

Feasibility Study on Climate-Resilient Community Access to Safe Water Powered by Renewable Energy in Drought-Vulnerable Regions of Ethiopia

Drawings Typical – Kobo Girana Valley and Borena Zone

Content

Drip irrigation system – Kobo Girana

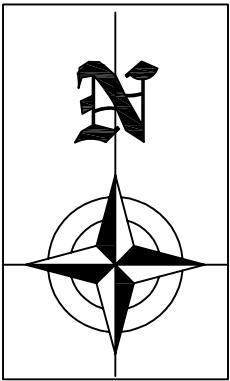
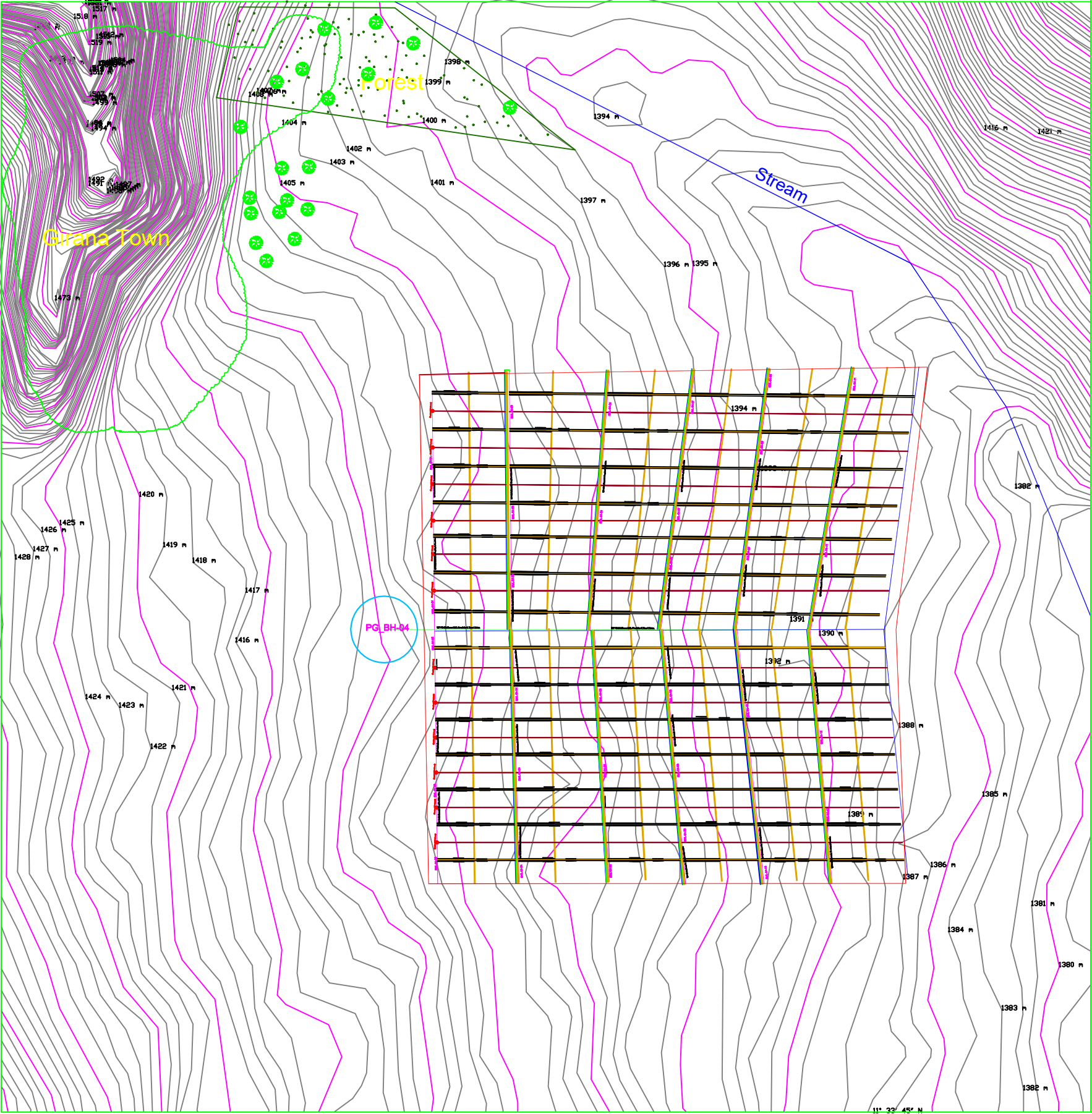
Center pivot system - Borena

Submersible pump - Typical

Solar, switch regulator and guard house - Typical

Cattle through - Typical

KOBO GIRANA DRIP IRRIGATION SYSTEM LAYOUT



- Road
- Main Pipeline
- Submain line

Legend

- Girana Town
- Stream
- Forest Area
- Tree
- Bore Hole
- Index Contour
- Intermediate contours
- Project boundary
- Forest Area


Note:-Contour interval 1.0 m
Datum ;Adindam
Zone ;37
Scale 1;1
Date ; 02/06/2022

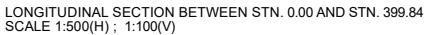
Coordinate

X-Coordinate	Y-Coordinate	Elevation
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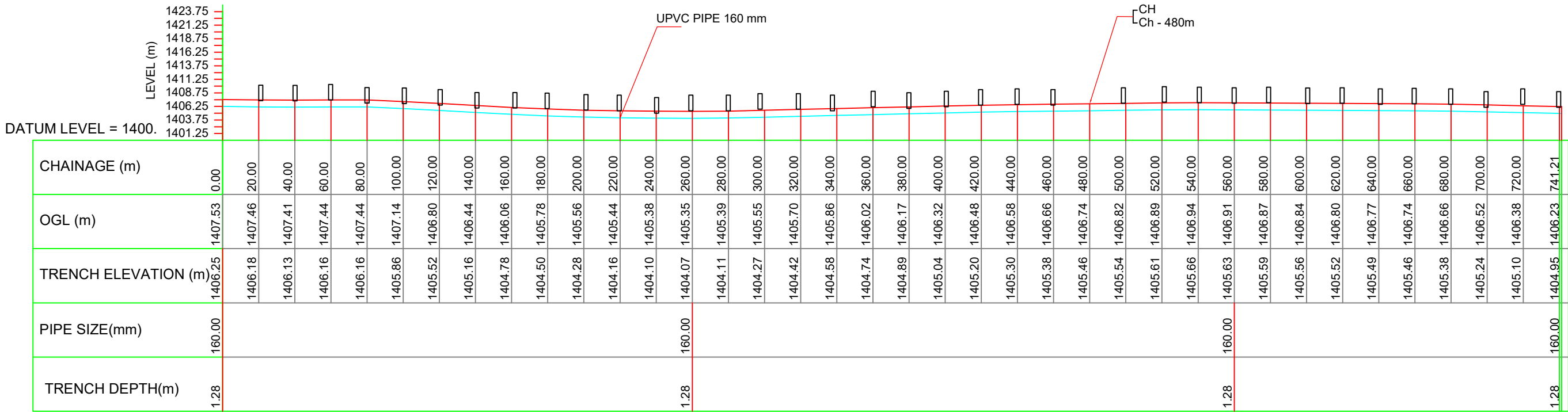
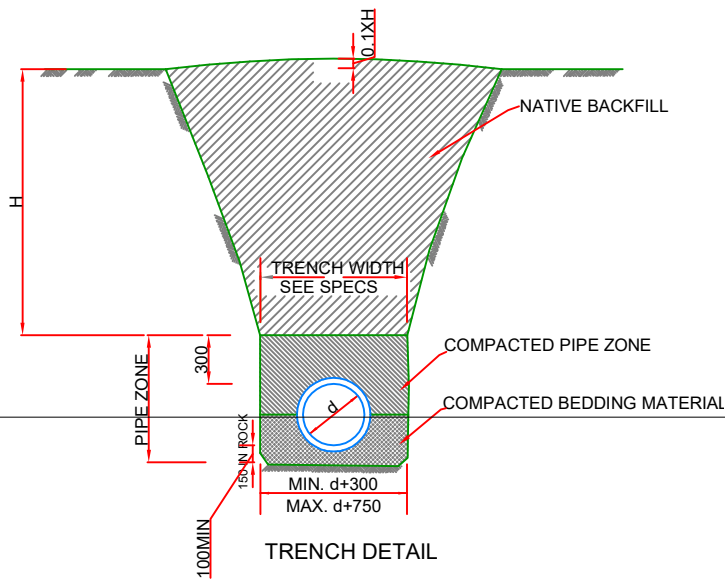
Kobo Girana Drip Irrigation System

Irrigable area = 22.3ha
Q = 30l/s
One mainpipeline and 12 submainline

REVISION	DATE	DESCRIPTION
Client		
TRIPLE LINE CONSULTING COMPANY		
		
PROJECT :KOBO GIRANA DRIP IRRIGATION PROJECT		
Title: Draft Feasibility Design KOBO GIRANA DRIP IRRIGATION SYSTEM GENERAL LAY OUT		
DRAWN	ASHENAFI K.	DATE MAY/ 2022
DESIGNED	ASHENAFI K.	SCALE 1:30
CHECKED	TESFAYE H.	REVISION No.
APPROVED	TESFAYE H.	DRAWING No. KGWIDP-DR- LO-1-1

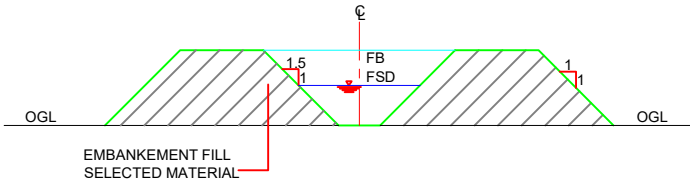
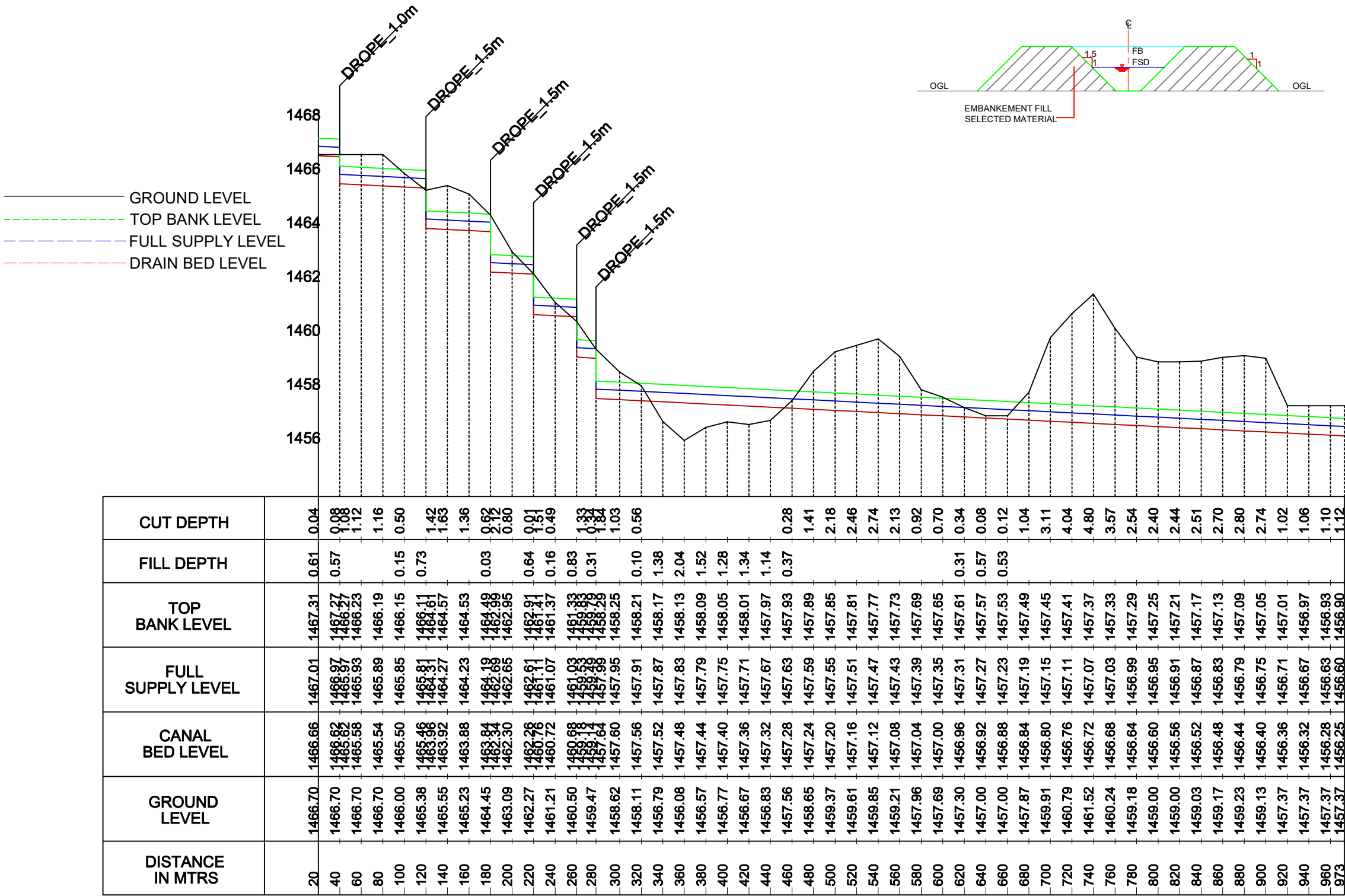


Client			
TRIPLELINE CONSULTING COMPANY			
PROJECT :KOBO GIRANA DRIP IRRIGATION PROJECT			
Title: Draft Feasibility Design LONGITUDINAL SECTION OF KOBO GIRANA MAIN PIPE LINE			
DRAWN	ASHENAFI K.	DATE	May / 2022
DESIGNED	ASHENAFI K.	SCALE	NOT TO SCALE
CHECKED	TESFAYE H.	REVISION No.	
APPROVED	TESFAYE H.	DRAWING No.	KGWIDP-EL-ML-LS-1



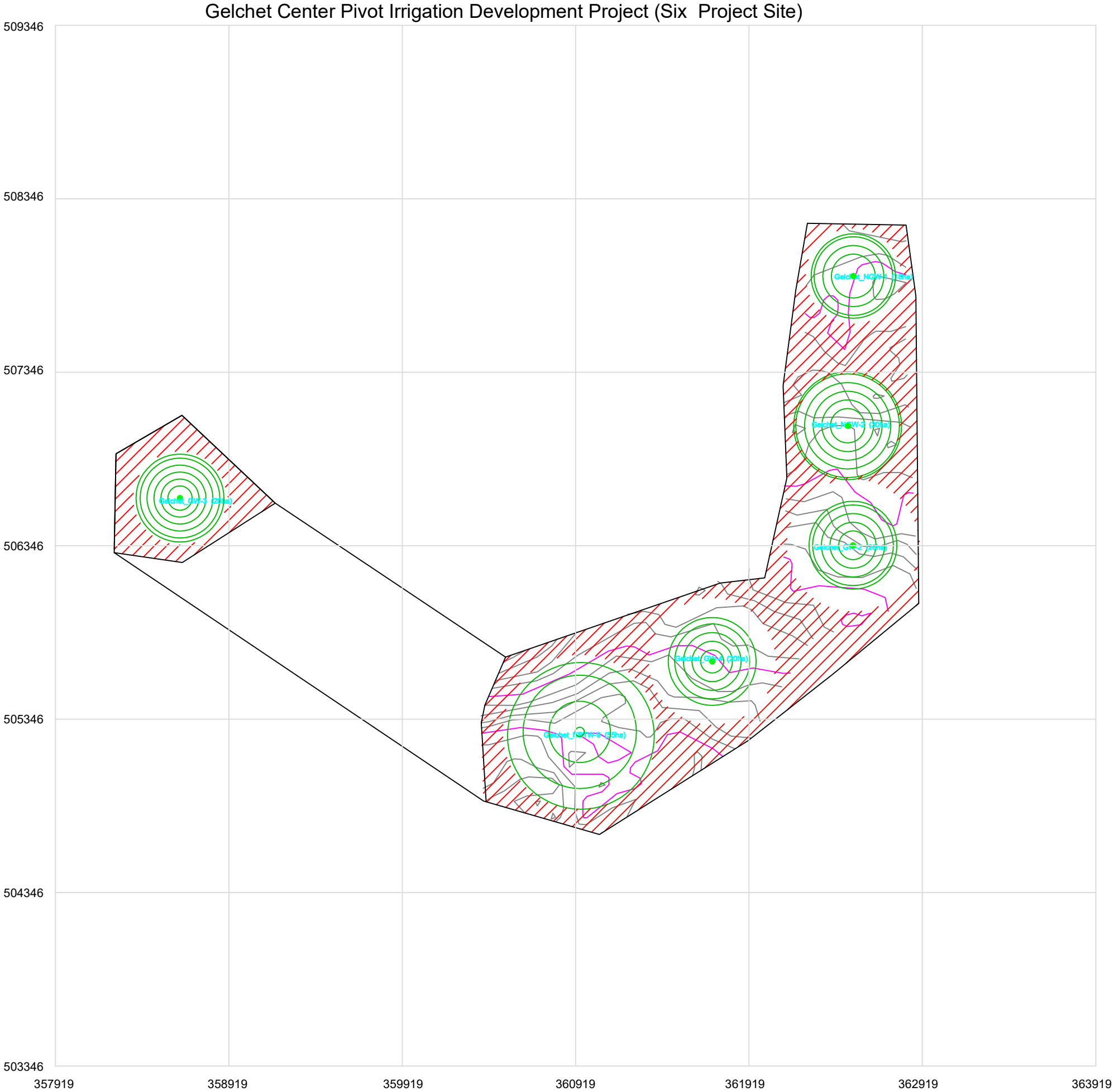
LONGITUDINAL SECTION BETWEEN STN. 0.00 AND STN. 741.21
SCALE 1:1500(H) ; 1:500(V)

REVISION	DATE	DESCRIPTION
Client		
TRIPLELINE CONSULTING COMPANY		
PROJECT :KOBO GIRANA DRIP IRRIGATION PROJECT		
Title: <div>Draft Feasibility Design</div> <div>LONGITUDINAL SECTION OF KOBO SUBMAINLINE -1 LINE</div>		
DRAWN	ASHENAFI K.	DATE <div>May/ 2022</div>
DESIGNED	ASHENAFI K.	SCALE <div>NOT TO SCALE</div>
CHECKED	TESFAYE H.	REVISION No.
APPROVED	TESFAYE H.	DRAWING No. <div>KGWIDP-HO-ML-LS-1/</div>



ABBREVIATIONS				
SL.No.	SYMBOLS USED	DESCRIPTION	SL.No.	SYMBOLS USED
1	CH	CHAINAGE	12	DB
2	OGL	ORIGINAL GROUND LEVEL	13	OT
3	BW	CANAL BED WIDTH	14	DR
4	FSD	FULL SUPPLY DEPTH		
5	FB	FREE BOARD		
6	SS	CANAL SIDE SLOPE		
7	VEL	VELOCITY		
8	TBW	TOP BANK WIDTH		
9	CBL	CANAL BED LEVEL		
10	TBL	TOP BANK LEVEL		
11	FSL	FULL SUPPLY LEVEL		

REVISION	DATE	DESCRIPTION	
Client			
TRIPLE LINE CONSULTING COMPANY			
KOBOGIRANA DRIP IRRIGATION PROJECT			
Title: LONGITUDINAL SECTION OFS ECONDARY DRAIN (CH-000-973)			
DRAWN	ASHENAFI K.	DATE	May. /2022
DESIGNED	ASHENAFI K.	SCALE	
CHECKED	TESFAYE H	REVISION No.	0
APPROVED	TESFAYE H	DRAWING No.	KGWIP-IRR-ID-1/1



Legend



Study Area



CP- Center Pivot



Grazing Area



BH



Main Pipe

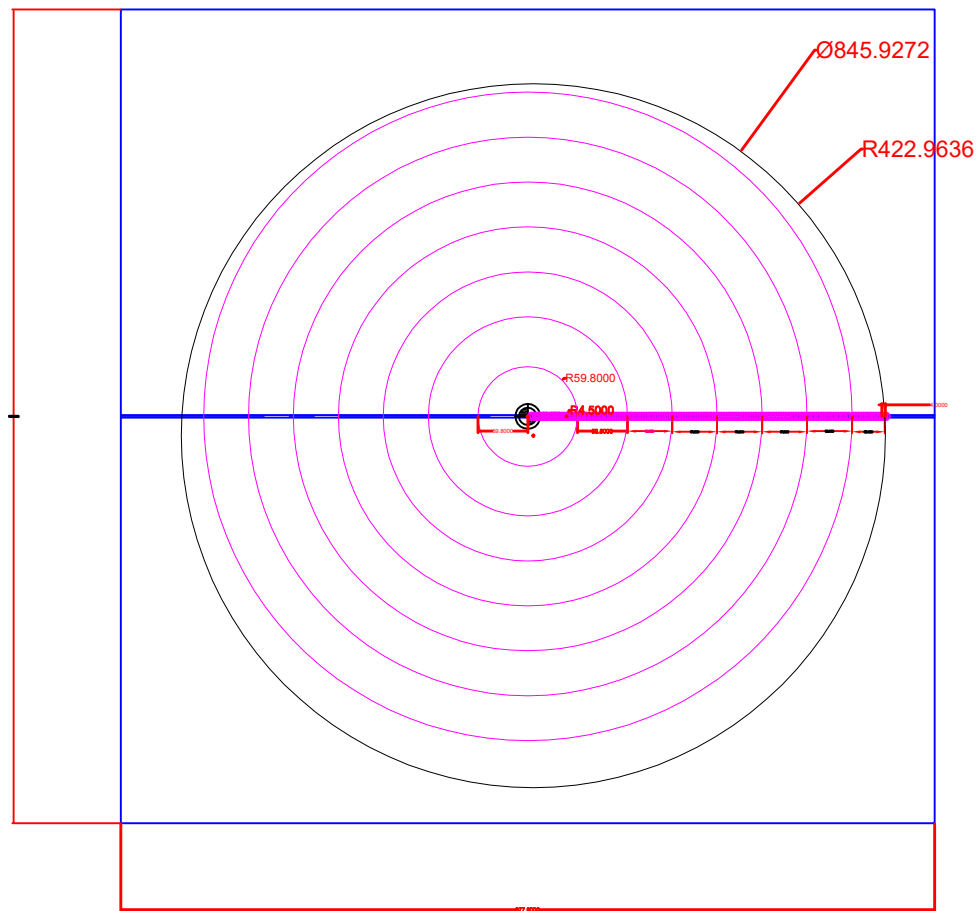
Gelches Center Pivot Irrigation System
Total Comand Area = 146.6ha
out of this 55.5ha for sample Design
have been Done

NO.of CP Machines

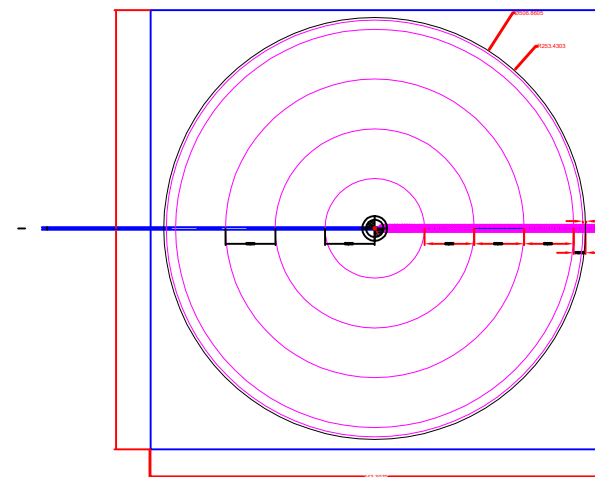
Coordinate

X-Coordinate	Y-Coordinate	Elevation
360943	505273	1121.000

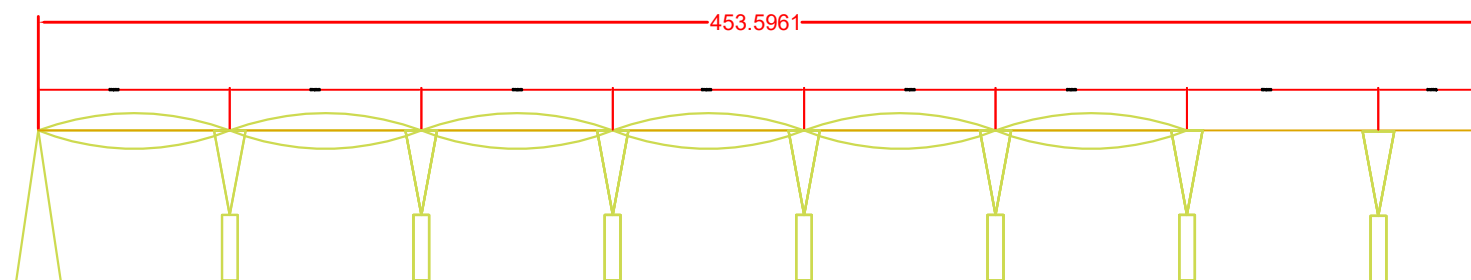
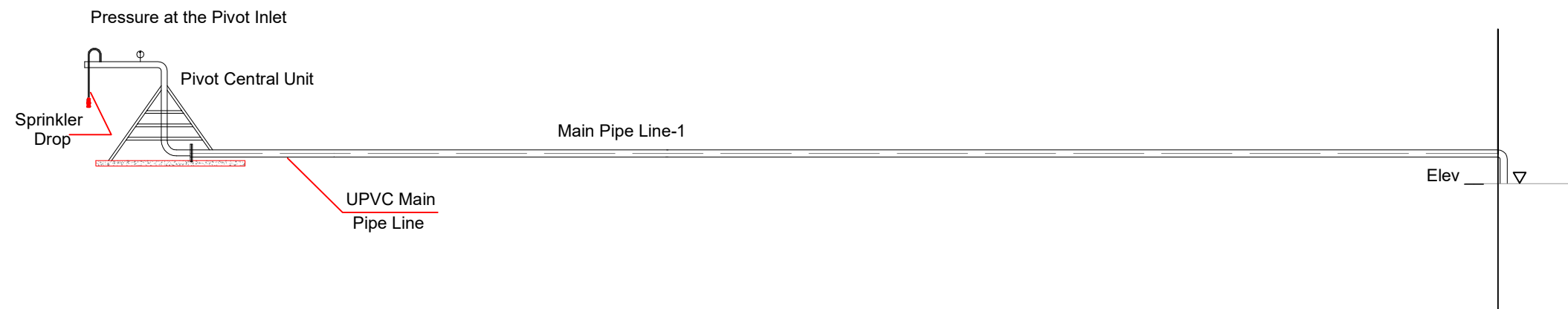
REVISION	DATE	DESCRIPTION
Client		
TRIPLE LINE CONSULTING COMPANY		
 INTERNATIONAL GREEN CLIMATE INITIATIVE (IGCI)		
PROJECT :BORENA CENTER PIVOT IRRIGATION		
Title: Draft Feasibility Design GELCHET CENTER PIVOT IRRIGATION SYSTEM GENERAL LAY OUT		
DRAWN	ASHENAFI K.	DATE MAY/ 2022
DESIGNED	ASHENAFI K.	SCALE 1:30
CHECKED	TESFAYE H.	REVISION No.
APPROVED	TESFAYE H.	DRAWING No. BGWIDP-MR- LO- 1-2




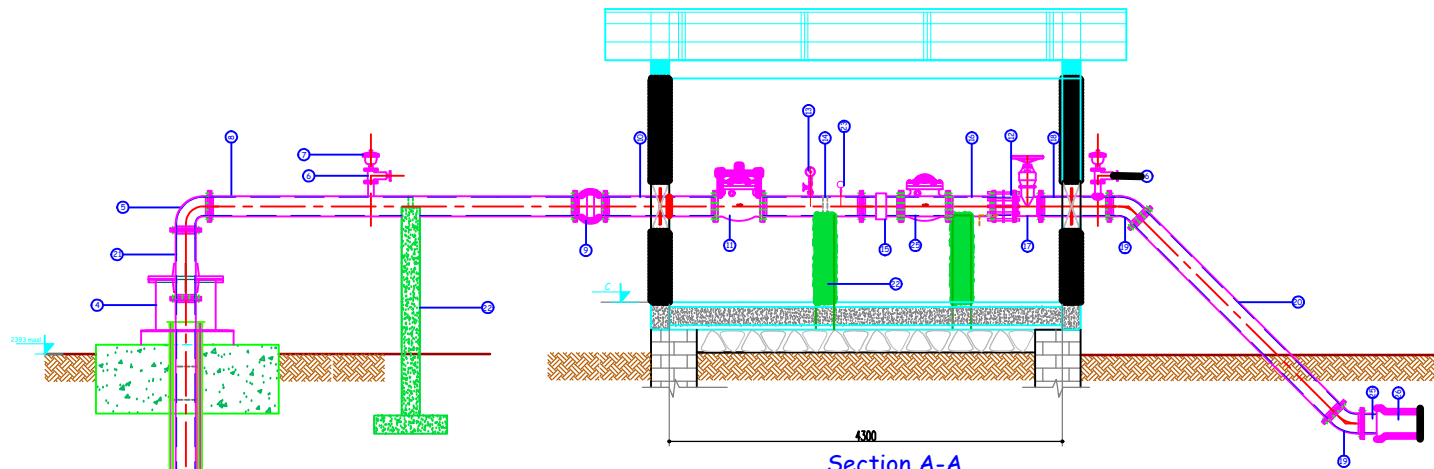
55.5ha; Maximum Radius = 422.96m
No. of Span = 8; 1 Overhang



20ha; Maximum Radius = 253.43m
No. of Span = 5; 1 Overhang



REVISION	DATE	DESCRIPTION	
Client			
TRIPLE LINE CONSULTING COMPANY			
			
PROJECT :BORENA CENTER PIVOT IRRIGATION			
Title: Draft Feasibility Design GELCHET CENTER PIVOT IRRIGATION SYSTEM GENERAL LAY OUT			
DRAWN	ASHENAFI K.	DATE	MAY/ 2022
DESIGNED	ASHENAFI K.	SCALE	1:10,3
CHECKED	TESFAYE H.	REVISION No.	
APPROVED	TESFAYE H.	DRAWING No.	BGWIDP-GLT- LO-2-2



25	Double Flanged check valve DN200, PN10	1
24	Galvanized Steel Riser pipe threaded connection , DN200,PN60 with accessories end connection pipe to submersible pump,L=6m	23
23	Pressure switch, working range 0-10 bar, ½" male connection.	1
22	Concrete support	3
21	Double Flanged GS Pipe DN200, PN10, L=0.75m.	1
20	Double Flanged GS Pipe DN200, PN10,L=2.80m.	1
19	Double Flanged DCI 45° Elbow DN200, PN10.	2
18	Double Flanged GS Pipe with puddle DN200, PN10, L=1m and welded with single flanged GS Pipe DN50, PN10 L=0.2m at the right side of the pipe.	1
17	Gate valve, DN200, PN10.Equipped with a hand wheel operating.	1
16	Double Flanged GS Pipe DN200, PN10, L=0.5m.	1
15	Waltman type water meter, DN200, PN10.	1
14	Single Flanged GS Pipe DN200,PN10, L=1.2m.	1
13	Pressure gauge glycerin filled, scale 0-10 bars.	1
12	Flange dismantling for steel pipe, DN200, PN10.	1
11	Pressure sustaining valve, DN200, PN10.	1
10	Double Flanged GS Pipe with puddle at center DN200, PN10, L=1.2m and connection for pressure gauge.	1
9	Rubber compensator, DN200, PN10.	1
8	Double Flanged GS Pipe D200, PN10 ,L=4m with Single flanged dn50 short pipe L=200mm,welded in the middle	1
7	Flanged double air release valve, DN50 PN10.	2
6	Double flanged Gate valve, DN50,PN10 Equipped with a hand wheel operating.	2
5	Double flanged 90° GS elbow DN200, PN10	1
4	Bore hole support plate DN350, PN10	1
3	Stainless steel level electrode for wells and bore hole	2
2	Hydrostatic water level sensor	1
1	Variable Speed Electric submersible pump 400V, 50 Hz complete with non-return valve,Q= 255.6m3/hr, H=80m, working Temp (-10°C - 30°C), Eff >70%	1
PART	Description	Qty

Revision/Issue	Date

CLIENT;
FDRE Ministry of Finance ,MOFED

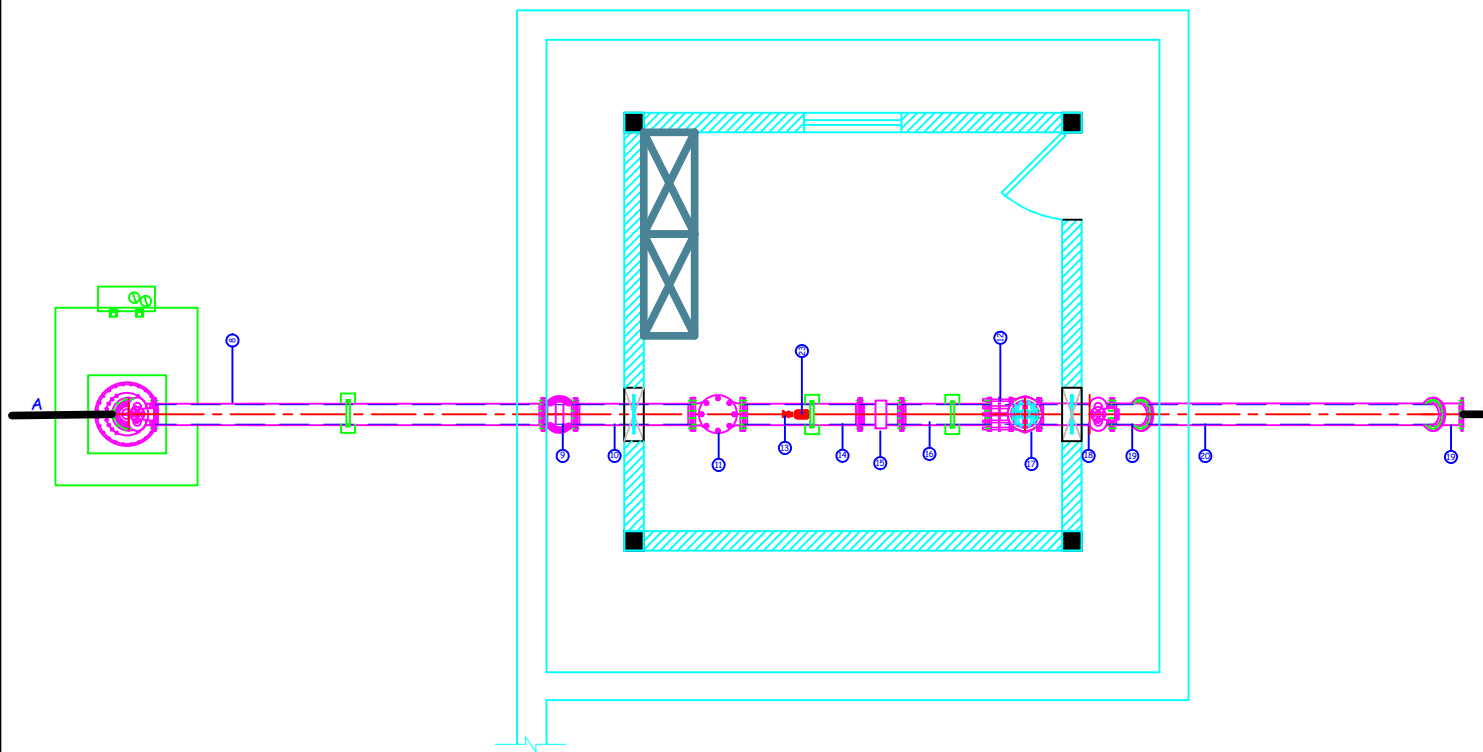
CONSULTANT;
TripleLine Consulting

PROJECT;
Borena Solar Pumped Water Supply Project

DWG.NO	SCALE	DATE
Borena - BH1-1	NTS	January,2022

DWG.TITLE	Sheet No
Site: BH-1 EM DRAWINGS Borehole submersible pumps and fittings	1 2

DESIGNED BY	MANDEFRO A.
CAD BY	MANDEFRO A.
CHECKED BY	
APPROVED BY	



PLAN

No.	Revision/Issue	Date

CLIENT;
FDRE Ministry of Finance ,MOFED

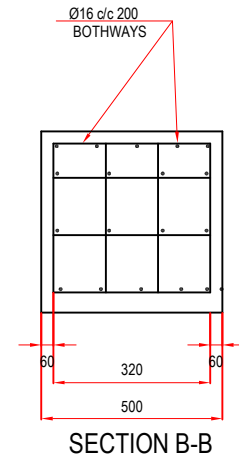
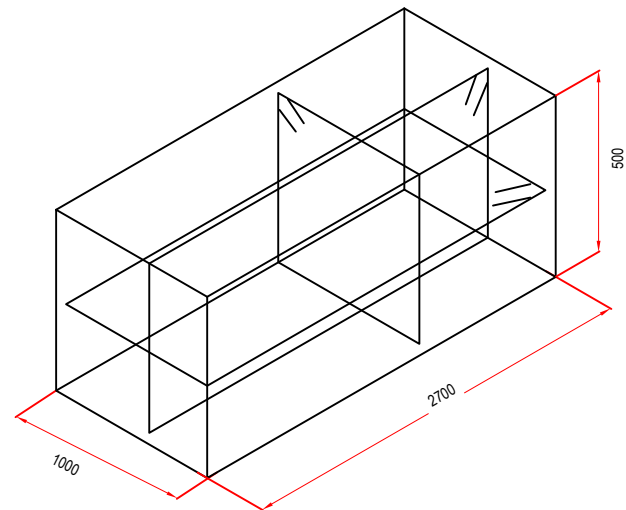
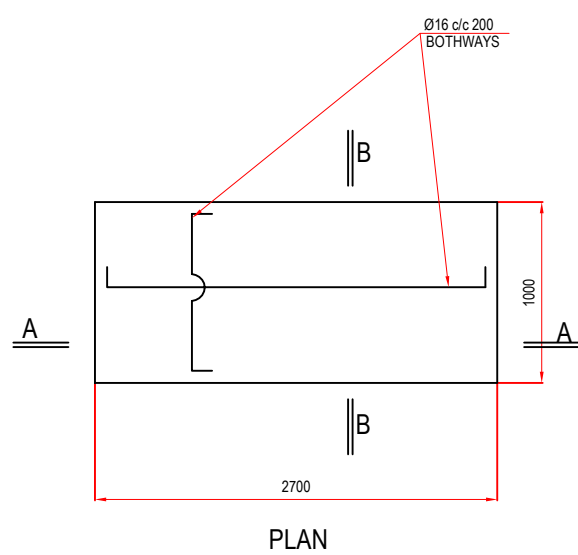
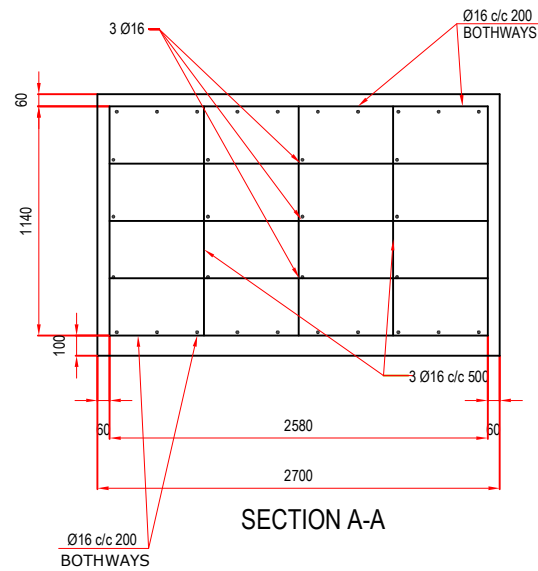
CONSULTANT;
TripleLine Consulting

PROJECT;
Borena Solar Pumped Water Supply Project

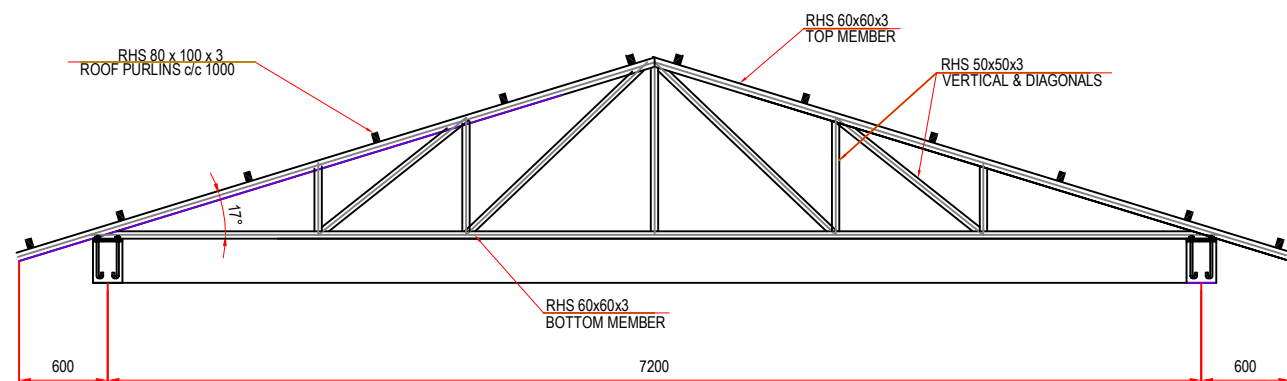
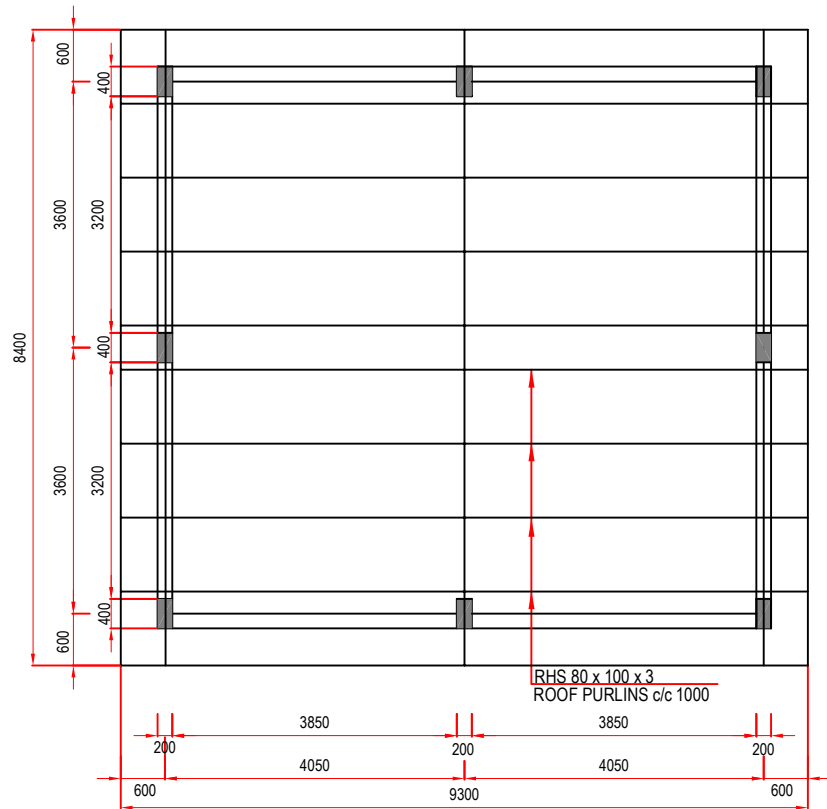
DWG.NO	SCALE	DATE
Borena- BH1-2	NTS	July,2022

DWG.TITLE	Sheet No
Site: BH-1 EM DRAWINGS Borehole submersible pumps and fittings	2 2

DESIGN BY	MANDEFRO A.
CAD BY	MANDEFRO A.
CHECKED BY	
APPROVED BY	



SOLAR POWER CONTROL SEAT DETAILS

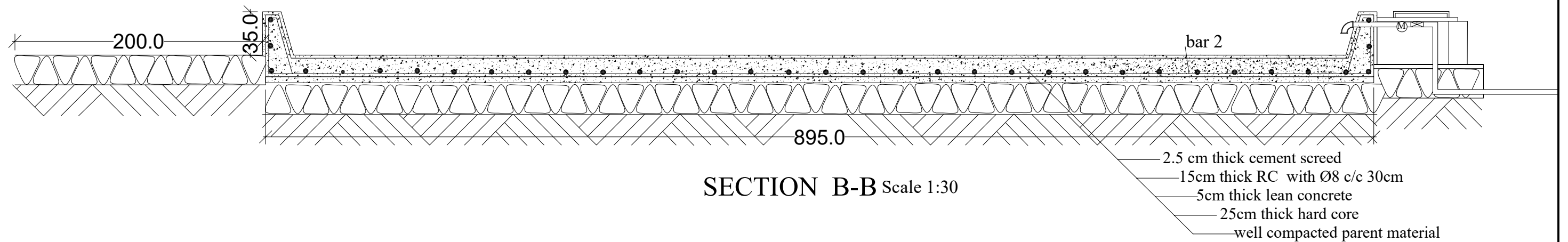
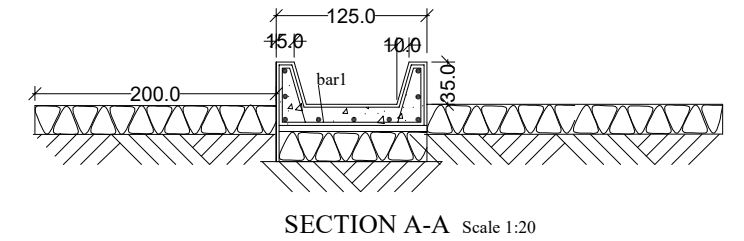


TRUSS DETAIL OF T - 1


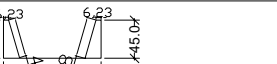
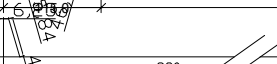
NOTE:

1. ALL DIMENSIONS ARE IN mm
2. CONCRETE QUALITY:
 - C-10 FOR LEAN CONCRETE
 - C-25 FOR ALL STRUCTURES
3. STEEL GRADE IS S-300 (300 MPa)
4. ALL BARS ARE DEFORMED BARS
5. CONCRETE COVER:
 - SUPER-STRUCTURE 25 mm
 - SUB-STRUCTURE 50 mm

REVISION	DATE	DESCRIPTION
Client		
TRIPLELINE CONSULTING COMPANY		
PROJECT :GELCHET DRIP IRRIGATION PROJECT (BORENA ZONE)		
Title: Draft Feasibility Design BORENA SOLAR POWER CONTROL HOUSE TRUSS & TOP TIE BEAM LAY OUT TRUSS & SOLARPOWER BOARD SET SEAT		
DRAWN	ASHENAFI K.	DATE July / 2021
DESIGNED	ASHENAFI K.	SCALE AS SHOWN
CHECKED	TESFAYE H.	REVISION No.
APPROVED	TESFAYE H.	DRAWING No. BGWIDP-ME- GH-52

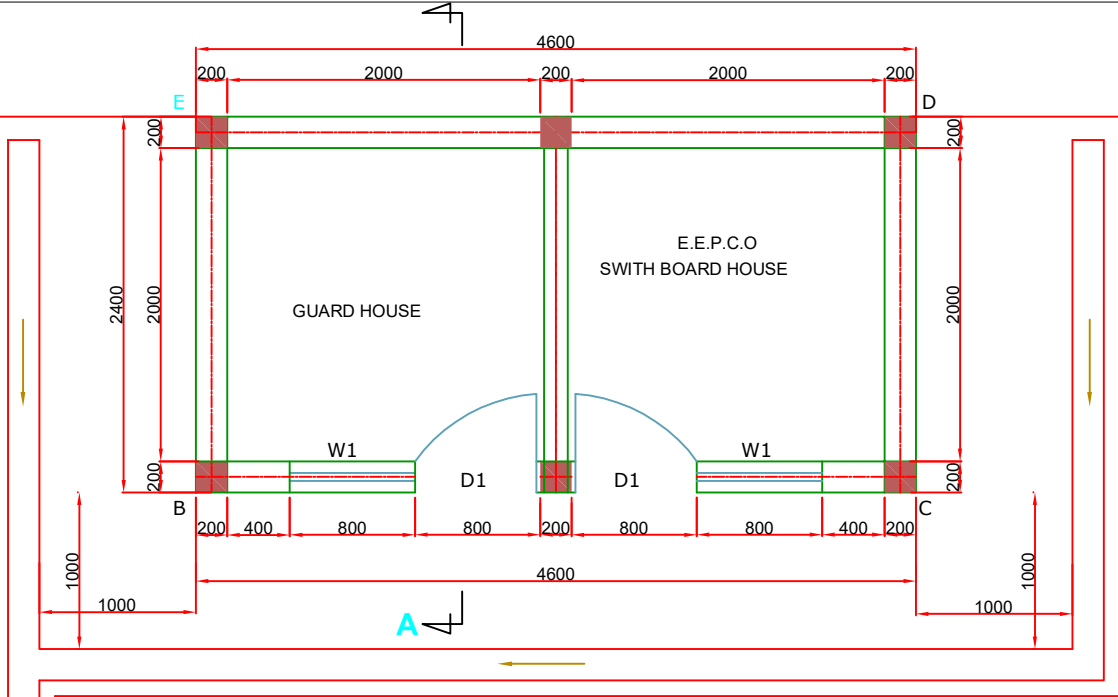


S.no	Description	Qty
1	GI Gate valve 40mm	1
2	GI union 40mm	1
3	GI nipples 40mm	2
4	GI coupling 40mm	2
5	water meter 40mm	1
6	GI elbow 40mm	3

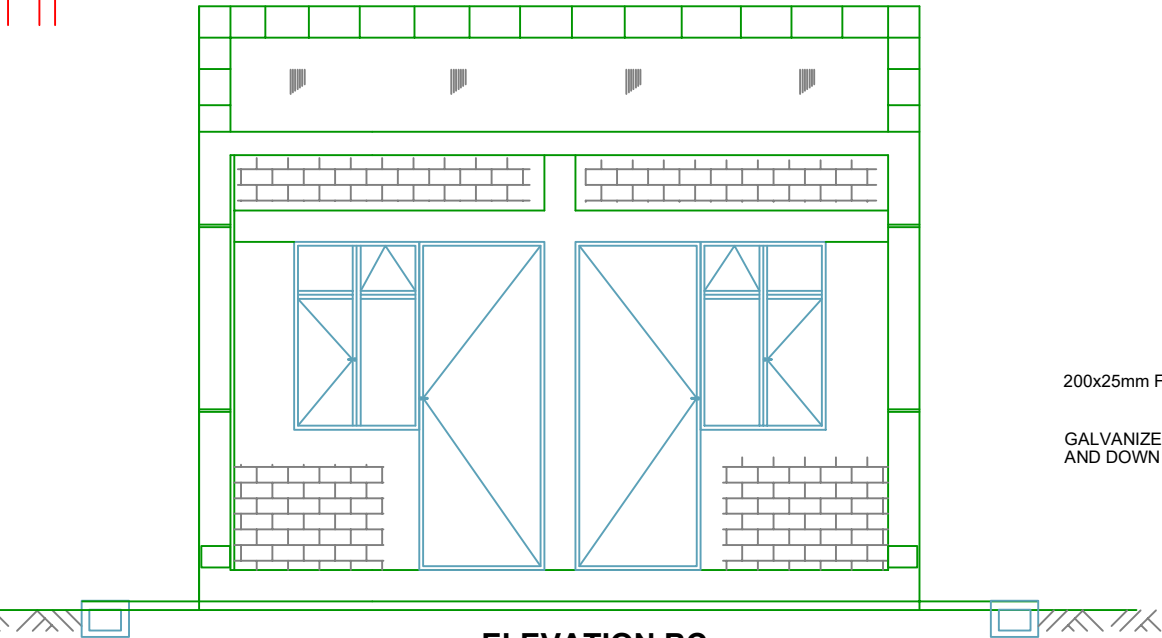
BAR SHCHEDULE FOR CATTLE TROUGH						
Ser no	Shape description	Diameter(mm)	No of pieces	Unit length(cm)	Total length(m)	Total weight(kg)
1		45.04	31	6.23	9641	37.99
2		45	5	890	5430	21.45
3		45	3	888.4	6390	25.24

Note: All dimensions are in cm unless otherwise stated.
Provide 25mm cover for reinforcement.
C-20 concrete is used for construction.

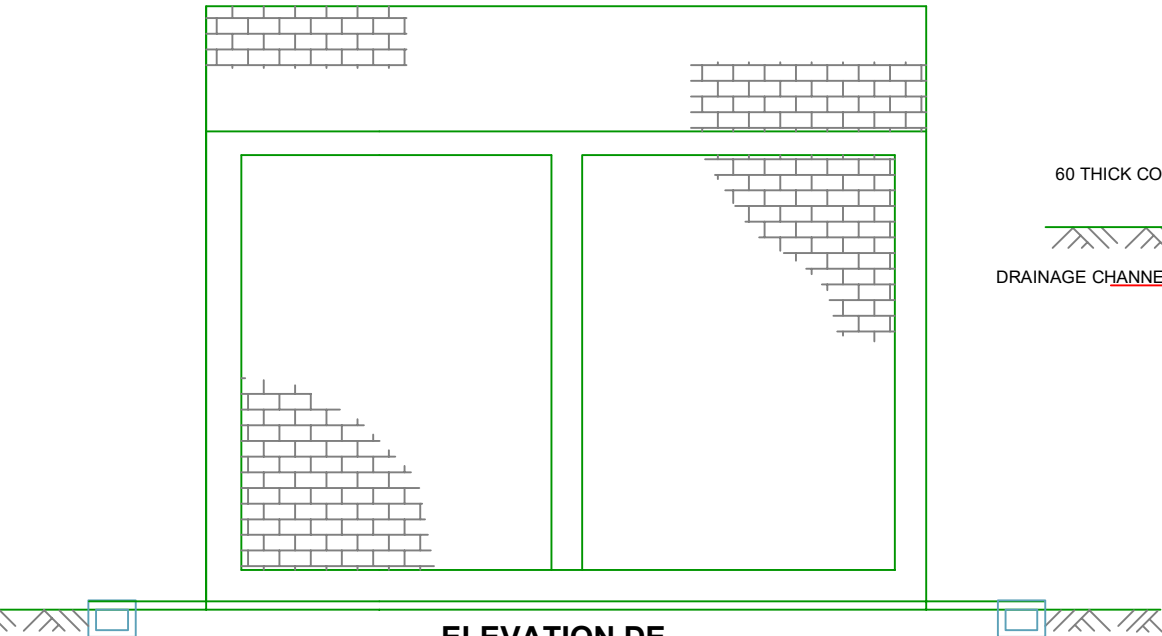
REVISION	DATE	DESCRIPTION	
Client			
TRIPLE LINE CONSULTING COMPANY			
PROJECT :BORENA CENTER PIVOT IRRIGATION			
Title: Draft Feasibility Design Borena Site Typical Cattle trough System layout and Section			
DRAWN	ASHENAFI K.	DATE	MAY/ 2022
DESIGNED	ASHENAFI K.	SCALE	1:10,3
CHECKED	TESFAYE H.	REVISION No.	
APPROVED	TESFAYE H.	DRAWING No.	BGWIDP-GLT- LO- 1/1



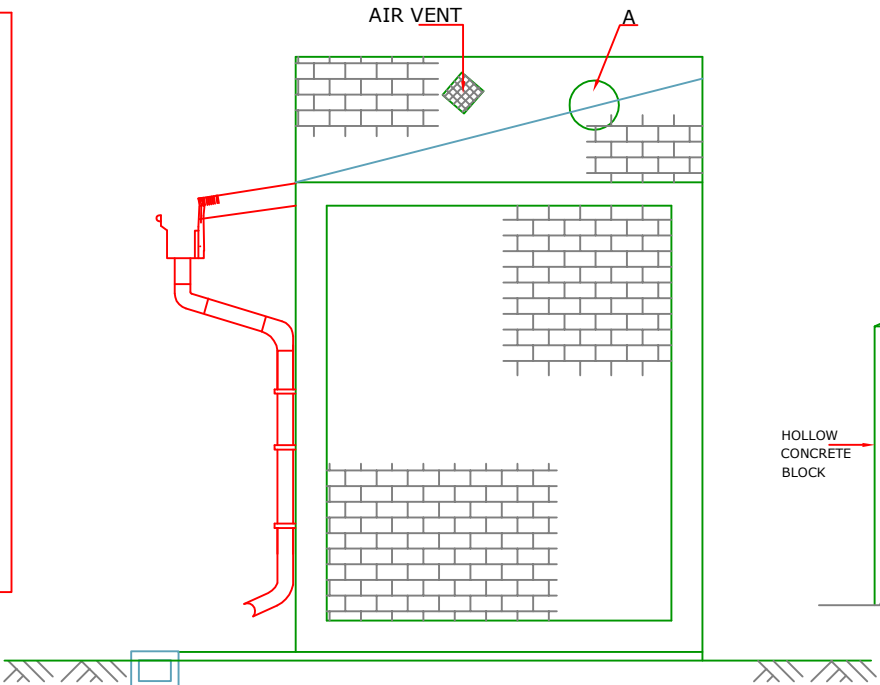
FLOOR PLAN



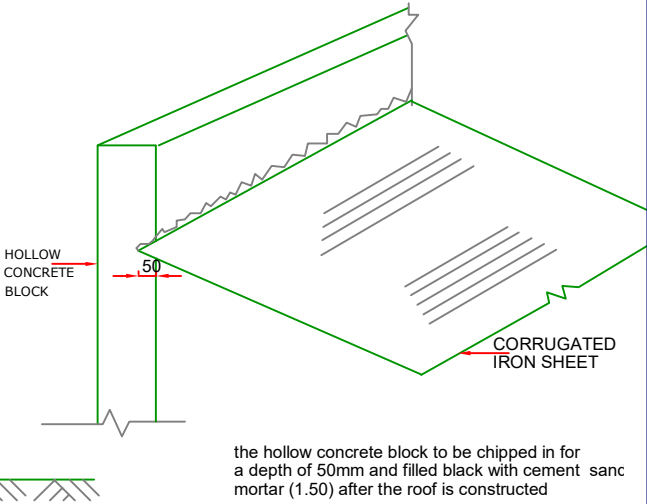
ELEVATION BC



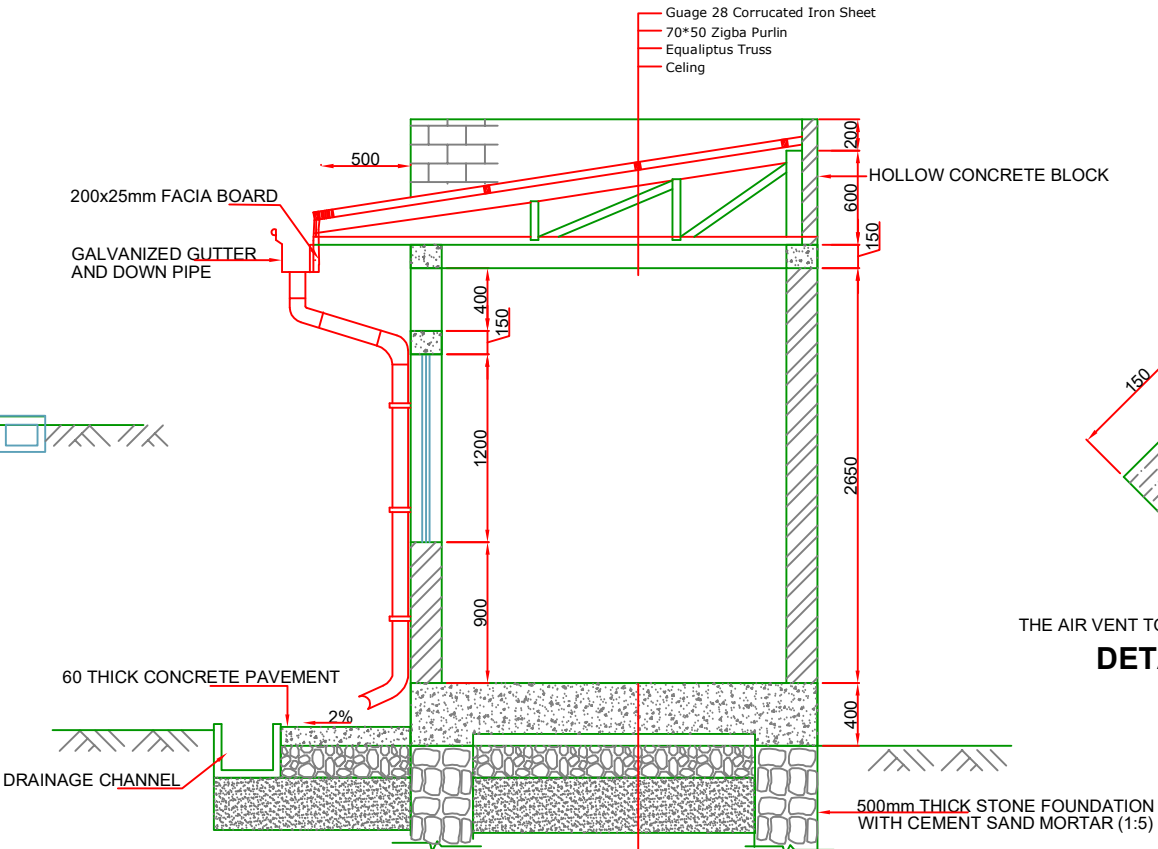
ELEVATION DE



ELEVATION CD & EB



DETAIL-A



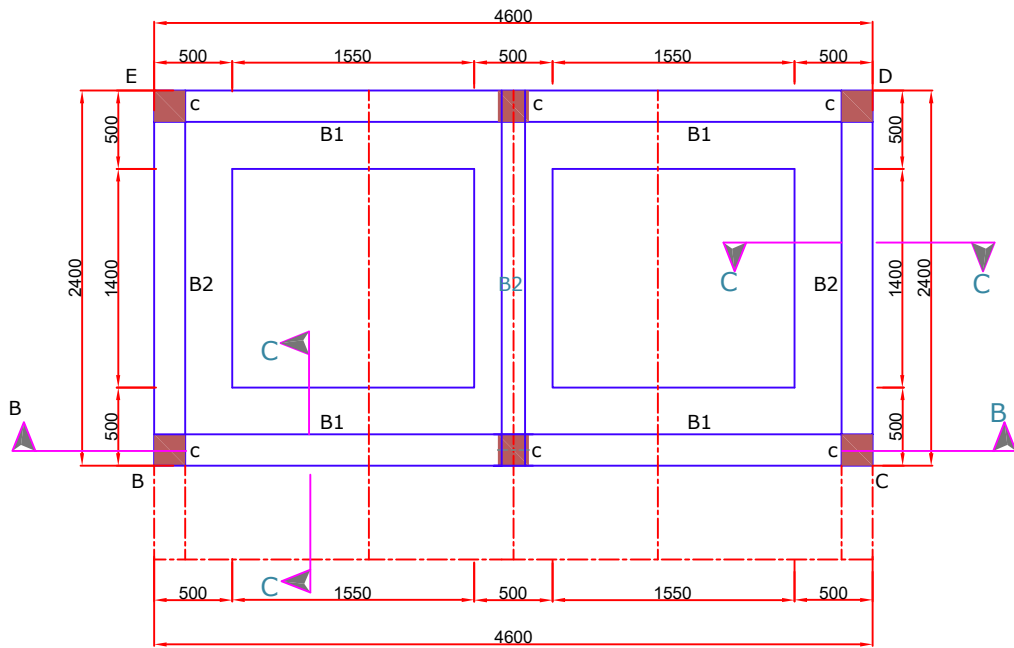
SECTION A-A

DETAIL OF AIR VENT

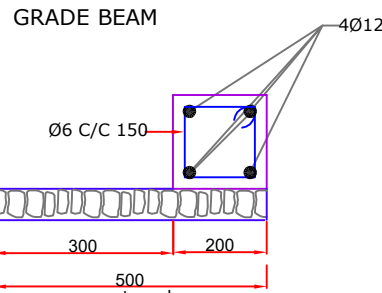
TYPE	SIZE	QUT.	MATERIAL	GLAZING
D1.	800x2000	2	Seno Profile And The Door To Be be Iron	4mm
W1.	800x1000		Conected Sheet Metal	

- All dimensions are in mm
- 200mm and 150mm hollow concrete blocks to be used for external and internal walls unless otherwise specified
- The depth of foundation to be determined on site
- Minimum concrete cover to all reinforcement to be 25mm unless otherwise specified
- The overlap length of reinforcement to be 40 times the bar diameter
- Concrete classes to be as follows:
 - o Blinding concrete c10
 - o Mass concrete fill c20
- Damp proof membrane to be provided between grade beam & all walls
- Internal wall to be plastered.
- External wall to be rendered with cement sand mortar (1:5) to a total thickness of 12mm.

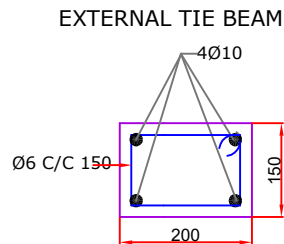
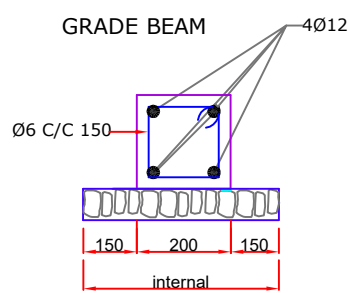
REVISION	DATE	DESCRIPTION
Client		
TRIPLELINE CONSULTING COMPANY		
PROJECT :BORENA SITE IRRIGATION PROJECT (BORENA ZONE)		
Title: Draft Fesaibility Design GAURD HOUSE SOLAR POWER OR EEPKO SWITCH BOARD HOUSE FLOOR PLAN,SECTION & ELEVATION		
DRAWN	ASHENAFI K.	DATE May/2022
DESIGNED	ASHENAFI K	SCALE AS SHOWN
CHECKED	TESFAYE H.	REVISION No.
APPROVED	TESFAYE H.	DRAWING No. BGWIDP-ME-GH-1/1



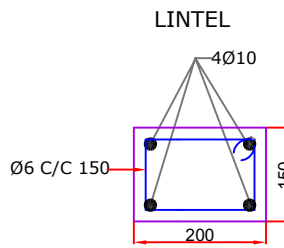
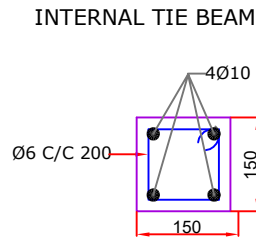
PLAN



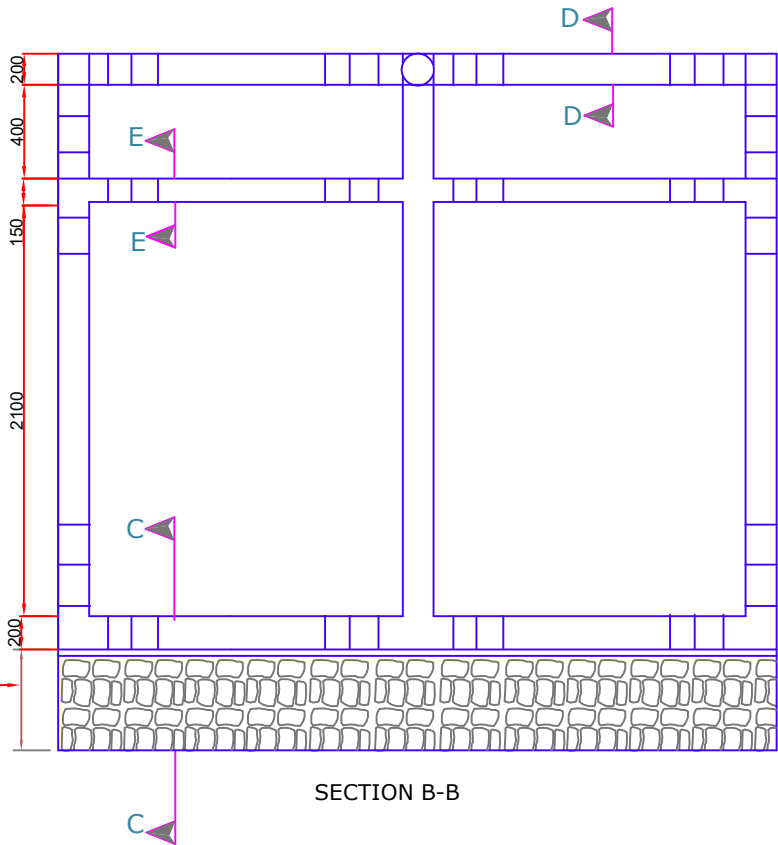
SECTION C-C



SECTION D-D



SECTION E-E



SECTION B-B

BAR SCHEDULE

LOCATION	NO	Ømm	SPACING (mm)	SHAPE	CUTTING LENGTH m	QTY	TOTAL LENGTH m	TOTAL LENGTH Kg
GRAD BEAM	81	12	-	4550	4.55	8	36.40	32.32
	82	12	-	2350	2.35	12	28.20	25.04
	STIRRUPS	6	150	150	0.70	71	49.70	11.03
GRAD BEAM	81	10	-	4550	4.55	8	36.40	22.46
	82	10	-	2350	2.35	12	28.20	17.40
	STIRRUPS INTERNAL	6	200	100	0.50	10	5.00	1.11
	STIRRUPS EXTERNAL	6	150	150	0.60	50	48.00	10.66
LINTEL	81 (ELV. BC)	10	-	4550	4.55	4	10.20	11.23
	STIRRUPS	6	150	150	0.60	27	16.20	3.60
COLUMN	81	12	-	2350	3.30	24	79.20	70.23
	STIRRUPS	6	150	150	0.70	104	72.80	36.30
TOTAL								221.34

- All dimensions are in mm
- 200mm and 150mm hollow concrete blocks to be used for external and internal walls unless otherwise specified
- The depth of foundation to be determined on site
- Minimum concrete cover to all reinforcement to be 25mm unless otherwise specified
- The overlap length of reinforcement to be 40 times the bar diameter
- Concrete classes to be as follows:
 - Blinding concrete c10
 - Mass concrete fill c20
- Damp proof membrane to be provided between grade beam & all walls
- Internal wall to be plastered.
- External wall to be rendered with cement sand mortar (1:5) to a total thickness of 12mm.

REVISION	DATE	DESCRIPTION
Client		
TRIPLELINE CONSULTING COMPANY		
PROJECT :GELCHET DRIP IRRIGATION PROJECT (BORENA ZONE)		
Title: Draft Feasibility Design BORENA GUARD HOUSE & SOLAR POWER SWITCH BOARD HOUSE: FOUNDATION PLAN ,SECTION & REINFORCEMENT DETAIL		
DRAWN	ASHENAFI K.	DATE May / 2022
DESIGNED	ASHENAFI K.	SCALE 1:50
CHECKED	TESFAYE H.	REVISION No.
APPROVED	TESFAYE H.	DRAWING No. BGWIDP-ME-GH-1/2