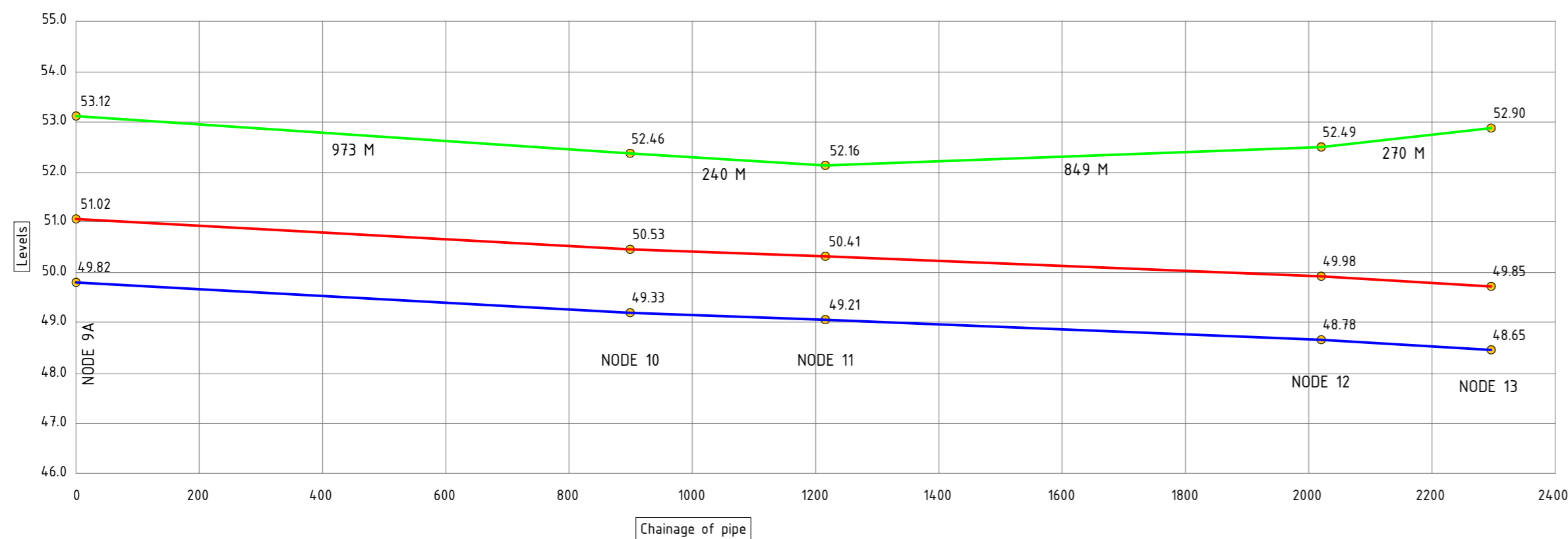
Longitudinal Section (Node 6 - Node 9)



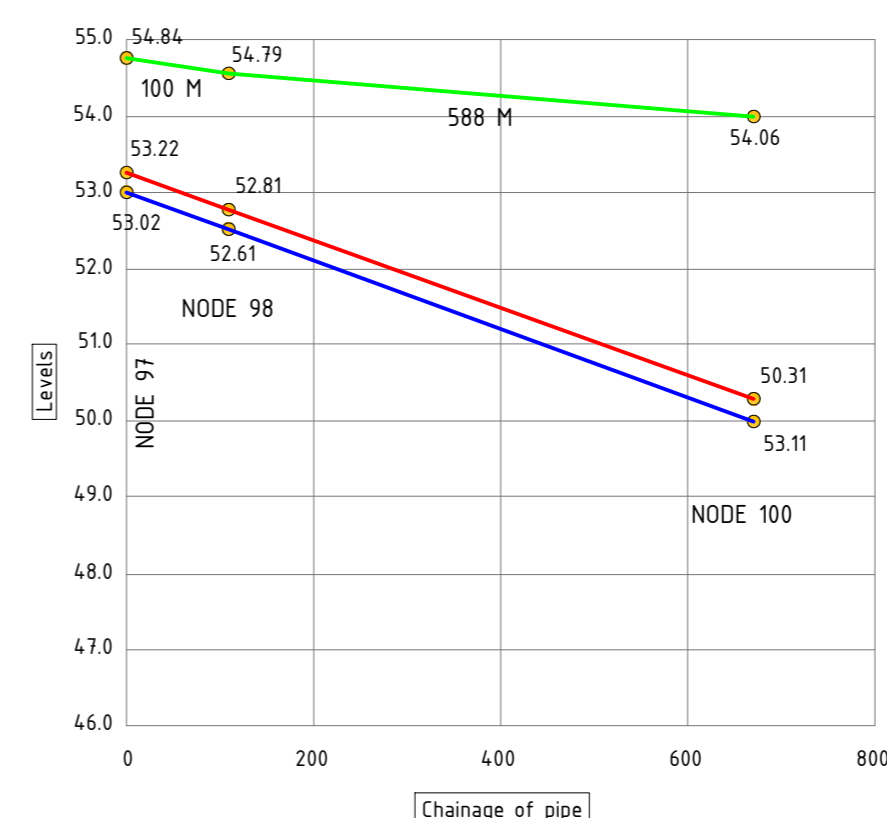
Longitudinal Section (Node 19 - Node 2)



Longitudinal Section (Node 9A - Node 13)



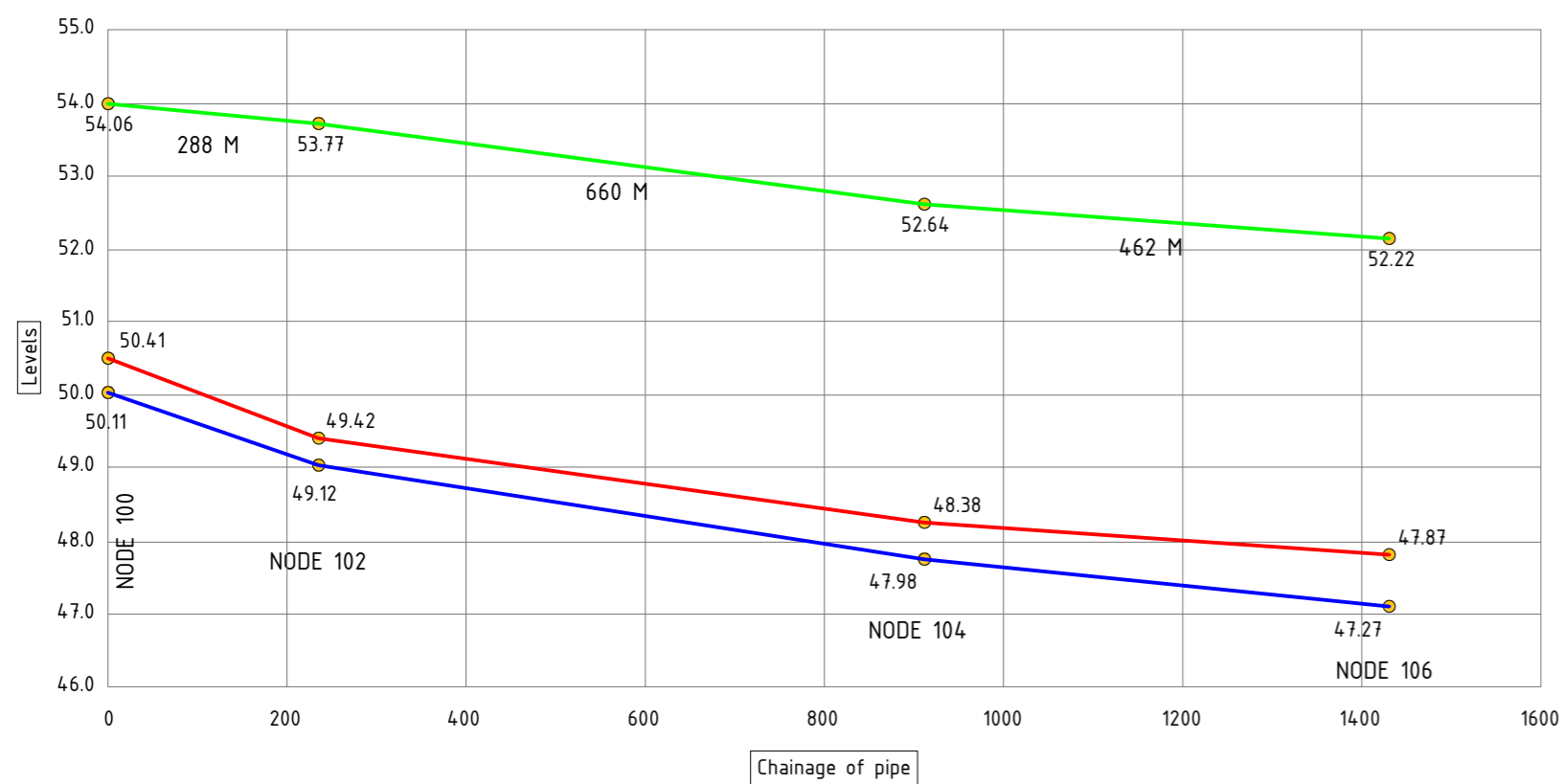
Longitudinal Section (Node 97 - Node 100)



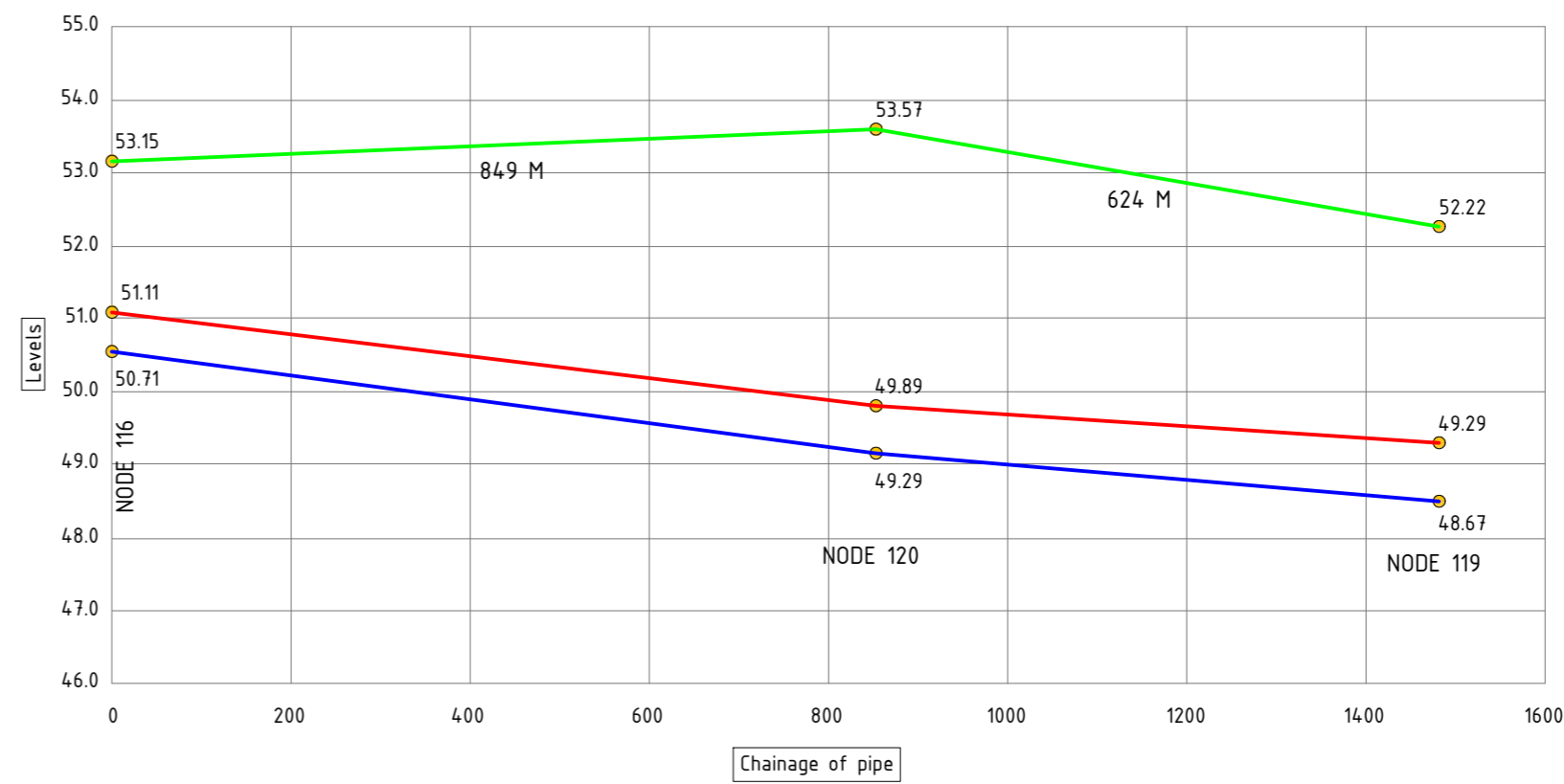
GL at Node ———
 Invert level of pipe ———
 Pipe top level ———

REV.	DATE	DESCRIPTION	DRAWN	CHECK	APPR.
REVISIONS					
Designed: D. Dutta		Date: 08.10.2018	Scale: NTS	Sheet Size: A2	
Drawn: K. Mukherjee		Checked: S. Nandi			
FILE NAME: D:\Projects\H.505084\H.505084\CHhapra BUIDCo\I & D\RF17_Long Section of I&D network					
BUIDCo (BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION)					
BENEFICIARY: _____					
GKW Consult GmbH India Branch Office: PS Srijan Corporate Park, Tower 1, 13th Floor, Sector V, Salt Lake Kolkata - 700 091, West Bengal, India Tel : 91 33 40176800/6826, Fax : 91 33 40176827 E-mail : info.gkw_india@gkw-consult.com www.gkw-consult.com					
PROJECT: Preparation of Detailed Project Report on Sewerage for Chhapra, Bihar Interception and Diversion, Chhapra Detailed Project Report					
SUBJECT: LONG SECTION OF PROPOSED I & D NETWORK					
DRAWING NO.: H.505084-D-31 00-W-017-0			SHEET: 1 OF 2		REVISION: 0

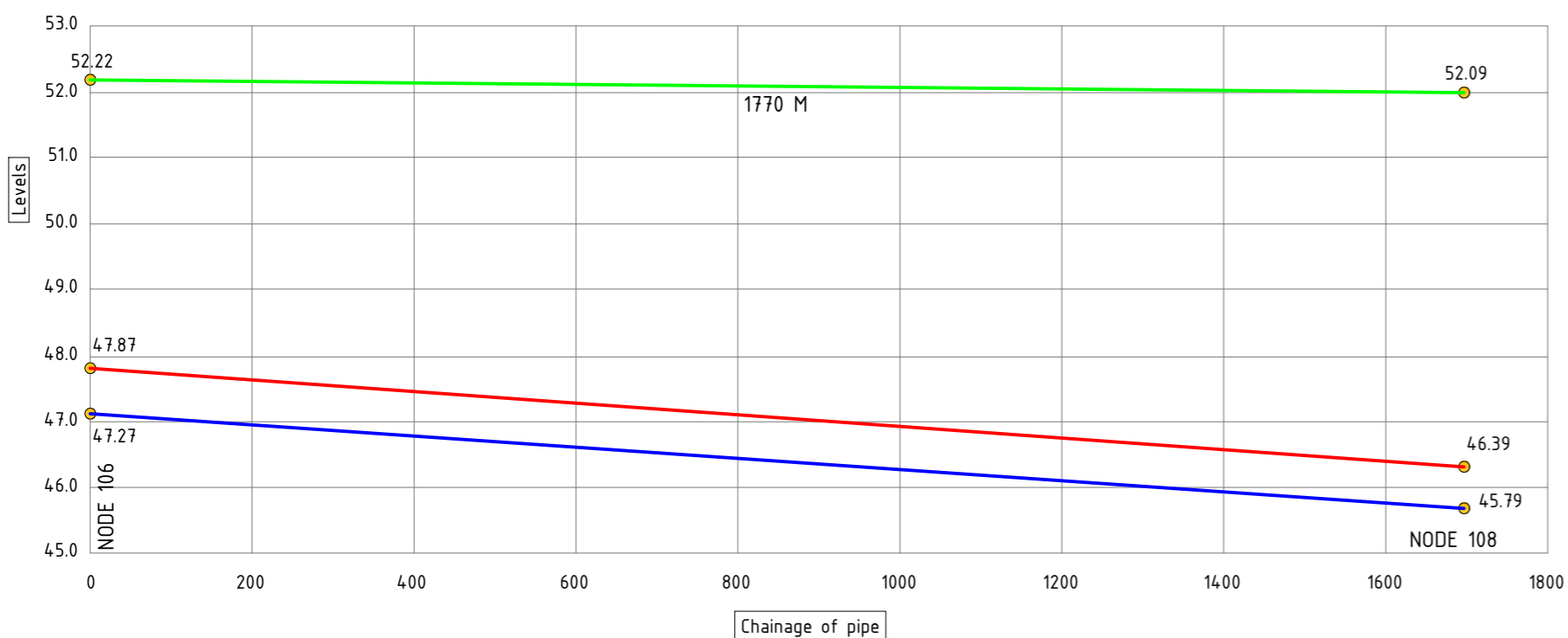
Longitudinal Section (Node 100 - Node 106)



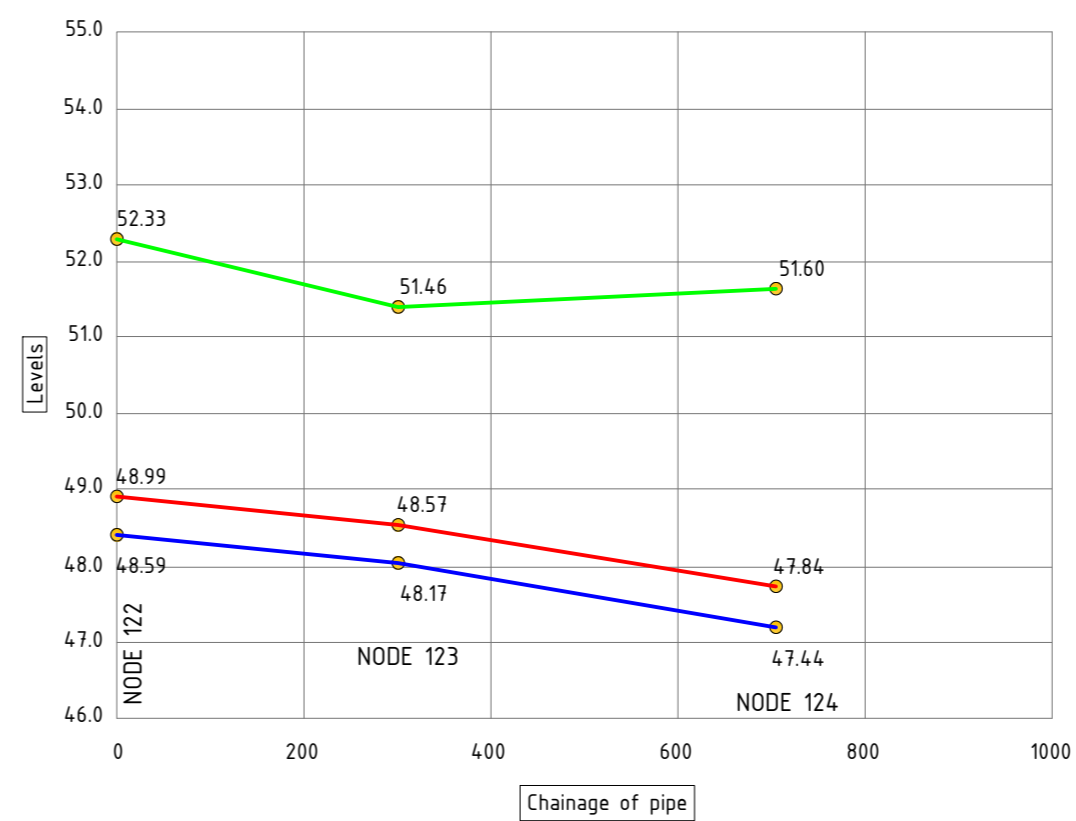
Longitudinal Section (Node 116 - Node 119)



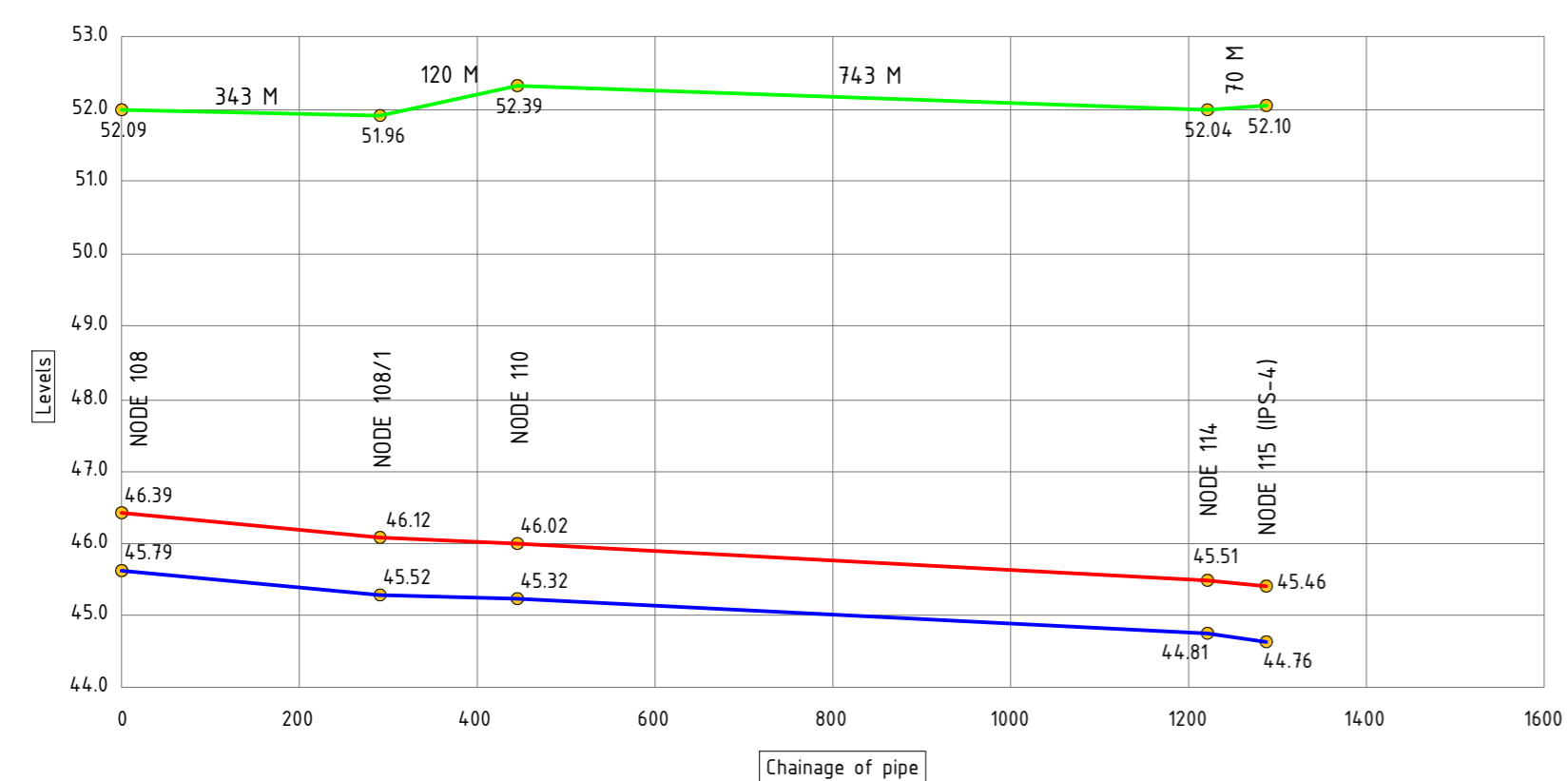
Longitudinal Section (Node 106 - Node 108)





Longitudinal Section (Node 122 - Node 124)



Longitudinal Section (Node 108 - Node 115)



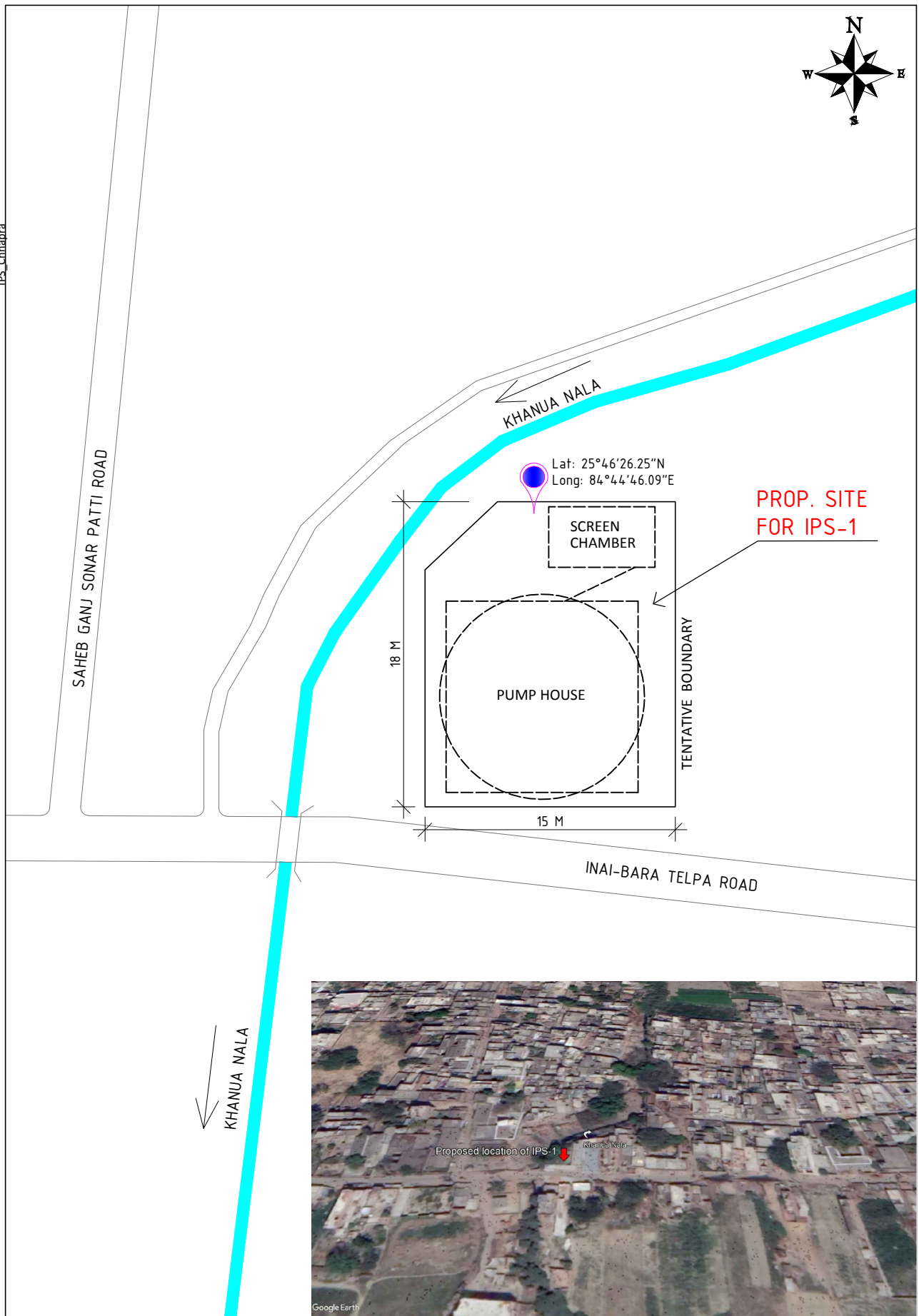
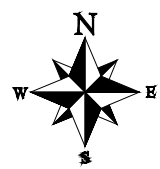
GL at Node ——— Green
 Invert level of pipe ——— Red
 Pipe top level ——— Blue

REV.	DATE	DESCRIPTION	DRAWN	CHECK	APPR.
REVISIONS					
Designed: D. Dutta	Date: 08.10.2018	Scale: NTS	Sheet Size: A2		
Drawn: K. Mukherjee	Checked: S. Nandi	FILE NAME: D:\Project\H505084\H_Chhapra BUIDCoV & DWR\17_Long Section of RSI network			
CLIENT:  BUIDCo (BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION)					
BENEFICIARY:					
CONSULTANT:  GKW Consult GmbH India Branch Office: PS Srijan Corporate Park, Tower 1, 13th Floor, Sector V, Salt Lake Kolkata - 700 051, West Bengal, India Tel : 91 33 40176800/6826, Fax : 91 33 40176827 E-mail : info.gkw_india@gkw-consult.com www.gkw-consult.com <small>A COMPANY OF THE LANXESS GROUP</small> Augustaanlage 67 68165 Mannheim, Germany					
PROJECT: Preparation of Detailed Project Report on Sewerage for Chhapra, Bihar Interception and Diversion, Chhapra Detailed Project Report					
SUBJECT: LONG SECTION OF PROPOSED I & D NETWORK					
DRAWING NO.: H.505084-D-31-00-W-017-0			SHEET: 2 OF 2	REVISION: 0	

TENTATIVE IPS's LOCATIONS OF CHHAPTRA TOWN

DRAWING NO.H.505084-D-31 00-J-018-0

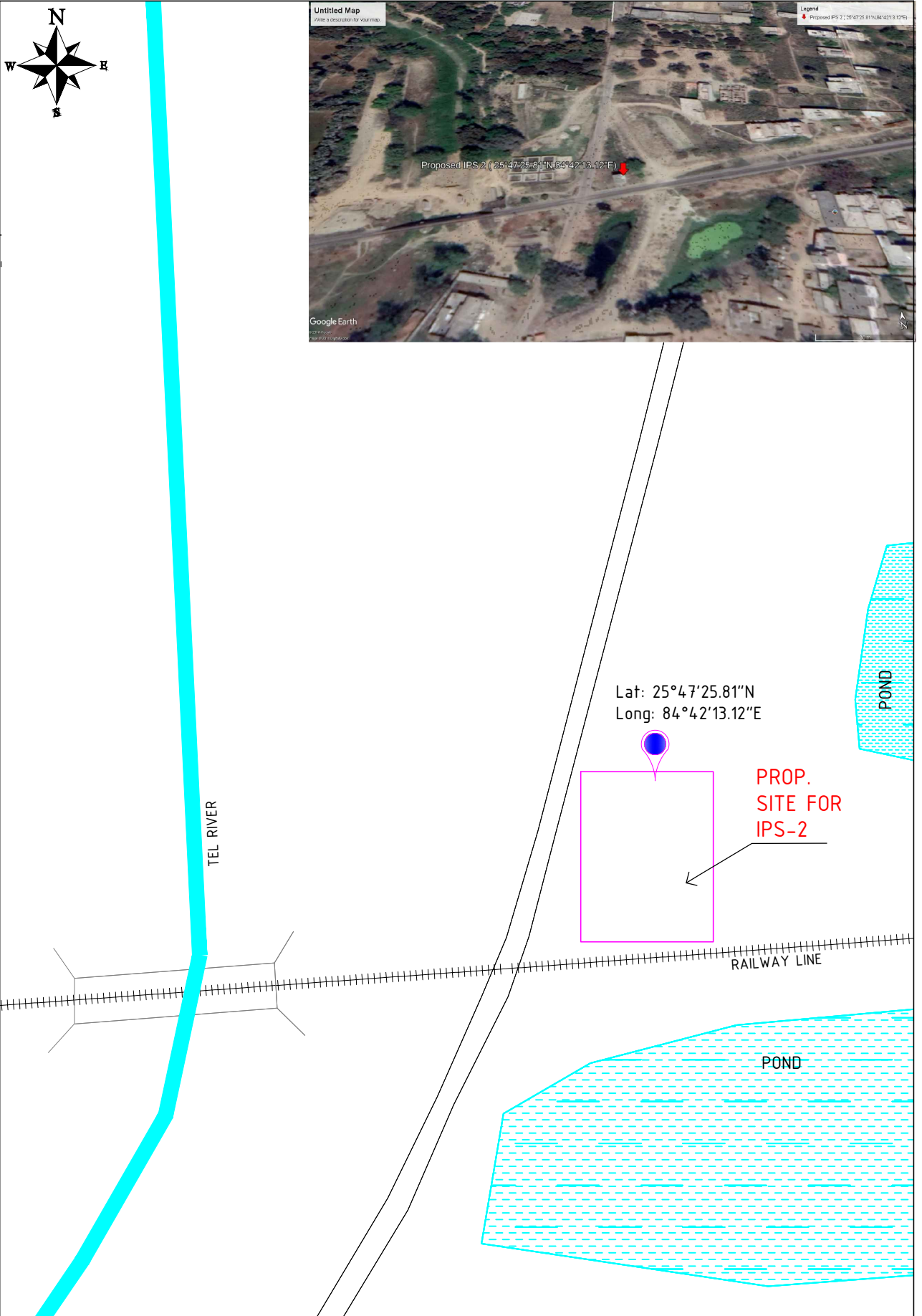
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PROJECT: Preparation of Detailed Project Report on Sewerage for Chhapra, Bihar Interception and Diversion, Chhapra	CONSULTANT:  GKW Consult GmbH India Branch Office: PS Srijan Corporate Park, Tower 1, 13th Floor, Sector V, Salt Lake Kolkata - 700 091, West Bengal, India Tel : 91 33 40176800/6826; Fax : 91 33 40176827 E-mail : info.gkw_india@gkw-consult.com www.gkw-consult.com	Designed by	Drawn by	Checked by	SUBJECT: PROPOSED SITE PLAN OF IPS-1 (CHHAPRA I&D)	Sheet
		DD.MM.YY	Scale	Sheet		Revision
CLIENT: Bihar Urban Infrastructure Development Corporation Limited (BUIDCo)	A COMPANY OF THE LANXESS GROUP Auguststraße 67 68165 Mannheim, Germany	22.08.2018	1:300	A4	Drawing No. 505084-D-31 00-I-018-0	0

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CLIENT: Bihar Urban Infrastructure Development Corporation Limited (BUIDCo)

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Designed by	Drawn by	Checked by
	K. Mukherjee	D. Dutta
DD.MM.YY	Scale	Sheet
22.08.2018	1:300	A4

SUBJECT: PROPOSED SITE PLAN OF IPS-2 (CHHAPRA I&D)
Drawing No. 505084-D-31 00-I-018-0

Sheet 2/12
Revision 0