

CONSULTANCY SERVICES FOR SURVEY, DESIGN AND EIA WORKS OF WATER SUPPLY AND  
SEWERAGE FACILITIES IN 6 ISLANDS, MALDIVES

PACKAGE 5

## WATER SUPPLY SYSTEM OF V. RAKEEDHOO, MALDIVES

For Ministry of National Planning and Housing Infrastructure, Republic of Maldives

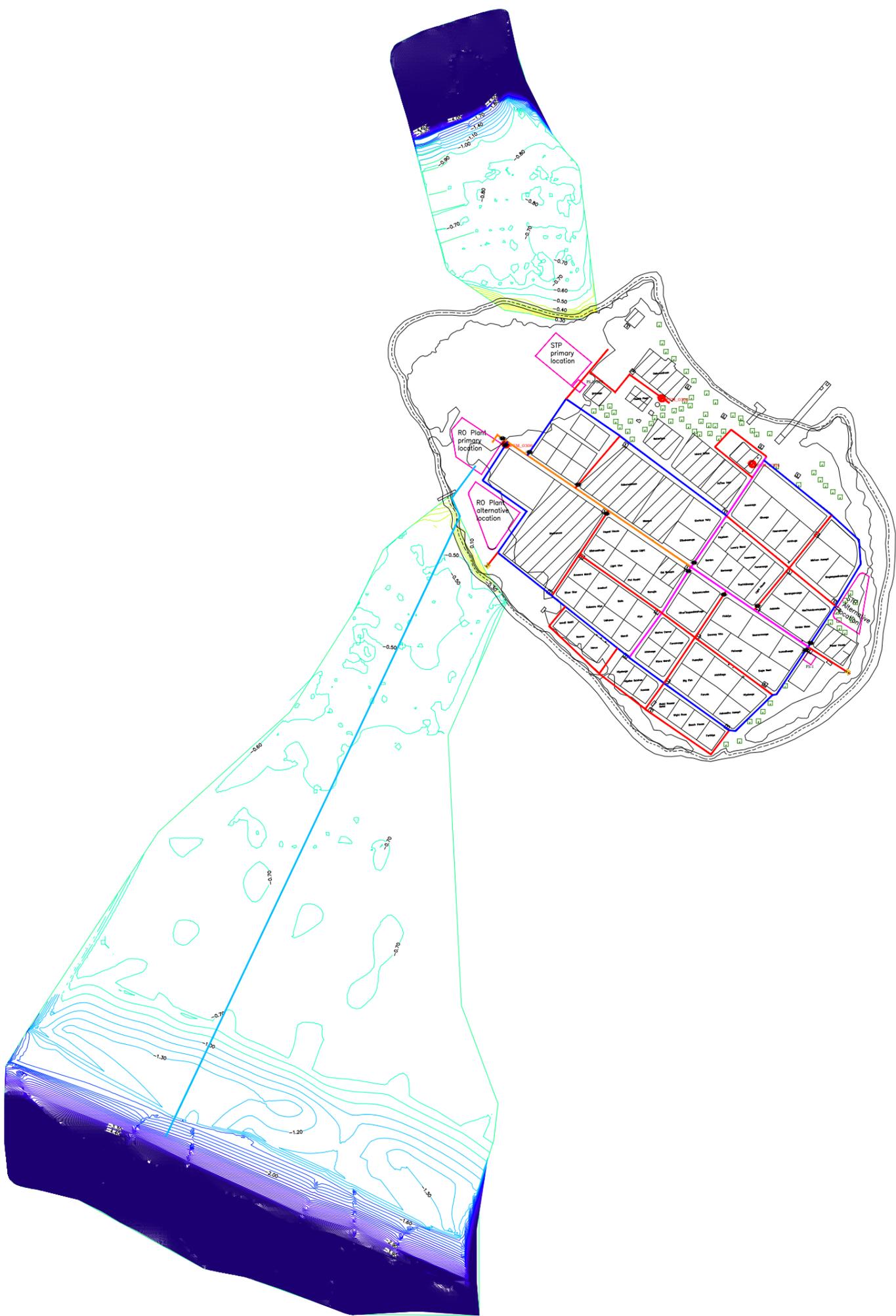


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**FEEDBACK INFRA**  
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- Legend**
- Ø63 HDPE Water Main Distribution Pipe
  - Ø90 HDPE Water Main Distribution Pipe
  - Ø150 HDPE Water Main Distribution Pipe
  - Ø75 HDPE Water Main Distribution Pipe
  - Ø110 HDPE Water Main Distribution Pipe
  - Ø110 HDPE Brine Outfall Pipe
  - Gate Valves
  - Junction
  - Washout Valves
- Notes:**
- All levels are shown in meters.
  - All levels are shown from mean sea level.
  - This drawing to be read in conjunction with all other relevant drawing and specifications.
  - All pressure pipes and fittings shall be installed using electro-fusion and butt-fusion technologies.
  - All pressure pipes shall be laid in between 0.7m - 1.0m below natural ground level to achieve best flat alignment based on topographic survey.
  - All the service connections to the mains shall be made using electro-fusion saddle and coupler.
  - Minimum size of the main water supply network shall be OD 63mm PE100, PN10, SDR17 HDPE pipe.
  - Minimum size of the house service line shall be OD 25mm PE100, PN6, SDR11 HDPE pipe.
  - Minimum size of commercial and other institutional connection service line shall be 50mm, PE100, PN6, SDR11 HDPE pipe.

**MAINS DISTRIBUTION**

DIAMETER (mm)	LENGTH HDPE (m)	TYPE OF PIPE
63	947	HDPE (PE100,PN10,SDR17)
75	694	
90	259	
110	157	
<b>Total</b>	<b>2047</b>	

**OUTFALL**

DIAMETER (mm)	LENGTH HDPE (m)	TYPE OF PIPE
110	39m (on land), 443m (offshore)	HDPE (PE100,PN10,SDR11)

**PSM BENCHMARKS**

<p>PERMANENT SURVEY MARK PSM_0304 330060.633E, 366565.383N 0.618m From MSL</p>
<p>PERMANENT SURVEY MARK PSM_0305 330002.044E, 366607.914N 0.657m From MSL</p>
<p>PERMANENT SURVEY MARK PSM_0306 329901.170E, 366578.095N 0.542m From MSL</p>

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.



V. RAKEEDHOO WATER SUPPLY SYSTEM NETWORK LAYOUT  
1:3000

**Title:**  
 Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives – Package 5

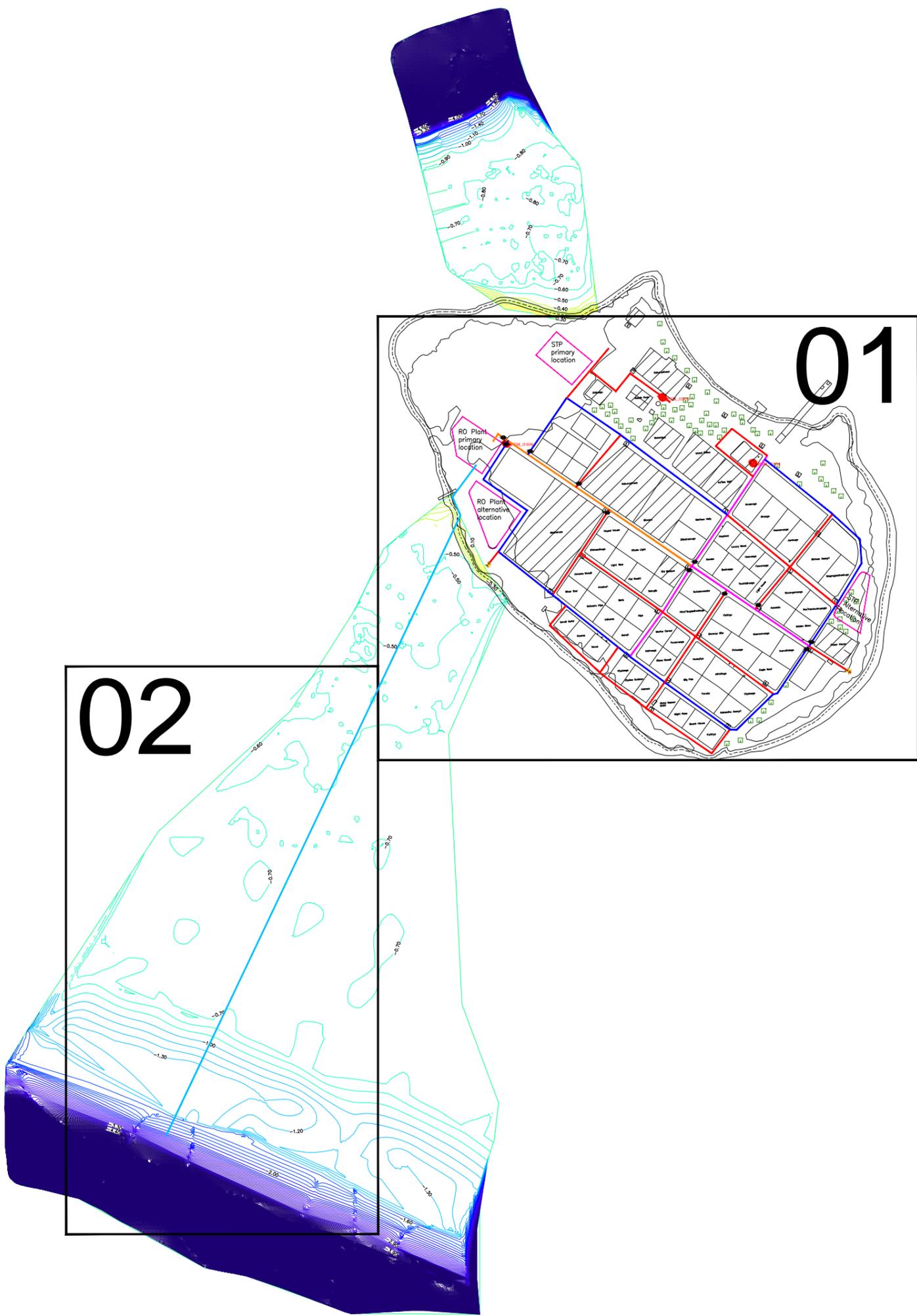
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 Water Supply Network in V. Rakeedhoo

**Client:**  
 Ministry of National Planning, Housing and Infrastructure, Republic of Maldives

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**Legend**

- Ø63 HDPE Water Main Distribution Pipe
- Ø90 HDPE Water Main Distribution Pipe
- Ø150 HDPE Water Main Distribution Pipe
- Ø75 HDPE Water Main Distribution Pipe
- Ø110 HDPE Water Main Distribution Pipe
- Ø110 HDPE Brine Outfall Pipe
- Gate Valves
- Washout Valves
- Junction

**Notes:**

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- All pressure pipes shall be laid in between 0.7m - 1.0m below natural ground level to achieve best flat alignment based on topographic survey.
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- Minimum size of the main water supply network shall be OD 63mm PE100, PN10, SDR17 HDPE pipe.
- Minimum size of the house service line shall be OD 25mm PE100, PN16, SDR11 HDPE pipe.
- Minimum size of commercial and other institutional connection service line shall be 50mm, PE100, PN16, SDR11 HDPE pipe.

**MAINS DISTRIBUTION**

DIAMETER (mm)	LENGTH HDPE (m)	TYPE OF PIPE
63	947	HDPE (PE100,PN10,SDR17)
75	694	
90	259	
110	157	
<b>Total</b>	<b>2047</b>	

Gate Valves - 11 nos  
Washout Valves - 02 nos

**OUTFALL**

DIAMETER (mm)	LENGTH HDPE (m)	TYPE OF PIPE
110	39m (on land), 443m (offshore)	HDPE (PE100,PN10,SDR11)

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PERMANENT SURVEY MARK PSM_0306 329901.70E, 366578.095N 0.542m From MSL

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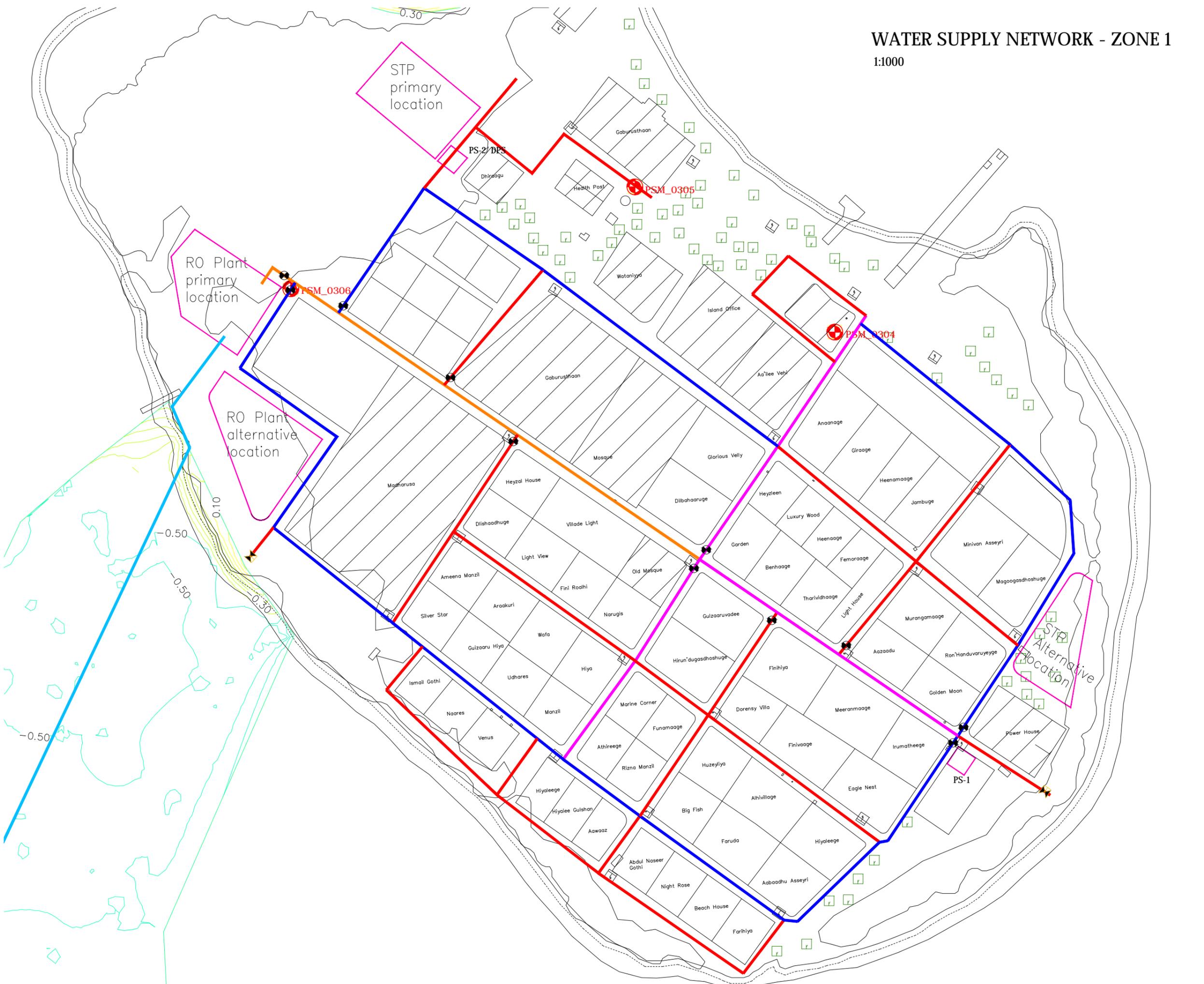
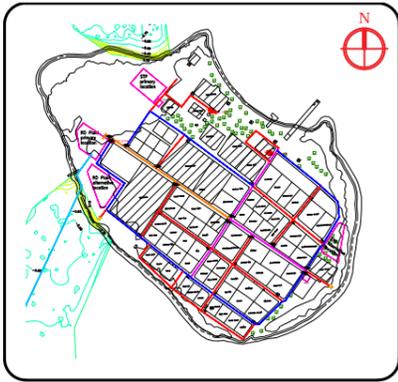
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V. RAKEEDHOO WATER SUPPLY SYSTEM NETWORK LAYOUT  
1:3000

# WATER SUPPLY NETWORK - ZONE 1

1:1000



**Legend**

- Red line: Ø63 HDPE Water Main Distribution Pipe
- Blue line: Ø75 HDPE Water Main Distribution Pipe
- Magenta line: Ø90 HDPE Water Main Distribution Pipe
- Cyan line: Ø110 HDPE Water Main Distribution Pipe
- Light blue line: Ø160 HDPE Water Main Distribution Pipe
- Light blue line: Ø110 HDPE Brine Outfall Pipe
- Black circle with cross: Gate Valves
- Yellow symbol: Washout Valves
- Black circle: Junction

**Notes:**

- All levels are shown in meters.
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- All pressure pipes and fittings shall be installed using electro-fusion and butt-fusion technologies.
- All pressure pipes shall be laid in between 0.7m - 1.0m below natural ground level to achieve best flat alignment based on topographic survey.
- All the service connections to the mains shall be made using electro-fusion saddle and coupler.
- Minimum size of the main water supply network shall be OD 63mm PE100, PN10, SDR17 HDPE pipe.
- Minimum size of the house service line shall be OD 25mm PE100, PN6, SDR11 HDPE pipe.
- Minimum size of commercial and other institutional connection service line shall be 50mm, PE100, PN6, SDR11 HDPE pipe.

**MAINS DISTRIBUTION**

DIAMETER (mm)	LENGTH (HDPE (m))	TYPE OF PIPE
63	947	HDPE (PE100, PN10, SDR17)
75	254	
90	249	
110	197	
Total	2047	

Gate Valves: 11 nos  
Washout Valves: 02 nos

**OUTFALL**

DIAMETER (mm)	LENGTH (HDPE (m))	TYPE OF PIPE
110	39m (on land), 443m (offshore)	HDPE (PE100, PN10, SDR11)

**PSM BENCHMARKS**

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0.618m From MSL.
- PERMANENT SURVEY MARK PSM\_0305  
330002.044E, 366607.984N  
0.657m From MSL.
- PERMANENT SURVEY MARK PSM\_0306  
329901.170E, 366578.095N  
0.542m From MSL.

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R00	JUNE 2020	STAGE -1	PD	SBC	SD

**Title:**  
Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives - Package 5

**Sub Title:**  
Water Supply System in V. Rakeedhoo

**Client:**  
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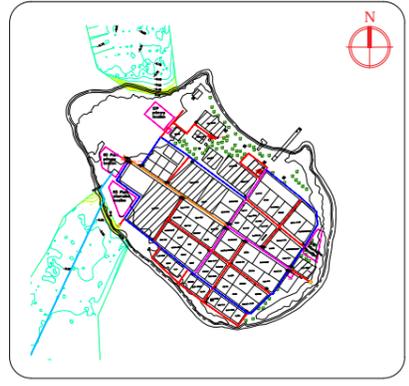
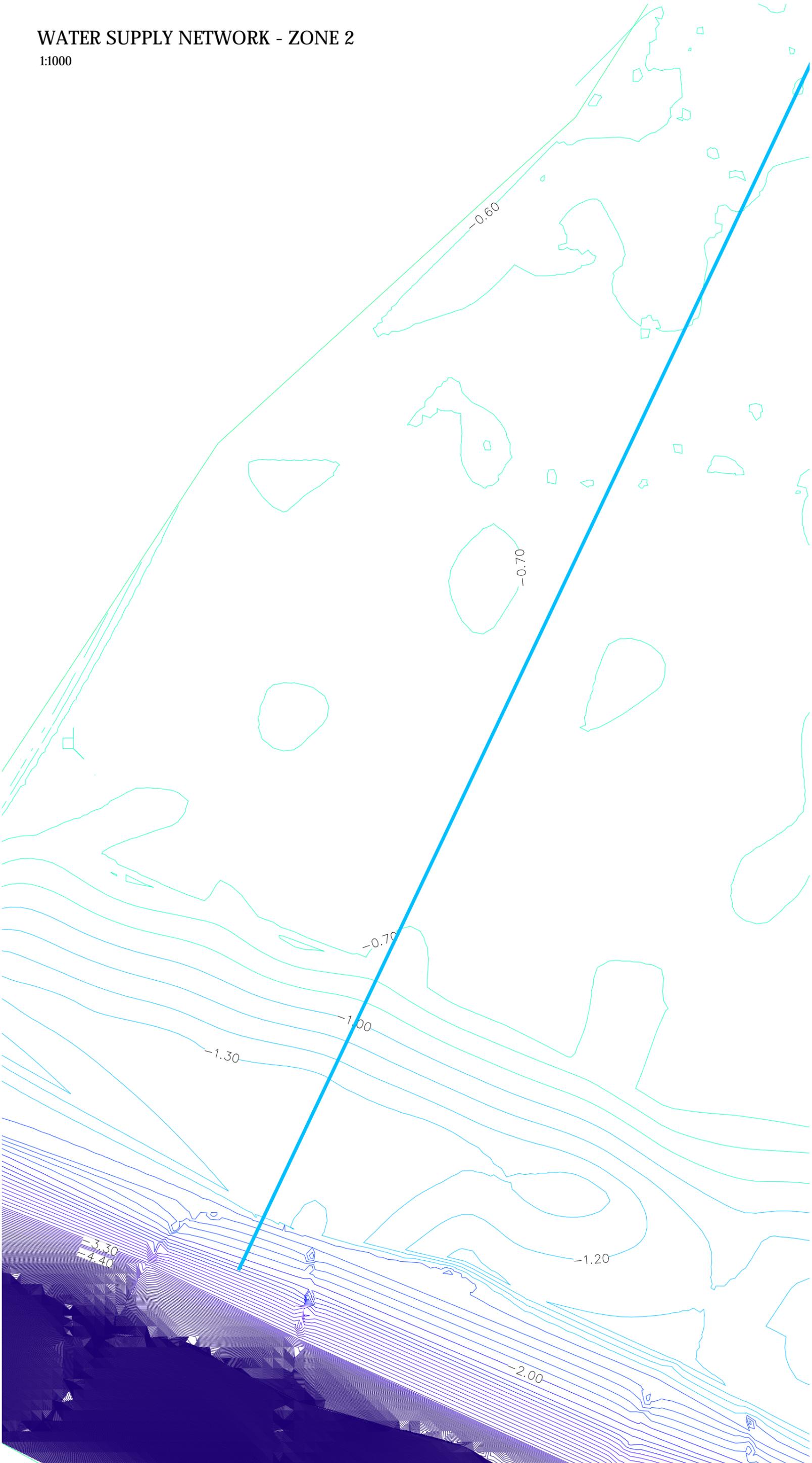
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**Designed:** F.I.A. **Approved:** I.W.  
**Date:** Sep 2020 **SCALE (AS):** 1:1000  
**Project No:** EP-WS/2019/05  
**Rev:** R-01 **Page:** 03

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# WATER SUPPLY NETWORK - ZONE 2

1:1000



**Legend**

- Ø63 HDPE Water Main Distribution Pipe
- Ø90 HDPE Water Main Distribution Pipe
- Ø150 HDPE Water Main Distribution Pipe
- Ø75 HDPE Water Main Distribution Pipe
- Ø110 HDPE Water Main Distribution Pipe
- Ø110 HDPE Brine Outfall Pipe
- Gate Valves
- Washout Valves
- Junction

**Notes:**

- All levels are shown in meters.
- All levels are shown from mean sea level.
- This drawing to be read in conjunction with all other relevant drawing and specifications.
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- All pressure pipes shall be laid in between 0.7m - 1.0m below natural ground level to achieve best flat alignment based on topographic survey.
- All the service connections to the mains shall be made using electro-fusion saddle and coupler.
- Minimum size of the main water supply network shall be OD 63mm PE100, PN10, SDR17 HDPE pipe.
- Minimum size of the house service line shall be OD 25mm PE100, PN16, SDR11 HDPE pipe.
- Minimum size of commercial and other institutional connection service line shall be 50mm, PE100, PN16, SDR11 HDPE pipe.

**MAINS DISTRIBUTION**

DIAMETER (mm)	LENGTH HDPE (m)	TYPE OF PIPE
63	947	HDPE (PE100,PN10,SDR17)
75	694	
90	249	
110	157	
<b>Total</b>	<b>2047</b>	

Gate Valves: 11 nos  
Washout Valves: 02 nos

**OUTFALL**

DIAMETER (mm)	LENGTH HDPE (m)	TYPE OF PIPE
110	39m (on land), 443m (offshore)	HDPE (PE100,PN10,SDR11)

**PSM BENCHMARKS**

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**Title:**  
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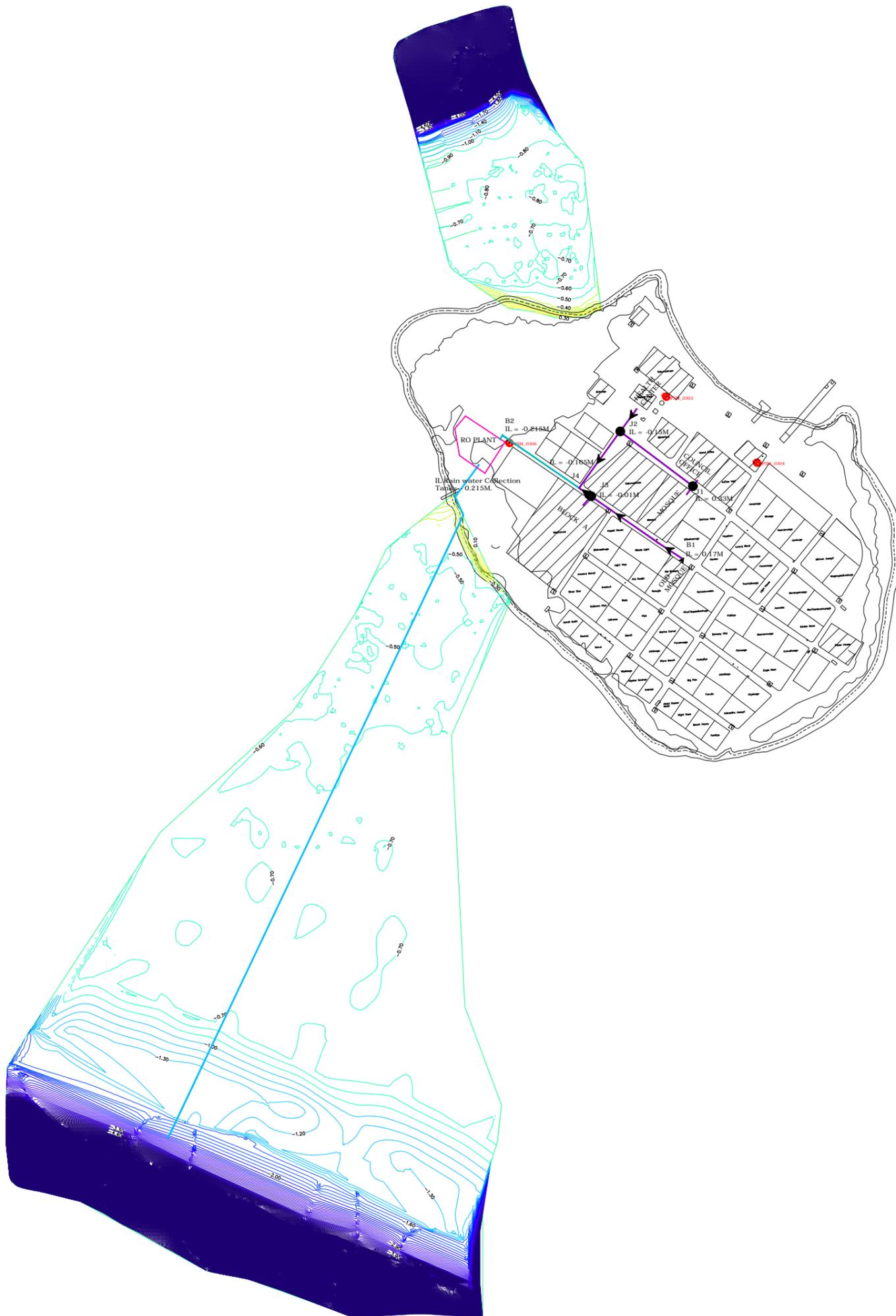
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 Rev:      Page: 04



**Legend**

- 0180 HDPE Rainwater Flow Pipe
- 0200 HDPE Rainwater Flow Pipe
- Junction

**Notes:**

1. All levels are shown in meters.
2. All levels are shown from mean sea level.
3. This drawing to be read in conjunction with all other relevant drawing and specifications.
4. All gravity pipes should be HDPE PE100, PN6, SDR26 pipes.
5. All gravity pipes are to be laid as per invert levels indicated. Any change based on site condition should be made based on approval from engineer.

**RAINWATER FLOW PIPES**

DIAMETER (mm)	LENGTH HDPE (m)	TYPE OF PIPE
180	225	HDPE (PE100, PN6, SDR26)
200	63	
<b>Total</b>	<b>288</b>	

**PSM BENCHMARKS**

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 Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives – Package 5

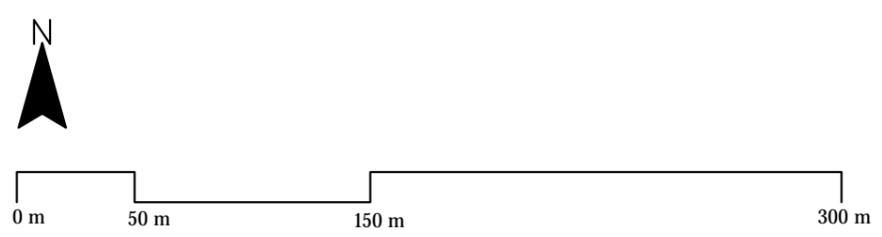
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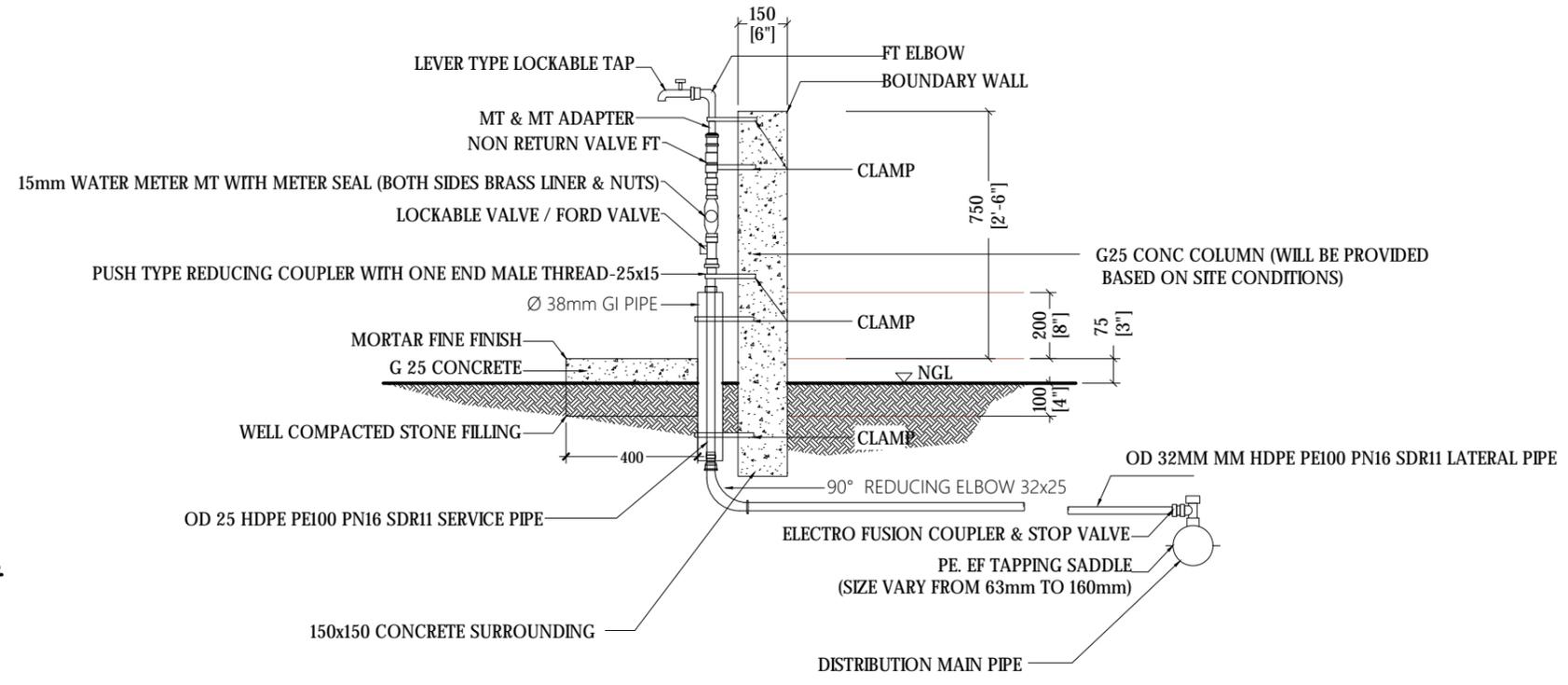
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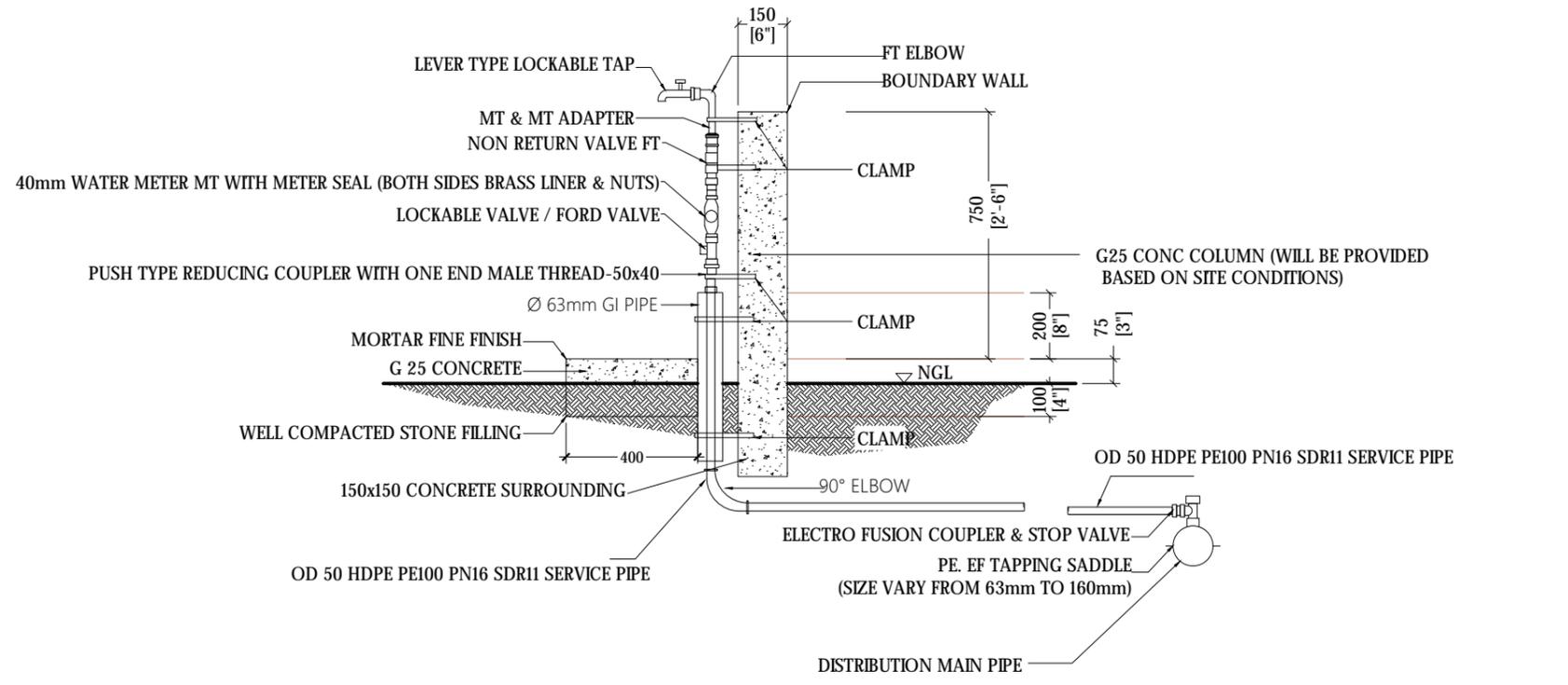


V. RAKEEDHOO RAINWATER COLLECTION NETWORK LAYOUT  
 1:3000

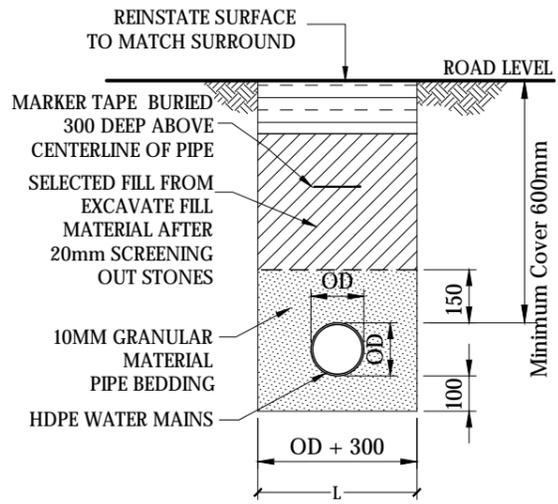




**WATER SUPPLY HOUSE CONNECTION DETAILS**



**WATER SUPPLY COMMERCIAL/INSTITUTIONAL CONNECTION DETAILS**



**TRENCH & BEDDING DETAILS**

**Legend**

**Notes:**

- Location of house connection meters to be determined based on house connection survey.
- Commercial connections for public buildings and industrial buildings to be provided as per approved connections list from island council.

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 Water Supply System in V. Rakeedhoo

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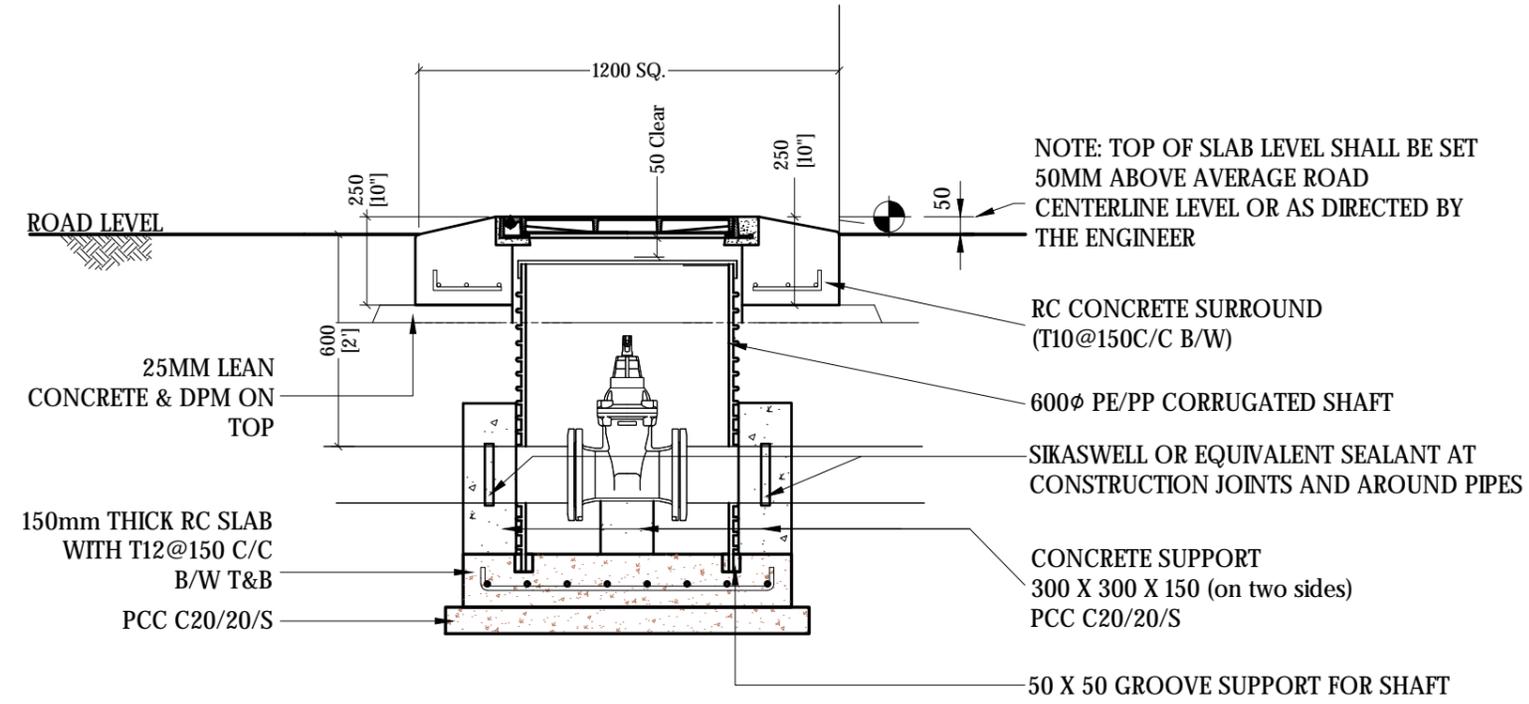
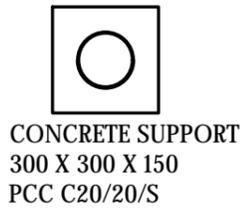
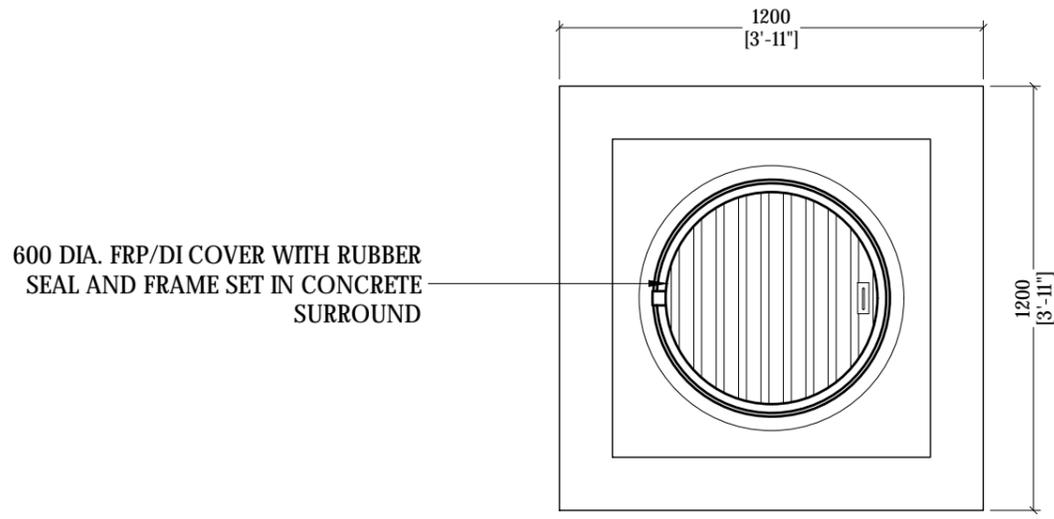
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Date: Sep 2020	SCALE (AS): 1:20
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Rev: R-01	Page: W-01



SECTION - VALVE CHAMBER

Legend

- Notes:
- All structural concrete shall be of grade C25.
  - All castings shall be done using sulphate resistant portland cement to BS 4027:1996.
  - All structural reinforcement shall be epoxy coating of non-pre-stressed reinforcement to ASTM-A775/A775M.
  - A cover of 75mm should be given for all reinforcements.

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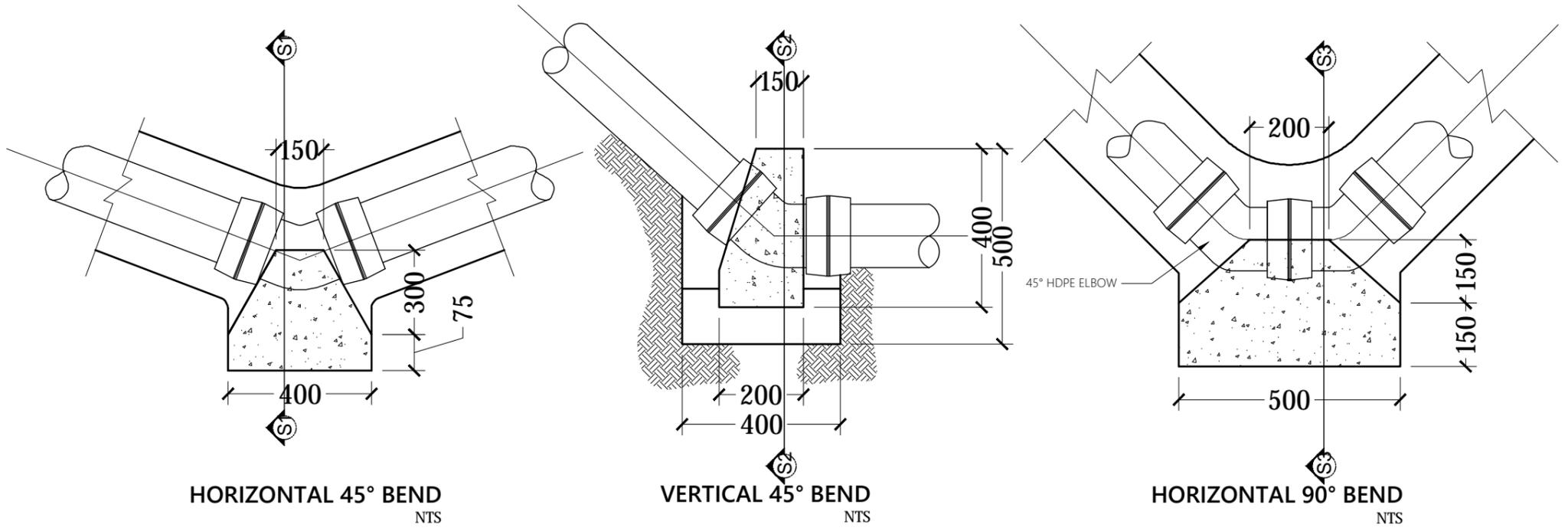
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Designed: F.I.A.	Approved: I.W.
Date: Sep 2020	SCALE (AS): 1:20
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Rev: R-01	Page: W-02

VALVE CHAMBER DETAILS

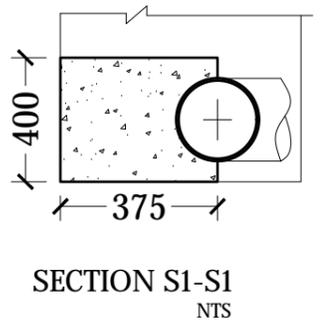
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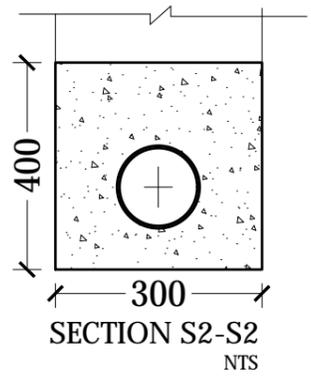
**HORIZONTAL 45° BEND**  
NTS

**VERTICAL 45° BEND**  
NTS

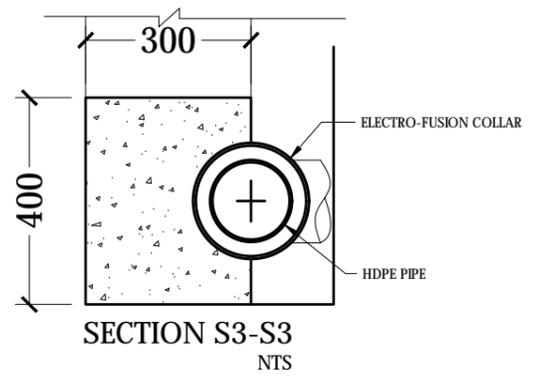
**HORIZONTAL 90° BEND**  
NTS



**SECTION S1-S1**  
NTS



**SECTION S2-S2**  
NTS



**SECTION S3-S3**  
NTS

**Legend**

- Notes:  
 -All structural concrete shall be of grade C25.  
 -All castings shall be done using sulphate resistant portland cement to BS 4027:1996.

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Designed: F.I.A.	Approved: I.W.
Date: Sep 2020	SCALE (AS): NTS
Project No: EP-WS/2019/05	Page: W-03
Rev: R-01	



**PUMP DETAILS**

- Borehole Pump : 2 Nos
  - Flow (Q) = 7.50 m<sup>3</sup>/hr
  - Head (H) = 50 m
- High Pressure Pump : 2 Nos
  - Flow (Q) = 3.71 m<sup>3</sup>/hr
  - Pressure Range = 45-85 bar
- Transfer Pump : 2 Nos
  - Flow (Q) = 4.73 m<sup>3</sup>/hr
  - Head (H) = 10 m
- Distribution Pump Set : 2 Nos
  - Flow (Q) = 4.00 m<sup>3</sup>/hr
  - Head (H) = 30 m
- Brine Pump : 2 Nos
  - Flow (Q) = 5.90 m<sup>3</sup>/hr
  - Head (H) = 12 m
- Rain Water lift Well Pump : 2 Nos
  - Flow (Q) = 20.3 m<sup>3</sup>/hr
  - Head (H) = 10m
- UF Feed Pump : 2 Nos
  - Flow (Q) = 2.5 m<sup>3</sup>/hr
  - Head (H) = 35 m

- Gate Valve
- Check Valve
- Totalizer
- Pump
- Closed Gate Valve
- Sampling Point
- Butterfly Valve
- Ball Valve

**Legend**

- Ø90 HDPE (PE100, PN10, SDR17)
- Ø63 HDPE (PE100, PN10, SDR17)
- Ø110 HDPE (PE100, PN10, SDR17)
- Ø160 HDPE (PE100, P10, SDR17)
- Ø110 HDPE (OUTFALL PE100, PN16, SDR11)
- Ø200 HDPE (RAINWATER PE100, PN6, SDR26)

**Notes:**

- All Pump sizes are based on 15 year demands.
- Rainwater collection Pump sizing is done considering Maximum Rainfall intensity of 50mm/hr.
- UF feed pump will be subject to Approved UF Plant suppliers approval.
- Both Feed Pump and High pressure pump capacity will need to be approved by the approved RO plant Supplier. The working pressure range will be established based on the approved suppliers requirements.
- Distribution Pump set will have Variable Frequency Drive.
- All pump control switches and automated valves will be provided.
- Contractor to produce shop drawings of interior layout based on site condition for approval by engineer.

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R00	JUNE 2020	STAGE -1	PD	SBC	SD

Title:  
**Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives - Package 5**

Sub Title:  
**Water Supply System in V. Rakeedhoo**

Client:  
**Ministry of National Planning, Housing and Infrastructure, Republic of Maldives**



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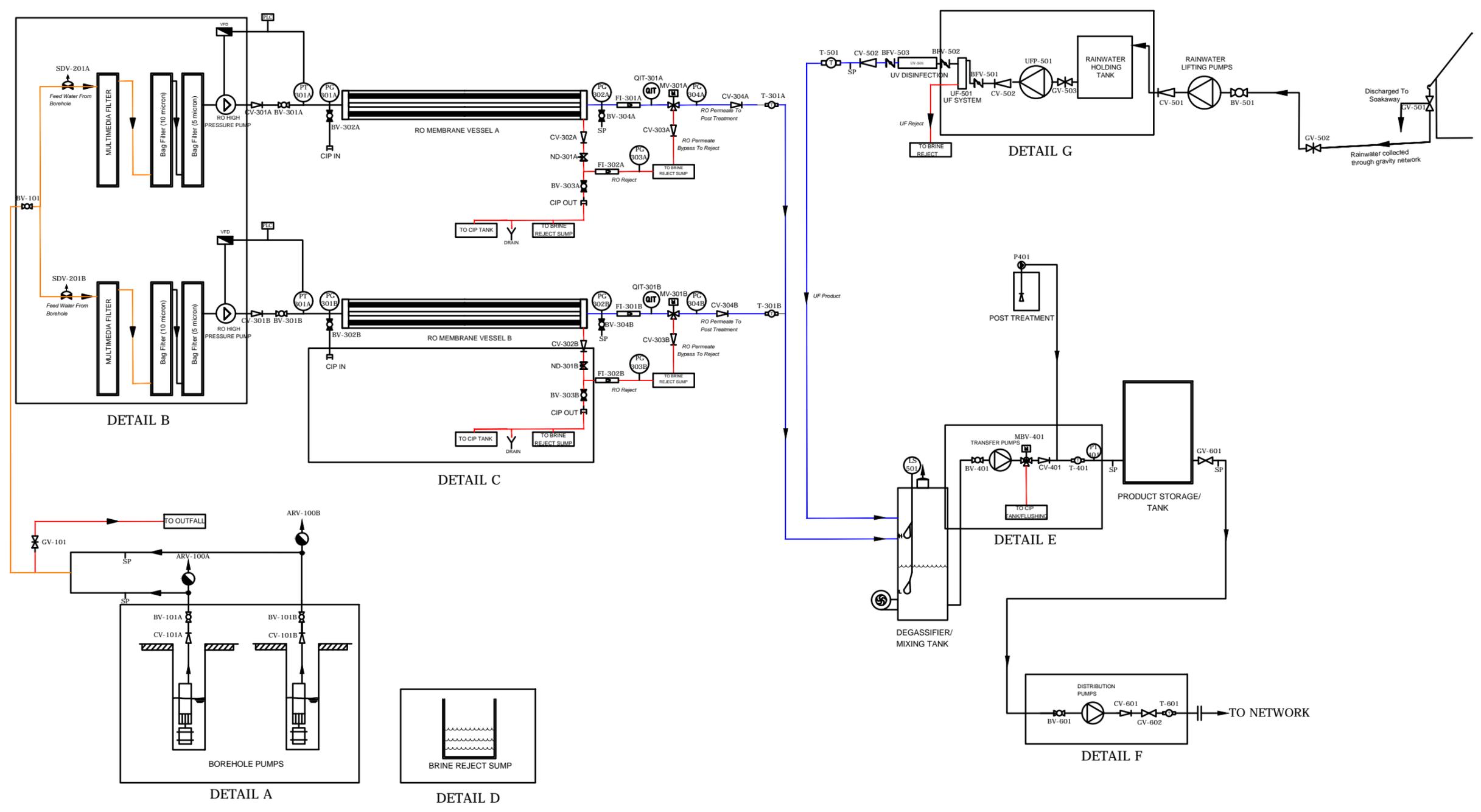


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Date: Sep 2020	SCALE (AS): 1:200
Project No: EP-WS/2019/05	
Rev: R-01	Page: W-04

**INTERNAL PIPE LAYOUT**

1:200





- Legend**
- FEED LINE
  - REJECT LINE
  - PRODUCT LINE
- Note:**
- CPVC pipe with PN10 rating to be used for the internal pipeline of the plant except for high pressure area (HPP to MV).
  - From HPP to MV SS316 piping to be used.
  - CPVC pipe with PN16 rating to be used for pipe fittings.
  - CPVC pipe with SDR ratio 17 ratio to be used for network.
  - HPP used to have a self cooled radial piston.
  - CF filters to have a plastic housing with SS304 bolt fittings at connections.
  - MM filters to be sized with 32" height by 7" diameter housing.
  - Borehole Pumps set to include Variable Frequency Drive (VFD)

R00	JUNE 2020	STAGE -1	PD	SBC	SD
REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.

LEGEND						
ACTUATION	VALVES		FEATURES		CONDITION	ABBREVIATIONS
		BUTTERFLY		MOTORIZED BALL		LS - LEVEL SENSOR
		BALL		TORTALIZER		FT - FLOW TRANSMITTER
		DIAPHRAGM		GATE		PI - PRESSURE INDICATOR
		3-WAY		CHECK VALVE		SP - SAMPLING POINT
		SLUICE		MOTORIZED 3 WAY		AR - AIR RELEASE
						P - PUMP
						PG - PRESSURE GAUGE
						PS - PRESSURE SENSOR
						CP - CONNECTION POINT
						LT - LEVEL TRANSMITTER
						QIT - CONDUCTIVITY INDICATOR
						PLC - PROGRAMMABLE LOGIC CONTROLLER

**IWRM PLANT P&I OVERVIEW**

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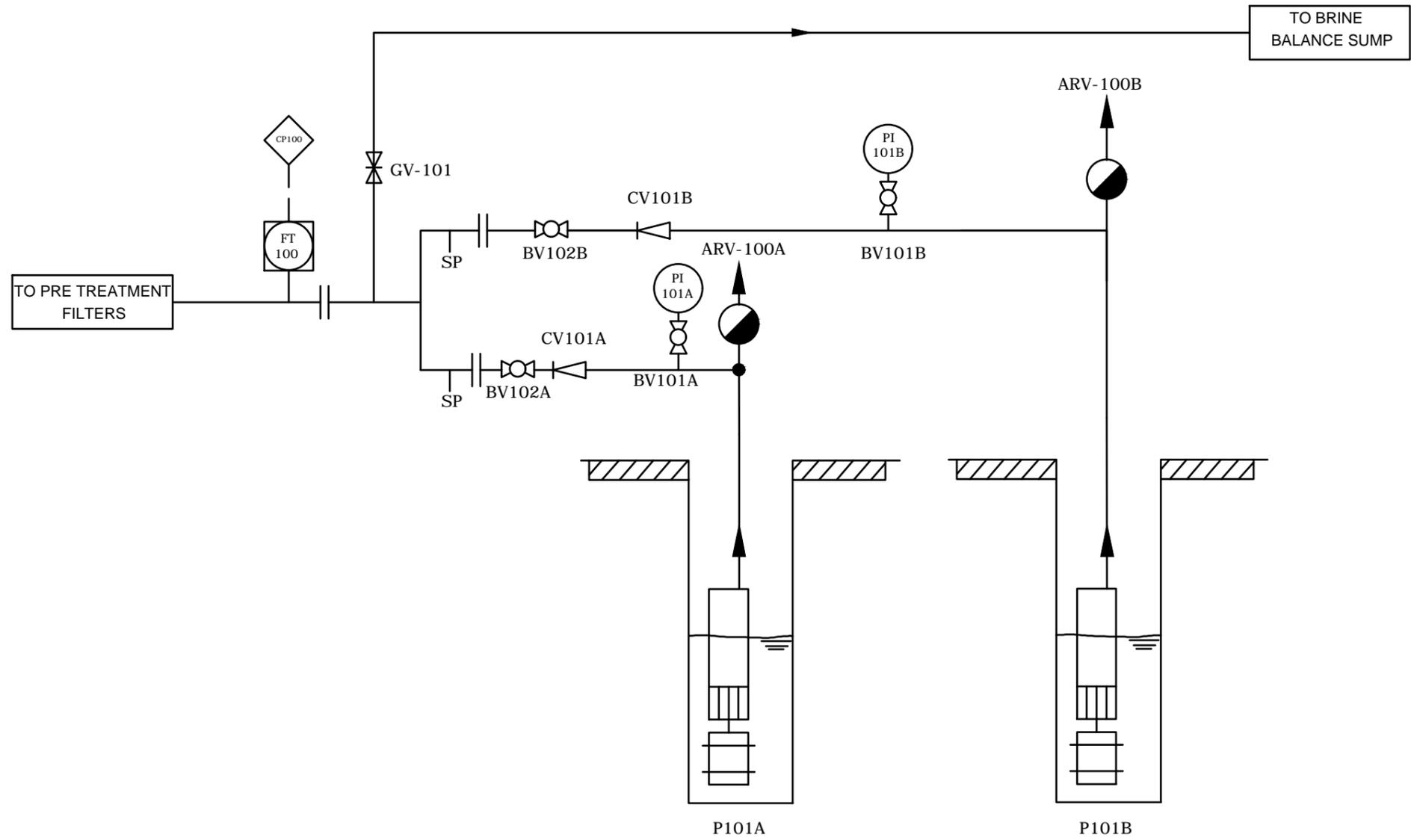
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BOREHOLE PUMPS

DETAIL A

Legend

Note:  
- Borehole pumps to be controlled by Variable Frequency Drive (VFD)

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
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LEGEND					
ACTUATION	VALVES		FEATURES	CONDITION	ABBREVIATIONS
		BUTTERFLY		MOTORIZED BALL	LS - LEVEL SENSOR FT - FLOW TRANSMITTER PI - PRESSURE INDICATOR SP - SAMPLING POINT AR - AIR RELEASE P - PUMP PG - PRESSURE GAUGE PS - PRESSURE SENSOR CP - CONNECTION POINT LT - LEVEL TRANSMITTER QIT - CONDUCTIVITY INDICATOR PLC - PROGRAMMABLE LOGIC CONTROLLER
		BALL		TORTALIZER	
		DIAPHRAGM		GATE	
		3-WAY		CHECK VALVE	
		SLUICE		MOTORIZED 3 WAY	
				FLANGED CONNECTION	
				TRAP	
				DISCHARGE TO ATMOSPHERE	
				SAMPLING POINT	
				FLOW INDICATOR	
				VALVE NORMALLY OPEN	
				VALVE NORMALLY CLOSED	

IWRM PLANT P&I DETAIL A

NTS

Title:  
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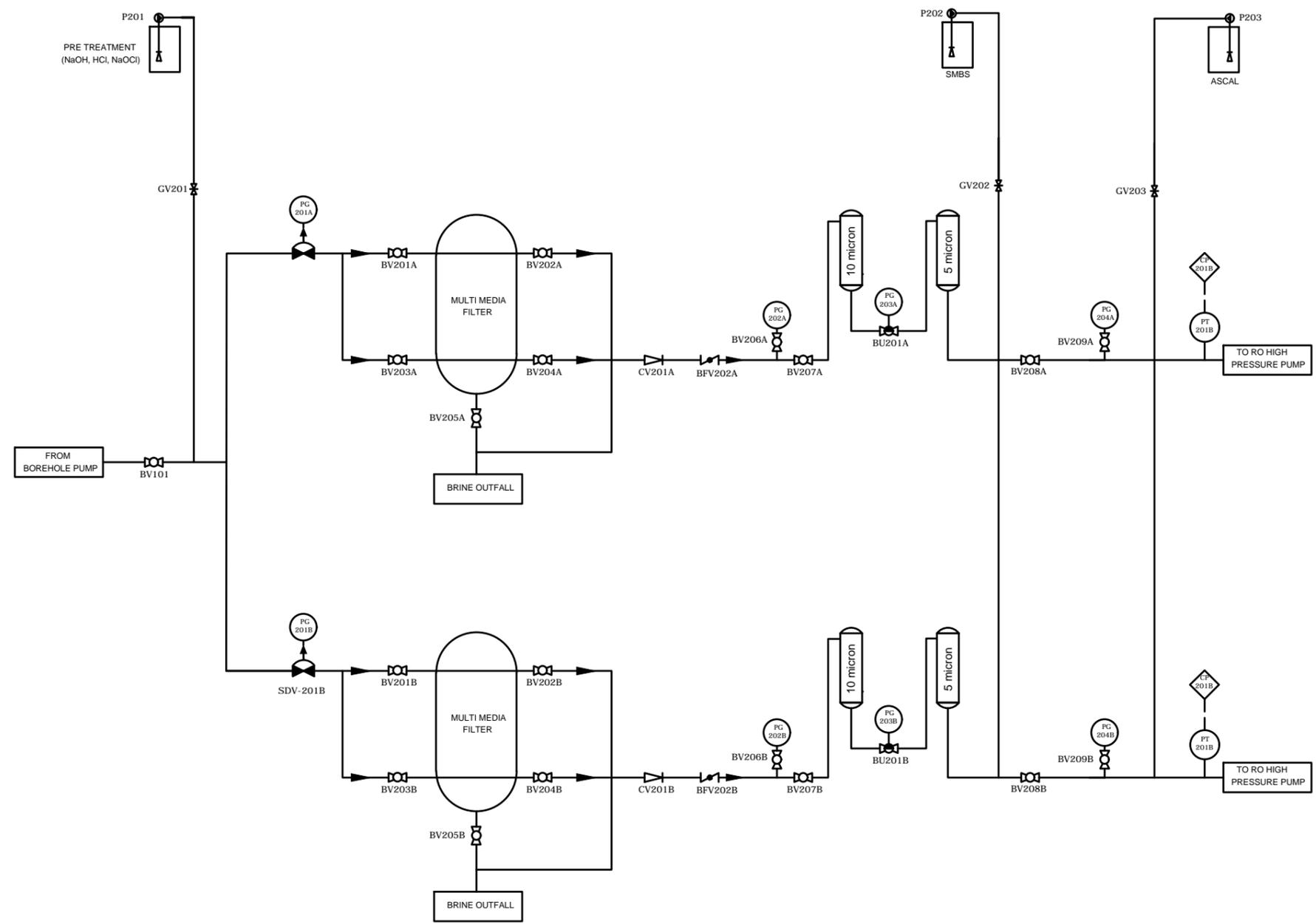
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Project No: EP-WS/2019/05

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DETAIL B

LEGEND					
ACTUATION	VALVES		FEATURES	CONDITION	ABBREVIATIONS
	MANUALLY OPERATED		BUTTERFLY		MOTORIZED BALL
	DIAPHRAGM - SINGLE ACTING		BALL		TORTALIZER
	DIAPHRAGM - DOUBLE ACTING		DIAPHRAGM		GATE
	PNEUMATIC PISTON		3-WAY		CHECK VALVE
			SLUICE		MOTORIZED 3 WAY
				FLANGED CONNECTION	
				TRAP	
				DISCHARGE TO ATMOSPHERE	
				SAMPLING POINT	
				FLOW INDICATOR	
				VALVE NORMALLY OPEN	
				VALVE NORMALLY CLOSED	

Legend

- Note:
- SMBS Pre dosing chemical to be used only if Chlorine based dosing chemical is added prior to filtration.
  - Union valve to be connected in between the two cartridge filters.
  - MM filters to be controlled manually.

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Sub Title:  
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Client:  
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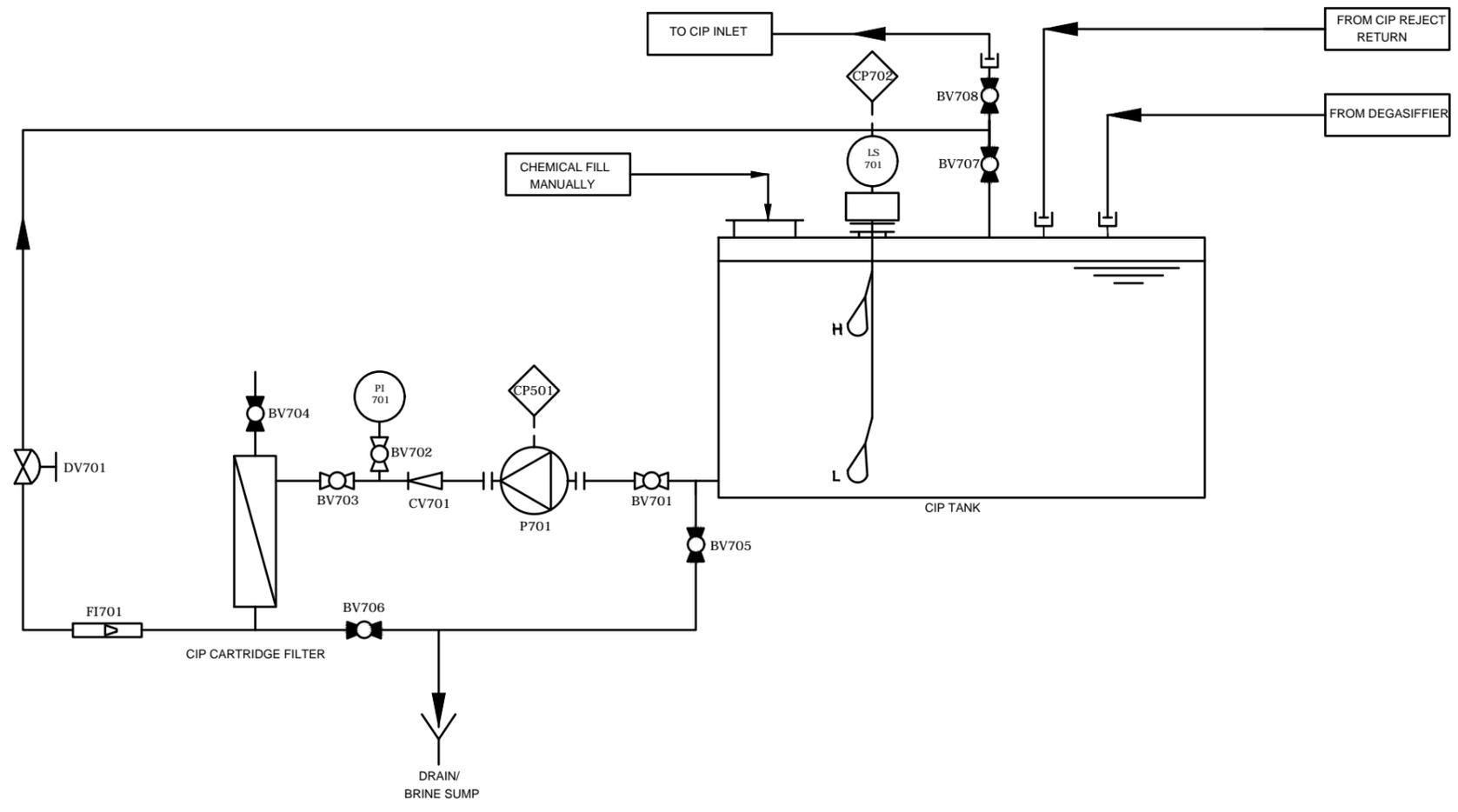
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IWRM PLANT P&I DETAIL B

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DETAIL C

Legend

Note:  
- Flexible hose VIC connection to be used for during CIP use and flushing.

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LEGEND

ACTUATION	VALVES	FEATURES	CONDITION	ABBREVIATIONS
MANUALLY OPERATED DIAPHRAGM - SINGLE ACTING DIAPHRAGM - DOUBLE ACTING PNEUMATIC PISTON	BUTTERFLY BALL DIAPHRAGM 3-WAY SLUICE MOTORIZED BALL TORTALIZER GATE CHECK VALVE MOTORIZED 3 WAY	FLANGED CONNECTION TRAP DISCHARGE TO ATMOSPHERE SAMPLING POINT FLOW INDICATOR	VALVE NORMALLY OPEN VALVE NORMALLY CLOSED	LS - LEVEL SENSOR FT - FLOW TRANSMITTER PI - PRESSURE INDICATOR SP - SAMPLING POINT AR - AIR RELEASE P - PUMP PG - PRESSURE GAUGE PS - PRESSURE SENSOR CP - CONNECTION POINT LT - LEVEL TRANSMITTER QIT - CONDUCTIVITY INDICATOR PLC - PROGRAMMABLE LOGIC CONTROLLER

IWRM PLANT P&I DETAIL C

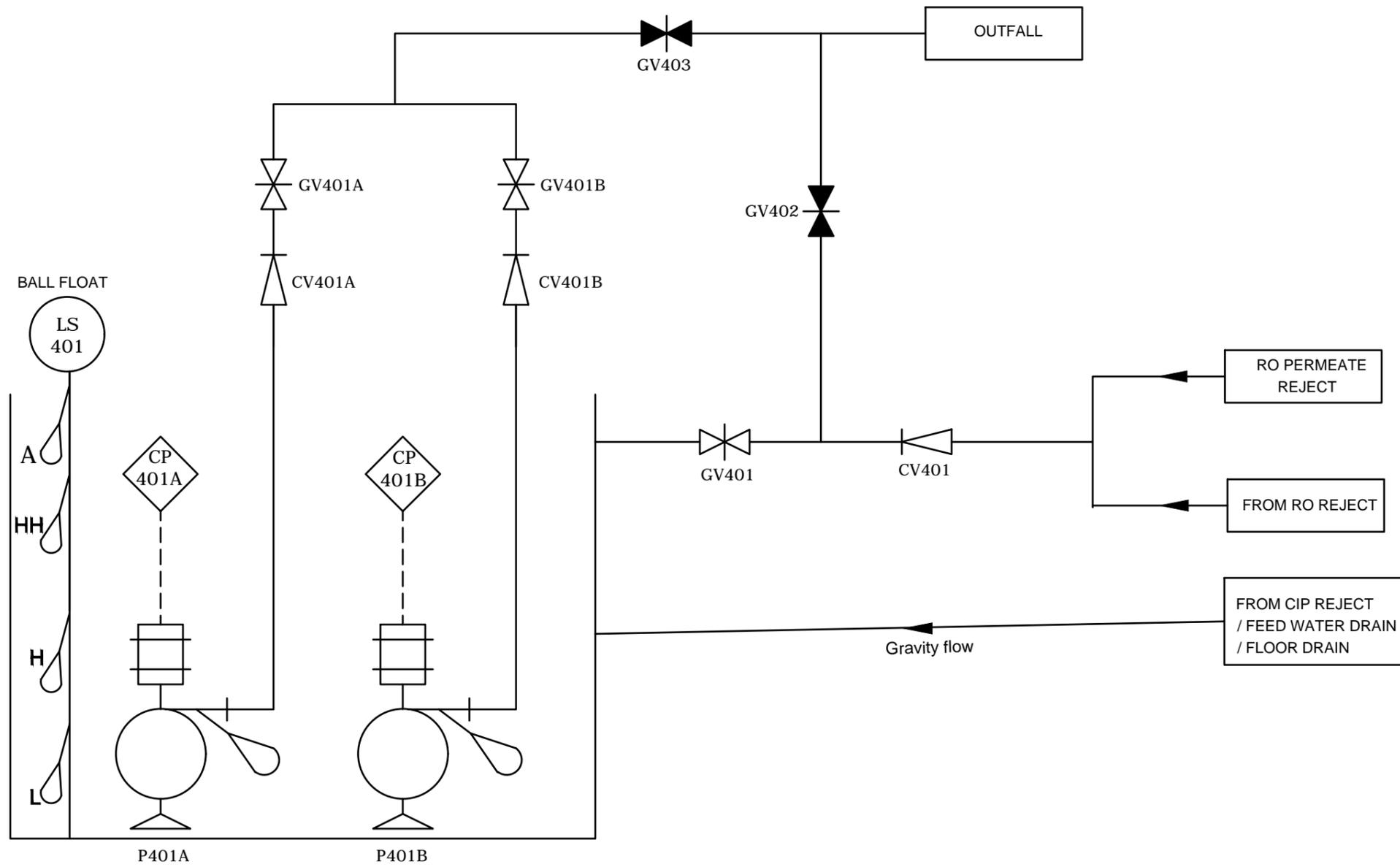
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Sub Title:  
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BRINE BALANCE SUMPS

DETAIL D

LEGEND					
ACTUATION	VALVES		FEATURES	CONDITION	ABBREVIATIONS
		BUTTERFLY		MOTORIZED BALL	LS - LEVEL SENSOR FT - FLOW TRANSMITTER PI - PRESSURE INDICATOR SP - SAMPLING POINT AR - AIR RELEASE P - PUMP PG - PRESSURE GAUGE PS - PRESSURE SENSOR CP - CONNECTION POINT LT - LEVEL TRANSMITTER QIT - CONDUCTIVITY INDICATOR PLC - PROGRAMMABLE LOGIC CONTROLLER
		BALL		TORTALIZER	
		DIAPHRAGM		GATE	
		3-WAY		CHECK VALVE	
		SLUICE		MOTORIZED 3 WAY	
				FLANGED CONNECTION	
				TRAP	
				DISCHARGE TO ATMOSPHERE	
				SAMPLING POINT	
				FLOW INDICATOR	
				VALVE NORMALLY OPEN	
				VALVE NORMALLY CLOSED	

IWRM PLANT P&I DETAIL D

NTS



Legend

- Note:
- Separate pipeline to be laid out connecting the drain points around the plant area, CIP reject and feed water drain.
  - Either Dry mount of submersible pumps to be used.

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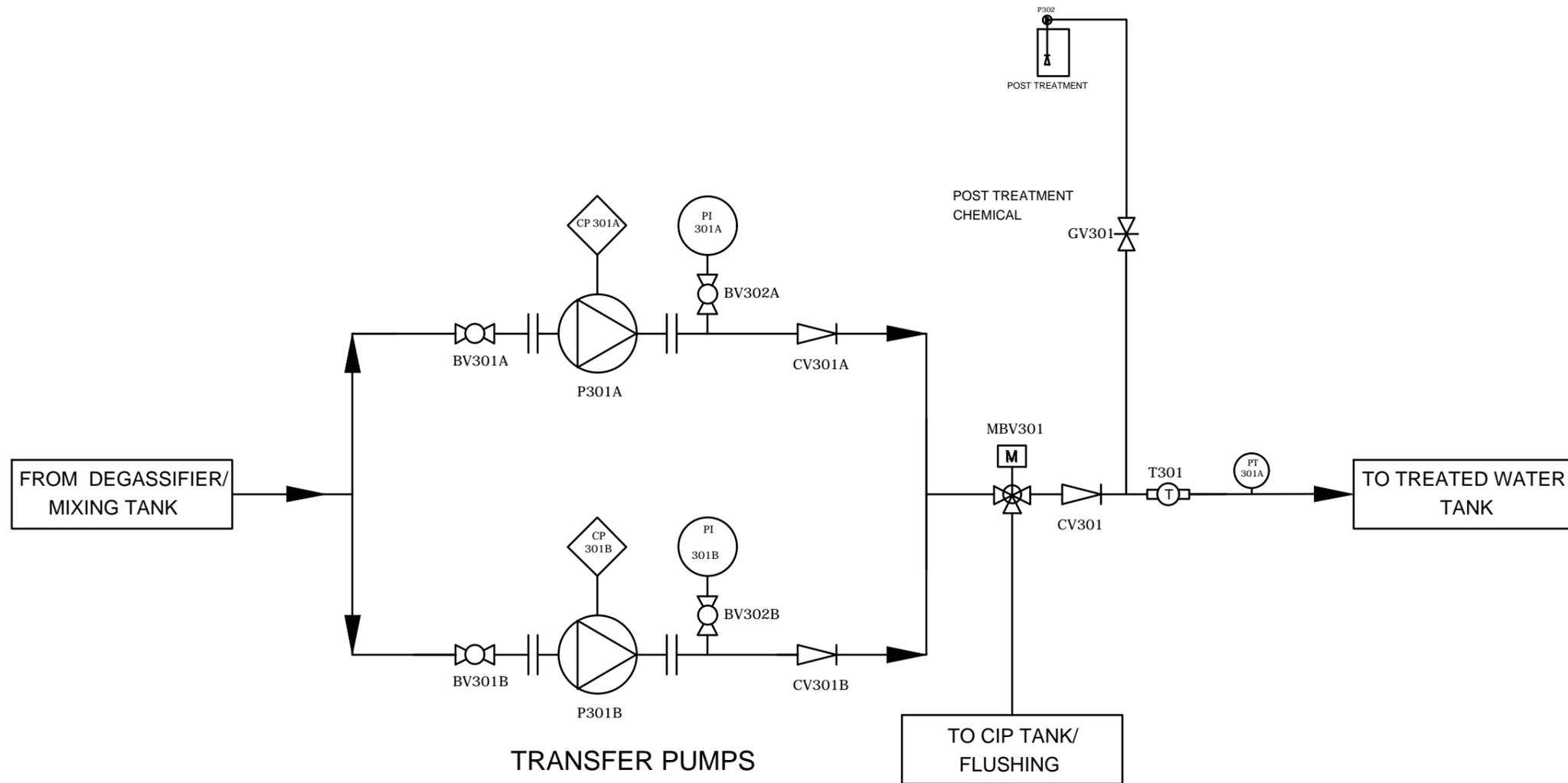
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TRANSFER PUMPS

DETAIL E

LEGEND					
ACTUATION	VALVES		FEATURES	CONDITION	ABBREVIATIONS
		BUTTERFLY		MOTORIZED BALL	LS - LEVEL SENSOR FT - FLOW TRANSMITTER PI - PRESSURE INDICATOR SP - SAMPLING POINT AR - AIR RELEASE P - PUMP PG - PRESSURE GAUGE PS - PRESSURE SENSOR CP - CONNECTION POINT LT - LEVEL TRANSMITTER QIT - CONDUCTIVITY INDICATOR PLC - PROGRAMMABLE LOGIC CONTROLLER
		BALL		TORTALIZER	
		DIAPHRAGM		GATE	
		3-WAY		CHECK VALVE	
		SLUICE		MOTORIZED 3 WAY	
				FLANGED CONNECTION	
				TRAP	
				DISCHARGE TO ATMOSPHERE	
				SAMPLING POINT	
				FLOW INDICATOR	
				VALVE NORMALLY OPEN	
				VALVE NORMALLY CLOSED	

Legend

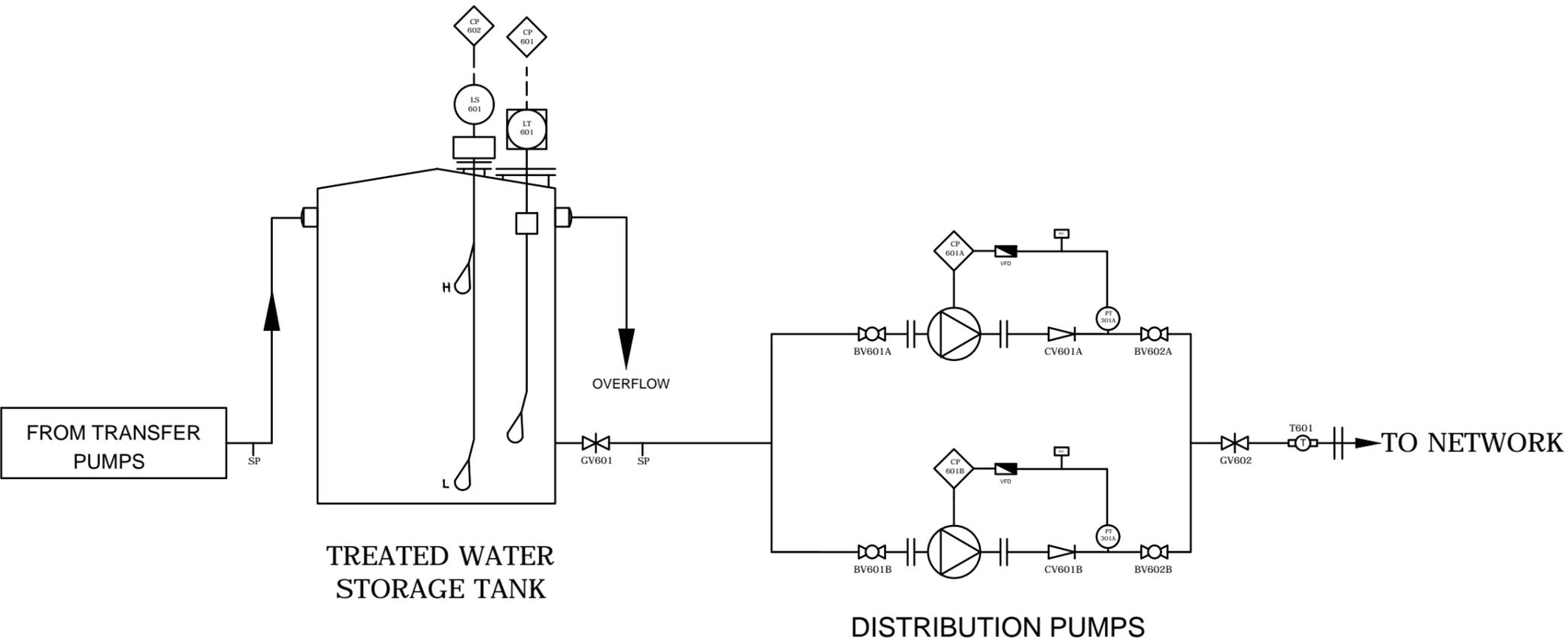
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Title:  
 Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives - Package 5  
 Sub Title:  
 Water Supply System in V. Rakeedhoo  
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DETAIL F

LEGEND					
ACTUATION	VALVES		FEATURES	CONDITION	ABBREVIATIONS
					LS - LEVEL SENSOR
					FT - FLOW TRANSMITTER
					PI - PRESSURE INDICATOR
					SP - SAMPLING POINT
					AR - AIR RELEASE
					P - PUMP
					PG - PRESSURE GAUGE
					PS - PRESSURE SENSOR
					CP - CONNECTION POINT
					LT - LEVEL TRANSMITTER
					QIT - CONDUCTIVITY INDICATOR
					PLC - PROGRAMMABLE LOGIC CONTROLLER

IWRM PLANT P&I DETAIL F

NTS



Legend

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 Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives - Package 5

Sub Title:  
 Water Supply System in V. Rakeedhoo

Client:  
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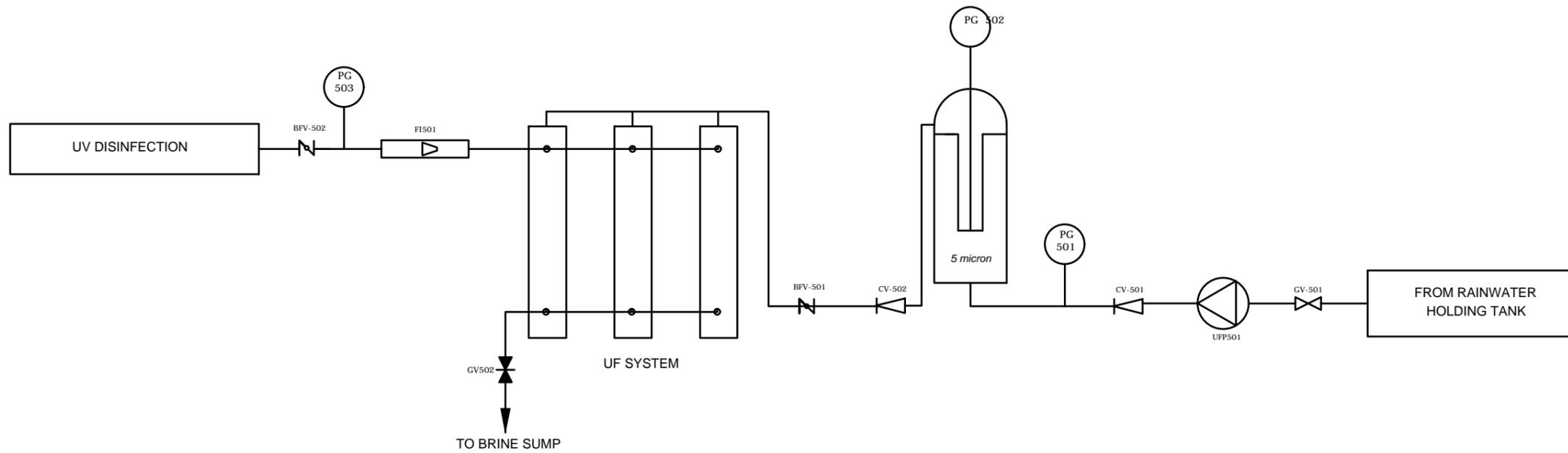
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Date: Sep 2020 SCALE (AS): NTS

Project No: EP-WS/2019/05

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# UV DISINFECTION



## DETAIL G

LEGEND					
ACTUATION	VALVES		FEATURES	CONDITION	ABBREVIATIONS
		BUTTERFLY		MOTORIZED BALL	LS - LEVEL SENSOR FT - FLOW TRANSMITTER PI - PRESSURE INDICATOR SP - SAMPLING POINT AR - AIR RELEASE P - PUMP PG - PRESSURE GAUGE PS - PRESSURE SENSOR CP - CONNECTION POINT LT - LEVEL TRANSMITTER QIT - CONDUCTIVITY INDICATOR PLC - PROGRAMMABLE LOGIC CONTROLLER
		BALL		TORTALIZER	
		DIAPHRAGM		GATE	
		3-WAY		CHECK VALVE	
		SLUICE		MOTORIZED 3 WAY	
				FLANGED CONNECTION	
				TRAP	
				DISCHARGE TO ATMOSPHERE	
				SAMPLING POINT	
				FLOW INDICATOR	
				VALVE NORMALLY OPEN	
				VALVE NORMALLY CLOSED	

IWRM PLANT P&I DETAIL G

NTS



### Legend

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
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Title:  
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Sub Title:  
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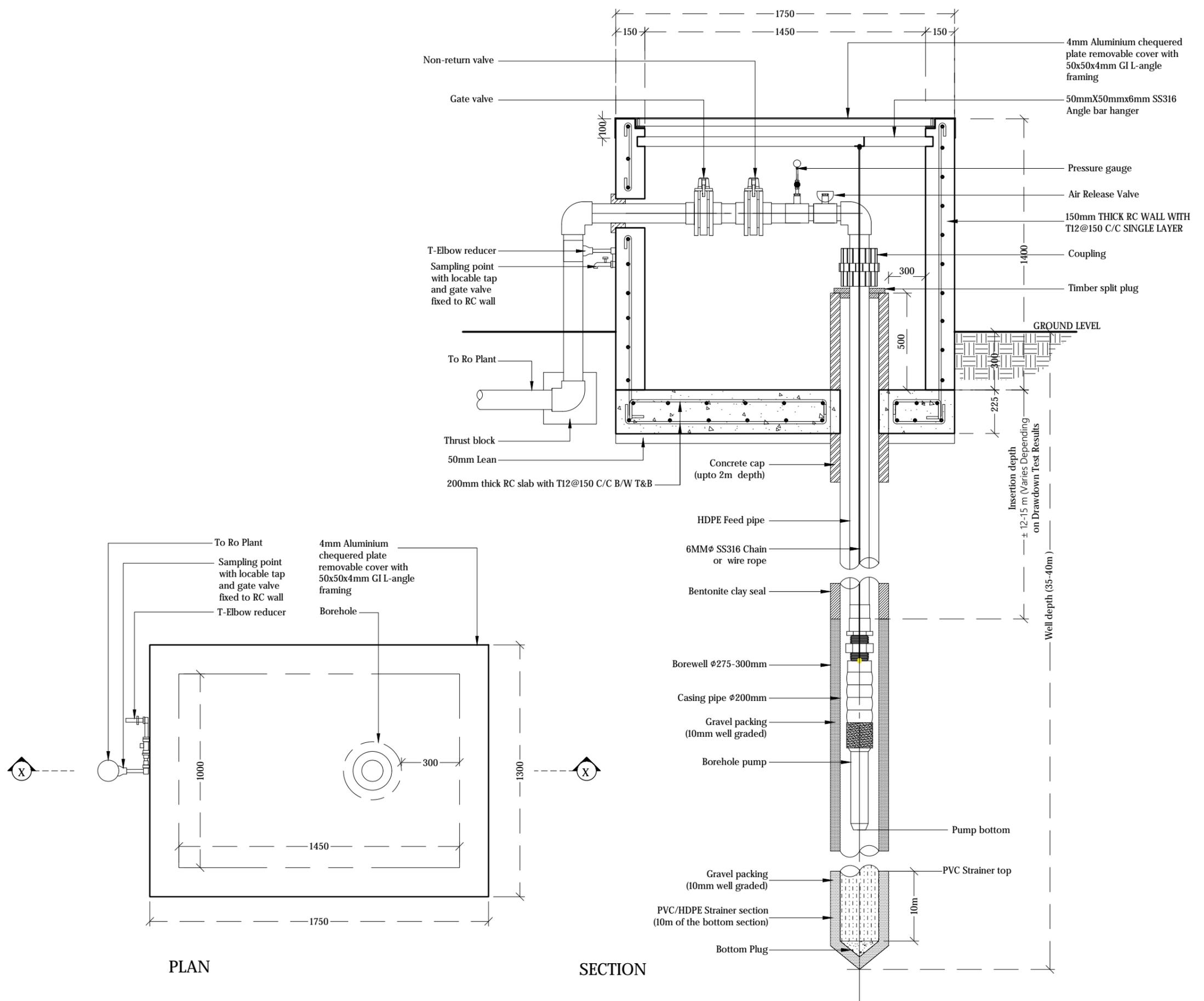
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Project No: EP-WS/2019/05	Page: R-01
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**Legend**

Notes:

- All structural concrete shall be of grade C30.
- All castings shall be done using sulphate resistant portland cement to BS 4027:1996.
- All structural reinforcement shall be epoxy coating of non-pre-stressed reinforcement to ASTM-A775/A775M.
- A cover of 75mm should be given for all reinforcements.
- All concrete cold joints shall casted with bonding agent
- Casing pipe to be HDPE or PVC with a diameter of 200mm.
- Contractor to submit well development methodology for approval by engineer.
- Contractor to submit drill logs.
- Contractor to submit drawdown test results for approval by engineer prior to pipe insertion.

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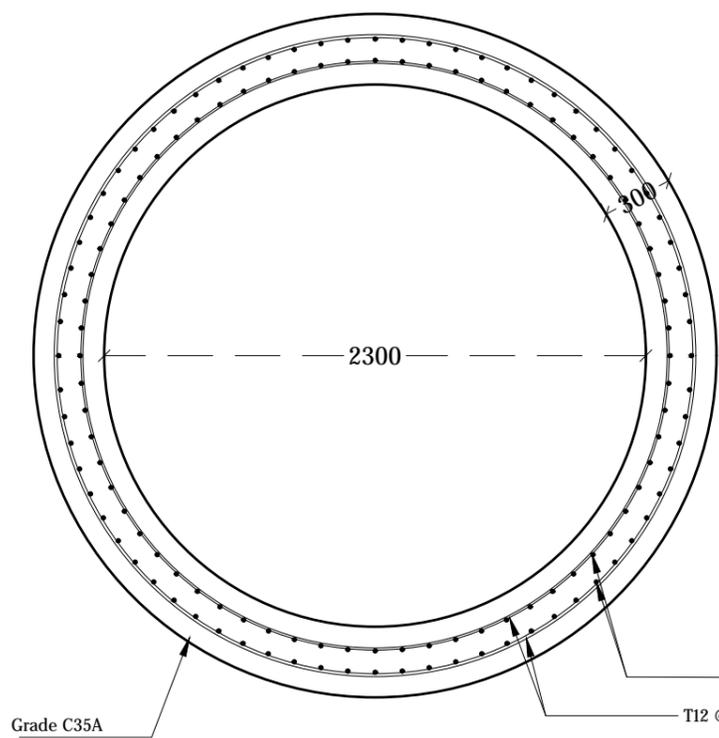
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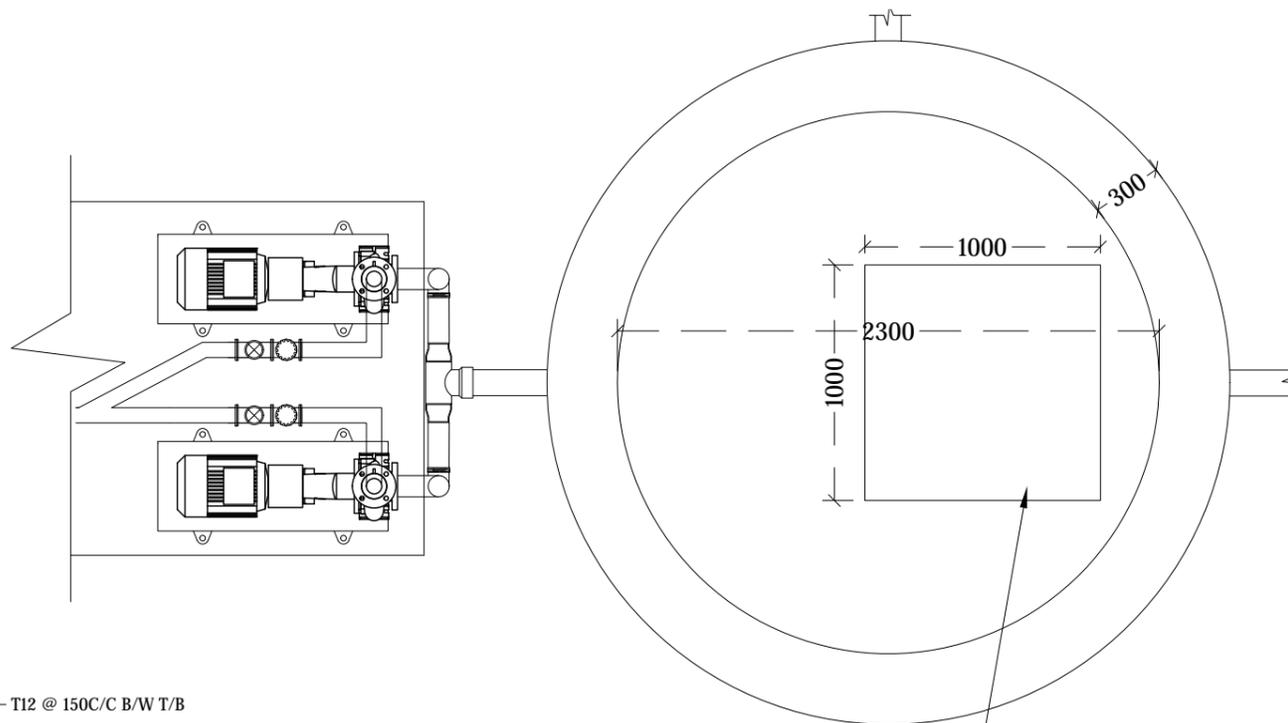
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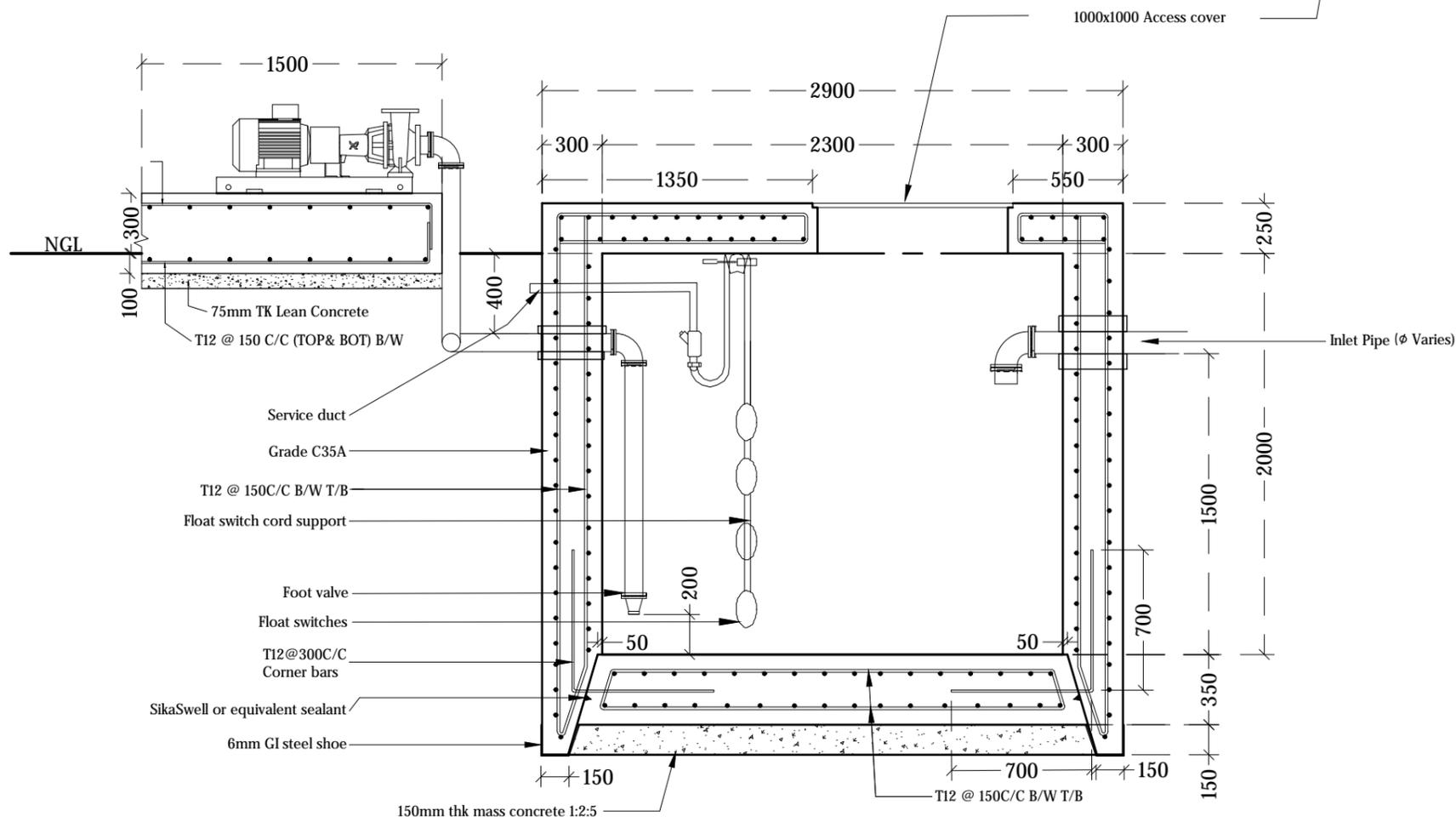
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BRINE WATER TANK PLAN - STRUCTURAL



BRINE WATER TANK PLAN



BRINE WATER TANK SECTION X-X

BRINE TANK DETAILS

1:30

Legend

- Note:
- Pumps, pipe work, fittings and control panel shall be installed in accordance with manufacturers recommendations.
  - Orientation of tanks and pipe work to suit location.
  - All structural concrete shall be of grade C35A.
  - All castings shall be done using sulphate resistant portland cement to BS 4027:1996.
  - All structural reinforcement shall be epoxy coating of non-pre-stressed reinforcement to ASTM-A775/A775M.
  - A cover of 75mm should be given for all reinforcements.
  - Internal concrete surfaces to be coated with 5mm thickness of epoxy bonded glass fibre and finished with gel coat or 500 microns epoxy paint coating.
  - External concrete surfaces to be painted with 3 coats of bitumen/rubber emulsion and protected by 500 micron polythene.
  - All concrete cold joints shall casted with bonding agent.
  - Corner bars (4T16@75C/C T&B) shall be provided around top slab opening.

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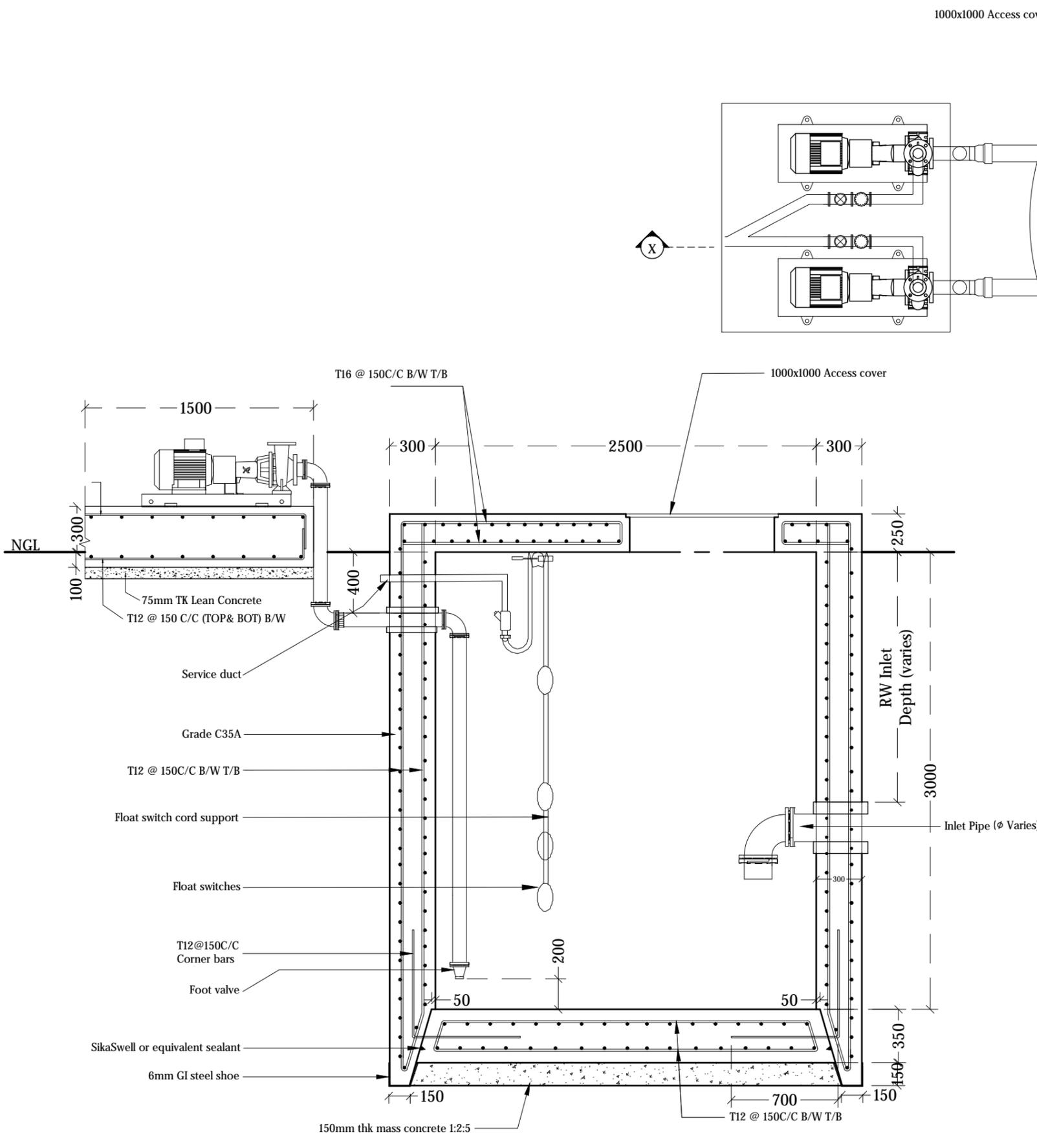
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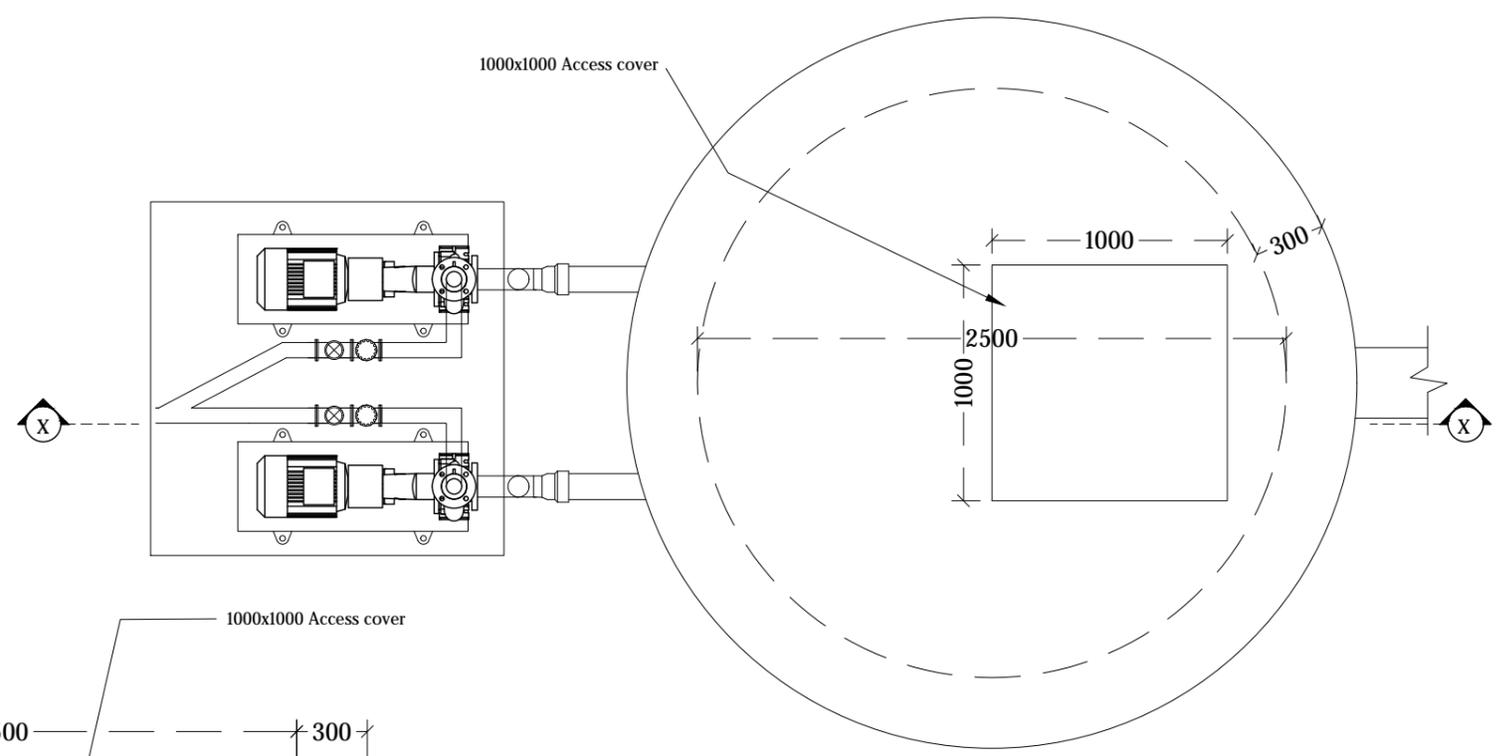
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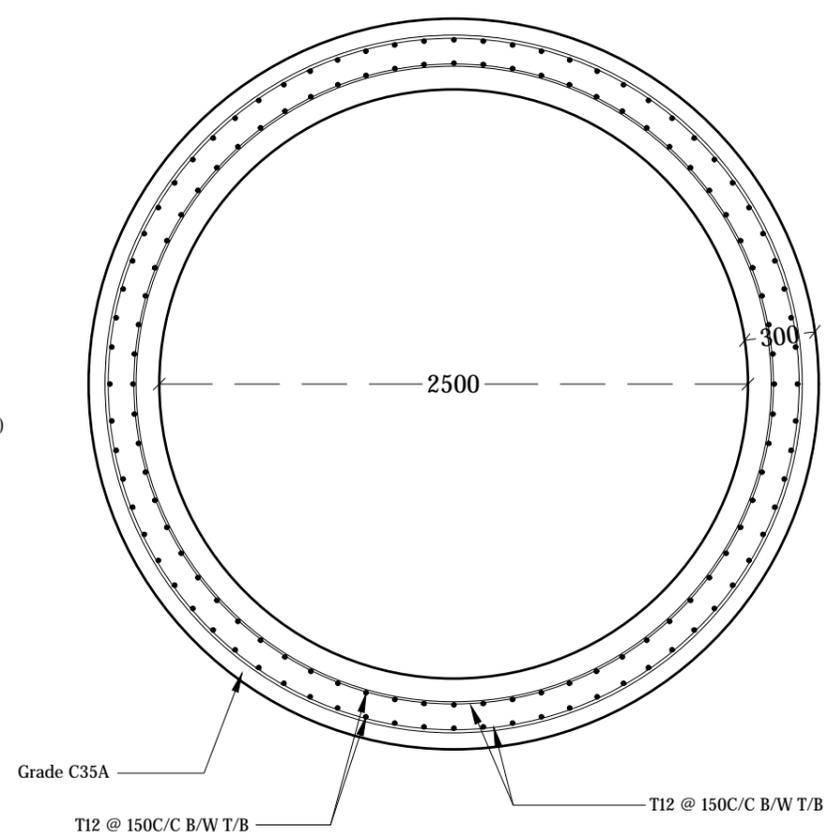
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RAIN WATER LIFT WELL SECTION X-X



RAIN WATER LIFT WELL PLAN



RAIN WATER LIFT WELL PLAN - STRUCTURAL

RAINWATER LIFT WELL DETAILS

Legend

- Note:
- Pumps, pipe work, fittings and control panel shall be installed in accordance with manufacturers recommendations.
  - The rainwater lift well will have a filter to prevent entry of debris and dirt.
  - All structural concrete shall be of grade C35A.
  - All castings shall be done using sulphate resistant portland cement to BS 4027:1996.
  - All structural reinforcement shall be epoxy coating of non-pre-stressed reinforcement to ASTM-A775/A775M.
  - A cover of 75mm should be given for all reinforcements.
  - Internal concrete surfaces to be coated with 5mm thickness of epoxy bonded glass fibre and finished with gel coat or 500 microns epoxy paint coating.
  - External concrete surfaces to be painted with 3 coats of bitumen/rubber emulsion and protected by 500 micron polyethylene.
  - All concrete cold joints shall casted with bonding agent.
  - Corner bars (4T16@75C/C T&B) shall be provided around top slab opening.

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
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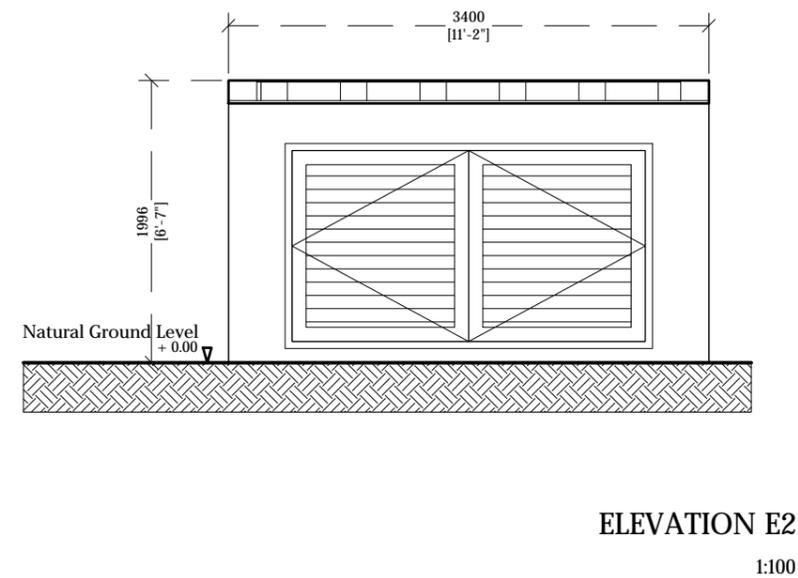
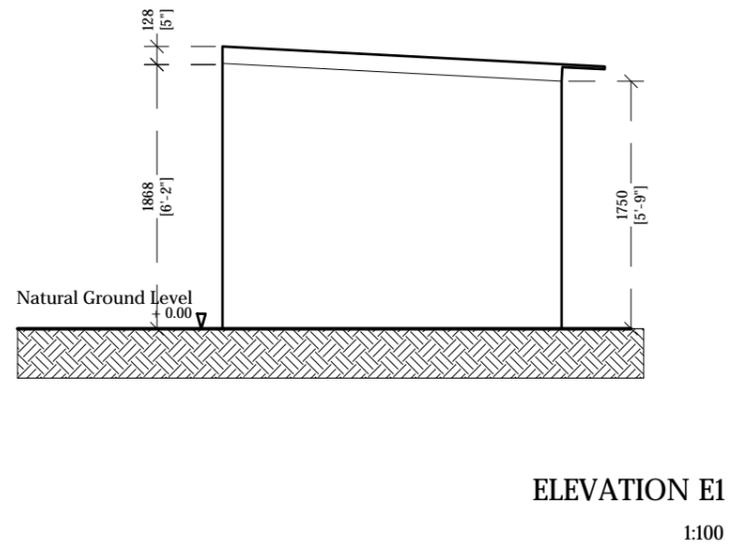
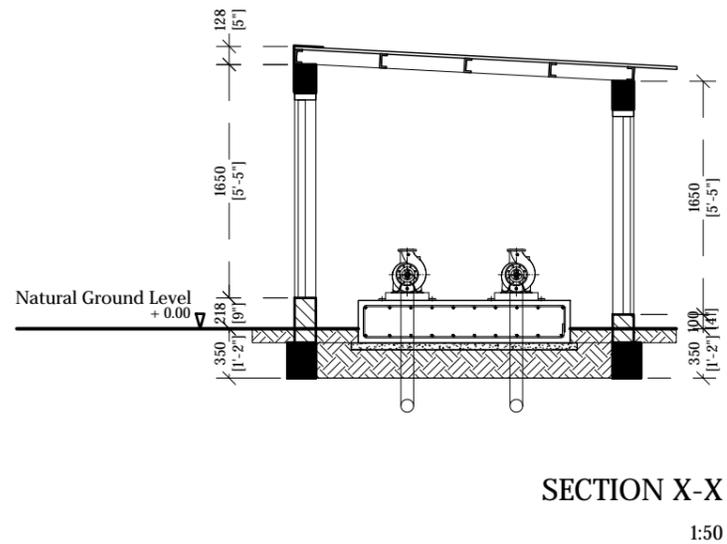
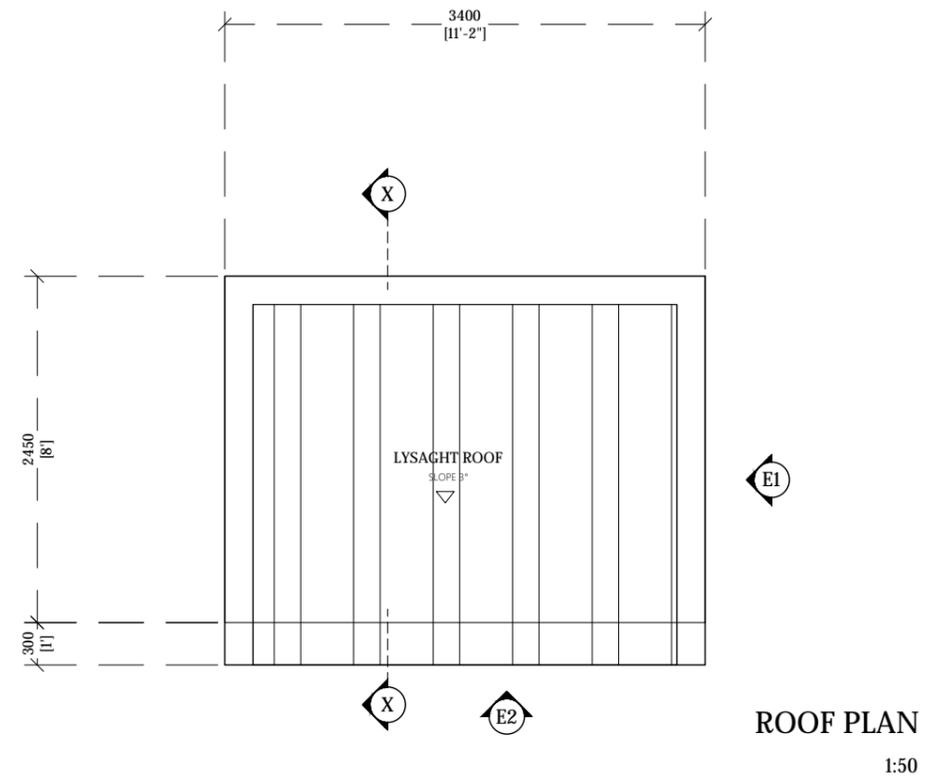
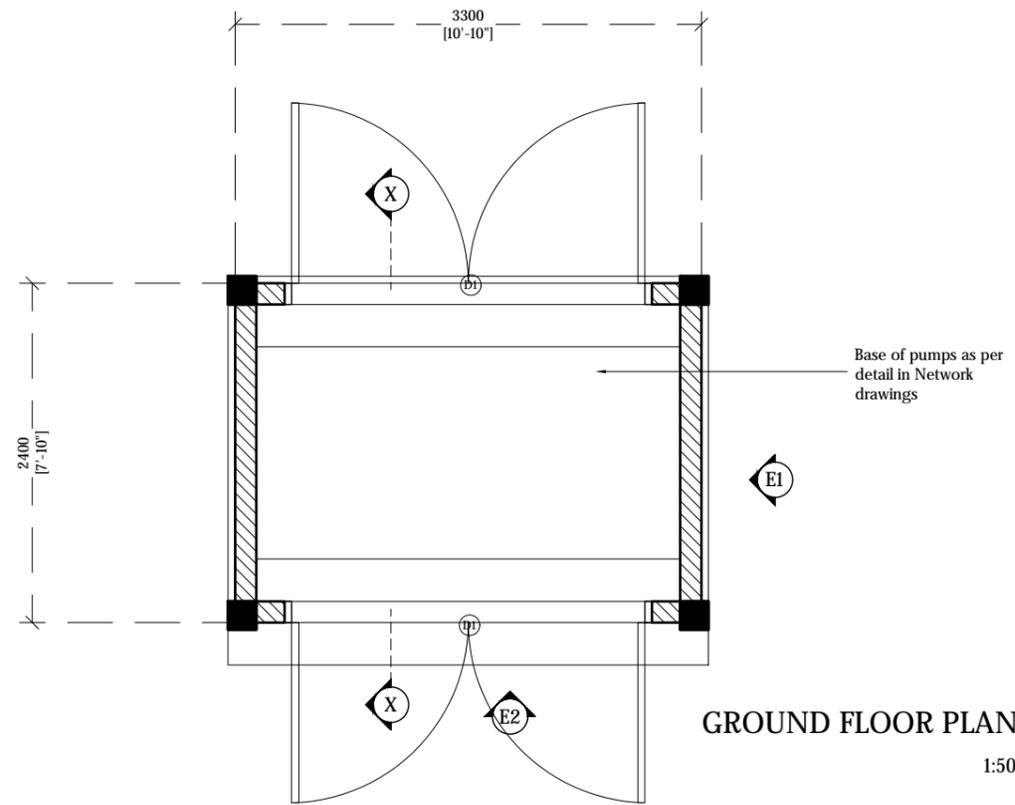
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 Husnuheemaa Magu, Male', Maldives

**DBACK INFRA**  
 Working Soft construction shoppo

Drawn: F.I.A.	Checked: M.S.S.
Designed: F.I.A.	Approved: I.W.
Date: Sep 2020	SCALE (AS): 1:30
Project No: EP-WS/2019/05	
Rev: R-01	Page: W-15



PUMP SHED DETAILS



Legend

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R00	JUNE 2020	STAGE -1	PD	SBC	SD

Title:  
**Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives - Package 5**

Sub Title:  
**Water Supply System in V. Rakeedhoo**

Client:  
 Ministry of National Planning, Housing and Infrastructure, Republic of Maldives



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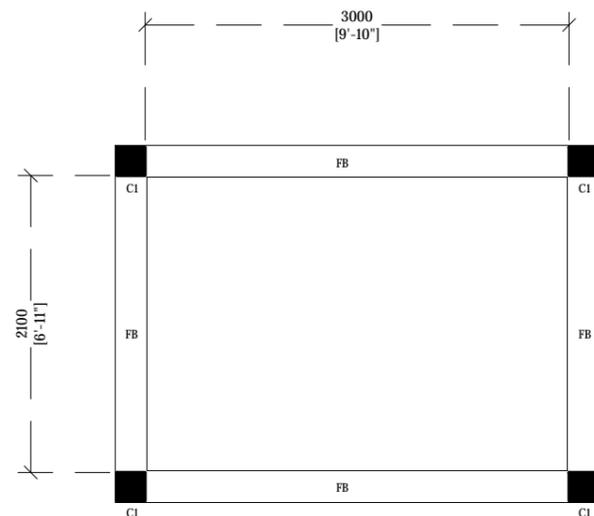
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Designed: F.I.A. Approved: I.W.

Date: Sep 2020 SCALE (A3): -

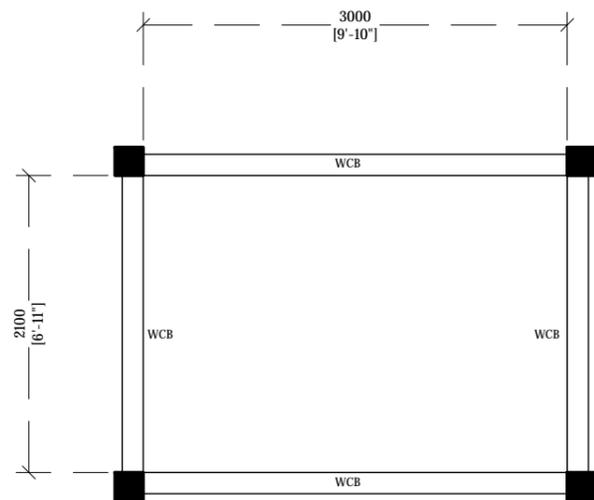
Project No: EP-WS/2019/05

Rev: R-01 Page: W-16



**GROUND FLOOR PLAN**

1:100



**ROOF PLAN**

1:100

**Legend**

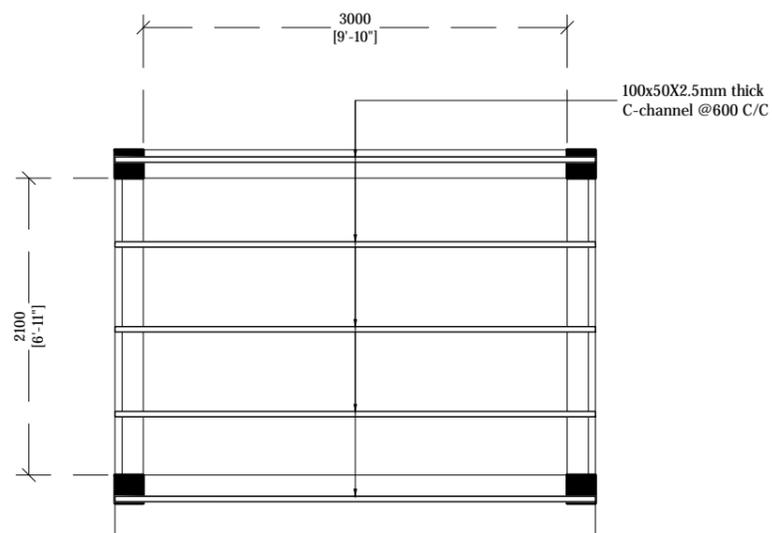
**Notes:**

- Cover for foundation pads and foundation beams shall be 50mm
- Cover for columns shall be 40mm
- Cover for roof beams shall be 30mm
- Concrete shall be of grade C25
- All concrete cold joints shall be casted with bonding agent
- Roof purlins shall be fixed to roof beam with hot-dip galvanized bolts and GI cleats

Door ID		<p><b>General Door Notes:</b></p> <p>Dimensions shown on DWG indicate effective openings of frame</p> <p>All frame depths are 100mm All door panel thicknesses are 35mm All window panel thickness are 25mm Al frame edges shall be trimmed 3mm</p> <p>All wooden components should be wood stained finish</p> <p>All glazing should be of 6mm unless specified</p> <p>External units must comply the following weather conditions:- Wind pressure: 200 kg/sqm Water tightness: 25 kg/sqm</p> <p>All external frames / wall joints must be sealed with silicon sealant and the wedges trimmed with 12X12mm hardwood beading fixed to frames by brass nails</p> <p>All hardware should be provided for the performance of all functions of the units</p> <p>Hinges shall confirm to</p> <ol style="list-style-type: none"> <li>1. Door size more than 700X1900mm WD: 125mm X2 sets SD: 150mm X3 sets</li> <li>2. Door size less than 700X1900mm WD: 100mm X2 sets SD: 125mm X2 sets</li> </ol> <p>Locks shall be cylindrical with master key sets</p> <p>Door knobs shall be 1000mm above FFL</p>
Plan view		
Elevation view		
FFL		
Frame material	600 micron powder coated aluminum frames	
Panel material	600 micron powder coated aluminum louvered panel with side aluminum frames with allowance for handle and lock	
Openable area	-	

**Door Schedule**

1:100



**ROOF PLAN**

1:100

**PUMP SHED DETAILS**

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R00	JUNE 2020	STAGE -1	PD	SBC	SD

Title:  
**Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives - Package 5**

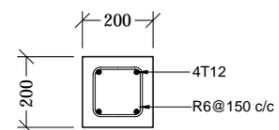
Sub Title:  
Water Supply System in V. Rakeedhoo

Client:  
Ministry of National Planning, Housing and Infrastructure, Republic of Maldives

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**DBACK INFRA**  
Water Supply Construction & Operation

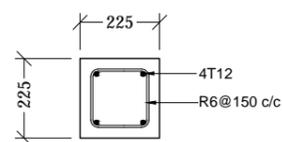
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Designed: F.I.A.	Approved: I.W.
Date: Sep 2020	SCALE (AS): 1:100
Project No: EP-WS/2019/05	Page: W-17
Rev: R-01	



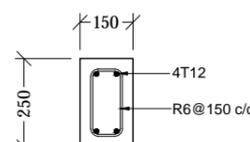
C1

### COLUMN DETAIL

1:20



FB



WBC

### BEAM DETAILS

1:20

#### Legend

#### Notes:

- Cover for foundation pads and foundation beams shall be 50mm
- Cover for columns shall be 40mm
- Cover for roof beams shall be 30mm
- Concrete shall be of grade C25
- All concrete cold joints shall be casted with bonding agent
- Roof purlins shall be fixed to roof beam with hot-dip galvanized bolts and GI cleats

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R00	JUNE 2020	STAGE -1	PD	SBC	SD

Title:  
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Sub Title:  
**Water Supply System in V. Rakeedhoo**

Client:  
**Ministry of National Planning, Housing and Infrastructure, Republic of Maldives**



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Drawn: F.I.A. Checked: M.S.S.

Designed: F.I.A. Approved: I.W.

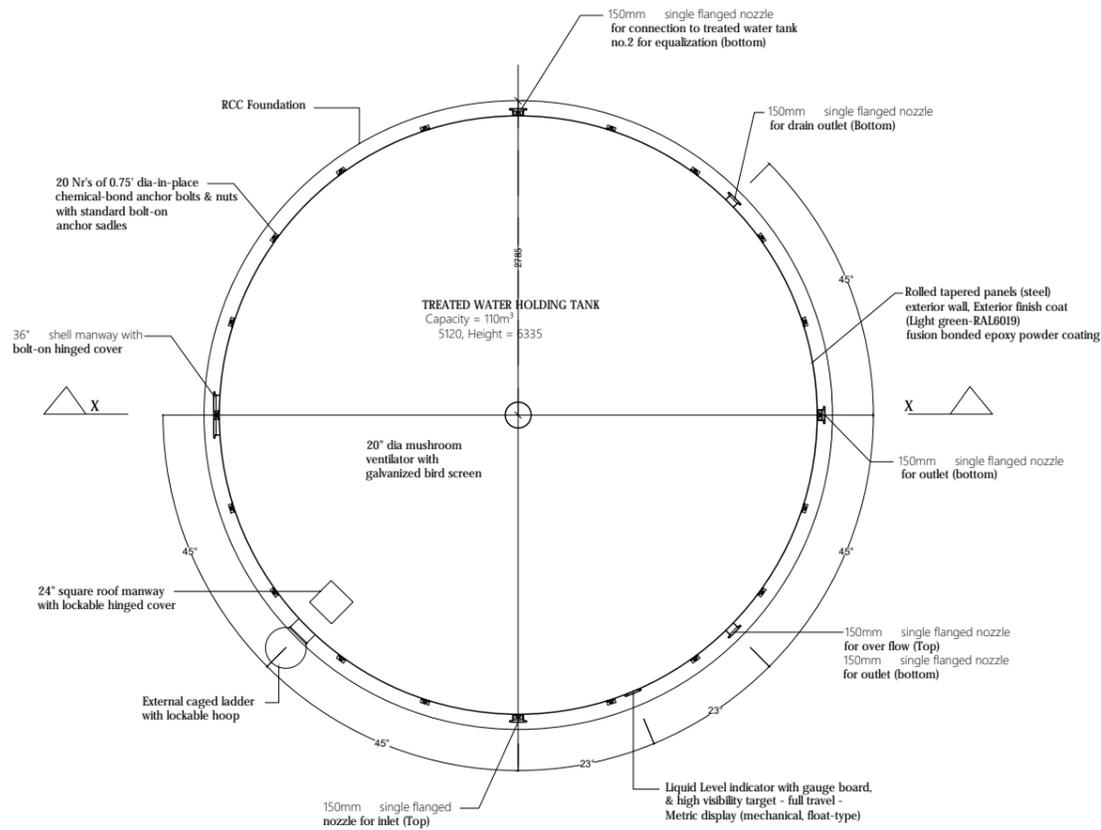
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Project No: EP-WS/2019/05

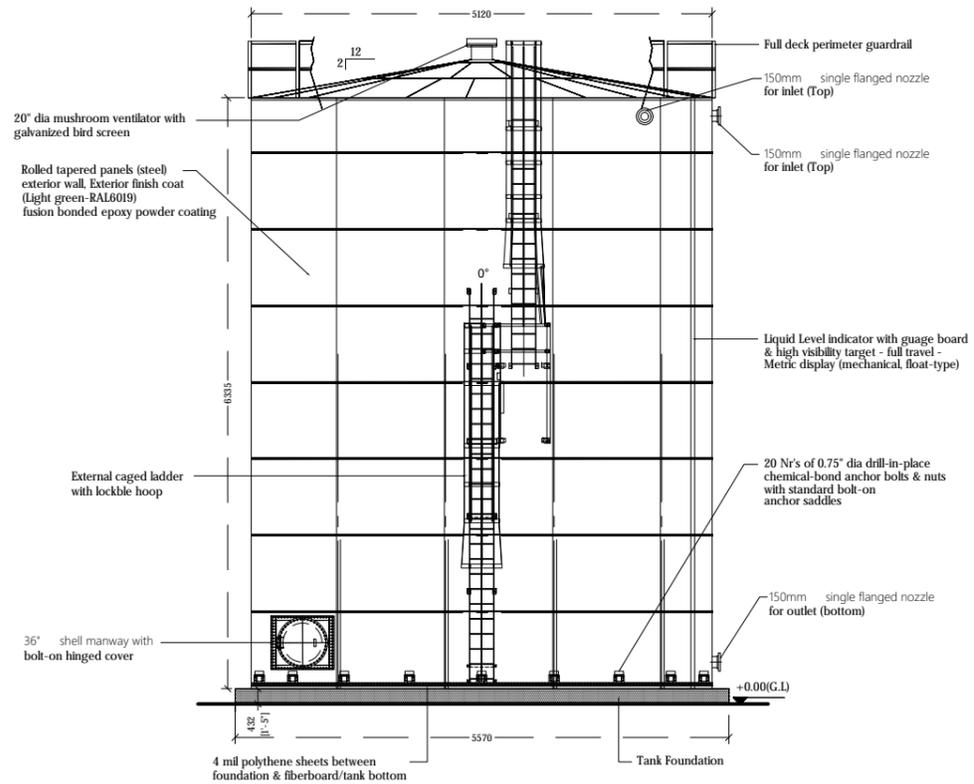
Rev: R-01 Page: W-18

## PUMP SHED BEAM AND COLUMN DETAILS

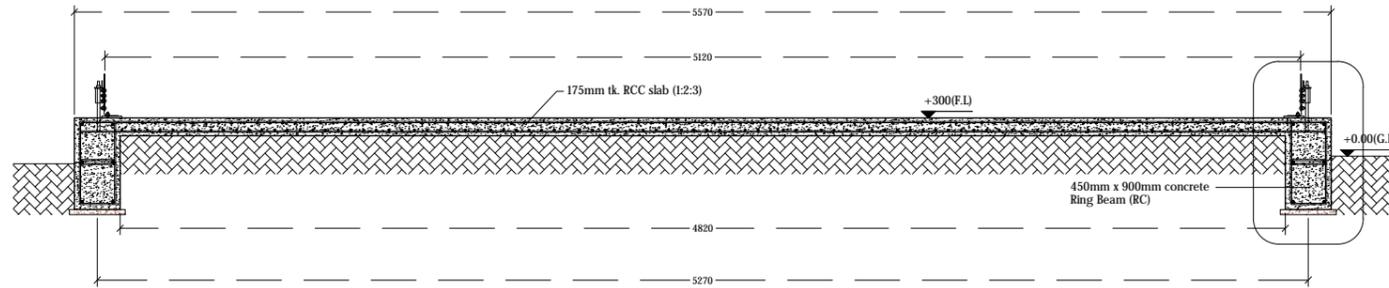
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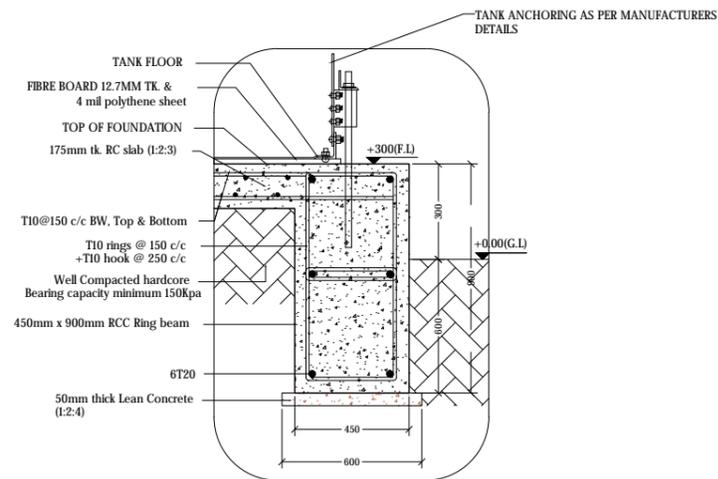
TREATED WATER HOLDING TANK AND FOUNDATION- PLAN



TREATED WATER HOLDING TANK AND FOUNDATION- ELEVATION



SECTION X-X



DETAIL

Note:-  
Cover = 50mm  
Lap length 50

TREATED WATER TANK DETAILS

NTS

Legend

- Note:
- Orientation of tanks and pipe work to suit location.
  - All structural concrete shall be of grade C30.
  - All castings shall be done using sulphate resistant portland cement to BS 4027:1996.
  - All structural reinforcement shall be epoxy coating of non-pre-stressed reinforcement to ASTM-A775/A775M.
  - A cover of 75mm should be given for all reinforcements.
  - All concrete cold joints shall be casted with bonding agent.
  - Tank foundation to be approved based on manufacturers recommendation.

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R00	JUNE 2020	STAGE -1	PD	SBC	SD

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Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 Islands, Maldives - Package 5

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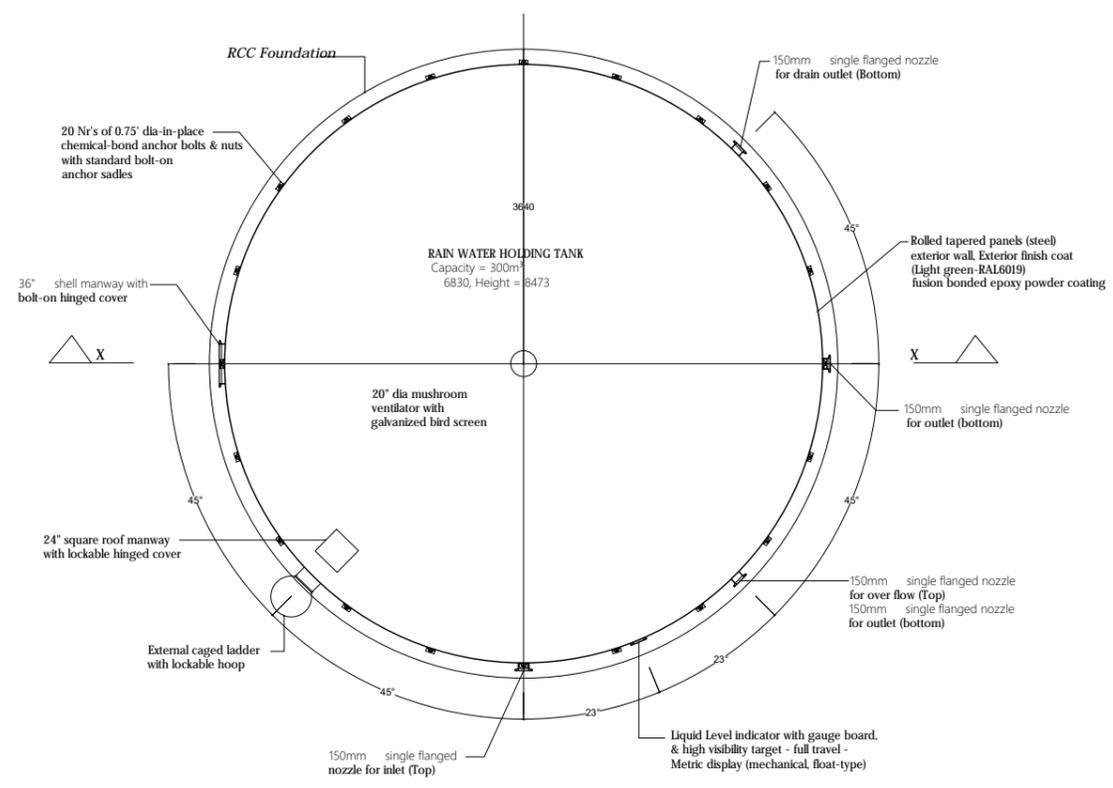
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Designed: F.I.A. Approved: I.W.

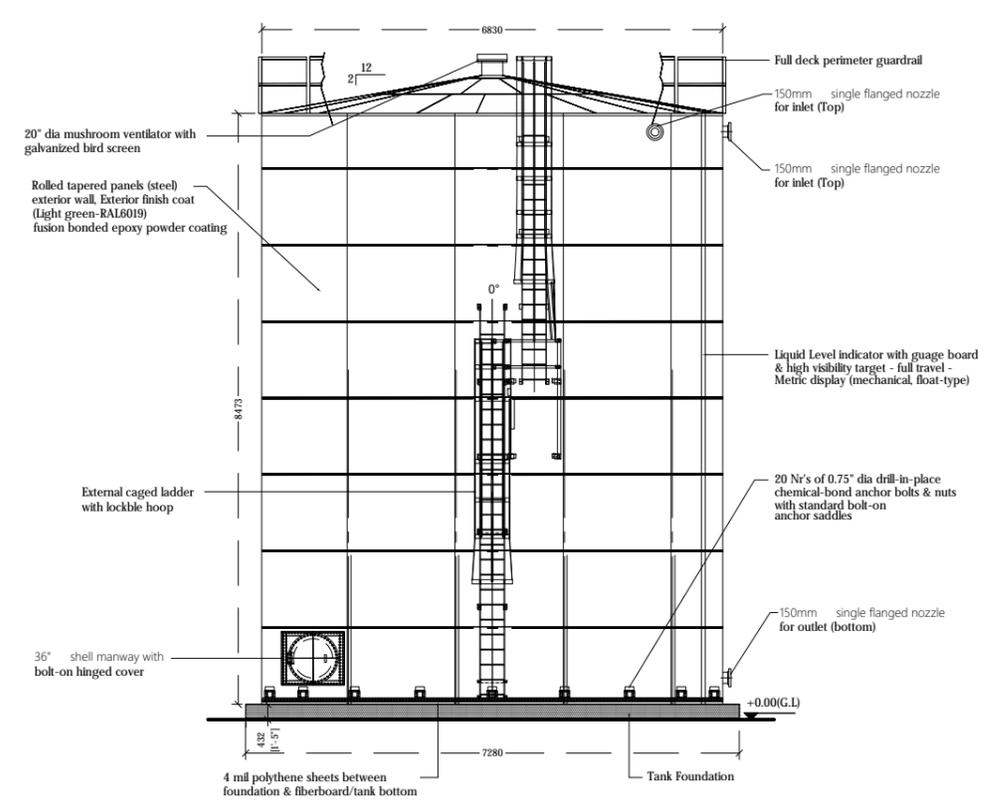
Date: Sep 2020 SCALE (AS): NTS

Project No: EP-WS/2019/05

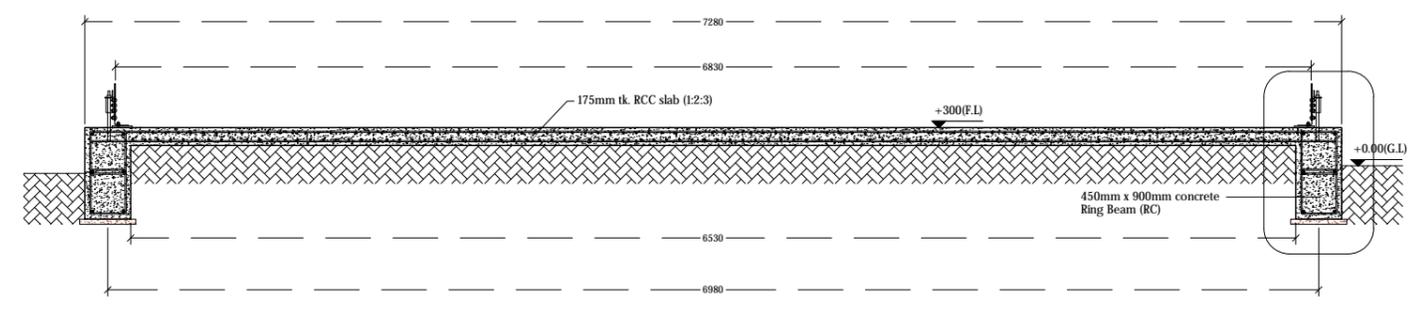
Rev: R-01 Page: W-19



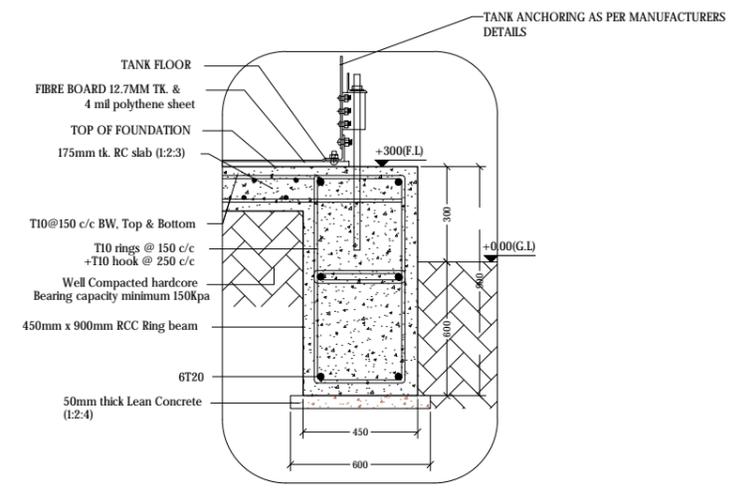
RAINWATER HOLDING TANK AND FOUNDATION- PLAN



RAINWATER HOLDING TANK AND FOUNDATION- ELEVATION



SECTION X-X



DETAIL

Note:-  
Cover = 50mm  
Lap length 50

RAINWATER HOLDING TANK DETAILS

Legend

- Note:
- Orientation of tanks and pipe work to suit location.
  - All structural concrete shall be of grade C30.
  - All castings shall be done using sulphate resistant portland cement to BS 4027:1996.
  - All structural reinforcement shall be epoxy coating of non-pre-stressed reinforcement to ASTM-A775/A775M.
  - A cover of 75mm should be given for all reinforcements.
  - All concrete cold joints shall casted with bonding agent.
  - Tank foundation to be approved based on manufacturers recommendation.

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R00	JUNE 2020	STAGE -1	PD	SBC	SD

Title:  
**Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives - Package 5**

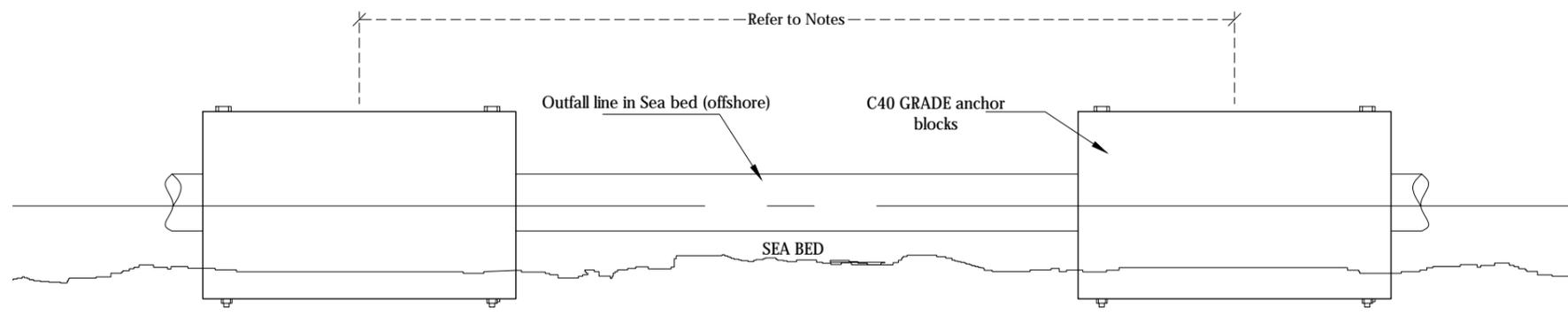
Sub Title:  
**Water Supply System in V. Rakeedhoo**

Client:  
**Ministry of National Planning, Housing and Infrastructure, Republic of Maldives**

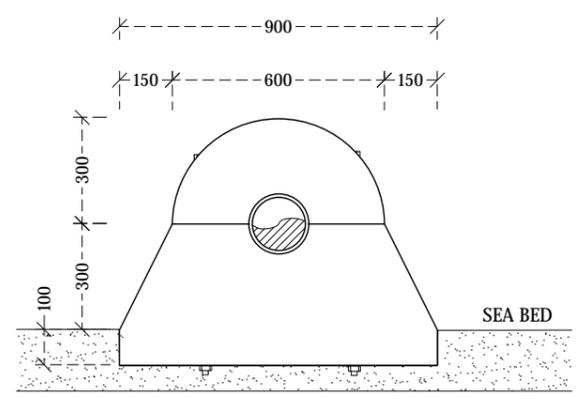
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Husnuheena Magu, Male', Maldives

**DBACK INFRA**  
Maldivian Infrastructure Developer

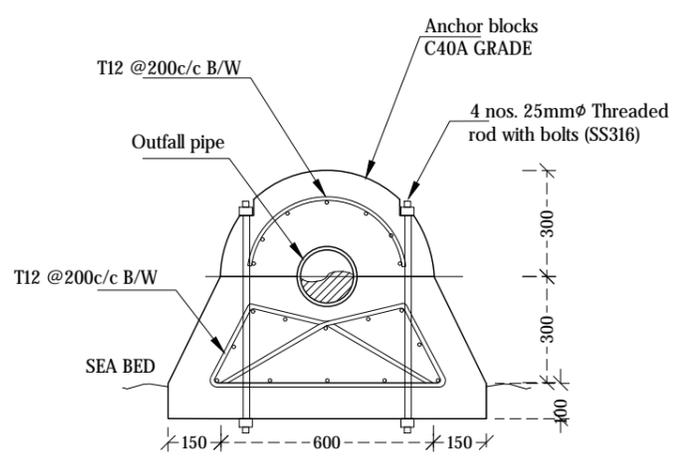
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Designed: F.I.A.	Approved: I.W.
Date: Sep 2020	SCALE (AS): NTS
Project No: EP-WS/2019/05	Page: R-01



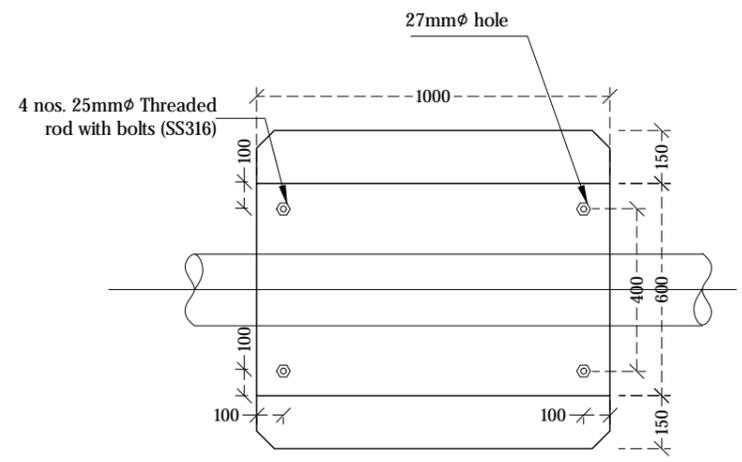
BALLAST BLOCK SIDE ELEVATION



BALLAST BLOCK FRONT ELEVATION



BALLAST BLOCK SECTION



BALLAST BLOCK PLAN

Legend

Notes:

- All backing rings for stub flanges, nuts and bolts shall be grade 316 stainless steel.
- All pipe work shall be bedded on 10mm thick neoprene rubber seat in semicircular recess matching the O.D. the pipe.
- Fabricate specific pipe clamps to provide firm clamping action according to pipe O.D.
- All structural concrete shall be of grade C40A.
- All castings shall be done using sulphate resistant portland cement to BS 4027:1996.
- All structural reinforcement shall be epoxy coating of non-pre-stressed reinforcement to ASTM-A775/A775M.
- A cover of 75mm should be given for all reinforcements.
- In shallow water (regions where the depth is less than 1m), the ballast block spacing is 3.5m. In deeper water (regions where the depth is greater than 1m), the ballast block spacing is 2.0m. All distances are from c/c of blocks.
- All pipe connections to be placed inside the ballast blocks.

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R00	JUNE 2020	STAGE-1	PD	SBC	SD

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**Water Supply System in V. Rakeedhoo**

Client:  
**Ministry of National Planning, Housing and Infrastructure, Republic of Maldives**

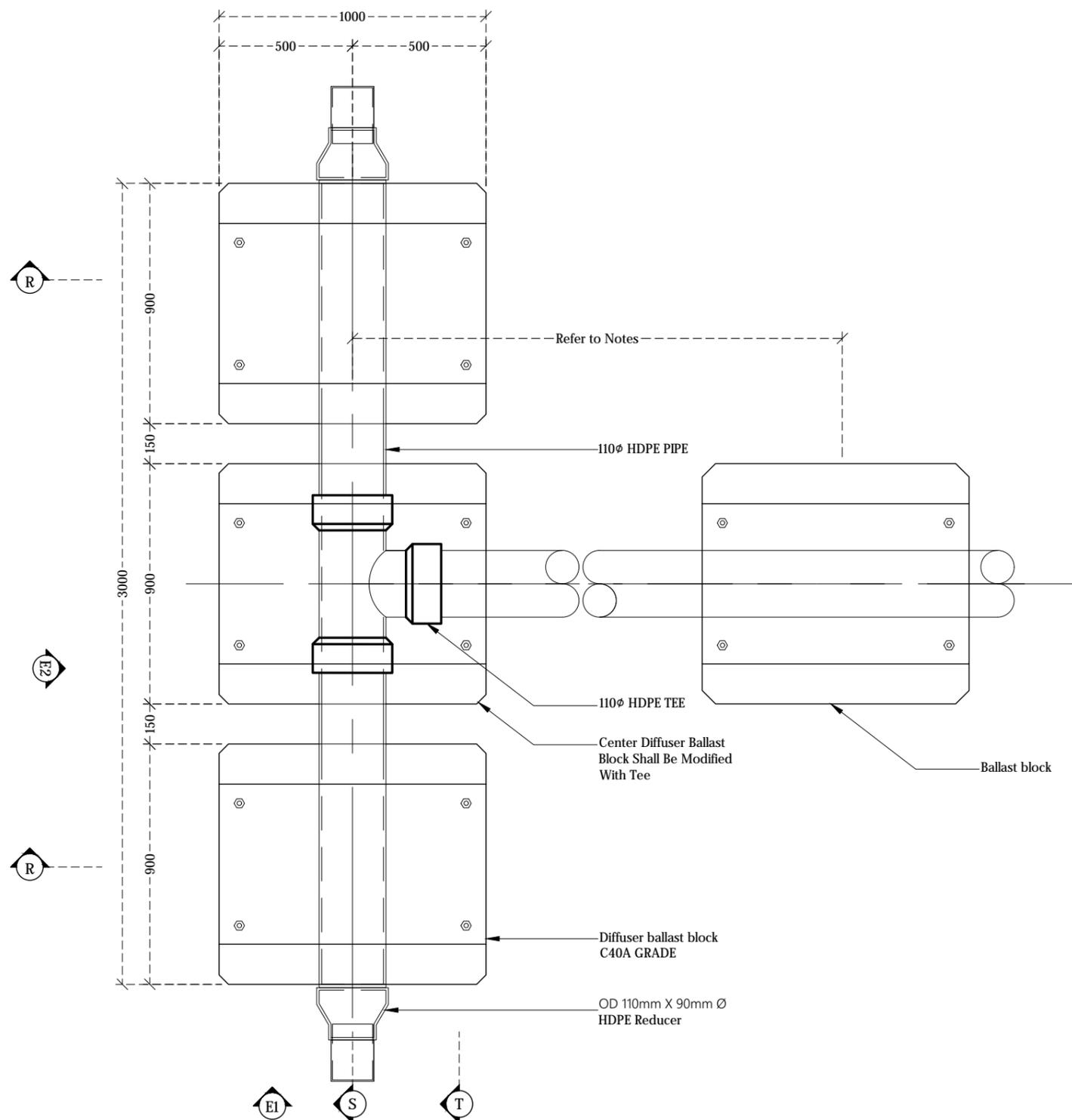
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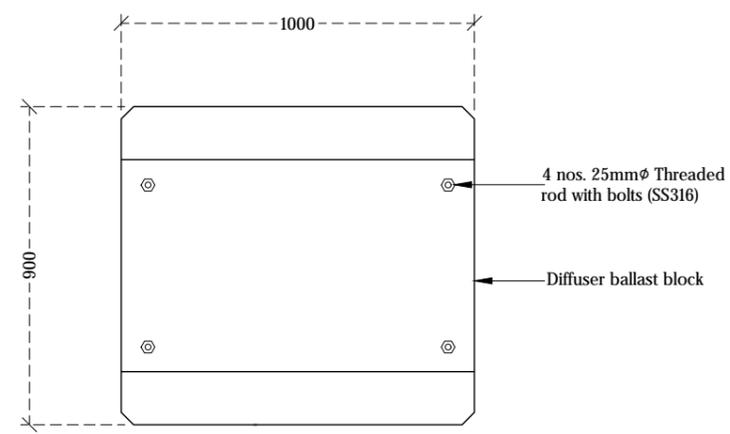
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Designed: F.I.A.	Approved: I.W.
Date: Sep 2020	SCALE (AS): NTS
Project No: EP-WS/2019/05	
Rev: R-01	Page: W-21

BALLAST BLOCK DETAILS

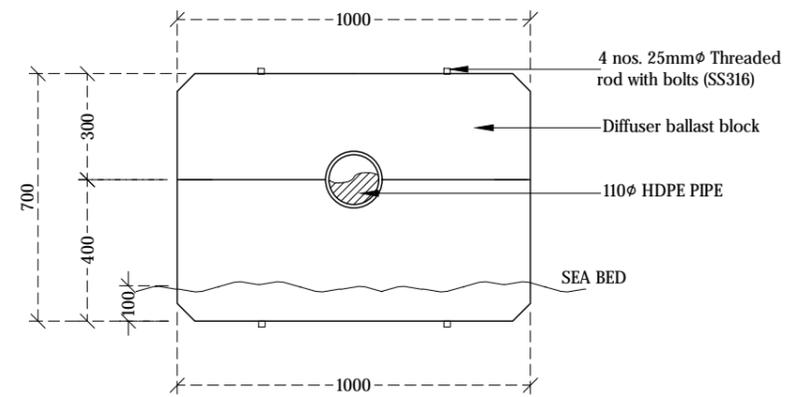
NTS



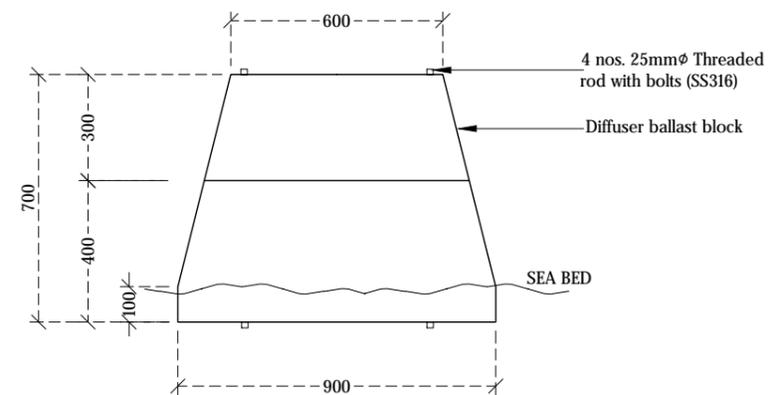
DIFFUSER BALLAST BLOCK SECTION - R



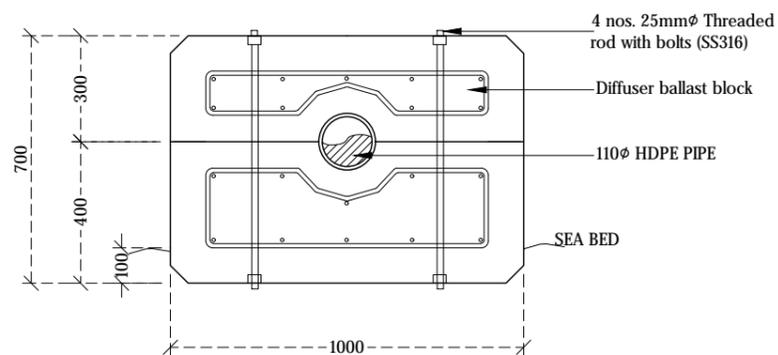
DIFFUSER BALLAST BLOCK PLAN



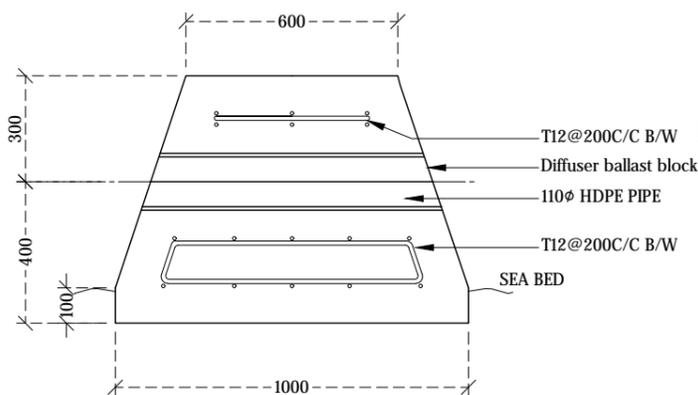
DIFFUSER BALLAST BLOCK FRONT ELEVATION - E1



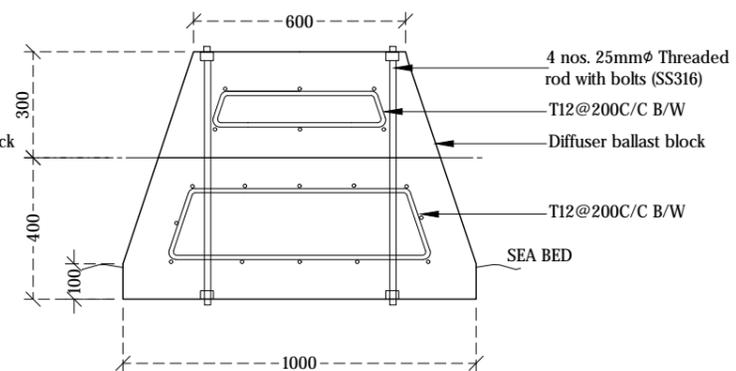
DIFFUSER BALLAST BLOCK FRONT ELEVATION - E2



DIFFUSER BALLAST BLOCK SECTION - R



DIFFUSER BALLAST BLOCK SECTION - S



DIFFUSER BALLAST BLOCK SECTION - T

DIFFUSER DETAILS

NTS



Legend

Notes:

- All backing rings for stub flanges, nuts and bolts shall be grade 316 stainless steel.
- All pipe work shall be bedded on 10mm thick neoprene rubber seat in semicircular recess matching the O.D. the pipe.
- Fabricate specific pipe clamps to provide firm clamping action according to pipe O.D.
- All structural concrete shall be of grade C40A.
- All castings shall be done using sulphate resistant portland cement to BS 4027:1998.
- All structural reinforcement shall be epoxy coating of non-pre-stressed reinforcement to ASTM-A775/A775M.
- A cover of 75mm should be given for all reinforcements.
- In shallow water (regions where the depth is less than 1m), the ballast block spacing is 3.5m. In deeper water (regions where the depth is greater than 1m), the ballast block spacing is 2.0m. All distances are from c/c of blocks.

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R00	JUNE 2020	STAGE -1	PD	SBC	SD

Title:  
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Sub Title:  
**Water Supply System in V. Rakeedhoo**

Client:  
 Ministry of National Planning, Housing and Infrastructure, Republic of Maldives



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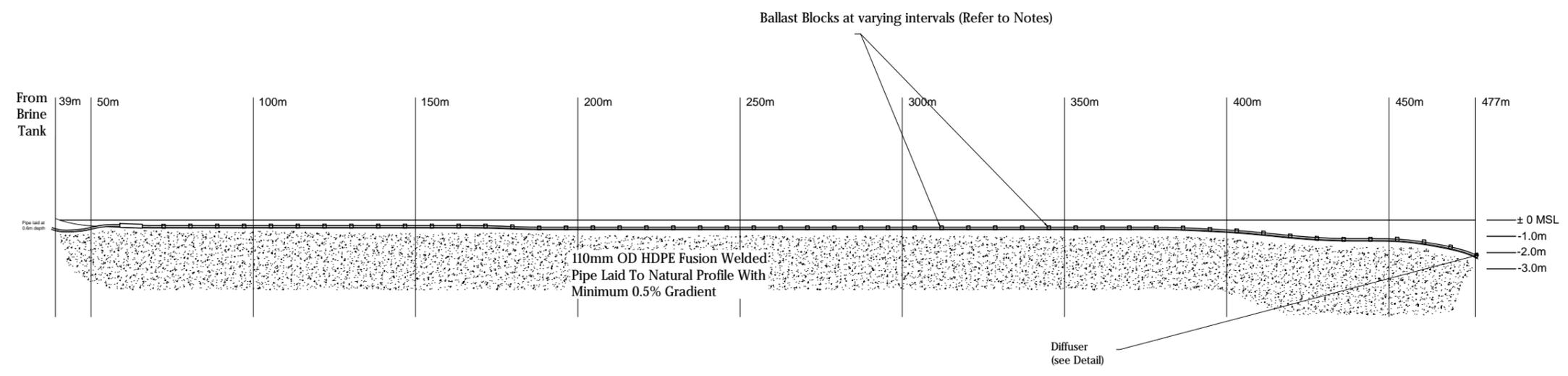
Drawn: F.I.A. Checked: M.S.S.

Designed: F.I.A. Approved: I.W.

Date: Sep 2020 SCALE (AS): NTS

Project No: EP-WS/2019/05

Rev: R-01 Page: W-22



**Legend**

**Notes:**

- The contractor to undertake a detailed inspection of the outfall site to assess the profile and condition of the reef below sea level and to prepare his methodology for installation and fixing.
- In shallow water (regions where the depth is less than 1m), the ballast block spacing is 3.5m. In deeper water (regions where the depth is greater than 1m), the ballast block spacing is 2.0m. All distances are from c/c of blocks.

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
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Sub Title:  
**Water Supply System in V. Rakeedhoo**

Client:  
**Ministry of National Planning, Housing and Infrastructure, Republic of Maldives**

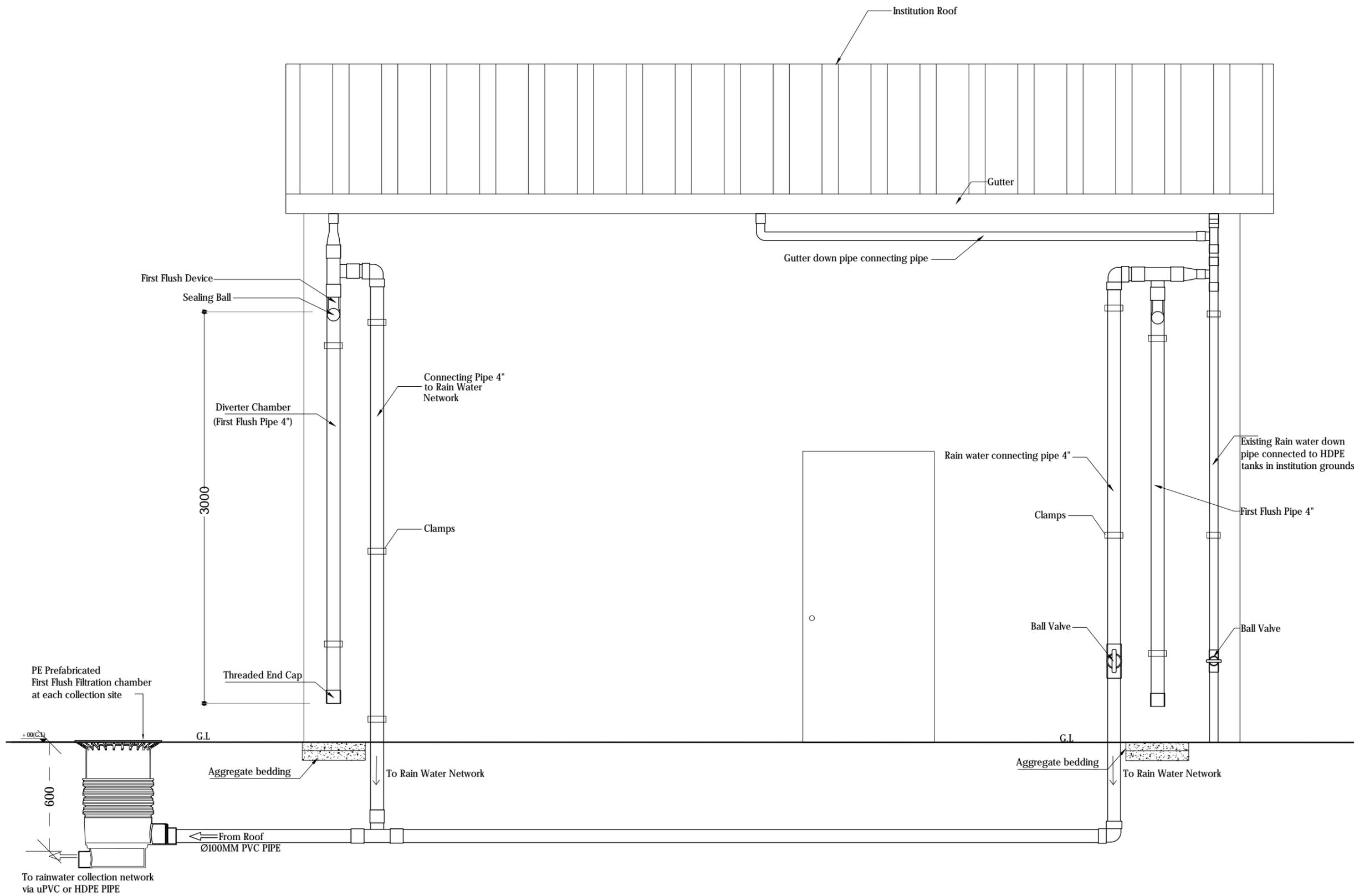


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DBACK INFRA  
 Building Self-Construction & Support

Drawn: F.I.A.	Checked: M.S.S.
Designed: F.I.A.	Approved: I.W.
Date: Sep 2020	SCALE (AS): NTS
Project No: EP-WS/2019/05	
Rev: R-01	Page: W-23



**Legend**

- Notes:
- Prefab filtration chambers will be used as first flush mechanism.
  - Filtration chambers suppliers to be approved by engineer.
  - Number of chambers will be based on approved manufacturers roof area recommendations.
  - Overflow mechanism will be installed on only corner down pipes or where necessary.
  - All down pipes are 3 inch dia PVC pipes.
  - The filtration chamber will have a screen to prevent entry of debris and dirt.
  - Clamps and hangers shall be fixed at 1.5m intervals.

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
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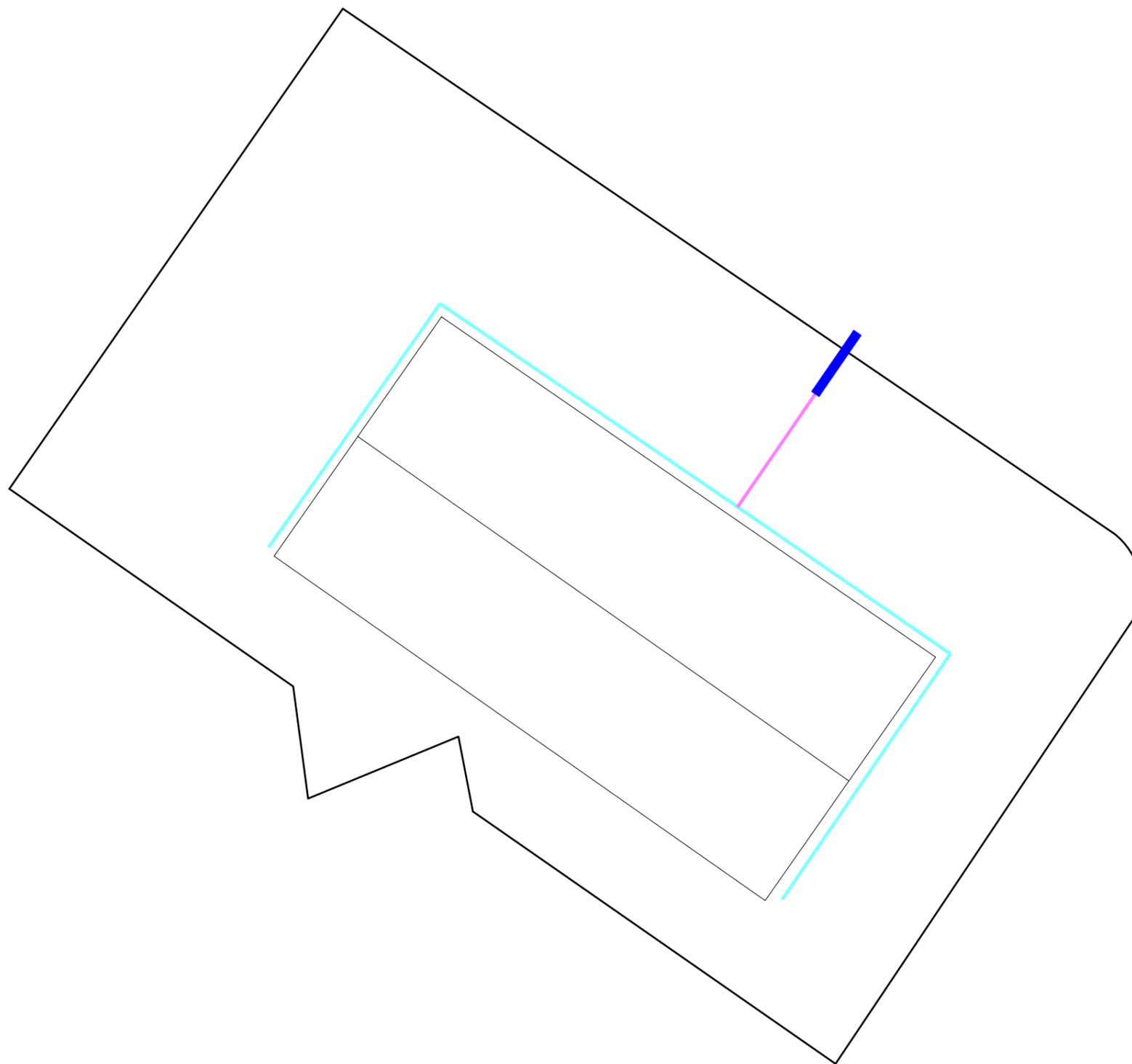
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Designed: F.I.A.	Approved: I.W.
Date: Sep 2020	SCALE (AS): NTS
Project No: EP-WS/2019/05	
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**RAINWATER FIRST FLUSH MECHANISM**

NTS



**Legend**

- = PVC PIPES Ø160mm
- = PVC PIPES Ø110mm

Notes:  
 - Shop drawings to be produced based on site location for engineers approval.  
 -Approximate Network Length = 52m  
 -Approximate Gutter Length = 47m  
 -Approximate Pipe Network Length (Diameter 160mm) = 5m  
 -Approximate Pipe Network Length (Diameter 110mm) = 47m

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
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Drawn: F.I.A. Checked: M.S.S.

Designed: F.I.A. Approved: I.W.

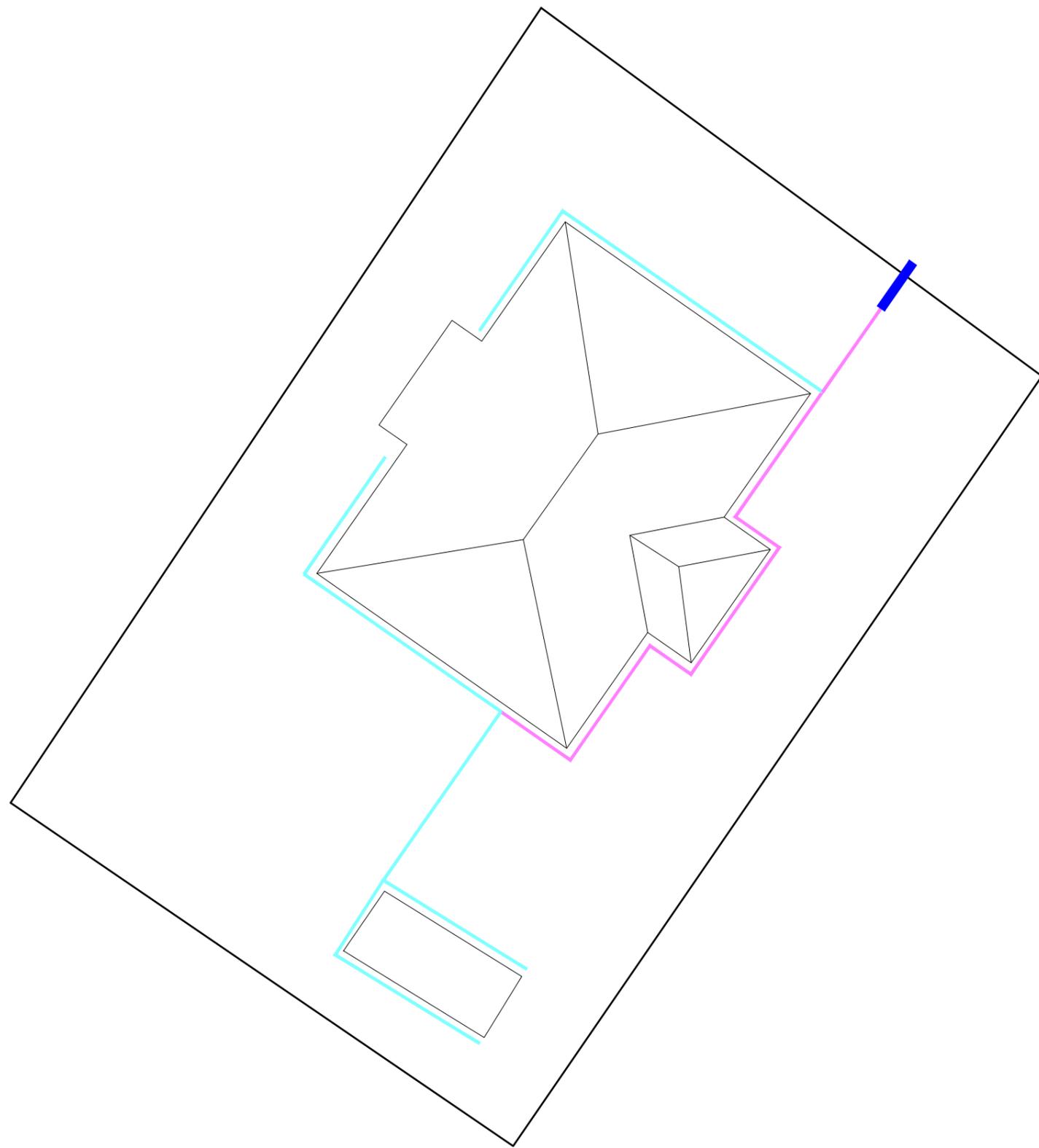
Date: Sep 2020 SCALE (AS): 1:200

Project No: EP-WS/2019/05

Rev: R-01 Page: W-25

**INTERNAL NETWORK LAYOUT- MADHARUSA**

1:200



INTERNAL NETWORK LAYOUT- MOSQUE

1:200



Legend

- = PVC PIPES Ø160mm
- = PVC PIPES Ø110mm

Notes:  
 - Shop drawings to be produced based on site location for engineers approval.  
 -Approximate Network Length = 85m  
 -Approximate Gutter Length = 74m  
 -Approximate Pipe Network Length (Diameter 160mm) = 28m  
 -Approximate Pipe Network Length (Diameter 110mm) = 57m

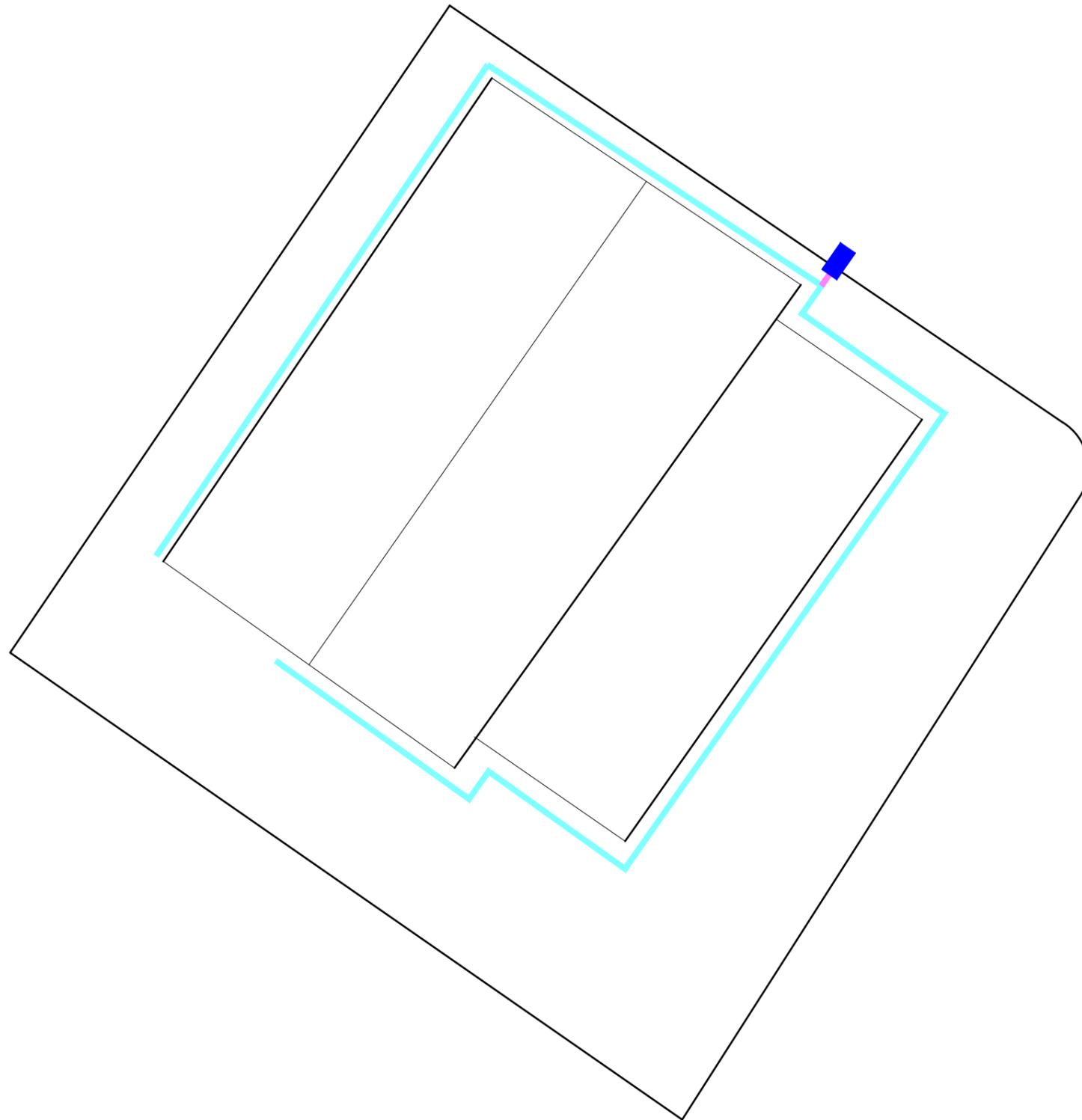
REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
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Title:  
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 Husnuheemaa Magu, Male', Maldives

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Drawn: F.I.A.	Checked: M.S.S.
Designed: F.I.A.	Approved: I.W.
Date: Sep 2020	SCALE (AS): 1:200
Project No: EP-WS/2019/05	
Rev: R-01	Page: W-26



INTERNAL NETWORK LAYOUT- OLD MOSQUE

1:100



Legend

- = PVC PIPES Ø160mm
- = PVC PIPES Ø110mm

- Notes:
- Shop drawings to be produced based on site location for engineers approval.
  - Approximate Network Length = 45m
  - Approximate Gutter Length = 32m
  - Approximate Pipe Network Length (Diameter 160mm) = 3m
  - Approximate Pipe Network Length (Diameter 110mm) = 42m

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R00	JUNE 2020	STAGE -1	PD	SBC	SD

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Sub Title:  
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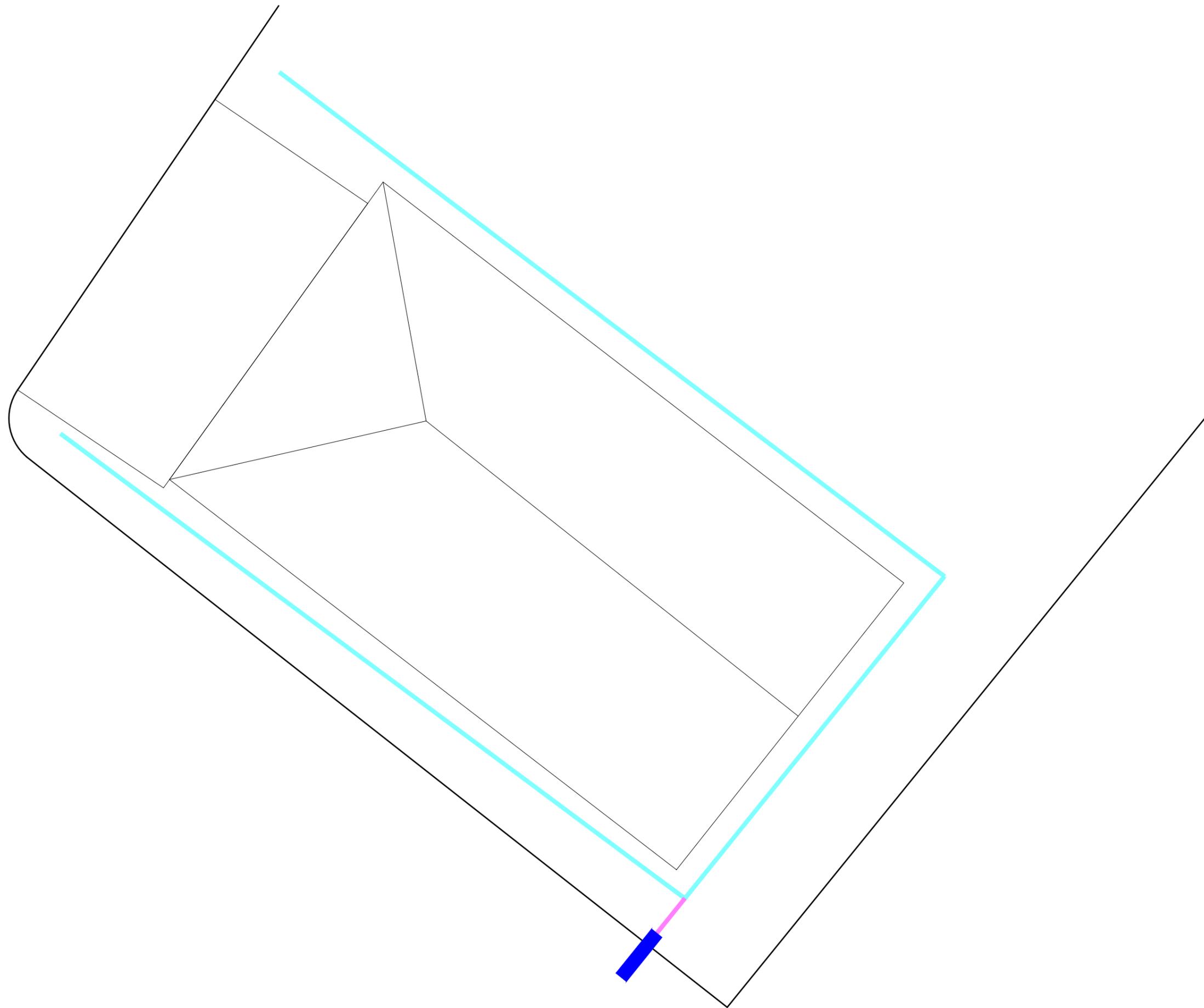
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**Legend**

- = PVC PIPES Ø110mm
- = PVC PIPES Ø160mm

**Notes:**

- Shop drawings to be produced based on site location for engineers approval.
- Approximate Network Length = 53m
- Approximate Gutter Length = 33m
- Approximate Pipe Network Length (Diameter 160mm) = 1m
- Approximate Pipe Network Length (Diameter 110mm) = 52m

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R00	JUNE 2020	STAGE -1	PD	SBC	SD

**Title:**  
 Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 islands, Maldives - Package 5

**Sub Title:**  
 Water Supply System in V. Rakeedhoo

**Client:**  
 Ministry of National Planning, Housing and Infrastructure, Republic of Maldives

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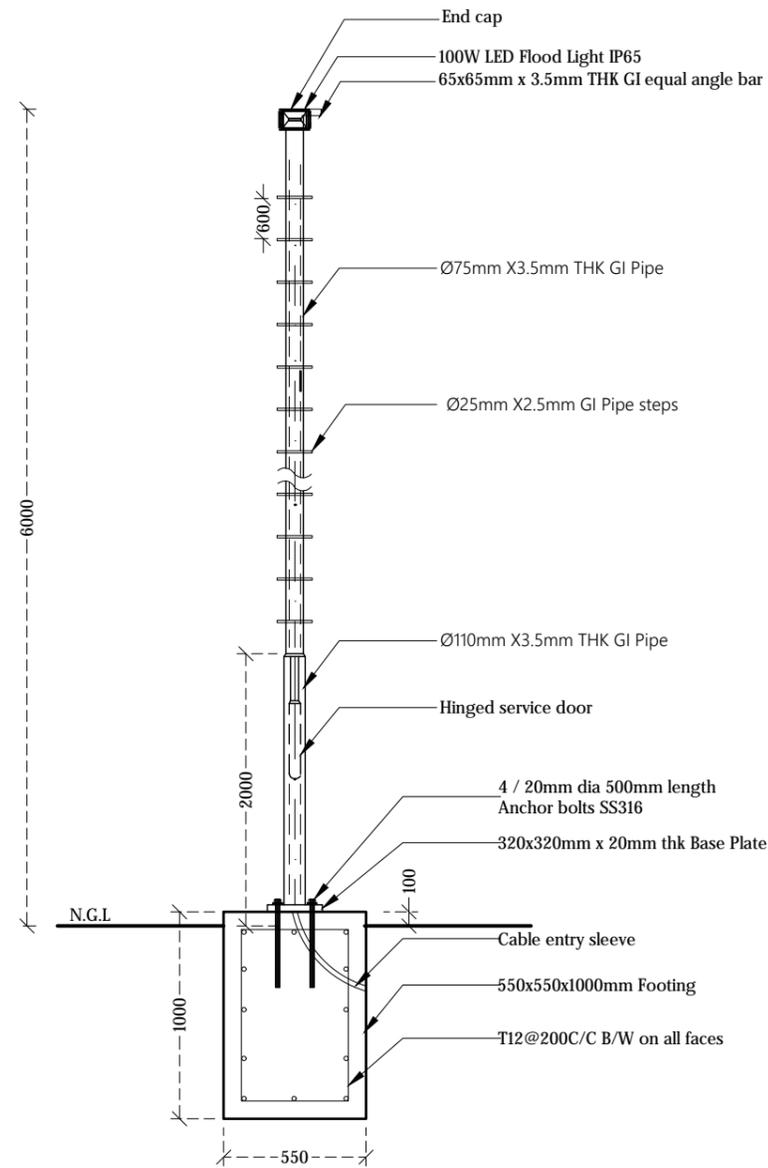
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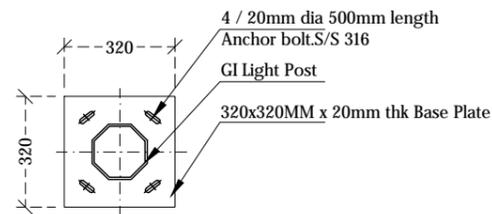
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**INTERNAL NETWORK LAYOUT- COUNCIL OFFICE**

1:100



LIGHT POST DETAILS FOR STP COMPOUND (LP1)



BASE PLATE (LP1)



Legend

- Notes:
- Light posts shall be galvanized (minimum 200 micron) and finished with epoxy paint.
  - All structural concrete shall be of grade C25.
  - All castings shall be done using sulphate resistant portland cement to BS 4027:1996.
  - All structural reinforcement shall be epoxy coating of non-pre-stressed reinforcement to ASTM-A775/A775M.
  - A cover of 50mm should be given for all reinforcements.
  - All steel members and GI SHS to be applied with 2 coats of anti-corrosive paint with epoxy finishing paint.
  - All anchor bolts shall be SS316

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LIGHT POST DETAILS

NTS

ARCHITECTURAL AND STRUCTURAL DRAWINGS OF

PROPOSED SINGLE STOREY BUILDING AT

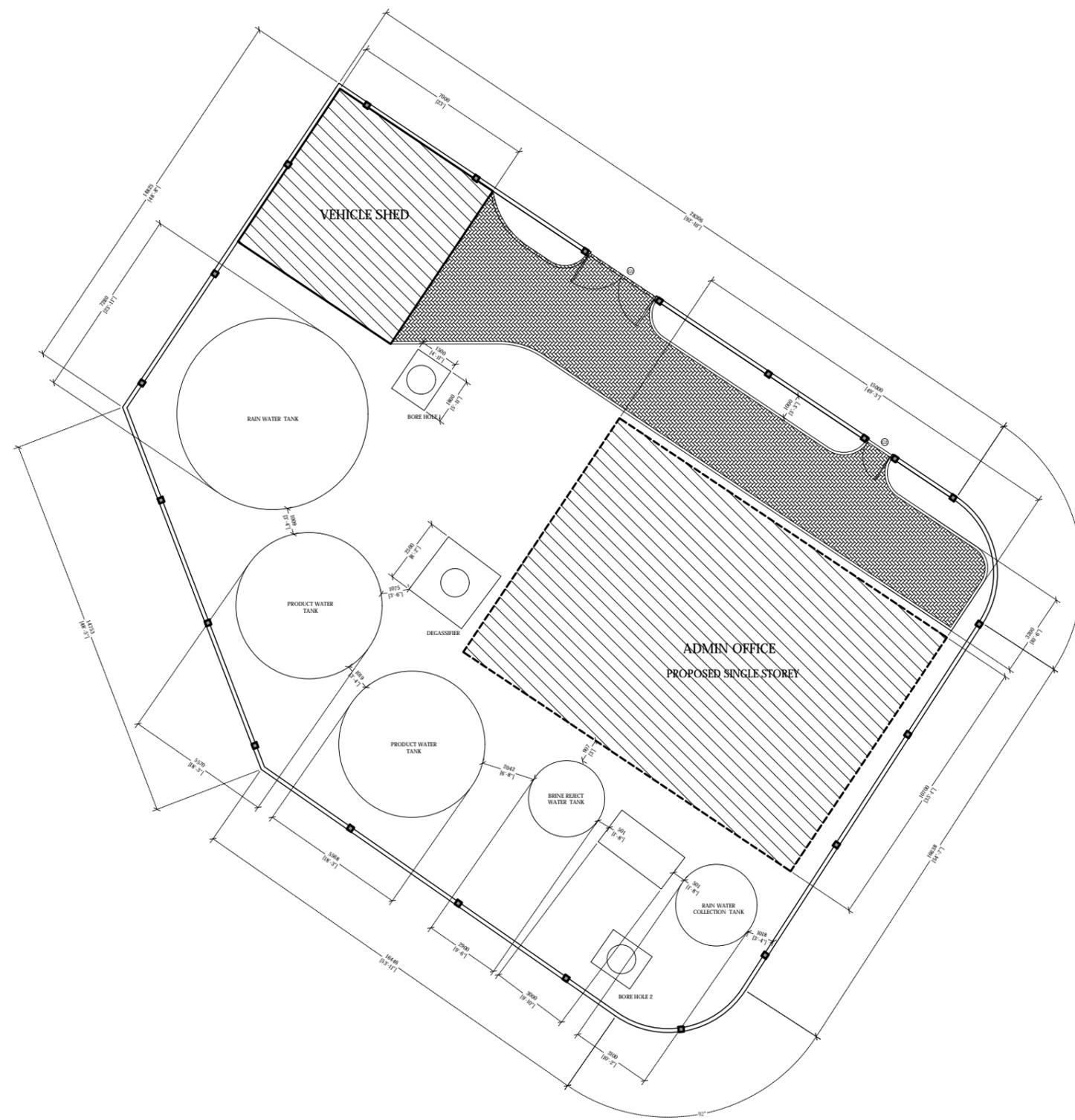
**RO PLANT ADMIN BUILDING AND VEHICLE SHED, V.RAKEEDHOO**

For Ministry of National Planning, Housing and Infrastructure

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**SITE PLAN**  
 1:200

**Legend**

Note:

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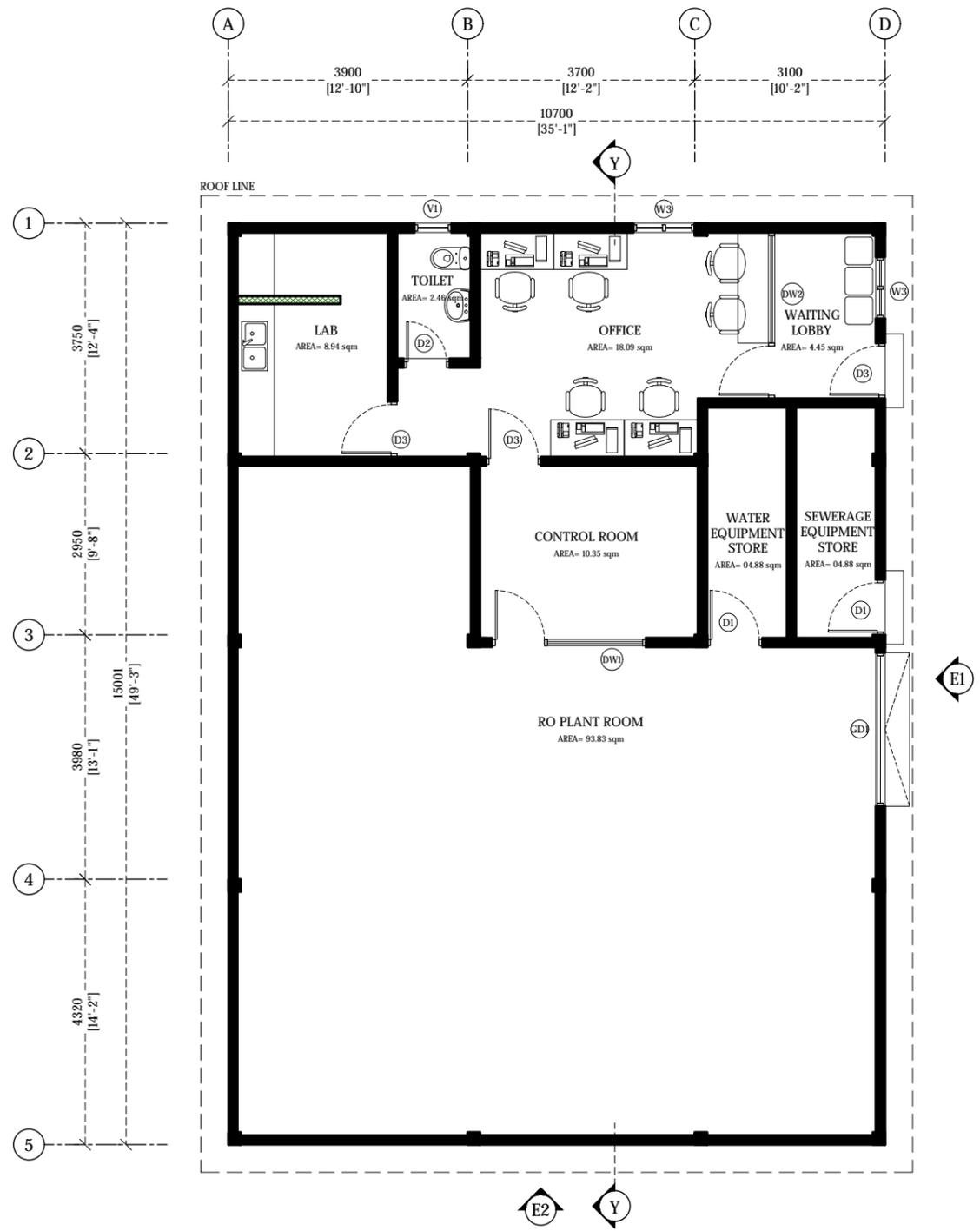
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ARCHITECTURAL AND STRUCTURAL DRAWINGS OF  
PROPOSED SINGLE STOREY BUILDING AT  
**RO PLANT ADMIN BUILDING, V.RAKEEDHOO**



**Wall Legend:**

- 150mm thick masonry blocks with 20mm plaster on exterior and 12mm plaster on interior
- 100mm thick partition walls up to ceiling level

**Wall Finish:**

Internal Wall Finish: Easy to wash odour-less Nippon paint ivory White

External Wall Finish: Weatherboard Algae guard Nippon September Cream

Toilet and shower walls: 300x300mm ceramic wall lanka tiles up to ceiling height with tile adhesive. use joint filler of appropriate color for grouting joints between tiles

**Floor Finish:**

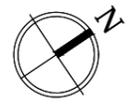
Floor Finishes: 600x600mm homogenous floor tiles with tile adhesive unless specified

Toilet Floor Finishes: 300x300mm homogenous non skid floor tiles with tile adhesive unless specified

**Notes:**

FFL of balconies and toilets should be 25mm lower than the FFL of respective floors

Water proofing to be applied in toilets, balconies and roof terrace prior to tiling



**GROUND FLOOR PLAN**  
1:100

**Legend**

Note:

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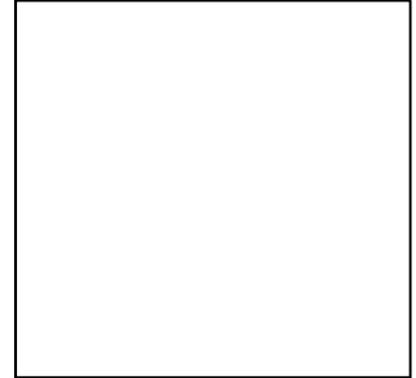
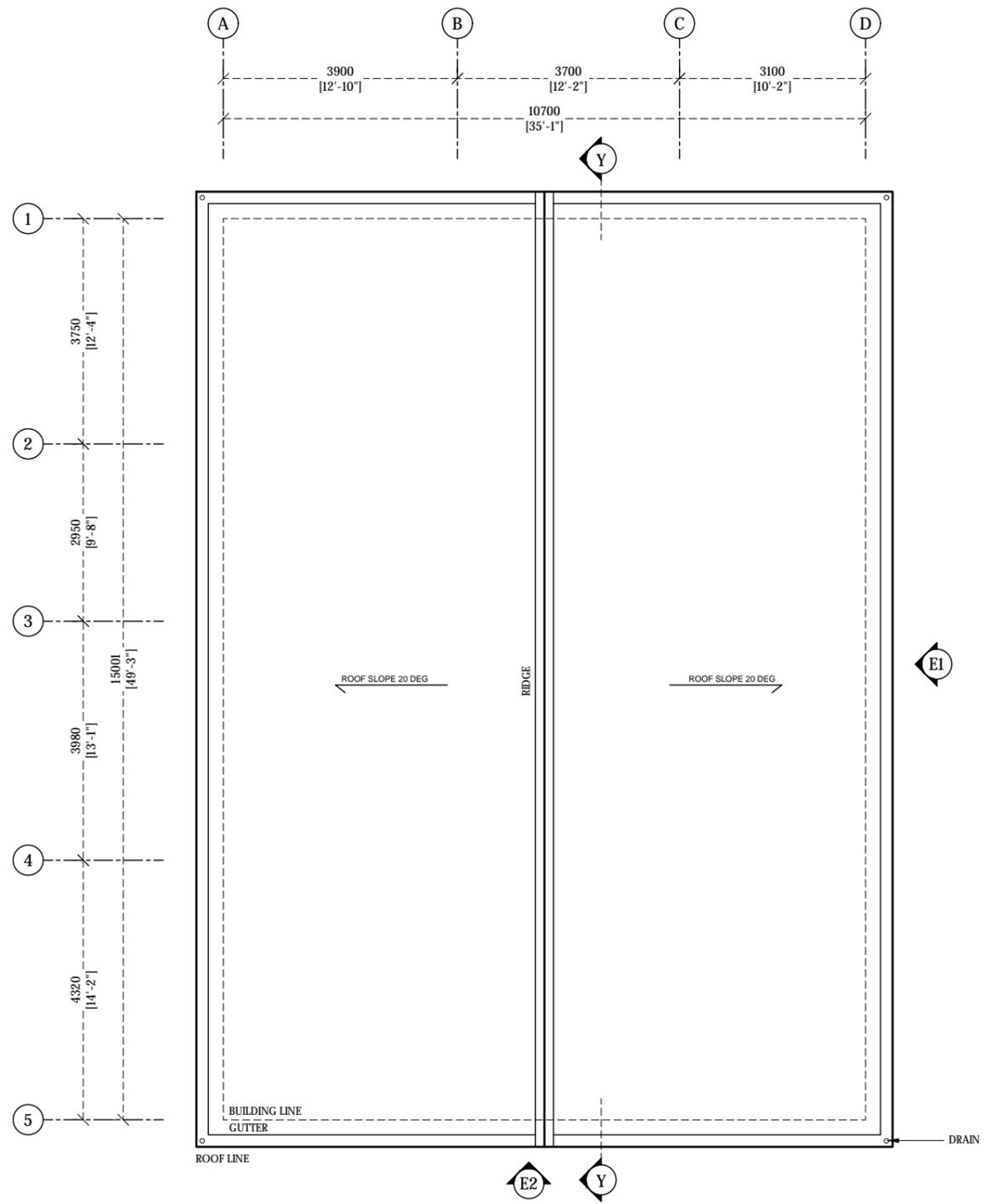
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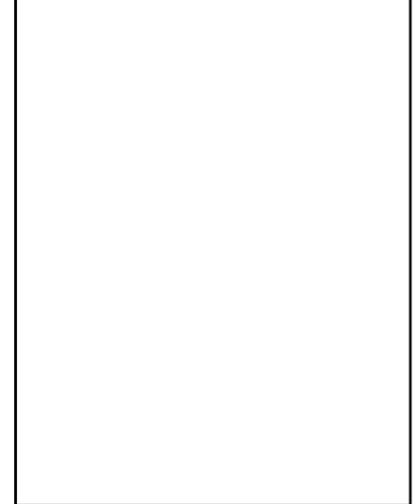
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Legend



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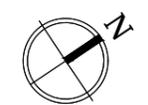


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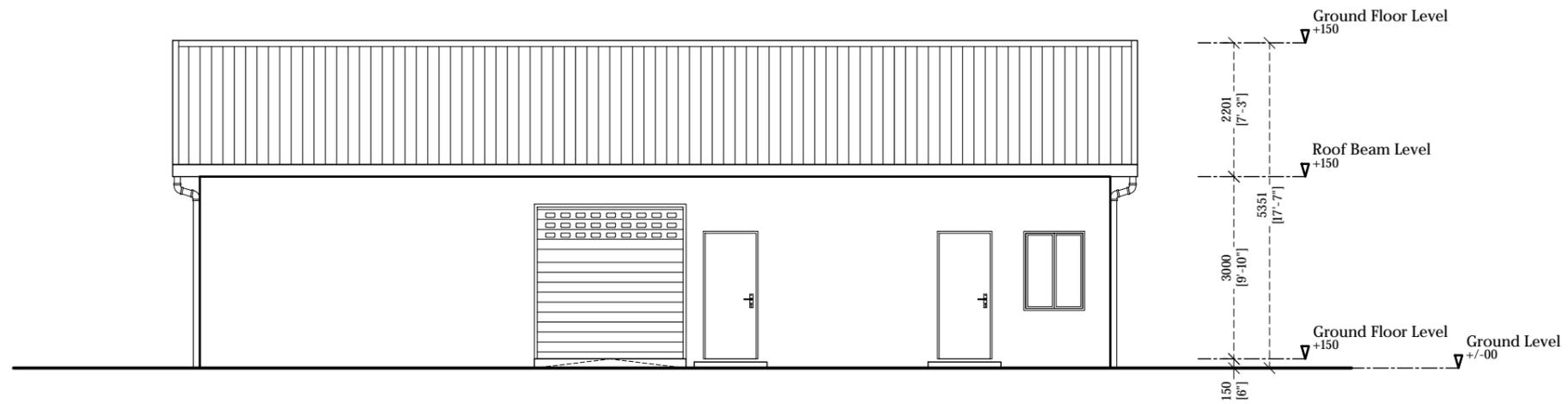


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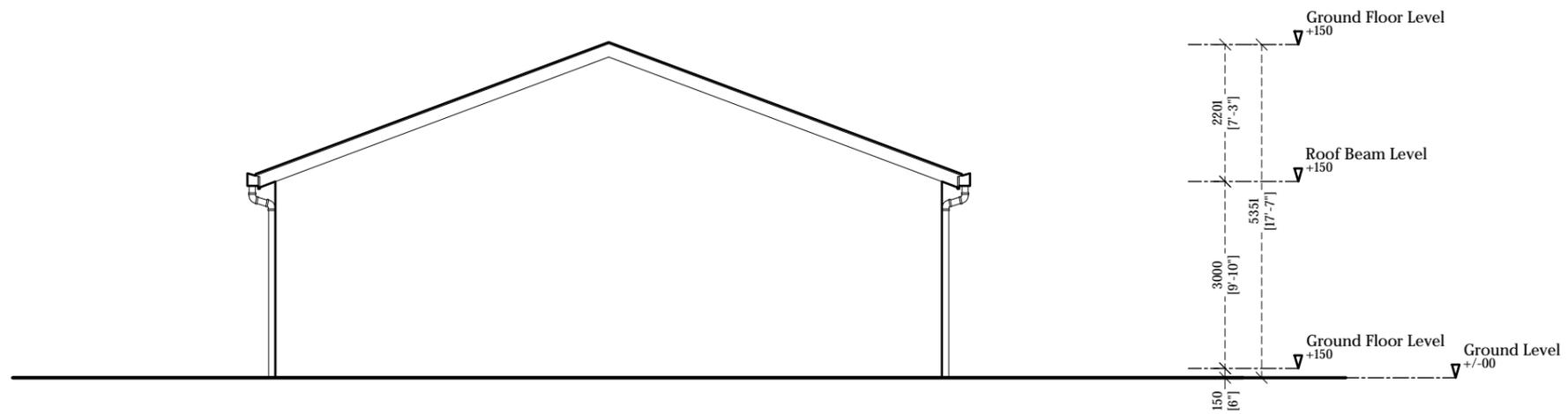
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**ROOF PLAN**  
 1:100



**ELEVATION E1**  
1:100



**ELEVATION E2**  
1:100

Legend

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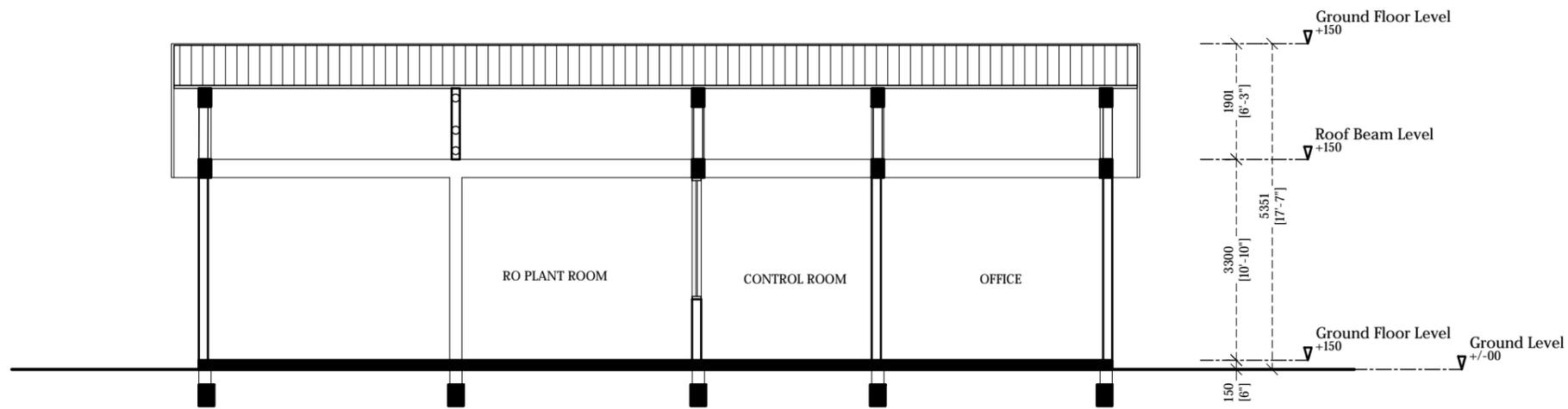
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SECTION XX  
1:100

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Door ID	D1	D2	D3	GD1
Plan view				
Elevation view				
FFL				50 [2']
Frame material	Aluminum black powder coated	Aluminum black powder coated	Aluminum black powder coated	Aluminum framed roller shutter
Panel material	Aluminum cladding sheet	Aluminum cladding sheet	Aluminum cladding sheet & Fixed clear glass	Aluminium
Openable area	1.74	1.45	1.74	6.0

**General Notes:**

Dimensions shown on DWG indicate effective openings of frame

All frame depths are 100mm  
 All dor panel thicknesses are 35mm  
 All window panel thickness are 25mm  
 All frame edges shall be trimmed 3mm

All wooden components should be wood stained finish

All glazing should be of 6mm unless specified

External units must comply the following weather conditions:-  
 Wind pressure: 200 kg/sqm  
 Water tightness: 25 kg/sqm

All external frames / wall joints must be sealed with silicon sealant and the wedges trimmed with 12X12mm hardwood beading fixed to frames by brass nails

All hardware should be provided for the performance of all functions of the units

- Hinges shall conform to
- Door size more than 700X1900mm  
 WD: 125mm X2 sets  
 SD: 150mm X3 sets
  - Door size less than 700X1900mm  
 WD: 100mm X2 sets  
 SD: 125mm X2 sets

Locks shall be cylindrical with master key sets

Door knobs shall be 1000mm above FFL

**Legend**

Note:

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**Water Supply System in V. Rakeedhoo**

Client:  
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**DOOR & WINDOW SCHEDULE -1**

Door ID	DW 1	DW 2	W3
Plan view			
Elevation view			
FFL			
Frame material	Aluminum black powder coated	Aluminum black powder coated	Aluminum black powder coated
Panel material	Aluminum cladding sheet & Fixed clear glass	Aluminum cladding sheet & Fixed clear glass	Reflective Glass
Openable area	-	-	-

Door ID	V1
Plan view	
Elevation view	
FFL	
Frame material	Aluminum black powder coated
Panel material	Reflective Glass
Openable area	0.32

**General Notes:**

Dimensions shown on DWG indicate effective openings of frame

All frame depths are 100mm  
 All dor panel thicknesses are 35mm  
 All window panel thickness are 25mm  
 All frame edges shall be trimmed 3mm

All wooden components should be wood stained finish

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All hardware should be provided for the performance of all functions of the units

Hinges shall confirm to

- Door size more than 700X1900mm  
 WD: 125mm X2 sets  
 SD: 150mm X3 sets
- Door size less than 700X1900mm  
 WD: 100mm X2 sets  
 SD: 125mm X2 sets

Locks shall be cylindrical with master key sets

Door knobs shall be 1000mm above FFL

**DOOR & WINDOW SCHEDULE -2**

1:50

**Legend**

Note:

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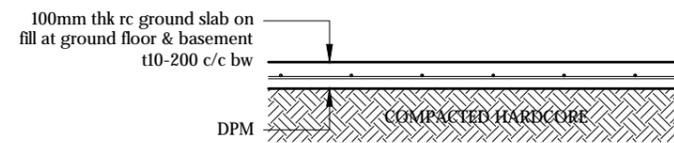
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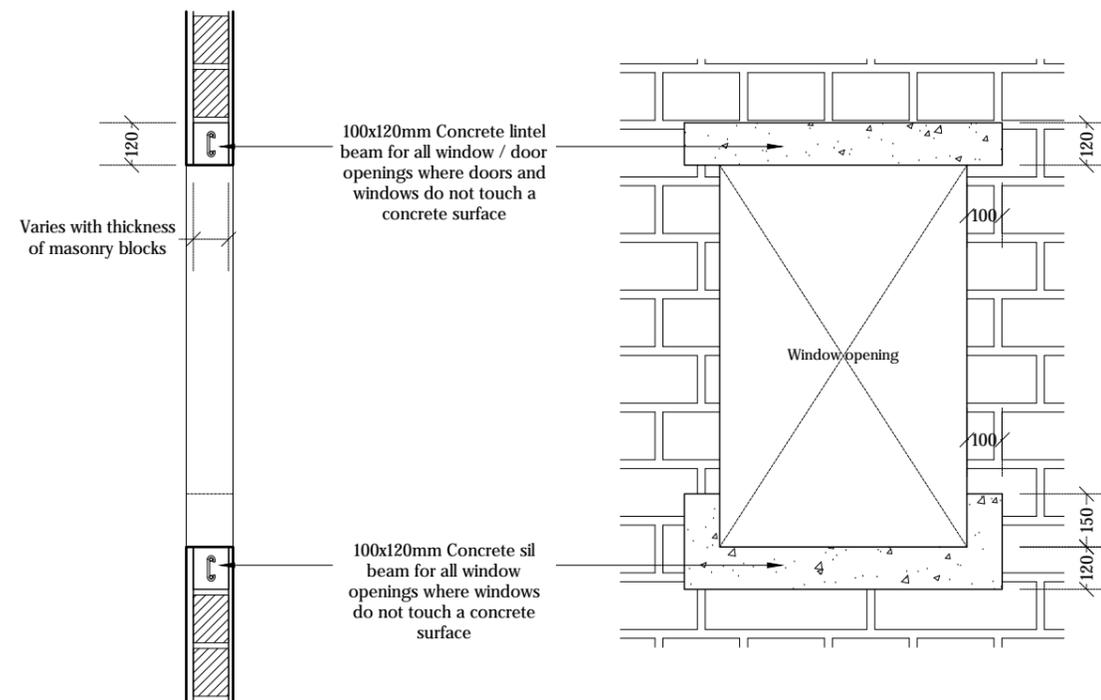


Note:

- All cover blocks shall be casted using grade C25/30 concrete with 5-10mm aggregates
- For slab, rebar spacer chairs spacing shall be minimum 1m spacing or 1 no. per 1 sqm

TYPICAL GROUND SLAB DETAIL

1:20



TYPICAL OPENING DETAIL

1:20

Legend

Note:

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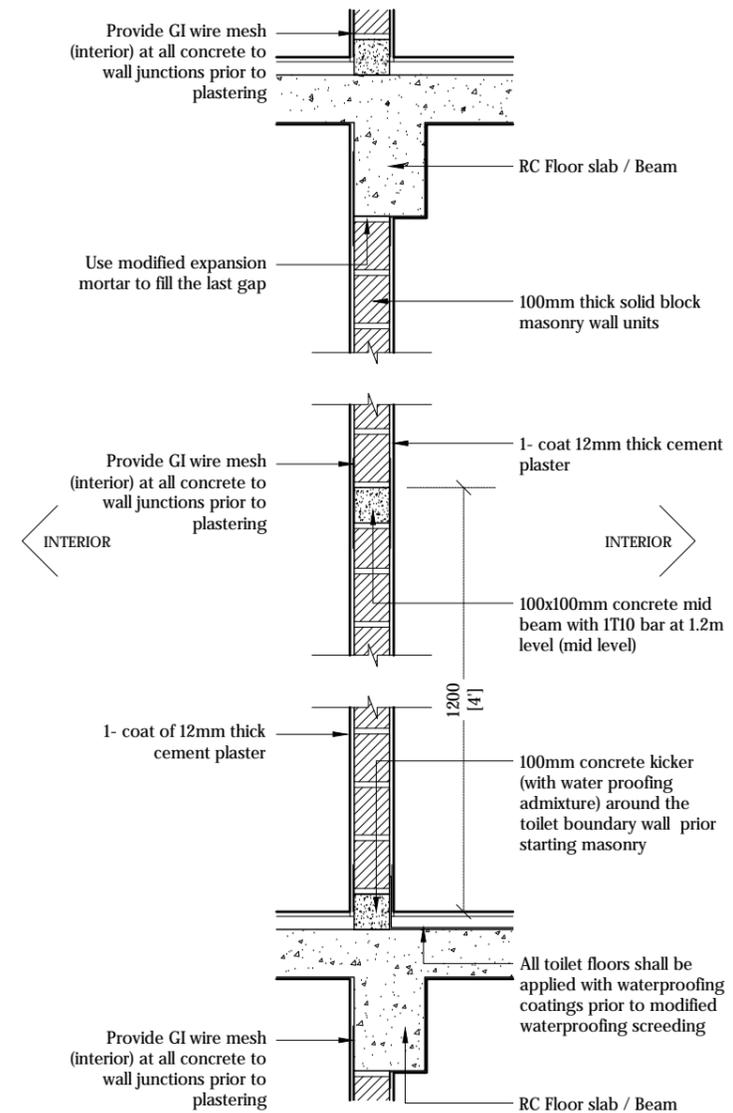
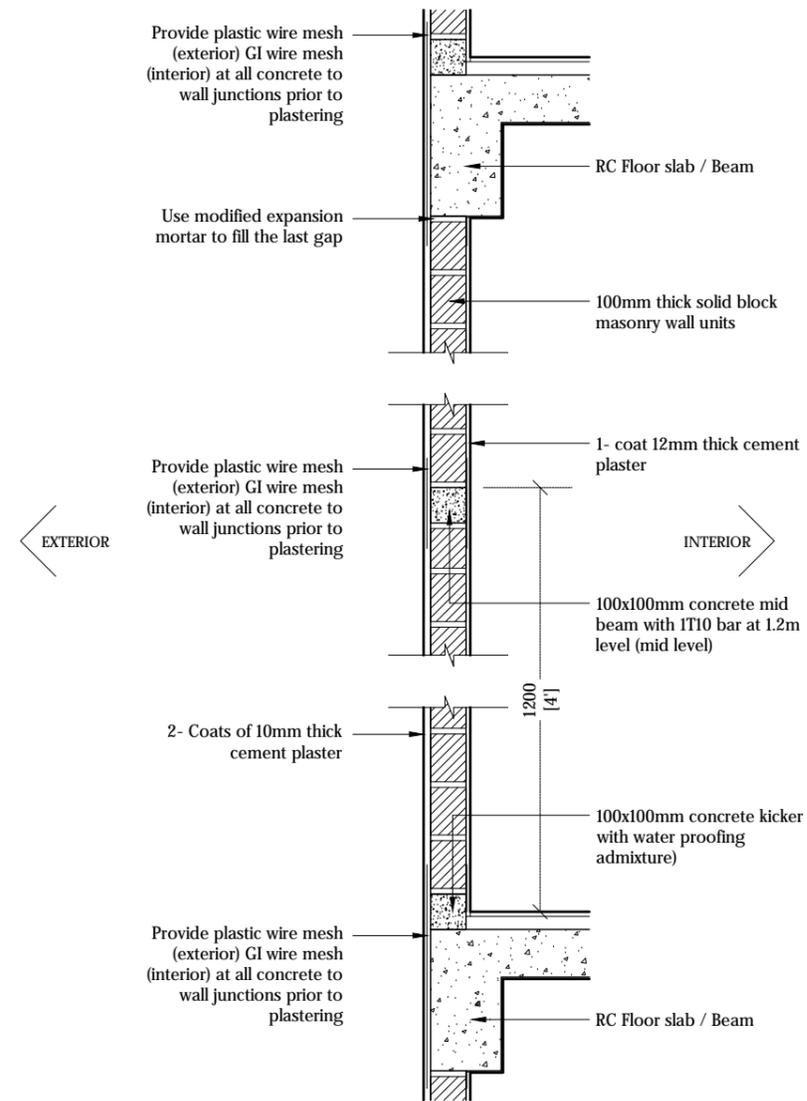
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Note:

- Concrete surfaces shall be thoroughly cleaned with water & applied with mastercast 141 or equivalent bonding mortar prior to plastering.
- Plastering mortar mix shall be 1:4 (cement: sand) ratio.
- Plaster mix shall be modified using fibre wool & mastercast 141 or equivalent plasticisers as per manufacturer's specification.
- Height of placing blocks shall be maximum 1.2m per day.
- After initial coat of plastering, water curing shall be provided for minimum 3 days & after final coat water curing shall be provided for 7 days.

TYPICAL WALL CONSTRUCTION DETAIL

1:20

Legend

Note:

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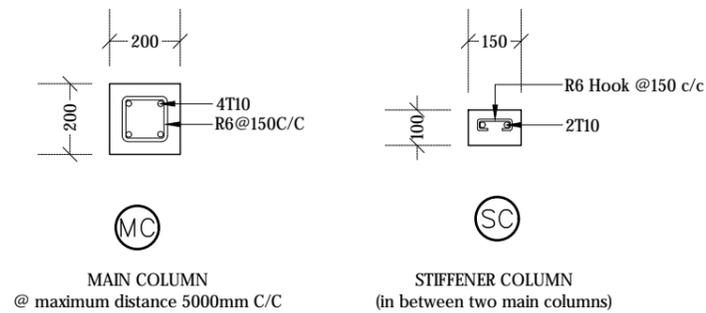
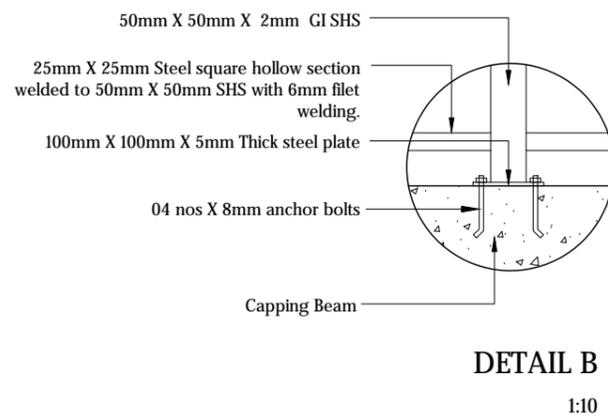
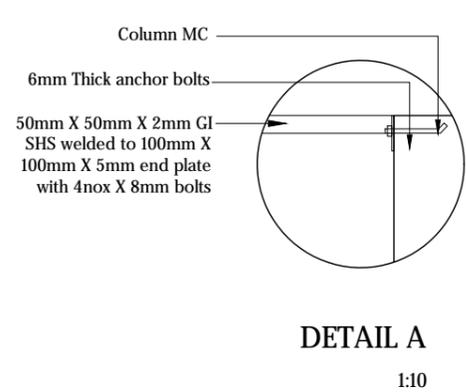
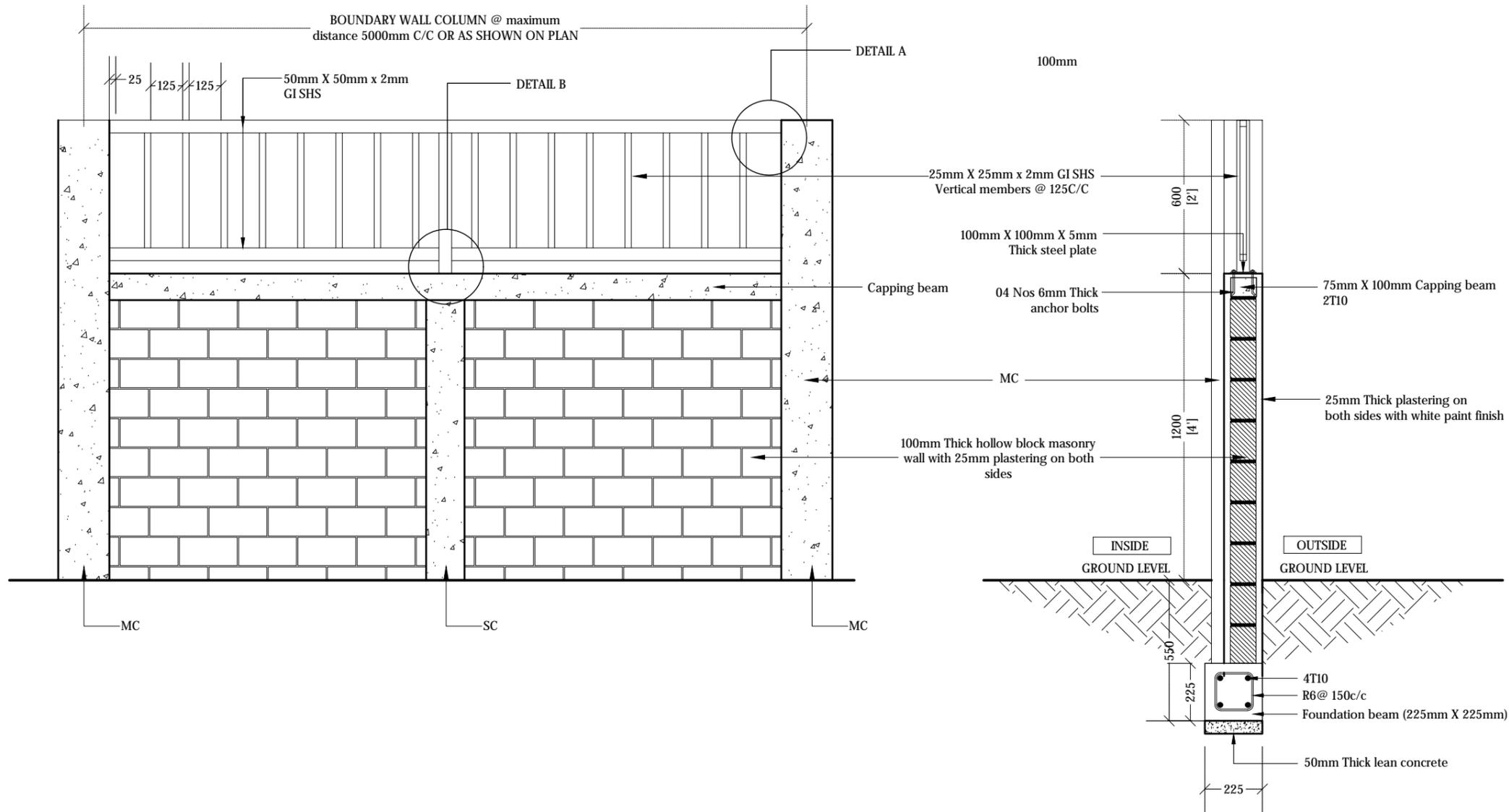
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**NOTE:**

- FRAME MATERIAL : Steel gate frame 2.5mm thick GI sections SHS
- All steel members and GI SHS to be applied with 2 coats of anti-corrosive paint with epoxy finishing paint
- Allowance shall be made to fix pad lock in Gates

Legend

Note:

- FRAME MATERIAL : Steel gate frame 2.5mm thick GI sections SHS
- All steel members and GI SHS to be applied with 2 coats of anti-corrosive paint with epoxy finishing paint
- Allowance shall be made to fix pad lock in Gates
- Cover for foundation beams shall be 50mm
- Cover for columns (MC) shall be 40mm
- Concrete shall be of grade C25
- All concrete cold joints shall be casted with bonding agent

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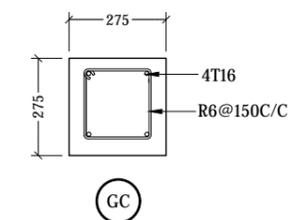
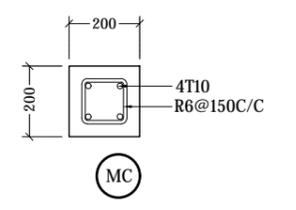
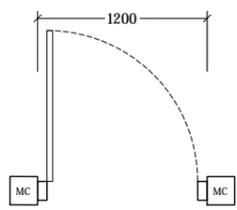
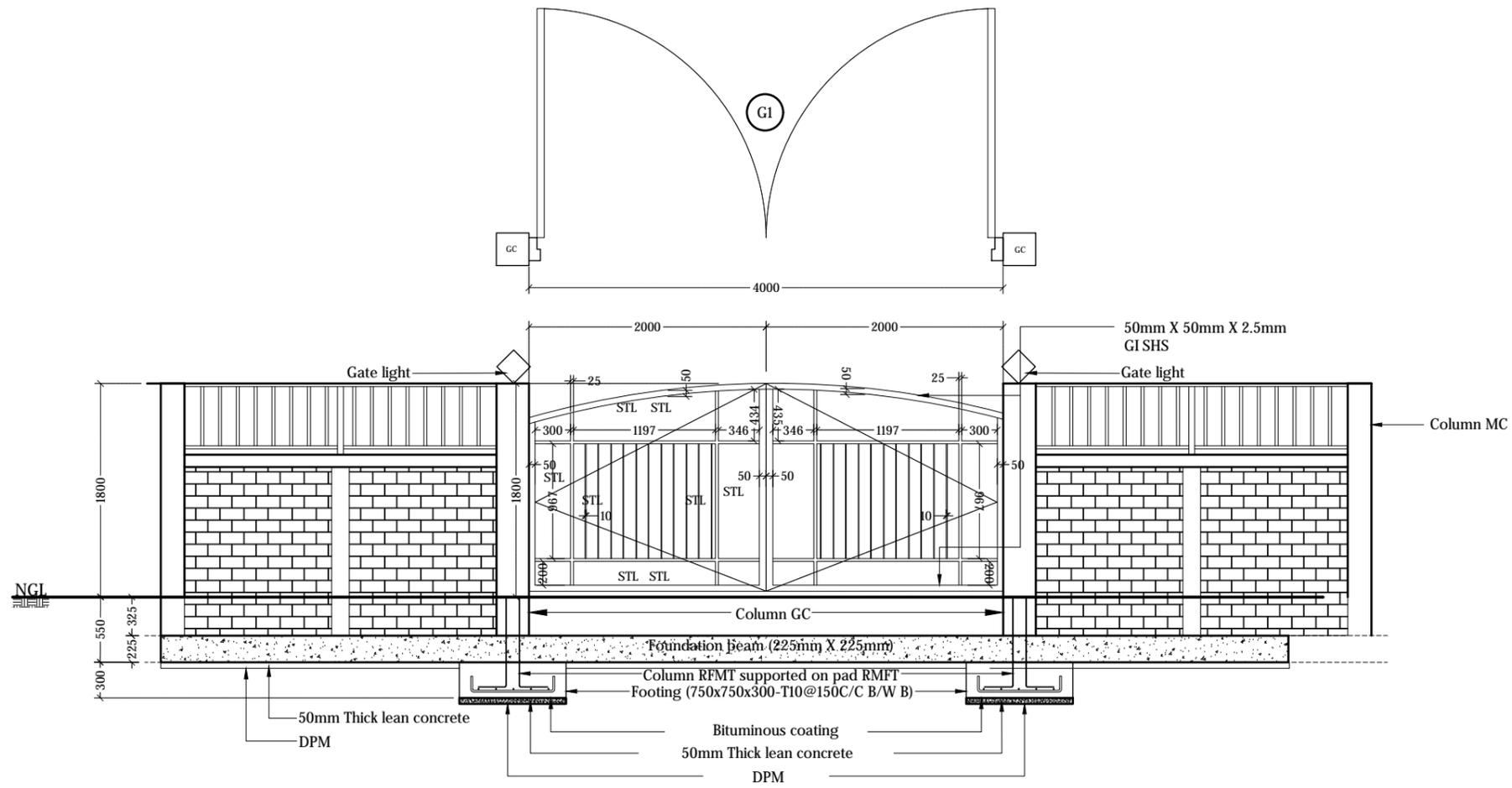
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**DBAC INFRA**  
Building Self construction - Maldives

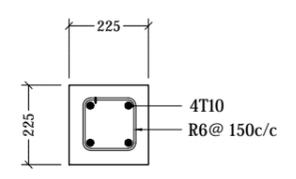
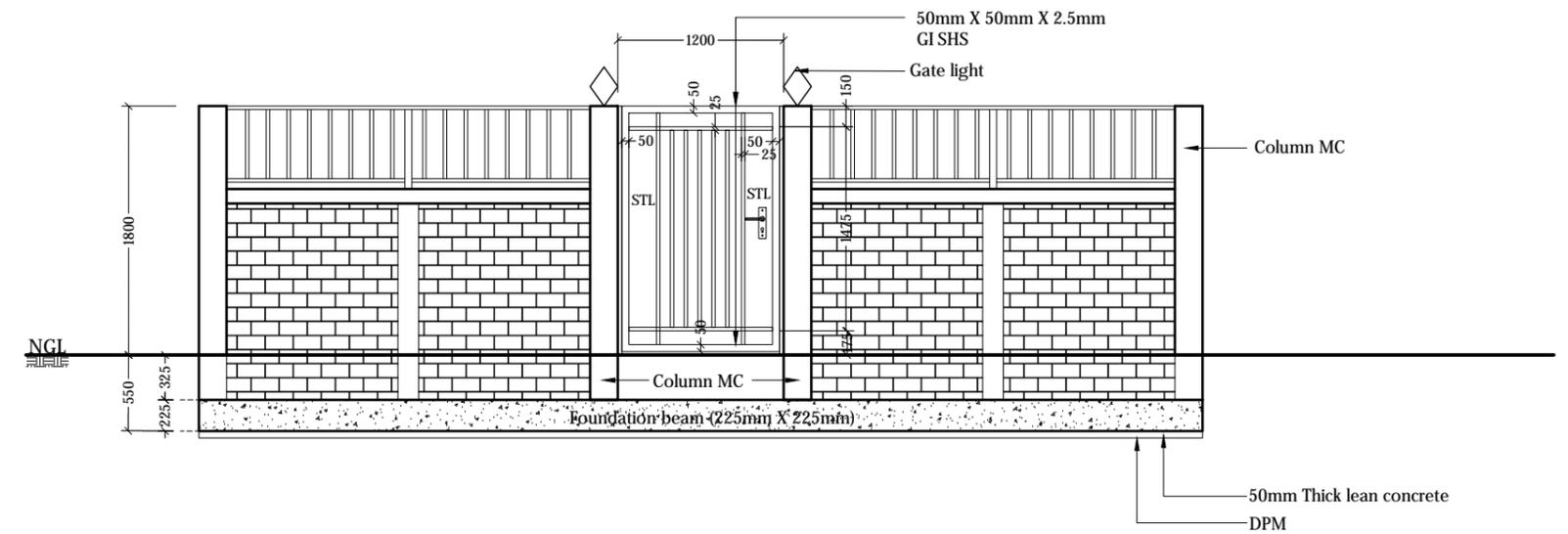
Drawn: A.S.A. Checked: F.I.A.  
Designed: A.S.A. Approved: M.H.  
Date: Nov 2020 SCALE (A3): 1:20  
Project No: EP-WS/2019/05  
Rev: R-01 Page: A.D (3)

**BOUNDARY WALL DETAIL**

1:20



**COLUMN DETAILS**  
1:20



**FOUNDATION BEAM DETAIL**  
1:20

**GATE DETAILS**  
1:50

**Legend**

**Note:**

- FRAME MATERIAL : Steel gate frame 2.5mm thick GI sections RHS
- PANEL MATERIAL : Steel frame with steel panels (STL) as shown on elevation view
- All steel members and GI SHS to be applied with 2 coats of anti-corrosive paint with epoxy finishing paint
- Allowance shall be made to fix pad lock in Gates
- Cover for foundation pads and foundation beams shall be 50mm
- Cover for columns (GC) and(MC) shall be 40mm
- Concrete shall be of grade C25
- All concrete cold joints shall be casted with bonding agent

REV. NO.	Date	Revision Description	Drawn	Chkd	Appd.
R01	NOV 2020		ASA	FIA	M.H.

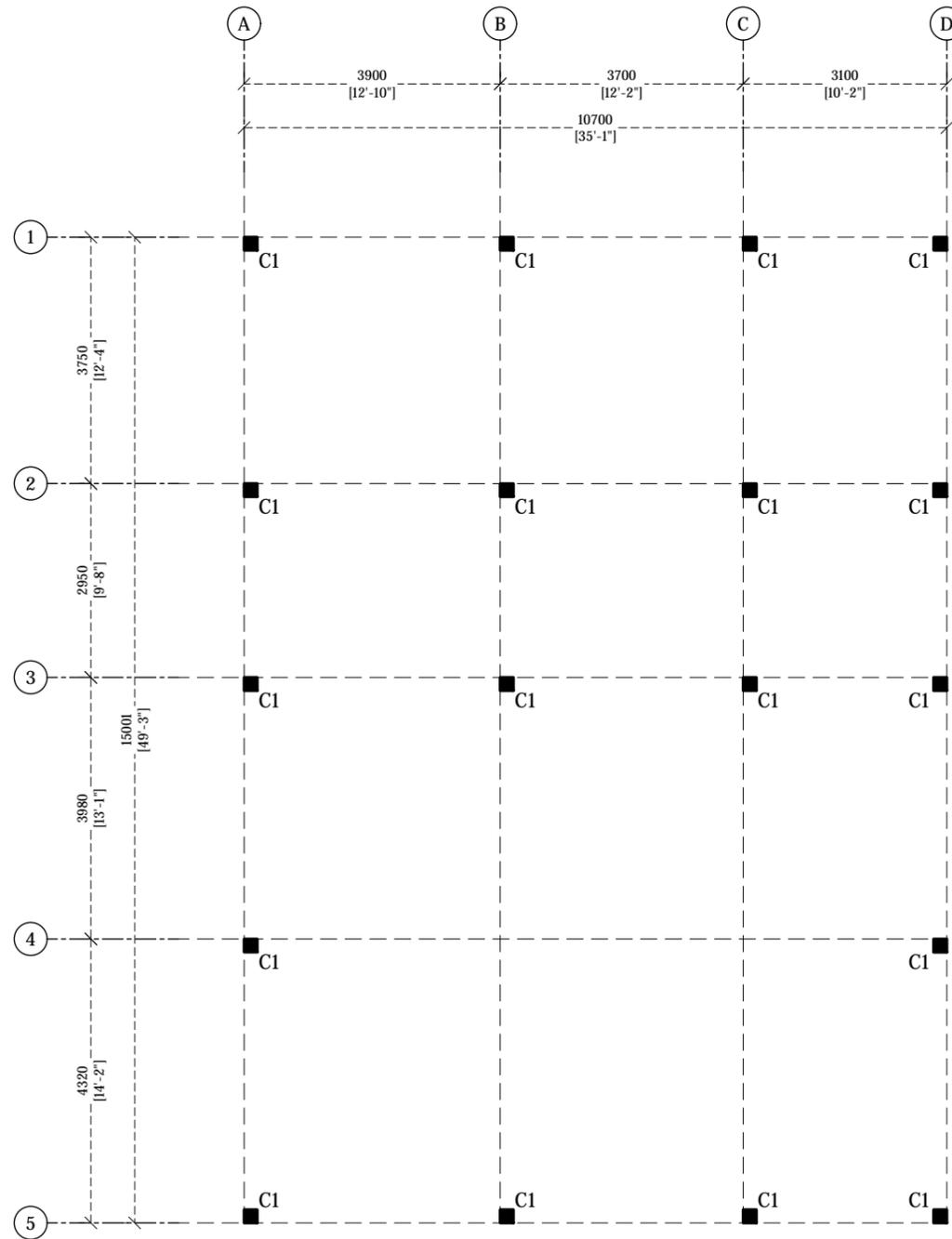
Title:  
**Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 Islands, Maldives – Package 5**  
Sub Title:  
Water Supply System in V. Rakeedhoo

Client:  
Ministry of National Planning, Housing and Infrastructure, Republic of Maldives

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Building Sustainable Futures

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Project No: EP-WS/2019/05	
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COLUMN LAYOUT PLAN

1:100

Legend

Note:

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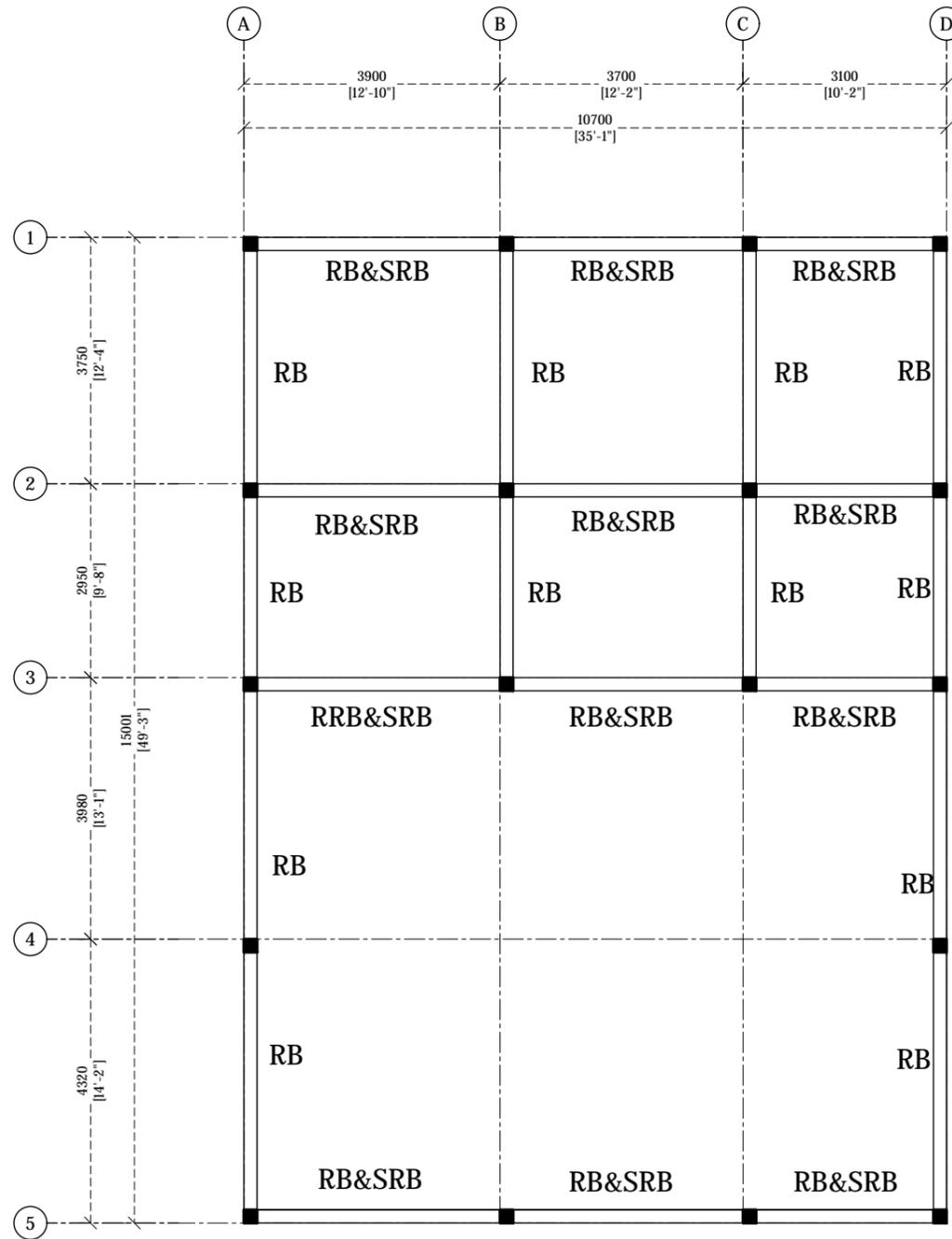
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Date: Nov 2020	SCALE (A3): 1:100
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ROOF BEAM PLAN  
1:100

Legend

Note:

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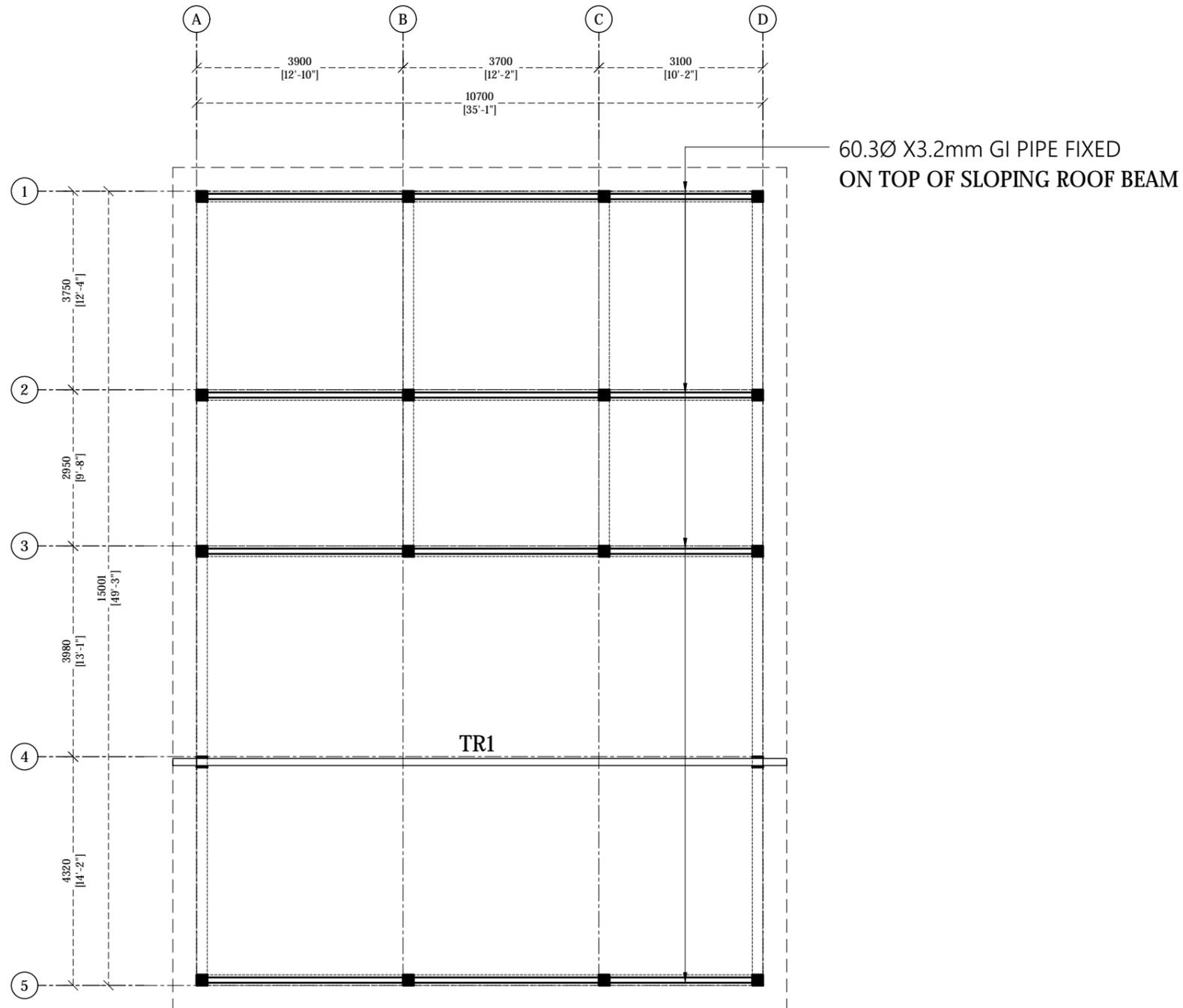
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ROOF TRUSS PLAN

1:100

Legend

Note:

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R01	NOV 2020		A.S.A.	F.I.A.	M.H.

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 Sub Title:  
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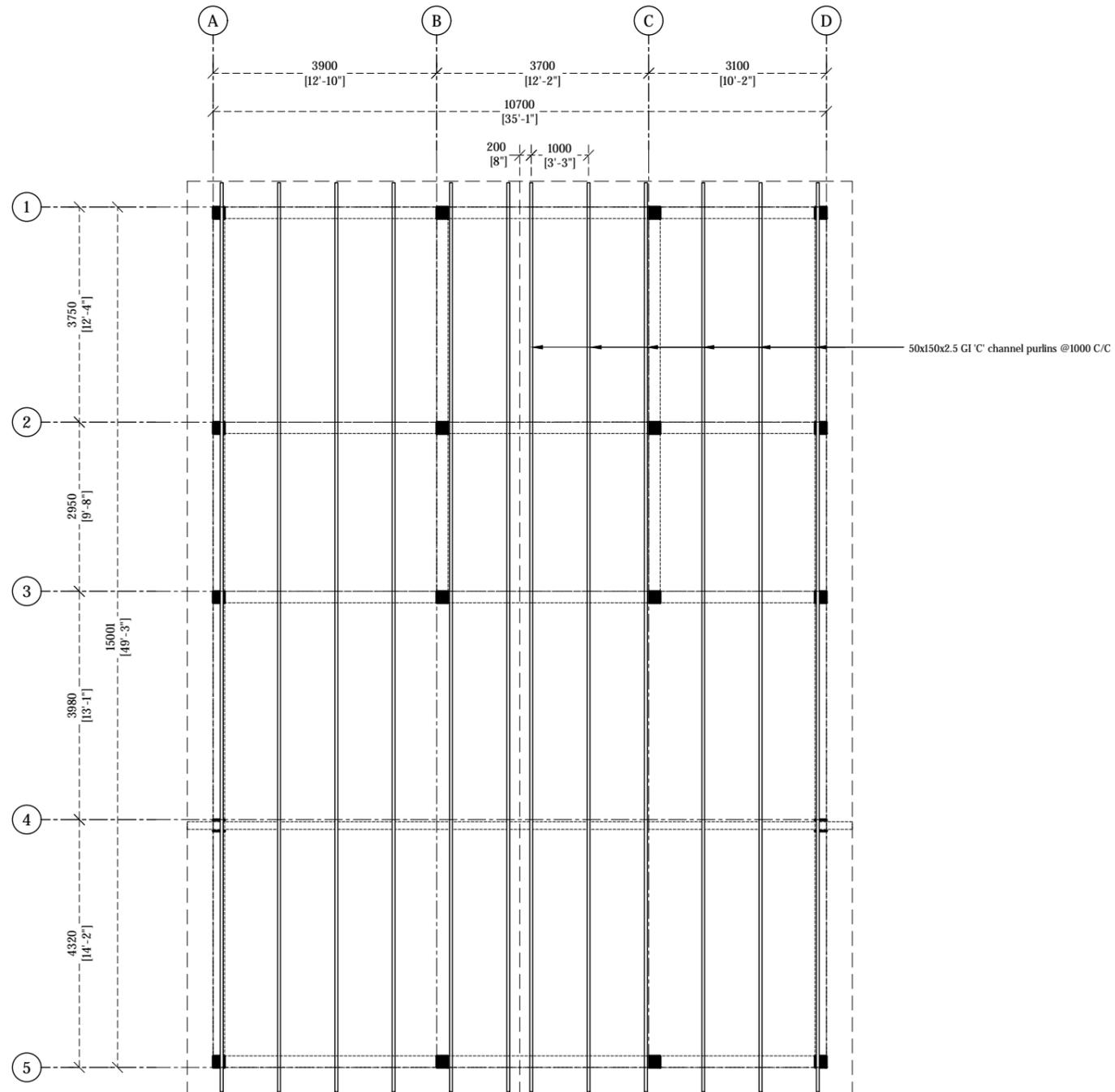


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ROOF FRAMING PLAN

1:100

Legend

Note:

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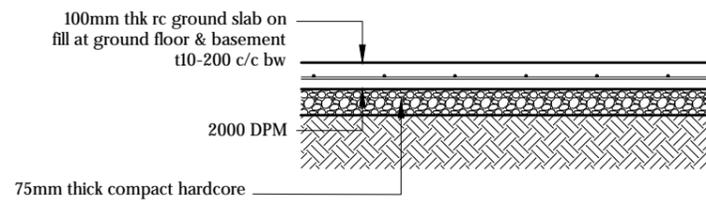
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Project No: EP-WS/2019/05	
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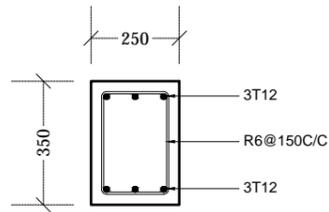


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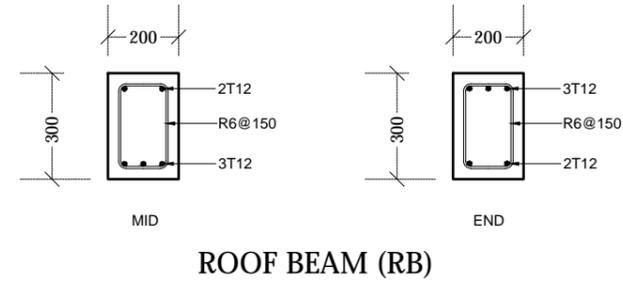
- All cover blocks shall be casted using grade C25/30 concrete with 5-10mm aggregates
- For slab, rebar spacer chairs spacing shall be minimum 1m spacing or 1 no. per 1 sqm

**TYPICAL GROUND SLAB DETAIL**

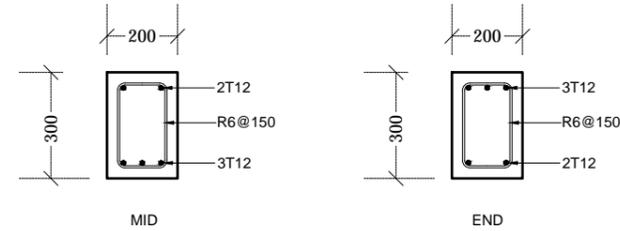
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**FOUNDATION BEAM (FB)**



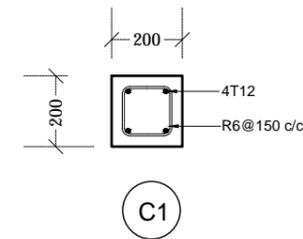
**ROOF BEAM (RB)**



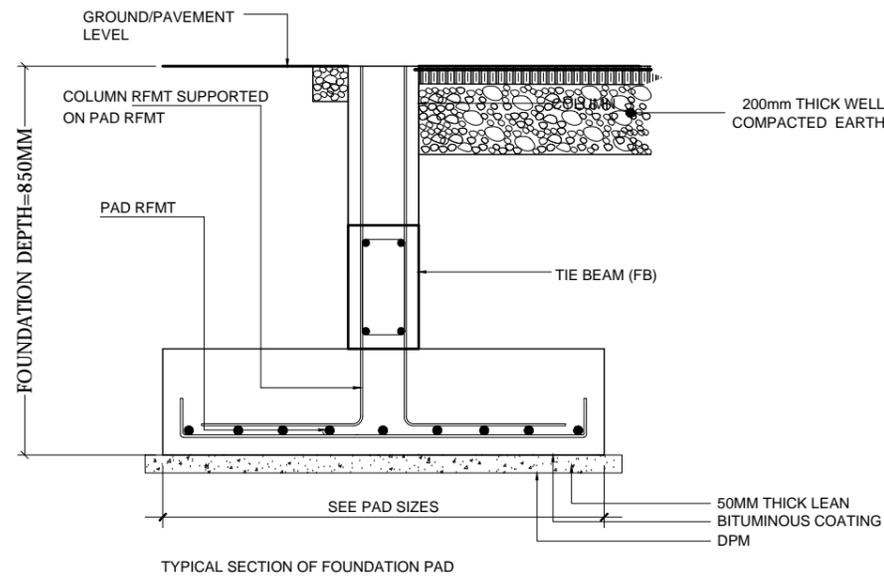
**SLOPING ROOF BEAM (SRB)**

F1 - 650x650x250 - T10@150C/C B/W (B)

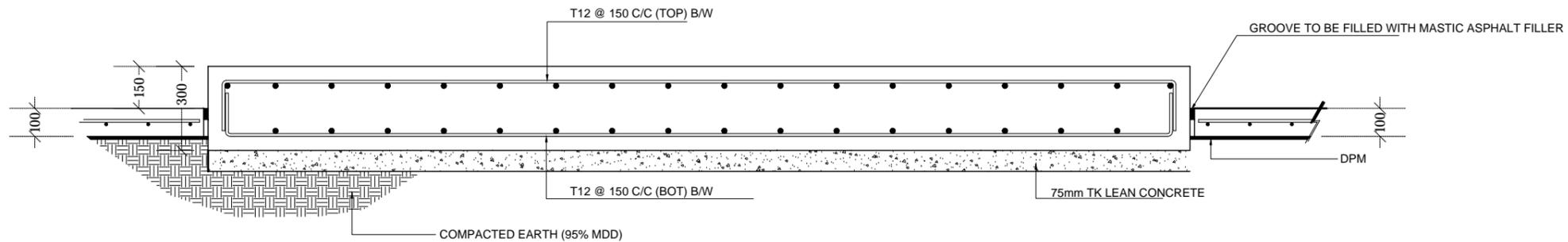
**FOUNDATION PAD DETAILS**



**COLUMN DETAIL**



**TYPICAL COLUMN SECTION**



**RO PLANT BASE DETAIL**

**Legend**

Note:

- Cover for foundation pads and foundation beams shall be 50mm
- Cover for floor slabs shall be 30mm
- Cover for columns shall be 40mm
- Concrete shall be of grade C25
- All concrete cold joints shall be casted with bonding agent
- laps = 45 dia (dia = bar diameter)
- mid bars = 0.85 x span
- sup bars = 1/3 x span
- concrete mix = 1:2:3 (C:S:A)
- lean concrete mix = 1:2:5

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 Sub Title:  
**Water Supply System in V. Rakeedho**  
 Client:  
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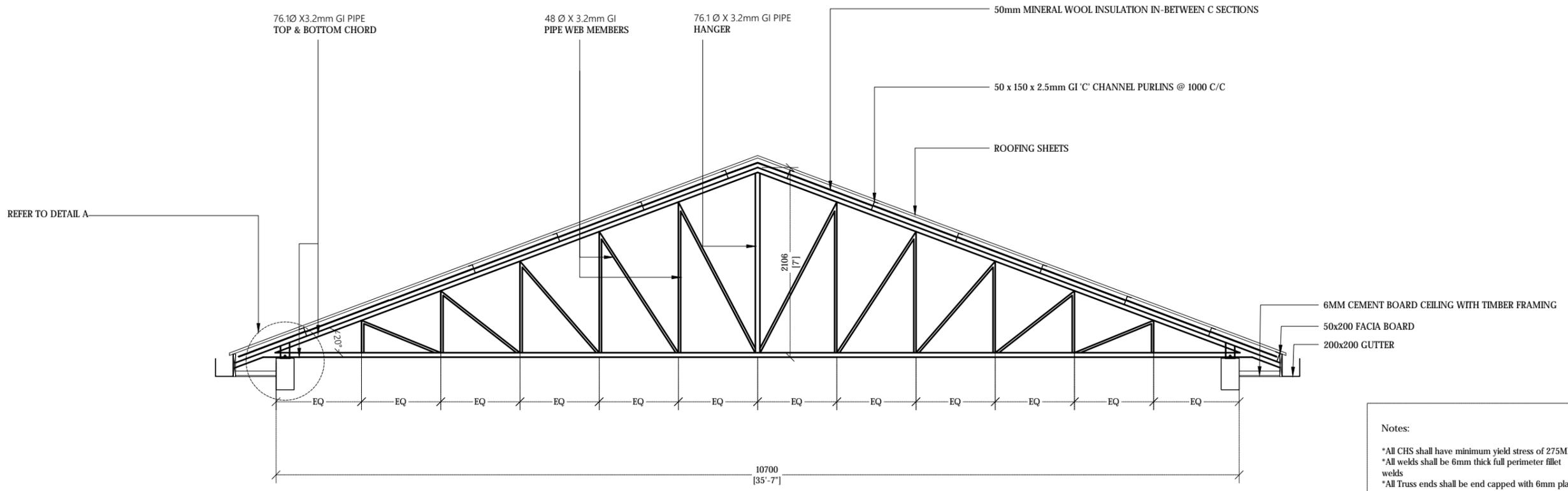
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**STRUCTURAL DETAILS**

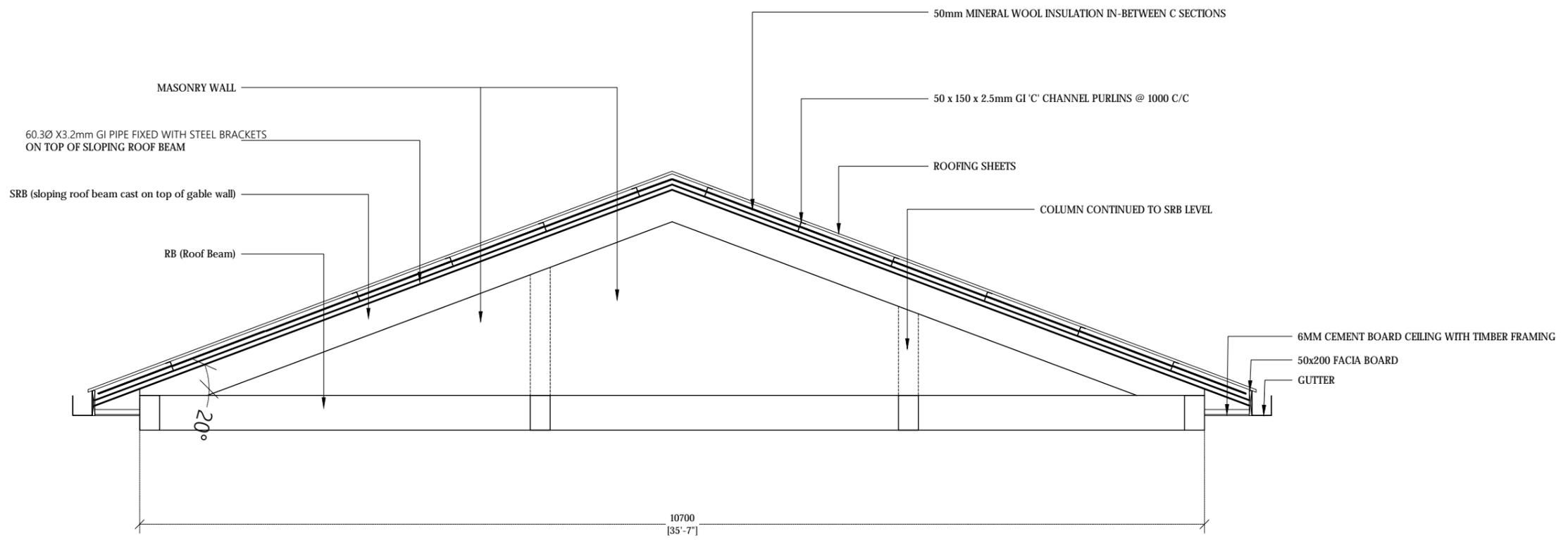
1:20



TRUSS DETAIL TR1 @ GRID 2

1:50

Notes:  
 \*All CHS shall have minimum yield stress of 275MPa  
 \*All welds shall be 6mm thick full perimeter fillet welds  
 \*All Truss ends shall be end capped with 6mm plates  
 \*All truss members shall be protected with anti corrosive coatings



DETAIL OF 63Øx3.2MM PIPE FIXED ON GRID 1,3,4 & 5

1:50

Legend

Note:

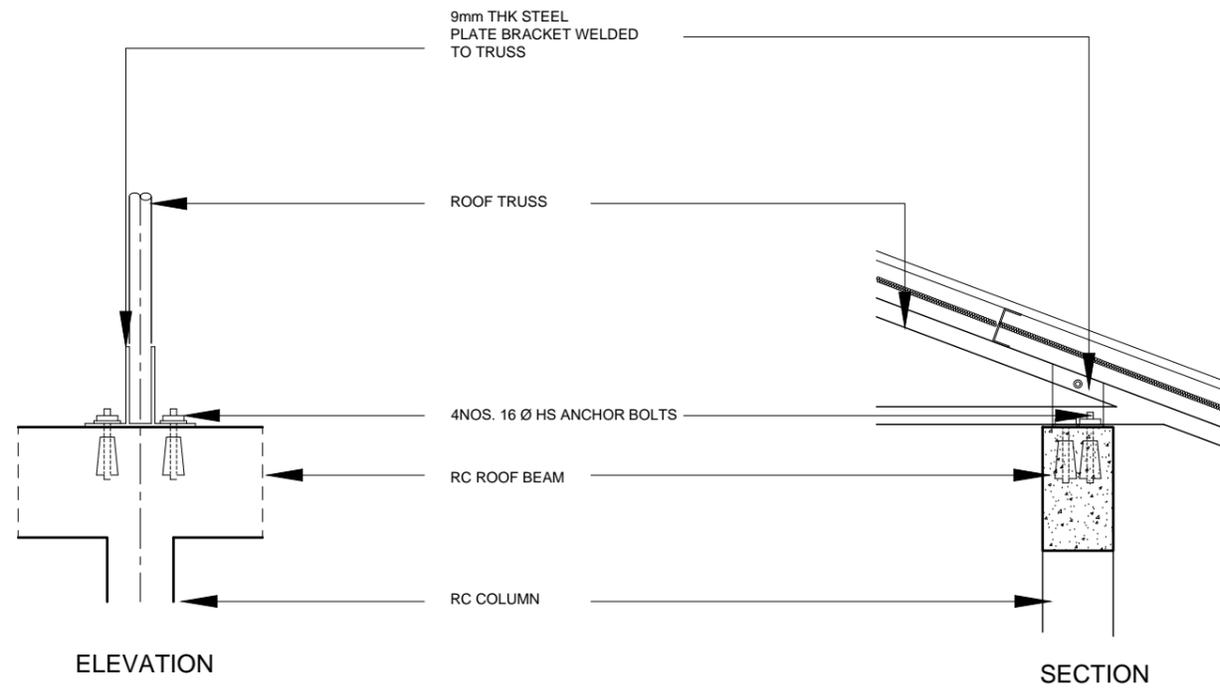
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 Maldivian Infrastructure Developer

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ELEVATION

SECTION

Legend

Note:

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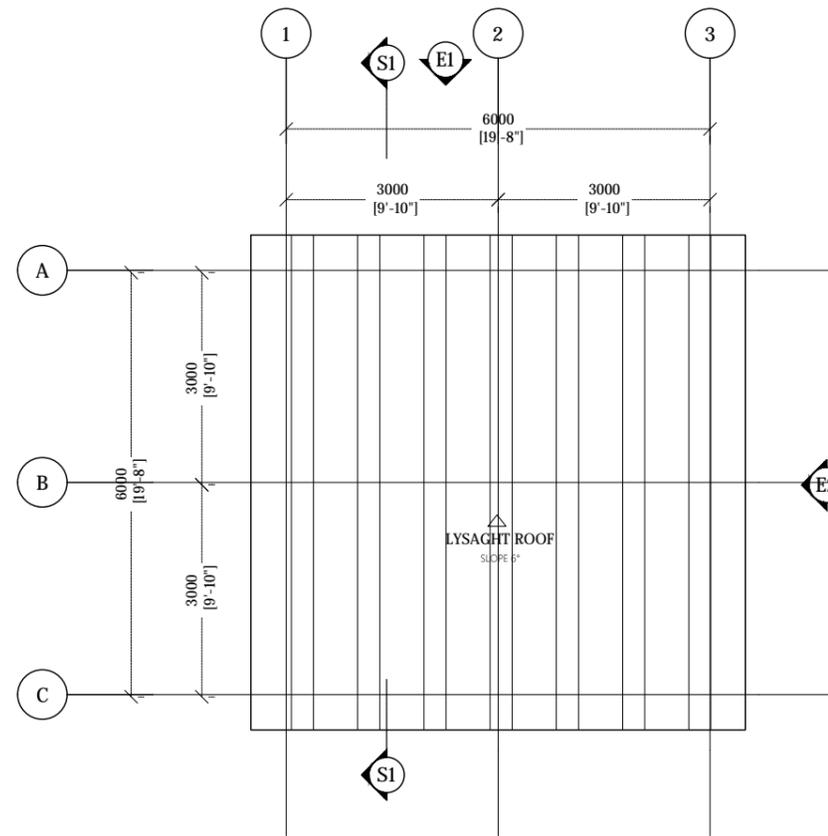
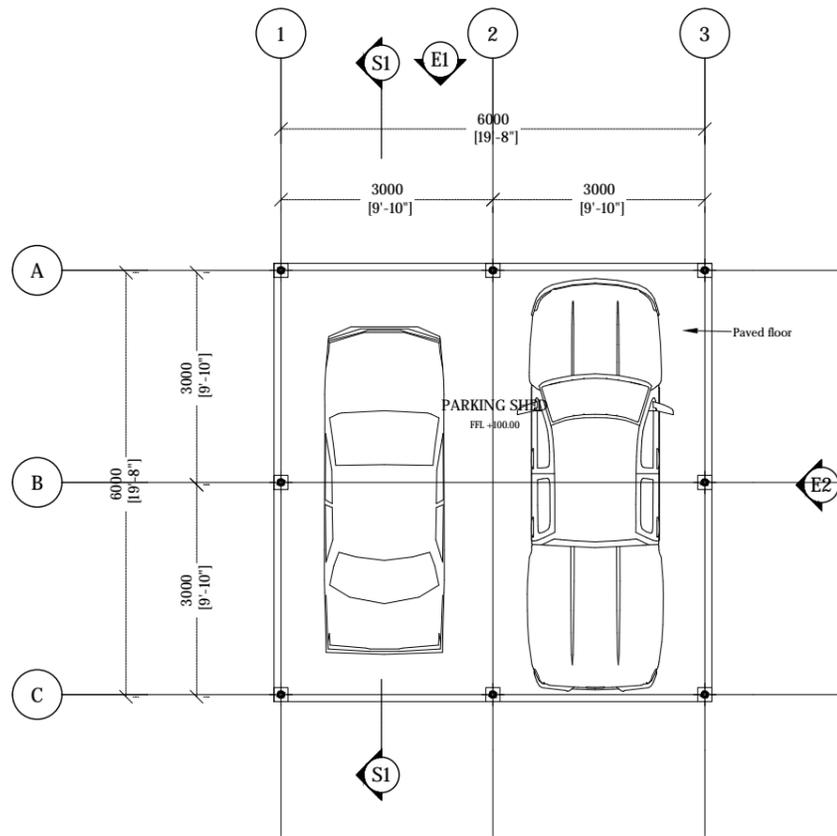
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DETAIL A

1:20

ARCHITECTURAL AND STRUCTURAL DRAWINGS OF  
PROPOSED SINGLE STOREY BUILDING AT  
**RO PLANT VEHICLE SHED, V.RAKEEDHOO**



Legend

Note:

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Client:  
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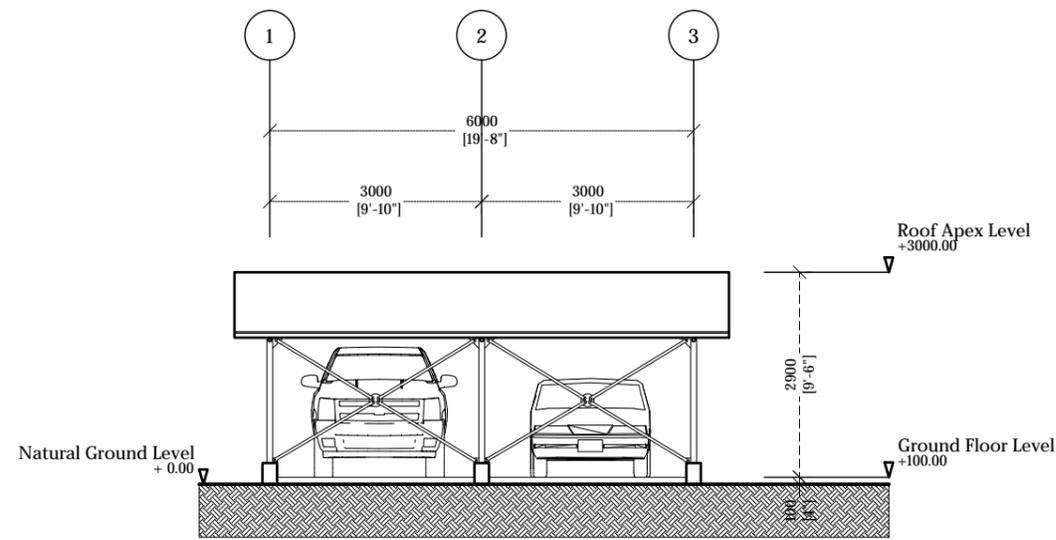


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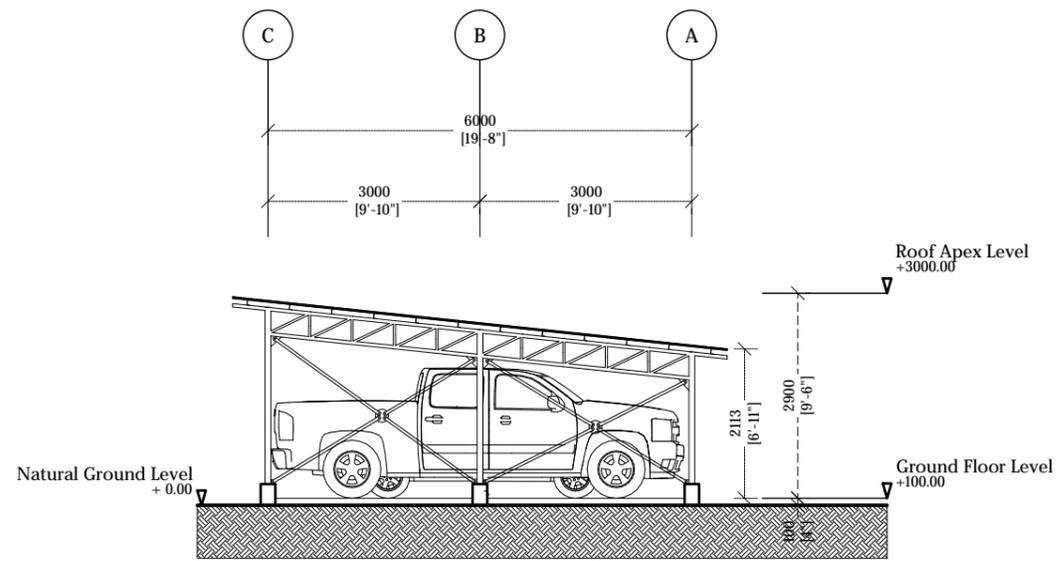
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Project No: EP-WS/2019/05

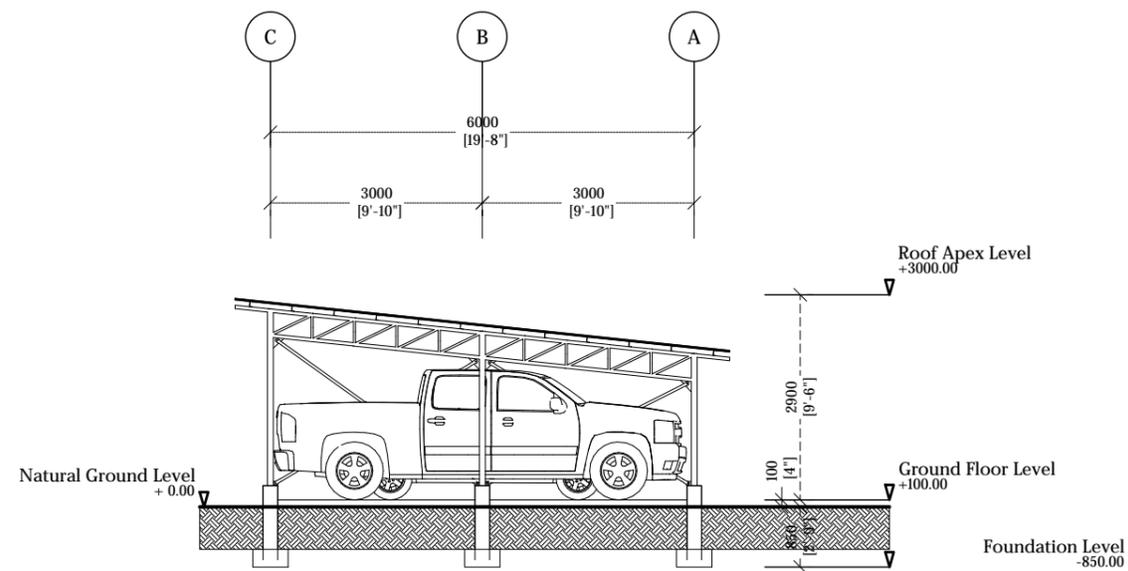
Rev: R-01	Page: A.6(1)
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ELEVATION E1  
1:100



ELEVATION E2  
1:100



SECTION S1  
1:100

Legend

Note:

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**Water Supply System in V. Rakeedhoo**

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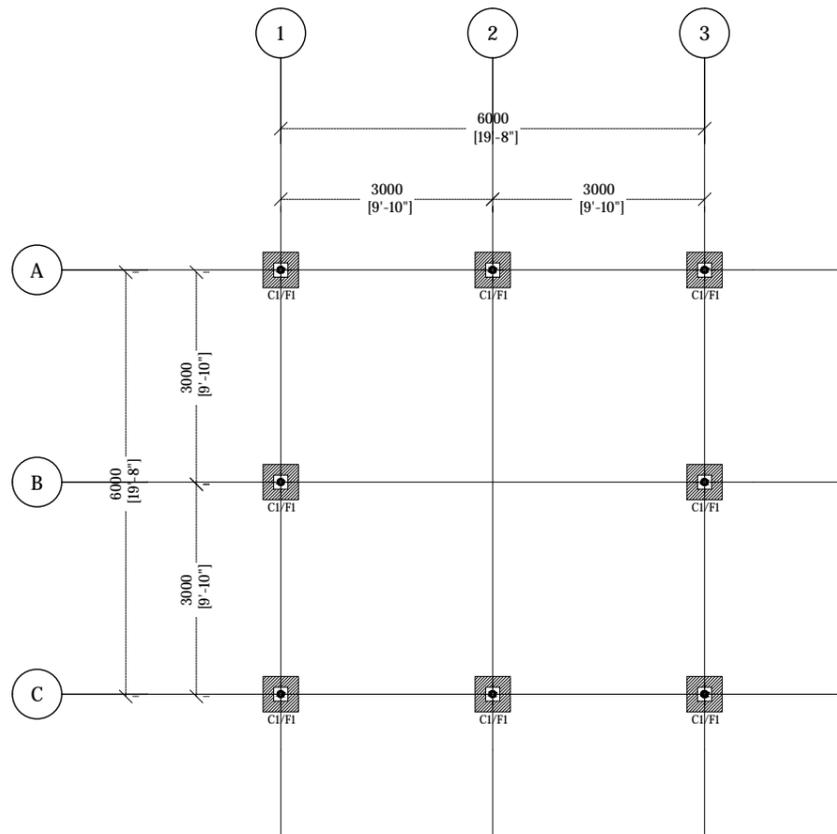


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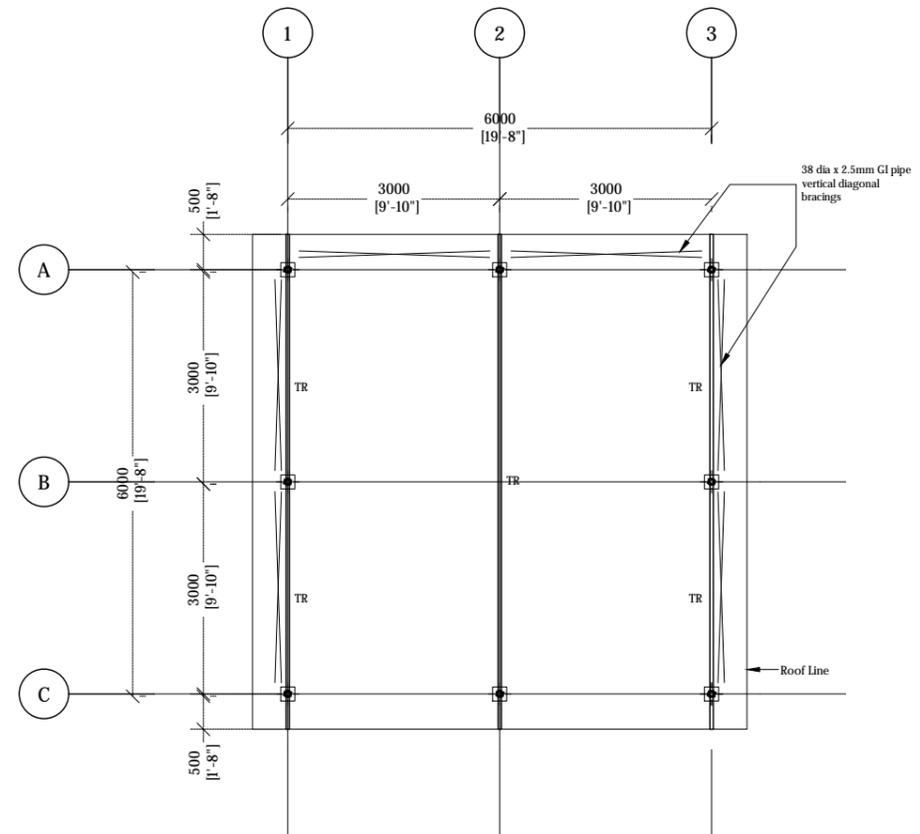


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FOUNDATION PLAN  
1:100



ROOF TRUSS PLAN  
1:100

Legend

Note:

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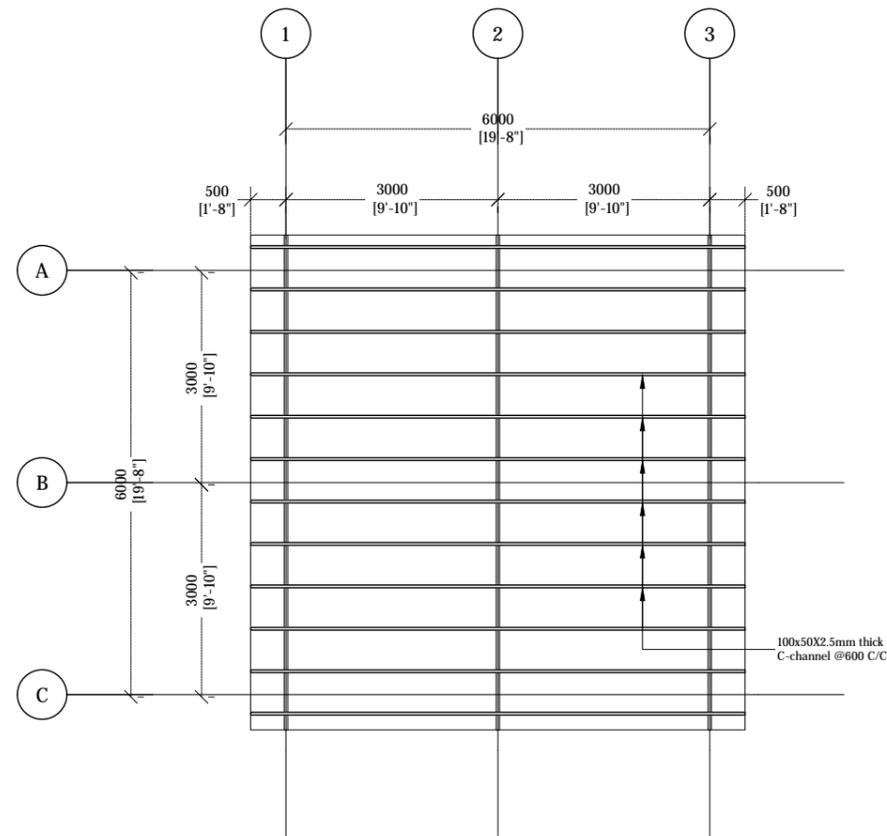


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ROOF FRAMING PLAN

1:100

Legend

Note:

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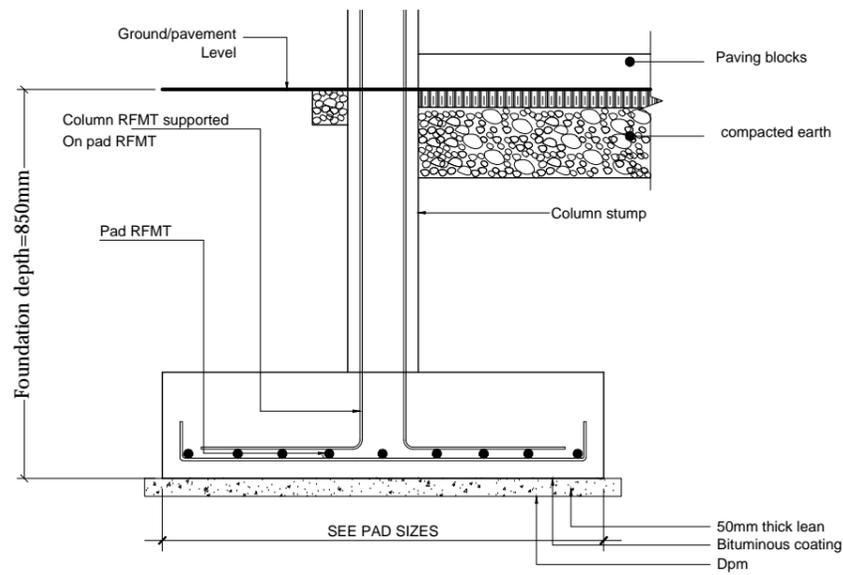


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DBAC INFRA  
 Building Self construction & support

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Designed: A.S.A.	Approved: M.H.
Date: Nov 2020	SCALE (A3): 1:100
Project No: EP-WS/2019/05	
Rev: R-01	Page: S.4(1)

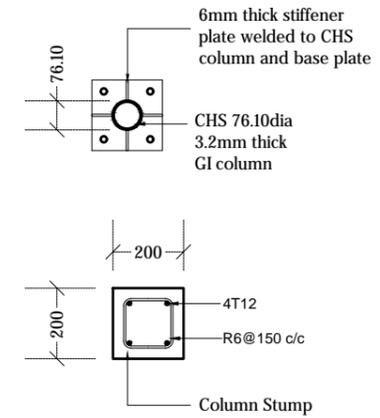
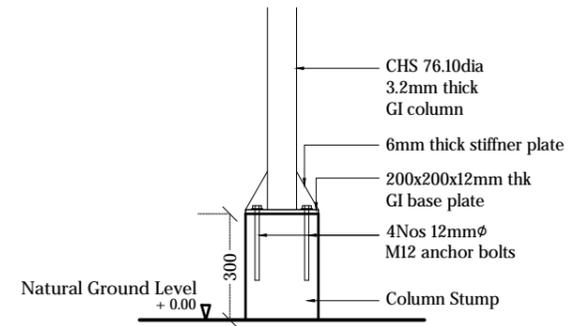


F1 - 500x500x250 - T10@150C/C B/W (B)

FOUNDATION PAD DETAILS

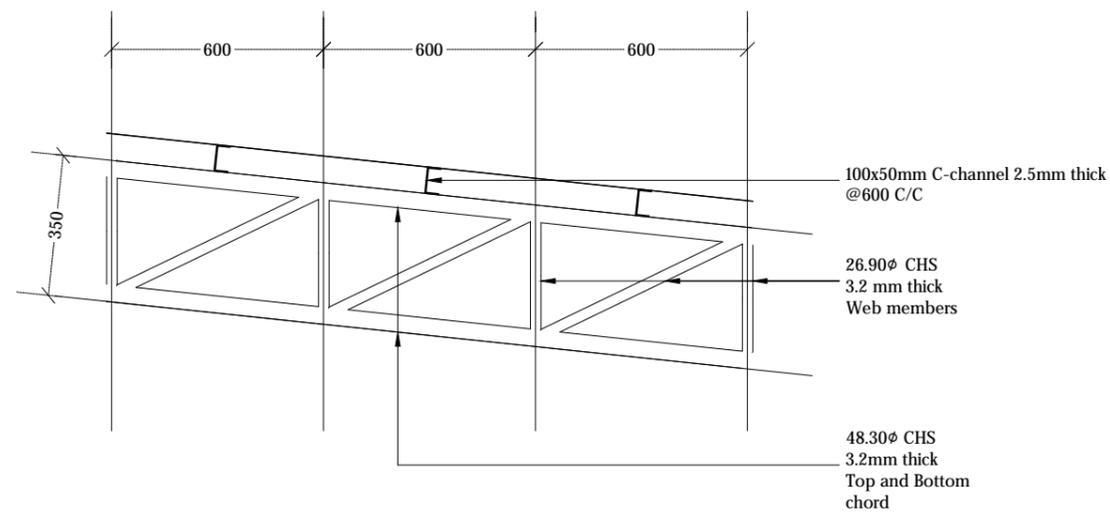
VEHICLE SHED FOOTING DETAIL

1:20



COLUMN DETAIL

1:20



TRUSS DETAIL

1:20

Legend

Note:

- \*All CHS shall have minimum yield stress of 275MPa
- \*All welds shall be 6mm thick full perimeter fillet welds
- \*All Truss ends shall be end capped with 6mm plates
- \*All truss members shall be protected with anti corrosive coatings
- \*38 dia x 2.5mm GI pipe to be used for all bracings.
- \*Cover for footings shall be 50mm.
- \*Cover for columns shall be 40mm.
- \*Concrete shall be of grade C25.

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DBAC INFRA  
 Building Self-Constructing - Shaping

Drawn: A.S.A.	Checked: F.I.A.
Designed: A.S.A.	Approved: M.H.
Date: Nov 2020	SCALE (A3): 1:50
Project No: EP-WS/2019/05	
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BUILDING SERVICES DRAWINGS OF  
PROPOSED SINGLE STOREY BUILDING AT  
**RO PLANT ADMIN BUILDING, V.RAKEEDHOO**

For Ministry of National Planning, Housing and Infrastructure

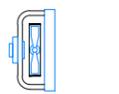
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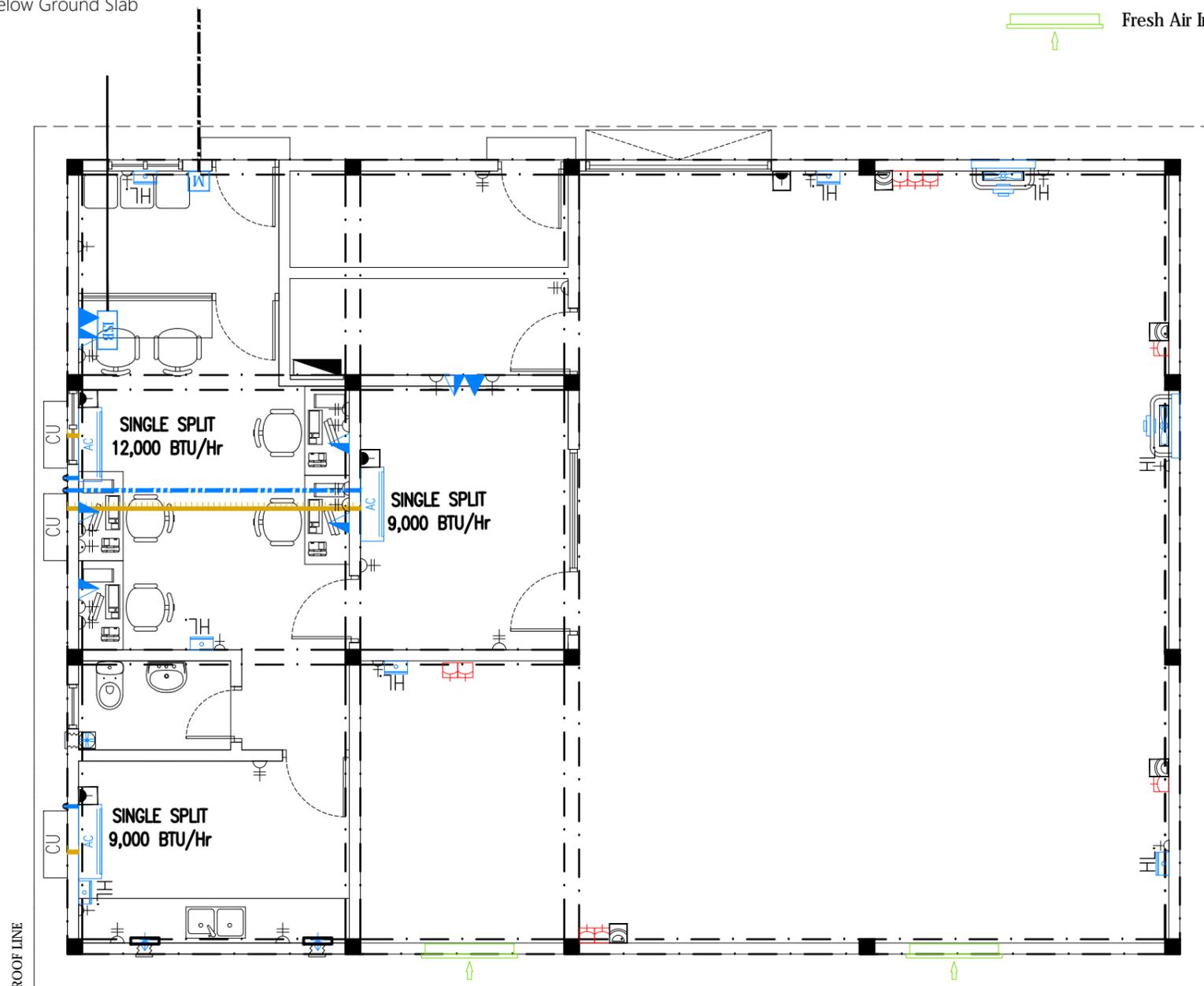
BUILDING SERVICES DRAWINGS	
GROUND FLOOR POWER AND ACV LAYOUT	PAC-01
GROUND FLOOR FDP LAYOUT	FDP-01
GROUND FLOOR LIGHTING LAYOUT	EL-01
GROUND FLOOR PLUMBING LAYOUT	PL-01
GROUND FLOOR DRAINAGE LAYOUT	DR-01
ROOF DRAINAGE LAYOUT	DR-02
SITE LIGHTING LAYOUT	EL-02
VEHICLE PARKING AREA - PLUMBING LAYOUT	PL-02
VEHICLE PARKING AREA - DRAINAGE LAYOUT	DR-03

**Legend**

-  13A Twin Socket
-  13A Twin Socket With USB Ports
-  15A Switched Socket @ H.L.
-  15A Socket In Polycarbonate Box
-  15A Switch @ 1200mm From F.F.L.
-  13A Power Socket
-  Distribution Board
-  HL. High Level
-  82Ø PVC Duct For Tel./Internet Cable Lead In Below Ground Slab
-  Main Incoming Cable For Power In 110Ø PVC Duct Below Ground Slab
-  ISB Internet Switchboard
-  Telephone Outlet
-  Computer Network Outlet
-  Emergency Light
-  Electricity Meter

**Legend**

-  Refrigerant Pipes
-  25Ø Condensate Drain Pipe
-  40Ø Condensate Drain Riser Pipe
-  AC Wall Mount Air Conditioner
-  CU Outdoor Condensing Unit
-  Ceiling Mounted Exhaust Fan 90m3/hr
-  Wall Mounted Exhaust Fan
-  Single Intake, Centrifugal, External Motor, 800m3/hr
-  Fresh Air Intake Grille/screen 1200 x 600



**Legend**

- Note:
- All 13A Power Outlets For Kitchen Hood Or Under Cabinet Or Wardrobe Lights At 1800mm From F.F.L.
  - All Twin Sockets At 300mm From F.F.L. Except Located At Kitchen Cupboard Area Which Shall Be At 1200mm From F.F.L.
  - All Computer, TV And Telephone Points At 300mm From F.F.L.
  - All 20A Switched Neon Indicator At 1200mm From F.F.L.

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R01	NOV 2020		H.R.	M.R.	M.R.

Title:  
**Consultancy Services for Survey, Design and EIA works of Water Supply and Sewerage Facilities in 6 Islands, Maldives – Package 5**  
 Sub Title:  
**Water Supply System in V. Rakeedhoo**  
 Client:  
 Ministry of National Planning, Housing and Infrastructure, Republic of Maldives

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Drawn: H.R.	Checked: M.R.
Designed: H.R.	Approved: M.R.
Date: Nov 2020	SCALE (A3): 1:75
Project No: EP- WS/2019/05	
Rev: R-01	Page: PAC-01

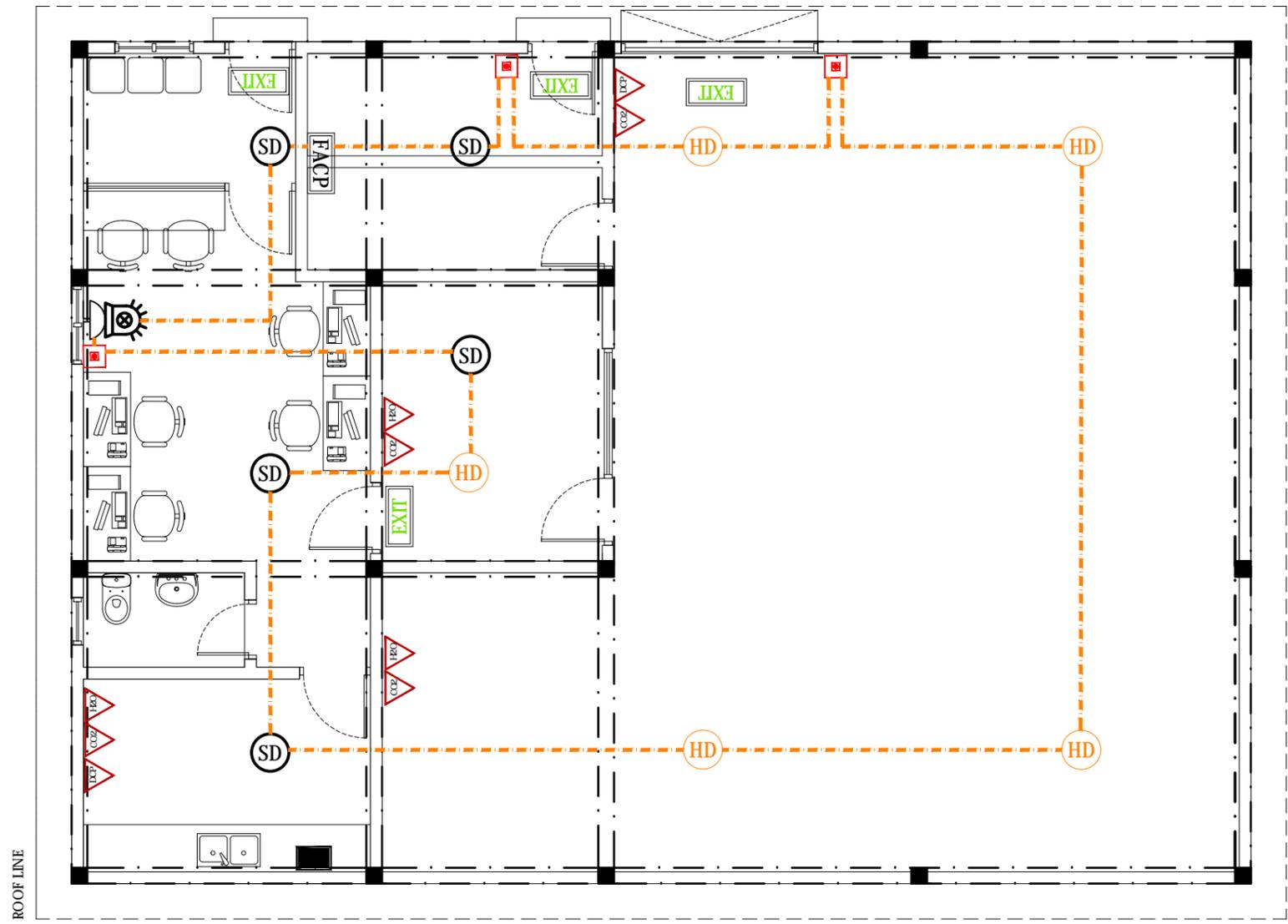
**GROUND FLOOR POWER AND ACV LAYOUT**

1:75



**Legend**

-  DCP Extinguisher (load: 6kg) In Polycarbonate Enclosure
-  CO<sub>2</sub> Extinguisher (load: 2kg) In Polycarbonate Enclosure
-  H<sub>2</sub>O Extinguisher (load: 9L) In Polycarbonate Enclosure
-  Manual Call Point
-  Smoke Detector
-  Heat Detector
-  Beacon
-  Sounder Bell
-  Fire Blanket
-  2.5mm<sup>2</sup> Fire Retardant Low Smoke (FRLS) Cables In FRLS Conduits
-  Fire Alarm Control Panel
-  Exit Sign



**GROUND FLOOR FDP LAYOUT**

1:75

**Legend**

Note:

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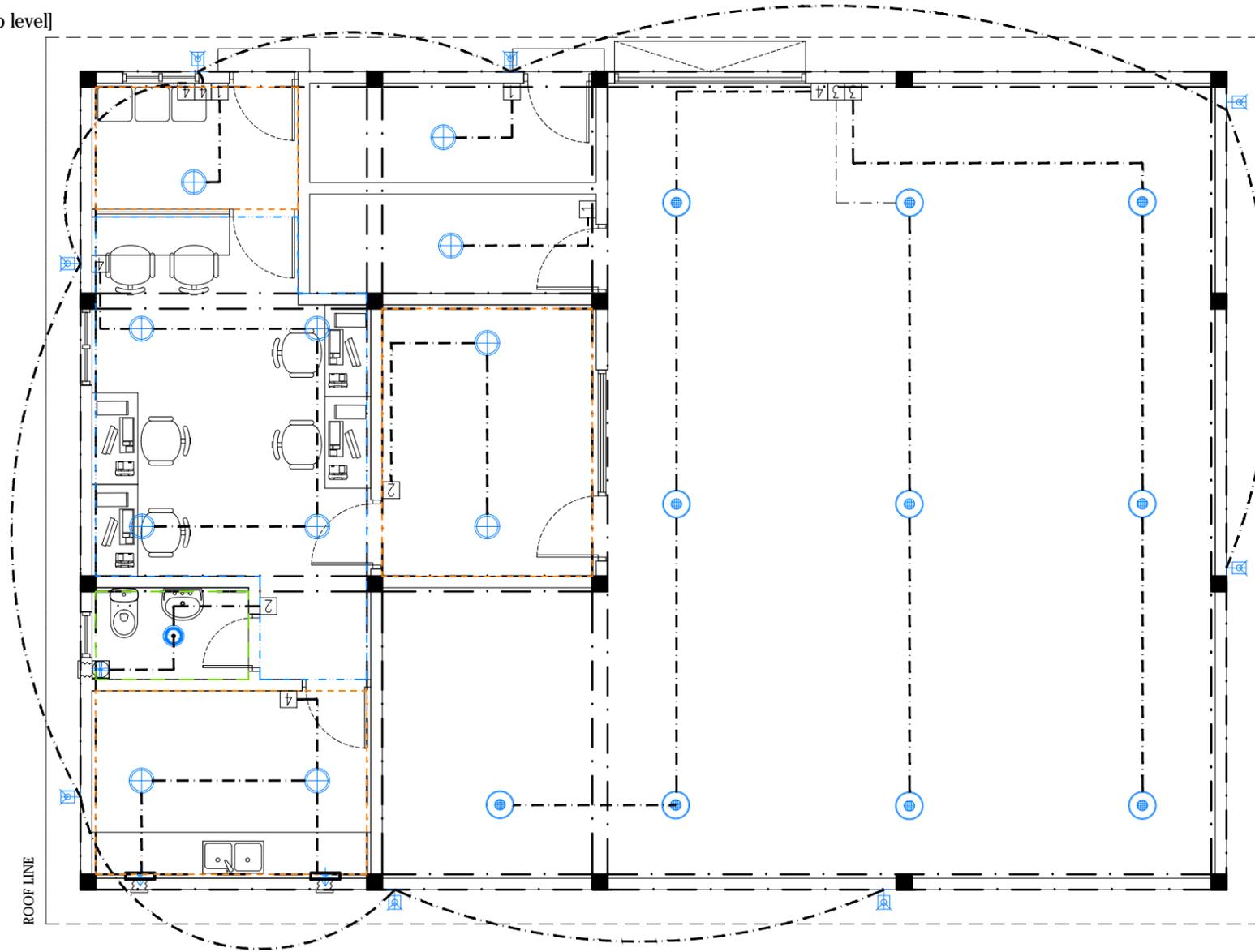


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**Legend**

-  Ceiling Light (12W)
-  Recessed Ceiling Light (12W)
-  Weather Proof Wall Light IP55 (12W)
-  60W, HPS, Low Bay Light
-  Light Switch (1 Gang - 4 Gang)
-  Two Way Light Switches (1 Gang - 4 Gang)
-  SINGLE INTAKE, CENTRIFUGAL, EXTERNAL MOTOR, 800M3/Hr
-  Ceiling Mounted Exhaust Fan 90m3/hr
-  Wall Mounted Exhaust Fan
-  Cement Board False Ceiling [200mm below beam bottom]
-  Plaster Board False Ceiling [200mm below beam bottom]
-  Plaster Board False Ceiling [at roof beam top level]



ROOF LINE



**GROUND FLOOR LIGHTING LAYOUT**

1:75

**Legend**

Note:

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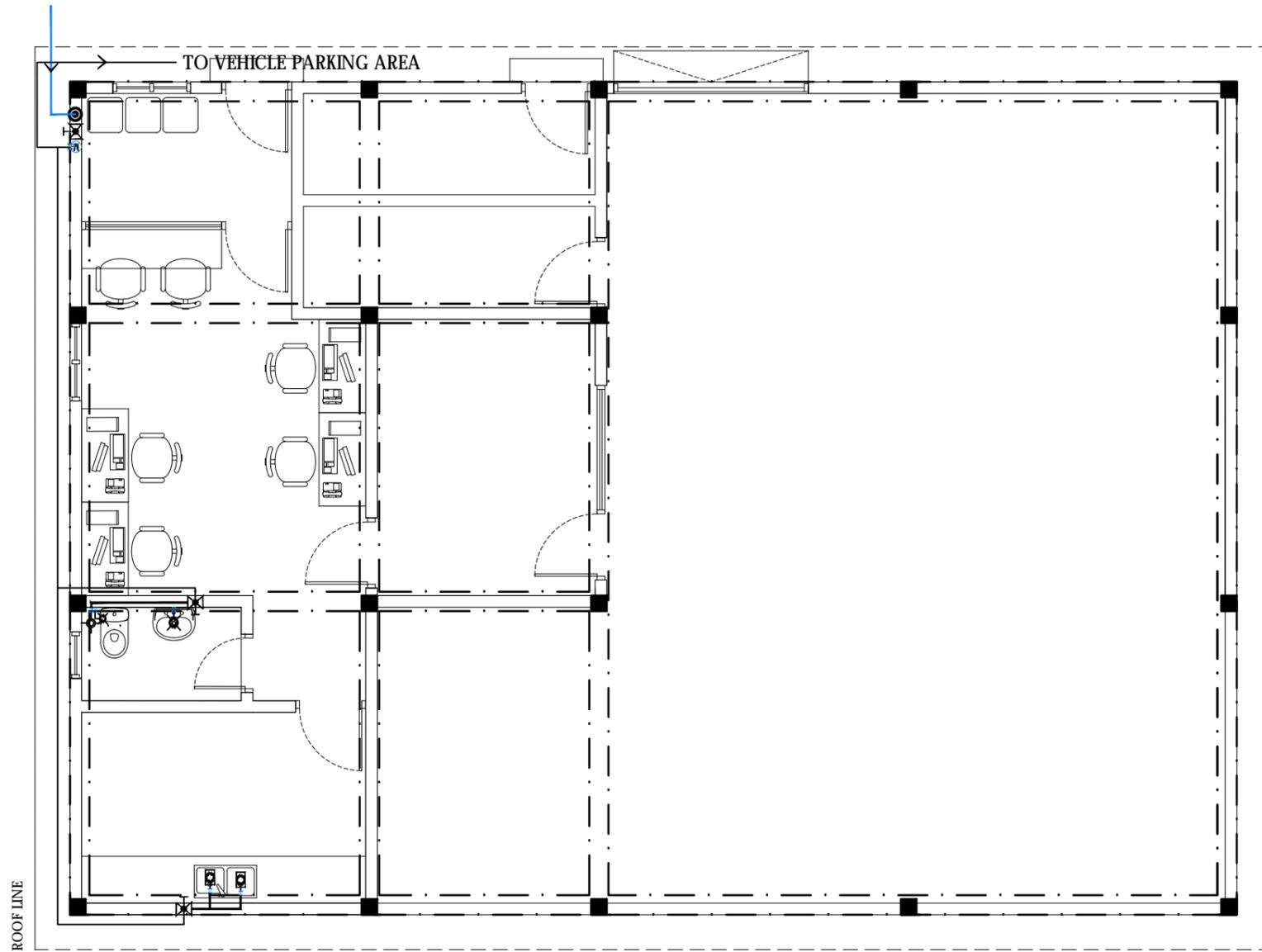
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**Legend**

-  16Ø Cold Water Supply To Basin Faucet
-  16Ø Cold Water Supply To Bidet Shower
-  16Ø Cold Water Supply To Wall Tap
-  16Ø Cold Water Supply To Cistern
-  Gate Valve
-  Rise In Wall
-  MWSC Meter
-  25Ø Cold Water Supply Pipes Running Underground
-  20Ø Cold Water Supply Pipes Running In Wall

PIPE FROM MAINS SUPPLY



**GROUND FLOOR PLUMBING LAYOUT**

1:75

**Legend**

Note:

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**Legend**

-  **Floor Drain**
-  **Floor Gully**
-  82Ø Soil Pipe (uPVC Pipe)
-  82Ø Soil Vent Pipe (uPVC Pipe)
-  63Ø Waste Pipe (uPVC Pipe)
-  63Ø Waste Vent Pipe (uPVC Pipe)
-  40Ø Waste Pipe (uPVC Pipe)
-  50Ø Manhole Vent Pipe (uPVC Pipe)
-  110Ø Rain Water Pipes (uPVC Pipe)
-  **Gully Trap**
-  110Ø Rainwater Outlet
-  **Clean Out Point**
-  **Bottle Trap**



**GROUND FLOOR DRAINAGE LAYOUT**

1:75

**Legend**

**Note:**

- All Drainage Pipes Should Have At A Slope Of 1/150
- All Floor Drains Should Have 'P' Traps

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Date: Nov 2020	SCALE (A3): 1:75
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**Legend**

-  100W LED Flood Light IP65 @ 6m Light Post
-  Solar Powered LED Gate Lights (12W)
-  Light Switch (1 Gang - 4 Gang)



**SITE LIGHTING LAYOUT**  
1:150

**Legend**

Note:  
-All Drainage Pipes Should Have At A Slope Of 1/150  
-All Floor Drains Should Have 'P' Traps

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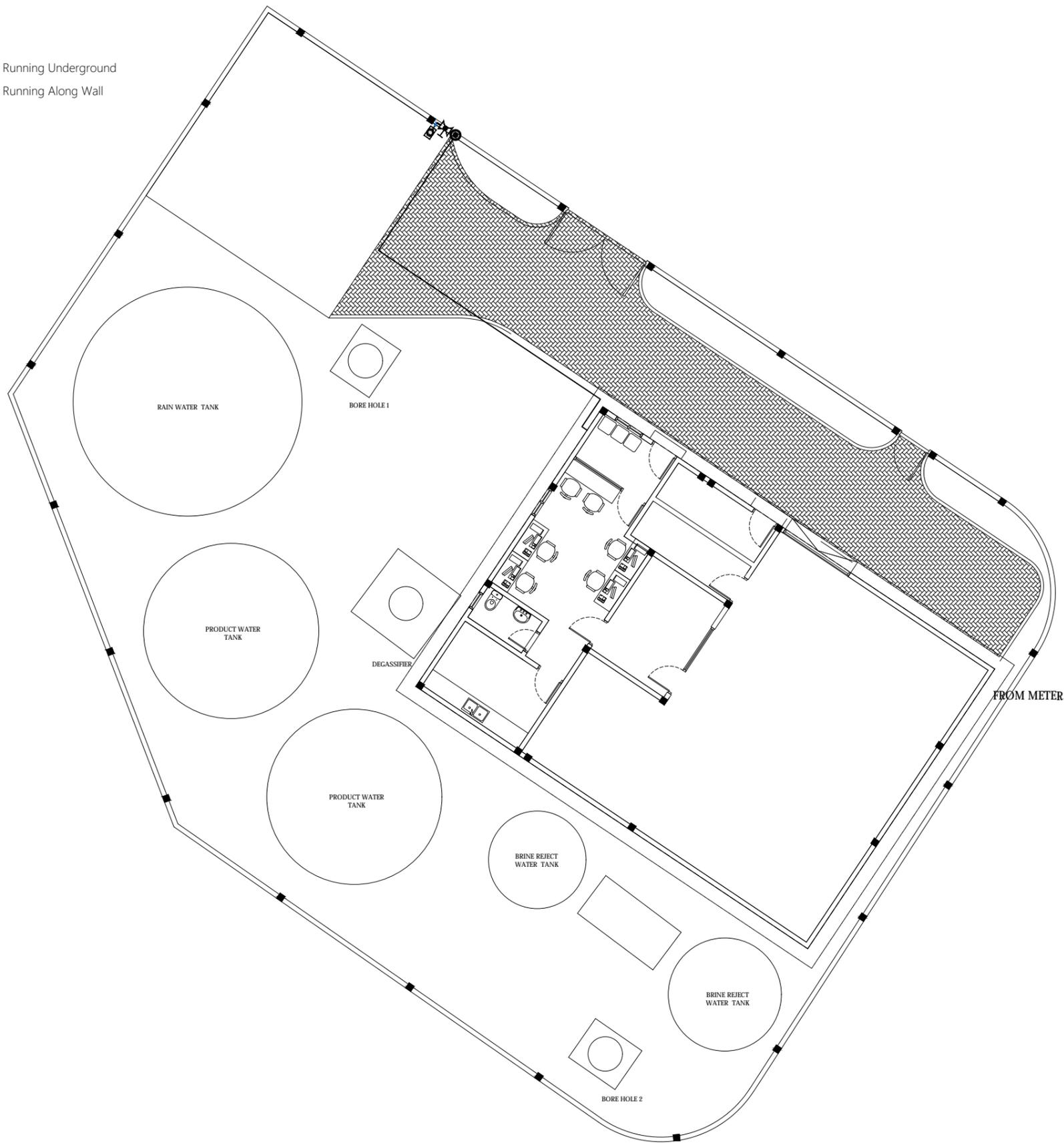


DBAC INFRA  
Building Infrastructure

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Date: Nov 2020	SCALE (A3): 1:75
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**Legend**

-  16Ø Cold Water Supply To Wall Tap
-  Gate Valve
-  Rise In Wall
-  MWSC Meter
-  25Ø Cold Water Supply Pipes Running Underground
-  20Ø Cold Water Supply Pipes Running Along Wall



**VEHICLE PARKING AREA - PLUMBING LAYOUT**  
1:150

**Legend**

Note:  
 -All Drainage Pipes Should Have At A Slope Of 1/150  
 -All Floor Drains Should Have 'P' Traps

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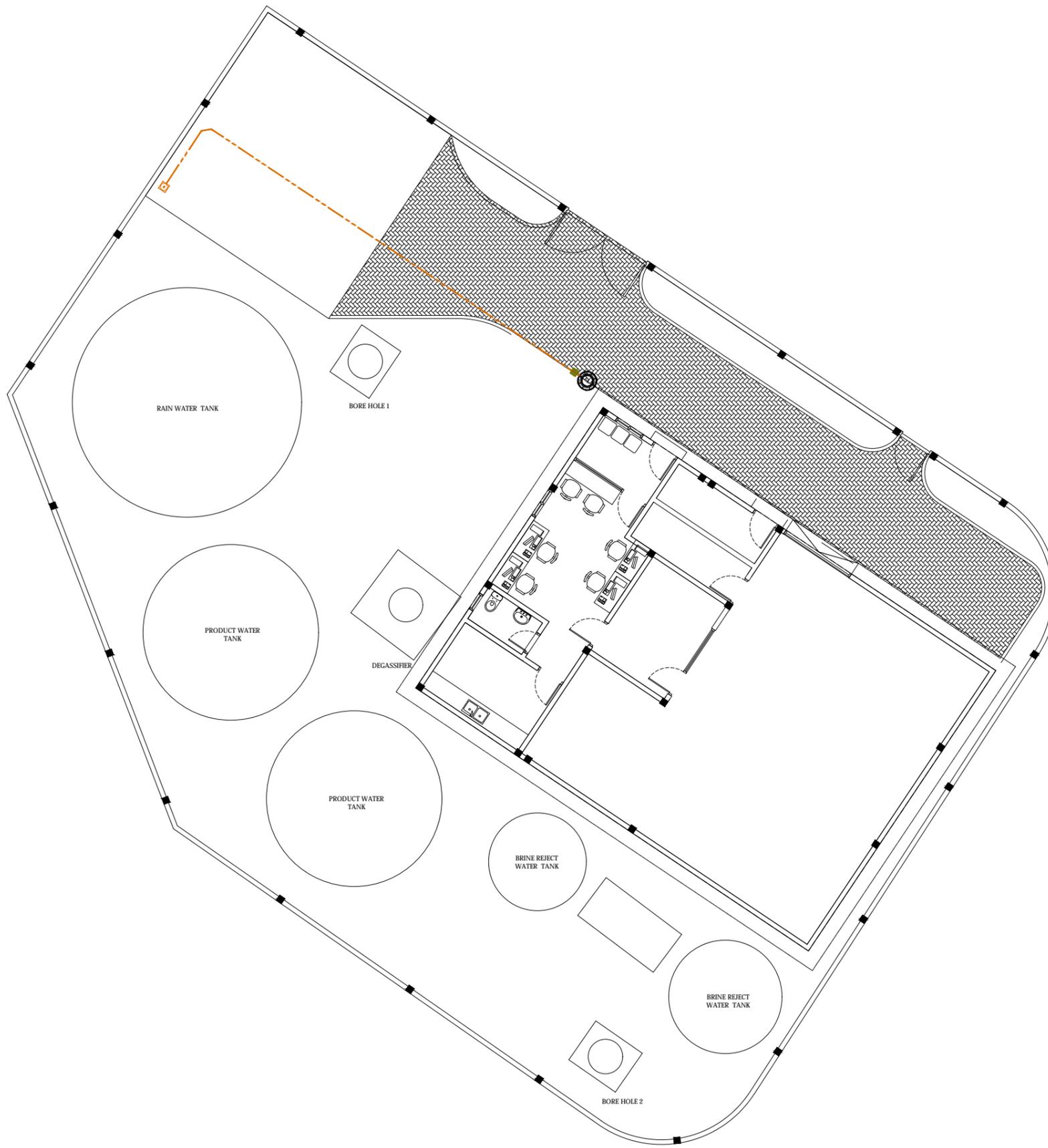


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VEHICLE PARKING AREA - DRAINAGE LAYOUT  
1:150

Legend

- Floor Drain
- 40Ø Stub For Washing Machine Or Tub
- 82Ø Soil Pipe (uPVC Pipe)
- 82Ø Soil Vent Pipe (uPVC Pipe)
- 63Ø Waste Pipe (uPVC Pipe)
- 63Ø Waste Vent Pipe (uPVC Pipe)
- 40Ø Waste Pipe (uPVC Pipe)
- 50Ø Manhole Vent Pipe (uPVC Pipe)
- 110Ø Rain Water Pipes (uPVC Pipe)
- Gully Trap
- Clean Out Point

Note:

- All Drainage Pipes Should Have At A Slope Of 1/150
- All Floor Drains Should Have 'P' Traps

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DBAC INFRA  
Building Self construction - Shoppers

Drawn: H.R.	Checked: M.R.
Designed: H.R.	Approved: M.R.
Date: Nov 2020	SCALE (A3): 1:75
Project No: EP- WS/2019/05	
Rev: R-01	Page: DR-03