

K.MANIYAFUSHI POWER SYSTEM UPGRADING PROJECT

BASIC DESIGN STUDY REPORT

May 2017

STATE ELECTRIC COMAPANY LIMITED

MALE'

MALDIVES

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1 INTRODUCTION

K.Maniyafushi Island located 17 kilometers SW from the Capital City Male' with just over one hectare of land area is used by the Ministry of Fisheries and Agriculture as a mariculture island. The island already consists of the necessary infra-structure which allows it to function as its core establishment.

However the existing electric power system is insufficient for its full operation and also for the planned upgrading works.

This document includes the power consumption for the future buildings and its equipment's which are anticipated to come in a near future by the Ministry.



2 BASIC CONCEPT OF THE PROJECT

Based on the data provided by the ministry and through analysis of the data, the basic concept of the proposal is to construct a new power plant along with a suitable and reliable distribution system that can cater for the existing and future demands at an optimum cost. The concept also emphasizes on providing reliable and cost effective power to the island. With this concept in mind, the capital investment is brought to a minimum.

3 OUTLINE OF THE BASIC PLAN

3.1 Load Forecast

The load forecasts for staff accommodation and hatchery and other such infrastructure areas are developed for 10 years but for street light and lighting for public spaces are considered constant. Refer Annex 2 for detailed calculations.

3.2 Generator Set Sizing and main Control Panel Board

For continuous operation of power system minimum four generator sets shall be installed. The power house and control panel shall be large enough to accommodate the diesel generator sets sizes for the 10 year period. The panel board is a synchronizing panel board with automatic load sharing for two generator sets.

3.3 Voltage Drop

Main distribution cables are selected to limit the voltage drop to maximum 5% for the 10 year period and up to 2% for the consumer cables. Existing consumer and road light cables shall be used where possible and make joints where necessary to connect new/ existing distribution boxes. Refer Annex 5 for detail calculations.

3.4 Power House Building

Existing power house insufficient for the installation of additional generators and control panel thus a new powerhouse building is designed and constructed. The new powerhouse will be equipped with sound attenuators and rockwool insulated roofs to minimize noise. Refer Annex 10 for basic design of a new power house.

3.5 Fuel tank

A fuel storage tank with a capacity of 3,600 liters shall be constructed within the powerhouse premises. Refer Annex 8.

3.6 Fire System

Fire extinguishers shall be installed at suitable locations of the powerhouse and in the premises. A fire alarm system with smoke and heat detectors shall be installed within the powerhouse.

4 PROJECT EFFECTS

With the commissioning of the upgraded power system, reliable and cost effective power will be delivered to the consumers throughout the day. Generating capacity of the power station would be further upgraded only on demand. With this strategy, the consumers on the island will benefit from low cost and reliable power for their consumption.

This project, if implemented as planned, will consolidate the infrastructure of the island and is an important means for developing K.Maniyafushi further. Stable, reliable and cost-effective electricity to this island will improve the life span of the general electrical appliance and as well as the most expensive machineries used in the island. .

ANNEX 1:
Site Plan

- Key

A

Accommodation/office block

a

Reception

b

Office

c

Mess room

d

Kitchen

e

Classroom

B

Mosque (Existing)

C

Store

D

Microalgae mass culture

E

Microalgae stock culture

F

Zooplankton culture/Enrichment

G

Wetlab/aquariums/Ground floor

H

On-farm feed preparation station

I

Larvae nursing/incubation

J

Packing station

L

Quarantine room

K

Pump station

L

Broodstock maintenance

M

Dry lab/store (1st floor)

N

Powerhouse

O

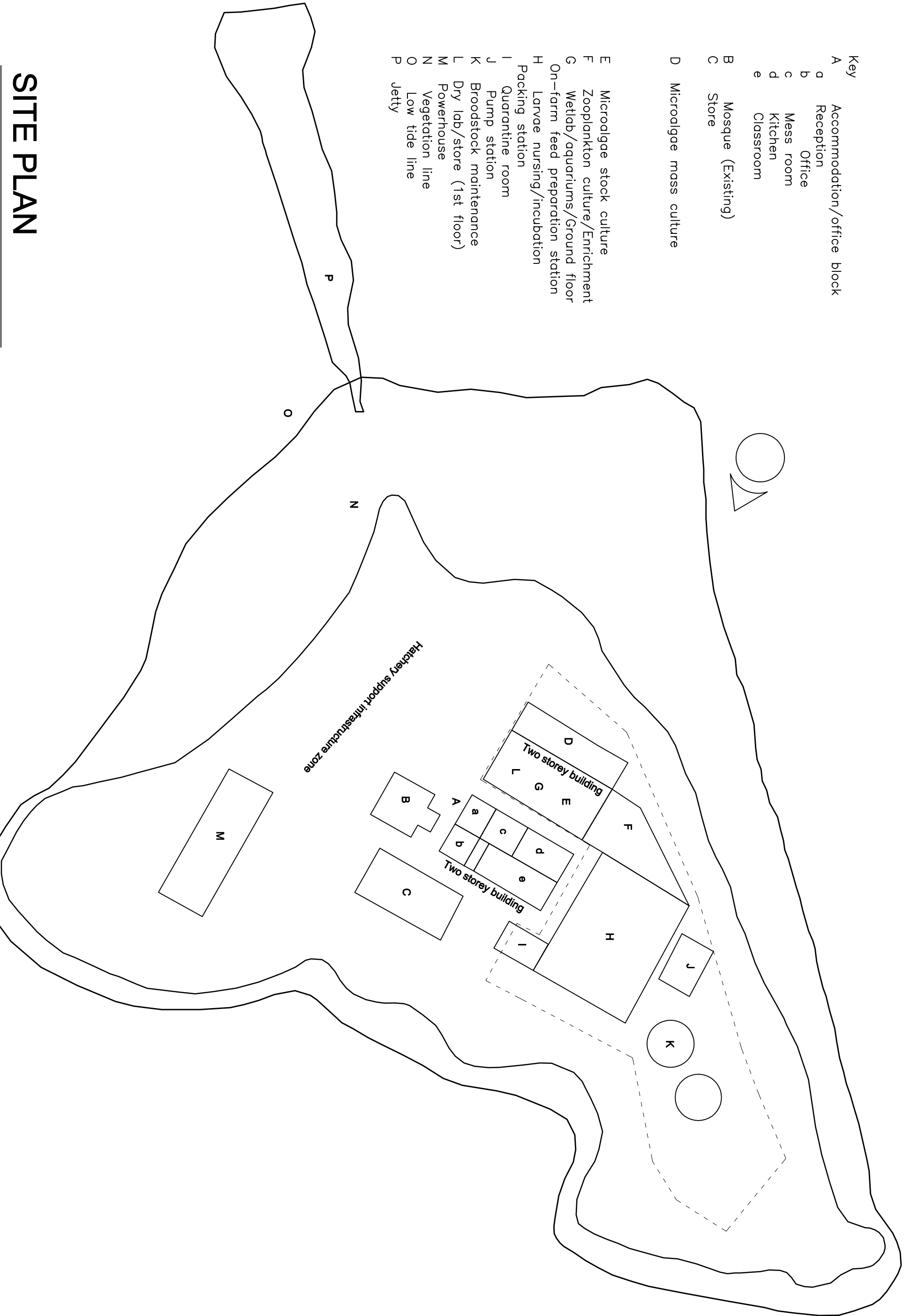
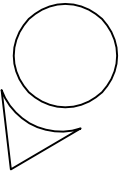
Vegetation line

P

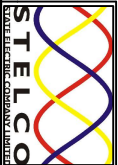
Low tide line

P

Jetty



SITE PLAN



STATE ELECTRIC COMPANY LTD.		TITLE		SITE PLAN		Drawn By		Amjad Mohamed		Rev		Remarks		Rev Date		Scale:		1:500	
Amaraene Magoli, Malé, Maldives.		PROJECT		MANNYAFUSHI POWER SYSTEM		Checked By		Ahmed Shaieau		00				-		Drawing No		NA	
Phone : 332 0982						MFA Licence No.		MTTL/9/0016								Date		03/05/2016	
Fax : 332 7036						Signature										Sht No		01 of 01	
E-mail : admin@stelco.com.mv																		Next Sht	
																		0	

ANNEX 2:
Build up Area and Unit Load

Kaafu Atoll, Maldives

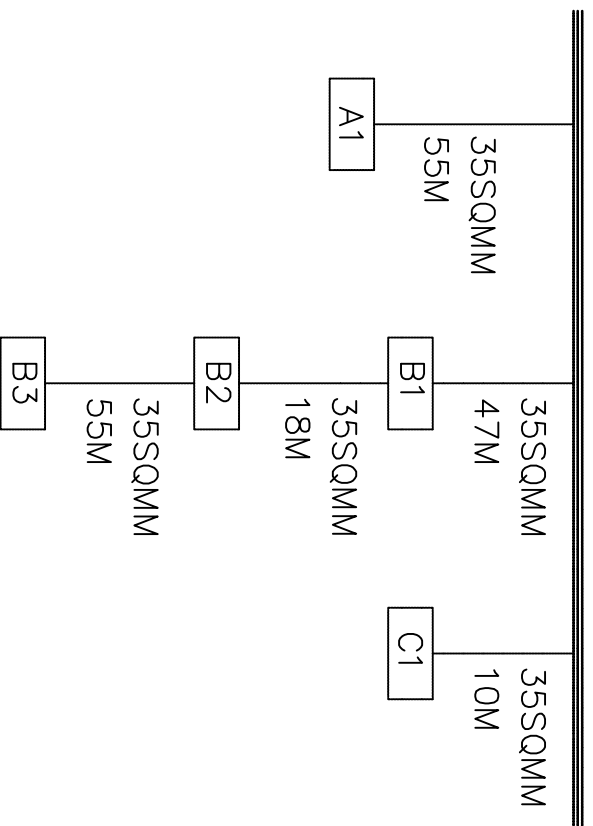
11.86%


ANNEX 3:
Distribution Map

ANNEX 4:

Distribution Schematic Diagram

BUSBAR 400V



		STATE ELECTRIC COMPANY LTD. Amaarene Magu, Male', Maldives. Phone : 332 0982 Fax : 332 7036 E-mail : admin@stelco.com.mv	
TITLE		DISTRIBUTION SCHEMATIC DIAGRAM	
PROJECT		MANYAFUSHI POWER SYSTEM	
Drawn By	Amjad Mohamed	Rev	
Checked By	Ahmed Shafeeu	01	added DB, added 2 gensets
MEA Licence No.	MTTU/97/0016		
Signature			
Rev Date	5/10/17	Scale:	NA
Date		Drawing No	NA
Sht No		01 of 01	Next Sht 0

ANNEX 5:

Feeder Voltage Drop Calculations

VOLTAGE DROP CALCULATION

Feeder A

Voltage Drop Calculation sheet for Underground LV Copper Cables.(BS 6346)

Distance															PH-A1	Volt drop	%
Sections			13	12	11	10	9	8	7	6	5	4	3	2	1	400 Volts	
Length (km)			0	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055		
Cab.size	16		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.43		
Cab.size	25		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.26		
Cab.size	35		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.99	8.99	2.25
Cab.size	50		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.62		
Cab.size	70		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.66		
Cab.size	95		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.51		
Cab.size	120		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.86		
Cab.size	150		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.37		
Cab.size	185		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.04		
Cab.size	240		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72		
Cab.size	300		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.55		
Cab.size	400		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.31		
Kilowatts			0	0	0	0	0	0	0	0	0	0	0	0	78.15		

Section No.	KVA drop Per Km.	Terminal Voltage		Terminal Amps.	
				Section	Load
1	5.37	V1	380.00	I1	148.60
2	0.00	V2	400.00	I2	148.60
3	0.00	V3	400.00	I3	148.60
4	0.00	V4	400.00	I4	148.60
5	0.00	V5	400.00	I5	148.60
6	0.00	V6	400.00	I6	148.60
7	0.00	V7	400.00	I7	148.60
8	0.00	V8	400.00	I8	148.60
9	0.00	V9	400.00	I9	148.60
10	0.00	V10	400.00	I10	148.60
11	0.00	V11	400.00	I11	148.60
12	0.00	V12	400.00	I12	148.60
13	0.00	V13	400.00	I13	148.60
14	0.00	V14	400.00	I14	148.60
15	0.00	V15	400.00	I15	148.60
		V16	400.00		
Total	5.37				

VOLTAGE DROP CALCULATION

Feeder B

Voltage Drop Calculation sheet for Underground LV Copper Cables.(BS 6346)

Distance													B2-B3	B1-B2	PH-B1	Volt drop	%
Sections			13	12	11	10	9	8	7	6	5	4	3	2	1	400 Volts	
Length (km)			0	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.018	0.047		
Cab.size	16		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.99	1.85	8.37		
Cab.size	25		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.13	2.42	5.02		
Cab.size	35		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.69	1.77	3.68		
Cab.size	50		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.93	1.31	2.71	8.95	2.24
Cab.size	70		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.47	0.92	1.91		
Cab.size	95		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.62	0.69	1.44		
Cab.size	120		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.13	0.56	1.17		
Cab.size	150		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.76	0.47	0.97		
Cab.size	185		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.52	0.40	0.84		
Cab.size	240		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.34	0.70		
Cab.size	300		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.16	0.31	0.64		
Cab.size	400		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.26	0.54		
Kilowatts			0	0	0	0	0	0	0	0	0	0	11.5	10	37.48		

Section No.	KVA drop Per Km.	Terminal Voltage		Terminal Amps.	
				Section	Load
1	2.20	V1	380.00	I1	71.27
2	0.23	V2	393.69	I2	89.62
3	0.79	V3	395.09	I3	110.65
4	0.00	V4	400.00	I4	110.65
5	0.00	V5	400.00	I5	110.65
6	0.00	V6	400.00	I6	110.65
7	0.00	V7	400.00	I7	110.65
8	0.00	V8	400.00	I8	110.65
9	0.00	V9	400.00	I9	110.65
10	0.00	V10	400.00	I10	110.65
11	0.00	V11	400.00	I11	110.65
12	0.00	V12	400.00	I12	110.65
13	0.00	V13	400.00	I13	110.65
14	0.00	V14	400.00	I14	110.65
15	0.00	V15	400.00	I15	110.65
		V16	400.00		
Total	3.22				

VOLTAGE DROP CALCULATION

Feeder C

Voltage Drop Calculation sheet for Underground LV Copper Cables.(BS 6346)

Distance															PH-A1	Volt drop	%
Sections			13	12	11	10	9	8	7	6	5	4	3	2	1	400 Volts	
Length (km)			0	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010		
Cab.size	16		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12		
Cab.size	25		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67		
Cab.size	35		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.49	0.12
Cab.size	50		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36		
Cab.size	70		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25		
Cab.size	95		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19		
Cab.size	120		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16		
Cab.size	150		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13		
Cab.size	185		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11		
Cab.size	240		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09		
Cab.size	300		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08		
Cab.size	400		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07		
Kilowatts			0	0	0	0	0	0	0	0	0	0	0	0	23.5		

Section No.	KVA drop Per Km.	Terminal Voltage		Terminal Amps.	
				Section	Load
1	0.29	V1	380.00	I1	44.68
2	0.00	V2	400.00	I2	44.68
3	0.00	V3	400.00	I3	44.68
4	0.00	V4	400.00	I4	44.68
5	0.00	V5	400.00	I5	44.68
6	0.00	V6	400.00	I6	44.68
7	0.00	V7	400.00	I7	44.68
8	0.00	V8	400.00	I8	44.68
9	0.00	V9	400.00	I9	44.68
10	0.00	V10	400.00	I10	44.68
11	0.00	V11	400.00	I11	44.68
12	0.00	V12	400.00	I12	44.68
13	0.00	V13	400.00	I13	44.68
14	0.00	V14	400.00	I14	44.68
15	0.00	V15	400.00	I15	44.68
		V16	400.00		
Total	0.29				

ANNEX 6:
DB Load Calculations

Feeder A

DB REF	DB-A1
MAIN INCOMING SWITCH RATING	100A TPN
SIZE OF INCOMING CABLE	1x 4C x 35sqmm XLPE/SWA/PVC

S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Micro algae mass culture	1	1	65.15	1.00	0.70	45.61	82	55
2	Micro stock Culture								
3	Zooplankton culture / enrichment								
4	Wetlab / aquarium								
5	Dry lab / store	1	1	13	1.00	0.70	9.10	16	
				78.15			55	99	

Feeder B

DB REF	DB-B1
MAIN INCOMING SWITCH RATING	80A TPN
SIZE OF INCOMING CABLE	1x 4C x 50sqmm XLPE/SWA/PVC

S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Staff Accomodation	14	1	14	1.00	0.70	9.80	18	47
2	Reception	2	1	2	1.00	0.70	1.40	3	
3	office	1.95	1	1.95	1.00	0.70	1.37	2	
4	Mess room	3.5	1	3.5	1.00	0.70	2.45	4	
5	Kitchen	6.35	1	6.35	1.00	0.70	4.45	8	
6	Class room	3.58	1	3.58	1.00	0.70	2.51	5	
7	Laundry	4.4	1	4.4	1.00	0.70	3.08	6	
8	Mosque	1.08	1	1.08	1.00	0.70	0.76	1	
9	Store	0.62	1	0.62	1.00	0.70	0.43	1	
				37.48			26	47	

DB REF	DB-B2
MAIN INCOMING SWITCH RATING	63A TPN
SIZE OF INCOMING CABLE	1x 4C x 50sqmm XLPE/SWA/PVC

S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Lavae nurse / incubation / packing	10	1	10	1.00	0.70	7.00	13	18
				10.00			7	13	

Feeder B

DB REF	DB-B3
MAIN INCOMING SWITCH RATING	63A TPN
SIZE OF INCOMING CABLE	1x 4C x 50sqmm XLPE/SWA/PVC

S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Quarantine Room	4	1	4	1.00	0.70	2.80	5	55
2	Pump station	6	1	6	1.00	0.70	4.20	8	
3	Brood stock maintenance	1.5	1	1.5	1.00	0.70	1.05	2	
				11.50			8	15	

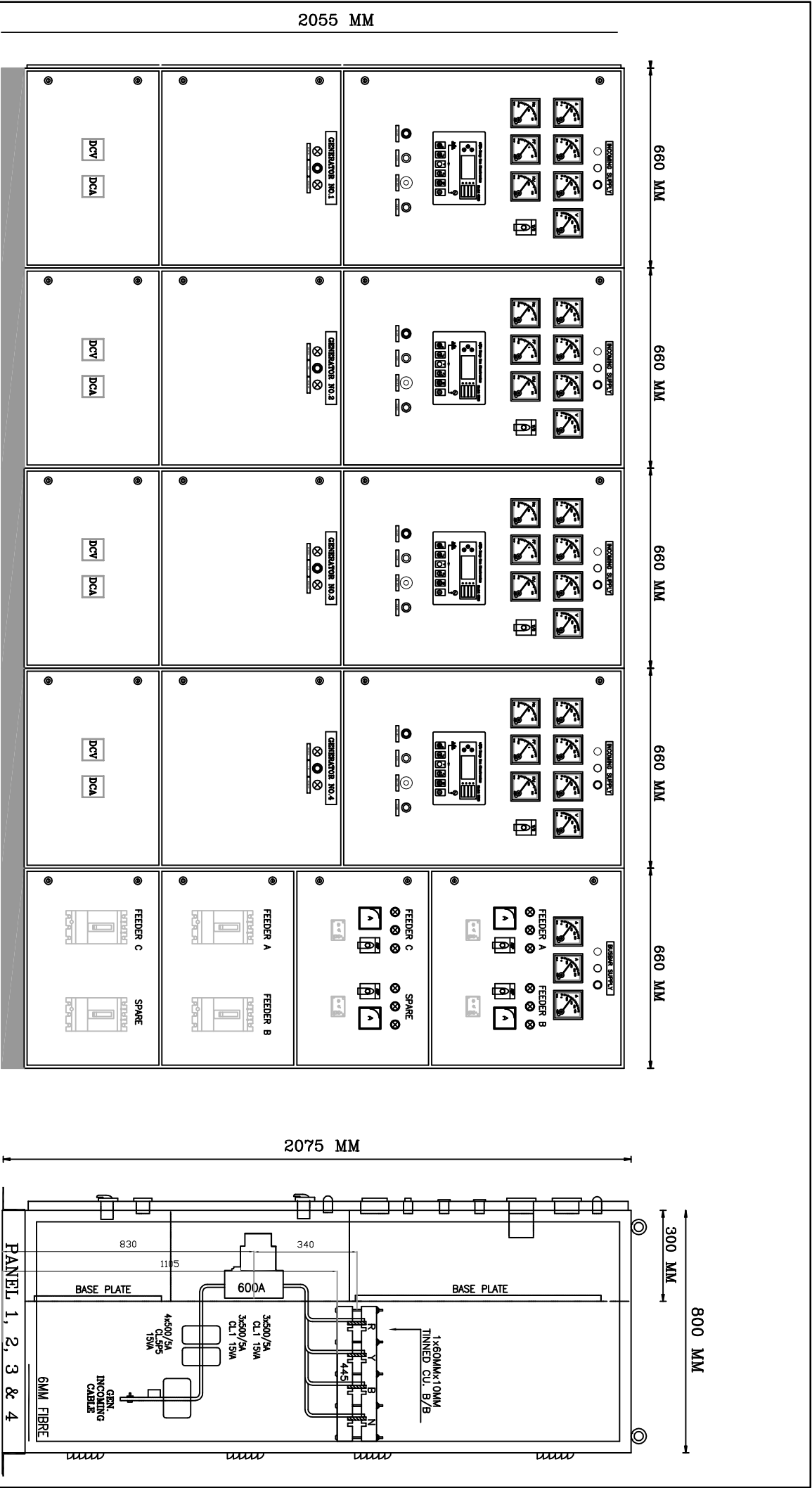
Feeder C

DB REF	DB-C1
MAIN INCOMING SWITCH RATING	63A TPN
SIZE OF INCOMING CABLE	1x 4C x 50sqmm XLPE/SWA/PVC

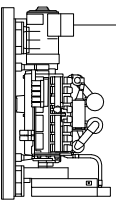
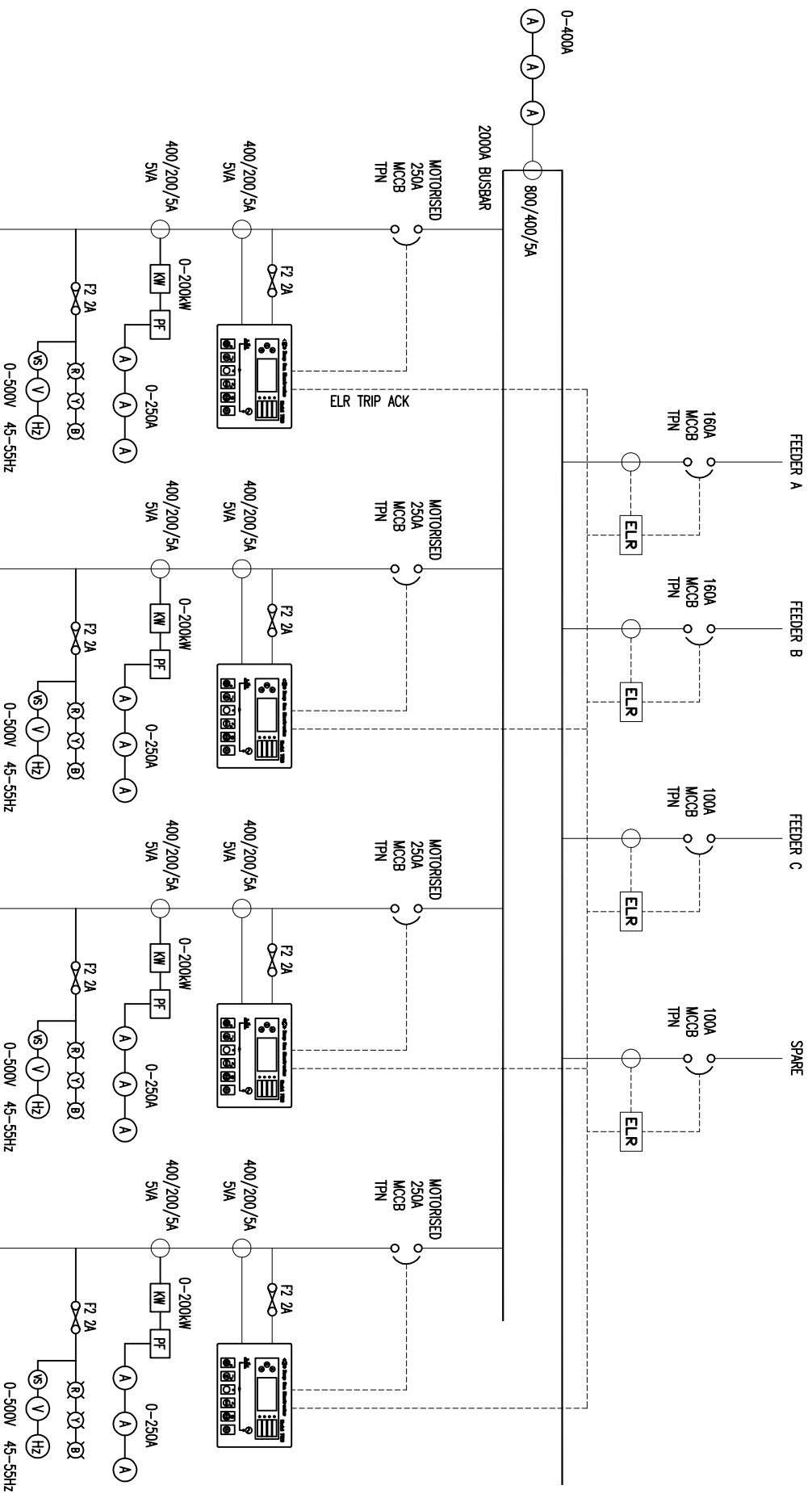
S/N	Item	Unit Load (kW)	Units	Total Con P(kW)	Demand Factor	Diversity Factor	Total Act P(kW)	Total Load (A)	MAIN CABLE LENGTH
1	Powerhouse	23.5	1	23.5	1.00	0.70	16.45	30	10
				23.50			16	30	

ANNEX 7:

Control Panel Details

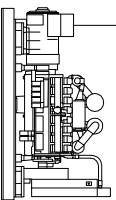


STATE ELECTRIC COMPANY LTD.		TITLE		PANEL FRONT VIEW	
Amnereen Magu, Male', Maldives.		PANEL SECTION VIEW		PANEL SECTION VIEW	
Phone : 332 0982		PROJECT		MANIYAFUSHI POWER SYSTEM	
Fax : 332 7036		Signature		MEB Licence No.	
E-mail : admin@stelco.com.mv		Signature		MEB/2004/385	
Drawn By		Rev		Scale:	
Checked By		Remarks		NA	
Added DB, added 2 generators		Rev Date		NA	
5/10/17		Drawing No		03/05/2016	
Date		Sht No		02 of 02	
		Next Sht		0	



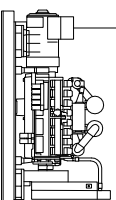
DEG 1

Cummins 200kV



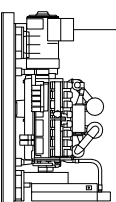
DEG 2

Cummins 100kV



DEG 3

Cummins 100kV



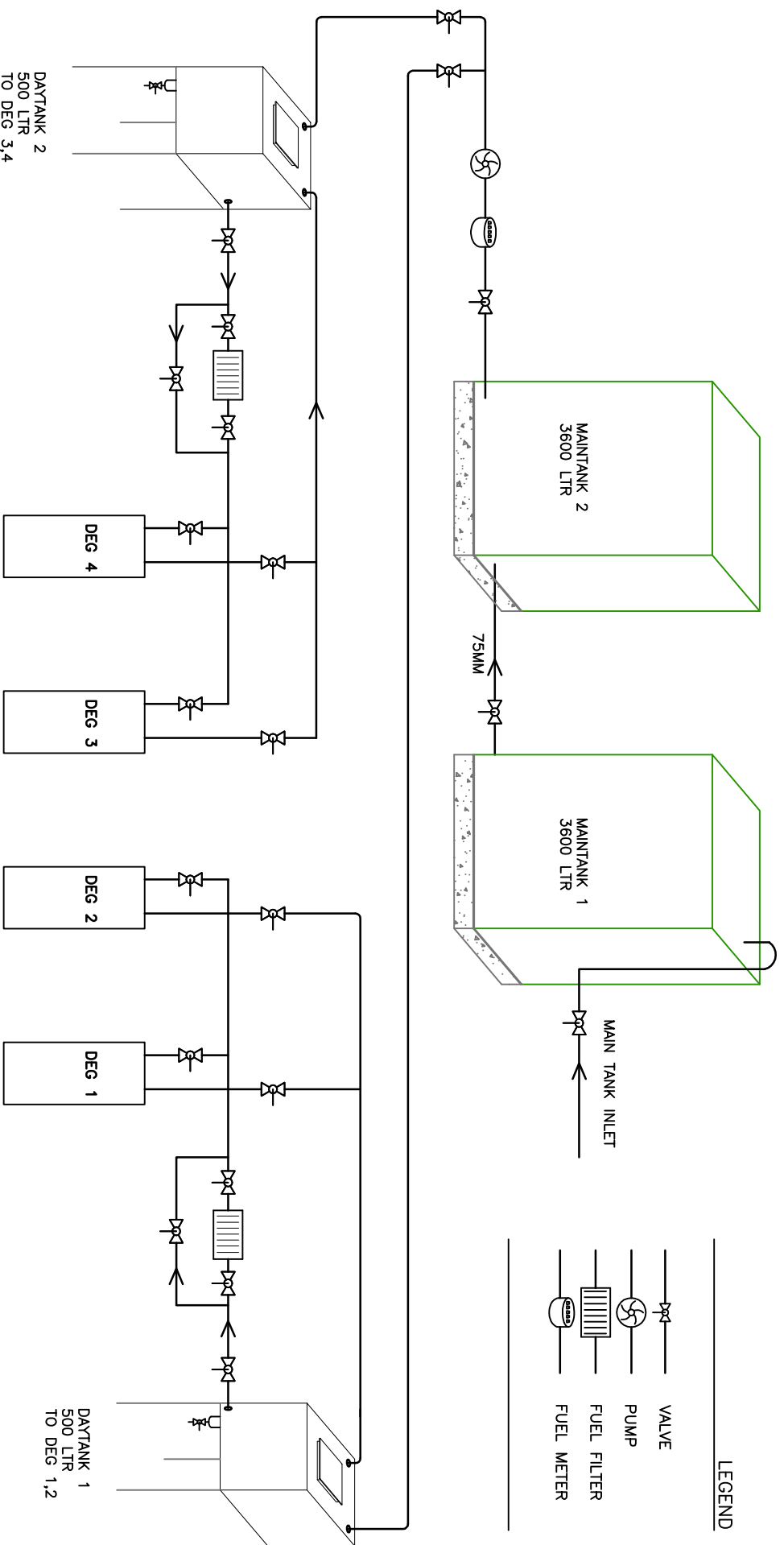
DEG 4


Cummins 100kV

STATE ELECTRIC COMPANY LTD.		TITLE	
Amnawee Magu, Male', Maldives.		PANEL SINGLE LINE DIAGRAM	
Phone : 332 0982		Drawn By	
Fax : 332 7036		Checked By	
E-mail : admin@stelco.com.mv		ME/Licence No.	
		PROJECT	
		MANNY AFUSHI POWER SYSTEM	
		Signature	
		Arifad Mohamed	
		Rev	
		added DB, added 2 generated	
		Rev Date	
		5/10/17	
		Scale:	
		Drawing No	
		NA	
		Date	
		03/05/2016	
		Sht No	
		01 of 02	
		Next Sht	
		2	

ANNEX 8:

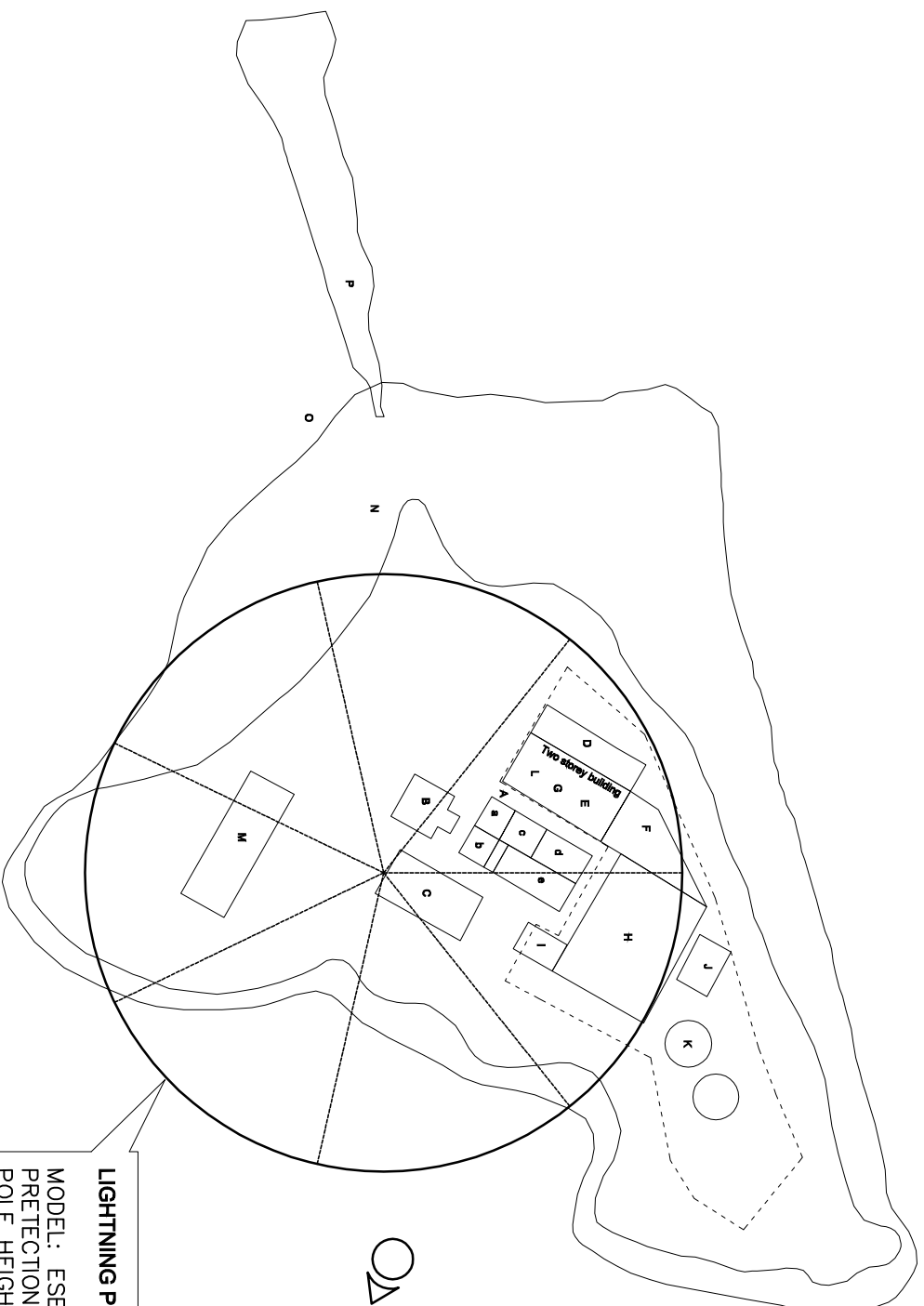
Fuel Tank and Fuel Lines



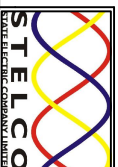
 <div>STATE ELECTRIC COMPANY LTD. Ammaeene Magu, Male', Maldives. Phone : 332 0982 Fax : 332 7036 E-mail : admin@stelco.com.mv</div>	TITLE		DRAWN BY		REV		SCALE:	
	FUEL SYSTEM SCHEMATIC DIAGRAM		Amjad Mohamed Checked By Ahmed Shaheer		01		NA	
	PROJECT		MECA Licence No. MTTL/97/0016				Date 03/05/2016	
	MANIYAFUSHI POWER SYSTEM		Signature				Shit No 01 of 01	
							Next Shit 0	

ANNEX 9:

Lightning Protection Layout



LIGHTNING PROTECTION LAYOUT

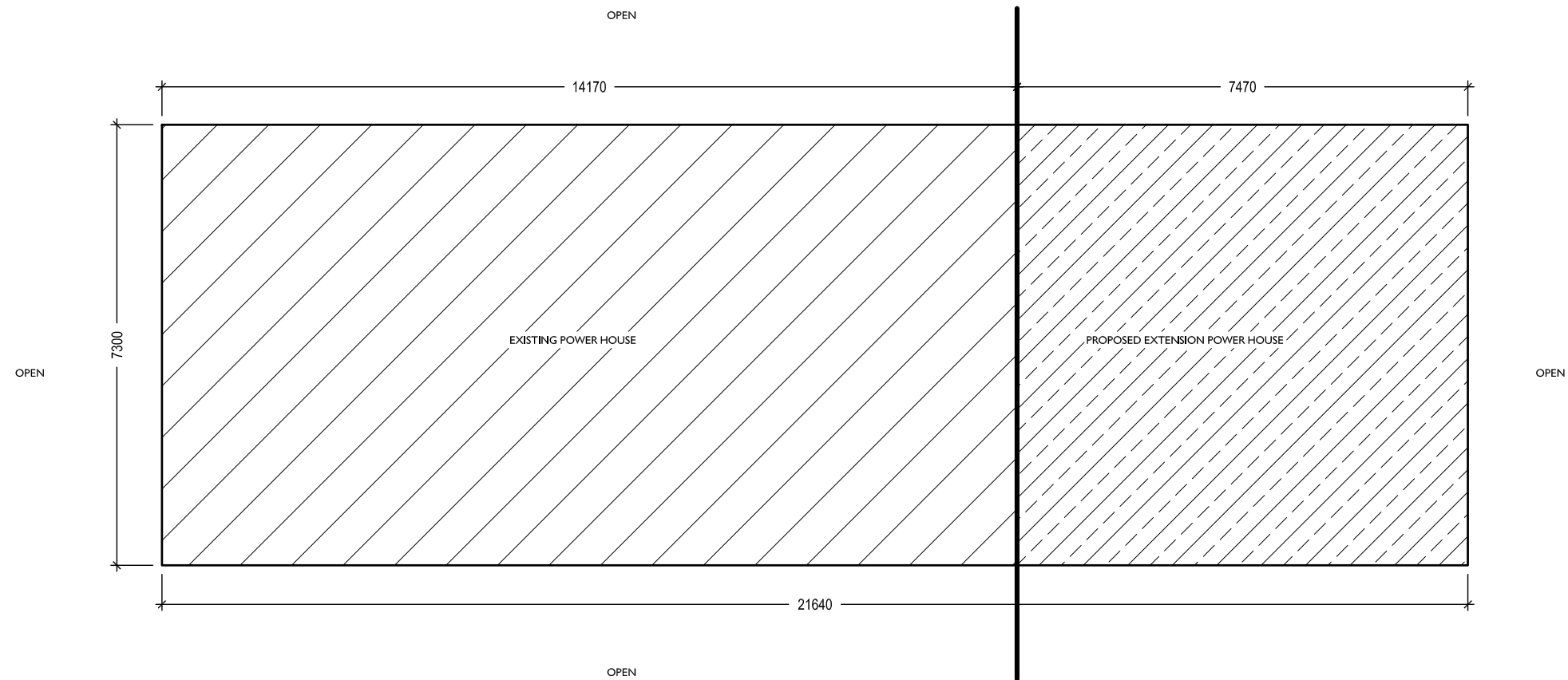


STATE ELECTRIC COMPANY LTD.
Amaerine Magu, Male', Maldives.
Phone : 332 0982
Fax : 332 7036
E-mail : admin@steico.com.mv

TITLE		PROJECT		Signature		Scale:	
LIGHTNING PROTECTION LAYOUT		MANIYAFUSHI POWER SYSTEM				1:1000	
Drawn By	Amyad Mohamed	Rev	00	Remarks	-	Drawing No	V/A
Checked By	Ahmed Sharfeu	MT/L/97/0016				Date	03/05/2016
ME A Licence No.						Sht No	01 of 01
							Next Sht 0

ANNEX 10:

Powerhouse Layouts



SITE PLAN 1:100

NOVEA ENGINEERING
PO Box 3013
Male
Maldives
m : +9609999413



CLIENT :
MINISTRY OF FISHERIES & AGRICULTURE

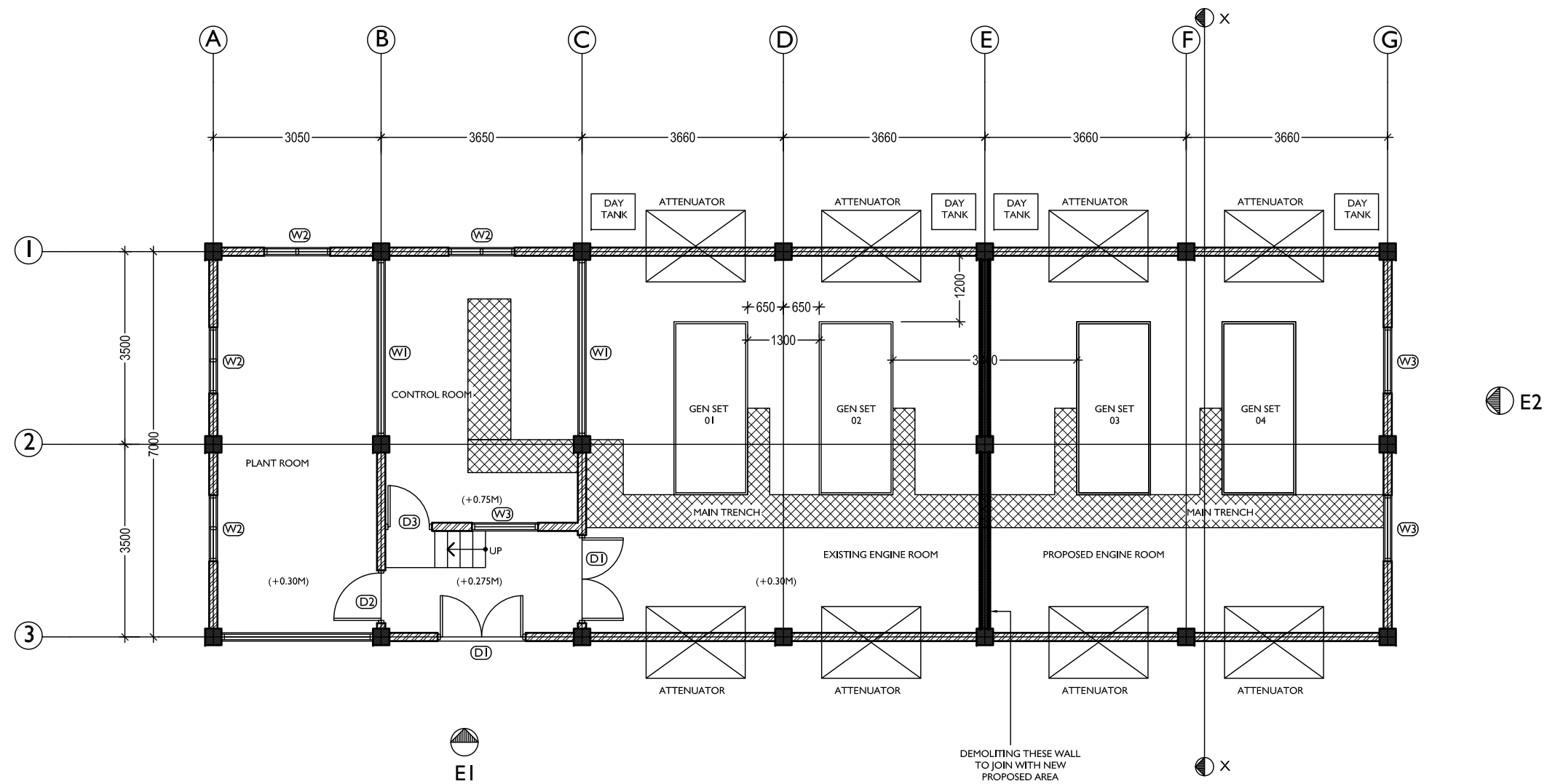
PROJECT :
**EXTENSION OF K. MANIYAFARU POWER
HOUSE**

	REVISIONS	
1		
2		

DRAWING TITLE:
01- SITE PLAN

SCALE : 1:100 DATE : 31 AUGUST 2017

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NOVEA ENGINEERING
 PO Box 3013
 Male
 Maldives
 m : +9609999413



CLIENT :
MINISTRY OF FISHERIES & AGRICULTURE

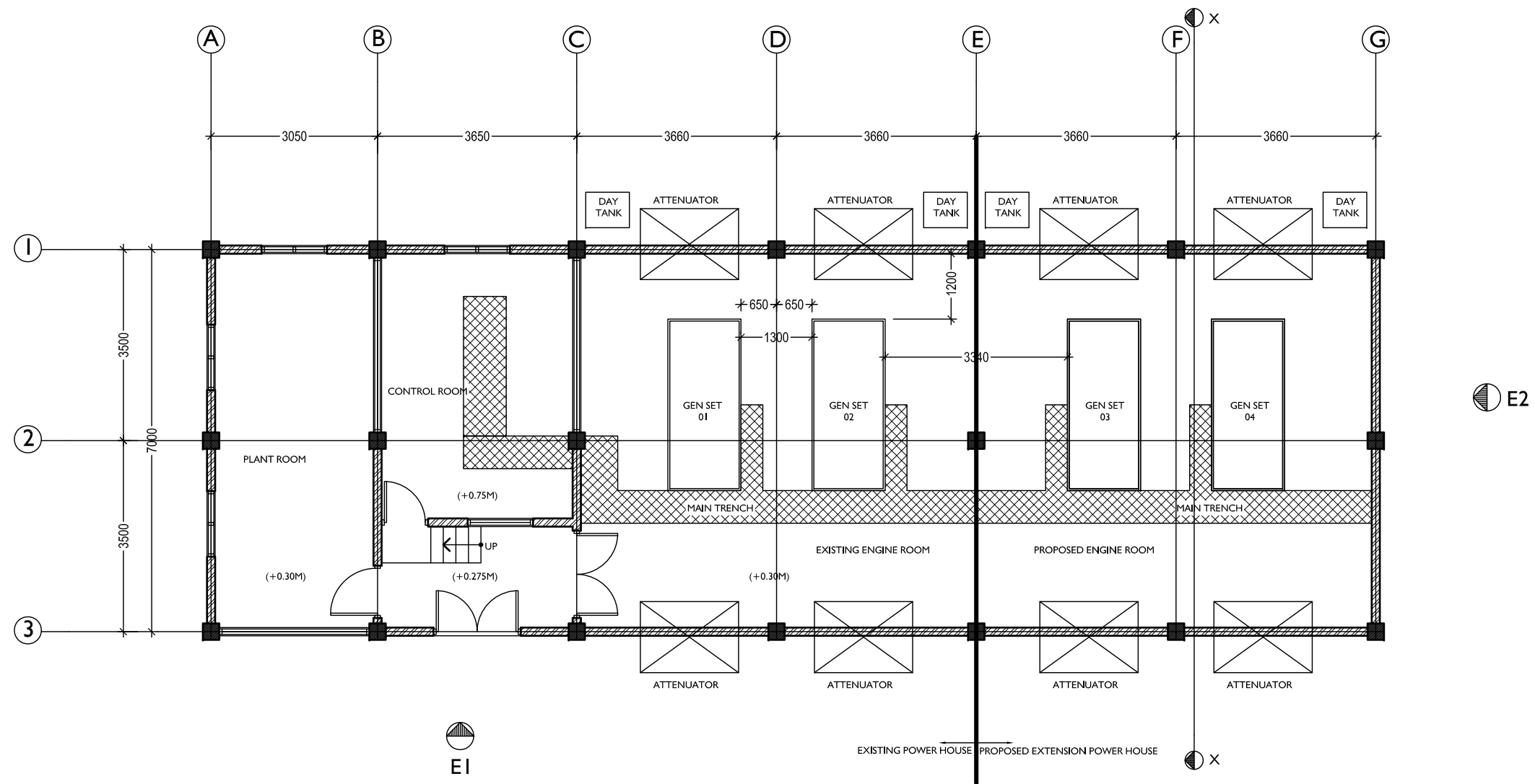
PROJECT :
EXTENSION OF K. MANIYAFARU POWER HOUSE

REVISIONS	
1	
2	

DRAWING TITLE:
02- DEMOLITION PLAN

SCALE : 1:100 DATE : 31 AUGUST 2017

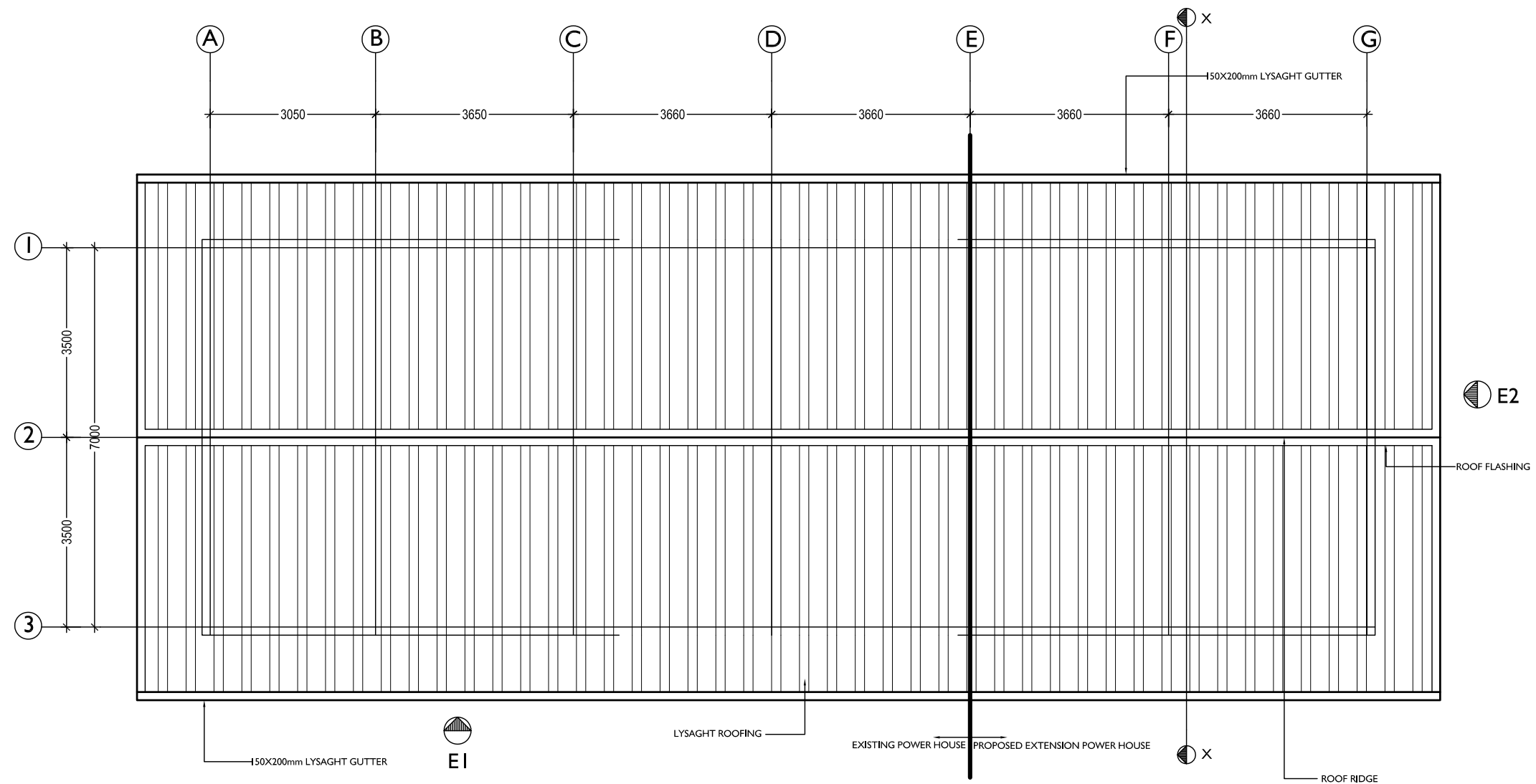
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GROUND FLOOR PLAN 1:100

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	 CLIENT : MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS		DRAWING TITLE:	
			1		03- GROUND FLOOR PLAN	
			2		SCALE : 1:100	DATE : 31 AUGUST 2017

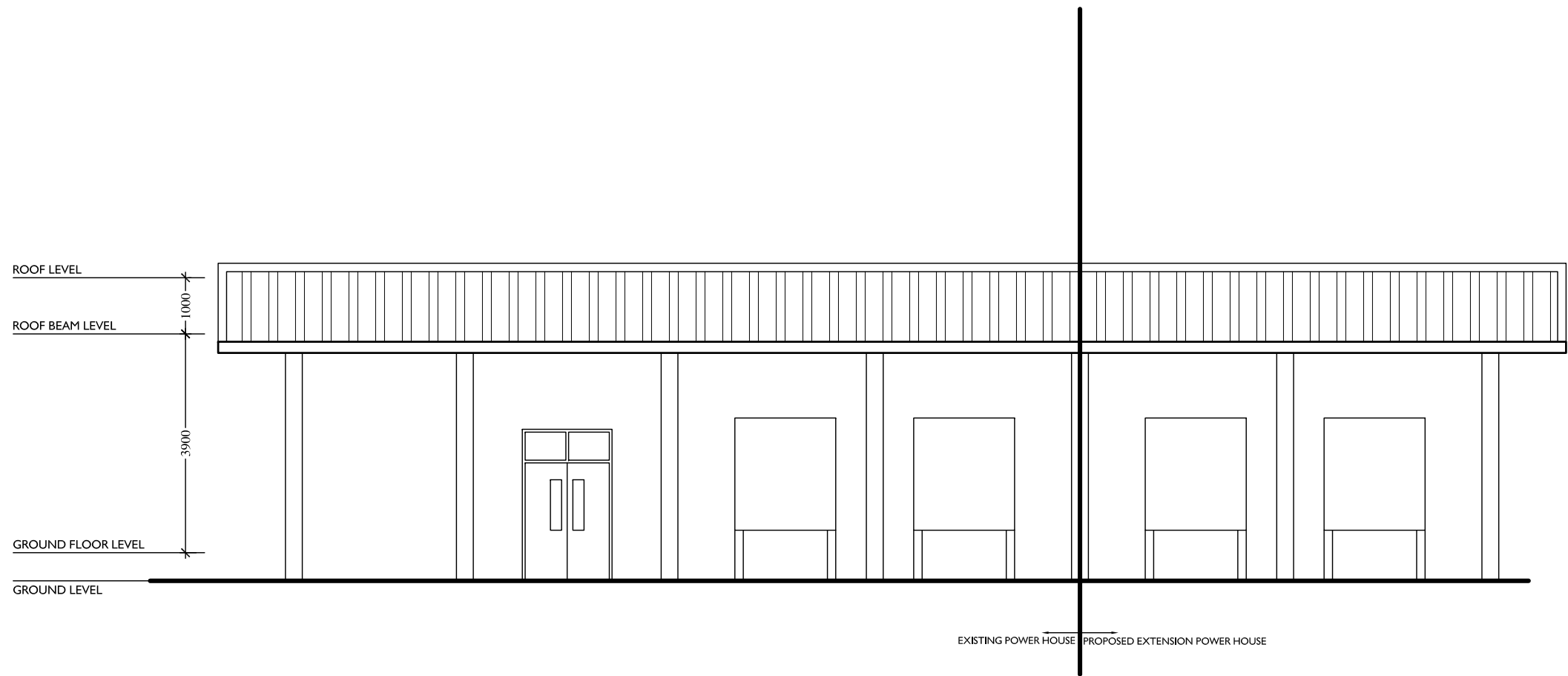
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ROOF PLAN 1:100

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	 CLIENT : MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS		DRAWING TITLE: 04 - ROOF PLAN	
			1		SCALE : 1:100	DATE : 31 AUGUST 2017
			2			

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FRONT ELEVATION (EI) 1:100

NOVEA ENGINEERING
PO Box 3013
Male
Maldives
m : +9609999413



CLIENT :
MINISTRY OF FISHERIES & AGRICULTURE

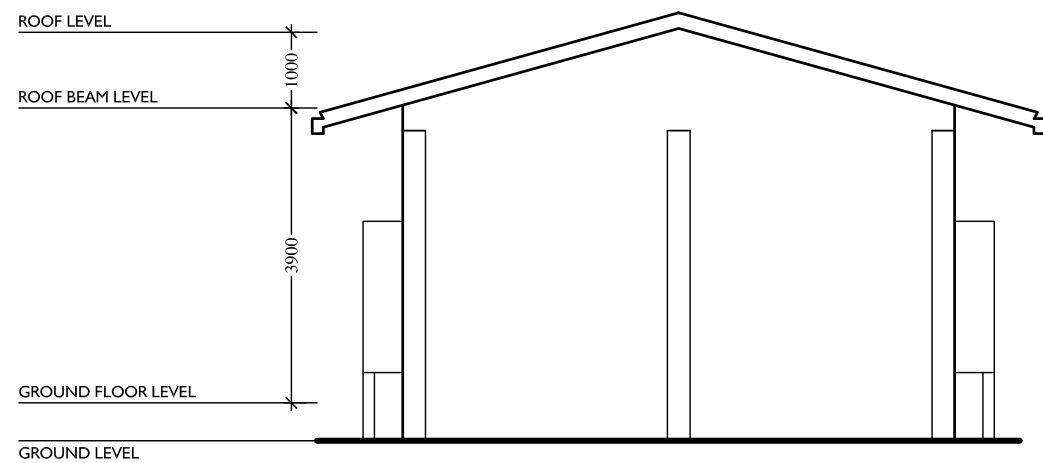
PROJECT :
**EXTENSION OF K. MANIYAFARU POWER
HOUSE**

	REVISIONS	
1		
2		

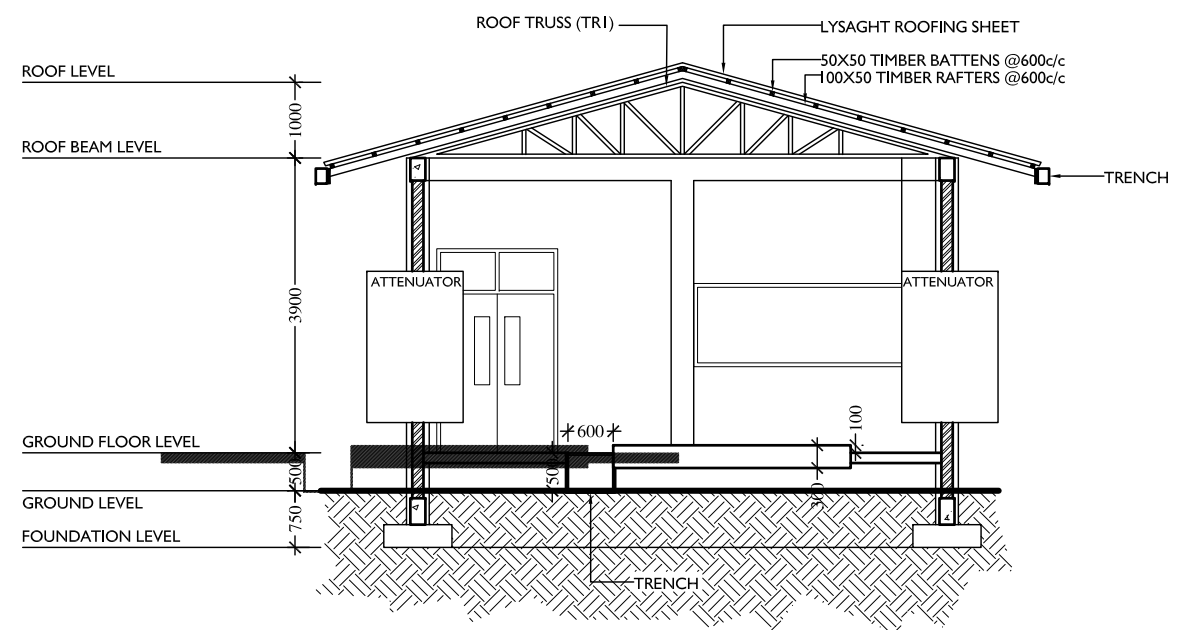
DRAWING TITLE:
05 - FRONT ELEVATION

SCALE : 1:100

DATE : 31 AUGUST 2017



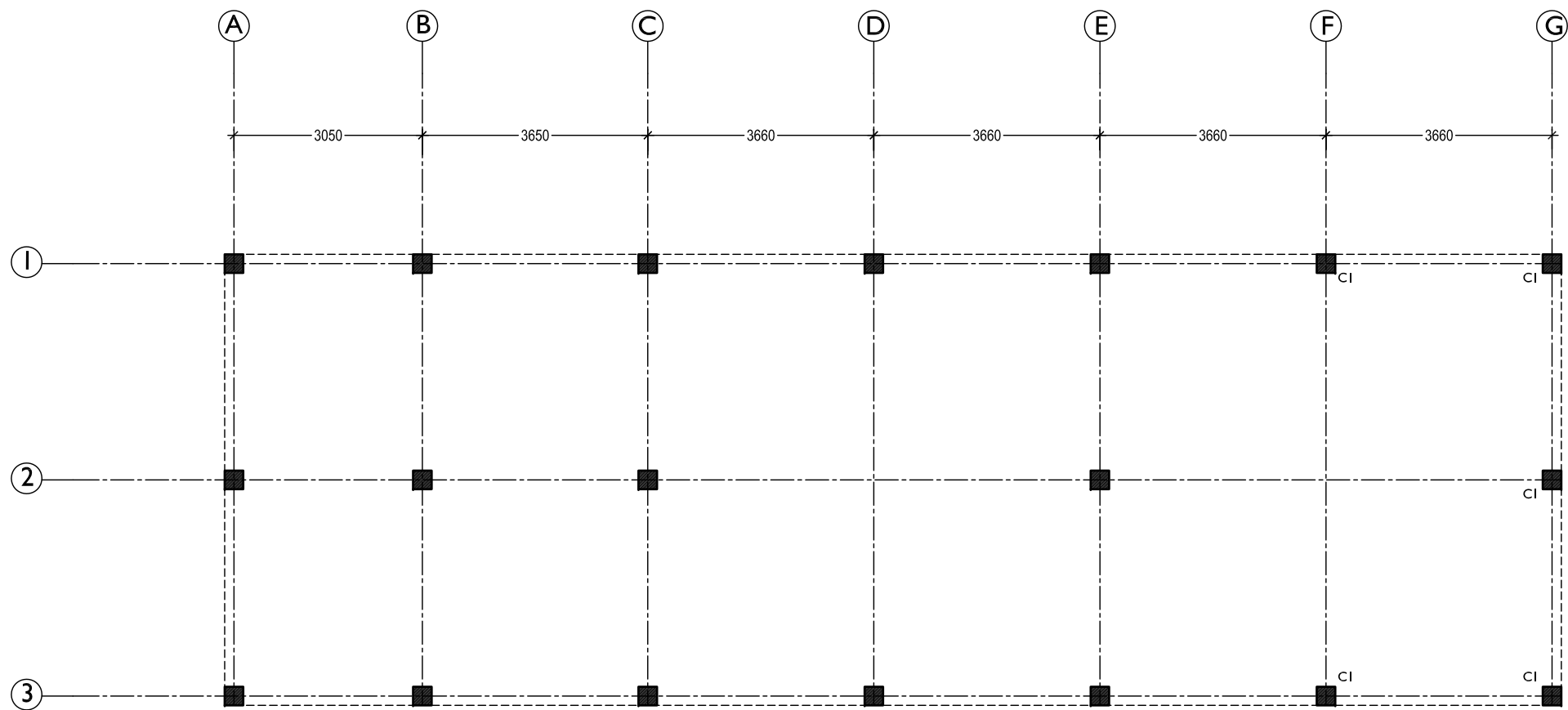
SIDE ELEVATION (E2) 1:100



SECTION X-X 1:100

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	 CLIENT : MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS		DRAWING TITLE: 06 - SIDE ELEVATION & SECTION	
			1		SCALE : 1:100	DATE : 31 AUGUST 2017
			2			

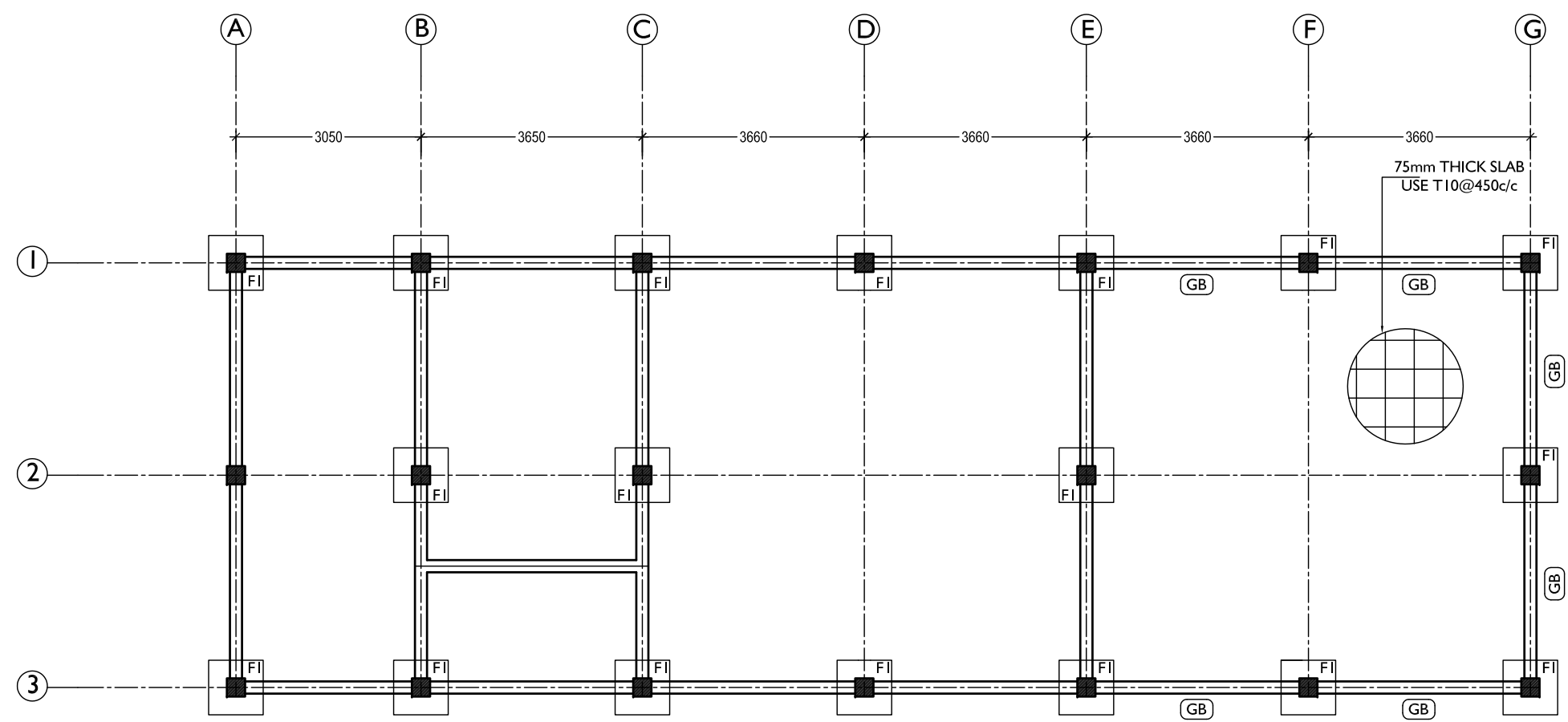
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COLUMN LOCATION PLAN 1:100


<div>NOVEA ENGINEERING</div> <div>PO Box 3013</div> <div>Male</div> <div>Maldives</div> <div>m : +9609999413</div>	<div>CLIENT :</div> <div></div> <div>MINISTRY OF FISHERIES & AGRICULTURE</div>	<div>PROJECT :</div> <div>EXTENSION OF K. MANIYAFARU POWER HOUSE</div>		REVISIONS		DRAWING TITLE:	
			1			07 - NEW COLUMN LOCATION PLAN	
			2			SCALE : 1:100	DATE : 31 AUGUST 2017

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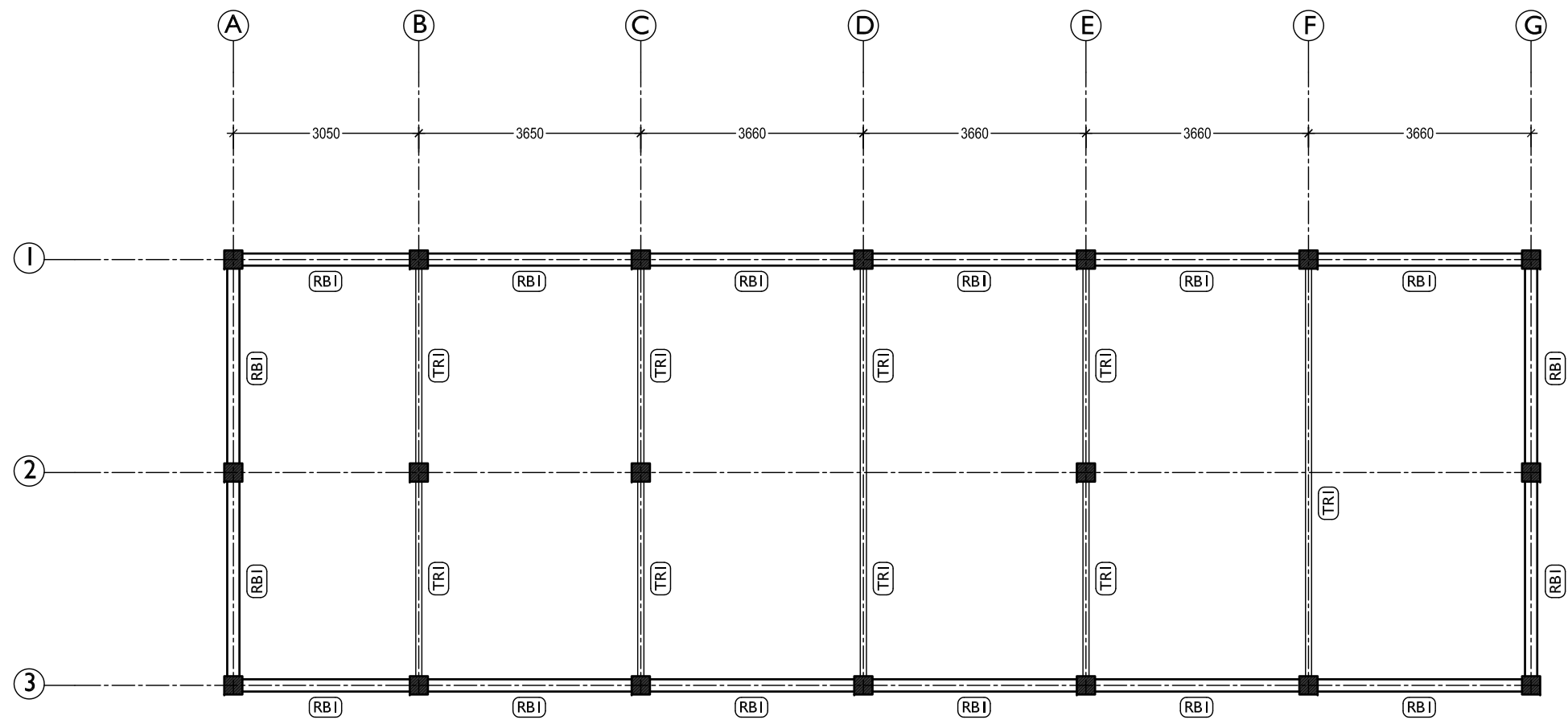


FOUNDATION PLAN 1:100

NOTE:-		
FOUNDATION DEPTH = 750mm		
FOOTING DETAIL		
#	SIZE	REINFORCEMENT
FI	900 X 900 X 300	T12@200c/c BW(B)

NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	 CLIENT : MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE	REVISIONS		DRAWING TITLE: 08 - FOUNDATION PLAN	
			1		SCALE : 1:100	DATE : 31 AUGUST 2017
			2			

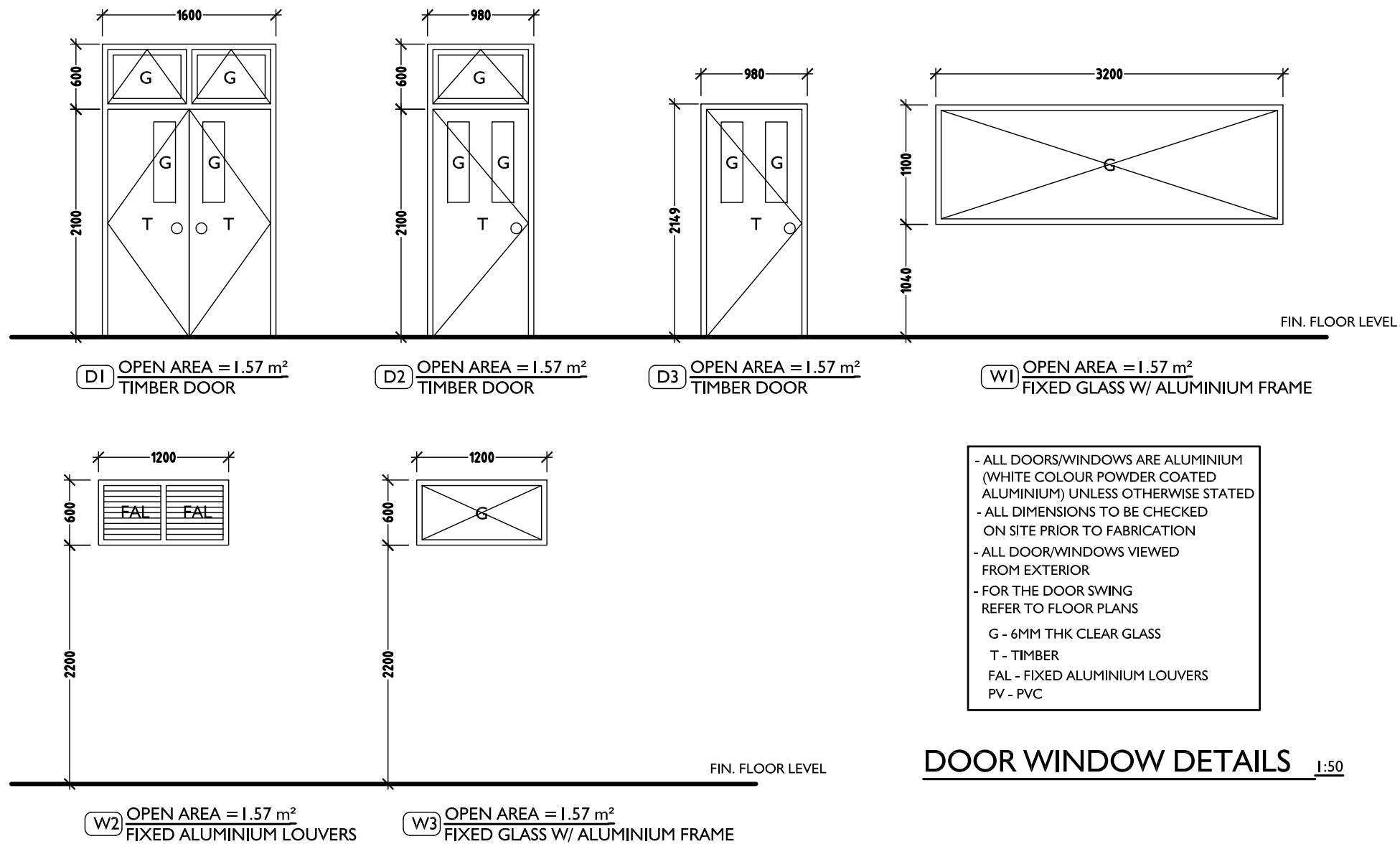
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ROOF BEAM/ TRUSS LAYOUT 1:100

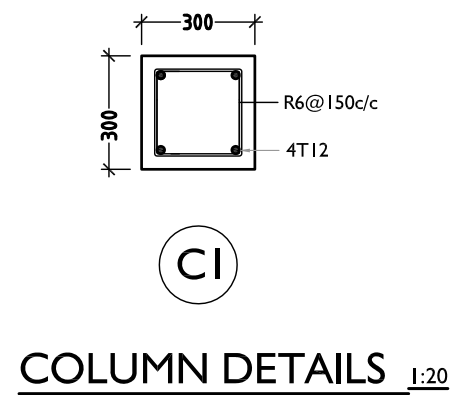
NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	 CLIENT : MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE		REVISIONS		DRAWING TITLE:	
			1			09 - ROOF BEAMS & TRUSS LAYOUT	
			2			SCALE : 1:100	DATE : 31 AUGUST 2017

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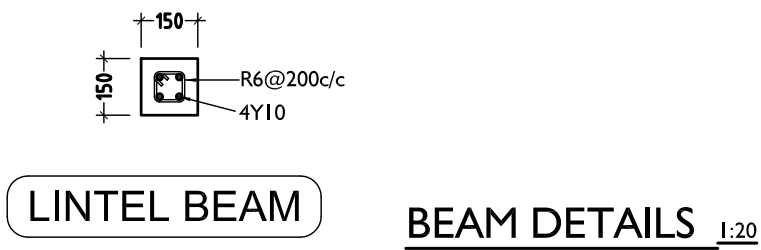
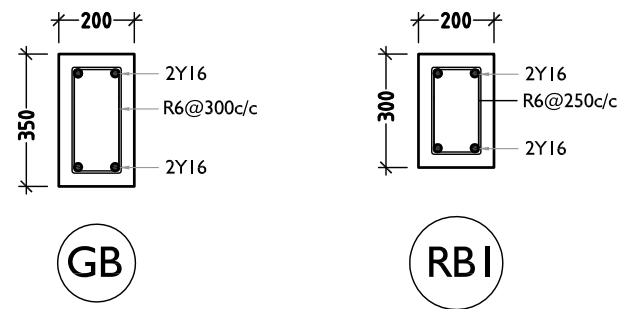



NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	 CLIENT : MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE		REVISIONS		DRAWING TITLE: 10 - DOORS & WINDOWS	
			1			SCALE : 1:100	DATE : 31 AUGUST 2017
			2				

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NOTES:	
MINIMUM COVER TO REINFORCEMENT:	
FOUNDATION	= 50MM
SLAB	= 25MM
BEAMS	= 35MM
COLUMNS	= 40MM
BEAMS BEND-UP BARS	= 12XDIA
ANCHOR BARS	= 55XDIA
LAPPING BARS	= 45XDIA
MID BARS	= 0.85 X SPAN
SUPPORT BARS	= 1/3 X SPAN



NOVEA ENGINEERING PO Box 3013 Male Maldives m : +9609999413	 CLIENT : MINISTRY OF FISHERIES & AGRICULTURE	PROJECT : EXTENSION OF K. MANIYAFARU POWER HOUSE		REVISIONS		DRAWING TITLE:	
			1			11 - STRUCTURAL DETAILS	
			2			SCALE : 1:20	DATE : 31 AUGUST 2017

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