



**Islamic Relief Worldwide**

**IR-W**

**South Region**

**Kandahar Area Office**

**Shelter Project**

**Water Supply Network (Household Connection) Powered by Solar System with RCC**

**Water Reservoir**

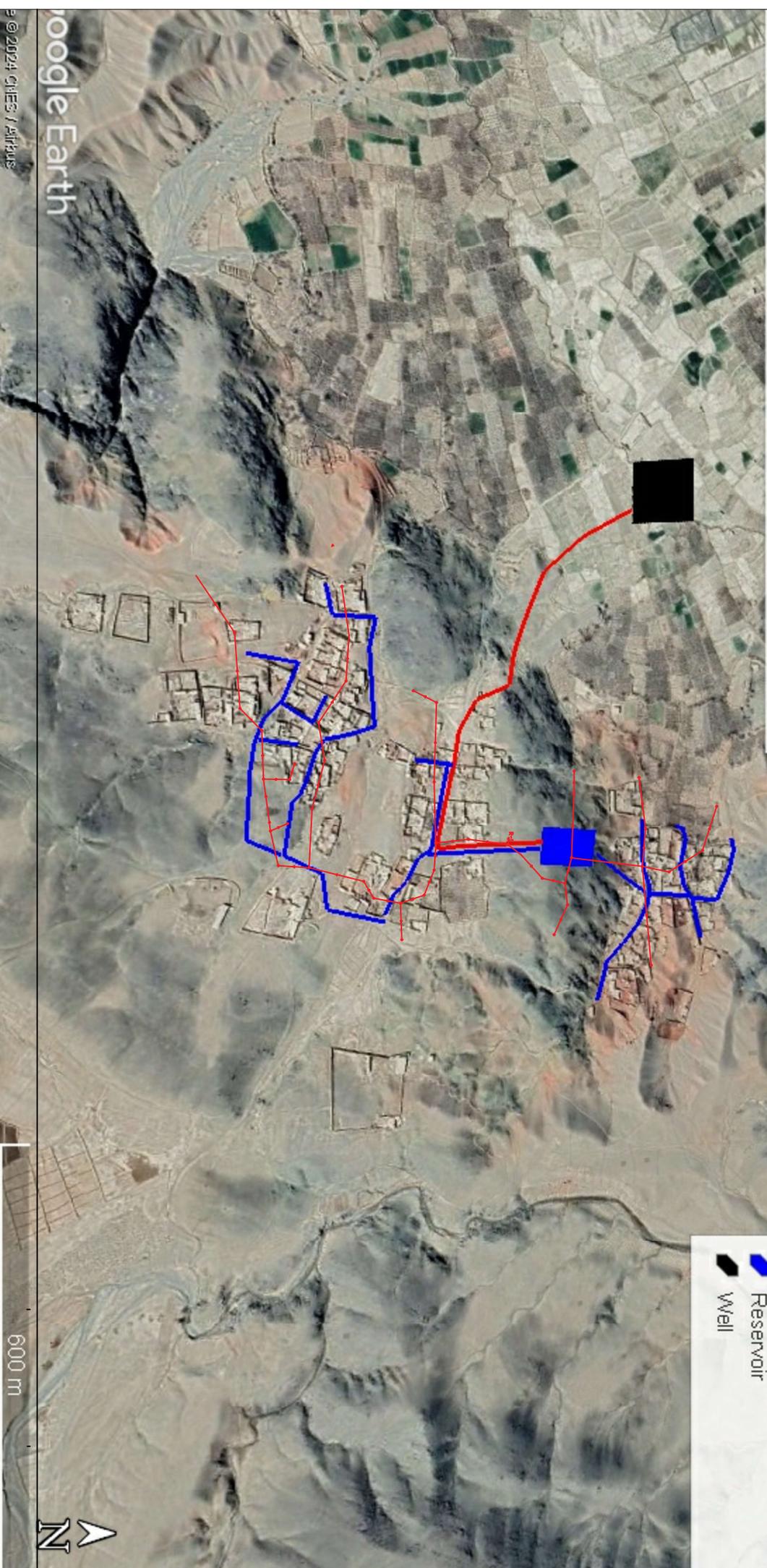
**Nazad Khil, Arghastan District, Kandahar Province, Afghanistan**

**Submission Date: 12/11/2023**

|

# Site Map Of Nazadkhial Village Water Network

Arghastan District



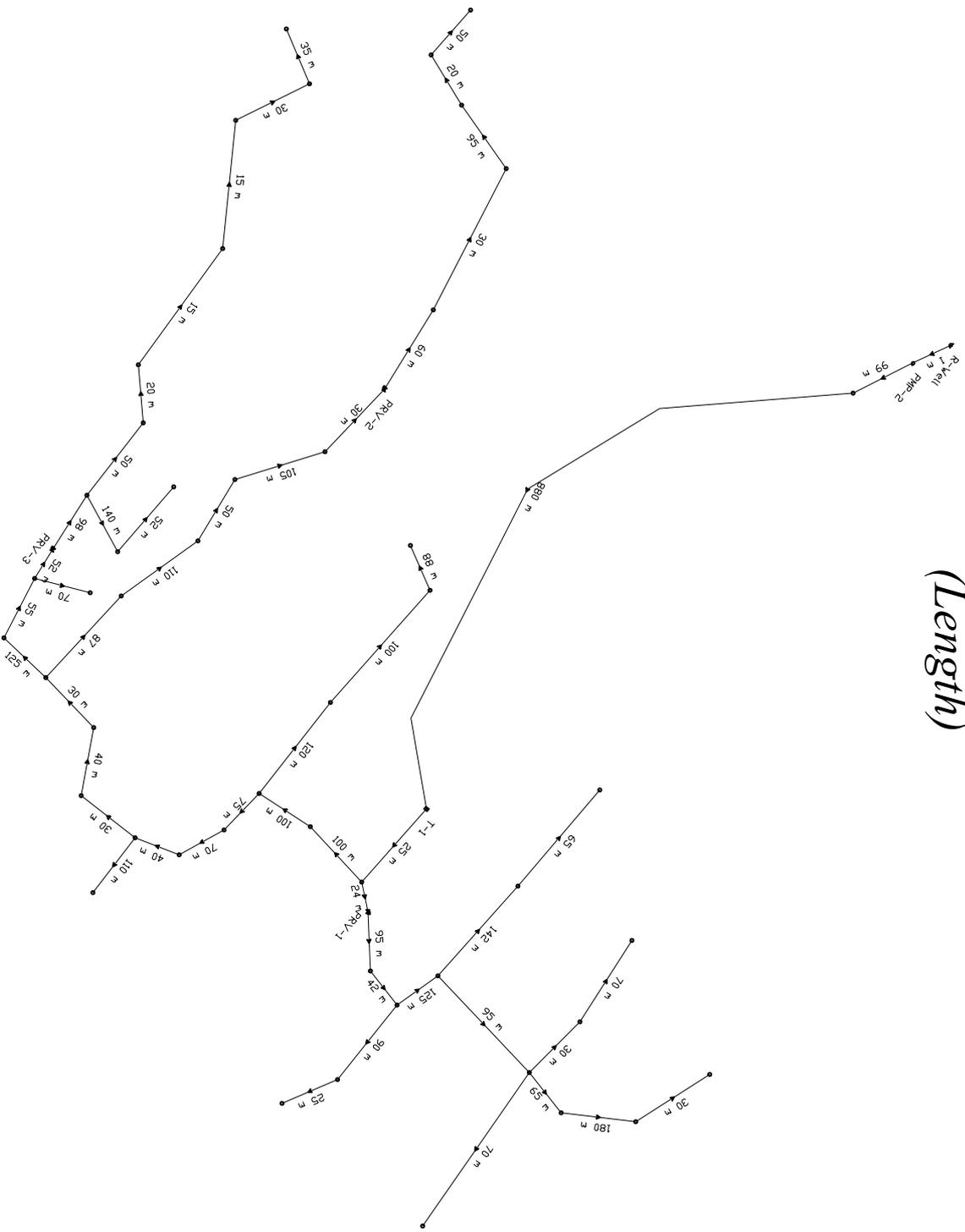
**Legend**

-  Main Pipe
-  Pipe from pump to Reservoir
-  Reservoir
-  Well

Survey: By	Eng. M. Moaine & M. Mehdi		Project	Shelter		Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi		Section	Water Network		IR-W	
Design : By	Eng. M. Moaine		Date	16/10/2023		Unit	cm
Checked: By	Eng. Dawod Shafag		Province	Kandahar		Scale	NO
Approved: By			District	Arghastan		Sheet No	0
			Village	Nazad Khil			



(Length)

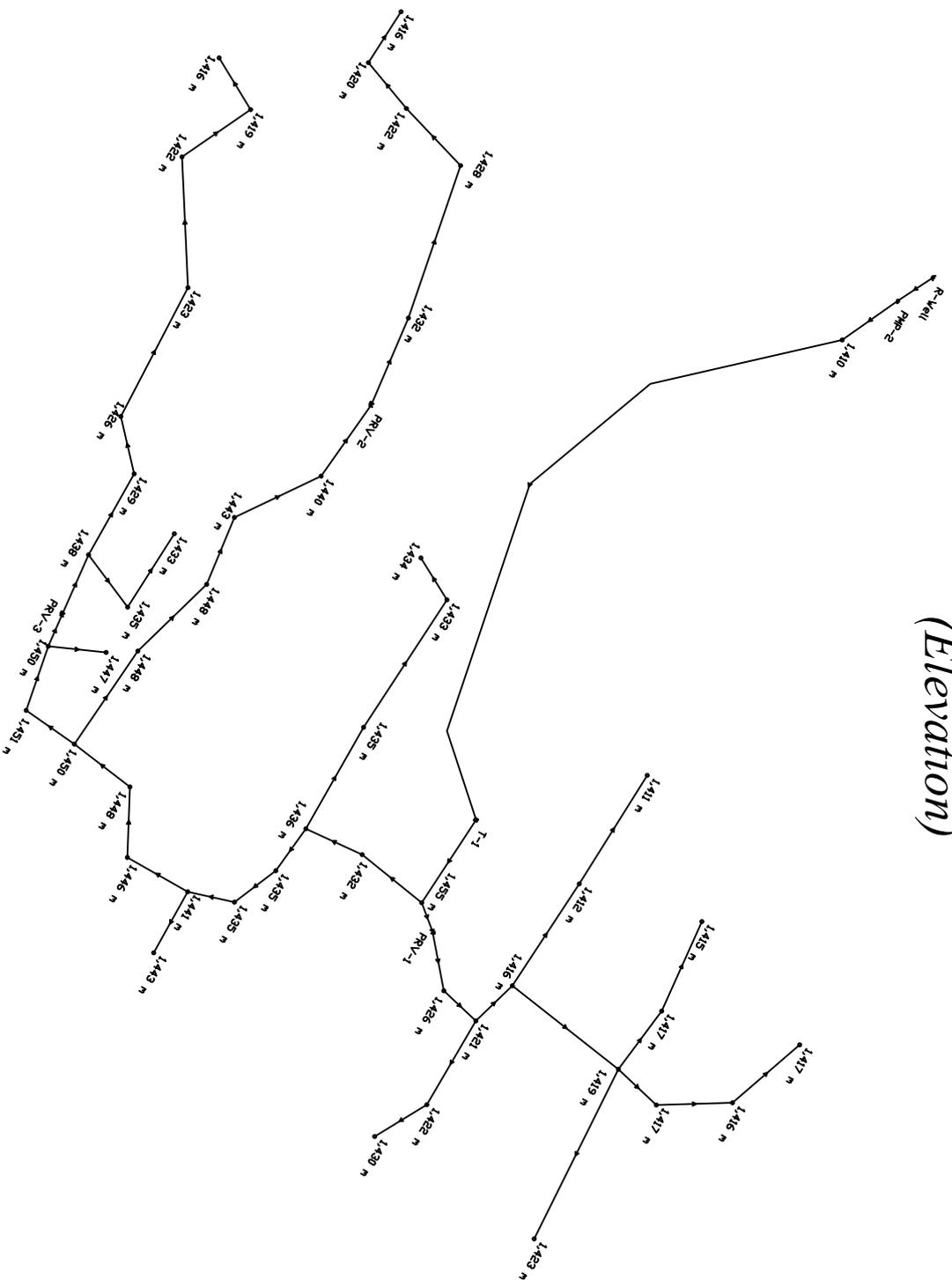


Water Network Project (Length)

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Nazad Khil		



(Elevation)



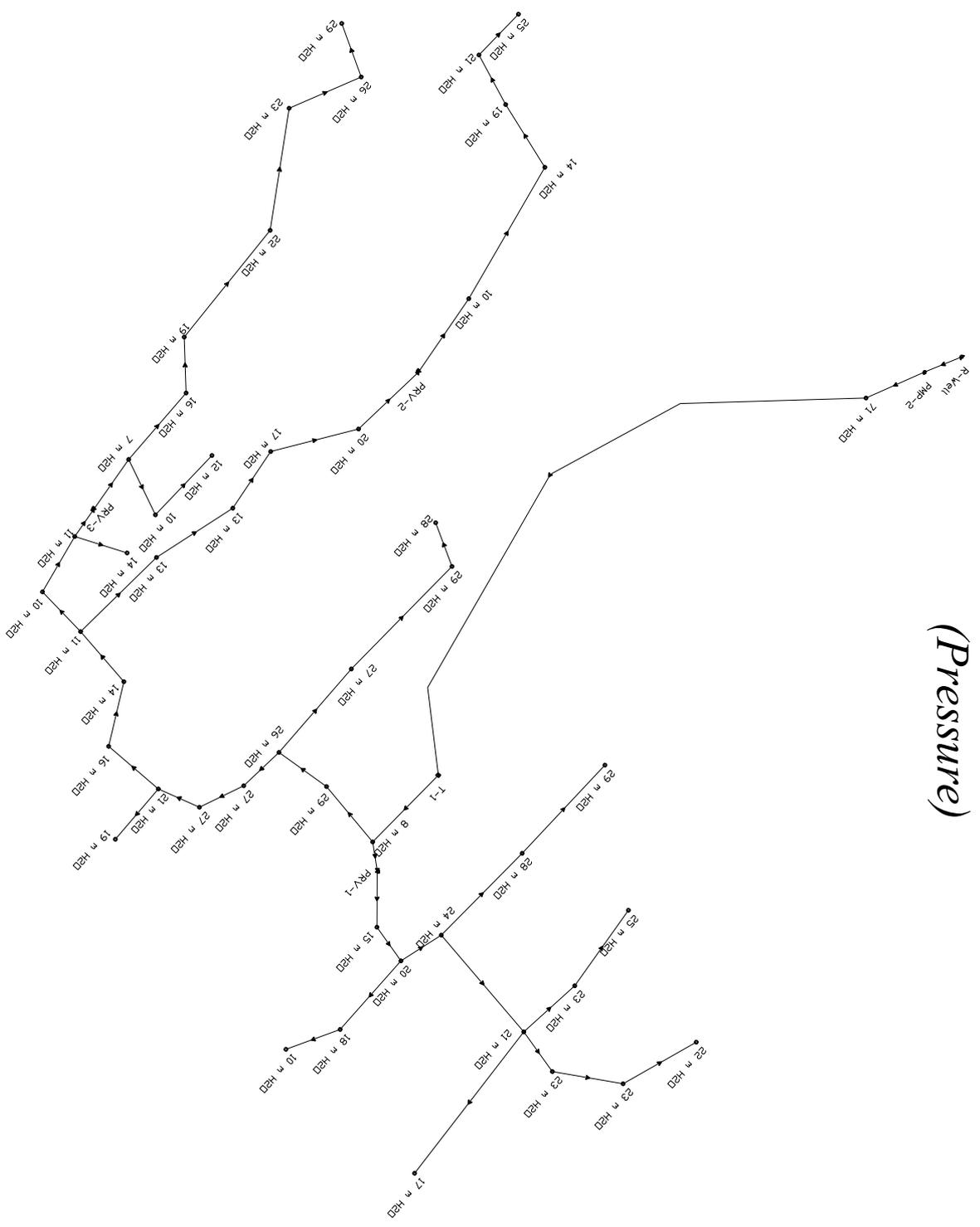
Water Network Project (Elevation)

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafaq	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Nazad Khil		





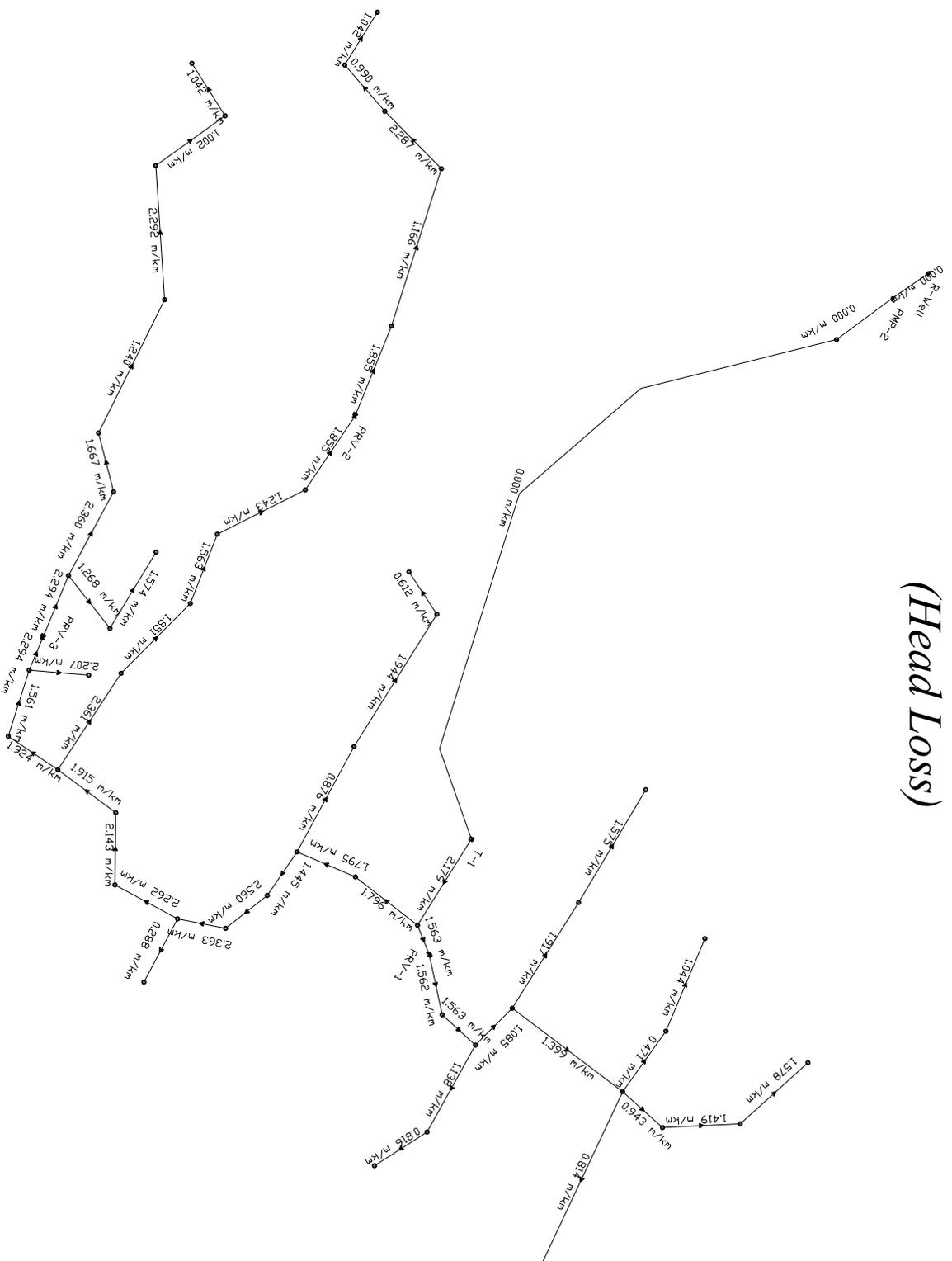
(Pressure)



Water Network Project (Pressure)

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checkd: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Nazad Khil		

# (Head Loss)



## Water Network Project (Head Loss)

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Nazad Khil		

دشبکی د دیزاین د ارقامو جدول

Nazad Khil			
ارقام	تشریحات		شمار
2100	Population	نفوس	1
300	Famil	د فامیلونو تعداد	2
2.2	Population growth/year	د نفوس کلنی زیاتوالی	3
15	Design period	د دیزاین زمان	4
2911	Design population	دیزاین نفوس	5
30	Daliy Demend l/c/d	په روخ کې دمصرف نورم	6
1.0	Everege daliy Flow for design population L/se	د دیزاین شوی نفوس لپاره د متوسطی روخی جریان	7
1.3	Peak daily factor	د روخی اعظمی مصرف ضریب	8
1.3	Peak daliy flow l/sec	د هغه روخی لپاره اوبه چې مصرف یې اعظمی وی	9
2.5	Peak hourly factor	د په ساعت کې د اعظمی مصرف ضریب	10
3.3	Peak horly flow l/sec	د اعظمی مصرف په ساعت کې لیتر فی ثانیه (دشبکی د دیزاین جریان)	11
3.90	Well water yald= Pumped water l/sec- 12.8x1000/3600=3.9	د څاه ابدھی لیتر فی ثانیه، د واټر پمپ استخراج لیتر فی ثانیه	12
55	Volume of Reservoir 49% of(113m3)	د ذخیزی حجم د اعظمی روخی د مصرف (113 متر مکعب) ۴۹ فیصده په متر مکعب	13



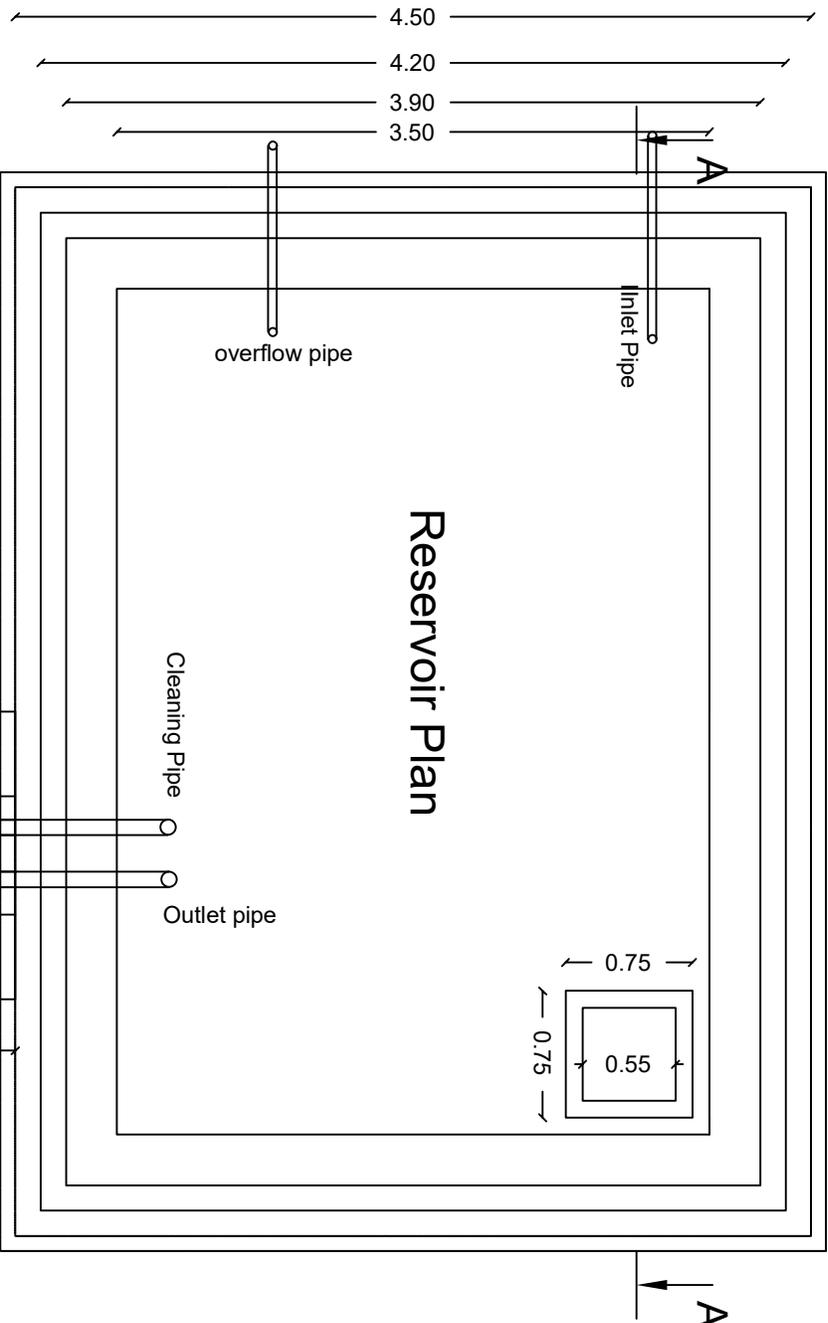
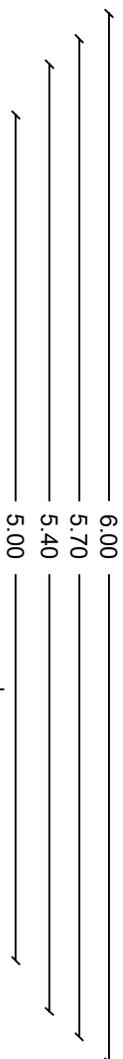
Islamic Relief Worldwide-Afghanistan  
Kandahar Area Office  
Shelter UK Project  
Solar Pump Water Network Project

Nazad Khil Village

دسولر پمپ محاسبوی جدول

ارقام	تشریحات	شماره
2100	Population	1 نفوس
300	Family	2 دfamیلونو تعداد
2.2	Population growth/year	3 دنفوس کلنی زیاتوالی
15	Design period	4 د دیزاین زمان
2911	Design population	5 دیزاین نفوس
30	Daliy Demend l/c/d	6 په روخ کي دمصرف نورم
87.3	Everage daliy Flow for design population m3/dy	7 ددیزاین شوی نفوس لپاره د متوسطی روخی جریان
1.3	Peak daily factor	8 دروخی اعظمی مصرف ضریب
113.5	Peak daliy flow m3/dy	9 د هغه روخی لپار اوبه چي مصرف یي اعظمی وی
14.2	Peak horliy flow m3/h= (row9/8)	10 د هغه اوبو اعظمی مقدار چي سولر پمپ یی له څاه څخه په ساعت کي پمپ کوی، د اعظمی ورخی دمصرف تقسیم به ۸ ساعته
100+50+4+1=155 m	TDH=Hds+H loss+1m	11 د واٹر پمپ لپاره ارتفاع، د څاه له دینامیک سطحی تر ذخیری ارتفاع جمعه د فشار ضایعات یو متر دخروج لپاره فشار په متر
155.0	TDH	مجموعی ارتفاع
6.0	Hydraulic power of the pump (kW)	12 هایدرولیکی فشار Ph
1.25	$\eta_p$ Pump efficiency (%). $\eta_p$	13 دپمپ موثریت ۷۵٪
7.5	Shaft power of the pump (kW)=75%Ph	14 دواٹر پمپ د شافت قدرت ۷۵٪ Ph
1.24	Coefficient C= (1.1-1.2-1.5-2)	15 د موټور د موثریت ضریب 1.1-1.2-1.5-2
9.3	Power to the Motor (kW)	16 دواٹر پمپ د موټور یانصب قدرت Pm
9.5	avalibal	17 دتولید ستندر
0.85	$\eta$ (Inverter)= inverter efficiency 85% = 11.1 kw	18 د انورتر موثریت ۸۵٪
0.80	$\eta$ (factor) = efficiency factor is normally 80%	19 د سستم موثریت ۸۰٪
14.0	PV	20 دلمریزو تختو د بریښنا قدرت په کیلو اټ
13970.6		دلمریزو تختو د بریښنا قدرت په واټ
27.9	28.0	دلمریزو تختو تعداد بریښنا قدرت په واټ

# 50M3 Water Reservoir Drawings



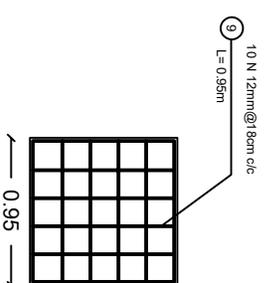
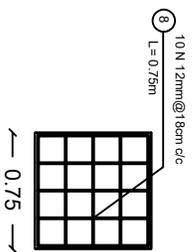
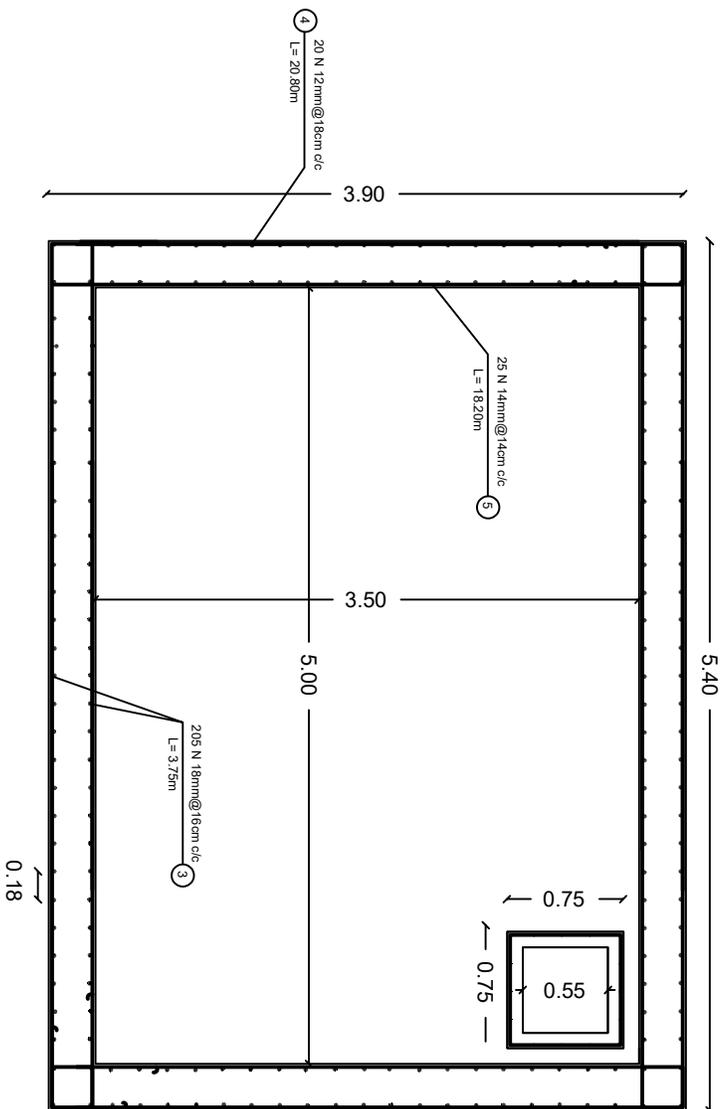
- Note:**
- 1- All dimension are in m unless otherwise stated.
  - 2- During RCC work, vibrator must be used to avoid water leakage from reservoir.
  - 3- All RCC works should be with 1:2:4 mortar unless otherwise stated.
  - 4- All RCC works should be with 1:1.5:3 concrete.
  - 5- Isolation material is glass wool.
  - 7- Curing must be continued upto 28 days.
  - 8- Clear and Clean water must be used every where.
  - 9- The inlet, outlet, overflow and washing pipes should be adjusted according to site condition.

Survey by: Eng.M.Mehdi	Checked by: Eng. Dawod Shafaq	Province: Kandahar
Drawing By: Eng.M.Mehdi	Approved By: Eng. Shah Faisal	District: Arghastan
Design By: Eng.M.Moalime		Village: Nazad Khil
Shelter UK Project		



# 50M3 Water Reservoir Drawings

## Reinforcement Plan



- Note:**
- 1- All dimensions are in m unless otherwise stated.
  - 2- During RCC work vibrator must be used to avoid water leakage from reservoir.
  - 3- All PCC works should be with 1:2:4 mortar unless otherwise stated.
  - 4- All RCC works should be with 1:1.5:3 mortar.
  - 5- Fastening material is glass wood.
  - 6- Cuttings must be continued upto 28 days.
  - 7- The concrete work must be done in every 10cm.
  - 8- The inlet, outlet, overflow and washing pipes should be adjusted according to site condition.

Survey by: Eng. M. Mehdi	
Drawing By: Eng. M. Mehdi	
Design By: Eng. M. Moaine	

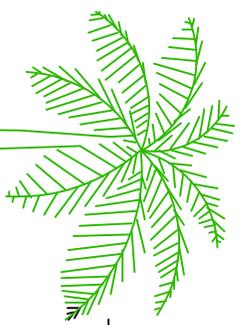
Checked by: Eng. Dawod Shafiq	
Approved By: Eng. Shah Faisal	

<b>Shelter UK Project</b>	
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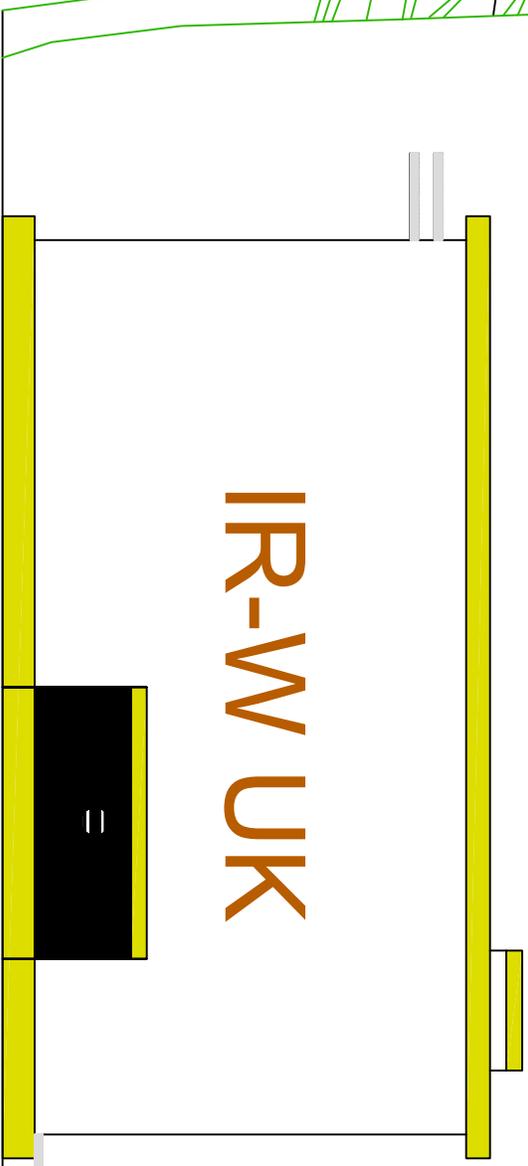
Province: Kandahar
District: Arghastan
Village: Nazad Khil



# 50M3 Water Reservoir Drawings



Front Elevation

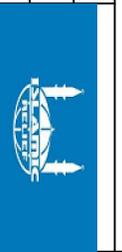


Survey by: Eng. M. Mehdi	
Drawing By: Eng. M. Mehdi	
Design By: Eng. M. Moaine	

Checked by: Eng. Dawod Shafaq	
Approved By: Eng. Shah Faisal	

Shelter UK Project

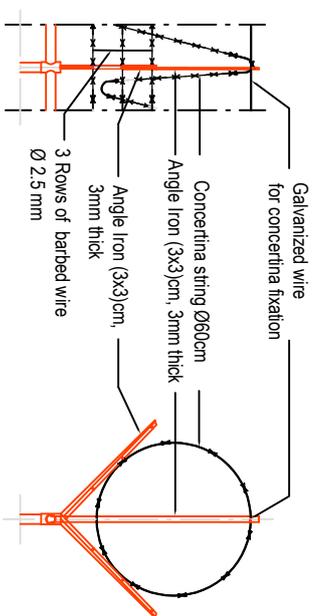
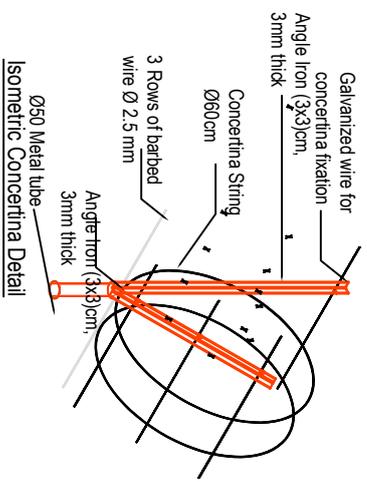
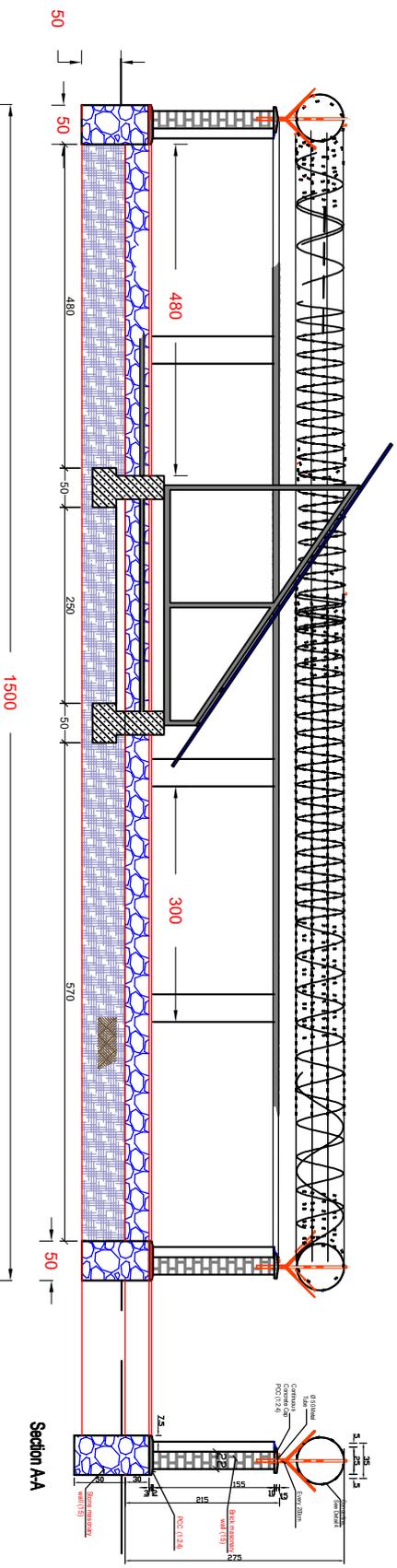
Province: Kandahar
District: Arghastan
Village: Nazad Khil





# Boundary Wall Section

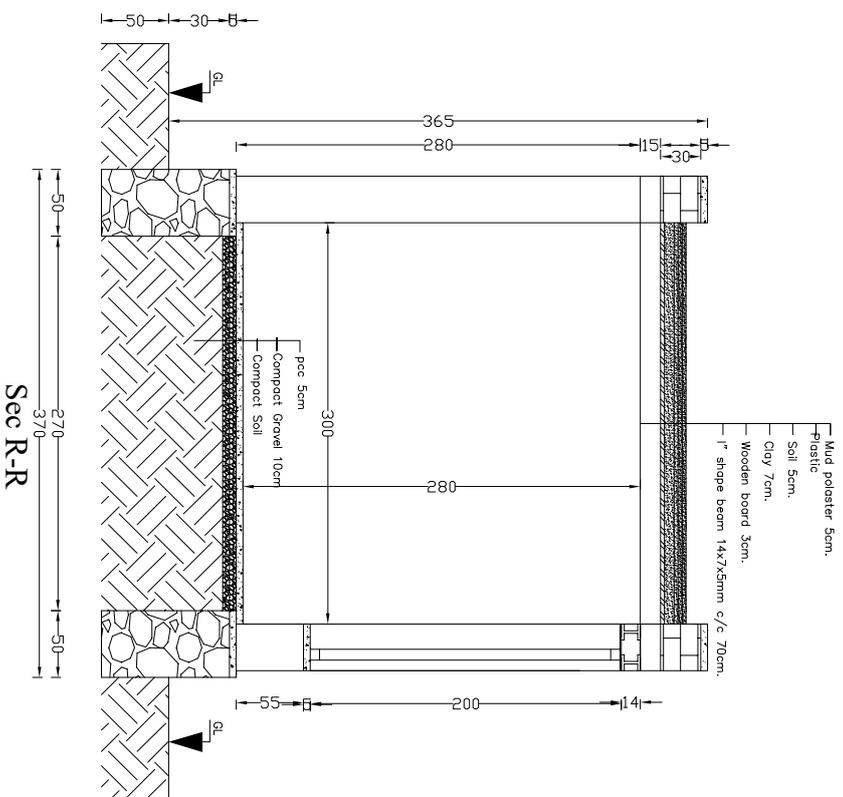
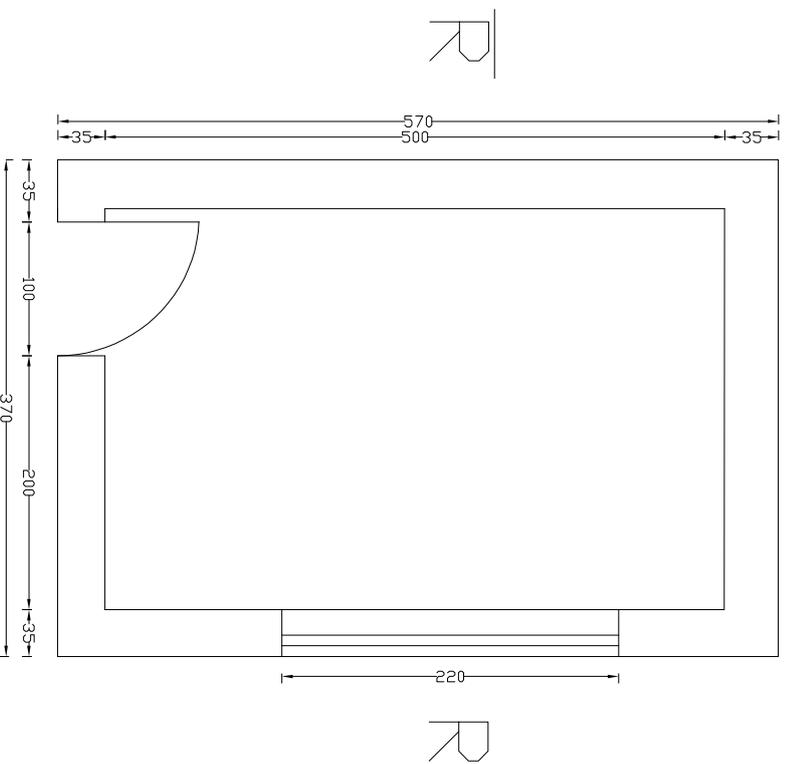
## Section (B-B)



## Water Network Project Boundary Wall Section

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafiq	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Nazad Khil		

# Guard Room



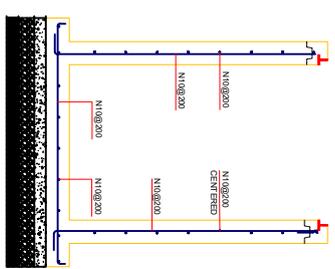
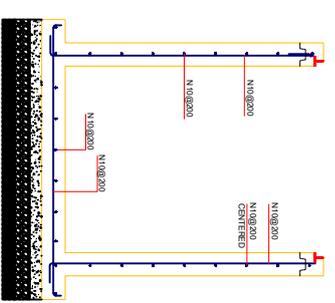
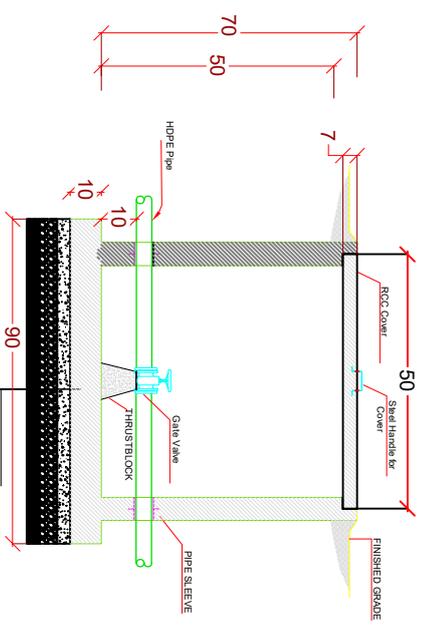
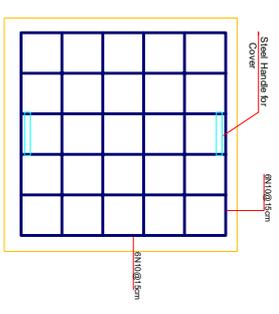
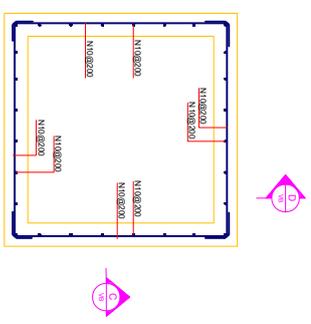
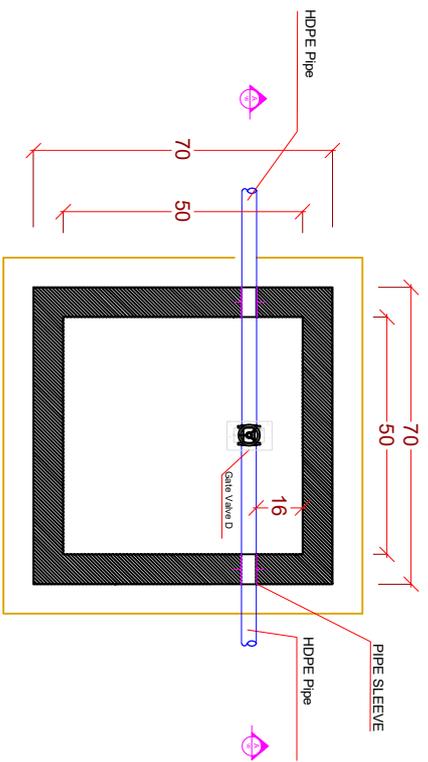
Sec R-R

## Water Network Project Guard Room

Survey: By		Eng. M. Moaine & M. Mehdi		Project		Shelter		Islamic Relief Worldwide	
Drawing: By		Eng. M. Mehdi		Section		Water Network		IR-W	
Design : By		Eng. M. Moaine		Date		16/10/2023		Unit	
Checked: By		Eng. Dawod Shafag		Province		Kandahar		Scale	
Approved: By				District		Arghastan		NO	
				Village		Nazad Khil		Sheet No	
								0	

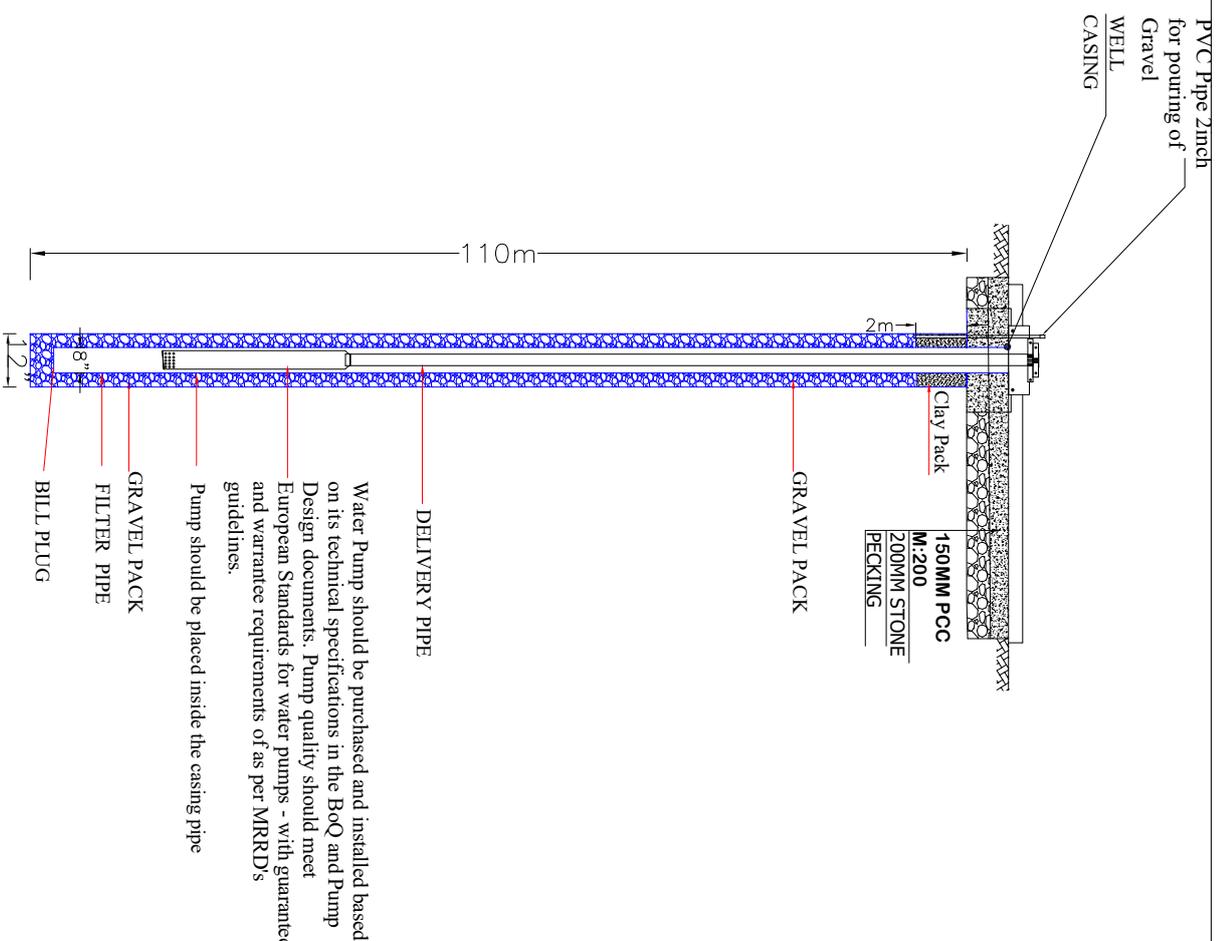


# Gate Manhole



## Water Network Project Manhole

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Nazd Khil		

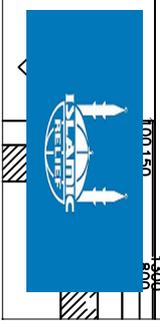


## Notes

- 1-Well designed by WTSAN department.
- 2-The working pressure for pipes and valves will be 16 or 20 bar ( 290 PSI )
- 3- If the ground stratum are made of bed rocks it no need for installation of casing pipes. if the stratum are made of Loss soil it should be stabilized by installation casing pipes.
- 4-Each drilled strata depth should be noted and soil sample should be kept in a sample box separately .
- 5-Pump test for 8 hours.
- 6-the depth of filter pipe has considered based on the previous experience . the true depth will be determined after well practical drilling.

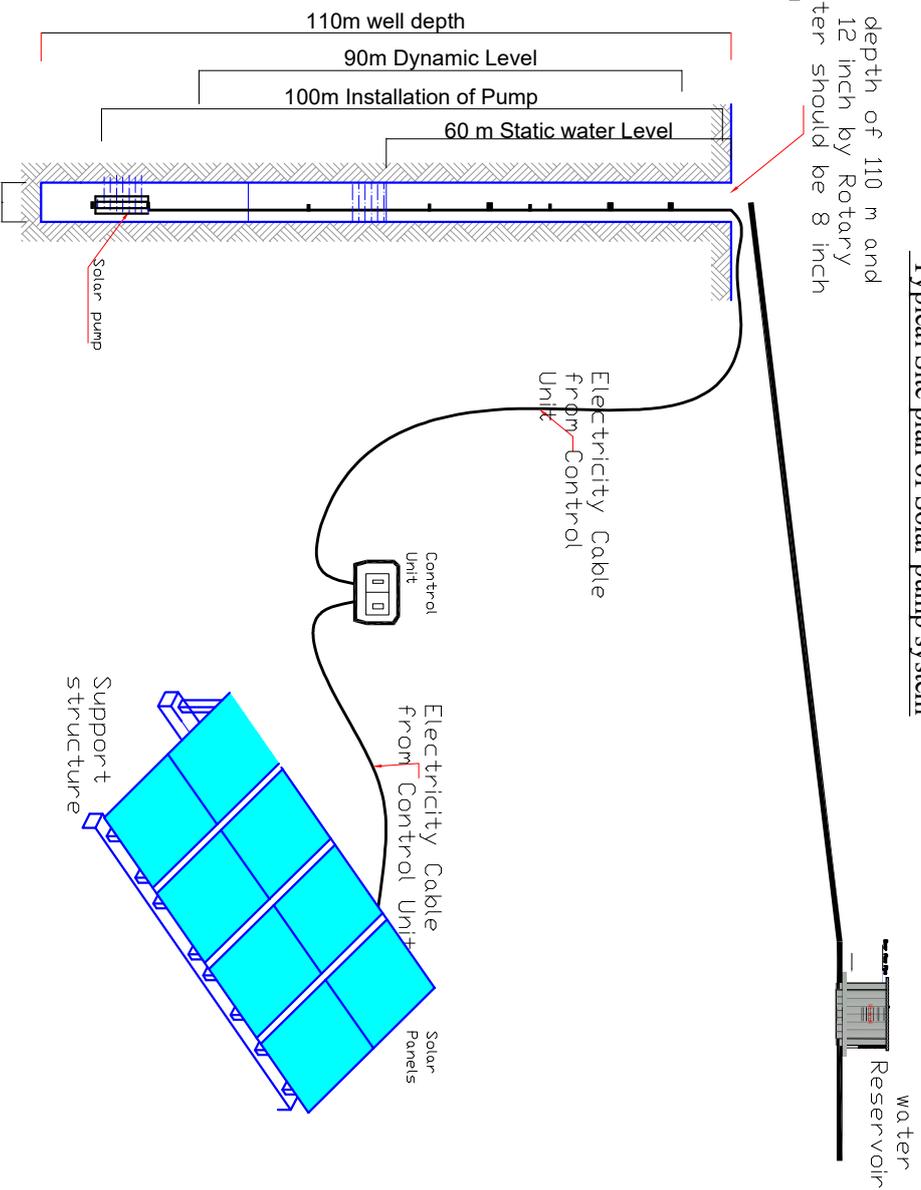
## Water Network Project Well

Survey: By		Eng. M.Moaine & M.Mehdi		Project		Shelter		Islamic Relief Worldwide	
Drawing: By		Eng. M.Mehdi		Section		Water Network		IR-W	
Design : By		Eng. M.Moaine		Date		16/10/2023		Unit	
Checked: By		Eng. Dawod Shafag		Province		Kandahar		Scale	
Approved: By				District		Arghastan		NO	
				Village		Nazad Khil		Sheet No	
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Typical Site plan of Solar pump system

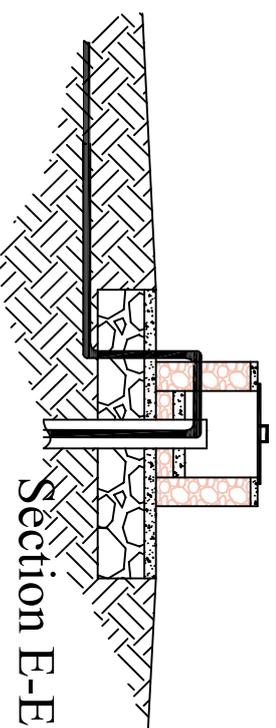
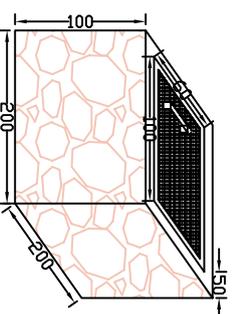
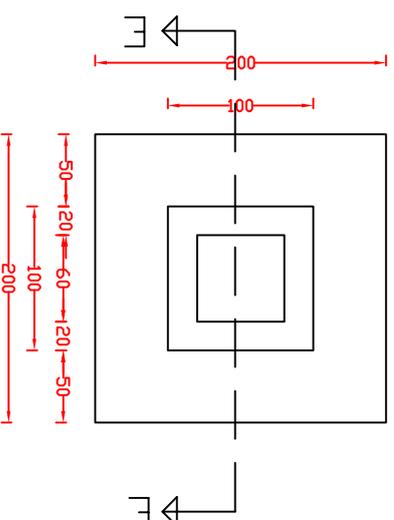
New proposed well with the depth of 110 m and diameter of drilling will be 12 inch by Rotary machine , the casing and filter should be 8 inch Class D



*Water Network Project Well*

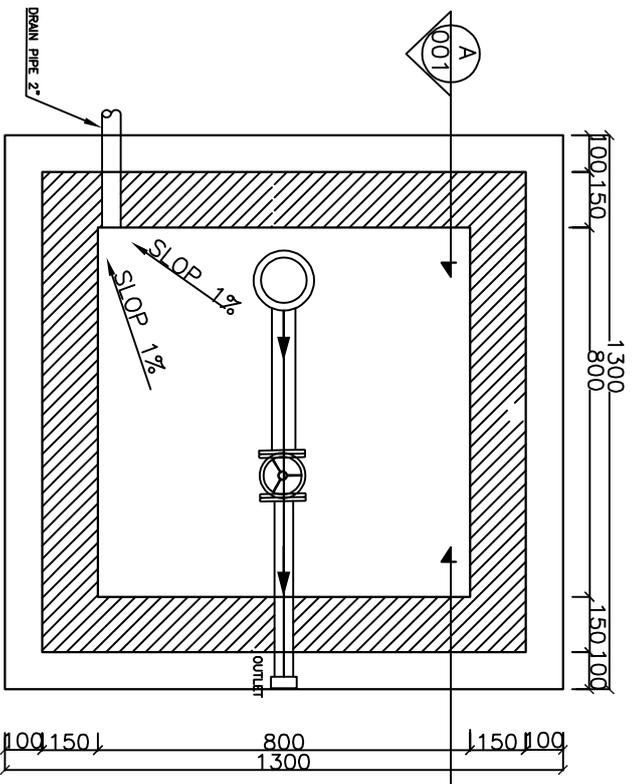
<i>Survey: By</i>		<i>Eng. M.Moaine &amp; M.Mehdi</i>		<i>Project</i>		<i>Shelter</i>		<i>Islamic Relief Worldwide</i>	
<i>Drawing: By</i>		<i>Eng. M.Mehdi</i>		<i>Section</i>		<i>Water Network</i>		<i>IR-W</i>	
<i>Design : By</i>		<i>Eng. M.Moaine</i>		<i>Date</i>		<i>16/10/2023</i>		<i>Unit</i>	
<i>Checked: By</i>		<i>Eng. Dawod Shafag</i>		<i>Province</i>		<i>Kandahar</i>		<i>cm</i>	
<i>Approved: By</i>				<i>District</i>		<i>Arghastan</i>		<i>Scale</i>	
				<i>Village</i>		<i>Nazad Khil</i>		<i>NO</i>	
								<i>Sheet No</i>	
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## Plan of Well Apron protection

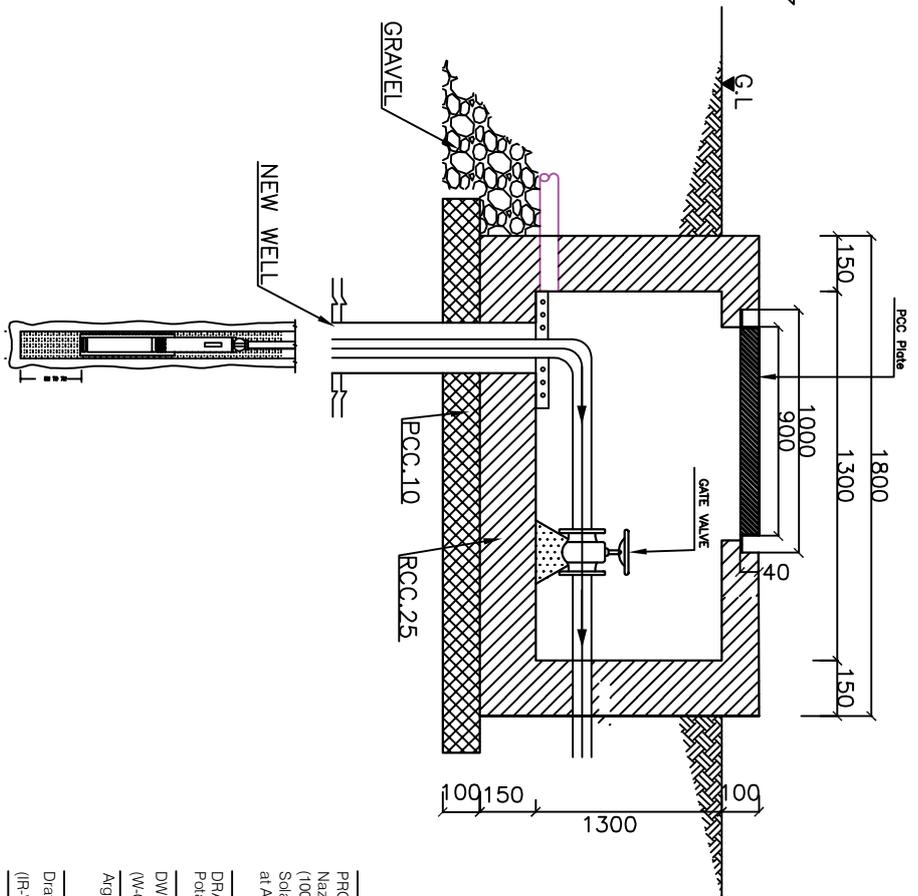


## Water Network Project Plan of Well Apron

<i>Survey: By</i>	<i>Eng. M.Moaine &amp; M.Mehdi</i>	<i>Project</i>	<i>Shelter</i>	<i>Islamic Relief Worldwide</i>	
<i>Drawing: By</i>	<i>Eng.M.Mehdi</i>	<i>Section</i>	<i>Water Network</i>	<i>IR-W</i>	
<i>Design : By</i>	<i>Eng.M.Moaine</i>	<i>Date</i>	<i>16/10/2023</i>	<i>Unit</i>	<i>cm</i>
<i>Checked: By</i>	<i>Eng.Dawod Shafag</i>	<i>Province</i>	<i>Kandahar</i>	<i>Scale</i>	<i>NO</i>
<i>Approved: By</i>		<i>District</i>	<i>Arghastan</i>	<i>Sheet No</i>	<i>0</i>
		<i>Village</i>	<i>Nazad Khil</i>		



01 Well Chamber Plan  
SCALE: NTS



02 WELL AND WELL CHAMBER SECTION A-A  
SCALE: NTS

Remarks

PROJECT NAME :Shaher  
Nazad Khil PROJECT  
(100)m Deep Well With Pump and  
Solar System For Each House cantion  
at Aghasthan

DRAWING TITLE  
Potable Water Well Plan and Section

DWG NUMBER  
(W-01)

Aghasthan District

Dra: Designed & Drawn By  
(IR-W Area Team)

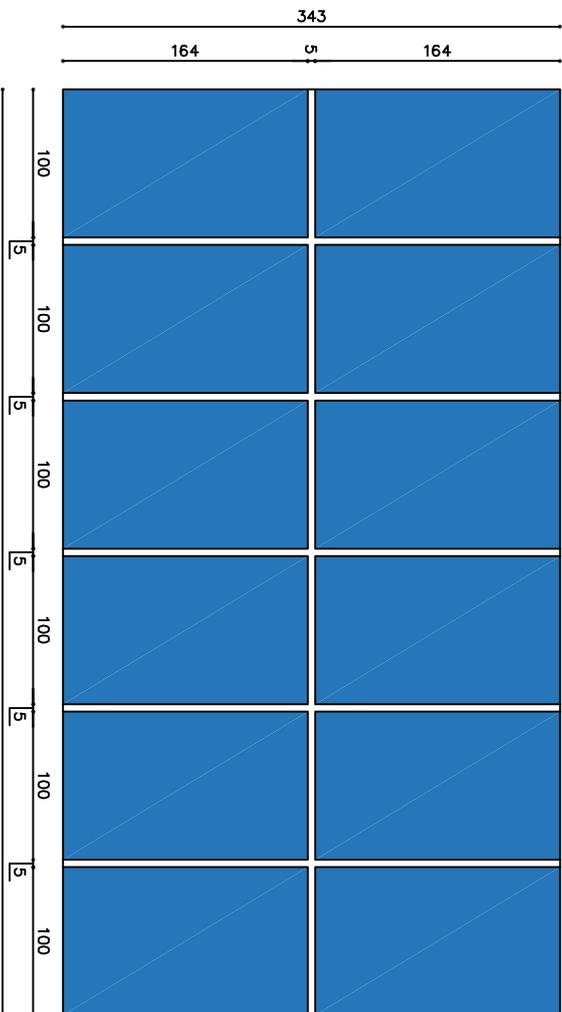
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SCALE(NTS) DATE:04/2023

## Water Network Project Well

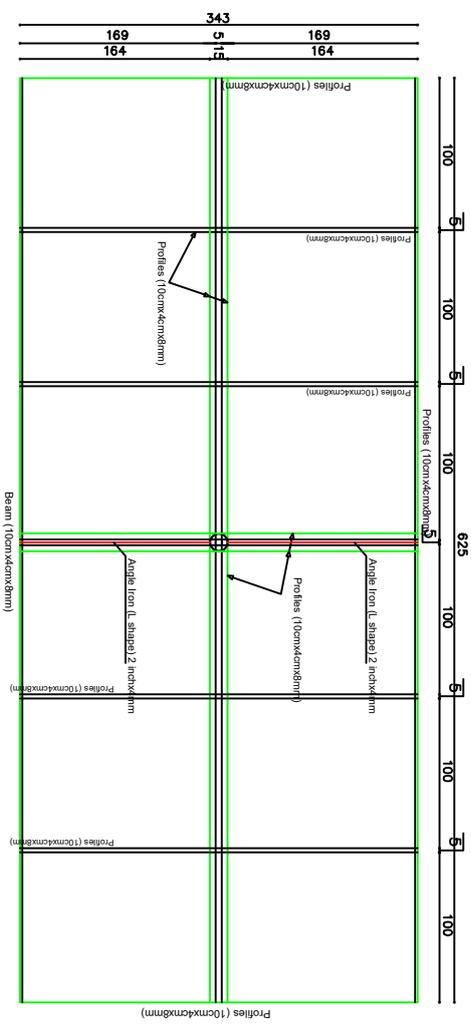
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Approved: By		District	Arghastan	Sheet No	0
		Village	Nazad Khil		

# Typical Solar Panel Frame

plan of solar panels



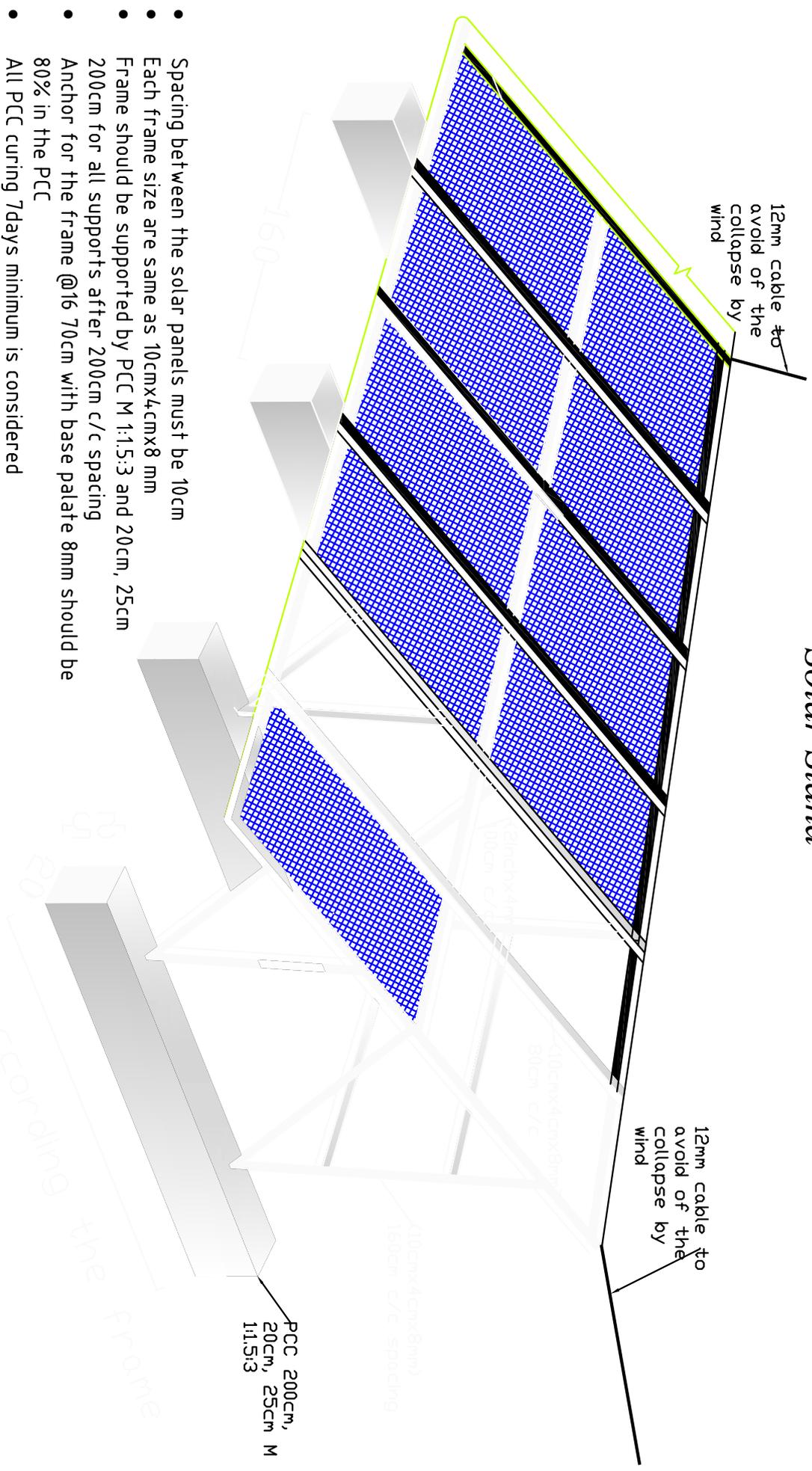
plan of solar panel's frame



## Water Network Project Solar Panel Frame

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Nazad Khil		

# Solar Stand

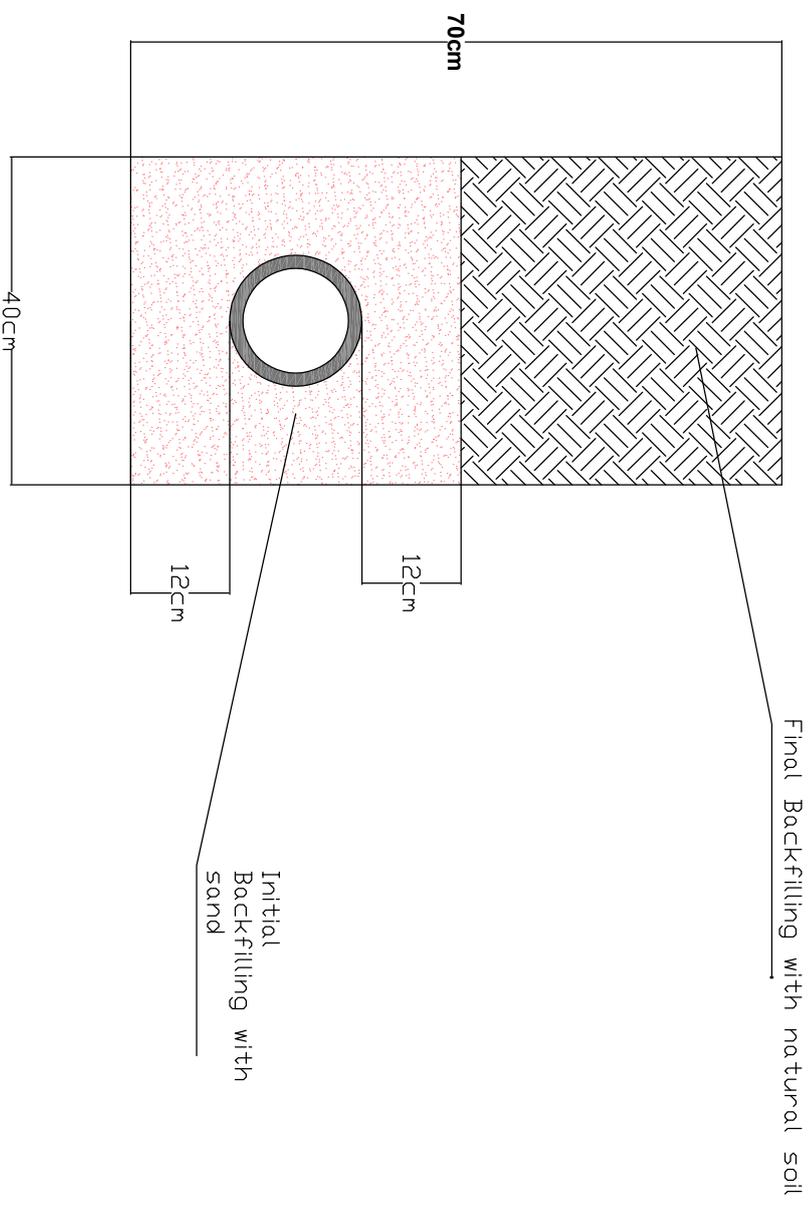


- Spacing between the solar panels must be 10cm
- Each frame size are same as 10cmx4cmx8 mm
- Frame should be supported by PCC M 1:1.5:3 and 20cm, 25cm
- 200cm for all supports after 200cm c/c spacing
- Anchor for the frame @16 70cm with base palatte 8mm should be 80% in the PCC
- All PCC curing 7days minimum is considered

## Water Network Project Solar Stand

Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	Islamic Relief Worldwide	
Drawing: By	Eng. M. Mehdi	Section	Water Network	IR-W	
Design : By	Eng. M. Moaine	Date	16/10/2023	Unit	cm
Checked: By	Eng. Dawod Shafag	Province	Kandahar	Scale	NO
Approved: By		District	Arghastan	Sheet No	0
		Village	Nazd Khil		

# Trench for Pipe

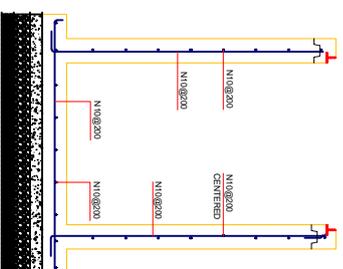
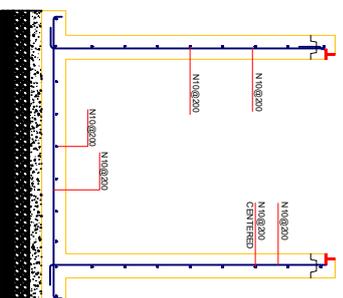
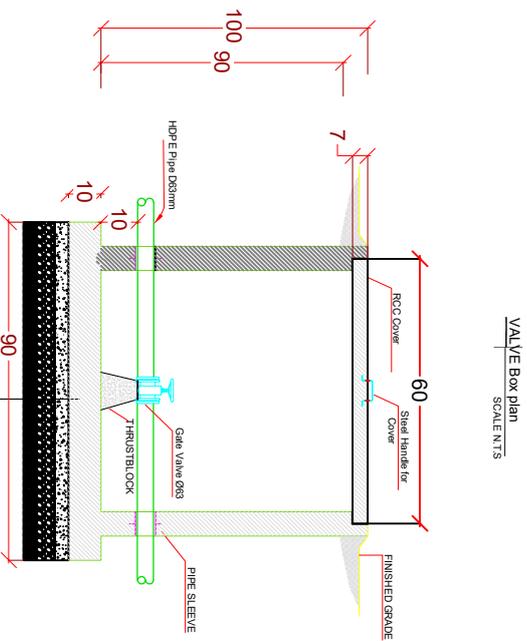
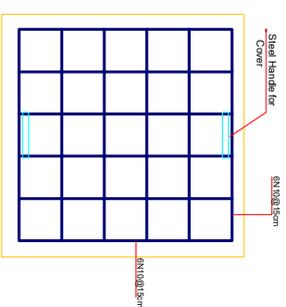
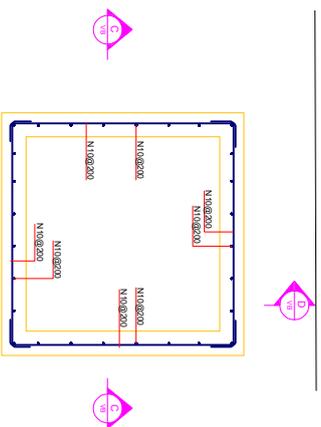
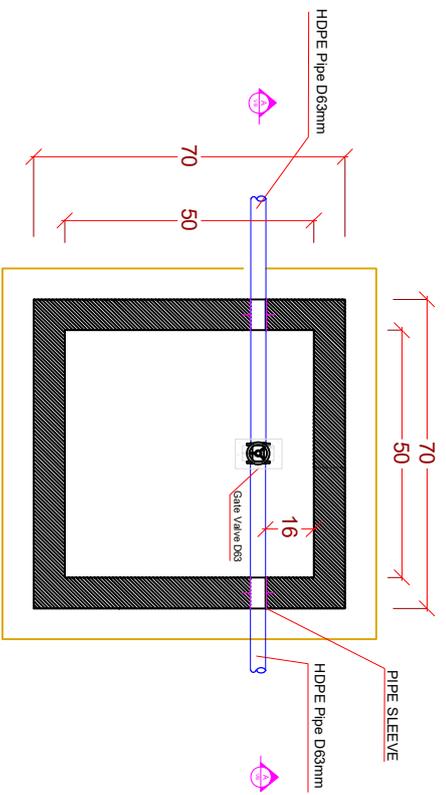


Section of trench for pipe laying

## Water Network Project Trench

		<i>Islamic Relief Worldwide</i>		
		<i>IR-W</i>		
Survey: By	Eng. M. Moaine & M. Mehdi	Project	Shelter	
Drawing: By	Eng. M. Mehdi	Section	Water Network	
Design : By	Eng. M. Moaine	Date	16/10/2023	
Checked: By	Eng. Dawod Shafag	Province	Kandahar	
Approved: By		District	Arghastan	
		Village	Nazad Khil	
Unit	cm	Sheet No	0	
Scale	NO			

# Well Gate Valve



## Water Network Project Well Gate Valve

Survey: By		Eng. M. Moaine & M. Mehdi		Project		Shelter		Islamic Relief Worldwide			
Drawing: By		Eng. M. Mehdi		Section		Water Network		IR-W			
Design : By		Eng. M. Moaine		Date		16/10/2023		Unit		cm	
Checked: By		Eng. Dawod Shafiq		Province		Kandahar		Scale		NO	
Approved: By				District		Arghastan		Sheet No		0	
				Village		Nazad Khil					





Islamic Relief Worldwide-Afghanistan  
Kandahar Area Office  
Shelter UK Project  
Solar Pump Water Network Project

Nazad Khil Village

دسولر پمپ محاسبوی جدول

ارقام	تشریحات	شماره
2100	Population	1 نفوس
300	Family	2 دfamیلونو تعداد
2.2	Population growth/year	3 دنفوس کلنی زیاتوالی
15	Design period	4 د دیزاین زمان
2911	Design population	5 دیزاین نفوس
30	Daliy Demend l/c/d	6 په روخ کي دمصرف نورم
87.3	Everage daliy Flow for design population m3/dy	7 ددیزاین شوی نفوس لپاره د متوسطی روخی جریان
1.3	Peak daily factor	8 دروخی اعظمی مصرف ضریب
113.5	Peak daliy flow m3/dy	9 د هغه روخی لپار اوبه چي مصرف یي اعظمی وی
14.2	Peak horliy flow m3/h= (row9/8)	10 د هغه اوبو اعظمی مقدار چي سولر پمپ یی له څاه څخه په ساعت کي پمپ کوی، د اعظمی ورخی دمصرف تقسیم به ۸ ساعته
100+50+4+1=155 m	TDH=Hds+H loss+1m	11 د واٹر پمپ لپاره ارتفاع، دڅاه له دینامیک سطحی تر ذخیری ارتفاع جمعه د فشار ضایعات یو متر دخروج لپاره فشار په متر
155.0	TDH	مجموعی ارتفاع
6.0	Hydraulic power of the pump (kW)	12 هایدر ولیکی فشار Ph
1.25	$\eta_p$ Pump efficiency (%). $\eta_p$	13 دپمپ موثریت ۷۵٪
7.5	Shaft power of the pump (kW)=75%Ph	14 دواٹر پمپ د شافت قدرت ۷۵٪ Ph
1.24	Coefficient C= (1.1-1.2-1.5-2)	15 د موټور د موثریت ضریب 1.1-1.2-1.5-2
9.3	Power to the Motor (kW)	16 دواٹر پمپ د موټور یانصب قدرت Pm
9.5	avalibal	17 دتولید ستندر
0.85	$\eta$ (Inverter)= inverter efficiency 85% = 11.1 kw	18 د انورتر موثریت ۸۵٪
0.80	$\eta$ (factor) = efficiency factor is normally 80%	19 د سستم موثریت ۸۰٪
14.0	PV	20 دلمریزو تختو د بریښنا قدرت په کیلو اټ
13970.6		دلمریزو تختو د بریښنا قدرت په واټ
27.9	28.0	دلمریزو تختو تعداد بریښنا قدرت په واټ

دشبکی د دیزاین د ارقامو جدول

Nazad Khil			
ارقام	تشریحات		شمار
2100	Population	نفوس	1
300	Famil	د فامیلونو تعداد	2
2.2	Population growth/year	د نفوس کلنی زیاتوالی	3
15	Design period	د دیزاین زمان	4
2911	Design population	دیزاین نفوس	5
30	Daliy Demend l/c/d	په روخ کې دمصرف نورم	6
1.0	Everege daliy Flow for design population L/se	د دیزاین شوی نفوس لپاره د متوسطی روخی جریان	7
1.3	Peak daily factor	د روخی اعظمی مصرف ضریب	8
1.3	Peak daliy flow l/sec	د هغه روخی لپاره اوبه چې مصرف یې اعظمی وی	9
2.5	Peak hourly factor	د په ساعت کې د اعظمی مصرف ضریب	10
3.3	Peak horly flow l/sec	د اعظمی مصرف په ساعت کې لیتر فی ثانه (دشبکی د دیزاین جریان)	11
3.90	Well water yald= Pumped water l/sec- 12.8x1000/3600=3.9	د څاه ابدھی لیتر فی ثابنه، د واټر پمپ استخراج لیتر فی ثابنه	12
55	Volume of Reservoir 49% of(113m3)	د ذخیزی حجم د اعظمی روخی د مصرف (113 متر مکعب) 49 فیصده په متر مکعب	13

## **Technical Specification for Nazad Khil Water Supply Pipe Scheme Project**

1. Population: The village has 300 families.
2. The project includes the following tasks: - Drilling of tube well with Rotary machine 12" and 8" casing. - Construction of solar panels. - Construction of a 50 cubic meters RCC water Tank. - Construction of 12 valve boxes. - Excavation works, pipe laying, and extension from the Well to the reservoir and from the reservoir to the houses.
3. To regulate the daily water consumption balance, a 50 cubic meter capacity reinforced concrete (RCC) reservoir has been considered.
4. Source: The drinking water well is a rotary -type with a 12-inch diameter and a depth of 110 meters. The perceived static water level is 60 meters. Due to the lack of precise static water level data for the area, the well will be drilled according to specifications, followed by a pump test. Subsequent network actions and will depend on the test results. If the well yield is insufficient, **adjustments to the pump design and the number of solar panels may be necessary, or the project could be canceled.**
5. High Quality- Solar panels 500 to 540watt internationally certified- (meet European standards, and MRRD requirements). The vendor should guarantee PV-Panels 90% efficiency of its productivity for the first 10 years and 85 % efficiency of productivity for the subsequent 15 years.
6. Submersible pump with its Compatible inverter, control box and Fuse box as per BoQ and pump design sheet - Pump quality should meet European Standard for water pumps- with guaranty and warrantee requirements of as per MRRD's guideline).
7. The Site Plan includes the length and diameter of each pipe. Additionally, there is another table called "Pipe and Fittings Table" containing the diameter and length of the pipes.
8. All pipes used in this network are made of polyethylene and have a pressure rating of 10 bar, except for house connection pipes + Supplying main from well to Reservoir which are 16 bars.
9. The network is designed as a house-to-house connection. Each house will have a water meter installed. Therefore, a fabricated meter box and water meter with all necessary accessories are included in the project budget.
10. The total number of house connections in this project is 97.
11. All structures in this project, including the reservoir, brake pressures, collection box, and other structures in the network, as well as the pipe routes, should be accurately positioned according to the provided site plan and coordinates to avoid any future technical issues in the network.
12. The minimum depth of excavation for pipe installation should be 80 centimeters, with a width of 50 centimeters. The cross section is indicated in the relevant plan.

13. Steel bar should not be rusty all reinforced concrete should have a grade of 250, with a ratio of 1:1:2 (cement: coarse aggregate: fine aggregate).

15. All stone works should be done with a mortar ratio of 1:4 (cement: sand).

16. All non-reinforced concrete should have a grade of 60, with M250 for RCC tanks and 200 for other components.

17. All plastering works should have a ratio of 1:3 (cement: sand).

18. All water-resistant plastering works should have a ratio of 1:3 (cement: sand), with a minimum of 1 kilogram of water-resistant powder mixed per cement bag.

19. The reservoir should be plastered on all internal surfaces using water-resistant plastering powder.

20. The top of the reservoir should be covered with waterproofing (ISOGAM) material.

21. The pointing for the stonework should have a ratio of 1:3 (cement: sand).

22. The reservoir should have an entrance gate equipped with a lock to prevent water contamination.

23. The roof of the reservoir and all similar structures should have gutters to prevent rainwater or snow from damaging the buildings.

24. Handrails and vertical access ladders per OSHA recommendations, with adjustments for project site.

25. The water used for construction purposes should be clean and free from impurities.

26. Proper curing and watering of concrete should continue for a minimum of 28 days.

27- All construction materials must be of high quality. The vendor is required to provide samples for inspection and verification by the IRW/MRRD technical team. If any materials do not conform to the specifications in the BoQ and Design documents and are delivered without the technical team's inspection and verification, the vendor must replace them at no additional cost.

29- The workmanship for each aspect of this project must be of the highest quality, meeting the satisfaction and recommendations of the IRW technical team.

30-The vendor/contractor is responsible for all health and safety issues at the project site.

31- The vendor must implement all necessary environmental protection measures during the project. They must also safely dispose of all surplus construction materials in an environmentally responsible manner and ensure the project site is safe and visually acceptable upon completion.

32- Testing Requirements:

1. Concrete Mix Design: Based on selected aggregate properties, the contractor must define the M25 concrete mix design and submit the lab report to IRW before casting RCC elements.

2. Slump Test: To be conducted at the batching plant and at the site before pouring the concrete for each concrete mix.
3. Air Content Test: To be performed at the batching plant for every batch of concrete to ensure the mix design is consistent.
4. Cylinder Test: Three sets of cylinders (6 cylinders) to be cast for each concrete pour. One set to be tested at 7 days and the other set at 28 days for compressive strength.
5. Soil-bearing Capacity Test: To be conducted before foundation works to determine the bearing capacity of the soil and ensure it meets the project requirements.

**Notes:**

- All concrete testing results must meet the specified criteria as per IS 456:2000 or equivalent.
- Tests to be conducted by a certified laboratory and results to be submitted to the project engineer.
- Any deviation in test results must be immediately reported and rectification measures to be discussed and implemented as per engineer's instructions.

**Work plan for the Water Supply ( Nazad Khil) Pipe scheme project**

ID-number: KDR-001 Water Network  
 Province: Kandahar  
 District: Aghastan  
 Village: Nazad Khil  
 Project purpose: Water Supply  
 Date: 12 /11/2023

No.	Activities Description	Duration/days	First Month				Second Month				Third Month				Fourth Month			
			Week-1	Week-2	Week-3	Week-4	Week-1	Week-2	Week-3	Week-4	Week-1	Week-2	Week-3	Week-4	Week-1	Week-2	Week-3	Week-4
1	Mobilization of Materials to Site	7	■															
2	Drilling, of well	7	■	■														
3	Supply and installation of solar pump system	21			■	■	■											
4	Construction of boundary wall for solar panels	21			■	■	■											
5	Construction and Installation of 40 Cubic meter RCC Elevated Tank	35			■	■	■	■	■									
6	Excavation, Laying and Backfilling of distribution system	98	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
7	Site Clearance and Hand over	112	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
8	Reporting	112	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

# Submittal Data

PROJECT:	UNIT TAG:	QUANTITY:
REPRESENTATIVE: _____	TYPE OF SERVICE:	DATE: _____
ENGINEER:	SUBMITTED BY:	DATE:
CONTRACTOR:	APPROVED BY:	DATE:
	ORDER NO.:	DATE:

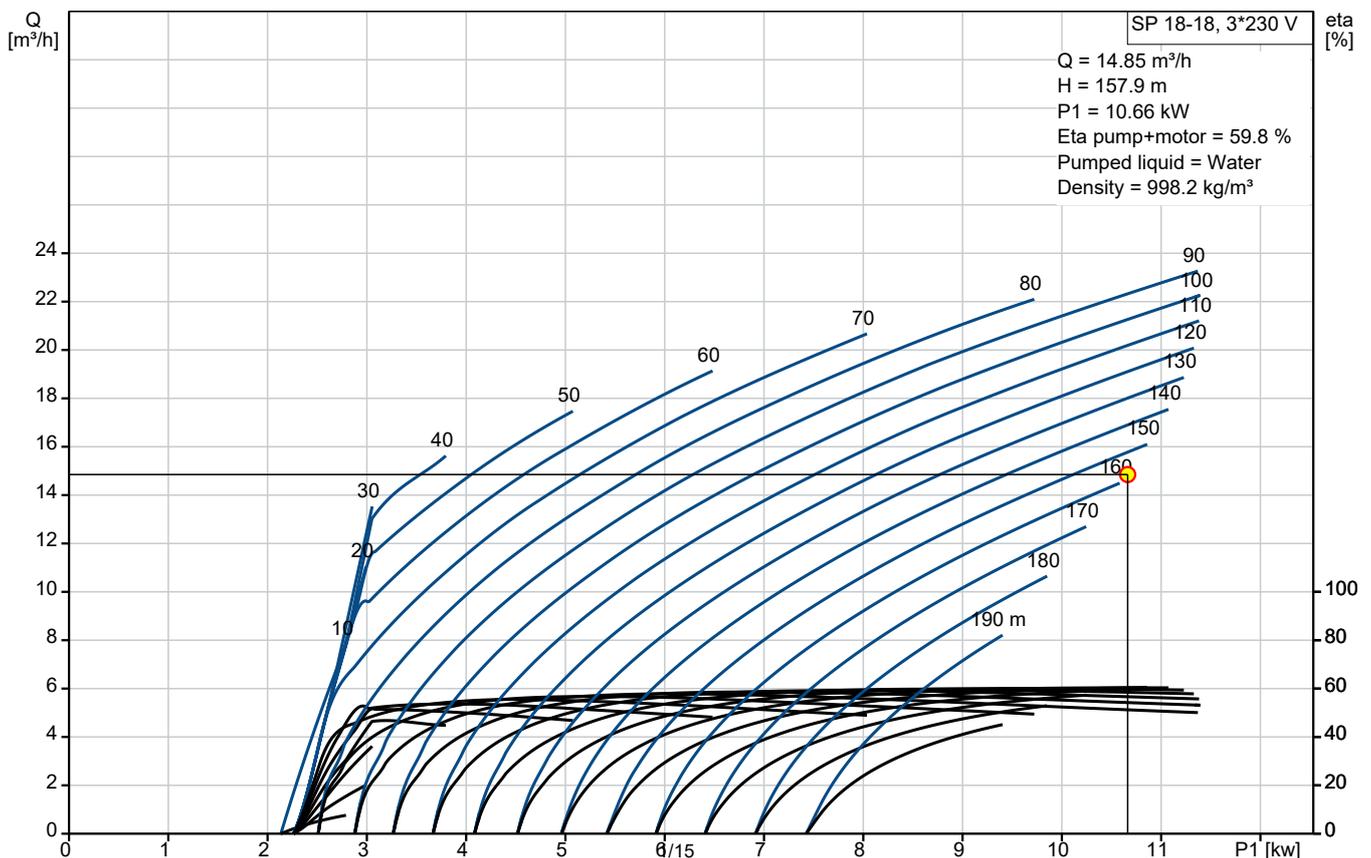


## SP 18-18

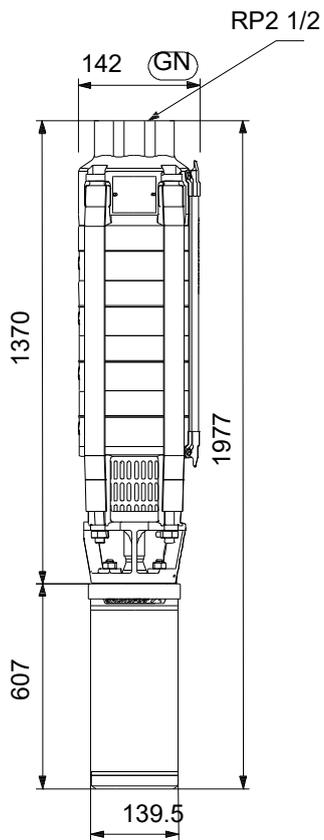
Grundfos SP are submersible borehole pumps, designed for pumping groundwater. Grundfos SP are all stainless-steel pumps, and they are available in 3 material grades. The pumps are suitable for boreholes in sizes ranging from 4" over 6" and 8" to 10". The motor sizes for the pumps are available in 0.37-250 kW.

Note! Product picture may differ from actual product

Conditions of Service	Pump Data	Motor Data
Liquid: Water	Liquid temperature range: -15 .. 40 °C Product number: On request	Rated power - P2: 9.2 kW Rated voltage: 220-230 V Mains frequency: 50 Hz Enclosure class: IP68 Insulation class: F Motor protection: NONE Thermal protection: EXT. Motor type: MS6000



# Submittal Data



## Materials:

- Impeller: Stainless steel
- Impeller: AISI 304
- Impeller: EN 1.4301
- Motor: Stainless steel
- Motor: DIN W.-Nr. 1.4301
- Motor: AISI 304

**Project:**

**Reference Number:**

**Client:**

**Client Number:**

**Contact:**

**Qty. Description**

1 SP 18-18



**Note! Product picture may differ from actual product**

Product No.: On request

Submersible borehole pump, suitable for pumping clean water. Can be installed vertically or horizontally. All steel components are made in stainless steel, EN 1.4301 (AISI 304), that ensures high corrosive resistance. This pump carries drinking water approval.

The pump is fitted with a 9.2 kW MS6000 motor with sand shield, mechanical shaft seal, water-lubricated journal bearings and a volume compensating diaphragm. The motor is a canned type submersible motor offering good mechanical stability and high efficiency.

The motor is fitted with the Grundfos Tempcon sensor that, by use of powerline communication together with a MP204 control panel, enables temperature monitoring.

The motor is for direct-on-line starting (DOL).

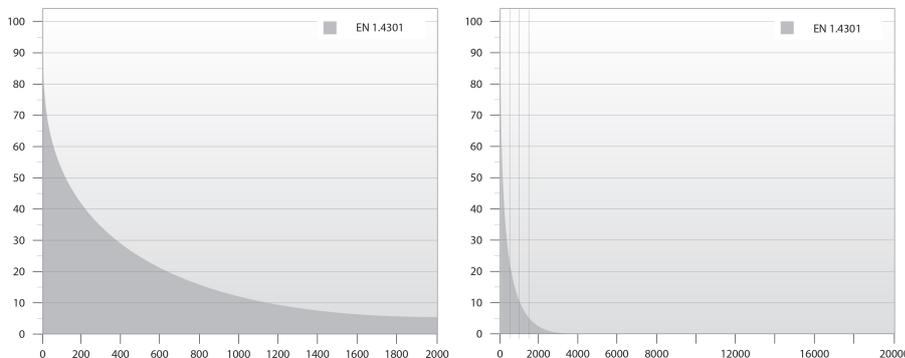
### Further product details

The pump is suitable for applications similar to the following:

- raw-water supply
- irrigation
- groundwater lowering
- pressure boosting
- fountain applications.

### Pump

All pump surfaces that are in contact with pumped liquids are made in stainless steel which makes them corrosion- and wear-resistant. The corrosion diagram below shows the capabilities of the pump and motor in relation to the temperature in Celsius (y-axis) and the concentration of chloride in ppm (x-axis).



The suction interconnector is fitted with a strainer to prevent large particles from entering the pump. The suction interconnector is designed to comply with NEMA standards for motor mounting/dimensions.

### Motor

The stator is hermetically encapsulated in stainless steel and the windings are embedded in polymer compound. This results in high mechanical stability, optimum cooling and reduces the risk of short circuits in the windings.

**Project:**

**Reference Number:**

**Client:**

**Client Number:**

**Contact:**

**Qty. Description**

- 1 The shaft seal faces are ceramic/carbon. The material combination provides good dry-running resistance. Together with the shaft seal housing, the sand shield forms a labyrinth seal, which during normal operating conditions prevents penetration of sand particles into the shaft seal.
- The motor is fitted with the Grundfos Tempcon temperature sensor device that includes a NTC-resistor which senses the temperature.
- The resistor is built-in close to the winding.
- The temperature is converted into a high-frequency signal which is sent via the submersible drop cable and which can be converted into a temperature reading by means of Grundfos MP204.
- The MP204 is an electronic motor protection device that also monitors the supply network quality to protect the submersible motor against supply network disturbances.



**Liquid:**

**Pumped liquid:** Water

**Liquid temperature range:** -15 .. 40 °C

**Technical:**

**Pump speed on which pump data are based:** 2900 rpm

**Rated flow:** 18 m<sup>3</sup>/h

**Rated head:** 137 m

**Shaft seal for motor:** CER/CARNBR

**Approvals:** CE,EAC,UKCA,SEPRO,MOROCCO

**Approvals for drinking water:** ACS,DM174

**Curve tolerance:** ISO9906:2012 3B

**Motor version:** T40

**Return valve:** YES

**Materials:**

**Pump:** Stainless steel  
EN 1.4301  
AISI 304

**Impeller:** Stainless steel  
EN 1.4301  
AISI 304

**Motor:** Stainless steel  
DIN W.-Nr. 1.4301  
AISI 304

**Installation:**

**Maximum ambient pressure:** 60 bar

**Maximum operating pressure:** 60 bar

**Maximum outlet pressure:** 19.9 bar

**Type of connection:** Rp

**Size of connection:** 2 1/2 inch

**Motor diameter:** 6 inch

**Minimum borehole diameter:** 145 mm



Company name:

Created by:

Phone:

Date: 07/07/2024

Project:

Reference Number:

Client:

Client Number:

Contact:

Qty.	Description
1	<p>Electrical data:</p> <p>Motor type: MS6000</p> <p>Motor flange design: Grundfos</p> <p>Rated power - P2: 9.2 kW</p> <p>Power (P2) required by pump: 9.2 kW</p> <p>Mains frequency: 50 Hz</p> <p>Rated voltage: 3 x 220-230 V</p> <p>Rated current: 38.5-39.0 A</p> <p>Starting current: 530-550 %</p> <p>Cos phi - power factor: 0.81-0.77</p> <p>Rated speed: 2880-2890 rpm</p> <p>Start. method: DOL</p> <p>Enclosure class (IEC 34-5): IP68</p> <p>Insulation class (IEC 85): F</p> <p>Built-in temp. transmitter: Y</p> <p>Length of cable: 5 m</p> <p>Power cable type: FLAT</p> <p>Motor No: 78105513</p> <p>Windings: Enamelled</p> <p>Others:</p> <p>Minimum efficiency index, MEI <math>\geq</math>: 0.70</p> <p>Net weight: 74.4 kg</p> <p>Gross weight: 109 kg</p> <p>Shipping volume: 0.264 m<sup>3</sup></p> <p>Environmental approvals: WEEE</p>



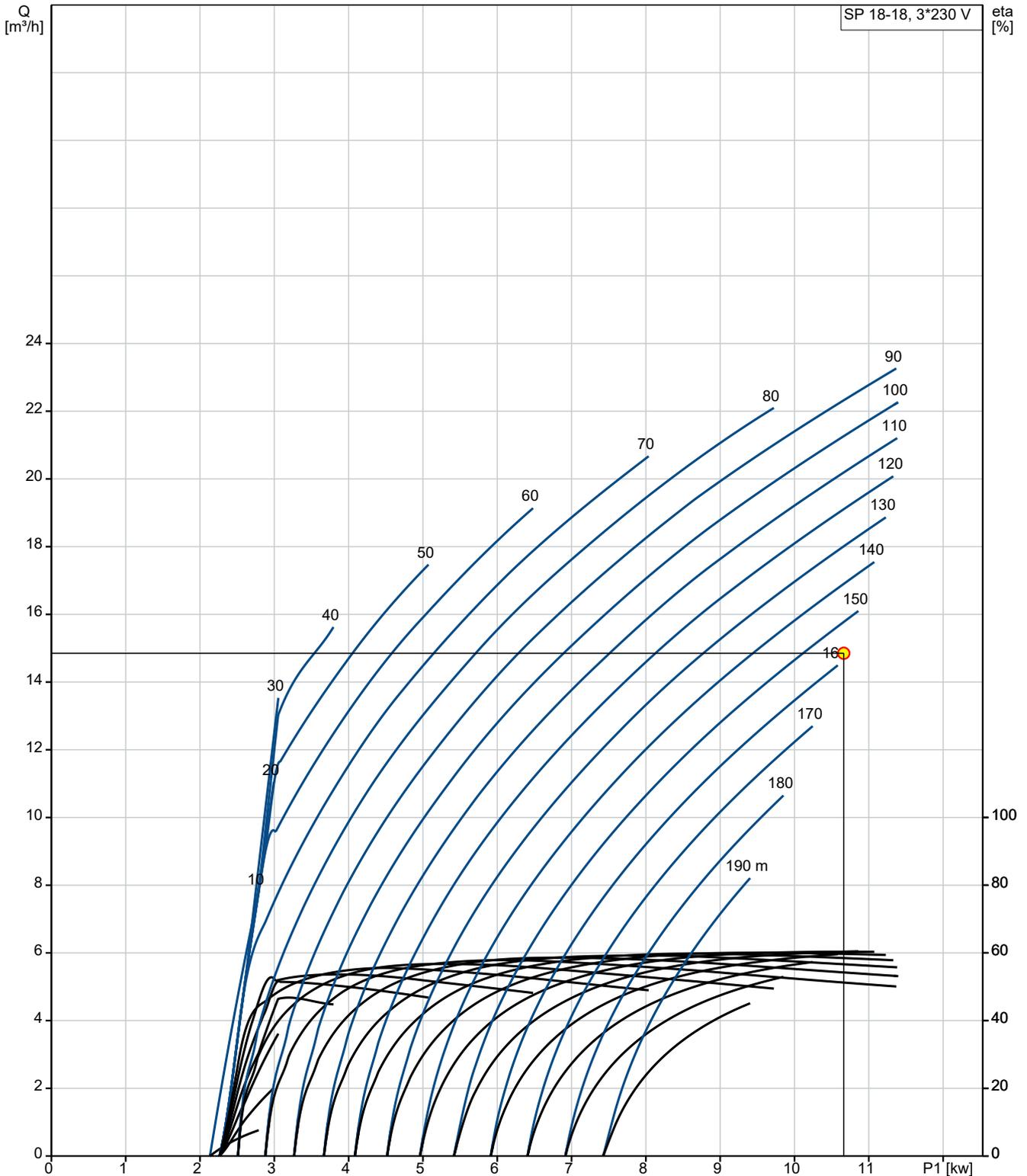
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Created by:  
Phone:

Date: 07/07/2024

Project:  
Reference Number:

Client:  
Client Number:  
Contact:

### On request SP 18-18



Q = 14.85 m³/h  
P1 = 10.66 kW  
Pumped liquid = Water

H = 157.9 m  
Eta pump+motor = 59.8 %  
Density = 998.2 kg/m³

**Project:**

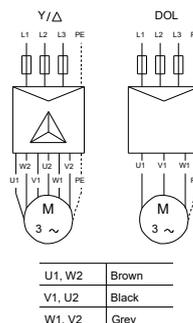
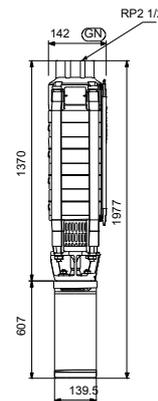
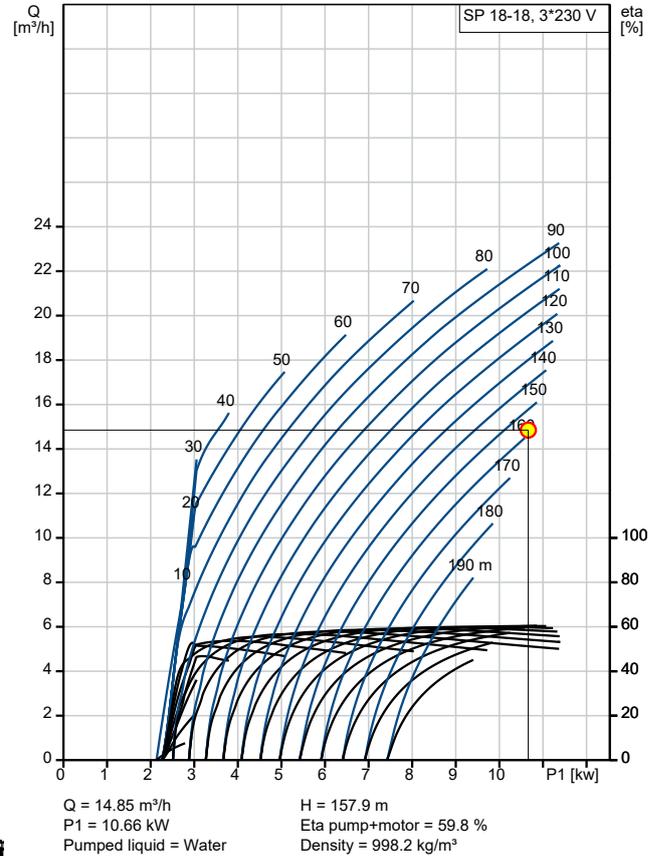
Reference Number:

**Client:**

Client Number:

Contact:

Description	Value
<b>General information:</b>	
Product name:	SP 18-18
Product No:	On request
EAN number:	On request
<b>Technical:</b>	
Pump speed on which pump data are based:	2900 rpm
Rated flow:	18 m <sup>3</sup> /h
Rated head:	137 m
Stages:	18
Number of reduced-diameter impellers:	NONE
Shaft seal for motor:	CER/CARNBR
Approvals:	CE, EAC, UKCA, SEPRO, MOR, OCCO
Approvals for drinking water:	ACS, DM174
Curve tolerance:	ISO9906:2012 3B
Model:	A
Motor version:	T40
Return valve:	YES
<b>Materials:</b>	
Pump:	Stainless steel
Pump:	EN 1.4301
Pump:	AISI 304
Impeller:	Stainless steel
Impeller:	EN 1.4301
Impeller:	AISI 304
Motor:	Stainless steel
Motor:	DIN W.-Nr. 1.4301
Motor:	AISI 304
<b>Installation:</b>	
Maximum ambient pressure:	60 bar
Maximum operating pressure:	60 bar
Maximum outlet pressure:	19.9 bar
Type of connection:	Rp
Size of connection:	2 1/2 inch
Motor diameter:	6 inch
Minimum borehole diameter:	145 mm
<b>Liquid:</b>	
Pumped liquid:	Water
Liquid temperature range:	-15 .. 40 °C
<b>Electrical data:</b>	
Motor type:	MS6000
Motor flange design:	Grundfos
Rated power - P2:	9.2 kW
Power (P2) required by pump:	9.2 kW
Mains frequency:	50 Hz
Rated voltage:	3 x 220-230 V
Rated current:	38.5-39.0 A
Starting current:	530-550 %
Cos phi - power factor:	0.81-0.77
Rated speed:	2880-2890 rpm
Start. method:	DOL
Enclosure class (IEC 34-5):	IP68
Insulation class (IEC 85):	F





Company name:

Created by:

Phone:

Date: 07/07/2024

Project:

Reference Number:

Client:

Client Number:

Contact:

Description	Value
Built-in motor protection:	NONE
Thermal protec:	EXT.
Built-in temp. transmitter:	Y
Length of cable:	5 m
Power cable type:	FLAT
Motor No:	78105513
Cable number:	96164209
Windings:	Enamelled
<b>Others:</b>	
Minimum efficiency index, MEI ≥:	0.70
Net weight:	74.4 kg
Gross weight:	109 kg
Shipping volume:	0.264 m <sup>3</sup>
Environmental approvals:	WEEE



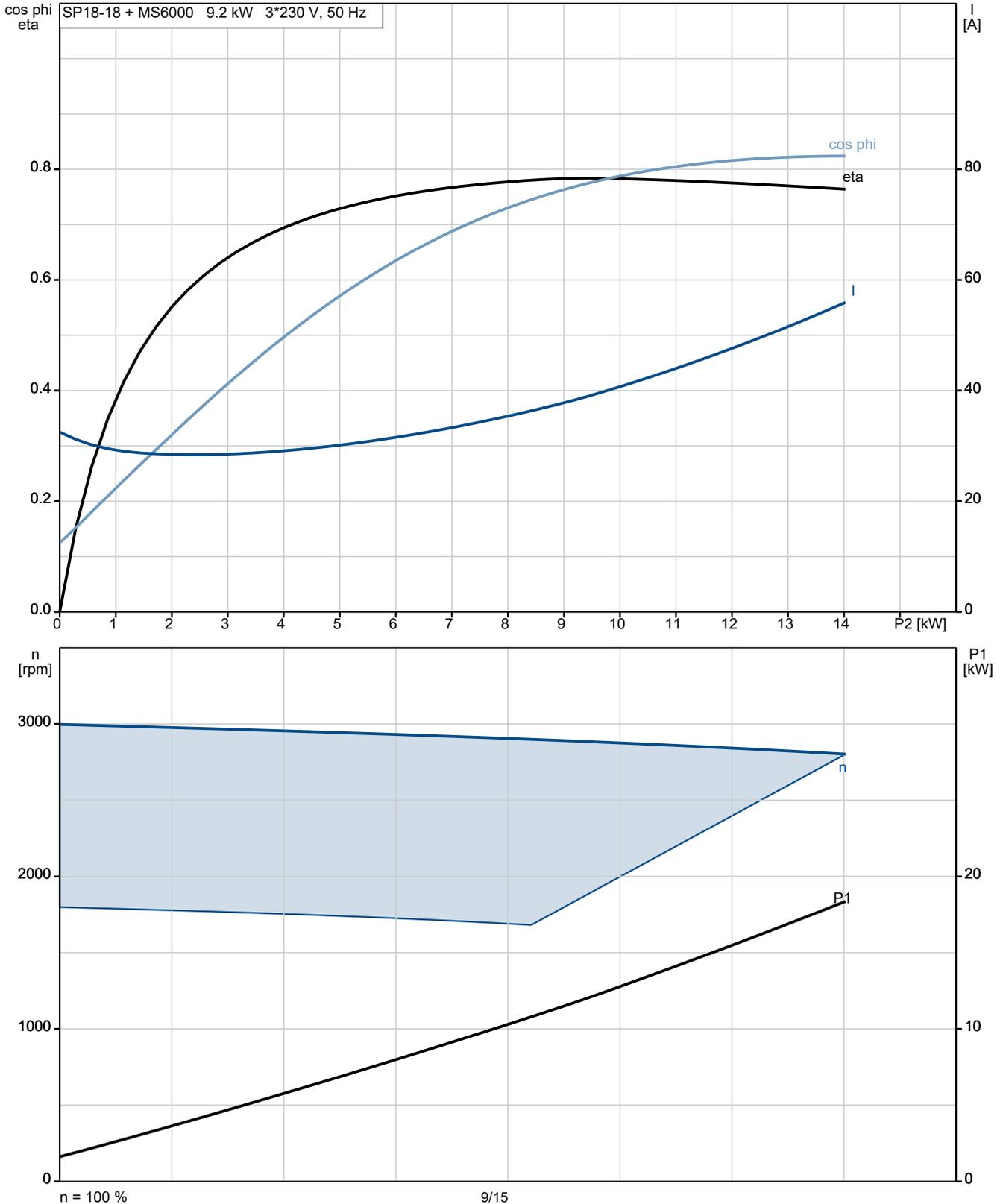
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Created by:  
Phone:

Date: 07/07/2024

Project:  
Reference Number:

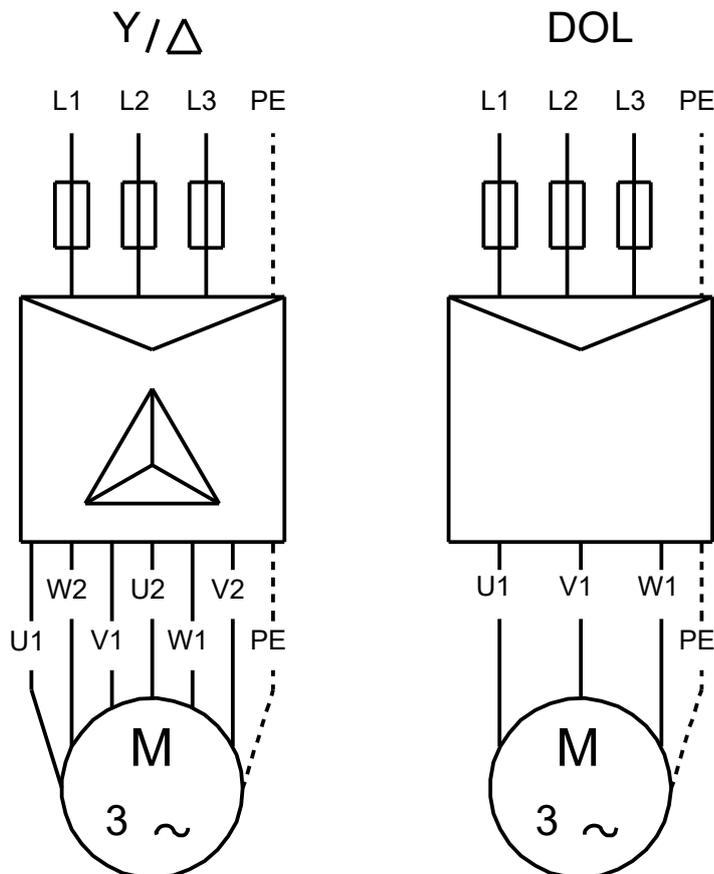
Client:  
Client Number:  
Contact:

## On request SP 18-18





## On request SP 18-18



U1, W2	Brown
V1, U2	Black
W1, V2	Grey



Company name:

Created by:

Phone:

Date:

07/07/2024

Project:

Reference Number:

Client:

Client Number:

Contact:

## On request SP 18-18

### Input - summary

Water volume (max): 113.5 m<sup>3</sup>/day  
Month for sizing: April  
Static lift above ground: 65 m  
Dynamic water level: 90 m  
Sun tracking: No (fixed)  
Location: Arghistan District, Kandahar, Afghanistan  
Latitude: 31.5699 DD, Longitude: 66.5174 DD

### Products

Pump: SP 18-18, 1 x On request  
Solar module: 60 x GF 270

### Sizing results - summary

#### Water production, Peak flow and Price

Total water production per year: 40200 m<sup>3</sup>  
Avg. water production per day: 110.2 m<sup>3</sup>/day  
Average water production per watt per day: 6.8 l/Wp/day

#### Typical performance at solar radiation 800 W/m<sup>2</sup>

Flow: 14.8 m<sup>3</sup>/h  
Total head: 157.9 m

#### Solar module configuration:

Number of solar modules in series: 10, in parallel: 6  
Solar array rated power: 16.2 kW  
Solar array rated volts: 316 V  
Sun tracking: No (fixed)  
Tilt angle: 31 deg.

#### Cables and pipes:

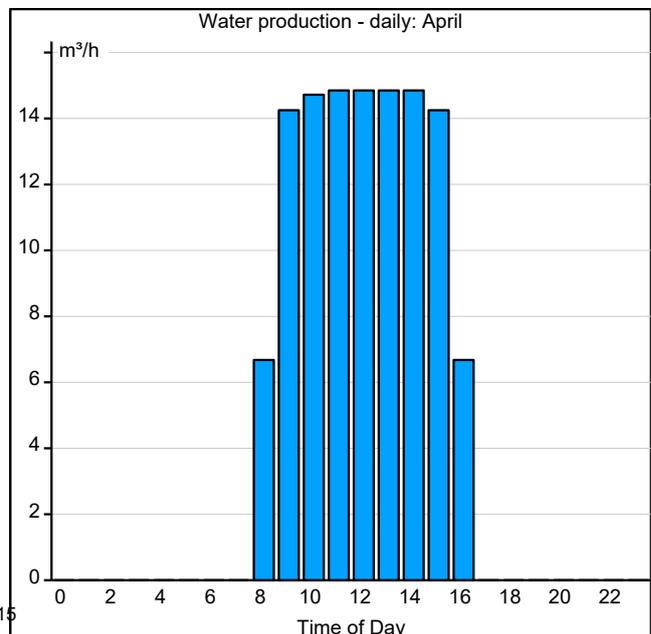
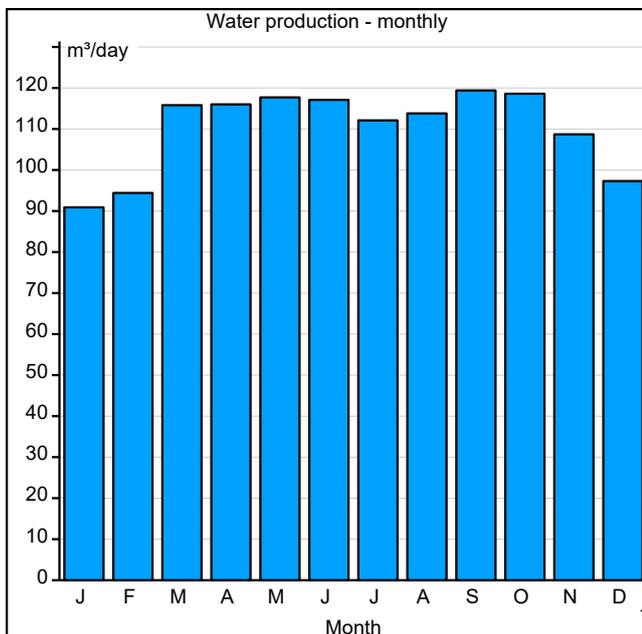
Pump cable length: 155 m  
Pump cable size: 35 mm<sup>2</sup>  
Total cable loss: 2.4 %

Material, riser pipe: PEH  
Pipe length of riser pipe: 90 m  
Friction losses: 2.858 m

### System performance - monthly average

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Water production [m <sup>3</sup> /day]	90.9	94.4	115.8	116	117.7	117.1	112.1	113.8	119.4	118.6	108.7	97.3
Energy production Solar [kWh/day]	85.9	91.8	117.7	115.2	116.2	114.5	107.7	111.3	123.7	125.9	113.2	96.3
Radiation horizontal [kWh/m <sup>2</sup> day]	3.6	4.5	6.7	7.8	8.9	9.3	8.6	8.1	7.7	6.4	4.8	3.9
Radiation tilt [kWh/m <sup>2</sup> day]	5.5	6.0	7.8	7.9	8.1	8.1	7.7	7.8	8.6	8.5	7.4	6.5
Avg. Temp. [°C]	1.9	4.3	9.4	15.6	20.3	23.5	24.8	22.9	17.7	11.4	7.2	4.2

Data location: Latitude: 31 DD, Longitude: 67 DD





Company name:

Created by:

Phone:

Date:

07/07/2024

Project:

Reference Number:

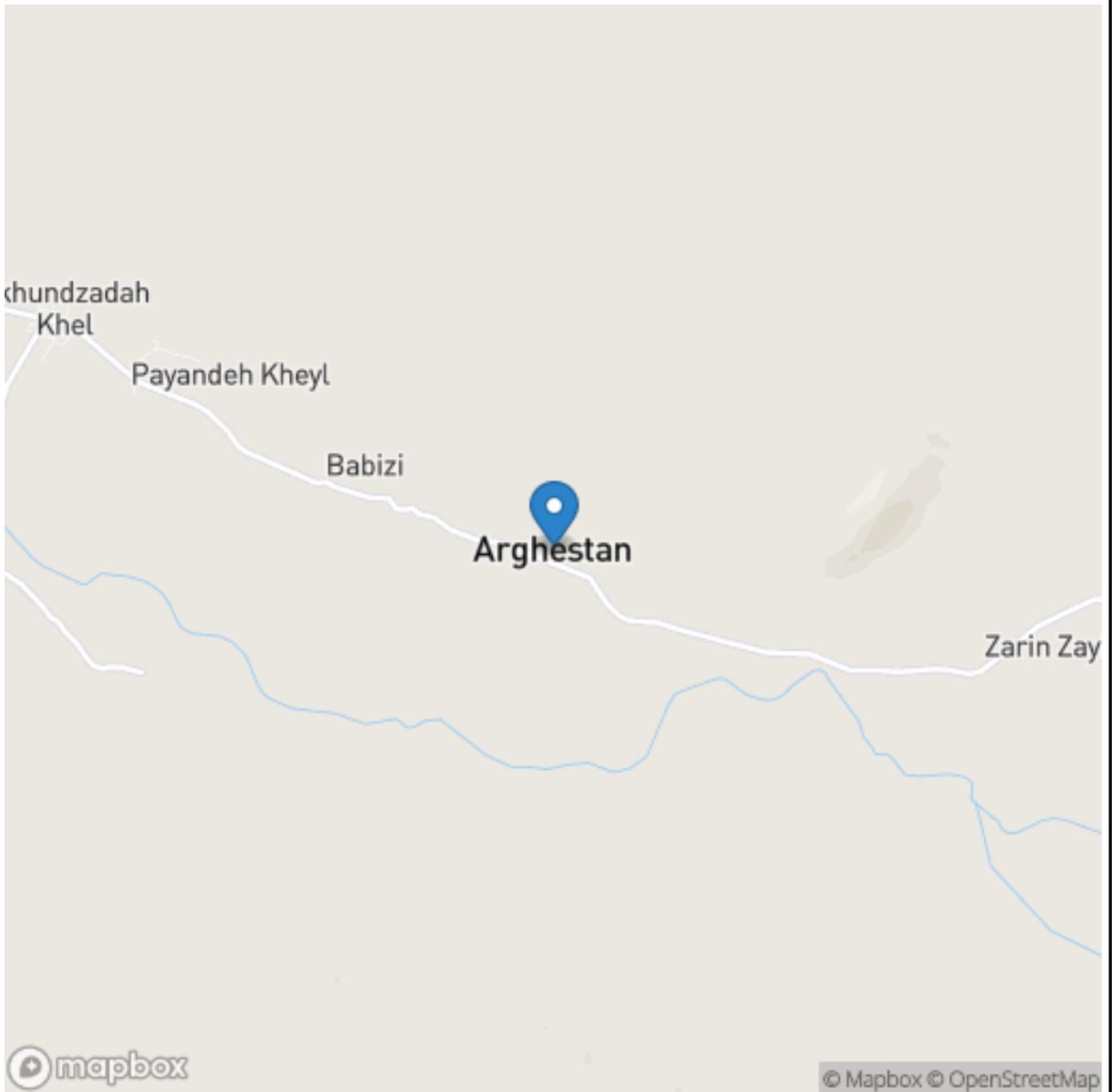
Client:

Client Number:

Contact:

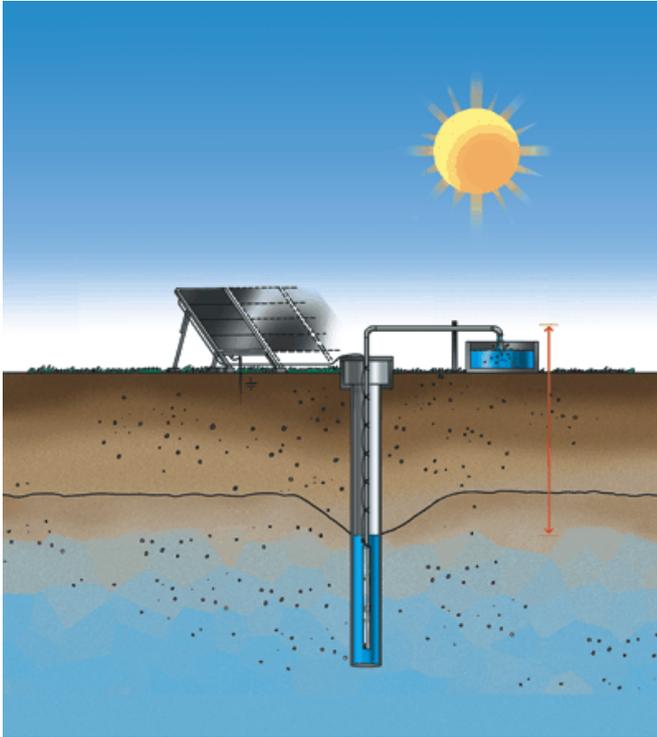
## On request SP 18-18

### Location Map



Location: Arghistan District, Kandahar, Afghanistan  
Latitude: 31.5699 DD, Longitude: 66.5174 DD

## Installation and Input



## Sizing Results

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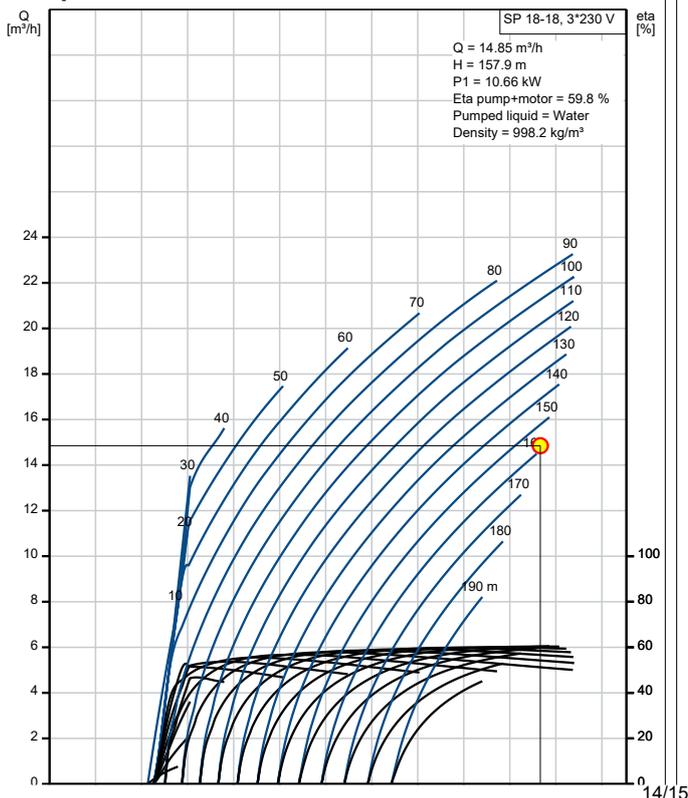
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 Pipe length of riser pipe: 90 m  
 Friction losses: 2.858 m

Location: Arghistan District, Kandahar, Afghanistan  
 Latitude: 31.5699 DD, Longitude: 66.5174 DD

## Pump Curve



## Dimensional Drawing

